

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:

$$\bar{x} = \frac{1}{N} \sum_{i=1}^N x_i \quad (1)$$

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 $\sigma(x) = \sqrt{V(x)}$.

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

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 :

$$P(x \leq m) = P(x \geq m) = \int_{-\infty}^m f(x) dx = \frac{1}{2} \quad (3)$$

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

The median is a special case of a percentile. Instead of 1/2 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} .

$$C_{kl} = C(x_{(k)}, x_{(l)}) = \frac{1}{N-1} \sum_{i=1}^N (x_{(k),i} - \bar{x}_{(k)})(x_{(l),i} - \bar{x}_{(l)}) \quad (4)$$

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

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

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]	0.610 ± 0.420	17234489	0.995	0.830	1.000	0.0	1.000
sulfurdioxide total vertical column [DU]	$(4.952 \pm 165.272) \times 10^{-2}$	17234489	0.211	0.406	8.948×10^{-3}	-152	640
sulfurdioxide total vertical column precision [DU]	0.599 ± 1.160	17234489	0.122	0.351	0.300	3.735×10^{-2}	897
sulfurdioxide slant column density corrected [DU]	$(1.686 \pm 34.579) \times 10^{-2}$	17234489	0.235	0.338	8.391×10^{-3}	-28.2	262
sulfurdioxide slant column density cobra [DU]	$(1.677 \pm 33.141) \times 10^{-2}$	17234489	0.235	0.338	8.390×10^{-3}	-28.2	36.3
sulfurdioxide slant column density cobra precision [DU]	0.271 ± 0.123	17234489	0.213	0.108	0.232	7.814×10^{-2}	22.1
sulfurdioxide slant column density window1 [DU]	$(9.597 \pm 64.075) \times 10^{-2}$	17234489	0.125	0.711	0.106	-66.2	54.1
sulfurdioxide slant column density window1 precision [DU]	0.271 ± 0.123	17234489	0.213	0.108	0.232	7.814×10^{-2}	22.1
sulfurdioxide slant column density corrected win1 [DU]	$(3.963 \pm 61.889) \times 10^{-2}$	17234489	2.500×10^{-2}	0.673	2.563×10^{-2}	-66.2	54.2
background so2 slant column offset window1 [DU]	$(-5.634 \pm 18.539) \times 10^{-2}$	17234489	-0.140	0.242	-0.116	-1.42	4.25
sulfurdioxide slant column density window2 [DU]	1.000 ± 8.536	17234489	1.25	10.7	0.870	-890	911
sulfurdioxide slant column density window2 precision [DU]	7.74 ± 2.20	17234489	6.97	2.48	7.39	2.13	829
sulfurdioxide slant column density corrected win2 [DU]	0.245 ± 8.339	17234489	0.250	10.5	0.242	-888	911
background so2 slant column offset window2 [DU]	-0.755 ± 2.167	17234489	0.750	2.48	-0.125	-13.6	5.30
sulfurdioxide slant column density window3 [DU]	-7.64 ± 23.12	17234489	-9.52	28.7	-7.98	-534	411
sulfurdioxide slant column density window3 precision [DU]	26.4 ± 12.6	17234489	21.5	9.73	23.2	9.47	250
sulfurdioxide slant column density corrected win3 [DU]	-2.24 ± 22.45	17234489	-3.92	27.7	-2.29	-535	404
background so2 slant column offset window3 [DU]	5.39 ± 6.56	17234489	5.04	9.57	5.59	-19.7	26.7
sulfurdioxide slant column cobra flag [1]	1.98 ± 0.21	17234489	1.67	0.0	2.00	0.0	2.00
integrated so2 profile apriori [DU]	$(4.170 \pm 11.024) \times 10^{-2}$	17234489	2.878×10^{-2}	2.371×10^{-2}	2.206×10^{-2}	6.650×10^{-4}	3.14
fitted radiance shift [nm]	$(-3.574 \pm 24.366) \times 10^{-4}$	17234489	-5.000×10^{-4}	1.646×10^{-3}	-4.063×10^{-4}	-7.365×10^{-2}	4.453×10^{-2}
fitted radiance squeeze [1]	$(-6.077 \pm 18.662) \times 10^{-5}$	17234489	-3.000×10^{-5}	2.199×10^{-4}	-4.843×10^{-5}	-1.358×10^{-2}	2.251×10^{-2}
fitted root mean square [1]	$(1.207 \pm 0.508) \times 10^{-3}$	17234489	9.250×10^{-4}	4.640×10^{-4}	1.064×10^{-3}	2.954×10^{-4}	8.875×10^{-2}
sulfurdioxide total air mass factor polluted [1]	0.930 ± 0.615	17234489	0.620	0.716	0.775	5.000×10^{-2}	3.00
sulfurdioxide total air mass factor polluted precision [1]	0.157 ± 0.190	17234489	3.500×10^{-2}	0.172	8.028×10^{-2}	2.500×10^{-3}	1.59
sulfurdioxide clear air mass factor polluted [1]	0.813 ± 0.571	17234489	0.500	0.425	0.654	1.666×10^{-2}	3.06
number of spectral points in retrieval [1]	73.4 ± 0.5	17234489	73.0	1.000	73.0	52.0	74.0

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	0.0	0.0	3.000×10^{-2}	7.000×10^{-2}	0.170	1.000	1.000	1.000	1.000	1.000
sulfurdioxide total vertical column [DU]	-3.25	-0.933	-0.523	-0.337	-0.190	0.216	0.376	0.585	1.06	3.92
sulfurdioxide total vertical column precision [DU]	8.175×10^{-2}	0.103	0.122	0.146	0.186	0.536	0.768	1.17	2.05	5.65
sulfurdioxide slant column density corrected [DU]	-0.786	-0.450	-0.328	-0.246	-0.159	0.179	0.270	0.359	0.500	0.941
sulfurdioxide slant column density cobra [DU]	-0.786	-0.450	-0.328	-0.246	-0.159	0.179	0.270	0.359	0.500	0.941
sulfurdioxide slant column density cobra precision [DU]	0.134	0.160	0.173	0.184	0.196	0.304	0.362	0.419	0.508	0.721
sulfurdioxide slant column density window1 [DU]	-1.62	-0.904	-0.633	-0.449	-0.256	0.455	0.634	0.804	1.06	1.78
sulfurdioxide slant column density window1 precision [DU]	0.134	0.160	0.173	0.184	0.196	0.304	0.362	0.419	0.508	0.721
sulfurdioxide slant column density corrected win1 [DU]	-1.51	-0.876	-0.640	-0.479	-0.308	0.365	0.547	0.723	0.997	1.80
background so2 slant column offset window1 [DU]	-0.362	-0.277	-0.241	-0.213	-0.182	5.949×10^{-2}	0.158	0.225	0.292	0.438
sulfurdioxide slant column density window2 [DU]	-19.1	-12.6	-9.43	-7.08	-4.44	6.26	9.01	11.5	15.0	22.7
sulfurdioxide slant column density window2 precision [DU]	4.17	4.95	5.42	5.81	6.29	8.77	9.64	10.5	11.8	14.4
sulfurdioxide slant column density corrected win2 [DU]	-20.0	-13.2	-10.0	-7.65	-5.01	5.49	8.11	10.5	13.7	20.7
background so2 slant column offset window2 [DU]	-7.71	-5.23	-3.84	-2.81	-1.74	0.738	1.01	1.24	1.60	2.86
sulfurdioxide slant column density window3 [DU]	-65.3	-44.8	-35.6	-29.1	-22.0	6.64	14.3	21.4	30.9	49.6
sulfurdioxide slant column density window3 precision [DU]	13.1	15.0	16.3	17.5	19.2	28.9	33.5	38.7	49.7	80.3
sulfurdioxide slant column density corrected win3 [DU]	-59.2	-38.9	-29.6	-23.1	-16.0	11.7	18.9	25.5	34.5	53.0
background so2 slant column offset window3 [DU]	-8.32	-5.60	-3.75	-1.89	0.715	10.3	12.4	14.0	15.7	18.6
sulfurdioxide slant column cobra flag [1]	0.0	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
integrated so2 profile apriori [DU]	2.421×10^{-3}	5.003×10^{-3}	7.399×10^{-3}	9.689×10^{-3}	1.278×10^{-2}	3.649×10^{-2}	4.696×10^{-2}	6.182×10^{-2}	0.110	0.418
fitted radiance shift [nm]	-7.721×10^{-3}	-3.853×10^{-3}	-2.520×10^{-3}	-1.798×10^{-3}	-1.225×10^{-3}	4.210×10^{-4}	1.090×10^{-3}	1.933×10^{-3}	3.390×10^{-3}	7.398×10^{-3}
fitted radiance squeeze [1]	-5.795×10^{-4}	-3.765×10^{-4}	-2.896×10^{-4}	-2.289×10^{-4}	-1.647×10^{-4}	5.519×10^{-5}	1.054×10^{-4}	1.509×10^{-4}	2.143×10^{-4}	3.637×10^{-4}
fitted root mean square [1]	5.708×10^{-4}	6.991×10^{-4}	7.729×10^{-4}	8.289×10^{-4}	8.955×10^{-4}	1.359×10^{-3}	1.591×10^{-3}	1.827×10^{-3}	2.188×10^{-3}	3.120×10^{-3}
sulfurdioxide total air mass factor polluted [1]	6.308×10^{-2}	0.179	0.285	0.380	0.492	1.21	1.57	1.92	2.29	2.61
sulfurdioxide total air mass factor polluted precision [1]	8.533×10^{-3}	1.571×10^{-2}	2.195×10^{-2}	2.758×10^{-2}	3.578×10^{-2}	0.208	0.295	0.385	0.537	0.934
sulfurdioxide clear air mass factor polluted [1]	0.153	0.266	0.346	0.407	0.475	0.900	1.06	1.59	2.37	2.73
number of spectral points in retrieval [1]	73.0	73.0	73.0	73.0	73.0	74.0	74.0	74.0	74.0	74.0

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]	0.690 ± 0.401	5985856	0.740	1.000	0.0	1.000	0.260	1.000
sulfurdioxide total vertical column [DU]	0.116 ± 2.625	5985856	0.611	1.686×10^{-2}	-152	640	-0.279	0.332
sulfurdioxide total vertical column precision [DU]	0.999 ± 1.720	5985856	0.711	0.422	5.423×10^{-2}	47.2	0.263	0.974
sulfurdioxide slant column density corrected [DU]	$(2.844 \pm 42.102) \times 10^{-2}$	5985856	0.396	1.259×10^{-2}	-8.50	41.7	-0.183	0.213
sulfurdioxide slant column density cobra [DU]	$(2.828 \pm 41.442) \times 10^{-2}$	5985856	0.396	1.259×10^{-2}	-8.50	10.9	-0.183	0.213
sulfurdioxide slant column density cobra precision [DU]	0.322 ± 0.153	5985856	0.166	0.276	8.277×10^{-2}	2.52	0.218	0.384
sulfurdioxide slant column density window1 [DU]	0.166 ± 0.752	5985856	0.793	0.174	-15.2	10.1	-0.226	0.567
sulfurdioxide slant column density window1 precision [DU]	0.322 ± 0.153	5985856	0.166	0.276	8.277×10^{-2}	2.52	0.218	0.384
sulfurdioxide slant column density corrected win1 [DU]	$(6.082 \pm 75.076) \times 10^{-2}$	5985856	0.783	3.459×10^{-2}	-14.2	11.6	-0.350	0.433
background so2 slant column offset window1 [DU]	-0.105 ± 0.163	5985856	0.134	-0.131	-0.955	4.25	-0.195	-6.090×10^{-2}
sulfurdioxide slant column density window2 [DU]	1.63 ± 9.66	5985856	12.2	1.29	-104	84.0	-4.68	7.55
sulfurdioxide slant column density window2 precision [DU]	8.67 ± 2.30	5985856	2.86	8.34	2.43	144	7.08	9.93
sulfurdioxide slant column density corrected win2 [DU]	0.306 ± 9.329	5985856	11.9	0.283	-111	81.7	-5.64	6.22
background so2 slant column offset window2 [DU]	-1.32 ± 2.71	5985856	3.44	-0.281	-13.6	5.30	-2.82	0.616
sulfurdioxide slant column density window3 [DU]	-10.2 ± 25.4	5985856	32.0	-9.75	-192	176	-25.9	6.10
sulfurdioxide slant column density window3 precision [DU]	29.6 ± 12.9	5985856	10.1	26.5	9.60	231	22.4	32.5
sulfurdioxide slant column density corrected win3 [DU]	-2.14 ± 25.09	5985856	31.6	-1.95	-182	180	-17.8	13.8
background so2 slant column offset window3 [DU]	8.04 ± 5.39	5985856	8.53	7.35	-14.5	26.7	3.76	12.3
sulfurdioxide slant column cobra flag [1]	1.96 ± 0.26	5985856	0.0	2.00	0.0	2.00	2.00	2.00
integrated so2 profile apriori [DU]	$(7.403 \pm 17.972) \times 10^{-2}$	5985856	4.387×10^{-2}	2.535×10^{-2}	8.580×10^{-4}	3.14	1.441×10^{-2}	5.828×10^{-2}
fitted radiance shift [nm]	$(-1.710 \pm 25.549) \times 10^{-4}$	5985856	1.724×10^{-3}	-1.924×10^{-4}	-4.000×10^{-2}	3.214×10^{-2}	-1.052×10^{-3}	6.726×10^{-4}
fitted radiance squeeze [1]	$(-1.204 \pm 19.436) \times 10^{-5}$	5985856	2.148×10^{-4}	-4.617×10^{-6}	-2.907×10^{-3}	6.638×10^{-3}	-1.141×10^{-4}	1.008×10^{-4}
fitted root mean square [1]	$(1.398 \pm 0.637) \times 10^{-3}$	5985856	6.700×10^{-4}	1.198×10^{-3}	3.660×10^{-4}	2.713×10^{-2}	9.790×10^{-4}	1.649×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.688 ± 0.406	5985856	0.557	0.653	5.000×10^{-2}	2.83	0.369	0.926
sulfurdioxide total air mass factor polluted precision [1]	$(9.898 \pm 13.607) \times 10^{-2}$	5985856	8.896×10^{-2}	4.899×10^{-2}	2.500×10^{-3}	1.57	2.768×10^{-2}	0.117
sulfurdioxide clear air mass factor polluted [1]	0.612 ± 0.280	5985856	0.436	0.607	1.666×10^{-2}	2.02	0.384	0.819
number of spectral points in retrieval [1]	73.5 ± 0.5	5985856	1.000	73.0	71.0	74.0	73.0	74.0

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]	0.567 ± 0.423	11248633	0.860	0.490	0.0	1.000	0.140	1.000
sulfurdioxide total vertical column [DU]	$(1.434 \pm 71.649) \times 10^{-2}$	11248633	0.335	6.470×10^{-3}	-59.0	436	-0.159	0.176
sulfurdioxide total vertical column precision [DU]	0.386 ± 0.599	11248633	0.272	0.252	3.735×10^{-2}	897	0.156	0.428
sulfurdioxide slant column density corrected [DU]	$(1.070 \pm 29.793) \times 10^{-2}$	11248633	0.313	6.610×10^{-3}	-28.2	262	-0.149	0.164
sulfurdioxide slant column density cobra [DU]	$(1.064 \pm 27.710) \times 10^{-2}$	11248633	0.313	6.610×10^{-3}	-28.2	36.3	-0.149	0.164
sulfurdioxide slant column density cobra precision [DU]	0.243 ± 0.091	11248633	7.752×10^{-2}	0.219	7.814×10^{-2}	22.1	0.190	0.267
sulfurdioxide slant column density window1 [DU]	$(5.875 \pm 56.924) \times 10^{-2}$	11248633	0.671	7.546×10^{-2}	-66.2	54.1	-0.270	0.402
sulfurdioxide slant column density window1 precision [DU]	0.243 ± 0.091	11248633	7.752×10^{-2}	0.219	7.814×10^{-2}	22.1	0.190	0.267
sulfurdioxide slant column density corrected win1 [DU]	$(2.835 \pm 53.530) \times 10^{-2}$	11248633	0.625	2.175×10^{-2}	-66.2	54.2	-0.289	0.336
background so2 slant column offset window1 [DU]	$(-3.039 \pm 19.111) \times 10^{-2}$	11248633	0.301	-9.799×10^{-2}	-1.42	1.71	-0.178	0.123
sulfurdioxide slant column density window2 [DU]	0.666 ± 7.855	11248633	10.0	0.684	-890	911	-4.34	5.69
sulfurdioxide slant column density window2 precision [DU]	7.24 ± 1.97	11248633	2.08	6.98	2.13	829	6.02	8.11
sulfurdioxide slant column density corrected win2 [DU]	0.212 ± 7.761	11248633	9.87	0.223	-888	911	-4.72	5.15
background so2 slant column offset window2 [DU]	-0.454 ± 1.741	11248633	2.24	-4.616×10^{-2}	-10.2	5.15	-1.44	0.800
sulfurdioxide slant column density window3 [DU]	-6.28 ± 21.68	11248633	27.2	-7.18	-534	411	-20.3	6.90
sulfurdioxide slant column density window3 precision [DU]	24.7 ± 12.2	11248633	8.11	21.6	9.47	250	18.1	26.2
sulfurdioxide slant column density corrected win3 [DU]	-2.30 ± 20.92	11248633	25.9	-2.44	-535	404	-15.3	10.7
background so2 slant column offset window3 [DU]	3.99 ± 6.69	11248633	10.8	4.33	-19.7	24.9	-1.63	9.22
sulfurdioxide slant column cobra flag [1]	1.98 ± 0.18	11248633	0.0	2.00	0.0	2.00	2.00	2.00
integrated so2 profile apriori [DU]	$(2.450 \pm 2.406) \times 10^{-2}$	11248633	2.071×10^{-2}	2.095×10^{-2}	6.650×10^{-4}	1.60	1.194×10^{-2}	3.265×10^{-2}
fitted radiance shift [nm]	$(-4.567 \pm 23.653) \times 10^{-4}$	11248633	1.565×10^{-3}	-5.148×10^{-4}	-7.365×10^{-2}	4.453×10^{-2}	-1.290×10^{-3}	2.746×10^{-4}
fitted radiance squeeze [1]	$(-8.670 \pm 17.698) \times 10^{-5}$	11248633	2.181×10^{-4}	-7.152×10^{-5}	-1.358×10^{-2}	2.251×10^{-2}	-1.884×10^{-4}	2.966×10^{-5}
fitted root mean square [1]	$(1.105 \pm 0.386) \times 10^{-3}$	11248633	3.709×10^{-4}	1.011×10^{-3}	2.954×10^{-4}	8.875×10^{-2}	8.660×10^{-4}	1.237×10^{-3}
sulfurdioxide total air mass factor polluted [1]	1.06 ± 0.67	11248633	0.916	0.859	5.000×10^{-2}	3.00	0.554	1.47
sulfurdioxide total air mass factor polluted precision [1]	0.187 ± 0.206	11248633	0.216	0.116	4.596×10^{-3}	1.59	4.176×10^{-2}	0.258
sulfurdioxide clear air mass factor polluted [1]	0.920 ± 0.652	11248633	0.463	0.677	0.119	3.06	0.507	0.970
number of spectral points in retrieval [1]	73.4 ± 0.5	11248633	1.000	73.0	52.0	74.0	73.0	74.0

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]	0.658 ± 0.409	12144875	0.780	1.000	0.0	1.000	0.220	1.000
sulfurdioxide total vertical column [DU]	$(3.134 \pm 123.536) \times 10^{-2}$	12144875	0.422	8.994×10^{-3}	-130	169	-0.200	0.223
sulfurdioxide total vertical column precision [DU]	0.538 ± 0.886	12144875	0.316	0.306	5.065×10^{-2}	35.8	0.205	0.520
sulfurdioxide slant column density corrected [DU]	$(1.367 \pm 30.177) \times 10^{-2}$	12144875	0.320	7.481×10^{-3}	-28.2	36.4	-0.151	0.169
sulfurdioxide slant column density cobra [DU]	$(1.364 \pm 30.012) \times 10^{-2}$	12144875	0.320	7.481×10^{-3}	-28.2	14.3	-0.151	0.169
sulfurdioxide slant column density cobra precision [DU]	0.254 ± 0.108	12144875	8.884×10^{-2}	0.221	7.814×10^{-2}	19.9	0.191	0.280
sulfurdioxide slant column density window1 [DU]	0.129 ± 0.580	12144875	0.661	0.132	-27.7	54.1	-0.201	0.460
sulfurdioxide slant column density window1 precision [DU]	0.254 ± 0.108	12144875	8.884×10^{-2}	0.221	7.814×10^{-2}	19.9	0.191	0.280
sulfurdioxide slant column density corrected win1 [DU]	$(4.012 \pm 56.721) \times 10^{-2}$	12144875	0.639	2.829×10^{-2}	-27.7	54.2	-0.288	0.351
background so2 slant column offset window1 [DU]	$(-8.870 \pm 15.283) \times 10^{-2}$	12144875	0.185	-0.128	-1.42	2.75	-0.187	-2.706×10^{-3}
sulfurdioxide slant column density window2 [DU]	0.605 ± 8.253	12144875	10.4	0.503	-890	888	-4.68	5.75
sulfurdioxide slant column density window2 precision [DU]	7.55 ± 2.05	12144875	2.33	7.25	2.13	829	6.21	8.54
sulfurdioxide slant column density corrected win2 [DU]	0.202 ± 8.131	12144875	10.3	0.211	-888	889	-4.96	5.36
background so2 slant column offset window2 [DU]	-0.403 ± 1.894	12144875	1.95	7.253×10^{-2}	-13.6	5.30	-1.15	0.797
sulfurdioxide slant column density window3 [DU]	-4.60 ± 22.69	12144875	28.5	-5.14	-179	275	-19.0	9.52
sulfurdioxide slant column density window3 precision [DU]	26.2 ± 12.1	12144875	9.09	23.1	9.47	230	19.4	28.5
sulfurdioxide slant column density corrected win3 [DU]	-0.174 ± 21.894	12144875	27.6	-0.590	-182	272	-14.1	13.5
background so2 slant column offset window3 [DU]	4.42 ± 6.05	12144875	8.37	4.67	-19.7	26.7	0.229	8.60
sulfurdioxide slant column cobra flag [1]	1.99 ± 0.15	12144875	0.0	2.00	0.0	2.00	2.00	2.00
integrated so2 profile apriori [DU]	$(3.053 \pm 3.948) \times 10^{-2}$	12144875	2.116×10^{-2}	2.259×10^{-2}	1.488×10^{-3}	1.62	1.395×10^{-2}	3.511×10^{-2}
fitted radiance shift [nm]	$(-2.971 \pm 23.774) \times 10^{-4}$	12144875	1.730×10^{-3}	-3.112×10^{-4}	-5.907×10^{-2}	4.453×10^{-2}	-1.186×10^{-3}	5.436×10^{-4}
fitted radiance squeeze [1]	$(-4.174 \pm 16.662) \times 10^{-5}$	12144875	1.972×10^{-4}	-3.461×10^{-5}	-1.131×10^{-2}	2.251×10^{-2}	-1.364×10^{-4}	6.083×10^{-5}
fitted root mean square [1]	$(1.127 \pm 0.442) \times 10^{-3}$	12144875	3.722×10^{-4}	1.010×10^{-3}	2.954×10^{-4}	8.875×10^{-2}	8.656×10^{-4}	1.238×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.816 ± 0.447	12144875	0.553	0.749	5.000×10^{-2}	2.55	0.493	1.05
sulfurdioxide total air mass factor polluted precision [1]	0.128 ± 0.137	12144875	0.143	6.905×10^{-2}	2.908×10^{-3}	1.57	3.659×10^{-2}	0.180
sulfurdioxide clear air mass factor polluted [1]	0.662 ± 0.243	12144875	0.337	0.631	4.447×10^{-2}	2.61	0.481	0.818
number of spectral points in retrieval [1]	73.4 ± 0.5	12144875	1.000	73.0	70.0	74.0	73.0	74.0

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]	0.482 $\pm$ 0.421	4523411	0.920	0.330	0.0	1.000	8.000×10^{-2}	1.000
sulfurdioxide total vertical column [DU]	$(7.803 \pm 215.039) \times 10^{-2}$	4523411	0.340	7.796×10^{-3}	-113	640	-0.157	0.183
sulfurdioxide total vertical column precision [DU]	0.673 $\pm$ 1.506	4523411	0.425	0.260	3.735×10^{-2}	897	0.127	0.552
sulfurdioxide slant column density corrected [DU]	$(2.233 \pm 42.792) \times 10^{-2}$	4523411	0.386	1.017×10^{-2}	-10.8	262	-0.181	0.205
sulfurdioxide slant column density cobra [DU]	$(2.210 \pm 38.803) \times 10^{-2}$	4523411	0.386	1.017×10^{-2}	-10.8	36.3	-0.181	0.205
sulfurdioxide slant column density cobra precision [DU]	0.308 $\pm$ 0.140	4523411	0.131	0.267	8.439×10^{-2}	22.1	0.220	0.351
sulfurdioxide slant column density window1 [DU]	$(8.057 \pm 7528.882) \times 10^{-4}$	4523411	0.852	1.114×10^{-2}	-66.2	41.0	-0.427	0.425
sulfurdioxide slant column density window1 precision [DU]	0.308 $\pm$ 0.140	4523411	0.131	0.267	8.439×10^{-2}	22.1	0.220	0.351
sulfurdioxide slant column density corrected win1 [DU]	$(3.311 \pm 71.782) \times 10^{-2}$	4523411	0.767	1.474×10^{-2}	-66.2	41.0	-0.364	0.403
background so2 slant column offset window1 [DU]	$(3.230 \pm 22.985) \times 10^{-2}$	4523411	0.399	-2.946×10^{-2}	-1.06	4.25	-0.161	0.237
sulfurdioxide slant column density window2 [DU]	1.95 $\pm$ 9.01	4523411	11.2	1.86	-842	911	-3.72	7.47
sulfurdioxide slant column density window2 precision [DU]	8.11 $\pm$ 2.42	4523411	2.77	7.69	2.36	515	6.48	9.25
sulfurdioxide slant column density corrected win2 [DU]	0.335 $\pm$ 8.740	4523411	10.8	0.311	-841	911	-5.11	5.74
background so2 slant column offset window2 [DU]	-1.61 $\pm$ 2.46	4523411	3.80	-1.34	-13.6	4.60	-3.31	0.487
sulfurdioxide slant column density window3 [DU]	-15.0 $\pm$ 22.2	4523411	26.8	-14.7	-534	156	-28.2	-1.42
sulfurdioxide slant column density window3 precision [DU]	26.4 $\pm$ 13.6	4523411	11.0	23.2	9.53	250	18.2	29.2
sulfurdioxide slant column density corrected win3 [DU]	-7.14 $\pm$ 22.73	4523411	27.4	-6.24	-535	158	-20.4	7.05
background so2 slant column offset window3 [DU]	7.88 $\pm$ 7.10	4523411	10.8	9.75	-19.7	25.3	2.66	13.5
sulfurdioxide slant column cobra flag [1]	1.95 $\pm$ 0.31	4523411	0.0	2.00	0.0	2.00	2.00	2.00
integrated so2 profile apriori [DU]	$(5.969 \pm 17.047) \times 10^{-2}$	4523411	3.214×10^{-2}	1.899×10^{-2}	6.650×10^{-4}	3.14	7.907×10^{-3}	4.004×10^{-2}
fitted radiance shift [nm]	$(-5.328 \pm 24.948) \times 10^{-4}$	4523411	1.344×10^{-3}	-6.441×10^{-4}	-7.365×10^{-2}	3.994×10^{-2}	-1.284×10^{-3}	5.993×10^{-5}
fitted radiance squeeze [1]	$(-1.155 \pm 2.202) \times 10^{-4}$	4523411	2.793×10^{-4}	-1.064×10^{-4}	-1.358×10^{-2}	1.557×10^{-2}	-2.507×10^{-4}	2.853×10^{-5}
fitted root mean square [1]	$(1.393 \pm 0.579) \times 10^{-3}$	4523411	5.832×10^{-4}	1.246×10^{-3}	3.341×10^{-4}	4.750×10^{-2}	1.022×10^{-3}	1.605×10^{-3}
sulfurdioxide total air mass factor polluted [1]	1.27 $\pm$ 0.84	4523411	1.61	1.03	5.000×10^{-2}	3.00	0.524	2.14
sulfurdioxide total air mass factor polluted precision [1]	0.237 $\pm$ 0.273	4523411	0.301	0.135	2.500×10^{-3}	1.59	3.478×10^{-2}	0.336
sulfurdioxide clear air mass factor polluted [1]	1.25 $\pm$ 0.90	4523411	1.74	0.871	1.666×10^{-2}	3.06	0.480	2.22
number of spectral points in retrieval [1]	73.4 $\pm$ 0.5	4523411	1.000	73.0	52.0	74.0	73.0	74.0

3 Granule outlines

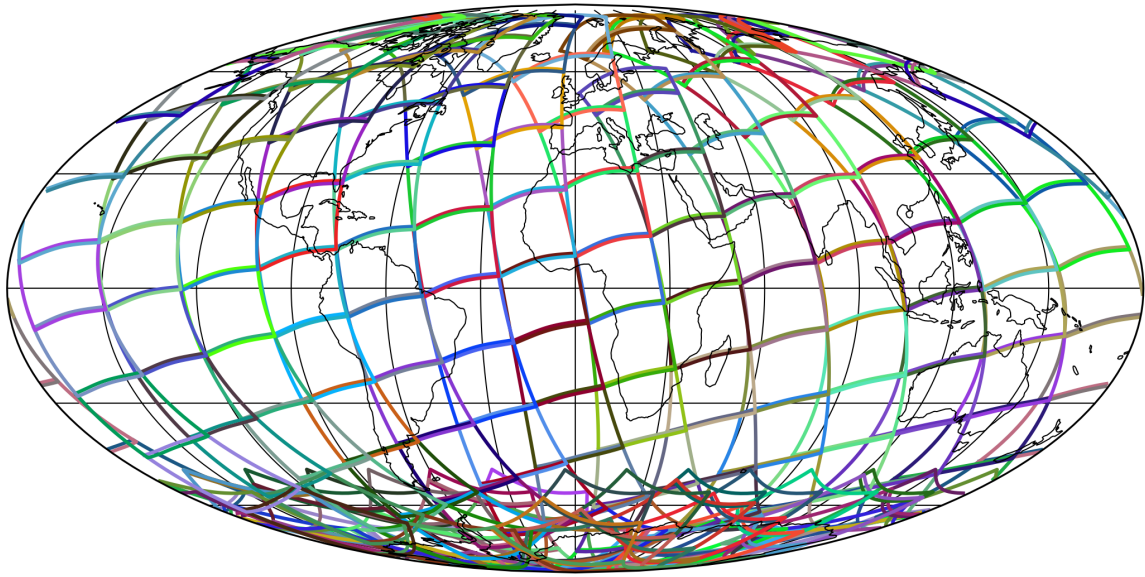


Figure 1: Outline of the granules.

4 Input data monitoring

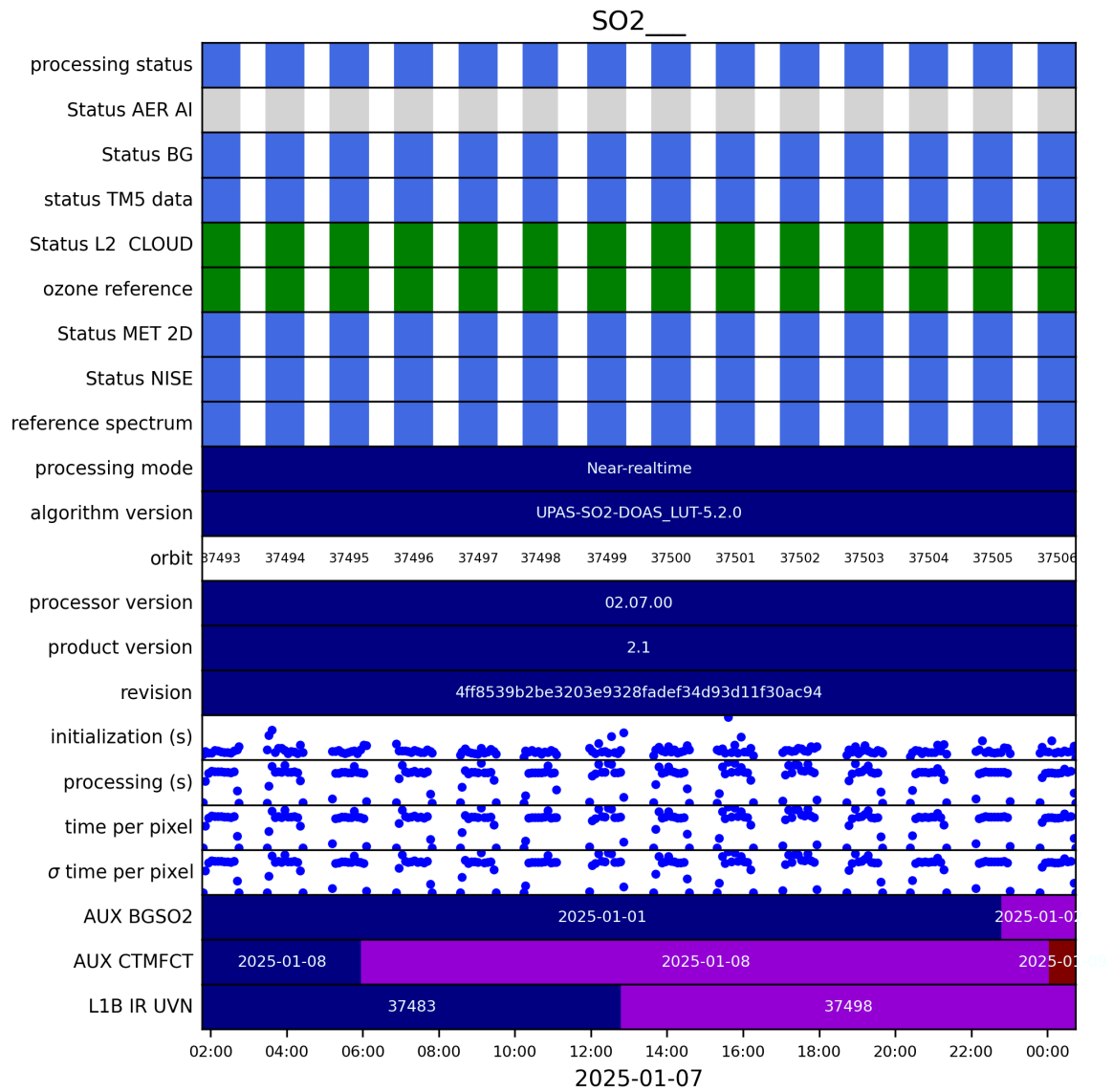


Figure 2: Input data per granule

5 Warnings and errors

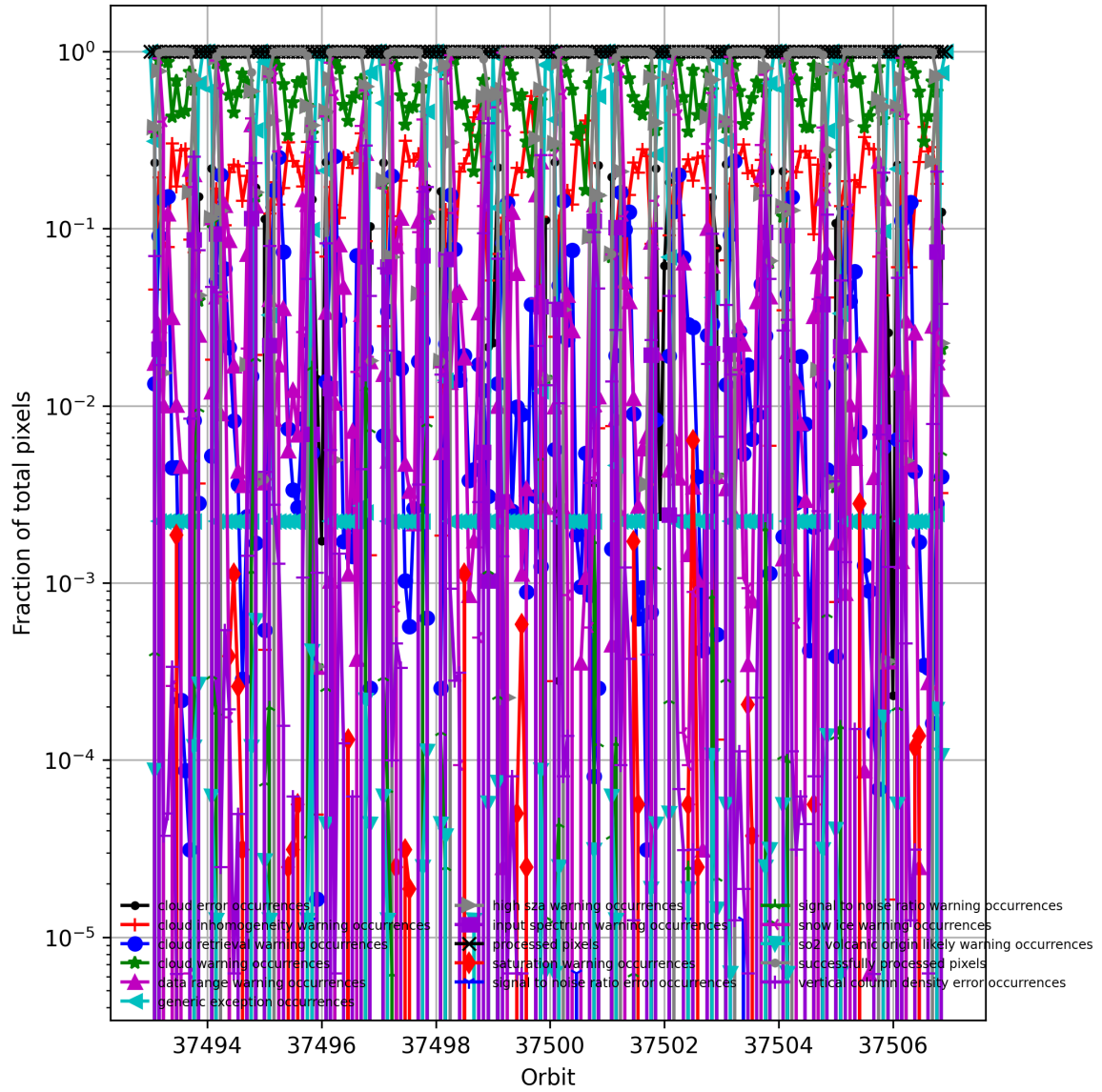


Figure 3: Fraction of pixels with specific warnings and errors during processing

6 World maps

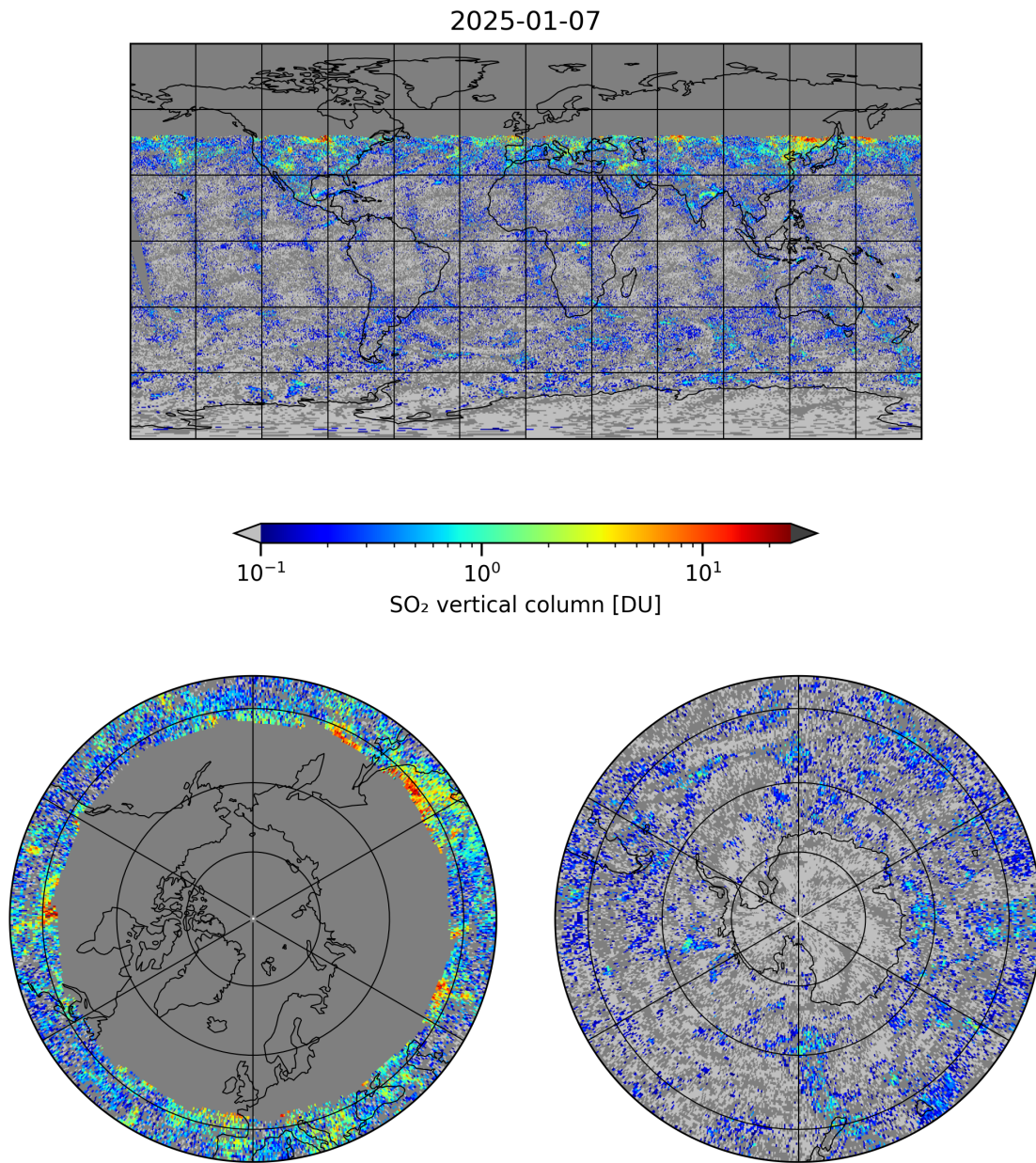


Figure 4: Map of “SO₂ vertical column” for 2025-01-07 to 2025-01-08

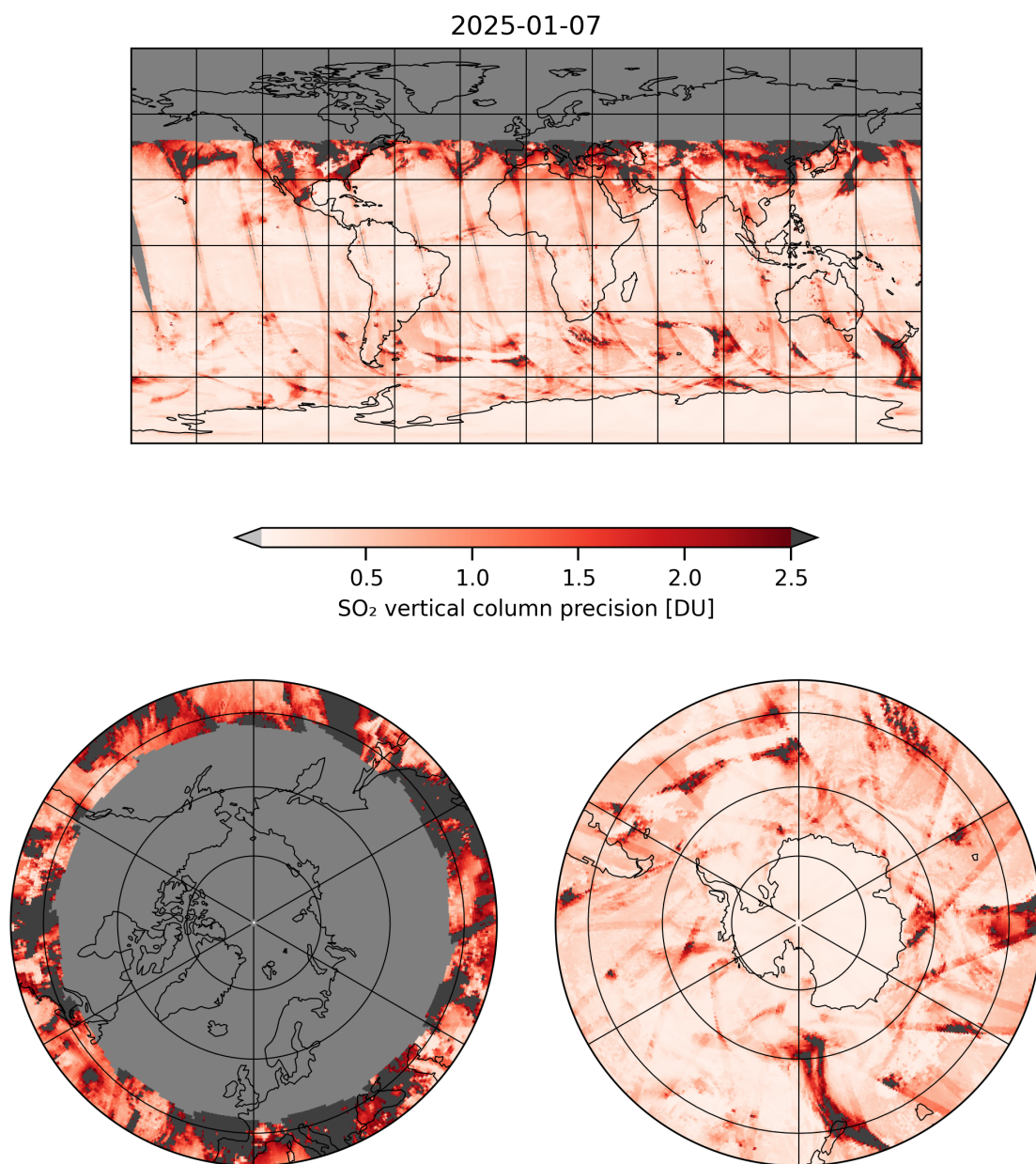


Figure 5: Map of “SO₂ vertical column precision” for 2025-01-07 to 2025-01-08

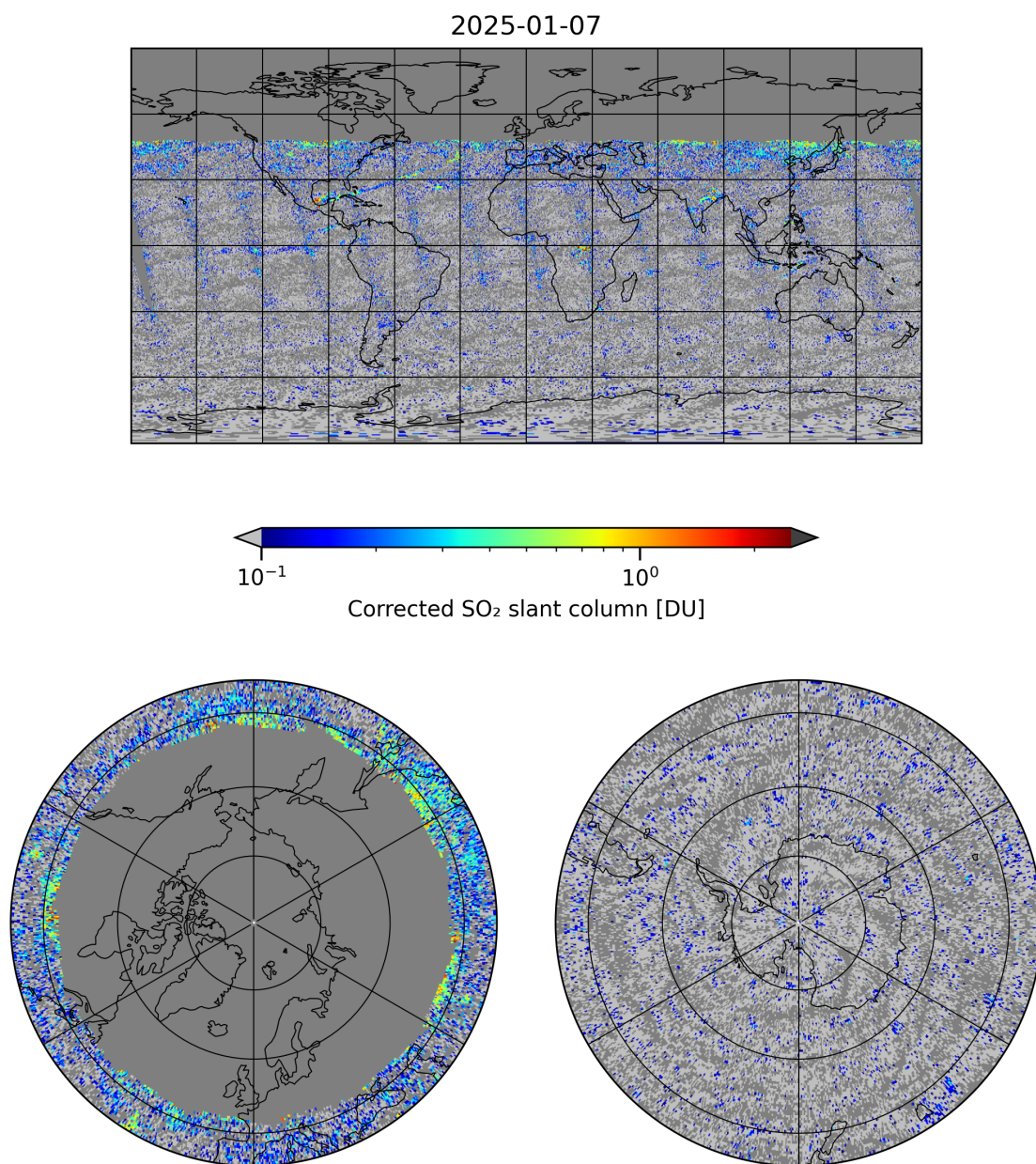


Figure 6: Map of “Corrected SO₂ slant column” for 2025-01-07 to 2025-01-08

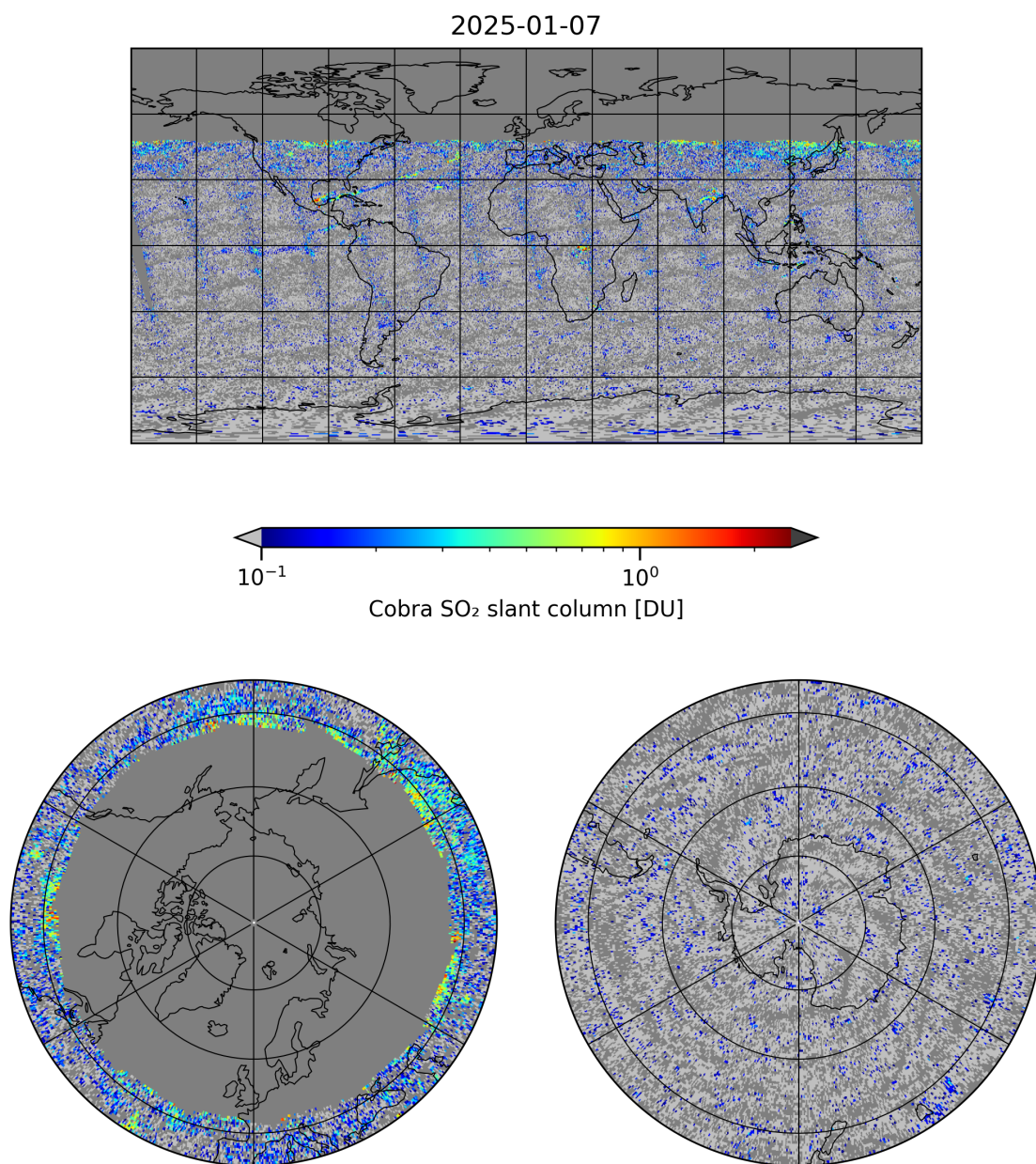


Figure 7: Map of “Cobra SO₂ slant column” for 2025-01-07 to 2025-01-08

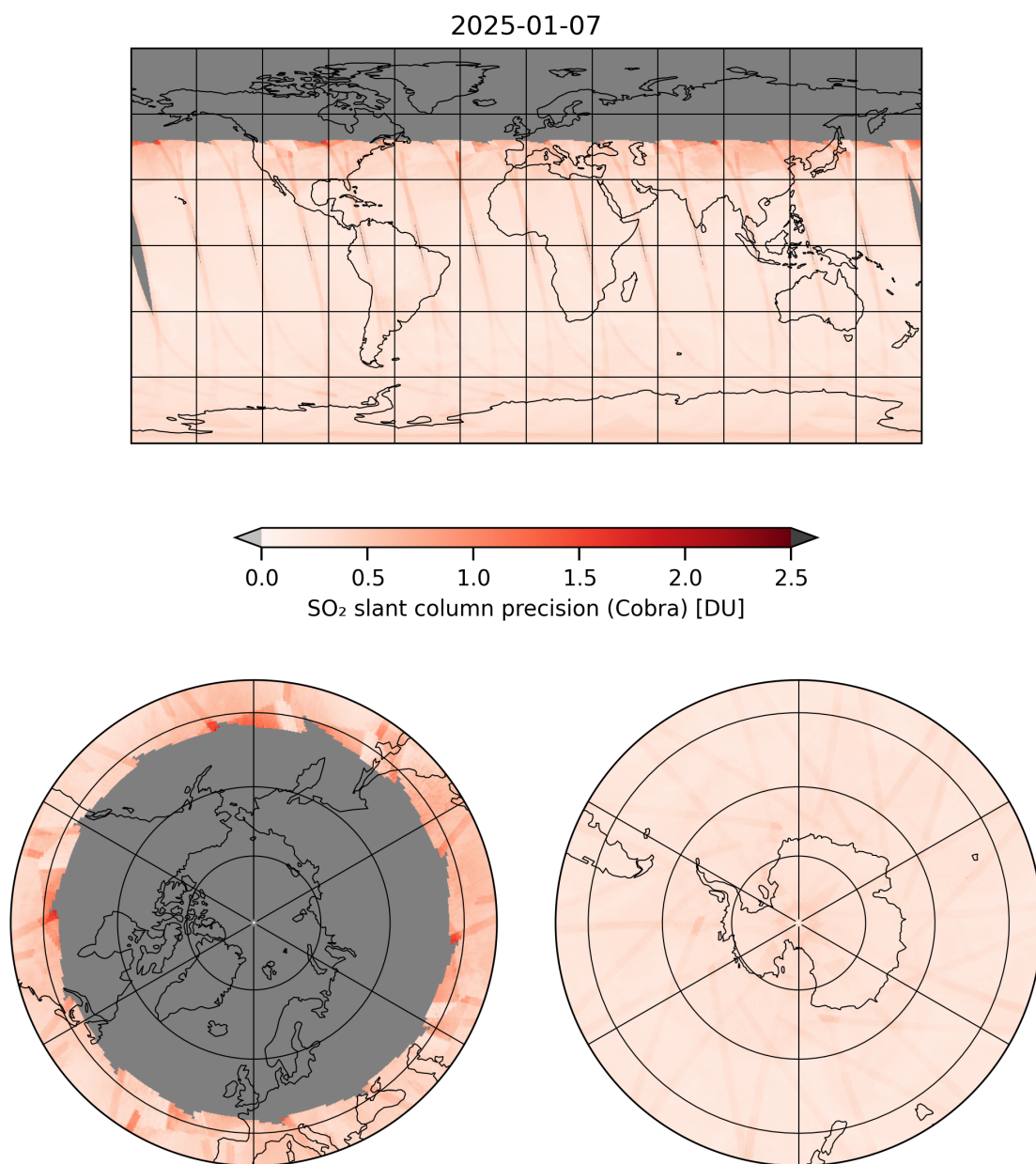


Figure 8: Map of “SO₂ slant column precision (Cobra)” for 2025-01-07 to 2025-01-08

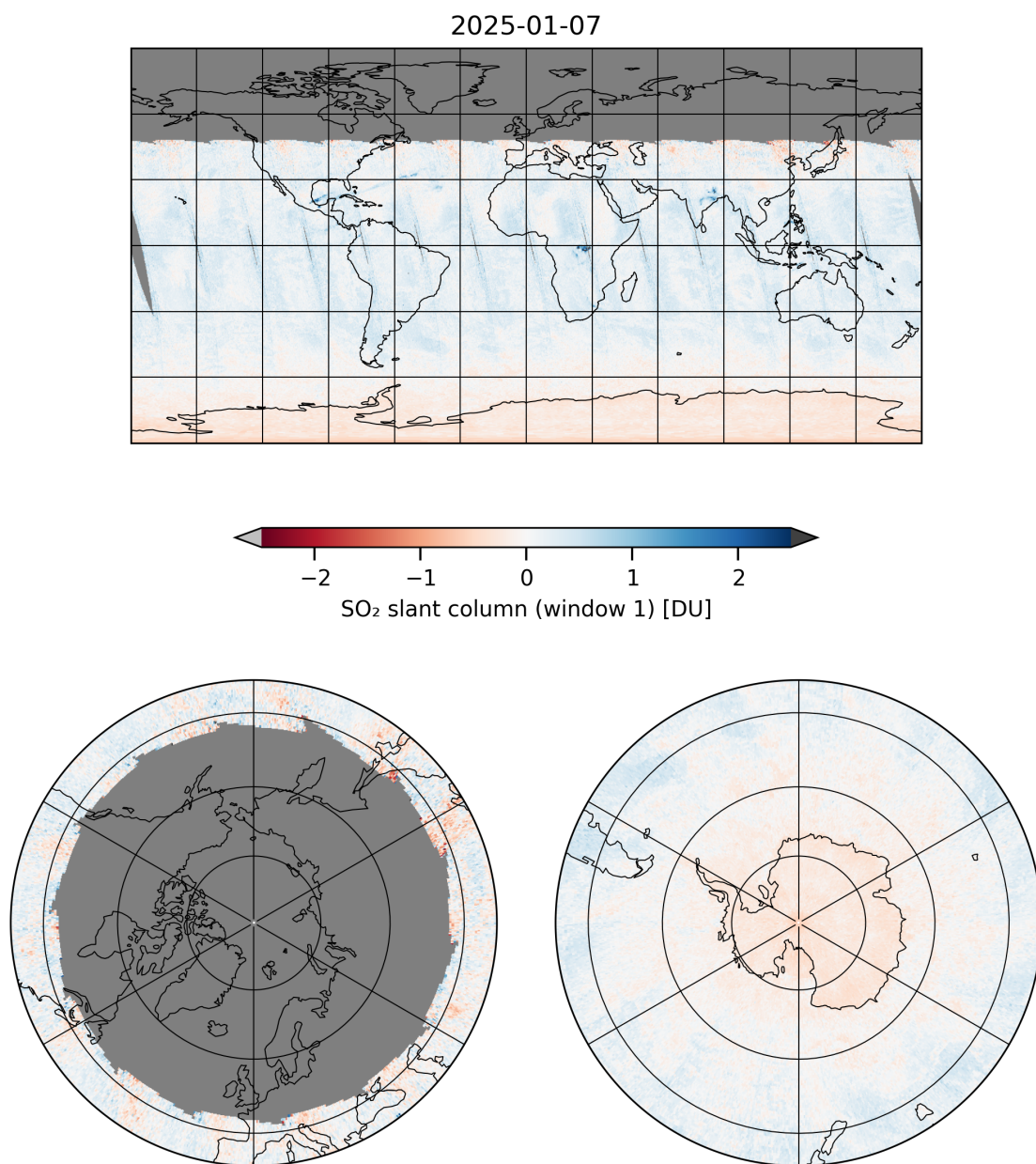


Figure 9: Map of “SO₂ slant column (window 1)” for 2025-01-07 to 2025-01-08

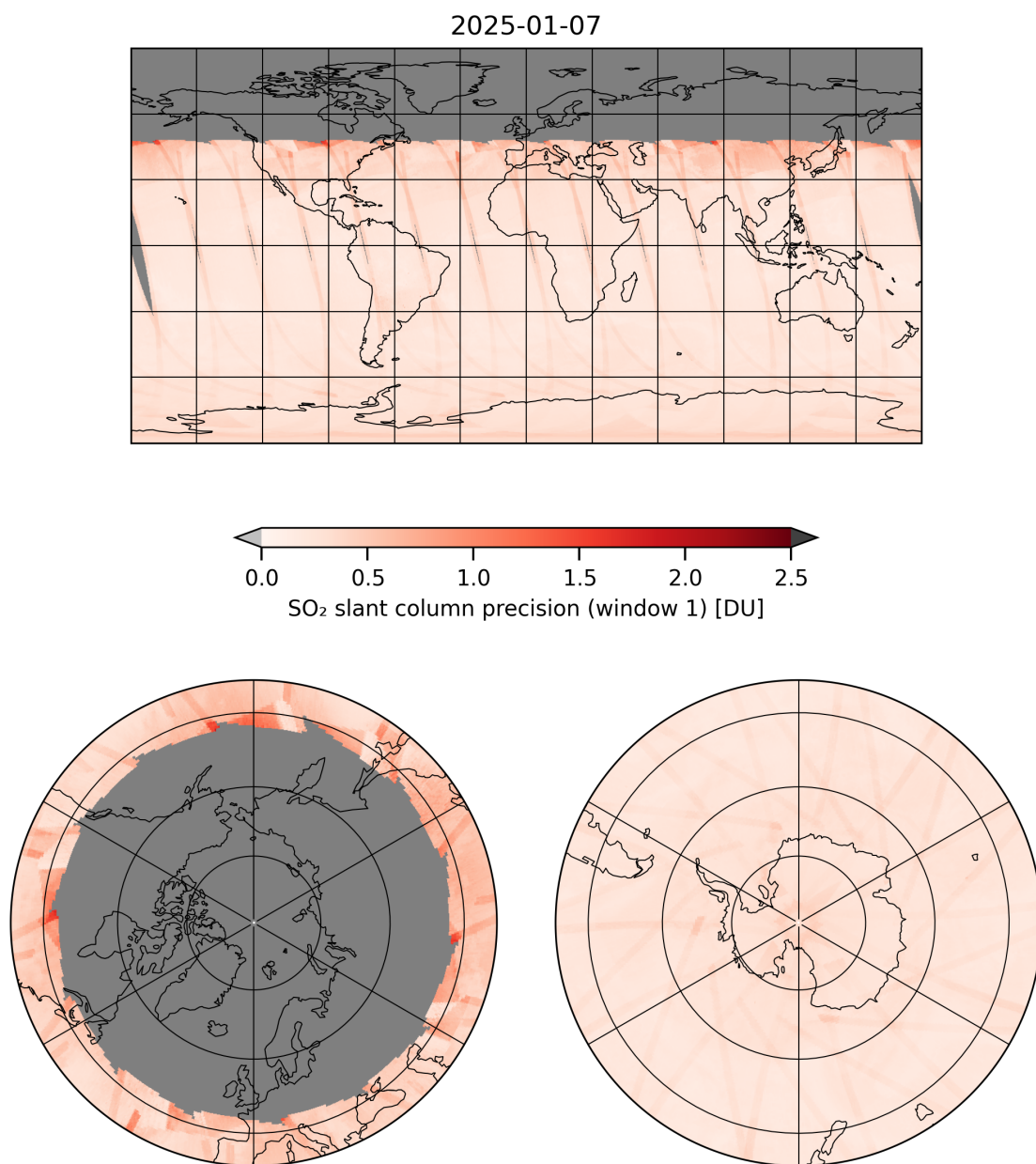


Figure 10: Map of “SO₂ slant column precision (window 1)” for 2025-01-07 to 2025-01-08

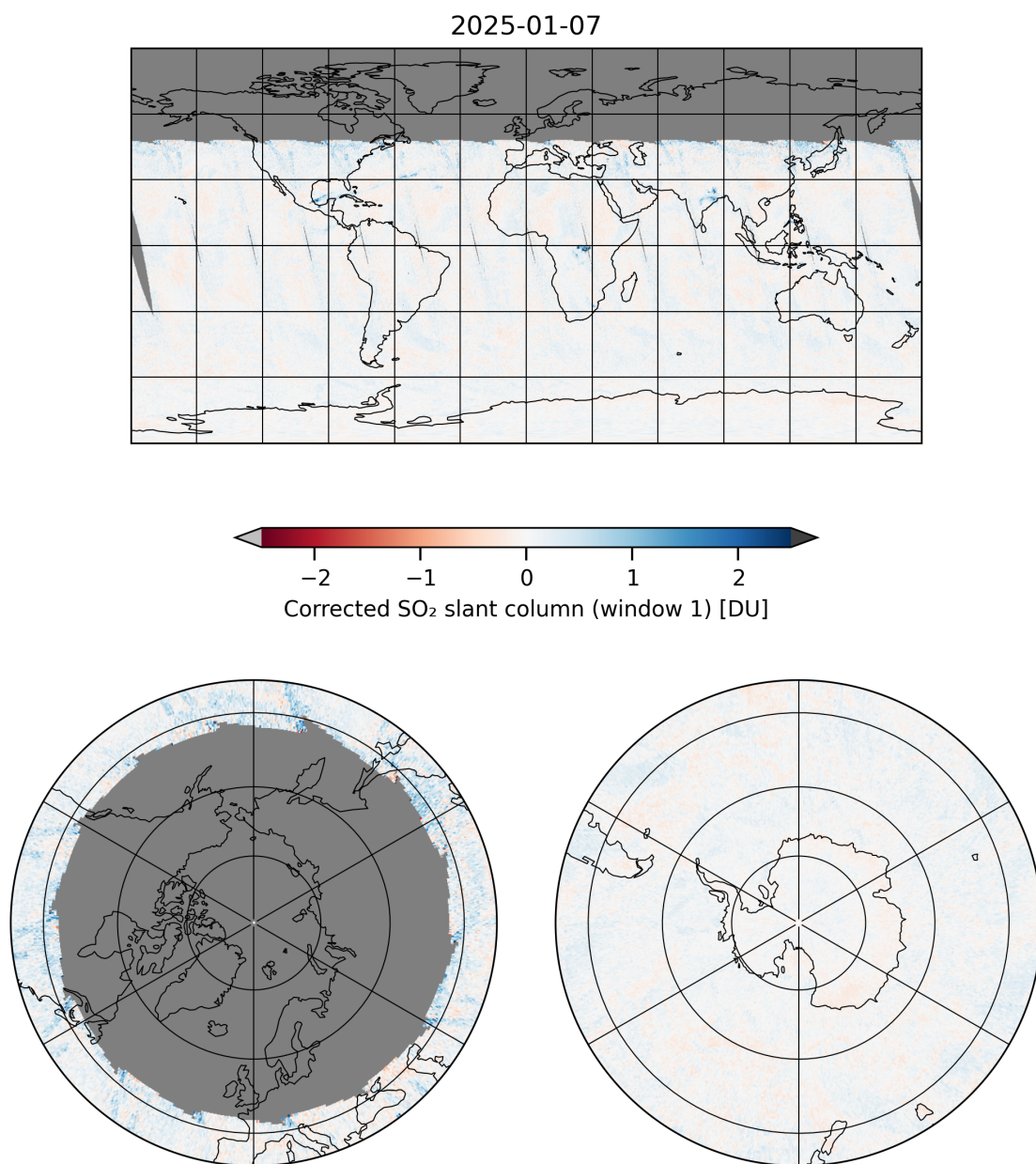


Figure 11: Map of “Corrected SO₂ slant column (window 1)” for 2025-01-07 to 2025-01-08

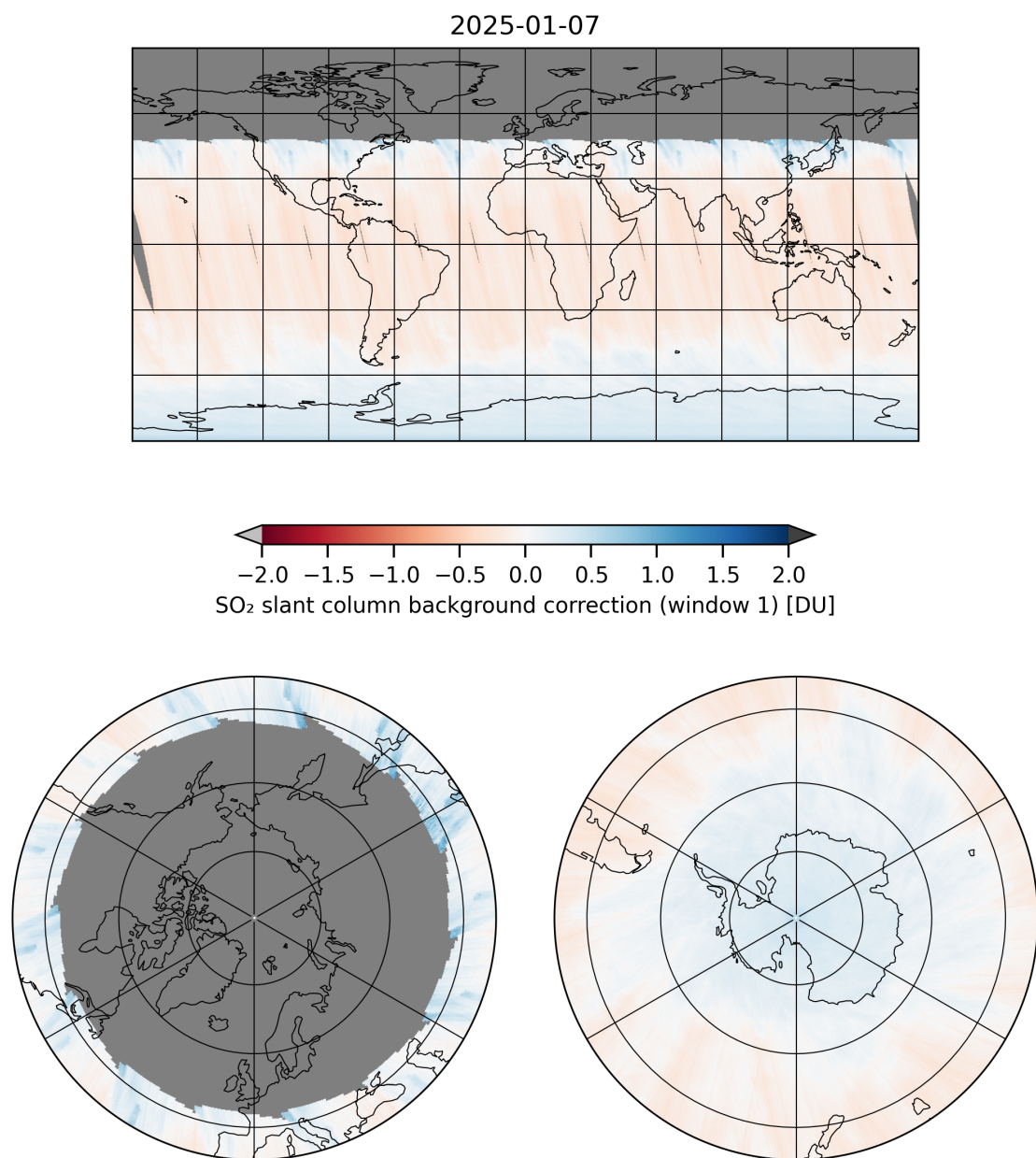


Figure 12: Map of “SO₂ slant column background correction (window 1)” for 2025-01-07 to 2025-01-08

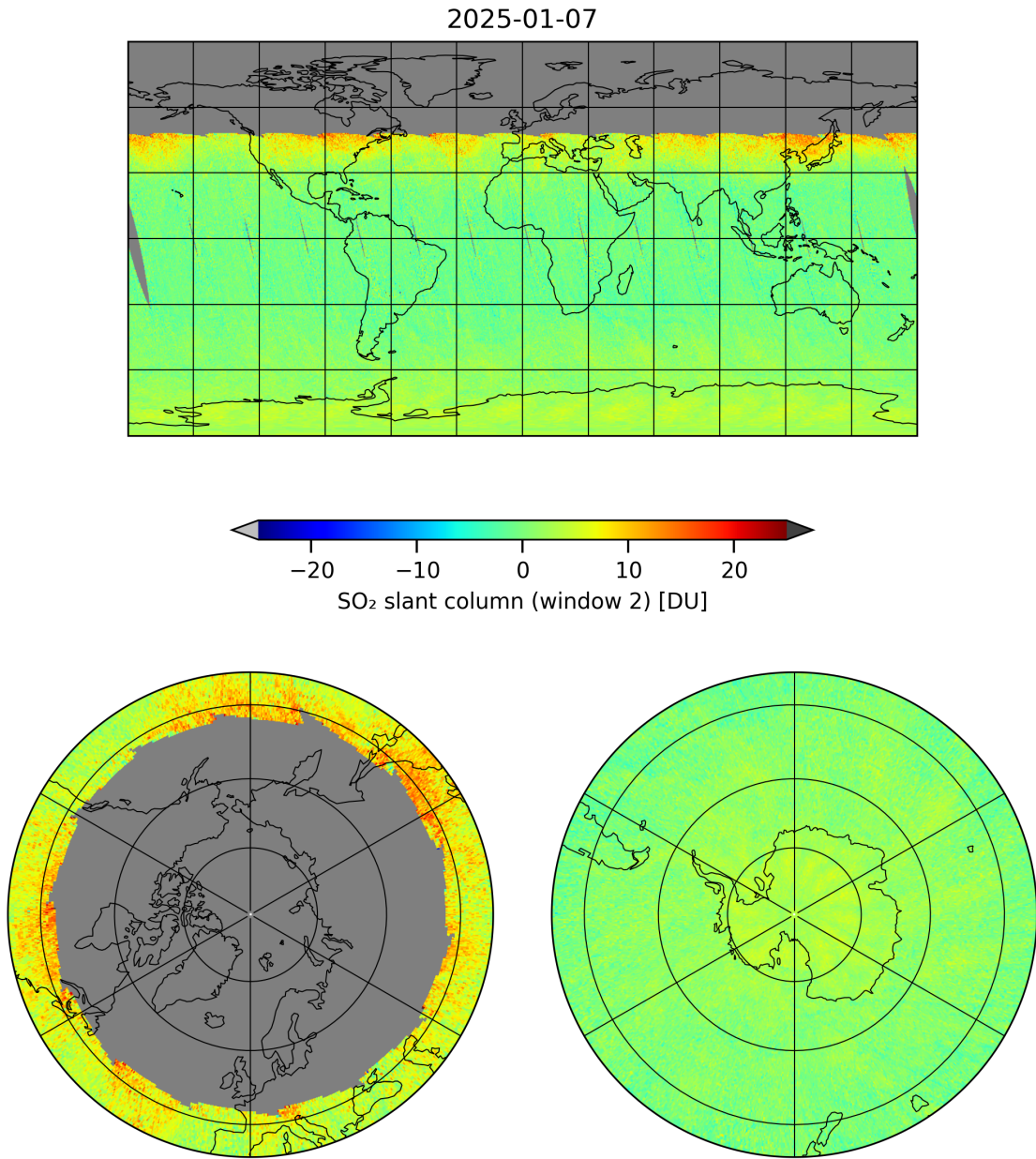


Figure 13: Map of “SO₂ slant column (window 2)” for 2025-01-07 to 2025-01-08

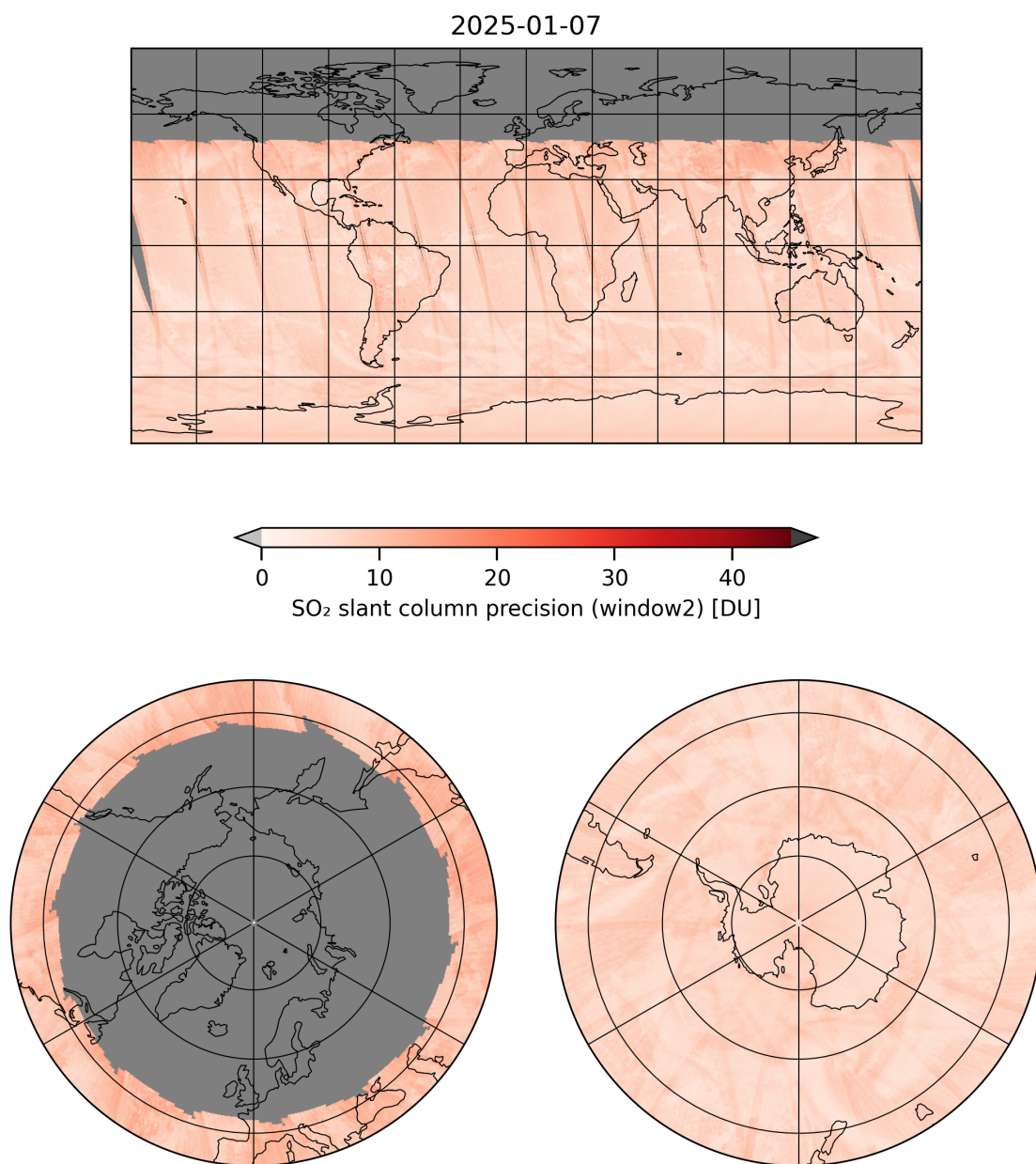


Figure 14: Map of “SO₂ slant column precision (window2)” for 2025-01-07 to 2025-01-08

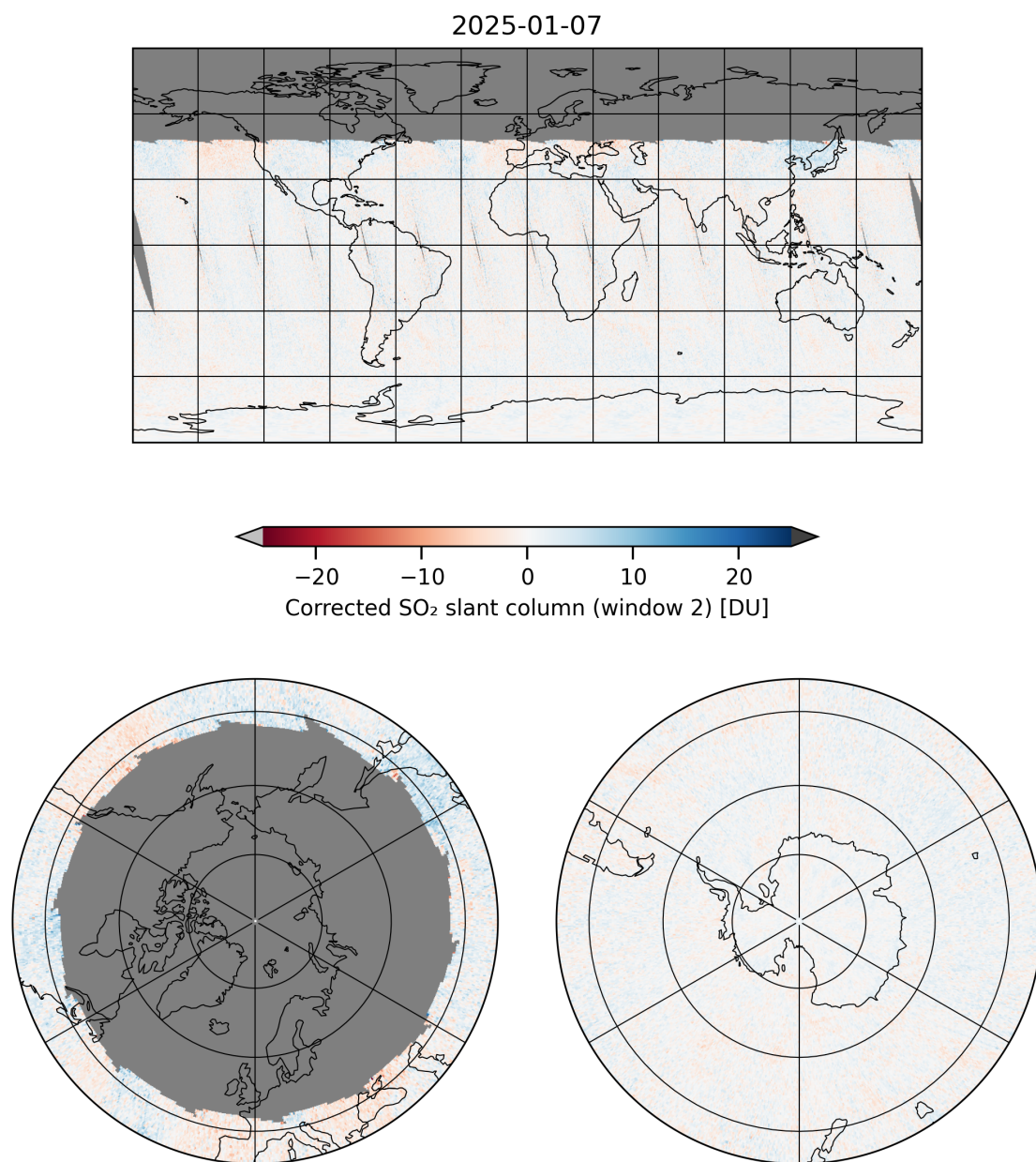


Figure 15: Map of “Corrected SO₂ slant column (window 2)” for 2025-01-07 to 2025-01-08

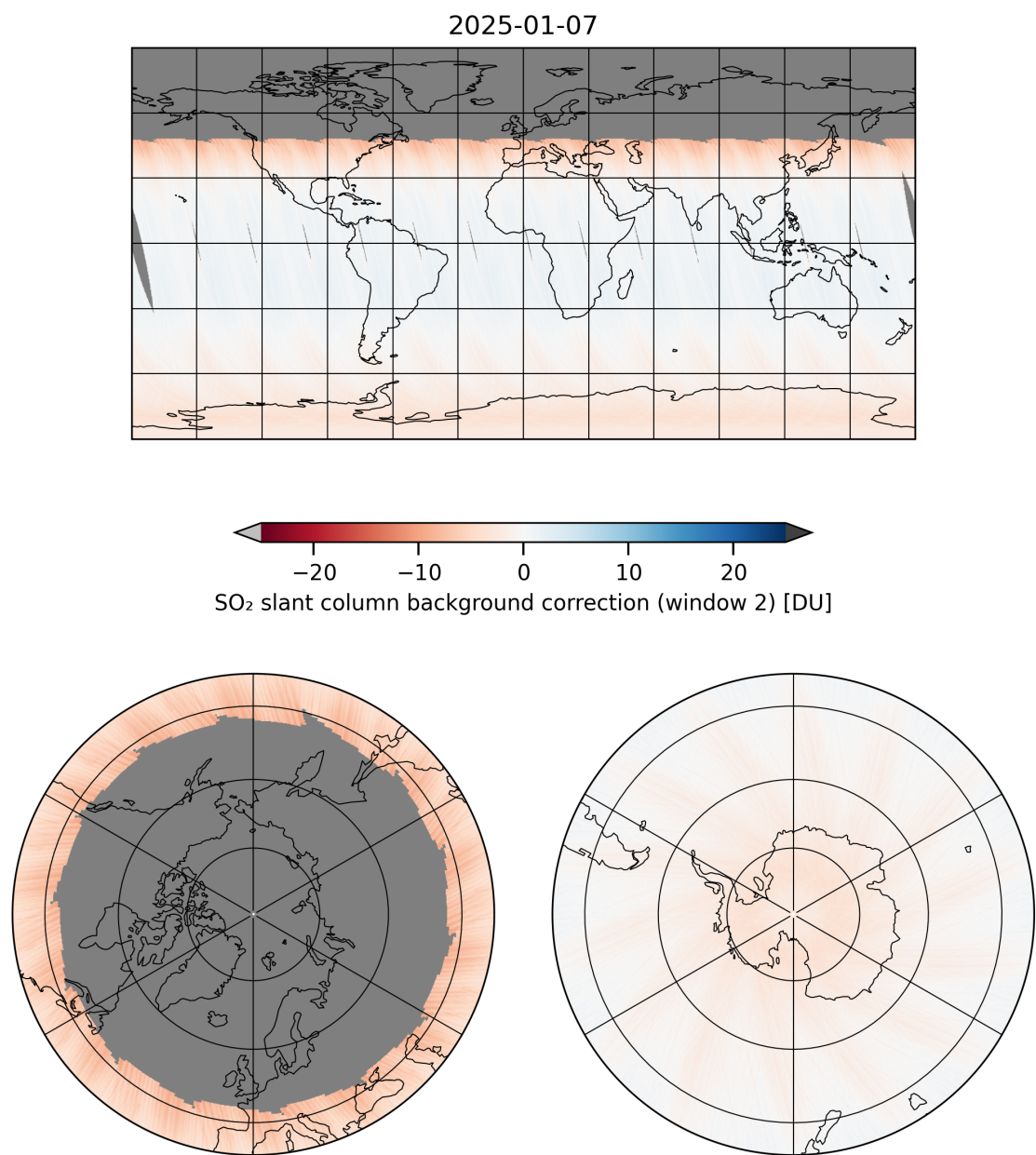


Figure 16: Map of “SO₂ slant column background correction (window 2)” for 2025-01-07 to 2025-01-08

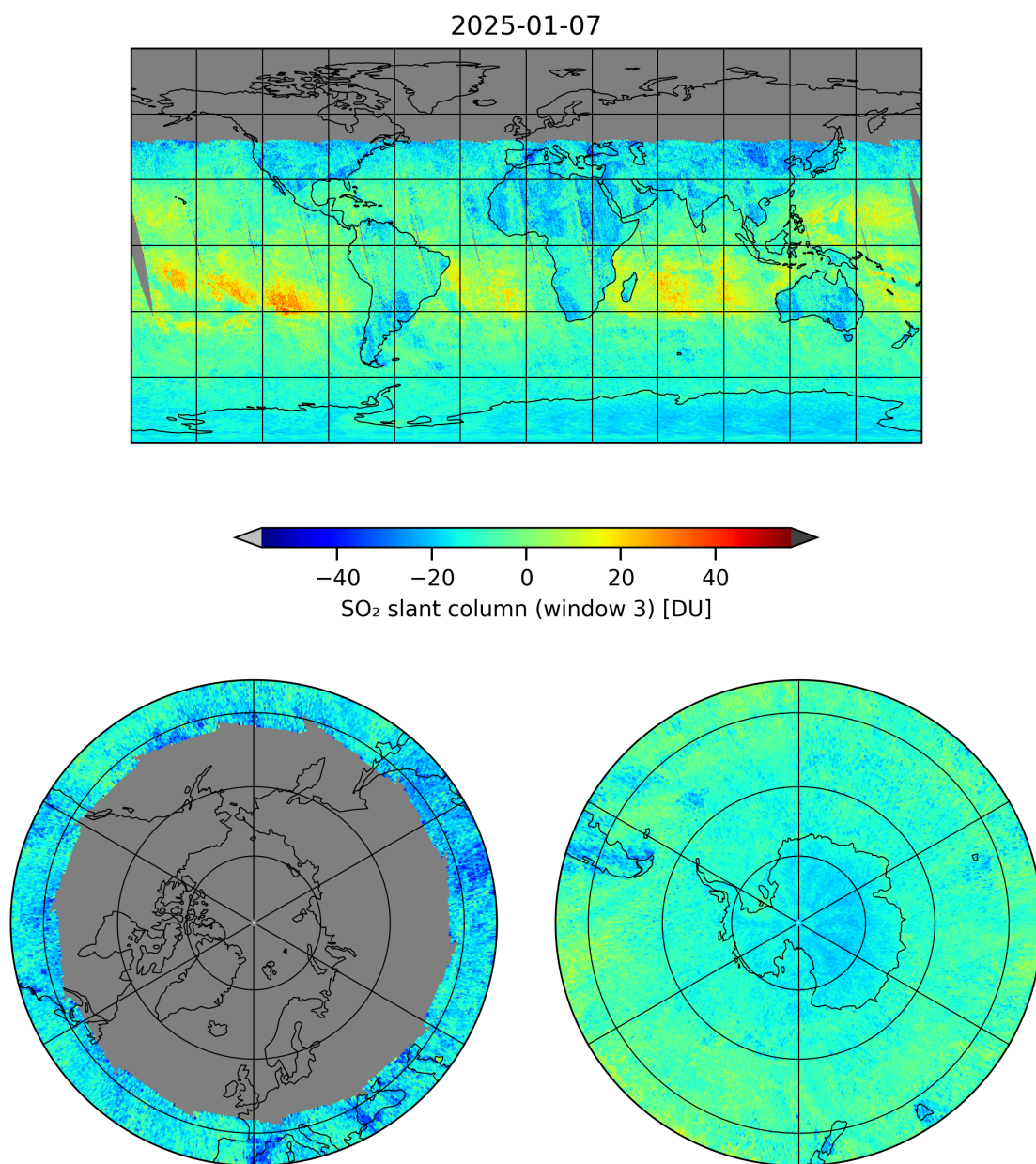


Figure 17: Map of “SO₂ slant column (window 3)” for 2025-01-07 to 2025-01-08

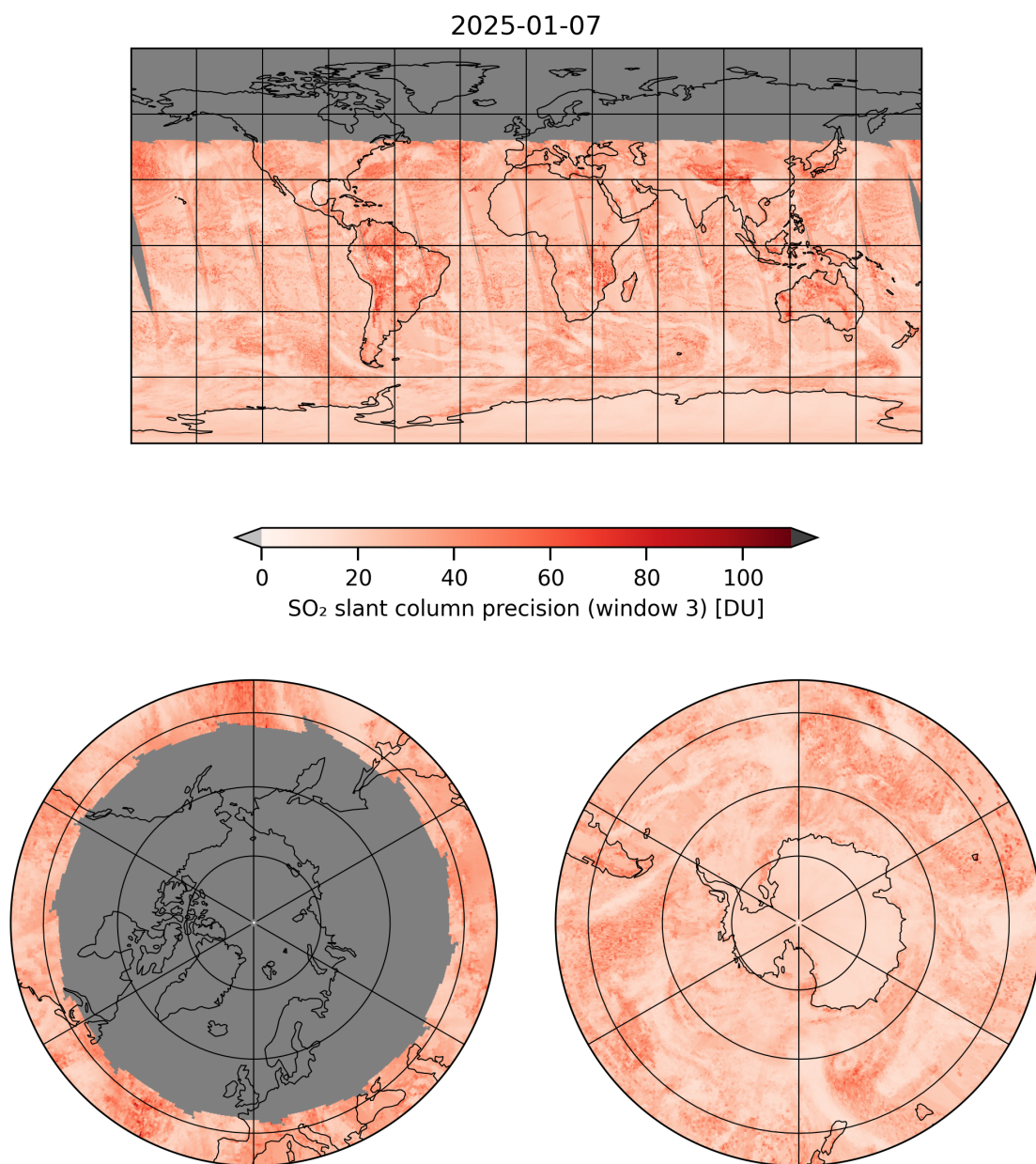


Figure 18: Map of “SO₂ slant column precision (window 3)” for 2025-01-07 to 2025-01-08

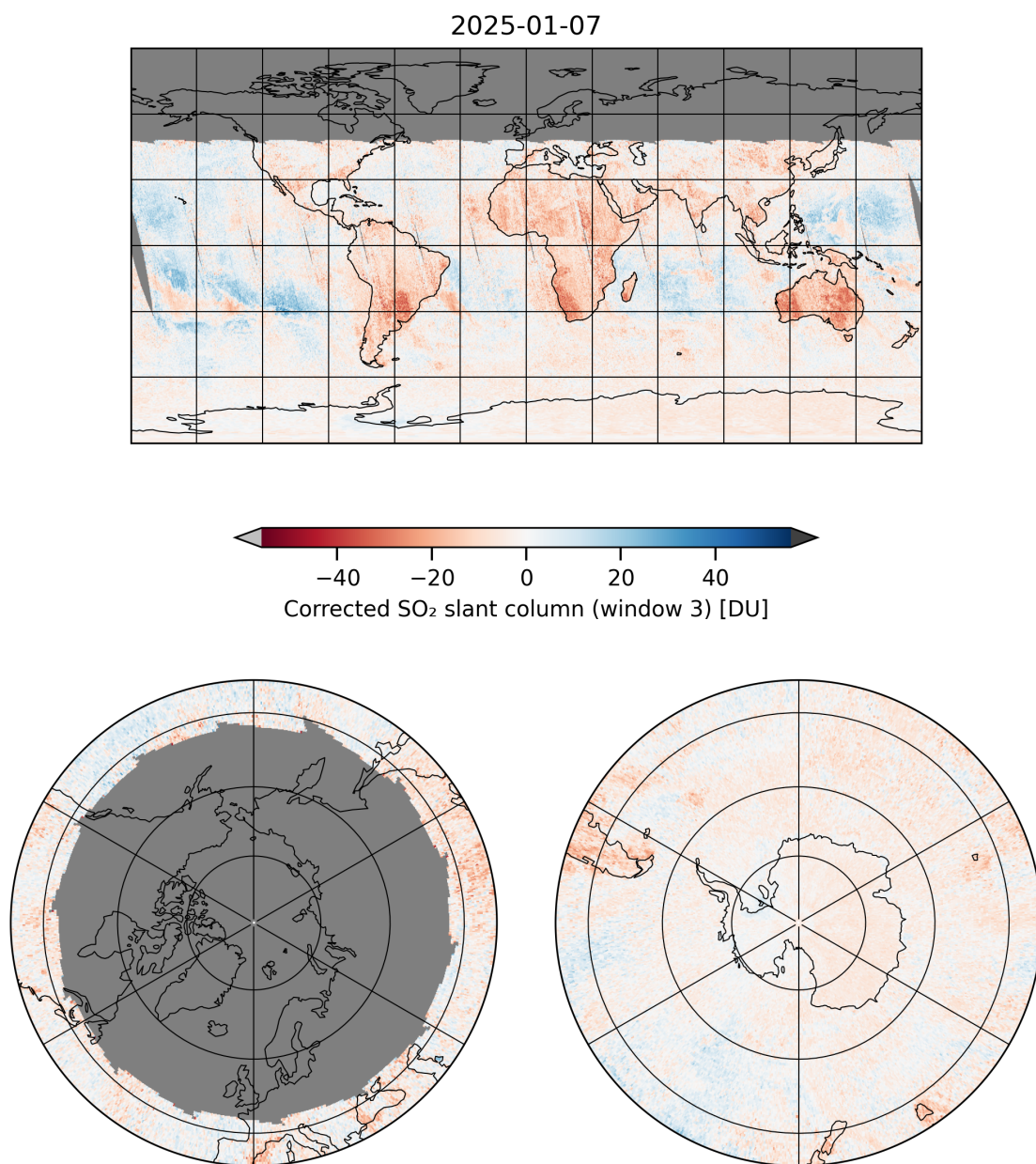


Figure 19: Map of “Corrected SO₂ slant column (window 3)” for 2025-01-07 to 2025-01-08

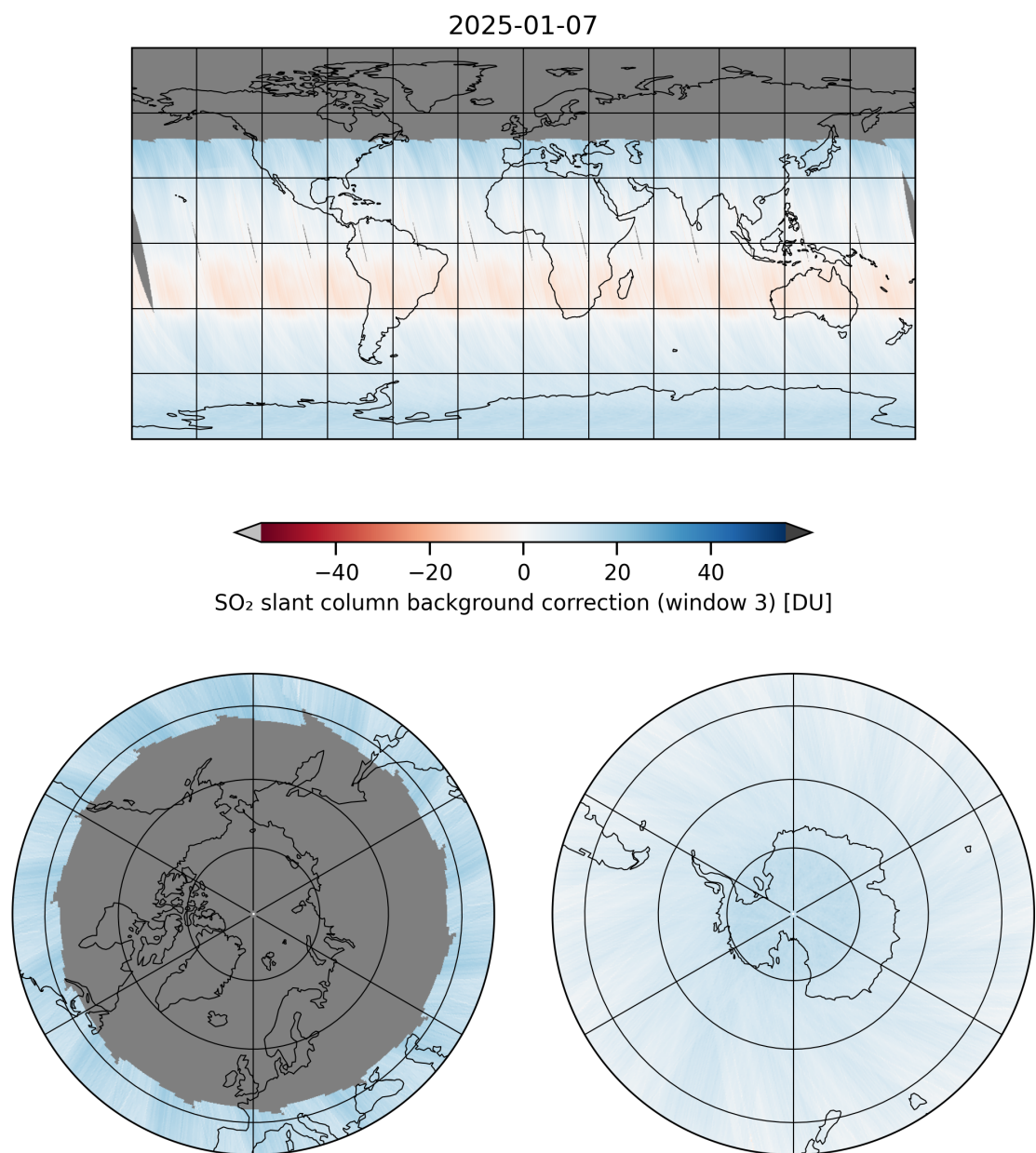


Figure 20: Map of “SO₂ slant column background correction (window 3)” for 2025-01-07 to 2025-01-08

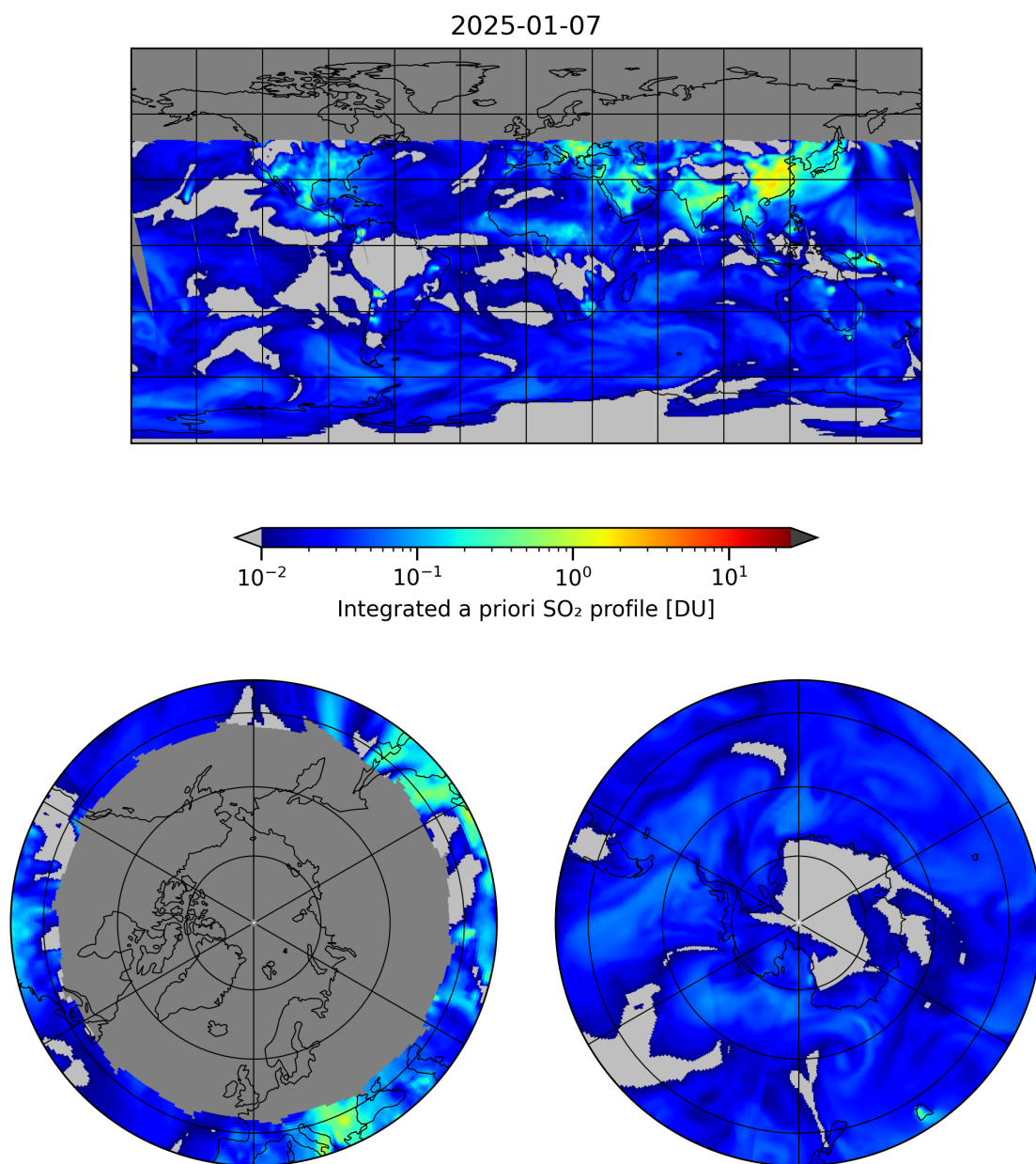


Figure 21: Map of “Integrated a priori SO₂ profile” for 2025-01-07 to 2025-01-08

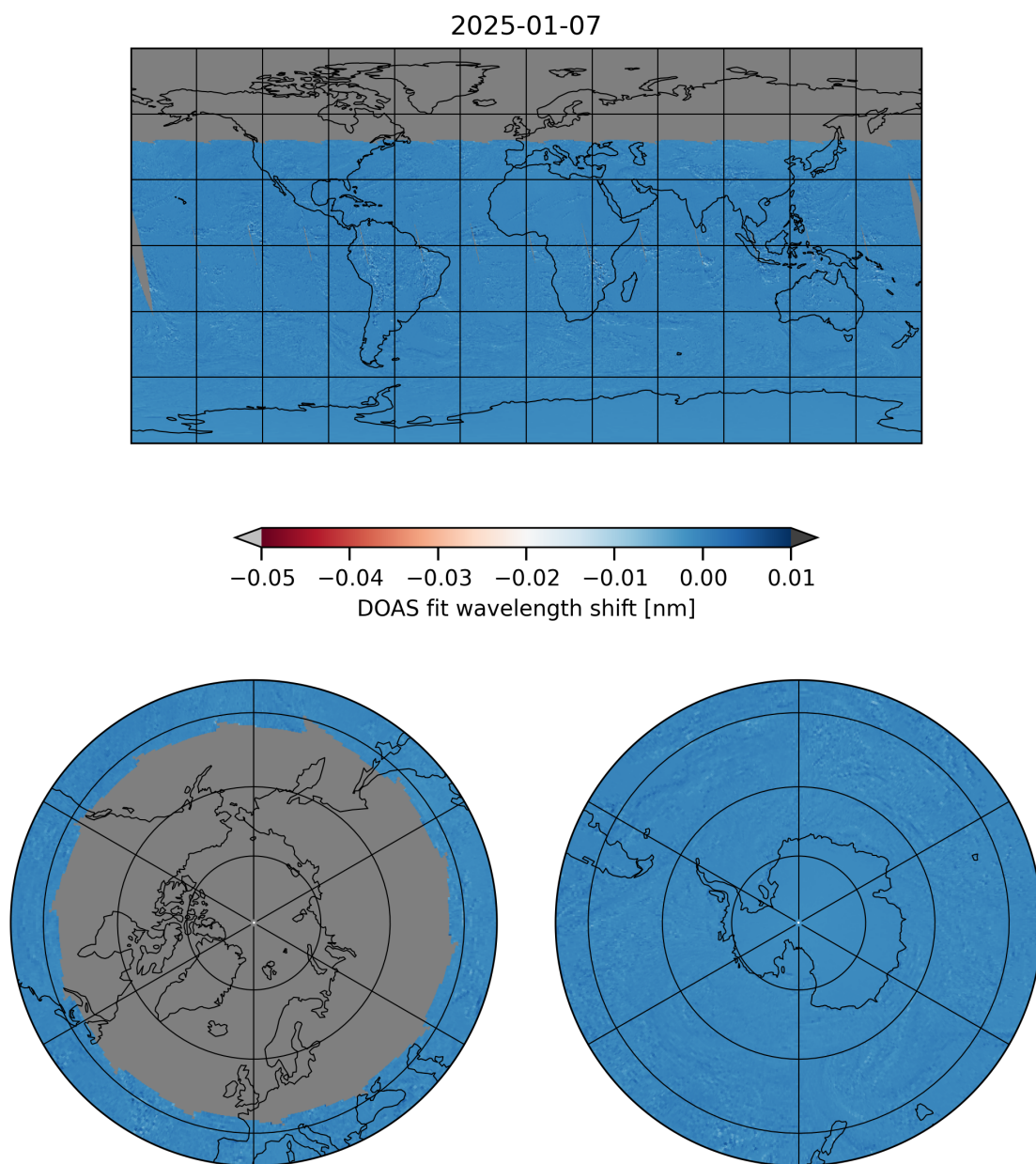


Figure 22: Map of “DOAS fit wavelength shift” for 2025-01-07 to 2025-01-08

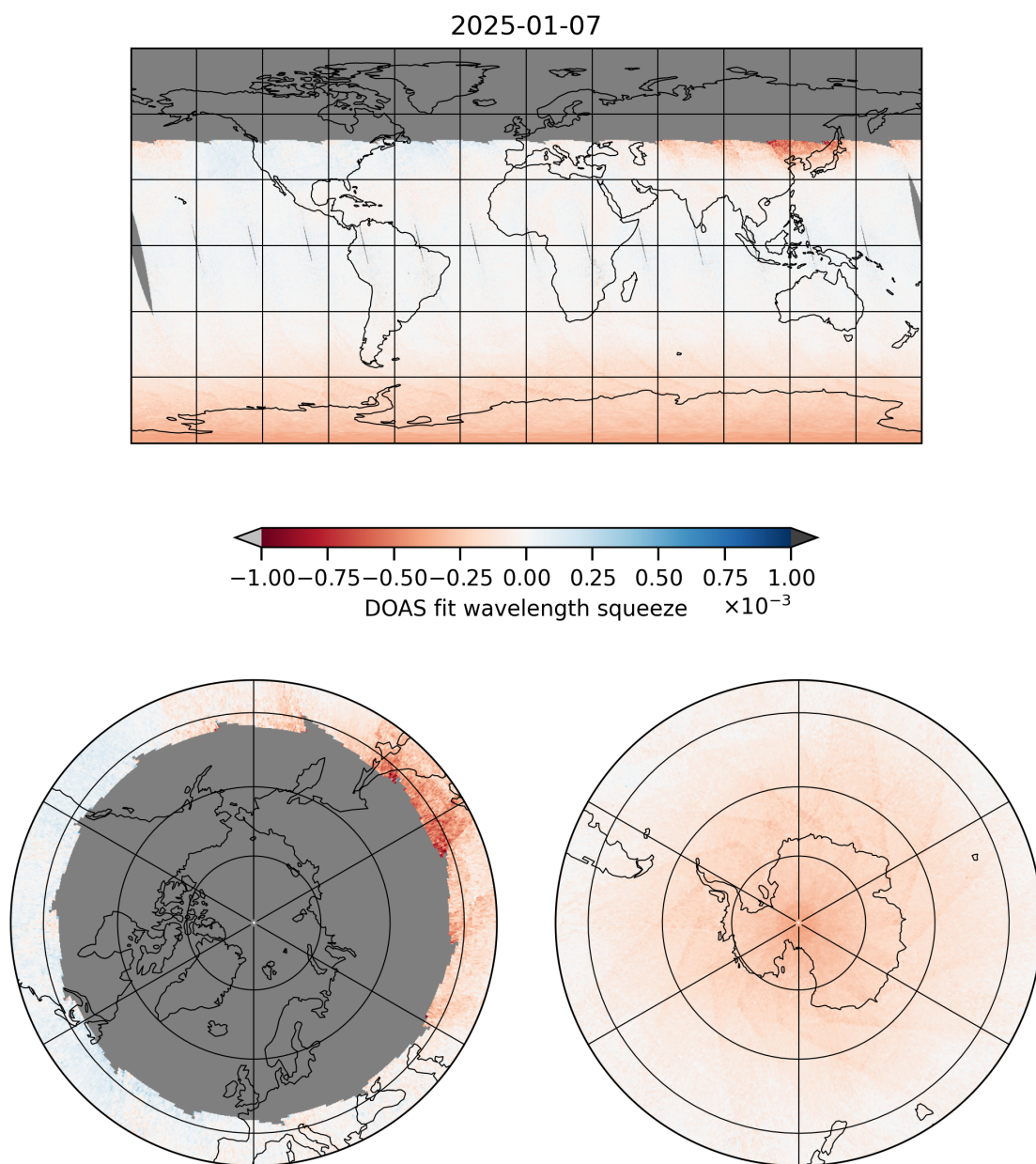


Figure 23: Map of “DOAS fit wavelength squeeze” for 2025-01-07 to 2025-01-08

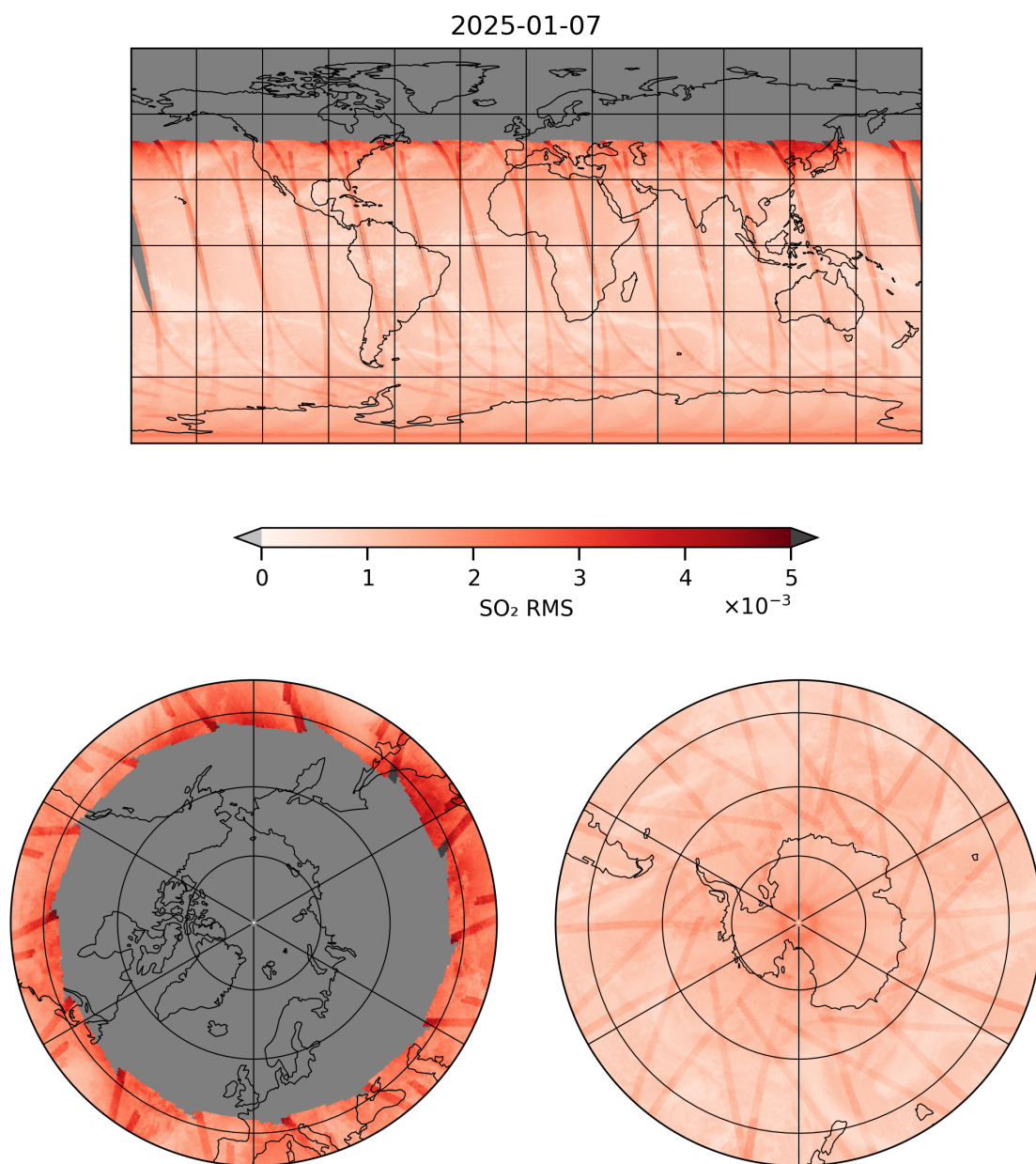


Figure 24: Map of “SO₂ RMS” for 2025-01-07 to 2025-01-08

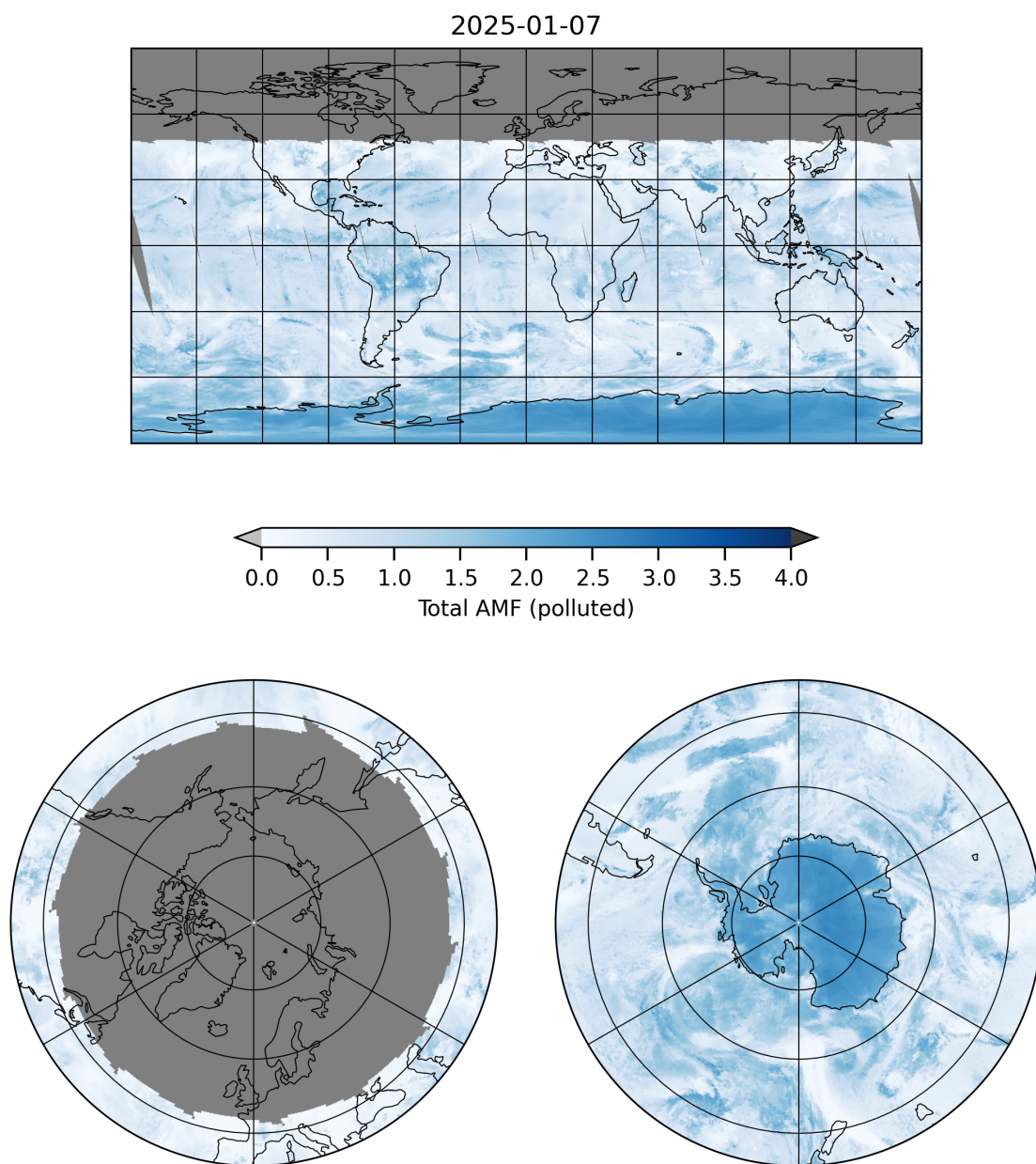


Figure 25: Map of “Total AMF (polluted)” for 2025-01-07 to 2025-01-08

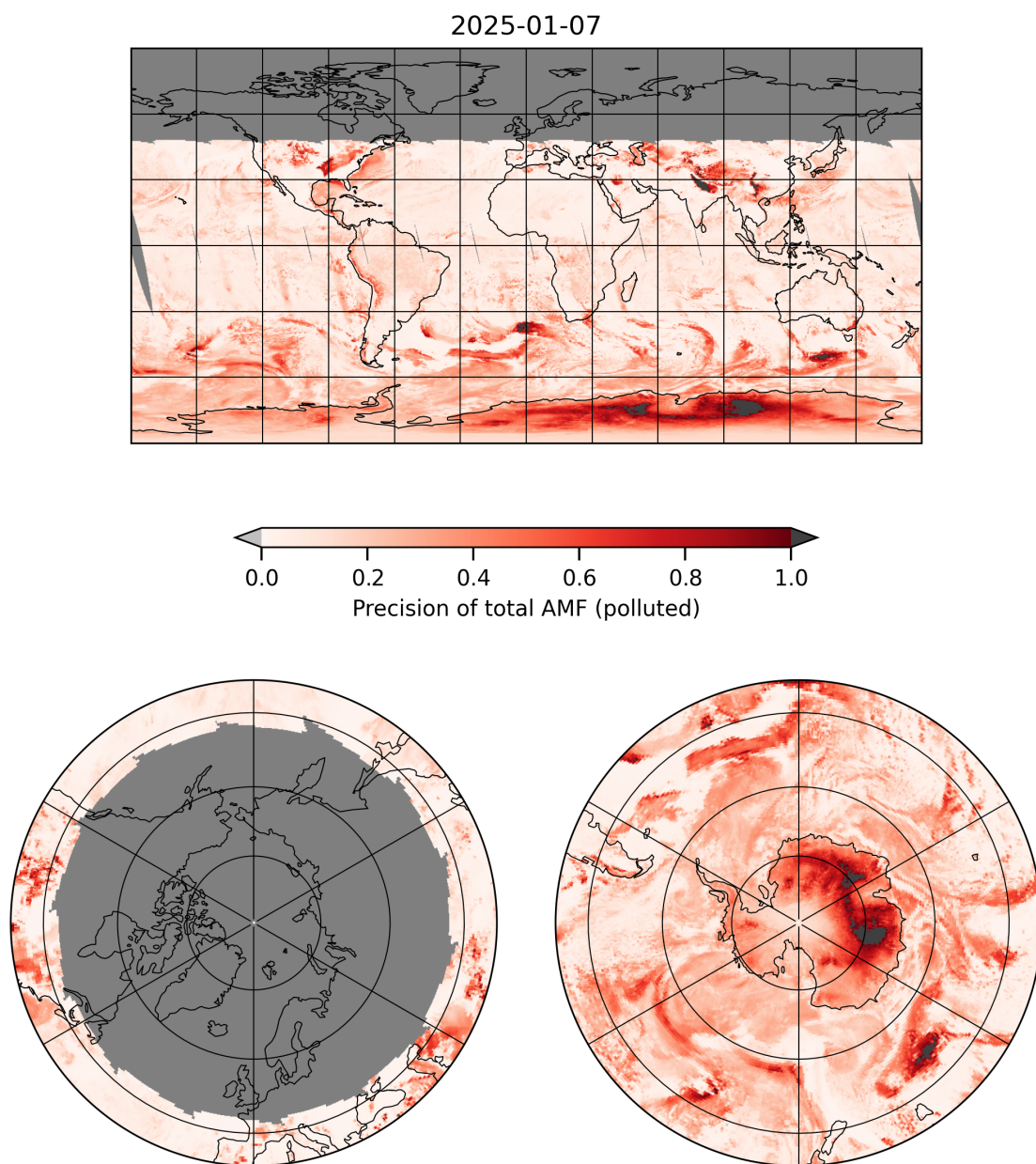


Figure 26: Map of “Precision of total AMF (polluted)” for 2025-01-07 to 2025-01-08

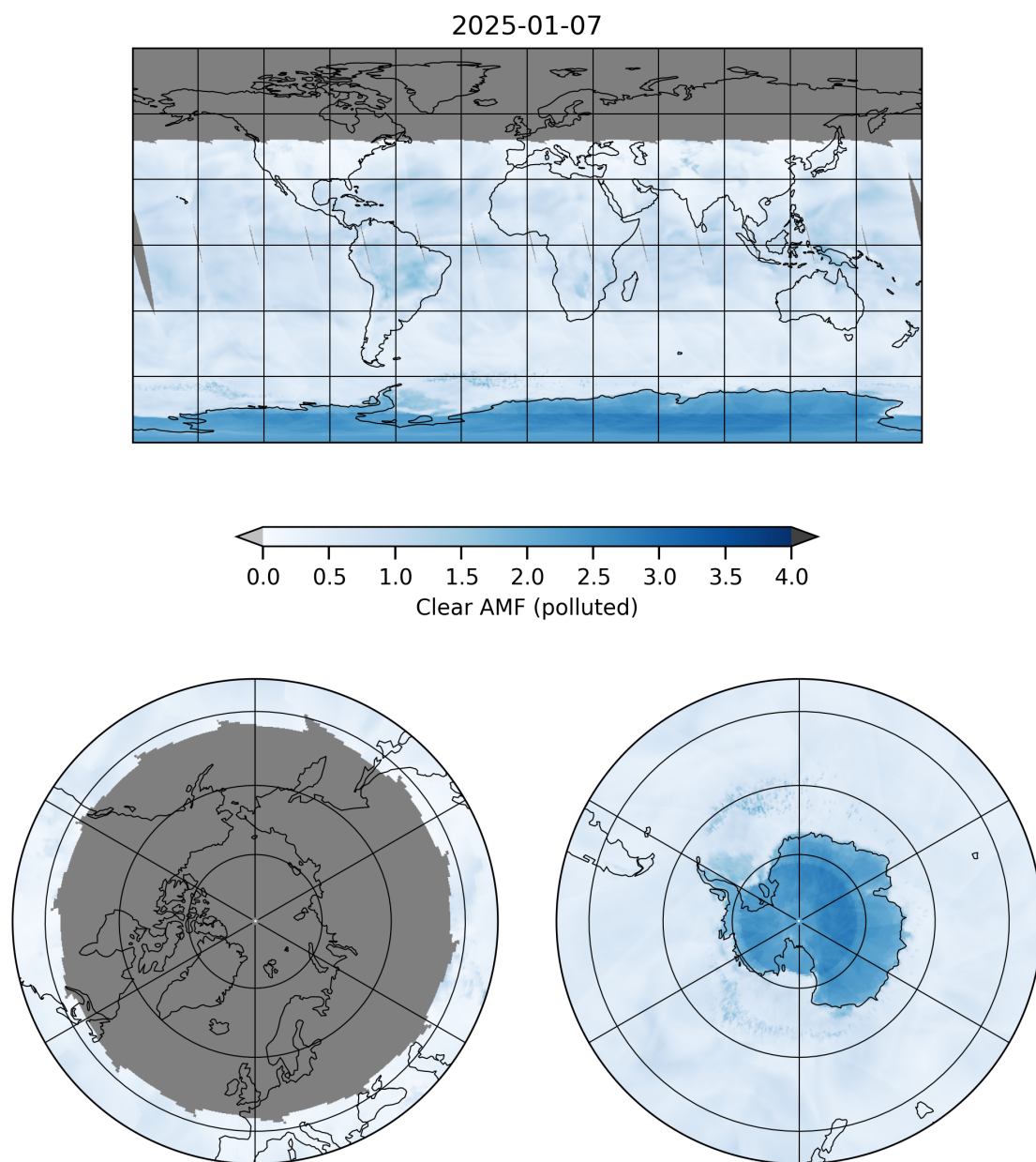


Figure 27: Map of “Clear AMF (polluted)” for 2025-01-07 to 2025-01-08

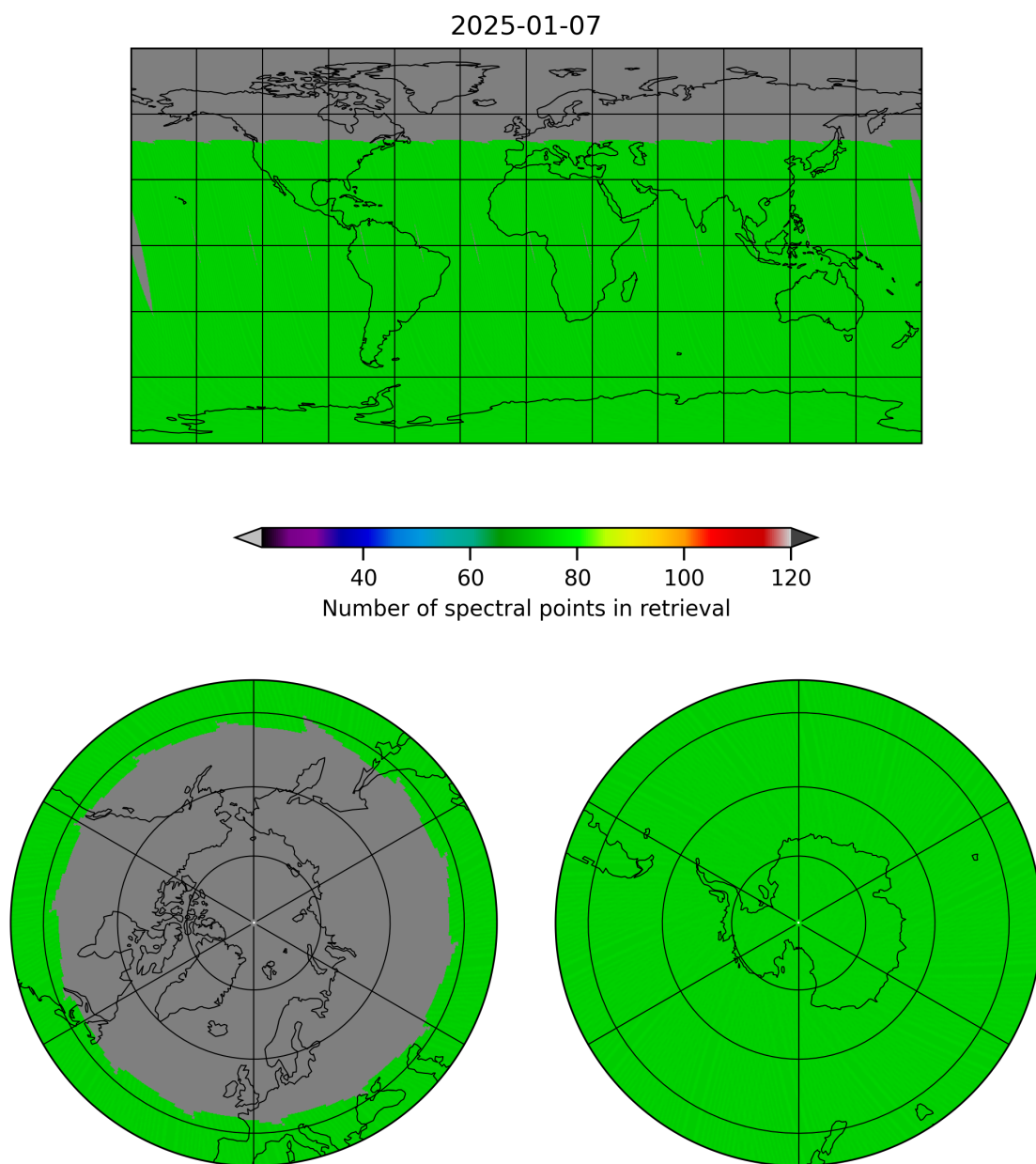


Figure 28: Map of “Number of spectral points in retrieval” for 2025-01-07 to 2025-01-08

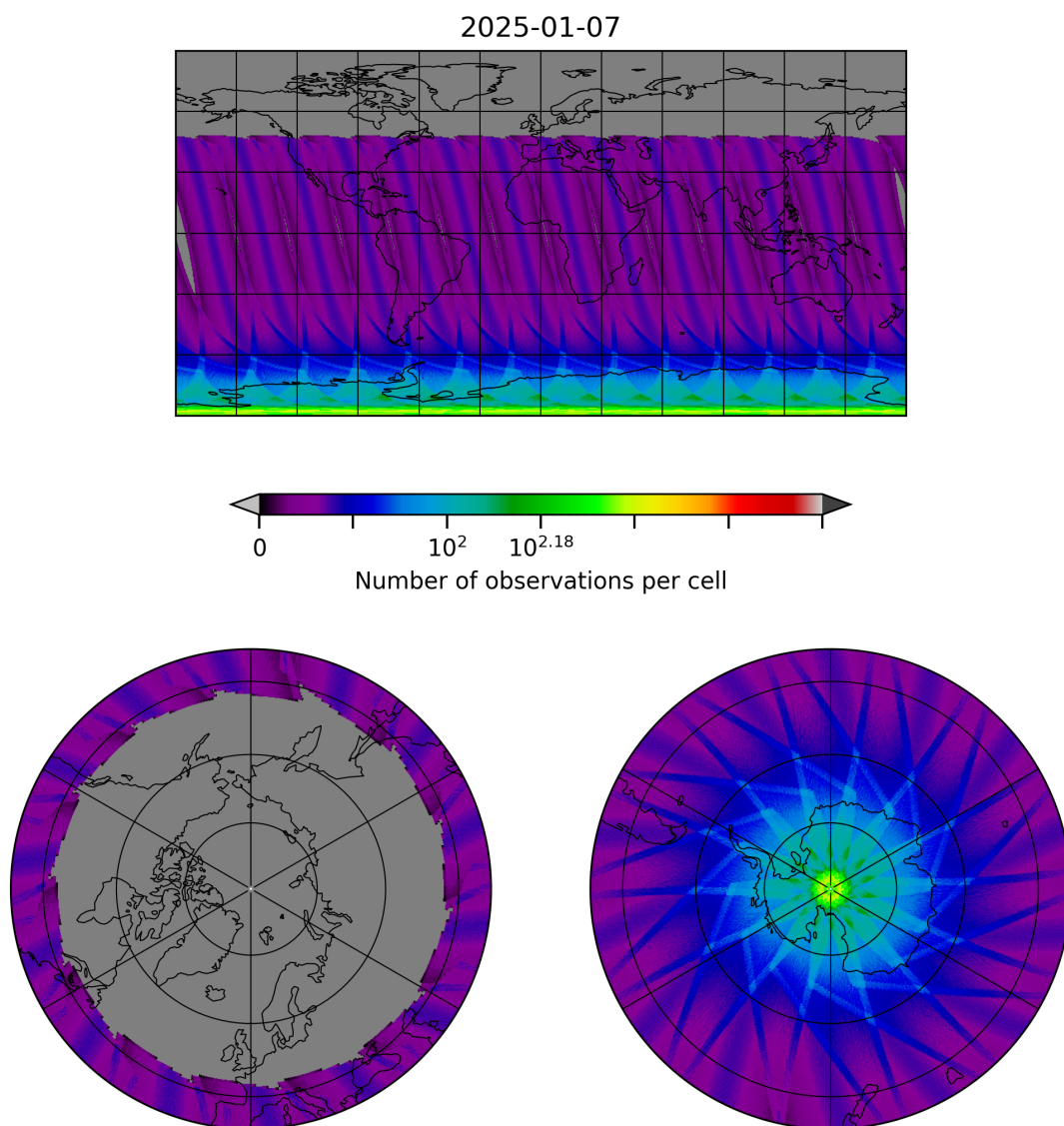


Figure 29: Map of the number of observations for 2025-01-07 to 2025-01-08

7 Zonal average

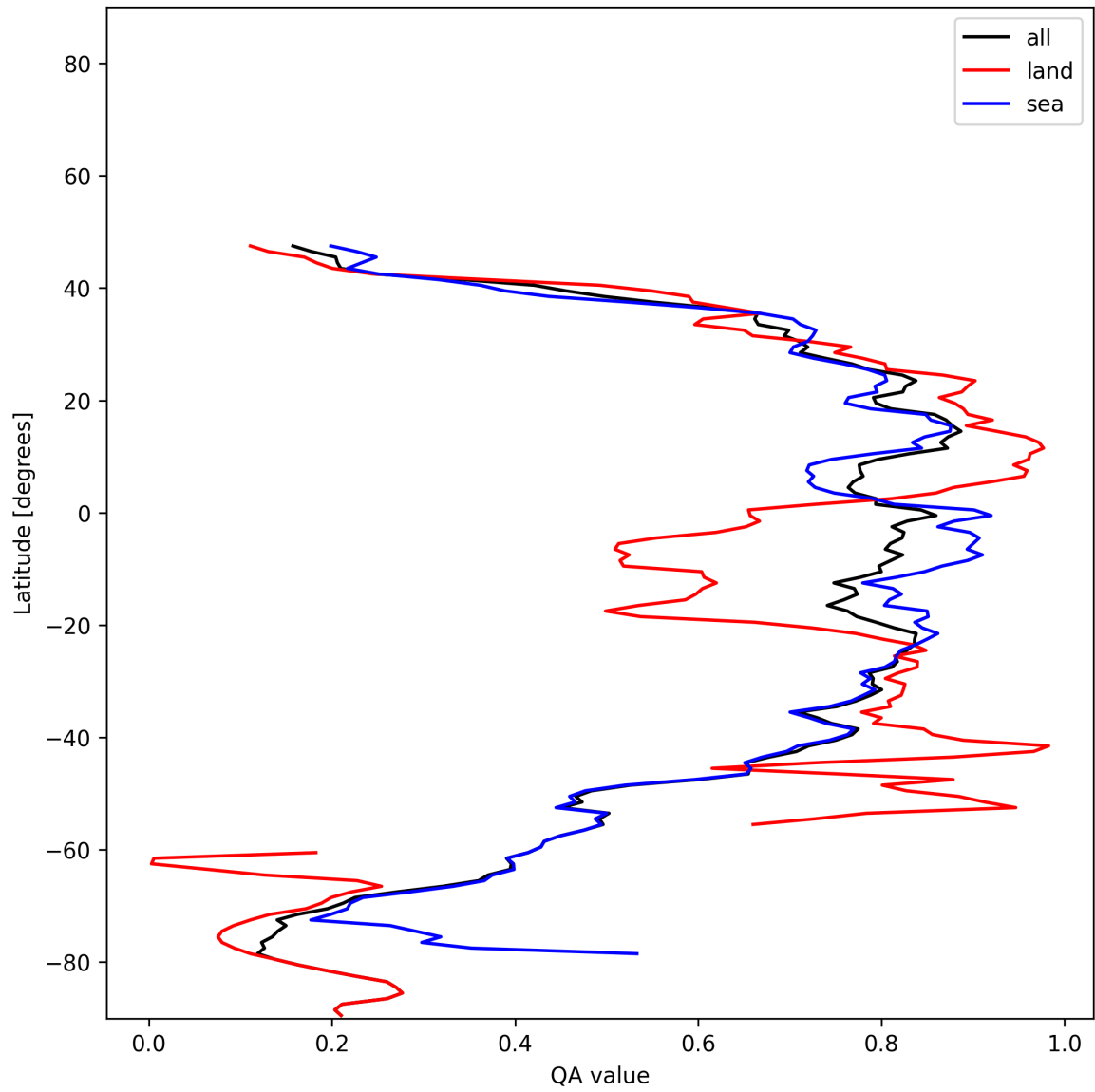


Figure 30: Zonal average of “QA value” for 2025-01-07 to 2025-01-08.

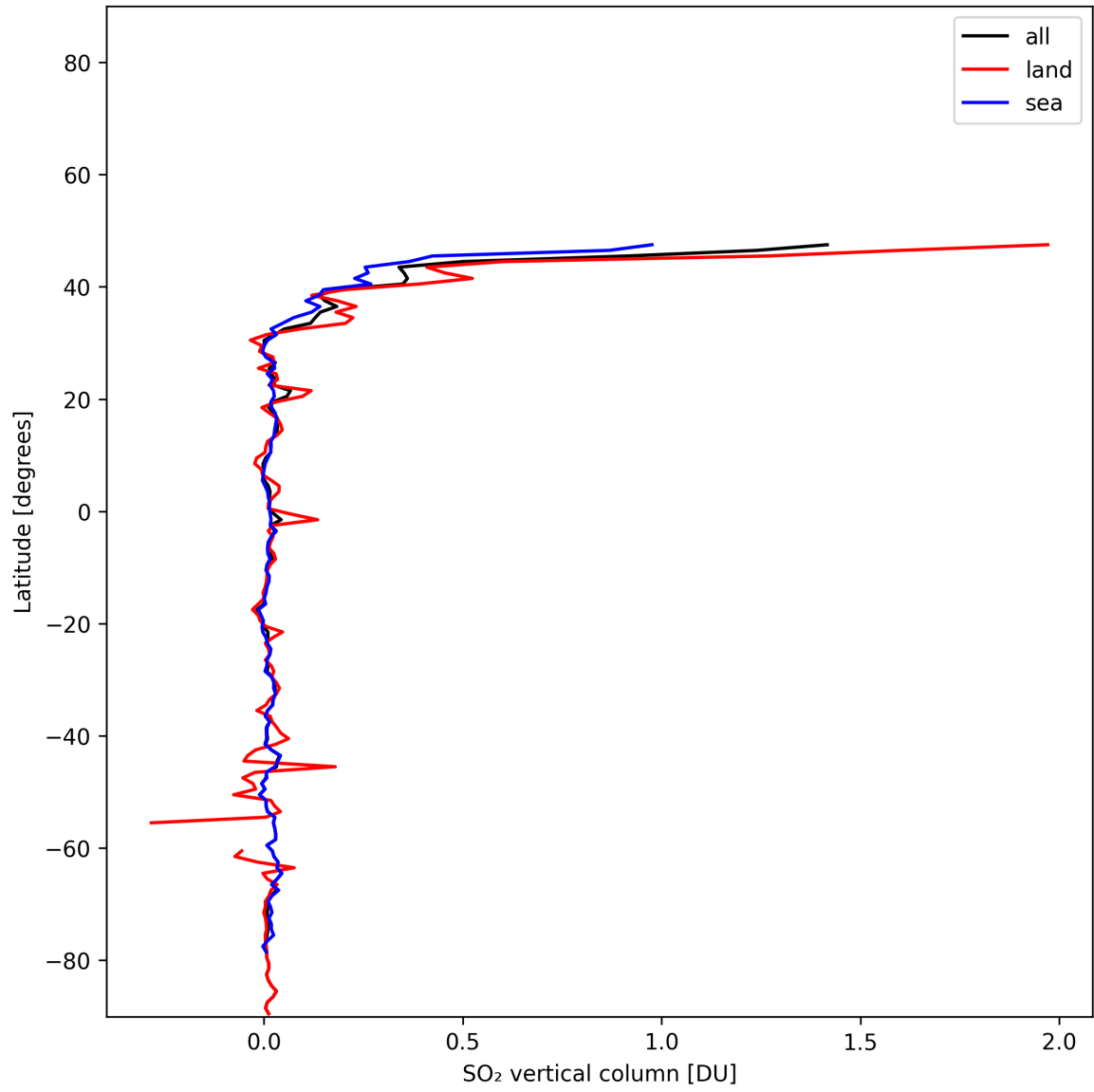


Figure 31: Zonal average of “SO₂ vertical column” for 2025-01-07 to 2025-01-08.

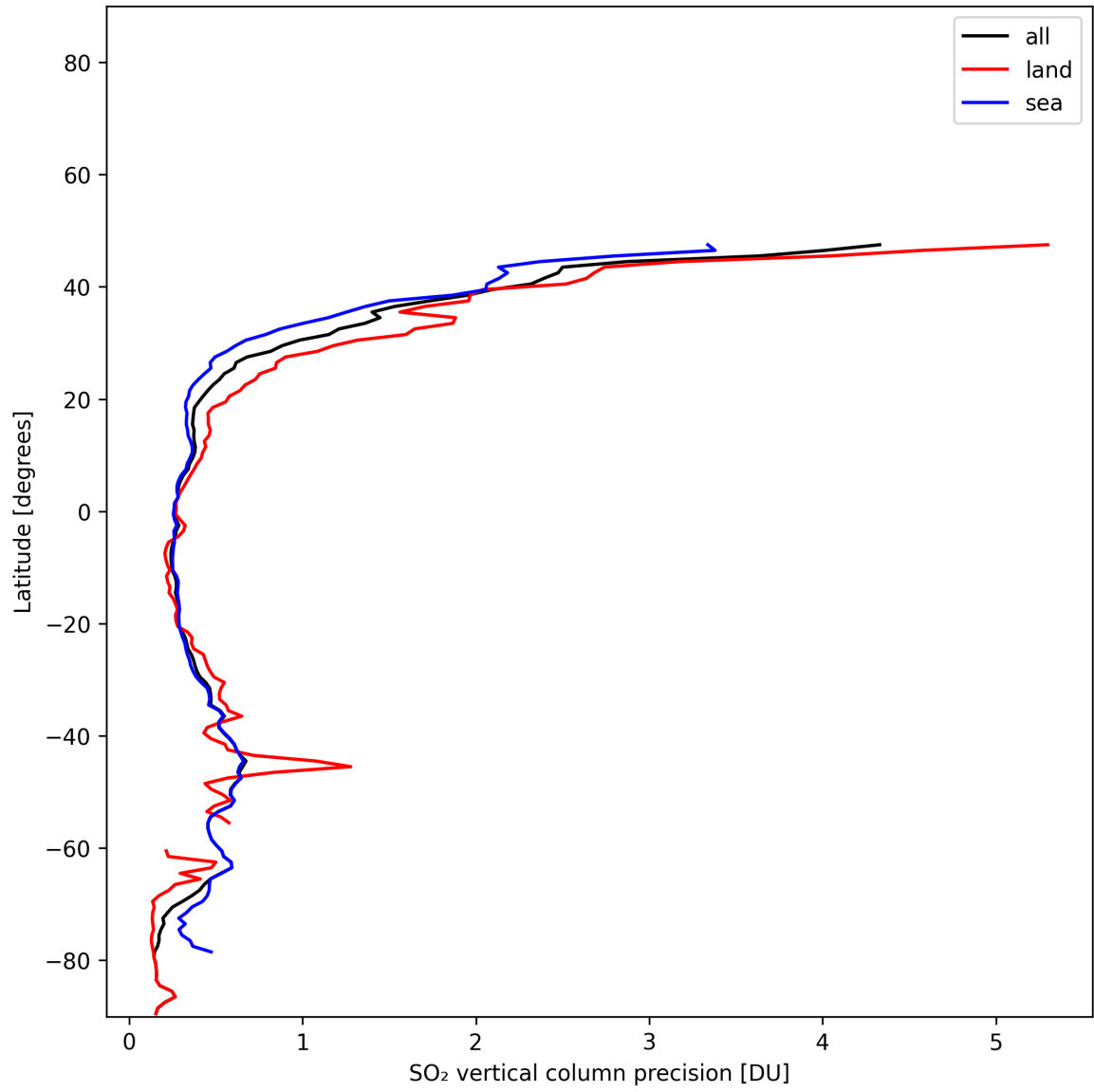


Figure 32: Zonal average of “SO₂ vertical column precision” for 2025-01-07 to 2025-01-08.

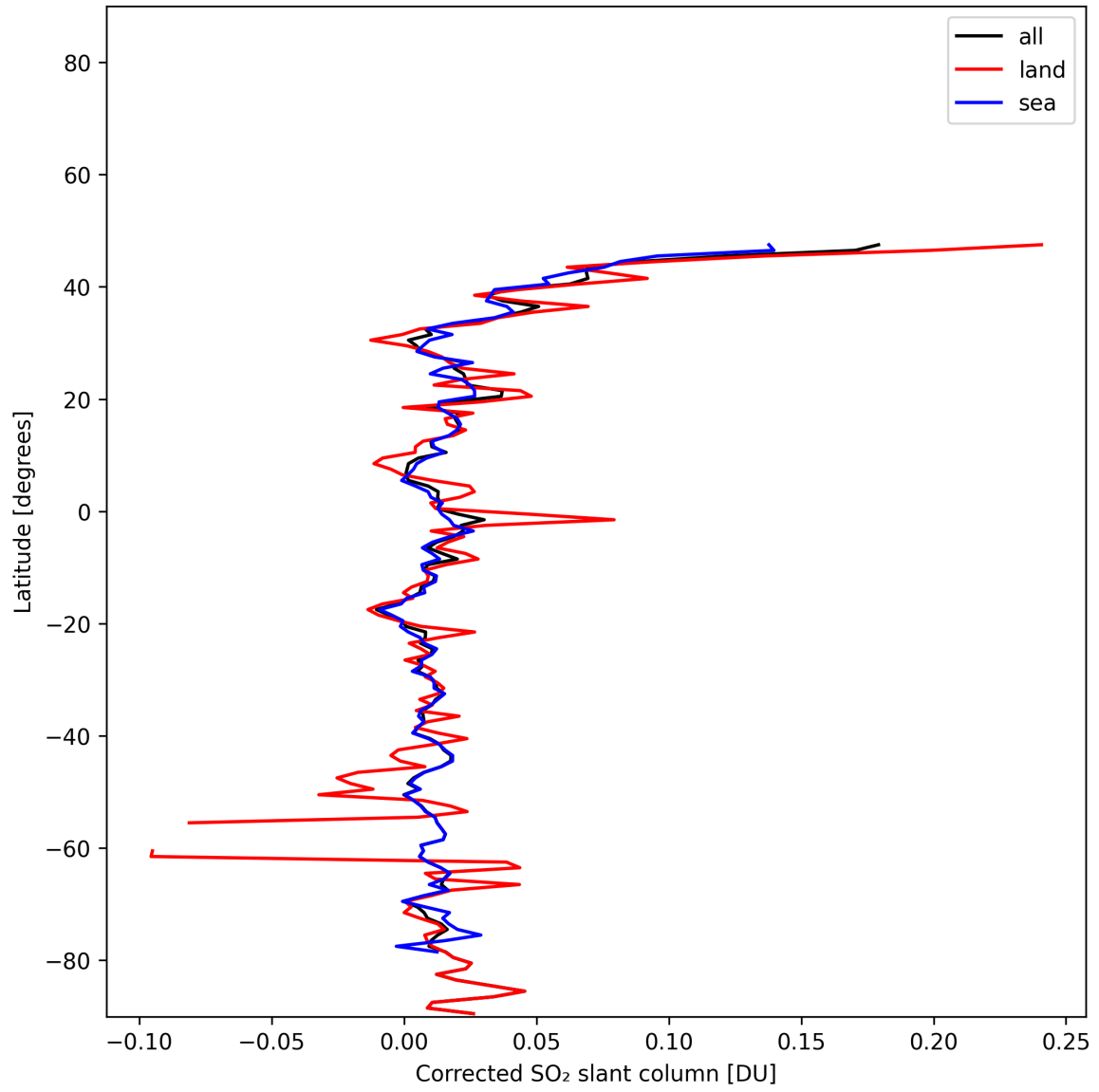


Figure 33: Zonal average of “Corrected SO₂ slant column” for 2025-01-07 to 2025-01-08.

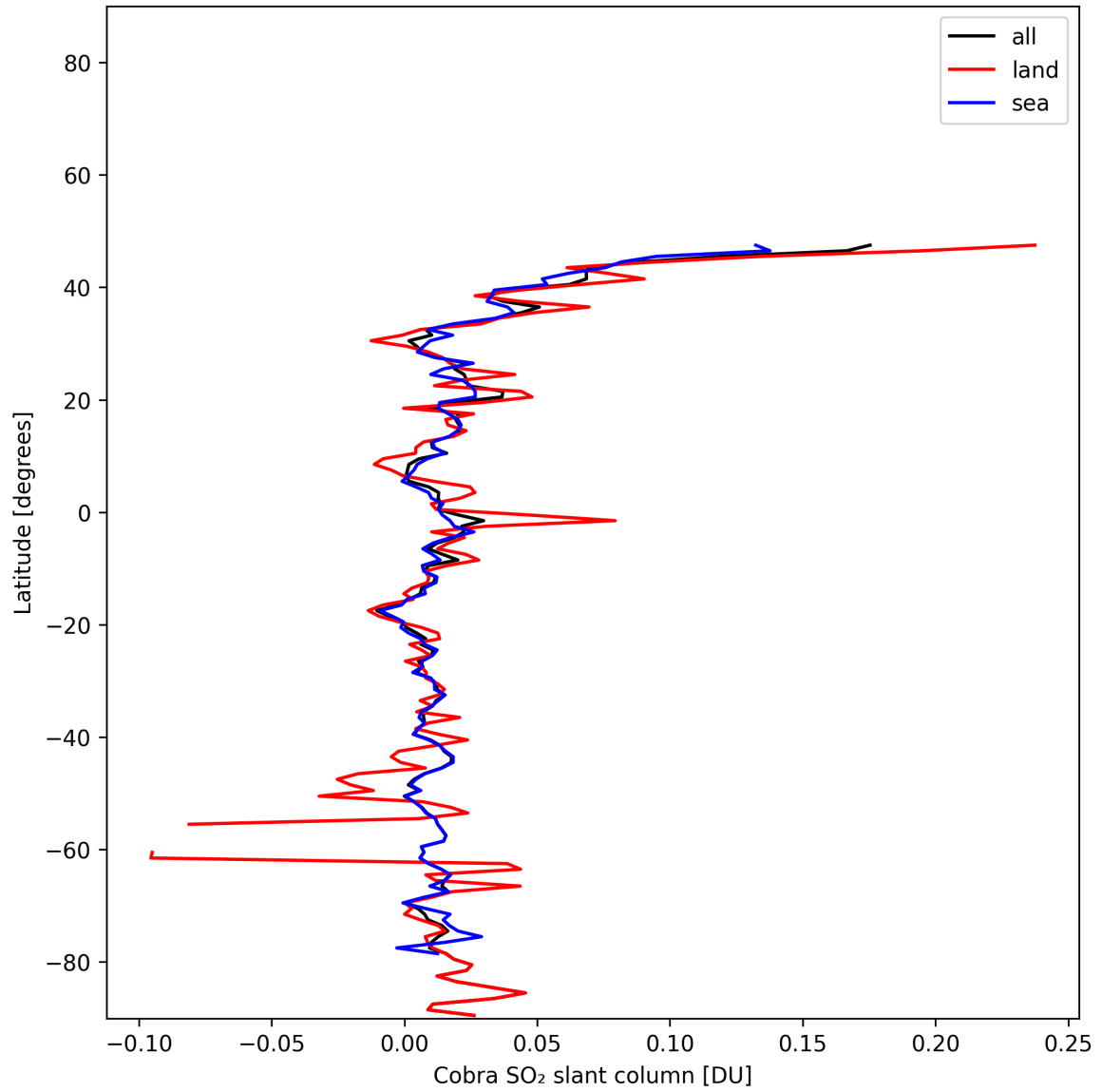


Figure 34: Zonal average of “Cobra SO₂ slant column” for 2025-01-07 to 2025-01-08.

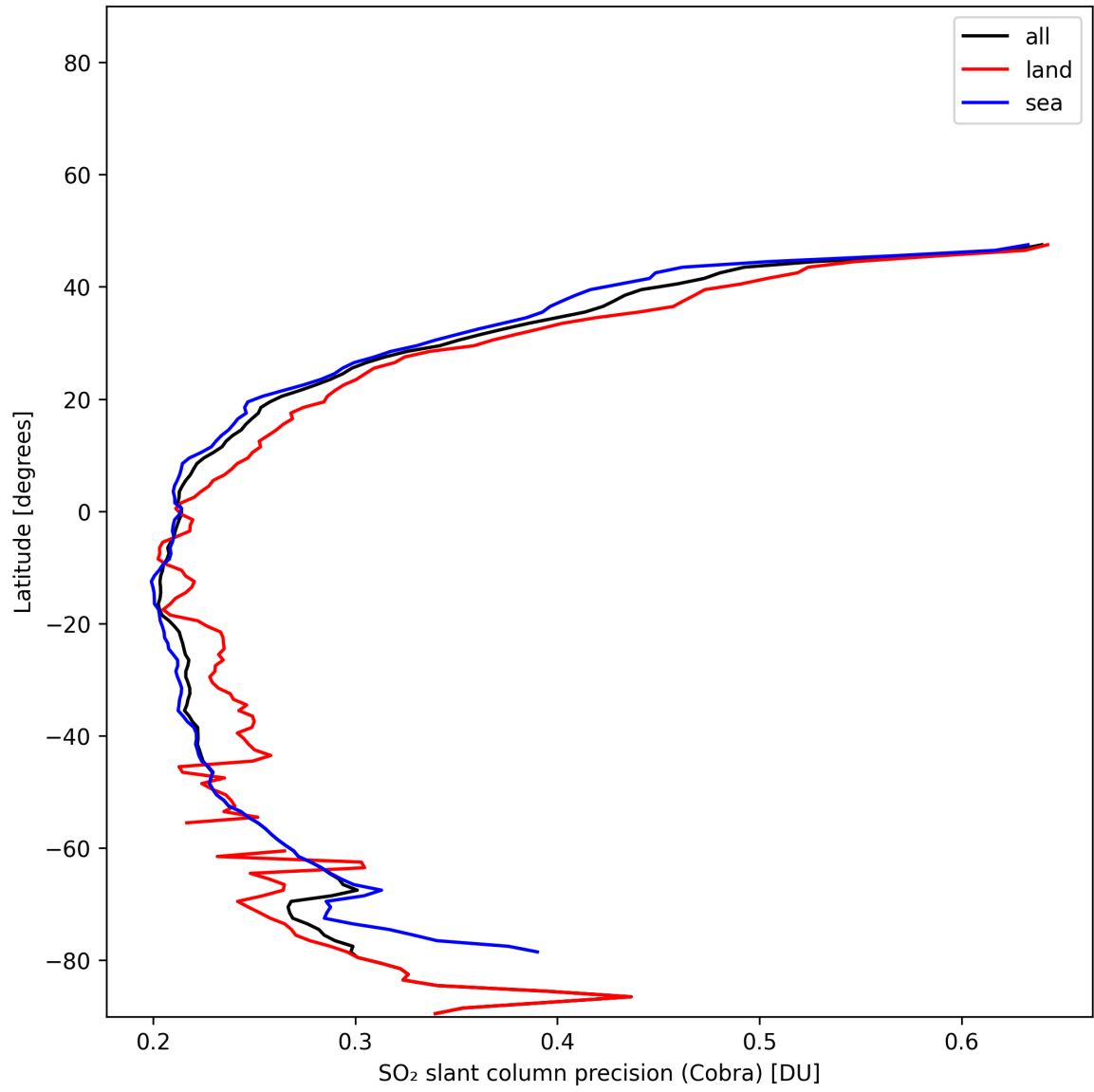


Figure 35: Zonal average of “SO₂ slant column precision (Cobra)” for 2025-01-07 to 2025-01-08.

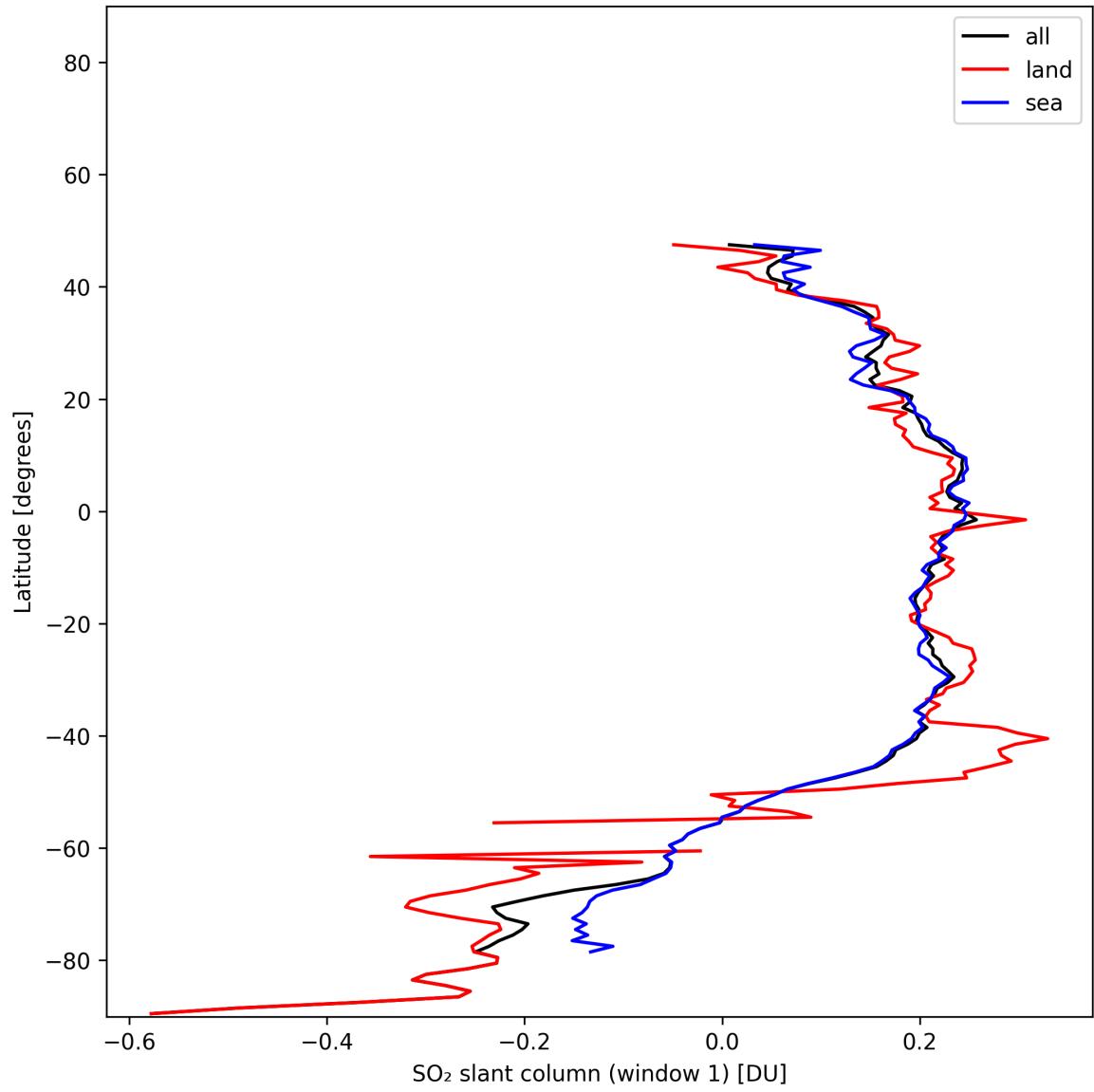


Figure 36: Zonal average of “SO₂ slant column (window 1)” for 2025-01-07 to 2025-01-08.

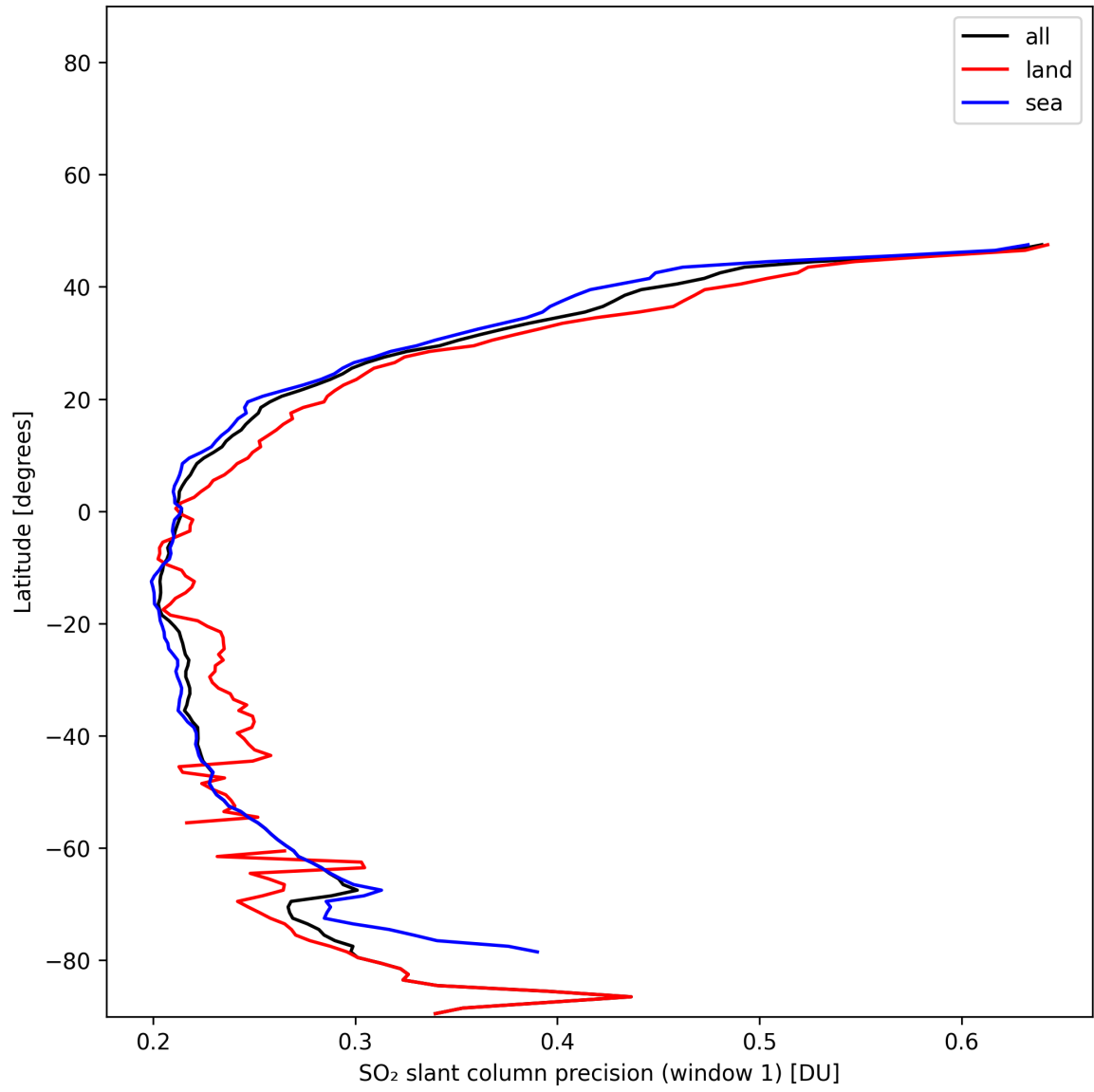


Figure 37: Zonal average of “SO₂ slant column precision (window 1)” for 2025-01-07 to 2025-01-08.

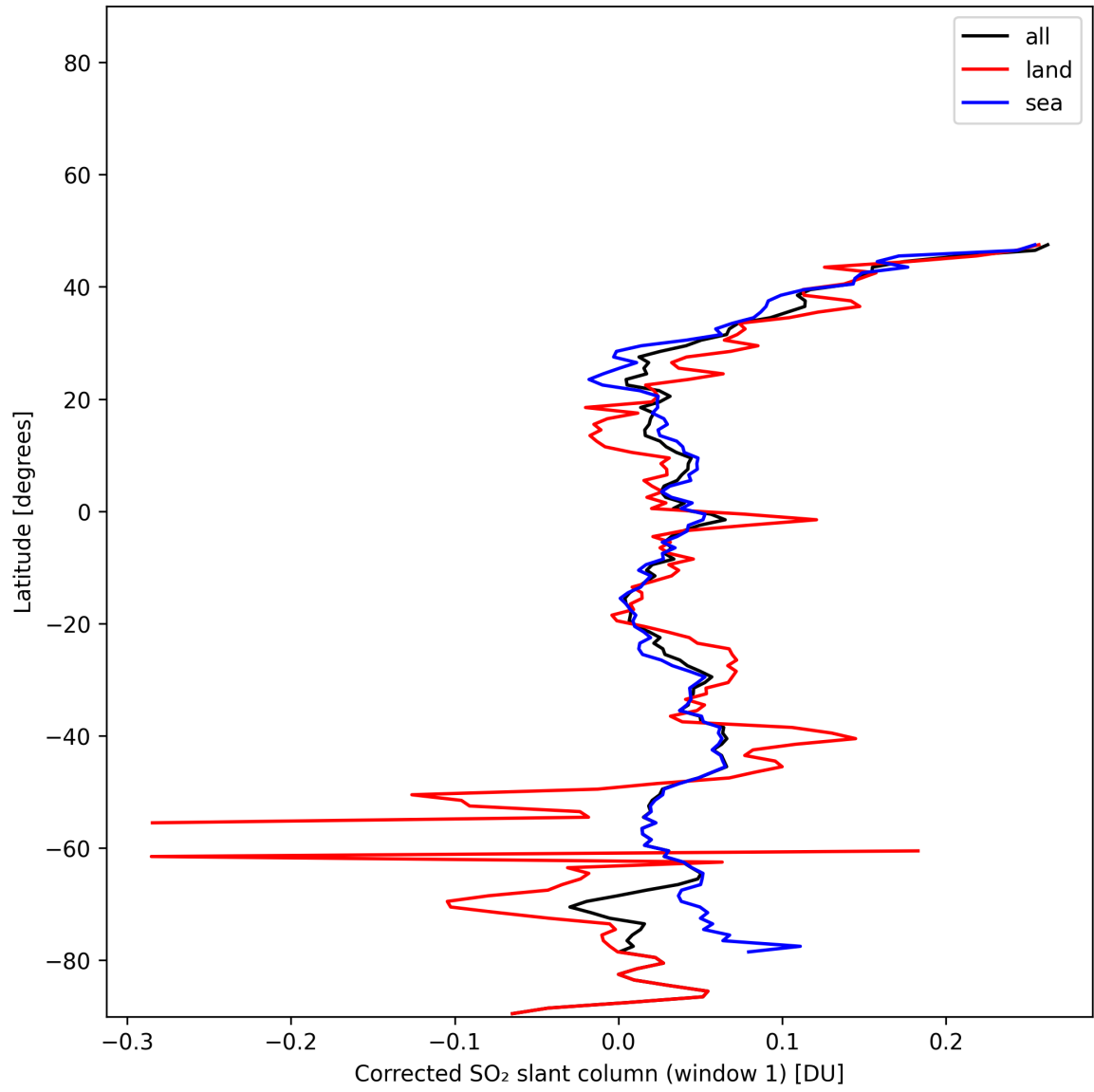


Figure 38: Zonal average of “Corrected SO₂ slant column (window 1)” for 2025-01-07 to 2025-01-08.

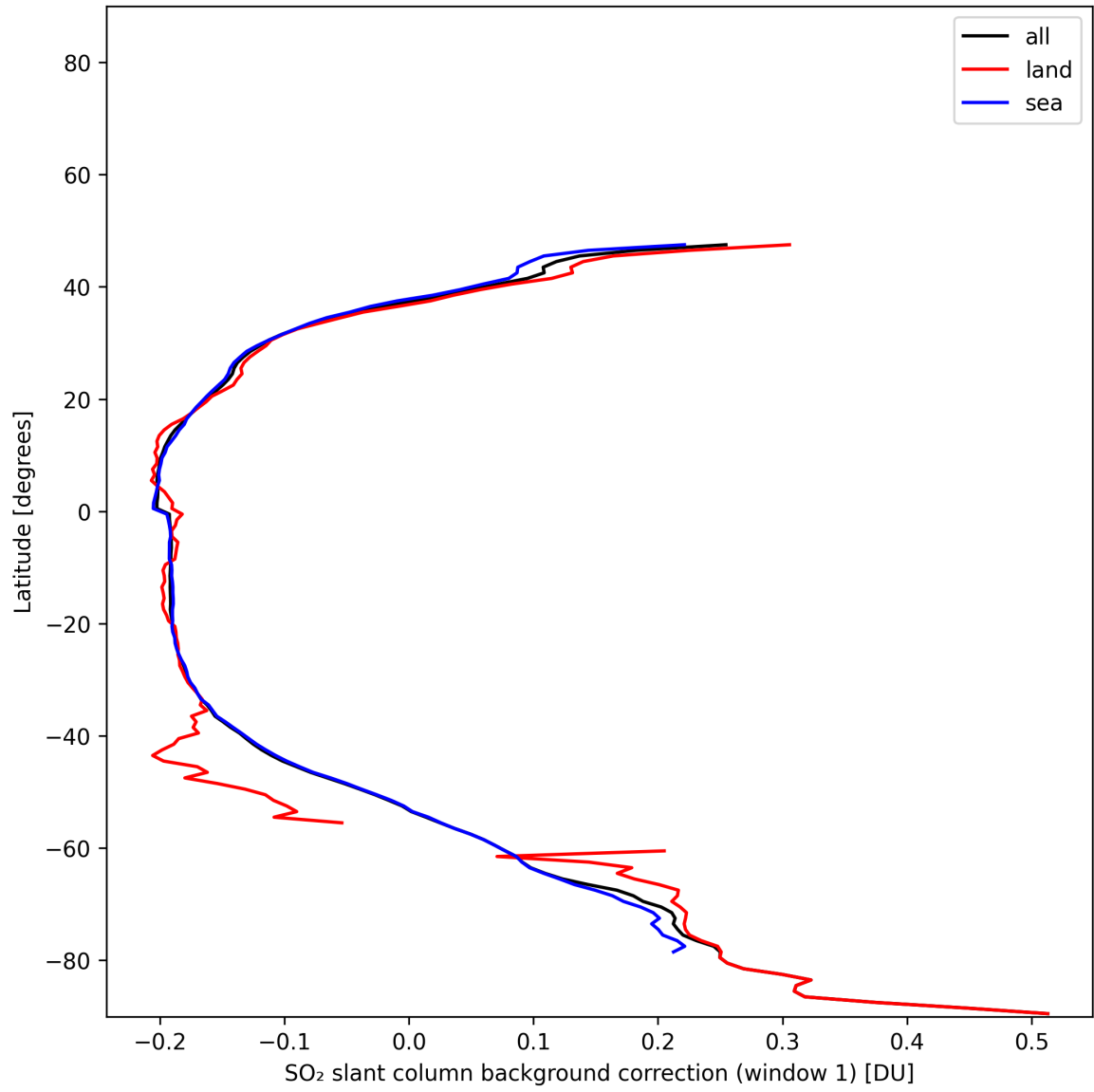


Figure 39: Zonal average of “SO₂ slant column background correction (window 1)” for 2025-01-07 to 2025-01-08.

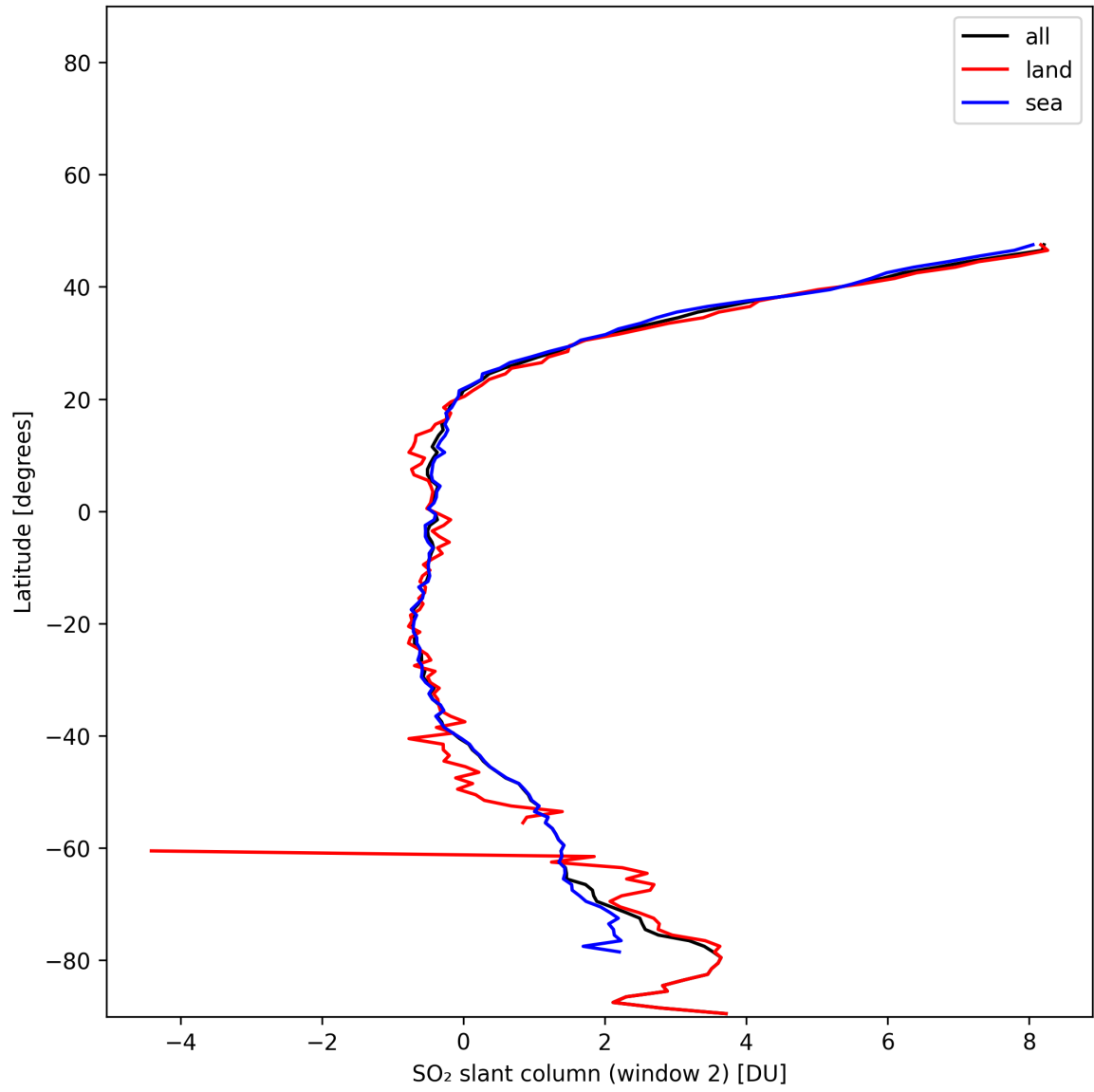


Figure 40: Zonal average of “SO₂ slant column (window 2)” for 2025-01-07 to 2025-01-08.

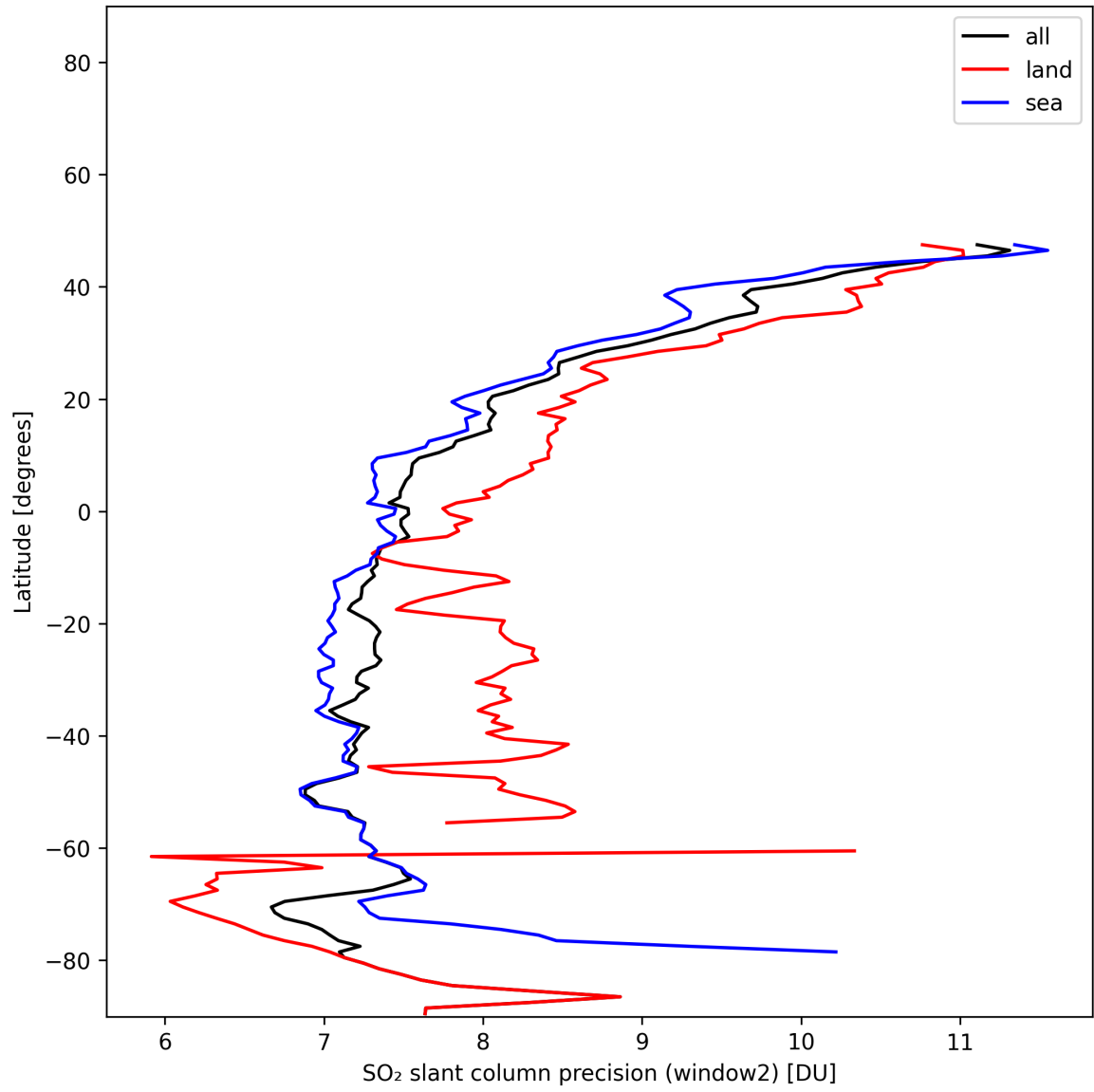


Figure 41: Zonal average of “SO₂ slant column precision (window2)” for 2025-01-07 to 2025-01-08.

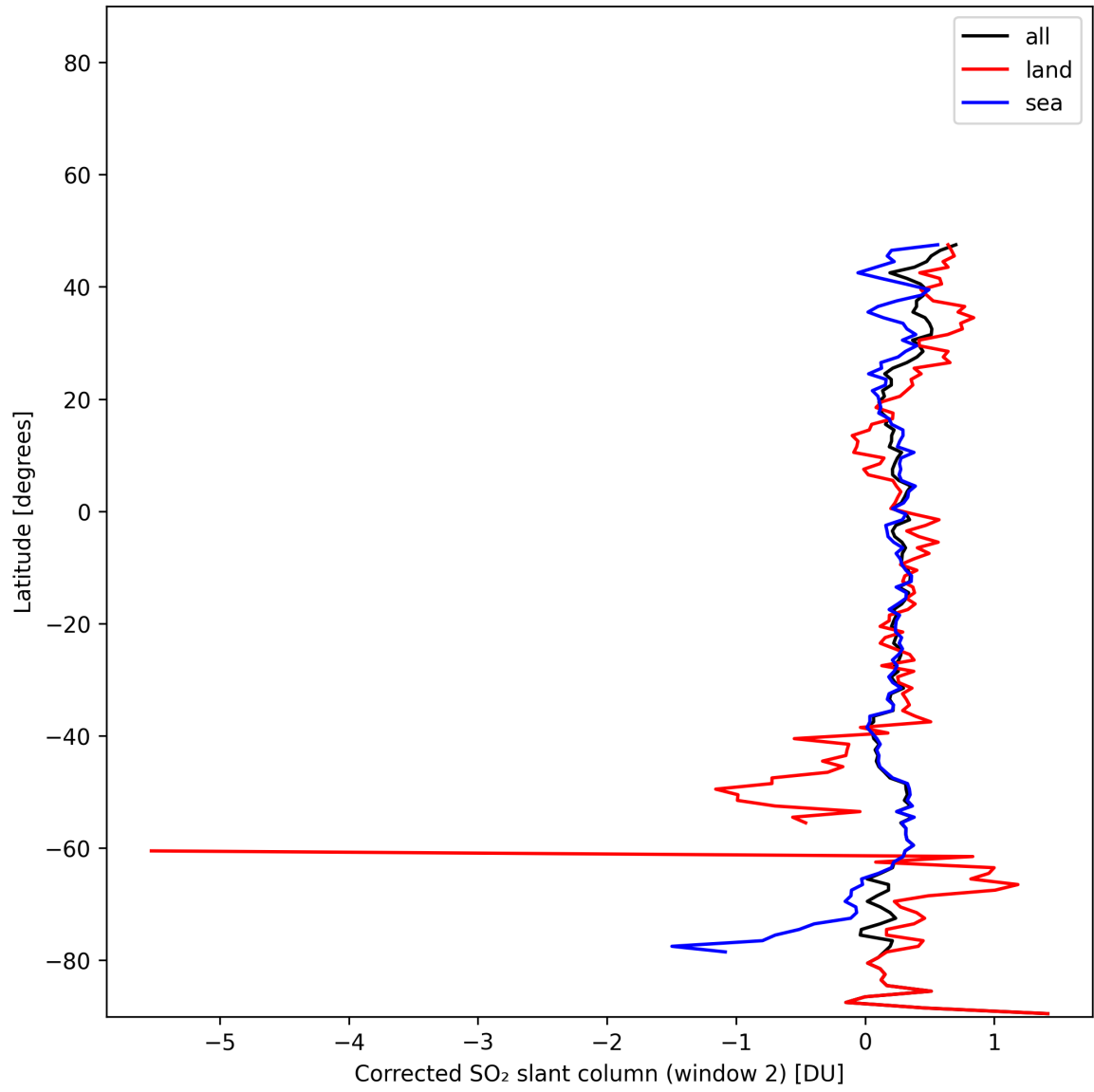


Figure 42: Zonal average of “Corrected SO₂ slant column (window 2)” for 2025-01-07 to 2025-01-08.

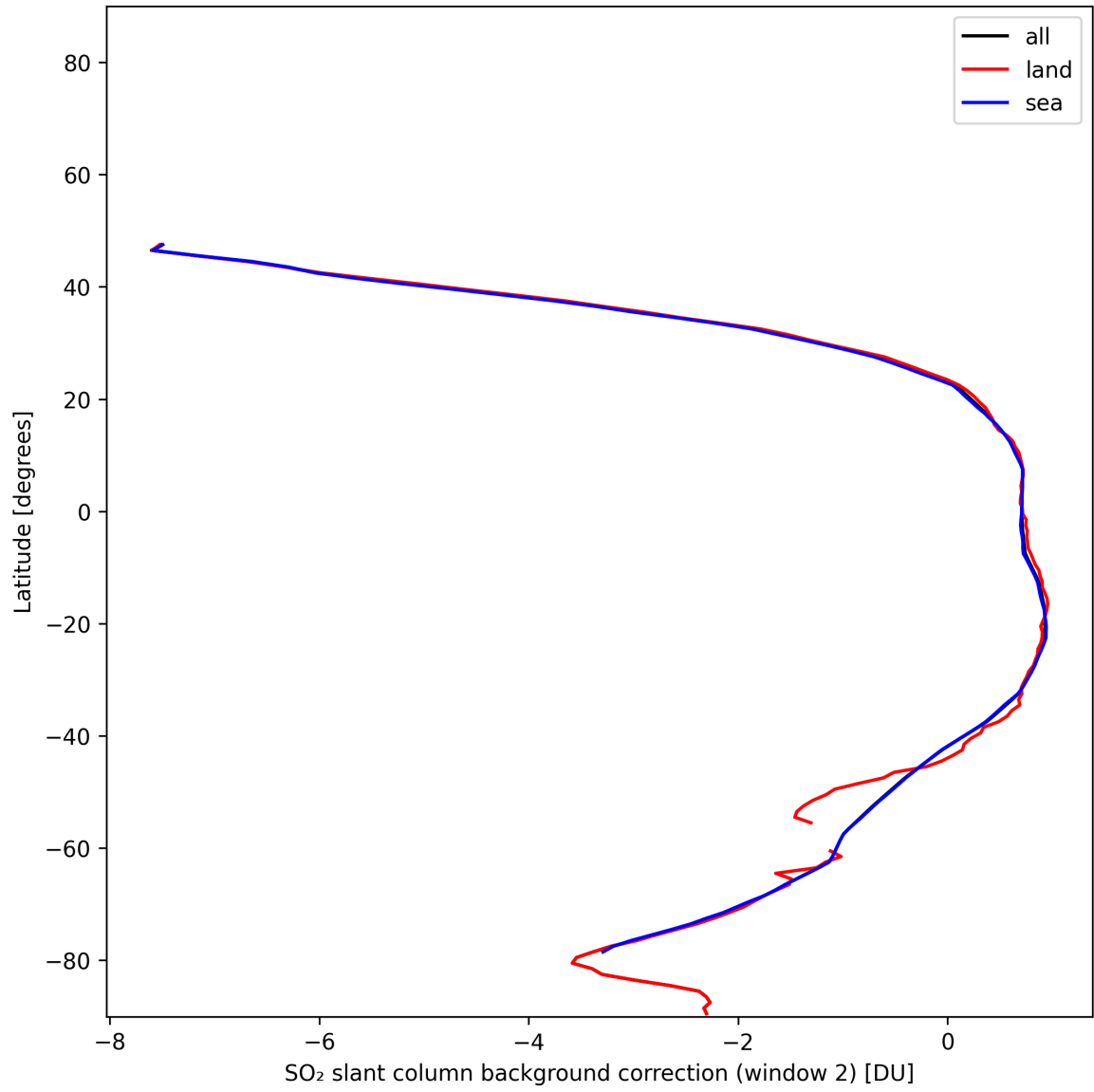


Figure 43: Zonal average of “SO₂ slant column background correction (window 2)” for 2025-01-07 to 2025-01-08.

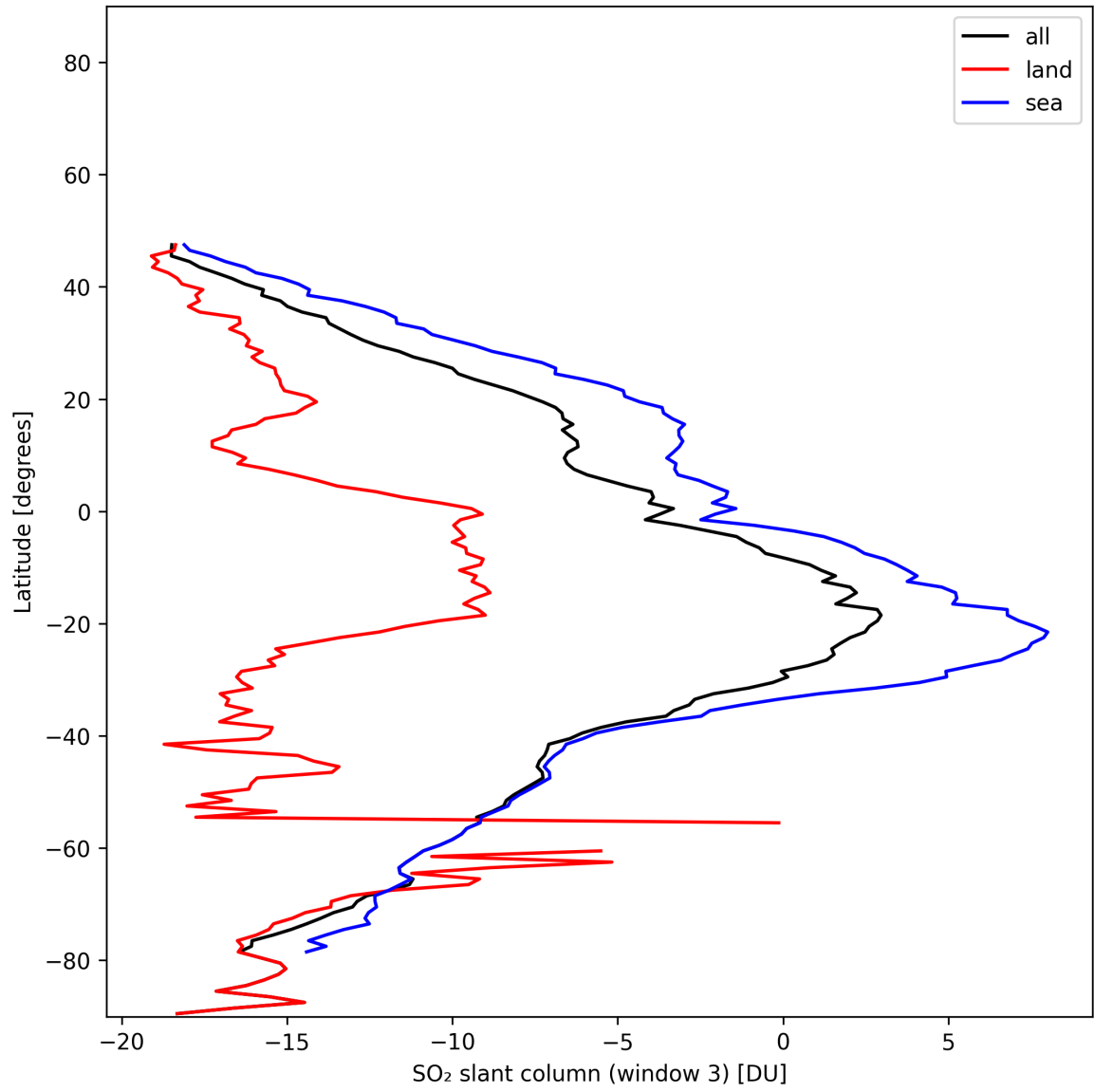


Figure 44: Zonal average of “SO₂ slant column (window 3)” for 2025-01-07 to 2025-01-08.

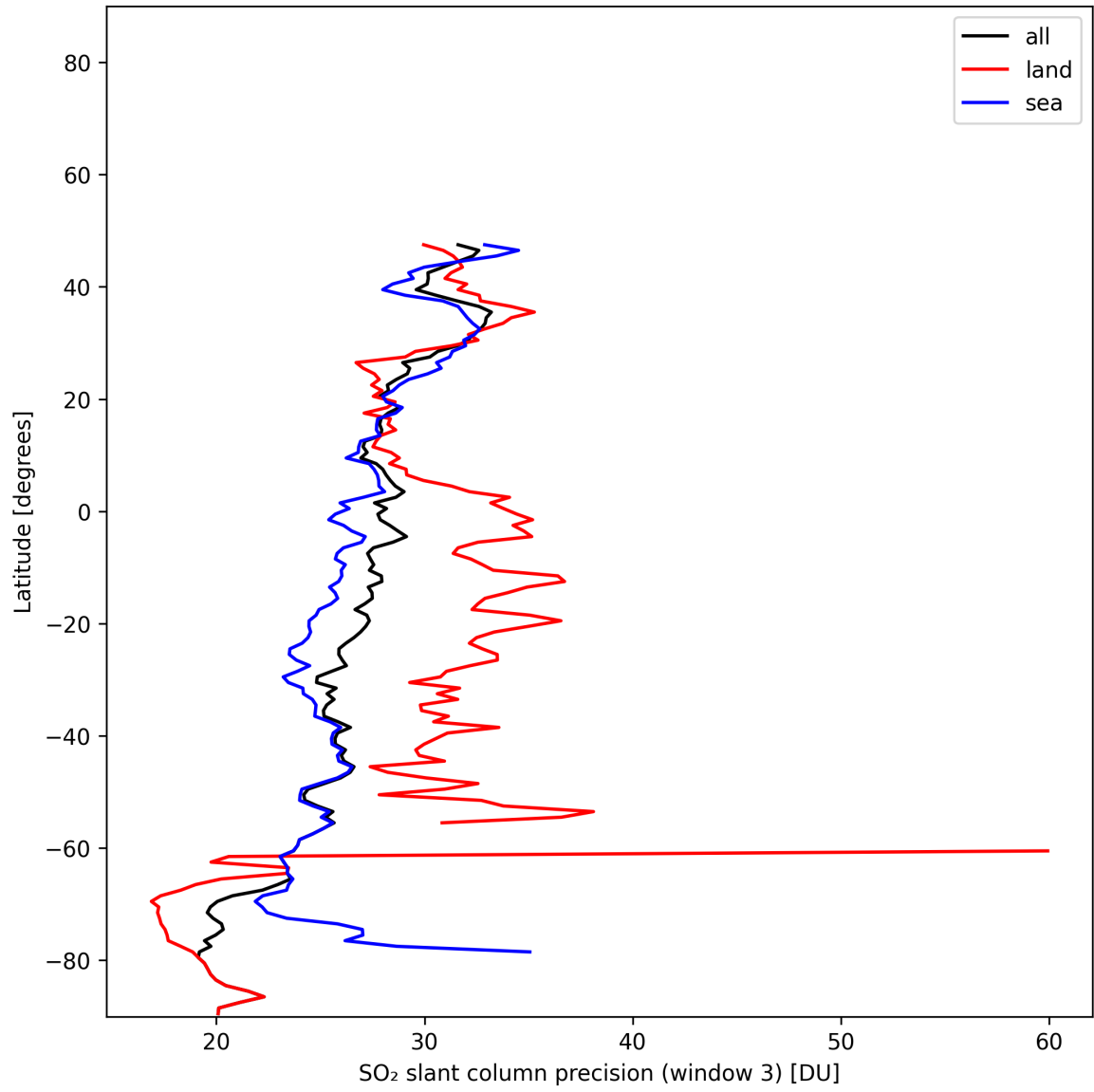


Figure 45: Zonal average of “SO₂ slant column precision (window 3)” for 2025-01-07 to 2025-01-08.

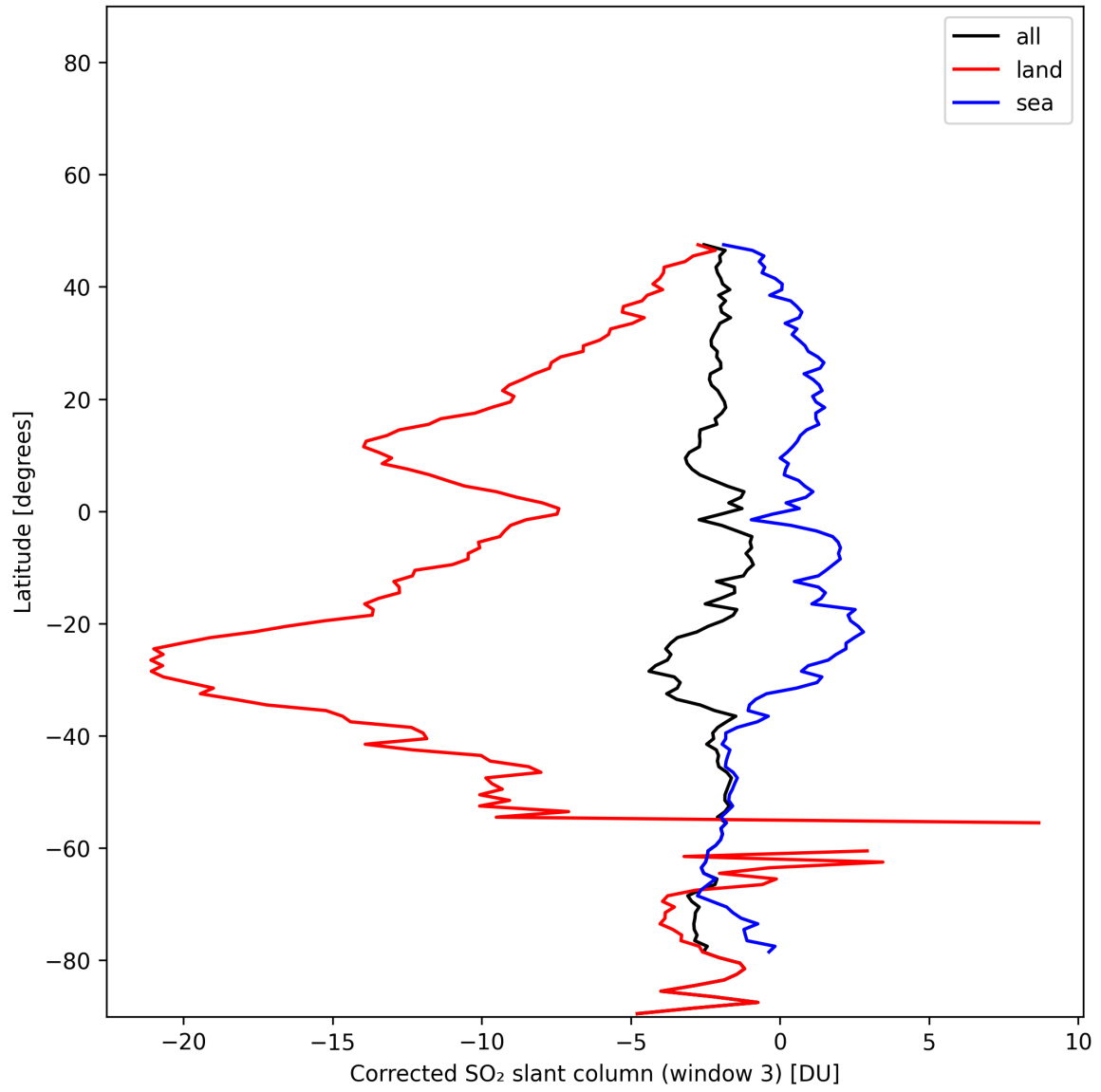


Figure 46: Zonal average of “Corrected SO₂ slant column (window 3)” for 2025-01-07 to 2025-01-08.

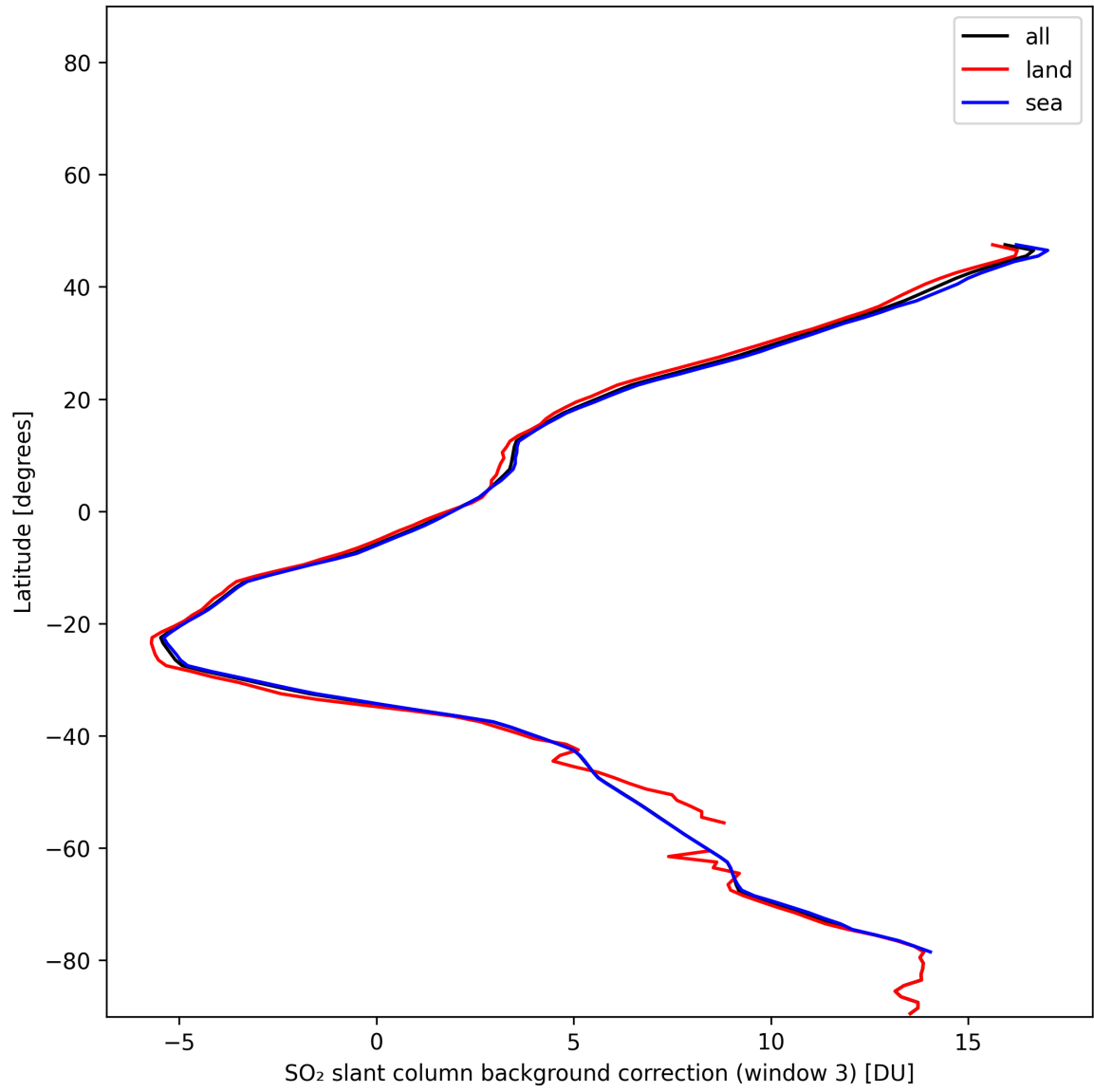


Figure 47: Zonal average of “SO₂ slant column background correction (window 3)” for 2025-01-07 to 2025-01-08.

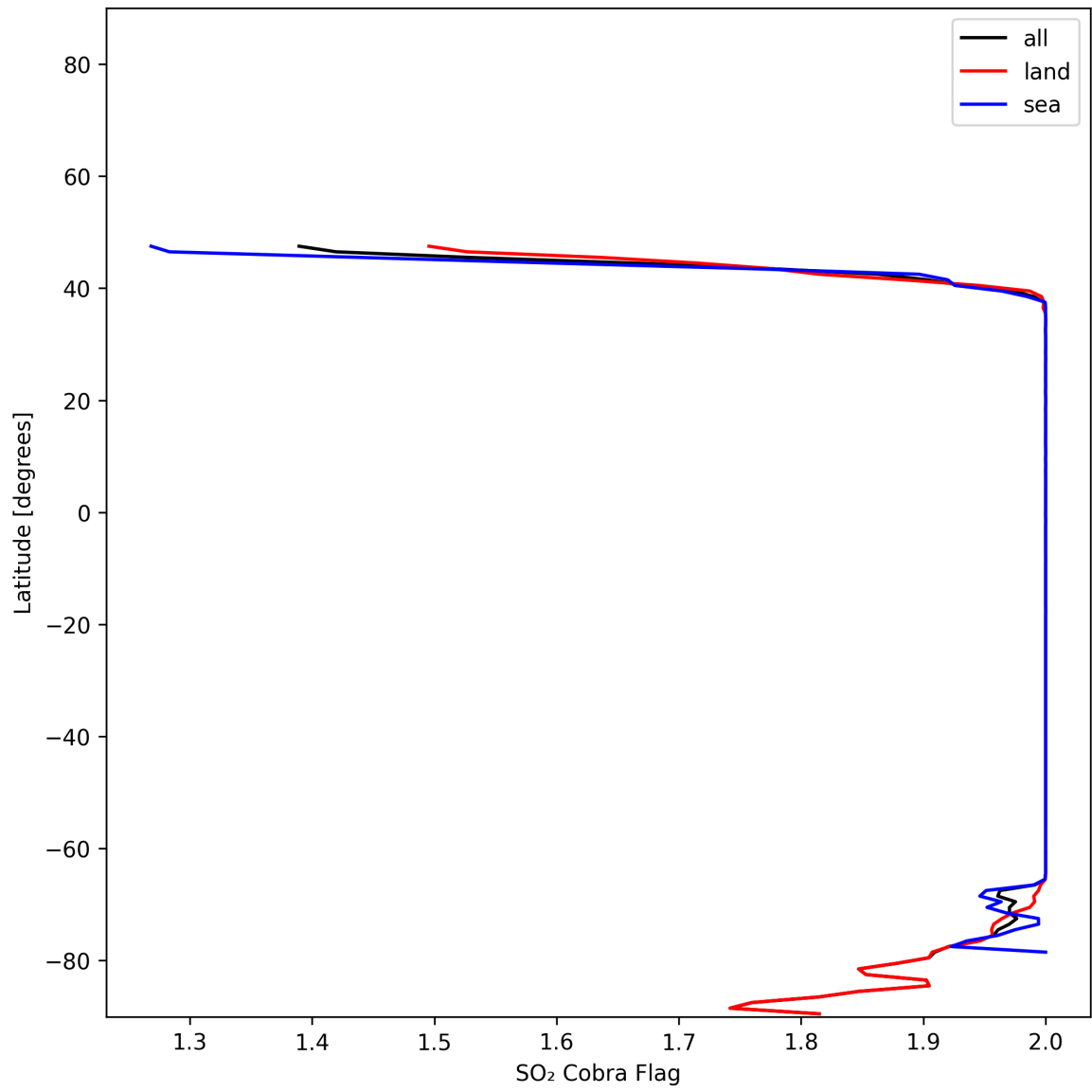


Figure 48: Zonal average of "SO₂ Cobra Flag" for 2025-01-07 to 2025-01-08.

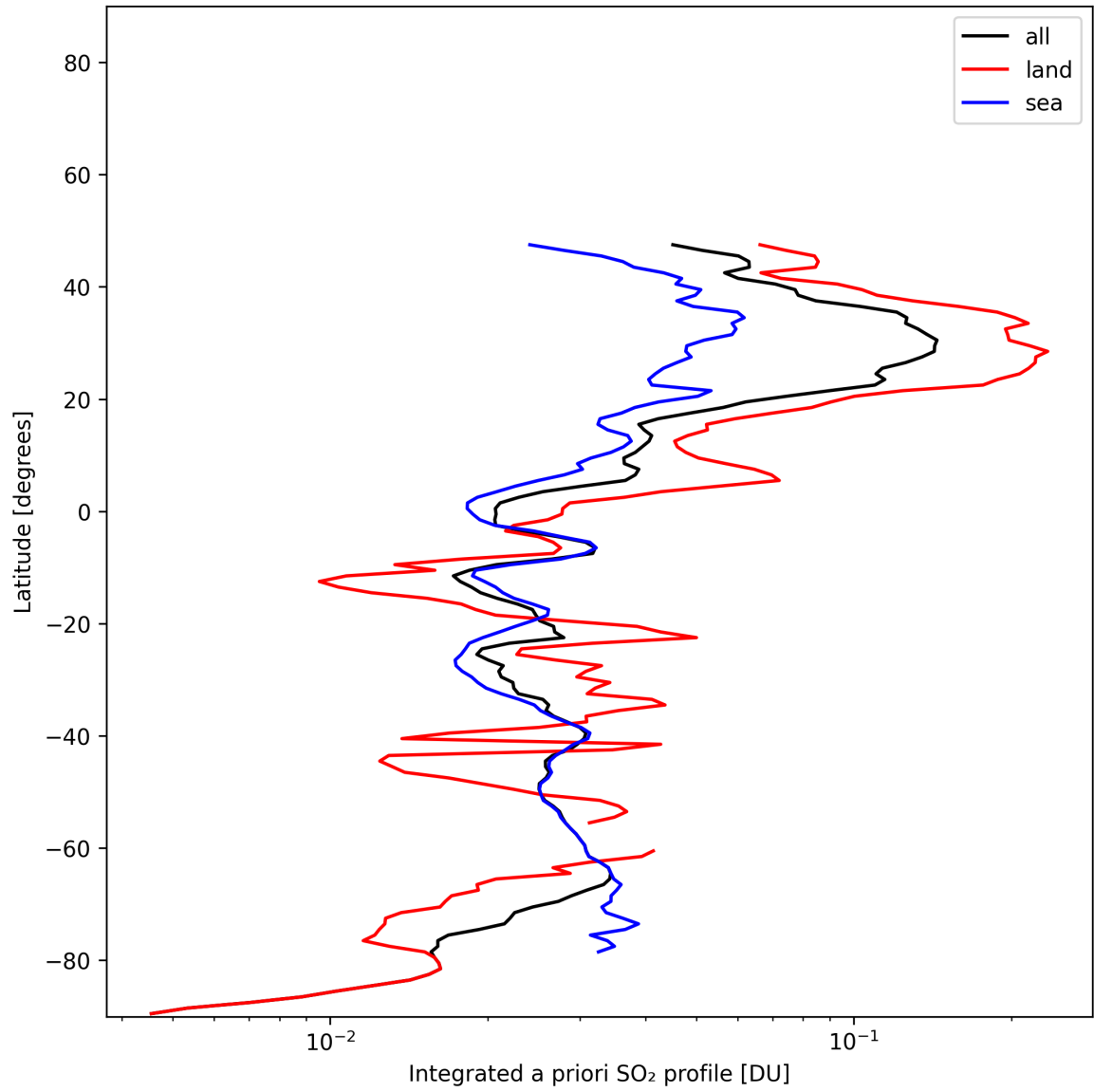


Figure 49: Zonal average of “Integrated a priori SO₂ profile” for 2025-01-07 to 2025-01-08.

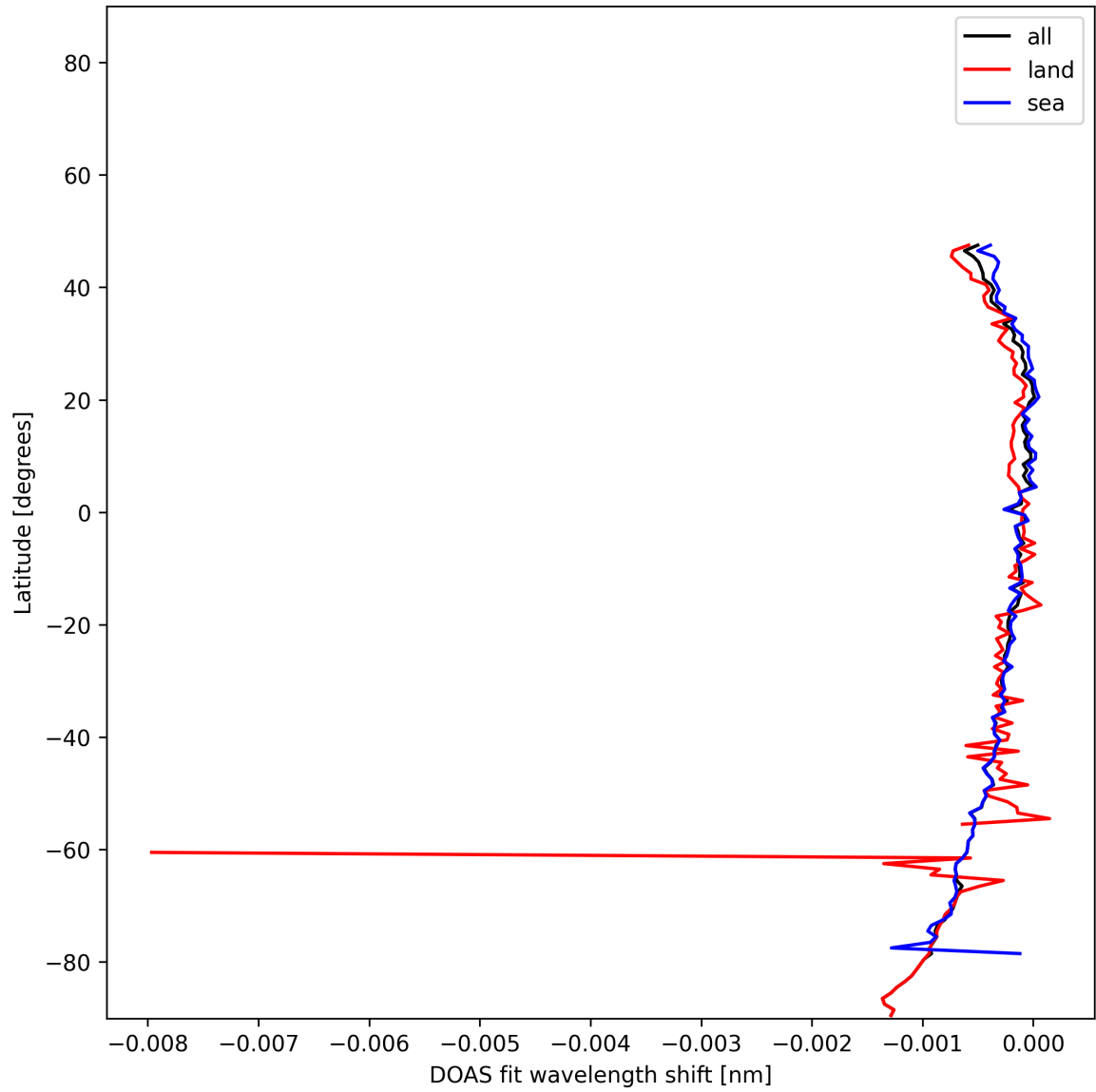


Figure 50: Zonal average of “DOAS fit wavelength shift” for 2025-01-07 to 2025-01-08.

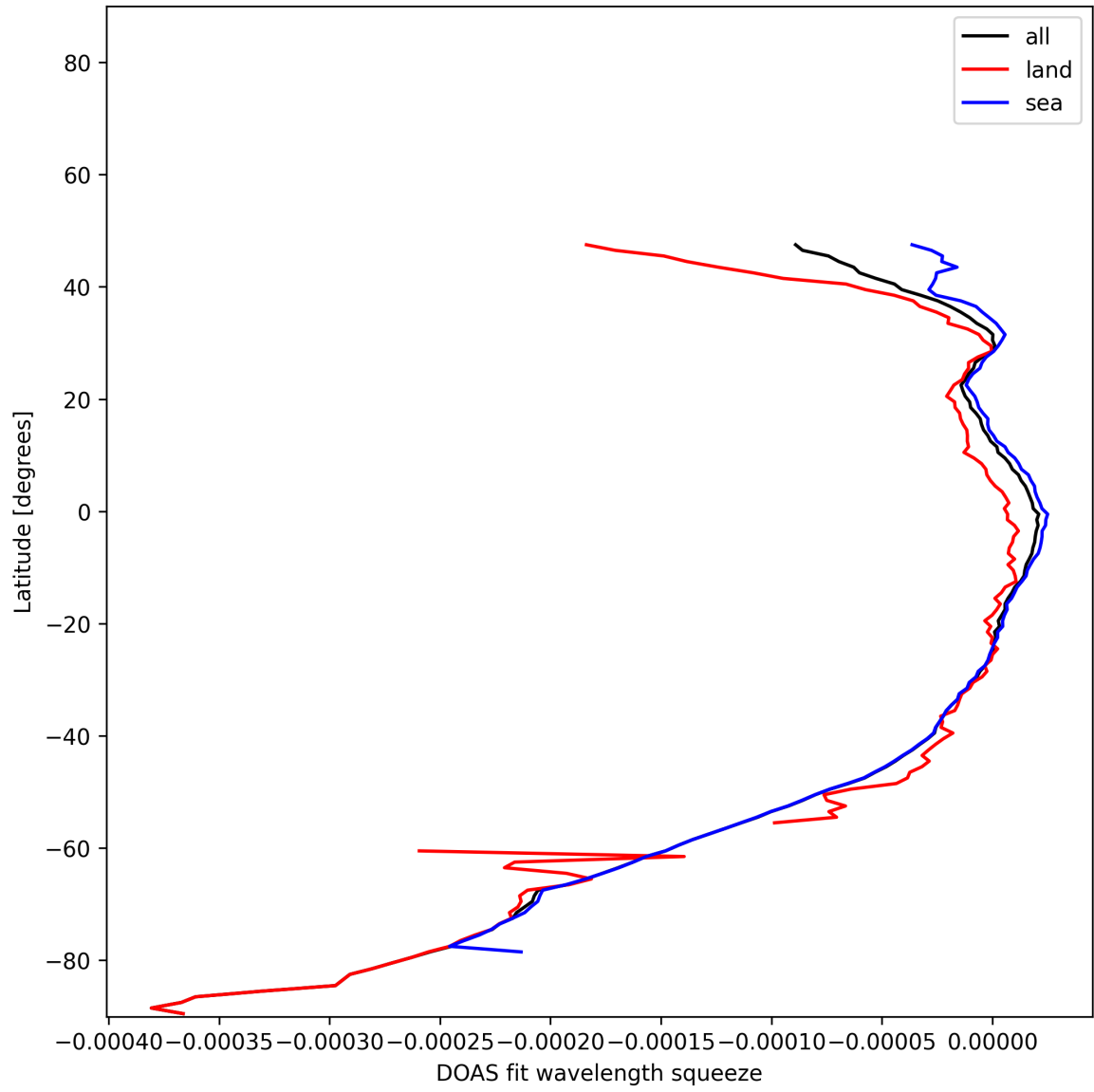


Figure 51: Zonal average of “DOAS fit wavelength squeeze” for 2025-01-07 to 2025-01-08.

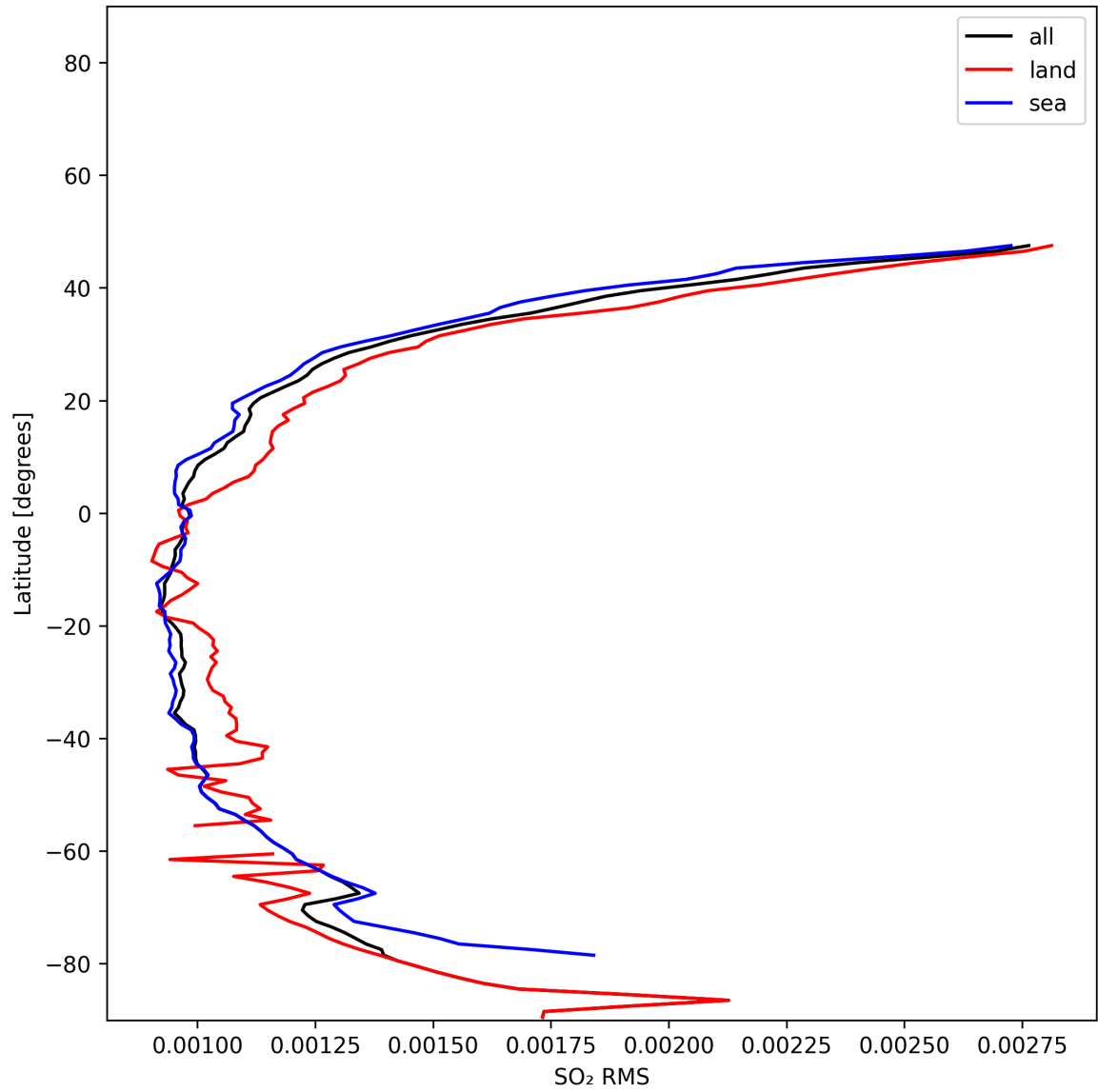


Figure 52: Zonal average of “SO₂ RMS” for 2025-01-07 to 2025-01-08.

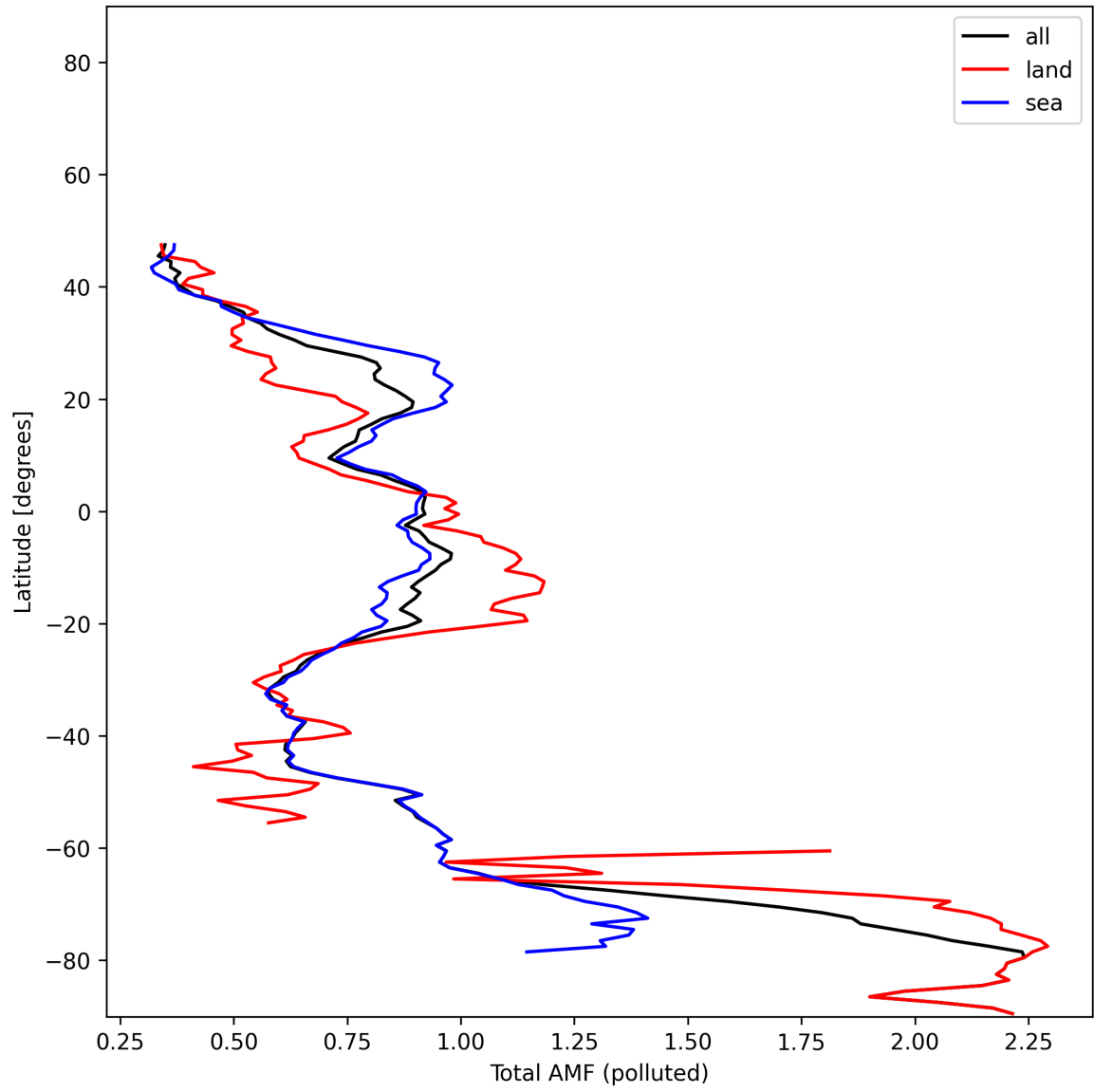


Figure 53: Zonal average of “Total AMF (polluted)” for 2025-01-07 to 2025-01-08.

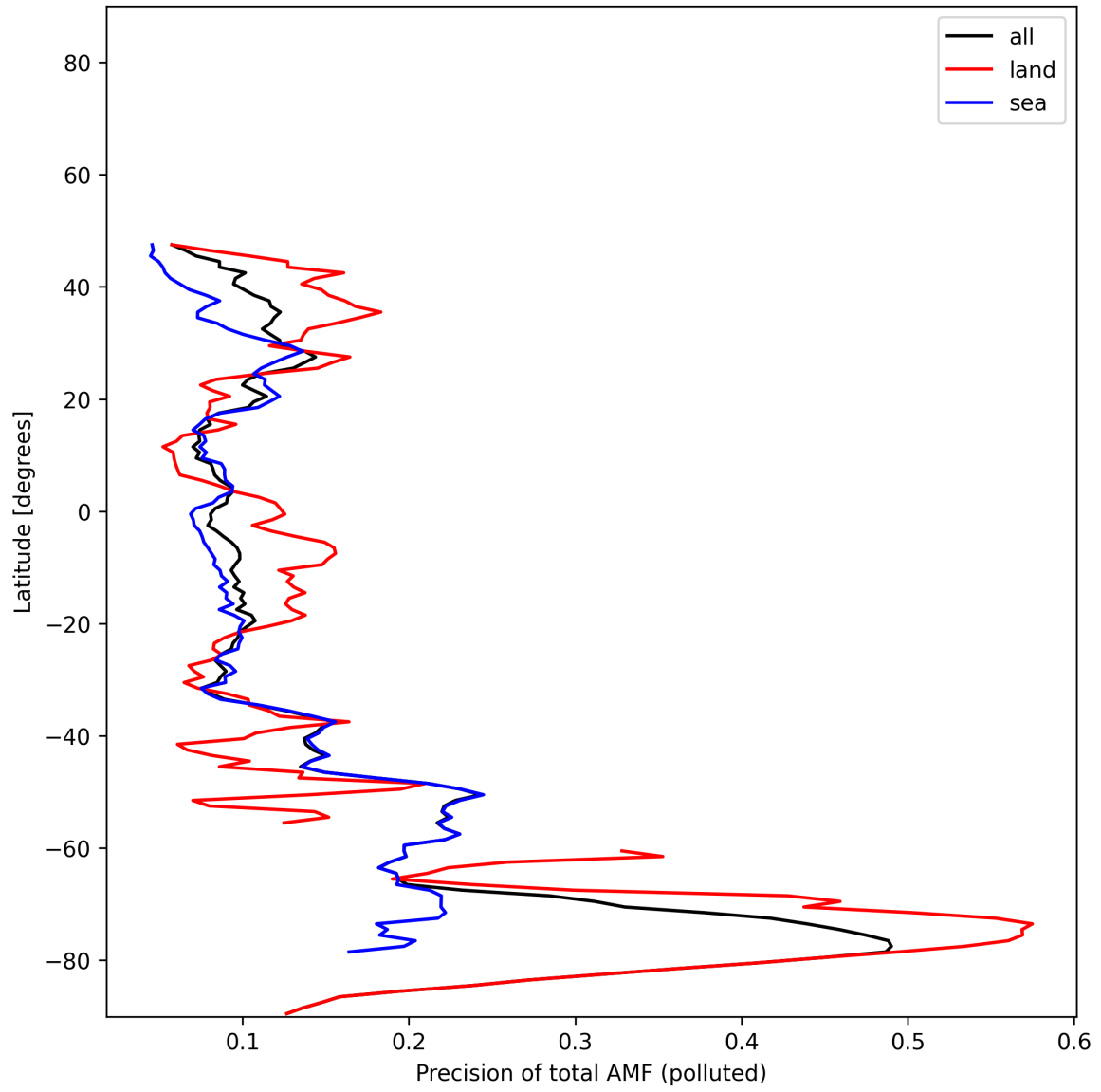


Figure 54: Zonal average of “Precision of total AMF (polluted)” for 2025-01-07 to 2025-01-08.

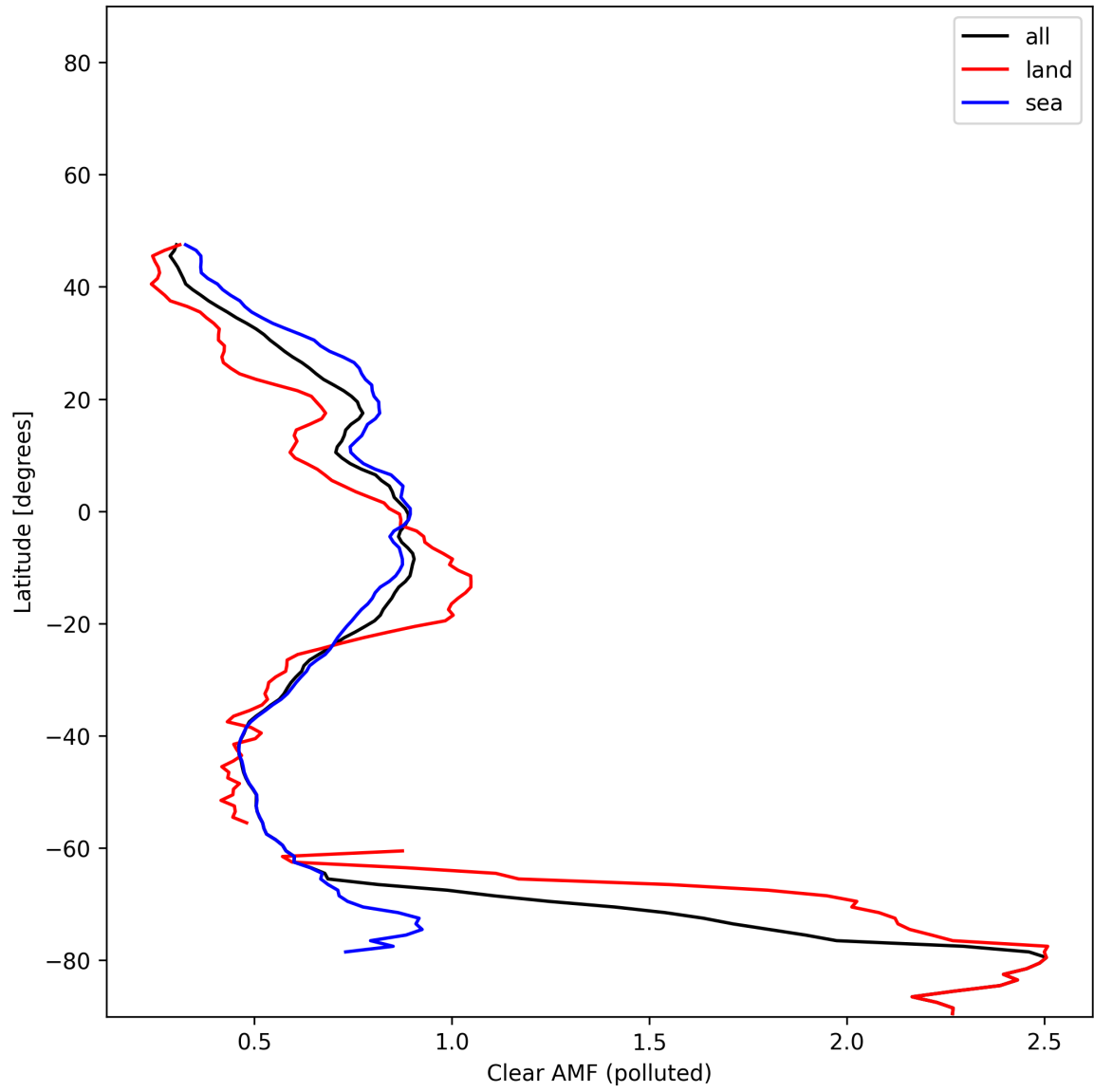


Figure 55: Zonal average of “Clear AMF (polluted)” for 2025-01-07 to 2025-01-08.

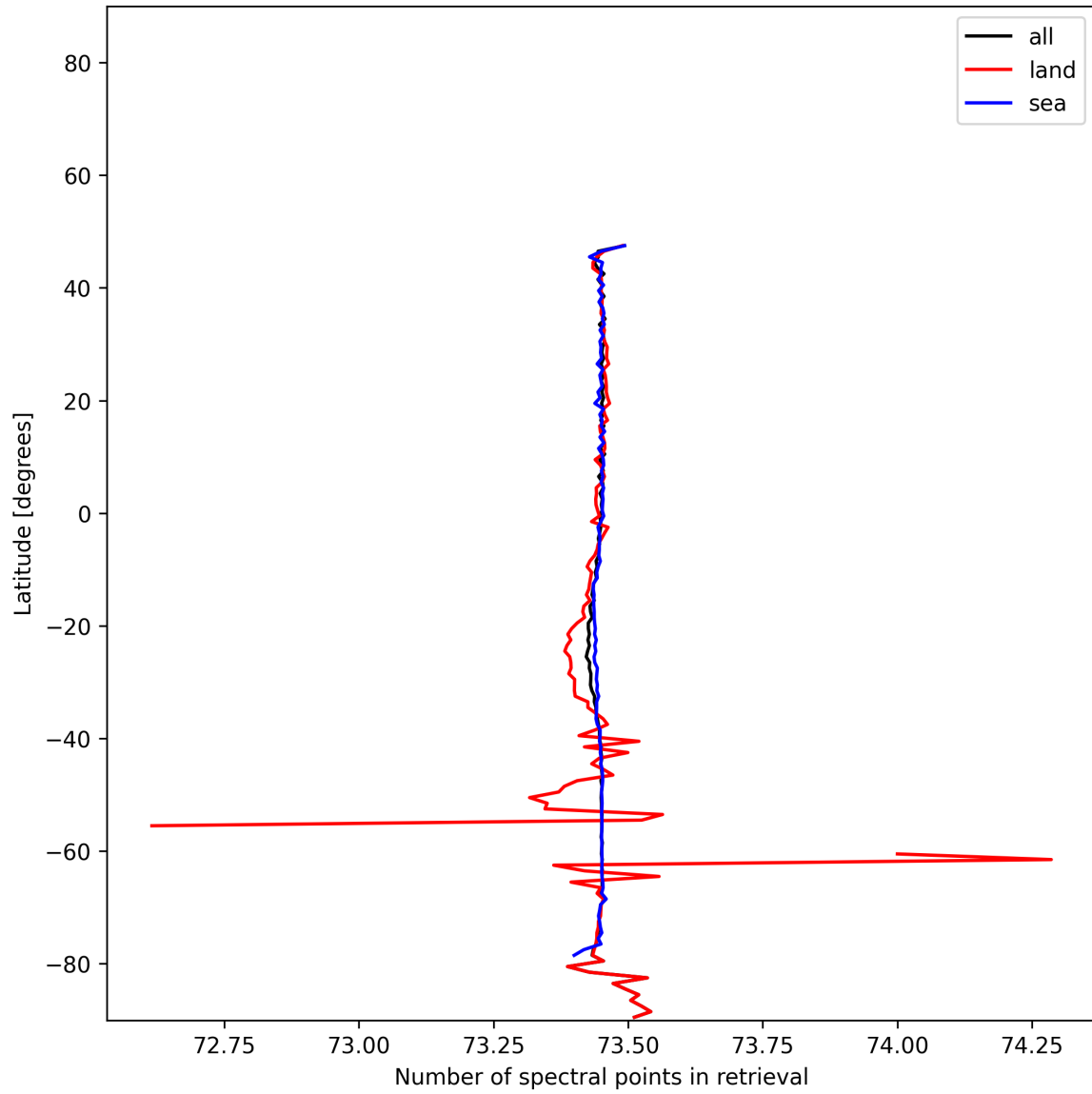


Figure 56: Zonal average of “Number of spectral points in retrieval” for 2025-01-07 to 2025-01-08.

8 Histograms

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

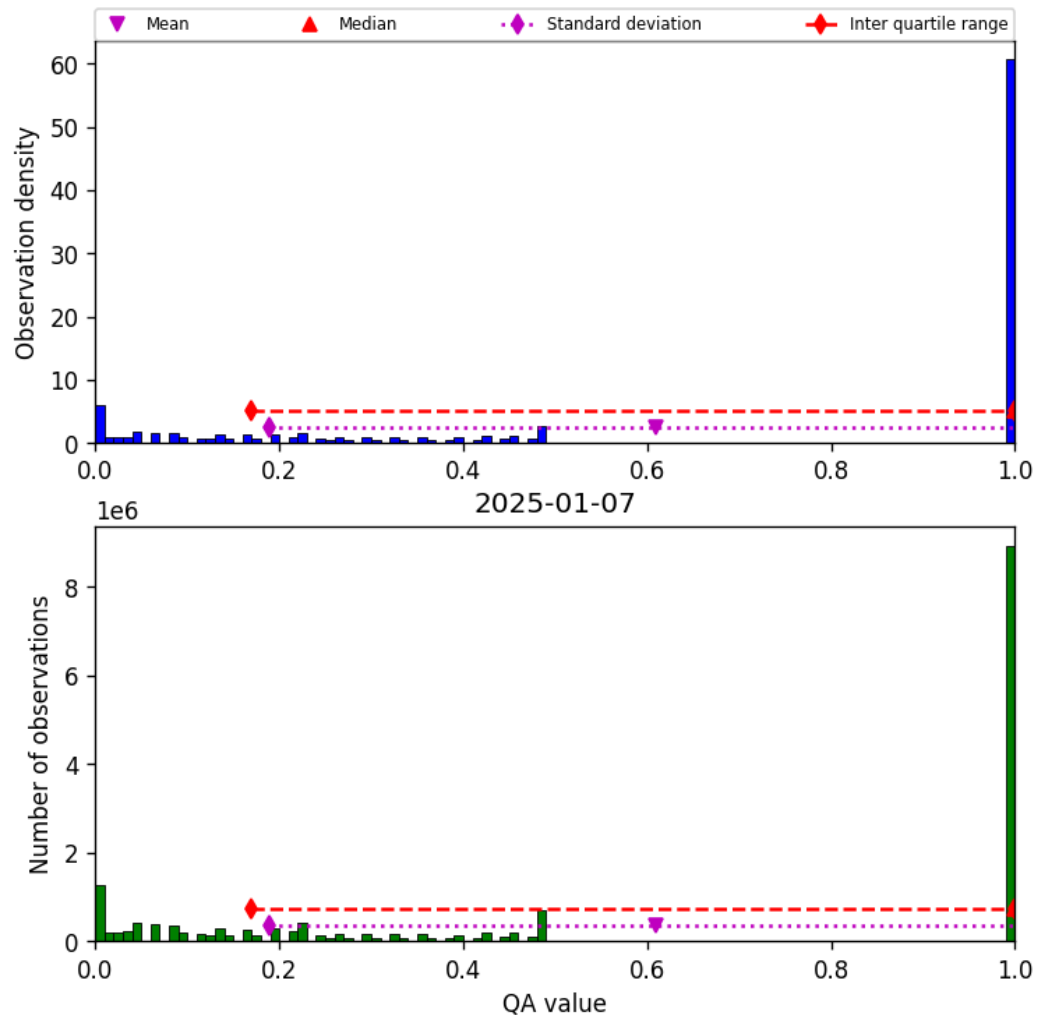


Figure 57: Histogram of “QA value” for 2025-01-07 to 2025-01-08

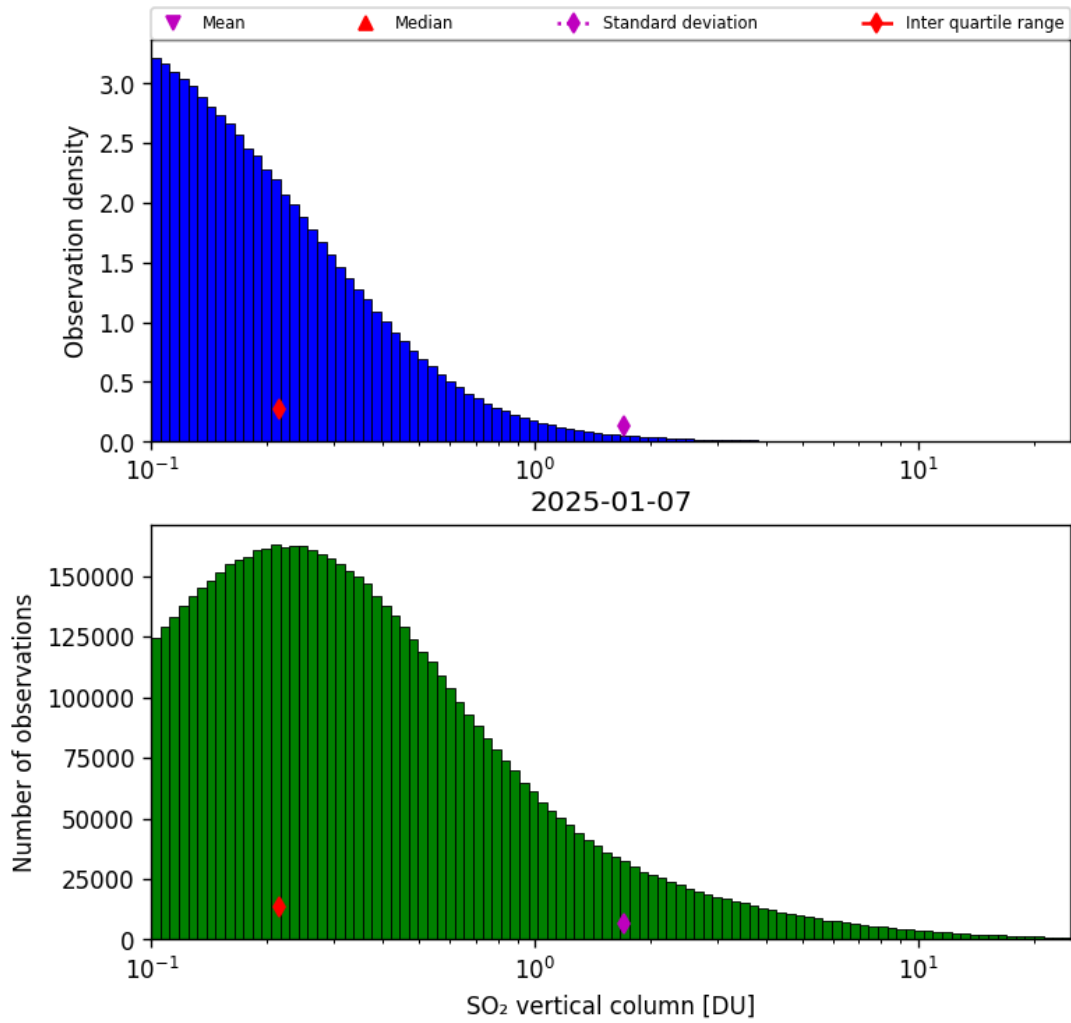


Figure 58: Histogram of “SO₂ vertical column” for 2025-01-07 to 2025-01-08

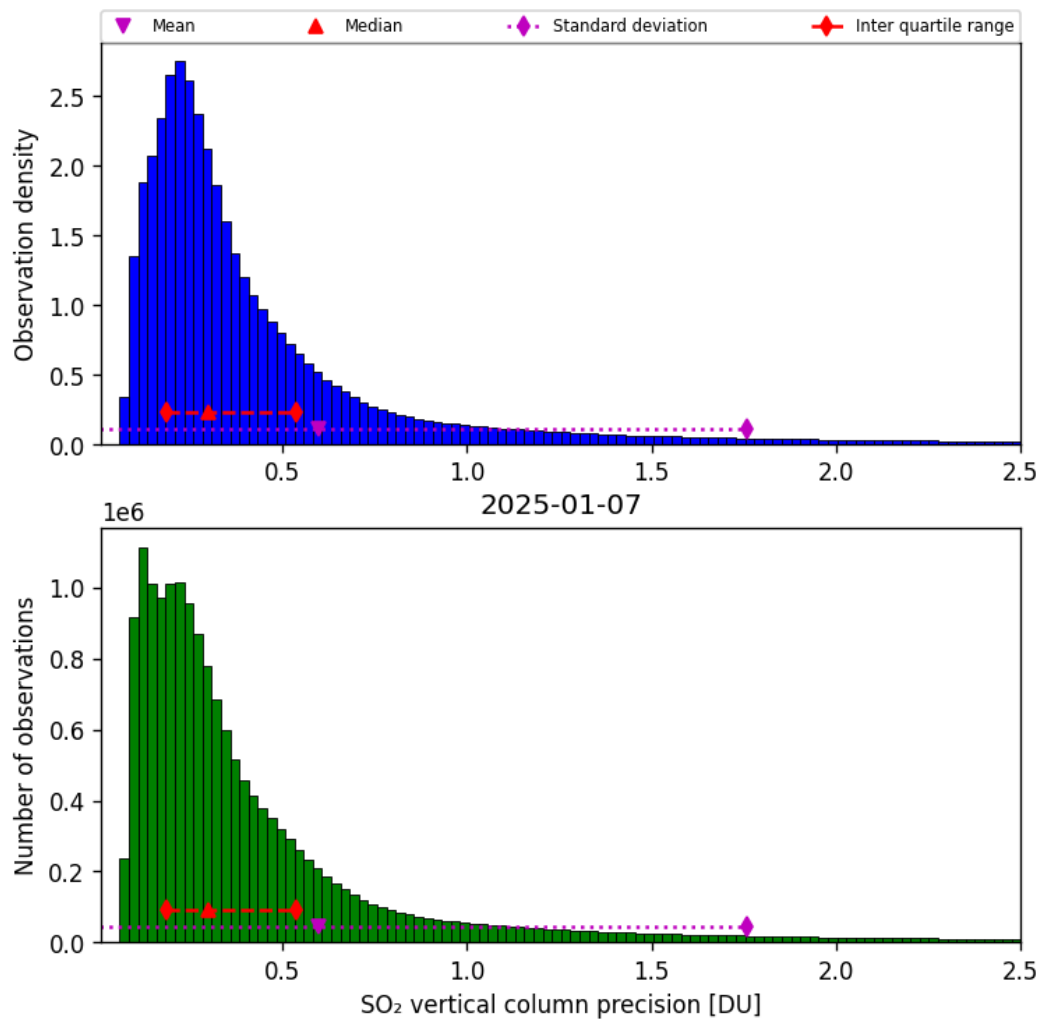


Figure 59: Histogram of “SO₂ vertical column precision” for 2025-01-07 to 2025-01-08

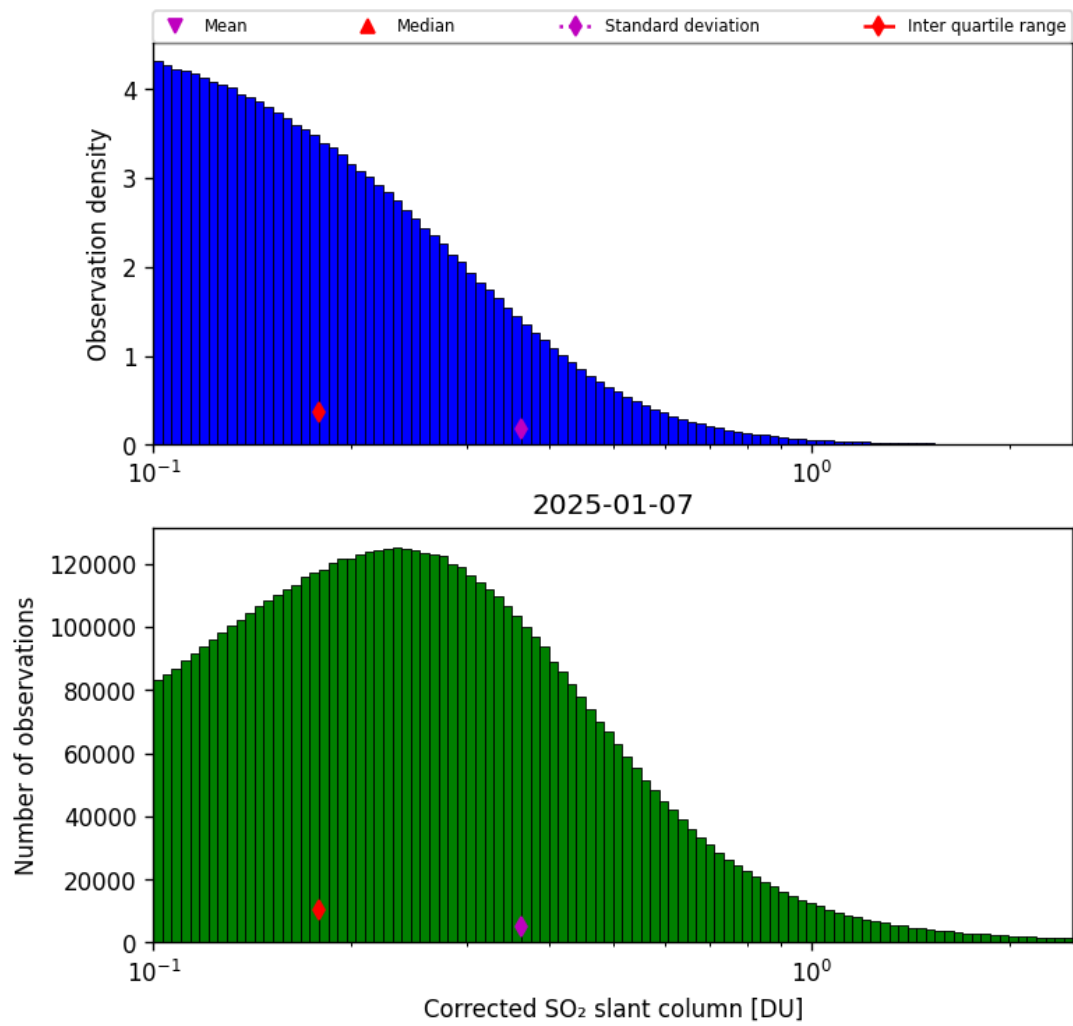


Figure 60: Histogram of “Corrected SO₂ slant column” for 2025-01-07 to 2025-01-08

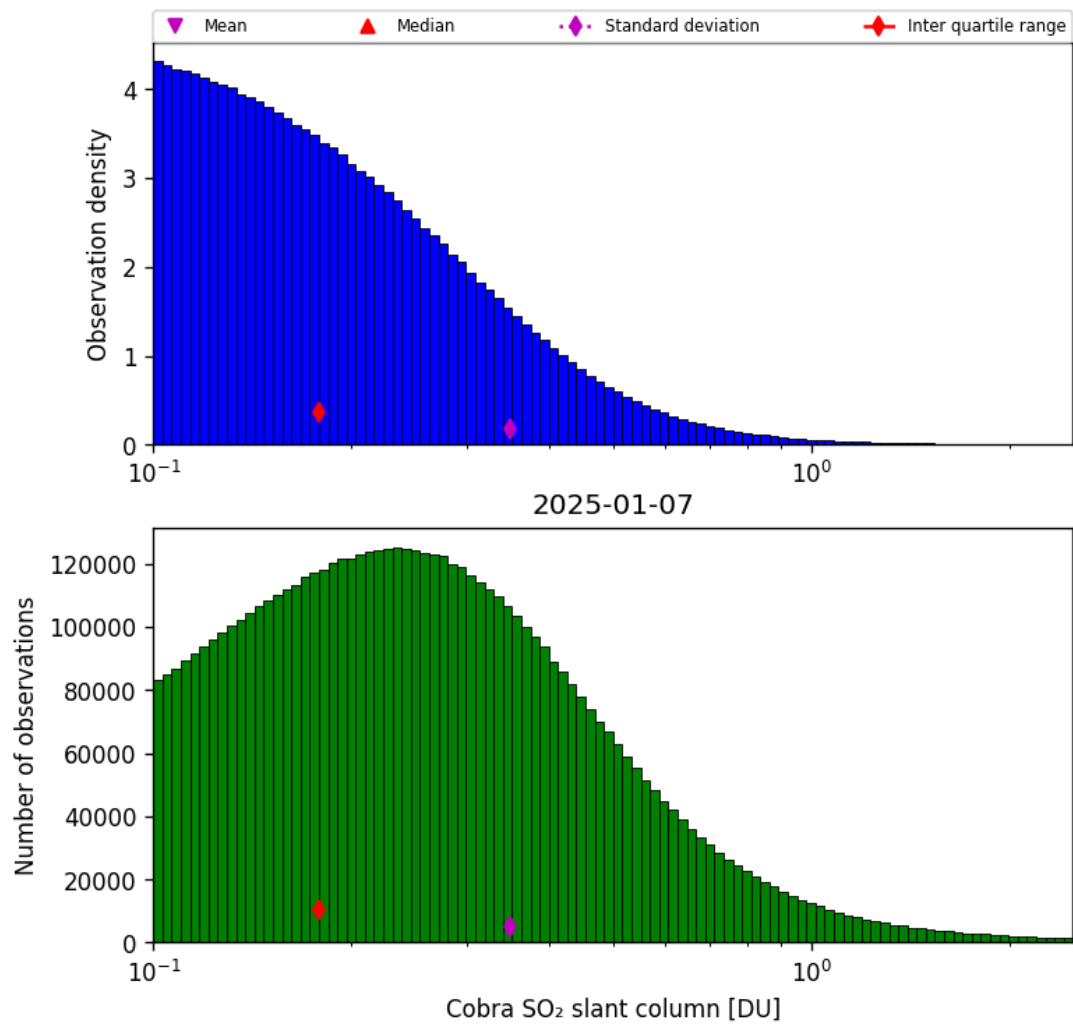


Figure 61: Histogram of “Cobra SO₂ slant column” for 2025-01-07 to 2025-01-08

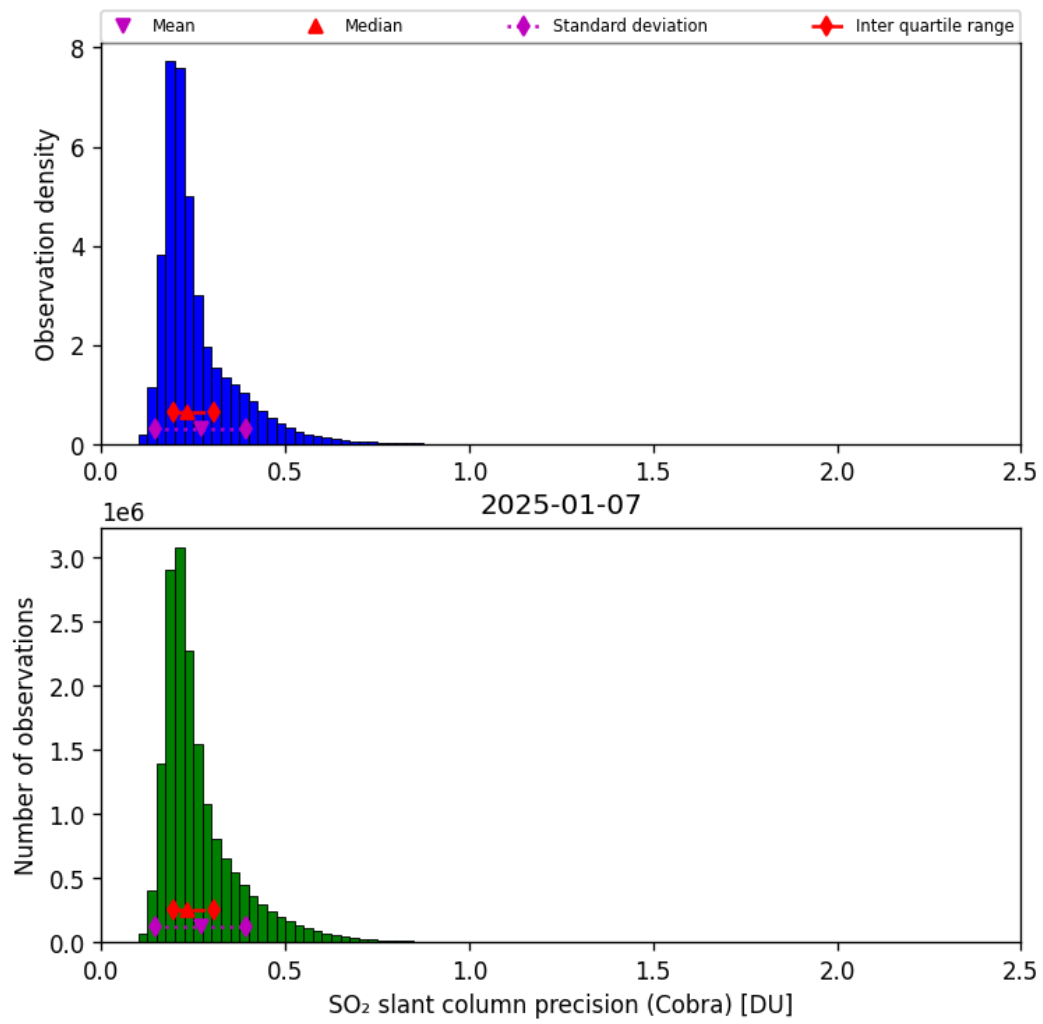


Figure 62: Histogram of “SO₂ slant column precision (Cobra)” for 2025-01-07 to 2025-01-08

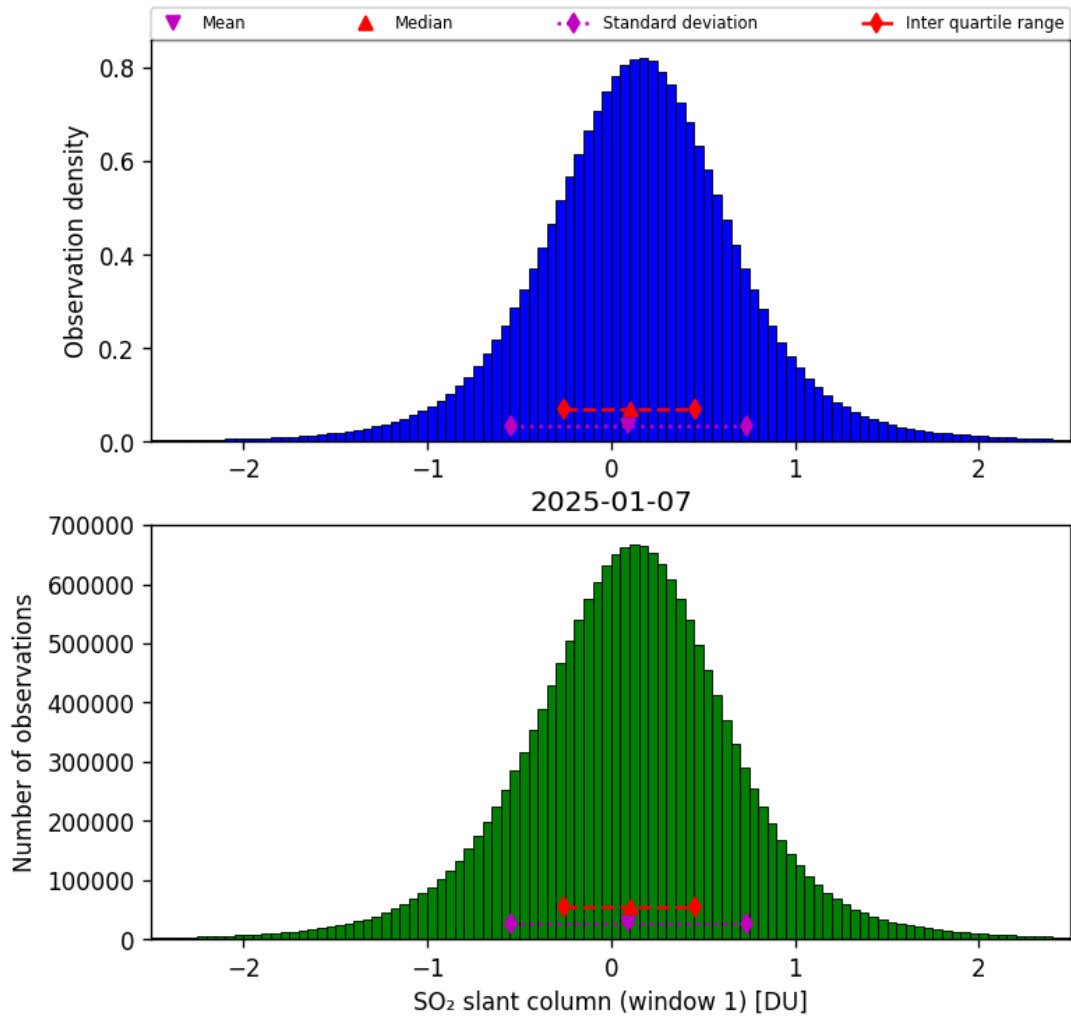


Figure 63: Histogram of “SO₂ slant column (window 1)” for 2025-01-07 to 2025-01-08

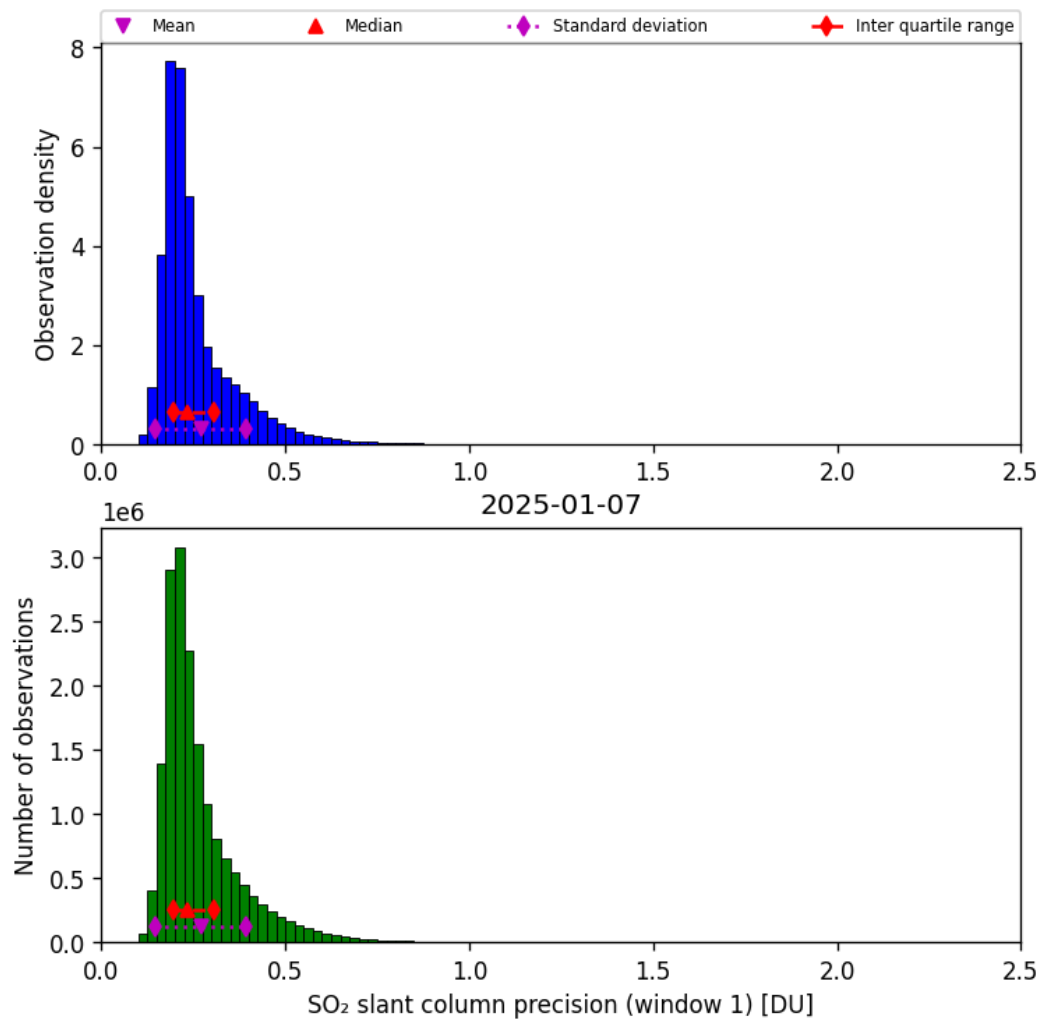


Figure 64: Histogram of “SO₂ slant column precision (window 1)” for 2025-01-07 to 2025-01-08

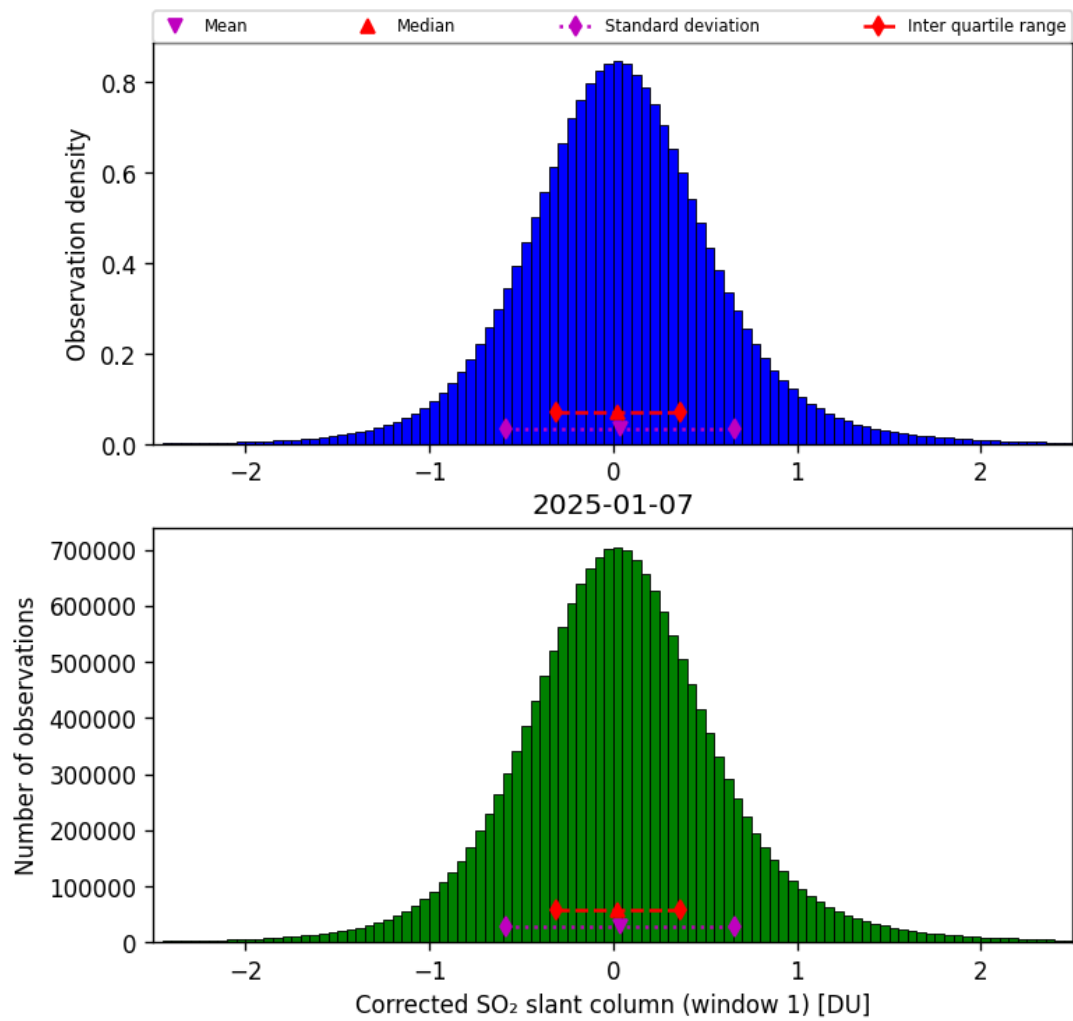


Figure 65: Histogram of “Corrected SO₂ slant column (window 1)” for 2025-01-07 to 2025-01-08

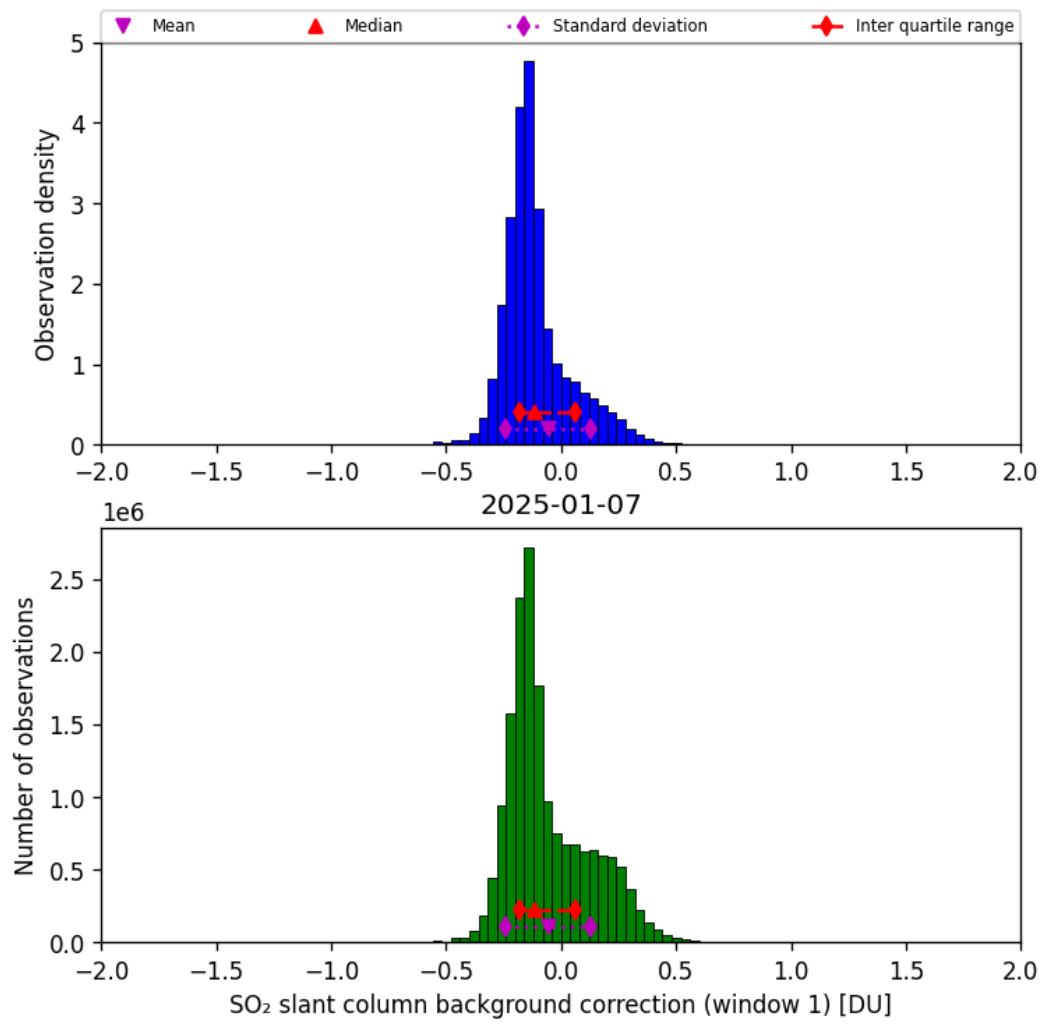


Figure 66: Histogram of “SO₂ slant column background correction (window 1)” for 2025-01-07 to 2025-01-08

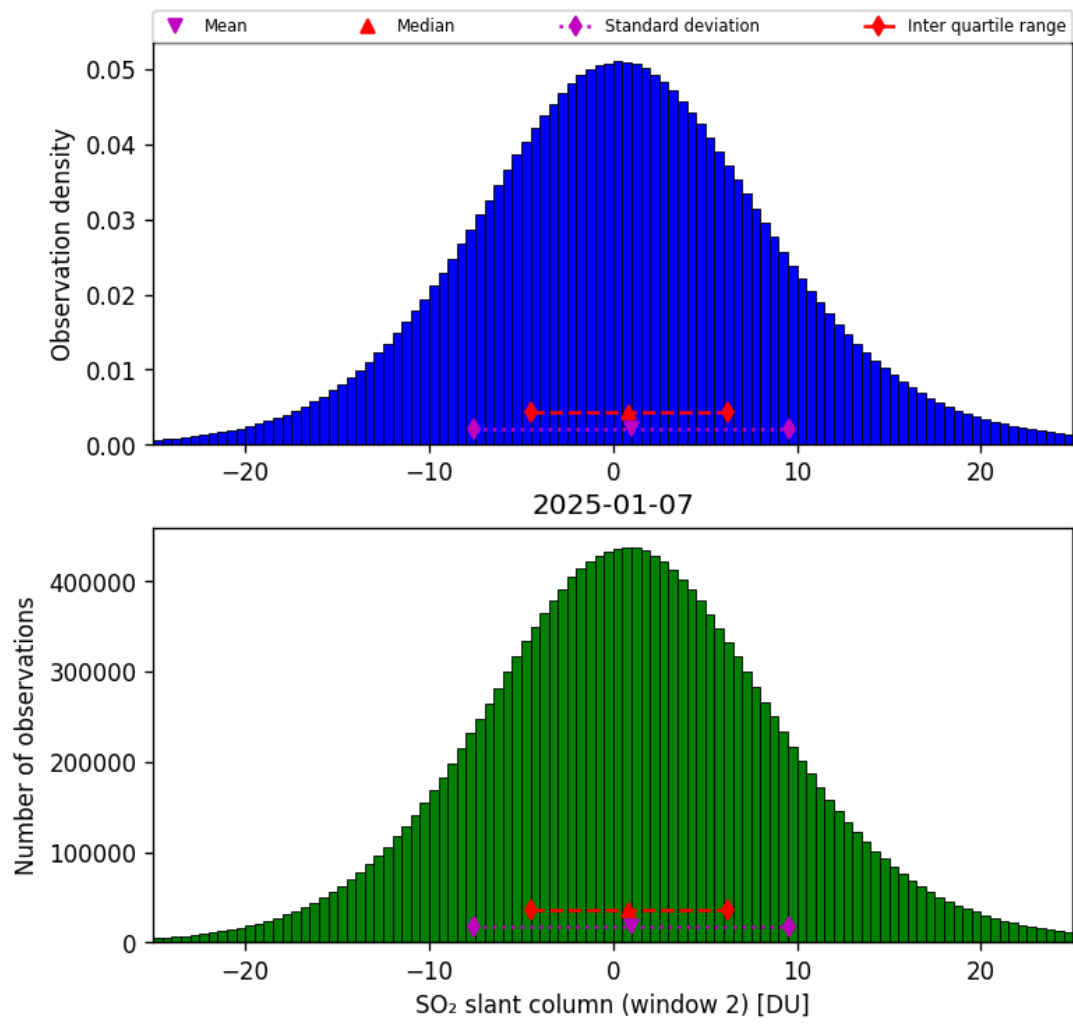


Figure 67: Histogram of “SO₂ slant column (window 2)” for 2025-01-07 to 2025-01-08

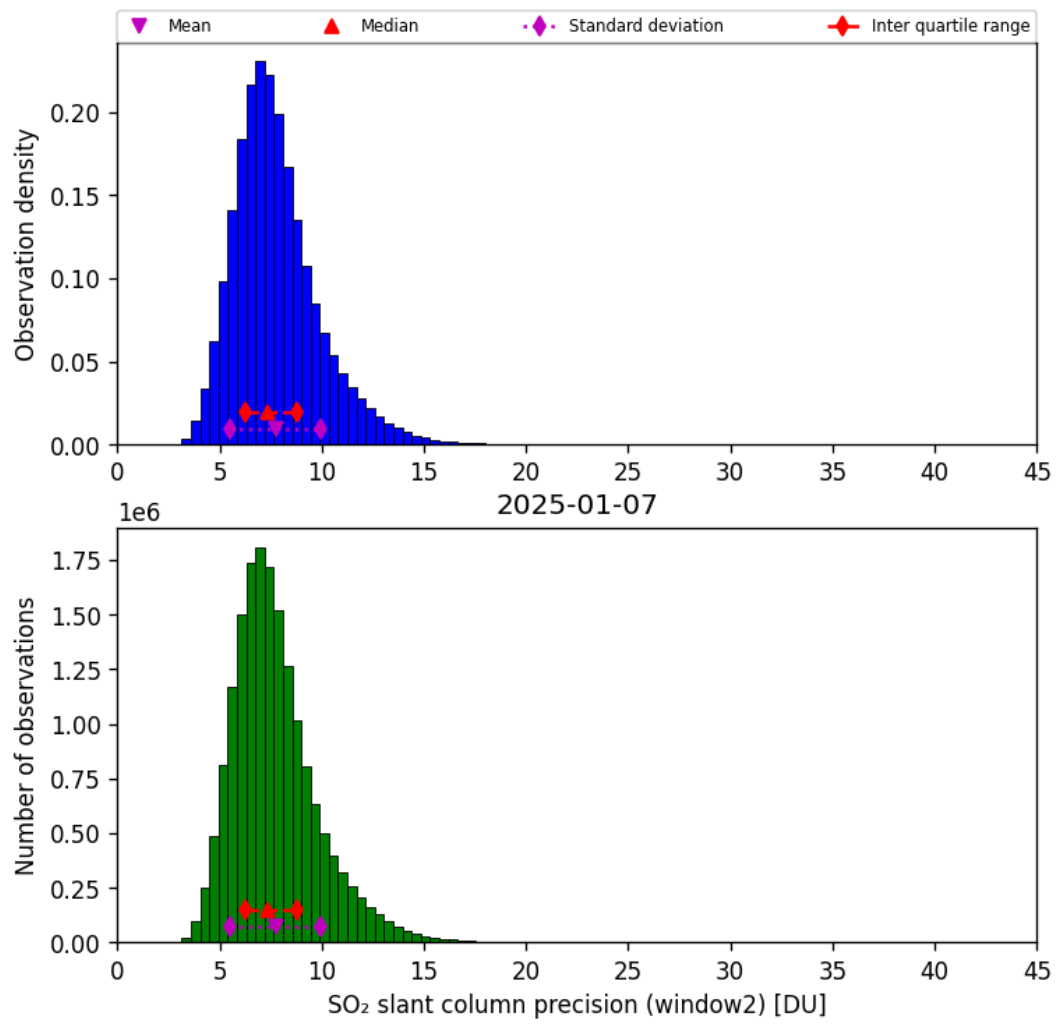


Figure 68: Histogram of “SO₂ slant column precision (window2)” for 2025-01-07 to 2025-01-08

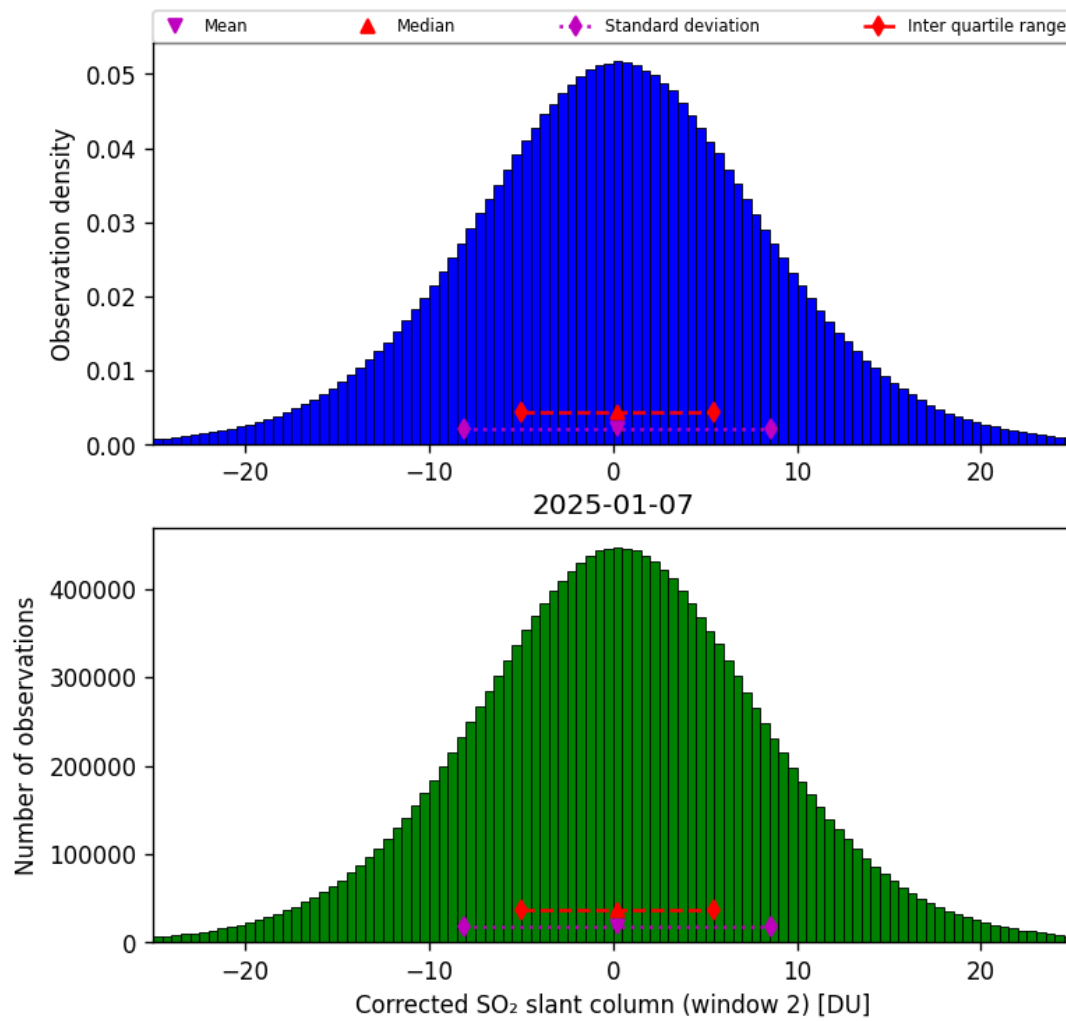


Figure 69: Histogram of “Corrected SO₂ slant column (window 2)” for 2025-01-07 to 2025-01-08

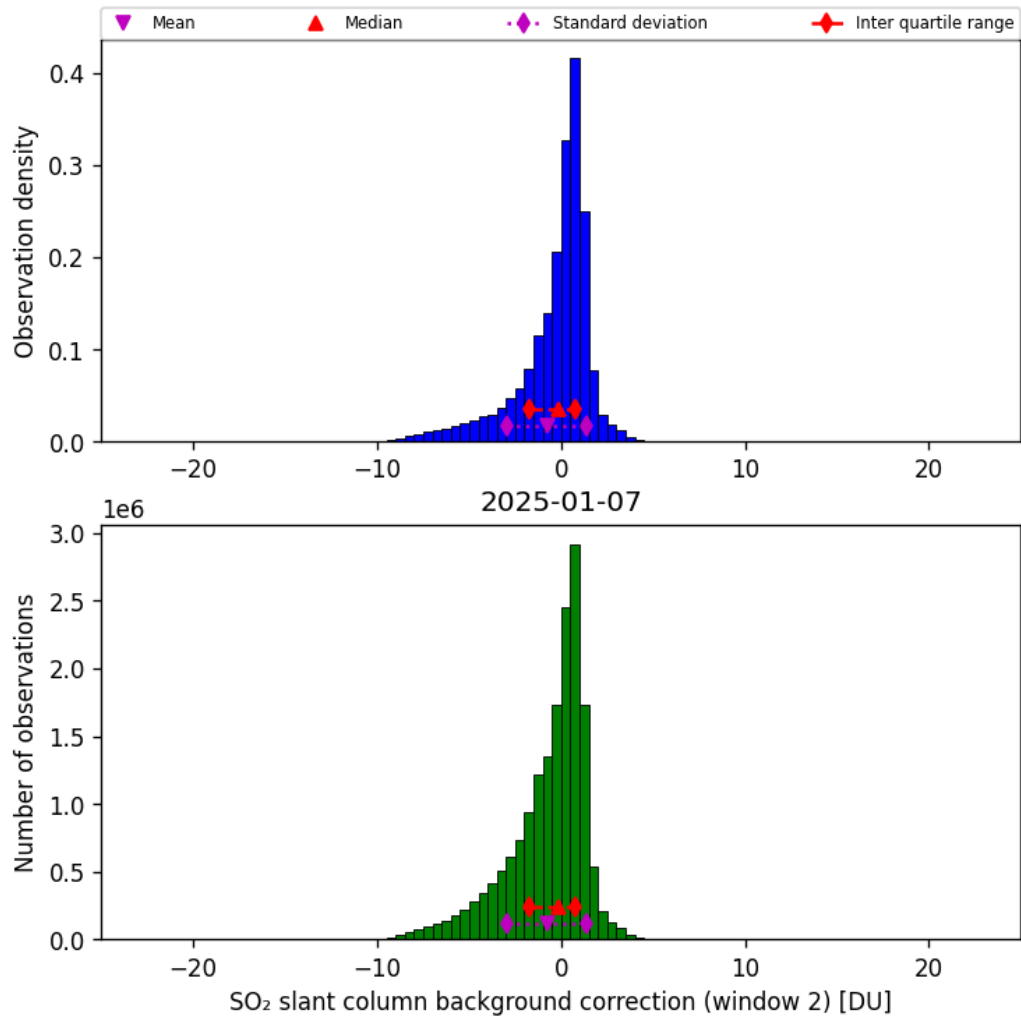


Figure 70: Histogram of “SO₂ slant column background correction (window 2)” for 2025-01-07 to 2025-01-08

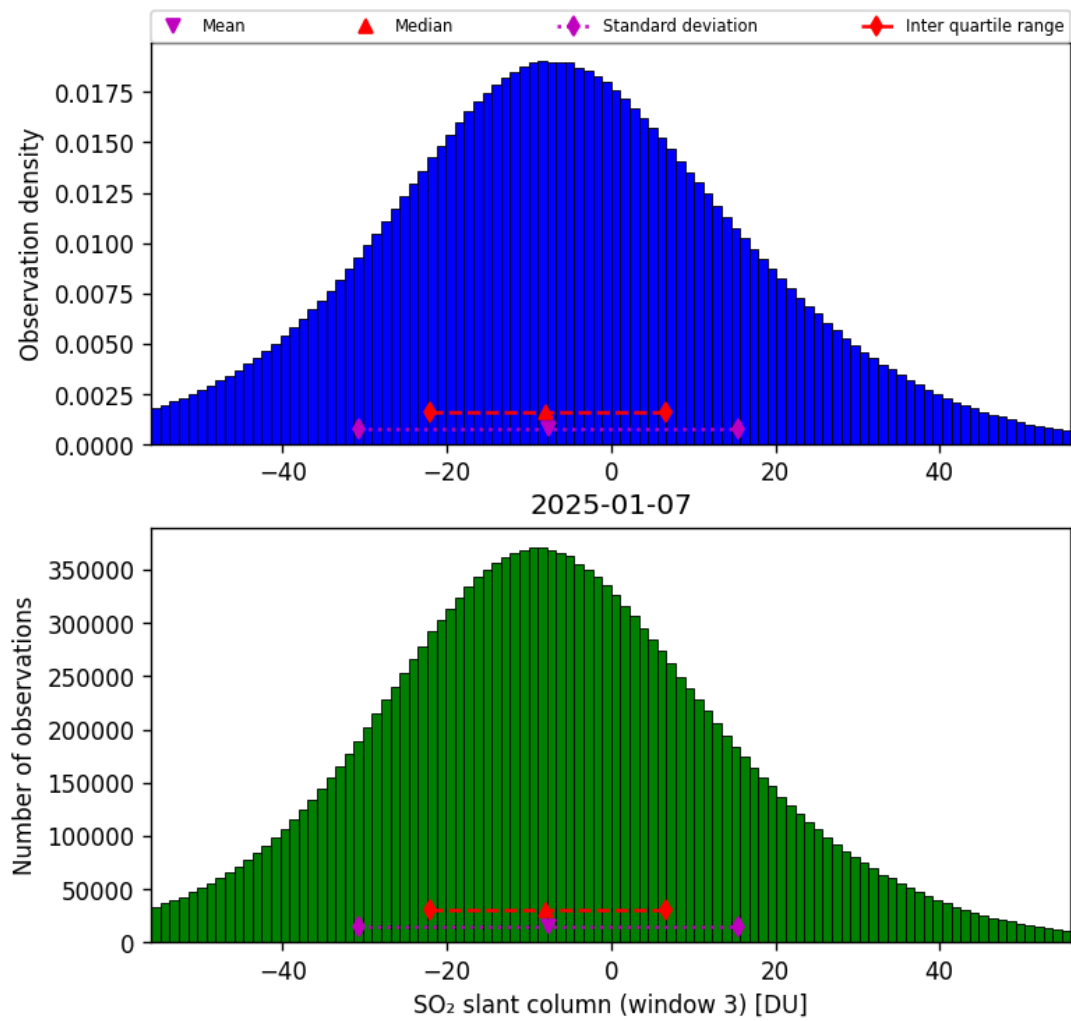


Figure 71: Histogram of “SO₂ slant column (window 3)” for 2025-01-07 to 2025-01-08

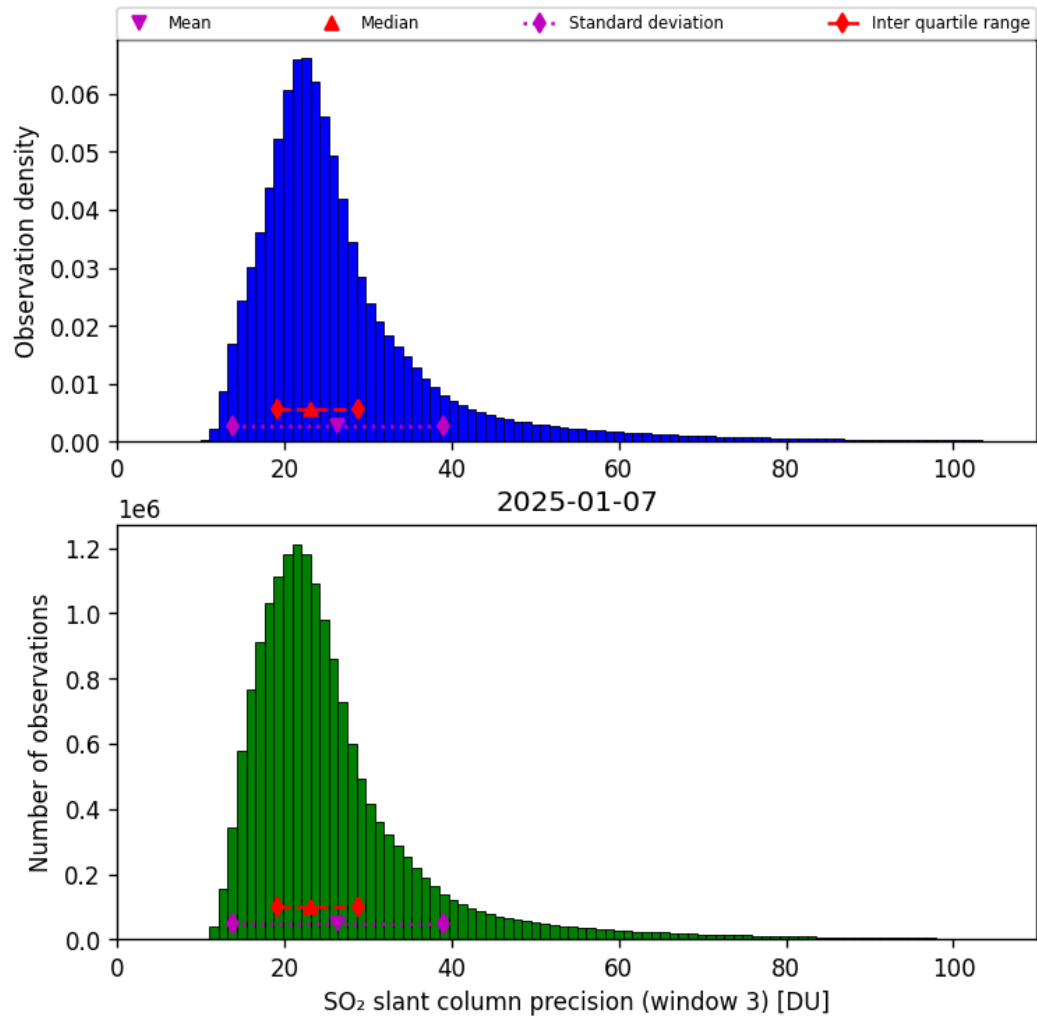


Figure 72: Histogram of “SO₂ slant column precision (window 3)” for 2025-01-07 to 2025-01-08

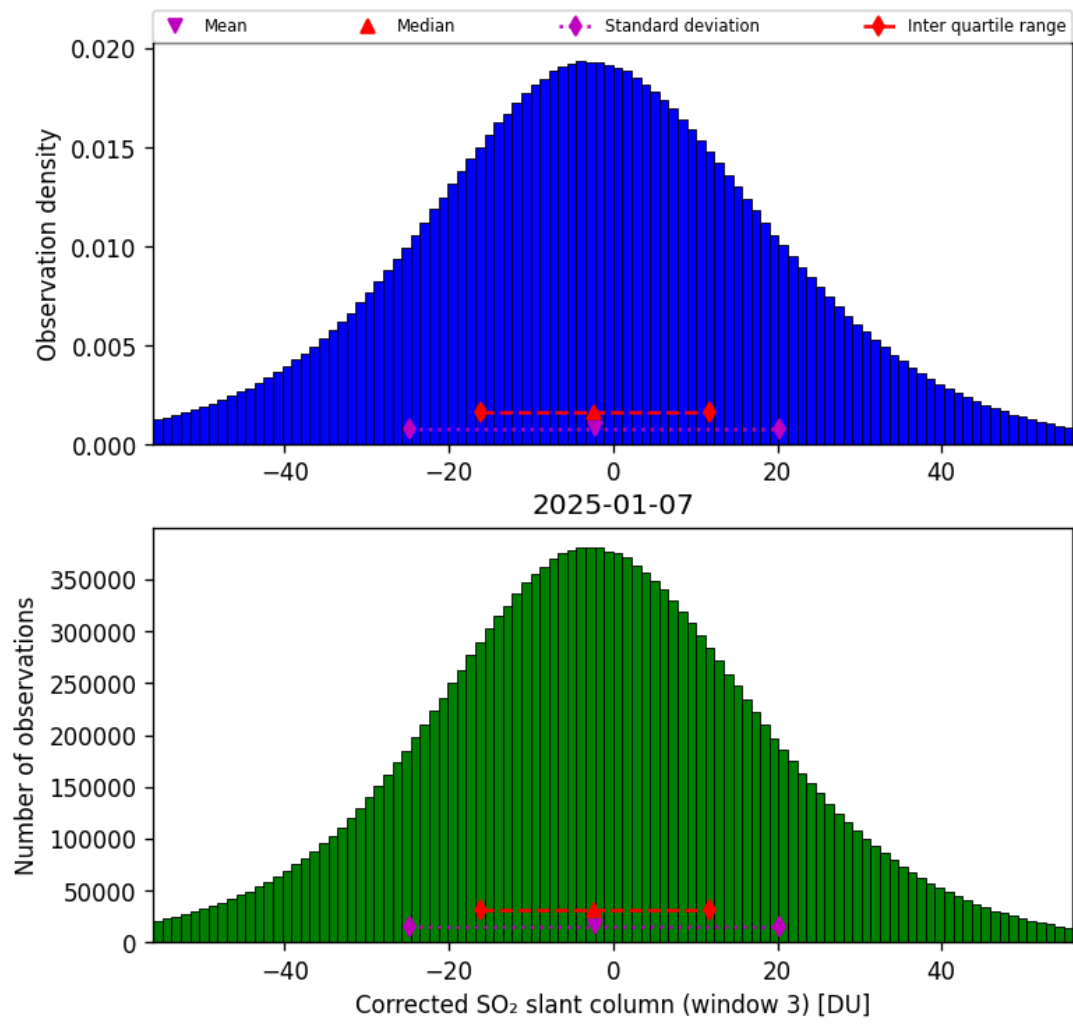


Figure 73: Histogram of “Corrected SO₂ slant column (window 3)” for 2025-01-07 to 2025-01-08

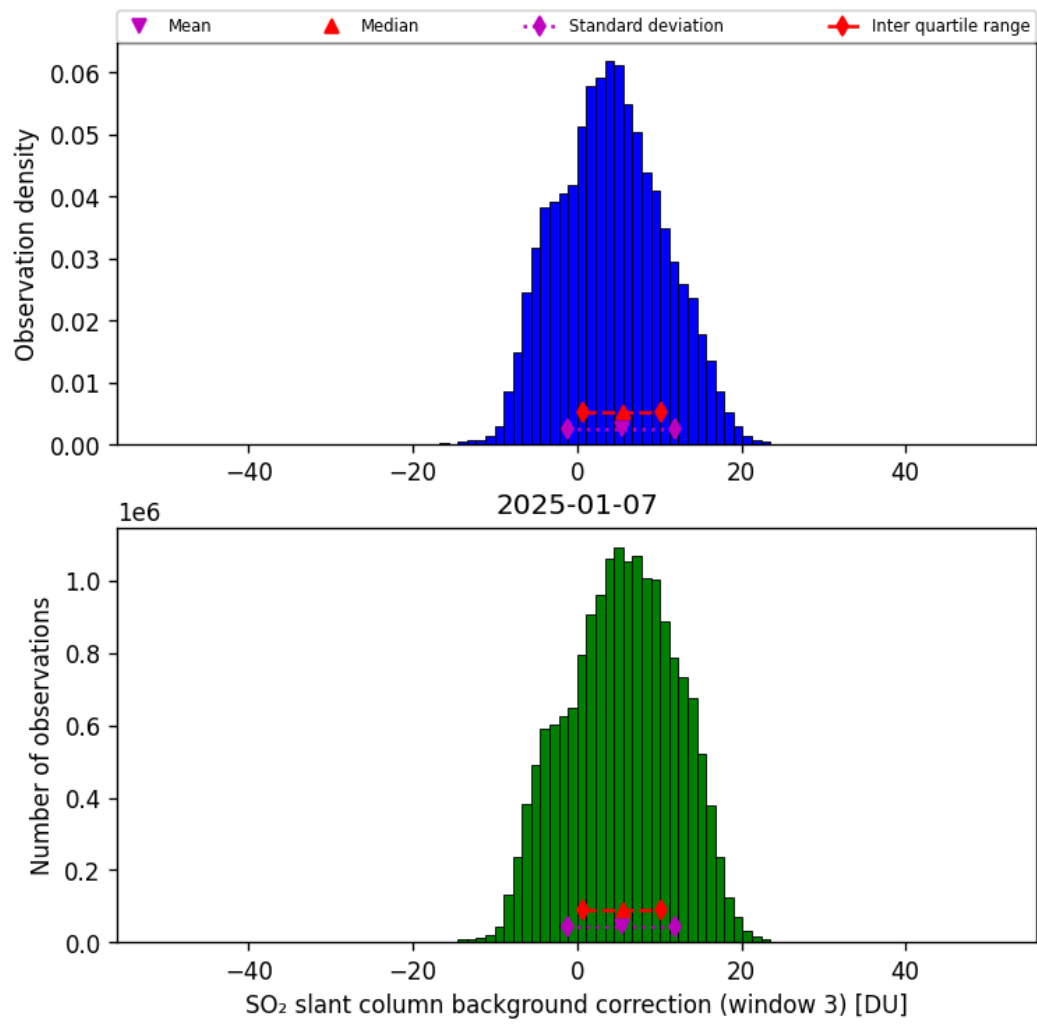


Figure 74: Histogram of “SO₂ slant column background correction (window 3)” for 2025-01-07 to 2025-01-08

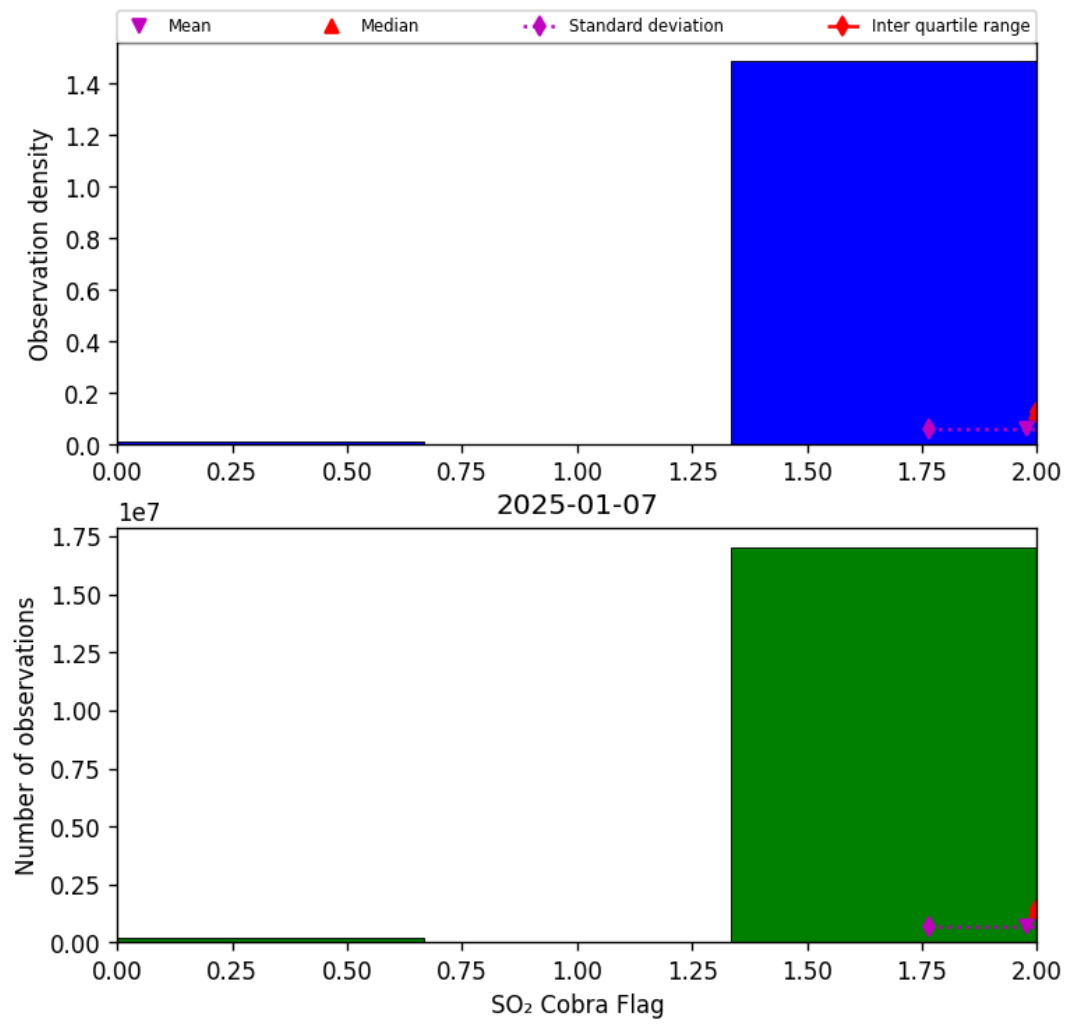


Figure 75: Histogram of “SO₂ Cobra Flag” for 2025-01-07 to 2025-01-08

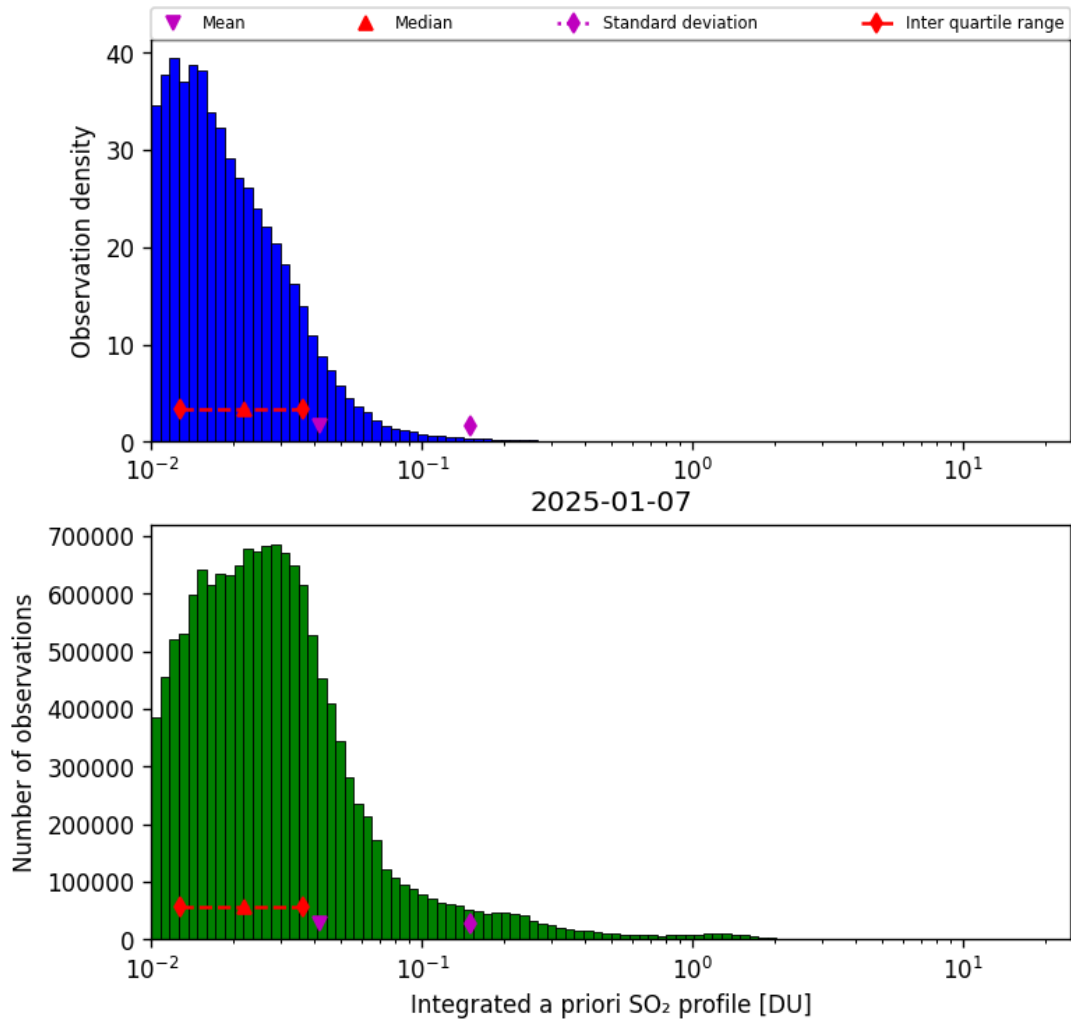


Figure 76: Histogram of “Integrated a priori SO₂ profile” for 2025-01-07 to 2025-01-08

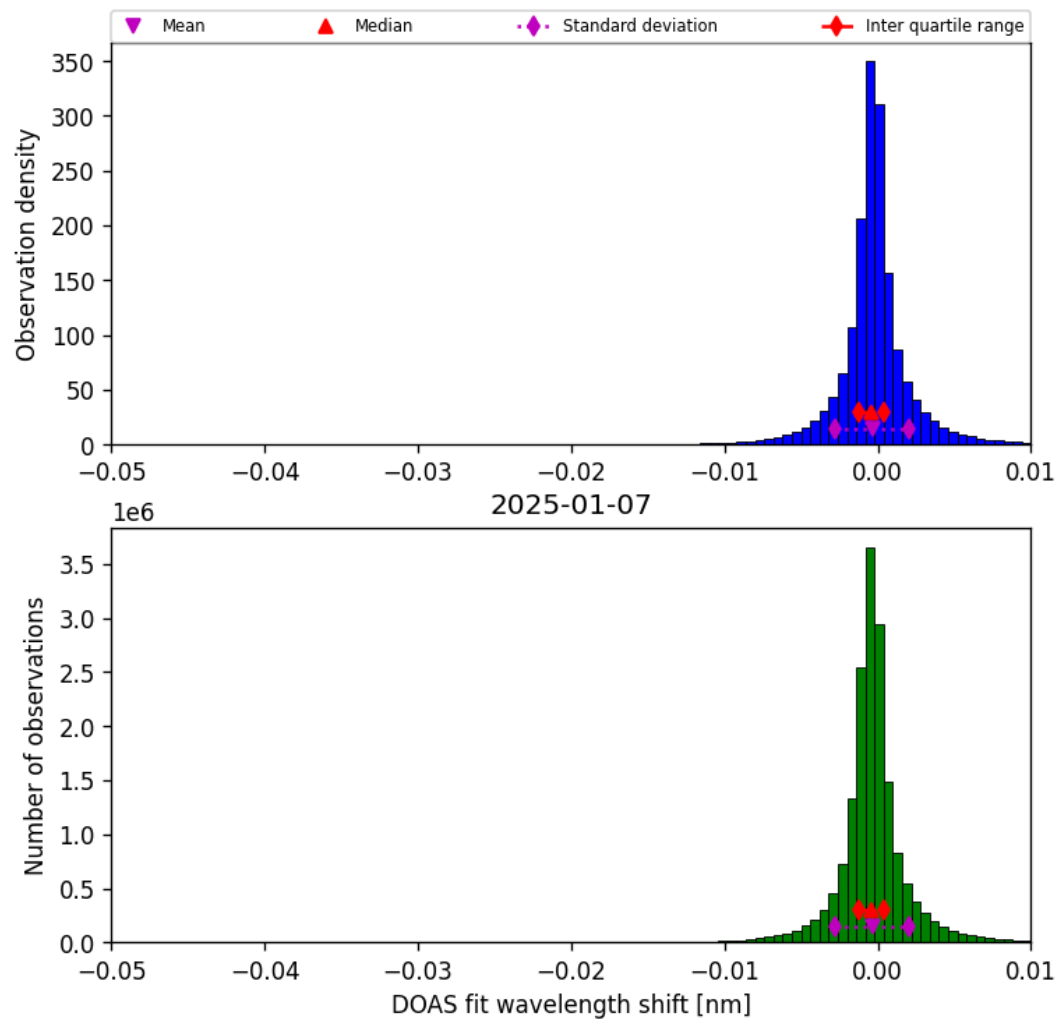


Figure 77: Histogram of “DOAS fit wavelength shift” for 2025-01-07 to 2025-01-08

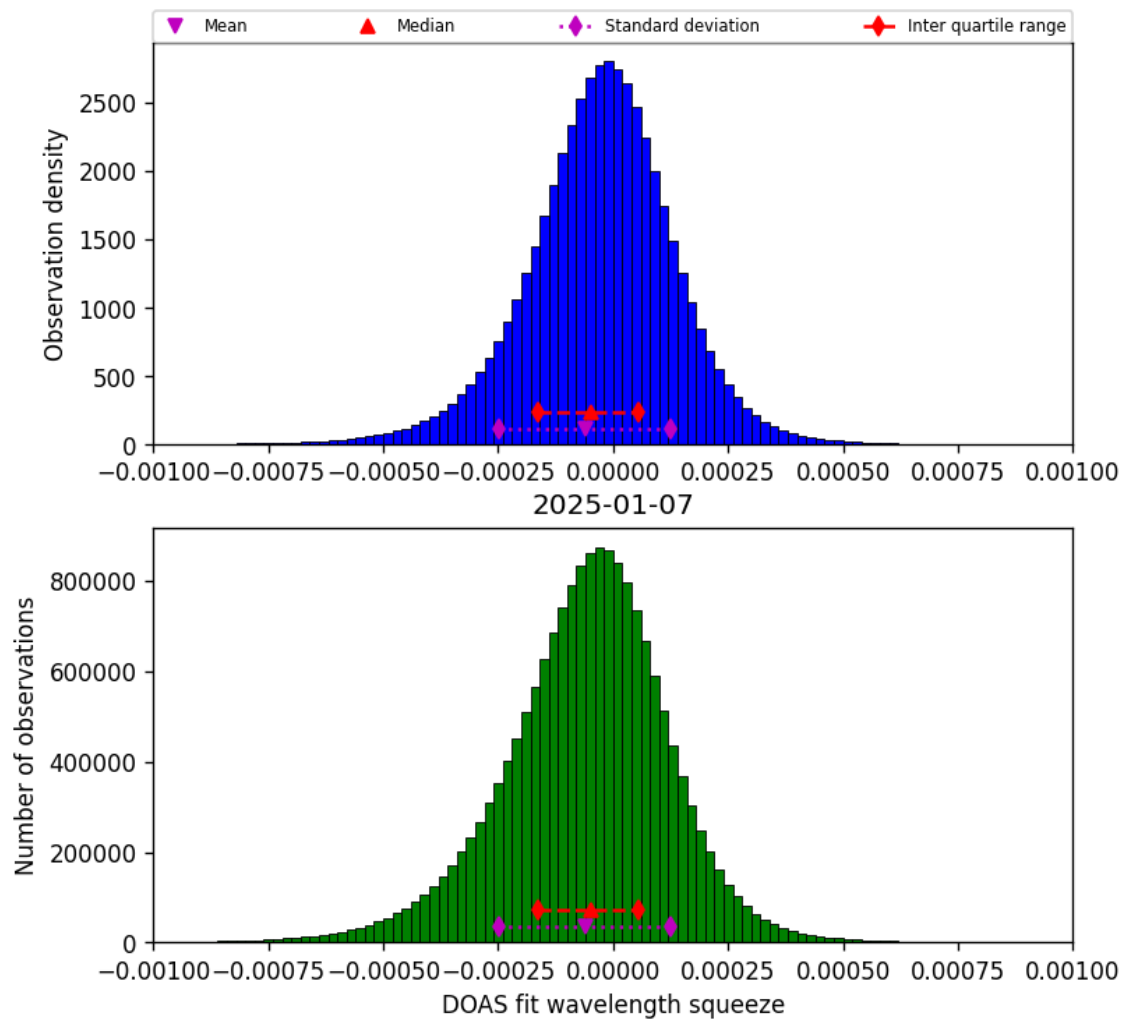


Figure 78: Histogram of “DOAS fit wavelength squeeze” for 2025-01-07 to 2025-01-08

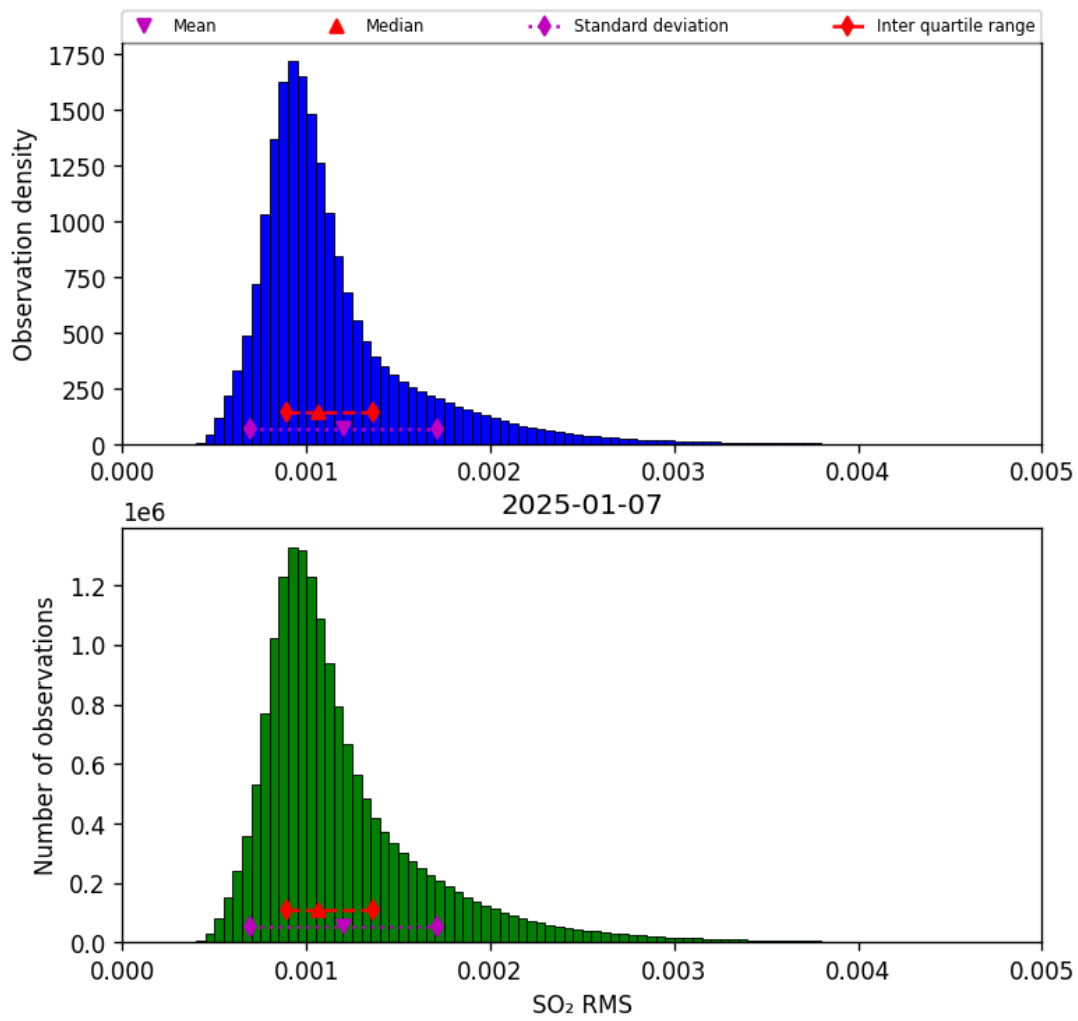


Figure 79: Histogram of “SO₂ RMS” for 2025-01-07 to 2025-01-08

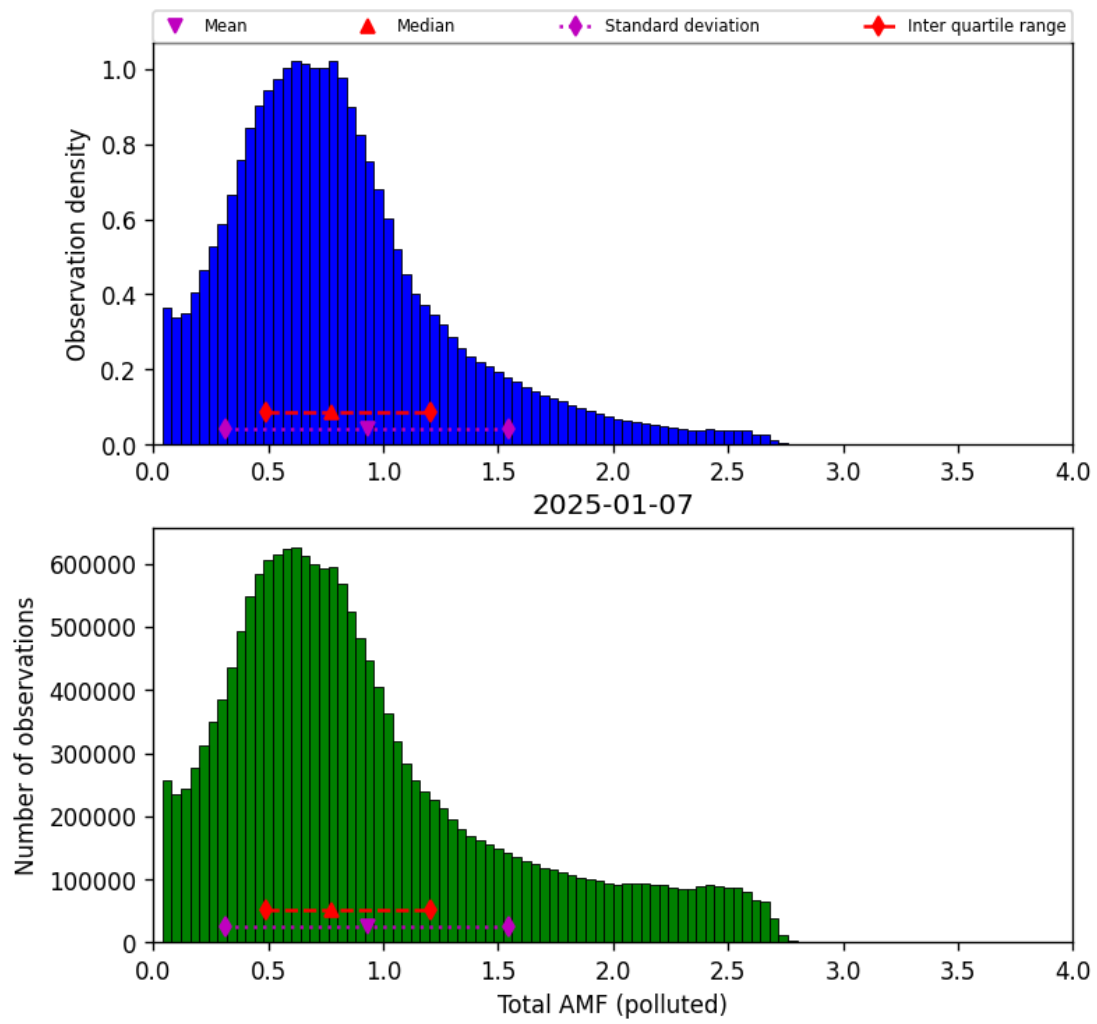


Figure 80: Histogram of “Total AMF (polluted)” for 2025-01-07 to 2025-01-08

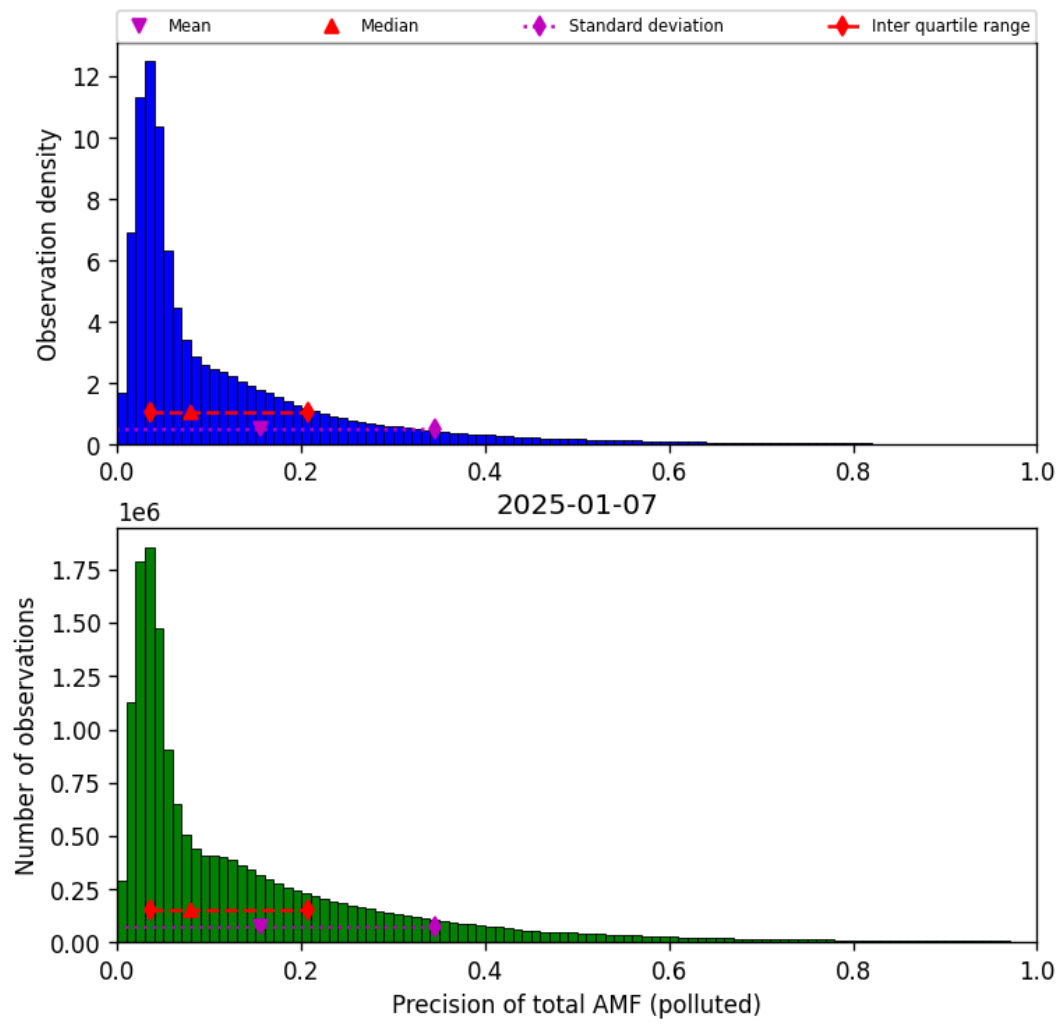


Figure 81: Histogram of “Precision of total AMF (polluted)” for 2025-01-07 to 2025-01-08

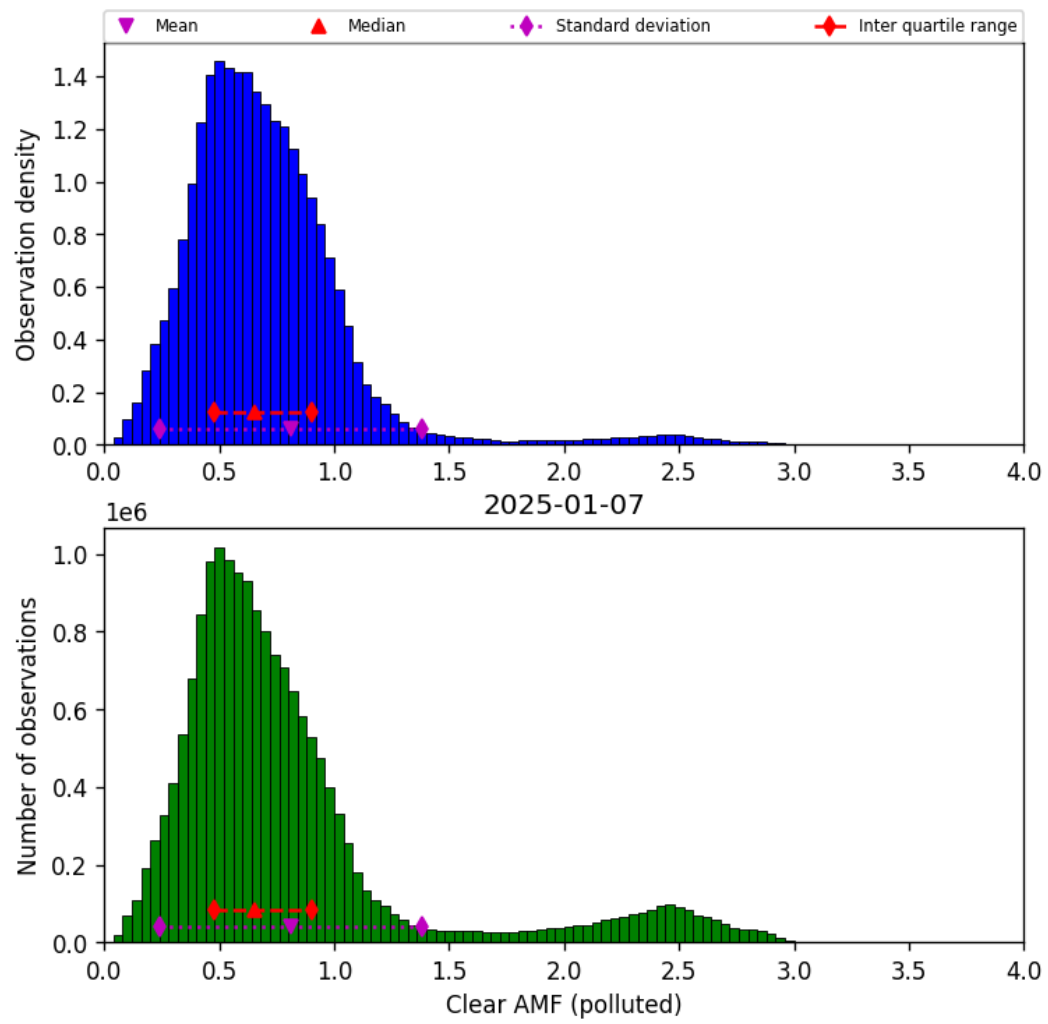


Figure 82: Histogram of “Clear AMF (polluted)” for 2025-01-07 to 2025-01-08

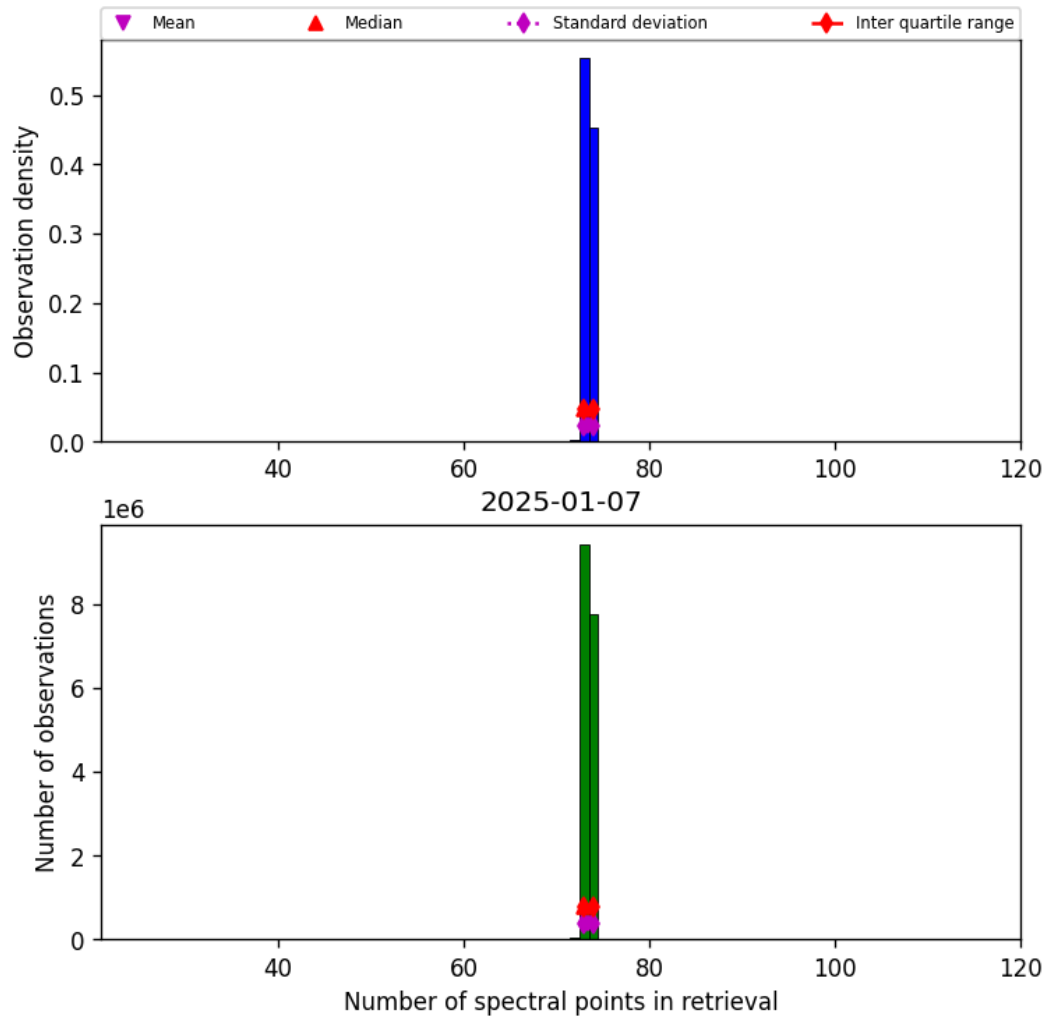


Figure 83: Histogram of “Number of spectral points in retrieval” for 2025-01-07 to 2025-01-08

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.

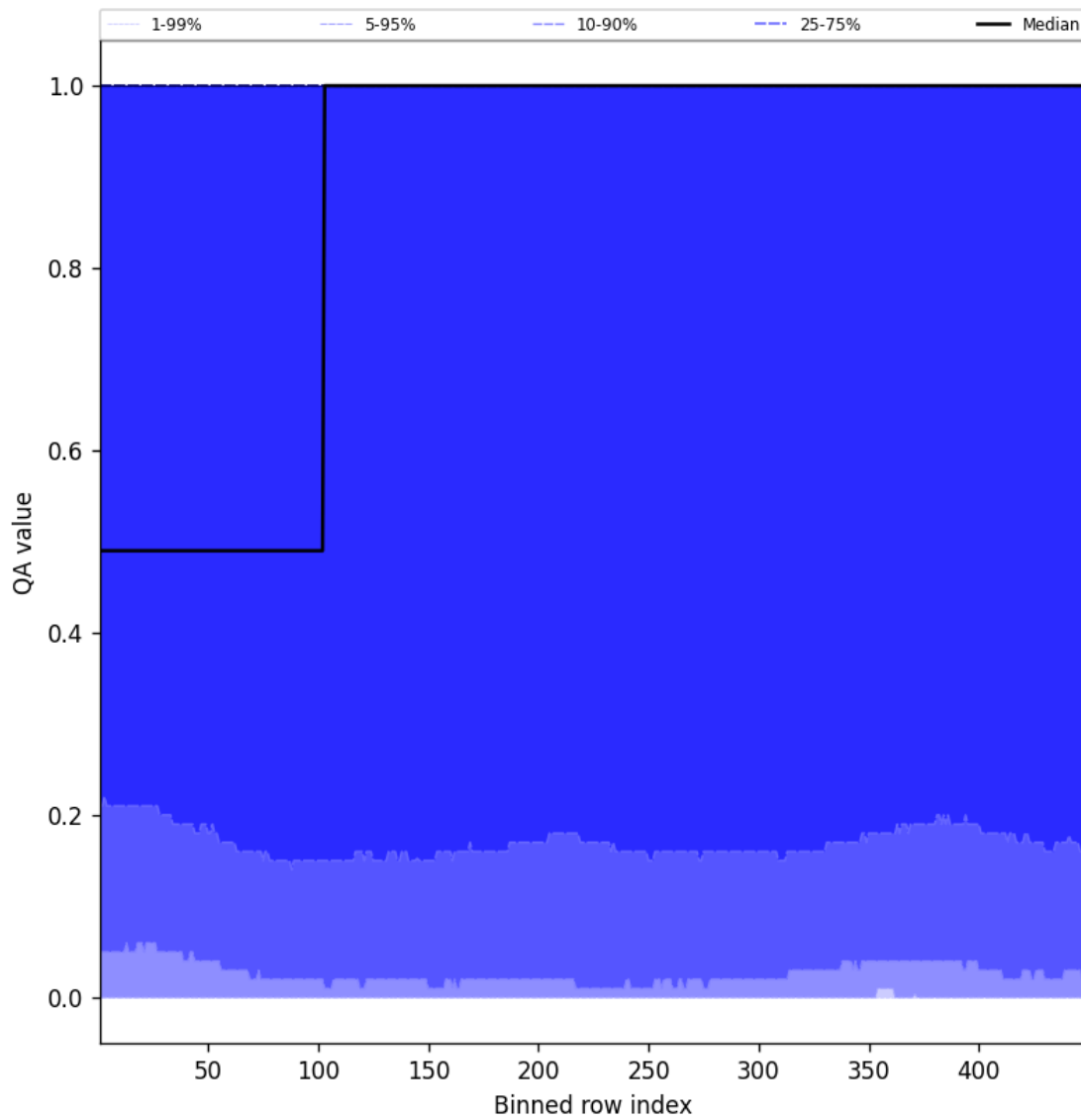


Figure 84: Along track statistics of “QA value” for 2025-01-07 to 2025-01-08

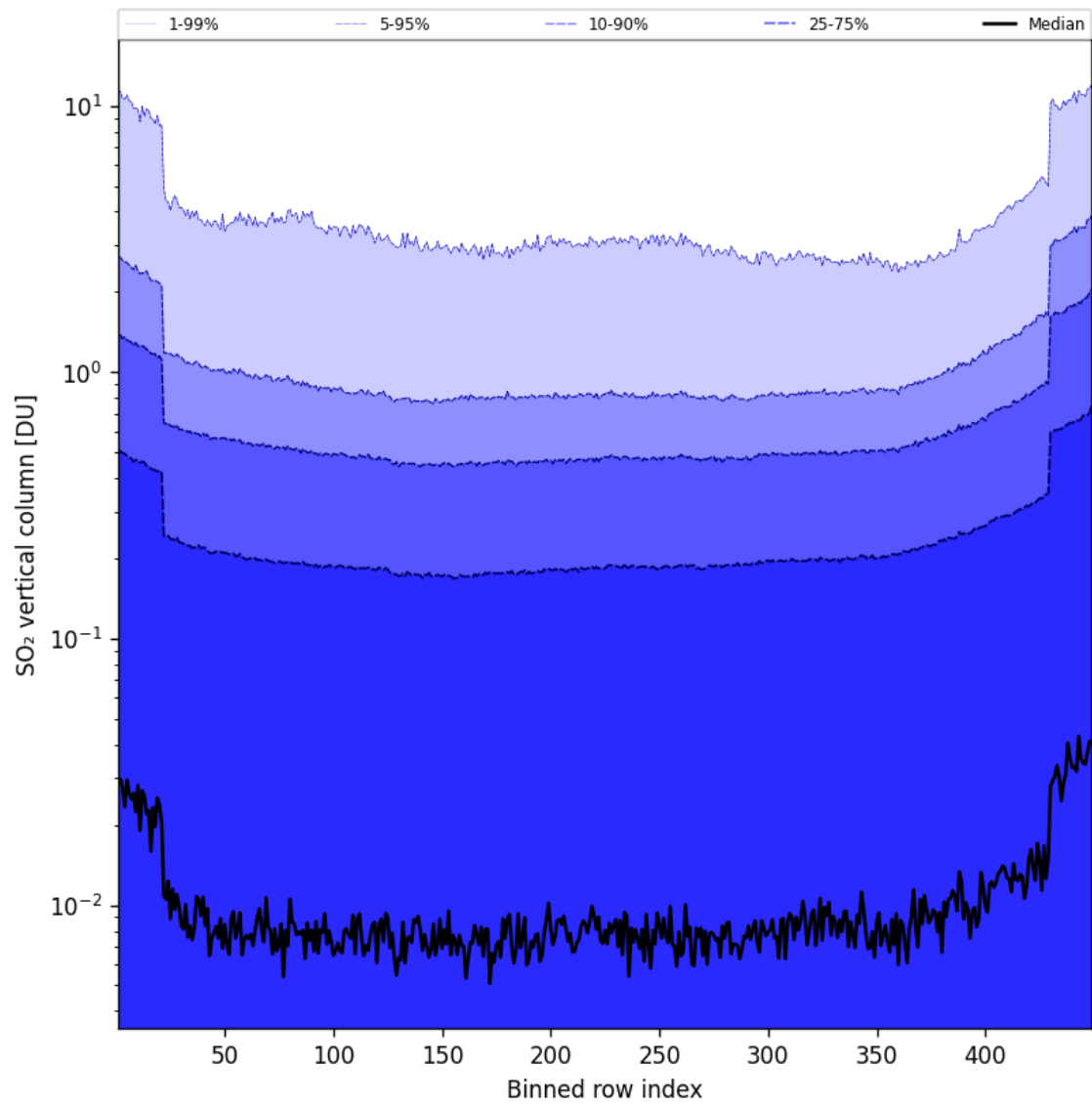


Figure 85: Along track statistics of “SO₂ vertical column” for 2025-01-07 to 2025-01-08

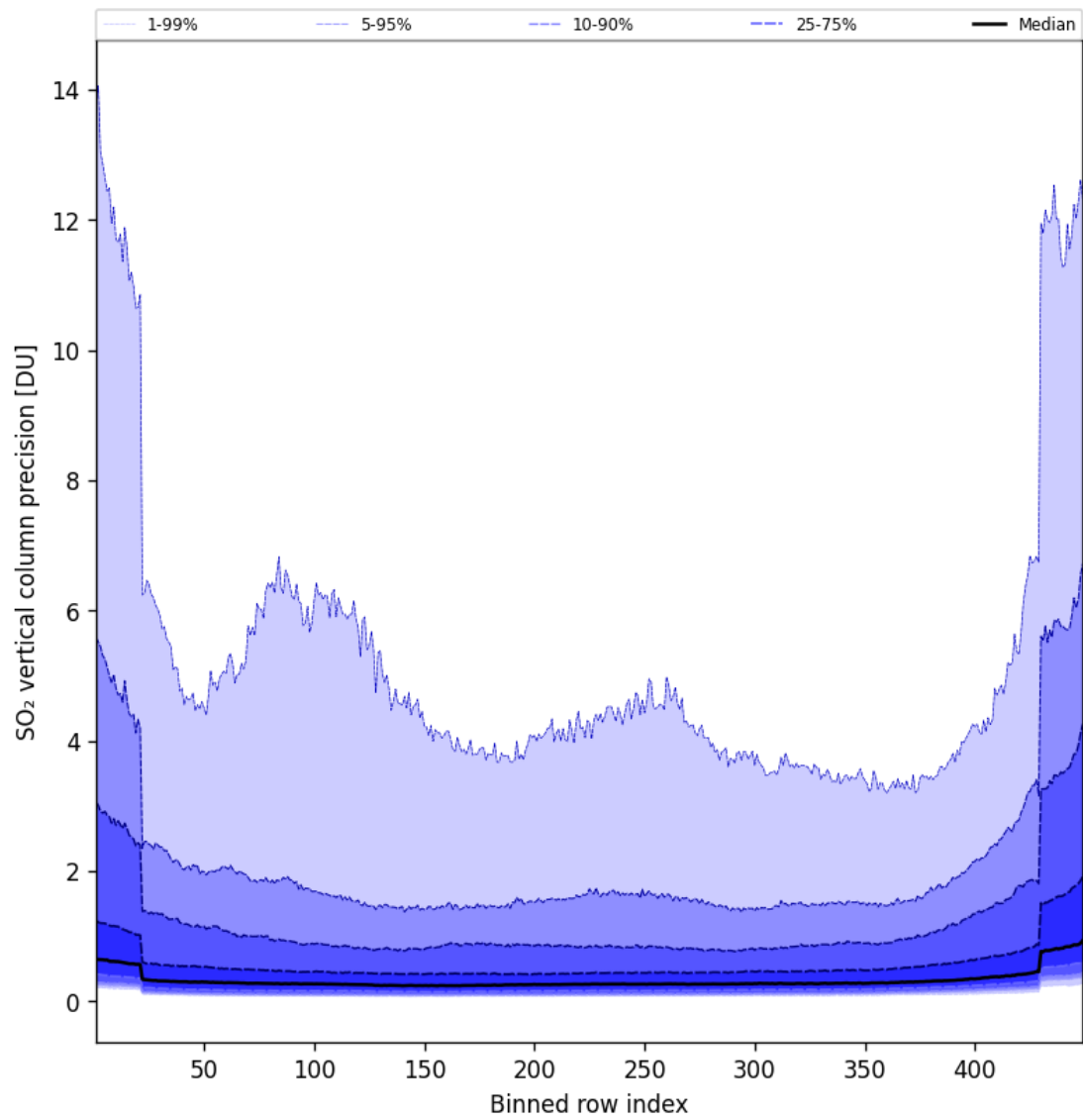


Figure 86: Along track statistics of "SO₂ vertical column precision" for 2025-01-07 to 2025-01-08

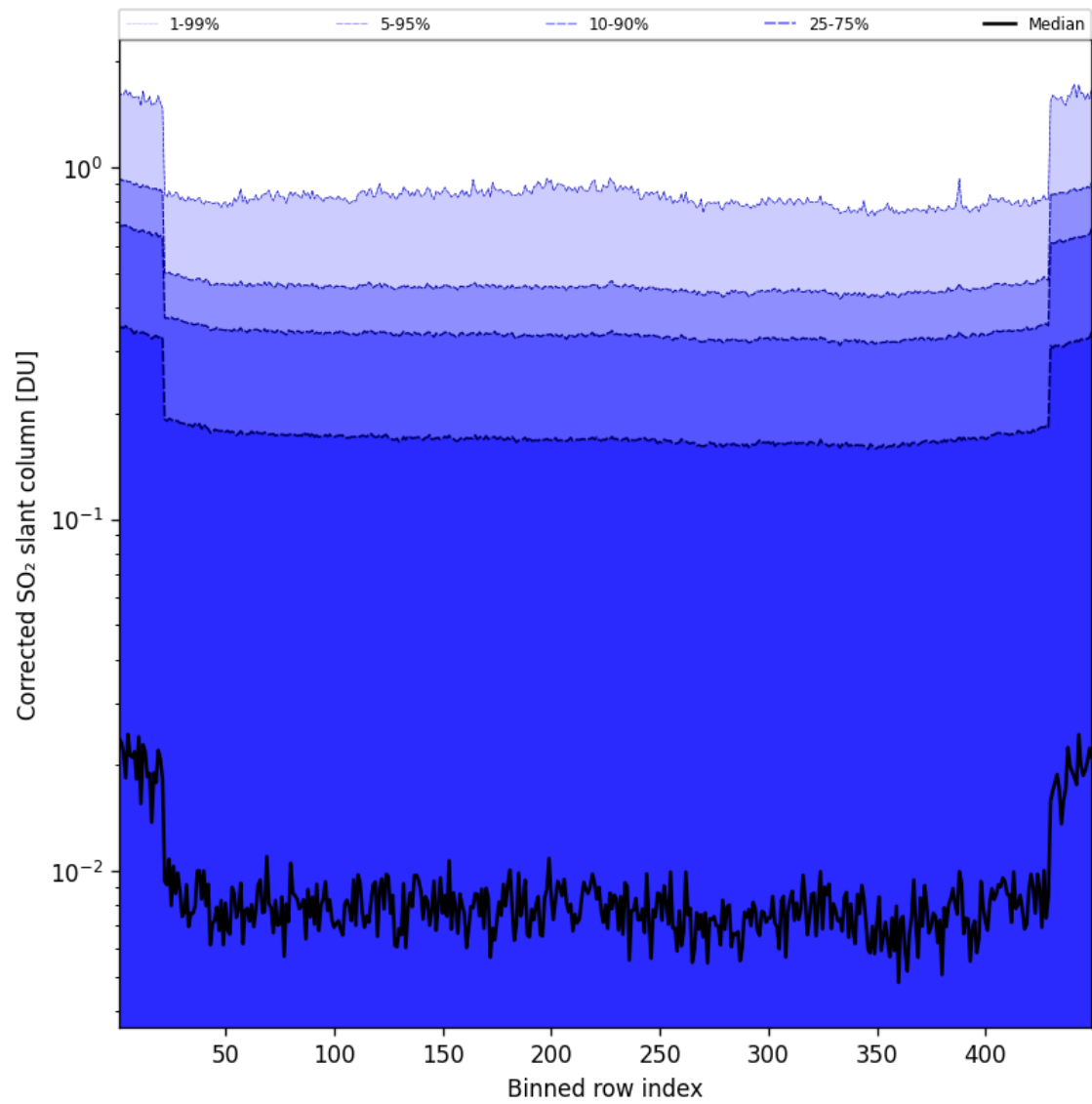


Figure 87: Along track statistics of “Corrected SO₂ slant column” for 2025-01-07 to 2025-01-08

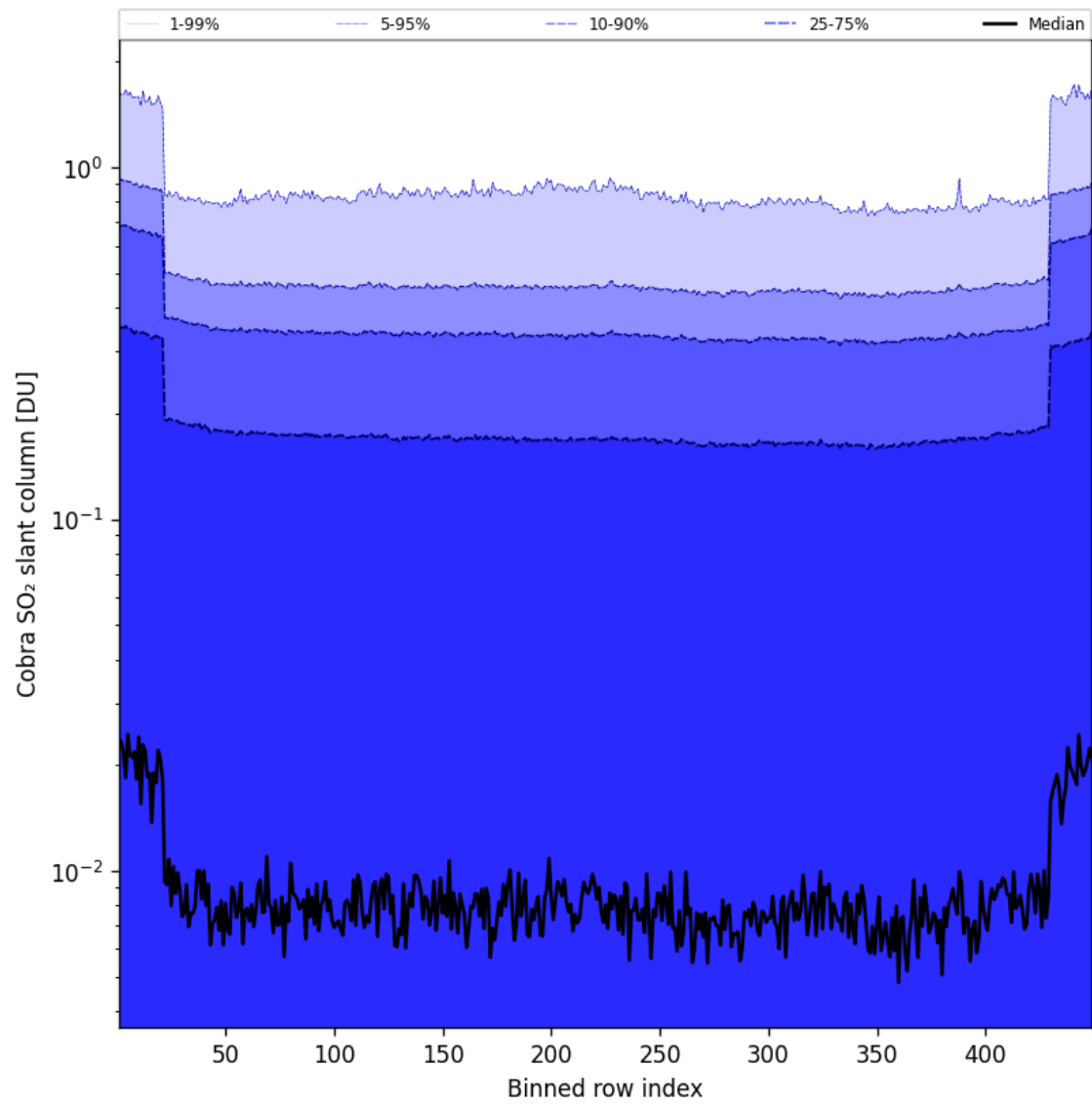


Figure 88: Along track statistics of "Cobra SO₂ slant column" for 2025-01-07 to 2025-01-08

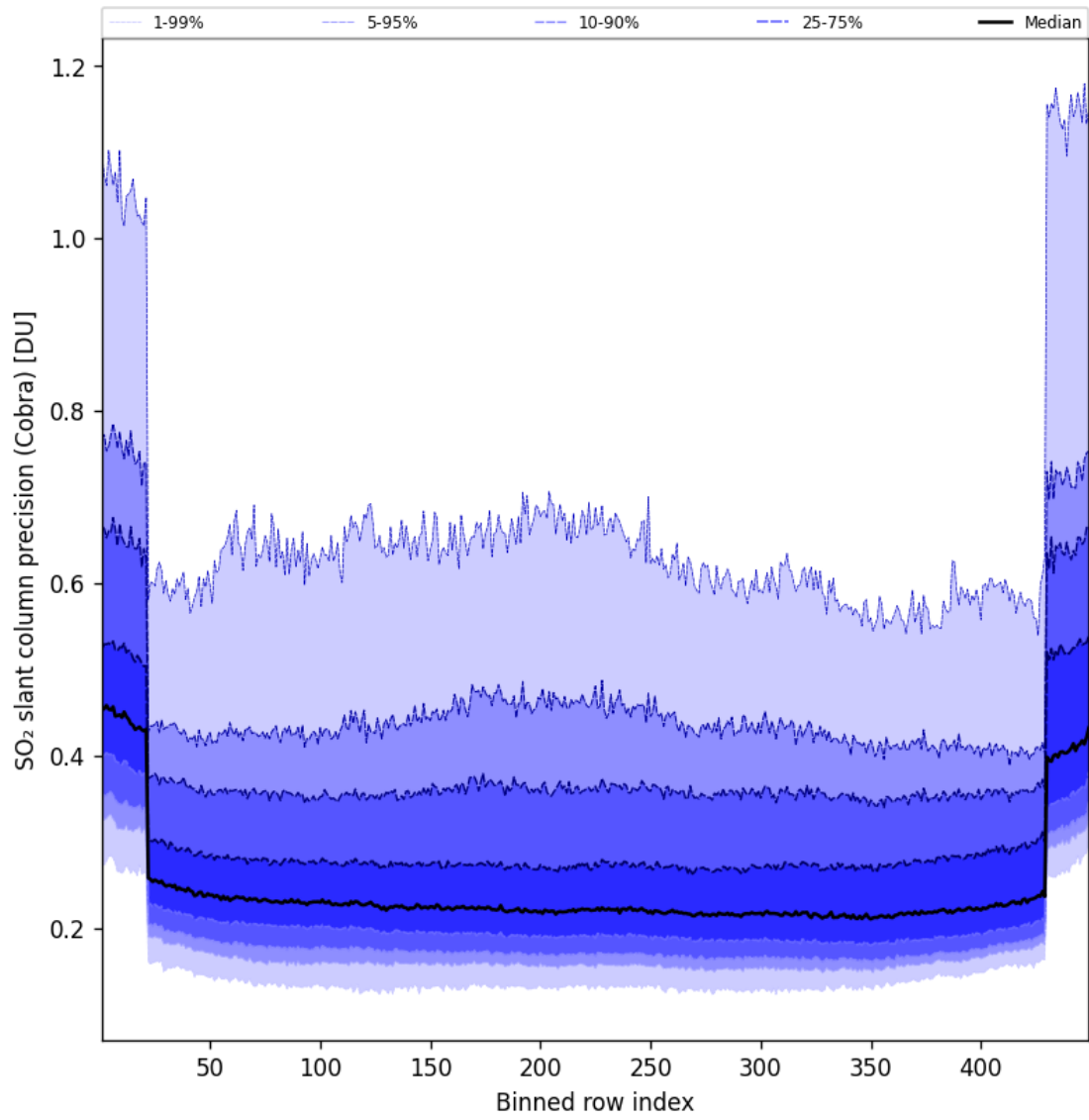


Figure 89: Along track statistics of “SO₂ slant column precision (Cobra)” for 2025-01-07 to 2025-01-08

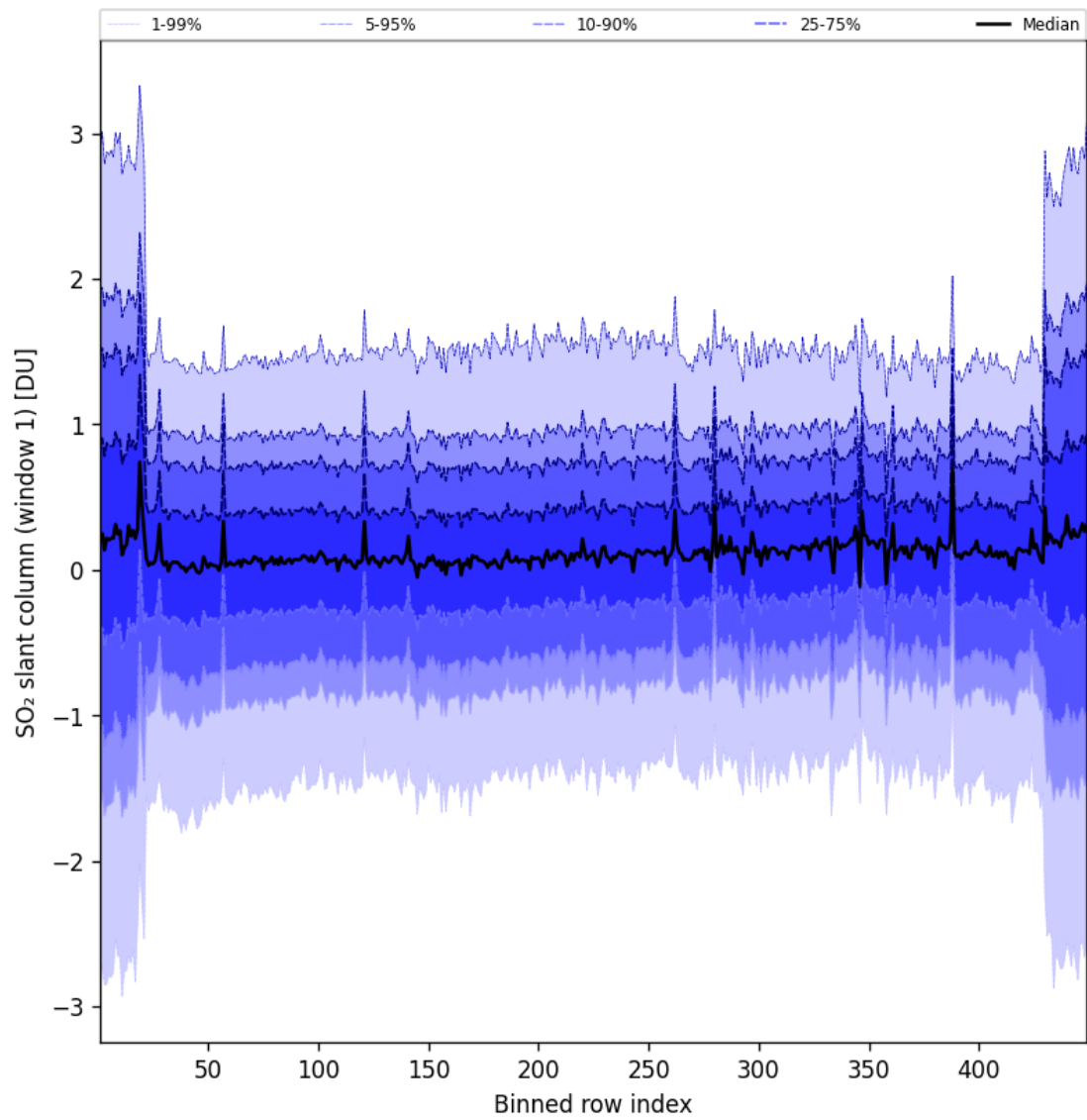


Figure 90: Along track statistics of “SO₂ slant column (window 1)” for 2025-01-07 to 2025-01-08

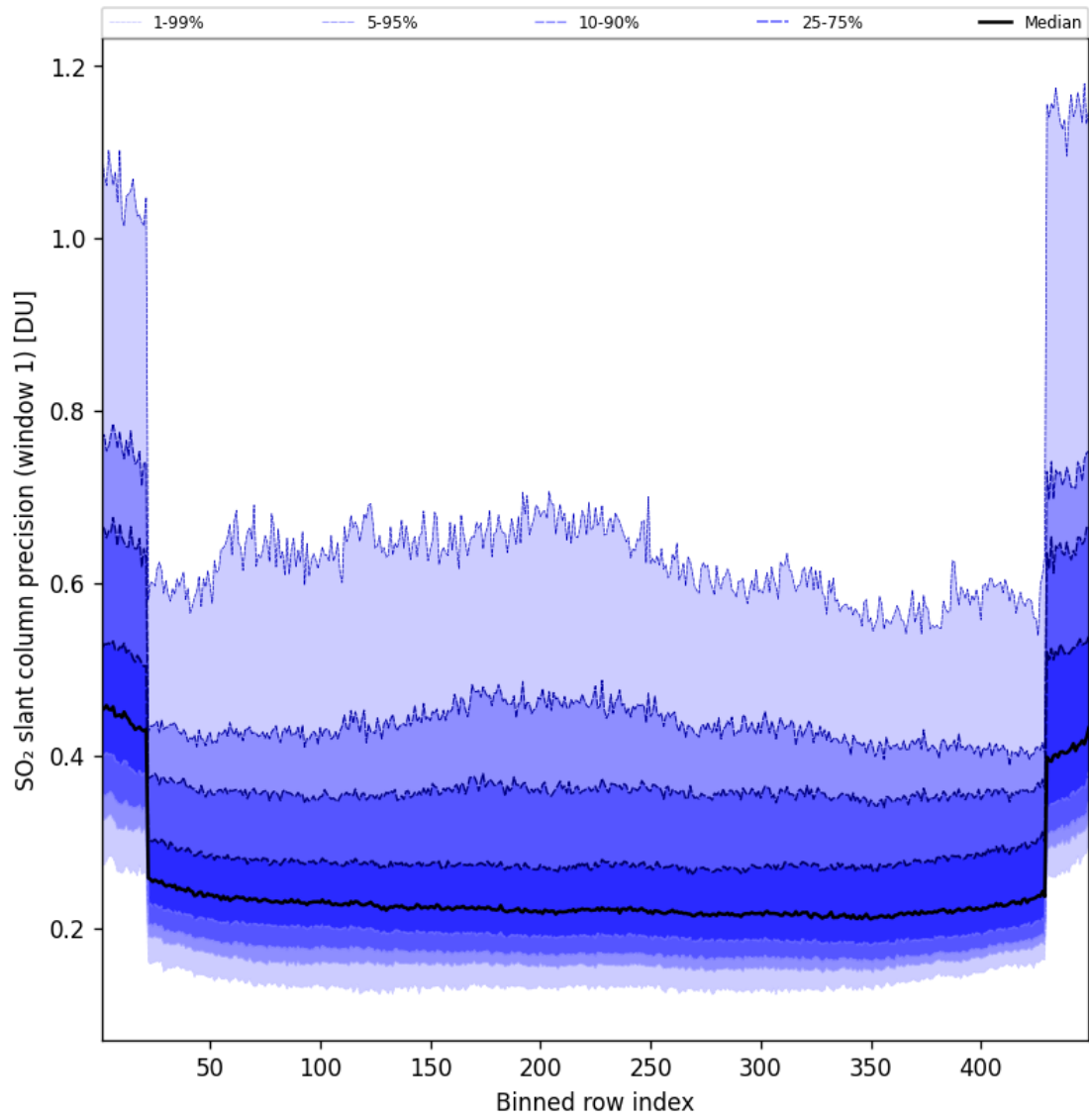


Figure 91: Along track statistics of “SO₂ slant column precision (window 1)” for 2025-01-07 to 2025-01-08

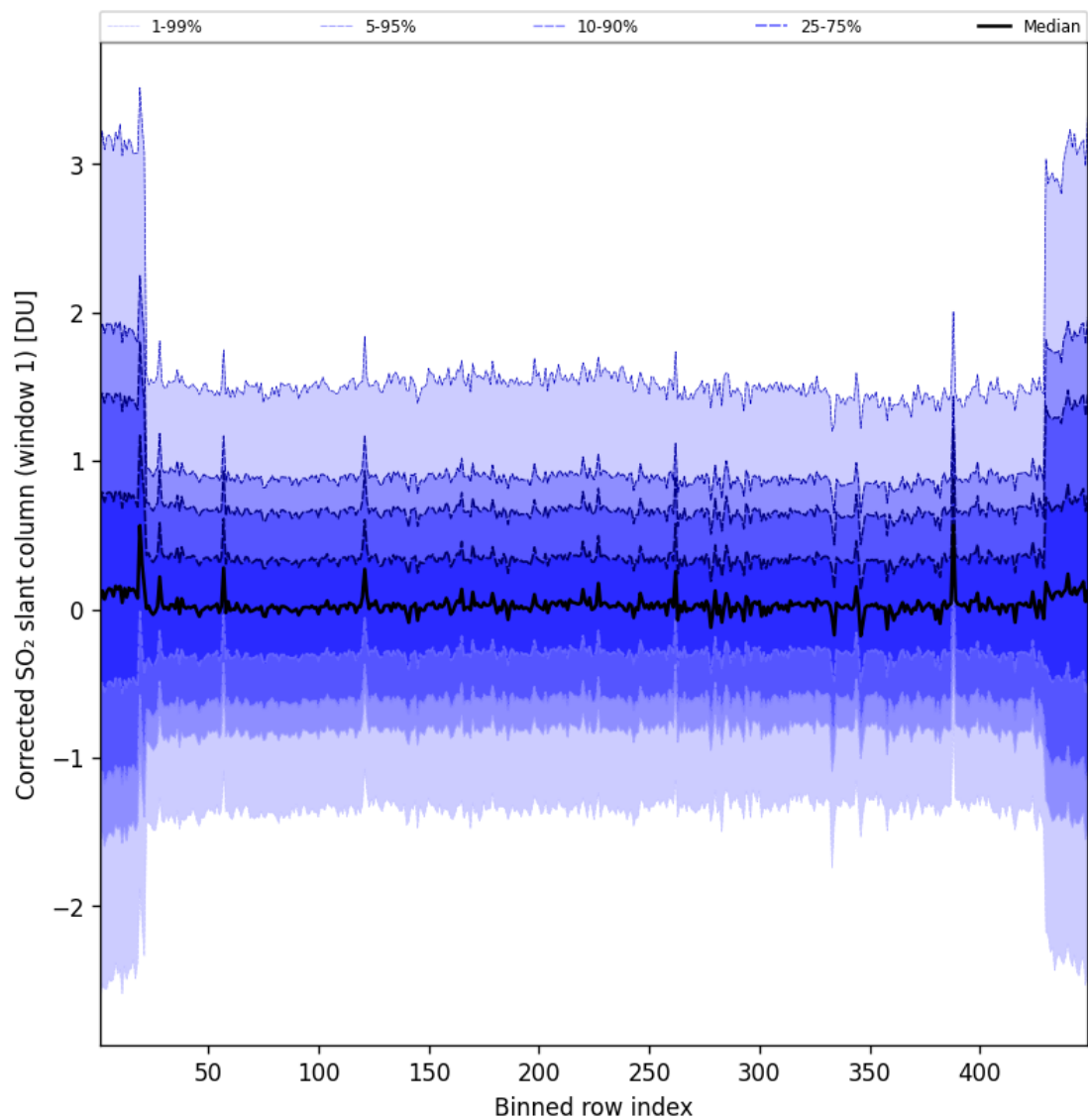


Figure 92: Along track statistics of “Corrected SO₂ slant column (window 1)” for 2025-01-07 to 2025-01-08

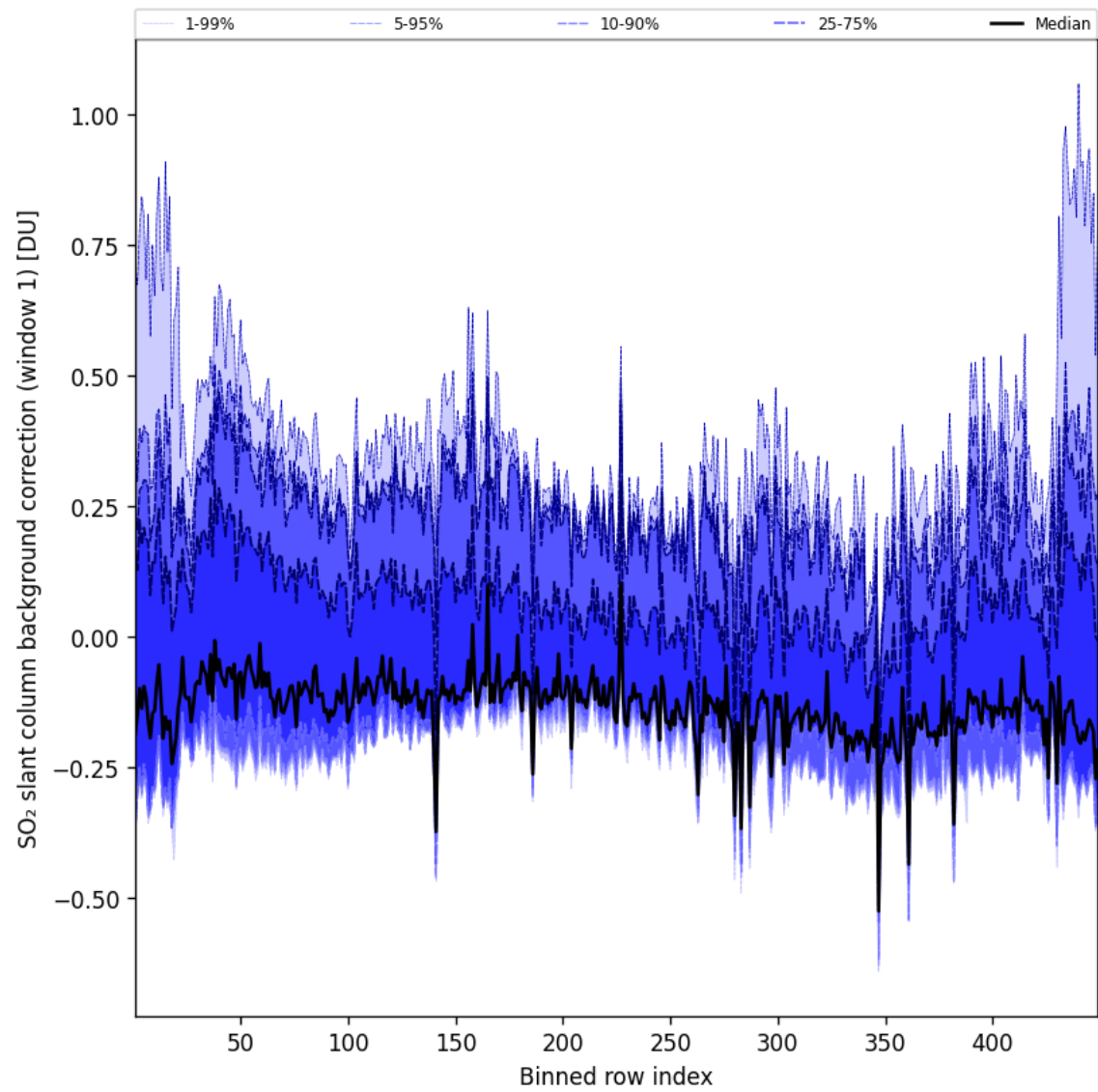


Figure 93: Along track statistics of “SO₂ slant column background correction (window 1)” for 2025-01-07 to 2025-01-08

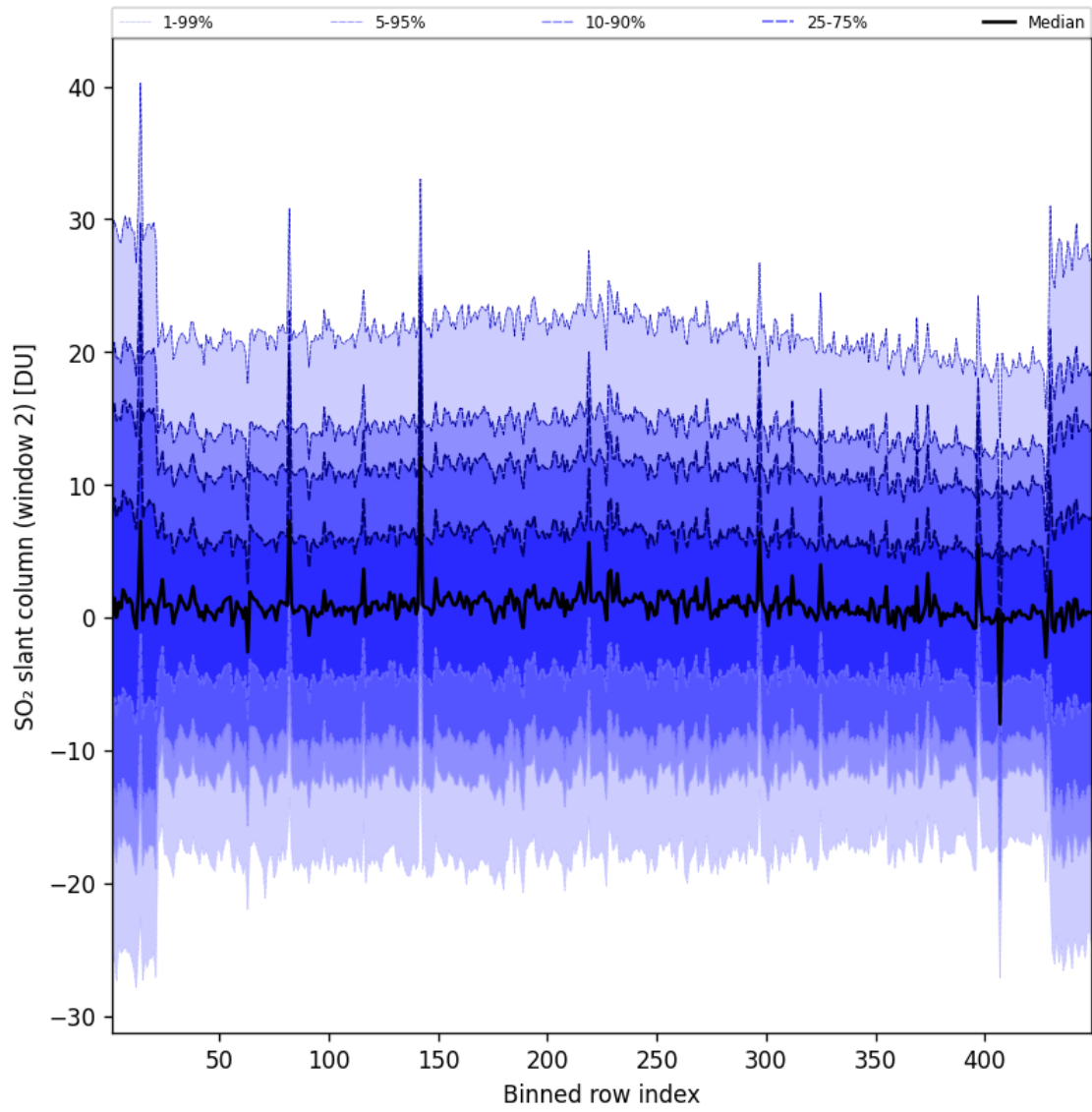


Figure 94: Along track statistics of “SO₂ slant column (window 2)” for 2025-01-07 to 2025-01-08

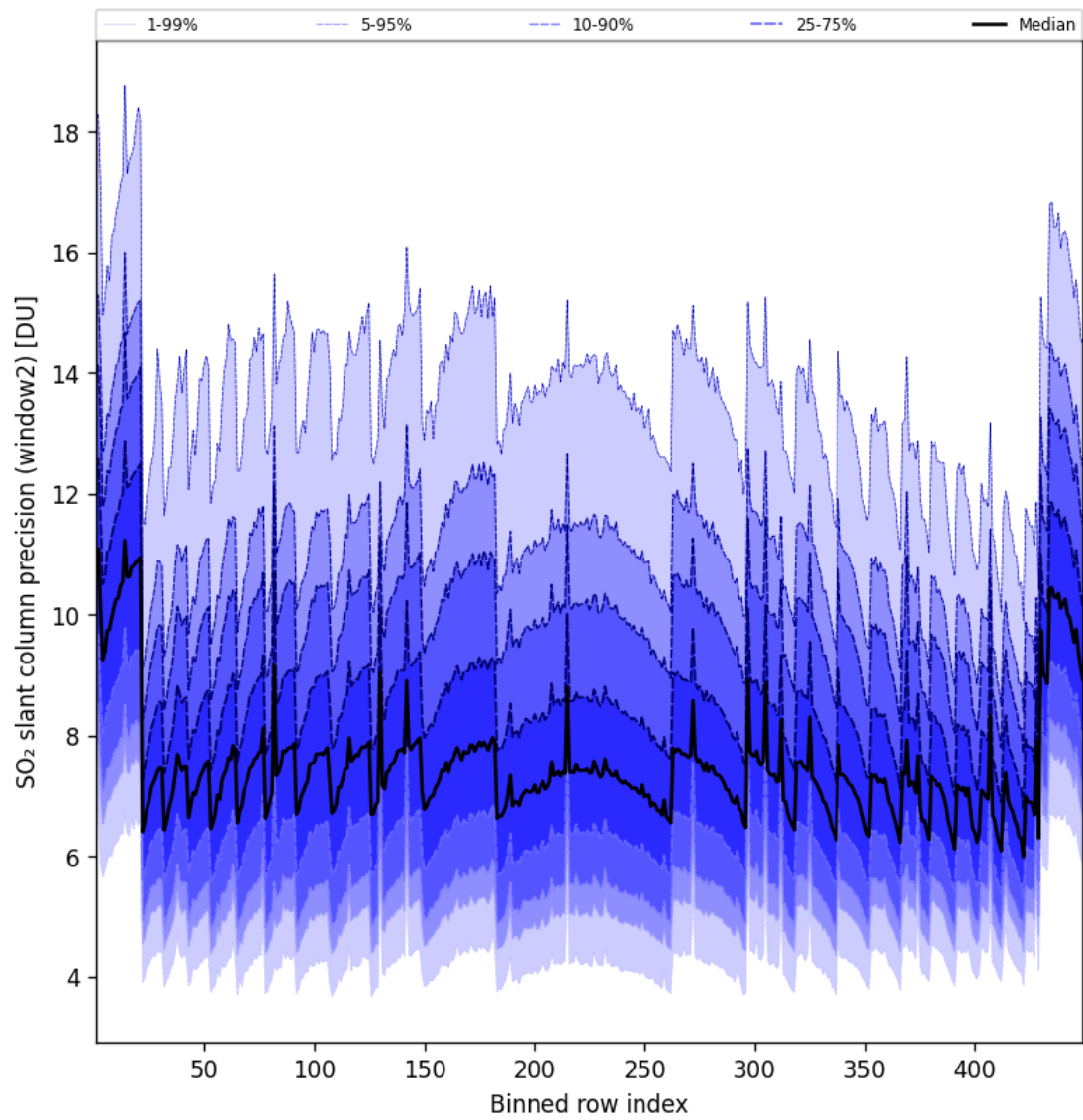


Figure 95: Along track statistics of “SO₂ slant column precision (window2)” for 2025-01-07 to 2025-01-08

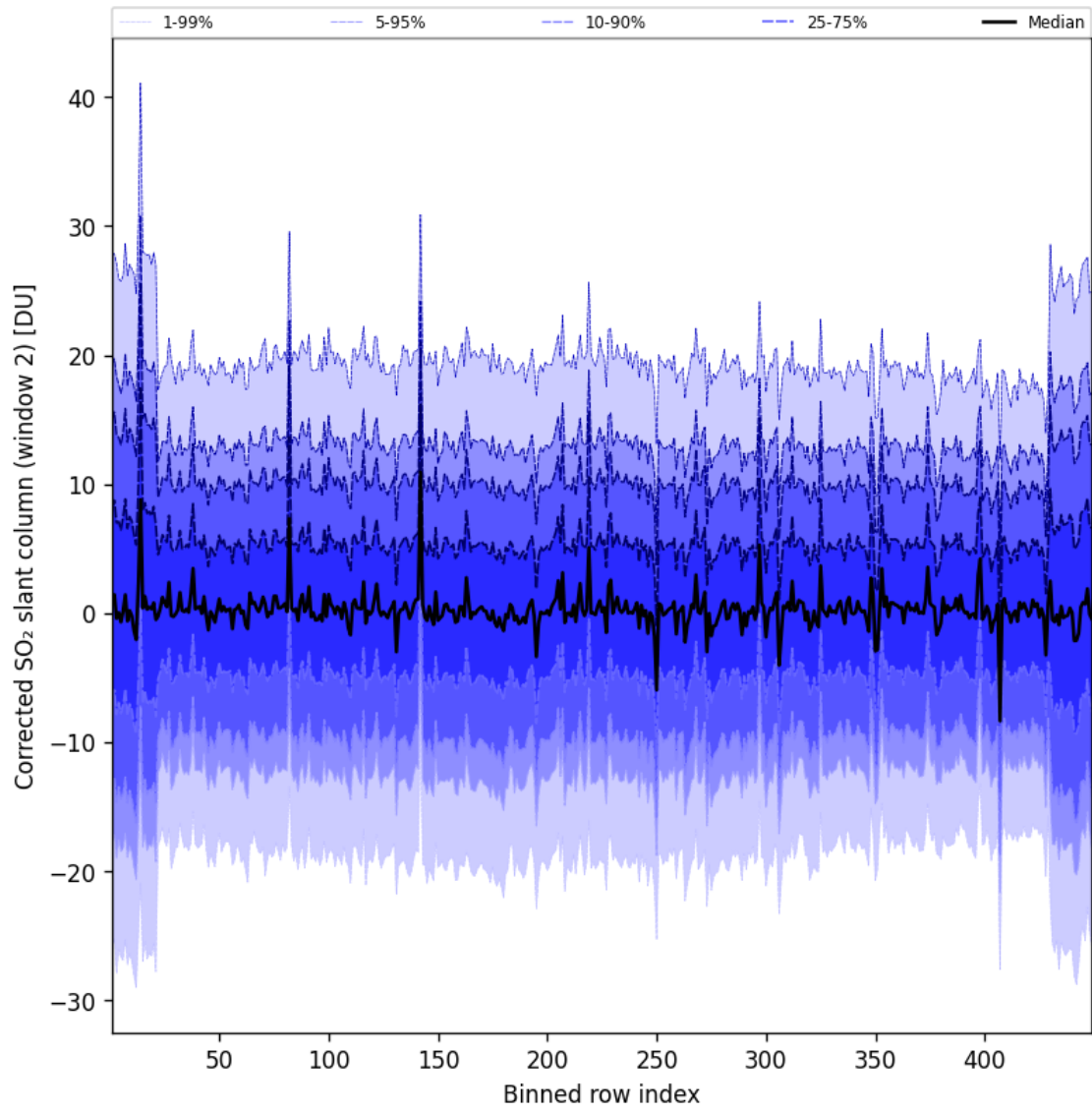


Figure 96: Along track statistics of “Corrected SO₂ slant column (window 2)” for 2025-01-07 to 2025-01-08

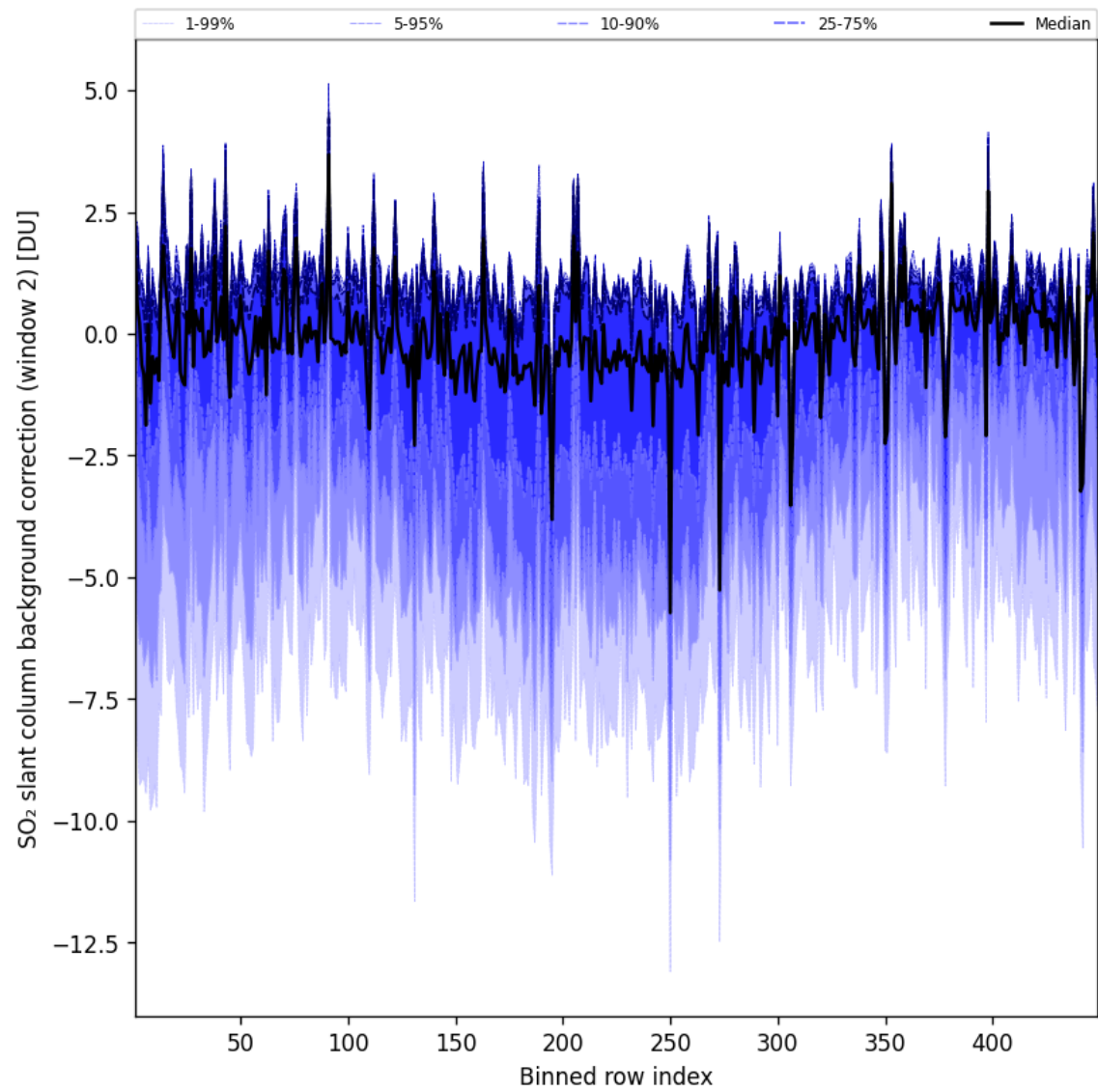


Figure 97: Along track statistics of “SO₂ slant column background correction (window 2)” for 2025-01-07 to 2025-01-08

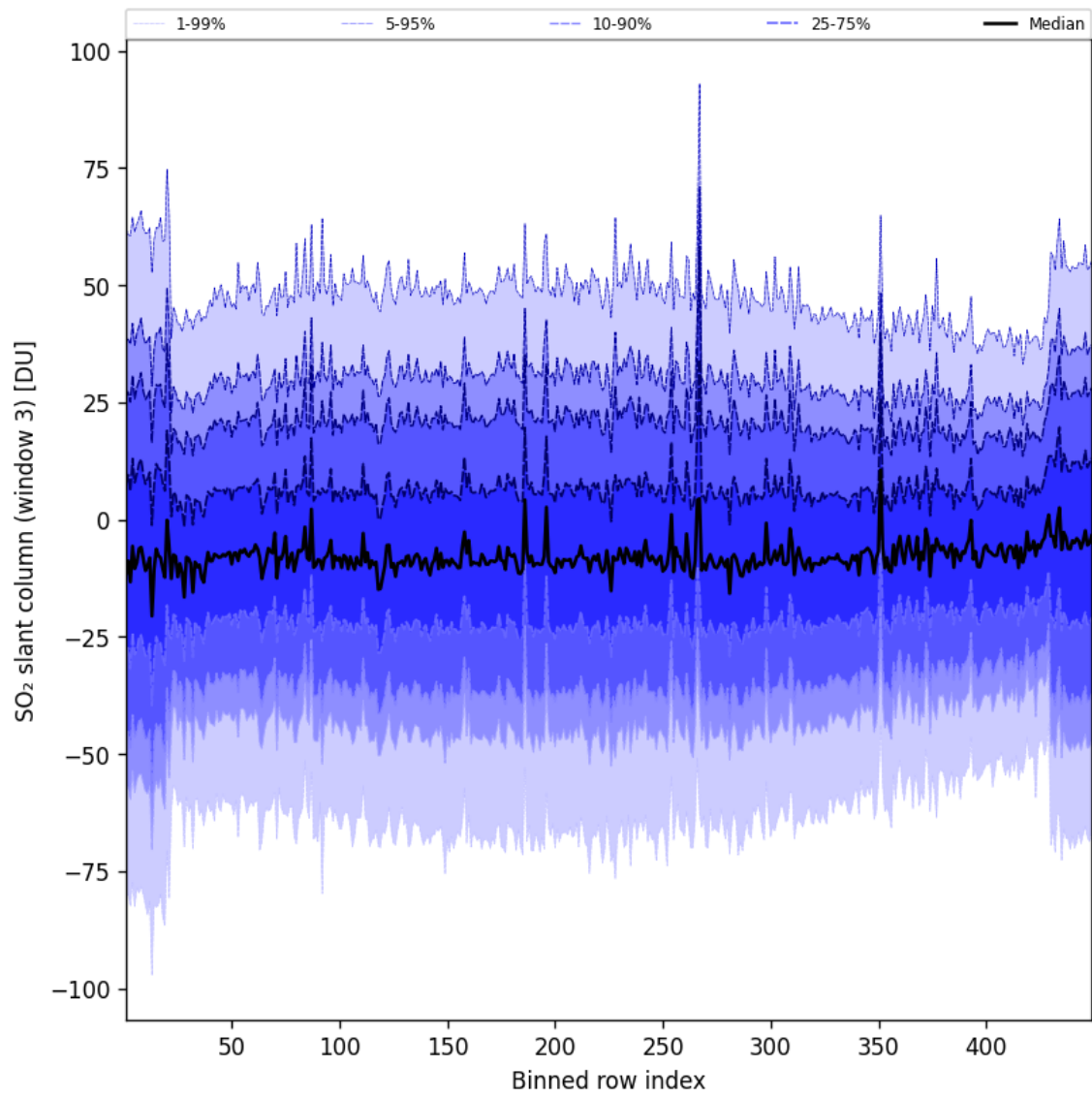


Figure 98: Along track statistics of “SO₂ slant column (window 3)” for 2025-01-07 to 2025-01-08

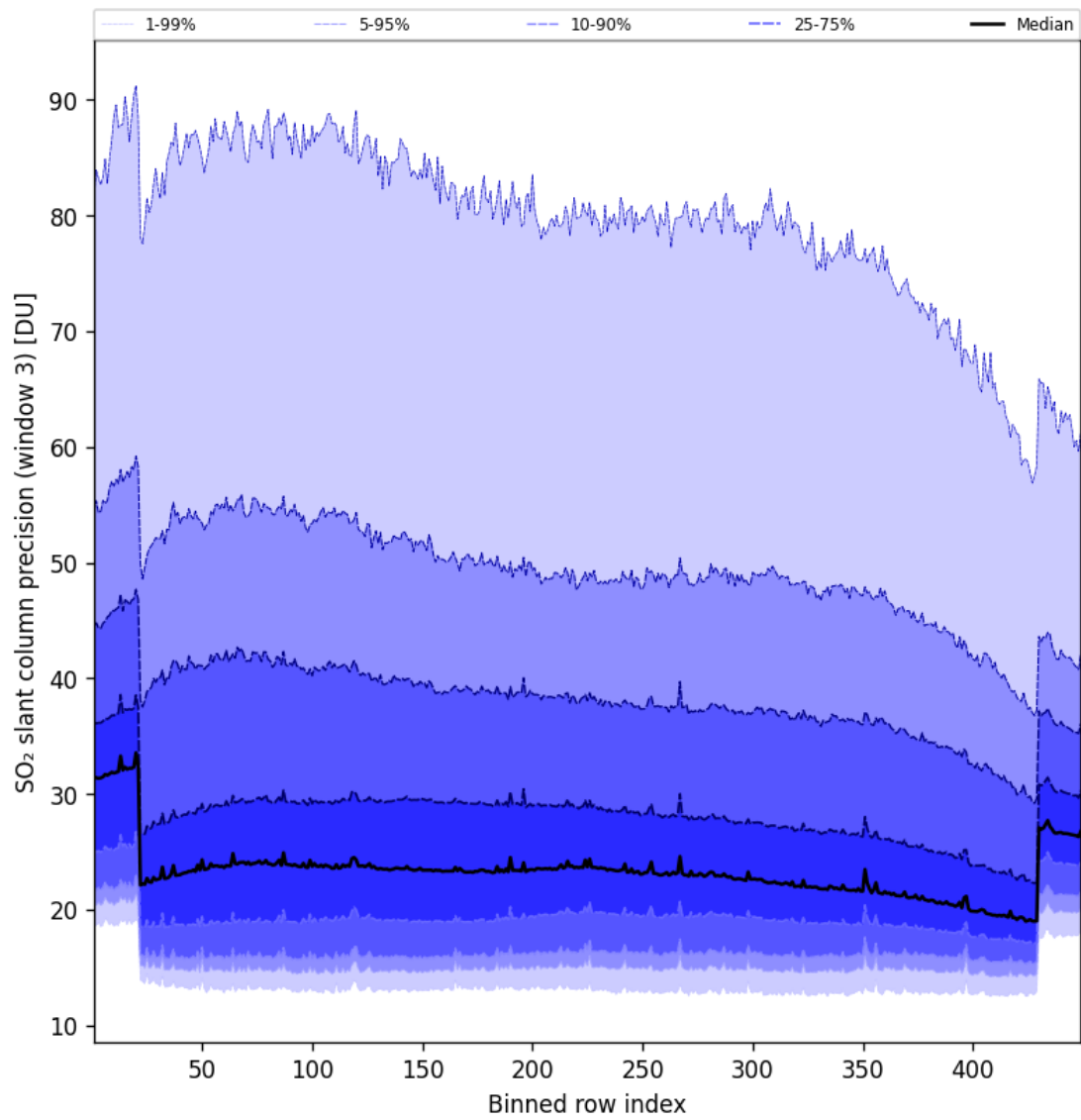


Figure 99: Along track statistics of “SO₂ slant column precision (window 3)” for 2025-01-07 to 2025-01-08

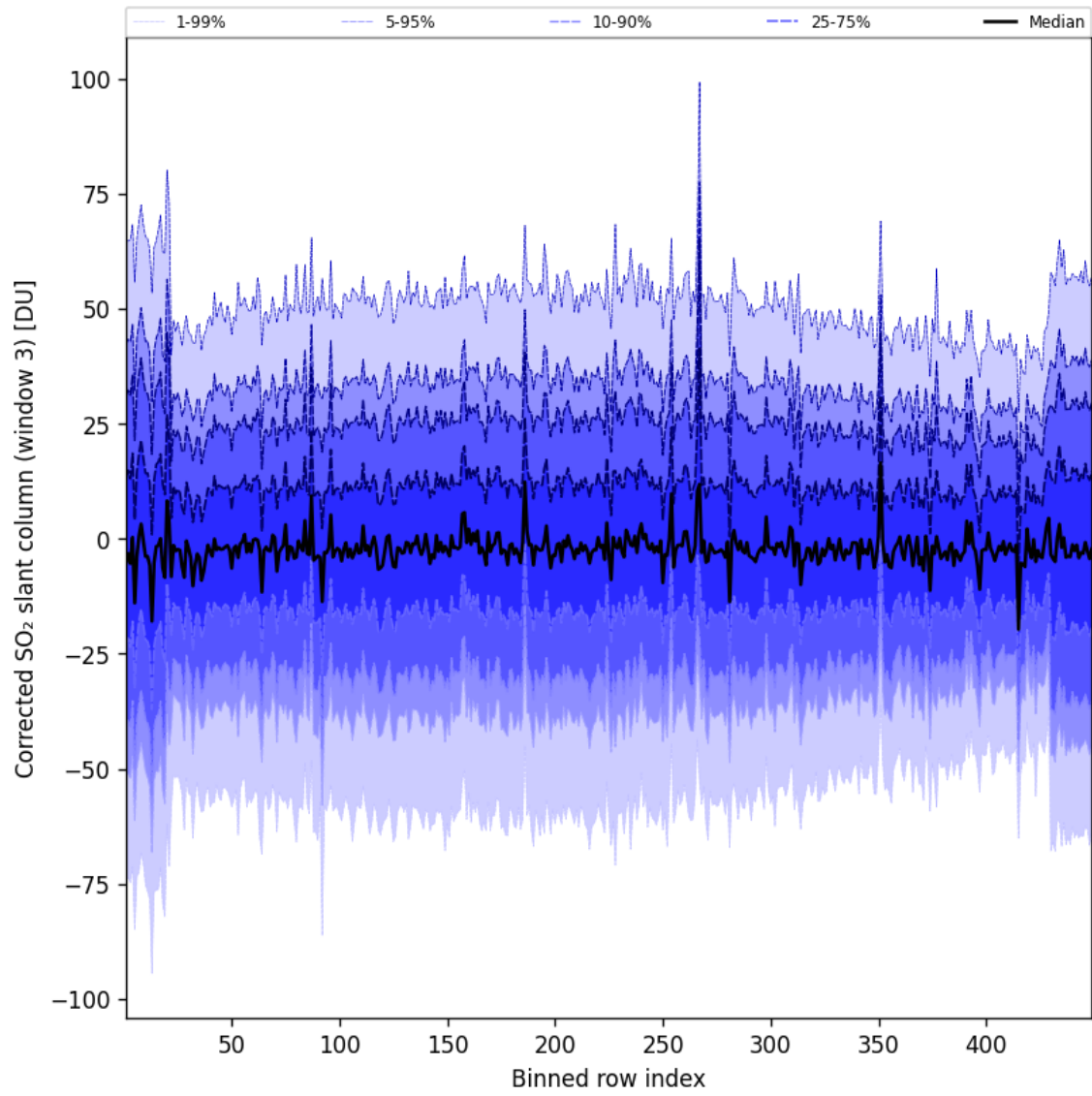


Figure 100: Along track statistics of “Corrected SO₂ slant column (window 3)” for 2025-01-07 to 2025-01-08

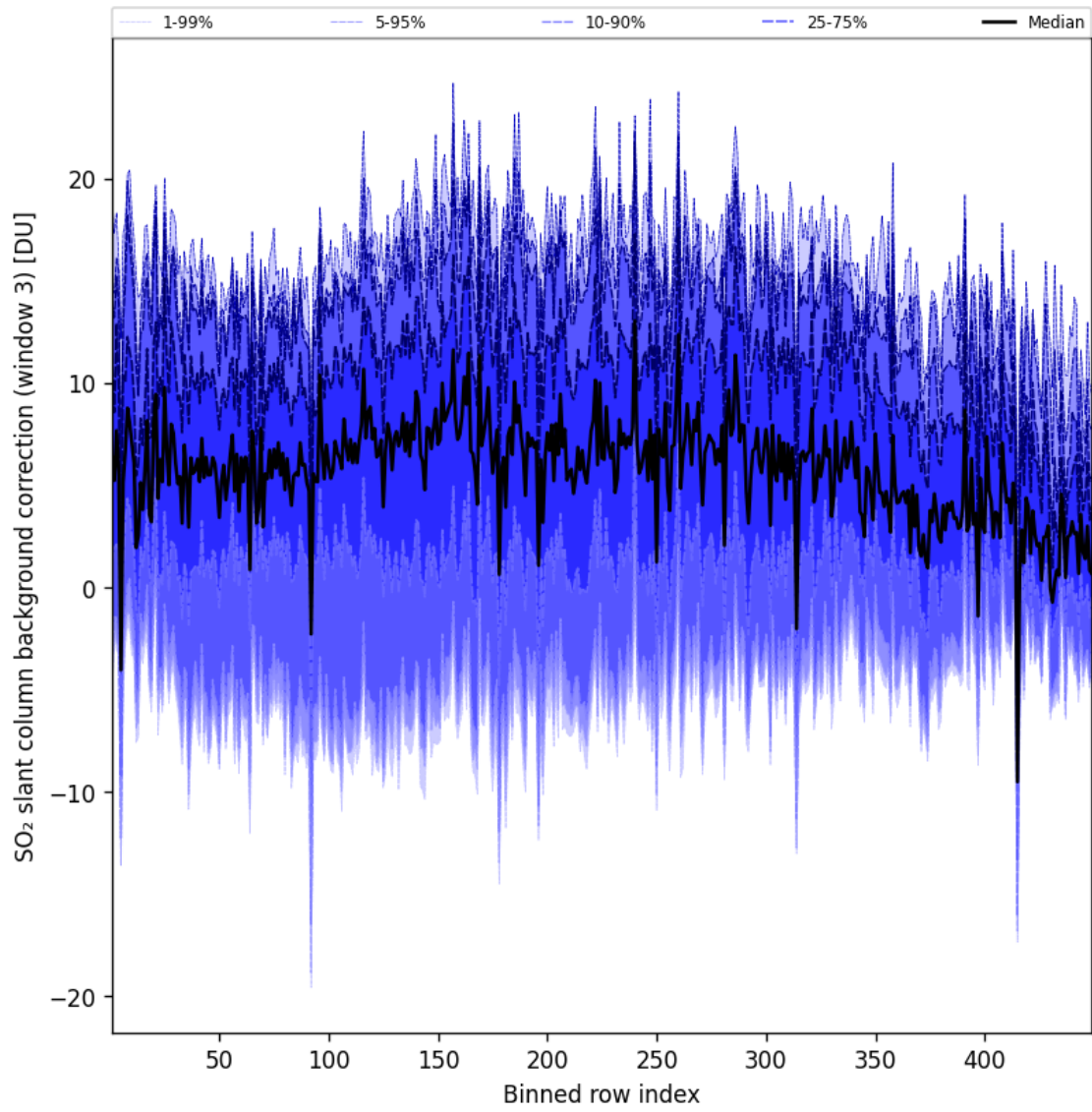


Figure 101: Along track statistics of “SO₂ slant column background correction (window 3)” for 2025-01-07 to 2025-01-08

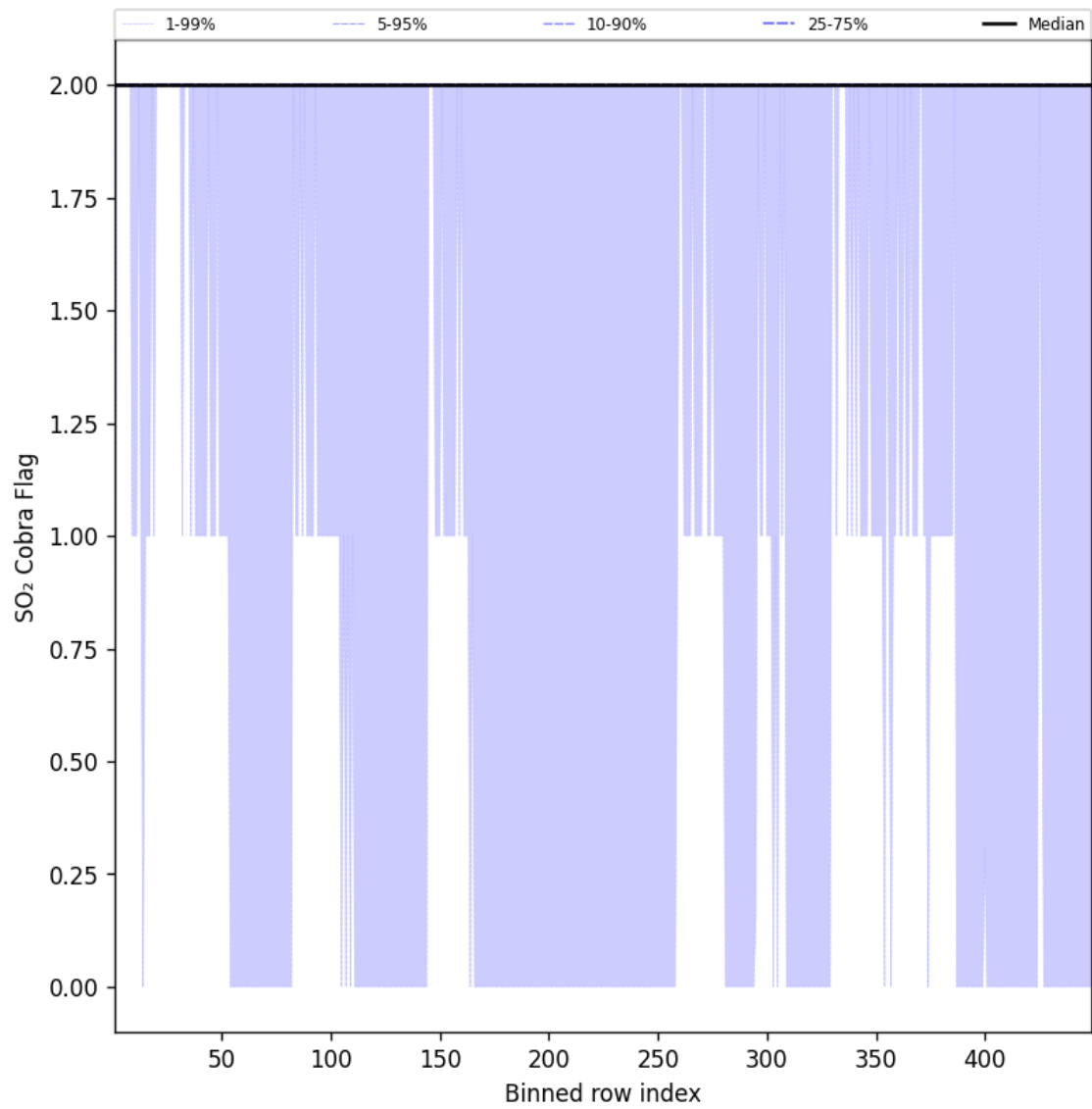


Figure 102: Along track statistics of "SO₂ Cobra Flag" for 2025-01-07 to 2025-01-08

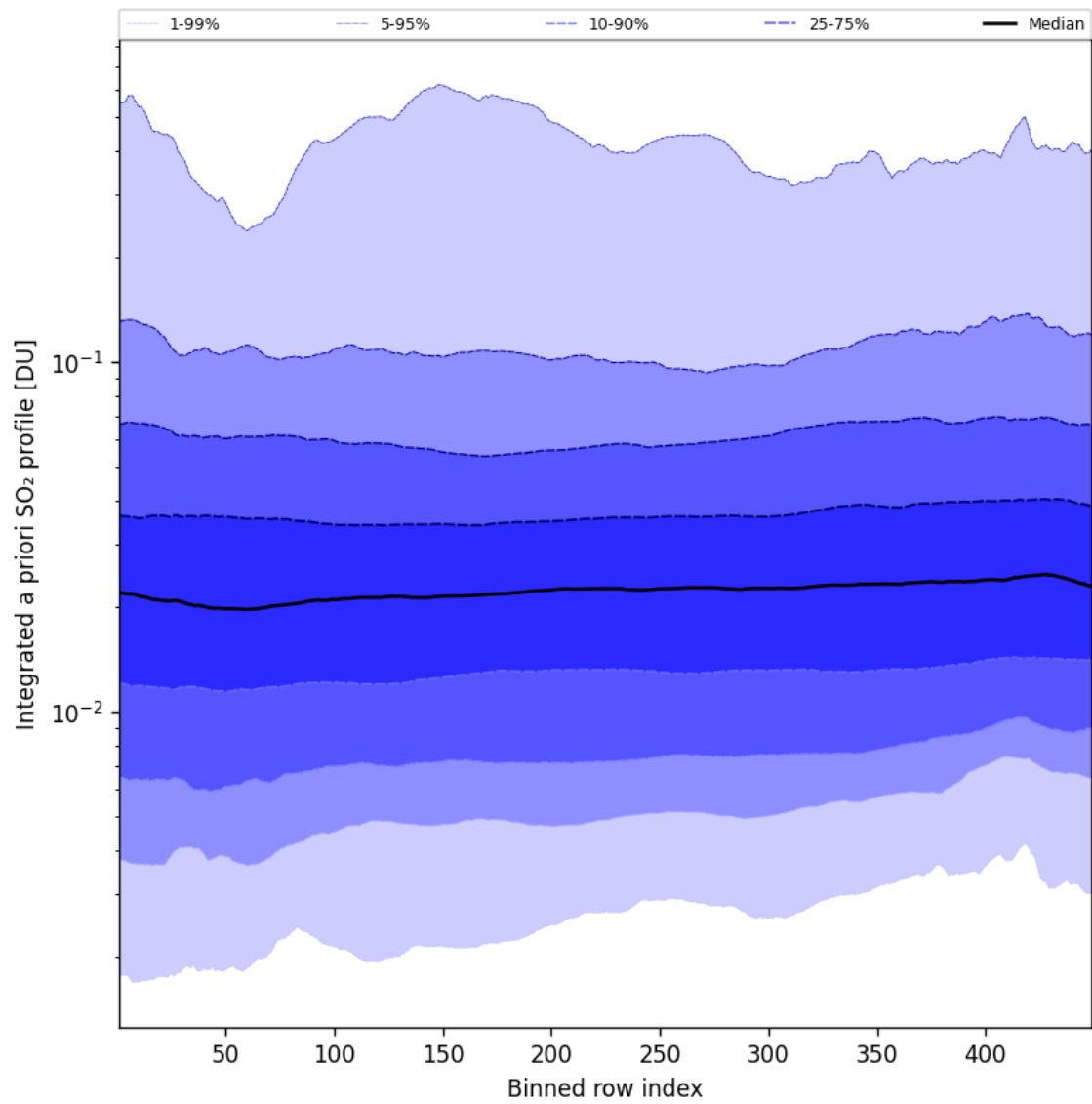


Figure 103: Along track statistics of “Integrated a priori SO₂ profile” for 2025-01-07 to 2025-01-08

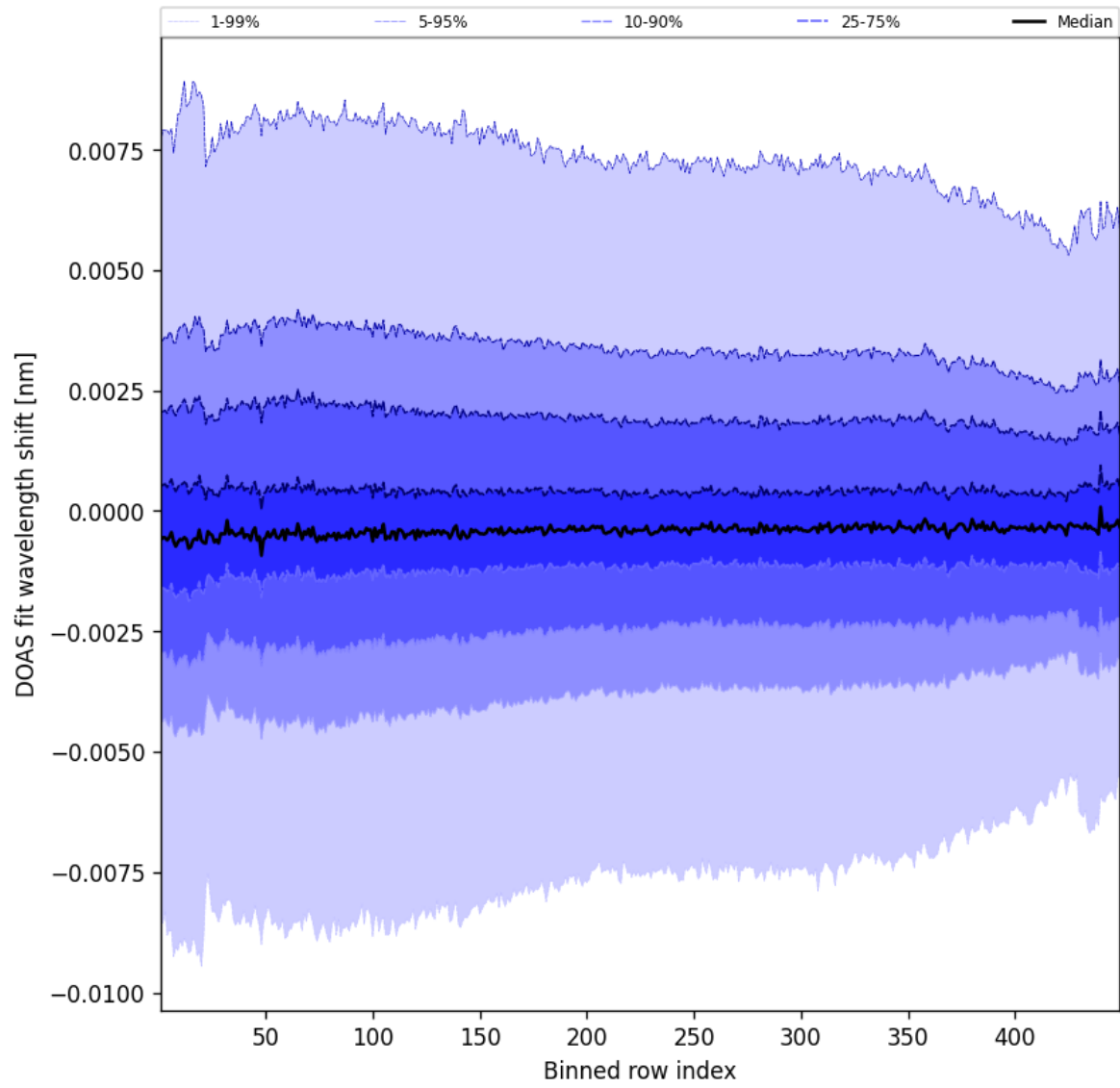


Figure 104: Along track statistics of “DOAS fit wavelength shift” for 2025-01-07 to 2025-01-08

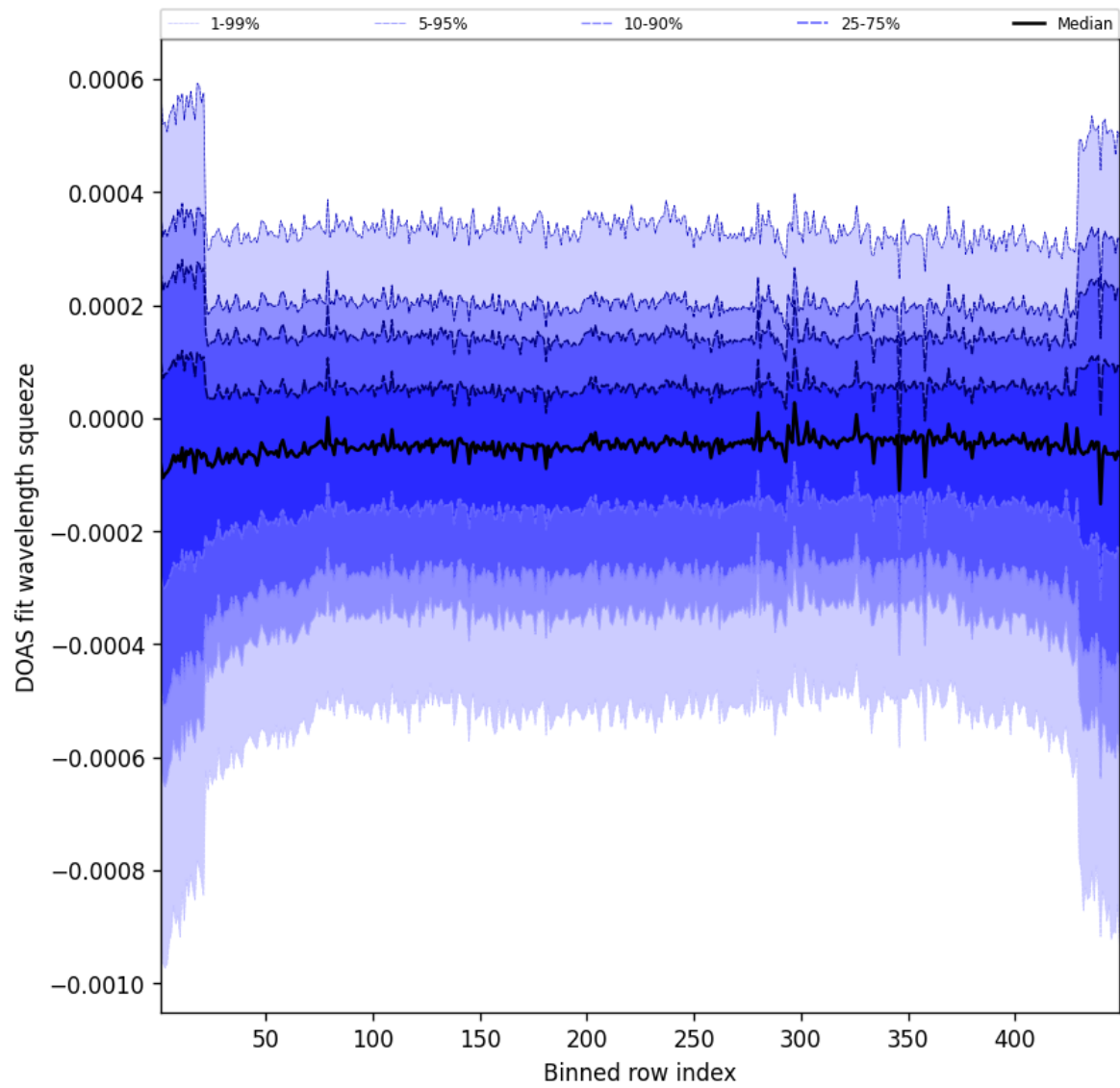


Figure 105: Along track statistics of “DOAS fit wavelength squeeze” for 2025-01-07 to 2025-01-08

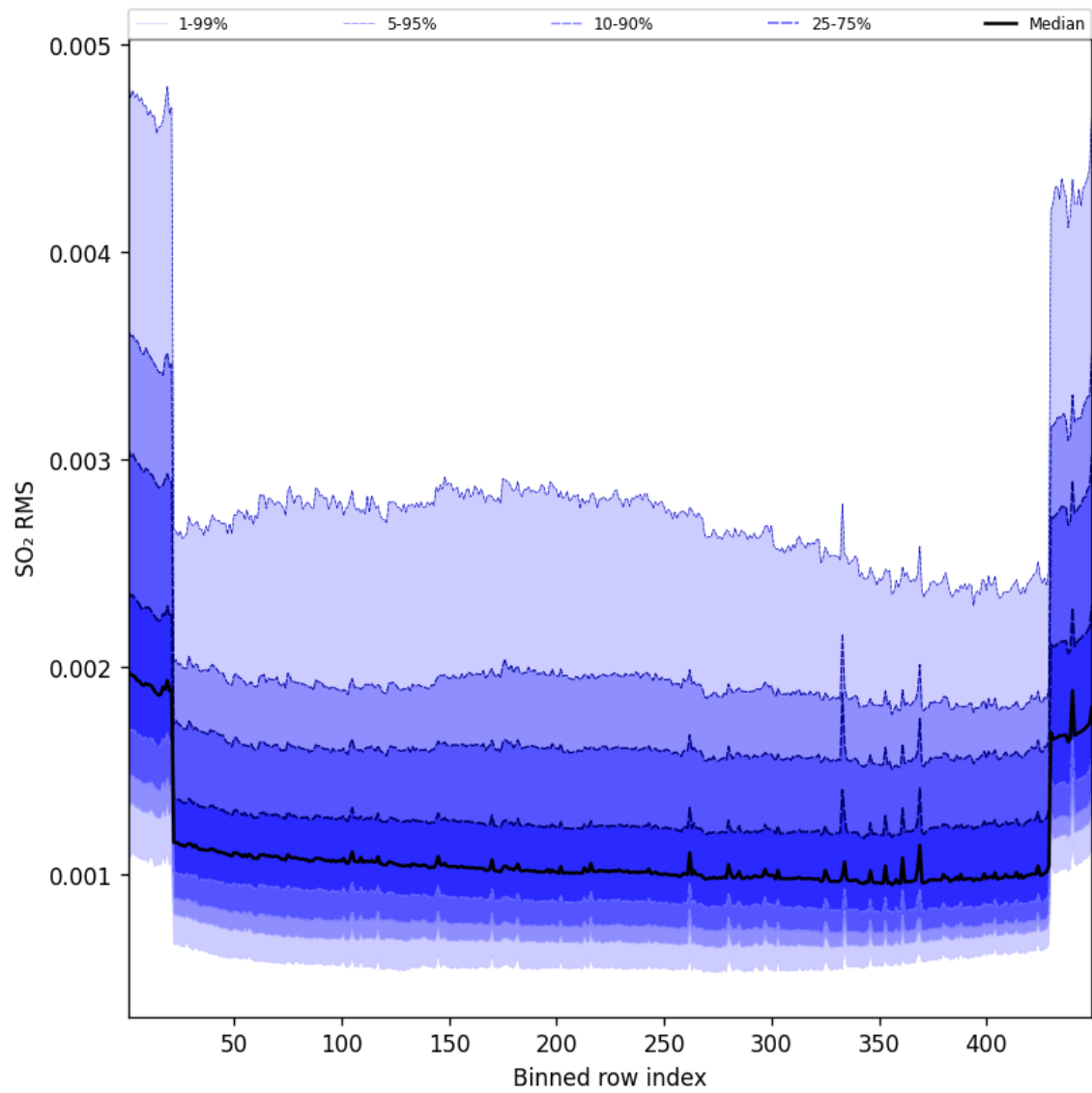


Figure 106: Along track statistics of “SO₂ RMS” for 2025-01-07 to 2025-01-08

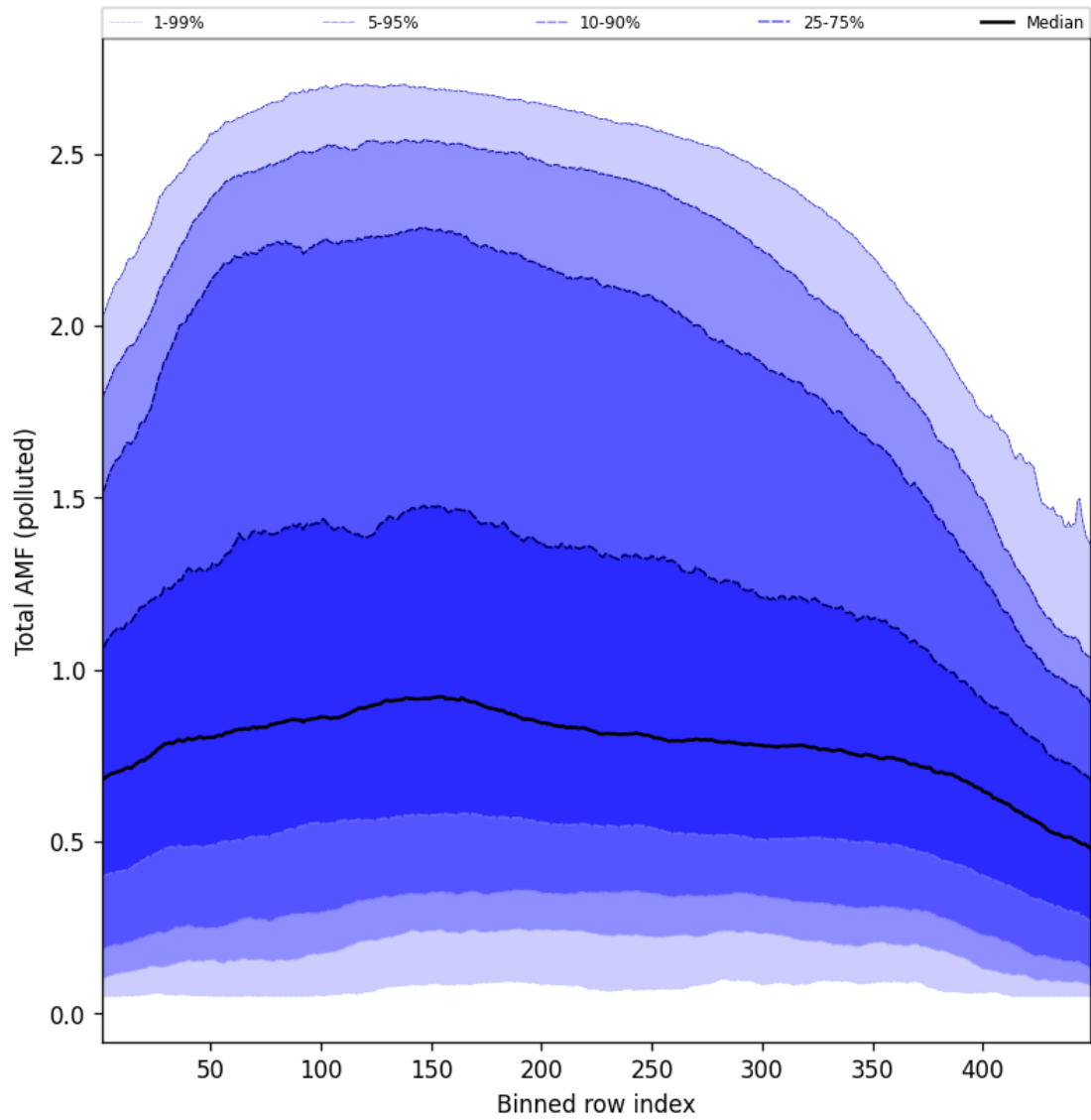


Figure 107: Along track statistics of “Total AMF (polluted)” for 2025-01-07 to 2025-01-08

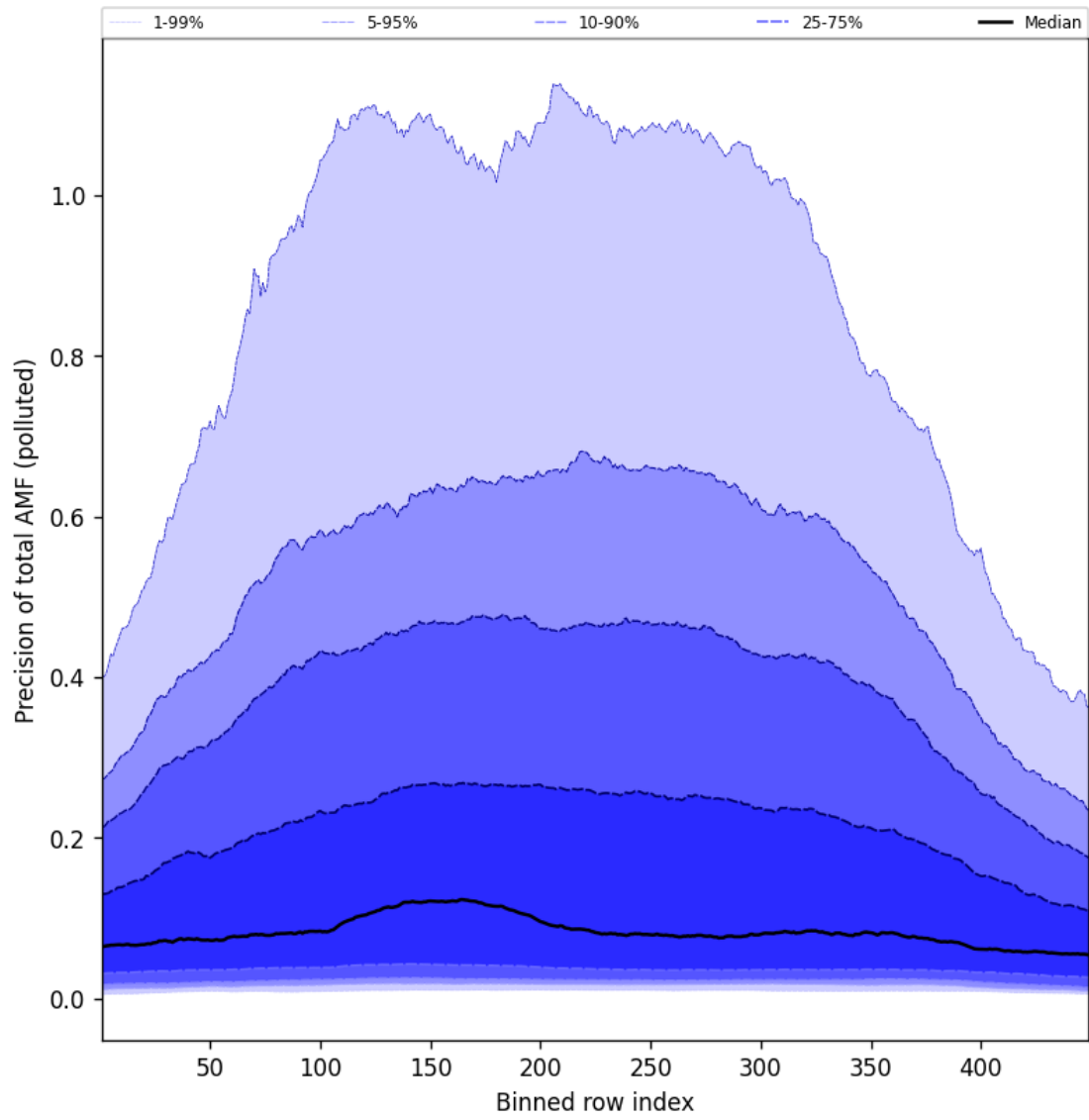


Figure 108: Along track statistics of “Precision of total AMF (polluted)” for 2025-01-07 to 2025-01-08

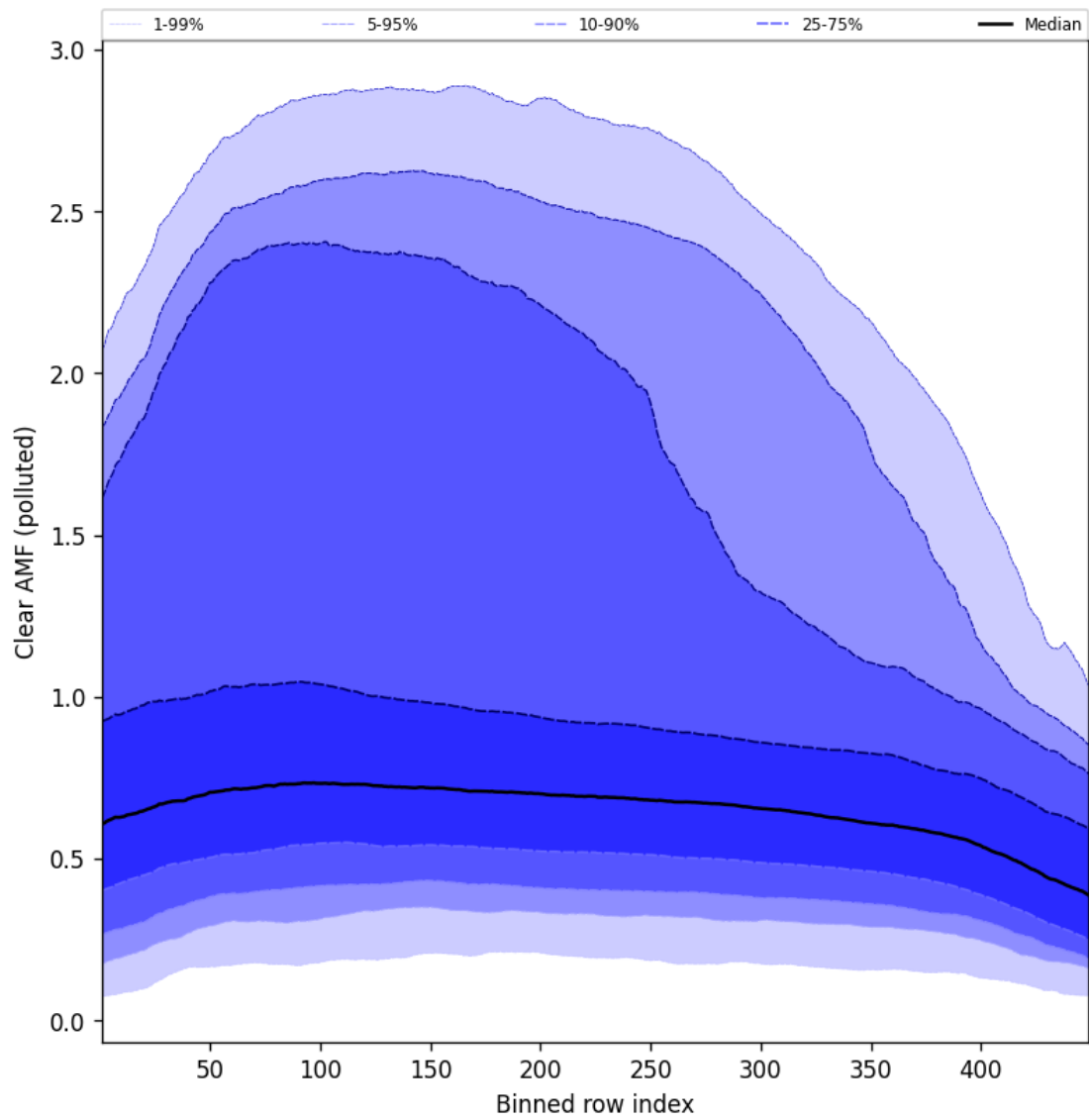


Figure 109: Along track statistics of “Clear AMF (polluted)” for 2025-01-07 to 2025-01-08

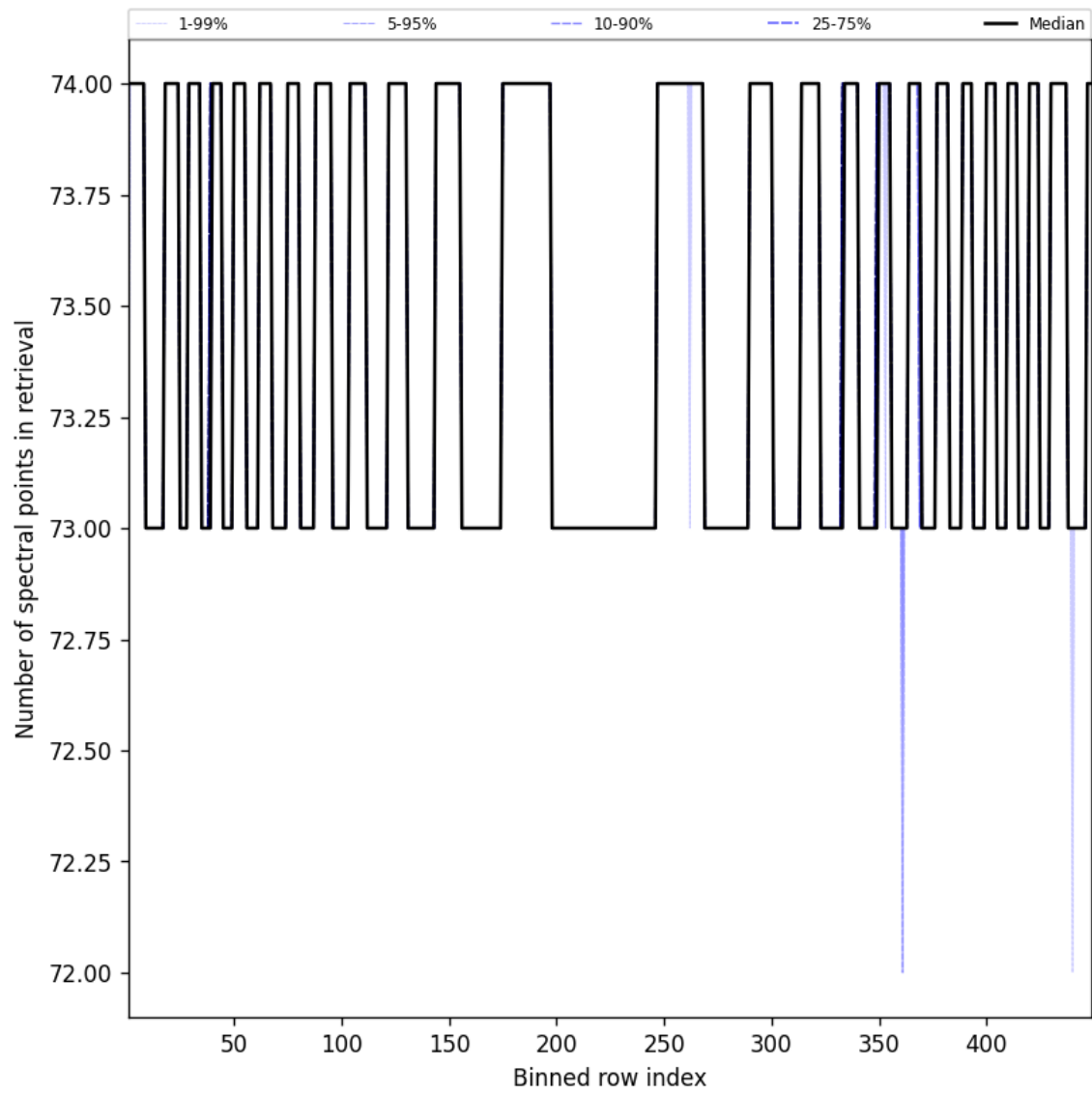


Figure 110: Along track statistics of “Number of spectral points in retrieval” for 2025-01-07 to 2025-01-08

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.

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