



Earth Degassing in Italy: results of the first year of the project “Diffuse Degassing in Italy, INGV-DPC V5 project”

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The results here discussed are presented by the project coordinators in the name of the many researchers involved in the project (<http://maniterm.ov.ingv.it/>).

The emission of endogenous gases from the soil (mainly CO₂) is a phenomenon which affects large areas of the Italian territory. Gas emissions characterize areas of active and extinct volcanism, geothermal areas and non volcanic regions. The gas is emitted both by diffuse degassing along active structures or by focused vents forming mof-fetes, mud volcanoes, bubbling pools etc.. In most of the cases the main component of the gases is CO₂ whose density is much higher of air density and which in absence of wind accumulate in the morphological depressions forming river and lakes of gas. The humans and the animals which fortuity enter these invisible traps are destined to a secure death. Many accidents involved in the past not only domestic and wild animals but also people. The periodical occurrence of such accidents alerted the Italian Civil Defense which financed a specific project (DPC-INGV project V5, Diffuse Degassing in Italy) whose main objective is the mitigation of gas hazard in Italy trough a coordinated and multidisciplinary study of the Earth degassing in Italy. Fourteen research unities (RU) from different Italian institutions are involved in the project. The project is divided in two research lines. The first regards the realization of the Italian Catalogue of the Gas Emissions (ICGE). At the present moment ICGE is an electronic archive containing the data acquired by the singular RU in field surveys and in the laboratory analytical work. After one year project about 170 gas emissions have been surveyed. Most of the gas emissions have been sampled and analysed and for many emissions gas fluxes have been measured. A preliminary analysis of the new

data (fluxes and chemical-isotopic composition) highlight that in Central and Southern Italy the gas emitted in areas of non active volcanism have a regional signature compatible with a deep origin, the same origin of the gas of the magmas of Central and South Italy volcanic provinces. The second research line regards gas hazard assessment and risk mitigation and is of particular interest for the Italian Civil Defense. The relevant impact of the natural gas emissions on the Italian territory is highlighted by the preliminary data of ICGE: accidents to wild and domestic animals were observed in 50 manifestations while lethal accidents to people are recorded in 10 manifestations. A specific code has been selected and adapted to simulate heavy gas dispersion from natural sources under different meteorological conditions. The code (TWODEE) is based on a shallow layer approach and uses depth-averaged variables to describe the flow behavior of dense gas over complex topography. The model was applied to simulate CO₂ air dispersion in two dangerous areas of gas emission. In both cases the comparison between the simulations and the observations showed a satisfactory agreement suggesting the high potentiality of the method for the definition of gas hazard in different environmental contexts.