



Supplement of

Global nitrogen and sulfur deposition mapping using a measurement–model fusion approach

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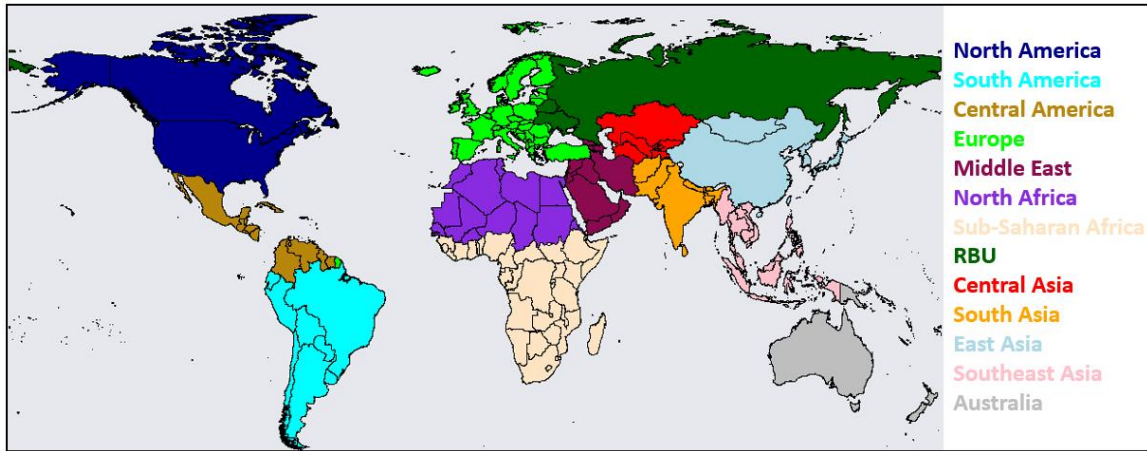


Figure S1. A world map showing the regions used to calculate the totals presented in Table 1. This figure is adapted from Tan et al., 2018, based on their region divisions. RBU is Russia, Belarus, Ukraine.

Table S1. 2010 adjusted global wet and dry deposition in Tg N or Tg S. MMM indicates Tan et al.'s 2018 multi-model mean and MMF is this measurement-model fusion work with a 1° interpolation distance. Total N deposition is 112.02 Tg N and total S deposition is 88.60 Tg S. Coastal means deposition on sea within 1 degree of the coastline. RBU is an abbreviation for Russia, Belarus, and Ukraine. Open ocean does not include near-land “coastal” waters. The regions can be seen in the world map in Figure S1. Regional changes greater than or equal to 10% are bolded and italicized.

	Non-Coastal		Coastal		Non-Coastal		Coastal		Non-Coastal		Coastal	
	MMM	MMF	MMM	MMF	MMM	MMF	MMM	MMF	MMM	MMF	MMM	MMF
Region	Total NH _x				Total NO _y				Total SO _x			
North America	3.40	3.50	0.40	0.30	4.40	4.44	0.80	0.90	4.70	5.66	1.30	1.68
Europe	2.50	2.67	0.80	1.14	2.60	2.42	1.20	1.75	2.70	2.51	1.50	3.18
South Asia	8.60	8.60	1.00	1.00	3.60	3.60	0.70	0.70	3.70	3.70	1.00	1.00
East Asia	6.70	6.71	1.00	1.04	8.30	7.90	2.20	2.44	11.20	11.89	2.90	4.09
Southeast Asia	3.20	2.25	1.60	2.12	1.90	1.10	1.40	1.44	2.40	0.81	2.80	0.56
Australia	0.40	0.40	0.40	0.40	0.60	0.60	0.40	0.40	1.00	1.00	1.50	1.50
North Africa	0.70	0.70	0.20	0.20	1.40	1.40	0.40	0.40	1.00	1.00	0.50	0.50
Sub-Saharan Africa	3.40	3.40	0.40	0.40	4.70	4.70	0.60	0.60	2.70	2.70	0.70	0.70
Middle East	0.50	0.38	0.10	0.10	1.40	1.40	0.30	0.30	1.70	3.18	0.60	0.60
Central America	1.40	1.40	0.60	0.60	1.20	1.20	0.80	0.80	1.40	1.40	1.40	1.40
South America	3.80	3.80	0.30	0.30	3.40	3.40	0.30	0.30	2.40	2.40	0.60	0.60
RBU	1.80	1.66	0.30	0.08	2.40	2.12	0.50	0.46	3.60	5.10	0.90	1.17
Central Asia	0.50	0.50	0.00	0.00	0.60	0.60	0.00	0.00	1.20	1.87	0.10	0.10
Antarctica	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00	1.40	1.40	0.00	0.00
Continental	37.00	36.07	7.10	7.68	36.70	34.98	9.70	10.49	41.00	44.62	15.60	17.08
Open Oceans	9.90	9.90			12.90	12.90			26.90	26.90		
Global	46.90	45.97	7.10	7.68	49.60	47.88	9.70	10.49	67.90	71.52	15.60	17.08

Table S2. 2010 adjusted global wet and dry deposition in Tg N or Tg S. MMM indicates Tan et al.’s 2018 multi-model mean and MMF is this measurement-model fusion work with a 5° interpolation distance. Total N deposition is 120.36 Tg N and total S deposition is 89.93 Tg S. Coastal means deposition on sea within 1 degree of the coastline. RBU is an abbreviation for Russia, Belarus, and Ukraine. Open ocean does not include near-land “coastal” waters. The regions can be seen in the world map in Figure S1. Regional changes greater than or equal to 10% are bolded and italicized.

	Non-Coastal		Coastal		Non-Coastal		Coastal		Non-Coastal		Coastal	
	MMM	MMF	MMM	MMF	MMM	MMF	MMM	MMF	MMM	MMF	MMM	MMF
Region	Total NH _x				Total NO _y				Total SO _x			
North America	3.40	3.66	0.40	0.30	4.40	4.54	0.80	0.90	4.70	5.67	1.30	1.69
Europe	2.50	2.68	0.80	1.14	2.60	2.42	1.20	1.75	2.70	2.51	1.50	3.18
South Asia	8.60	8.60	1.00	1.00	3.60	3.60	0.70	0.70	3.70	3.70	1.00	1.00
East Asia	6.70	5.96	1.00	1.04	8.30	6.80	2.20	2.44	11.20	11.89	2.90	4.10
Southeast Asia	3.20	1.25	1.60	2.12	1.90	0.60	1.40	1.44	2.40	0.81	2.80	0.57
Australia	0.40	0.40	0.40	0.40	0.60	0.60	0.40	0.40	1.00	1.00	1.50	1.50
North Africa	0.70	0.70	0.20	0.20	1.40	1.40	0.40	0.40	1.00	1.00	0.50	0.50
Sub-Saharan Africa	3.40	3.40	0.40	0.40	4.70	4.70	0.60	0.60	2.70	2.70	0.70	0.70
Middle East	0.50	0.38	0.10	0.10	1.40	1.11	0.30	0.30	1.70	3.18	0.60	0.60
Central America	1.40	1.40	0.60	0.60	1.20	1.20	0.80	0.80	1.40	1.40	1.40	1.40
South America	3.80	3.80	0.30	0.30	3.40	3.40	0.30	0.30	2.40	2.40	0.60	0.60
RBU	1.80	1.08	0.30	0.77	2.40	1.36	0.50	0.50	3.60	5.10	0.90	1.17
Central Asia	0.50	0.32	0.00	0.00	0.60	0.60	0.00	0.00	1.20	1.86	0.10	0.10
Antarctica	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00	1.40	1.40	0.00	0.00
Continental	37.00	33.73	7.10	8.37	36.70	32.43	9.70	10.53	41.00	44.62	15.60	17.11
Open Oceans	9.90	16.00			12.90	19.30			26.90	28.20		
Global	46.90	49.73	7.10	8.37	49.60	51.73	9.70	10.53	67.90	72.82	15.60	17.11

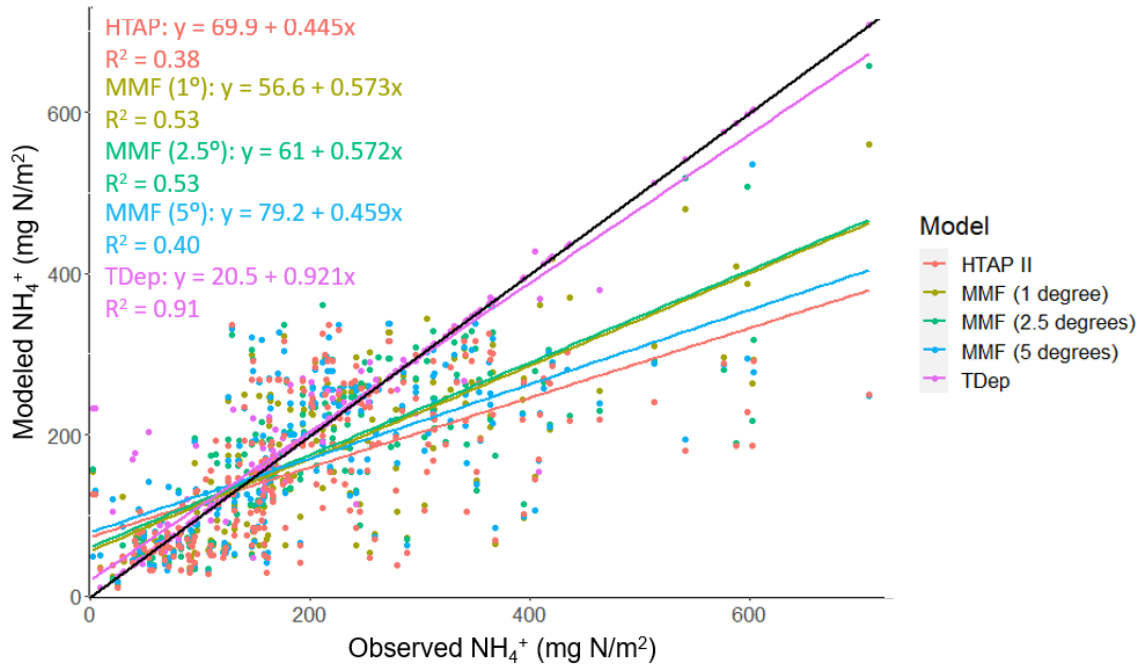


Figure S2. Observed and modeled wet NH_4^+ deposition in the US in 2010. Each NADP/NTN wet deposition measurement and the associated HTAP II, TDep, or MMF NH_4 wet deposition value. The black line is the 1:1 line.

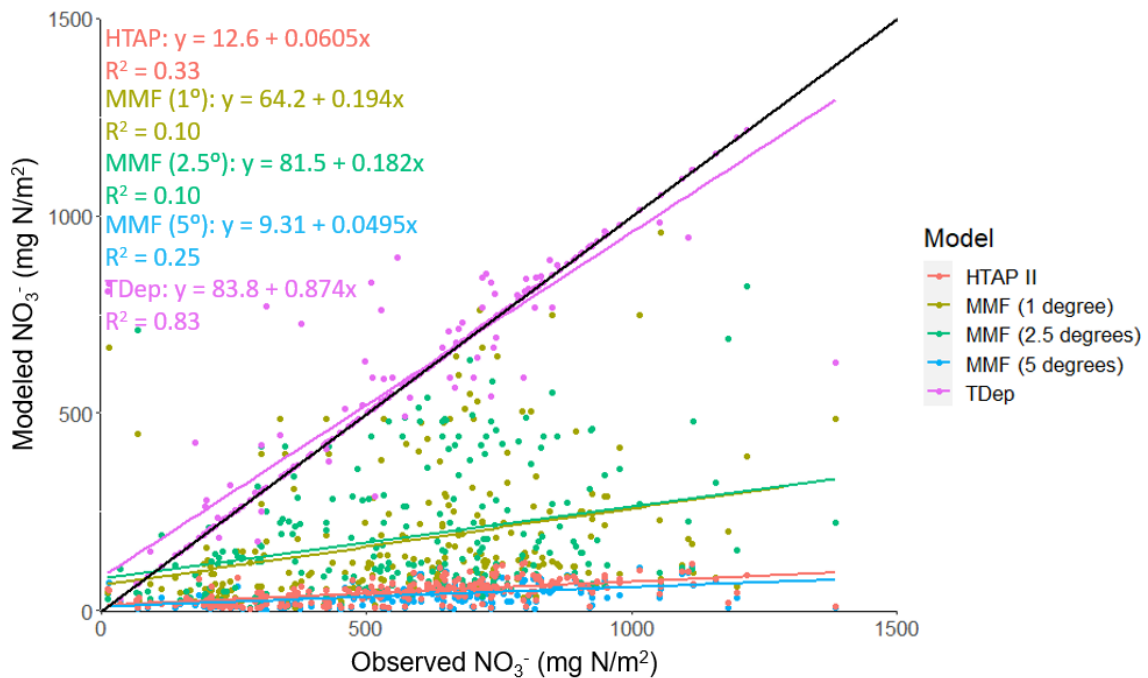


Figure S3. Observed and modeled wet NO_3^- deposition in the US in 2010. Each NADP/NTN wet deposition measurement and the associated HTAP II, TDep, or MMF NO_3 wet deposition value. The black line is the 1:1 line.

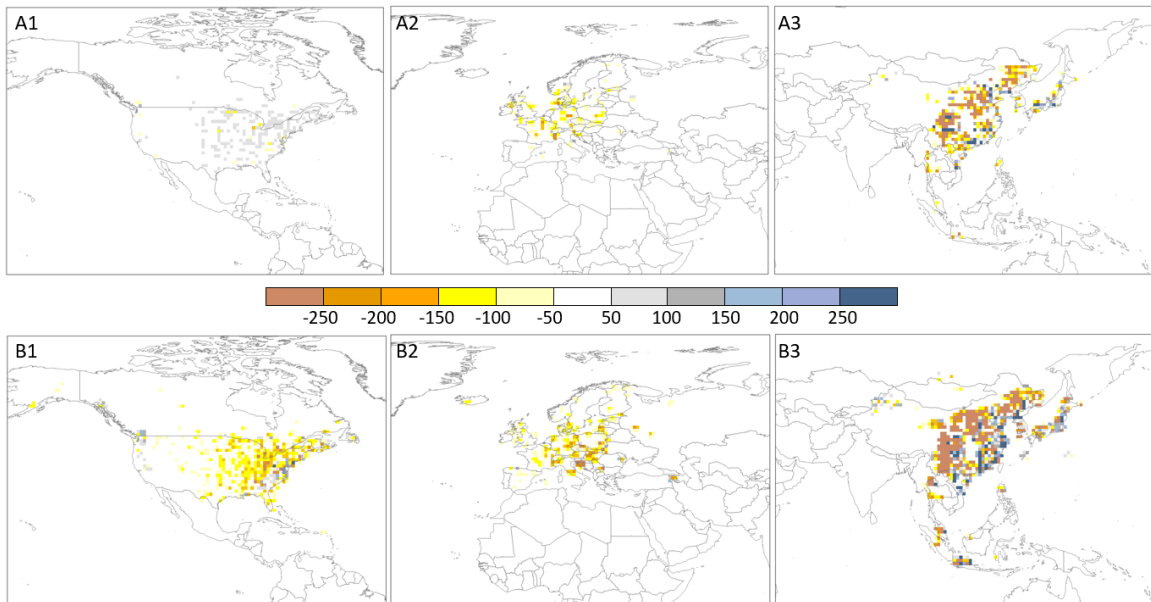


Figure S4. The difference between MMF and MMM deposition with a 1-degree interpolation distance. A) MMF minus MMM reactive nitrogen deposition in North America (A1) Europe (A2) and East Asia (A3) in mg/m². B) MMF minus MMM sulfate deposition in North America (B1) Europe (B2) and East Asia (B3) in mg/m².

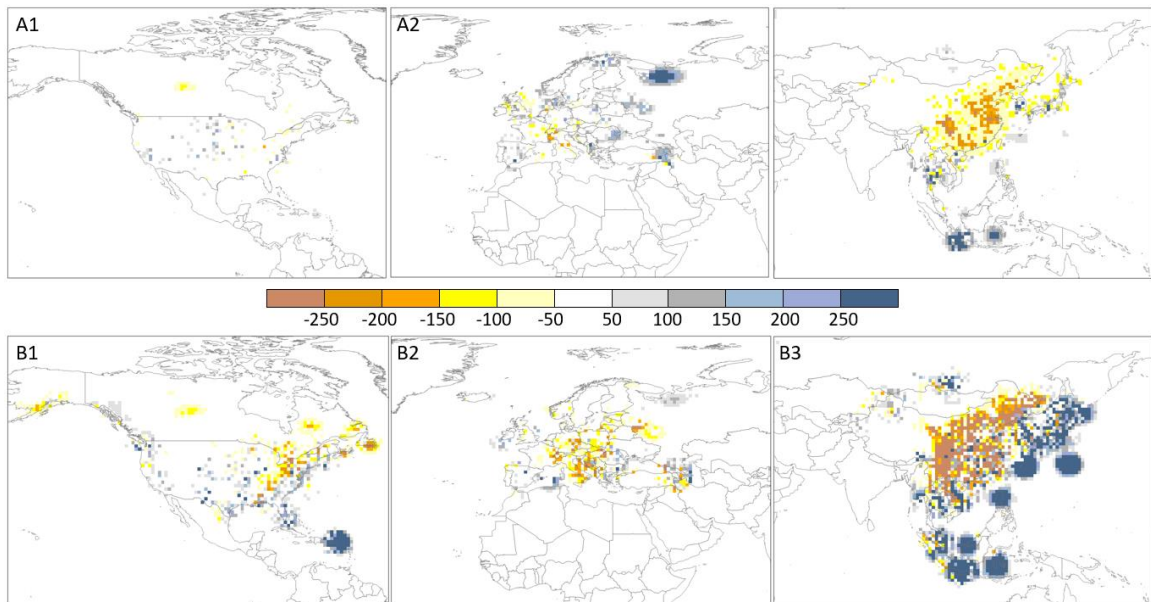


Figure S5. The difference between MMF and MMM deposition with a 5-degree interpolation distance. A) MMF minus MMM reactive nitrogen deposition in North America (A1) Europe (A2) and East Asia (A3) in mg/m². B) MMF minus MMM sulfate deposition in North America (B1) Europe (B2) and East Asia (B3) in mg/m².

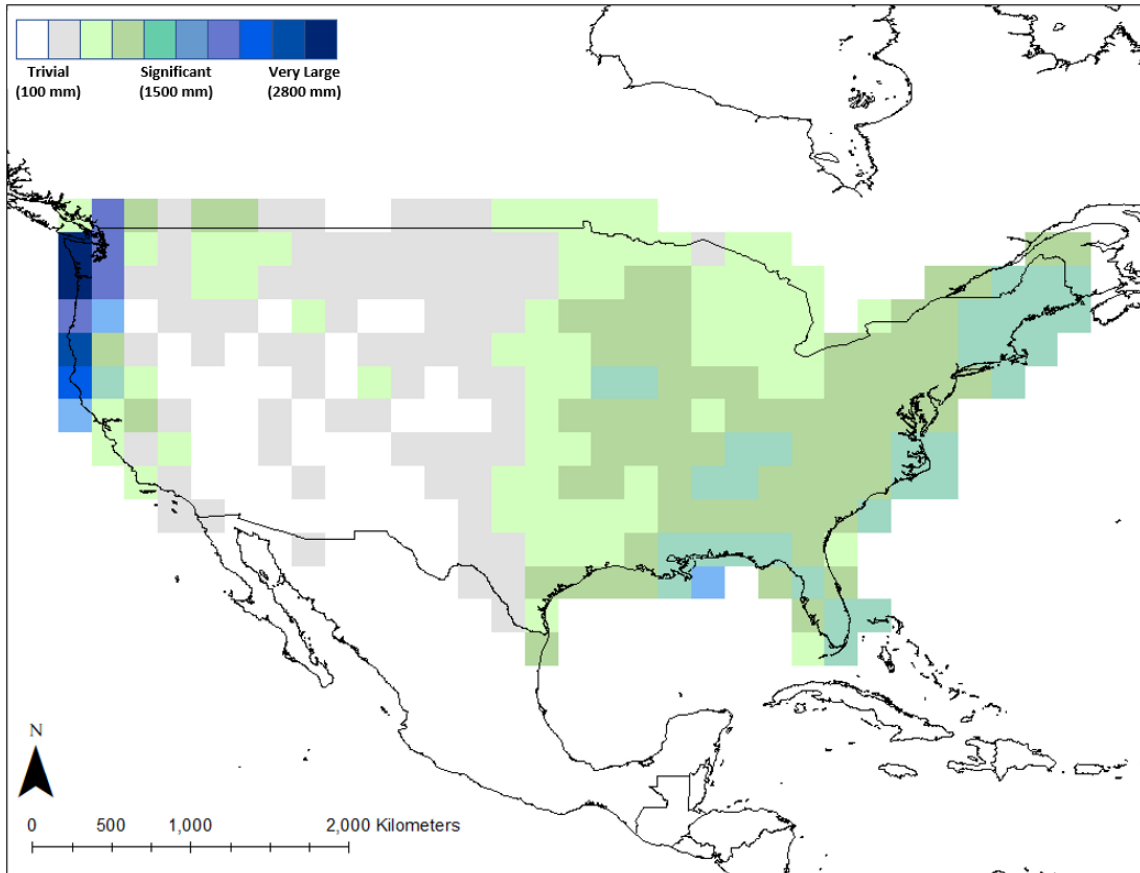


Figure S6. The difference between aggregated PRISM precipitation (1.9x1.9 degree) and modeled CAM-chem precipitation (1.9x1.9 degree) over the US in 2010. The greatest differences are in coastal areas.