

Aerosol characteristics during dust storm in Middle East and South-Western Asia

F. Subhan¹, K. Alam^{1,2}

¹Institute of Physics & Electronics, University of Peshawar, Peshawar, 25120, Pakistan

²Higher education commission (HEC), Pakistan

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Presenting author email: khalamso@gmail.com

Aerosol optical and radiative properties were analyzed during dust storm in March, 2012 over Middle East and South-Western Asia using moderate resolution imaging Spectroradiometer (MODIS) and aerosol robotic network (AERONET) data. The aerosol optical depth (AOD) values were found maximum on 18th March in Kuwait, Bahrain, Qatar, and Saudi Arabia and were 4.948, 4.414, 4.283, and 4.999, respectively. The AOD values were also found maximum on 19th March in Oman, Arabian Sea, and Iran and were 4.552, 5, and 5, respectively. The dust storm spread over Pakistan and passed through Multan, Faisalabad, and Lahore. The maximum AOD values on 20th March were found to be 2.14, 2.63, and 2.66 over Multan, Faisalabad and Lahore, respectively. The aerosol volume size distributions were maximum during dusty days and minimum in non-dusty days in Lahore as shown in Figure.1.

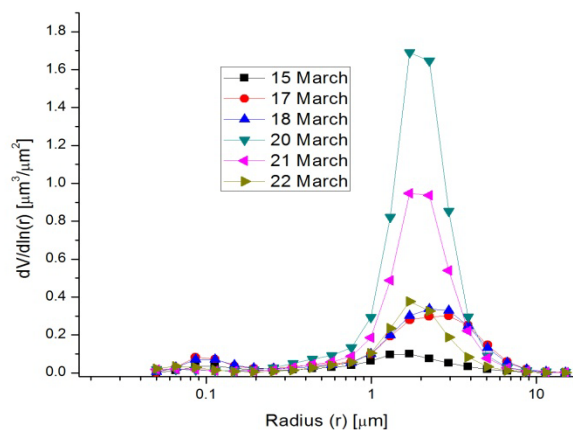


Figure.1. Aerosol volume size distribution during dust days (20-21 March) and non-dusty days (15,17,18,22 March)

The single scattering albedo (SSA) increases as wave length increases implying that SSA is wavelength dependent and increases rapidly with wavelength on the dusty days as compared non-dusty days. This rapid increase in SSA with wavelength revealed that dust particles were dominant and were of larger size as compared to other aerosols particles. The aerosol radiative forcing values at the surface and at top of atmosphere during dusty and non-dusty days were in the range of -64 Wm^{-2} to -260 Wm^{-2} (averaged $-137 \pm 60 \text{ Wm}^{-2}$) and -20 Wm^{-2} to -105 Wm^{-2} (averaged $-48 \pm 25 \text{ Wm}^{-2}$), respectively.

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