



Upgrading the seismic and geodetic network of the Popocatépetl volcano (Mexico).

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The Popocatépetl is one of the most active volcanoes in Mexico and is located only 70 km from Mexico City, populated by more than 20 millions of people, and only 35 km from the Puebla municipality with almost 1.5 millions of people living. The recent activity of the volcano is generally marked by explosions emitting ash plumes often reaching the densely populated regions.

In the framework of the Mexican Fund for Prevention of Natural Disasters (FOPREDEN) we are renovating and upgrading the existing geodetic and seismic networks monitoring the volcano. In this project we are installing 10 broadband seismic stations (120s-050Hz) in shallow boreholes (3-5m depth) and 4 GPS with real time sampling rate of 1 Hz. All instruments are equipped with continuous recording systems for real time monitoring purposes and research.

The Popocatépetl exceeds 5400m, and the altitude of the stations ranges from 2200 m to 4300 m making it difficult their installation and maintenance. Because of ash emissions and the hard working condition, the real-time transmission is split into two systems in order to ensure the monitoring of the volcano also during the highest expected activity. Therefore we set up a network of “first order”, consisting of four stations located about 20 km from the crater and equipped with satellite transmission. These stations, being far enough from the crater, ensure the real time monitoring of the major events also during intense periods of activity of the volcano.

The remaining six stations are installed near to the crater (less than 10 km) and take part of the “second order” network equipped with a telemetered radio system transmitting the data either directly to the National Center of Disaster Prevention (CENAPRED) and National Seismological Service (SSN) or to the first order stations (for the sites that have not direct visible line with the monitoring centers).

The four GPS sensors are all installed in the second order sites in order to monitor the largest deformations at the top of the volcano.

In this work we show both the installation procedure of the boreholes seismometers in hard conditions and their improved performance with respect to the actual stations installed at surface and the scheme of the transmitting system for ensuring the monitoring of the Popocatépetl volcano in all the possible scenarios of its activity.