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Palaeoecological Research in the Triglav National Park (Slovenia)

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Summary

The aim of multidisciplinary palaeoecological research in the Triglav National Park is to investigate long-term environmental changes to better understand past, present and future changes of the environment. Previous research in the area focused on multidisciplinary studies of Lateglacial sediment of Lake Bled and the reconstruction of the climatic fluctuations and vegetation history between ca. 20.000–10.000 cal. BP (ANDRIČ et al. 2009). These results suggest that terrestrial and aquatic ecosystems at Lake Bled were very dynamic and sensitive to Late-glacial climatic fluctuations. They responded to changes of temperature, precipitation and hydrological conditions. Thin layers of microscopic volcanic ash deriving from Italian and Icelandic volcanos were also discovered (LANE et al. 2011). In Europe study sites with volcanic ash from both, northern and southern Europe are very rare, therefore Lake Bled is a missing link connecting both areas. It helps us to tie together regional stratigraphy into a broader, continental-scale Late Quaternary European tephrostratigraphic framework.

In addition to studies of Lateglacial environment, palynological research at Pokljuka plateau (Šijec peat bog) focused on vegetation changes and human impact on the environment in the last few centuries (ANDRIČ et al. 2010). In the 15th century AD Šijec was surrounded by mixed forest (*Fagus*, *Abies*, *Picea*, *Quercus*) and agricultural fields and pastures, but by the beginning of the 19th century AD the landscape had become more open, with very intensive agricultural land-use and grazing. The forest composition also changed: beech (*Fagus*) and fir (*Abies*) declined because of intensive grazing and ironworks (forest clearance and charcoal production). In the second half of the 19th and at the beginning of the 20th century AD, forest recovered, but farming activities continued and, as a result of the forestry policy, spruce (*Picea*) prevailed. After AD 1945 agricultural economy declined and mixed forests, which today cover more than 70% of land, started to expand.

The results of previous research in the Julian Alps indicate that Late Quaternary environment was very sensitive to climatic fluctuations and human impact (farming and metallurgical activities in the last few centuries). However, to date no detailed study of the entire Holocene sequence when both, climatic fluctuations and human impact, were important, was carried out.

Current research in the Triglav National Park aims to close this gap. It is being carried out by an international multidisciplinary team (Slovenian–French cooperation) of geologists, chemists and paleaoecologists, who collected two 12 m deep sedimentary cores in both Lakes Bled and Bohinj (in 2012, Fig. 1, Fig. 2). Selected Triglav mountain lakes were also cored (2014 and 2015, Fig.3). Studies of fossil plant/animal remains (e.g. pollen), sedimentological and geochemical composition of lake sediments and radiocarbon dating are being used to reconstruct the vegetation composition, earthquake chronicle, climatic fluctuations and the impact/adaptation of people on the environment.

The research in the area of Lake Bohinj focuses on changes of the vegetation, farming and metallurgical activities, soil erosion, climatic fluctuations, floods and earthquakes in the last 6600 yrs cal. BP. Sedimentological and geochemical results namely suggest that the area was affected by a very strong earthquake (6617±94 yrs cal. BP), which reworked previously deposited sediment (RAPUC et al., in review). In addition to 29 deposits, which can be related to earthquakes, there is also evidence of sedimentation rate changes, which are linked to human activity in the watershed. The results of palynological research e.g. suggest that in the Neolithic the lake was surrounded by mixed beech-spruce-fir forests (*Fagus, Picea, Abies*), with weak traces of human impact (agriculture and grazing), whereas in the Bronze Age human impact (especially grazing) on the environment increased. Very intensive clearance of beech forest, which can be associated with metallurgic activities of local population (MOHORIČ 1969; HORVAT 2006; OGRIN 2006), is dated to the Iron Age (ca. 2700 cal. BP), when sedimentation rate in the basin increased. Human impact on the environment continued also in younger archaeological and historical time periods.

Figure 1: Coring at Lake Bled (2012), photo M. Zaplatil

Figure 2:. Lake Bohinj core, description of sediment. Photo M. Andrič

Figure. 3: Coring at Lake Ledvica (2014), Photo M. Andrič

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