



Multiply scattered waves as a tool for better understanding seismic and chemical activity at Fogo volcano, São Miguel, Azores

F. Martini (1), C. Riedel (2), F. Viveiros (2), C.J. Bean (1), G. Saccorotti (3), R. Silva (2), N. Wallenstein (2)

(1) Seismology and Computational Rock Physics Lab., Geophysics Research Group, School of Geological Sciences, University College Dublin, Dublin, Ireland (2) Universidade dos Açores, Centro de Vulcanologia e Avaliação de Riscos Geológicos, Ponta Delgada, São Miguel, Azores (3) INGV-OV, Napoli, Italy (contact: Francesca.Martini@ucd.ie)

Multiply scattered waves are an effective tool for monitoring changes in the Earth's subsurface. We are attempting their exploitation as a tool for volcano monitoring and for a better understanding of volcanic systems. Field data from Fogo show families of repeating almost identical earthquakes (multiplets). Although the early wavetrains are effectively identical, later coda arrivals show distinct changes with time. The coda are created by multiply scattered waves which have "sampled" the medium more than the ballistic arrival, detecting small changes in the medium not captured by the early arrivals. In a previous study (Martini et al. 2005), we analysed a dataset collected at Sao Miguel from April to July 2003, with a focus on a swarm that occurred on the 26th April. The coda wave interferometry technique (Sneider 2002) was used to identify source movement and the results were found to be consistent with the ones obtained by more classical source location techniques. The results were also related to temporal fluctuations in gas emissions recorded at the ground based CO₂ monitoring stations on the island. The results of the temporal and spatial behaviour of seismicity integrated with the coda wave interferometry was suggestive of fluid involvement in the seismicity. Here we extend our analysis to a longer temporal series (2003-2004) to look at the longer term role of a degassing process as a possible cause of seismicity at Fogo volcano.