

Interactive comment on “Study of successive contrasting monsoons (2001–2002) in terms of aerosol variability over a tropical station Pune, India” by R. L. Bhawar and P. C. S. Devara

R. L. Bhawar and P. C. S. Devara

Received and published: 12 August 2009

It has been well known that aerosols play a pivotal role in the Earth-atmosphere radiation balance and influence the monsoon. The present study has been carried out over a tropical urban station, Pune in India. The TOMS-observed aerosol index (AI) data, used in the study, basically denote both absorbing and scattering type of aerosols depending upon the sign of AI. The results reveal that during monsoon 2002, the positive AI values (represent absorbing aerosols) dominate the negative values (represent scattering aerosols) with large spread (anomaly) in the data as compared to the variations in AI during the normal monsoon year, 2001. The absorbing aerosols, originated from semi-arid (desert dust), transport over Pune during the pre-monsoon months as explained by Pandithurai et al. (Geophys. Res. Lettrs, 31, doi:10.1029/2004GL019702,

S2952

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



2004). Moreover, dust storms occur over Pune during the pre-monsoon months. Albeit, air mass, consisting of hygroscopic particles generated from Arabian sea passes over Pune during the transition from pre-monsoon to monsoon period, dominance of absorbing aerosols (dust or/and organics) over scattering aerosols varies from year to year depending on circulation features that support the transport of these aerosol particles over Pune (Devara et al., *Meteorologische Zeitschrift*, 10, 123-130, 2001; Devara et al., *Aerosol and Air Quality Res.*, 5, 103-114, 2005). The influence of aerosols over Arabian sea on Indian monsoon has been studied recently by Rahul et al. (*Geophys. Res. Letts.*, 35, doi:10.28/2008L035573) and reported that wind direction (transport) plays a prominent role in such impacts. Further, the studies conducted by Safai et al. (*Atmos. Environ.*, 41, 2699-2709, 2007) indicate that black carbon concentrations are minimum over Pune during the monsoon season. As suggested by Johnson et al. (*Q. J. R. Meteorol. Soc.*, 130, 1407–1422, 2004), such absorbing aerosols affect (semi-direct effect) the local heating of the atmosphere significantly and reduce the relative humidity, which in turn results in reduced cover of lower-level clouds, forming over Pune during the monsoon season, affecting especially the light rain. Thus the dominance of absorbing aerosols, as opposed to scattering type, may have lead to suppressed rainfall during 2002 monsoon. These findings also corroborate the declaration of 2002 as a drought year by the India Meteorological Department (IMD).

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 9, 6957, 2009.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)