



New developments in radon monitoring at Stromboli volcano

Cigolini C.(1), Ripepe M.(2), Laiolo M.(1), Coppola D.(1); Ulivieri G. (2)

(1) – Dipartimento di Scienze Mineralogiche e Petrologiche, Università di Torino, Italy

(2) – Dipartimento di Scienze della Terra, Università di Firenze, Italy

We investigated the distribution of radon soil degassing at Stromboli volcano. We used E-PERM electretes (1-4 days exposure) and Track-Etch detectors (20-40 days exposure) to evaluate background levels and anomalous values in radon emissions for the operating radon network consisting of 25 stations. These values were used to construct keys maps that identify radon anomalies due to changes in volcanic activity and/or the occurrence of major seismic events. Higher emissions are concentrated at the summit and along the NE sector of the island (controlled by faults trending N40 and N60).

Automated radon measurements started since May 2005 at two distinct summit sites. Data processing outline a general correlation between atmospheric pressure and radon degassing. Moreover, comparison of our data with those collected by INGV on carbon dioxide shows a very strong correlation, thus further supporting the idea that CO₂ is an active “radon carrier”.

Measurements of the radon progeny (²¹⁸Po and ²¹⁴Po) give us a clue to discriminate between the residing gas in the porous medium and the “new coming” ²²²Rn parent which is related to deeper degassing.

We finally analyzed the link between radon emissions and volcanic tremor. The overall data shows a general time-correlation between the two parameters. Variations in radon emissions are more irregular and occasionally reach a positive peak with a relative delay of few days. This indicates that radon degassing may also be modulated by variations in volcanic tremor.