



Sedimentary Evolution and a dramatic Lake Level Change of Alpine Lago di Tovel, Italy, revealed by Sediment Cores and 3.5 kHz Seismic Mapping

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Proxy data from a total of 30 sediment cores and information from a seismic survey show that the sedimentological and limnological history of Lago di Tovel (1178 m a.s.l.) has been significantly influenced by slope dynamics of its mountainous catchment. The lake represents a dead-ice lake with pro-glacial deposits at the base of its sedimentary record. A prominent lake level rise in 1597/1598 that increased maximum water depth from ~20 to 39 m caused slope instabilities, leading to the deposition of mass-flow sediments with a maximum thickness of 2.5 m in the northern part of the lake and less than 50 cm in the southern part, resulting in a total volume of more than 113,000 m³. Consequently, rough lake bottom morphology was produced, which led to distinct differences in sedimentation rates of 0.07 cm yr⁻¹ on sills and 0.18 cm yr⁻¹ within depressions. The age of the top of the mass-flow deposits was used to validate the ages of the younger, laminated sediments, which were dated by ²¹⁰Pb and ¹³⁷Cs. Lithological investigations showed that the sediments below the mass-flow deposits are also laminated and that they were not bioturbated. The long-term meromixis of Lago di Tovel is therefore mainly due to a combination of its topographic setting and the five-month period of ice cover. Both prevent effective mixing of the lake by strong winds during spring and autumn. Distinct spatial differences in sediment distribution within the lake show that it is risky to interpret proxy data from only one coring site, even if the lake is very small. This is especially true in mountainous areas, where rock falls, mass movements, and slope instabilities of a significant size may have consider-

able effects on lakes.