

*Supplement of*

**Measurement report: Validation of multi-satellite remote sensing products and potential source apportionment of BrO and IO in the Arctic using ship-based DOAS**

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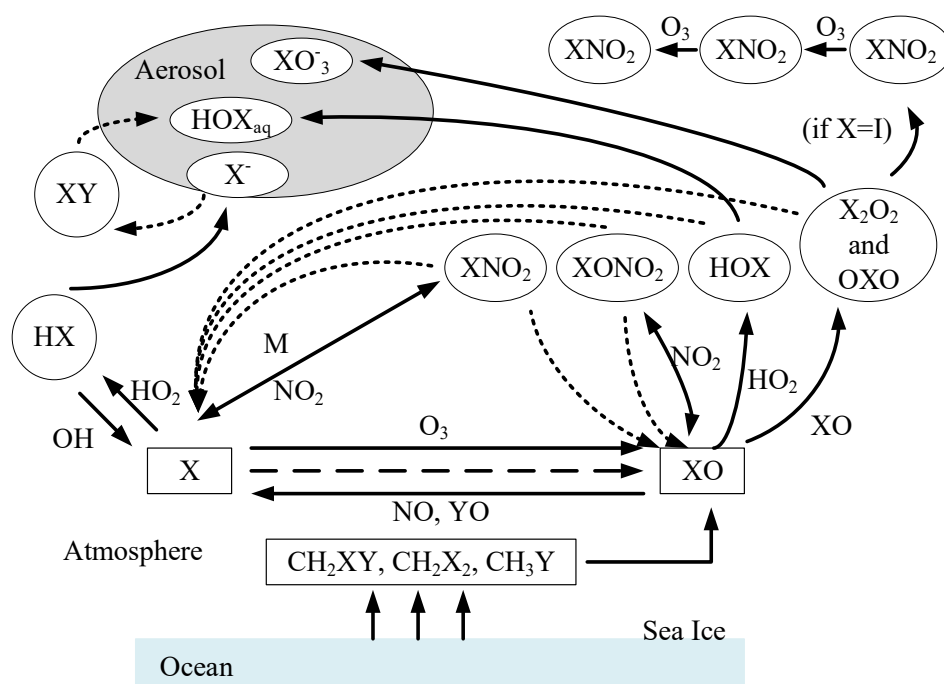
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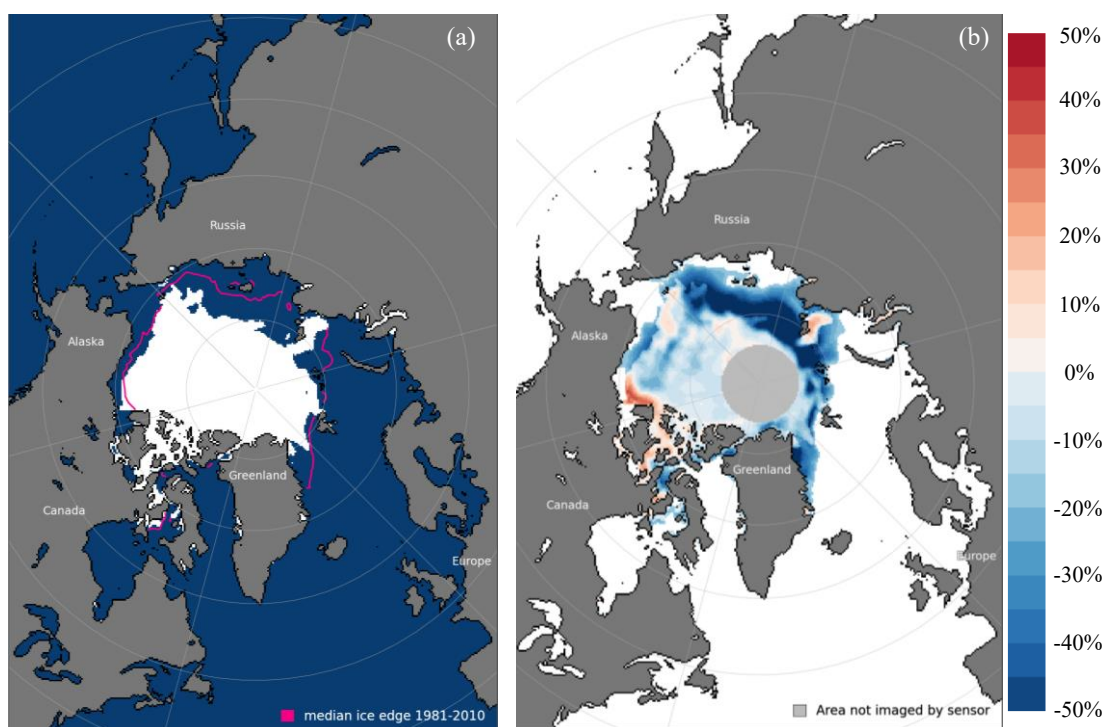
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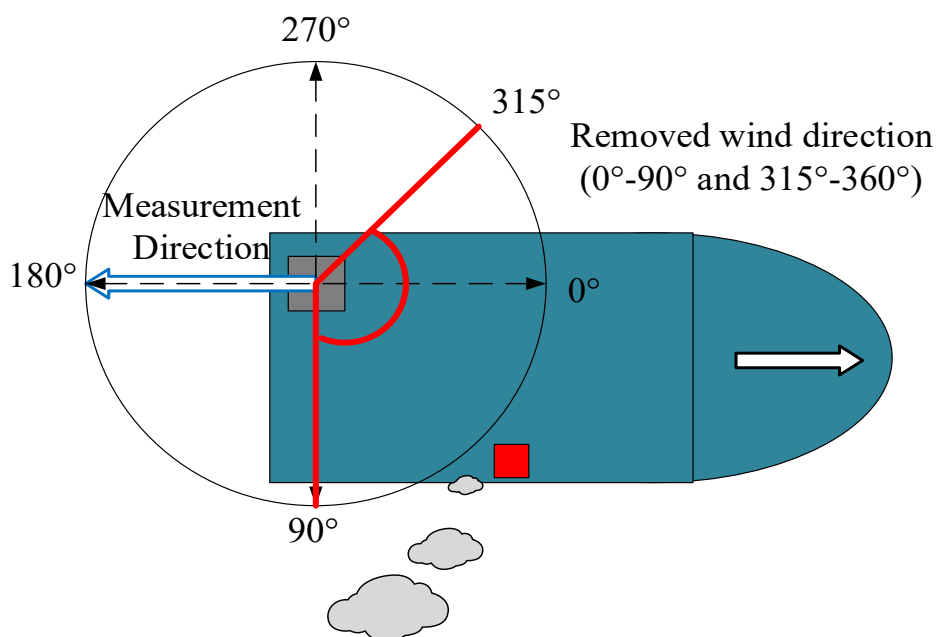


**Fig. S1.** Simplified chemical diagram of iodine and bromine in the Arctic.

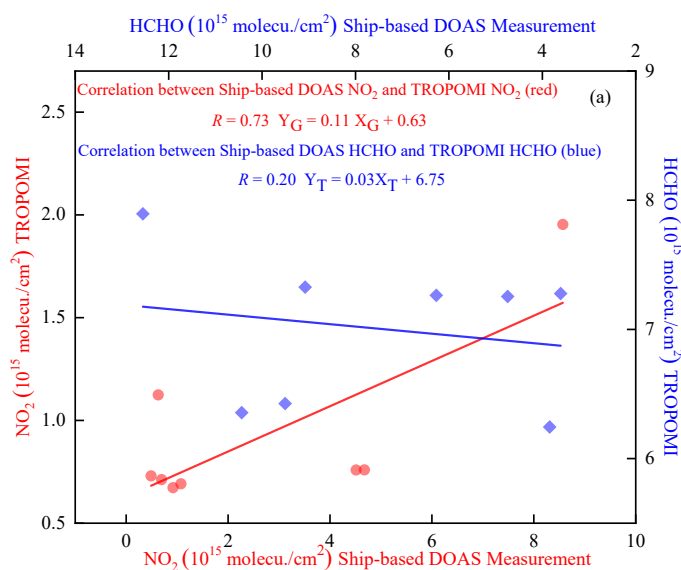


**Fig. S2.** (a) Arctic sea ice extent (August 2021); (b) Arctic sea ice concentration.

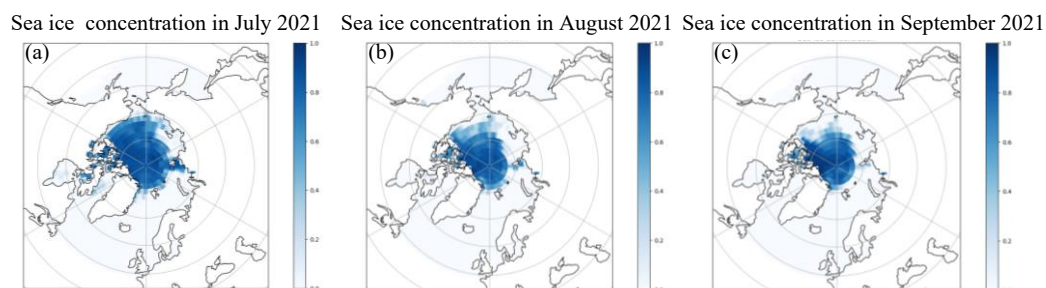
Data source: [http://nsidc.org/data/seaice\\_index/](http://nsidc.org/data/seaice_index/)



**Fig. S3.** Top-down schematic of the Xuelong 2 research vessel (0° denotes the direction of travel): red rectangles mark the chimney location, and gray rectangles denote the MAX-DOAS installation position.

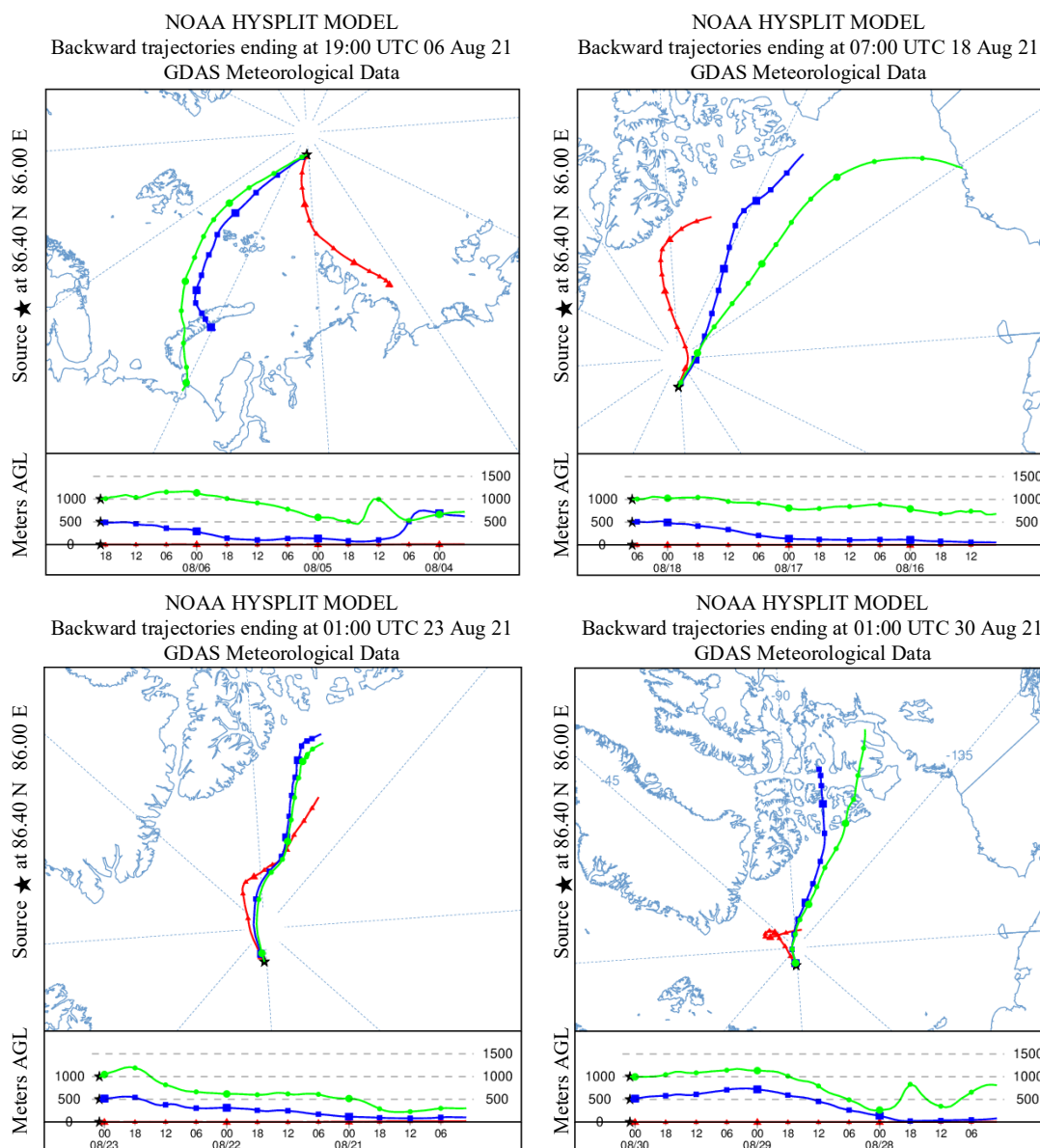


**Fig. S4.** Correlation between Daily MAX-DOAS Measurements and TROPOMI Satellite. Data over 110° E - 130° E, 20° N - 45° N during ship-based Measurements.

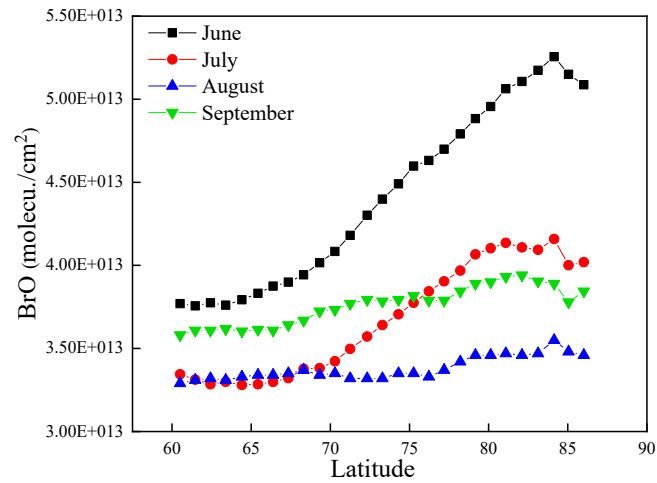


**Fig. S5.** Spatial distribution of Arctic sea ice concentration (July – September 2021). Data

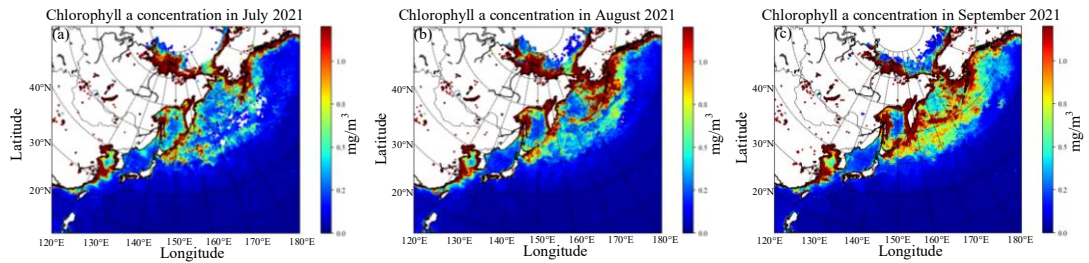
source: <https://nsidc.org/home>



**Fig. S6.** Backward trajectories of polluted air masses at the target location: (a) 6 August, (b) 18 August, (c) 23 August, (d) 30 August. Curves denote trajectories originating at different altitudes: 0 m (red), 500 m (blue), 1000 m (green).

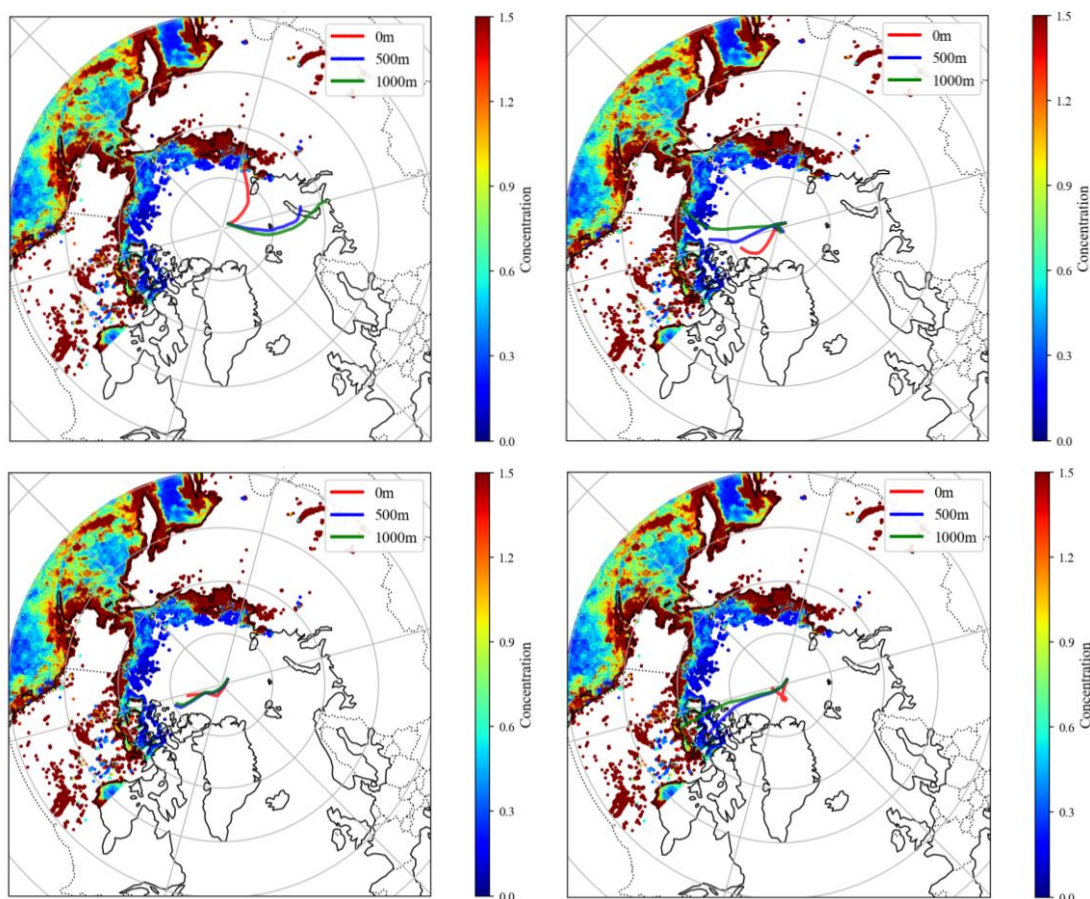


**Fig. S7.** BrO VCD variation from GOME-2 satellite data (July-September 2021) as a function of latitude.

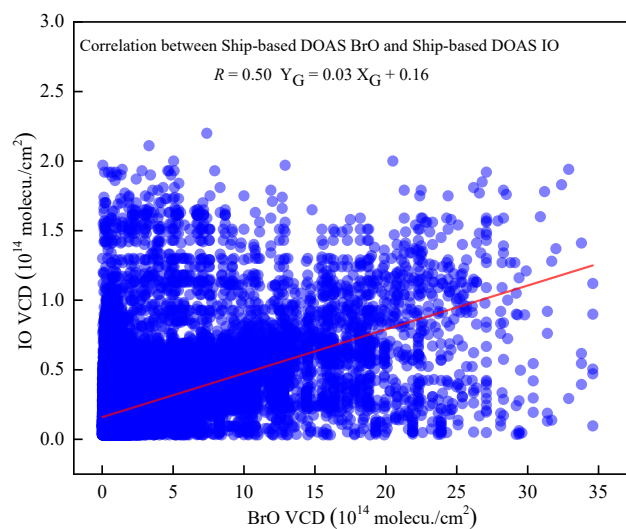


**Fig. S8.** Spatial distribution of chlorophyll a concentration (July-September 2021).

Data source: <https://aqua.nasa.gov/modis>



**Fig. S9.** Backward trajectories of polluted air masses at the target location over Arctic chlorophyll-a concentration (August 2021)



**Fig. S10.** Correlation between ship-based MAX-DOAS BrO VCDs and IO VCDs