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



Quantification of volcanic risks: experience of recent large run-out PDCs at Volcán de Colima, Mexico

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During July 2015 Volcán de Colima, Mexico had its largest eruption since the last major sub-Plinian event in 1913. This eruption has important consequences not only for the local population, but also for hazard zonification in general, given the extraordinary distances reached by the pyroclastic density currents generated by the eruption (10.6 km). The July eruption was the peak in activity that commenced in January 2013 and continues to the present (August 2016). This eruptive period has been characterized by frequent variations in eruption style and effusion rate. Significantly, little warning was given prior to the eruption and risk mitigation actions were only carried out subsequently.

Currently the PDC deposits are being studied in an attempt to understand the large mobility of the series of flows, which can be attributed to unusually small clasts, large gas volumes and high temperatures combining to enhance fluidity. Observations of vegetation damage and analysis of the deposits are enabling the definition of the transport processes. The climactic sequence of explosive events featured efficient fragmentation of a large, gas-rich ascending magma volume, which conversely did not attain the buoyancy to produce a typical high altitude explosion column. A collapse occurred, which included a proportion of the crater rim adding to the volume of material. We are currently detailing the evolution of the summit area prior to the eruption using photogrammetric methods on photographs and thermal images.

Recent hazard and risk maps of Volcán de Colima did not contemplate the July 2015 eruptive scenario and hence simulations are now being run to better understand the processes and permit the updating of the maps. Fortunately nobody was hurt during the eruption, and it raised awareness of a new and potentially dangerous eruptive style, illustrating the importance of continued vigilance.