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]	0.654 ± 0.397	16080572	0.995	0.760	1.000	0.0	1.000
sulfurdioxide total vertical column [DU]	$(4.915 \pm 142.553) \times 10^{-2}$	16080572	0.294	0.490	1.232×10^{-2}	-146	483
sulfurdioxide total vertical column precision [DU]	0.629 ± 1.018	16080572	0.197	0.407	0.356	4.202×10^{-2}	157
sulfurdioxide slant column density corrected [DU]	$(2.514 \pm 58.575) \times 10^{-2}$	16080572	0.250	0.369	1.016×10^{-2}	-18.4	558
sulfurdioxide slant column density cobra [DU]	$(2.384 \pm 40.471) \times 10^{-2}$	16080572	0.250	0.369	1.016×10^{-2}	-18.4	91.1
sulfurdioxide slant column density cobra precision [DU]	0.302 ± 0.148	16080572	0.213	0.159	0.254	7.786×10^{-2}	23.2
sulfurdioxide slant column density window1 [DU]	0.182 ± 0.739	16080572	0.225	0.754	0.202	-83.0	73.4
sulfurdioxide slant column density window1 precision [DU]	0.302 ± 0.148	16080572	0.213	0.159	0.254	7.786×10^{-2}	23.2
sulfurdioxide slant column density corrected win1 [DU]	$(5.433 \pm 72.880) \times 10^{-2}$	16080572	2.500×10^{-2}	0.735	2.950×10^{-2}	-83.0	73.1
background so2 slant column offset window1 [DU]	-0.127 ± 0.207	16080572	-0.260	0.216	-0.177	-1.18	3.82
sulfurdioxide slant column density window2 [DU]	1.84 ± 9.26	16080572	1.25	11.8	1.59	-991	804
sulfurdioxide slant column density window2 precision [DU]	8.14 ± 2.23	16080572	7.43	2.53	7.81	2.05	652
sulfurdioxide slant column density corrected win2 [DU]	1.14 ± 8.80	16080572	1.25	11.2	1.13	-990	806
background so2 slant column offset window2 [DU]	-0.705 ± 2.811	16080572	1.25	3.59	0.304	-19.1	7.02
sulfurdioxide slant column density window3 [DU]	-9.83 ± 24.34	16080572	-11.8	31.0	-10.1	-1.666×10^3	1.792×10^3
sulfurdioxide slant column density window3 precision [DU]	28.2 ± 13.0	16080572	22.5	9.52	24.7	9.82	1.554×10^3
sulfurdioxide slant column density corrected win3 [DU]	-4.97 ± 23.31	16080572	-5.04	29.4	-5.05	-1.666×10^3	1.792×10^3
background so2 slant column offset window3 [DU]	4.86 ± 6.88	16080572	-0.560	11.1	4.24	-30.2	27.2
sulfurdioxide slant column cobra flag [1]	1.97 ± 0.22	16080572	1.67	0.0	2.00	0.0	2.00
integrated so2 profile apriori [DU]	$(3.822 \pm 10.324) \times 10^{-2}$	16080572	1.423×10^{-2}	1.785×10^{-2}	1.538×10^{-2}	1.707×10^{-4}	3.44
fitted radiance shift [nm]	$(-3.743 \pm 26.010) \times 10^{-4}$	16080572	-5.000×10^{-4}	1.842×10^{-3}	-3.416×10^{-4}	-5.045×10^{-2}	5.569×10^{-2}
fitted radiance squeeze [1]	$(-4.309 \pm 19.907) \times 10^{-5}$	16080572	-1.000×10^{-5}	2.092×10^{-4}	-2.521×10^{-5}	-2.165×10^{-2}	1.747×10^{-2}
fitted root mean square [1]	$(1.324 \pm 0.622) \times 10^{-3}$	16080572	9.250×10^{-4}	6.291×10^{-4}	1.125×10^{-3}	3.092×10^{-4}	9.776×10^{-2}
sulfurdioxide total air mass factor polluted [1]	0.807 ± 0.417	16080572	0.660	0.542	0.760	5.000×10^{-2}	3.07
sulfurdioxide total air mass factor polluted precision [1]	0.105 ± 0.117	16080572	3.500×10^{-2}	0.105	6.020×10^{-2}	2.787×10^{-3}	1.87
sulfurdioxide clear air mass factor polluted [1]	0.692 ± 0.287	16080572	0.580	0.390	0.663	5.425×10^{-2}	2.67
number of spectral points in retrieval [1]	73.4 ± 0.5	16080572	73.0	1.000	73.0	52.0	155

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	0.0	1.000×10^{-2}	6.000×10^{-2}	0.130	0.240	1.000	1.000	1.000	1.000	1.000
sulfurdioxide total vertical column [DU]	−3.03	−1.02	−0.601	−0.394	−0.228	0.262	0.446	0.684	1.19	3.72
sulfurdioxide total vertical column precision [DU]	9.868×10^{-2}	0.139	0.168	0.192	0.225	0.632	0.866	1.18	1.87	5.15
sulfurdioxide slant column density corrected [DU]	−0.902	−0.508	−0.363	−0.269	−0.172	0.197	0.301	0.406	0.578	1.15
sulfurdioxide slant column density cobra [DU]	−0.902	−0.508	−0.363	−0.269	−0.172	0.197	0.301	0.406	0.578	1.15
sulfurdioxide slant column density cobra precision [DU]	0.138	0.165	0.179	0.190	0.204	0.364	0.422	0.475	0.566	0.865
sulfurdioxide slant column density window1 [DU]	−1.91	−0.954	−0.611	−0.397	−0.183	0.571	0.763	0.949	1.24	2.06
sulfurdioxide slant column density window1 precision [DU]	0.138	0.165	0.179	0.190	0.204	0.364	0.422	0.475	0.566	0.865
sulfurdioxide slant column density corrected win1 [DU]	−1.75	−0.981	−0.703	−0.522	−0.332	0.403	0.612	0.822	1.17	2.19
background so2 slant column offset window1 [DU]	−0.379	−0.333	−0.308	−0.290	−0.267	-5.065×10^{-2}	3.172×10^{-2}	0.116	0.249	0.598
sulfurdioxide slant column density window2 [DU]	−19.5	−12.7	−9.43	−6.97	−4.17	7.59	10.7	13.5	17.3	25.3
sulfurdioxide slant column density window2 precision [DU]	4.37	5.27	5.80	6.21	6.70	9.23	10.1	10.9	12.1	14.7
sulfurdioxide slant column density corrected win2 [DU]	−20.1	−13.1	−9.72	−7.23	−4.45	6.71	9.50	12.0	15.4	22.5
background so2 slant column offset window2 [DU]	−9.01	−6.43	−5.05	−3.78	−2.25	1.34	1.62	1.87	2.23	3.36
sulfurdioxide slant column density window3 [DU]	−69.2	−49.2	−39.8	−32.9	−25.3	5.63	13.7	20.9	30.5	49.4
sulfurdioxide slant column density window3 precision [DU]	14.2	16.7	18.4	19.7	21.2	30.7	35.3	41.1	52.7	83.8
sulfurdioxide slant column density corrected win3 [DU]	−62.9	−43.0	−33.7	−26.9	−19.6	9.77	17.3	24.1	33.3	51.7
background so2 slant column offset window3 [DU]	−8.11	−4.82	−3.31	−2.12	−0.734	10.4	12.6	14.2	16.2	18.9
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]	1.283×10^{-3}	2.291×10^{-3}	3.433×10^{-3}	5.656×10^{-3}	8.738×10^{-3}	2.659×10^{-2}	4.027×10^{-2}	6.745×10^{-2}	0.133	0.483
fitted radiance shift [nm]	-8.175×10^{-3}	-4.240×10^{-3}	-2.863×10^{-3}	-2.054×10^{-3}	-1.328×10^{-3}	5.144×10^{-4}	1.204×10^{-3}	2.062×10^{-3}	3.545×10^{-3}	7.695×10^{-3}
fitted radiance squeeze [1]	-6.844×10^{-4}	-3.809×10^{-4}	-2.675×10^{-4}	-1.996×10^{-4}	-1.351×10^{-4}	7.410×10^{-5}	1.232×10^{-4}	1.681×10^{-4}	2.309×10^{-4}	3.772×10^{-4}
fitted root mean square [1]	5.924×10^{-4}	7.299×10^{-4}	8.022×10^{-4}	8.576×10^{-4}	9.267×10^{-4}	1.556×10^{-3}	1.824×10^{-3}	2.082×10^{-3}	2.500×10^{-3}	3.610×10^{-3}
sulfurdioxide total air mass factor polluted [1]	6.281×10^{-2}	0.201	0.306	0.394	0.506	1.05	1.22	1.38	1.59	1.96
sulfurdioxide total air mass factor polluted precision [1]	8.271×10^{-3}	1.575×10^{-2}	2.144×10^{-2}	2.702×10^{-2}	3.420×10^{-2}	0.139	0.187	0.237	0.321	0.555
sulfurdioxide clear air mass factor polluted [1]	0.169	0.262	0.339	0.407	0.491	0.881	0.974	1.06	1.18	1.48
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]	0.631 ± 0.396	8739871	0.770	1.000	0.0	1.000	0.230	1.000
sulfurdioxide total vertical column [DU]	$(7.033 \pm 182.092) \times 10^{-2}$	8739871	0.557	1.378×10^{-2}	-146	370	-0.256	0.301
sulfurdioxide total vertical column precision [DU]	0.798 ± 1.302	8739871	0.562	0.415	4.652×10^{-2}	50.4	0.237	0.799
sulfurdioxide slant column density corrected [DU]	$(3.215 \pm 70.210) \times 10^{-2}$	8739871	0.386	1.081×10^{-2}	-10.9	495	-0.179	0.207
sulfurdioxide slant column density cobra [DU]	$(2.991 \pm 45.168) \times 10^{-2}$	8739871	0.386	1.081×10^{-2}	-10.9	59.5	-0.179	0.207
sulfurdioxide slant column density cobra precision [DU]	0.322 ± 0.165	8739871	0.189	0.268	8.745×10^{-2}	8.55	0.207	0.396
sulfurdioxide slant column density window1 [DU]	0.176 ± 0.810	8739871	0.789	0.201	-69.3	61.5	-0.203	0.586
sulfurdioxide slant column density window1 precision [DU]	0.322 ± 0.165	8739871	0.189	0.268	8.745×10^{-2}	8.55	0.207	0.396
sulfurdioxide slant column density corrected win1 [DU]	$(6.504 \pm 80.161) \times 10^{-2}$	8739871	0.773	2.868×10^{-2}	-69.3	61.4	-0.348	0.424
background so2 slant column offset window1 [DU]	-0.111 ± 0.244	8739871	0.240	-0.175	-0.984	3.82	-0.272	-3.176×10^{-2}
sulfurdioxide slant column density window2 [DU]	2.60 ± 9.32	8739871	12.0	2.31	-782	494	-3.54	8.45
sulfurdioxide slant column density window2 precision [DU]	8.05 ± 2.09	8739871	2.44	7.73	2.18	652	6.65	9.09
sulfurdioxide slant column density corrected win2 [DU]	1.16 ± 8.66	8739871	11.1	1.17	-791	495	-4.37	6.70
background so2 slant column offset window2 [DU]	-1.44 ± 3.30	8739871	5.36	-0.490	-19.1	7.02	-3.99	1.37
sulfurdioxide slant column density window3 [DU]	-12.1 ± 23.5	8739871	29.9	-12.5	-207	1.792×10^{3}	-27.2	2.76
sulfurdioxide slant column density window3 precision [DU]	27.3 ± 12.4	8739871	8.29	24.0	9.82	1.554×10^{3}	20.8	29.1
sulfurdioxide slant column density corrected win3 [DU]	-4.74 ± 22.44	8739871	28.3	-4.79	-203	1.792×10^{3}	-18.9	9.42
background so2 slant column offset window3 [DU]	7.36 ± 6.73	8739871	11.5	8.23	-28.3	27.2	1.29	12.8
sulfurdioxide slant column cobra flag [1]	1.97 ± 0.23	8739871	0.0	2.00	0.0	2.00	2.00	2.00
integrated so2 profile apriori [DU]	$(5.346 \pm 13.508) \times 10^{-2}$	8739871	3.377×10^{-2}	1.600×10^{-2}	1.707×10^{-4}	3.44	6.190×10^{-3}	3.996×10^{-2}
fitted radiance shift [nm]	$(-2.316 \pm 24.945) \times 10^{-4}$	8739871	1.673×10^{-3}	-2.115×10^{-4}	-4.492×10^{-2}	4.312×10^{-2}	-1.093×10^{-3}	5.795×10^{-4}
fitted radiance squeeze [1]	$(-6.760 \pm 21.935) \times 10^{-5}$	8739871	2.250×10^{-4}	-3.850×10^{-5}	-1.971×10^{-2}	1.119×10^{-2}	-1.609×10^{-4}	6.418×10^{-5}
fitted root mean square [1]	$(1.403 \pm 0.705) \times 10^{-3}$	8739871	7.379×10^{-4}	1.167×10^{-3}	3.301×10^{-4}	9.776×10^{-2}	9.376×10^{-4}	1.676×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.759 ± 0.433	8739871	0.607	0.703	5.000×10^{-2}	3.07	0.423	1.03
sulfurdioxide total air mass factor polluted precision [1]	0.104 ± 0.135	8739871	9.906×10^{-2}	5.411×10^{-2}	2.787×10^{-3}	1.87	2.830×10^{-2}	0.127
sulfurdioxide clear air mass factor polluted [1]	0.645 ± 0.312	8739871	0.467	0.597	5.425×10^{-2}	2.67	0.398	0.865
number of spectral points in retrieval [1]	73.5 ± 0.5	8739871	1.000	73.0	52.0	155	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]	0.681 ± 0.395	7340701	0.730	1.000	0.0	1.000	0.270	1.000
sulfurdioxide total vertical column [DU]	$(2.392 \pm 70.901) \times 10^{-2}$	7340701	0.430	1.086×10^{-2}	-58.1	483	-0.202	0.228
sulfurdioxide total vertical column precision [DU]	0.427 ± 0.425	7340701	0.290	0.312	4.202×10^{-2}	157	0.215	0.505
sulfurdioxide slant column density corrected [DU]	$(1.679 \pm 40.567) \times 10^{-2}$	7340701	0.351	9.444×10^{-3}	-18.4	558	-0.165	0.186
sulfurdioxide slant column density cobra [DU]	$(1.660 \pm 34.029) \times 10^{-2}$	7340701	0.351	9.444×10^{-3}	-18.4	91.1	-0.165	0.186
sulfurdioxide slant column density cobra precision [DU]	0.279 ± 0.120	7340701	0.126	0.243	7.786×10^{-2}	23.2	0.202	0.328
sulfurdioxide slant column density window1 [DU]	0.189 ± 0.644	7340701	0.716	0.204	-83.0	73.4	-0.161	0.555
sulfurdioxide slant column density window1 precision [DU]	0.279 ± 0.120	7340701	0.126	0.243	7.786×10^{-2}	23.2	0.202	0.328
sulfurdioxide slant column density corrected win1 [DU]	$(4.159 \pm 63.102) \times 10^{-2}$	7340701	0.695	3.038×10^{-2}	-83.0	73.1	-0.314	0.381
background so2 slant column offset window1 [DU]	-0.147 ± 0.149	7340701	0.188	-0.179	-1.18	1.50	-0.260	-7.230×10^{-2}
sulfurdioxide slant column density window2 [DU]	0.938 ± 9.112	7340701	11.4	0.772	-991	804	-4.86	6.54
sulfurdioxide slant column density window2 precision [DU]	8.26 ± 2.38	7340701	2.64	7.91	2.05	540	6.75	9.40
sulfurdioxide slant column density corrected win2 [DU]	1.11 ± 8.97	7340701	11.3	1.09	-990	806	-4.54	6.72
background so2 slant column offset window2 [DU]	0.172 ± 1.720	7340701	1.96	0.613	-10.9	5.27	-0.649	1.31
sulfurdioxide slant column density window3 [DU]	-7.12 ± 25.04	7340701	31.7	-7.13	-1.666×10^{3}	400	-22.8	8.87
sulfurdioxide slant column density window3 precision [DU]	29.4 ± 13.6	7340701	10.7	25.6	9.91	349	21.7	32.4
sulfurdioxide slant column density corrected win3 [DU]	-5.24 ± 24.30	7340701	30.8	-5.39	-1.666×10^{3}	397	-20.6	10.2
background so2 slant column offset window3 [DU]	1.88 ± 5.79	7340701	8.87	0.971	-30.2	21.4	-2.42	6.45
sulfurdioxide slant column cobra flag [1]	1.98 ± 0.20	7340701	0.0	2.00	0.0	2.00	2.00	2.00
integrated so2 profile apriori [DU]	$(2.007 \pm 3.193) \times 10^{-2}$	7340701	1.108×10^{-2}	1.504×10^{-2}	7.668×10^{-4}	1.34	1.065×10^{-2}	2.173×10^{-2}
fitted radiance shift [nm]	$(-5.443 \pm 27.127) \times 10^{-4}$	7340701	2.012×10^{-3}	-5.231×10^{-4}	-5.045×10^{-2}	5.569×10^{-2}	-1.599×10^{-3}	4.128×10^{-4}
fitted radiance squeeze [1]	$(-1.392 \pm 16.720) \times 10^{-5}$	7340701	1.945×10^{-4}	-1.110×10^{-5}	-2.165×10^{-2}	1.747×10^{-2}	-1.094×10^{-4}	8.508×10^{-5}
fitted root mean square [1]	$(1.229 \pm 0.489) \times 10^{-3}$	7340701	5.009×10^{-4}	1.090×10^{-3}	3.092×10^{-4}	5.830×10^{-2}	9.149×10^{-4}	1.416×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.864 ± 0.389	7340701	0.468	0.808	5.000×10^{-2}	2.70	0.597	1.07
sulfurdioxide total air mass factor polluted precision [1]	0.107 ± 0.093	7340701	0.111	6.838×10^{-2}	5.399×10^{-3}	1.44	3.948×10^{-2}	0.150
sulfurdioxide clear air mass factor polluted [1]	0.748 ± 0.241	7340701	0.318	0.707	0.167	2.43	0.578	0.896
number of spectral points in retrieval [1]	73.4 ± 0.5	7340701	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]	0.701 ± 0.390	11050741	0.700	1.000	0.0	1.000	0.300	1.000
sulfurdioxide total vertical column [DU]	$(2.503 \pm 92.818) \times 10^{-2}$	11050741	0.442	9.371×10^{-3}	-59.0	483	-0.210	0.233
sulfurdioxide total vertical column precision [DU]	0.488 ± 0.644	11050741	0.315	0.312	5.100×10^{-2}	35.6	0.217	0.531
sulfurdioxide slant column density corrected [DU]	$(1.552 \pm 42.701) \times 10^{-2}$	11050741	0.351	7.868×10^{-3}	-18.4	558	-0.166	0.185
sulfurdioxide slant column density cobra [DU]	$(1.527 \pm 34.566) \times 10^{-2}$	11050741	0.351	7.868×10^{-3}	-18.4	91.1	-0.166	0.185
sulfurdioxide slant column density cobra precision [DU]	0.284 ± 0.131	11050741	0.134	0.241	7.786×10^{-2}	20.1	0.200	0.334
sulfurdioxide slant column density window1 [DU]	0.188 ± 0.660	11050741	0.717	0.204	-83.0	56.8	-0.161	0.556
sulfurdioxide slant column density window1 precision [DU]	0.284 ± 0.131	11050741	0.134	0.241	7.786×10^{-2}	20.1	0.200	0.334
sulfurdioxide slant column density corrected win1 [DU]	$(4.015 \pm 65.034) \times 10^{-2}$	11050741	0.701	2.333×10^{-2}	-83.0	56.6	-0.323	0.378
background so2 slant column offset window1 [DU]	-0.148 ± 0.172	11050741	0.197	-0.186	-0.805	3.15	-0.269	-7.263×10^{-2}
sulfurdioxide slant column density window2 [DU]	1.26 ± 8.97	11050741	11.4	1.05	-806	666	-4.56	6.83
sulfurdioxide slant column density window2 precision [DU]	8.01 ± 2.12	11050741	2.46	7.67	2.05	469	6.61	9.07
sulfurdioxide slant column density corrected win2 [DU]	1.09 ± 8.66	11050741	11.0	1.08	-805	668	-4.43	6.60
background so2 slant column offset window2 [DU]	-0.167 ± 2.345	11050741	2.61	0.571	-19.1	7.02	-1.20	1.41
sulfurdioxide slant column density window3 [DU]	-6.64 ± 24.37	11050741	31.2	-6.88	-860	1.792×10^3	-22.2	8.97
sulfurdioxide slant column density window3 precision [DU]	27.4 ± 11.8	11050741	9.14	24.2	9.92	1.554×10^3	20.9	30.0
sulfurdioxide slant column density corrected win3 [DU]	-2.95 ± 23.27	11050741	29.6	-3.19	-863	1.792×10^3	-17.8	11.8
background so2 slant column offset window3 [DU]	3.69 ± 6.35	11050741	9.71	2.82	-30.2	27.2	-1.14	8.57
sulfurdioxide slant column cobra flag [1]	1.98 ± 0.21	11050741	0.0	2.00	0.0	2.00	2.00	2.00
integrated so2 profile apriori [DU]	$(2.662 \pm 6.285) \times 10^{-2}$	11050741	1.252×10^{-2}	1.531×10^{-2}	1.707×10^{-4}	2.24	1.031×10^{-2}	2.283×10^{-2}
fitted radiance shift [nm]	$(-3.739 \pm 23.650) \times 10^{-4}$	11050741	1.766×10^{-3}	-3.256×10^{-4}	-5.045×10^{-2}	4.301×10^{-2}	-1.283×10^{-3}	4.827×10^{-4}
fitted radiance squeeze [1]	$(-2.200 \pm 17.471) \times 10^{-5}$	11050741	1.946×10^{-4}	-1.361×10^{-5}	-1.971×10^{-2}	1.747×10^{-2}	-1.134×10^{-4}	8.129×10^{-5}
fitted root mean square [1]	$(1.246 \pm 0.535) \times 10^{-3}$	11050741	5.277×10^{-4}	1.077×10^{-3}	3.301×10^{-4}	9.776×10^{-2}	9.077×10^{-4}	1.435×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.833 ± 0.370	11050741	0.469	0.805	5.000×10^{-2}	2.58	0.579	1.05
sulfurdioxide total air mass factor polluted precision [1]	0.100 ± 0.092	11050741	9.523×10^{-2}	6.279×10^{-2}	2.787×10^{-3}	1.54	3.864×10^{-2}	0.134
sulfurdioxide clear air mass factor polluted [1]	0.724 ± 0.251	11050741	0.335	0.701	6.140×10^{-2}	2.43	0.554	0.889
number of spectral points in retrieval [1]	73.4 ± 0.5	11050741	1.000	73.0	52.0	155	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]	0.588 ± 0.403	3503440	0.810	0.490	0.0	1.000	0.190	1.000
sulfurdioxide total vertical column [DU]	$(8.320 \pm 204.094) \times 10^{-2}$	3503440	0.595	1.636×10^{-2}	-146	345	-0.268	0.327
sulfurdioxide total vertical column precision [DU]	0.889 ± 1.502	3503440	0.594	0.463	4.202×10^{-2}	157	0.253	0.847
sulfurdioxide slant column density corrected [DU]	$(3.172 \pm 66.168) \times 10^{-2}$	3503440	0.388	1.310×10^{-2}	-16.4	495	-0.178	0.210
sulfurdioxide slant column density cobra [DU]	$(3.033 \pm 43.024) \times 10^{-2}$	3503440	0.388	1.310×10^{-2}	-16.4	59.5	-0.178	0.210
sulfurdioxide slant column density cobra precision [DU]	0.317 ± 0.156	3503440	0.177	0.269	8.822×10^{-2}	23.2	0.211	0.389
sulfurdioxide slant column density window1 [DU]	0.191 ± 0.793	3503440	0.786	0.215	-33.2	73.4	-0.188	0.599
sulfurdioxide slant column density window1 precision [DU]	0.317 ± 0.156	3503440	0.177	0.269	8.822×10^{-2}	23.2	0.211	0.389
sulfurdioxide slant column density corrected win1 [DU]	$(6.788 \pm 78.059) \times 10^{-2}$	3503440	0.763	3.934×10^{-2}	-33.2	73.1	-0.335	0.428
background so2 slant column offset window1 [DU]	-0.123 ± 0.225	3503440	0.222	-0.183	-1.18	3.39	-0.272	-4.950×10^{-2}
sulfurdioxide slant column density window2 [DU]	2.32 ± 9.56	3503440	12.1	2.10	-782	804	-3.82	8.25
sulfurdioxide slant column density window2 precision [DU]	8.37 ± 2.52	3503440	2.61	8.05	2.18	652	6.85	9.46
sulfurdioxide slant column density corrected win2 [DU]	1.14 ± 9.03	3503440	11.3	1.15	-791	806	-4.52	6.80
background so2 slant column offset window2 [DU]	-1.18 ± 3.07	3503440	4.74	-2.301×10^{-2}	-18.6	6.17	-3.47	1.27
sulfurdioxide slant column density window3 [DU]	-16.4 ± 23.1	3503440	29.0	-16.2	-465	852	-30.8	-1.78
sulfurdioxide slant column density window3 precision [DU]	30.8 ± 16.1	3503440	11.2	26.1	9.82	236	22.0	33.2
sulfurdioxide slant column density corrected win3 [DU]	-10.2 ± 23.2	3503440	28.9	-9.69	-466	853	-24.4	4.52
background so2 slant column offset window3 [DU]	6.19 ± 7.22	3503440	12.4	6.79	-30.2	27.2	-0.145	12.2
sulfurdioxide slant column cobra flag [1]	1.99 ± 0.16	3503440	0.0	2.00	0.0	2.00	2.00	2.00
integrated so2 profile apriori [DU]	$(6.669 \pm 15.605) \times 10^{-2}$	3503440	5.527×10^{-2}	1.989×10^{-2}	3.778×10^{-4}	3.44	5.120×10^{-3}	6.039×10^{-2}
fitted radiance shift [nm]	$(-3.234 \pm 32.671) \times 10^{-4}$	3503440	2.079×10^{-3}	-3.345×10^{-4}	-4.492×10^{-2}	5.569×10^{-2}	-1.400×10^{-3}	6.788×10^{-4}
fitted radiance squeeze [1]	$(-6.534 \pm 21.389) \times 10^{-5}$	3503440	2.253×10^{-4}	-4.168×10^{-5}	-2.165×10^{-2}	1.470×10^{-2}	-1.625×10^{-4}	6.280×10^{-5}
fitted root mean square [1]	$(1.381 \pm 0.675) \times 10^{-3}$	3503440	6.650×10^{-4}	1.181×10^{-3}	3.272×10^{-4}	4.271×10^{-2}	9.549×10^{-4}	1.620×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.758 ± 0.512	3503440	0.664	0.604	5.000×10^{-2}	3.07	0.392	1.06
sulfurdioxide total air mass factor polluted precision [1]	0.123 ± 0.164	3503440	0.140	5.537×10^{-2}	3.058×10^{-3}	1.87	2.415×10^{-2}	0.165
sulfurdioxide clear air mass factor polluted [1]	0.618 ± 0.328	3503440	0.445	0.535	5.426×10^{-2}	2.67	0.378	0.823
number of spectral points in retrieval [1]	73.4 ± 0.5	3503440	1.000	73.0	52.0	74.0	73.0	74.0

3 Granule outlines

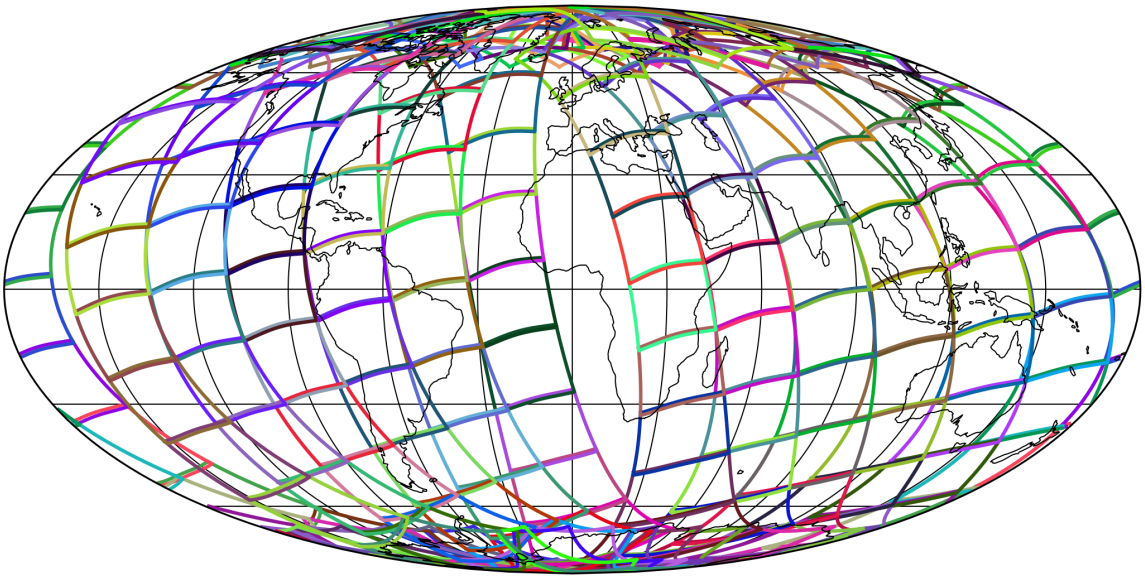

Figure 1: Outline of the granules.

4 Input data monitoring

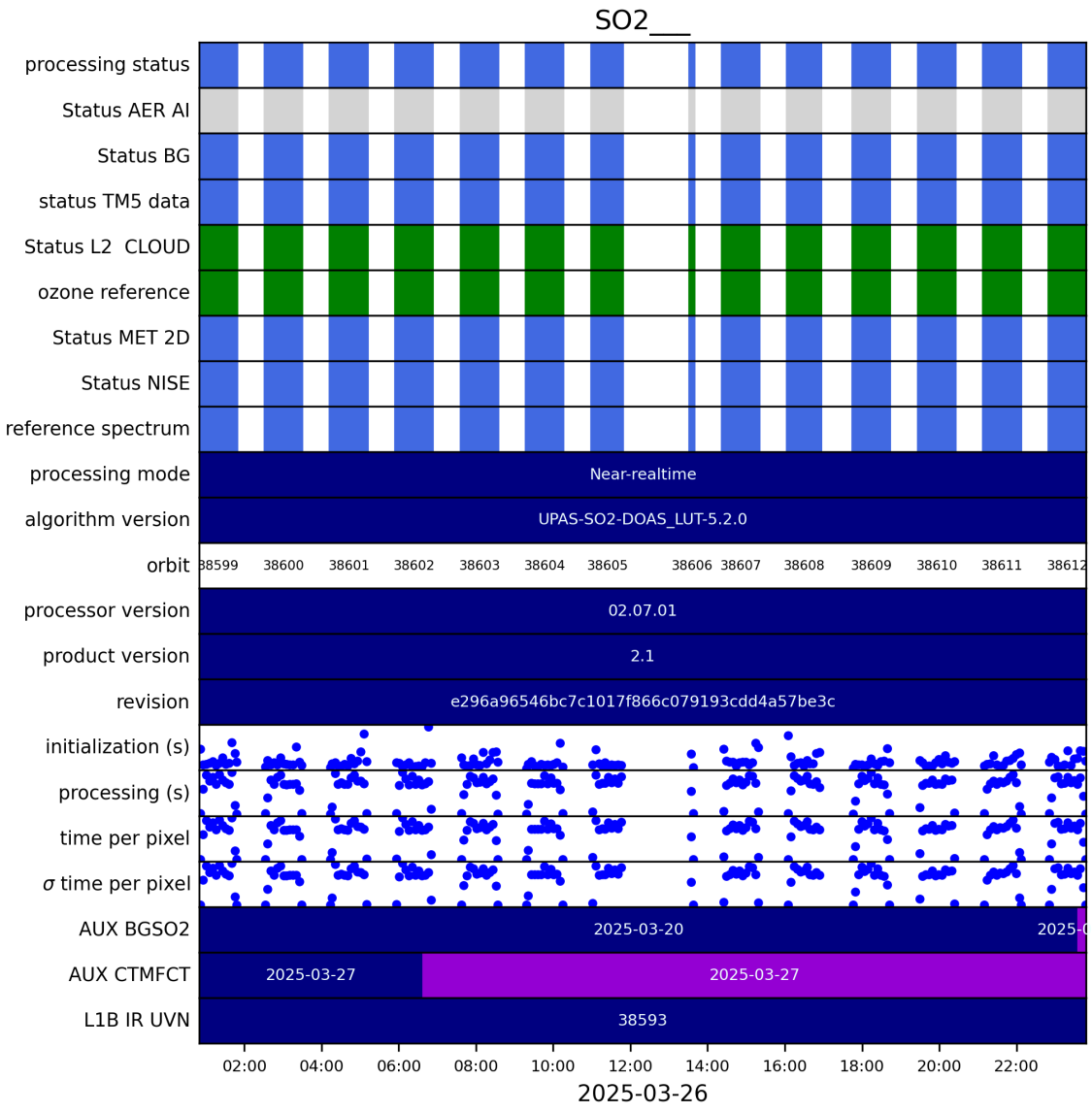

Figure 2: Input data per granule

5 Warnings and errors

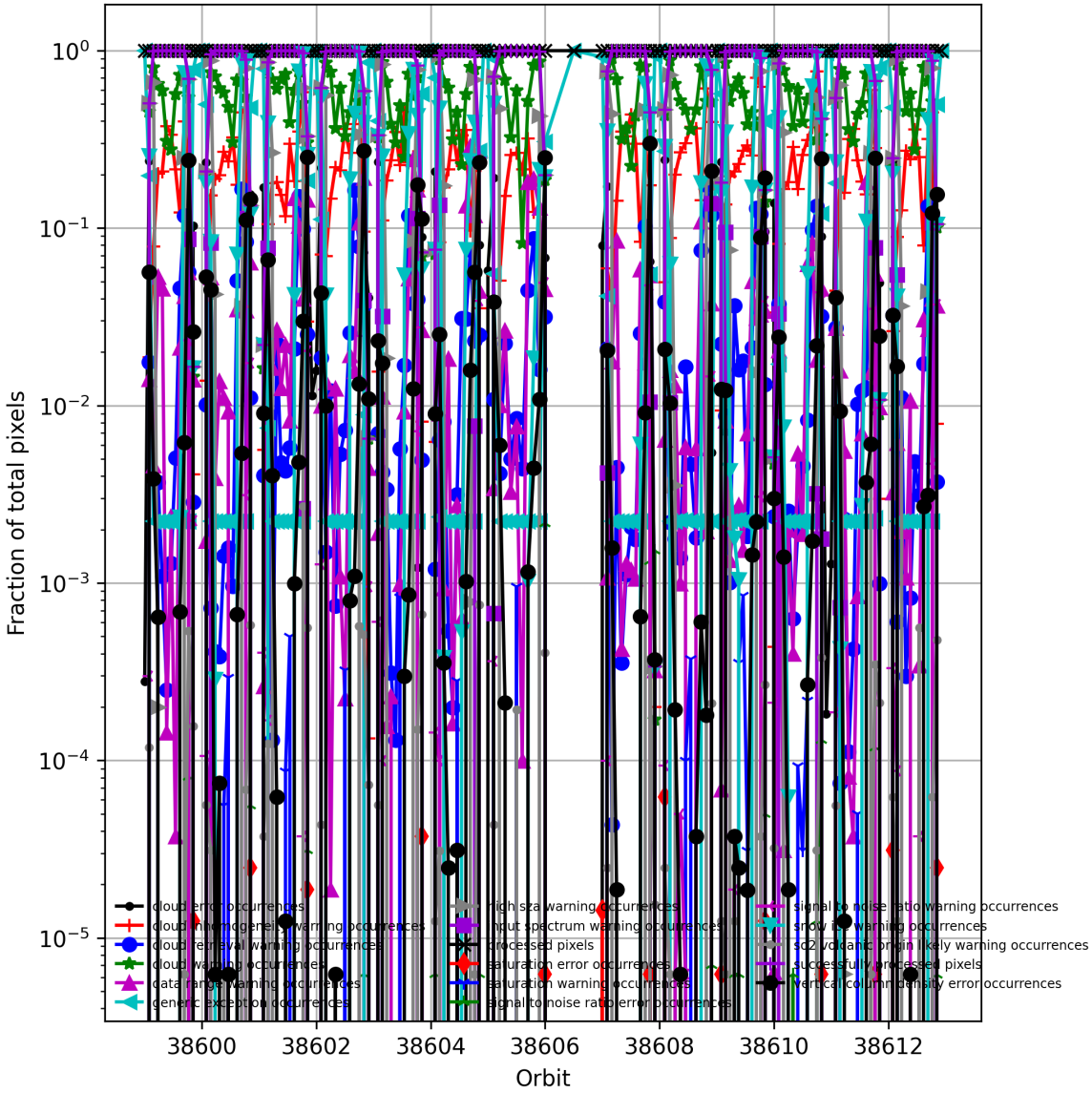

Figure 3: Fraction of pixels with specific warnings and errors during processing

6 World maps

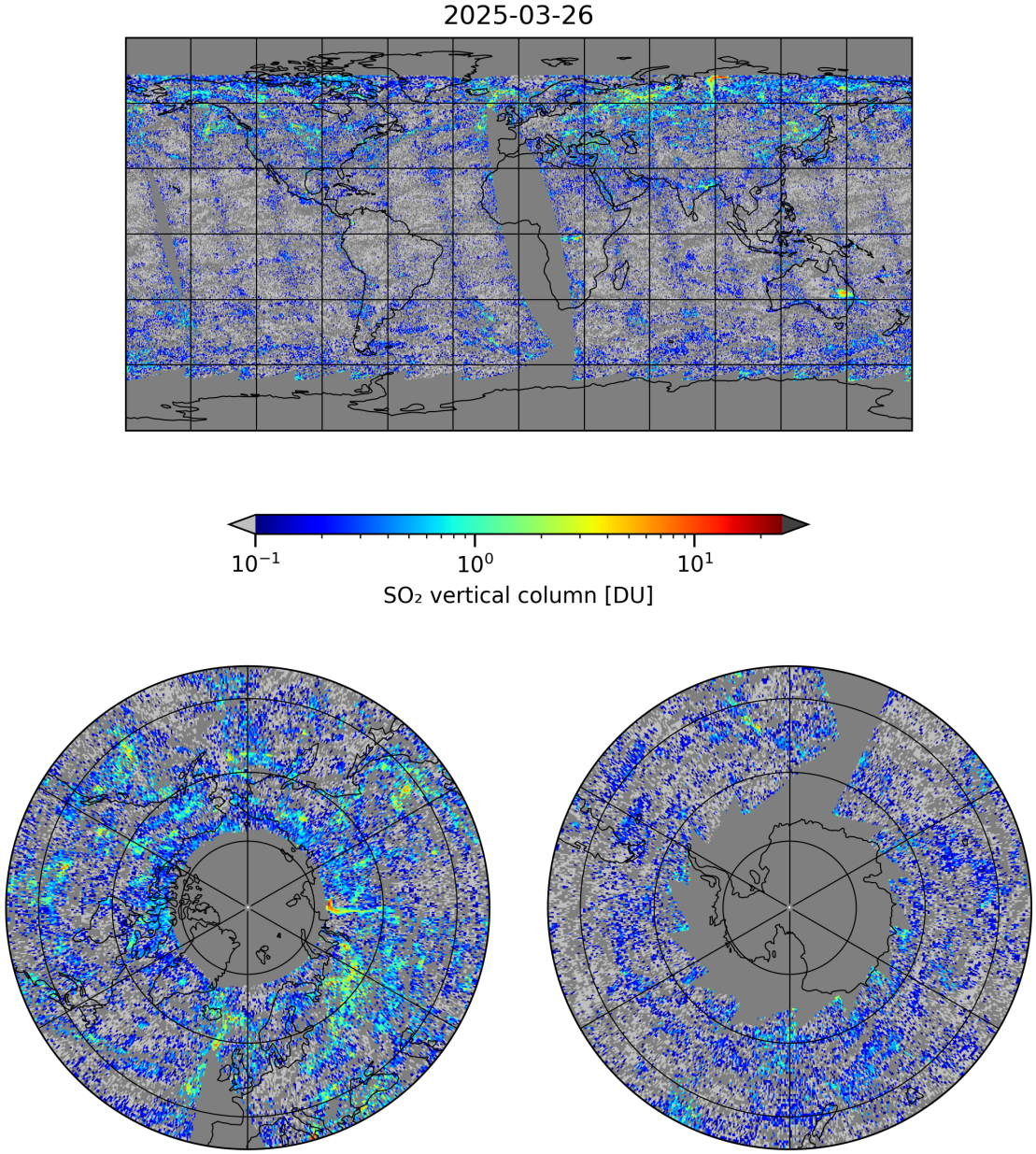

Figure 4: Map of "SO_2 vertical column" for 2025-03-26 to 2025-03-26

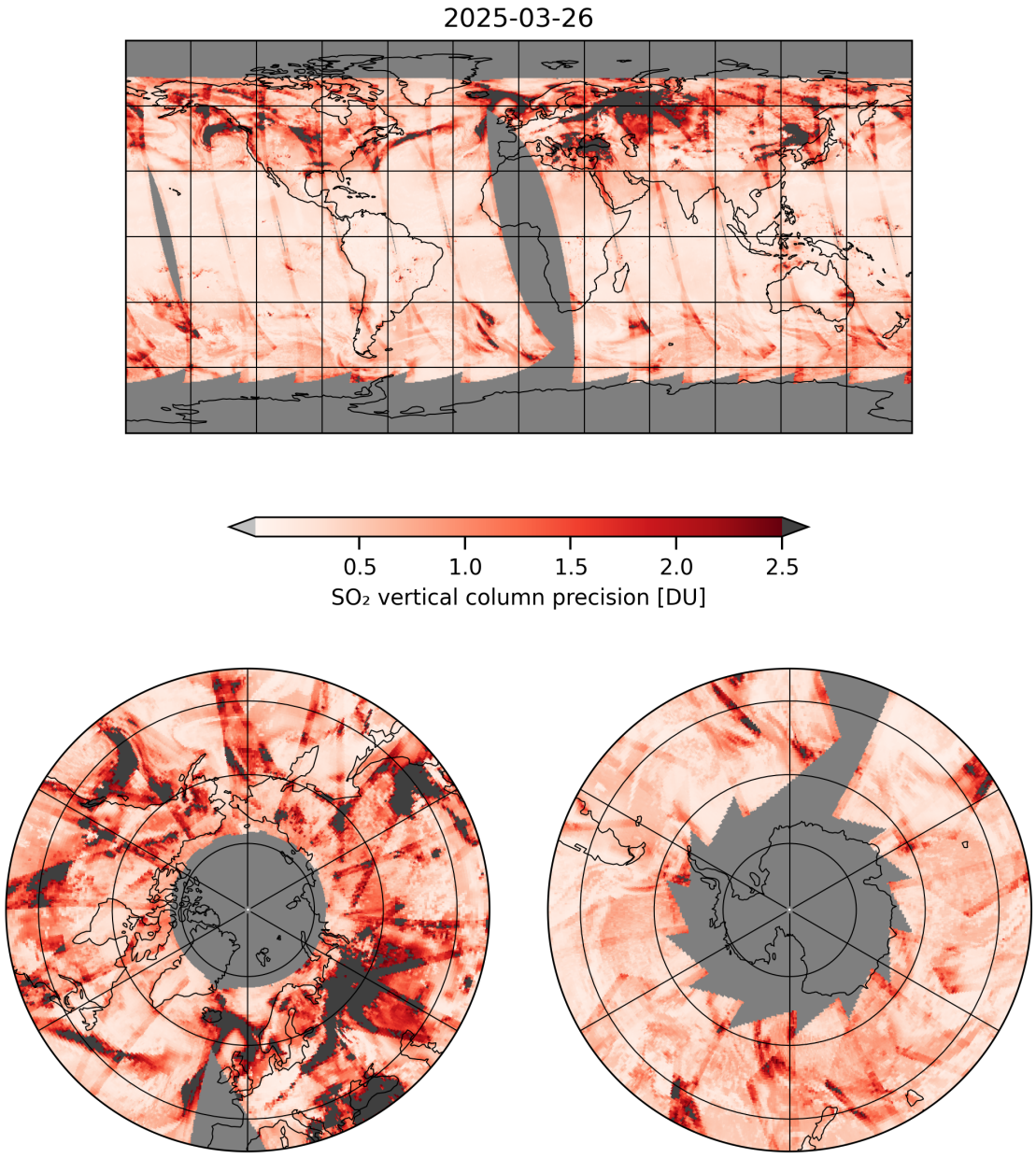

Figure 5: Map of "SO_2 vertical column precision" for 2025-03-26 to 2025-03-26

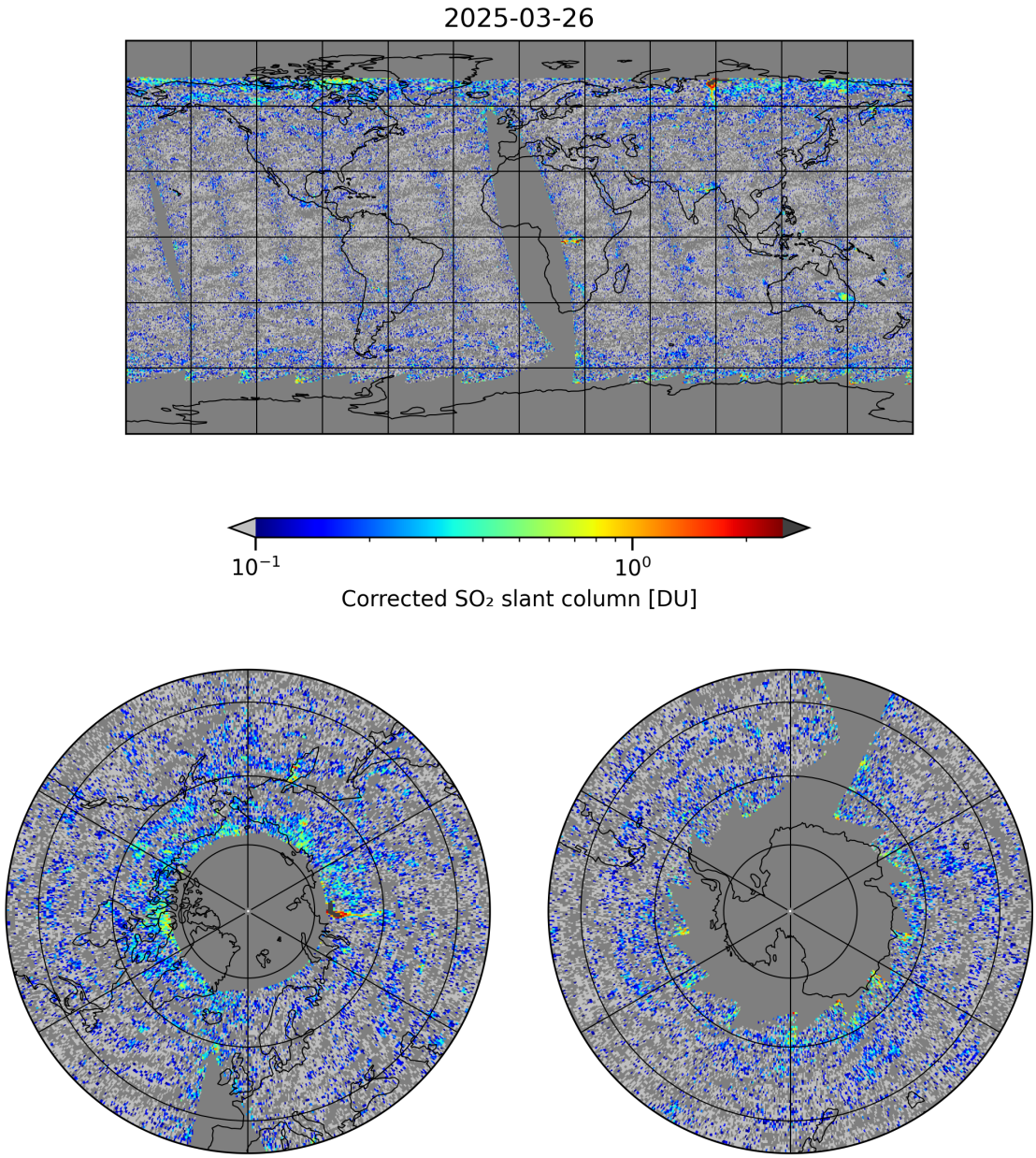

Figure 6: Map of “Corrected SO_2 slant column” for 2025-03-26 to 2025-03-26

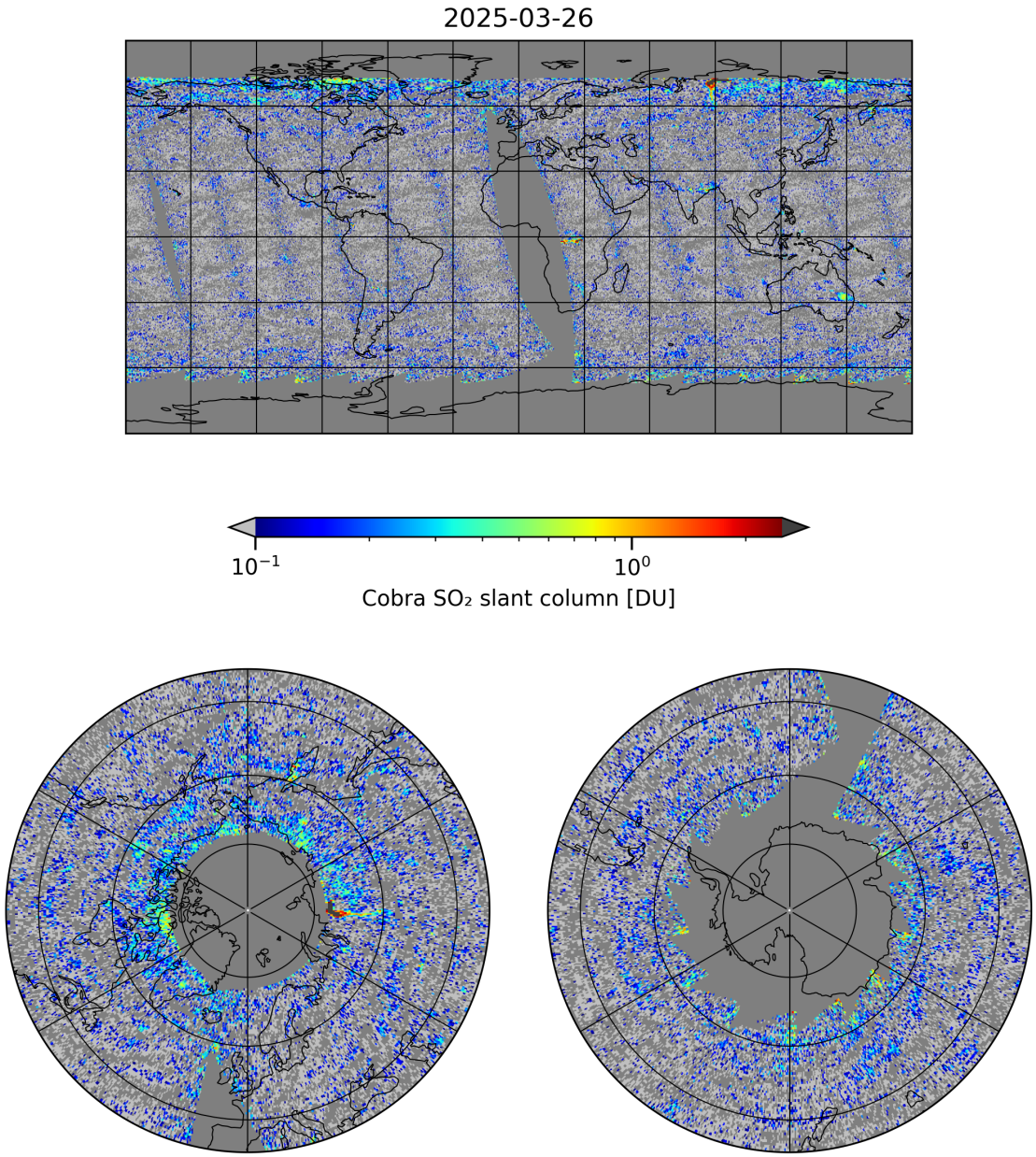

Figure 7: Map of "Cobra SO_2 slant column" for 2025-03-26 to 2025-03-26

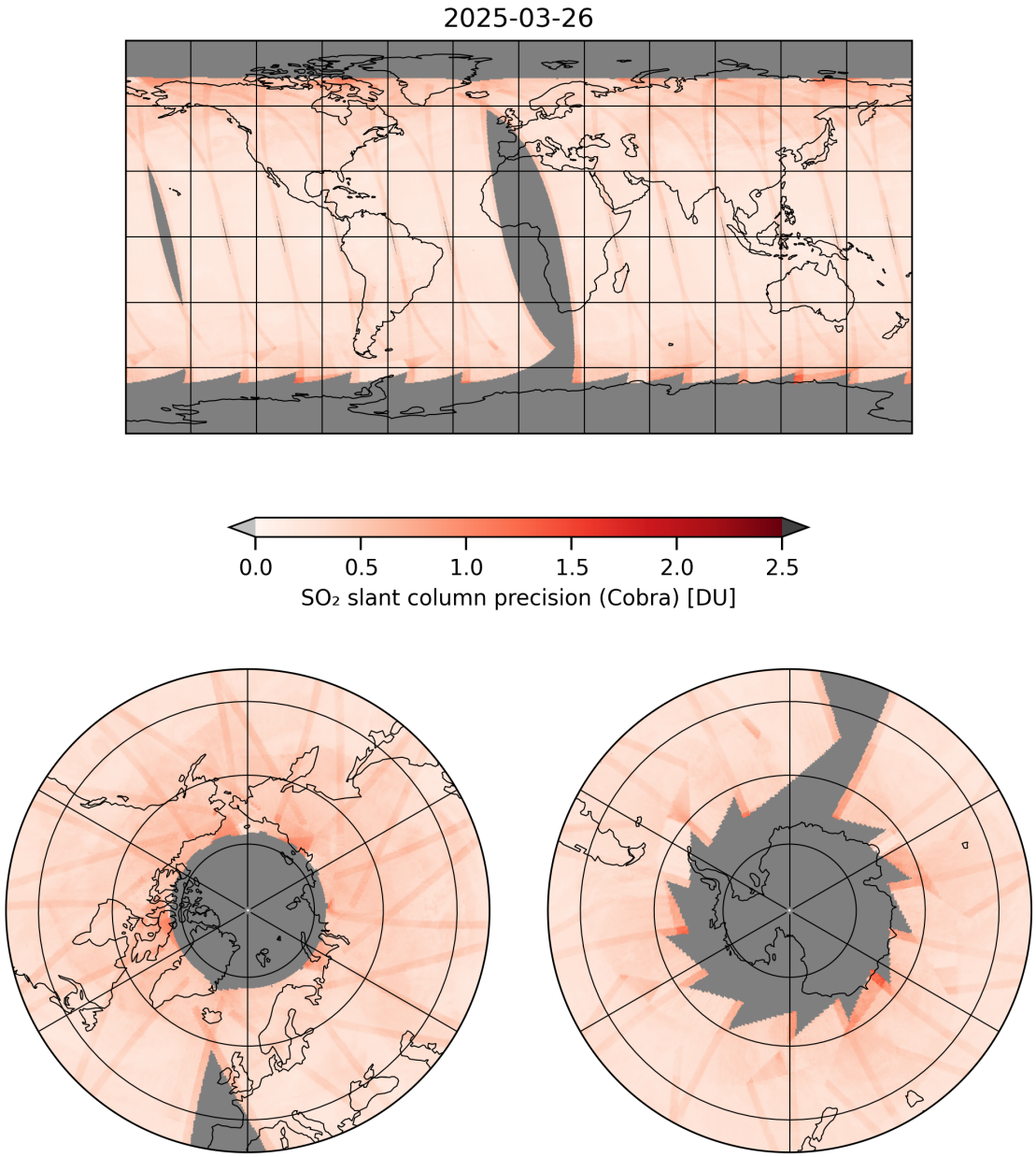

Figure 8: Map of "SO_2 slant column precision (Cobra)" for 2025-03-26 to 2025-03-26

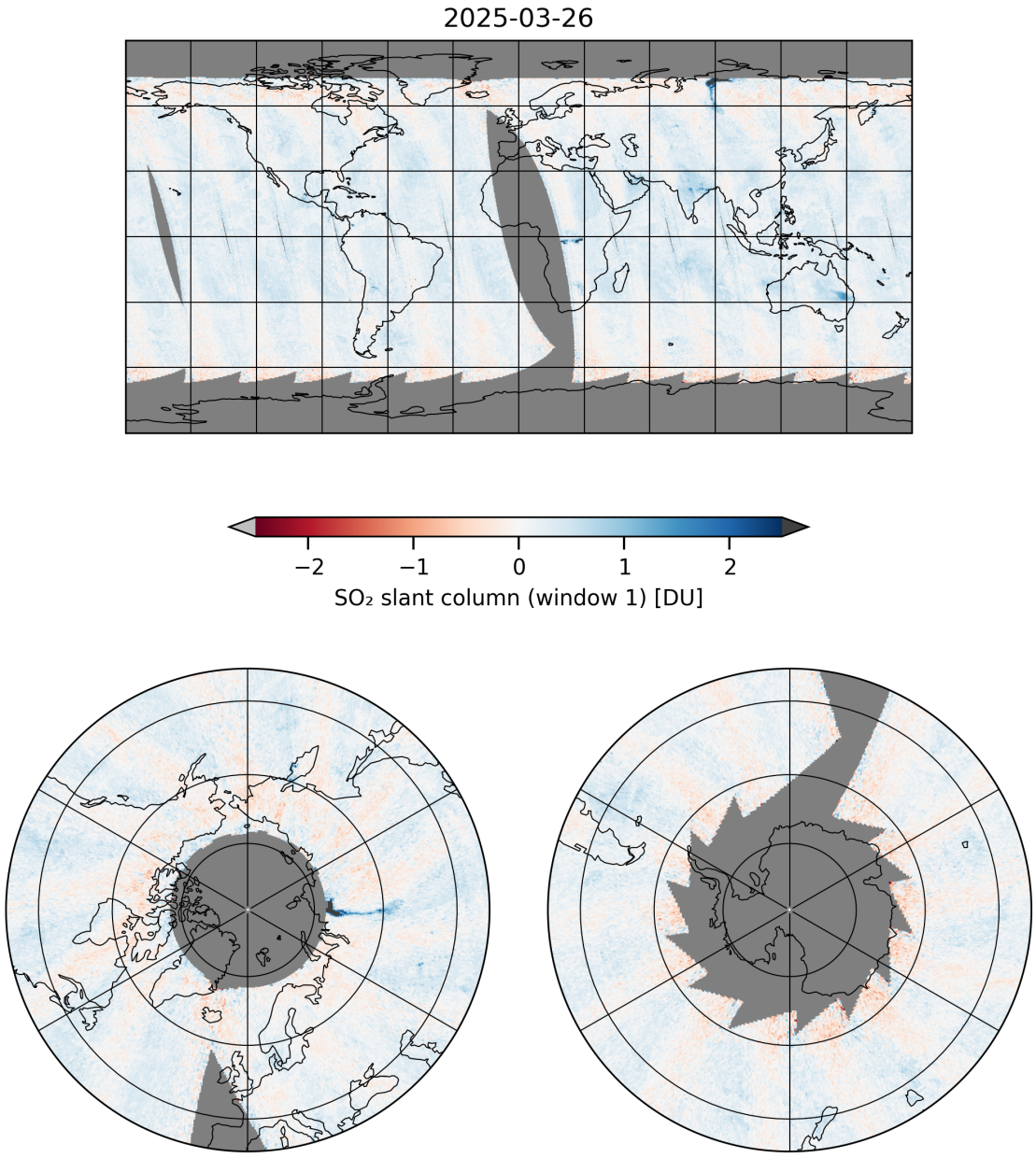

Figure 9: Map of "SO_2 slant column (window 1)" for 2025-03-26 to 2025-03-26

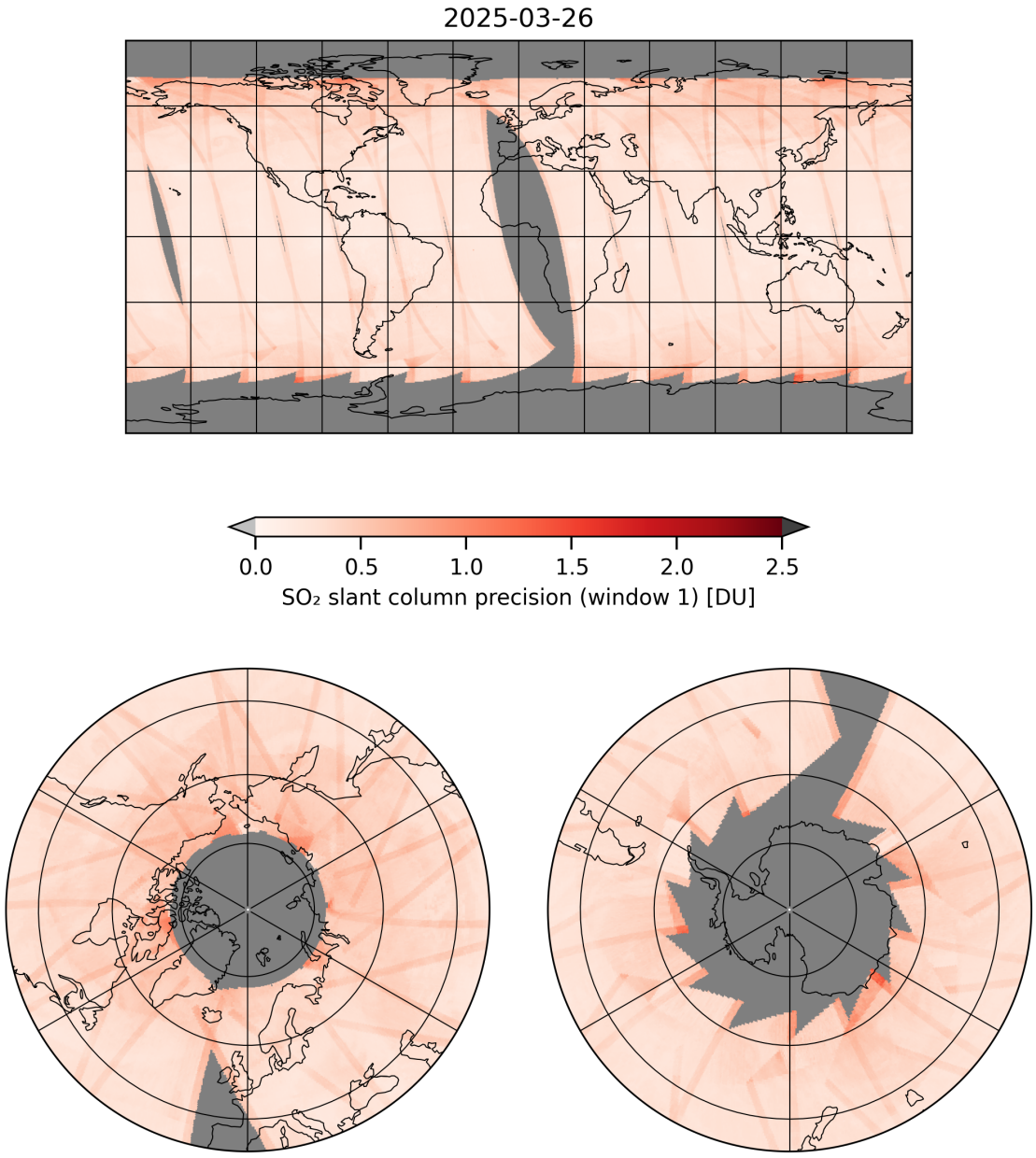

Figure 10: Map of "SO_2 slant column precision (window 1)" for 2025-03-26 to 2025-03-26

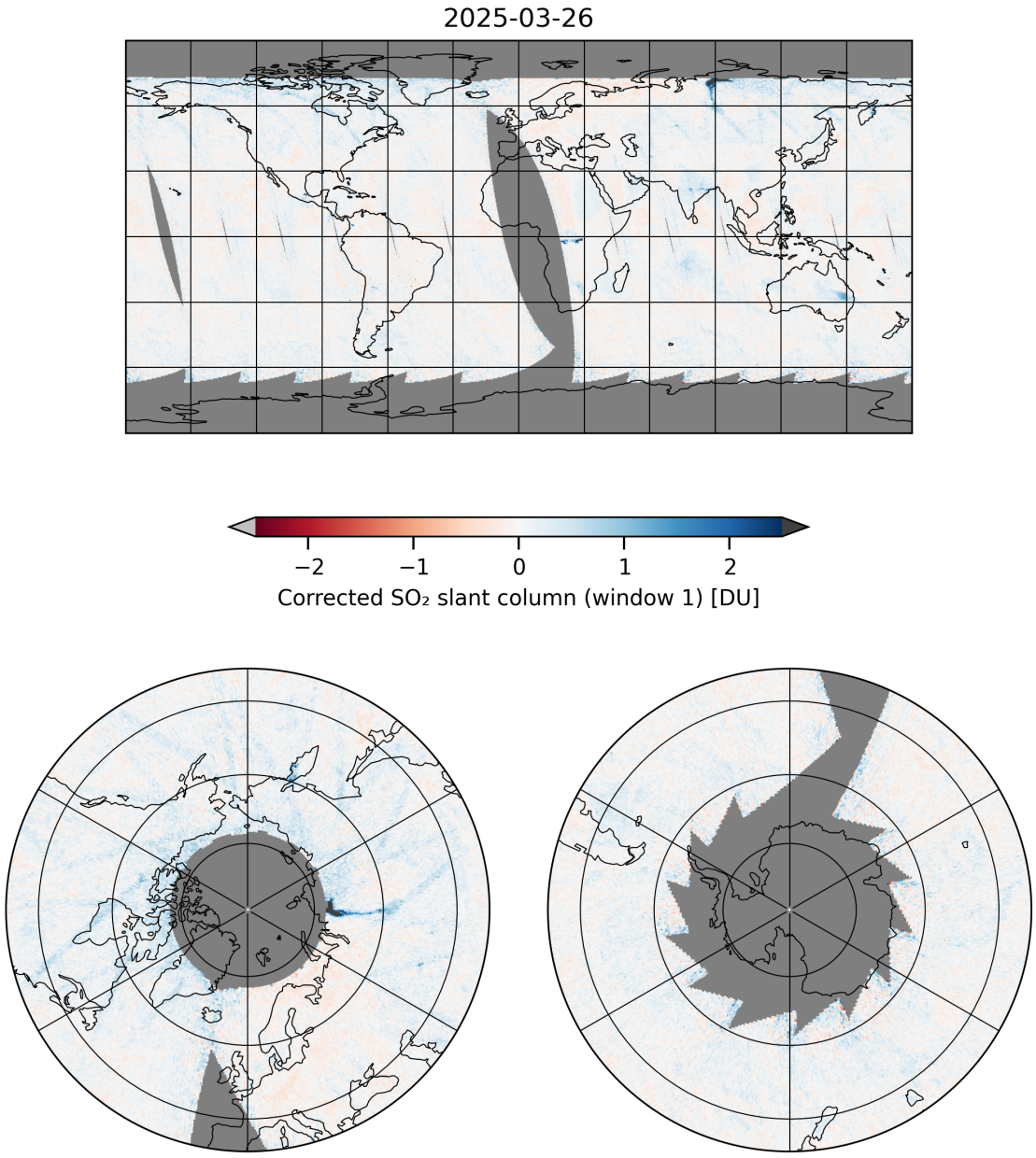

Figure 11: Map of “Corrected SO_2 slant column (window 1)” for 2025-03-26 to 2025-03-26

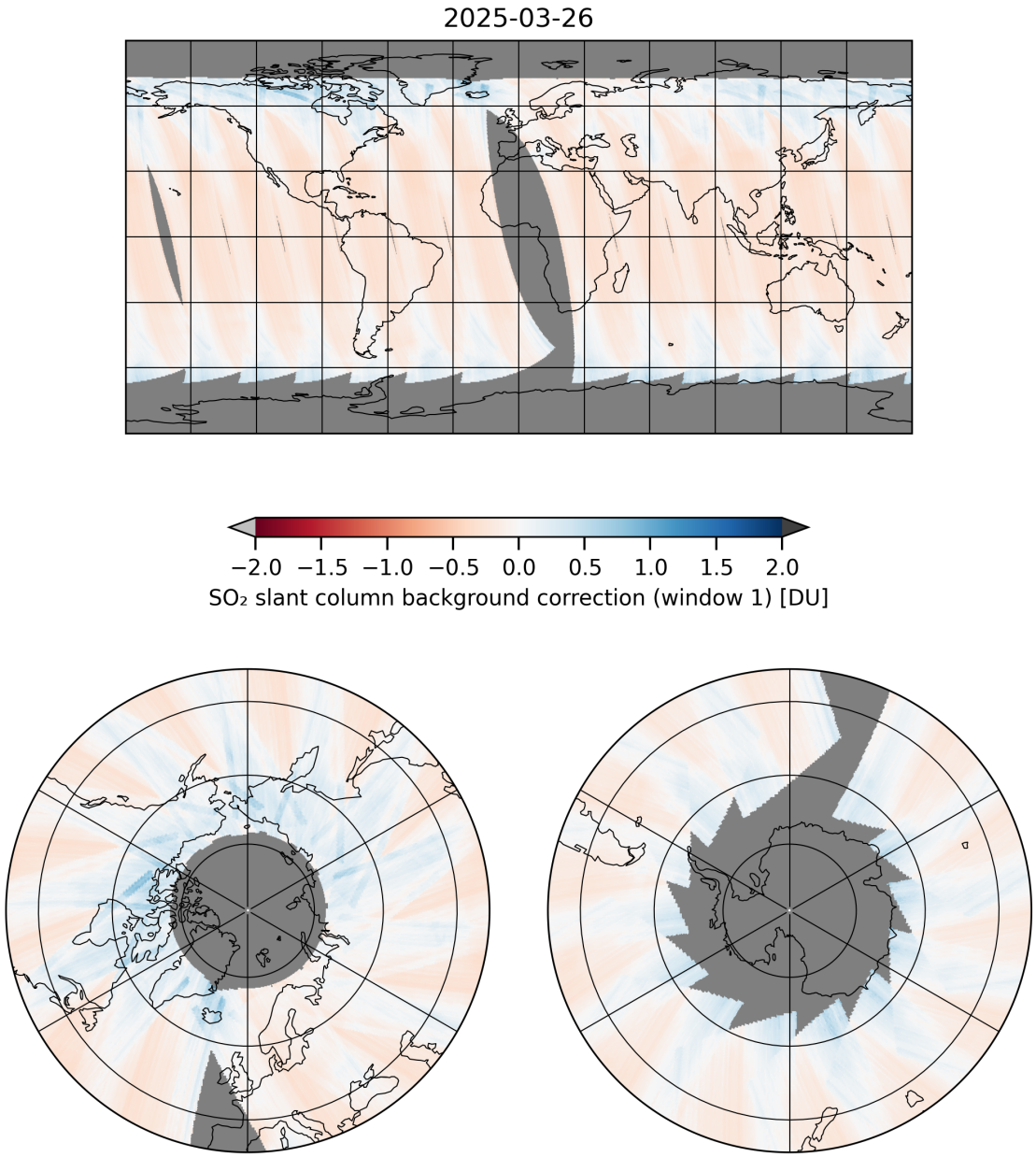

Figure 12: Map of "SO_2 slant column background correction (window 1)" for 2025-03-26 to 2025-03-26

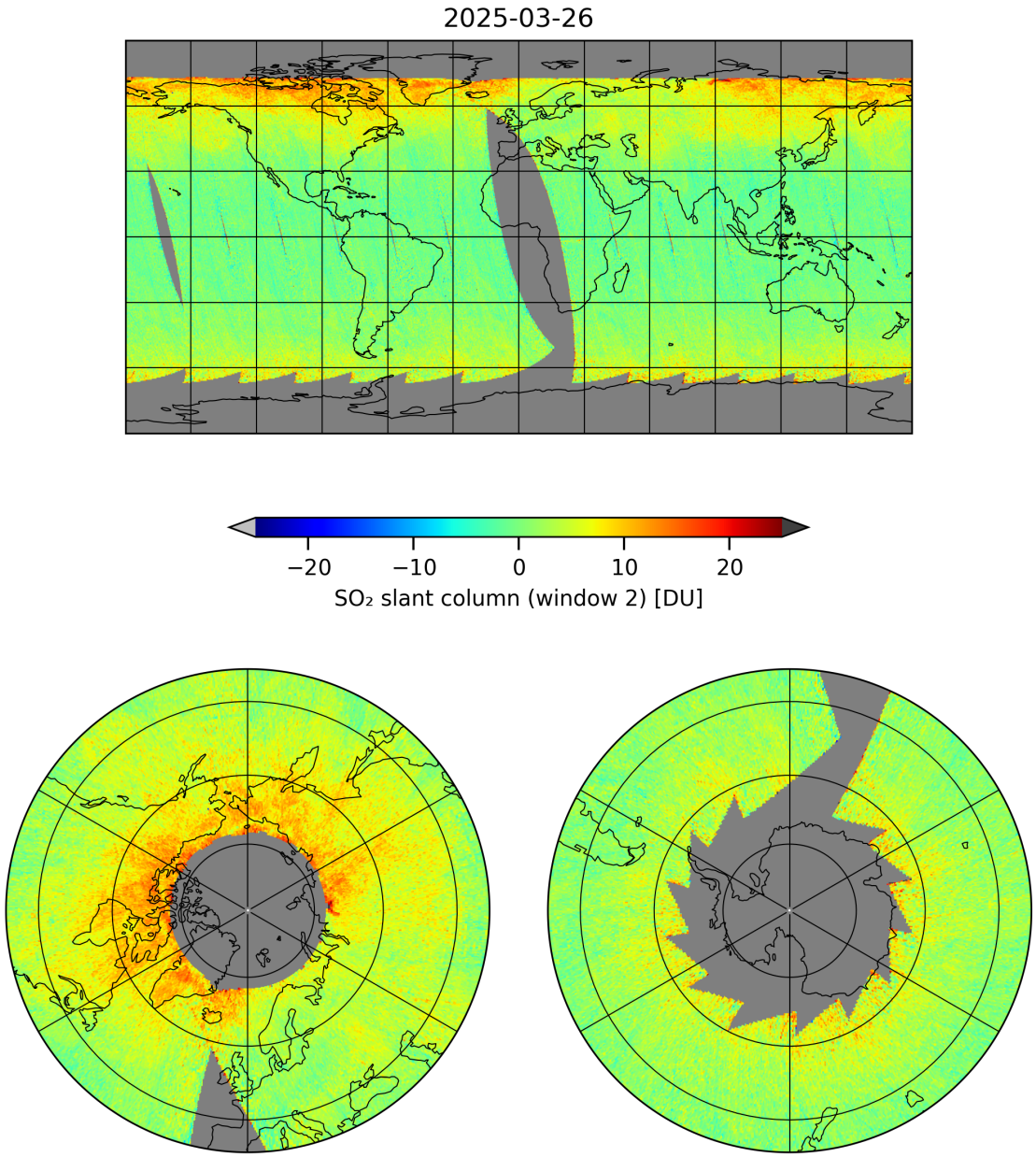

Figure 13: Map of "SO_2 slant column (window 2)" for 2025-03-26 to 2025-03-26

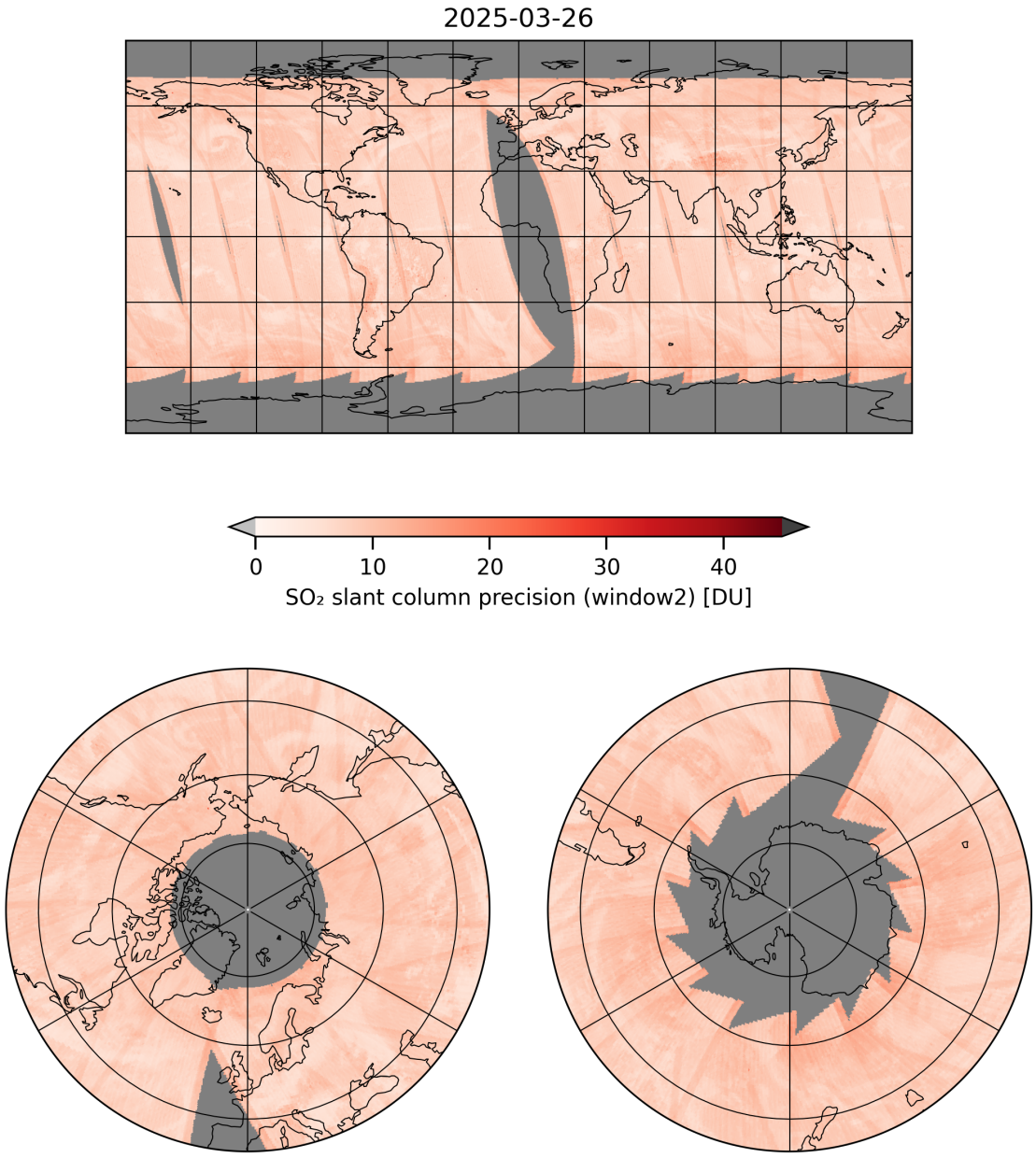

Figure 14: Map of "SO_2 slant column precision (window2)" for 2025-03-26 to 2025-03-26

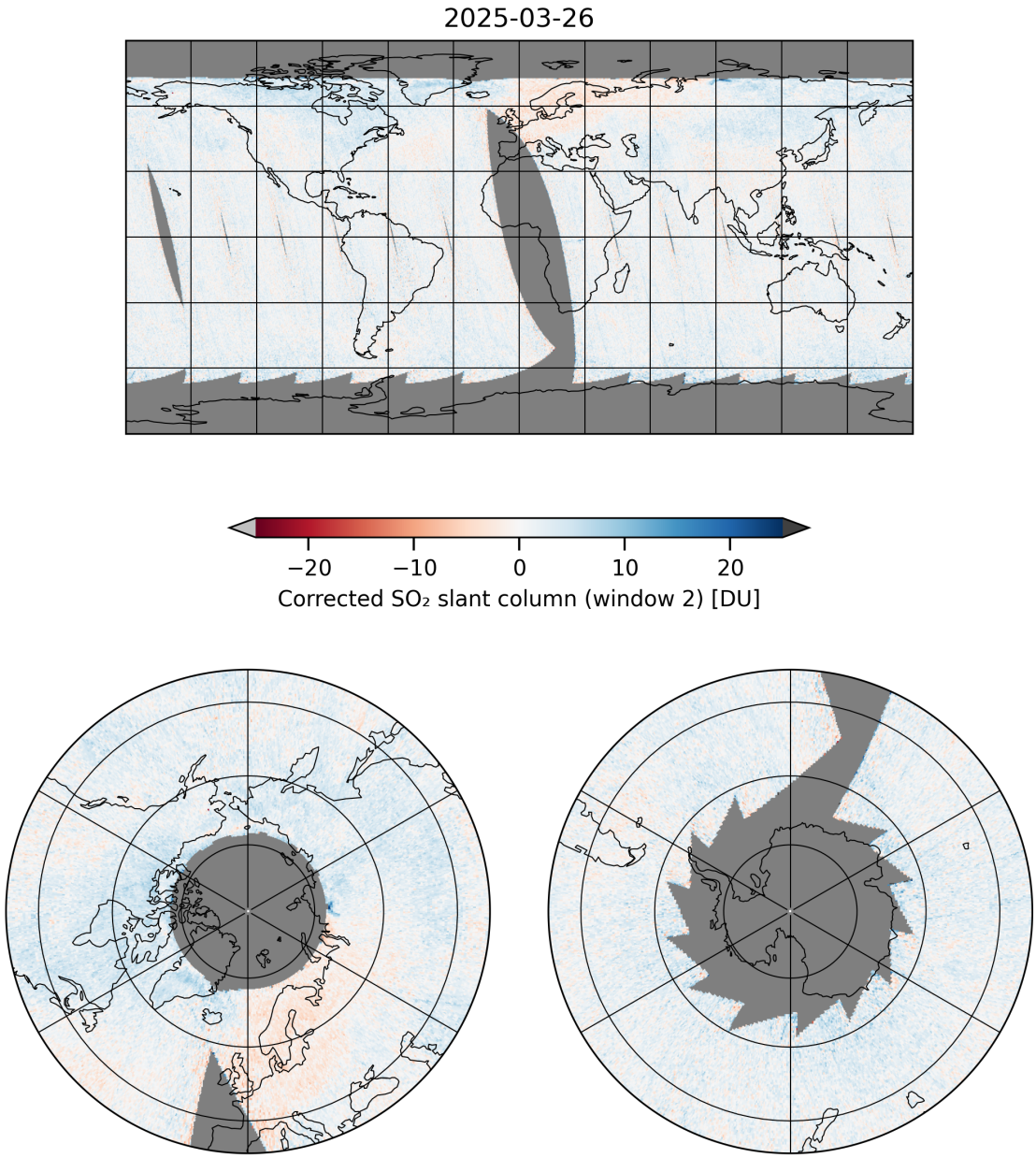

Figure 15: Map of “Corrected SO_2 slant column (window 2)” for 2025-03-26 to 2025-03-26

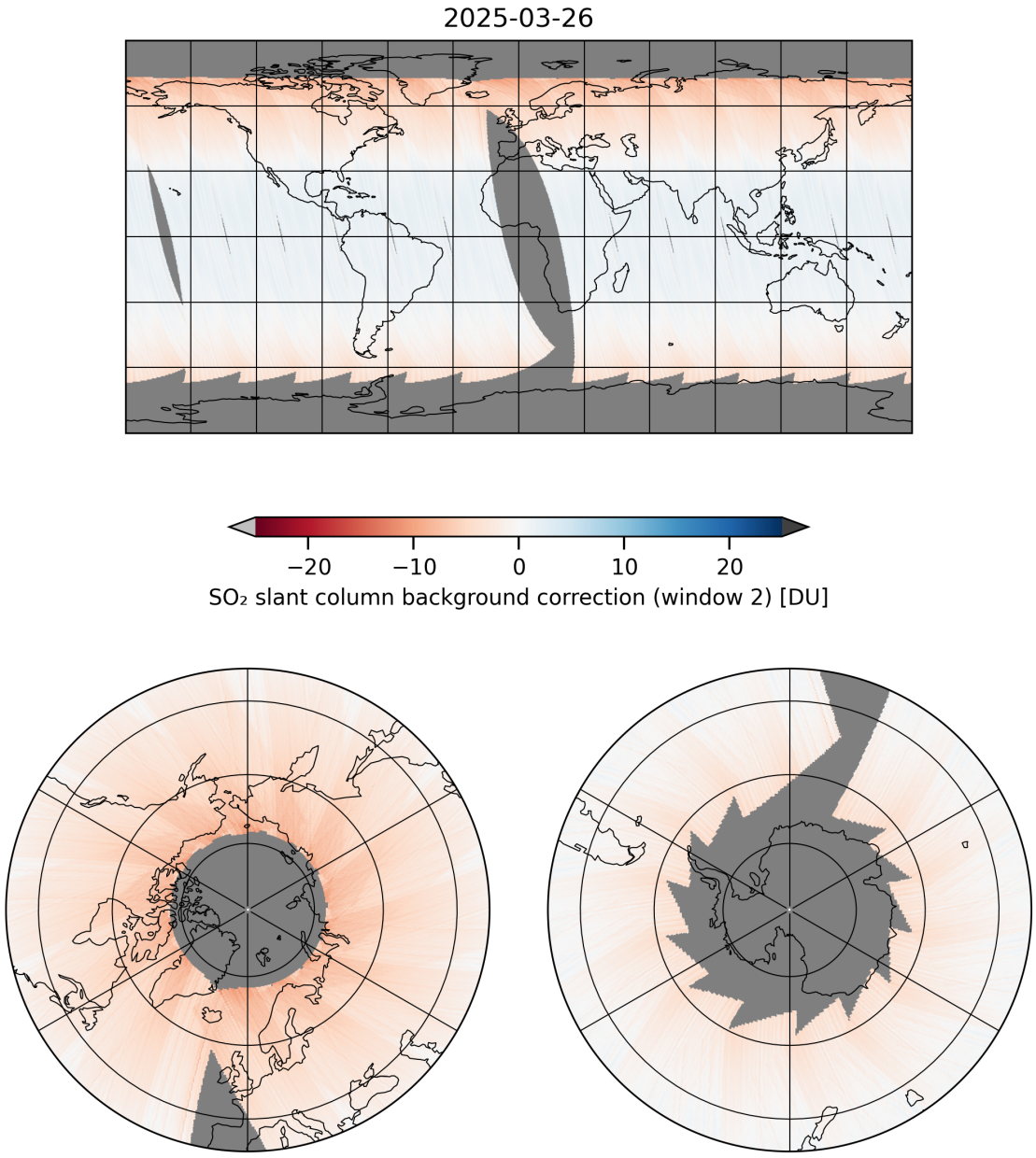

Figure 16: Map of "SO_2 slant column background correction (window 2)" for 2025-03-26 to 2025-03-26

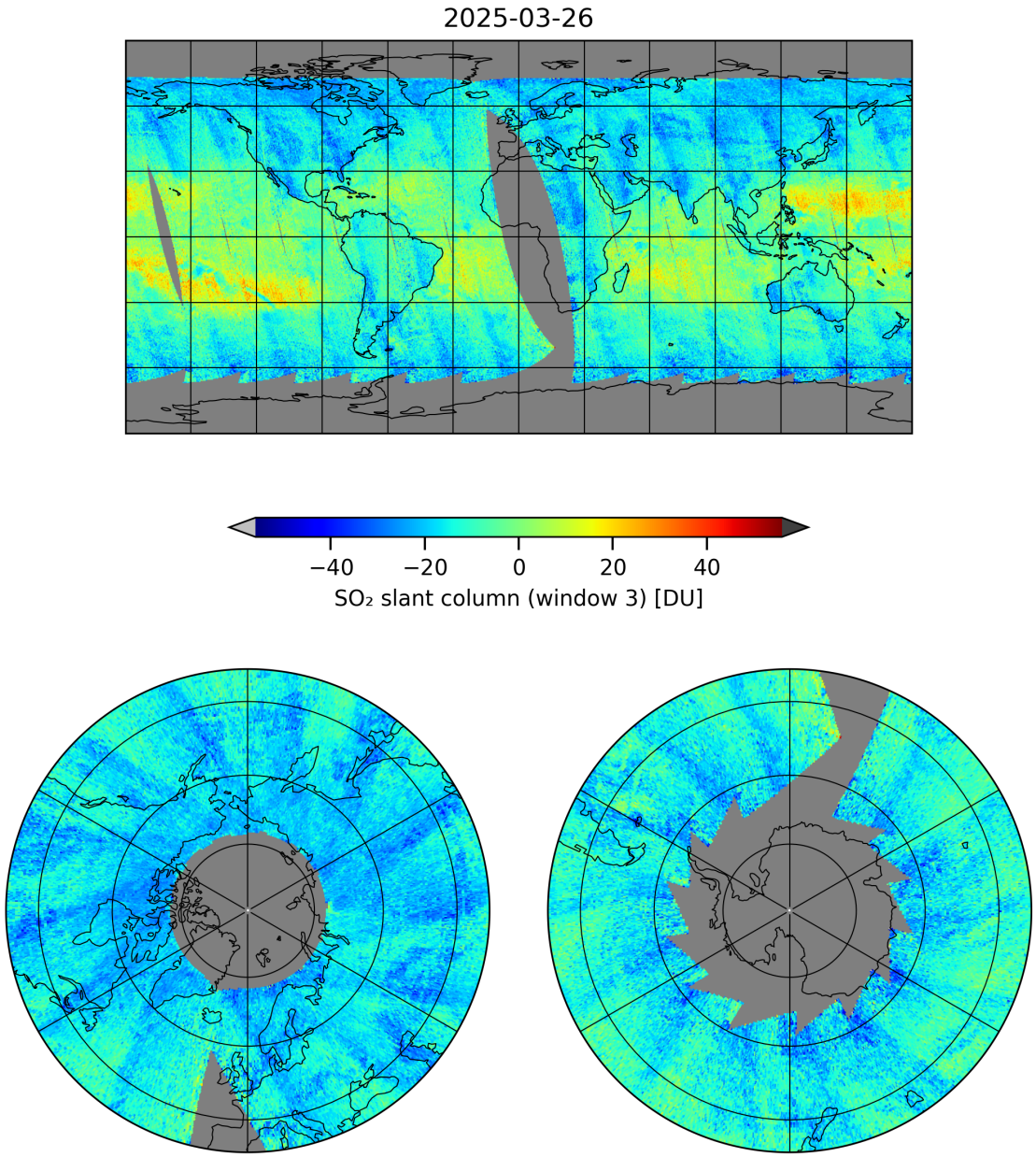

Figure 17: Map of "SO_2 slant column (window 3)" for 2025-03-26 to 2025-03-26

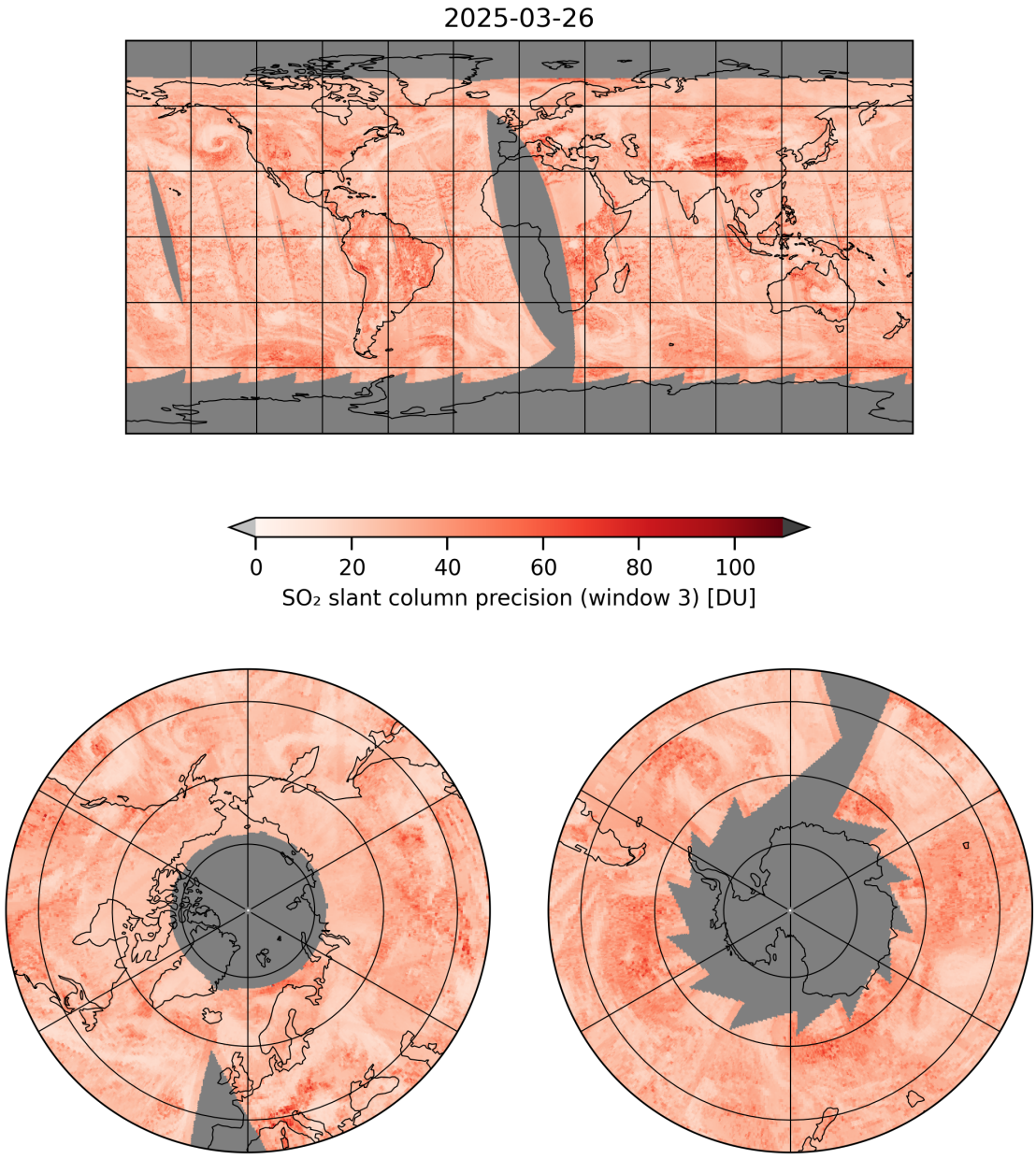

Figure 18: Map of "SO_2 slant column precision (window 3)" for 2025-03-26 to 2025-03-26

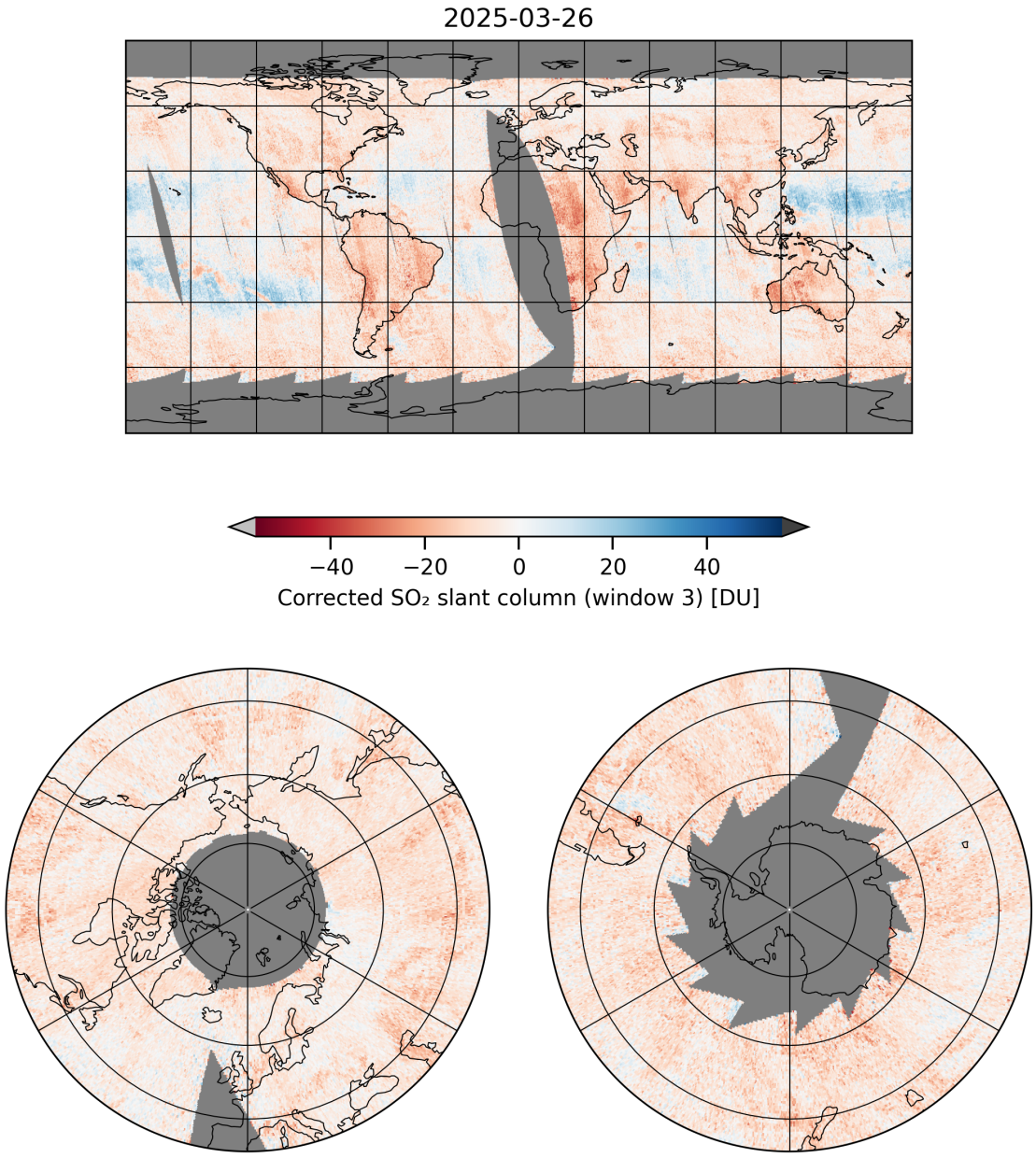

Figure 19: Map of “Corrected SO_2 slant column (window 3)” for 2025-03-26 to 2025-03-26

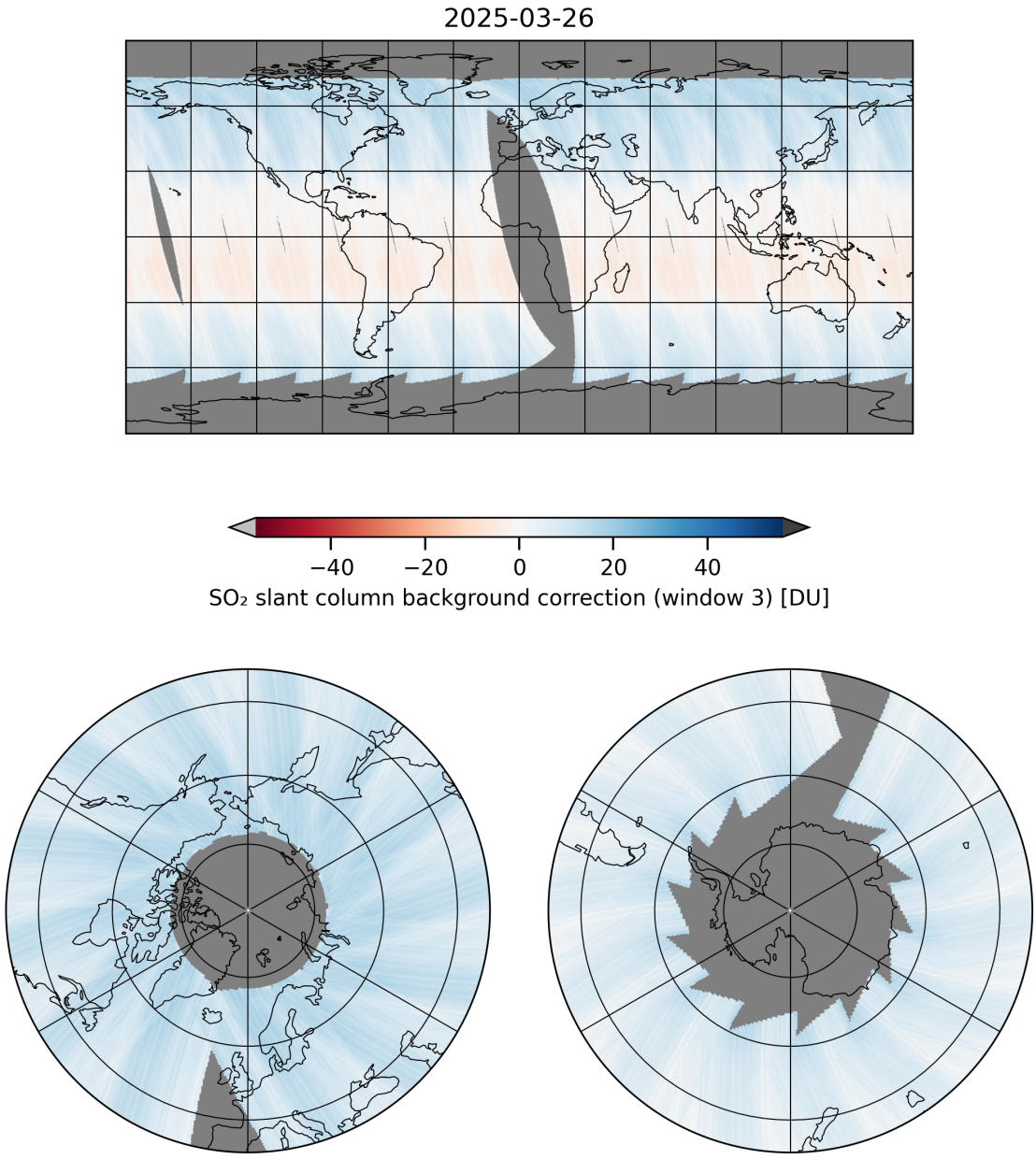

Figure 20: Map of "SO_2 slant column background correction (window 3)" for 2025-03-26 to 2025-03-26

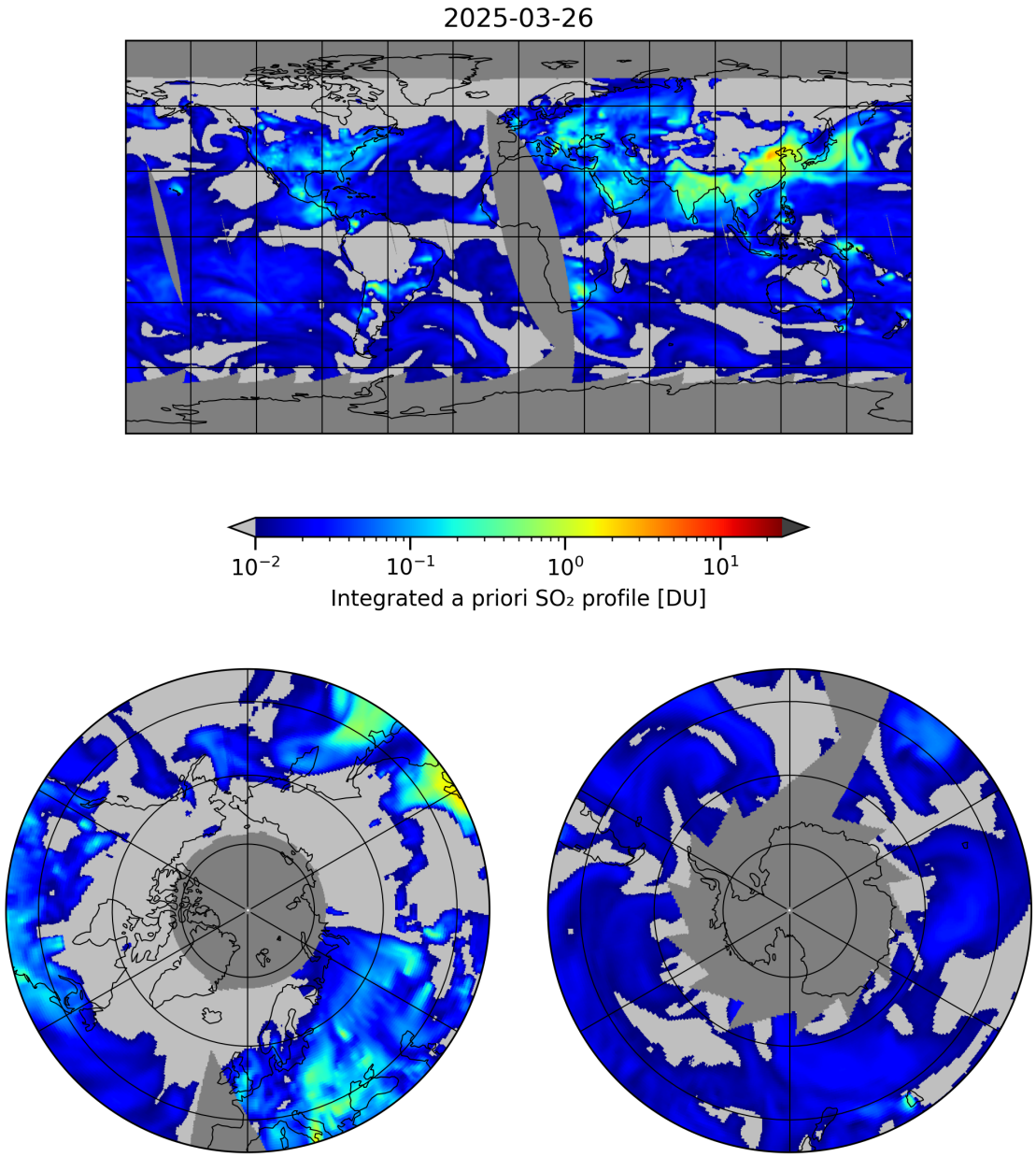

Figure 21: Map of “Integrated a priori SO_2 profile” for 2025-03-26 to 2025-03-26

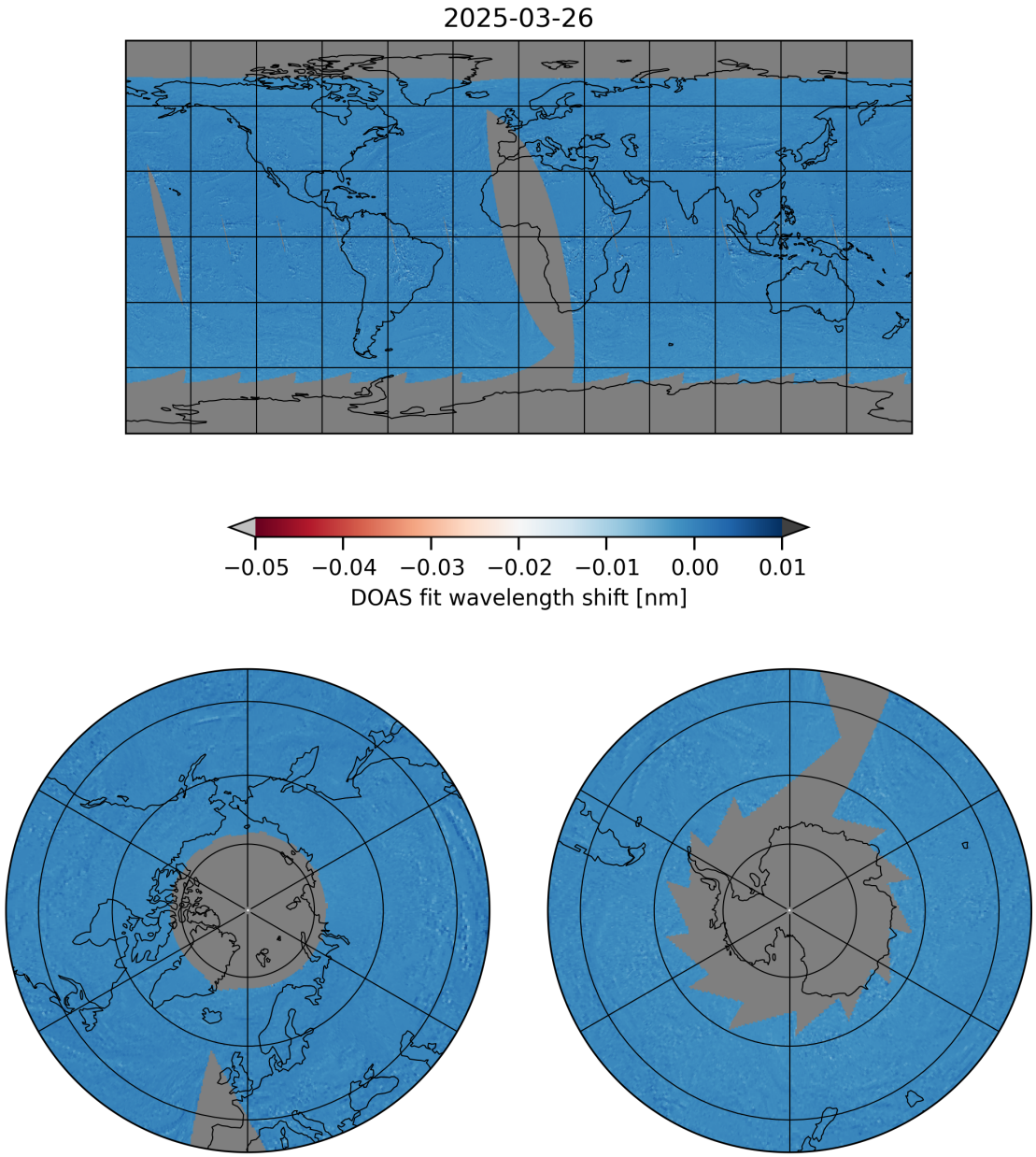

Figure 22: Map of “DOAS fit wavelength shift” for 2025-03-26 to 2025-03-26

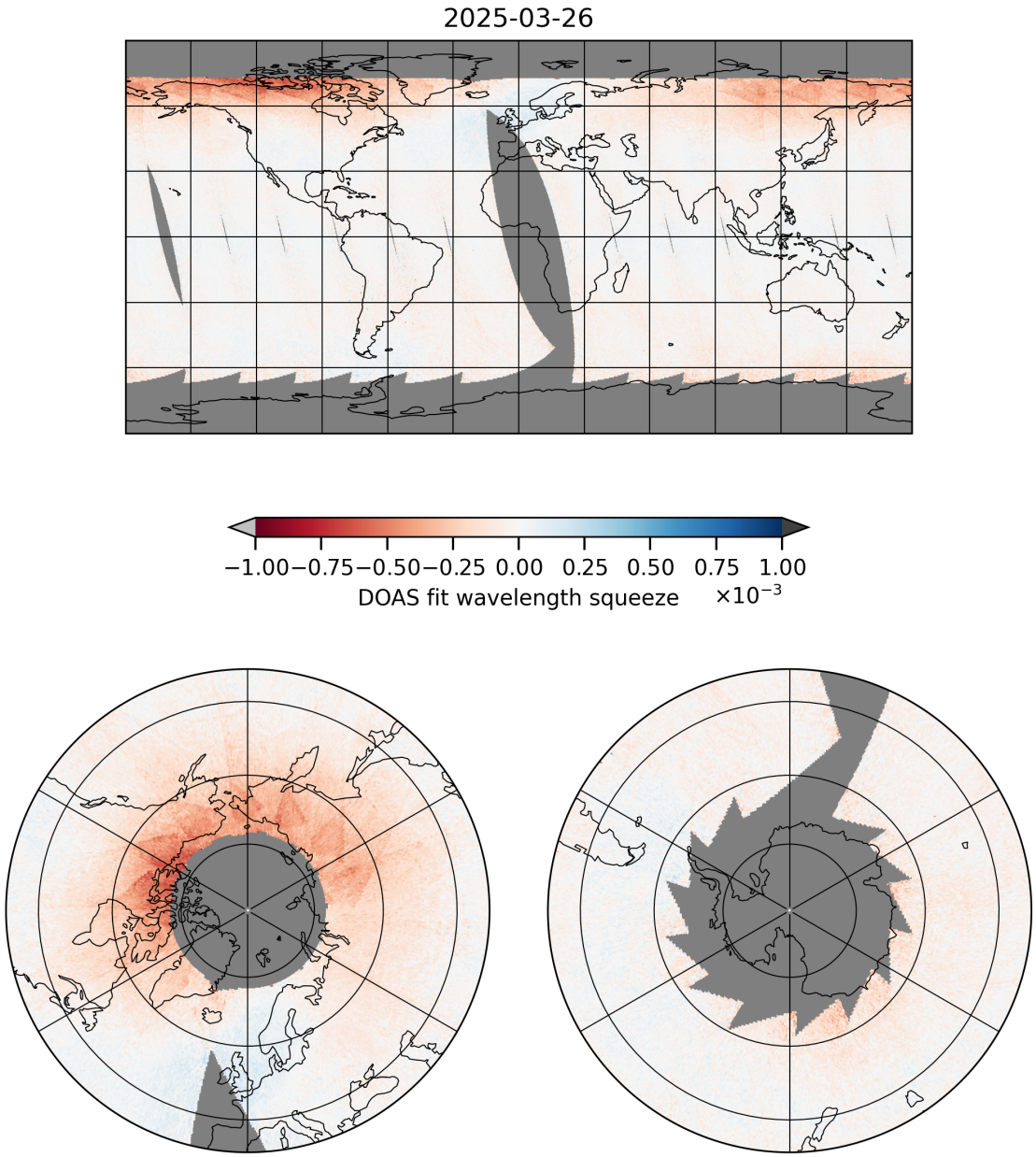

Figure 23: Map of “DOAS fit wavelength squeeze” for 2025-03-26 to 2025-03-26

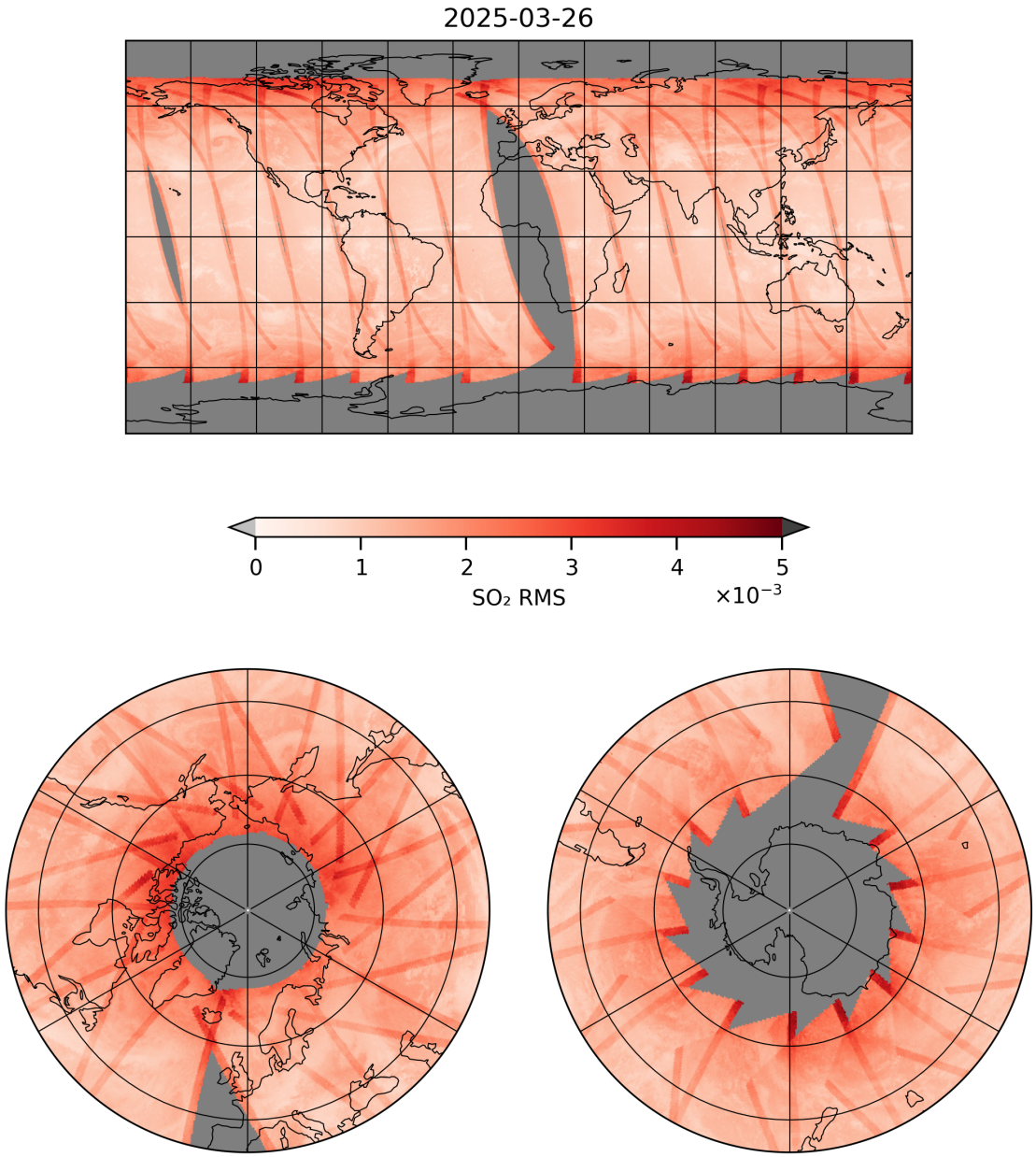

Figure 24: Map of "SO_2 RMS" for 2025-03-26 to 2025-03-26

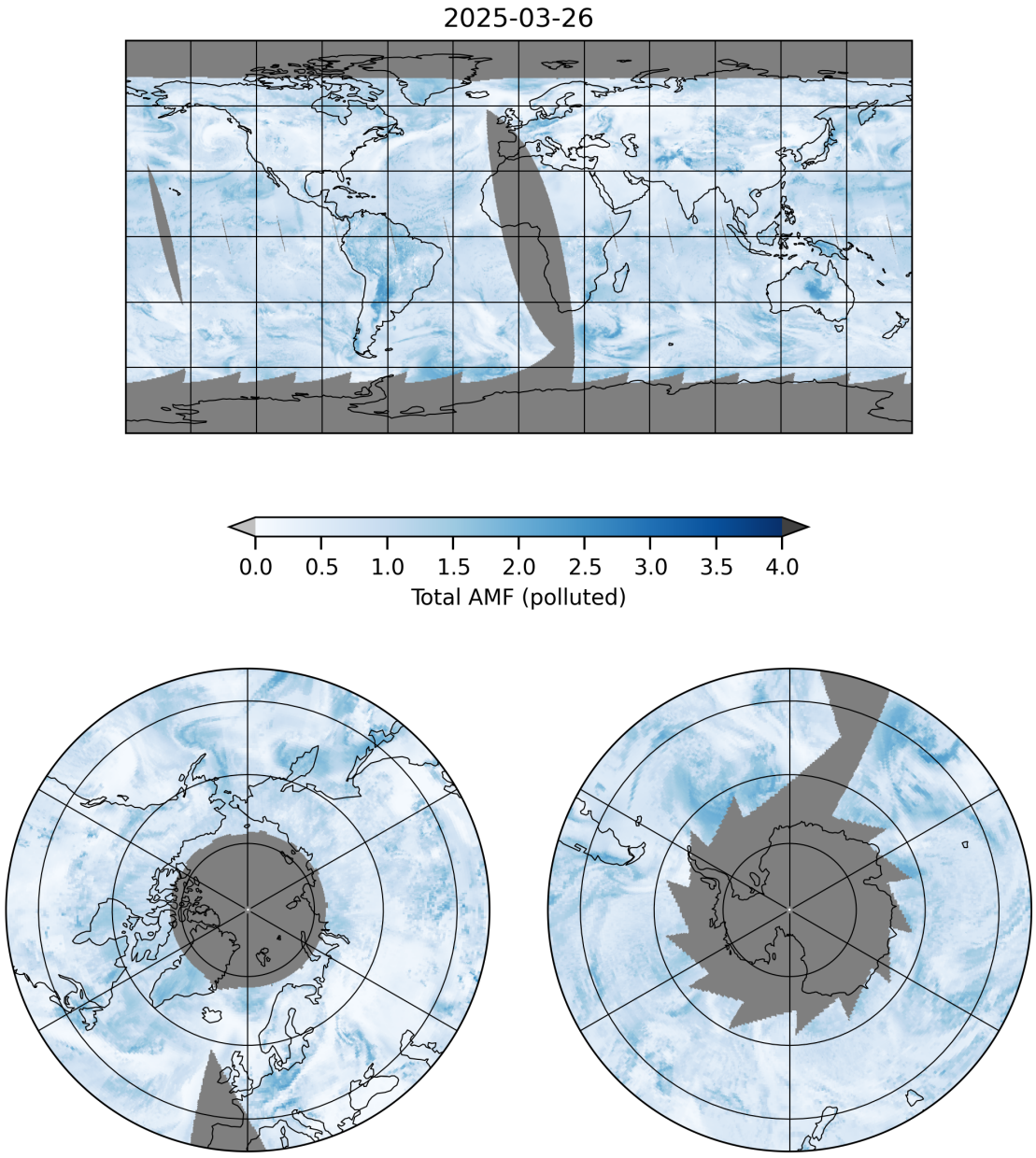

Figure 25: Map of “Total AMF (polluted)” for 2025-03-26 to 2025-03-26

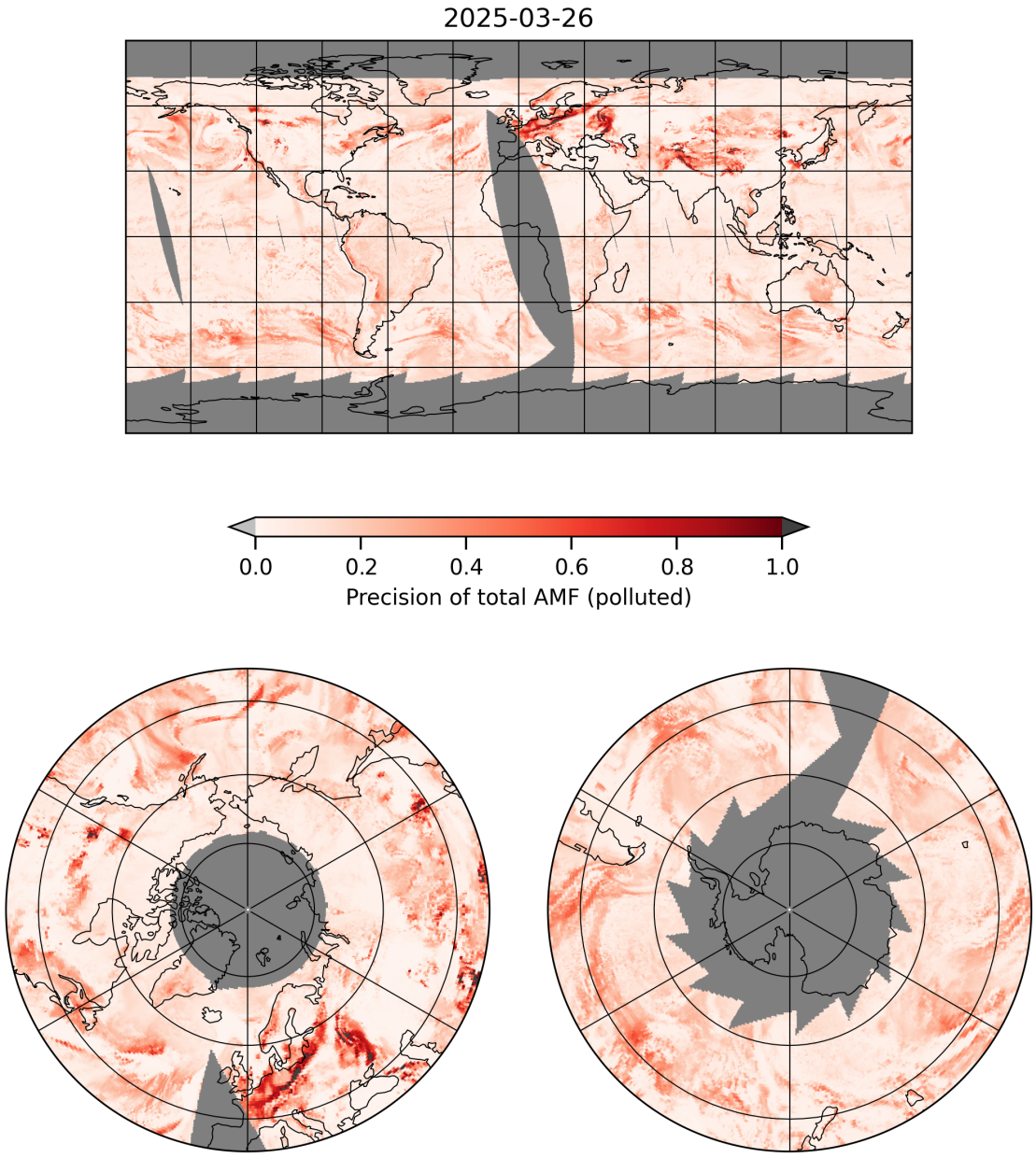

Figure 26: Map of “Precision of total AMF (polluted)” for 2025-03-26 to 2025-03-26

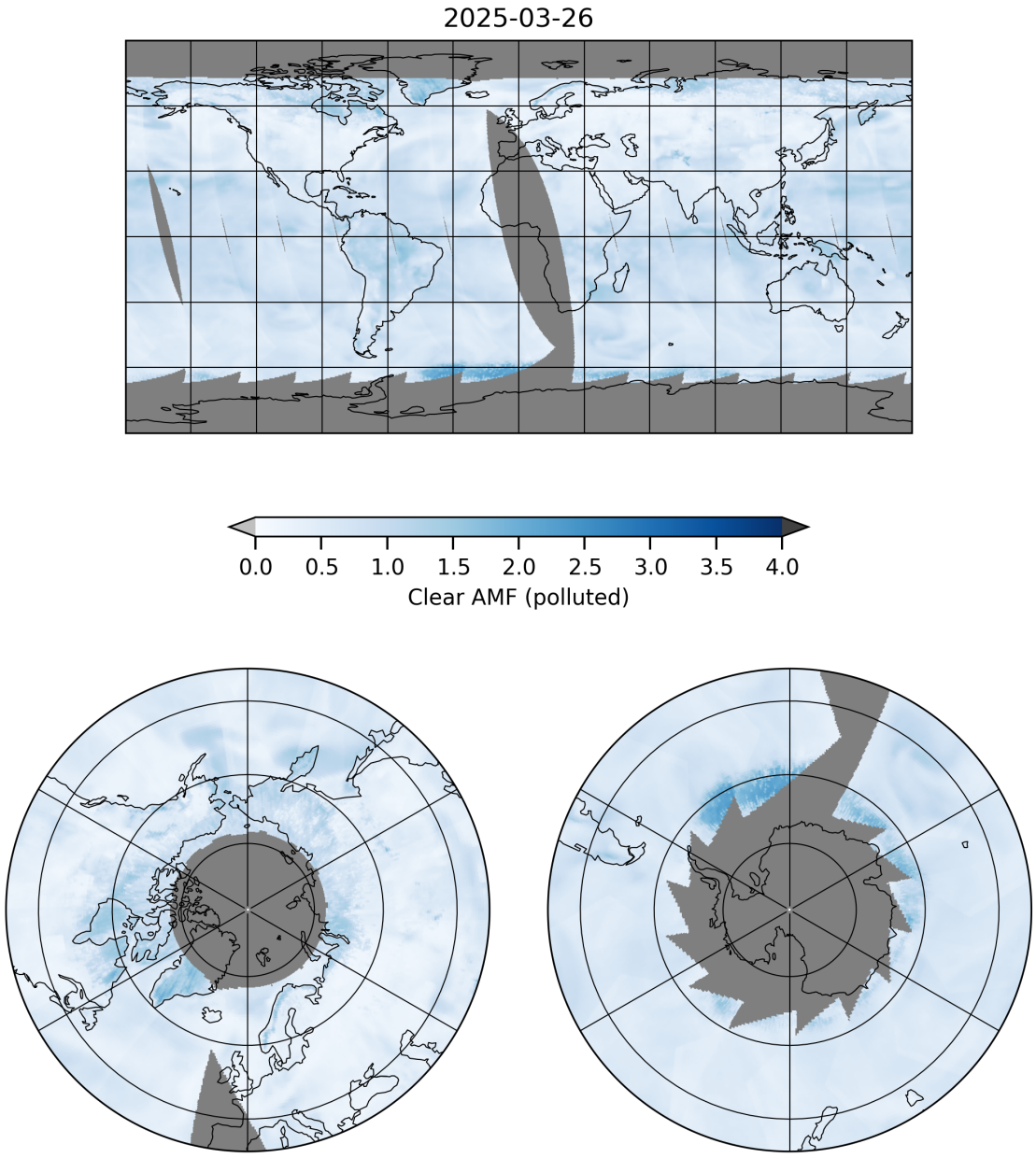

Figure 27: Map of “Clear AMF (polluted)” for 2025-03-26 to 2025-03-26

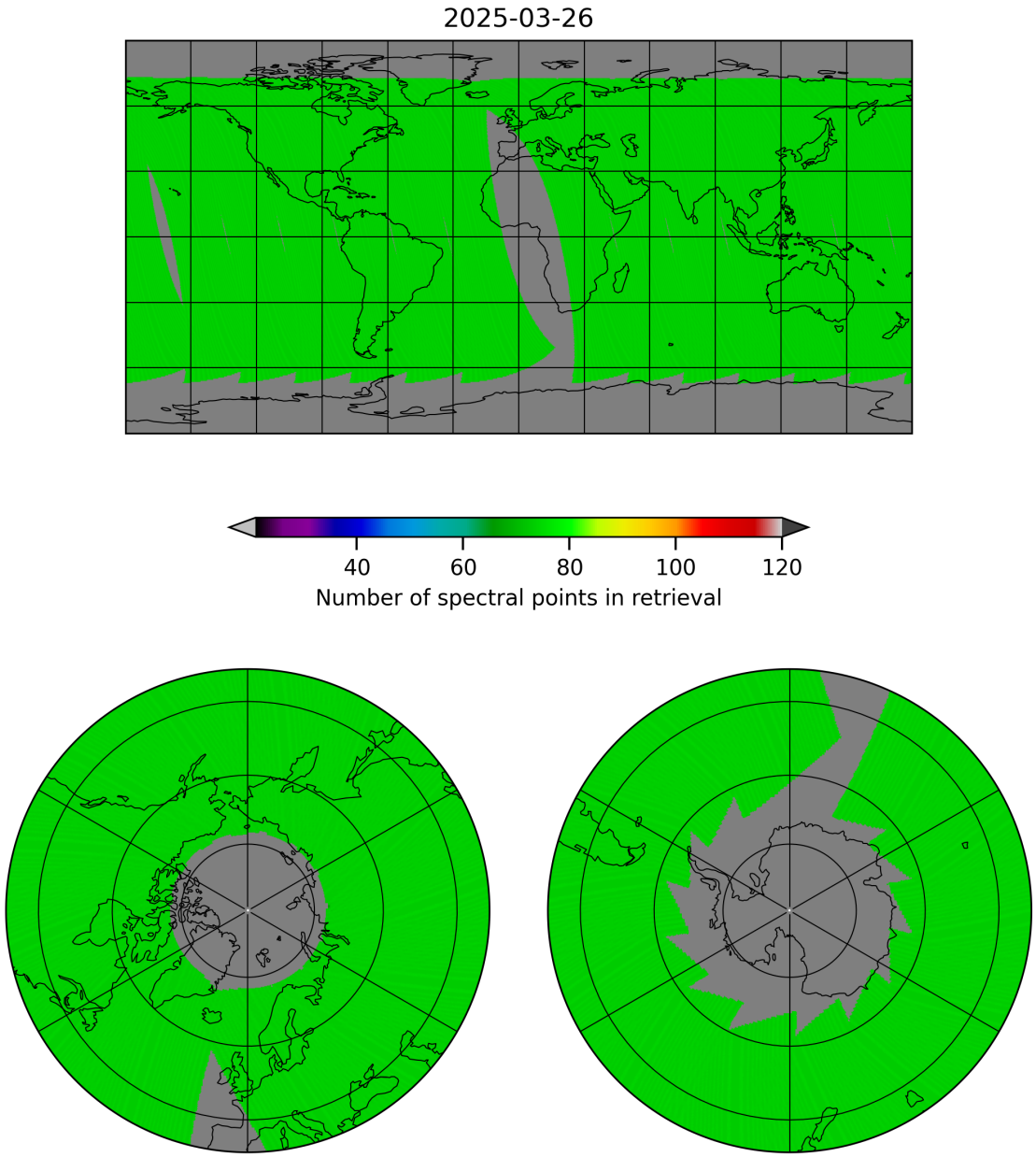

Figure 28: Map of “Number of spectral points in retrieval” for 2025-03-26 to 2025-03-26

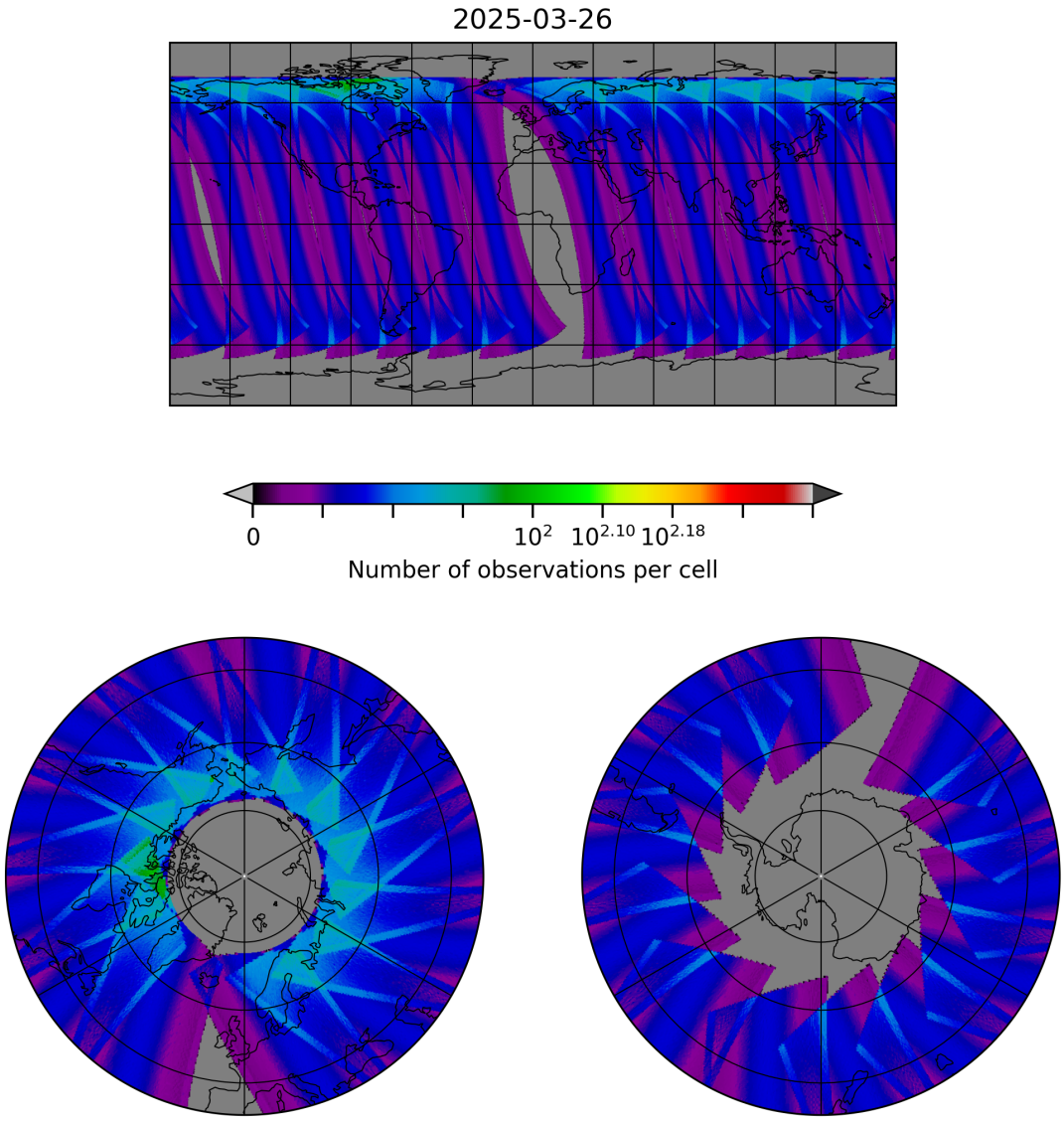

Figure 29: Map of the number of observations for 2025-03-26 to 2025-03-26

7 Zonal average

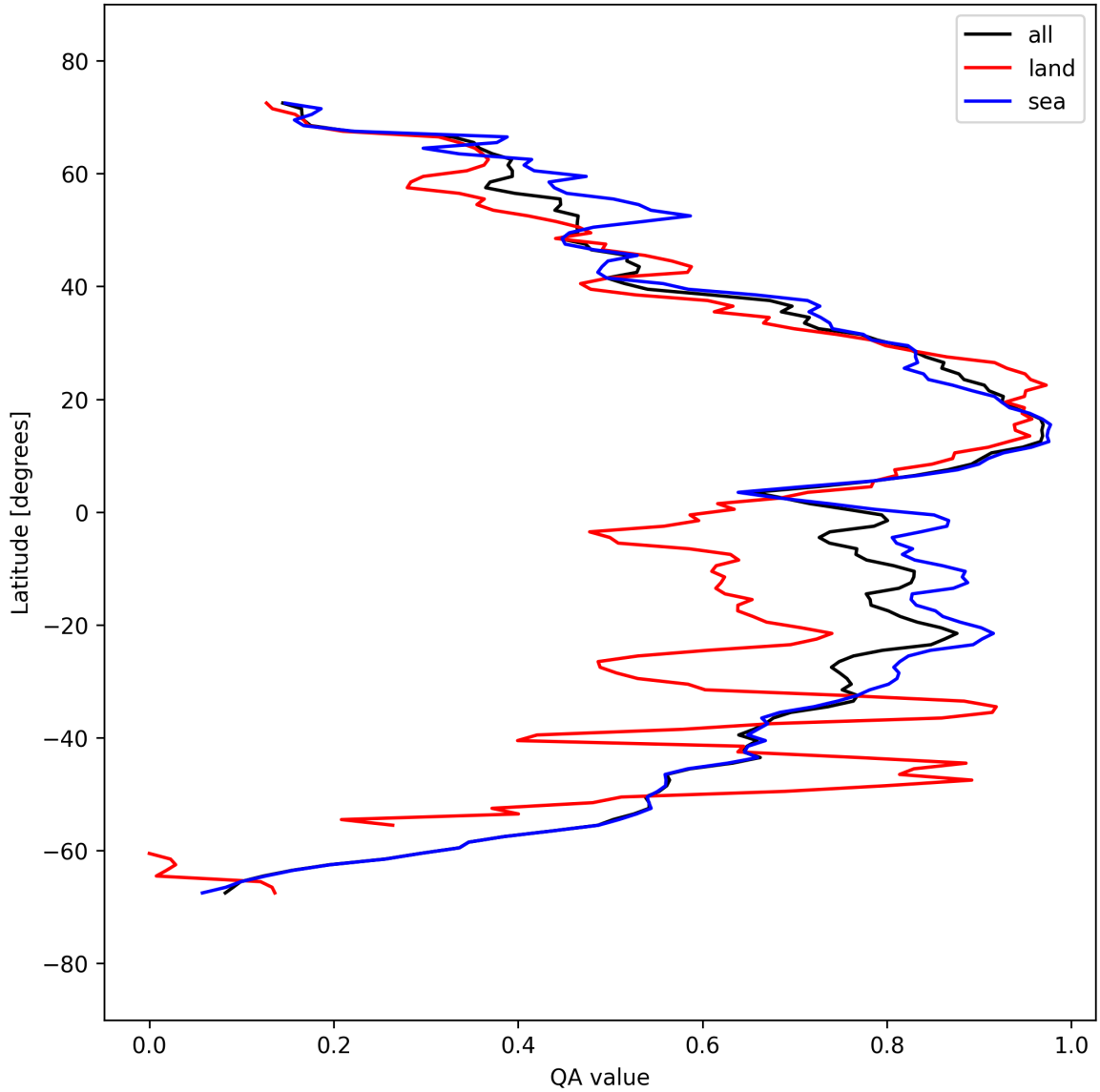

Figure 30: Zonal average of “QA value” for 2025-03-26 to 2025-03-26.

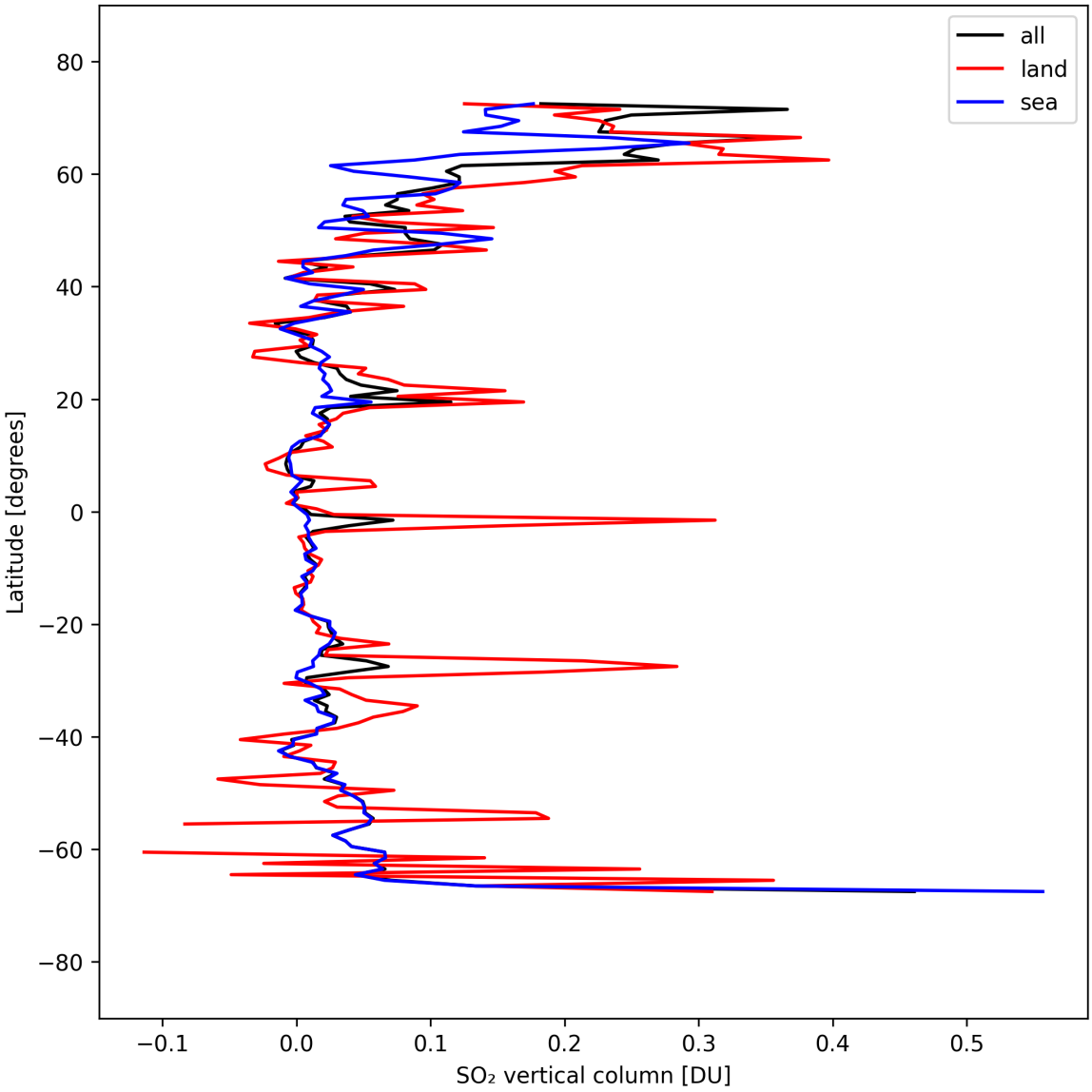

Figure 31: Zonal average of "SO_2 vertical column" for 2025-03-26 to 2025-03-26.

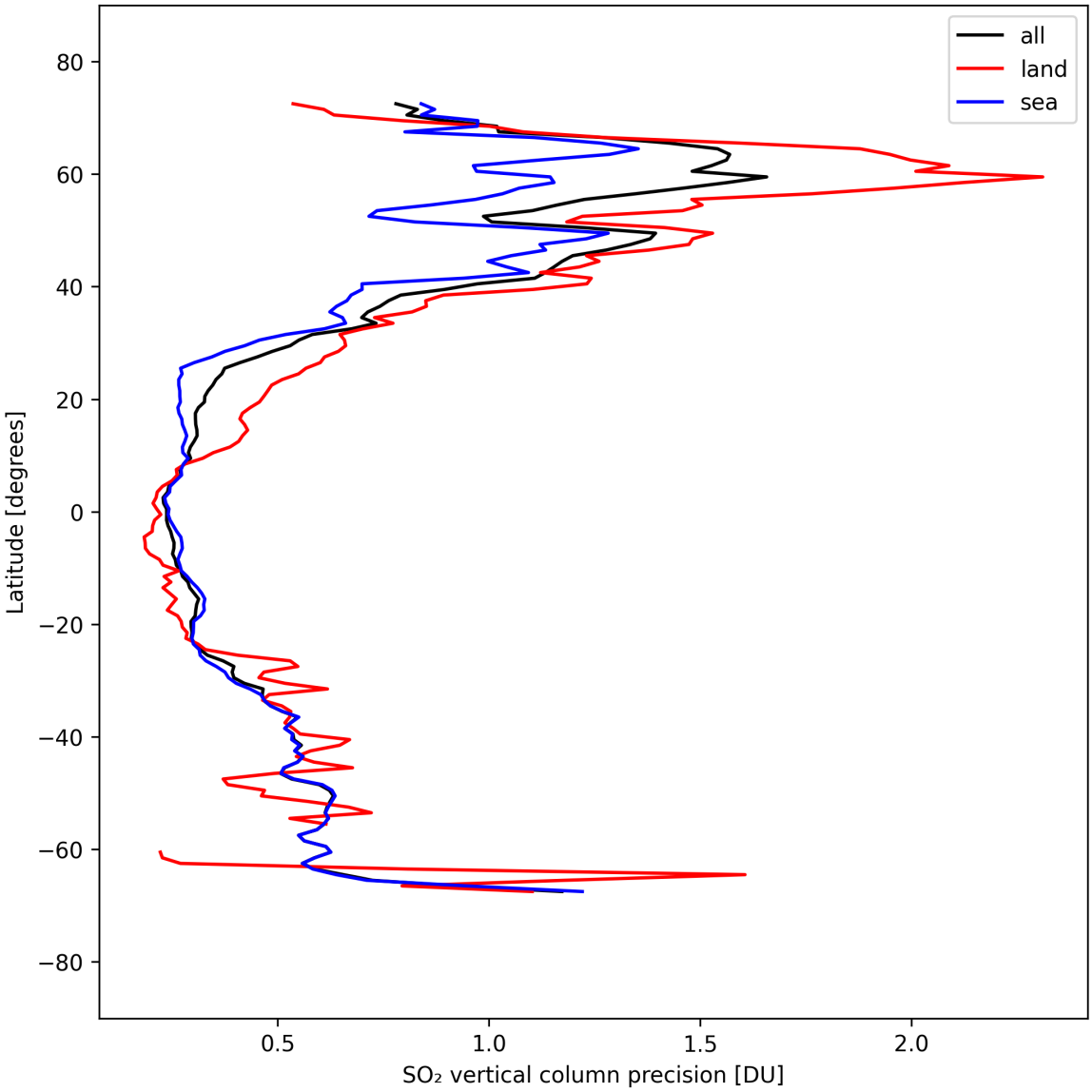

Figure 32: Zonal average of "SO_2 vertical column precision" for 2025-03-26 to 2025-03-26.

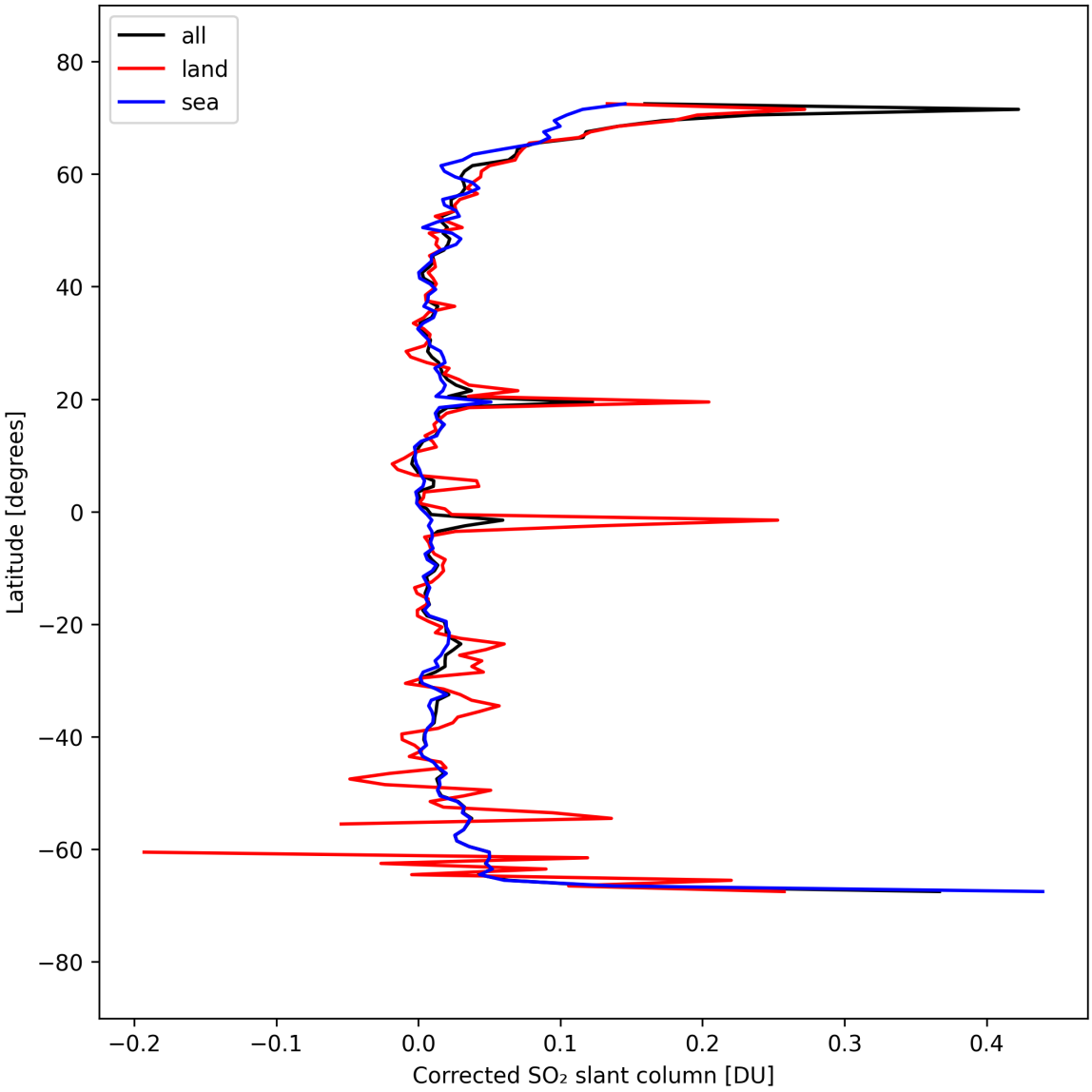

Figure 33: Zonal average of “Corrected SO_2 slant column” for 2025-03-26 to 2025-03-26.

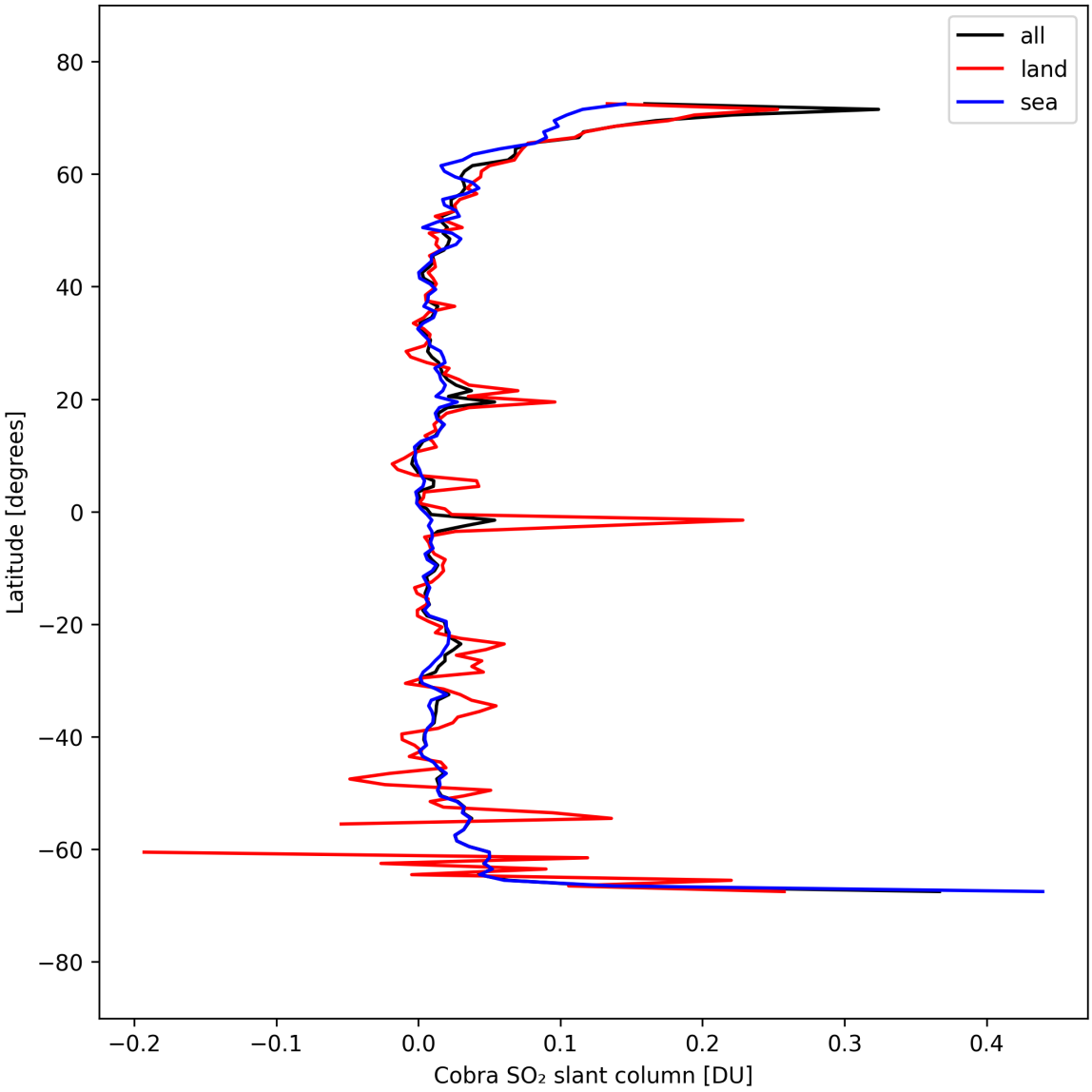

Figure 34: Zonal average of “Cobra SO_2 slant column” for 2025-03-26 to 2025-03-26.

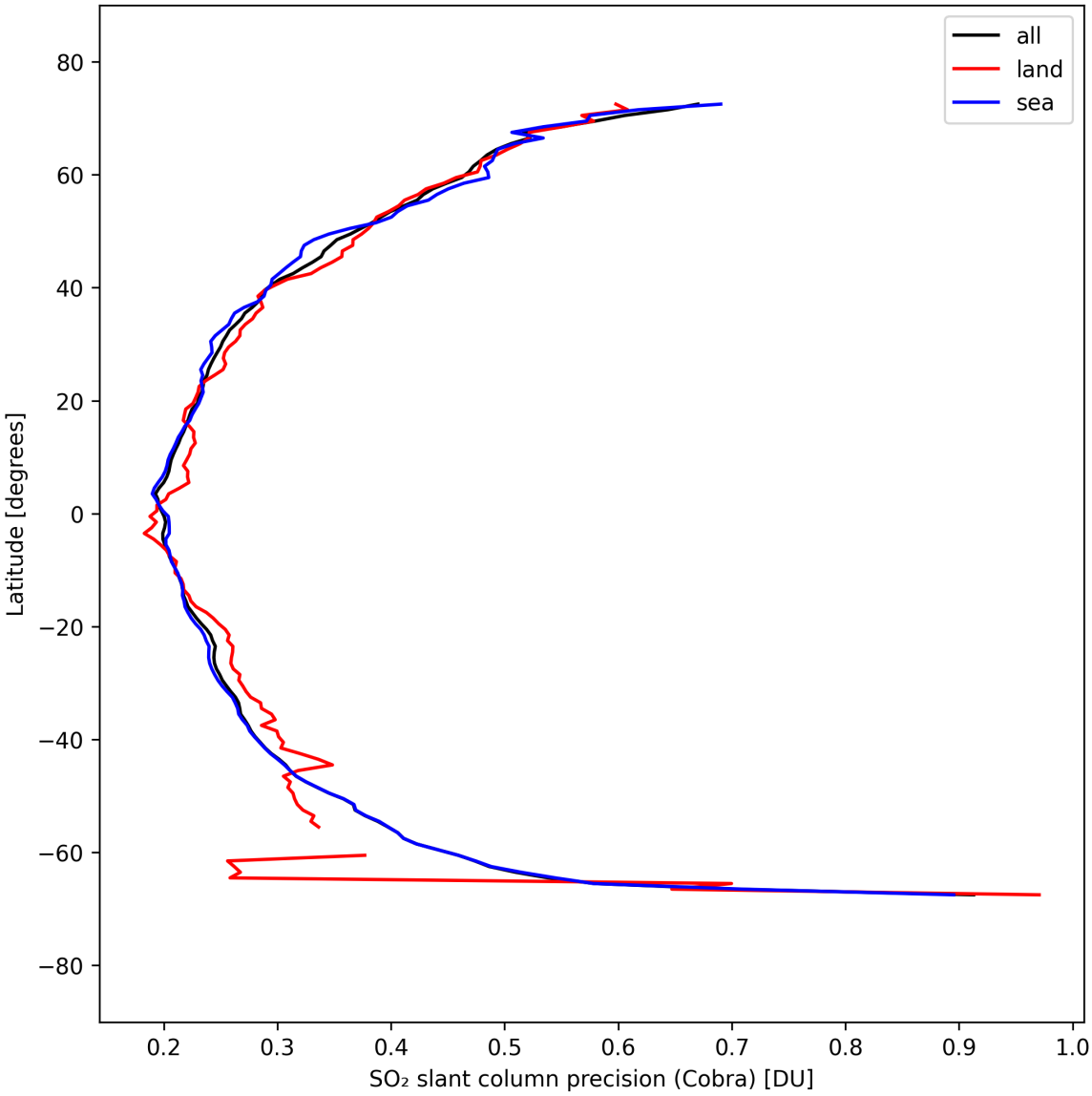

Figure 35: Zonal average of "SO_2 slant column precision (Cobra)" for 2025-03-26 to 2025-03-26.

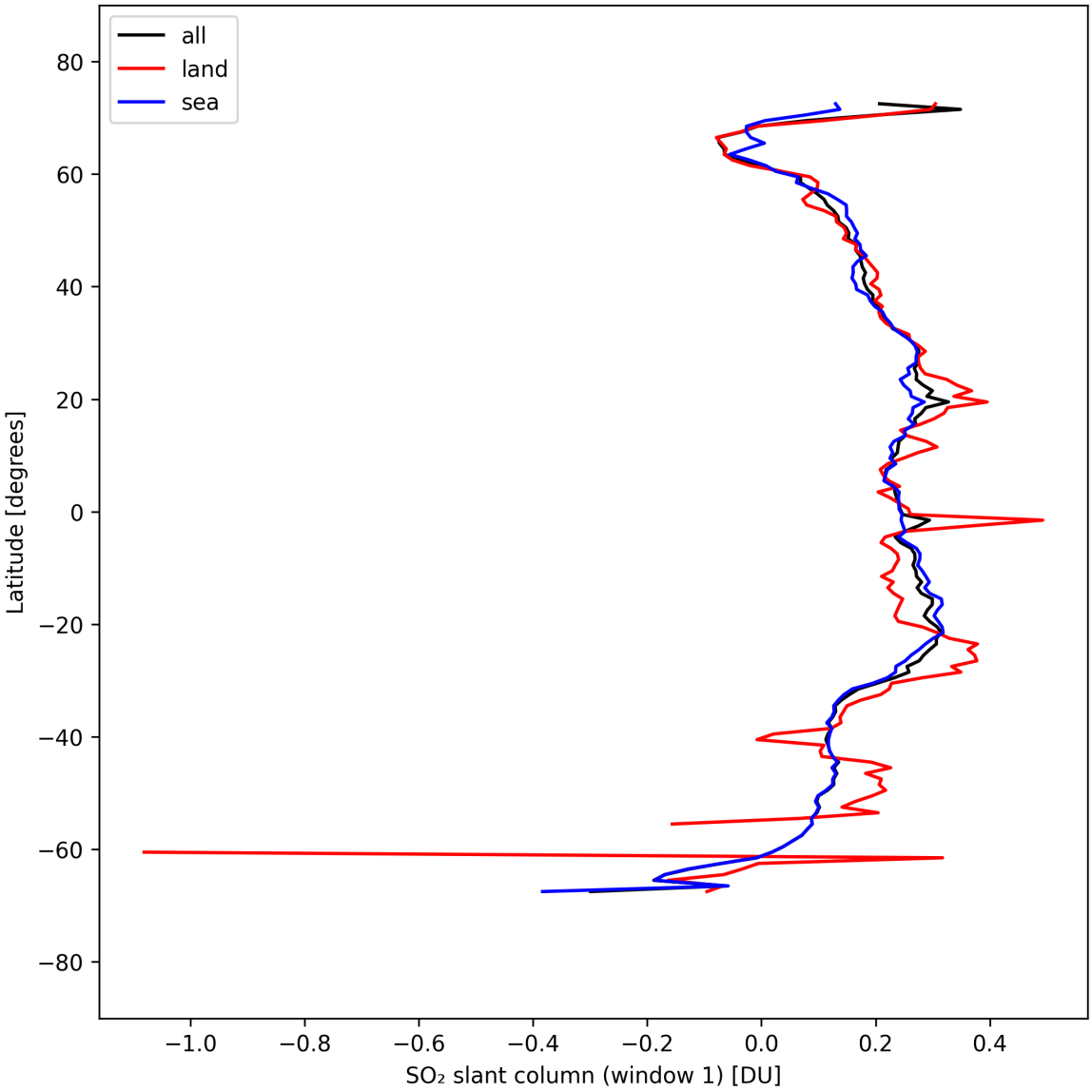

Figure 36: Zonal average of "SO_2 slant column (window 1)" for 2025-03-26 to 2025-03-26.

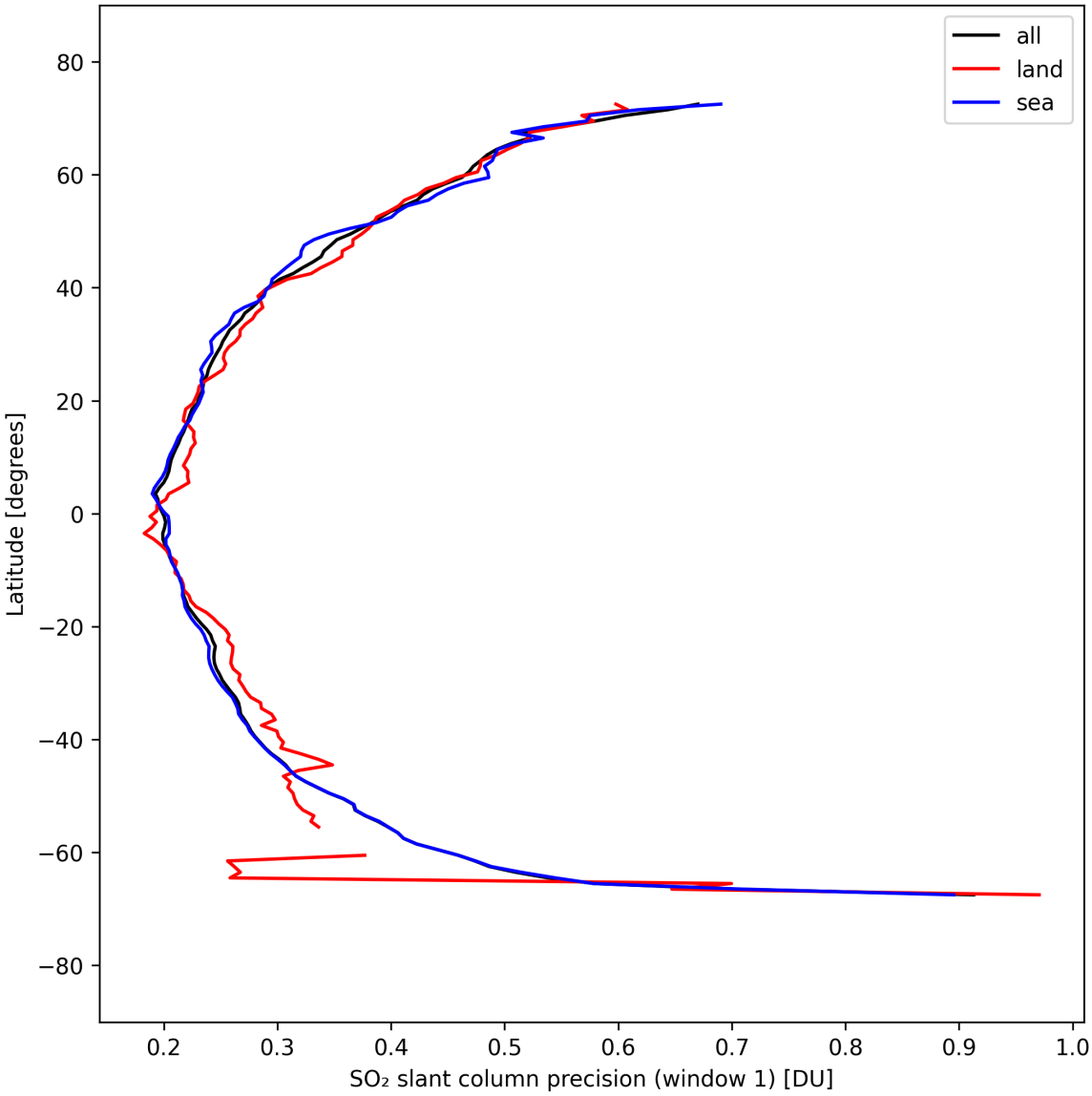

Figure 37: Zonal average of "SO_2 slant column precision (window 1)" for 2025-03-26 to 2025-03-26.

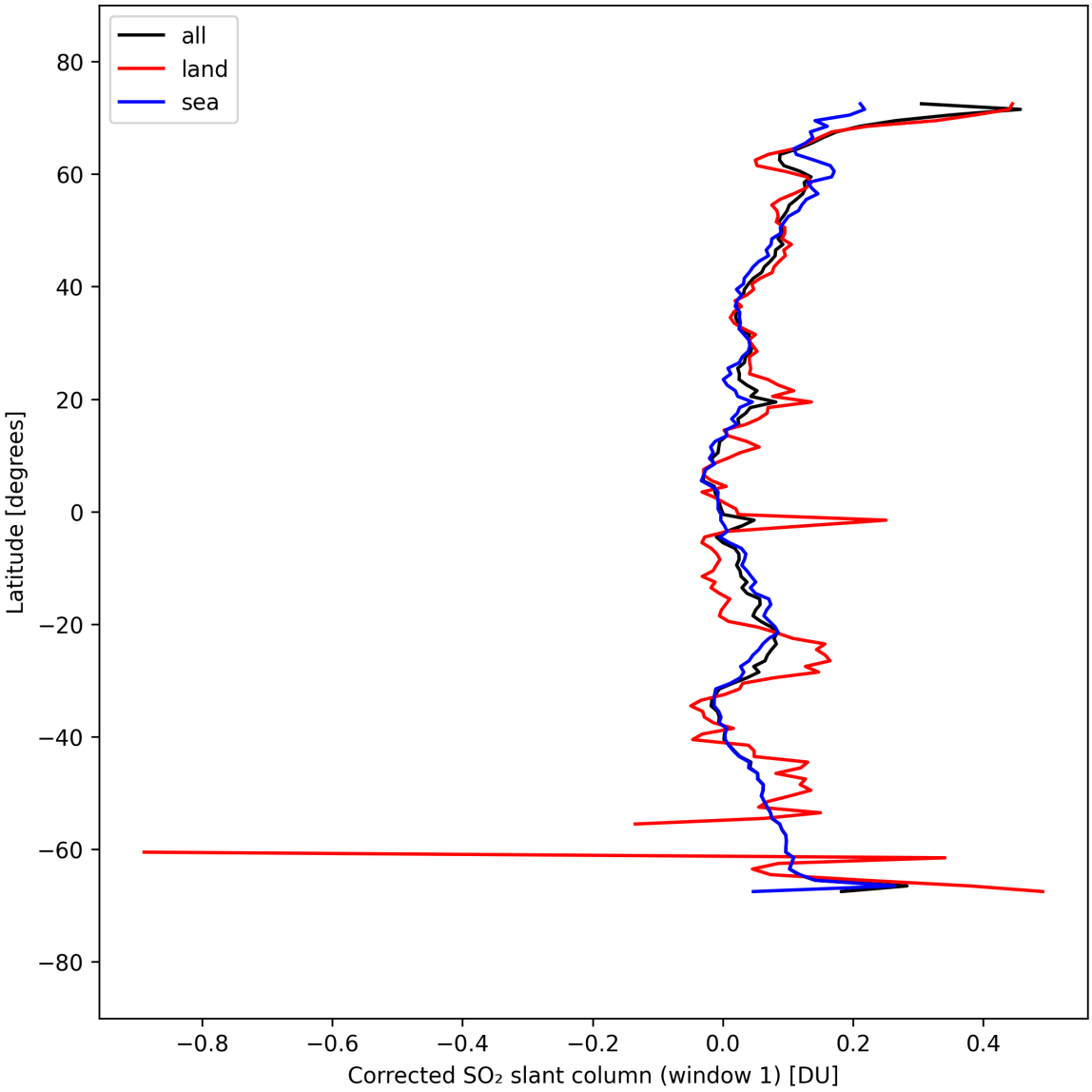

Figure 38: Zonal average of "Corrected SO_2 slant column (window 1)" for 2025-03-26 to 2025-03-26.

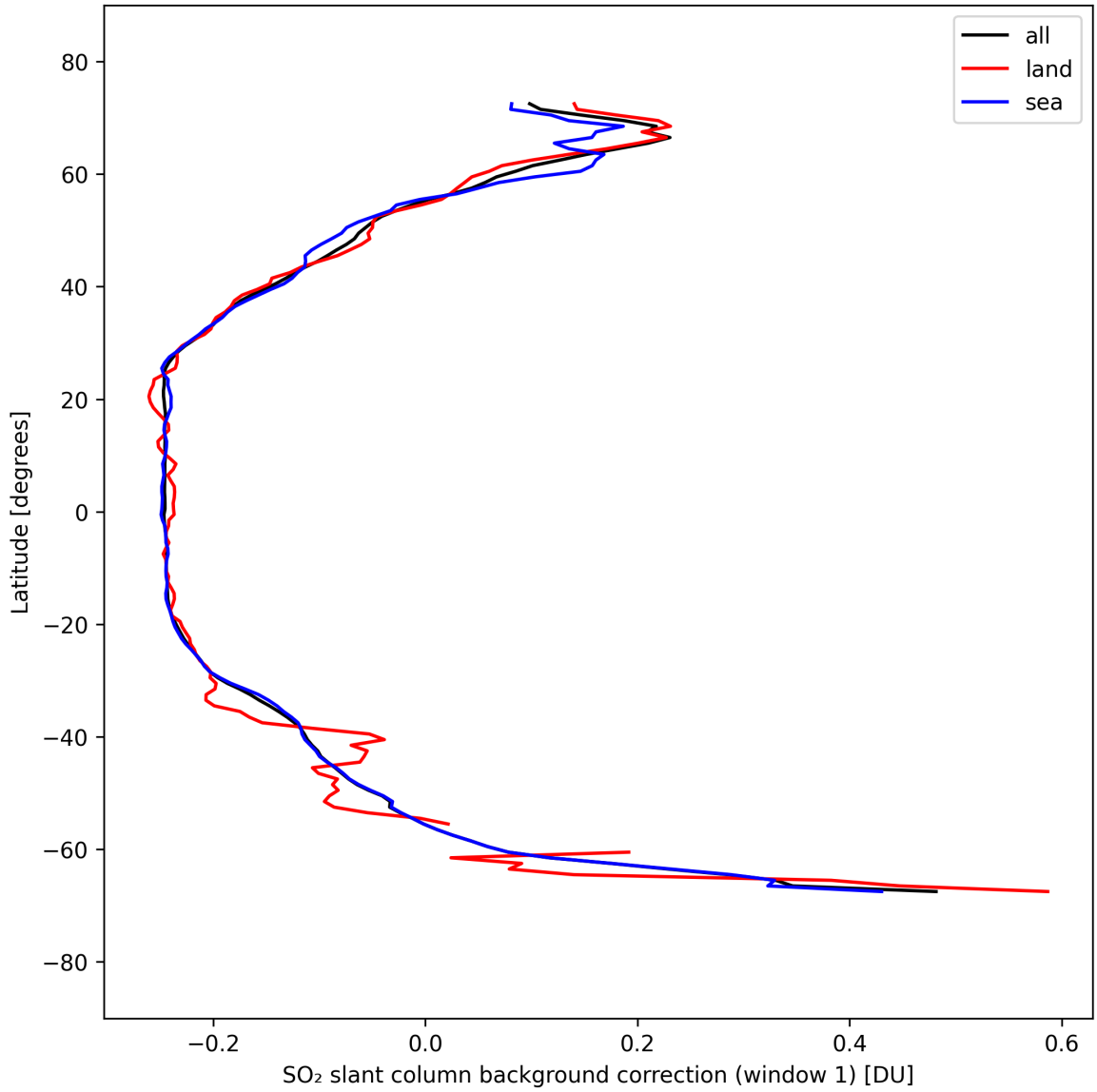

Figure 39: Zonal average of "SO_2 slant column background correction (window 1)" for 2025-03-26 to 2025-03-26.

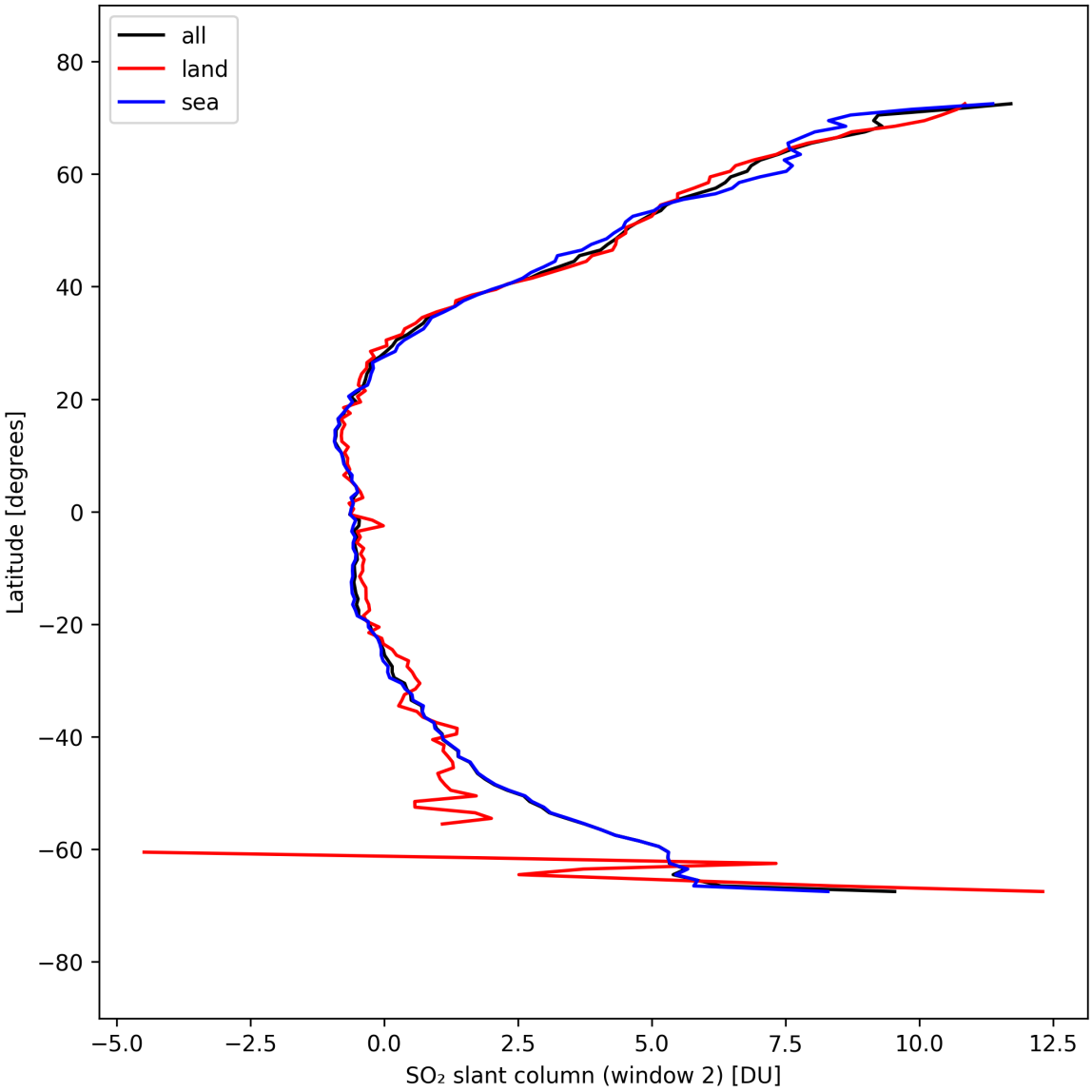

Figure 40: Zonal average of "SO_2 slant column (window 2)" for 2025-03-26 to 2025-03-26.

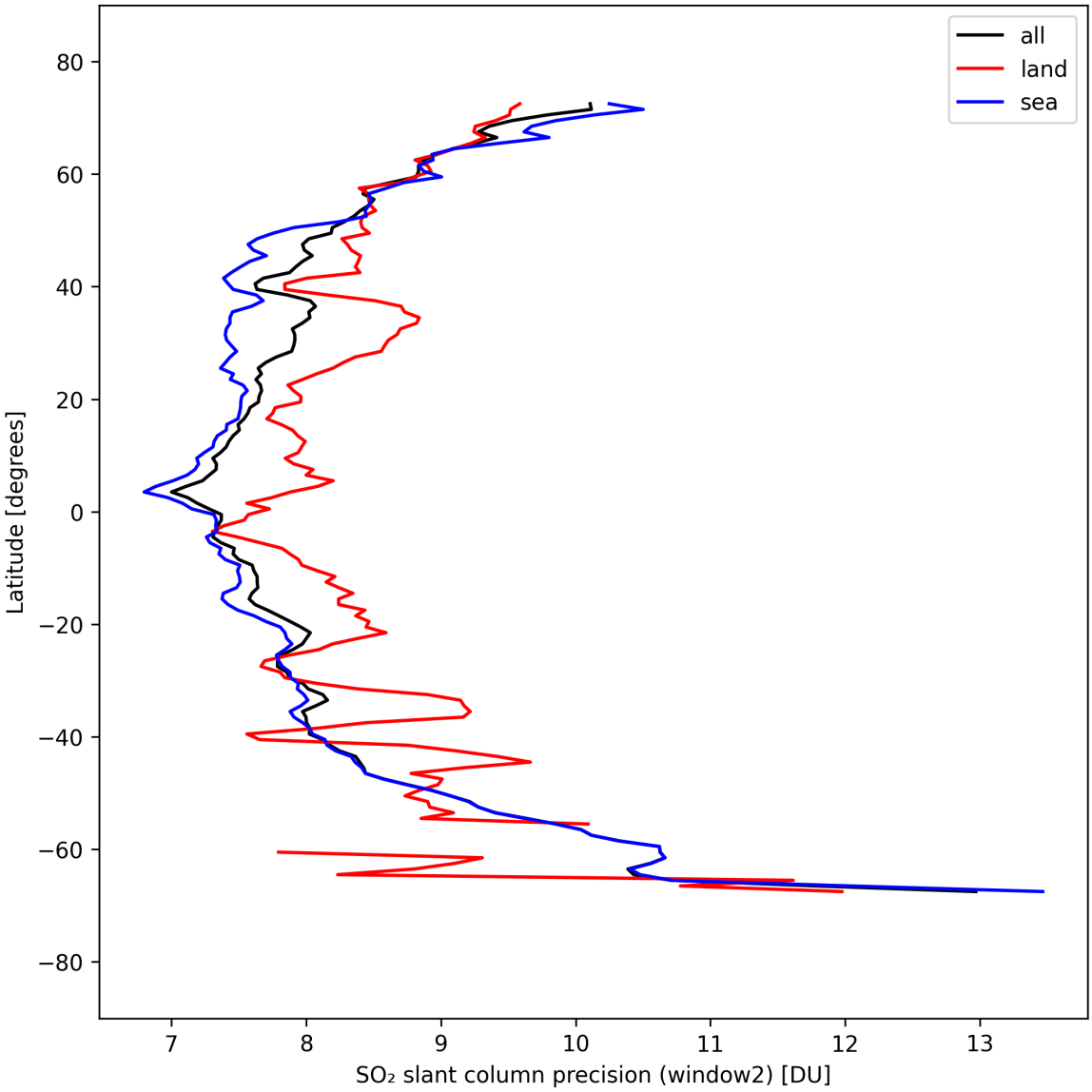

Figure 41: Zonal average of "SO_2 slant column precision (window2)" for 2025-03-26 to 2025-03-26.

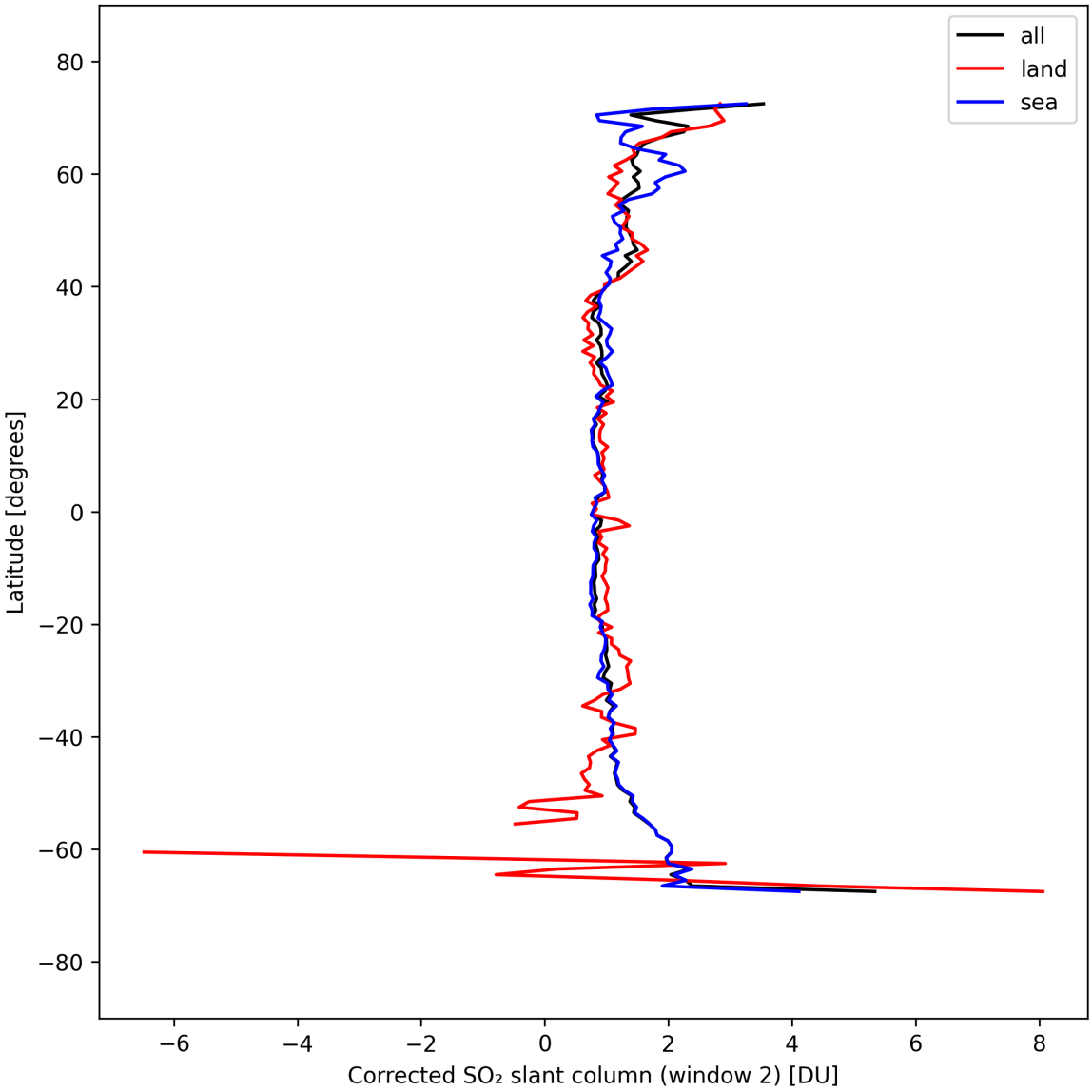

Figure 42: Zonal average of “Corrected SO_2 slant column (window 2)” for 2025-03-26 to 2025-03-26.

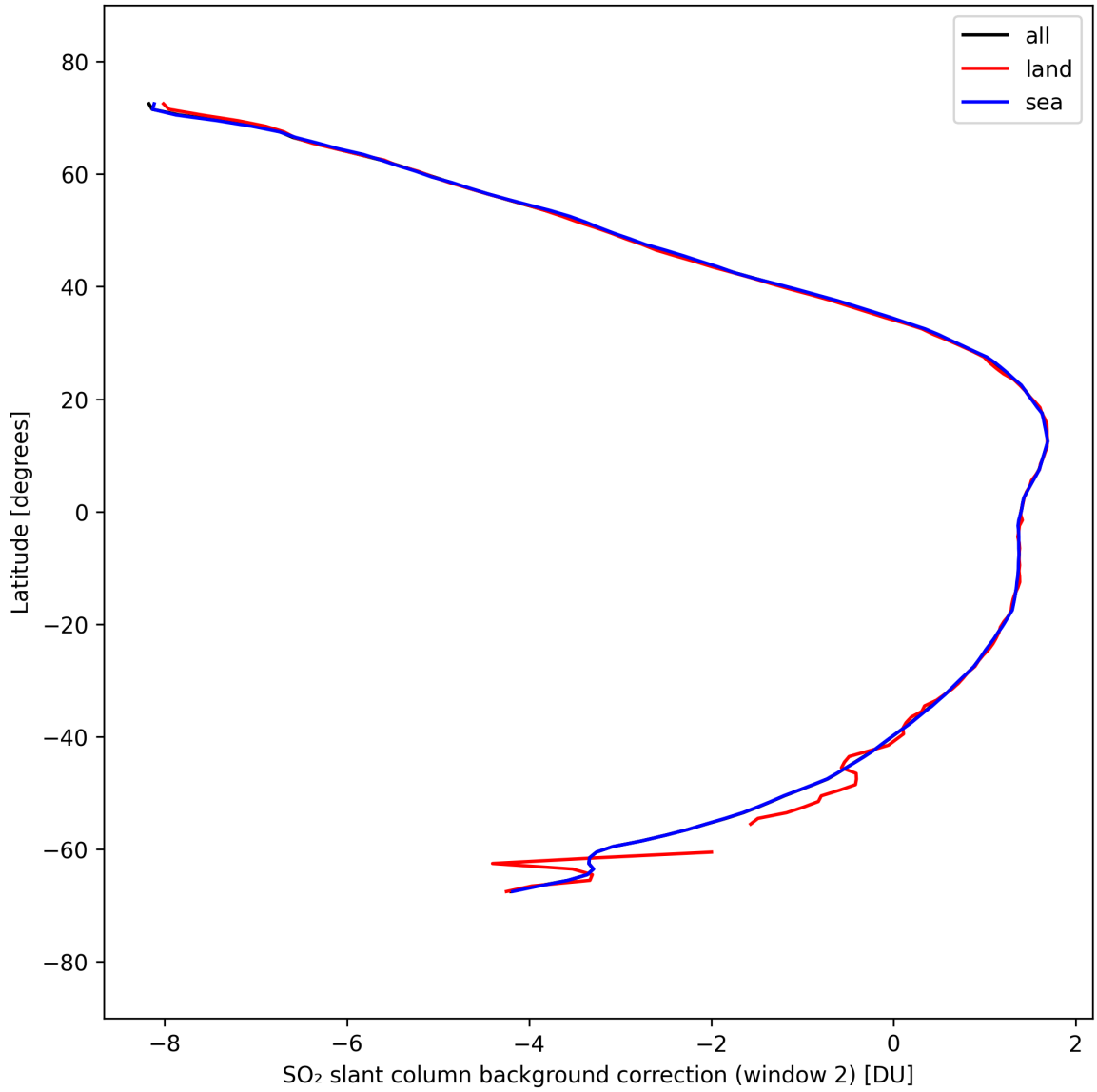

Figure 43: Zonal average of "SO_2 slant column background correction (window 2)" for 2025-03-26 to 2025-03-26.

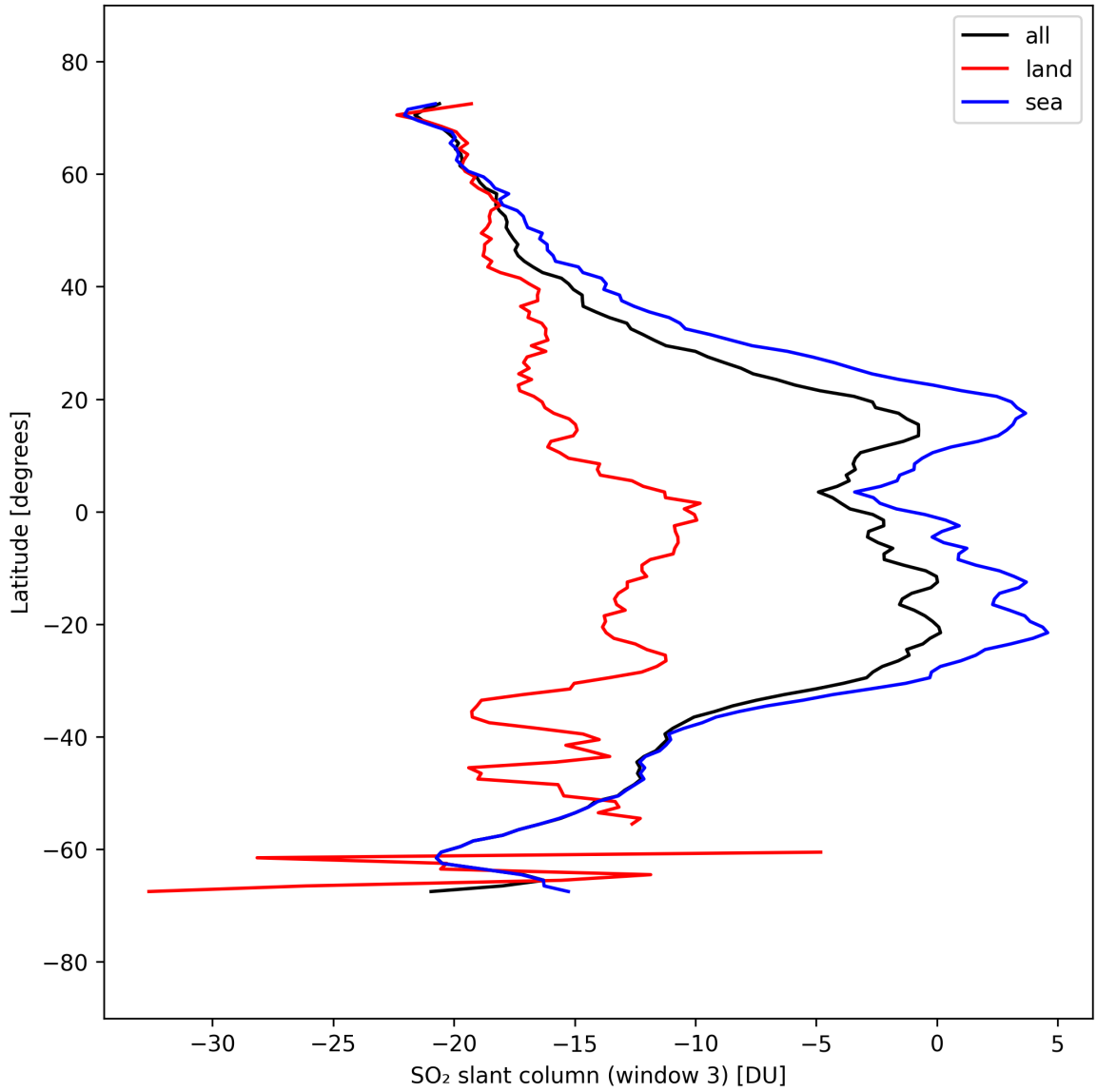

Figure 44: Zonal average of "SO_2 slant column (window 3)" for 2025-03-26 to 2025-03-26.

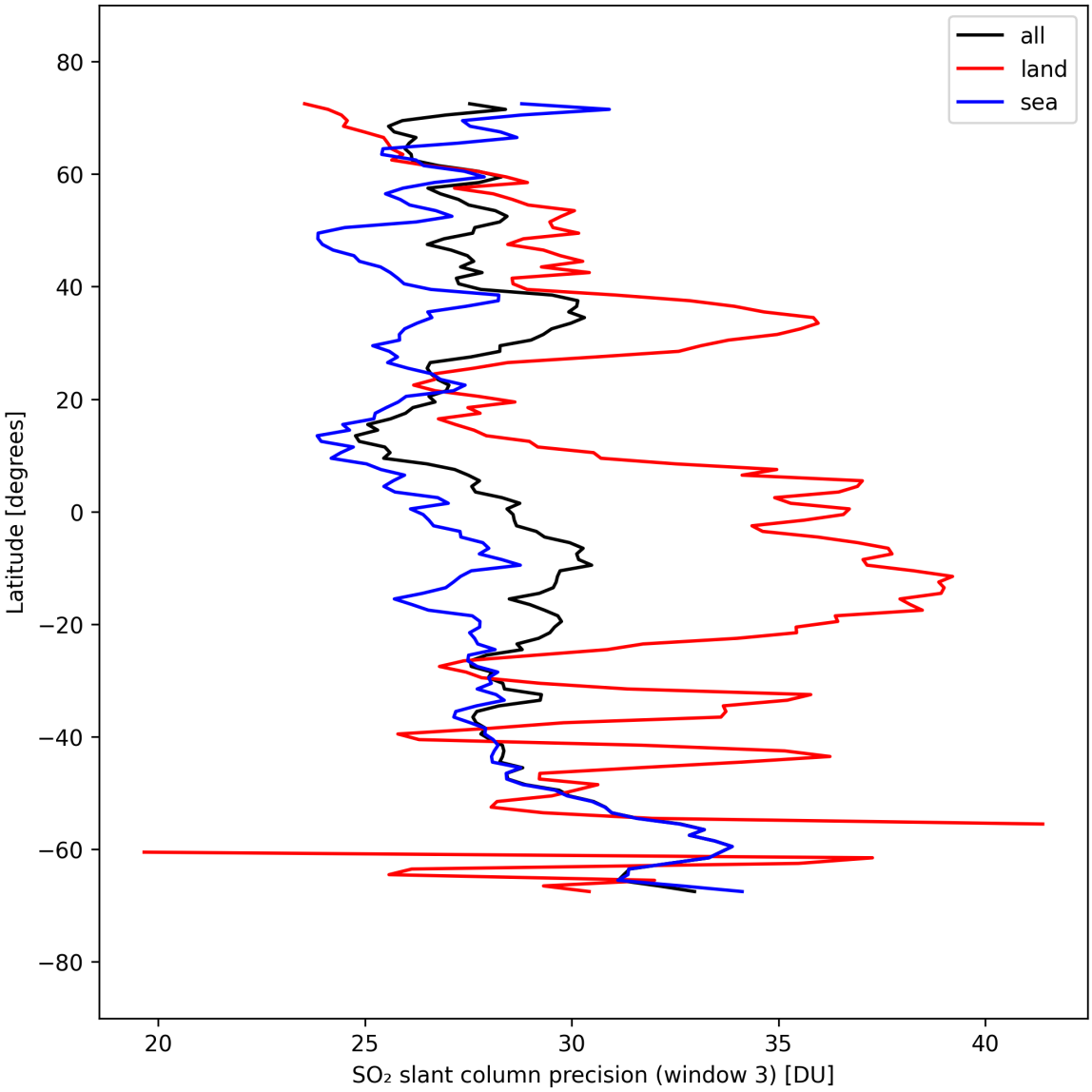

Figure 45: Zonal average of "SO_2 slant column precision (window 3)" for 2025-03-26 to 2025-03-26.

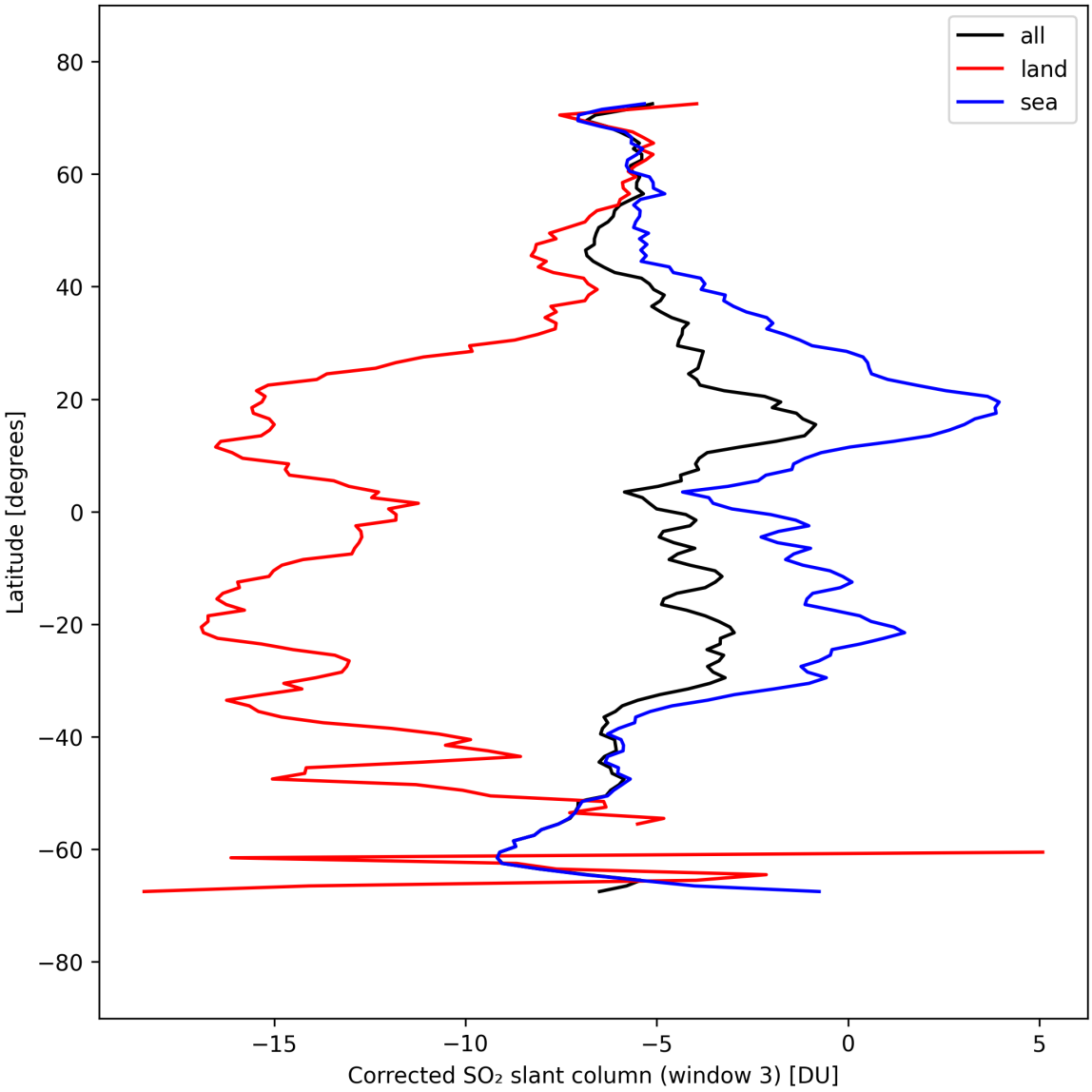

Figure 46: Zonal average of "Corrected SO_2 slant column (window 3)" for 2025-03-26 to 2025-03-26.

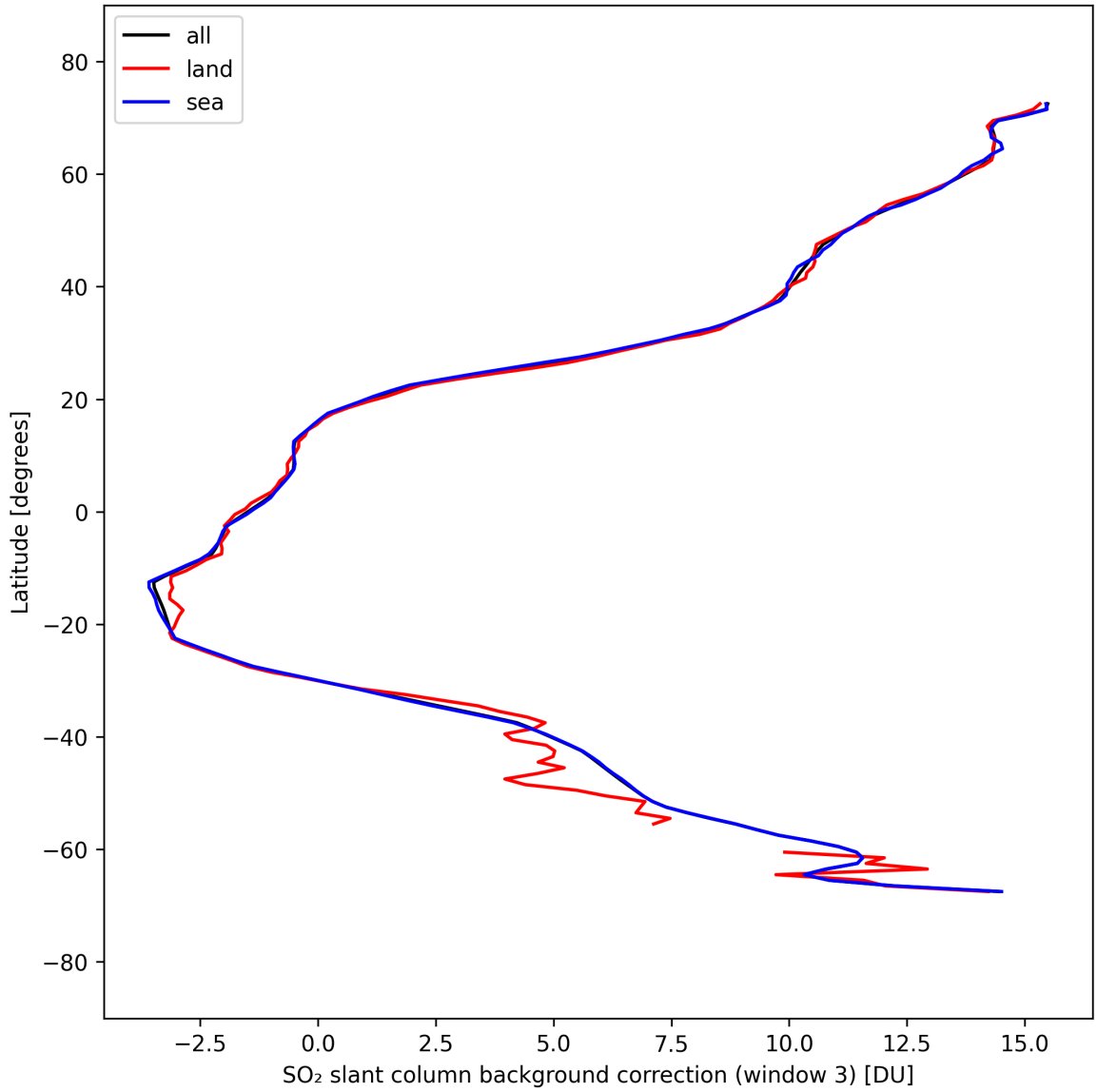

Figure 47: Zonal average of "SO_2 slant column background correction (window 3)" for 2025-03-26 to 2025-03-26.

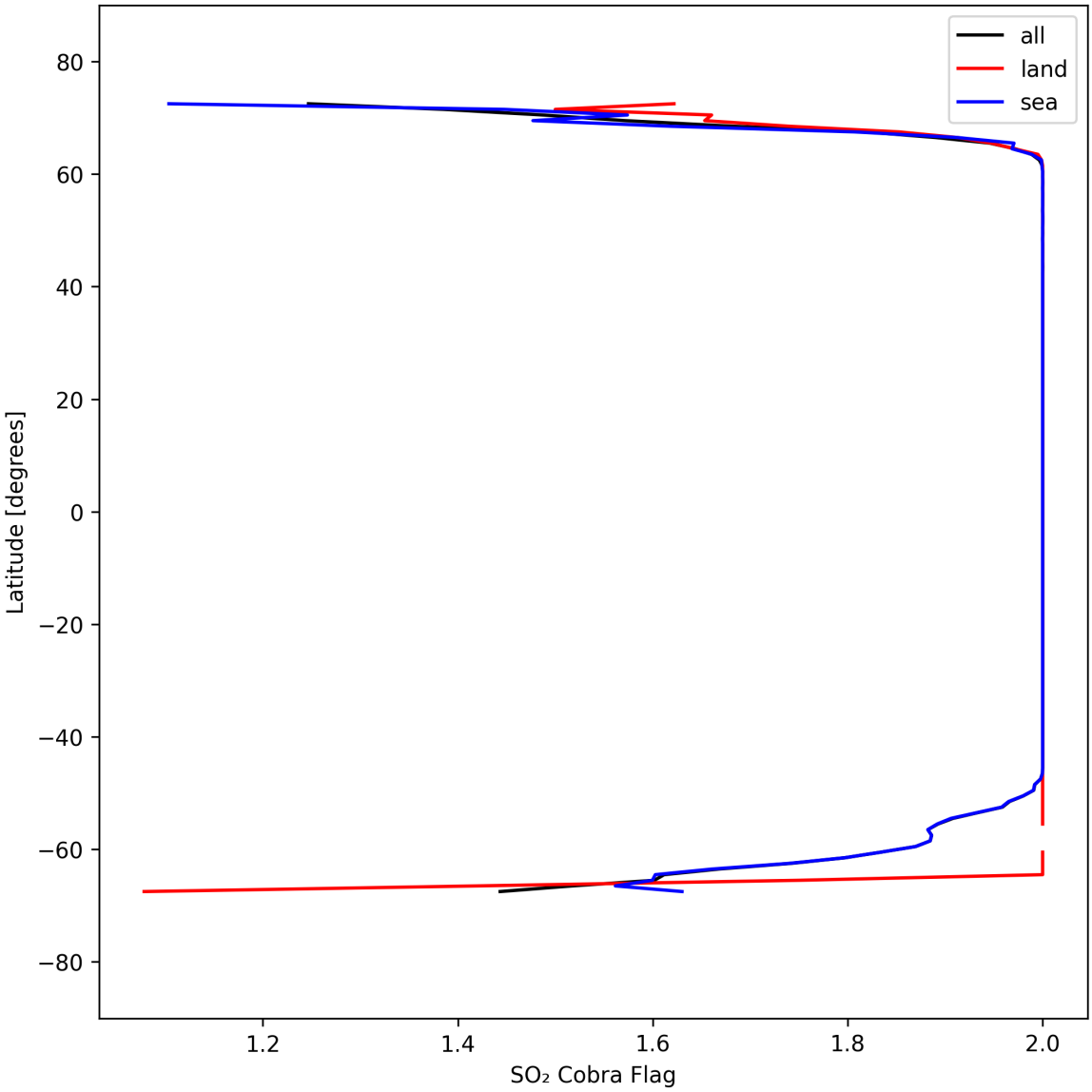

Figure 48: Zonal average of "SO_2 Cobra Flag" for 2025-03-26 to 2025-03-26.

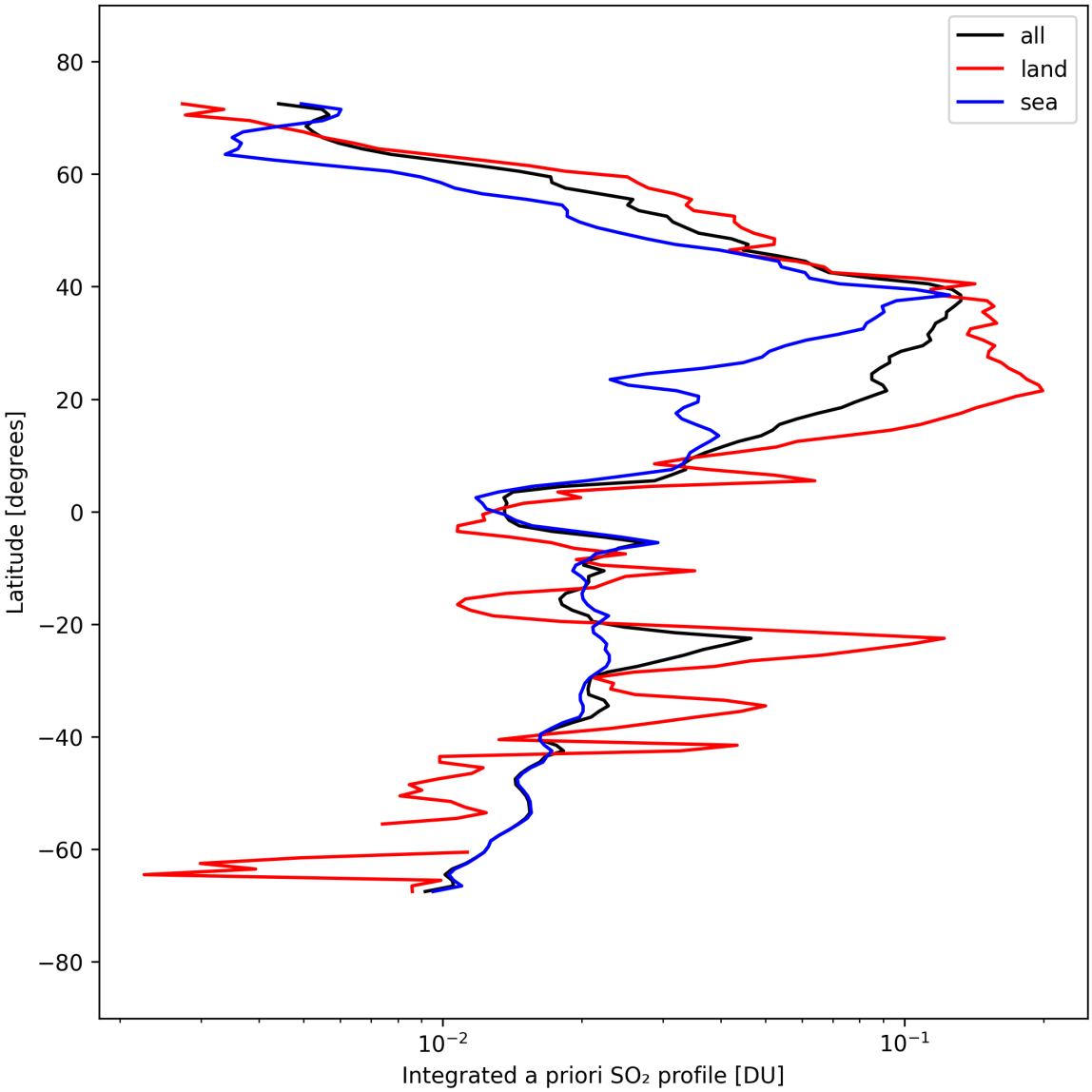

Figure 49: Zonal average of “Integrated a priori SO_2 profile” for 2025-03-26 to 2025-03-26.

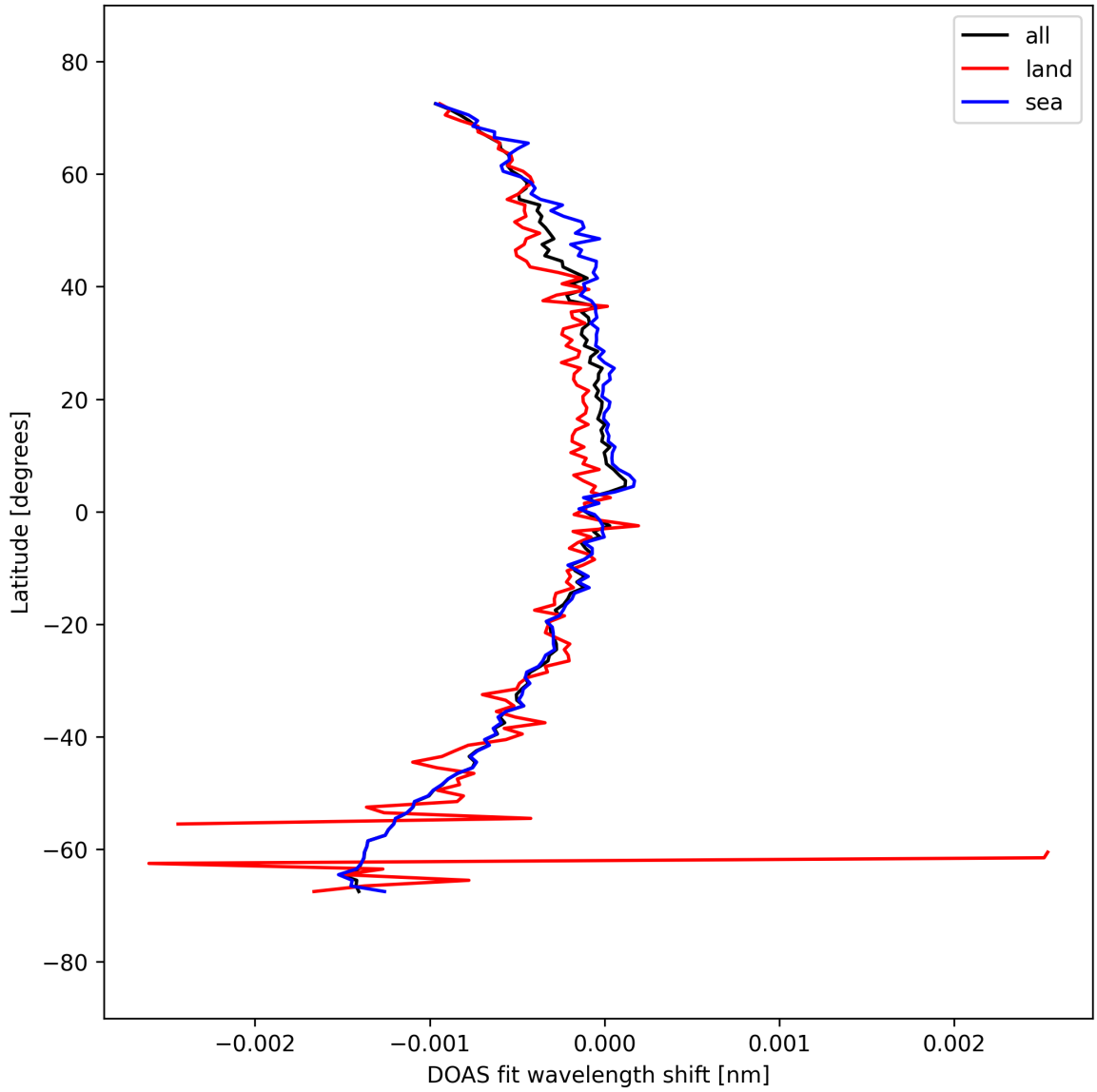

Figure 50: Zonal average of “DOAS fit wavelength shift” for 2025-03-26 to 2025-03-26.

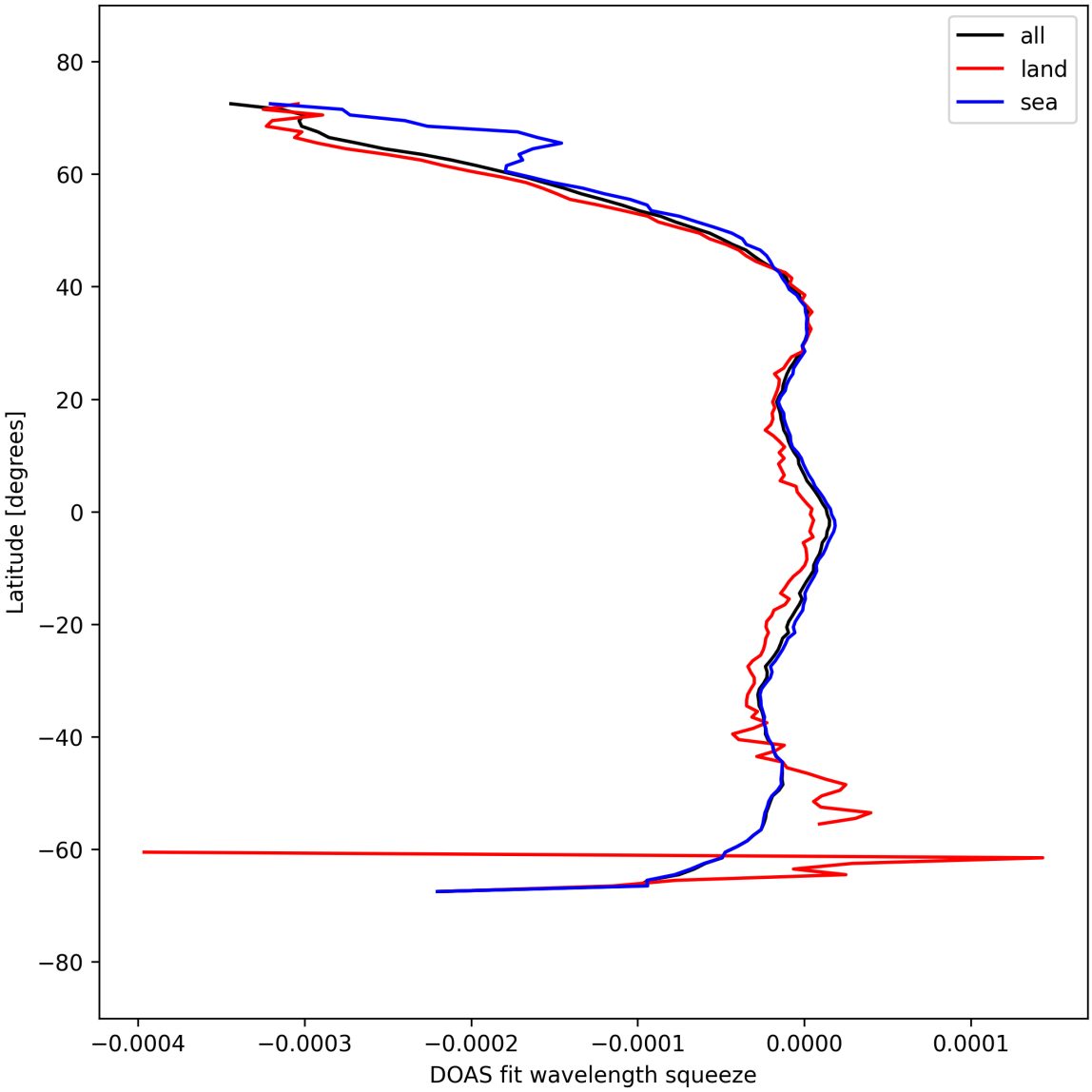

Figure 51: Zonal average of “DOAS fit wavelength squeeze” for 2025-03-26 to 2025-03-26.

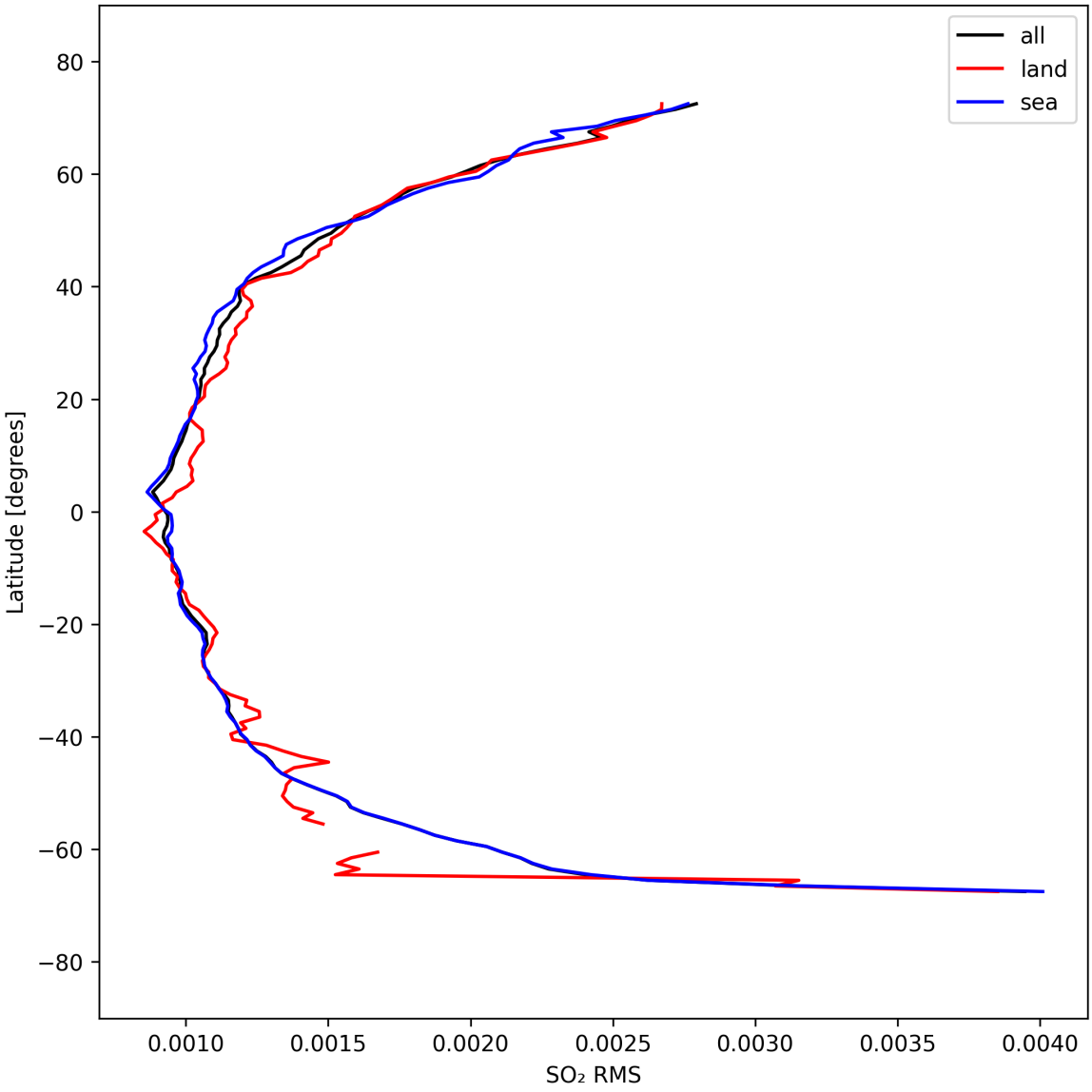

Figure 52: Zonal average of "SO_2 RMS" for 2025-03-26 to 2025-03-26.

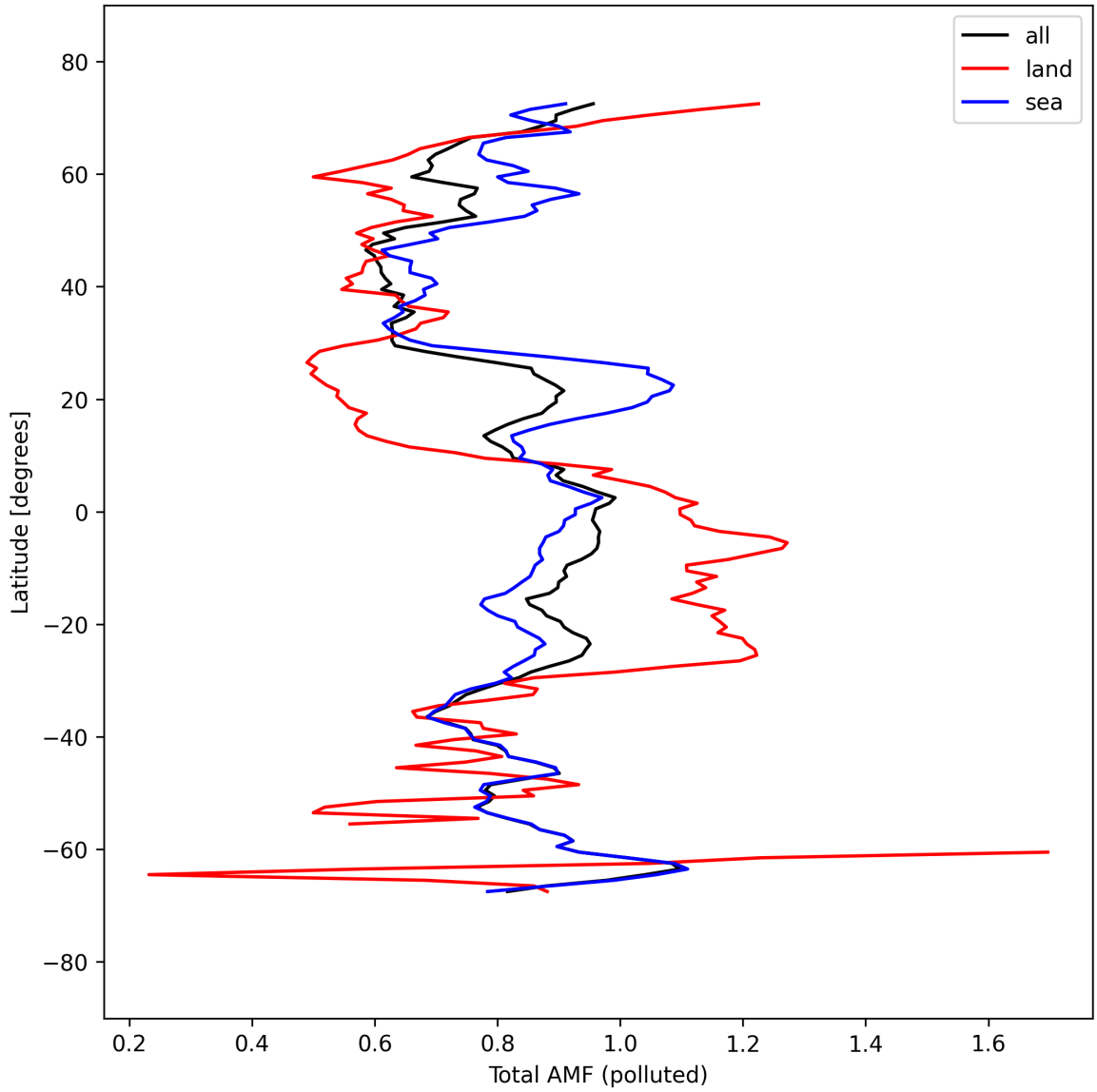

Figure 53: Zonal average of “Total AMF (polluted)” for 2025-03-26 to 2025-03-26.

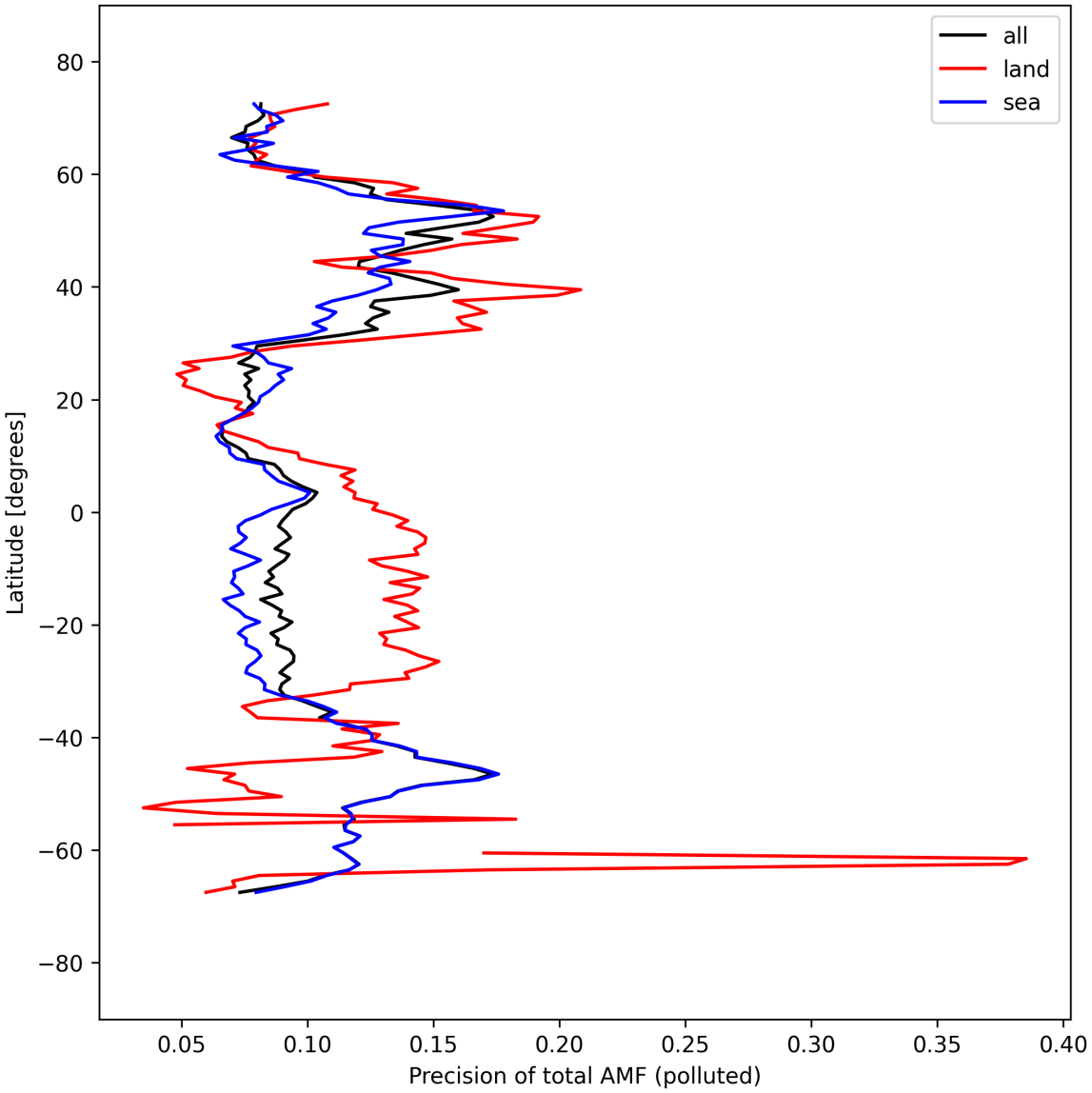

Figure 54: Zonal average of “Precision of total AMF (polluted)” for 2025-03-26 to 2025-03-26.

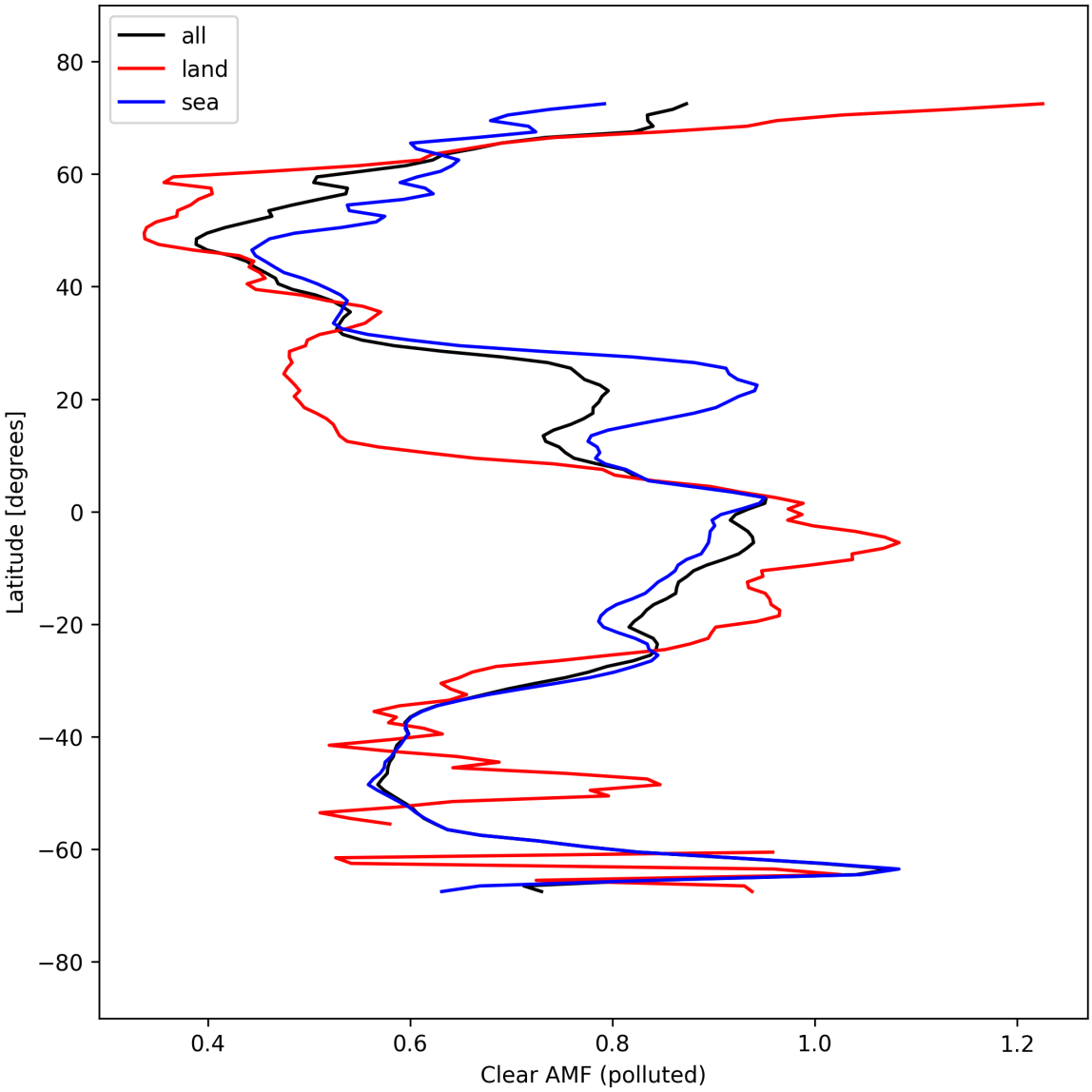

Figure 55: Zonal average of “Clear AMF (polluted)” for 2025-03-26 to 2025-03-26.

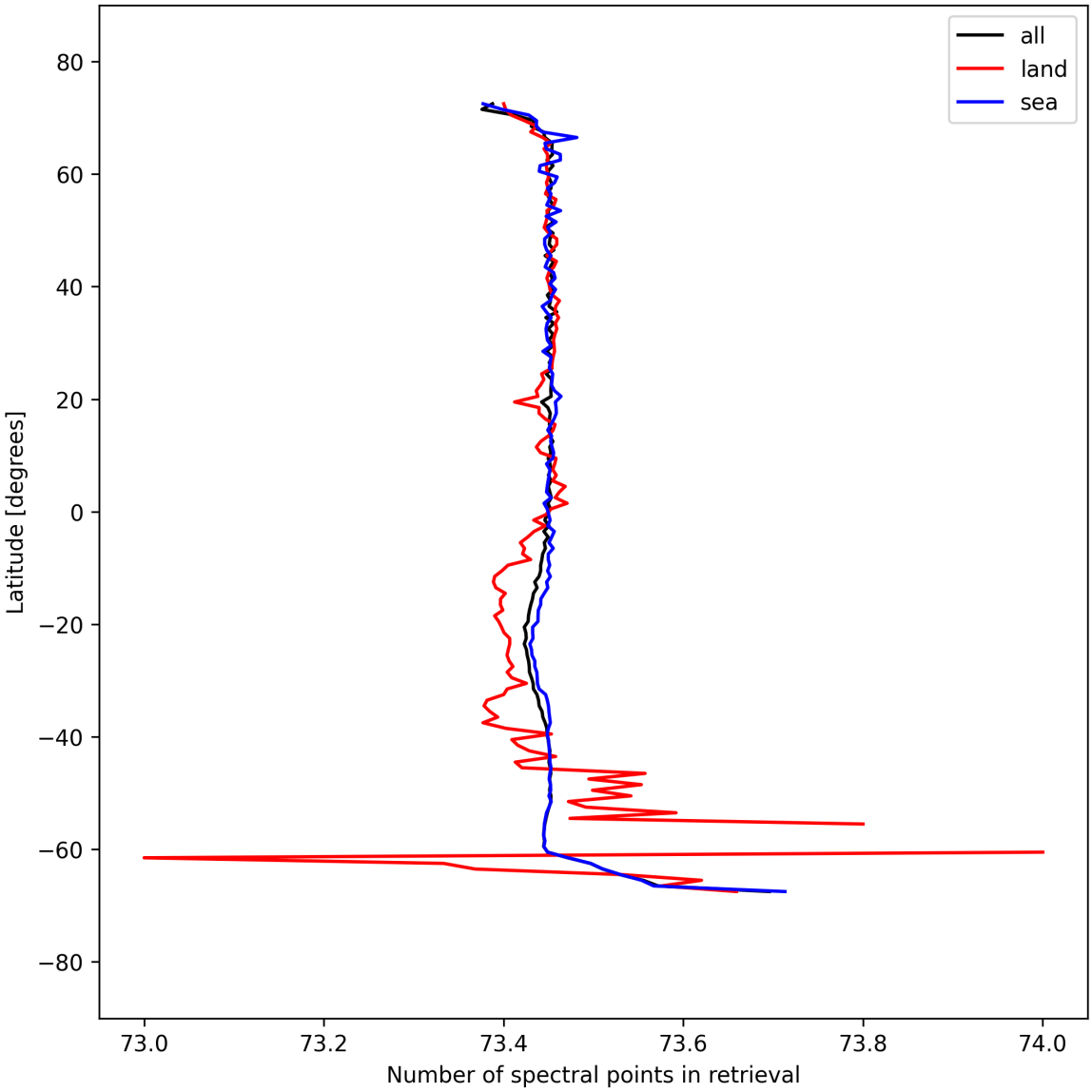

Figure 56: Zonal average of “Number of spectral points in retrieval” for 2025-03-26 to 2025-03-26.

8 Histograms

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

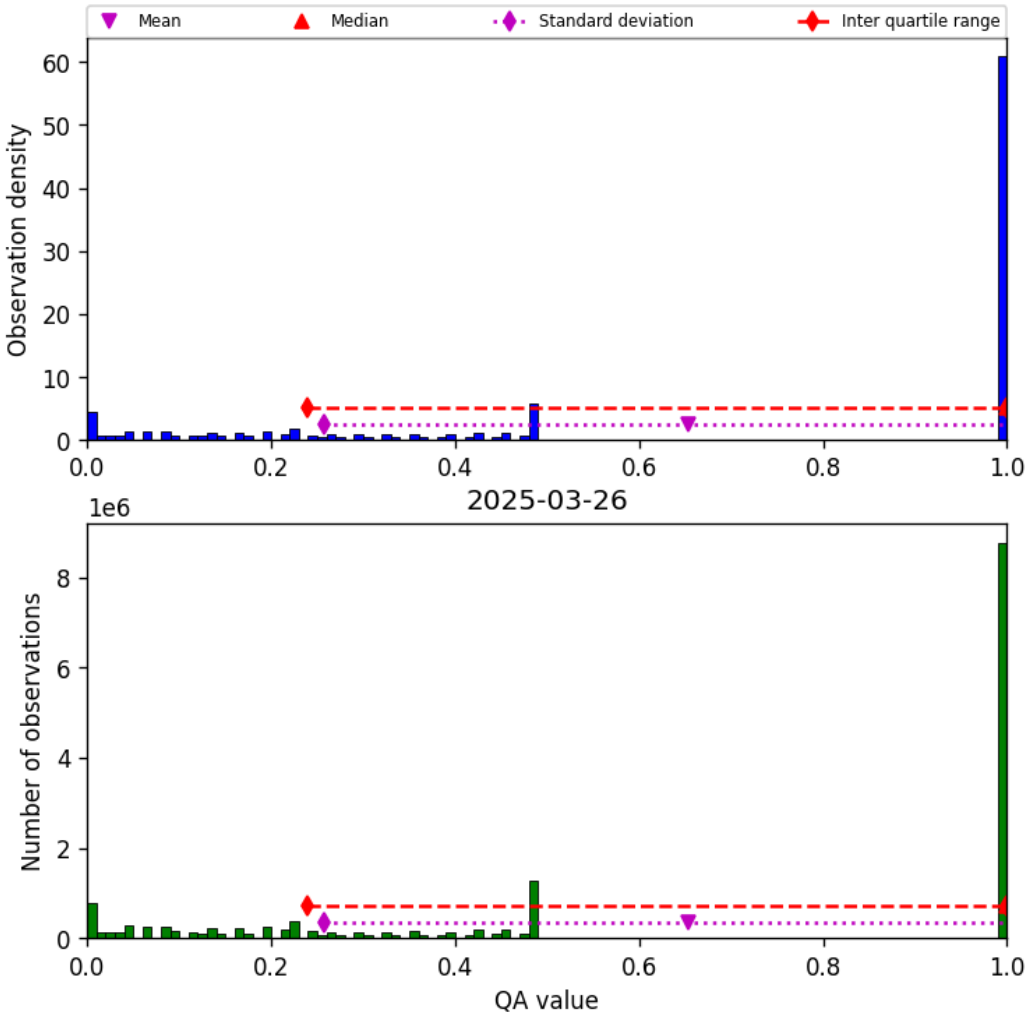

Figure 57: Histogram of “QA value” for 2025-03-26 to 2025-03-26

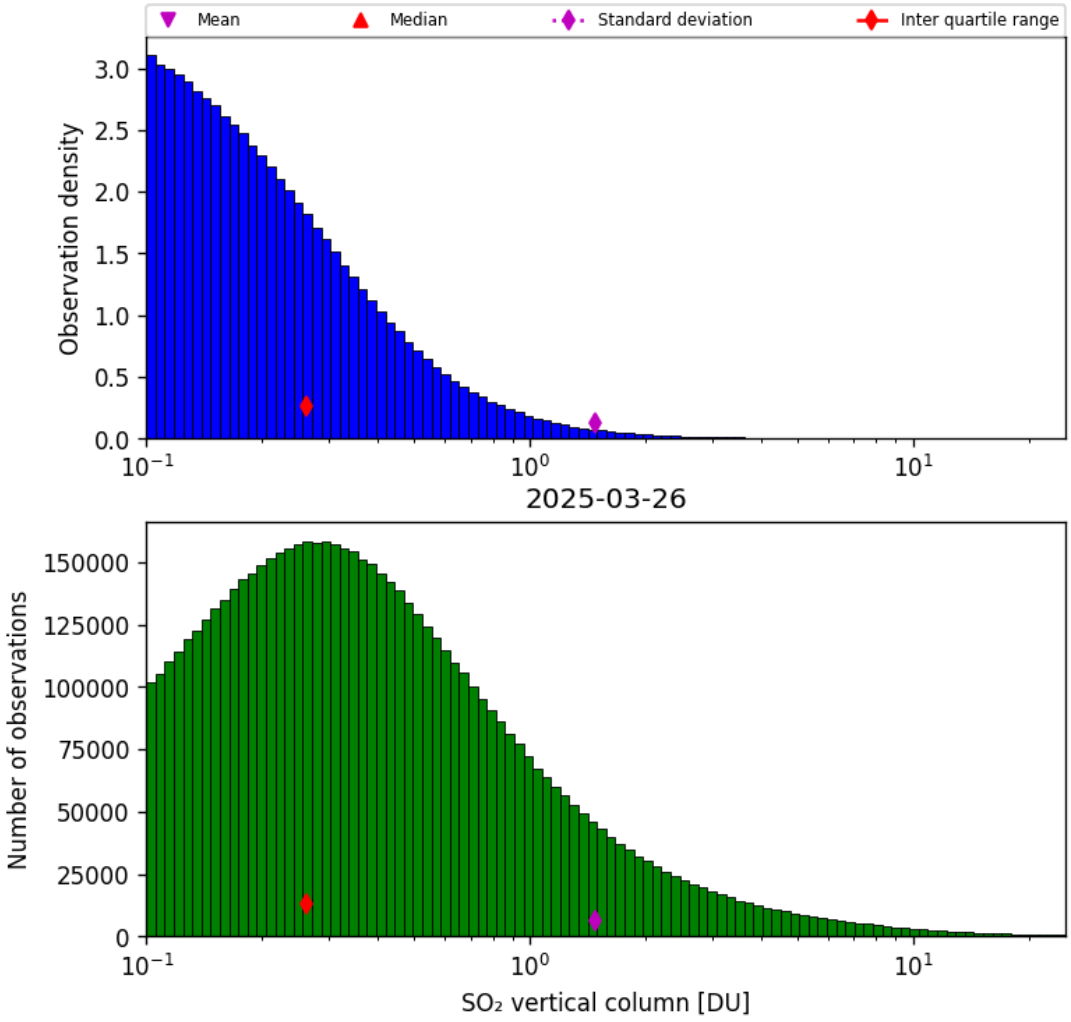

Figure 58: Histogram of "SO_2 vertical column" for 2025-03-26 to 2025-03-26

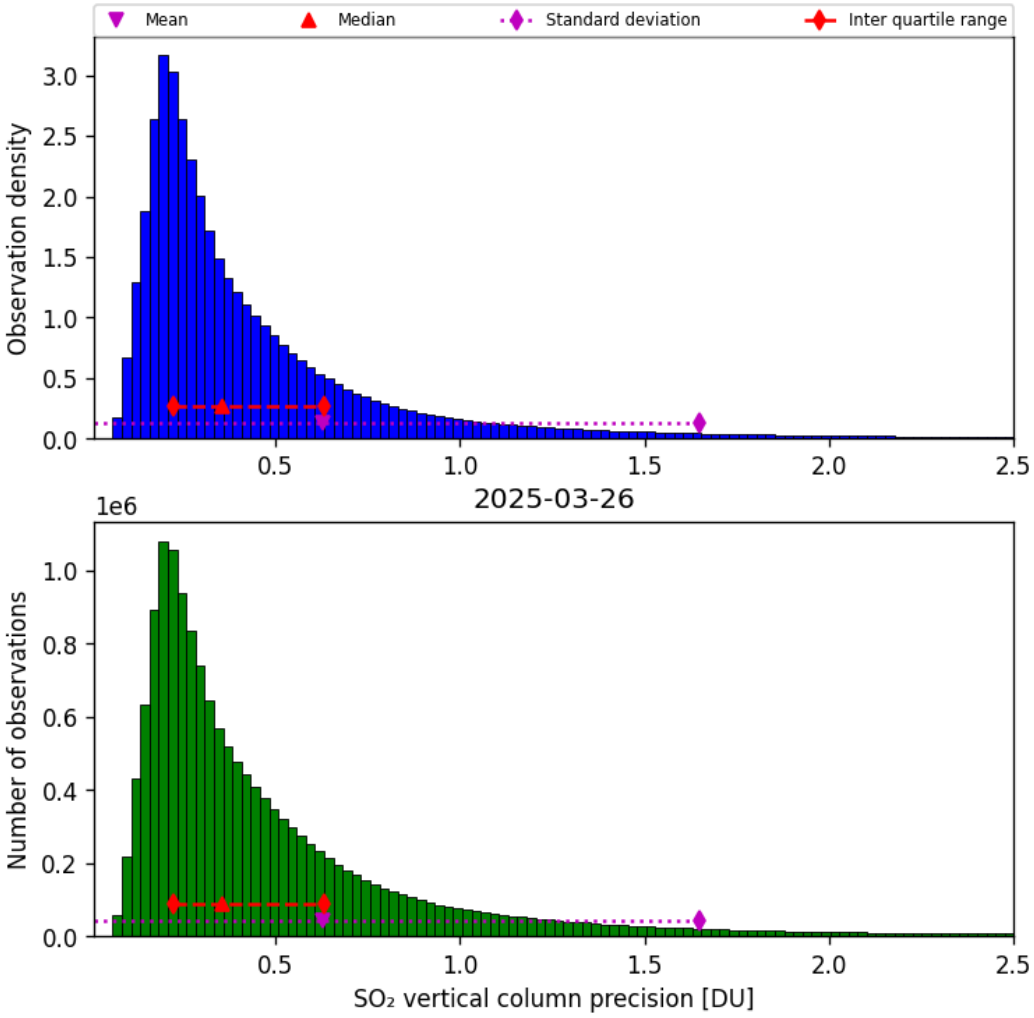

Figure 59: Histogram of "SO_2 vertical column precision" for 2025-03-26 to 2025-03-26

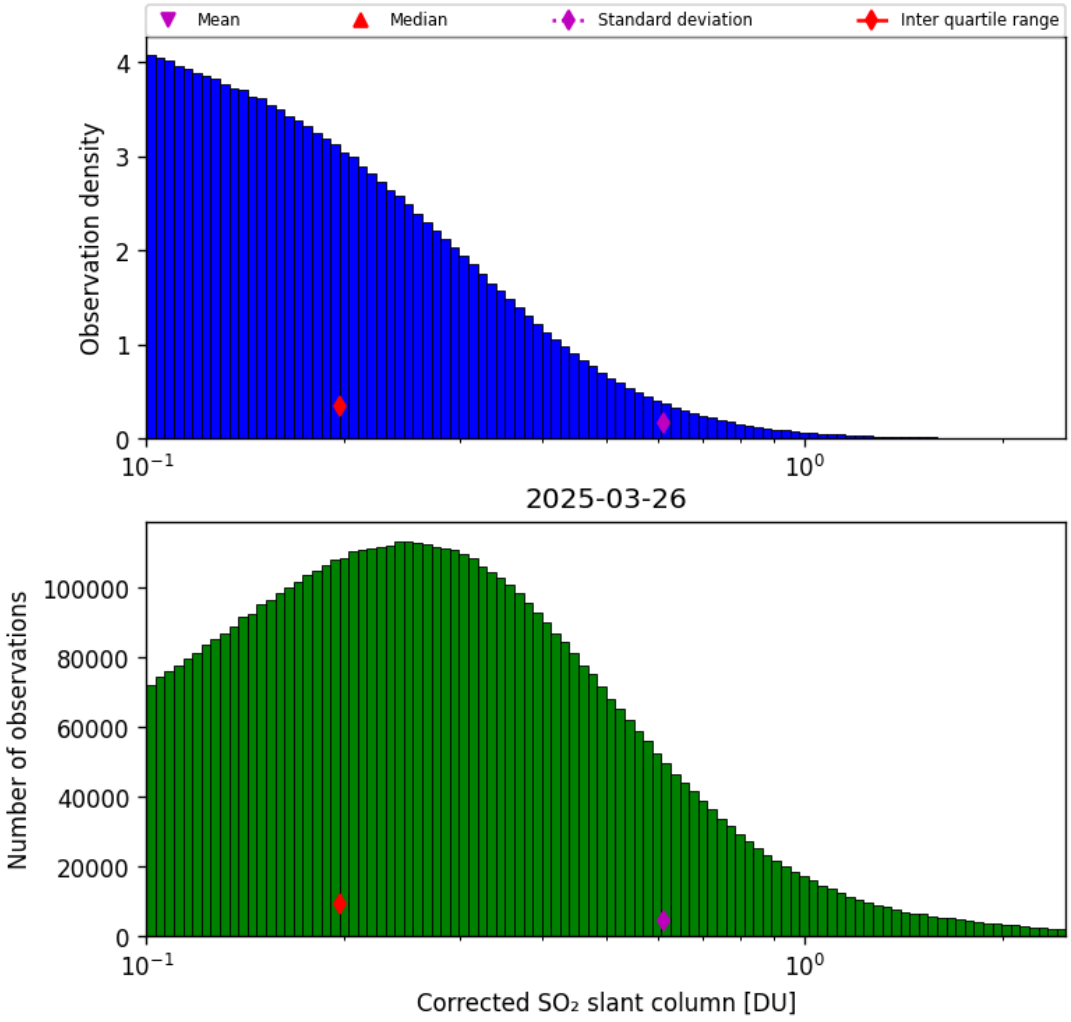

Figure 60: Histogram of "Corrected SO_2 slant column" for 2025-03-26 to 2025-03-26

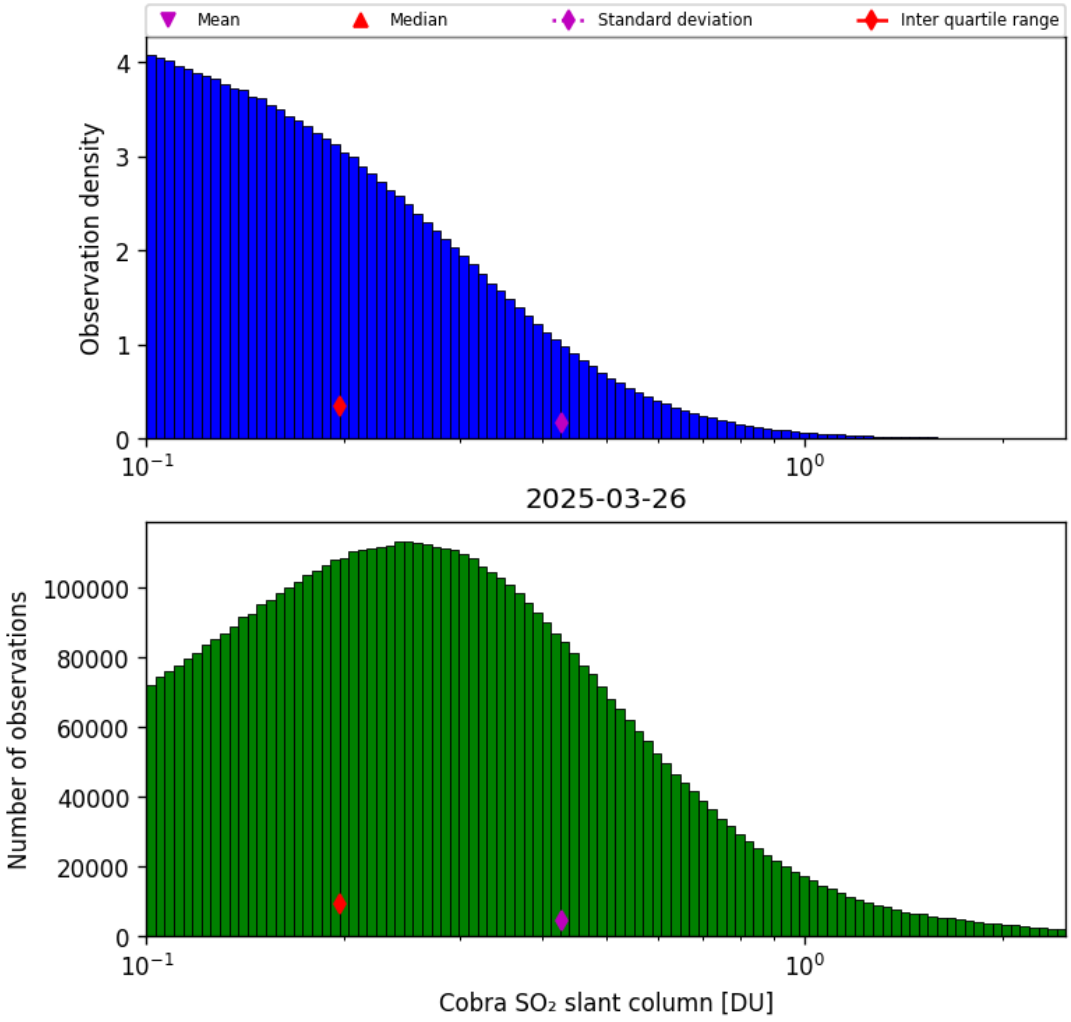

Figure 61: Histogram of "Cobra SO_2 slant column" for 2025-03-26 to 2025-03-26

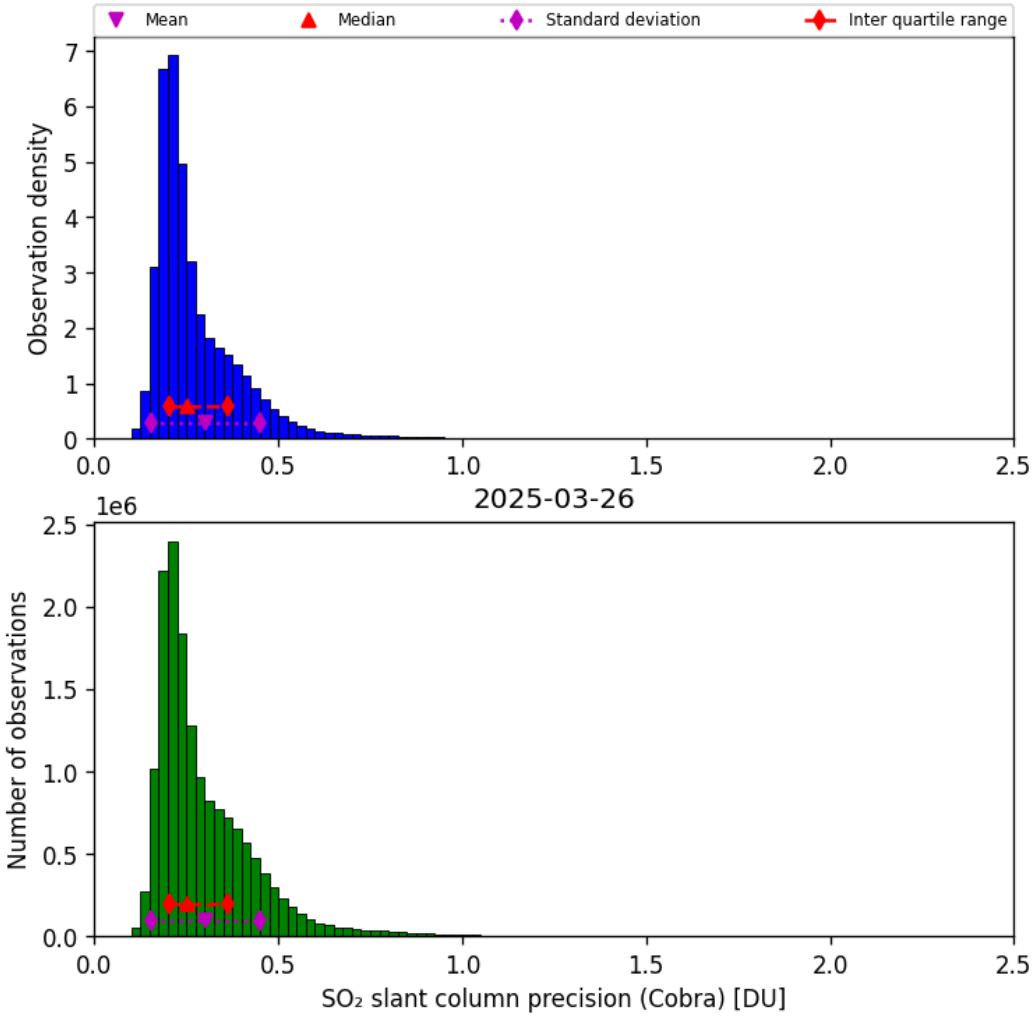

Figure 62: Histogram of "SO_2 slant column precision (Cobra)" for 2025-03-26 to 2025-03-26

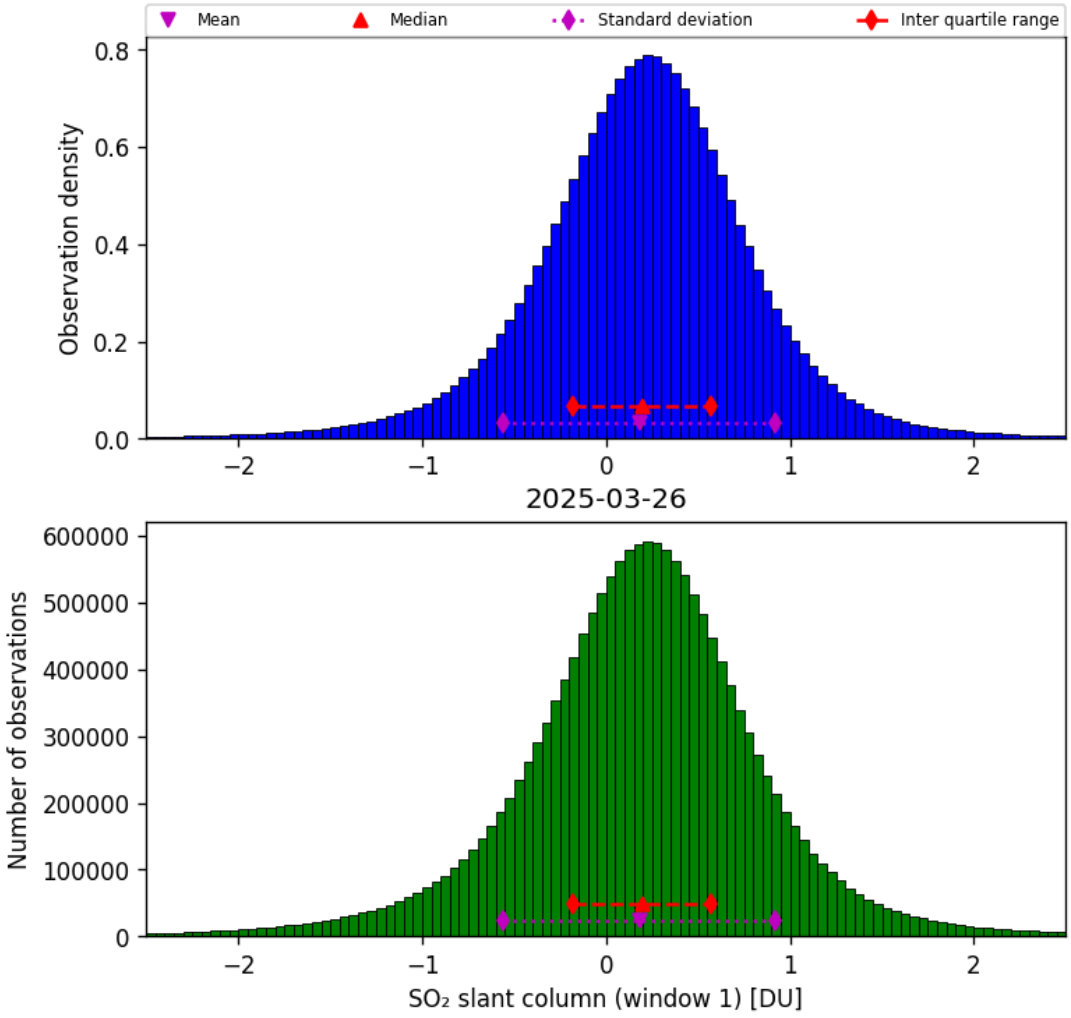

Figure 63: Histogram of "SO_2 slant column (window 1)" for 2025-03-26 to 2025-03-26

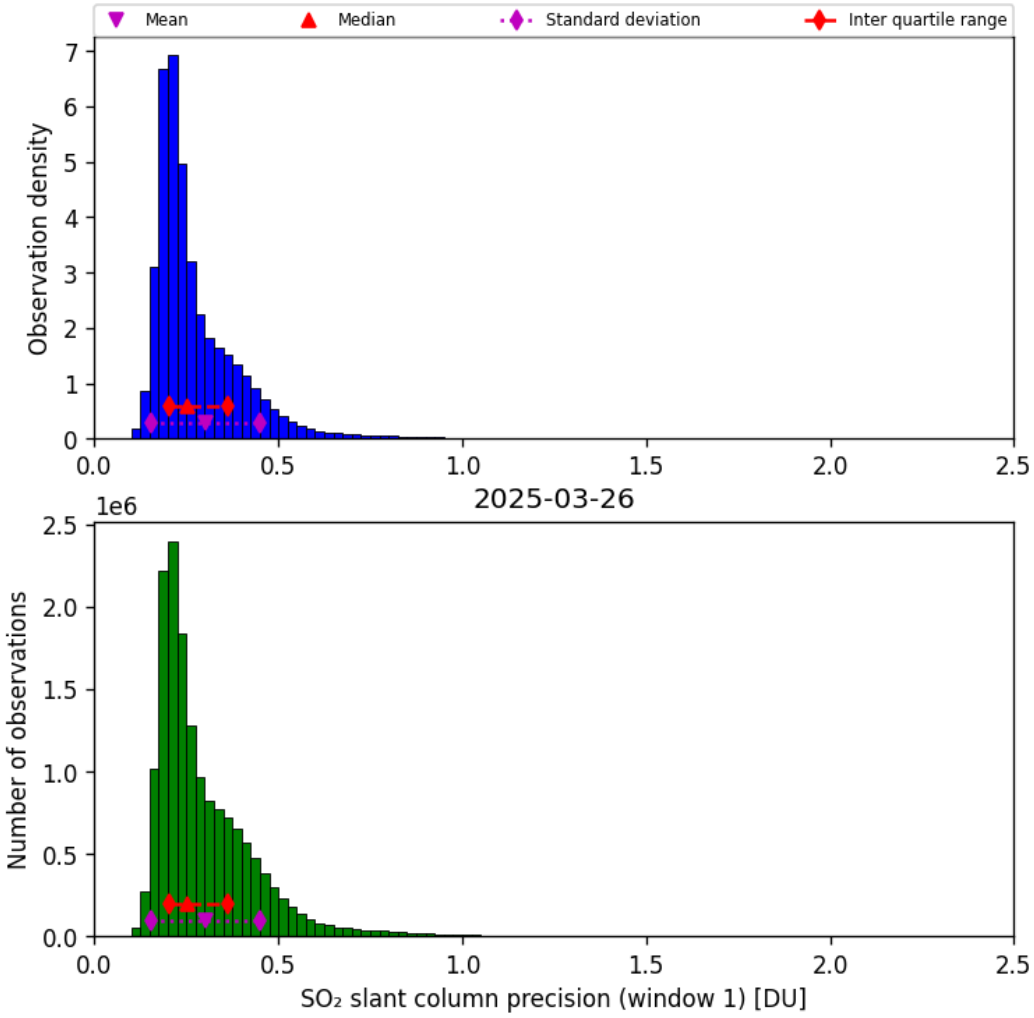

Figure 64: Histogram of "SO_2 slant column precision (window 1)" for 2025-03-26 to 2025-03-26

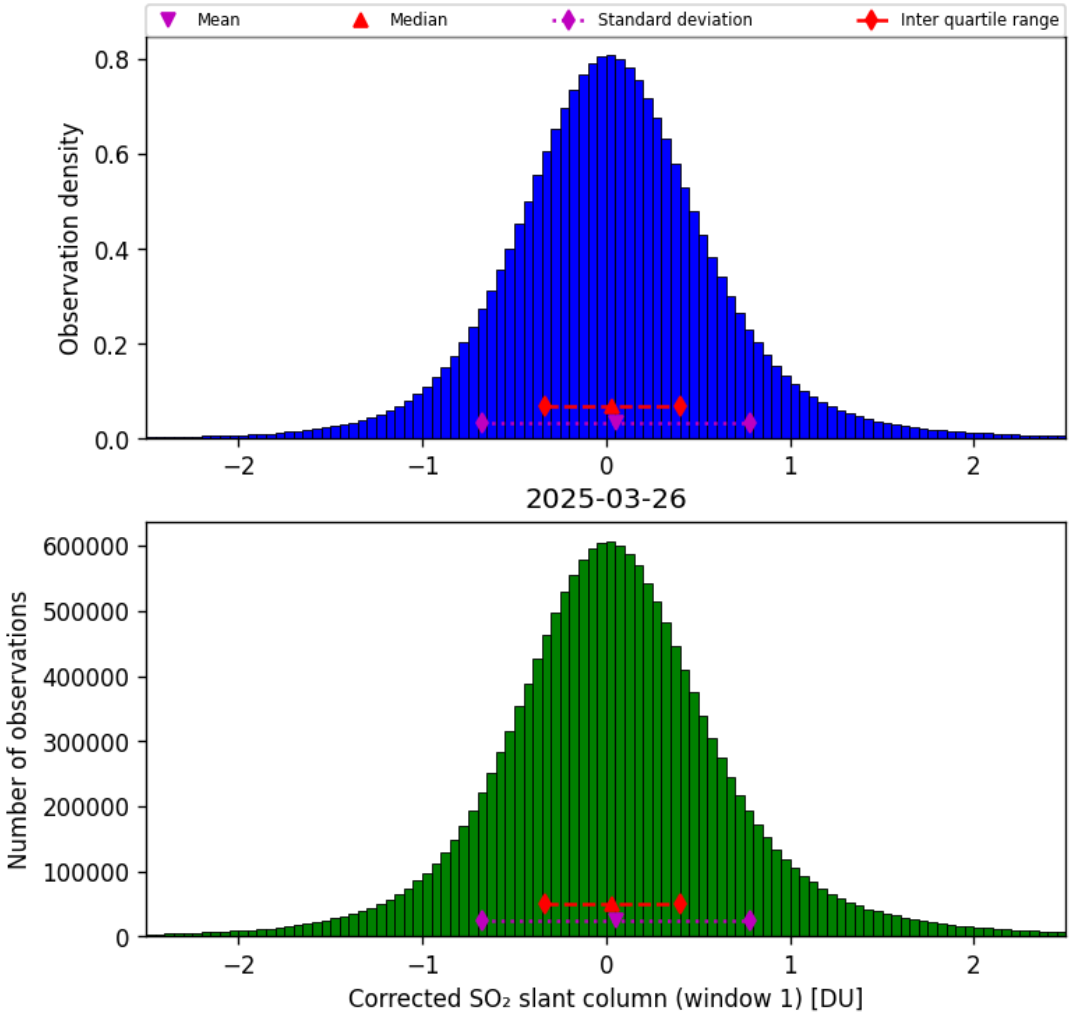

Figure 65: Histogram of "Corrected SO_2 slant column (window 1)" for 2025-03-26 to 2025-03-26

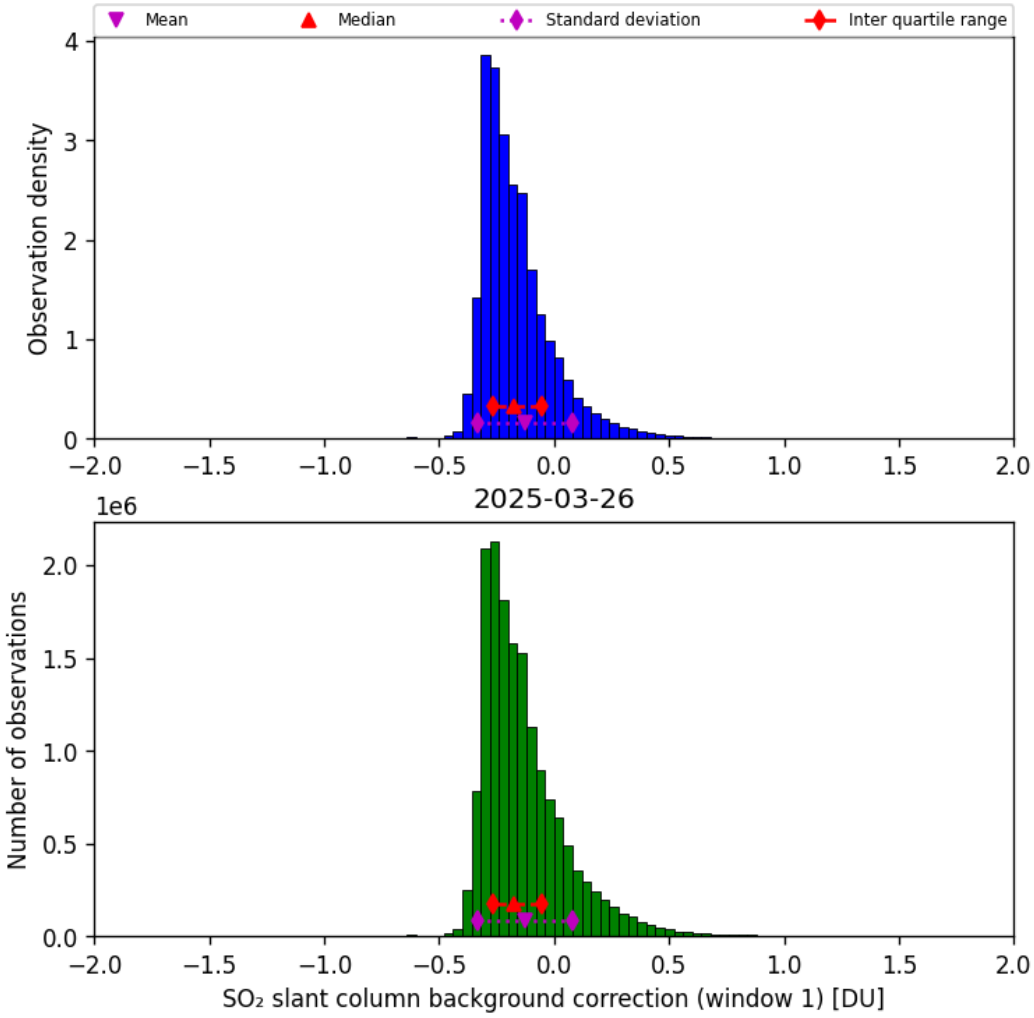

Figure 66: Histogram of "SO_2 slant column background correction (window 1)" for 2025-03-26 to 2025-03-26

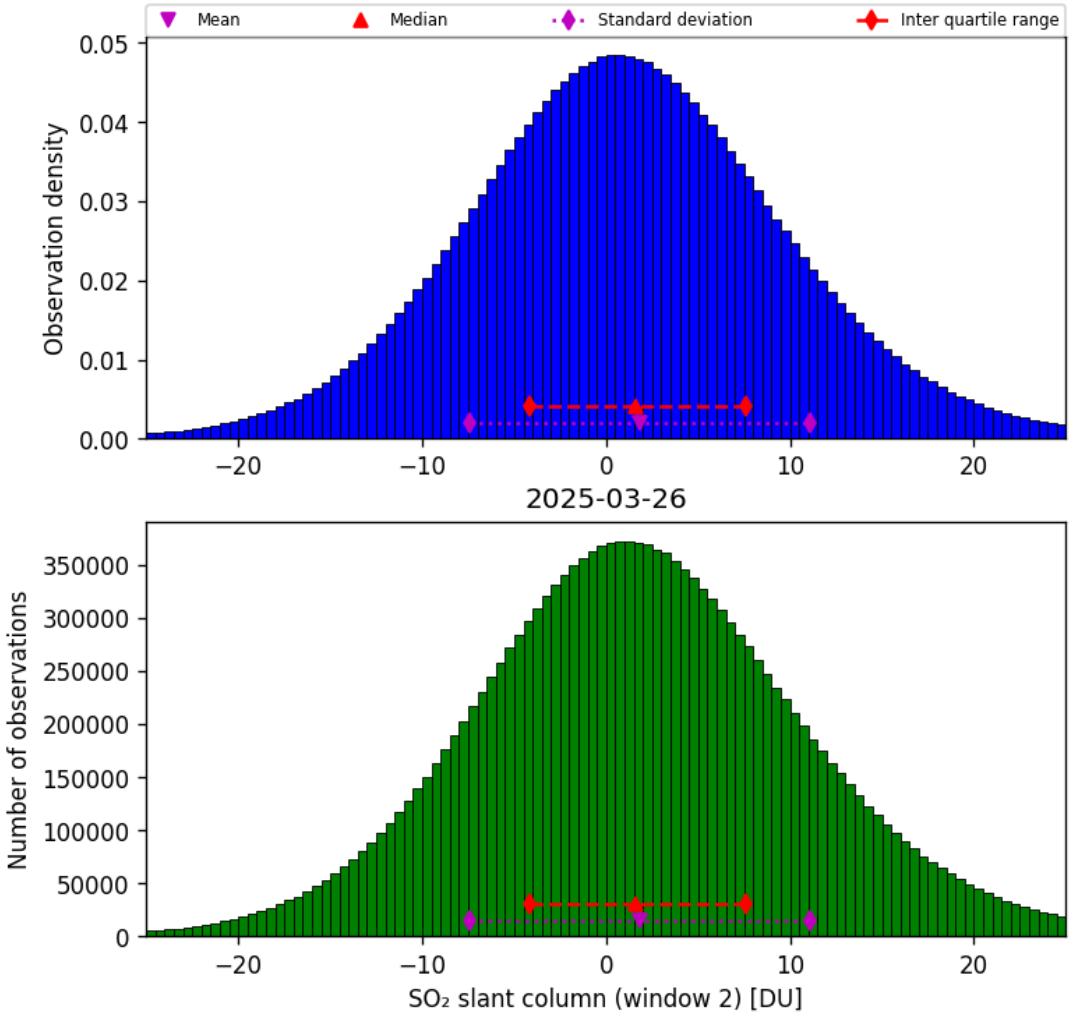

Figure 67: Histogram of "SO_2 slant column (window 2)" for 2025-03-26 to 2025-03-26

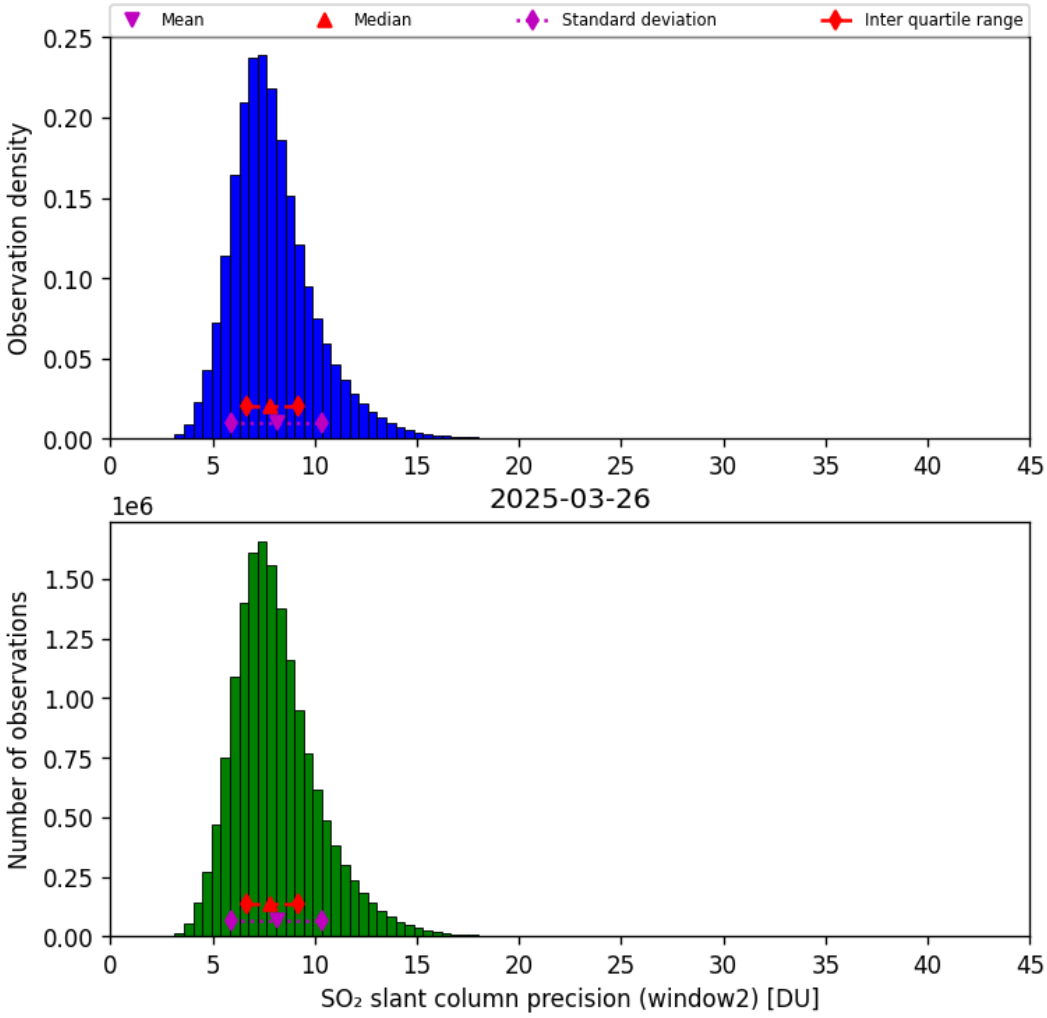

Figure 68: Histogram of "SO_2 slant column precision (window2)" for 2025-03-26 to 2025-03-26

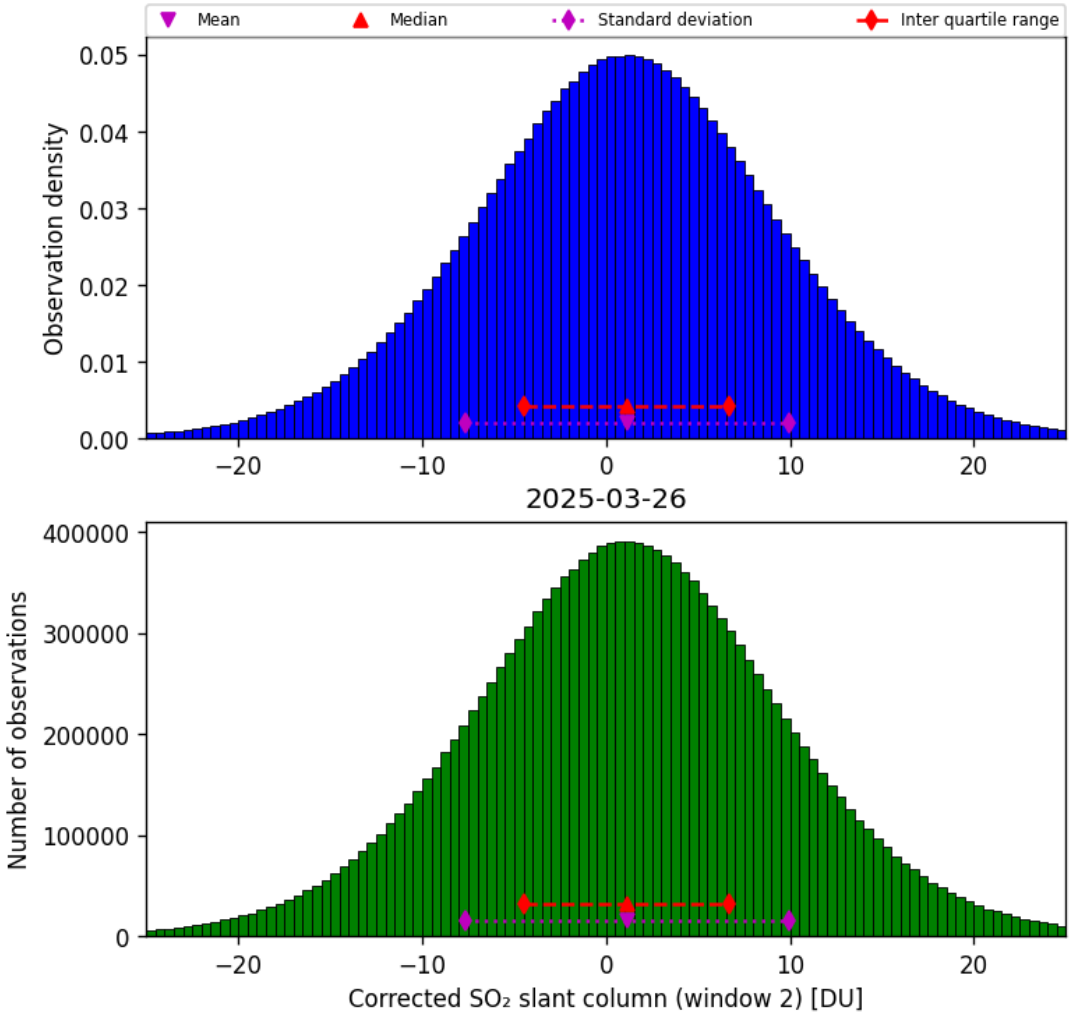

Figure 69: Histogram of "Corrected SO_2 slant column (window 2)" for 2025-03-26 to 2025-03-26

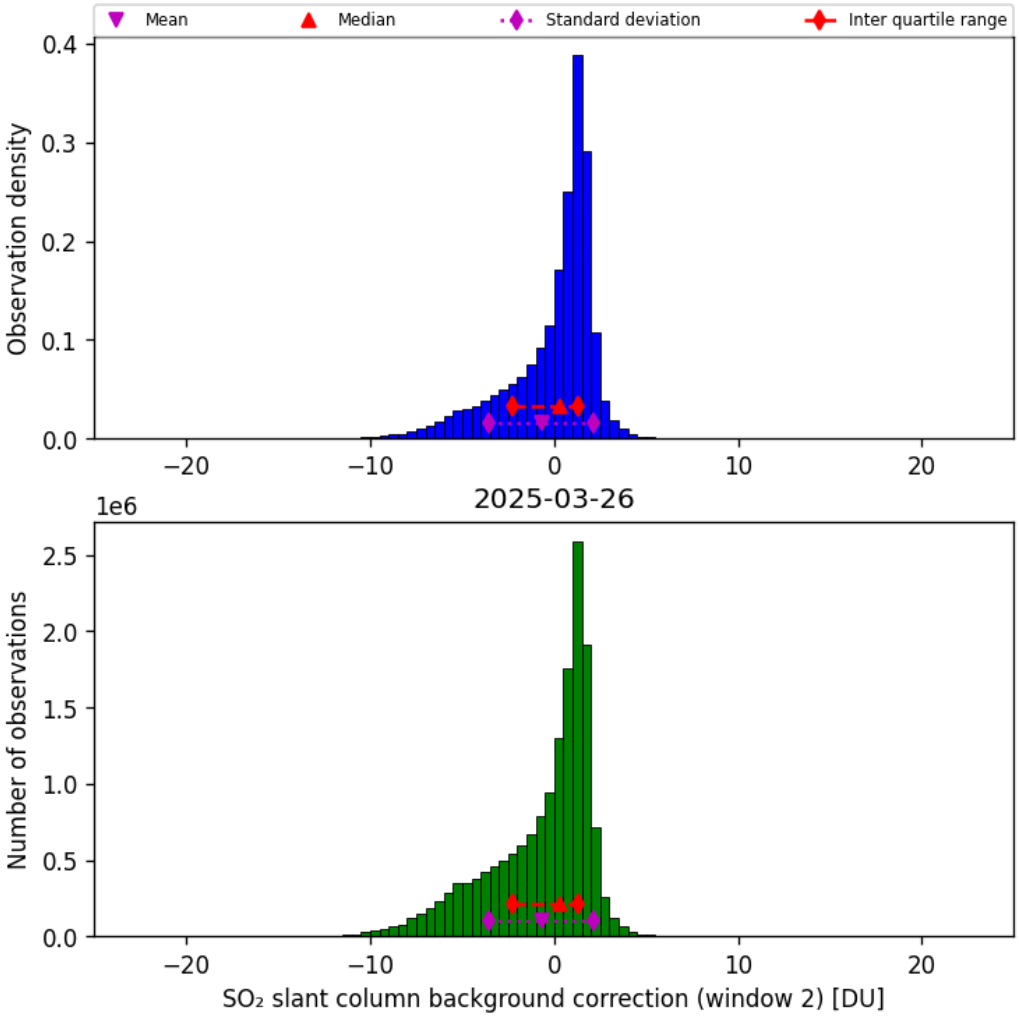

Figure 70: Histogram of "SO_2 slant column background correction (window 2)" for 2025-03-26 to 2025-03-26

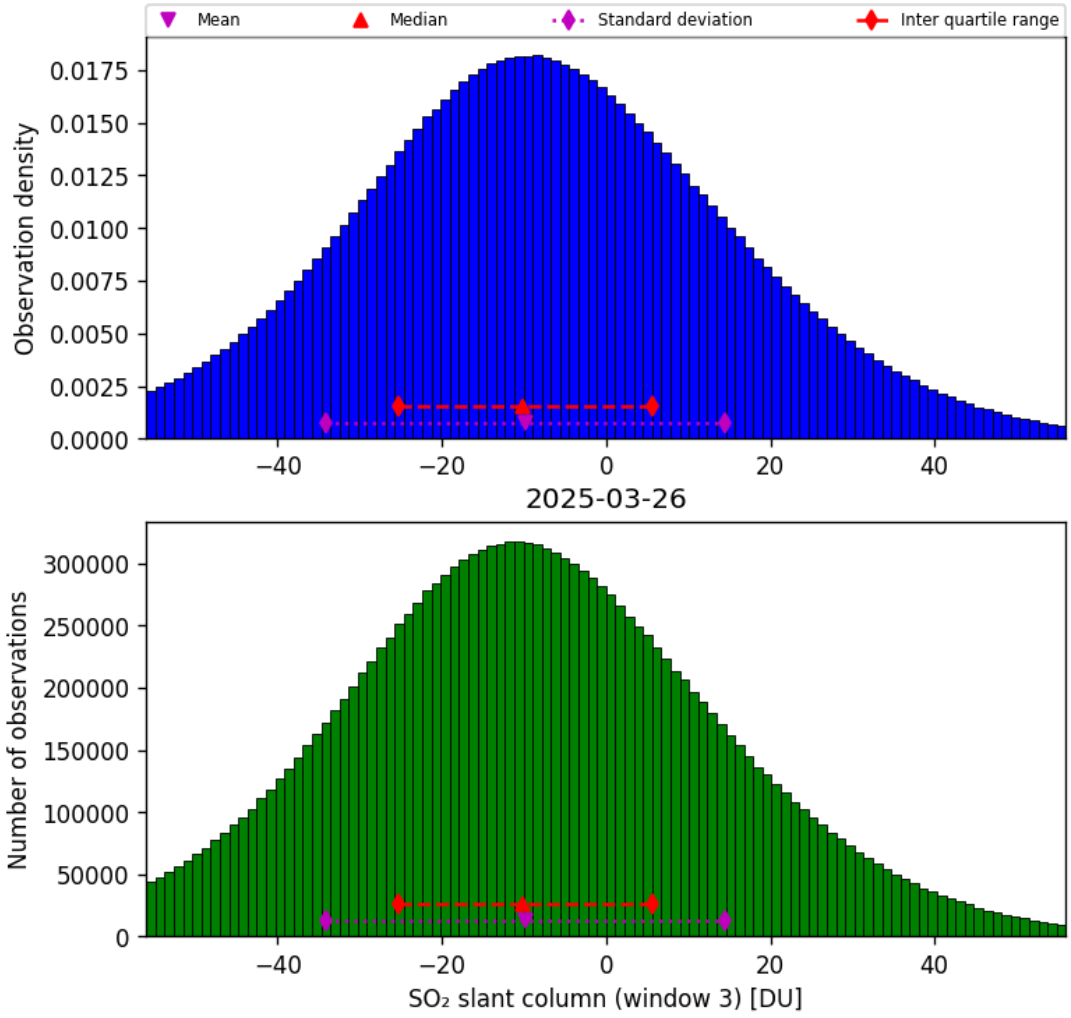

Figure 71: Histogram of "SO_2 slant column (window 3)" for 2025-03-26 to 2025-03-26

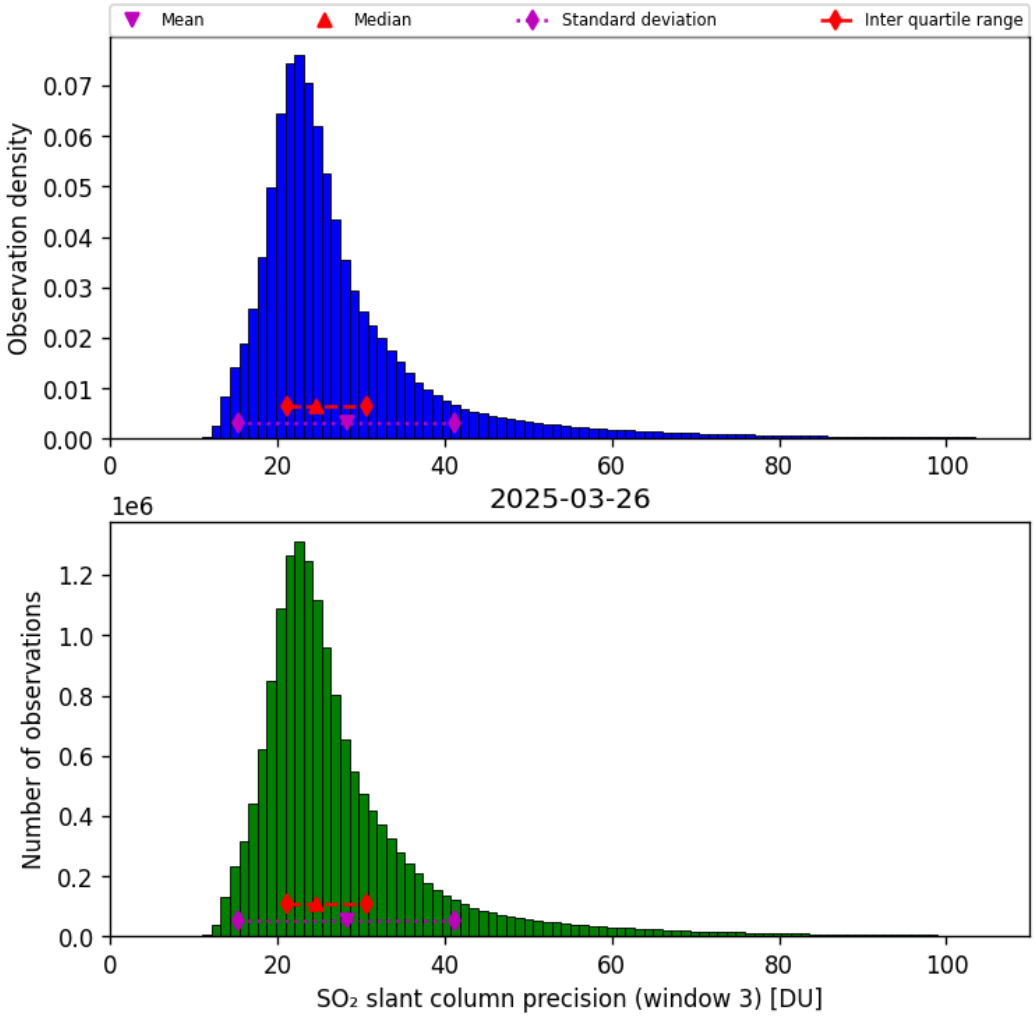

Figure 72: Histogram of "SO_2 slant column precision (window 3)" for 2025-03-26 to 2025-03-26

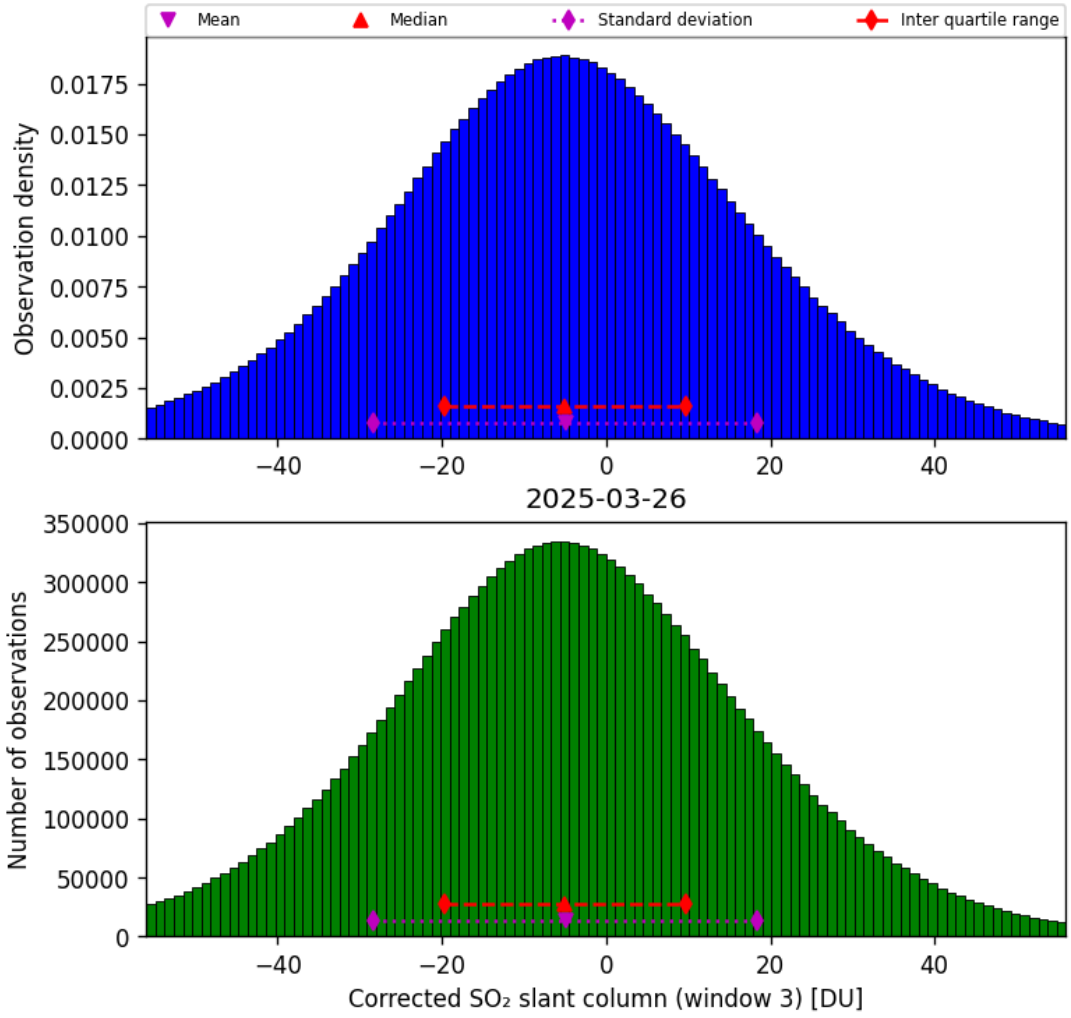

Figure 73: Histogram of "Corrected SO_2 slant column (window 3)" for 2025-03-26 to 2025-03-26

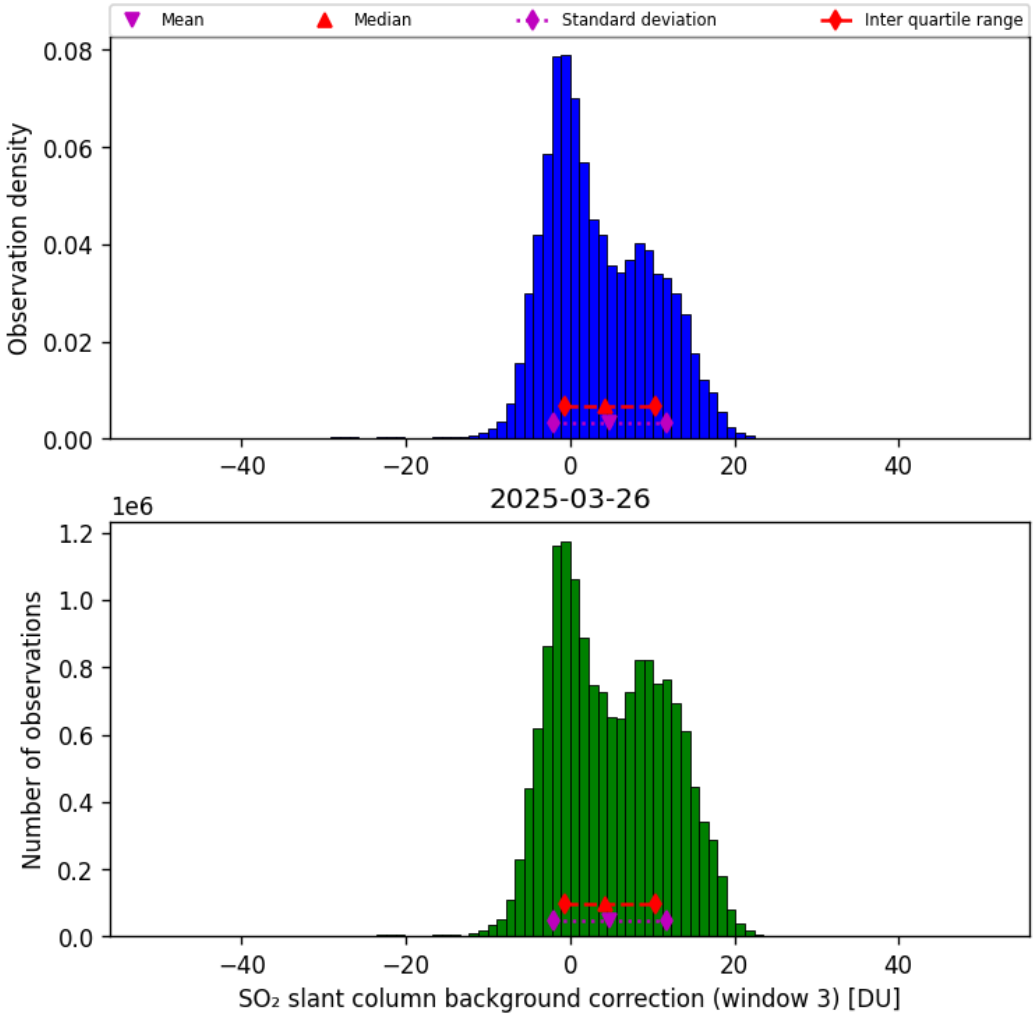

Figure 74: Histogram of "SO_2 slant column background correction (window 3)" for 2025-03-26 to 2025-03-26

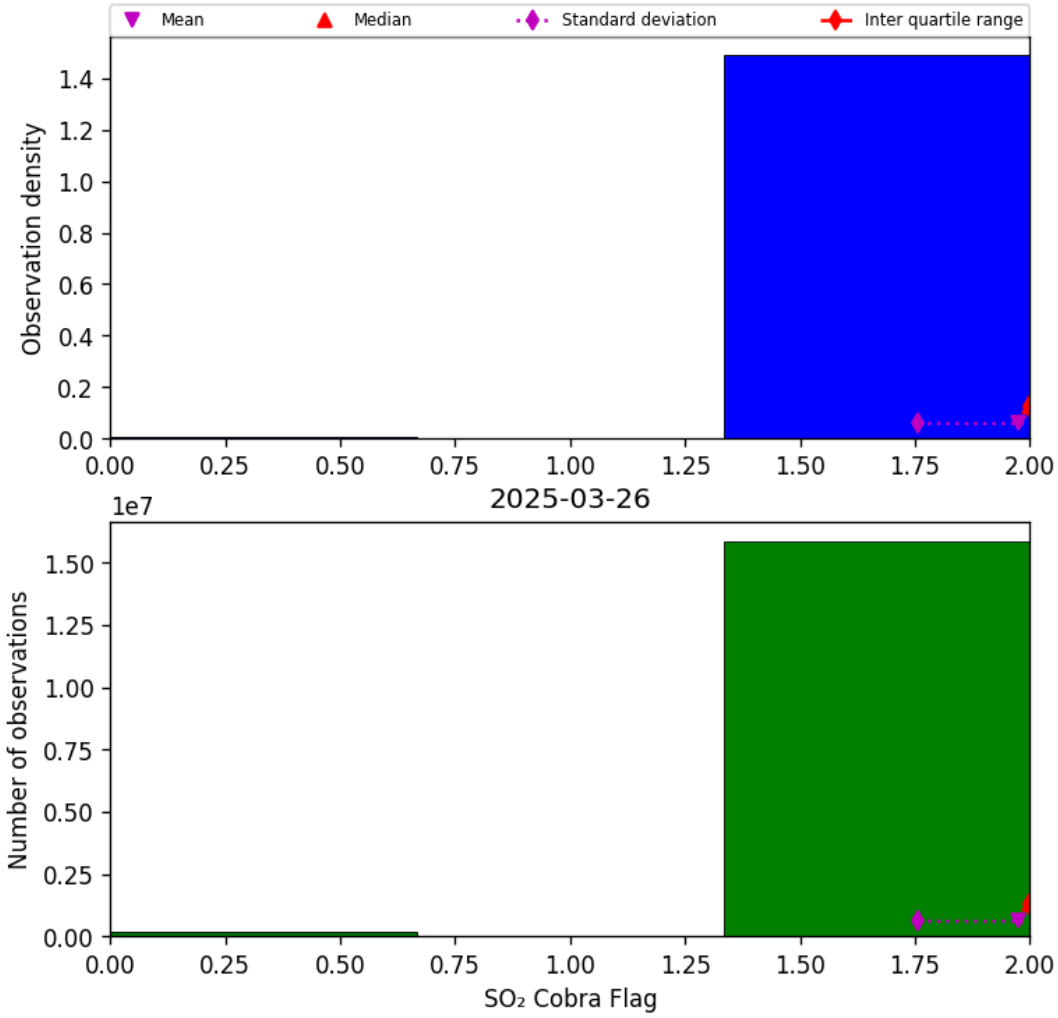

Figure 75: Histogram of "SO_2 Cobra Flag" for 2025-03-26 to 2025-03-26

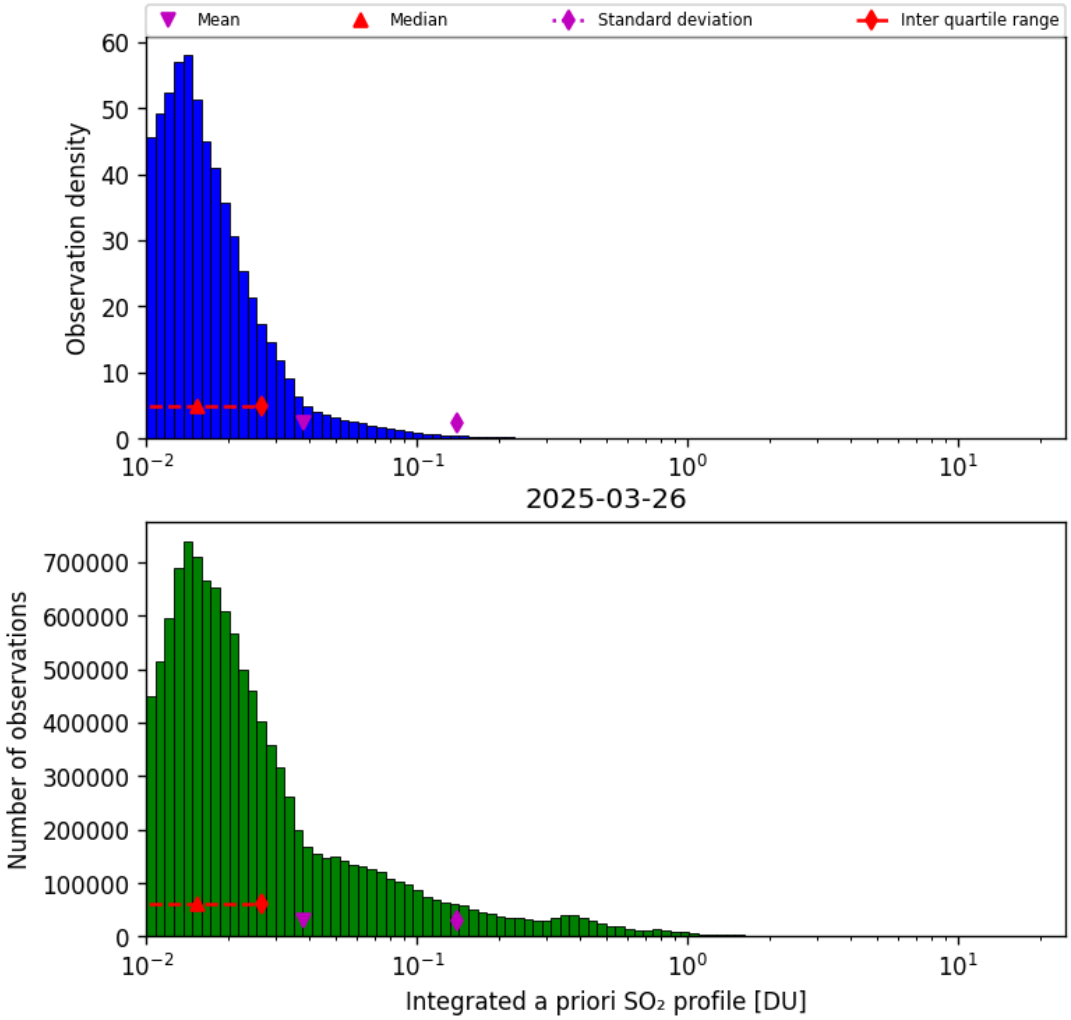

Figure 76: Histogram of “Integrated a priori SO_2 profile” for 2025-03-26 to 2025-03-26

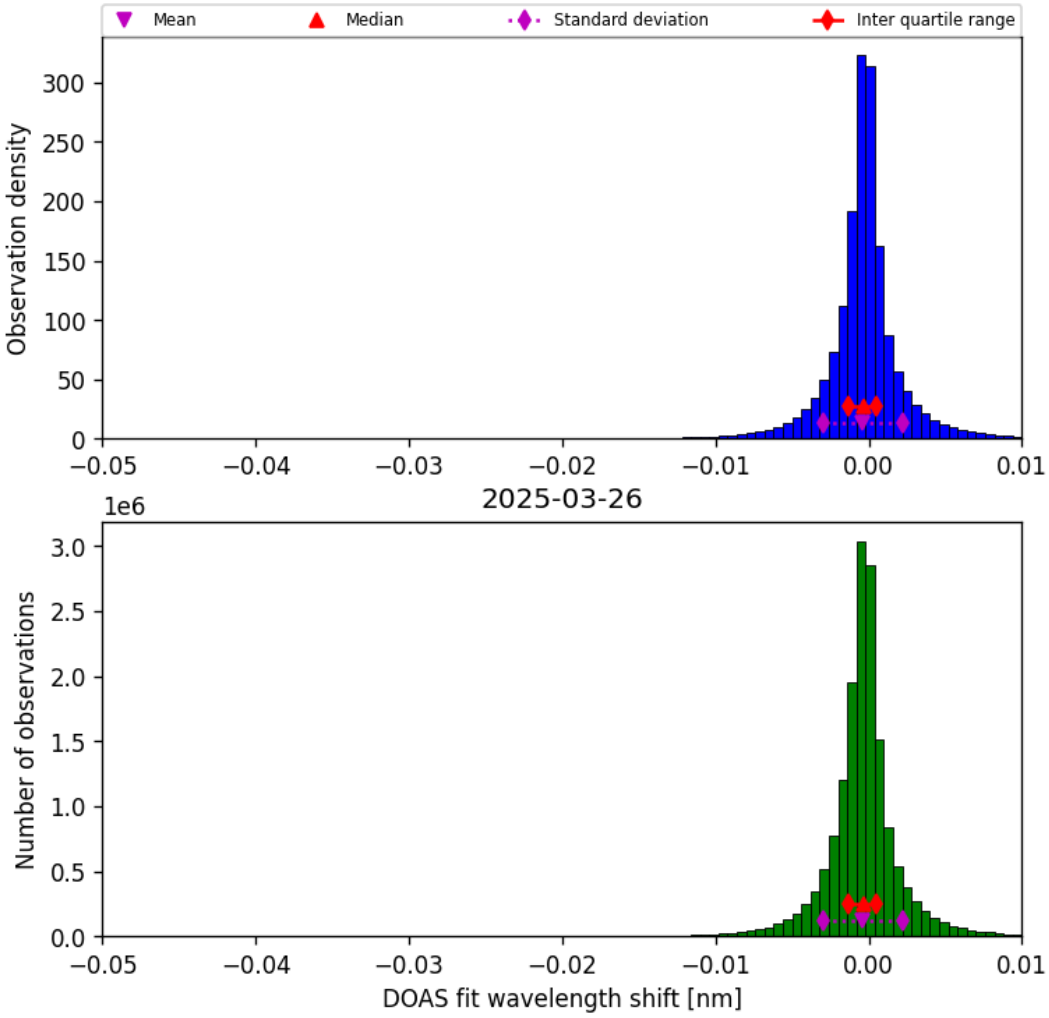

Figure 77: Histogram of “DOAS fit wavelength shift” for 2025-03-26 to 2025-03-26

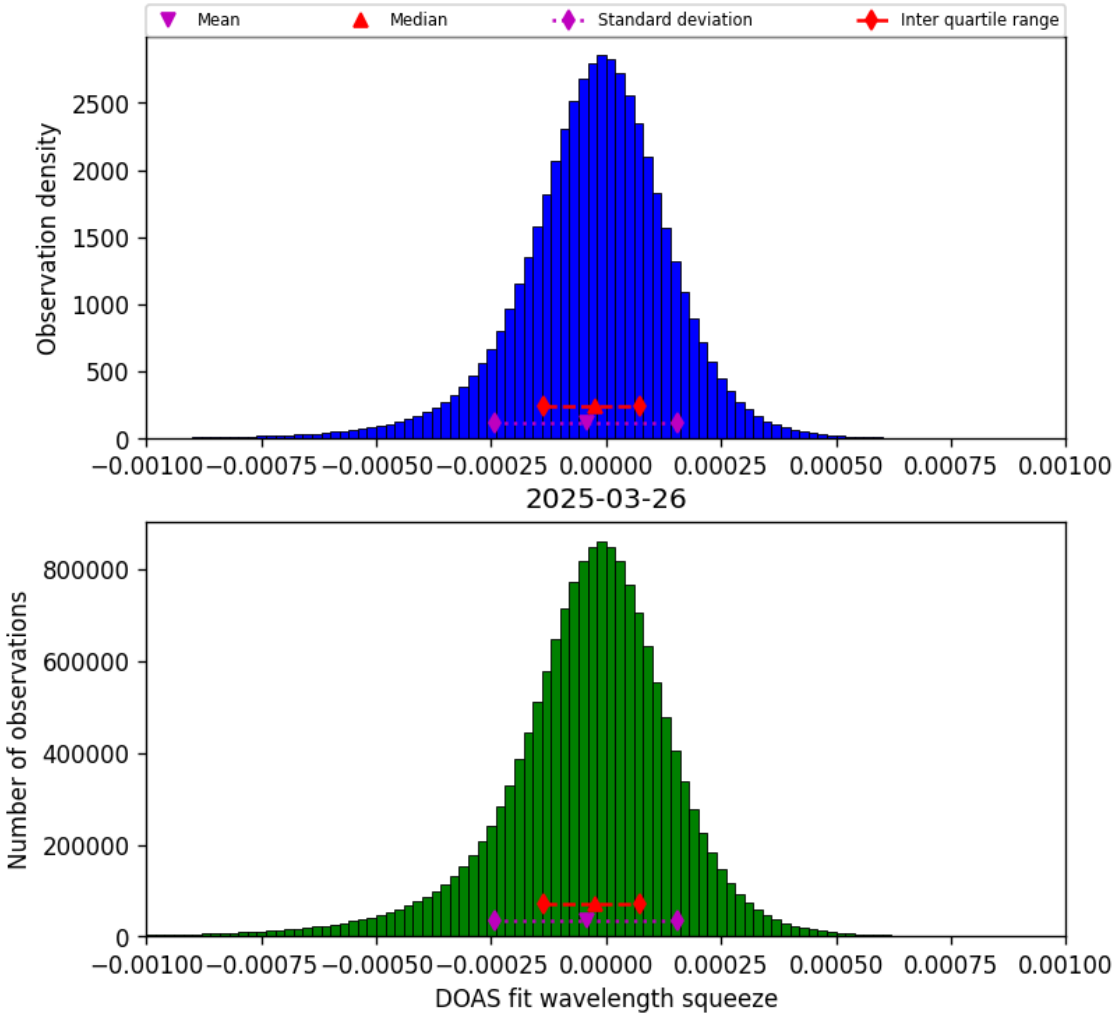

Figure 78: Histogram of “DOAS fit wavelength squeeze” for 2025-03-26 to 2025-03-26

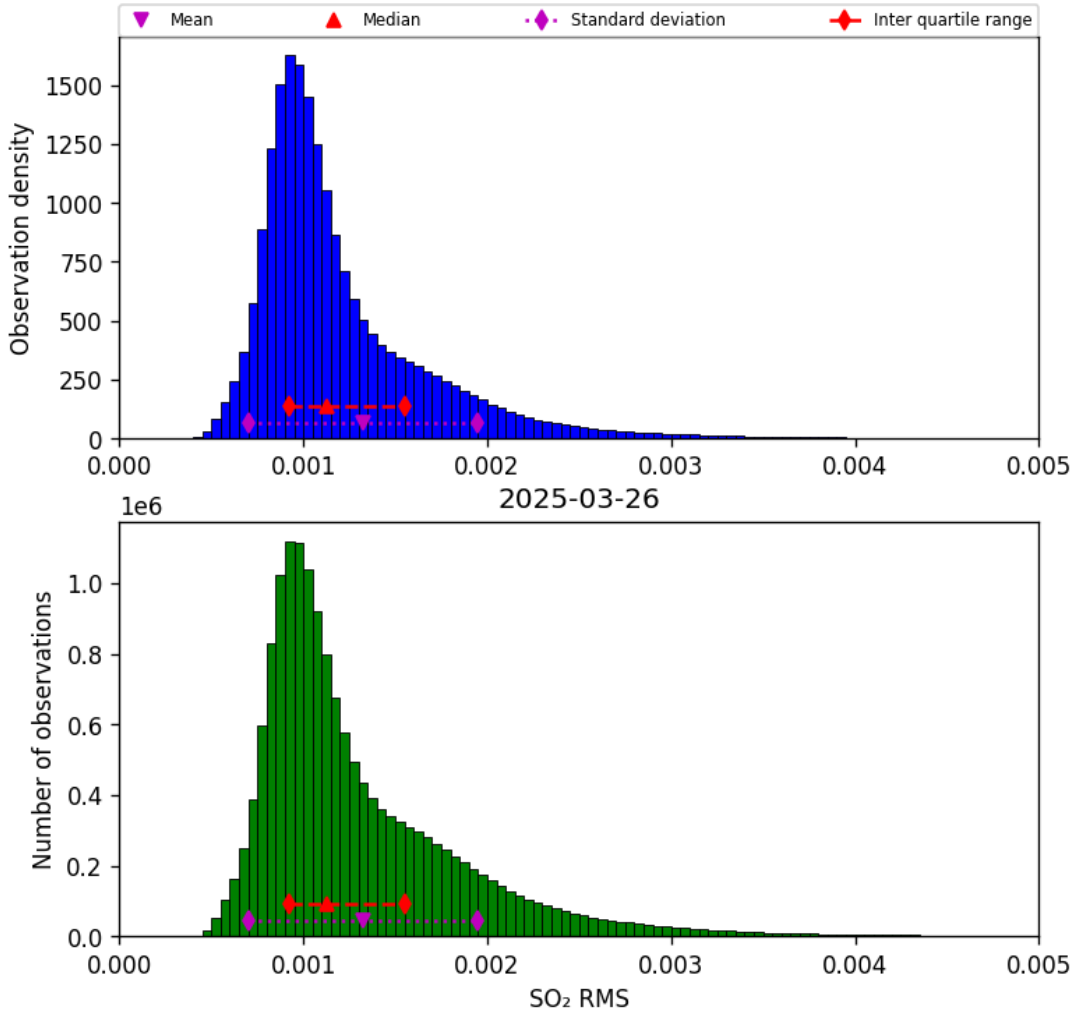

Figure 79: Histogram of "SO_2 RMS" for 2025-03-26 to 2025-03-26

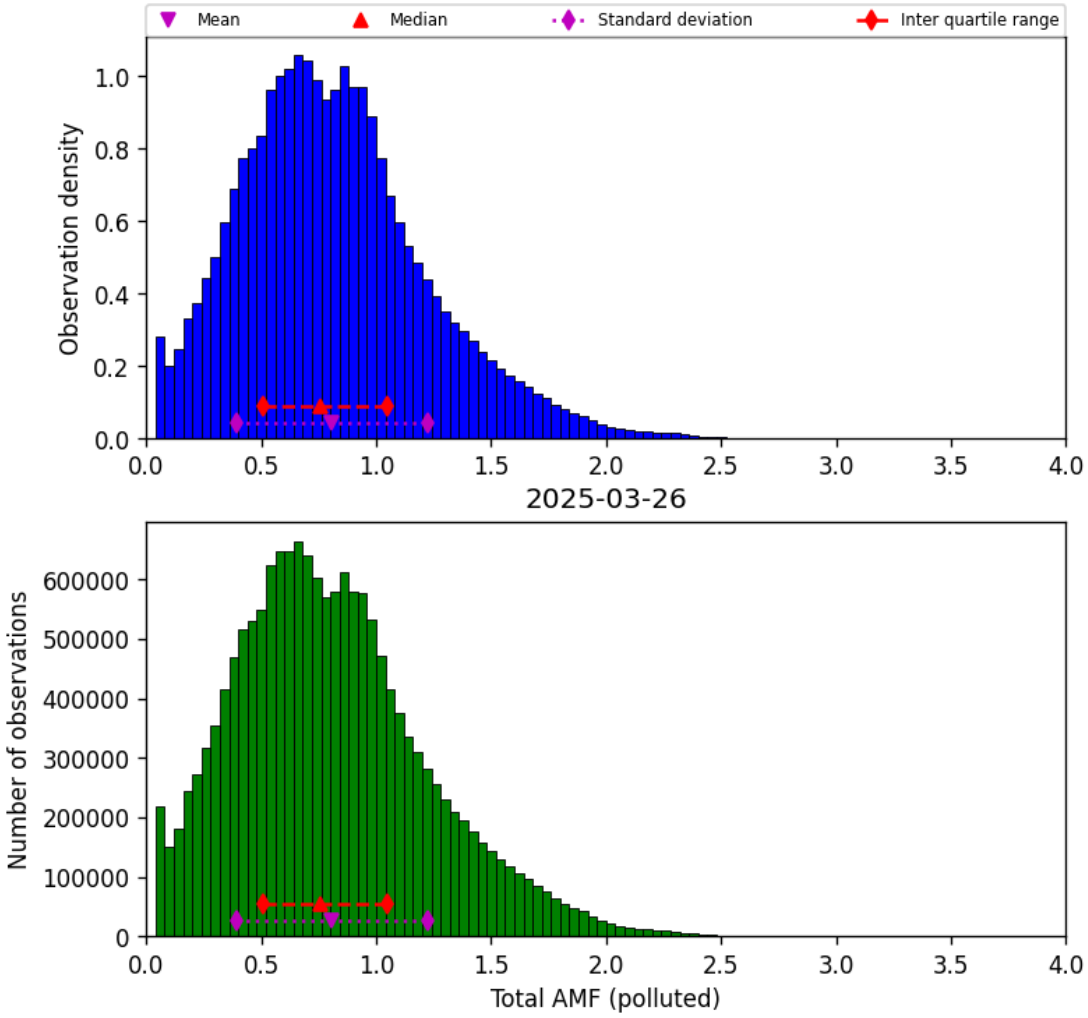

Figure 80: Histogram of “Total AMF (polluted)” for 2025-03-26 to 2025-03-26

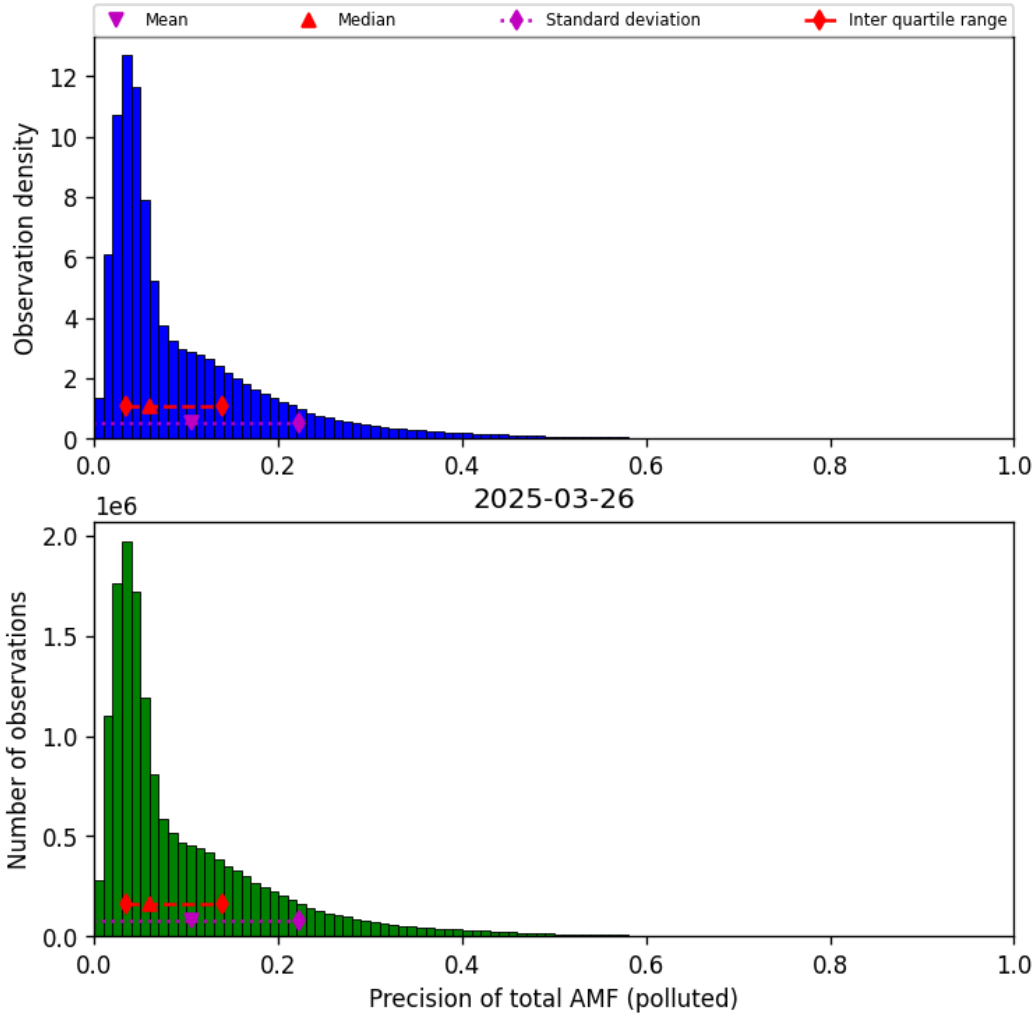

Figure 81: Histogram of “Precision of total AMF (polluted)” for 2025-03-26 to 2025-03-26

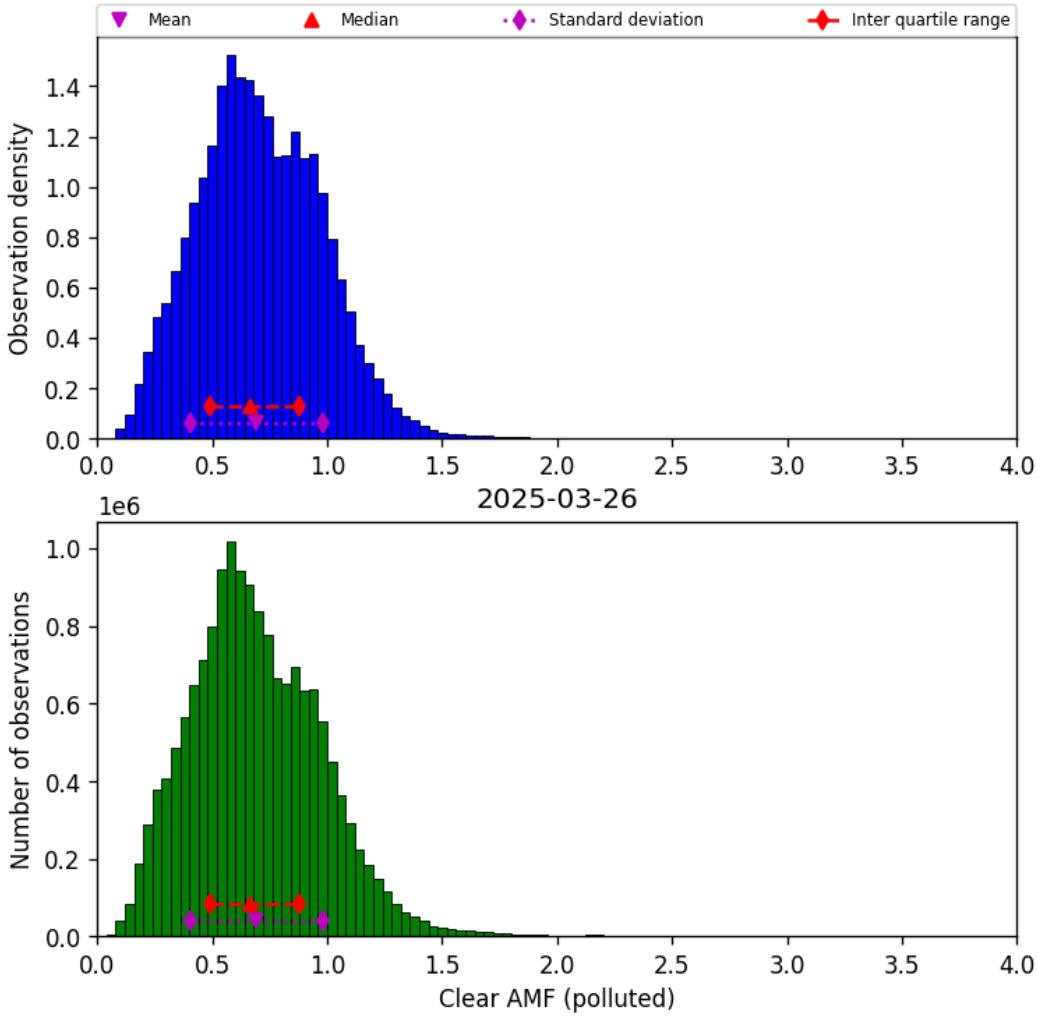

Figure 82: Histogram of “Clear AMF (polluted)” for 2025-03-26 to 2025-03-26

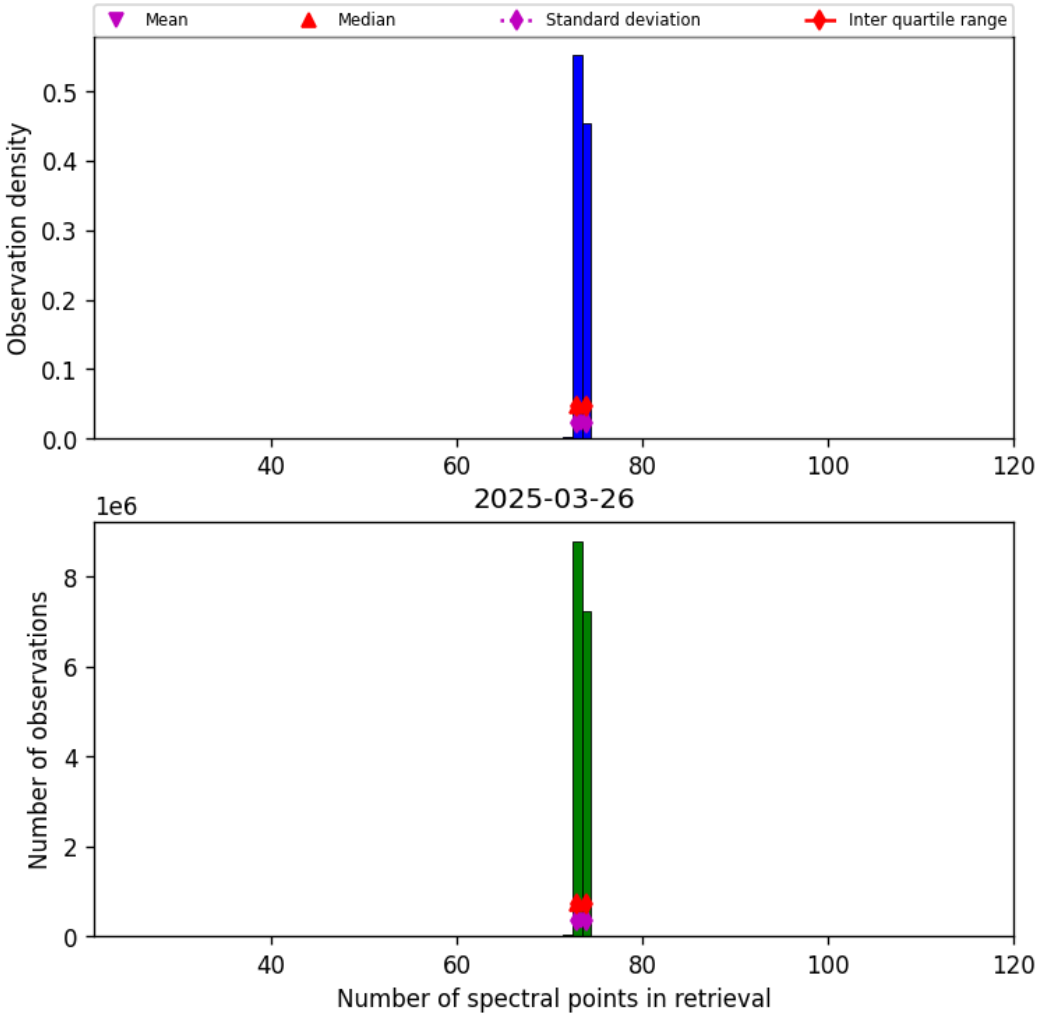

Figure 83: Histogram of “Number of spectral points in retrieval” for 2025-03-26 to 2025-03-26

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.

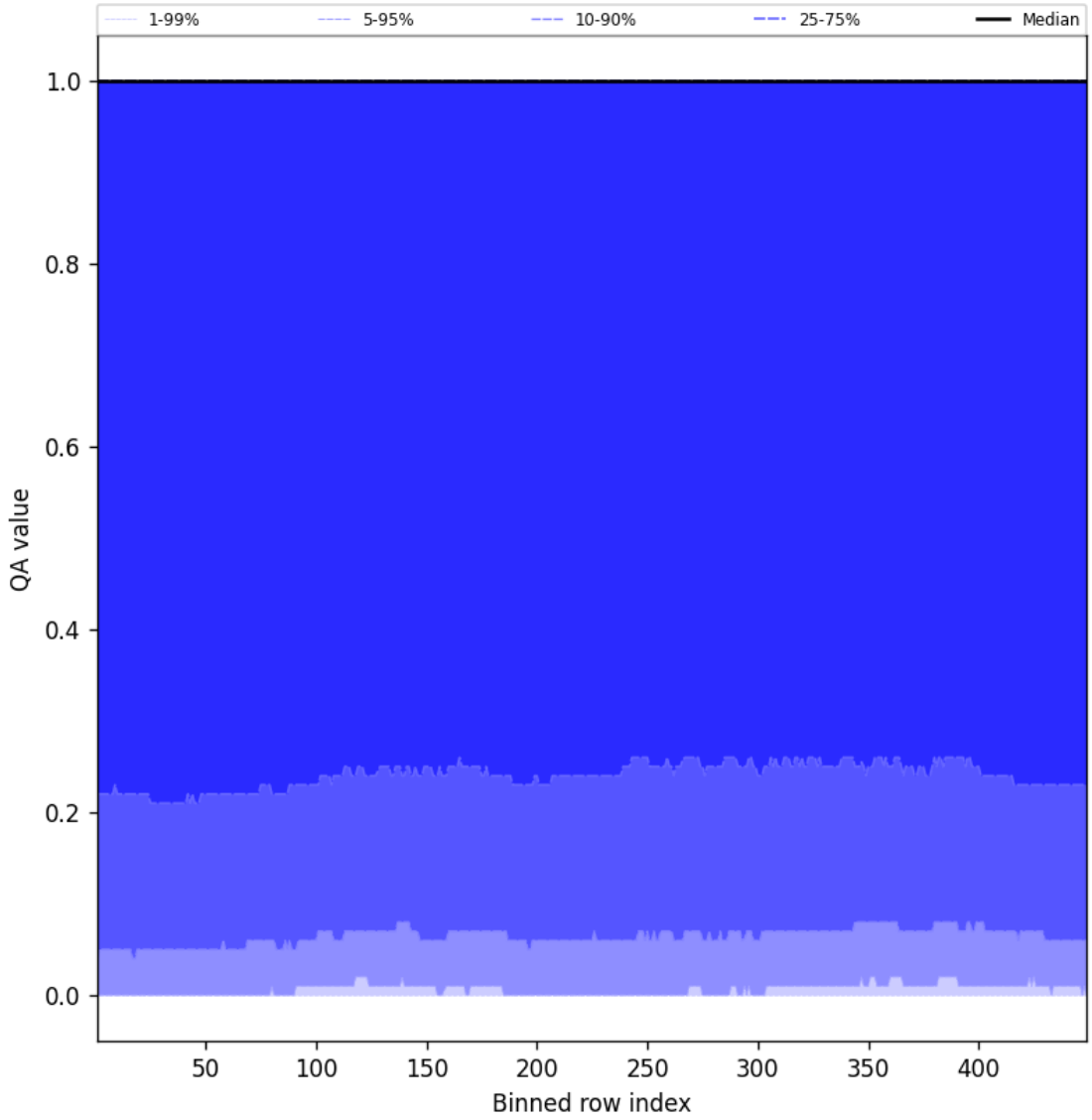

Figure 84: Along track statistics of “QA value” for 2025-03-26 to 2025-03-26

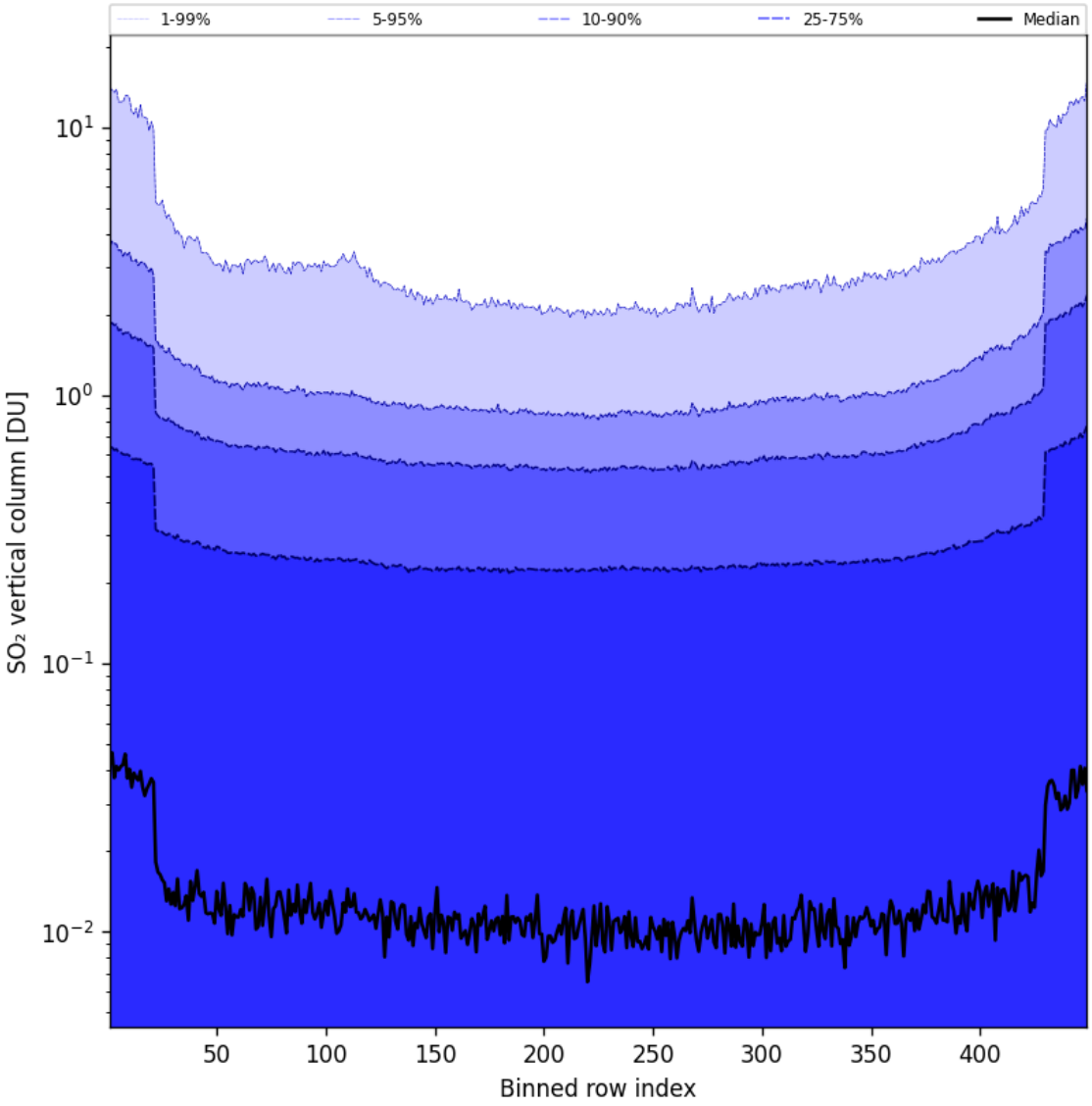

Figure 85: Along track statistics of "SO_2 vertical column" for 2025-03-26 to 2025-03-26

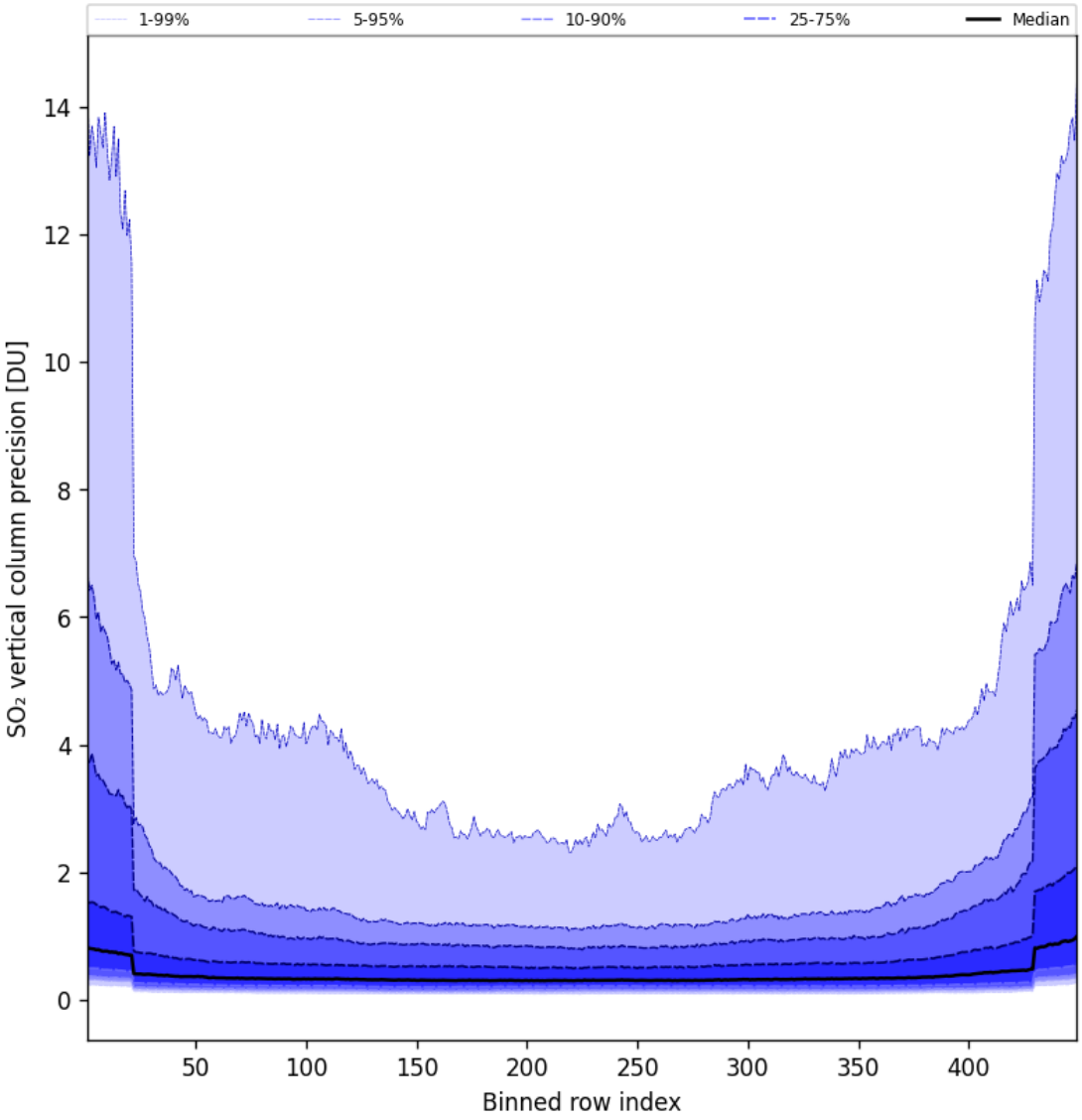

Figure 86: Along track statistics of "SO_2 vertical column precision" for 2025-03-26 to 2025-03-26

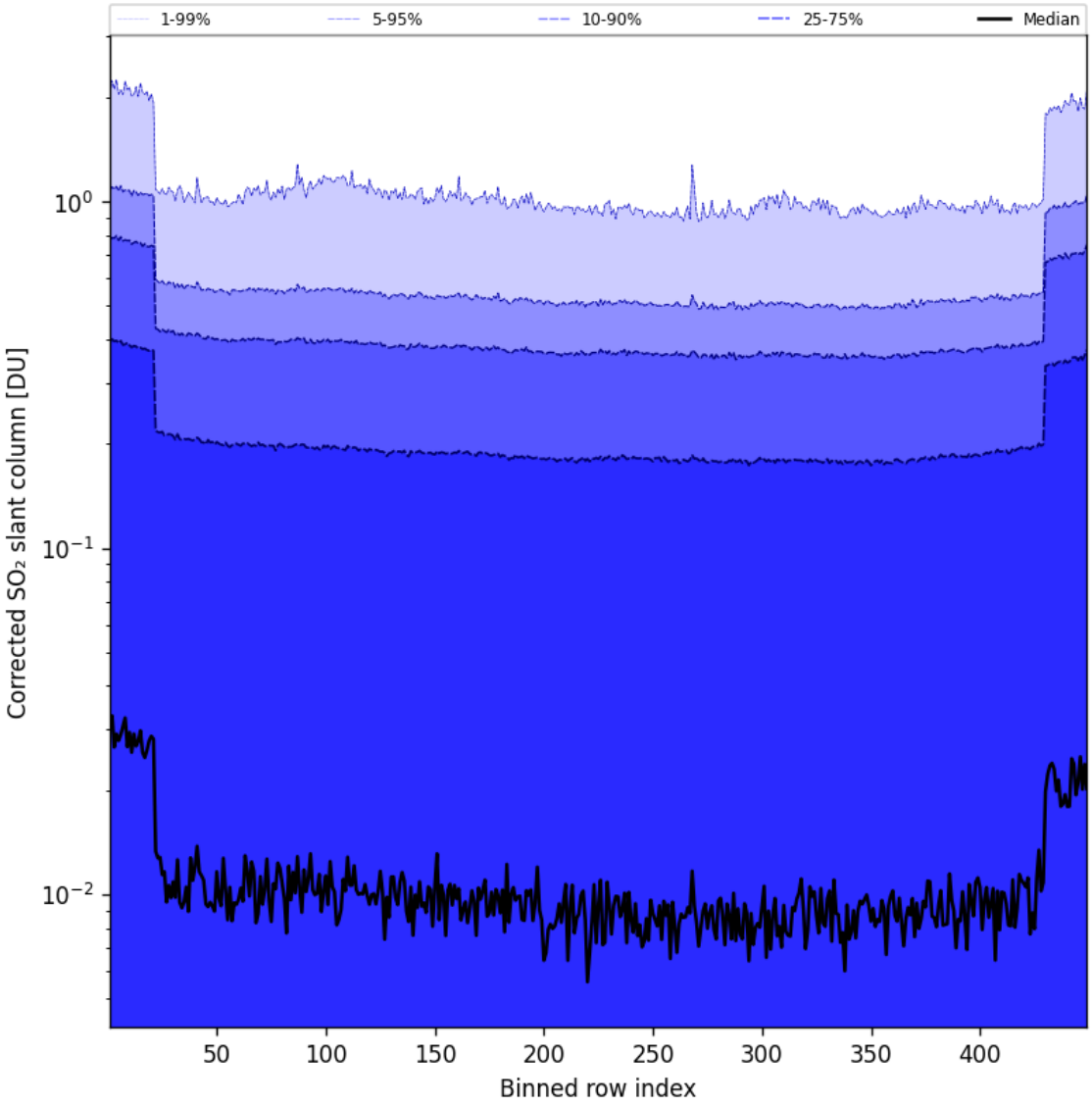

Figure 87: Along track statistics of "Corrected SO_2 slant column" for 2025-03-26 to 2025-03-26

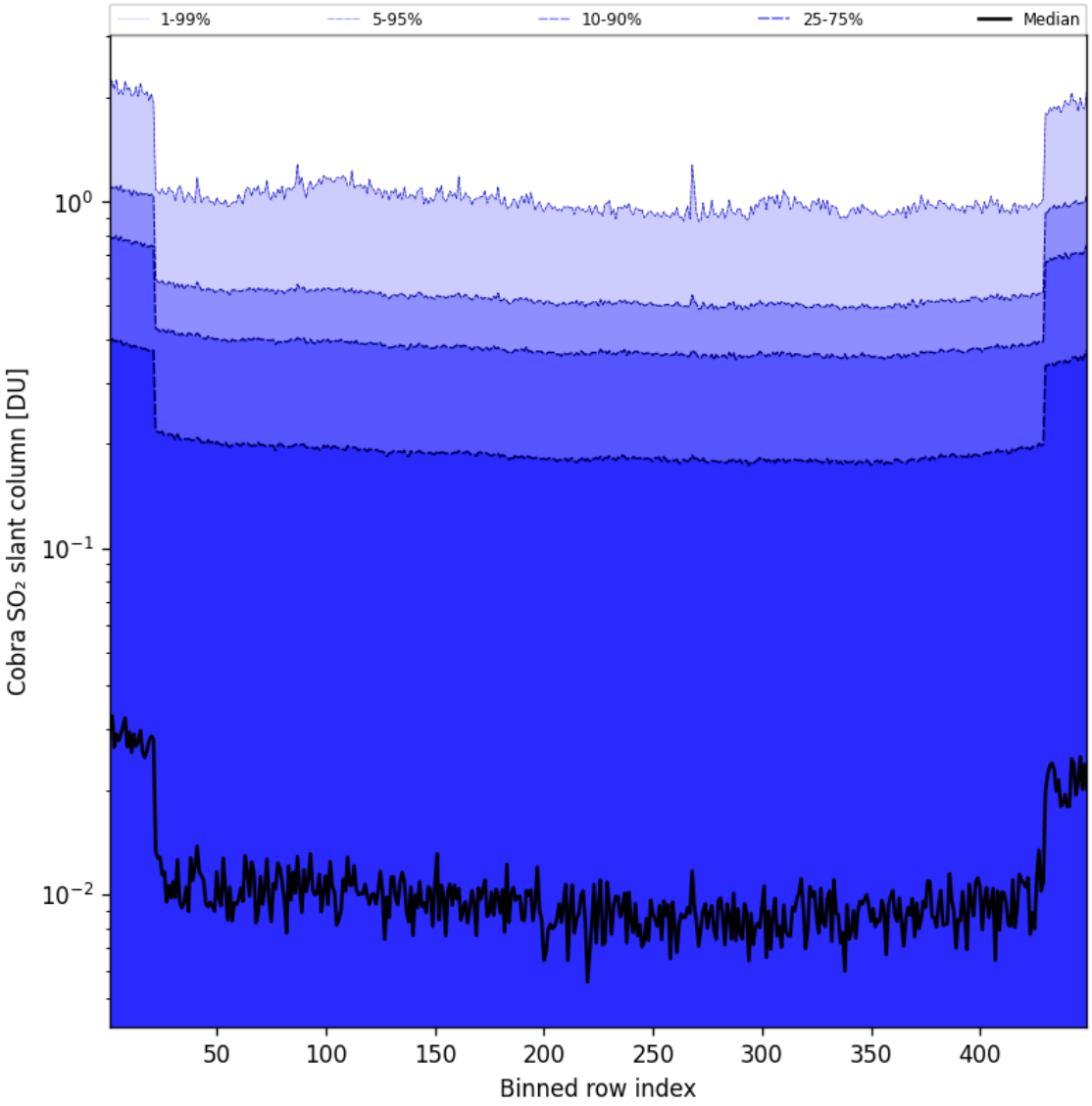

Figure 88: Along track statistics of "Cobra SO_2 slant column" for 2025-03-26 to 2025-03-26

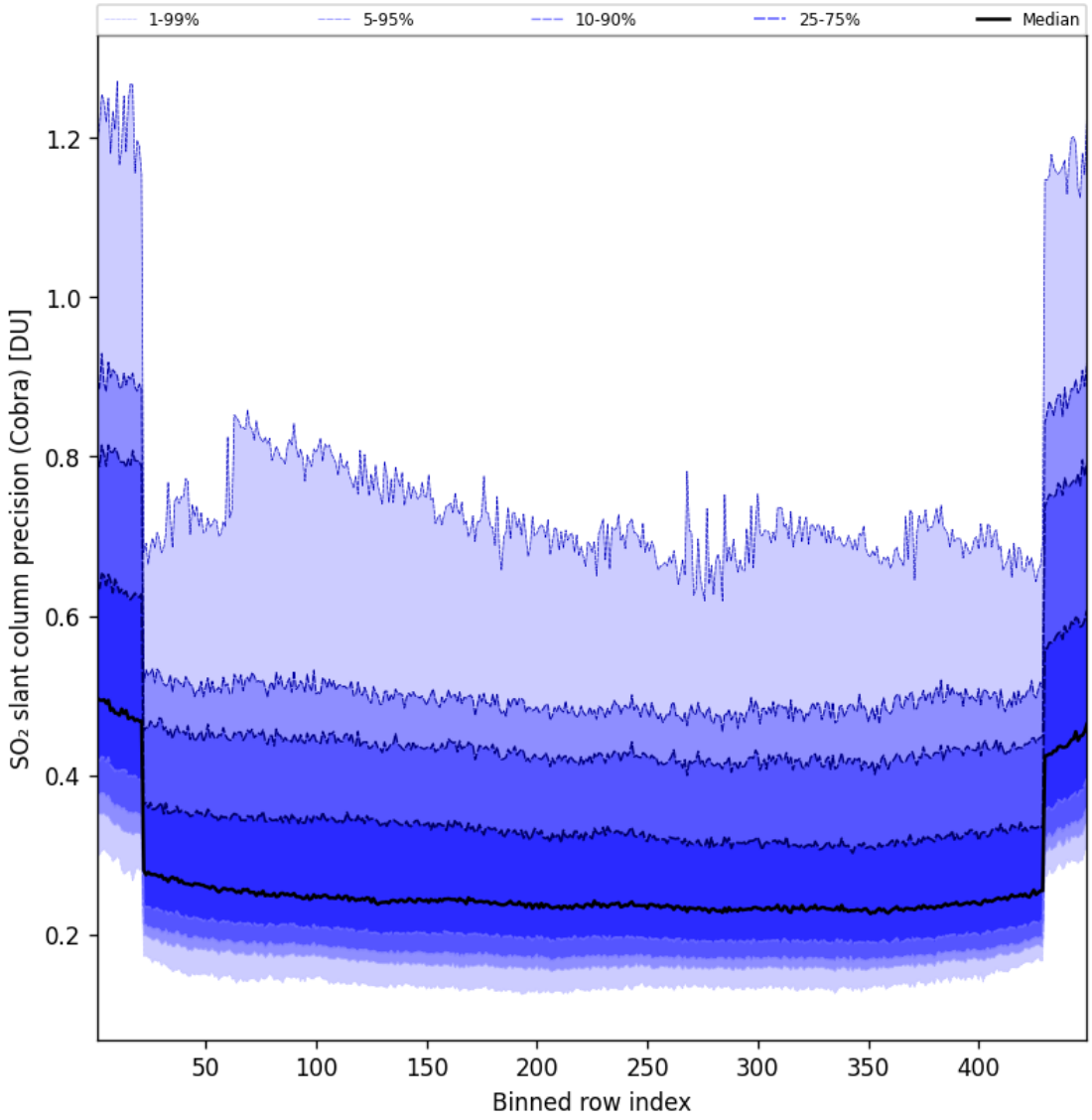

Figure 89: Along track statistics of "SO_2 slant column precision (Cobra)" for 2025-03-26 to 2025-03-26

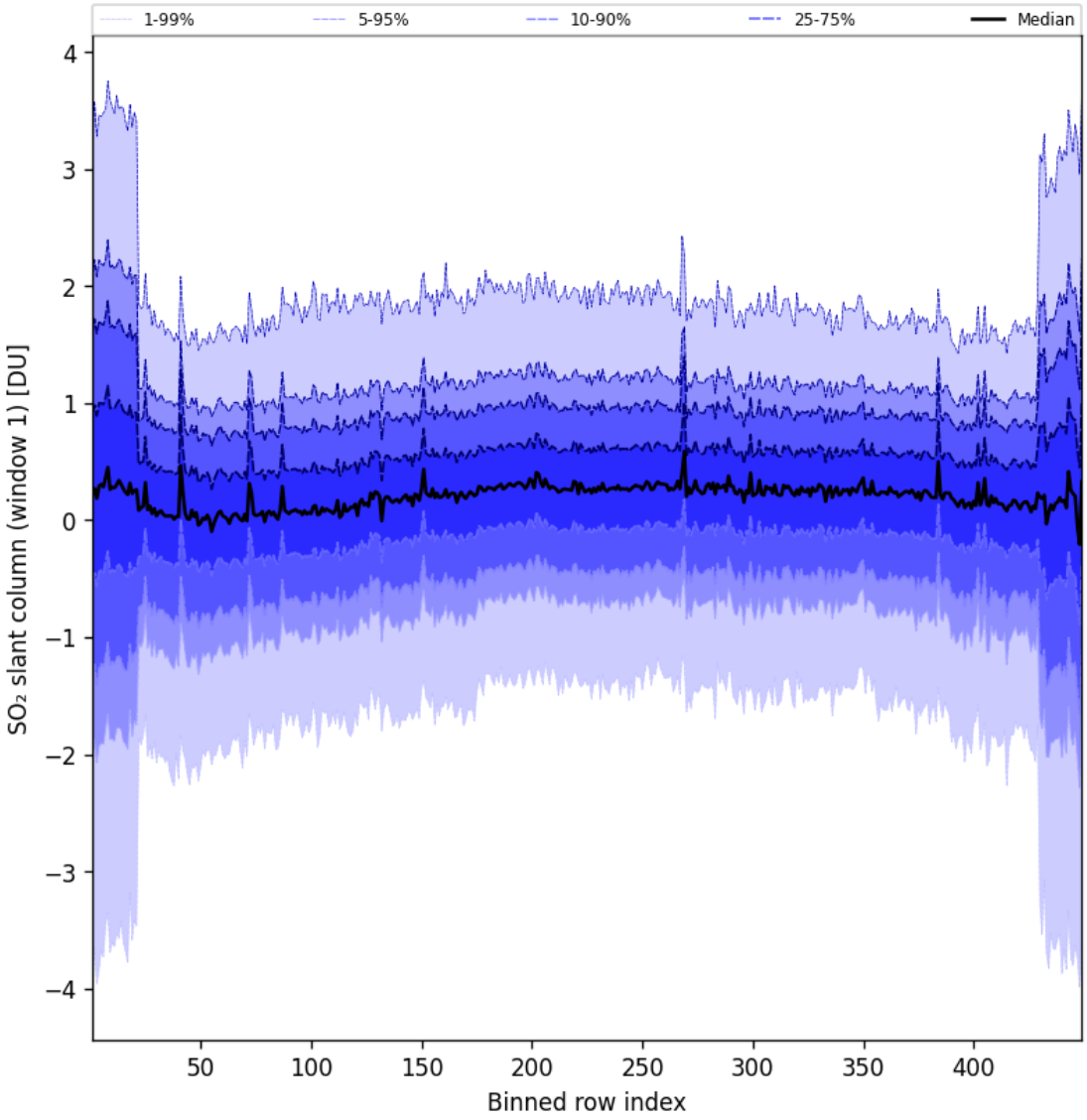

Figure 90: Along track statistics of "SO_2 slant column (window 1)" for 2025-03-26 to 2025-03-26

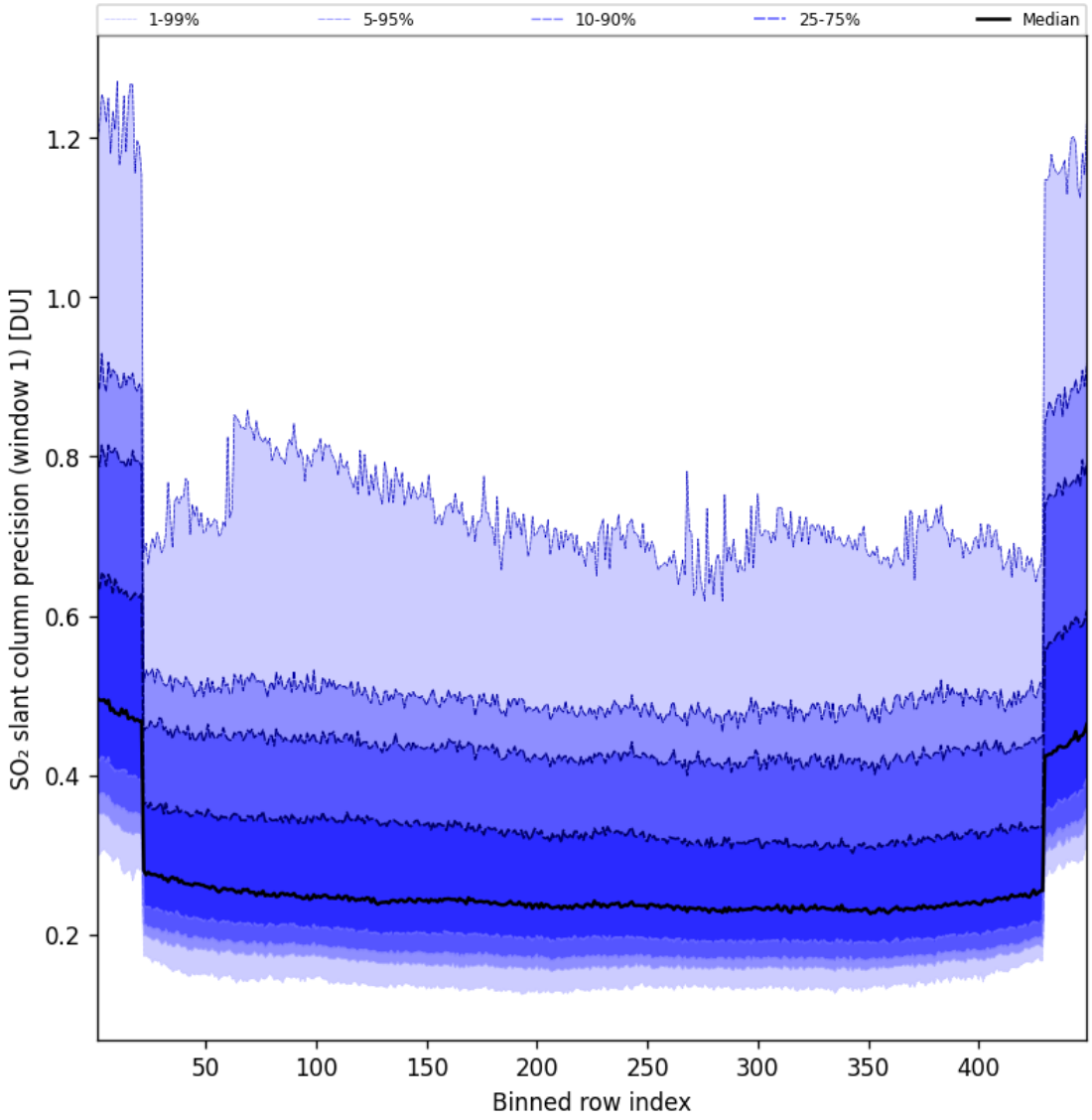

Figure 91: Along track statistics of "SO_2 slant column precision (window 1)" for 2025-03-26 to 2025-03-26

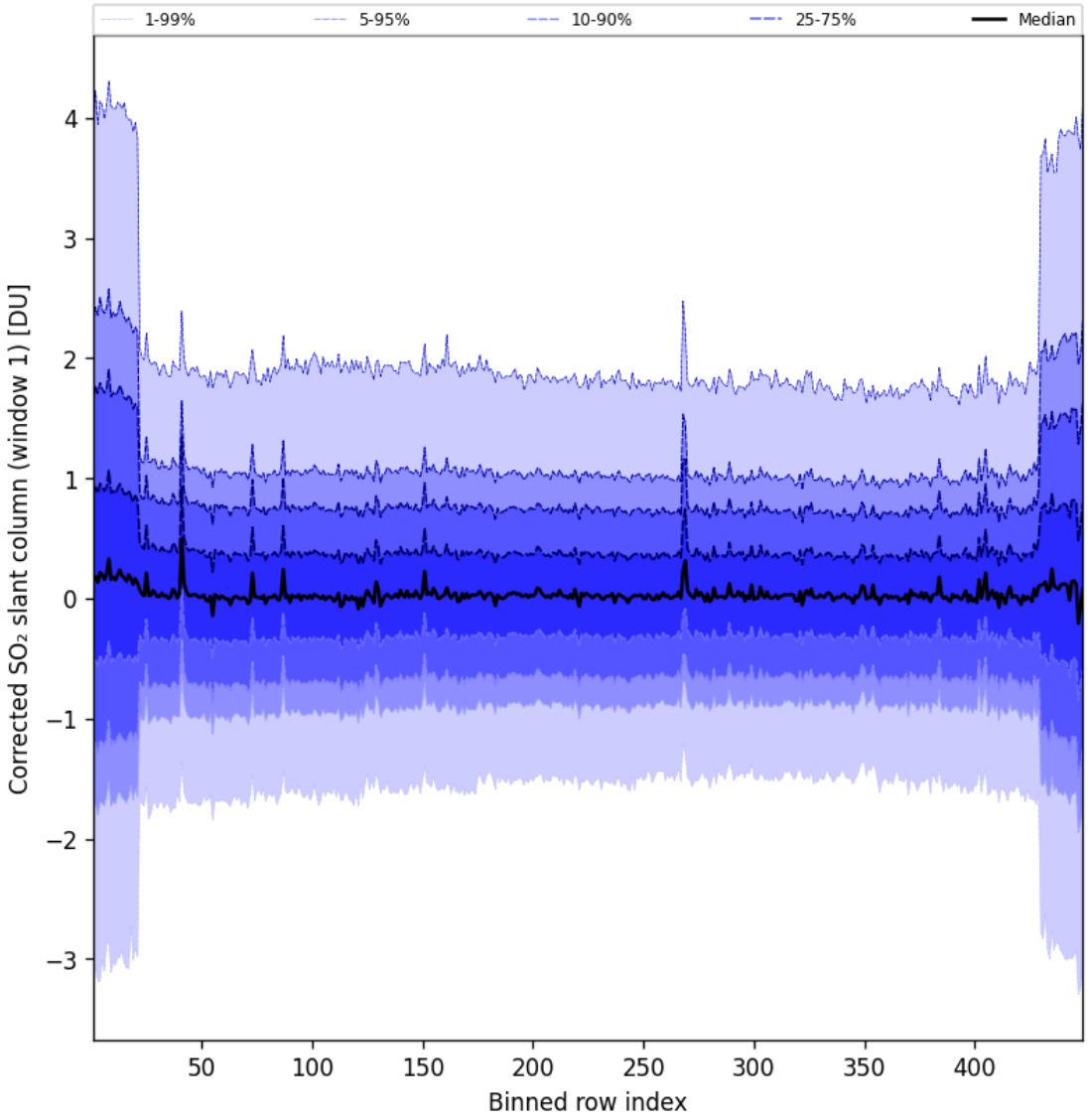

Figure 92: Along track statistics of “Corrected SO_2 slant column (window 1)” for 2025-03-26 to 2025-03-26

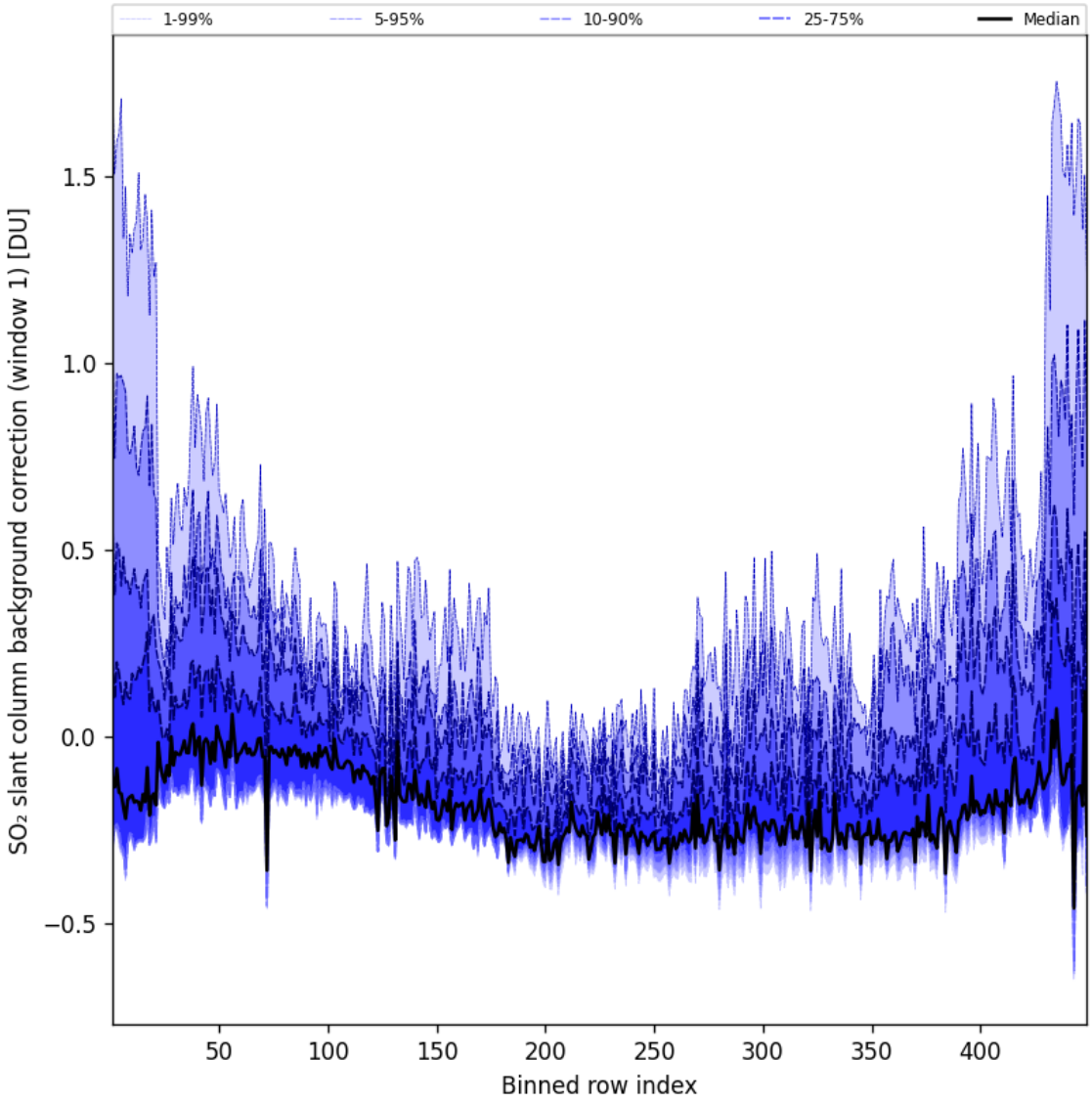

Figure 93: Along track statistics of "SO_2 slant column background correction (window 1)" for 2025-03-26 to 2025-03-26

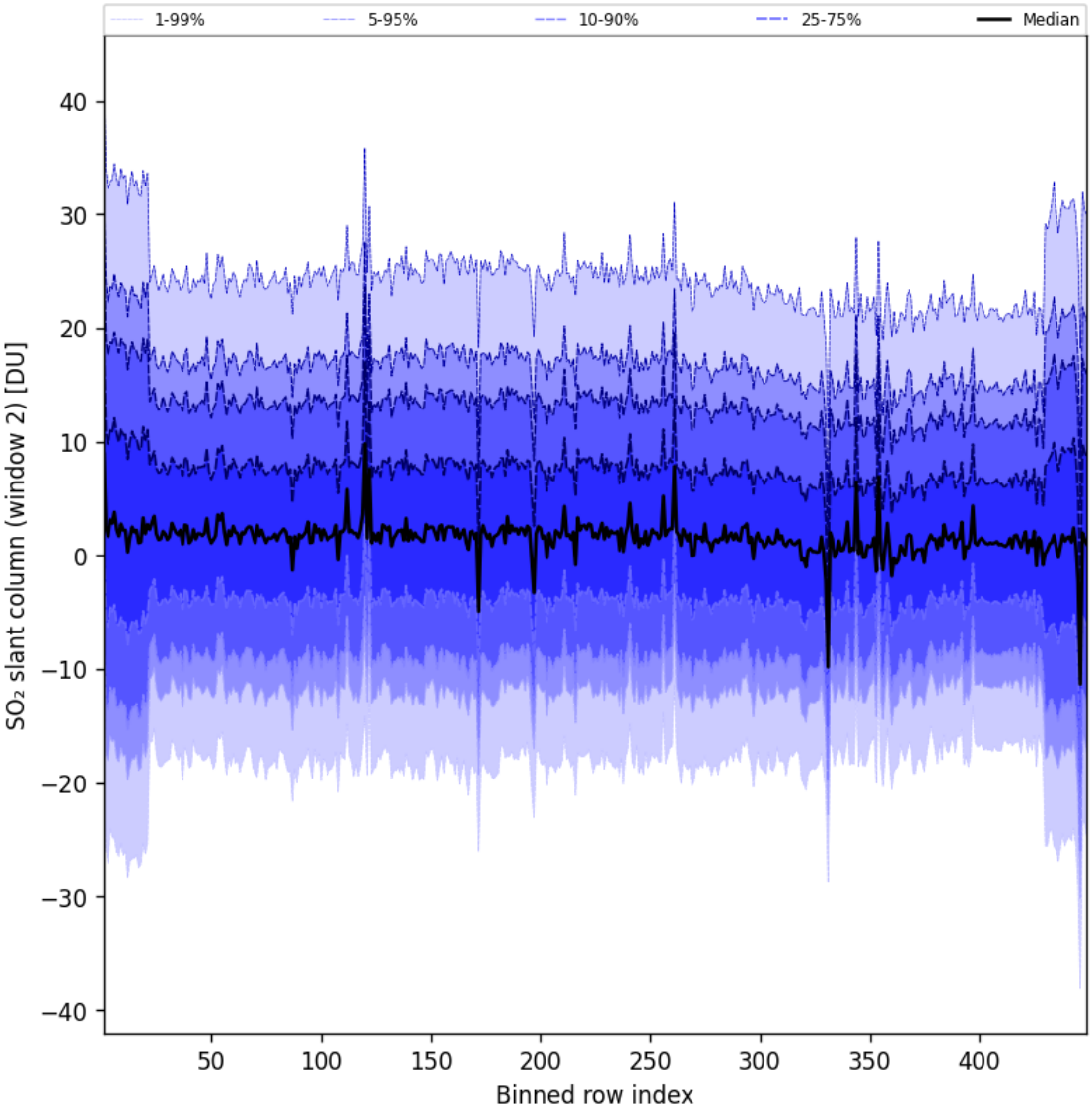

Figure 94: Along track statistics of "SO_2 slant column (window 2)" for 2025-03-26 to 2025-03-26

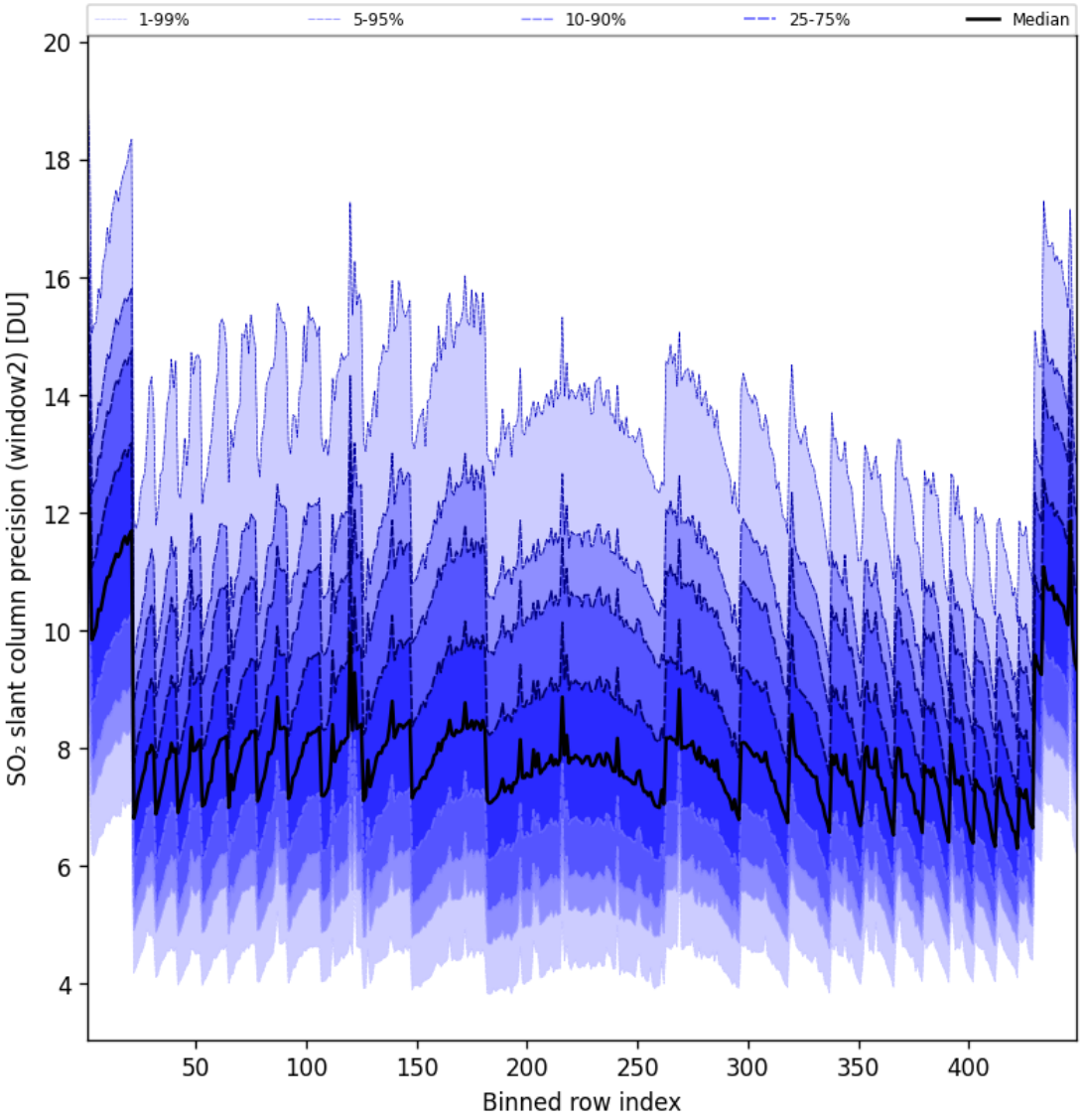

Figure 95: Along track statistics of "SO_2 slant column precision (window2)" for 2025-03-26 to 2025-03-26

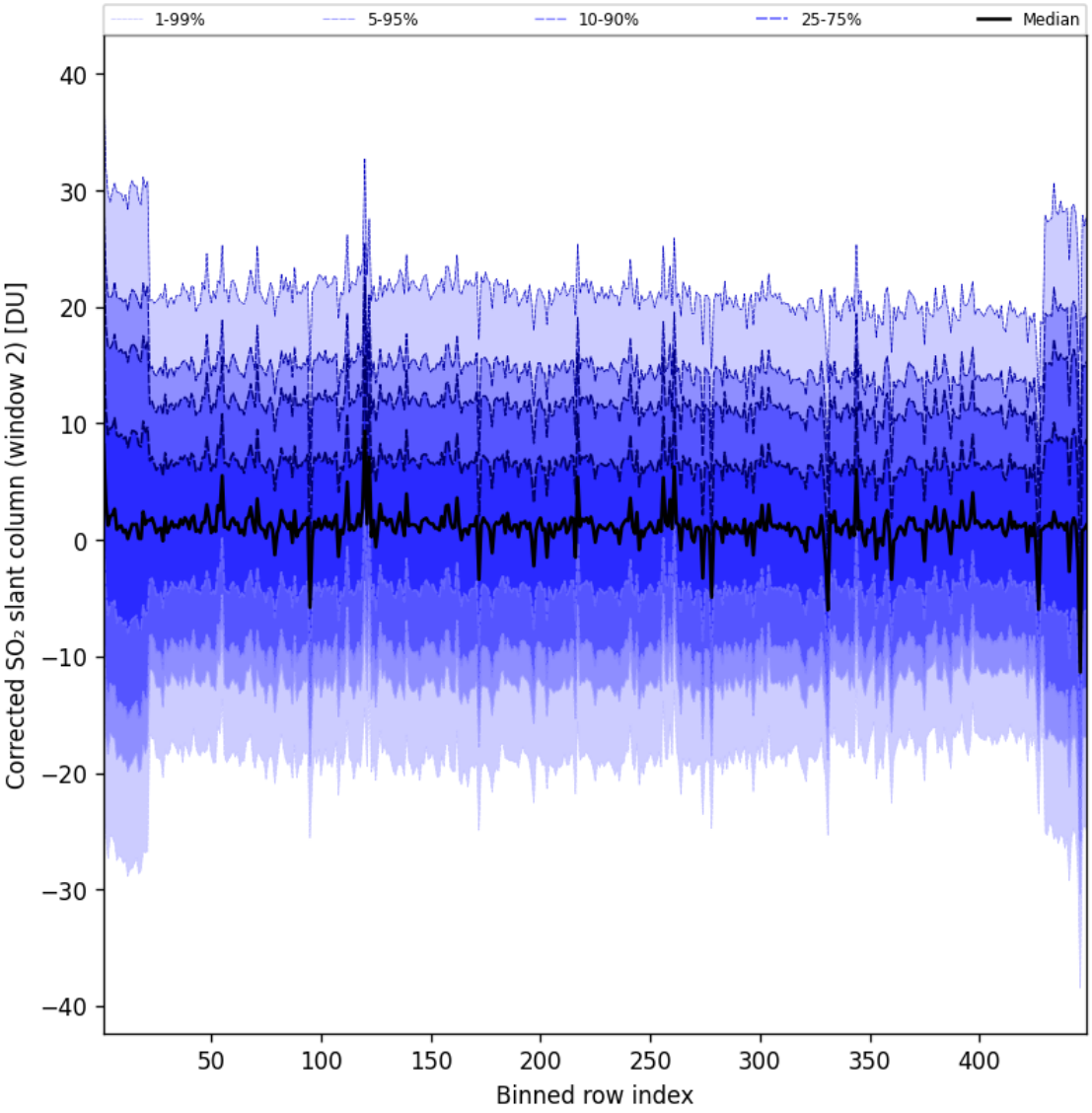

Figure 96: Along track statistics of “Corrected SO_2 slant column (window 2)” for 2025-03-26 to 2025-03-26

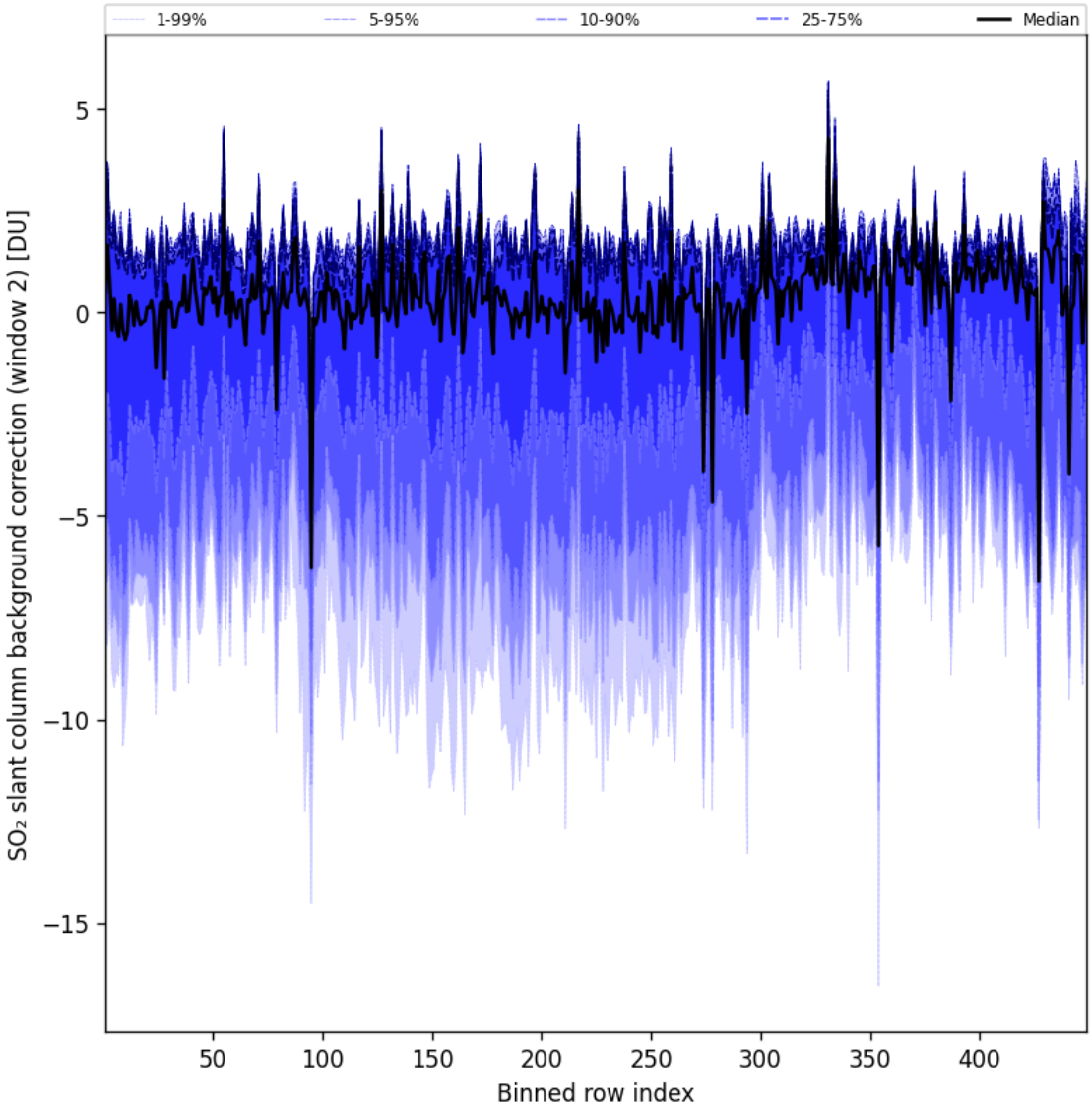

Figure 97: Along track statistics of "SO_2 slant column background correction (window 2)" for 2025-03-26 to 2025-03-26

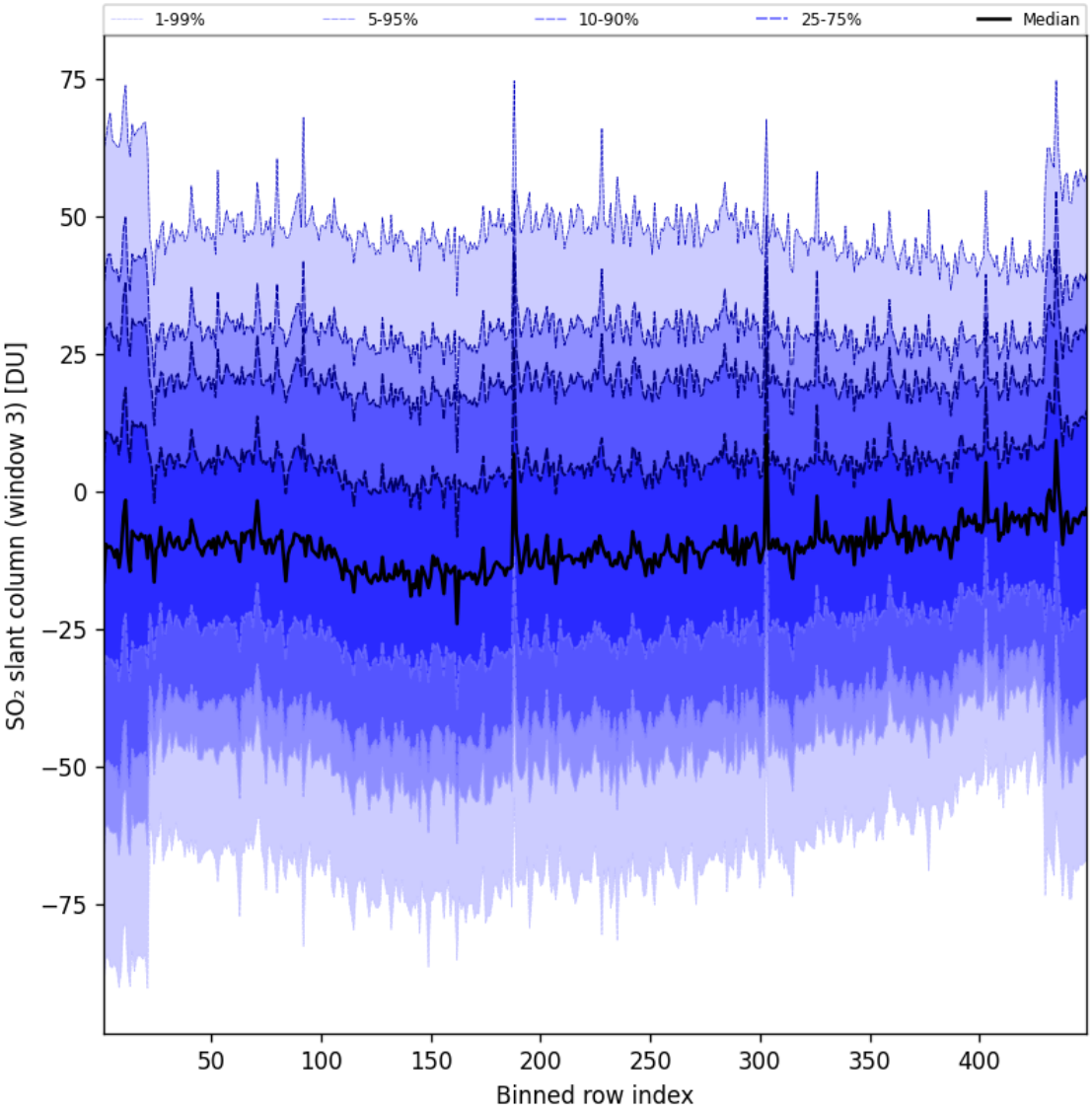

Figure 98: Along track statistics of "SO_2 slant column (window 3)" for 2025-03-26 to 2025-03-26

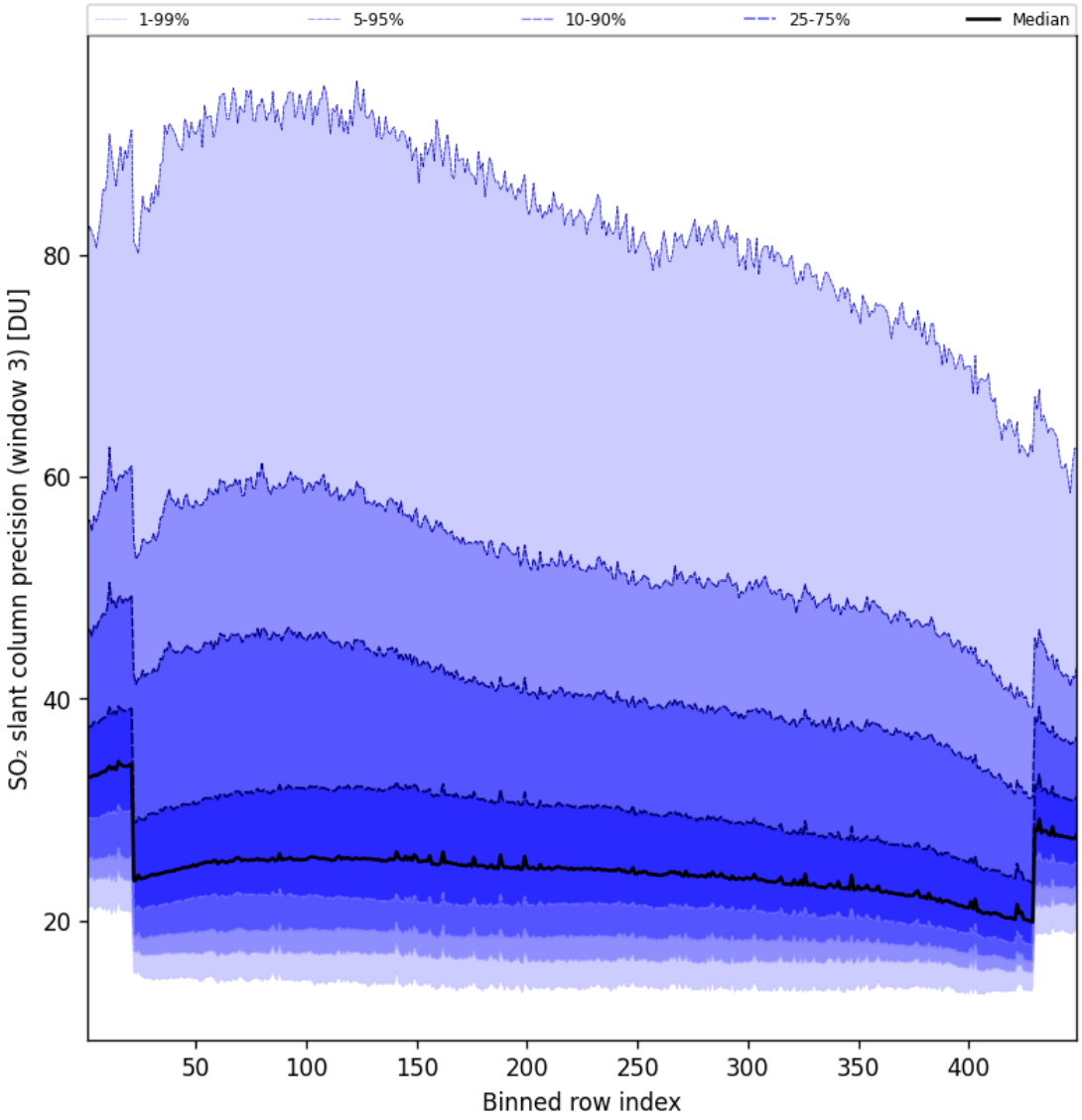

Figure 99: Along track statistics of "SO_2 slant column precision (window 3)" for 2025-03-26 to 2025-03-26

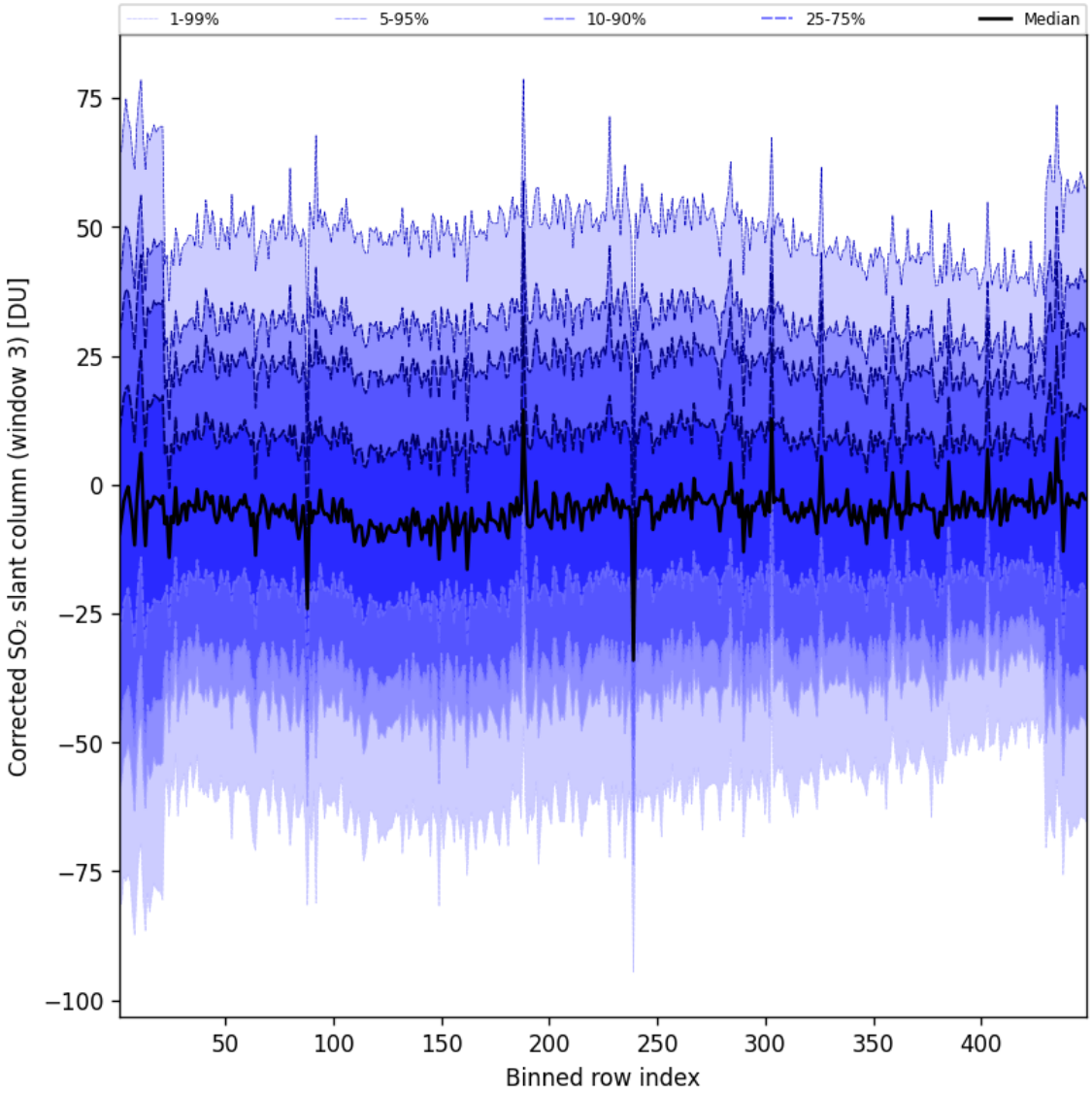

Figure 100: Along track statistics of “Corrected SO_2 slant column (window 3)” for 2025-03-26 to 2025-03-26

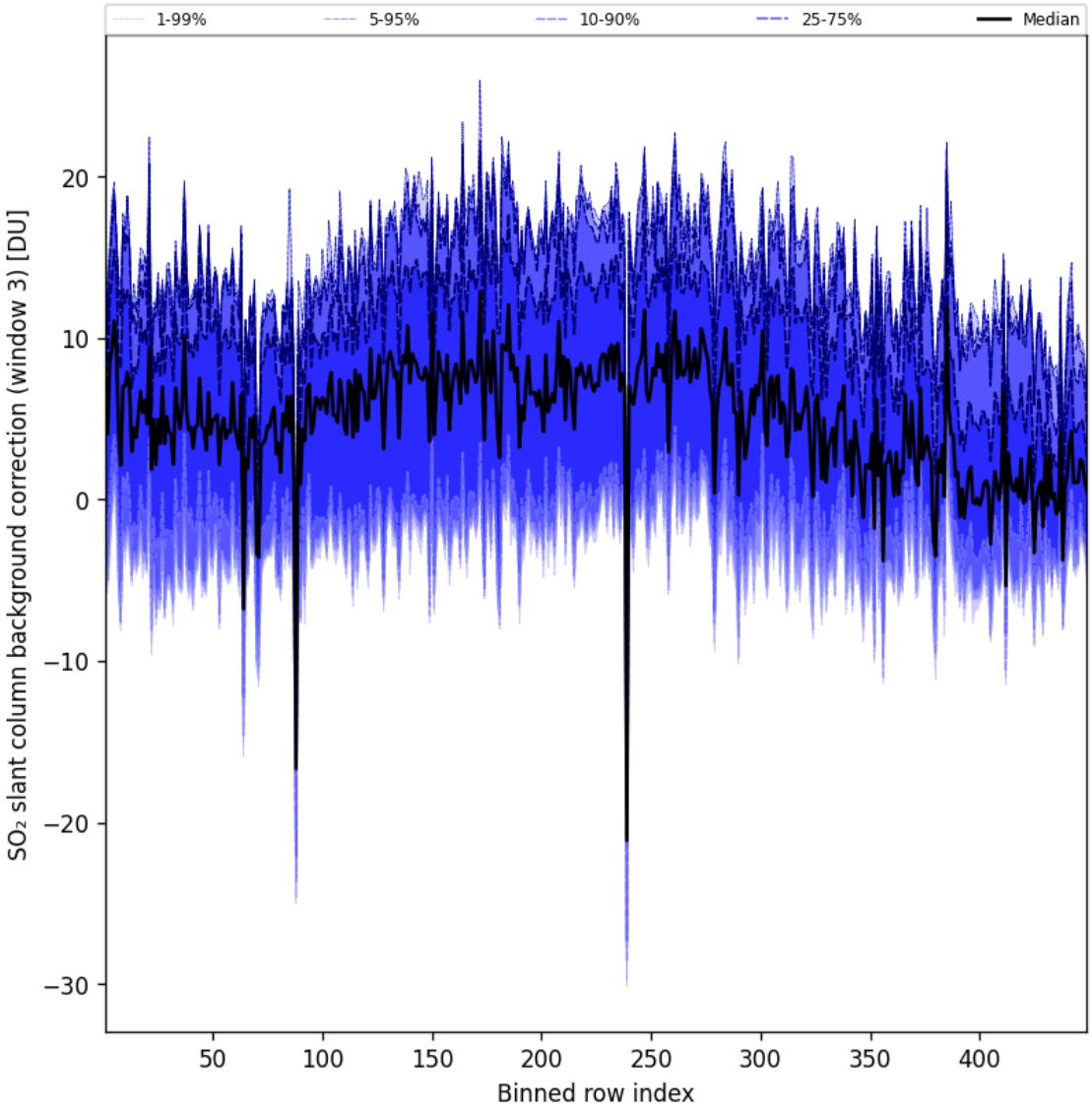

Figure 101: Along track statistics of "SO_2 slant column background correction (window 3)" for 2025-03-26 to 2025-03-26

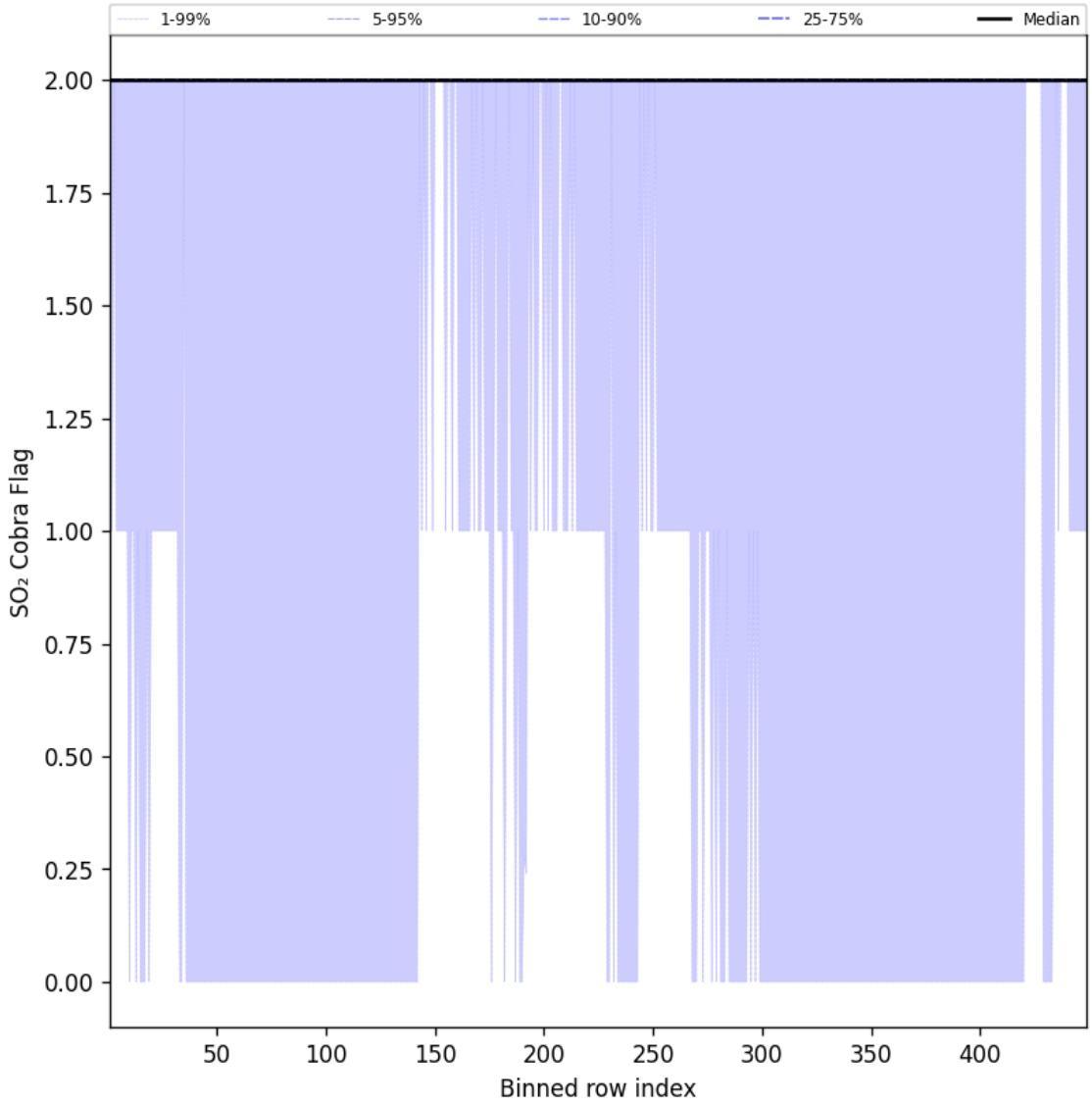

Figure 102: Along track statistics of "SO_2 Cobra Flag" for 2025-03-26 to 2025-03-26

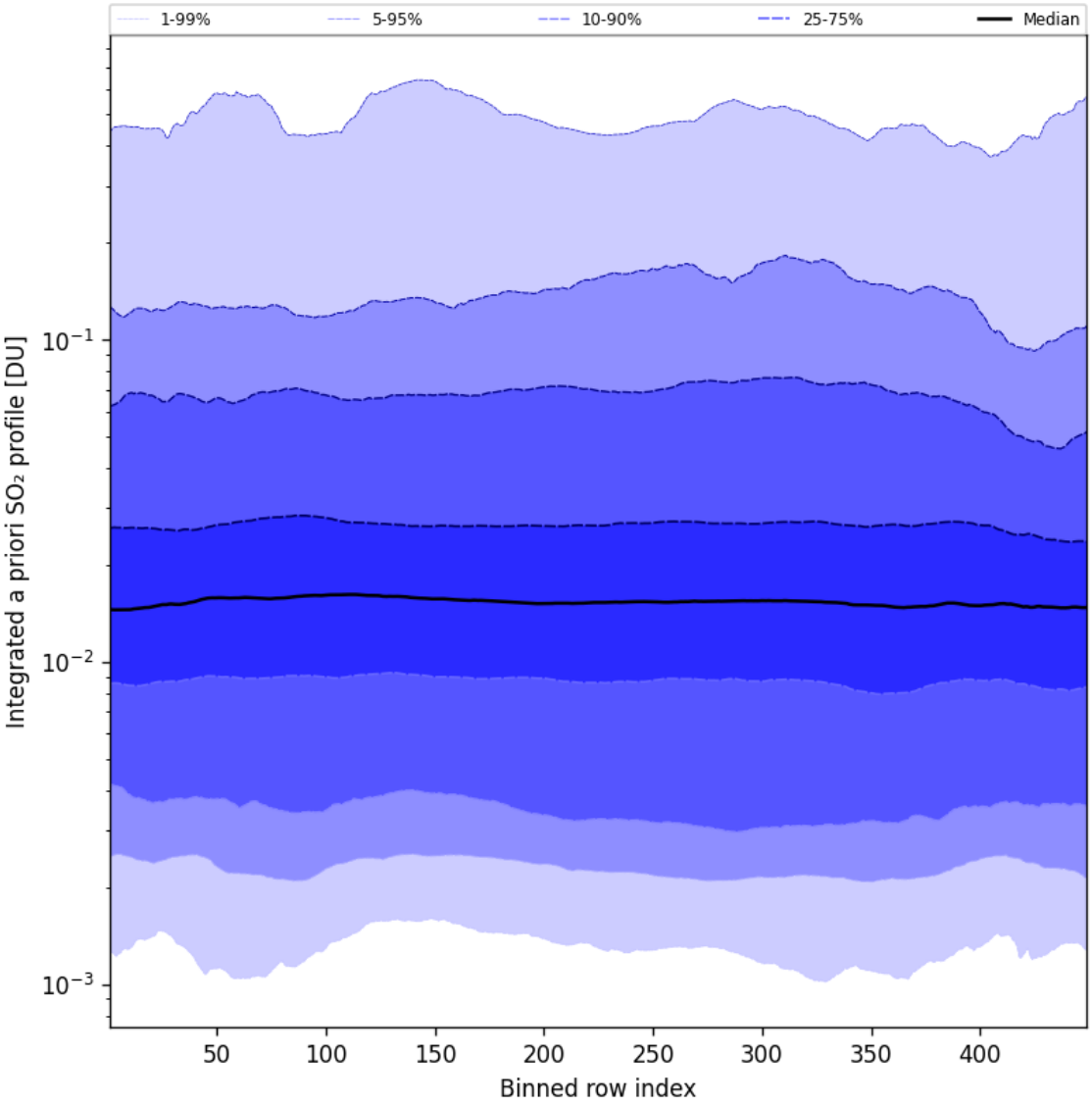

Figure 103: Along track statistics of “Integrated a priori SO_2 profile” for 2025-03-26 to 2025-03-26

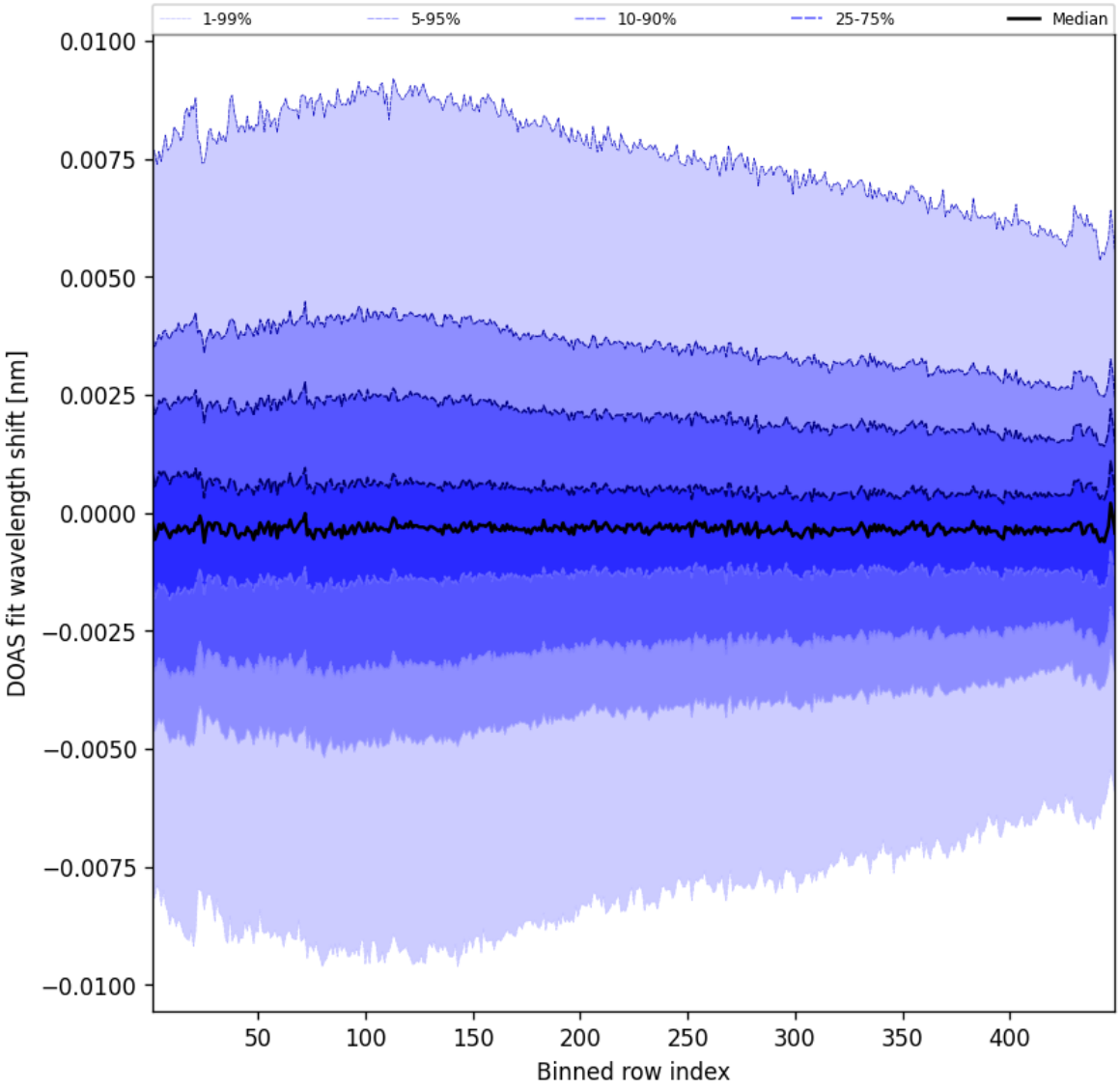

Figure 104: Along track statistics of “DOAS fit wavelength shift” for 2025-03-26 to 2025-03-26

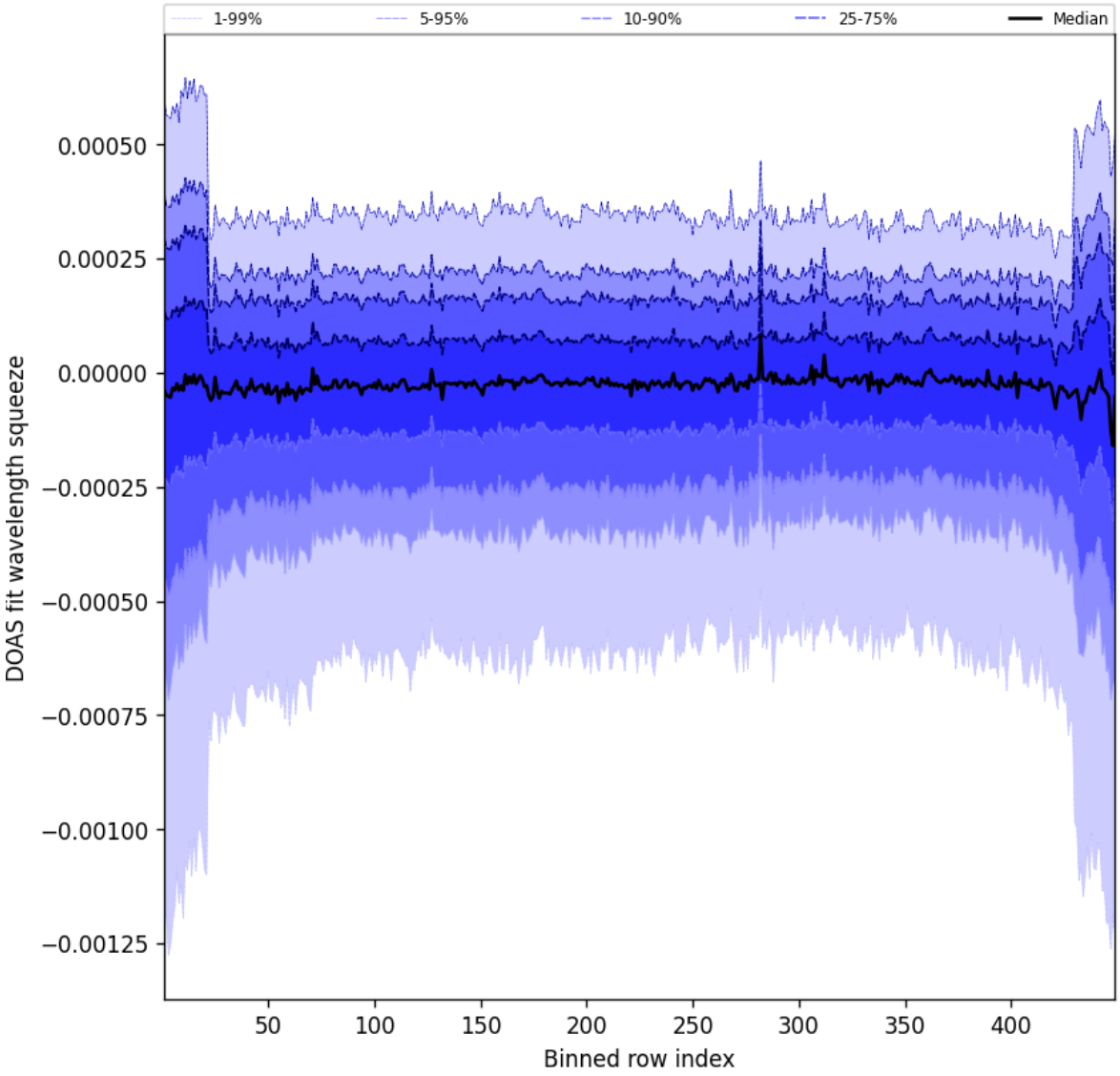

Figure 105: Along track statistics of “DOAS fit wavelength squeeze” for 2025-03-26 to 2025-03-26

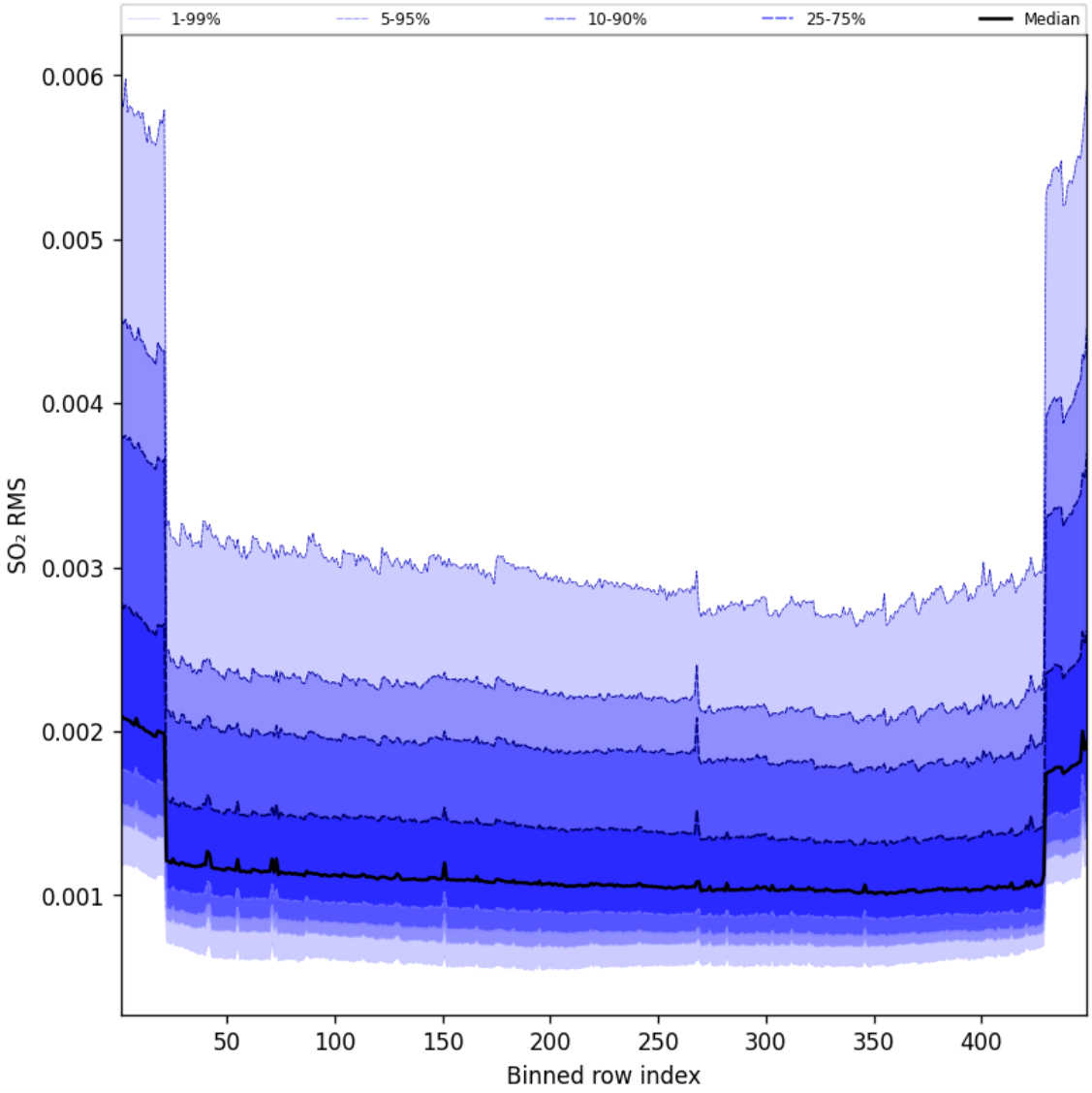

Figure 106: Along track statistics of "SO_2 RMS" for 2025-03-26 to 2025-03-26

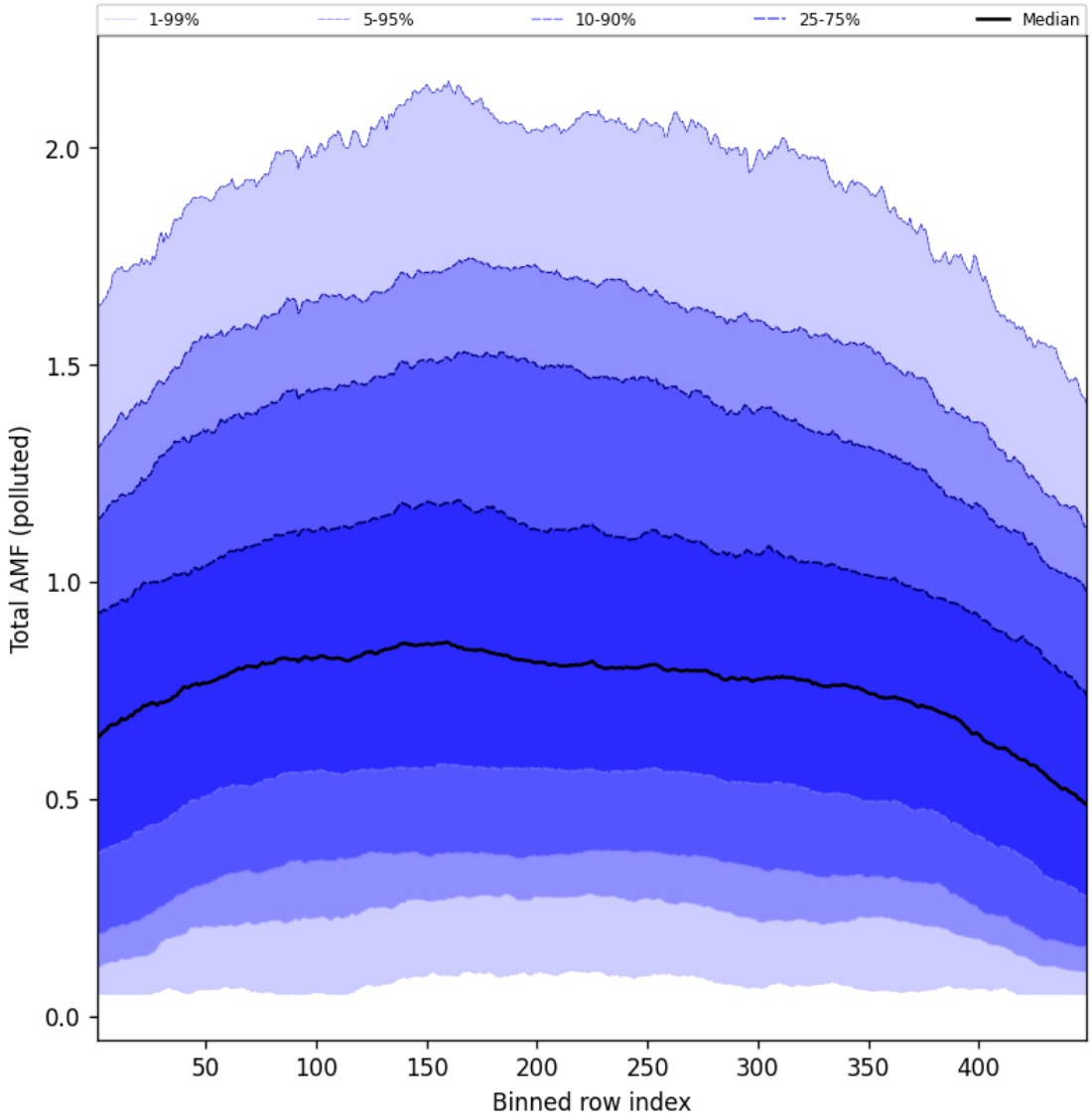

Figure 107: Along track statistics of “Total AMF (polluted)” for 2025-03-26 to 2025-03-26

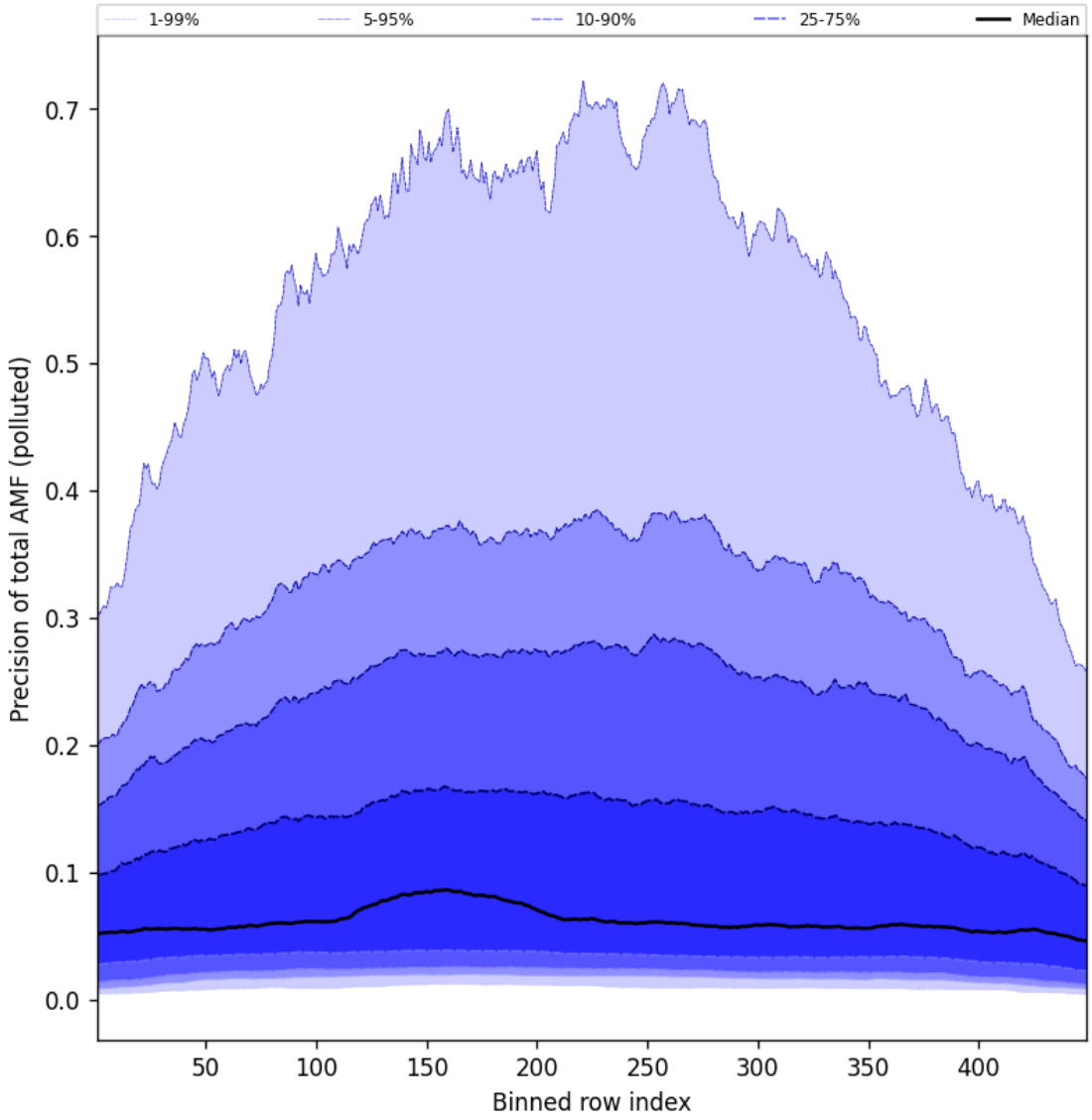

Figure 108: Along track statistics of “Precision of total AMF (polluted)” for 2025-03-26 to 2025-03-26

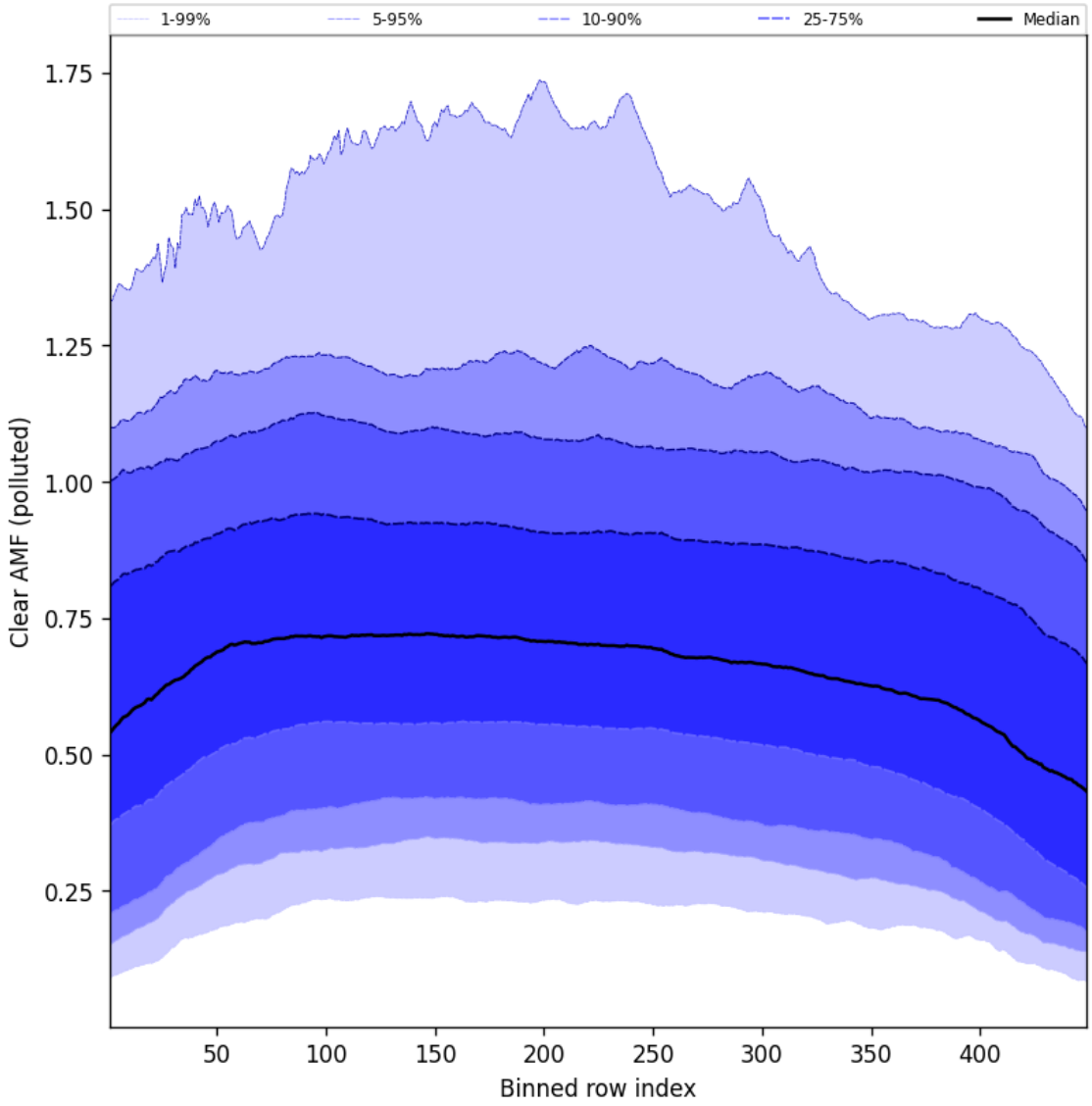

Figure 109: Along track statistics of “Clear AMF (polluted)” for 2025-03-26 to 2025-03-26

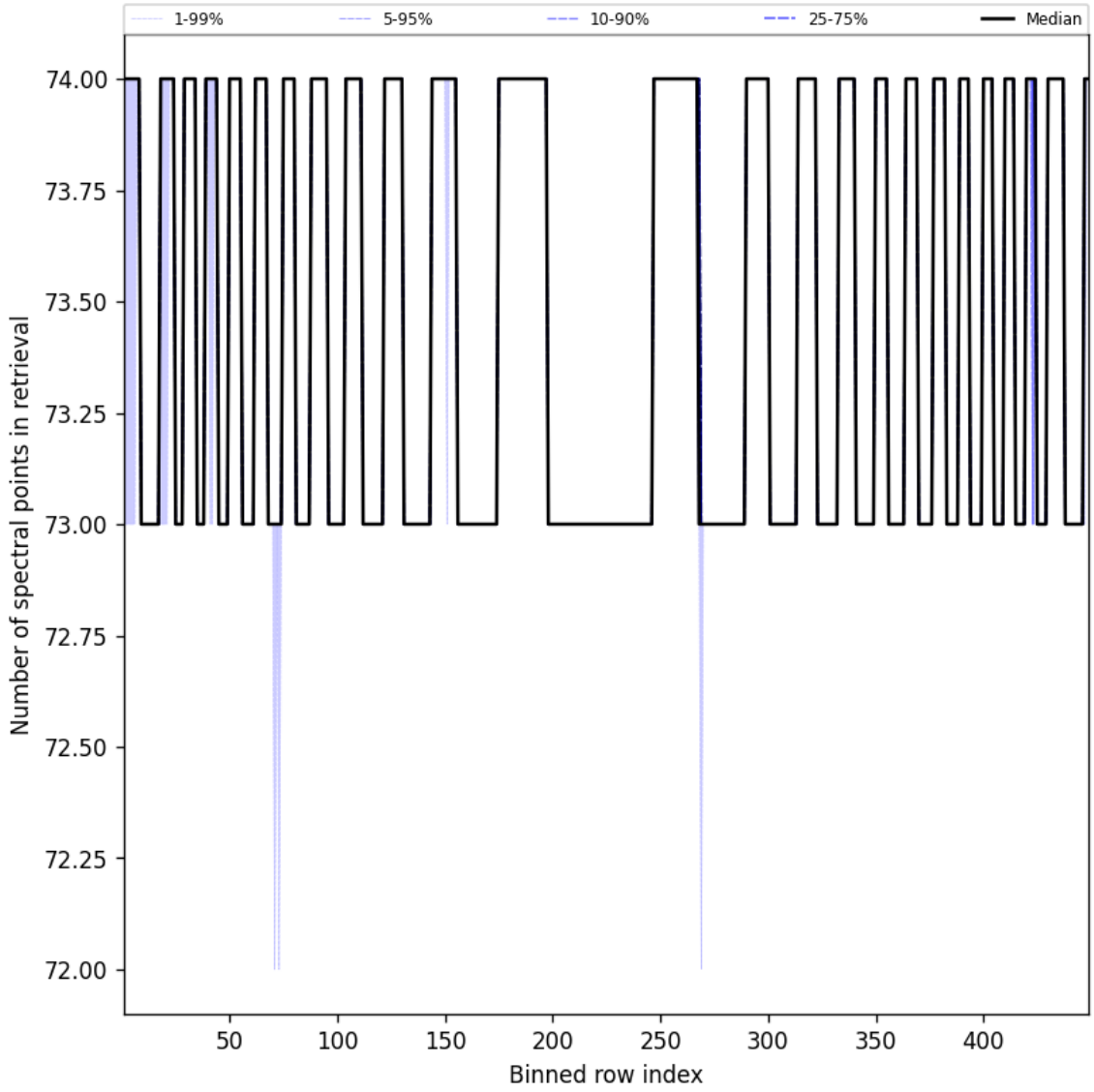

Figure 110: Along track statistics of “Number of spectral points in retrieval” for 2025-03-26 to 2025-03-26

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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