



## **Continuous monitoring of soil CO<sub>2</sub> flux in tectonic active area of Sicily: relationship between gas emissions and crustal stress**

Marco Camarda, Sofia De Gregorio, Rocco Favara, and Roberto M. R. Di Martino

Istituto Nazionale di Geofisica e Vulcanologia, sezione di Palermo, Palermo, Italy (sofia.degregorio@ingv.it)

Tectonic active areas are subjected to continue modification of the stress fields as result of the relative movement of portions of the crust. In these areas the stress generated the seismogenetic processes and at same time produces detectable modifications in the shallower portion of the crust such as superficial deformation, increase or decrease of pore pressure and change in fluids circulation. As results a wide variety of changes can be recorded in several parameters due to stress field modifications. The aim of this study was to monitor in continuous soil gas emissions of selected tectonic active area of the Sicily in order to investigate the relation between changes on this parameter and stress field modifications linked to seismogenetic processes. For this reason, in cooperation with DPC Sicilia a network of 20 stations for continuous monitoring of soil CO<sub>2</sub> flux in the main seismic area of Sicily was deployed. The selection of the monitoring sites was based on a detailed geological structural study aimed to recognize active tectonic structures and on geochemical survey for identifying areas of anomalous degassing along the structures. Time series of soil CO<sub>2</sub> flux long from 1 to 3 years were obtained. The acquired series were filtered for removing atmospheric parameters induced variations by applying the fast Fourier transform (FFT) and regression analysis. The results of comparison of filtered signals showed as almost all the stations have a low coefficient correlation, indicating that the recorded variations are likely due to minor stress modification having small spatial scale. A discrete correlation was founded between the signals of three stations placed in the same tectonic context in north-eastern sector of Sicily. Interesting these stations showed a contemporary steep increase few days before the onset of seismic sequence, with events of magnitude up to 4.4, occurred in August 2013 in the northeastern Sicily. The concomitance of change in soil CO<sub>2</sub> flux and onset of seismic sequence suggest that the two phenomena could be trigger by the same processes acting in the crust.