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Reactive uptake of ozone by chlorophyll present at aqueous surfaces

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Understanding the sources and sinks of ozone in the marine boundary layer is critical to the ability to model the local oxidizing potential. Although there is now growing understanding about oxidative halogen release as a gas phase reactive sink for boundary layer ozone, ozone's loss rate to the sea surface by dry deposition remains uncertain. Reported values of the surface resistance to ozone uptake span a range of almost an order of magnitude. Models for the deposition which ignore chemical reactions at the interface region underestimate the observed deposition velocities. Here we report the results of two complementary studies of the heterogeneous reaction between gas phase ozone and chlorophyll present at the water surface. The two experiments agree that the uptake coefficient for ozone by such chlorophyll samples is $\sim$2-5$\times10^{-6}$ with unpolluted boundary layer ozone concentrations. This value for the uptake implies that at low wind speed, the reaction between ozone and chlorophyll at the sea surface may represent the driving force for ozone deposition at the ocean surface.