



Temporal and spatial variations in soil CO₂ flux exhaled in peripheral areas of Mt. Etna during the last two years

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Mt. Etna is the highest volcano in Europe, up today it reaches about 3320 m a.s.l. It is located in the eastern coast of Sicily (Southern Italy) which is characterized by intense tectonic activity and magmatism (Hirn et al., 1997). The Mt. Etna has a very intense degassing (Gerlach, 1991, Allard et al., 1991) which occurs both from top craters and along its flanks, mainly along the active structures (D'alessandro et al. 1995, Giannanco et al., 1998). In order to monitoring the volcanic activity, since 1989, several soil CO₂ flux measurements have been periodically carried out in some areas of the volcano characterized by high CO₂ emissions. In particular, the selected areas are located in the SW zone around the Paternò village and in the eastern part of the volcano, around the village of Zafferana Etnea. The measurements of CO₂ flux in the areas are performed in a regular grid of about 70 sites. In the past the highest values of CO₂ flux were recorded before the 1991-1993 eruption. This was the most important eruption of the last three century as regard of amount of erupted magma volume (Barberi et al., 1993). Generally till now the data about peripheral degassing have been considered only in term of total mean flux leaving aside any consideration about the spatial distribution in the single area. In the last two years, besides simply considered the variations of mean flux, an analysis of spatial distributions variations has been undertaken in order to better understand the relationships between volcano system modifications and diffuse degassing. During the same period two anomalous episodes were recorded one on May - September 2005 and the other, on May - July 2006. These two periods showed on the whole different characteristics. The first anomaly was more intense in the Zafferana area and was coupled with an intense seismic activity recorded, nearby this area. Otherwise the second episodes showed the greatest

intensity in Paternò area and coincided with the occurrence of several earthquakes, with hypocentre placed about 10 km depth, few kilometers north of the Paternò. Furthermore both the episodes were associated with significantly modifications on spatial distribution of soil CO₂ with shapes and the extents quite different each other. The two anomalies were due to movement and/or arrive of magma batches. The differences being between them reflect inequality in the modality and/or type of the magma rising process. Regarding the occurrence of the last eruptive period (July – December 06) should be noted, that unlike of the almost all previous eruptions, the flux remain rather high in both the areas, also after the beginning of the eruptive event.