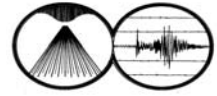


The frequent lahar threats to communities around Rincón de la Vieja Volcano, Costa Rica

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Abstract

The Rincón de la Vieja ($10^{\circ} 49' 40''$ N, $85^{\circ} 19' 42''$ W, 1700 m a.s.l.), andesitic stratovolcano is located at about 25 km NE of Liberia city, in NW Costa Rica, on the Guanacaste volcanic range. Its historical volcanic activity takes place in the Active Crater (hosting a 200 m wide hot-acidic lake), is characterized by the occurrence of several phreatic and phreatomagmatic eruptive events that produce frequent lahars affecting mainly the northern low lands. Minor effects by ash, water contamination and acid rain are brought by these episodes to other communities in other directions.

Rincón has had several eruptions in the last 40 years, being the most recent: 1966-67, 1983, 1987, 1991, 1995 and 1998. Communities like Dos Ríos de Upalá, Gavilán, Buenos Aires and others are subject to frequent threats besides their common hazards by their hostile weather. Located some 7 km North from the active crater these communities have endured in the past the loss of plantations, bridges, roads and communication among them.

No specific local emergency plans have been designed to these communities. An informal alert system was set up by the National Emergency Commission and fortunately since it was installed there has not been the chance to test its usefulness. Meanwhile communities are in need of organization and understanding of the elements threatening them. Only in recent years some of these communities around volcanoes have been taken into account in regional emergency governmental plans. Very few have specific organizational, response, evacuation or preparedness plans. Thus, they have been historically neglected to play a primary role in volcanic emergency plans. Specific studies to assess perception, level of organization, resources and capabilities will be needed in the near future in order to create fundamental links between scientists, state emergency agencies and settlers.

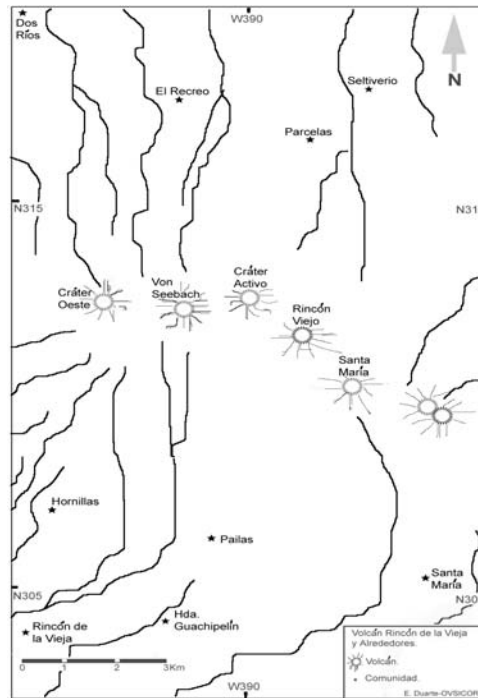
Due to topographical conditions the north flanks are more prone to the impact by lahars. Nonetheless, in past events there has been reports of fine sediments flowing down the south streams, in such case the impact over drinking water is more acute due to the dry weather conditions in that area.



Since its last phreato-magmatic event, Rincon de la Vieja volcano has sustained intermittent phreatic events. Degassing hence, is a common feature from the acidic-hot lake and surrounding fumaroles.



During phreatic activity ash plumes rise several kms above the summit provoking the strong winds to disperse fine material as far as the Pacific Coast (some 50 kms W). Heavy impact on natural vegetation has been documented in the summit zone. Metric impact craters were measured after the activity in november 1995. Minor impact was assessed further down the flanks, west of the active crater. The evacuation of the lake caused several lahars to run down the north walls and as far as 18 kms N on the lower flatlands.



Impact of lahars in local economy is serious as it is the fact that most of communities get their drinking water from the affected streams. No plan, at this point, has been envisioned to manage such a problem. Fortunately the area is blessed with plenty of rain which rapidly washes away polluting solids.

During lahar events some streams get deeply eroded instead of building up due to sedimentation.



Both N and S communities located in the lower areas of the volcanic edifice are differentially impacted by Rincón's activity. Growing tourism in these areas is an extra concern in case of reactivation.

Lahars moving north along the lower lands in repeated occasions have interrupted the way by destroying bridges, leaving incommunicated communities like Buenos Aires, El Gavilán y Colonia La libertad, thus affecting the regular movement of agricultural products to their market. Small patches of cultivated land have also been impacted.

In cases, riverbeds change greatly their topography; in the steep areas erosion is acute and in the lower lands sediments and big blocks rise the usual level. During the lahars from may 1991, deposits reached up to 18.5km, near the community known as Birmania.



Conclusions

It is necessary to implement response and emergency plans to reduce the negative impact of Rincón's enhanced activity. This wealthy region can greatly be benefited from a better organized set of communities ready to act during extraordinary events. Ways of disseminating our knowledge of the volcano must also be included in an integrated educational platform.