

Gas manifestations of Greece: Catalogue, geochemical characterization and gas hazard definition

Daskalopoulou K.*¹, D'Alessandro W.², Kyriakopoulos K.³, Calabrese S.¹ & Parello F.¹

1. INGV, Palermo. 2. Department of Geology & Geo-environment, National & Kapodistrian University of Athens, Greece.
3. Dipartimento di Scienze della Terra e del Mare, Università di Palermo.

Corresponding email: kdaskalopoulou@hotmail.com

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Like other geodynamically active areas, Greece is affected by a large number of geogenic gas manifestations. These occur either in form of point sources (fumaroles, mofettes, bubbling gases) or as diffuse emanations.

We produced a first catalogue of the geogenic gas manifestations of Greece also considering few literature data. Collected samples were analysed for their chemical (He, Ne, Ar, O₂, N₂, H₂, H₂S, CO, CH₄ and CO₂) and isotopic composition (He, C and N).

Most of the sampled gas manifestation are found along the South Aegean active volcanic arc (32 sites) and in the majority they belong to the CO₂ dominated group. Very few gas manifestations, N₂- or CH₄- dominated, are found along the most external units of the Hellenides orogen (Apulia domain - W and SW Greece), where generally compressive or transpressive tectonic prevails. On the contrary, gas manifestations (mainly CO₂- dominated) are widespread along northern Greece (28 sites) and along Sperchios basin - north Evia graben (12 sites) which are characterised by extensional tectonic.

Geogenic gases, apart from having important influences on the global climate, could have strong impact on human health. Gas hazard is often disregarded because fatal episodes are often not correctly attributed. Geodynamic active areas release geogenic gases for million years over wide areas and the potential risks should not be disregarded.

A preliminary estimation of the gas hazard has been made for the last 20 years considering the whole population of Greece. In this period at least 2 fatal episodes with a total of 3 victims could be certainly attributed to CO₂. This would give a risk of $1.3 \cdot 10^{-8}$ fatality per annum. Such value, probably underestimated, is much lower than most other natural or anthropogenic risks. Nevertheless this risk, being unevenly distributed along the whole territory, should not be overlooked and better constrained in areas with high density of gas manifestations and high soil gas fluxes.