



SW radiative effect of aerosol in GRAPES_GFS

Qiyang Chen

NMC,CMA, NWPC, Beijing,China (chenqy@cma.gov.cn)

The aerosol particles can scatter and absorb solar radiation, and so change the shortwave radiation absorbed by the atmosphere, reached the surface and that reflected back to outer space at TOA. Since this process doesn't interact with other processes, it is called direct radiation effect. The clear sky downward SW and net SW fluxes at the surface in GRAPES_GFS of China Meteorological Administration are overestimated in Northern midlatitudes and Tropics. The main source of these errors is the absence of aerosol SW effect in GRAPES_GFS.

The climatic aerosol mass concentration data, which include 13 kinds of aerosol and their 14 SW bands optical properties are considered in GRAPES_GFS. The calculated total optical depth, single scatter albedo and asymmetry factor are used as the input to radiation scheme. Compared with the satellite observation from MISER, the calculated total optical depth is in good consistent. The seasonal experiments show that, the summer averaged clear sky radiation fluxes at the surface are improved after including the SW effect of aerosol. The biases in the clear sky downward SW and net SW fluxes at the surface in Northern midlatitudes and Tropic reduced obviously. Furthermore, the weather forecast experiments also show that the skill scores in Northern hemisphere and East Asia also become better.