



Present-day Saharan dust deposition in the Atlantic Ocean and its marine-environmental consequences

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Mineral dust plays an important role in the ocean's carbon cycle through the input of nutrients and metals which potentially fertilise phytoplankton, and by ballasting organic matter from the surface ocean to the sea floor. However, time series and records of open-ocean dust deposition fluxes are sparse. Here, we present a two-year time series of the spatial and temporal evolution of dust-deposition fluxes from a trans-Atlantic array of dust-collecting instruments (surface dust collectors and moored submarine traps) directly below the core of the Saharan dust plume along 12°N. By combining observational data of actually deposited dust with model simulations and satellite observations, we argue that dust deposition in the Atlantic is strongly influenced by summer rains. Using in-situ incubation experiments we demonstrate that such wet deposition increases the release of nutrients up to an order-of-magnitude relative to dry deposition. As a result, we hypothesise that rain-amplified bioavailability of these nutrients may well be the key to increased surface-ocean productivity in remote and oligotrophic parts of the oceans and, potentially, continental ecosystems.