First occurrence of dumortierite in Croatia: A potential evidence of tetrahedral Ti substitution for Si

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Dumortierite $(Al,\square)Al_6(BO_3)Si_3O_{13}(O,OH)_2$ occurs in a pegmatite vein cutting S-type granite in the Late Cretaceous magmatic-metamorphic complex of Mt. Moslavačka gora, in the SW part of the Pannonian Basin, Croatia. The granitoid pluton intruded Abukuma type series of metamorphic rocks associated with migmatites. Dumortierite-bearing vein, up to 6 cm thick, consists of coarse-grained quartz, orthoclase, microcline and albite, less abundant muscovite, biotite, pinkish andalusite and blue-coloured dumortierite. The microscopic studies identified two types of dumortierite crystals: Dum I and Dum II. The Dum I crystals are subhedral prismatic up to 16 mm in size, strongly pleochroic ranging from colourless to azure blue. The Dum II type represents bundles of parallel fibrous or acicular crystals, up to 1,4 mm long, strongly pleochroic from colourless to red violet. The Dum I crystals have lower contents of Mg (0.033-0.055 pfu) and Ti (0.001-0.011 pfu) than Dum II crystals (0.047-0.087 pfu and 0.043-0.064 pfu, respectively) whilst differences in Fe abundance (0.038-0.072 pfu vs. 0.037-0.057 pfu) and Al/Si ratios (2.35-2.47 vs. 2.27-2.49) are not significant. A Si deficiency (< of 3.0 pfu) is found in 95% of EPMA spot analysis of the dumortierite. The Si tetrahedral deficiency has been conventionally balanced by Al. A moderate correlation between 3-Si and Al (r = 0.606), and between 3-Si and Ti (r = 0.609) exists in the analysed dumortierites. Strong correlation between 3-Si and Al+Ti (r = 0.968) suggests that Ti in dumortierite replaces not only Al in octahedra as generally accepted, but also may substitute Si in tetrahedra.

Temperature driven stable carbon isotope ratio in marine aerosols

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Stable carbon isotope ratio mass spectrometry is evolving as a powerful tool in aerosol source apportionment studies due to unique capability of discriminating among various carbon sources [1, 2].

Stable carbon isotopic analysis was performed on the aerosol particles that were collected from 3 December 2006 until 4 March 2007 in Amsterdam Island (37.81°S, 77.5733°E), which is an atmospheric research station located in the southern Indian Ocean far from continents. The aerosol particles were sampled in fine and coarse modes. The $\delta^{13}C$ values in the fine mode ranged from -27.5 ‰ to -20.4 ‰, and in the coarse mode from -28.2 ‰ to -22.6 ‰. The concentrations of organic and inorganic species were measured in the both size fractions as reported by Claeys *et al* [3].

The measured $\delta^{13}C$ values, salts and organic carbon concentrations in the fine and coarse size fractions were combined with the isobaric air mass back trajectories, the corresponding chlorophyll concentrations and the sea surface temperature (SST). Correlation between organic carbon isotopic ratio of atmospheric aerosol and the sea surface temperature was found, corroborating significant differences in biogenic processes in the Southern Ocean.

[1] Ceburnis *et al* (2011), *ACP* **11**, 8593-8606. [2] Miyazaki *et al* (2011), *ACP* **11**, 3037-3049. [3] Claeys *et al* (2010) *J. Aerosol Sci.* **41**, 13-22.