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Geochemistry of gas emissions in the volcano-tectonic environment of the Eastern Carpathians

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The Eastern Carpathians are characterized by intense gas emissions starting from the Neogene to Quaternary volcanic structures, especially the youngest dormant volcano, Ciomadul, but occurring also far away from these, in the Cretaceous flysch units. This is the most intensive degassing area from Romania. The gas emissions appear in different forms: dry gas, named mofettes and bubbling gas when they are accompanied by groundwater. The major components of these gas emissions are: CO₂, CH₄, N₂ and sometimes H₂S. Recent studies reveal a magmatic contribution up to 60% in these emissions (Vaselli et al., 2002, Kis et al., 2019). Gases are also present dissolved in groundwater and transported to the surface by CO₂-rich springs. Besides these visible emissions, the gases come to the surface as diffuse degassing from the soil. We started a systematic geochemical investigation of the gas emissions in the volcano-tectonic environment of the southern part of the Eastern Carpathians, together with a 5-year monitoring of the gas emissions. Our primary aims are to constrain the flux of CO₂, the origin of the different gas species, their interaction, and their relationship with the geodynamic background. Our findings could be integrated to the global carbon estimations, currently missing from the worldwide evaluations and could help the establishment of a long-term monitoring system of the gases in the area.

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