

Palaeoenvironment in the Eastern Alps during the Last Glacial Cycle

Martina Pacher¹ & Markus Fiebig²

1 Institut für Paläontologie, Universität Wien, Geozentrum, Althanstr. 14, A-1090 Wien, martina.pacher@univie.ac.at

2 Institut für Angewandte Geologie, Universität für Bodenkultur, Peter Jordan Str. 70, A-1190 Wien, markus.fiebig@boku.ac.at

The maximum ice extent in the Eastern Alps during the Last Glacial Maximum (LGM) is compiled on the map from van Husen (1987). Glaciers fluctuated during the Last Glacial Cycle (Wuermian) but these previous ice extensions are almost unknown.

Starting from the four glacial and three interglacial periods, as proposed by Penck & Brückner (1909), the glacial cycles became progressively more resolved into successions of stadial and interstadials. Recent ice core data suggest a sequence of numerous strong oscillations during the Wuermian (EPICA community members (2004), Dansgaard et al. (1993).

Cave bear remains document animals within the glaciated area of the Alps during the Wuermian. Hand in hand with the improvement of the chronology, the proposed age of Alpine cave sites changed from the Riss interglacial to an interstadial during the early Wuermian Age. The first radiometric dates given for bear bones from Ramesch-Knochenhöhle surprisingly placed the bear remains into the middle Wuermian (Hille & Rabeder 1986). At present, more than a hundred direct dates confirm cave bear occupation of Eastern Alpine sites during much of OIS 3 (oxygen isotope stage, Pacher 2003).

However, climatic conditions during the Middle Wuermian are a matter of discussion as inconsistent evidence and interpretations are reported. For example, the pollen sequence at Mondsee, Upper Austria, argues for less favourable climatic conditions (Drescher-Schneider 2000) based on the pollen data. The gravel pit near Gossau, on the Swiss Alpine foreland, documents phases of climatic amelioration. The analysis of the beetle assemblage at the sites indicates relatively temperate climatic conditions during the Middle Wuermian (Preusser 2004, Jost-Stauffer et al. 2001). Based on results from Ramesch-Knochenhöhle in Upper Austria even interglacial conditions between 64,000 and 31,000 years BP have been assumed (Rabeder et al. 2000). As there is only one another report for such warm conditions based on evidence from speleothems (Spötl et al. 2002), the interglacial conditions are still questionable (Preusser 2004). According to van Husen (2000) the ice extent was confined to the central Alps during this period.

Evidence for significant ice advances in the Alps during the early part of the last glacial cycle is reported (eg. Preusser 2002, Fiebig & Preusser 2003, Preusser & Schlüchter 2004). Van Husen argues, based on Fliri (1978, 1973), that glaciations prior to the LGM

were less extensive than the LGM in the Eastern Alps. Until now, no attempt has been made to reconstruct the variations.

In summary, cave bear and other fauna remains document animals within the glaciated area of the Alps during the Wuermian. Ice-free conditions are assumed as prerequisite for the occupation of the cave by an animal or human. However, no clear succession of warm climatic conditions with fauna and cold climate conditions with ice cover has been reconstructed.

The palaeoenvironment in the Eastern Alps needs revision.

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