



Turbidites as proxy for past flood events: Testing this approach in a large clastic system (Lake Geneva, France/Switzerland)

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Turbidites recorded in lake sediments are often used to reconstruct the frequency of past flood and also seismological events. However, for such a reconstruction, the origin and causes of the recorded turbidites need to be clearly identified.

In this study, we test if turbidites can be used as paleohydrological archive based on the the sedimentary record of Lake Geneva resulting from inputs by the Rhone and Dranse clastic river systems. Our approach is based on several methods combining high-resolution seismic reflection data with geophysical (magnetic susceptibility, grain size) and high-resolution XRF/XRD data measured on ca. 10-m-long sediment cores (dated by radiocarbon ages and ^{137}Cs activity).

This dataset allows distinguishing between the different sources (rivers or hemipelagic sediment) of the turbidites deposited in the deep basin of Lake Geneva. However, no clear distinction between the various trigger processes (mass failures or floods) could be made, thus flood deposits could not be clearly identified.

From our results, we also conclude that the lack of turbidite deposits in the deep basin between the 15th and 18th century seems to be linked to a change in turbidite depocentre due to the Rhone River mouth shifting possibly triggered by human activity and not by any direct climate effect.

This study demonstrates that a least two conditions are needed to perform an adequate paleohydrological interpretation based on turbidite records: (1) the holistic understanding of the basin sedimentary system and (2) the distinction of flood-induced turbidites from other types of turbidites (mass failures etc.).