Advanced Study Program Seminar

Wednesday April 16th 2008 at 11 am.
Foothills Laboratory 2, Room 1022 (Auditorium)
Tea and coffee served before the seminar

US NOx Emissions Evaluated by Space-based Observations and Model Simulations

Gregory Frost
CIRES Research Associate
Chemical Sciences Division
Earth System Research Laboratory
National Oceanic and Atmospheric Administration

Abstract:

Gregory Frost, Si-Wan Kim, Stuart McKeen, Eirh Yu Hsie, Michael Trainer, Andreas Heckel, Andreas Richter, and John Burrows

Nitrogen oxide (NO_x) emissions resulting from fossil fuel combustion lead to unhealthy levels of near-surface ozone. The two largest US anthropogenic NO_x sources are motor vehicles and the generation of electric power by coal combustion. Our recent work examines atmospheric vertical columns of nitrogen dioxide (NO_2) detected by space-based instruments and calculated by a regional air quality model. We use these comparisons to evaluate bottom-up inventories and infer trends in NO_x emissions from power plants and motor vehicles. We show that a decline in NO2 columns detected by satellite instruments over the Ohio River Valley since the 1990's is a direct result of NO_x emission reductions due to pollution controls implemented at coal-burning power plants. In another study, we demonstrate that power plants NO_x emissions in the western US are well understood but that emissions from motor vehicles in urban areas across the West are probably overestimated by inventories. Satellite observations demonstrate significant recent declines and day-of-week trends in motor vehicle NO_x emissions in some western US cities.