



Southern Alpine floods of the last 50 years recorded in the sediment record from Lago Maggiore

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The frequency of extreme floods is increasingly discussed under meteorological and anthropogenic forcing aspects because of their potentially disastrous consequences. Existing hydrological and meteorological instrumental data are, however, limited to rather short time scales. Records of natural geoarchives like lacustrine sediments, in contrast, reach much further back in time and reflect climate changes and environmental processes. In particular, extreme floods give an imprint to lake sediment records. The sediment loaded stream enters the lake water and eventually is deposited as a detrital layer.

Here we present a multicore study from Pallanza Basin in the western part of Lago Maggiore. Major detrital layers are triggered mainly by flooding events of the Toce River. Through microfacies analyses of petrographic thin-sections and high-resolution element scanning techniques several detrital layers have been identified and correlated to historical flood events of the last 50 years. For this time interval fifteen flood event layers have been identified in the sediment record. Their thicknesses range from 0.5 to more than 15 mm. Noticeable is a rise of flooding events in the 1970s, which might be related to a change in atmospheric circulation patterns as documented in the NAO index. Comparison of these detrital layers in different cores allowed reconstructing their spatial distribution within the Pallanza Basin. Two detrital layers are clearly not related to regional floods but were generated by local slope failure or debris flows.

This work is combined with studies of biological remains and pigment analyses, proving evidence of historical changes in the trophic state, pollution and climate history of the lake. Overall a comprehensive reconstruction of anthropogenic and climatic changes to Lake Maggiore for the last five decades is shown.