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



Multidimensional study of landslide hazard on Concepcion and Maderas Volcanoes (Ometepe Island, Nicaragua) for reducing risks to the surrounding communities

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Residents of volcanic landscapes are vulnerable to eruptions and earthquakes where volcanism is active and landslides, lahars and flooding regardless of activity. Such is the case for Ometepe, an island formed from a pair of volcanoes, one active and the other less so, located in Lake Nicaragua. Steep slopes and tropical storms yield frequent surface movements presenting potential for catastrophes. Climate and land-use changes intensify hazard potential, but land-use changes continue unregulated and the area lacks an adequate system of weather monitoring across the volcanic edifices and over time. Particularly in the case of Maderas Volcano, infrastructure such as aqueducts supplying entire communities with water is highly vulnerable to damage from lahars. Such damages occur annually during the rainy season. A collaborative project was formed to utilize a M.S. student serving in the Peace Corps on Ometepe Island and a local M.S. student to estimate current hazards for lahars, to establish meteorological monitoring to continue data collection, and provide means for hazard warnings. Meteorological data has been collected using weather stations beginning January 2016. Lahar/landslide susceptibility maps for Maderas were created to complement those previously developed for Concepcion. Both qualitative and quantitative procedures were implemented in hazard map creation, utilizing results to introduce risk reduction techniques to both the local communities and vulnerable infrastructure by highlighting lower risk corridors down slope. In conjunction with a local NGO, development and dissemination of the maps were implemented with community leaders, governmental officials, and local producers, emphasizing grassroots mitigation and response as well as land-use improvement. This study provides data and results for the thesis research of both students and provides a foundation for the continuation of projects. Collaboration was valuable for joining expertise, coupling local knowledge of the landscape and access to satellite data, and facilitating small-grant funding to acquire weather stations.