

## VIENNA RADIUM INSTITUTE RADIOCARBON DATES VIII

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Measurements have continued with the same proportional counter system, pretreatment procedure, methane preparation and measurement, and calculation, as described previously (R, 1970, v 12, p 298-318). Uncertainties quoted are single standard deviations originating from standard, sample, background counting rates and half-life. No  $^{13}\text{C}/^{12}\text{C}$  ratios were measured.

Sample descriptions have been prepared in cooperation with submitters.

### ACKNOWLEDGMENTS

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### SAMPLE DESCRIPTIONS

#### I. GEOLOGIC, GLAZIOLOGIC, LIMNOLOGIC, AND FOREST SAMPLES

##### A. Austria

##### Strobl series, OÖ

Clay gyttja, transition from clay to peat development, from base of bogs in Strobl area, Upper Austria. Coll 1974 and subm by D van Husen, Inst Geol, TU Vienna. Clay eliminated by HCl and HF pretreatment; no NaOH pretreatment was given.

*General Comment* (DvH): date is min for ice retreat in area and dates beginning of organic sedimentation.

**VRI-429. Wirling** **10,210 ± 150**

Bog between drumlins, W Wirling (47° 43' 38" N, 13° 42' 48" E).

**VRI-431. Moosalm** **12,520 ± 180**

Bog in rock depression, W Moosalm (47° 45' 57" N, 13° 29' 07" E).

*Comment* (DvH): dates tundra phase established by palynology.

**VRI-430. Plakner** **12,410 ± 190**

Bog between drumlins NW farm Plakner (47° 43' 37" N, 13° 30' 42" E).

**VRI-432. Bad Goisern, OÖ** **11,970 ± 200**

Clay gyttja, transition from clay to peat development, from base of bog lying within end moraine ramparts NNE farm Sperrer (47° 37' 12" N, 13° 37' 30" E), near Bad Goisern, Upper Austria (D van Husen, 1973). Coll 1974 and subm by D van Husen. Clay eliminated by HCl and HF pretreatment; no NaOH pretreatment. *Comment* (DvH): dates cold phase established by palynology and min is age for ice retreat in area.

**VRI-486. Mt Dachstein, OÖ 11,490 ± 290**

Gyttja from clay/bog transition in depth of 1.70 to 1.75m bog on Gjaidalm (47° 31' 03" N, 13° 40' 05" E), Mt Dachstein plateau, Upper Austria. Coll 1975 and subm by D van Husen. Clay separation by HCl and HF pretreatment, no humic acids separation. *Comment* (DvH): dates beginning of bog growth and change to warm climate.

**VRI-488. Bad Goisern, OÖ 9880 ± 140**

Peat in depth 3.15 to 3.25m of bog near farm Sperrer (47° 37' 12" N, 13° 37' 30" E), Bad Goisern, Upper Austria. Coll 1975 and subm by D van Husen. No humic acids separation. *Comment* (DvH): dates climatic deterioration palynologically detected.

**VRI-491. Donnerau, OÖ 12,220 ± 140**

Peat from depth 6.10 to 6.20m, 10cm above base of bog, Donnerau near Neustift (48° 29' N, 14° 52' E), Upper Austria. Coll 1974 and subm by J Draxler, Geol BA, Vienna. No humic acids extraction. *Comment* (JD): dates beginning of peat growth.

**Halldorf series, Salzburg**

Wood and peat remnants in form of peat rubbles excavated from artificially opened (ballast-pit) terrace system (Slupetzky, 1975) in valley of R Salzach, Halldorf (47° 21' N, 13° 11' E) near St Johann im Pongau, Salzburg. Coll 1974 and subm by H Slupetzky, Geog Inst, Univ Salzburg. *General Comment* (HS): helps explain origin of finds.

**VRI-444. Halldorf 1 >36,500**

Peat rubble in sand layer (Slupetzky, 1975) ca 50cm thick, 8m below level.

**VRI-449. Halldorf 2 32,000 ± 1200**

Wood (*Juniperus* com), 2m above sand layer of Halldorf 1. No NaOH pretreatment.

**VRI-489. Halldorf B9 31,600 ± 1000**

Peat rubble in sand layer of Halldorf 1.

**VRI-452. Halldorf 19D 35,500**

Wood in sand layer of Halldorf 1.

**Schwarzach series, Salzburg**

Wood (*Juniperus*) from basal complex of opening, ca 8m deep, in terrace of R Salzach (Slupetzky, 1975), near Schwarzach (47° 20' N, 13° 10' E), Pongau, Salzburg. Basal complex, differently colored sand and clay zones ca 20cm thick, lying on gravel, overlain by banded clay ca 5m thick followed by ca 3m gravel. Coll 1973 and subm by H Slupetzky.

*General Comment* (HS): dates basal complex.

**VRI-407. Schwarzach 1/4 12,740 ± 310**

Joined Samples 1 and 4 coll 3m apart in same horizon between underlying reddish-brown and overlying gray fine sand from lowest part of basal complex.

**VRI-453. Schwarzach 3 12,840 ± 250**

Sample 3, site similar to VRI-407 in lowest part of basal complex.

**VRI-454. Schwarzach 10 12,500 ± 170**

Sample 10 in upper part of basal complex.

**VRI-483. Salzburg, Salzburg 9990 ± 150**

Wood from bog layer 50 to 70cm thick above mud sediment of dammed up lake, overlain by 2m material. Salzburg-City, Riedenburg (47° 48' 00" N, 13° 02' 30" E), Salzburg. Coll 1975 and subm by G Horninger, Geol Inst, TU Vienna. *Comment* (GH): dates bog growth, gives min age for end of mud sedimentation.

**Neumarkt series, Steiermark**

Peat of bog Dürnberger-Moos (47° 05' 53" N, 14° 21' 29" E), near Neumarkt, Styria. Coll 1973 and subm by E Schultze, Limnolog Inst österr Akad Wiss, Vienna.

*General Comment* (ES): dates events in pollen diagram. No NaOH pre-treatment (HF).

**VRI-415. 130-145cm 9940 ± 140**

Terrestrial grass peat 130 to 145cm above base. *Comment* (ES): dates rise of spruce.

**VRI-416. Base 11,840 ± 170**

Carex peat from base. *Comment* (ES): dates oscillation of *Pinus cembra* curve at beginning of reforestation.

**VRI-433. Kainisch, Steiermark 12,220 ± 180**

Clay gyttja, transition from clay to peat development, from base of bog between Kame terrace and end moraine rampart NNW Lake Öden-see (47° 34' 08" N, 13° 49' 36" E), near Kainisch, Styria (van Husen, 1973). Coll 1974 and subm by D van Husen. *Comment* (DvH): dates cold phase palynologically recognized and gives min age for ice retreat in area.

**Bad Mitterndorf series, Steiermark**

Samples from bog near Rödschitz (47° 33' 40" N, 13° 54' 50" E) near Bad Mitterndorf, Styria. Coll 1975 and subm by D van Husen.

*General Comment* (DvH): dates palynologically detected climatic events.

**VRI-484. Rödschitz 7.05-7.20m 15,400 ± 470**

Organic material in clay below bog, depth 7.05 to 7.20m. Pretreatment with HCl and HF for clay elimination only. *Comment* (DvH): dates climatic amelioration between 2 cold phases.

**VRI-485. Rödsschitz 5.39-5.40m 12,440 ± 420**

Peat from thin peat layer on clay, depth 5.39 to 5.40m. No NaOH pretreatment. *Comment* (DvH): dates beginning of strongly marked warm phase.

**VRI-490. Hohentauern, Steiermark 30,700 ± 1000**

Mud in depth 105 to 106m below thick moraine at road ca 2km SW village Hohentauern, ca 100m W shelter Draxler Hütte (47° 25' N, 14° 28' E), Styria. Coll 1973 by E Clar from core of borehole 1/73 drilled by STEWEAG, subm by I Draxler, Geol BA, Vienna. *Comment* (ID): according to stratigraphy and pollen analysis a Würm interstadial is expected.

**VRI-542. Schladming, Steiermark 30,700 ± 1200**

Peat coal between clay horizons in pre-Würm deposited Ramsauschotter. Compressed bog remnants slightly carbonized. Schladming (47° 23' 47" N, 13° 38' 18" E), Styria. Coll 1975 and subm by D van Husen. No humic acids separation. *Comment* (DvH): clue to chronology of Ramsauschotter.

**Reith series, Tirol**

Samples from bog Zotensenk (47° 25' 21" N, 11° 52' 35" E), 550m asl, near Reith near Brixlegg, Tyrol. Coll 1973 by G Patzelt and S Bortenschlager subm by G Patzelt, Geog Inst, Univ Innsbruck. No NaOH pretreatment.

**VRI-422. Zotensenk 821-830cm 12,440 ± 160**

Organic material in clay, depth 821 to 830cm. *Comment* (GP): min age for late glacial ice retreat in area. Palynologic evidence and stratigraphic location point to older age.

**VRI-423. Zotensenk 795-798cm 12,770 ± 150**

Clay gyttja in depth 795 to 798cm. *Comment* (GP): dates palynologically detected reforestation in area.

**VRI-455. Stubaital, Tirol 7550 ± 120**

Peat from base of 139cm deep bog near shelter Dresdner Hütte (46° 56' 48" N, 11° 08' 38" E), 2300m asl, Stubai valley, Tyrol. Coll 1974 by S Bortenschlager, subm by G Patzelt. *Comment* (GP): dates beginning of organic sedimentation and gives min age for ice retreat in area.

*B. Italy, Yugoslavia, Saudi Arabia***VRI-472. Fusine, Italy 8360 ± 220**

Carex peat with wood remnants in depth 115 to 123cm from bog near Fusine (46° 29' 12" N, 13° 40' 30" E), Weissenfelser saddle, Julian Alps, Italy. Coll 1975 and subm by F Kral. *Comment* (FK): dates warm period (Boreal) palynologically detected by raised values for fir, beech and woods characterized by oak.

**Koprivna series, Yugoslavia**

Eriophorum-carr peat from different depths of *Pinus mugo*-raised bog Zadnji travniki above Koprivna (46° 27' 40" N, 14° 41' 20" E), Eastern Karawanken, Yugoslavia. Coll 1974 by A Šercelj, subm by F Kral, Univ Bodenkultur, Vienna.

*General Comment (FK)*: dates palynologically detected events.

**VRI-469. 78-90cm 3170 ± 90**

Peat with remnants of wood from depth 78 to 90cm. *Comment (FK)*: change from spruce-fir wood to spruce-fir-beech wood. Sub-Boreal, as expected.

**VRI-470. 150-158cm 5960 ± 100**

Peat with clay from depth 150 to 158cm. *Comment (FK)*: change from spruce wood to spruce-fir wood followed by less marked hazel max. Putting sample into older Atlanticum, because of retarded hazel max in SE Alps, date is too young for some hundred yr. Possible contamination by rootlets?

**VRI-503. Wadi Birk, Saudi Arabia 2170 ± 130**

Charcoal particles in sand from several cm thick burning horizon ca 1m below surface of fluvial terrace (23° 25' N, 46° 47' E), Wadi Birk, Saudi Arabia. Coll 1975 by Hötzl, subm by J Zötl, Inst Hydrogeol, TU Graz. *Comment (JZ)*: gives max age for overlying sediments of presumedly aeolian origin.

## II. ARCHAEOLOGIC, HISTORIC SAMPLES

## A. Austria

**Keutschach, series, Kärnten**

Wood from lake bottom. Coll 1974 by Bundesdenkmalamt, Abt f Bodendenkmalpflege, Vienna, subm by H Offenberger.

*General Comment (HO)*: remnants of lake-dwellings.

**VRI-438. Hafnersee II 4460 ± 100**

Sample (1193 % moisture) coll 30m off shore in depth ca -3m in Lake Hafnersee (46° 35' 10" N, 14° 08' 00" E), Carinthia.

**VRI-439. Keutschachersee I 4900 ± 100**

Sample (847 % moisture) coll 30m off shore in depth ca -3m in Lake Keutschachersee (46° 35' 10" N, 14° 09' 30" E), Carinthia.

**VRI-440. Keutschachersee II 5170 ± 150**

Sample (931 % moisture) coll 30m off shore in depth ca -3m in Lake Keutschachersee.

**Böheimkirchen series, NÖ**

Charcoal from excavations, Böheimkirchen (48° 12' N, 15° 45' E) near St Pölten, Lower Austria. Coll 1974 and subm by J W Neugebauer, Inst Ur u Frühgesch, Univ Vienna.

*General Comment* (JN): absolute chronology of archaeol dating. Expected ages between 3400 and 3600 BP. Discrepancies unknown.

**VRI-493. Sample 1** **3060 ± 130**

Sample from layer of beams overlain by younger rampart. Settlement layer belongs to classic phase of Věteřov culture. Rampart was erected at end of this phase. Quad L1, depth 140cm. *Comment* (HF): DeVries correction (Suess, 1970) gives 1400 BC.

**VRI-494. Sample 5** **2860 ± 90**

Like VRI-493.

**VRI-495. Sample 6** **2640 ± 80**

Like VRI-493.

**VRI-496. Sample 8** **2900 ± 90**

Sample from Pit 107, filled with waste materials (ceramics, bones, charcoal, and humus) belonging to classic or post classic phase of Věteřov culture. Quad d13, depth 150 to 170cm.

**VRI-497. Sample 10** **2940 ± 90**

Like VRI-496.

**VRI-498. Sample 11** **2920 ± 90**

Similar to VRI-496 except for Pit 113, Quad h13, depth 130cm.

**VRI-584. Stillfried, NÖ** **2700 ± 80**

Charred wood from construction of W rampart of prehistoric bulwark, Stillfried a d March (48° 25' N, 16° 51' E), Lower Austria. Coll 1969 and subm by F Felgenhauer, Inst Ur u Frühgeschichte, Univ Vienna. *Comment* (FF): archaeol dating is 750 BC. DeVries correction (Suess, 1970) gives 870 BC. (HF).

**VRI-468. Litzelberg, OÖ** **2040 ± 70**

Wooden post from bottom of I. Attersee, 1.2m below level, ca 15m from shore of plot Bintner (47° 52' N, 13° 33' E), SW Litzelberg, Upper Austria. Coll 1972 by W Bintner, subm by H Offenberger, Bundesdenkmalamt, Vienna. *Comment* (HF): date rejects supposition that post is relic of Neolithic lake-dwelling.

**VRI-445. Kramsach, Tirol** **1620 ± 80**

Wood buried under boulder by landslip, N slope of mt ridge Schneidjoch (47° 29' N, 11° 48' E), Rofengebirge, NW Kramsach, Tyrol. Coll 1974 by F Jira, subm by R Pittioni, Inst Ur-Frühgesch, Univ Vienna. *Comment* (FJ): dates landslip.

**VRI-502. Wien, Austria** **510 ± 70**

Pine wood from periphery of stem of monument "Stock im Eisen" at corner Kärntnerstraße—Stock im Eisen Platz, Vienna I. Sample taken 1975 by H Bednar, subm by O Harl, Mus d Stadt Wien. *Comment* (OH): date rejects supposition of stem renewal ca 200 yr ago.

## B. Iran

**Kordlar series, Iran**

Charcoal excavated from 28m high settlement hill Tepe Kordlar (37° 30' N, 45° E), near Rezaiyeh, W-Aserbeidschan, Iran. Coll 1974 and subm by A Lippert, Inst f Vor- u Frühgeschichte, Univ Innsbruck.

*General Comment (AL):* dates Early Iron age layers (Lippert, 1975).

**VRI-446. 1301.50m** **2960 ± 80**

Charcoal from Quad Hd1, depth 1301.50m, on outside E framework wall.

**VRI-447. 1300.50m** **2850 ± 80**

Charcoal from Quad Hd3, E side, depth 1300.50m.

**VRI-448. 1300m** **2880 ± 90**

Charcoal from Quad Gd4, Rm B, depth 1300m.

## REFERENCES

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- Lippert, A, 1975, 3. Vorbericht zu den österr Ausgrabungen am Tepe Kordlar, West-aserbeidschan, Iran: Anthropol Gesell Wien Mitt, v 105,
- Slupetzky, H, 1975, Erste Radiocarbonatierungen in Quartärablagerungen im Pongau im Bereich des inneralpinen Salzachgletschers (Vorbericht): Anz österr Akad Wiss, math-naturw Kl, Jg 1975, p 154-160.
- Suess, H E, 1970, *in*: Olsson, I U, Radiocarbon variations and absolute chronology: Stockholm, Almqvist and Wiksell.

**Corrections**

Radiocarbon, 1976, v 18, no. 2:

VRI-346. Tennengebirge, p 241, should read: VRI-436.

VRI-421. Profile S, 35,000 bc, p 241, should read: 35,900 bc.