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Aerosols in GEOS-5: simulations of the UV Aerosol Index and the Aerosol Absorption Optical Depth and comparisons with OMI retrievals.

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GEOS-5 is the latest version of the NASA Global Modeling and Assimilation Office (GMAO) earth system model. GEOS-5 contains components for atmospheric circulation and composition (including data assimilation), ocean circulation and biogeochemistry, and land surface processes. In addition to traditional meteorological parameters, GEOS-5 includes modules representing the atmospheric composition, most notably aerosols and tropospheric/stratospheric chemical constituents, taking explicit account of the impact of these constituents on the radiative processes of the atmosphere. The assimilation of Aerosol Optical Depth (AOD) in GEOS-5 involves very careful cloud screening and homogenization of the observing system by means of a Neural Net scheme that translates MODIS radiances into AERONET calibrated AOD. These measurements are further quality controlled using an adaptive buddy check scheme, and assimilated using the Local Displacement Ensemble (LDE) methodology. For this analysis, GEOS-5 runs at a nominal 50km horizontal resolution with 72 vertical layers (top at $\sim$85km). GEOS-5 is driven by daily biomass burning emissions derived from MODIS fire radiative power retrievals. We present a summary of our efforts to simulate the UV Aerosol Index (AI) at 354 nm from aerosol simulations by performing a radiative transfer calculation. We have compared model produced AI with the corresponding OMI measurements, identifying regions where the model representation of absorbing aerosols were deficient. Separately, model derived Absorption Aerosol Optical Depth (AAOD) is compared with OMI retrievals. Making use of CALIPSO measurements we have also investigated the impact of the altitude of the aerosol layer on OMI derived AI trying to ascertain misplacement of plume height by the model.