Supplement of Atmos. Chem. Phys., 25, 1273–1287, 2025
https://doi.org/10.5194/acp-25-1273-2025-supplement

Atmospheric Chemistry and Physics
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EGU

Supplement of

Quasi-weekly oscillation of regional $PM_{2.5}$ transport over China driven by the synoptic-scale disturbance of the East Asian winter monsoon circulation

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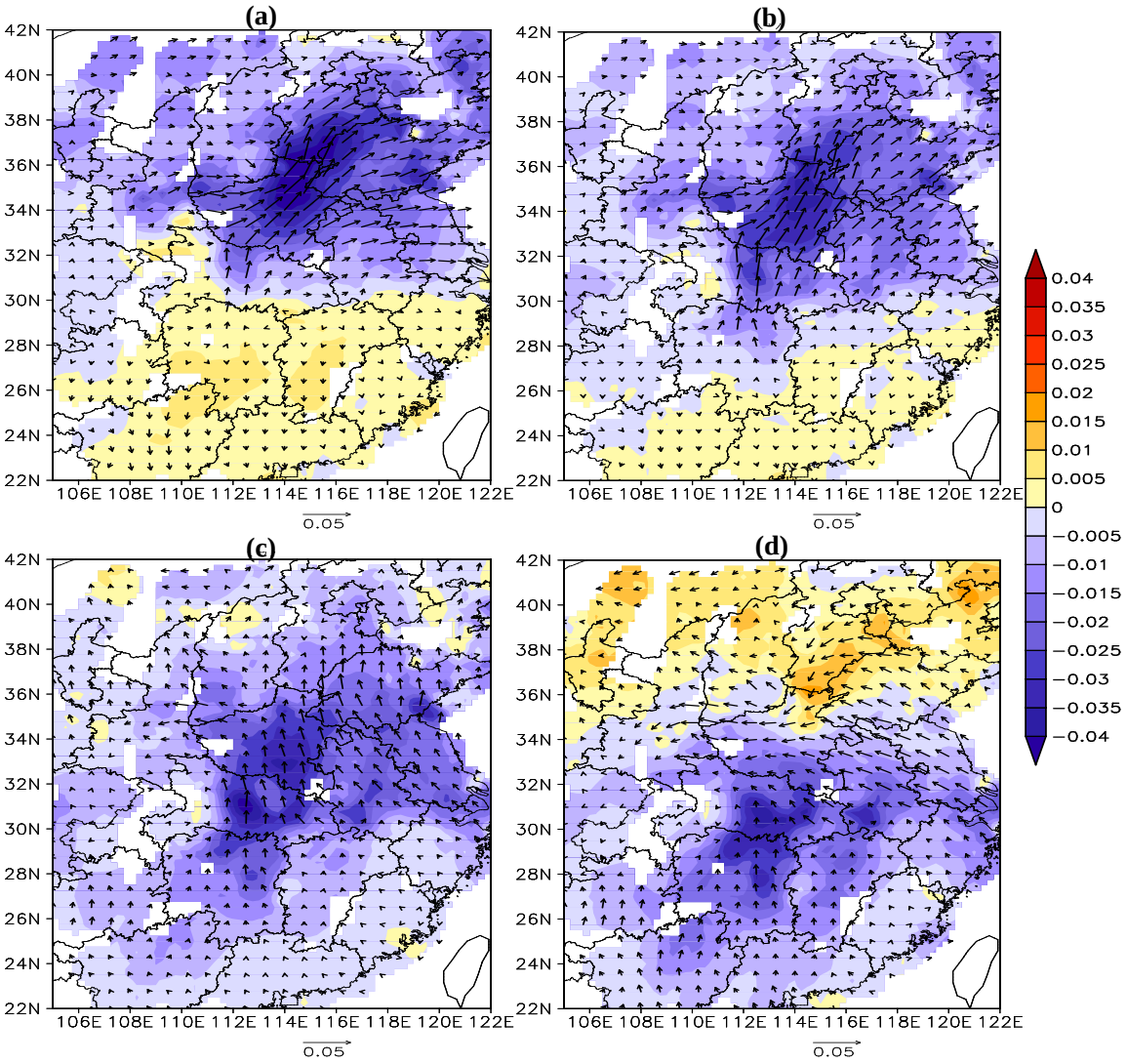


Figure S1. Same as Fig. 2. (a)-(d) The last four phases (days) of QWO (8-d) of the regional $PM_{2.5}$ transport over CEC. The loads of $PM_{2.5}$ TFM anomalies (color contours, unitless) for EEOF2 and TFV anomalies (vectors, unitless) for EEOF1 with lag time (a) 4 d, (b) 5 d, and loads of TFM anomalies (color contours, unitless) for EEOF3 and TFV anomalies (vectors, unitless) for EEOF2 with lag time (c) 0 d, (d) 1 d over CEC in the winters of 2015-2019.

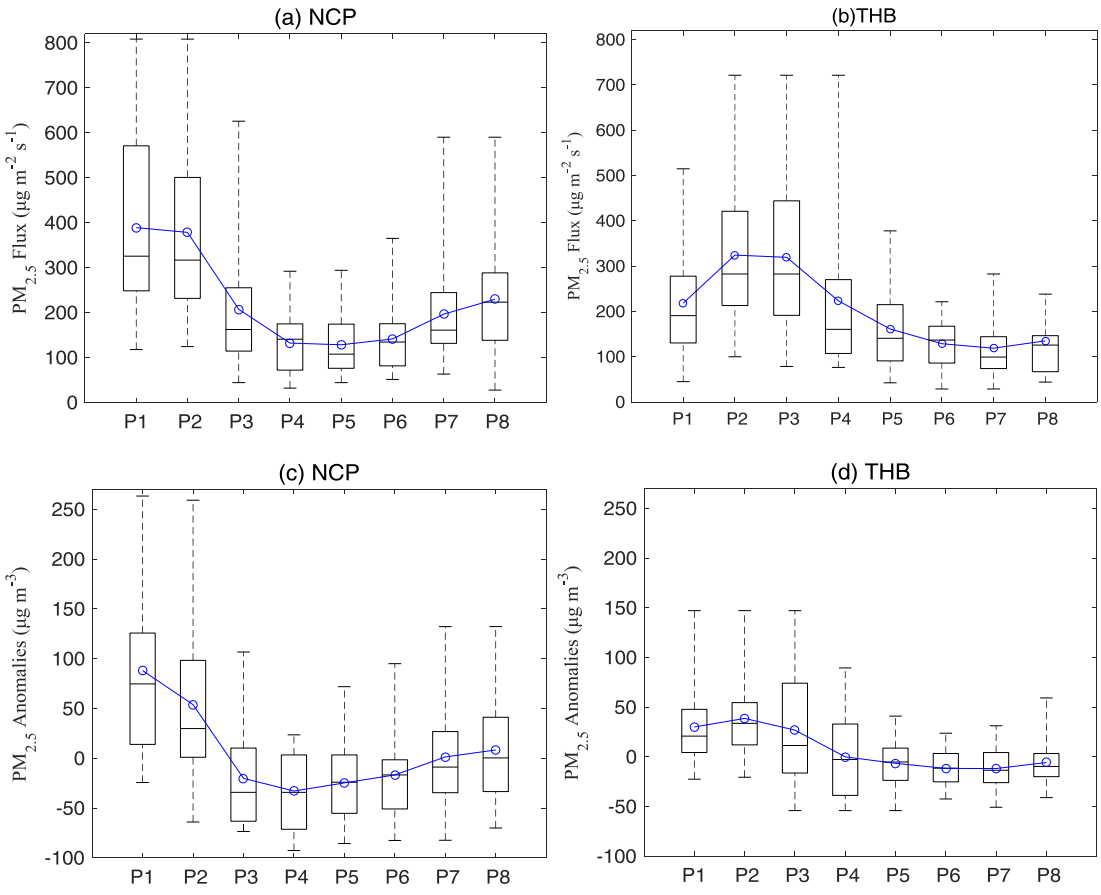


Figure S2. Box plots illustrating the 8 phases of QWO during 23 typical events of regional $PM_{2.5}$ transport from NCP to THB of (a,b) $PM_{2.5}$ TFM (μg m^{-2} s^{-1}) and (c,d) anomalies of $PM_{2.5}$ (unit: μg m^{-3}); each box plot displays the maximum, minimum, median, and upper and lower quartiles, with the circles indicating the mean.

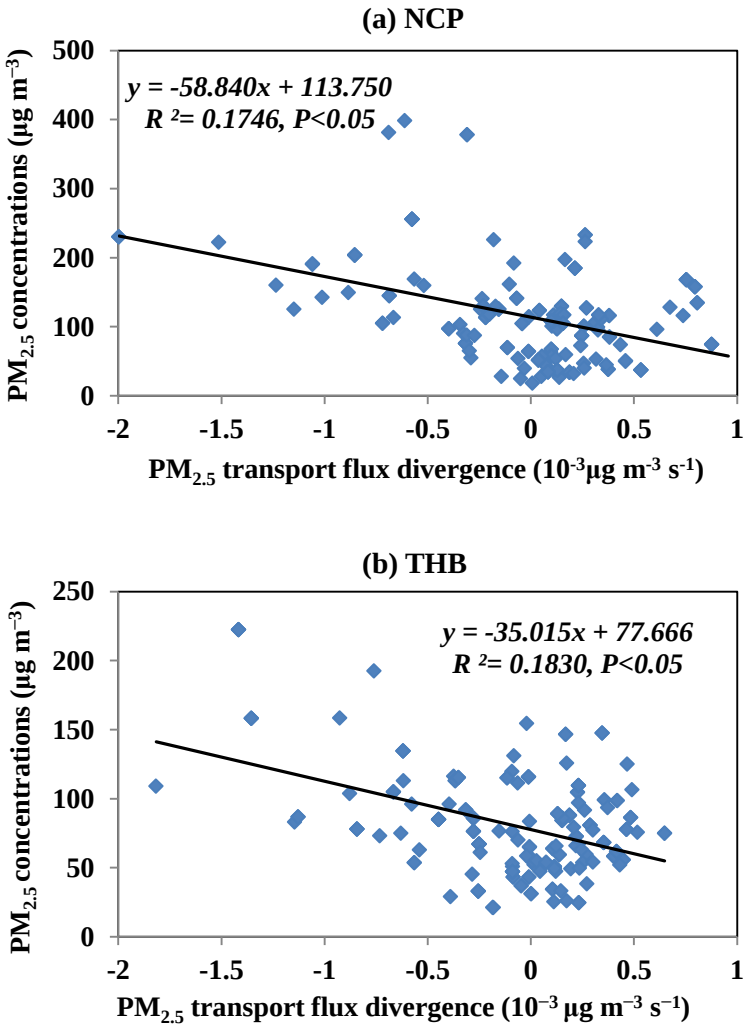
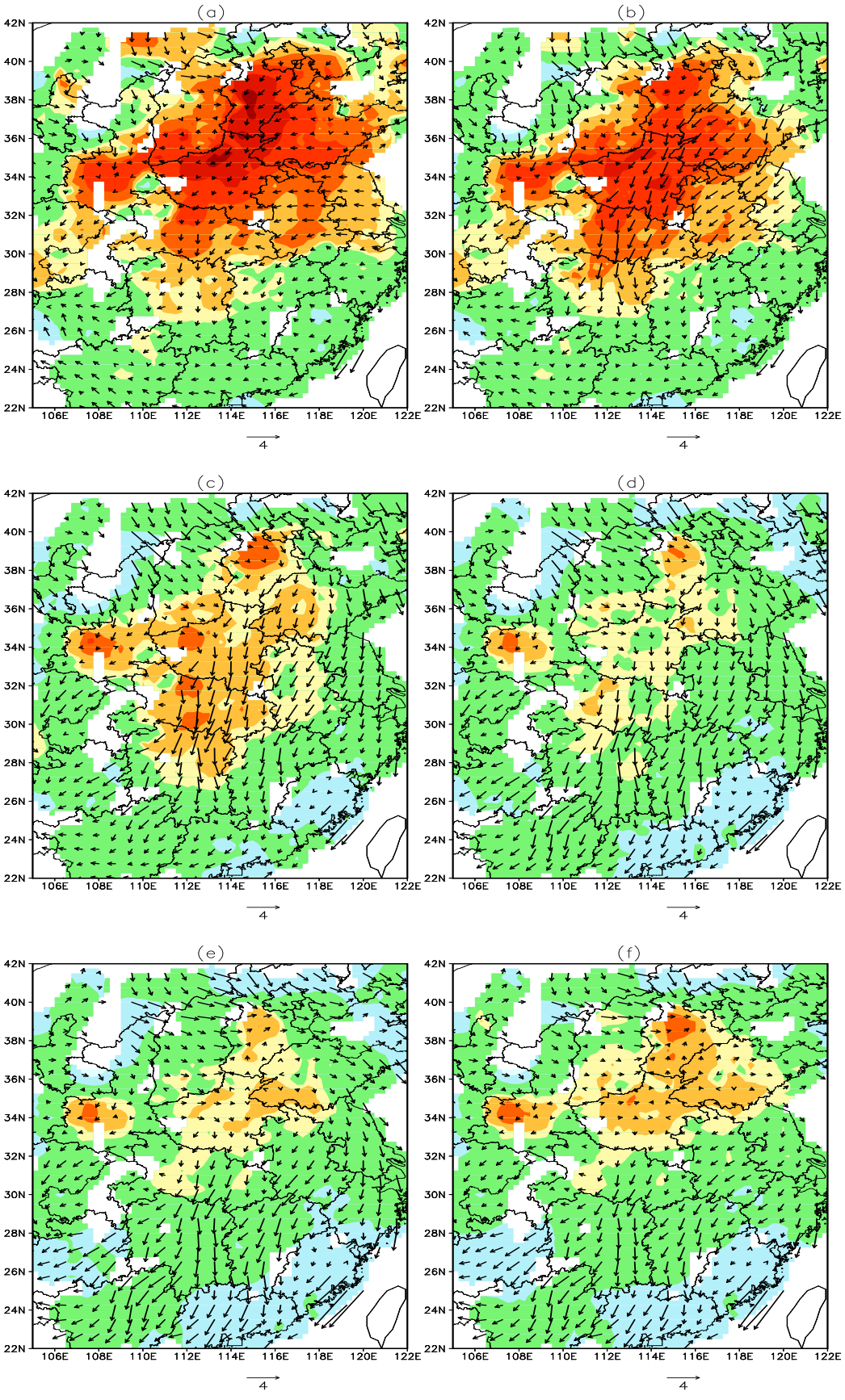


Figure S3. Scatter plot of $PM_{2.5}$ transport flux divergences and $PM_{2.5}$ concentrations over (a) NCP and (b) THB during the 23 typical events of regional $PM_{2.5}$ transport over CEC.


(a)
(b)
(c)
(d)
(e)
(f)
42N
40N
38N
36N
34N
32N
30N
28N
26N
24N
22N
106E
108E
110E
112E
114E
116E
118E
120E
122E
4

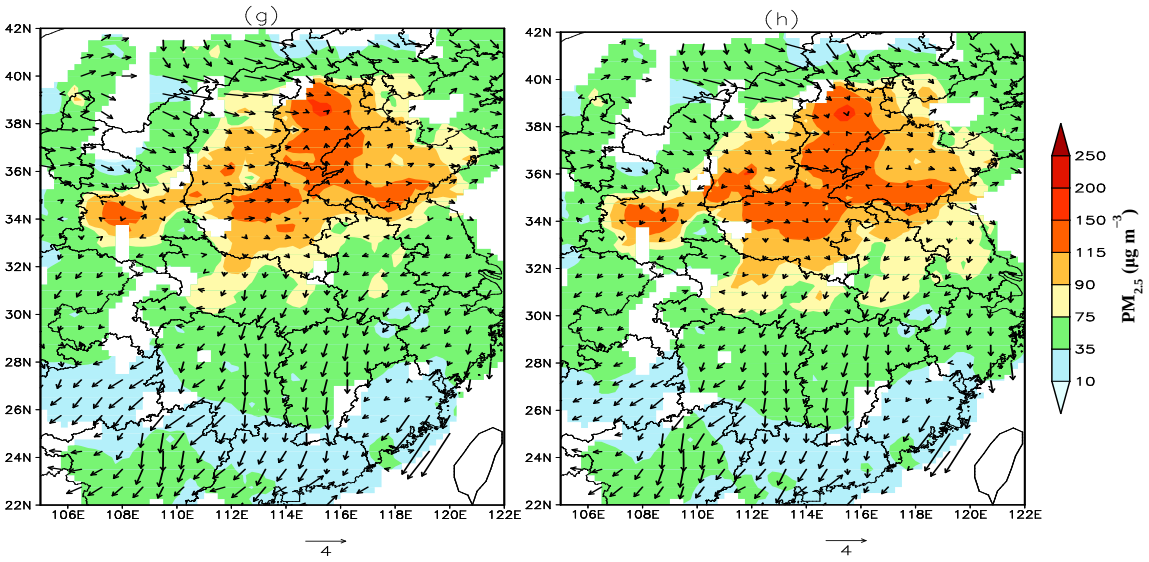


Figure S4. The composited $PM_{2.5}$ concentrations (color contours, unit: μ g m^{-3}) and 10-m wind (vector, unit: m s^{-1}) in the 8 phases (a-h) of QWO during the 23 typical events of regional $PM_{2.5}$ transport over CEC.

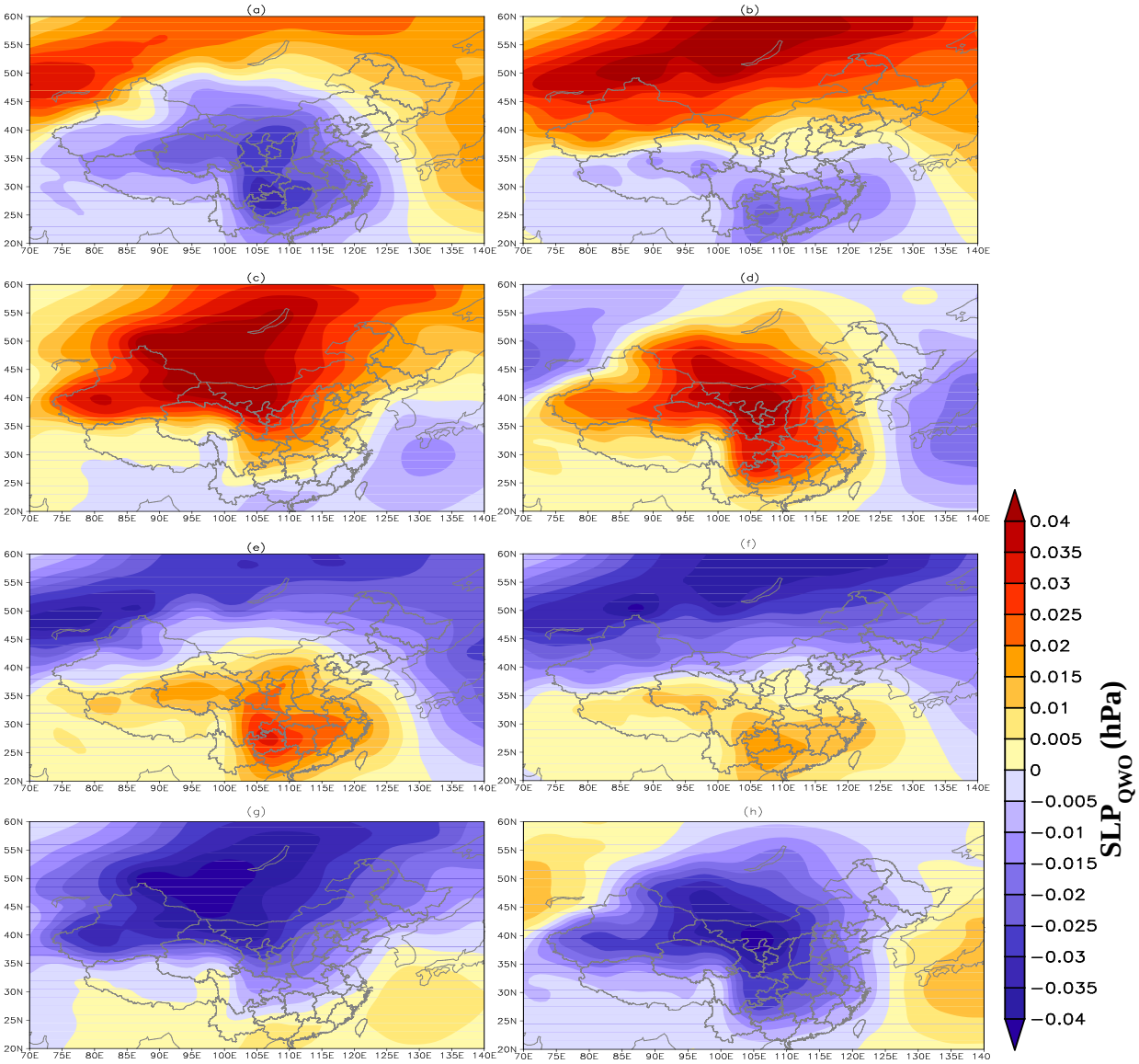


Figure S5. EEOF analysis of the SLP_{QWO} in the winters of 2015-2019, and the 8-d QWO formed by the lag time (a) 1 d, (b)2 d, (c) 3 d, (d) 4 d, (e) 5 d of its second mode and by the lag time (f) 0 d, (g) 1 d, (h) 2 d of its first mode. The color contours represent the loads of SLP_{QWO}.