

Natural hazards recorded in the Fuji Five Lakes: earthquake shaking, typhoon induced flooding and volcanic eruptions

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The 2014-2018 QuakeRecNankai project (acronym for "Paleo-tsunami and earthquake records of ruptures along the Nankai Trough, offshore South-Central Japan") funded by the Belgium Sciences Policy Office focuses on the Fuji Five Lake area (central Japan) with the aim of a better understanding of the spatial and temporal recurrence of natural disasters. The region is susceptible to be impacted by natural hazards such as earthquake shaking, typhoon-induced floods and volcanic eruptions. The study location for natural hazard disaster is highly relevant since Mt. Fuji and the Fuji Five Lakes were recognized as a world heritage site in 2013 with about 300 000 tourists visiting the area every year.

Within the framework of the project, the lacustrine sediments from Lake Motosu, Lake Sai and Lake Yamanaka were investigated and used to reconstruct the natural hazard history of the region. In the sedimentary infill of Lake Motosu, mass-transport deposits and turbidites triggered by earthquakes were recorded. Over the last ca. 6000 years, the mean recurrence time of seismic event triggering turbidites in Lake Motosu is 184 ± 8 years.

A comparison between the age of the turbidites and historical and paleoseismological records suggest that earthquake shaking impacting the Fuji Five Lakes area can be attributed mostly to large magnitude earthquakes occurring along the Sagami trench or along the Nankai-Suruga Subduction Zone. The two most recent earthquakes occurring along these subduction zones (i.e., the 1944 Showa Tonankai and the 1923 Kanto earthquakes) were recorded.

By contrast with the sedimentary record of Lake Motosu, the lacustrine sediments collected in Lake Sai are a good archive for flood events. Detrital layers associated with the debris flow triggered by the 1966 Typhoon Ida (189 killed people, 3.9 millions yens damages) were identified, as well as other flood events associated with extreme precipitation events.

Regarding volcanic eruptions, Lake Yamanaka and its catchment were repeatedly impacted by scoria fall-out due to their proximity to the Mt. Fuji volcano and the westerly wind direction. The last eruption (Hoei, A.D. 1707) strongly affected the lacustrine sedimentation and has a long-term effect on the catchment and on the lake, due to the sealing of the underlying sediments by the thick scoria layer.

The geolimnology study of the Fuji Five Lakes gave us a better comprehension of the long-term recurrence of natural hazards affecting the region as well as their effects on the environment.

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