

Supplementary Materials:

Incorporation of Remote PM_{2.5} Concentrations into the Downscaler Model for Spatially Fused Air Quality Surfaces

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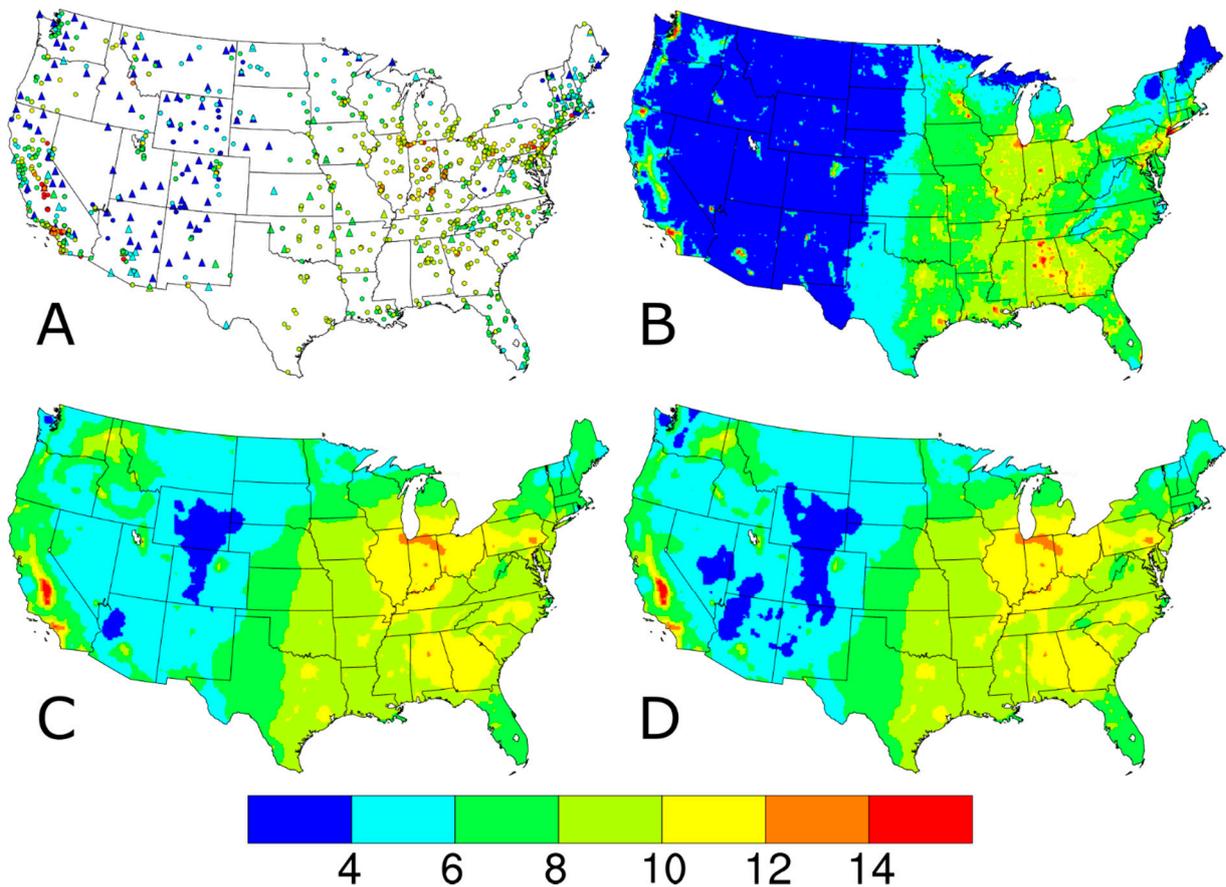


Figure S1. Annual average PM_{2.5} concentrations (in units of $\mu\text{g m}^{-3}$) (A) observed at the AQS (circles) and IMPROVE (triangles) sites and predicted for the entire period by the (B) CMAQ model, (C) Downscaler with the baseline configuration, and (D) Downscaler with IMPROVE data.

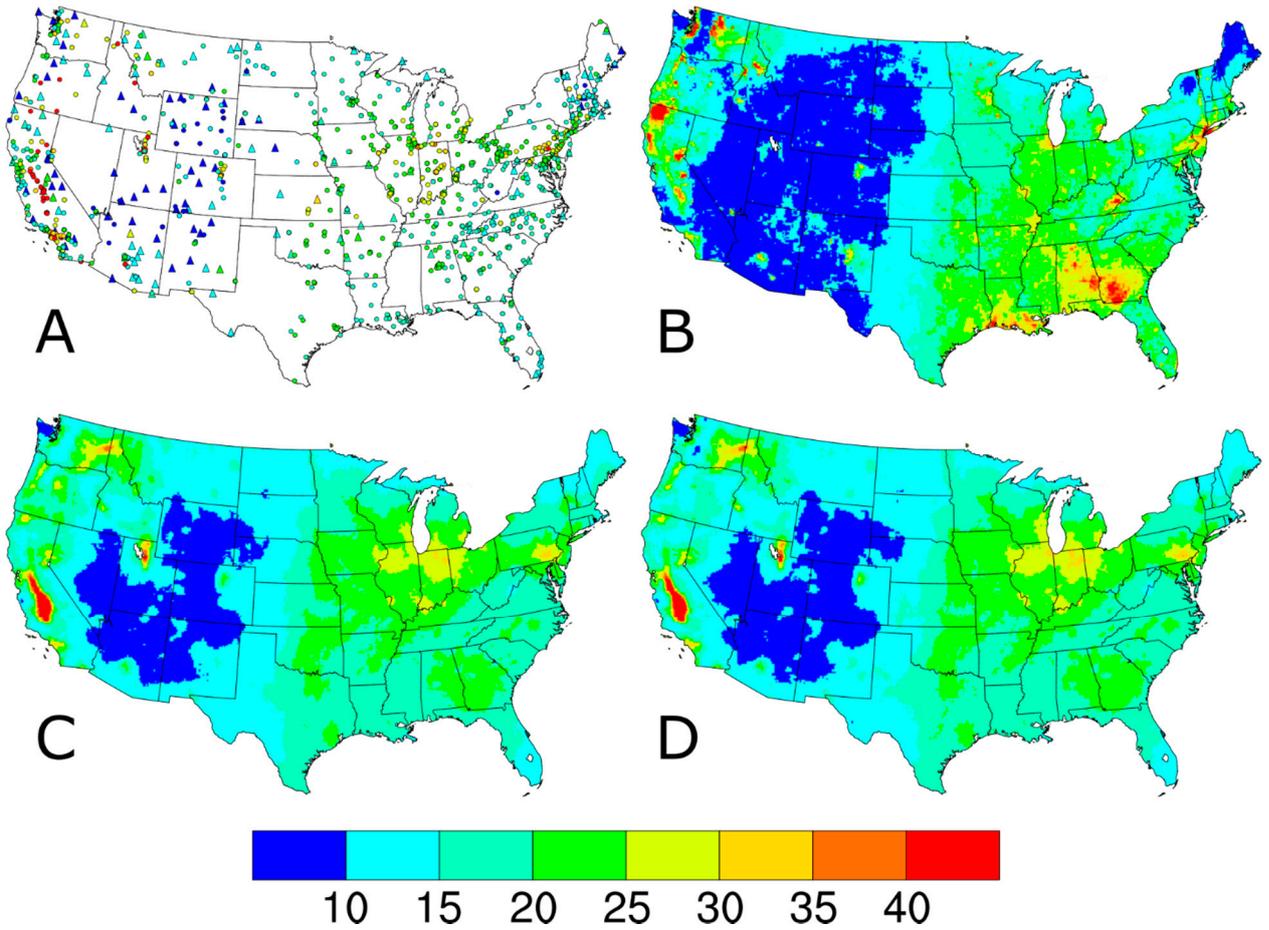


Figure S2. 98th percentile PM_{2.5} concentrations (in units of $\mu\text{g m}^{-3}$) (A) observed at the AQS (circles) and IMPROVE (triangles) sites and predicted for the entire period by the (B) CMAQ model, (C) Downscaler with the baseline configuration, and (D) Downscaler with IMPROVE data. Note that the color scales differ across Figure S1 (annual averages) and Figure S2.

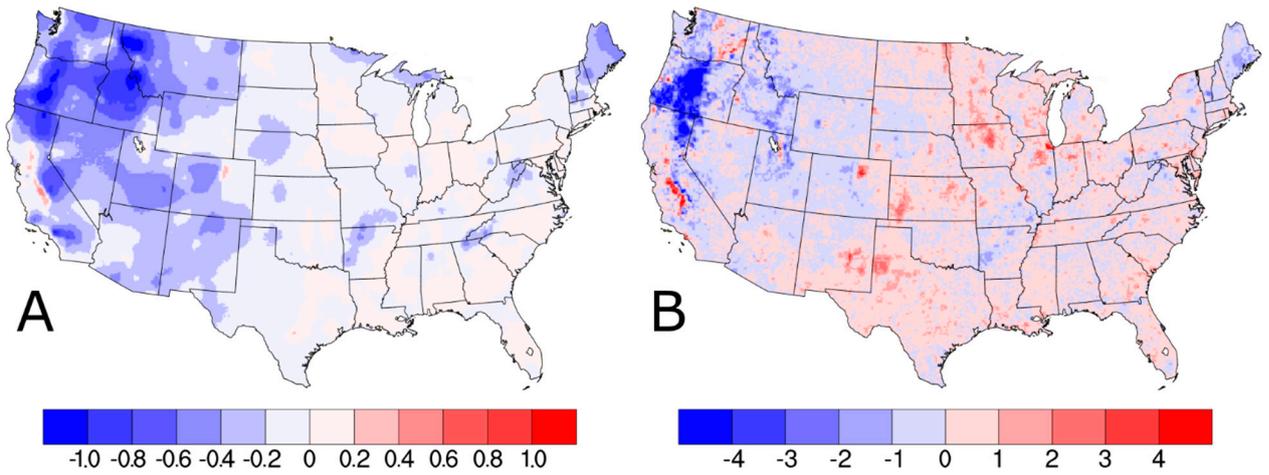


Figure S3. Difference in Downscaler-predicted (A) annual average and (B) 98th percentile PM_{2.5} concentrations (in units of $\mu\text{g m}^{-3}$) for the entire period between the w/IMPROVE and Baseline model runs. The values in these figures are calculated as w/IMPROVE – Baseline.

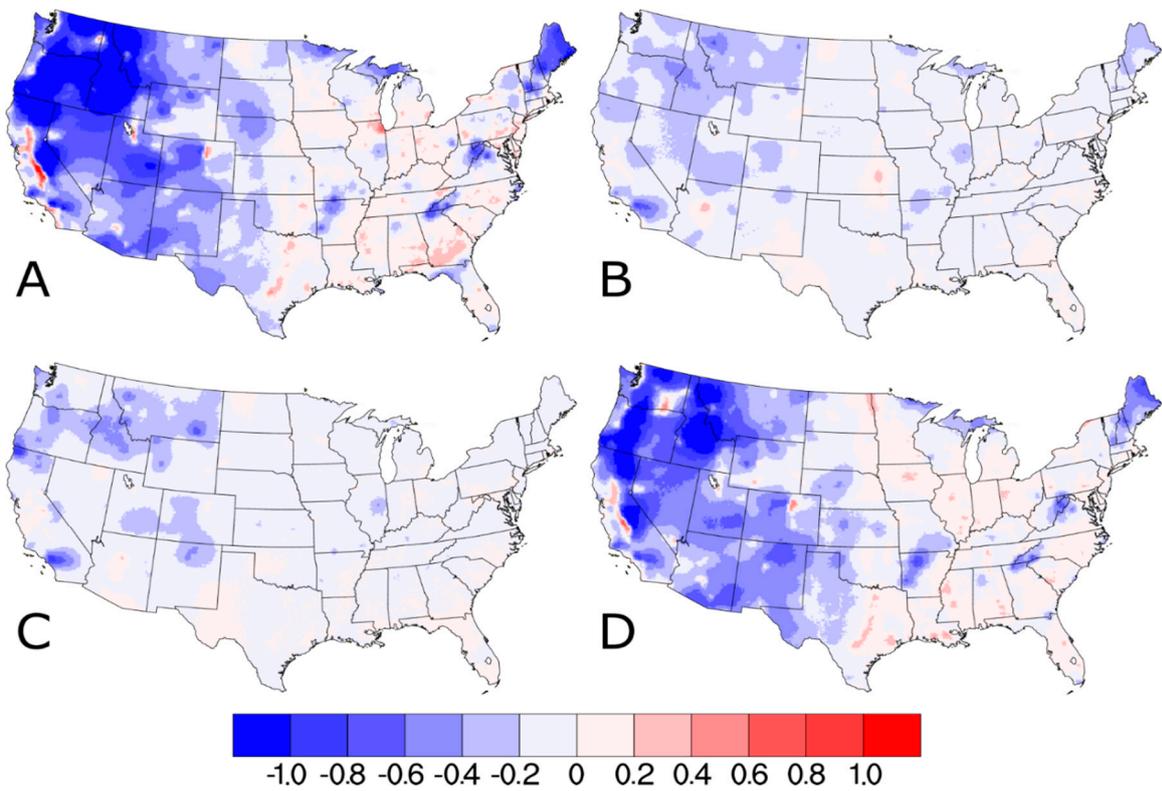


Figure S4. Difference in Downscaler-predicted quarterly average PM_{2.5} concentrations (in units of $\mu\text{g m}^{-3}$) for the entire period between the w/IMPROVE and Baseline model runs for (A) Q1 (January, February, March), (B) Q2 (April, May, June), (C) Q3 (July, August, September), and (D) Q4 (October, November, December). The values in these figures are calculated as w/IMPROVE – Baseline.

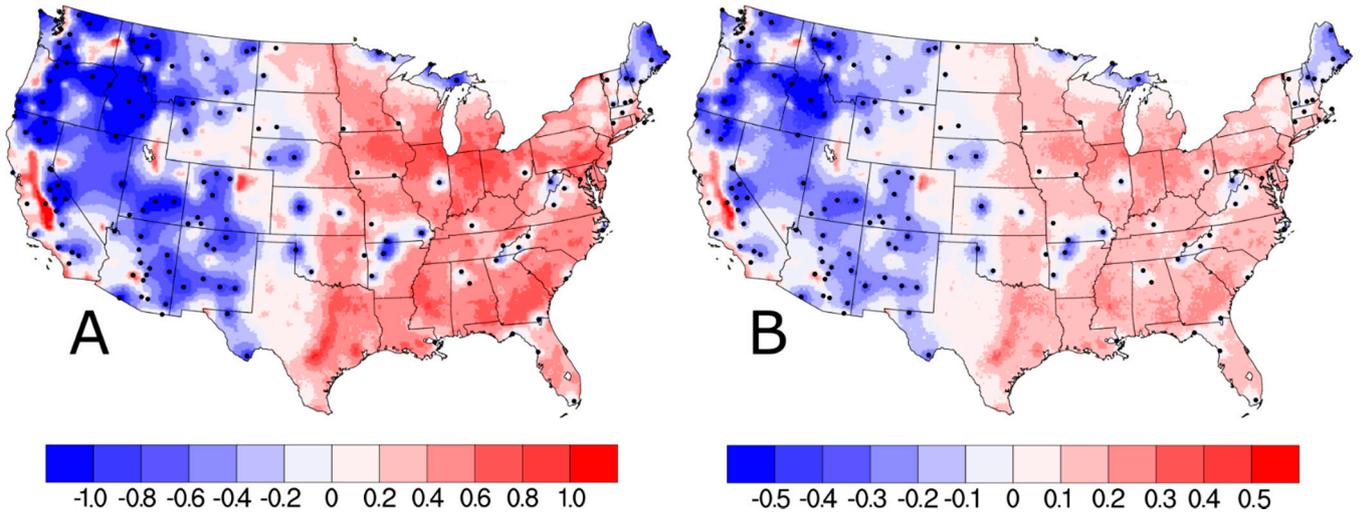


Figure S5. Difference in Downscaler-predicted standard error in annual average $\text{PM}_{2.5}$ concentrations (in units of $\mu\text{g m}^{-3}$) for (A) IMPROVE sample dates and (B) the entire period between the w/IMPROVE and Baseline model runs. The values in these figures are calculated as w/IMPROVE – Baseline. The black dots indicate locations of the IMPROVE sites.

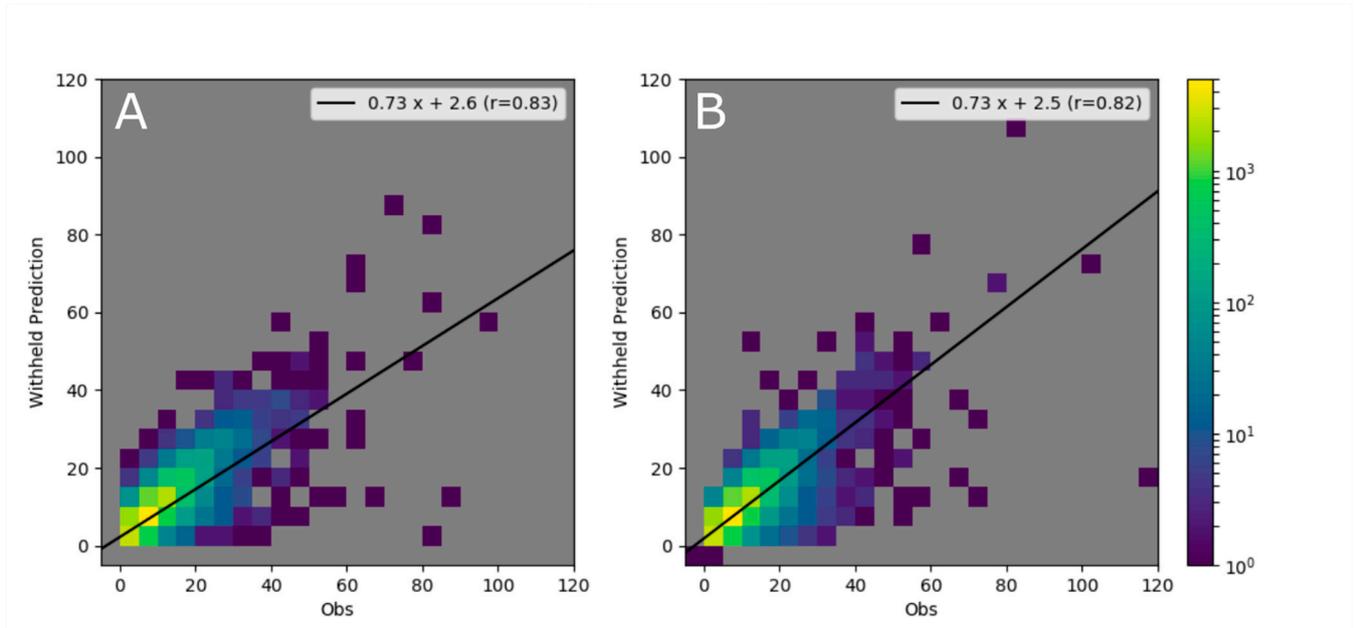


Figure S6. Scatter density of the Downscaler validation (10% of data withheld) for AQS sites using (A) the baseline configuration and (B) including IMPROVE data. The x-axis values represent the average of the observed concentration for each AQS site-day withheld and the y-axis values represent the validation bias value (converted to concentration).