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The kinematics of lahars generated during the eruption of Villarrica volcano on March 3, 2015

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On March 3, 2015, Villarrica volcano exhibited a ~1.5 km high lava fountain that generated rapid avalanches of hot scoria mixed with snow and ice. Some of these avalanches eroded the ice cap, created channels and added meltwater to the flows which quickly developed into lahars. The timing of these events were captured by webcam and manual photographs as well as direct visual observations. Using acoustic arrays we measured lahar velocities of up to 38 m/s near the source for a lahar that descended in the Correntoso-Turbio drainage. Despite the acoustic interference of the lava fountain and strombolian activity, we were also able to distinguish different lahars and flow pulses travelling down into the Correntoso valley (NW). These observations are consistent with local seismic records and analysis of the deposits left by these flows within 10 km of the crater. This presentation shows the capabilities of acoustic (infrasound) arrays to detect lahars near the source and to measure flow speed, which can be used to estimate the time of their arrival to populated areas. In addition, using acoustic data to analyse the flow path, flow pulses (or waves) and their speed - i.e. the kinematics of the lahars - is a valuable contribution to the understanding of the origin and characteristics of lahars, as is demonstrated by the data collected regarding the lahars generated at Villarrica volcano.