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New Results on the Palaeobiology of Bears on the Swabian Alb (Chronology, Isotopic Geochemistry and Palaeogenetics)

Susanne Muenzel

Institut für Ur- und Frühgeschichte und Archäologie des Mittelalters, Universität Tübingen, Naturwissenschaftliche Archäologie, Arbeitsbereich Archäozoologie, Rümelinstr. 23, D-72070 Tübingen (Germany)
(susanne.muenzel@uni-tuebingen.de)

Paleogenetic investigations at three geographically close caves in the Ach Valley near Blaubeuren have revealed two different cave bear haplogroups. These two haplogroups correspond to *Ursus spelaeus* (haplogroup 1) and *Ursus ingressus* (haplogroup 4) (Rabeder & Hofreiter 2004, *Die Höhle* 55, 58-77). This genetic variability was first attested for Geißenklösterle and Sirgenstein cave, but the new genetic data attest them also for Hohle Fels. In all three caves *Ursus ingressus* replaced *Ursus spelaeus* around 28 000 B.P.

The carbon and nitrogen isotopes of the two genetic types do not vary significantly, meaning that there is no dietary difference between them and *Ursus spelaeus* were in dietary competition with *Ursus ingressus* in the Ach valley. The radiocarbon dates suggested a sudden replacement (Hofreiter et al. 2007, *Current Biology* 17(4): R1-R3), which must have been accompanied by local extinction of the older cave bear, according to the dietary competition with the younger bear.

The possible reasons for this replacement are not clear yet. Climatic changes are unlikely, since the faunal composition remains the same and the environmental data do not differ significantly. But we cannot exclude human impact on the cave bear population, since a cave bear vertebra with an embedded fragment of a flint projectile was recovered in the Gravettian layer AH IIcf dated to 27 830+150-140 B.P. and gives indisputable proof of the hunting of cave bears. Numerous cut marks proof an ongoing exploitation of this species.

In this context, new radiocarbon dates and isotopic results on cave bears and coeval brown bears will help us to refine the possible scenarios of this complex evolutionary and ecological process. These results will be used to test hypotheses of competitive exclusion between the different bear species. This study will exemplify how combining evidence from different approaches can provide invaluable clues about palaeobiology of late Pleistocene large mammals such as fossil bears in Europe.