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Global DMS cycle in HAMOCC5 - a modeling attempt

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Oceanic sulfur emissions as dimethylsulfide (DMS) provide the largest contribution to the natural atmospheric sulfur cycle. Large uncertainties of the magnitude and regional distribution of the oceanic sulfur source exist. Earlier attempts to quantify the oceanic DMS emission were either based on extrapolation of sparse data or on correlations of DMS with e.g. chlorophyll distributions (Belviso et al., 2004). The complexity of the processes controlling DMS however hampers satisfying results. We present here a prognostic model of the oceanic sulfur cycle imbedded into a global three-dimensional biogeochemical ocean circulation model (HAMOCC5). On the basis of intercellular DMSP concentrations for different plankton species we calculate dissolved DMSP production and its conversion to DMS. Decay of DMS occurs via bacterial removal, photolysis and exchange with the atmosphere. The turnover rates of the decay processes and intercellular sulfur concentrations are relativly unknown and can by regarded within limits as free adjustable parameters. The minimization of an error function defined on model results and the global DMS data set of Kettle et al.(2000) allows us to confine these free parameters and, thus, combine a dynamically consistent DMS distributions with an estimate of the regional distribution of the controlling processes.