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*Supplement of*

## **Increasing Arabian dust activity and the Indian Summer Monsoon**

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1 **Supporting Information: Tables.**

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| <b>Bin size (<math>\mu\text{m}</math>)</b>                         | <b>0.1 - 1</b> | <b>1 - 2.5</b> | <b>2.5 - 5</b> | <b>5 - 20</b> |
|--|----------------|----------------|----------------|---------------|
| <b>Extinction cross section (<math>\text{m}^2/\text{g}</math>)</b> | 2.44           | 0.85           | 0.38           | 0.17          |
| <b>Single Scattering Albedo</b>                                    | 0.95           | 0.89           | 0.81           | 0.70          |
| <b>Asymmetry parameter</b>   | 0.64           | 0.76           | 0.81           | 0.87          |

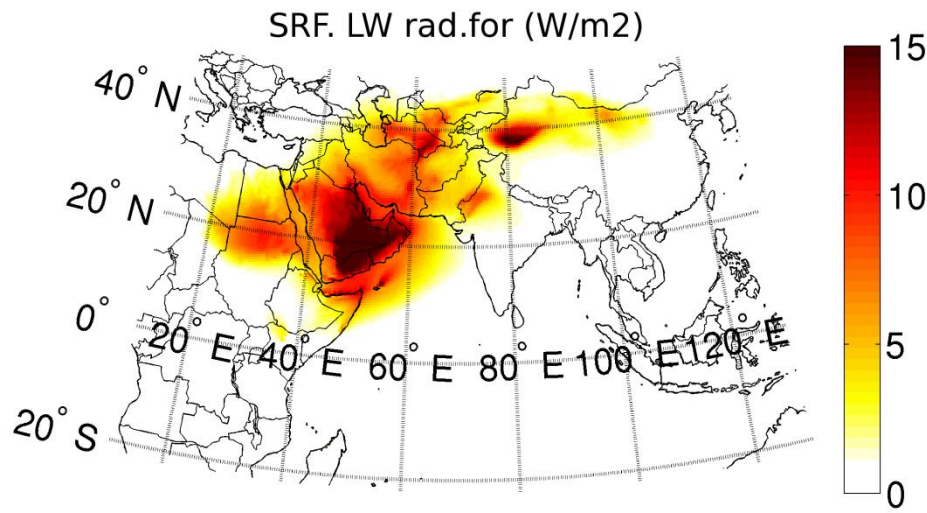
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4 Table S1. Dust bin size and corresponding short wave optical properties for the visible band  
5 (350-640 nm) of the RegCM model.

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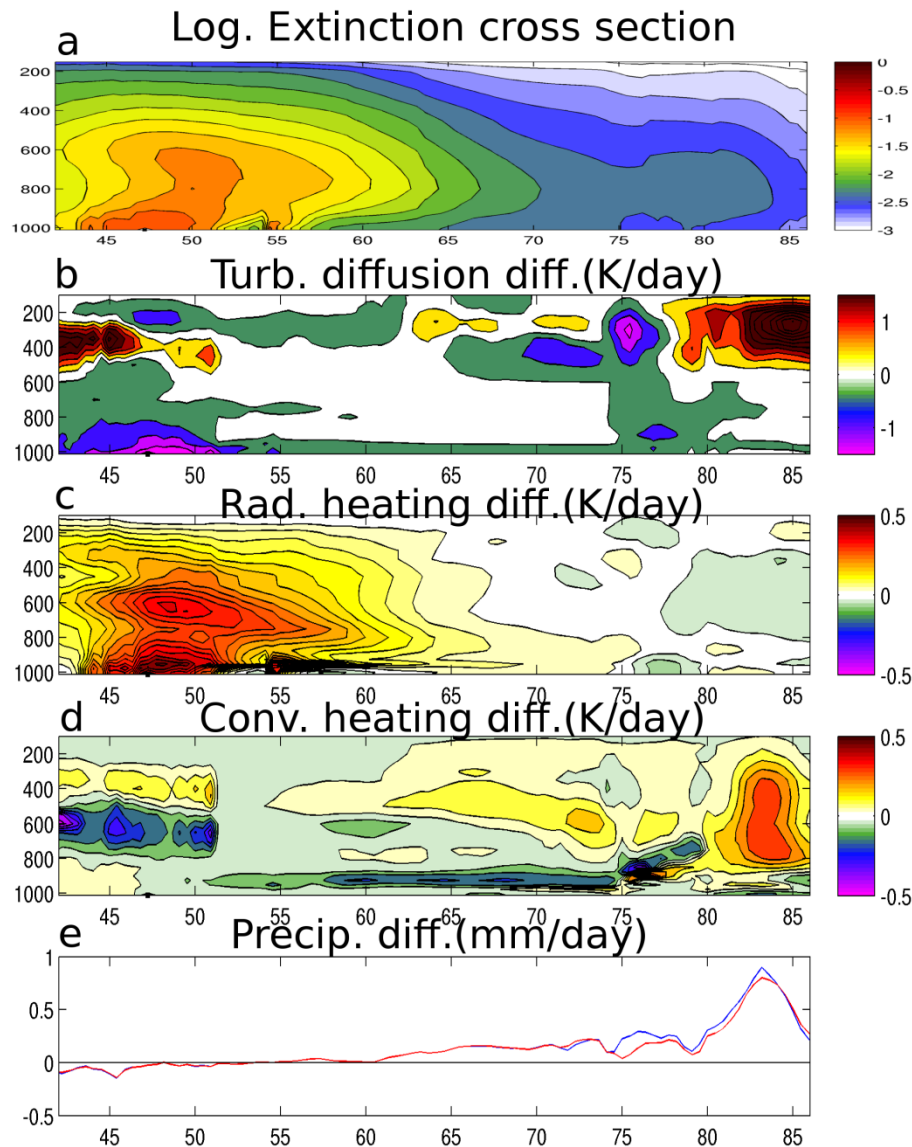
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**Supporting Information: Figures.**



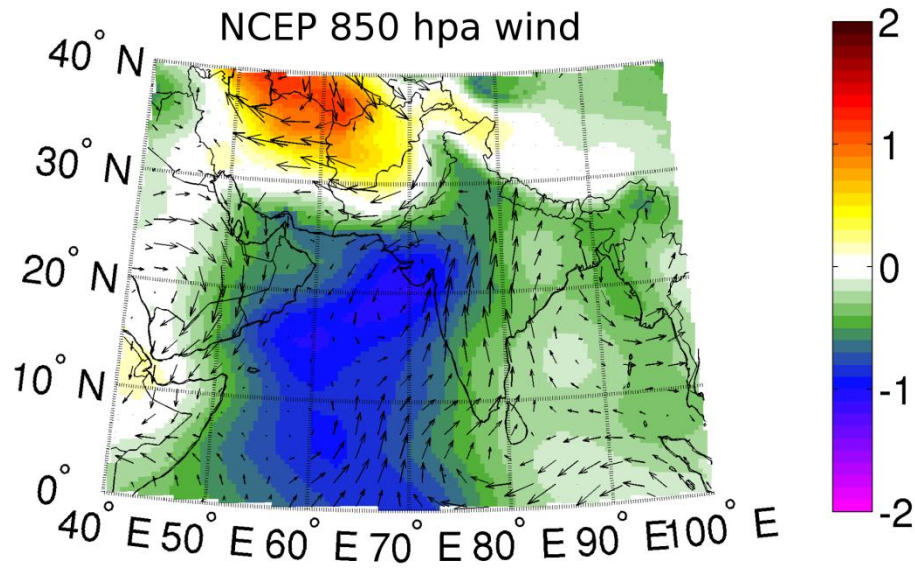
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**Figure S1.** JJAS 2000-2009 dust surface long wave radiative forcing.



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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 precipitations.

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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.