



Supplement of

Increasing Arabian dust activity and the Indian summer monsoon

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1 **Supporting Information: Tables.**

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Bin size (μm)	0.1 - 1	1 - 2.5	2.5 - 5	5 - 20
Extinction cross section (m^2/g)	2.89	0.83	0.33	0.11
Single Scattering Albedo	0.95	0.89	0.79	0.64
Asymmetry parameter	0.66	0.76	0.82	0.90

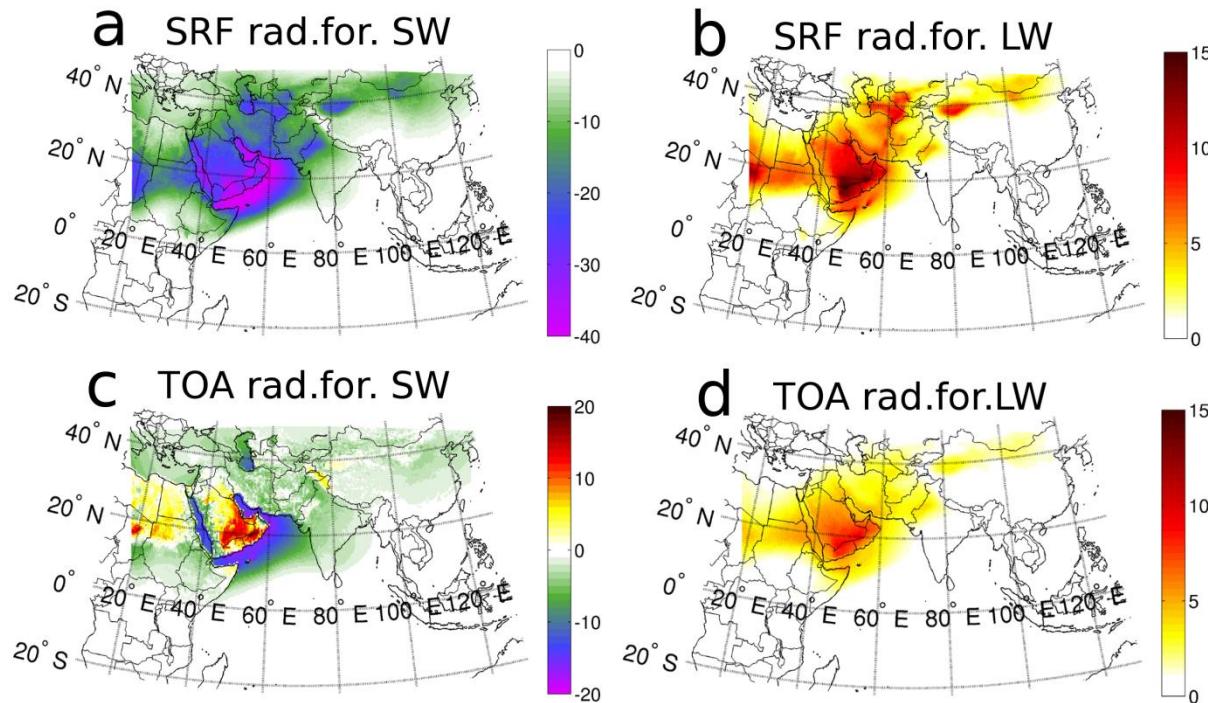
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7 Table S1. Dust bin size and corresponding short wave optical properties for the visible band
 8 (350-640 nm) of the RegCM model. These values were determined from a Mie code and
 9 considering a dust sub-bin size distribution from Alfaro and Gomez 2001 with parameters
 10 detailed in Crumeyrolle et al., 2011. Dust refractive indices were taken from the OPAC data set
 11 d'Almeida et al., 1991 .For the visible band the dust refractive index is $1.55 - 0.0055i$.

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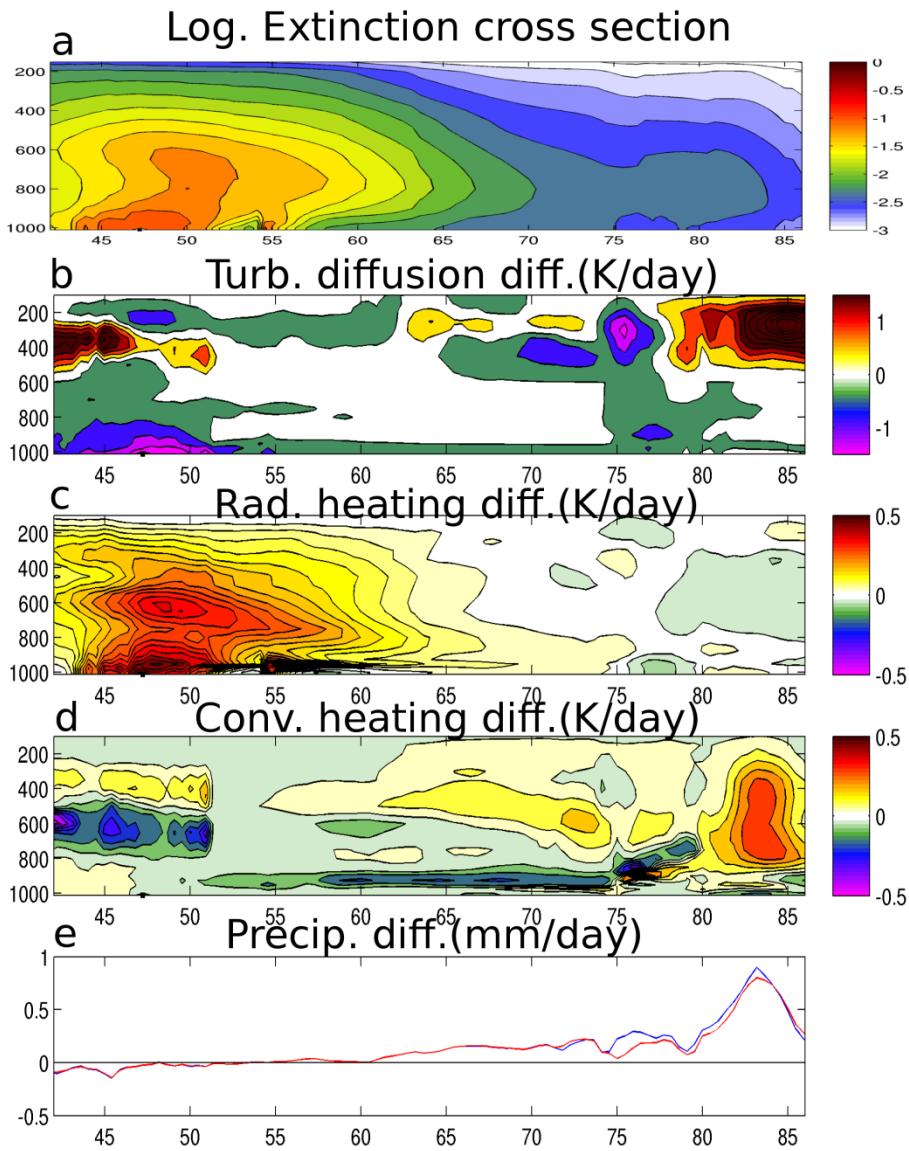
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Supporting Information: Figures.



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Figure S1. JJAS 2000-2009 dust radiative forcing in W/m². (a) Surface short-wave, (b) Surface long wave, (c) Top of Atmosphere short-wave, (d) Top of atmosphere long wave.



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 2 **Figure S2.** Zonal and vertical cross sections averaged between Latitude 5 and 15 N. (a) Mean
 3 JJAS 2000-2009 extinction cross section (on a logarithm scale) of dust aerosols. (b) Mean JJAS
 4 2000-2009 difference of turbulent heating rate between *dust* and *nodust* simulation. (c) Mean
 5 JJAS 2000-2009 difference of radiative heating rate (SW +LW) between dust and nodust
 6 simulation. (d) Mean JJAS 2000-2009 difference of convective heating rate between *dust* and
 7 *nodust* simulation. (e) Precipitation difference between *dust* and *nodust* simulation. The red line
 8 denotes convective precipitations, the blue line denotes total precipitations including convective
 9 and stratiform percipitations.
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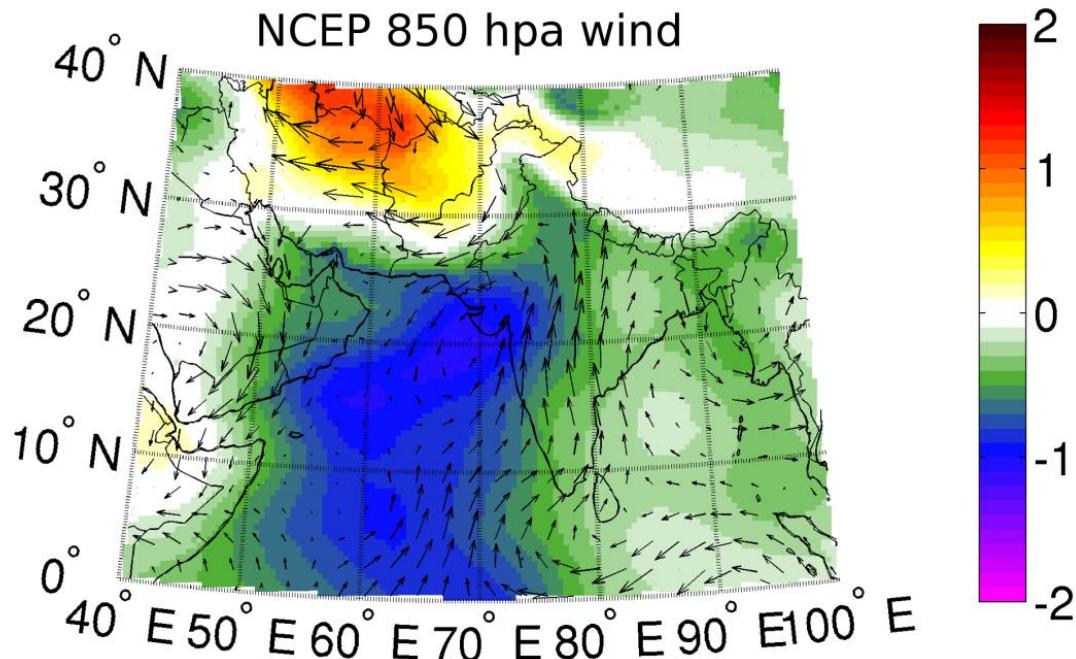
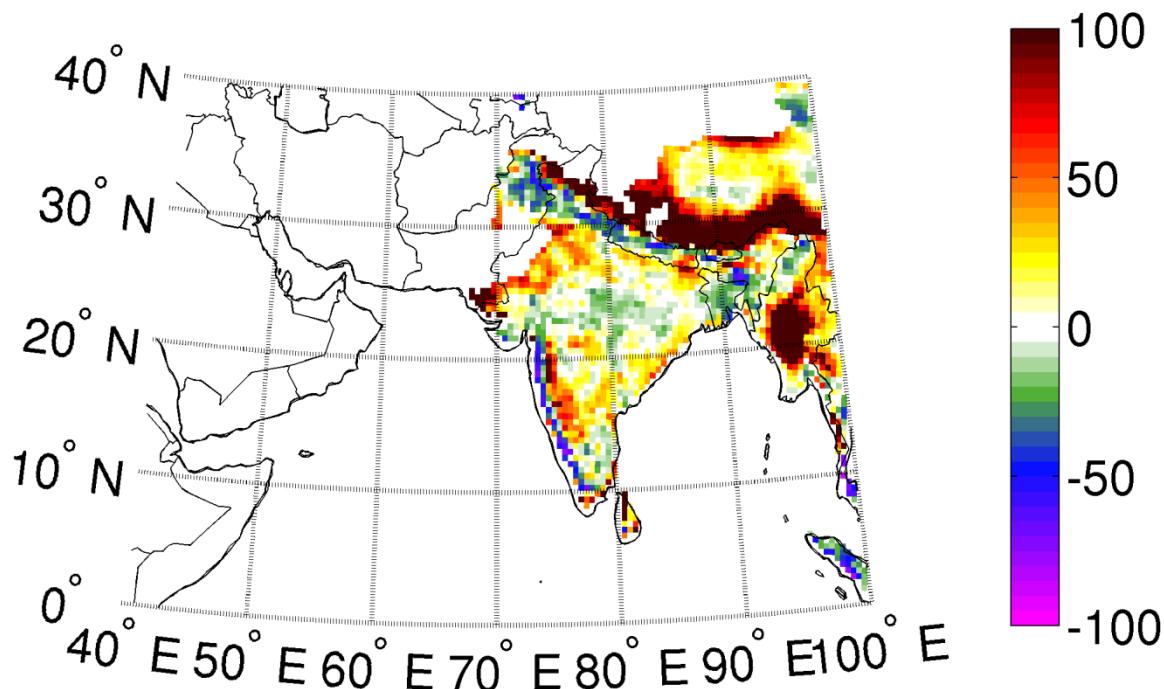


Figure S3. Difference of mean JJAS 850 hpa circulation and surface pressure between “dusty” (2005-2009) and “less dusty” (2000-2004) pentads as defined in the text and calculated from NCEP reanalysis, as a complement to manuscript figure 8.a.

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5 **Figure S4.** Precipitation bias (in %) between JJAS 2000-2007 RegCM “dust” simulation and
6 APHRODITE precipitations. Compared to Figure 6.h an improvement of dry bias is notably
7 obtained over southern India.
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1 **References:**

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