



On the Effect of Heavy Aerosols Loads on Longwave Atmospheric Radiation, Theoretical Investigations

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Dust particles affect both solar and terrestrial radiation by scattering and absorption and are therefore considered to be a significant climate-forcing factor. In this study, theoretical simulations were carried out using MODTRAN program to examine the changes in the atmospheric radiation (4- 100 μm) during dust storms occurred over Riyadh, central Saudi Arabia, between 1999-2000. The Atmospheric Optical Depth (AOD) measurements at (500 nm) and meteorological parameters were used as an input into MODTRAN. The simulation results showed that the heavy aerosol loads brought by the dust storms increase the atmospheric emission in the atmospheric window (8-14 μm) such that the window emissions resembled those of a blackbody and the atmospheric window was almost closed.