Supplementary Materials:

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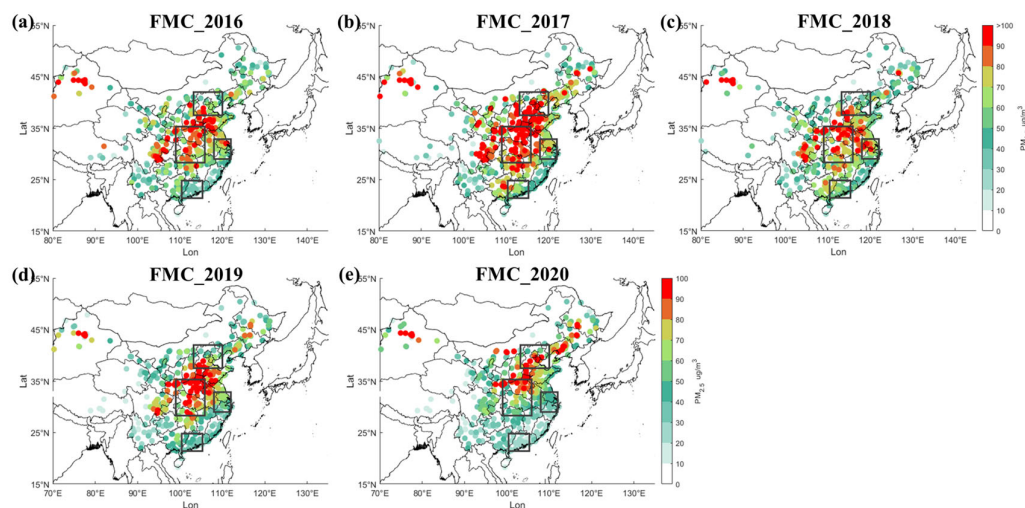
Figure S1. Distributions of monthly average PM2.5 mass concentration ($\mu g\ m^{-3}$) in China. (a) FMC_2016. (b) FMC_2017. (c) FMC_2018. (d) FMC_2019. (e) FMC_2020.
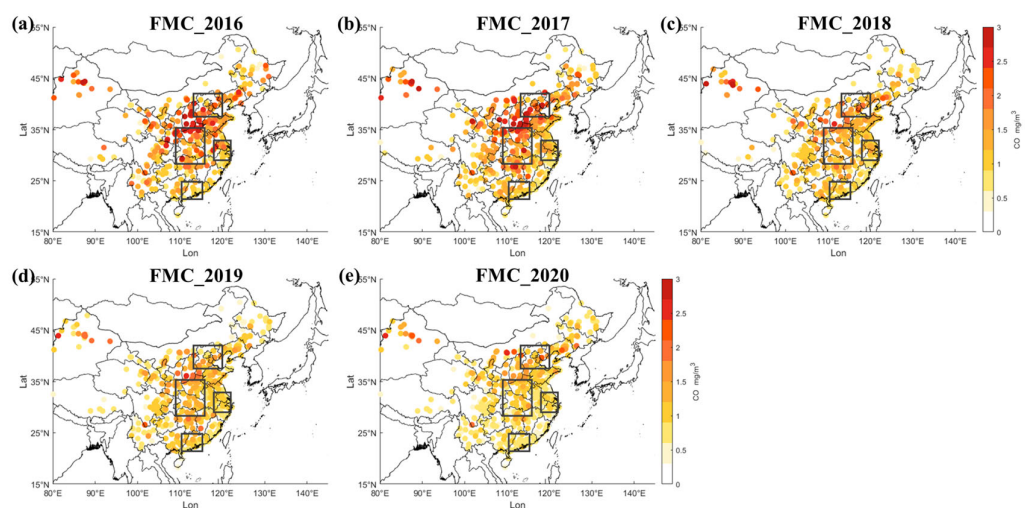

Figure S2. Distributions of monthly average CO mass concentration ($mg\ m^{-3}$) in China. (a) FMC_2016. (b) FMC_2017. (c) FMC_2018. (d) FMC_2019. (e) FMC_2020.
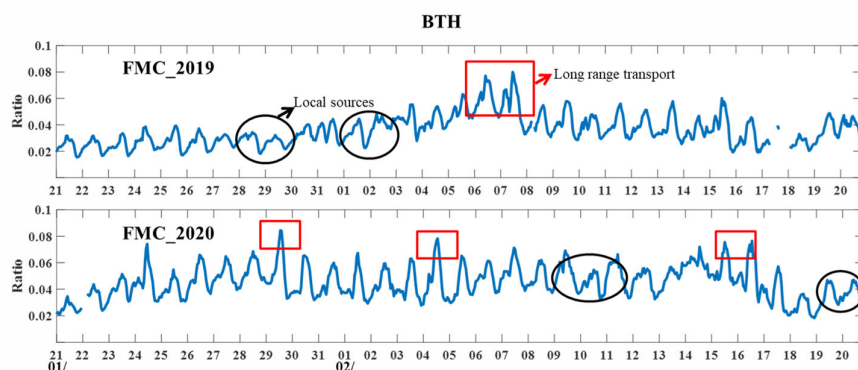
Figure S3. The values of CO/NO$_x$ during FMC_2019 and FMC_2020 in the BTH. The red rectangles represent long range transport of CO. The black ovals represent selected periods with similar meteorological conditions affected by local sources.
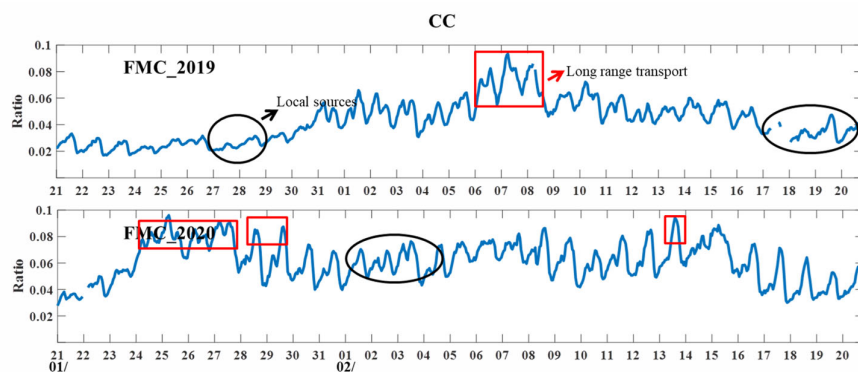

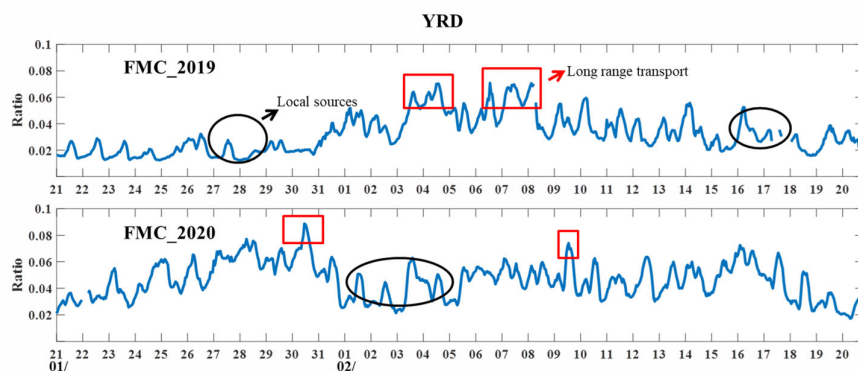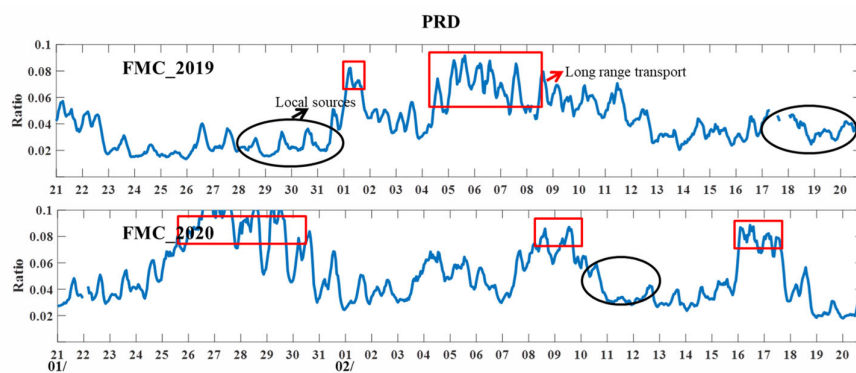**Figure S4.** As in Figure S3, but in the CC.

Figure S5. As in Figure S3, but in the YRD.

Figure S6. As in Figure S3, but in the PRD.