

# Dust size parameterization in RegCM4: Impact on aerosol burden and radiative forcing

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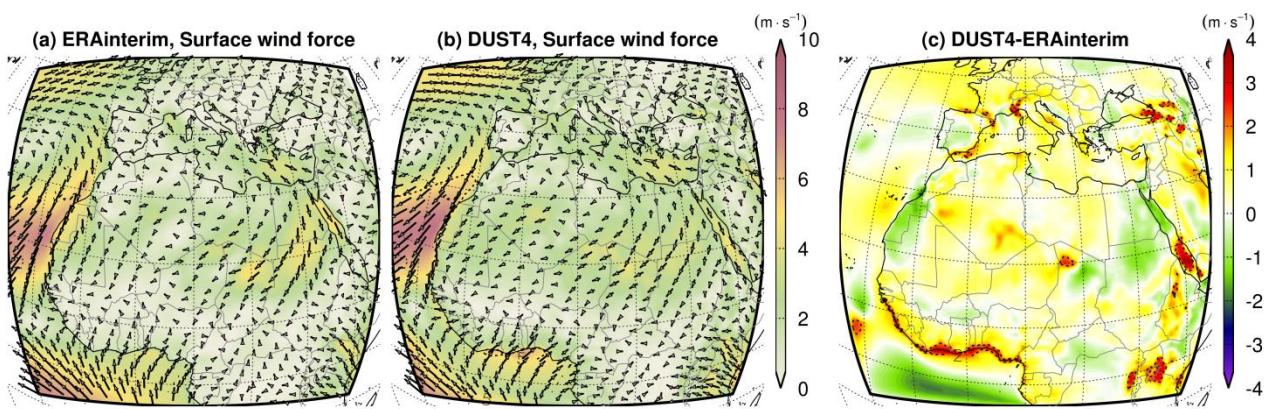
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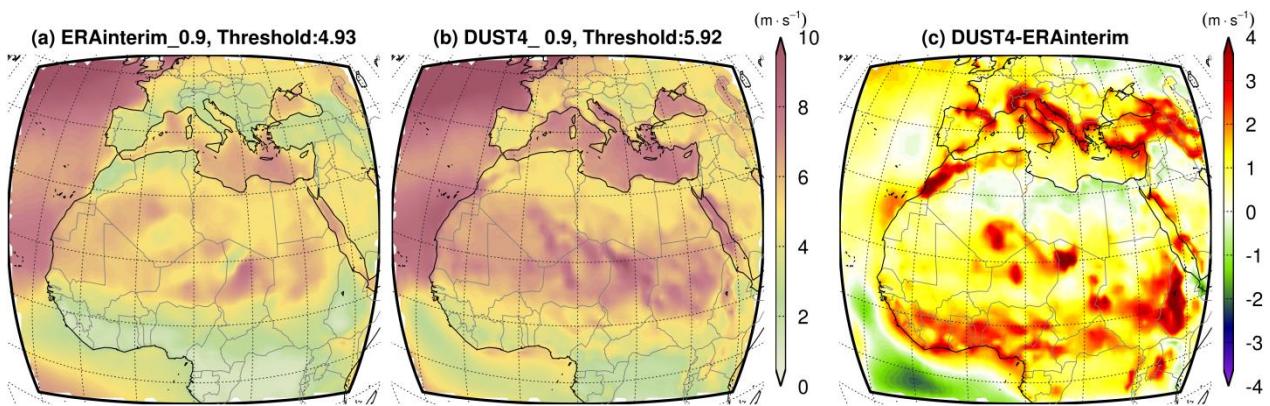
This is the electronic supplement of the article "Dust size parameterization in RegCM4: Impact on aerosol burden and  
15   radiative forcing" submitted to *Atmos. Chem. Phys. Diss.* (2016)

### 3 Results

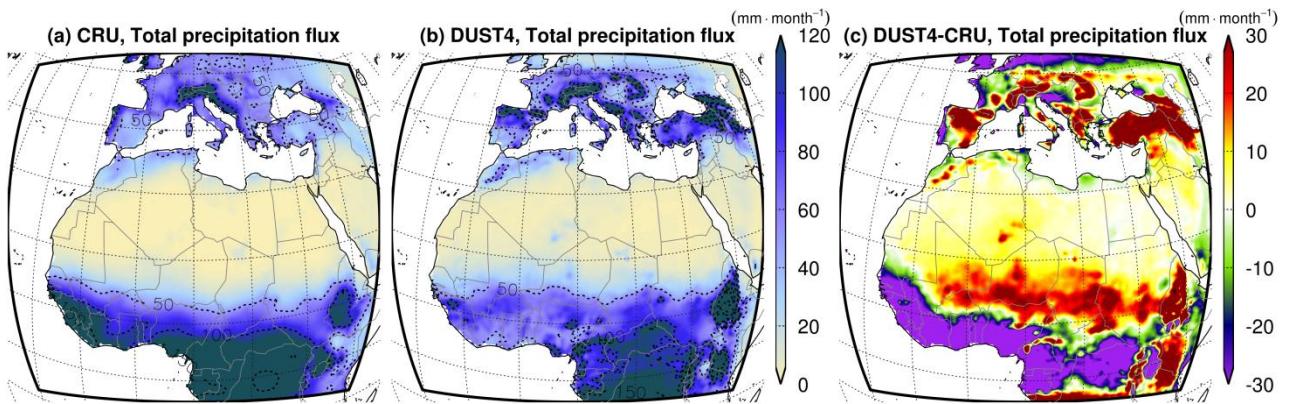
#### 3.1 Evaluation



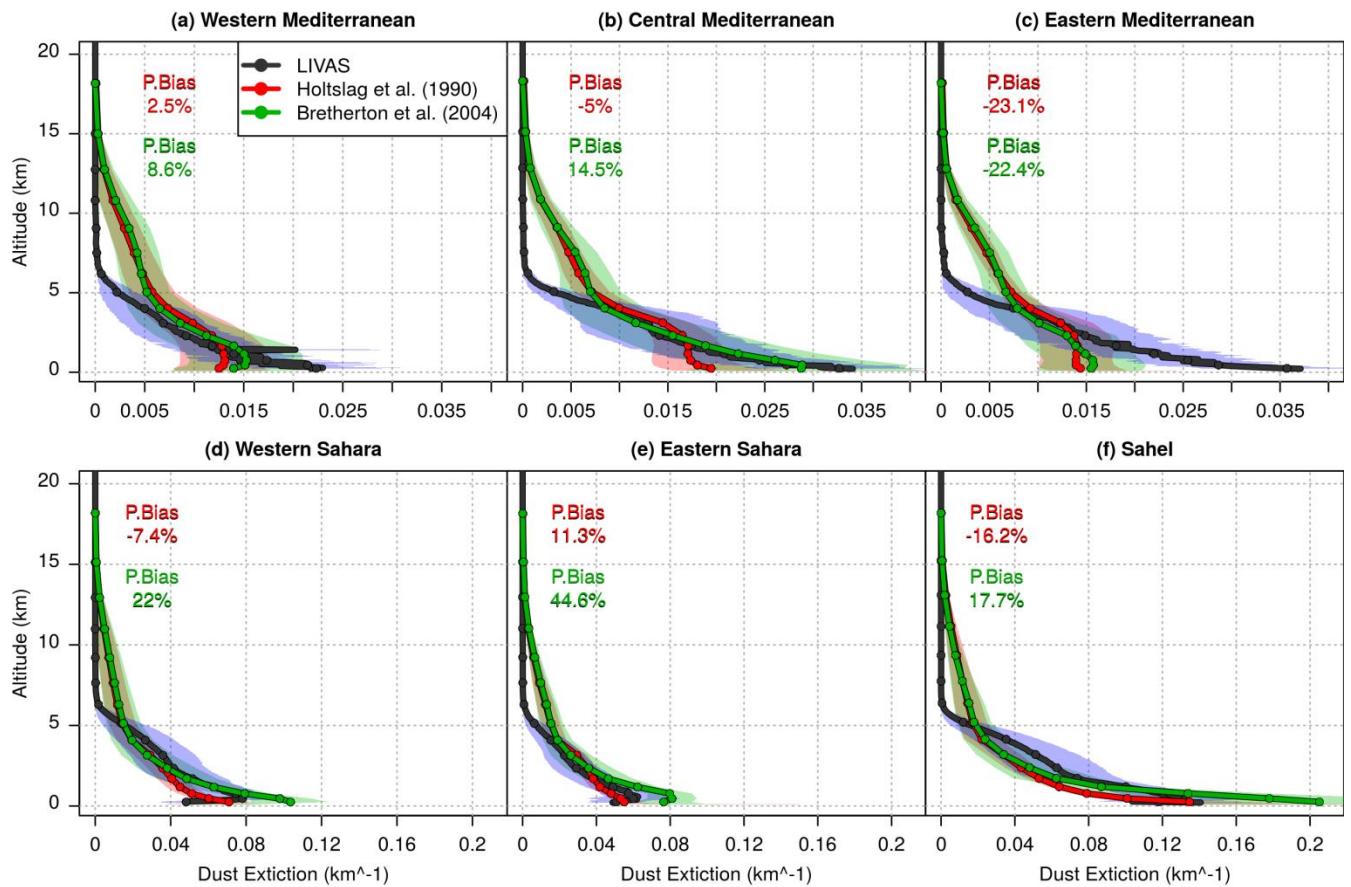
5 FigureS 1: Wind velocity at the surface of DUST4 experiment against the reanalysis ERA-interim for the period December 2006 to November 2014.



FigureS 2: Wind velocity at the surface of the 0.9 percentile over the desert for the period December 2006 to November 2014.

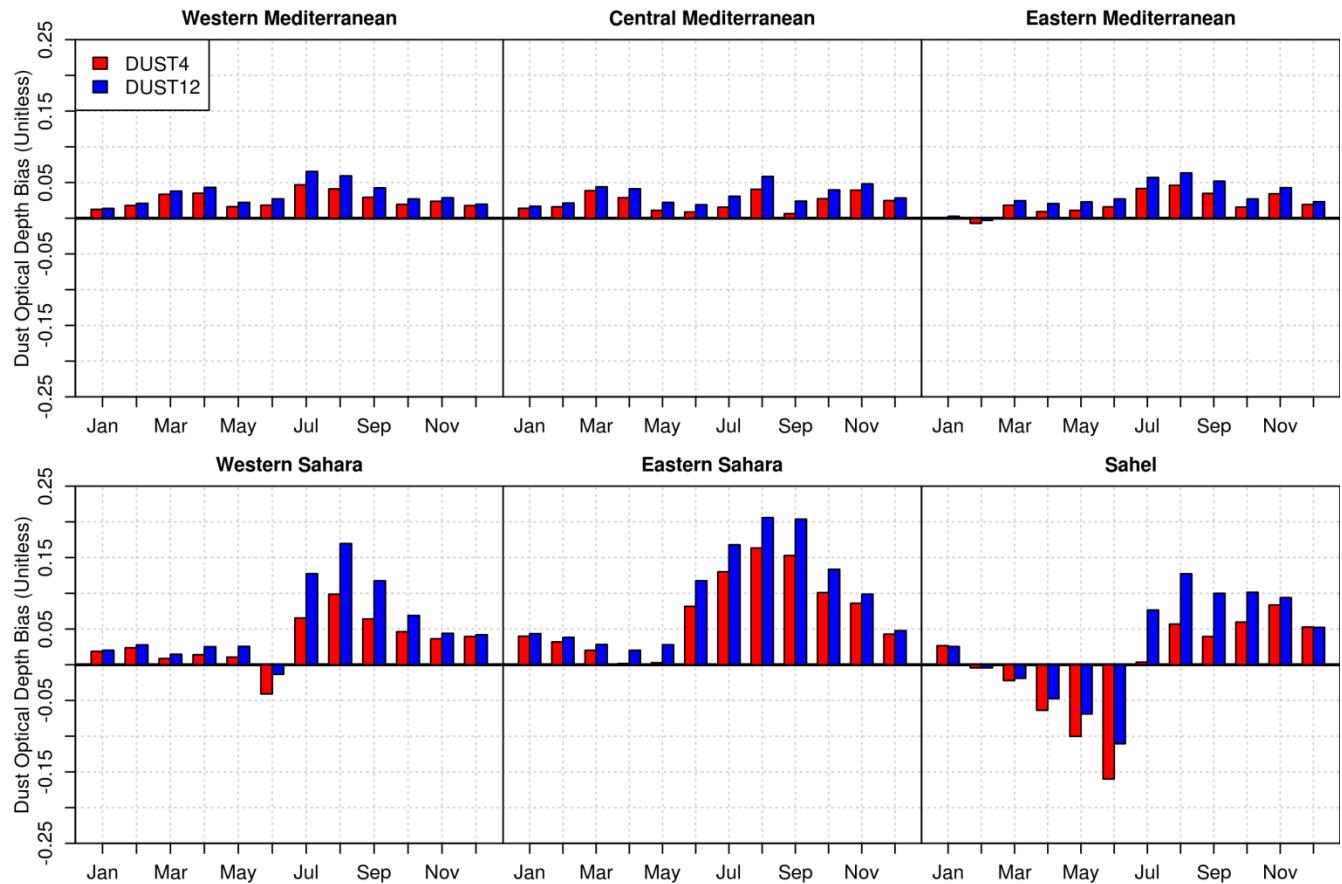


FigureS 3: Total precipitation flux of DUST4 experiment against the reanalysis ERA-interim for the period December 2006 to November 2014.



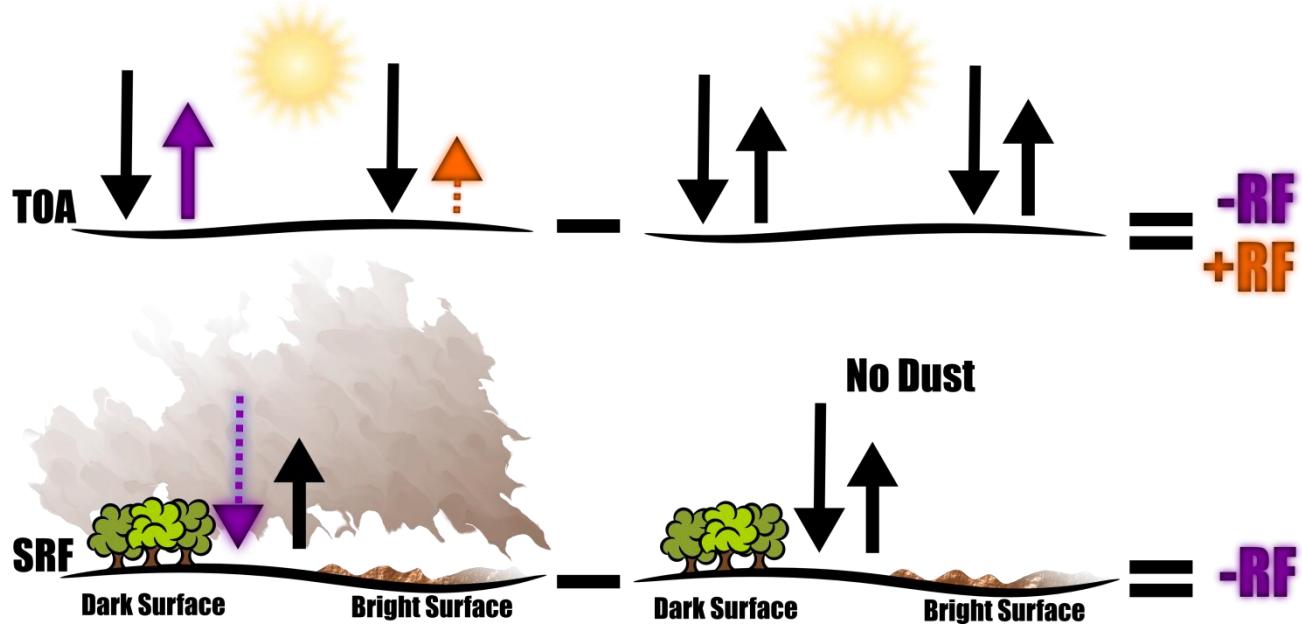
5 FigureS 4: Dust extinction profiles of LIVAS and DUST4 using Holtslag et al. (1990) and Bretherton et al. (2004) PBL schemes for 2008. P.Bias indicates the column percentage bias of DEX.

### 3.2 Comparison of 4-bin and 12-bin experiments



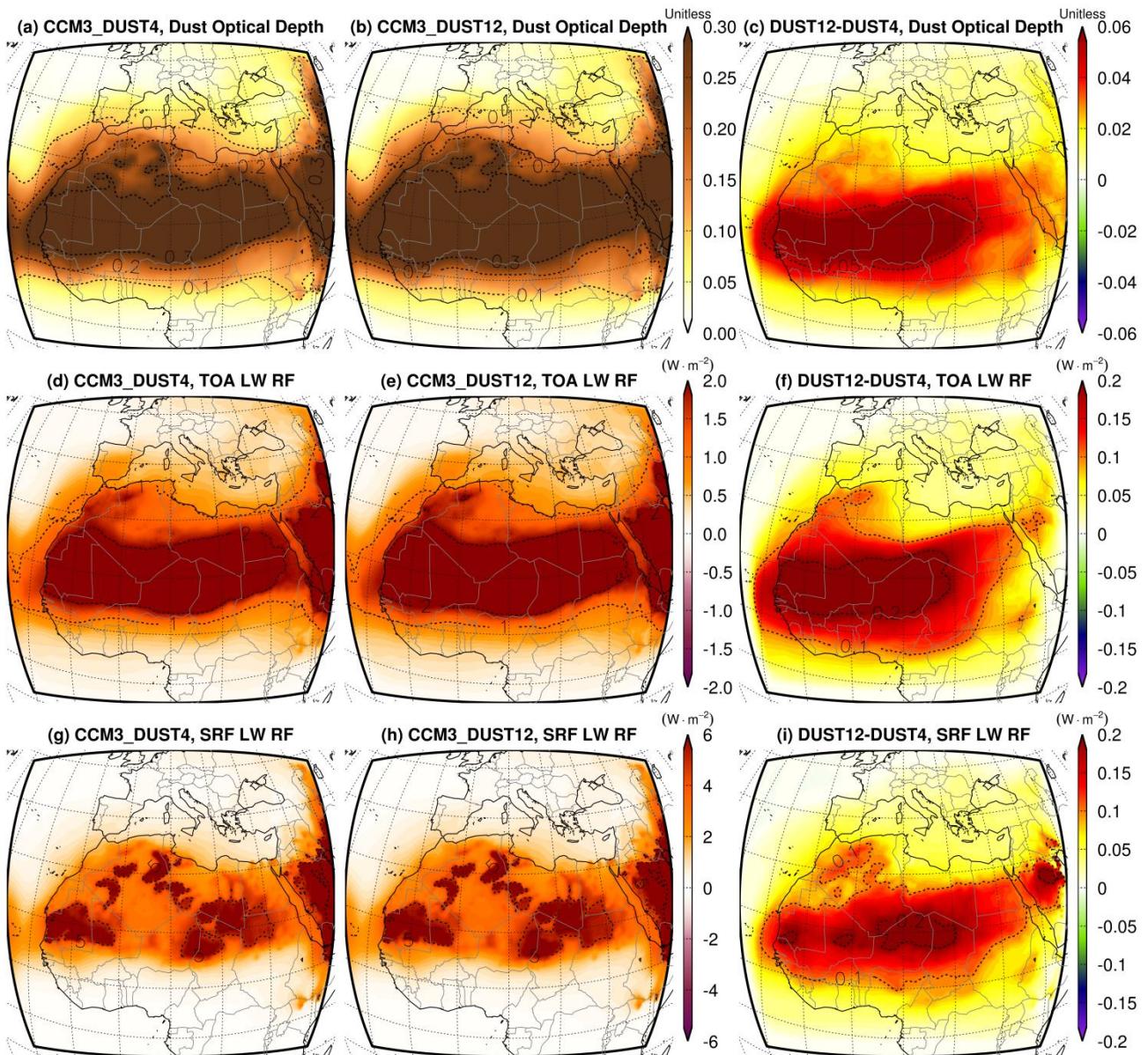
FigureS 5: Monthly biases of DUST4 and DUST12 experiment in comparison to the LIVAS dust product for the period December 2006 to November 2014.

### 3.3 Radiative Forcing

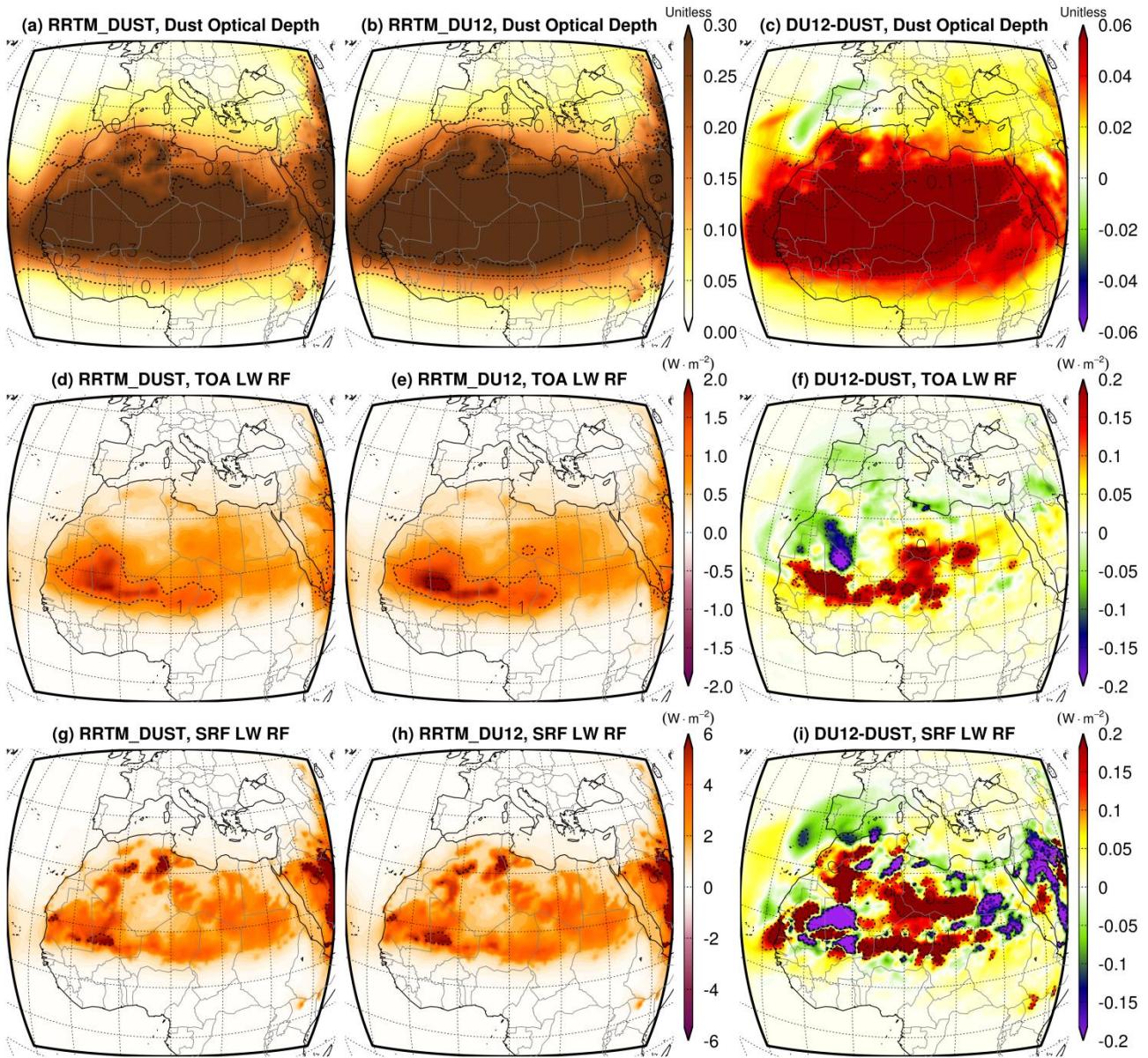


FigureS 6: Illustration of shortwave radiative forcing of dust at the surface and at the top of the atmosphere. Left and right panel depicts a dust loaded and a dust free atmosphere respectively. Arrows indicate the downward and upward radiation. The purple and the orange color correspond to a negative and positive radiative effect of dust particles respectively.

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**FigureS 7: Dust optical depth, top of the atmosphere (TOA) and surface (SRF) radiative forcing on the longwave spectrum using the Community Climate Model 3 (CCM3) radiation transfer scheme for June 2008.**



**FigureS 8:** Dust optical depth, top of the atmosphere (TOA) and surface (SRF) radiative forcing on the longwave spectrum using as radiation transfer scheme the Rapid Radiation Transfer Model (RRTM) for June 2008.