



Significant atmospheric aerosol pollution caused by world food cultivation

Susanne E. Bauer (1,2), Kostas Tsigaridis (1,2), and Ron Miller (2)

(1) Center for Climate Systems Research, Earth Institute, Columbia University, New York, NY, USA, (2) NASA Goddard Institute for Space Studies, New York, NY, USA

Particulate matter is a major concern for public health, causing cancer and cardiopulmonary mortality. Therefore, governments in most industrialized countries monitor and set limits for particulate matter. To assist policy makers, it is important to connect the chemical composition and severity of particulate pollution to its sources. Here we show how agricultural practices, livestock production, and the use of nitrogen fertilizers impact near-surface air quality. In many densely populated areas, aerosols formed from gases that are released by fertilizer application and animal husbandry dominate over the combined contributions from all other anthropogenic pollution. Here we test reduction scenarios of combustion-based and agricultural emissions that could lower air pollution. For a future scenario, we find opposite trends, decreasing nitrate aerosol formation near the surface while total tropospheric loads increase. This suggests that food production could be increased to match the growing global population without sacrificing air quality if combustion emission is decreased.