Chemical composition of tropospheric particulate matter in West Africa: Natural and pollution source assessment

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West African troposphere is periodically perturbed by Saharan dust events, occurring mainly during the dry season (November to April). Saharan dust events are able to transport natural aerosols over long distances [1]. These typical events are sporadic but intense. Nevertheless, in an overall description of the air quality in the Sahelian zone, other sources (biomass burning emissions, traffic) have to be considered. To complete the characterization of these dust events, the chemical composition of tropospheric Particulate Matter (PM) is presented here. Sampling campaigns (PM 10) were performed in Jan.-Feb. 2006 in the vicinity of M'Bour, Senegal, a coastal city of 100,000 inhabitants. Chemical analyses have been performed for carbon (total, organic and water-soluble fractions), major elements (Al, Si, Fe, Ca, Na, Mg, K), trace metals (Pb, Zn), and major ions (SO_4^{2-}, Cl^-, PO_4^{3-}, NO_3^-, Na^+, K^+, NH_4^+, Mg^{2+}, Ca^{2+}).

The absence of any significant dust event is conclusively proven by the low Al content in PM 10 ([Al] < 10 $\mu g.m^{-3}$). Organic carbon, possibly from biomass, represents a considerable proportion of collected carbonaceous PM (67 to 92 wt.%). High Pb and Zn contents (mostly > 100 $ng.m^{-3}$) indicate possible pollution episodes. However, the black carbon content (0.36 to 2.69 $\mu g.m^{-3}$), is not typical of polluted areas [2]. Our results seem to indicate the variable PM sources: the remote Saharan dust emissions, the local anthropogenic emissions and biomass burning. Current investigations concern the assessment of the biomass burning sources regulating the organic content of PM 10.

[1] Caquineau, S. *et al.* (2002) *J. Geophys. Res.*, doi, 10.1029/2000JD000247. [2] Alfaro, S.C. *et al.* (2003) *J. Geophys. Res.*, doi, 10.1029/2002JD003214.

Direct *in situ* dating of titanite in biotextures using laser ablation MC-ICP-MS

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Submarine bio-alteration of pillow basalts involves etching of the glassy parts of the rock and leaves tubular and granular textures [1]. Such textures have been observed in pillow basalts of the tubular textures are often infilled by titanite ($CaTiSiO_5$). Direct dating of these µ-sized textures provides a minimum age constraint on the bio-alteration process [3]. Due to their small size, an *in situ* dating method with high sensitivity and high spatial resolution is required. For this reason laser ablation MC-ICP-MS is used here for direct dating of titanite in the biotextures [4].

Recent to Archean age. The Archean textures are thought to be one of the oldest traces of life on the Earth [2].

We present U-Pb data for titanite samples of different ages. This paper will also discuss challenges to method development during the dating of natural titanite in biotextures, such as are standardization, sample homogeneity, spatial resolution and correction for common lead contamination.

[1] Banerjee *et al.* (2007) *Geology* **35**, 487-490. [2] Furnes *et al.* (2004) *Science* **304**, 578-581. [3] Furnes *et al.* (2001) *Geochem. Geophys. Geosyst*. **2**. [4] Simonetti *et al.* (2006) *Int. J. Mass spectrom.* **253**, 87-97.