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# Lake sediments as neotectonic archives: Quaternary fault structures in perialpine Lake Thun (Switzerland)

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The dominating process driving the geodetically measured uplift in the European Alps is still highly debated. While recent studies showed that up to 90% of the uplift can be attributed to postglacial rebound, others argue that a compressional tectonic component in the form of active deformation of the Alpine arc or a positive response to erosional unloading are primarily responsible for the observed uplift rates. The dynamics of these processes are additionally evidenced by recent weak to moderate and strong historic earthquakes (i.e. intensities $I_0 \geq$ VIII), the latter being well documented by the earthquake catalogue of Switzerland ECOS-09. Many of these events can be recognized paleoseismically by large subaquatic, earthquake-triggered mass movements that occur frequently in Swiss lakes. However, convincing evidence for Quaternary displacements with offset surface expressions has scarcely been found. New detailed seismic stratigraphic data of perialpine Lake Thun unravelled a large collection of $\sim$20 single fault structures, most of them of Post-LGM to Holocene age, providing a high likelihood of on-fault evidence of recently ongoing deformation along the Alpine arc.

Lately acquired 2D high-resolution multichannel reflection seismic data on Lake Thun (Switzerland) allowed us to distinguish ten stratigraphic units and their seismic facies architectures within the glacial and (glacio-) lacustrine sedimentary infill of the glacially overdeepened lake. Perialpine Lake Thun located at the northern Alpine front extends orthogonally to the general strike direction of the Alpine nappes. Its sedimentary infill builds the fundamental backbone for the structural analysis.

The reconstructed relative chronology of the Lake Thun fault structures show almost continuous aging of the faults from East to West, implying sequential triggering of an underlying superior fault along the basin. The large number of single fault strands, some with flower-like structures, suggests a highly complex fault pattern dominated by a major deep-seated strike-slip fault. Since primarily thrust and strike-slip faults were detected within Lake Thun, the latter with an orientation perpendicular to the Alpine arc and parallel to the strike direction of the basin, a predominantly (neo-)tectonic cause in the form of ongoing NW-SE converging plate motion seems most plausible.