

The Mesolithic project Ullafelsen in Tyrol – Man and environment in the early Holocene

C. Geitner* and D. Schäfer**, in cooperation with H. Kerschner^{a)}, S. Bertola^{b)}, A. Pawlik^{c)}, W. Schoch^{d)}, K. Oegg^{l)}, A. Iking^{e)}, D. Tscheko^{d)}, O. Ehrmann^{g)}, R. Traidl^{h)}

* Universität Innsbruck, Institut für Geographie, A-6020 Innsbruck, Innrain 52 / Gebirgsforschung: Mensch und Umwelt, Forschungsstelle der Österreichischen Akademie der Wissenschaften, A-6020 Innsbruck (clemens.geitner@uibk.ac.at)
** Universität Innsbruck, Institut für Geologie und Paläontologie, A-6020 Innsbruck, Innrain 52 (dieter.schaefer@uibk.ac.at) - www.hochgebirgsarchaeologie.info -- www.quartaer.info

1. Introduction

1 - Meaningful investigations of the occurrence of humans in the Alps can only be carried out transdisciplinarily (in the sense of Mittelstraß 2003*). The founding of a corresponding alpine archeology was motivated by the recovery of the “ice man” at the Tisenjoch, South Tyrol, in 1991.



Tisenjoch (Italy), the find site of the „Ice man“ (1994)

2. Mesolithic site ,Ullafelsen‘ (1860 m, Fotscher Valley)

2 - Since then investigations of the prehistory of the early Holocene have been intensified in Tyrol and, in particular, deal with the conditions in the vicinity of the timberline. Numerous sites meanwhile document the here prevailing favourable conditions concerning bio mass, possibilities for hunting groups as well as the use of regional and transalpine transport paths. Our work focuses on the Ullafelsen site (1869m a.s.l., Sellrain), which is situated in the Fotscher Valley, Northern Stubai Alps.

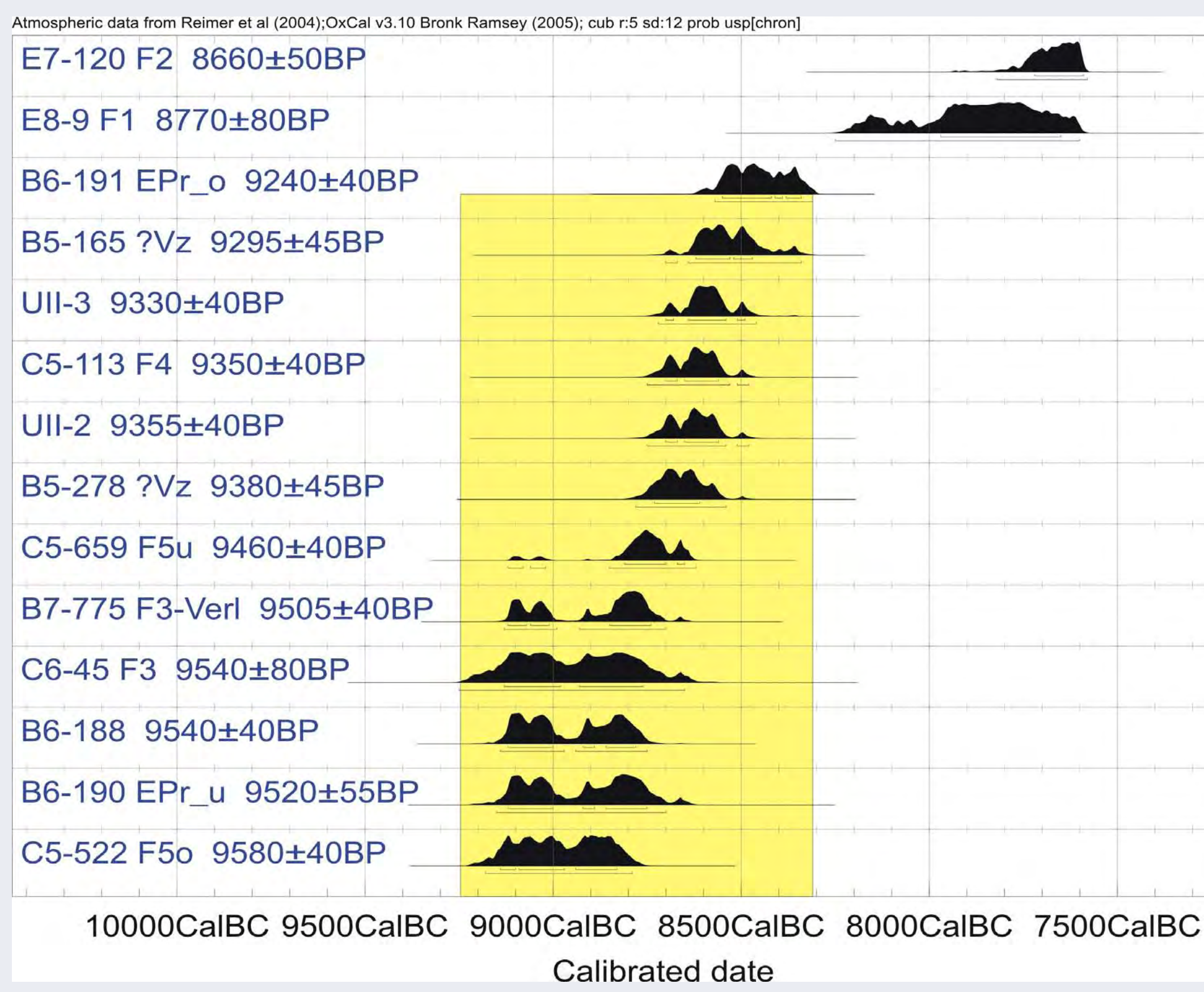


The ,Ullafelsen‘ site (2007)



Field work at the ,Ullafelsen‘ site (2003)

3. AMS data



3 - The time for using the Ullafelsen site can be derived from several 14C data of fireplaces and charcoal concentrations on the basic artefact layer. They are focusing mainly within the second half of the Preboreal chronozone.



Detail of the southern part of fireplace 4 (2003)

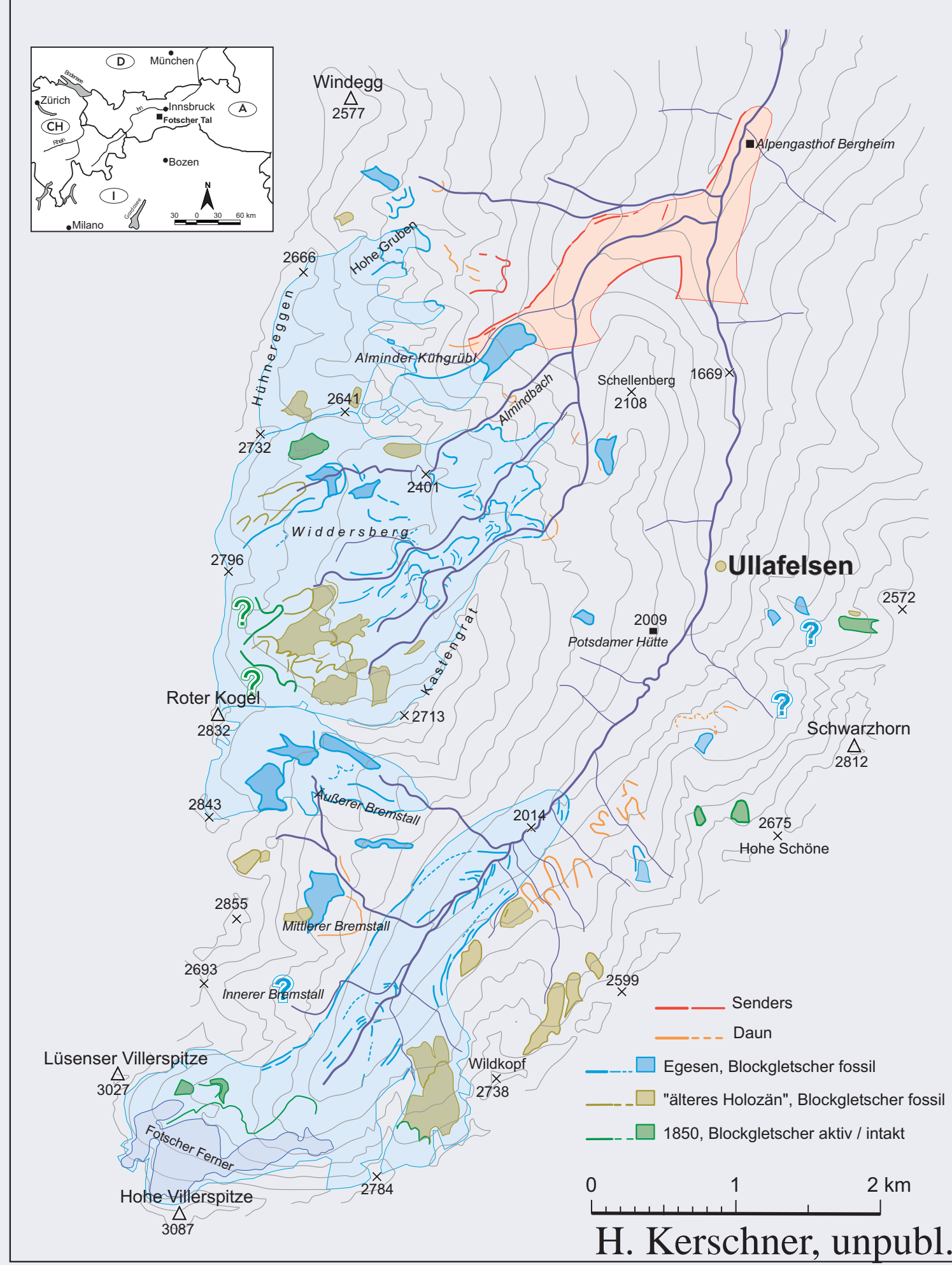


Detail of the fireplace 5 (2003)

4. Examples for disciplines involved in the project

4 - The investigations in various disciplines are partly completed, partly ongoing and aim at a better understanding of the natural conditions for the prehistoric land use. This includes several aspects of geology, geomorphology, pedology, meteorology, mineralogy/petrography, the glaciation history of the late Weichselian and early Holocene, regional climate, development and change of the timberline zone during the mesolithic settlement of the site.

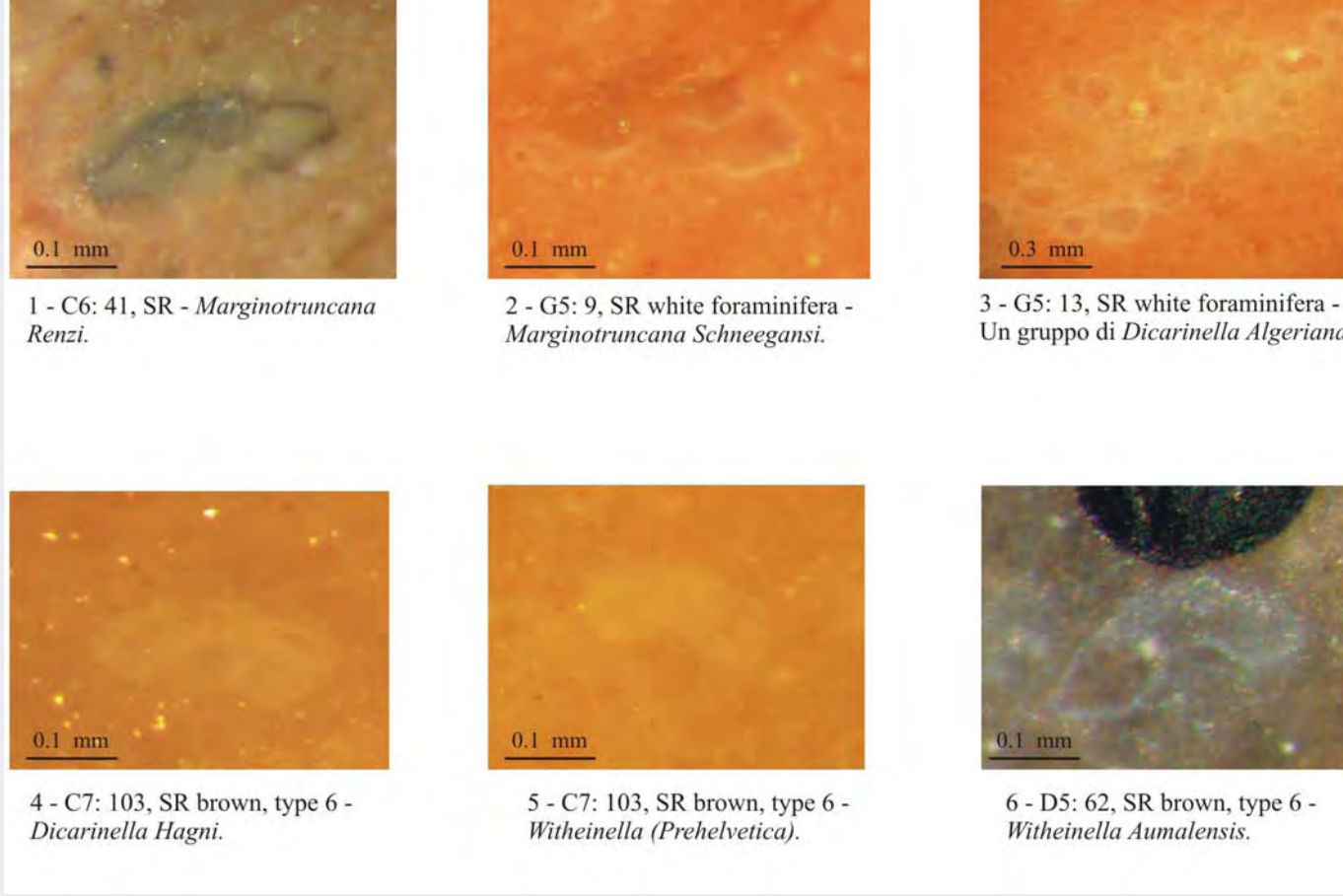
4.1 Glaciology of the Fotscher Valley



4.2 Mineralogy/Micropalaeontology of stone artefacts



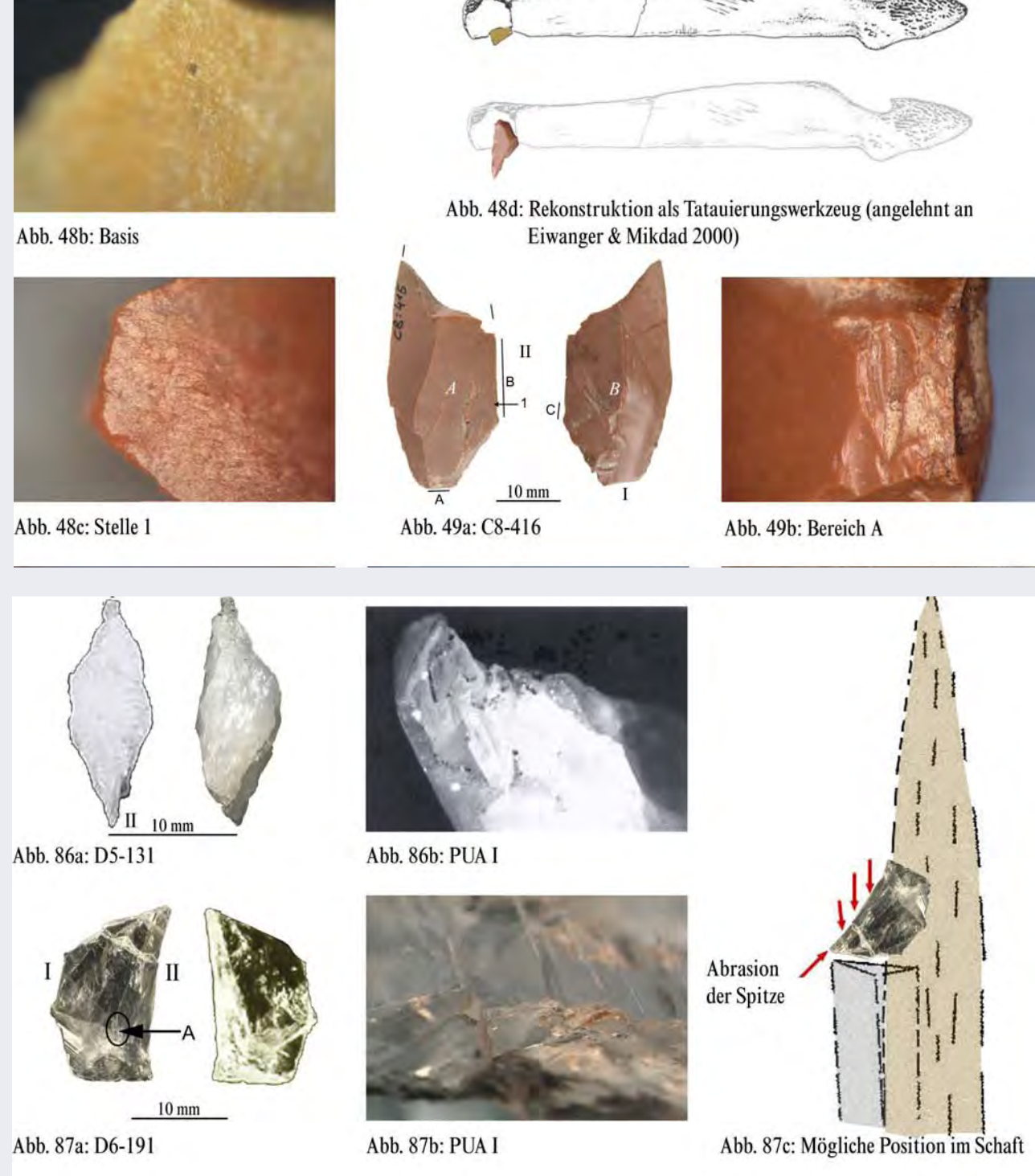
S. Bertola at work in the field (2003)



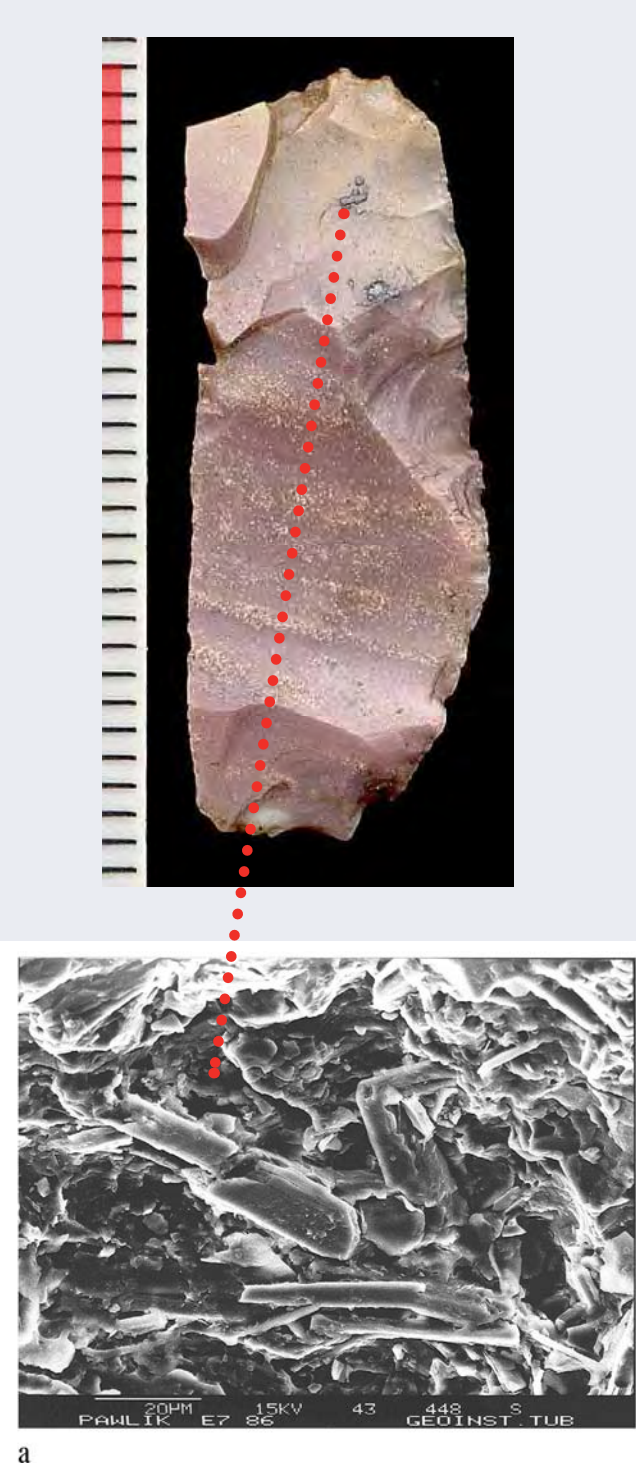
Examples of microfossils in south alpine silex specimens (S. Bertola, unpublished)

Most of the stone artefacts found at Ullafelsen are made of radiolarites and hornstones, which originate from Jurassic hornstones of the Frankish Jurassic (Kelheim Basin, Bavaria) and from Scaglia rossa/S. variegata silex types of the Nons Valley, Upper Italy. Whereas the first group means subsistence-based excursions of more than 200km, the Italian silices yield the oldest holocene proof of the most likely regular crossing of the main Alpine crest, which supports the hypothesis of a transalpine cultural transfer between the mesolithic societies of the Northern and the Southern Alps, respectively,

4.3 Analysis of use wear and organic shaft remains

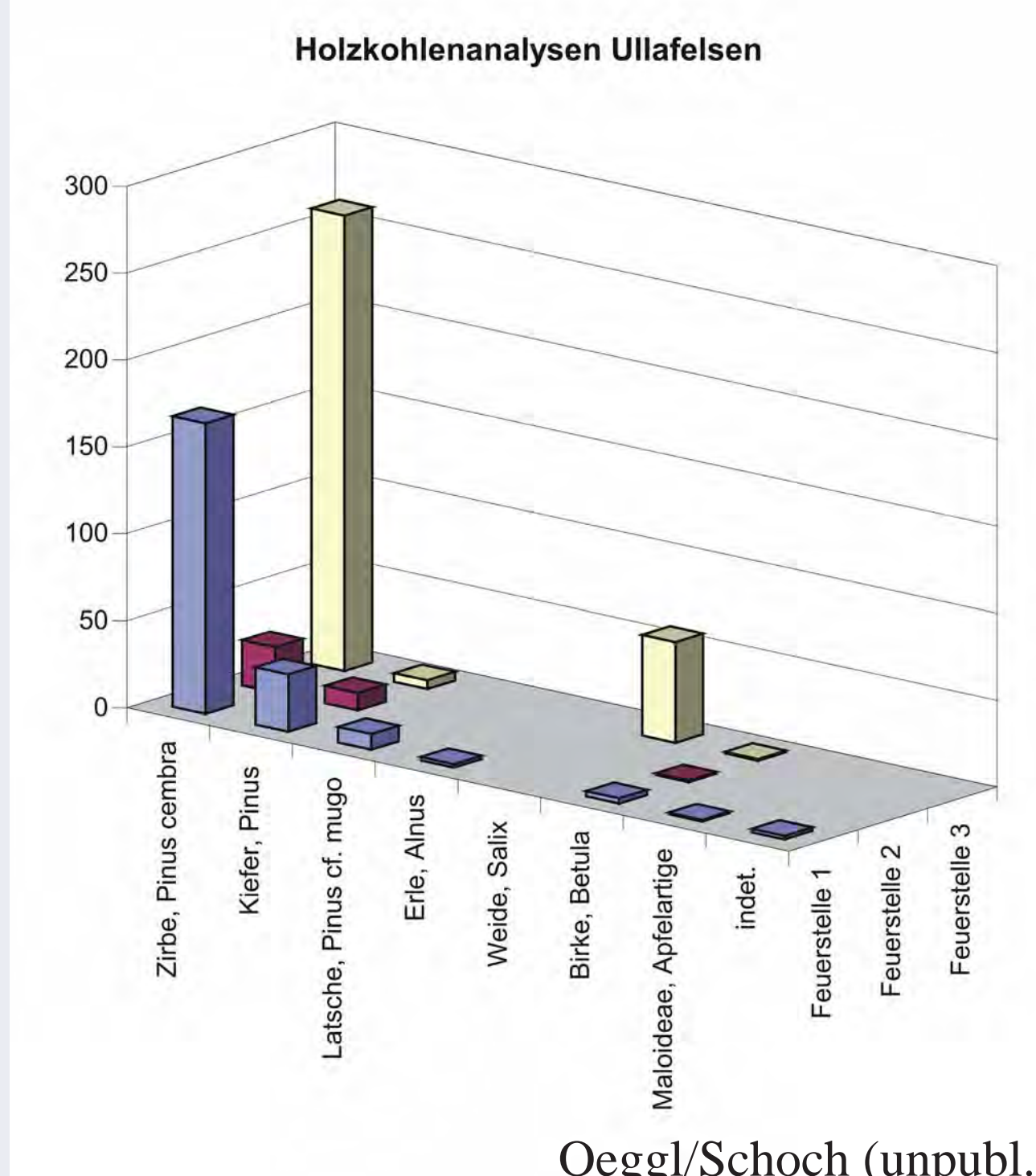


Use wears and possible use for mesolithic artefacts from Ullafelsen site (examples)



Plant fibres in the residue sample from Ullafelsen (example)
(A. Pawlik, unpubl.)

4.4 Charcoal analysis of the fireplaces



Oegg/Schoch (unpubl.)

Determinations of many charcoal items in combination with the AMS data can be related to the change of the natural timber line.

5. Soil Science



5.1 - This typical Podsol in upper Fotscher Valley (at 2,000 m a.s.l.) is located on a lateglacial moraine beneath dwarf shrubs and shows a clear differentiation into a bleached eluviation topsoil and accumulation horizons in subsoil. Well developed soils like this are not very common in Fotscher Valley above the timber line, more frequently Leptosols and Cambisols are found.



5.2 - This profile on the eastern slope of Ullafelsen (approx. 30 meters far from the archaeological excavation) seems to be similar to a Podsol, but some features cannot be sufficiently explained by podsolation processes. In particular the grey horizon in the middle profile is remarkable. Its origin will be discussed in-depth and it is therefore neutrally called “light layer” (LL).

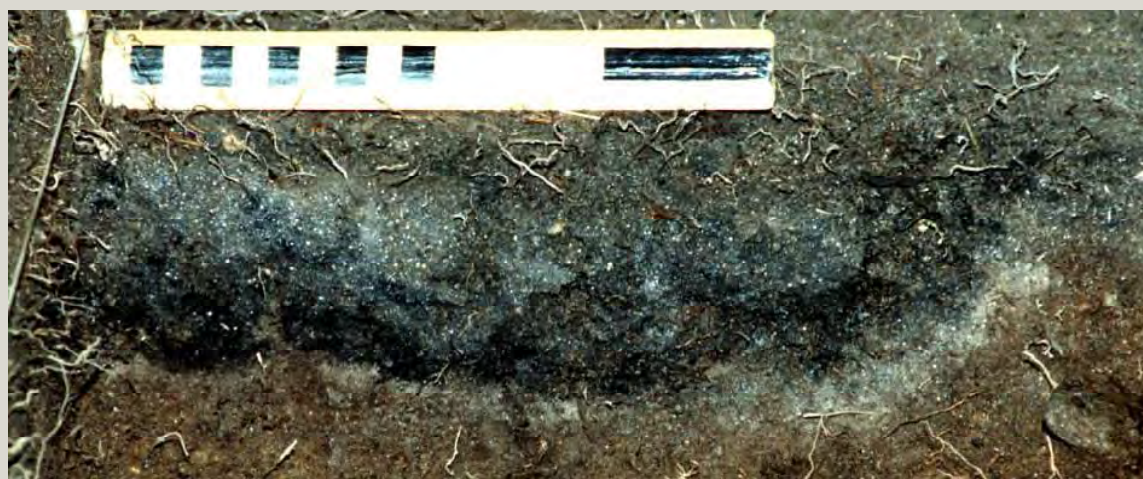


5.3-5.4 - Typical features of LL in the profiles around Ullafelsen are:

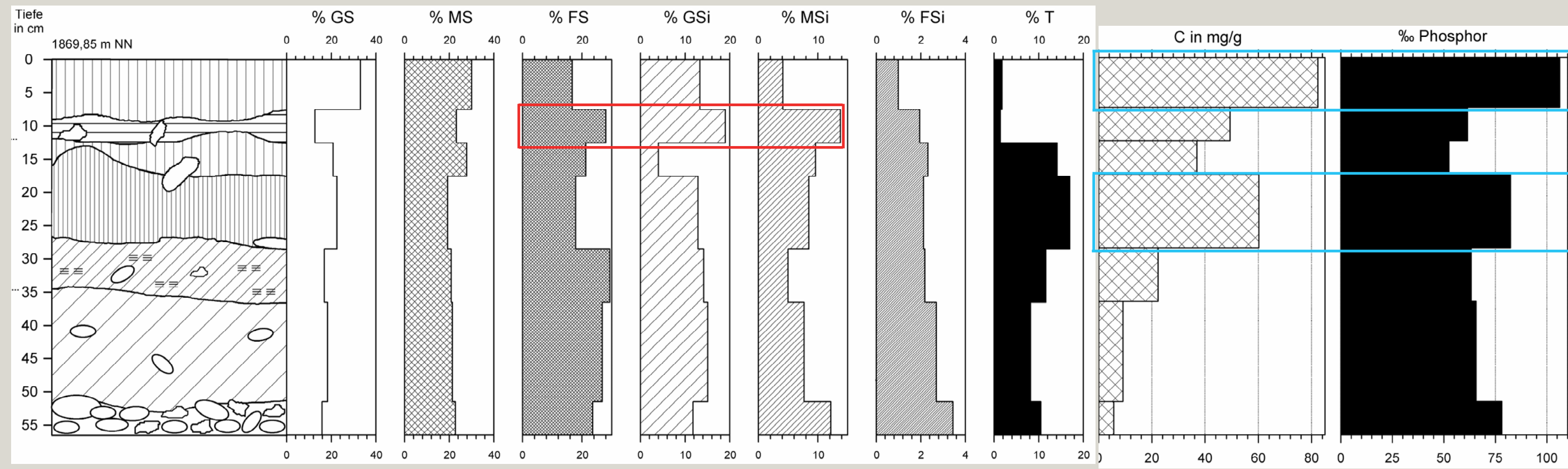
- it is more distinct below stones than within undisturbed profiles
- it is undulating around obstacles like stones, if these are not highly protruding the LL

- the upper boundary is clearly developed
- it is covered by a moderately deep mineral top soil

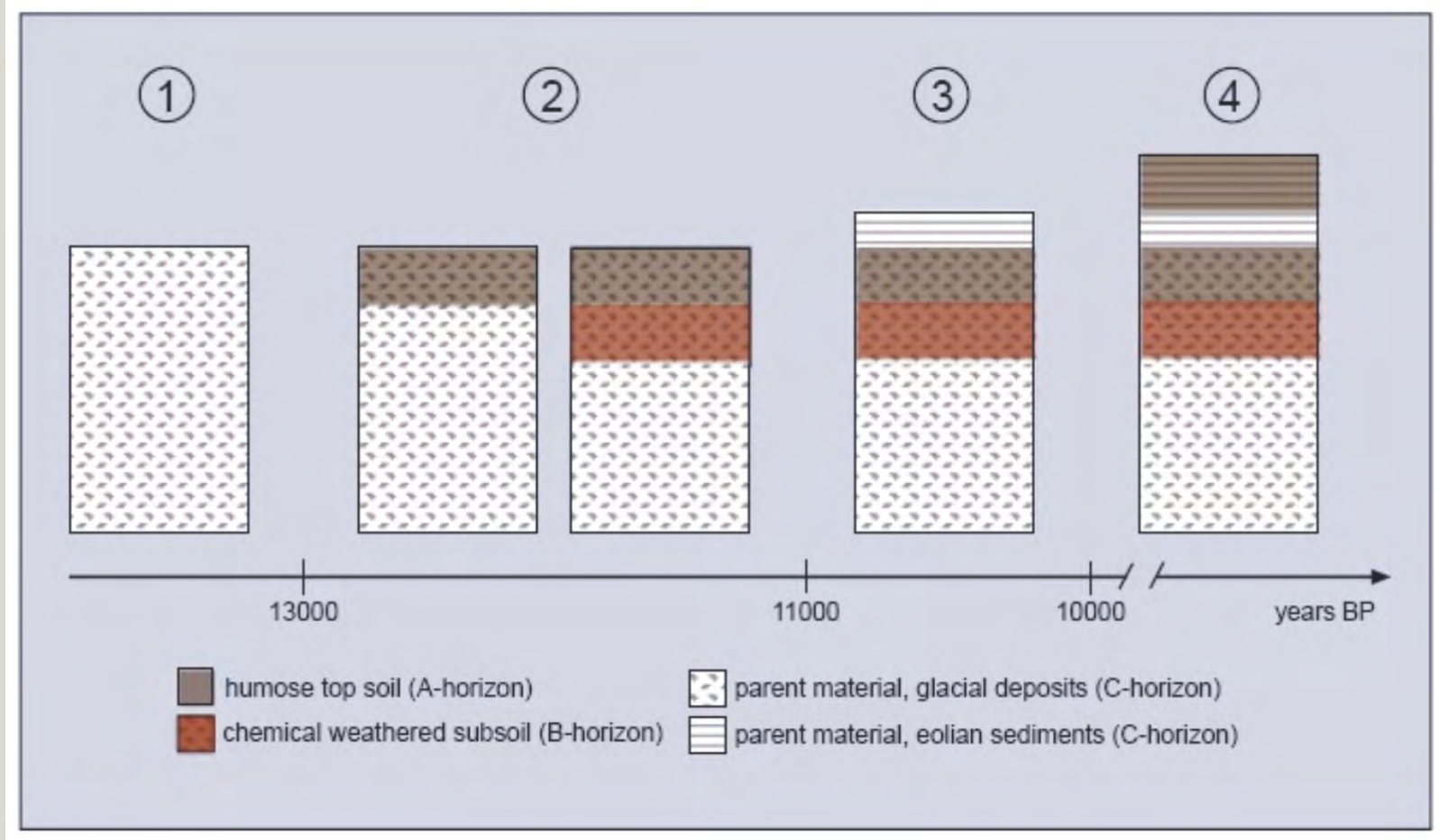
These features do not correspond with the eluviation horizon of a Podsol, but point to a sedimentary origin of the LL.



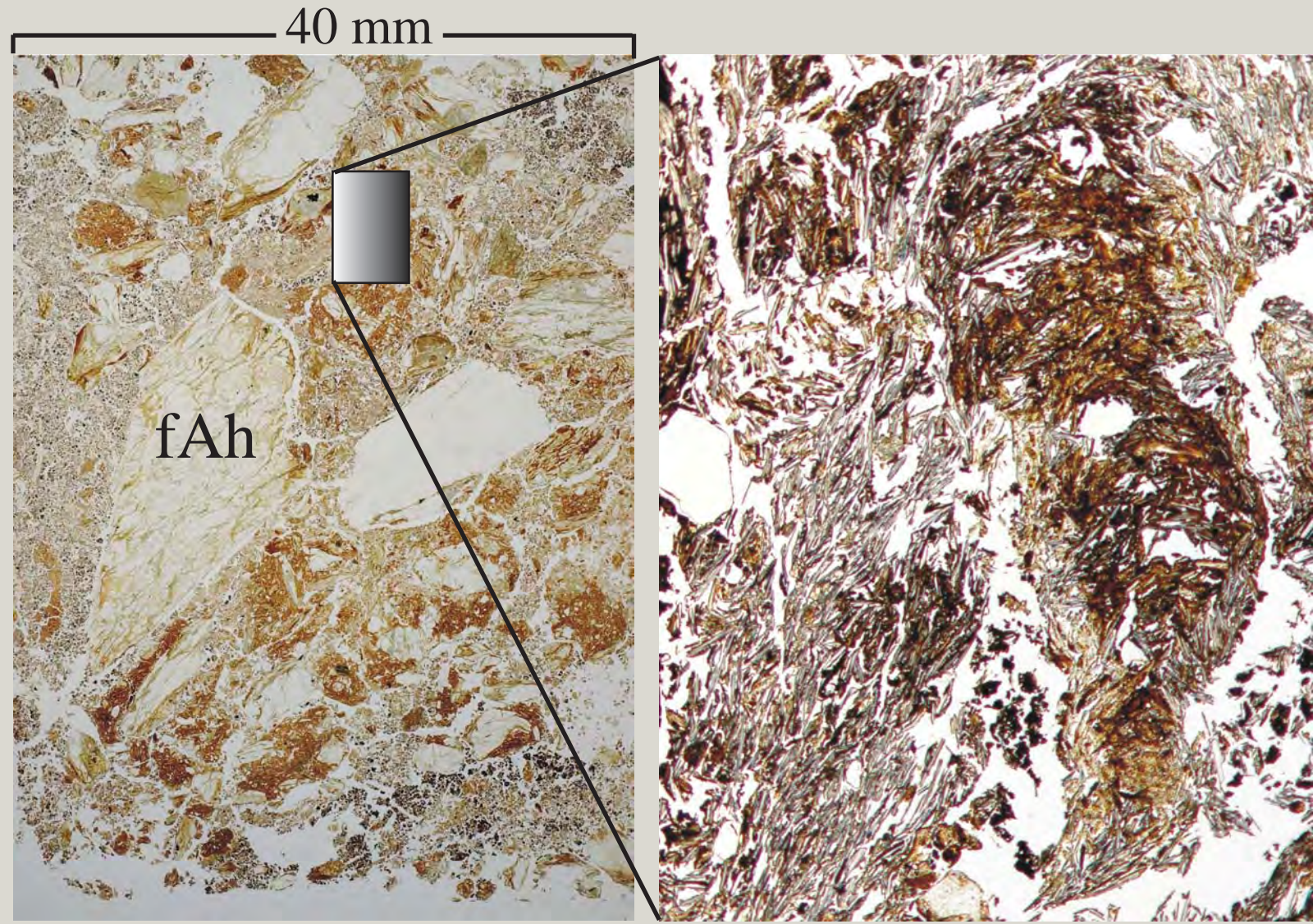
5.5 - The profiles within the archeological site are shallow but also with a well developed LL. In this case it is found below the charcoal that has been dated to 9,540 ± 80 BP. Moreover, stone artefacts from this period proof the living floor directly above LL. Therefore LL material has to be older.



5.6 - The high contents of fine sand, coarse and medium silt in LL (red mark) could be explained by the eolian origin of this horizon. The high humus content above and below the LL is shown as well by the carbon and phosphorus contents (blue marks).



5.11 - The figure shows a preliminary hypothesis about the development of the Ullafelsen profiles based on field work and laboratory analysis. Due to these results there must have been intensive soil formation during the warm stages of the lateglacial period. In the course of the clearly colder phases of Younger Dryas the profile has been covered by eolian sediments, this accumulation process continued during Holocene but with an about ten-time lower sedimentation rate. Simultaneous soil formation led only to poorly developed soils, an effect of accumulating sediments and possibly increased by anthropogenic influences.



5.9-5.10 - The humose horizon below LL has a different structure than the present top soil, with a significant higher content of coarse material. Signs of earthworms probably indicate a former top soil (fAh) and not an accumulation horizon of a Podsol.

- a) Universität Innsbruck (A)
- b) Universität Ferrara (I)
- c) Universität Tübingen (D)/Universität Manila (PH)
- d) Labor für Quartäre Hölzer, Adliswil (CH)
- e) Universität Düsseldorf (D)
- f) Universität Stuttgart-Hohenheim (D)
- g) Büro für Bodenbiologie und Bodenmikromorphologie, Creglingen (D)
- h) Bayerisches Landesamt für Umwelt, Marktreidwitz (D)