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Slope instability related to permafrost changes on Mexican volcanoes

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Permafrost is present above 4,500 meters at the three highest Mexican mountains, Citlaltépetl, Popocatépetl and Iztaccihuatl (5,675, 5,452 and 5,286m asl, respectively), all active volcanoes. During the rainy season in the central region of Mexico, the occurrence of small debris-flows in the ice-free parts of the mountains, as well as small lanslides is frequent. At Popocatépetl volcano, flows are mostly related to a combination of the eruptive activity and climatic factors. However, the volcanic activity is different at Citlaltépetl and Iztaccihuatl where there is no eruptive activity, but landslides have occurred in recent years on their steep slopes because its stability has been altered as a result of an increase in the air temperature which in turn has caused variations in the thickness of the active layer of permafrost, causing as a consequence, the increase of an even more unstable soil. Additionally, cracks in the rock walls are subject to an increasing hydrostatic pressure due to continuous daily freezing and thawing of seasonal water produced by a warmer and less solid precipitation accumulating in the cracks over time and in the unconsolidated potentially unstable material.