

## **Previous research activities - R.M.RIDOLFI**

### **Researcher on external collaboration contract**

In the wake of the magistral thesis project, thanks to this collaboration with the Tectonic and Fluid Chemistry Laboratory of the DST-Sapienza, I consolidated my abilities in geochemical sampling and analysis. During this period, I used highly technical equipment, both for site operations (e.g., the DurrIDGE Rad7 radon detector, the Dräger X-am 7000 multigas detector, and the soil fluxmeter with accumulation chamber) and for laboratory analysis (e.g., Carlo Erba mod. GC8000 series gas chromatograph and Varian Helium Leak Detector 938-41 mass spectrometer). In collaboration with Dr. S.E. Beaubien, in these months I actively participated in two sampling campaigns, in the Regions of Basilicata and Abruzzo, to assess the presence of deep buried fault structures and for environmental monitoring purposes respectively. The first campaign was composed by 138 sampling and analysis stations at regional scale (for a total extent of 105 km<sup>2</sup> approx.). The second campaign, at local scale, was composed by 150 stations within a length of 1.5 km.

### **Geochemical characterization of the northern sector of the Sulmona Plain and correlation with the geological structure of the area**

Held as part of the magistral thesis project with the supervision of Prof. Sabina Bigi, Dr. Livio Ruggiero and Dr. S. E. Beaubien, this activity allowed me to learn and apply the procedures of sampling and analysis of soil gases according to the methodology proposed by the US Geological Survey of Colorado and developed at the Department of Earth Sciences of the University of Rome "La Sapienza". In particular, I managed the material and equipment needed for field analysis (a DurrIDGE Rad7 radon detector, a Dräger X-am 7000 multigas detector, and a soil fluxmeter with accumulation chamber) and the one for the sampling of soil gases at a depth of about 70 cm from soil-air interface, carried out using manual insertion steel probes and the steel cylinders previously placed in vacuum conditions. Once learnt the practice, I independently carried out a regional-scale campaign consisting of 179 sampling and measuring stations; then, at the Tectonic and Fluid Chemistry Laboratory of the DST-Sapienza, I carried out the analysis on the soil gas samples, using a Carlo Erba mod. GC8000 series gas chromatograph (to detect major gasses and light hydrocarbons) and a Varian Helium Leak Detector 938-41 mass spectrometer (to detect helium). The obtained dataset was then processed on a statistical and geostatistical basis through software such as TIBCO Statistica and ArcGis 10.5, in order to gain a deeper knowledge of the structural characteristics of the basin and to constitute a preliminary geochemical baseline for the northern sector of the Sulmona Plain.

### **Geotechnical characterization of a quarry front at the Fioranello Cave**

Three-year thesis project, for which I analyzed a basalt wall of the Fioranello Cave used by outdoor climbers through the "rock mass rating" method proposed by Z. T. Bieniawski.