Lake-floor signatures revealed by a post-earthquake follow-up geophysical survey

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Abstract

A ten-day geophysical survey was conducted in the largest saline lake, Lake Van (<450 m in depth) by a Turkiye-KIGAM joint research team. The study area is located in the eastern part of Turkiye near the borders to Syria and Iraq. The main purpose of the survey was to search and identify any earthquake-induced change in the lake floor sediments, which were possibly resulted from the 2011 Van earthquake (up to 7.2 in magnitude). More than 650 line-km-long records of a chirp-type acoustic profiler were achieved along previous survey tracks made before the 2011 earthquake. Six cored samples were also recovered in the eastern part of the lake floor using a handheld gravity corer. Several signatures in the acoustic images indicating syn- or post-earthquake deformation, movement or redeposition of the lake floor sediments could be recognized along with subaqueous slope failures and shallow gas anomalies. In some records new acoustic turbid zones were found, which were invisible in the previous survey records acquired before the 2011 Van earthquake and possibly be formed during the period of ground movement. This study shows a good example of repetitive surveys applicable to investigate and monitor subaqueous hazardous elements and their characteristics in earthquake-prone areas.

Keyword

Lake Van, Turkiye, lake floor, earthquake, hazard