



## **High resolution seismic imaging of highly heterogeneous media : An experiment on the Puy des Goules volcano, France**

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Near-surface seismic imaging is hampered by highly heterogeneous media. Wave propagation in such media undergoes scattering phenomena, seismic energy losses and deformation of the wave fronts. These are significant limiting factors for the detailed imaging of specific geological objects. We focus here on the mapping of the inner structure of a strombolian type volcano cone located in central France, the Puy des Goules. This strato-volcano cone is 1 km wide and 200 m high. It is seven thousand years old and thus fairly preserved from erosion. This type of structure is of particular interest because it presents strong seismic impedance contrasts between the outer low velocity volcanic cinder deposits and the inner high velocity feeder conduits. We first performed small scale seismic experiments as well as numerical simulations in order to design the main experiment geometry. The field work took place in November 2004 and involved 15 persons during one month. We deployed 210 standard 2 Hz velocimeters spaced 20 meters apart according to a 2D pattern as well as 48 geophones spaced 10 meters apart along a linear antenna. Data acquisition was monitored in real time by radio communication between the recording stations. Most of the instrumental equipment is part of the recently developed French National High Resolution Seismic Imaging Network (IHR). Dynamite shots at 30 locations and a M22 vibrator operating at 870 vibration points were used as seismic sources. We present the first results of the campaign obtained by analyzing the first arrivals and waveforms. In particular, we will emphasize the importance of survey planning and the choice of an adapted inversion scheme to image decametric geological objects within a highly heterogeneous volcanic structure.