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CONTRIBUTIONS TO THE EUROPEAN POLLEN DATABASE

43. Buchensee (Lake Constance region, Germany)

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Sediment description and methods

The western Bodensee region has a size of about 800 km² and is elevated between 395 m (lake level of Bodensee) and about 750 m above sea level (a.s.l.) (Lang 1990). The landscape was covered by ice during the Weichselian. The most common soils are luvisols and haplic luvisols developed from glacial tills and Molasse sandstones. The climate is sub-oceanic, with annual average temperatures of 9 °C and an annual precipitation of c. 900 mm. The potential natural vegetation would be deciduous forest dominated by *Fagus sylvatica* L. The actual vegetation is strongly influenced by agriculture. Besides the lower Bodensee with a water table of 62 km² and the Überlinger See at the north-western bay of upper Bodensee of 61 km² there are several smaller lakes as well as mires in the western foreland of lower Bodensee, originating from kettle holes and other glacial basins. Furthermore, 3 km from Radolfzell, the Buchenseen are situated, three small kettle-hole lakes, arranged in a glacial depression running from southeast to northwest. West and south of the lakes is forest with frequent *F. sylvatica*, on the north and east arable fields and meadows. The two north-western lakes are very close, have water expanses of 2.5 and 1.2 ha and maximum depths of more than 10 m, whereas the south-eastern lake is in a distance of 120 m, has a water expanse of 1.6 ha, but a maximum depth of only 2 m. The two deep lakes have only 2–3 m of profundal Holocene sediment, but the shallow lake provided in its centre a total core length of 9.3 m, of which more than 7 m were deposited during the

Holocene. This core taken at 47° 46' 01" N and 8° 59' 04" E and 429 m a.s.l. was studied.

Sediment description

The sampling was done with a modified Livingstone sampler from a raft. The core consists of calcareous and fine detritus gyttja, interrupted by some layers of peat or peat gyttja, above glacial clay. Loss-on-ignition analysis was carried, out, in the same sampling intervals than pollen analysis. Between 6500 and 5200 BC, the sediment of Buchensee consists mostly of organic matter. After a strong input of mineral matter at about 5000 BC, organic and calcareous matter is more or less the same, until 1500 BC, but with shifting proportions. From 2000 BC mineral matter is slightly increased. Between 1200 BC and AD 1500 the content of calcareous matter is very low. Afterwards it is again very high.

After preliminary pollen analysis, the upper part of the core from the first occurrence of *Fagus sylvatica* onwards was investigated with close sampling of 1 cm³ samples, resulting in a total of 797 samples, each analysed with a pollen sum of 1000 arboreal pollen. The work was shared between author LW analysing the overview and the bottom samples, and author MR analysing the uppermost 300 samples.

Dating

The chronology is based on 19 mass spectrometer carbon-14 (¹⁴C) dates measured on terrestrial plant macrofossils. The time model was calculated using oxcal, including 17 data.

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Table I. Buchensee, Radiocarbon dates.

Number	Median (cm)	Number	BP	BC/AD
BUC 151–155	153	Poz-80663	460 ± 30	1412–1468
BUC 201–205	203	Poz-80662	475 ± 30	1408–1454
BUC 246–250	248	Poz-80661	780 ± 30	1210–1281
BUC 276–280	278	Poz-80660	1275 ± 30	661–800
BUC 322–328	325	Poz-80614	1605 ± 35	387–543
BUC 360–362	361	Poz-80659	2210 ± 35	380–194
BUC 374–390	382	Poz-80658	2320 ± 30	429–235
BUC 402–406	404	Poz-80657	2990 ± 30	1374–1118
BUC 422–438	430	Poz-80688	2420 ± 35	751–401
BUC 448–452	450	Poz-80687	1570 ± 30	416–557
BUC 486–492	489	Poz-80686	3745 ± 35	2280–2035
BUC 500–502	501	Poz-24426	3830 ± 40	2459–2148
BUC 514–516	515	Poz-24427	3620 ± 40	2132–1886
BUC 572–576	574	Poz-24428	4100 ± 40	2871–2497
BUC 666–670	668	Poz-24429	5560 ± 40	4462–4338
BUC 684–686	685	Poz-24431	5840 ± 40	4798–4584
BUC 740–742	741	Poz-24432	6950 ± 50	5976–5731
BUC 766–770	768	Poz-24433	7260 ± 50	6226–6031
BUC 786–788	787	Poz-24434	7720 ± 50	6641–6467

Interpretation

The pollen sum includes all terrestrial pollen types except Cyperaceae, spores of mosses and pteridophytes. Percentages of selected taxa are shown in [Figure 1](#). Twenty-three local pollen assemblage zones (LPAZs) can be recognised (PD, predominance; SD, subdominance; CD, codominance; *sensu* Bastin [1979]):

LPAZ 1, 6800–6300 BC. — PD *Corylus*, SD *Quercus*, *Ulmus*.

LPAZ 2, 6300–4800 BC. — CD *Corylus*, *Quercus*, first *Corylus*, later *Quercus* dominating; *Picea*, *Abies*, *Fagus* continuous, *Fagus* slowly increasing.

LPAZ 3, 4800–4300 BC. — PD *Fagus*; SD *Quercus*, *Corylus*; decrease of *Ulmus*, *Tilia*.

LPAZ 4, 4300–3700 BC (Younger Neolithic). — PD *Corylus*, SD *Betula*; increase of charcoal.

LPAZ 5, 3700–3400 BC (Younger and Late Neolithic). — PD *Fagus*, SD *Quercus*, *Corylus*, *Betula*.

LPAZ 6, 3400–2700 BC (Late and Final Neolithic). — CD *Corylus*, *Fagus*, *Betula*, *Quercus*; charcoal frequent.

LPAZ 7, 2700–2600 BC (Final Neolithic). — PD *Betula*.

LPAZ 8, 2600–1900 BC (Final Neolithic/Earliest Bronze Age). — PD *Fagus*, SD *Corylus*, *Betula*, *Quercus*.

LPAZ 9, 1900–1850 BC (Earliest Bronze Age). — PD *Betula*.

LPAZ 10, 1850–1700 BC (Earliest Bronze Age). — PD *Quercus*; SD *Corylus*, *Fagus*; NAP and charcoal high.

LPAZ 11, 1700–1650 BC (Earliest Bronze Age). — PD *Betula*, SD *Corylus*, *Fagus*, *Quercus*; NAP and charcoal low.

LPAZ 12, 1650–1350 BC (Middle Bronze Age). — PD *Fagus*.

LPAZ 13, 1350–1300 BC (Middle Bronze Age). — PD *Betula*.

LPAZ 14, 1300–1100 BC (Middle Bronze Age/Late Bronze Age). — PD *Fagus*; SD *Betula*, *Quercus*, *Corylus*; NAP increasing.

LPAZ 15, 1100–450 BC (Late Bronze Age, Hallstatt period). — PD *Betula*; SD *Quercus*, *Corylus*, *Fagus*.

LPAZ 16, 450–100 BC (Latène period). — PD *Quercus*, SD *Fagus*, *Betula*; NAP high.

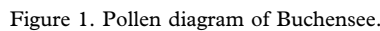
LPAZ 17, 100 ± 1 BC (late Latène period). — PD *Betula*.

LPAZ 18, ± 1 BC–AD 250 (Roman period). — PD *Quercus*; SD *Fagus* (increasing), *Betula*; NAP high.

LPAZ 19, AD 250–300 (Migration period). — PD *Betula*.

LPAZ 20, AD 300–500 (Migration period). — CD *Fagus* – *Quercus*; NAP increasing.

LPAZ 21, AD 500–1700 (Medieval and Early Modern period). — PD *Quercus*; SD *Fagus*, *Corylus*, *Betula*; 3



LP 23, *AD* 1800–2000 (modern times). — *PD*
Pinus, *SD* *Picea*; high *Poaceae* percentages.

Bastin B. 1979. Essai de définition d'une terminologie précise applicable au commentaire des diagrammes polliniques se rapportant au Quaternaire. Bulletin de la Société Royale de Botanique de Belgique 112: 7-12.

Lang G. 1990. Die Vegetation des westlichen Bodenseegebietes, 2nd edition. Stuttgart: Fischer.