

Risk analysis of Colima volcano, Mexico

Carlos Suarez-Plascencia¹, Miguel A Camarena-Garcia¹, Francisco J Nunez-Cornu²

¹CUCSH/Univ. of Guadalajara, Department of Geography, Guadalajara, Jalisco, Mexico, ²CUC/Univ. of Guadalajara, SisVOc, Puerto Vallarta, Jalisco, Mexico

E-mail: csuarez@cencar.udg.mx

Colima volcano, also known as Volcan de Fuego (19 30.696 N, 103 37.026 W), is located on the border between the states of Jalisco and Colima and is the most active volcano in Mexico. Began its current eruptive process in February 1991, in February 10, 1999 the biggest explosion since 1913 occurred at the summit dome. The activity during the 2001-2005 period was the most intense, but did not exceed VEI 3. The activity resulted in the formation of domes and their destruction after explosive events. The explosions originated eruptive columns, reaching attitudes between 4,500 and 9,000 masl, further pyroclastic flows reaching distances up to 3.5 km from the crater. During the explosive events ash emissions were generated in all directions reaching distances up to 100 km, slightly affected nearby villages as Tuxpan, Tonila, Zapotlan, Cuauhtemoc, Comala, Zapotitlan de Vadillo and Toliman.

During the 2005 and January 2013 this volcano has had an intense effusive-explosive activity, similar to the one that took place during the period of 1890 through 1900. Intense pre-plinian eruption in January 20, 1913, generated little economic losses in the lower parts of the volcano due to low population density and low socio-economic activities at the time.

Shows the updating of the volcanic hazard maps published in 2001, where we identify whit SPOT satellite imagery, helicopter flights and Google Earth, change in the land use on the slope of volcano, the expansion of the agricultural frontier on the east and southeast sides of the Colima volcano, the population inhabiting the area is approximately 533,000 people, and growing at an annual rate of 1.6 percent, of the total population, 60 percent live in towns with less than 250 inhabitants, also the region that has shown an increased in the vulnerability for the development of economic activities, supported by the construction of highways, natural gas pipelines and electrical infrastructure that connect to the Port of Manzanillo to Guadalajara city.

The update the hazard maps are: a) Exclusion areas and moderate hazard for explosive events (rockfall) and pyroclastic flows, b) Hazard map of lahars and debris flow, and c) Hazard map of ash-fall.

The cartographic and database information obtained will be the basis for updating the Operational Plan of the Colima Volcano by the State Civil and Fire Protection Unit of Jalisco, Mexico, and the urban development plans of surrounding municipalities, in order to reduce their vulnerability to the hazards of the volcanic activity.