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Lahar modelling for Isluga and Lascar volcano, northern Chile: Insights for hazard assesment

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One of most suitable and widely used software to model lahars correspond to LAHARZ, which allow to construct areas of potential inundation based in uses of mass-flow volume, planimetric or cross-sectional areas inundated, mass-flow source locations and drainage network. Despite that northern Chile is characterized by its hyper arid climate, intense rain periods occur frequently in January and February during the “Altiplanic Winter”, being a common phenomenon in the Western Range, where active volcanoes are mainly located. These rains can be a potential source to produce lahars in active volcanoes, particularly if is contemporary to explosive eruptive activity. We built different models for two active volcanoes from northern Chile, corresponding to Isluga and Lascar. We used 12.5 m resolution DEM, and the lowest and highest volume of rainwater was considered in two different months for a standard year in each volcano (0.5 and 121 mm for Isluga; 0.8 and 46 mm for Lascar). Two eruptive scenarios were considered, corresponding low and high volume explosive eruptions, 0.001 and 1 km³, respectively. In the case of Isluga volcano, the proximal hazard zone has a mean diameter of ~5.1 km, whereas the maximum length of lahars deposits varied from 0.75 to 9.45 km. For Lascar volcano, the mean diameter of proximal hazard zone is ~3.8 km, and the maximum length of lahars ranged between 2.3 and 10.4 km. According to our models, although little villages located in the SW and S flanks of Isluga volcano (~8.5 km from active crater) seem not be affected by lahars, the road between Colchane and Salar de Surire, which connect those villages, could be effectively affected. In the case of Lascar, only the livestock farm called Tumbres, located 8 km NW from active crater, could be affected by lahars.