PyCAMA report generated by tropl2-proc

tropl2-proc

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1 Short Introduction

1.1 The list of parameters

You may want to keep the list given in table 1 at hand when viewing the results.

2 Definitions

The averages shown here are *unweighed* averages:

$$\overline{x} = \frac{1}{N}\sum_{i=1}^{N} x_i \tag{1}$$

with N the number of observations in the dataset.

The spread of the measurements is indicated with the variance $V(x)$, or rather the standard deviation $\sigma(x) = \sqrt{V(x)}$.

$$V(x) = \frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2 \tag{2}$$

We also report the more robust statistics median, minimum, maximum, various percentiles and inter quartile range.

The median m is the value of parameter x for which half of the observations of x is smaller than m:

$$P(x \leq m) = P(x \geq m) = \int_{-\infty}^{m} f(x)\,\mathrm{d}x = \frac{1}{2} \tag{3}$$

with $f(x)$ the probability density function.

The median is a special case of a percentile. Instead of ½ in equation 3, other threshold values can be used. We report results for 1 %, 5 %, 10 %, 15.9 %, 25 %, 75 %, 84.1 %, 90 %, 95 % and 99 %. The inter quartile range is the difference between the 75 % and 25 % percentiles. Similarly the minimum and maximum values correspond to the 0 % and 100 % percentiles respectively.

For normally distributed parameters the mean and median are the same, while the $\mu \pm \sigma$ values and the 15.9 % and 84.1 % percentiles coincide.

To get a measure for the relation of one variable $x_{(k)}$ with another $x_{(l)}$, we calculate the covariance matrix C_{kl}.

$$C_{kl} = C(x_{(k)}, x_{(l)}) = \frac{1}{N-1}\sum_{i=1}^{N}(x_{(k),i} - \overline{x_{(k)}})(x_{(l),i} - \overline{x_{(l)}}) \tag{4}$$

Rather than a dimensionally dependent covariance, it is often easier to interpret a correlation matrix R_{kl}, a matrix of Pearson's r coefficients:

$$R_{kl} = R(x_{(k)}, x_{(l)}) = \frac{C_{kl}}{\sqrt{C_{kk}C_{ll}}} = \frac{C_{kl}}{\sqrt{V(x_k)V(x_l)}} \tag{5}$$

The diagonal elements of the covariance matrix are the variances of the elements, $V(x_{(k)}) = C_{kk}$ and obviously $R_{kk} = 1$.

Table 1: Parameterlist and basic statistics for the analysis

Variable	mean $\pm\sigma$	Count	Mode	IQR	Median	Minimum	Maximum
qa value [1]	0.735 ± 0.283	24127665	0.995	0.270	0.740	0.0	1.000
nitrogendioxide tropospheric column [mol m^{-2}]	$(4.636 \pm 26.169) \times 10^{-6}$	24127665	9.253×10^{-6}	1.146×10^{-5}	3.707×10^{-6}	-4.722×10^{-3}	1.512×10^{-2}
nitrogendioxide tropospheric column precision [mol m^{-2}]	$(9.645 \pm 242.826) \times 10^{-6}$	24127665	6.763×10^{-6}	4.340×10^{-6}	7.125×10^{-6}	3.098×10^{-6}	0.459
air mass factor troposphere [1]	2.36 ± 1.17	24127665	1.74	1.63	2.07	9.118×10^{-3}	8.08
air mass factor total [1]	3.70 ± 2.26	24127665	2.10	1.86	2.85	0.376	15.5
number of spectral points in retrieval [1]	304 ± 1	24127665	304	1.000	304	234	305
number of iterations [1]	3.96 ± 1.17	24127665	4.22	1.000	4.00	2.00	10.00
wavelength calibration offset [nm]	$(-1.500 \pm 6.020) \times 10^{-3}$	24127665	-8.000×10^{-4}	4.844×10^{-3}	-1.205×10^{-3}	-6.789×10^{-2}	6.462×10^{-2}
nitrogendioxide stratospheric column [mol/m^2]	$(5.538 \pm 2.279) \times 10^{-5}$	24127665	3.050×10^{-5}	4.036×10^{-5}	5.355×10^{-5}	1.231×10^{-5}	1.251×10^{-4}
nitrogendioxide stratospheric column precision [mol/m^2]	$(3.321 \pm 0.000) \times 10^{-6}$	24127665	3.350×10^{-6}	0.0	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}
nitrogendioxide total column [mol/m^2]	$(6.111 \pm 2.328) \times 10^{-5}$	24127665	8.111×10^{-5}	4.119×10^{-5}	6.364×10^{-5}	2.222×10^{-6}	8.575×10^{-4}
nitrogendioxide total column precision [mol/m^2]	$(1.270 \pm 0.460) \times 10^{-5}$	24127665	1.622×10^{-5}	7.806×10^{-6}	1.320×10^{-5}	1.393×10^{-6}	2.816×10^{-4}
nitrogendioxide summed total column [mol/m^2]	$(6.002 \pm 3.115) \times 10^{-5}$	24127665	8.111×10^{-5}	3.954×10^{-5}	6.138×10^{-5}	-4.683×10^{-3}	1.518×10^{-2}
nitrogendioxide summed total column precision [mol/m^2]	$(1.039 \pm 24.282) \times 10^{-5}$	24127665	7.415×10^{-6}	3.961×10^{-6}	7.861×10^{-6}	4.542×10^{-6}	0.459
chi square [1]	532 ± 639	24127665	312	219	385	146	9.683×10^4
root mean square error of fit [1]	$(4.082 \pm 2.774) \times 10^{-4}$	24127665	5.130×10^{-4}	3.369×10^{-4}	3.485×10^{-4}	8.660×10^{-5}	6.490×10^{-3}
air mass factor stratosphere [1]	3.86 ± 2.35	24127665	2.10	1.84	2.97	1.90	15.7

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	4.000×10^{-2}	7.000×10^{-2}	0.220	0.350	0.730	1.000	1.000	1.000	1.000	1.000
nitrogendioxide tropospheric column [mol m^{-2}]	-4.278×10^{-5}	-1.508×10^{-5}	-7.941×10^{-6}	-4.495×10^{-6}	-1.526×10^{-6}	9.931×10^{-6}	1.374×10^{-5}	1.782×10^{-5}	2.511×10^{-5}	5.448×10^{-5}
nitrogendioxide tropospheric column precision [mol m^{-2}]	3.394×10^{-6}	3.691×10^{-6}	4.117×10^{-6}	4.681×10^{-6}	5.512×10^{-6}	9.851×10^{-6}	1.228×10^{-5}	1.520×10^{-5}	2.069×10^{-5}	4.148×10^{-5}
air mass factor troposphere [1]	0.401	0.823	1.09	1.29	1.52	3.15	3.61	4.01	4.57	5.61
air mass factor total [1]	1.71	1.94	2.01	2.09	2.24	4.10	5.43	6.99	9.01	11.9
number of spectral points in retrieval [1]	303	303	304	304	304	305	305	305	305	305
number of iterations [1]	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	8.00	8.00
wavelength calibration offset [nm]	-2.016×10^{-2}	-1.074×10^{-2}	-7.467×10^{-3}	-5.685×10^{-3}	-3.951×10^{-3}	8.931×10^{-4}	2.132×10^{-3}	3.873×10^{-3}	7.282×10^{-3}	1.715×10^{-2}
nitrogendioxide stratospheric column [mol/m^2]	2.160×10^{-5}	2.754×10^{-5}	2.953×10^{-5}	3.110×10^{-5}	3.413×10^{-5}	7.449×10^{-5}	8.185×10^{-5}	8.837×10^{-5}	9.425×10^{-5}	1.046×10^{-4}
nitrogendioxide stratospheric column precision [mol/m^2]	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}
nitrogendioxide total column [mol/m^2]	2.253×10^{-5}	2.847×10^{-5}	3.208×10^{-5}	3.511×10^{-5}	3.924×10^{-5}	8.043×10^{-5}	8.553×10^{-5}	8.950×10^{-5}	9.407×10^{-5}	1.054×10^{-4}
nitrogendioxide total column precision [mol/m^2]	4.836×10^{-6}	6.205×10^{-6}	7.071×10^{-6}	7.702×10^{-6}	8.534×10^{-6}	1.634×10^{-5}	1.733×10^{-5}	1.809×10^{-5}	1.902×10^{-5}	2.156×10^{-5}
nitrogendioxide summed total column [mol/m^2]	1.460×10^{-5}	2.658×10^{-5}	3.106×10^{-5}	3.454×10^{-5}	3.922×10^{-5}	7.876×10^{-5}	8.376×10^{-5}	8.767×10^{-5}	9.221×10^{-5}	1.093×10^{-4}
nitrogendioxide summed total column precision [mol/m^2]	4.749×10^{-6}	4.965×10^{-6}	5.290×10^{-6}	5.739×10^{-6}	6.435×10^{-6}	1.040×10^{-5}	1.272×10^{-5}	1.556×10^{-5}	2.096×10^{-5}	4.162×10^{-5}
chi square [1]	221	249	268	286	309	528	620	764	1.201×10^3	3.215×10^3
root mean square error of fit [1]	1.181×10^{-4}	1.322×10^{-4}	1.443×10^{-4}	1.604×10^{-4}	1.941×10^{-4}	5.310×10^{-4}	6.143×10^{-4}	7.216×10^{-4}	9.268×10^{-4}	1.419×10^{-3}
air mass factor stratosphere [1]	2.02	2.07	2.13	2.21	2.36	4.20	5.60	7.26	9.49	12.6

Table 3: Parameterlist and basic statistics for the analysis for observations in the northern hemisphere

Variable	mean $\pm\sigma$	Count	IQR	Median	Minimum	Maximum	25 % percentile	75 % percentile
qa value [1]	0.707 ± 0.287	16004778	0.260	0.740	0.0	1.000	0.670	0.930
nitrogendioxide tropospheric column [mol m^{-2}]	$(4.271 \pm 30.305) \times 10^{-6}$	16004778	1.251×10^{-5}	3.228×10^{-6}	-2.830×10^{-3}	1.512×10^{-2}	-2.150×10^{-6}	1.036×10^{-5}
nitrogendioxide tropospheric column precision [mol m^{-2}]	$(9.799 \pm 297.764) \times 10^{-6}$	16004778	5.025×10^{-6}	6.998×10^{-6}	3.098×10^{-6}	0.459	4.978×10^{-6}	1.000×10^{-5}
air mass factor troposphere [1]	2.32 ± 1.20	16004778	1.79	1.95	9.118×10^{-3}	8.08	1.44	3.23
air mass factor total [1]	3.47 ± 2.12	16004778	1.64	2.67	0.376	13.8	2.13	3.78
number of spectral points in retrieval [1]	304 ± 1	16004778	1.000	304	234	305	304	305
number of iterations [1]	4.01 ± 1.10	16004778	1.000	4.00	3.00	10.00	3.00	4.00
wavelength calibration offset [nm]	$(-1.259 \pm 5.619) \times 10^{-3}$	16004778	4.421×10^{-3}	-9.681×10^{-4}	-6.789×10^{-2}	6.380×10^{-2}	-3.442×10^{-3}	9.791×10^{-4}
nitrogendioxide stratospheric column [mol/m^2]	$(6.707 \pm 1.904) \times 10^{-5}$	16004778	2.733×10^{-5}	6.712×10^{-5}	2.608×10^{-5}	1.251×10^{-4}	5.379×10^{-5}	8.112×10^{-5}
nitrogendioxide stratospheric column precision [mol/m^2]	$(3.321 \pm 0.000) \times 10^{-6}$	16004778	0.0	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}
nitrogendioxide total column [mol/m^2]	$(7.341 \pm 1.796) \times 10^{-5}$	16004778	2.131×10^{-5}	7.615×10^{-5}	1.256×10^{-5}	8.575×10^{-4}	6.375×10^{-5}	8.506×10^{-5}
nitrogendioxide total column precision [mol/m^2]	$(1.508 \pm 0.356) \times 10^{-5}$	16004778	4.045×10^{-6}	1.553×10^{-5}	4.408×10^{-6}	1.718×10^{-4}	1.319×10^{-5}	1.724×10^{-5}
nitrogendioxide summed total column [mol/m^2]	$(7.134 \pm 3.097) \times 10^{-5}$	16004778	2.251×10^{-5}	7.386×10^{-5}	-2.768×10^{-3}	1.518×10^{-2}	6.065×10^{-5}	8.316×10^{-5}
nitrogendioxide summed total column precision [mol/m^2]	$(1.057 \pm 29.776) \times 10^{-5}$	16004778	4.556×10^{-6}	7.746×10^{-6}	4.542×10^{-6}	0.459	5.984×10^{-6}	1.054×10^{-5}
chi square [1]	555 ± 663	16004778	228	416	159	9.683×10^4	325	553
root mean square error of fit [1]	$(4.147 \pm 2.783) \times 10^{-4}$	16004778	3.595×10^{-4}	3.666×10^{-4}	8.660×10^{-5}	6.490×10^{-3}	1.854×10^{-4}	5.449×10^{-4}
air mass factor stratosphere [1]	3.65 ± 2.26	16004778	1.55	2.78	1.90	14.5	2.26	3.81

Table 4: Parameterlist and basic statistics for the analysis for observations in the southern hemisphere

Variable	mean $\pm\sigma$	Count	IQR	Median	Minimum	Maximum	25 % percentile	75 % percentile
qa value [1]	0.789 ± 0.267	8122887	0.260	0.740	0.0	1.000	0.740	1.000
nitrogendioxide tropospheric column [mol m^{-2}]	$(5.355 \pm 14.963) \times 10^{-6}$	8122887	9.678×10^{-6}	4.466×10^{-6}	-4.722×10^{-3}	1.892×10^{-3}	-3.158×10^{-7}	9.362×10^{-6}
nitrogendioxide tropospheric column precision [mol m^{-2}]	$(9.343 \pm 21.165) \times 10^{-6}$	8122887	3.449×10^{-6}	7.286×10^{-6}	3.585×10^{-6}	2.071×10^{-2}	6.109×10^{-6}	9.559×10^{-6}
air mass factor troposphere [1]	2.44 ± 1.10	8122887	1.26	2.22	2.192×10^{-2}	7.48	1.72	2.97
air mass factor total [1]	4.13 ± 2.45	8122887	2.15	3.22	0.981	15.5	2.53	4.69
number of spectral points in retrieval [1]	304 ± 1	8122887	1.000	304	242	305	304	305
number of iterations [1]	3.87 ± 1.31	8122887	1.000	4.00	2.00	9.00	3.00	4.00
wavelength calibration offset [nm]	$(-1.974 \pm 6.716) \times 10^{-3}$	8122887	5.607×10^{-3}	-1.770×10^{-3}	-6.446×10^{-2}	6.462×10^{-2}	-4.964×10^{-3}	6.424×10^{-4}
nitrogendioxide stratospheric column [mol/m^2]	$(3.235 \pm 0.538) \times 10^{-5}$	8122887	7.003×10^{-6}	3.185×10^{-5}	1.231×10^{-5}	5.042×10^{-5}	2.912×10^{-5}	3.612×10^{-5}
nitrogendioxide stratospheric column precision [mol/m^2]	$(3.321 \pm 0.000) \times 10^{-6}$	8122887	0.0	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}
nitrogendioxide total column [mol/m^2]	$(3.686 \pm 0.935) \times 10^{-5}$	8122887	1.012×10^{-5}	3.663×10^{-5}	2.222×10^{-6}	8.105×10^{-4}	3.152×10^{-5}	4.163×10^{-5}
nitrogendioxide total column precision [mol/m^2]	$(8.022 \pm 2.195) \times 10^{-6}$	8122887	2.081×10^{-6}	7.986×10^{-6}	1.393×10^{-6}	2.816×10^{-4}	6.921×10^{-6}	9.002×10^{-6}
nitrogendioxide summed total column [mol/m^2]	$(3.771 \pm 1.559) \times 10^{-5}$	8122887	1.183×10^{-5}	3.684×10^{-5}	-4.683×10^{-3}	1.927×10^{-3}	3.109×10^{-5}	4.293×10^{-5}
nitrogendioxide summed total column precision [mol/m^2]	$(1.004 \pm 2.111) \times 10^{-5}$	8122887	3.165×10^{-6}	8.007×10^{-6}	4.887×10^{-6}	2.071×10^{-2}	6.954×10^{-6}	1.012×10^{-5}
chi square [1]	485 ± 587	8122887	160	341	146	3.477×10^4	288	448
root mean square error of fit [1]	$(3.956 \pm 2.752) \times 10^{-4}$	8122887	2.776×10^{-4}	3.236×10^{-4}	9.436×10^{-5}	3.624×10^{-3}	2.055×10^{-4}	4.832×10^{-4}
air mass factor stratosphere [1]	4.28 ± 2.48	8122887	2.19	3.36	2.09	15.7	2.65	4.84

Table 5: Parameterlist and basic statistics for the analysis for observations over water

Variable	mean $\pm\sigma$	Count	IQR	Median	Minimum	Maximum	25 % percentile	75 % percentile
qa value [1]	0.743 ± 0.268	16052982	0.270	0.740	0.0	1.000	0.730	1.000
nitrogendioxide tropospheric column [mol m^{-2}]	$(3.582 \pm 14.109) \times 10^{-6}$	16052982	9.636×10^{-6}	3.285×10^{-6}	-4.722×10^{-3}	2.374×10^{-3}	-1.321×10^{-6}	8.315×10^{-6}
nitrogendioxide tropospheric column precision [mol m^{-2}]	$(8.281 \pm 13.464) \times 10^{-6}$	16052982	3.285×10^{-6}	6.758×10^{-6}	3.166×10^{-6}	2.071×10^{-2}	5.335×10^{-6}	8.621×10^{-6}
air mass factor troposphere [1]	2.48 ± 1.13	16052982	1.58	2.23	1.226×10^{-2}	7.48	1.67	3.26
air mass factor total [1]	3.77 ± 2.21	16052982	1.91	3.00	0.724	15.5	2.32	4.23
number of spectral points in retrieval [1]	304 ± 1	16052982	1.000	304	234	305	304	305
number of iterations [1]	3.98 ± 1.23	16052982	1.000	4.00	2.00	9.00	3.00	4.00
wavelength calibration offset [nm]	$(-1.544 \pm 5.766) \times 10^{-3}$	16052982	4.724×10^{-3}	-1.234×10^{-3}	-6.446×10^{-2}	6.191×10^{-2}	-3.915×10^{-3}	8.090×10^{-4}
nitrogendioxide stratospheric column [mol/m^2]	$(5.163 \pm 2.319) \times 10^{-5}$	16052982	4.117×10^{-5}	4.143×10^{-5}	1.231×10^{-5}	1.245×10^{-4}	3.219×10^{-5}	7.336×10^{-5}
nitrogendioxide stratospheric column precision [mol/m^2]	$(3.321 \pm 0.000) \times 10^{-6}$	16052982	0.0	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}
nitrogendioxide total column [mol/m^2]	$(5.574 \pm 2.268) \times 10^{-5}$	16052982	4.160×10^{-5}	4.817×10^{-5}	2.222×10^{-6}	3.488×10^{-4}	3.627×10^{-5}	7.787×10^{-5}
nitrogendioxide total column precision [mol/m^2]	$(1.161 \pm 0.438) \times 10^{-5}$	16052982	7.895×10^{-6}	1.034×10^{-5}	1.393×10^{-6}	1.026×10^{-4}	7.910×10^{-6}	1.581×10^{-5}
nitrogendioxide summed total column [mol/m^2]	$(5.521 \pm 2.405) \times 10^{-5}$	16052982	4.047×10^{-5}	4.956×10^{-5}	-4.683×10^{-3}	2.484×10^{-3}	3.620×10^{-5}	7.666×10^{-5}
nitrogendioxide summed total column precision [mol/m^2]	$(9.061 \pm 13.371) \times 10^{-6}$	16052982	2.954×10^{-6}	7.529×10^{-6}	4.588×10^{-6}	2.071×10^{-2}	6.285×10^{-6}	9.239×10^{-6}
chi square [1]	504 ± 515	16052982	210	390	146	6.073×10^4	314	524
root mean square error of fit [1]	$(4.026 \pm 2.646) \times 10^{-4}$	16052982	3.226×10^{-4}	3.466×10^{-4}	9.171×10^{-5}	6.490×10^{-3}	2.014×10^{-4}	5.240×10^{-4}
air mass factor stratosphere [1]	3.89 ± 2.27	16052982	1.92	3.10	2.00	15.7	2.42	4.33

Table 6: Parameterlist and basic statistics for the analysis for observations over land

Variable	mean $\pm\sigma$	Count	IQR	Median	Minimum	Maximum	25 % percentile	75 % percentile
qa value [1]	0.716 ± 0.316	5808306	0.270	0.740	0.0	1.000	0.730	1.000
nitrogendioxide tropospheric column [mol m^{-2}]	$(4.677 \pm 37.708) \times 10^{-6}$	5808306	1.546×10^{-5}	4.519×10^{-6}	-8.968×10^{-4}	1.512×10^{-2}	-2.399×10^{-6}	1.306×10^{-5}
nitrogendioxide tropospheric column precision [mol m^{-2}]	$(1.145 \pm 48.700) \times 10^{-5}$	5808306	5.604×10^{-6}	7.994×10^{-6}	3.098×10^{-6}	0.459	5.789×10^{-6}	1.139×10^{-5}
air mass factor troposphere [1]	2.25 ± 1.23	5808306	1.65	1.82	9.123×10^{-3}	8.08	1.37	3.02
air mass factor total [1]	3.63 ± 2.39	5808306	1.67	2.61	0.399	15.2	2.14	3.81
number of spectral points in retrieval [1]	304 ± 1	5808306	1.000	304	237	305	304	305
number of iterations [1]	3.92 ± 1.04	5808306	1.000	4.00	3.00	10.00	3.00	4.00
wavelength calibration offset [nm]	$(-1.298 \pm 6.325) \times 10^{-3}$	5808306	4.826×10^{-3}	-1.013×10^{-3}	-6.789×10^{-2}	6.462×10^{-2}	-3.761×10^{-3}	1.065×10^{-3}
nitrogendioxide stratospheric column [mol/m^2]	$(6.337 \pm 2.030) \times 10^{-5}$	5808306	2.799×10^{-5}	6.385×10^{-5}	1.381×10^{-5}	1.251×10^{-4}	4.903×10^{-5}	7.702×10^{-5}
nitrogendioxide stratospheric column precision [mol/m^2]	$(3.321 \pm 0.000) \times 10^{-6}$	5808306	0.0	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}	3.321×10^{-6}
nitrogendioxide total column [mol/m^2]	$(7.080 \pm 1.918) \times 10^{-5}$	5808306	2.276×10^{-5}	7.384×10^{-5}	8.985×10^{-6}	8.575×10^{-4}	6.029×10^{-5}	8.306×10^{-5}
nitrogendioxide total column precision [mol/m^2]	$(1.464 \pm 0.378) \times 10^{-5}$	5808306	4.304×10^{-6}	1.511×10^{-5}	3.101×10^{-6}	2.448×10^{-4}	1.260×10^{-5}	1.690×10^{-5}
nitrogendioxide summed total column [mol/m^2]	$(6.805 \pm 3.789) \times 10^{-5}$	5808306	2.448×10^{-5}	7.080×10^{-5}	-8.425×10^{-4}	1.518×10^{-2}	5.622×10^{-5}	8.070×10^{-5}
nitrogendioxide summed total column precision [mol/m^2]	$(1.216 \pm 48.700) \times 10^{-5}$	5808306	5.193×10^{-6}	8.656×10^{-6}	4.542×10^{-6}	0.459	6.674×10^{-6}	1.187×10^{-5}
chi square [1]	574 ± 821	5808306	228	370	159	9.683×10^4	300	528
root mean square error of fit [1]	$(4.256 \pm 3.070) \times 10^{-4}$	5808306	3.909×10^{-4}	3.598×10^{-4}	8.660×10^{-5}	6.061×10^{-3}	1.720×10^{-4}	5.629×10^{-4}
air mass factor stratosphere [1]	3.86 ± 2.57	5808306	1.63	2.74	1.90	15.3	2.29	3.92

3 Granule outlines

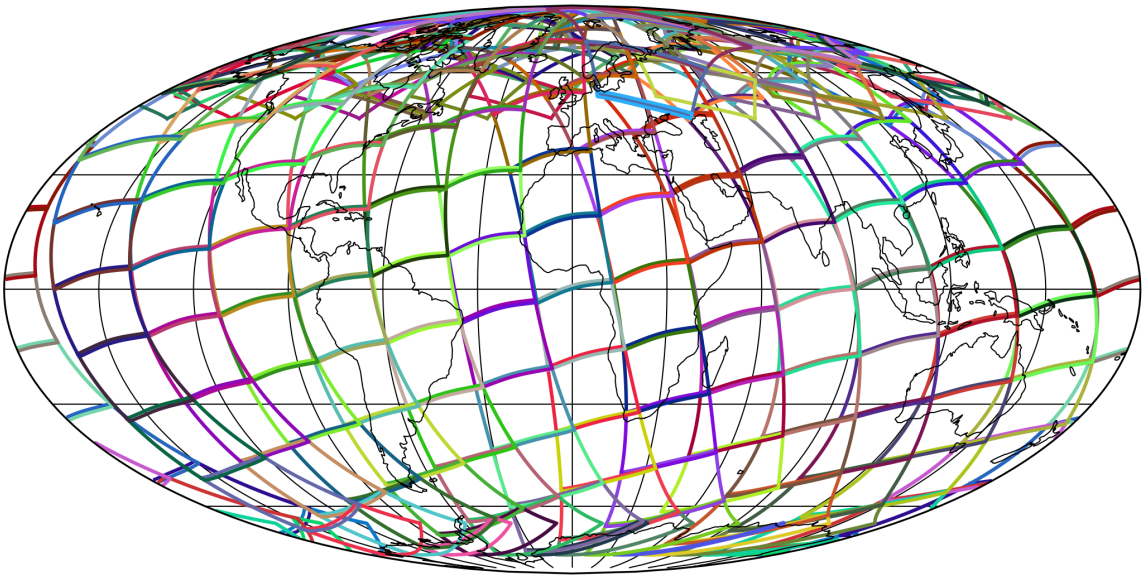

Figure 1: Outline of the granules.

4 Input data monitoring

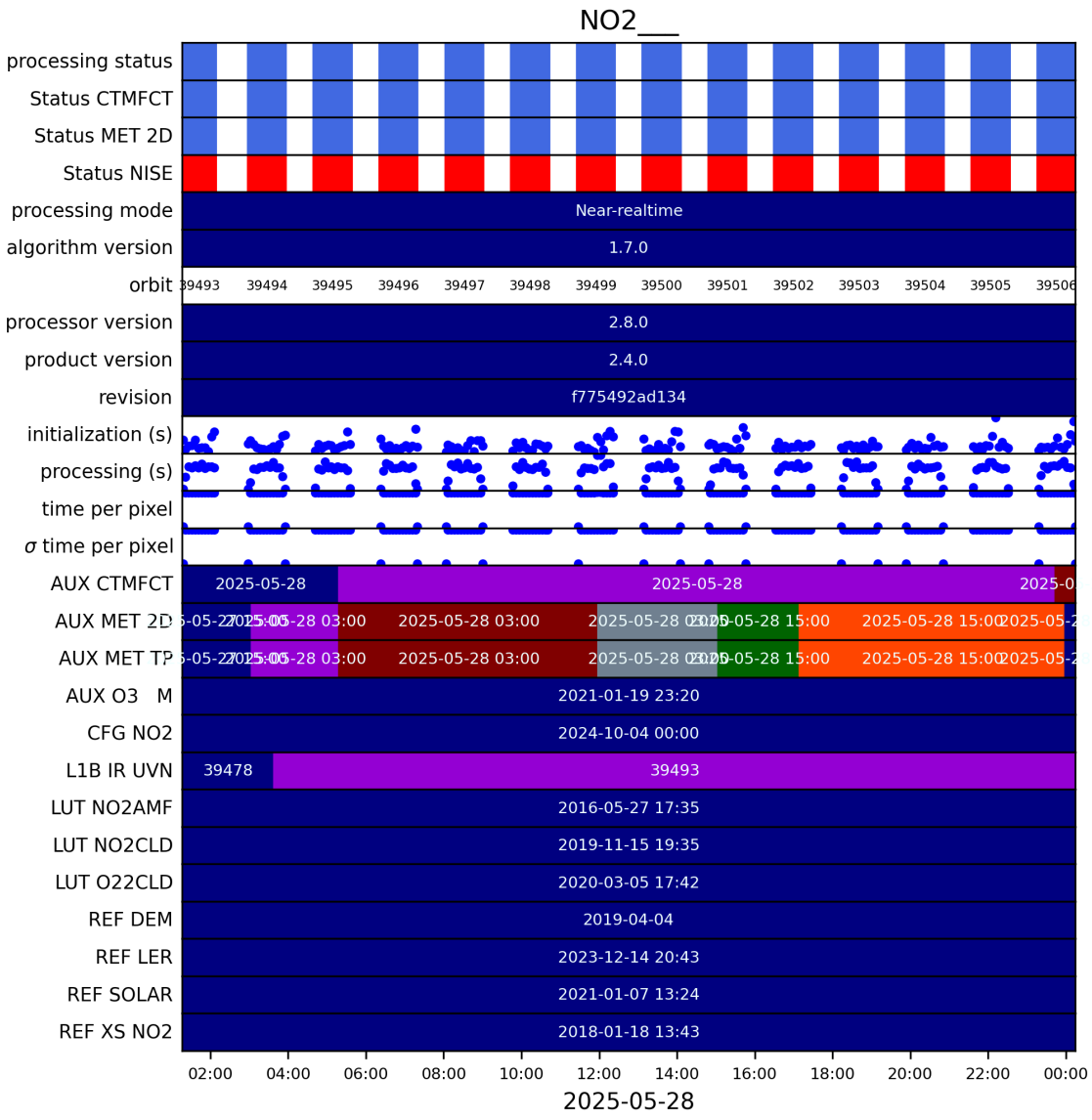

Figure 2: Input data per granule

5 Warnings and errors

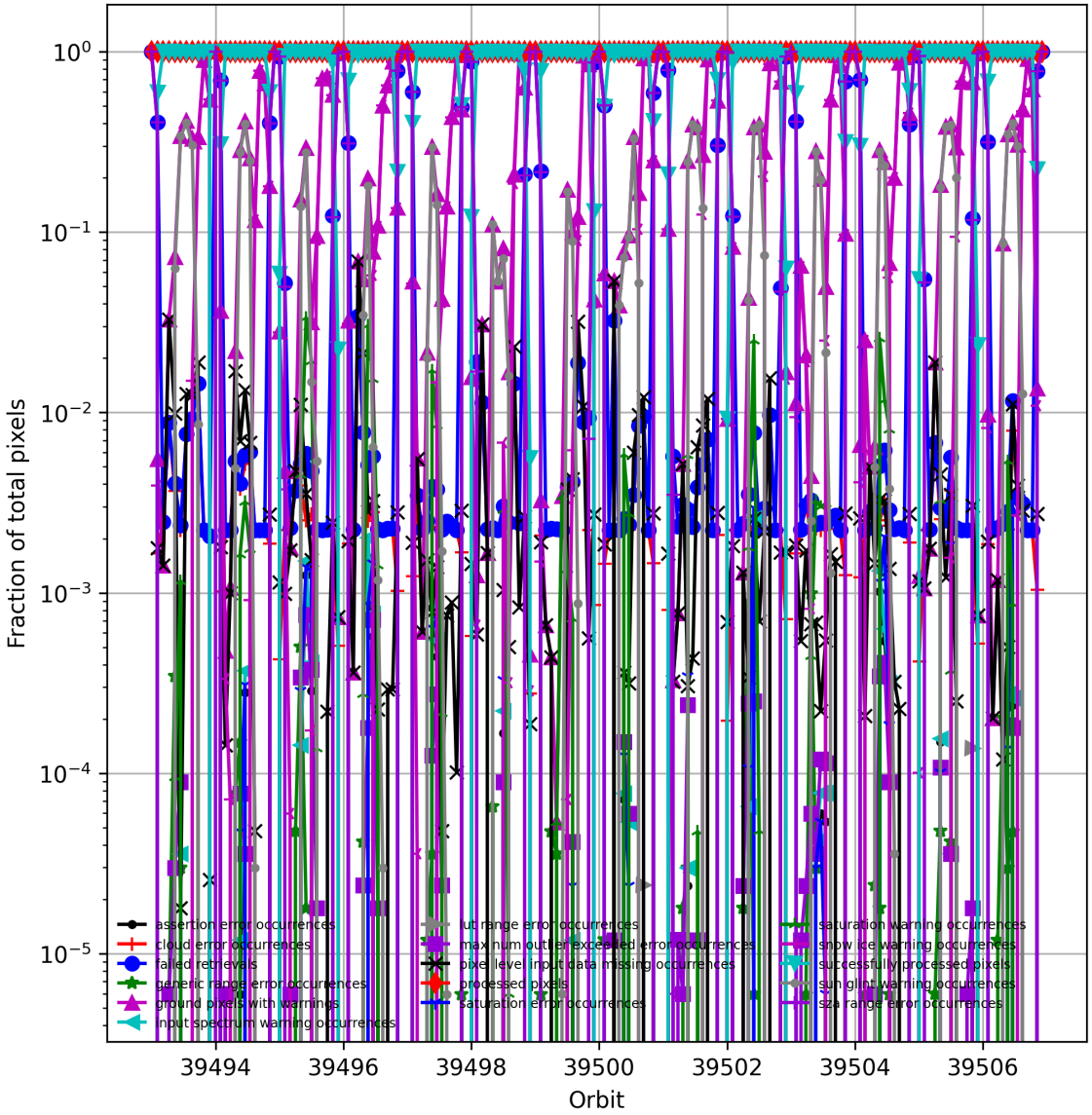

Figure 3: Fraction of pixels with specific warnings and errors during processing

6 World maps

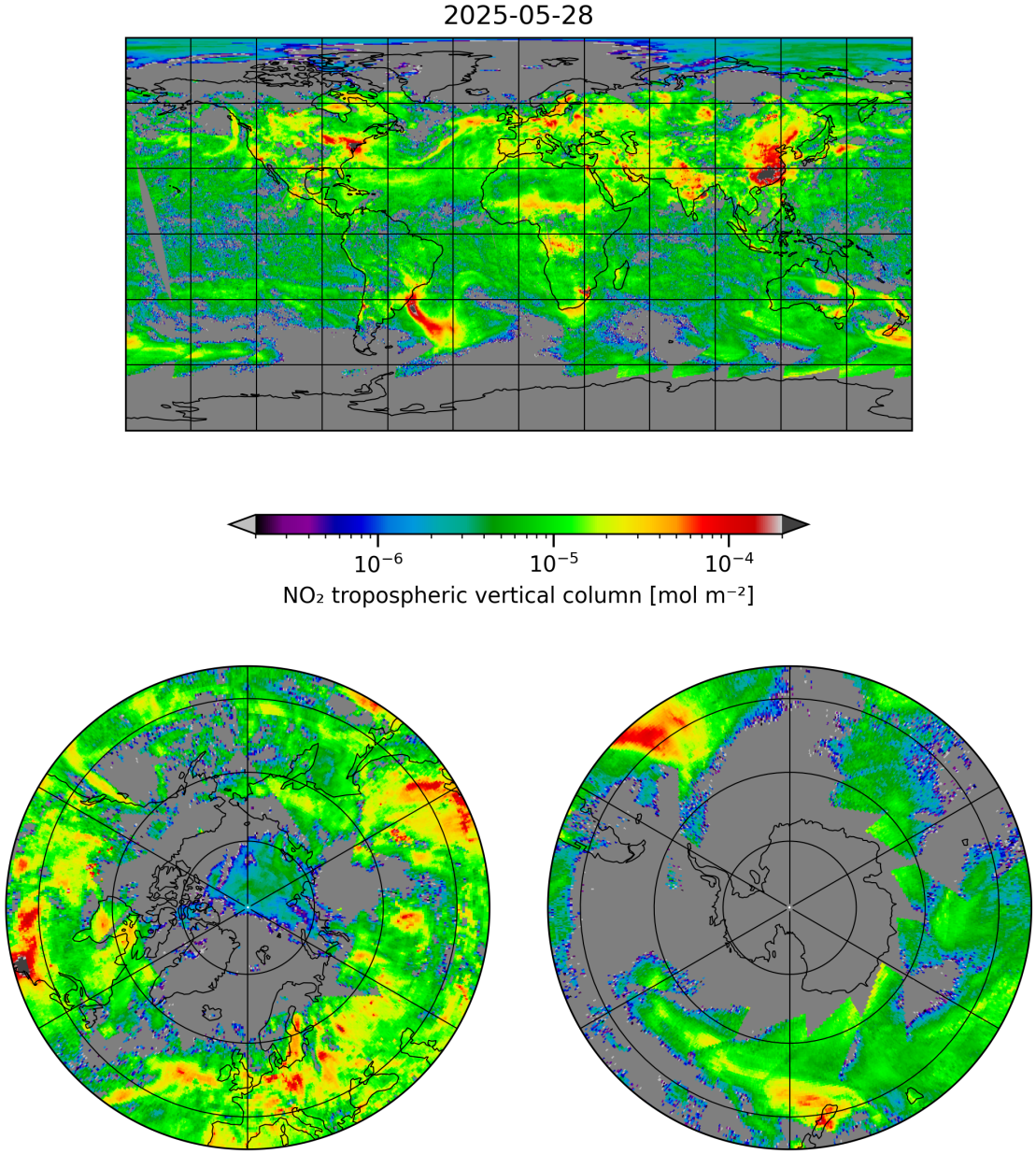

Figure 4: Map of "NO_2 tropospheric vertical column" for 2025-05-28 to 2025-05-29

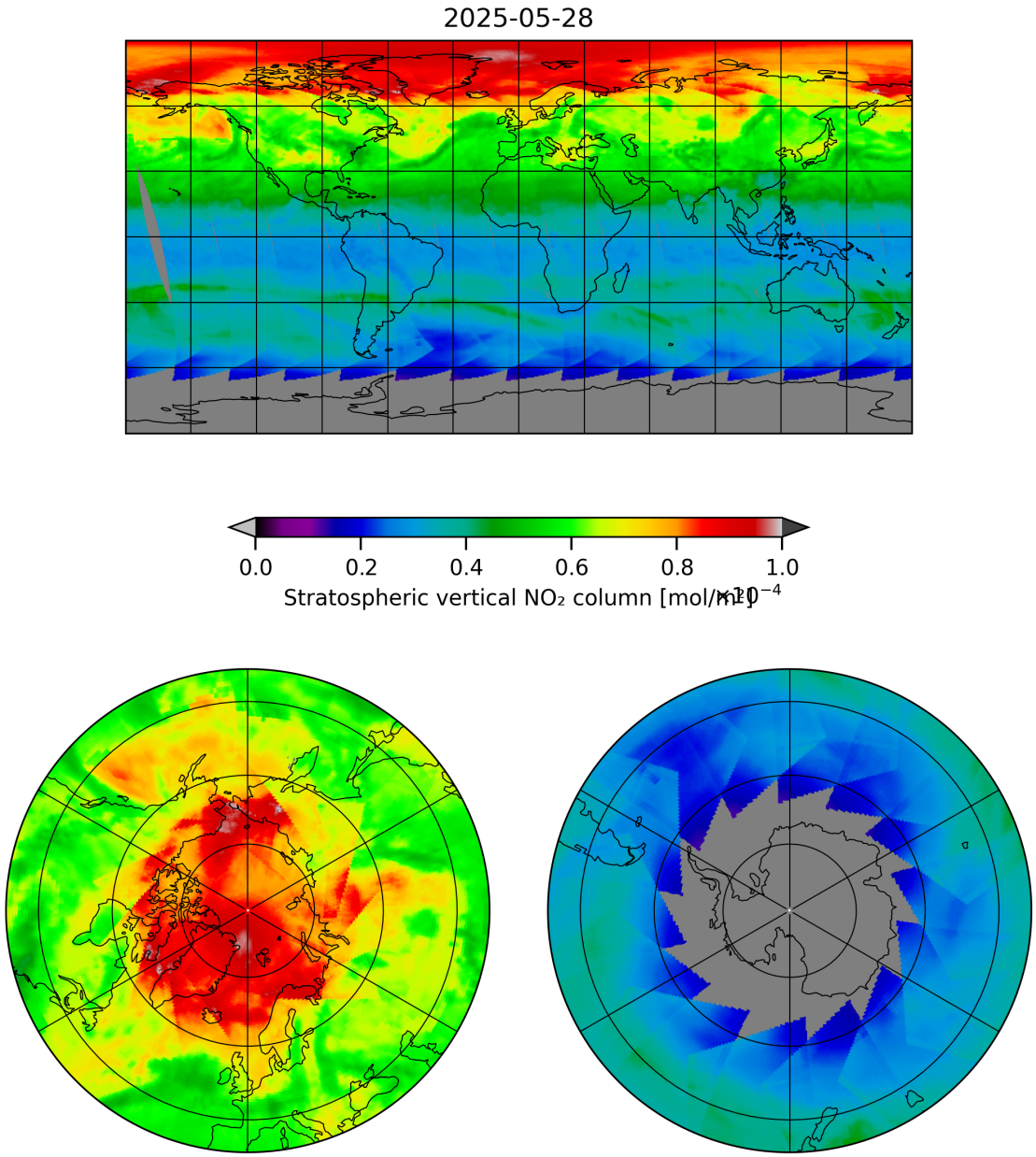

Figure 5: Map of “Stratospheric vertical NO_2 column” for 2025-05-28 to 2025-05-29

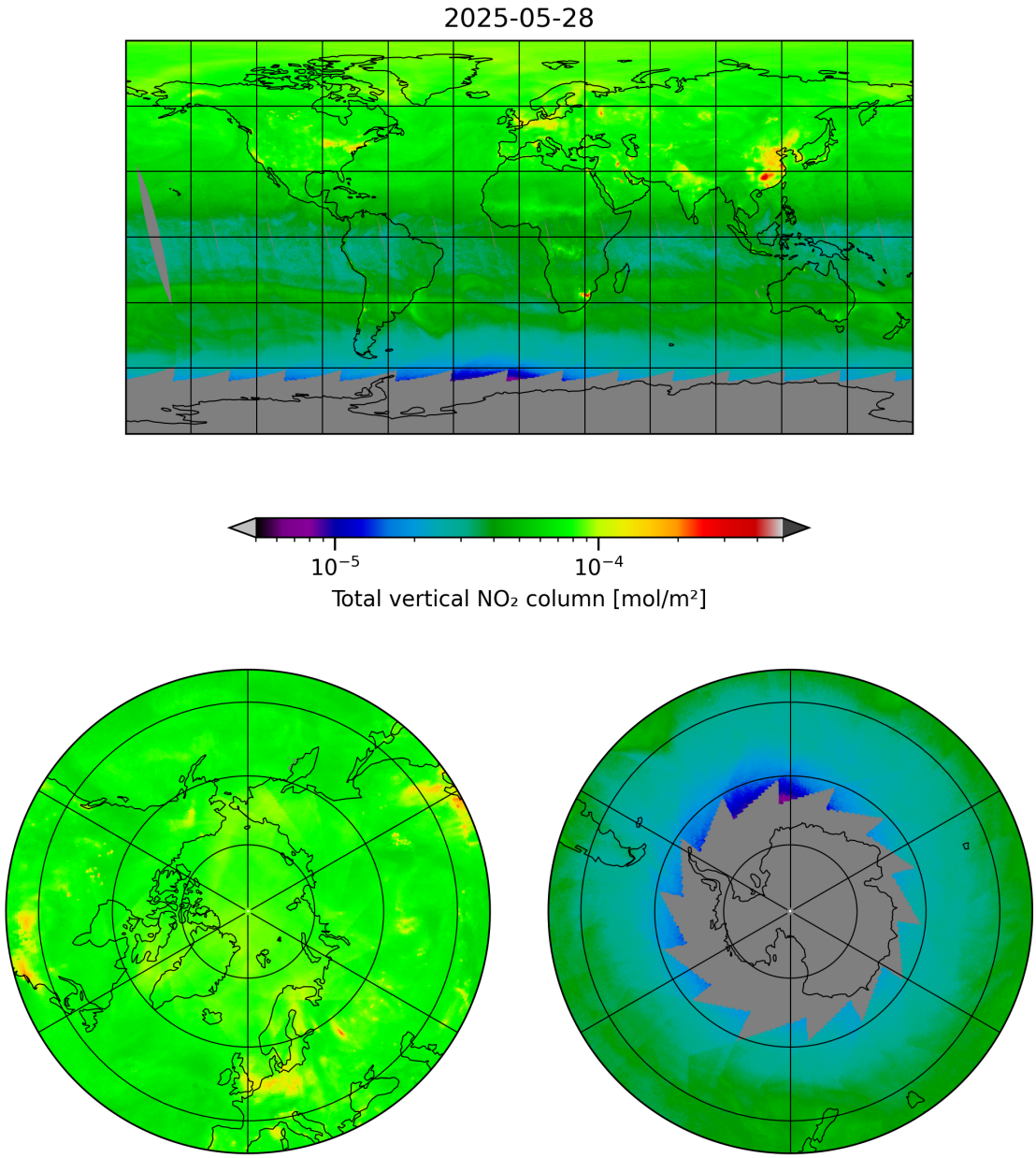

Figure 6: Map of "Total vertical NO_2 column" for 2025-05-28 to 2025-05-29

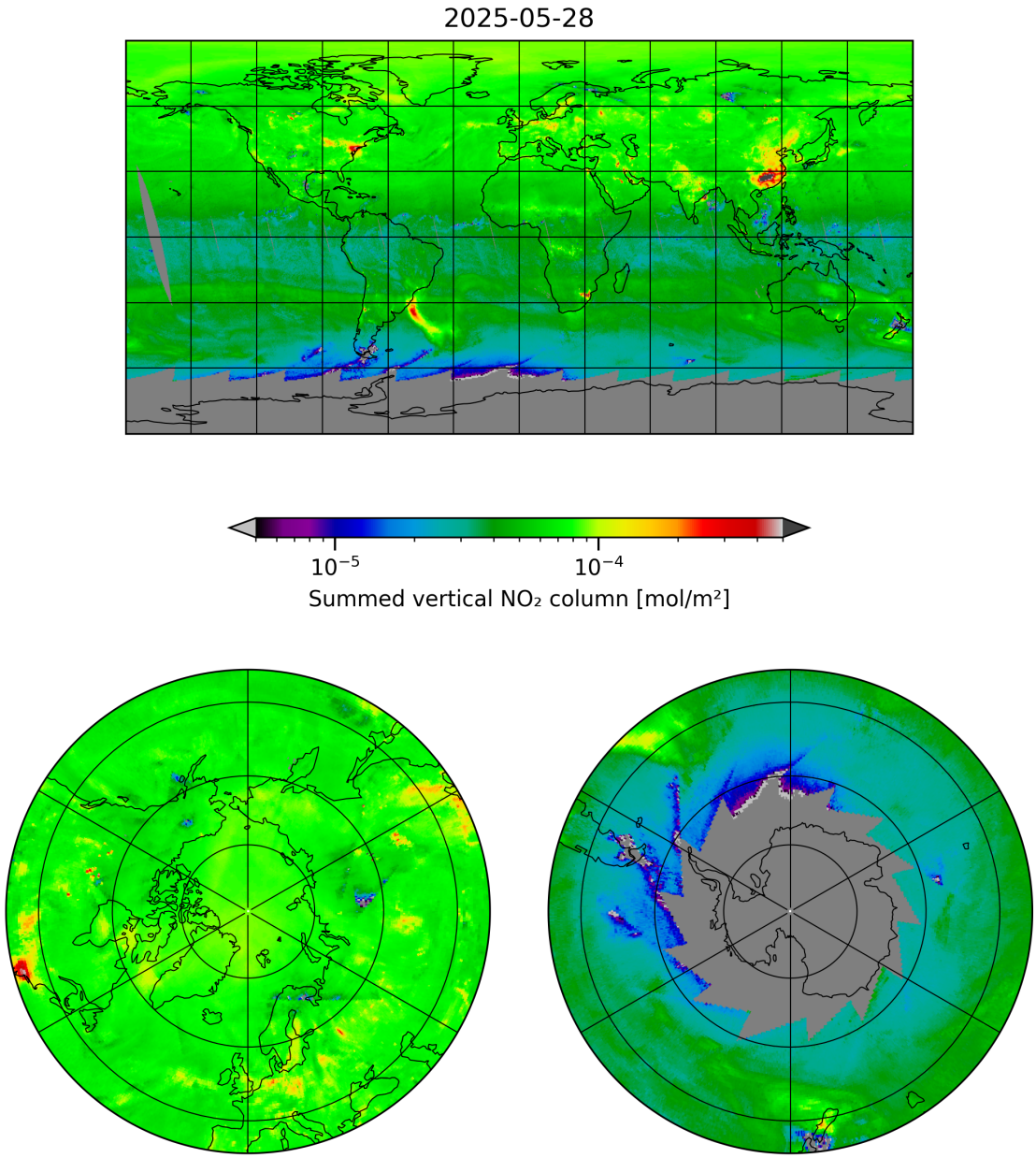

Figure 7: Map of “Summed vertical NO_2 column” for 2025-05-28 to 2025-05-29

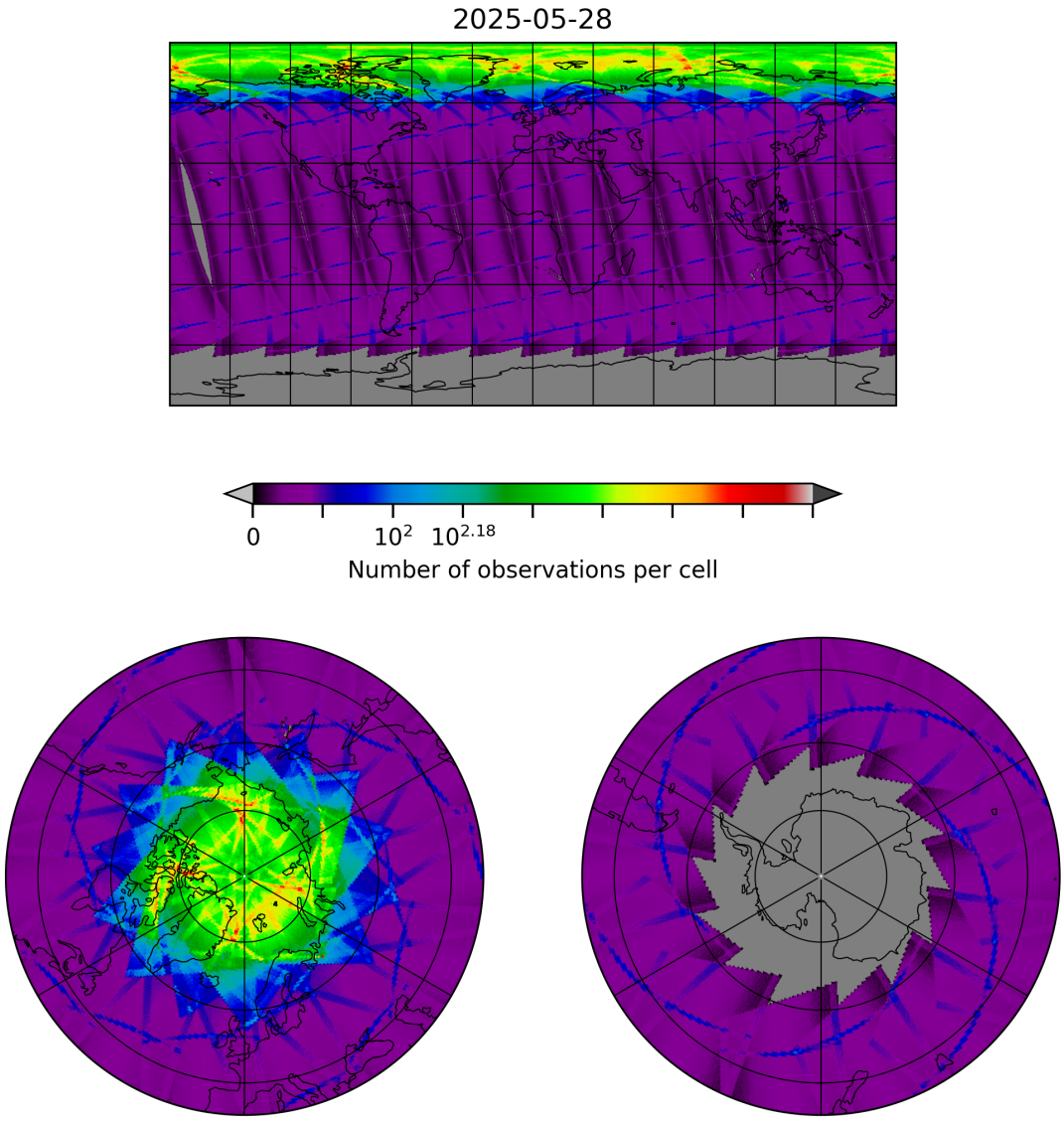

Figure 8: Map of the number of observations for 2025-05-28 to 2025-05-29

7 Zonal average

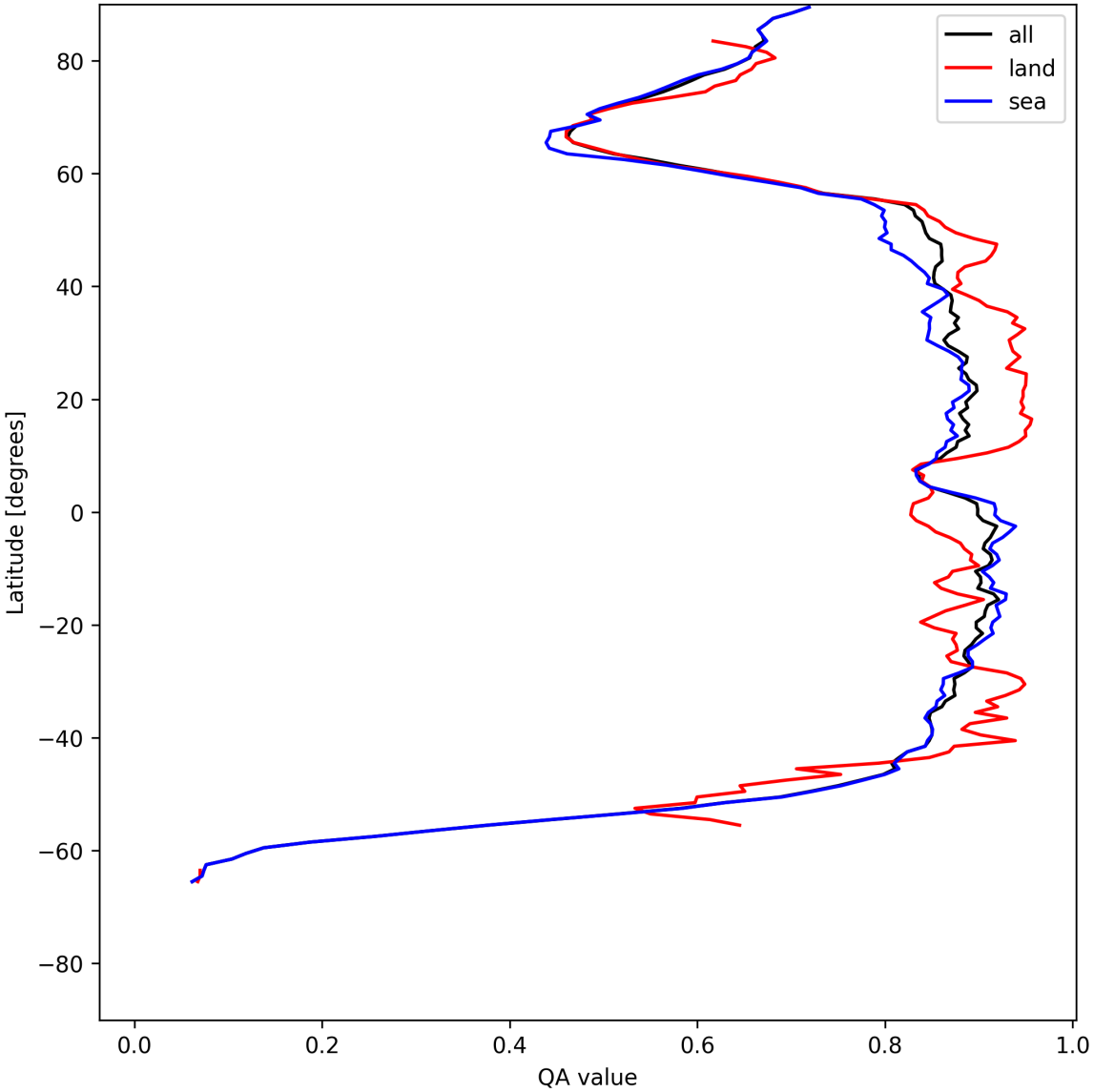

Figure 9: Zonal average of “QA value” for 2025-05-28 to 2025-05-29.

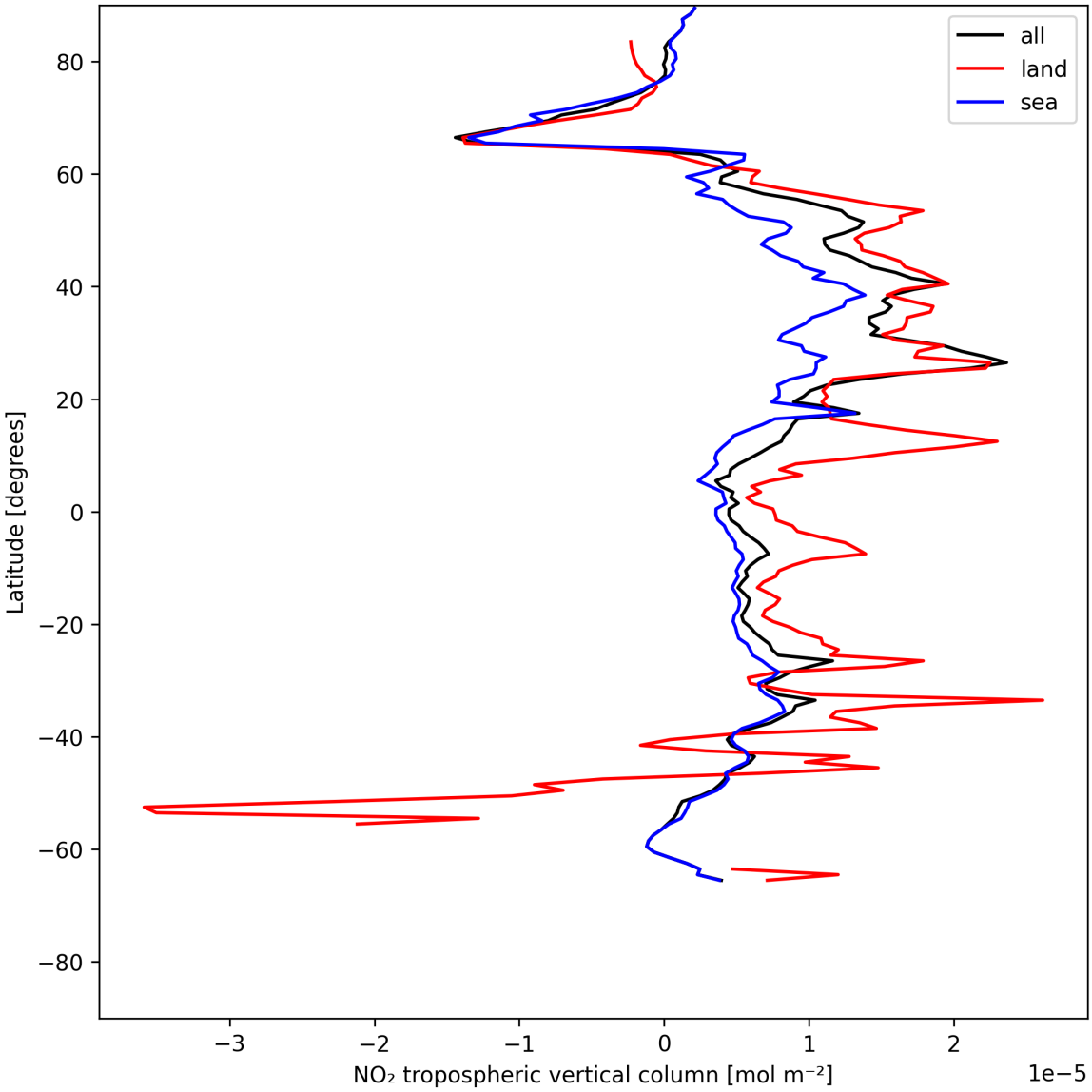

Figure 10: Zonal average of "NO_2 tropospheric vertical column" for 2025-05-28 to 2025-05-29.

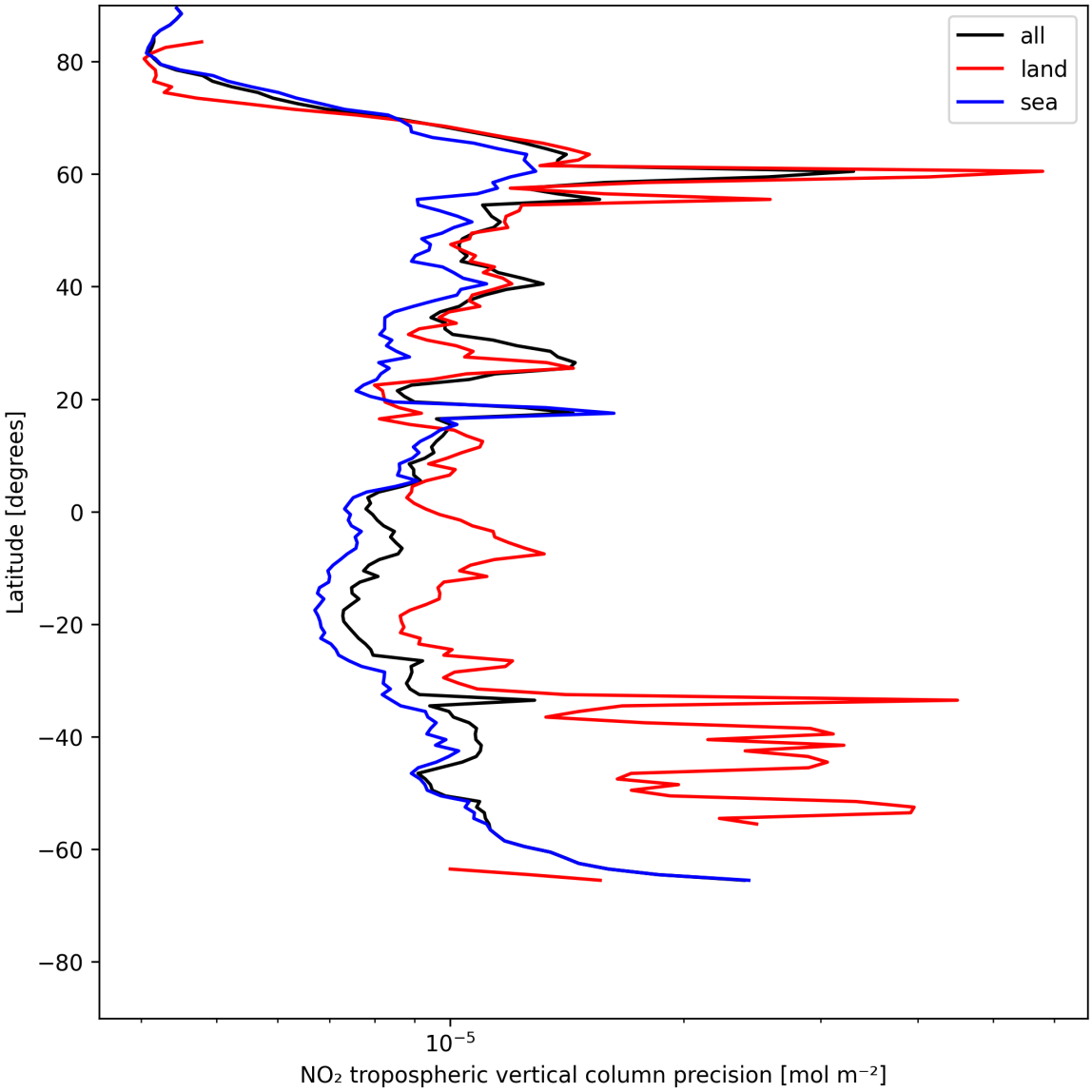

Figure 11: Zonal average of "NO_2 tropospheric vertical column precision" for 2025-05-28 to 2025-05-29.

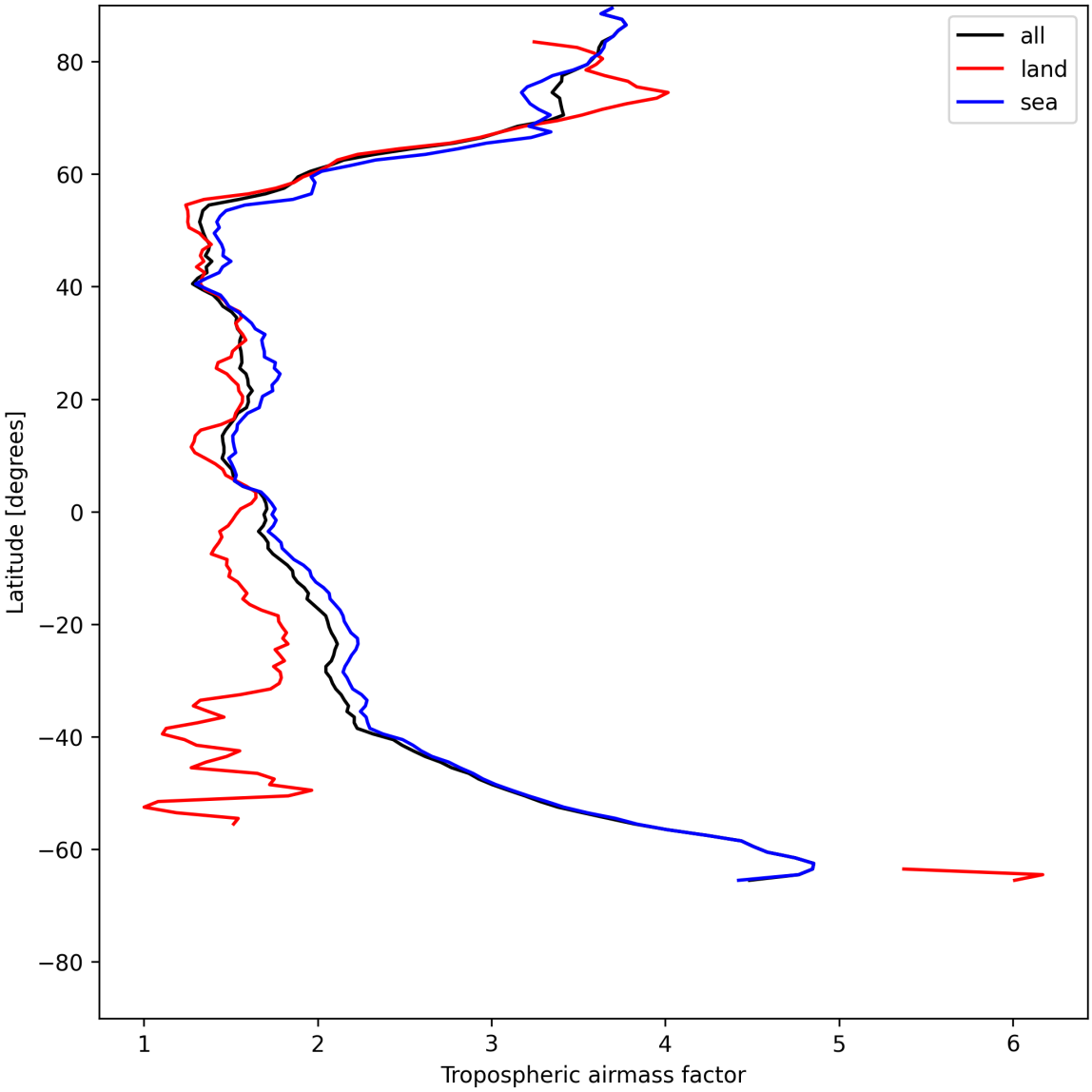

Figure 12: Zonal average of “Tropospheric airmass factor” for 2025-05-28 to 2025-05-29.

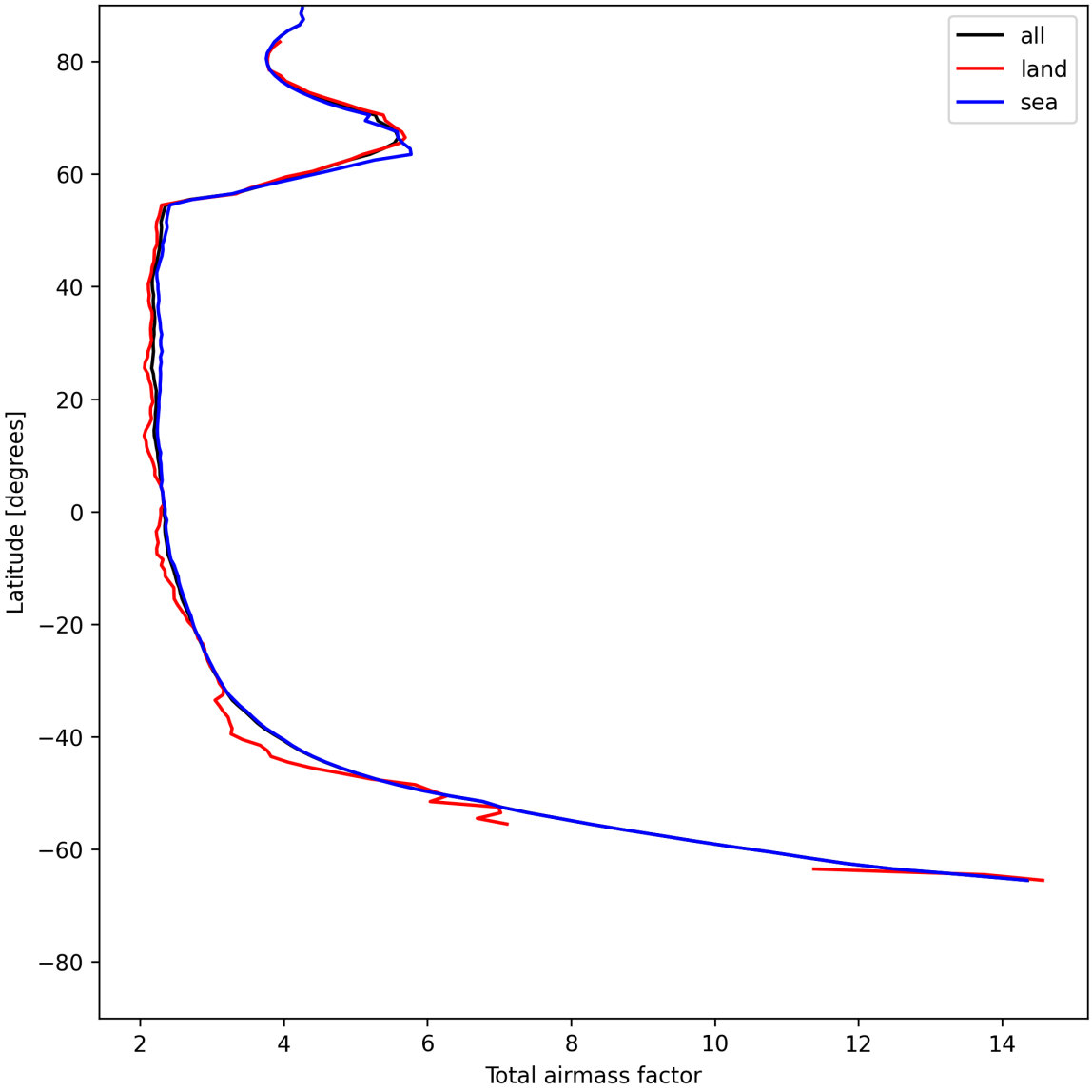

Figure 13: Zonal average of “Total airmass factor” for 2025-05-28 to 2025-05-29.

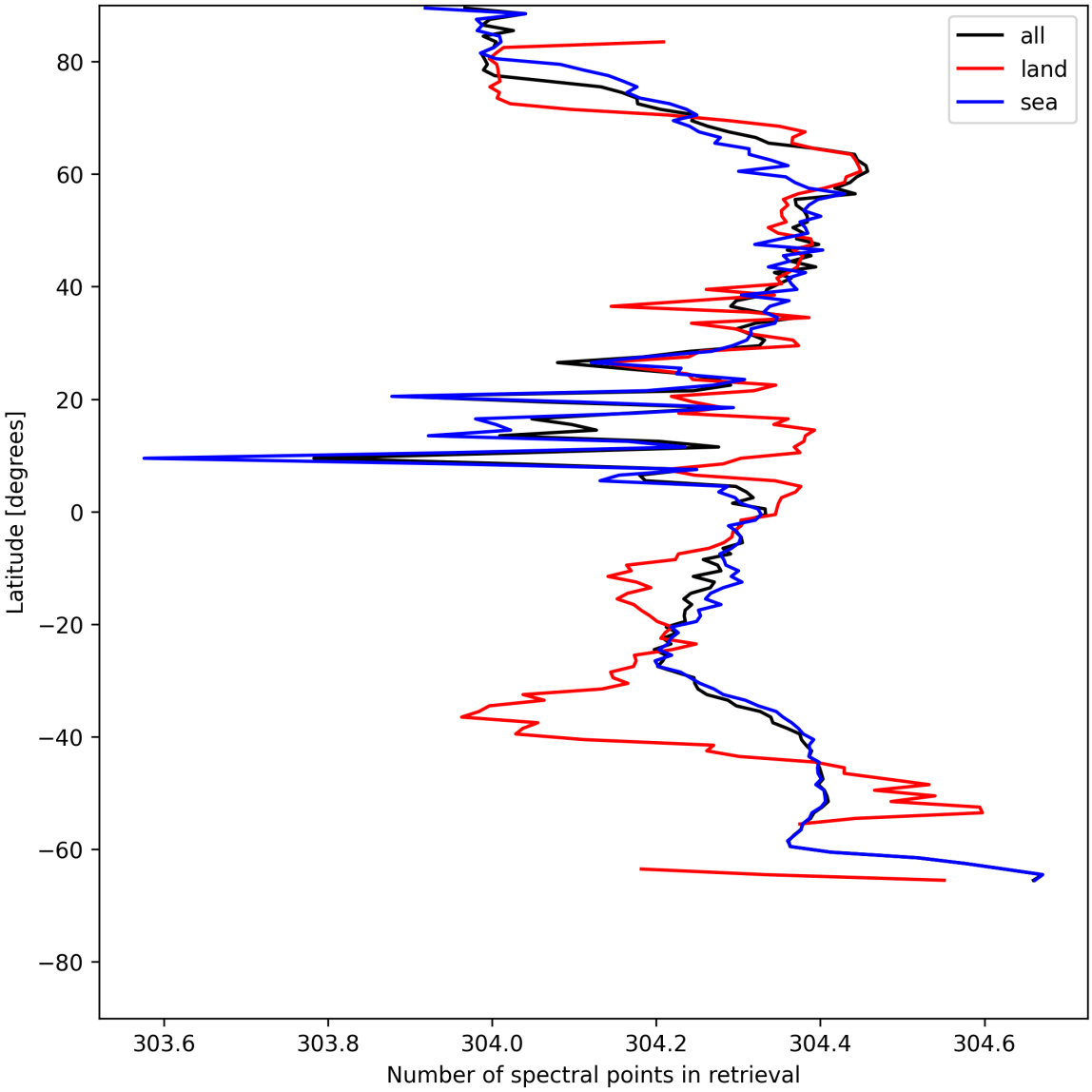

Figure 14: Zonal average of “Number of spectral points in retrieval” for 2025-05-28 to 2025-05-29.

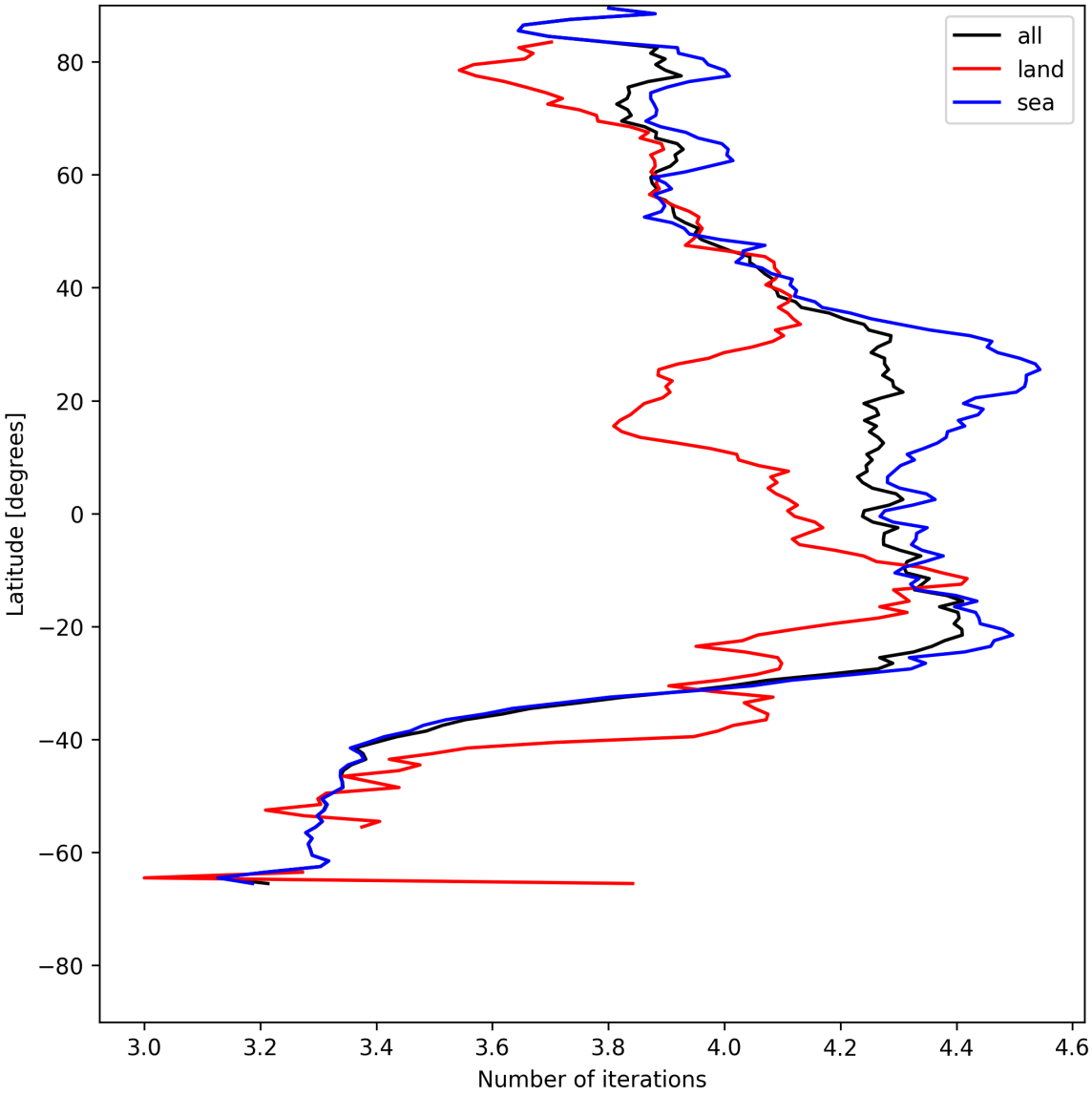

Figure 15: Zonal average of “Number of iterations” for 2025-05-28 to 2025-05-29.

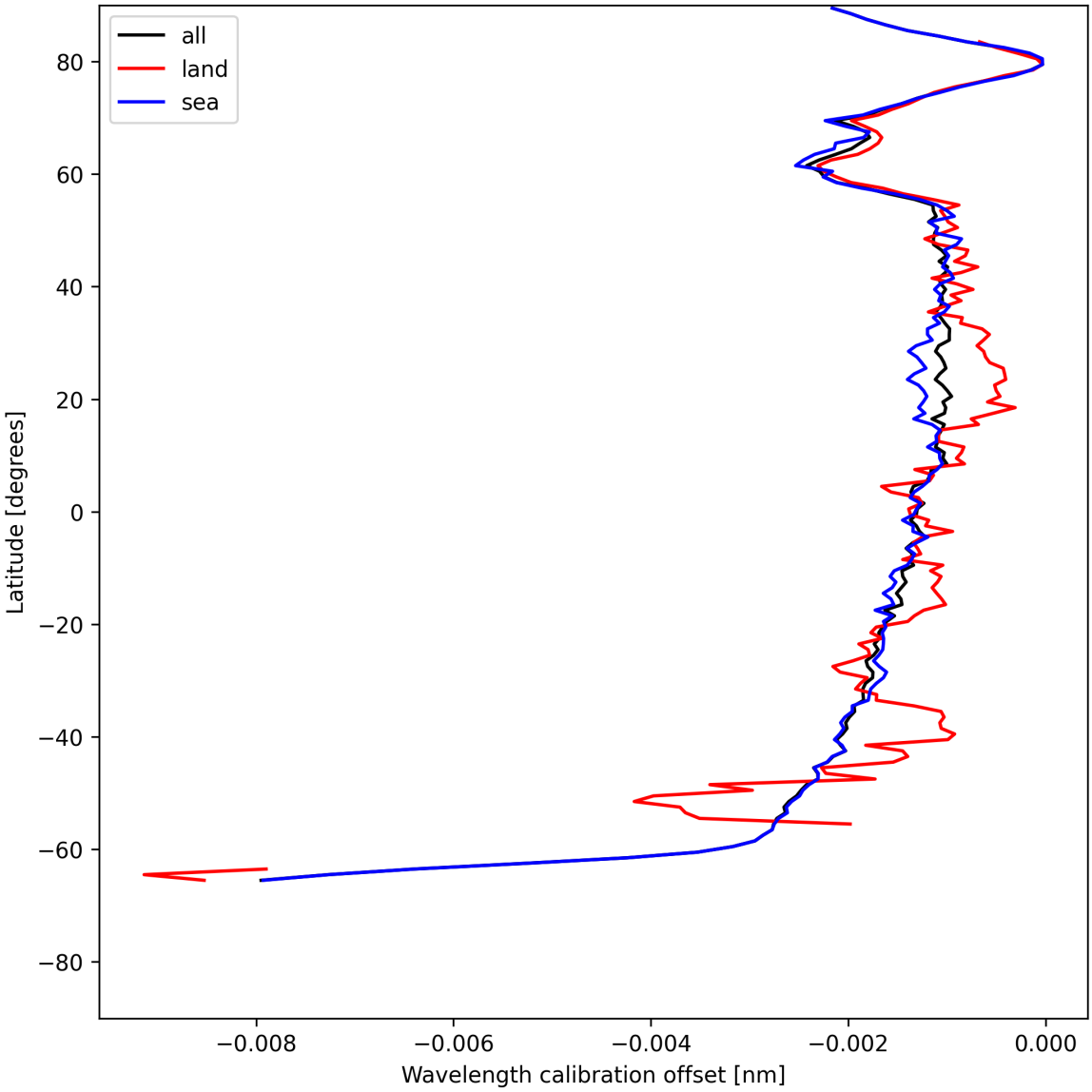

Figure 16: Zonal average of “Wavelength calibration offset” for 2025-05-28 to 2025-05-29.

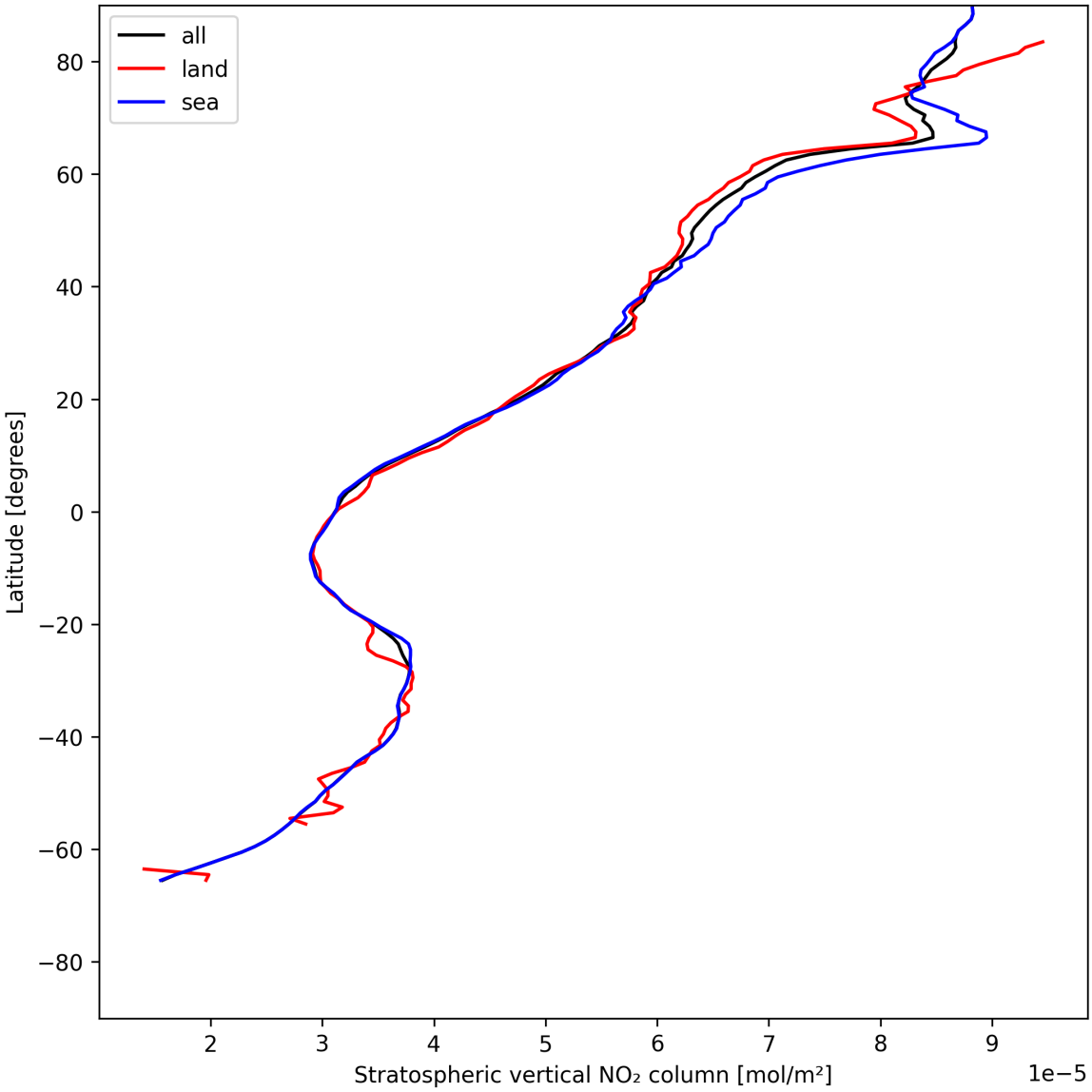

Figure 17: Zonal average of “Stratospheric vertical NO_2 column” for 2025-05-28 to 2025-05-29.

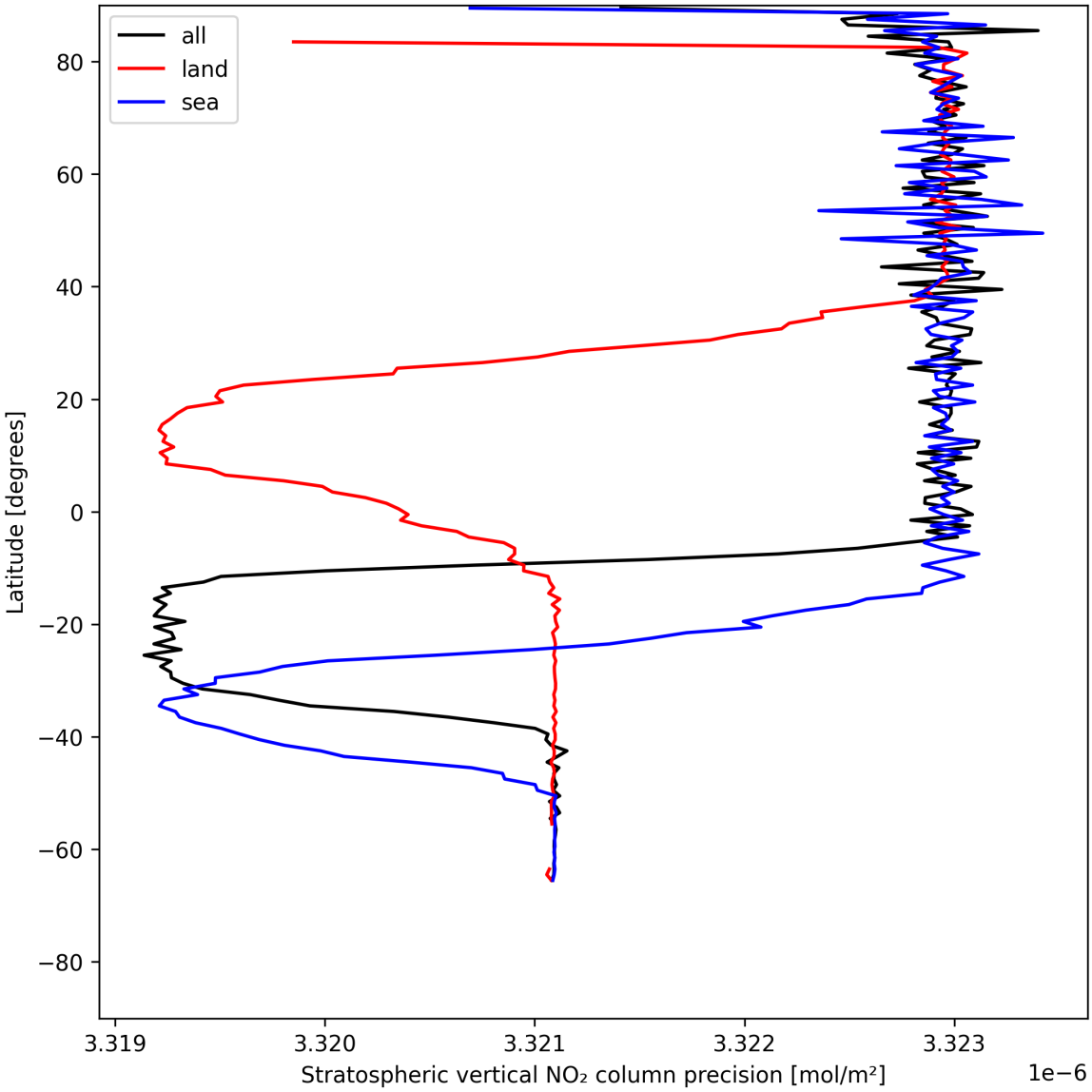

Figure 18: Zonal average of “Stratospheric vertical NO_2 column precision” for 2025-05-28 to 2025-05-29.

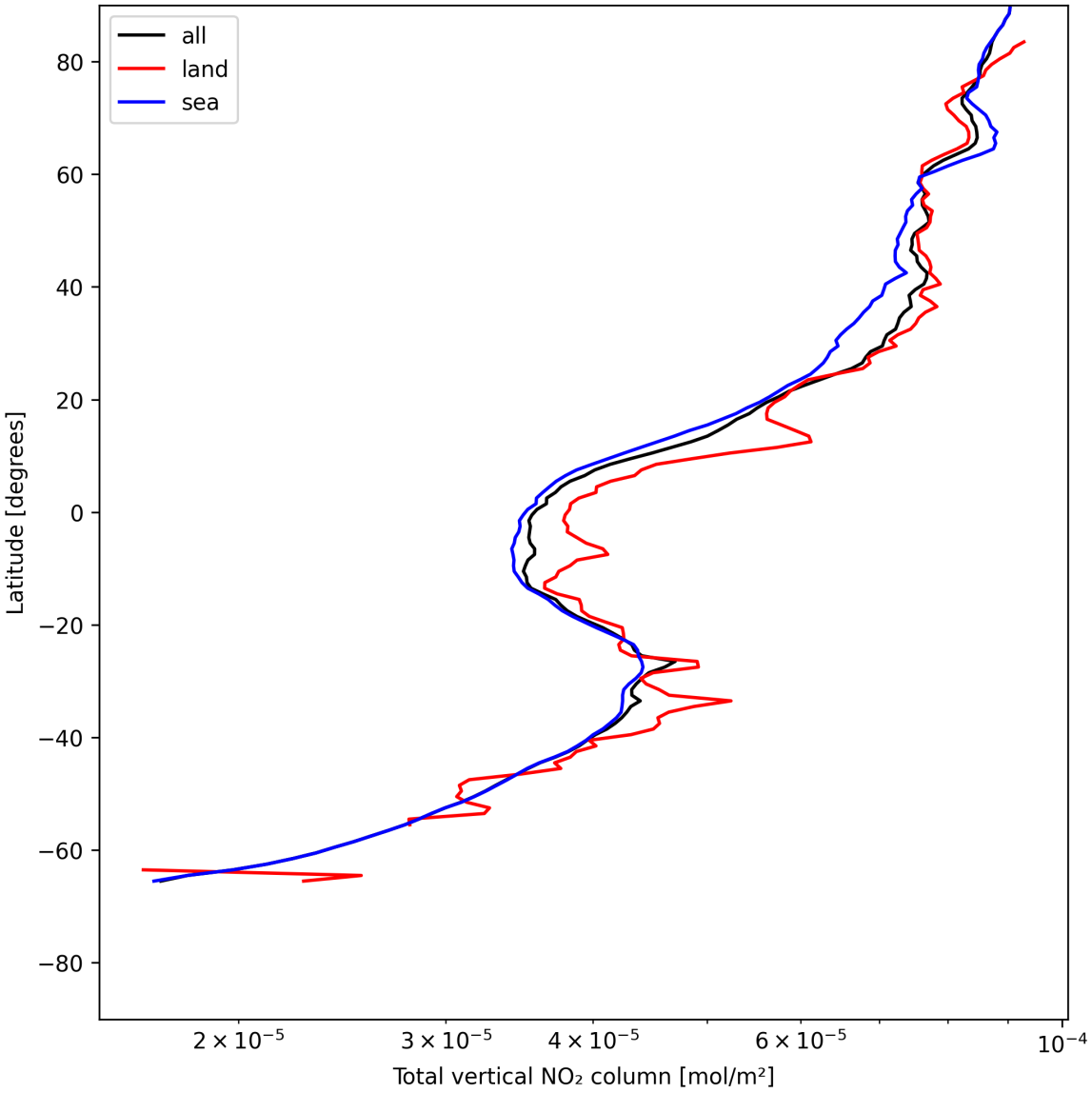

Figure 19: Zonal average of "Total vertical NO_2 column" for 2025-05-28 to 2025-05-29.

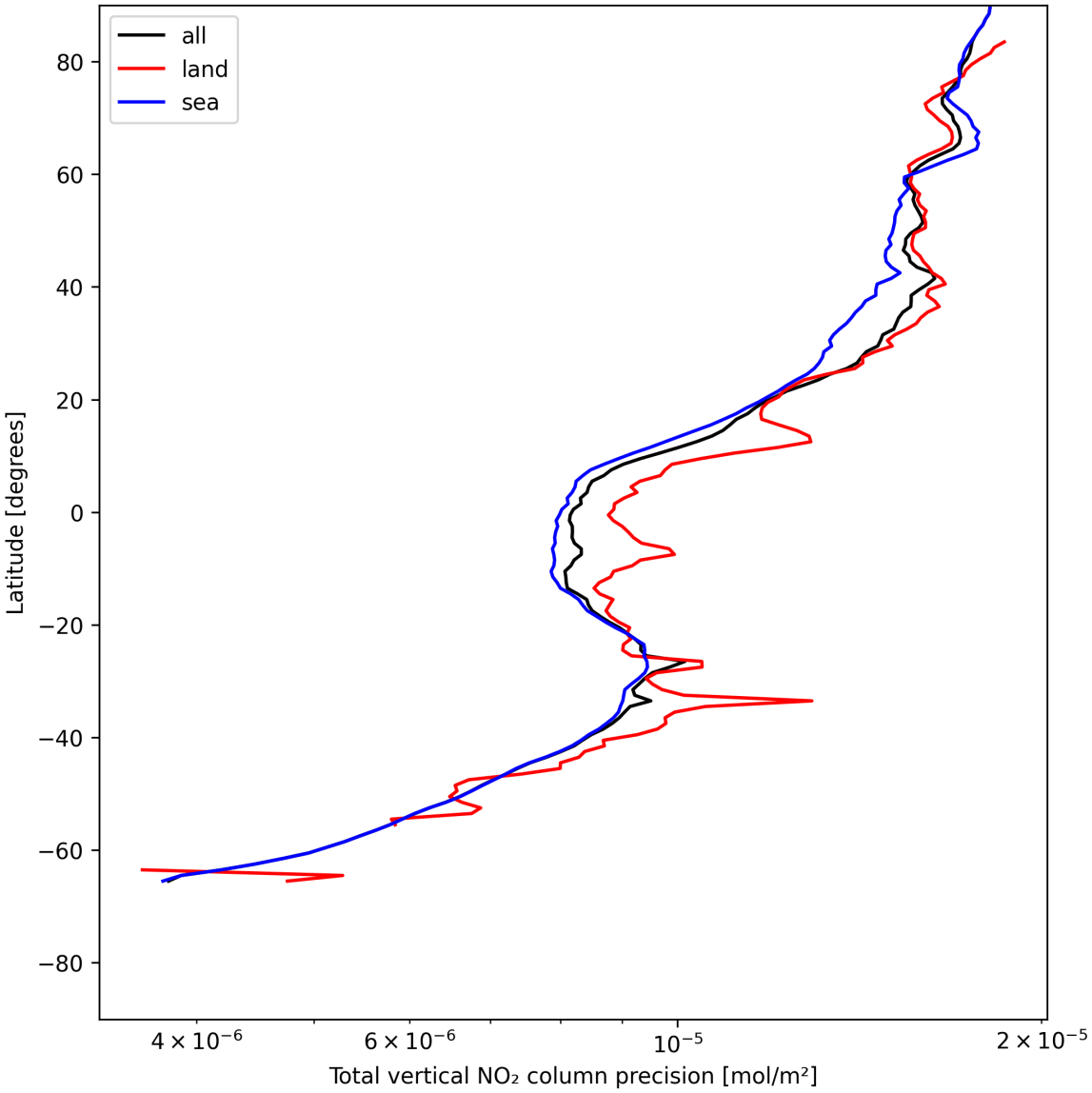

Figure 20: Zonal average of "Total vertical NO_2 column precision" for 2025-05-28 to 2025-05-29.

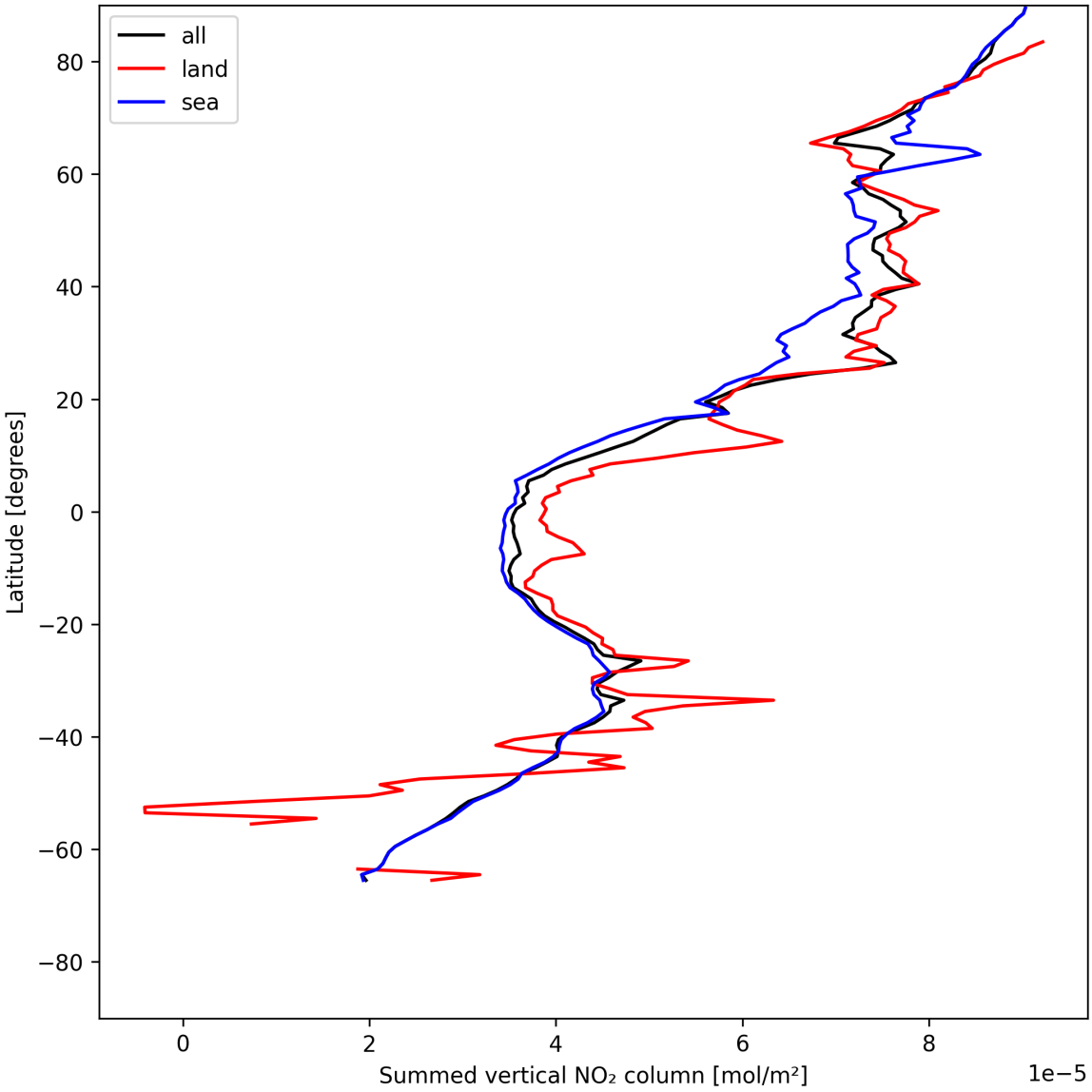

Figure 21: Zonal average of “Summed vertical NO_2 column” for 2025-05-28 to 2025-05-29.

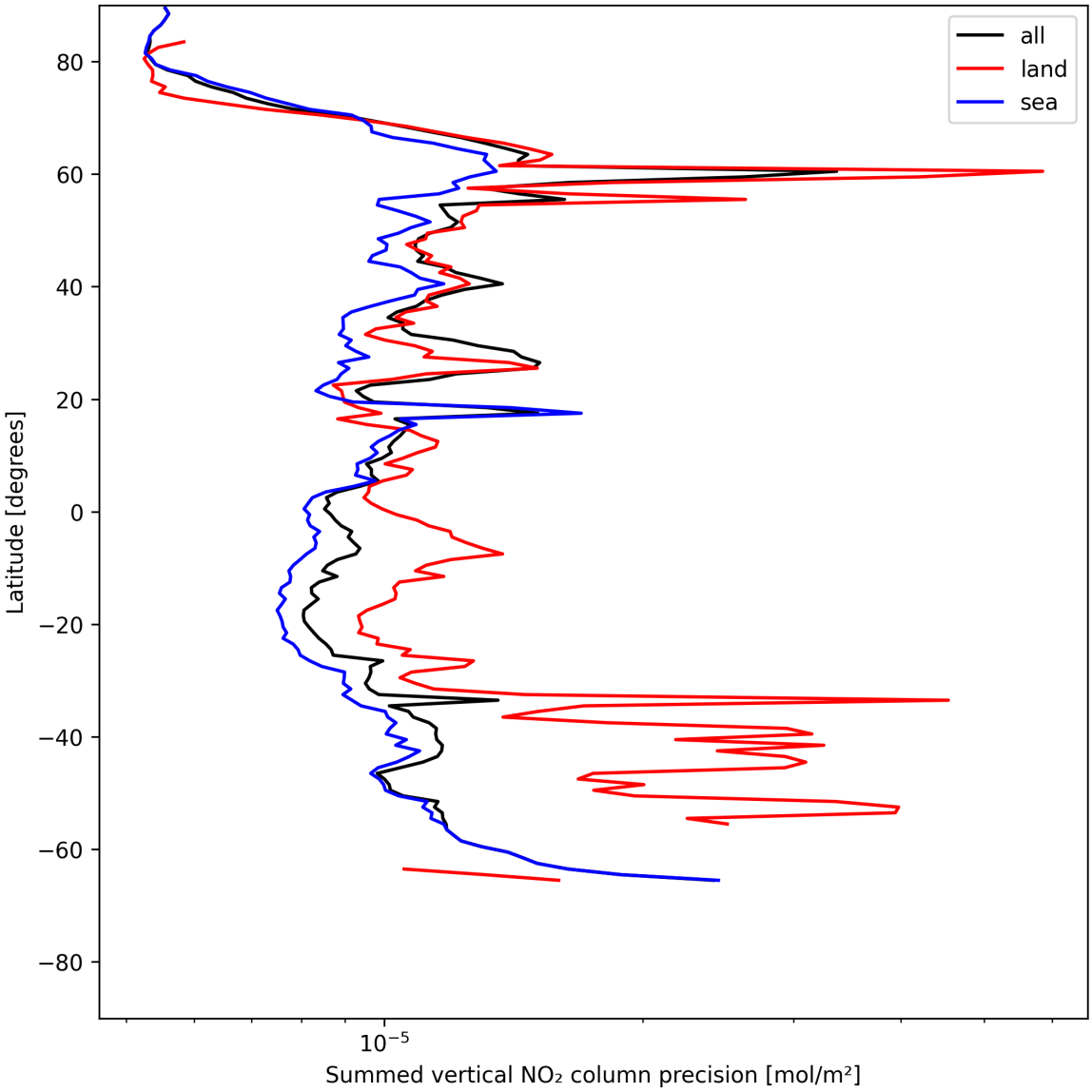

Figure 22: Zonal average of “Summed vertical NO_2 column precision” for 2025-05-28 to 2025-05-29.

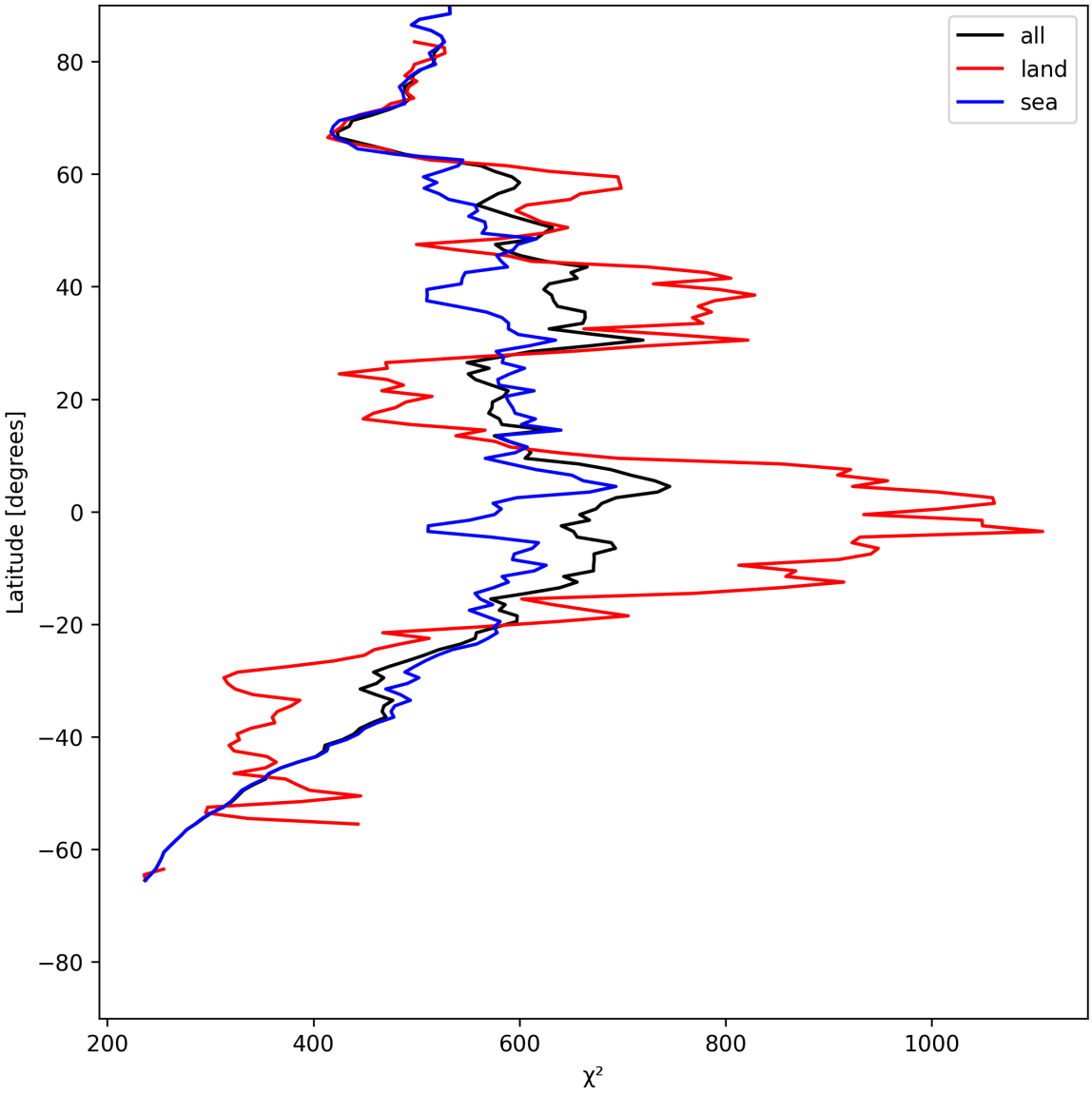

Figure 23: Zonal average of "χ^2" for 2025-05-28 to 2025-05-29.

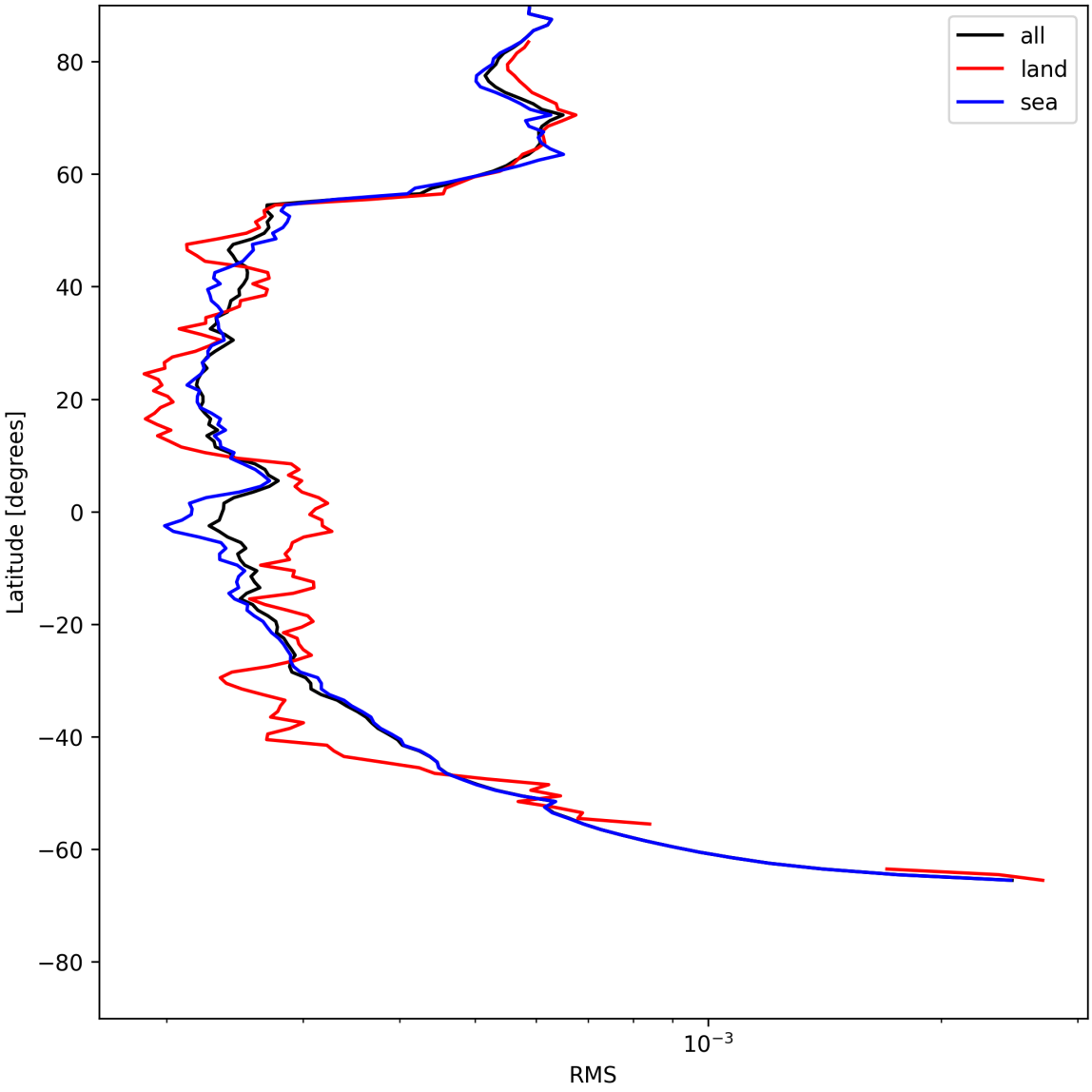

Figure 24: Zonal average of “RMS” for 2025-05-28 to 2025-05-29.

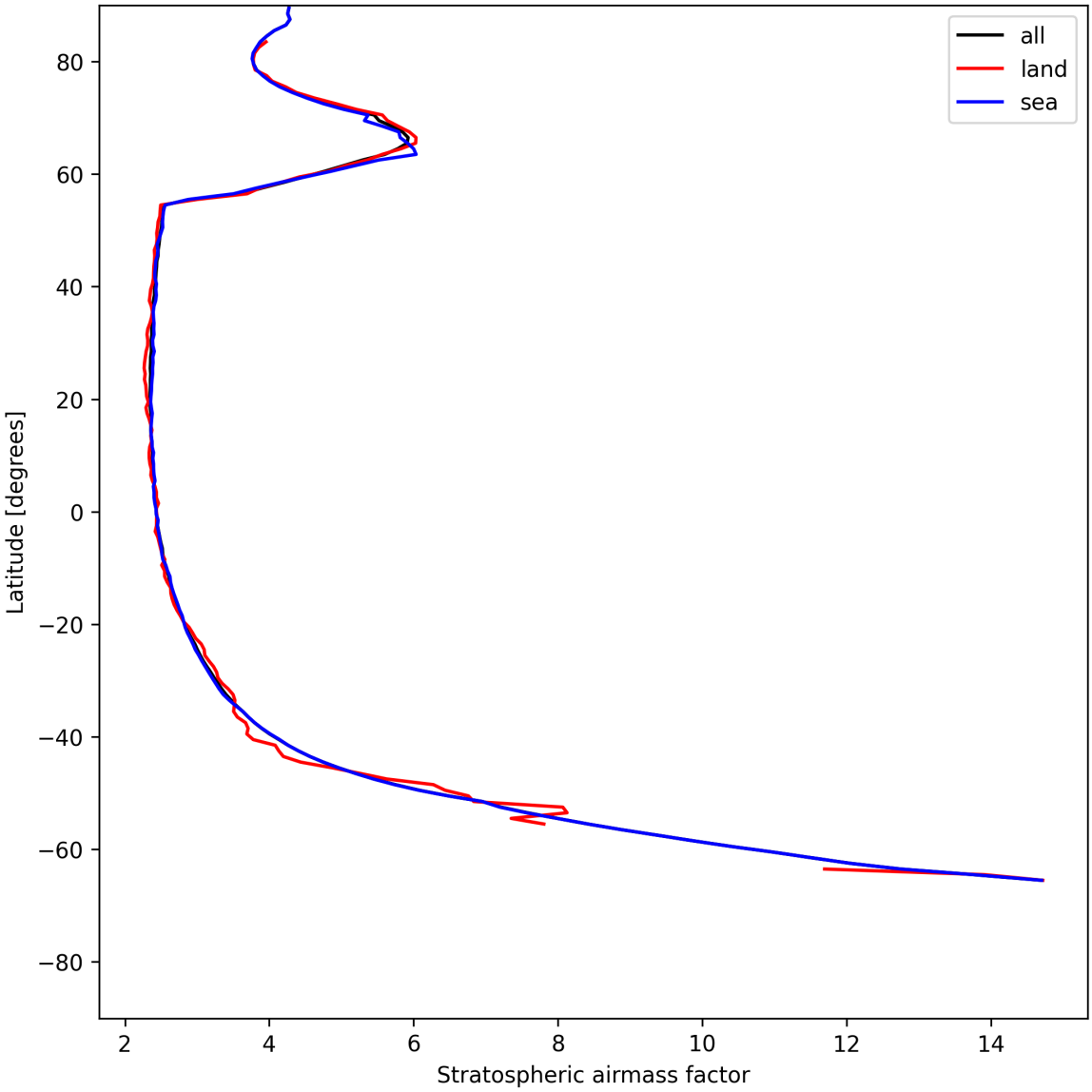

Figure 25: Zonal average of “Stratospheric airmass factor” for 2025-05-28 to 2025-05-29.

8 Histograms

The definitions of the parameters given in this section can be found in section 2.

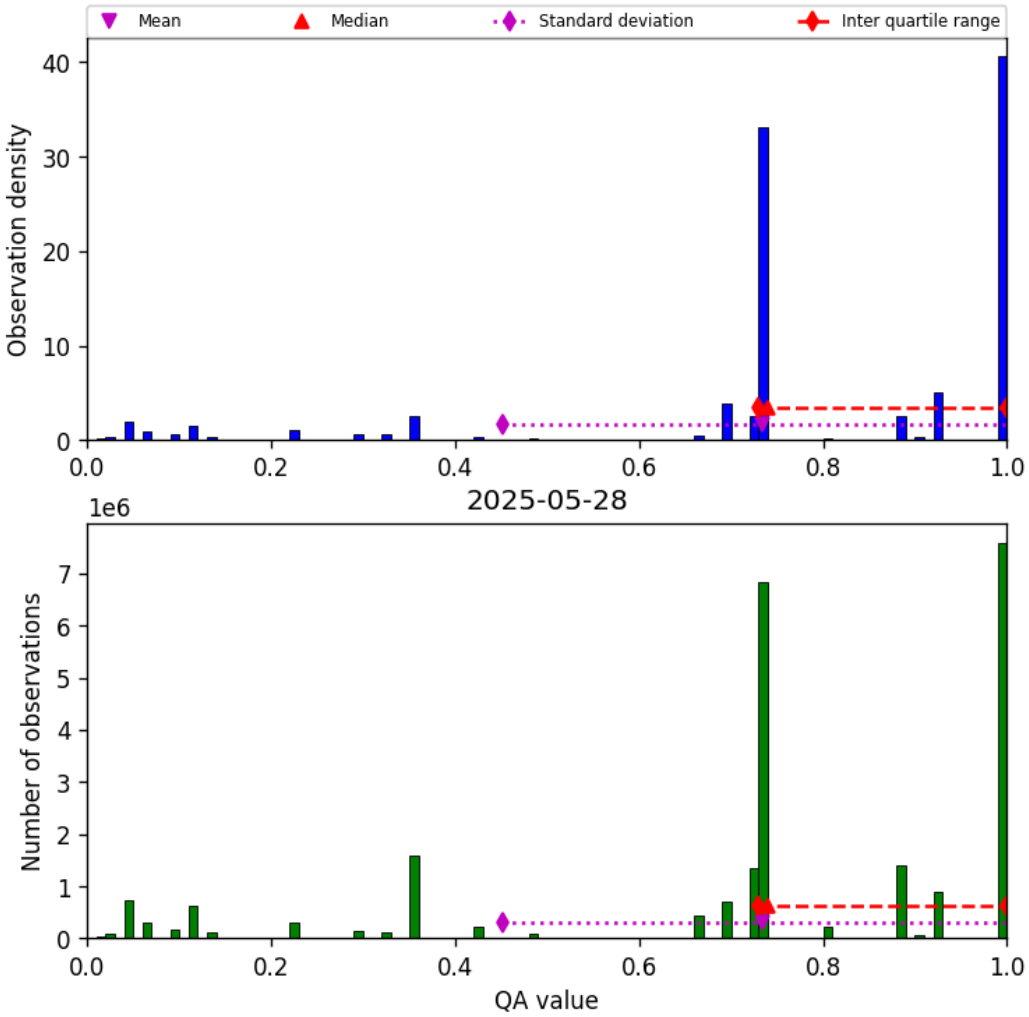

Figure 26: Histogram of “QA value” for 2025-05-28 to 2025-05-29

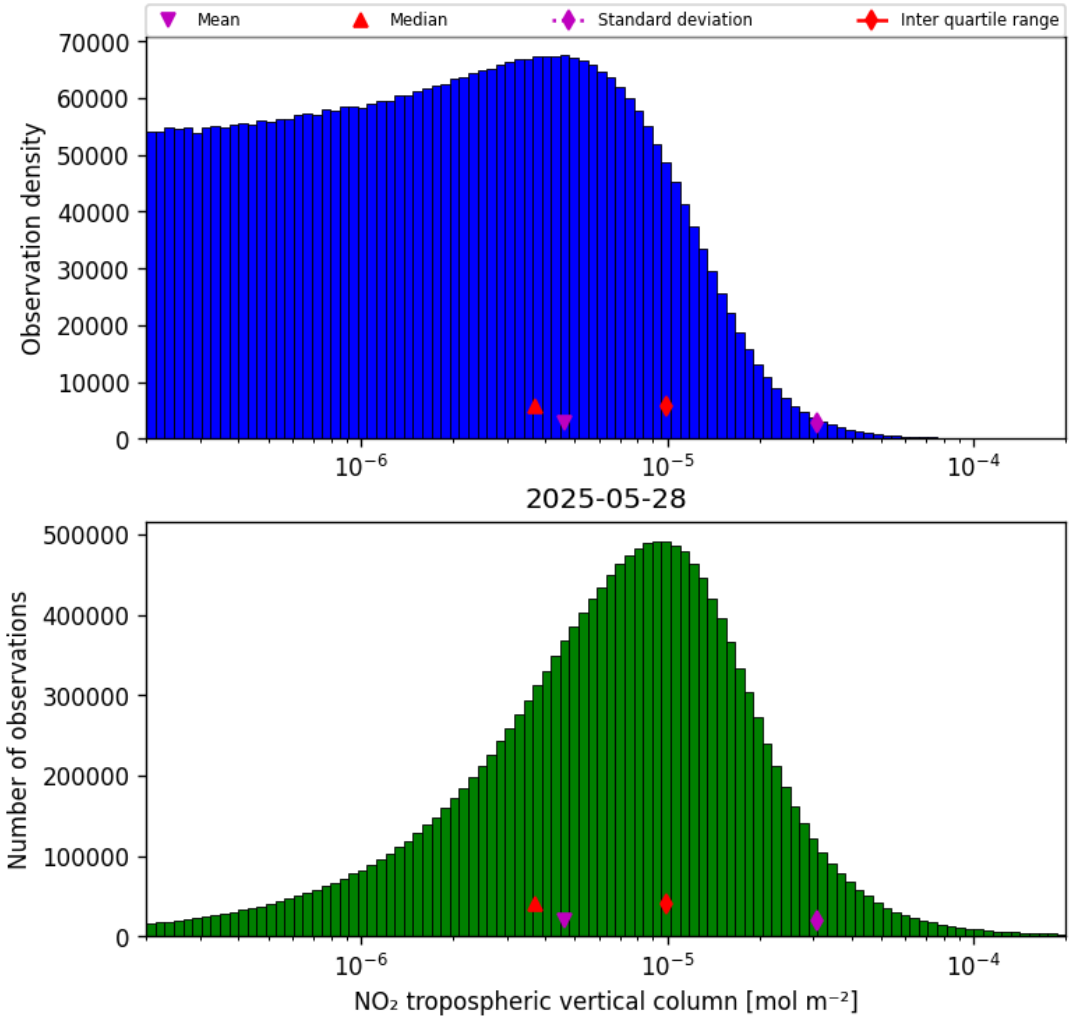

Figure 27: Histogram of "NO_2 tropospheric vertical column" for 2025-05-28 to 2025-05-29

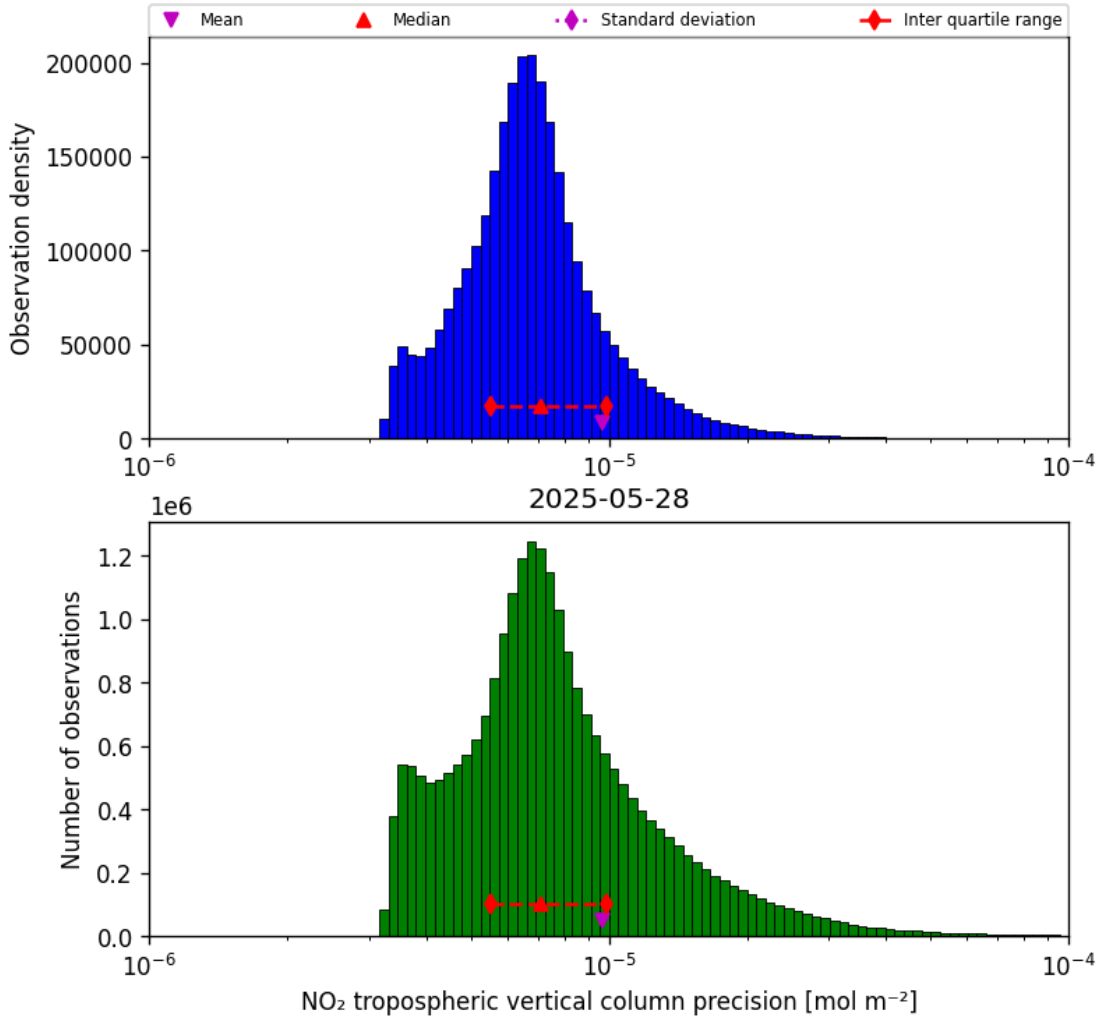

Figure 28: Histogram of "NO_2 tropospheric vertical column precision" for 2025-05-28 to 2025-05-29

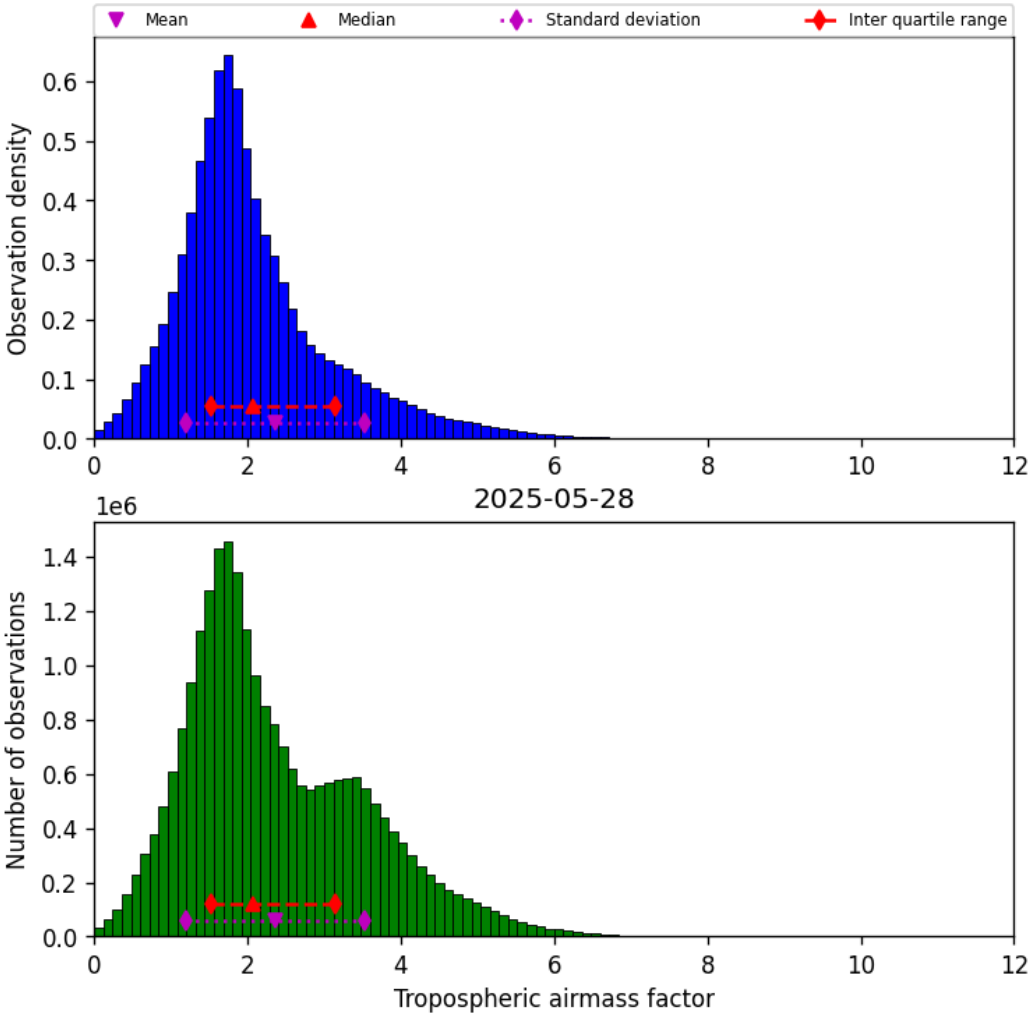

Figure 29: Histogram of “Tropospheric airmass factor” for 2025-05-28 to 2025-05-29

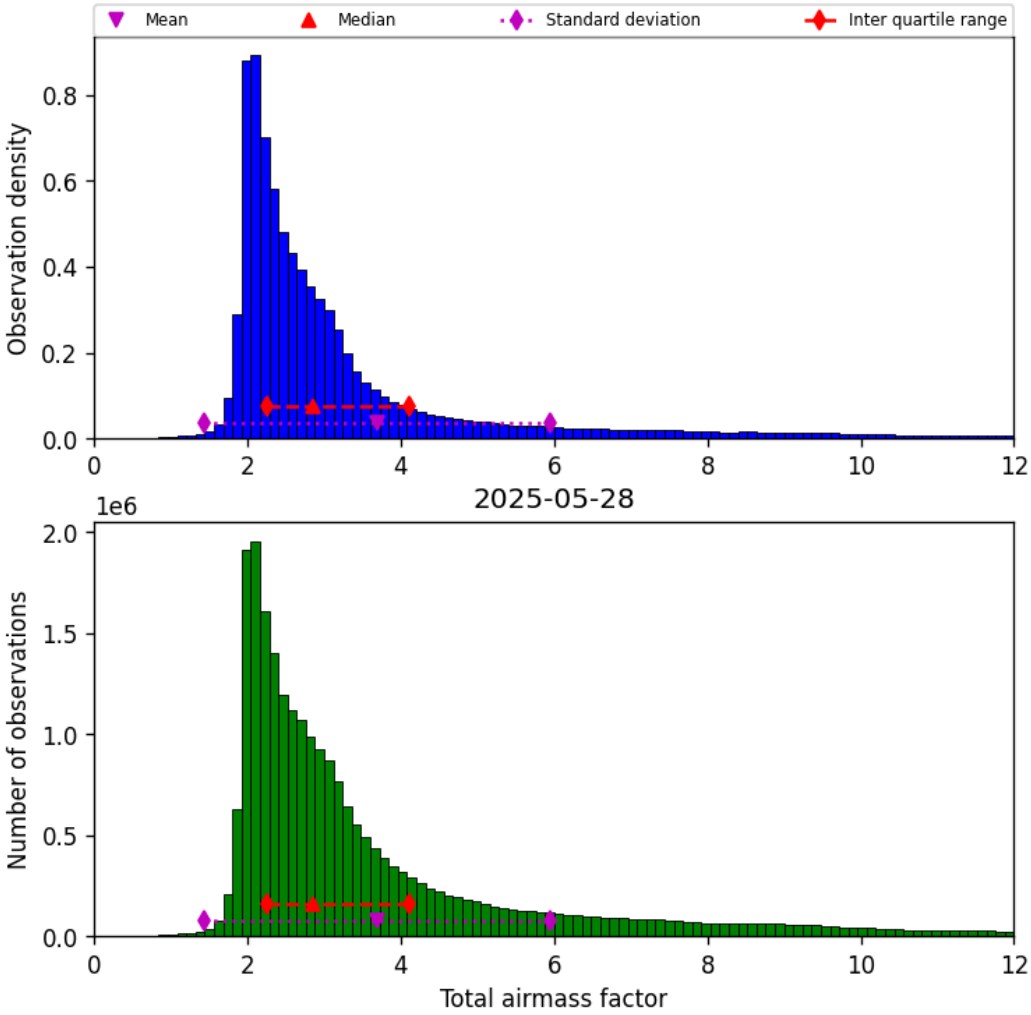

Figure 30: Histogram of “Total airmass factor” for 2025-05-28 to 2025-05-29

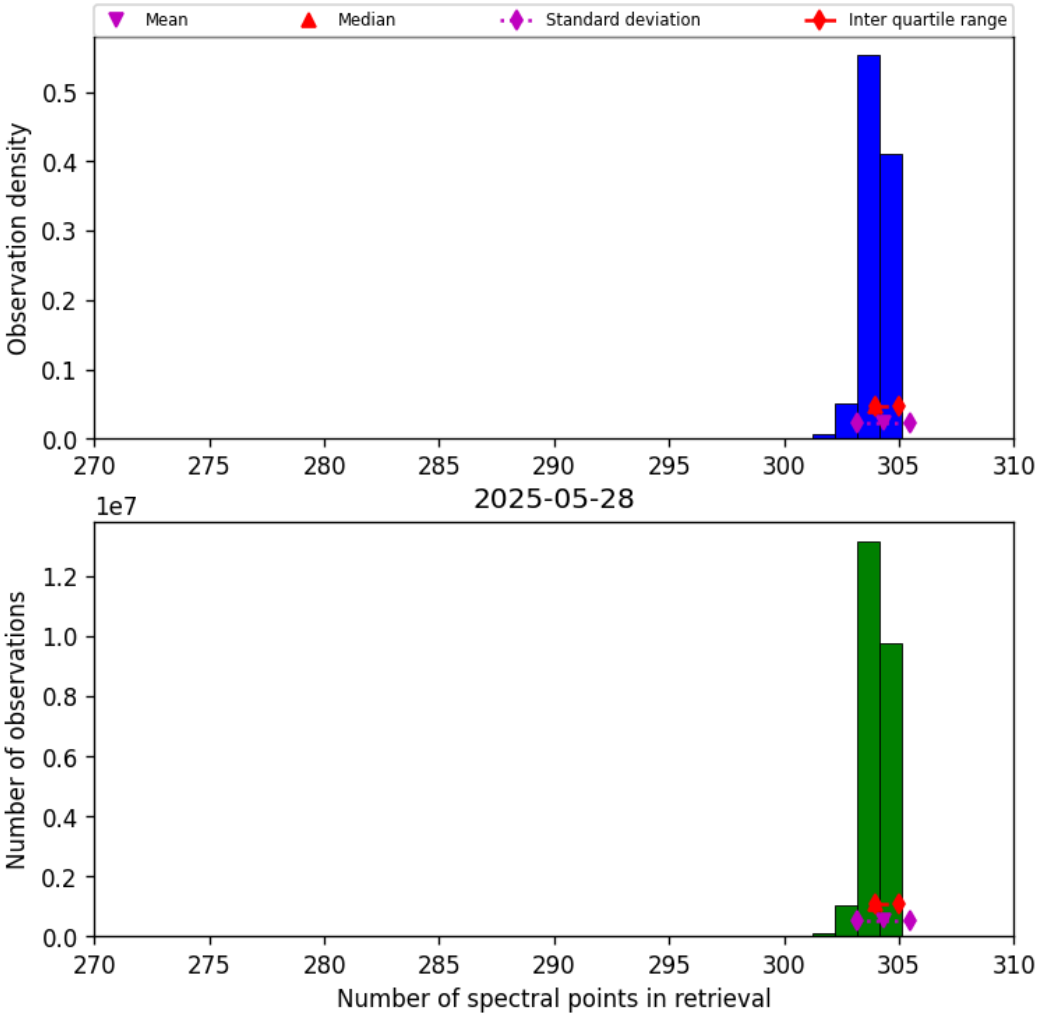

Figure 31: Histogram of “Number of spectral points in retrieval” for 2025-05-28 to 2025-05-29

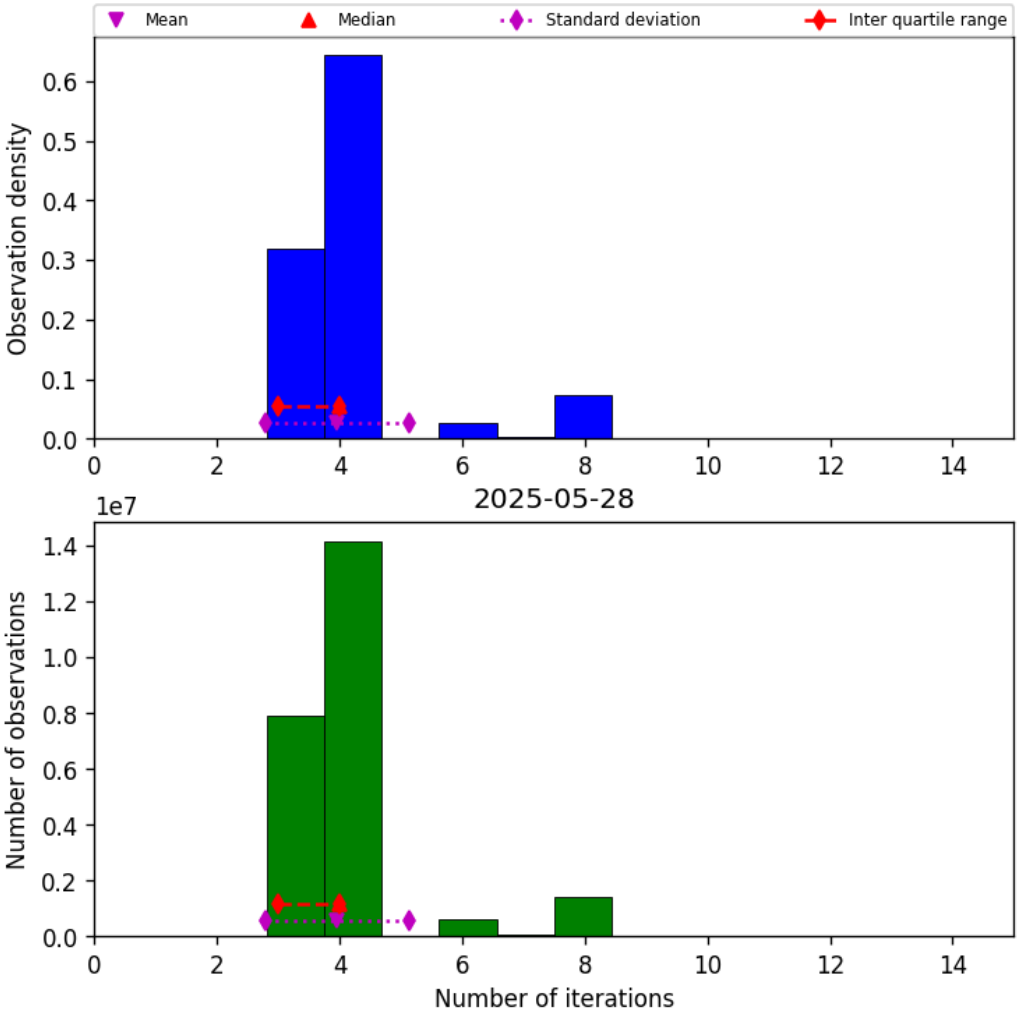

Figure 32: Histogram of “Number of iterations” for 2025-05-28 to 2025-05-29

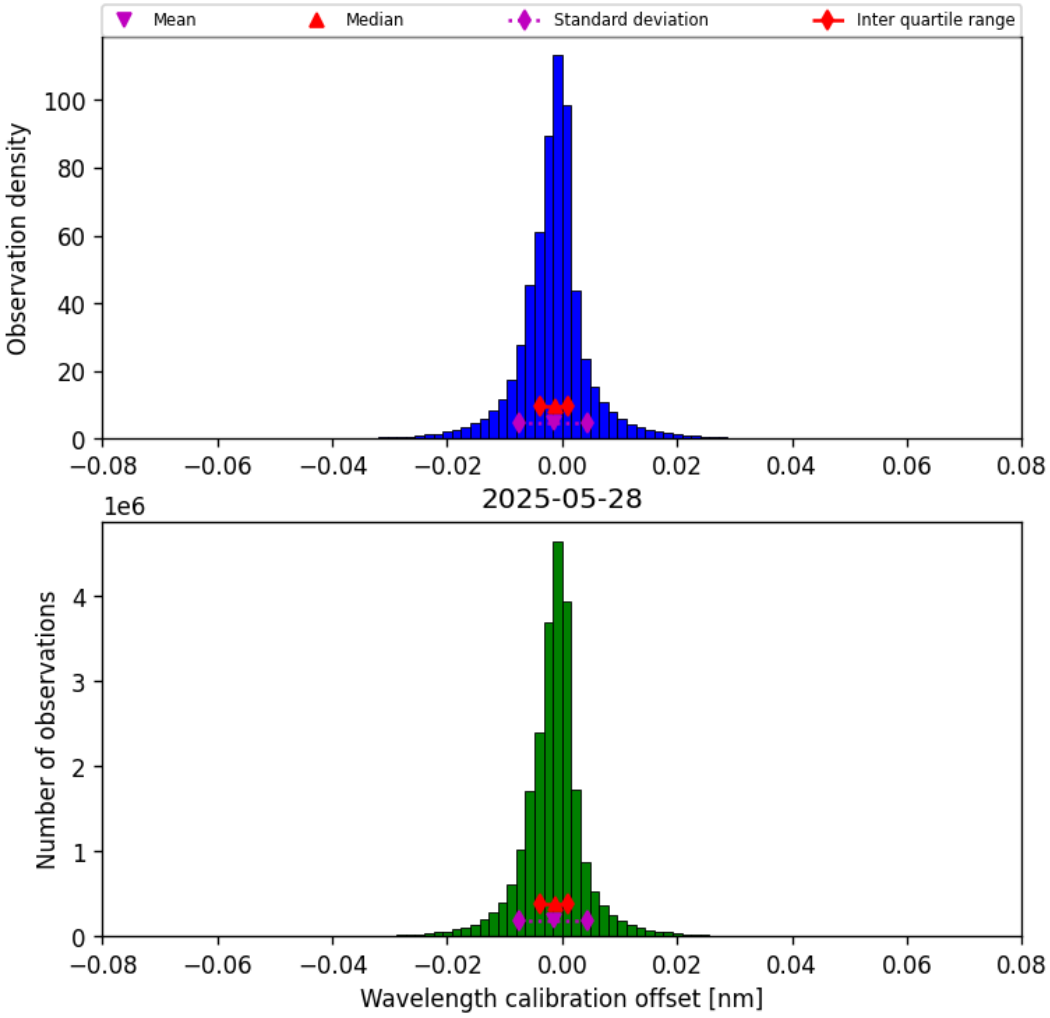

Figure 33: Histogram of “Wavelength calibration offset” for 2025-05-28 to 2025-05-29

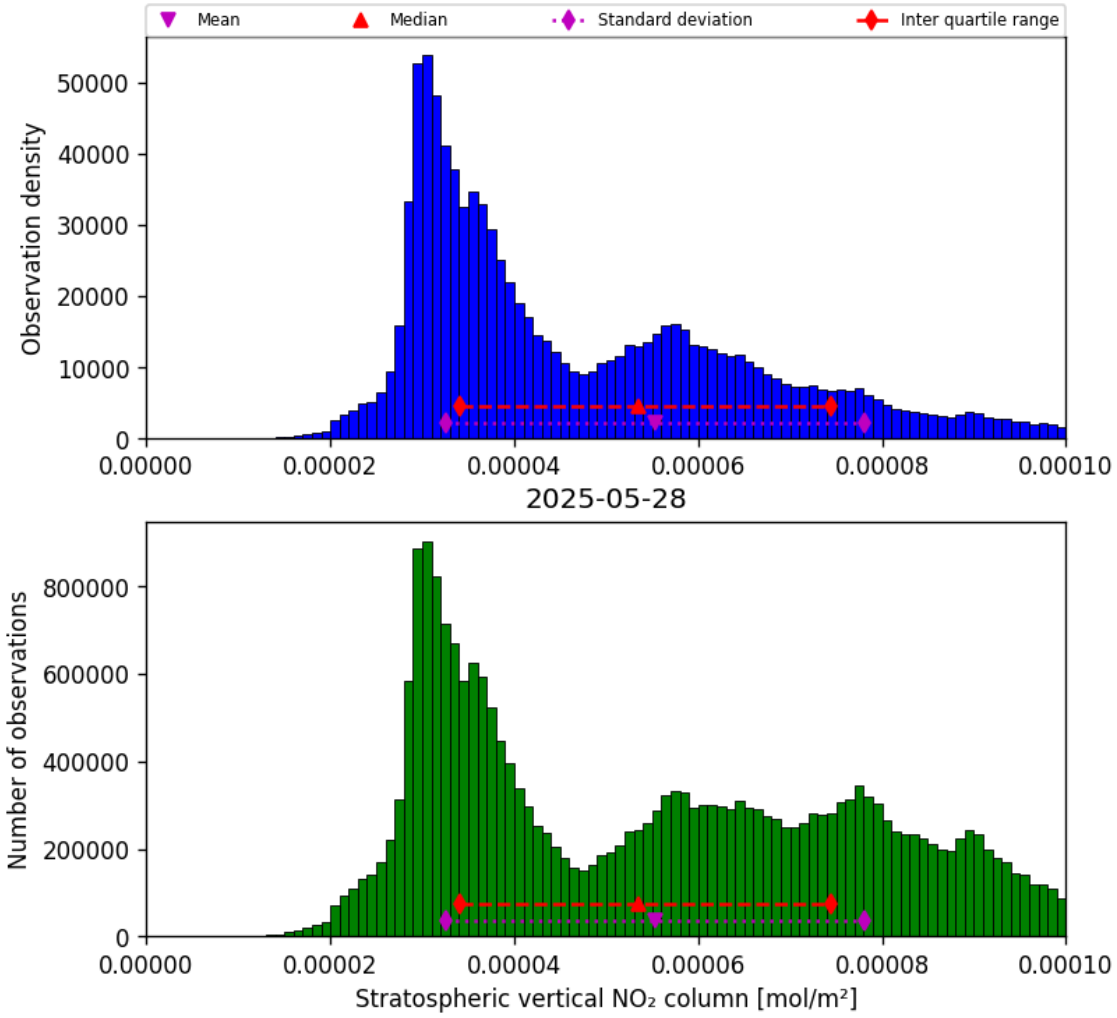

Figure 34: Histogram of "Stratospheric vertical NO_2 column" for 2025-05-28 to 2025-05-29

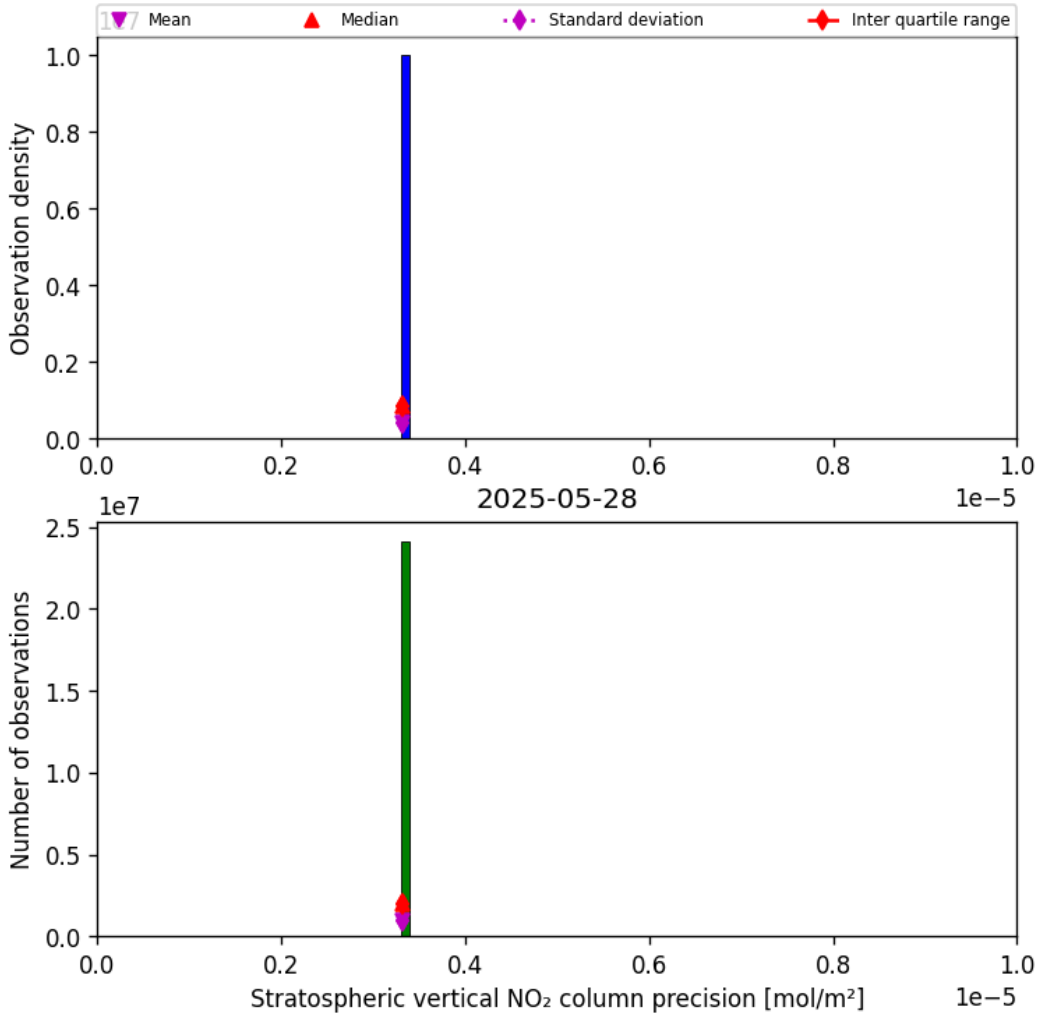

Figure 35: Histogram of “Stratospheric vertical NO_2 column precision” for 2025-05-28 to 2025-05-29

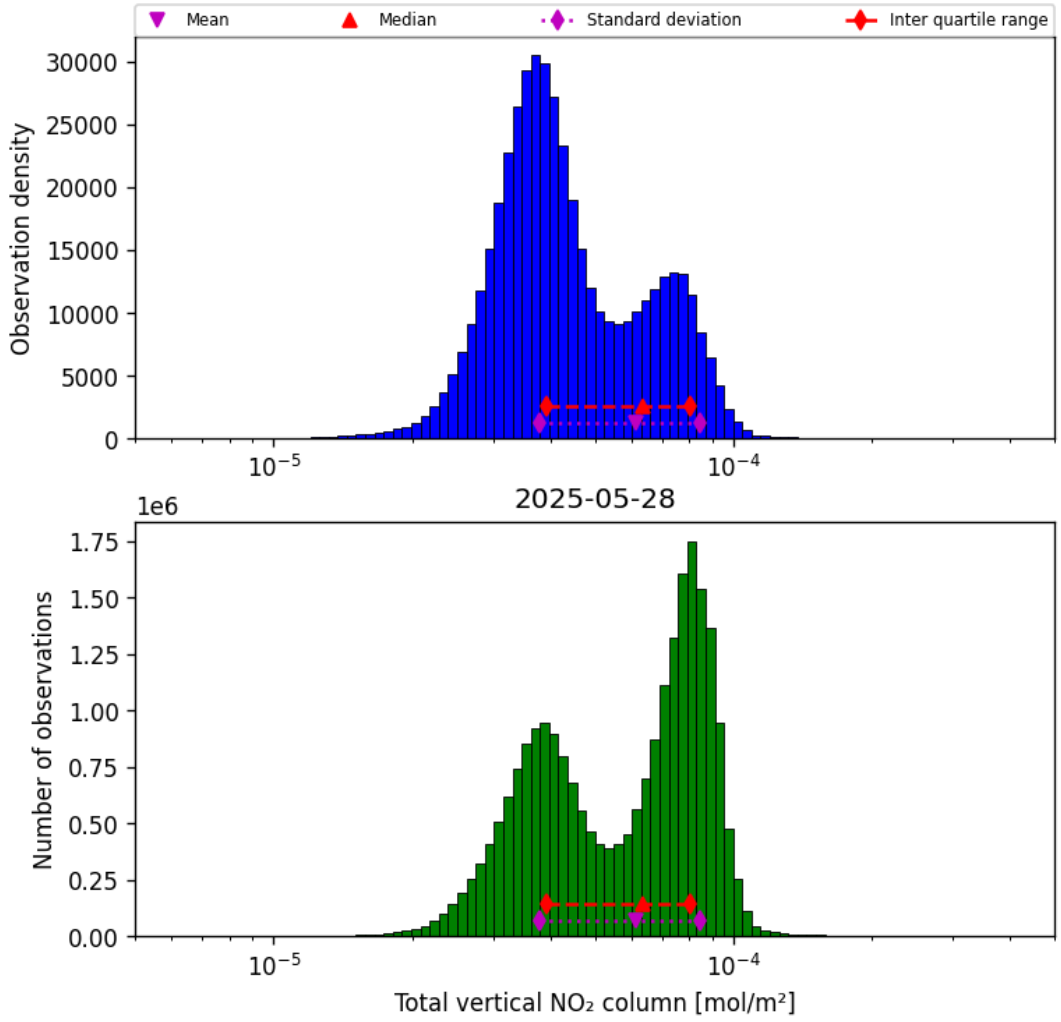

Figure 36: Histogram of "Total vertical NO_2 column" for 2025-05-28 to 2025-05-29

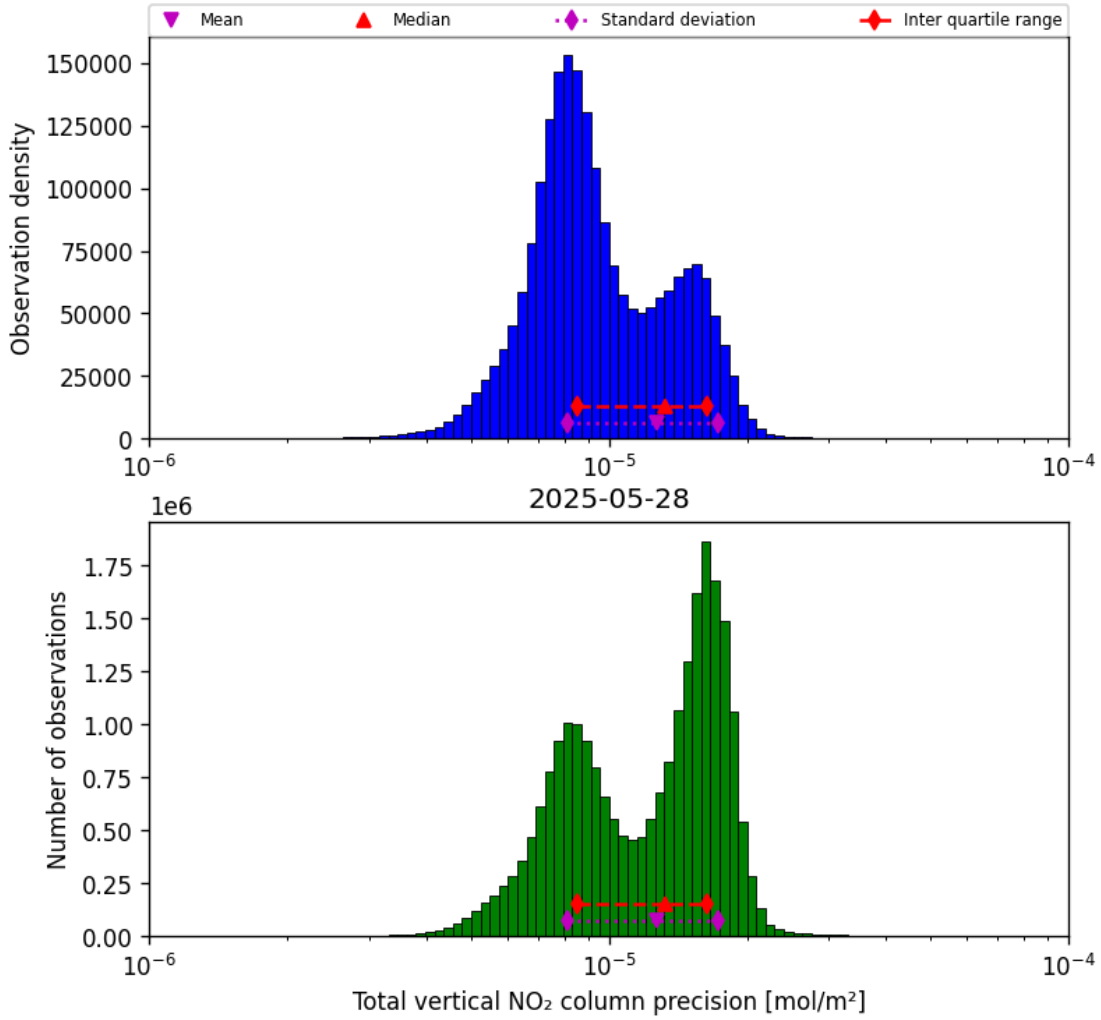

Figure 37: Histogram of "Total vertical NO_2 column precision" for 2025-05-28 to 2025-05-29

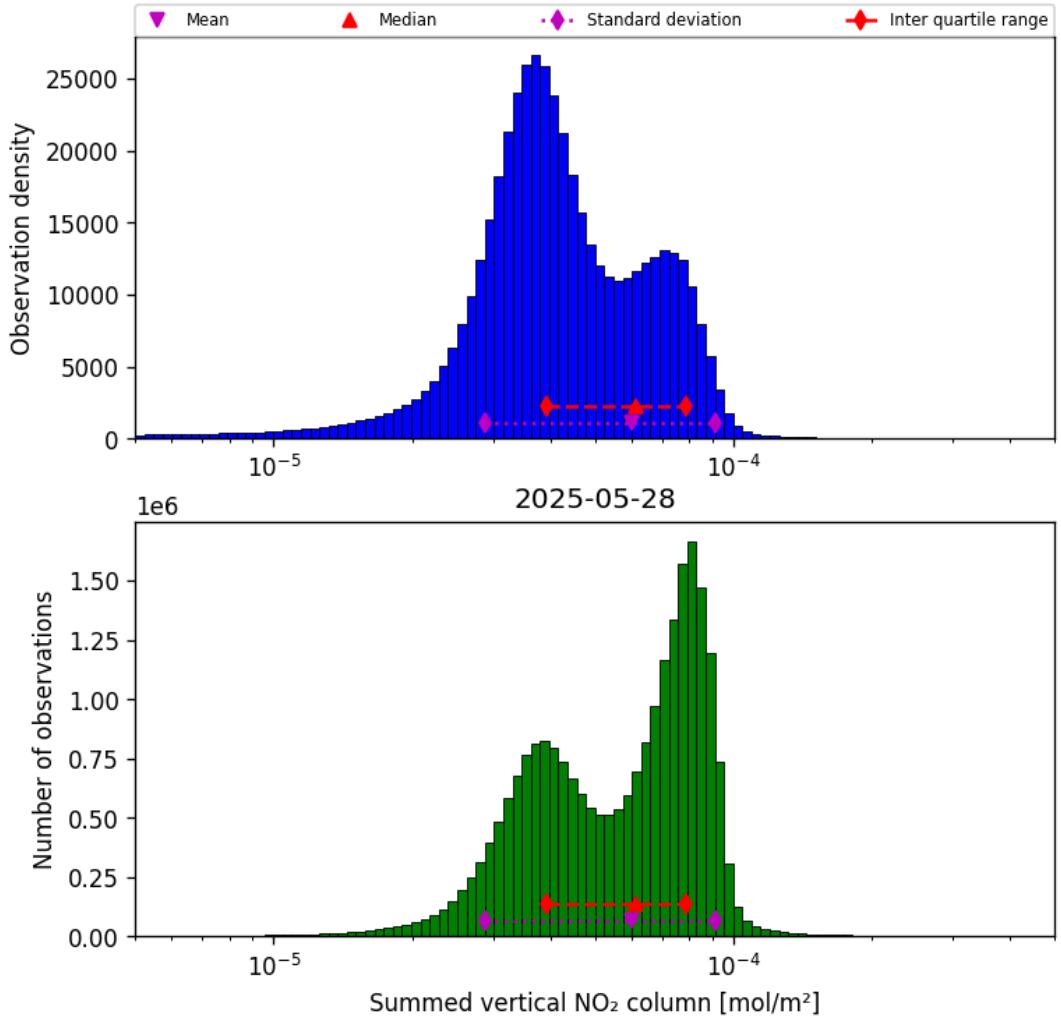

Figure 38: Histogram of "Summed vertical NO_2 column" for 2025-05-28 to 2025-05-29

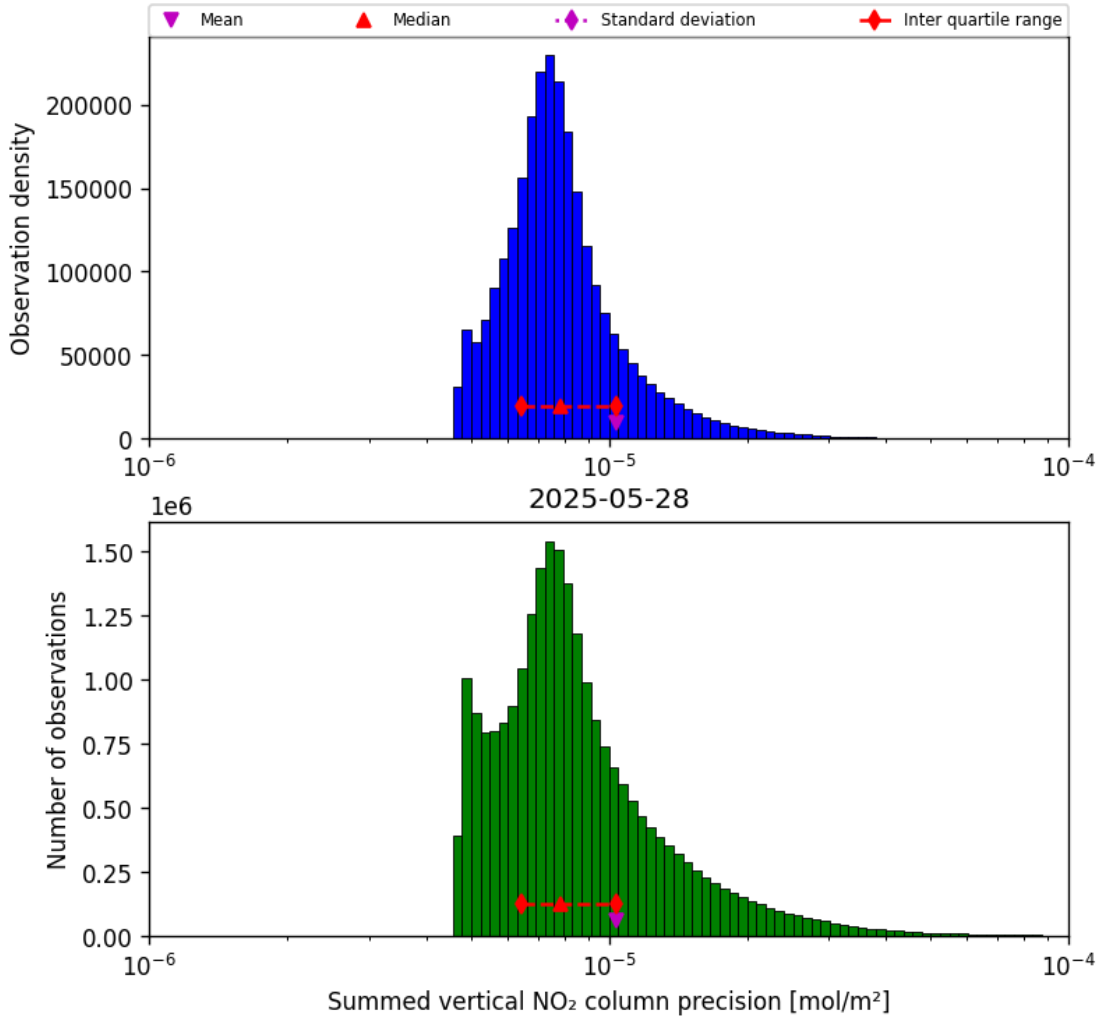

Figure 39: Histogram of "Summed vertical NO_2 column precision" for 2025-05-28 to 2025-05-29

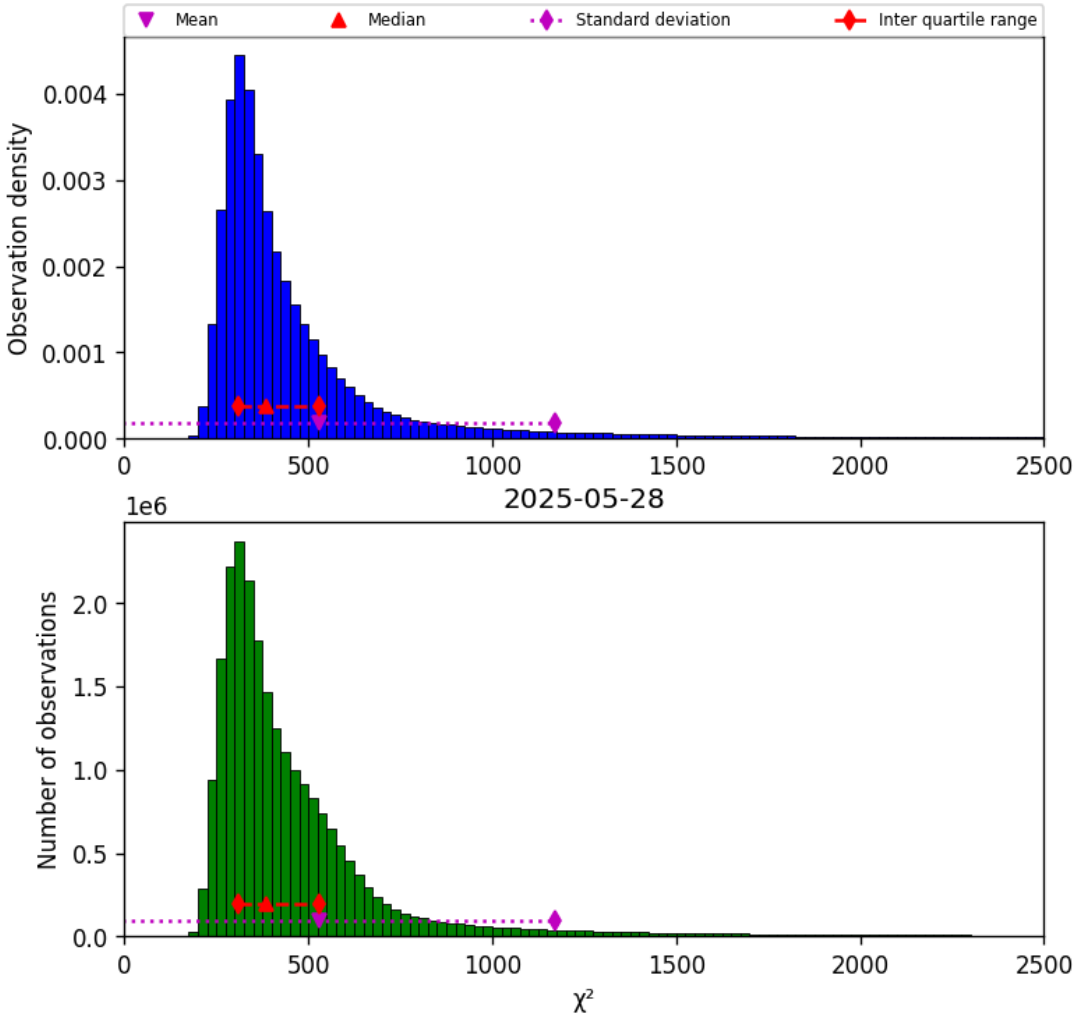

Figure 40: Histogram of "χ^2" for 2025-05-28 to 2025-05-29

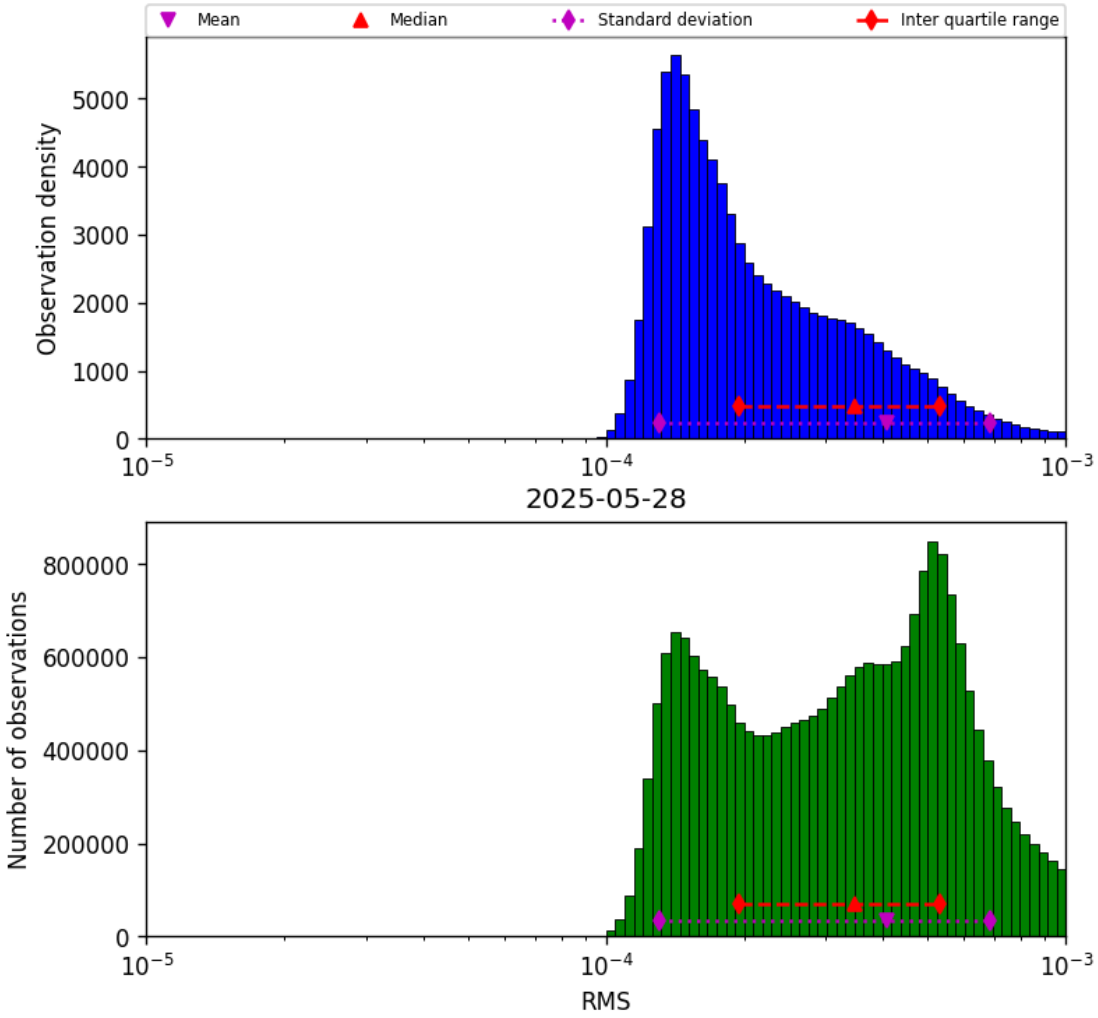

Figure 41: Histogram of “RMS” for 2025-05-28 to 2025-05-29

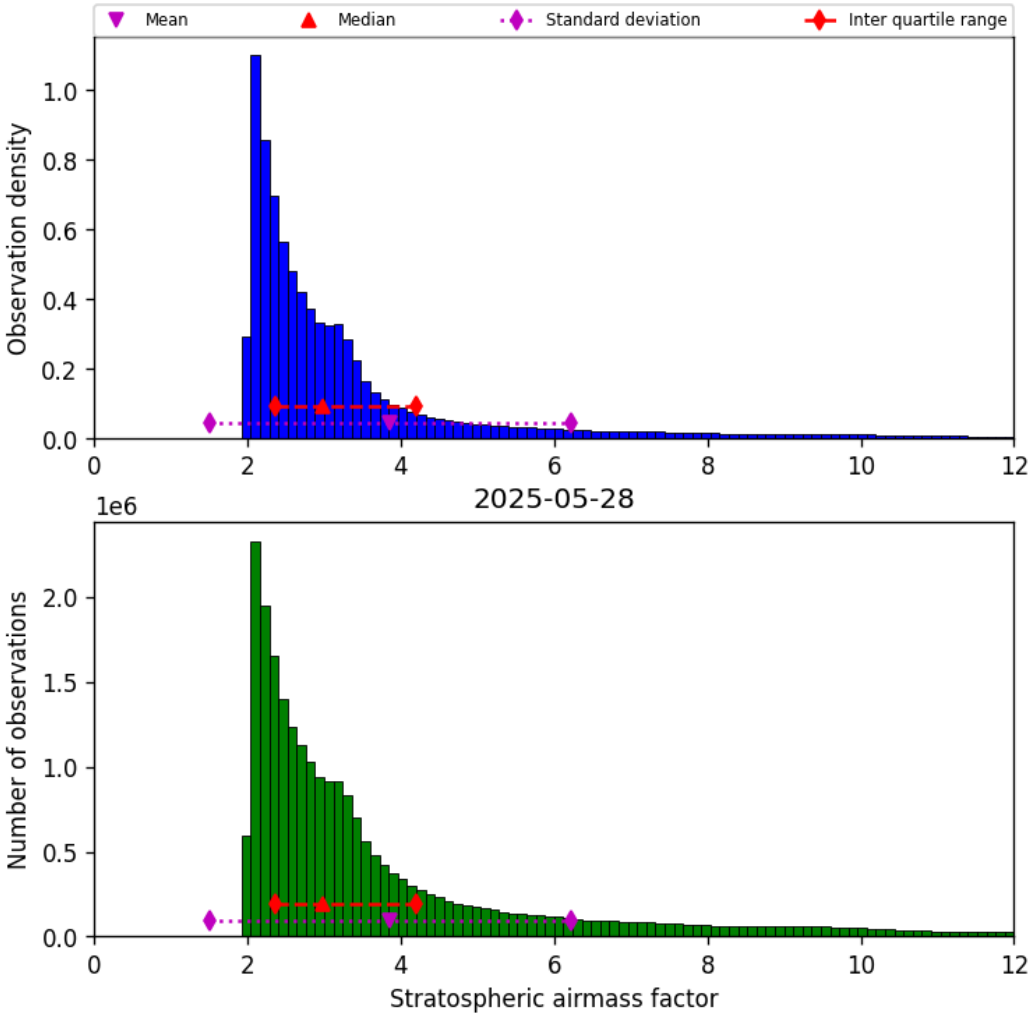

Figure 42: Histogram of “Stratospheric airmass factor” for 2025-05-28 to 2025-05-29

9 Along track statistics

The TROPOMI instrument uses different binned detector rows for different viewing directions. In this section statistics are presented for each of the binned rows in the instrument.

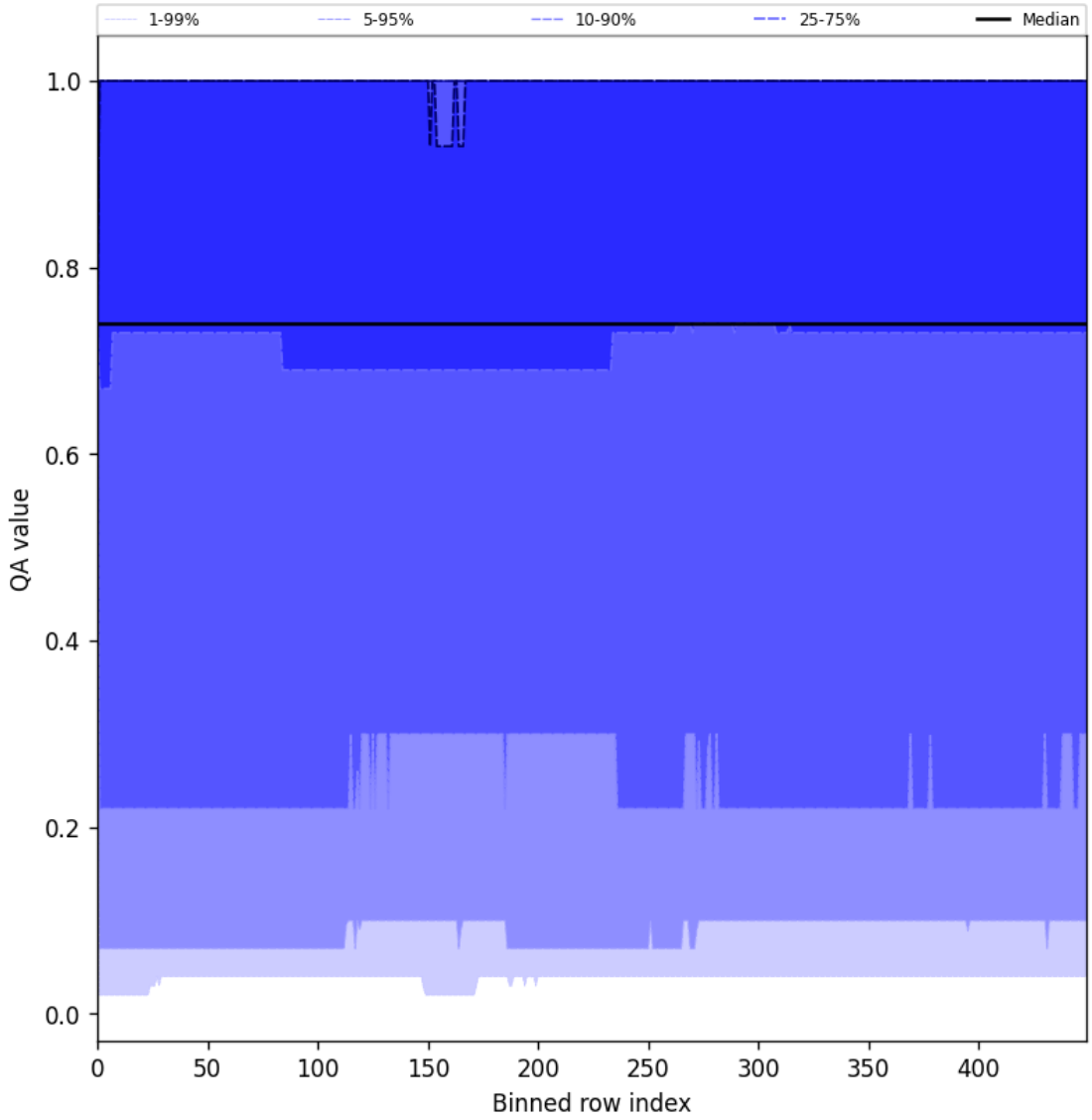

Figure 43: Along track statistics of “QA value” for 2025-05-28 to 2025-05-29

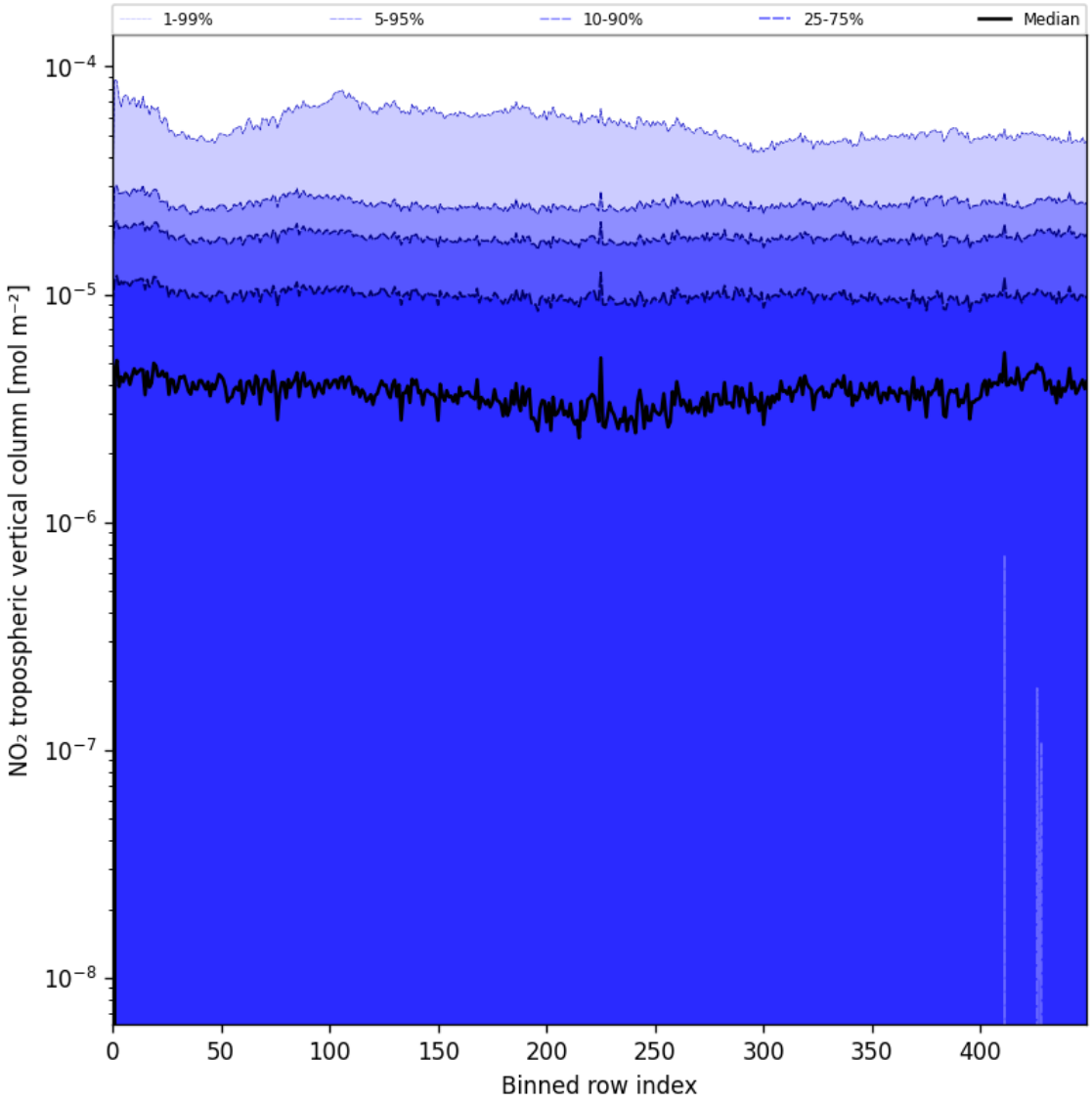

Figure 44: Along track statistics of "NO_2 tropospheric vertical column" for 2025-05-28 to 2025-05-29

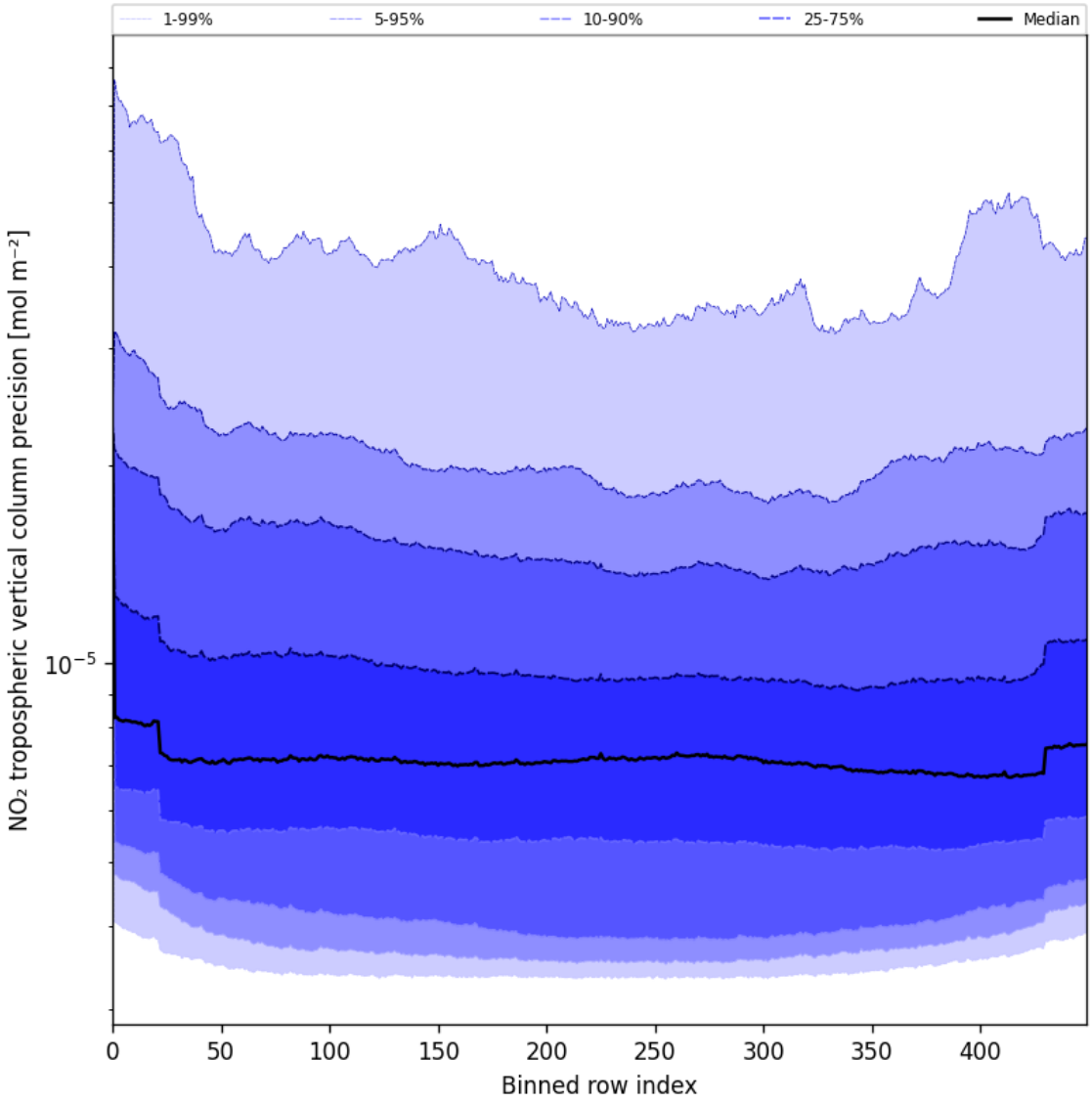

Figure 45: Along track statistics of "NO_2 tropospheric vertical column precision" for 2025-05-28 to 2025-05-29

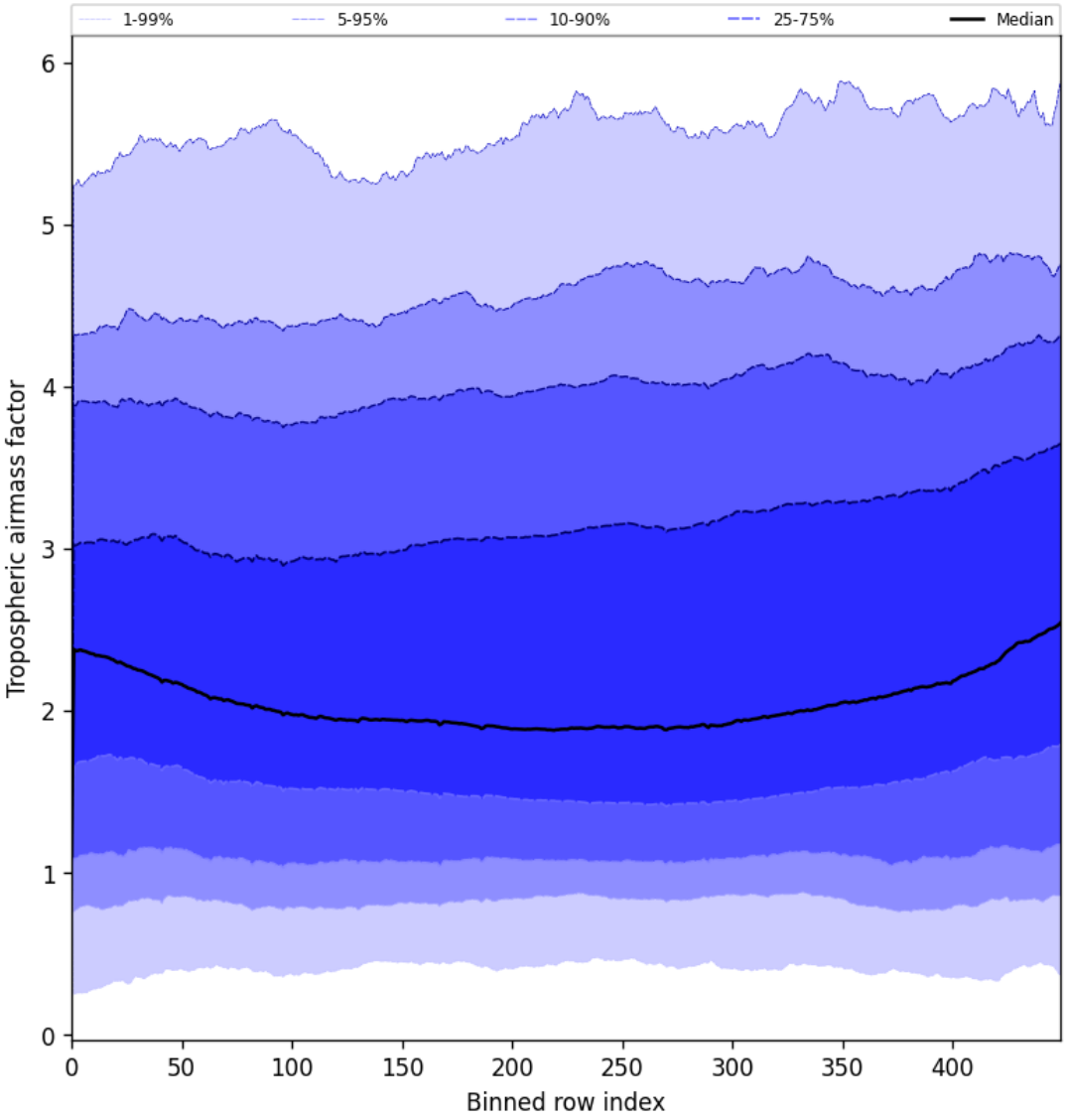

Figure 46: Along track statistics of “Tropospheric airmass factor” for 2025-05-28 to 2025-05-29

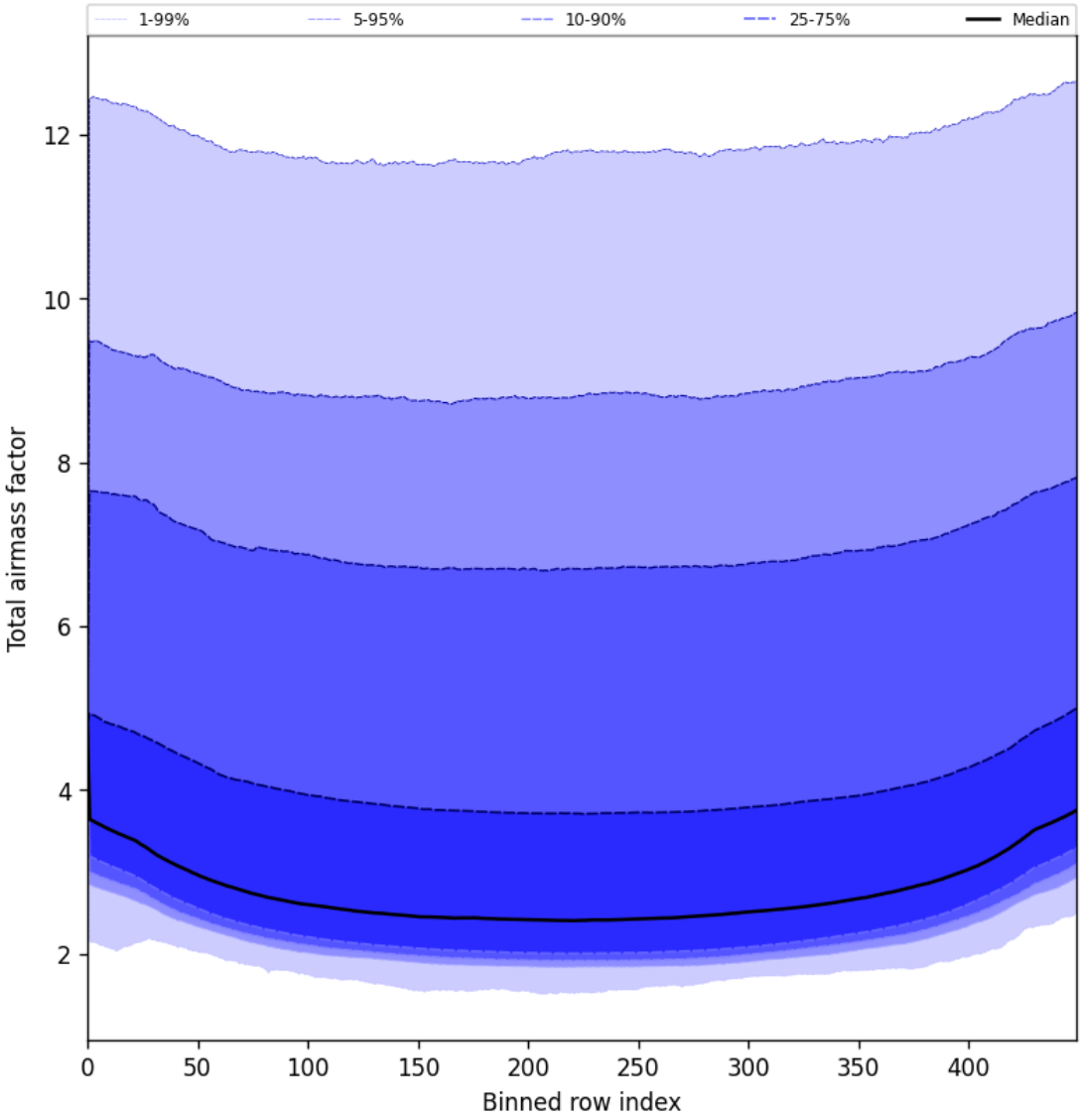

Figure 47: Along track statistics of “Total airmass factor” for 2025-05-28 to 2025-05-29

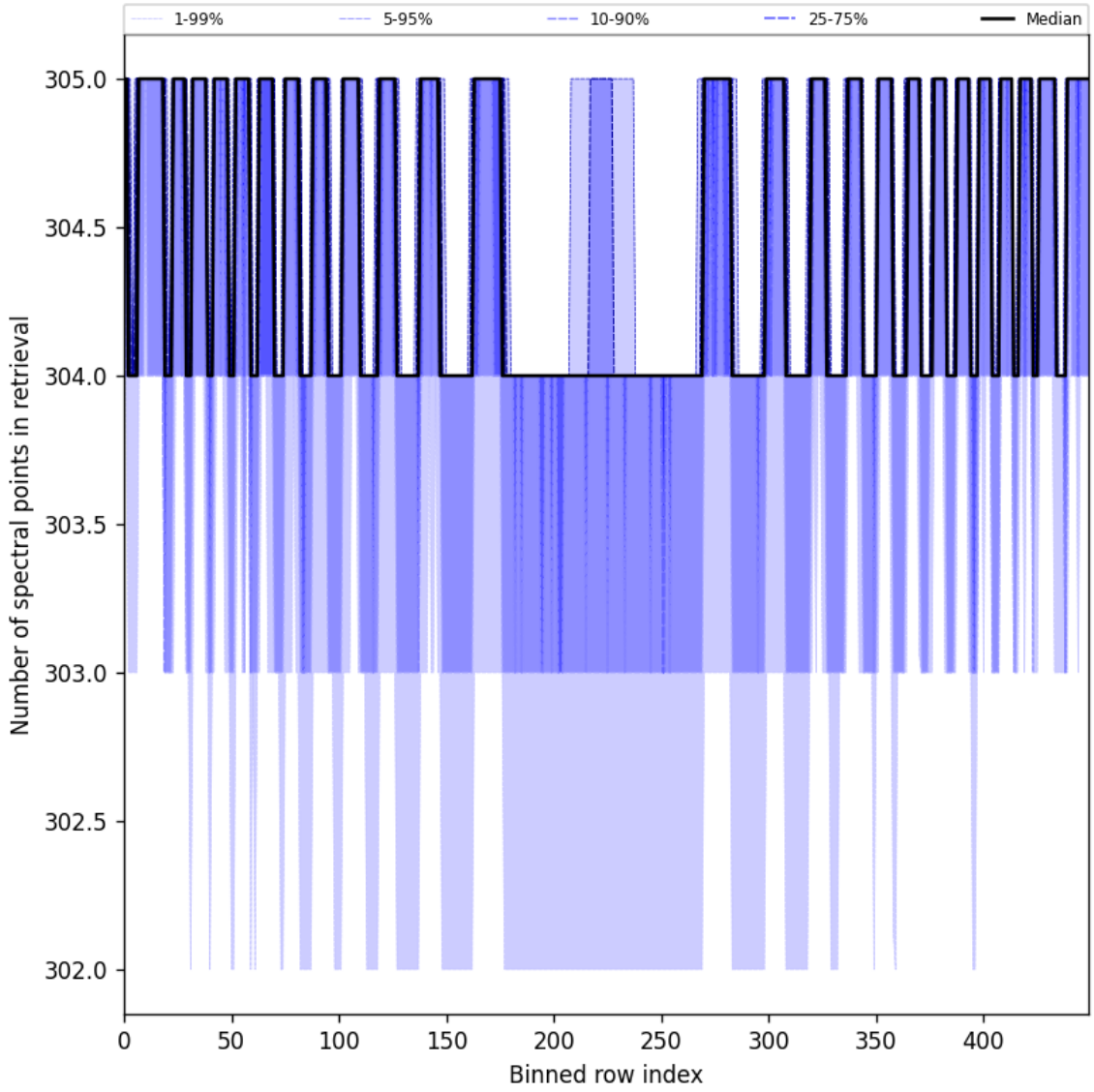

Figure 48: Along track statistics of “Number of spectral points in retrieval” for 2025-05-28 to 2025-05-29

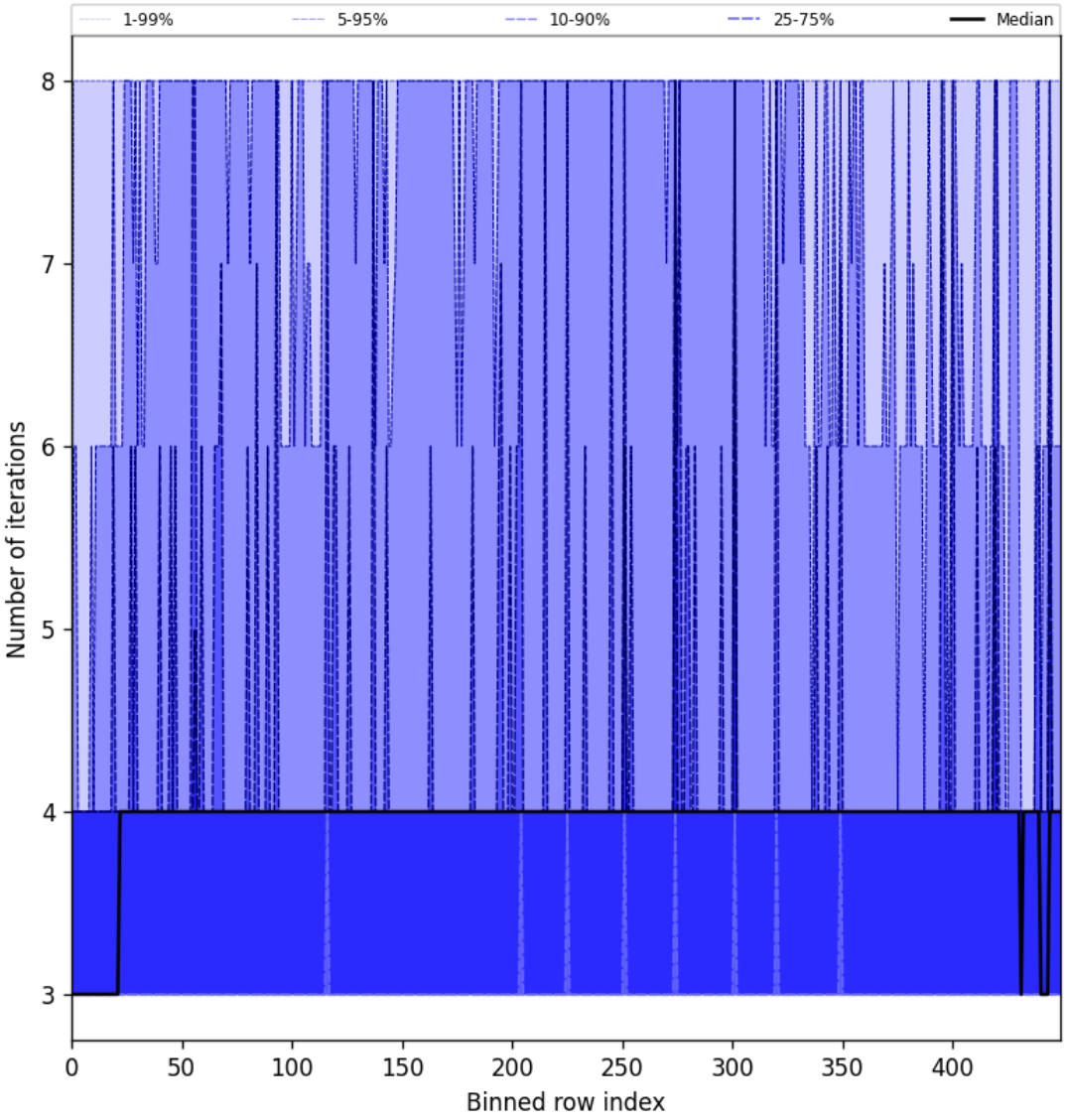

Figure 49: Along track statistics of “Number of iterations” for 2025-05-28 to 2025-05-29

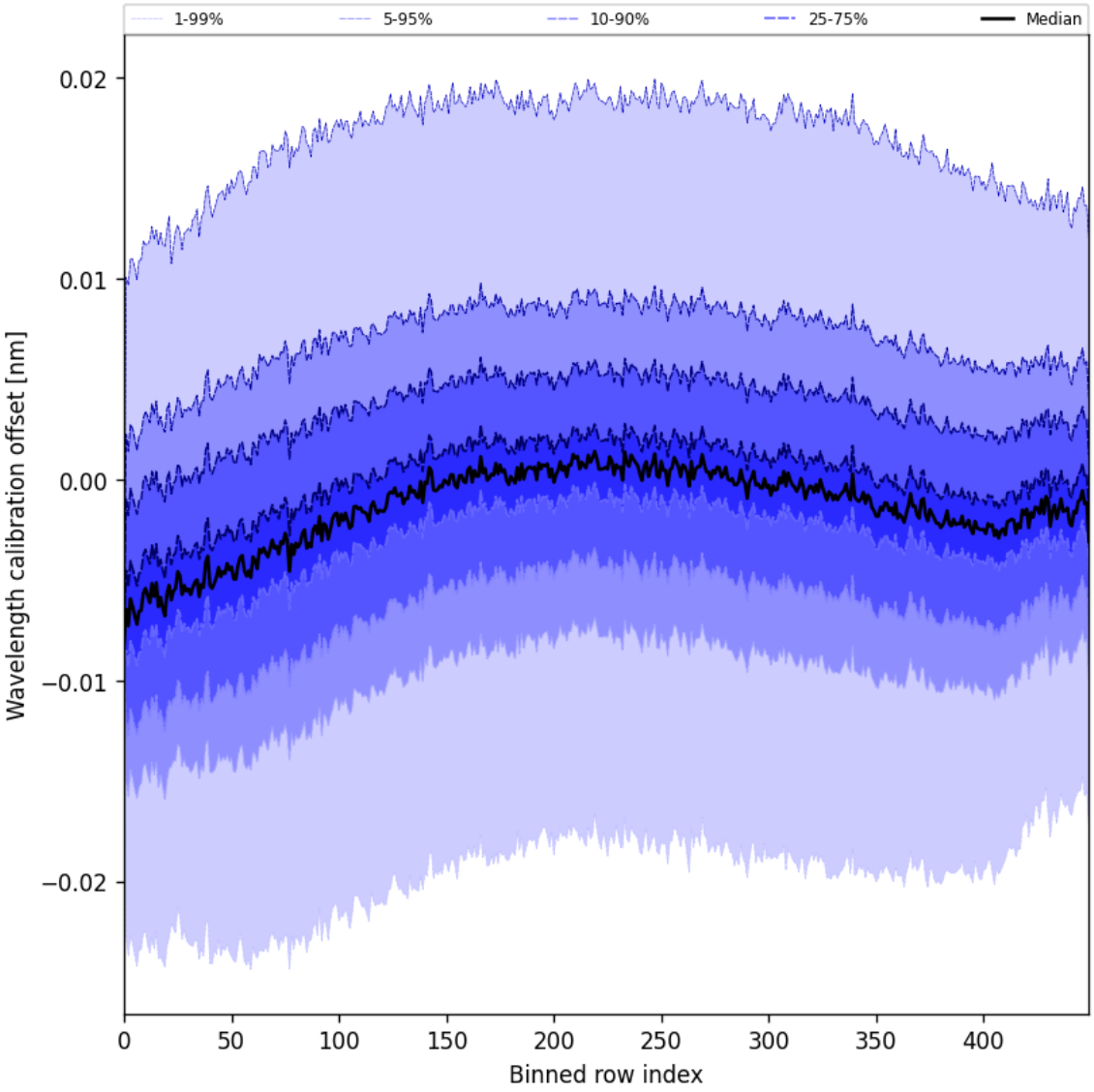

Figure 50: Along track statistics of “Wavelength calibration offset” for 2025-05-28 to 2025-05-29

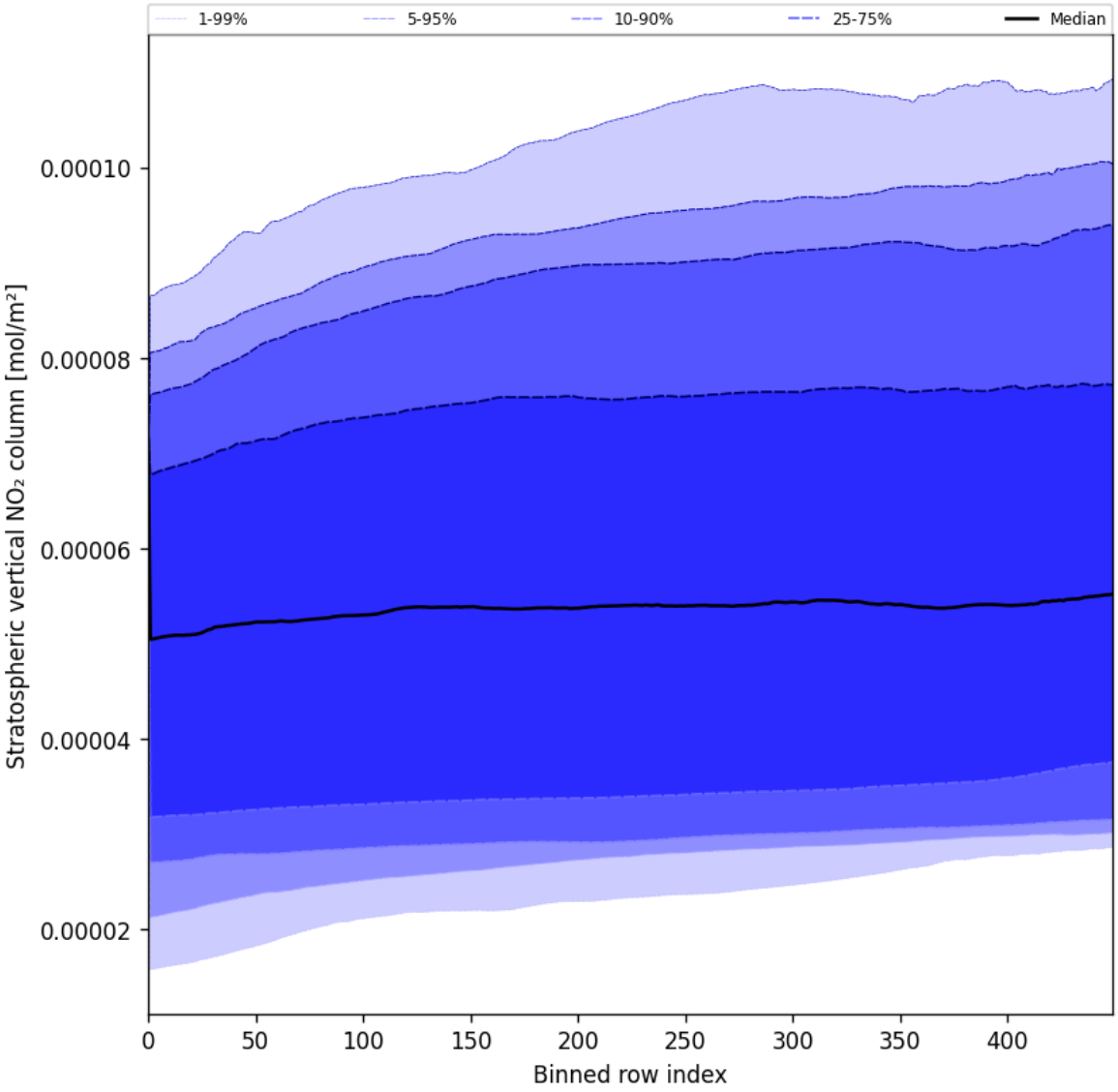

Figure 51: Along track statistics of “Stratospheric vertical NO_2 column” for 2025-05-28 to 2025-05-29

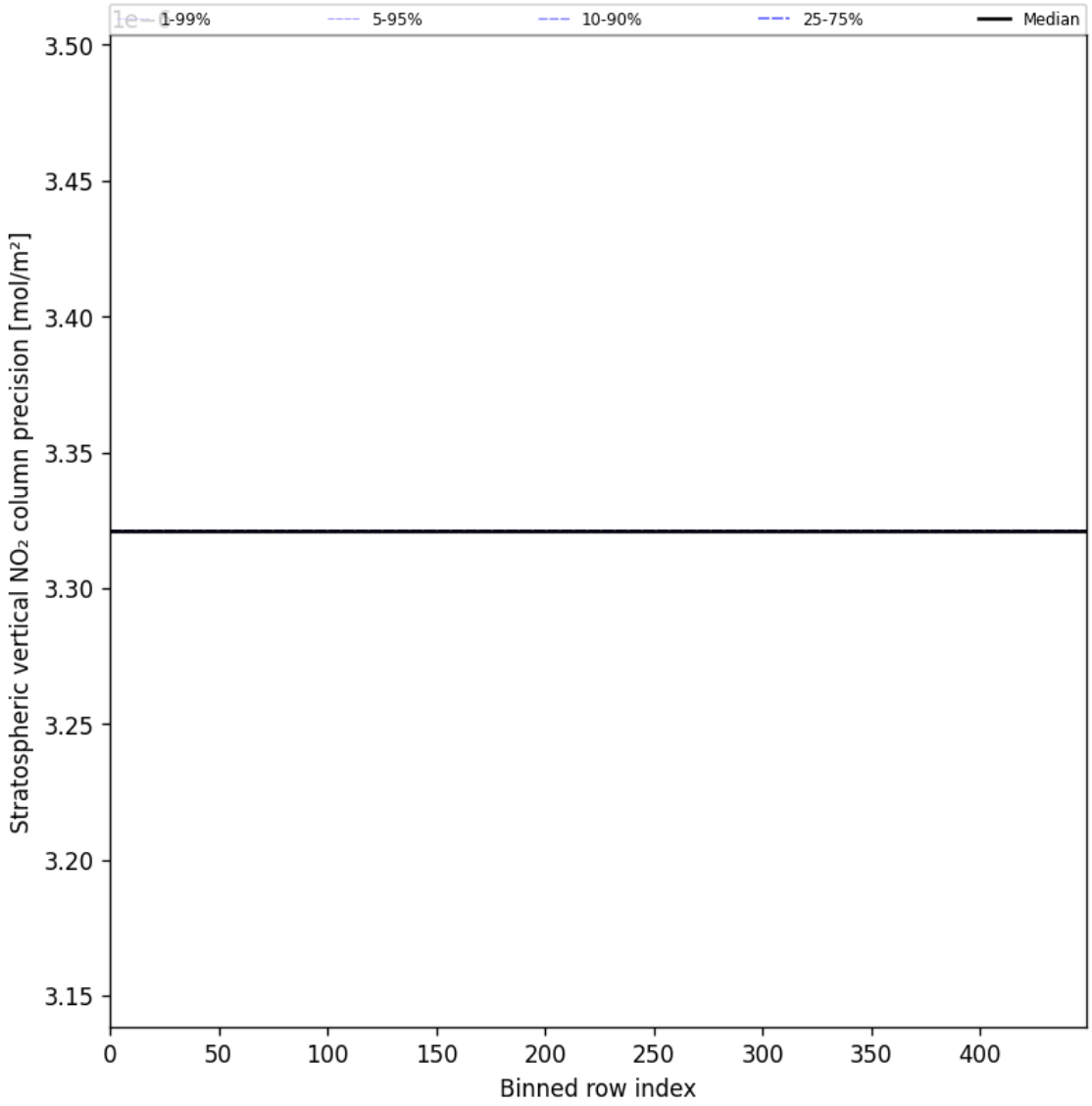

Figure 52: Along track statistics of “Stratospheric vertical NO_2 column precision” for 2025-05-28 to 2025-05-29

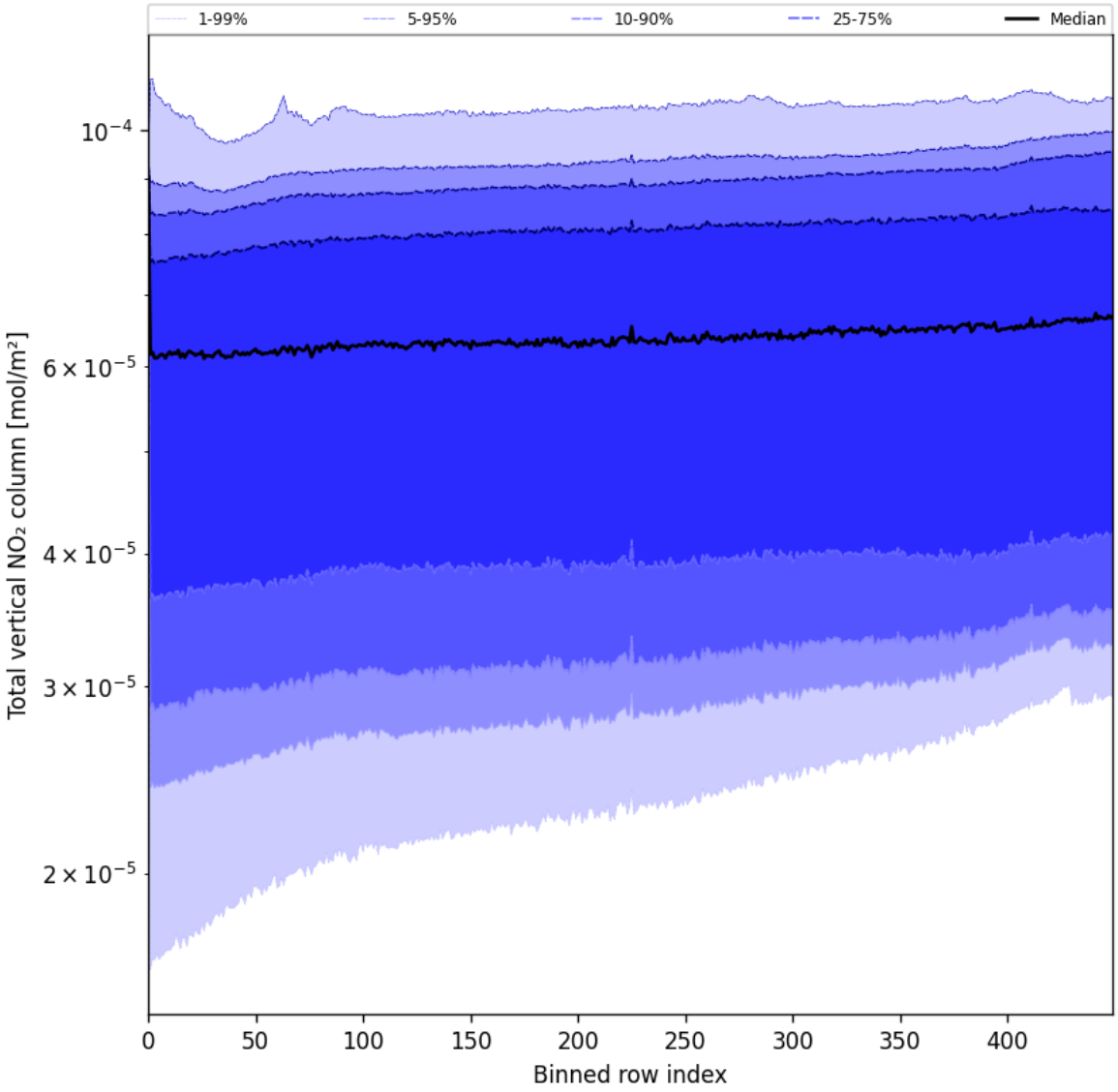

Figure 53: Along track statistics of "Total vertical NO_2 column" for 2025-05-28 to 2025-05-29

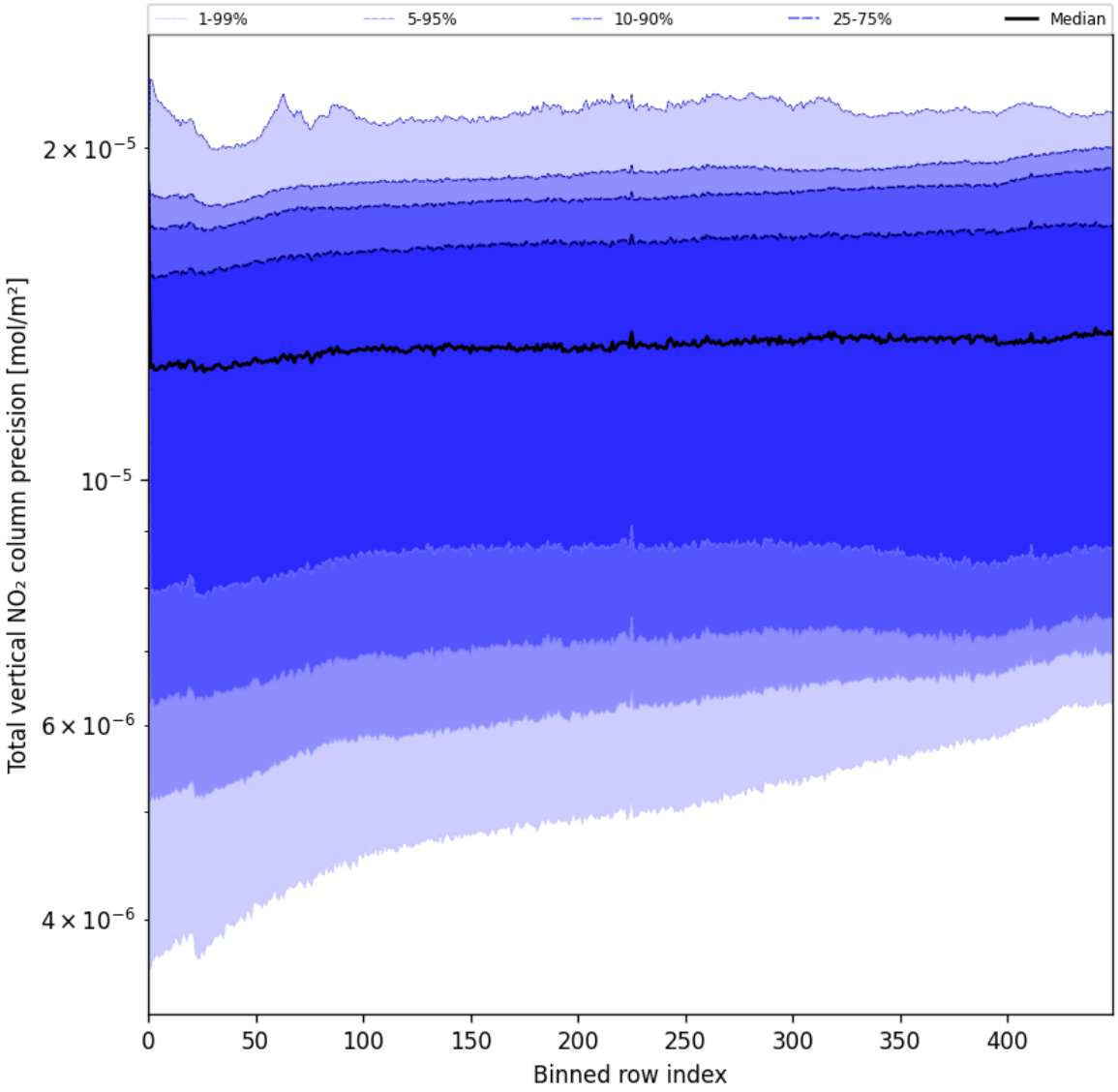

Figure 54: Along track statistics of "Total vertical NO_2 column precision" for 2025-05-28 to 2025-05-29

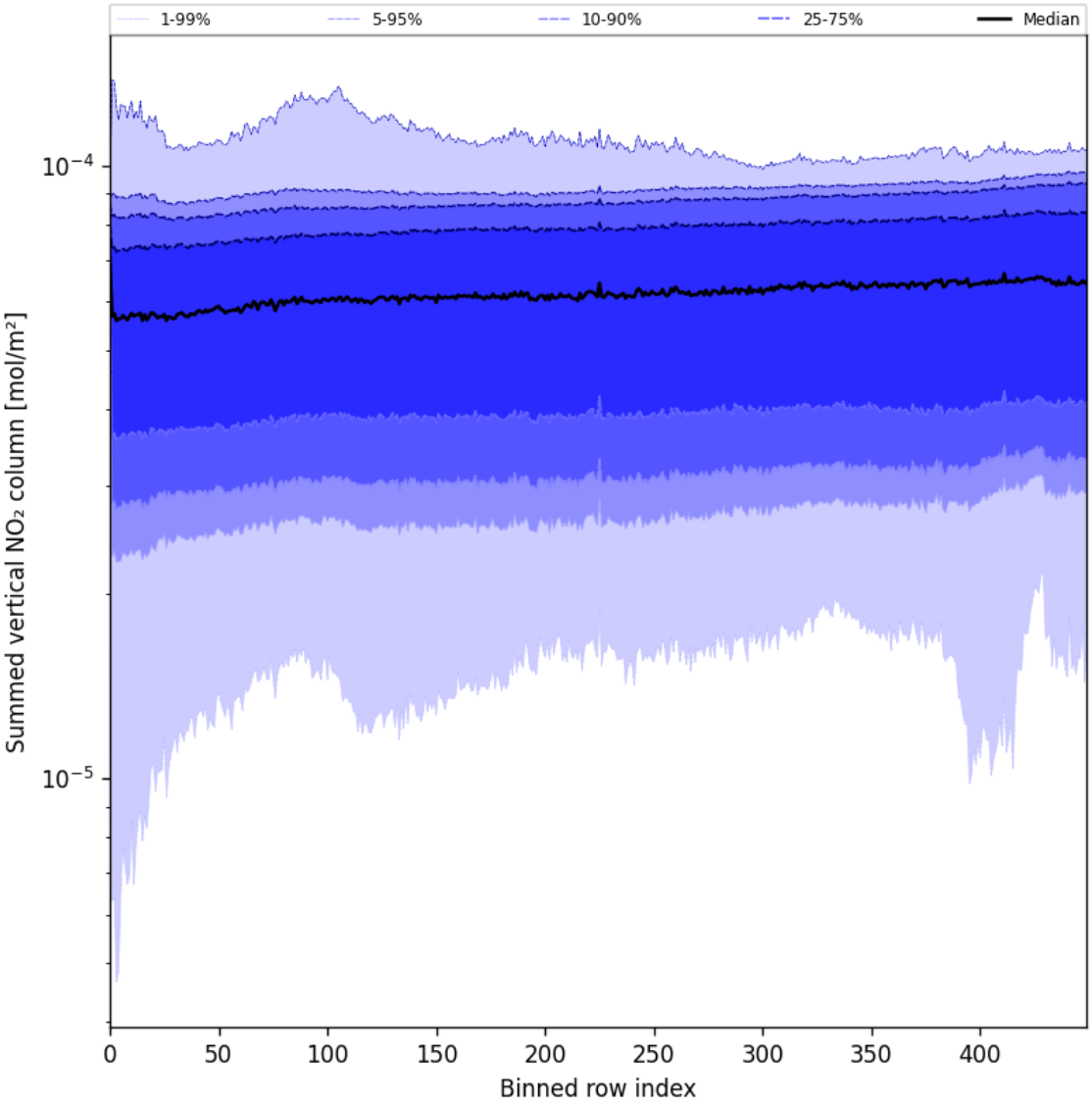

Figure 55: Along track statistics of "Summed vertical NO_2 column" for 2025-05-28 to 2025-05-29

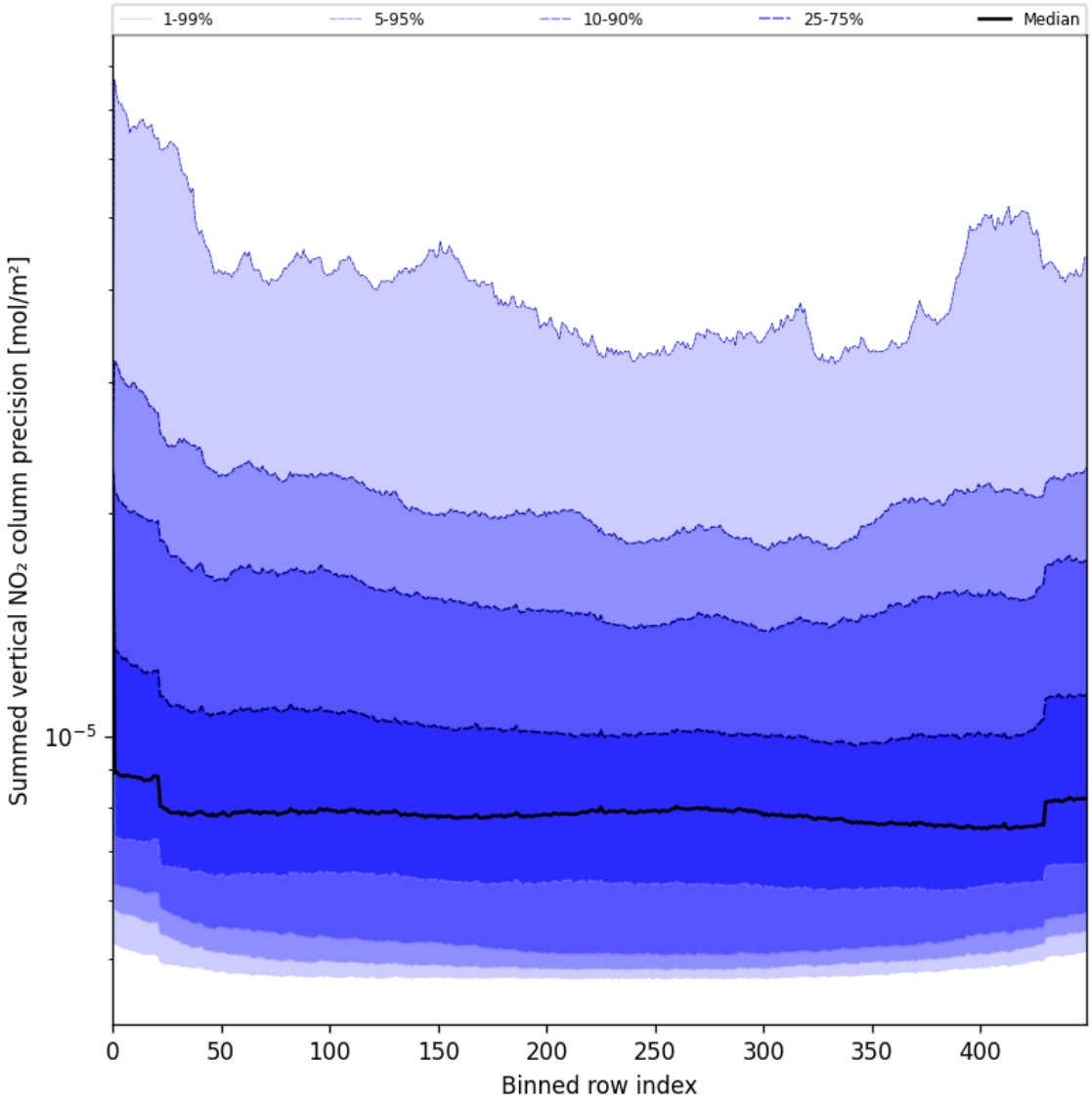

Figure 56: Along track statistics of “Summed vertical NO_2 column precision” for 2025-05-28 to 2025-05-29

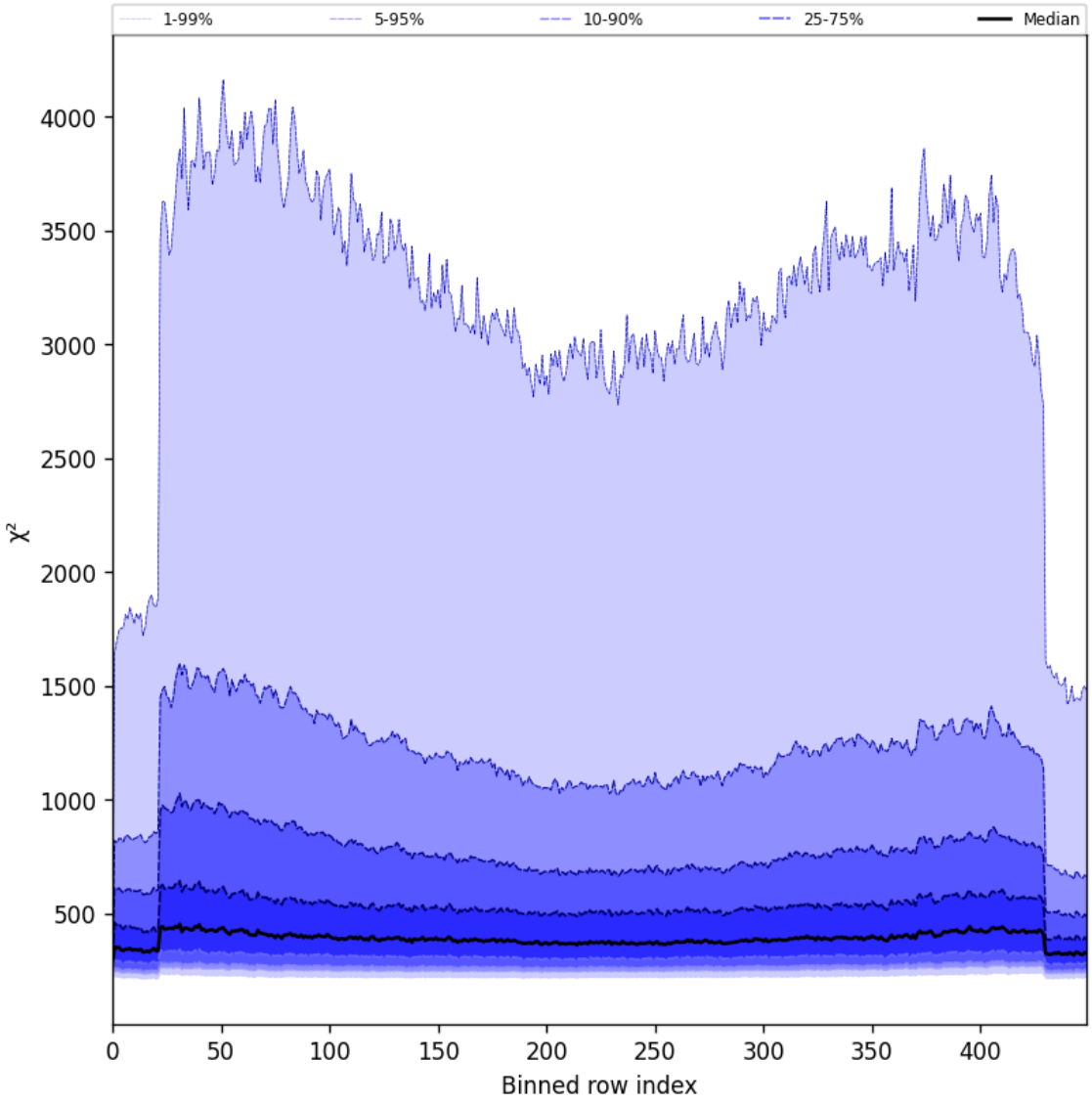

Figure 57: Along track statistics of "χ^2" for 2025-05-28 to 2025-05-29

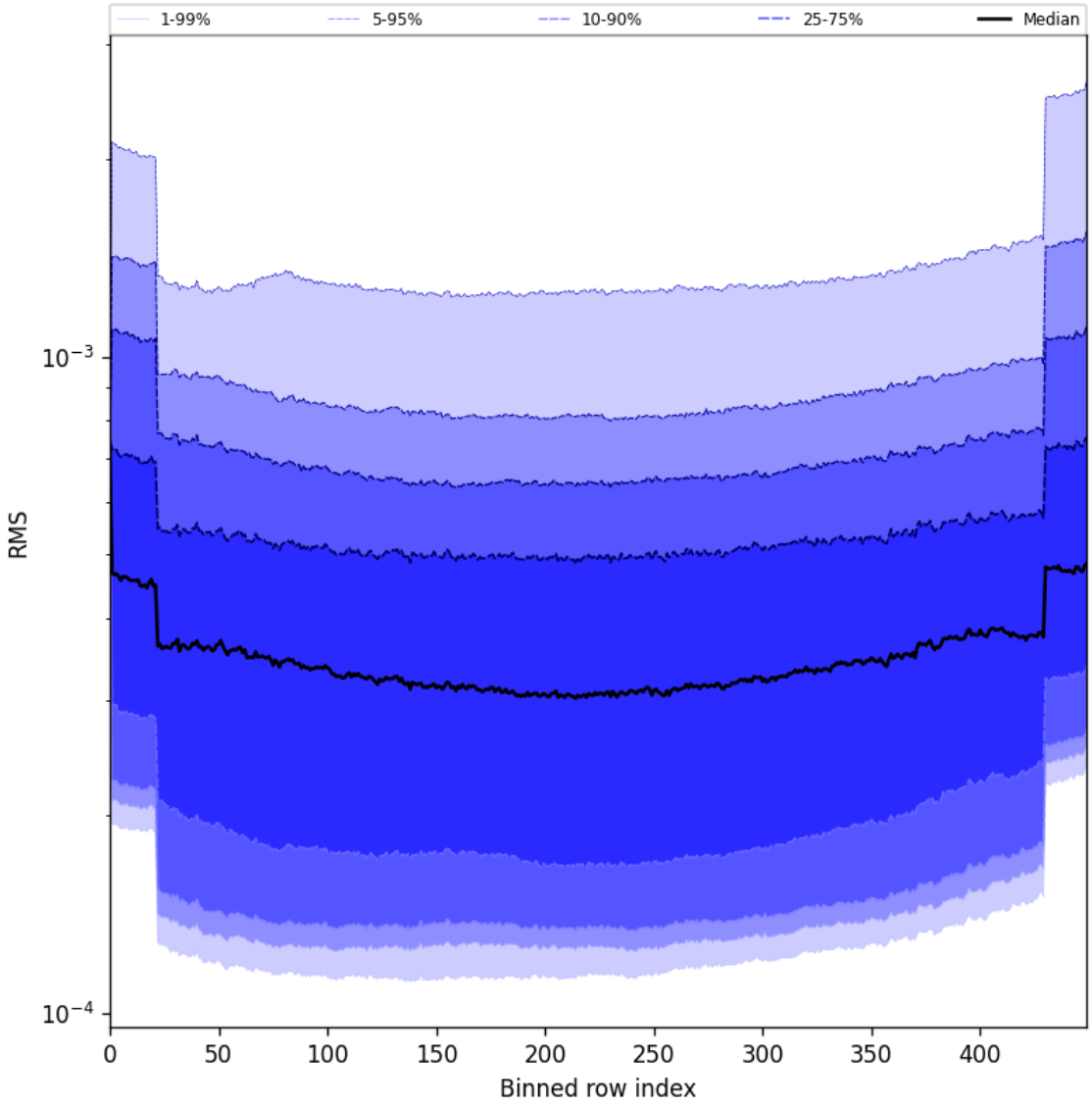

Figure 58: Along track statistics of “RMS” for 2025-05-28 to 2025-05-29

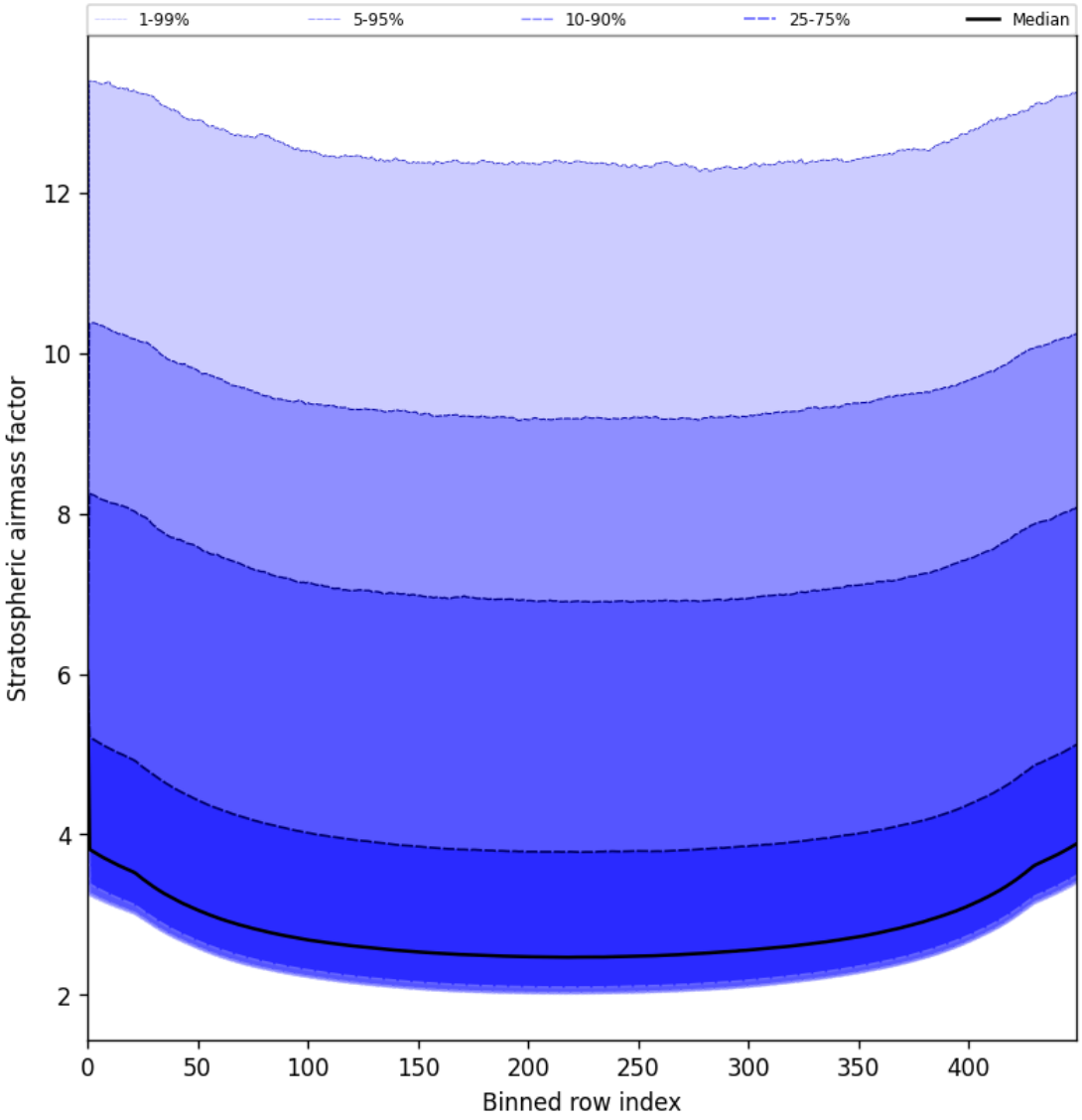

Figure 59: Along track statistics of “Stratospheric airmass factor” for 2025-05-28 to 2025-05-29

10 Coincidence density

To investigate the relation between parameters scatter density plots are produced. These include some 'hidden' parameters, latitude and the solar- and viewing geometries, in addition to all configured parameters. All combinations of pairs of parameters are included *once*, in one direction alone.

Contents

1 Short Introduction **1**
1.1 The list of parameters . . . 1

2 Definitions **1**

3 Granule outlines **8**

4 Input data monitoring **9**

5 Warnings and errors **10**

6 World maps **11**

7 Zonal average **16**

8 Histograms **33**

9 Along track statistics **50**

10 Coincidence density **67**

11 Copyright information of 'PyCAMA' **67**

List of Figures

1 Outline of the granules. . . . 8
2 Input data per granule . . . 9
3 Fraction of pixels with specific warnings and errors during processing . . . 10
4 Map of "NO_2 tropospheric vertical column" for 2025-05-28 to 2025-05-29 . . . 11
5 Map of "Stratospheric vertical NO_2 column" for 2025-05-28 to 2025-05-29 . . . 12
6 Map of "Total vertical NO_2 column" for 2025-05-28 to 2025-05-29 . . . 13
7 Map of "Summed vertical NO_2 column" for 2025-05-28 to 2025-05-29 . . . 14
8 Map of the number of observations for 2025-05-28 to 2025-05-29 . . . 15
9 Zonal average of "QA value" for 2025-05-28 to 2025-05-29. . . . 16
10 Zonal average of "NO_2 tropospheric vertical column" for 2025-05-28 to 2025-05-29. . . . 17
11 Zonal average of "NO_2 tropospheric vertical column precision" for 2025-05-28 to 2025-05-29. . . . 18
12 Zonal average of "Tropospheric airmass factor" for 2025-05-28 to 2025-05-29. . . . 19
13 Zonal average of "Total airmass factor" for 2025-05-28 to 2025-05-29. . . . 20
14 Zonal average of "Number of spectral points in retrieval" for 2025-05-28 to 2025-05-29. . . . 21
15 Zonal average of "Number of iterations" for 2025-05-28 to 2025-05-29. . . . 22
16 Zonal average of "Wavelength calibration offset" for 2025-05-28 to 2025-05-29. . . . 23
17 Zonal average of "Stratospheric vertical NO_2 column" for 2025-05-28 to 2025-05-29. . . . 24
18 Zonal average of "Stratospheric vertical NO_2 column precision" for 2025-05-28 to 2025-05-29. . . . 25
19 Zonal average of "Total vertical NO_2 column" for 2025-05-28 to 2025-05-29. . . . 26
20 Zonal average of "Total vertical NO_2 column precision" for 2025-05-28 to 2025-05-29. . . . 27
21 Zonal average of "Summed vertical NO_2 column" for 2025-05-28 to 2025-05-29. . . . 28
22 Zonal average of "Summed vertical NO_2 column precision" for 2025-05-28 to 2025-05-29. . . . 29
23 Zonal average of "χ^2" for 2025-05-28 to 2025-05-29. . . . 30
24 Zonal average of "RMS" for 2025-05-28 to 2025-05-29. . . . 31
25 Zonal average of "Stratospheric airmass factor" for 2025-05-28 to 2025-05-29. . . . 32
26 Histogram of "QA value" for 2025-05-28 to 2025-05-29 . . . 33
27 Histogram of "NO_2 tropospheric vertical column" for 2025-05-28 to 2025-05-29 . . . 34
28 Histogram of "NO_2 tropospheric vertical column precision" for 2025-05-28 to 2025-05-29 . . . 35
29 Histogram of "Tropospheric airmass factor" for 2025-05-28 to 2025-05-29 . . . 36

30 Histogram of “Total airmass factor” for 2025-05-28 to 2025-05-29 . . . 37
31 Histogram of “Number of spectral points in retrieval” for 2025-05-28 to 2025-05-29 . . . 38
32 Histogram of “Number of iterations” for 2025-05-28 to 2025-05-29 . . . 39
33 Histogram of “Wavelength calibration offset” for 2025-05-28 to 2025-05-29 . . . 40
34 Histogram of “Stratospheric vertical NO_2 column” for 2025-05-28 to 2025-05-29 . . . 41
35 Histogram of “Stratospheric vertical NO_2 column precision” for 2025-05-28 to 2025-05-29 . . . 42
36 Histogram of “Total vertical NO_2 column” for 2025-05-28 to 2025-05-29 . . . 43
37 Histogram of “Total vertical NO_2 column precision” for 2025-05-28 to 2025-05-29 . . . 44
38 Histogram of “Summed vertical NO_2 column” for 2025-05-28 to 2025-05-29 . . . 45
39 Histogram of “Summed vertical NO_2 column precision” for 2025-05-28 to 2025-05-29 . . . 46
40 Histogram of “χ^2” for 2025-05-28 to 2025-05-29 . . . 47
41 Histogram of “RMS” for 2025-05-28 to 2025-05-29 . . . 48
42 Histogram of “Stratospheric airmass factor” for 2025-05-28 to 2025-05-29 . . . 49
43 Along track statistics of “QA value” for 2025-05-28 to 2025-05-29 . . . 50
44 Along track statistics of “NO_2 tropospheric vertical column” for 2025-05-28 to 2025-05-29 . . . 51
45 Along track statistics of “NO_2 tropospheric vertical column precision” for 2025-05-28 to 2025-05-29 . . . 52
46 Along track statistics of “Tropospheric airmass factor” for 2025-05-28 to 2025-05-29 . . . 53
47 Along track statistics of “Total airmass factor” for 2025-05-28 to 2025-05-29 . . . 54
48 Along track statistics of “Number of spectral points in retrieval” for 2025-05-28 to 2025-05-29 . . . 55
49 Along track statistics of “Number of iterations” for 2025-05-28 to 2025-05-29 . . . 56
50 Along track statistics of “Wavelength calibration offset” for 2025-05-28 to 2025-05-29 . . . 57
51 Along track statistics of “Stratospheric vertical NO_2 column” for 2025-05-28 to 2025-05-29 . . . 58
52 Along track statistics of “Stratospheric vertical NO_2 column precision” for 2025-05-28 to 2025-05-29 . . . 59
53 Along track statistics of “Total vertical NO_2 column” for 2025-05-28 to 2025-05-29 . . . 60
54 Along track statistics of “Total vertical NO_2 column precision” for 2025-05-28 to 2025-05-29 . . . 61
55 Along track statistics of “Summed vertical NO_2 column” for 2025-05-28 to 2025-05-29 . . . 62
56 Along track statistics of “Summed vertical NO_2 column precision” for 2025-05-28 to 2025-05-29 . . . 63
57 Along track statistics of “χ^2” for 2025-05-28 to 2025-05-29 . . . 64
58 Along track statistics of “RMS” for 2025-05-28 to 2025-05-29 . . . 65
59 Along track statistics of “Stratospheric airmass factor” for 2025-05-28 to 2025-05-29 . . . 66

List of Tables

1 Parameterlist and basic statistics for the analysis . . . 2
2 Percentile ranges . . . 3
3 Parameterlist and basic statistics for the analysis for observations in the northern hemisphere . . . 4
4 Parameterlist and basic statistics for the analysis for observations in the southern hemisphere . . . 5
5 Parameterlist and basic statistics for the analysis for observations over water . . . 6
6 Parameterlist and basic statistics for the analysis for observations over land . . . 7

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