

Environmental drivers for the secular evolution of Lake Garda as outlined by paleolimnological reconstructions.

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Lake Garda, the largest Italian lake, is divided in two sub-basins: the NW deepest one (350 m) and the SE shallowest one (81 m). A regular monitoring program of lake chemistry and biology has been started in the early 1990s. Before that, only sporadic limnological measurements are available. Lake sediment records provide a complementary source of information to extend the time span of ecological records back into the past, through the reconstruction of secular lake evolution. Radiometrical dating, geochemical (water and LOI content) and biological proxies (algal pigments and diatoms) are being analysed in two short cores (56 cm and 65 cm) retrieved from the deepest point in each basins.

The sub-fossil diatom assemblages analysis show two major changes in both cores. The first one, in mid 1940s, consists of a decrease in benthic taxa. The second change consists of an increase in the relative abundance of planktonic Fragilariaceae around 1960, accompanied by a decrease in the most common centrals (i.e. *Cyclotella comensis*). The diatom based reconstructions of lake TP concentration in the two lake basins show very stable oligotrophic conditions since the early 1960, followed by a consistent increase peaking in the late 1980s. The limnological data confirm the long-term TP trend.

Non-metric multidimensional scaling (NMDS) analyses, coupled with correlation analyses with a set of environmental variables, were performed on sub-fossil diatom assemblages. The analysis outputs indicate the ecological lake evolution as strongly correlated with air temperature, and changes in NAO and EA teleconnection indices. This confirms recent findings (Salmaso and Cerasino, 2012), demonstrating how inter-annual changes in trophic conditions of Lake Garda are largely controlled by climatic fluctuations.