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Late Glacial to Holocene environmental variabilities: A new multi-proxy paleolimnological study of sedimentary sequences from Como (northern Italy)

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Lake Como (northern Italy) is the deepest Italian lake, reaching a depth of about 425 m. The lambda-shaped lake expands about 45 km in NE-SW direction. Southwards of the hydrologically closed western branch, two sediment cores of 70 m (S1) and 65 m length (S2) were taken in the year 2005 close to the cathedral of Como (Piazza Verdi). The drilling sites are located in the middle of the Southern Alps, some 300 m from the present-day lakeshore. The cores provide the first detailed Late Glacial to Holocene multi-proxy record for the Lake Como basin. Our research is aimed at investigating the environmental and geological evolution of the Insubria Region. The multi-proxy study of the stratigraphic sequences contain geophysical, geotechnical, sedimentological, paleobotanical, and radiocarbon analyses. They have been performed for core S1 and are still in progress on core S2. With this data the working group focuses on two main issues. The first topic is the reconstruction of the natural and anthropogenic processes controlling the ground subsidence in the Como urban area (e.g., Comerci et al., 2007) and another aim is to reconstruct vegetation and land-use dynamics. In particular, 150 samples of vegetal macroremains have been collected in the palustrine deposits along S1 core, down to 31,00 m. Below this depth (dated 14C 12,496 $\pm$ 55 yr BP – 15,050 - 14,250 cal yr BP), the amount of plant macroremains in the sediment drops dramatically. The taxonomic determination was carried out on more than 800 macroremains. They are represented by fragments of wood, leaves, needles, seeds, fruits, mosses and tiny charcoals (Motella, 2009, unpublished PhD Thesis). Picea/Larix, Pinus sp., Juniperus with Betula, found in the deeper levels (30.80 - 30.00 m), are the first arboreal taxa that colonized the shores of Lake Como, and show that the reforestation began in this area about 16,000 years ago. During the early Holocene (25.10 m) Abies alba expanded and further upwards the sequence mixed deciduous forests became important.

Preliminary results of palynological analyses for a section of the core S2 (35.04 - 18.12 m), show Late Glacial sediments in the depth of 35.04 - 31.16 m, due to vegetation changes related to natural climatic variability, with an alternation of communities typical of cold (Poaceae, Artemisia, Juniperus, Pinus and Betula) and temperate climates (e.g. Quercus). Later, during the Holocene, forests composed by mostly deciduous broadleaves and Abies alba expanded. During the mid and late Holocene human impact increased and modified vegetation. This is shown by the increase of herbs and heliofilous shrubs (26.51 m), typical of deforested spaces for fields and pastures. Human exploitation of wood is represented for example by the dramatic decline of Abies alba (24.97 m). Finally, the increase of Cerealia (19.39 m) is clearly related to intensified agricultural activities. The results of further paleobotanical and geophysical analyses which are in progress will be presented during the conference. Moreover, geochemical measurements (e.g., XRF) will be performed in future for core S2. Researches realized within the project of Italy-Switzerland Cooperation SITINET “Censimento, valorizzazione e messa in rete di siti geologici e archeologici” (Census, increase of value and computerization of geological and archaeological sites). Interreg IV A “Geo-Archeositi dell’Insubria” (Geo-Archaeosites of Insubria).