

Annex II

Annex II: Models

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This annex provides information on the numerical models used in this assessment.

AII.1 Regional Climate Models (RCMs) Participating in CORDEX

The Coordinated Regional Climate Downscaling Experiment (CORDEX; Gutowski Jr. et al., 2016) coordinates regional downscaling activities worldwide over a number of defined domains. Regional downscaling is performed using regional climate models (RCMs) run over limited geographical regions, driven at the boundaries by the output from the Coupled Model Intercomparison Project (CMIP) global model simulations. CORDEX relies on the same infrastructure as CMIP to make the multi-model output publicly available in a standardized format: the data is disseminated via the Earth System Grid Federation (ESGF; Williams et al., 2016).

Table AII.1 lists the current CORDEX domains, displaying the different resolutions (from the lowest – 0.44°, to the highest – 0.11°, typically in rotated coordinates), with data available through the ESGF. Figure Atlas.6 provides a geographical map of the domains. Note that 0.44° and 0.22° are the prioritized resolution in the CORDEX and CORDEX-CORE experimental designs, respectively, and only some domains provide information for higher resolution (0.11°); see Atlas, Atlas.1.4.4 and <https://cordex.org> for further details. Table AII.1 also displays the number of simulations available for the following experiments: ‘evaluation’ (ERA-Interim driven simulations), and the ‘historical’, ‘RCP2.6’, ‘RCP4.5’ and ‘RCP8.5’ CMIP5-driven simulations

(Taylor et al., 2012). This table illustrates the heterogeneity of information available across the different domains which limits the assessment of some scenarios in some regions.

The RCMs contributing to CORDEX (as available from ESGF) are listed in Table AII.2, including the main references and details on model components relevant for the AR6 WGI assessment.

Finally, Tables AII.3 and AII.4 provide information on the CMIP5 and RCM models used in the different CORDEX domains, respectively (the numbers in each cell indicate the number of available simulations for each scenario). Note that CORDEX information is complex to describe since each particular simulation is produced by a single combination of a CMIP5 boundary forcing, or ‘driving model’ (or reanalysis for the evaluation experiment) and an RCM model from Table AII.2. These two tables together provide comprehensive information on the GCM/RCM composition of the ensembles available in each domain, which is key to understanding the assessment done in WGI chapters (in particular the regional Chapters 10, 11 and 12, and the Atlas).



Table AII.1 | CORDEX regional domains. Column 1: name of the domain. Column 2: domain code (as in ESGF specification). Column 3: horizontal grid resolutions (11, 22 and 44 for 0.11°, 0.22° and 0.44° resolution in the native projections, and the suffix ‘i’ indicating regular interpolated domains). Columns 4–8 indicate the number of simulations available at each resolution, for the evaluation, historical, RCP2.6, RCP4.5 and RCP8.5 experiments, respectively, as archived in the ESGF as of 31 January 2021. Note that MED-CORDEX data is stored on a dedicated server (details at www.medcordex.eu) and includes experiments with only atmosphere (the standard for other domains) and atmosphere–ocean coupled regional climate models (denoted by MED and OMED, respectively). See Atlas.1.4.4 for more details on CORDEX and CORDEX-CORE experiments.

CORDEX Domains	Code	Resolutions	Evaluation	Historical	RCP2.6	RCP4.5	RCP8.5
1: South America	SAM	20, 22, 44	1, 2, 5	3, 6, 14	0, 6, 6	3, 0, 12	3, 6, 13
2: Central America	CAM	22, 44	3, 2	9, 15	6, 5	0, 3	9, 14
3: North America	NAM	11, 22, 44	1, 5, 7	0, 17, 13	0, 3, 1	0, 5, 6	0, 17, 13
4: Africa	AFR	22, 44	4, 10	10, 33	9, 13	1, 22	10, 29
5: Europe	EUR	11, 22, 44	14, 2, 15	65, 3, 27	29, 3, 11	26, 0, 21	63, 3, 26
6: South Asia	WAS	22, 44, 44i	3, 3, 0	9, 18, 1	8, 7, 1	0, 18, 1	9, 18, 1
7: East Asia	EAS	22, 44	5, 3	6, 5	6, 0	0, 5	6, 5
8: Central Asia	CAS	22, 44	2, 2	4, 2	4, 0	1, 2	4, 2
9: Australasia	AUS	22, 44, 44i	2, 6, 1	6, 34, 24	6, 0, 0	0, 25, 17	6, 25, 17
10: Antarctica	ANT	22, 44	4, 0	12, 6	2, 0	8, 5	10, 5
11: Arctic	ARC	22, 44, 44i	2, 13, 2	1, 11, 0	0, 1, 0	1, 6, 0	1, 13, 1
12: Mediterranean	MED	11, 22, 44	6, 3, 20	2, 2, 13	1, 0, 1	2, 0, 7	1, 2, 12
	OMED	11, 22, 44	5, 4, 9	1, 1, 8	0, 0, 1	1, 0, 4	1, 1, 7
13: Middle East North Africa	MNA	22, 44	1, 2	2, 6	0, 1	0, 6	2, 6
14: South-East Asia	SEA	22	3	12	6	5	11

Table AII.2 | Regional climate models contributing to CORDEX experiments. Salient features of the regional climate models (RCMs) participating in CORDEX scenario experiments (CMIP5-driven). Column 1: sponsoring institution(s). Column 2: name of the model (and versions); subsequent columns for each of the model components with main references. Column 3: atmospheric component with number of vertical levels and main reference. Column 4: aerosols component (interactive or prescribed, with component details when interactive). Column 5: land component (number of levels and component name). Column 6: ocean component (prescribed or interactive, with model details when interactive). Column 7: additional components (lake, urban or river models) and comments on versions and/or different configurations of the same model.

Institution (Country)	Model	Atmosphere	Aerosols	Land	Ocean	Additional Components/Comments
		1) Number of Levels 2) Main References	1) Interactive or Prescribed 2) Component Name (When Interactive)	1) Number of Levels 2) Component Name	1) Interactive or Prescribed 2) Component Name 3) Details	Lake (LK), Urban (UR) or River (RI) Models, etc., Comments on the Different Versions
CNRM (France)	ALADIN52_v1 ALADIN53_v1	1) 31 2) Colin et al. (2010)	1) Prescribed; Szopa et al. (2013) dataset for evaluation and GCM forcing for scenario runs, 5 classes, 2D spatial pattern, vertical profile, seasonal cycle, temporal evolution	1) 3 2) ISBA (Noilhan and Mahfouf, 1996)	1) Prescribed SST (ice cover defined by a SST threshold)	LK: no UR: no ALADIN53_v1 is same as ALADIN52_v1 except for the radiation scheme (RRTM for the LW (Mlawer et al., 1997) and FMR-6 bands for the SW (Foucart and Bonnel, 1980; Morcrette et al., 2008)), for the turbulent air-sea fluxes (ECUME) and for the mixing length based on Lenderink's work
CNRM (France)	ALADIN63_v1 ALADIN63_v2	1) 91 2) Nabat et al. (2020)	1) Prescribed; TACTIC dataset for eval and GCM forcing for scen, 5 classes, 2D spatial pattern, vertical profile, seasonal cycle, temporal evolution	1) 14 2) SURFEX8-ISBA (Decharme et al., 2019) No land-use land cover change is taken into account	1) Prescribed SST (ice cover defined by a SST threshold)	LK: Flake (Le Moigne et al., 2016), pronostic lake ice UR: Urban areas are considered as rock (Daniel et al., 2019) ALADIN63_v1 and ALADIN63_v2 are identical. The v2 label is used to indicate that the runs driven by the CNRM-CM5 GCM use the corrected version of the CNRM-CM5 atmospheric LBCs contrary to ALADIN53_v1
RMIB-UGent (Belgium)	ALARO-0_v1	1) 46 2) Giot et al. (2016); Top et al. (2021)	1) Prescribed	1) 2 2) ISBA (Douville et al., 2000)	1) Prescribed SST	n.a.
CCCma (Canada)	CanRCM4_r2	1) 25 2) Scinocca et al. (2016)	1) Interactive 2) Described in main reference	1) 3 2) CLASS 2.7	1) Prescribed SST	Full atmospheric physics package identical to that used by parent global model, CanAM4, used by CanESM2 for CMIP5. Historical + RCP8.5 large ensemble (50 members) of 'NAM-44' available for large ensemble (50 members) of its parent model, CanESM2

Institution (Country)	Model	Atmosphere	Aerosols	Land	Ocean	Additional Components/Comments
		1) Number of Levels 2) Main References	1) Interactive or Prescribed 2) Component Name (When Interactive)	1) Number of Levels 2) Component Name	1) Interactive or Prescribed 2) Component Name 3) Details	Lake (LK), Urban (UR) or River (RI) Models, etc., Comments on the Different Versions
CSIRO (Australia)	CCAM_v1 CCAM-1704_v1	1) 27 2) Hoffmann et al. (2016)	1) Interactive 2) Sulphate, black carbon, organic aerosol, mineral dust and sea salt (Rotstayn and Lohmann, 2002; Rotstayn et al., 2011)	1) 6 2) CABLE (Kowalczyk et al., 2013)	1) Prescribed SST after bias and variance correction (CCAM_v1) or just bias correction (CCAM-1704_v1) No atmospheric nudging	UR: UCLEM (Lipson et al., 2018)
CSIRO (Australia)	CCAM-2008_v1	1) 35 2) Thatcher and McGregor (2009)	1) Interactive 2) Sulphate, black carbon, organic aerosol, mineral dust and sea salt (Rotstayn and Lohmann, 2002; Rotstayn et al., 2011)	1) 6 2) CABLE (Kowalczyk et al., 2013)	1) Prescribed SST	UR: UCLEM (Lipson et al., 2018)
CLM-Community: BTU, CMCC, DWD, ETH, GUF, HZG, JLU, KIT, WEGC ZAMG (Europe)	CCLM4-8-17-CLM3-5_v1	1) 35 2) Di Virgilio et al. (2019)	1) Prescribed	1) 9 2) CLM (Dickinson et al., 2006)	1) Prescribed SST	n.a.
CLM-Community (Europe)	CCLM4-8-17_v1	1) 35 2) Panitz et al. (2014)	1) Prescribed	1) 9 2) Soil-vegetation-atmosphere transfer TERRA-ML (Schrodin and Heise, 2002)	1) Prescribed SST	n.a.
CLM-Community (Europe)	CCLM5-0-2_v1	1) 45 2) Li et al. (2018)	1) Prescribed. Aerosol optical thickness: NASA/GISS (Global Aerosol Climatology Project)	1) 9 2) Multilayer soil model TERRA-ML (Schrodin and Heise, 2002)	1) Prescribed SST	Surface roughness: GLOBE (NOAA/NGDC); Global Land Cover 2000 Project (GLC2000)
CLM-Community: HZG and KIT (Germany)	CCLM5-0-15_v1	1) 57 2) n.a.	1) Prescribed	1) 9 2) TERRA-ML (Schrodin and Heise, 2002)	1) Prescribed SST	LK: Flake (Mironov et al., 2010)
CLM-Community: GUF (Germany)	CCLM5-0-9-NEMOMED12-3-6	1) 40 2) Akhtar et al. (2018)	1) Prescribed; AeroCom global AOD data is used for Aerosol representation (Kinne et al., 2006)	1) 9 2) TERRA-ML (Schrodin and Heise, 2002)	1) Interactive 2) NEMOMED12 ($1/12^\circ$ resolution) is the interactive ocean model component (Beuvier et al., 2012) 3) The CCLM and NEMOMED12 models are coupled via OASIS3-MCT (Valcke, 2013) with a 1-h coupling time	RI: TRIP (Total Runoff Integrating Pathways) is used as the interactive river component for rivers over the Mediterranean basin to feed runoff at the river mouths to the Mediterranean Sea (NEMOMED12)

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		1) Number of Levels 2) Main References	1) Interactive or Prescribed 2) Component Name (When Interactive)	1) Number of Levels 2) Component Name	1) Interactive or Prescribed 2) Component Name 3) Details	Lake (LK), Urban (UR) or River (RI) Models, etc., Comments on the Different Versions
CLM-Community: ETH (Switzerland)	COSMO-crCLIM-v1-1_v1	1) 40 (EUR-11), 57 (WAS-22) 2) Leutwyler et al. (2017)	1) Prescribed; AeroCom1 aerosol monthly climatology dataset (Kinne et al., 2006)	1) 9 2) TERRA-ML with a soil hydrology scheme (Schlemmer et al., 2018)	1) Prescribed SST	COSMO-crCLIM is similar to CCLM. Its main characteristics are that it runs on GPUs and includes the soil hydrology scheme of Schlemmer et al. (2018). Other adjustments include changing the upper level damping to only relax the vertical velocity instead of all dynamical fields (Klemp et al., 2008)
OURANOS (Canada)	CRCM5_v1	1) 56 (TOA 10 hPa) 2) Martynov et al. (2013); Šeparović et al. (2013)	1) Prescribed	1) 17 (to 15 m) 2) CLASS3.5c (Versegny et al., 1993)	1) Prescribed SST and sea ice fraction	LK: Flake
UQAM (Canada)	CRCM5_v1	1) 56 (TOA 10 hPa) 2) Martynov et al. (2013)	1) Prescribed; not varying in time; higher values at the equator, lower at the poles; higher values over land than over the ocean	1) 26 (to 60 m) 2) CLASS3.5+	1) Prescribed SST and sea ice fraction	LK: FLake
INPE (Brazil)	Eta_v1	1) 38 (TOA 25hPa) 2) Chou et al. (2014a, b)	1) Prescribed	1) 4 2) NOAH scheme (Ek et al., 2003), 12 Vegetation types and 9 soil types	1) Prescribed SST	No orography smoothing; no internal or lateral boundary relaxation nudging
DMI (Denmark)	HIRHAM5_v1 HIRHAM5_v2 HIRHAM5_v3	1) 31 2) Bøssing Christensen et al. (2007)	1) Prescribed	1) 5 2) ECHAM5	1) Prescribed SST and sea ice	The different versions v1, v2 and v3 are simulation versions due to necessary re-runs, not different model versions
MOHC (UK)	HadREM3-GA7-05_v1 HadREM3-GA7-05_v2	1) 63 2) Walters et al. (2019)	1) Prescribed. MACv2-SP dataset (Stevens et al., 2017), total aerosol properties, 9 bands. EasyAerosol (Voigt et al., 2014) RCP scenarios	1) 4 2) Walters et al. (2019)	1) Prescribed SST and sea ice from driving GCM/reanalysis	LK: no The 'v2' runs are using CNRM boundary conditions from pressure level 3d data. No differences in the RCM, only a different source of LBCs

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		1) Number of Levels 2) Main References	1) Interactive or Prescribed 2) Component Name (When Interactive)	1) Number of Levels 2) Component Name	1) Interactive or Prescribed 2) Component Name 3) Details	Lake (LK), Urban (UR) or River (RI) Models, etc., Comments on the Different Versions
LMD (France)	LMDZ4NEMOMED8_v1 LMDZ4NEMOMED8_v2	1) n.a. 2) L'Hévéder et al. (2013); Vadsaria et al. (2020)	1) Prescribed	1) 2 2) ORCHIDEE	1) Interactive 2) NEMOMED8 (Beuvier et al., 2010) 3) Interactive Mediterranean Sea only; 43 vertical levels with a 6-m thick first level; daily coupling frequency by the OASIS coupler (Valcke, 2013)	RI: Interactive river coupling in v2. No river coupling in v1
ULg (Belgium)	MAR311_v1	1) 24 2) Agosta et al. (2019); Kittel et al. (2021)	1) Prescribed, RCP scenarios	1) 7 2) SISVAT (De Ridder, 1997; De Ridder and Schayes, 1997; Gallée and Duynkerke, 1997; Gallée et al., 2001; Lefebvre, 2003)	1) Prescribed SST and SIC (evolution of the snow properties simulated by SISVAT)	SISVAT model: 30 snow/ice layers over the ice sheet and two sub-pixels (rocs and permanent ice-covered area)
UB Belgrade (Serbia)	EBU-POM2c_v1	1) 32 2) Djurdjevic and Rajkovic (2008, 2010); Kržižić et al. (2011)	1) Prescribed	1) 4 2) NOAA-LSM (Ek et al., 2003)	1) Interactive 2) POM – Princeton ocean model (30 km, L21, coupling frequency 6 min)	n.a.
ENEA (Italy)	PROTHEUS_v2	1) 18 2) Artale et al. (2010); Soto-Navarro et al. (2020)	1) No active aerosol chemical model	1) 2 2) BATS1e (Dickinson et al., 1993). Air–sea exchanges by Zeng et al. (1998) to improve excessive evaporation from warm ocean surfaces (Pal et al., 2007) in the original BATS package	1) Interactive 2) MITMED8 (1/8° resolution) is the interactive ocean model component (Sannino et al., 2009).	RI: Fully interactive (daily coupling) using the TRIP river routine model.
KNMI (Netherlands)	RACMO21P_v1 RACMO21P_v2	1) 40 2) van Meijgaard et al. (2008)	1) Prescribed (Tegen et al., 1997); 4 classes (land, maritime, dust and urban). Stratospheric and (optionally) volcanic	1) 4 2) Baseline LSM TESSEL (van den Hurk et al., 2000); land-ice tile added for ice-sheet modelling. Multilayer snow-ice-refreezing scheme (Ettema et al., 2010); snow albedo scheme (Kuipers Munneke et al., 2011); snow drift scheme (Lenaerts et al., 2012)	1) Prescribed SST and sea ice concentration; inferred from reanalysis or GCM	Model versions: simulations with RACMO21P_v2 are straight re-runs of RACMO21P_v1 employing the same model system and parameter settings. In ANT-44 simulations, v2 is only used with MOHC-HadGEM2-ES forcing to fix the remapping of SST to the RACMO grid in the v1-simulation

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		1) Number of Levels 2) Main References	1) Interactive or Prescribed 2) Component Name (When Interactive)	1) Number of Levels 2) Component Name	1) Interactive or Prescribed 2) Component Name 3) Details	Lake (LK), Urban (UR) or River (RI) Models, etc., Comments on the Different Versions
KNMI (Netherlands)	RACMO22E_v1 RACMO22E_v2	1) 40 2) van Meijgaard et al. (2012)	1) Prescribed; inferred from CAM inventory (except volcanic); historical and RCP pathways (Lamarque et al., 2010, 2011; van Vuuren et al., 2011); also used in evaluation. Sulphate, particulate organic matter black carbon, sea salt, desert dust stratospheric aerosols and volcanic aerosol. Spatial maps and vertical profiles per species. Monthly variations and decadal trends	1) 4 2) HTESEL (Balsamo et al., 2009)	1) Prescribed SST and sea ice concentration; inferred from reanalysis or GCM	Model versions: simulations with RACMO22E_v2 are straight re-runs of RACMO22E_v1 employing the same model system and parameter settings. Meaning of v2 depends on forcing GCM: i) MOHC-HadGEM2-ES: remapping of GCM-SST to RACMO grid erroneous in v1, corrected in v2 ii) CNRM-CERFACS-CNRM-CM5: atmospheric forcings derived from pressure-level fields, because of error in CNRM-CM5 model-level fields
KNMI (Netherlands)	RACMO22T_v1 RACMO22T_v2	1) 40 2) van Meijgaard et al. (2012)	1) Prescribed, as in RACMO22E	1) 4 2) HTESEL (Balsamo et al., 2009)	1) Prescribed SST and sea ice concentration; inferred from reanalysis of GCM	Model versions: simulations with RACMO22T_v2 are straight re-runs of RACMO22T_v1 employing the same model system and parameter settings. In AFR-44, v2 is only used with MOHC-HadGEM2-ES forcing to fix the remapping of SST to the RACMO grid in the v1-simulation
SMHI (Sweden)	RCA4_v1 RCA4_v1a RCA4_v2 RCA4_v3 RCA4-SN_v1	1) 40 2) Samuelsson et al. (2015); Strandberg et al. (2015)	1) Prescribed; single integrated class, parametrized aerosol effect on radiation fluxes, spatially uniform, static	1) 3 2) A tile-based scheme with physiography based on ECOCLIMAP (Samuelsson et al., 2015)	1) Prescribed SST and sea ice from daily driving GCMs/reanalysis	LK: Flake (pronostic lake ice; Mironov et al., 2010) Model versions: i) RCA4-v1a is simply a re-run because a restart file to start the scenario experiment was taken from another simulation. ii) RCA4-v2 and RCA4-v3 are slightly tuned versions of RCA4-v1 (some parameters) but parametrizations are the same. RCA-SN indicates spectral nudging

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		1) Number of Levels 2) Main References	1) Interactive or Prescribed 2) Component Name (When Interactive)	1) Number of Levels 2) Component Name	1) Interactive or Prescribed 2) Component Name 3) Details	Lake (LK), Urban (UR) or River (RI) Models, etc., Comments on the Different Versions
CNRM (France)	RCSM4_v1	1) 31 2) Sevault et al. (2014)	1) Prescribed (Szopa et al., 2013) dataset for evaluation and GCM forcing for scen runs, 5 classes, 2D spatial pattern, vertical profile, seasonal cycle and temporal evolution	1) 3 2) ISBA (Noilhan and Mahfouf, 1996)	1) Interactive 2) NEMOMED8 (Beuier et al., 2010) 3) Mediterranean Sea only; 43 vertical levels with a 6-m thick first level; daily coupling frequency by the OASIS coupler (Valcke, 2013)	1) Interactive rivers connecting the atmosphere to the ocean 2) TRIP (Oki and Sud, 1998; Decharme et al., 2010) 3) 50-km spatial resolution
GERICS and MPI-CSC (Germany)	REMO2009_v1 REMO2015_v1 REMO2015_v2	1) 27 2) Jacob and Podzun, (1997); Jacob (2001)	1) Prescribed (Tanré et al., 1984)	1) 5 2) A tile-based scheme including annual cycle of albedo (Rechid et al., 2009)	1) Prescribed SST and SIC	REMO2009_v1 and REMO2015_v1 and V2 are essentially the same, just with some technical changes
GERICS-AWI (Germany)	ROM ROM_v1	1) 27 2) Sein et al. (2015)	See above	See above	1) Interactive 2) SST, SIC and SIT are calculated in ocean model MPIOM	1) Interactive rivers connecting the atmosphere to the ocean 2) Hydrological Discharge (HD) model 3) 50-km spatial resolution
MGO (Russia)	RRCM_v1	1) 25 2) Shkolnik and Efimov (2013)	1) Prescribed	1) 4 2) MGO-2	1) Prescribed SST	n.a.
ITU (Turkey)	RegCM4-BATS_v1	1) 18 2) Ruti et al. (2016); Turuncoglu (2019)	1) No active aerosol chemical model	1) 2 2) BATS1e	1) Prescribed; surface layer (Zeng et al., 1998)	In MED-11, Wave Model (WAM) Cycle-4 (4.5.3-MPI) coupled with atmospheric model
ITU (Turkey)	RegESM	1) 18 2) Ruti et al. (2016); Turuncoglu (2019)	See above	See above	1) Interactive 2) ROMS-revision 809; (Haidvogel et al., 2008)	In MED-11, Wave Model (WAM) Cycle-4 (4.5.3-MPI) coupled with atmospheric model
ICTP (Italy) RU-CORE (Thailand)	RegCM4-3_v4	1) 18 2) Giorgi et al. (2012)	1) No active aerosol chemical model	1) 2 2) BATS1e (SAM-44: 1) 10 2) CLM3.5)	1) Prescribed; surface layer (Zeng et al., 1998)	n.a.
ICTP (Italy) BOUN (Turkey)	RegCM4-3_v5	1) 18 2) Ozturk et al. (2017, 2018)	1) No active aerosol chemical model	1) 1 2) BATS1e	1) Prescribed; surface layer (Zeng et al., 1998)	n.a.
ICTP (Italy)	RegCM4-4_v0	1) 18 2) Giorgi et al. (2012)	1) No active aerosol chemical model	1) 2 2) BATS1e	1) Prescribed; surface layer (Zeng et al., 1998)	n.a.

Institution (Country)	Model	Atmosphere	Aerosols	Land	Ocean	Additional Components/Comments
		1) Number of Levels 2) Main References	1) Interactive or Prescribed 2) Component Name (When Interactive)	1) Number of Levels 2) Component Name	1) Interactive or Prescribed 2) Component Name 3) Details	Lake (LK), Urban (UR) or River (RI) Models, etc., Comments on the Different Versions
ICTP (Italy) IITM (India)	RegCM4-4_v5	1) 18 2) Giorgi et al. (2012); Sanjay et al. (2017, 2020)	1) No active aerosol chemical model	1) 10 2) CLM4.5	1) Prescribed; surface layer (Zeng et al., 1998)	UR: CLM4.5
ICTP (Italy)	RegCM4-6_v1	1) 23 2) Giorgi et al. (2012)	1) No active aerosol chemical model	1) 10 2) CLM4.5	1) Prescribed; surface layer (Zeng et al., 1998)	UR: CLM4.5
ICTP (Italy) ORNL (USA)	RegCM4-7_v0	1) 23 2) Giorgi et al. (2012)	1) No active aerosol chemical model	1) 10 2) CLM4.5	1) Prescribed; surface layer (Zeng et al., 1998)	UR: CLM4.5
ICTP (Italy) ISU (USA)	RegCM4_v4-4-rc8	1) 18 2) Giorgi and Anyah (2012); Mearns et al. (2017); Bukovsky and Mearns (2020)	n.a.	1) 3 soil layers 2) BATS	1) Prescribed SST; no sea ice prescribed, atmospheric skin temperature instead	LK: Hostetler et al. (1994)
UB (Serbia)	EBU	1) 32 2) n.a.	Same as EBU-POM2c_v1	Same as EBU-POM2c_v1	1) Prescribed SST	n.a.
UCAN (Spain)	WRF341I_v2	1) 30 2) Skamarock et al. (2008)	1) Prescribed uniform background with vertical profile. Constant in time	1) 4 2) Noah (Chen and Dudhia, 2001)	1) Prescribed SST and sea ice	WRF v3.4.1. 'I' stands for the coordinated physics configuration used within CORDEX. 'v2' refers to the variable GHG input and no leap calendar in scenario (CanESM2) simulations. Otherwise, fully comparable to v1 in ERA-Interim (fixed GHG, standard cal.)
CYI (Cyprus)	WRF351_v1	1) 30 2) Zittis et al. (2014); Zittis and Hadjinicolaou (2017)	1) Prescribed	1) 4 2) Noah (Chen and Dudhia, 2001)	1) Prescribed SST	n.a.
UNSW (Australia)	WRF360J_v1 WRF360K_v1	1) 30 2) Powers et al. (2017); Evans et al. (2021)	1) Prescribed	1) 4 2) Noah (Chen and Dudhia, 2001)	1) Prescribed SST (ice with SST threshold)	n.a.
UNSW (Australia)	WRF360L_v1	1) 30 2) Powers et al. (2017); Di Virgilio et al. (2019)	1) Prescribed	1) 4 2) Noah (Chen and Dudhia, 2001)	1) Prescribed SST (ice with SST threshold)	n.a.
UHOH (Germany)	WRF361H_v1	1) 50 2) Skamarock et al. (2008)	1) Prescribed uniform background with vertical profile. Constant in time	1) 4 2) NOAA (Chen and Dudhia, 2001)	1) Prescribed SST (ice with SST threshold)	n.a.

Institution (Country)	Model	Atmosphere	Aerosols	Land	Ocean	Additional Components/Comments
		1) Number of Levels 2) Main References	1) Interactive or Prescribed 2) Component Name (When Interactive)	1) Number of Levels 2) Component Name	1) Interactive or Prescribed 2) Component Name 3) Details	Lake (LK), Urban (UR) or River (RI) Models, etc., Comments on the Different Versions
CRC (France)	WRF381_v1	1) 50 2) DOIs: 10.25666/dataosu-2021-03-05-02 ; 10.25666/dataosu-2021-03-05	1) Prescribed (Tegen et al., 1997)	1) 4 2) Noah_mp (Niu et al., 2011) Modis land categories	1) Prescribed SST (ice with SST threshold) from global model	Allow sub-grid cloud fraction interaction with radiation (Alapaty et al., 2012). The forcing variables have been bias corrected using ERA-Interim fields for 1981–2005, as in Bruyère et al. (2014)
IPSL (France)	WRF381P_v1 WRF381P_v2	1) 31 2) Skamarock et al. (2008)	1) Prescribed aerosols	1) 4	1) Prescribed SST and sea ice (from global model)	n.a.
NCAR and UA (USA)	WRF_v3-5-1	1) 28 2) Skamarock et al. (2008); Mearns et al. (2017); Bukovsky and Mearns, (2020)	1) Prescribed	1) 4 soil levels 2) Noah	1) Prescribed SST, prescribed sea ice for GFDL and MPI-driven simulations, sea ice with an SST threshold for HadGEM-driven simulation	WRF v3.5.1 Spectral nudging used

Table AII.3 | CMIP5 models used for downscaling in the different CORDEX domains. Climate models participating in CMIP5 (rows) used as boundary conditions for the CORDEX regional simulations in the different domains (columns). Each cell indicates the number of simulations available for the historical, RCP2.6, RCP4.5 and RCP8.5 experiments (see the colour legend). Salient features of these models are described in IPCC AR5 Appendix 9.A (model names are taken from Table 9.A.1). Further details on these simulations (e.g., particular GCM-RCM combinations in each cell) are given in the November 2020 list of simulations available in the CORDEX website: <https://cordex.org>.^a For the Mediterranean domain, only the coupled atmosphere–ocean simulations are listed. See Table AII.1 for the codes of CORDEX domains.

GCM/Domain	Historical				RCP2.6				RCP4.5				RCP8.5																																							
	SAM	CAM	NAM	AFR	EUR-11	WAS	EAS	CAS	AUS	ANT	ARC	MED ^a	MNA	SEA																																						
CanESM2_r1i1p1	3	3	3	3	3	6	5	6	4	4	3				2	2	2				3	3	3	1	1	1	4	3	4																							
CNRM-CM5_r1i1p1					2		2	1	1	1	2	2	2	10	5	6	9	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	3	1	2	2	1	1	1	1	1									
ACCESS1-0_r1i1p1																																		9	5	5	1	1	1	1												
ACCESS1-3_r1i1p1																																		6	2	2	1	1	1	1												
CSIRO-Mk3-6-0_r1i1p1	1	1	1	1						1	1	1						2	2	2																																
EC-EARTH_r12i1p1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	3	3	3	8	5	4	8	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2									
EC-EARTH_r1i1p1										2	1	2	4	1	4																1	1	1	1	1	1	1	1	1	1	1	1	1									
EC-EARTH_r3i1p1					1	1	1	2	1	2	4	1	1	4																	1	1	1	1	1	1	1	1	1	1	1	1	1									
PSL-CM5A-LR_r1i1p1										1	1	1	1	1																																						
IPSL-CM5A-MR_r1i1p1	1	1	1	1						1	1	1	5	2	5	1	1	1																																		
MIROC5_r1i1p1	2	1	2	2	1	1	1			2	2	1	2	2																			2	2	2	1	1	1	1													
HadGEM2-CC_r1i1p1																																		1	1	1																
HadGEM2-ES_r1i1p1	5	3	3	5	4	3	1	4	5	1	5	8	6	3	8	9	6	5	9	2	2	1	2	3	2	1	3	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1								
HadGEM2-ES_r2i1p1					1					1																																										
MPI-ESM-LR_r1i1p1	3	3	2	3	2	2	1	2	8	1	2	8	6	4	4	5	9	4	3	10	5	5	3	5	2	1	1	2	1	1	1	1	4	2	2	4																
MPI-ESM-LR_r2i1p1										1			1	3	1	1	3																																			
MPI-ESM-LR_r3i1p1										1			1	3		3																																				
MPI-ESM-MR_r1i1p1	2	1	2	2	2	1	2	2	2	2	1	2	2	2	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1																							
MPI-ESM-MR_r2i1p1					1																																															
CCSM4_r1i1p1																																		1	1	1																
CCSM4_r6i1p1																																																				
NorESM1-M_r1i1p1	3	3	1	3	2	2	2	1	1	1	4	4	1	4	8	3	3	8	4	4	1	4	2	2	2	1	1	1	1	5	2	3	5	2	1	2	1	1	1	1	1	1	1									
GFDL-CM3_r1i1p1																																		1	1	1																
GFDL-ESM2G_r1i1p1										1	1						1	1																																		
GFDL-ESM2M_r1i1p1	2	1	1	3	1	3	5	1	5	1	1	1																		2	2	2	1	1	1																	

Table AII.4 | Regional models used for downscaling in the different CORDEX domains. Regional simulations contributed by the different models participating in CORDEX (rows, grouped by model families, see Table AII.2) in the different domains (columns). Each cell indicates the number of simulations available for the historical, RCP2.6, RCP4.5 and RCP8.5 experiments (see the colour legend). Further details on these simulations (e.g., particular GCM-RCM combinations in each cell) are given in the November 2020 list of simulations available in the CORDEX website: <https://cordex.org>.^a For the Mediterranean domain, only the coupled atmosphere–ocean simulations are listed. See Table AII.1 for the codes of CORDEX domains.

RCM/Domain	SAM	CAM	NAM	AFR	EUR-11	WAS	EAS	CAS	AUS	ANT	ARC	MED ^a	MNA	SEA
ALADIN63					5 2 2 5									
ALARO					1 1 1 1			1 1 1 1						
CCAM									18 17 17 6	5 5				
CCLM				7 3 4 7	4 2 4 4		4 4 4		7 3 4 7			2 1 2		
COSMO-crCLIM					8	8 3 2 3								
CRCM5		4	4 10	6 10 2	2 2						2 2			
CanRCM4			2 2 2 2	2 2 2							2 2 2			
EBU-POM2c												1 1		
Eta	3 3 3													
HIRHAM5			1 1 1 1	1 1 1 1	8 2 3 8		1 1 1			1 1 1 1	1 1 3			
HadREM3-GA7-05					5 2 4									
LMZ4NEMOMED8											4 1 4			
MAR311										2 2				
PROTHEUS											1 1			
RACMO				3 2 2 2	8 5 4 8					3 2 2 2				
RCA4	9 5 9 9	10 5 3 10	2 1 2 2	14 5 10 14	11 5 7 11	10 5 10 10					8 1 4 8		5 1 3 5	1 1 1
RCSM4											1 1 1 1			
REMO2009	1 1 1 1			6 6 2 5	2 2 2 2	2 2 2 2								
REMO2015	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	6 7 3 4	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3	3 3 3 3				3 3 3
ROM												2 1 2		
RRCM											1 1			
RegCM4_3	3 1 2 4			2 2				2 2 2					2 2 2 5	4 4
RegCM4-4*6*7	3 3 3 3	3 3 3 3	6 6 3 3	3 3 3 3	3 2 3 3	9 3 6 9	3 3 3 3							3 3 3
WRF	1 1 1		6 6		5 1 6				14 6 6				1 1 1	

AII.2 Earth System Models and General Circulation Models for Climate Projections

Detailed and structured information about climate models, simulations and their conformance to common experimental protocols is not only important for scientific interpretation but, under increased scrutiny from society, it is also demanded of climate science that purports to be mature, credible, open, transparent and reproducible (Guilyardi et al., 2013). Scientific publications remain an essential way of documenting models but remain largely scattered and not easily accessible by the growing community of users of model output. To address these challenges, the Earth System Documentation (ES-DOC) project offers an ecosystem of tools and services in support of Earth system modelling documentation creation, analysis and dissemination. ES-DOC is coordinated with other community efforts such as the Coupled Model Intercomparison Project (CMIP) via the World Climate Research Programme work group on Climate Modelling (WGCM) and its Infrastructure Panel WIP (Balaji et al., 2018).

The objective of CMIP is to better understand past, present and future global climate changes arising from natural, unforced variability or in response to changes in radiative forcing in a multi-model context (Chapter 1, Section 1.5.4). This understanding includes assessments of model performance during the historical period (Chapter 3) and quantifications of the causes of the spread in future projections (Chapters 4 and 7). Idealized experiments are also used to increase understanding of the model responses. In addition to these long time scale responses, experiments are performed to investigate the predictability of the climate system on various time and space scales, as well as making predictions from initialized climate states. The different activities (MIP) endorsed by CMIP6 are listed in Chapter 1, Table 1.3 (Eyring et al., 2016). A set of common experiments, the DECK (Diagnostic, Evaluation and Characterization of Klima) and CMIP historical simulations (1850–2014), were introduced that will maintain continuity with previous CMIP phases and help document basic and evolving characteristics of models. ScenarioMIP is the framework for future climate projections (O'Neill et al., 2016). The infrastructure panel of the World Climate Research Programme coordinates framework developments and defines data standards for CMIP. A key aspect is the dissemination of the data via the Earth System Grid Federation (ESGF; Williams et al., 2016; Petrie et al., 2021).

A new online service, ES-DOC, provides information about all aspects of CMIP6. Building on the Common Information Model concepts and standards (Lawrence et al., 2012), a number of documents are created for the CMIP6 Project, as illustrated at <https://es-doc.org/cmip6/>. These include documents to describe experiments, ensemble simulations, models, conformance to the numerical requirements of the CMIP6 protocol (see Pascoe et al., 2020 for CMIP6 experiments) and other important aspects of the CMIP6 model archive. These different documents are either produced automatically or provided in a standard way by modelling groups. Hundreds of clearly structured properties are harvested and stored on a database to be used by clients and portals (e.g., <https://search.es-doc.org/> and <https://explore.es-doc.org/>). Another entry point to the database is

provided by the one-stop-shop 'further_info_url' global attribute in each CMIP6 netCDF data file. ES-DOC also includes the CMIP6 errata system (<https://errata.es-doc.org>), which tracks issues with the model data and the potential corrections made. ES-DOC includes information at the model level and the experiment level.

Model datasets shared on ESGF are characterized by their institution, model, experiment, variable and ensemble member (the different types of ensemble strategies are introduced in Chapter 1, Section 1.4). Each ensemble member is designated by a label of four letters, each associated with a number: 'r' for realization, 'i' for initialization, 'p' for physics, and 'f' for forcing. For example, Table Atlas.SM.2 lists the ensemble member label of each CMIP6 dataset used in the Atlas. In the future, ES-DOC will document in more detail how each individual member differs from the other members of a given ensemble.

The key new model developments since AR5 are summarized in Chapter 1, Section 1.3.5, and model results are assessed in multiple chapters of this report. In this annex, Table AII.5 presents the main features of the CMIP6 coupled models, in a format comparable with AR5 Table 9.A.1 for CMIP5 (Flato et al., 2013). At the date of March 2021, 136 models had registered for CMIP6, including the 23 CMIP6-endorsed MIPs (Chapter 1, Table 1.3). For conciseness, Table AII.5 documents only the coupled models used in the CMIP6 'DECK' experiments and ScenarioMIP, excluding atmosphere-only and ocean-only components (AMIP and OMIP), radiative transfer models (RFMIP), and other MIPs. Registered coupled models that have not submitted data in time to be used in this report are not included. The high-resolution models used for HighResMIP (Haarsma et al., 2016) are listed in Table AII.6, and ice-sheet models are documented in Section AII.3. The citation information for all CMIP6 model datasets is compiled in Section AII.4, Table AII.10.

Table AII.5 | Coupled climate and Earth system models participating in CMIP6 DECK, historical simulation and ScenarioMIP. Salient features of the coupled general circulation models (GCMs) and Earth system models (ESMs) participating in the CMIP6 DECK, historical simulation and ScenarioMIP. Column 1: sponsoring institution(s). Column 2: names of model configurations. Column 3: main reference(s); subsequent columns for each of the model components, with names and main component reference(s). In addition, there are standard entries for the atmosphere component: horizontal grid resolution, number of vertical levels, grid top; and for the ocean component: horizontal grid resolution, number of vertical levels and vertical coordinate type. The horizontal resolution (rounded to 10km) is the square root of the surface area of the Earth divided by the number of grid points, or the area of the ocean surface divided by the number of surface ocean grid points, for the atmosphere and ocean, respectively. When reported in hPa, the atmosphere top heights are converted into km assuming standard atmosphere (ISO 2533:1975, 1975). Aerosols are either prescribed or computed from emissions (emissions-driven). For land carbon, a list of active processes is provided among: active land carbon cycle (Land carbon), active nitrogen cycle (N cycle), prognostic biogeography of vegetation (Prog. veg.), carbon included in a permafrost pool (Permafrost), and dynamic fires (Fires). A blank entry indicates that information was not available. The information contained in the table is consistent with version 6.2.55.10 of the CMIP6 Controlled Vocabularies (https://github.com/WCRP-CMIP/CMIP6_CVs).

Institution Full Country or Region Name	Models	Main References	Atmosphere 1) Component Name 2) Resolution (km) and Number of Levels (L) 3) Top 4) References	Aerosol 1) Component Name 2) Emissions- driven or Prescribed 3) References	Atmospheric Chemistry 1) Component Name 2) Details 3) References	Ocean 1) Component Name 2) Horizontal Resolution and Number of Levels 3) Vertical Grid 4) References	Cryosphere 1) Sea Ice 2) Land Ice	Land 1) Component Name 2) Reference	Land Carbon Active Processes	Ocean Interactive Biogeochemistry 1) Component Name 2) Reference
AS-RCEC Research Center for Environmental Changes, Academia Sinica Taiwan, China	TaiESM1.0	W.-L. Lee et al. (2020)	1) TaiAM1 2) 100 km, 30 L 3) Top 43 km	1) SNAP 2) Emissions-driven 3) Chen et al. (2013)	None	1) POP2 2) 60 km, 60 L 3) z	1) CICE4	1) CLM4.0 with modified surface solar radiation 2) Lee et al. (2013)	Land carbon N cycle Fires	None
AWI Alfred Wegener Institute Germany	AWI-CM-1-1-LR AWI-CM-1-1-MR AWI-ESM-1-1-LR	Sidorenko et al. (2015) Semmler et al. (2020)	1) ECHAM6.3.04p1 2) LR: 170 km, 47 L; MR: 80 km, 95 L 3) Top 80 km	2) Prescribed MACv2-SP 3) Stevens et al. (2017)	None	1) FESOM1.4 2) LR: 50 km, 46 L MR: 20km, 46 L 3) z	1) FESOM1.4	1) JSBACH 3.20	AWI-CM: none AWI-ESM: Land carbon N cycle Prog. veg. Fires	None
BCC Beijing Climate Centre, China	BCC-CSM2-MR	Wu et al. (2019)	1) AGCM3 2) 100 km, 46 L 3) Top 45 km	2) Prescribed MACv2-SP 3) Stevens et al. (2017)	None	1) MOM4 2) 80 km, 40 L 3) z	1) SIS1	1) BCC_AVIM2 2) Li et al. (2019b)	None	None
BCC	BCC-ESM1	Wu et al. (2020)	1) AGCM3 2) 250 km, 26 L 3) Top 42 km	2) Emissions-driven	1) BCC- AGCM3-Chem 2) Interactive 3) Wu et al. (2020)	1) MOM4 2) 80 km, 40 L 3) z	1) SIS1	1) BCC_AVIM2 2) Li et al. (2019b)	Land carbon	None
CAMS Chinese Academy of Meteorological Sciences China	CAMS-CSM1-0	Rong et al. (2018)	1) ECHAM5_CAMS 2) 100 km, 31 L 3) Top 31.2 km	2) Prescribed MACv2-SP 3) Stevens et al. (2017)	None	1) MOM4 2) 90 km, 50 L 3) z	1) SIS1	1) CoLM	None	None

Institution Full Country or Region Name	Models	Main References	Atmosphere 1) Component Name 2) Resolution (km) and Number of Levels (L) 3) Top 4) References	Aerosol 1) Component Name 2) Emissions- driven or Prescribed 3) References	Atmospheric Chemistry 1) Component Name 2) Details 3) References	Ocean 1) Component Name 2) Horizontal Resolution and Number of Levels 3) Vertical Grid 4) References	Cryosphere 1) Sea Ice 2) Land Ice	Land 1) Component Name 2) Reference	Land Carbon Active Processes	Ocean Interactive Biogeochemistry 1) Component Name 2) Reference
CAS Chinese Academy of Sciences China	FGOALS-f3-L	He et al. (2020)	1) FAMIL2.2 2) 90 km, 32 L 4) Top 42.1 km (He et al., 2019)	2) Prescribed 3) He et al. (2019)	None	1) LICOM3.0, 2) 80 km, 30 L 3) z 4) P. Lin et al. (2020)	1) CICE4.0	1) CLM4.0/CAS-LSM 2) Xie et al. (2018)	None	None
CAS	FGOALS-g3	Li et al. (2020)	1) GAMIL3 2) 190 km, 26 L 3) Top 42 km	2) Prescribed 3) Li et al. (2020)	None	1) LICOM3.0, 2) 80 km, 30 L 3) z 4) P. Lin et al. (2020)	1) CICE4.0	1) CLM4.0/CAS-LSM 2) Xie et al. (2018)	None	None
CCCma Canadian Centre for Climate Modelling and Analysis Canada	CanESM5 CanESM5-CanOE	Swart et al. (2019a)	1) CanAM5 2) 250 km, 49 L 3) Top 48 km	2) Emissions-driven 3) von Salzen et al. (2013)	2) Specified oxidants, interactive sulphur 3) von Salzen et al. (2013)	1) NEMO3.4.1 2) 70 km, 45 L 3) z	1) LIM2	1) Physics, CLASS3.6 Biogeochemistry, CTEM1.2 2) Verseghy (2000); Arora and Boer (2010)	Land carbon	CanESM5: CMOC CanESM5-CanOE: CanOE
CCCR-IITM Centre for Climate Change Research, Indian Institute of Tropical Meteorology India	IITM-ESM	Swapna et al. (2018)	1) IITM-GFS 2) 170 km, 64 L 3) Top 61 km	2) Prescribed MAC-v2 3) Stevens et al., (2017); Fiedler et al. (2019a)	None	1) MOM4p1 2) 90 km, 50 L 3) z	1) SISv1.0	1) NOAH LSMv2.7.1	None	TOPAZv2.0
CMCC Centro Euro- Mediterraneo sui Cambiamenti Climatici Italy	CMCC-CM2-SR5 CMCC-ESM2	Cherchi et al. (2019)	1) CAM5.3 2) 100 km, 30 L 3) Top 43 km	1) MAM3 2) Emissions-driven 3) Liu et al. (2012)	2) Specified oxidants based on MOZART simulations	1) NEMO3.6 2) 70 km, 50 L 3) z	1) CICE4.0	1) CLM4.5 2) Oleson et al. (2013)	Land carbon N cycle Permafrost Fires	CM2-SR5: None ESM2: BFM5.2
CNRM Centre National de Recherches Météorologiques and CERFACS Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique France	CNRM-CM6-1 CNRM-CM6-1-HR	Voldoire et al. (2019); Saint- Martin et al. (2021)	1) Arpege 6.3; 2) CM6-1: 140 km, 91 L; CM6-1-HR: 50km, 91 L 3) Top 78 km 4) Roehrig et al. (2020)	1) TACTIC_v2 2) Prescribed 3) Michou et al. (2020)	1) OZL_V2 2) Linear ozone	1) NEMO3.6 2) CM6-1: 70 km, 75L CM6-1-HR: 20 km, 75 L 3) z	1) Gelato 6.1	1) ISBA-CTRIP 2) Voldoire et al. (2017); Decharme et al. (2019)	None	None

Institution Full Country or Region Name	Models	Main References	Atmosphere 1) Component Name 2) Resolution (km) and Number of Levels (L) 3) Top 4) References	Aerosol 1) Component Name 2) Emissions- driven or Prescribed 3) References	Atmospheric Chemistry 1) Component Name 2) Details 3) References	Ocean 1) Component Name 2) Horizontal Resolution and Number of Levels 3) Vertical Grid 4) References	Cryosphere 1) Sea Ice 2) Land Ice	Land 1) Component Name 2) Reference	Land Carbon Active Processes	Ocean Interactive Biogeochemistry 1) Component Name 2) Reference
CNRM and CERFACS	CNRM-ESM2-1	Séférian et al. (2019)	1) Arpege 6.3; 2) 140 km, 91 L; 3) Top 78 km	1) TACTIC_v2 2) Emissions-driven 3) Michou et al. (2020)	1) REPROBUS-C-V2 2) Stratosphere only (above 560 hPa)	1) NEMO3.6 2) 70 km, 75 L 3) z	1) Gelato 6.1	1) ISBA-CTRIP 2) Delire et al. (2020)	Land carbon Fires	Pisces 2.s (Aumont et al., 2015; Séférian et al., 2020)
CSIRO Commonwealth Scientific and Industrial Research Organisation Australia	ACCESS-ESM1-5	Ziehn et al. (2020a)	1) HadGAM2 r1.1 2) 140 km, 38 L 3) Top 39 km	1) CLASSIC (v1.0) 2) Emissions-driven 3) Bellouin et al. (2011)	2) Specified oxidants for aerosols	1) ACCESS-OM2 GFDL-MOM5 2) 70 km, 50 L 3) z 4) Kiss et al. (2020)	1) CICE4.1	1) CABLE2.4 2) Ziehn et al. (2020a)	Land carbon N cycle	Wombat1.0
CSIRO-ARCCSS CSIRO and Austr. Res. Council Centre of Excellence for Climate System Science Australia	ACCESS-CM2	Bi et al. (2020)	1) HadGEM3- GA7.1 2) 140 km, 85 L 3) Top 85 km	1) UKCA- GLOMAP-mode 2) Emissions-driven 3) Mulcahy et al. (2020)	2) Specified oxidants for aerosols	ACCESS-OM2 GFDL-MOM5 2) 70 km, 50 L 3) z 4) Kiss et al. (2020)	1) CICES.1.2 2) Ridley et al. (2018b)	1) CABLE2.5 2) Bi et al. (2020)	None	None
E3SM National Laboratories Consortium USA	E3SM 1.0 E3SM-1-1 E3SM-1-1-ECA	Golaz et al. (2019)	1) E3M v1.0 2) 100 km, 72 L; 3) Top 66 km 4) Rasch et al. (2019)	1) MAM4 2) Emissions-driven 3) H. Wang et al. (2020)	2) Specified oxidants for aerosols; linear interactive stratospheric ozone (LINOZ v2)	1) MPAS- Ocean v6.0 2) 40 km, 60 L 3) z* 4) Petersen et al. (2019)	1) MPAS- Seaice v6.0	1) ELM v1.0, based on CLM4.5 2) E3SM-1.0: Golaz et al. (2019) E3SM-1.1: Burrows et al. (2020)	ES3M 1.0: None ES3M1.1: Land carbon N cycle Fires	None
EC-Earth Consortium Europe	EC-Earth3 EC-Earth3-LR Options: AerChem, Veg	Döscher et al. (2021)	1) IFS cy36r4 2) EC-Earth3: 80 km, 91 L; EC-Earth3-LR: 120 km, 62 L 3) EC-Earth3: Top 80 km EC-Earth3-LR: Top 36 km	EC-Earth3 2) Prescribed, MACv2-SP AerChem: 1) TMS 2) Emission- driven 3) van Noije et al. (2014, 2021)	EC-Earth3 None AerChem: 1) TMS 2) Interactive 3) van Noije et al. (2014, 2021)	NEMO3.6 2) 70 km, 75 L 3) z	1) LIM3 2) Rousset et al. (2015)	EC-Earth3: 1) H-TESSSEL 2) Balsamo et al. (2009) Veg: 1) H-TESSSEL and LPJ-GUESS 2) Smith et al. (2014)	EC-Earth3: None Veg: N cycle Prog. veg. Fires	None
EC-Earth	EC-Earth3-CC	Döscher et al. (2021)	1) IFS cy36r4 2) 80 km, 91 L; 3) Top 80 km	2) Prescribed, MACv2-SP	None	NEMO3.6 2) 70 km, 75 L 3) z	1) LIM3 2) Rousset et al. (2015)	1) H-TESSSEL and LPJ-GUESS 2) Smith et al. (2014)	Land carbon N cycle Prog. veg. Fires	PISCES v2

Institution Full Country or Region Name	Models	Main References	Atmosphere 1) Component Name 2) Resolution (km) and Number of Levels (L) 3) Top 4) References	Aerosol 1) Component Name 2) Emissions- driven or Prescribed 3) References	Atmospheric Chemistry 1) Component Name 2) Details 3) References	Ocean 1) Component Name 2) Horizontal Resolution and Number of Levels 3) Vertical Grid 4) References	Cryosphere 1) Sea Ice 2) Land Ice	Land 1) Component Name 2) Reference	Land Carbon Active Processes	Ocean Interactive Biogeochemistry 1) Component Name 2) Reference
FIO-QNLM First Institute of Oceanography and Pilot National Laboratory for Marine Science and Technology (Qingdao), China	FIO-ESM-2-0	Bao et al. (2020)	1) CAM5 2) 100km, 26 L 3) Top 43 km	2) Prescribed, MACv2-SP (Stevens et al., 2017)	None	POP-W with MASNUM surface wave model 2) 60 km, 60 L 3) z 4) Qiao et al. (2013)	1) CICE4.0 2) Hunke and Lipscomp (2010)	1) CLM4.0 2) Lawrence et al. (2011)	Land carbon N cycle	BEC
HAMMOZ- Consortium Switzerland, Germany, UK, Finland	MPI-ESM-1-2-HAM	Neubauer et al. (2019a)	1) ECHAM6.3 2) 170 km, 47 L 3) Top 80 km	1) HAM2.3 2) Emissions-driven 3) Tegen et al. (2019)	2) Specified oxidants, sulphur chemistry 3) Feichter et al. (1996); Inness et al. (2013)	1) MPIOM 1.63 2) 100 km, 40 L 3) z	2) Notz et al. (2013)	1) JSBACH3.20 2) Reick et al. (2021)	Land carbon N cycle Prog. veg. Fires	HAMOCC6
INM Institute for Numerical Mathematics Russian Federation	INM-CM4-8 INM-CM5-0	INM-CM4-8: (Volodin et al., 2018) INM-CM5-0: (Volodin et al., 2017)	CM4: 1) INM-AM4-8 2) 150 km, 21 L 3) Top 31 km CM5: 1) INM-AM5.0 2) 150 km, 73 L 3) Top 61 km	1) INM-AER1 2) Emissions-driven 3) Volodin and Kostykin (2016)	None	INM-OM5 2) CM4: 70 km, 40 L CM5: 30 km, 40 L 3) Sigma 4) Zalesny et al. (2010)	1) INM-ICE1 2) Yakovlev (2009)	INM-LND1	Land carbon	None
IPSL Institut Pierre- Simon Laplace France	IPSL-CM6A-LR	Boucher et al. (2020g)	1) LMDZ NPv6 2) 160 km, 79 L 3) Top 80 km 4) Hourdin et al., 2020)	2) Prescribed 3) Lurton et al. (2020)	2) Specified oxidants for aerosols	1) NEMO 3.6 2) 70 km, 75 L 3) z	1) NEMO-LIM3 2) Rousset et al. (2015)	ORCHIDEE (v2.0, Water/carbon/ energy mode)	None	PISCES
IPSL	IPSL-CM5A2-INCA		1) LMDZ APv5 2) 240 km, 79 L, 3) Top 80 km 4) Hourdin et al., 2020)	1) INCA 2) Emissions-driven	1) INCA 2) Interactive 3) Hauglustaine et al. (2014)	1) NEMO 3.6 2) 150 km, 30 L 3) z	1) NEMO-LIM3 2) Rousset et al. (2015)	ORCHIDEE (IPSLCM5A2.1, Water/ carbon/energy mode)	Land carbon	PISCES
KIOST Korea Institute of Ocean Science & Technology Republic of Korea	KIOST-ESM	Pak et al. (2021)	1) GFDL-AM2.0 2) 190 km, 32 L 3) Top 43 km 4) Anderson et al. (2004)	1) GFDL-AM2.0 2) Emissions-driven 3) Anderson et al. (2004)	None	1) GFDL-MOM5.0 2) 90 km, 52 L 3) z	1) GFDL-SIS	GFDL-LM3.0 (Milly et al., 2014)	Land carbon N cycle Prog. veg.	TOPAZ2

Institution Full Country or Region Name	Models	Main References	Atmosphere 1) Component Name 2) Resolution (km) and Number of Levels (L) 3) Top 4) References	Aerosol 1) Component Name 2) Emissions- driven or Prescribed 3) References	Atmospheric Chemistry 1) Component Name 2) Details 3) References	Ocean 1) Component Name 2) Horizontal Resolution and Number of Levels 3) Vertical Grid 4) References	Cryosphere 1) Sea Ice 2) Land Ice	Land 1) Component Name 2) Reference	Land Carbon Active Processes	Ocean Interactive Biogeochemistry 1) Component Name 2) Reference
MIROC Consortium JAMSTEC, AORI, NIES, R-CCS Japan	MIROC-ES2L MIROC-ES2H MIROC6	ES2L: Hajima et al. (2020a) ES2H: Kawamiya et al. (2020) MIROC6: Tatebe et al. (2019)	ES2L: 1) CCSR AGCM 2) 250 km, 40 L 3) Top 40 km ES2H, MIROC6: 1) CCSR AGCM 2) 120 km, 81 L; 3) Top 80 km	1) SPRINTARS 2) Emissions-driven 3) Takemura et al. (2000, 2005, 2009)	ES2L, MIROC6: 2) Prescribed oxidants ES2H: 1) CHASER 2) Interactive 3) Sudo et al. (2002a b); Morgenstern et al. (2017)	1) COCO4.9 2) 80 km, 63 L 3) z	1) COCO4.9	MIROC6: MATSIRO6.0 (Takata et al., 2003; Nitta et al., 2014, 2017)	MIROC6: None	OECO v2.0
								ES2L & ES2H: MATSIRO6.0 with visit-e1.0 (Hajima et al., 2020a)	ES2L & ES2H Land carbon N cycle	
MOHC Met Office Hadley Centre UK	HADGEM3- GC31-LL HADGEM3- GC31-MM	Kuhlbrodt et al. (2018); Williams et al. (2018) Sellar et al. (2019)	1) MetUM- HadGEM3-GA7.1 2) LL: 140 km, 85 L MM: 60 km, 85 L 3) Top 85 km	1) UK-GLOMAP 2) Emissions-driven 3) Mulcahy et al. (2020)	None	1) NEMO- HadGEM3-GO6.0 2) LL: 70 km, 75 L MM: 20 km, 75 L 3) z	1) CICE HadGEM3-GSI8 2) Ridley et al. (2018b)	JULES-HadGEM3-GL7.1	None	None
MOHC	UK-ESM1.0-LL	Sellar et al. (2019)	1) MetUM- HadGEM3-GA7.1 2) 140 km, 85 L 3) Top 85 km	1) UK-GLOMAP 2) Emissions-driven 3) Mulcahy et al. (2020)	1) UKCA-StratTrop 3) Archibald et al. (2020)	1) NEMO- HadGEM3-GO6.0 2) 70 km, 75 L 3) z	1) CICE HadGEM3-GSI8 2) Ridley et al. (2018b)	JULES-HadGEM3-GL7.1 (Sellar et al., 2019; Wiltshire et al., 2021)	Land carbon N cycle Prog. veg.	MEDUSA2
MPI-M Max Planck Institute for Meteorology Germany	MPI-ESM1-2-LR MPI-ESM1-2-HR	MPI-ESM (Mauritsen et al., 2019) MPI-ESM1-2-HR (Müller et al., 2018)	1) ECHAM6.3 2) LR: 170 km, 47 L HR: 80 km 95 L 3) Top 80 km	2) Prescribed MACv2-SP	None	1) MPIOM 1.63 2) LR: 100 km, 40 L HR: 40 km, 40 L 3) z	2) Notz et al. (2013)	1) JSBACH3.20 2) Reick et al. (2021)	LR: Land carbon N cycle Prog. veg. Fires HR: None	HAMOCC6
MRI Meteorological Research Institute Japan	MRI-ESM-2.0	MRI-ESM-2.0 (Mizuta et al., 2012; Yukimoto et al., 2019a)	1) MRI-AGCM3.5 2) 100 km, 80 L 3) Top 80 km	1) MASINGAR mk-2r4c 2) Emissions-driven 3) Yukimoto et al. (2019a); Oshima et al. (2020)	1) MRI-CCM2.1 2) Interactive 3) Deushi and Shibata (2011)	1) MRI.COM4.4 2) 60 km, 61 L 3) z 4) Tsujino et al. (2017)	1) MRI.COM4.4 2) Tsujino et al. (2017)	1) HAL 1.0 and MRI-LCCM2 2) Obata and Shibata (2012); Yukimoto et al. (2012); Obata and Adachi (2019)	Land carbon Prog. veg. Fires	MRI.COM4.4 (Nakano et al., 2015)

Institution Full Country or Region Name	Models	Main References	Atmosphere 1) Component Name 2) Resolution (km) and Number of Levels (L) 3) Top 4) References	Aerosol 1) Component Name 2) Emissions- driven or Prescribed 3) References	Atmospheric Chemistry 1) Component Name 2) Details 3) References	Ocean 1) Component Name 2) Horizontal Resolution and Number of Levels 3) Vertical Grid 4) References	Cryosphere 1) Sea Ice 2) Land Ice	Land 1) Component Name 2) Reference	Land Carbon Active Processes	Ocean Interactive Biogeochemistry 1) Component Name 2) Reference
NASA-GISS Goddard Institute for Space Studies USA	GISS-E2-1-G GISS-E2-1-H GISS-E2.1-G-CC GISS-E2-2-G	Kelley et al. (2020) GISS-E2-2-G: Rind et al. (2020)	GISS-E2-1: 1) GISS-E2.1 2) 200 km, 40L 3) Top 66 km GISS-E2-2-G: 1) GISS-E2-2 2) 200km, 102L 3) Top 88 km	Varies with physics version p1 p3 OMA, p5 MATRIX 3) Bauer et al. (2020)	Varies with physics version p1 None, p3, p5 GPUCCINI, interactive 3) Shindell et al. (2006)	GISS-E2-1-G, GISS-E2-2-G: 1) GISS ocean 2) 100 km, 40 L 3) z GISS-E2-1-H: 1) HYCOM 2) 70 km, 32 L 3) Hybrid	1) GISS-SI	1) GISS-LSM	None	GISS-E2-1- G-CC: NOBM Others: None
NCAR National Center for Atmospheric Research USA	CESM2 CESM2-FV2 CESM2-WACCM CESM2- WACCM-FV2	Danabasoglu et al. (2020)	1) CAM6 2) CESM2: 100 km FV2 variants: 190 km 3) CESM2: 32 L, Top 42 km WACCM variants: 70 L, Top 80 km.	1) MAM4 2) Emissions- driven 3) Liu et al. (2016)	CESM2: 2) Prescribed oxidants WACM variants: 2) Interactive 3) Emmons et al. (2020)	1) POP2 2) 60 km, 60 L 3) z	1) CICE5.1, (Hunke et al., 2015) 2) CISM2.1, (Lipscomb et al., 2019)	1) CLM5 2) Lawrence et al. (2019)	Land carbon N cycle Permafrost Fires	MARBL, Moore et. al, 2013
NCC NorESM Climate Modelling Consortium Norway	NorCPM1 NorESM1-F	NorESM1-F: Guo et al. (2019a)	1) CAM4 2) 190 km, 26 L 3) Top 43 km	NorCPM1: 1) OsloAero4.1 2) Emissions-driven NorESM1-F: 2) Prescribed	NorCPM1: 1) OsloAero4.1 2) Prescribed oxidants for aerosols NorESM1-F: None	1) MICOM1.1 2) 60 km, 53 L 3) Isopycnal	1) CICE4	1) CLM4	Land carbon N cycle Fires	HAMOCC5.1 (Tjiputra et al., 2013; Schwinger et al., 2016)
NCC	NorESM2-LM NorESM2-MM	NorESM2: Seland et al. (2020)	1) CAM6-Nor 2) NorESM2-LM: 190 km, 32 L NorESM2-MM: 100km, 32 L 3) Top 40 km	1) OsloAero6 2) Emissions-driven 3) Kirkevåg et al. (2018); Seland et al. (2020)	1) OsloAero6 2) Prescribed oxidants, interactive sulphur chemistry, SOA precursor chemistry	1) BLOM1.0 2) 60 km, 70 L 3) Isopycnal	1) CICE5.1	1) CLM5	Land carbon N cycle Permafrost Fires	iHAMOCC (Tjiputra et al., 2020)
NIMS-KMA National Institute of Meteorological Sciences, Korea Meteorological Administration Republic of Korea	KACE-1-0-G	J. Lee et al. (2020)	1) MetUM- HadGEM3-GA7.1 2) 140 km, 85 L 3) Top 85 km	1) UKCA- GLOMAP-mode 2) Emissions-driven	2) Specified oxidants for aerosols	1) MOM4p1 2) 90 km, 50 L 3) z	1) CICE- HadGEM3-GS18	1) JULES- HadGEM3-GL7.1	None	None

Institution Full Country or Region Name	Models	Main References	Atmosphere 1) Component Name 2) Resolution (km) and Number of Levels (L) 3) Top 4) References	Aerosol 1) Component Name 2) Emissions- driven or Prescribed 3) References	Atmospheric Chemistry 1) Component Name 2) Details 3) References	Ocean 1) Component Name 2) Horizontal Resolution and Number of Levels 3) Vertical Grid 4) References	Cryosphere 1) Sea Ice 2) Land Ice	Land 1) Component Name 2) Reference	Land Carbon Active Processes	Ocean Interactive Biogeochemistry 1) Component Name 2) Reference
NOAA-GFDL National Oceanic and Atmospheric Administration, Geophysical Fluid Dynamics Laboratory USA	GFDL-CM4	Held et al. (2019)	1) GFDL-AM4.0.1 2) 100 km, 33 L 3) Top 48 km 4) (Zhao et al., 2018c, 2018d)	1) GFDL-AM4.0.1 2) Emissions- driven 3) Zhao et al. (2018c, d)	1) GFDL-AM4.0.1 2) Specified oxidants, fast chemistry, aerosol only	1) GFDL-OM4p25 (GFDL-MOM6) 2) 20 km, 75 L 3) Hybrid; 4) Adcroft et al. (2019)	1) GFDL-SIM4p25 (GFDL-SIS2.0); 2) Adcroft et al. (2019)	1) GFDL-LM4.0.1 1) Zhao et al. (2018c, d)	Land carbon Prog. veg. Fires	GFDL-BLINGv2 (Dunne et al., 2020a)
NOAA-GFDL	GFDL-ESM4	Dunne et al. (2020b)	1) GFDL-AM4.1; 2) 100 km, 49 L 3) Top 80 km 4) Horowitz et al. (2020)	1) GFDL-AM4.1 2) Emissions-driven 3) Horowitz et al. (2020)	1) GFDL- ATMCHEM4.1 2) Interactive 3) Horowitz et al. (2020)	GFDL-OM4p5 (GFDL-MOM6); 2) 40 km, 75 L 3) Hybrid 4) Adcroft et al. (2019)	1) GFDL-SIM4p5 (GFDL-SIS2.0); 2) Adcroft et al. (2019)	1) GFDL-LM4.1	Land carbon Prog. veg. Fires	GFDL-COBALTv2 (Stock et al., 2020)
NUIST Nanjing University of Information Science and Technology China	NESM3	Cao et al. (2018)	1) ECHAM v6.3 2) 170 km, 47 L 3) Top 48 km	2) Prescribed	None	1) NEMO v3.4 2) 70 km, 46 L 3) z	1) CICE 4.1	1) JSBACH v3.1	Land carbon Prog. veg.	None
SNU Seoul National University Republic of Korea	SAM0-UNICON	Park et al. (2019)	1) CAM5.3 with UNICON 2) 100 km 30 L 3) Top 43 km	1) MAM3 2) Emissions-driven 3) Liu et al. (2012)	None	1) POP2 2) 60 km, 60 L 3) z	1) CICE4.0	1) CLM 4.0	Land carbon N cycle Fires	None
THU Department of Earth System Science China	CIESM	Y. Lin et al. (2020)	1) CIESM-AM 2) 100 km, 30 L 3) Top 42 km	2) Prescribed MACv2-SP 3) Stevens et al. (2017)	None	1) CIESM-OM 2) 60 km, 46 L 3) z	1) CICE4	1) CIESM-LM (modified CLM4.0)	None	None
University of Arizona USA	MCM-UA-1-0	Delworth et al. (2002)	1) Manabe R30L14 2) 260 km, 14 L 3) Top 29 km	None	None	1) MOM1.0 2) 190 km, 18 L 3) z	1) Thermo-dynamic simplified sea ice	1) Manabe bucket scheme 2) Manabe (1969)	None	None

Table AII.6 | High-resolution coupled models participating in HighResMIP. Full names of the institutions are found in Table AII.5. The horizontal resolution (rounded to 10 km when larger than 10 km) is the square root of the number of grid points divided by the surface area of the Earth, or the number of surface ocean grid points divided by the area of the ocean surface, for the atmosphere and ocean respectively. When reported in hPa, the atmosphere top heights are converted into kilometres assuming standard atmosphere (ISO 2533:1975, 1975).

Institution	Model	Reference	Atmosphere Top (km)	Atmosphere Resolution Horizontal (km), Number of Vertical Levels	Ocean Resolution Horizontal (km), Number of Vertical Levels
AWI	AWI-CM-1-1-HR	Sein et al. (2017, 2018)	80 km	80 km, N = 95	20 km, N = 46
BCC	BCC-CSM2-HR	Wu et al. (2021)	66 km	40 km, N = 5 6	20 km, N = 40
CAS	FGOALS-f3-H		42 km	20 km, N = 32	8 km, N = 55
CMCC	CMCC-CM2-HR4	Scoccimarro et al. (2020b);	43 km	100 km, N = 26	20 km, N = 50
	CMCC-CM2-VHR4	Bellucci et al. (2021)	43 km	20 km, N = 26	20 km, N = 50
CNRM	CNRM-CM6-1-HR	Saint-Martin et al. (2021)	78 km	50 km, N = 91	20 km, N = 75
EC-Earth	EC-Earth3P-HR	Haarsma et al. (2020)	80 km	40 km, N = 91	20 km, N = 75
ECMWF	ECMWF-IFS-MR	Roberts et al. (2018b)	80 km	60 km, N = 91	20 km, N = 75
	ECMWF-IFS-HR		80 km	30 km, N = 91	20 km, N = 75
INM	INM-CM5-H		61 km	50 km, N = 73	10 km, N = 40
MOHC	HadGEM3-GC31-MH	Roberts et al. (2019)	85 km	60 km, N = 85	7 km, N = 75
	HadGEM3-GC31-HM		85 km	30 km, N = 85	20 km, N = 75
	HadGEM3-GC31-HH		85 km	30 km, N = 85	7 km, N = 75
MPI	MPI-ESM1-2-HR	Gutjahr et al. (2019)	80 km	80 km, N = 95	40 km, N = 40
	MPI-ESM1-2-XR		80 km	40 km, N = 95	40 km, N = 40
NCAR	CESM1-CAM5-SE-HR	Small et al. (2014); Meehl et al. (2019); Chang et al. (2020)	42 km	30 km, N = 30	8 km, N = 62
NOAA-GFDL	GFDL-CM4C192	Zhao (2020)	48 km	50 km, N = 33	20 km, N = 75

AII.3 Models Used in Ice Sheet and Glacier Model Intercomparison Studies

Ice sheet and glacier models are used to assess the contribution of ice sheets and glaciers to future sea level rise as described in Section 9.6.3. New to AR6, the projections of the future sea level contribution from ice sheets and glaciers comes from the ensemble of model intercomparison studies (Sections 9.4.1.2, 9.4.2.2 and 9.5.1.3, and Box 9.3). The tables here describe the models used for Greenland ISMIP6 (Table AII.7), Antarctica ISMIP6 and LARMIP-2 (Table AII.8) and GlacierMIP (Table AII.9).

More specific information on the model capabilities and parameter choices used for each ice sheet and glacier MIP are presented in the following papers: ISMIP6 initMIP-Greenland (Goelzer et al., 2018), ISMIP6 projection-Greenland (Goelzer et al., 2020), ISMIP6 initMIP-Antarctica (Seroussi et al., 2019), ISMIP6 Antarctica projection (Seroussi et al., 2020), LARMIP-2 Antarctica projections (Levermann et al., 2020) and GlacierMIP (Hock et al., 2019; Marzeion et al., 2020).

Table AII.7 | Models used in Greenland model intercomparison studies (initMIP and/or ISMIP6 projections).

Institution Full Country Name	Model	Reference	Resolution (min to max; km)	MIP Activity
AWI Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, and University of Bremen Germany	AWI-ISSM	Larour et al. (2012); Rückamp et al. (2020)	0.75–7.5 km	initMIP ISMIP6
BGC Bristol Glaciology Center UK	BGC-BISICLES	Cornford et al. (2013); Lee et al. (2015)	1.2–4.8 km	initMIP ISMIP6
DMI Danish Meteorological Institute Denmark	DMI-PISM	Bueler and Brown (2009); Aschwanden et al. (2016)	5 km	initMIP

Institution Full Country Name	Model	Reference	Resolution (min to max; km)	MIP Activity
GSFC Goddard Space Flight Center NASA USA	GSFC-ISSM	Larour et al. (2012)	0.5–25 km	ISMIP6
IGE Institut des Géosciences de L'Environnement France	IGE-ELMER	Gillet-Chaulet et al. (2012)	1–4.5 km	initMIP
ILTSPK Institute of Low Temperature Science Japan Potsdam Institute for Climate Impact Research Germany	ILTSPK-SICOPOLIS	Greve and Blatter (2016); Greve and SICOPOLIS Developer Team (2019); Greve et al. (2020)	5 km	initMIP ISMIP6
IMAU Institute for Marine and Atmospheric Research Netherlands	IMAUICE	de Boer et al. (2014)	8–16 km	initMIP ISMIP6
JPL Jet Propulsion Laboratory USA	JPL-ISSM	Larour et al. (2012); Seroussi et al. (2013)	0.25–15 km	initMIP ISMIP6
JPL Jet Propulsion Laboratory USA	JPL-ISSMPALEO	Larour et al. (2012); Cuzzzone et al. (2018)	3–30 km	initMIP ISMIP6
LSCE Laboratoire des Sciences du Climat et de l'Environnement France	LSCE-GRISLI	Quiquet et al. (2018)	5 km	initMIP ISMIP6
MIROC Japan Agency for Marine-Earth Science and Technology The University of Tokyo Japan	MIROC-IcIES	Saito et al. (2016)	10 km	initMIP
MPIM Max Planck Institute for Meteorology Germany	MPIM-PISM	Bueler and Brown (2009); Aschwanden et al. (2016)	5 km	initMIP
MUN Memorial University of Newfoundland Canada	MUN-GSM	Tarasov and Peltier (1999, 2003)	5–14 km	ISMIP6
NCAR National Center for Atmospheric Research USA	NCAR-CISM	Lipscomb et al. (2019)	4 km	initMIP ISMIP6
UAF University of Alaska Fairbanks USA	UAF-PISM	Bueler and Brown (2009); Aschwanden et al. (2016)	0.9 km	initMIP ISMIP6
UCIJPL University of California Irvine Jet Propulsion Laboratory USA	UCIJPL-ISSM	Morlighem et al. (2010); Larour et al. (2012)	0.2–30 km	initMIP ISMIP6
ULB Université Libre de Bruxelles Belgium	ULB-FETISH	Pattyn (2017)	10 km	initMIP
VUB Vrije Universiteit Brussel Belgium	VUB-GISM	Huybrechts (2002); Fürst et al. (2015)	5 km	initMIP ISMIP6
VUW Victoria University of Wellington New Zealand	VUW-PISM	Bueler and Brown (2009); Golledge et al. (2019)	2 km	initMIP ISMIP6

Table AII.8 | Models used in Antarctica model intercomparison studies (initMIP and/or ISMIP6 projections and/or LARMIP-2 projections).

Institution Full Country Name	Model	Reference	Resolution (min to max) (km)	MIP Activity
AWI Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, and University of Bremen Germany	AWI-PISM	Bueler and Brown (2009); Winkelmann et al. (2011)	8–16 km	initMIP ISMIP6 LARMIP-2
LBL Lawrence Berkeley National Laboratory USA Swansea University UK	LBL-BISICLES	Cornford et al. (2013, 2015)	0.5–8 km	initMIP ISMIP6 LARMIP-2
DOE Los Alamos National Laboratory USA	DOE-MALI	Hoffman et al. (2018)	2–20 km	initMIP ISMIP6 LARMIP-2
DMI Danish Meteorological Institute Denmark	DMI-PISM	Bueler and Brown (2009)	5–16 km	initMIP LARMIP-2
IGE Institut des Géosciences de l'Environnement France	IGE-ELMER	Gillet-Chaulet et al. (2012)	1–4.5 km	initMIP
ILTSPiK Institute of Low Temperature Science Japan Potsdam Institute for Climate Impact Research Germany	ILTSPiK-SICOPOLIS	Greve and Blatter (2016); Greve and SICOPOLIS Developer Team (2019); Greve et al. (2020)	8 km	initMIP ISMIP6 LARMIP-2
IMAU Institute for Marine and Atmospheric Research Netherlands	IMAUICE	de Boer et al. (2014)	32 km	initMIP ISMIP6 LARMIP-2
JPL Jet Propulsion Laboratory USA	JPL-ISSM	Larour et al. (2012); Seroussi et al. (2013)	2–50 km	initMIP ISMIP6 LARMIP-2
LSCE Laboratoire des Sciences du Climat et de l'Environnement France	LSCE-GRISLI	Quiquet et al. (2018)	16 km	initMIP ISMIP6 LARMIP-2
NCAR National Center for Atmospheric Research USA	NCAR-CISM	Lipscomb et al. (2019)	4 km	initMIP ISMIP6 LARMIP-2
PIK Potsdam Institute for Climate Impact Research Germany	PIK-PISM	Winkelmann et al. (2011)	4–8 km	initMIP ISMIP6 LARMIP-2
PSU Pennsylvania State University USA	PSUICE3D	Pollard and DeConto (2012); Pollard et al. (2015)	16 km	initMIP LARMIP-2
UCIJPL University of California Irvine Jet Propulsion Laboratory USA	UCIJPL-ISSM	Morlighem et al. (2010); Larour et al. (2012)	3–50 km	initMIP ISMIP6 LARMIP-2
ULB Université Libre de Bruxelles Belgium	ULB-FETISH	Pattyn (2017)	16–32 km	initMIP ISMIP6 LARMIP-2
UNN University of Northumbria UK	UNN-UA	Gudmundsson et al. (2012)	1–40 km	LARMIP-2
UTAS University of Tasmania, Australia University of Lapland, Finland CSC-IT Center for Science, Finland	UTAS-ELMER	Gillet-Chaulet et al. (2016)	4–40 km	ISMIP6
VUB Vrije Universiteit Brussel Belgium	VUB-AISPALEO	Huybrechts (2002)	20 km	initMIP ISMIP6 LARMIP-2
VUW Victoria University of Wellington New Zealand	VUW-PISM	Bueler and Brown (2009); Golledge et al. (2019)	16 km	initMIP ISMIP6 LARMIP-2

Table AII.9 | Models used in the GlacierMIP2 model intercomparison.

Institution Full Name, Country	Model Name	Reference	Resolution	Domain (Global/Regional)
Nagoya University, Japan	GLIMB	Sakai and Fujita (2017)	0.5° grid and 50 m elevation bands for mass balance, each glacier for geometry change	Global
ETH Zurich, Switzerland University of Fribourg, Switzerland University of Alaska Fairbanks, USA Uppsala University, Sweden	GloGEM	Huss and Hock (2015)	Each glacier, 10 m elevation bands	Global
University of British Columbia, Canada University of Alaska Fairbanks, USA Scott Polar Research Institute, UK Trent University, Canada	RAD2014	Radić et al. (2014)	Each glacier, 20–25 m elevation bands	Global
Utrecht University, Netherlands ETH Zurich, Switzerland	WAL2001	Van de Wal and Wild (2001)	Each glacier	Global
University of Exeter, UK University of Bristol, UK University of Reading, UK Met Office, UK University of Fribourg, Switzerland ETH Zurich, Switzerland University of Crete, Greece University of Exeter, UK	JULES	Shannon et al. (2019)	0.5° grid, 250 m elevation bands	Global except Antarctica
University of Innsbruck, Austria	MAR2012	Marzeion et al. (2012)	Each glacier, considering elevation range	Global except Antarctica
University of Innsbruck, Austria University of Bremen, Germany University of Grenoble Alpes, France ETH Zurich, Switzerland WSL, Switzerland University of Natural Resources and Life Sciences, Austria University of Canterbury, New Zealand	OGGM	Maussion et al. (2019)	Each glacier, 20–400 m spacing of grid points on flow line	Global except Antarctica
Utrecht University, Netherlands FutureWater, Netherlands ICIMOD, Nepal	KRA2017	Kraaijenbrink et al. (2017)	Each glacier, variable elevation bands	High Mountain Asia
University of Alaska Fairbanks, USA University of Washington, USA	PyGEM	Rounce et al. (2020)	Each glacier, 20 m elevation bands	High Mountain Asia
Victoria University of Wellington, New Zealand	AND2012	Anderson and Mackintosh (2012)	100 m	New Zealand
ETH Zurich, Switzerland WSL, Switzerland University of Fribourg, Switzerland	GloGEMflow	Zekollari et al. (2019)	Each glacier, 10–202 m spacing of grid points on flow line	Central Europe

All

AII.4 Coupled Model Intercomparison Project Model Datasets Used in the Report

Table AII.10 | List of CMIP Phase 6 (CMIP6) model datasets used in this report.

Institute: Model	Activity ID	Dataset citation and DOI
AER:LBLRTM-12-8	RFMIP	Mlawer and Pernak (2019), DOI: 10.22033/ESGF/CMIP6.2003
AER:RRTMG-LW-4-91	RFMIP	Mlawer and Pernak (2020a), DOI: 10.22033/ESGF/CMIP6.9961
AER:RRTMG-SW-4-02	RFMIP	Mlawer and Pernak (2020b), DOI: 10.22033/ESGF/CMIP6.9963
AS-RCEC:HIRAM-SIT-HR	HighResMIP	Tu (2020a), DOI: 10.22033/ESGF/CMIP6.13301
AS-RCEC:HIRAM-SIT-LR	HighResMIP	Tu (2020b), DOI: 10.22033/ESGF/CMIP6.13303
AS-RCEC:TaiESM1	AerChemMIP	Tsai et al. (2020), DOI: 10.22033/ESGF/CMIP6.9682
AS-RCEC:TaiESM1	CFMIP	Shiu et al. (2020), DOI: 10.22033/ESGF/CMIP6.9683
AS-RCEC:TaiESM1	CMIP	Lee and Liang (2019), DOI: 10.22033/ESGF/CMIP6.9684

Institute: Model	Activity ID	Dataset citation and DOI
AS-RCEC:TaiESM1	GMMIP	Y.-C. Wang et al. (2020), DOI: 10.22033/ESGF/CMIP6.9685
AS-RCEC:TaiESM1	PAMIP	Hong et al. (2020), DOI: 10.22033/ESGF/CMIP6.15214
AS-RCEC:TaiESM1	ScenarioMIP	Lee and Liang (2020), DOI: 10.22033/ESGF/CMIP6.9688
AWI:AWI-CM-1-1-HR	HighResMIP	Semmler et al. (2017a), DOI: 10.22033/ESGF/CMIP6.1202
AWI:AWI-CM-1-1-LR	HighResMIP	Semmler et al. (2017b), DOI: 10.22033/ESGF/CMIP6.1209
AWI:AWI-CM-1-1-MR	CMIP	Semmler et al. (2018), DOI: 10.22033/ESGF/CMIP6.359
AWI:AWI-CM-1-1-MR	PAMIP	Semmler et al. (2019a), DOI: 10.22033/ESGF/CMIP6.12021
AWI:AWI-CM-1-1-MR	ScenarioMIP	Semmler et al. (2019b), DOI: 10.22033/ESGF/CMIP6.376
AWI:AWI-ESM-1-1-LR	CMIP	Danek et al. (2020), DOI: 10.22033/ESGF/CMIP6.9301
AWI:AWI-ESM-1-1-LR	PMIP	Shi et al. (2020), DOI: 10.22033/ESGF/CMIP6.9302
BCC:BCC-CSM2-HR	HighResMIP	Jie et al. (2020), DOI: 10.22033/ESGF/CMIP6.1722
BCC:BCC-CSM2-MR	C4MIP	F. Zhang et al. (2019), DOI: 10.22033/ESGF/CMIP6.1723
BCC:BCC-CSM2-MR	CFMIP	L. Zhang et al. (2019), DOI: 10.22033/ESGF/CMIP6.1724
BCC:BCC-CSM2-MR	CMIP	Xin et al. (2018), DOI: 10.22033/ESGF/CMIP6.1725
BCC:BCC-CSM2-MR	DAMIP	Xin et al. (2019a), DOI: 10.22033/ESGF/CMIP6.1726
BCC:BCC-CSM2-MR	DCPP	Fang et al. (2019), DOI: 10.22033/ESGF/CMIP6.1727
BCC:BCC-CSM2-MR	GMMIP	J. Zhang et al. (2019a), DOI: 10.22033/ESGF/CMIP6.1728
BCC:BCC-CSM2-MR	LS3MIP	Li et al. (2019a), DOI: 10.22033/ESGF/CMIP6.1729
BCC:BCC-CSM2-MR	LUMIP	Y. Zhang et al. (2019), DOI: 10.22033/ESGF/CMIP6.1730
BCC:BCC-CSM2-MR	ScenarioMIP	Xin et al. (2019b), DOI: 10.22033/ESGF/CMIP6.1732
BCC:BCC-ESM1	AerChemMIP	J. Zhang et al. (2019b), DOI: 10.22033/ESGF/CMIP6.1733
BCC:BCC-ESM1	CMIP	Zhang et al. (2018), DOI: 10.22033/ESGF/CMIP6.1734
CAMS:CAMS-CSM1-0	CMIP	Rong (2019a), DOI: 10.22033/ESGF/CMIP6.1399
CAMS:CAMS-CSM1-0	GMMIP	Chinese Academy of Meteorological Sciences (CAMS) (2019), DOI: 10.22033/ESGF/CMIP6.11002
CAMS:CAMS-CSM1-0	HighResMIP	Rong (2020), DOI: 10.22033/ESGF/CMIP6.11003
CAMS:CAMS-CSM1-0	ScenarioMIP	Rong (2019b), DOI: 10.22033/ESGF/CMIP6.11004
CAS:CAS-ESM2-0	CMIP	Chai (2020a), DOI: 10.22033/ESGF/CMIP6.1944
CAS:CAS-ESM2-0	FAFMIP	Chai (2020b), DOI: 10.22033/ESGF/CMIP6.1948
CAS:CAS-ESM2-0	OMIP	Chai (2020c), DOI: 10.22033/ESGF/CMIP6.1954
CAS:FGOALS-f3-H	HighResMIP	Bao and He (2019a), DOI: 10.22033/ESGF/CMIP6.2041
CAS:FGOALS-f3-H	OMIP	Lin (2020a), DOI: 10.22033/ESGF/CMIP6.13261
CAS:FGOALS-f3-L	CMIP	Yu (2018), DOI: 10.22033/ESGF/CMIP6.1782
CAS:FGOALS-f3-L	GMMIP	He and Bao (2019a), DOI: 10.22033/ESGF/CMIP6.2043
CAS:FGOALS-f3-L	HighResMIP	Bao and He (2019b), DOI: 10.22033/ESGF/CMIP6.12001
CAS:FGOALS-f3-L	OMIP	Lin (2019), DOI: 10.22033/ESGF/CMIP6.2044
CAS:FGOALS-f3-L	PAMIP	He and Bao (2019b), DOI: 10.22033/ESGF/CMIP6.11497
CAS:FGOALS-f3-L	PMIP	Zheng and He (2019), DOI: 10.22033/ESGF/CMIP6.12002
CAS:FGOALS-f3-L	ScenarioMIP	Yu (2019), DOI: 10.22033/ESGF/CMIP6.2046
CAS:FGOALS-g3	CMIP	Li (2019a), DOI: 10.22033/ESGF/CMIP6.1783
CAS:FGOALS-g3	DAMIP	Li (2020a), DOI: 10.22033/ESGF/CMIP6.2048
CAS:FGOALS-g3	FAFMIP	Lin (2020b), DOI: 10.22033/ESGF/CMIP6.2050
CAS:FGOALS-g3	GMMIP	Li (2020b), DOI: 10.22033/ESGF/CMIP6.2051
CAS:FGOALS-g3	LS3MIP	Jia et al. (2020), DOI: 10.22033/ESGF/CMIP6.2052
CAS:FGOALS-g3	PMIP	Zheng and Dong (2019), DOI: 10.22033/ESGF/CMIP6.2054
CAS:FGOALS-g3	ScenarioMIP	Li (2019b), DOI: 10.22033/ESGF/CMIP6.2056

Institute: Model	Activity ID	Dataset citation and DOI
CCCR-IITM:IITM-ESM	CMIP	Gopinathan et al. (2019a), DOI: 10.22033/ESGF/CMIP6.44
CCCR-IITM:IITM-ESM	GMMIP	Gopinathan et al. (2019b), DOI: 10.22033/ESGF/CMIP6.825
CCCR-IITM:IITM-ESM	ScenarioMIP	Panickal and Narayanasetti (2020), DOI: 10.22033/ESGF/CMIP6.14741
CCCma:CanESM5	C4MIP	Swart et al. (2019b), DOI: 10.22033/ESGF/CMIP6.1301
CCCma:CanESM5	CDRMIP	Swart et al. (2019c), DOI: 10.22033/ESGF/CMIP6.10201
CCCma:CanESM5	CFMIP	Cole et al. (2019d), DOI: 10.22033/ESGF/CMIP6.1302
CCCma:CanESM5	CMIP	Swart et al. (2019d), DOI: 10.22033/ESGF/CMIP6.1303
CCCma:CanESM5	DAMIP	Swart et al. (2019e), DOI: 10.22033/ESGF/CMIP6.1305
CCCma:CanESM5	DCPP	Sospedra-Alfonso et al. (2019), DOI: 10.22033/ESGF/CMIP6.1306
CCCma:CanESM5	FAFMIP	Swart et al. (2019f), DOI: 10.22033/ESGF/CMIP6.1308
CCCma:CanESM5	GMMIP	Swart et al. (2019g), DOI: 10.22033/ESGF/CMIP6.1309
CCCma:CanESM5	GeoMIP	Cole et al. (2019c), DOI: 10.22033/ESGF/CMIP6.1310
CCCma:CanESM5	LUMIP	Swart et al. (2019h), DOI: 10.22033/ESGF/CMIP6.1313
CCCma:CanESM5	OMIP	Swart et al. (2019i), DOI: 10.22033/ESGF/CMIP6.1314
CCCma:CanESM5	PAMIP	Sigmond et al. (2019), DOI: 10.22033/ESGF/CMIP6.13942
CCCma:CanESM5	RFMIP	Cole et al. (2019a), DOI: 10.22033/ESGF/CMIP6.1315
CCCma:CanESM5	ScenarioMIP	Swart et al. (2019j), DOI: 10.22033/ESGF/CMIP6.1317
CCCma:CanESM5	VolMIP	Cole et al. (2019b), DOI: 10.22033/ESGF/CMIP6.10202
CCCma:CanESM5-CanOE	C4MIP	Swart et al. (2019k), DOI: 10.22033/ESGF/CMIP6.10203
CCCma:CanESM5-CanOE	CDRMIP	Swart et al. (2019l), DOI: 10.22033/ESGF/CMIP6.10204
CCCma:CanESM5-CanOE	CMIP	Swart et al. (2019m), DOI: 10.22033/ESGF/CMIP6.10205
CCCma:CanESM5-CanOE	OMIP	Swart et al. (2019n), DOI: 10.22033/ESGF/CMIP6.10206
CCCma:CanESM5-CanOE	ScenarioMIP	Swart et al. (2019o), DOI: 10.22033/ESGF/CMIP6.10207
CMCC:CMCC-CM2-HR4	CMIP	Scoccimarro et al. (2020a), DOI: 10.22033/ESGF/CMIP6.1358
CMCC:CMCC-CM2-HR4	HighResMIP	Scoccimarro et al. (2017a), DOI: 10.22033/ESGF/CMIP6.1359
CMCC:CMCC-CM2-HR4	OMIP	Fogli et al. (2020a), DOI: 10.22033/ESGF/CMIP6.13161
CMCC:CMCC-CM2-SR5	CMIP	Lovato and Peano (2020a), DOI: 10.22033/ESGF/CMIP6.1362
CMCC:CMCC-CM2-SR5	DCPP	Nicoli and Bellucci (2020), DOI: 10.22033/ESGF/CMIP6.1363
CMCC:CMCC-CM2-SR5	OMIP	Fogli et al. (2020b), DOI: 10.22033/ESGF/CMIP6.13162
CMCC:CMCC-CM2-SR5	ScenarioMIP	Lovato and Peano (2020b), DOI: 10.22033/ESGF/CMIP6.1365
CMCC:CMCC-CM2-VHR4	HighResMIP	Scoccimarro et al. (2017b), DOI: 10.22033/ESGF/CMIP6.1367
CMCC:CMCC-ESM2	C4MIP	Lovato et al. (2021a), DOI: 10.22033/ESGF/CMIP6.13163
CMCC:CMCC-ESM2	CMIP	Lovato et al. (2021b), DOI: 10.22033/ESGF/CMIP6.13164
CMCC:CMCC-ESM2	LS3MIP	Peano et al. (2020a), DOI: 10.22033/ESGF/CMIP6.13165
CMCC:CMCC-ESM2	LUMIP	Peano et al. (2020b), DOI: 10.22033/ESGF/CMIP6.13166
CMCC:CMCC-ESM2	OMIP	Lovato and Butenschön (2021), DOI: 10.22033/ESGF/CMIP6.13167
CMCC:CMCC-ESM2	ScenarioMIP	Lovato et al. (2021c), DOI: 10.22033/ESGF/CMIP6.13168
CMCC:CMCC-ESM2-SR5	LS3MIP	Peano et al. (2019), DOI: 10.22033/ESGF/CMIP6.1372
CMCC:CMCC-ESM2-SR5	LUMIP	Peano and Lovato (2019), DOI: 10.22033/ESGF/CMIP6.1373
CNRM-CERFACS:CNRM-CM6-1	CFMIP	Voltaire (2019a), DOI: 10.22033/ESGF/CMIP6.1374
CNRM-CERFACS:CNRM-CM6-1	CMIP	Voltaire (2018), DOI: 10.22033/ESGF/CMIP6.1375
CNRM-CERFACS:CNRM-CM6-1	DAMIP	Voltaire (2019b), DOI: 10.22033/ESGF/CMIP6.1376
CNRM-CERFACS:CNRM-CM6-1	DCPP	Voltaire (2019c), DOI: 10.22033/ESGF/CMIP6.1377
CNRM-CERFACS:CNRM-CM6-1	GMMIP	Voltaire (2019d), DOI: 10.22033/ESGF/CMIP6.1379
CNRM-CERFACS:CNRM-CM6-1	HighResMIP	Voltaire (2019e), DOI: 10.22033/ESGF/CMIP6.1925

Institute: Model	Activity ID	Dataset citation and DOI
CNRM-CERFACS:CNRM-CM6-1	LS3MIP	Voltaire (2019f), DOI: 10.22033/ESGF/CMIP6.1381
CNRM-CERFACS:CNRM-CM6-1	OMIP	Voltaire (2019g), DOI: 10.22033/ESGF/CMIP6.10336
CNRM-CERFACS:CNRM-CM6-1	PAMIP	Voltaire (2021a), DOI: 10.22033/ESGF/CMIP6.9561
CNRM-CERFACS:CNRM-CM6-1	PMIP	Voltaire (2020), DOI: 10.22033/ESGF/CMIP6.1382
CNRM-CERFACS:CNRM-CM6-1	RFMIP	Voltaire (2019h), DOI: 10.22033/ESGF/CMIP6.1383
CNRM-CERFACS:CNRM-CM6-1	ScenarioMIP	Voltaire (2019i), DOI: 10.22033/ESGF/CMIP6.1384
CNRM-CERFACS:CNRM-CM6-1-HR	CMIP	Voltaire (2019j), DOI: 10.22033/ESGF/CMIP6.1385
CNRM-CERFACS:CNRM-CM6-1-HR	GMMIP	Voltaire (2019k), DOI: 10.22033/ESGF/CMIP6.13921
CNRM-CERFACS:CNRM-CM6-1-HR	HighResMIP	Voltaire (2019l), DOI: 10.22033/ESGF/CMIP6.1387
CNRM-CERFACS:CNRM-CM6-1-HR	OMIP	Voltaire (2021b), DOI: 10.22033/ESGF/CMIP6.10337
CNRM-CERFACS:CNRM-CM6-1-HR	ScenarioMIP	Voltaire (2019m), DOI: 10.22033/ESGF/CMIP6.1388
CNRM-CERFACS:CNRM-ESM2-1	AerChemMIP	Séférián (2019a), DOI: 10.22033/ESGF/CMIP6.1389
CNRM-CERFACS:CNRM-ESM2-1	C4MIP	Séférián (2018a), DOI: 10.22033/ESGF/CMIP6.1390
CNRM-CERFACS:CNRM-ESM2-1	CDRMIP	Séférián (2021), DOI: 10.22033/ESGF/CMIP6.9562
CNRM-CERFACS:CNRM-ESM2-1	CMIP	Séférián (2018b), DOI: 10.22033/ESGF/CMIP6.1391
CNRM-CERFACS:CNRM-ESM2-1	GMMIP	Séférián (2019c), DOI: 10.22033/ESGF/CMIP6.13922
CNRM-CERFACS:CNRM-ESM2-1	GeoMIP	Séférián (2019b), DOI: 10.22033/ESGF/CMIP6.1392
CNRM-CERFACS:CNRM-ESM2-1	LS3MIP	Séférián (2019d), DOI: 10.22033/ESGF/CMIP6.9564
CNRM-CERFACS:CNRM-ESM2-1	LUMIP	Séférián (2019e), DOI: 10.22033/ESGF/CMIP6.1393
CNRM-CERFACS:CNRM-ESM2-1	OMIP	Séférián (2019f), DOI: 10.22033/ESGF/CMIP6.1394
CNRM-CERFACS:CNRM-ESM2-1	RFMIP	Séférián (2019g), DOI: 10.22033/ESGF/CMIP6.9565
CNRM-CERFACS:CNRM-ESM2-1	ScenarioMIP	Séférián (2019h), DOI: 10.22033/ESGF/CMIP6.1395
CSIRO-ARCCSS:ACCESS-CM2	CMIP	Dix et al. (2019a), DOI: 10.22033/ESGF/CMIP6.2281
CSIRO-ARCCSS:ACCESS-CM2	FAFMIP	Savita et al. (2019), DOI: 10.22033/ESGF/CMIP6.2282
CSIRO-ARCCSS:ACCESS-CM2	RFMIP	Dix et al. (2020), DOI: 10.22033/ESGF/CMIP6.2284
CSIRO-ARCCSS:ACCESS-CM2	ScenarioMIP	Dix et al. (2019b), DOI: 10.22033/ESGF/CMIP6.2285
CSIRO:ACCESS-ESM1-5	C4MIP	Ziehn et al. (2019a), DOI: 10.22033/ESGF/CMIP6.2286
CSIRO:ACCESS-ESM1-5	CDRMIP	Ziehn et al. (2019b), DOI: 10.22033/ESGF/CMIP6.2287
CSIRO:ACCESS-ESM1-5	CMIP	Ziehn et al. (2019c), DOI: 10.22033/ESGF/CMIP6.2288
CSIRO:ACCESS-ESM1-5	DAMIP	Ziehn et al. (2020b), DOI: 10.22033/ESGF/CMIP6.14362
CSIRO:ACCESS-ESM1-5	PMIP	Yeung et al. (2019), DOI: 10.22033/ESGF/CMIP6.13701
CSIRO:ACCESS-ESM1-5	RFMIP	Ziehn et al. (2020c), DOI: 10.22033/ESGF/CMIP6.2290
CSIRO:ACCESS-ESM1-5	ScenarioMIP	Ziehn et al. (2019d), DOI: 10.22033/ESGF/CMIP6.2291
DKRZ:MPI-ESM1-2-HR	ScenarioMIP	Schupfner et al. (2019), DOI: 10.22033/ESGF/CMIP6.2450
DWD:MPI-ESM1-2-HR	ScenarioMIP	Steger et al. (2019), DOI: 10.22033/ESGF/CMIP6.1869
E3SM-Project:E3SM-1-0	CMIP	Bader et al. (2019a), DOI: 10.22033/ESGF/CMIP6.2294
E3SM-Project:E3SM-1-1	C4MIP	Bader et al. (2019b), DOI: 10.22033/ESGF/CMIP6.11441
E3SM-Project:E3SM-1-1	CMIP	Bader et al. (2019c), DOI: 10.22033/ESGF/CMIP6.11442
E3SM-Project:E3SM-1-1	ScenarioMIP	Bader et al. (2020a), DOI: 10.22033/ESGF/CMIP6.15103
E3SM-Project:E3SM-1-1-ECA	C4MIP	Bader et al. (2020b), DOI: 10.22033/ESGF/CMIP6.11443
E3SM-Project:E3SM-1-1-ECA	CMIP	Bader et al. (2019d), DOI: 10.22033/ESGF/CMIP6.11444
EC-Earth-Consortium:EC-Earth3	CMIP	EC-Earth Consortium (EC-Earth) (2019a), DOI: 10.22033/ESGF/CMIP6.181
EC-Earth-Consortium:EC-Earth3	DAMIP	EC-Earth Consortium (EC-Earth) (2020a), DOI: 10.22033/ESGF/CMIP6.14701
EC-Earth-Consortium:EC-Earth3	DCPP	EC-Earth Consortium (EC-Earth) (2019b), DOI: 10.22033/ESGF/CMIP6.227
EC-Earth-Consortium:EC-Earth3	LS3MIP	EC-Earth Consortium (EC-Earth) (2020b), DOI: 10.22033/ESGF/CMIP6.218

Institute: Model	Activity ID	Dataset citation and DOI
EC-Earth-Consortium:EC-Earth3	OMIP	EC-Earth Consortium (EC-Earth) (2020c), DOI: 10.22033/ESGF/CMIP6.14702
EC-Earth-Consortium:EC-Earth3	RFMIP	EC-Earth Consortium (EC-Earth) (2020d), DOI: 10.22033/ESGF/CMIP6.242
EC-Earth-Consortium:EC-Earth3	ScenarioMIP	EC-Earth Consortium (EC-Earth) (2019c), DOI: 10.22033/ESGF/CMIP6.251
EC-Earth-Consortium:EC-Earth3-AerChem	AerChemMIP	EC-Earth Consortium (EC-Earth) (2020e), DOI: 10.22033/ESGF/CMIP6.699
EC-Earth-Consortium:EC-Earth3-AerChem	CMIP	EC-Earth Consortium (EC-Earth) (2020f), DOI: 10.22033/ESGF/CMIP6.639
EC-Earth-Consortium:EC-Earth3-AerChem	RFMIP	EC-Earth Consortium (EC-Earth) (2020g), DOI: 10.22033/ESGF/CMIP6.15326
EC-Earth-Consortium:EC-Earth3-AerChem	ScenarioMIP	EC-Earth Consortium (EC-Earth) (2020h), DOI: 10.22033/ESGF/CMIP6.724
EC-Earth-Consortium:EC-Earth3-CC	C4MIP	EC-Earth Consortium (EC-Earth) (2020i), DOI: 10.22033/ESGF/CMIP6.650
EC-Earth-Consortium:EC-Earth3-CC	CMIP	EC-Earth Consortium (EC-Earth) (2020j), DOI: 10.22033/ESGF/CMIP6.640
EC-Earth-Consortium:EC-Earth3-CC	ScenarioMIP	EC-Earth Consortium (EC-Earth) (2021), DOI: 10.22033/ESGF/CMIP6.15327
EC-Earth-Consortium:EC-Earth3-LR	CMIP	EC-Earth Consortium (EC-Earth) (2019d), DOI: 10.22033/ESGF/CMIP6.202
EC-Earth-Consortium:EC-Earth3-LR	PMIP	EC-Earth Consortium (EC-Earth) (2020k), DOI: 10.22033/ESGF/CMIP6.247
EC-Earth-Consortium:EC-Earth3-Veg	CMIP	EC-Earth Consortium (EC-Earth) (2019f), DOI: 10.22033/ESGF/CMIP6.642
EC-Earth-Consortium:EC-Earth3-Veg	LS3MIP	EC-Earth Consortium (EC-Earth) (2020m), DOI: 10.22033/ESGF/CMIP6.672
EC-Earth-Consortium:EC-Earth3-Veg	LUMIP	EC-Earth Consortium (EC-Earth) (2020n), DOI: 10.22033/ESGF/CMIP6.692
EC-Earth-Consortium:EC-Earth3-Veg	ScenarioMIP	EC-Earth Consortium (EC-Earth) (2019g), DOI: 10.22033/ESGF/CMIP6.727
EC-Earth-Consortium:EC-Earth3-Veg-LR	CMIP	EC-Earth Consortium (EC-Earth) (2020o), DOI: 10.22033/ESGF/CMIP6.643
EC-Earth-Consortium:EC-Earth3-Veg-LR	PMIP	EC-Earth Consortium (EC-Earth) (2020p), DOI: 10.22033/ESGF/CMIP6.718
EC-Earth-Consortium:EC-Earth3-Veg-LR	ScenarioMIP	EC-Earth Consortium (EC-Earth) (2020q), DOI: 10.22033/ESGF/CMIP6.728
EC-Earth-Consortium:EC-Earth3P	HighResMIP	EC-Earth Consortium (EC-Earth) (2019e), DOI: 10.22033/ESGF/CMIP6.2322
EC-Earth-Consortium:EC-Earth3P-HR	HighResMIP	EC-Earth Consortium (EC-Earth) (2018), DOI: 10.22033/ESGF/CMIP6.2323
EC-Earth-Consortium:EC-Earth3P-VHR	CMIP	EC-Earth Consortium (EC-Earth) (2020i), DOI: 10.22033/ESGF/CMIP6.2326
ECMWF:ECMWF-IFS-HR	HighResMIP	Roberts et al. (2017a), DOI: 10.22033/ESGF/CMIP6.2461
ECMWF:ECMWF-IFS-LR	HighResMIP	Roberts et al. (2017b), DOI: 10.22033/ESGF/CMIP6.2463
ECMWF:ECMWF-IFS-MR	HighResMIP	Roberts et al. (2018a), DOI: 10.22033/ESGF/CMIP6.2465
FIO-QLNM:FIO-ESM-2-0	CMIP	Song et al. (2019a), DOI: 10.22033/ESGF/CMIP6.9047
FIO-QLNM:FIO-ESM-2-0	GMMIP	Song et al. (2019b), DOI: 10.22033/ESGF/CMIP6.9049
FIO-QLNM:FIO-ESM-2-0	ScenarioMIP	Song et al. (2019c), DOI: 10.22033/ESGF/CMIP6.9051
HAMMOZ-Consortium:MPI-ESM-1-2-HAM	AerChemMIP	Neubauer et al. (2019b), DOI: 10.22033/ESGF/CMIP6.1621
HAMMOZ-Consortium:MPI-ESM-1-2-HAM	CMIP	Neubauer et al. (2019c), DOI: 10.22033/ESGF/CMIP6.1622
HAMMOZ-Consortium:MPI-ESM-1-2-HAM	RFMIP	Neubauer et al. (2019d), DOI: 10.22033/ESGF/CMIP6.14724
INM:INM-CM4-8	CMIP	Volodin et al. (2019a), DOI: 10.22033/ESGF/CMIP6.1422
INM:INM-CM4-8	PMIP	Volodin et al. (2019b), DOI: 10.22033/ESGF/CMIP6.2295
INM:INM-CM4-8	ScenarioMIP	Volodin et al. (2019c), DOI: 10.22033/ESGF/CMIP6.12321
INM:INM-CM5-0	CMIP	Volodin et al. (2019d), DOI: 10.22033/ESGF/CMIP6.1423
INM:INM-CM5-0	ScenarioMIP	Volodin et al. (2019e), DOI: 10.22033/ESGF/CMIP6.12322
INM:INM-CM5-H	HighResMIP	Volodin et al. (2019f), DOI: 10.22033/ESGF/CMIP6.14041
IPSL:4AOP-v1-5	RFMIP	Boucher et al. (2020e), DOI: 10.22033/ESGF/CMIP6.12340
IPSL:IPSL-CM5A2-INCA	CMIP	Boucher et al. (2020a), DOI: 10.22033/ESGF/CMIP6.13642
IPSL:IPSL-CM5A2-INCA	LUMIP	Boucher et al. (2020f), DOI: 10.22033/ESGF/CMIP6.15666
IPSL:IPSL-CM5A2-INCA	ScenarioMIP	Boucher et al. (2020d), DOI: 10.22033/ESGF/CMIP6.15667
IPSL:IPSL-CM6A-ATM-HR	HighResMIP	Boucher et al. (2019e), DOI: 10.22033/ESGF/CMIP6.2361
IPSL:IPSL-CM6A-LR	C4MIP	Boucher et al. (2018d), DOI: 10.22033/ESGF/CMIP6.1521
IPSL:IPSL-CM6A-LR	CFMIP	Boucher et al. (2018a), DOI: 10.22033/ESGF/CMIP6.1522
IPSL:IPSL-CM6A-LR	CMIP	Boucher et al. (2018c), DOI: 10.22033/ESGF/CMIP6.1534

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IPSL:IPSL-CM6A-LR	DAMIP	Boucher et al. (2018f), DOI: 10.22033/ESGF/CMIP6.13801
IPSL:IPSL-CM6A-LR	DCPP	Boucher et al. (2019b), DOI: 10.22033/ESGF/CMIP6.1523
IPSL:IPSL-CM6A-LR	GMMIP	Boucher et al. (2018h), DOI: 10.22033/ESGF/CMIP6.1525
IPSL:IPSL-CM6A-LR	GeoMIP	Boucher et al. (2018g), DOI: 10.22033/ESGF/CMIP6.1526
IPSL:IPSL-CM6A-LR	HighResMIP	Boucher et al. (2019f), DOI: 10.22033/ESGF/CMIP6.13803
IPSL:IPSL-CM6A-LR	LS3MIP	Boucher et al. (2019g), DOI: 10.22033/ESGF/CMIP6.1527
IPSL:IPSL-CM6A-LR	LUMIP	Boucher et al. (2019h), DOI: 10.22033/ESGF/CMIP6.1528
IPSL:IPSL-CM6A-LR	OMIP	Boucher et al. (2019c), DOI: 10.22033/ESGF/CMIP6.1529
IPSL:IPSL-CM6A-LR	PAMIP	Boucher et al. (2019d), DOI: 10.22033/ESGF/CMIP6.13802
IPSL:IPSL-CM6A-LR	PMIP	Boucher et al. (2018b), DOI: 10.22033/ESGF/CMIP6.1530
IPSL:IPSL-CM6A-LR	RFMIP	Boucher et al. (2018e), DOI: 10.22033/ESGF/CMIP6.1531
IPSL:IPSL-CM6A-LR	ScenarioMIP	Boucher et al. (2019a), DOI: 10.22033/ESGF/CMIP6.1532
IPSL:IPSL-CM6A-LR-INCA	AerChemMIP	Boucher et al. (2020b), DOI: 10.22033/ESGF/CMIP6.13581
IPSL:IPSL-CM6A-LR-INCA	CMIP	Boucher et al. (2021), DOI: 10.22033/ESGF/CMIP6.13582
IPSL:IPSL-CM6A-LR-INCA	RFMIP	Boucher et al. (2020c), DOI: 10.22033/ESGF/CMIP6.14583
KIOST:KIOST-ESM	CMIP	Kim et al. (2019a), DOI: 10.22033/ESGF/CMIP6.1922
KIOST:KIOST-ESM	ScenarioMIP	Kim et al. (2019b), DOI: 10.22033/ESGF/CMIP6.11241
LLNL:E3SM-1-0	CFMIP	Qin et al. (2021), DOI: 10.22033/ESGF/CMIP6.15093
MIROC:MIROC-ES2H	CMIP	Watanabe et al. (2021a), DOI: 10.22033/ESGF/CMIP6.901
MIROC:MIROC-ES2H	GeoMIP	Watanabe et al. (2021b), DOI: 10.22033/ESGF/CMIP6.907
MIROC:MIROC-ES2H-NB	AerChemMIP	Sudo et al. (2020), DOI: 10.22033/ESGF/CMIP6.13305
MIROC:MIROC-ES2L	C4MIP	Hajima et al. (2019c), DOI: 10.22033/ESGF/CMIP6.906
MIROC:MIROC-ES2L	CDRMIP	Hajima et al. (2020b), DOI: 10.22033/ESGF/CMIP6.2161
MIROC:MIROC-ES2L	CMIP	Hajima et al. (2019a), DOI: 10.22033/ESGF/CMIP6.902
MIROC:MIROC-ES2L	DAMIP	Ohgaito et al. (2020), DOI: 10.22033/ESGF/CMIP6.15241
MIROC:MIROC-ES2L	LUMIP	Hajima et al. (2019b), DOI: 10.22033/ESGF/CMIP6.922
MIROC:MIROC-ES2L	OMIP	Watanabe et al. (2020), DOI: 10.22033/ESGF/CMIP6.934
MIROC:MIROC-ES2L	PMIP	Ohgaito et al. (2019), DOI: 10.22033/ESGF/CMIP6.932
MIROC:MIROC-ES2L	ScenarioMIP	Tachiiri et al. (2019), DOI: 10.22033/ESGF/CMIP6.936
MIROC:MIROC-ES2L	VoIMIP	Abe et al. (2021), DOI: 10.22033/ESGF/CMIP6.918
MIROC:MIROC6	AerChemMIP	Takemura (2019), DOI: 10.22033/ESGF/CMIP6.9121
MIROC:MIROC6	CFMIP	Ogura et al. (2019), DOI: 10.22033/ESGF/CMIP6.885
MIROC:MIROC6	CMIP	Tatebe and Watanabe (2018), DOI: 10.22033/ESGF/CMIP6.881
MIROC:MIROC6	DAMIP	Shiogama (2019), DOI: 10.22033/ESGF/CMIP6.894
MIROC:MIROC6	DCPP	Mochizuki et al. (2019), DOI: 10.22033/ESGF/CMIP6.890
MIROC:MIROC6	FAFMIP	Suzuki (2019), DOI: 10.22033/ESGF/CMIP6.892
MIROC:MIROC6	GMMIP	Watanabe and Tatebe (2019), DOI: 10.22033/ESGF/CMIP6.886
MIROC:MIROC6	LS3MIP	Onuma and Kim (2020), DOI: 10.22033/ESGF/CMIP6.887
MIROC:MIROC6	OMIP	Komuro (2019), DOI: 10.22033/ESGF/CMIP6.897
MIROC:MIROC6	PAMIP	Mori (2019), DOI: 10.22033/ESGF/CMIP6.2162
MIROC:MIROC6	RFMIP	Sekiguchi and Shiogama (2019), DOI: 10.22033/ESGF/CMIP6.895
MIROC:MIROC6	ScenarioMIP	Shiogama et al. (2019), DOI: 10.22033/ESGF/CMIP6.898
MIROC:NICAM16-7S	HighResMIP	Kodama et al. (2019a), DOI: 10.22033/ESGF/CMIP6.1033
MIROC:NICAM16-8S	HighResMIP	Kodama et al. (2019b), DOI: 10.22033/ESGF/CMIP6.1034
MIROC:NICAM16-9S	HighResMIP	Kodama et al. (2019c), DOI: 10.22033/ESGF/CMIP6.1036

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MOHC:HadGEM3-GC31-HH	HighResMIP	Roberts (2018), DOI: 10.22033/ESGF/CMIP6.445
MOHC:HadGEM3-GC31-HM	HighResMIP	Roberts (2017a), DOI: 10.22033/ESGF/CMIP6.446
MOHC:HadGEM3-GC31-LL	CFMIP	Webb (2019), DOI: 10.22033/ESGF/CMIP6.435
MOHC:HadGEM3-GC31-LL	CMIP	Ridley et al. (2018a), DOI: 10.22033/ESGF/CMIP6.419
MOHC:HadGEM3-GC31-LL	DAMIP	G. Jones (2019), DOI: 10.22033/ESGF/CMIP6.471
MOHC:HadGEM3-GC31-LL	HighResMIP	Roberts (2017b), DOI: 10.22033/ESGF/CMIP6.1901
MOHC:HadGEM3-GC31-LL	LS3MIP	Wiltshire et al. (2020b), DOI: 10.22033/ESGF/CMIP6.14460
MOHC:HadGEM3-GC31-LL	LUMIP	Wiltshire et al. (2020a), DOI: 10.22033/ESGF/CMIP6.14461
MOHC:HadGEM3-GC31-LL	RFMIP	Andrews (2019), DOI: 10.22033/ESGF/CMIP6.475
MOHC:HadGEM3-GC31-LL	ScenarioMIP	Good (2019), DOI: 10.22033/ESGF/CMIP6.10845
MOHC:HadGEM3-GC31-LM	HighResMIP	Roberts (2017c), DOI: 10.22033/ESGF/CMIP6.1321
MOHC:HadGEM3-GC31-MH	HighResMIP	Roberts (2017d), DOI: 10.22033/ESGF/CMIP6.1762
MOHC:HadGEM3-GC31-MM	CMIP	Ridley et al. (2019), DOI: 10.22033/ESGF/CMIP6.420
MOHC:HadGEM3-GC31-MM	DCPP	Hermanson (2020), DOI: 10.22033/ESGF/CMIP6.456
MOHC:HadGEM3-GC31-MM	HighResMIP	Roberts (2017e), DOI: 10.22033/ESGF/CMIP6.1902
MOHC:HadGEM3-GC31-MM	PAMIP	Eade (2020), DOI: 10.22033/ESGF/CMIP6.14627
MOHC:HadGEM3-GC31-MM	ScenarioMIP	Jackson (2020), DOI: 10.22033/ESGF/CMIP6.10846
MOHC:UKESM1-0-LL	AerChemMIP	O'Connor (2019), DOI: 10.22033/ESGF/CMIP6.1561
MOHC:UKESM1-0-LL	C4MIP	Liddicoat et al. (2019), DOI: 10.22033/ESGF/CMIP6.1562
MOHC:UKESM1-0-LL	CDRMIP	Jones et al. (2019), DOI: 10.22033/ESGF/CMIP6.12181
MOHC:UKESM1-0-LL	CMIP	Tang et al. (2019), DOI: 10.22033/ESGF/CMIP6.1569
MOHC:UKESM1-0-LL	DAMIP	Rumbold et al. (2020), DOI: 10.22033/ESGF/CMIP6.14830
MOHC:UKESM1-0-LL	GeoMIP	A. Jones (2019), DOI: 10.22033/ESGF/CMIP6.1563
MOHC:UKESM1-0-LL	LS3MIP	Wiltshire et al. (2020c), DOI: 10.22033/ESGF/CMIP6.14462
MOHC:UKESM1-0-LL	LUMIP	Wiltshire et al. (2019), DOI: 10.22033/ESGF/CMIP6.1564
MOHC:UKESM1-0-LL	RFMIP	O'Connor et al. (2019), DOI: 10.22033/ESGF/CMIP6.11061
MOHC:UKESM1-0-LL	ScenarioMIP	Good et al. (2019), DOI: 10.22033/ESGF/CMIP6.1567
MPI-M:MPI-ESM1-2-HR	CMIP	Jungclaus et al. (2019a), DOI: 10.22033/ESGF/CMIP6.741
MPI-M:MPI-ESM1-2-HR	DCPP	Pohlmann et al. (2019), DOI: 10.22033/ESGF/CMIP6.768
MPI-M:MPI-ESM1-2-HR	FAFMIP	Haak et al. (2019), DOI: 10.22033/ESGF/CMIP6.774
MPI-M:MPI-ESM1-2-HR	GeoMIP	Niemeier et al. (2019a), DOI: 10.22033/ESGF/CMIP6.15294
MPI-M:MPI-ESM1-2-HR	HighResMIP	von Storch et al. (2017a), DOI: 10.22033/ESGF/CMIP6.762
MPI-M:MPI-ESM1-2-LR	C4MIP	Brovkin et al. (2019), DOI: 10.22033/ESGF/CMIP6.748
MPI-M:MPI-ESM1-2-LR	CMIP	Wieners et al. (2019b), DOI: 10.22033/ESGF/CMIP6.742
MPI-M:MPI-ESM1-2-LR	DAMIP	Müller et al. (2019), DOI: 10.22033/ESGF/CMIP6.15016
MPI-M:MPI-ESM1-2-LR	GeoMIP	Niemeier et al. (2019b), DOI: 10.22033/ESGF/CMIP6.751
MPI-M:MPI-ESM1-2-LR	LS3MIP	Stracke et al. (2019), DOI: 10.22033/ESGF/CMIP6.760
MPI-M:MPI-ESM1-2-LR	LUMIP	Pongratz et al. (2019), DOI: 10.22033/ESGF/CMIP6.772
MPI-M:MPI-ESM1-2-LR	PMIP	Jungclaus et al. (2019b), DOI: 10.22033/ESGF/CMIP6.787
MPI-M:MPI-ESM1-2-LR	RFMIP	Fiedler et al. (2019b), DOI: 10.22033/ESGF/CMIP6.784
MPI-M:MPI-ESM1-2-LR	ScenarioMIP	Wieners et al. (2019a), DOI: 10.22033/ESGF/CMIP6.793
MPI-M:MPI-ESM1-2-XR	HighResMIP	von Storch et al. (2017b), DOI: 10.22033/ESGF/CMIP6.10290
MRI:MRI-AGCM3-2-H	HighResMIP	Mizuta et al. (2019a), DOI: 10.22033/ESGF/CMIP6.10942
MRI:MRI-AGCM3-2-S	HighResMIP	Mizuta et al. (2019b), DOI: 10.22033/ESGF/CMIP6.1625
MRI:MRI-ESM2-0	AerChemMIP	Yukimoto et al. (2019b), DOI: 10.22033/ESGF/CMIP6.633

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MRI:MRI-ESM2-0	C4MIP	Yukimoto et al. (2019c), DOI: 10.22033/ESGF/CMIP6.623
MRI:MRI-ESM2-0	CFMIP	Yukimoto et al. (2019d), DOI: 10.22033/ESGF/CMIP6.625
MRI:MRI-ESM2-0	CMIP	Yukimoto et al. (2019e), DOI: 10.22033/ESGF/CMIP6.621
MRI:MRI-ESM2-0	DAMIP	Yukimoto et al. (2019f), DOI: 10.22033/ESGF/CMIP6.634
MRI:MRI-ESM2-0	DCPP	Yukimoto et al. (2020a), DOI: 10.22033/ESGF/CMIP6.630
MRI:MRI-ESM2-0	FAFMIP	Yukimoto et al. (2019g), DOI: 10.22033/ESGF/CMIP6.632
MRI:MRI-ESM2-0	GMMIP	Yukimoto et al. (2019h), DOI: 10.22033/ESGF/CMIP6.626
MRI:MRI-ESM2-0	OMIP	Yukimoto et al. (2020b), DOI: 10.22033/ESGF/CMIP6.637
MRI:MRI-ESM2-0	PMIP	Yukimoto et al. (2019i), DOI: 10.22033/ESGF/CMIP6.636
MRI:MRI-ESM2-0	RFMIP	Yukimoto et al. (2019j), DOI: 10.22033/ESGF/CMIP6.635
MRI:MRI-ESM2-0	ScenarioMIP	Yukimoto et al. (2019k), DOI: 10.22033/ESGF/CMIP6.638
NASA-GISS:GISS-E2-1-G	AerChemMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019a), DOI: 10.22033/ESGF/CMIP6.2059
NASA-GISS:GISS-E2-1-G	C4MIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019b), DOI: 10.22033/ESGF/CMIP6.2060
NASA-GISS:GISS-E2-1-G	CFMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2018a), DOI: 10.22033/ESGF/CMIP6.2061
NASA-GISS:GISS-E2-1-G	CMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2018b), DOI: 10.22033/ESGF/CMIP6.1400
NASA-GISS:GISS-E2-1-G	DAMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2018c), DOI: 10.22033/ESGF/CMIP6.2062
NASA-GISS:GISS-E2-1-G	ISMIP6	NASA Goddard Institute for Space Studies (NASA/GISS) (2018d), DOI: 10.22033/ESGF/CMIP6.2066
NASA-GISS:GISS-E2-1-G	LS3MIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2018e), DOI: 10.22033/ESGF/CMIP6.2067
NASA-GISS:GISS-E2-1-G	LUMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2018f), DOI: 10.22033/ESGF/CMIP6.2068
NASA-GISS:GISS-E2-1-G	PMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019c), DOI: 10.22033/ESGF/CMIP6.2071
NASA-GISS:GISS-E2-1-G	RFMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019d), DOI: 10.22033/ESGF/CMIP6.2072
NASA-GISS:GISS-E2-1-G	ScenarioMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2020), DOI: 10.22033/ESGF/CMIP6.2074
NASA-GISS:GISS-E2-1-G-CC	C4MIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019f), DOI: 10.22033/ESGF/CMIP6.11656
NASA-GISS:GISS-E2-1-G-CC	CMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019g), DOI: 10.22033/ESGF/CMIP6.11657
NASA-GISS:GISS-E2-1-H	CFMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019e), DOI: 10.22033/ESGF/CMIP6.13941
NASA-GISS:GISS-E2-1-H	CMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2018g), DOI: 10.22033/ESGF/CMIP6.1421
NASA-GISS:GISS-E2-2-G	CFMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019h), DOI: 10.22033/ESGF/CMIP6.11659
NASA-GISS:GISS-E2-2-G	CMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019i), DOI: 10.22033/ESGF/CMIP6.2081
NASA-GISS:GISS-E3-G	RFMIP	NASA Goddard Institute for Space Studies (NASA/GISS) (2019j), DOI: 10.22033/ESGF/CMIP6.2098
NCAR:CESM1-1-CAM5-CMIP5	DCPP	Danabasoglu (2019a), DOI: 10.22033/ESGF/CMIP6.11542
NCAR:CESM1-CAM5-SE-HR	HighResMIP	Gent (2020a), DOI: 10.22033/ESGF/CMIP6.14220
NCAR:CESM1-CAM5-SE-LR	HighResMIP	Gent (2020b), DOI: 10.22033/ESGF/CMIP6.14262
NCAR:CESM1-WACCM-SC	PAMIP	Peings (2020), DOI: 10.22033/ESGF/CMIP6.12281
NCAR:CESM2	AerChemMIP	Danabasoglu (2019b), DOI: 10.22033/ESGF/CMIP6.2181
NCAR:CESM2	C4MIP	Danabasoglu (2019c), DOI: 10.22033/ESGF/CMIP6.2182
NCAR:CESM2	CDRMIP	Danabasoglu (2019d), DOI: 10.22033/ESGF/CMIP6.2183
NCAR:CESM2	CFMIP	Danabasoglu (2019e), DOI: 10.22033/ESGF/CMIP6.2184
NCAR:CESM2	CMIP	Danabasoglu (2019f), DOI: 10.22033/ESGF/CMIP6.2185
NCAR:CESM2	DAMIP	Danabasoglu (2019g), DOI: 10.22033/ESGF/CMIP6.2187
NCAR:CESM2	FAFMIP	Danabasoglu (2020), DOI: 10.22033/ESGF/CMIP6.14052
NCAR:CESM2	GMMIP	Danabasoglu (2019h), DOI: 10.22033/ESGF/CMIP6.2190
NCAR:CESM2	ISMIP6	Danabasoglu (2019i), DOI: 10.22033/ESGF/CMIP6.2193
NCAR:CESM2	LS3MIP	Danabasoglu (2019j), DOI: 10.22033/ESGF/CMIP6.2194
NCAR:CESM2	LUMIP	Danabasoglu (2019k), DOI: 10.22033/ESGF/CMIP6.2195
NCAR:CESM2	OMIP	Danabasoglu (2019l), DOI: 10.22033/ESGF/CMIP6.2196

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NCAR:CESM2	PAMIP	Danabasoglu (2019m), DOI: 10.22033/ESGF/CMIP6.2197
NCAR:CESM2	PMIP	Danabasoglu (2019n), DOI: 10.22033/ESGF/CMIP6.2198
NCAR:CESM2	RFMIP	Danabasoglu (2019o), DOI: 10.22033/ESGF/CMIP6.2199
NCAR:CESM2	ScenarioMIP	Danabasoglu (2019p), DOI: 10.22033/ESGF/CMIP6.2201
NCAR:CESM2-FV2	CMIP	Danabasoglu (2019q), DOI: 10.22033/ESGF/CMIP6.11281
NCAR:CESM2-WACCM	AerChemMIP	Danabasoglu (2019r), DOI: 10.22033/ESGF/CMIP6.10023
NCAR:CESM2-WACCM	CMIP	Danabasoglu (2019s), DOI: 10.22033/ESGF/CMIP6.10024
NCAR:CESM2-WACCM	GeoMIP	Danabasoglu (2019t), DOI: 10.22033/ESGF/CMIP6.10025
NCAR:CESM2-WACCM	RFMIP	Danabasoglu (2019u), DOI: 10.22033/ESGF/CMIP6.14053
NCAR:CESM2-WACCM	ScenarioMIP	Danabasoglu (2019v), DOI: 10.22033/ESGF/CMIP6.10026
NCAR:CESM2-WACCM-FV2	CMIP	Danabasoglu (2019w), DOI: 10.22033/ESGF/CMIP6.11282
NCC:NorCPM1	CMIP	Bethke et al. (2019a), DOI: 10.22033/ESGF/CMIP6.10843
NCC:NorCPM1	DCPP	Bethke et al. (2019b), DOI: 10.22033/ESGF/CMIP6.10844
NCC:NorESM1-F	CMIP	Guo et al. (2019b), DOI: 10.22033/ESGF/CMIP6.11543
NCC:NorESM1-F	PMIP	Guo et al. (2019c), DOI: 10.22033/ESGF/CMIP6.11544
NCC:NorESM2-LM	AerChemMIP	Oliviè et al. (2019a), DOI: 10.22033/ESGF/CMIP6.574
NCC:NorESM2-LM	C4MIP	Schwinger et al. (2019), DOI: 10.22033/ESGF/CMIP6.13721
NCC:NorESM2-LM	CDRMIP	Tjiputra et al. (2019), DOI: 10.22033/ESGF/CMIP6.13722
NCC:NorESM2-LM	CMIP	Seland et al. (2019a), DOI: 10.22033/ESGF/CMIP6.502
NCC:NorESM2-LM	DAMIP	Seland et al. (2019b), DOI: 10.22033/ESGF/CMIP6.580
NCC:NorESM2-LM	LUMIP	Cai et al. (2020), DOI: 10.22033/ESGF/CMIP6.562
NCC:NorESM2-LM	OMIP	Bentsen et al. (2019a), DOI: 10.22033/ESGF/CMIP6.598
NCC:NorESM2-LM	PAMIP	Graff et al. (2019), DOI: 10.22033/ESGF/CMIP6.13723
NCC:NorESM2-LM	PMIP	Z. Zhang et al. (2019), DOI: 10.22033/ESGF/CMIP6.592
NCC:NorESM2-LM	RFMIP	Oliviè et al. (2019b), DOI: 10.22033/ESGF/CMIP6.586
NCC:NorESM2-LM	ScenarioMIP	Seland et al. (2019c), DOI: 10.22033/ESGF/CMIP6.604
NCC:NorESM2-MM	CMIP	Bentsen et al. (2019b), DOI: 10.22033/ESGF/CMIP6.506
NCC:NorESM2-MM	RFMIP	Oliviè et al. (2020), DOI: 10.22033/ESGF/CMIP6.590
NCC:NorESM2-MM	ScenarioMIP	Bentsen et al. (2019c), DOI: 10.22033/ESGF/CMIP6.608
NERC:HadGEM3-GC31-HH	HighResMIP	Coward and Roberts (2018), DOI: 10.22033/ESGF/CMIP6.1822
NERC:HadGEM3-GC31-HM	HighResMIP	Schiemann et al. (2019), DOI: 10.22033/ESGF/CMIP6.1824
NERC:HadGEM3-GC31-LL	FAFMIP	Gregory (2021), DOI: 10.22033/ESGF/CMIP6.12065
NERC:HadGEM3-GC31-LL	PMIP	Williams et al. (2020), DOI: 10.22033/ESGF/CMIP6.12067
NERC:UKESM1-0-LL	AerChemMIP	O'Connor (2020), DOI: 10.22033/ESGF/CMIP6.405
NIMS-KMA:KACE-1-0-G	CMIP	Byun et al. (2019b), DOI: 10.22033/ESGF/CMIP6.2241
NIMS-KMA:KACE-1-0-G	ScenarioMIP	Byun et al. (2019a), DOI: 10.22033/ESGF/CMIP6.2242
NIMS-KMA:UKESM1-0-LL	AerChemMIP	Shim et al. (2020a), DOI: 10.22033/ESGF/CMIP6.2243
NIMS-KMA:UKESM1-0-LL	CMIP	Shim et al. (2020b), DOI: 10.22033/ESGF/CMIP6.2245
NIMS-KMA:UKESM1-0-LL	ScenarioMIP	Shim et al. (2020c), DOI: 10.22033/ESGF/CMIP6.2250
NIWA:UKESM1-0-LL	AerChemMIP	Dalvi et al. (2019), DOI: 10.22033/ESGF/CMIP6.1741
NOAA-GFDL:GFDL-AM4	CMIP	Zhao et al. (2018b), DOI: 10.22033/ESGF/CMIP6.1401
NOAA-GFDL:GFDL-CM4	CFMIP	Silvers et al. (2018), DOI: 10.22033/ESGF/CMIP6.1641
NOAA-GFDL:GFDL-CM4	CMIP	Guo et al. (2018a), DOI: 10.22033/ESGF/CMIP6.1402
NOAA-GFDL:GFDL-CM4	DAMIP	Ploshay et al. (2018), DOI: 10.22033/ESGF/CMIP6.11383
NOAA-GFDL:GFDL-CM4	GMMIP	Xiang et al. (2018), DOI: 10.22033/ESGF/CMIP6.1642

Institute: Model	Activity ID	Dataset citation and DOI
NOAA-GFDL:GFDL-CM4	OMIP	Adcroft et al. (2018), DOI: 10.22033/ESGF/CMIP6.1403
NOAA-GFDL:GFDL-CM4	RFMIP	Paynter et al. (2018c), DOI: 10.22033/ESGF/CMIP6.1643
NOAA-GFDL:GFDL-CM4	ScenarioMIP	Guo et al. (2018b), DOI: 10.22033/ESGF/CMIP6.9242
NOAA-GFDL:GFDL-CM4C192	HighResMIP	Zhao et al. (2018a), DOI: 10.22033/ESGF/CMIP6.2262
NOAA-GFDL:GFDL-ESM2M	FAFMIP	Hurlin et al. (2018), DOI: 10.22033/ESGF/CMIP6.1645
NOAA-GFDL:GFDL-ESM4	AerChemMIP	Horowitz et al. (2018b), DOI: 10.22033/ESGF/CMIP6.1404
NOAA-GFDL:GFDL-ESM4	C4MIP	Krasting et al. (2018a), DOI: 10.22033/ESGF/CMIP6.1405
NOAA-GFDL:GFDL-ESM4	CDRMIP	John et al. (2018a), DOI: 10.22033/ESGF/CMIP6.1981
NOAA-GFDL:GFDL-ESM4	CMIP	Krasting et al. (2018b), DOI: 10.22033/ESGF/CMIP6.1407
NOAA-GFDL:GFDL-ESM4	DAMIP	Horowitz et al. (2018a), DOI: 10.22033/ESGF/CMIP6.1408
NOAA-GFDL:GFDL-ESM4	LUMIP	Malyshev et al. (2018), DOI: 10.22033/ESGF/CMIP6.1411
NOAA-GFDL:GFDL-ESM4	RFMIP	Paynter et al. (2018d), DOI: 10.22033/ESGF/CMIP6.11961
NOAA-GFDL:GFDL-ESM4	ScenarioMIP	John et al. (2018b), DOI: 10.22033/ESGF/CMIP6.1414
NOAA-GFDL:GFDL-GRTCODE	RFMIP	Paynter et al. (2018a), DOI: 10.22033/ESGF/CMIP6.10404
NOAA-GFDL:GFDL-OM4p5B	OMIP	Zadeh et al. (2018), DOI: 10.22033/ESGF/CMIP6.2264
NOAA-GFDL:GFDL-RFM-DISORT	RFMIP	Paynter et al. (2018b), DOI: 10.22033/ESGF/CMIP6.10406
NTU:TaiESM1-TIMCOM	OMIP	Tseng et al. (2020), DOI: 10.22033/ESGF/CMIP6.14323
NUIST:NESM3	CMIP	Cao and Wang (2019), DOI: 10.22033/ESGF/CMIP6.2021
NUIST:NESM3	PMIP	Cao (2019a), DOI: 10.22033/ESGF/CMIP6.2026
NUIST:NESM3	ScenarioMIP	Cao (2019b), DOI: 10.22033/ESGF/CMIP6.2027
RTE-RRTMGP-Consortium:RTE-RRTMGP-181204	RFMIP	Pincus (2019), DOI: 10.22033/ESGF/CMIP6.10124
SNU:SAM0-UNICON	CMIP	Park and Shin (2019), DOI: 10.22033/ESGF/CMIP6.1489
THU:CIESM	CMIP	Huang (2019a), DOI: 10.22033/ESGF/CMIP6.1352
THU:CIESM	GMMIP	Xue (2020), DOI: 10.22033/ESGF/CMIP6.1354
THU:CIESM	ScenarioMIP	Huang (2019b), DOI: 10.22033/ESGF/CMIP6.1357
UA:MCM-UA-1-0	CMIP	Stouffer (2019a), DOI: 10.22033/ESGF/CMIP6.2421
UA:MCM-UA-1-0	ScenarioMIP	Stouffer (2019b), DOI: 10.22033/ESGF/CMIP6.13816
UHH:ARTS-2-3	RFMIP	Brath (2019), DOI: 10.22033/ESGF/CMIP6.2001

References

- Abe, M. et al., 2021: MIROC MIROC-ES2L model output prepared for CMIP6 VolMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.918](https://doi.org/10.22033/esgf/cmip6.918).
- Adcroft, A. et al., 2018: NOAA-GFDL GFDL-CM4 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1403](https://doi.org/10.22033/esgf/cmip6.1403).
- Adcroft, A. et al., 2019: The GFDL Global Ocean and Sea Ice Model OM4.0: Model Description and Simulation Features. *Journal of Advances in Modeling Earth Systems*, **11**(10), 3167–3211, doi:[10.1029/2019ms001726](https://doi.org/10.1029/2019ms001726).
- Agosta, C. et al., 2019: Estimation of the Antarctic surface mass balance using the regional climate model MAR (1979–2015) and identification of dominant processes. *The Cryosphere*, **13**(1), 281–296, doi:[10.5194/tc-13-281-2019](https://doi.org/10.5194/tc-13-281-2019).
- Akhtar, N., J. Brauch, and B. Ahrens, 2018: Climate modeling over the Mediterranean Sea: impact of resolution and ocean coupling. *Climate Dynamics*, **51**(3), 933–948, doi:[10.1007/s00382-017-3570-8](https://doi.org/10.1007/s00382-017-3570-8).
- Alapaty, K. et al., 2012: New Directions: Understanding interactions of air quality and climate change at regional scales. *Atmospheric Environment*, **49**, 419–421, doi:[10.1016/j.atmosenv.2011.12.016](https://doi.org/10.1016/j.atmosenv.2011.12.016).
- Anderson, B. and A. Mackintosh, 2012: Controls on mass balance sensitivity of maritime glaciers in the Southern Alps, New Zealand: The role of debris cover. *Journal of Geophysical Research: Earth Surface*, **117**(F1), F01003, doi:[10.1029/2011jf002064](https://doi.org/10.1029/2011jf002064).
- Anderson, J.L. et al., 2004: The New GFDL Global Atmosphere and Land Model AM2–LM2: Evaluation with Prescribed SST Simulations. *Journal of Climate*, **17**(24), 4641–4673, doi:[10.1175/jcli-3223.1](https://doi.org/10.1175/jcli-3223.1).
- Andrews, T., 2019: MOHC HadGEM3-GC31-LL model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.475](https://doi.org/10.22033/esgf/cmip6.475).
- Archibald, A.T. et al., 2020: Description and evaluation of the UKCA stratosphere–troposphere chemistry scheme (StratTrop vn 1.0) implemented in UKESM1. *Geoscientific Model Development*, **13**(3), 1223–1266, doi:[10.5194/gmd-13-1223-2020](https://doi.org/10.5194/gmd-13-1223-2020).
- Arora, V.K. and G.J. Boer, 2010: Uncertainties in the 20th century carbon budget associated with land use change. *Global Change Biology*, **16**(12), 3327–3348, doi:[10.1111/j.1365-2486.2010.02202.x](https://doi.org/10.1111/j.1365-2486.2010.02202.x).
- Artale, V. et al., 2010: An atmosphere–ocean regional climate model for the Mediterranean area: assessment of a present climate simulation. *Climate Dynamics*, **35**(5), 721–740, doi:[10.1007/s00382-009-0691-8](https://doi.org/10.1007/s00382-009-0691-8).
- Aschwanden, A., M.A. Fahnestock, and M. Truffer, 2016: Complex Greenland outlet glacier flow captured. *Nature Communications*, **7**(1), 10524, doi:[10.1038/ncomms10524](https://doi.org/10.1038/ncomms10524).
- Aumont, O., C. Ethé, A. Tagliabue, L. Bopp, and M. Gehlen, 2015: PISCES-v2: an ocean biogeochemical model for carbon and ecosystem studies. *Geoscientific Model Development*, **8**(8), 2465–2513, doi:[10.5194/gmd-8-2465-2015](https://doi.org/10.5194/gmd-8-2465-2015).
- Bader, D.C., R. Leung, M. Taylor, and R.B. McCoy, 2019a: E3SM-Project E3SM1.0 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2294](https://doi.org/10.22033/esgf/cmip6.2294).
- Bader, D.C., R. Leung, M. Taylor, and R.B. McCoy, 2019b: E3SM-Project E3SM1.1 model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11441](https://doi.org/10.22033/esgf/cmip6.11441).
- Bader, D.C., R. Leung, M. Taylor, and R.B. McCoy, 2019c: E3SM-Project E3SM1.1 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11442](https://doi.org/10.22033/esgf/cmip6.11442).
- Bader, D.C., R. Leung, M. Taylor, and R.B. McCoy, 2019d: E3SM-Project E3SM1.1ECA model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11444](https://doi.org/10.22033/esgf/cmip6.11444).
- Bader, D.C., R. Leung, M. Taylor, and R.B. McCoy, 2020a: E3SM-Project E3SM1.1 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15103](https://doi.org/10.22033/esgf/cmip6.15103).
- Bader, D.C., R. Leung, M. Taylor, and R.B. McCoy, 2020b: E3SM-Project E3SM1.1ECA model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11443](https://doi.org/10.22033/esgf/cmip6.11443).
- Balaji, V. et al., 2018: Requirements for a global data infrastructure in support of CMIP6. *Geoscientific Model Development*, **11**(9), 3659–3680, doi:[10.5194/gmd-11-3659-2018](https://doi.org/10.5194/gmd-11-3659-2018).
- Balsamo, G. et al., 2009: A Revised Hydrology for the ECMWF Model: Verification from Field Site to Terrestrial Water Storage and Impact in the Integrated Forecast System. *Journal of Hydrometeorology*, **10**(3), 623–643, doi:[10.1175/2008jhm1068.1](https://doi.org/10.1175/2008jhm1068.1).
- Bao, Q. and B. He, 2019a: CAS FGOALS-f3-H model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2041](https://doi.org/10.22033/esgf/cmip6.2041).
- Bao, Q. and B. He, 2019b: CAS FGOALS-f3-L model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12001](https://doi.org/10.22033/esgf/cmip6.12001).
- Bao, Y., Z. Song, and F. Qiao, 2020: FIO-ESM Version 2.0: Model Description and Evaluation. *Journal of Geophysical Research: Oceans*, **125**(6), e2019JC016036, doi:[10.1029/2019jc016036](https://doi.org/10.1029/2019jc016036).
- Bauer, S.E. et al., 2020: Historical (1850–2014) Aerosol Evolution and Role on Climate Forcing Using the GISS ModelE2.1 Contribution to CMIP6. *Journal of Advances in Modeling Earth Systems*, **12**(8), e2019MS001978, doi:[10.1029/2019ms001978](https://doi.org/10.1029/2019ms001978).
- Bellouin, N. et al., 2011: Aerosol forcing in the Climate Model Intercomparison Project (CMIP5) simulations by HadGEM2-ES and the role of ammonium nitrate. *Journal of Geophysical Research: Atmospheres*, **116**(D20), D20206, doi:[10.1029/2011jd016074](https://doi.org/10.1029/2011jd016074).
- Bellucci, A. et al., 2021: Air-Sea interaction over the Gulf Stream in an ensemble of HighResMIP present climate simulations. *Climate Dynamics*, **56**(7–8), 2093–2111, doi:[10.1007/s00382-020-05573-z](https://doi.org/10.1007/s00382-020-05573-z).
- Bentsen, M. et al., 2019a: NCC NorESM2-LM model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.598](https://doi.org/10.22033/esgf/cmip6.598).
- Bentsen, M. et al., 2019b: NCC NorESM2-MM model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.506](https://doi.org/10.22033/esgf/cmip6.506).
- Bentsen, M. et al., 2019c: NCC NorESM2-MM model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.608](https://doi.org/10.22033/esgf/cmip6.608).
- Bethke, I. et al., 2019a: NCC NorCPM1 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10843](https://doi.org/10.22033/esgf/cmip6.10843).
- Bethke, I. et al., 2019b: NCC NorCPM1 model output prepared for CMIP6 DCPP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10844](https://doi.org/10.22033/esgf/cmip6.10844).
- Beuviel, J. et al., 2010: Modeling the Mediterranean Sea interannual variability during 1961–2000: Focus on the Eastern Mediterranean Transient. *Journal of Geophysical Research: Oceans*, **115**(C8), C08017, doi:[10.1029/2009jc005950](https://doi.org/10.1029/2009jc005950).
- Beuviel, J. et al., 2012: Med12, Oceanic Component For The Modeling Of The Regional Mediterranean Earth System. *Mercator Ocean Quarterly Newsletter*, **46**, 60–66, www.mercator-ocean.fr/en/ocean-science/scientific-publications/mercator-ocean-journal/newsletter-46-nemo-myocean/.
- Bi, D. et al., 2020: Configuration and spin-up of ACCESS-CM2, the new generation Australian Community Climate and Earth System Simulator Coupled Model. *Journal of Southern Hemisphere Earth Systems Science*, **70**(1), 225, doi:[10.1071/es19040](https://doi.org/10.1071/es19040).
- Bøssing Christensen, O. et al., 2007: *The HIRHAM Regional Climate Model. Version 5 (beta)*. Technical Report 06-17, Danish Climate Centre, Danish Meteorological Institute, Denmark, 22 pp., <https://backend.orbit.dtu.dk/ws/portalfiles/portal/51950450/HIRHAM.pdf>.
- Boucher, O. et al., 2018a: IPSL IPSL-CM6A-LR model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1522](https://doi.org/10.22033/esgf/cmip6.1522).

- Boucher, O. et al., 2018b: IPSL IPSL-CM6A-LR model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1530](https://doi.org/10.22033/esgf/cmip6.1530).
- Boucher, O. et al., 2018c: IPSL IPSL-CM6A-LR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1534](https://doi.org/10.22033/esgf/cmip6.1534).
- Boucher, O. et al., 2018d: IPSL IPSL-CM6A-LR model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1521](https://doi.org/10.22033/esgf/cmip6.1521).
- Boucher, O. et al., 2018e: IPSL IPSL-CM6A-LR model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1531](https://doi.org/10.22033/esgf/cmip6.1531).
- Boucher, O. et al., 2018f: IPSL IPSL-CM6A-LR model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13801](https://doi.org/10.22033/esgf/cmip6.13801).
- Boucher, O. et al., 2018g: IPSL IPSL-CM6A-LR model output prepared for CMIP6 GeoMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1526](https://doi.org/10.22033/esgf/cmip6.1526).
- Boucher, O. et al., 2018h: IPSL IPSL-CM6A-LR model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1525](https://doi.org/10.22033/esgf/cmip6.1525).
- Boucher, O. et al., 2019a: IPSL IPSL-CM6A-LR model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1532](https://doi.org/10.22033/esgf/cmip6.1532).
- Boucher, O. et al., 2019b: IPSL IPSL-CM6A-LR model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1523](https://doi.org/10.22033/esgf/cmip6.1523).
- Boucher, O. et al., 2019c: IPSL IPSL-CM6A-LR model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1529](https://doi.org/10.22033/esgf/cmip6.1529).
- Boucher, O. et al., 2019d: IPSL IPSL-CM6A-LR model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13802](https://doi.org/10.22033/esgf/cmip6.13802).
- Boucher, O. et al., 2019e: IPSL IPSL-CM6A-ATM-HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2361](https://doi.org/10.22033/esgf/cmip6.2361).
- Boucher, O. et al., 2019f: IPSL IPSL-CM6A-LR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13803](https://doi.org/10.22033/esgf/cmip6.13803).
- Boucher, O. et al., 2019g: IPSL IPSL-CM6A-LR model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1527](https://doi.org/10.22033/esgf/cmip6.1527).
- Boucher, O. et al., 2019h: IPSL IPSL-CM6A-LR model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1528](https://doi.org/10.22033/esgf/cmip6.1528).
- Boucher, O. et al., 2020a: IPSL IPSL-CM5A2-INCA model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13642](https://doi.org/10.22033/esgf/cmip6.13642).
- Boucher, O. et al., 2020b: IPSL IPSL-CM6A-LR-INCA model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13581](https://doi.org/10.22033/esgf/cmip6.13581).
- Boucher, O. et al., 2020c: IPSL IPSL-CM6A-LR-INCA model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14583](https://doi.org/10.22033/esgf/cmip6.14583).
- Boucher, O. et al., 2020d: IPSL IPSL-CM5A2-INCA model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15667](https://doi.org/10.22033/esgf/cmip6.15667).
- Boucher, O. et al., 2020e: IPSL 4AOP-v1-5 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12340](https://doi.org/10.22033/esgf/cmip6.12340).
- Boucher, O. et al., 2020f: IPSL IPSL-CM5A2-INCA model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15666](https://doi.org/10.22033/esgf/cmip6.15666).
- Boucher, O. et al., 2020g: Presentation and Evaluation of the IPSL-CM6A-LR Climate Model. *Journal of Advances in Modeling Earth Systems*, **12**(7), e2019MS002010, doi:[10.1029/2019ms002010](https://doi.org/10.1029/2019ms002010).
- Boucher, O. et al., 2021: IPSL IPSL-CM6A-LR-INCA model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13582](https://doi.org/10.22033/esgf/cmip6.13582).
- Brath, M., 2019: UHH ARTS2.3 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2001](https://doi.org/10.22033/esgf/cmip6.2001).
- Brovkin, V. et al., 2019: MPI-M MPIESM1.2-LR model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.748](https://doi.org/10.22033/esgf/cmip6.748).
- Bruyère, C.L., J.M. Done, G.J. Holland, and S. Fredrick, 2014: Bias corrections of global models for regional climate simulations of high-impact weather. *Climate Dynamics*, **43**(7–8), 1847–1856, doi:[10.1007/s00382-013-2011-6](https://doi.org/10.1007/s00382-013-2011-6).
- Bueler, E. and J. Brown, 2009: Shallow shelf approximation as a “sliding law” in a thermomechanically coupled ice sheet model. *Journal of Geophysical Research: Earth Surface*, **114**(F3), F03008, doi:[10.1029/2008jf001179](https://doi.org/10.1029/2008jf001179).
- Bukovsky, M.S. and L.O. Mearns, 2020: Regional climate change projections from NA-CORDEX and their relation to climate sensitivity. *Climatic Change*, **162**(2), 645–665, doi:[10.1007/s10584-020-02835-x](https://doi.org/10.1007/s10584-020-02835-x).
- Burrows, S.M. et al., 2020: The DOE E3SM v1.1 Biogeochemistry Configuration: Description and Simulated Ecosystem–Climate Responses to Historical Changes in Forcing. *Journal of Advances in Modeling Earth Systems*, **12**(9), e2019MS001766, doi:[10.1029/2019ms001766](https://doi.org/10.1029/2019ms001766).
- Byun, Y.-H. et al., 2019a: NIMS-KMA KACE1.0-G model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2242](https://doi.org/10.22033/esgf/cmip6.2242).
- Byun, Y.-H. et al., 2019b: NIMS-KMA KACE1.0-G model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2241](https://doi.org/10.22033/esgf/cmip6.2241).
- Cai, L. et al., 2020: NCC NorESM2-LM model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.562](https://doi.org/10.22033/esgf/cmip6.562).
- Cao, J., 2019a: NUIST NESMv3 model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2026](https://doi.org/10.22033/esgf/cmip6.2026).
- Cao, J., 2019b: NUIST NESMv3 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2027](https://doi.org/10.22033/esgf/cmip6.2027).
- Cao, J. and B. Wang, 2019: NUIST NESMv3 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2021](https://doi.org/10.22033/esgf/cmip6.2021).
- Cao, J. et al., 2018: The NUIST Earth System Model (NESM) version 3: description and preliminary evaluation. *Geoscientific Model Development*, **11**(7), 2975–2993, doi:[10.5194/gmd-11-2975-2018](https://doi.org/10.5194/gmd-11-2975-2018).
- Chai, Z., 2020a: CAS CAS-ESM2.0 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1944](https://doi.org/10.22033/esgf/cmip6.1944).
- Chai, Z., 2020b: CAS CAS-ESM2.0 model output prepared for CMIP6 FAFMIP (test). Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1948](https://doi.org/10.22033/esgf/cmip6.1948).
- Chai, Z., 2020c: CAS CAS-ESM2.0 model output prepared for CMIP6 OMIP (test). Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1954](https://doi.org/10.22033/esgf/cmip6.1954).
- Chang, P. et al., 2020: An Unprecedented Set of High-Resolution Earth System Simulations for Understanding Multiscale Interactions in Climate Variability and Change. *Journal of Advances in Modeling Earth Systems*, **12**(12), e2020MS002298, doi:[10.1029/2020ms002298](https://doi.org/10.1029/2020ms002298).
- Chen, F. and J. Dudhia, 2001: Coupling an Advanced Land Surface–Hydrology Model with the Penn State–NCAR MM5 Modeling System. Part I: Model Implementation and Sensitivity. *Monthly Weather Review*, **129**(4), 569–585, doi:[10.1175/1520-0493\(2001\)129<0569:caalsh>2.0.co;2](https://doi.org/10.1175/1520-0493(2001)129<0569:caalsh>2.0.co;2).
- Chen, J.-P., I.-C. Tsai, and Y.-C. Lin, 2013: A statistical–numerical aerosol parameterization scheme. *Atmospheric Chemistry and Physics*, **13**(20), 10483–10504, doi:[10.5194/acp-13-10483-2013](https://doi.org/10.5194/acp-13-10483-2013).
- Cherchi, A. et al., 2019: Global Mean Climate and Main Patterns of Variability in the CMCC-CM2 Coupled Model. *Journal of Advances in Modeling Earth Systems*, **11**(1), 185–209, doi:[10.1029/2018ms001369](https://doi.org/10.1029/2018ms001369).
- Chinese Academy of Meteorological Sciences (CAMS), 2019: CAMS CAMS-CSM1.0 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11002](https://doi.org/10.22033/esgf/cmip6.11002).
- Chou, S.C. et al., 2014a: Assessment of Climate Change over South America under RCP 4.5 and 8.5 Downscaling Scenarios. *American Journal of Climate Change*, **3**(5), 512–527, doi:[10.4236/ajcc.2014.35043](https://doi.org/10.4236/ajcc.2014.35043).
- Chou, S.C. et al., 2014b: Evaluation of the Eta Simulations Nested in Three Global Climate Models. *American Journal of Climate Change*, **3**(5), 438–454, doi:[10.4236/ajcc.2014.35039](https://doi.org/10.4236/ajcc.2014.35039).
- Cole, J.N.S. et al., 2019a: CCCma CanESM5 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1315](https://doi.org/10.22033/esgf/cmip6.1315).
- Cole, J.N.S. et al., 2019b: CCCma CanESM5 model output prepared for CMIP6 VolMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10202](https://doi.org/10.22033/esgf/cmip6.10202).
- Cole, J.N.S. et al., 2019c: CCCma CanESM5 model output prepared for CMIP6 GeoMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1310](https://doi.org/10.22033/esgf/cmip6.1310).
- Cole, J.N.S. et al., 2019d: CCCma CanESM5 model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1302](https://doi.org/10.22033/esgf/cmip6.1302).
- Colin, J., M. Déqué, R. Radu, and S. Somot, 2010: Sensitivity study of heavy precipitation in Limited Area Model climate simulations: influence of the size of the domain and the use of the spectral nudging technique. *Tellus A*:

- Dynamic Meteorology and Oceanography*, **62**(5), 591–604, doi:[10.1111/j.1600-0870.2010.00467.x](https://doi.org/10.1111/j.1600-0870.2010.00467.x).
- Cornford, S.L. et al., 2013: Adaptive mesh, finite volume modeling of marine ice sheets. *Journal of Computational Physics*, **232**(1), 529–549, doi:[10.1016/j.jcp.2012.08.037](https://doi.org/10.1016/j.jcp.2012.08.037).
- Cornford, S.L. et al., 2015: Century-scale simulations of the response of the West Antarctic Ice Sheet to a warming climate. *The Cryosphere*, **9**(4), 1579–1600, doi:[10.5194/tc-9-1579-2015](https://doi.org/10.5194/tc-9-1579-2015).
- Coward, A. and M. Roberts, 2018: NERC HadGEM3-GC31-HH model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1822](https://doi.org/10.22033/esgf/cmip6.1822).
- Cuzzone, J.K., M. Morlighem, E. Larour, N. Schlegel, and H. Seroussi, 2018: Implementation of higher-order vertical finite elements in ISSM v4.13 for improved ice sheet flow modeling over paleoclimate timescales. *Geoscientific Model Development*, **11**(5), 1683–1694, doi:[10.5194/gmd-11-1683-2018](https://doi.org/10.5194/gmd-11-1683-2018).
- Dalvi, M. et al., 2019: NIWA UKESM1.0-LL model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1741](https://doi.org/10.22033/esgf/cmip6.1741).
- Danabasoglu, G., 2019a: NCAR CESM1-1-CAM5-CMIP5 model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11542](https://doi.org/10.22033/esgf/cmip6.11542).
- Danabasoglu, G., 2019b: NCAR CESM2 model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2181](https://doi.org/10.22033/esgf/cmip6.2181).
- Danabasoglu, G., 2019c: NCAR CESM2 model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2182](https://doi.org/10.22033/esgf/cmip6.2182).
- Danabasoglu, G., 2019d: NCAR CESM2 model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2183](https://doi.org/10.22033/esgf/cmip6.2183).
- Danabasoglu, G., 2019e: NCAR CESM2 model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2184](https://doi.org/10.22033/esgf/cmip6.2184).
- Danabasoglu, G., 2019f: NCAR CESM2 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2185](https://doi.org/10.22033/esgf/cmip6.2185).
- Danabasoglu, G., 2019g: NCAR CESM2 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2187](https://doi.org/10.22033/esgf/cmip6.2187).
- Danabasoglu, G., 2019h: NCAR CESM2 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2190](https://doi.org/10.22033/esgf/cmip6.2190).
- Danabasoglu, G., 2019i: NCAR CESM2 model output prepared for CMIP6 ISMIP6. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2193](https://doi.org/10.22033/esgf/cmip6.2193).
- Danabasoglu, G., 2019j: NCAR CESM2 model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2194](https://doi.org/10.22033/esgf/cmip6.2194).
- Danabasoglu, G., 2019k: NCAR CESM2 model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2195](https://doi.org/10.22033/esgf/cmip6.2195).
- Danabasoglu, G., 2019l: NCAR CESM2 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2196](https://doi.org/10.22033/esgf/cmip6.2196).
- Danabasoglu, G., 2019m: NCAR CESM2 model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2197](https://doi.org/10.22033/esgf/cmip6.2197).
- Danabasoglu, G., 2019n: NCAR CESM2 model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2198](https://doi.org/10.22033/esgf/cmip6.2198).
- Danabasoglu, G., 2019o: NCAR CESM2 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2199](https://doi.org/10.22033/esgf/cmip6.2199).
- Danabasoglu, G., 2019p: NCAR CESM2 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2201](https://doi.org/10.22033/esgf/cmip6.2201).
- Danabasoglu, G., 2019q: NCAR CESM2-FV2 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11281](https://doi.org/10.22033/esgf/cmip6.11281).
- Danabasoglu, G., 2019r: NCAR CESM2-WACCM model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10023](https://doi.org/10.22033/esgf/cmip6.10023).
- Danabasoglu, G., 2019s: NCAR CESM2-WACCM model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10024](https://doi.org/10.22033/esgf/cmip6.10024).
- Danabasoglu, G., 2019t: NCAR CESM2-WACCM model output prepared for CMIP6 GeoMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10025](https://doi.org/10.22033/esgf/cmip6.10025).
- Danabasoglu, G., 2019u: NCAR CESM2-WACCM model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14053](https://doi.org/10.22033/esgf/cmip6.14053).
- Danabasoglu, G., 2019v: NCAR CESM2-WACCM model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10026](https://doi.org/10.22033/esgf/cmip6.10026).
- Danabasoglu, G., 2019w: NCAR CESM2-WACCM-FV2 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11282](https://doi.org/10.22033/esgf/cmip6.11282).
- Danabasoglu, G., 2020: NCAR CESM2 model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14052](https://doi.org/10.22033/esgf/cmip6.14052).
- Danabasoglu, G. et al., 2020: The Community Earth System Model Version 2 (CESM2). *Journal of Advances in Modeling Earth Systems*, **12**(2), e2019MS001916, doi:[10.1029/2019ms001916](https://doi.org/10.1029/2019ms001916).
- Danek, C. et al., 2020: AWI AWI-ESM1.1LR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9301](https://doi.org/10.22033/esgf/cmip6.9301).
- Daniel, M. et al., 2019: Benefits of explicit urban parameterization in regional climate modeling to study climate and city interactions. *Climate Dynamics*, **52**(5–6), 2745–2764, doi:[10.1007/s00382-018-4289-x](https://doi.org/10.1007/s00382-018-4289-x).
- de Boer, B., P. Stocchi, and R.S.W. van de Wal, 2014: A fully coupled 3-D ice-sheet–sea-level model: algorithm and applications. *Geoscientific Model Development*, **7**(5), 2141–2156, doi:[10.5194/gmd-7-2141-2014](https://doi.org/10.5194/gmd-7-2141-2014).
- De Ridder, K., 1997: Radiative Transfer in the IAGL Land Surface Model. *Journal of Applied Meteorology and Climatology*, **36**(1), 12–21, doi:[10.1175/1520-0450\(1997\)036<0012:rtitil>2.0.co;2](https://doi.org/10.1175/1520-0450(1997)036<0012:rtitil>2.0.co;2).
- De Ridder, K. and G. Schayes, 1997: The IAGL Land Surface Model. *Journal of Applied Meteorology and Climatology*, **36**(2), 167–182, doi:[10.1175/1520-0450\(1997\)036<0167:tilsm>2.0.co;2](https://doi.org/10.1175/1520-0450(1997)036<0167:tilsm>2.0.co;2).
- Decharme, B., R. Alkama, H. Douville, M. Becker, and A. Cazenave, 2010: Global Evaluation of the ISBA-TRIP Continental Hydrological System. Part II: Uncertainties in River Routing Simulation Related to Flow Velocity and Groundwater Storage. *Journal of Hydrometeorology*, **11**(3), 601–617, doi:[10.1175/2010jhm1212.1](https://doi.org/10.1175/2010jhm1212.1).
- Decharme, B. et al., 2019: Recent Changes in the ISBA-CTRIP Land Surface System for Use in the CNRM-CM6 Climate Model and in Global Off-Line Hydrological Applications. *Journal of Advances in Modeling Earth Systems*, **11**(5), 1207–1252, doi:[10.1029/2018ms001545](https://doi.org/10.1029/2018ms001545).
- Delire, C. et al., 2020: The Global Land Carbon Cycle Simulated With ISBA-CTRIP: Improvements Over the Last Decade. *Journal of Advances in Modeling Earth Systems*, **12**(9), e2019MS001886, doi:[10.1029/2019ms001886](https://doi.org/10.1029/2019ms001886).
- Delworth, T. et al., 2002: Simulation of climate variability and change by the GFDL R30 coupled climate model. *Climate Dynamics*, **19**, 555–574, doi:[10.1007/s00382-002-0249-5](https://doi.org/10.1007/s00382-002-0249-5).
- Deushi, M. and K. Shibata, 2011: Development of a Meteorological Research Institute Chemistry–Climate Model version 2 for the Study of Tropospheric and Stratospheric Chemistry. *Papers in Meteorology and Geophysics*, **62**, 1–46, doi:[10.2467/mripapers.62.1](https://doi.org/10.2467/mripapers.62.1).
- Di Virgilio, G. et al., 2019: Evaluating reanalysis-driven CORDEX regional climate models over Australia: model performance and errors. *Climate Dynamics*, **53**(5–6), 2985–3005, doi:[10.1007/s00382-019-04672-w](https://doi.org/10.1007/s00382-019-04672-w).
- Dickinson, R.E., A. Henderson-Sellers, and P.J. Kennedy, 1993: *Biosphere–Atmosphere Transfer Scheme (BATS) Version 1e as Coupled to the NCAR Community Climate Model*. No. NCAR/TN-387+STR, National Center for Atmospheric Research (NCAR), Boulder, CO, USA, 72 pp., <https://openky.ucar.edu/islandora/object/technotes:154>.
- Dickinson, R.E. et al., 2006: The Community Land Model and Its Climate Statistics as a Component of the Community Climate System Model. *Journal of Climate*, **19**(11), 2302–2324, doi:[10.1175/jcli3742.1](https://doi.org/10.1175/jcli3742.1).
- Dix, M. et al., 2019a: CSIRO-ARCCSS ACCESS-CM2 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2281](https://doi.org/10.22033/esgf/cmip6.2281).
- Dix, M. et al., 2019b: CSIRO-ARCCSS ACCESS-CM2 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2285](https://doi.org/10.22033/esgf/cmip6.2285).
- Dix, M. et al., 2020: CSIRO-ARCCSS ACCESS-CM2 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2284](https://doi.org/10.22033/esgf/cmip6.2284).

- Djordjevic, V. and B. Rajkovic, 2008: Verification of a coupled atmosphere-ocean model using satellite observations over the Adriatic Sea. *Annales Geophysicae*, **26(7)**, 1935–1954, doi:[10.5194/angeo-26-1935-2008](https://doi.org/10.5194/angeo-26-1935-2008).
- Djordjevic, V. and B. Rajkovic, 2010: Development of the EBU-POM coupled regional climate model and results from climate change experiments. In: *Advances in Environmental Modeling and Measurements* [Mihajlovic, T.D. and B. Lalic (eds.)]. Nova Publishers, pp. 23–32.
- Döscher, R. et al., 2021: The EC-Earth3 Earth System Model for the Climate Model Intercomparison Project 6. *Geoscientific Model Development* (in press).
- Douville, H. et al., 2000: Importance of vegetation feedbacks in doubled-CO₂ climate experiments. *Journal of Geophysical Research: Atmospheres*, **105(D11)**, 14841–14861, doi:[10.1029/1999jd901086](https://doi.org/10.1029/1999jd901086).
- Dunne, J.P. et al., 2020a: Simple Global Ocean Biogeochemistry With Light, Iron, Nutrients and Gas Version 2 (BLINGv2): Model Description and Simulation Characteristics in GFDL's CM4.0. *Journal of Advances in Modeling Earth Systems*, **12(10)**, e2019MS002008, doi:[10.1029/2019ms002008](https://doi.org/10.1029/2019ms002008).
- Dunne, J.P. et al., 2020b: The GFDL Earth System Model Version 4.1 (GFDL-ESM4.1): Overall Coupled Model Description and Simulation Characteristics. *Journal of Advances in Modeling Earth Systems*, **12(11)**, e2019MS002015, doi:[10.1029/2019ms002015](https://doi.org/10.1029/2019ms002015).
- Eade, R., 2020: MOHC HadGEM3-GC31-MM model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14627](https://doi.org/10.22033/esgf/cmip6.14627).
- EC-Earth Consortium (EC-Earth), 2018: EC-Earth-Consortium EC-Earth3P-HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2323](https://doi.org/10.22033/esgf/cmip6.2323).
- EC-Earth Consortium (EC-Earth), 2019a: EC-Earth-Consortium EC-Earth3 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.181](https://doi.org/10.22033/esgf/cmip6.181).
- EC-Earth Consortium (EC-Earth), 2019b: EC-Earth-Consortium EC-Earth3 model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.227](https://doi.org/10.22033/esgf/cmip6.227).
- EC-Earth Consortium (EC-Earth), 2019c: EC-Earth-Consortium EC-Earth3 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.251](https://doi.org/10.22033/esgf/cmip6.251).
- EC-Earth Consortium (EC-Earth), 2019d: EC-Earth-Consortium EC-Earth3-LR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.202](https://doi.org/10.22033/esgf/cmip6.202).
- EC-Earth Consortium (EC-Earth), 2019e: EC-Earth-Consortium EC-Earth3P model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2322](https://doi.org/10.22033/esgf/cmip6.2322).
- EC-Earth Consortium (EC-Earth), 2019f: EC-Earth-Consortium EC-Earth3-Veg model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.642](https://doi.org/10.22033/esgf/cmip6.642).
- EC-Earth Consortium (EC-Earth), 2019g: EC-Earth-Consortium EC-Earth3-Veg model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.727](https://doi.org/10.22033/esgf/cmip6.727).
- EC-Earth Consortium (EC-Earth), 2020a: EC-Earth-Consortium EC-Earth3 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14701](https://doi.org/10.22033/esgf/cmip6.14701).
- EC-Earth Consortium (EC-Earth), 2020b: EC-Earth-Consortium EC-Earth3 model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.218](https://doi.org/10.22033/esgf/cmip6.218).
- EC-Earth Consortium (EC-Earth), 2020c: EC-Earth-Consortium EC-Earth3 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14702](https://doi.org/10.22033/esgf/cmip6.14702).
- EC-Earth Consortium (EC-Earth), 2020d: EC-Earth-Consortium EC-Earth3 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.242](https://doi.org/10.22033/esgf/cmip6.242).
- EC-Earth Consortium (EC-Earth), 2020e: EC-Earth-Consortium EC-Earth3-AerChem model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.699](https://doi.org/10.22033/esgf/cmip6.699).
- EC-Earth Consortium (EC-Earth), 2020f: EC-Earth-Consortium EC-Earth3-AerChem model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.639](https://doi.org/10.22033/esgf/cmip6.639).
- EC-Earth Consortium (EC-Earth), 2020g: EC-Earth-Consortium EC-Earth3-AerChem model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15326](https://doi.org/10.22033/esgf/cmip6.15326).
- EC-Earth Consortium (EC-Earth), 2020h: EC-Earth-Consortium EC-Earth3-AerChem model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.724](https://doi.org/10.22033/esgf/cmip6.724).
- EC-Earth Consortium (EC-Earth), 2020i: EC-Earth-Consortium EC-Earth3-CC model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.650](https://doi.org/10.22033/esgf/cmip6.650).
- EC-Earth Consortium (EC-Earth), 2020j: EC-Earth-Consortium EC-Earth3-CC model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.640](https://doi.org/10.22033/esgf/cmip6.640).
- EC-Earth Consortium (EC-Earth), 2020k: EC-Earth-Consortium EC-Earth3-LR model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.247](https://doi.org/10.22033/esgf/cmip6.247).
- EC-Earth Consortium (EC-Earth), 2020l: EC-Earth-Consortium EC-Earth3P-VHR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2326](https://doi.org/10.22033/esgf/cmip6.2326).
- EC-Earth Consortium (EC-Earth), 2020m: EC-Earth-Consortium EC-Earth3-Veg model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.672](https://doi.org/10.22033/esgf/cmip6.672).
- EC-Earth Consortium (EC-Earth), 2020n: EC-Earth-Consortium EC-Earth3-Veg model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.692](https://doi.org/10.22033/esgf/cmip6.692).
- EC-Earth Consortium (EC-Earth), 2020o: EC-Earth-Consortium EC-Earth3-Veg-LR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.643](https://doi.org/10.22033/esgf/cmip6.643).
- EC-Earth Consortium (EC-Earth), 2020p: EC-Earth-Consortium EC-Earth3-Veg-LR model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.718](https://doi.org/10.22033/esgf/cmip6.718).
- EC-Earth Consortium (EC-Earth), 2020q: EC-Earth-Consortium EC-Earth3-Veg-LR model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.728](https://doi.org/10.22033/esgf/cmip6.728).
- EC-Earth Consortium (EC-Earth), 2021: EC-Earth-Consortium EC-Earth3-CC model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15327](https://doi.org/10.22033/esgf/cmip6.15327).
- Ek, M.B. et al., 2003: Implementation of Noah land surface model advances in the National Centers for Environmental Prediction operational mesoscale Eta model. *Journal of Geophysical Research: Atmospheres*, **108(D22)**, 2002JD003296, doi:[10.1029/2002jd003296](https://doi.org/10.1029/2002jd003296).
- Emmons, L.K. et al., 2020: The Chemistry Mechanism in the Community Earth System Model Version 2 (CESM2). *Journal of Advances in Modeling Earth Systems*, **12(4)**, e2019MS001882, doi:[10.1029/2019ms001882](https://doi.org/10.1029/2019ms001882).
- Ettema, J. et al., 2010: Climate of the Greenland ice sheet using a high-resolution climate model – Part 1: Evaluation. *The Cryosphere*, **4(4)**, 511–527, doi:[10.5194/tc-4-511-2010](https://doi.org/10.5194/tc-4-511-2010).
- Evans, J.P. et al., 2021: The CORDEX-Australasia ensemble: evaluation and future projections. *Climate Dynamics*, **57(5–6)**, 1385–1401, doi:[10.1007/s00382-020-05459-0](https://doi.org/10.1007/s00382-020-05459-0).
- Eyring, V. et al., 2016: Overview of the Coupled Model Intercomparison Project Phase 6 (CMIP6) experimental design and organization. *Geoscientific Model Development*, **9(5)**, 1937–1958, doi:[10.5194/gmd-9-1937-2016](https://doi.org/10.5194/gmd-9-1937-2016).
- Fang, Y. et al., 2019: BCC BCC-CSM2MR model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1727](https://doi.org/10.22033/esgf/cmip6.1727).
- Feichter, J. et al., 1996: Simulation of the tropospheric sulfur cycle in a global climate model. *Atmospheric Environment*, **30(10)**, 1693–1707, doi:[10.1016/1352-2310\(95\)00394-0](https://doi.org/10.1016/1352-2310(95)00394-0).

- Fiedler, S. et al., 2019a: First forcing estimates from the future CMIP6 scenarios of anthropogenic aerosol optical properties and an associated Twomey effect. *Geoscientific Model Development*, **12**(3), 989–1007, doi:[10.5194/gmd-12-989-2019](https://doi.org/10.5194/gmd-12-989-2019).
- Fiedler, S. et al., 2019b: MPI-M MPIESM1.2-LR model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.784](https://doi.org/10.22033/esgf/cmip6.784).
- Flato, G. et al., 2013: Evaluation of Climate Models. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 741–866, doi:[10.1017/cbo9781107415324.020](https://doi.org/10.1017/cbo9781107415324.020).
- Fogli, P.G., D. Iovino, and T. Lovato, 2020a: CMCC CMCC-CM2-HR4 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13161](https://doi.org/10.22033/esgf/cmip6.13161).
- Fogli, P.G., D. Iovino, and T. Lovato, 2020b: CMCC CMCC-CM2-SR5 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13162](https://doi.org/10.22033/esgf/cmip6.13162).
- Fouquart, Y. and B. Bonnel, 1980: Computations of solar heating of the Earth's atmosphere: A new parameterization. *Beitrage zur Physik der Atmosphäre*, **53**, 35–62.
- Fürst, J.J., H. Goelzer, and P. Huybrechts, 2015: Ice-dynamic projections of the Greenland ice sheet in response to atmospheric and oceanic warming. *The Cryosphere*, **9**(3), 1039–1062, doi:[10.5194/tc-9-1039-2015](https://doi.org/10.5194/tc-9-1039-2015).
- Gallée, H. and P.G. Duynkerke, 1997: Air–snow interactions and the surface energy and mass balance over the melting zone of west Greenland during the Greenland Ice Margin Experiment. *Journal of Geophysical Research: Atmospheres*, **102**(D12), 13813–13824, doi:[10.1029/96jd03358](https://doi.org/10.1029/96jd03358).
- Gallée, H., G. Guyomarc'h, and E. Brun, 2001: Impact Of Snow Drift On The Antarctic Ice Sheet Surface Mass Balance: Possible Sensitivity To Snow-Surface Properties. *Boundary-Layer Meteorology*, **99**(1), 1–19, doi:[10.1023/a:1018776422809](https://doi.org/10.1023/a:1018776422809).
- Gent, P., 2020a: NCAR CESM1-CAM5-SE-HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14220](https://doi.org/10.22033/esgf/cmip6.14220).
- Gent, P., 2020b: NCAR CESM1-CAM5-SE-LR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14262](https://doi.org/10.22033/esgf/cmip6.14262).
- Gillet-Chaulet, F. et al., 2012: Greenland ice sheet contribution to sea-level rise from a new-generation ice-sheet model. *The Cryosphere*, **6**, 1561–1576, doi:[10.5194/tc-6-1561-2012](https://doi.org/10.5194/tc-6-1561-2012).
- Gillet-Chaulet, F. et al., 2016: Assimilation of surface velocities acquired between 1996 and 2010 to constrain the form of the basal friction law under Pine Island Glacier. *Geophysical Research Letters*, **43**(19), 10311–10321, doi:[10.1002/2016gl069937](https://doi.org/10.1002/2016gl069937).
- Giorgi, F. and R.O. Anyah, 2012: The road towards RegCM4. *Climate Research*, **52**, 3–6, doi:[10.3354/cr01089](https://doi.org/10.3354/cr01089).
- Giorgi, F. et al., 2012: RegCM4: model description and preliminary tests over multiple CORDEX domains. *Climate Research*, **52**, 7–29, doi:[10.3354/cr01018](https://doi.org/10.3354/cr01018).
- Giot, O. et al., 2016: Validation of the ALARO-0 model within the EURO-CORDEX framework. *Geoscientific Model Development*, **9**(3), 1143–1152, doi:[10.5194/gmd-9-1143-2016](https://doi.org/10.5194/gmd-9-1143-2016).
- Goelzer, H. et al., 2018: Design and results of the ice sheet model initialisation experiments initMIP-Greenland: an ISMIP6 intercomparison. *The Cryosphere*, **12**(4), 1433–1460, doi:[10.5194/tc-12-1433-2018](https://doi.org/10.5194/tc-12-1433-2018).
- Goelzer, H. et al., 2020: The future sea-level contribution of the Greenland ice sheet: a multi-model ensemble study of ISMIP6. *The Cryosphere*, **14**(9), 3071–3096, doi:[10.5194/tc-14-3071-2020](https://doi.org/10.5194/tc-14-3071-2020).
- Golaz, J.-C. et al., 2019: The DOE E3SM Coupled Model Version 1: Overview and Evaluation at Standard Resolution. *Journal of Advances in Modeling Earth Systems*, **11**(7), 2089–2129, doi:[10.1029/2018ms001603](https://doi.org/10.1029/2018ms001603).
- Golledge, N.R. et al., 2019: Global environmental consequences of twenty-first-century ice-sheet melt. *Nature*, **566**(7742), 65–72, doi:[10.1038/s41586-019-0889-9](https://doi.org/10.1038/s41586-019-0889-9).
- Good, P., 2019: MOHC HadGEM3-GC31-LL model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10845](https://doi.org/10.22033/esgf/cmip6.10845).
- Good, P. et al., 2019: MOHC UKESM1.0-LL model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1567](https://doi.org/10.22033/esgf/cmip6.1567).
- Gopinathan, P.A. et al., 2019a: CCCR-IITM IITM-ESM model output data prepared for CMIP6 CMIP/DECK. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.44](https://doi.org/10.22033/esgf/cmip6.44).
- Gopinathan, P.A. et al., 2019b: CCCR-IITM IITM-ESM model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.825](https://doi.org/10.22033/esgf/cmip6.825).
- Graff, L.S. et al., 2019: NCC NorESM2-LM model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13723](https://doi.org/10.22033/esgf/cmip6.13723).
- Gregory, J.M., 2021: NERC HadGEM3-GC31-LL model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12065](https://doi.org/10.22033/esgf/cmip6.12065).
- Greve, R. and H. Blatter, 2016: Comparison of thermodynamics solvers in the polythermal ice sheet model SICOPOLIS. *Polar Science*, **10**(1), 11–23, doi:[10.1016/j.polar.2015.12.004](https://doi.org/10.1016/j.polar.2015.12.004).
- Greve, R. and SICOPOLIS Developer Team, 2019: SICOPOLIS v5.1 (5.1). Zenodo. Retrieved from: <https://doi.org/10.5281/zenodo.3727511>.
- Greve, R., C. Chambers, and R. Calov, 2020: ISMIP6 future projections for the Greenland ice sheet with the model SICOPOLIS (1.0.1). Zenodo. Retrieved from: <https://doi.org/10.5281/zenodo.4035941>.
- Gudmundsson, G.H., J. Krug, G. Durand, L. Favier, and O. Gagliardini, 2012: The stability of grounding lines on retrograde slopes. *The Cryosphere*, **6**(6), 1497–1505, doi:[10.5194/tc-6-1497-2012](https://doi.org/10.5194/tc-6-1497-2012).
- Guilyardi, E. et al., 2013: Documenting Climate Models and Their Simulations. *Bulletin of the American Meteorological Society*, **94**(5), 623–627, doi:[10.1175/bams-d-11-00035.1](https://doi.org/10.1175/bams-d-11-00035.1).
- Guo, C. et al., 2019a: Description and evaluation of NorESM1-F: a fast version of the Norwegian Earth System Model (NorESM). *Geoscientific Model Development*, **12**(1), 343–362, doi:[10.5194/gmd-12-343-2019](https://doi.org/10.5194/gmd-12-343-2019).
- Guo, C. et al., 2019b: NCC NorESM1-F model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11543](https://doi.org/10.22033/esgf/cmip6.11543).
- Guo, C. et al., 2019c: NCC NorESM1-F model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11544](https://doi.org/10.22033/esgf/cmip6.11544).
- Guo, H. et al., 2018a: NOAA-GFDL GFDL-CM4 model output. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1402](https://doi.org/10.22033/esgf/cmip6.1402).
- Guo, H. et al., 2018b: NOAA-GFDL GFDL-CM4 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9242](https://doi.org/10.22033/esgf/cmip6.9242).
- Gutjahr, O. et al., 2019: Max Planck Institute Earth System Model (MPI-ESM1.2) for the High-Resolution Model Intercomparison Project (HighResMIP). *Geoscientific Model Development*, **12**(7), 3241–3281, doi:[10.5194/gmd-12-3241-2019](https://doi.org/10.5194/gmd-12-3241-2019).
- Gutowski Jr, W.J. et al., 2016: WCRP COordinated Regional Downscaling Experiment (CORDEX): a diagnostic MIP for CMIP6. *Geoscientific Model Development*, **9**(11), 4087–4095, doi:[10.5194/gmd-9-4087-2016](https://doi.org/10.5194/gmd-9-4087-2016).
- Haak, H. et al., 2019: MPI-M MPIESM1.2-HR model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.774](https://doi.org/10.22033/esgf/cmip6.774).
- Haarsma, R.J. et al., 2016: High Resolution Model Intercomparison Project (HighResMIP v1.0) for CMIP6. *Geoscientific Model Development*, **9**(11), 4185–4208, doi:[10.5194/gmd-9-4185-2016](https://doi.org/10.5194/gmd-9-4185-2016).
- Haarsma, R.J. et al., 2020: HighResMIP versions of EC-Earth: EC-Earth3P and EC-Earth3P-HR – description, model computational performance and basic validation. *Geoscientific Model Development*, **13**(8), 3507–3527, doi:[10.5194/gmd-13-3507-2020](https://doi.org/10.5194/gmd-13-3507-2020).
- Haidvogel, D.B. et al., 2008: Ocean forecasting in terrain-following coordinates: Formulation and skill assessment of the Regional Ocean Modeling System. *Journal of Computational Physics*, **227**(7), 3595–3624, doi:[10.1016/j.jcp.2007.06.016](https://doi.org/10.1016/j.jcp.2007.06.016).

- Hajima, T. et al., 2019a: MIROC MIROC-ES2L model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.902](https://doi.org/10.22033/esgf/cmip6.902).
- Hajima, T. et al., 2019b: MIROC MIROC-ES2L model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.922](https://doi.org/10.22033/esgf/cmip6.922).
- Hajima, T. et al., 2019c: MIROC MIROC-ES2L model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.906](https://doi.org/10.22033/esgf/cmip6.906).
- Hajima, T. et al., 2020a: Development of the MIROC-ES2L Earth system model and the evaluation of biogeochemical processes and feedbacks. *Geoscientific Model Development*, **13**(5), 2197–2244, doi:[10.5194/gmd-13-2197-2020](https://doi.org/10.5194/gmd-13-2197-2020).
- Hajima, T. et al., 2020b: MIROC MIROC-ES2L model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2161](https://doi.org/10.22033/esgf/cmip6.2161).
- Hauglustaine, D.A., Y. Balkanski, and M. Schulz, 2014: A global model simulation of present and future nitrate aerosols and their direct radiative forcing of climate. *Atmospheric Chemistry and Physics*, **14**(20), 11031–11063, doi:[10.5194/acp-14-11031-2014](https://doi.org/10.5194/acp-14-11031-2014).
- He, B. and Q. Bao, 2019a: CAS FGOALS-f3-L model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2043](https://doi.org/10.22033/esgf/cmip6.2043).
- He, B. and Q. Bao, 2019b: CAS FGOALS-f3-L model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11497](https://doi.org/10.22033/esgf/cmip6.11497).
- He, B. et al., 2019: CAS FGOALS-f3-L Model Datasets for CMIP6 Historical Atmospheric Model Intercomparison Project Simulation. *Advances in Atmospheric Sciences*, **36**(8), 771–778, doi:[10.1007/s00376-019-9027-8](https://doi.org/10.1007/s00376-019-9027-8).
- He, B. et al., 2020: CAS FGOALS-f3-L model dataset descriptions for CMIP6 DECK experiments. *Atmospheric and Oceanic Science Letters*, **13**(6), 582–588, doi:[10.1080/16742834.2020.1778419](https://doi.org/10.1080/16742834.2020.1778419).
- Held, I.M. et al., 2019: Structure and Performance of GFDL's CM4.0 Climate Model. *Journal of Advances in Modeling Earth Systems*, **11**(11), 3691–3727, doi:[10.1029/2019ms001829](https://doi.org/10.1029/2019ms001829).
- Hermanson, L., 2020: MOHC HadGEM3-GC31-MM model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.456](https://doi.org/10.22033/esgf/cmip6.456).
- Hock, R. et al., 2019: GlacierMIP – A model intercomparison of global-scale glacier mass-balance models and projections. *Journal of Glaciology*, **65**(251), 453–467, doi:[10.1017/jog.2019.22](https://doi.org/10.1017/jog.2019.22).
- Hoffman, M.J. et al., 2018: MPAS-Albany Land Ice (MALI): a variable-resolution ice sheet model for Earth system modeling using Voronoi grids. *Geoscientific Model Development*, **11**(9), 3747–3780, doi:[10.5194/gmd-11-3747-2018](https://doi.org/10.5194/gmd-11-3747-2018).
- Hoffmann, P., J.J. Katzfey, J.L. McGregor, and M. Thatcher, 2016: Bias and variance correction of sea surface temperatures used for dynamical downscaling. *Journal of Geophysical Research: Atmospheres*, **121**(21), 12877–12890, doi:[10.1002/2016jd025383](https://doi.org/10.1002/2016jd025383).
- Hong, H.-J., W.-L. Lee, H.-H. Hsu, and H.-C. Liang, 2020: AS-RCEC TaiESM1.0 model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15214](https://doi.org/10.22033/esgf/cmip6.15214).
- Horowitz, L.W. et al., 2018a: NOAA-GFDL GFDL-ESM4 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1408](https://doi.org/10.22033/esgf/cmip6.1408).
- Horowitz, L.W. et al., 2018b: NOAA-GFDL GFDL-ESM4 model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1404](https://doi.org/10.22033/esgf/cmip6.1404).
- Horowitz, L.W. et al., 2020: The GFDL Global Atmospheric Chemistry-Climate Model AM4.1: Model Description and Simulation Characteristics. *Journal of Advances in Modeling Earth Systems*, **12**(10), e2019MS002032, doi:[10.1029/2019ms002032](https://doi.org/10.1029/2019ms002032).
- Hostetler, S.W., F. Giorgi, G.T. Bates, and P.J. Bartlein, 1994: Lake–Atmosphere Feedbacks Associated with Paleolakes Bonneville and Lahontan. *Science*, **263**(5147), 665–668, doi:[10.1126/science.263.5147.665](https://doi.org/10.1126/science.263.5147.665).
- Hourdin, F. et al., 2020: LMDZ6A: The Atmospheric Component of the IPSL Climate Model With Improved and Better Tuned Physics. *Journal of Advances in Modeling Earth Systems*, **12**(7), e2019MS001892, doi:[10.1029/2019ms001892](https://doi.org/10.1029/2019ms001892).
- Huang, W., 2019a: THU CIESM model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1352](https://doi.org/10.22033/esgf/cmip6.1352).
- Huang, W., 2019b: THU CIESM model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1357](https://doi.org/10.22033/esgf/cmip6.1357).
- Hunke, E.C. and W.H. Lipscomb, 2010: *CICE: the Los Alamos Sea Ice Model Documentation and Software User's Manual Version 4.1 LA-CC-06-012*. Los Alamos National Laboratory, Los Alamos, NM, USA, 76 pp., https://csdms.colorado.edu/w/images/CICE_documentation_and_software_user's_manual.pdf.
- Hunke, E.C., W.H. Lipscomb, A.K. Turner, N. Jeffery, and S. Elliott, 2015: *CICE: the Los Alamos Sea Ice Model Documentation and Software User's Manual Version 5.1 LA-CC-06-012*. Los Alamos National Laboratory, Los Alamos, NM, USA, 116 pp., https://csdms.colorado.edu/w/images/CICE_documentation_and_software_user's_manual.pdf.
- Hurlin, W. et al., 2018: NOAA-GFDL GFDL-ESM2M model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1645](https://doi.org/10.22033/esgf/cmip6.1645).
- Huss, M. and R. Hock, 2015: A new model for global glacier change and sea-level rise. *Frontiers in Earth Science*, **3**, 54, doi:[10.3389/feart.2015.00054](https://doi.org/10.3389/feart.2015.00054).
- Huybrechts, P., 2002: Sea-level changes at the LGM from ice-dynamic reconstructions of the Greenland and Antarctic ice sheets during the glacial cycles. *Quaternary Science Reviews*, **21**(1–3), 203–231, doi:[10.1016/S0277-3791\(01\)00082-8](https://doi.org/10.1016/S0277-3791(01)00082-8).
- Inness, A. et al., 2013: The MACC reanalysis: an 8 yr data set of atmospheric composition. *Atmospheric Chemistry and Physics*, **13**(8), 4073–4109, doi:[10.5194/acp-13-4073-2013](https://doi.org/10.5194/acp-13-4073-2013).
- Jackson, L., 2020: MOHC HadGEM3-GC31-MM model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10846](https://doi.org/10.22033/esgf/cmip6.10846).
- Jacob, D., 2001: A note to the simulation of the annual and inter-annual variability of the water budget over the Baltic Sea drainage basin. *Meteorology and Atmospheric Physics*, **77**(1–4), 61–73, doi:[10.1007/s007030170017](https://doi.org/10.1007/s007030170017).
- Jacob, D. and R. Podzun, 1997: Sensitivity studies with the regional climate model REMO. *Meteorology and Atmospheric Physics*, **63**(1–2), 119–129, doi:[10.1007/bf01025368](https://doi.org/10.1007/bf01025368).
- Jia, B. et al., 2020: CAS FGOALS-g3 model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2052](https://doi.org/10.22033/esgf/cmip6.2052).
- Jie, W. et al., 2020: BCC BCC-CSM2HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1722](https://doi.org/10.22033/esgf/cmip6.1722).
- John, J.G. et al., 2018a: NOAA-GFDL GFDL-ESM4 model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1981](https://doi.org/10.22033/esgf/cmip6.1981).
- John, J.G. et al., 2018b: NOAA-GFDL GFDL-ESM4 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1414](https://doi.org/10.22033/esgf/cmip6.1414).
- Jones, A., 2019: MOHC UKESM1.0-LL model output prepared for CMIP6 GeoMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1563](https://doi.org/10.22033/esgf/cmip6.1563).
- Jones, C., S. Liddicoat, and A. Wiltshire, 2019: MOHC UKESM1.0-LL model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12181](https://doi.org/10.22033/esgf/cmip6.12181).
- Jones, G., 2019: MOHC HadGEM3-GC31-LL model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.471](https://doi.org/10.22033/esgf/cmip6.471).
- Jungclaus, J. et al., 2019a: MPI-M MPIESM1.2-HR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.741](https://doi.org/10.22033/esgf/cmip6.741).
- Jungclaus, J. et al., 2019b: MPI-M MPIESM1.2-LR model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.787](https://doi.org/10.22033/esgf/cmip6.787).
- Kawamiya, M., T. Hajima, K. Tachiiri, S. Watanabe, and T. Yokohata, 2020: Two decades of Earth system modeling with an emphasis on Model for Interdisciplinary Research on Climate (MIROC). *Progress in Earth and Planetary Science*, **7**(1), 64, doi:[10.1186/s40645-020-00369-5](https://doi.org/10.1186/s40645-020-00369-5).
- Kelley, M. et al., 2020: GISS-E2.1: Configurations and Climatology. *Journal of Advances in Modeling Earth Systems*, **12**(8), e2019MS002025, doi:[10.1029/2019ms002025](https://doi.org/10.1029/2019ms002025).

- Kim, Y.H. et al., 2019a: KIOST KIOST-ESM model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1922](https://doi.org/10.22033/esgf/cmip6.1922).
- Kim, Y.H. et al., 2019b: KIOST KIOST-ESM model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11241](https://doi.org/10.22033/esgf/cmip6.11241).
- Kinne, S. et al., 2006: An AeroCom initial assessment – optical properties in aerosol component modules of global models. *Atmospheric Chemistry and Physics*, **6**(7), 1815–1834, doi:[10.5194/acp-6-1815-2006](https://doi.org/10.5194/acp-6-1815-2006).
- Kirkevåg, A. et al., 2018: A production-tagged aerosol module for Earth system models, OsloAero5.3 – extensions and updates for CAM5.3-Oslo. *Geoscientific Model Development*, **11**(10), 3945–3982, doi:[10.5194/gmd-11-3945-2018](https://doi.org/10.5194/gmd-11-3945-2018).
- Kiss, A.E. et al., 2020: ACCESS-OM2 v1.0: A global ocean–sea ice model at three resolutions. *Geoscientific Model Development*, **13**(2), 401–442, doi:[10.5194/gmd-13-401-2020](https://doi.org/10.5194/gmd-13-401-2020).
- Kittel, C. et al., 2021: Diverging future surface mass balance between the Antarctic ice shelves and grounded ice sheet. *The Cryosphere*, **15**(3), 1215–1236, doi:[10.5194/tc-15-1215-2021](https://doi.org/10.5194/tc-15-1215-2021).
- Klemp, J.B., J. Dudhia, and A.D. Hassiotis, 2008: An Upper Gravity-Wave Absorbing Layer for NWP Applications. *Monthly Weather Review*, **136**(10), 3987–4004, doi:[10.1175/2008mwr2596.1](https://doi.org/10.1175/2008mwr2596.1).
- Kodama, C. et al., 2019a: MIROC NICAM16-7S model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1033](https://doi.org/10.22033/esgf/cmip6.1033).
- Kodama, C. et al., 2019b: MIROC NICAM16-8S model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1034](https://doi.org/10.22033/esgf/cmip6.1034).
- Kodama, C. et al., 2019c: MIROC NICAM16-9S model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1036](https://doi.org/10.22033/esgf/cmip6.1036).
- Komuro, Y., 2019: MIROC MIROC6 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.897](https://doi.org/10.22033/esgf/cmip6.897).
- Kowalczyk, E. et al., 2013: The land surface model component of ACCESS: description and impact on the simulated surface climatology. *Australian Meteorological and Oceanographic Journal*, **63**(1), 65–82, doi:[10.22499/2.6301.005](https://doi.org/10.22499/2.6301.005).
- Kraaijenbrink, P.D.A., M.F.P. Bierkens, A.F. Lutz, and W.W. Immerzeel, 2017: Impact of a global temperature rise of 1.5 degrees Celsius on Asia's glaciers. *Nature*, **549**(7671), 257–260, doi:[10.1038/nature23878](https://doi.org/10.1038/nature23878).
- Krasting, J.P. et al., 2018a: NOAA-GFDL GFDL-ESM4 model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1405](https://doi.org/10.22033/esgf/cmip6.1405).
- Krasting, J.P. et al., 2018b: NOAA-GFDL GFDL-ESM4 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1407](https://doi.org/10.22033/esgf/cmip6.1407).
- Kržič, A., I. Tošić, V. Djurdjević, K. Veljović, and B. Rajković, 2011: Changes in climate indices for Serbia according to the SRES-A1B and SRES-A2 scenarios. *Climate Research*, **49**(1), 73–86, doi:[10.3354/cr01008](https://doi.org/10.3354/cr01008).
- Kuhlbrot, T. et al., 2018: The Low-Resolution Version of HadGEM3 GC3.1: Development and Evaluation for Global Climate. *Journal of Advances in Modeling Earth Systems*, **10**(11), 2865–2888, doi:[10.1029/2018ms001370](https://doi.org/10.1029/2018ms001370).
- Kuipers Munneke, P. et al., 2011: A new albedo parameterization for use in climate models over the Antarctic ice sheet. *Journal of Geophysical Research: Atmospheres*, **116**(D5), D05114, doi:[10.1029/2010jd015113](https://doi.org/10.1029/2010jd015113).
- L'Hévéder, B., L. Li, F. Sevault, and S. Somot, 2013: Interannual variability of deep convection in the Northwestern Mediterranean simulated with a coupled AORCM. *Climate Dynamics*, **41**(3–4), 937–960, doi:[10.1007/s00382-012-1527-5](https://doi.org/10.1007/s00382-012-1527-5).
- Lamarque, J.-F., J.R. McConnell, D.T. Shindell, J.J. Orlando, and G.S. Tyndall, 2011: Understanding the drivers for the 20th century change of hydrogen peroxide in Antarctic ice-cores. *Geophysical Research Letters*, **38**(4), L04810, doi:[10.1029/2010gl045992](https://doi.org/10.1029/2010gl045992).
- Lamarque, J.-F. et al., 2010: Historical (1850–2000) gridded anthropogenic and biomass burning emissions of reactive gases and aerosols: methodology and application. *Atmospheric Chemistry and Physics*, **10**(15), 7017–7039, doi:[10.5194/acp-10-7017-2010](https://doi.org/10.5194/acp-10-7017-2010).
- Larour, E., H. Seroussi, M. Morlighem, and E. Rignot, 2012: Continental scale, high order, high spatial resolution, ice sheet modeling using the Ice Sheet System Model (ISSM). *Journal of Geophysical Research: Earth Surface*, **117**(F1), F01022, doi:[10.1029/2011jf002140](https://doi.org/10.1029/2011jf002140).
- Lawrence, B.N. et al., 2012: Describing Earth system simulations with the Metafor CIM. *Geoscientific Model Development*, **5**(6), 1493–1500, doi:[10.5194/gmd-5-1493-2012](https://doi.org/10.5194/gmd-5-1493-2012).
- Lawrence, D.M. et al., 2011: Parameterization improvements and functional and structural advances in Version 4 of the Community Land Model. *Journal of Advances in Modeling Earth Systems*, **3**(1), M03001, doi:[10.1029/2011ms00045](https://doi.org/10.1029/2011ms00045).
- Lawrence, D.M. et al., 2019: The Community Land Model Version 5: Description of New Features, Benchmarking, and Impact of Forcing Uncertainty. *Journal of Advances in Modeling Earth Systems*, **11**(12), 4245–4287, doi:[10.1029/2018ms001583](https://doi.org/10.1029/2018ms001583).
- Le Moigne, P., J. Colin, and B. Decharme, 2016: Impact of lake surface temperatures simulated by the FLake scheme in the CNRM-CM5 climate model. *Tellus A: Dynamic Meteorology and Oceanography*, **68**(1), 31274, doi:[10.3402/tellusa.v68.31274](https://doi.org/10.3402/tellusa.v68.31274).
- Lee, J. et al., 2020: Evaluation of the Korea Meteorological Administration Advanced Community Earth-System model (K-ACE). *Asia-Pacific Journal of Atmospheric Sciences*, **56**(3), 381–395, doi:[10.1007/s13143-019-00144-7](https://doi.org/10.1007/s13143-019-00144-7).
- Lee, V., S.L. Cornford, and A.J. Payne, 2015: Initialization of an ice-sheet model for present-day Greenland. *Annals of Glaciology*, **56**(70), 129–140, doi:[10.3189/2015aog70a121](https://doi.org/10.3189/2015aog70a121).
- Lee, W.-L. and H.-C. Liang, 2019: AS-RCEC TaiESM1.0 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9684](https://doi.org/10.22033/esgf/cmip6.9684).
- Lee, W.-L. and H.-C. Liang, 2020: AS-RCEC TaiESM1.0 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9688](https://doi.org/10.22033/esgf/cmip6.9688).
- Lee, W.-L., K.N. Liou, and C.-C. Wang, 2013: Impact of 3-D topography on surface radiation budget over the Tibetan Plateau. *Theoretical and Applied Climatology*, **113**(1), 95–103, doi:[10.1007/s00704-012-0767-y](https://doi.org/10.1007/s00704-012-0767-y).
- Lee, W.-L. et al., 2020: Taiwan Earth System Model Version 1: description and evaluation of mean state. *Geoscientific Model Development*, **13**(9), 3887–3904, doi:[10.5194/gmd-13-3887-2020](https://doi.org/10.5194/gmd-13-3887-2020).
- Lefebvre, F., 2003: Modeling of snow and ice melt at ETH Camp (West Greenland): A study of surface albedo. *Journal of Geophysical Research: Atmospheres*, **108**(D8), 4231, doi:[10.1029/2001jd001160](https://doi.org/10.1029/2001jd001160).
- Lenaerts, J.T.M. et al., 2012: Modeling drifting snow in Antarctica with a regional climate model: 1. Methods and model evaluation. *Journal of Geophysical Research: Atmospheres*, **117**(D5), D05108, doi:[10.1029/2011jd016145](https://doi.org/10.1029/2011jd016145).
- Leutwyler, D., D. Lüthi, N. Ban, O. Fuhrer, and C. Schär, 2017: Evaluation of the convection-resolving climate modeling approach on continental scales. *Journal of Geophysical Research: Atmospheres*, **122**(10), 5237–5258, doi:[10.1002/2016jd026013](https://doi.org/10.1002/2016jd026013).
- Levermann, A. et al., 2020: Projecting Antarctica's contribution to future sea level rise from basal ice shelf melt using linear response functions of 16 ice sheet models (LARMIP-2). *Earth System Dynamics*, **11**(1), 35–76, doi:[10.5194/esd-11-35-2020](https://doi.org/10.5194/esd-11-35-2020).
- Li, D. et al., 2018: Present Climate Evaluation and Added Value Analysis of Dynamically Downscaled Simulations of CORDEX-East Asia. *Journal of Applied Meteorology and Climatology*, **57**(10), 2317–2341, doi:[10.1175/jamc-d-18-0008.1](https://doi.org/10.1175/jamc-d-18-0008.1).
- Li, L., 2019a: CAS FGOALS-g3 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1783](https://doi.org/10.22033/esgf/cmip6.1783).
- Li, L., 2019b: CAS FGOALS-g3 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2056](https://doi.org/10.22033/esgf/cmip6.2056).
- Li, L., 2020a: CAS FGOALS-g3 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2048](https://doi.org/10.22033/esgf/cmip6.2048).
- Li, L., 2020b: CAS FGOALS-g3 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2051](https://doi.org/10.22033/esgf/cmip6.2051).

- Li, L. et al., 2020: The Flexible Global Ocean–Atmosphere–Land System Model Grid-Point Version 3 (FGOALS-g3): Description and Evaluation. *Journal of Advances in Modeling Earth Systems*, **12**(9), e2019MS002012, doi:[10.1029/2019ms002012](https://doi.org/10.1029/2019ms002012).
- Li, W. et al., 2019a: BCC BCC-CSM2MR model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1729](https://doi.org/10.22033/esgf/cmip6.1729).
- Li, W. et al., 2019b: Development of Land Surface Model BCC_AVIM2.0 and Its Preliminary Performance in LS3MIP/CMIP6. *Journal of Meteorological Research*, **33**(5), 851–869, doi:[10.1007/s13351-019-9016-y](https://doi.org/10.1007/s13351-019-9016-y).
- Liddicoat, S., A. Wiltshire, and E. Robertson, 2019: MOHC UKESM1.0-LL model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1562](https://doi.org/10.22033/esgf/cmip6.1562).
- Lin, P., 2019: CAS FGOALS-f3-L model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2044](https://doi.org/10.22033/esgf/cmip6.2044).
- Lin, P., 2020a: CAS FGOALS-f3-H model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13261](https://doi.org/10.22033/esgf/cmip6.13261).
- Lin, P., 2020b: CAS FGOALS-g3 model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2050](https://doi.org/10.22033/esgf/cmip6.2050).
- Lin, P. et al., 2020: LICOM Model Datasets for the CMIP6 Ocean Model Intercomparison Project. *Advances in Atmospheric Sciences*, **37**(3), 239–249, doi:[10.1007/s00376-019-9208-5](https://doi.org/10.1007/s00376-019-9208-5).
- Lin, Y. et al., 2020: Community Integrated Earth System Model (CIESM): Description and Evaluation. *Journal of Advances in Modeling Earth Systems*, **12**(8), e2019MS002036, doi:[10.1029/2019ms002036](https://doi.org/10.1029/2019ms002036).
- Lipscomb, W.H. et al., 2019: Description and evaluation of the Community Ice Sheet Model (CISM) v2.1. *Geoscientific Model Development*, **12**(1), 387–424, doi:[10.5194/gmd-12-387-2019](https://doi.org/10.5194/gmd-12-387-2019).
- Lipson, M.J., M. Thatcher, M.A. Hart, and A. Pitman, 2018: A building energy demand and urban land surface model. *Quarterly Journal of the Royal Meteorological Society*, **144**(714), 1572–1590, doi:[10.1002/qj.3317](https://doi.org/10.1002/qj.3317).
- Liu, X. et al., 2012: Toward a minimal representation of aerosols in climate models: description and evaluation in the Community Atmosphere Model CAM5. *Geoscientific Model Development*, **5**(3), 709–739, doi:[10.5194/gmd-5-709-2012](https://doi.org/10.5194/gmd-5-709-2012).
- Liu, X. et al., 2016: Description and evaluation of a new four-mode version of the Modal Aerosol Module (MAM4) within version 5.3 of the Community Atmosphere Model. *Geoscientific Model Development*, **9**(2), 505–522, doi:[10.5194/gmd-9-505-2016](https://doi.org/10.5194/gmd-9-505-2016).
- Lovato, T. and D. Peano, 2020a: CMCC CMCC-CM2-SR5 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1362](https://doi.org/10.22033/esgf/cmip6.1362).
- Lovato, T. and D. Peano, 2020b: CMCC CMCC-CM2-SR5 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1365](https://doi.org/10.22033/esgf/cmip6.1365).
- Lovato, T. and M. Butenschön, 2021: CMCC CMCC-ESM2 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13167](https://doi.org/10.22033/esgf/cmip6.13167).
- Lovato, T., D. Peano, and M. Butenschön, 2021a: CMCC CMCC-ESM2 model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13163](https://doi.org/10.22033/esgf/cmip6.13163).
- Lovato, T., D. Peano, and M. Butenschön, 2021b: CMCC CMCC-ESM2 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13164](https://doi.org/10.22033/esgf/cmip6.13164).
- Lovato, T., D. Peano, and M. Butenschön, 2021c: CMCC CMCC-ESM2 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13168](https://doi.org/10.22033/esgf/cmip6.13168).
- Lurton, T. et al., 2020: Implementation of the CMIP6 Forcing Data in the IPSL-CM6A-LR Model. *Journal of Advances in Modeling Earth Systems*, **12**(4), e2019MS001940, doi:[10.1029/2019ms001940](https://doi.org/10.1029/2019ms001940).
- Malyshev, S. et al., 2018: NOAA-GFDL GFDL-ESM4 model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1411](https://doi.org/10.22033/esgf/cmip6.1411).
- Manabe, S., 1969: Climate and the Ocean Circulation I. The Atmospheric Circulation and the Hydrology of the Earth's Surface. *Monthly Weather Review*, **97**(11), 739–774, doi:[10.1175/1520-0493\(1969\)097<0739:cato>2.3.co;2](https://doi.org/10.1175/1520-0493(1969)097<0739:cato>2.3.co;2).
- Martynov, A. et al., 2013: Reanalysis-driven climate simulation over CORDEX North America domain using the Canadian Regional Climate Model, version 5: model performance evaluation. *Climate Dynamics*, **41**(11–12), 2973–3005, doi:[10.1007/s00382-013-1778-9](https://doi.org/10.1007/s00382-013-1778-9).
- Marzeion, B., A.H. Jarosch, and M. Hofer, 2012: Past and future sea-level change from the surface mass balance of glaciers. *The Cryosphere*, **6**(6), 1295–1322, doi:[10.5194/tc-6-1295-2012](https://doi.org/10.5194/tc-6-1295-2012).
- Marzeion, B. et al., 2020: Partitioning the Uncertainty of Ensemble Projections of Global Glacier Mass Change. *Earth's Future*, **8**(7), e2019EF001470, doi:[10.1029/2019ef001470](https://doi.org/10.1029/2019ef001470).
- Mauritsen, T. et al., 2019: Developments in the MPI-M Earth System Model version 1.2 (MPI-ESM1.2) and Its Response to Increasing CO₂. *Journal of Advances in Modeling Earth Systems*, **11**(4), 998–1038, doi:[10.1029/2018ms001400](https://doi.org/10.1029/2018ms001400).
- Maussion, F. et al., 2019: The Open Global Glacier Model (OGGM) v1.0. *Geoscientific Model Development*, **12**, 909–931, doi:[10.5194/gmd-2018-9](https://doi.org/10.5194/gmd-2018-9).
- Mearns, L. et al., 2017: The NA-CORDEX dataset, version 1.0. NCAR Climate Data Gateway, Boulder, CO, USA. Retrieved from: <https://doi.org/10.5065/D6SJ1JCH>.
- Meehl, G.A. et al., 2019: Effects of Model Resolution, Physics, and Coupling on Southern Hemisphere Storm Tracks in CESM1.3. *Geophysical Research Letters*, **46**(21), 12408–12416, doi:[10.1029/2019gl084057](https://doi.org/10.1029/2019gl084057).
- Michou, M. et al., 2020: Present-Day and Historical Aerosol and Ozone Characteristics in CNRM CMIP6 Simulations. *Journal of Advances in Modeling Earth Systems*, **12**(1), e2019MS001816, doi:[10.1029/2019ms001816](https://doi.org/10.1029/2019ms001816).
- Milly, P.C.D. et al., 2014: An Enhanced Model of Land Water and Energy for Global Hydrologic and Earth-System Studies. *Journal of Hydrometeorology*, **15**(5), 1739–1761, doi:[10.1175/jhm-d-13-0162.1](https://doi.org/10.1175/jhm-d-13-0162.1).
- Mironov, D. et al., 2010: Implementation of the lake parameterisation scheme Flake into the numerical weather prediction model COSMO. *Boreal Environment Research*, **15**(2), 218–230, <https://helda.helsinki.fi/bitstream/handle/10138/233087/ber15-2-218.pdf?sequence=1>.
- Mizuta, R., H. Yoshimura, T. Ose, M. Hosaka, and S. Yukimoto, 2019a: MRI MRI-AGCM3-2-H model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10942](https://doi.org/10.22033/esgf/cmip6.10942).
- Mizuta, R., H. Yoshimura, T. Ose, M. Hosaka, and S. Yukimoto, 2019b: MRI MRI-AGCM3-2-S model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1625](https://doi.org/10.22033/esgf/cmip6.1625).
- Mizuta, R. et al., 2012: Climate Simulations Using MRI-AGCM3.2 with 20-km Grid. *Journal of the Meteorological Society of Japan. Series II*, **90A**, 233–258, doi:[10.2151/jmsj.2012-a12](https://doi.org/10.2151/jmsj.2012-a12).
- Mlawer, E. and R. Perna, 2019: AER LBLRTM model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2003](https://doi.org/10.22033/esgf/cmip6.2003).
- Mlawer, E. and R. Perna, 2020a: AER RRTMG-LW4.91 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9961](https://doi.org/10.22033/esgf/cmip6.9961).
- Mlawer, E. and R. Perna, 2020b: AER RRTMG-SW4.02 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9963](https://doi.org/10.22033/esgf/cmip6.9963).
- Mlawer, E.J., S.J. Taubman, P.D. Brown, M.J. Iacono, and S.A. Clough, 1997: Radiative transfer for inhomogeneous atmospheres: RRTM, a validated correlated-k model for the longwave. *Journal of Geophysical Research: Atmospheres*, **102**(D14), 16663–16682, doi:[10.1029/97jd00237](https://doi.org/10.1029/97jd00237).
- Mochizuki, T., H. Tatebe, T. Kataoka, and H. Koyama, 2019: MIROC MIROC6 model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.890](https://doi.org/10.22033/esgf/cmip6.890).

- Moore, J.K., K. Lindsay, S.C. Doney, M.C. Long, and K. Misumi, 2013: Marine Ecosystem Dynamics and Biogeochemical Cycling in the Community Earth System Model [CESM1(BGC)]: Comparison of the 1990s with the 2090s under the RCP4.5 and RCP8.5 Scenarios. *Journal of Climate*, **26**(23), 9291–9312, doi:[10.1175/jcli-d-12-00566.1](https://doi.org/10.1175/jcli-d-12-00566.1).
- Morcrette, J.-J., H.W. Barker, J.N.S. Cole, M.J. Iacono, and R. Pincus, 2008: Impact of a New Radiation Package, McRad, in the ECMWF Integrated Forecasting System. *Monthly Weather Review*, **136**(12), 4773–4798, doi:[10.1175/2008mwr2363.1](https://doi.org/10.1175/2008mwr2363.1).
- Morgenstern, O. et al., 2017: Review of the global models used within phase 1 of the Chemistry–Climate Model Initiative (CCMI). *Geoscientific Model Development*, **10**(2), 639–671, doi:[10.5194/gmd-10-639-2017](https://doi.org/10.5194/gmd-10-639-2017).
- Mori, M., 2019: MIROC MIROC6 model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2162](https://doi.org/10.22033/esgf/cmip6.2162).
- Morlighem, M. et al., 2010: Spatial patterns of basal drag inferred using control methods from a full-Stokes and simpler models for Pine Island Glacier, West Antarctica. *Geophysical Research Letters*, **37**(14), L14502, doi:[10.1029/2010gl043853](https://doi.org/10.1029/2010gl043853).
- Mulcahy, J.P. et al., 2020: Description and evaluation of aerosol in UKESM1 and HadGEM3-GC3.1 CMIP6 historical simulations. *Geoscientific Model Development*, **13**(12), 6383–6423, doi:[10.5194/gmd-13-6383-2020](https://doi.org/10.5194/gmd-13-6383-2020).
- Müller, W.A. et al., 2018: A Higher-resolution Version of the Max Planck Institute Earth System Model (MPI-ESM1.2-HR). *Journal of Advances in Modeling Earth Systems*, **10**(7), 1383–1413, doi:[10.1029/2017ms001217](https://doi.org/10.1029/2017ms001217).
- Müller, W.A. et al., 2019: MPI-M MPI-ESM1.2-LR model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15016](https://doi.org/10.22033/esgf/cmip6.15016).
- Nabat, P. et al., 2020: Modulation of radiative aerosols effects by atmospheric circulation over the Euro-Mediterranean region. *Atmospheric Chemistry and Physics*, **20**(14), 8315–8349, doi:[10.5194/acp-20-8315-2020](https://doi.org/10.5194/acp-20-8315-2020).
- Nakano, H., M. Ishii, K.B. Rodgers, H. Tsujino, and G. Yamanaka, 2015: Anthropogenic CO₂ uptake, transport, storage, and dynamical controls in the ocean imposed by the meridional overturning circulation: A modeling study. *Global Biogeochemical Cycles*, **29**(10), 1706–1724, doi:[10.1002/2015gb005128](https://doi.org/10.1002/2015gb005128).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2018a: NASA-GISS GISS-E2.1G model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2061](https://doi.org/10.22033/esgf/cmip6.2061).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2018b: NASA-GISS GISS-E2.1G model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1400](https://doi.org/10.22033/esgf/cmip6.1400).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2018c: NASA-GISS GISS-E2.1G model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2062](https://doi.org/10.22033/esgf/cmip6.2062).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2018d: NASA-GISS GISS-E2.1G model output prepared for CMIP6 ISMIP6. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2066](https://doi.org/10.22033/esgf/cmip6.2066).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2018e: NASA-GISS GISS-E2.1G model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2067](https://doi.org/10.22033/esgf/cmip6.2067).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2018f: NASA-GISS GISS-E2.1G model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2068](https://doi.org/10.22033/esgf/cmip6.2068).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2018g: NASA-GISS GISS-E2.1H model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1421](https://doi.org/10.22033/esgf/cmip6.1421).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019a: NASA-GISS GISS-E2.1G model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2059](https://doi.org/10.22033/esgf/cmip6.2059).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019b: NASA-GISS GISS-E2.1G model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2060](https://doi.org/10.22033/esgf/cmip6.2060).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019c: NASA-GISS GISS-E2.1G model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2071](https://doi.org/10.22033/esgf/cmip6.2071).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019d: NASA-GISS GISS-E2.1G model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2072](https://doi.org/10.22033/esgf/cmip6.2072).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019e: NASA-GISS GISS-E2.1H model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13941](https://doi.org/10.22033/esgf/cmip6.13941).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019f: NASA-GISS GISS-E2-1-G-CC model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11656](https://doi.org/10.22033/esgf/cmip6.11656).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019g: NASA-GISS GISS-E2-1-G-CC model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11657](https://doi.org/10.22033/esgf/cmip6.11657).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019h: NASA-GISS GISS-E2-2-G model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11659](https://doi.org/10.22033/esgf/cmip6.11659).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019i: NASA-GISS GISS-E2-2-G model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2081](https://doi.org/10.22033/esgf/cmip6.2081).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2019j: NASA-GISS GISS-E3-G model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2098](https://doi.org/10.22033/esgf/cmip6.2098).
- NASA Goddard Institute for Space Studies (NASA/GISS), 2020: NASA-GISS GISS-E2.1G model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2074](https://doi.org/10.22033/esgf/cmip6.2074).
- Neubauer, D. et al., 2019a: The global aerosol–climate model ECHAM6.3–HAM2.3 – Part 2: Cloud evaluation, aerosol radiative forcing, and climate sensitivity. *Geoscientific Model Development*, **12**(8), 3609–3639, doi:[10.5194/gmd-12-3609-2019](https://doi.org/10.5194/gmd-12-3609-2019).
- Neubauer, D. et al., 2019b: HAMMOZ–Consortium MPI-ESM1.2–HAM model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1621](https://doi.org/10.22033/esgf/cmip6.1621).
- Neubauer, D. et al., 2019c: HAMMOZ–Consortium MPI-ESM1.2–HAM model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1622](https://doi.org/10.22033/esgf/cmip6.1622).
- Neubauer, D. et al., 2019d: HAMMOZ–Consortium MPI-ESM1.2–HAM model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14724](https://doi.org/10.22033/esgf/cmip6.14724).
- Nicoli, D. and A. Bellucci, 2020: CMCC CMCC-CM2-SR5 model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1363](https://doi.org/10.22033/esgf/cmip6.1363).
- Niemeier, U. et al., 2019a: MPI-M MPI-ESM1.2–HR model output prepared for CMIP6 GeoMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15294](https://doi.org/10.22033/esgf/cmip6.15294).
- Niemeier, U. et al., 2019b: MPI-M MPIESM1.2–LR model output prepared for CMIP6 GeoMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.751](https://doi.org/10.22033/esgf/cmip6.751).
- Nitta, T., K. Yoshimura, and A. Abe-Ouchi, 2017: Impact of Arctic Wetlands on the Climate System: Model Sensitivity Simulations with the MIROC5 AGCM and a Snow-Fed Wetland Scheme. *Journal of Hydrometeorology*, **18**(11), 2923–2936, doi:[10.1175/jhm-d-16-0105.1](https://doi.org/10.1175/jhm-d-16-0105.1).
- Nitta, T. et al., 2014: Representing Variability in Subgrid Snow Cover and Snow Depth in a Global Land Model: Offline Validation. *Journal of Climate*, **27**(9), 3318–3330, doi:[10.1175/jcli-d-13-00310.1](https://doi.org/10.1175/jcli-d-13-00310.1).
- Niu, G.-Y. et al., 2011: The community Noah land surface model with multiparameterization options (Noah-MP): 1. Model description and evaluation with local-scale measurements. *Journal of Geophysical Research: Atmospheres*, **116**(D12), D12109, doi:[10.1029/2010jd015139](https://doi.org/10.1029/2010jd015139).
- Noilhan, J. and J.-F. Mahfouf, 1996: The ISBA land surface parameterisation scheme. *Global and Planetary Change*, **13**(1–4), 145–159, doi:[10.1016/0921-8181\(95\)00043-7](https://doi.org/10.1016/0921-8181(95)00043-7).
- Notz, D., F.A. Haumann, H. Haak, J.H. Jungclaus, and J. Marotzke, 2013: Arctic sea-ice evolution as modeled by Max Planck Institute for Meteorology's

- Earth system model. *Journal of Advances in Modeling Earth Systems*, **5**(2), 173–194, doi:[10.1002/jame.20016](https://doi.org/10.1002/jame.20016).
- O'Connor, F., 2019: MOHC UKESM1.0-LL model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1561](https://doi.org/10.22033/esgf/cmip6.1561).
- O'Connor, F., 2020: NERC UKESM1.0-LL model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.405](https://doi.org/10.22033/esgf/cmip6.405).
- O'Connor, F. et al., 2019: MOHC UKESM1.0-LL model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11061](https://doi.org/10.22033/esgf/cmip6.11061).
- O'Neill, B.C. et al., 2016: The Scenario Model Intercomparison Project (ScenarioMIP) for CMIP6. *Geoscientific Model Development*, **9**(9), 3461–3482, doi:[10.5194/gmd-9-3461-2016](https://doi.org/10.5194/gmd-9-3461-2016).
- Obata, A. and K. Shibata, 2012: Damage of Land Biosphere due to Intense Warming by 1000-Fold Rapid Increase in Atmospheric Methane: Estimation with a Climate–Carbon Cycle Model. *Journal of Climate*, **25**(24), 8524–8541, doi:[10.1175/jcli-d-11-00533.1](https://doi.org/10.1175/jcli-d-11-00533.1).
- Obata, A. and Y. Adachi, 2019: Earth System Model Response to Large Midlatitude and High-latitude Volcanic Eruptions. *Journal of Geophysical Research: Biogeosciences*, **124**(7), 1865–1886, doi:[10.1029/2018jg004696](https://doi.org/10.1029/2018jg004696).
- Ogura, T., M. Watanabe, and N. Hirota, 2019: MIROC MIROC6 model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.885](https://doi.org/10.22033/esgf/cmip6.885).
- Ohgaito, R. et al., 2019: MIROC MIROC-ES2L model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.932](https://doi.org/10.22033/esgf/cmip6.932).
- Ohgaito, R. et al., 2020: MIROC MIROC-ES2L model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15241](https://doi.org/10.22033/esgf/cmip6.15241).
- Oki, T. and Y.C. Sud, 1998: Design of Total Runoff Integrating Pathways (TRIP)-A Global River Channel Network. *Earth Interactions*, **2**(1), 1–37, doi:[10.1175/1087-3562\(1998\)002<0001:dotrip>2.3.co;2](https://doi.org/10.1175/1087-3562(1998)002<0001:dotrip>2.3.co;2).
- Oleson, K. et al., 2013: *Technical description of version 4.5 of the Community Land Model (CLM)*. No. NCAR/TN-503+STR, National Center for Atmospheric Research (NCAR), Boulder, CO, USA, 420 pp., doi:[10.5065/d6rr1w7m](https://doi.org/10.5065/d6rr1w7m).
- Olivieri, D.J.L. et al., 2019a: NCC NorESM2-LM model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.574](https://doi.org/10.22033/esgf/cmip6.574).
- Olivieri, D.J.L. et al., 2019b: NCC NorESM2-LM model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.586](https://doi.org/10.22033/esgf/cmip6.586).
- Olivieri, D.J.L. et al., 2020: NCC NorESM2-MM model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.590](https://doi.org/10.22033/esgf/cmip6.590).
- Onuma, Y. and H. Kim, 2020: MIROC MIROC6 model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.887](https://doi.org/10.22033/esgf/cmip6.887).
- Oshima, N. et al., 2020: Global and Arctic effective radiative forcing of anthropogenic gases and aerosols in MRI-ESM2.0. *Progress in Earth and Planetary Science*, **7**(1), 38, doi:[10.1186/s40645-020-00348-w](https://doi.org/10.1186/s40645-020-00348-w).
- Ozturk, T., M.T. Turp, M. Türkeş, and M.L. Kurnaz, 2017: Projected changes in temperature and precipitation climatology of Central Asia CORDEX Region 8 by using RegCM4.3.5. *Atmospheric Research*, **183**, 296–307, doi:[10.1016/j.atmosres.2016.09.008](https://doi.org/10.1016/j.atmosres.2016.09.008).
- Ozturk, T., M.T. Turp, M. Türkeş, and M.L. Kurnaz, 2018: Future projections of temperature and precipitation climatology for CORDEX-MENA domain using RegCM4.4. *Atmospheric Research*, **206**, 87–107, doi:[10.1016/j.atmosres.2018.02.009](https://doi.org/10.1016/j.atmosres.2018.02.009).
- Pak, G. et al., 2021: Korea Institute of Ocean Science and Technology Earth System Model and Its Simulation Characteristics. *Ocean Science Journal*, **56**(1), 18–45, doi:[10.1007/s12601-021-00001-7](https://doi.org/10.1007/s12601-021-00001-7).
- Pal, J.S. et al., 2007: Regional Climate Modeling for the Developing World: The ICTP RegCM3 and RegCNET. *Bulletin of the American Meteorological Society*, **88**(9), 1395–1410, doi:[10.1175/bams-88-9-1395](https://doi.org/10.1175/bams-88-9-1395).
- Panickal, S. and S. Narayanasetti, 2020: CCCR-IITM IITM-ESM model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14741](https://doi.org/10.22033/esgf/cmip6.14741).
- Panitz, H.-J., A. Dosio, M. Büchner, D. Lüthi, and K. Keuler, 2014: COSMO-CLM (CCLM) climate simulations over CORDEX-Africa domain: analysis of the ERA-Interim driven simulations at 0.44° and 0.22° resolution. *Climate Dynamics*, **42**(11–12), 3015–3038, doi:[10.1007/s00382-013-1834-5](https://doi.org/10.1007/s00382-013-1834-5).
- Park, S. and J. Shin, 2019: SNU SAM0-UNICON model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1489](https://doi.org/10.22033/esgf/cmip6.1489).
- Park, S., J. Shin, S. Kim, E. Oh, and Y. Kim, 2019: Global Climate Simulated by the Seoul National University Atmosphere Model Version 0 with a Unified Convection Scheme (SAM0-UNICON). *Journal of Climate*, **32**(10), 2917–2949, doi:[10.1175/jcli-d-18-0796.1](https://doi.org/10.1175/jcli-d-18-0796.1).
- Pascoe, C., B.N. Lawrence, E. Guilyardi, M. Juckes, and K.E. Taylor, 2020: Documenting numerical experiments in support of the Coupled Model Intercomparison Project Phase 6 (CMIP6). *Geoscientific Model Development*, **13**(5), 2149–2167, doi:[10.5194/gmd-13-2149-2020](https://doi.org/10.5194/gmd-13-2149-2020).
- Pattyn, F., 2017: Sea-level response to melting of Antarctic ice shelves on multi-centennial timescales with the fast Elementary Thermomechanical Ice Sheet model (f.ETISH v1.0). *The Cryosphere*, **11**(4), 1851–1878, doi:[10.5194/tc-11-1851-2017](https://doi.org/10.5194/tc-11-1851-2017).
- Paynter, D.J. et al., 2018a: NOAA-GFDL GFDL-GRTCODE model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10404](https://doi.org/10.22033/esgf/cmip6.10404).
- Paynter, D.J. et al., 2018b: NOAA-GFDL GFDL-RFM-DISORT model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10406](https://doi.org/10.22033/esgf/cmip6.10406).
- Paynter, D.J. et al., 2018c: NOAA-GFDL GFDL-CM4 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1643](https://doi.org/10.22033/esgf/cmip6.1643).
- Paynter, D.J. et al., 2018d: NOAA-GFDL GFDL-ESM4 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11961](https://doi.org/10.22033/esgf/cmip6.11961).
- Peano, D. and T. Lovato, 2019: CMCC CMCC-ESM2-SR5 model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1373](https://doi.org/10.22033/esgf/cmip6.1373).
- Peano, D., T. Lovato, and S. Materia, 2019: CMCC CMCC-ESM2-SR5 model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1372](https://doi.org/10.22033/esgf/cmip6.1372).
- Peano, D., T. Lovato, and S. Materia, 2020a: CMCC CMCC-ESM2 model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13165](https://doi.org/10.22033/esgf/cmip6.13165).
- Peano, D., T. Lovato, and S. Materia, 2020b: CMCC CMCC-ESM2 model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13166](https://doi.org/10.22033/esgf/cmip6.13166).
- Peings, Y., 2020: UCI CESM1-WACCM-SC model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12281](https://doi.org/10.22033/esgf/cmip6.12281).
- Petersen, M.R. et al., 2019: An Evaluation of the Ocean and Sea Ice Climate of E3SM Using MPAS and Interannual CORE-II Forcing. *Journal of Advances in Modeling Earth Systems*, **11**(5), 1438–1458, doi:[10.1029/2018ms001373](https://doi.org/10.1029/2018ms001373).
- Petrie, R. et al., 2021: Coordinating an operational data distribution network for CMIP6 data. *Geoscientific Model Development*, **14**(1), 629–644, doi:[10.5194/gmd-14-629-2021](https://doi.org/10.5194/gmd-14-629-2021).
- Pincus, R., 2019: RTE-RRTMGP-Consortium RTE+RRTMGP (2018-12-04full-resolution) model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10124](https://doi.org/10.22033/esgf/cmip6.10124).
- Ploshay, J. et al., 2018: NOAA-GFDL GFDL-CM4 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11383](https://doi.org/10.22033/esgf/cmip6.11383).
- Pohlmann, H. et al., 2019: MPI-M MPIESM1.2-HR model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.768](https://doi.org/10.22033/esgf/cmip6.768).
- Pollard, D. and R.M. DeConto, 2012: Description of a hybrid ice sheet-shelf model, and application to Antarctica. *Geoscientific Model Development*, **5**, 1273–1295, doi:[10.5194/gmd-5-1273-2012](https://doi.org/10.5194/gmd-5-1273-2012).
- Pollard, D., R.M. DeConto, and R.B. Alley, 2015: Potential Antarctic Ice Sheet retreat driven by hydrofracturing and ice cliff failure. *Earth and Planetary Science Letters*, **412**, 112–121, doi:[10.1016/j.epsl.2014.12.035](https://doi.org/10.1016/j.epsl.2014.12.035).
- Pongratz, J. et al., 2019: MPI-M MPIESM1.2-LR model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.772](https://doi.org/10.22033/esgf/cmip6.772).
- Powers, J.G. et al., 2017: The Weather Research and Forecasting Model: Overview, System Efforts, and Future Directions. *Bulletin of the*

- American Meteorological Society*, **98**(8), 1717–1737, doi:[10.1175/bams-d-15-00308.1](https://doi.org/10.1175/bams-d-15-00308.1).
- Qiao, F. et al., 2013: Development and evaluation of an Earth System Model with surface gravity waves. *Journal of Geophysical Research: Oceans*, **118**(9), 4514–4524, doi:[10.1002/jgrc.20327](https://doi.org/10.1002/jgrc.20327).
- Qin, Y., S.A. Klein, M.D. Zelinka, and C. Golaz, 2021: LLNL E3SM1.0 model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.15093](https://doi.org/10.22033/esgf/cmip6.15093).
- Quiquet, A., C. Dumas, C. Ritz, V. Peyaud, and D.M. Roche, 2018: The GRISLI ice sheet model (version 2.0): calibration and validation for multi-millennial changes of the Antarctic ice sheet. *Geoscientific Model Development*, **11**(12), 5003–5025, doi:[10.5194/gmd-11-5003-2018](https://doi.org/10.5194/gmd-11-5003-2018).
- Radić, V. et al., 2014: Regional and global projections of twenty-first century glacier mass changes in response to climate scenarios from global climate models. *Climate Dynamics*, **42**(1–2), 37–58, doi:[10.1007/s00382-013-1719-7](https://doi.org/10.1007/s00382-013-1719-7).
- Rasch, P.J. et al., 2019: An Overview of the Atmospheric Component of the Energy Exascale Earth System Model. *Journal of Advances in Modeling Earth Systems*, **11**(8), 2377–2411, doi:[10.1029/2019ms001629](https://doi.org/10.1029/2019ms001629).
- Rechid, D., T.J. Raddatz, and D. Jacob, 2009: Parameterization of snow-free land surface albedo as a function of vegetation phenology based on MODIS data and applied in climate modelling. *Theoretical and Applied Climatology*, **95**(3–4), 245–255, doi:[10.1007/s00704-008-0003-y](https://doi.org/10.1007/s00704-008-0003-y).
- Reick, C.H. et al., 2021: *The land component of the MPI Earth System Model JSBACH 3: Documentation of version 3.2*. Reports on Earth System Science 240, Max Planck Institute for Meteorology (MPI-M), Hamburg, Germany, 271 pp., doi:[10.17617/2.3279802](https://doi.org/10.17617/2.3279802).
- Ridley, J.K., M. Menary, T. Kuhlbrodt, M. Andrews, and T. Andrews, 2018a: MOHC HadGEM3-GC31-LL model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.419](https://doi.org/10.22033/esgf/cmip6.419).
- Ridley, J.K., M. Menary, T. Kuhlbrodt, M. Andrews, and T. Andrews, 2019: MOHC HadGEM3-GC31-MM model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.420](https://doi.org/10.22033/esgf/cmip6.420).
- Ridley, J.K. et al., 2018b: The sea ice model component of HadGEM3-GC3.1. *Geoscientific Model Development*, **11**(2), 713–723, doi:[10.5194/gmd-11-713-2018](https://doi.org/10.5194/gmd-11-713-2018).
- Rind, D. et al., 2020: GISS Model E2.2: A Climate Model Optimized for the Middle Atmosphere – Model Structure, Climatology, Variability, and Climate Sensitivity. *Journal of Geophysical Research: Atmospheres*, **125**(10), e2019JD032204, doi:[10.1029/2019jd032204](https://doi.org/10.1029/2019jd032204).
- Roberts, C.D., R. Senan, F. Molteni, S. Boussetta, and S. Keeley, 2017a: ECMWF ECMWF-IFS-HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2461](https://doi.org/10.22033/esgf/cmip6.2461).
- Roberts, C.D., R. Senan, F. Molteni, S. Boussetta, and S. Keeley, 2017b: ECMWF ECMWF-IFS-LR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2463](https://doi.org/10.22033/esgf/cmip6.2463).
- Roberts, C.D., R. Senan, F. Molteni, S. Boussetta, and S. Keeley, 2018a: ECMWF ECMWF-IFS-MR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2465](https://doi.org/10.22033/esgf/cmip6.2465).
- Roberts, C.D. et al., 2018b: Climate model configurations of the ECMWF Integrated Forecasting System (ECMWF-IFS cycle 43r1) for HighResMIP. *Geoscientific Model Development*, **11**(9), 3681–3712, doi:[10.5194/gmd-11-3681-2018](https://doi.org/10.5194/gmd-11-3681-2018).
- Roberts, M., 2017a: MOHC HadGEM3-GC31-HM model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.446](https://doi.org/10.22033/esgf/cmip6.446).
- Roberts, M., 2017b: MOHC HadGEM3-GC31-LL model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1901](https://doi.org/10.22033/esgf/cmip6.1901).
- Roberts, M., 2017c: MOHC HadGEM3-GC31-LM model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1321](https://doi.org/10.22033/esgf/cmip6.1321).
- Roberts, M., 2017d: MOHC HadGEM3-GC31-MH model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1762](https://doi.org/10.22033/esgf/cmip6.1762).
- Roberts, M., 2017e: MOHC HadGEM3-GC31-MM model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1902](https://doi.org/10.22033/esgf/cmip6.1902).
- Roberts, M., 2018: MOHC HadGEM3-GC31-HH model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.445](https://doi.org/10.22033/esgf/cmip6.445).
- Roberts, M.J. et al., 2019: Description of the resolution hierarchy of the global coupled HadGEM3-GC3.1 model as used in CMIP6 HighResMIP experiments. *Geoscientific Model Development*, **12**(12), 4999–5028, doi:[10.5194/gmd-12-4999-2019](https://doi.org/10.5194/gmd-12-4999-2019).
- Roehrig, R. et al., 2020: The CNRM Global Atmosphere Model ARPEGE-Climat 6.3: Description and Evaluation. *Journal of Advances in Modeling Earth Systems*, **12**(7), e2020MS002075, doi:[10.1029/2020ms002075](https://doi.org/10.1029/2020ms002075).
- Rong, X., 2019a: CAMS CAMS_CSM1.0 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1399](https://doi.org/10.22033/esgf/cmip6.1399).
- Rong, X., 2019b: CAMS CAMS-CSM1.0 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11004](https://doi.org/10.22033/esgf/cmip6.11004).
- Rong, X., 2020: CAMS CAMS-CSM1.0 model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.11003](https://doi.org/10.22033/esgf/cmip6.11003).
- Rong, X. et al., 2018: The CAMS Climate System Model and a Basic Evaluation of Its Climatology and Climate Variability Simulation. *Journal of Meteorological Research*, **32**(6), 839–861, doi:[10.1007/s13351-018-8058-x](https://doi.org/10.1007/s13351-018-8058-x).
- Rotstayn, L.D. and U. Lohmann, 2002: Simulation of the tropospheric sulfur cycle in a global model with a physically based cloud scheme. *Journal of Geophysical Research: Atmospheres*, **107**(D21), AAC 20-1–AAC 20-21, doi:[10.1029/2002jd002128](https://doi.org/10.1029/2002jd002128).
- Rotstayn, L.D. et al., 2011: Simulated enhancement of ENSO-related rainfall variability due to Australian dust. *Atmospheric Chemistry and Physics*, **11**(13), 6575–6592, doi:[10.5194/acp-11-6575-2011](https://doi.org/10.5194/acp-11-6575-2011).
- Rounce, D.R., R. Hock, and D.E. Shean, 2020: Glacier Mass Change in High Mountain Asia Through 2100 Using the Open-Source Python Glacier Evolution Model (PyGEM). *Frontiers in Earth Science*, **7**, 331, doi:[10.3389/feart.2019.00331](https://doi.org/10.3389/feart.2019.00331).
- Rousset, C. et al., 2015: The Louvain-La-Neuve sea ice model LIM3.6: global and regional capabilities. *Geoscientific Model Development*, **8**(10), 2991–3005, doi:[10.5194/gmd-8-2991-2015](https://doi.org/10.5194/gmd-8-2991-2015).
- Rückamp, M., H. Goelzer, and A. Humbert, 2020: Sensitivity of Greenland ice sheet projections to spatial resolution in higher-order simulations: the Alfred Wegener Institute (AWI) contribution to ISMIP6 Greenland using the Ice-sheet and Sea-level System Model (ISSM). *The Cryosphere*, **14**(10), 3309–3327, doi:[10.5194/tc-14-3309-2020](https://doi.org/10.5194/tc-14-3309-2020).
- Rumbold, S., J. Walton, and Y. Tang, 2020: MOHC UKESM1.0-LL model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14830](https://doi.org/10.22033/esgf/cmip6.14830).
- Ruti, P.M. et al., 2016: Med-CORDEX Initiative for Mediterranean Climate Studies. *Bulletin of the American Meteorological Society*, **97**(7), 1187–1208, doi:[10.1175/bams-d-14-00176.1](https://doi.org/10.1175/bams-d-14-00176.1).
- Saint-Martin, D. et al., 2021: Tracking Changes in Climate Sensitivity in CNRM Climate Models. *Journal of Advances in Modeling Earth Systems*, **13**(6), e2020MS002190, doi:[10.1029/2020ms002190](https://doi.org/10.1029/2020ms002190).
- Saito, F., A. Abe-Ouchi, K. Takahashi, and H. Blatter, 2016: SeaRISE experiments revisited: potential sources of spread in multi-model projections of the Greenland ice sheet. *The Cryosphere*, **10**(1), 43–63, doi:[10.5194/tc-10-43-2016](https://doi.org/10.5194/tc-10-43-2016).
- Sakai, A. and K. Fujita, 2017: Contrasting glacier responses to recent climate change in high-mountain Asia. *Scientific Reports*, **7**(1), 13717, doi:[10.1038/s41598-017-14256-5](https://doi.org/10.1038/s41598-017-14256-5).
- Samuelsson, P. et al., 2015: *The surface processes of the Rossby Centre regional atmospheric climate model (RCA4)*. Meteorologi Nr 157, Swedish Meteorological and Hydrological Institute (SMHI), Norrköping,

- Sweden, 58 pp., www.smhi.se/en/publications/the-surface-processes-of-the-rossby-centreregional-atmospheric-climate-model-rca4-1.89801.
- Sanjay, J., R. Krishnan, A.B. Shrestha, R. Rajbhandari, and G.-Y. Ren, 2017: Downscaled climate change projections for the Hindu Kush Himalayan region using CORDEX South Asia regional climate models. *Advances in Climate Change Research*, **8**(3), 185–198, doi:[10.1016/j.accre.2017.08.003](https://doi.org/10.1016/j.accre.2017.08.003).
- Sanjay, J. et al., 2020: Temperature Changes in India. In: *Assessment of Climate Change over the Indian Region* [Krishnan, R., J. Sanjay, C. Gnanaseelan, M. Mujumdar, A. Kulkarni, and S. Chakraborty (eds.)]. Springer, Singapore, pp. 21–45, doi:[10.1007/978-981-15-4327-2_2](https://doi.org/10.1007/978-981-15-4327-2_2).
- Sannino, G. et al., 2009: An eddy-permitting model of the Mediterranean Sea with a two-way grid refinement at the Strait of Gibraltar. *Ocean Modelling*, **30**(1), 56–72, doi:[10.1016/j.ocemod.2009.06.002](https://doi.org/10.1016/j.ocemod.2009.06.002).
- Savita, A. et al., 2019: CSIRO-ARCCSS ACCESS-CM2 model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2282](https://doi.org/10.22033/esgf/cmip6.2282).
- Schiemann, R., P.L. Vidale, R. Hatcher, and M. Roberts, 2019: NERC HadGEM3-GC31-HM model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1824](https://doi.org/10.22033/esgf/cmip6.1824).
- Schlemmer, L., C. Schär, D. Lüthi, and L. Strebel, 2018: A Groundwater and Runoff Formulation for Weather and Climate Models. *Journal of Advances in Modeling Earth Systems*, **10**(8), 1809–1832, doi:[10.1029/2017ms001260](https://doi.org/10.1029/2017ms001260).
- Schrodin, R. and E. Heise, 2002: A New Multi-Layer Soil-Model. *COSMO Newsletter*, **2**, 149–151, www.cosmo-model.org/content/model/documentation/newsLetters/newsLetter02/default.htm.
- Schupfner, M. et al., 2019: DKRZ MPI-ESM1.2-HR model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2450](https://doi.org/10.22033/esgf/cmip6.2450).
- Schwinger, J. et al., 2016: Evaluation of NorESM-OC (versions 1 and 1.2), the ocean carbon-cycle stand-alone configuration of the Norwegian Earth System Model (NorESM1). *Geoscientific Model Development*, **9**(8), 2589–2622, doi:[10.5194/gmd-9-2589-2016](https://doi.org/10.5194/gmd-9-2589-2016).
- Schwinger, J. et al., 2019: NCC NorESM2-LM model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13721](https://doi.org/10.22033/esgf/cmip6.13721).
- Scinocca, J.F. et al., 2016: Coordinated Global and Regional Climate Modeling. *Journal of Climate*, **29**(1), 17–35, doi:[10.1175/jcli-d-15-0161.1](https://doi.org/10.1175/jcli-d-15-0161.1).
- Soccimarro, E., A. Bellucci, and D. Peano, 2017a: CMCC CMCC-CM2-HR4 model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1359](https://doi.org/10.22033/esgf/cmip6.1359).
- Soccimarro, E., A. Bellucci, and D. Peano, 2017b: CMCC CMCC-CM2-VHR4 model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1367](https://doi.org/10.22033/esgf/cmip6.1367).
- Soccimarro, E., A. Bellucci, and D. Peano, 2020a: CMCC CMCC-CM2-HR4 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1358](https://doi.org/10.22033/esgf/cmip6.1358).
- Soccimarro, E. et al., 2020b: The typhoon-induced drying of the Maritime Continent. *Proceedings of the National Academy of Sciences*, **117**(8), 3983–3988, doi:[10.1073/pnas.1915364117](https://doi.org/10.1073/pnas.1915364117).
- Séférian, R., 2018a: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1390](https://doi.org/10.22033/esgf/cmip6.1390).
- Séférian, R., 2018b: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1391](https://doi.org/10.22033/esgf/cmip6.1391).
- Séférian, R., 2019a: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1389](https://doi.org/10.22033/esgf/cmip6.1389).
- Séférian, R., 2019b: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 GeoMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1392](https://doi.org/10.22033/esgf/cmip6.1392).
- Séférian, R., 2019c: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13922](https://doi.org/10.22033/esgf/cmip6.13922).
- Séférian, R., 2019d: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9564](https://doi.org/10.22033/esgf/cmip6.9564).
- Séférian, R., 2019e: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1393](https://doi.org/10.22033/esgf/cmip6.1393).
- Séférian, R., 2019f: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1394](https://doi.org/10.22033/esgf/cmip6.1394).
- Séférian, R., 2019g: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9565](https://doi.org/10.22033/esgf/cmip6.9565).
- Séférian, R., 2019h: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1395](https://doi.org/10.22033/esgf/cmip6.1395).
- Séférian, R., 2021: CNRM-CERFACS CNRM-ESM2-1 model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9562](https://doi.org/10.22033/esgf/cmip6.9562).
- Séférian, R. et al., 2019: Evaluation of CNRM Earth System Model, CNRM-ESM2-1: Role of Earth System Processes in Present-Day and Future Climate. *Journal of Advances in Modeling Earth Systems*, **11**(12), 4182–4227, doi:[10.1029/2019ms001791](https://doi.org/10.1029/2019ms001791).
- Séférian, R. et al., 2020: Tracking Improvement in Simulated Marine Biogeochemistry Between CMIP5 and CMIP6. *Current Climate Change Reports*, **6**(3), 95–119, doi:[10.1007/s40641-020-00160-0](https://doi.org/10.1007/s40641-020-00160-0).
- Sein, D. et al., 2015: Regionally coupled atmosphere–ocean–sea ice–marine biogeochemistry model ROM: 1. Description and validation. *Journal of Advances in Modeling Earth Systems*, **7**(1), 268–304, doi:[10.1002/2014ms000357](https://doi.org/10.1002/2014ms000357).
- Sein, D. et al., 2017: Ocean Modeling on a Mesh With Resolution Following the Local Rossby Radius. *Journal of Advances in Modeling Earth Systems*, **9**(7), 2601–2614, doi:[10.1002/2017ms001099](https://doi.org/10.1002/2017ms001099).
- Sein, D. et al., 2018: The Relative Influence of Atmospheric and Oceanic Model Resolution on the Circulation of the North Atlantic Ocean in a Coupled Climate Model. *Journal of Advances in Modeling Earth Systems*, **10**(8), 2026–2041, doi:[10.1029/2018ms001327](https://doi.org/10.1029/2018ms001327).
- Sekiguchi, M. and H. Shiogama, 2019: MIROC MIROC6 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.895](https://doi.org/10.22033/esgf/cmip6.895).
- Seland, Ø. et al., 2019a: NCC NorESM2-LM model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.502](https://doi.org/10.22033/esgf/cmip6.502).
- Seland, Ø. et al., 2019b: NCC NorESM2-LM model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.580](https://doi.org/10.22033/esgf/cmip6.580).
- Seland, Ø. et al., 2019c: NCC NorESM2-LM model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.604](https://doi.org/10.22033/esgf/cmip6.604).
- Seland, Ø. et al., 2020: Overview of the Norwegian Earth System Model (NorESM2) and key climate response of CMIP6 DECK, historical, and scenario simulations. *Geoscientific Model Development*, **13**(12), 6165–6200, doi:[10.5194/gmd-13-6165-2020](https://doi.org/10.5194/gmd-13-6165-2020).
- Sellar, A.A. et al., 2019: UKESM1: Description and Evaluation of the U.K. Earth System Model. *Journal of Advances in Modeling Earth Systems*, **11**(12), 4513–4558, doi:[10.1029/2019ms001739](https://doi.org/10.1029/2019ms001739).
- Semmler, T., E. Manzini, D. Matei, H.K. Pradhan, and T. Jung, 2019a: AWI AWI-CM1.1MR model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12021](https://doi.org/10.22033/esgf/cmip6.12021).
- Semmler, T. et al., 2017a: AWI AWI-CM 1.1 HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1202](https://doi.org/10.22033/esgf/cmip6.1202).
- Semmler, T. et al., 2017b: AWI AWI-CM 1.1 LR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1209](https://doi.org/10.22033/esgf/cmip6.1209).
- Semmler, T. et al., 2018: AWI AWI-CM1.1MR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.359](https://doi.org/10.22033/esgf/cmip6.359).
- Semmler, T. et al., 2019b: AWI AWI-CM1.1MR model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.376](https://doi.org/10.22033/esgf/cmip6.376).
- Semmler, T. et al., 2020: Simulations for CMIP6 With the AWI Climate Model AWI-CM-1-1. *Journal of Advances in Modeling Earth Systems*, **12**(9), e2019MS002009, doi:[10.1029/2019ms002009](https://doi.org/10.1029/2019ms002009).

- Šeparović, L. et al., 2013: Present climate and climate change over North America as simulated by the fifth-generation Canadian regional climate model. *Climate Dynamics*, **41**(11–12), 3167–3201, doi:[10.1007/s00382-013-1737-5](https://doi.org/10.1007/s00382-013-1737-5).
- Seroussi, H. et al., 2013: Dependence of century-scale projections of the Greenland ice sheet on its thermal regime. *Journal of Glaciology*, **59**(218), 1024–1034, doi:[10.3189/2013jog13j054](https://doi.org/10.3189/2013jog13j054).
- Seroussi, H. et al., 2019: initMIP-Antarctica: an ice sheet model initialization experiment of ISMIP6. *The Cryosphere*, **13**(5), 1441–1471, doi:[10.5194/tc-13-1441-2019](https://doi.org/10.5194/tc-13-1441-2019).
- Seroussi, H. et al., 2020: ISMIP6 Antarctica: a multi-model ensemble of the Antarctic ice sheet evolution over the 21st century. *The Cryosphere*, **14**(9), 3033–3070, doi:[10.5194/tc-14-3033-2020](https://doi.org/10.5194/tc-14-3033-2020).
- Sevault, F. et al., 2014: A fully coupled Mediterranean regional climate system model: design and evaluation of the ocean component for the 1980–2012 period. *Tellus A: Dynamic Meteorology and Oceanography*, **66**(1), 23967, doi:[10.3402/tellusa.v66.23967](https://doi.org/10.3402/tellusa.v66.23967).
- Shannon, S. et al., 2019: Global glacier volume projections under high-end climate change scenarios. *The Cryosphere*, **13**(1), 325–350, doi:[10.5194/tc-13-325-2019](https://doi.org/10.5194/tc-13-325-2019).
- Shi, X., H. Yang, C. Danek, and G. Lohmann, 2020: AWI AWI-ESM1.1LR model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9302](https://doi.org/10.22033/esgf/cmip6.9302).
- Shim, S. et al., 2020a: NIMS-KMA UKESM1.0-LL model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2243](https://doi.org/10.22033/esgf/cmip6.2243).
- Shim, S. et al., 2020b: NIMS-KMA UKESM1.0-LL model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2245](https://doi.org/10.22033/esgf/cmip6.2245).
- Shim, S. et al., 2020c: NIMS-KMA UKESM1.0-LL model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2250](https://doi.org/10.22033/esgf/cmip6.2250).
- Shindell, D.T. et al., 2006: Simulations of preindustrial, present-day, and 2100 conditions in the NASA GISS composition and climate model G-PUCCINI. *Atmospheric Chemistry and Physics*, **6**(12), 4427–4459, doi:[10.5194/acp-6-4427-2006](https://doi.org/10.5194/acp-6-4427-2006).
- Shiogama, H., 2019: MIROC MIROC6 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.894](https://doi.org/10.22033/esgf/cmip6.894).
- Shiogama, H., M. Abe, and H. Tatebe, 2019: MIROC MIROC6 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.898](https://doi.org/10.22033/esgf/cmip6.898).
- Shiu, C.-J., W.-L. Lee, and H.-H. Hsu, 2020: AS-RCEC TaiESM1.0 model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9683](https://doi.org/10.22033/esgf/cmip6.9683).
- Shkolnik, I.M. and S. Efimov, 2013: Cyclonic activity in high latitudes as simulated by a regional atmospheric climate model: added value and uncertainties. *Environmental Research Letters*, **8**(4), 045007, doi:[10.1088/1748-9326/8/4/045007](https://doi.org/10.1088/1748-9326/8/4/045007).
- Sidorenko, D. et al., 2015: Towards multi-resolution global climate modeling with ECHAM6–FESOM. Part I: model formulation and mean climate. *Climate Dynamics*, **44**(3), 757–780, doi:[10.1007/s00382-014-2290-6](https://doi.org/10.1007/s00382-014-2290-6).
- Sigmond, M. et al., 2019: CCCma CanESM5 model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13942](https://doi.org/10.22033/esgf/cmip6.13942).
- Silvers, L. et al., 2018: NOAA-GFDL GFDL-CM4 model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1641](https://doi.org/10.22033/esgf/cmip6.1641).
- Skamarock, W.C. et al., 2008: *A Description of the Advanced Research WRF Version 3*. No. NCAR/TN-475+STR, National Center for Atmospheric Research (NCAR), Boulder, CO, USA, 113 pp., doi:[10.5065/D68S4MVH](https://doi.org/10.5065/D68S4MVH).
- Small, R.J. et al., 2014: A new synoptic scale resolving global climate simulation using the Community Earth System Model. *Journal of Advances in Modeling Earth Systems*, **6**(4), 1065–1094, doi:[10.1002/2014ms000363](https://doi.org/10.1002/2014ms000363).
- Smith, B. et al., 2014: Implications of incorporating N cycling and N limitations on primary production in an individual-based dynamic vegetation model. *Biogeosciences*, **11**(7), 2027–2054, doi:[10.5194/bg-11-2027-2014](https://doi.org/10.5194/bg-11-2027-2014).
- Song, Z. et al., 2019a: FIO-QLNM FIO-ESM2.0 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9047](https://doi.org/10.22033/esgf/cmip6.9047).
- Song, Z. et al., 2019b: FIO-QLNM FIO-ESM2.0 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9049](https://doi.org/10.22033/esgf/cmip6.9049).
- Song, Z. et al., 2019c: FIO-QLNM FIO-ESM2.0 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9051](https://doi.org/10.22033/esgf/cmip6.9051).
- Sospedra-Alfonso, R. et al., 2019: CCCma CanESM5 model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1306](https://doi.org/10.22033/esgf/cmip6.1306).
- Soto-Navarro, J. et al., 2020: Evolution of Mediterranean Sea water properties under climate change scenarios in the Med-CORDEX ensemble. *Climate Dynamics*, **54**(3–4), 2135–2165, doi:[10.1007/s00382-019-05105-4](https://doi.org/10.1007/s00382-019-05105-4).
- Steger, C. et al., 2019: DWD MPI-ESM1.2-HR model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1869](https://doi.org/10.22033/esgf/cmip6.1869).
- Stevens, B. et al., 2017: MACv2-SP: a parameterization of anthropogenic aerosol optical properties and an associated Twomey effect for use in CMIP6. *Geoscientific Model Development*, **10**(1), 433–452, doi:[10.5194/gmd-10-433-2017](https://doi.org/10.5194/gmd-10-433-2017).
- Stock, C.A. et al., 2020: Ocean Biogeochemistry in GFDL's Earth System Model 4.1 and Its Response to Increasing Atmospheric CO₂. *Journal of Advances in Modeling Earth Systems*, **12**(10), e2019MS002043, doi:[10.1029/2019ms002043](https://doi.org/10.1029/2019ms002043).
- Stouffer, R., 2019a: U of Arizona MCM-UA-1-0 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2421](https://doi.org/10.22033/esgf/cmip6.2421).
- Stouffer, R., 2019b: UA MCM-UA-1-0 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13816](https://doi.org/10.22033/esgf/cmip6.13816).
- Stracke, T. et al., 2019: MPI-M MPIESM1.2-LR model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.760](https://doi.org/10.22033/esgf/cmip6.760).
- Strandberg, G. et al., 2015: *CORDEX scenarios for Europe from the Rossby Centre regional climate model RCA4*. Report Meteorology and Climatology No. 116, Swedish Meteorological and Hydrological Institute (SMHI), Norrköping, Sweden, 84 pp., www.smhi.se/en/publications/cordex-scenarios-for-europe-from-the-rossby-centre-regional-climate-model-rca4-1.90274.
- Sudo, K., M. Takahashi, and H. Akimoto, 2002a: CHASER: A global chemical model of the troposphere 2. Model results and evaluation. *Journal of Geophysical Research: Atmospheres*, **107**(D21), ACH 9-1–ACH 9-39, doi:[10.1029/2001jd001114](https://doi.org/10.1029/2001jd001114).
- Sudo, K., M. Takahashi, J.-I. Kurokawa, and H. Akimoto, 2002b: CHASER: A global chemical model of the troposphere 1. Model description. *Journal of Geophysical Research: Atmospheres*, **107**(D17), ACH 7-1–ACH 7-20, doi:[10.1029/2001jd001113](https://doi.org/10.1029/2001jd001113).
- Sudo, K., T. Takemura, M. Abe, O. Arakawa, and S. Watanabe, 2020: MIROC MIROC-ES2H-NB model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13305](https://doi.org/10.22033/esgf/cmip6.13305).
- Suzuki, T., 2019: MIROC MIROC6 model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.892](https://doi.org/10.22033/esgf/cmip6.892).
- Swapna, P. et al., 2018: Long-Term Climate Simulations Using the IITM Earth System Model (IITM-ESMv2) With Focus on the South Asian Monsoon. *Journal of Advances in Modeling Earth Systems*, **10**(5), 1127–1149, doi:[10.1029/2017ms001262](https://doi.org/10.1029/2017ms001262).
- Swart, N.C. et al., 2019a: The Canadian Earth System Model version 5 (CanESM5.0.3). *Geoscientific Model Development*, **12**(11), 4823–4873, doi:[10.5194/gmd-12-4823-2019](https://doi.org/10.5194/gmd-12-4823-2019).
- Swart, N.C. et al., 2019b: CCCma CanESM5 model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1301](https://doi.org/10.22033/esgf/cmip6.1301).
- Swart, N.C. et al., 2019c: CCCma CanESM5 model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10201](https://doi.org/10.22033/esgf/cmip6.10201).
- Swart, N.C. et al., 2019d: CCCma CanESM5 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1303](https://doi.org/10.22033/esgf/cmip6.1303).
- Swart, N.C. et al., 2019e: CCCma CanESM5 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1305](https://doi.org/10.22033/esgf/cmip6.1305).

- Swart, N.C. et al., 2019f: CCCma CanESM5 model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1308](https://doi.org/10.22033/esgf/cmip6.1308).
- Swart, N.C. et al., 2019g: CCCma CanESM5 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1309](https://doi.org/10.22033/esgf/cmip6.1309).
- Swart, N.C. et al., 2019h: CCCma CanESM5 model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1313](https://doi.org/10.22033/esgf/cmip6.1313).
- Swart, N.C. et al., 2019i: CCCma CanESM5 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1314](https://doi.org/10.22033/esgf/cmip6.1314).
- Swart, N.C. et al., 2019j: CCCma CanESM5 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1317](https://doi.org/10.22033/esgf/cmip6.1317).
- Swart, N.C. et al., 2019k: CCCma CanESM5-CanOE model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10203](https://doi.org/10.22033/esgf/cmip6.10203).
- Swart, N.C. et al., 2019l: CCCma CanESM5-CanOE model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10204](https://doi.org/10.22033/esgf/cmip6.10204).
- Swart, N.C. et al., 2019m: CCCma CanESM5-CanOE model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10205](https://doi.org/10.22033/esgf/cmip6.10205).
- Swart, N.C. et al., 2019n: CCCma CanESM5-CanOE model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10206](https://doi.org/10.22033/esgf/cmip6.10206).
- Swart, N.C. et al., 2019o: CCCma CanESM5-CanOE model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10207](https://doi.org/10.22033/esgf/cmip6.10207).
- Szopa, S. et al., 2013: Aerosol and ozone changes as forcing for climate evolution between 1850 and 2100. *Climate Dynamics*, **40**(9–10), 2223–2250, doi:[10.1007/s00382-012-1408-y](https://doi.org/10.1007/s00382-012-1408-y).
- Tachiiri, K. et al., 2019: MIROC MIROC-ES2L model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.936](https://doi.org/10.22033/esgf/cmip6.936).
- Takata, K., S. Emori, and T. Watanabe, 2003: Development of the minimal advanced treatments of surface interaction and runoff. *Global and Planetary Change*, **38**(1), 209–222, doi:[10.1016/s0921-8181\(03\)00030-4](https://doi.org/10.1016/s0921-8181(03)00030-4).
- Takemura, T., 2019: MIROC MIROC6 model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9121](https://doi.org/10.22033/esgf/cmip6.9121).
- Takemura, T., T. Nozawa, S. Emori, T.Y. Nakajima, and T. Nakajima, 2005: Simulation of climate response to aerosol direct and indirect effects with aerosol transport-radiation model. *Journal of Geophysical Research: Atmospheres*, **110**(D2), D02202, doi:[10.1029/2004jd005029](https://doi.org/10.1029/2004jd005029).
- Takemura, T. et al., 2000: Global three-dimensional simulation of aerosol optical thickness distribution of various origins. *Journal of Geophysical Research: Atmospheres*, **105**(D14), 17853–17873, doi:[10.1029/2000jd900265](https://doi.org/10.1029/2000jd900265).
- Takemura, T. et al., 2009: A simulation of the global distribution and radiative forcing of soil dust aerosols at the Last Glacial Maximum. *Atmospheric Chemistry and Physics*, **9**(9), 3061–3073, doi:[10.5194/acp-9-3061-2009](https://doi.org/10.5194/acp-9-3061-2009).
- Tang, Y. et al., 2019: MOHC UKESM1.0-LL model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1569](https://doi.org/10.22033/esgf/cmip6.1569).
- Tanré, D., J.-F. Geleyn, and J.M. Slingo, 1984: First results of the introduction of an advanced aerosol–radiation interaction in the ECMWF low resolution global model. In: *Aerosols and their Climatic Effects: Proceedings of the Meeting of Experts on Aerosols and Their Climatic Effects* [Gerber, H.E. and A. Deepak (eds.)]. Deepak Publishing, Hampton, VA, USA, pp. 133–177.
- Tarasov, L. and W.R. Peltier, 1999: Impact of thermomechanical ice sheet coupling on a model of the 100 kyr ice age cycle. *Journal of Geophysical Research: Atmospheres*, **104**(D8), 9517–9545, doi:[10.1029/1998jd200120](https://doi.org/10.1029/1998jd200120).
- Tarasov, L. and W.R. Peltier, 2003: Greenland glacial history, borehole constraints, and Eemian extent. *Journal of Geophysical Research: Solid Earth*, **108**(B3), 2143, doi:[10.1029/2001jb001731](https://doi.org/10.1029/2001jb001731).
- Tatebe, H. and M. Watanabe, 2018: MIROC MIROC6 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.881](https://doi.org/10.22033/esgf/cmip6.881).
- Tatebe, H. et al., 2019: Description and basic evaluation of simulated mean state, internal variability, and climate sensitivity in MIROC6. *Geoscientific Model Development*, **12**(7), 2727–2765, doi:[10.5194/gmd-12-2727-2019](https://doi.org/10.5194/gmd-12-2727-2019).
- Taylor, K.E., R.J. Stouffer, and G.A. Meehl, 2012: An Overview of CMIP5 and the Experiment Design. *Bulletin of the American Meteorological Society*, **93**(4), 485–498, doi:[10.1175/bams-d-11-00094.1](https://doi.org/10.1175/bams-d-11-00094.1).
- Tegen, I. et al., 1997: Contribution of different aerosol species to the global aerosol extinction optical thickness: Estimates from model results. *Journal of Geophysical Research: Atmospheres*, **102**(D20), 23895–23915, doi:[10.1029/97jd01864](https://doi.org/10.1029/97jd01864).
- Tegen, I. et al., 2019: The global aerosol–climate model ECHAM6.3–HAM2.3 – Part 1: Aerosol evaluation. *Geoscientific Model Development*, **12**(4), 1643–1677, doi:[10.5194/gmd-12-1643-2019](https://doi.org/10.5194/gmd-12-1643-2019).
- Thatcher, M. and J.L. McGregor, 2009: Using a Scale-Selective Filter for Dynamical Downscaling with the Conformal Cubic Atmospheric Model. *Monthly Weather Review*, **137**(6), 1742–1752, doi:[10.1175/2008mwr2599.1](https://doi.org/10.1175/2008mwr2599.1).
- Tjiputra, J. et al., 2019: NCC NorESM2-LM model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13722](https://doi.org/10.22033/esgf/cmip6.13722).
- Tjiputra, J.F. et al., 2013: Evaluation of the carbon cycle components in the Norwegian Earth System Model (NorESM). *Geoscientific Model Development*, **6**(2), 301–325, doi:[10.5194/gmd-6-301-2013](https://doi.org/10.5194/gmd-6-301-2013).
- Tjiputra, J.F. et al., 2020: Ocean biogeochemistry in the Norwegian Earth System Model version 2 (NorESM2). *Geoscientific Model Development*, **13**(5), 2393–2431, doi:[10.5194/gmd-13-2393-2020](https://doi.org/10.5194/gmd-13-2393-2020).
- Top, S. et al., 2021: Evaluation of regional climate models ALARO-0 and REMO2015 at 0.22° resolution over the CORDEX Central Asia domain. *Geoscientific Model Development*, **14**(3), 1267–1293, doi:[10.5194/gmd-14-1267-2021](https://doi.org/10.5194/gmd-14-1267-2021).
- Tsai, I.-C., W.-L. Lee, and H.-H. Hsu, 2020: AS-RCEC TaiESM1.0 model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9682](https://doi.org/10.22033/esgf/cmip6.9682).
- Tseng, Y.-H., W.-L. Lee, and H.-C. Liang, 2020: NTU TaiESM1-TIMCOM model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14323](https://doi.org/10.22033/esgf/cmip6.14323).
- Tsujino, H. et al., 2017: Reference Manual for the Meteorological Research Institute Community Ocean Model version 4 (MRI.COMv4), doi:[10.11483/mritechrepo.80](https://doi.org/10.11483/mritechrepo.80).
- Tu, C.-Y., 2020a: AS-RCEC HiRAM-SIT-HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13301](https://doi.org/10.22033/esgf/cmip6.13301).
- Tu, C.-Y., 2020b: AS-RCEC HiRAM-SIT-LR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13303](https://doi.org/10.22033/esgf/cmip6.13303).
- Turuncoglu, U.U., 2019: Toward modular in situ visualization in Earth system models: the regional modeling system RegESM 1.1. *Geoscientific Model Development*, **12**(1), 233–259, doi:[10.5194/gmd-12-233-2019](https://doi.org/10.5194/gmd-12-233-2019).
- Vadsaria, T., L. Li, G. Ramstein, and J.-C. Dutay, 2020: Development of a sequential tool, LMDZ-NEMO-med-V1, to conduct global-to-regional past climate simulation for the Mediterranean basin: an Early Holocene case study. *Geoscientific Model Development*, **13**(5), 2337–2354, doi:[10.5194/gmd-13-2337-2020](https://doi.org/10.5194/gmd-13-2337-2020).
- Valcke, S., 2013: The OASIS3 coupler: a European climate modelling community software. *Geoscientific Model Development*, **6**(2), 373–388, doi:[10.5194/gmd-6-373-2013](https://doi.org/10.5194/gmd-6-373-2013).
- Van de Wal, R.S.W. and M. Wild, 2001: Modelling the response of glaciers to climate change by applying volume-area scaling in combination with a high resolution GCM. *Climate Dynamics*, **18**(3), 359–366, doi:[10.1007/s003820100184](https://doi.org/10.1007/s003820100184).
- van den Hurk, B.J.J.M., P. Viterbo, A.C.M. Beljaars, and A.K. Betts, 2000: *Offline validation of the ERA40 surface scheme*. Technical Memorandum No. 295, European Centre for Medium-Range Weather Forecasts (ECMWF), Reading, UK, 43 pp., doi:[10.21957/9a0aspz8](https://doi.org/10.21957/9a0aspz8).
- van Meijgaard, E. et al., 2008: *The KNMI regional atmospheric climate model RACMO, version 2.1, KNMI number: TR-302*. TR - 302, Royal Netherlands Meteorological Institute (KNMI), De Bilt, The Netherlands, 43 pp., <https://cdn.knmi.nl/knmi/pdf/bibliotheek/knmipubTR/TR302.pdf>.
- van Meijgaard, E. et al., 2012: *Refinement and application of a regional atmospheric model for climate scenario calculations of Western*

- Europe. KvR 054/12, National Research Programme Climate changes Spatial Planning/Nationaal Onderzoekprogramma Klimaat voor Ruimte (KvR), 44 pp., <https://edepot.wur.nl/312258>.
- van Noije, T. et al., 2021: EC-Earth3-AerChem: a global climate model with interactive aerosols and atmospheric chemistry participating in CMIP6. *Geoscientific Model Development*, **14**(9), 5637–5668, doi:[10.5194/gmd-14-5637-2021](https://doi.org/10.5194/gmd-14-5637-2021).
- van Noije, T.P.C. et al., 2014: Simulation of tropospheric chemistry and aerosols with the climate model EC-Earth. *Geoscientific Model Development*, **7**(5), 2435–2475, doi:[10.5194/gmd-7-2435-2014](https://doi.org/10.5194/gmd-7-2435-2014).
- van Vuuren, D.P. et al., 2011: The representative concentration pathways: an overview. *Climatic Change*, **109**(1–2), 5–31, doi:[10.1007/s10584-011-0148-z](https://doi.org/10.1007/s10584-011-0148-z).
- Verseghy, D.L., 2000: The Canadian land surface scheme (CLASS): Its history and future. *Atmosphere-Ocean*, **38**(1), 1–13, doi:[10.1080/07055900.2000.9649637](https://doi.org/10.1080/07055900.2000.9649637).
- Verseghy, D.L., N.A. McFarlane, and M. Lazare, 1993: Class-A Canadian land surface scheme for GCMS, II. Vegetation model and coupled runs. *International Journal of Climatology*, **13**(4), 347–370, doi:[10.1002/joc.3370130402](https://doi.org/10.1002/joc.3370130402).
- Voigt, A., B. Stevens, S. Bony, and O. Boucher, 2014: *EasyAerosol – a modeling framework to study robustness and sources of uncertainties in aerosol-induced changes of the large-scale atmospheric circulation*. World Climate Research Programme (WCRP), 14 pp., www.wcrp-climate.org/gc-clouds-circulation-activities/gc4-clouds-initiatives/368-gc-clouds-initiative3-easy-aerosol.
- Voltaire, A., 2018: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1375](https://doi.org/10.22033/esgf/cmip6.1375).
- Voltaire, A., 2019a: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1374](https://doi.org/10.22033/esgf/cmip6.1374).
- Voltaire, A., 2019b: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1376](https://doi.org/10.22033/esgf/cmip6.1376).
- Voltaire, A., 2019c: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1377](https://doi.org/10.22033/esgf/cmip6.1377).
- Voltaire, A., 2019d: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1379](https://doi.org/10.22033/esgf/cmip6.1379).
- Voltaire, A., 2019e: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1925](https://doi.org/10.22033/esgf/cmip6.1925).
- Voltaire, A., 2019f: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1381](https://doi.org/10.22033/esgf/cmip6.1381).
- Voltaire, A., 2019g: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10336](https://doi.org/10.22033/esgf/cmip6.10336).
- Voltaire, A., 2019h: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1383](https://doi.org/10.22033/esgf/cmip6.1383).
- Voltaire, A., 2019i: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1384](https://doi.org/10.22033/esgf/cmip6.1384).
- Voltaire, A., 2019j: CNRM-CERFACS CNRM-CM6-1-HR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1385](https://doi.org/10.22033/esgf/cmip6.1385).
- Voltaire, A., 2019k: CNRM-CERFACS CNRM-CM6-1-HR model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13921](https://doi.org/10.22033/esgf/cmip6.13921).
- Voltaire, A., 2019l: CNRM-CERFACS CNRM-CM6-1-HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1387](https://doi.org/10.22033/esgf/cmip6.1387).
- Voltaire, A., 2019m: CNRM-CERFACS CNRM-CM6-1-HR model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1388](https://doi.org/10.22033/esgf/cmip6.1388).
- Voltaire, A., 2020: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1382](https://doi.org/10.22033/esgf/cmip6.1382).
- Voltaire, A., 2021a: CNRM-CERFACS CNRM-CM6-1 model output prepared for CMIP6 PAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9561](https://doi.org/10.22033/esgf/cmip6.9561).
- Voltaire, A., 2021b: CNRM-CERFACS CNRM-CM6-1-HR model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10337](https://doi.org/10.22033/esgf/cmip6.10337).
- Voltaire, A. et al., 2017: SURFEX v8.0 interface with OASIS3-MCT to couple atmosphere with hydrology, ocean, waves and sea-ice models, from coastal to global scales. *Geoscientific Model Development*, **10**(11), 4207–4227, doi:[10.5194/gmd-10-4207-2017](https://doi.org/10.5194/gmd-10-4207-2017).
- Voltaire, A. et al., 2019: Evaluation of CMIP6 DECK Experiments With CNRM-CM6-1. *Journal of Advances in Modeling Earth Systems*, **11**(7), 2177–2213, doi:[10.1029/2019ms001683](https://doi.org/10.1029/2019ms001683).
- Volodine, E. et al., 2019a: INM INM-CM4-8 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1422](https://doi.org/10.22033/esgf/cmip6.1422).
- Volodine, E. et al., 2019b: INM INM-CM4-8 model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2295](https://doi.org/10.22033/esgf/cmip6.2295).
- Volodine, E. et al., 2019c: INM INM-CM4-8 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12321](https://doi.org/10.22033/esgf/cmip6.12321).
- Volodine, E. et al., 2019d: INM INM-CM5-0 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1423](https://doi.org/10.22033/esgf/cmip6.1423).
- Volodine, E. et al., 2019e: INM INM-CM5-0 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12322](https://doi.org/10.22033/esgf/cmip6.12322).
- Volodine, E. et al., 2019f: INM INM-CM5-H model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14041](https://doi.org/10.22033/esgf/cmip6.14041).
- Volodine, E.M. and S. Kostykin, 2016: The aerosol module in the INM RAS climate model. *Russian Meteorology and Hydrology*, **41**(8), 519–528, doi:[10.3103/s106837391608001x](https://doi.org/10.3103/s106837391608001x).
- Volodine, E.M. et al., 2017: Simulation of the present-day climate with the climate model INMCM5. *Climate Dynamics*, **49**(11), 3715–3734, doi:[10.1007/s00382-017-3539-7](https://doi.org/10.1007/s00382-017-3539-7).
- Volodine, E.M. et al., 2018: Simulation of the modern climate using the INM-CM48 climate model. *Russian Journal of Numerical Analysis and Mathematical Modelling*, **33**, 367, doi:[10.1515/rnam-2018-0032](https://doi.org/10.1515/rnam-2018-0032).
- von Salzen, K. et al., 2013: The Canadian Fourth Generation Atmospheric Global Climate Model (CanAM4). Part I: Representation of Physical Processes. *Atmosphere-Ocean*, **51**(1), 104–125, doi:[10.1080/07055900.2012.755610](https://doi.org/10.1080/07055900.2012.755610).
- von Storch, J.-S. et al., 2017a: MPI-M MPI-ESM1.2-HR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.762](https://doi.org/10.22033/esgf/cmip6.762).
- von Storch, J.-S. et al., 2017b: MPI-M MPI-ESM1.2-XR model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.10290](https://doi.org/10.22033/esgf/cmip6.10290).
- Walters, D. et al., 2019: The Met Office Unified Model Global Atmosphere 7.0/7.1 and JULES Global Land 7.0 configurations. *Geoscientific Model Development*, **12**(5), 1909–1963, doi:[10.5194/gmd-12-1909-2019](https://doi.org/10.5194/gmd-12-1909-2019).
- Wang, H. et al., 2020: Aerosols in the E3SM Version 1: New Developments and Their Impacts on Radiative Forcing. *Journal of Advances in Modeling Earth Systems*, **12**(1), e2019MS001851, doi:[10.1029/2019ms001851](https://doi.org/10.1029/2019ms001851).
- Wang, Y.-C., W.-L. Lee, H.-H. Hsu, and H.-C. Liang, 2020: AS-RCEC TaiESM1.0 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.9685](https://doi.org/10.22033/esgf/cmip6.9685).
- Watanabe, M. and H. Tatebe, 2019: MIROC MIROC6 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.886](https://doi.org/10.22033/esgf/cmip6.886).
- Watanabe, M. et al., 2020: MIROC MIROC-ES2L model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.934](https://doi.org/10.22033/esgf/cmip6.934).
- Watanabe, S. et al., 2021a: MIROC MIROC-ES2H model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.901](https://doi.org/10.22033/esgf/cmip6.901).
- Watanabe, S. et al., 2021b: MIROC MIROC-ES2H model output prepared for CMIP6 GeoMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.907](https://doi.org/10.22033/esgf/cmip6.907).

- Webb, M., 2019: MOHC HadGEM3-GC31-LL model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.435](https://doi.org/10.22033/esgf/cmip6.435).
- Wieners, K.-H. et al., 2019a: MPI-M MPIESM1.2-LR model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.793](https://doi.org/10.22033/esgf/cmip6.793).
- Wieners, K.-H. et al., 2019b: MPI-M MPIESM1.2-LR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.742](https://doi.org/10.22033/esgf/cmip6.742).
- Williams, C., D. Lunt, J. Singarayer, and M.V. Guarino, 2020: NERC HadGEM3-GC31-LL model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12067](https://doi.org/10.22033/esgf/cmip6.12067).
- Williams, D.N. et al., 2016: A global repository for planet-sized experiments and observations. *Bulletin of the American Meteorological Society*, **97**(5), 755–766, doi:[10.1175/bams-d-15-00132.1](https://doi.org/10.1175/bams-d-15-00132.1).
- Williams, K.D. et al., 2018: The Met Office Global Coupled Model 3.0 and 3.1 (GC3.0 and GC3.1) Configurations. *Journal of Advances in Modeling Earth Systems*, **10**(2), 357–380, doi:[10.1002/2017ms001115](https://doi.org/10.1002/2017ms001115).
- Wiltshire, A.J., S. Liddicoat, and E. Robertson, 2019: MOHC UKESM1.0-LL model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1564](https://doi.org/10.22033/esgf/cmip6.1564).
- Wiltshire, A.J., S. Liddicoat, and E. Robertson, 2020a: MOHC HadGEM3-GC31-LL model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14461](https://doi.org/10.22033/esgf/cmip6.14461).
- Wiltshire, A.J., E. Robertson, E. Burke, and S. Liddicoat, 2020b: MOHC HadGEM3-GC31-LL model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14460](https://doi.org/10.22033/esgf/cmip6.14460).
- Wiltshire, A.J., E. Robertson, E. Burke, and S. Liddicoat, 2020c: MOHC UKESM1.0-LL model output prepared for CMIP6 LS3MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14462](https://doi.org/10.22033/esgf/cmip6.14462).
- Wiltshire, A.J. et al., 2021: JULES-CN: a coupled terrestrial carbon–nitrogen scheme (JULES vn5.1). *Geoscientific Model Development*, **14**(4), 2161–2186, doi:[10.5194/gmd-14-2161-2021](https://doi.org/10.5194/gmd-14-2161-2021).
- Winkelmann, R. et al., 2011: The Potsdam Parallel Ice Sheet Model (PISM-PIK) – Part 1: Model description. *The Cryosphere*, **5**(3), 715–726, doi:[10.5194/tc-5-715-2011](https://doi.org/10.5194/tc-5-715-2011).
- Wu, T. et al., 2019: The Beijing Climate Center Climate System Model (BCC-CSM): the main progress from CMIP5 to CMIP6. *Geoscientific Model Development*, **12**(4), 1573–1600, doi:[10.5194/gmd-12-1573-2019](https://doi.org/10.5194/gmd-12-1573-2019).
- Wu, T. et al., 2020: Beijing Climate Center Earth System Model version 1 (BCC-ESM1): model description and evaluation of aerosol simulations. *Geoscientific Model Development*, **13**(3), 977–1005, doi:[10.5194/gmd-13-977-2020](https://doi.org/10.5194/gmd-13-977-2020).
- Wu, T. et al., 2021: BCC-CSM2-HR: a high-resolution version of the Beijing Climate Center Climate System Model. *Geoscientific Model Development*, **14**(5), 2977–3006, doi:[10.5194/gmd-14-2977-2021](https://doi.org/10.5194/gmd-14-2977-2021).
- Xiang, B. et al., 2018: NOAA-GFDL GFDL-CM4 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1642](https://doi.org/10.22033/esgf/cmip6.1642).
- Xie, Z. et al., 2018: A High-Resolution Land Model With Groundwater Lateral Flow, Water Use, and Soil Freeze-Thaw Front Dynamics and its Applications in an Endorheic Basin. *Journal of Geophysical Research: Atmospheres*, **123**(14), 7204–7222, doi:[10.1029/2018jd028369](https://doi.org/10.1029/2018jd028369).
- Xin, X. et al., 2018: BCC BCC-CSM2MR model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1725](https://doi.org/10.22033/esgf/cmip6.1725).
- Xin, X. et al., 2019a: BCC BCC-CSM2MR model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1726](https://doi.org/10.22033/esgf/cmip6.1726).
- Xin, X. et al., 2019b: BCC BCC-CSM2MR model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1732](https://doi.org/10.22033/esgf/cmip6.1732).
- Xue, W., 2020: THU CIESM model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1354](https://doi.org/10.22033/esgf/cmip6.1354).
- Yakovlev, N.G., 2009: Reproduction of the large-scale state of water and sea ice in the Arctic Ocean in 1948–2002: Part I. Numerical model. *Izvestiya, Atmospheric and Oceanic Physics*, **45**(3), 357–371, doi:[10.1134/s0001433809030098](https://doi.org/10.1134/s0001433809030098).
- Yeung, N. et al., 2019: CSIRO ACCESS-ESM1.5 model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.13701](https://doi.org/10.22033/esgf/cmip6.13701).
- Yu, Y., 2018: CAS FGOALS-f3-L model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1782](https://doi.org/10.22033/esgf/cmip6.1782).
- Yu, Y., 2019: CAS FGOALS-f3-L model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2046](https://doi.org/10.22033/esgf/cmip6.2046).
- Yukimoto, S. et al., 2012: A New Global Climate Model of the Meteorological Research Institute: MRI-CGCM3 – Model Description and Basic Performance. *Journal of the Meteorological Society of Japan. Series II*, **90A**, 23–64, doi:[10.2151/jmsj.2012-a02](https://doi.org/10.2151/jmsj.2012-a02).
- Yukimoto, S. et al., 2019a: The Meteorological Research Institute Earth System Model Version 2.0, MRI-ESM2.0: Description and Basic Evaluation of the Physical Component. *Journal of the Meteorological Society of Japan. Series II*, **97**(5), 931–965, doi:[10.2151/jmsj.2019-051](https://doi.org/10.2151/jmsj.2019-051).
- Yukimoto, S. et al., 2019b: MRI MRI-ESM2.0 model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.633](https://doi.org/10.22033/esgf/cmip6.633).
- Yukimoto, S. et al., 2019c: MRI MRI-ESM2.0 model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.623](https://doi.org/10.22033/esgf/cmip6.623).
- Yukimoto, S. et al., 2019d: MRI MRI-ESM2.0 model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.625](https://doi.org/10.22033/esgf/cmip6.625).
- Yukimoto, S. et al., 2019e: MRI MRI-ESM2.0 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.621](https://doi.org/10.22033/esgf/cmip6.621).
- Yukimoto, S. et al., 2019f: MRI MRI-ESM2.0 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.634](https://doi.org/10.22033/esgf/cmip6.634).
- Yukimoto, S. et al., 2019g: MRI MRI-ESM2.0 model output prepared for CMIP6 FAFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.632](https://doi.org/10.22033/esgf/cmip6.632).
- Yukimoto, S. et al., 2019h: MRI MRI-ESM2.0 model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.626](https://doi.org/10.22033/esgf/cmip6.626).
- Yukimoto, S. et al., 2019i: MRI MRI-ESM2.0 model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.636](https://doi.org/10.22033/esgf/cmip6.636).
- Yukimoto, S. et al., 2019j: MRI MRI-ESM2.0 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.635](https://doi.org/10.22033/esgf/cmip6.635).
- Yukimoto, S. et al., 2019k: MRI MRI-ESM2.0 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.638](https://doi.org/10.22033/esgf/cmip6.638).
- Yukimoto, S. et al., 2020a: MRI MRI-ESM2.0 model output prepared for CMIP6 DCP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.630](https://doi.org/10.22033/esgf/cmip6.630).
- Yukimoto, S. et al., 2020b: MRI MRI-ESM2.0 model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.637](https://doi.org/10.22033/esgf/cmip6.637).
- Zadeh, N.T. et al., 2018: NOAA-GFDL GFDL-OM4p5B model output prepared for CMIP6 OMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2264](https://doi.org/10.22033/esgf/cmip6.2264).
- Zalesny, V.B. et al., 2010: Numerical simulation of large-scale ocean circulation based on the multicomponent splitting method. *Russian Journal of Numerical Analysis and Mathematical Modelling*, **25**(6), 581–609, doi:[10.1515/rjnam.2010.036](https://doi.org/10.1515/rjnam.2010.036).
- Zekollari, H., M. Huss, and D. Farinotti, 2019: Modelling the future evolution of glaciers in the European Alps under the EURO-CORDEX RCM ensemble. *The Cryosphere*, **13**(4), 1125–1146, doi:[10.5194/tc-13-1125-2019](https://doi.org/10.5194/tc-13-1125-2019).
- Zeng, X., M. Zhao, and R.E. Dickinson, 1998: Intercomparison of Bulk Aerodynamic Algorithms for the Computation of Sea Surface Fluxes Using TOGA COARE and TAO Data. *Journal of Climate*, **11**(10), 2628–2644, doi:[10.1175/1520-0442\(1998\)011<2628:iobaaf>2.0.co;2](https://doi.org/10.1175/1520-0442(1998)011<2628:iobaaf>2.0.co;2).
- Zhang, F. et al., 2019: BCC BCC-CSM2MR model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1723](https://doi.org/10.22033/esgf/cmip6.1723).
- Zhang, J. et al., 2018: BCC BCC-ESM1 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1734](https://doi.org/10.22033/esgf/cmip6.1734).
- Zhang, J. et al., 2019a: BCC BCC-CSM2MR model output prepared for CMIP6 GMMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1728](https://doi.org/10.22033/esgf/cmip6.1728).
- Zhang, J. et al., 2019b: BCC BCC-ESM1 model output prepared for CMIP6 AerChemMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1733](https://doi.org/10.22033/esgf/cmip6.1733).
- Zhang, L. et al., 2019: BCC BCC-CSM2MR model output prepared for CMIP6 CFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1724](https://doi.org/10.22033/esgf/cmip6.1724).
- Zhang, Y. et al., 2019: BCC BCC-CSM2MR model output prepared for CMIP6 LUMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1730](https://doi.org/10.22033/esgf/cmip6.1730).

- Zhang, Z. et al., 2019: NCC NorESM2-LM model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.592](https://doi.org/10.22033/esgf/cmip6.592).
- Zhao, M., 2020: Simulations of Atmospheric Rivers, Their Variability, and Response to Global Warming Using GFDL's New High-Resolution General Circulation Model. *Journal of Climate*, **33**(23), 10287–10303, doi:[10.1175/jcli-d-20-0241.1](https://doi.org/10.1175/jcli-d-20-0241.1).
- Zhao, M. et al., 2018a: NOAA-GFDL GFDL-CM4C192 model output prepared for CMIP6 HighResMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2262](https://doi.org/10.22033/esgf/cmip6.2262).
- Zhao, M. et al., 2018b: NOAA-GFDL GFDL-AM4 model output. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.1401](https://doi.org/10.22033/esgf/cmip6.1401).
- Zhao, M. et al., 2018c: The GFDL Global Atmosphere and Land Model AM4.0/LM4.0: 1. Simulation Characteristics With Prescribed SSTs. *Journal of Advances in Modeling Earth Systems*, **10**(3), 691–734, doi:[10.1002/2017ms001208](https://doi.org/10.1002/2017ms001208).
- Zhao, M. et al., 2018d: The GFDL Global Atmosphere and Land Model AM4.0/LM4.0: 2. Model Description, Sensitivity Studies, and Tuning Strategies. *Journal of Advances in Modeling Earth Systems*, **10**(3), 735–769, doi:[10.1002/2017ms001209](https://doi.org/10.1002/2017ms001209).
- Zheng, W. and L. Dong, 2019: CAS FGOALS-g3 model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2054](https://doi.org/10.22033/esgf/cmip6.2054).
- Zheng, W. and B. He, 2019: CAS FGOALS-f3-L model output prepared for CMIP6 PMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.12002](https://doi.org/10.22033/esgf/cmip6.12002).
- Ziehn, T. et al., 2019a: CSIRO ACCESS-ESM1.5 model output prepared for CMIP6 C4MIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2286](https://doi.org/10.22033/esgf/cmip6.2286).
- Ziehn, T. et al., 2019b: CSIRO ACCESS-ESM1.5 model output prepared for CMIP6 CDRMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2287](https://doi.org/10.22033/esgf/cmip6.2287).
- Ziehn, T. et al., 2019c: CSIRO ACCESS-ESM1.5 model output prepared for CMIP6 CMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2288](https://doi.org/10.22033/esgf/cmip6.2288).
- Ziehn, T. et al., 2019d: CSIRO ACCESS-ESM1.5 model output prepared for CMIP6 ScenarioMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2291](https://doi.org/10.22033/esgf/cmip6.2291).
- Ziehn, T. et al., 2020a: The Australian Earth System Model: ACCESS-ESM1.5. *Journal of Southern Hemisphere Earth Systems Science*, **70**, 193–214, doi:[10.1071/es19035](https://doi.org/10.1071/es19035).
- Ziehn, T. et al., 2020b: CSIRO ACCESS-ESM1.5 model output prepared for CMIP6 DAMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.14362](https://doi.org/10.22033/esgf/cmip6.14362).
- Ziehn, T. et al., 2020c: CSIRO ACCESS-ESM1.5 model output prepared for CMIP6 RFMIP. Earth System Grid Federation, doi:[10.22033/esgf/cmip6.2290](https://doi.org/10.22033/esgf/cmip6.2290).
- Zittis, G. and P. Hadjinicolaou, 2017: The effect of radiation parameterization schemes on surface temperature in regional climate simulations over the MENA-CORDEX domain. *International Journal of Climatology*, **37**(10), 3847–3862, doi:[10.1002/joc.4959](https://doi.org/10.1002/joc.4959).
- Zittis, G., P. Hadjinicolaou, and J. Lelieveld, 2014: Comparison of WRF Model Physics Parameterizations over the MENA-CORDEX Domain. *American Journal of Climate Change*, **3**(5), 490–511, doi:[10.4236/ajcc.2014.35042](https://doi.org/10.4236/ajcc.2014.35042).

