

Analysis of the lahars associated with the 2011 Cordón Caulle eruption, Chile

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We present an analysis of lahar events associated with the 2011 eruption of Cordón Caulle volcano (Chile). The main 4-6 June phase, characterized by plumes heights of 7 to 11 km, dispersed about 1 km³ of tephra towards Argentina, depositing between 1 m (15 km from vent) and 6 cm (240 km from the vent) of tephra on the ground. On 10 June 2011, a major lahar occurred close to the Argentina-Chile border that reached the National road 231 (26 km from the vent). At the same time, floods also occurred in the town of Villa La Angostura (48 km from the vent) due to the high concentration of pyroclastic material in the river. Here, we combine field observations and numerical simulations to analyse lahars events that occurred during the first 15 days of eruption around the town of Villa La Angostura. The spatial distribution of potential lahar sources was modelled with an infinite slope stability model considering deposit grain-size and thickness, rainfall data and slope angle. Lahar spreading has also been investigated with numerical simulations. Outcomes are calibrated with field observations and use to constrain critical conditions for lahar triggering. This approach constitutes a first step towards a better characterization of the lahar hazard in the South Andes volcanic region, aiming at the compilation of better emergency management plans.