Dust fluxes and iron fertilization in Holocene and Last Glacial Maximum climates

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Resumen

Mineral dust aerosols play a major role in present and past climates. To date, we rely on climate models for estimates of dust fluxes to calculate the impact of airborne micronutrients on biogeochemical cycles. Here we provide a new global dust flux data set for Holocene and Last Glacial Maximum LGM) conditions based on observational data. A comparison with dust flux simulations highlights regional differences between observations and models. By forcing a biogeochemical model with our new data set and using this model's results to guide a millennial-scale Earth System Model simulation, we calculate the impact of enhanced glacial oceanic iron deposition on the LGM-Holocene carbon cycle. On centennial timescales, the higher LGM dust deposition results in a weak reduction of <10 ppm in atmospheric CO2 due to enhanced efficiency of the biological pump. This is followed by a further similar to 10 ppm reduction over millennial timescales due to greater carbon burial and carbonate compensation.

Palabras clave

Palabras clave de autor:paleoclimate; dust; iron fertilization; atmospheric CO2; carbon cycle; LGM

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