

Interactive comment on “Understanding Processes that Control Dust Spatial Distributions with Global Climate Models and Satellite Observations” by Mingxuan Wu et al.

Ashu Dastoor (Editor)

ashu.dastoor@canada.ca

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This study provides a comprehensive evaluation of the spatiotemporal variations of dust extinction profiles and dust optical depth simulated by several GCMs against satellite retrievals from Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP), Moderate Resolution Imaging Spectroradiometer (MODIS), and Multi-angle Imaging SpectroRadiometer (MISR). The study provides a quantitative analysis of the importance of representing dust emission, deposition processes, and size distribution in GCMs for capturing observed dust spatiotemporal distributions. The study also discusses discrepancies among the satellite products.

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Dust particles play important roles in the climate, and its understating and accurate simulation is important to advancing climate models and their predictions. The authors have presented an excellent analysis of this topic, helpful to the climate modelers. The manuscript is well written and results are clearly presented. The study is a valuable contribution to advancing modeling of dust in climate models.

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