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Lake Lavarone Late-glacial to present palaeoenvironmental changes: a unique multi-proxy record from Trentino, NE Italy

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The Alps are a key region to understand the interaction between the Northern European climate trends and the effects of the Mediterranean during climatic transition periods. However, paleoenvironmental and palaeoclimatic multi-disciplinary studies on continuous Late Glacial to Holocene continental sequences are still relatively rare for the Southern watersheds of the Alps. The OLOAMBIENT project (2003-2006, funded by the Autonomous Province of Trento) aims at reconstructing climate fluctuations and environmental responses for this period in the Trent region (Dolomites, NE Italy) by combining lake sediment and speleothem archives. The sediment sequence retrieved from Lake Lavarone was selected for a multi-proxy study, including radiometric, sedimentological, mineralogical, geochemical, palynological and biological (diatoms, chironomids) analyses.

Lake Lavarone (0.05 km^2 large, 17 m deep, 1100 m a.s.l.) is a nice small karstic lake, a local tourist attraction, with almost permanently anoxic bottom waters. The ca. 10 m-long sediment sequence collected in the deepest part of the basin, has been divided in 4 lithostratigraphic units. The upper three units (first ca. 5.5 m) have good chronological constraints through ^{210}Pb dating of the uppermost section of the core and 20 radiocarbon dates. The lower unit, is characterized by organic-poor, light- to dark-grey bedded silty clay with intercalated mm- to cm-thick sandy layers and records the transition from a recently deglaciated environment (17-18000 yr BP?), characterized by

a high detrital sedimentation rate, low organic content and steppe vegetation, to the first afforestation, which took place in the "Bølling-Allerød" period, and led to an increase in total organic carbon content of the sediment. The Younger Dryas (Unit III) is marked by a distinct increase in xerophytes and decrease in July temperature, as reconstructed from selected chironomid samples. Unit I and II (upper ca. 5 m) vary from a bedded and partly laminated brown sapropelic diatomaceous and carbonate-rich ooze at the top, to a homogeneous to vaguely laminated reddish brown mud with abundant plant remains. This section shows the characteristic Holocene pollen sequence, with clear human presence on the site dating to the Roman age. Catchment and productivity changes determine the presence/absence of endogenic calcite in the sediment, an indirect indicator of changes in the ecosystem of lake. Ongoing microtephra analyses focus on the lower units (III and IV) and will likely help constrain the timing of deglaciation and the beginning of afforestation in the region.