Critical zone dynamic over the past 2,000 years record in large Mediterranean Lake (Iseo, Italia): Climate versus human impacts

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Human activities and climate variability have direct impacts on the dynamic of the Critical Zone (CZ) both in quantitative (increase of the flux of organic and mineral matter) and qualitative way (modification of the biogeochemical cycles). Mountainous areas hold a strong CZ dynamic due to their inherent environmental conditions. Among them, European Alps are of prime interest because they have been impacted by human activities over the last millennia. To understand the CZ trajectories, we need to develop long term monitoring far beyond the current instrumental period. To reach this objective we adopt a source-to-sink approach based on geochemical analyses with i) Nd and Sr isotopic composition to trace sediment sources form the watershed and ii) major and traces elements compositions to reconstruct the evolution of sources weathering states over this period. The watershed of Lake Iseo, located in the Val Camonica (NW Italy) was chosen for its substantial size (1.777km²), its various geological context, helping the identification of the different sources of sediment inputs, and a well-documented anthropization history. 25 samples of fine fluvialite sediments were sampled on the flood plain of the main tributaries of Lake Iseo and were linked to a 15.5m long lake sediment core, retrieved from the deep basin of the lake and covering the last 2,000 years. The fluctuations of the sediment inputs coming from the different sources is discussed from the Roman period until the recent warming through Medieval Optimum and Little Ice Age period to disentangle the influence of both climate (precipitation, glacial dynamics) and human activity onto the dynamic of the CZ throughout the erosion and the chemical weathering of the soils in this Mediterranean Alpine region.