



Enhanced DMS emissions: Impacts on clouds and climate

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Dimethyl sulfide (DMS) is a significant precursor of sulfate aerosol in remote ocean regions. DMS is a product of dimethylsulfoniopropionate emitted by marine phytoplankton. Increased ocean productivity, such as that which may be induced by artificial fertilization of the ocean in an attempt to remove carbon dioxide from the atmosphere, may lead to an increase in DMS emissions. Enhanced DMS emissions may lead to an increase in sulfate aerosol. This increased sulfate aerosol concentration may lead to a direct radiative effect on climate. Sulfate aerosol is also an important source of cloud condensation nuclei. Therefore, an increase in sulfate aerosol may impact cloud properties, possibly leading to indirect radiative effects on climate. Such effects are likely to be largest in remote ocean regions where DMS is a significant precursor to sulfate aerosol. Using a fully coupled atmosphere-ocean configuration of the Community Earth System Model (CESM), including a representation of aerosol-cloud microphysics, the impacts of enhanced DMS emissions on clouds and transient climate response are investigated.