

SUBMITTED TO SYMPOSIUM NUMBER: 19

SYMPOSIUM TITLE: Atmospheric Particles and Aerosols

**STRATOSPHERIC CLOUDS AND THE EXTINCTION OF THE
DINOSAURS: THE ROLE OF SULFURIC ACID PARTICU-
LATES GENERATED BY THE CHICXULUB IMPACT**

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Sulfate aerosols generated by the impact of an asteroid or comet in the northern Yucatan peninsula 65 million years ago caused over a decade of global cooling, acid rain, depletion of stratospheric ozone, and disruption of ocean circulation. Impact models predict that over 200 **gigatons** (Gt) each of SO₂ and water vapor and over 500 Gt of CO₂ were globally distributed in **the** stratosphere by the impact. Estimates of the conversion **rate** of stratospheric SO₂ and water vapor to sulfate aerosol, based on observed volcanic production rates coupled with radiative transfer **modelling** and calculations of diffusion, coagulation, and sedimentation, demonstrate that the 200 Gt stratospheric SO₂ and water vapor reservoir **would** produce sulfate aerosols worldwide for 12 years, dropping the global surface temperatures between 5 and 31° K, depending upon **the** rate of temperature-driven ocean mixing. These severe **global** environmental effects may be the dominant causal **link** between the **bolide** impact and the mass extinction of the dinosaurs at the end of the **Cretaceous**.

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