Geophysical Research Abstracts
Vol. 19, EGU2017-15640, 2017
EGU General Assembly 2017

Present-day transatlantic Saharan dust deposition across the equatorial North Atlantic Ocean

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Massive amounts of Saharan dust are blown from the African coast across the Atlantic Ocean towards the Americas each year. This dust has direct and indirect effects on global climate including reflection and absorption of solar radiation as well as transport and deposition of nutrients and metals fertilizing both ocean and land. To determine the temporal and spatial variability of Saharan dust transport and deposition and their marine environmental effects across the equatorial North Atlantic Ocean, we have set up a monitoring experiment using deep-ocean sediment traps as well as on land-based dust collectors. The sediment traps were deployed at five sampling sites on a transect between northwest Africa and the Caribbean along 12^0 N, in a down-wind extension of the land-based dust collectors placed at 19^0 N on the Mauritanian coast in Iwik. We establish the temporal distribution of the particle fluxes deposited in the Atlantic and compare chemical compositions with the land-based dust collectors propagating to the down-wind sediment trap sites.
First-year results show that the total mass fluxes in the ocean are highest at the sampling sites in the East and West, closest to the African continent and the Caribbean, respectively. Element ratios reveal that the lithogenic particles deposited nearest to Africa are most similar in composition to the Saharan dust collected in Iwik. Down-wind Al and Fe contents suggest a downwind change in the mineralogical composition of Saharan dust and indicate an increasing contribution of clay minerals towards the west. In the westernmost Atlantic, gradients suggest admixture of re-suspended clay-sized sediment advected towards the deep sediment trap. Seasonality is most prominent near both continents but generally weak, with mass fluxes dominated by calcium carbonate and clear seasonal maxima of biogenic silica towards the west.
See also: www.nioz.nl/dust