Goldschmidt 2000
September 3rd–8th, 2000
Oxford, UK.

Journal of Conference Abstracts
Volume 5(2), 286

Geochemistry of Surface Sediments, Filtered and Sediment Trap Particles from the Sub Antarctic and Polar Front Zones of the Southern Ocean, South of Tasmania

Damien Cardinal[1], **Luc André** (landre@africamuseum.be)[1], **Frank Dehairs** (fdehairs@vub.ac.be)[2], **Thierry Cattaldo** (thierry.cattaldo@vub.ac.be)[2], **Nathalie Fagel** (nathalie.fagel@ulg.ac.be)[3] & **Tom Trull** (tom.trull@utas.edu.au)[4]

[1] Royal Museum for Central Africa, Dpt. of Geology, Leuvensesteenweg, 13, Tervuren, B-3080, Belgium
[2] Vrije Universiteit Brussel, ANCH, Pleinlaan, 2, B-1050 Brussels, Belgium
[3] Université de Liège, Sedimentoloy, Allée du 6 Août, B18, Sart-Tilman, B-4000 Liège, Belgium
[4] University of Tasmania, Antar-CRC, GPO box 252-80, Hobart, Tasmania 7001, Australia

The Southern Ocean is of particular interest as its circumpolar circulation yields to a latitudinal stratification of water masses which behave as ecosystems with singular characteristics, strongly affected by seasonal and latitudinal variations of productivity (e.g. Stephens and Keeling, 2000). Enhanced productivity in the Southern Ocean during the last glacial period has been proposed to account for low atmospheric CO_2 contents, via the biological CO_2 pump but this assumption is still under debate (e.g. Anderson et al., 1998). Biogenic Ba in sediments has been used as a proxy to assess carbon export variation in the Southern Ocean (e.g. Shimmield et al., 1994). In an attempt to shed more light on certain, poorly known, aspects of the Ba biogeochemistry in the Southern Ocean environment, we compared the major (Al, Fe, Mn, Ti, Ca) and trace element (Ba, Sr, REE, Th, U) distributions in water column particles with surface sediments in the Sub-antarctic (SAZ) and Polar Front Zones (PFZ), south of Tasmania.

The samples studied are (1) sediment traps (47º, 51º and 54ºS, 140ºE, 800-3800m); (2) core tops (45º - 65ºS, 146ºE); (3) filtered particles (SAZ'98 cruise, 42-54ºS, 142ºS, 0-600m).

The preliminary results show a close relationship between Al content and Ce anomaly (Ce/Ce*) in all the three types of samples. Within the PFZ, the more biogenic origin of the trap and filtered particles is evidenced by a more negative Ce/Ce* and lower Al contents. In the PFZ core tops (56º and 60ºS), the biogenic Ba and U contents are the highest. The lithogenic contribution is more significant in the SAZ sediment traps and filtered particles and also in the southernmost (more than 60ºS) core tops (closer to the Antarctic shelf) than in the PFZ. The biogenic Ba accumulation rates in the core tops north of 49ºS have been corrected for preservation rates (Dymond et al., 1992), and for focusing and winnowing by the $^{230}Th_{xs}$ methodology (Francois et al., 1993). They range between 1.2-1.5 μgBa/cm^2/yr, and are thus slightly lower than fluxes from the Indian sector of the SAZ (1.2-2.1μgBa/cm^2/yr, Fagel et al., submitted). In the sediment traps, the seasonal variations of the element fluxes seem to identify two groups of elements: Ba, Ca, REE, U on one hand, and Ti, Sr, Mn on the other.

We will discuss these results in terms of latitude, depth, seasonality and sample type in order to identify the leading controlling factors of element fluxes in the water column.

Anderson RF, Kumar N, Mortlock RA, Froelich PN, Kubik P, Dittrich-Hannen B & Sutter M, *J. Mar. Syst.*, **17**, 497-514, (1998).

Dymond J., Suess E & Lyle M, *Paleoceanography*, **7**, 163-181, (1992).

Fagel N, Dehairs F, André L, Bareille G & Monnin C, *Paleoceanography*, (Submitted).

François R., Bacon MP, Altabet MA & Labeyrie LD, *Paleoceanography*, **8**, 611-629, (1993).

Shimmield GB, Derrick S, Mackensen A, Grobe H & Pudsey C., *In: Carbon Cycling in the Glacial Ocean: Constraints on the Ocean's Role in Global Change. Springer, Berlin Eds. NATO ASI Series I*, **17**, 555-574, (1994).

Stephens BB & Keeling RF, *Nature*, **404**, 171-174, (2000).