Multi-proxy study of an intra-interglacial cool interval of the Piànico Interglacial with special emphasis on μ-XRF data

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The sedimentary infilling of the Piànico-Sèllere Basin (Orobic Prealps, Northern Italy) includes interglacial lacustrine sediments composed by ca 15,500 biogeochemically precipitated calcite varves (Piànico Interglacial). Tephrochronology provided an age of about 400 ka for this interglacial. A millennial-scale oscillation of cooler climate occurred after ca 10,000 varve years of warm interglacial climate. This climatic fluctuation was studied in great detail with respect to seasonal sub-layers thickness, detrital layers frequency and thickness, oxygen and carbon isotopes of endogenic calcite as well as geochemical variations (μ-XRF scanning), carried out at 54 μm resolution (ca 10-20 data points per varve year).

The chemical profiles reflect the pattern of seasonal sublayers and their thickness variations. Calcium peaks reflect endogenic calcite which forms the summer layers while winter layers are characterised by silica peaks reflecting minerogenic and diatom debris. Peaks in magnesium indicate detrital material originating from the catchment of the lake.

Comparing μ-XRF element intensities expressed in counts per seconds (cps) with ICP-MS data (concentrations in %) of 20 sample intervals reveals a good agreement for element variations between individual samples. However, μ-XRF intensities of some elements (i.e. Fe, Al) do not correspond to the concentrations measured by ICP-MS in the same sample interval.