



The global atmospheric loading of dust aerosols

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Mineral dust is one of the most ubiquitous aerosols in the atmosphere, with critical effects on human health and the Earth system. But despite its importance, the global atmospheric loading of dust has remained uncertain, with model results spanning about a factor of five. Similarly, the size distribution of atmospheric dust varies substantially across models, with the fraction of dust in the clay size range varying by over a factor of three.

Here we use a novel theoretical framework that integrates observational, experimental, and model data to constrain the size-resolved atmospheric loading of dust aerosols. We find that atmospheric dust is substantially coarser than represented in current climate models, that dust dominates global atmospheric aerosol mass, and that many climate models underestimate the global atmospheric dust loading and emission rate.