

A study of stratospheric aerosols and their effect on inorganic chlorine partitioning using balloon, in situ, and satellite observations.

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Heterogeneous reactions on the surface of aerosols lead to a decrease in the concentration of nitrogen radicals and an increase in the concentration of chlorine and hydrogen radical species. As a consequence, enhanced sulfate aerosol levels in the lower stratosphere resulting from volcanic eruptions lead to lower concentrations of ozone due to more rapid loss by chlorine and hydrogen radicals. This study focuses on continuing the effort to quantify the effect of sulfate aerosols on the partitioning of inorganic chlorine species at midlatitudes. The study begins with an examination of balloon-borne measurements of key chlorine species obtained by the JPL MkIV interferometer for different aerosol loading conditions. A detailed comparison of the response of HCl to variations in aerosol surface area observed by MkIV, ER-2 instruments, HALOE, and ATMOS is carried out by examining HCl vs CH<sub>4</sub> correlation diagrams, since CH<sub>4</sub> is the only tracer measured on each platform. Finally, the consistency between theory and observed changes in ClO and HCl due to variations in aerosol surface area is examined.