



THE IMPLEMENTATION OF A VOLCANO SEISMIC MONITORING NETWORK IN SETE CIDADES VOLCANO, SÃO MIGUEL, AÇORES

N. Wallenstein (1), A. Montalvo (1), U. Barata (1), and R. Ortiz (2)

(1) Centro de Vulcanologia e Avaliação de Riscos Geológicos, Universidade dos Açores, Rua Mãe de Deus, 9501-801 Ponta Delgada, Portugal, (2) Departamento de Vulcanologia, Museo nacional de Ciencias Naturales, C.S.I.C., Madrid, Spain (nw@notes.uac.pt/Fax +351-296650142)

Sete Cidades is one of the three active central volcanoes of S. Miguel Island, in the Azores archipelago. With a 5 kilometres wide caldera, it has the highest eruptive record in the last 5000 years with 17 intracaldera explosive events (Queiroz, 1997). Only submarine volcanic eruptions occurred in Sete Cidades volcano-tectonic system since the settlement of the island, in the 15th century. Small seismic swarms, some of which were interpreted as being related with magmatic and/or deep hydrothermal origin, characterize the most recent seismo-volcanic activity of Sete Cidades volcano.

To complement the regional seismic network, operating since the early 80's, a new local seismic network was designed and installed at Sete Cidades Volcano. It includes 5 digital stations being one 5-seconds three-component station located inside the caldera and four 10-seconds one-component stations placed on the caldera rim. The solution found for the digital telemetry is based on UHF 19,2 Kbps radio modems linking four of the seismic stations to a central point, where the fifth station is installed. At this site, signals are synchronised with a GPS receiver, stored in a PC and re-transmitted to the Azores University Volcanological Observatory by an 115,2 Kbps Spread Spectrum 2.4 Ghz Radio Modem Network.

Seismic signal tests carried out in all the area showed that cultural and sea noise, as well as some scattering effects due to the geological nature of the terrain (composed by thick pumice and ash deposits) and the topographic effects are factors that can not be avoidable and will be present in future records.

This low cost network with locally developed and assembled components, based on short-period sensors without signal filtering in the field and digital telemetry, will improve the detection and location of low magnitude events in the Sete Cidades volcano area. Future developments of this program will include the installation of a seismic array inside the caldera to identify and characterize LP events and volcanic tremor signals.