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Does Saharan dust deposition influence the export of particle fluxes in the tropical North Atlantic Ocean?

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Every year over 200 million tons of Saharan dust are blown over the Atlantic Ocean towards the Caribbean. On its journey most of the dust is removed from the atmosphere by either dry or wet deposition and is ending up in the ocean. Its input potentially stimulates phytoplankton growth and possibly also drags down organic matter through the water column to the sea floor. The role of dust as a means to export organic carbon from the surface ocean to the deep is still controversially discussed. However, aggregation plays a critical role in carbon export since sinking velocities depend amongst others on particle constituents, size and shape, porosity and way of formation. Higher sinking velocities lead to less degradation and remineralization, or, in other words: fresher material.
Here we present particle fluxes from one year (October 2012 until November 2013) collected by three sediment traps at 1200 m depth along a profile across the tropical North Atlantic Ocean. Average total mass fluxes vary between 40 and 111 mg/m2/d depending on the location in the ocean. Peak fluxes of 230 and 270 mg/m2/d in the second half of April and by the end of October/start of November 2013 in the western tropical ocean are worth mentioning since they differ in nature; carbonaceous material dominate fluxes in spring and biogenic opal in autumn. The calculated rest fractions, which we interpret as wind-blown dust, vary between 41 mg/m2/d closest to the African coast, and 10 to 18 mg/m2/d to the western open ocean. Total organic carbon (TOC) and biogenic opal are related to the rest fraction for two traps; this relation improves with distance to the source. Unexpectedly, the rest fraction of the sediment trap closest to the African coast, do neither show a relation to organic matter nor to biogenic opal. Same findings hold true for the [U+F064]15Ntot values of the material: they correlate negatively with the rest fraction, indicating fresher material. These correlations become stronger to the West Atlantic Ocean. Nevertheless, we speculate that Saharan dust deposition might influence the export and freshness of particles in the North Atlantic Ocean.