

Are mafic microgranular enclaves in durbachites plutonic equivalents of common minettes?

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Durbachites are K-feldspar-phyric biotite-bearing MgO-rich rocks of syenitic composition whose formation involves the mixing of mafic high-potassium partial melts from an enriched mantle with granitic melts. Due to this process, durbachites encompass a broad compositional range and contain variable amounts of mafic microgranular enclaves (MME). The mafic members are considered to be the plutonic equivalent of common mica lamprophyres, i.e., minettes [1]. Large volumes of durbachites (e.g., the Třebíč Massif) have been emplaced in the Moldanubian Zone of the Bohemian Massif. Regionally contrasting geochemical fingerprints of mantle metasomatism and the role of mantle contribution in durbachite magmatism may be the key control on the distribution of durbachites in the Bohemian Massif. MME from the Třebíč Massif have been investigated petrologically and geochemically (including Sr-Nd-Pb isotopes) and compared with Variscan mafic dikes of the Bohemian Massif. The geochemical composition of the MME does not correspond to the composition of typical minettes from which they are noticeably shifted toward higher ⁸⁷Sr/⁸⁶Sr(i) values and more negative εNd(i) values. Moreover, the composition of MME also differs from newly recognised peralkaline lamproitic rocks cropping out around the Třebíč Massif [2]. Instead, the MME compositionally overlap with micaceous mafic dykes that could be best described as cocites [2]. Both cocites and MME show high Mg-values and are characterized – in comparison with minettes and lamproites – by a remarkable negative Eu anomaly, an extremely high positive Pb anomaly, and an unusually high Sm/La ratio. It is the particular geochemical and isotopic signature of mantle metasomatic component that is common for the durbachites and the cocite dykes and that distinguishes them from Variscan minettes of other parts of the Bohemian Massif.

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[1] Parat *et al.* (2010) *Contrib. Mineral. Petrol.* **159**, 331–347.

[2] Krmíček (2011) *PhD thesis*, Brno, 1–160.

Near-field measurements of volcanogenic sulfur: Emissions, oxidation, and neutralization

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Volcanic activity represents a major natural source of sulfur dioxide (SO₂) to the Earth's atmosphere, and thus is an important component of the global sulfur cycle. In addition, the very high concentrations of SO₂ and particulate matter in the areas immediately surrounding volcanoes can have serious effects on human and ecological health. In order to better understand the atmospheric fate of volcanogenic emissions in the near field (in the first few hours after emission), we have carried out *in situ* studies of key sulfur species on the Big Island of Hawai'i. Measurements were made as part of MIT's Traveling Research Environmental eXperiences (TREX) program, aimed at introducing undergraduate students to environmental fieldwork. A suite of instruments for characterizing oxidized sulfur in both the gas and particle phase, including an SO₂ monitor and an Aerosol Chemical Speciation Monitor (ACSM), were deployed on a mobile ground-based platform, with sampling carried out at a range of locations on the island. To our knowledge these measurements represent the first real-time measurement of the chemical composition of volcanic aerosol. The high time resolution of the instruments, combined with the high spatial coverage of the mobile measurements, enables the characterization of the volcanic plume at different times/distances downwind of the point of emission. From these measurements we are able to track the initial lifecycle of volcanogenic sulfur, including emission, oxidation to particulate sulfuric acid, and neutralization by ammonia. Results are compared with continuous measurements taken by air quality monitoring sites on the island.