



Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile

'Understanding volcanoes and society: the key for risk mitigation'



The July 10-11, 2015 exceptional eruption at Volcán de Colima: understanding an unexpected eruptive scenario based real-time data, field and imagery survey.

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Keywords: Colima, pyroclastic density current, dome collapse, volcanic hazard

On July 10-11, 2015 an eruption occurred at Colima volcano and produced 10.5 km long pyroclastic density currents (PDCs) along the Montegrande ravines. The summit dome was destroyed and a new crater excavated and breached to the south. At the lahar monitoring station installed at 6.5 km from the crater, a camcorder captured images of one of the first pulses of the pyroclastic flow, and an Acoustic Flow Monitor (10 Hz geophone measuring the vertical component of the ground vibration, with sampling rate at 250 Hz) recorded the signal of the flow before being completely destroyed. A velocity of 10 m/s was estimated at this point, and from the AFM two main peak of frequency at 15 and 25 are observed, giving important hints on the internal dynamic of the recorded PDC. The deposit from the PDC that destroyed the station show a 1 cm-thick basal layer of fine ash, surmounted by an inversely graded, matrix rich, block-and-ash flow deposit. The grass below the unit is partially burned but no erosion was observed. The deposits are mostly monolithological in composition with dense, dark-grey lava block, up to 2.5 m in diameter, vesicular lava fragment, and hydrothermally altered lava clasts from the breached old edifice. Ash fall from the phoenix plume mostly consists of angular fragments of partially vesiculated glass, crystals and centimetric ash aggregates. The PDC from the 10-11 July 2015 eruption extended far beyond the existing hazard assessment for PDC from dome collapse, indicating that a better hazard evaluation based on a probabilistic approach should be applied to avoid epistemic uncertainties when hazard evaluation is based only on observed past events or a specific scenario. Project found by PAPIIT-DGAPA IN105116.