

Supplementary Material

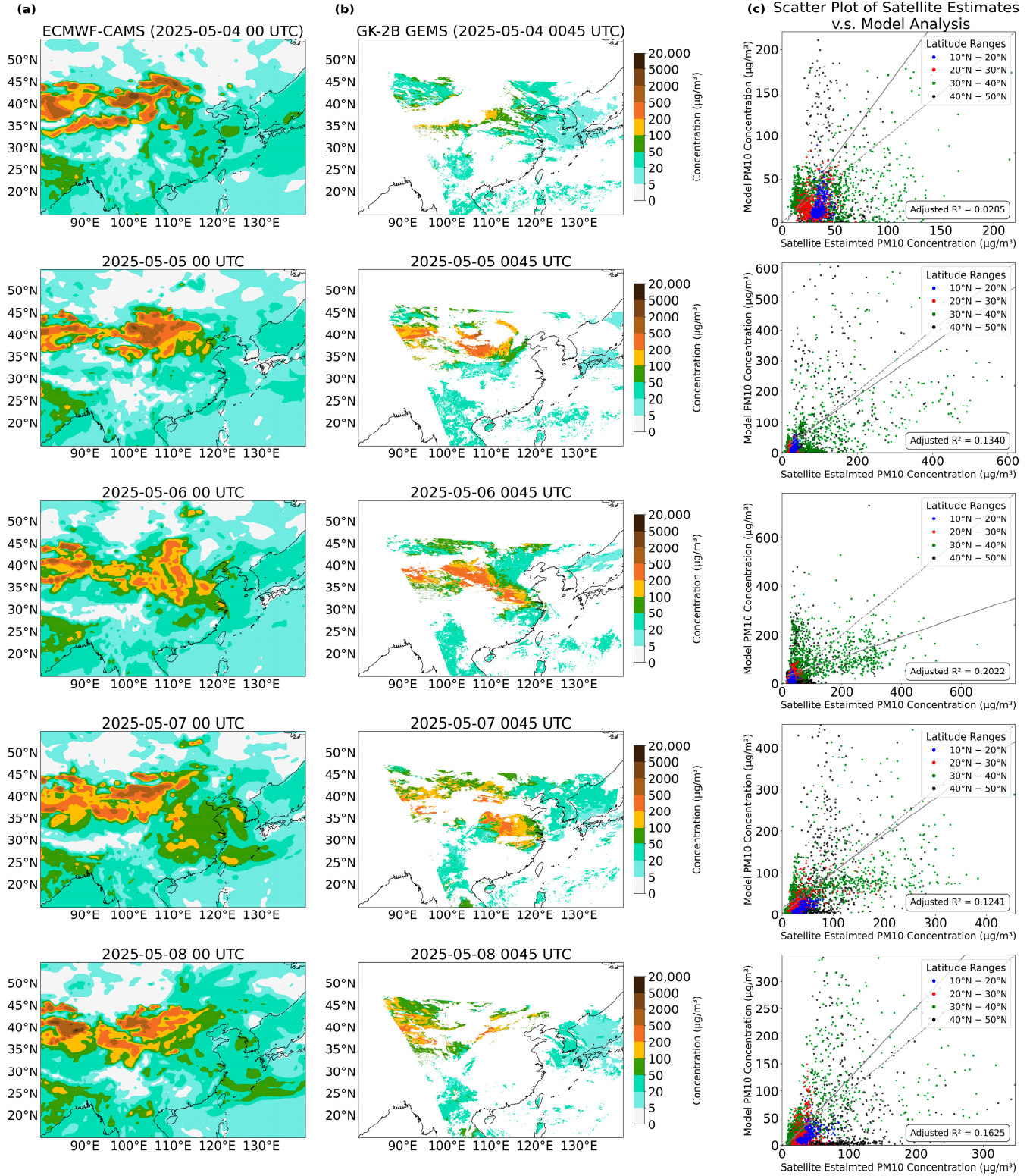


Figure S1. Comparison of PM10 concentration ($\mu\text{g}/\text{m}^3$) between ECMWF-CAMS model analysis and GK2B-GEMS satellite estimates during the period of 4–12 May 2025. Column (a) shows the daily 00UTC 0.5-degree ECMWF-CAMS model analysis, while column (b) shows the GK2B-GEMS satellite estimated values at 0045UTC (refer to legend next to column (b) for the colour scale). Column (c) shows scatter plots of model-analysed PM10 concentration against the GK2B-GEMS estimates interpolated to a 0.5-degree grid with values at different latitude ranges indicated by different colours (refer to legend). The linear regression fit for all data pairs regardless of latitude range is indicated by the solid line with the proportion of variance explained (adjusted R-squared value) shown, while the dashed line is the identity line ($y=x$) for reference.

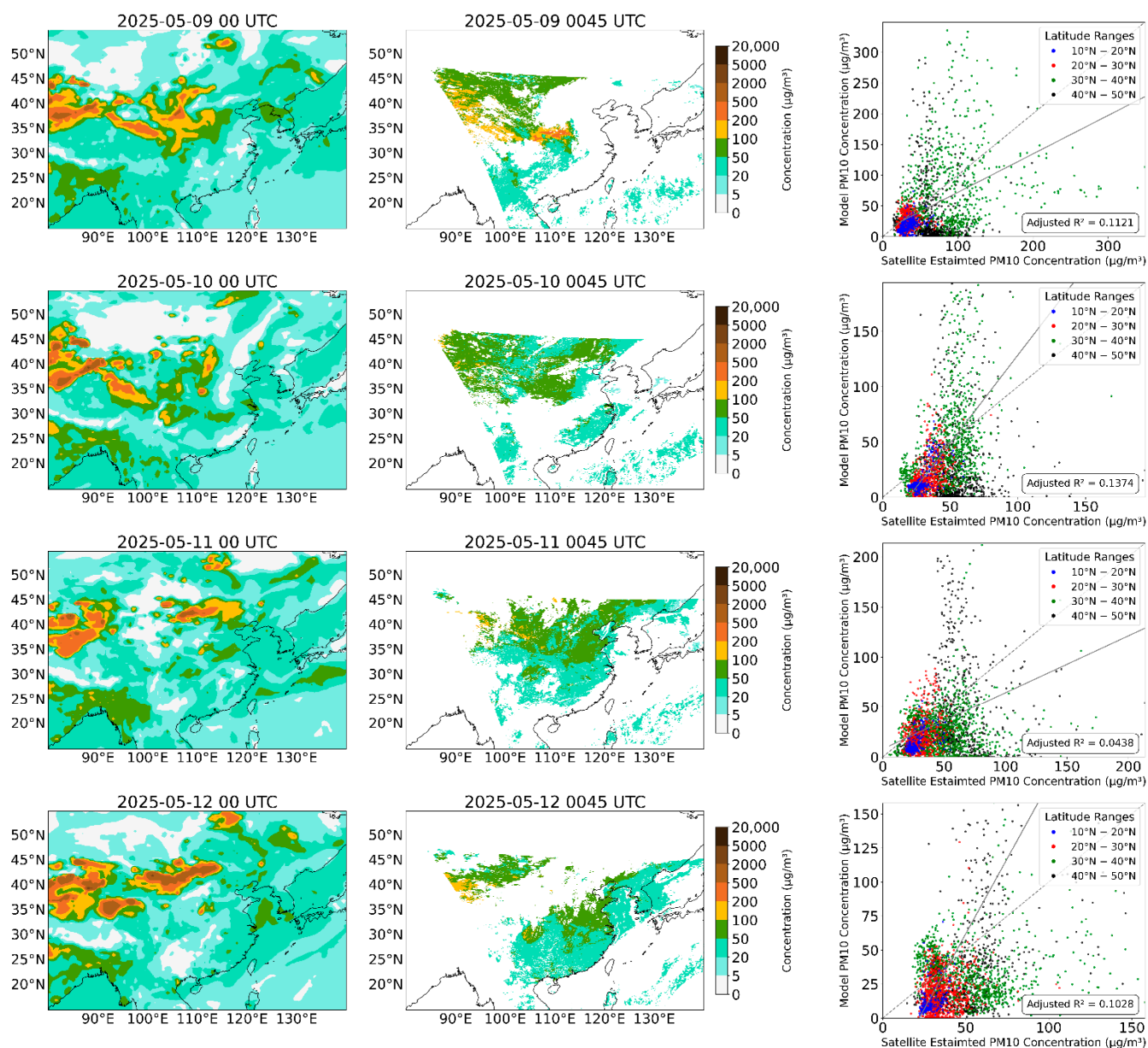


Figure S1. (cont'd)

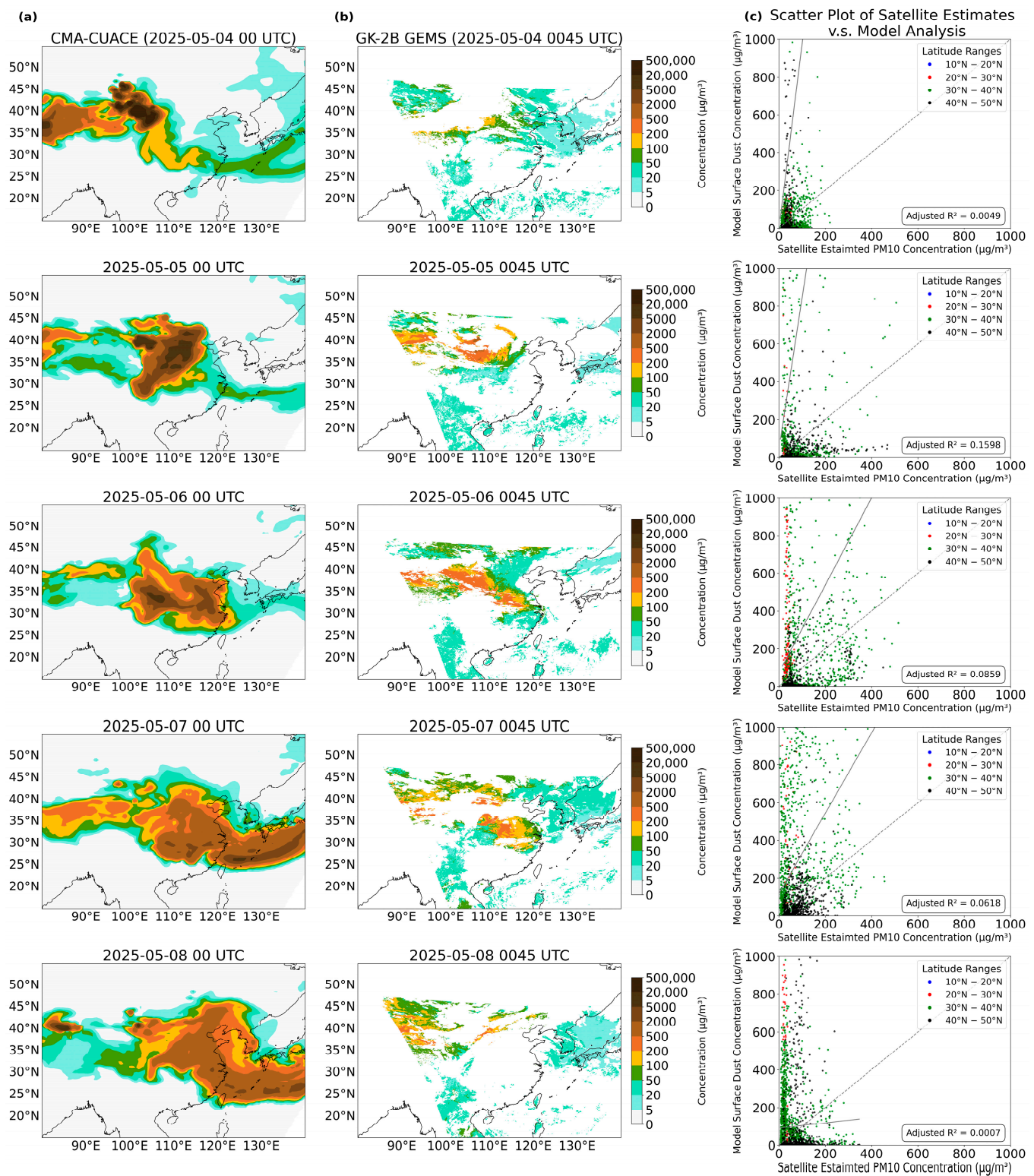


Figure S2. Comparison of CMA-CUACE model analysis of surface dust concentration ($\mu\text{g}/\text{m}^3$) and GK2B-GEMS satellite estimates of PM10 concentration ($\mu\text{g}/\text{m}^3$) during the period of 4–12 May 2025. Column (a) shows the daily 00UTC 0.5-degree CMA-CUACE model analysis, while column (b) shows the GK2B-GEMS satellite estimated values at 0045UTC (refer to legend next to column (b) for the colour scale). Column (c) shows scatter plots of model-analysed surface dust concentration against the GK2B-GEMS estimates of PM10 concentration interpolated to a 0.5-degree grid with values at different latitude indicated by different colours (refer to legend). The linear regression fit for all data pairs regardless of latitude range is indicated by the solid line with the proportion of variance explained (adjusted R-squared value) shown, while the dashed line is the identity line ($y=x$) for reference. For the sake of clarity, large values of surface dust concentration are omitted.

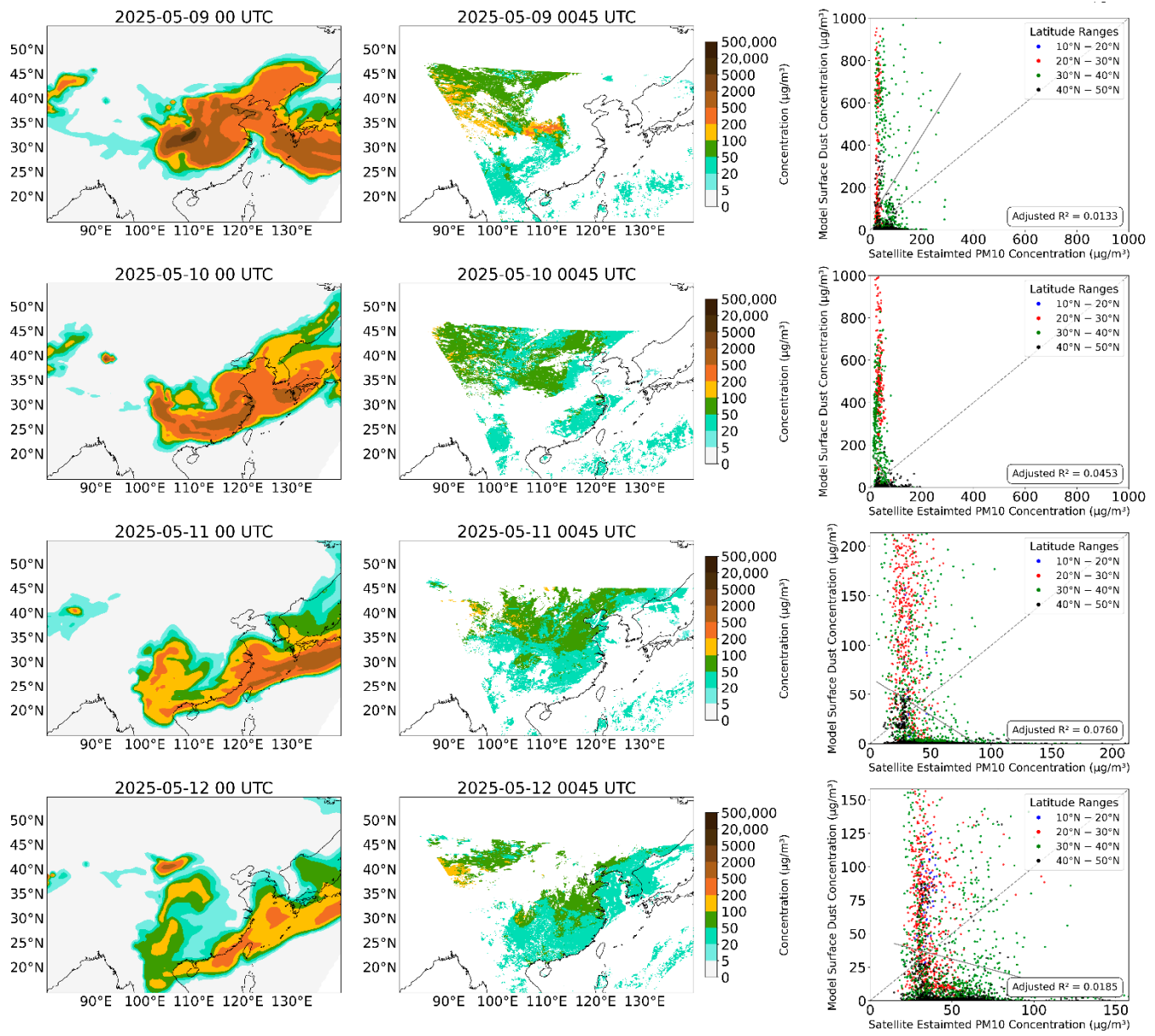


Figure S2. (cont'd).