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Water-side turbulence enhancement of ozone deposition to the ocean

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Abstract. A parameterization for the deposition velocity of an ocean-reactive atmospheric gas (such as ozone) is developed. The parameterization is based on integration of the turbulent-molecular transport equation (with a chemical source term) in the ocean. It extends previous work that only considered reactions within the oceanic molecular sublayer. The sensitivity of the ocean-side transport to reaction rate and wind forcing is examined. A more complicated case with a much more reactive thin surfactant layer is also considered. The full atmosphere-ocean deposition velocity is obtained by matching boundary conditions at the interface. For an assumed ocean reaction rate of 10^3 s^{-1} , the enhancement for ozone deposition by oceanic turbulence is found to be up to a factor of three for meteorological data obtained in a recent cruise off the East Coast of the U.S.

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