Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00215, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00215
EGU General Assembly 2008

Hemispheric aerosol asymmetry and cloud symmetry based on MODIS data

P. Kishcha (1), B. Starobinets (1), P. Alpert (1), R. Levy (2), and L. Remer (2)

(1) Dept. of Geophysics and Planetary Sciences, Tel-Aviv University, Israel, (2) NASA GSFC, Greenbelt, USA (pavel@cyclone.tau.ac.il / Fax: +972-3-6409282)

- Collection 5 of MODIS data, from March 2000 to November 2006, was used to analyze the latitudinal distribution of averaged total aerosol optical depth (AOD), fine mode aerosol optical depth (FMAOD), and cloud optical thickness (COT). Over the ocean where MODIS aerosol retrievals are most reliable, there is a pronounced hemispheric asymmetry both in AOD and in FMAOD. In contrast to aerosol asymmetry, the latitudinal distribution of ocean COT is quite symmetrical in both hemispheres. Over the land, the asymmetry in AOD between the Northern and Southern hemispheres is even more pronounced than that over the ocean. Latitudinal distributions of COT over the land are less symmetrical than over the ocean. The bimodal maximum is observed in the latitudinal distribution of AOD over the ocean, in contrast to the monomodal maximum in the latitudinal distribution of AOD over the land. A possible explanation is that the major land aerosol sources are strongly concentrated in the 20N – 40N latitudinal band, while the aerosol transport from land to ocean is affected by two different circulation regimes in the Northern hemisphere: predominant westerlies towards the north-east across the Pacific ocean and predominant easterlies to the south-west across the Atlantic ocean. Over the ocean, at latitudes between 30S and 60S, there is a noticeable increase in AOD and a slight decrease in FMAOD. This indicates that strong winds at those latitudes produce mainly coarse sea-salt aerosols with size greater than 1 μm. Overall, the main features of MODIS-based latitudinal distributions of aerosol and cloud optical thicknesses are demonstrated, for the first time, over the land and over the ocean. These distributions can be specifically useful for validating cloud and aerosol

schemes in climate models.