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Editorial

Human occupations of mountain environments

1. Introduction: multiplicity of mountains, clustering of research

This special issue of *Quaternary International* concerns the Human Occupations in Mountain Environments (hereafter HOME). This topic gives the name of one of the commissions of the International Union of Prehistoric and Protohistoric Science (Grimaldi and Perrin, 2008; Grimaldi, 2013) and it was also the topic discussed during the session A6a – organised by the HOME members – held during the last XVII IUPPS conference (Burgos, Spain, 1–7 september 2014). The papers here presented are the proceedings of that session.

Defining “Mountain archaeology” concisely within a worldwide perspective is not an easy task, as what is normally understood by mountainous or montane differs both geographically and depending on the chosen approach of research. In most respects, it is more difficult to describe than for example “Coastal archaeology”, “Island archaeology”, “Glacial archaeology” or “Arctic anthropology”. There is no universal answer, but there are some clues.

In a narrow sense, a mountain is a large landform that stretches above the surrounding land usually in the form of a peak. High reliefs and high gradients make the mountain ecosystems vulnerable to even slight changes in temperature and precipitation, and range them among the most sensitive ecosystems on a global scale (Diaz et al., 2003). In a wide sense, mountains include almost everything from barren, bare rock dominated, high-Alpine landscapes like the Carpathians, the European Alps, the Pyrenees and southern Norway (with the highest parts ranging between 1500 and 4500 m a.s.l.) to mainly non-mountainous, moorland covered highlands below 1000 m in Scotland (Whittow, 1984). Many climatic zones exist, and the present vegetation differs from lichens to forest. In sub-Arctic areas such as Greenland, Iceland and parts of central Norway, even coastal areas down to 200 m a.s.l. are defined as mountainous. “Outfield archaeology” is the unauthorized, new term for cultural historical studies within the multitude of non-agrarian upland, highland and mountain landscapes in northern Europe (Indrelid et al., 2015).

It is worth pointing out that mountains are not restricted to Europe and some islands in the North Atlantic, but cover in a narrow sense about 25% of the global land surface. A glance at the map reveals that the largest mountain massifs are to be found in and around the Himalayan plateau, in the highlands of Iran, on the Somalian peninsula or along the Pacific coasts of the Americas. In South America, mountain archaeology has developed more or less systematically since 1954, when the mummy from Cerro el

Plomo was discovered in the Andes, near Santiago de Chile. There, since it is well known that Andean state societies used high mountain landscapes as ritual sites. The concept of “high mountain archaeology” was introduced by Schobinger (1965) in order to refer to an archaeology based on mountaineering techniques and explorations, and oriented to research about remains or sites located at high altitude (over 5000 m a.s.l.). However mountain landscapes of the extreme south of the Andes have also been used by nomadic hunter-gatherer societies, as part of migratory circuits or hunting territories, for the exploitation of seasonal resources or even trans-cordilleran valleys as pathways between the Pacific and Atlantic coasts. It is also known that mountains play an important role in the mythology of aboriginal population. However, studies of human use of mountain ecosystems during prehistoric times have been undertaken more intensively and systematically in Europe than elsewhere in the world.

Before the HOME commission was created, a number of formal and informal working groups (some of which are still active) had made considerable contributions on mountain archaeology. It is worth mentioning, among others, *Alpine Archäologie*, *The Alpine Network for Archaeological Sciences*, *The Southern French Alps Landscape Project*, *The Frozen Pasts Network* and *The Total Archaeology Project*. Normally, Mountain archaeology is also on the agenda of the annual meetings of the EAA (European Association of Archaeologists), and discussed under the quinquennial MESO conferences, most recently in Belgrade, in Sept. 2015.

2. The papers

The HOME session gathered 12 contributions on the topics of survey, site detection, and resource exploitation in a large geographical setting reaching from the Alps to the Pyrenees, the Carpathians, Scandinavia, the Caucasus, and to the sub-Antarctic Andes in Tierra del Fuego. The session was a perfect occasion to discuss these issues in a wider research perspective, and was as such, with lively discussions, very successful.

It appears that many of the topics that the HOME commission has set on its agenda are truly of global dimensions. Mountain environments are governed by geographical parameters that, at least in certain key aspects, are similar throughout the globe. Archaeologists are thus confronted with similar settings and challenges. This is especially important in the case of hunter-gatherer occupations in the mountains, and became in particular evident when discussing strategies of site detection in survey and their

geomorphological implications, a topic addressed in a majority of the papers in this volume.

At this regard, [Visentin et al. \(in this volume\)](#) and [Berruti et al. \(in this volume\)](#) discuss results from the archaeological survey project developed in northern Italy. The objective of their papers is to set hypotheses on the settlement strategies adopted by prehistoric groups through the spatial analysis of identified find-spots in connection to the topography of the investigated territory (Cadore district, southeastern Alps in Visentin et al.) and the identification of new prehistoric human frequentations in the Sessera valley (south western Alps in Berruti et al.). Both studies show the intense archaeological evidence in the Southern Alps related to the last hunters-gatherers who exploited local resources.

The northern central and eastern Alps are investigated by [Della Casa et al. \(in this volume\)](#); the goal is the early Copper production with an emphasis on the operational chain and field survey methods. The first results achieved by the project are namely the localization and investigation of ore extracting and smelting sites.

Pyrenees are the research field for [Gassiot Balbe et al. \(in this volume\)](#); authors discuss the methodological organization of surveying in mountainous territories. As a result of their reflection, they conclude that surveys in high mountain environments are revealing past landscapes and new scenarios that challenge the traditional (pre)conceptions deduced from archaeology and ethnography.

Methodology of surveying in mountainous territories is also a topic discussed by [Reinhold et al. \(in this volume\)](#). On the basis of a case-study from the North Caucasus (Russia), they demonstrate the efficiency of modern technologies (such as aerial photography, satellite images or images from un-manned aerial vehicles). At the same time, non-destructive prospection methods such as geophysics and soil sciences are suggested in order to evaluate the percentage of the sites detectable from above the ground.

Soil sciences and archaeometric approaches are also developed by [Leigh et al. \(in this volume\)](#). They focus on transition to agropastoral land use in a mountain landscape by analysing two case-studies in the French Pyrénées. Results indicate that intentional burning and clearing probably were initiated in the Late Neolithic (ca. 5000–6000 cal. BP) and became more intensive during the Bronze and Iron Age.

Finally, [Callanan \(in this volume\)](#) focuses on archaeological and historical remains of great value recovered from melting snow and ice in alpine regions across the globe as a consequence of rising temperatures and changing weather patterns. Some of the field and methodological responses that have been applied in different regions and a number of management related issues in need of special attention in the future are highlighted.

The following papers are more related to the interpretation of the archaeological evidence found in sites/regions located in mountain environments.

[Santaniello and Grimaldi \(in this volume\)](#) present the results of archaeometric tests (FT-IR spectroscopy, microstructural and analytical characterizations with low vacuum scanning electron microscopy, energy dispersive X-ray spectroscopy) made on lithic artefacts confirming the first evidence of heat treatment on lithic artefacts during the early Neolithic in northeastern alpine Italy.

The southern slope of the Cantabrian Range is investigated by [Neira Campos et al. \(in this volume\)](#); the paper focuses on the characterization of raw materials, the reconstruction of provisioning strategies and the techno-typological study of the lithic assemblages from two Mesolithic sites. Similar patterns have been observed from the point of view of exploited raw materials and the scarcity of geometrics. Both are characterised by lithic assemblages with deeply-rooted archaic features linked to the Upper Palaeolithic/Azilian regional tradition.

The Cantabria archaeological evidence is also investigated by [Álvarez-Alonso et al. \(in this volume\)](#); they present results from investigations carried out in the cave of Coímbre. Significant differences have been observed between the faunal remains from the Magdalenian and the Gravettian reflecting a differential use of the landscape. Authors suggest that these patterns reflect a change in the hunting behaviour of the occupants of the cave.

The Mousterian layer XIX of Obřázova Cave in the Polish Carpathians and layer 11 of the Kůlna Cave in Moravia are sintetically discussed by [Cieřla and Valde-Nowak \(in this volume\)](#). Authors observe that the connection between the archaeological evidence of the microlithic Taubachian and the presence of thermal waters had never been considered as one of the key aspects in the discussion of Neanderthal presence in Central Europe.

Finally, the results of a research carried out in Tierra del Fuego (Argentina) are presented by [Mansur and De Angelis \(in this volume\)](#). Authors present a program of systematic surveys carried out in different landscapes in mountain and piedmont areas in the sub-Antarctic Andes. They stress the importance of site formation processes and taphonomical phenomena for identification and analysis of the archaeological record in the area. Results are used to discuss lithic resource management as the main variable for technological organization, according to two different perspectives: location and characteristics of raw material sources and evaluation of land occupation by hunter gatherer societies.

3. Some future challenges

As evidenced by the Burgos presentations and this introduction, the scientific activity of the HOME Commission – with a few honourable exceptions – has so far had a focus on the central and southern European spheres of interest. Acknowledging that mountains are a worldwide phenomenon, the field of activity now deserves to be expanded to the remaining parts of the mountain world not yet represented in the commission. This will confirm the main purpose of UISPP as an international organization. With improved geographical representation by researchers dedicated to mountain archaeology both in and outside Europe, sharpening of the research goals, and adequate supportive funding, the perspectives seem promising for obtaining new, basic and deepened knowledge on human ecosystems in mountain regions. Among the many themes which may be relevant under a refurbished and larger umbrella, there may be:

1. The timing of and reason behind the first human exploitation of mountain environments in different parts of the world. What is the time lag between the pioneer settlement on the coast or in main lowland valleys and the first use of near-lying or distant mountains? Why, for example, the southern Alps were taken into use as early as the Late Glacial ([Fontana and Guerreschi, 2003](#)) while human exploitation of the mountains in South-western Norway first started in the early Preboreal, one hundred years after the final retreat of the inland ice from the area ([Bang-Andersen, 1996, 2012](#))?
2. What were the topographically-driven pathways within the mountains, how long were they, how were they used, and by what kind groups ([Grimaldi, 2006a,b](#))? Questions such as these would probably benefit greatly from examination and comparison of diametrically opposed areas, for instance western Japan, north-eastern Italy, northern Spain, mid-western Greenland and along the steep coast/mountain traverses of Chile, Argentina, or Alaska.
3. The gradual spread of agricultural activities such as transhumance and summer farming into mountain environments. As it appears to have started already about 5000 BP in the southern

French Alps (Walsh and Mocchi, 2011), what was the situation elsewhere in Europe and in other parts of the world (Bar-Yosef, 2011)?

4. The exploitation of natural resources other than pastures and grassland: wild game, fish, lithic and mineral materials, chalk and copper, just to name a few (Della Casa, 2013; Mansur et al., 2013; Turck et al., 2014).
5. Mountains transformations, resulting from the present climatic changes which lead to a massive melting of glaciers and ice patches (Callanan, 2013; Dixon et al., 2014) and also to physical alteration of hillsides, riverbeds and lakesides. “Glacial archaeology” and “Erosion archaeology” are the terms to describe these new fields of research.
6. Sacred places. The mountains, or particular local natural phenomena functioning as physical attractors of symbolic values, and underlining reflection, adventure and superstition as basic human properties which should always be taken into account as possible correctives to “solid evidence” (Reinhard and Ceruti, 2010).

In order to further the development of mountain archaeology as a discipline with a global perspective, new constructive actions have to be undertaken. And the wake of Burgos seems the best moment to define and promote these actions within and outside the Commission.

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