The hafnium and neodymium isotopic composition of seawater in the tropical Atlantic Ocean

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The combination of radiogenic isotopes of hafnium (Hf) and neodymium (Nd) has been used to investigate present and past changes of ocean circulation patterns and continental weathering regimes. We present the first combined full water column Hf and Nd isotopic compositions and concentrations in seawater of the western Atlantic Ocean, as well as Hf and Nd isotopic and concentration data in surface waters of the tropical Atlantic Ocean between the Canary Islands and the northeastern coast of Brazil. Samples were collected during GEOTRACES cruise A11 (Meteor M81/1) from Las Palmas (Canary Islands) to Port of Spain (Trinidad and Tobago) in spring 2010.

Hf concentrations in surface waters range between a maximum of 0.67 pmol/kg north of 20°N off the coast of NW Africa and in the area of the Canary Islands and a minimum of 0.20 pmol/kg off the northeastern coast of Brazil. Surface waters with reduced salinities (< 33.6 psu) due to freshwater input by the Amazon river also show low Hf concentrations. Nd concentrations show a similar distribution pattern with a maximum off the coast of Mauritania (27 pmol/kg) and a minimum in the Amazon plume (14 pmol/kg). Elevated concentrations provide evidence of inputs from partial dissolution of dust from the Sahara region and from ocean island wheathering, which is also reflected in more radiogenic Hf and Nd isotope compositions [1]. Low concentrations of Hf and Nd in the Amazonas plume are most likely caused by particle scavenging induced by high productivity.

Deep-water samples show the highest Hf concentrations in UNADW in the area of the Canary Islands (0.93 pmol/kg), as well as in UNADW in the western basin. Nd concentrations range between a minimum of 12 pmol/kg in SACW and a maximum of 34 pmol/kg in AABW. Lower Hf concentrations in LNADW and AABW indicate an oceanic residence time of Hf shorter than that of Nd.

The isotopic distribution of Hf and Nd in the same samples reflect inputs via dust, the Amazon river, and weathering inputs from the volcanic Canary islands, as well as intermediate and deep water mass mixing.

[1] Rickli *et al*. (2009), *EPSL* **280**, 118-127.

Connection of atmospheric stability and aerosol and gaseous polutants concentration

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Our aim is to find suitable criteria to asses an atmospheric stability without direct measurements in order to estimate relationships between meteorological conditions and concentration of aerosol particles (measured by SMPS) and gaseous pollutants (O_3, NO_2 and SO_2). An aerological method, a synoptical method and NWP models' CAPE values are applied.

Aerological method and CAPE were found to be suitable methods for description of atmosperic stability. Synoptical method shows mainly origin of air masses.

The strongest relationships between aerosol particles and stability was found for acumulation mode particles, weaker for particles under 50 nm in diameter.

A negative correlation for acumulation mode particles shows "dilution" of atmosphere during unstable conditions, whereas during stable conditions the aerosol acumulates.

Similar relatioship is between gaseous polutants and stability (apart from concentrations of NO_2).

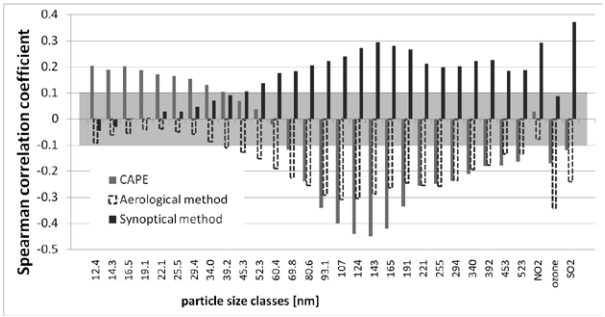

Figure 1: Dependencies between aerosol concentration in different sizes, gaseous pollutants concentrations and atmospheric stability described by the three tested methods.

[1] Zikova N. (2010) *WDS'10 Proceedings of Contributed Papers: Part III – Physics*, Matfyzpress, pp. 97–102. Ack: GACR P209/11/1342 and SVV-2011-263308.