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Aerosol Behaviour Over Arabian Sea During Pre Monsoon Period

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Several cruise measurements have been conducted over the Arabian Sea region to gain insight into the onset processes of Indian monsoon and its dynamics. A variety of operational and special data sets on pressure, temperature, wind, humidity, rainfall, surface fluxes, OLR, SST, salinity etc have been collected during Arabian Sea Monsoon Experiment (ARMEX) conducted under Indian Climate Research Programme (ICRP). During these experiments measurements of aerosol characteristics like mass loading, size distribution, columnar optical depth and water vapour content were also carried out for understanding their spatial and temporal variations. The aerosol samples were also collected and the chemical composition studied. The multi-channel measurement of aerosol number density at the five different size channels is used to examine the spatial variation of size distribution over the cruise region. The concentration of smaller size particles (with aerodynamic dia$<$1.0 m) is found to be significantly large close to the coast. This can mainly be attributed to proximity to anthropogenic sources. On the contrary the large particle concentration is observed to be high $\sim$12°N. An inverse power law has been assigned to the aerosol size distribution and the spatial variation of the power law index has been examined. The observed values of size index values were relatively low around 12°N (north west region) indicating the dominance of large particles. A notable feature observed in this study was the significantly low aerosol concentration (near the surface) as well as the low optical depth in the warm pool area. The aerosol mass loading in the latitude-longitude sector of 8° to 9.6°N and 75° to 76°E lies in the range 20-40 mg m-3. The columnar water vapour content over the ARMEX region varied from 1.3 to 3.5 cm and is found to be highest close to the coastal regions of Indian Peninsula, decreasing westward. The low water vapour content observed in the mid Arabian Sea region can be attributed to the northeasterly winds from the dry and arid regions. The day-to–day variability of aerosol parameters as well as water vapour in the warm pool area has been studied in detail.