



Supplement of

Continuous mapping of fine particulate matter $(PM_{2.5})$ air quality in East Asia at daily $6\times 6\,km^2$ resolution by application of a random forest algorithm to 2011–2019 GOCI geostationary satellite data

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Figure S1: Distribution of surface network and GOCI 24-h surface $PM_{2.5}$ on days where AOD retrieval is successful (red) and days where retrieval fails (blue). GOCI $PM_{2.5}$ (top row) distributions are shown at network sites withheld from training in the crossvalidation. Surface network $PM_{2.5}$ are shown on the bottom row. Panels (a-b) show the distribution across the entire study domain; panels (c-d) show distributions in China; panels (e-f) in South Korea; panels (g-h) in Japan.

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Figure S2: Annual mean GOCI $PM_{2.5}$ concentrations for the study domain for each year where data is fully available. Prior to 2015 results for China and South Korea are not shown due to a lack of surface network data. Due to the unavailability of the early months of the year, 2011 is discarded for Japan and 2014 for eastern China, The colorbar is on a log scale.



Figure S3: Annual mean PM_{2.5} concentrations in China in 2015 and 2019. GOCI PM_{2.5} predictions (top) inferred from an RF trained on all available data are compared to China MEE network observations (bottom). Network observations are shown only if at least 80% of the year was observed.



15 Figure S4: Annual mean PM_{2.5} concentrations in Japan in 2012 and 2019. GOCI PM_{2.5} predictions (top) inferred from an RF trained on all available data are compared to the Japan NIES and Soramame network observations (bottom). Network observations are shown only if at least 80% of the year was observed.



Figure S5: Absolute 2015-2019 trends per year in PM_{2.5} concentrations across the study domain. The trends are obtained by ordinary linear regression of the annual mean GOCI PM_{2.5} in each $6x6 \text{ km}^2$ grid cell with significant regression slopes (p < 0.05), where the RF is trained on all the available data. Grid cells with insignificant trends are plotted in gray.