

# Electronic Supplementary Material to Monthly Variations of Atmospheric Circulations Associated with Haze Pollution in the Yangtze River Delta and North China

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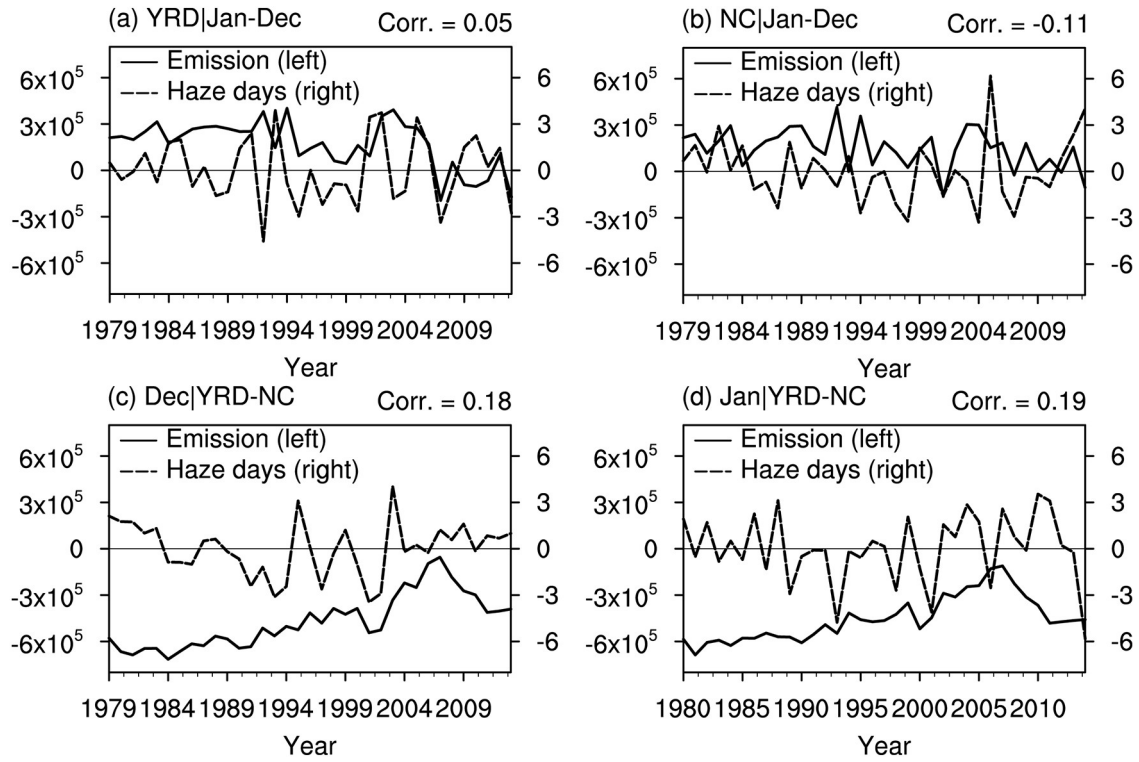
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**Table 1.** Definitions of the East Asian early winter (December and January) monsoon indices. Note: ALI, MW850I, and EADTI have already been multiplied by  $-1$ , in order to ensure the consistency of high indices and high strength.

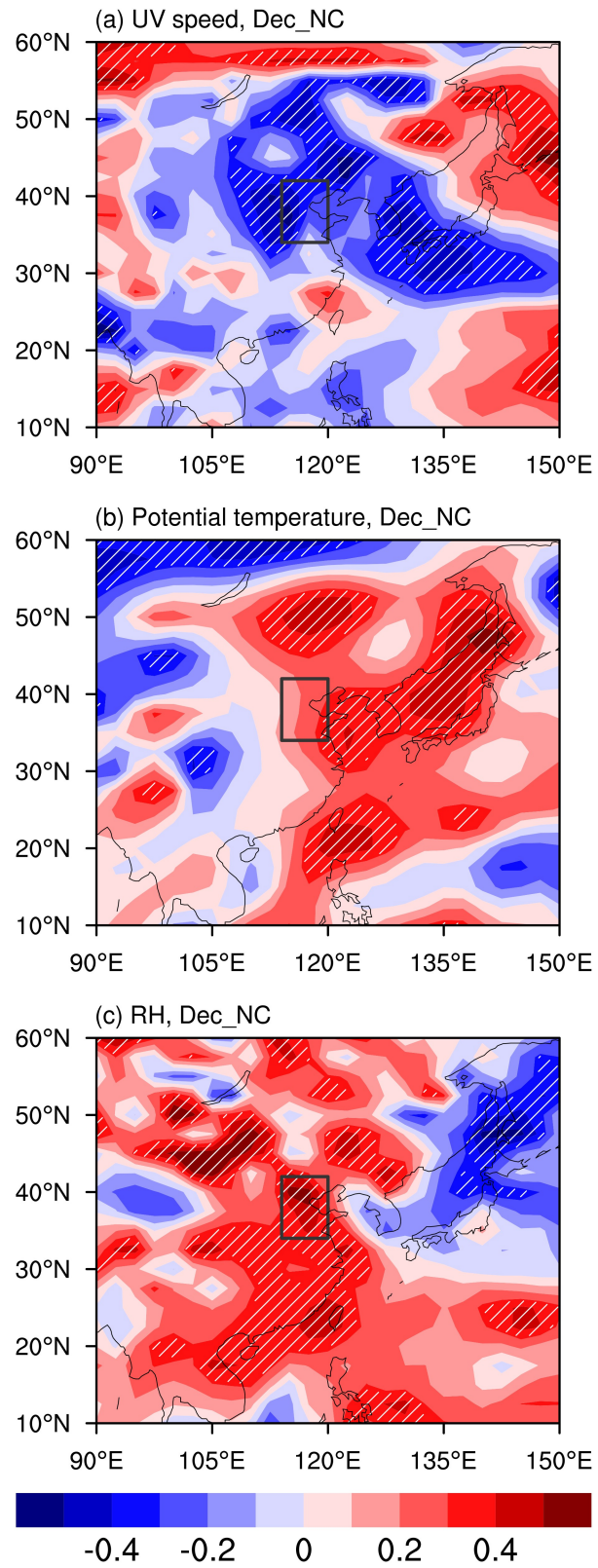
Name	Definition
Siberian high index (SHI)	SLP ( $40^{\circ}$ – $55^{\circ}$ N, $80^{\circ}$ – $100^{\circ}$ E)
Aleutian low index (ALI)	–SLP ( $50^{\circ}$ – $60^{\circ}$ N, $145^{\circ}$ – $170^{\circ}$ E)
Meridional wind at 850 hPa index (MW850I)	–V850 ( $30^{\circ}$ – $60^{\circ}$ N, $100^{\circ}$ – $125^{\circ}$ E)
East Asian deep trough index (EADTI)	–Hgt500 ( $40^{\circ}$ – $50^{\circ}$ N, $110^{\circ}$ – $130^{\circ}$ E)
Westerly jet index (WJI)	U300 ( $30^{\circ}$ – $45^{\circ}$ N, $90^{\circ}$ – $130^{\circ}$ E) – U300 ( $55^{\circ}$ – $70^{\circ}$ N, $80^{\circ}$ – $130^{\circ}$ E)
Synthetic index (SI)	(SHI + EADTI + WJI) / 3
Wind speed at 850 hPa index (WS850I)	Wind speed850 ( $25^{\circ}$ – $50^{\circ}$ N, $115^{\circ}$ – $145^{\circ}$ E)

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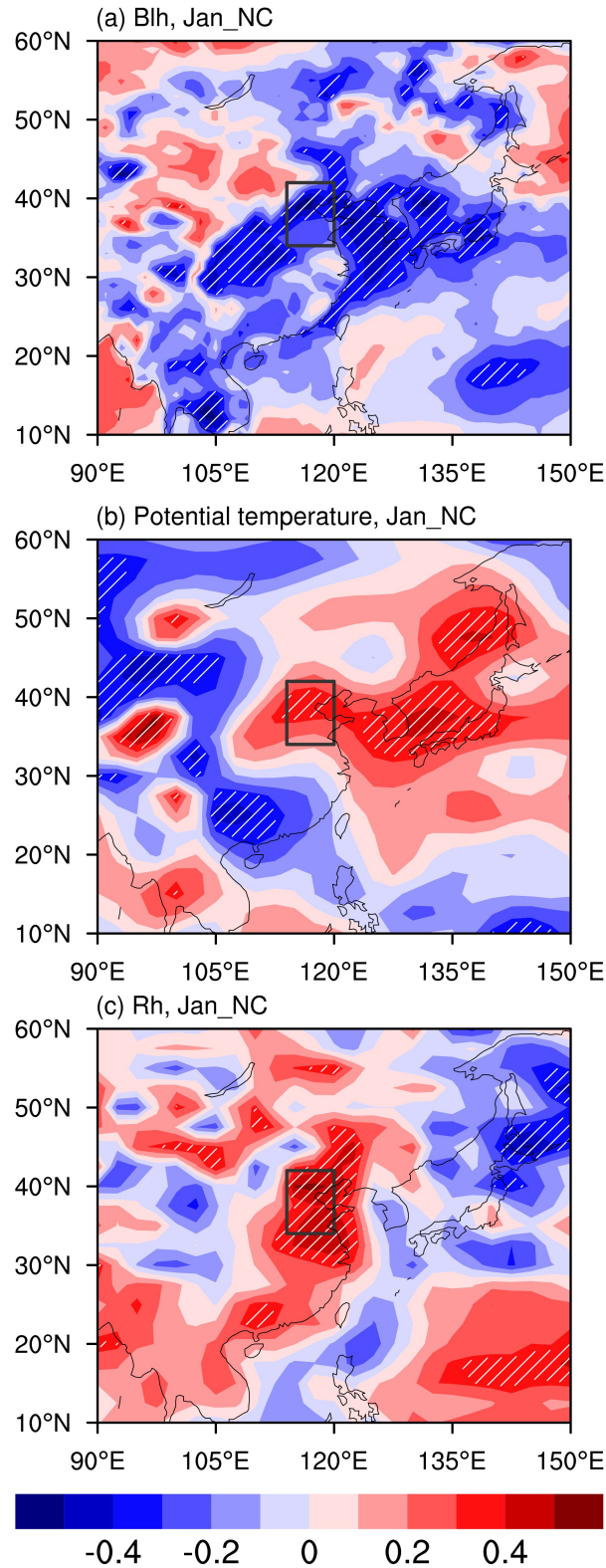
\*The online version of this article can be found at <https://doi.org/10.1007/s00376-020-0227-z>.



**Fig. S1.** (a) The emissions inventory (total black carbon, ammonia, organic carbon, sulfur dioxide,  $PM_{10}$ , and  $PM_{2.5}$ ; unit: g; left) and HDs (unit: d; right) difference between January during 1980–2014 and December during 1979–2013 over the YRD. (b) As in (a) but for NC. (c) The December emissions inventory (total black carbon, ammonia, organic carbon, sulfur dioxide,  $PM_{10}$ , and  $PM_{2.5}$ ; unit: g; left) and HDs (unit: d; right) difference between the YRD and NC during 1979–2013. (d) As in (c) but for January variables during 1980–2014. Numbers in the upper right are the CCs between two lines. The linear trends of all data were removed.



**Fig. S2.** The CCs between December HDs in NC and December (a) UV speed, (b) potential temperature and (c) RH from 1981 to 2017. White slanted lines indicate that the CCs represented by the shading exceed the 95% confidence level. The gray box indicates the location of NC. The linear trends of all data were removed.



**Fig. S3.** The CCs between January HDs in NC and the January (a) PBLH, (b) potential temperature and (c) RH from 1982 to 2018. White slanted lines indicate that the CCs represented by the shading exceed the 95% confidence level. The gray box indicates the location of NC. The linear trends of all data were removed.