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Real Time 222Rn Measurements at Stromboli Island

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Geophysical survey is employed for natural hazard and geological risk mitigation in many natural context, the real-time monitoring of several physical parameters is a powerful tool in the surveillance of volcanic and seismic area. Monitoring gas emanation from soil allows to get information about volcano activity, fault surveillance as well as the analysis of the hydrothermal systems. Radon emission from soil at Stromboli Island has been monitored since 2000 up to present days using an "ad hoc" multi-parameter real-time set-up able to measure 222Rn together with the environmental factors that mostly influence its soil concentration. The detection system is presented and discussed. From the data analysis, atmospheric pressure, soil humidity, soil temperature show to be the local variable factors that exert the main influence on radon results. Special care was paid for soil humidity values: from the real time collected data the great influence of soil humidity on radon variations is stressed. Radon concentration shows a stronger correlation with soil humidity than that with the widely investigated temperature variation. A signal processing analysis (Power Spectral Density by Fast Fourier Transform) has been done on the all data set: radon concentration peaks follow the variation of atmospheric pressure and soil temperature with an average time delay of 12h and 24h respectively. The performance of the detection set up are discussed in the frame of Stromboli geophysical survey.

Primary author: LAVAGNO, Andrea (Politecnico di Torino)

Co-authors: CIGOLINI, C. (Università di Torino); MARINO, C. (Università di Torino); COPPOLA, D. (Università di Torino); GERVINO, G. (Università di Torino); LAIOLO, M. (Università di Torino)

Presenter: LAVAGNO, Andrea (Politecnico di Torino)

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