



Influence of the East Asian winter monsoon on interannual variations of wintertime aerosol concentrations over East Asia during 1980-2013

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The monsoon circulation influence the spatial and temporal variations of aerosol concentrations. In this study, we examine the effect of the East Asian winter monsoon (EAWM) on wintertime aerosol concentrations in East Asia during 1980–2013 using observed PM₁₀ concentrations and a global 3-D chemical transport model (GEOS-Chem) driven by the assimilated MERRA meteorological data. We find that the observed and simulated surface aerosol concentrations have strong negative (positive) correlations with the EAWM over the northeast (southeast) Asia. Differences in aerosol concentrations between the strong and weak monsoon years are up to 25% over the northeast Asia (30°–55°N, 110°–160°E), where the strong monsoon years show much lower aerosol concentrations than those of the weak monsoon years. On the other hand, the opposite patterns are found over the southeast Asia (20°–30°N, 110°–160°E). The EAWM appears to play a significant role in the inter-annual variability of aerosol concentrations and thus its change would be crucial to predict wintertime aerosol concentrations and their future changes over East Asia.