



Seasonal Trends of Atmospheric Aerosols over India Sub-Continent

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The Indian sub-continent shows contrast characteristics in atmospheric aerosols in its southern, northern, western and eastern parts. The southern part is surrounded by the Arabian Sea in the west, Bay of Bengal in the east and the Indian ocean in the south. The northern part is surrounded by towering Himalaya in the north, Thar desert in the west and the dense forested areas in the eastern side. The Indo-Gangetic plains (IGP) lie in the northern part of India covering an area extending from Pakistan borders in the west to the Bangladesh in the eastern side. The surface topography is lower in the eastern parts of India compared to higher topography in the western part. Detailed analysis of MODIS data during the last decade has been carried out over India mainly focusing on analyzing the aerosol trends along south-to-north India and west-to-east of IGP. An increasing annual trend of aerosol optical depth (AOD) is observed during 2000 – 2010 over the Indian sub-continent that is attributed to the population growth, vehicular emissions, industrial growth, biomass burning, bio-fuel cooking etc. This increasing trend of AOD is mainly evident in winter season (December to January). During the pre-monsoon (summer) season (April-June), the long range transport of dust from the Arabian peninsula enters into Indian sub-continent and, depending upon the meteorological conditions and wind velocity, the aerosol optical characteristics change drastically up to several parts of the country; sometimes dust influences the albedo of the snow over the Himalayan region. The present study reveals that the winter and summer seasons show contrasting trends in AOD over the Indian sub-continent; the increasing trend over the northern part is found to be pronounced during winter season, however, over the central and southern parts the annual contrast is not so big. On the other hand, during summer season there is an evidence for decreasing AOD over IGP, a feature that has not been so highlighted in the previous studies over the region.