Recent seismic events preserved in lacustrine sediments from the SE Tibetan Plateau

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Large earthquakes are regarded as important contributors to long-term erosion rates and considerable hazard to infrastructure and society, which were difficult to track because of the long recurrence time exceeding the time span of historical records. Geological records, especially the continuously accumulated lacustrine sediments, hold the potential to capture signals of prehistoric seismic events, which has been barely reported from the Tibetan Plateau. Here we present lacustrine sediment records recovered from Basom Tso in Southeastern Tibetan Plateau, in which two seismic events were preserved. Sediment lithology, grain size composition, magnetic susceptibility and XRF scanning induced element compositions showed dramatic variations in two turbidite-like sediment segments. Particularly, the grain size showed an abrupt increase at the bottom of the Turbidites which was followed by a fining-up pattern and covered by a fine clay cap, expressing similar sedimentary processes caused by the seiche effect triggered by seismic events. Consistent patterns were recorded in the element contents as well, i.e. obvious bias in the counts of Fe, Zr, Ti, Ca. In addition, such pattern were preserved in sediment cores from different part of the lake basin, indicating a basin wide event layer. Finally, according to the dating results from \(^{137}\)Cs and \(^{14}C\), the two Turbidites were formed around 1950 A.D. and during the late 18\(^{th}\)/early 19\(^{th}\) century respectively. Such information was further confirmed by historical earthquake records that Chayu Earthquake (M=8.6, 1950 A.D.) and Nyingchi Earthquake (M=6.75, 1845 A.D.) have possibly responsible for the slump of underwater sediments and the formation of these two turbidites.