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Dissolved Aluminium distribution along GEOTRACES section GA08 in the South East Atlantic

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One of the main goals of the GEOTRACES program is to investigate the factors controlling the distribution and cycling of key trace elements in the ocean by means of high resolution ocean sections across the major basins. Here we focus on dissolved Aluminum (dAl), which is a tracer of inputs from land and oceanic/atmospheric exchange processes. The South East Atlantic has up to now been one of the most trace metal under-sampled areas in the Atlantic Ocean. Here we present the dAl concentrations of more than 900 samples recovered at 52 stations using the new GEOMAR trace metal clean CTD and winch, as well as a towed fish for uncontaminated surface water sampling.

The relative low dAl concentrations found in the Benguela upwelling system suggests that at the time of the cruise, dAl distribution is predominantly controlled by upwelling waters rather than aerosol deposition from the Namibian Desert. We found that the Congo River plume supplied a very high amount of dAl to the surface waters, and evidence of this input is observed in the northwards transport of the river plume by the Benguela coastal current system over at least 350 km along the coast and at least 500 km offshore into the open South East Atlantic. The surface water data also show that the open Angola Basin dAl signature is mainly affected by the South Atlantic gyre, as reflected by very low concentrations of dAl. With the help of ancillary parameters (e.g. S, O2 and nutrients) we demonstrate the importance that deep and intermediate water mass mixing (e.g. Antarctic Intermediate Water – AAIW and Antarctic Bottom Water –AABW) have on the dAl distribution in the deep South East Atlantic.