Organics in the Mix during SAPUSS

M. DALL´OSTO[1], X. QUEROL[1] AND THE SAPUSS TEAM[2]

[1]IDAEA-CSIC, c/Jordi Girona 18-26, Barcelona, Spain (manuel.dallosto@gmail.com)
[2]see reference below [1]

In this work we illustrate the results of the organic aerosols measurements taken during the SAPUSS experiment (Solving Aerosol Problems By Using Synergistic Strategies) in Barcelona (Spain) during autumn 2010 [1]. Two supersites were chosen: Urban background (UB) and Road site (RS) on which

Simultaneous measurements with High Resolution Aerosol Mass Spectrometry (HR-ToF-AMS) were taken; Positive Matrix Factorization (PMF) was applied revealing five different organic aerosol factors.

Simultaneous single particle mixing state measurements with Aerosol Time Of Flight Mass Spectrometry (ATOFMS) were classified by ART-2a algoritm, resulting in eighteen specific particle types internally mixed with a number of organic and inorganic species.

Simultaneous aerosol filter measurements at 12 hours resolution were taken, and concentrations of thirtysix neutral and polar organic compounds were obtained by GC-MS; subsequentally classified by MCR-ALS apportioning six OA components (two were of primary anthropogenic OA origin, three of secondary OA origin while a sixth one was not clearly defined).

This presentation aims at summarising key SAPUSS findings on organic aerosol source apportionment, on the role of organics in new-particle formation and on the interactions of organics and inorganics components.

[1] Dall´Osto *et al*.., 2012. *Atmos. Chem. Phys. Discuss*., **12**, 18741-18815, 2012

Activity of cable bacteria and electro-physical properties of gradient systems studied with a novel microsensor for electric potential

LARS RIIS DAMGAARD*, NILS RISGAARD-PETERSEN AND LARS PETER NIELSEN

Insitute for Biosciences, Aarhus University, Ny Munkegade 114-116, DK-8000 Aarhus C, Denmark. (*correspondence: lrd@biology.au.dk)

Activity in sediments and biofilm are thought to be confined to steep chemical gradients and cascades of coupled co-localized redox processes. Recently, however, filamentous bacteria of the family Desulfobulbaceae were found to transfer electrons over centimeter distances to couple spatially separated oxidation and reduction processes (1, 2). For this new exciting research area we have developed a novel microscale sensor for measuring electric potential at micrometer and microvolt scales. Microprofiles of electric potential in marine sediment dominated by such ‘cable bacteria’ allowed identification of involved electron donors and acceptors as well as the localization and quantification of the bio-electrical currents. Electrical conductivity – and in turn diffusivity – of sediment and other soft substrates could also be measured with the aid of the electric potential microsensor, and possibly it can help elucidate the nature of conductivity in microbial nanowires and cable bacteria.

[1] Nielsen, L. P., N. Risgaard-Petersen, H. Fossing, P. B. Christensen, and M. Sayama (2010), Electric currents couple spatially separated biogeochemical processes in marine sediment, *Nature,* **463** (7284), 1071-1074. [2] Pfeffer, C., *et al*.. (2012), Filamentous bacteria transport electrons over centimetre distances, *Nature*, **491** (7423), 218-221.

www.minersoc.org
DOI: 10.1180/minmag.2013.077.5.4