Preliminary results from a study of coarse airborne particles >2.5µm in Hanoi, Vietnam

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The study aimed to identify and classify coarse airborne particles, especially anthropogenic particles, such as those derived from traffic, domestic fuel combustion, and industry. In 2008, two sampling sites were selected in the congested urban area of Hanoi: site 1 represents a background location; site 2 has the character of a roadside location. Using a passive sampling device (Sigma-2), airborne particles were collected on carbon pads for scanning electron microscopy (SEM), as well as on clear adhesive collection plates suitable for transmitted light microscopy. The sedimentation principle of the passive sampler technique permits investigating particles >2.5µm. Chemical composition, geometry and morphology were determined by computer-aided SEM, combined with single-particle analysis (Genesis, EDAX) and energy-dispersive spectroscopy (EDS). Particles were classified according to their composition and assigned to three classes: anthropogenic, geogenic, and biogenic. Computer-controlled single-particle optical microscopy (IAS) of the adhesive collection plates was applied to measure size and optical density of individual particles. Statistical evaluation of the data allows us to assess the abundance of black, elementary carbon particles, which are suggest to be anthropogenic. As expected, these particles are much more abundant in the samples from the roadside than in those from the background site, which is shielded from major traffic sources. These types of particles sampled at the background site are mostly in the size range 2.5–10µm, indicating that they represent particles that have been transported there from the high-traffic roads.

The surface area, reactivity, and effect on global cycles of riverine transported basaltic suspended load

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Several recent studies have emphasized the significant role of riverine transport of basaltic suspended material to the oceans on global cycles and climate moderation [1, 2]. To further quantify this process, co-existing suspended material and water samples have been collected regularly from 8 catchments in NE Iceland over a four year period. The suspended material in these catchments is similar to that of the host rock, which itself is over 90% basaltic glass in composition. The measured B.E.T. surface area of this material was found to range from 10 to 80 m^2/g, with an average value of ~30 m^2/g.

The dissolution rates of selected suspended material samples were determined in Si-free artificial surface seawater at 5 and 25° C using batch reactors. Initial B.E.T. normalised dissolution rates are found to be ~$2x10^{-17}$ and $1x10^{-16}$ (mol Si)/cm^2/s at 5 and 25° C respectively. These rates are approximately one order of magnitude slower than that of basaltic glass at the same conditions [3]. Nevertheless, these results suggest that between 1% and 10% of the basaltic suspended material will dissolve per year once it arrives in the ocean. Whilst much of this mass will be rapidly incorporated into secondary phases, the combined dissolution of the primary basaltic material coupled with secondary phase precipitation will have a strong influence on the isotopic and trace element composition of the world's oceans.

[1] Gislason S.R. *et al.* (2009) *EPSL* **277**, 213-222. [2] Gislason S.R. *et al*. (2006) *Geology* **34**, 49-52. [3] Gislason & Oelkers (2003) *GCA* **67**, 3817-3832.