



High precision locations of the seismicity accompanying the 2007 Stromboli eruption.

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In a volcanic environment, the migration of earthquakes usually suggests the potential movement of magma toward the surface. High precision in earthquake locations, therefore, constitutes one of the most important elements for accurate seismic investigation to understand the relation between the migration of hypocenters and the volcanic processes of intrusions. Stromboli is considered one of the most active volcanoes in the world, and its persistent but moderate explosive activity is only interrupted by occasional episodes of more vigorous activity accompanied by lava flows. A new effusive eruption began on late February, 2007. Intense seismic activity (Long-Period, Hybrid, Volcano-Tectonic events) characterised the whole period of this eruption. The accurate seismic signals analysis showed the presence of groups of events with similar waveform signatures (i.e. multiplets) located in a roughly 1 km sq. area, beneath the crater region. Since traditional location techniques do not allow obtaining reliable hypocenters, our analysis focused on high precision locations of the seismicity accompanying the 2007 Stromboli eruption, in order to better define the source geometry of the events. Hypocenters, therefore, have been relocated considering two steps: (i) identification of the multiplet families; (ii) application of a highly precise relative location technique. In this manner we were able to reduce the scatter of hypocentres significantly. Compared to the standard location the volume occupied by the foci contracted to $\sim 5\%$. Finally, the spatial and temporal distribution of hypocentres were correlated with the eruptive activity. Overall, the results highlight that the high precision locations method is an efficient and quick tool to obtain a better understanding of

the magmatic processes occurring during an ongoing eruption.