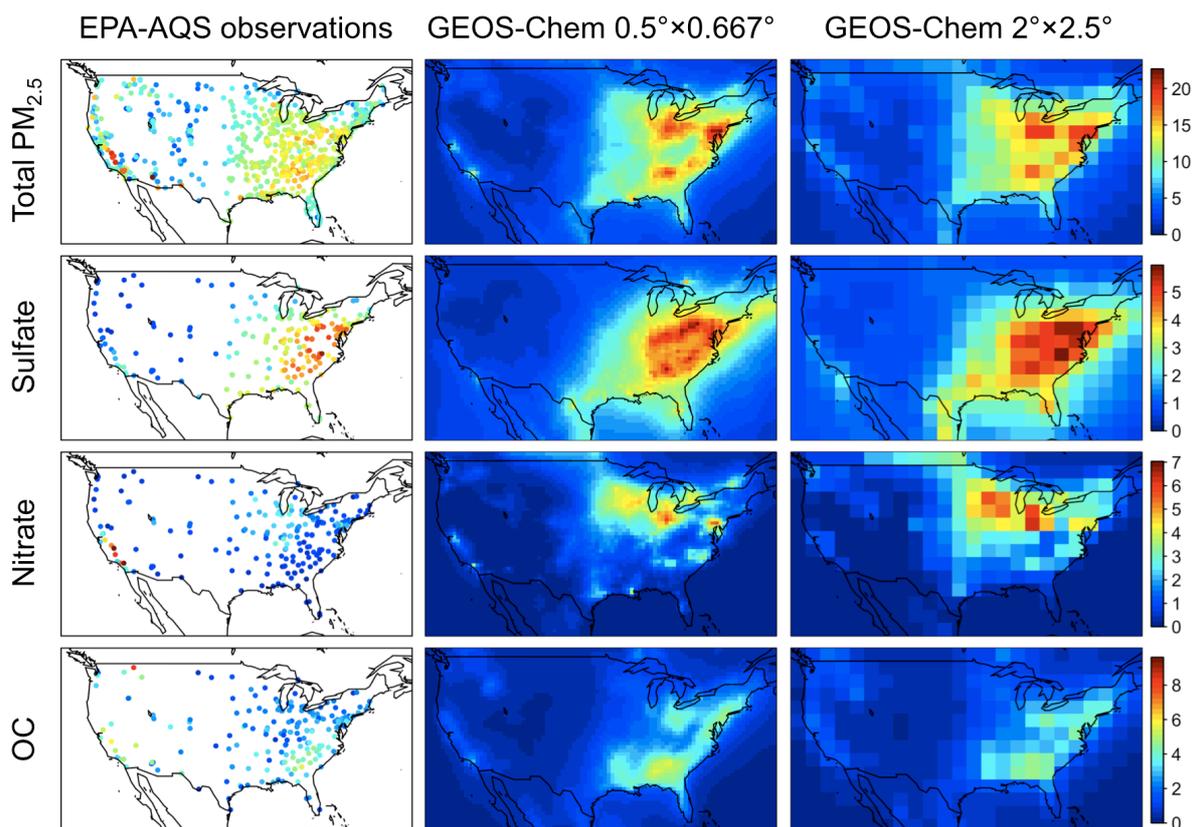


1 **Supplementary Materials**

2 **Meteorological modes of variability for fine particulate matter (PM_{2.5}) air quality in the**
3 **United States: implications for PM_{2.5} sensitivity to climate change**

4 A. P. K. Tai, L. J. Mickey, D. J. Jacob, E. M. Leibensperger, L. Zhang, J. A. Fisher, H. O. T.
5 Pye

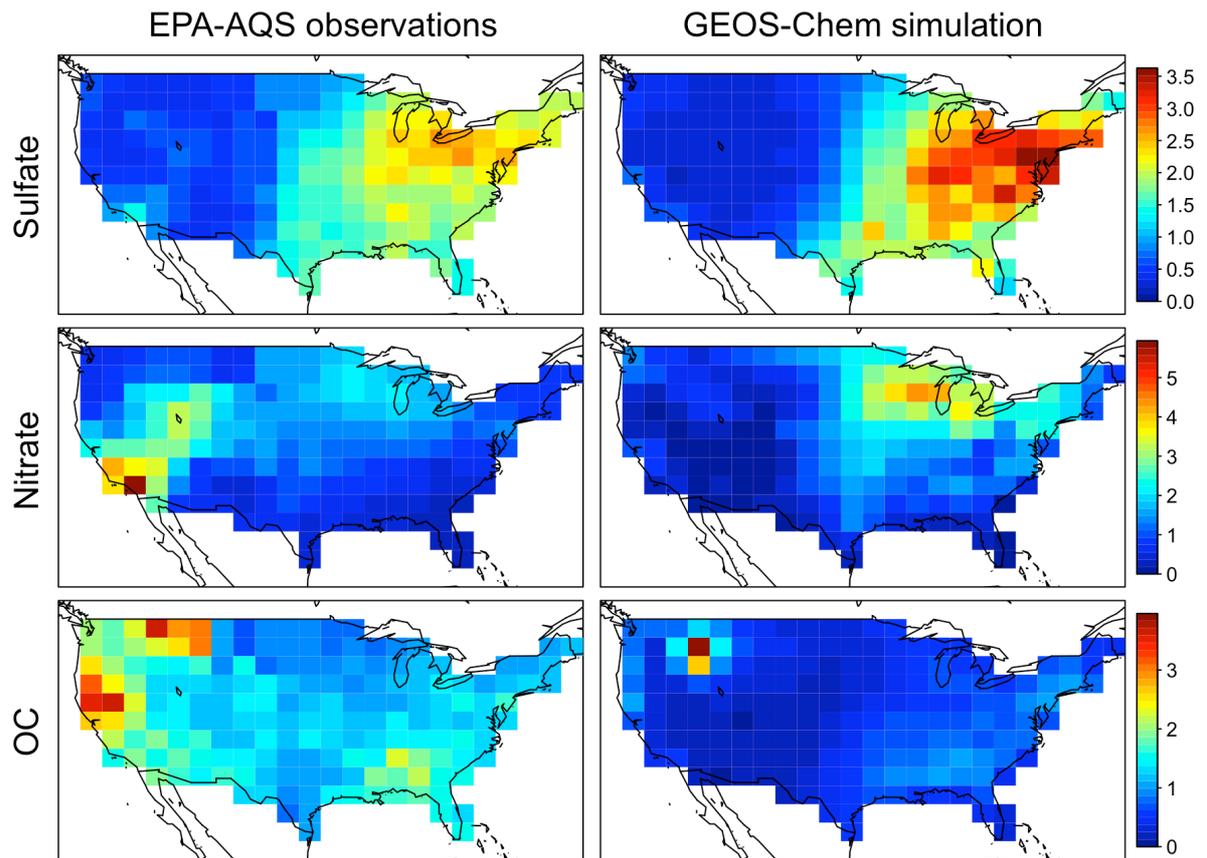
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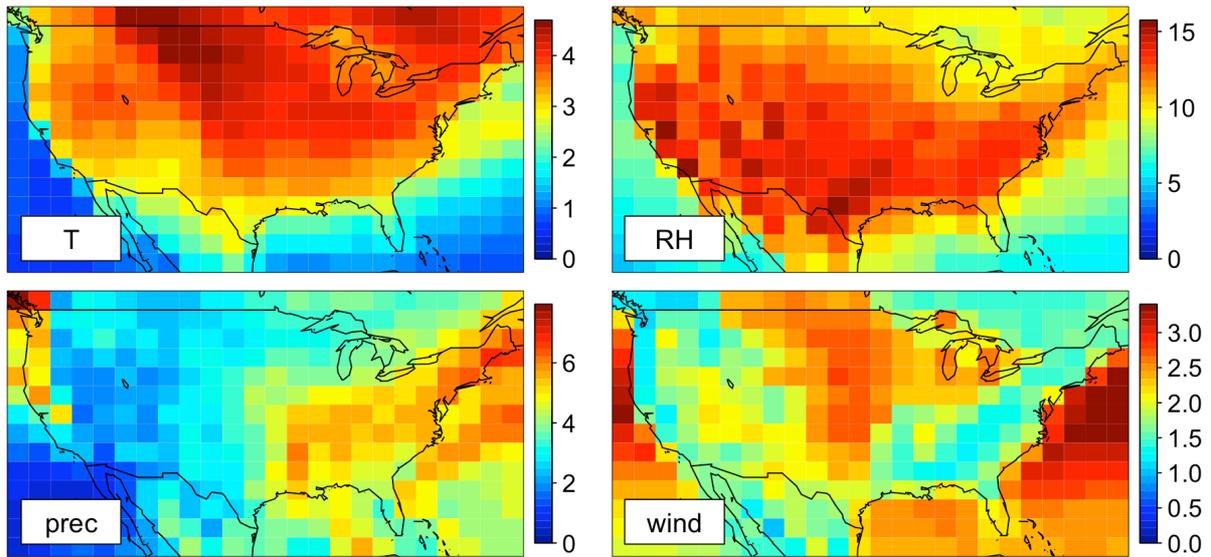
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8 Annual mean observed (EPA-AQS) and simulated (GEOS-Chem) concentrations of total
9 PM_{2.5}, sulfate, nitrate and organic carbon (OC) for 2006. GEOS-Chem results are shown for
10 simulations at 0.5°x0.667° and 2°x2.5° resolution. Concentrations are in units of $\mu\text{g m}^{-3}$.

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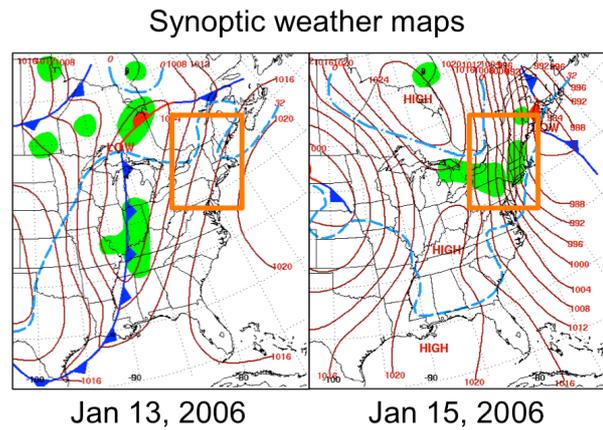
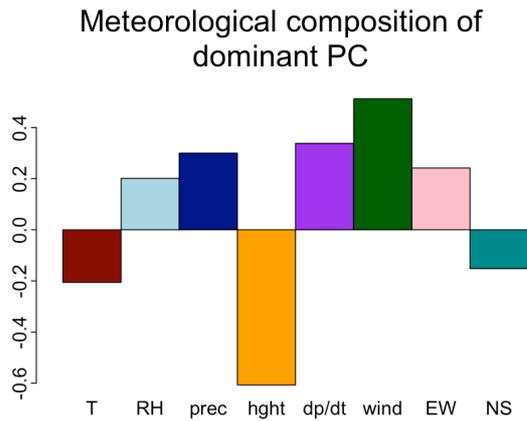
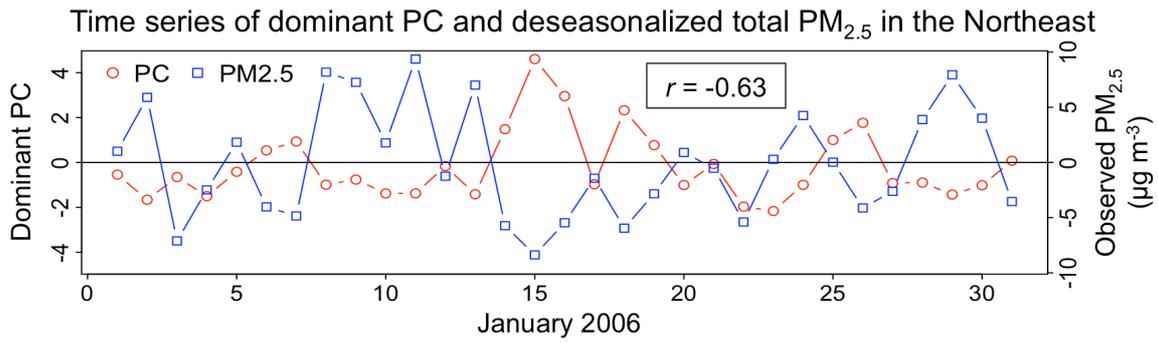
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 2 Standard deviations of deseasonalized concentrations of sulfate, nitrate and organic carbon
 3 (OC) for both observations (EPA-AQS) and simulations (GEOS-Chem).
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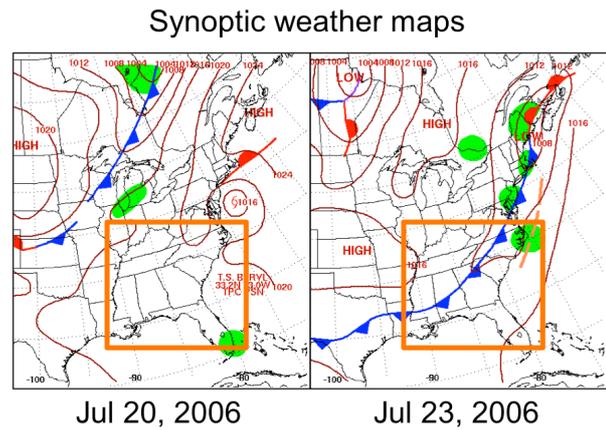
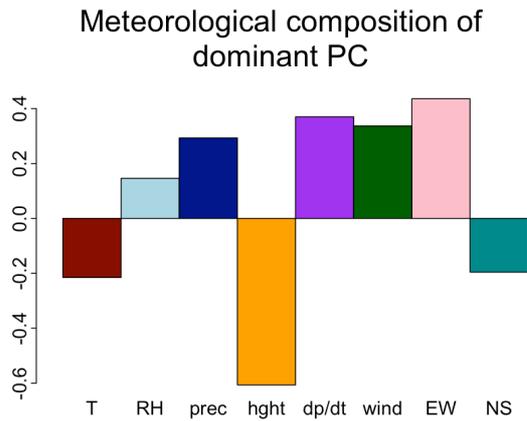
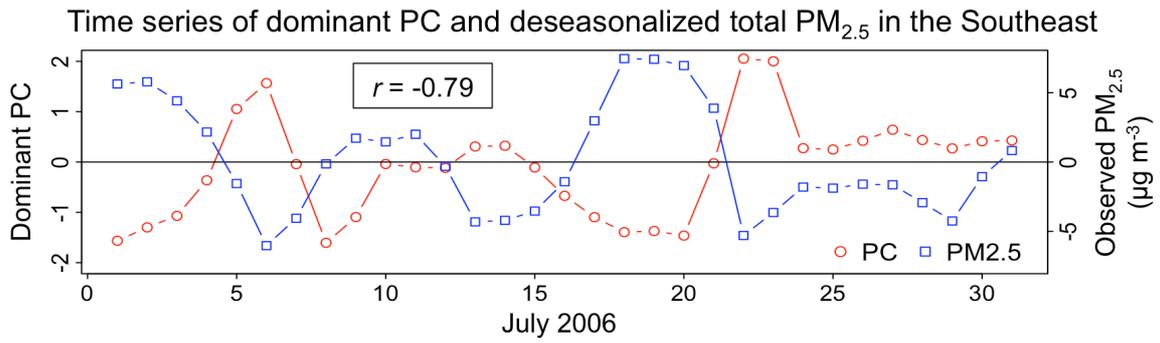
2 Standard deviations of deseasonalized GEOS-5 meteorological variables: temperature (K),
3 relative humidity (%), precipitation (mm d^{-1}), and wind speed (m s^{-1}).

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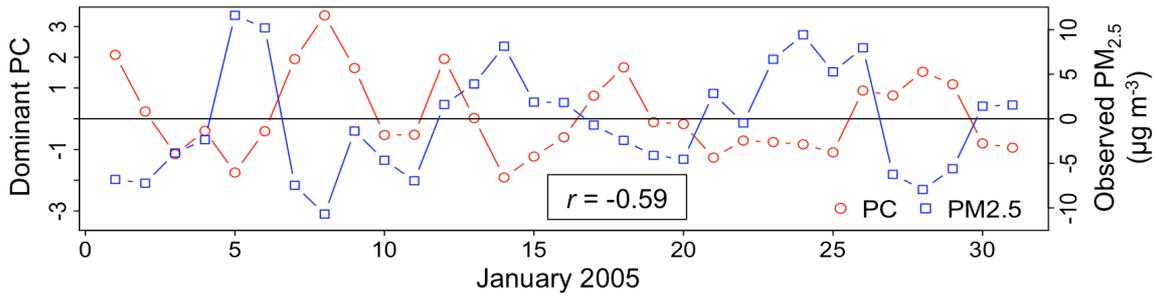
Dominant meteorological mode for observed $PM_{2.5}$ variability in the Northeast inferred from the principal component analysis. Top panel: time series of deseasonalized observed total $PM_{2.5}$ concentrations and the dominant meteorological mode or principal component (PC) in January 2006. Bottom left: composition of this dominant mode as measured by the coefficients α_{ki} in Eq. (3). Meteorological variables (x_k) are listed in Table 1. Bottom right: synoptic weather maps from the National Center for Environmental Prediction (NCEP) (<http://www.hpc.ncep.noaa.gov/dailywxmap/>) for 13 and 15 January, corresponding to maximum negative and positive influences from the principal component. The Northeast is delineated in orange.



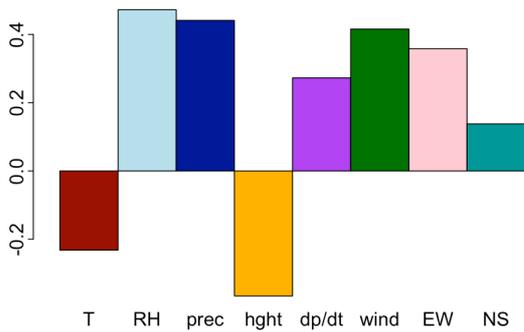
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Dominant meteorological mode for observed $PM_{2.5}$ variability in the Southeast inferred from the principal component analysis. Top panel: time series of deseasonalized observed total $PM_{2.5}$ concentrations and the dominant meteorological mode or principal component (PC) in July 2006. Bottom left: composition of this dominant mode as measured by the coefficients α_{ki} in Eq. (3). Meteorological variables (x_k) are listed in Table 1. Bottom right: synoptic weather maps from the National Center for Environmental Prediction (NCEP) (<http://www.hpc.ncep.noaa.gov/dailywxmap/>) for 20 and 23 July, corresponding to maximum negative and positive influences from the principal component. The Southeast is delineated in orange.

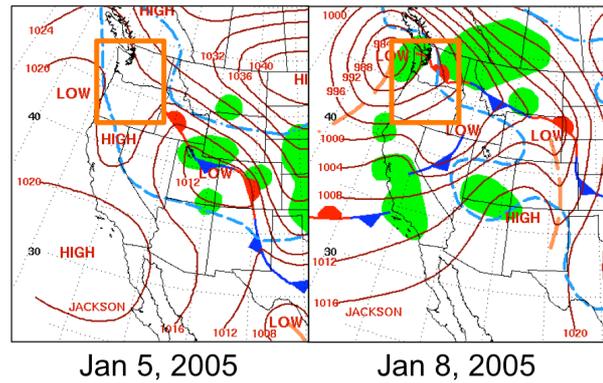
Time series of dominant PC and deseasonalized total PM_{2.5} in Pacific Northwest



Meteorological composition of dominant PC



Synoptic weather maps



1

2 Dominant meteorological mode for observed PM_{2.5} variability in the Pacific Northwest
 3 inferred from the principal component analysis. Top panel: time series of deseasonalized
 4 observed total PM_{2.5} concentrations and the dominant meteorological mode or principal
 5 component (PC) in January 2005. Bottom left: composition of this dominant mode as
 6 measured by the coefficients α_{ki} in Eq. (3). Meteorological variables (x_k) are listed in Table 1.
 7 Bottom right: synoptic weather maps from the National Center for Environmental Prediction
 8 (NCEP) (<http://www.hpc.ncep.noaa.gov/dailywxmap/>) for 5 and 8 January, corresponding to
 9 maximum negative and positive influences from the principal component. The Pacific
 10 Northwest is delineated in orange.

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