Sedimententnahme und Datierungen in der Verlandungszone des Tüttensees

Ernst Kroemer

In der östlichen Verlandungszone des Tüttensees wurden auf dem Gebiet der Gemeinde Vachendorf mittels eines Stechzylinders Proben aus den Torfen und der unterlagernden Seekreide entnommen. SCHMEIDL (1977: S.232-233) beschreibt am Tüttensee Verlandungsmoore von bis zu 8,5 m Mächtigkeit.

Profilaufnahme (KROEMER, 2009):
-0,5 m Torf zersetzt
    0,6 m Cal BP 4.580-4.420 [Beta 262618]
    0,8 m Cal BP 6.890-6.670 [Beta 262617]
    2,5 m Cal BP 10.220- 9.910 [Beta 265371]
-2,5 m Niedermoortorf bis Bruchwaldtorf
    2,8 m Cal BP 12.750- 12.390 [Beta 265372]
-4,0 m Seekreide (belegt)
-5,0 m Seekreide (vermutet aufgrund der Konsistenz, die durch Peilstangen festgestellt wurde)

Drei Torfproben (in 0,6, 0,8 und 2,5 m Tiefe unter Gelände), sowie eine Schneckenschale aus 2,8 m Tiefe unter Gelände wurden ^{14}C-datiert. Die auch Radiocarbondatierung genannte Methode verwendet das Verhältnis verschiedener Kohlenstoff-Isotope zur Altersbestimmung. Die Bezeichnung Cal BP kennzeichnet dabei Kalenderjahre vor 1950. Die Analysen zeigen konsistente Alter, auch das Profil zeigt keine Störungen innerhalb der Schichtabfolge.
Als Ergebnis ist ein Mindestalter der Hohlform von Cal BP 12.750 bis 12.390 Jahren [Beta 265372] festzustellen. Da mit Peilstangen die Mächtigkeit der Seekreide auf mehr als 2,5 m prognostiziert wurde, ist mit deutlich höheren Altern bis hin in das ausgehende Hochglazial zu rechnen. Die Besonderheit, dass im Tüttensee bereits im Spätglazial eine Seekreidesedimentation eingesetzt hat, ist durch sein kleines Einzugsgebiet erklärbar, aus dem kein Gletscher-Schmelzwasser mehr zufloss. Im Gegensatz zum Chiemsee, in dem zu dieser Zeit große Mächtigkeiten an feinkörnige Beckenablagerungen abgesetzt wurden, waren hier die Sedimenteinträge so gering, dass sich eine durchlichtete Zone mit Algenwachstum und biogener Kalkfällung entwickeln konnte.
Die Interpretation der Tüttensee-Hohlform als Toteiskessel wird durch diese Datierungen gestützt. Die Hohlform kann damit nicht erst durch ein kosmisches Ereignis im 1. Jahrtausend vor Christus entstanden sein.

Literatur:

SCHMEIDL, H. (1977): Die Moorvorkommen der Blätter Prien und Traunstein. – In: GANSS, O.: Geologische Karte von Bayern 1:25 000, Erläuterungen zum Blatt Nr. 8140 Prien a. Chiemsee und zum Blatt Nr. 8141 Traunstein: 217-239.

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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Ernst Kroemer — Report Date: 8/21/2009

Bavarian Environment Agency — Material Received: 8/5/2009

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 262617	5990 +/- 40 BP	-27.5 o/oo	5950 +/- 40 BP
SAMPLE : TUT2009-1			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (peat): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 4940 to 4720 (Cal BP 6890 to 6670)			
Beta - 262618	4060 +/- 40 BP	-26.7 o/oo	4030 +/- 40 BP
SAMPLE : TUT2009-5			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (peat): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 2830 to 2820 (Cal BP 4780 to 4770) AND Cal BC 2630 to 2470 (Cal BP 4580 to 4420)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27.5:lab. mult=1)

Laboratory number: **Beta-262617**

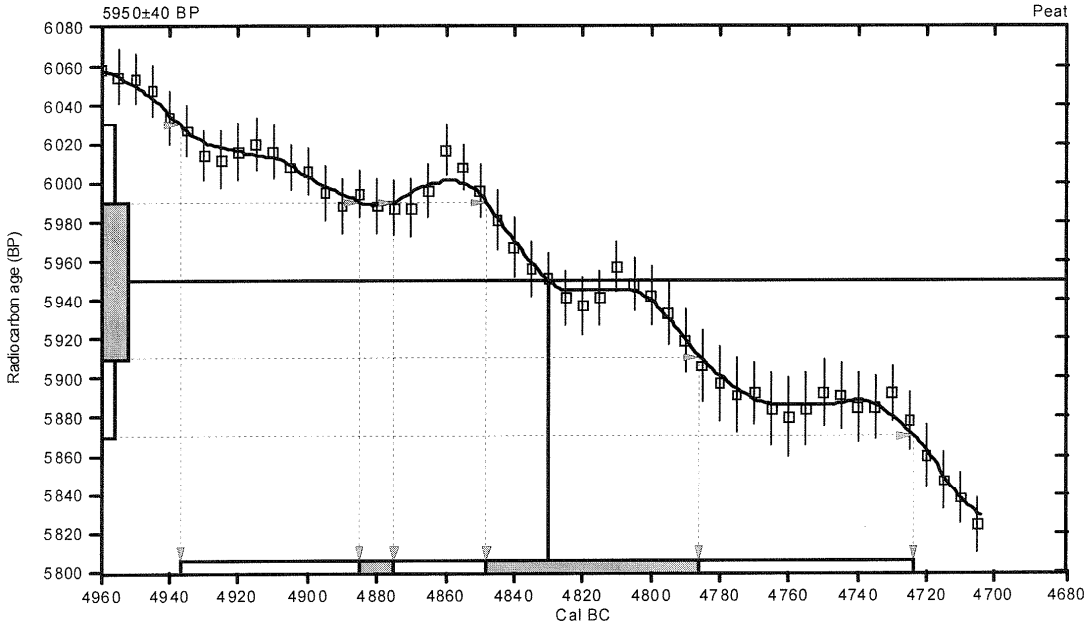
Conventional radiocarbon age: **5950±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 4940 to 4720 (Cal BP 6890 to 6670)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 4830 (Cal BP 6780)

1 Sigma calibrated results: (68% probability) Cal BC 4880 to 4880 (Cal BP 6840 to 6820) and Cal BC 4850 to 4790 (Cal BP 6800 to 6740)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-26.7:lab. mult=1)

Laboratory number: **Beta-262618**

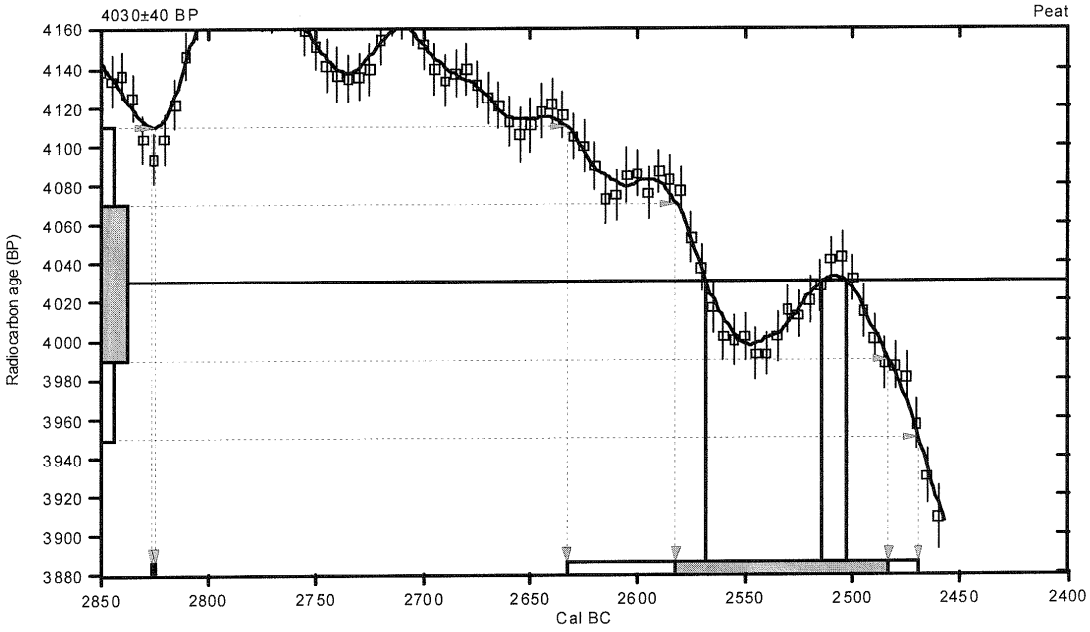
Conventional radiocarbon age: **4030±40 BP**

2 Sigma calibrated results: **Cal BC 2830 to 2820 (Cal BP 4780 to 4770) and**
(95% probability) **Cal BC 2630 to 2470 (Cal BP 4580 to 4420)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal BC 2570 (Cal BP 4520) and
Cal BC 2510 (Cal BP 4460) and
Cal BC 2500 (Cal BP 4450)

1 Sigma calibrated result: Cal BC 2580 to 2480 (Cal BP 4530 to 4430)
(68% probability)



References:

Database used

INTCAL04

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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Ernst Kroemer

Report Date: 10/31/2009

Bavarian Environment Agency

Material Received: 10/5/2009

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 265371	8990 +/- 50 BP	-28.0 o/oo	8940 +/- 50 BP
SAMPLE : TUT-09-04-A			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (peat): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 8270 to 7960 (Cal BP 10220 to 9910)			
Beta - 265372	10250 +/- 50 BP	-6.5 o/oo	10550 +/- 50 BP
SAMPLE : TUT-09-04-B			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (shell): acid etch			
2 SIGMA CALIBRATION : Cal BC 10800 to 10440 (Cal BP 12750 to 12390)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-28:lab. mult=1)

Laboratory number: **Beta-265371**

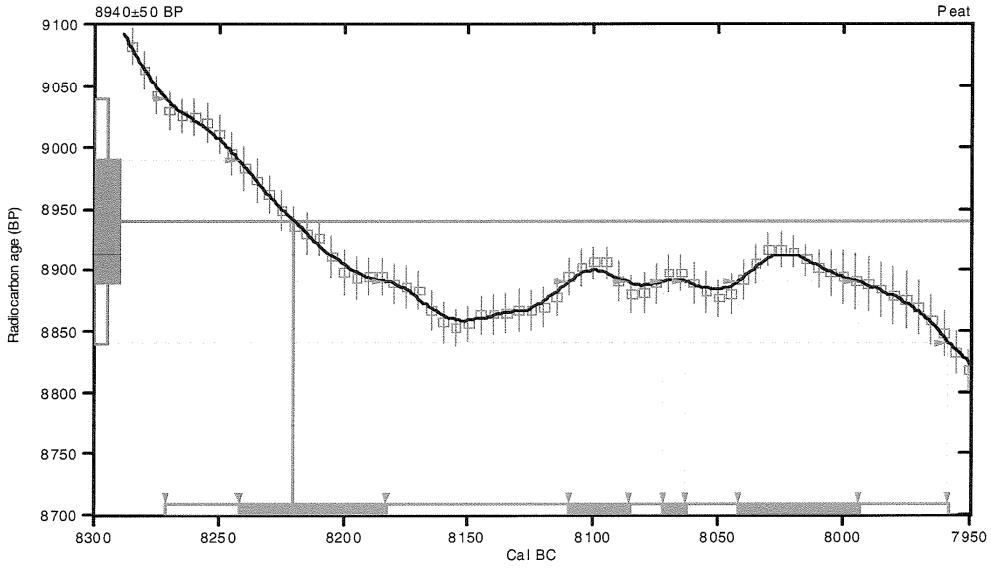
Conventional radiocarbon age: **8940±50 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 8270 to 7960 (Cal BP 10220 to 9910)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 8220 (Cal BP 10170)

1 Sigma calibrated results: (68% probability) Cal BC 8240 to 8180 (Cal BP 10190 to 10130) and
Cal BC 8110 to 8090 (Cal BP 10060 to 10040) and
Cal BC 8070 to 8060 (Cal BP 10020 to 10010) and
Cal BC 8040 to 7990 (Cal BP 9990 to 9940)



References:

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-6.5:lab. mult=1)

Laboratory number: **Beta-265372**

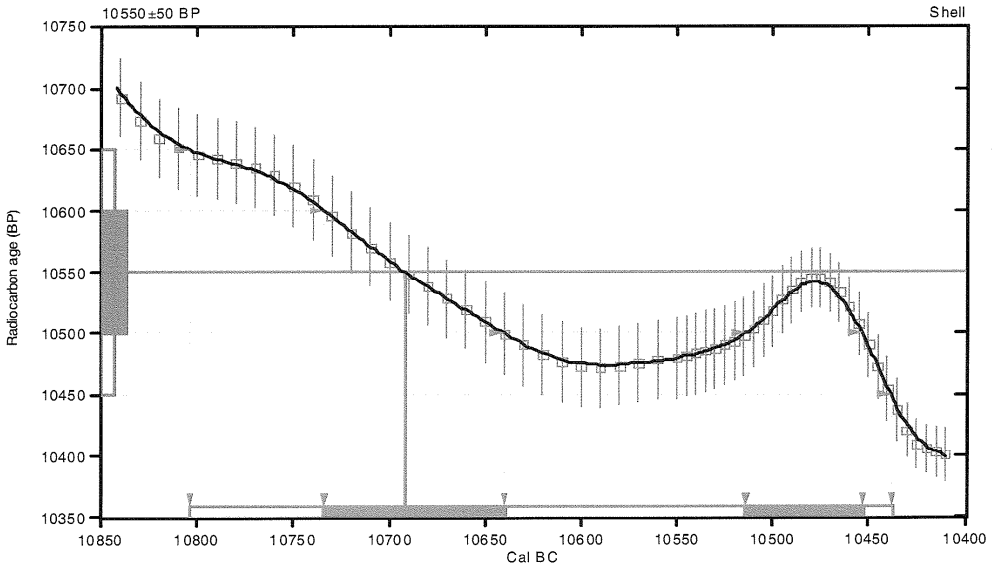
Conventional radiocarbon age: **10550±50 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 10800 to 10440 (Cal BP 12750 to 12390)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 10690 (Cal BP 12640)

1 Sigma calibrated results: (68% probability) Cal BC 10730 to 10640 (Cal BP 12680 to 12590) and Cal BC 10510 to 10450 (Cal BP 12460 to 12400)



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