Vertical and Horizontal Structure in the Aerosol Scattering Properties over Bay of Bengal during Winter: Role of East Asian Advection and Prevailing Meteorology

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Campaign mode aircraft measurements of aerosol scattering coefficients are carried out over Bay of Bengal during wintertime of 2008-2009 as part of the winter campaign under Integrated Campaign for Aerosols, gases and Radiation Budget (ICARB) of ISRO-GBP project. The altitude profiles revealed that the scattering coefficient remained steady in the stable and convectively well-mixed regions and then dropped off, above the MABL. This decrease was quite rapid off the Indian mainland, while it was more gradual in the eastern BoB. Investigation on horizontal gradients revealed that the scattering coefficients over northern BoB are 3 to 4 times higher compared to that of central BoB within and above the MABL. Over central western BoB, an eastward gradient, where the scattering coefficients and the derived quantities like wavelength exponent and hemispheric backscatter ratio, increased with increasing longitude is observed, indicating eastward increasing (i) aerosol abundance. (ii) its fine mode fraction and (iii) influence of the continental synoptic airmass originating from the east Asian region, over the marine environment of BoB. A north-south gradient in scattering coefficients measured for the first time over Port Blair in the eastern BoB, revealed a north-south gradient with the coefficients decreasing from south to north. Examination of this feature, along with near simultaneous ocean surface winds derived from Quikscat revealed a strong influence of scattering aerosols, produced over the ocean by the winds in the southern BoB. The gradients are parameterized using bestfit analytical functions.