PAST
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Beyond Lake Villages in the Neolithic of Austria

Waterlogged archaeological sites offer exceptional insights into prehistoric life. Excellent preservation conditions for most organic materials enable archaeological research to deploy its full interdisciplinary arsenal and gain a deeper understanding of socio-economic and ecological conditions. The waterlogged sites on the shores of the Alpine lakes and in the wetlands of the perialpine zone are among the most famous and evocative. Currently, about a thousand sites dating to the time span 5000–500 BC are known from around the Alps. In 2011 UNESCO World Heritage status was accorded to 111 of them, spread across six different modern nation states.

Nearly 30 waterlogged lacustrine sites are known from Austria. Most are scattered around the northern Alpine lakes of Upper Austria (Attersee, Mondsee, Traunsee), with two south of the Alpine range (Keutschacher See, Hafnersee). Chronologically, they fall within a broad time span from approximately 4200 to 500 BC. The most important group are the 23 sites in Upper Austria, most of which are associated with the archaeological cultural entity known as the *Mondsee Group* (4th millennium BC). It is known for its distinctive, white encrusted ceramics and early rich evidence for copper casting.

The Austrian sites were discovered shortly after those in Switzerland, but modern transdisciplinary research has been limited. The conferral of World Heritage status was an important impetus to the development of a network of national and federal institutions (including the University of Vienna, the UNESCO World Heritage Management Association 'Kuratorium Pfahlbauten', the University of Innsbruck, the Upper Austrian State Museum and the Natural History Museum Vienna) which have begun several collaborative projects to address these shortcomings.

Excavating the hilltops

Since 2014, the University of Vienna and the Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology (LBI ArchPro) have been conducting archaeological fieldwork around lakes Attersee and Mondsee. The aim is to investigate settlement history and land use in the hinterlands of the lakes within a diachronic perspective. One major success of our excavation campaigns was the discovery of a hilltop settlement dating to the 4th and early 3rd millennium BC just north of Lake Attersee at Lenzing. For the first time in Austria, we have knowledge of a hinterland settlement contemporaneous with the lakeshore sites. Excavations are currently taking place on the fortified multi-period hilltop site of Buchberg-am-Attersee, whose main phase appears to extend from the Middle Bronze Age to the Iron Age. Earlier phases are expected.

View over Lake Attersee. © K. Kowarik

Typical Mondsee pot © Museum Mondsee / OÖLM

Excavating underwater

The underwater sites in the lakes Attersee, Mondsee, Keutschacher See and Hafnersee have been subjected to repeated underwater survey in recent decades. In 2015, the Federal State of Upper Austria (which has scheduled a major exhibition on lakeshore settlements for 2020) and Kuratorium Pfahlbauten initiated a five-year research programme (the *Zeitensprung* project) that aims to gain new insights into settlement structure and history, as well as human–environment interactions. It includes excavations and an extensive interdisciplinary programme. As a pilot project, a part of the Seewalchen site at the northern end of Lake Attersee has been excavated and was radiocarbon dated to 3800–3500 cal BC, thus associating it with the Mondsee Group. Evidence for an older settlement phase (4200 BC) nearby was also found, and there are indications for human activity in the 7th millennium BC.

Since 2016, the excavations have focused on another 4th millennium site, Weyregg II on the eastern shore of Lake Attersee, which is well protected by sediment and undisturbed. The research history of lake villages in Austria means we lack stratigraphic context for the majority of Mondsee Group artefacts currently known; thus one of the aims of the Weyregg II excavation is to establish a highly resolved stratigraphy of this multi-phase site. The new excavations will also provide typochronological information and will be complemented by archaeobotanical, archaeozoological, sedimentological and palynological analysis.

Excavation under water at Lake Attersee, Seewalchen I. © H. Pohl, palafittes.

Going Beyond Lake Villages

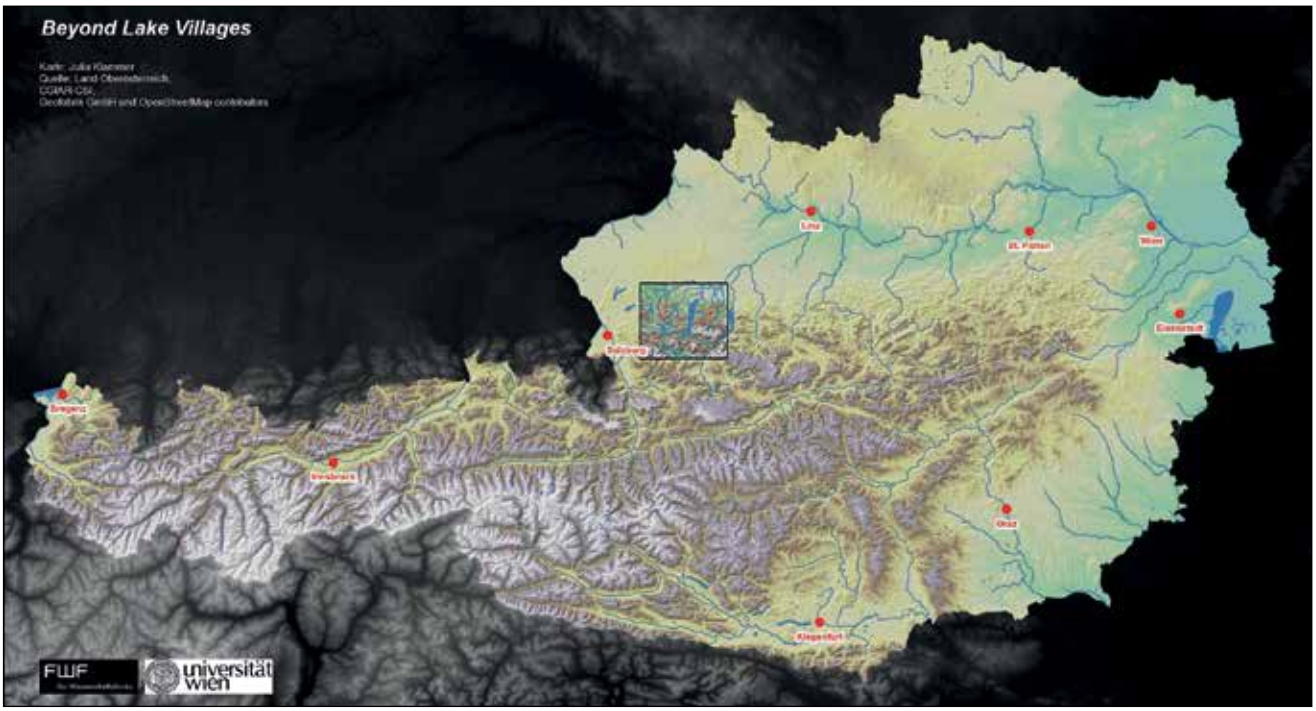
The Beyond Lake Villages project (jointly funded by the Swiss, German and Austrian national funding agencies, SNF, DFG and FWF, see also https://beyondlakevillages.wordpress.com/news/) focuses on the 4th millennium BC as a time of fundamental change in Europe's early agrarian societies, while also considering developments in a broader time frame. Since 2015, an international team has been establishing a highly resolved Holocene palaeoenvironmental record, enhancing our understanding of landscape in terms of spatial networks, and integrating palaeoenvironmental data sets with archaeological data in three research areas: the Bernese Swiss Plateau; Lake Constance and the Federsee region in southern Germany; and Attersee and Mondsee.

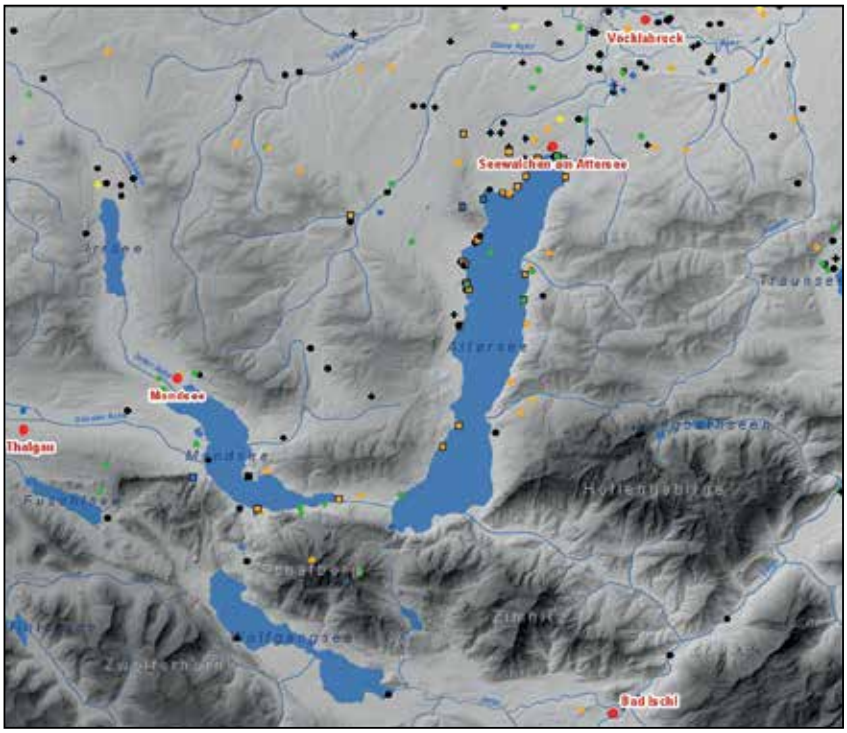
The investigation of sedimentary archives is a central aspect of our work. We focus on climatic and anthropogenic impacts on past ecosystems, as well as on prehistoric agricultural systems and subsistence strategies, through reconstructing past forest use and tree/shrub diversity and regeneration cycles. Different types of sedimentary archives have been targeted. In June 2016, a sediment core 14 m long was taken from Lake Mondsee at a water depth of 64 m. The stratigraphy is currently being analysed for geological, sedimentological and biological proxies. The first results from Mondsee suggest the use of fire *c.* 6000–5000 cal BP, associated with the earliest pastoral activities and cultivation of cereals in the area, and coinciding with eutrophication of the lake (indicated by the presence of *Tetraedron cf. minimum*).

Attention is also being paid to the analysis of lake sediments within archaeological contexts. Short (< 1m) stratigraphies, including cultural layers reflecting past human and livestock activities, were recovered during the 2016 excavation of Weyregg II. Systematic palynological investigations are currently under way, revealing possible short- and long-term sedimentary hiatuses before and after the establishment of the Neolithic village, which suggests low lake water levels; a strong presence of cereal remains, possibly hinting at very local processing and food preparation; and fungal spore types that highlight the presence of extensive amounts of livestock/human faeces within the cultural layers.

A landscape perspective

One major goal is to understand land use at a landscape level. Land use in the direct vicinity of the lakeshore settlements has been intensively investigated, but much less attention has been paid to the broader landscape. We have conducted surveys using LiDAR and aerial photography, with a developing geophysics programme. These have allowed us to identify a range of potential archaeological features in the hinterland of the lakes. Three areas around lakes Mondsee and Attersee were chosen for field survey and geophysical prospection to enhance our understanding of the full range of surviving features and to assess preservation conditions. We are now using GIS methods such as cost surface calculations and viewshed analysis, but also looking at site location choices. A Master's thesis is currently focused on building a predictive model for the lakeshore sites. This will be tested





Location of Beyond Lake Villages research area (above) and location of currently known sites (left). Yellow: Neolithic; green: Bronze Age; blue: Iron Age; black: prehistoric (unspecified); dots signal unspecified sites, squares signal settlement sites, crosses are undated graves. © BELAVI

by underwater survey. A further Project, 'OÖ ArchPro Pfahlbauten', is currently getting under way to develop the technology for extensive high-resolution underwater archaeological prospection. We hope that taken together, these investigations will shed new light on the Neolithic of the Mondsee region and deepen our understanding of human–environment interrelations in the 4th millennium BC in the circumalpine area.

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