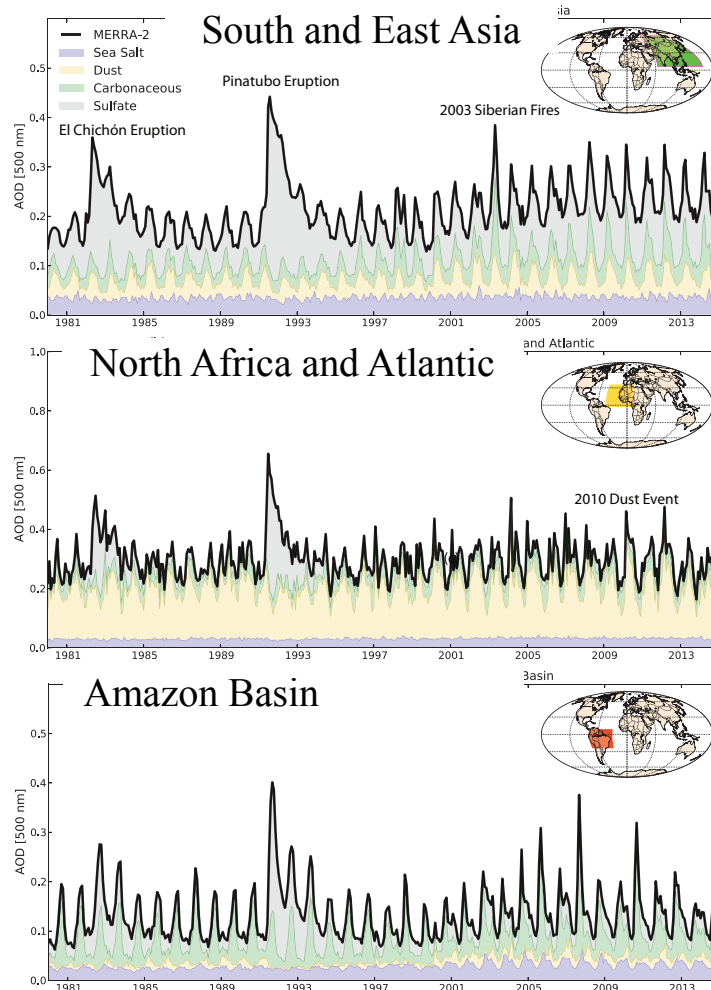




Satellite-Derived Aerosol Data are Introduced into a Global Reanalysis

Arlindo da Silva, Ron Gelaro, et al. (Global Modeling and Assimilation Office, 610.1)



Time series of monthly mean Aerosol Optical Depth (AOD) from MERRA-2 over three regions

Science Question: Can we derive coherent global aerosol datasets over 40-year satellite data record?

Finding: Aerosol information, mainly from NASA's AVHRR and MODIS data, were assimilated in the Modern-Era Retrospective Analysis for Research and Applications (MERRA-2). This has led to a multi-decadal, three-dimensional speciated aerosol record based on complex model components, observation-constrained emissions, and observations of aerosol optical depth. Regional and temporal differences in aerosol type are depicted.

Impact: For the first time, the radiative impacts of aerosols are included in a global reanalysis dataset.

Why It Matters: Introduction of aerosol information into reanalyses provides a significant step towards full Earth System datasets based on satellite observations and forefront models. MERRA-2 is the first reanalysis to include interactive aerosol modules.

Gelaro, R., and Co-authors, 2017: The Modern-Era Retrospective Analysis for Research and Applications, Version-2 (MERRA-2). *J. Climate*, **30**, 5419-5454. DOI: 10.1175/JCLI-D-16-0758.1.