Variation of Aerosol Optical Depth over a Coastal Station (Goa), Along the West Coast of India

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Using a 10 wavelength radiometer (Multiwavelength radiometer – MWR), Aerosol Optical Depth (AOD) over a coastal station in Goa, along the west coast of India, have been measured. To supplement the data obtained from Mutiwavelength radiometer (MWR), especially during monsoon season, Microtops II Sunphotometer have been also been used. The observations were carried out from January 2008 to December 2009 on all the clear sky days. The spectral variation of AOD revealed that it follows angstrom turbidity formulae. AOD values were further analyzed to estimate aerosol size spectrum (α) and atmospheric turbidity (β). To understand the variability of aerosol loading over the study region, AOD at 500 nm have been analyzed. The result indicates highest loading during April 2008 (0.75) and lowest (0.35) during May 2008. But in the year 2009, highest AOD was encountered during March. To decipher the reason for the differential loading, both local and remote forcing were examined. The remote forcing have been examined through HYSPLIT (Hybrid Single Particle Lagrangian Integrated trajectory model) model while local forcing were studied through meteorological parameters. Realizing the contribution of different air masses, over the area of study, percentage contribution has been examined. During the month of April 2008, 75% of the air mass was found to be originating from the north -west part of India and from west Asia countries. On the other hand during the month of May, almost all the trajectories originated from the Arabian Sea. Furthermore highest α around 0.9 was recorded in the month of October 2008 whereas lowest was in May 2008 (~0.35). While β was highest during in April and showed lower values in the month of December, during both the year.

Keywords: Multiwavelength Radiometer; Aerosol Optical Depth; MicrotopsII Sunphotometer; Hysplit