The Mesolithic Project Ullafelsen in Tyrol (Austria)

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Abstract

Systematic field research about early Holocene Prehistory in the Tyrolean Alps has been started in the early 1990ies after the find of the late Neolithic mummy known as the ' Tyrolean Iceman'. The central focus of the project is the old Mesolithic site 'Ullafelsen'. The prominent felsic bedrock is situated in the Fotscher valley around 25 km southwest of Innsbruck. A team of geoscientists, botanists, archaeologists and other contributed to the project which has been supported by the Austrian Science Foundation (FWF) in Vienna (Schäfer 2011).

Introduction

The "Mesolithic Project Ullafelsen" was set up to investigate the man-environment relationship from the late glacial period (called Würmian in the Alps) until the Early Holocene in the western Austrian Alps. In the course of a systematic field work since the early 1990s several Mesolithic sites have been found in the Central Alps and in the Northern Limestone Alps of Tyrol (Austria). The so called Ullafelsen has been identified as the most promising site among our old Holocene finds and will be the main focus of this presentation.

The site is an isolated rock formation in the Fotscher valley in the northern part of the Stubai Alps at an altitude of 1,869 meter above sea level. Between 1994 and 2004 excavations of 25 m2 have been executed but parts of the felsic plateau were reserved for future examinations. Many finds and features were found the first time in the Austrian Alps and became the subject of intensive studies until recent times. It was also the first time in Austria that several Mesolithic fireplaces were found at a high subalpine altitude. They were accompanied by – sometimes very high – concentrations of lithic artefacts belonging to several material groups. Very early in the project it became clear that only broad interdisciplinary cooperation would be able to cope with the specific features and finds.

Main starting point for further cooperations

A: Apparently, several of the lithic raw-material groups had no native source in the region of North Tyrol. But where did these silex groups came from – and how did they arrived here? It became clear that the answers to those questions could help to gain insights into the living environment and movements of the Mesolithic people in Alpine regions.

B: Some of the Preboreal and Boreal fireplaces featured well-preserved charcoal. This raised hopes of answering the question: Are there any correlations between the composition of plant species found in the charcoal of the fireplaces and the vegetation (treeline) in the Early Holocene?

C: Specific features were found in several soil profiles. A grey light layer (LL) next to the humus layer of the Holocene was identified as the original living floor for the Mesolithic people of the Ullafelsen. During the first years of the project this layer was seen as the bleached horizon of a podzolisation process. But further inspections suggested that the LL could also be the effect of an aeolian sedimentation process at the very end of the Würmian period. Any answers to this question would provide important insights, not only for the landscape history in the Fotscher valley but also for the interpretation of several soil profiles and the identification of possible manipulations by Mesolithic humans on their living floor.

D: The Fotscher valley shows glacial deposits of several Late-Würmian phases. Being able to date these phases is important for questions related to the Late Würmian sedimentation processes, the availability of parent material for aeolian processes, the growth of vegetation, faunal assemblages and the appearance of the first humans in the valley.

Within the Ullafelsen project we used a broad holistic approach, integrating meteorology, geology and geomorphology, soil science and sedi-

mentology, glaciology, climate and vegetation history, archaeology - including geoarchaeology, use-wear analysis and typology - as well as chert and rock crystal analysis and others.
In the course of the project, and independent of individual interpretations of features discovered in the field, some of the working groups interacted more closely and widened their perception. Looking at the project as a whole, it can be said that the overall knowledge of the man-environment relationship in our working region today is certainly much more than the sum of the individual approaches.

Important findings
1) The Fotscher valley including the Ullafelsen is located between the high precipitation Northern Limestone Alps and the dry Central Alps (fig. 1). There are some indications of an especifially favoured position for the Ullafelsen compared to other sites in the region.
2) The Ullafelsen (fig. 2) became ice-free before the Bölling/Alleröd oscillation. There might have been a Late Palaeolithic settlement here but this has not been proved so far.
3) Geological, hydrogeological and geomorphological features of the Fotscher valley (fig. 3) provide the framework for many key aspects , such as possible routes through the valley, cave and rock shelter formations, availability of water and plant resources, sedimentation and erosion processes, rock characteristics and their spatial distribution as an important basis for pedological sequencing, etc. The physical properties of the surface soils in the valley did not allow the preservation of any kind of bones. The only one exception is a rib from an unknown game animal within our excavations at the Ullafelsen site.
4) Most observations and laboratory data obtained so far confirm that the light layer (LL) was the living floor of the Lower Mesolithic occupation of the site (=middle part of fig. 4). Below this layer, a fossil humus horizon could be identified which can only belong to the Bölling/Alleröd complex. Based on these findings, a local stratigraphy between the Late-Würmian period and the Early Holocene could be identified which had hitherto been completely unknown in our region. Current fieldwork concentrates on the chronological and spatial occurrences of the light layer in the valley. This is a difficult undertaking as aeolian processses did not stop abruptly at the beginning of the Holocene and because aeolianaccumulated silty sediments might have been redeposited.
5) The current vegetation in the inner part of the valley shows an altitude zonation primarily influenced by the climate but also by human and animal activities. Today's treeline is largely defined by a long-standing mountain pasture economy.
During the second half of the Preboreal period, the closed treeline did not reach the Ullafelsen but came close. At that time, the plateau of our site was mostly used by Early Mesolithic hunters and gatherers. It seems that in the middle of the Boreal period the Ullafelsen was covered by a closed forest which ended the hunting-strategic interests of the Mesolithic people.
We have no evidence to date from the Late Mesolithic at our site.
6) Altogether, 14 fireplaces (F) could be identified within the excavation area (fig 5 with fireplace F2). One of the fireplaces (F5) was used later to deposit waste chert material while F3 (and possibly others) can be correlated with the production of tar. Therefore a central part of this fireplace was covered intentionally with a mixture of LL material and sediments containing charcoal from the surrounding area to produce oxygen-reduced conditions for this special fire. Before was done a kind of levelling the surface. Many tar particles were found as single find spots (fig 6) but also detected on the surface of several artefacts. It was the first time in the Alps that such adhesive material could be identified.
7) From the C14 data of the fireplaces one can establish a chronological breakdown for the Ullafelsen area. The fireplaces in the central northern part were used only during the first half of the Boreal period in contrast with fireplaces in the central southern and southwestern parts of the excavation area which were only used in the second half of the Preboreal period. Nevertheless, we have to wait for more detailed intra-site interpretations before finalizing the database of the refitted artefacts.
8) Altogether nearly 7900 three-dimensionally documented stone artefacts were found at the

site. They are dominated by microlithic chips 2 and 3 mm in length. Only 14% of the artefacts reach more than 10 mm in length. This wealth of small artefacts highlights not only the efforts of the excavation participants but also an important feature of the Ullafelsen site, i.e. repeated retouching und re-using processses. Combined with quantitative analyses of those chips which were the results of water-screening (in sub-units of ¼ m^2), these finds underline the dominance of extremely small artefacts in the vicinity of fireplaces F9/F10 and F4/F5.
9) The Fotscher valley itself offers only rough quartz of very low quality which was used very rarely (fig 7). Therefore the usual lithic raw material had to be transported from a) regional and b) supra-regional sources (fig 8). The rock crystal which was used at the Ullfelsen (fig 9) is very similar to outcrops in the neigbouring Zillertal and Tuxer Alps within the western Tauern Window in the Central Alps (BK in fig. 8). Radiolarites from the Northern Limestone Alps have their primary sources in the eastern part of the Karwendel and the Rofan mountain, 40 to 50 km northeast of our site (fig 10; NK in fig. 8]. The most distant raw material comes from the southern Franconian Alb (Upper Jurassic cherts) in Bavaria (fig 11; FA in fig. 8) demonstrating a linear distance of about 200 km to the Ullafelsen site. Some of it is famous Abensberg-Arnhofen hornstone.
More than 1/3 of the analysed cherts comes from the Val di Non area in northern Italy (fig 12; SA in fig. 8), evidence that the central passes of the Alps were crossed during the very early Holocene.

10) Previous horizontal mapping results of our artefacts show a differentiation or clustering of specific artefact raw materials within our excavated area (fig 13). After finishing this map Stefano Bertola continued his analyses and the results will be refined in the near future.
11) Typo-technological differences between the Early Mesolithic stages of the south-Alpine Sauveterrian and the south German Beuronian can also be seen in the Ullafelsen inventory: Several very small bladelets with typical backs are made only from south alpine cherts. Because those types are not very common in the Beuronian, one can see them as a Sauveterrian element in the Ullafelsen inventory. On the other hand a single long and narrow trapeze in our inventory does not exist as a type within the Sauveterrian but is a special form in the south German Beuronian. This piece is made from hornstone from the Franconian Jura in Bavaria. From what we know to date, one can see our site as a transitional area with influences from both traditions.
12) The inventory of the Ullafelsen shows most classic features of an Early Mesolithic site: mainly microlithic tool fragments, plus edge-retouched micropoints, backed bladelets as mentioned, triangles, segments, a trapeze, retouched pieces, scrapers, truncations, burins and borers. There is also evidence of the micro-burin technique and several cores and refitted flakes show blank form productions.
Our complete use-wear analysis of all modified artefacts and of several non-modified flakes (done by A. Pawlik) indicates work on bones or antlers, woodwork, hafting and retooling, work on hide and leather as well as on unspecified harder material. Detailed mapping of single artefacts allowed us to distinguish several working areas and to integrate these with other insights into the inventory. They all point to the Ullafelsen as a base camp for hunting activities.

Discussion
The old Mesolithic site Ullafelsen (Tyrol) has been highlighted as a key site in the Eastern Alps of Austria. The inner organization of the site, raw material characteristics and their transport into the valley, the systematic production of tar for rehafting/retooling and surprising results of extended use wear analyses demonstrate fundamental possibilities in alpine archaeological project studies.

Literature

Schäfer, D. (Ed.), 2011, Das Mesolithikum-Projekt Ullafelsen (Teil 1). Mensch und Umwelt im Holozän Tirols 1. Innsbruck: Philipp von Zabern.

Internet: www.hochgebirgsarchaeologie.at

Figures

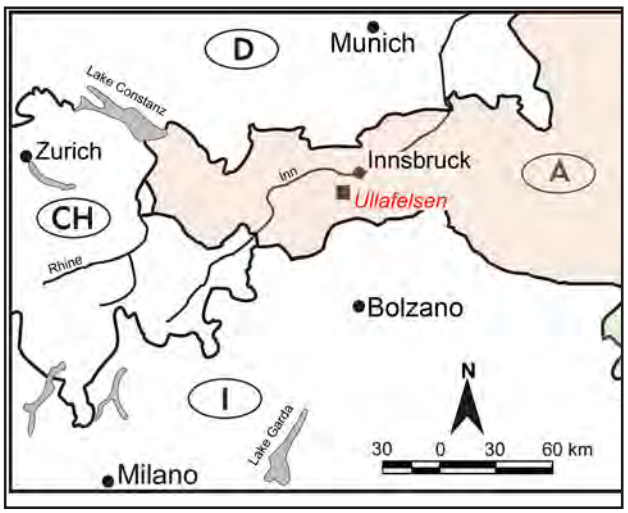

fig. 1 - Position of the old Mesolithic Ullafelsen site (Fotscher valley, Stubai Alps) in the western part of Austria (fotograph: D. Schäfer)

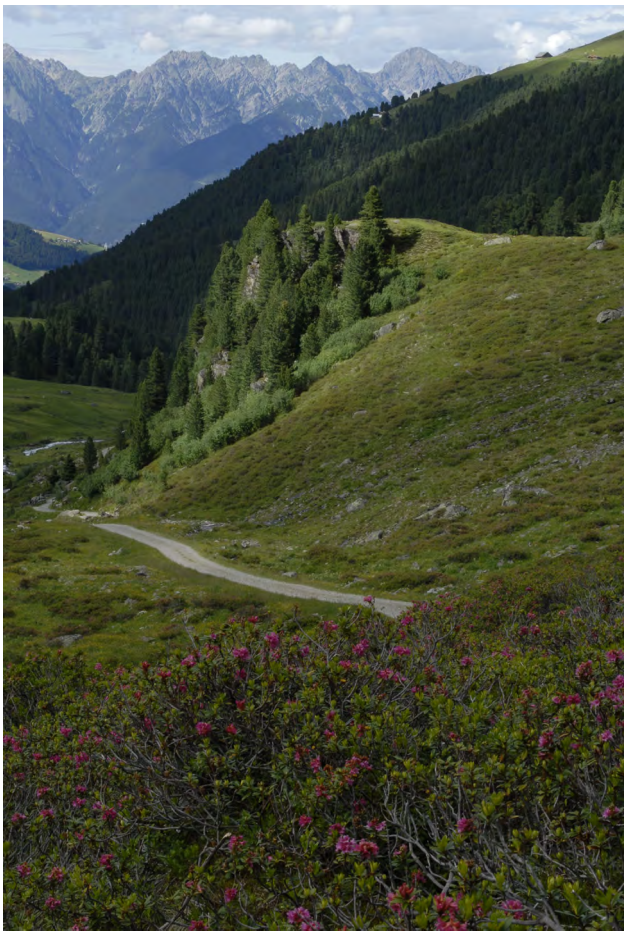

Figure 2 – The Ullafelsen (Fotscher valley, Stubai Alps, Tyrol/ Austria) from south (2007) (fotograph: D. Schäfer)

Figure 3 – The inner part of the Fotscher valley (with the Ullafelsen in the left lower part of the foto), mainly built up by metamorphic rocks (Para- and Orthogneisses), 2010 (fotograph: D. Schäfer)

Figure 4 – Ullafelsen, square C9, N-Profile with the typical stratigraphic sequence (in the mid with the 'light layer' (2012) (fotograph: D. Schäfer)

Figure 5 – Ullafelsen, The fireplace F2 (1995) (fotograph: D. Schäfer)

Figure 6 – Ullafelsen, Mesolithic tar remains (fotograph: A. Pawlik)

Figure 7 – Ullafelsen, Mesolithic artefacts of rough local quartz varieties (Q in figure 8) (fotograph: D. Schäfer)

Figure 8 – The position of the Ullafelsen (U) southwest of Innsbruck and the evidence of the lithic raw material groups used at this site: Q (local quartz); BK (mountain crystal); SA (south alpine silex); NK (silex of the Northern Calcareous Alps); FA (silex of the Franconian Alb)

Figure 9 – Ullafelsen, Mesolithic artefacts; raw material: mountain crystal [BK in figure 8] (photograph: D. Schäfer)

Figure 10 - Ullafelsen, Mesolithic artefacts; raw material: silex of the Northern Calcareous Alps (a: Chiemgau formation; b: Ruhpolding formation) [NK in figure 8] (fotograph: D. Schäfer)

Figure 11 - Ullafelsen, Mesolithic artefacts; raw material: Upper Jurassic hornstone from the Franconian Alb (Bavaria) [FA in figure 8] (fotograph: D. Schäfer)

Figure 12 - Ullafelsen, Mesolithic artefacts; raw material: south alpine chert (Scaglia variegata/Scaglia rossa from the Valle di Non area (Trentino, Italy) (fotograph: D. Schäfer)

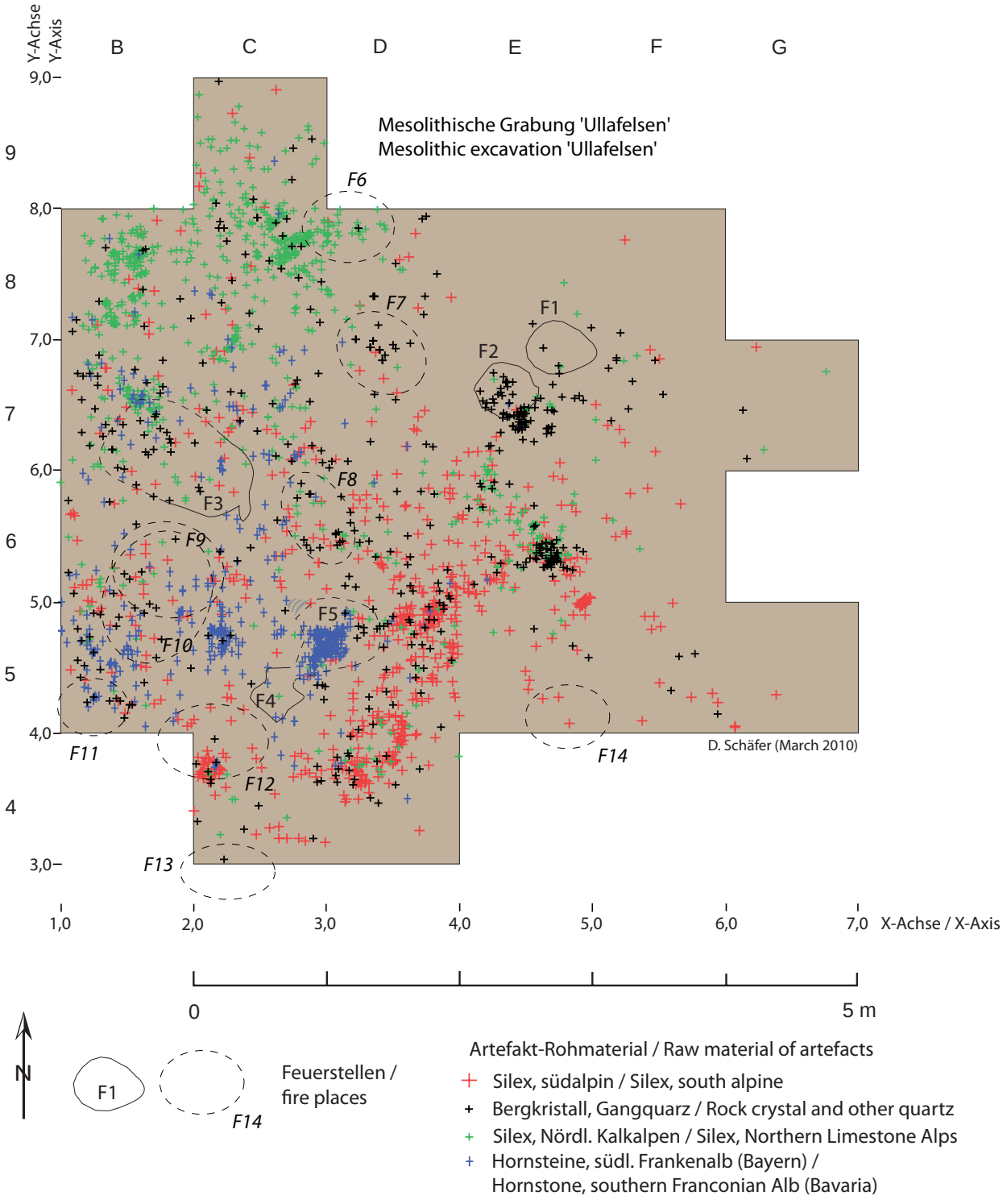

Figure 13 - Ullafelsen, horizontal stratigraphic distribution of several artefact raw material groups (including analyses until 2010)