



## **Landslides triggered by the 1949 Khait Earthquake, Tien Shan, Tajikistan**

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Landslides triggered by the 1949 Khait earthquake, Tajikistan, are largely undocumented due in part to the remoteness of the region and the suppression of disaster details by the Soviet regime then in power. We have carried out a review of Soviet era Russian-language literature, including the classic works of Gubin and Leonov, and a recently undertaken field investigation in the epicentral area, including interviews of survivors of the earthquake. The affected area of the Tien Shan is composed of steep rock slopes frequently mantled by Quaternary loess, which is also of substantial thicknesses on valley floors. The July 10, 1949 M7.4 earthquake was preceded by numerous strong foreshocks and followed by major aftershocks. The series of earthquakes triggered a large number of mass movements. The Khait landslide began as a major rockslide in the Obi-dara valley and was transformed into a high-velocity catastrophic flow by entrainment of saturated loess from the valley floor and valley side. The rockslide-loess flow (est. vol. 40 Mm<sup>3</sup>) ran out 11 km over a vertical distance of only 1500 m (fahrböschung of 8 degrees) and buried the villages of Khait and Kusurak resulting in the deaths of an estimated 18,000 people. In the Yasman valley hundreds of earthquake-triggered loess flowslides coalesced to form a gigantic high-velocity loess flow (est. vol. 100 Mm<sup>3</sup>) that swept 20 km down the Yasman valley burying at least 20 villages (kishlaks) and, based on the population of a typical kishlak, killing an estimated 13,000 people. Several large flowslides in the adjacent Surkhob Valley buried a number of additional villages. We estimate a total death toll from earthquake-triggered landslides in the epicentral area to be in the order of 38,000. Our results thus indicate that the 1949 Khait earthquake was responsible for one of the most devastating regional landslide disasters in history.