Rethinking primary organic aerosol emission inventories with a focus on wood combustion in Europe

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In Europe, residential wood combustion (RWC) is the largest source of organic aerosol (OA). Recently OA modelling has significantly improved since the introduction of the Volatility Base Set approach [1]. However, these new insights had no impact on the primary particulate matter (PM) emission inventories in Europe. To quantify the importance of RWC our "traditional" OA inventory derived from reported PM emissions was used as input for 2 CTMs, PMCAMx and the EMEP model, revealing major underestimations of OA in winter time, especially for regions dominated by RWC. A new RWC emission inventory was constructed that also accounted for condensable particles, increasing RWC emissions with a factor of 2-3 but with substantial inter-country variation.

The new emission grid served as input for the CTMs and a signifcant improvement between measured and predicted black carbon (BC) [2] and organic carbon (OC) was found, further supported by levoglucosan campaign measurements. The results suggests that primary aerosol (PM) inventories need to be revised to include the semi-volatile OA that is formed almost instantaneously due to cooling of the flue gas or exhaust. A further analysis indicated that this is, based on the measurement protocol, not appropriate for European road transport emissions but industrial OA emissions may also be underestimated. We will also show that the choice of emission inventory influences the assesment of the effectiveness of reducing BC emisisons from RWC as a mitigation strategy for decelerating global warming.

[1] Robinson *et al*., Science, 315, 1259-1262, 2007. [2] Genberg *et al*., ACPD, 13, 9051-9105, 2013

Petrology and Raman Characterization of Leucitites within the Ultrapotassic Rocks: Afyon, NW Turkey

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NW Anatolia was exposed to alkaline volcanic activity during Miocene to Quaternary. These alkaline volcanic rocks show potassic and ultrapotassic character. Alkaline volcanic activity can be differentiated into five main groups as a leucitites, leucite phonolite, phonolitic tephrite, thrachyandesite and alkaline basalts. The first stage volcanic activity is represented by leucitites which have hypocrystalline texture and composed of leucite, melilite, augite, diopsite, analcime, hematite and magnetite. Leucite phonolites and phonolitic tephrites have porphyritic texture and respectively leucite, sanidine, augite, nepheline, opaque minerals comprise the main mineral compositions. Thrachyandesites represent the third stage of volcanism and have hylopilitic porphyritic texture with augite, plagioclase, sanidine, nepheline and phlogopite. The last stage of volcanism contains alkaline basalts which show flow texture. The main mineral composition consist of augite, phlogopite, plagioclase and opaque minerals. Leucite gives a strong Raman shift in 500-530 cm^{-1}. Analcime gives a strong Raman shift in 389-484-673 cm^{-1} and 1113 cm^{-1}. Augite type pyroxene group gives Raman shift in 324-357-390 cm^{-1}, 506 cm^{-1}, 666 cm^{-1} ,835 cm^{-1} and 1010-1046 cm^{-1}. Diopsite gives different Raman shift from augite in 963 cm^{-1}. Opaque minerals are hematite and minor magnetite in composition. Hematite gives Raman shift in 395-487-599-1293 cm^{-1}. Magnetite gives Raman shift in 649 cm^{-1}. Sanidine gives a strong Raman shift in 470-520 cm^{-1}. Whole rock geochemical data reveal that alkaline volcanic rocks are ultrapotassic and metaluminous in compositions. The ultrapotassic rocks both show enrichment in LILE and LREE with respect to HFSE and HREE. The Ba, Rb and Sr contents are enriched relative to mantle component. *The data obtained from petrological studies suggest that Afyon ultrapotassic volcanic rocks derived from lithospheric mantle source and were affected by subduction zone metasomatism during late stage of Cenozoic extensional magmatism in Western Anatolia*.

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