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Were Holocene large slumps in Lake Geneva off the city of Lausanne caused by fault activity?

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Lake Geneva is set in an area where glacier advances and retreats have carved Tertiary Molasse rocks in front of the Alpine units. Glacial and lacustrine sediments have accumulated in the lake on top of the Molasse. Within Holocene sedimentary layers, seismic studies in the central part of Lake Geneva ("Grand-Lac") have shown the presence of several mass transport deposits (MTD). A large one, MTD A, is observed off the city of Lausanne. The depth of the associated failure scars (100 m water depth), its volume ($\sim$ 0.13 km3), and the occurrence of other smaller MTDs that were possibly co-deposited with MTD A point to the occurrence of a major slide event in the lake, most likely associated with an earthquake. Based on 14C dating, the sediment age model for MTD A gives an age interval of 1865-1608 BC (Kremer et al. 2014).
To resolve the details of the MTDs off Lausanne, and to better understand its geological context different seismic systems were used. These were a 3.5 KHz pinger with a theoretical vertical resolution of 0.15 m and a multichannel system with water-gun or air-gun seismic sources with vertical resolution of 0.6 m and 1.1 m, respectively. After a first pass processing, the multi-channel data were reprocessed in order to take into account the shape of the streamer in the water and to enhance the results of migration.
In addition to typical seismic images of MTDs observed in other alpine lakes such as chaotic or transparent seismic character between well-organized reflections, two intriguing positive water-bottom topographic features associated with apparent sub-vertical offsets are revealed by the seismic data. They are located in the near vicinity of the depot centers of the MTDs and conspicuously located near faults in the Tertiary Molasse. These are thrust faults that are offset by small strike-slip faults, and we suggest that the positive topographic features are linked to a compressive component within the sediments due to displacements along these faults.

Reference

Kremer K., Marillier F., Hilbe M., Simpson G., Dupuy D., Yrro B.J.F., Rachoud-Schneider A.-M., Corboud P., Bellwald B., Wildi W. and Girardclos S. 2014. Lake dwellers occupation gap in Lake Geneva (France-Switzerland) possibly explained by an earthquake – mass movement – tsunami event during Early Bronze Age. Earth and Planetary Science Letters 385: 28-39.