

Short and long term chemical and isotopic variations of Lake Trasimeno (Italy)

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Lake Trasimeno, located in Umbria (central Italy), is a shallow lake of a remarkable naturalistic interest and a significant resource for the economy of the region (Ludovisi and Gaino, 2010; Dragoni, 2004). The Lake Trasimeno has an average area of about 124 km² with a maximum depth of approximately 5.5 m, has no natural outlet and the volume of water stored is strictly linked to rainfall. In order to limit water level variations in 1898 an efficient outlet was built. At present the water exits from the Lake only when the level reaches a fixed threshold above the outlet channel, so during periods with low precipitation the evaporation becomes the most relevant output from the lake. For instance, between 1989 and 2013 the outlet did not work, and the maximum depth of the lake was reduced to little more than three meters. In the framework of climate change, it is important to understand the changes that could affect Lake Trasimeno in the near future. To this aim it is necessary to individuate the long term trends of the hydrologic, chemical and physical characteristics of the Trasimeno water and distinguish them from the short term variations. At the present it is available a long record of hydrologic data allowing reliable studies on quantitative variations at Lake Trasimeno (Dragoni et al., 2015; Dragoni et al., 2012; Ludovisi and Gaino, 2010), but the definition of the chemical and isotopic trends of lake water it is still a problematic task. On the basis of new chemical and isotopic data, collected from 2006 to 2015, it is possible to observe (i) short term and/or very short (seasonal) variations in temperature, salinity and saturation state with respect to carbonate minerals and a long term trends in isotopic composition of water and total load of mobile species (Cl, Na). The short term variations readily respond to the precipitation regime and are strongly related to lake level; the long term trend is probably related to the progressive increase of near-surface atmospheric temperature observed in the last decades.

References

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