

## ***Interactive comment on* “The Indian summer monsoon rainfall: interplay of coupled dynamics, radiation and cloud microphysics” by P. K. Patra et al.**

**Anonymous Referee #2**

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This paper illustrates the influences anthropogenic effects (aerosols viz. dust and biomass burning) on the interannual variability of Indian summer monsoon rainfall for year 2002 and 2003. The main discussion of the paper is based upon the inhibition of cloud droplet growth by increasing presence of aerosol activities over the Indian monsoon domain which drastically reduced the summer monsoon precipitation amount for the region. The authors also illustrates other prevailing dynamical and synoptic conditions (viz. negative IOD), which facilitate the increase of aerosol over the region.

Overall this paper is a good observational finding and adopted well to establish some

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of the results through statistical interpretations. These findings, which would help monsoon modelers to enhance their model precipitation forecast skills over the Indian sub-continent by including this cause and effect of loading of aerosol and cloud droplet growth. However the relationship between cloud droplet growth (mainly by condensation, coalescence, ice crystal process) and aerosol concentrations is not that straight forward. It is a complex and dynamic feed back function of variable aerosol size, aerosol chemistry, updraft and saturation and needs a thorough validation by exploring sophisticated explicit microphysical parameterization in very high resolution cloud resolving mesoscale models.

I recommend this paper for publications with following minor changes.

Page 2887, 4th line: It seems to me “ The cloud top pressures were lowered by about 1000 hpa during July 2002 over the Ę..” should be only “July”.

Following references are missing in the reference section: Walker, 1910 ; Bjerknes, 1969

Supplemental figures (Fig S1 , S2 , S3 , S4 and S5) should be included with the paper as these figures are referred within the manuscripts.

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