Supplementary Materials for

A new method for inferring city emissions and lifetimes of nitrogen oxides from

high-resolution nitrogen dioxide observations: A model study

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This PDF file includes:

Figs. S1 to S3
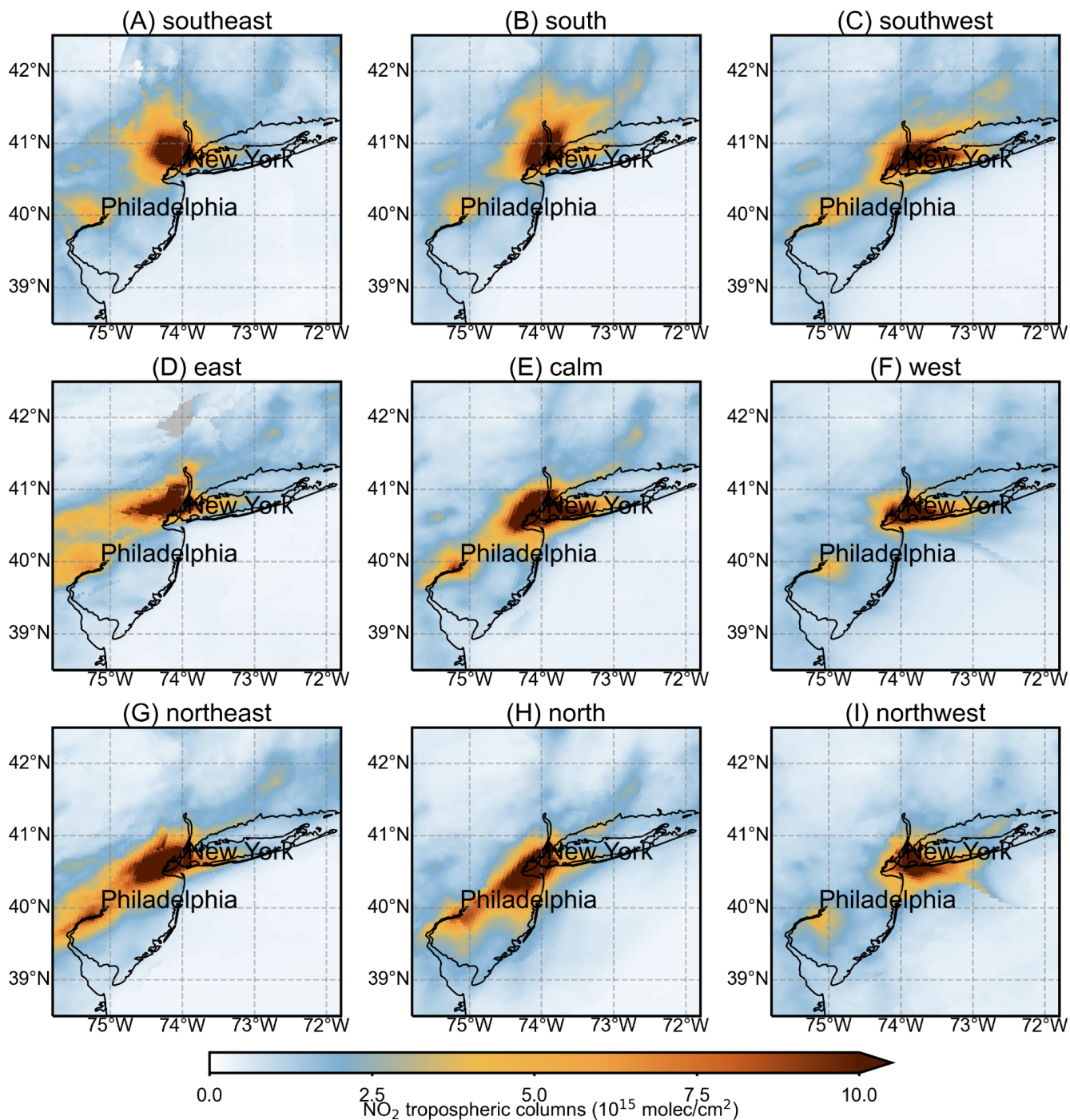
Figure S1 Wind dependency of the NU-WRF tropospheric NO₂ vertical column densities around New York City. NO₂ columns at the local overpass time of TROPOMI are averaged from April through September, 2016. Mean NO₂ column densities for different wind conditions, i.e., calm (center panel) and eight main wind direction sectors (surrounding panels; titles indicate the mean of the respective winds). Missing data due to lack of observations for a certain wind direction is in grey.
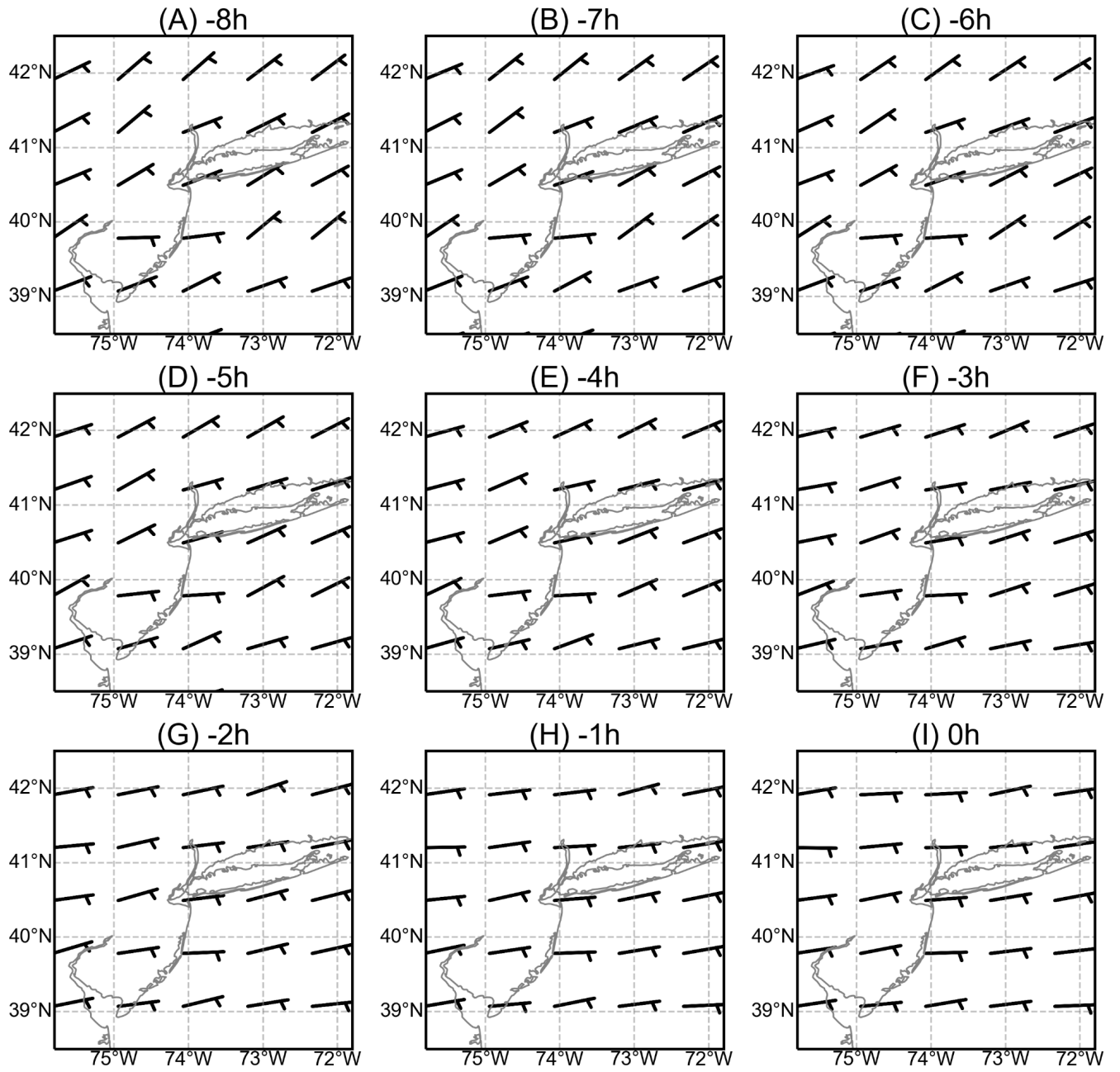
Figure S2 Similar to Figure 5, but for easterly wind.
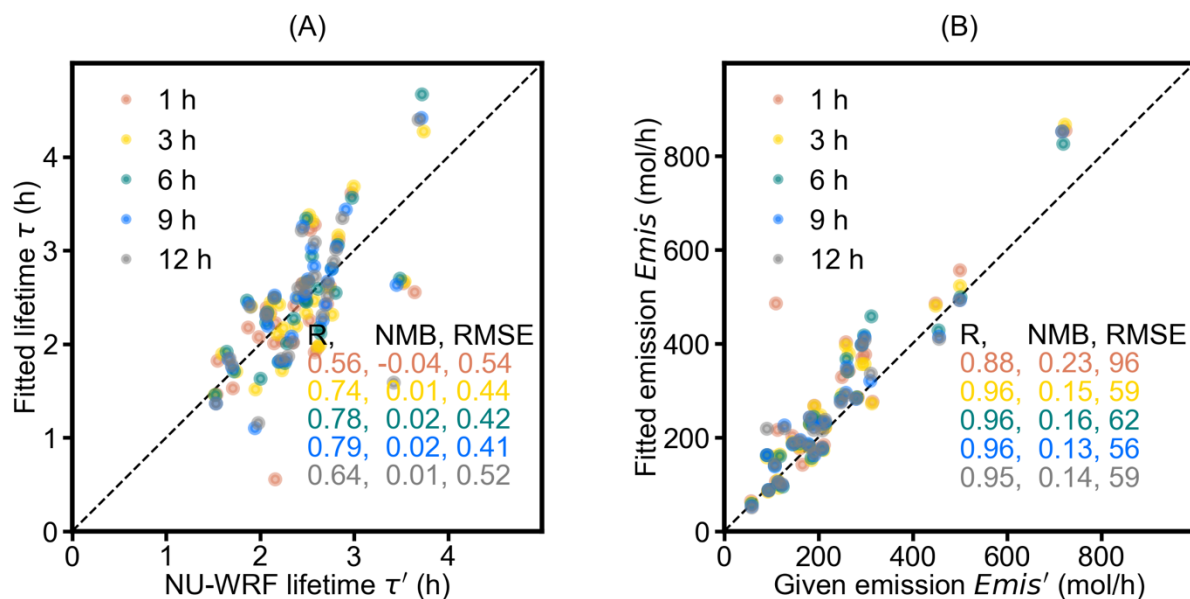
Figure S3 Scatterplots of (A) the fitted NO$_x$ lifetime τ as compared to the NU-WRF lifetime τ'; and (B) the fitted NO$_x$ emissions *Emis* as compared to the given emissions *Emis'*. The results deriving from the wind fields sampled at the TROPOMI overpass time ("1 h"), the weighted average of 3 h wind fields ("3 h"), 6 h wind fields ("6 h"), 9 h wind fields ("9 h"), and 12 h wind fields ("12 h") are displayed by red, yellow, green, blue, and grey dots, respectively. The dash line represents the 1:1 line.