Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11193, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11193
EGU General Assembly 2008

Mineral dust transport characterization over the Atlantic from combined satellite aerosol retrievals.

Olga V. Kalashnikova(1), Ralph A. Kahn(2), Michael Garay(1), Jianglong Zhang(3), and Jeffrey S. Reid(4)

(1) Jet Propulsion Laboratory, California Institute of Technology, (2) NASA Goddard Space Flight Center (3) University of North Dakota (4) NRL/SPAWAR Systems center

We examine the potential of combining MISR and MODIS space-based aerosol products for improving dust aerosol representations in climate and forecast models, using selected North Africa dust transport events during Summer 2000. We demonstrate that MISR and MODIS retrievals are complimentary over the Atlantic, and are in a good agreement with AERONET observations. MODIS provides more extensive coverage, whereas MISR's multi-angle retrievals include particle nonspherical fraction, and fill in areas where glint precludes MODIS optical depth retrievals, increasing by up to 50% dust plume surface area coverage compared to MODIS-only observations.

We use MISR and MODIS observations to investigate the relationship between aerosol optical thickness (AOT) and plume surface area, as the plume is transported over the Atlantic, for five selected dust events. Within MISR retrieval uncertainties, Angstrom exponent is lower and AOT Nonspherical fraction is higher in the optically thicker parts of the plume; Single Scattering Albedo (SSA) values are ~ 0.97 for all stages of plume evolution. For the cases selected, AERONET shows a $\sim 15\%$ decrease in aerosol coarse mode effective radius as the plume moves across the Atlantic.

Available MISR stereo retrievals show that dust blown off the coast is concentrated between 3 and 5 km above the surface, which could explain the high correlation between TOMS Aerosol Index (AI) and MISR AOT near African source regions. We did not find a strong correlation between dust source activity, downwind properties, and deposition patterns; observed variations are likely due to monsoon flows and local

meteorology.