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Assessing the vulnerability of the evacuation emergency plan: the case of the El Hierro, Canary Island, Spain

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On July 17, 2011 an unrest was detected in the El Hierro island. A serretian submarine eruption started on October 10th in the southern area of the island, two miles away from La Restinga village. The analysis and interpretation of seismic and deformation data show a large volume of intruded magma. These data also show a high probability of a new vent opening.

One of the most complex volcanic hazard scenarios is a new open vent in the El Golfo Valley, in the north slope of the island, where more than 5,000 people live. In this area there are only two possible terrestrial evacuation routes: 1) HI-1 road NE direction, the fastest but most vulnerable one, very near a 1,000 meters height cliff and through a 2 km tunnel with a structural deficiency that had to be closed during high energy periods of seismic activity; and 2) HI-1 road SW direction, a mountain road with many curves, frequent small landslides and fog.

The Emergency Plan of the island takes into account the entire evacuation of El Golfo Valley in case of eruption. This process will be carried out by means of an assisted evacuation. The evacuees will be transported to a temporally regrouping shelter outside the valley to organize the transport to Tenerife Island. Only those people who have a second residence or relatives outside the affected area will be able to remain in the island.

The evacuation time estimated by authorities for the entire evacuation of El Golfo Valley is of about 4 hours. This is extremely low considering: the complexity of the area; the number of evacuees; the lack of preparedness by the population; and adverse weather conditions.
To evaluate the Evacuation Plan vulnerability, a series of evacuation scenarios have been simulated: self-evacuation; assisted evacuation; both terrestrial evacuation routes. The warning time, the response time by the population and the evacuation time have been taken into account.