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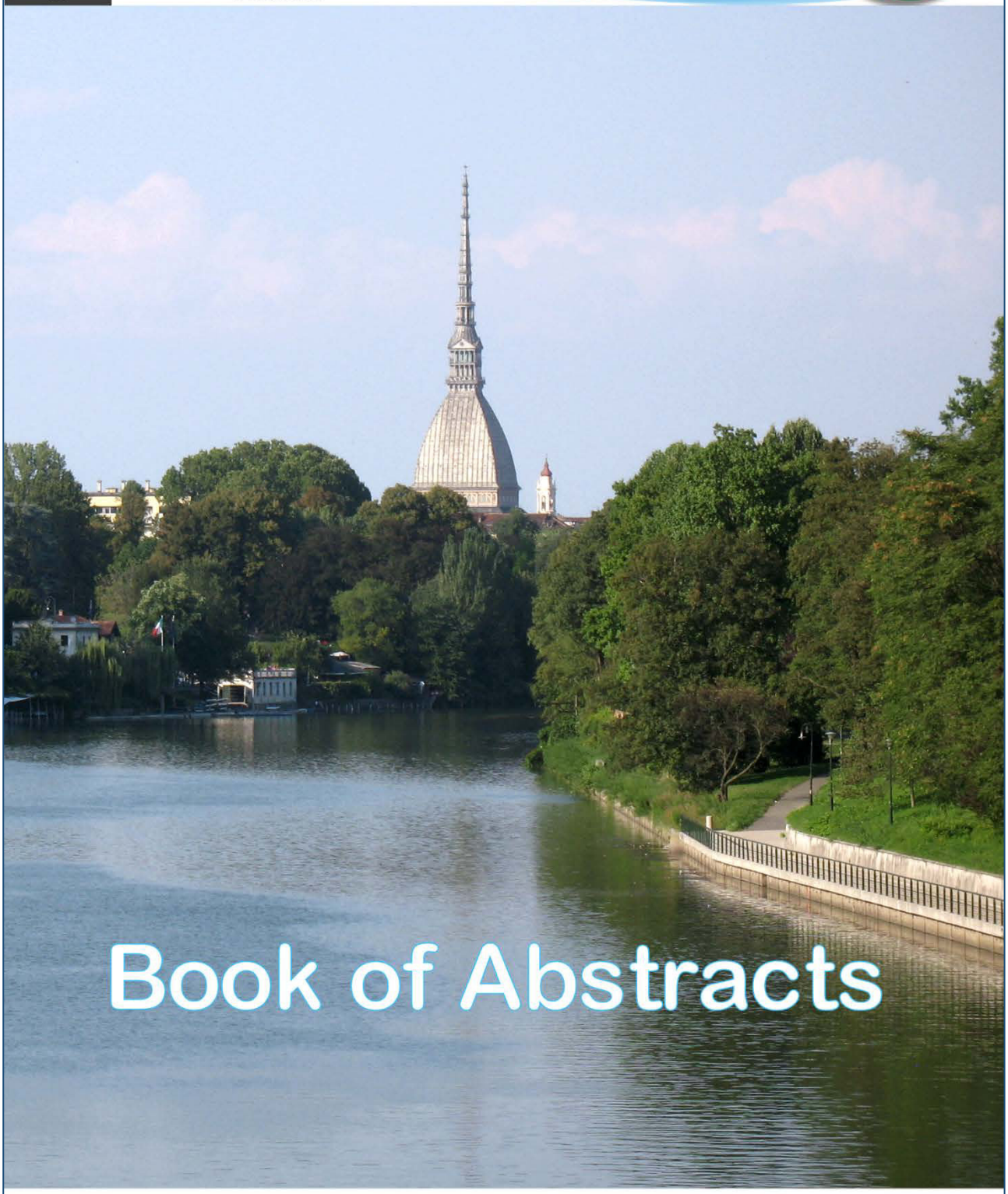

Book of Abstracts

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This study outlined that the ecological conditions of large and deep lakes in Northern Italy, such as Lake Garda, are mainly driven by nutrient enrichment, and that climate change can effectively modulate the lake ecological response to nutrients. The results stresses that the establishment of sustainable management policies and realistic restoration goalsof large subalpine lakes, which are usually based on the definition of lake reference conditions, need to pay particular attention to lake-specific sensitivity.

39-O Degenerative processes in a deep meromictic lake: anoxia, reducing conditions and internal loadings.

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Ecological studies in Lake Idro (Northern Italy), performed in the last five years (May 2010 - April 2012 and September 2013 - November 2014), evidenced a progressive deterioration of water quality and ecosystem status. The water column is permanently stratified and the chemocline is presently at about 40-50 m depth, out of a maximum depth of 120 m. The monimolimnion, which is ~50% of the water volume, is devoid of oxygen, with a concurrent accumulation of Fe^{2+} and Mn^{2+}, methane, dissolved sulphides, ammonium (NH_4^+), soluble reactive phosphorus (SRP) and dissolved reactive silica. Conversely, in the mixolimnion NH_4^+, SRP and trace metals are almost completely depleted, whilst nitrate is the main nitrogen species. The development of phytoplankton and the contribution of cyanobacteria to total biovolume are quite limited (<~10%), because of the moderate availability of nutrients in the upper layers. For the trophogenic waters, we can propose the term “meromictic induced mesotrophy”. The littoral zone (<10 m depth) is colonized by a wide macrophyte belt, with the dominance of invasive elodeids. The internal SRP regeneration is recognized as a major P source, whilst nitrogen is mainly imported from the watershed. The meromixis is a critical threat to lake recovery. The reducing compound bulk in the monimolimnion can potentially account for an oxygen demand which is nearly threefold the actual oxygen availability. Hence, in case of complete water overturn, oxygen dilution and consumption, might lead to a critical oxygen shortage with a possible collapse of the aquatic food web, coupled with and exceptional fertilization of the surface waters. In fact, the monimolimnion and the surface sediment horizon have accumulated a great quantity of phosphorus. Here, the strong reducing conditions of the monimolimnion favour the SRP release from sediments: At the same time a very small quota of inorganic nitrogen is recycled into the water column. The resulting inorganic N to P ratio is thus imbalanced and can be recognized as a possible trigger of the development of toxigenic cyanobacteria. The internal P recycling, which greatly exceeds the external P inputs, can counteract the effort aimed at reducing the external loading. However, the P speciation indicates that, a significant quota of the sedimentary P is not readily available, constituting the so called calcium bound fractions, either authigenic or detrital. The P speciation and its potential availability have also been analysed in sediments at different depth, with different oxygen concentrations, in order to explore the effects of oxic to anoxic conditions on sedimentary SRP retention and exchanges.

39-O Long-tern nutrient dynamics in a deep subalpine lake (Lake Maggiore, Italy): the role of atmospheric deposition, catchment sources and climate.

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Lake Maggiore, one of the deep subalpine lake (DSL) in Italy, achieved a stable oligotrophic status after a recovery process started at the beginning of the 1980s. As an effect of decreasing nutrient loads from the catchment, concentrations of total phosphorus (TP) in the lake reached values of 9-10 µg L^{-1} at winter overturn in the late 1990s. The oligotrophic condition was also testified by chlorophyll concentration of about 3 µg L^{-1} as annual mean.
TP concentrations constantly decreased within 1980-1995, whereas total nitrogen (TN) progressively increased in the same period and beyond, mostly due to nitrate (NO_3) concentrations. Despite the adoption of measures to control N input from the catchment, NO_3 increased in the lake, as an effect of the high atmospheric input of N affecting this area. Recently, a slight decrease of NO_3 and TN concentrations has been observed, mainly affecting summer values in the