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Supporting Information for

Impacts of snow darkening effects by light absorbing aerosols on hydroclimate of Eurasia during boreal spring and summer

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Figures S1, S2, S3 and S4.

Introduction

This supporting information includes figures that show:

The spatial distribution of annual mean percentage contributions of different species of light absorbing aerosols (dust, BC and OC) to snow darkening (Fig. S1), induced anomalous surface shortwave radiation and snowmelt rate over Eurasia for May-June, and July-August, respectively (Fig. S2), comparison of GEOS5 model to MERRA2 reanalysis of surface air temperature, and snow cover fraction for March-April-May (Fig. S3) and June-July-August (Fig.S4), respectively.

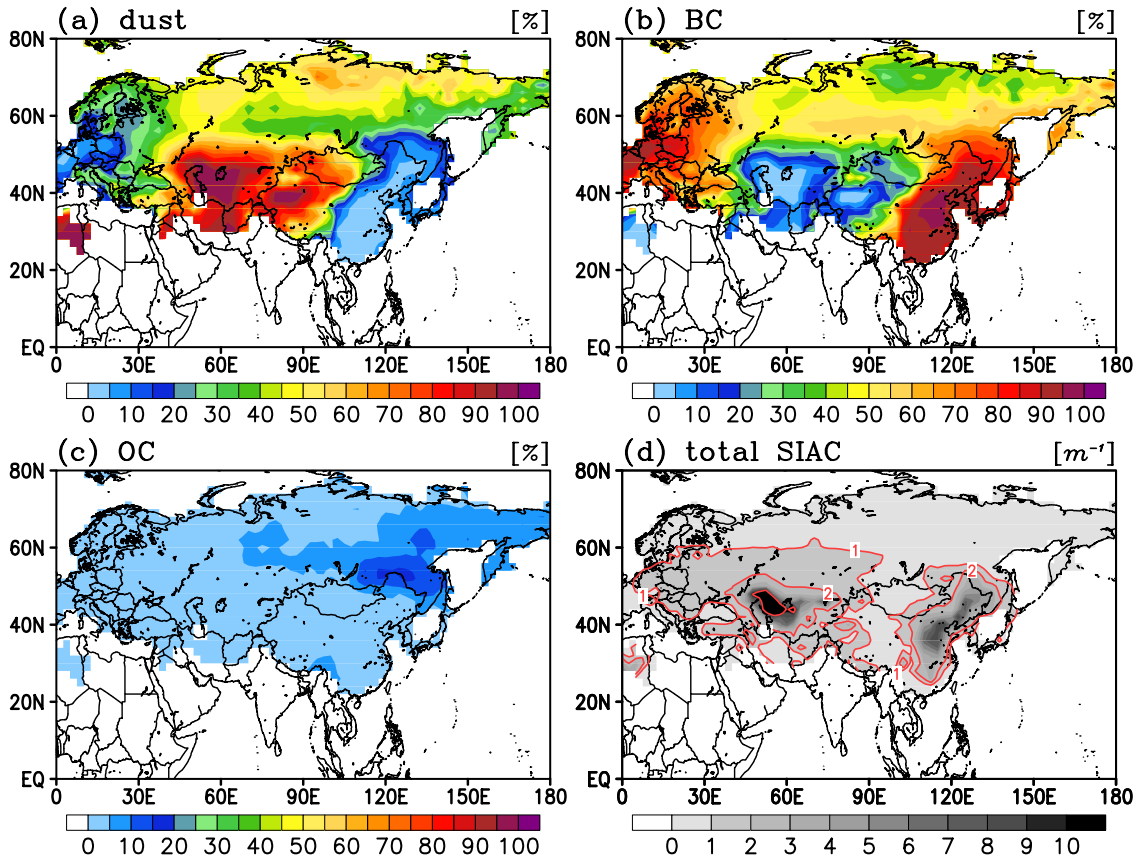

Figure S1 Annual mean distributions showing percentage contribution of (a) dust, (b) BC, and (c) OC to total absorption of visible wavelength radiation by snow impurities in the snow top layer, and (d) total Snow Impurities Absorption Coefficient (total SIAC). Contours indicate SAIC > 1 m^{-1}. See text for definition of SIAC.

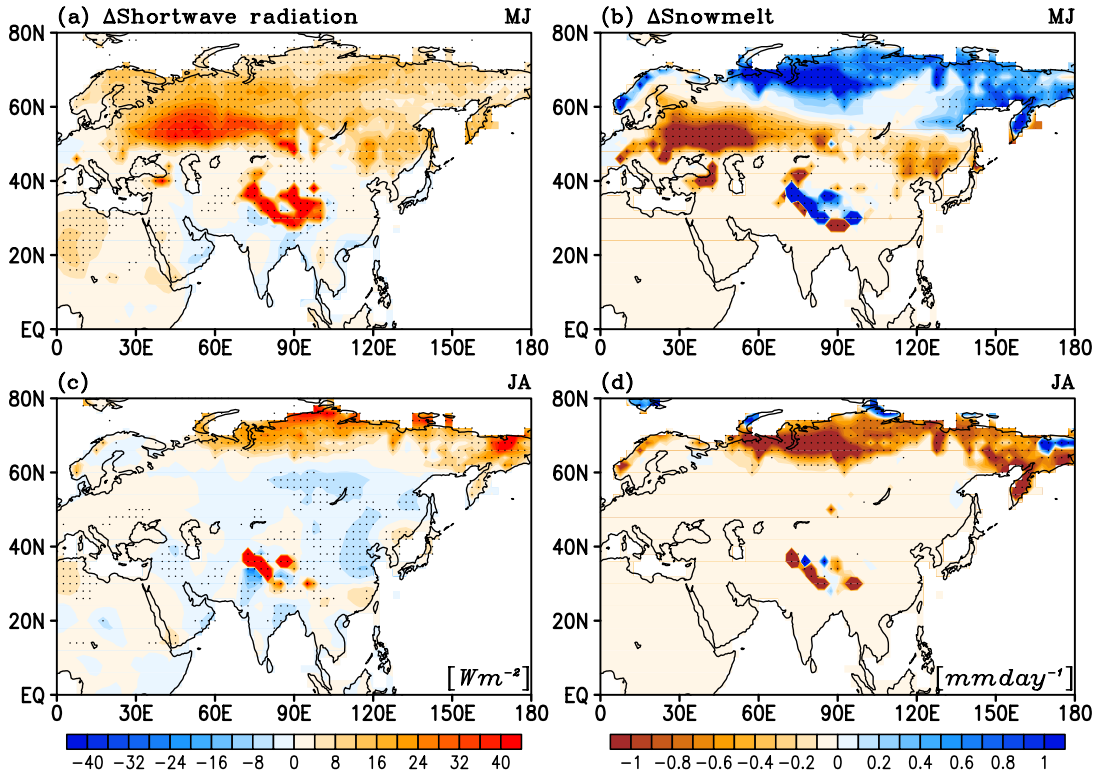

Figure S2 Spatial distributions of SDE-induced anomalies in a) surface shortwave radiation (Wm^{-2}) and b) snowmelt rate (%) during May-June. Panels c) and d) are the same as a) and b) respectively, except for July-August. Dots represent statistical significance at 95% confidence level.

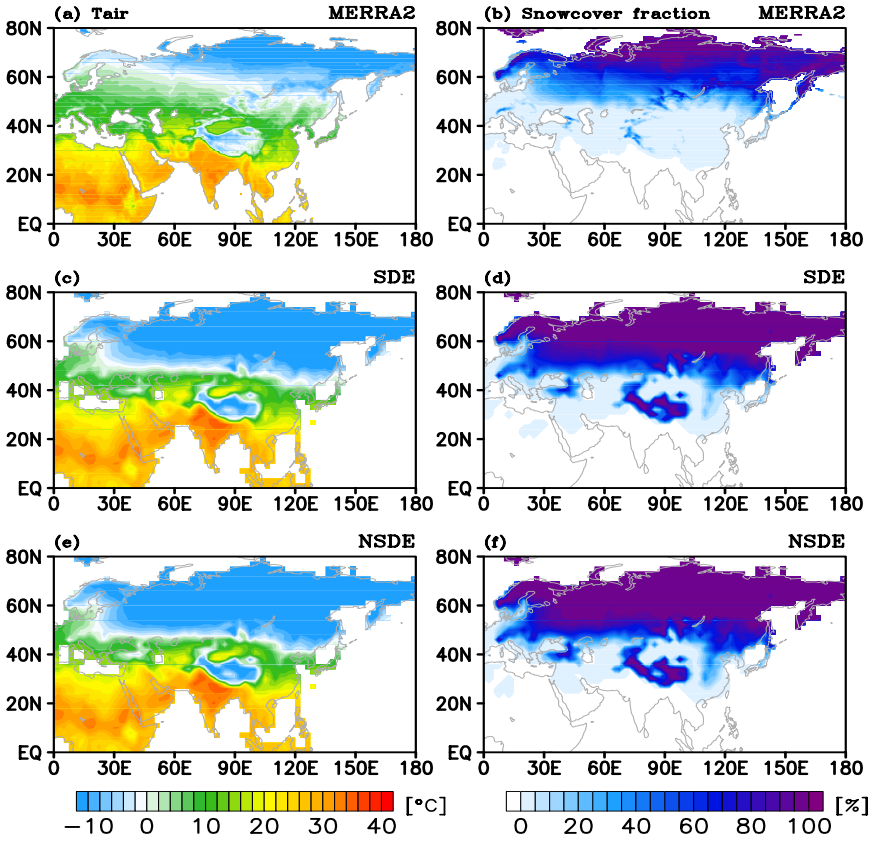

Fig. S3 Comparison of March-April-May climatology of surface air temperature (T_{air}), and snowcover fraction (SCF) between GEOS5 model, and MERRA2 re-analysis, over Eurasia and Africa, a) MERRA2 T_{air} , b) MERRA2 SCF. Panels c) and d) are the same as a) and b) respectively, except for SDE experiment. Panel e) and f) are the same as a) and b) respectively, except for NSDE experiment.

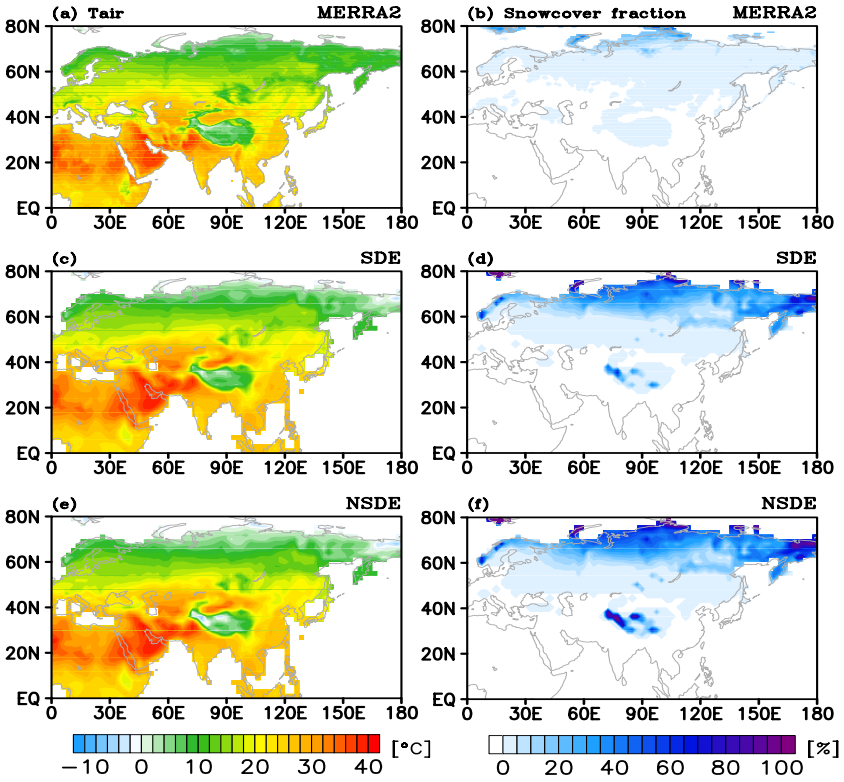

Fig S4 Comparison of June-July-August climatology of surface air temperature (T_{air}), and snowcover fraction (SCF) between GEOS5 model, and MERRA2 re-analysis, over Eurasia and Africa, a) MERRA2 surface air temperature T_{air} , b) MERRA2 SCF. Panels c) and d) are the same as a) and b) respectively, except for SDE experiment. Panel e) and f) are the same as a) and b) respectively, except for NSDE experiment.