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Measure of CO₂ fluxes diffused from the soil (Φ CO₂) released from active volcanoes brings profound insights into our understanding of volcanic processes, as a matter of fact strong CO₂ soil flux variations were recorded before and during the last eruptions on Mt. Etna. In order to further our understanding of the volcano dynamics concerning soil's degassing, a network for measuring geochemical parameter (ETNAGAS) stations was installed on the flanks of Mt. Etna. This network contributes to volcano monitoring since December 2002. Today, ETNAGAS consists of 19 automatic stations located close to the main volcanic structures of the Mt. Etna, in areas of the volcano characterized by strong soil CO₂ emissions. The monitoring stations of the network were entirely developed by the INGV at Palermo; they are able to monitor different parameters, such as CO₂ (eventually CH₄) soil flux, T, P, rain, Rh, wind speed and wind direction, and data are acquired at hourly intervals. The soil CO₂ flux measuring system follows the principles proposed by Gurrieri and Valenza (Gurrieri & Valenza 1988) which is based on CO₂ content in a mixture of air and soil gas (dynamic concentration, Cd).

A multi network management software has also been developed in order to allow stations handling and data elaboration. The software was developed for a LINUX environment and consists of several modules for data acquisition, processing, visualization and early warning generation. The remote stations are connected by radio modem and/or GSM modem to the Geochemical monitoring laboratory of the INGV at Palermo, where data are real-time processed and used for surveillance of the volcano.

We report here on the very large Φ CO₂ variations recorded by the above network during the last 5 years during eruptive periods, in particular we show the results about the 2004-2005 and 2006 eruptions on Mt. Etna.

These results suggest the importance of continuously monitoring the CO₂ emitted from soil to the surveillance of volcanic activity in this area, and open up an interesting scenario for the surveillance of this volcano.