Supplement of Atmos. Chem. Phys., 22, 10375–10388, 2022
https://doi.org/10.5194/acp-22-10375-2022-supplement
© Author(s) 2022. CC BY 4.0 License.

Atmospheric Chemistry and Physics
Open Access

Supplement of

Estimating global ammonia (NH_3) emissions based on IASI observations from 2008 to 2018

Zhenqi Luo et al.

Correspondence to: Yuzhong Zhang (zhangyuzhong@westlake.edu.cn) and Zhenqi Luo (zl725@cornell.edu)

The copyright of individual parts of the supplement might differ from the article licence.

Table S1. Consistency evaluation of simulated NH_3 concentrations against IASI observations using full-chemistry simulations driven by different emission datasets (BUE1 and TDE) in 2008, 2013 and 2018.

Year	Number of grids	Percentage of grids	Emission	R^2	RMSE[a]	FB
2008	9971	60 %	TDE	0.32	12.44	0.18
			BUE1	0.40	7.83	-0.30
2013	8957	54 %	TDE	0.54	7.34	0.08
			BUE1	0.37	8.02	-0.19
2018	8599	52 %	TDE	0.62	8.12	0.05
			BUE1	0.31	10.55	-0.32

[a]In 10^{-5} mol m^{-2}.

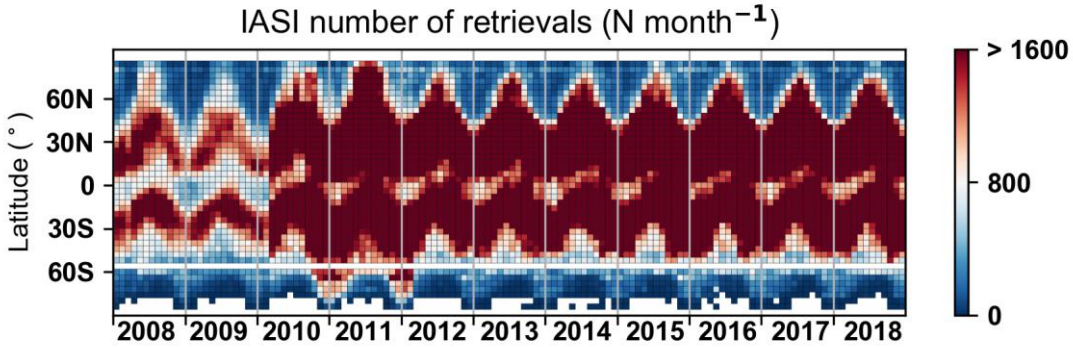

Figure S1. Number of satellite retrievals by latitude and by month during 2008-2018.

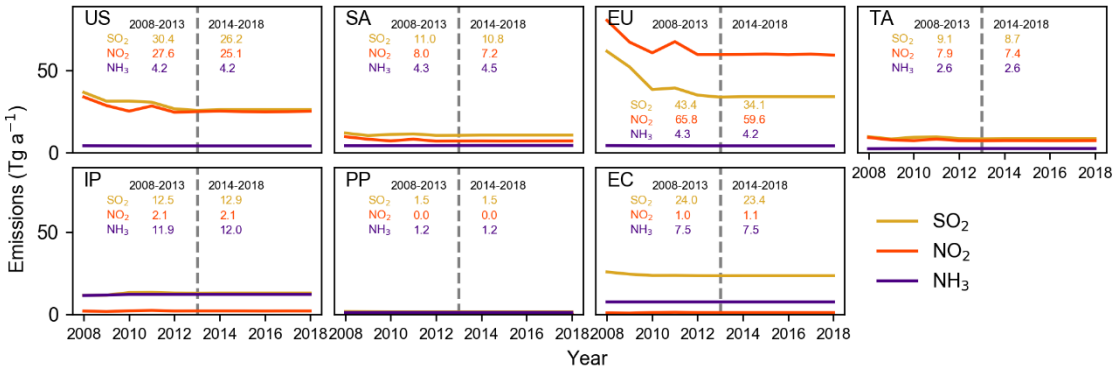

Figure S2. Annual anthropogenic emissions of NH_3, NO_2 and SO_2 from BUE1 for the seven selected regions between 2008-2018. Average annual emissions (Tg a^{-1}) for 2008-2013 and 2014-2018 are inset.

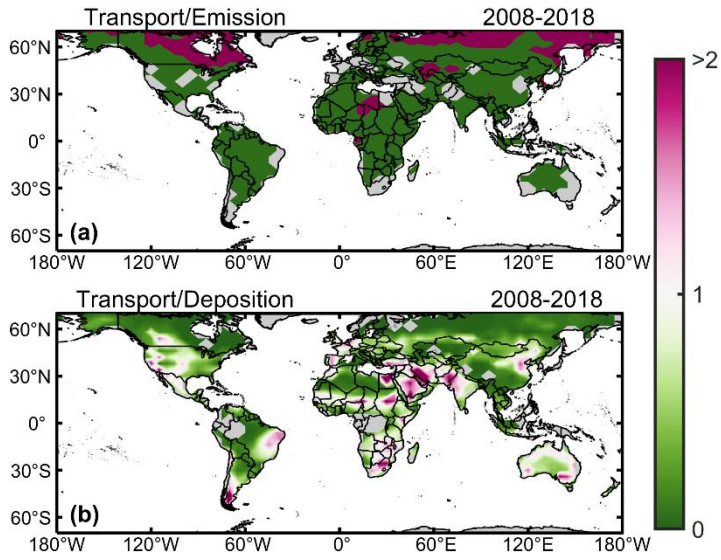

Figure S3. Spatial distribution of (a) positive transport to emission and (b) negative transport to deposition ratios during 2008-2018.

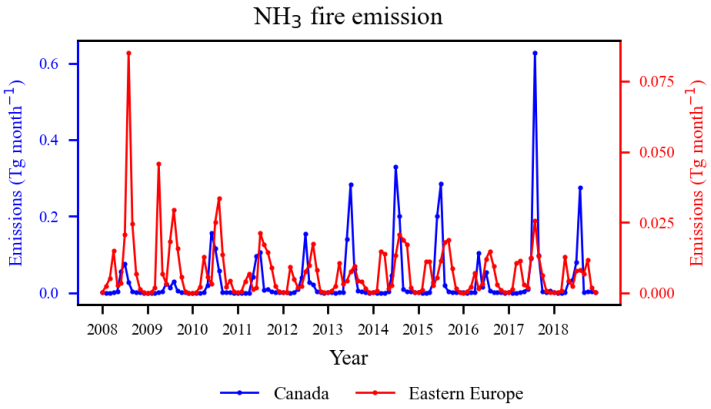

Figure S4. Monthly average of NH_3 fire emission over Canada ($\mathbf{130^{\circ} - 50}$°W, $\mathbf{48^{\circ} - 84}$°N) and eastern Europe ($\mathbf{10^{\circ} - 55}$°E, $\mathbf{36^{\circ} - 72}$°N) during 2008-2018. The emission data is from GFED4.

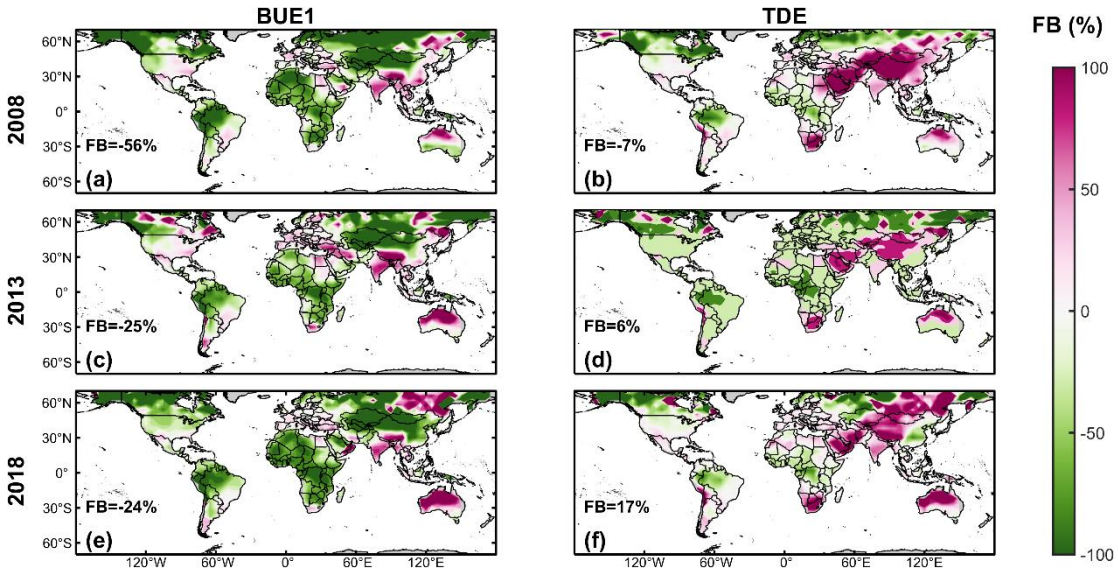

Figure S5. Fractional biases (FBs) of simulated NH_3 column densities from GEOS-Chem simulations driven by (a, c, e) BUE1 and (b, d, f) TDE for the year (a-b) 2008, (d-e) 2013 and (g-h) 2018, against IASI observations. Global average FBs (%) for each year are inset.

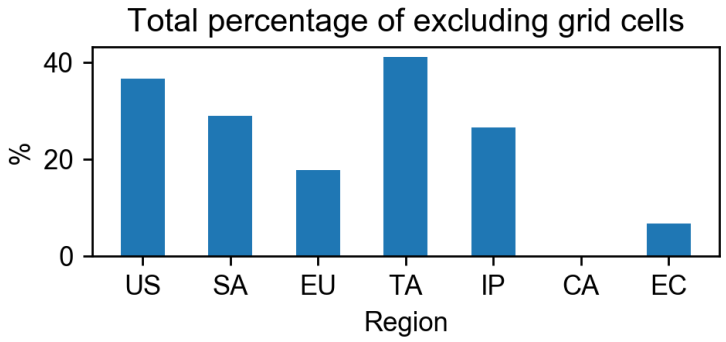

Figure S6. Total percentages of excluding grid cells for seven selected regions between 2008-2018.