



The CO₂ diffusive degassing in Linosa Island (Sicily Channel)

D. Cellura (1), V. Stagno (2), M. Valenza (1)

(1) Dipartimento CFTA, Università di Palermo, 90123 Palermo, Italy (dcellura@unipa.it / Phone: +39(0)91 6161574)

(2) Bayerisches Geoinstitut, University of Bayreuth, 95440 Bayreuth, Germany (vincenzo.stagno@uni-bayreuth.de / Phone: +49-921-373878)

The diffusive degassing from soil is a common process that characterizes tectonic and volcano-tectonic areas. The release of deep gases towards surface occurs by tectonic structures that represent high permeable preferential pathways. Based on this consideration, measurements of gaseous emissions from soil have carried out in order to reveal hidden active tectonic faults and detect changes in volcanic feeding systems. In this study, a survey of soil CO₂ diffusive degassing on Linosa Island (about 5.2 km²; 196 m a.s.l.) was made covering the 80% of the total area. Despite the island represents the oldest sub-aerial volcanic centre (1.06 to 0.53 Ma) located in the Sicily Channel Rift System (SCRS) and no evidence of volcanic related phenomena has been shown in the recent history, the occurring of degassing activity from submerged structures of the volcanic complex constitutes a potential indication of anomalous degassing processes. This gaseous phenomenon is enhanced by the location in the active tectonic area represented by the African-European collision plate boundary. Based on about 150 measurement of CO₂ soil flux accordingly to the *dynamic concentration method*, the presence of anomalous diffusive degassing structures was identified in the western sector, the latest edified island portion. This anomalies show a distribution coinciding with volcano-tectonic lineaments and in a good agreement with the predominant regional faults system (NW-SE and NNW-SSE). The anomalous CO₂ flux values (up to 78 gm²d⁻¹) and the negative values of $\delta^{13}\text{C}(\text{CO}_2)$ of collected samples (from -8.41 to -17.3 ‰, relative to PDB) induce to a reasonable hypothesis about the pos-

sible mixing between a minor contribution of a deep magmatic source and prevalent superficial organic derived gases. Furthermore, the submerged exhalative manifestation in the western offshore of the island may be connected with the inland degassing processes and represent a possible starting point for future investigations.