Supplement of

Seasonal and interannual variability of atmospheric ammonia over Guatemala driven by land use, biomass burning, and meteorological circulation

Christian Saravia et al.

Correspondence to: Christian Saravia (saravchr@b-tu.de)

Table S1: Annual means of NH_3 emission over Guatemala from IASI A, B and C.

Year	Annual Mean	Min	Max	Std
2015	4.45×10^{15}	3.75×10^{15}	7.46×10^{15}	1.00×10^{15}
2016	5.46×10^{15}	3.32×10^{15}	1.53×10^{16}	3.19×10^{15}
2017	4.32×10^{15}	3.68×10^{15}	5.79×10^{15}	6.02×10^{14}
2018	4.12×10^{15}	3.12×10^{15}	5.08×10^{15}	5.34×10^{14}
2019	4.76×10^{15}	3.57×10^{15}	8.30×10^{15}	1.53×10^{15}
2020	6.67×10^{15}	3.57×10^{15}	2.34×10^{16}	5.63×10^{15}
2021	4.64×10^{15}	3.88×10^{15}	5.55×10^{15}	4.59×10^{14}
2022	4.80×10^{15}	4.10×10^{15}	7.14×10^{15}	7.87×10^{14}
2023	5.60×10^{15}	4.12×10^{15}	9.74×10^{15}	1.89×10^{15}

Table S2: Monthly means of NH_3 emission over Guatemala from IASI A, B and C.

Month	Monthly Mean	Min	Max	Std
Jan	4.21×10^{15}	6.94×10^{14}	1.63×10^{16}	2.04×10^{15}
Feb	3.59×10^{15}	5.17×10^{14}	1.14×10^{16}	1.7×10^{15}
Mar	3.76×10^{15}	6.77×10^{14}	1.07×10^{16}	1.76×10^{15}
Apr	1.01×10^{16}	1.38×10^{15}	2.33×10^{16}	4.43×10^{15}

May	9.8×10^{15}	1.8×10^{15}	2.72×10^{16}	4.49×10^{15}
Jun	5.77×10^{15}	5.09×10^{15}	2.74×10^{16}	3.2×10^{15}
Jul	3.81×10^{15}	1.24×10^{14}	1.62×10^{16}	2.08×10^{15}
Aug	3.61×10^{15}	1.42×10^{14}	1.55×10^{16}	1.99×10^{15}
Sep	4.08×10^{15}	1.42×10^{14}	2.15×10^{16}	2.39×10^{15}
Oct	4.25×10^{15}	8.78×10^{13}	1.48×10^{16}	2.3×10^{15}
Nov	4.35×10^{15}	3.2×10^{14}	1.91×10^{16}	2.39×10^{15}
Dec	4.22×10^{15}	2.56×10^{14}	1.58×10^{16}	2.17×10^{15}

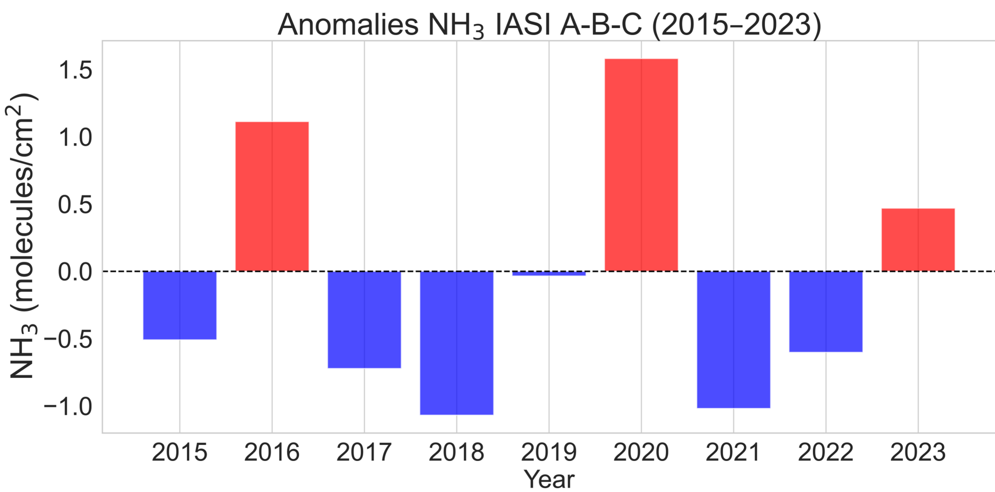

Figure S1: Anomalies of NH_3 ($\times 10^{16}$ molecules/cm^2) during the long-term mean, from IASI A, B and C.

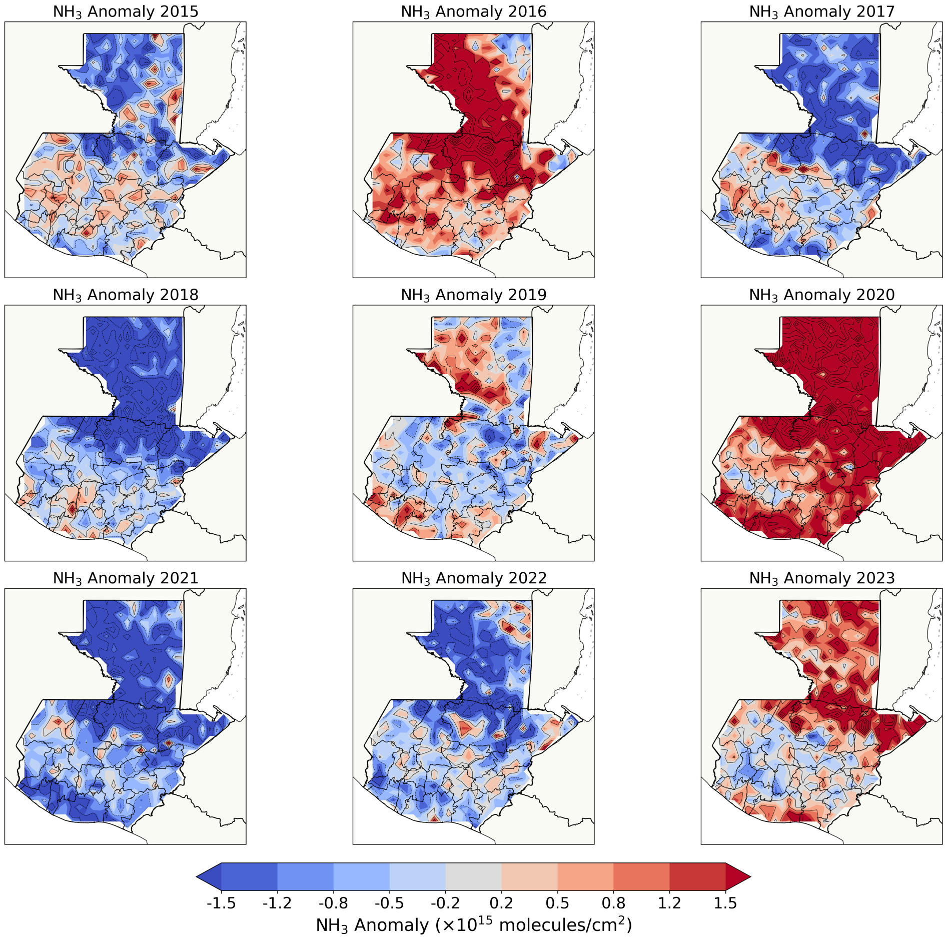

Figure S2: Annual area-wide of NH_3 anomalies ($\times 10^{15}$ molecules/cm^2) over Guatemala for the 2015–2023 period, from IASI A, B and C.

Table S3: Summary statistics of detected fires over Guatemala from MODIS filtered by a nominal confidence level >70% and fire radiative power >40 MW. The annual mean column refers to the mean monthly fire counts per year, while minimum and maximum values correspond to the lowest and highest monthly fire counts observed within each year.

Year	Annual Mean	Min	Max	Std
2015	137	2	817	234.3
2016	162	2	659	227.1
2017	149	1	947	269.8
2018	77	1	383	111.5
2019	133	1	741	219.4
2020	142	1	957	282.1
2021	82	1	400	118.2
2022	73	2	247	92.0

2023	119	2	564	170.6

Table S4: Summary statistics of detected fires over Guatemala from MODIS filtered by a nominal confidence level >70% and fire radiative power >40 MW. The monthly mean column refers to the mean monthly fire counts per month, while minimum and maximum values correspond to the lowest and highest monthly fire counts observed within each month.

Month	Monthly Mean	Min	Max	Std
Jan	78	50	114	22.8
Feb	105	63	144	25.2
Mar	211	110	305	76.9
Apr	635	247	957	255.0
May	261	147	509	116.1
Jun	15	1	69	23.0
Jul	4	1	8	2.4
Aug	5	1	11	3.1
Sep	3	1	5	1.4
Oct	4	1	8	2.4
Nov	15	10	19	3.5
Dec	46	27	64	10.9

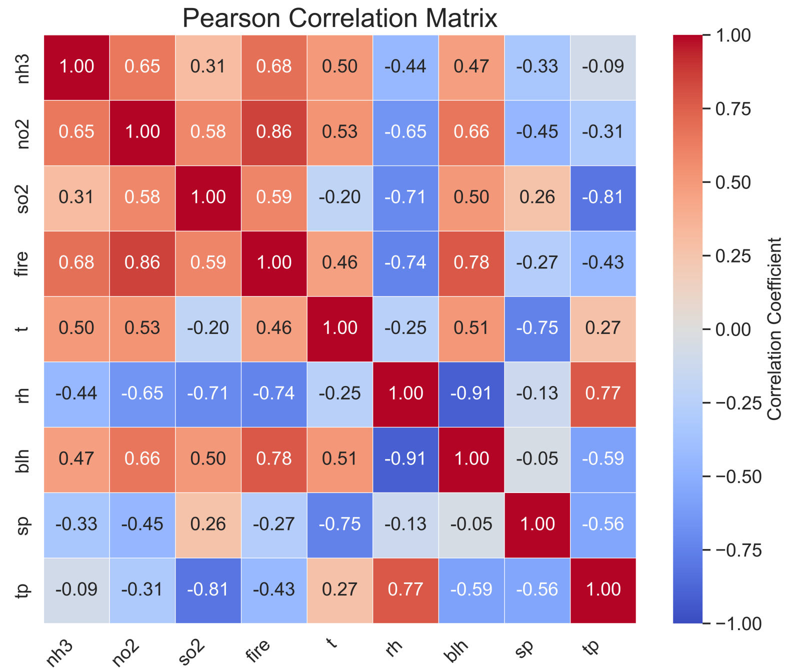

Figure S3: Pearson correlation matrix of NH_3 and different variables: fires, temperature (t, °C), relative humidity (rh, %), boundary layer height (blh), surface pressure (sp), total precipitation (tp), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2).

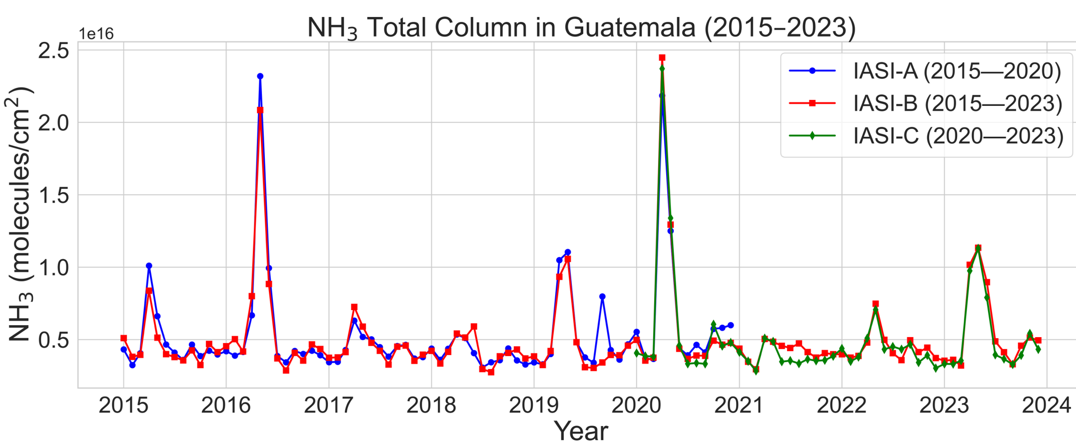

Figure S4: Monthly distribution of NH_3 (× 10^{16} molecules/cm^2) from IASI A, B and C over Guatemala (2015–2023).

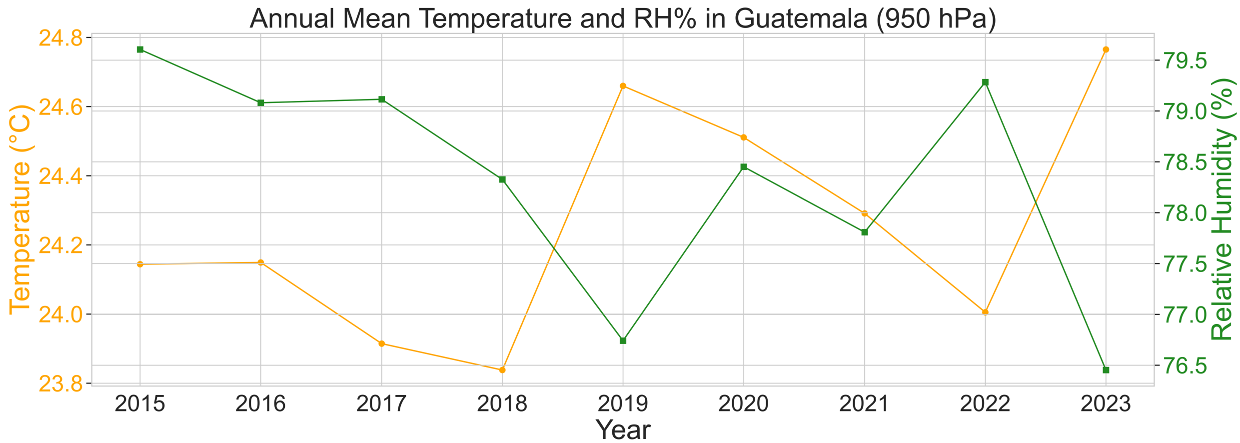

Figure S5: Annual distribution of temperature (°C) and relative humidity (%) from ERA5 over Guatemala (2015–2023).

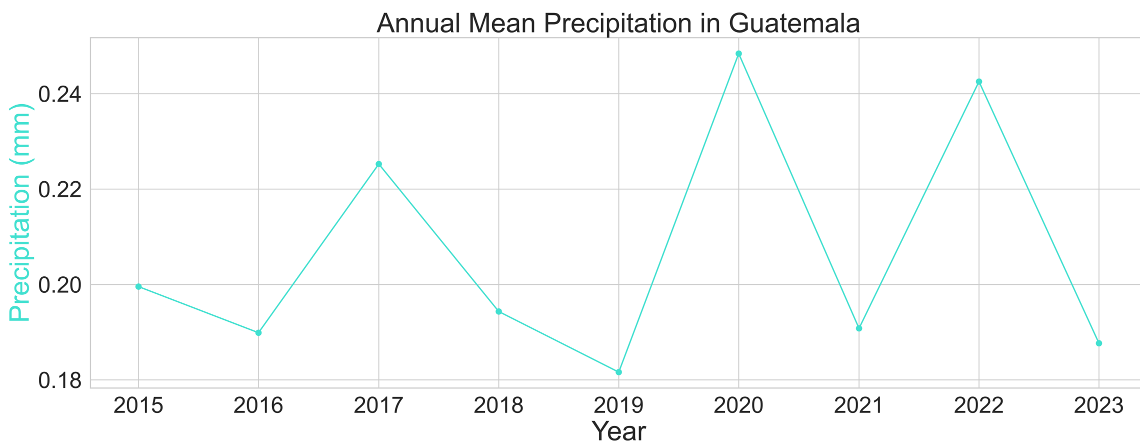

Figure S6: Annual distribution of total precipitation (mm) from ERA5 over Guatemala (2015–2023).