

*Supplement of*

## **Ship-based MAX-DOAS measurements of tropospheric NO<sub>2</sub>, SO<sub>2</sub>, and HCHO distribution along the Yangtze River**

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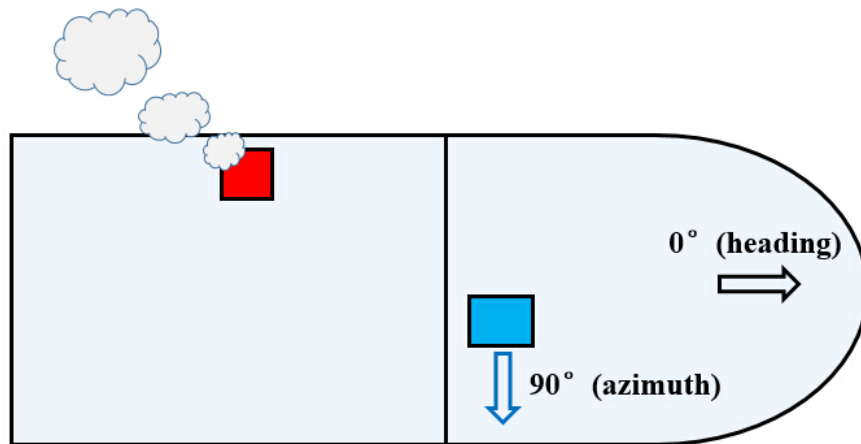
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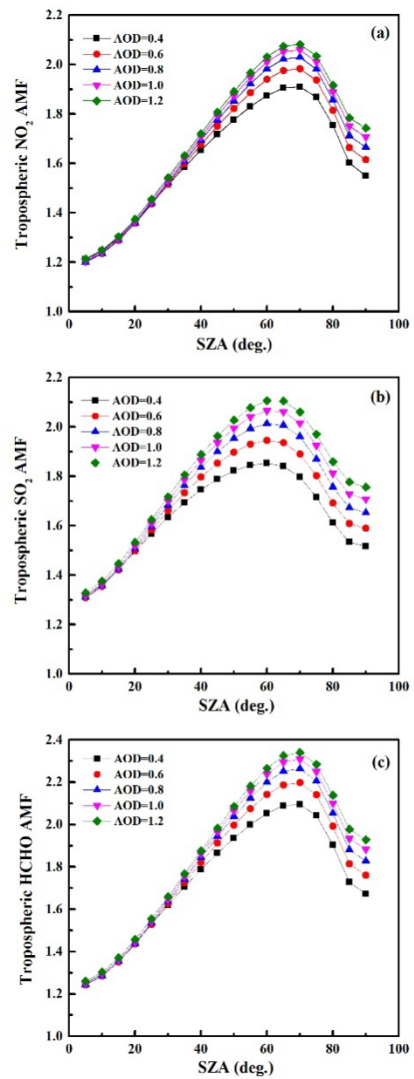
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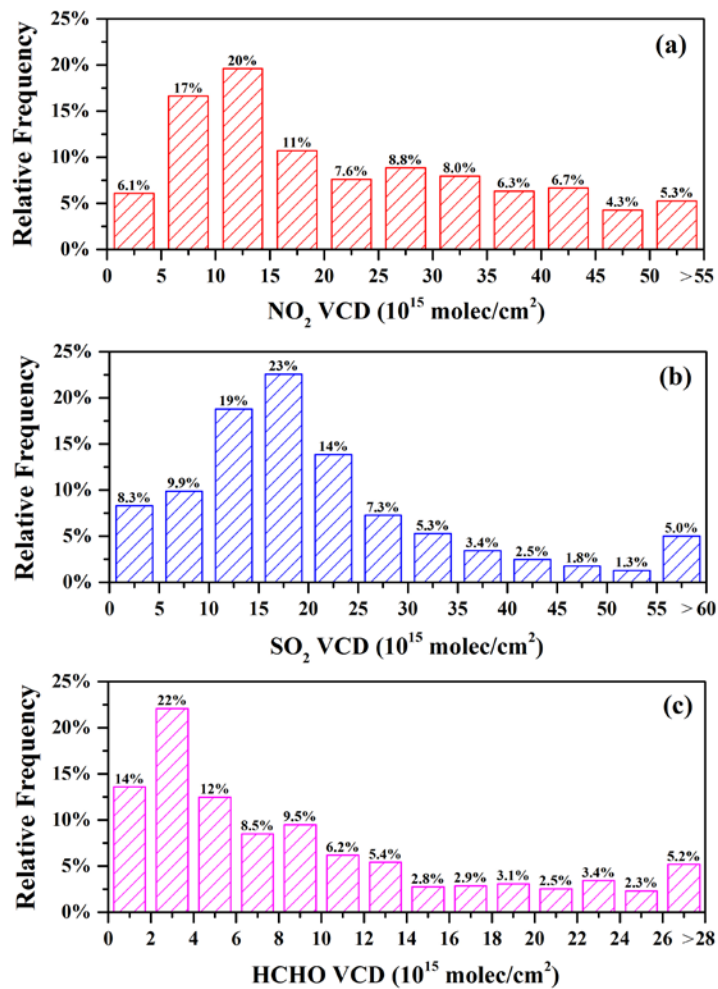
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**Fig. S1.** Illustration of the MAX-DOAS setup location on the measurement ship. The red rectangle indicates the ship's exhaust. The blue rectangle represents the MAX-DOAS instrument, measuring in 90° azimuthal direction (blue arrow) relative to the ship's heading (black arrow).



**Fig. S2.** Sensitivity analysis of the influence of aerosol load on tropospheric (a) NO<sub>2</sub> (354 nm), (b) SO<sub>2</sub> (311 nm), and (c) HCHO (347 nm) AMFs. AMFs are calculated using the radiative transfer model SCIATRAN. The tropospheric AMFs deduced under the assumption of different aerosol optical depths (AOD).



**Fig. S3.** Frequency distribution of (a) NO<sub>2</sub>, (b) SO<sub>2</sub>, and (c) HCHO VCDs during Yangtze River campaign.