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The development of human activity in the high altitudes of the Schnals Valley (South Tyrol/Italy) from the Mesolithic to modern periods

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ABSTRACT

This paper reports on the previous use of a mountainous landscape (Schnals Valley, South Tyrol/Italy) and how this relates to socio-economic processes from the Mesolithic to modern period. The results of archaeological surveys, the interpretation of excavated archaeological features and changes from natural to cultural landscape as evidenced by palynological and plant macrofossil analyses are presented and discussed. The resultant land-use-history documents a human presence over more than 10,000 years and evidences the diversity of human activities during these prehistoric and historic periods. In the Mesolithic (c. 9000–6000 cal BC) the availability of faunal species above the tree line is seen as the main attractor for the investigation of high altitudes by humans. At the beginning of the Neolithic (c. 6000–3500 cal BC), there seems to have been little interest in the high alpine environment of the Schnals Valley despite the existence of agro-pastoral communities in the main valley of Vinschgau. Following a hiatus, new evidence for human presence is observed at the end of the Neolithic (about 4000 cal BC), probably caused by a climate deterioration that forced populations to frequent the high alpine landscape for hunting once again. During the Chalcolithic (c. 3500–2200 BC), the Iceman and his equipment demonstrate utilisation of the area for hunting just as in the earlier periods. A major impact on the natural landscape is emerges during the Bronze Age (c. 2200–1000 cal BC) based on the onset of transhumance system in the study area. Pasture indicators show intensification during the Middle Bronze Age (c. 1700–1350 cal BC) validated also by archaeological features connected to pastoralism. High alpine farming remains important in later prehistoric periods. The Iron Age (c. 1000–15 cal BC) is represented by an initial decrease in find sites, caused by the Hallstatt climate depression before the emergence of a favourable climate for high alpine farming about 400 cal BC. During the Roman period, pollen diagrams show continuity in pastoral activities, however this is not reflected by archaeological features. During the Medieval and modern periods, human activity increases again as documented by a large number of animal enclosures and by a regional transit route for communication across the passes of the main Alpine ridge.

1. Introduction

The discovery of 'Ötzi', the Alpine Iceman, in 1991 on the Tisen Pass (Egg and Spindler, 2009; Rastbichler-Zissernig, 2006) focused the attention of scientists from all over the world and from different academic disciplines on the previously little known high alpine Schnals Valley. The find shows – not only for the area in question – that human activity on the high mountain landscape was not exclusively connected to Mesolithic hunters. Hundreds of publications from multiple scientific disciplines have highlighted this extraordinary finding. However, the human impact and, especially, the use of the natural landscape in periods prior to and later than that of the 'Iceman' were neglected. Fieldwork (Bagolini et al., 1994; Bagolini et al., 1995; Niederwanger, 1999) undertaken in the 1990s revealed new Mesolithic sites and showed the importance of the valley for seasonal hunting strategies. On the Austrian side of the catchment area, archaeological survey was accompanied by palaeoenvironmental multi-proxy analyses (Bortenschlager, 2000). The presence of humans in the high alpine landscape started during the Middle Mesolithic (8000–7000 cal BC) as demonstrated by sites in the inner part of the Ötz Valley (Leitner, 1995; Zanesco, 2006). Botanical analysis shows continuity in landscape use and in creation of a cultural landscape connected to pastoralism from the Neolithic period (about the middle of the 5th millennium cal BC). These results induced the Institute of Botany of the University of Innsbruck to expand this research into the Schnals Valley. However, the palaeoenvironmental multi-proxy analyses were now strengthened by archaeological surveys with the aim of detecting land use changes in a diachronic way over multiple prehistoric periods.

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2. The study area

The Schnals Valley (Fig. 1) is the largest tributary valley of the Vinschgau (South Tyrol/Italy) ranging from 560 m a.s.l at the valley entrance, terminating in an Alpine Ridge, the highest peak of which is Similaun at 3596 m a.s.l. The valley is oriented northwest and follows the typical U-shaped morphology of a valley formed by glacial modelling. A ravine caused by erosion and fluvial modelling characterises the first part of the valley. The upper part of the valley has a more open morphology with peat soils formed in glacial deposits from a palaeo-rockslide (Gatto et al., 1964). The geological substrata of the valley consist mainly of metamorphic primary rock of two different formations. The crystalline schist of the Ötztal Alps is characteristic for the upper part of the valley and consists mainly of paragneiss. The lower part of the valley is characterised by Partschiner orthogneiss. The soil properties are the result of the local rock that heats the soil easily and dries it out. The main valley, as with the lateral valleys, is characterised by slopes, which form a fertile soil (Icardi, 2004). Permanent farming settlements reach altitudes of approximately 2000 m a.s.l., for example Wieshof (2011 m a.s.l.) and Finailhof (1973 m a.s.l.). The area has a continental climate with low precipitation during the summer months (Albrecht, 1974), caused by high mountain chains surrounding the valley. The vegetation is characterised by a larch-arolla pine forest (*Larici-Pinetum cembrae*) that in some regions is composed of larch (*Larix decidua*) only. Above the treeline that oscillates between 2100 and 2200 m a.s.l., alpine grasses are predominated by Crooked Sege (*Carex curvula*), mat-grass (*Nardus stricta*) and alpine meadow-grass (*Poa alpina*) (Peer, 1995).

3. Methodology

The research project included palaeoenvironmental and archaeological studies in order to disentangle the change from natural to cultural landscape. The archaeological results are based mainly on fieldwork carried out at an altitude above 2000 m. At first, orthophotographs were used to locate existing structures, especially surfaces or potential sites which could have attracted human attention in the past. However, in the Schnals Valley most of the visible structures on the ground were revealed to be from Medieval or modern times. It was therefore clear that an extensive field survey was needed to uncover older structures. During the survey we focused on surfaces without structures or close to them, taking a few very simple basic criteria for settlement: the presence of water, possible sunshine duration, flat surfaces, absence of dangerous risks (avalanches, mudflows, rock fall etc.) visibility and a good view of the surrounding territory. Field walking consisted initially of identifying areas of interest, starting at the top of the valley. The overview of the valley from higher altitude allowed better detection of landforms and potential sites of interest. After these sites were identified, the next step consisted of digging test pits. Archaeological excavation was up for debate only by recovering of archaeological finds to attest human presence and to exclude natural events like forest fire (Gobet et al., 2003; Gleirscher, 2010), thereby favouring find sites from the Neolithic period on. When complete, the archaeological excavation covered an area of 30 m^2, unusual for high alpine archaeology given the difficulties of fieldwork in the harsh environments prevailing above 2000 m a.s.l. This effort was crucial as the purpose was to recover more detailed information about typology and especially the use of several high alpine sites and the anthropogenic impact on the surrounding landscape. Complementary to the excavations, samples of sediment (at least five litres) from each site were extracted for archaeobotanical analysis.

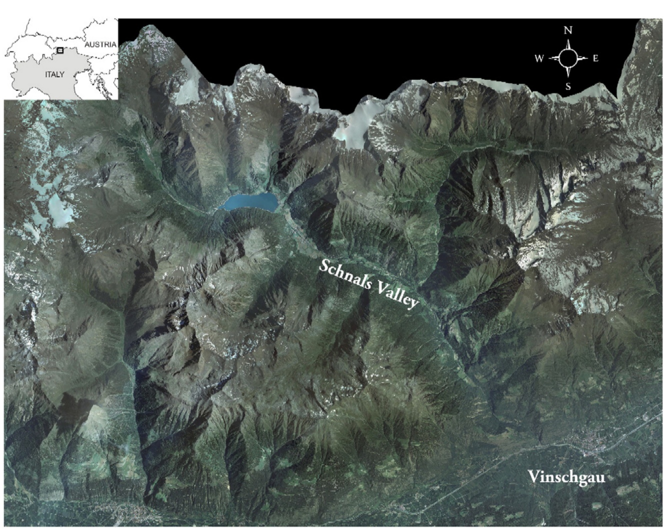

Fig. 1. Location of the research area.

Palynological analyses aimed at reconstructing the onset and development of alpine pasture in the Schnals valley. Accordingly, three investigation sites were selected along the traditional transhumance route, which is known to have been used since at least the Late Middle Ages in order to bring flocks from the Schnals Valley to the alpine grasslands of the Ötz valley, across the main Alpine ridge. All three sites are natural archives and are located at different altitudinal levels. The Penaud mire is the highest, situated at 2330 m a.s.l, above the current treeline and next to an archaeological site; the Lagaun mire is locate at 2180 m a.s.l., level with the treeline; while Lake Vernagt is located at 1610 m a.s.l., at the entrance of the Tisen and Finail Valleys, where several archaeological sites are located (Fig. 2). Pollen samples were prepared according to standard procedures for fossil pollen analyses (Faegri and Iversen, 1989) as well as AMS dating and loss of ignition analyses (Festi et al., 2014). The age-depth model for the Penaud pollen record was improved by one radiocarbon date (Table 1) in order to provide a more precise date for when the forest opened up. Palynological results in relation to human impact in the area are synthesized in Fig. 3, where a selection of proxies indicating human activity is shown for each site. The arboreal pollen (AP) to non-arboreal pollen (NAP) ratio provides an indication of to what degree vegetation is open or closed. This can be controlled by climatic factors and/or by human activity, i.e. a decline of the forest can be triggered by a cold climatic phase or by humans willing to gain more land for grazing or agriculture. Cereal pollen indicates ongoing agriculture activity in the valley. The pasture curve is based on pasture indicators specifically identified for the region for different altitudinal levels according to the modern pollen analogue technique (Festi et al., 2014). For the upper montane belt, where Lake Vernagt is located, pollen indicators for pasture are *Artemisia*-type, *Plantago lanceolata*-type, Brassicaceae, Chichorioideae and Chenopodiaceae. For the subalpine belt, *Rhinanthus*-type, *Geum*-type, *Campanula*/*Phyteuma*-type, Urticaeae, *Rumex acetosella*-type, *Plantago alpina*-type and Gentianaceae were used as pasture indicators. The pasture indicator curve suggests the possibility of pasture development at the site. However, these values have to be carefully interpreted for several reasons. First of all, pollen types indicative of pasture originate from plants that are already part of the natural vegetation, so called 'apocrats'. Positive reaction of pasture indicator plants is based on increased input of nutrients (Augustine and MacNaughton, 1998) and can be therefore connected to grazing. However, higher erosion rates triggered by increased precipitation may result in soil enrichment of nutrients as well. In fact, some pasture indicators show a positive reaction to both irrigation and increase in nutrients (Oeggl, 1994). For these reasons this curve is tentative and it should be interpreted taking into account the climatic context. A last proxy testifying grazing activity is represented by coprophilous fungal spores (Fig. 3). However, in this case too, one must interpret with caution as such fungi do not develop exclusively on domestic animal dung. However, when these proxies are taken together, they give a good indication of grazing activity and enable us to