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Catalogue of the main gas manifestation of Greece: Geochemical characterisation and preliminary gas hazard assessment

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

The present work produced a first catalogue of the geogenic gas manifestations of the whole Hellenic territory also considering a few literature data. All collected samples were analysed for their chemical composition (He, Ne, Ar, O₂, N₂, H₂, H₂S, CO, CH₄ and CO₂) and isotopic composition (He, CO₂-C, CH₄-C, N₂-N).

Geogenic sources release huge amounts of gases, which, apart from having important influences on the global climate, could have strong impact on human health. Gases have both acute and chronic effects. Carbon Dioxide and Hydrogen Sulphide are the main gases responsible for acute mortality due to their asphyxiating and/or toxic properties. Methane instead represents a risk for its explosive properties.

Gas hazard is often disregarded because in fatal episodes connected to geogenic gases the death cause is often not correctly attributed. Due to the fact that geodynamic active areas can release geogenic gases for million years over wide areas, it is important not to underestimate potential risks.

A preliminary estimation of the gas hazard has been made for the time period of the last 20 years considering the whole population of Greece. In this period at least two fatal episodes with a total of three victims could be certainly attributed to geogenic gases (specifically CO₂). This would give a risk of 1.3×10^{-8} fatality from geogenic gas manifestations per annum. Such value, although 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 especially in areas with high density of gas manifestations and high soil gas fluxes.