

Atmospheric nitrate and its impact on air quality and climate constrained by measurements from ground stations, aircraft and satellite

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Atmospheric nitrate simulated by NASA global modeling initiative (GMI) model has been evaluated using various measurements from ground station networks (CastNet and EMEP), aircraft measurements (ARCTAS and DISCOVER), and satellite AURA TES retrieval. The impacts of nitrate on atmospheric chemistry and climate have also been investigated. The model results show a substantial global tropospheric OH reduction ($\sim 10\%$) due to partitioning previous pure gas phase nitrate acid between gas phase and aerosol phase. This perturbation results in several percent changes of CO and other tracers since atmospheric OH is one of the major atmospheric oxidants. The impact of nitrate aerosol on climate simulated by GMI is about one third of that of sulfate aerosol on a global annual basis.