Geochemical characterization of modern aerosols along the West African continent regarding to provenance, vegetation cover, and biomass burning

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Regional and temporal variations in the terrigenous fraction of marine sediments are widely used as indicators for continental climate changes. For a reliable interpretation of more and more specific sub-components of the terrigenous material the knowledge on sources and pathways are of essential importance. Here, we present a comprehensive data set from aerosol samples which have been collected along the West African continent from the Canary Islands to South Africa on a RV *Marion Dufresne* cruise during July/August 2003.

As to be expected, satellite images (TOMS) and analytical results show that the prominent westward aerosol transport over NW Africa was dominated by inorganic dust particles. South of the Intertropical Convergence Zone, strong SE trade winds transported high amounts of aerosols from southern central Africa. As suggested by satellite fire sightings (MODIS), their origin is more likely related to biomass burning.

Major elemental abundances suggest three distinct source areas which reflect the major weathering or rather vegetation or climate zonation along the West African coast. Furthermore, our results give clear evidence that biomass burning indeed has a pronounced impact on charcoal particle emissions, total organic carbon contents, concentrations of plant lipids and specific biomass alteration products in aerosols.

Chalcophile element budget in the upper oceanic crust (ODP Hole 1256D)

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Hydrothermal processes in the mid-oceanic crust at ridges cause significant changes in the budget of chalcophile elements (e.g. Cu, Sn, Sb, Zn, and PGE) and have the potential to form stockwork sulphide mineralisation – located, for example, in the Transition Zone between the Lava Flows and the Sheeted Dikes. The root zones for such deposits are possibly located at the transition between the Sheeted Dikes and the Gabbros. Up to now, a complete chalcophile element budget for the upper crust is still lacking, due to the absence of an appropriate sample suite, which probes a complete *in situ* section of upper oceanic crust. Such a section of oceanic basalts and gabbros was probably drilled at ODP Hole 1256D in the Pacific (Cocos plate). Selected samples from each stratigraphic unit (Lava Flows, Transition Zone, Sheeted Dike Complex, Granoblastic Dikes, Gabbro) of Hole 1256D were analysed for this study for their chalcophile elements by XRF (Univ.Bonn) and ICP-MS (Univ. Kiel) and sulphur by CSA (Univ. Göttingen).

We find, for example, Cu to be highly variable in the Gabbro and overlying Granoblastic Dikes, whereas Cu is fairly constant in the upper parts of the Sheeted Dikes and in the Lava Flows. In addition, Cu is slightly enriched in the Transition Zone, but significantly less than in Transition Zones analysed at other places [1]. Probably Cu was mobilised in the Gabbro and the Granoblastic Dikes at Hole 1256D by the oxidation of primary (magmatic) sulphides during hydrothermal alteration [1]. However, it appears that the mobilised Cu was precipitated still in the same section (in the Gabbros and Granoblastic Dikes) and in the Transition Zone, but not extensively in the upper parts of the Sheeted Dikes and in the Lava Flows. Other chalcophile elements, like Zn, show no significant variations in the Gabbros and Granoblastic Dikes, but are variable e.g. in the upper parts of the Sheeted Dikes. Hence, the mobility of Zn depends on other processes or different kinds of fluids/temperatures than Cu. For example [1] have ascribed Zn mobility to the replacement of primary Ti-magnetite by sphene and/or magnetite.

[1] W. Bach *et al.* (2003), *Geochem., Geophysics, Geosys.* **4** (3) doi:10.1029/2002GC000419.