



Recent seismicity detection increase at Santorini' s volcanic islands

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Santorini is the most active volcano in the southern Aegean volcanic arc. To improve the seismological network detectability of the Santorini seismicity, the Institute of Geodynamics of the National Observatory of Athens (NOA) installed 6 new seismological stations. The addition of these stations which begun in the year 2010 has significantly improved the detectability and reporting of the local seismic activity in NOA's instrumental seismicity catalog.

Anomalous spatial and temporal changes in the b-value of the frequency-magnitude relationship and changes in the seismicity rate have been reported for many active volcanoes and have been used for the mapping of active magma chambers.

In this study we present the results from a quantitative analysis of the seismicity in the Santorini volcanic complex using the seismicity catalog of NOA. From these results we observe a significant detection increase after the year 2010 mainly for events of small magnitudes and an increase in the seismicity rate by more than 100%. The statistical significance of this rate change is determined and mapped with the z-value method and it is found that the seismicity rate increases significantly within the two main active fault zones of the volcanic complex, in a zone perpendicular to the extensive tectonic regime that characterizes this region.

Temporal variations in the b-value for different time periods indicate a rather homogeneous behaviour of the frequency-magnitude curves. The spatial distribution of the b-value is shown to vary around the volcanic complex exhibiting low b-values in the two main regions of seismic activity. A b-value cross section of the volcanic complex indicates relatively high b-values under the caldera and a significant b-value decrease with depth.

The results from this study are found to be in general agreement with the results from other volcanic regions and they encourage further investigations concerning the seismic and volcanic hazard and risk estimates for the Santorini volcanic complex using the earthquake catalog of NOA.