Study of Changes of Aerosol Apportionment in Different Breeze Conditions at Eastern Coastal Region of India

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Aerosol optical and physical properties are studied at Kalpakkam, a coastal station, 80 km far from Chennai, during 16-31 March 2006 as a part of the Integrated Campaign for Aerosols, gases, and Radiation Budget (ICARB) during different breeze conditions. We found that columnar aerosol optical depth decreased as day progressed due to the change in breeze from land (morning) to sea (evening). In the diurnal variation of Black Carbon (BC) mass concentration there is only one peak during morning whereas two peaks during morning and evening were observed at other coastal stations like Trivandrum, Vishakhapattanam etc., as reported by earlier researcher. At Kalpakkam, the reason could be that the land breeze carries more BC concentration from Chennai and surrounding suburban regions during morning while sea breeze was carries less BC concentration during evening and therefore it goes to the background level. During 20-28 March, the sea breeze was from the Indo-Gangetic basin and carried comparatively high BC to eastern coast of India increasing the background BC by a factor of 1.6. The AOD also increased from 0.27 to 0.32. At the surface radiative forcing became a maximum of 24.60 W/m^2 . Due to the large transportation of BC from Chennai and surrounding suburban regions, there is a large variation in diurnal radiative surface forcing and BC transported from IGB also contributes to the enhancement of background surface forcing at east coast of India. Results during other wind regimes when wind was from North Indian Ocean and Bay of Bengal will also be discussed with emphasis on how the radiative forcing is affected due to the large variation in BC concentration.