PyCAMA report generated by tropl2-proc

tropl2-proc

2025-07-25 (04:36)

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]	0.663 ± 0.400	19970732	0.995	0.760	1.000	0.0	1.000
sulfurdioxide total vertical column [DU]	$(2.960 \pm 112.008) \times 10^{-2}$	19970732	0.278	0.478	1.076×10^{-2}	-127	384
sulfurdioxide total vertical column precision [DU]	0.554 ± 0.762	19970732	0.247	0.377	0.346	4.829×10^{-2}	293
sulfurdioxide slant column density corrected [DU]	$(1.922 \pm 52.378) \times 10^{-2}$	19970732	0.258	0.390	9.576×10^{-3}	-19.4	309
sulfurdioxide slant column density cobra [DU]	$(1.818 \pm 38.921) \times 10^{-2}$	19970732	0.258	0.390	9.576×10^{-3}	-19.4	56.0
sulfurdioxide slant column density cobra precision [DU]	0.315 ± 0.139	19970732	0.213	0.162	0.267	8.562×10^{-2}	22.0
sulfurdioxide slant column density window1 [DU]	$(7.607 \pm 68.985) \times 10^{-2}$	19970732	7.500×10^{-2}	0.740	7.853×10^{-2}	-77.2	64.3
sulfurdioxide slant column density window1 precision [DU]	0.315 ± 0.139	19970732	0.213	0.162	0.267	8.562×10^{-2}	22.0
sulfurdioxide slant column density corrected win1 [DU]	$(1.574 \pm 68.069) \times 10^{-2}$	19970732	-2.500×10^{-2}	0.723	-6.692×10^{-4}	-77.2	64.3
background so2 slant column offset window1 [DU]	$(-6.033 \pm 13.281) \times 10^{-2}$	19970732	-0.140	0.168	-9.017×10^{-2}	-1.50	6.87
sulfurdioxide slant column density window2 [DU]	0.636 ± 9.130	19970732	0.250	11.4	0.499	-1.841×10^{3}	1.023×10^{3}
sulfurdioxide slant column density window2 precision [DU]	8.29 ± 2.43	19970732	7.43	2.74	7.93	2.23	791
sulfurdioxide slant column density corrected win2 [DU]	-0.175 ± 9.046	19970732	0.250	11.3	-0.139	-1.844×10^{3}	1.021×10^{3}
background so2 slant column offset window2 [DU]	-0.811 ± 1.899	19970732	0.250	2.12	-0.358	-19.5	5.87
sulfurdioxide slant column density window3 [DU]	-2.42 ± 24.51	19970732	-1.68	30.3	-2.23	-2.072×10^{3}	2.563×10^{3}
sulfurdioxide slant column density window3 precision [DU]	28.9 ± 13.7	19970732	22.5	10.8	25.4	9.06	1.358×10^{3}
sulfurdioxide slant column density corrected win3 [DU]	2.72 ± 24.16	19970732	3.92	30.0	2.94	-2.075×10^{3}	2.560×10^{3}
background so2 slant column offset window3 [DU]	5.14 ± 4.66	19970732	8.40	6.59	5.44	-14.3	31.8
sulfurdioxide slant column cobra flag [1]	2.00 ± 0.00	19970732	1.67	0.0	2.00	2.00	2.00
fitted radiance shift [nm]	$(-1.175 \pm 26.394) \times 10^{-4}$	19970732	1.000×10^{-4}	1.794×10^{-3}	-1.260×10^{-4}	-4.347×10^{-2}	5.362×10^{-2}
fitted radiance squeeze [1]	$(-5.013 \pm 19.019) \times 10^{-5}$	19970732	-3.000×10^{-5}	2.221×10^{-4}	-4.418×10^{-5}	-1.688×10^{-2}	2.196×10^{-2}
fitted root mean square [1]	$(1.290 \pm 0.529) \times 10^{-3}$	19970732	9.750×10^{-4}	5.337×10^{-4}	1.138×10^{-3}	3.092×10^{-4}	7.582×10^{-2}
sulfurdioxide total air mass factor polluted [1]	0.886 ± 0.476	19970732	0.740	0.553	0.805	5.000×10^{-2}	2.90
sulfurdioxide total air mass factor polluted precision [1]	0.120 ± 0.149	19970732	3.500×10^{-2}	0.108	6.962×10^{-2}	2.876×10^{-3}	2.04
sulfurdioxide clear air mass factor polluted [1]	0.754 ± 0.355	19970732	0.620	0.380	0.701	6.123×10^{-2}	2.83
number of spectral points in retrieval [1]	73.4 ± 0.5	19970732	73.0	1.000	73.0	51.0	156

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	0.0	0.0	6.000×10^{-2}	0.130	0.240	1.000	1.000	1.000	1.000	1.000
sulfurdioxide total vertical column [DU]	−2.39	−0.935	−0.572	−0.384	−0.225	0.253	0.423	0.629	1.03	2.66
sulfurdioxide total vertical column precision [DU]	9.868×10^{-2}	0.134	0.165	0.195	0.233	0.610	0.800	1.03	1.52	3.70
sulfurdioxide slant column density corrected [DU]	−0.905	−0.529	−0.382	−0.285	−0.183	0.206	0.313	0.419	0.584	1.03
sulfurdioxide slant column density cobra [DU]	−0.905	−0.529	−0.382	−0.285	−0.183	0.206	0.313	0.419	0.584	1.03
sulfurdioxide slant column density cobra precision [DU]	0.149	0.179	0.194	0.206	0.221	0.383	0.438	0.489	0.574	0.812
sulfurdioxide slant column density window1 [DU]	−1.71	−0.966	−0.682	−0.492	−0.294	0.446	0.639	0.823	1.10	1.86
sulfurdioxide slant column density window1 precision [DU]	0.149	0.179	0.194	0.206	0.221	0.383	0.438	0.489	0.574	0.812
sulfurdioxide slant column density corrected win1 [DU]	−1.65	−0.976	−0.717	−0.543	−0.358	0.366	0.564	0.756	1.05	1.87
background so2 slant column offset window1 [DU]	−0.292	−0.223	−0.196	−0.176	−0.153	1.521×10^{-2}	6.954×10^{-2}	0.117	0.185	0.316
sulfurdioxide slant column density window2 [DU]	−20.8	−13.8	−10.4	−7.93	−5.14	6.22	9.14	11.8	15.5	23.7
sulfurdioxide slant column density window2 precision [DU]	4.31	5.18	5.74	6.19	6.73	9.46	10.4	11.3	12.5	15.3
sulfurdioxide slant column density corrected win2 [DU]	−22.2	−14.8	−11.2	−8.65	−5.80	5.48	8.29	10.8	14.3	21.7
background so2 slant column offset window2 [DU]	−7.11	−4.50	−3.18	−2.42	−1.67	0.454	0.719	0.958	1.28	2.61
sulfurdioxide slant column density window3 [DU]	−65.0	−43.0	−32.6	−25.3	−17.4	13.0	20.7	27.8	37.4	56.4
sulfurdioxide slant column density window3 precision [DU]	13.4	15.8	17.8	19.4	21.2	32.0	36.7	42.5	54.3	86.6
sulfurdioxide slant column density corrected win3 [DU]	−58.6	−37.2	−27.1	−19.9	−12.1	17.9	25.5	32.4	41.8	60.9
background so2 slant column offset window3 [DU]	−5.94	−2.65	−1.02	0.284	1.88	8.47	9.71	10.8	12.3	15.2
sulfurdioxide slant column cobra flag [1]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
fitted radiance shift [nm]	-8.037×10^{-3}	-3.997×10^{-3}	-2.565×10^{-3}	-1.736×10^{-3}	-1.041×10^{-3}	7.532×10^{-4}	1.459×10^{-3}	2.333×10^{-3}	3.856×10^{-3}	8.161×10^{-3}
fitted radiance squeeze [1]	-5.550×10^{-4}	-3.611×10^{-4}	-2.776×10^{-4}	-2.196×10^{-4}	-1.584×10^{-4}	6.366×10^{-5}	1.179×10^{-4}	1.680×10^{-4}	2.399×10^{-4}	4.153×10^{-4}
fitted root mean square [1]	5.947×10^{-4}	7.363×10^{-4}	8.193×10^{-4}	8.804×10^{-4}	9.517×10^{-4}	1.485×10^{-3}	1.732×10^{-3}	1.966×10^{-3}	2.306×10^{-3}	3.182×10^{-3}
sulfurdioxide total air mass factor polluted [1]	8.152×10^{-2}	0.242	0.351	0.445	0.559	1.11	1.35	1.58	1.85	2.29
sulfurdioxide total air mass factor polluted precision [1]	9.793×10^{-3}	1.794×10^{-2}	2.447×10^{-2}	3.014×10^{-2}	3.763×10^{-2}	0.145	0.194	0.258	0.389	0.783
sulfurdioxide clear air mass factor polluted [1]	0.219	0.306	0.369	0.433	0.521	0.902	1.01	1.13	1.50	2.02
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]	0.612 ± 0.412	13790491	0.800	1.000	0.0	1.000	0.200	1.000
sulfurdioxide total vertical column [DU]	$(2.246 \pm 118.620) \times 10^{-2}$	13790491	0.430	7.532×10^{-3}	-127	246	-0.206	0.224
sulfurdioxide total vertical column precision [DU]	0.531 ± 0.821	13790491	0.319	0.307	4.829×10^{-2}	107	0.212	0.532
sulfurdioxide slant column density corrected [DU]	$(1.498 \pm 52.968) \times 10^{-2}$	13790491	0.361	6.866×10^{-3}	-6.35	175	-0.172	0.189
sulfurdioxide slant column density cobra [DU]	$(1.368 \pm 36.022) \times 10^{-2}$	13790491	0.361	6.866×10^{-3}	-6.35	56.0	-0.172	0.189
sulfurdioxide slant column density cobra precision [DU]	0.288 ± 0.117	13790491	0.122	0.249	8.562×10^{-2}	22.0	0.211	0.333
sulfurdioxide slant column density window1 [DU]	$(6.203 \pm 63.690) \times 10^{-2}$	13790491	0.696	6.738×10^{-2}	-33.6	64.3	-0.285	0.412
sulfurdioxide slant column density window1 precision [DU]	0.288 ± 0.117	13790491	0.122	0.249	8.562×10^{-2}	22.0	0.211	0.333
sulfurdioxide slant column density corrected win1 [DU]	$(5.217 \pm 622.984) \times 10^{-3}$	13790491	0.676	-6.854×10^{-3}	-33.6	64.3	-0.341	0.335
background so2 slant column offset window1 [DU]	$(-5.682 \pm 13.433) \times 10^{-2}$	13790491	0.190	-8.380×10^{-2}	-0.651	1.97	-0.159	3.077×10^{-2}
sulfurdioxide slant column density window2 [DU]	0.301 ± 8.413	13790491	10.7	0.268	-256	905	-5.09	5.64
sulfurdioxide slant column density window2 precision [DU]	7.83 ± 2.14	13790491	2.43	7.52	2.23	511	6.42	8.86
sulfurdioxide slant column density corrected win2 [DU]	-0.179 ± 8.395	13790491	10.7	-0.130	-257	903	-5.49	5.18
background so2 slant column offset window2 [DU]	-0.480 ± 1.552	13790491	1.95	-0.162	-15.0	5.87	-1.38	0.574
sulfurdioxide slant column density window3 [DU]	-1.65 ± 23.07	13790491	28.6	-1.72	-2.072×10^{3}	2.563×10^{3}	-15.9	12.7
sulfurdioxide slant column density window3 precision [DU]	27.5 ± 13.9	13790491	9.56	23.7	9.06	1.358×10^{3}	20.1	29.7
sulfurdioxide slant column density corrected win3 [DU]	2.75 ± 22.69	13790491	28.3	2.93	-2.075×10^{3}	2.560×10^{3}	-11.2	17.0
background so2 slant column offset window3 [DU]	4.40 ± 4.58	13790491	7.18	4.98	-14.3	17.2	0.887	8.07
sulfurdioxide slant column cobra flag [1]	2.00 ± 0.00	13790491	0.0	2.00	2.00	2.00	2.00	2.00
fitted radiance shift [nm]	$(3.636 \pm 271.529) \times 10^{-5}$	13790491	1.725×10^{-3}	4.335×10^{-6}	-4.227×10^{-2}	4.407×10^{-2}	-8.431×10^{-4}	8.817×10^{-4}
fitted radiance squeeze [1]	$(-7.912 \pm 17.740) \times 10^{-5}$	13790491	2.149×10^{-4}	-6.646×10^{-5}	-1.175×10^{-2}	7.650×10^{-3}	-1.796×10^{-4}	3.532×10^{-5}
fitted root mean square [1]	$(1.201 \pm 0.462) \times 10^{-3}$	13790491	4.438×10^{-4}	1.075×10^{-3}	3.365×10^{-4}	4.152×10^{-2}	9.135×10^{-4}	1.357×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.923 ± 0.524	13790491	0.661	0.838	5.000×10^{-2}	2.90	0.546	1.21
sulfurdioxide total air mass factor polluted precision [1]	0.136 ± 0.168	13790491	0.122	8.002×10^{-2}	2.876×10^{-3}	2.04	3.992×10^{-2}	0.162
sulfurdioxide clear air mass factor polluted [1]	0.783 ± 0.405	13790491	0.463	0.723	6.123×10^{-2}	2.83	0.491	0.954
number of spectral points in retrieval [1]	73.5 ± 0.5	13790491	1.000	73.0	52.0	156	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]	0.777 ± 0.345	6180241	0.550	1.000	0.0	1.000	0.450	1.000
sulfurdioxide total vertical column [DU]	$(4.552 \pm 95.601) \times 10^{-2}$	6180241	0.609	2.100×10^{-2}	-49.6	384	-0.278	0.331
sulfurdioxide total vertical column precision [DU]	0.605 ± 0.605	6180241	0.420	0.462	5.472×10^{-2}	293	0.296	0.717
sulfurdioxide slant column density corrected [DU]	$(2.868 \pm 51.023) \times 10^{-2}$	6180241	0.469	1.735×10^{-2}	-19.4	309	-0.214	0.255
sulfurdioxide slant column density cobra [DU]	$(2.823 \pm 44.702) \times 10^{-2}$	6180241	0.469	1.735×10^{-2}	-19.4	49.3	-0.214	0.255
sulfurdioxide slant column density cobra precision [DU]	0.377 ± 0.162	6180241	0.204	0.352	0.101	18.0	0.251	0.456
sulfurdioxide slant column density window1 [DU]	0.107 ± 0.794	6180241	0.854	0.109	-77.2	57.2	-0.319	0.535
sulfurdioxide slant column density window1 precision [DU]	0.377 ± 0.162	6180241	0.204	0.352	0.101	18.0	0.251	0.456
sulfurdioxide slant column density corrected win1 [DU]	$(3.923 \pm 79.398) \times 10^{-2}$	6180241	0.850	1.661×10^{-2}	-77.2	57.1	-0.401	0.449
background so2 slant column offset window1 [DU]	$(-6.816 \pm 12.903) \times 10^{-2}$	6180241	0.118	-9.695×10^{-2}	-1.50	6.87	-0.141	-2.289×10^{-2}
sulfurdioxide slant column density window2 [DU]	1.38 ± 10.52	6180241	13.0	1.12	-1.841×10^{3}	1.023×10^{3}	-5.26	7.73
sulfurdioxide slant column density window2 precision [DU]	9.30 ± 2.71	6180241	2.91	8.96	2.56	791	7.67	10.6
sulfurdioxide slant column density corrected win2 [DU]	-0.165 ± 10.353	6180241	12.8	-0.164	-1.844×10^{3}	1.021×10^{3}	-6.57	6.23
background so2 slant column offset window2 [DU]	-1.55 ± 2.34	6180241	3.04	-0.765	-19.5	5.81	-2.89	0.154
sulfurdioxide slant column density window3 [DU]	-4.15 ± 27.37	6180241	34.8	-3.62	-830	416	-21.2	13.6
sulfurdioxide slant column density window3 precision [DU]	32.1 ± 12.7	6180241	10.3	29.1	9.56	337	24.9	35.2
sulfurdioxide slant column density corrected win3 [DU]	2.64 ± 27.15	6180241	34.6	2.96	-820	428	-14.4	20.2
background so2 slant column offset window3 [DU]	6.79 ± 4.40	6180241	6.18	6.12	-11.8	31.8	3.74	9.93
sulfurdioxide slant column cobra flag [1]	2.00 ± 0.00	6180241	0.0	2.00	2.00	2.00	2.00	2.00
fitted radiance shift [nm]	$(-4.609 \pm 24.266) \times 10^{-4}$	6180241	1.828×10^{-3}	-4.453×10^{-4}	-4.347×10^{-2}	5.362×10^{-2}	-1.411×10^{-3}	4.174×10^{-4}
fitted radiance squeeze [1]	$(1.456 \pm 20.151) \times 10^{-5}$	6180241	2.312×10^{-4}	1.026×10^{-5}	-1.688×10^{-2}	2.196×10^{-2}	-1.036×10^{-4}	1.276×10^{-4}
fitted root mean square [1]	$(1.487 \pm 0.611) \times 10^{-3}$	6180241	6.760×10^{-4}	1.315×10^{-3}	3.092×10^{-4}	7.582×10^{-2}	1.074×10^{-3}	1.750×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.802 ± 0.331	6180241	0.395	0.753	5.000×10^{-2}	2.60	0.577	0.971
sulfurdioxide total air mass factor polluted precision [1]	$(8.561 \pm 8.007) \times 10^{-2}$	6180241	7.623×10^{-2}	5.387×10^{-2}	4.485×10^{-3}	1.63	3.508×10^{-2}	0.111
sulfurdioxide clear air mass factor polluted [1]	0.690 ± 0.189	6180241	0.253	0.675	8.970×10^{-2}	1.62	0.560	0.813
number of spectral points in retrieval [1]	73.4 ± 0.5	6180241	1.000	73.0	51.0	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]	0.673 ± 0.388	13555003	0.730	1.000	0.0	1.000	0.270	1.000
sulfurdioxide total vertical column [DU]	$(2.918 \pm 110.830) \times 10^{-2}$	13555003	0.476	1.129×10^{-2}	-59.5	292	-0.224	0.252
sulfurdioxide total vertical column precision [DU]	0.544 ± 0.723	13555003	0.368	0.335	5.634×10^{-2}	67.3	0.233	0.602
sulfurdioxide slant column density corrected [DU]	$(2.015 \pm 52.969) \times 10^{-2}$	13555003	0.393	1.003×10^{-2}	-11.0	309	-0.184	0.209
sulfurdioxide slant column density cobra [DU]	$(1.907 \pm 39.333) \times 10^{-2}$	13555003	0.393	1.003×10^{-2}	-11.0	50.7	-0.184	0.209
sulfurdioxide slant column density cobra precision [DU]	0.319 ± 0.139	13555003	0.175	0.269	8.562×10^{-2}	11.6	0.219	0.394
sulfurdioxide slant column density window1 [DU]	$(7.805 \pm 70.067) \times 10^{-2}$	13555003	0.748	8.450×10^{-2}	-71.0	61.9	-0.294	0.454
sulfurdioxide slant column density window1 precision [DU]	0.319 ± 0.139	13555003	0.175	0.269	8.562×10^{-2}	11.6	0.219	0.394
sulfurdioxide slant column density corrected win1 [DU]	$(2.017 \pm 69.085) \times 10^{-2}$	13555003	0.731	4.222×10^{-3}	-71.0	61.9	-0.357	0.374
background so2 slant column offset window1 [DU]	$(-5.788 \pm 13.812) \times 10^{-2}$	13555003	0.174	-9.135×10^{-2}	-0.651	2.90	-0.154	2.078×10^{-2}
sulfurdioxide slant column density window2 [DU]	0.740 ± 9.098	13555003	11.4	0.556	-1.841×10^{3}	905	-5.06	6.30
sulfurdioxide slant column density window2 precision [DU]	8.22 ± 2.30	13555003	2.67	7.88	2.23	791	6.72	9.39
sulfurdioxide slant column density corrected win2 [DU]	-0.169 ± 8.993	13555003	11.3	-0.141	-1.844×10^{3}	903	-5.79	5.47
background so2 slant column offset window2 [DU]	-0.909 ± 2.023	13555003	2.32	-0.331	-19.5	5.87	-1.87	0.452
sulfurdioxide slant column density window3 [DU]	$(6.647 \pm 2418.253) \times 10^{-2}$	13555003	30.3	4.746×10^{-2}	-830	316	-14.9	15.3
sulfurdioxide slant column density window3 precision [DU]	27.8 ± 11.9	13555003	9.89	24.7	9.56	255	21.0	30.9
sulfurdioxide slant column density corrected win3 [DU]	5.17 ± 23.61	13555003	29.7	5.13	-820	316	-9.61	20.1
background so2 slant column offset window3 [DU]	5.11 ± 4.69	13555003	6.51	5.21	-14.3	31.8	1.86	8.36
sulfurdioxide slant column cobra flag [1]	2.00 ± 0.00	13555003	0.0	2.00	2.00	2.00	2.00	2.00
fitted radiance shift [nm]	$(-1.360 \pm 23.149) \times 10^{-4}$	13555003	1.729×10^{-3}	-1.171×10^{-4}	-4.347×10^{-2}	5.362×10^{-2}	-1.020×10^{-3}	7.088×10^{-4}
fitted radiance squeeze [1]	$(-4.097 \pm 19.132) \times 10^{-5}$	13555003	2.215×10^{-4}	-3.486×10^{-5}	-1.688×10^{-2}	1.431×10^{-2}	-1.490×10^{-4}	7.254×10^{-5}
fitted root mean square [1]	$(1.303 \pm 0.542) \times 10^{-3}$	13555003	5.810×10^{-4}	1.137×10^{-3}	3.365×10^{-4}	7.582×10^{-2}	9.487×10^{-4}	1.530×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.890 ± 0.453	13555003	0.508	0.827	5.000×10^{-2}	2.70	0.591	1.10
sulfurdioxide total air mass factor polluted precision [1]	0.116 ± 0.153	13555003	9.026×10^{-2}	6.703×10^{-2}	3.159×10^{-3}	2.04	4.004×10^{-2}	0.130
sulfurdioxide clear air mass factor polluted [1]	0.774 ± 0.359	13555003	0.366	0.731	7.309×10^{-2}	2.50	0.548	0.914
number of spectral points in retrieval [1]	73.4 ± 0.5	13555003	1.000	73.0	51.0	156	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]	0.663 ± 0.419	4405634	0.810	1.000	0.0	1.000	0.190	1.000
sulfurdioxide total vertical column [DU]	$(2.454 \pm 92.673) \times 10^{-2}$	4405634	0.449	8.493×10^{-3}	-105	384	-0.212	0.237
sulfurdioxide total vertical column precision [DU]	0.504 ± 0.633	4405634	0.356	0.348	4.829×10^{-2}	293	0.214	0.570
sulfurdioxide slant column density corrected [DU]	$(1.662 \pm 50.220) \times 10^{-2}$	4405634	0.374	7.979×10^{-3}	-19.4	266	-0.177	0.197
sulfurdioxide slant column density cobra [DU]	$(1.567 \pm 36.981) \times 10^{-2}$	4405634	0.374	7.979×10^{-3}	-19.4	54.6	-0.177	0.197
sulfurdioxide slant column density cobra precision [DU]	0.299 ± 0.135	4405634	0.114	0.257	9.697×10^{-2}	22.0	0.219	0.334
sulfurdioxide slant column density window1 [DU]	$(9.225 \pm 64.741) \times 10^{-2}$	4405634	0.706	8.557×10^{-2}	-65.9	58.8	-0.266	0.440
sulfurdioxide slant column density window1 precision [DU]	0.299 ± 0.135	4405634	0.114	0.257	9.697×10^{-2}	22.0	0.219	0.334
sulfurdioxide slant column density corrected win1 [DU]	$(7.031 \pm 639.624) \times 10^{-3}$	4405634	0.693	-9.230×10^{-3}	-65.9	58.8	-0.350	0.343
background so2 slant column offset window1 [DU]	$(-8.521 \pm 11.860) \times 10^{-2}$	4405634	0.134	-0.112	-0.512	6.87	-0.163	-2.873×10^{-2}
sulfurdioxide slant column density window2 [DU]	0.300 ± 9.255	4405634	11.4	0.258	-1.240×10^{3}	1.023×10^{3}	-5.42	5.94
sulfurdioxide slant column density window2 precision [DU]	8.42 ± 2.77	4405634	2.86	8.03	2.39	691	6.74	9.59
sulfurdioxide slant column density corrected win2 [DU]	-0.136 ± 9.208	4405634	11.3	-8.957×10^{-2}	-1.240×10^{3}	1.021×10^{3}	-5.75	5.52
background so2 slant column offset window2 [DU]	-0.436 ± 1.593	4405634	1.80	-9.700×10^{-2}	-18.1	5.05	-1.23	0.574
sulfurdioxide slant column density window3 [DU]	-7.85 ± 24.52	4405634	29.8	-7.06	-2.072×10^{3}	2.563×10^{3}	-22.4	7.48
sulfurdioxide slant column density window3 precision [DU]	31.5 ± 17.1	4405634	12.7	27.0	9.06	1.358×10^{3}	22.0	34.7
sulfurdioxide slant column density corrected win3 [DU]	-3.34 ± 24.65	4405634	30.2	-2.55	-2.075×10^{3}	2.560×10^{3}	-18.1	12.1
background so2 slant column offset window3 [DU]	4.51 ± 4.67	4405634	7.01	4.86	-14.3	21.8	1.11	8.12
sulfurdioxide slant column cobra flag [1]	2.00 ± 0.00	4405634	0.0	2.00	2.00	2.00	2.00	2.00
fitted radiance shift [nm]	$(-8.671 \pm 331.104) \times 10^{-5}$	4405634	1.844×10^{-3}	-1.666×10^{-4}	-4.227×10^{-2}	4.038×10^{-2}	-1.051×10^{-3}	7.931×10^{-4}
fitted radiance squeeze [1]	$(-5.401 \pm 18.266) \times 10^{-5}$	4405634	2.144×10^{-4}	-4.963×10^{-5}	-1.449×10^{-2}	2.196×10^{-2}	-1.589×10^{-4}	5.548×10^{-5}
fitted root mean square [1]	$(1.230 \pm 0.479) \times 10^{-3}$	4405634	4.261×10^{-4}	1.115×10^{-3}	3.092×10^{-4}	4.362×10^{-2}	9.444×10^{-4}	1.371×10^{-3}
sulfurdioxide total air mass factor polluted [1]	0.916 ± 0.539	4405634	0.649	0.758	5.000×10^{-2}	2.90	0.534	1.18
sulfurdioxide total air mass factor polluted precision [1]	0.130 ± 0.142	4405634	0.153	8.097×10^{-2}	2.876×10^{-3}	1.95	3.250×10^{-2}	0.186
sulfurdioxide clear air mass factor polluted [1]	0.742 ± 0.360	4405634	0.380	0.659	6.129×10^{-2}	2.83	0.507	0.888
number of spectral points in retrieval [1]	73.4 ± 0.5	4405634	1.000	73.0	52.0	155	73.0	74.0

Table 7: Correlation matrix

	Viewing zenith angle	Solar zenith angle	Latitude	SO_2 vertical column	SO_2 vertical column precision	Corrected SO_2 slant column	Cobra SO_2 slant column	SO_2 slant column precision (Cobra)	SO_2 slant column (window 1)	SO_2 slant column precision (window 1)	SO_2 slant column background correction (window 1)	SO_2 slant column precision (window2)	Corrected SO_2 slant column (window 2)	SO_2 slant column background correction (window 2)	SO_2 slant column (window 3)	SO_2 slant column precision (window 3)	Corrected SO_2 slant column (window 3)	SO_2 slant column background correction (window 3)	DOAS fit wavelength shift	DOAS fit wavelength squeeze	SO_2 RMS	Total AMF (polluted)	Precision of total AMF (polluted)	Clear AMF (polluted)
Viewing zenith angle	1.000	9.795×10^{-3}	-8.921×10^{-3}	6.180×10^{-3}	0.232	3.234×10^{-4}	1.690×10^{-3}	0.321	1.947×10^{-2}	0.321	3.615×10^{-2}	0.122	-2.054×10^{-3}	1.325×10^{-2}	6.142×10^{-3}	1.578×10^{-2}	-1.597×10^{-3}	-4.059×10^{-2}	1.290×10^{-3}	-1.767×10^{-2}	0.300	−0.167	−0.128	−0.140
Solar zenith angle	9.795×10^{-3}	1.000	-2.770×10^{-2}	1.569×10^{-2}	0.214	1.337×10^{-2}	2.047×10^{-2}	0.617	−0.112	0.617	0.647	0.324	-7.731×10^{-3}	−0.661	−0.139	1.925×10^{-2}	-1.387×10^{-2}	0.657	-8.508×10^{-2}	−0.167	0.577	0.104	-9.596×10^{-3}	0.112
Latitude	-8.921×10^{-3}	-2.770×10^{-2}	1.000	-7.010×10^{-3}	2.193×10^{-2}	-1.054×10^{-2}	-1.347×10^{-2}	−0.126	-9.630×10^{-2}	−0.126	0.334	−0.202	-4.898×10^{-3}	8.085×10^{-2}	-1.631×10^{-2}	−0.173	-6.606×10^{-3}	5.155×10^{-2}	7.246×10^{-2}	−0.383	-9.213×10^{-2}	0.198	0.213	0.185
SO_2 vertical column	6.180×10^{-3}	1.569×10^{-2}	-7.010×10^{-3}	1.000	9.193×10^{-2}	0.740	0.697	6.355×10^{-2}	0.399	6.355×10^{-2}	1.334×10^{-2}	1.768×10^{-2}	2.502×10^{-2}	-1.400×10^{-2}	7.071×10^{-3}	1.502×10^{-3}	8.690×10^{-3}	7.867×10^{-3}	-2.569×10^{-3}	3.991×10^{-3}	2.678×10^{-2}	-1.312×10^{-2}	-3.730×10^{-3}	-1.327×10^{-2}
SO_2 vertical column precision	0.232	0.214	2.193×10^{-2}	9.193×10^{-2}	1.000	7.419×10^{-2}	4.125×10^{-2}	0.407	1.218×10^{-2}	0.407	0.222	0.182	6.087×10^{-3}	−0.210	-6.072×10^{-2}	-6.872×10^{-3}	-2.510×10^{-2}	0.189	-2.836×10^{-2}	-5.252×10^{-2}	0.360	−0.483	−0.221	−0.376
Corrected SO_2 slant column	3.234×10^{-4}	1.337×10^{-2}	-1.054×10^{-2}	0.740	7.419×10^{-2}	1.000	0.868	7.382×10^{-2}	0.500	7.382×10^{-2}	9.897×10^{-3}	1.619×10^{-2}	3.518×10^{-2}	-1.441×10^{-2}	1.217×10^{-2}	4.816×10^{-4}	1.359×10^{-2}	6.435×10^{-3}	-2.780×10^{-3}	8.508×10^{-3}	2.221×10^{-2}	3.102×10^{-3}	6.194×10^{-3}	-2.015×10^{-3}
Cobra SO_2 slant column	1.690×10^{-3}	2.047×10^{-2}	-1.347×10^{-2}	0.697	4.125×10^{-2}	0.868	1.000	6.563×10^{-2}	0.566	6.563×10^{-2}	1.395×10^{-2}	1.651×10^{-2}	2.289×10^{-2}	-2.158×10^{-2}	4.778×10^{-3}	4.208×10^{-4}	7.036×10^{-3}	1.135×10^{-2}	-3.614×10^{-3}	7.972×10^{-3}	3.156×10^{-2}	4.666×10^{-3}	6.314×10^{-3}	-1.845×10^{-3}
SO_2 slant column precision (Cobra)	0.321	0.617	−0.126	6.355×10^{-2}	0.407	7.382×10^{-2}	6.563×10^{-2}	1.000	1.242×10^{-2}	1.000	0.447	0.603	-2.924×10^{-3}	−0.563	−0.105	0.191	-2.941×10^{-2}	0.400	-8.071×10^{-2}	-6.668×10^{-2}	0.915	-8.882×10^{-2}	−0.148	-8.389×10^{-2}
SO_2 slant column (window 1)	1.947×10^{-2}	-0.112	-9.630×10^{-2}	0.399	1.218×10^{-2}	0.500	0.566	1.242×10^{-2}	1.000	1.242×10^{-2}	0.447	0.603	-2.924×10^{-3}	−0.563	−0.105	0.191	-2.941×10^{-2}	0.400	-8.071×10^{-2}	-6.668×10^{-2}	0.915	-8.882×10^{-2}	−0.148	-8.389×10^{-2}
SO_2 slant column precision (window 1)	0.321	0.617	−0.126	6.355×10^{-2}	0.407	7.382×10^{-2}	6.563×10^{-2}	1.000	1.242×10^{-2}	1.000	0.447	0.603	-2.924×10^{-3}	−0.563	−0.105	0.191	-2.941×10^{-2}	0.400	-8.071×10^{-2}	-6.668×10^{-2}	0.915	-8.882×10^{-2}	−0.148	-8.389×10^{-2}
SO_2 slant column background correction (window 1)	3.615×10^{-2}	0.647	0.334	1.334×10^{-2}	0.222	9.897×10^{-3}	1.395×10^{-2}	0.447	-0.165	0.447	1.000	0.146	9.044×10^{-3}	−0.492	−0.109	-6.080×10^{-2}	-8.651×10^{-3}	0.526	-5.280×10^{-2}	−0.255	0.457	0.131	0.154	5.692×10^{-2}
SO_2 slant column precision (window2)	0.122	0.324	−0.202	1.768×10^{-2}	0.182	1.619×10^{-2}	1.651×10^{-2}	0.603	2.338×10^{-2}	0.603	0.146	1.000	-1.630×10^{-2}	−0.326	-7.737×10^{-2}	0.553	-4.021×10^{-2}	0.198	-5.760×10^{-2}	2.993×10^{-2}	0.621	-8.918×10^{-2}	−0.181	-7.345×10^{-2}
Corrected SO_2 slant column (window 2)	-2.054×10^{-3}	-7.731×10^{-3}	-4.898×10^{-3}	2.502×10^{-2}	6.087×10^{-3}	3.518×10^{-2}	2.289×10^{-2}	-2.924×10^{-3}	4.204×10^{-3}	-2.924×10^{-3}	9.044×10^{-3}	-1.630×10^{-2}	1.000	6.048×10^{-2}	-2.027×10^{-2}	-5.261×10^{-3}	-2.388×10^{-2}	1.720×10^{-2}	0.172	2.779×10^{-2}	-9.731×10^{-3}	6.257×10^{-4}	1.150×10^{-2}	-6.014×10^{-3}
SO_2 slant column background correction (window 2)	1.325×10^{-2}	−0.661	8.085×10^{-2}	-1.400×10^{-2}	−0.210	-1.441×10^{-2}	-2.158×10^{-2}	−0.563	6.523×10^{-2}	−0.563	−0.492	−0.326	6.048×10^{-2}	1.000	0.118	-7.266×10^{-2}	9.021×10^{-3}	−0.576	7.946×10^{-2}	6.219×10^{-2}	−0.553	-3.958×10^{-2}	-5.836×10^{-3}	-9.283×10^{-3}
SO_2 slant column (window 3)	6.142×10^{-3}	−0.139	-1.631×10^{-2}	7.071×10^{-3}	-6.072×10^{-2}	1.217×10^{-2}	4.778×10^{-3}	−0.105	2.546×10^{-2}	−0.105	−0.109	-7.737×10^{-2}	-2.027×10^{-2}	0.118	1.000	-3.239×10^{-2}	0.982	−0.170	−0.107	-3.402×10^{-3}	−0.103	4.825×10^{-2}	9.096×10^{-3}	5.705×10^{-2}
SO_2 slant column precision (window 3)	1.578×10^{-2}	1.925×10^{-2}	−0.173	1.502×10^{-3}	-6.872×10^{-3}	4.816×10^{-4}	4.208×10^{-4}	0.191	2.396×10^{-2}	0.191	-6.080×10^{-2}	0.553	-5.261×10^{-3}	-7.266×10^{-2}	-3.239×10^{-2}	1.000	-2.599×10^{-2}	3.558×10^{-2}	-1.884×10^{-2}	6.576×10^{-2}	0.227	1.943×10^{-2}	-1.618×10^{-2}	-5.104×10^{-2}
Corrected SO_2 slant column (window 3)	-1.597×10^{-3}	-1.387×10^{-2}	-6.606×10^{-3}	8.690×10^{-3}	-2.510×10^{-2}	1.359×10^{-2}	7.036×10^{-3}	-2.941×10^{-2}	6.798×10^{-3}	-2.941×10^{-2}	-8.651×10^{-3}	-4.021×10^{-2}	-2.388×10^{-2}	9.021×10^{-3}	0.982	-2.599×10^{-2}	1.000	2.086×10^{-2}	−0.120	-2.561×10^{-2}	-3.177×10^{-2}	4.976×10^{-2}	2.824×10^{-2}	4.103×10^{-2}
SO_2 slant column background correction (window 3)	-4.059×10^{-2}	0.657	5.155×10^{-2}	7.867×10^{-3}	0.189	6.435×10^{-3}	1.135×10^{-2}	0.400	-9.866×10^{-2}	0.400	0.526	0.198	-1.720×10^{-2}	−0.576	−0.170	3.558×10^{-2}	2.086×10^{-2}	1.000	-6.258×10^{-2}	−0.115	0.376	4.197×10^{-3}	9.858×10^{-2}	-8.729×10^{-2}
DOAS fit wavelength shift	1.290×10^{-3}	-8.508×10^{-2}	7.246×10^{-2}	-2.569×10^{-3}	-2.836×10^{-2}	-2.780×10^{-3}	-3.614×10^{-3}	-8.071×10^{-2}	-2.990×10^{-2}	-8.071×10^{-2}	-5.280×10^{-2}	-5.760×10^{-2}	0.172	7.946×10^{-2}	−0.107	-1.884×10^{-2}	-6.258×10^{-2}	1.000	8.795×10^{-2}	1.000	-8.100×10^{-2}	3.266×10^{-2}	2.850×10^{-2}	2.348×10^{-2}
DOAS fit wavelength squeeze	-1.767×10^{-2}	−0.167	−0.383	3.991×10^{-3}	-5.252×10^{-2}	8.508×10^{-3}	7.972×10^{-3}	-6.668×10^{-2}	0.272	-6.668×10^{-2}	−0.255	2.993×10^{-2}	2.779×10^{-2}	6.219×10^{-2}	-3.402×10^{-3}	6.576×10^{-2}	−0.115	1.000	8.795×10^{-2}	1.000	-7.657×10^{-2}	−0.108	−0.101	-9.171×10^{-2}
SO_2 RMS	0.300	0.577	-9.213×10^{-2}	2.678×10^{-2}	0.360	2.221×10^{-2}	3.156×10^{-2}	0.915	-2.214×10^{-2}	0.915	0.457	0.621	-9.731×10^{-3}	−0.553	−0.103	0.227	-3.177×10^{-2}	0.376	-8.100×10^{-2}	-7.657×10^{-2}	1.000	-8.442×10^{-2}	−0.161	-7.135×10^{-2}
Total AMF (polluted)	−0.167	0.104	0.198	-1.312×10^{-2}	−0.483	3.102×10^{-3}	4.666×10^{-3}	-8.882×10^{-2}	-6.019×10^{-2}	-8.882×10^{-2}	0.131	-8.918×10^{-2}	6.257×10^{-4}	-3.958×10^{-2}	4.825×10^{-2}	1.943×10^{-2}	4.976×10^{-2}	4.197×10^{-3}	3.266×10^{-2}	−0.108	-8.442×10^{-2}	1.000	0.432	0.728
Precision of total AMF (polluted)	−0.128	-9.596×10^{-3}	0.213	-3.730×10^{-3}	−0.221	6.194×10^{-3}	6.314×10^{-3}	−0.148	-5.901×10^{-2}	−0.148	0.154	−0.181	1.150×10^{-2}	-5.836×10^{-3}	9.096×10^{-3}	-1.618×10^{-2}	2.824×10^{-2}	9.858×10^{-2}	2.850×10^{-2}	−0.101	−0.161	0.432	1.000	-7.040×10^{-2}
Clear AMF (polluted)	−0.140	0.112	0.185	-1.327×10^{-2}	−0.376	-2.015×10^{-3}	-1.845×10^{-3}	-8.389×10^{-2}	-3.920×10^{-2}	-8.389×10^{-2}	5.692×10^{-2}	-7.345×10^{-2}	-6.014×10^{-3}	-9.283×10^{-3}	5.705×10^{-2}	-5.104×10^{-2}	4.103×10^{-2}	-8.729×10^{-2}	2.348×10^{-2}	-9.171×10^{-2}	-7.135×10^{-2}	0.728	-7.040×10^{-2}	1.000

Table 8: Covariance matrix

Viewing zenith angle	Solar zenith angle	Latitude	SO_2 vertical column	SO_2 vertical column precision	Corrected SO_2 slant column	Cobra SO_2 slant column	SO_2 slant column precision (Cobra)	SO_2 slant column (window 1)	SO_2 slant column precision (window 1)	SO_2 slant column background correction (window 1)	SO_2 slant column precision (window2)	Corrected SO_2 slant column (window 2)	SO_2 slant column background correction (window 2)	SO_2 slant column (window 3)	SO_2 slant column precision (window 3)	Corrected SO_2 slant column (window 3)	SO_2 slant column background correction (window 3)	DOAS fit wavelength shift	DOAS fit wavelength squeeze	SO_2 RMS	Total AMF (polluted)	Precision of total AMF (polluted)	Clear AMF (polluted)
383	3.23	−6.60	0.135	3.46	3.315×10^{-3}	1.287×10^{-2}	0.874	0.263	0.874	9.396×10^{-2}	5.80	−0.364	0.492	2.95	4.23	−0.755	−3.70	6.662×10^{-5}	-6.575×10^{-5}	3.102×10^{-3}	−1.56	−0.371	−0.971
3.23	284	−17.7	0.296	2.74	0.118	0.134	1.45	−1.30	1.45	1.45	13.3	−1.18	−21.2	−57.3	4.45	−5.65	51.6	-3.786×10^{-3}	-5.339×10^{-4}	5.151×10^{-3}	0.838	-2.405×10^{-2}	0.669
−6.60	−17.7	1.430×10^{3}	−0.297	0.631	−0.209	−0.198	−0.661	−2.51	−0.661	1.68	−18.6	−1.68	5.81	−15.1	−89.6	−6.04	9.08	7.233×10^{-3}	-2.755×10^{-3}	-1.844×10^{-3}	3.57	1.20	2.49
0.135	0.296	−0.297	1.25	7.841×10^{-2}	0.434	0.304	9.896×10^{-3}	0.308	9.896×10^{-3}	1.984×10^{-3}	4.813×10^{-2}	0.254	-2.978×10^{-2}	0.194	2.307×10^{-2}	0.235	4.106×10^{-2}	-7.594×10^{-6}	8.503×10^{-7}	1.587×10^{-5}	-6.997×10^{-3}	-6.212×10^{-4}	-5.281×10^{-3}
3.46	2.74	0.631	7.841×10^{-2}	0.580	2.959×10^{-2}	1.223×10^{-2}	4.314×10^{-2}	6.399×10^{-3}	4.314×10^{-2}	2.243×10^{-2}	0.338	4.193×10^{-2}	−0.304	−1.13	-7.173×10^{-2}	−0.462	0.671	-5.700×10^{-5}	-7.606×10^{-6}	1.451×10^{-4}	−0.175	-2.501×10^{-2}	−0.102
3.315×10^{-3}	0.118	−0.209	0.434	2.959×10^{-2}	0.274	0.177	5.375×10^{-3}	0.181	5.375×10^{-3}	6.885×10^{-4}	2.061×10^{-2}	0.167	-1.433×10^{-2}	0.156	3.458×10^{-3}	0.172	1.571×10^{-2}	-3.844×10^{-6}	8.475×10^{-7}	6.156×10^{-6}	7.737×10^{-4}	4.823×10^{-4}	-3.751×10^{-4}
1.287×10^{-2}	0.134	−0.198	0.304	1.223×10^{-2}	0.177	0.151	3.551×10^{-3}	0.152	3.551×10^{-3}	7.213×10^{-4}	1.562×10^{-2}	8.061×10^{-2}	-1.594×10^{-2}	4.558×10^{-2}	2.245×10^{-3}	6.616×10^{-2}	2.058×10^{-2}	-3.712×10^{-6}	5.901×10^{-7}	6.500×10^{-6}	8.649×10^{-4}	3.654×10^{-4}	-2.552×10^{-4}
0.874	1.45	−0.661	9.896×10^{-3}	4.314×10^{-2}	5.375×10^{-3}	3.551×10^{-3}	1.933×10^{-2}	1.191×10^{-3}	1.933×10^{-2}	8.246×10^{-3}	0.204	-3.676×10^{-3}	−0.149	−0.358	0.364	-9.878×10^{-2}	0.259	-2.961×10^{-5}	-1.763×10^{-6}	6.736×10^{-5}	-5.881×10^{-3}	-3.063×10^{-3}	-4.144×10^{-3}
0.263	−1.30	−2.51	0.308	6.399×10^{-3}	0.181	0.152	1.191×10^{-3}	0.476	1.191×10^{-3}	-1.510×10^{-2}	3.921×10^{-2}	2.623×10^{-2}	8.544×10^{-2}	0.430	0.227	0.113	−0.317	-5.444×10^{-5}	3.571×10^{-5}	-8.085×10^{-6}	-1.977×10^{-2}	-6.052×10^{-3}	-9.609×10^{-3}
0.874	1.45	−0.661	9.896×10^{-3}	4.314×10^{-2}	5.375×10^{-3}	3.551×10^{-3}	1.933×10^{-2}	1.191×10^{-3}	1.933×10^{-2}	8.246×10^{-3}	0.204	-3.676×10^{-3}	−0.149	−0.358	0.364	-9.878×10^{-2}	0.259	-2.961×10^{-5}	-1.763×10^{-6}	6.736×10^{-5}	-5.881×10^{-3}	-3.063×10^{-3}	-4.144×10^{-3}
9.396×10^{-2}	1.45	1.68	1.984×10^{-3}	2.243×10^{-2}	6.885×10^{-4}	7.213×10^{-4}	8.246×10^{-3}	-1.510×10^{-2}	8.246×10^{-3}	1.764×10^{-2}	4.710×10^{-2}	1.087×10^{-2}	−0.124	−0.354	−0.111	-2.776×10^{-2}	0.326	-1.851×10^{-5}	-6.433×10^{-6}	3.213×10^{-5}	8.258×10^{-3}	3.045×10^{-3}	2.686×10^{-3}
5.80	13.3	−18.6	4.813×10^{-2}	0.338	2.061×10^{-2}	1.562×10^{-2}	0.204	3.921×10^{-2}	0.204	4.710×10^{-2}	5.91	−0.358	−1.51	−4.61	18.4	−2.36	2.25	-3.696×10^{-4}	1.384×10^{-5}	7.987×10^{-4}	−0.103	-6.552×10^{-2}	-6.345×10^{-2}
−0.364	−1.18	−1.68	0.254	4.193×10^{-2}	0.167	8.061×10^{-2}	-3.676×10^{-3}	2.623×10^{-2}	-3.676×10^{-3}	1.087×10^{-2}	−0.358	81.8	1.04	−4.49	−0.652	−5.22	−0.725	4.117×10^{-3}	4.782×10^{-5}	-4.659×10^{-5}	2.696×10^{-3}	1.546×10^{-2}	-1.933×10^{-2}
0.492	−21.2	5.81	-2.978×10^{-2}	−0.304	-1.433×10^{-2}	-1.594×10^{-2}	−0.149	8.544×10^{-2}	−0.149	−0.124	−1.51	1.04	3.61	5.51	−1.89	0.414	−5.10	3.982×10^{-4}	2.246×10^{-5}	-5.558×10^{-4}	-3.579×10^{-2}	-1.648×10^{-3}	-6.264×10^{-3}
2.95	−57.3	−15.1	0.194	−1.13	0.156	4.558×10^{-2}	−0.358	0.430	−0.358	−0.354	−4.61	−4.49	5.51	601	−10.9	581	−19.4	-6.899×10^{-3}	-1.586×10^{-5}	-1.334×10^{-3}	0.563	3.314×10^{-2}	0.497
4.23	4.45	−89.6	2.307×10^{-2}	-7.173×10^{-2}	3.458×10^{-3}	2.245×10^{-3}	0.364	0.227	0.364	−0.111	18.4	−0.652	−1.89	−10.9	188	−8.61	2.27	-6.816×10^{-4}	1.715×10^{-4}	1.648×10^{-3}	0.127	-3.298×10^{-2}	−0.249
−0.755	−5.65	−6.04	0.235	−0.462	0.172	6.616×10^{-2}	-9.878×10^{-2}	0.113	-9.878×10^{-2}	-2.776×10^{-2}	−2.36	−5.22	0.414	581	−8.61	584	2.35	-7.669×10^{-3}	-1.177×10^{-4}	-4.062×10^{-4}	0.573	0.101	0.352
−3.70	51.6	9.08	4.106×10^{-2}	0.671	1.571×10^{-2}	2.058×10^{-2}	0.259	−0.317	0.259	0.326	2.25	−0.725	−5.10	−19.4	2.27	2.35	21.7	-7.697×10^{-4}	-1.018×10^{-4}	9.274×10^{-4}	9.315×10^{-3}	6.830×10^{-2}	−0.145
6.662×10^{-5}	-3.786×10^{-3}	7.233×10^{-3}	-7.594×10^{-6}	-5.700×10^{-5}	-3.844×10^{-6}	-3.712×10^{-6}	-2.961×10^{-5}	-5.444×10^{-5}	-2.961×10^{-5}	-1.851×10^{-5}	-3.696×10^{-4}	4.117×10^{-3}	3.982×10^{-4}	-6.899×10^{-3}	-6.816×10^{-4}	-7.669×10^{-3}	-7.697×10^{-4}	6.966×10^{-6}	4.415×10^{-8}	-1.131×10^{-7}	4.106×10^{-5}	1.118×10^{-5}	2.202×10^{-5}
-6.575×10^{-5}	-5.339×10^{-4}	-2.755×10^{-3}	8.503×10^{-7}	-7.606×10^{-6}	8.475×10^{-7}	5.901×10^{-7}	-1.763×10^{-6}	3.571×10^{-5}	-1.763×10^{-6}	-6.433×10^{-6}	1.384×10^{-5}	4.782×10^{-5}	2.246×10^{-5}	-1.586×10^{-5}	1.715×10^{-4}	-1.177×10^{-4}	-1.018×10^{-4}	4.415×10^{-8}	3.617×10^{-8}	-7.707×10^{-9}	-9.803×10^{-6}	-2.860×10^{-6}	-6.198×10^{-6}
3.102×10^{-3}	5.151×10^{-3}	-1.844×10^{-3}	1.587×10^{-5}	1.451×10^{-4}	6.156×10^{-6}	6.500×10^{-6}	6.736×10^{-5}	-8.085×10^{-6}	6.736×10^{-5}	3.213×10^{-5}	7.987×10^{-4}	-4.659×10^{-5}	-5.558×10^{-4}	-1.334×10^{-3}	1.648×10^{-3}	-4.062×10^{-4}	9.274×10^{-4}	-1.131×10^{-7}	-7.707×10^{-9}	2.801×10^{-7}	-2.128×10^{-5}	-1.271×10^{-5}	-1.342×10^{-5}
−1.56	0.838	3.57	-6.997×10^{-3}	−0.175	7.737×10^{-4}	8.649×10^{-4}	-5.881×10^{-3}	-1.977×10^{-2}	-5.881×10^{-3}	8.258×10^{-3}	−0.103	2.696×10^{-3}	-3.579×10^{-2}	0.563	0.127	0.573	9.315×10^{-3}	4.106×10^{-5}	-9.803×10^{-6}	-2.128×10^{-5}	0.227	3.059×10^{-2}	0.123
−0.371	-2.405×10^{-2}	1.20	-6.212×10^{-4}	-2.501×10^{-2}	4.823×10^{-4}	3.654×10^{-4}	-3.063×10^{-3}	-6.052×10^{-3}	-3.063×10^{-3}	3.045×10^{-3}	-6.552×10^{-2}	1.546×10^{-2}	-1.648×10^{-3}	3.314×10^{-2}	-3.298×10^{-2}	0.101	6.830×10^{-2}	1.118×10^{-5}	-2.860×10^{-6}	-1.271×10^{-5}	3.059×10^{-2}	2.211×10^{-2}	-3.720×10^{-3}
−0.971	0.669	2.49	-5.281×10^{-3}	−0.102	-3.751×10^{-4}	-2.552×10^{-4}	-4.144×10^{-3}	-9.609×10^{-3}	-4.144×10^{-3}	2.686×10^{-3}	-6.345×10^{-2}	-1.933×10^{-2}	-6.264×10^{-3}	0.497	−0.249	0.352	−0.145	2.202×10^{-5}	-6.198×10^{-6}	-1.342×10^{-5}	0.123	-3.720×10^{-3}	0.126

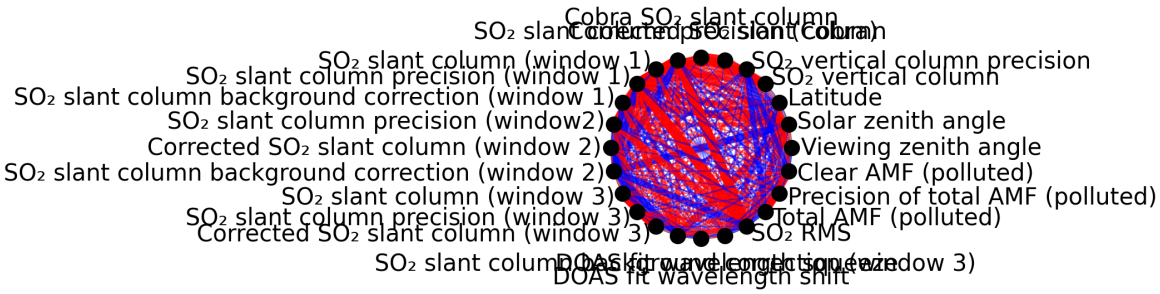

Figure 1: Map of correlation graph for 2025-07-09 to 2025-07-11.

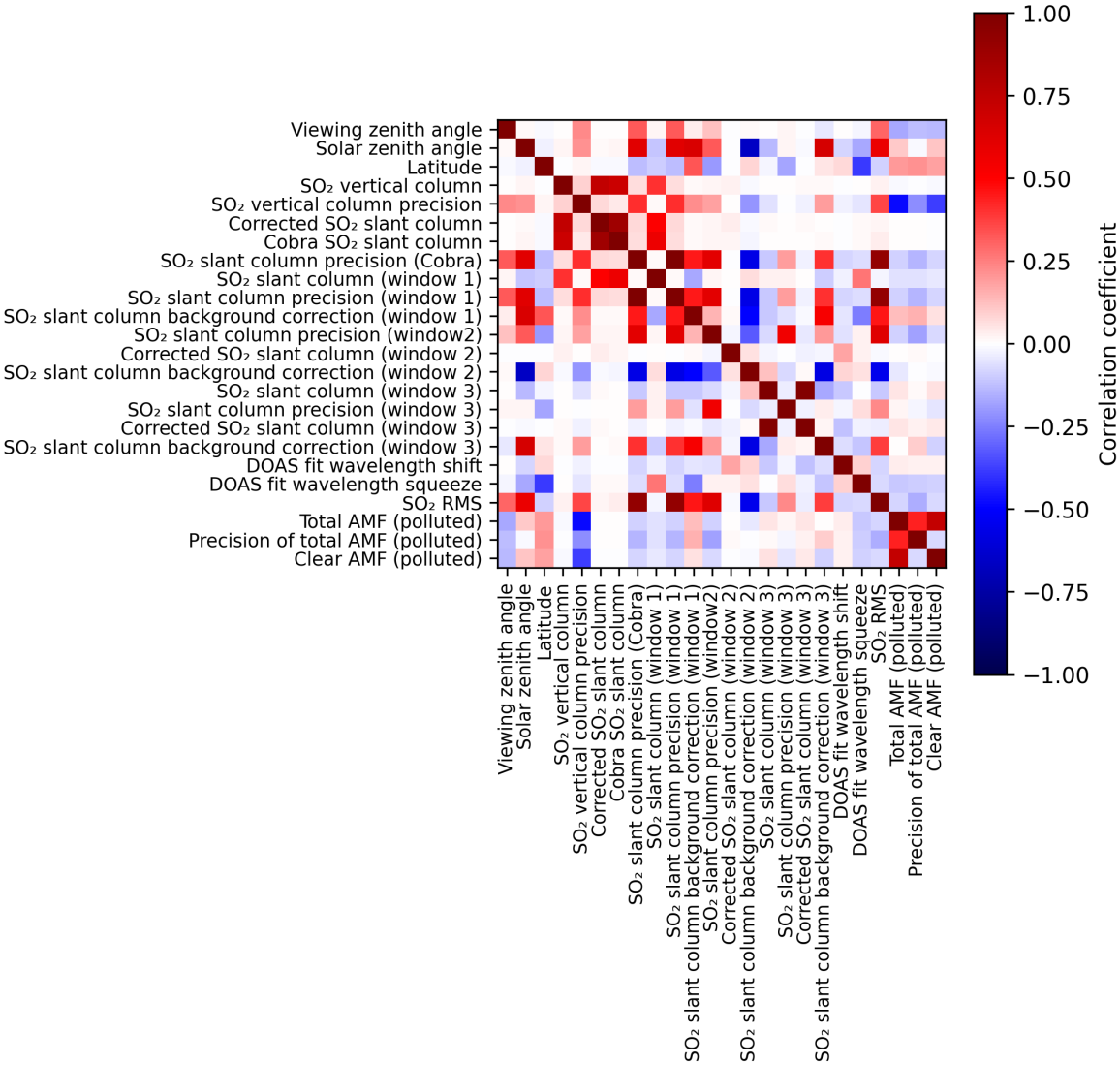

Figure 2: Map of correlation matrix for 2025-07-09 to 2025-07-11.

3 Granule outlines

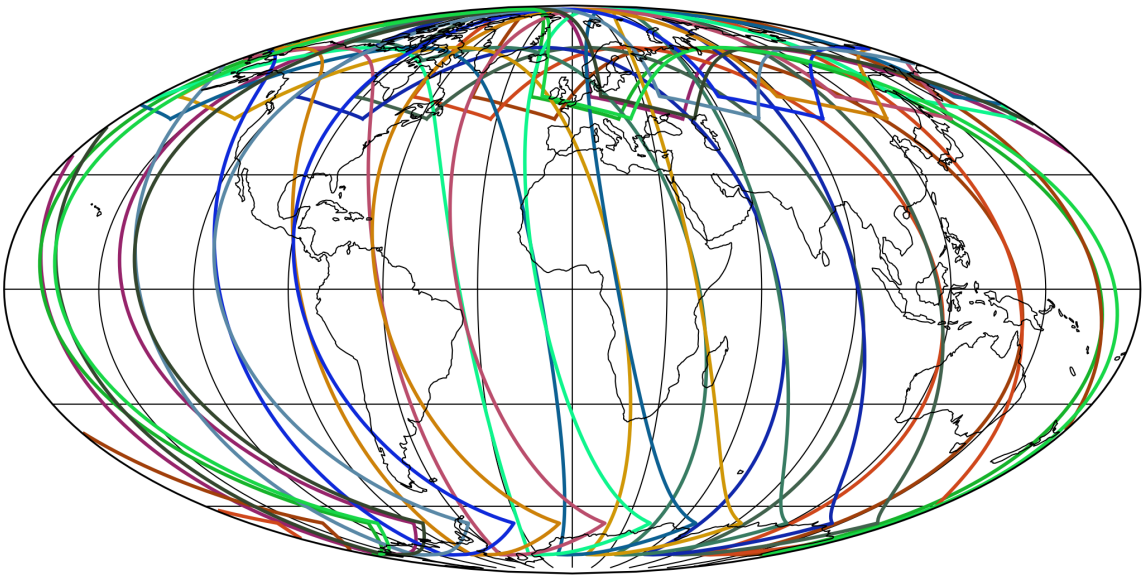

Figure 3: Outline of the granules.

4 Input data monitoring

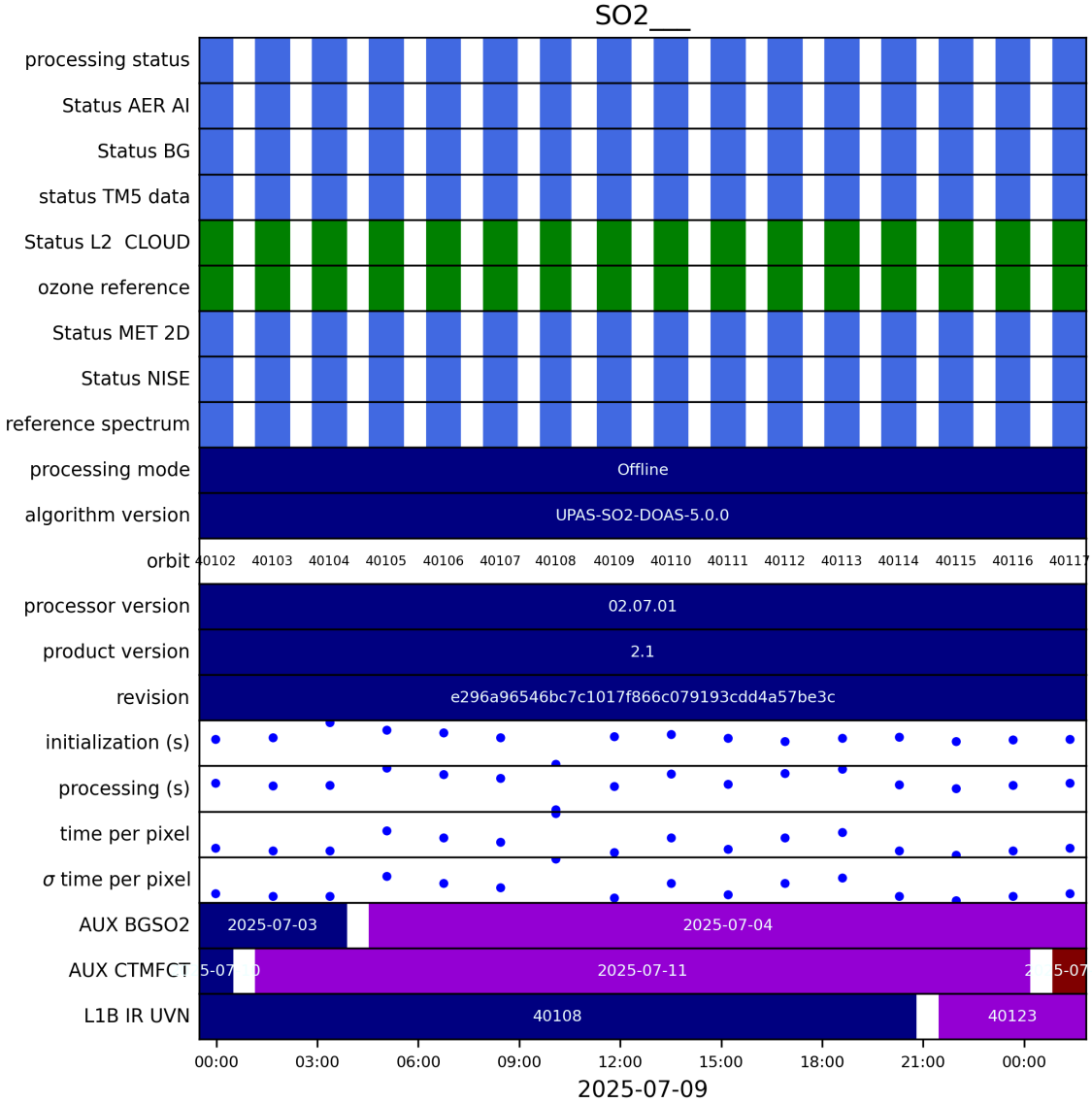

Figure 4: Input data per granule

5 Warnings and errors

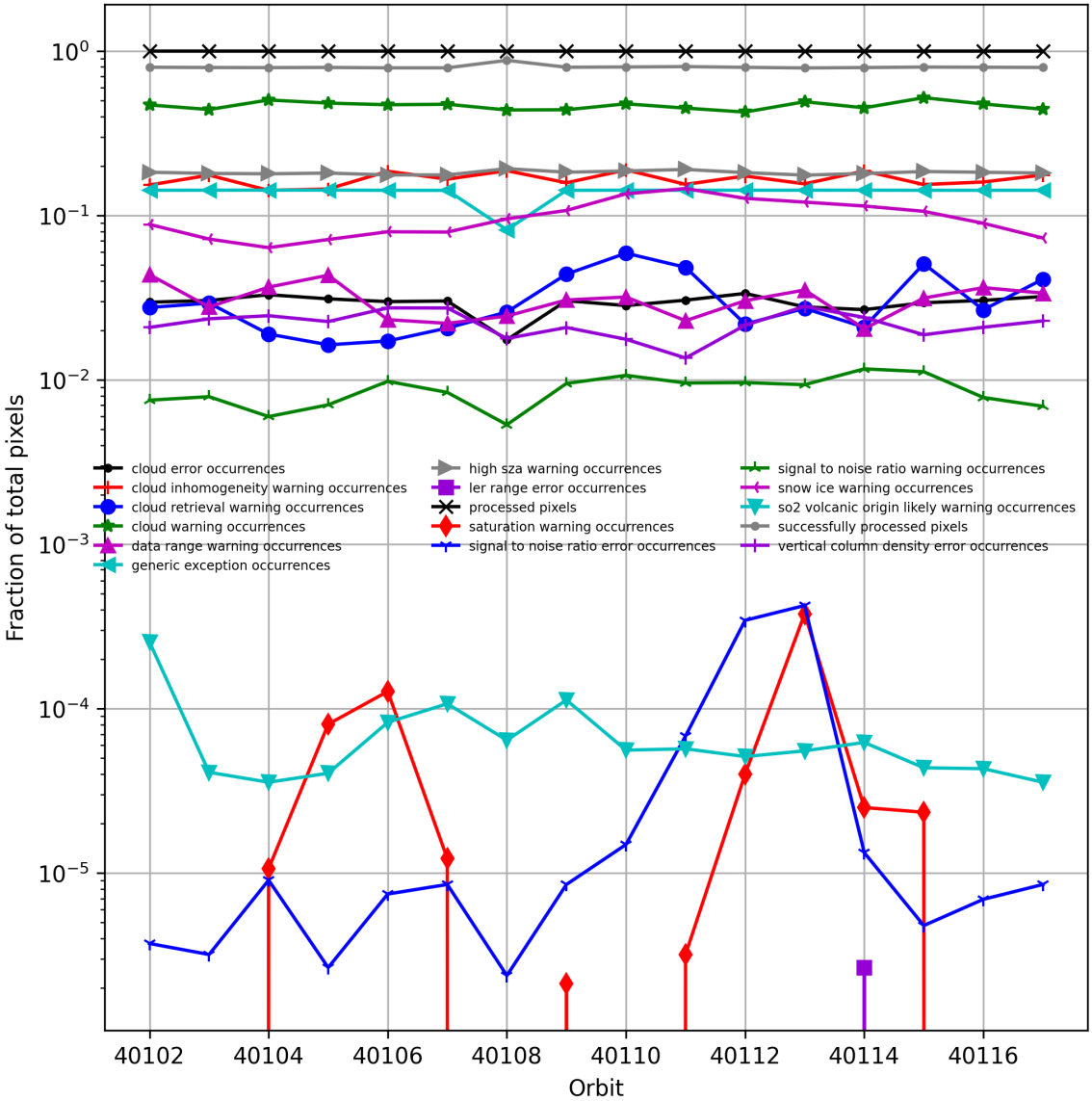

Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

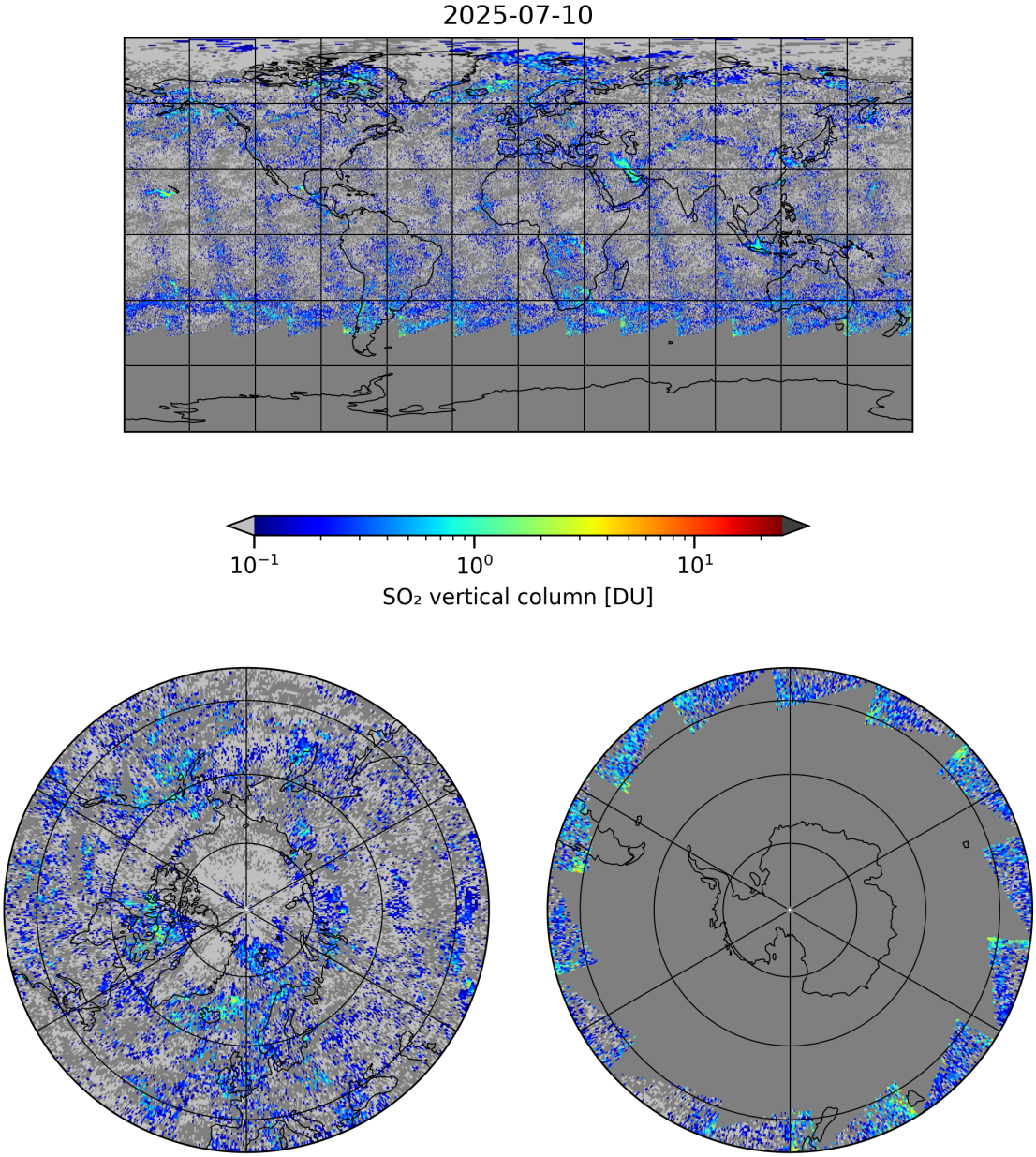

Figure 6: Map of "SO_2 vertical column" for 2025-07-09 to 2025-07-11

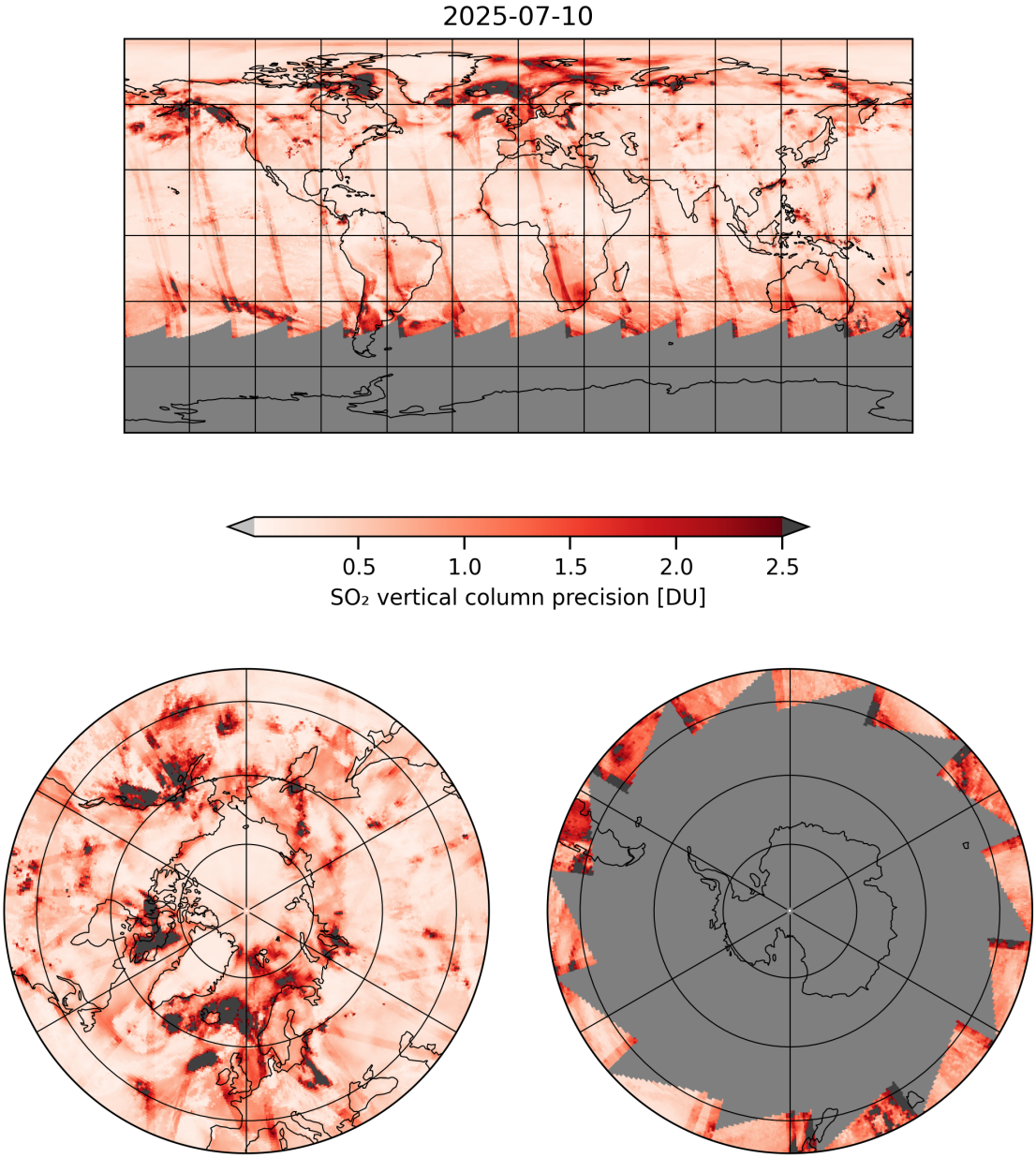

Figure 7: Map of "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11

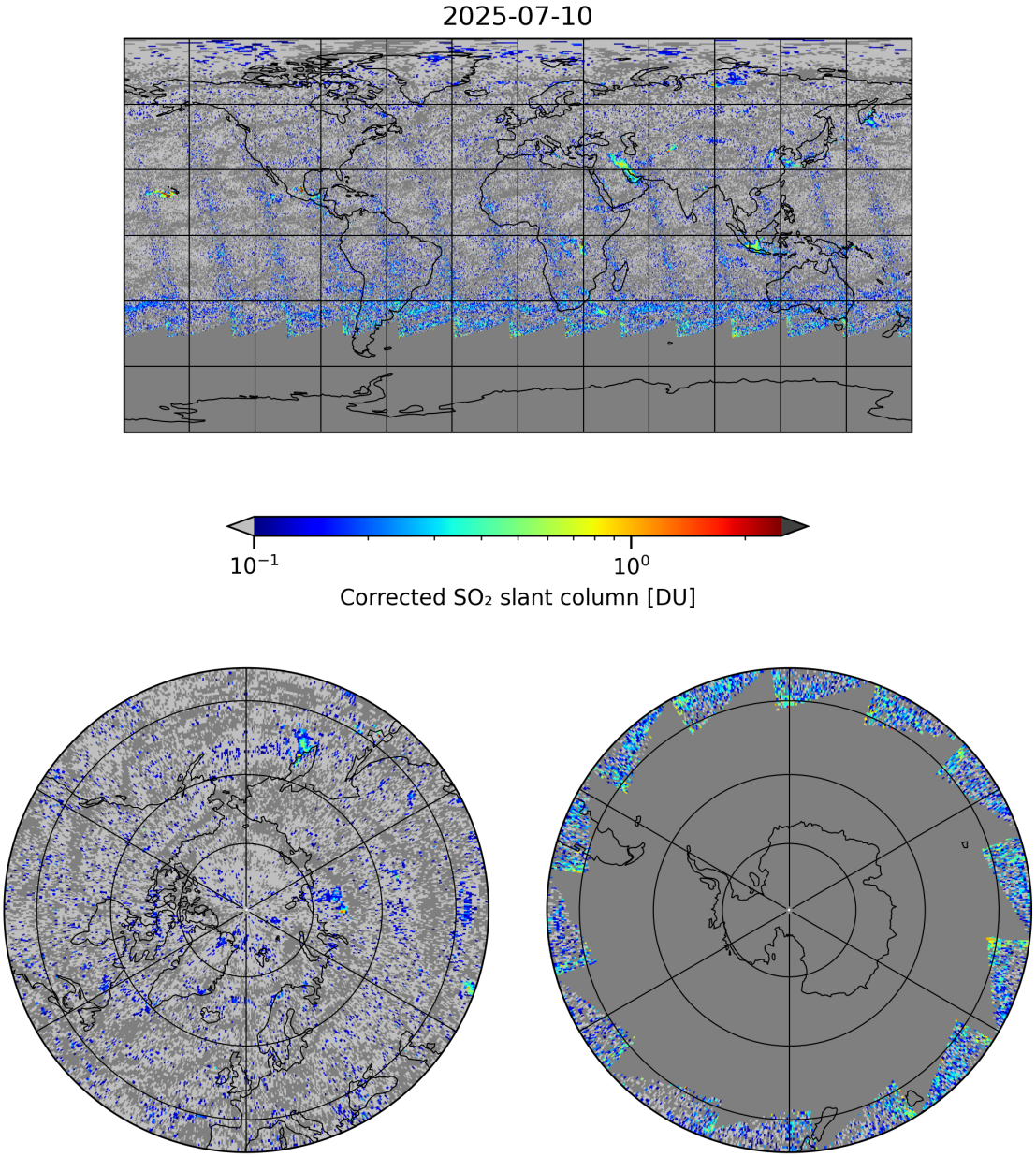

Figure 8: Map of "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11

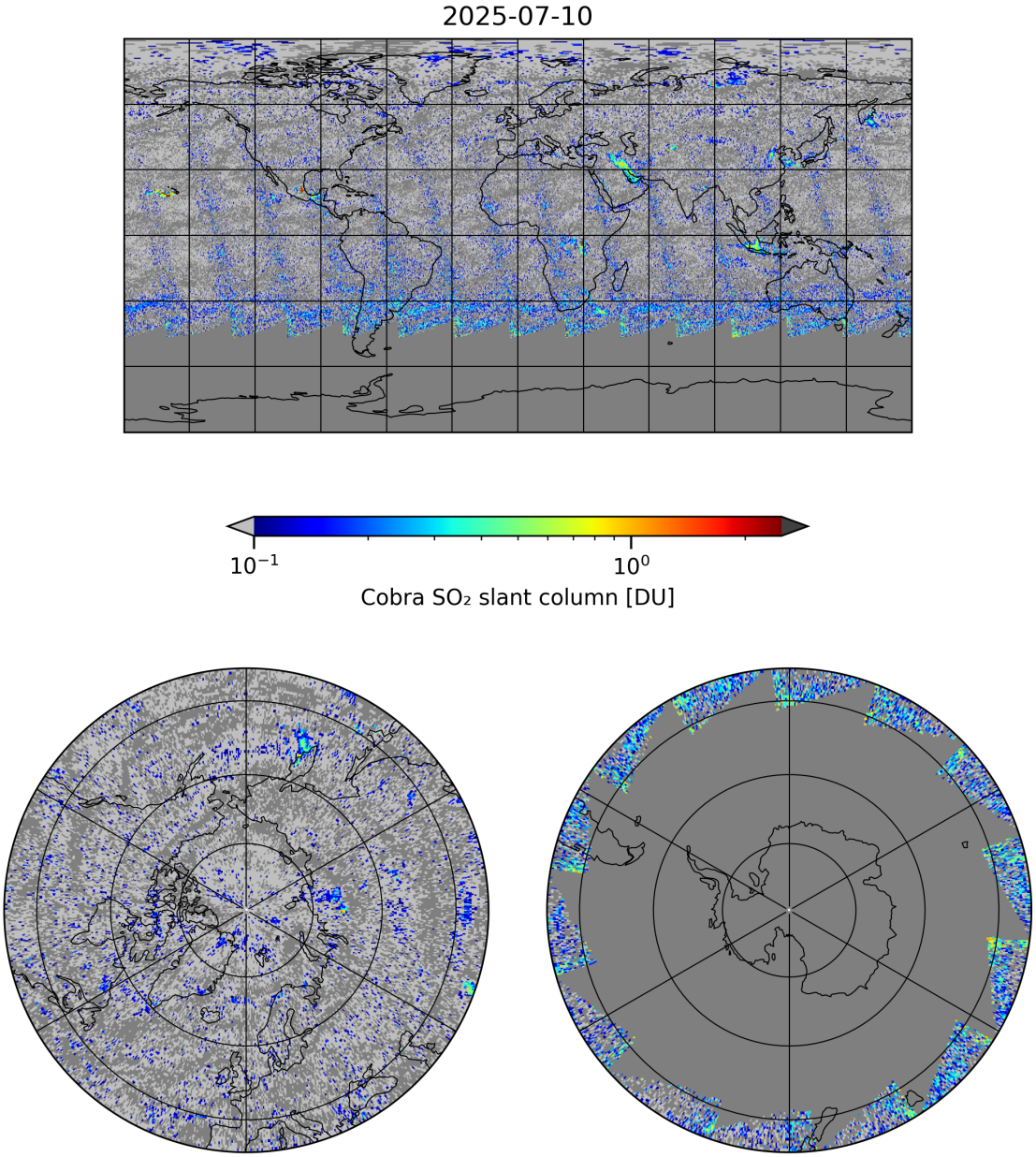

Figure 9: Map of "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11

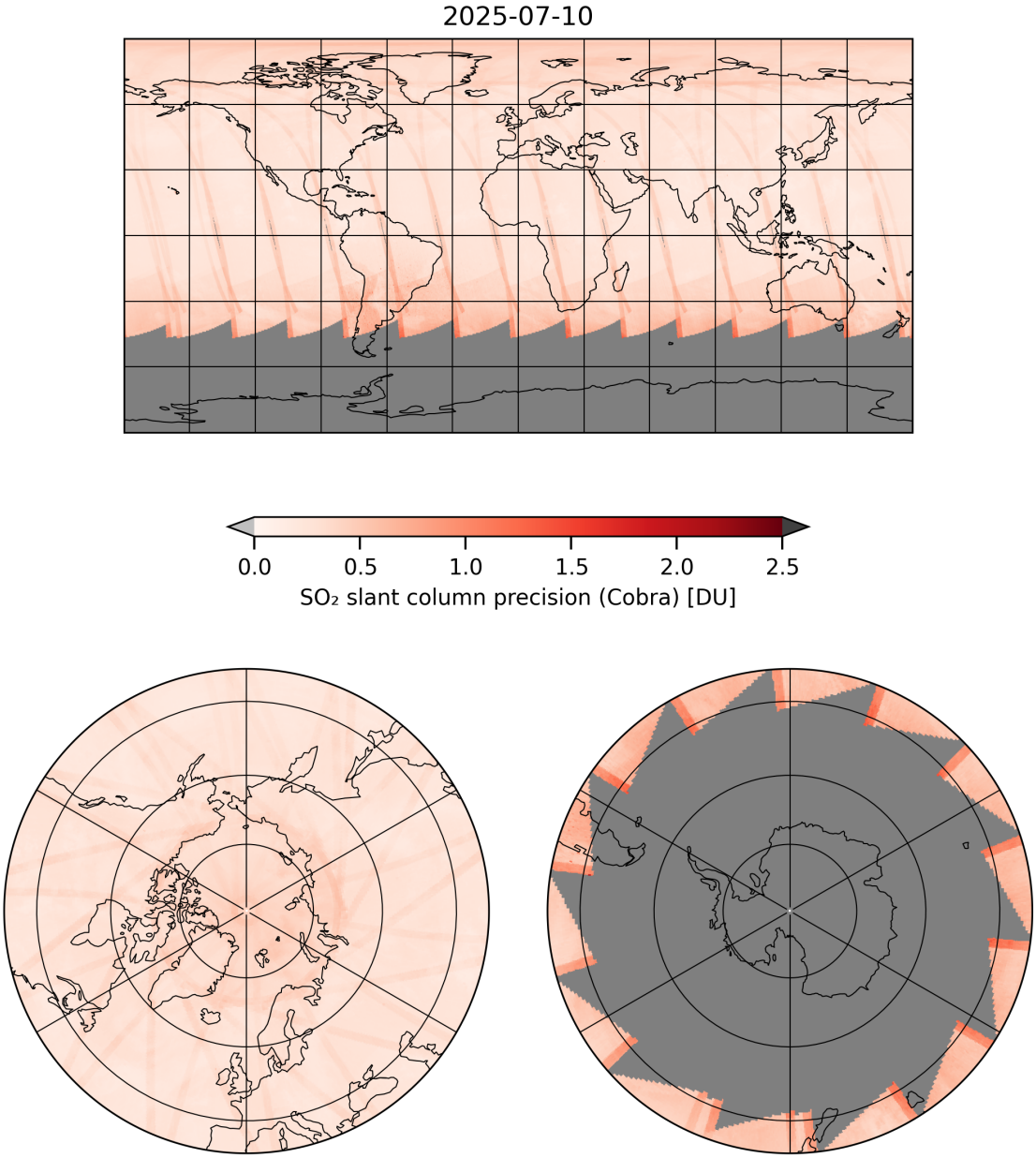

Figure 10: Map of "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11

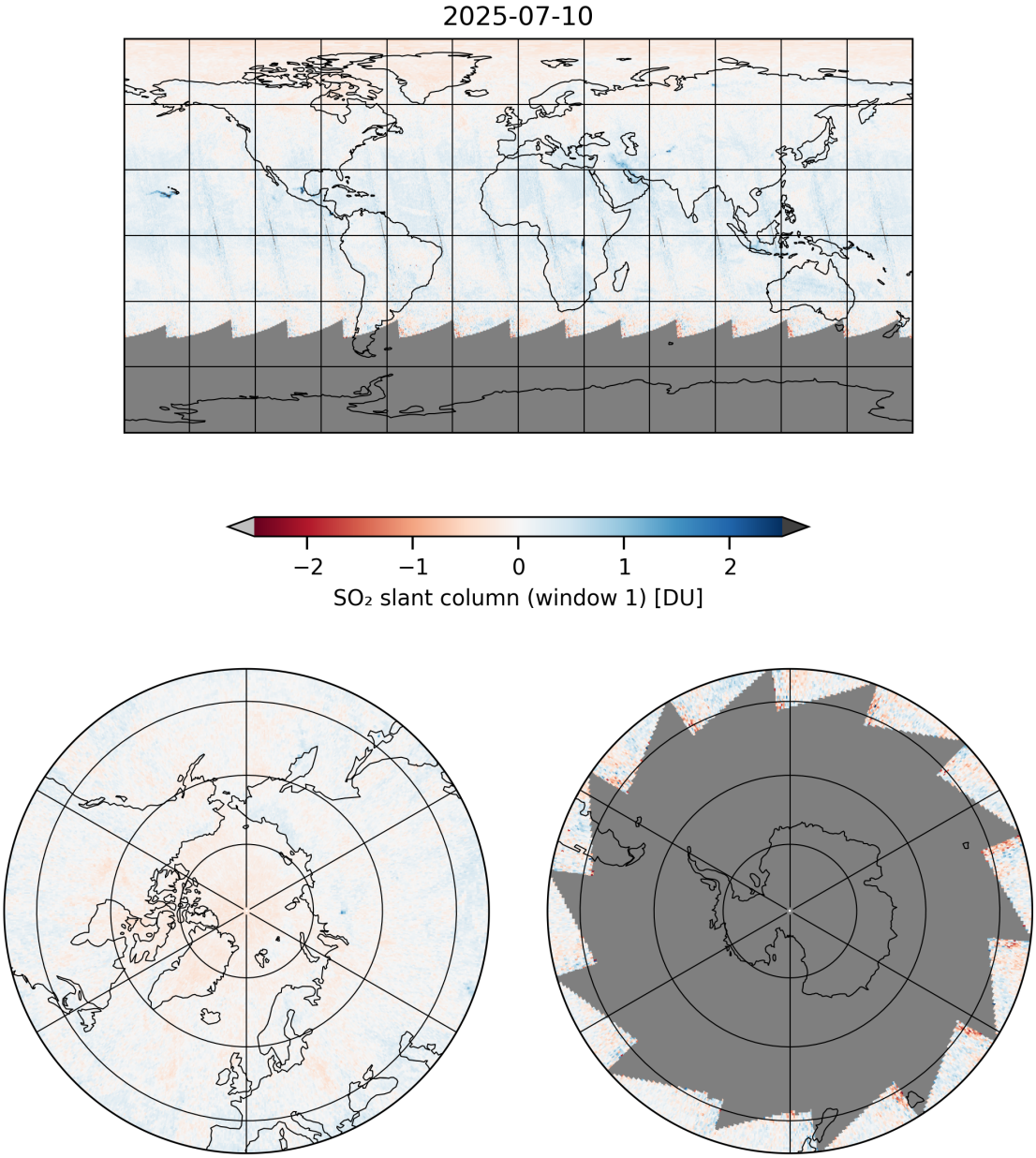

Figure 11: Map of "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11

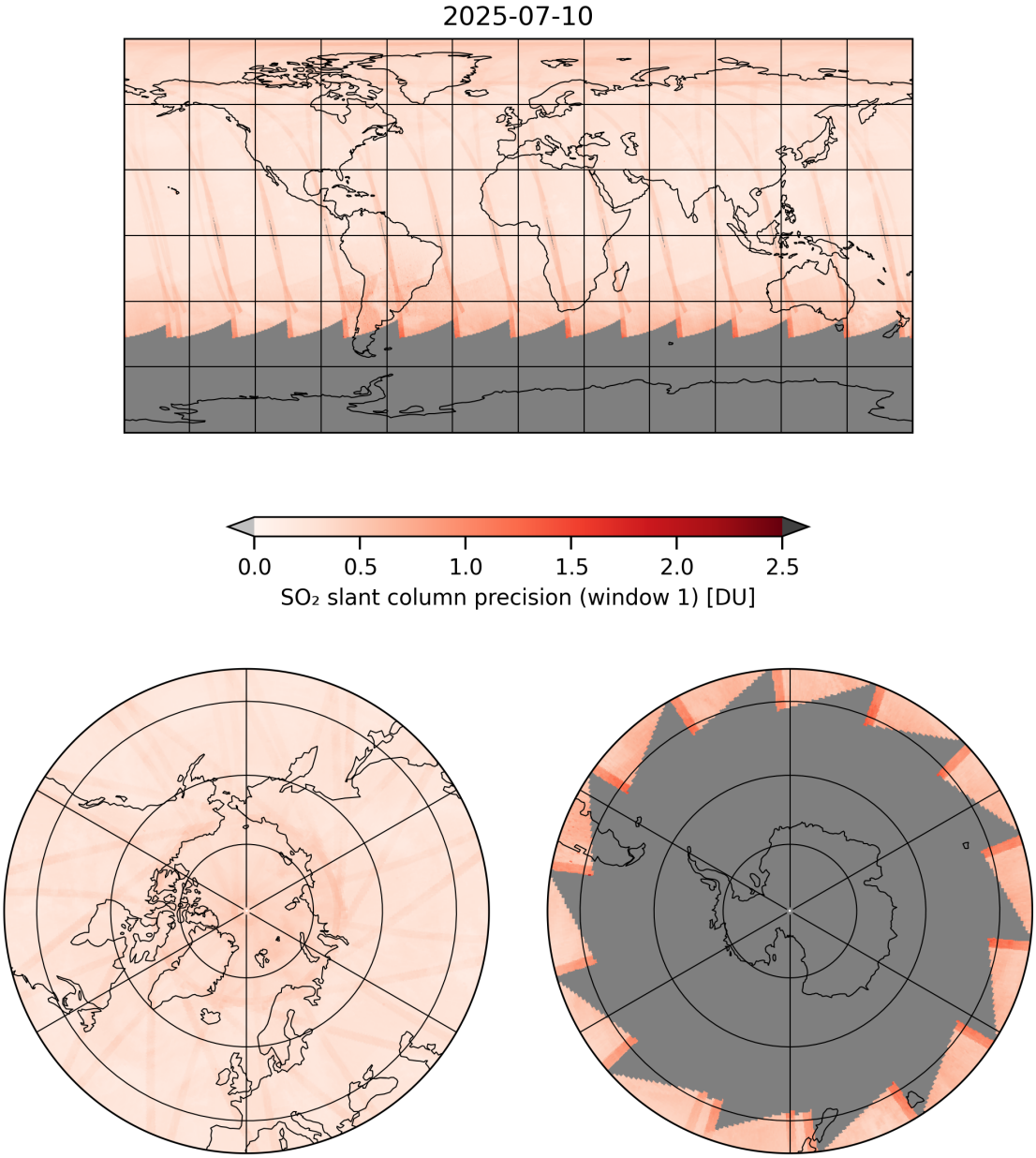

Figure 12: Map of "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11

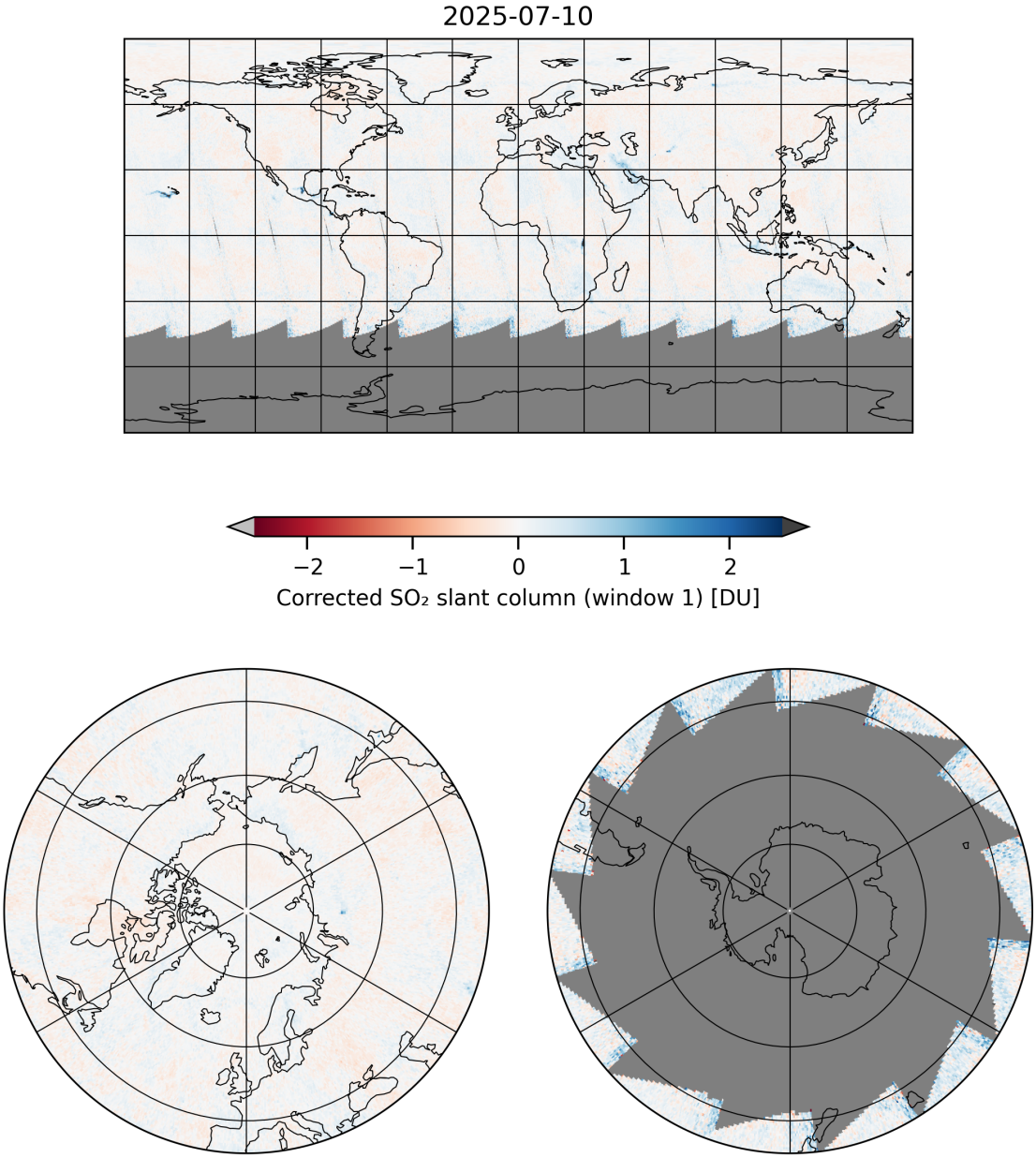

Figure 13: Map of "Corrected SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11

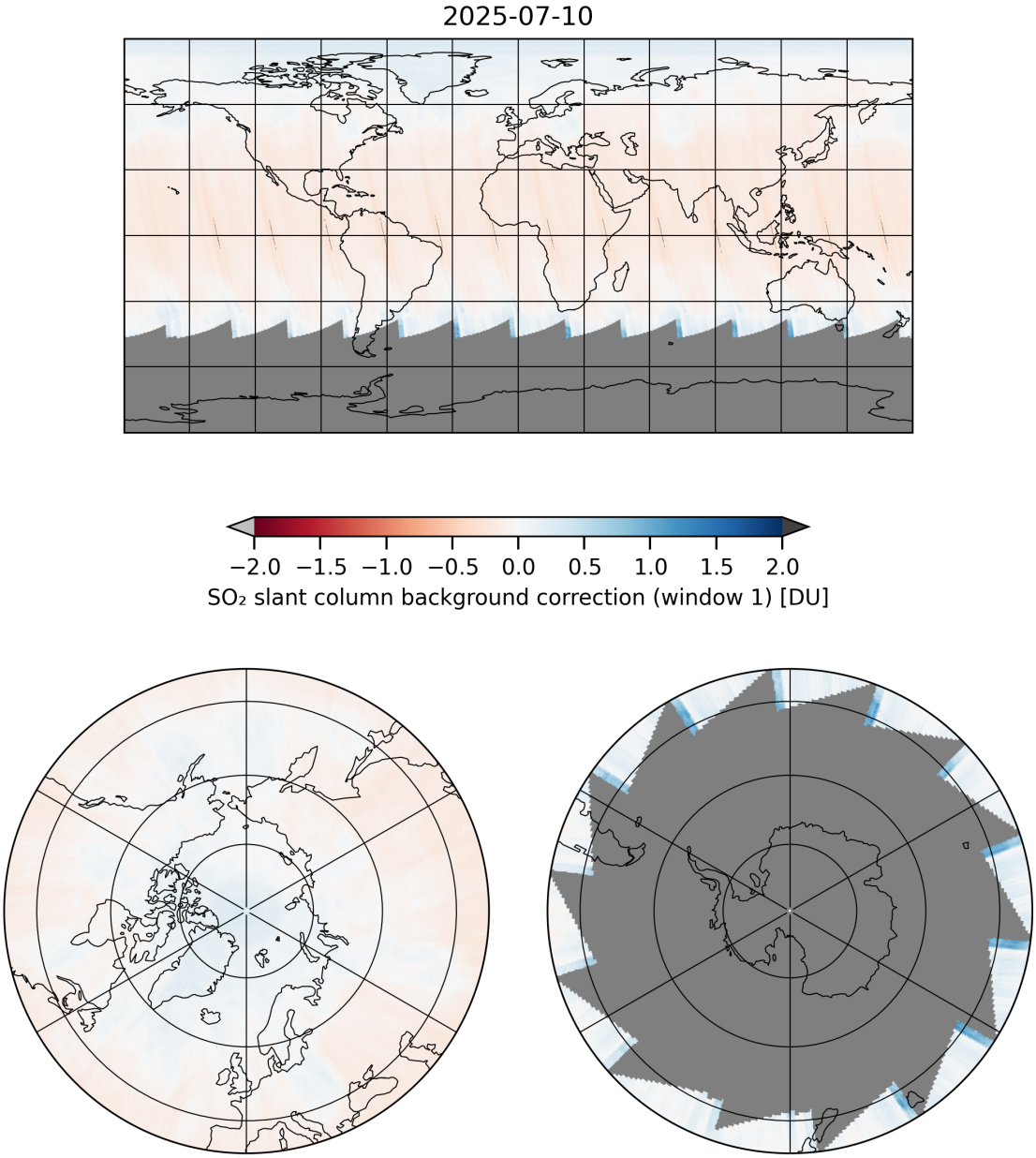

Figure 14: Map of "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11

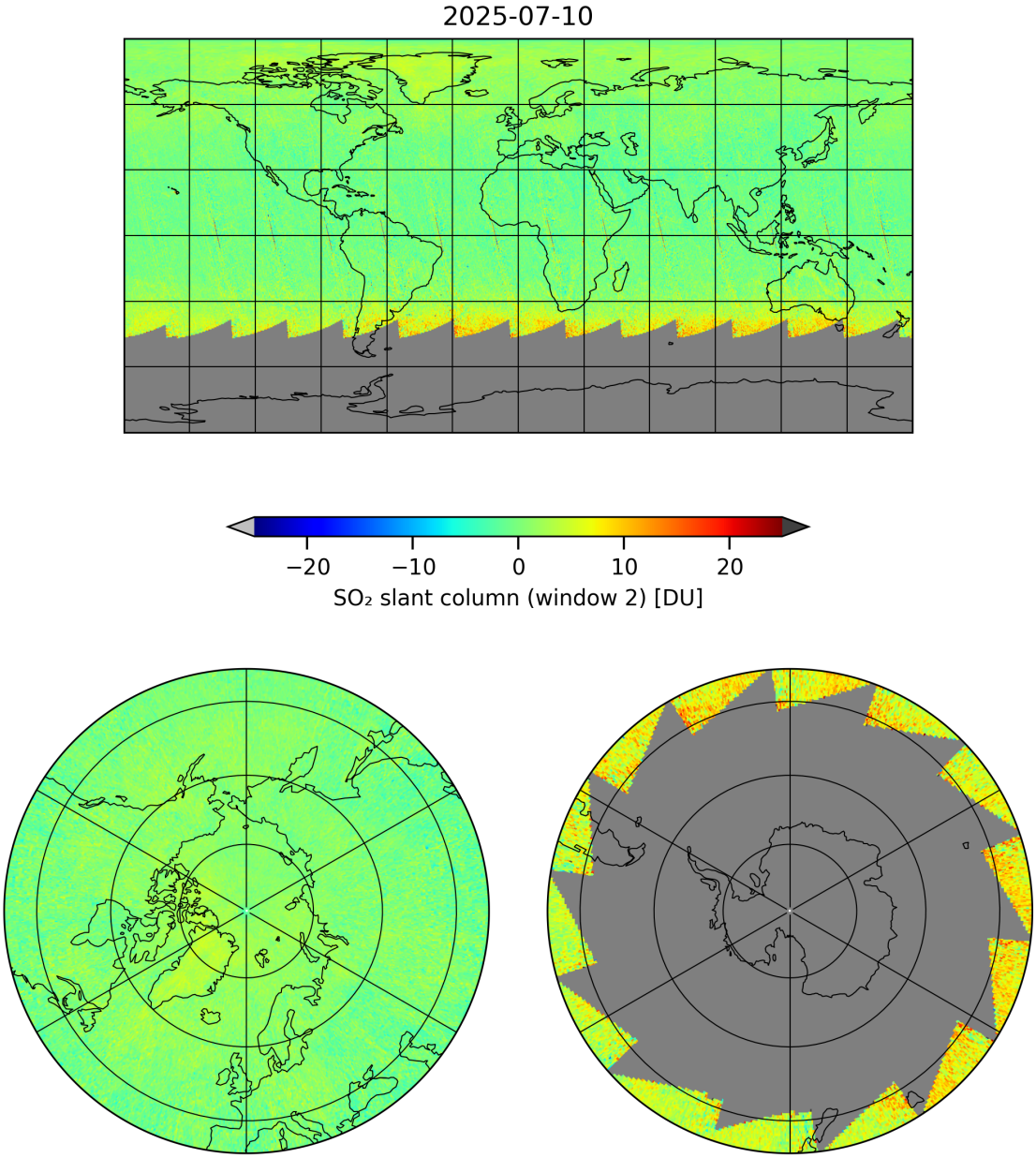

Figure 15: Map of “SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11

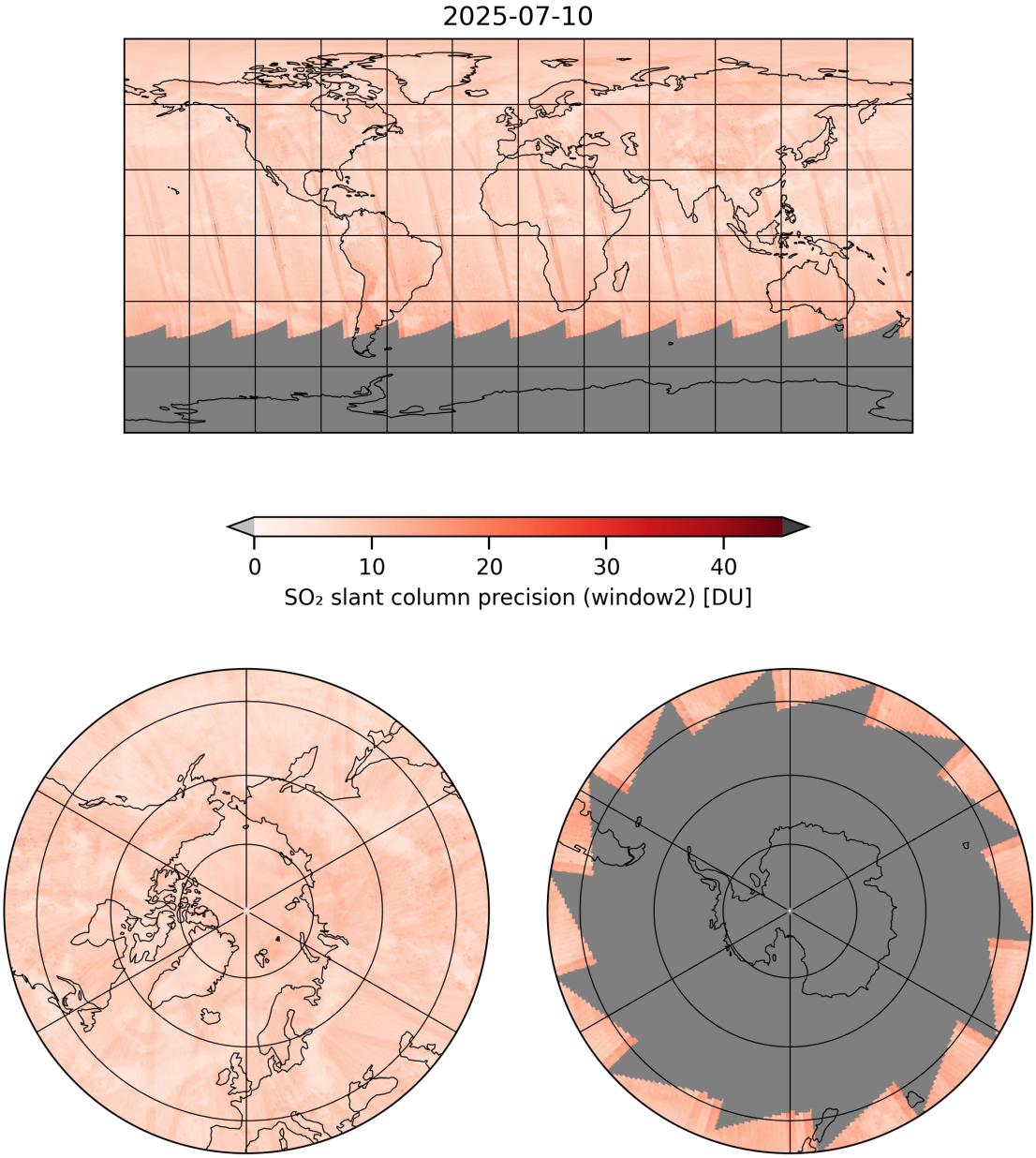

Figure 16: Map of "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11

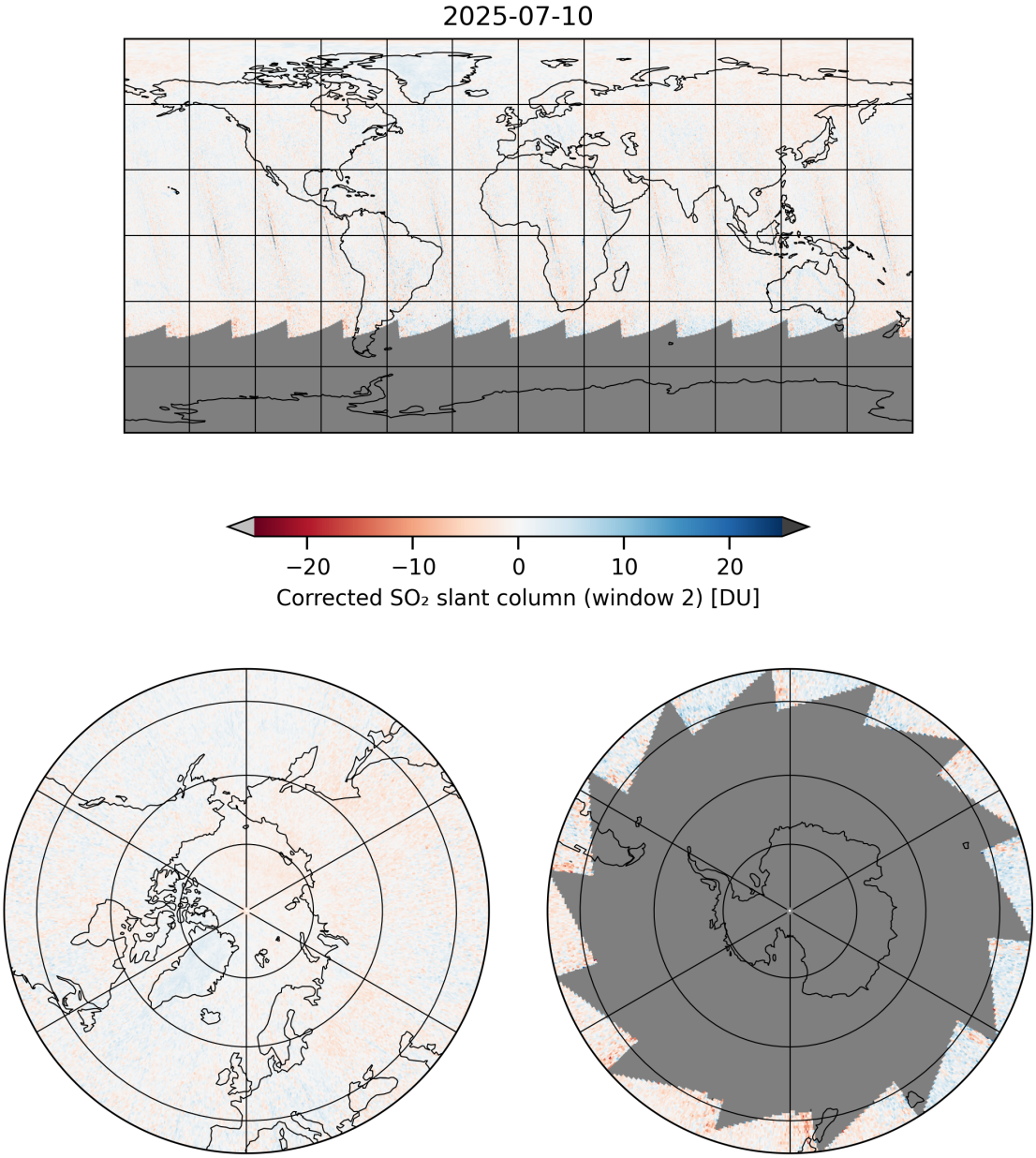

Figure 17: Map of "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11

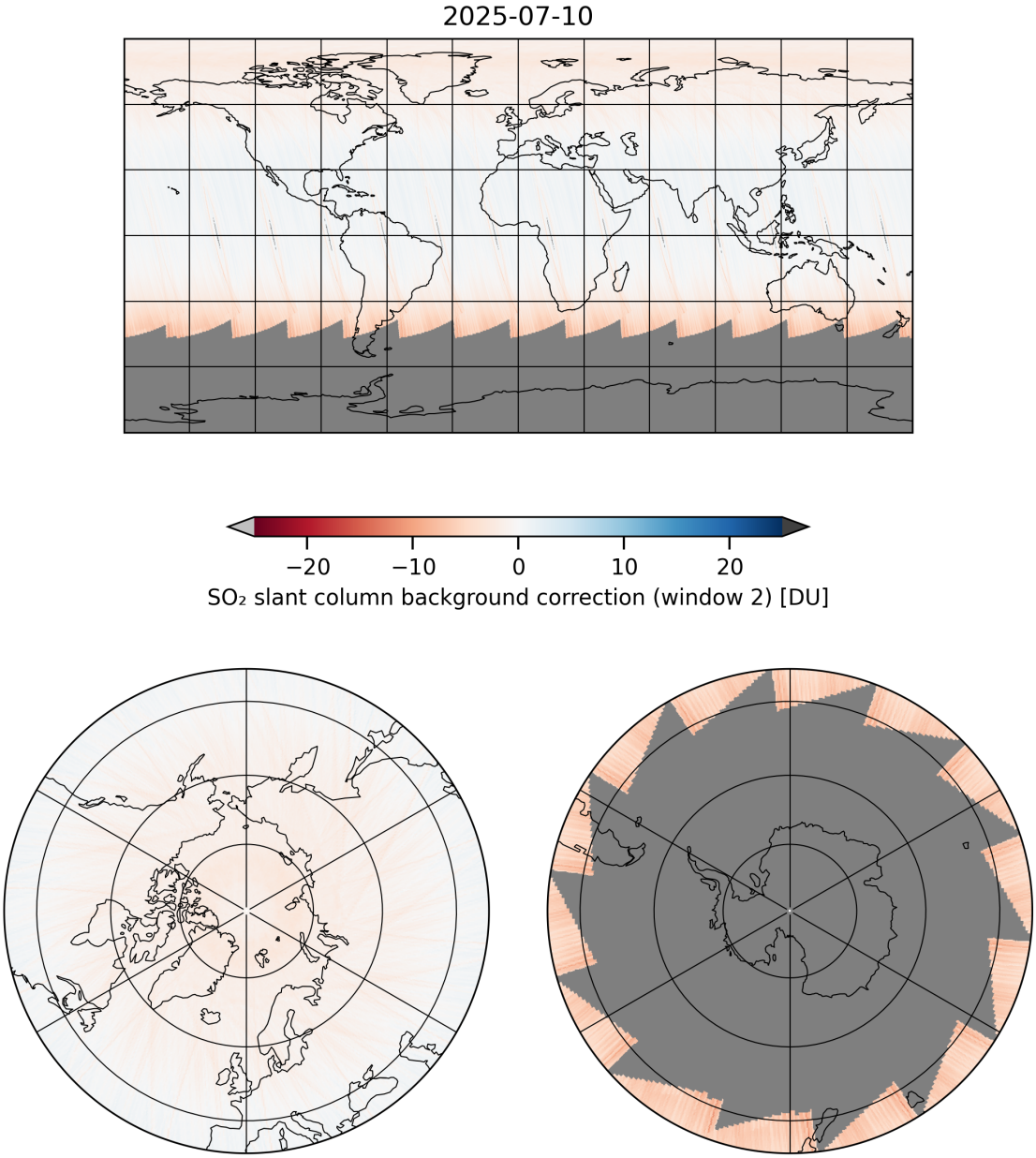

Figure 18: Map of "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11

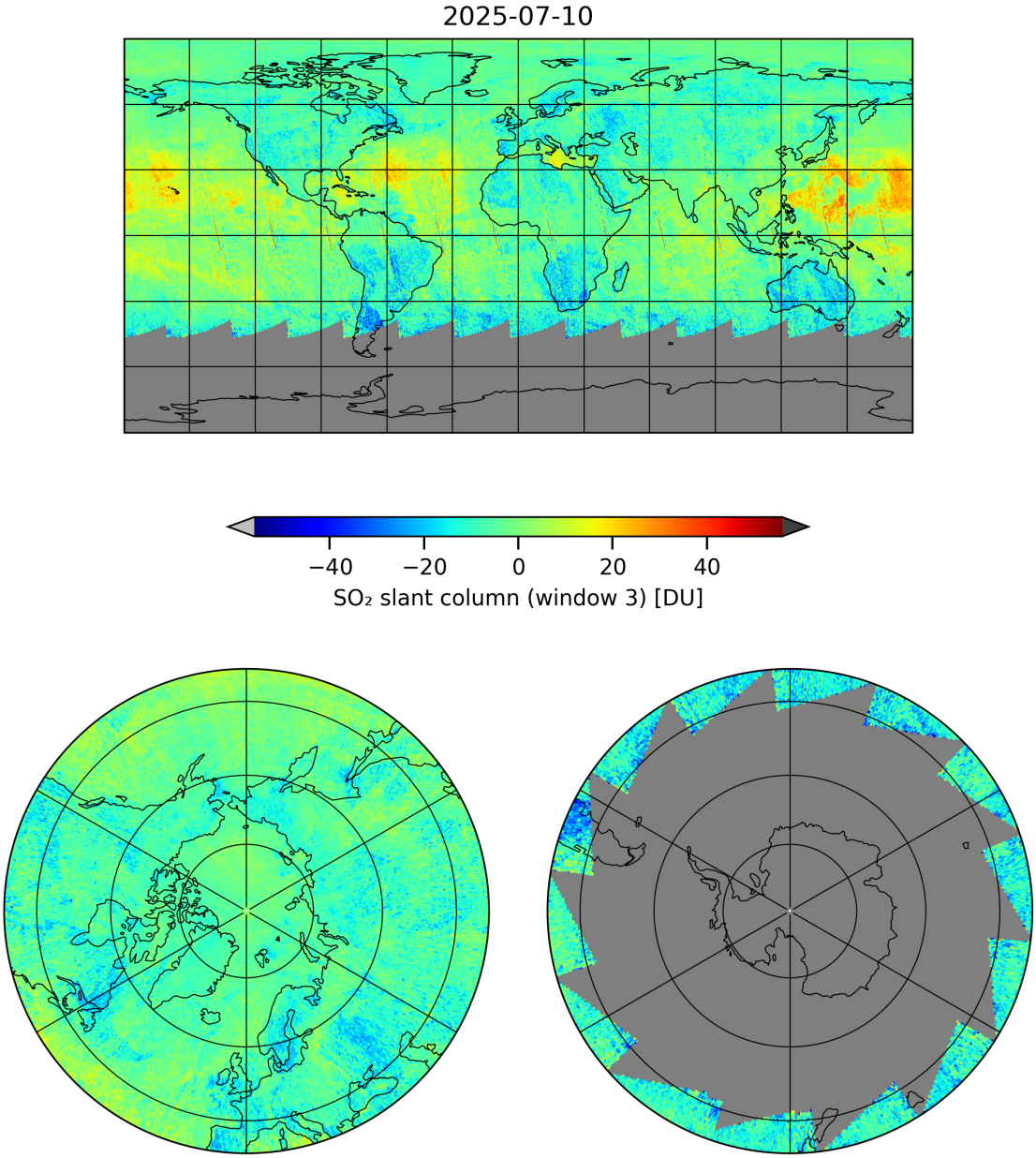

Figure 19: Map of "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11

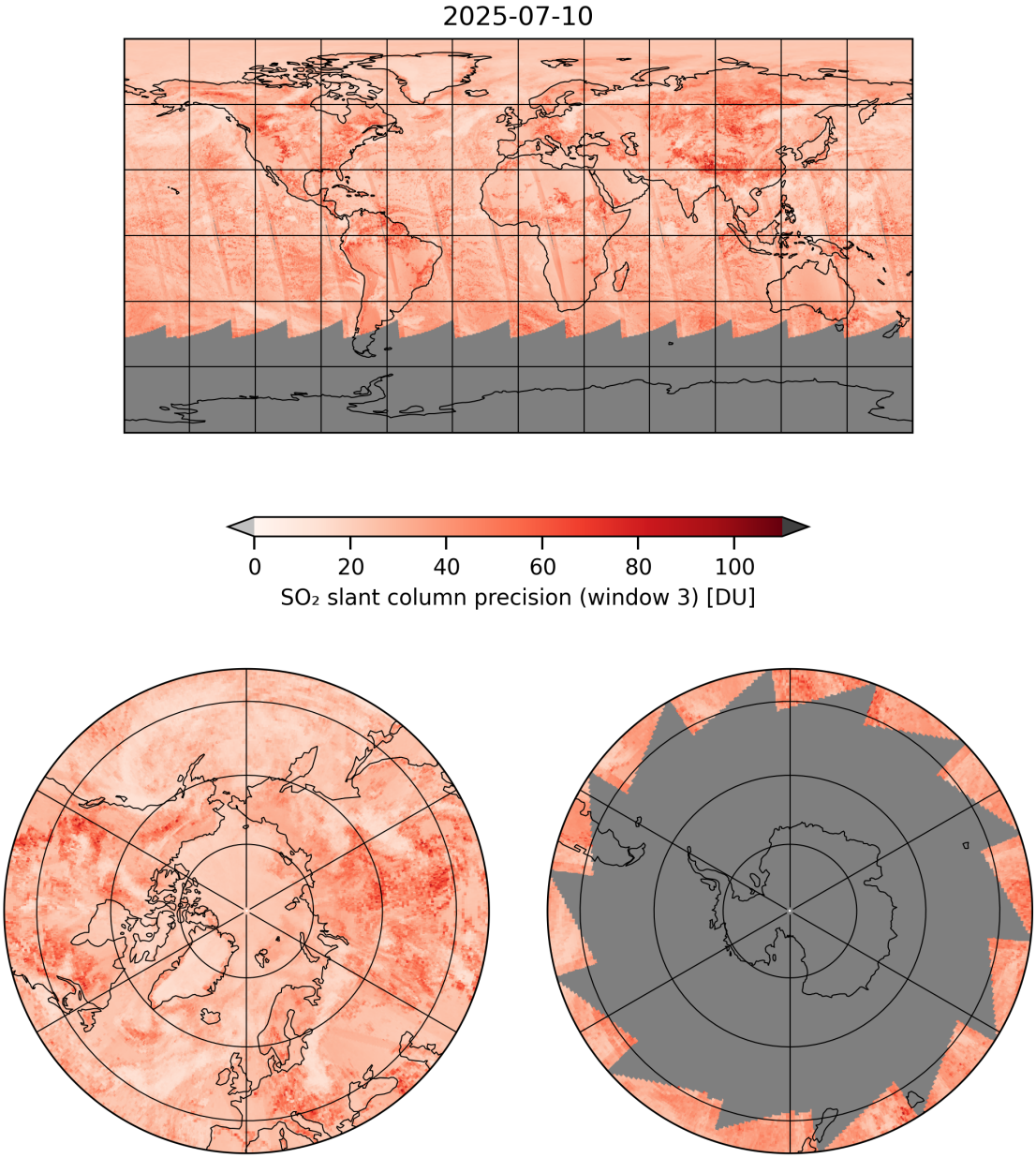

Figure 20: Map of "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11

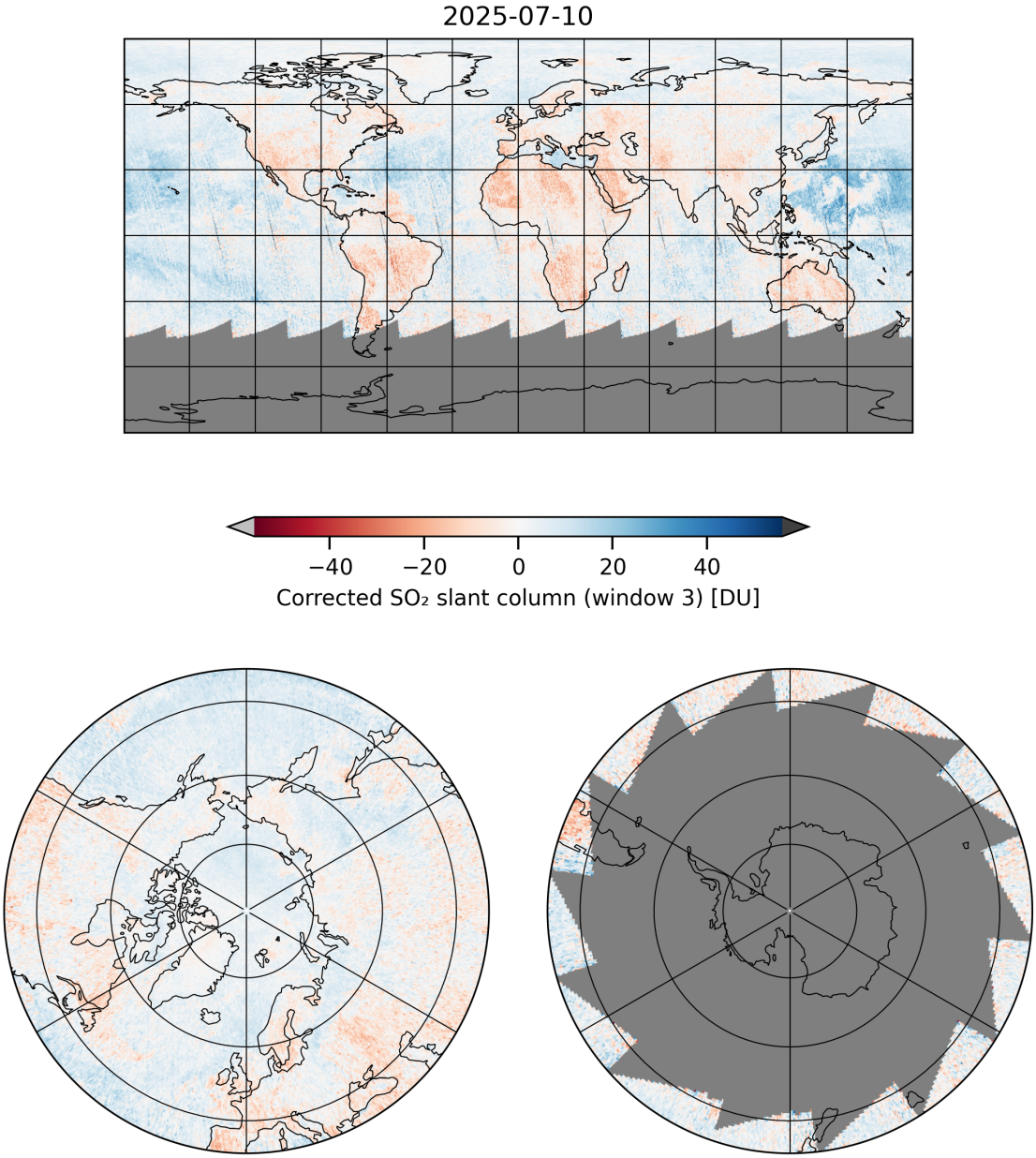

Figure 21: Map of "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11

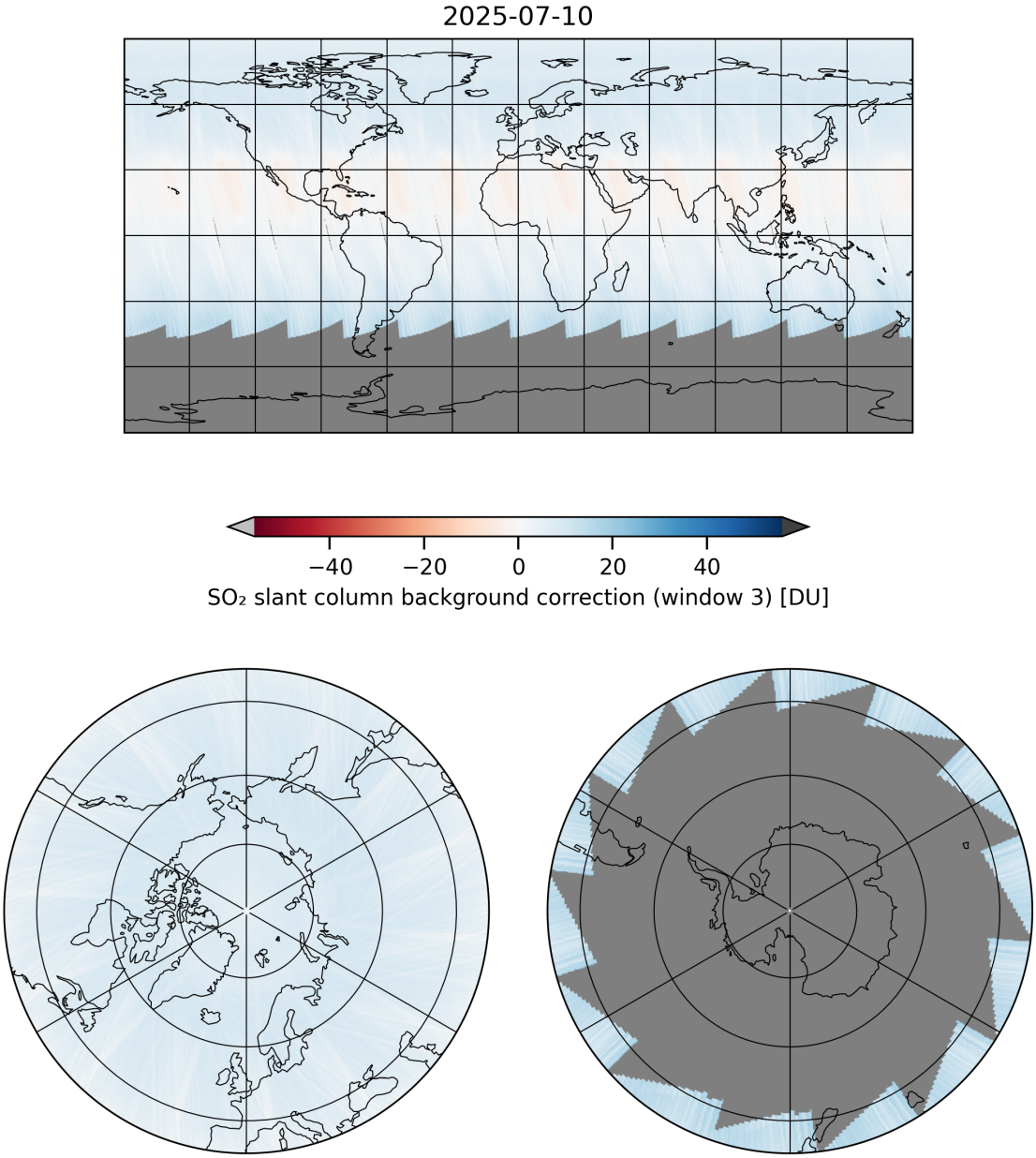

Figure 22: Map of "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11

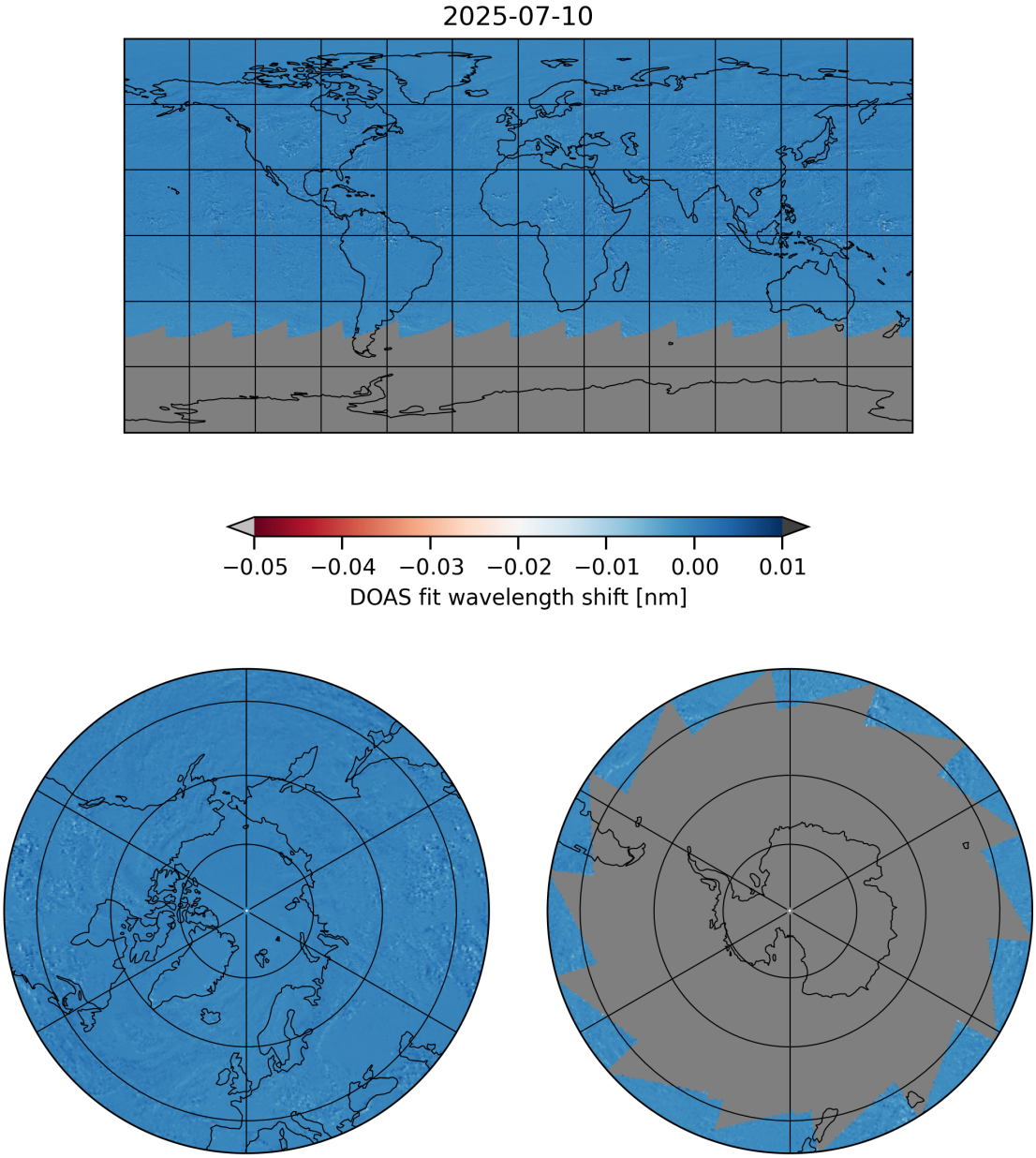

Figure 23: Map of “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11

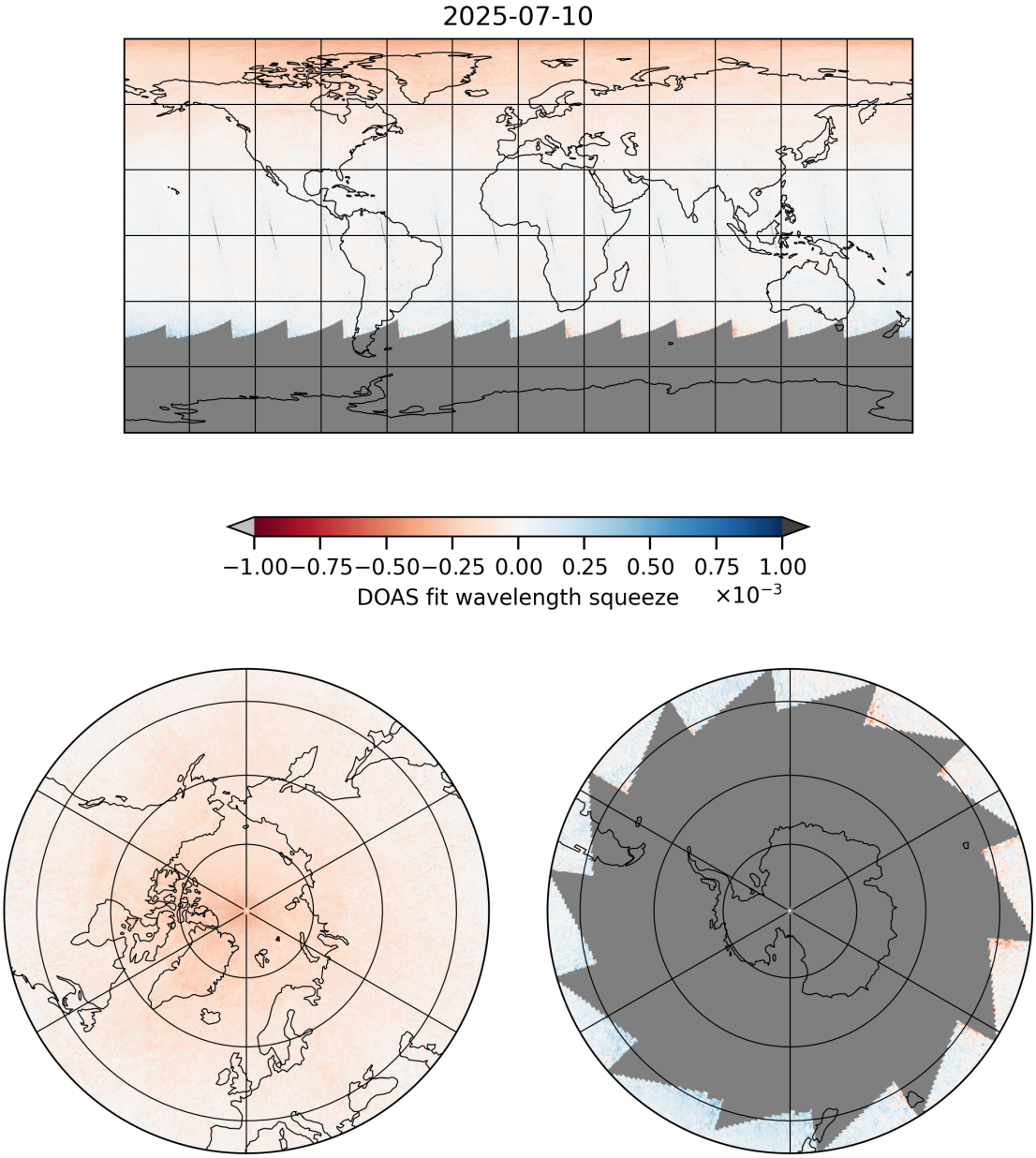

Figure 24: Map of “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11

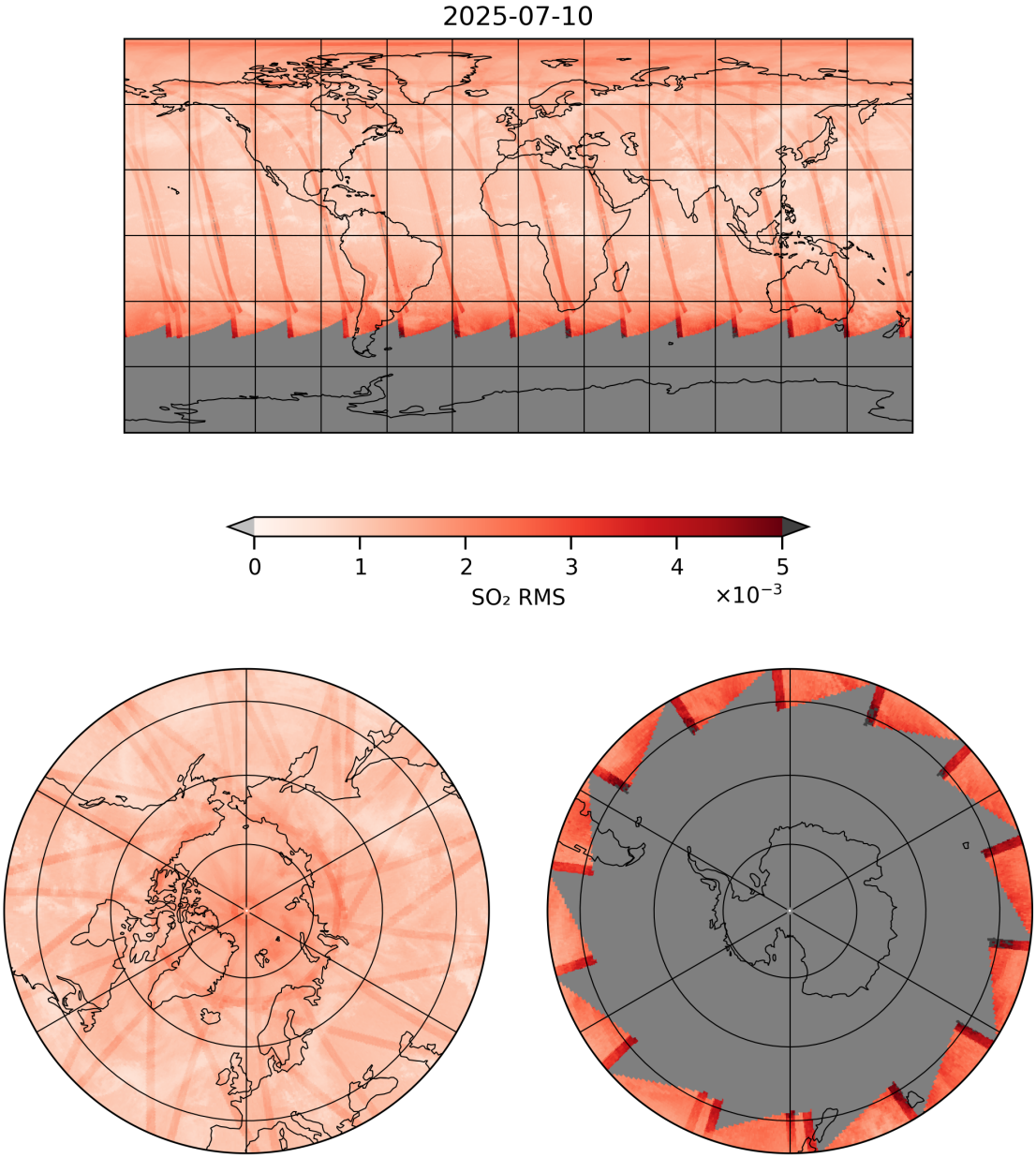

Figure 25: Map of "SO_2 RMS" for 2025-07-09 to 2025-07-11

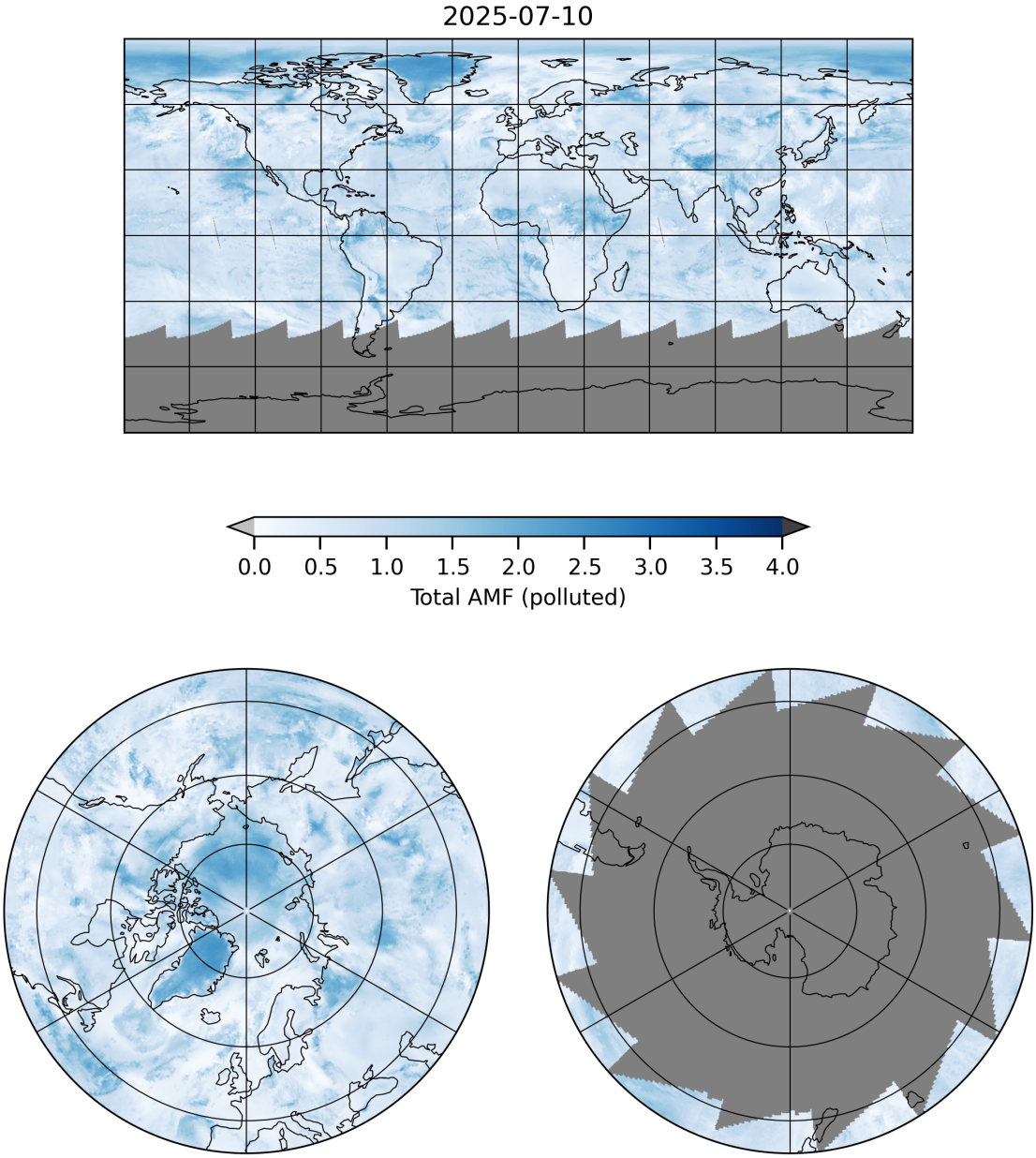

Figure 26: Map of “Total AMF (polluted)” for 2025-07-09 to 2025-07-11

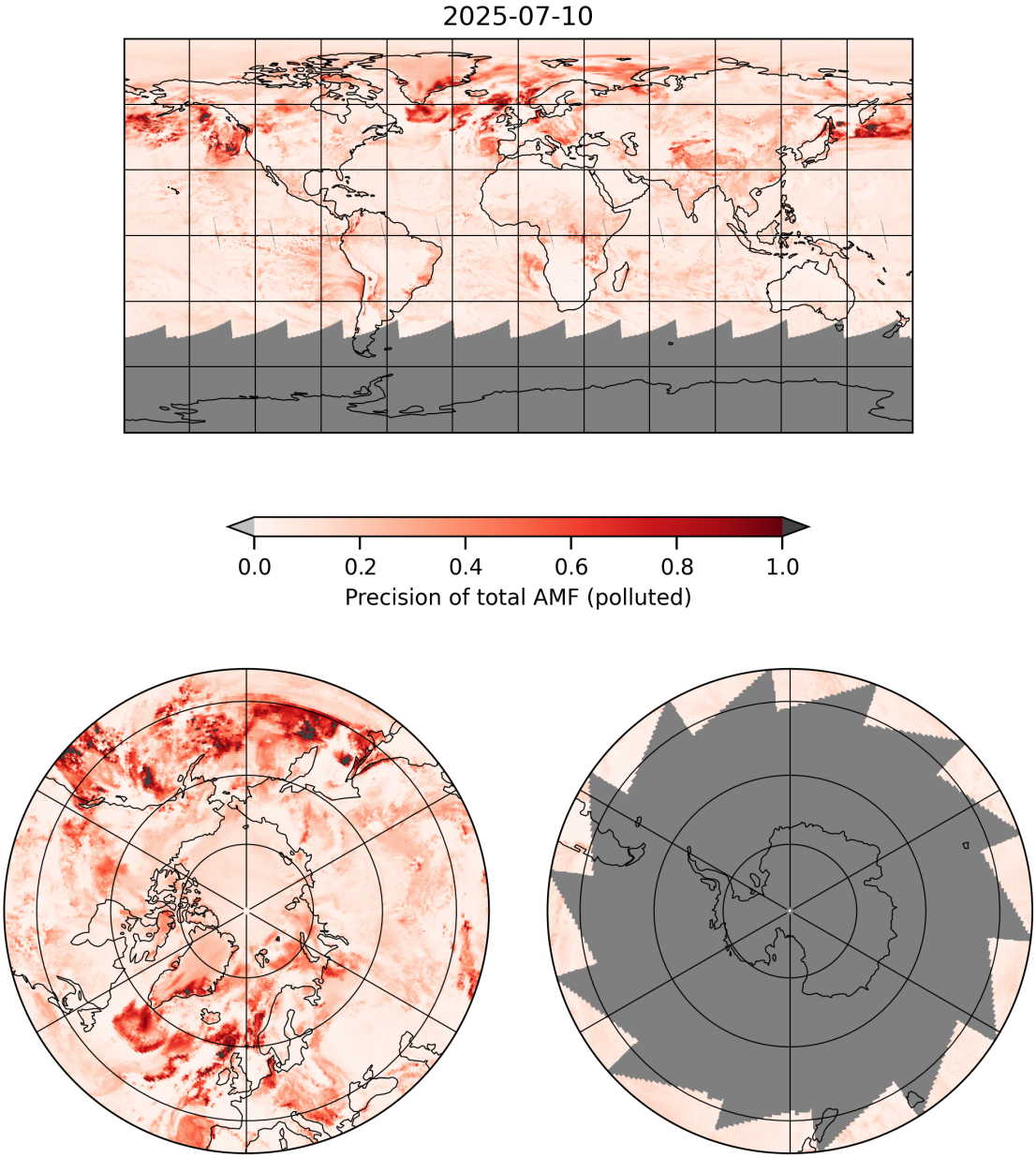

Figure 27: Map of “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11

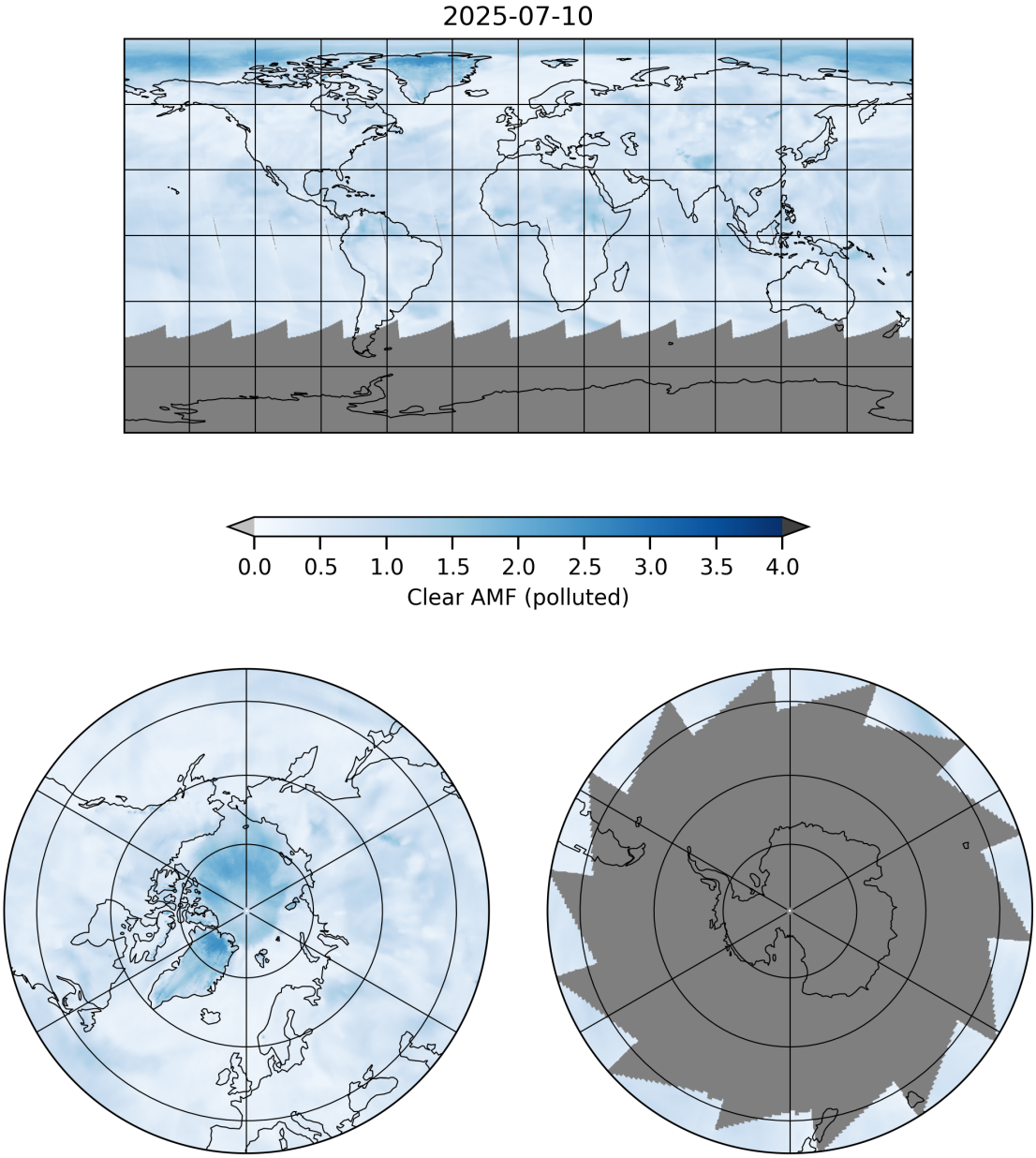

Figure 28: Map of “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11

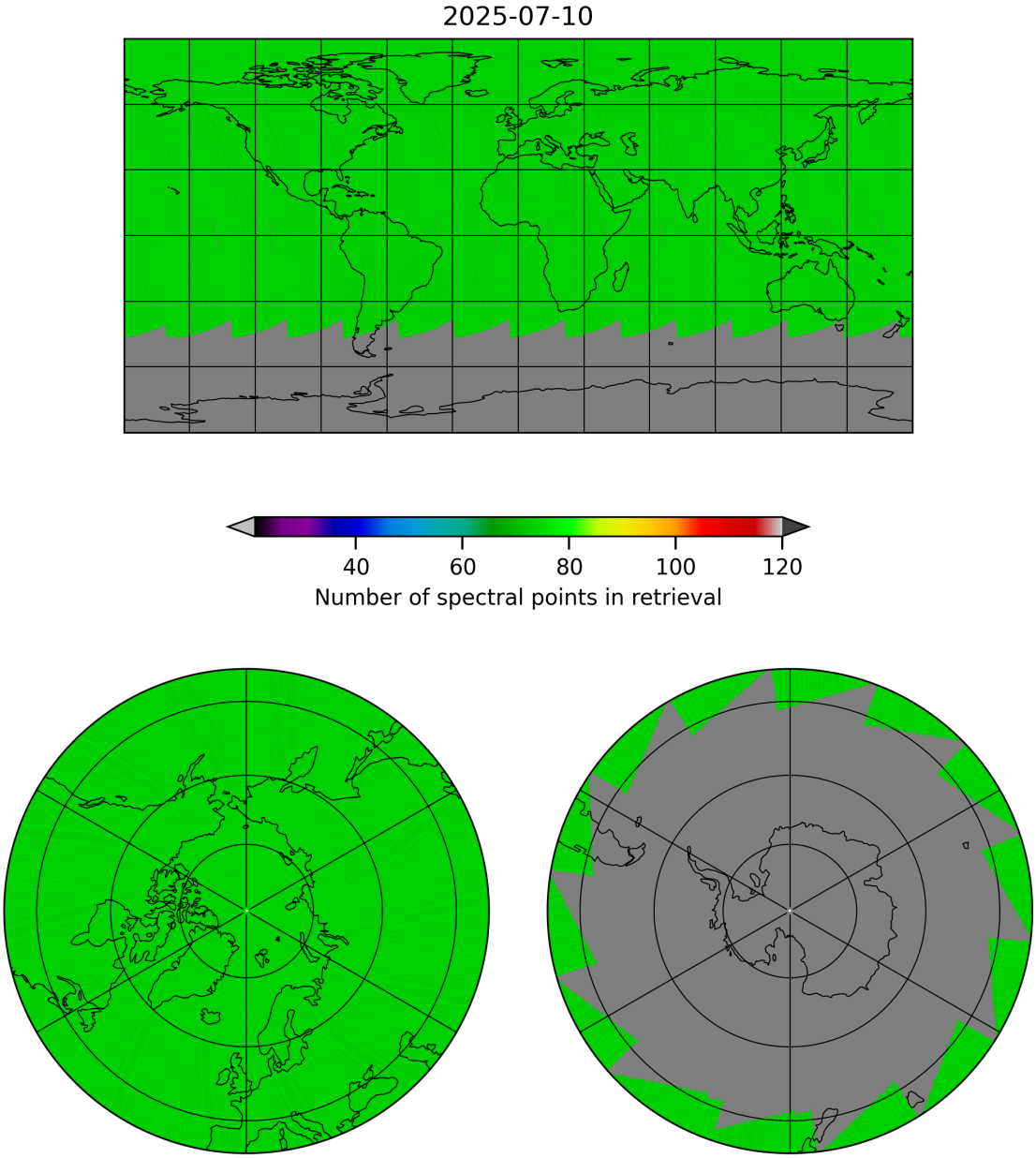

Figure 29: Map of “Number of spectral points in retrieval” for 2025-07-09 to 2025-07-11

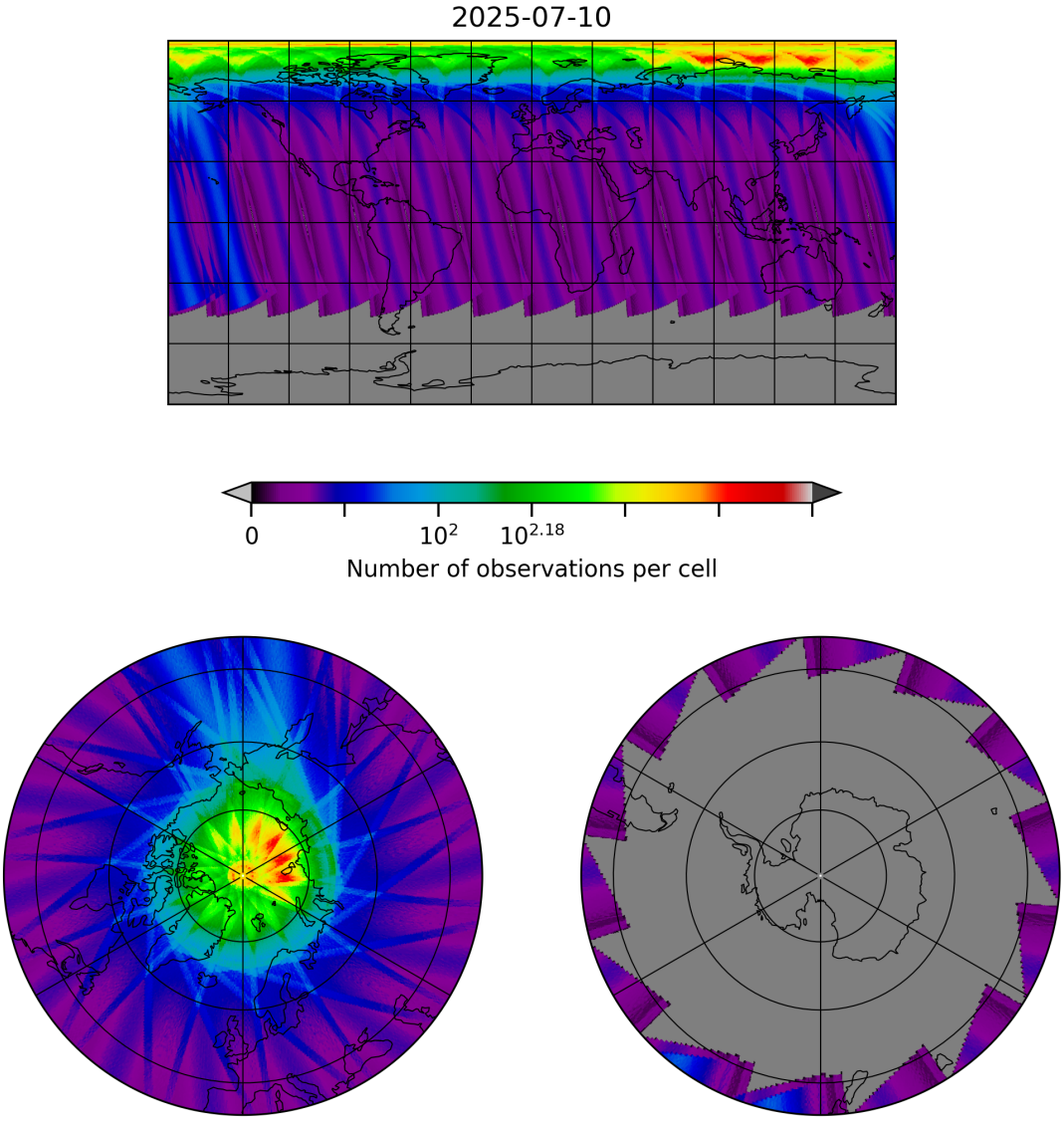

Figure 30: Map of the number of observations for 2025-07-09 to 2025-07-11

7 Zonal average

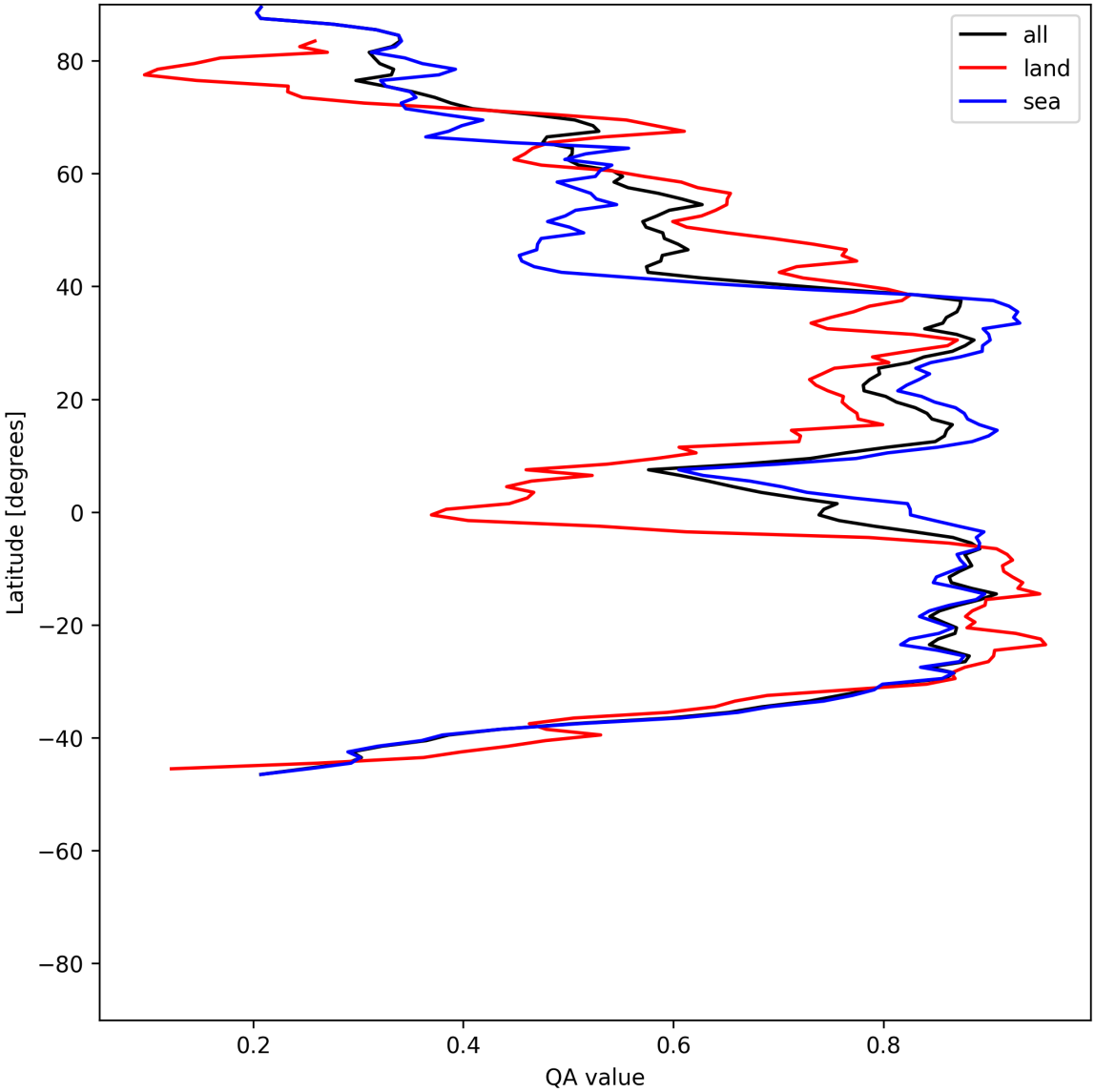

Figure 31: Zonal average of “QA value” for 2025-07-09 to 2025-07-11.

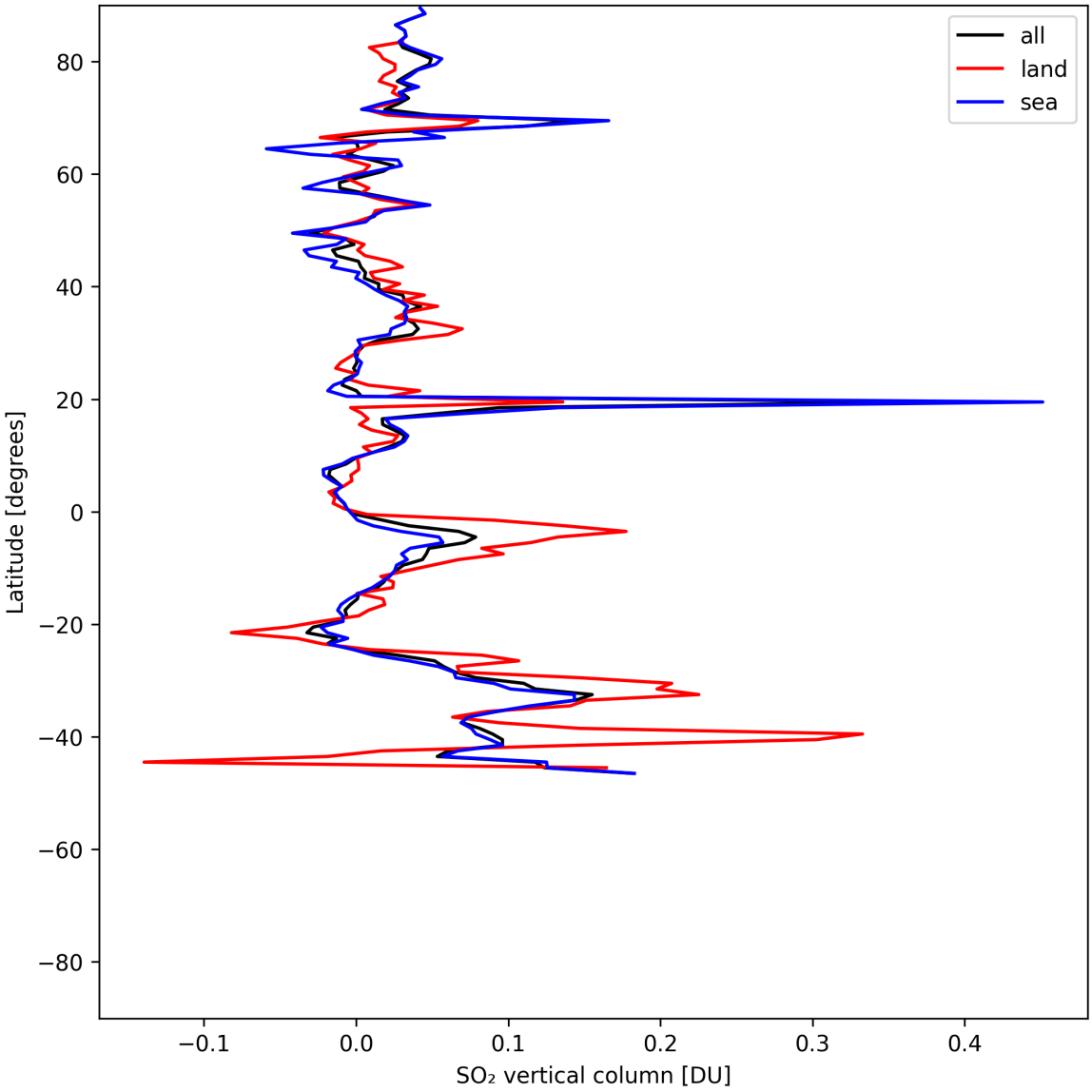

Figure 32: Zonal average of "SO_2 vertical column" for 2025-07-09 to 2025-07-11.

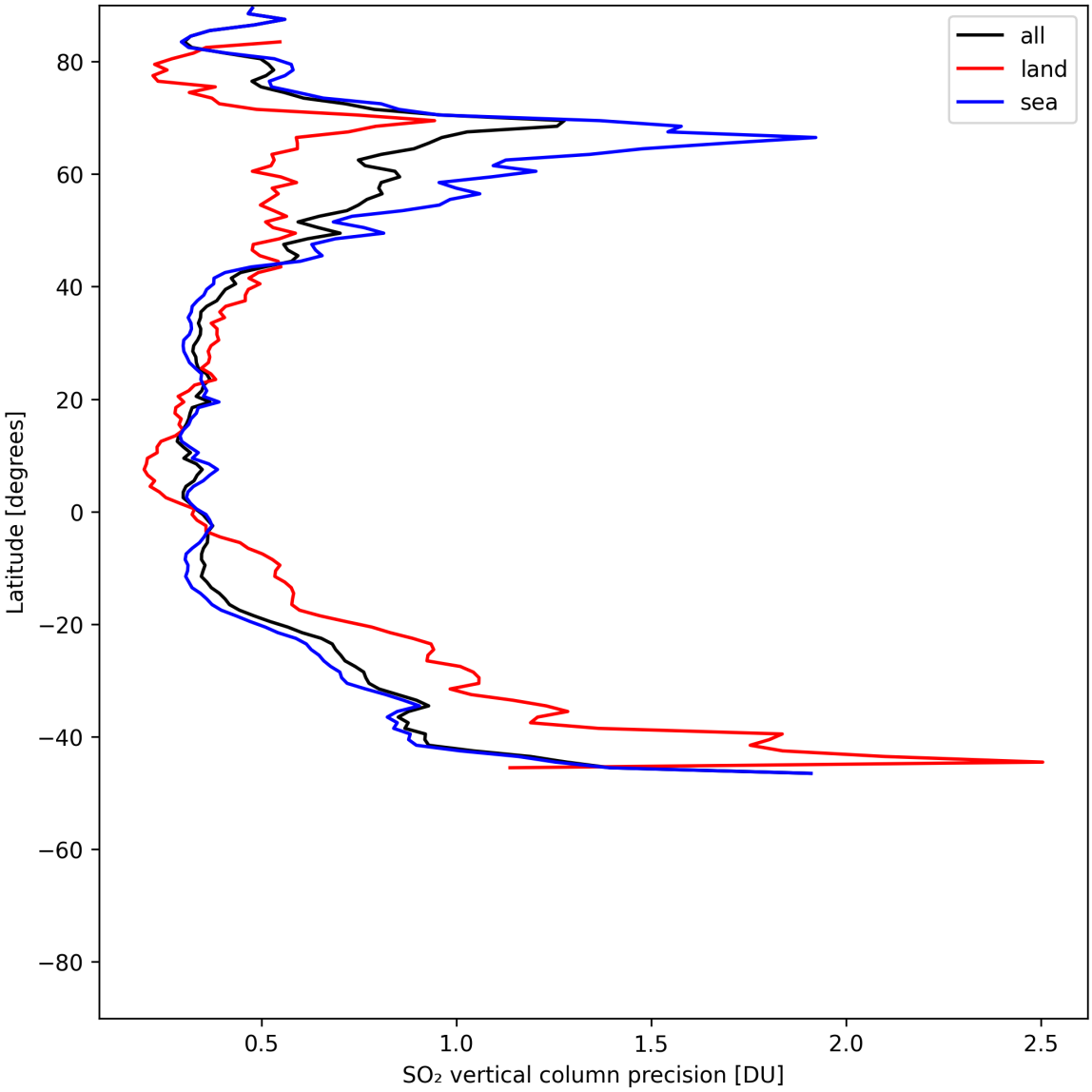

Figure 33: Zonal average of "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11.

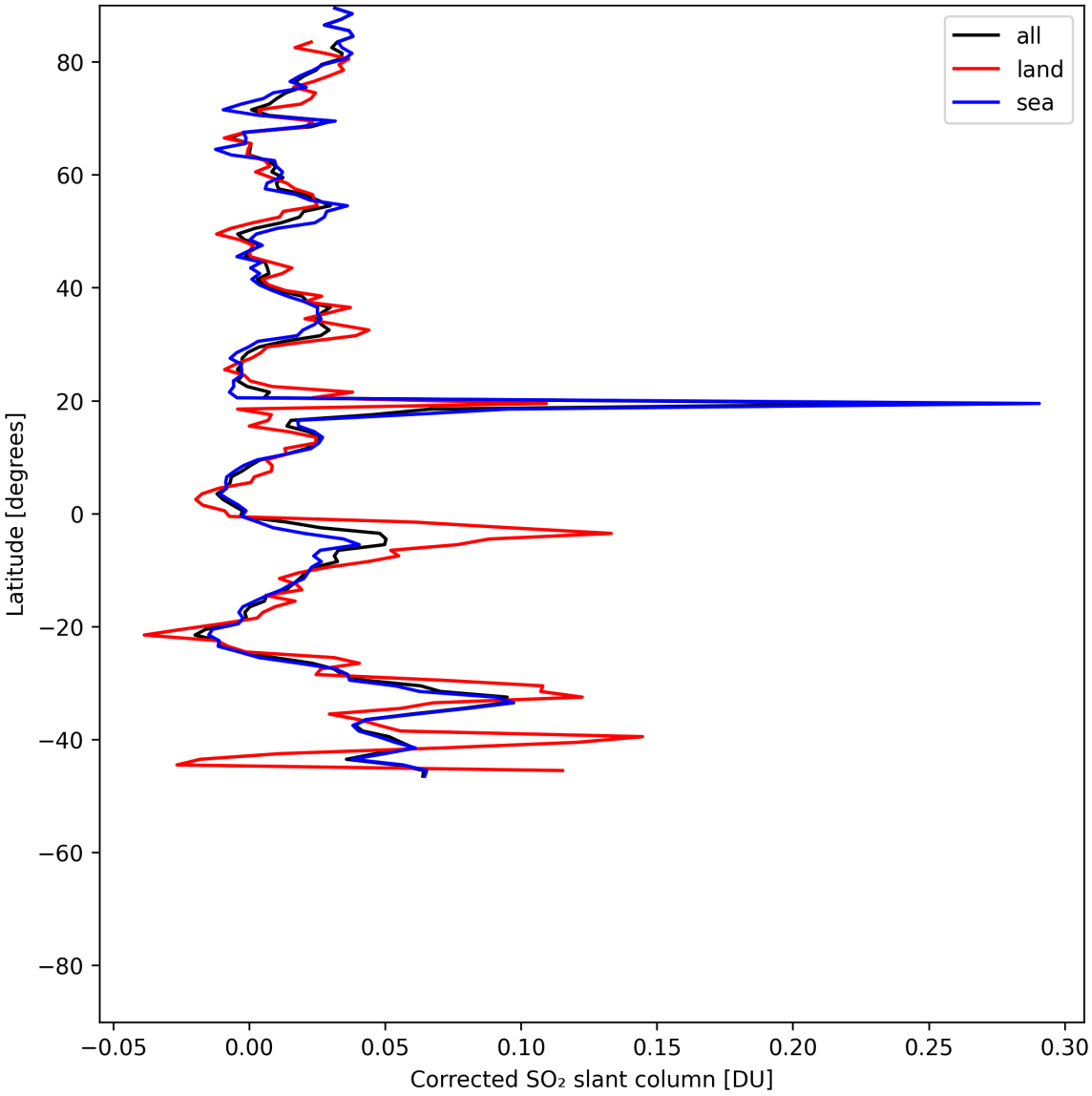

Figure 34: Zonal average of "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11.

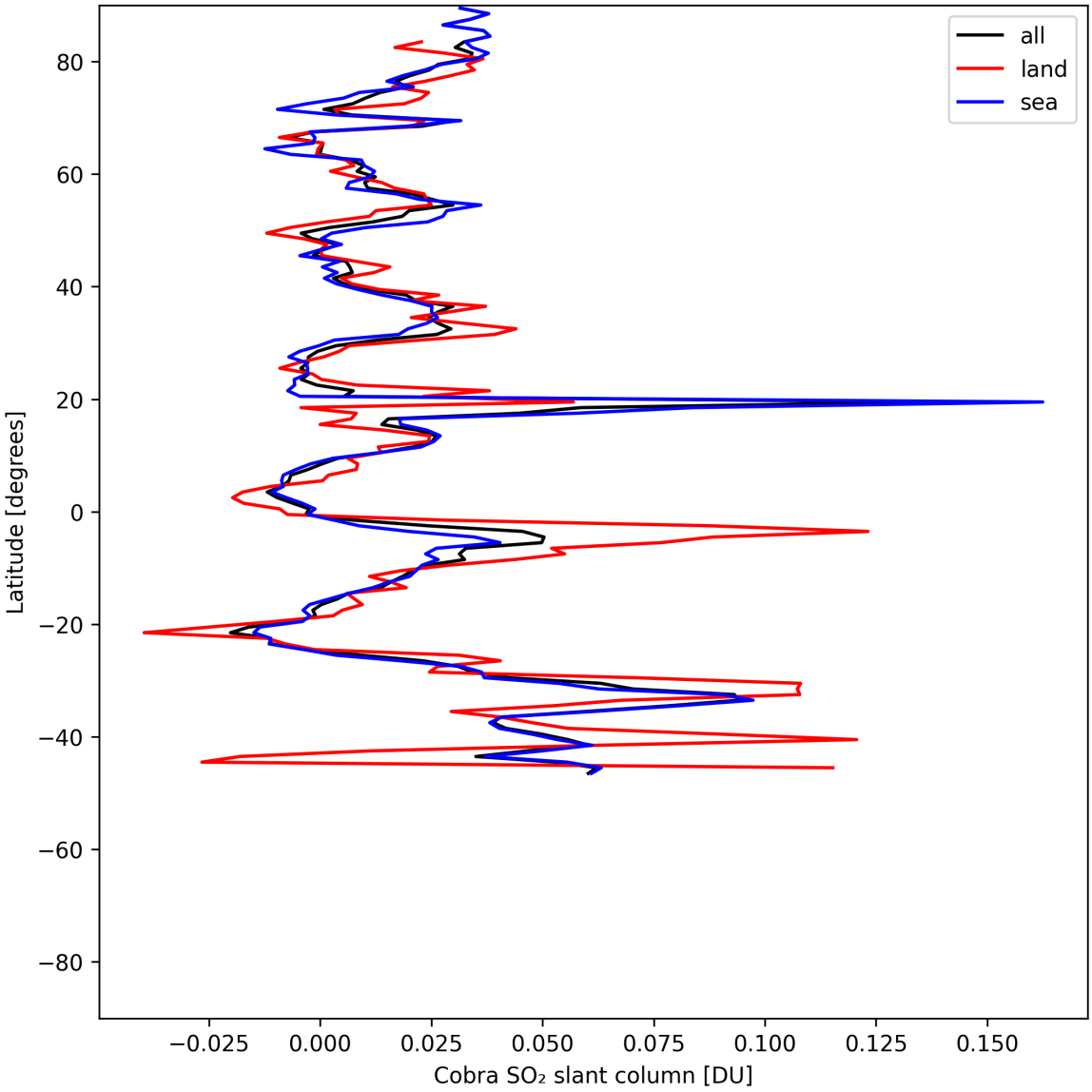

Figure 35: Zonal average of "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11.

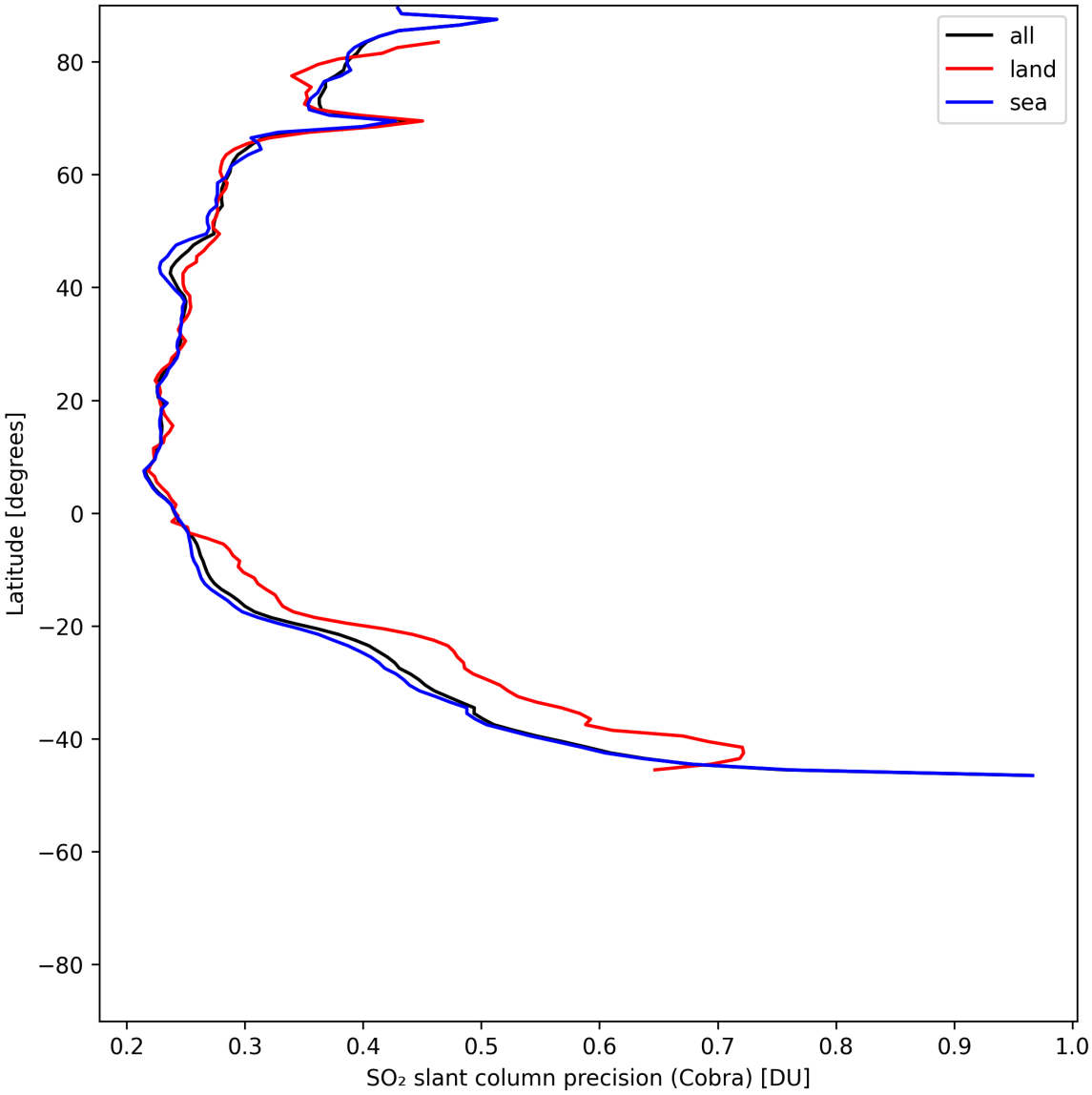

Figure 36: Zonal average of "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11.

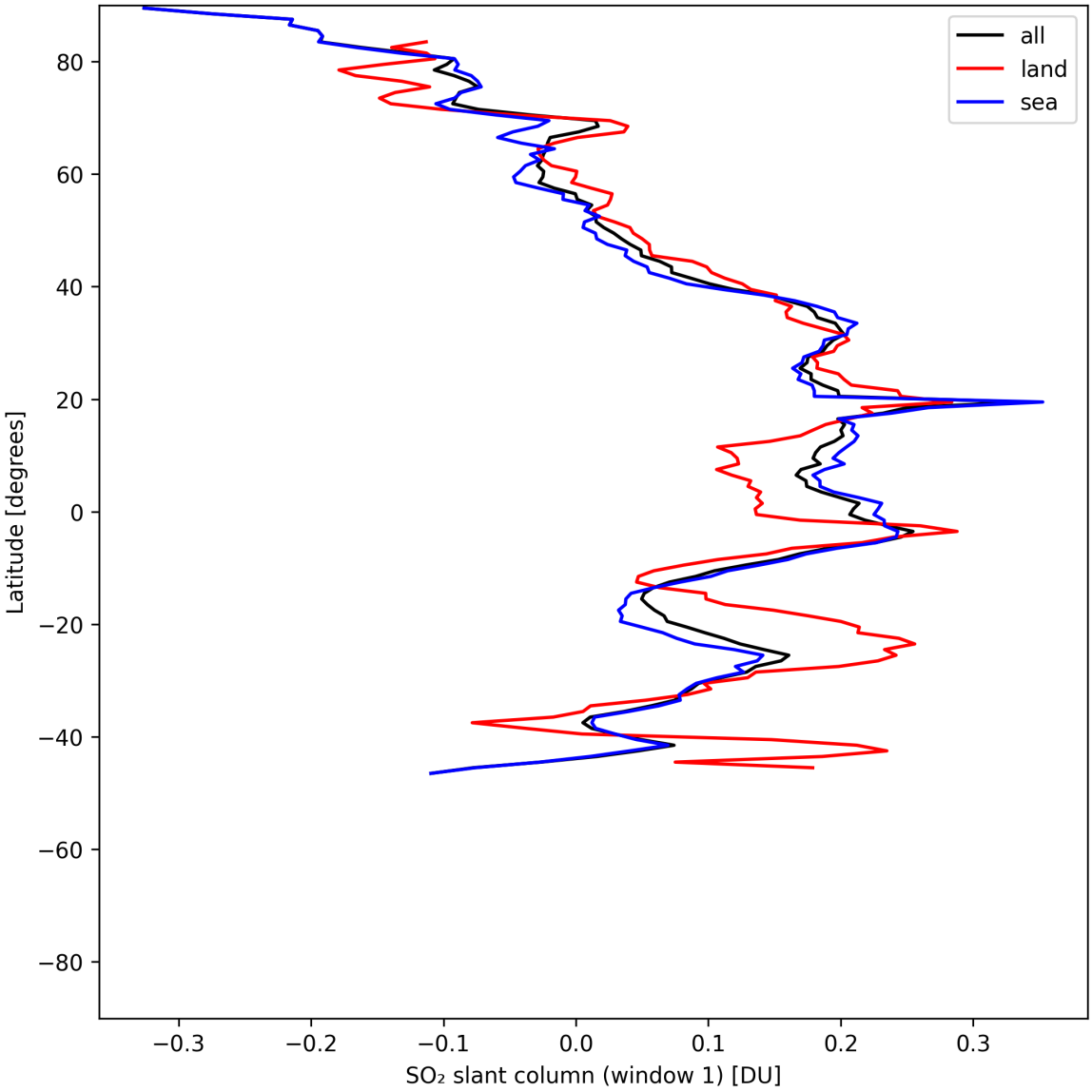

Figure 37: Zonal average of "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

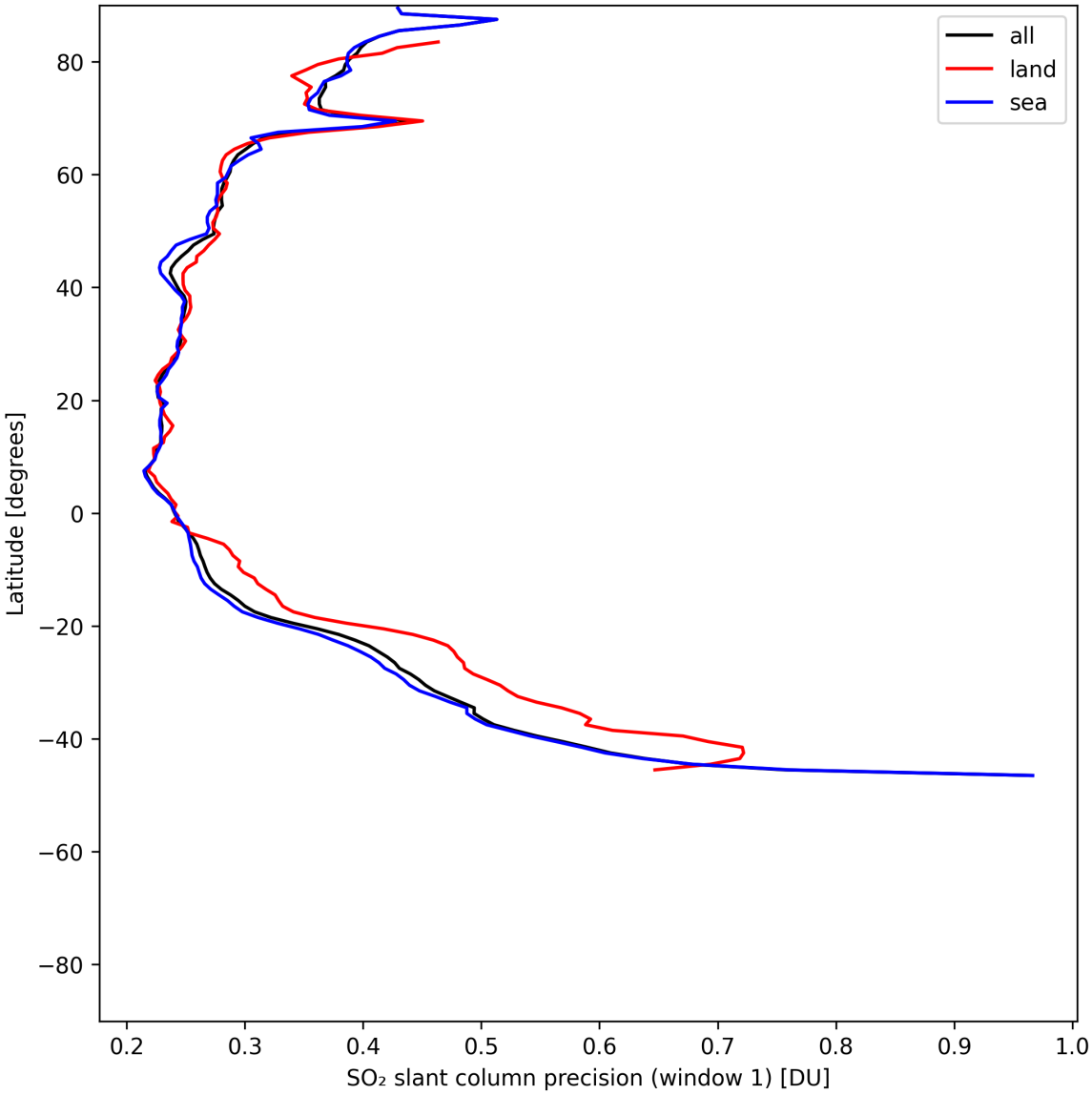

Figure 38: Zonal average of "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

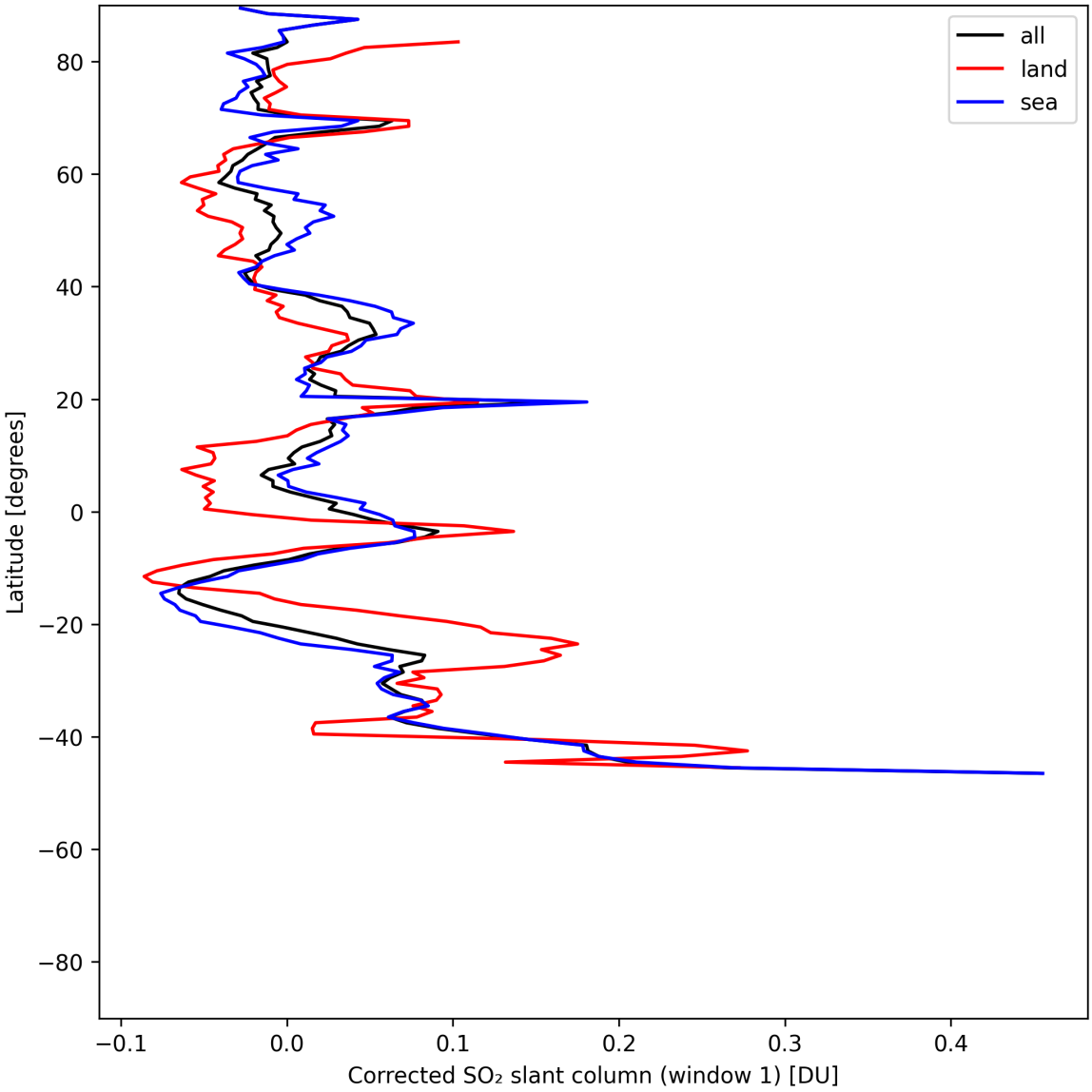

Figure 39: Zonal average of "Corrected SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

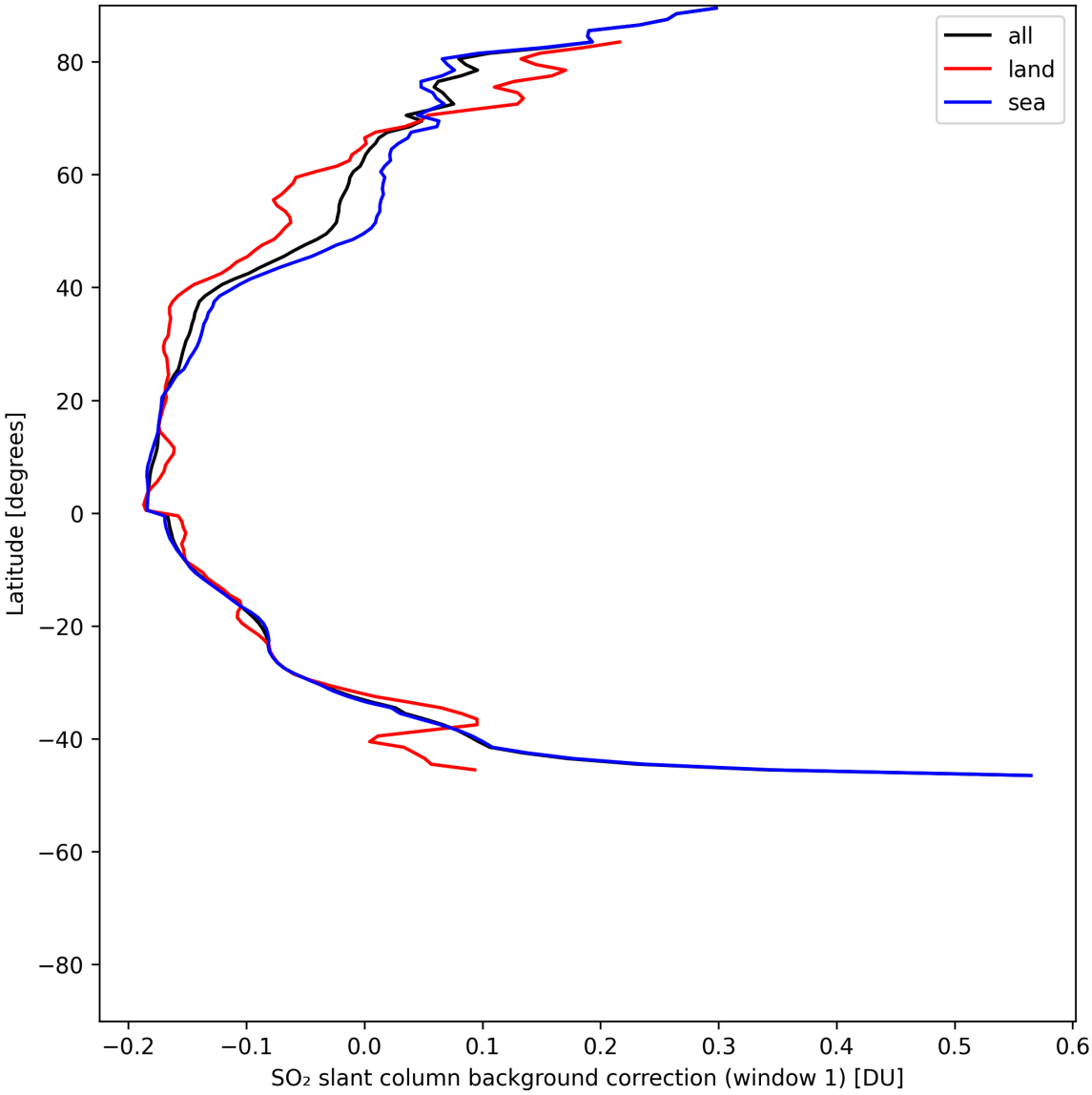

Figure 40: Zonal average of "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

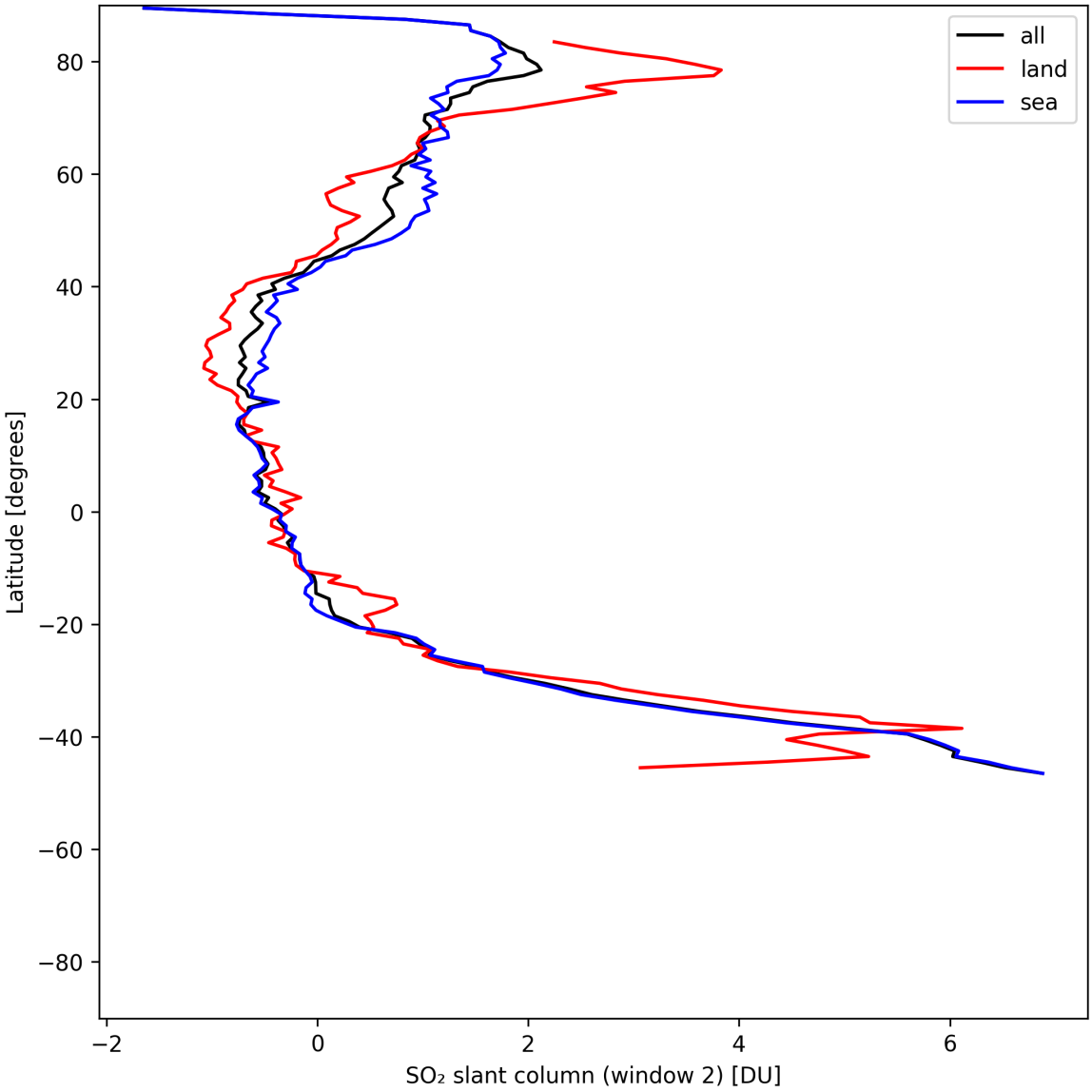

Figure 41: Zonal average of "SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

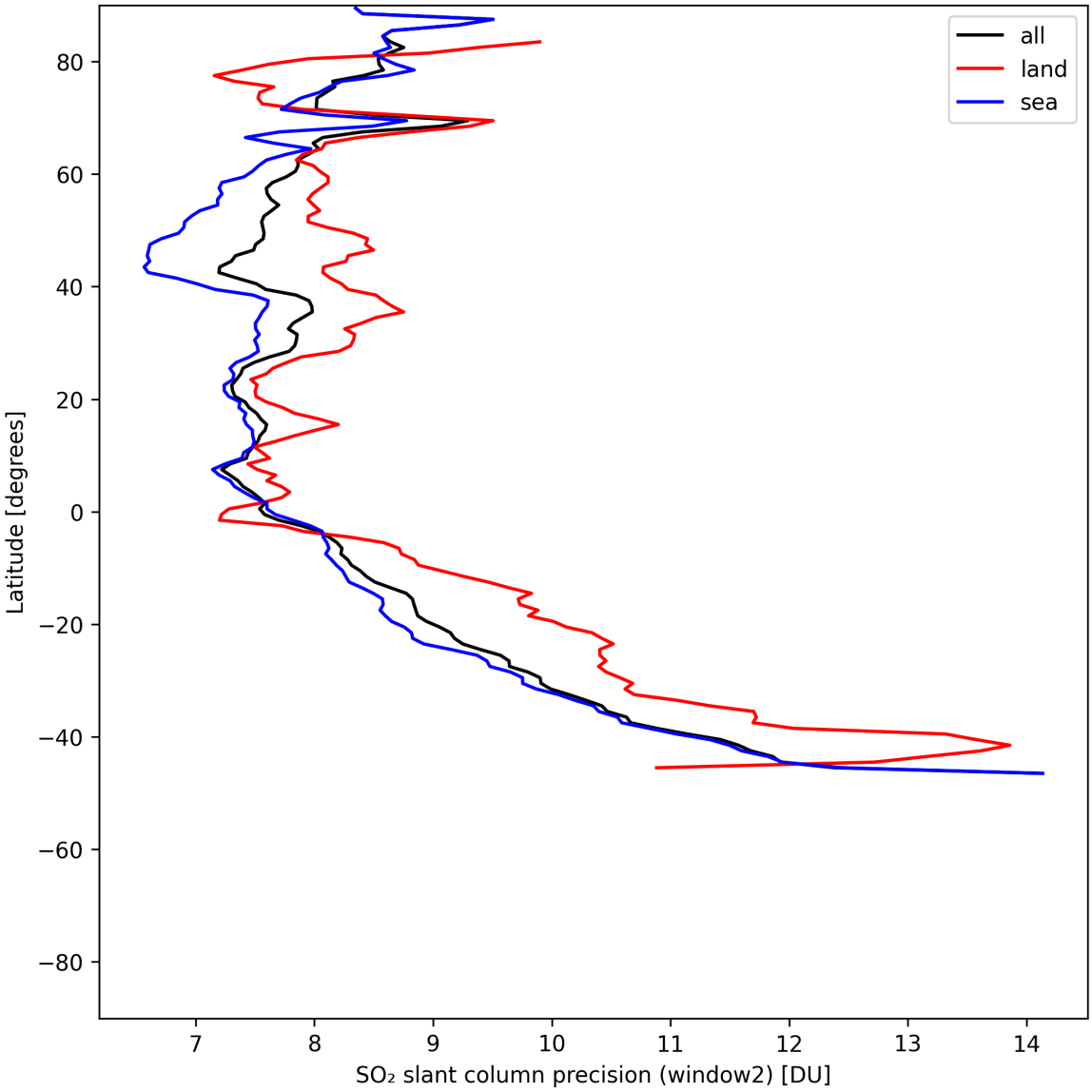

Figure 42: Zonal average of "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

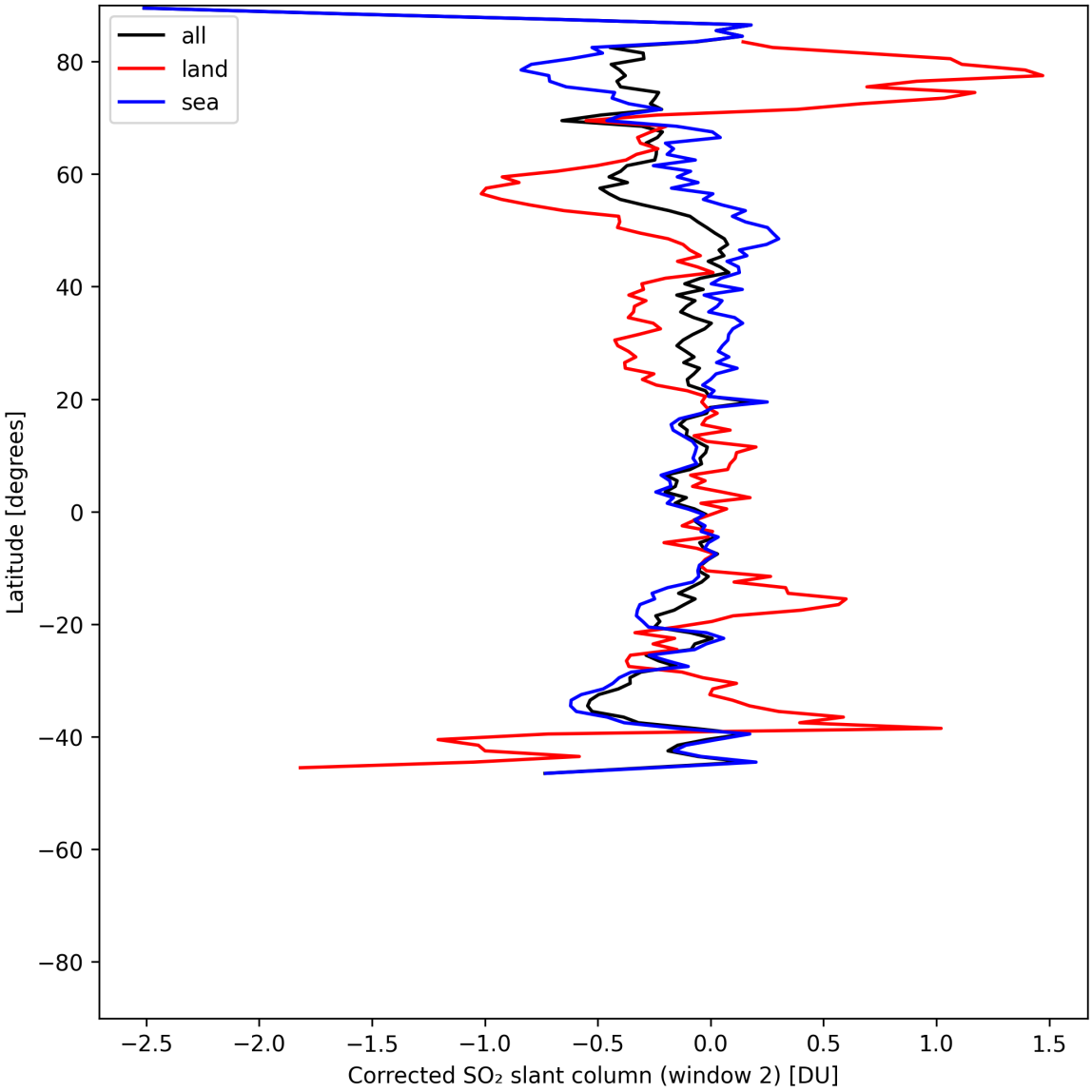

Figure 43: Zonal average of "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

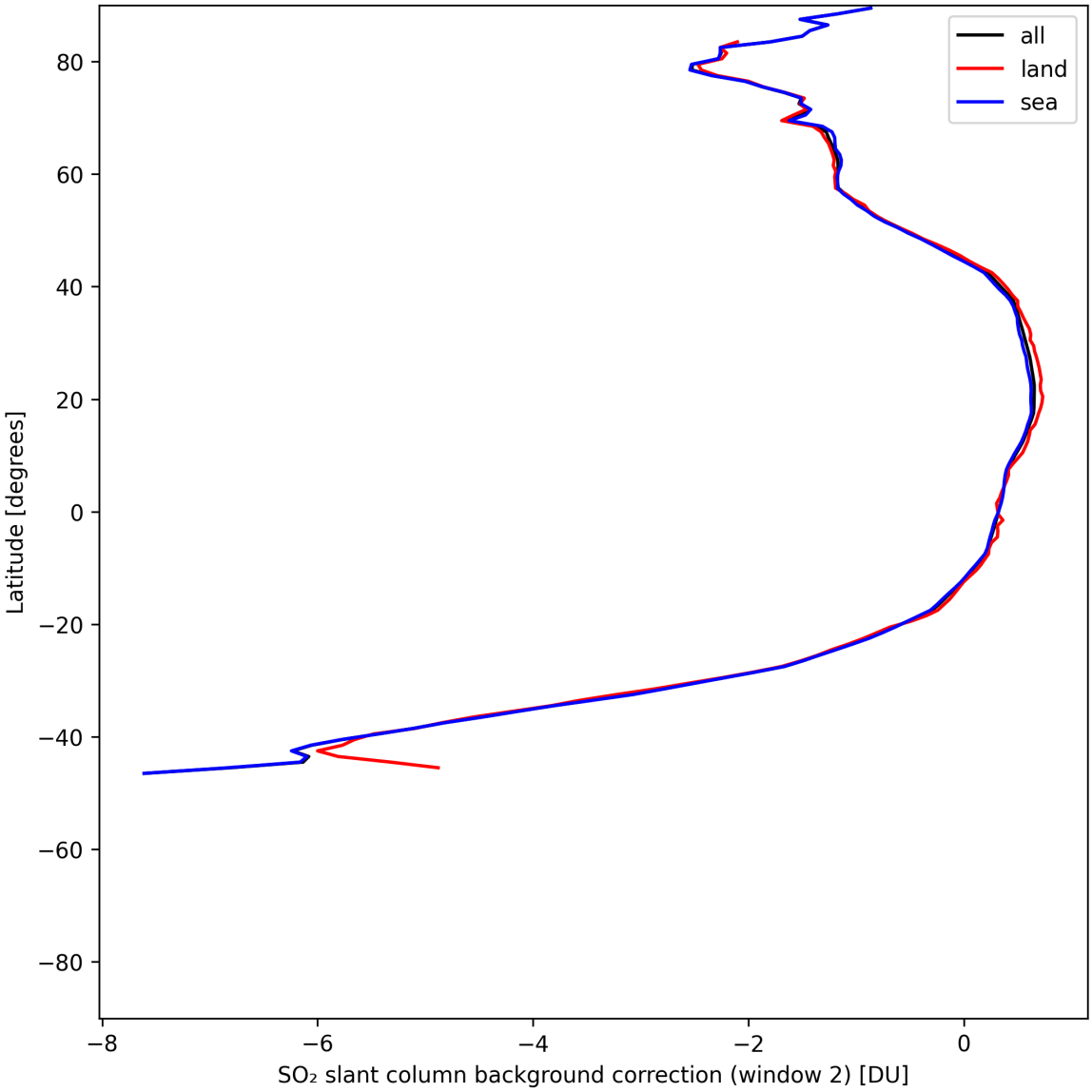

Figure 44: Zonal average of "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

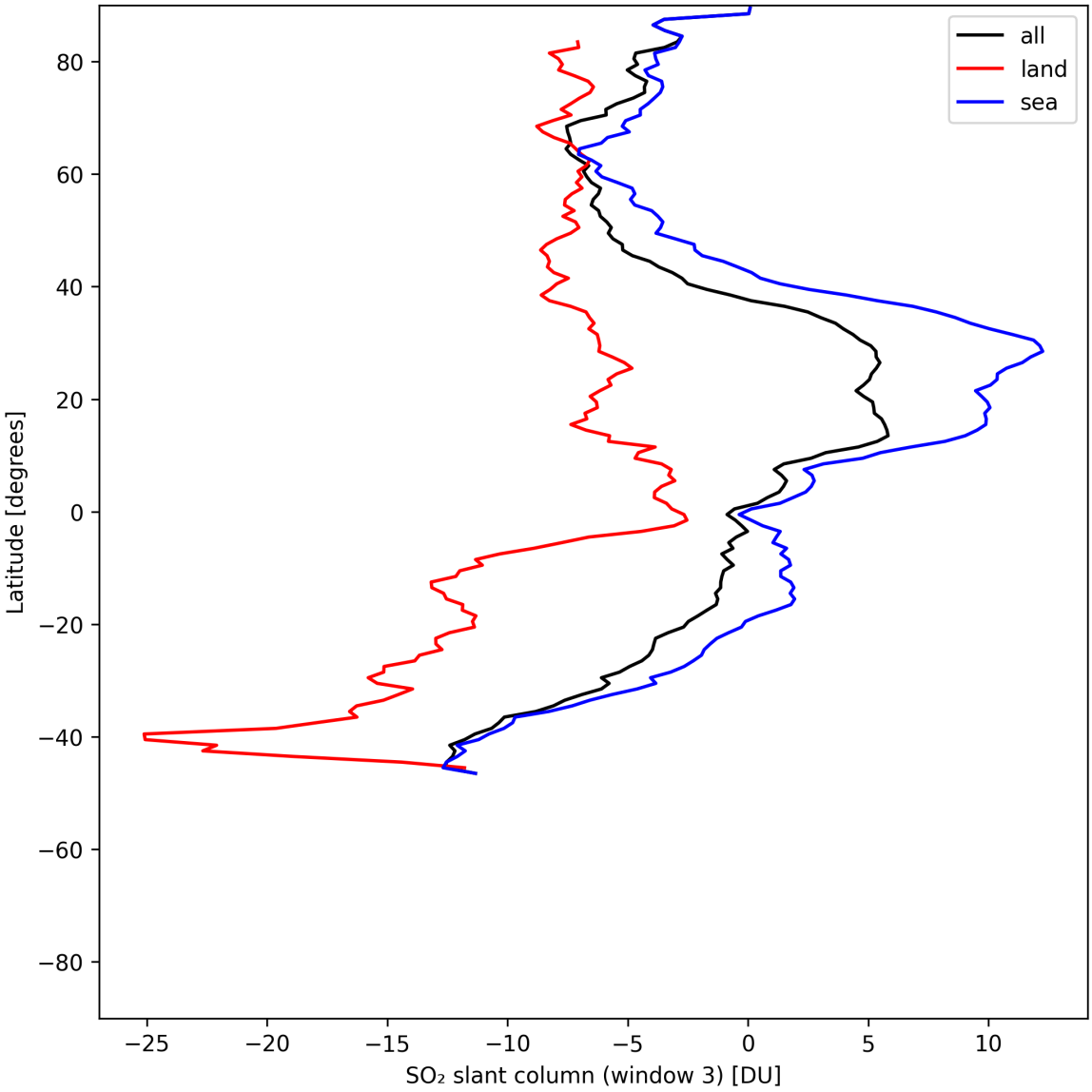

Figure 45: Zonal average of "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

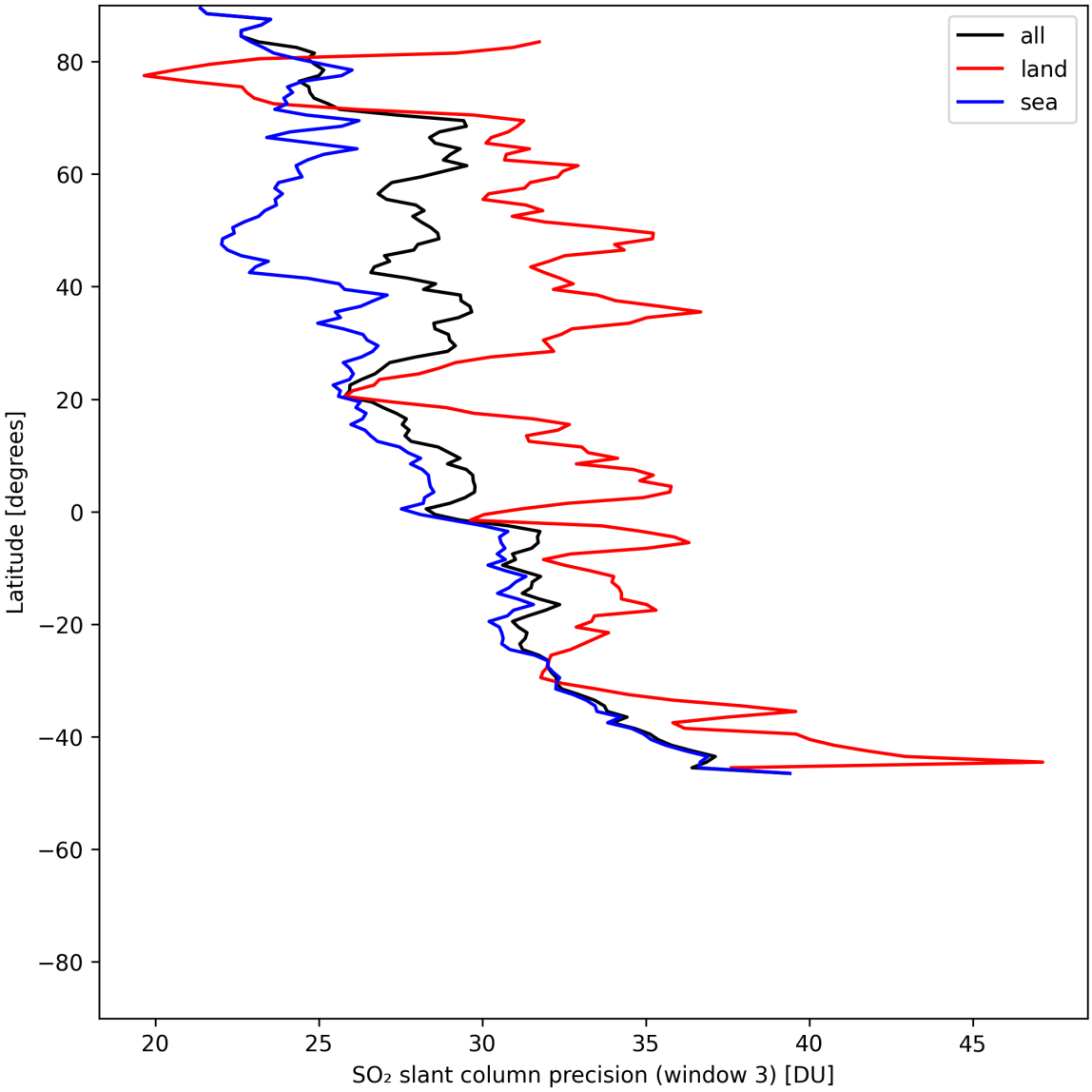

Figure 46: Zonal average of "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

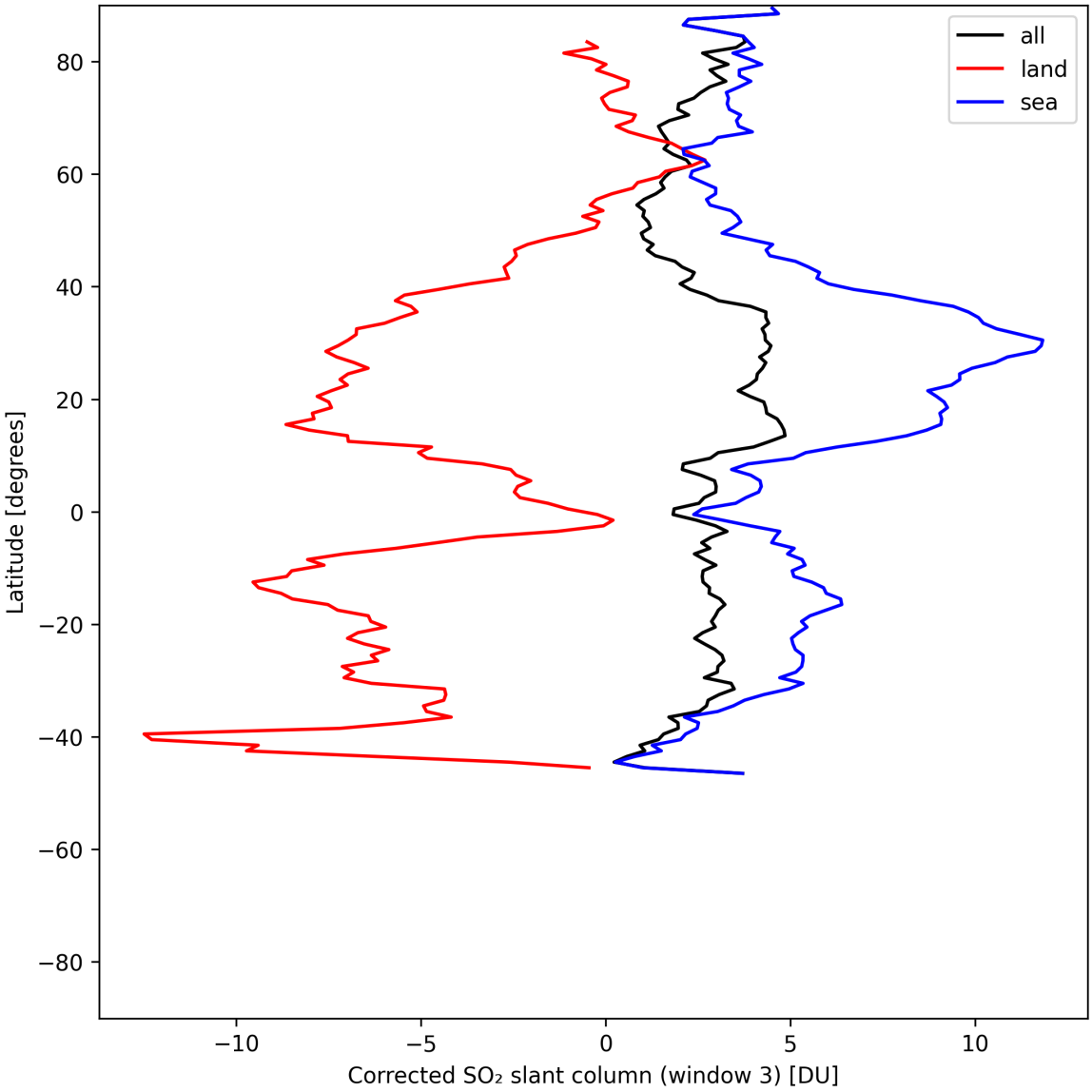

Figure 47: Zonal average of "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

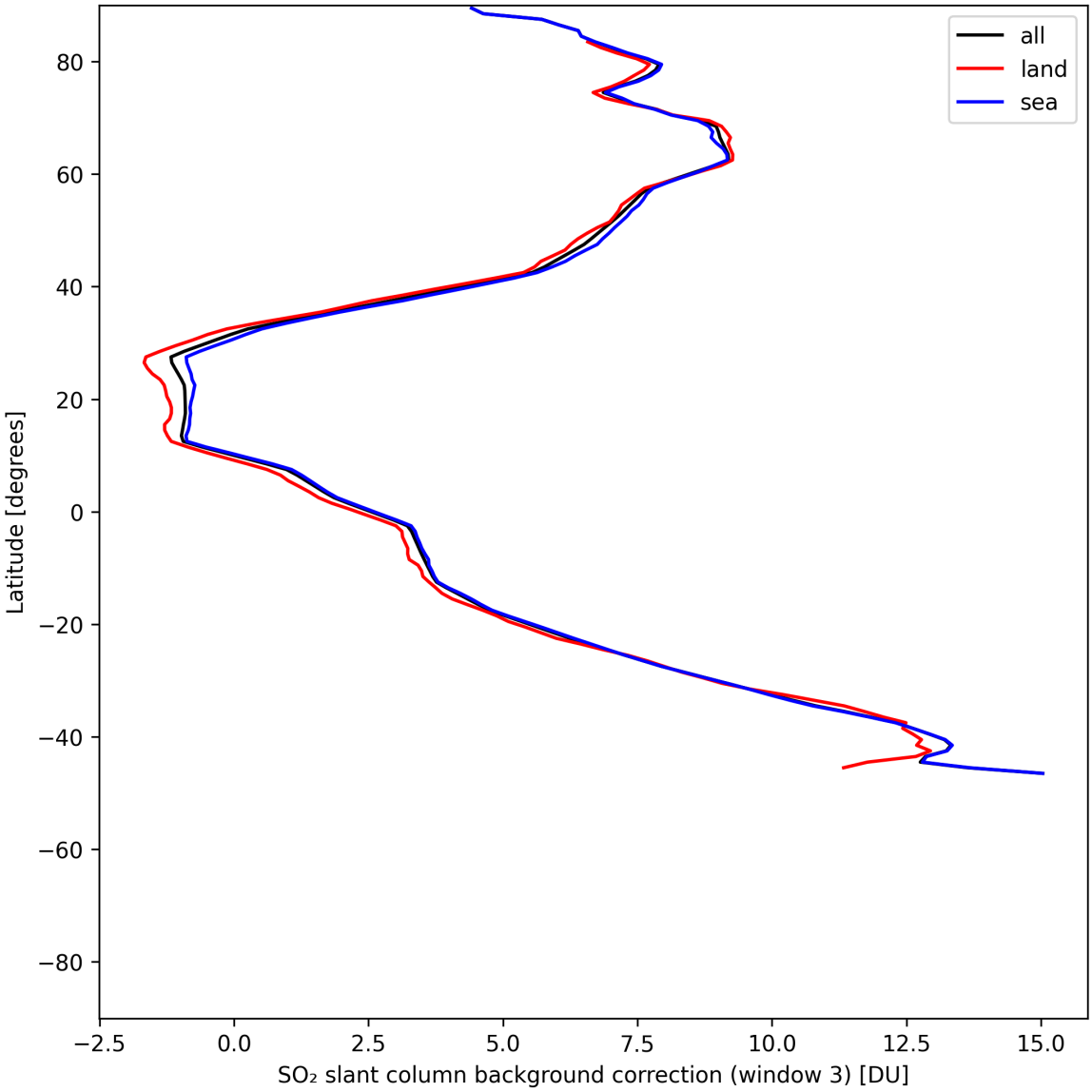

Figure 48: Zonal average of "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

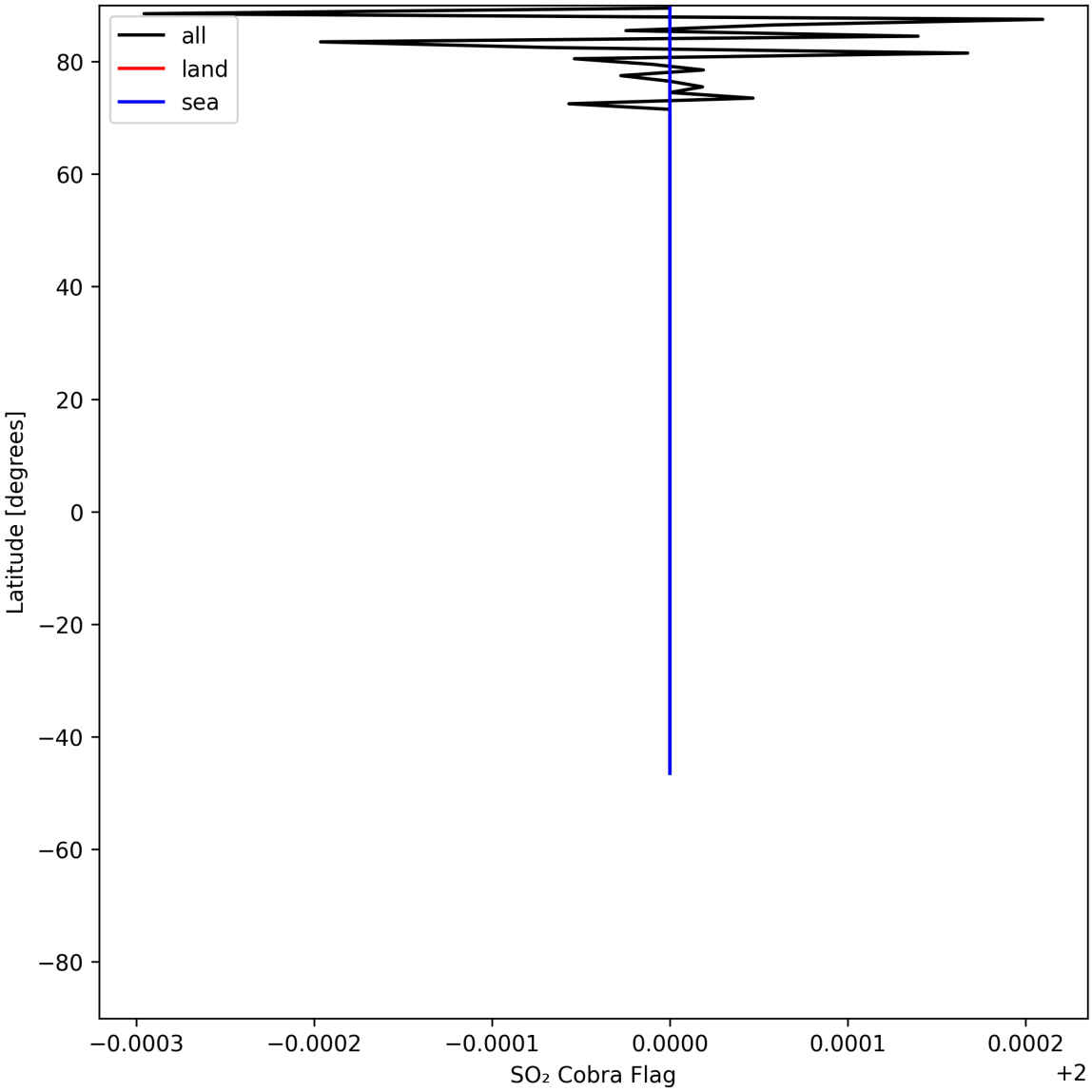

Figure 49: Zonal average of "SO_2 Cobra Flag" for 2025-07-09 to 2025-07-11.

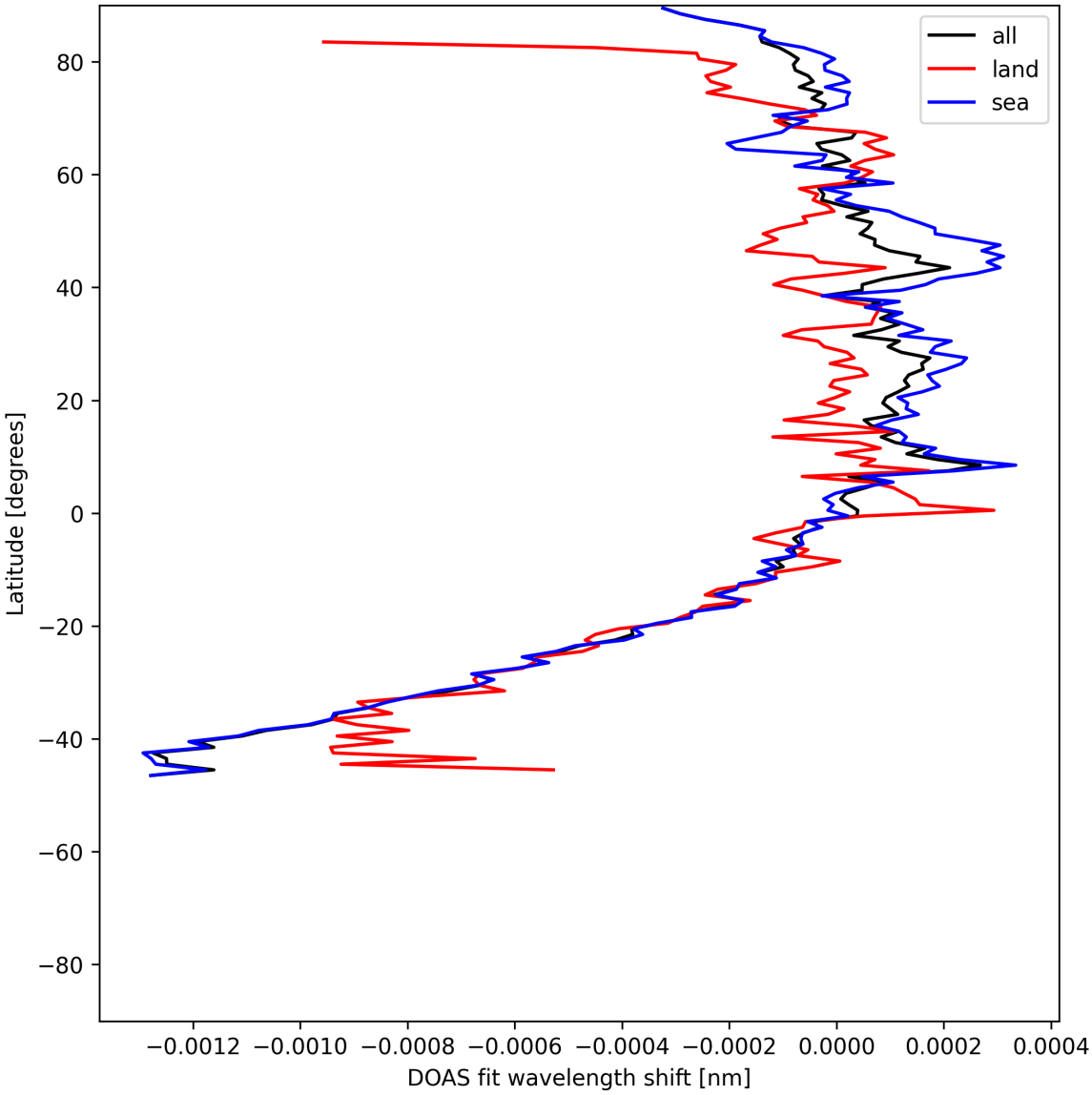

Figure 50: Zonal average of “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11.

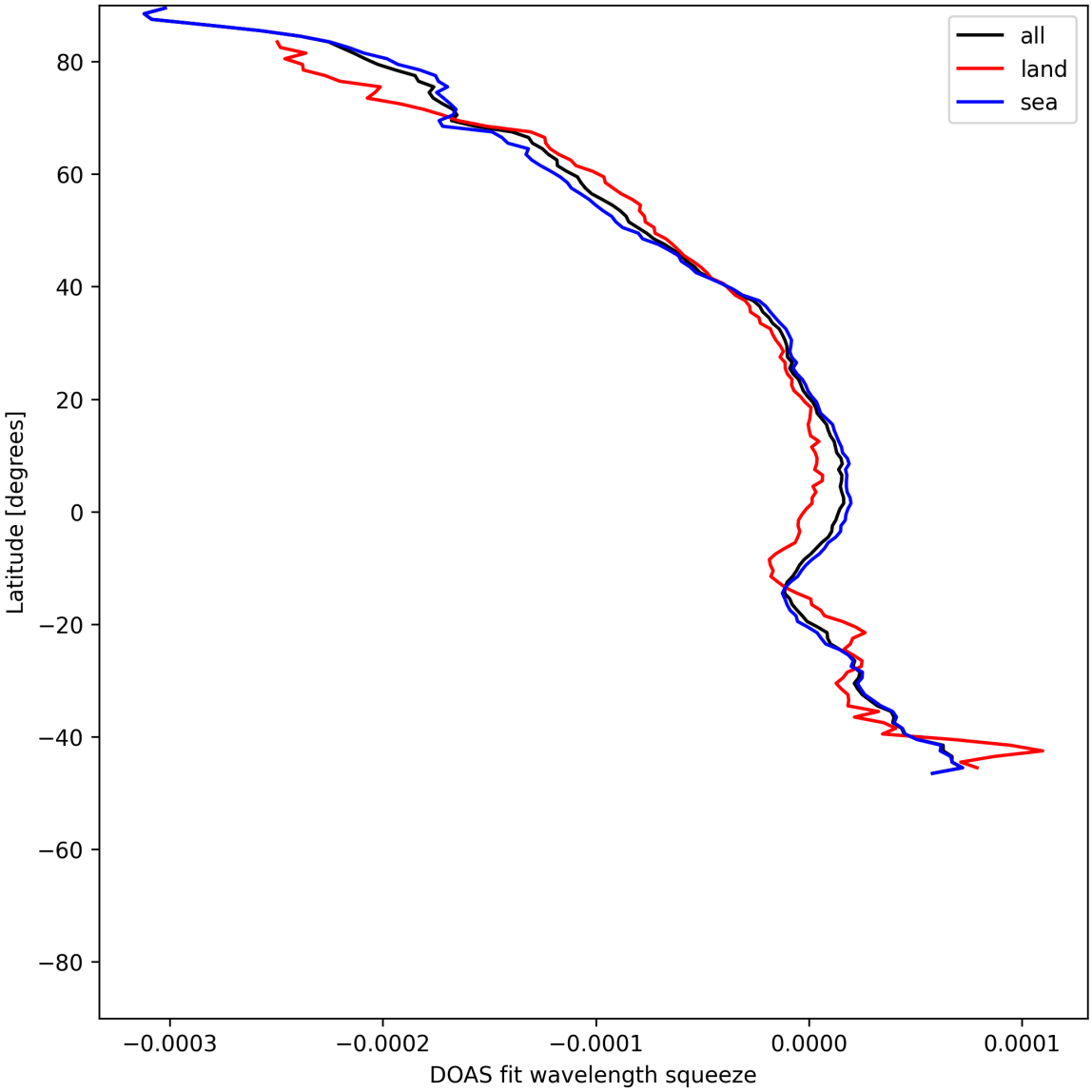

Figure 51: Zonal average of “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11.

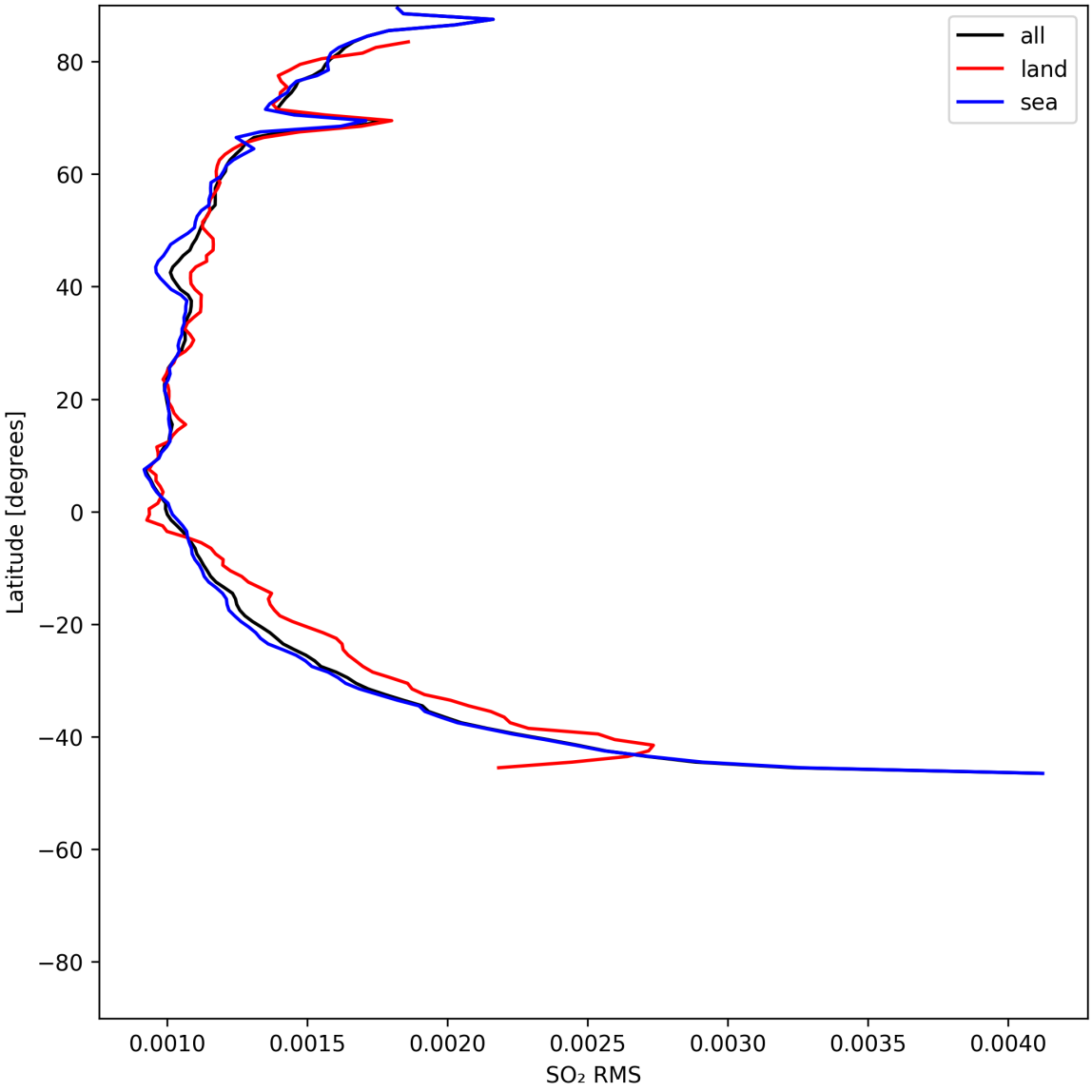

Figure 52: Zonal average of "SO_2 RMS" for 2025-07-09 to 2025-07-11.

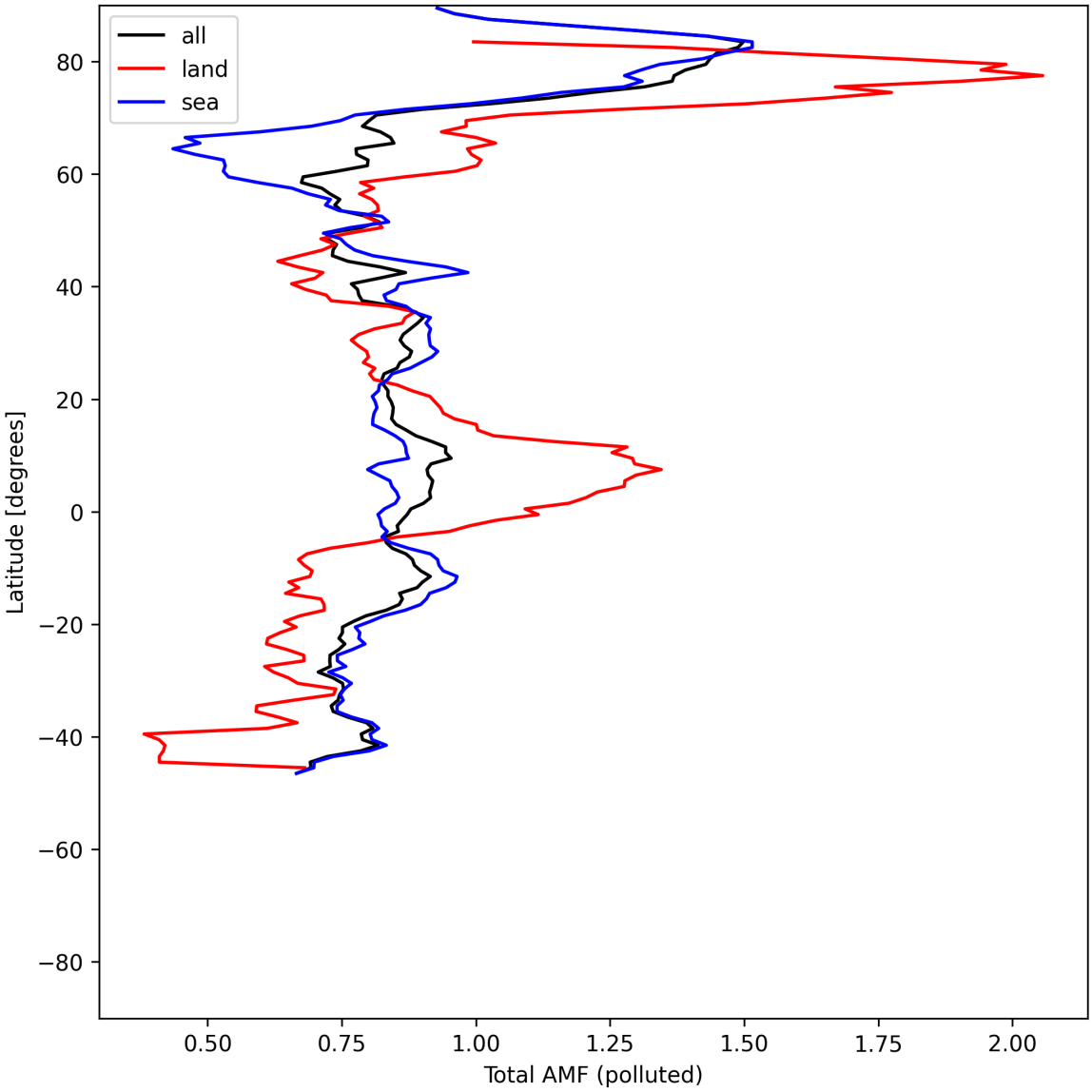

Figure 53: Zonal average of “Total AMF (polluted)” for 2025-07-09 to 2025-07-11.

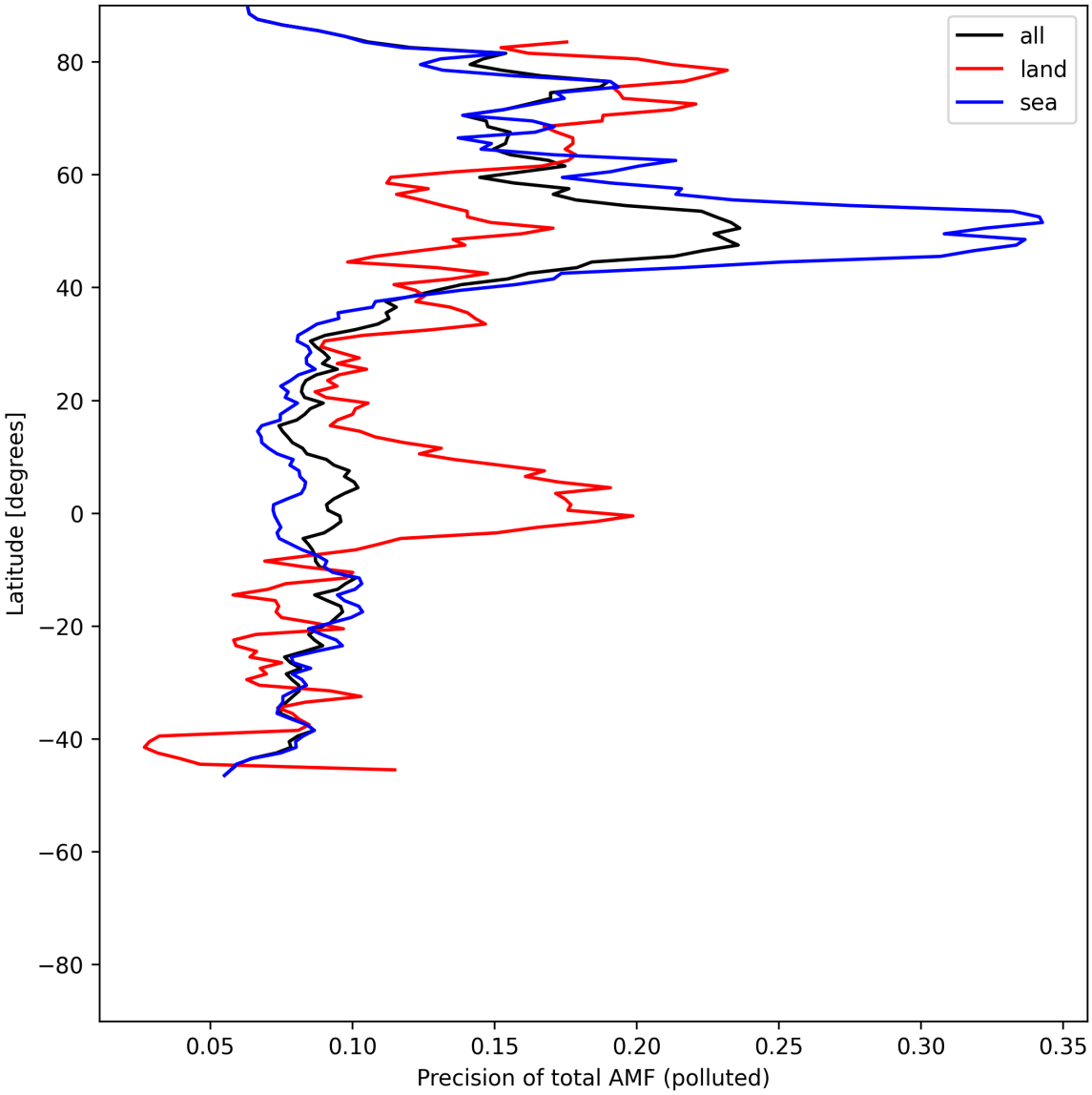

Figure 54: Zonal average of “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11.

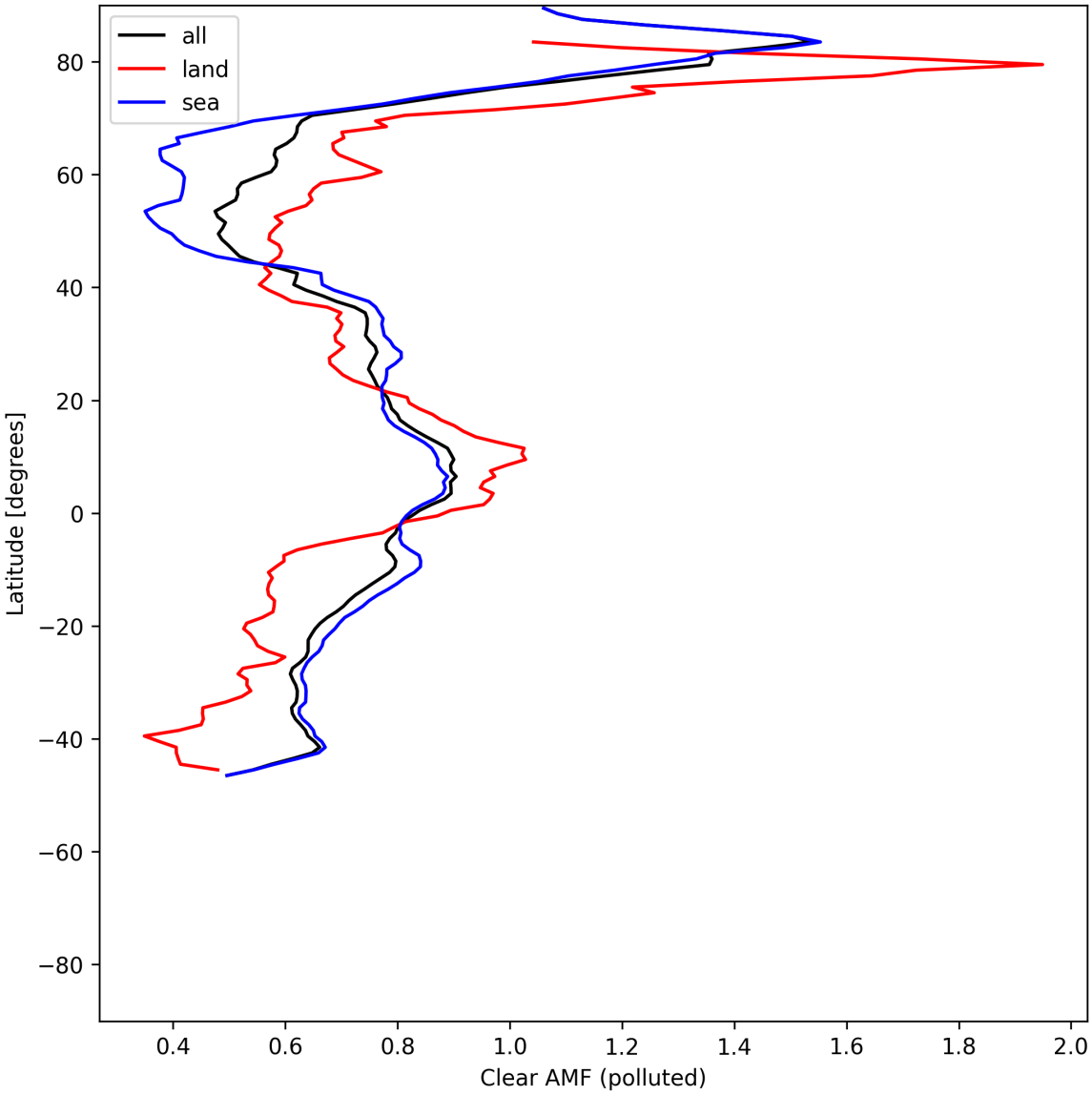

Figure 55: Zonal average of “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11.

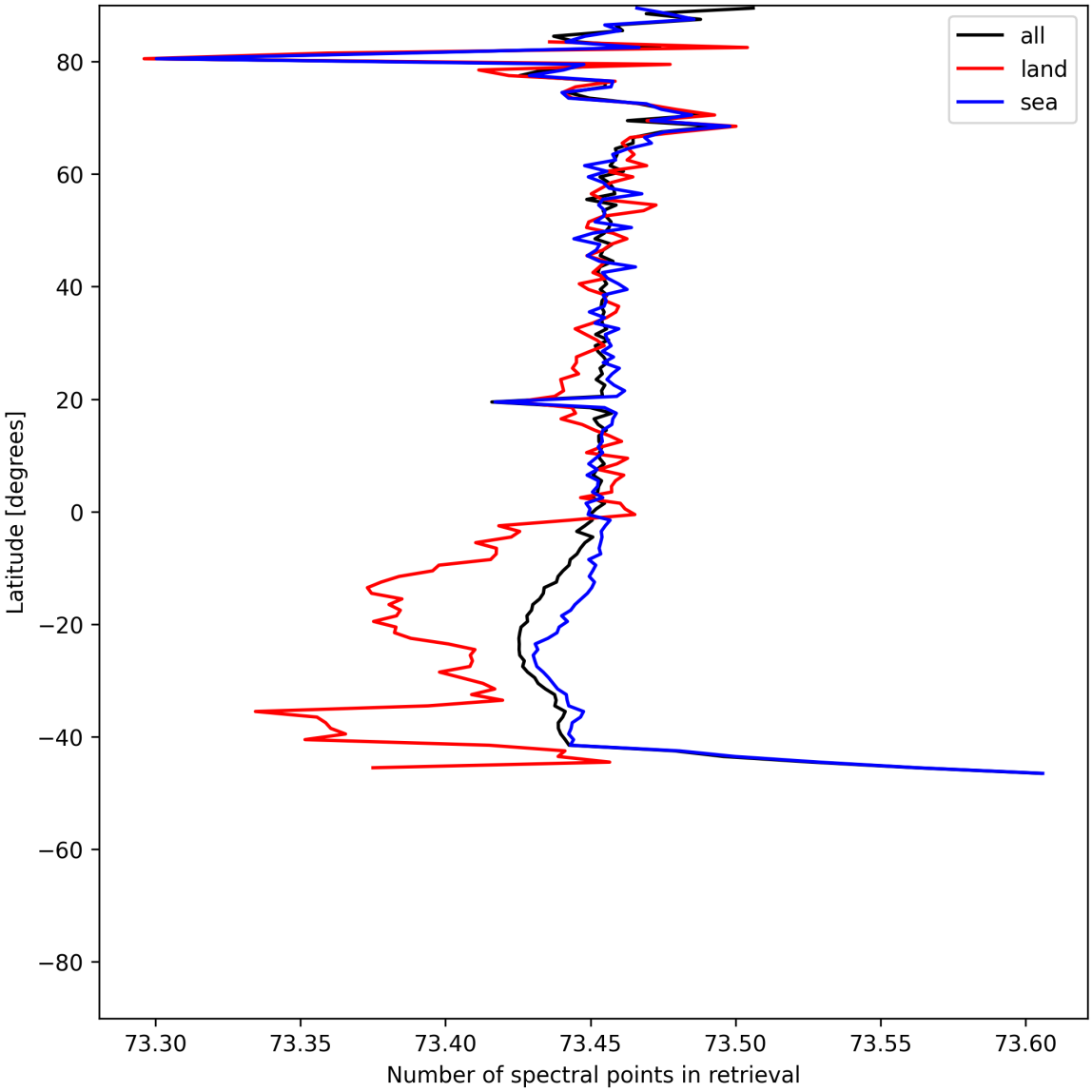

Figure 56: Zonal average of “Number of spectral points in retrieval” for 2025-07-09 to 2025-07-11.

8 Histograms

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

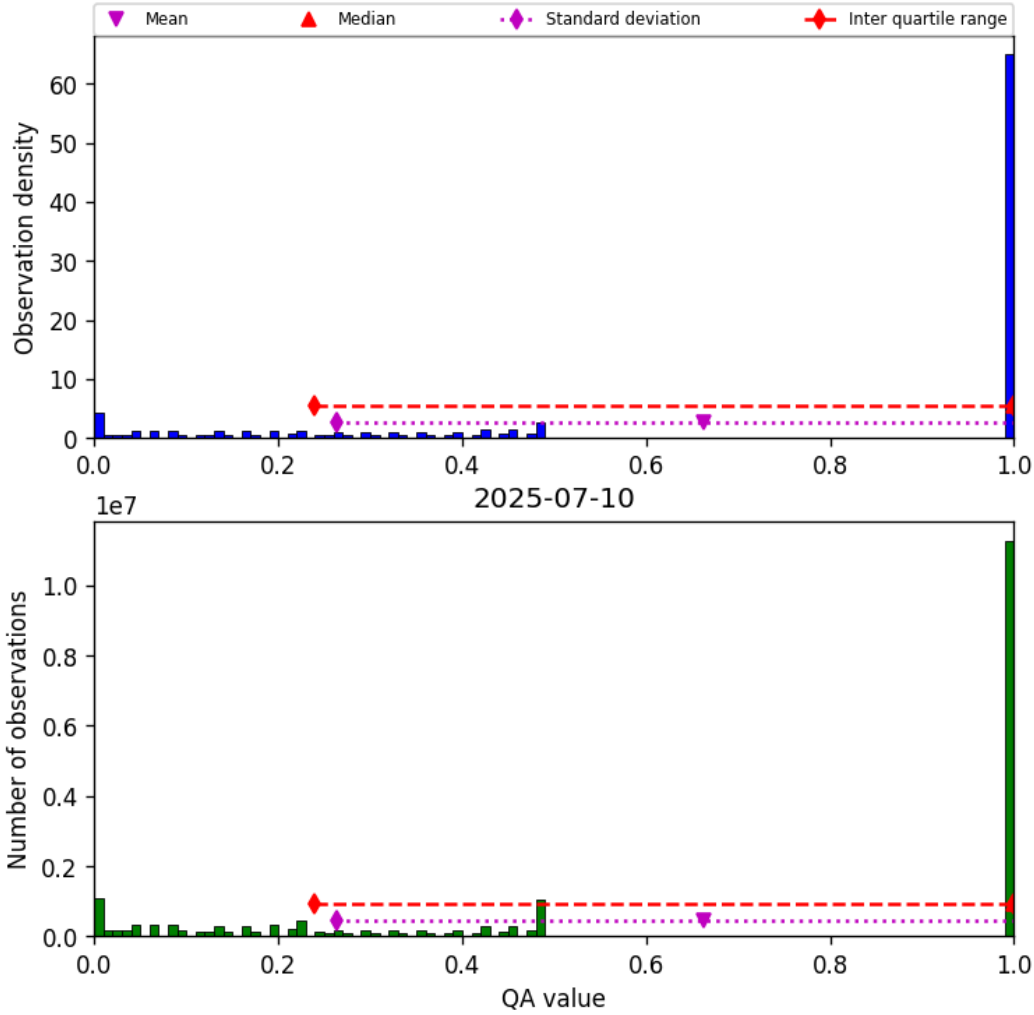

Figure 57: Histogram of “QA value” for 2025-07-09 to 2025-07-11

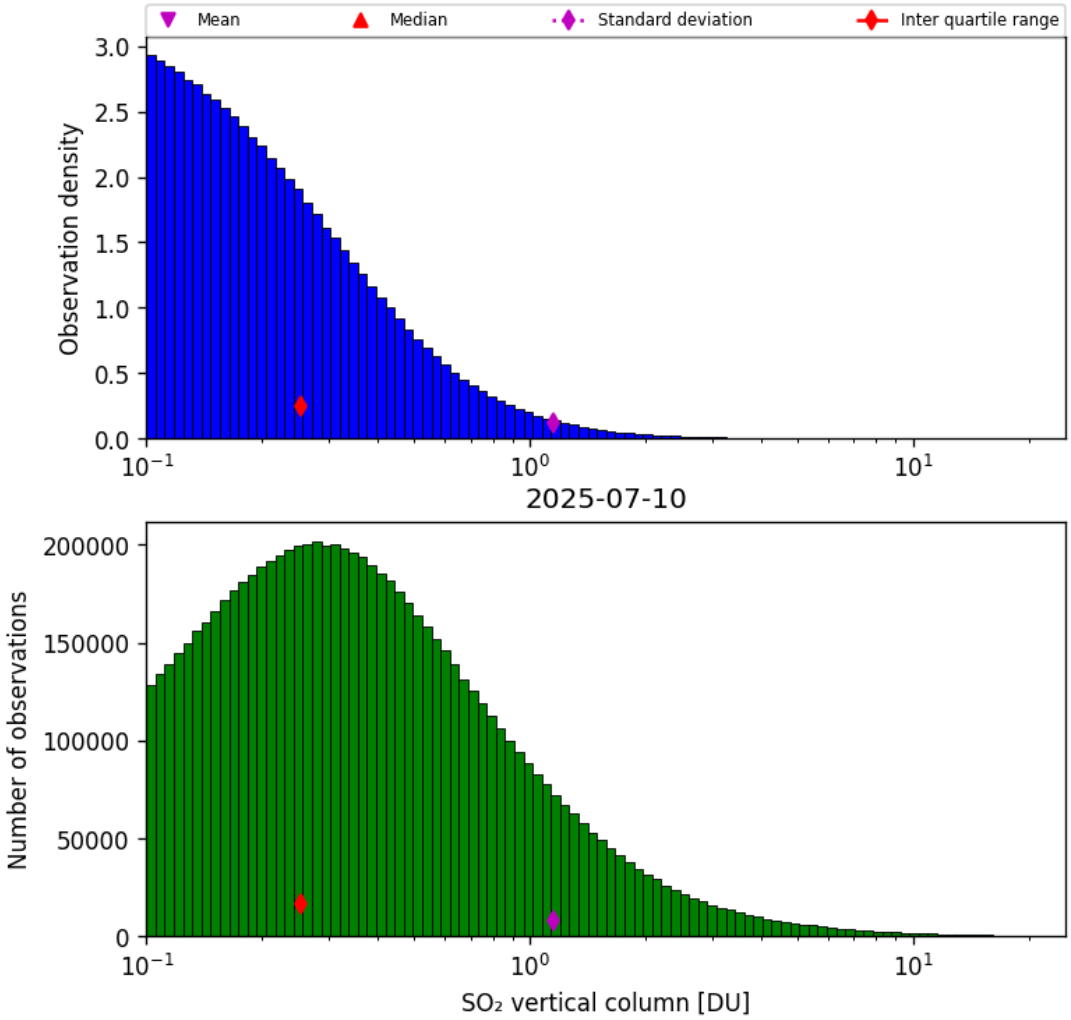

Figure 58: Histogram of "SO_2 vertical column" for 2025-07-09 to 2025-07-11

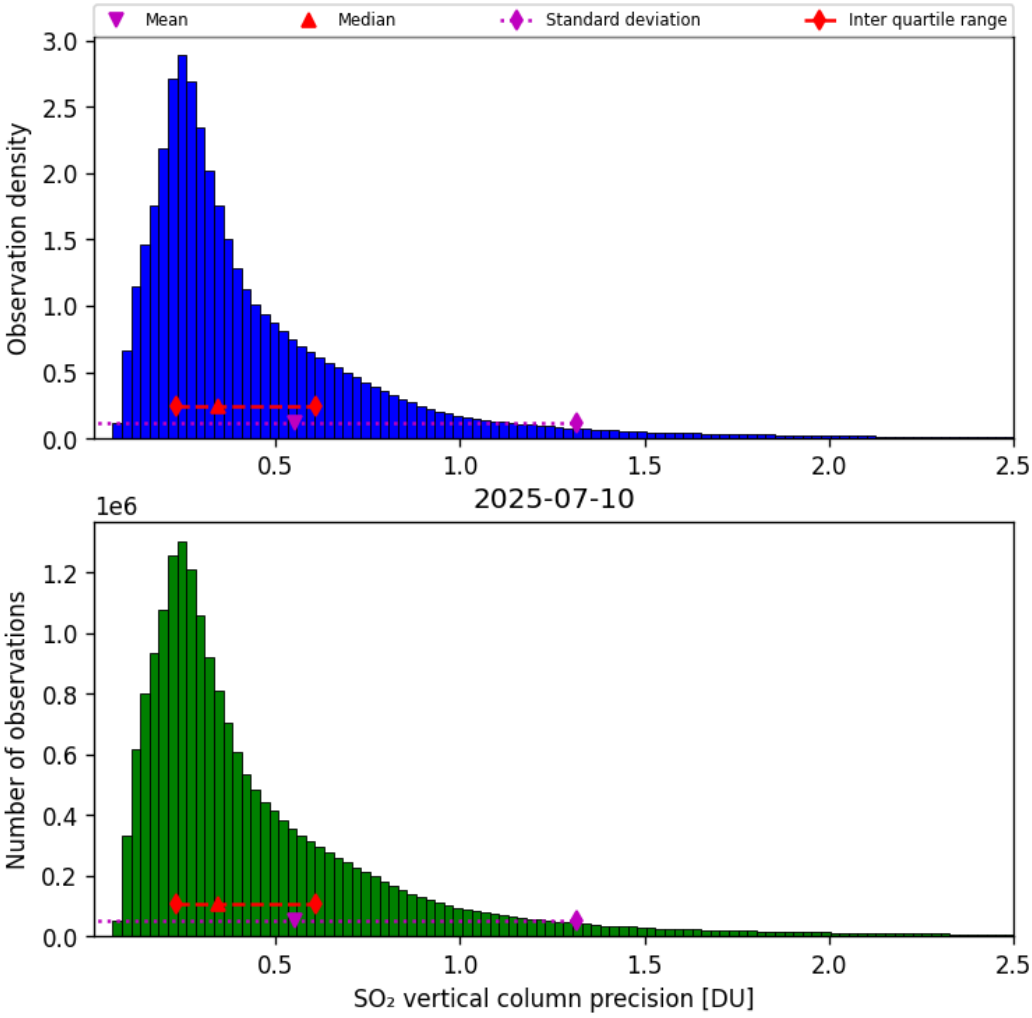

Figure 59: Histogram of "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11

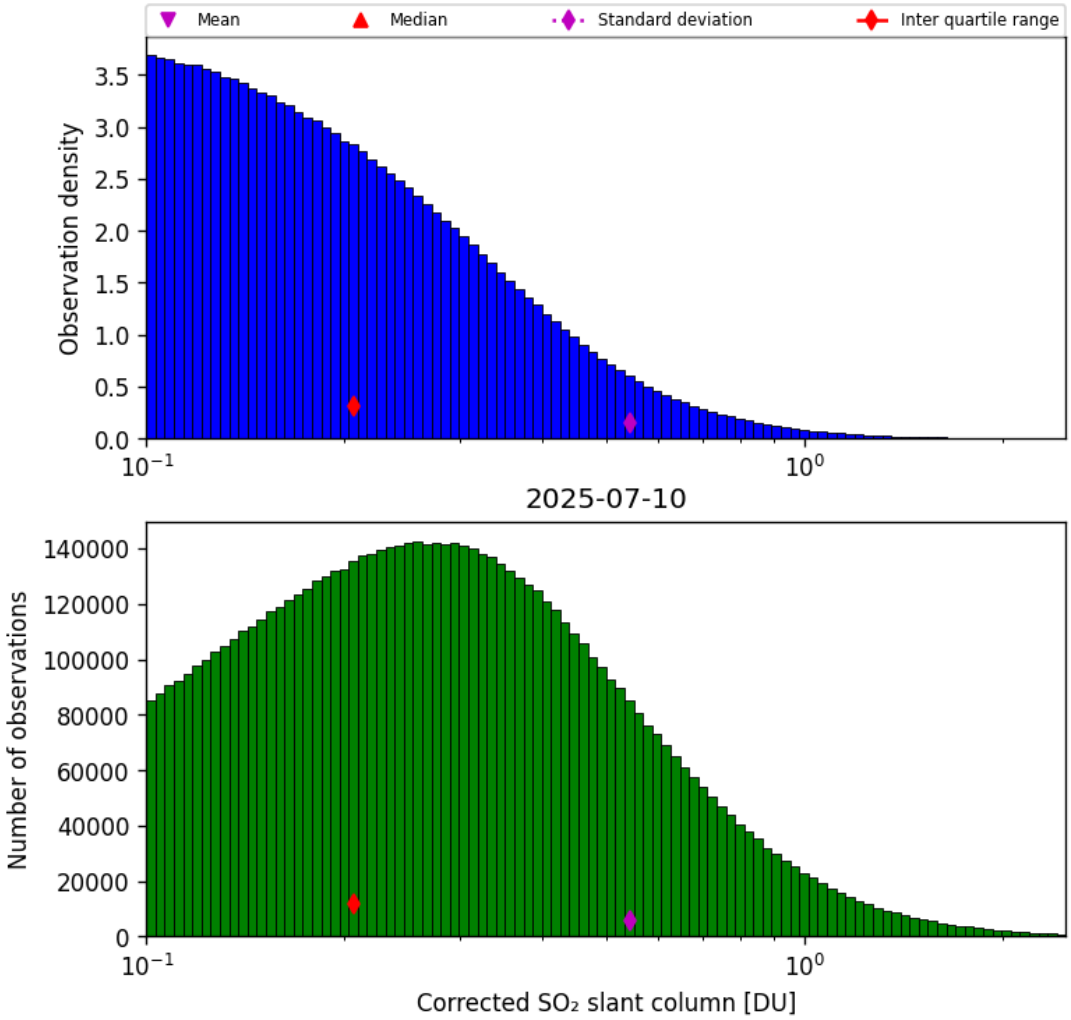

Figure 60: Histogram of "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11

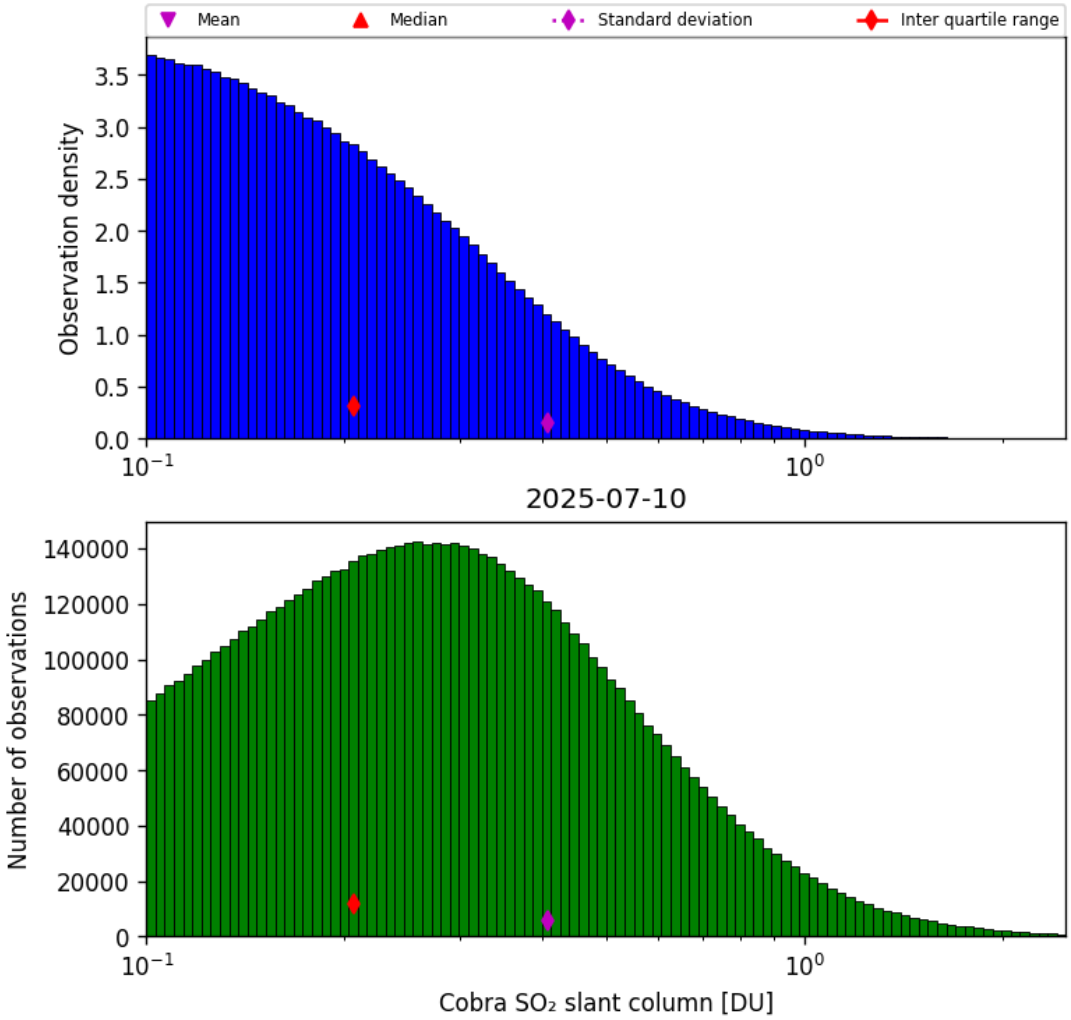

Figure 61: Histogram of "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11

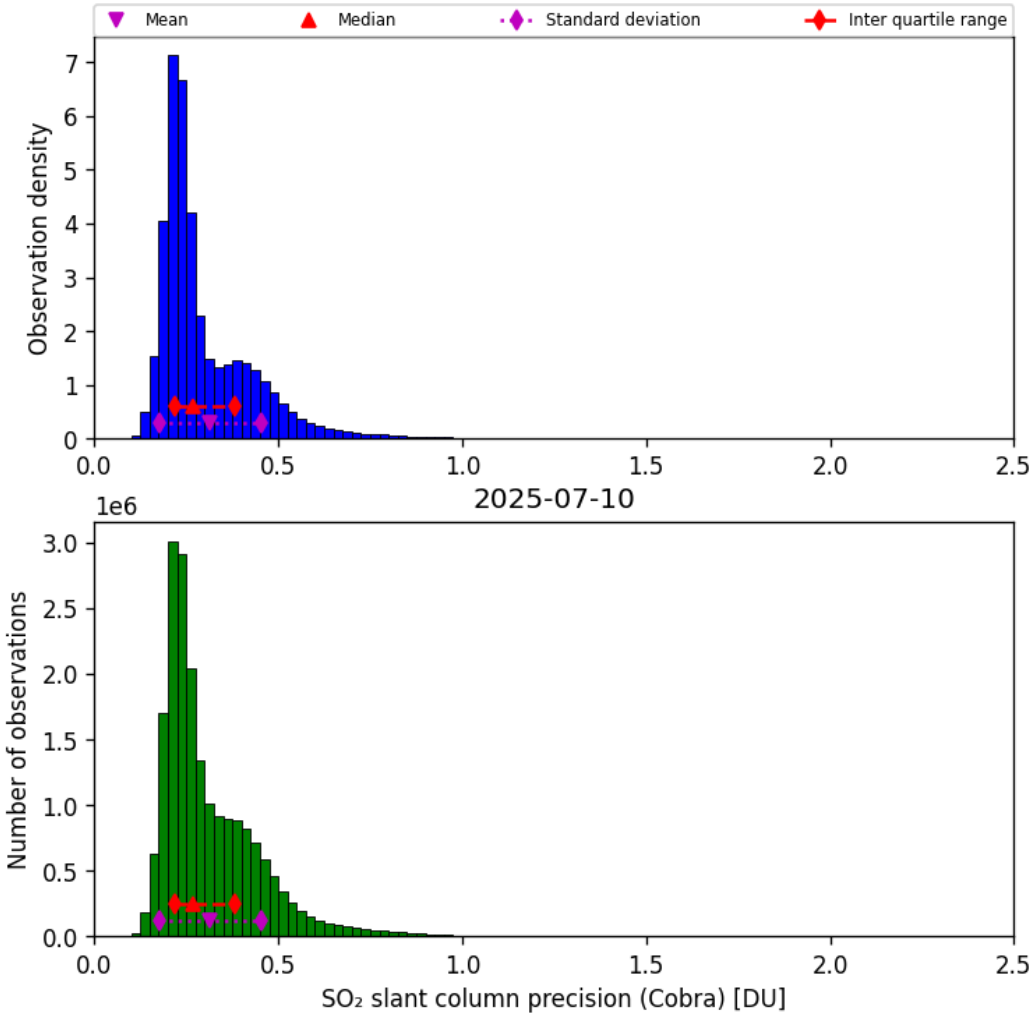

Figure 62: Histogram of "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11

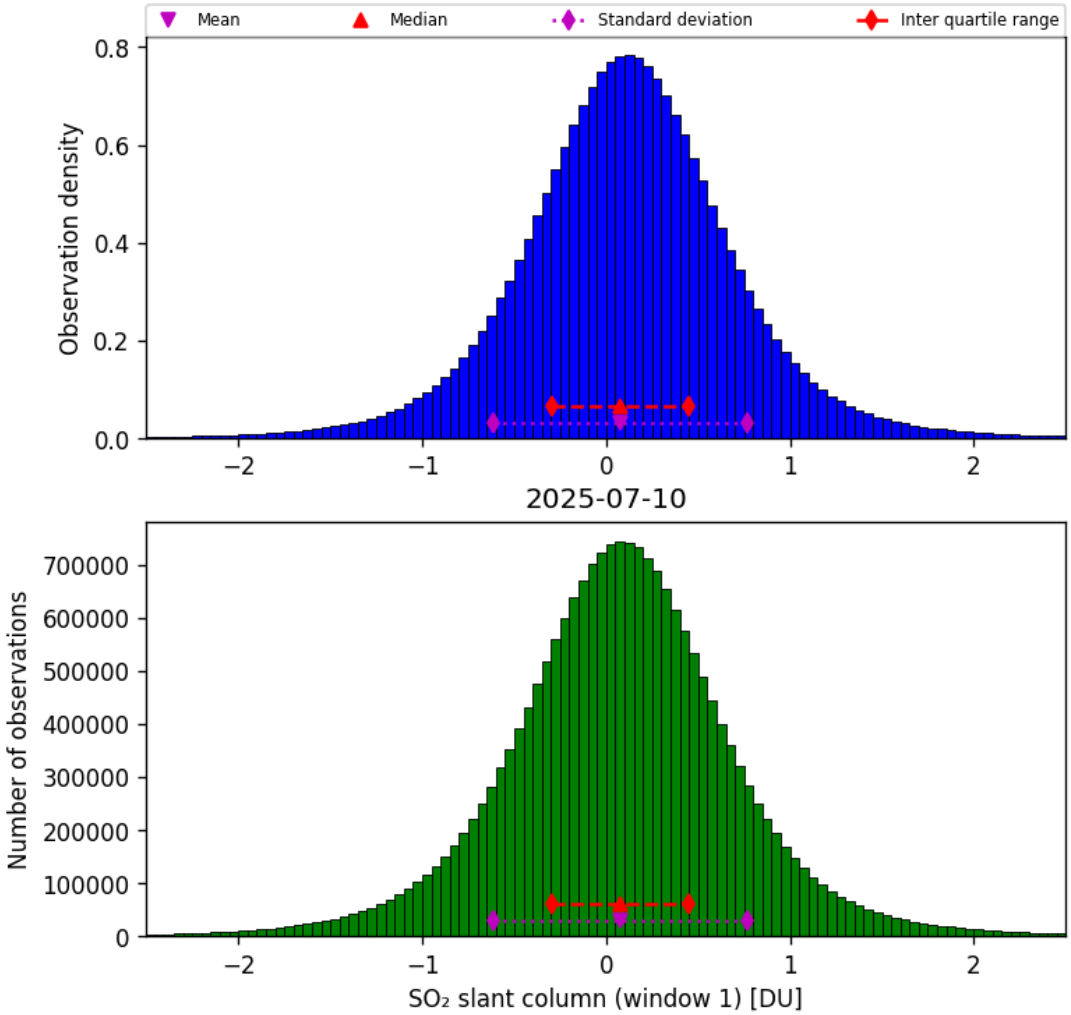

Figure 63: Histogram of "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11

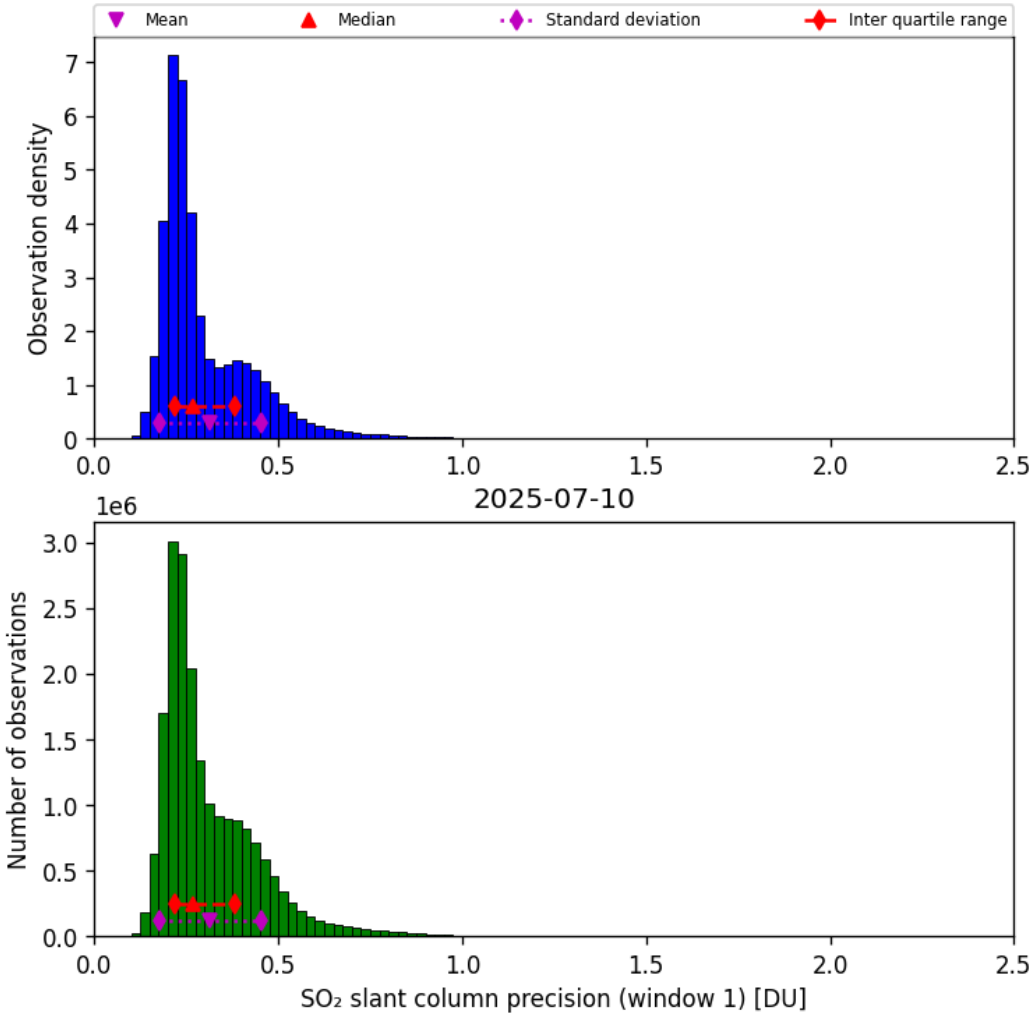

Figure 64: Histogram of "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11

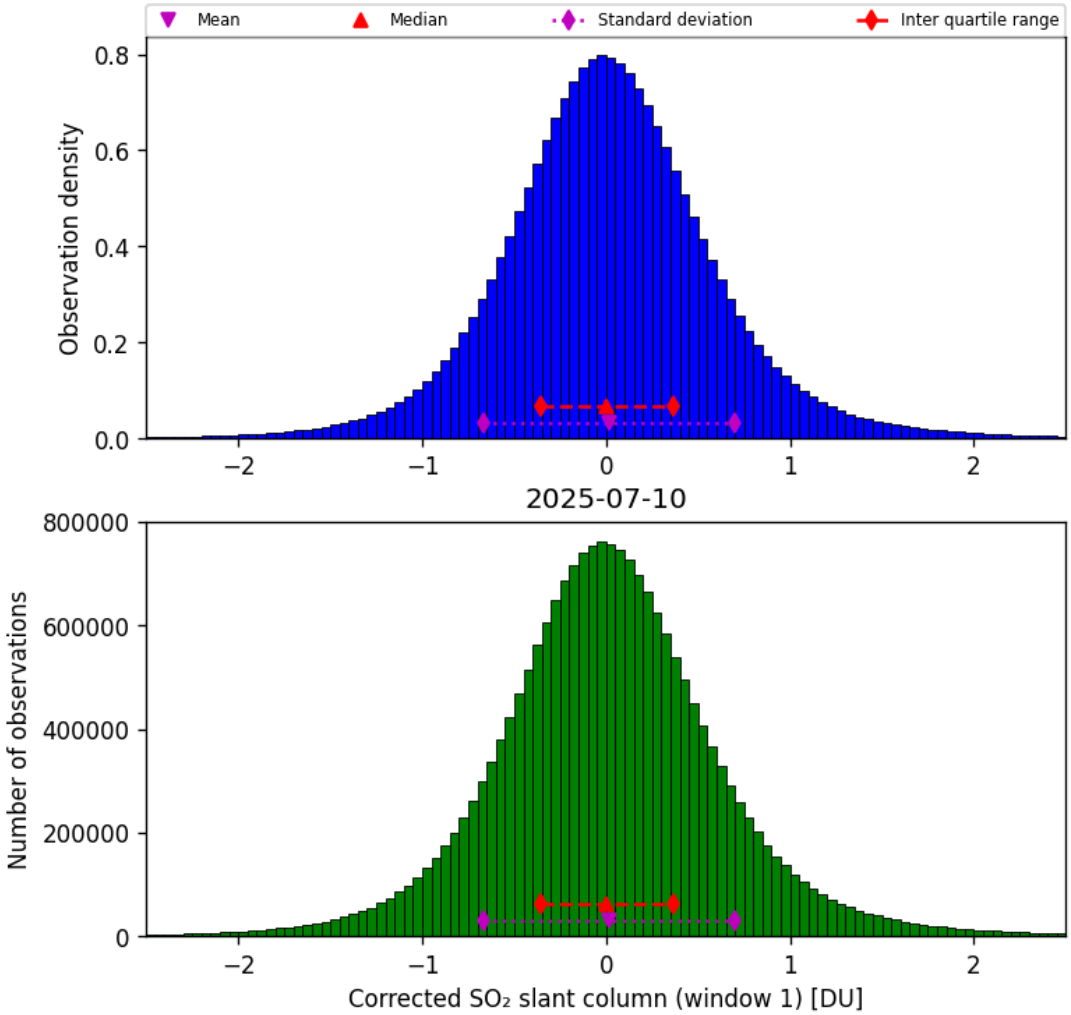

Figure 65: Histogram of "Corrected SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11

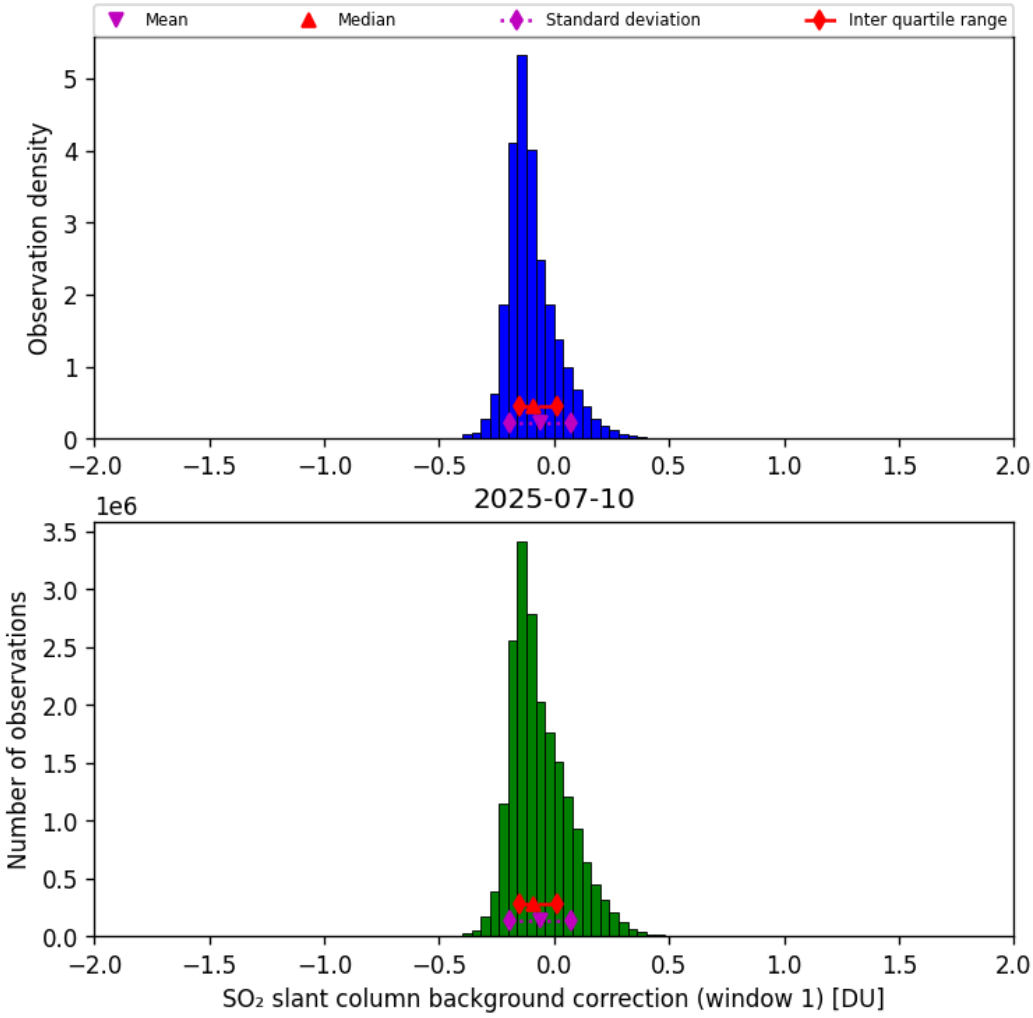

Figure 66: Histogram of "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11

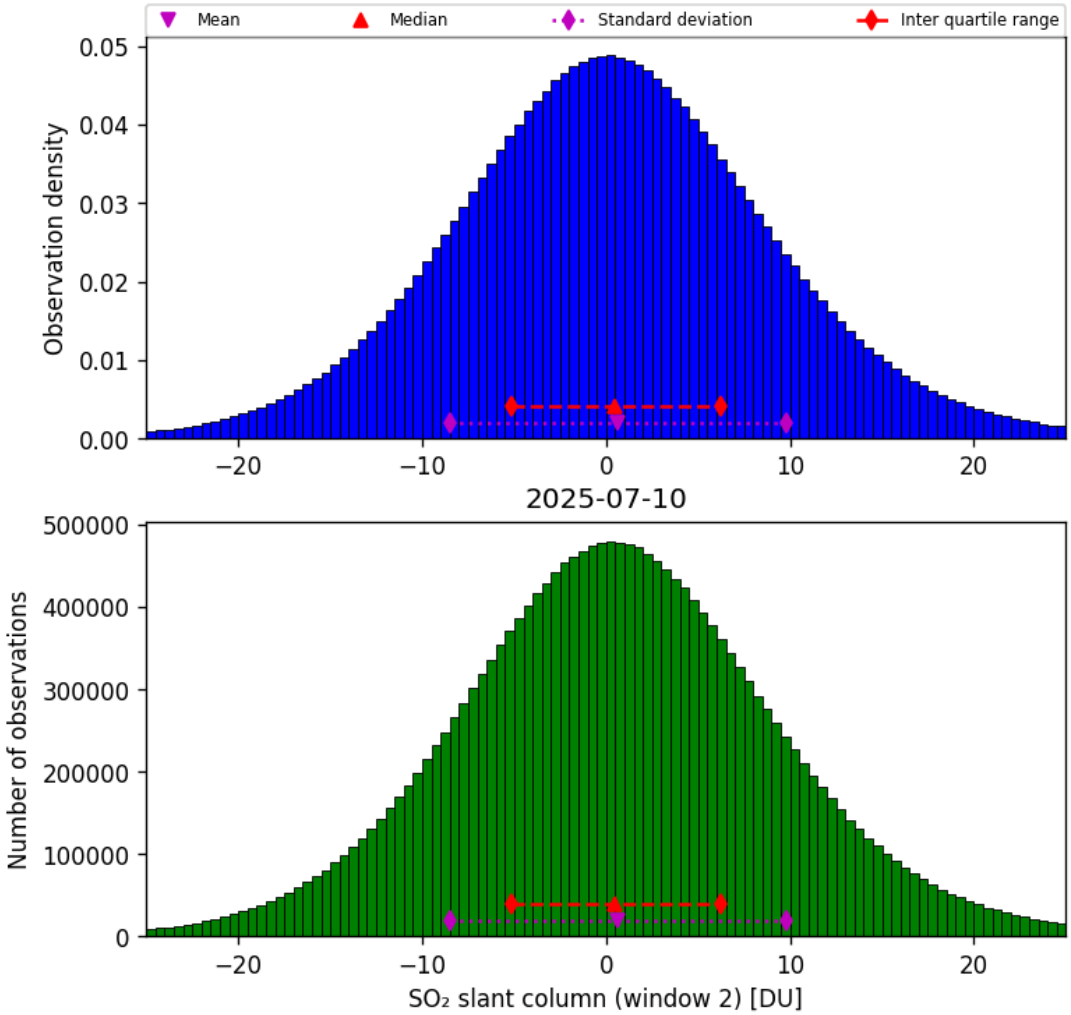

Figure 67: Histogram of "SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11

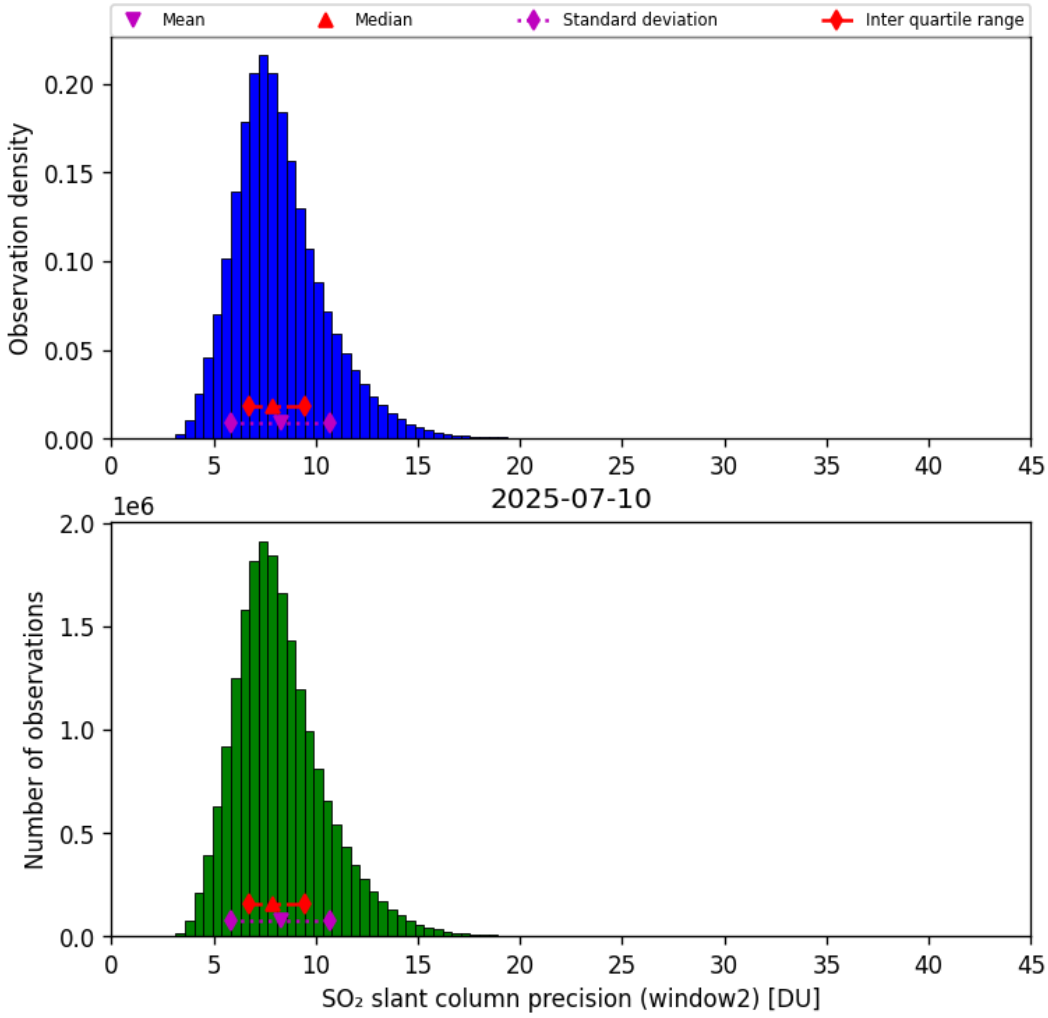

Figure 68: Histogram of "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11

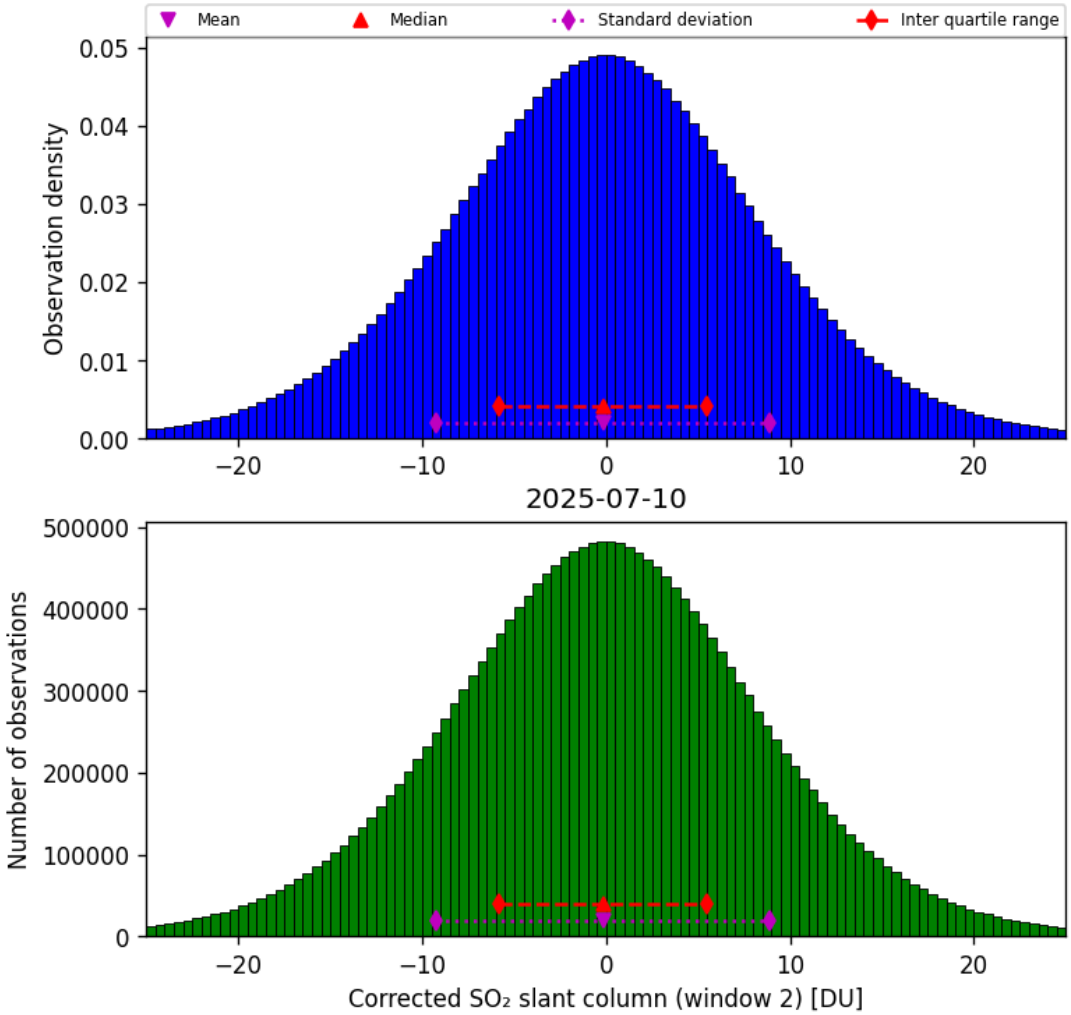

Figure 69: Histogram of "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11

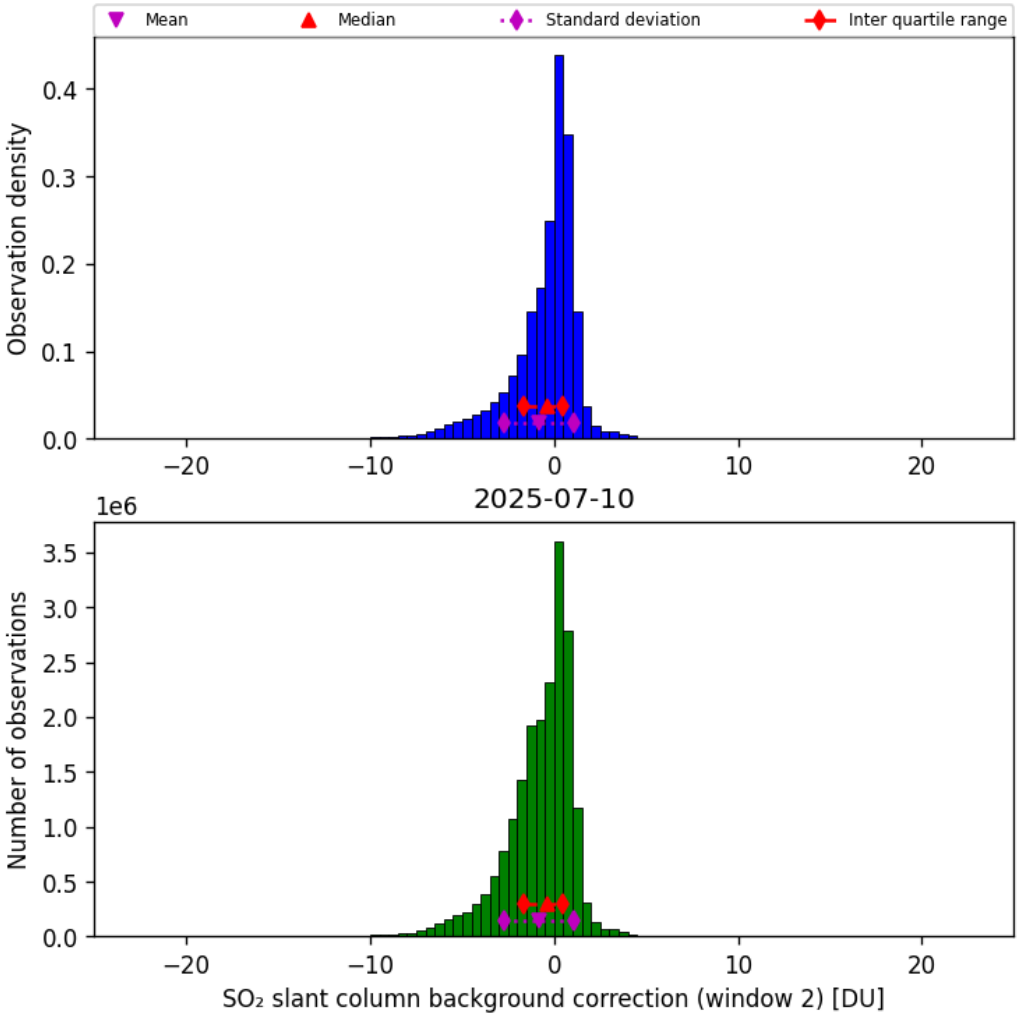

Figure 70: Histogram of "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11

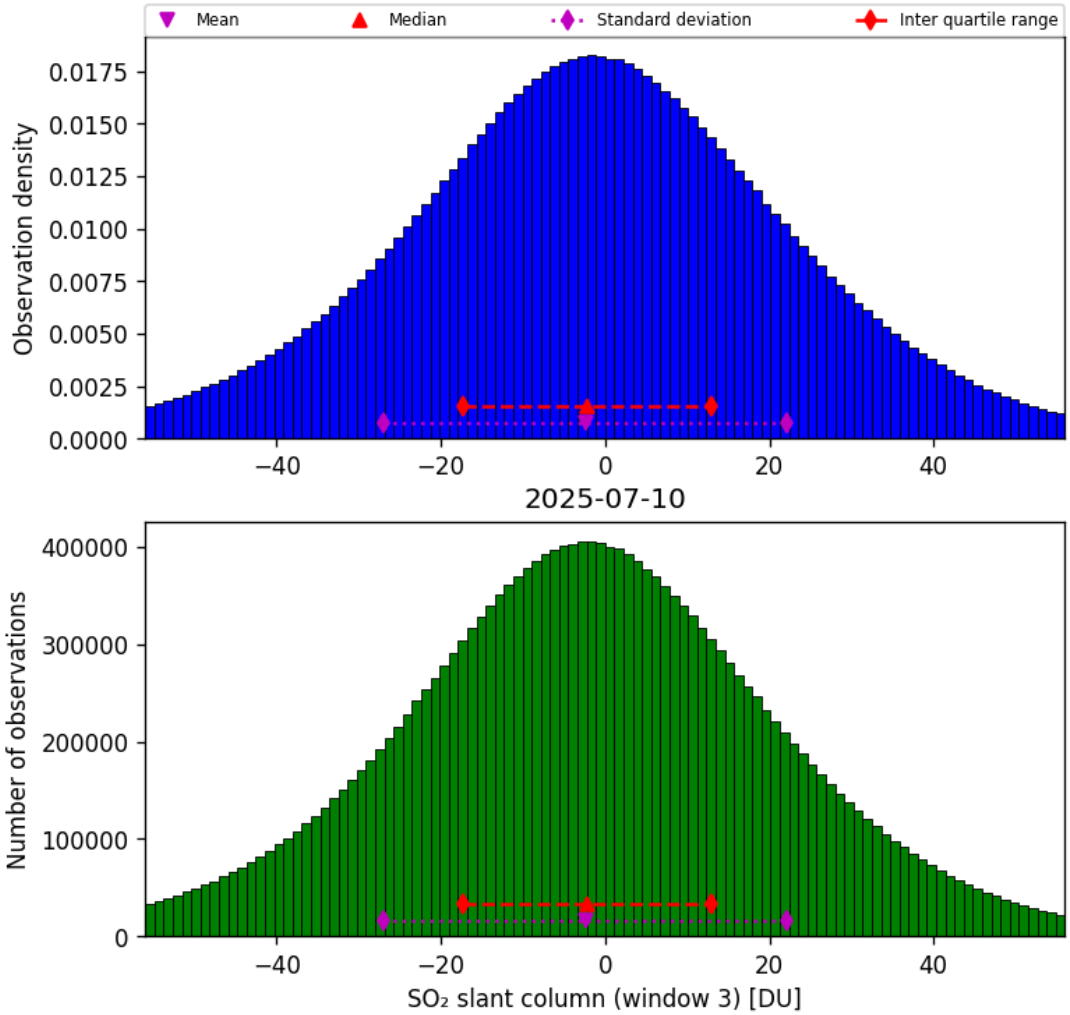

Figure 71: Histogram of "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11

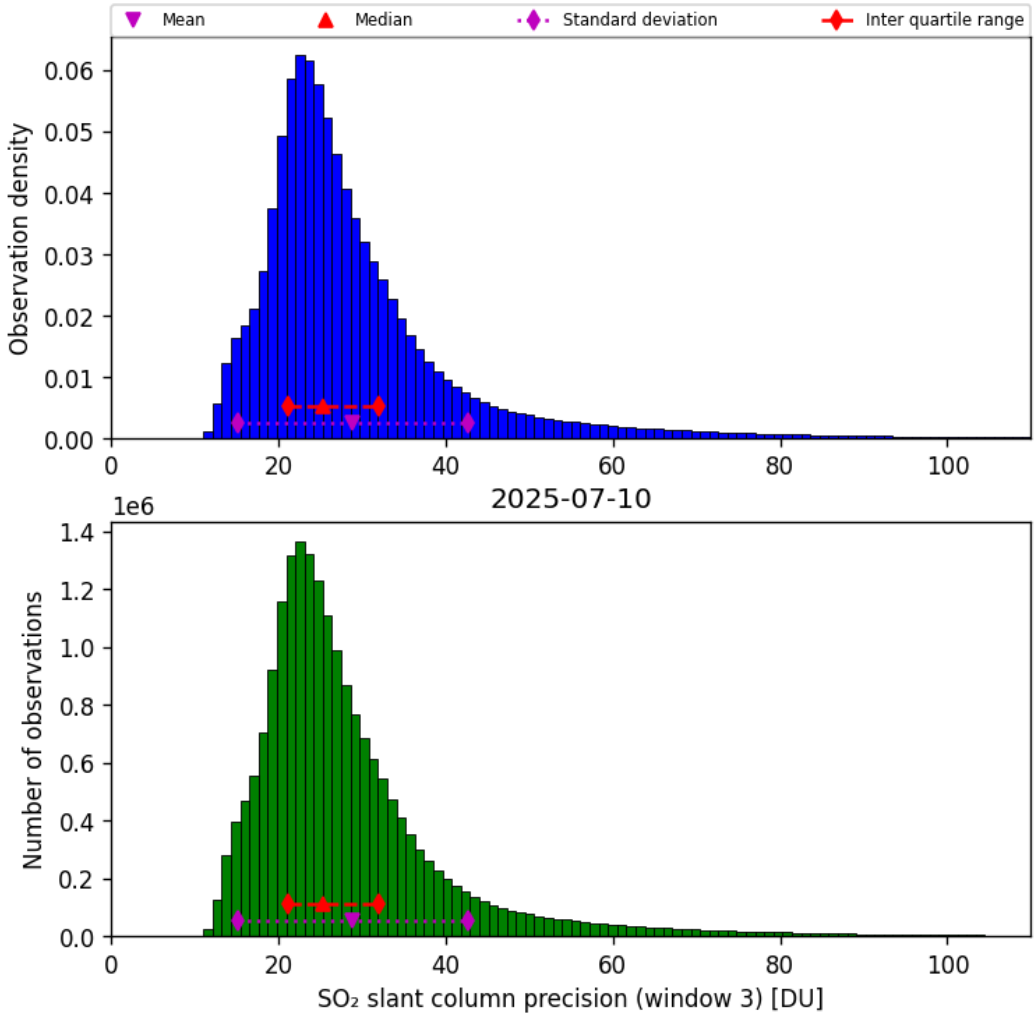

Figure 72: Histogram of "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11

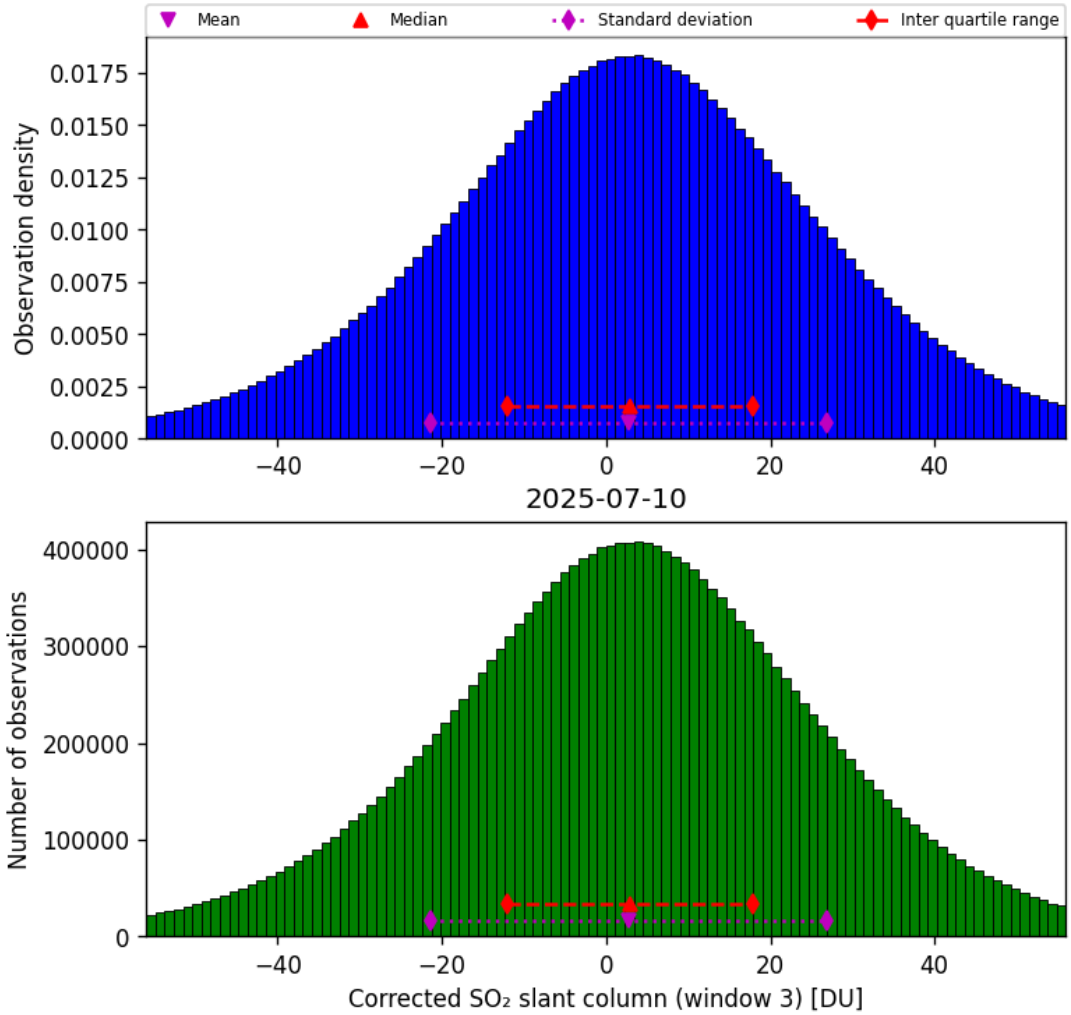

Figure 73: Histogram of "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11

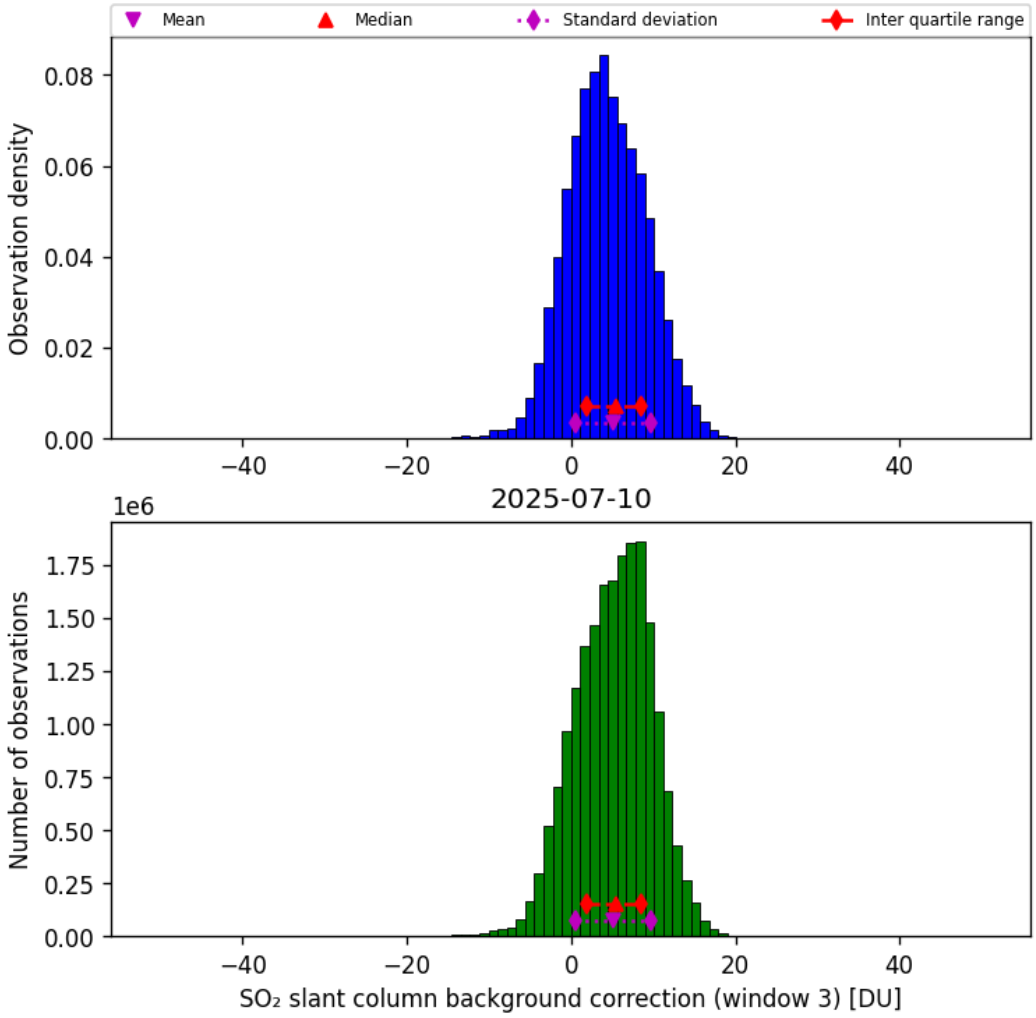

Figure 74: Histogram of "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11

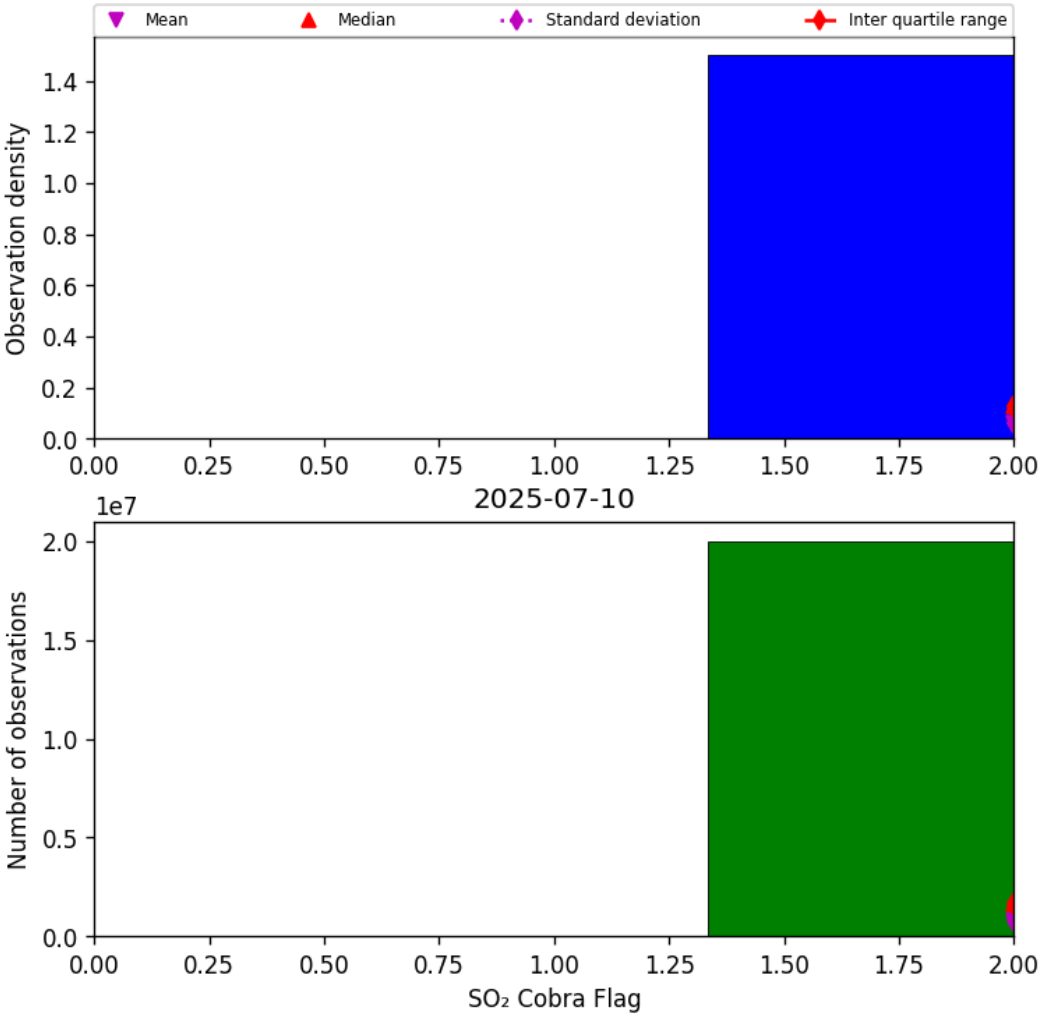

Figure 75: Histogram of "SO_2 Cobra Flag" for 2025-07-09 to 2025-07-11

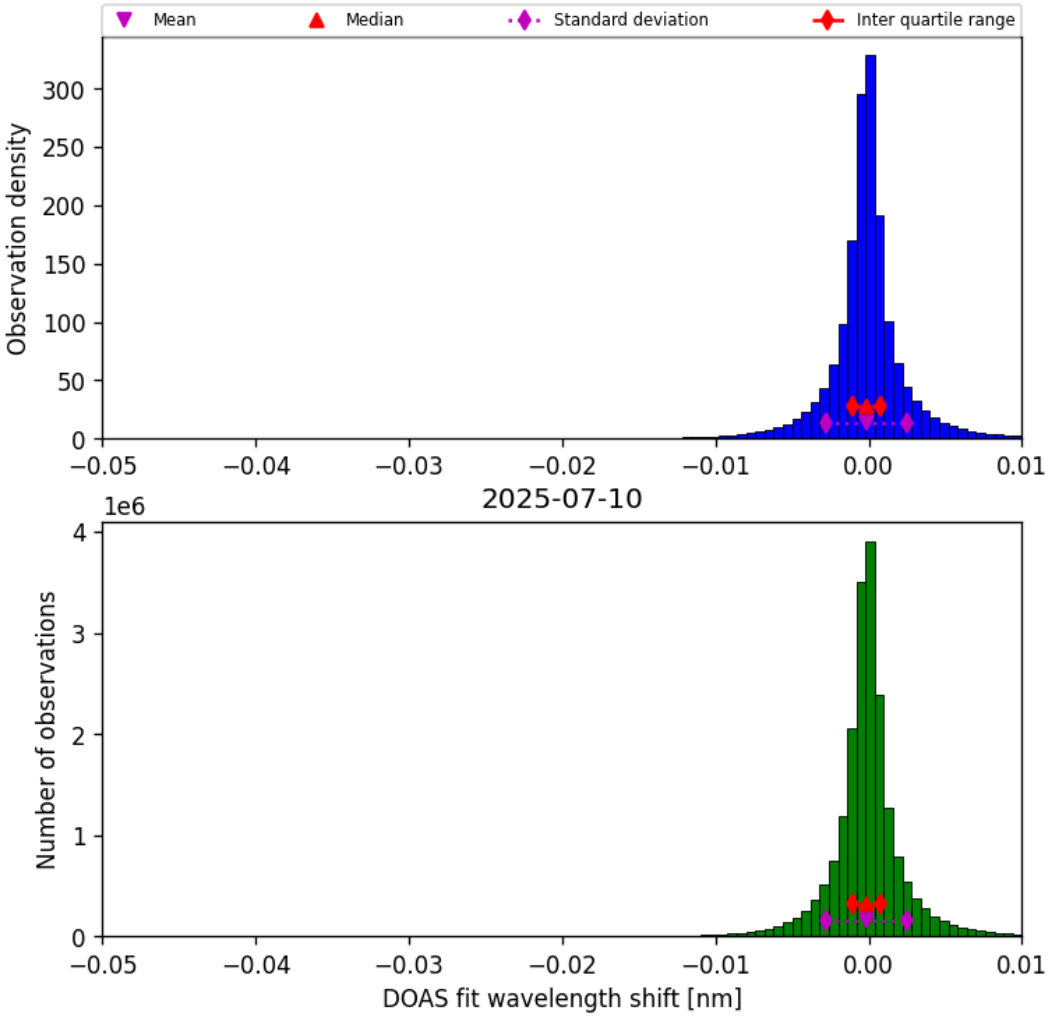

Figure 76: Histogram of “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11

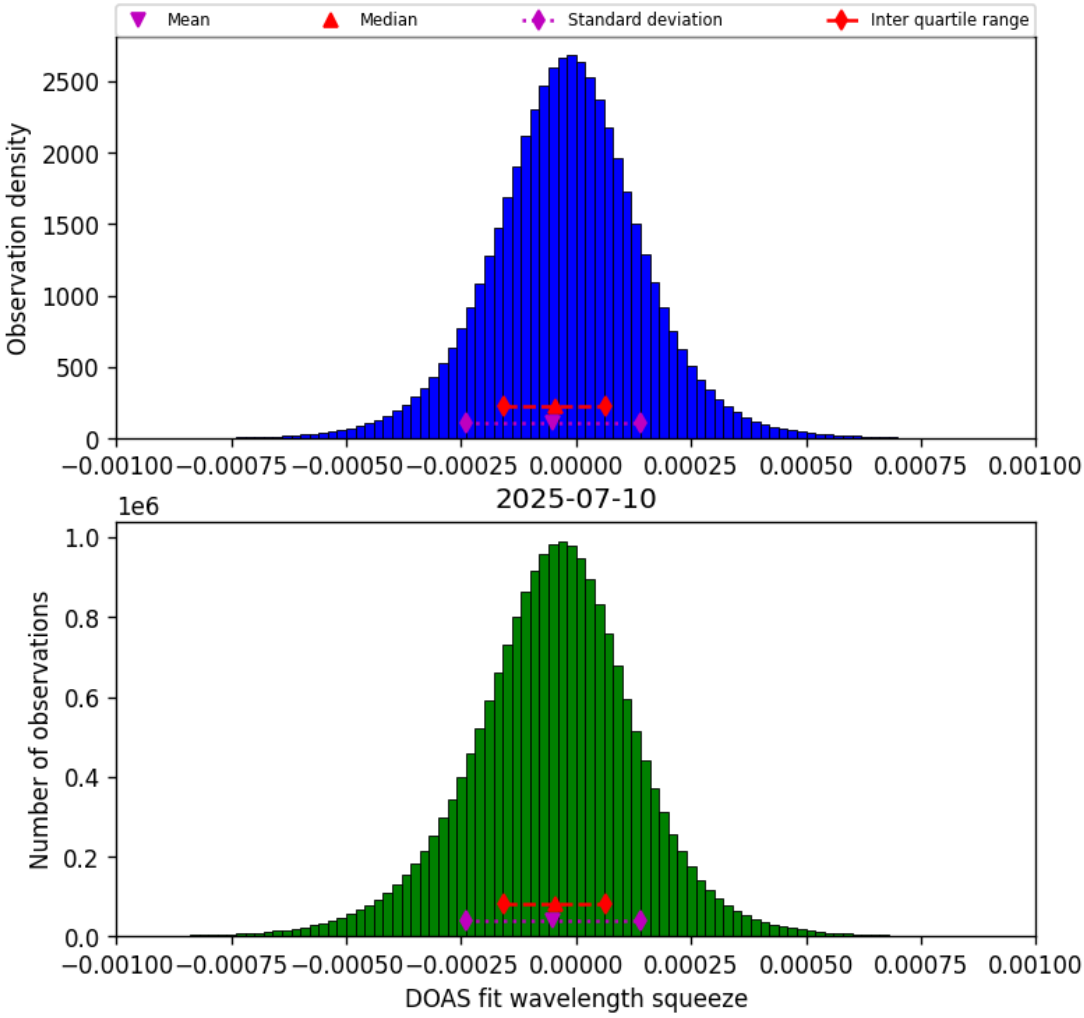

Figure 77: Histogram of “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11

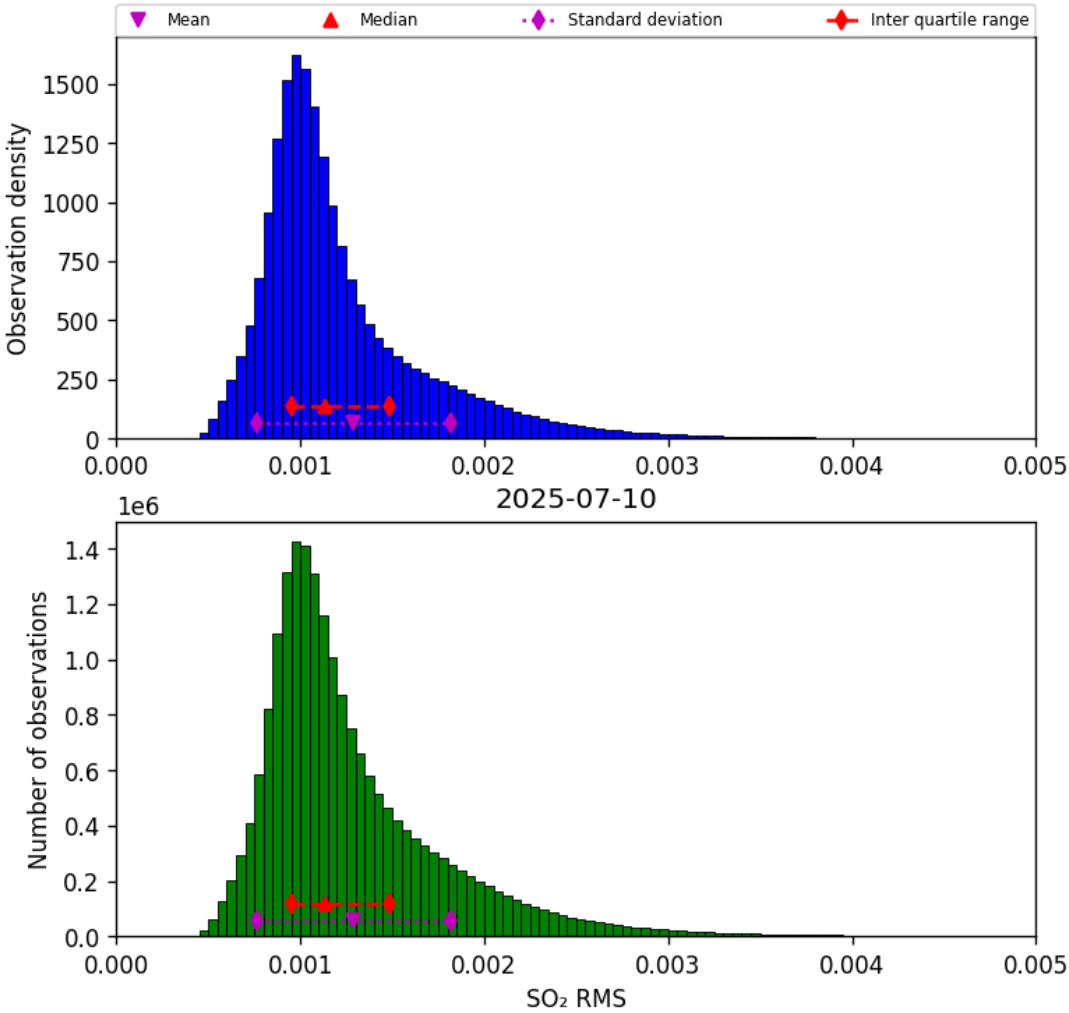

Figure 78: Histogram of "SO_2 RMS" for 2025-07-09 to 2025-07-11

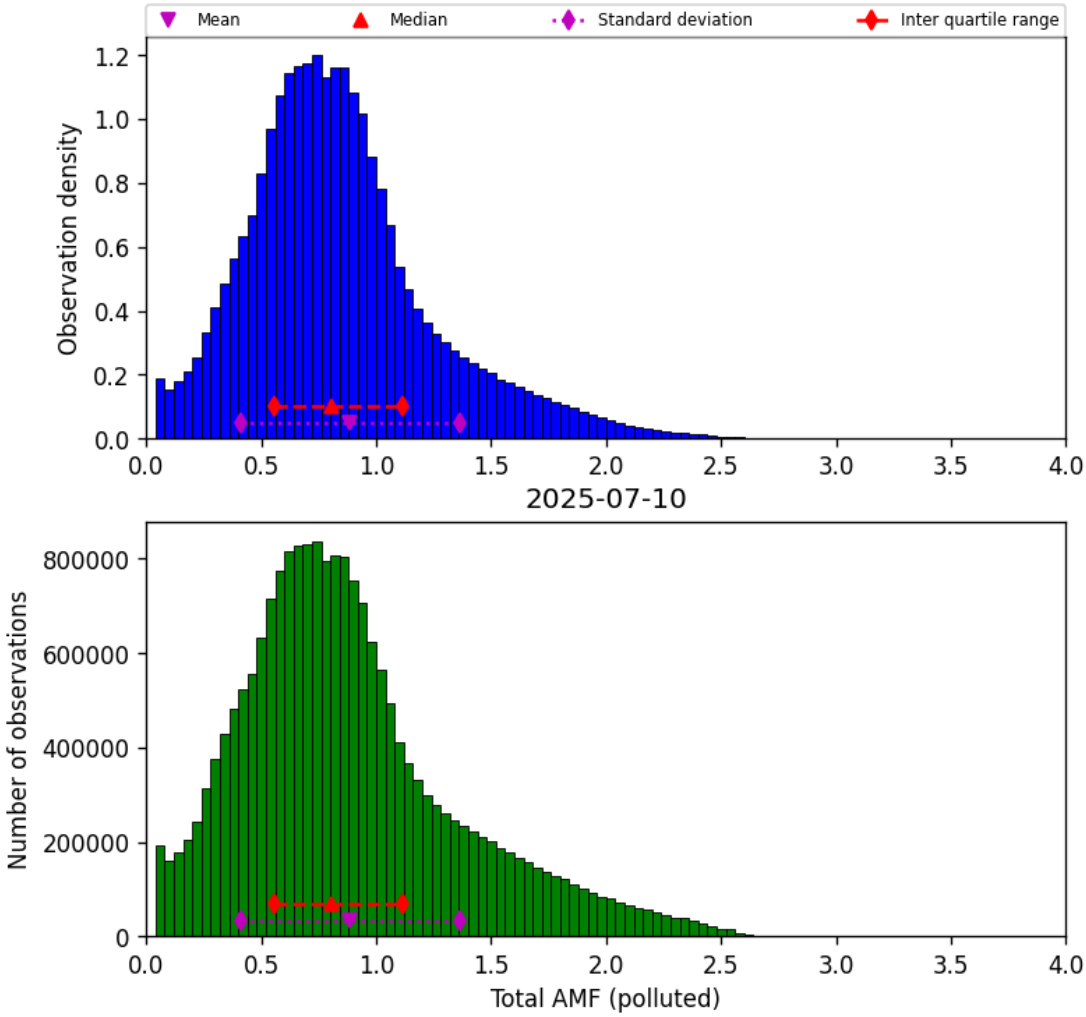

Figure 79: Histogram of “Total AMF (polluted)” for 2025-07-09 to 2025-07-11

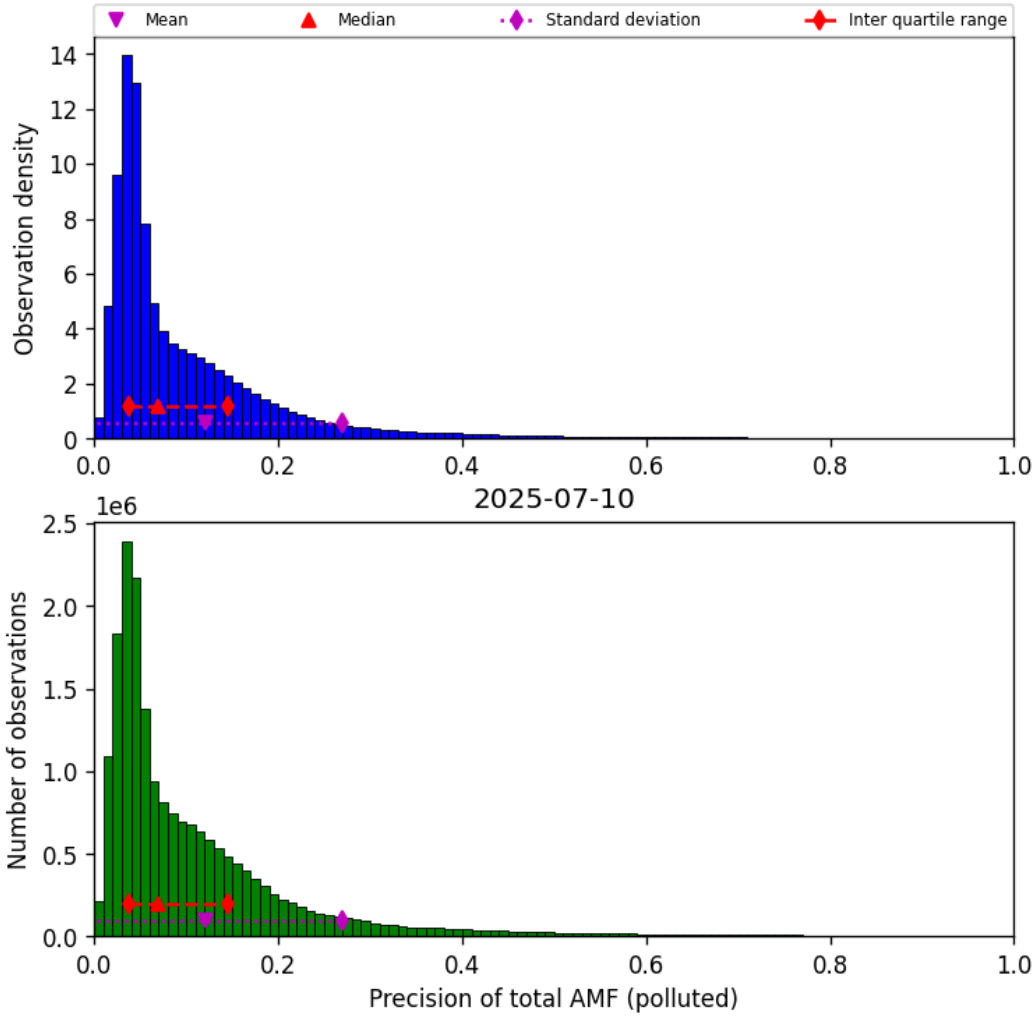

Figure 80: Histogram of “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11

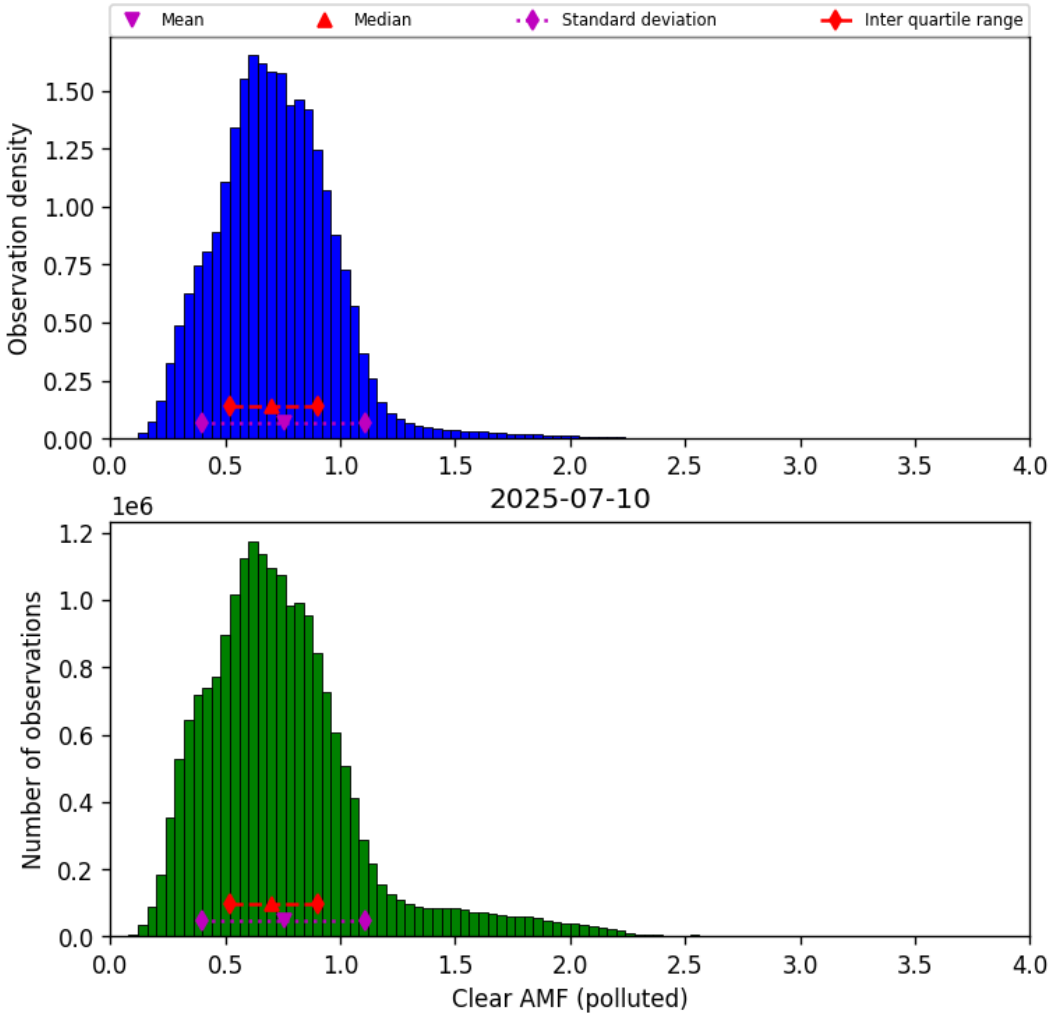

Figure 81: Histogram of “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11

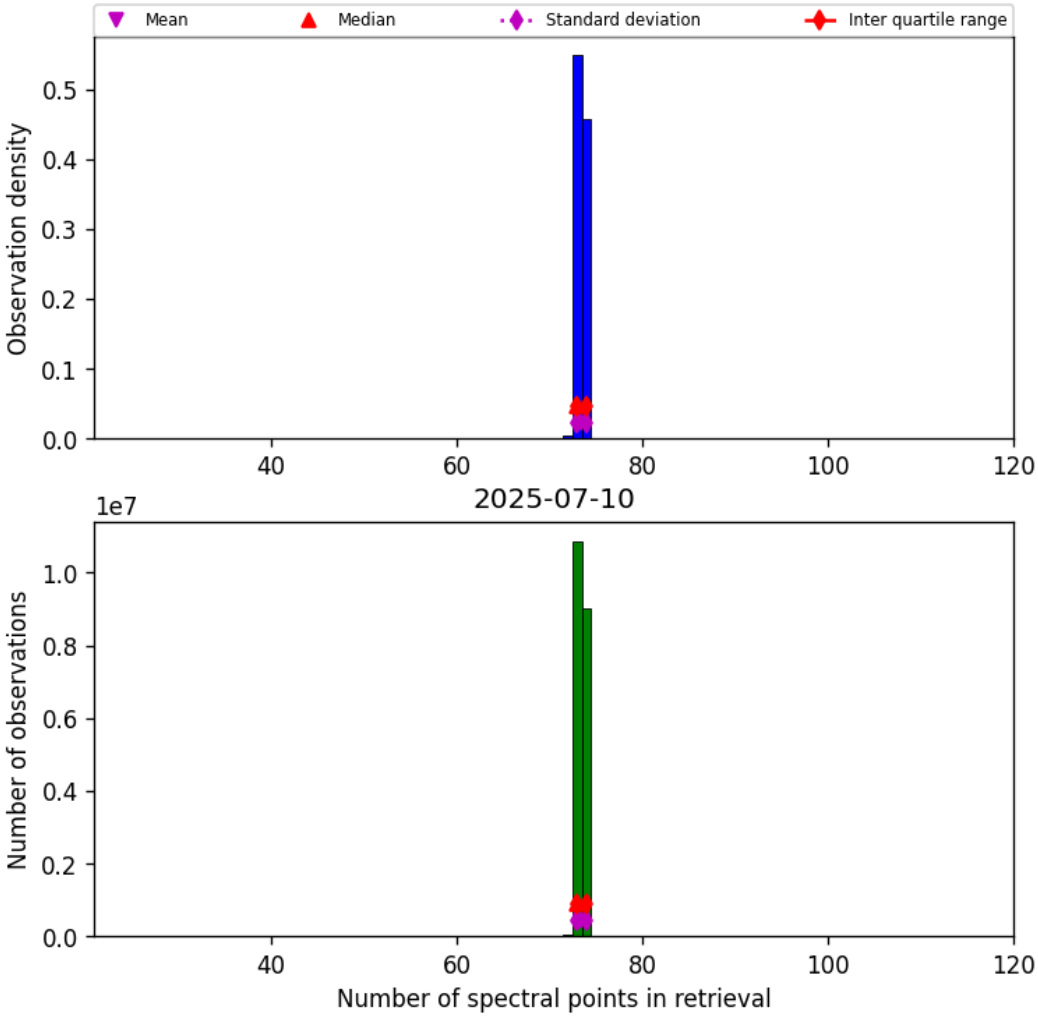

Figure 82: Histogram of “Number of spectral points in retrieval” for 2025-07-09 to 2025-07-11

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.

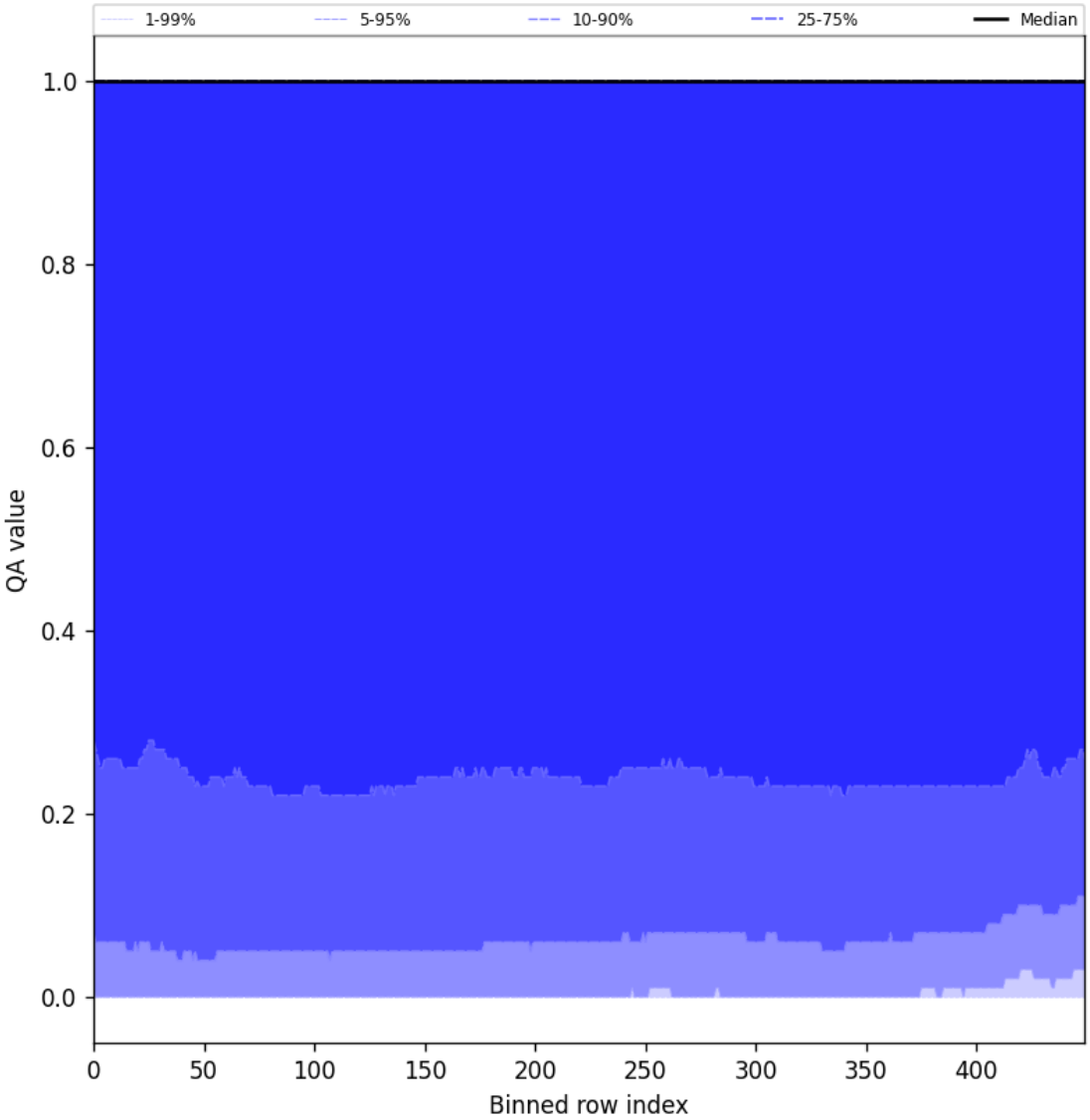

Figure 83: Along track statistics of “QA value” for 2025-07-09 to 2025-07-11

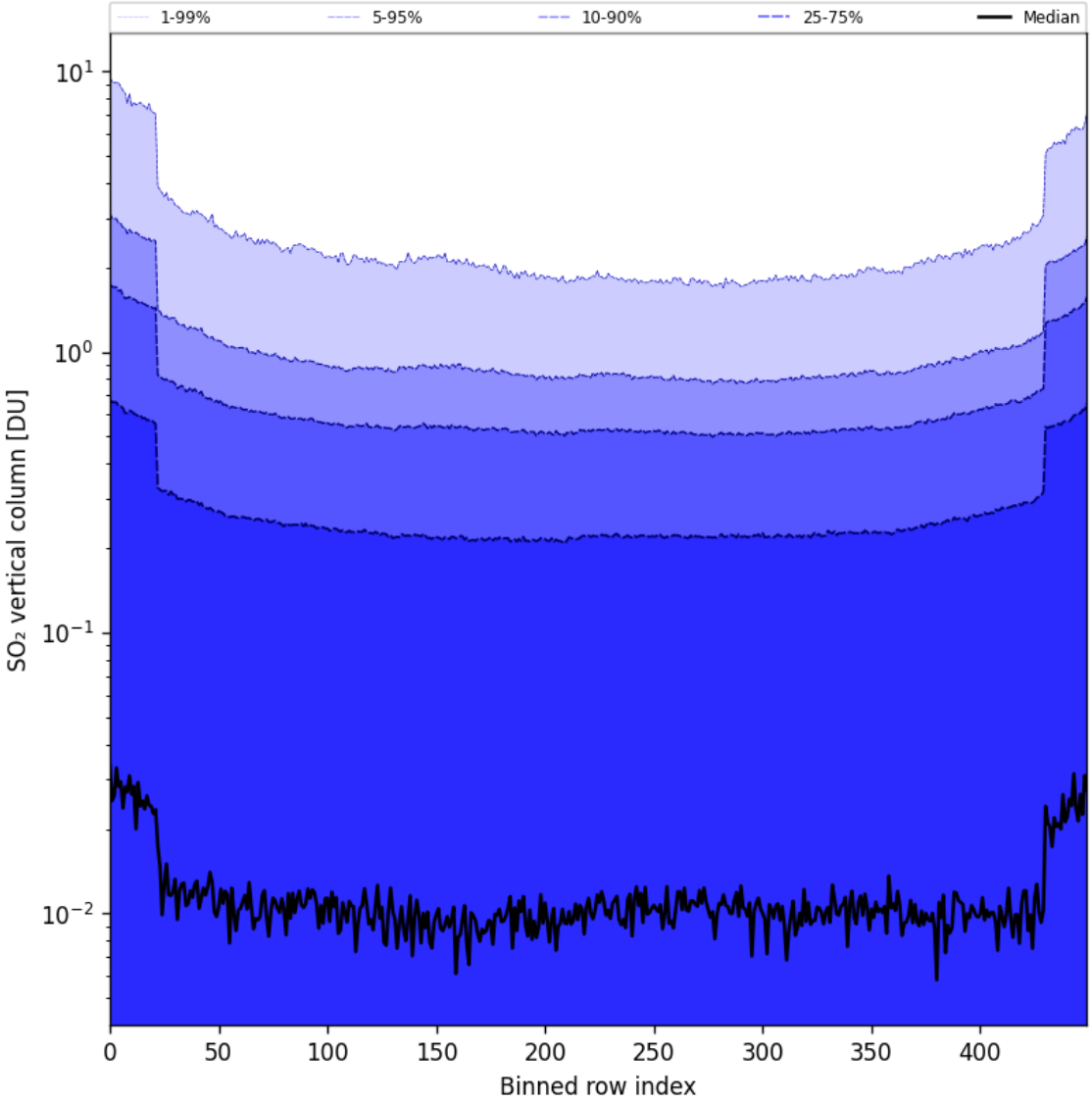

Figure 84: Along track statistics of "SO_2 vertical column" for 2025-07-09 to 2025-07-11

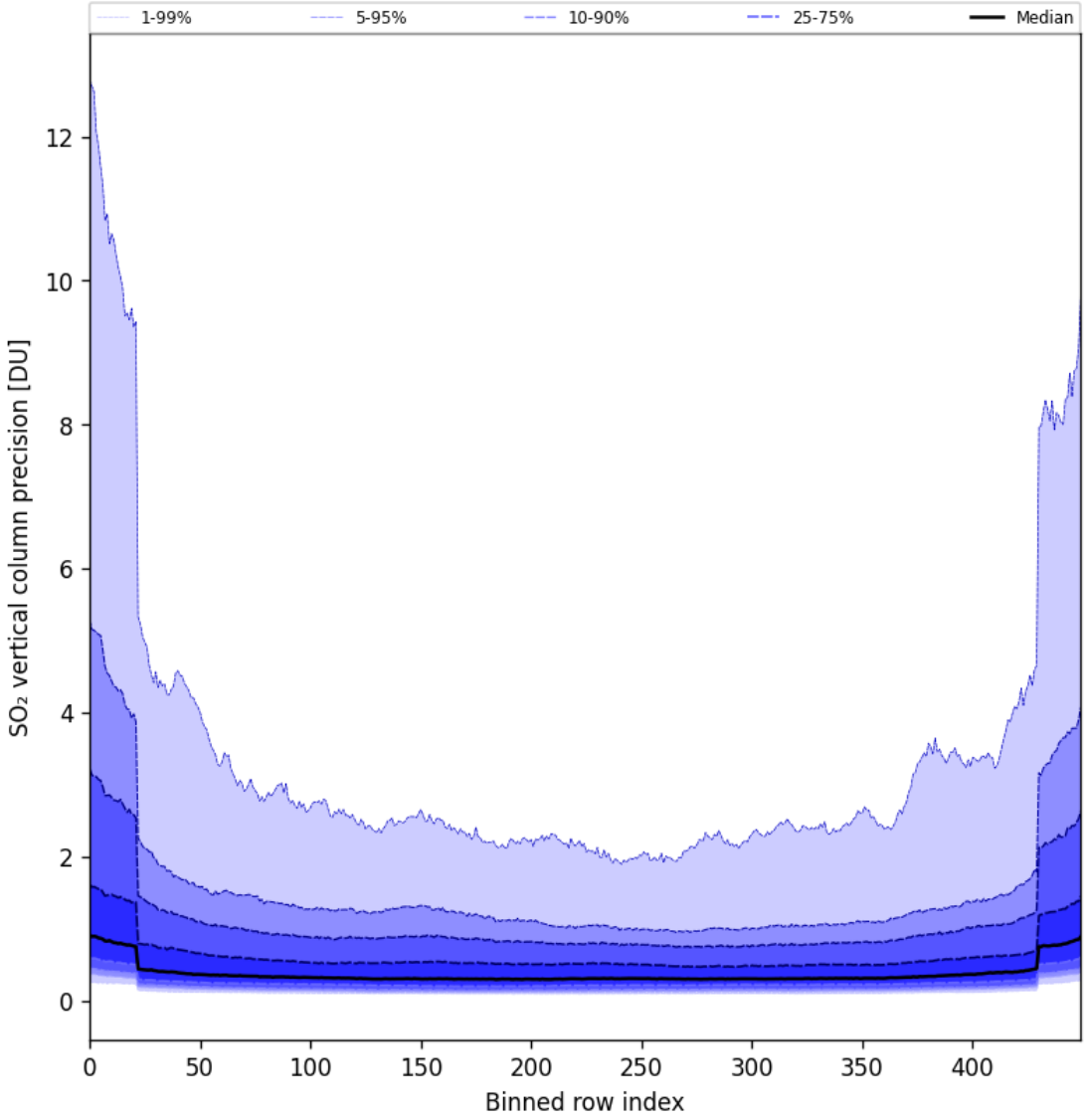

Figure 85: Along track statistics of "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11

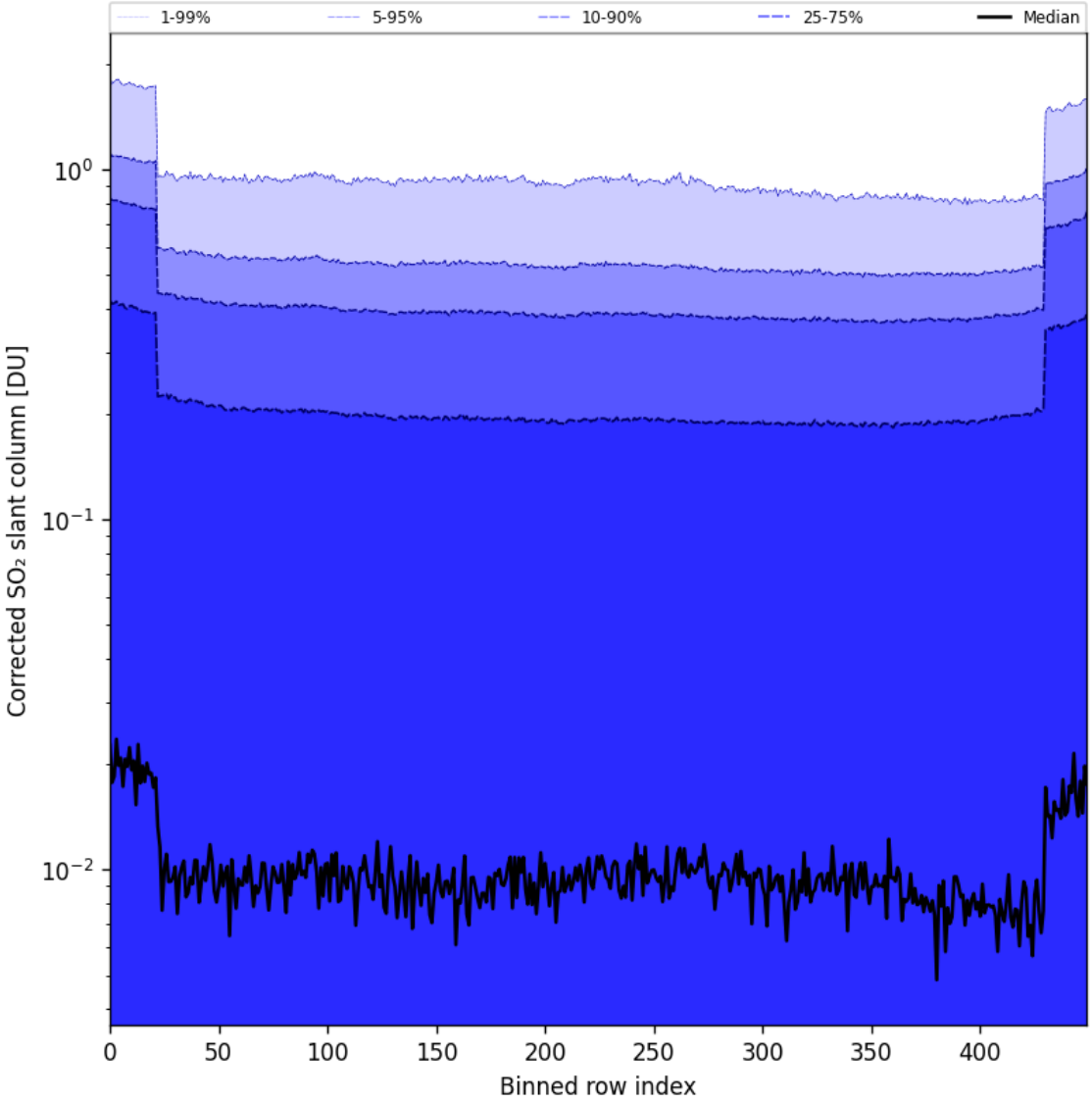

Figure 86: Along track statistics of "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11

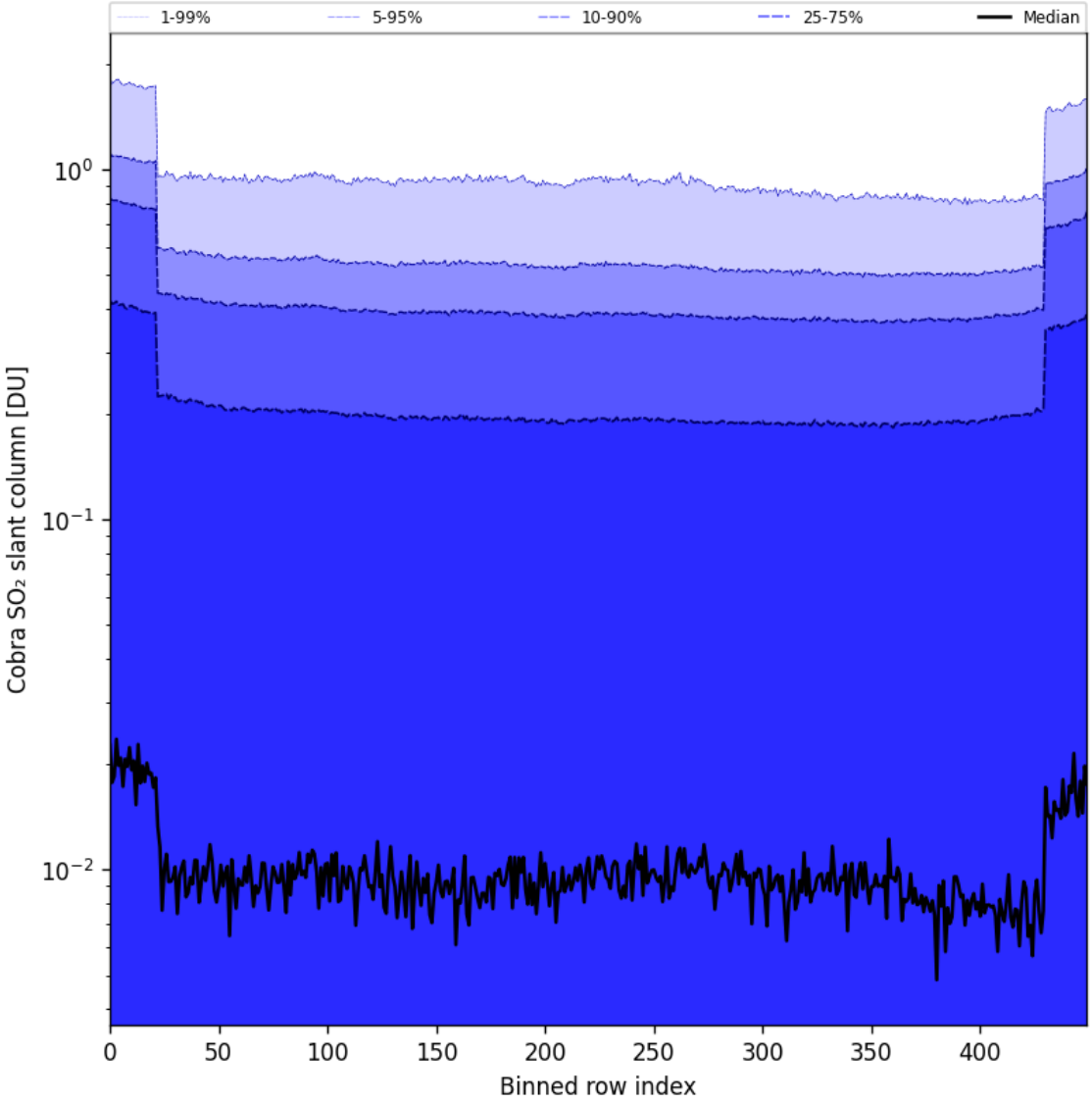

Figure 87: Along track statistics of “Cobra SO_2 slant column” for 2025-07-09 to 2025-07-11

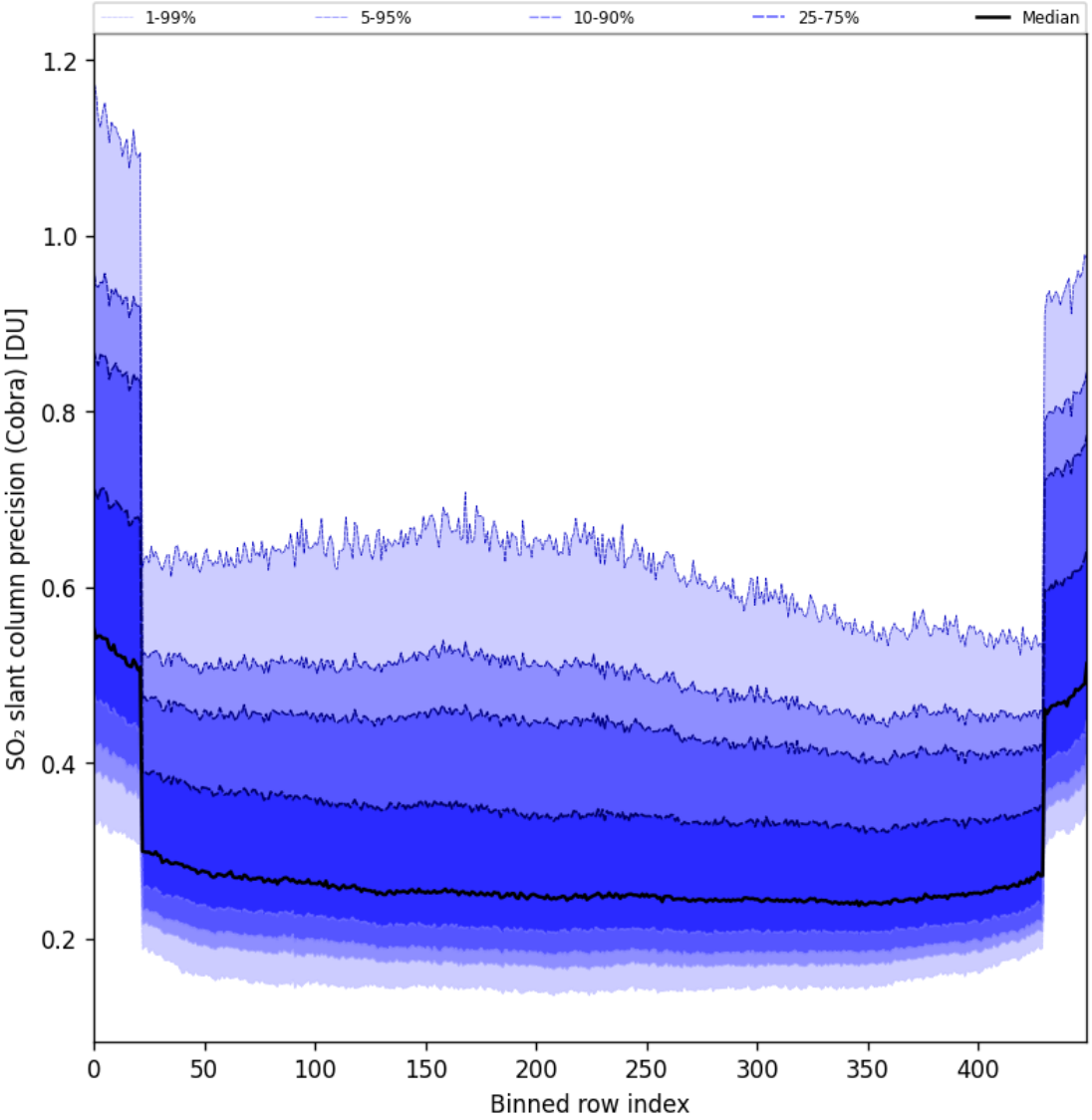

Figure 88: Along track statistics of "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11

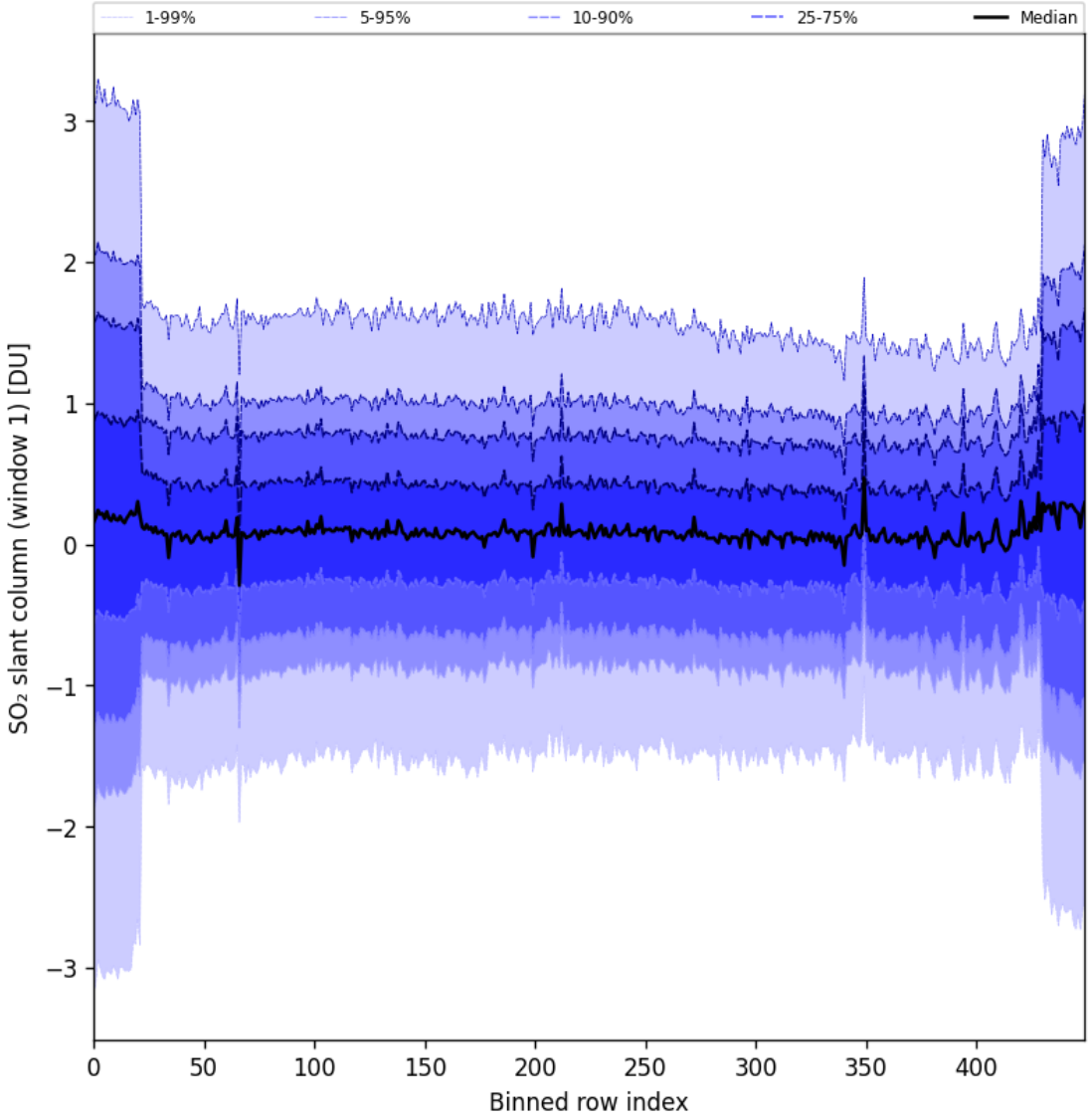

Figure 89: Along track statistics of "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11

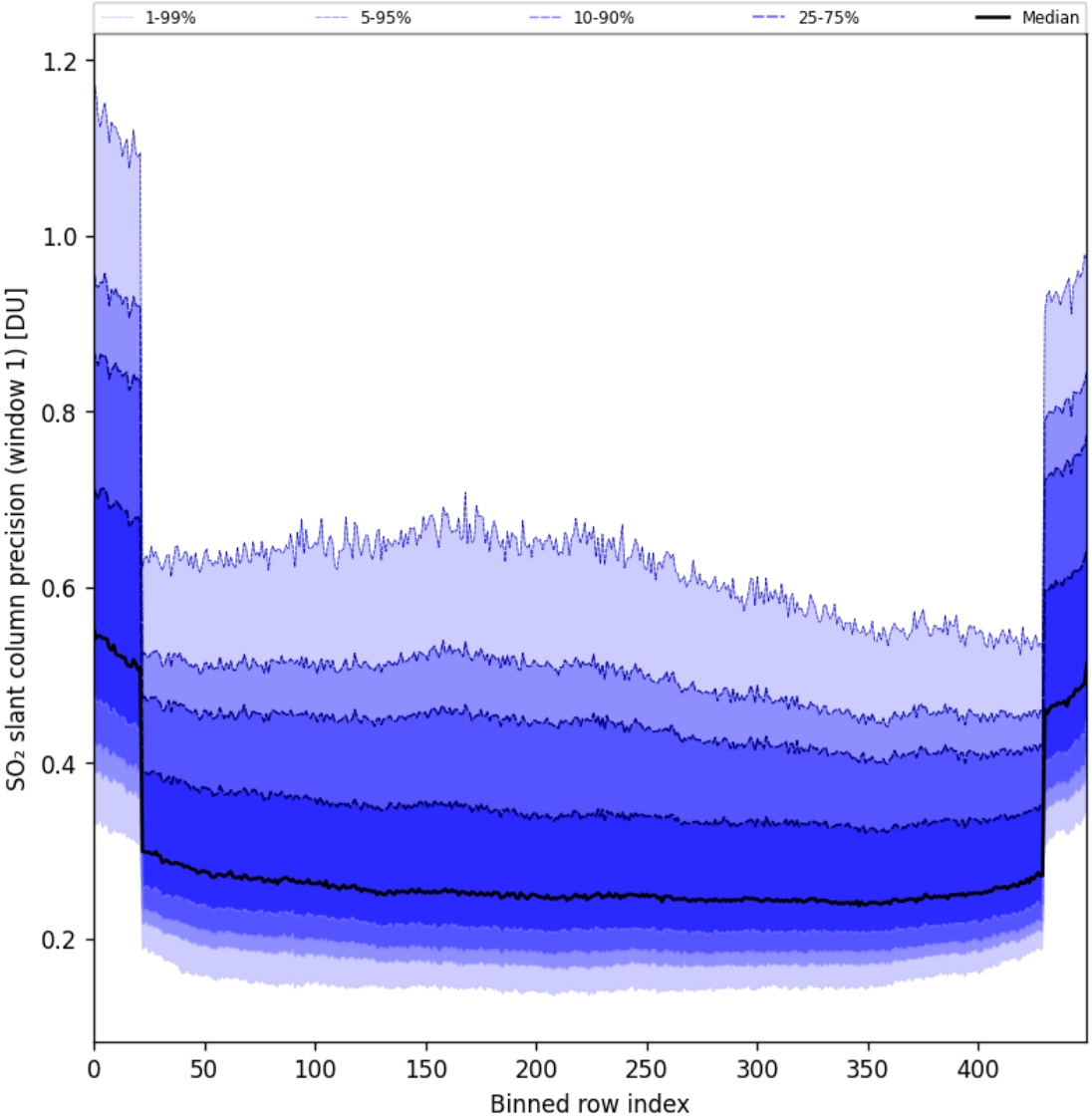

Figure 90: Along track statistics of "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11

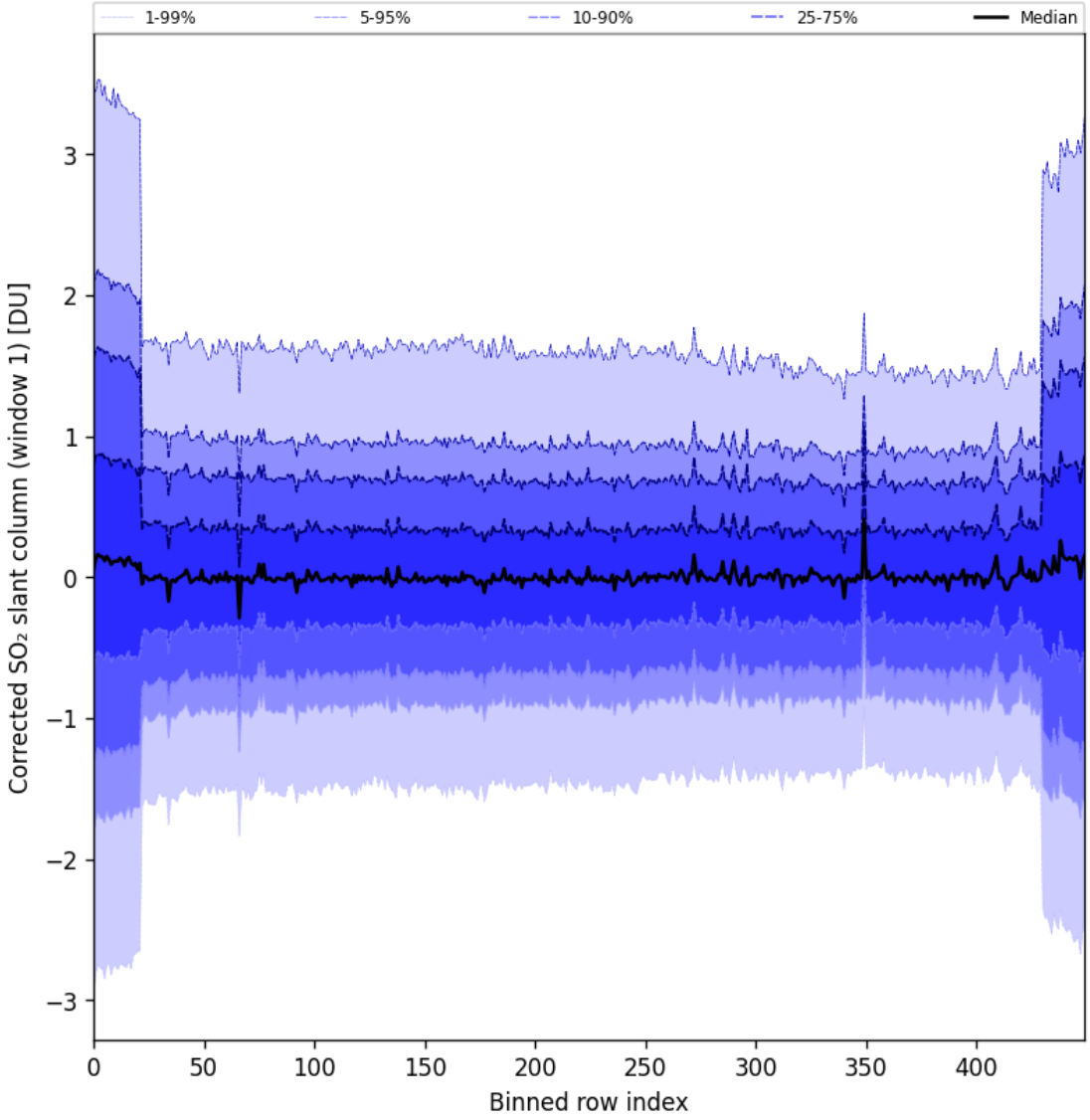

Figure 91: Along track statistics of "Corrected SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11

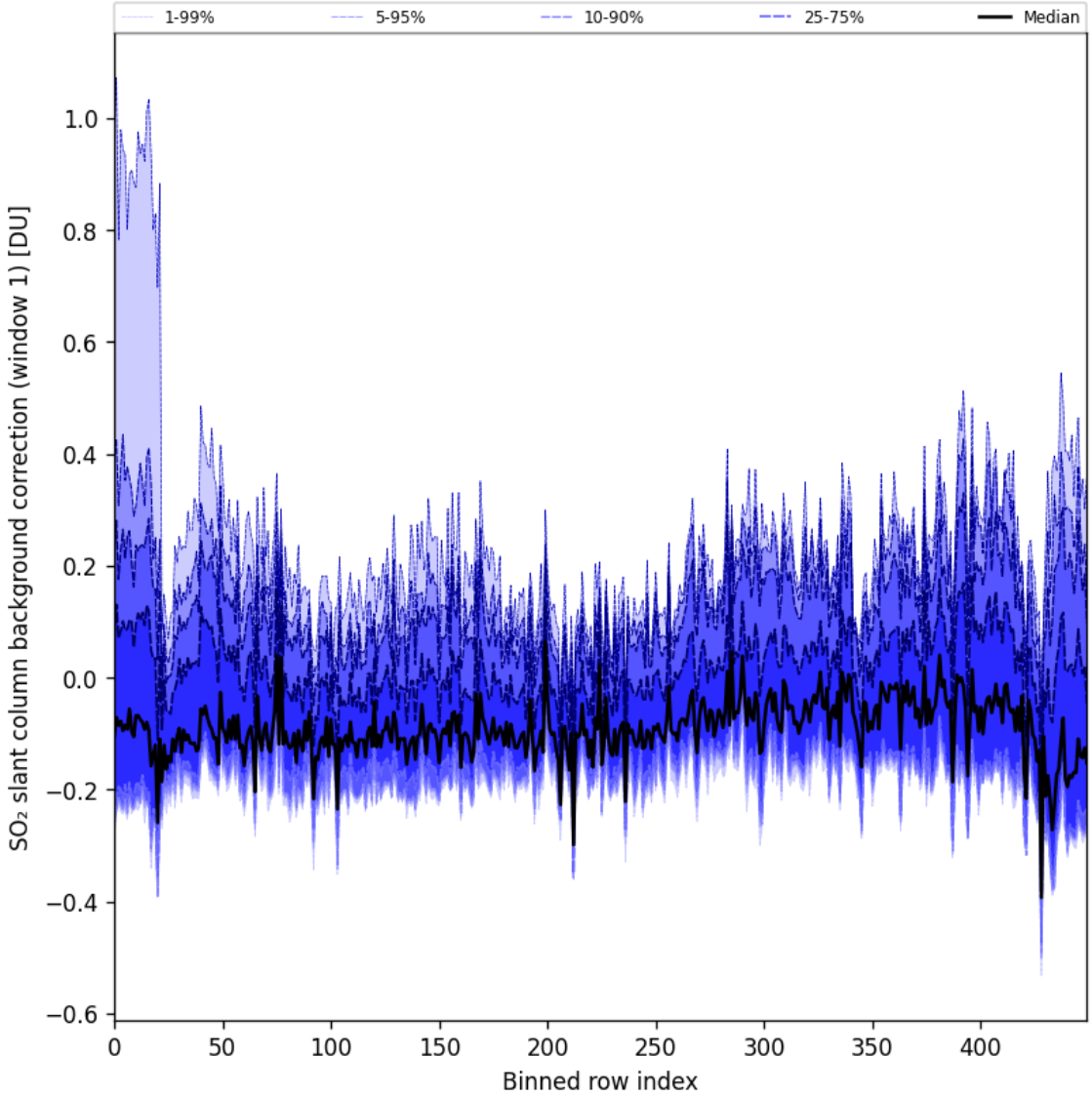

Figure 92: Along track statistics of "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11

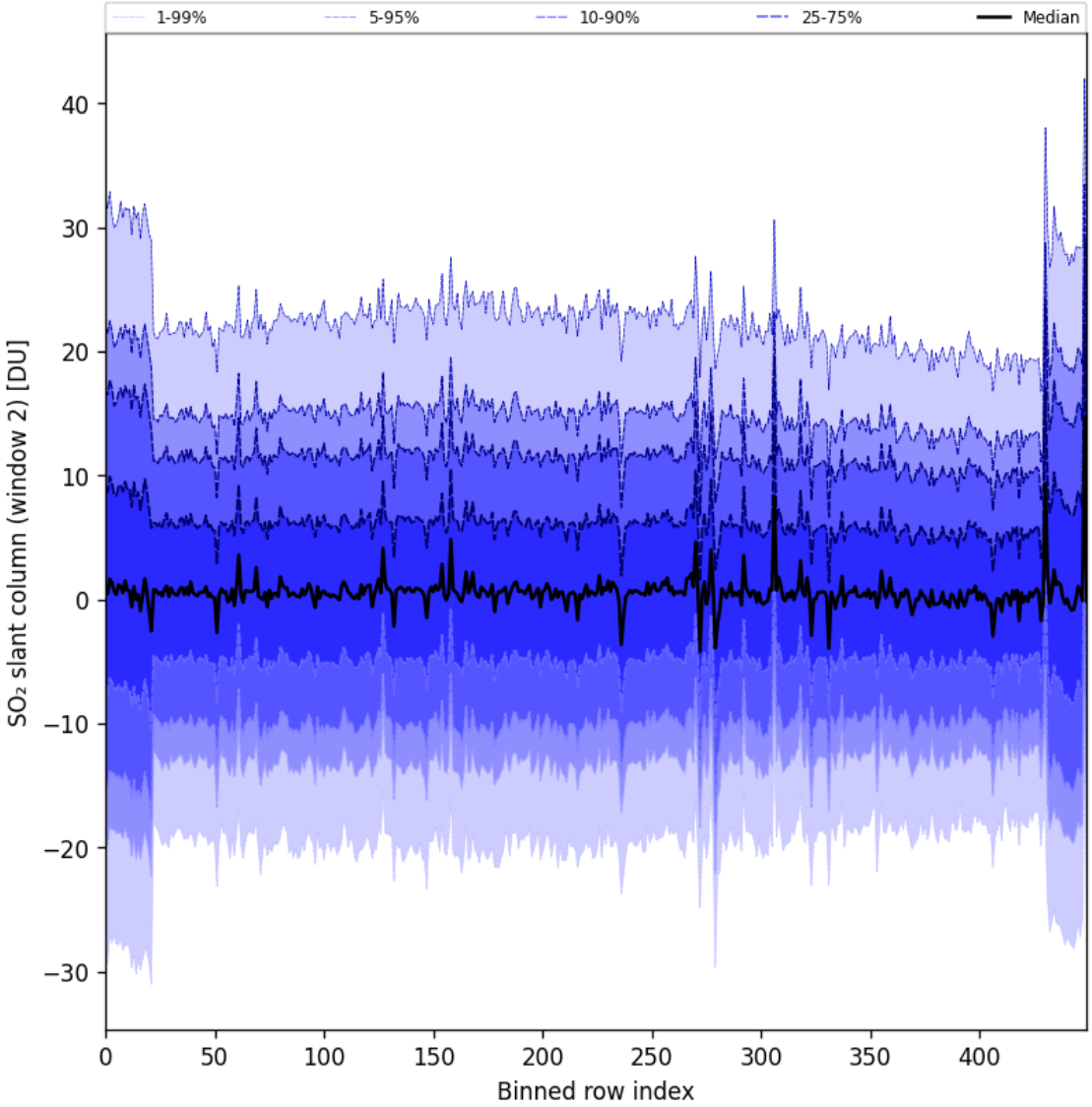

Figure 93: Along track statistics of "SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11

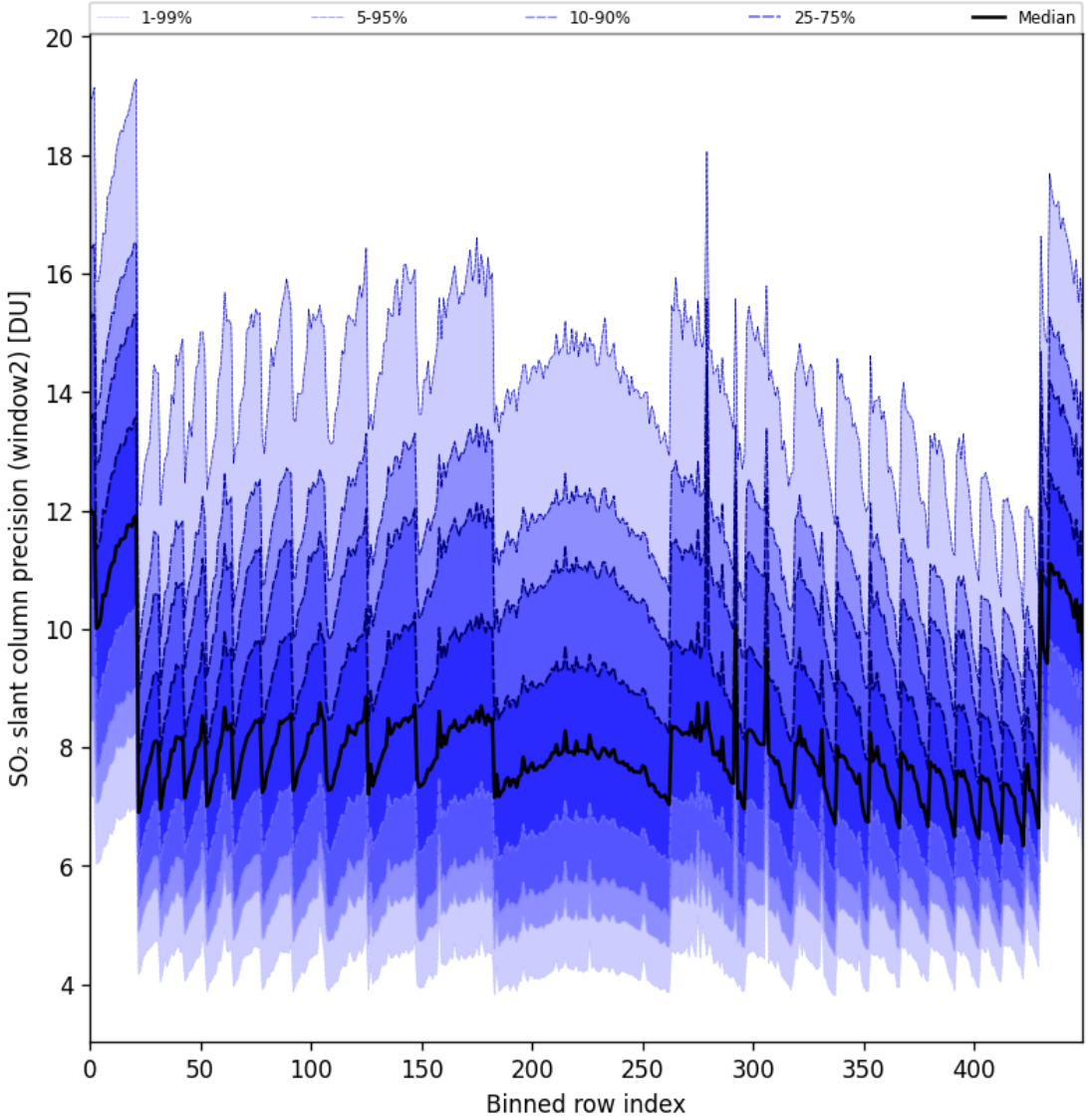

Figure 94: Along track statistics of "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11

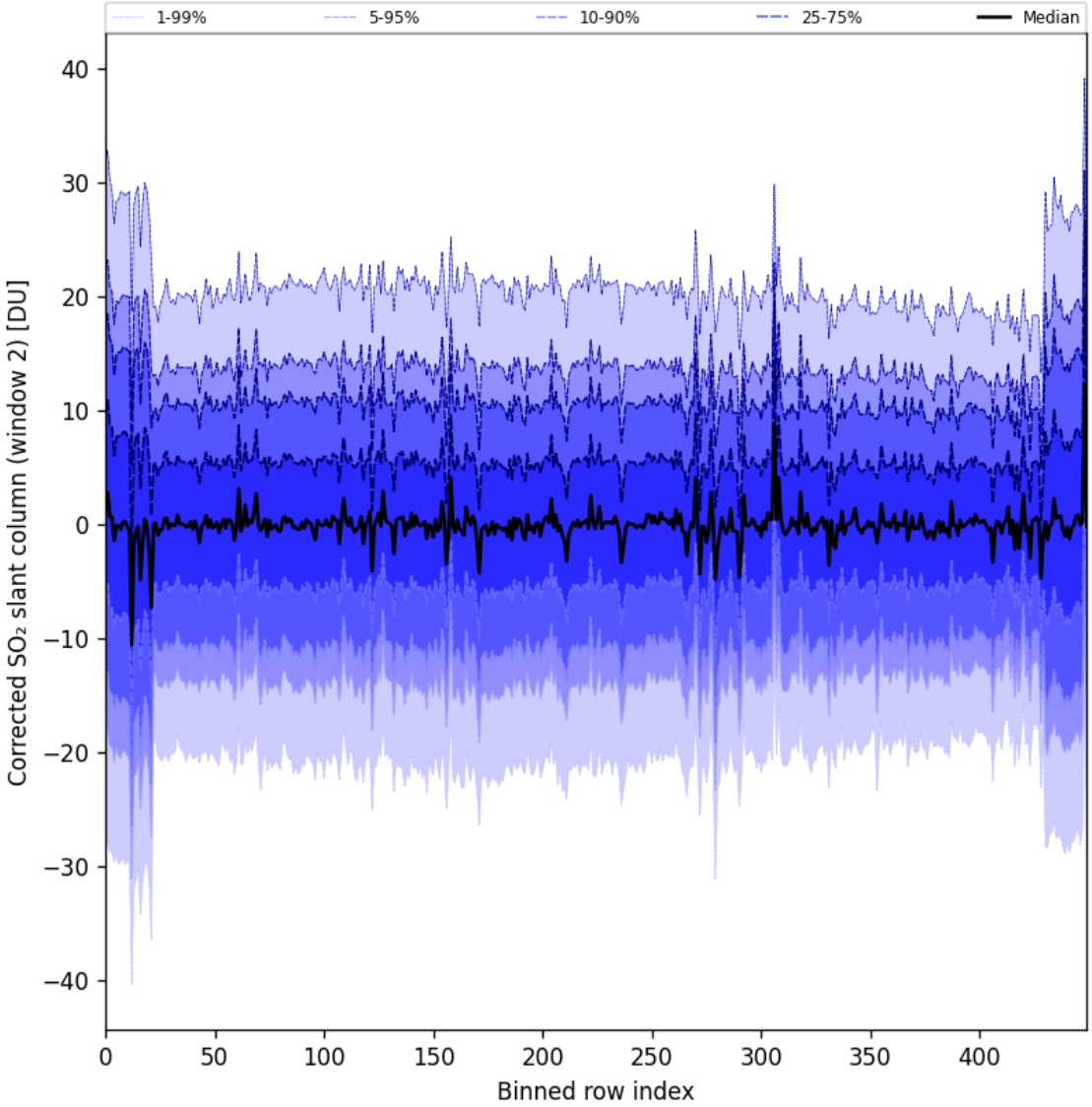

Figure 95: Along track statistics of "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11

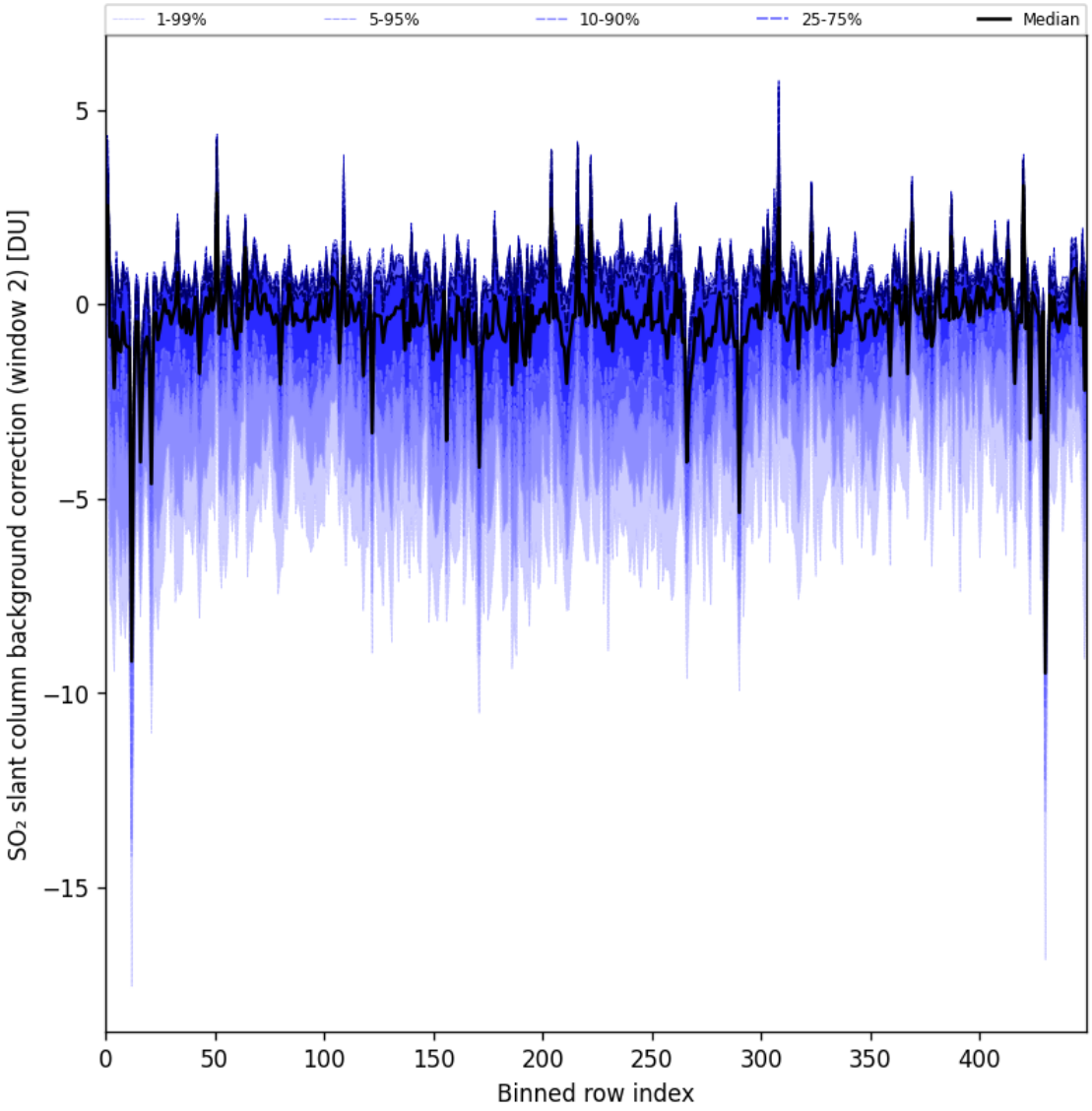

Figure 96: Along track statistics of "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11

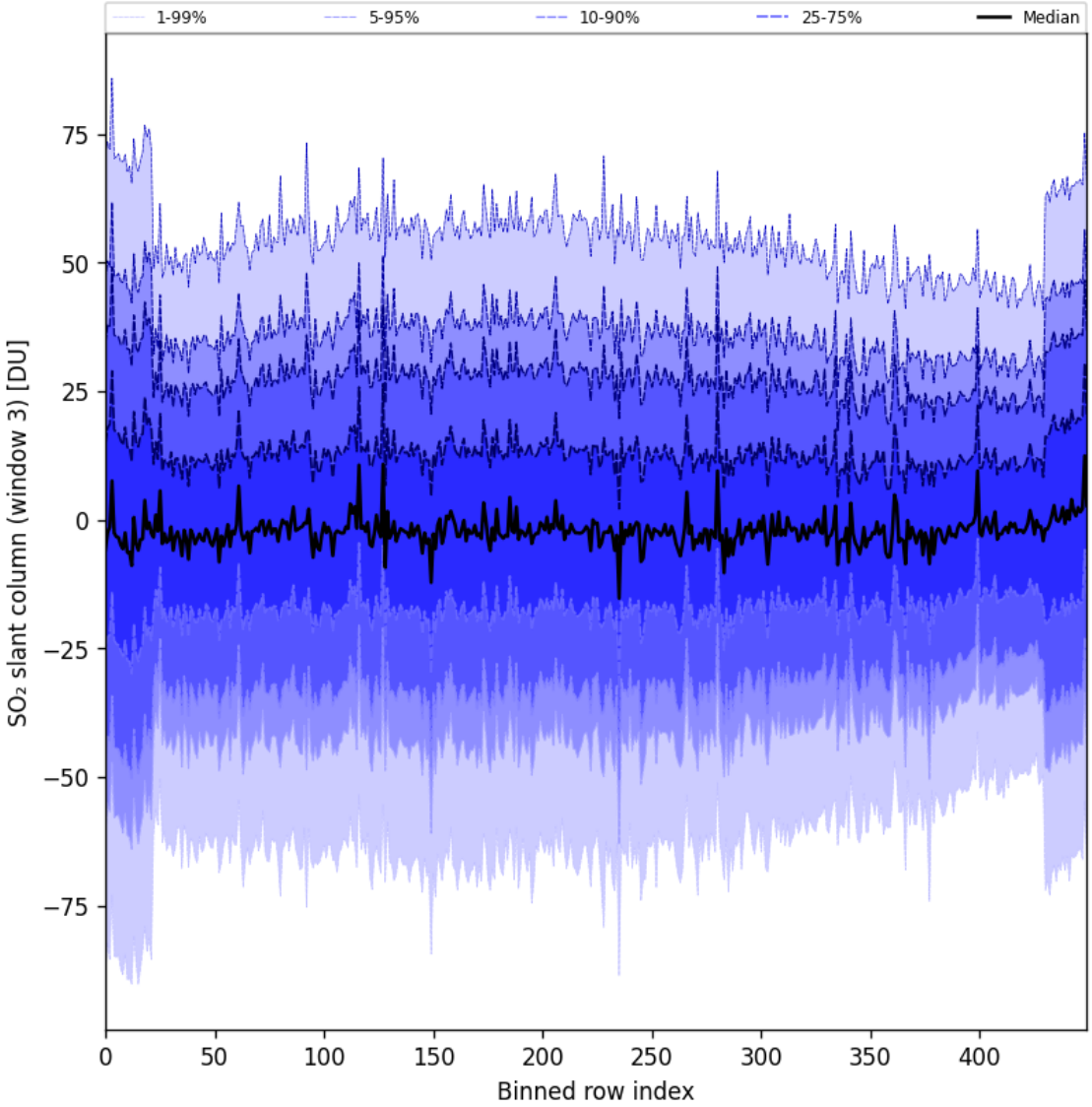

Figure 97: Along track statistics of "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11

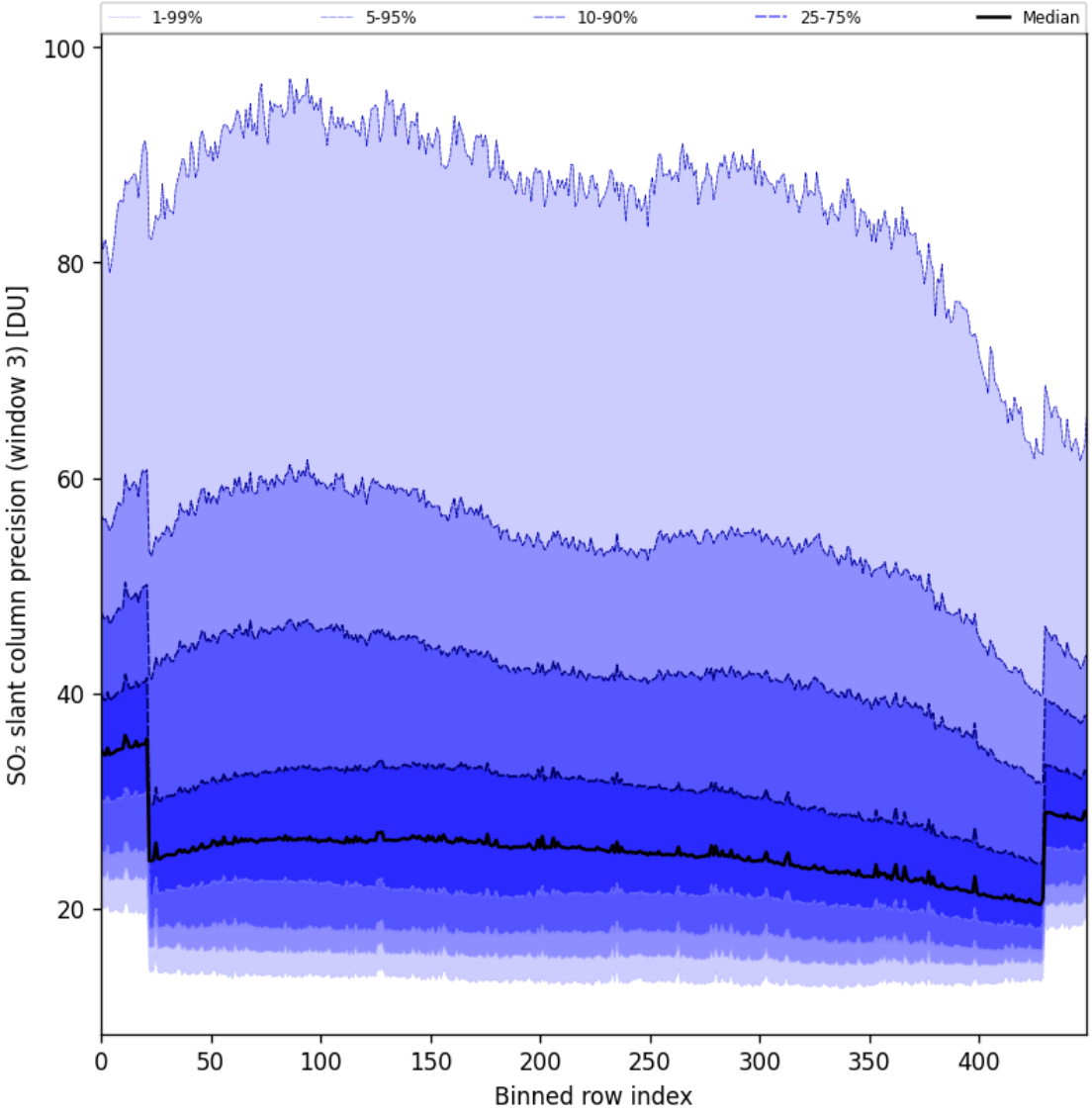

Figure 98: Along track statistics of "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11

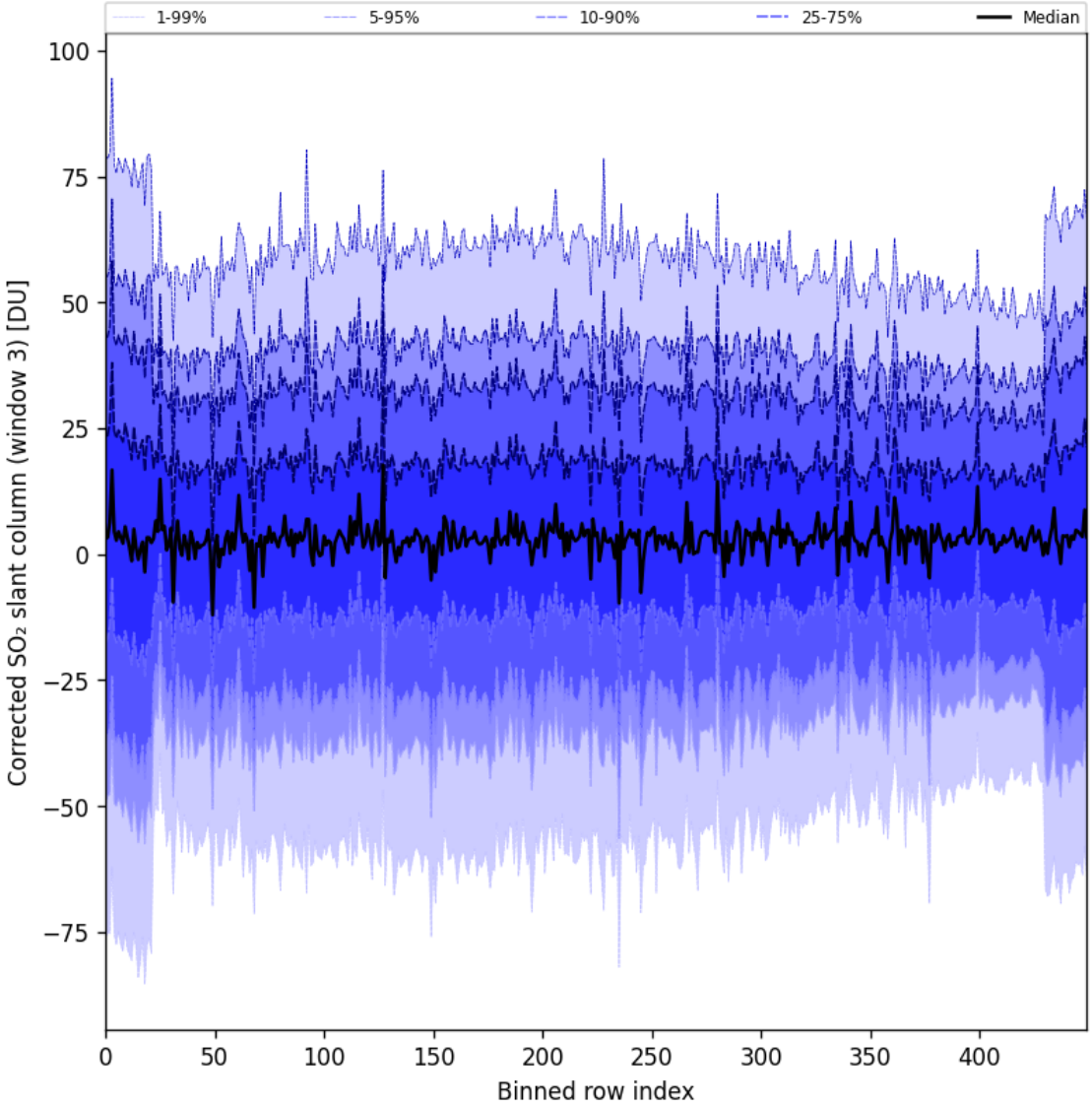

Figure 99: Along track statistics of "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11

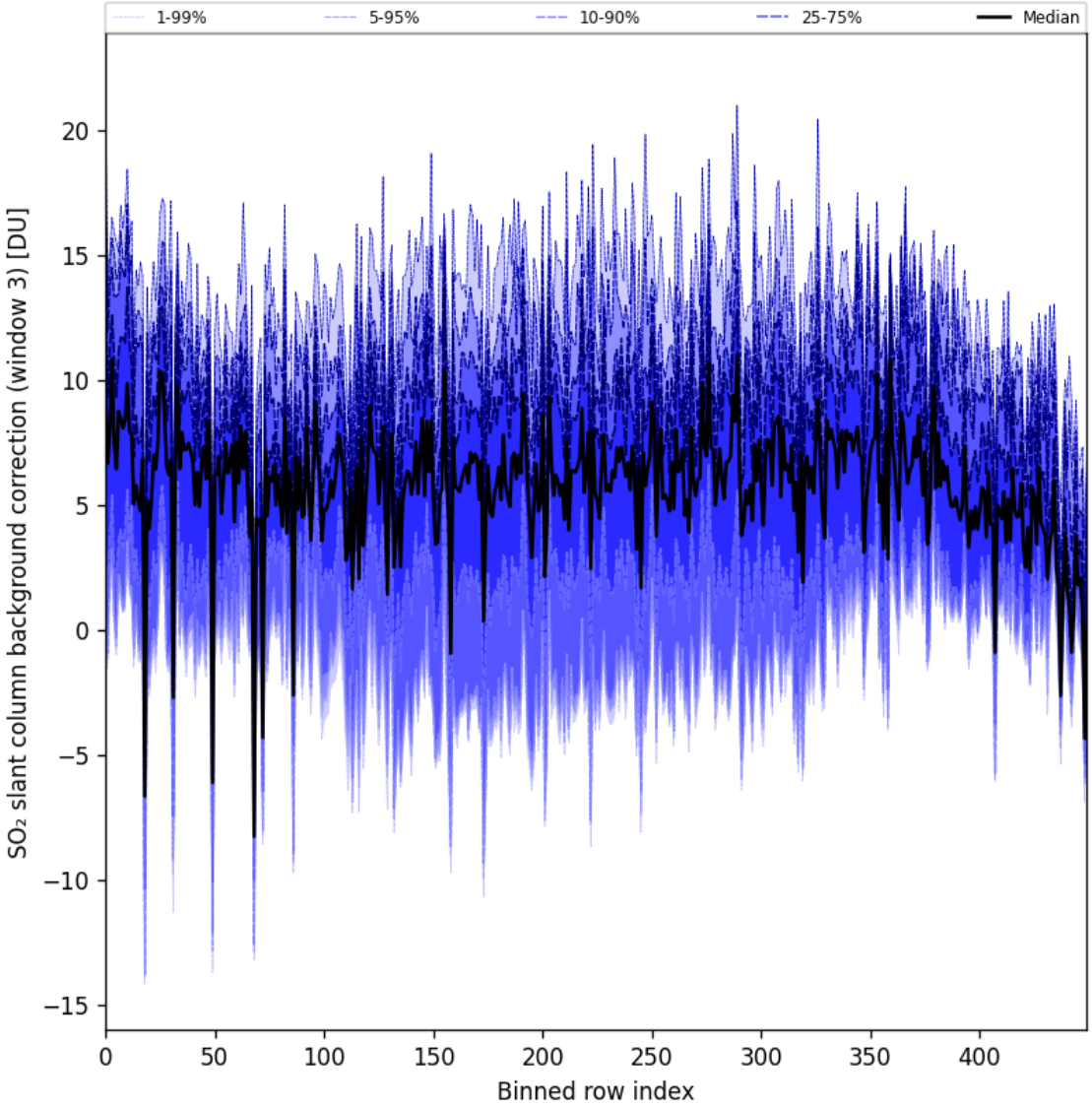

Figure 100: Along track statistics of "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11

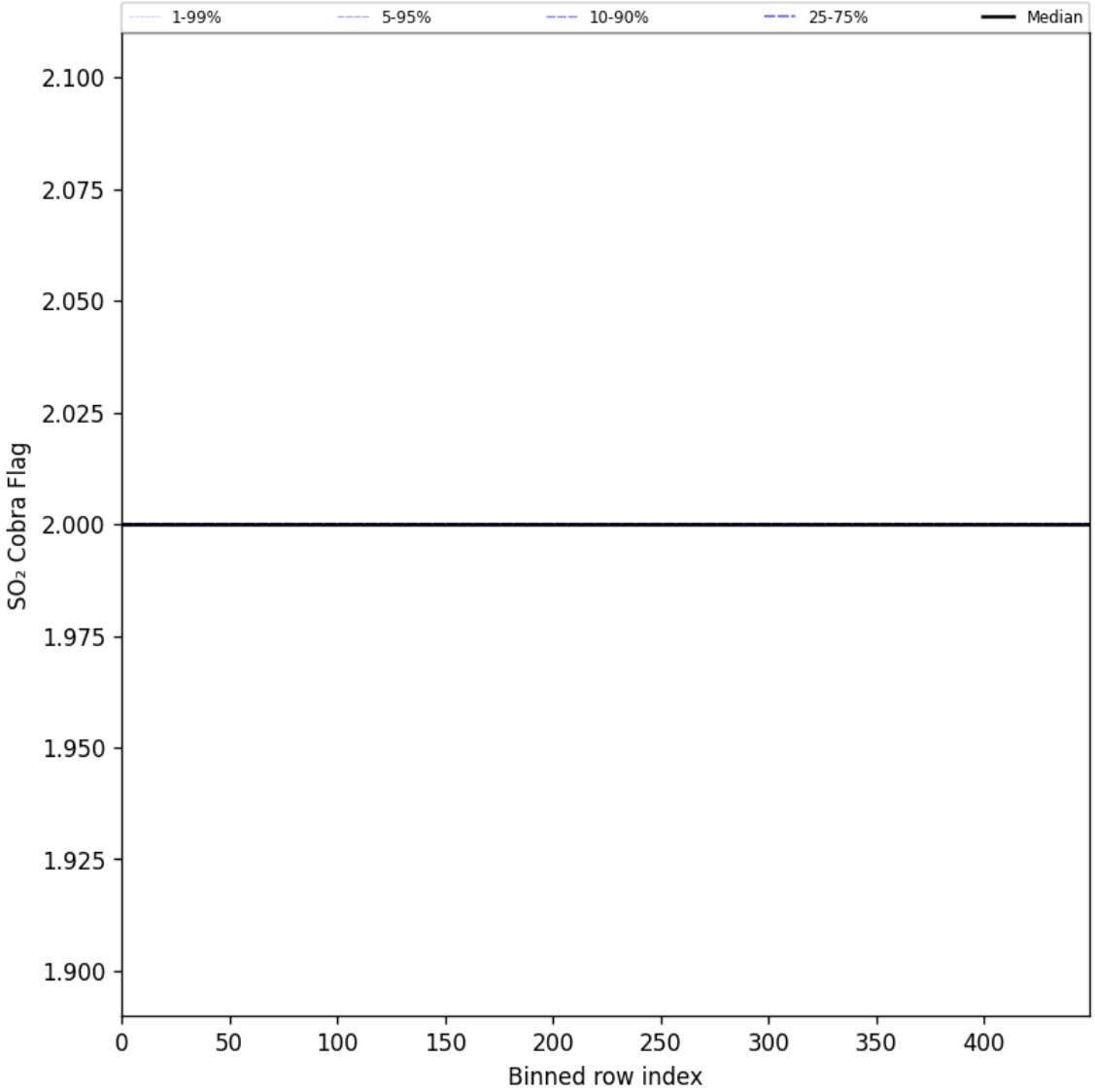

Figure 101: Along track statistics of "SO_2 Cobra Flag" for 2025-07-09 to 2025-07-11

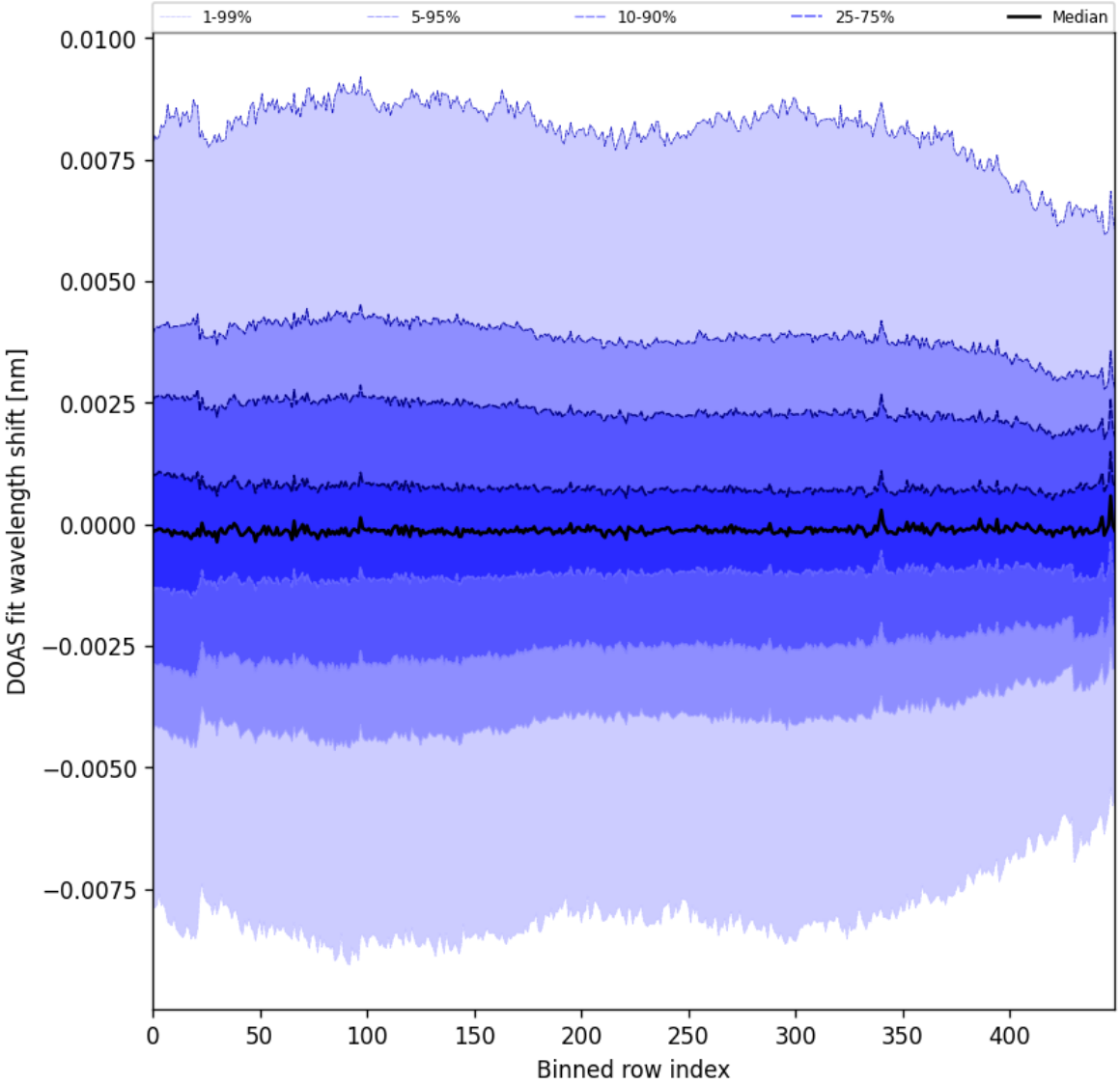

Figure 102: Along track statistics of “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11

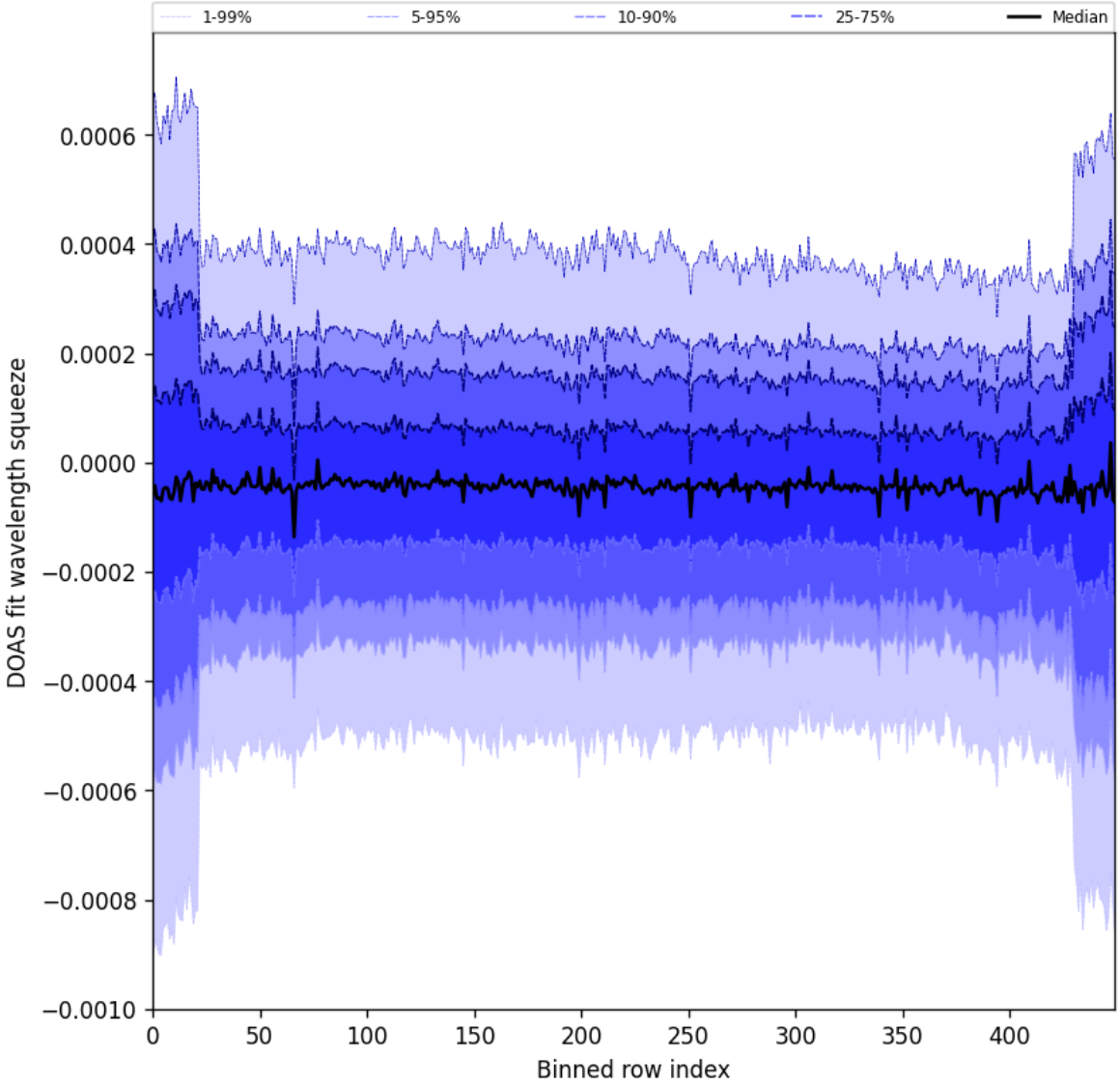

Figure 103: Along track statistics of “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11

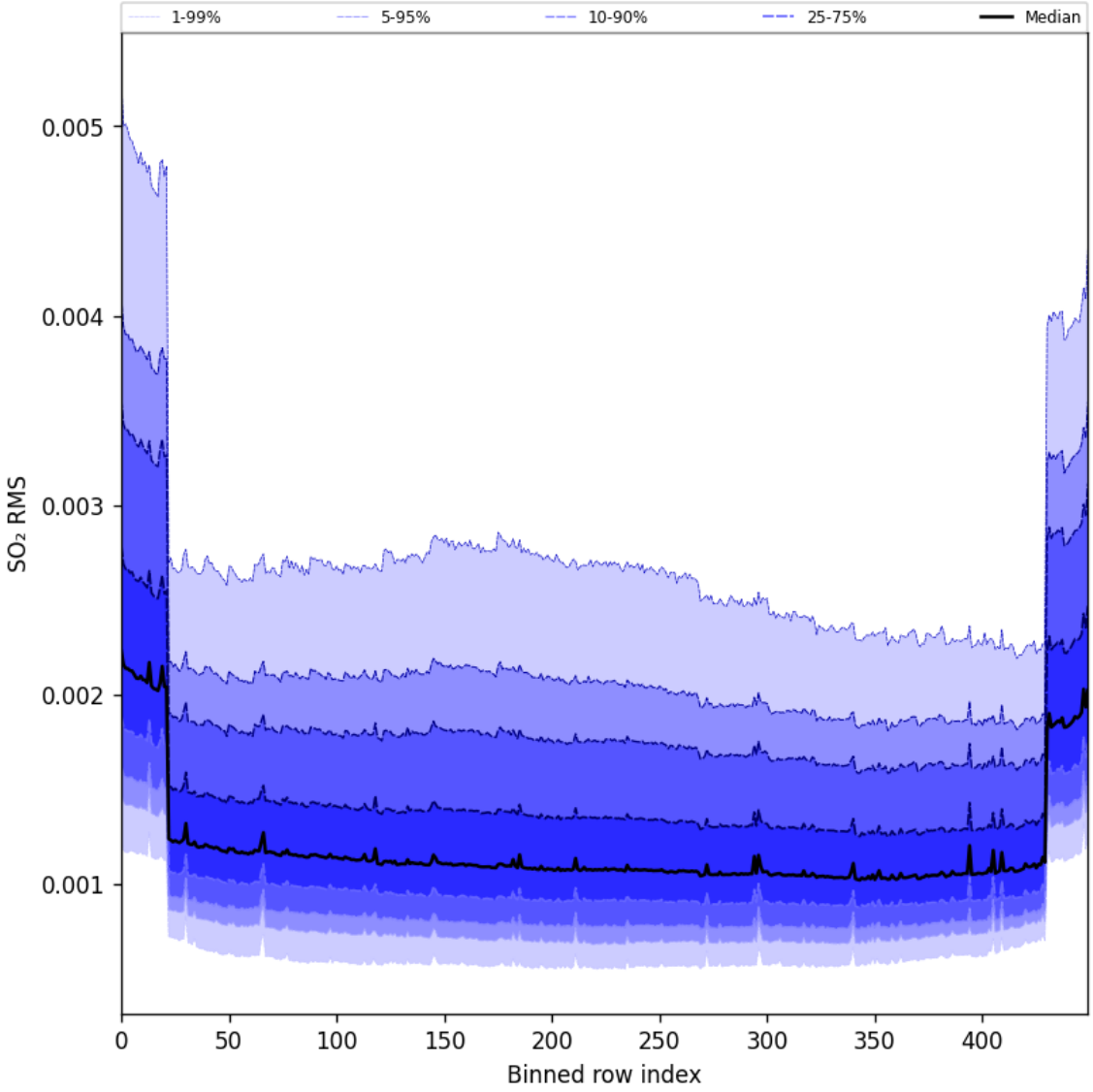

Figure 104: Along track statistics of "SO_2 RMS" for 2025-07-09 to 2025-07-11

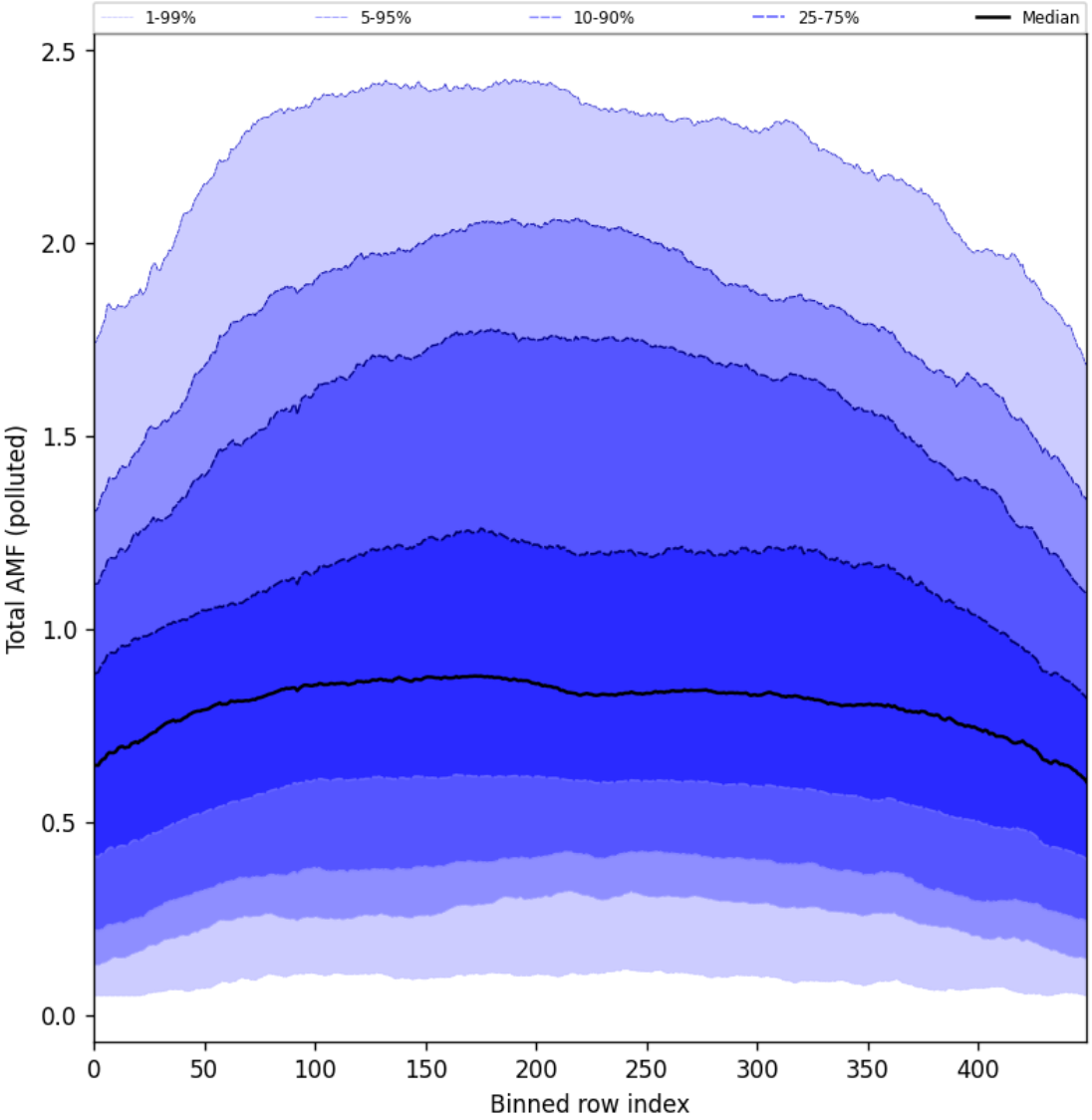

Figure 105: Along track statistics of “Total AMF (polluted)” for 2025-07-09 to 2025-07-11

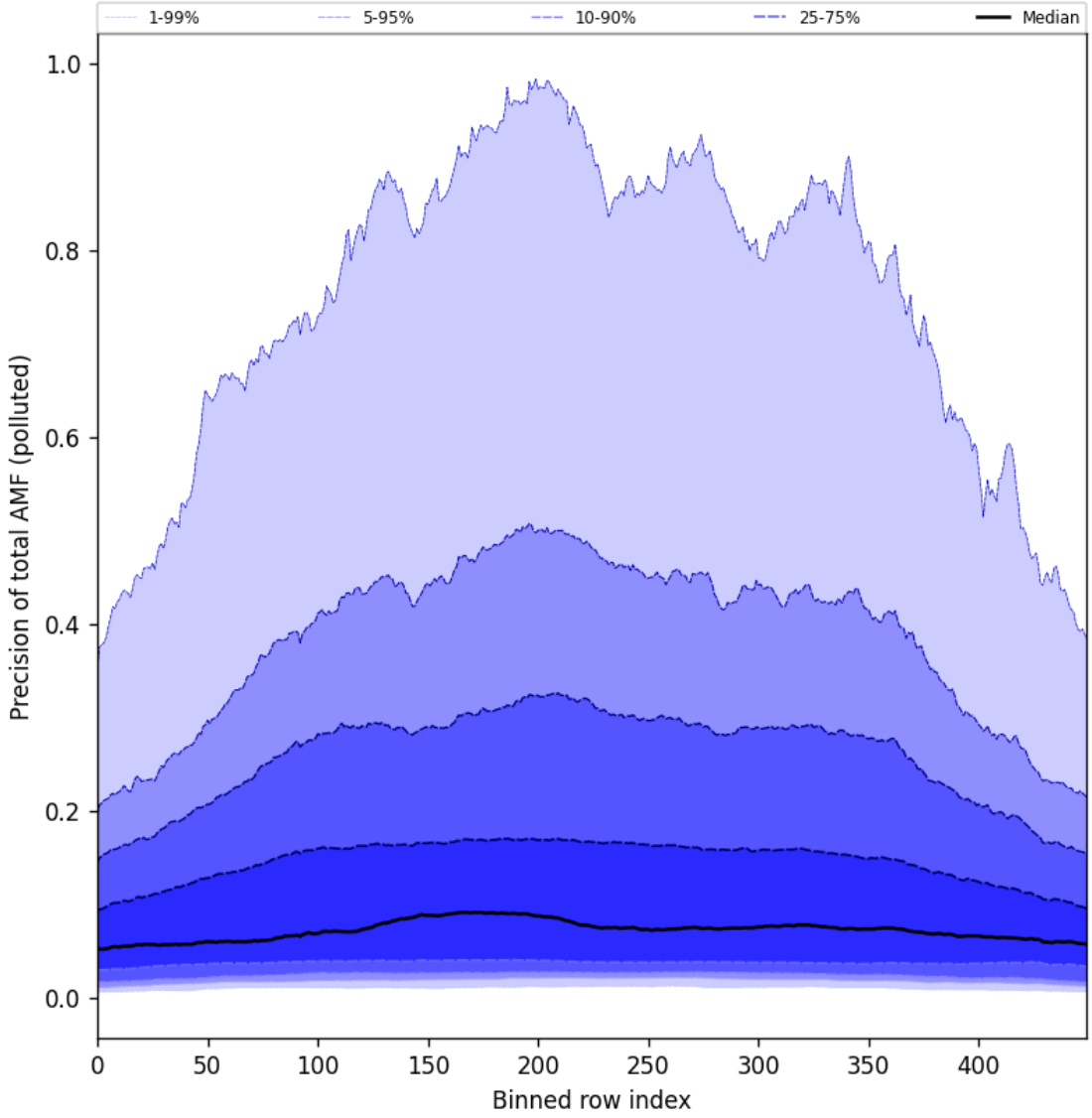

Figure 106: Along track statistics of “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11

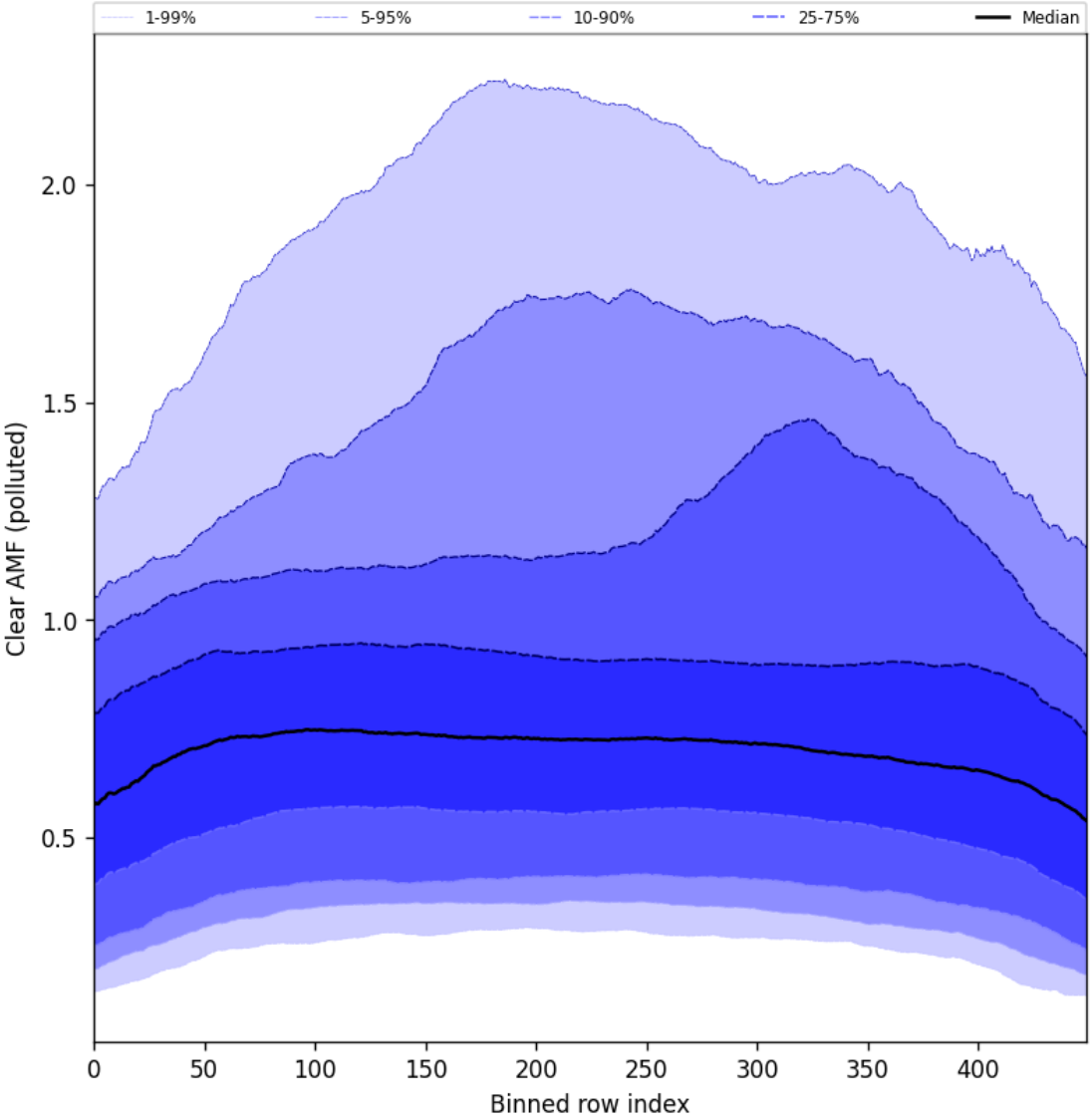

Figure 107: Along track statistics of “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11

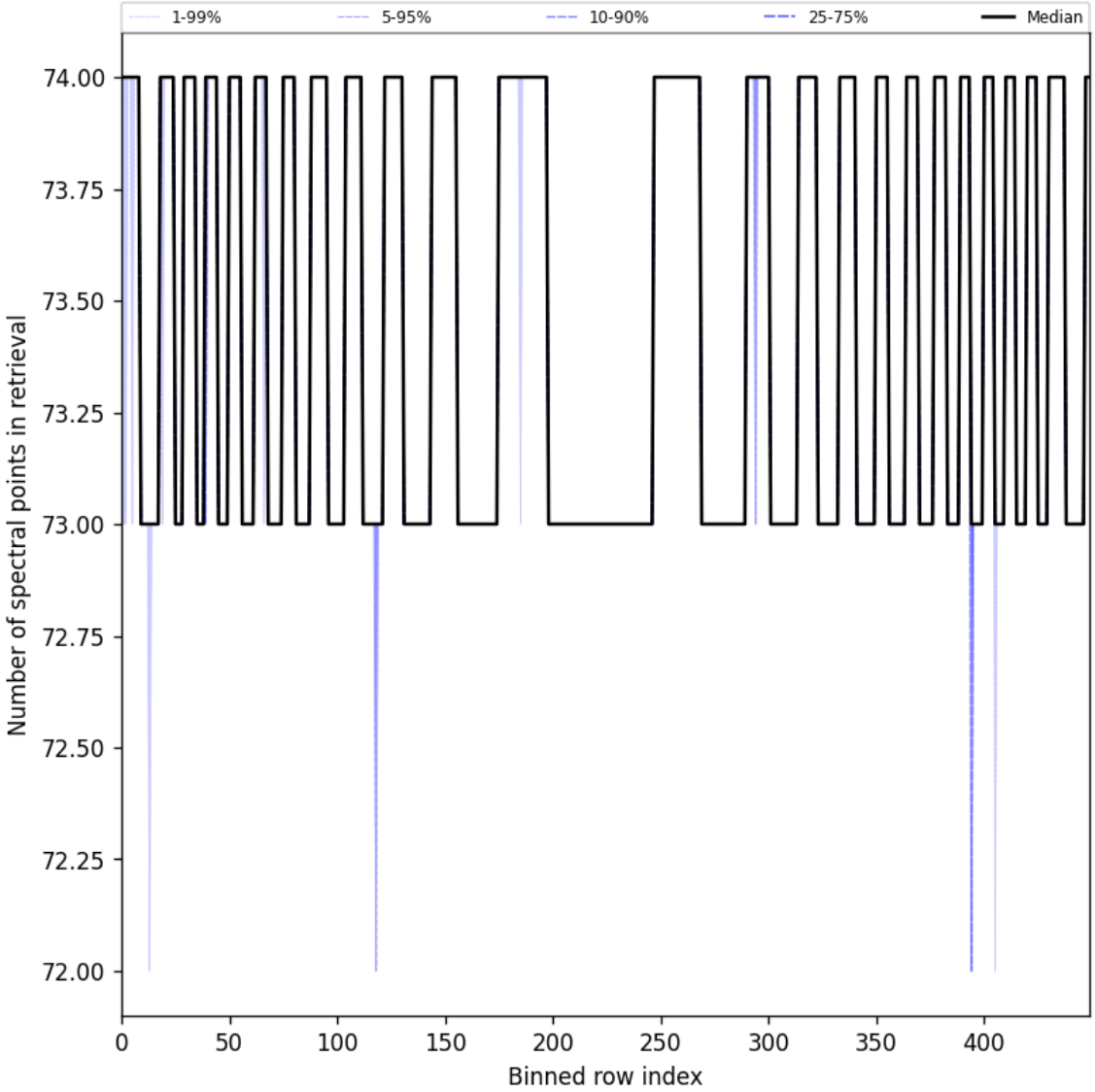

Figure 108: Along track statistics of “Number of spectral points in retrieval” for 2025-07-09 to 2025-07-11

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.

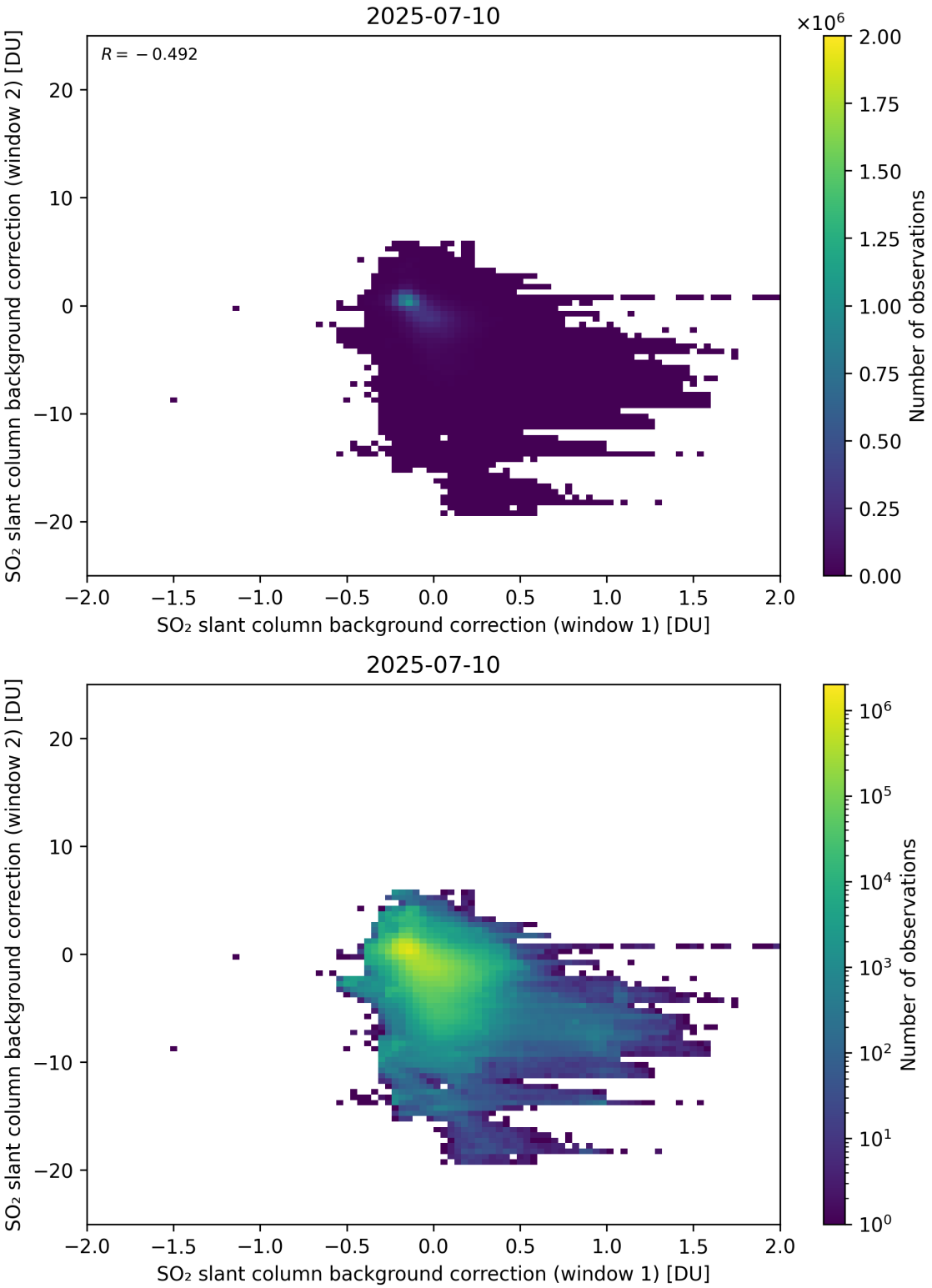

Figure 109: Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

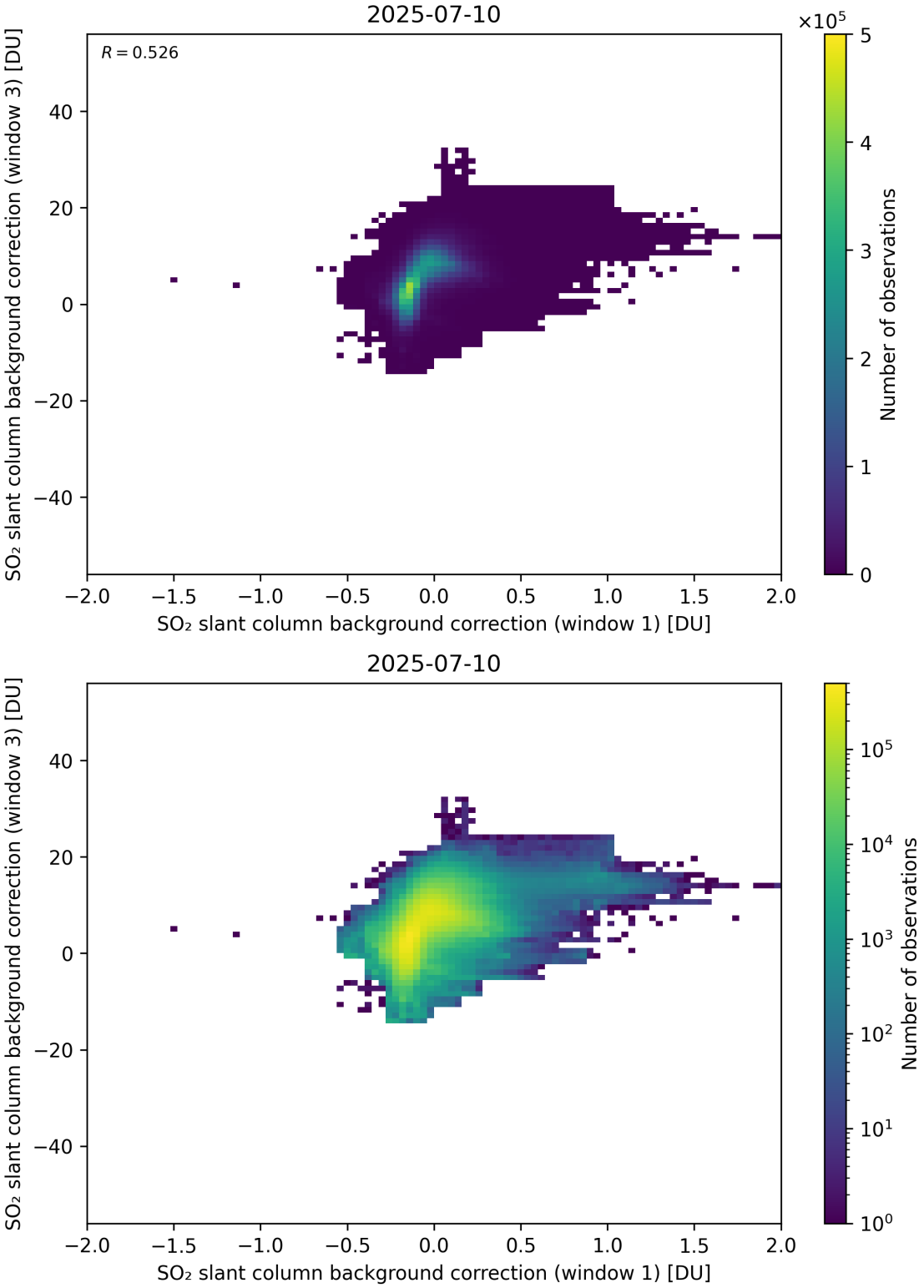

Figure 110: Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

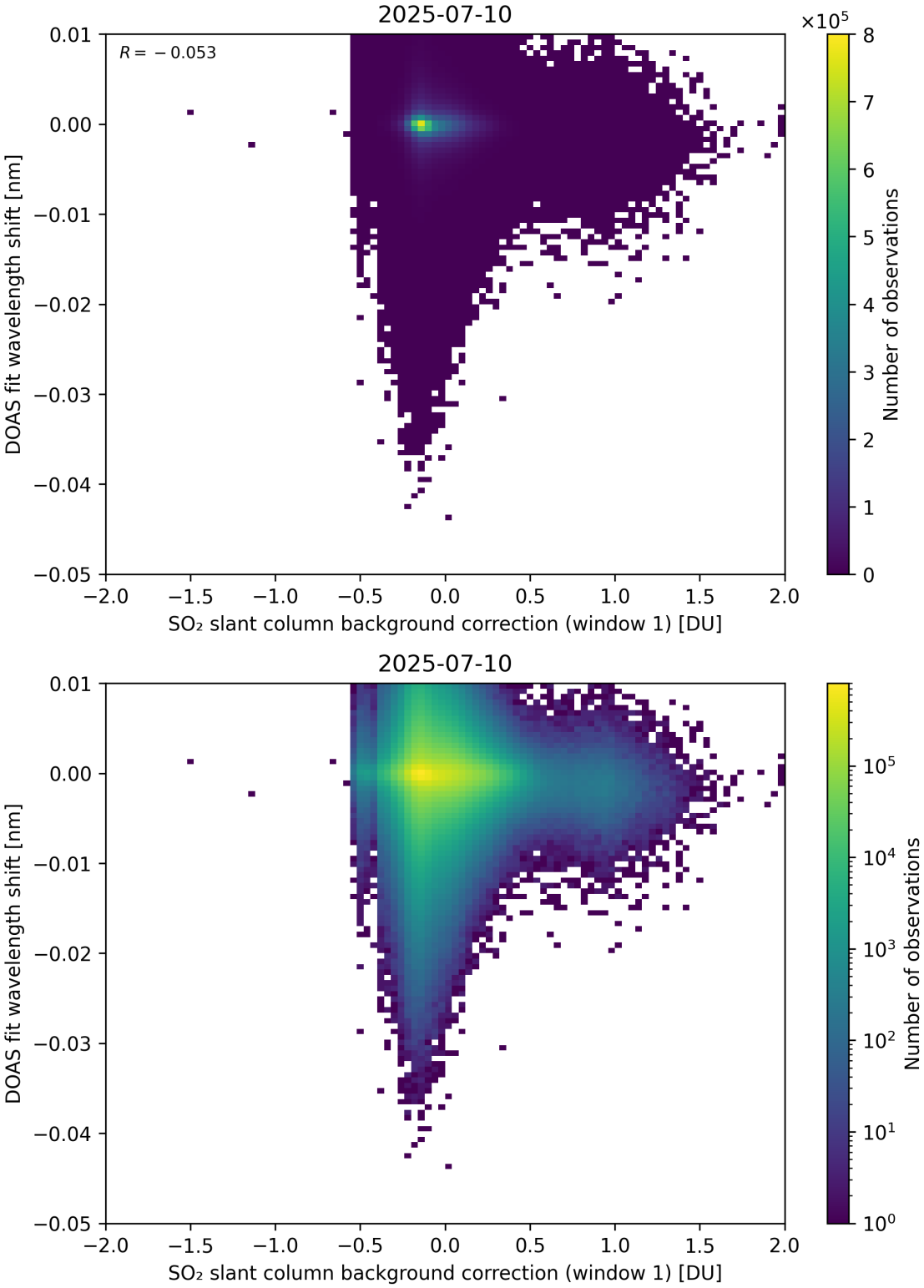

Figure 111: Scatter density plot of "SO_2 slant column background correction (window 1)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

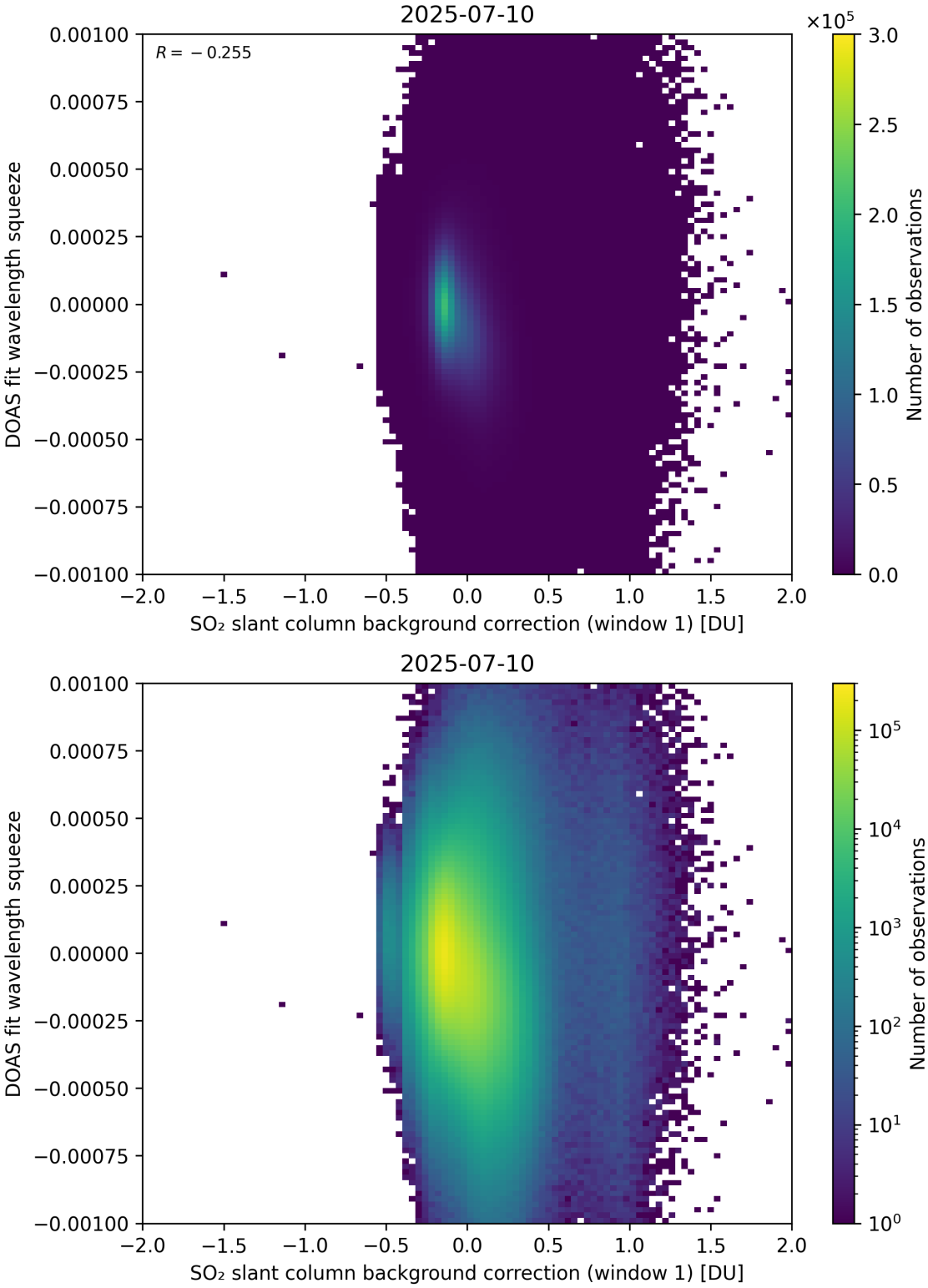

Figure 112: Scatter density plot of "SO_2 slant column background correction (window 1)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

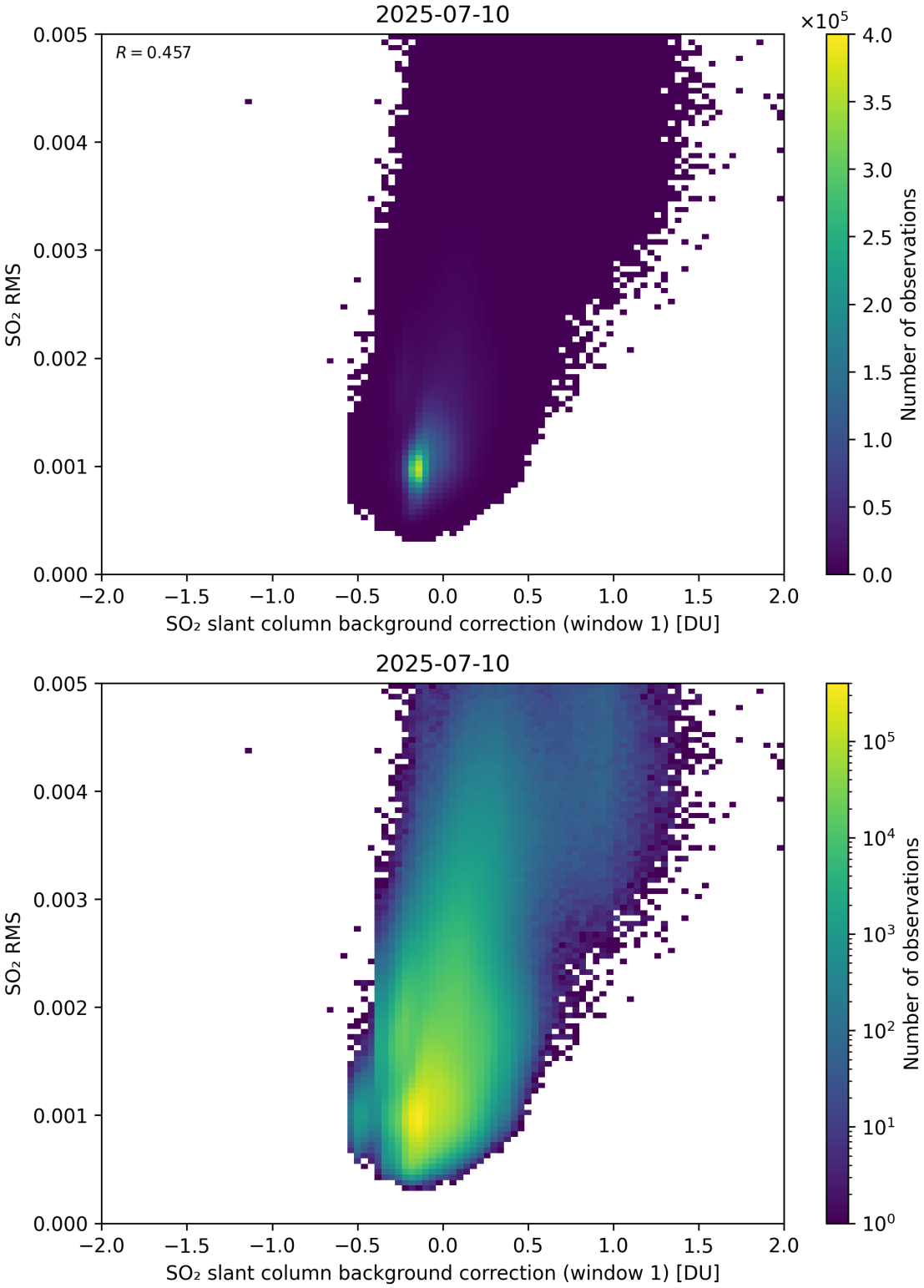

Figure 113: Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

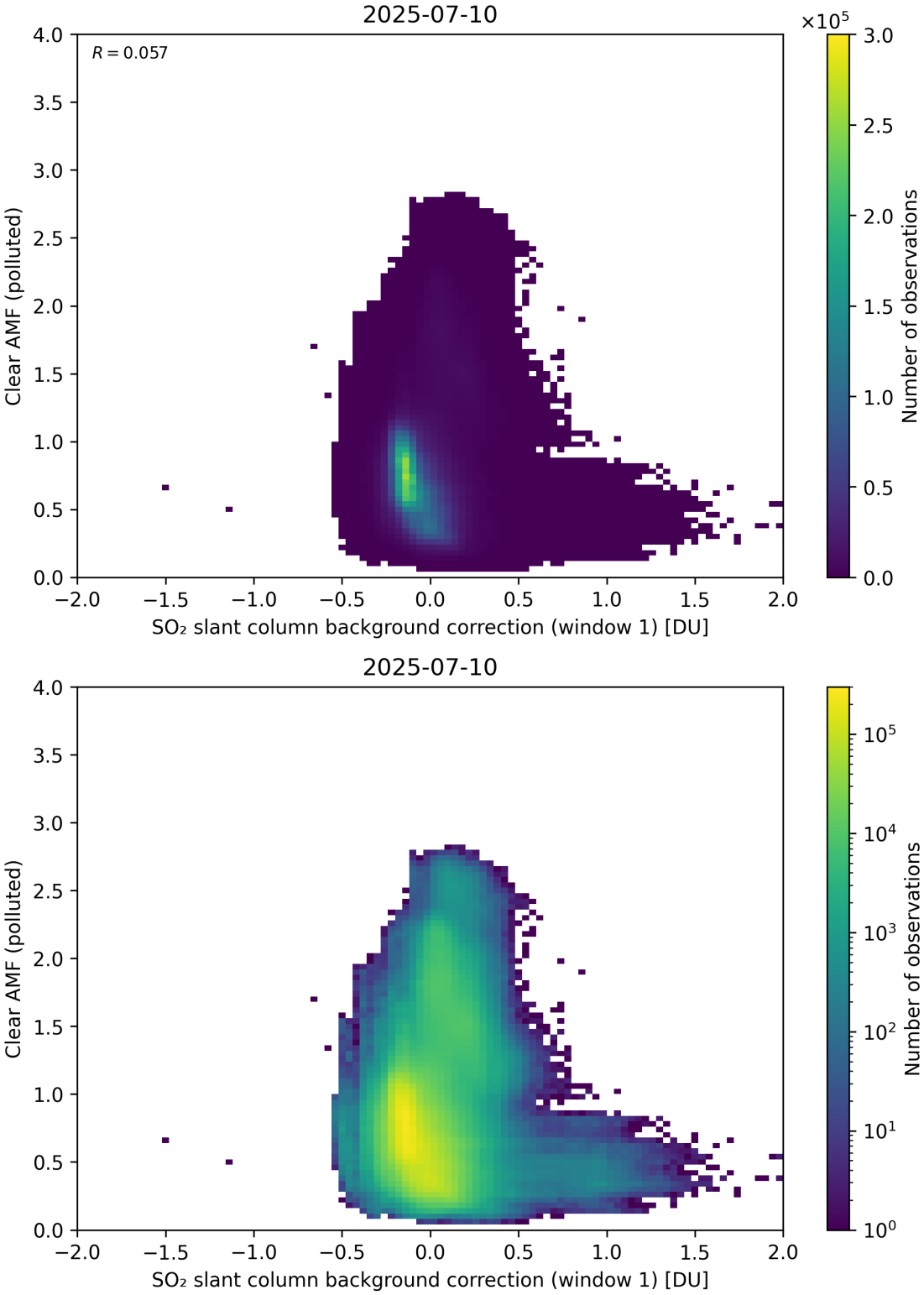

Figure 114: Scatter density plot of "SO_2 slant column background correction (window 1)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

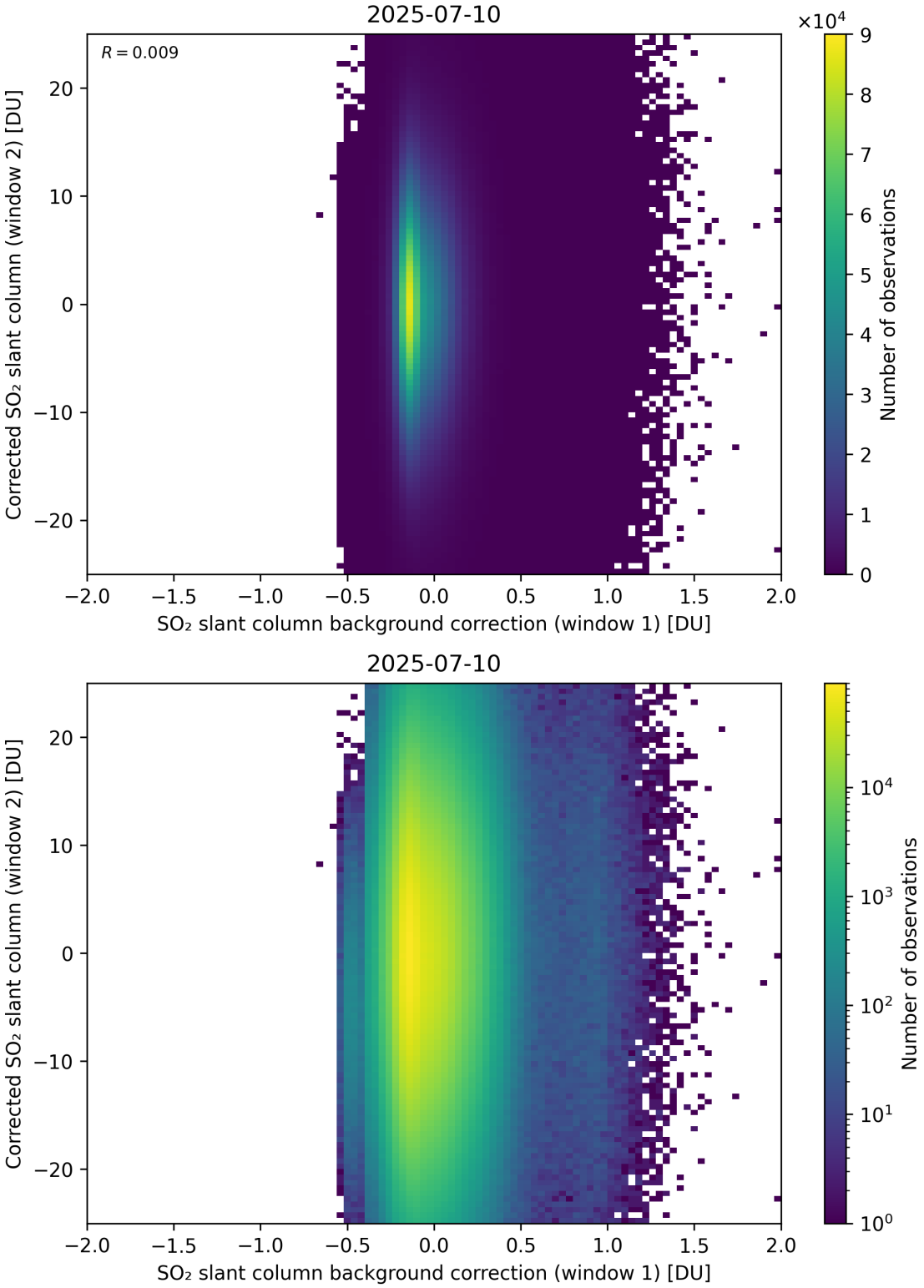

Figure 115: Scatter density plot of "SO_2 slant column background correction (window 1)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

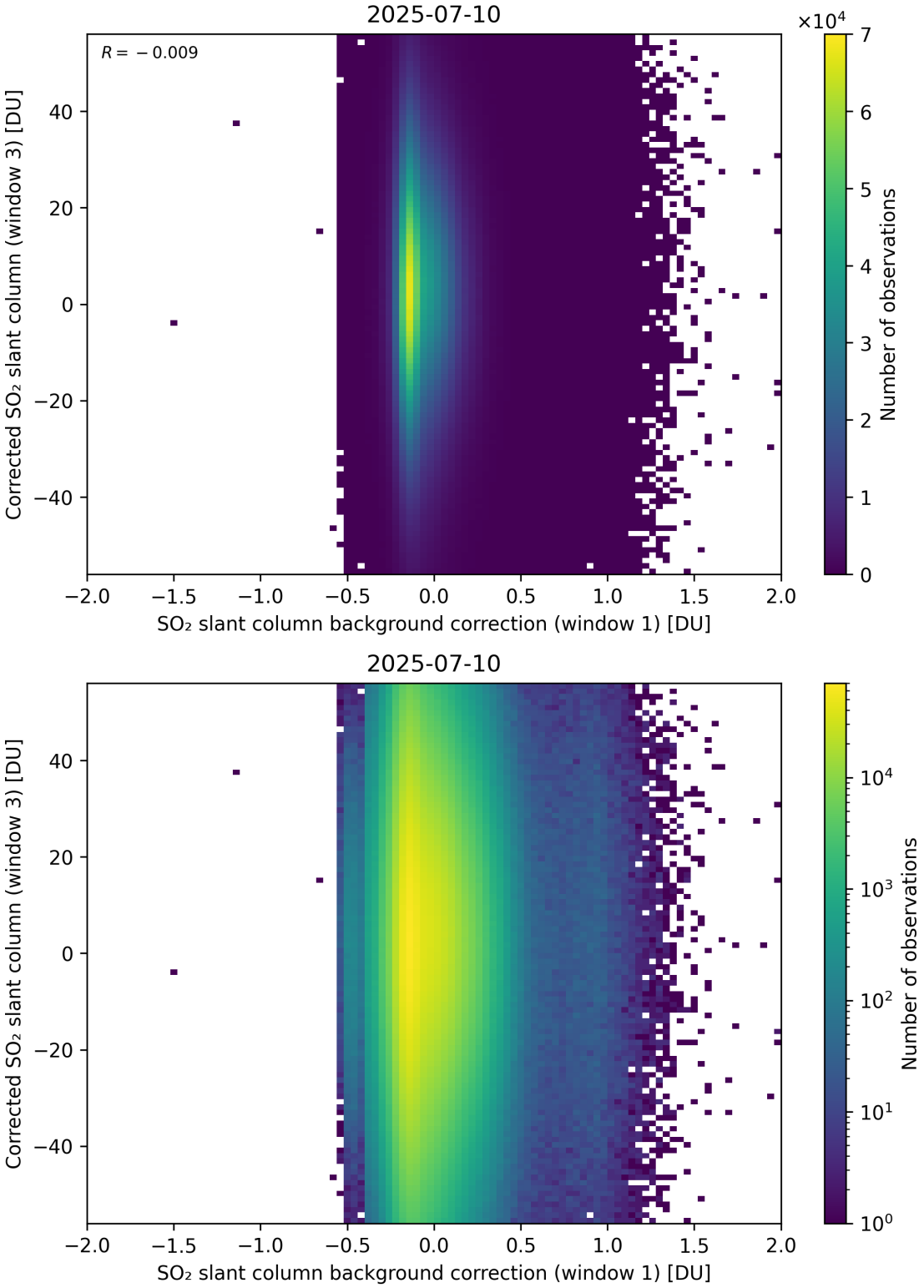

Figure 116: Scatter density plot of "SO_2 slant column background correction (window 1)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

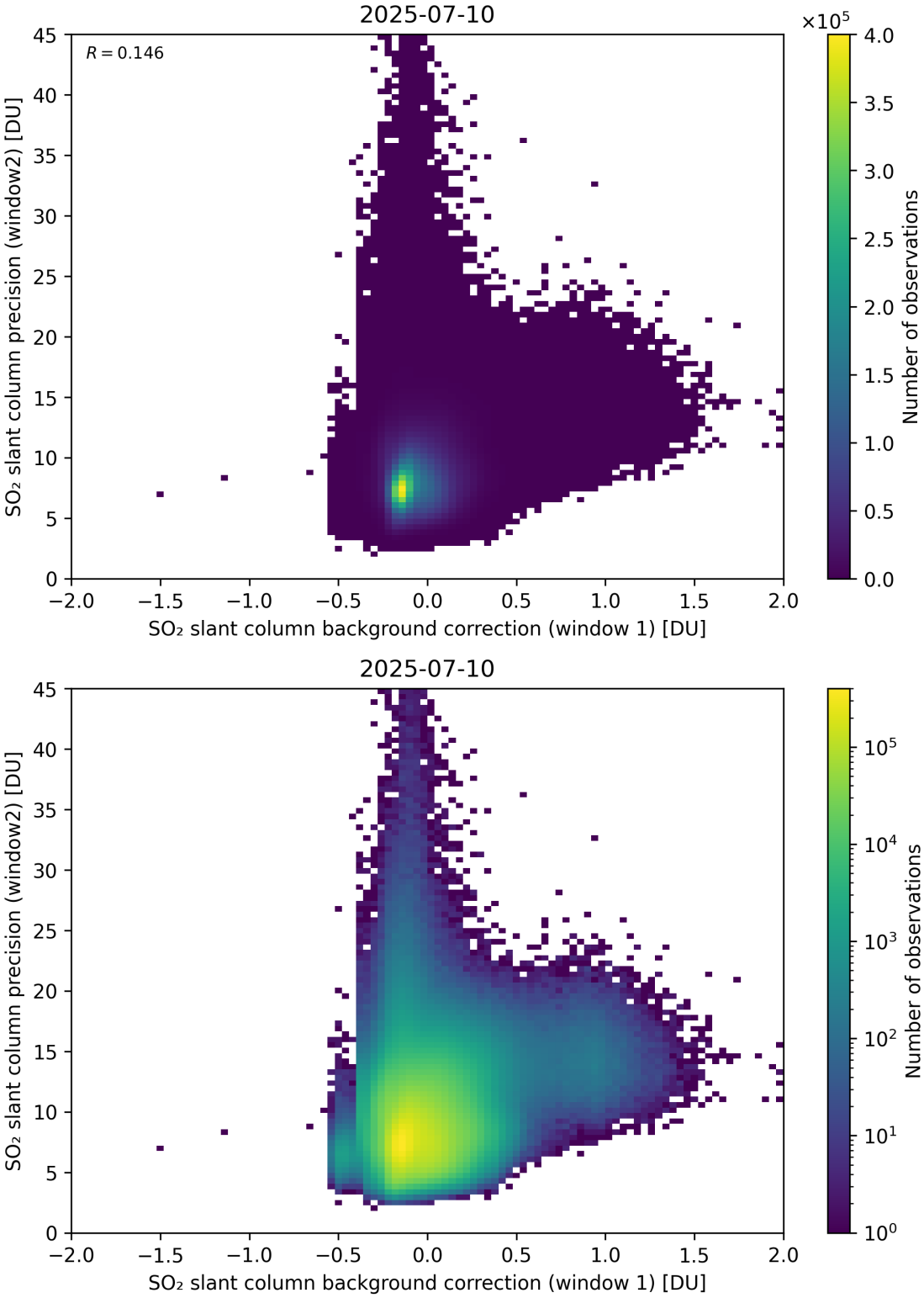

Figure 117: Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

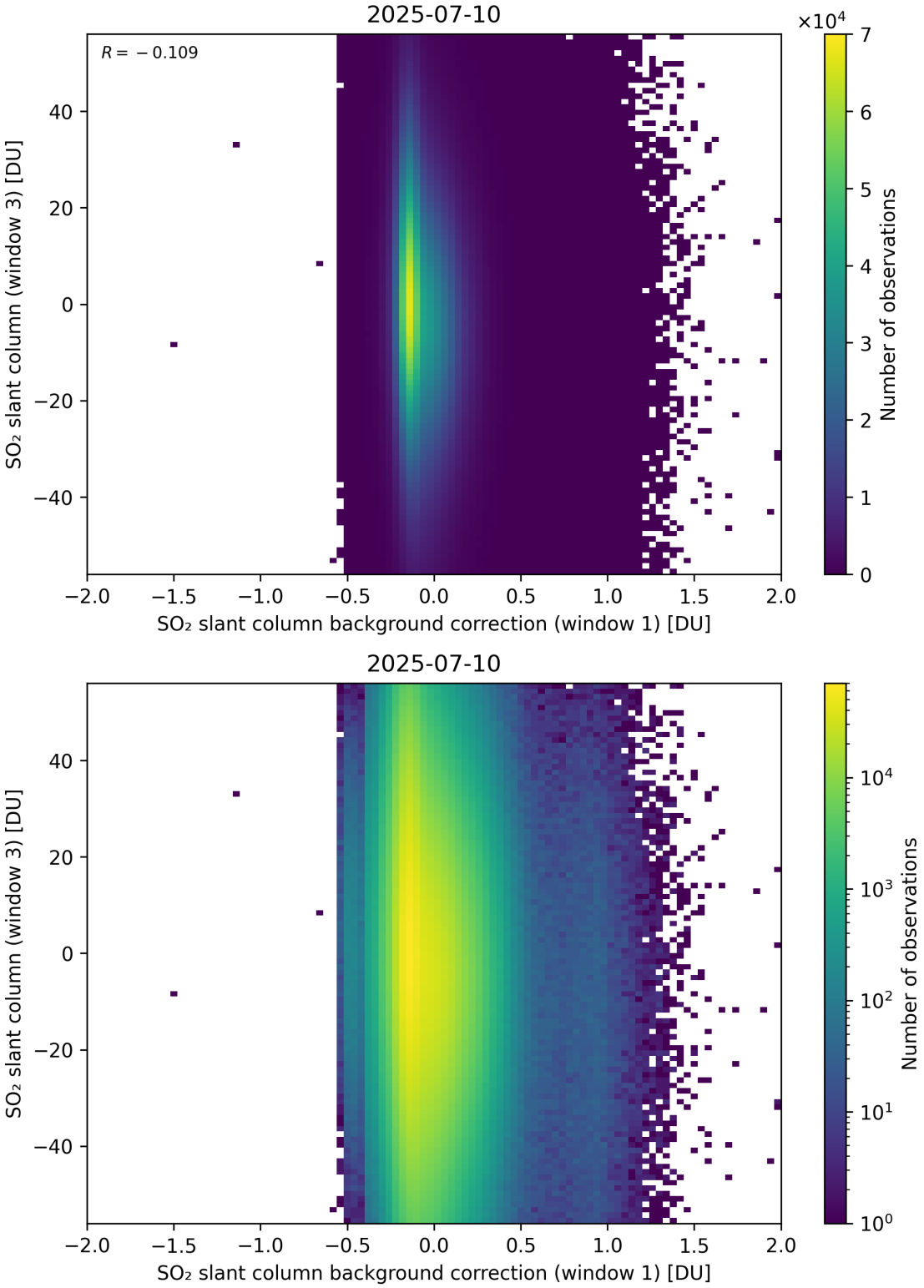

Figure 118: Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

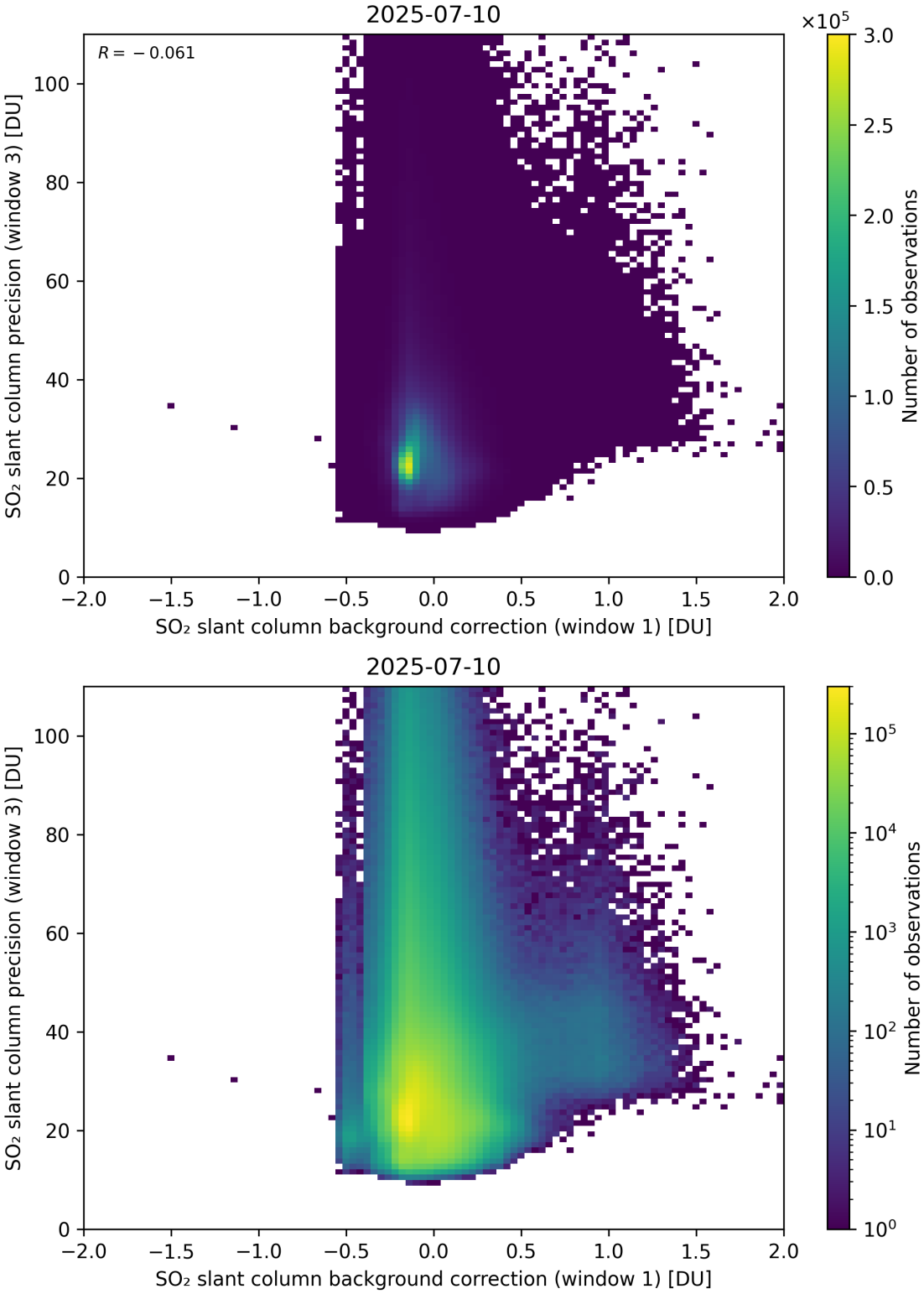

Figure 119: Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

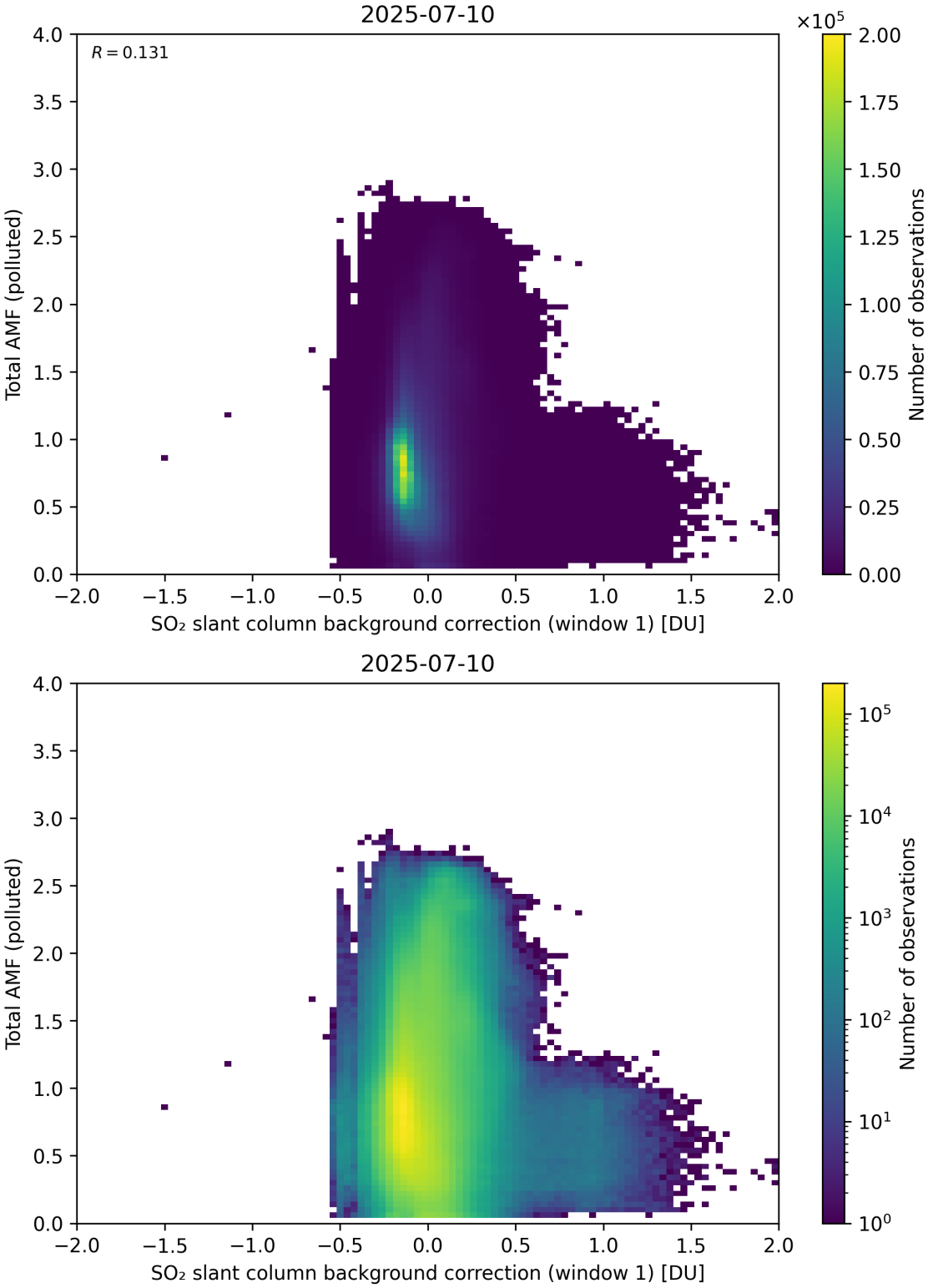

Figure 120: Scatter density plot of "SO_2 slant column background correction (window 1)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

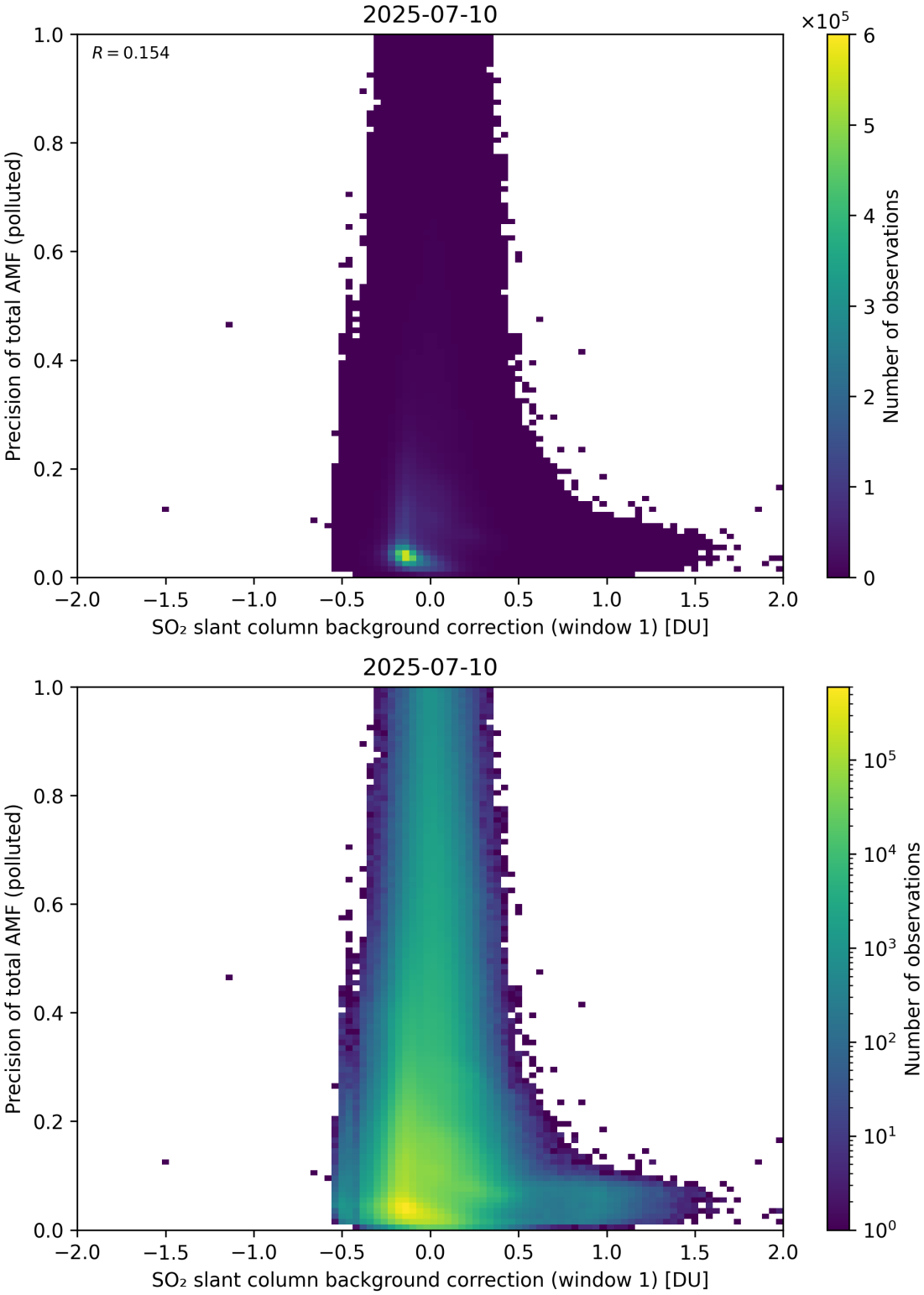

Figure 121: Scatter density plot of "SO_2 slant column background correction (window 1)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

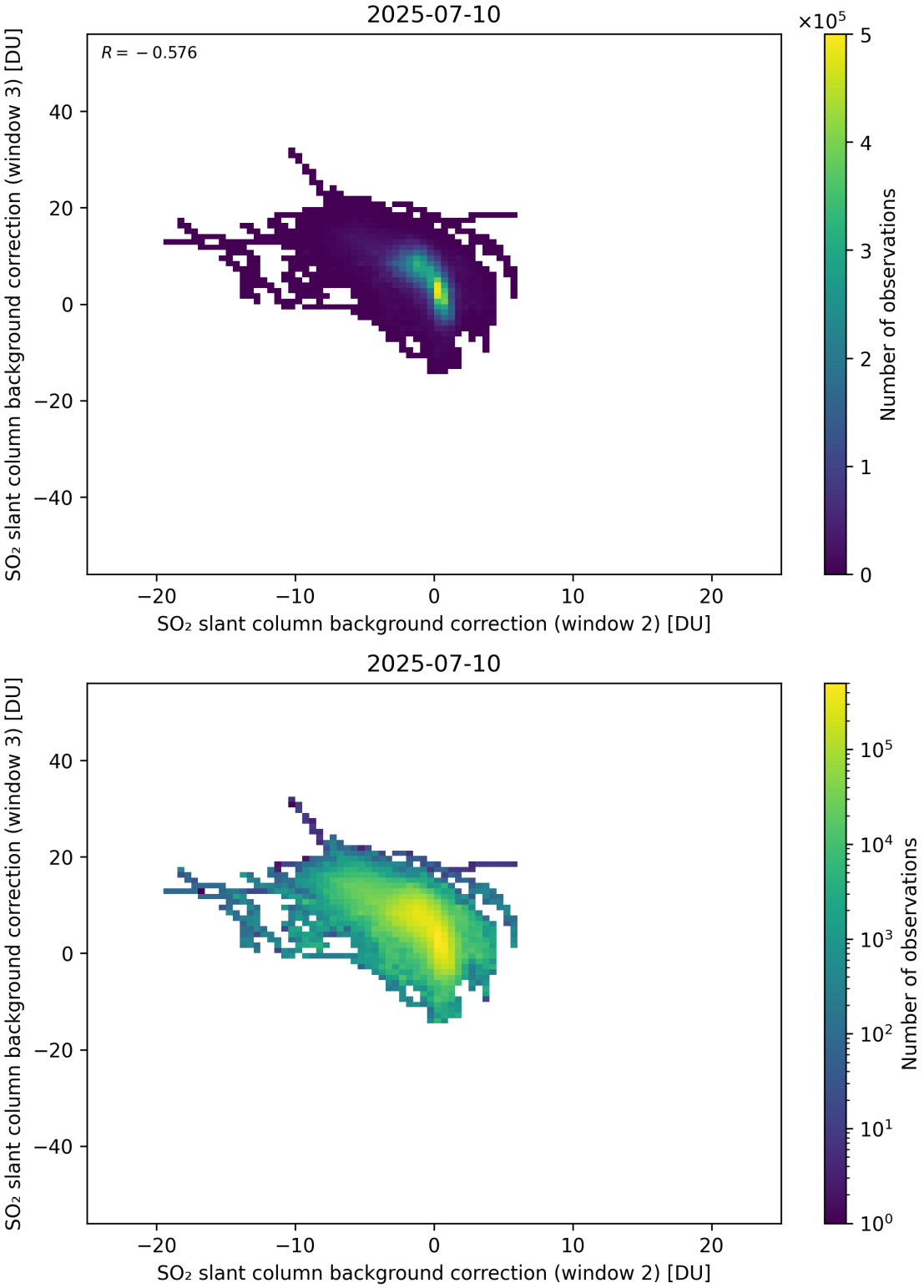

Figure 122: Scatter density plot of "SO_2 slant column background correction (window 2)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

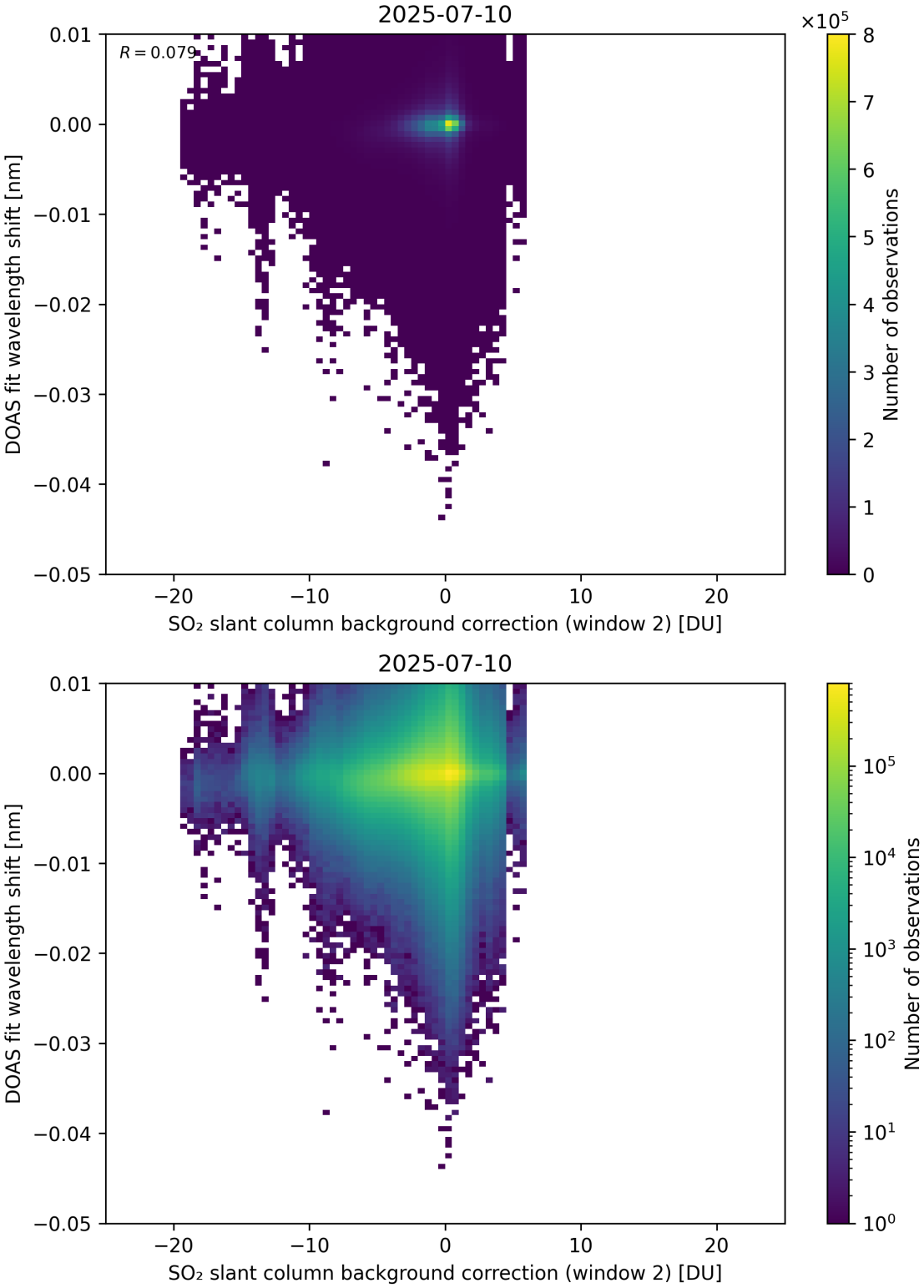

Figure 123: Scatter density plot of "SO_2 slant column background correction (window 2)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

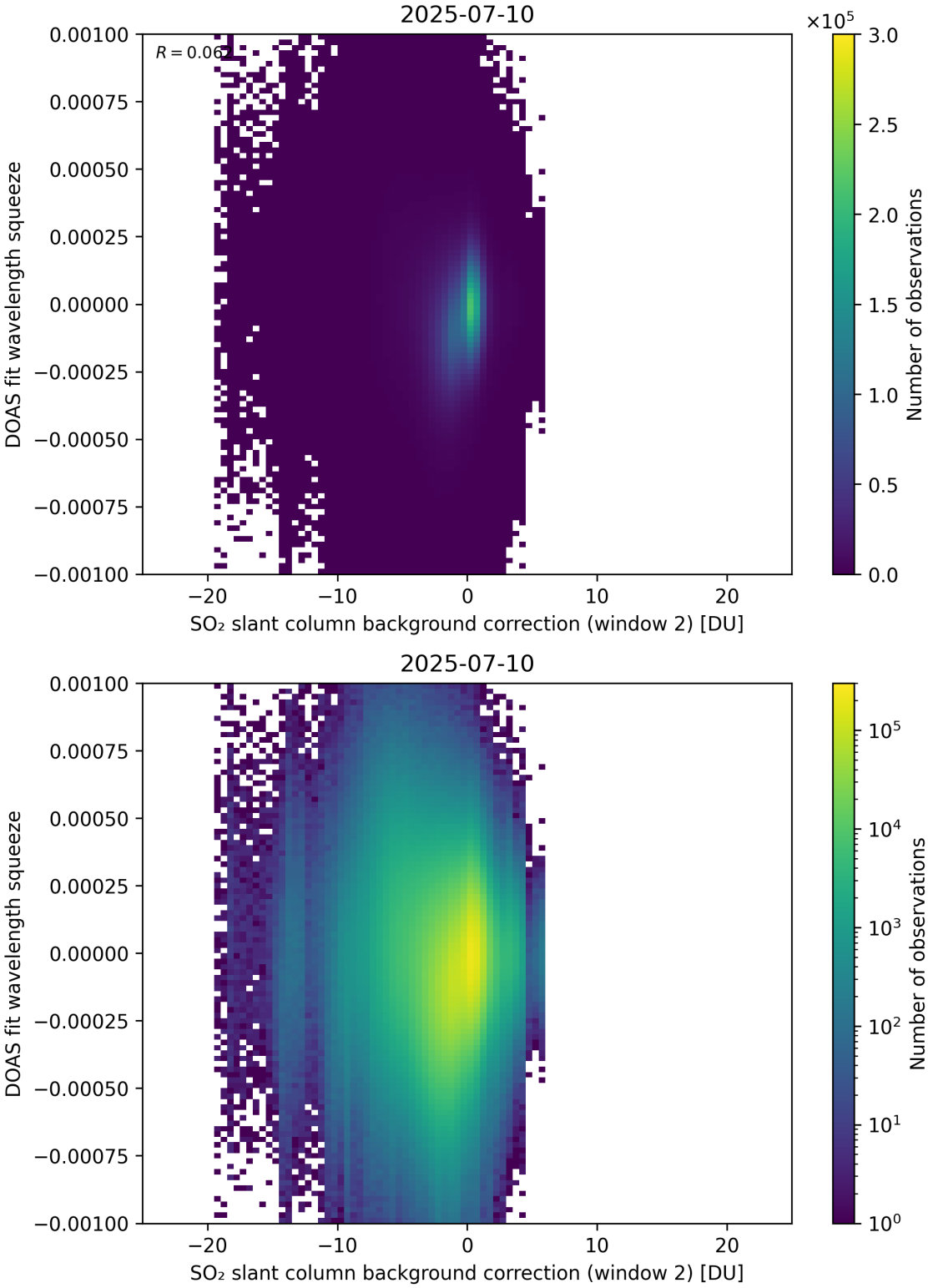

Figure 124: Scatter density plot of "SO_2 slant column background correction (window 2)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

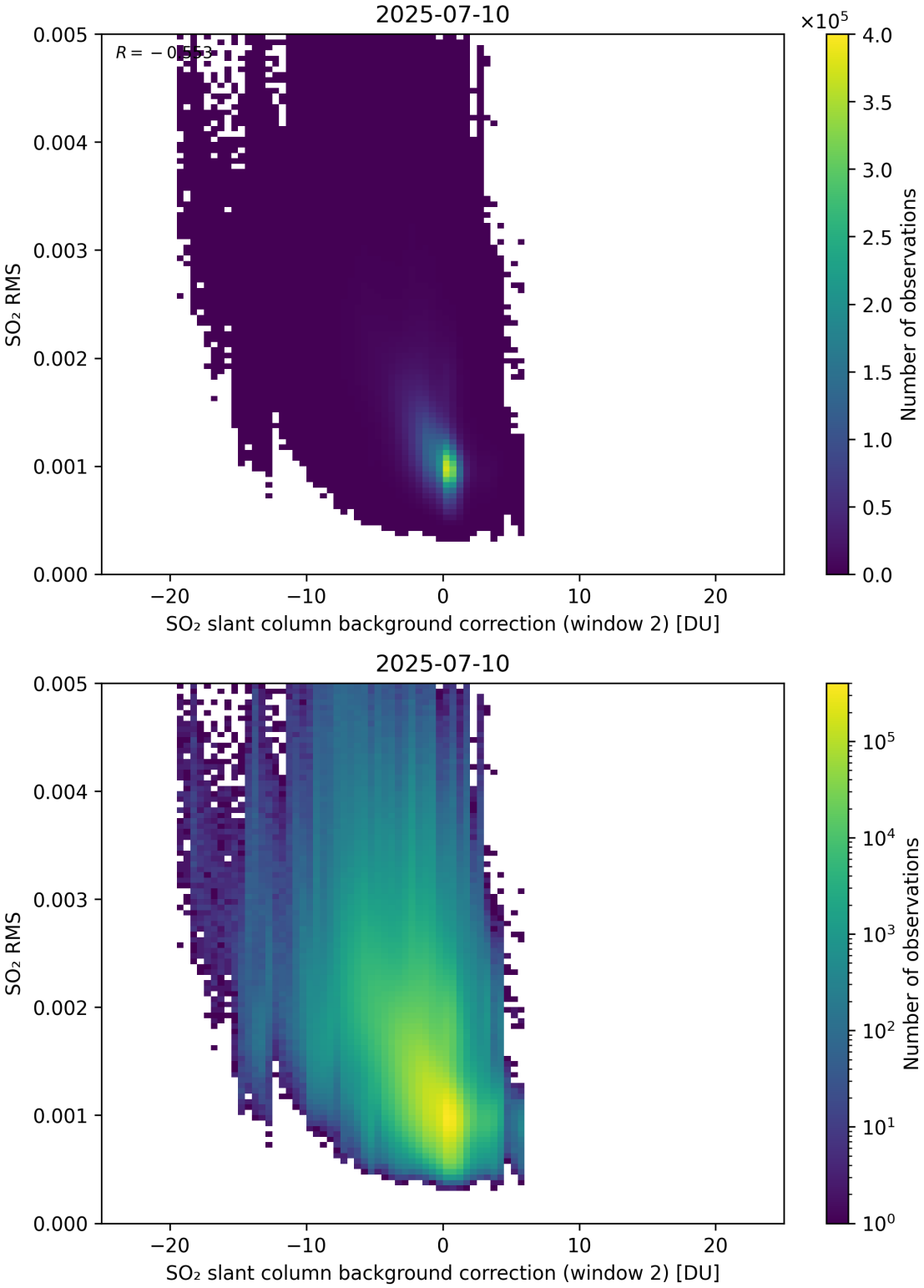

Figure 125: Scatter density plot of "SO_2 slant column background correction (window 2)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

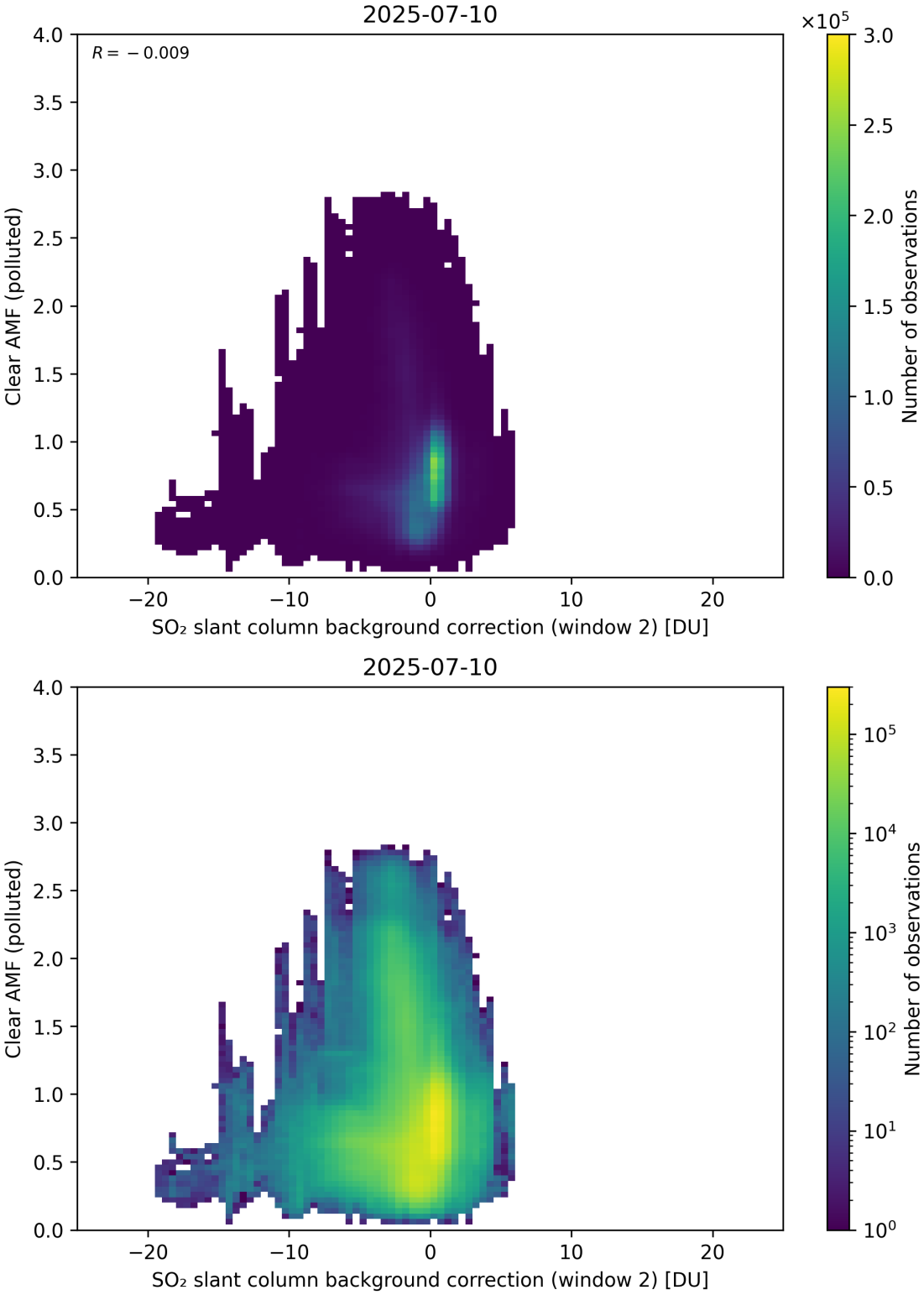

Figure 126: Scatter density plot of "SO_2 slant column background correction (window 2)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

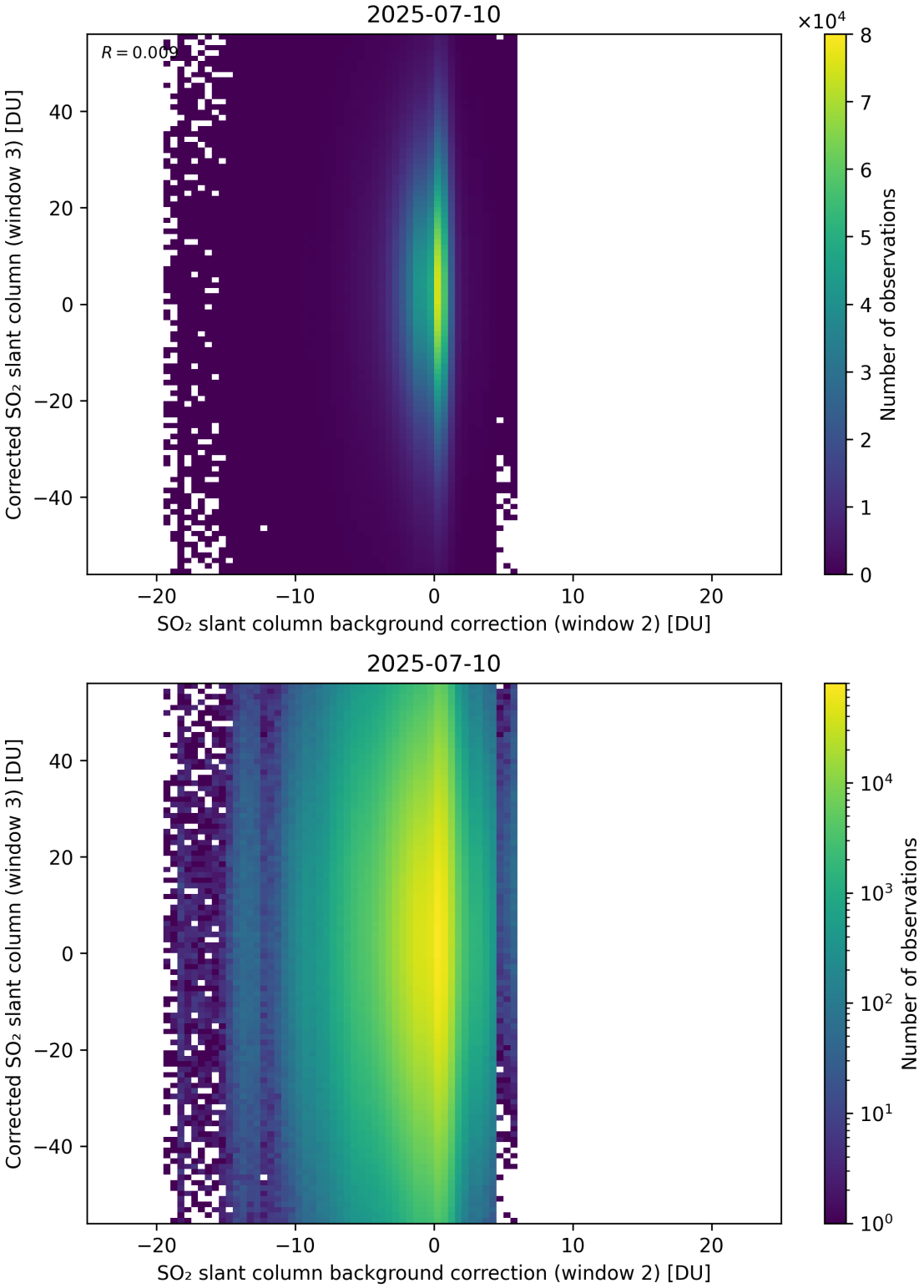

Figure 127: Scatter density plot of "SO_2 slant column background correction (window 2)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

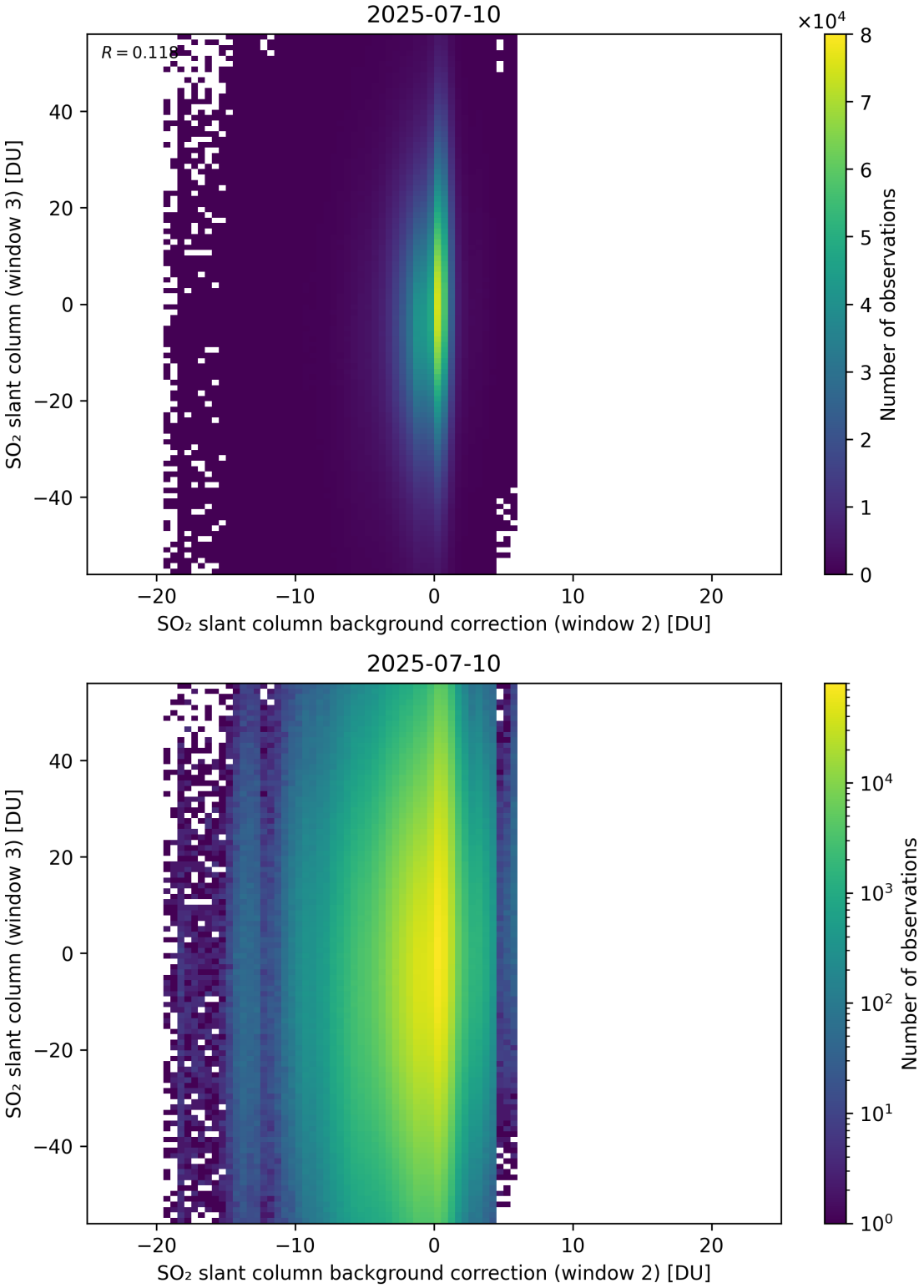

Figure 128: Scatter density plot of "SO_2 slant column background correction (window 2)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

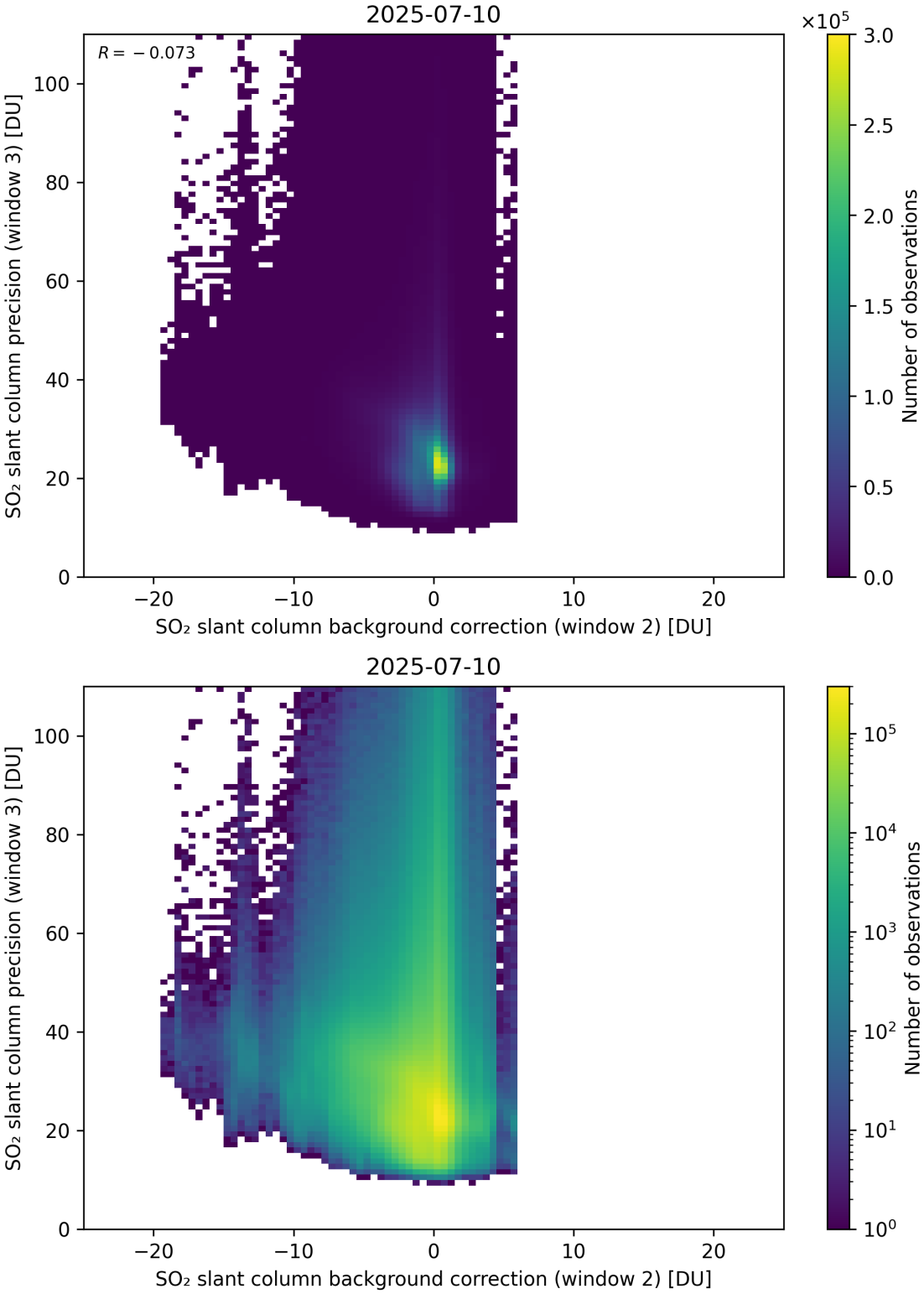

Figure 129: Scatter density plot of "SO_2 slant column background correction (window 2)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

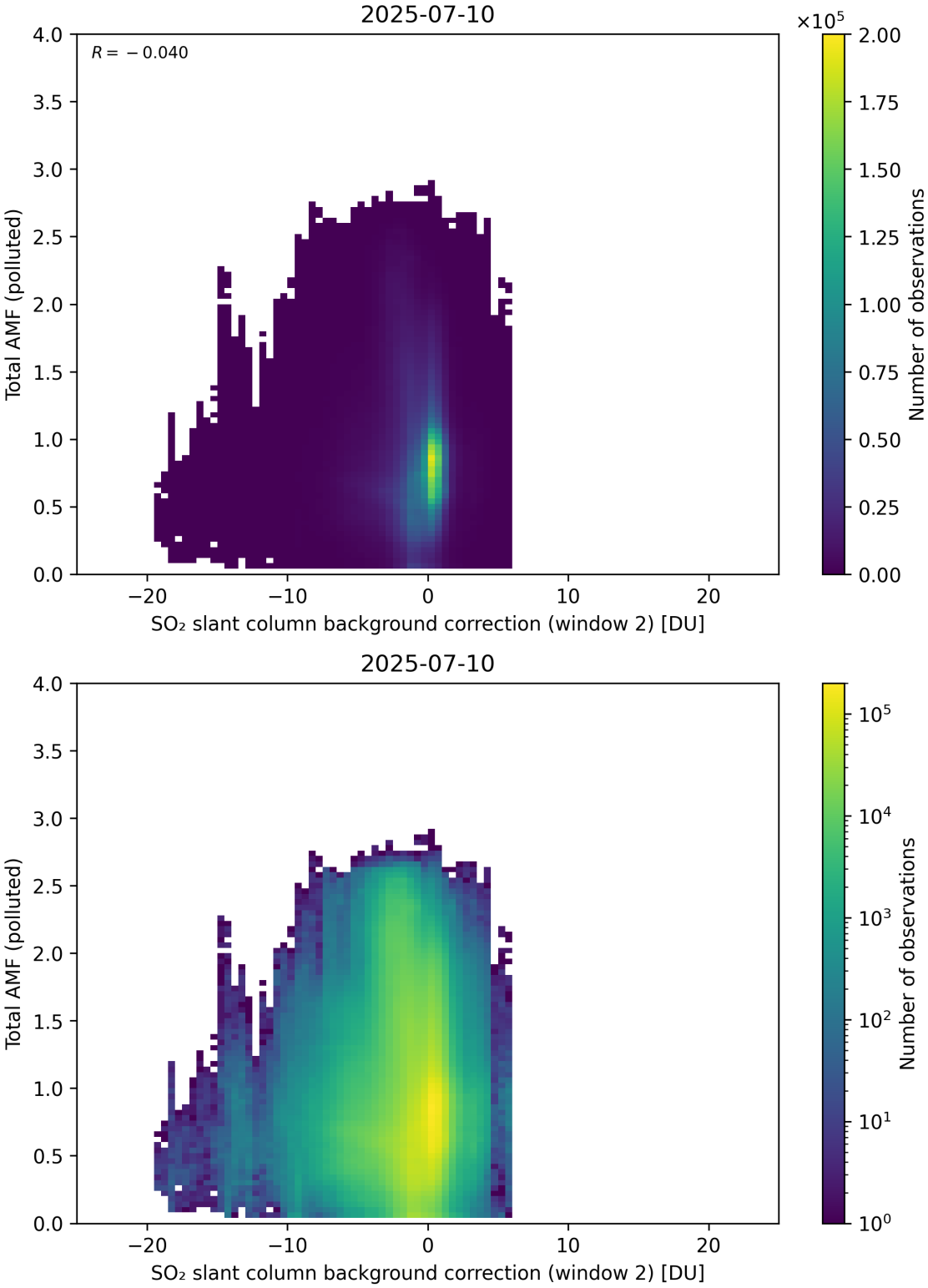

Figure 130: Scatter density plot of "SO_2 slant column background correction (window 2)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

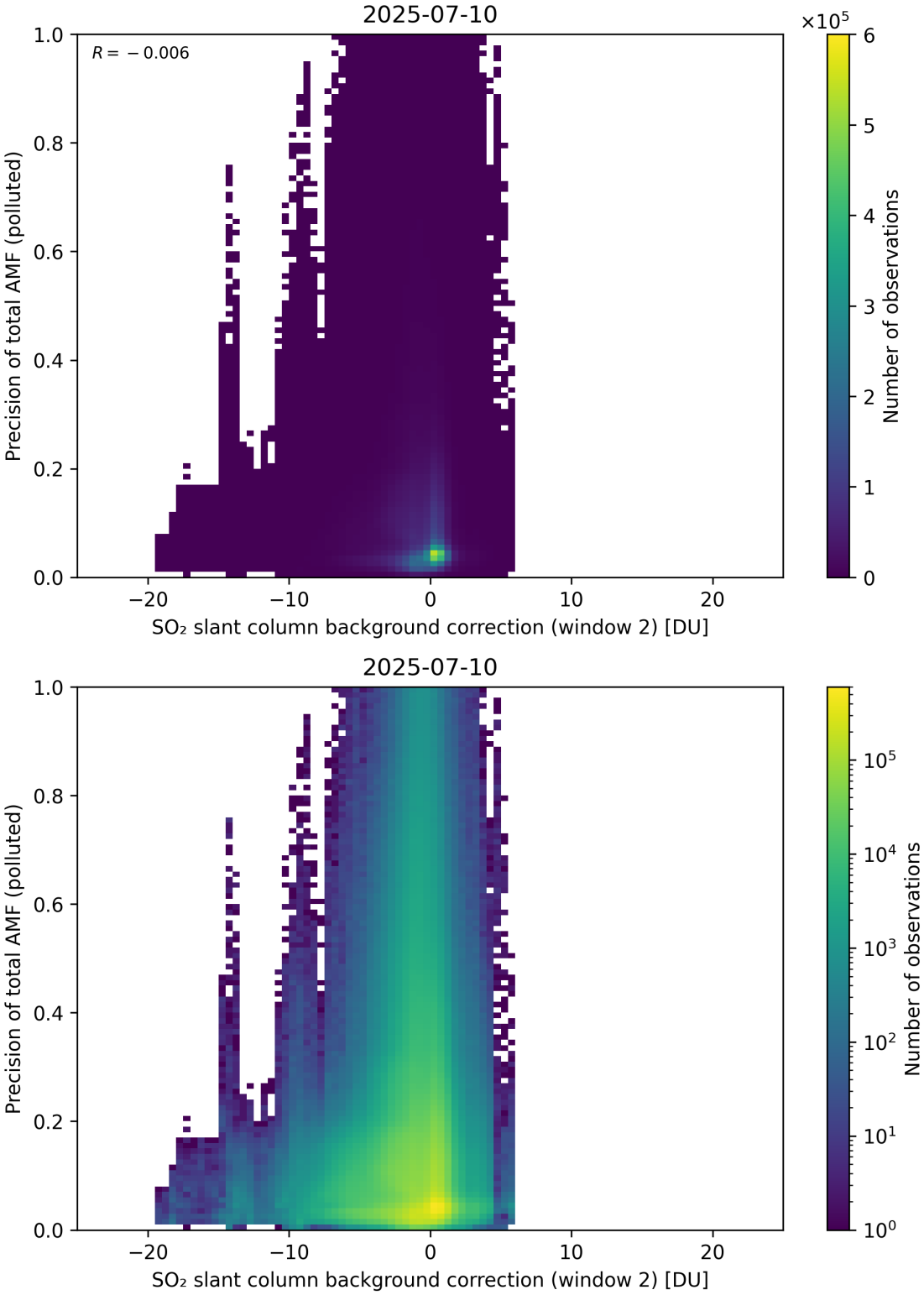

Figure 131: Scatter density plot of "SO_2 slant column background correction (window 2)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

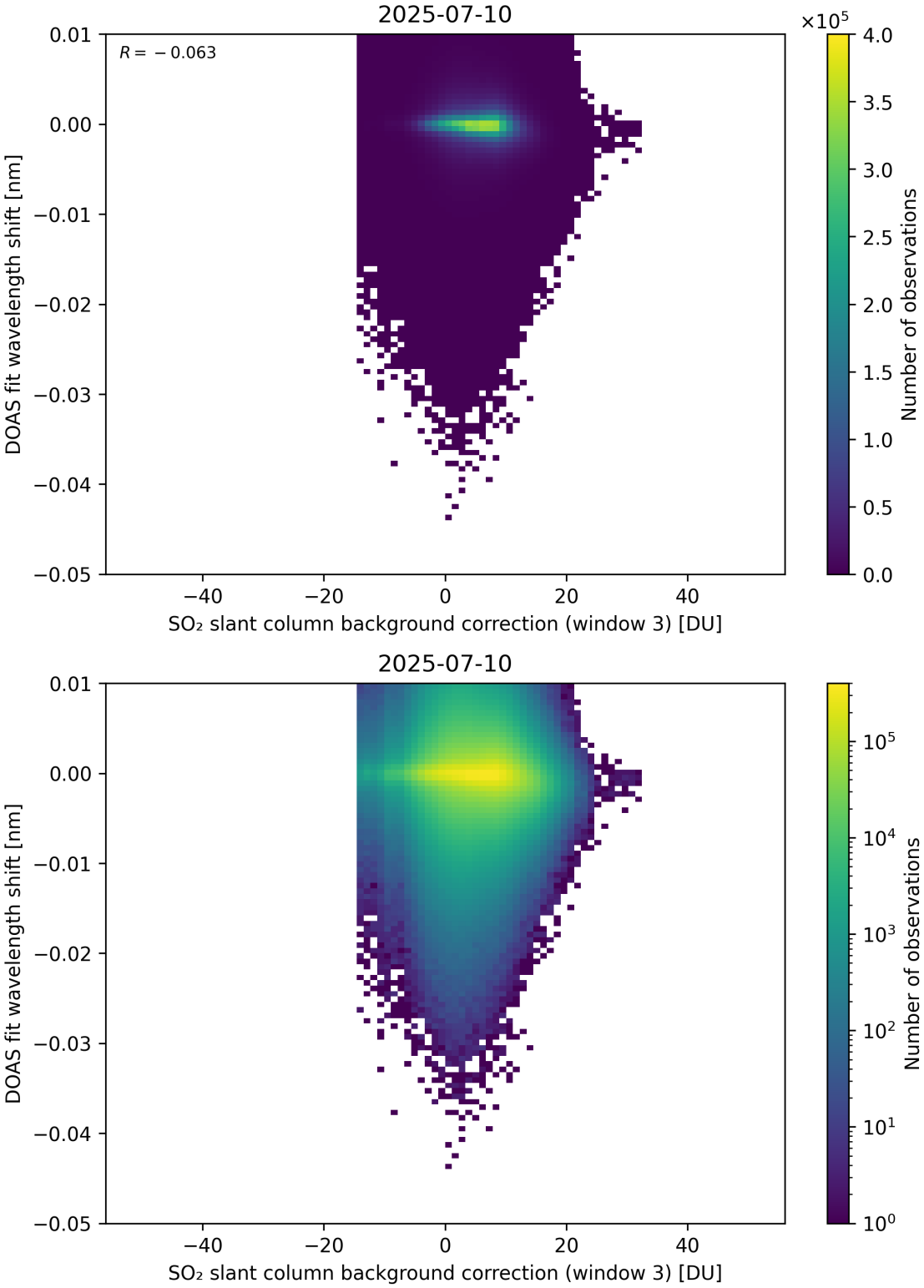

Figure 132: Scatter density plot of "SO_2 slant column background correction (window 3)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

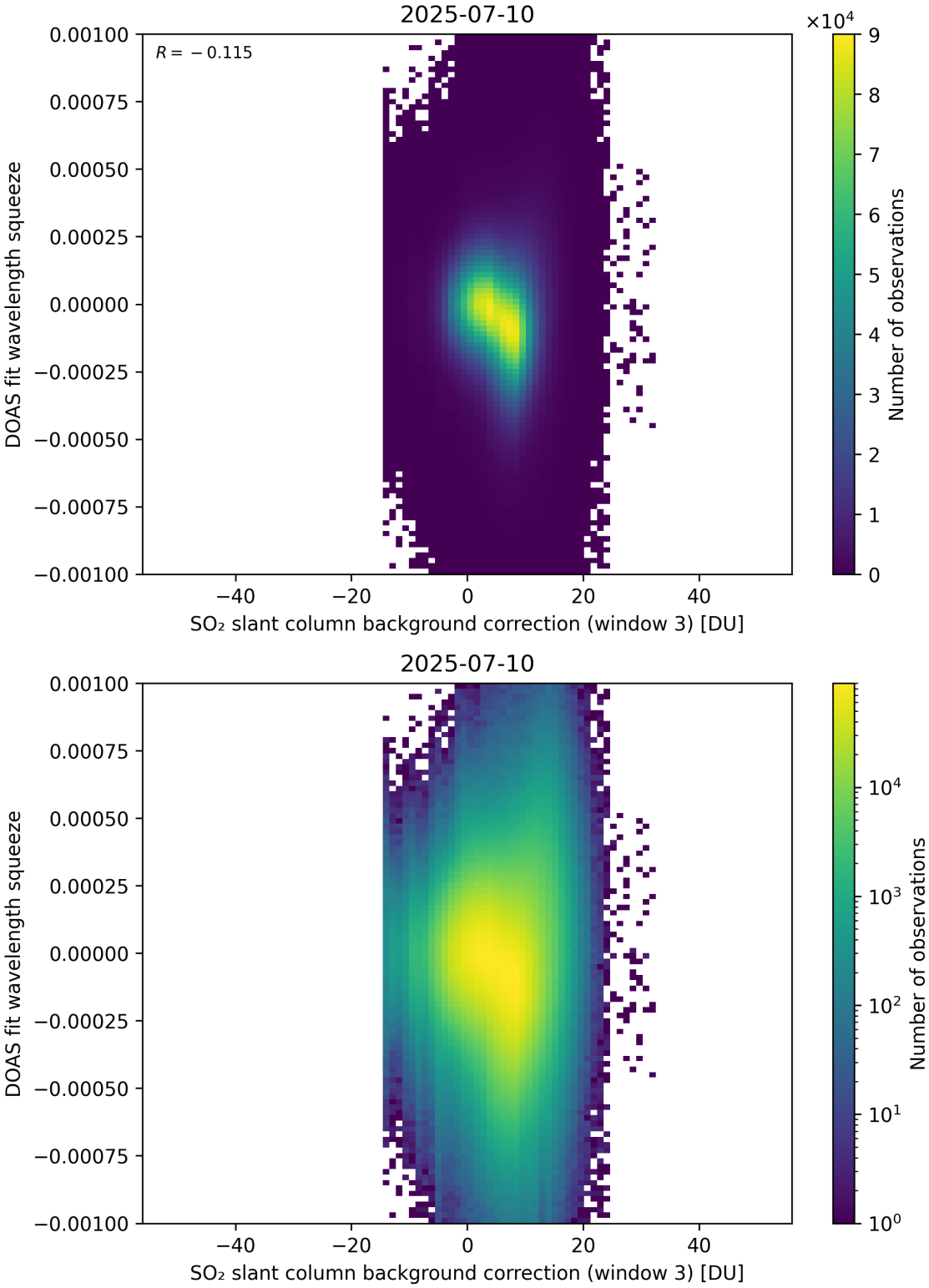

Figure 133: Scatter density plot of "SO_2 slant column background correction (window 3)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

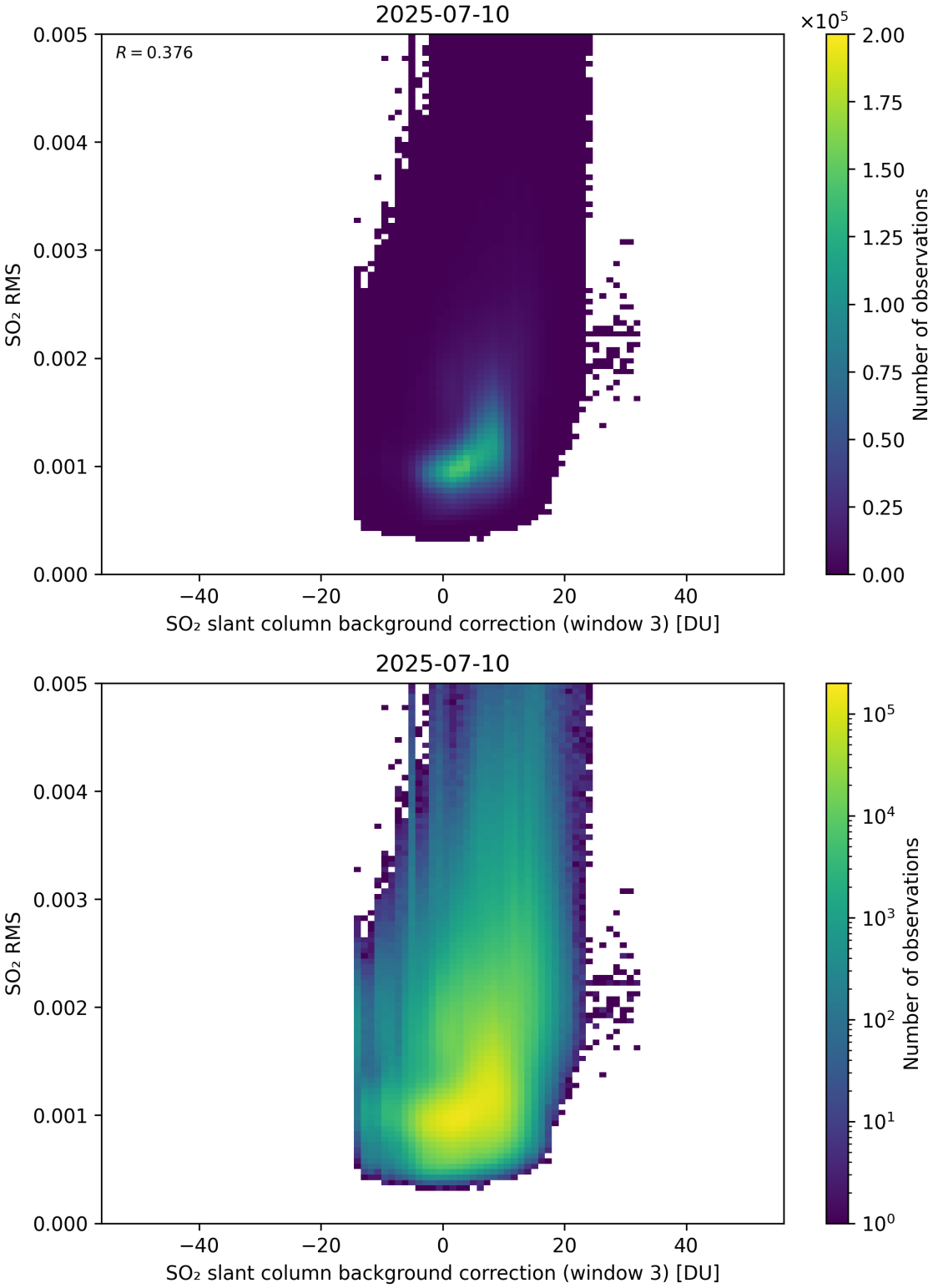

Figure 134: Scatter density plot of "SO_2 slant column background correction (window 3)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

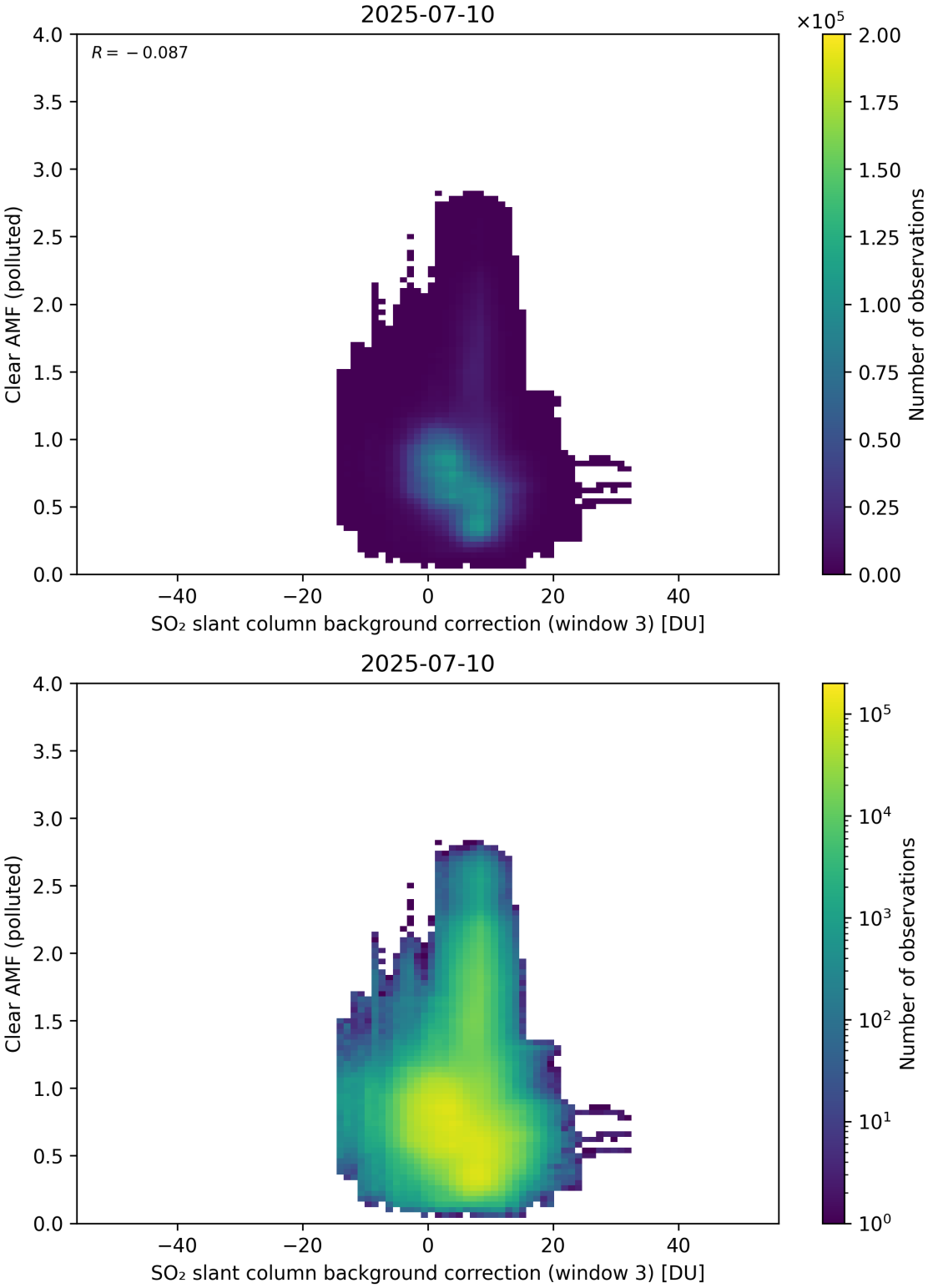

Figure 135: Scatter density plot of "SO_2 slant column background correction (window 3)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

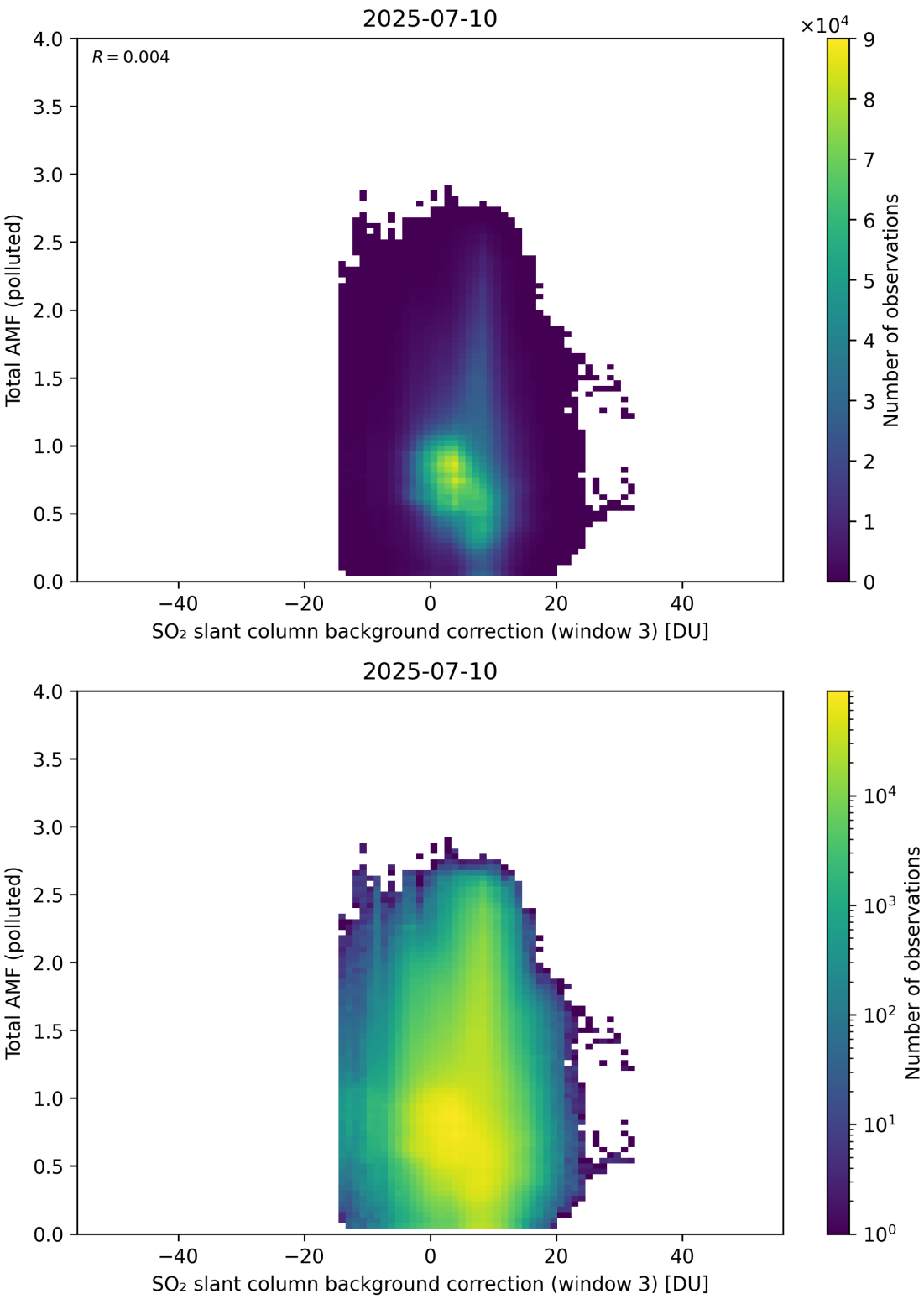

Figure 136: Scatter density plot of "SO_2 slant column background correction (window 3)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

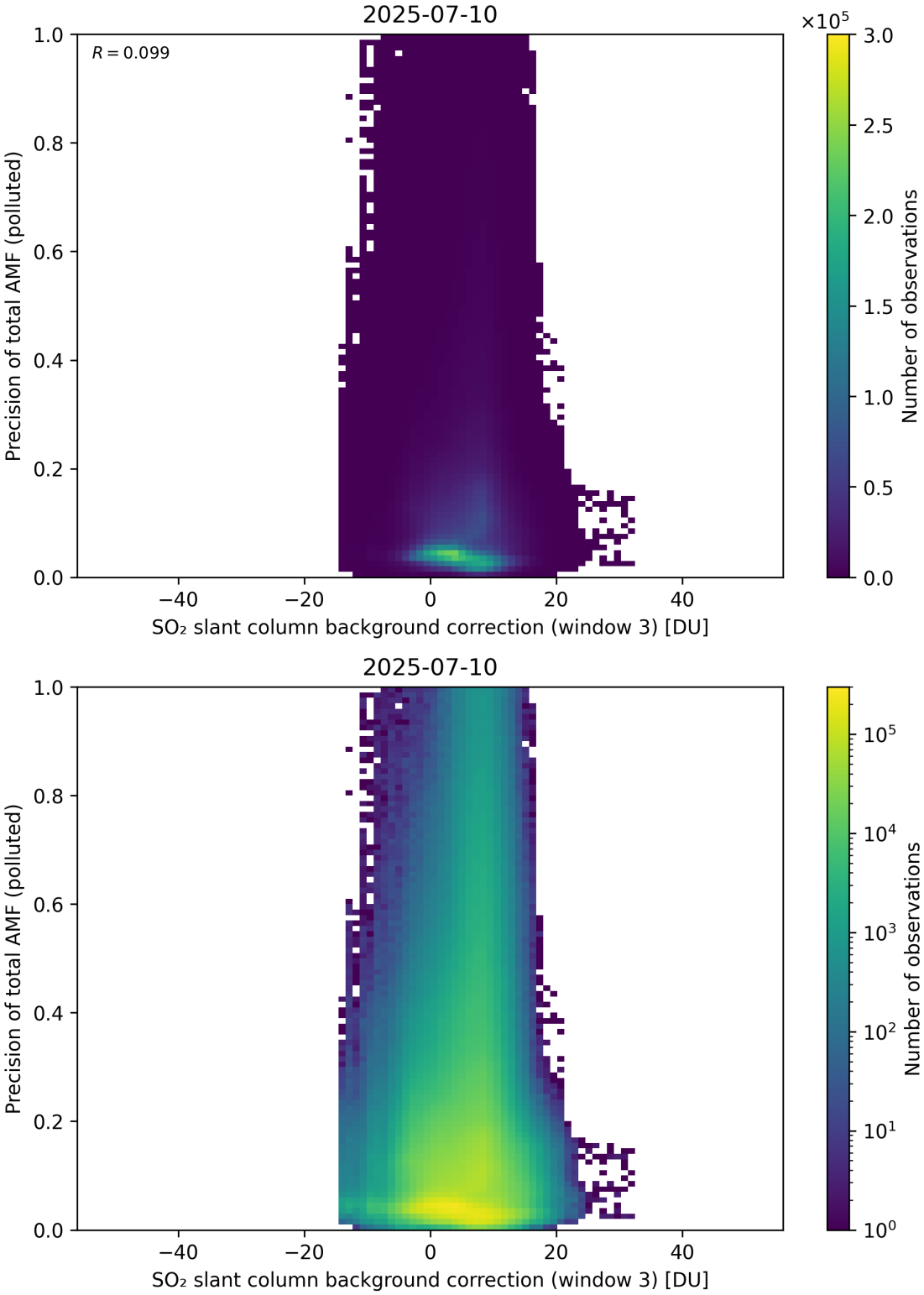

Figure 137: Scatter density plot of "SO_2 slant column background correction (window 3)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

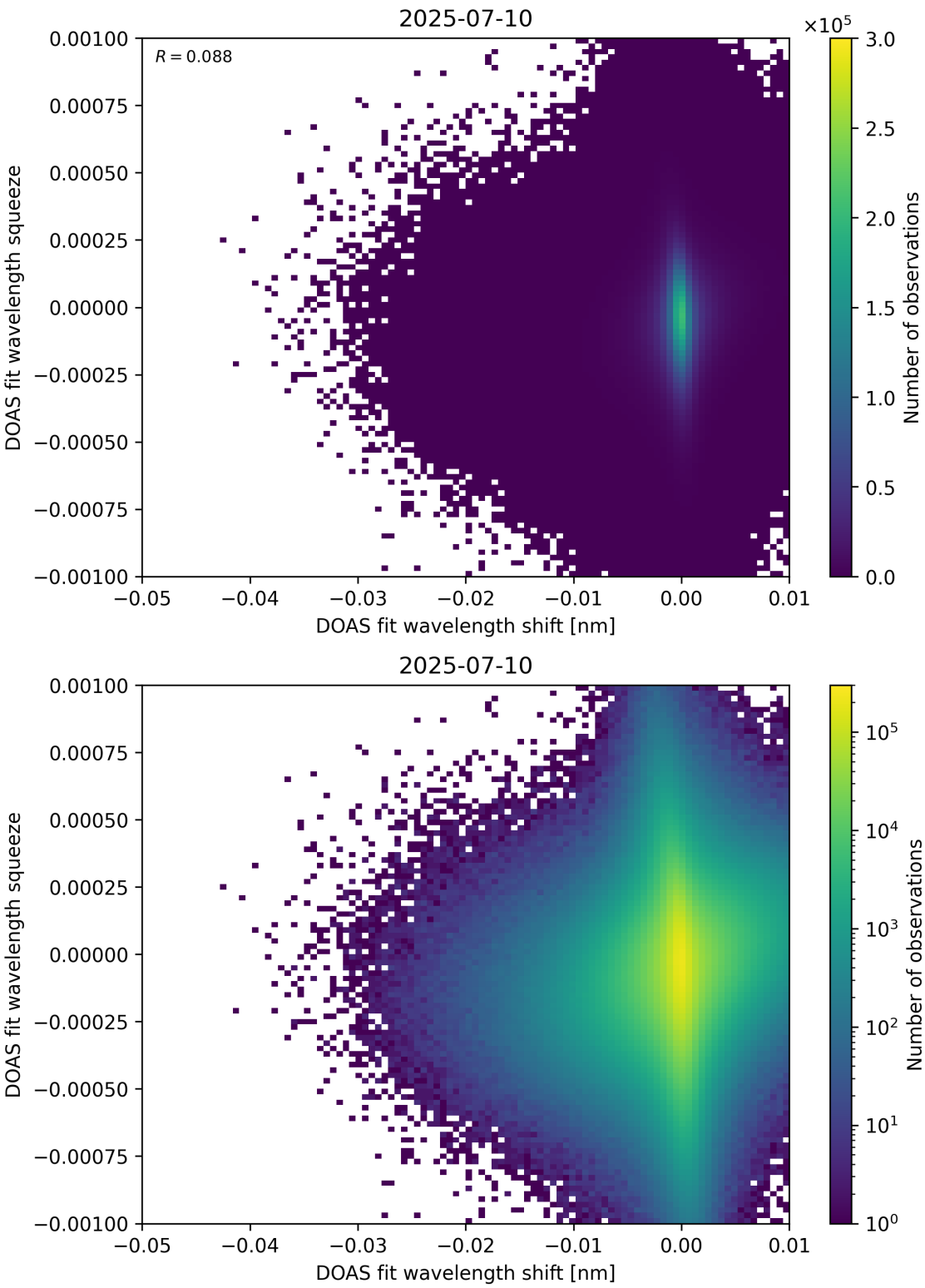

Figure 138: Scatter density plot of “DOAS fit wavelength shift” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11.

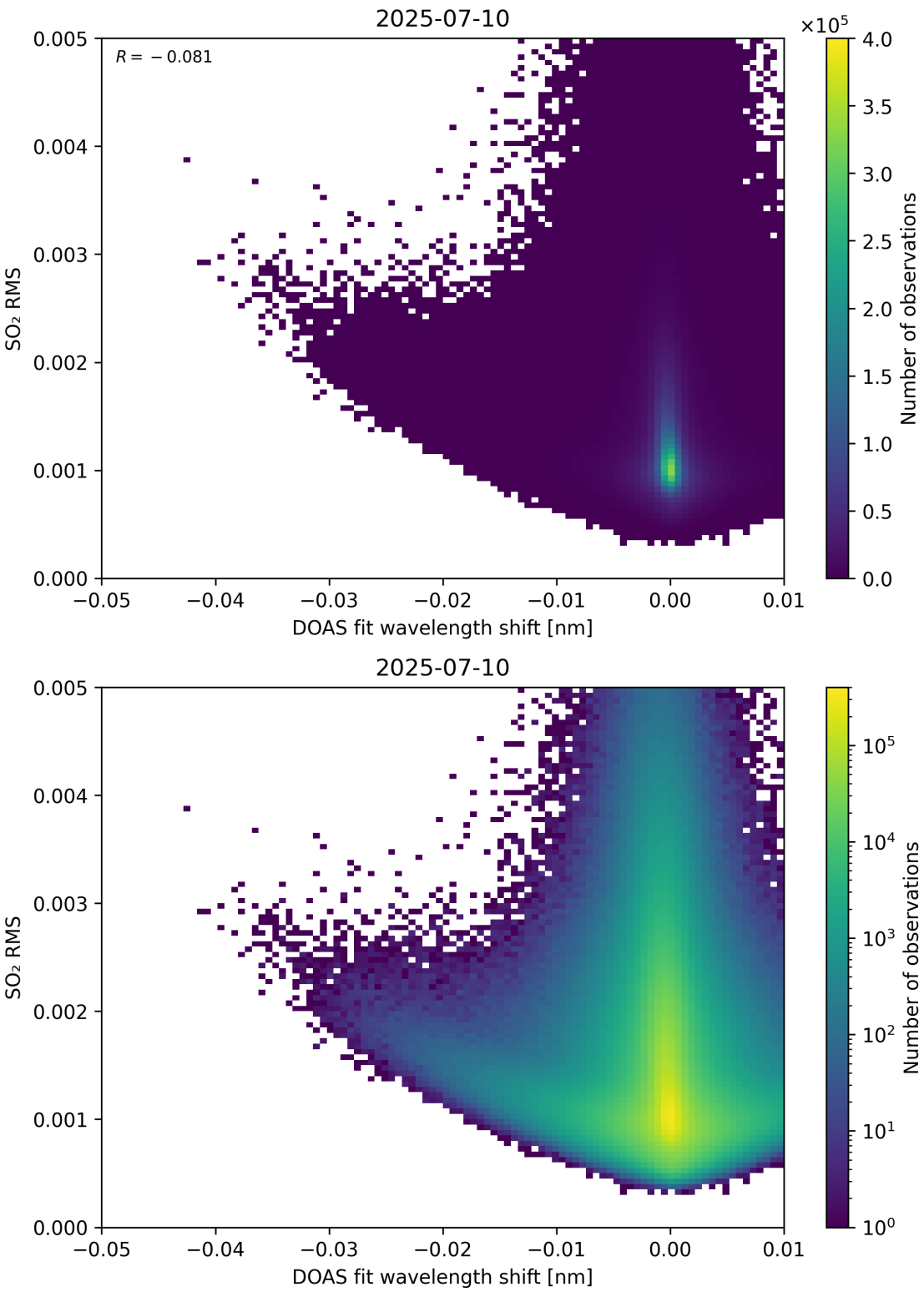

Figure 139: Scatter density plot of "DOAS fit wavelength shift" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

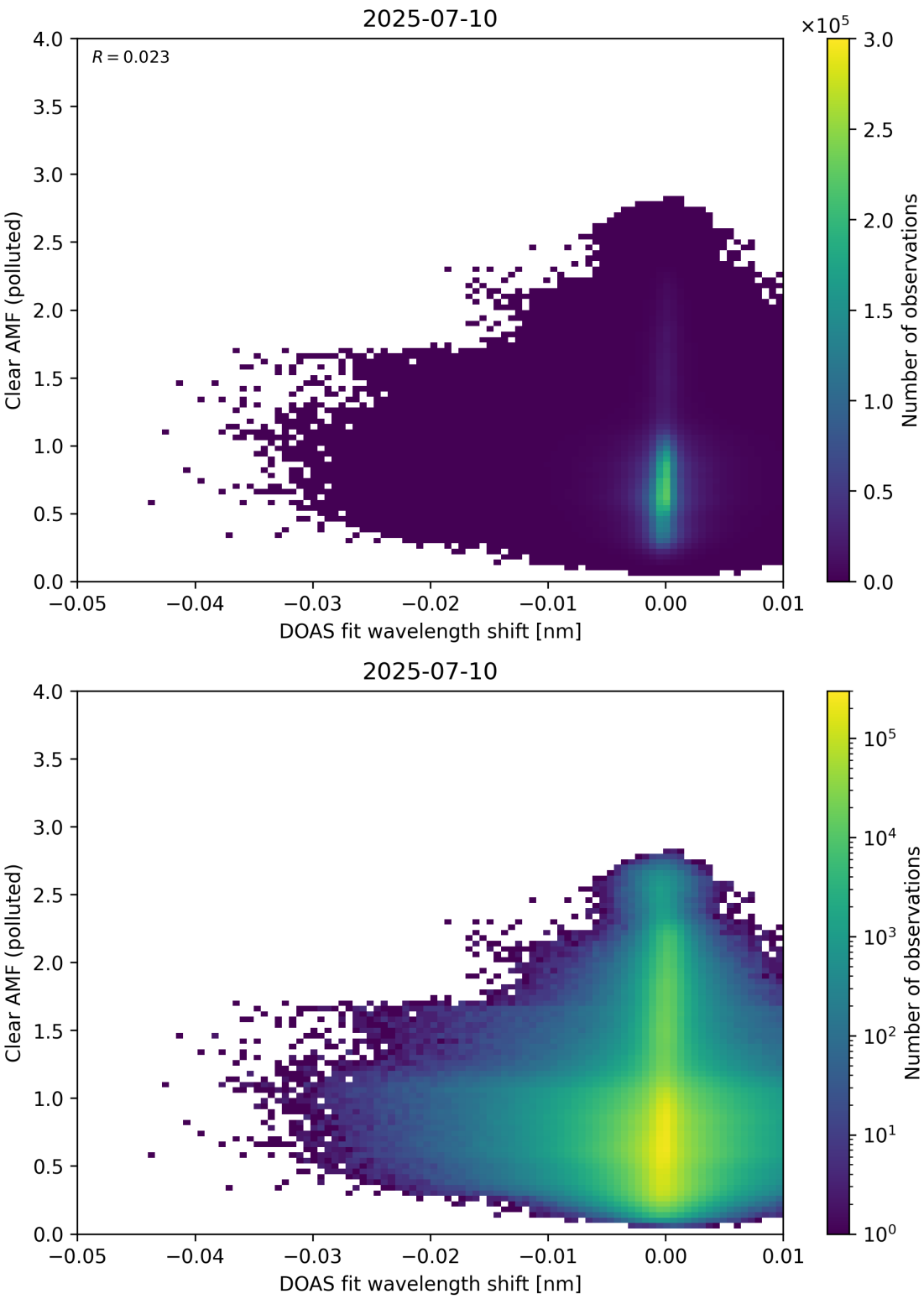

Figure 140: Scatter density plot of “DOAS fit wavelength shift” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11.

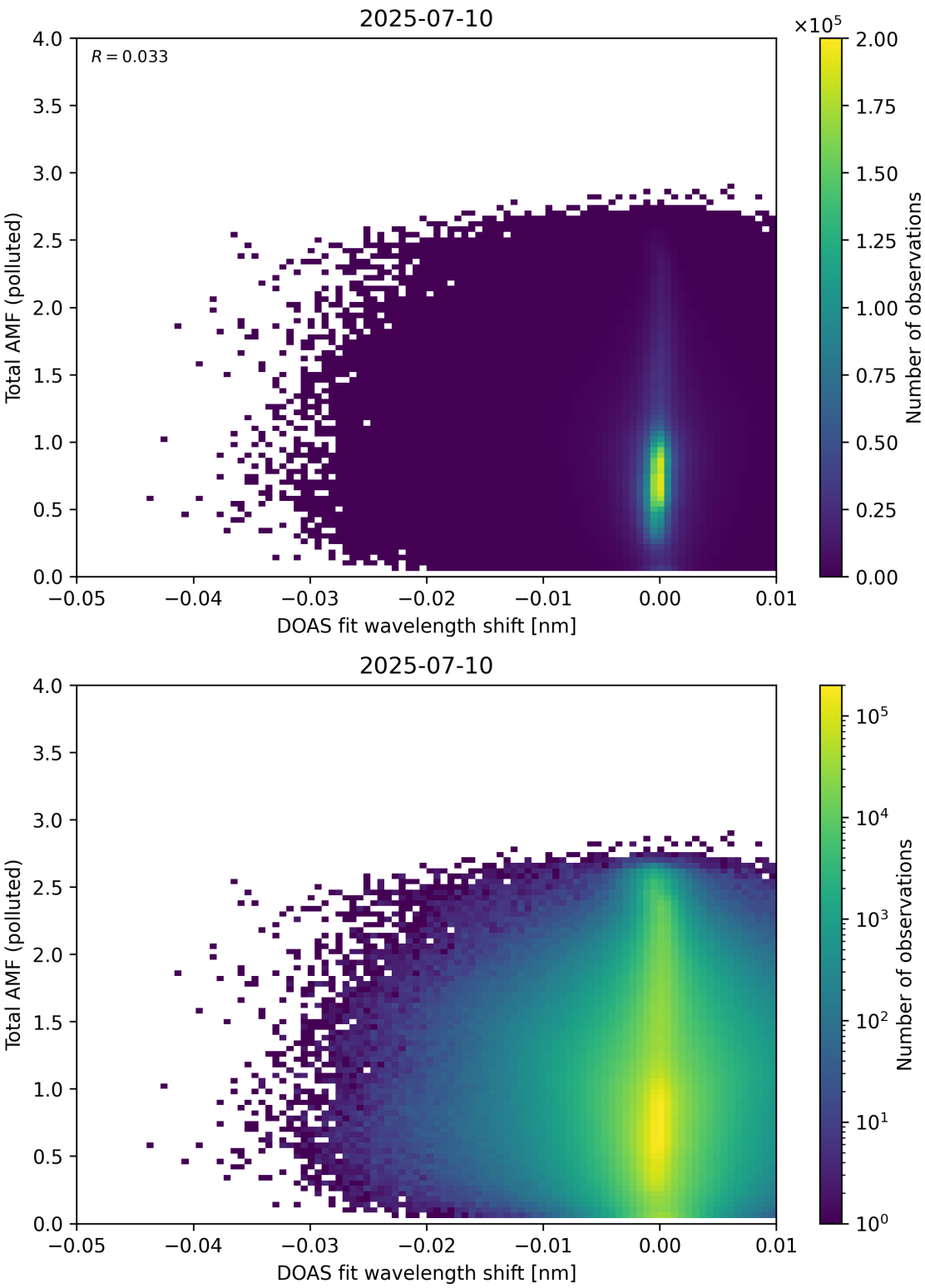

Figure 141: Scatter density plot of “DOAS fit wavelength shift” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11.

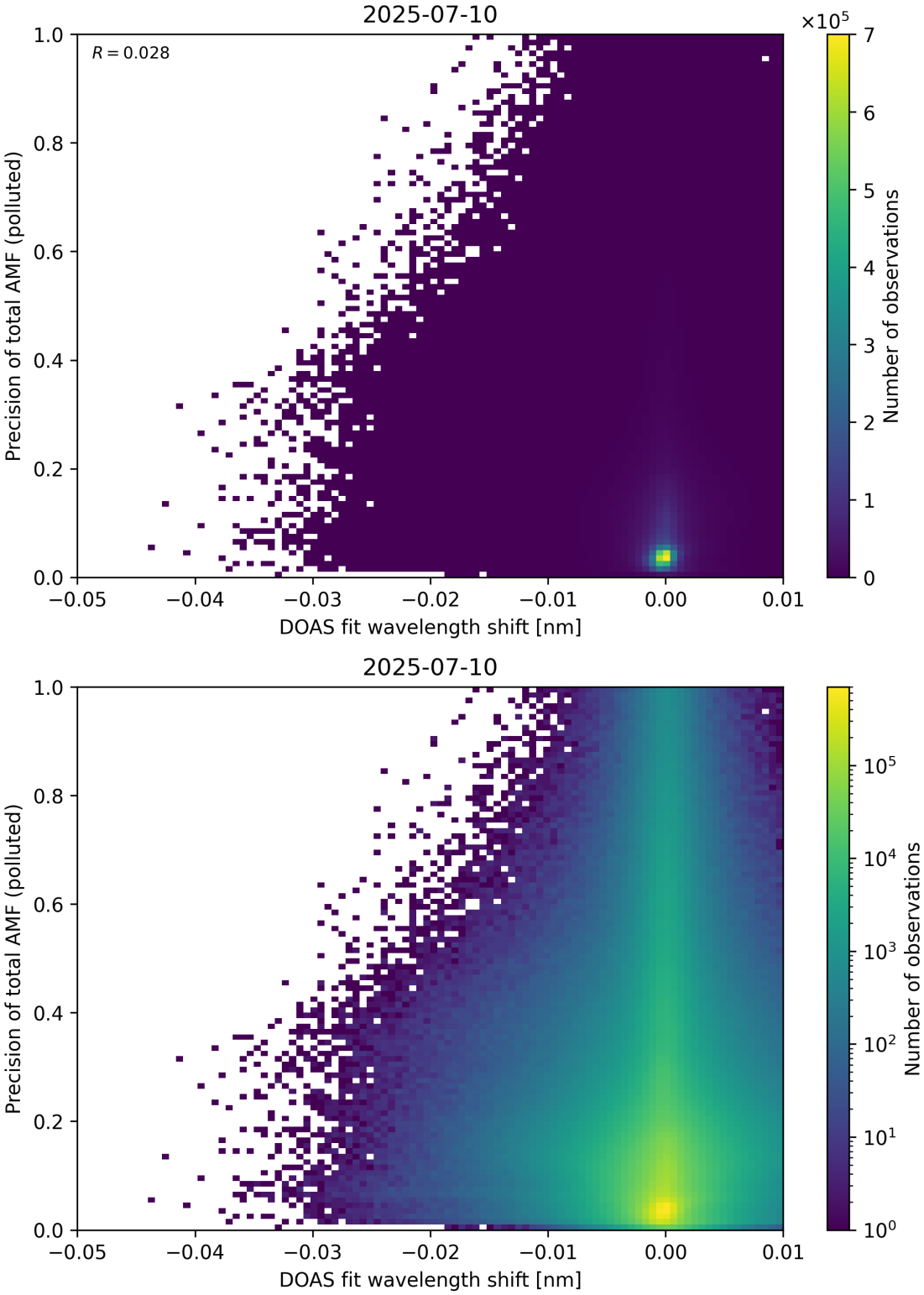

Figure 142: Scatter density plot of “DOAS fit wavelength shift” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11.

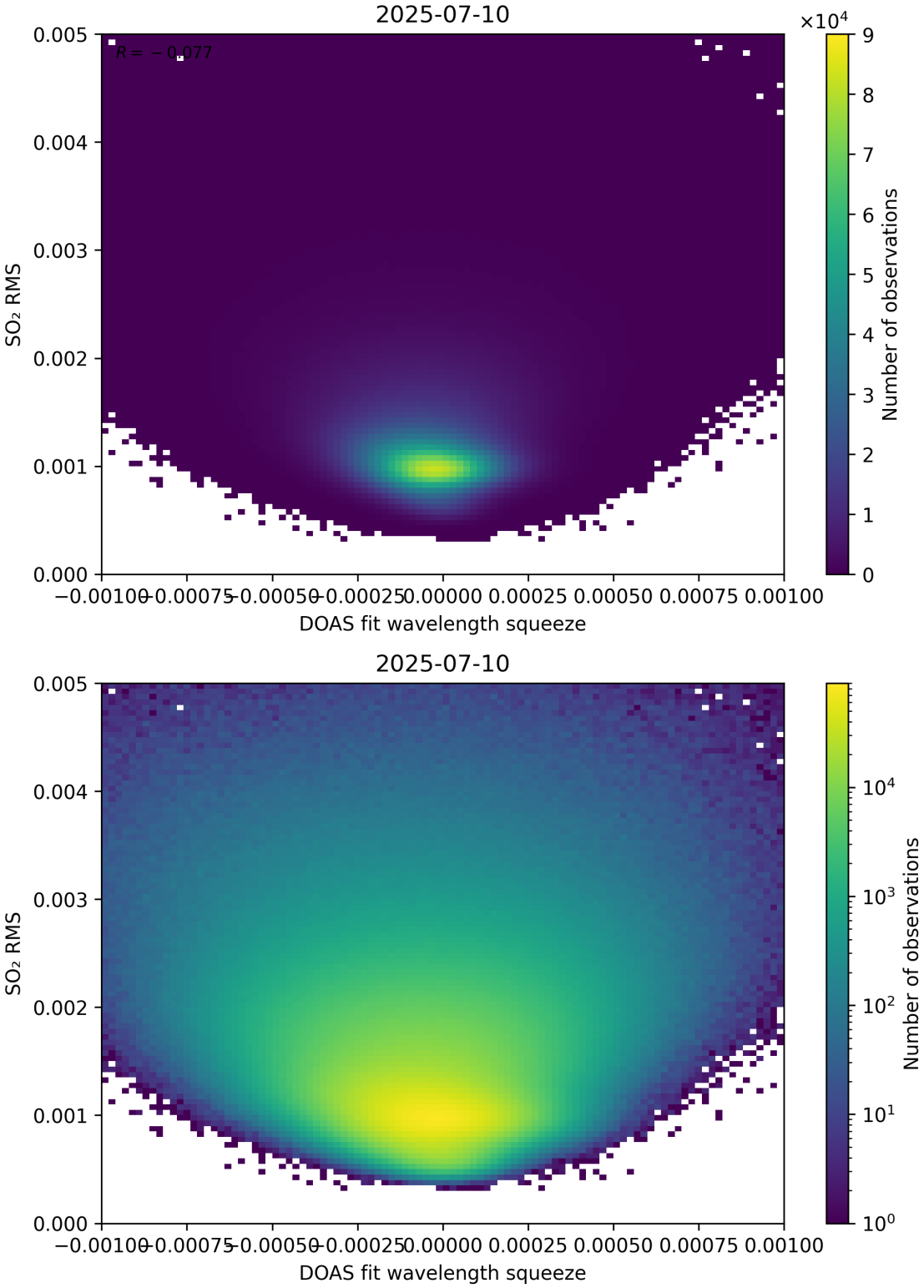

Figure 143: Scatter density plot of “DOAS fit wavelength squeeze” against “SO_2 RMS” for 2025-07-09 to 2025-07-11.

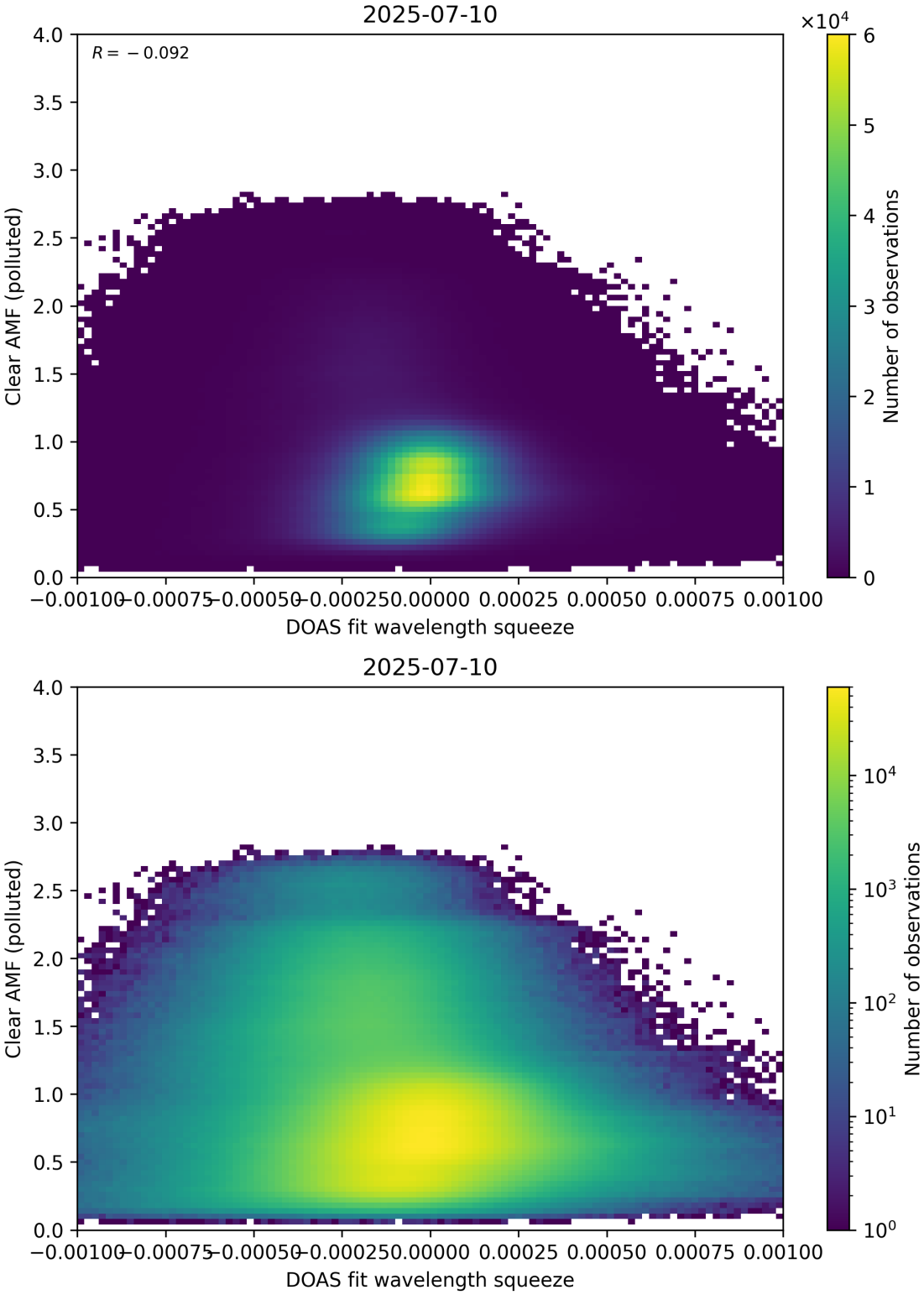

Figure 144: Scatter density plot of “DOAS fit wavelength squeeze” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11.

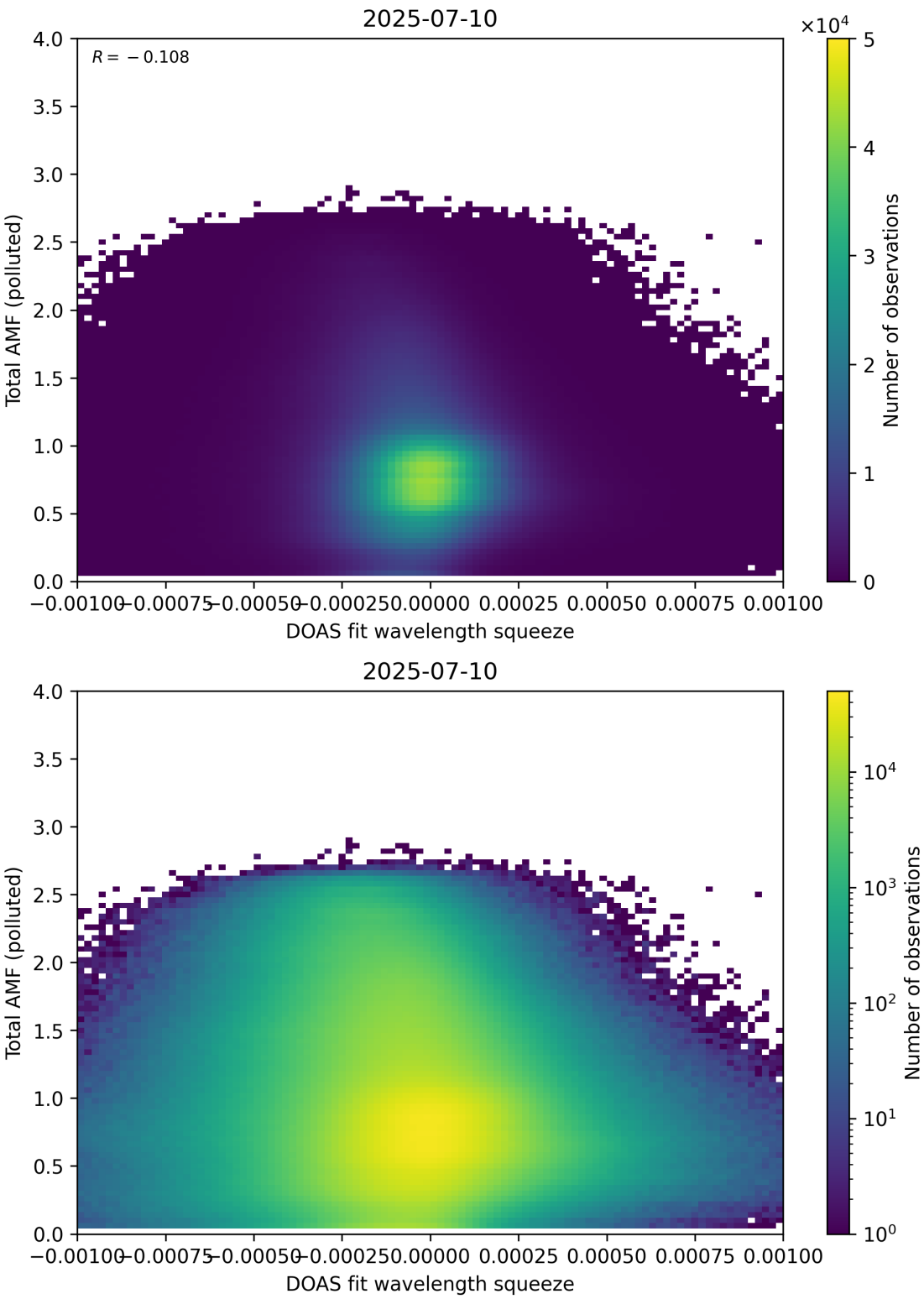

Figure 145: Scatter density plot of “DOAS fit wavelength squeeze” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11.

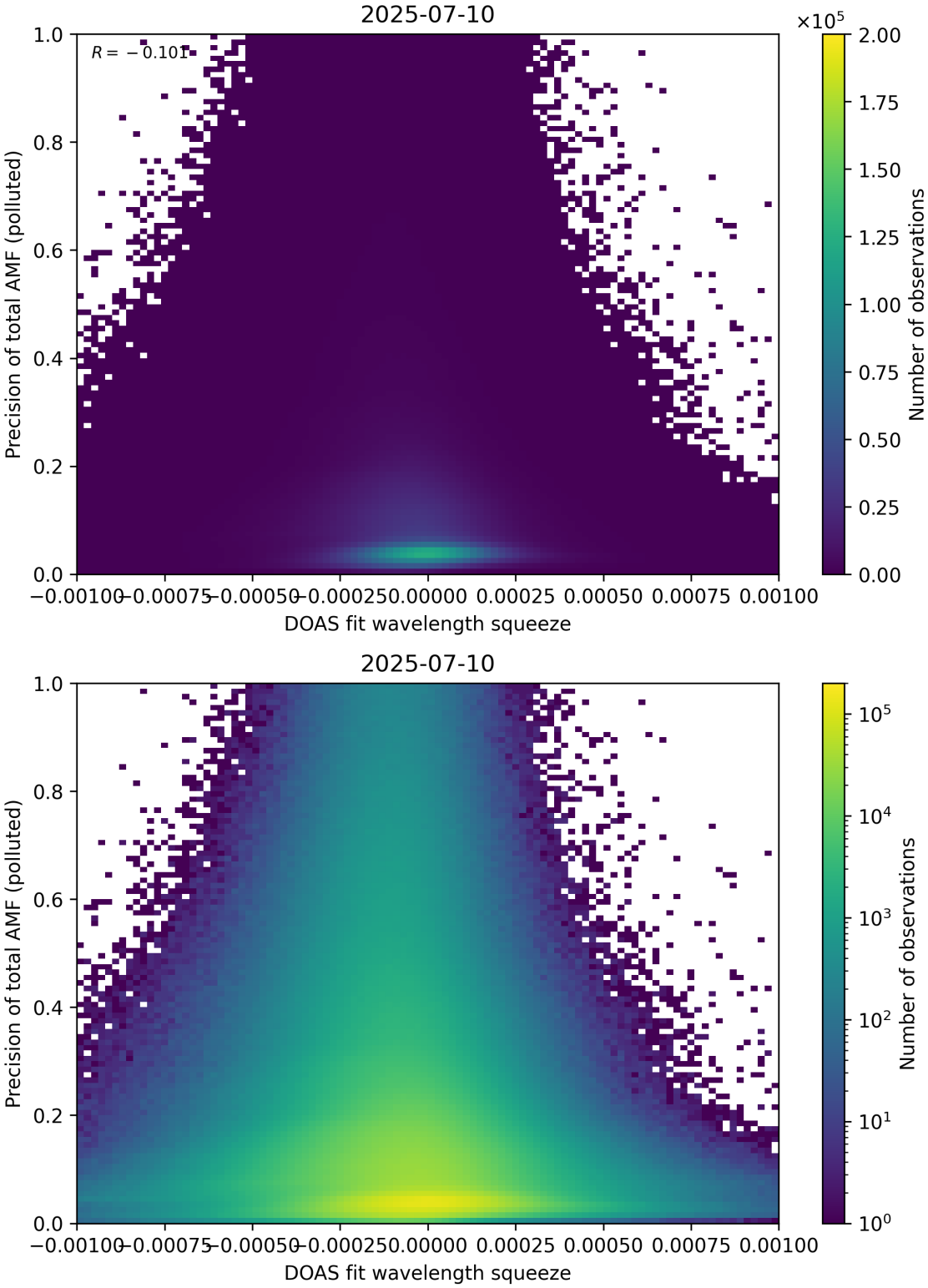

Figure 146: Scatter density plot of “DOAS fit wavelength squeeze” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11.

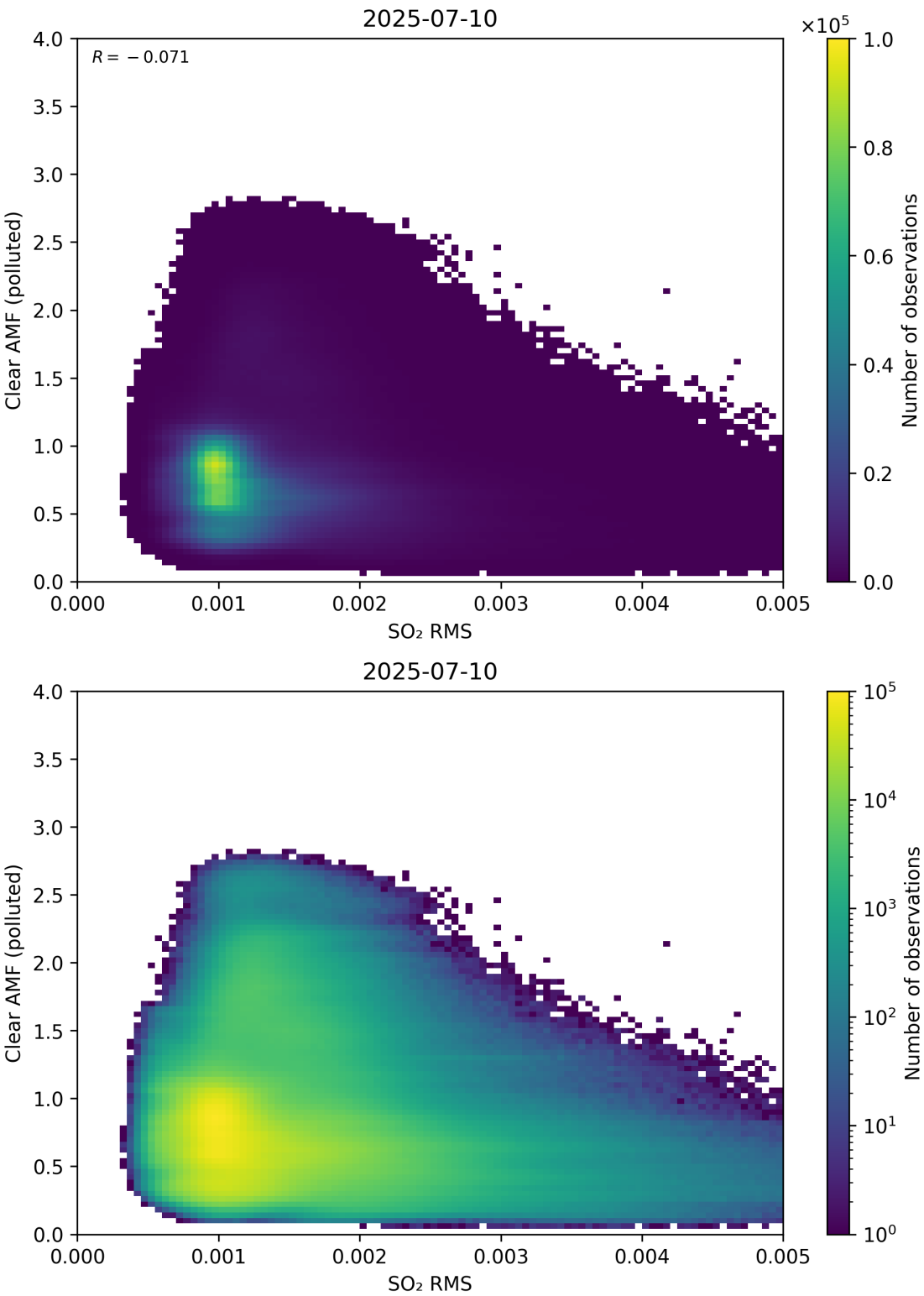

Figure 147: Scatter density plot of "SO_2 RMS" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

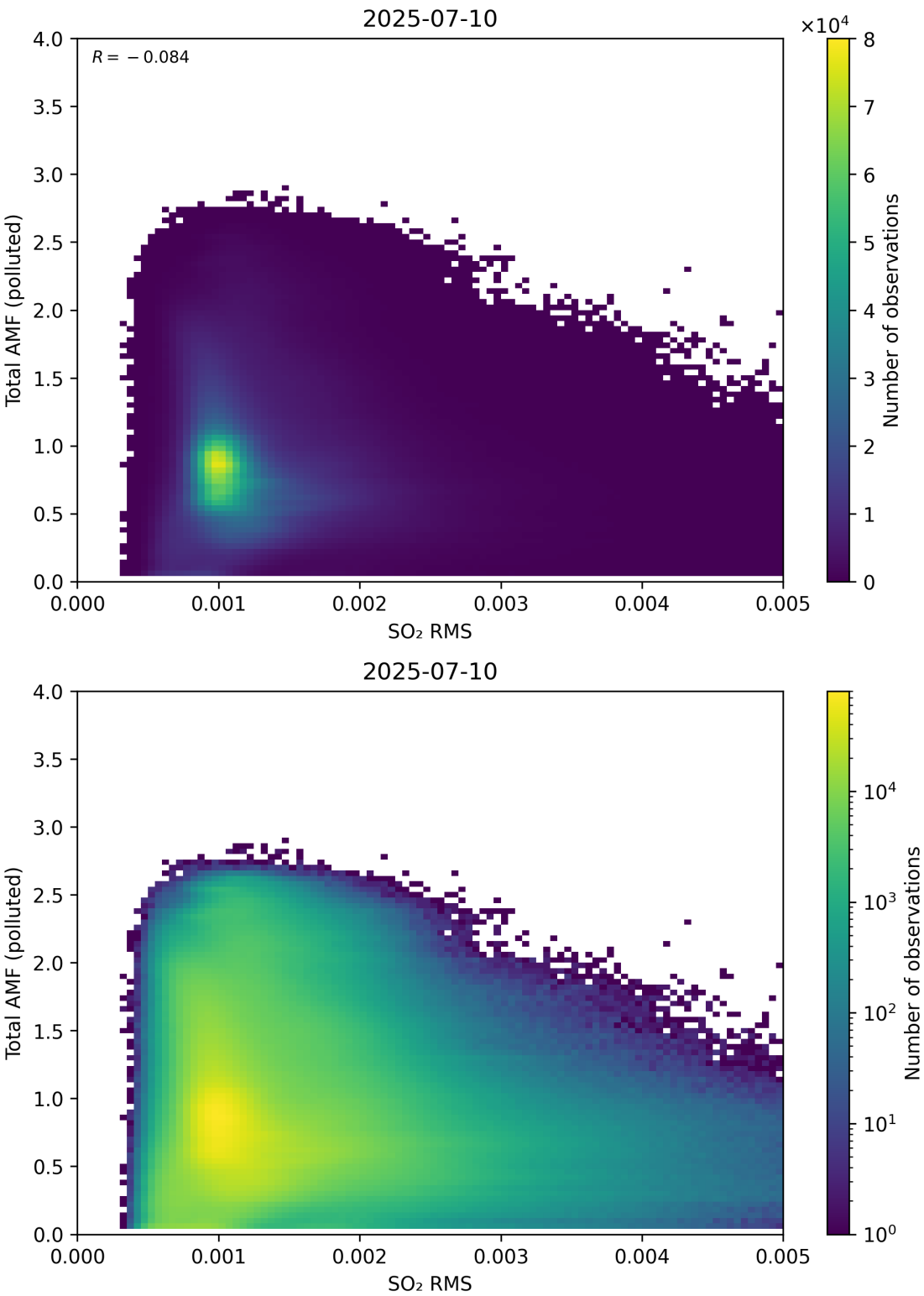

Figure 148: Scatter density plot of "SO_2 RMS" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

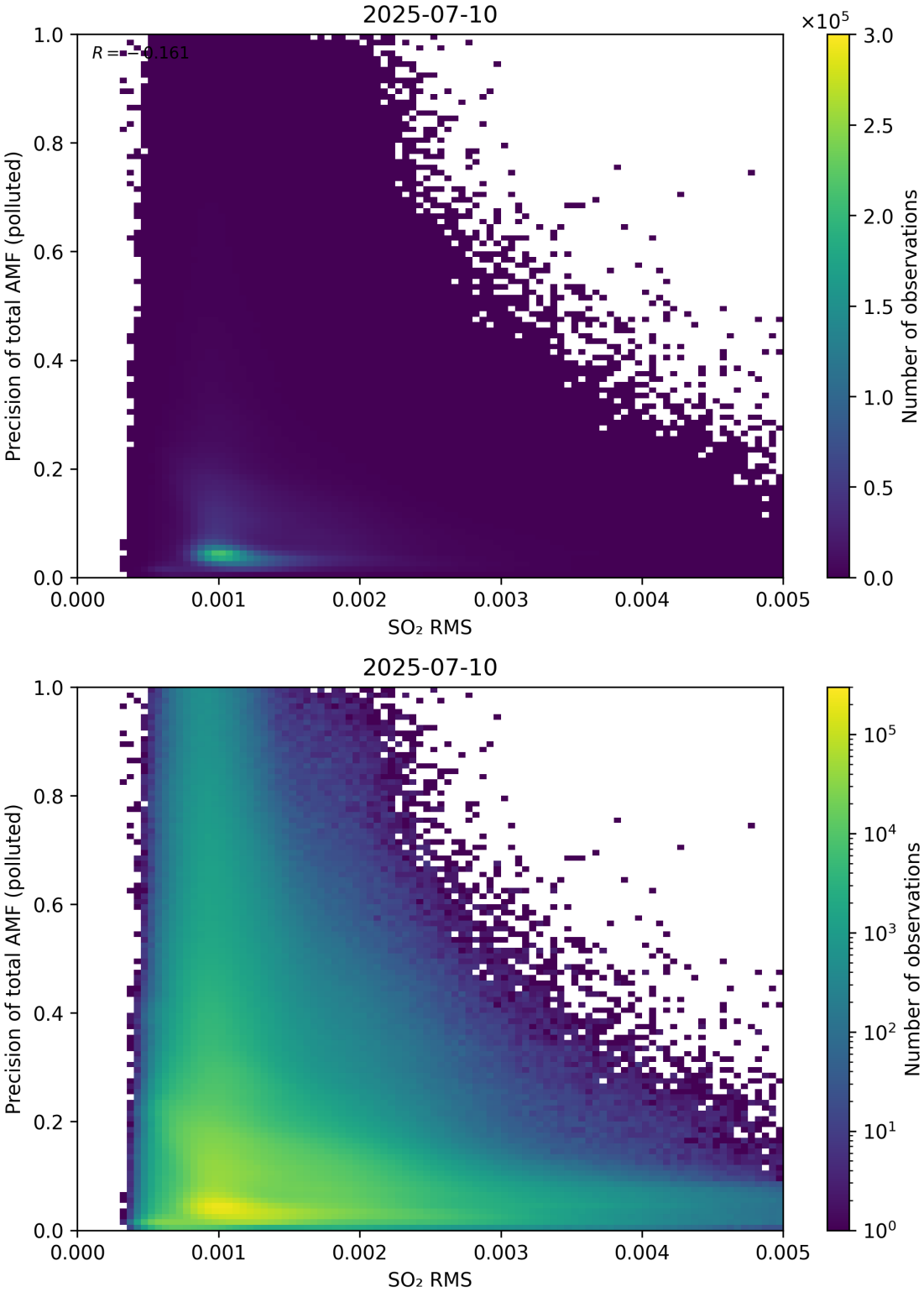

Figure 149: Scatter density plot of "SO_2 RMS" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

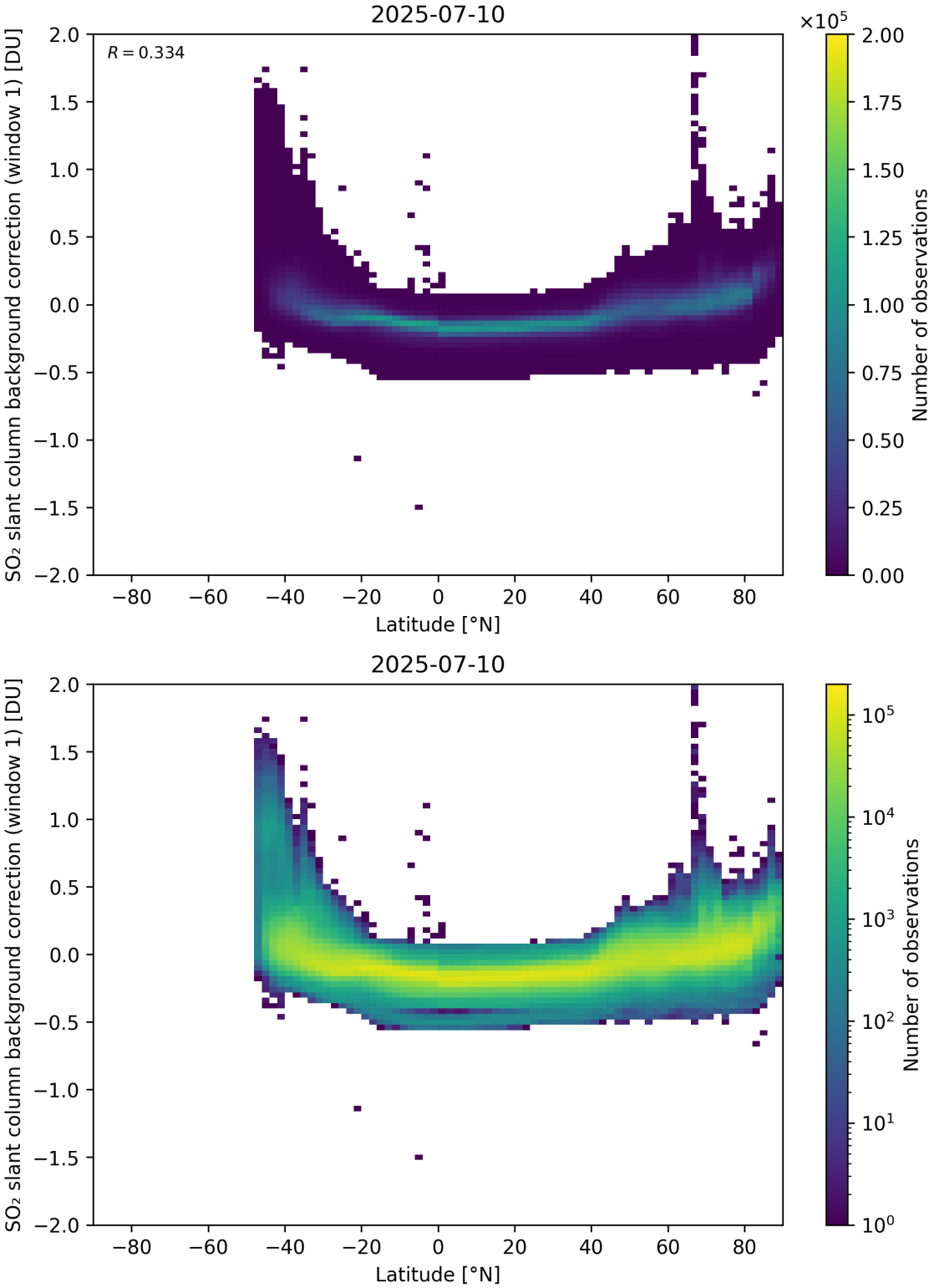

Figure 150: Scatter density plot of "Latitude" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

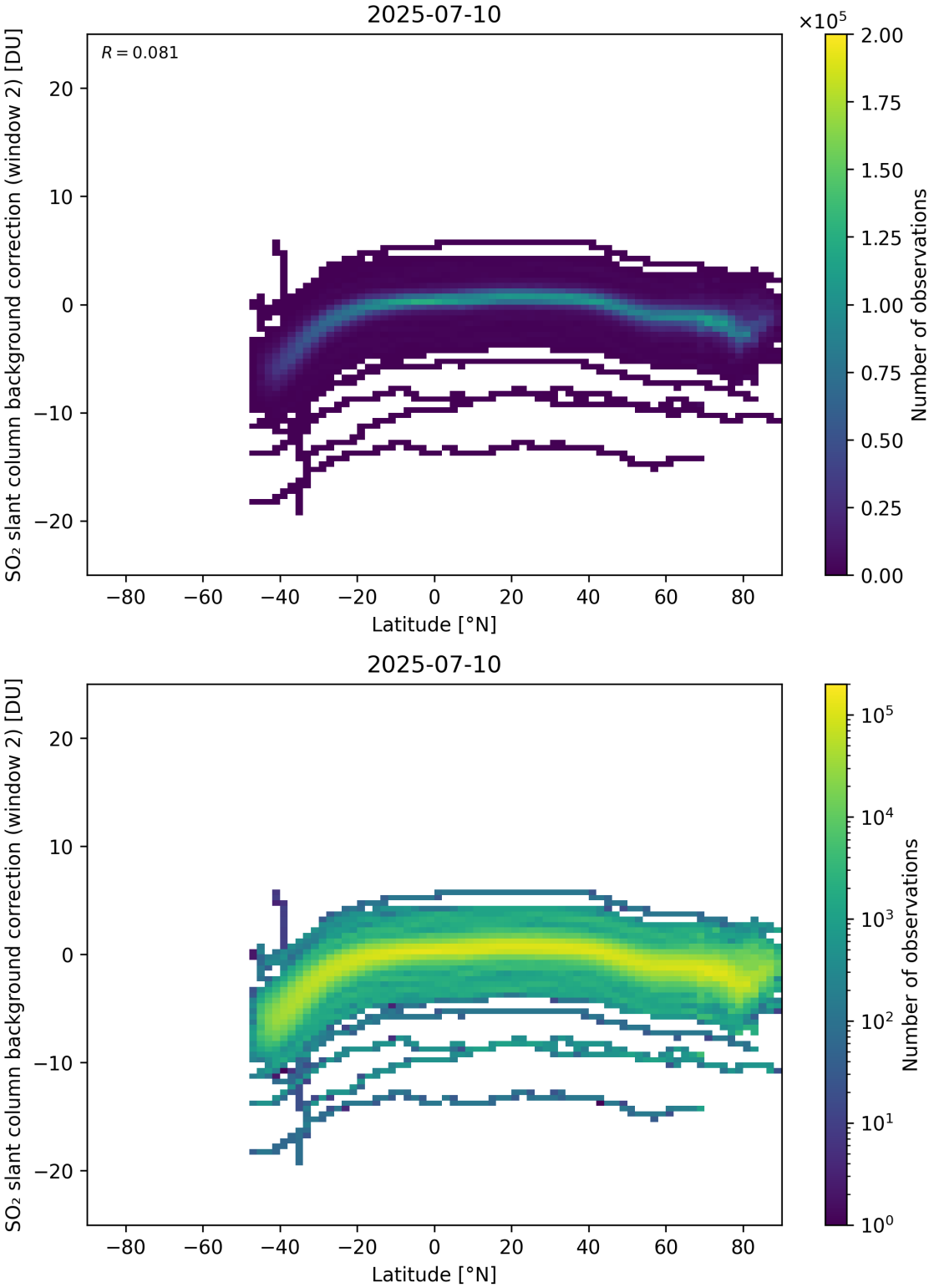

Figure 151: Scatter density plot of "Latitude" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

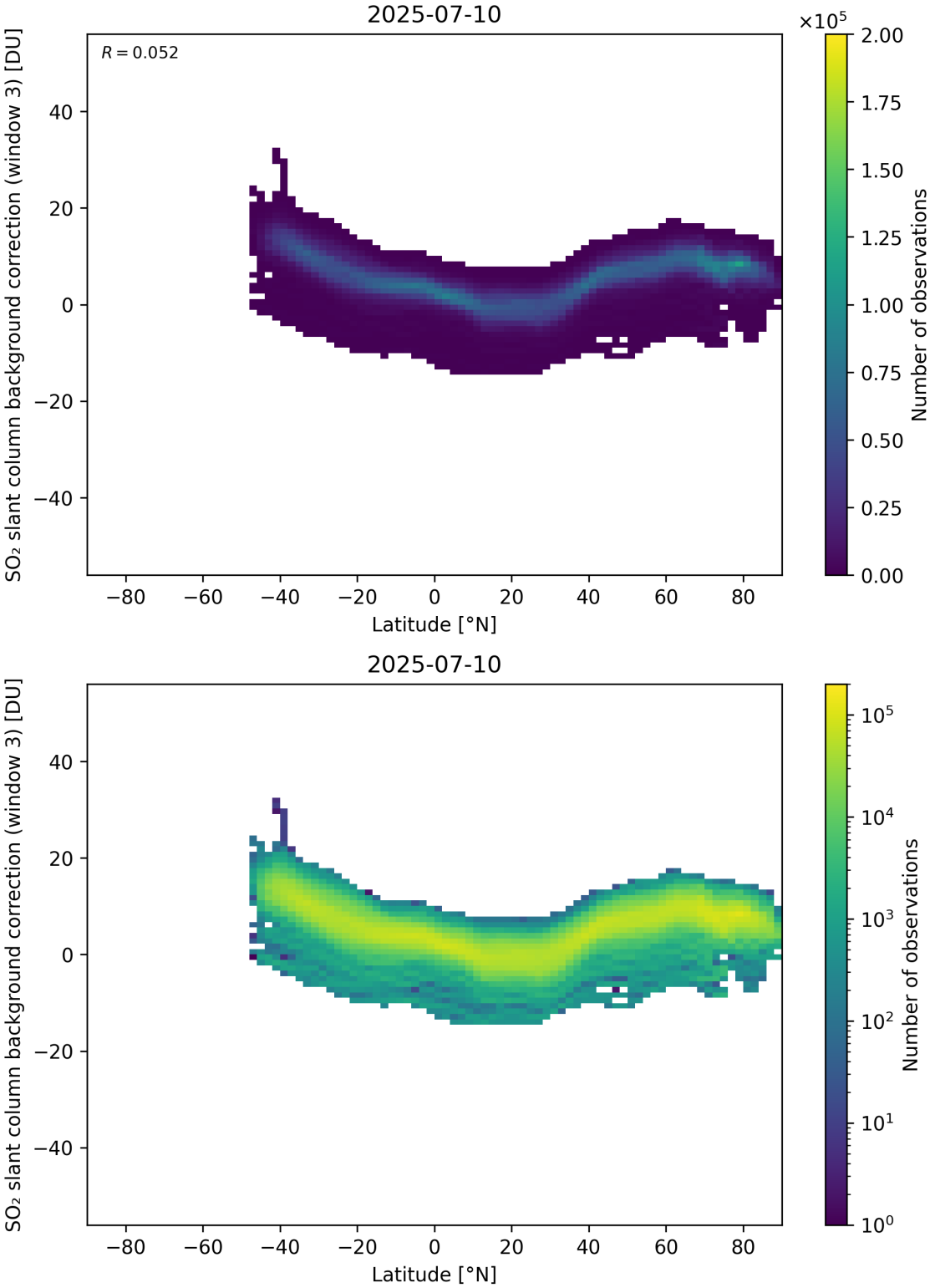

Figure 152: Scatter density plot of "Latitude" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

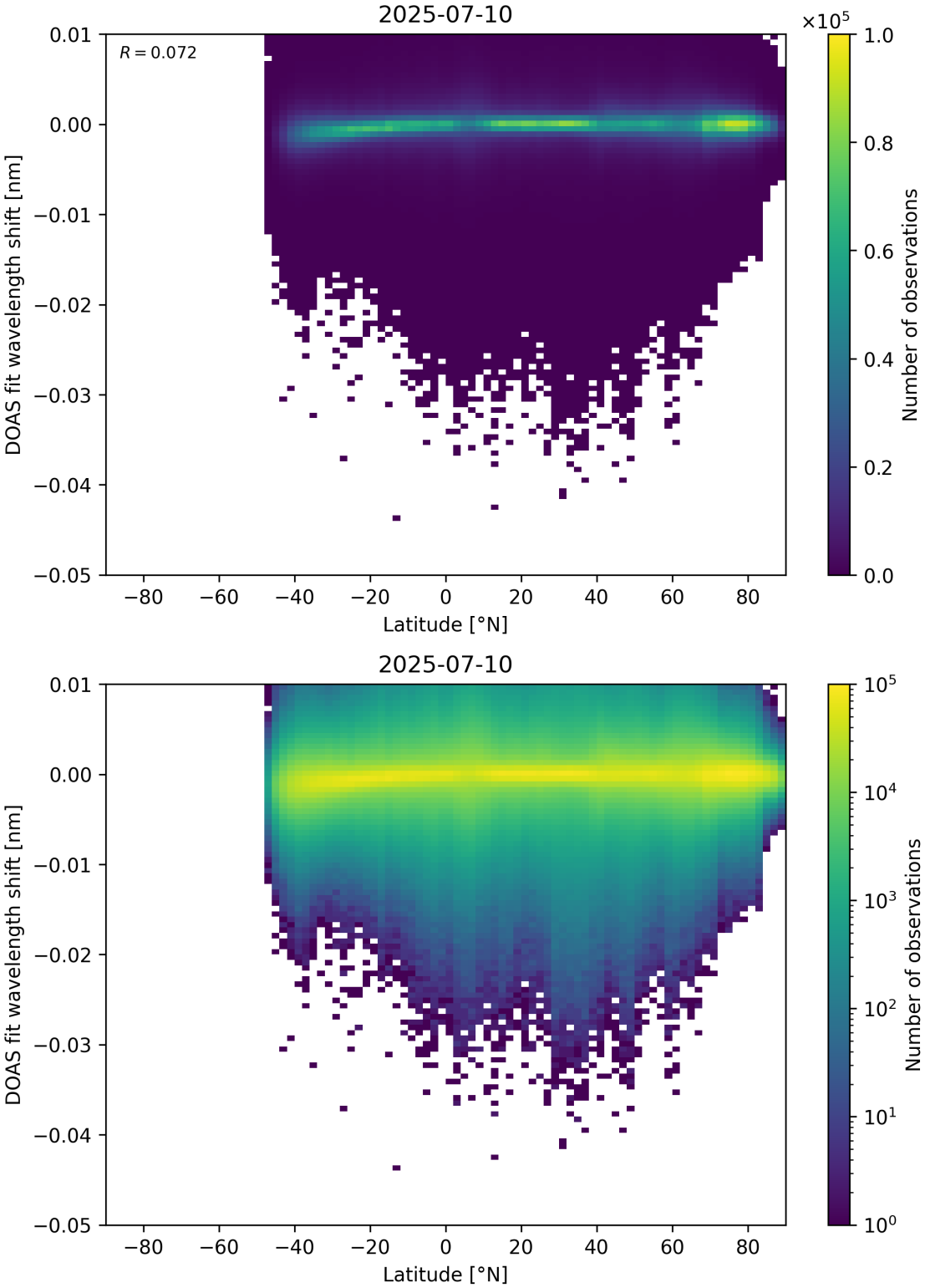

Figure 153: Scatter density plot of “Latitude” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11.

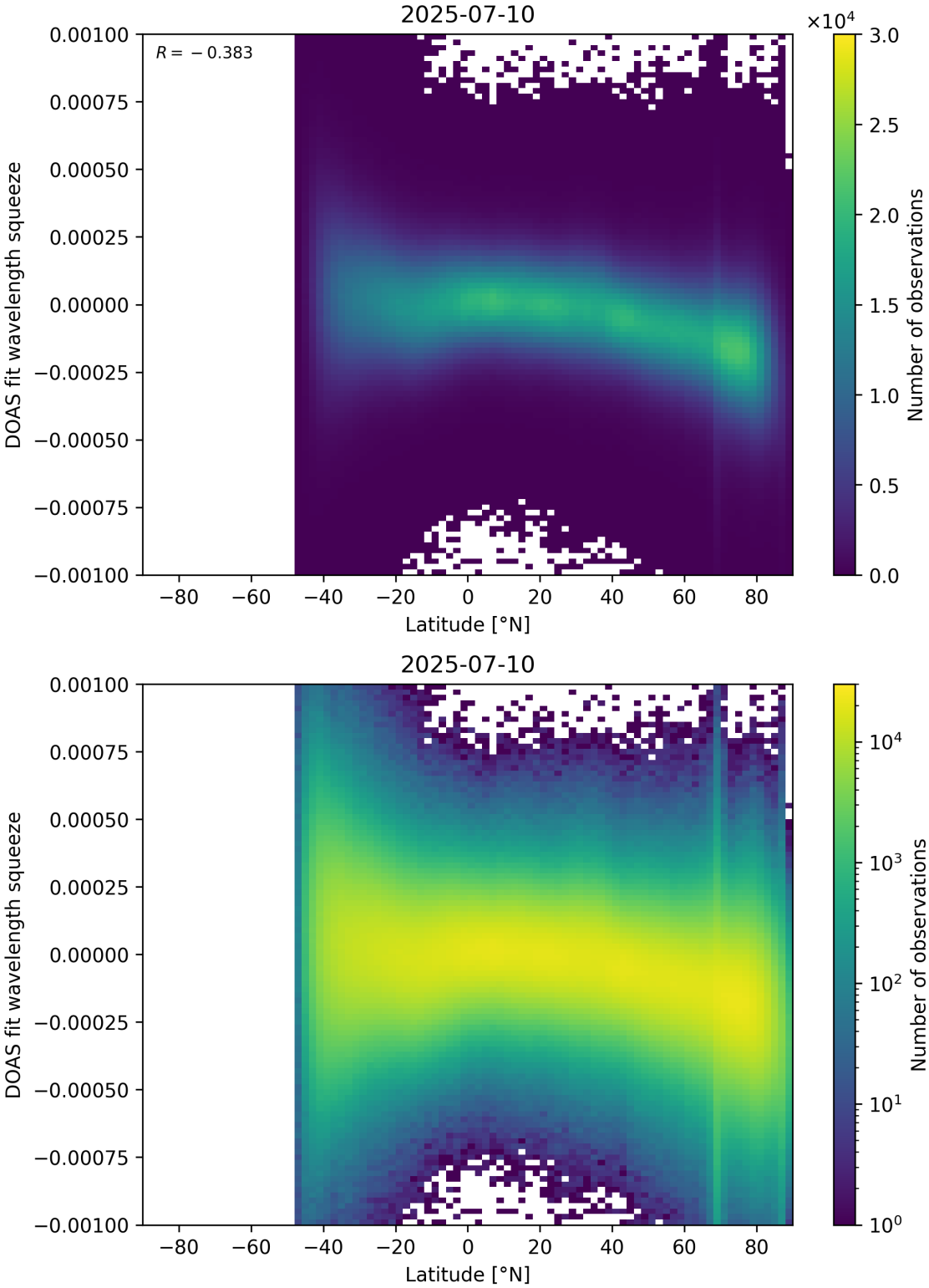

Figure 154: Scatter density plot of “Latitude” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11.

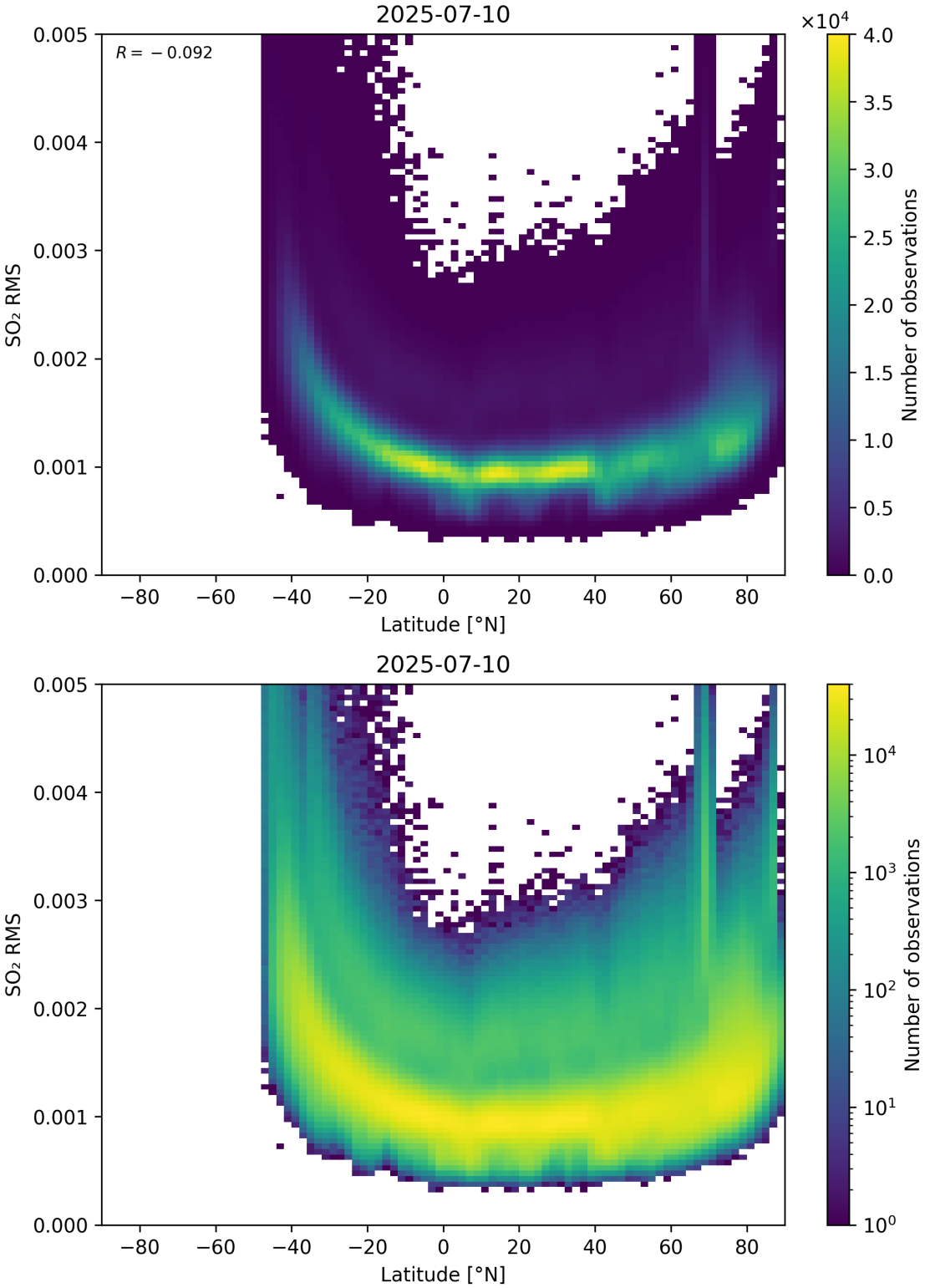

Figure 155: Scatter density plot of “Latitude” against “SO_2 RMS” for 2025-07-09 to 2025-07-11.

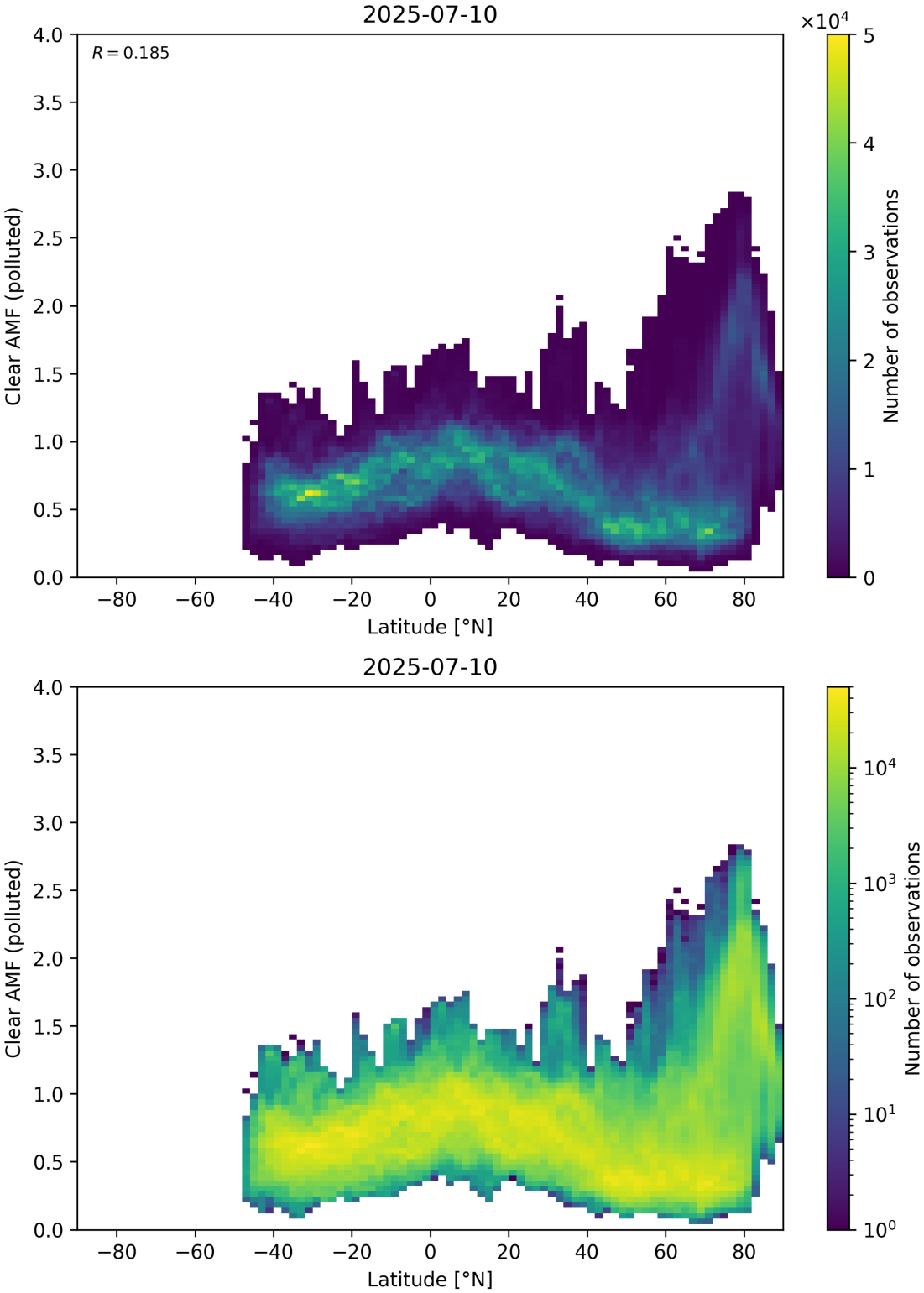

Figure 156: Scatter density plot of “Latitude” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11.

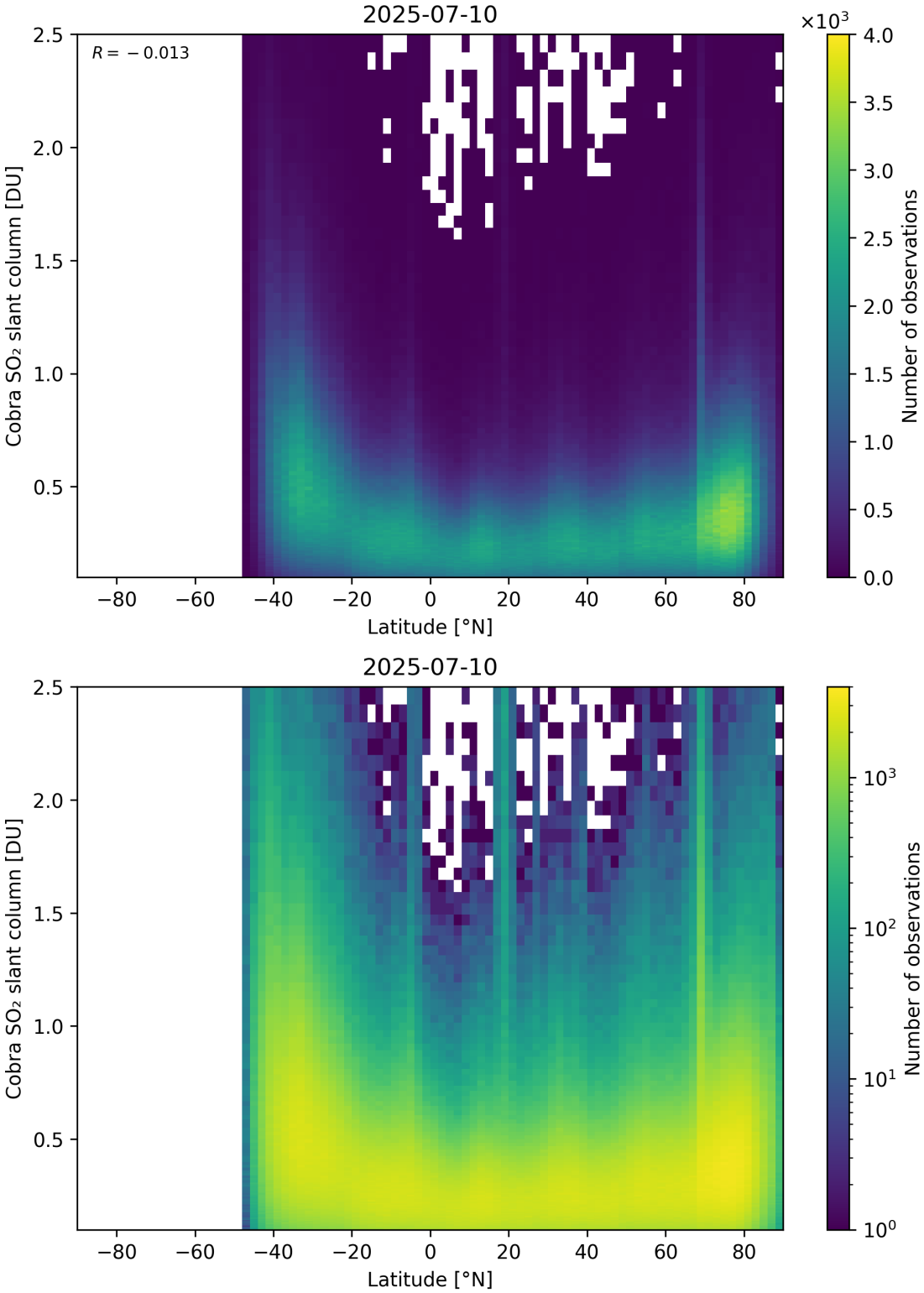

Figure 157: Scatter density plot of “Latitude” against “Cobra SO_2 slant column” for 2025-07-09 to 2025-07-11.

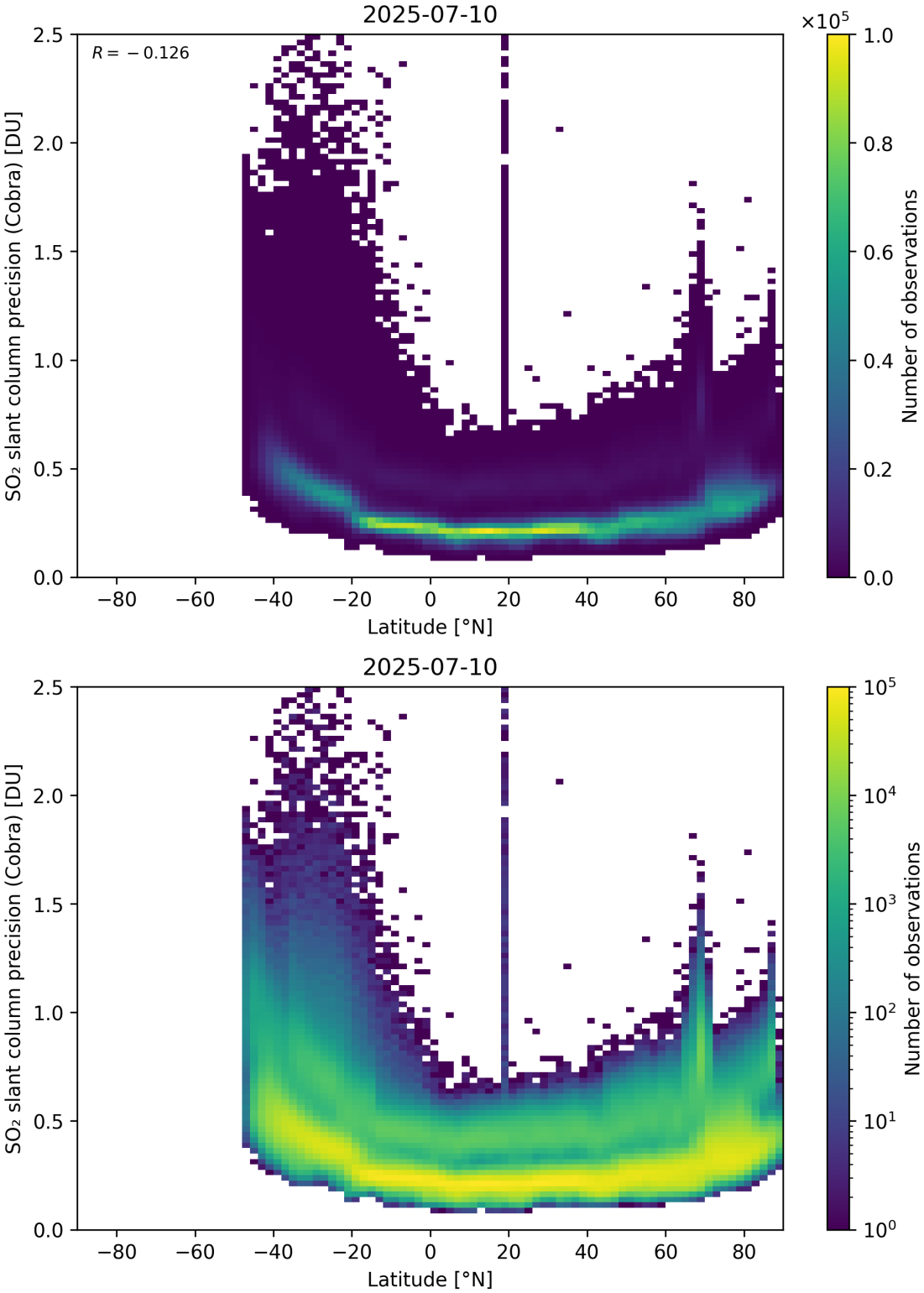

Figure 158: Scatter density plot of "Latitude" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11.

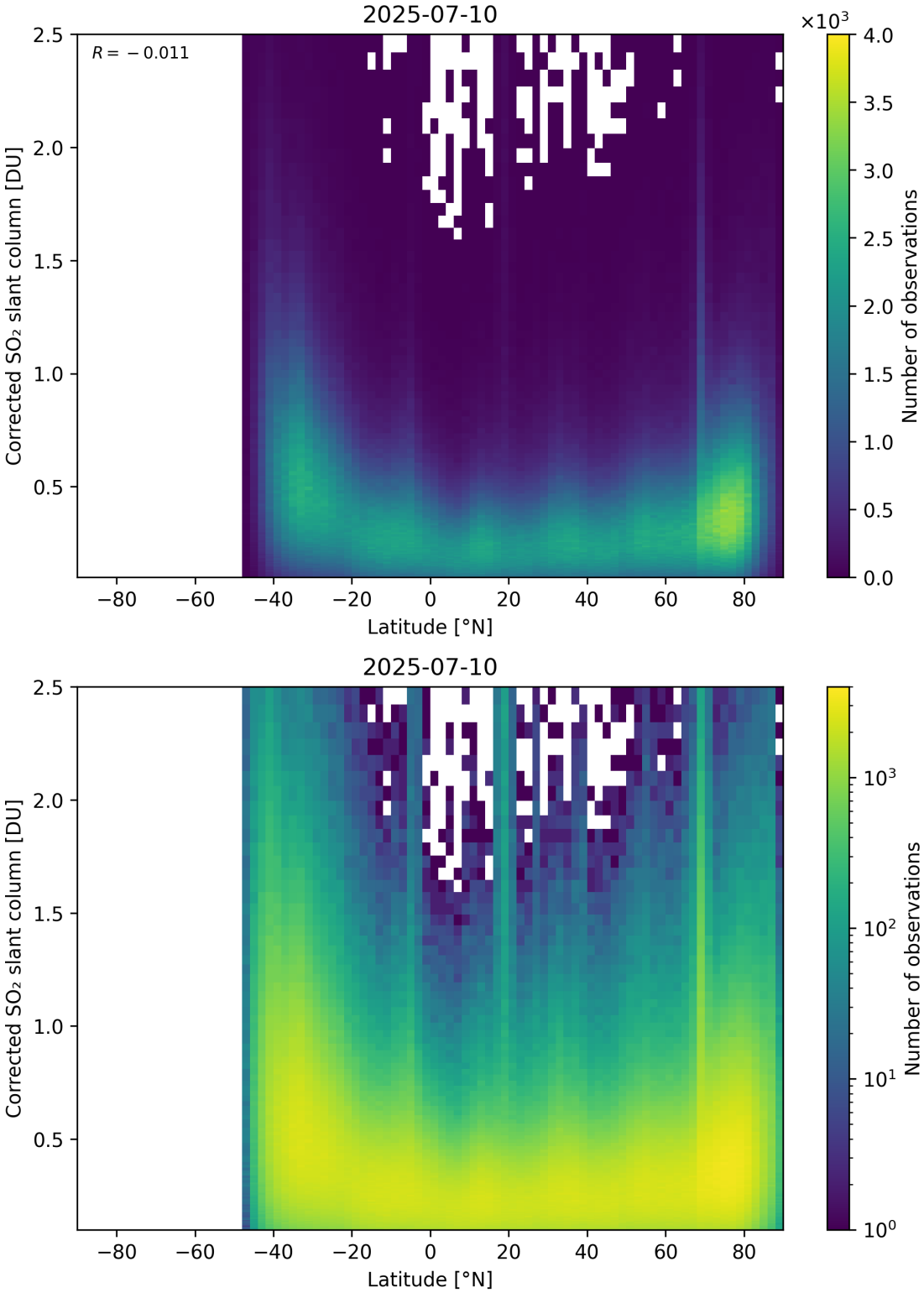

Figure 159: Scatter density plot of “Latitude” against “Corrected SO_2 slant column” for 2025-07-09 to 2025-07-11.

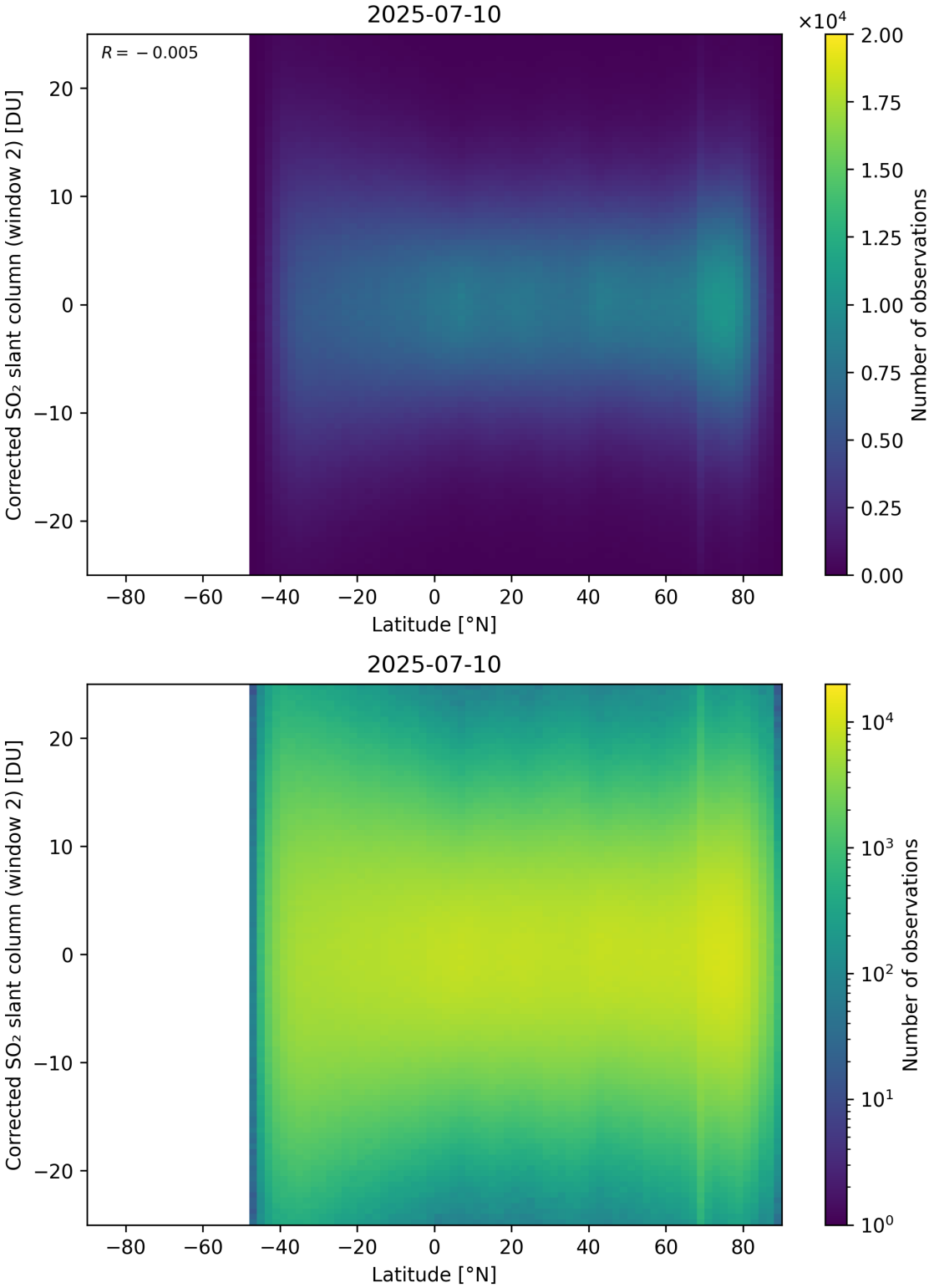

Figure 160: Scatter density plot of "Latitude" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

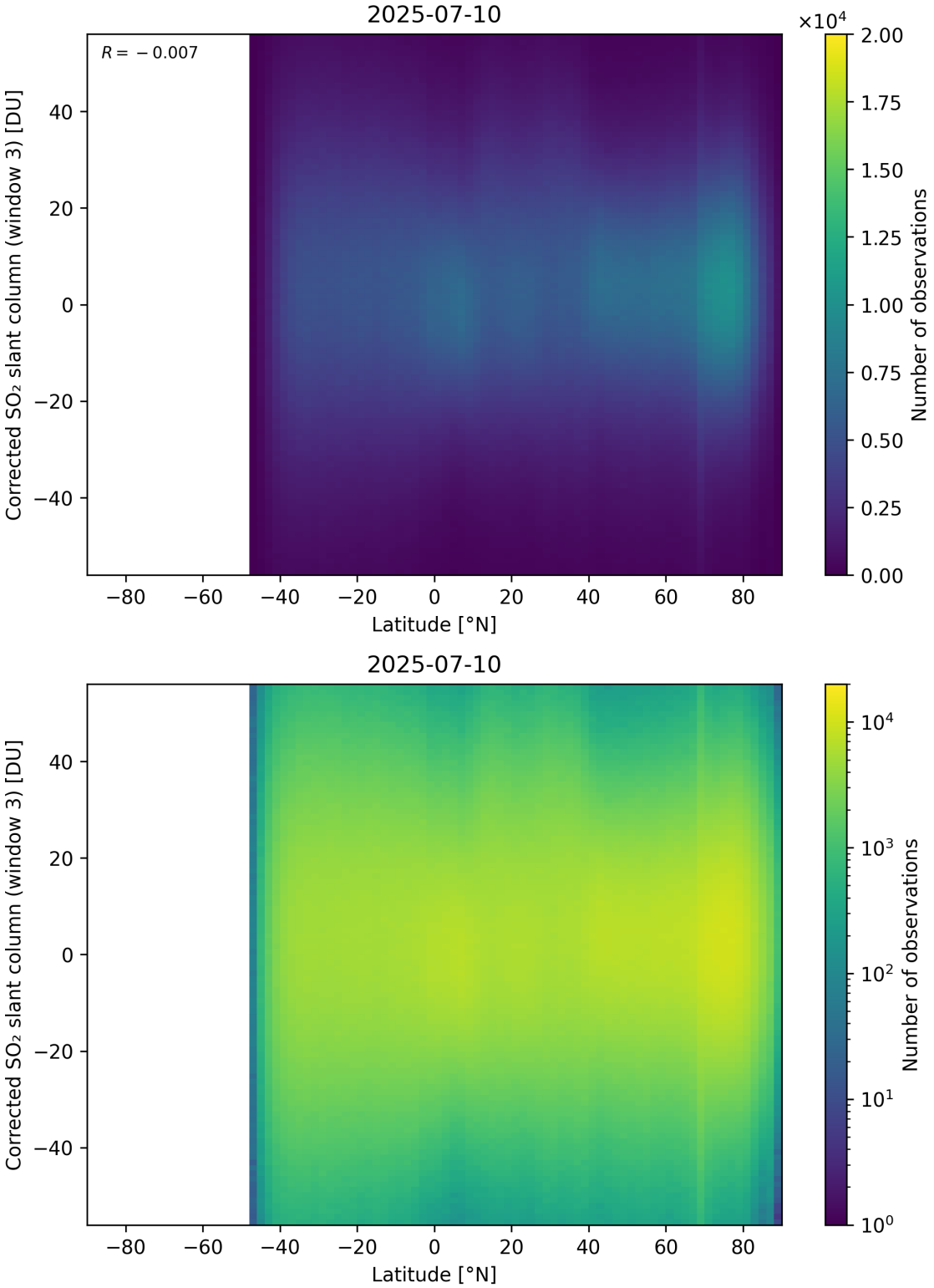

Figure 161: Scatter density plot of "Latitude" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

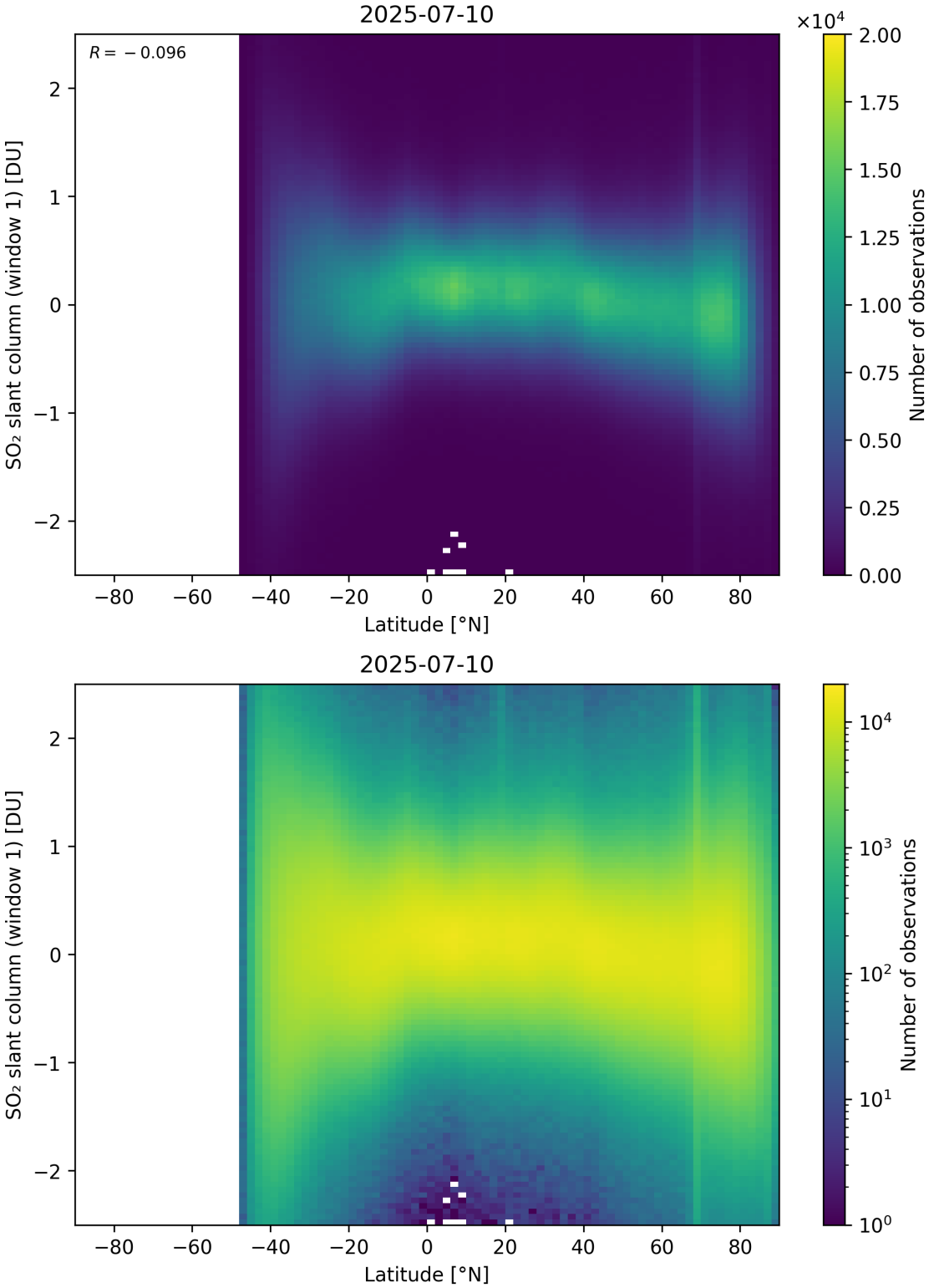

Figure 162: Scatter density plot of “Latitude” against “SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11.

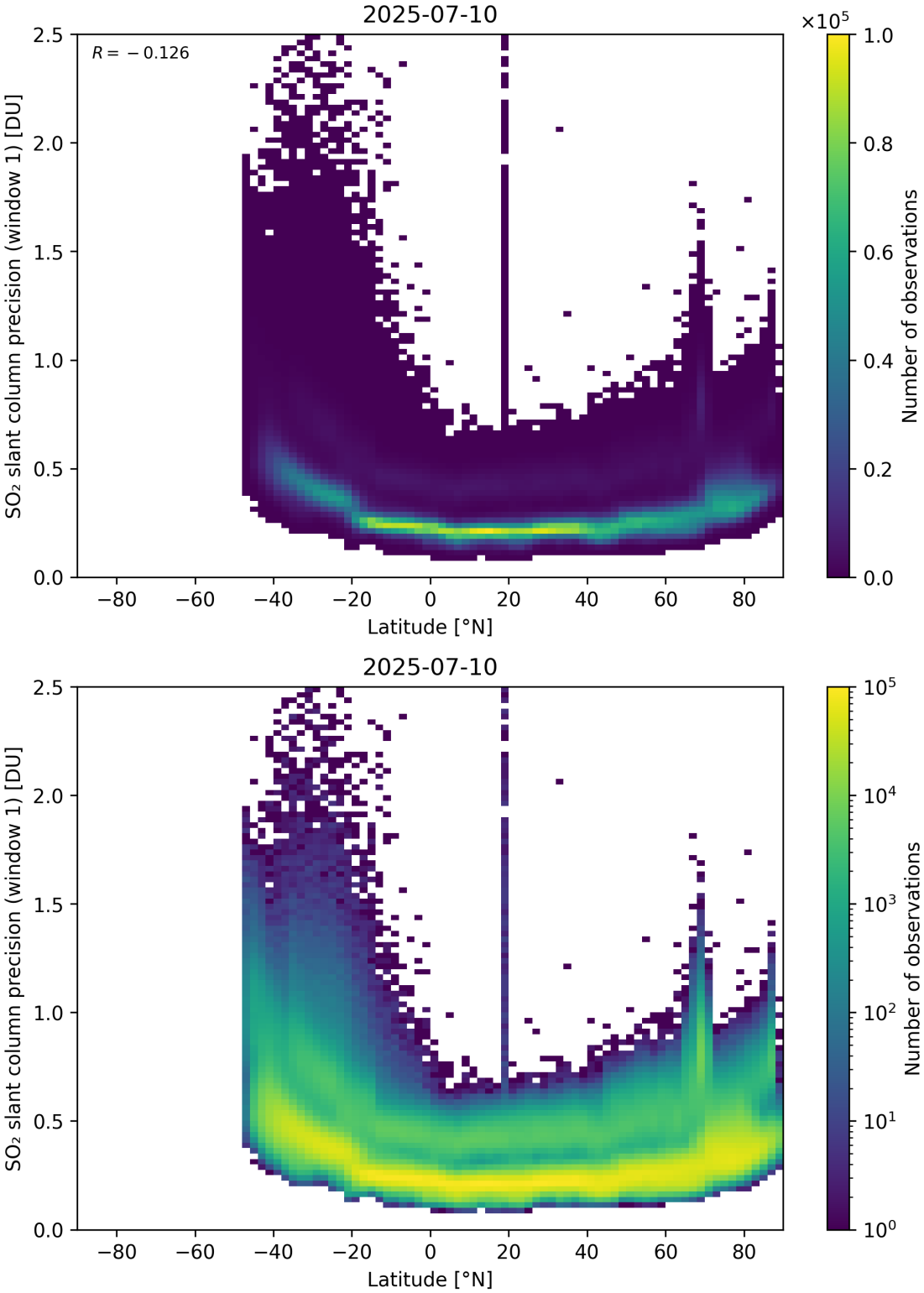

Figure 163: Scatter density plot of "Latitude" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

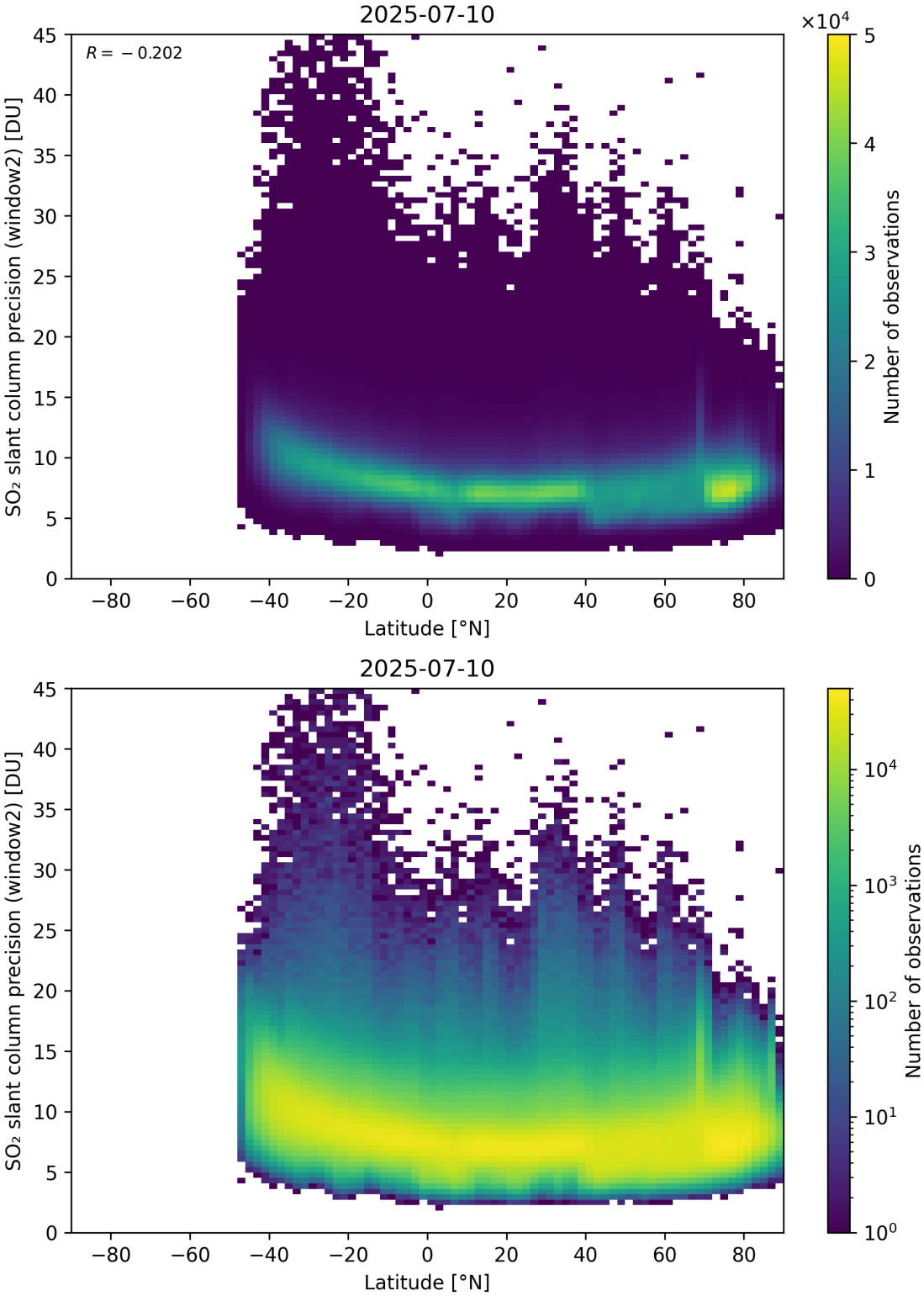

Figure 164: Scatter density plot of "Latitude" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

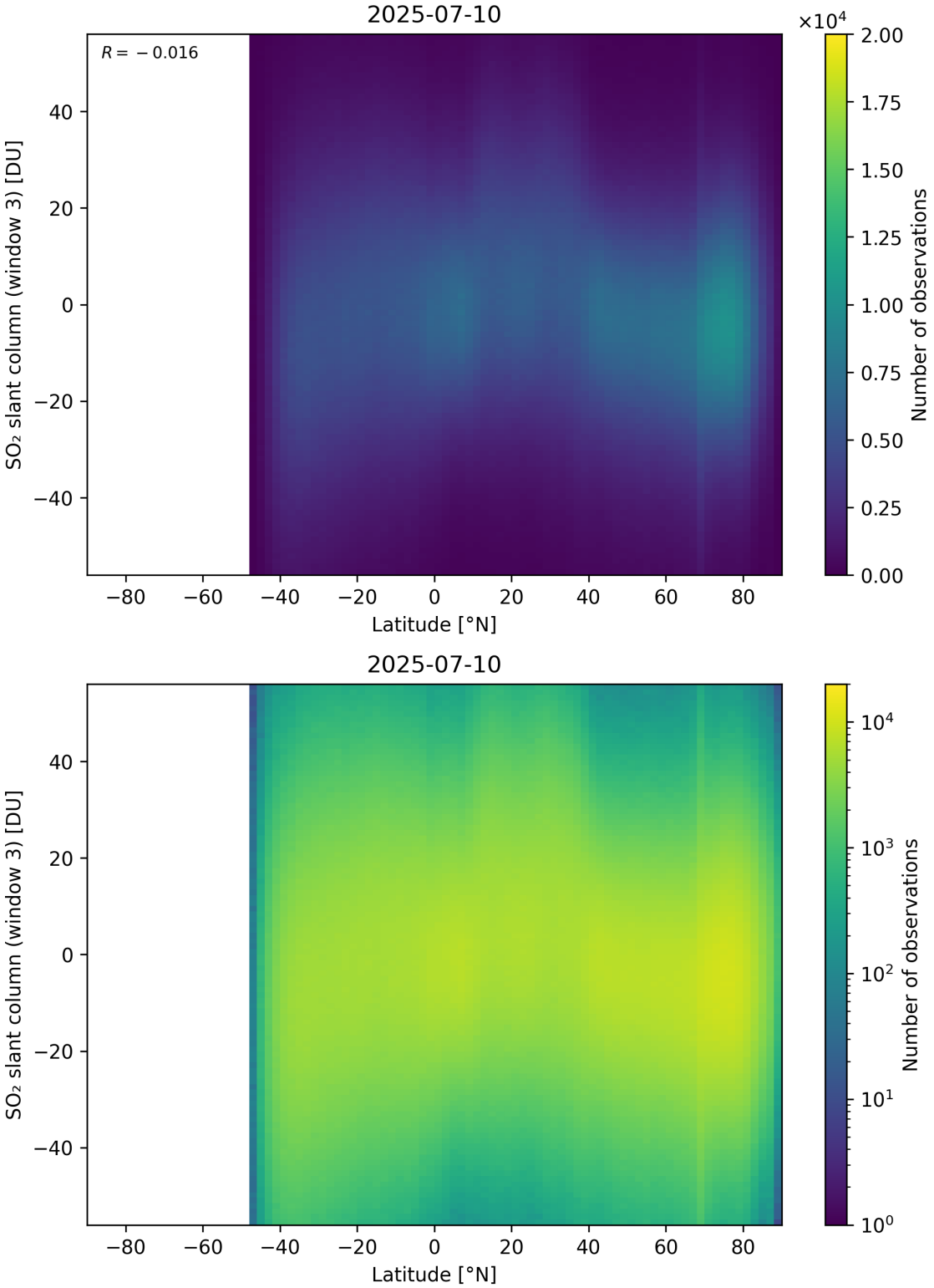

Figure 165: Scatter density plot of “Latitude” against “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11.

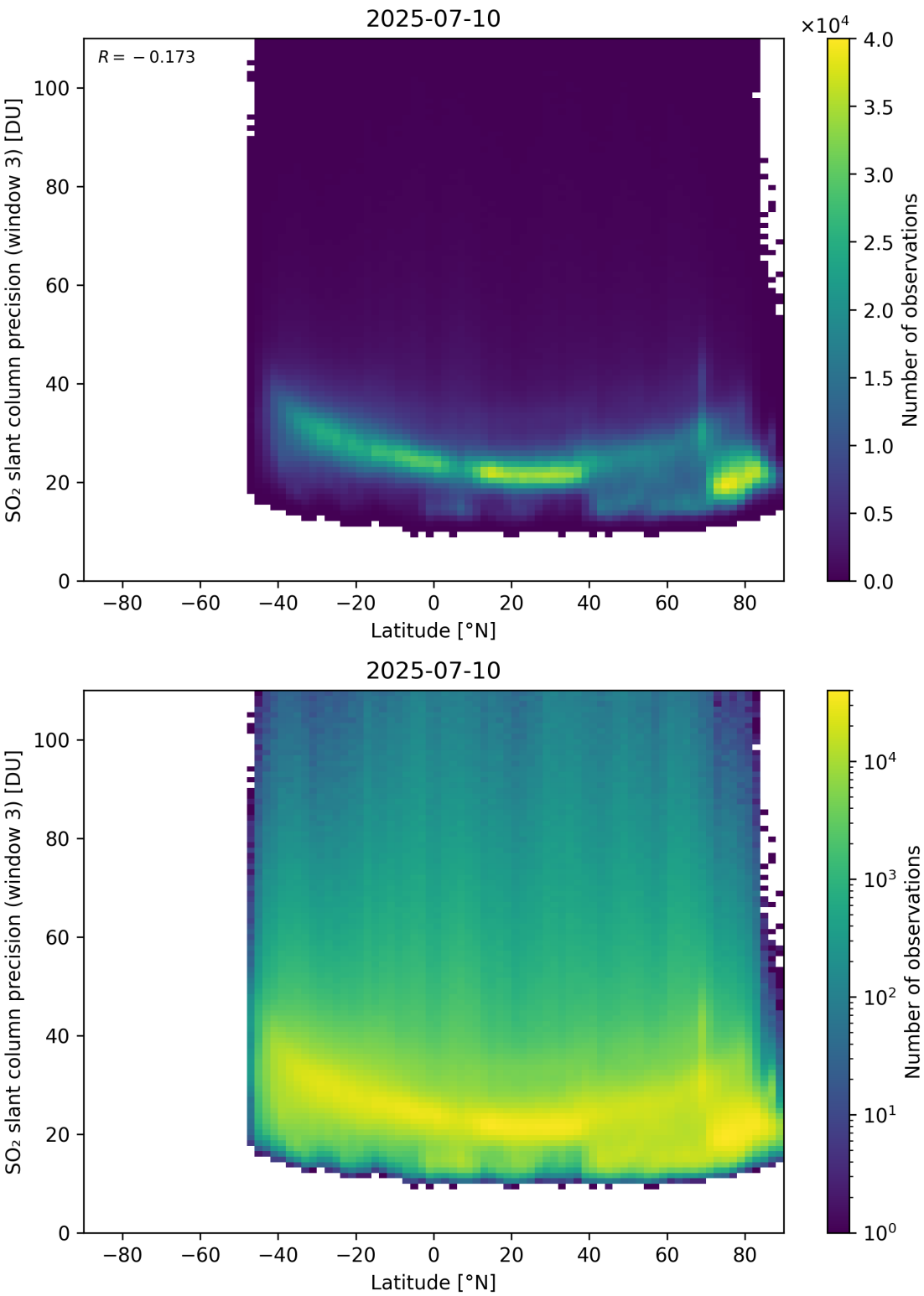

Figure 166: Scatter density plot of “Latitude” against “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11.

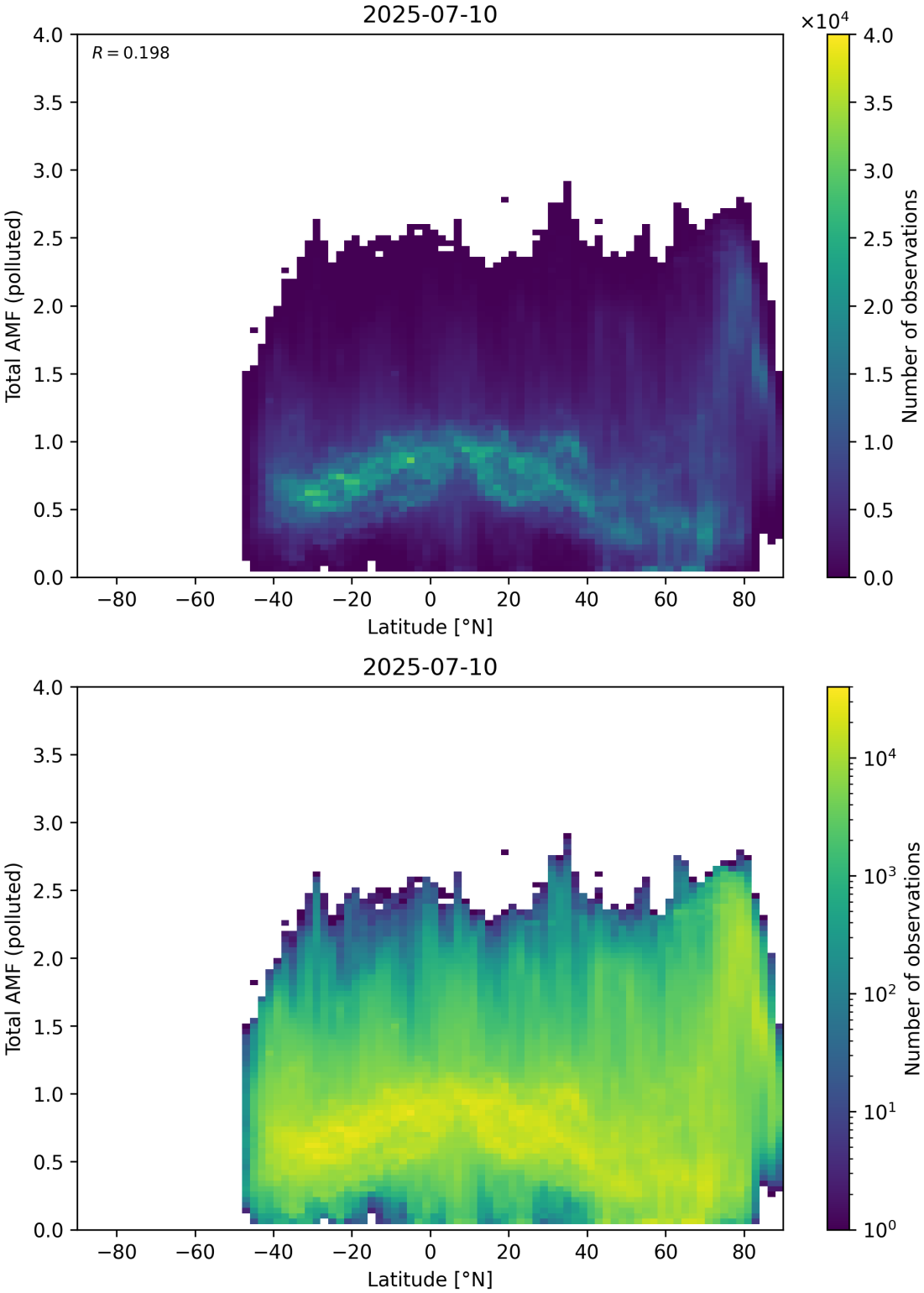

Figure 167: Scatter density plot of “Latitude” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11.

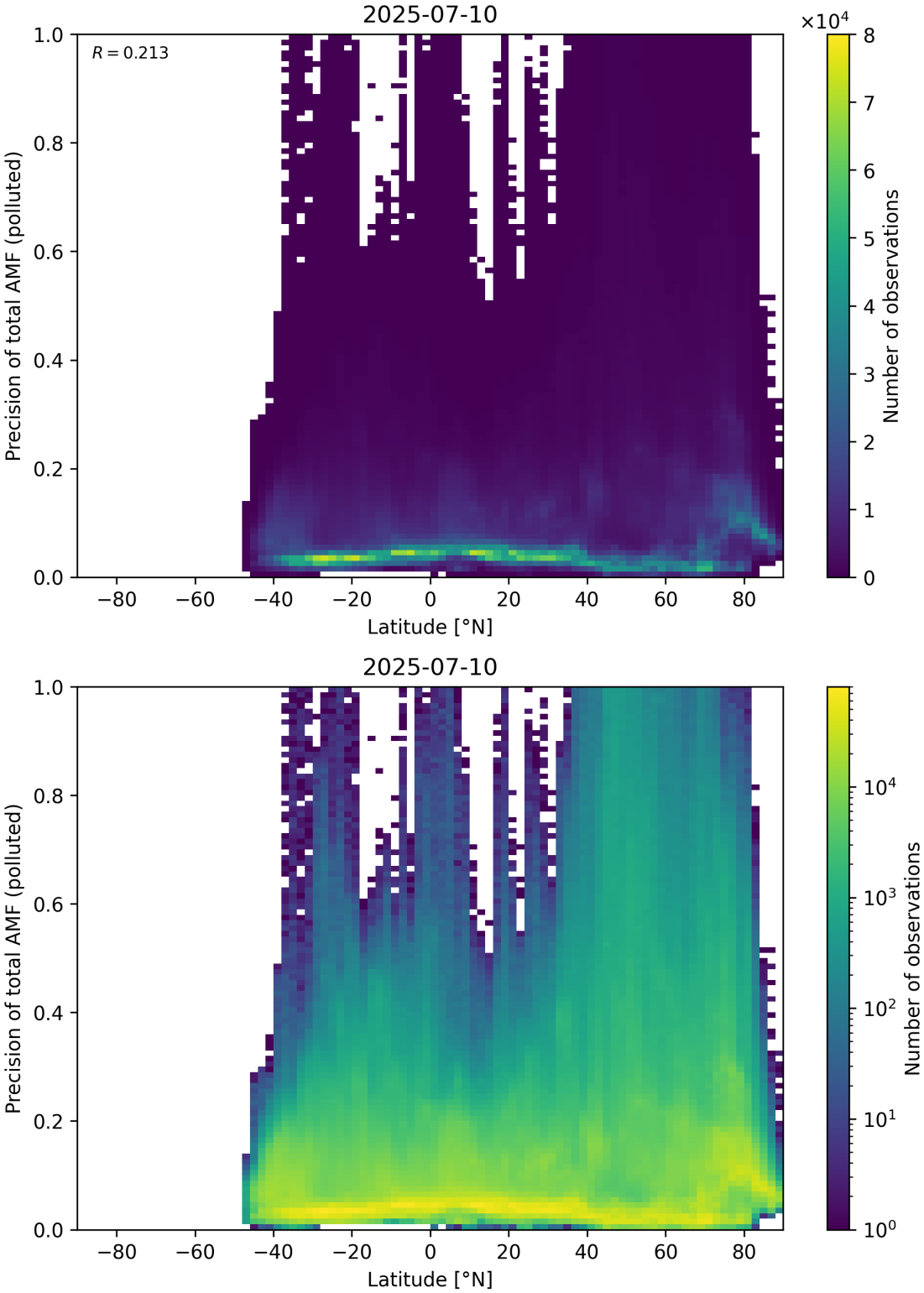

Figure 168: Scatter density plot of “Latitude” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11.

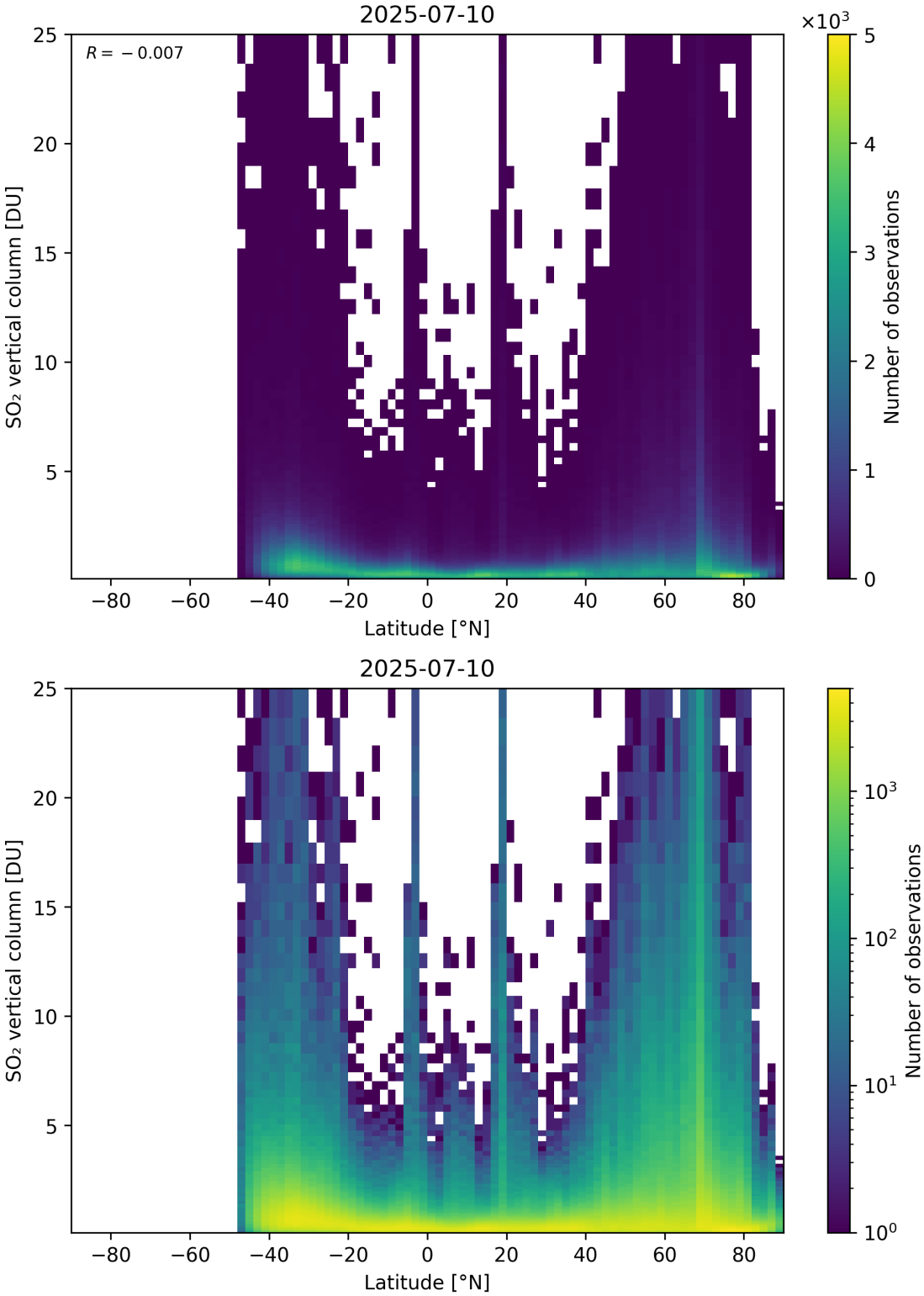

Figure 169: Scatter density plot of “Latitude” against “SO_2 vertical column” for 2025-07-09 to 2025-07-11.

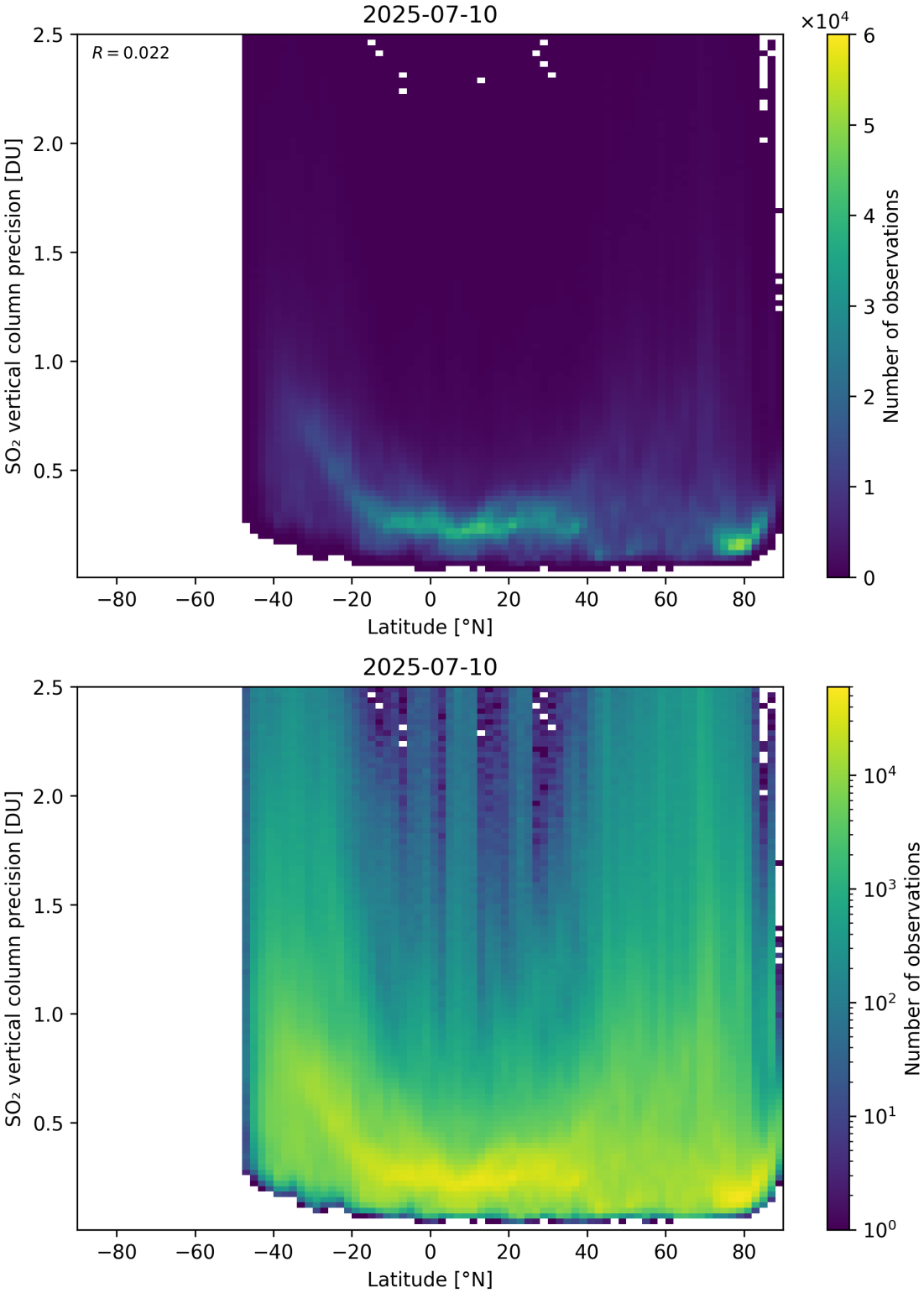

Figure 170: Scatter density plot of “Latitude” against “SO_2 vertical column precision” for 2025-07-09 to 2025-07-11.

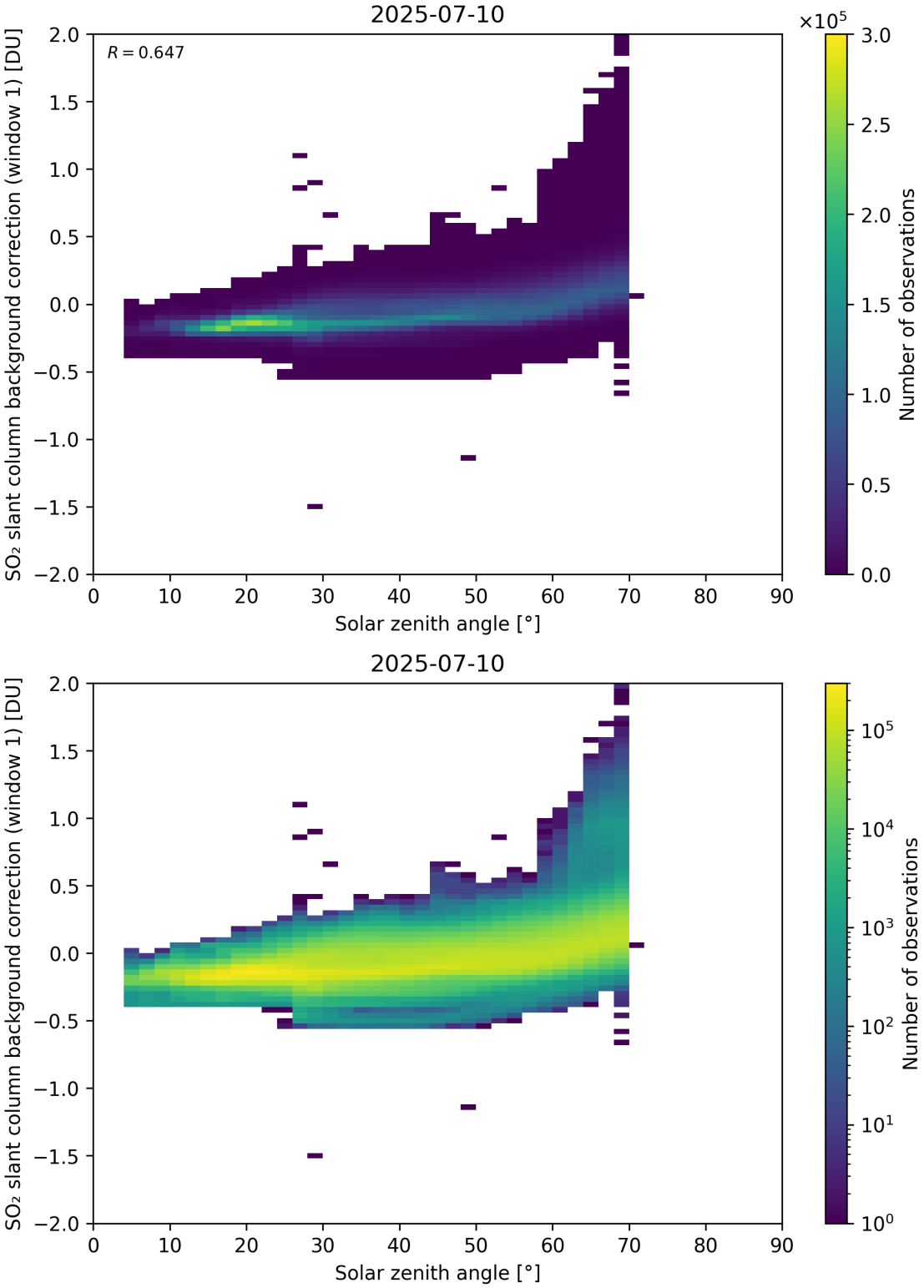

Figure 171: Scatter density plot of "Solar zenith angle" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

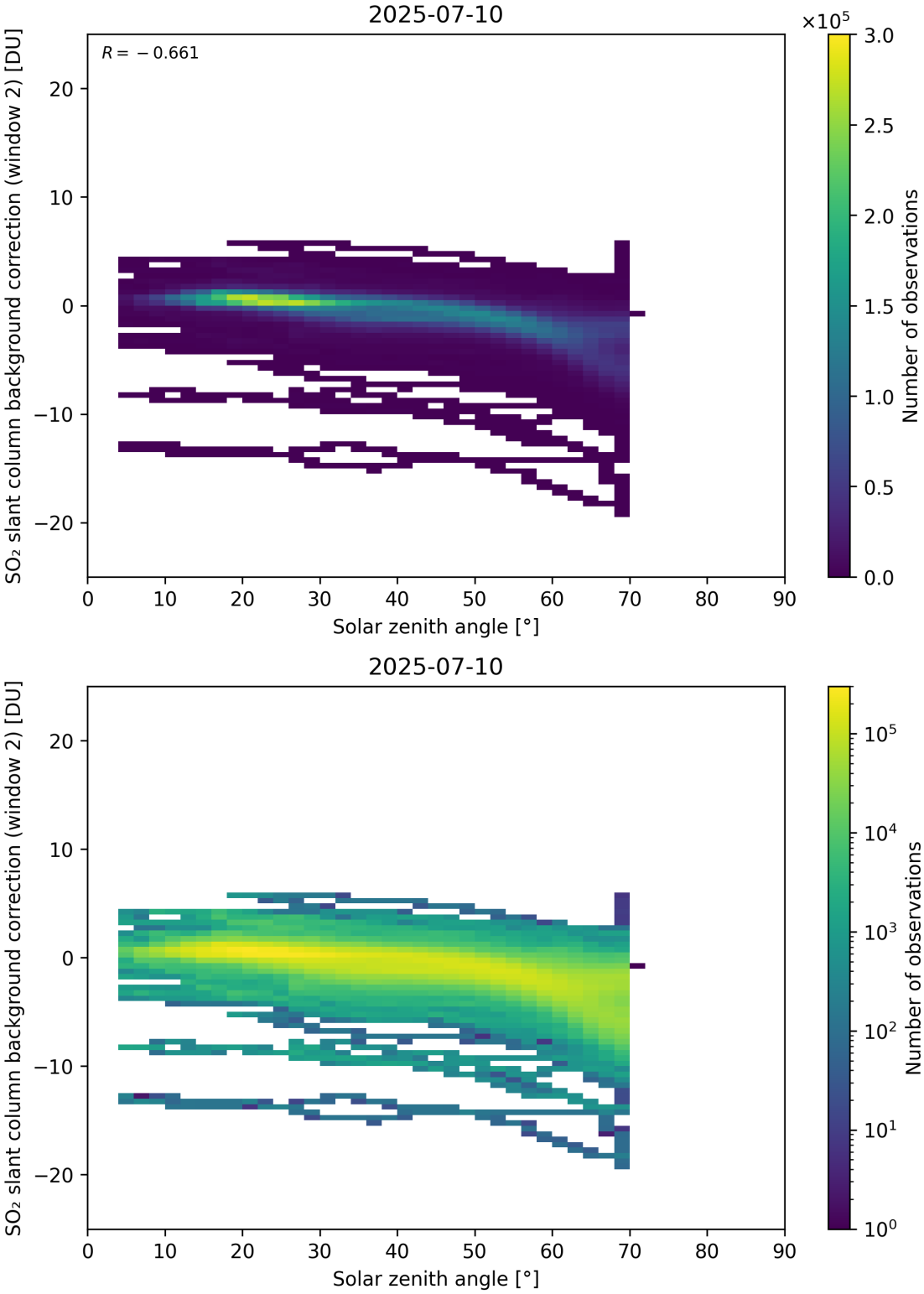

Figure 172: Scatter density plot of "Solar zenith angle" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

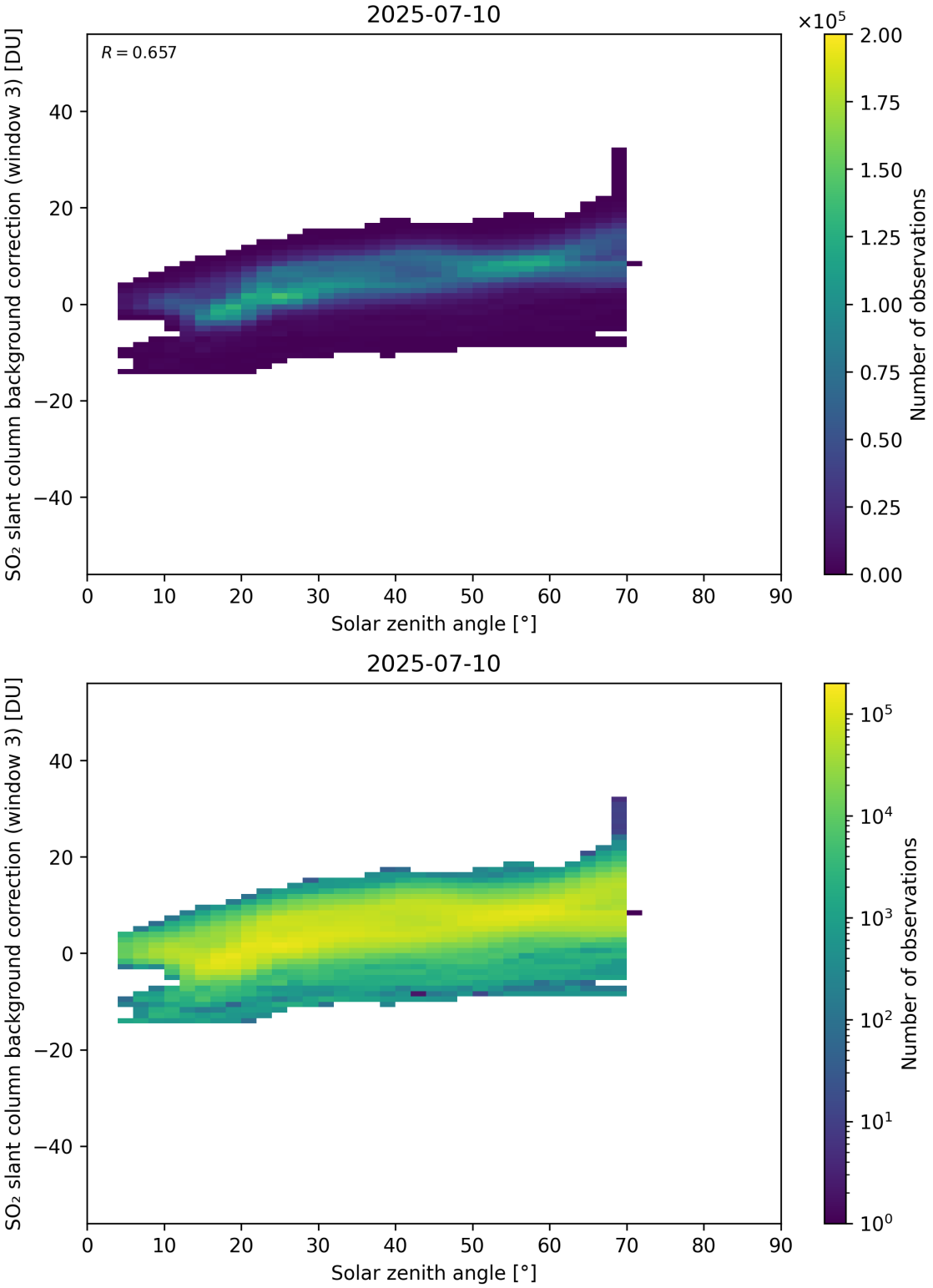

Figure 173: Scatter density plot of "Solar zenith angle" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

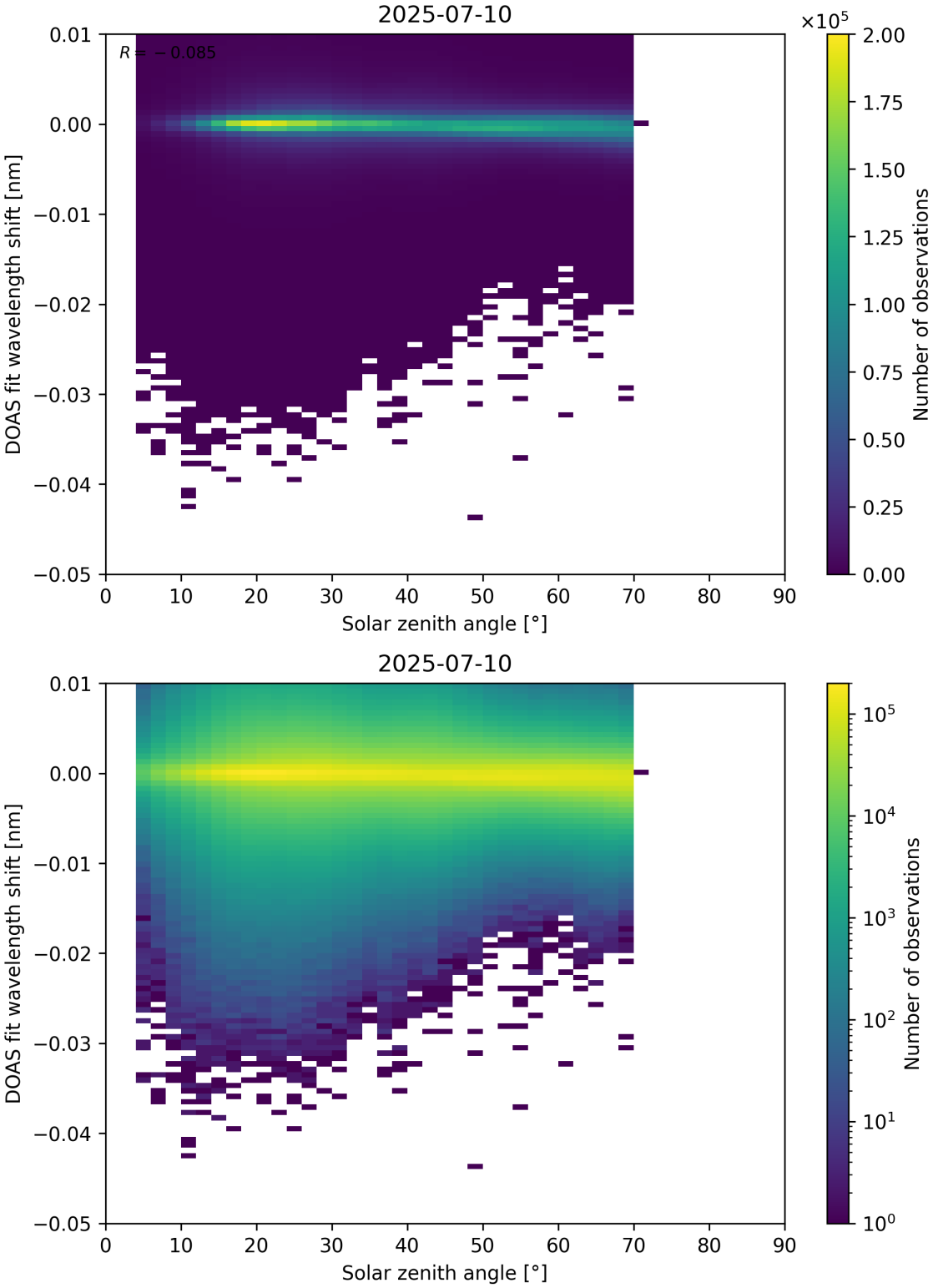

Figure 174: Scatter density plot of “Solar zenith angle” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11.

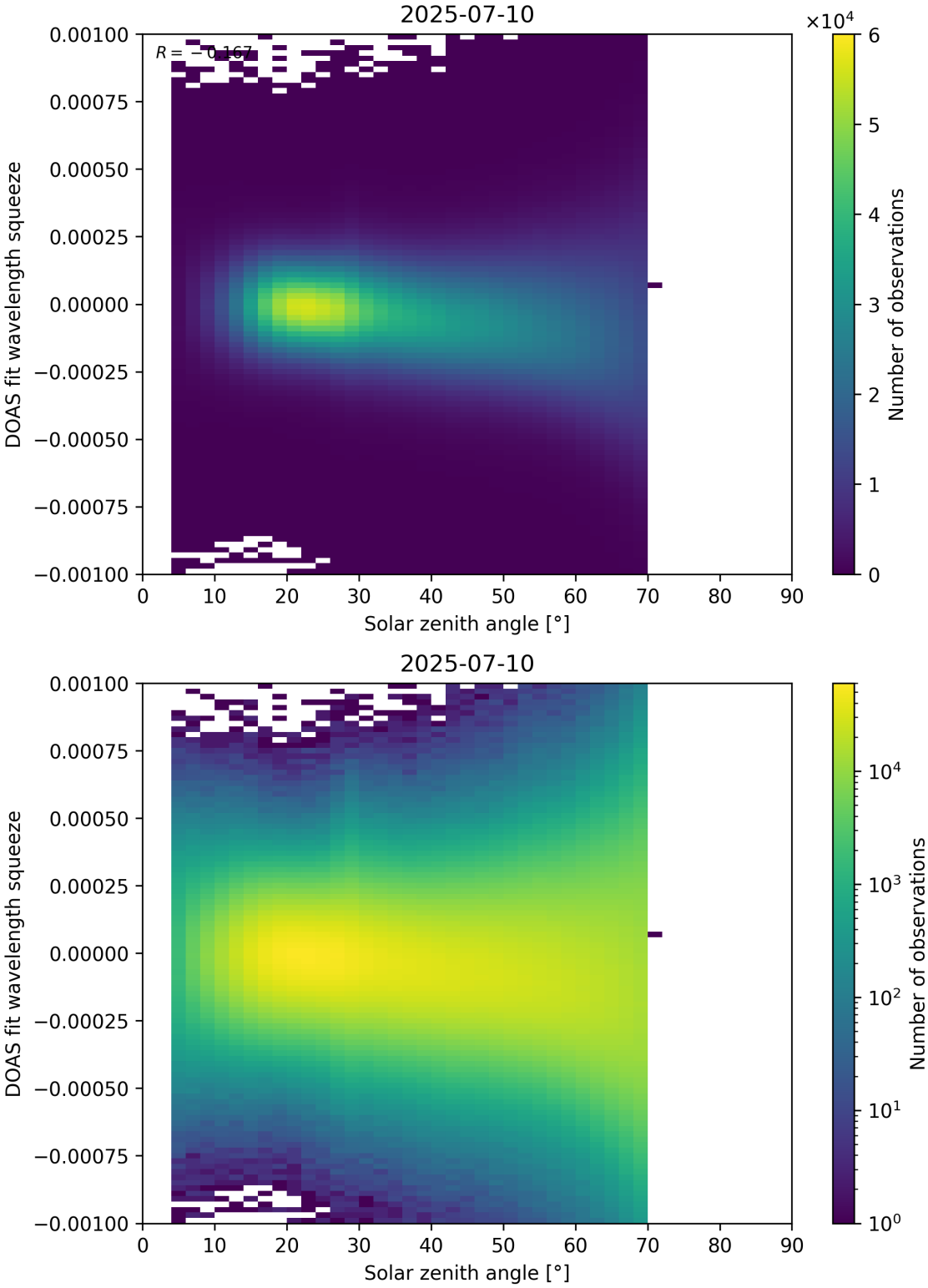

Figure 175: Scatter density plot of “Solar zenith angle” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11.

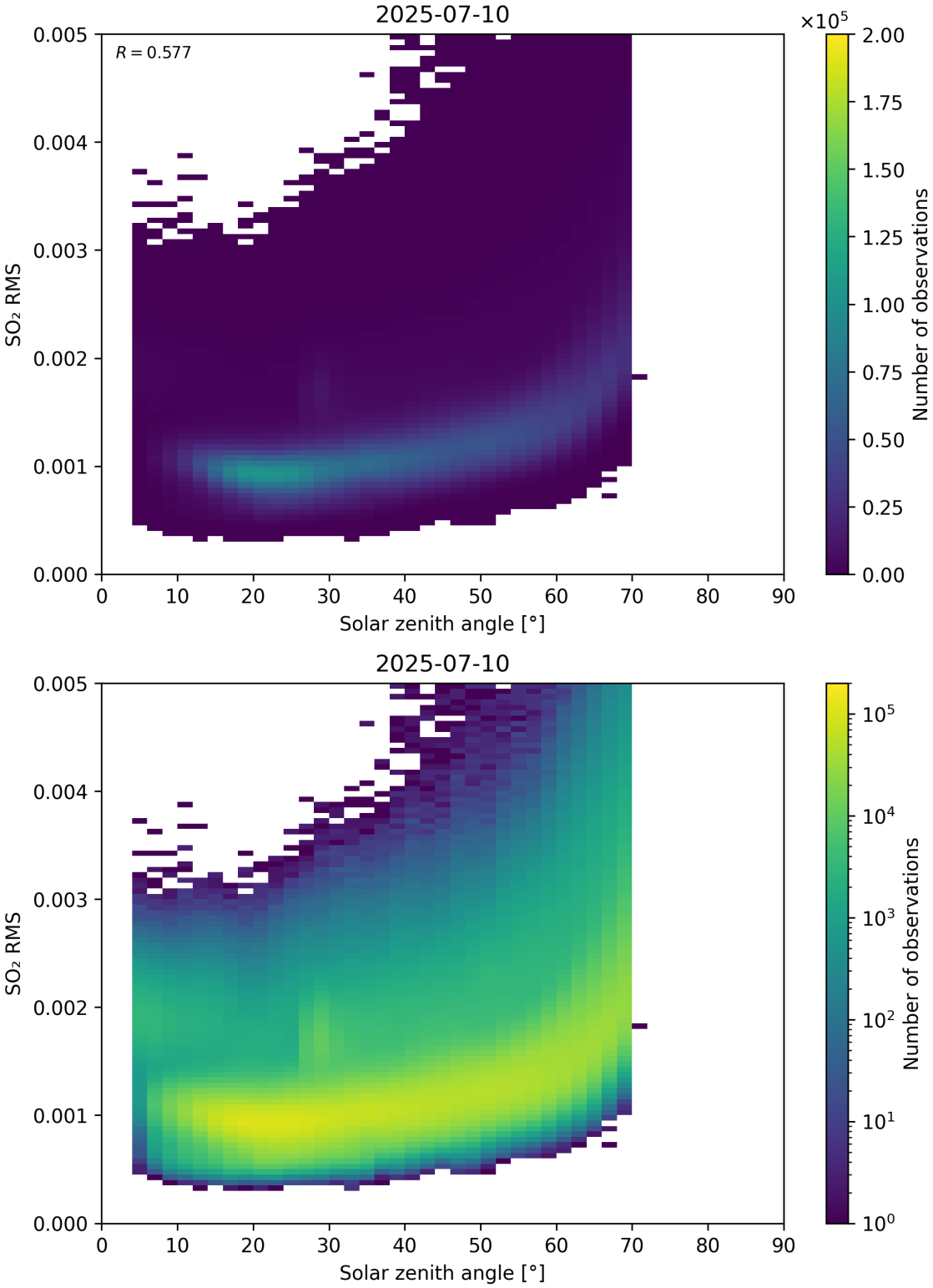

Figure 176: Scatter density plot of “Solar zenith angle” against “SO_2 RMS” for 2025-07-09 to 2025-07-11.

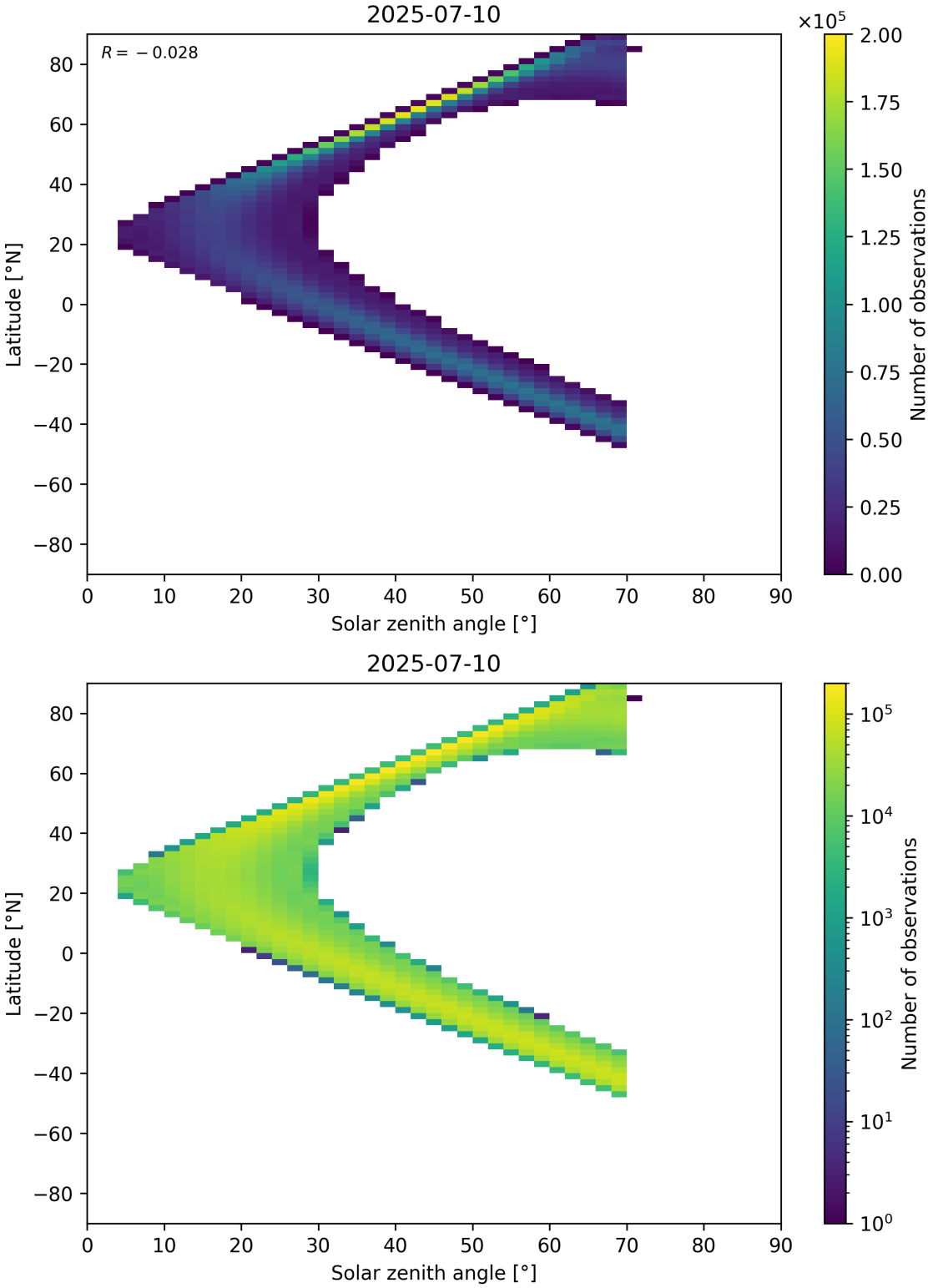

Figure 177: Scatter density plot of “Solar zenith angle” against “Latitude” for 2025-07-09 to 2025-07-11.

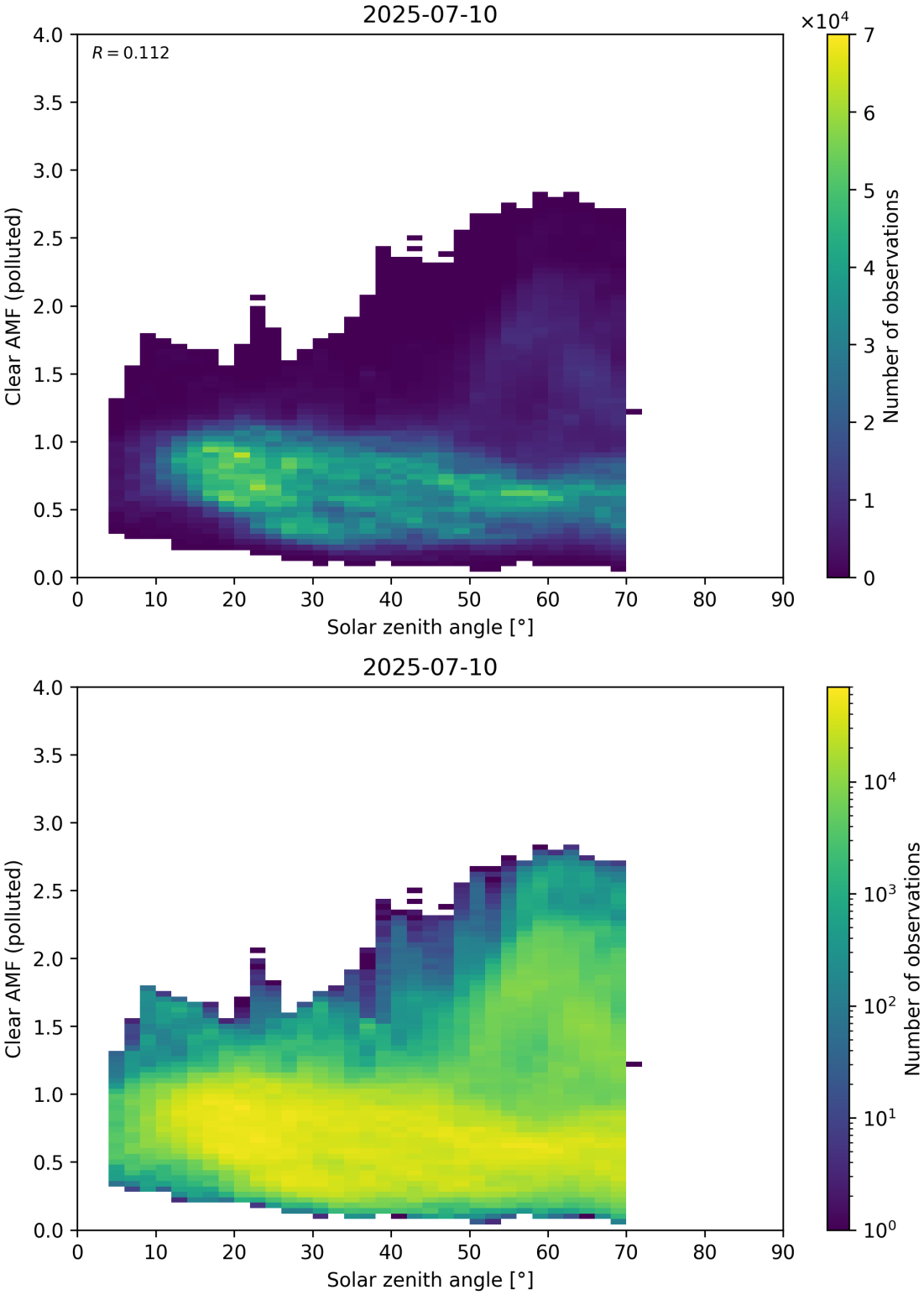

Figure 178: Scatter density plot of “Solar zenith angle” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11.

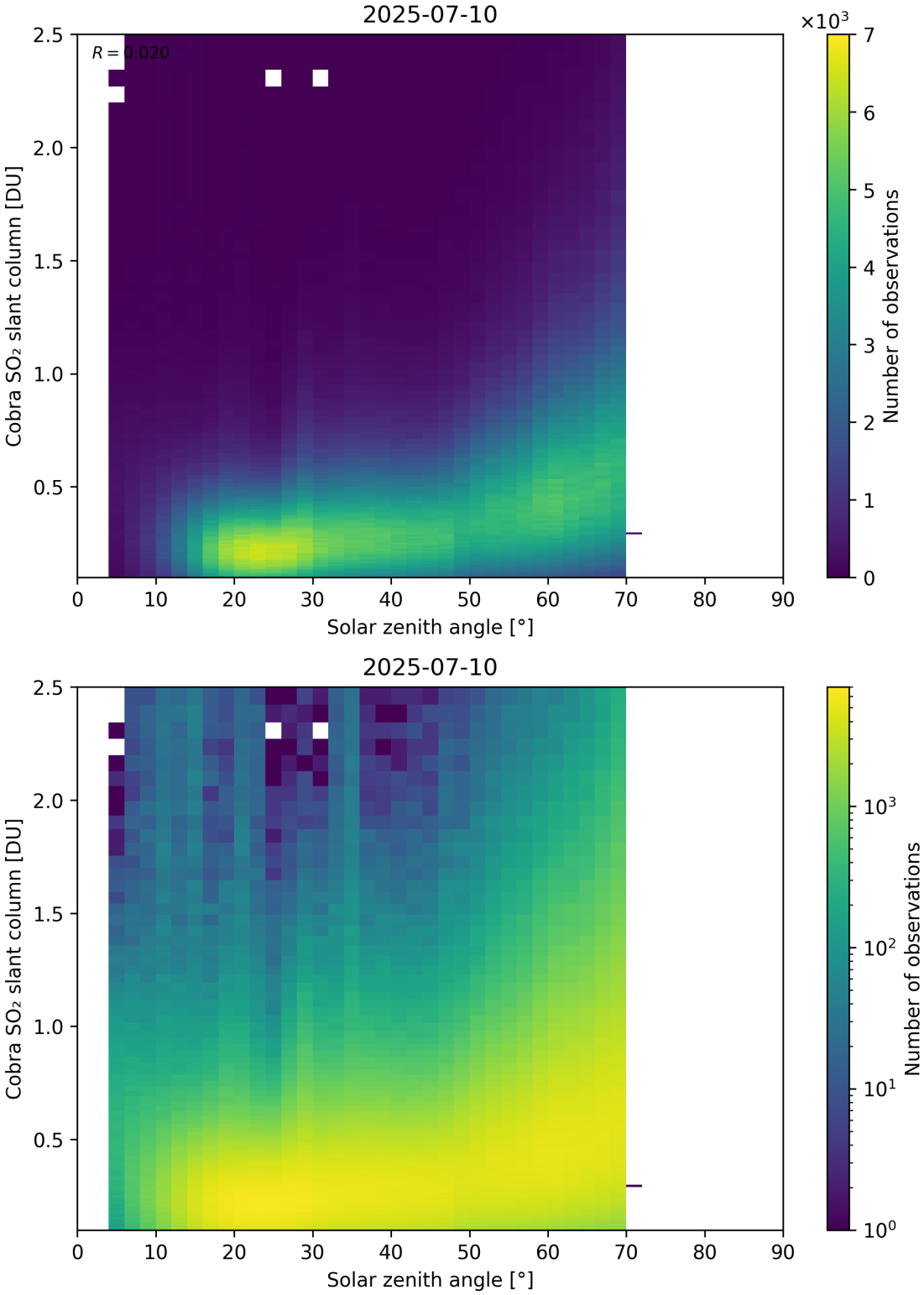

Figure 179: Scatter density plot of “Solar zenith angle” against “Cobra SO_2 slant column” for 2025-07-09 to 2025-07-11.

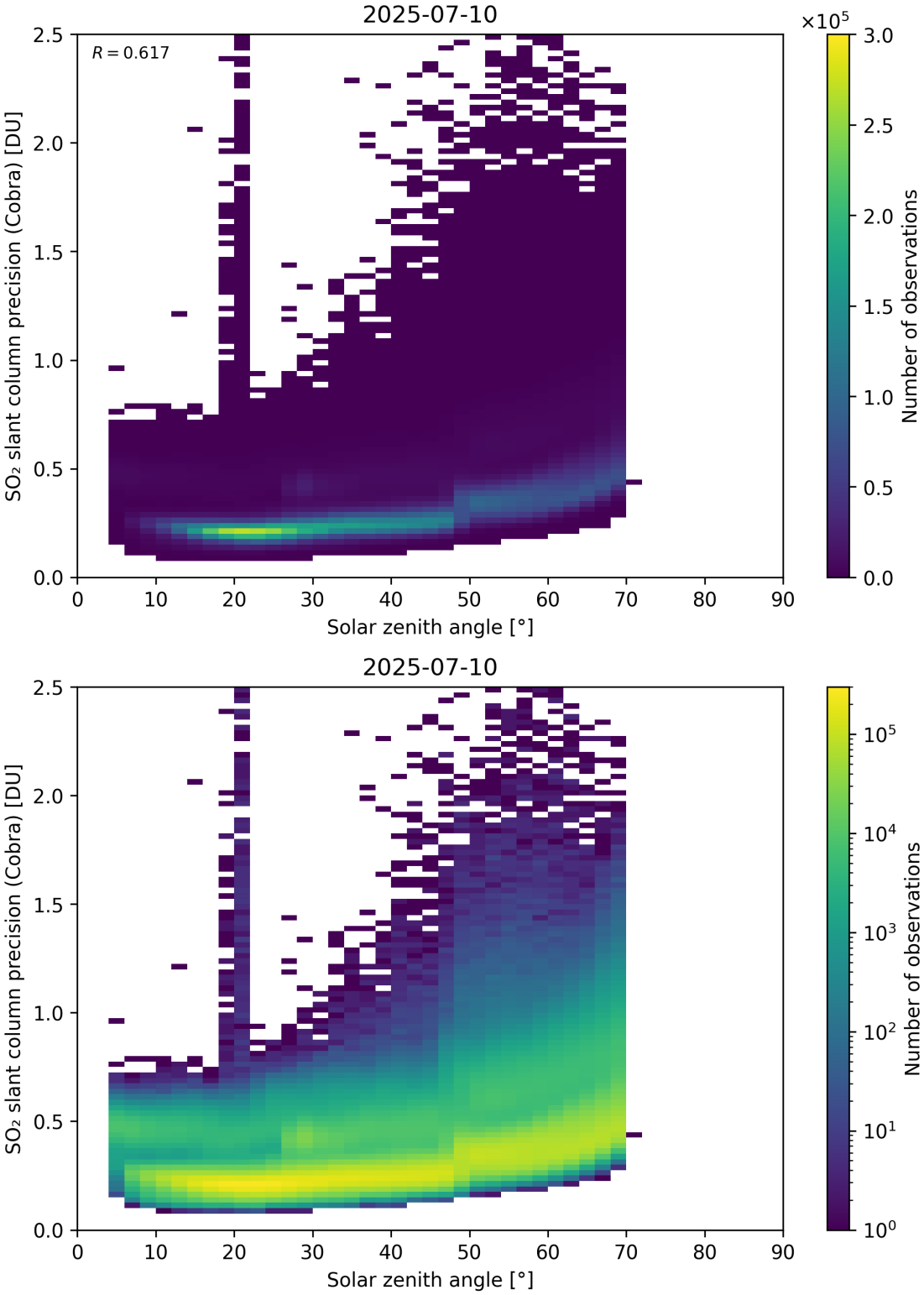

Figure 180: Scatter density plot of "Solar zenith angle" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11.

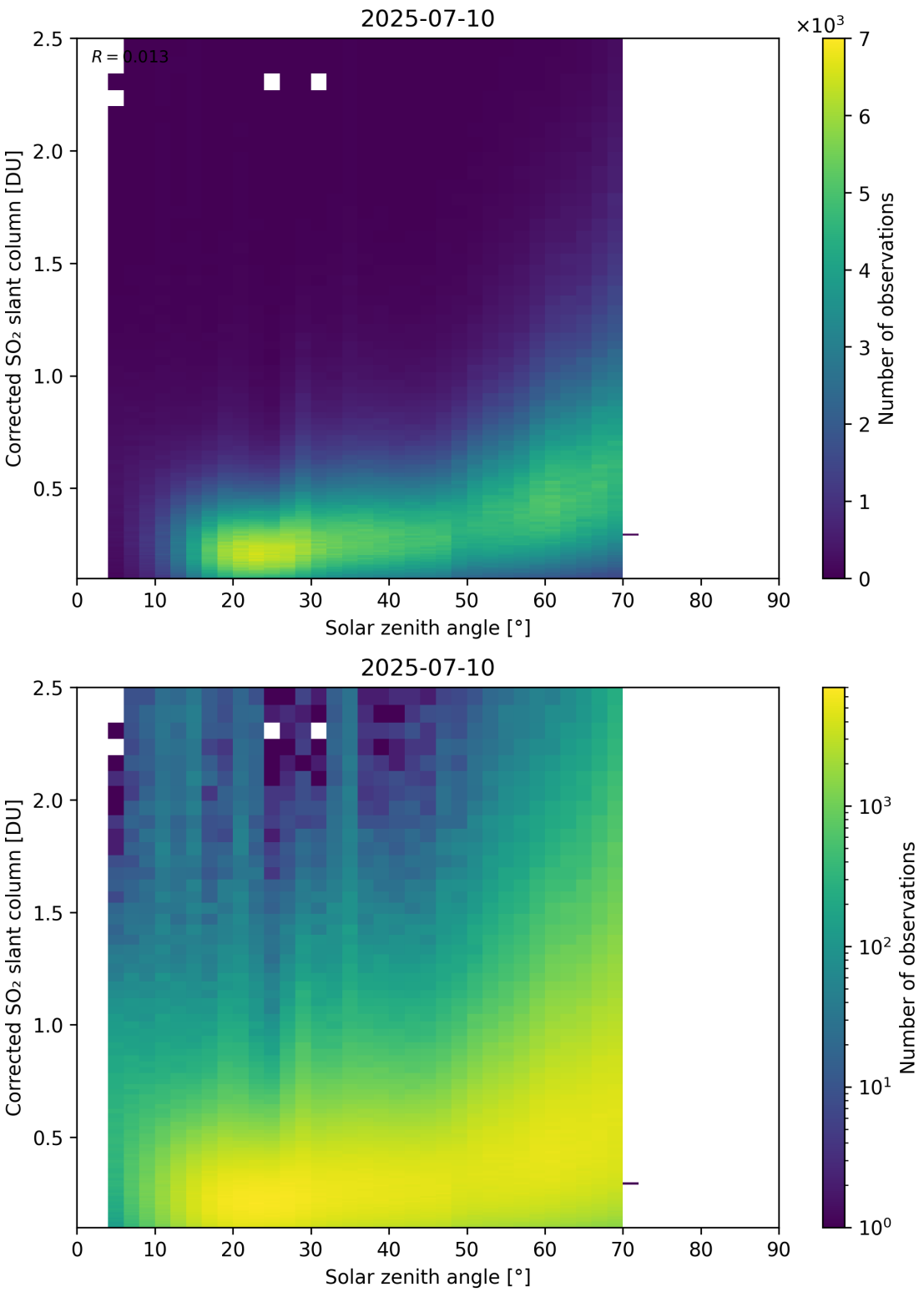

Figure 181: Scatter density plot of “Solar zenith angle” against “Corrected SO_2 slant column” for 2025-07-09 to 2025-07-11.

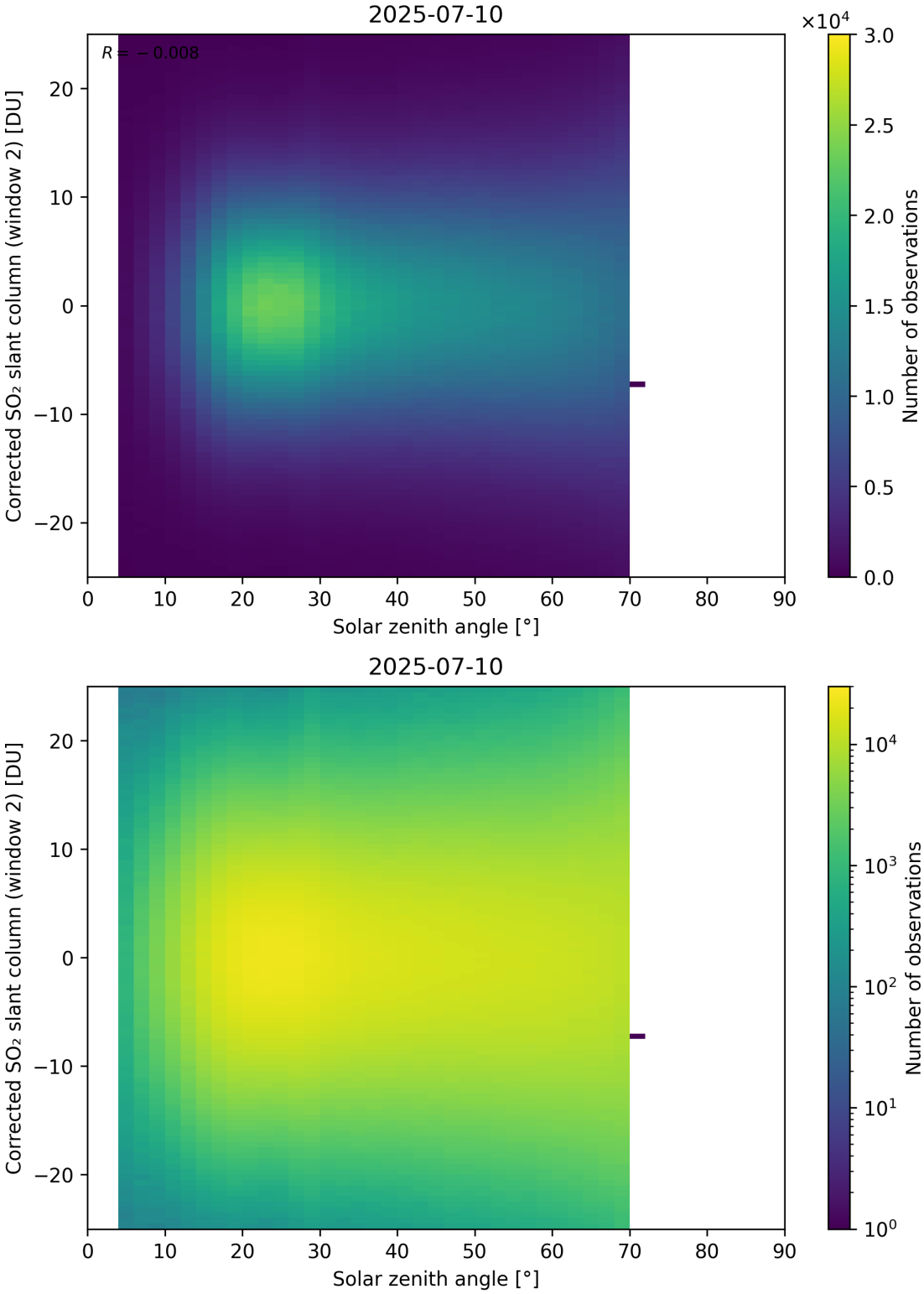

Figure 182: Scatter density plot of "Solar zenith angle" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

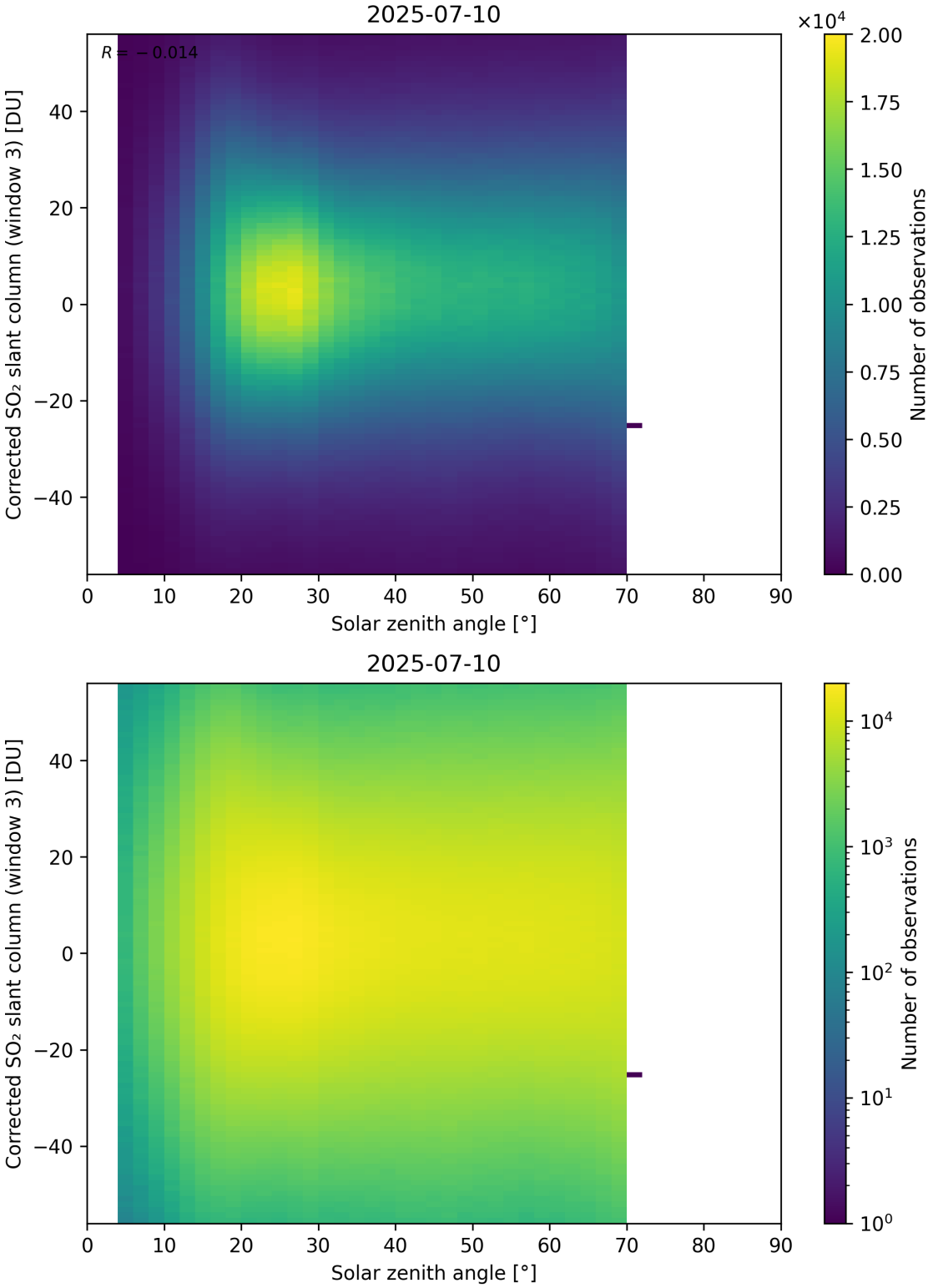

Figure 183: Scatter density plot of "Solar zenith angle" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

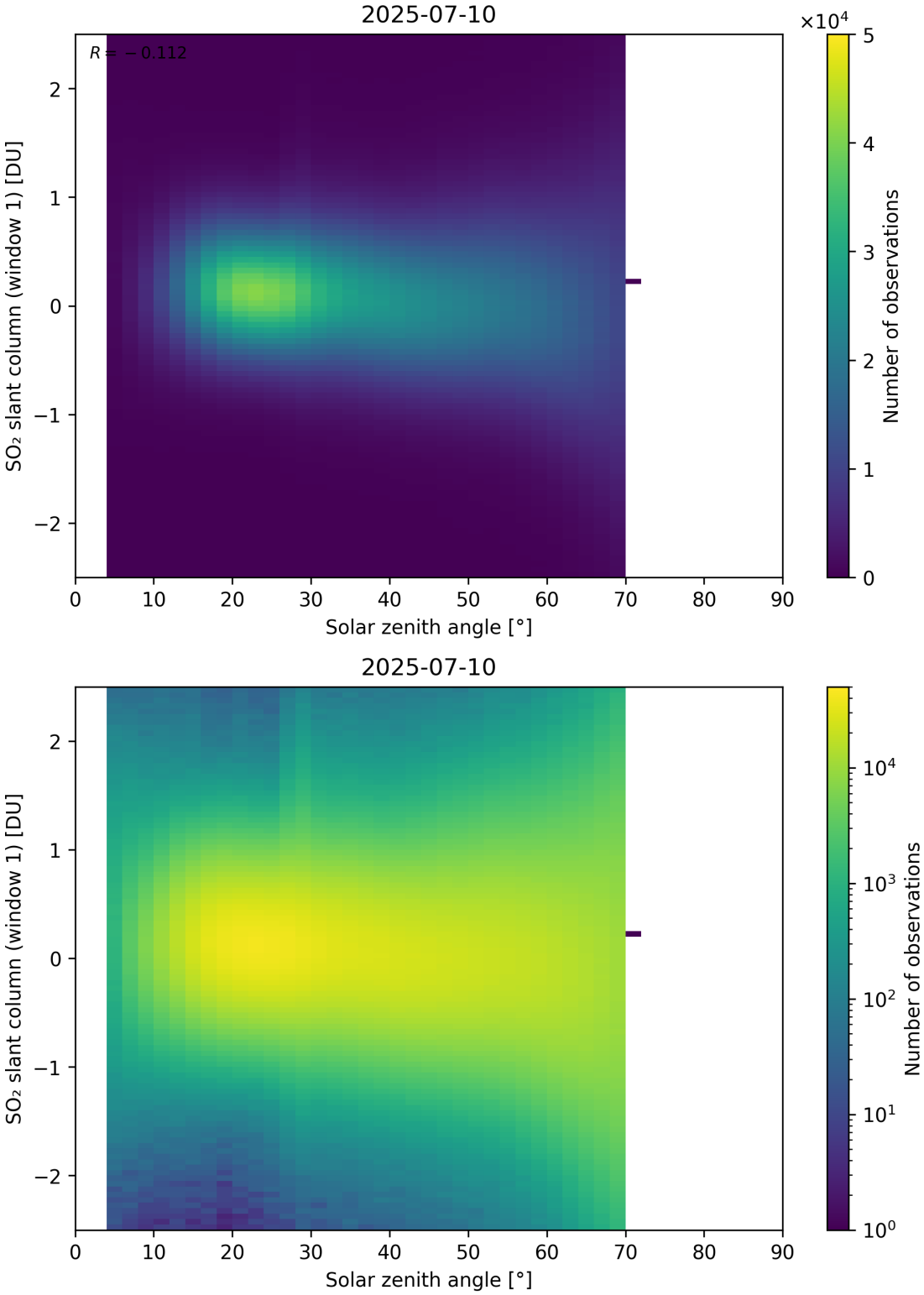

Figure 184: Scatter density plot of "Solar zenith angle" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

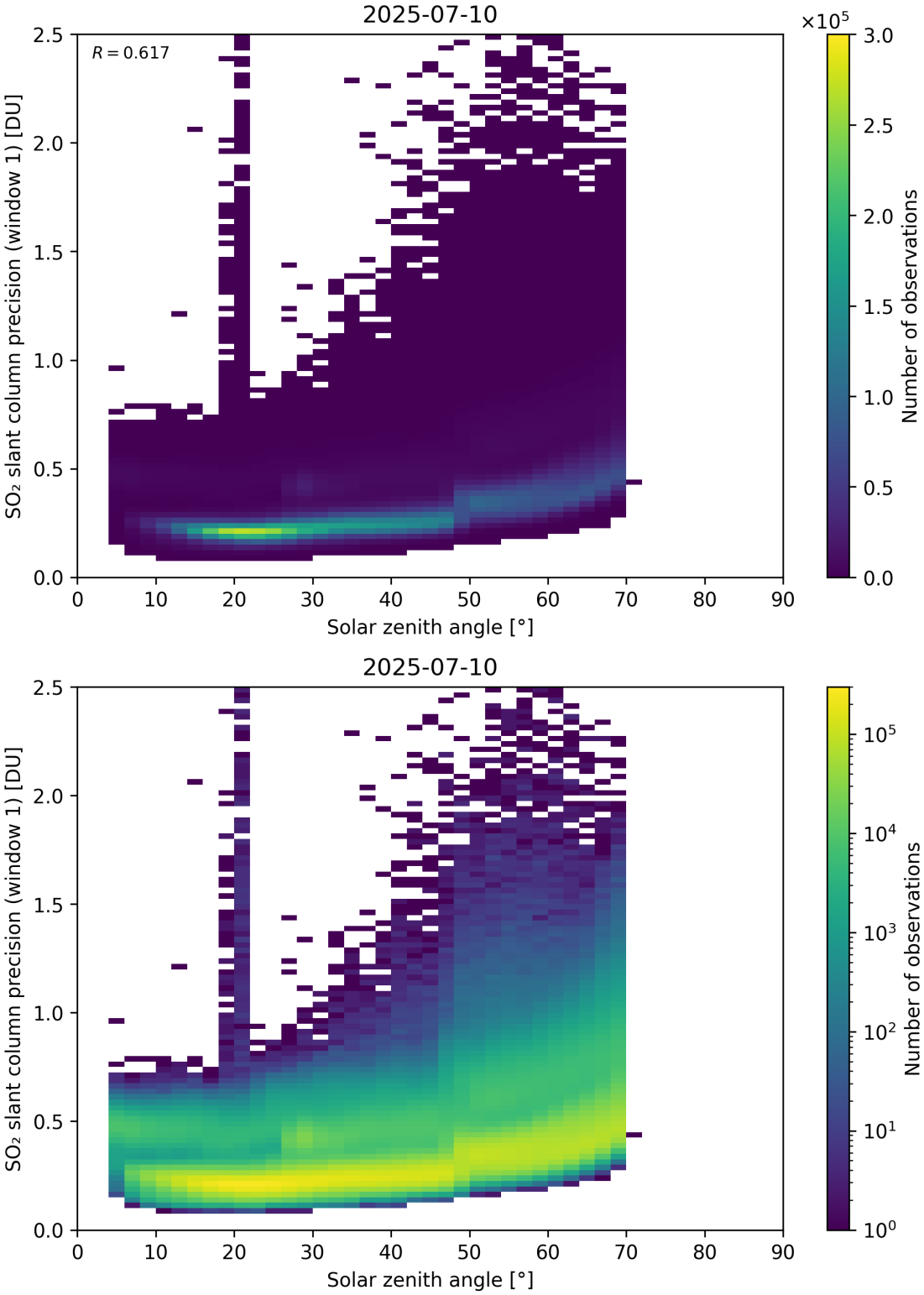

Figure 185: Scatter density plot of "Solar zenith angle" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

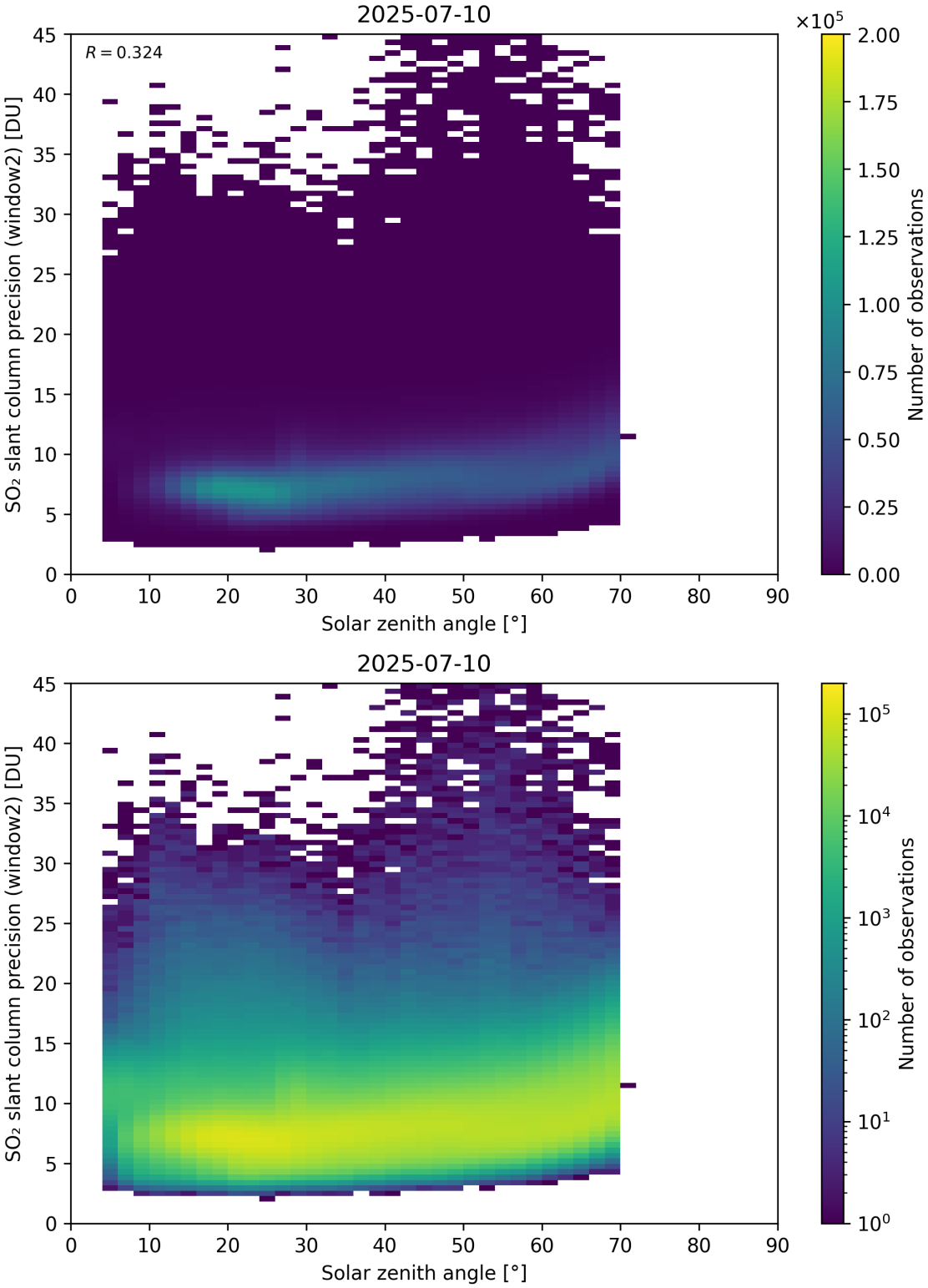

Figure 186: Scatter density plot of “Solar zenith angle” against “SO_2 slant column precision (window2)” for 2025-07-09 to 2025-07-11.

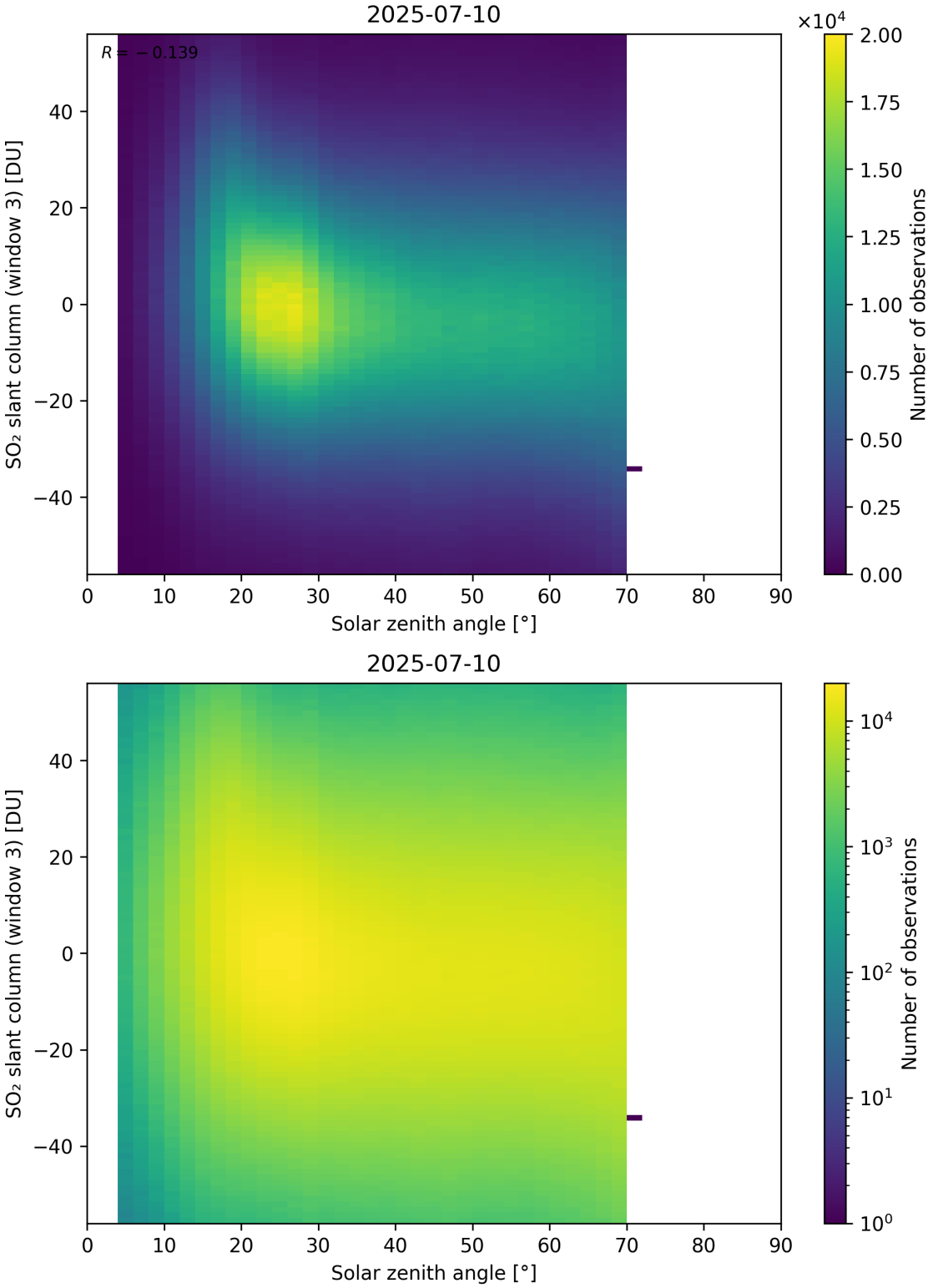

Figure 187: Scatter density plot of “Solar zenith angle” against “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11.

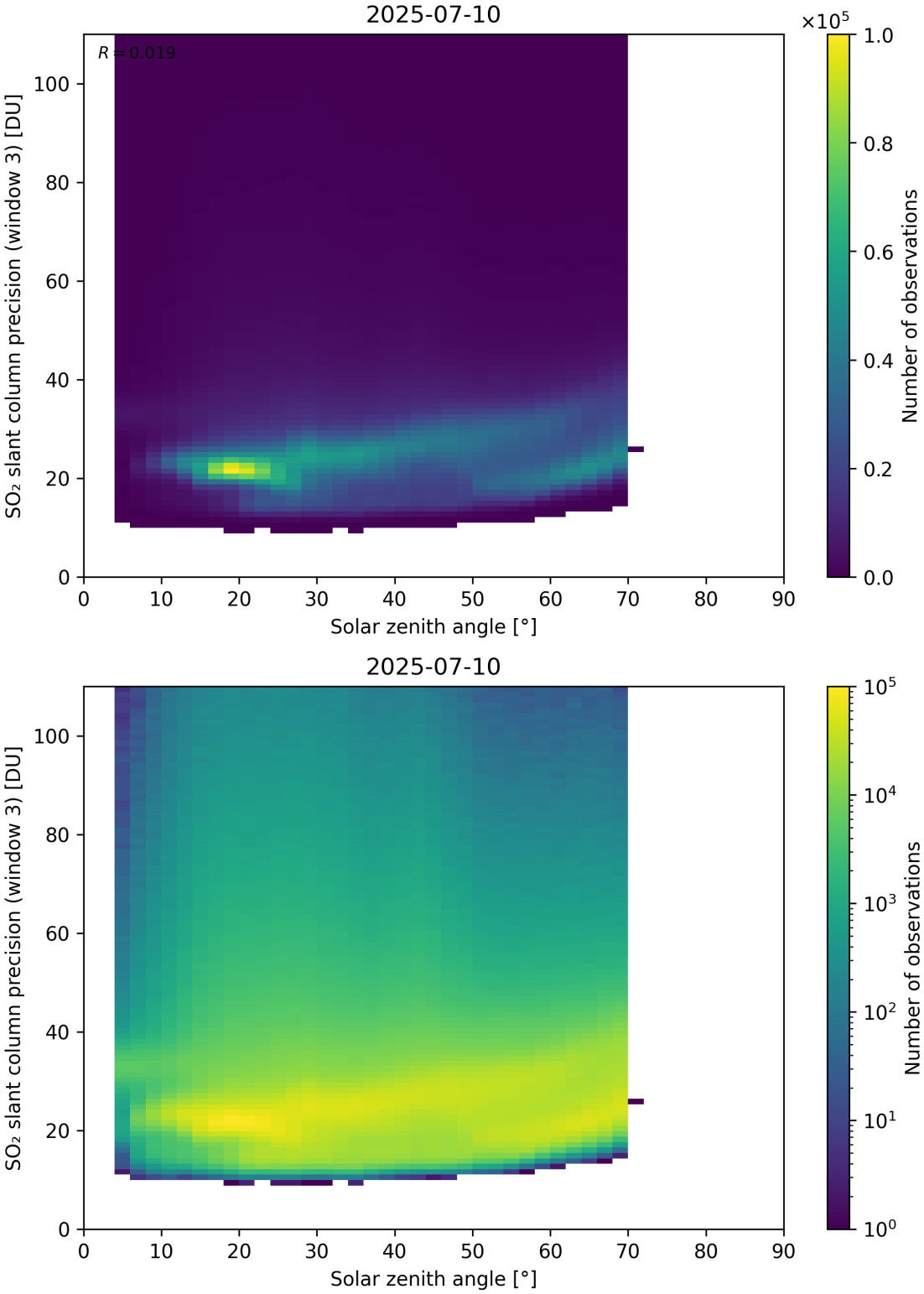

Figure 188: Scatter density plot of "Solar zenith angle" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

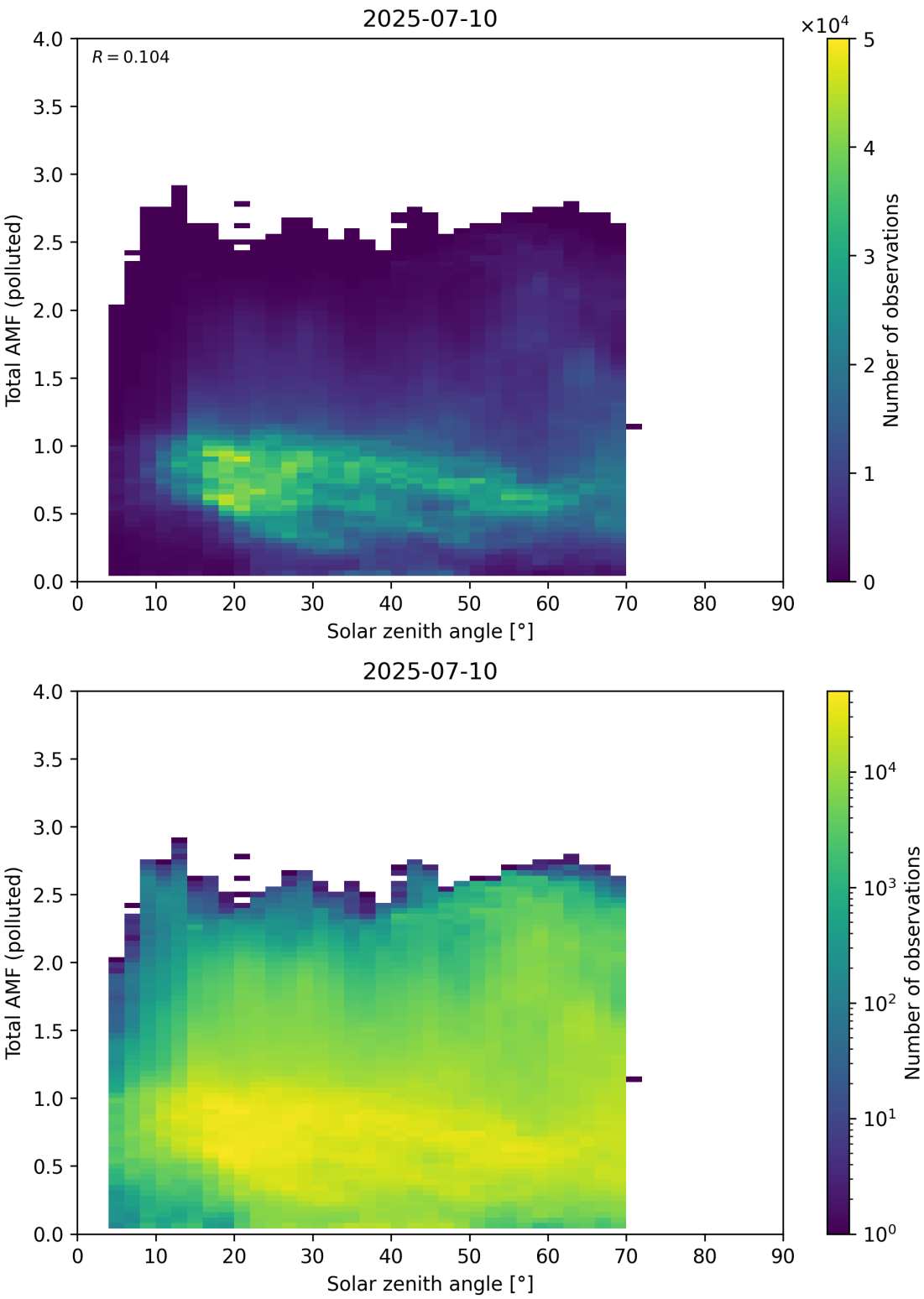

Figure 189: Scatter density plot of “Solar zenith angle” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11.

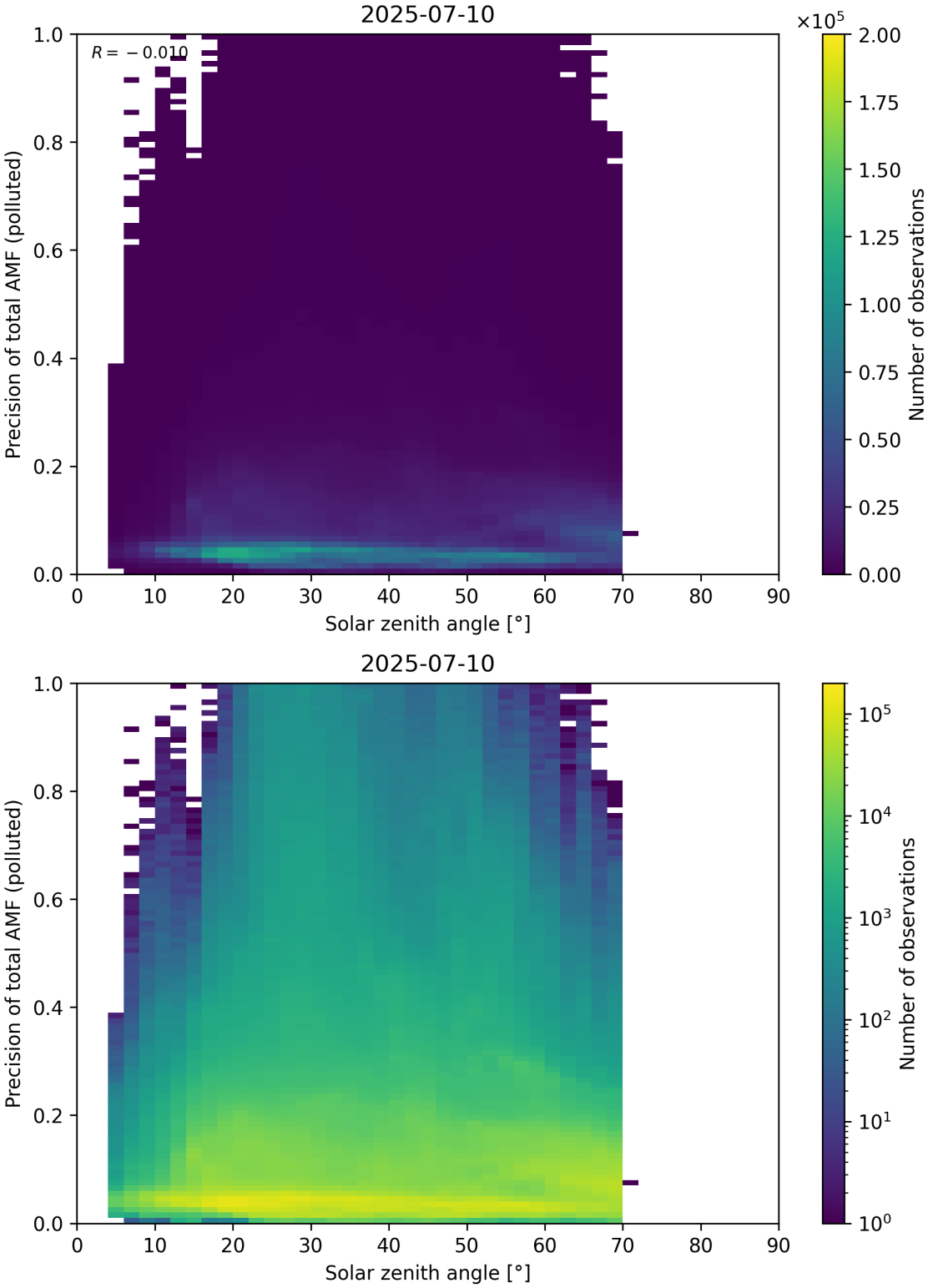

Figure 190: Scatter density plot of “Solar zenith angle” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11.

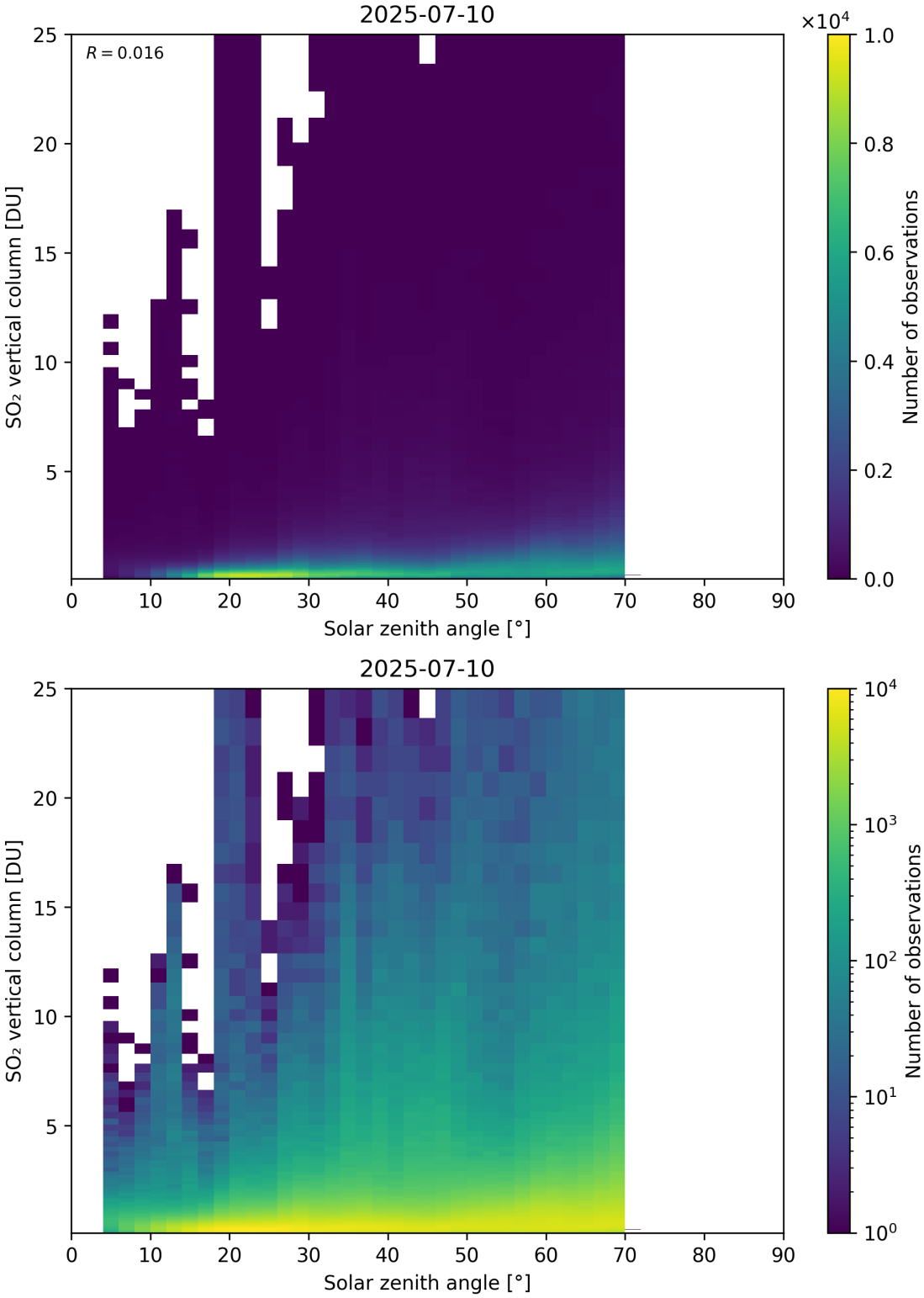

Figure 191: Scatter density plot of “Solar zenith angle” against “SO_2 vertical column” for 2025-07-09 to 2025-07-11.

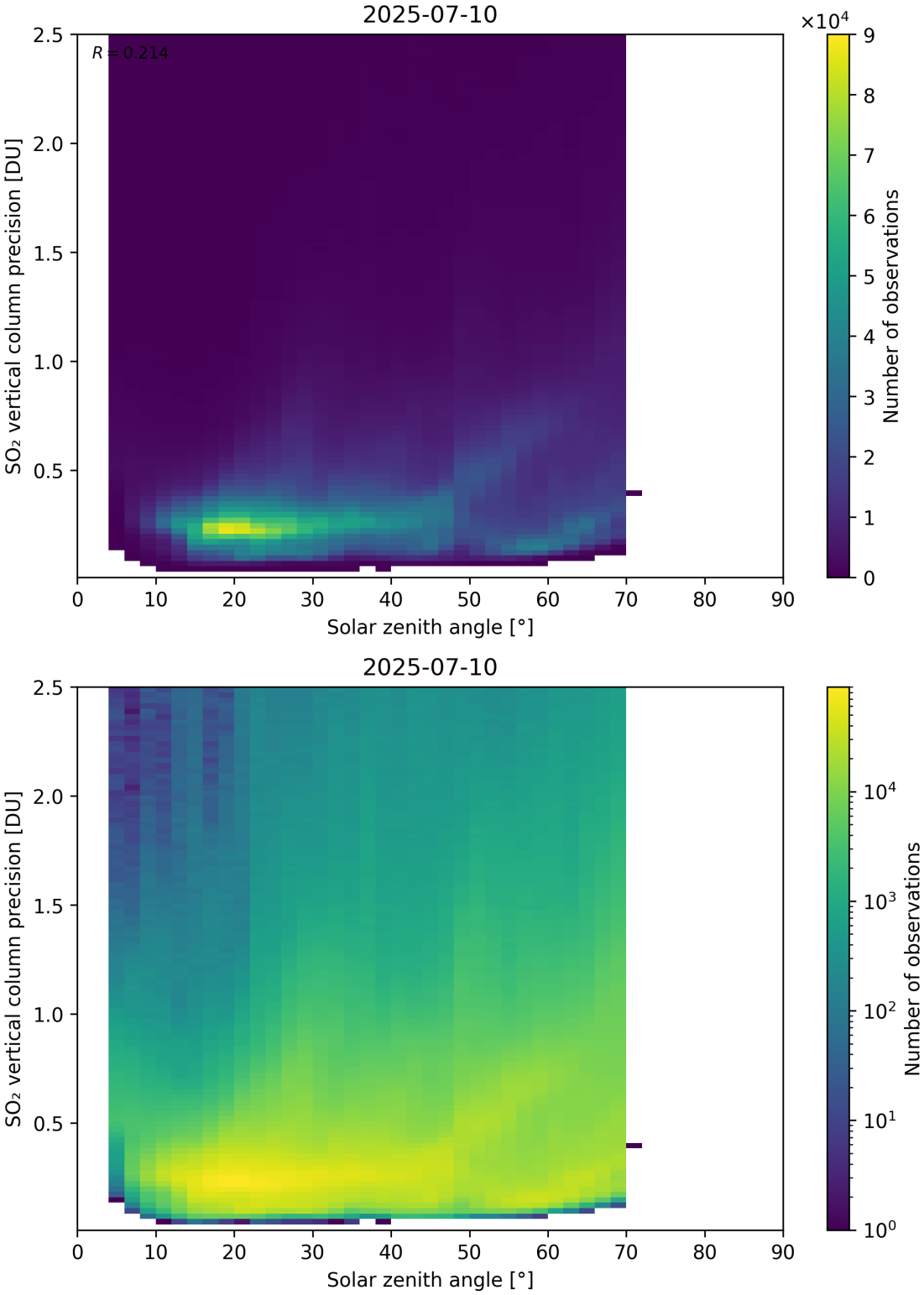

Figure 192: Scatter density plot of "Solar zenith angle" against "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11.

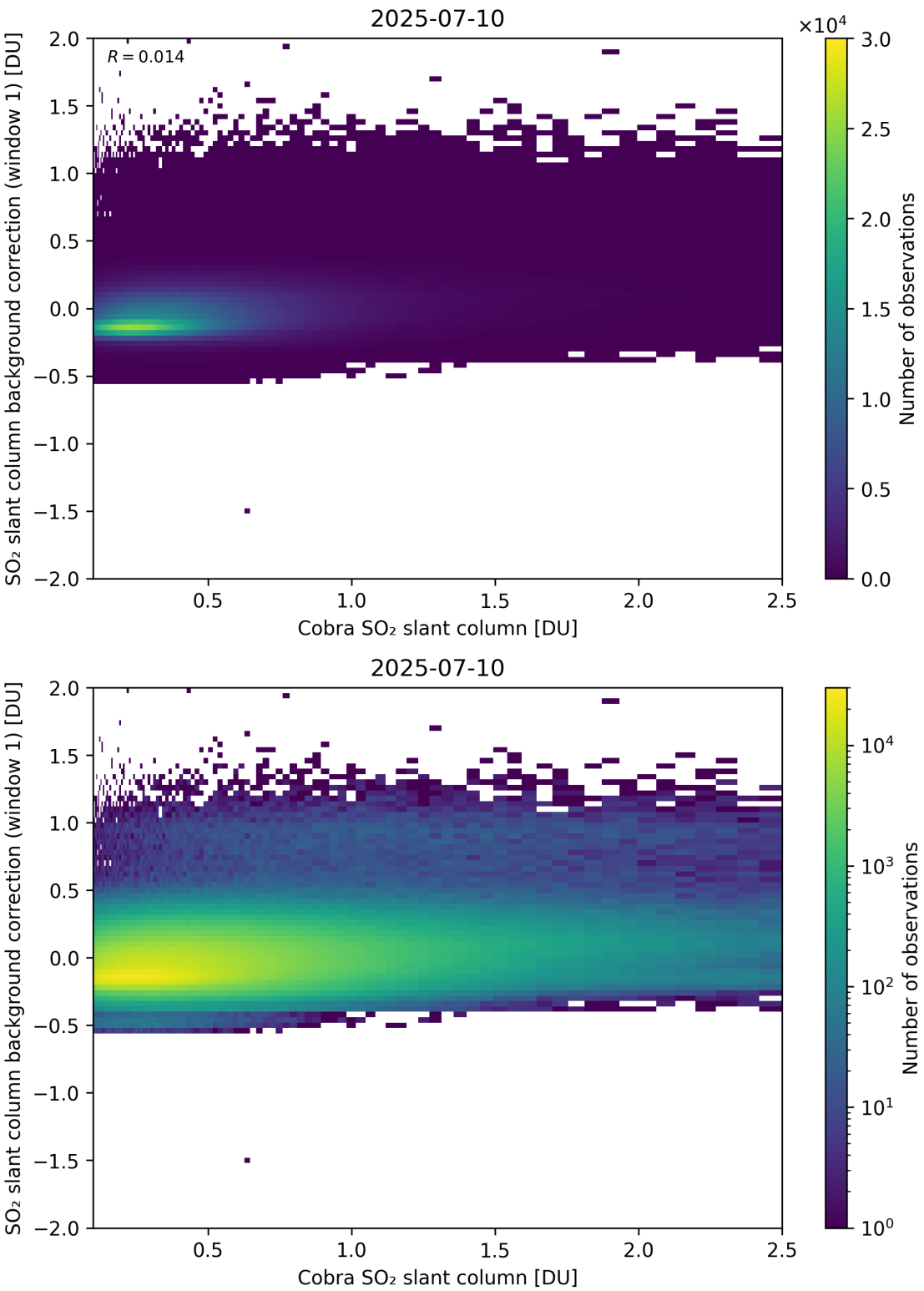

Figure 193: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

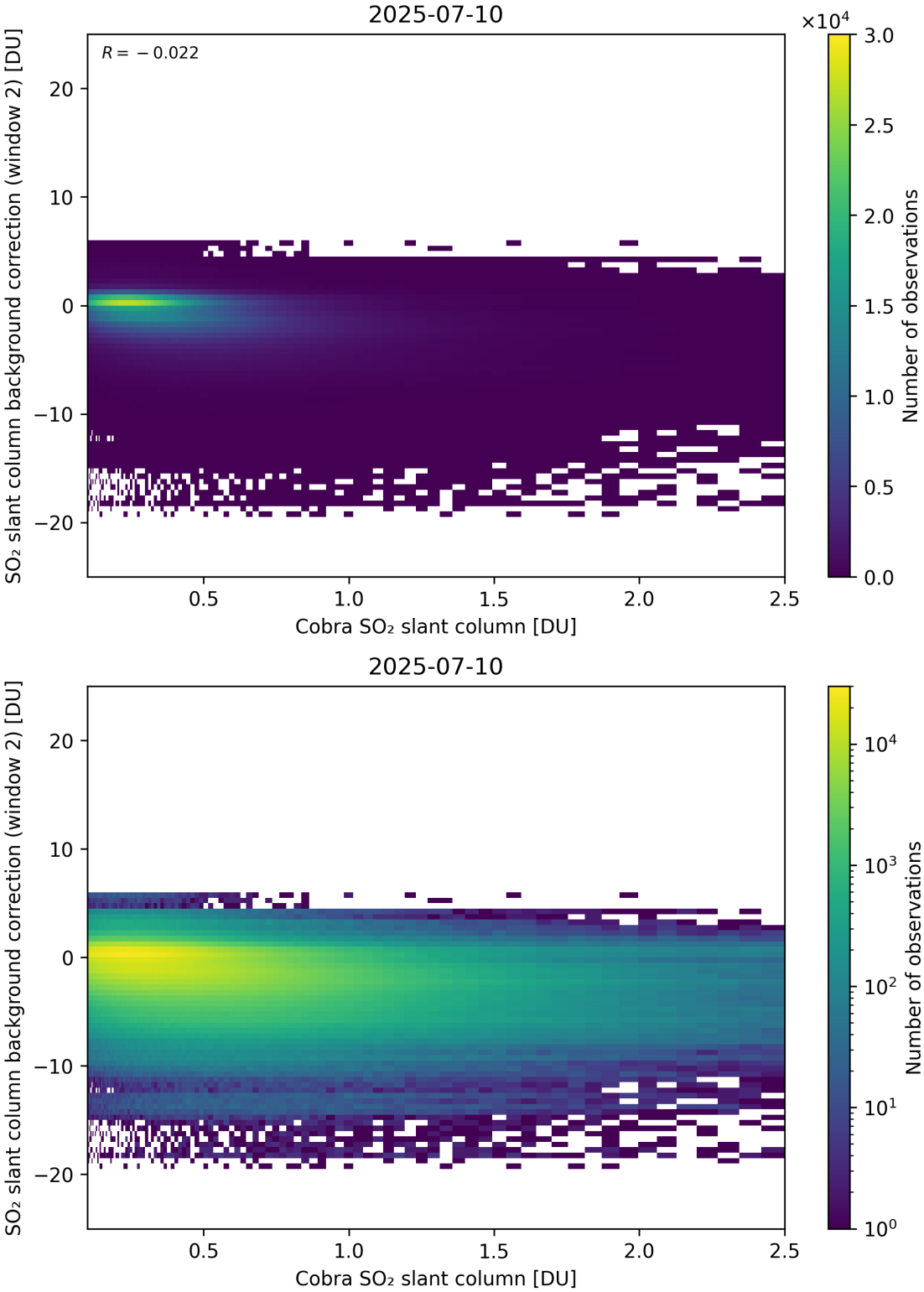

Figure 194: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

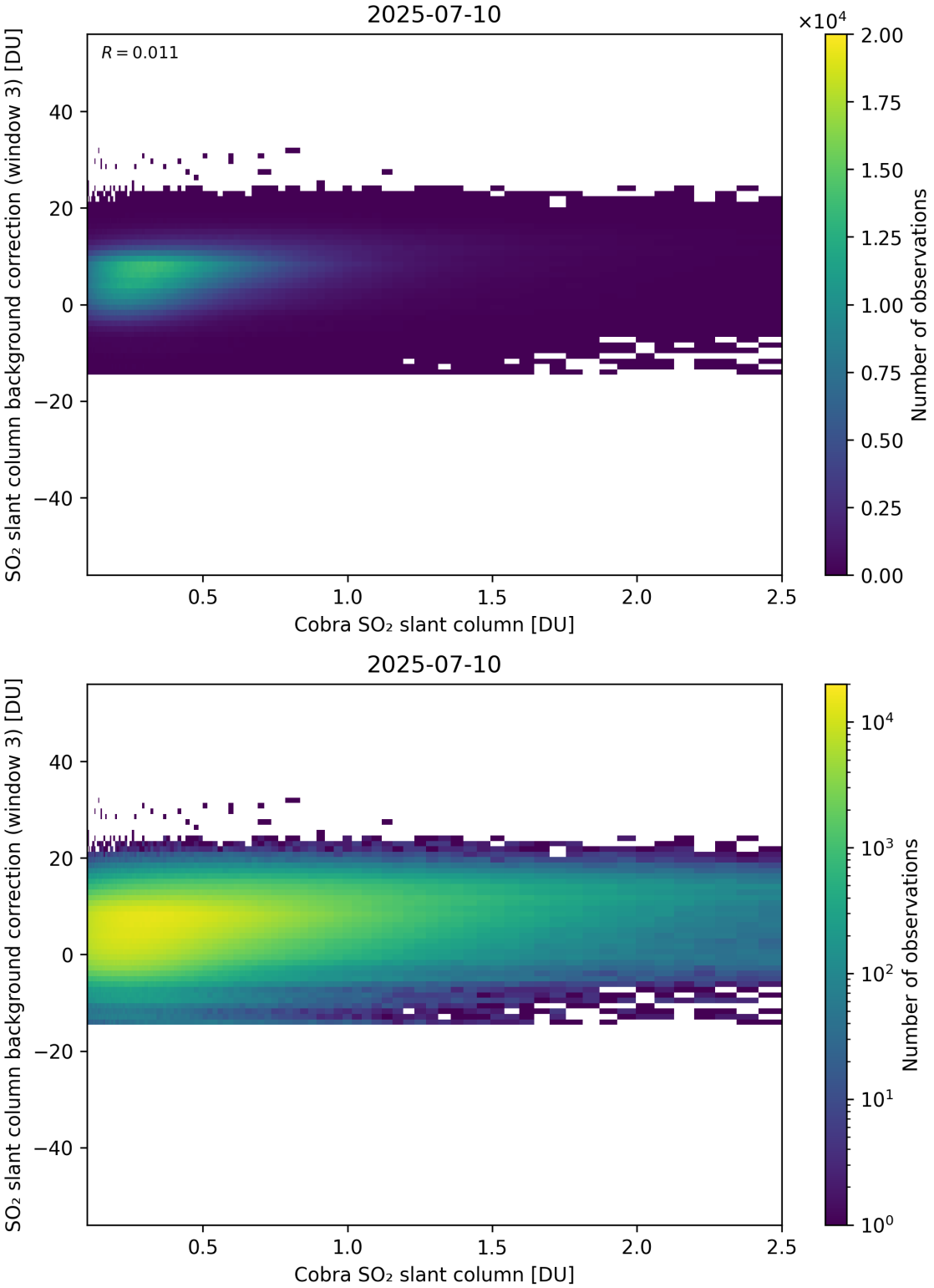

Figure 195: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

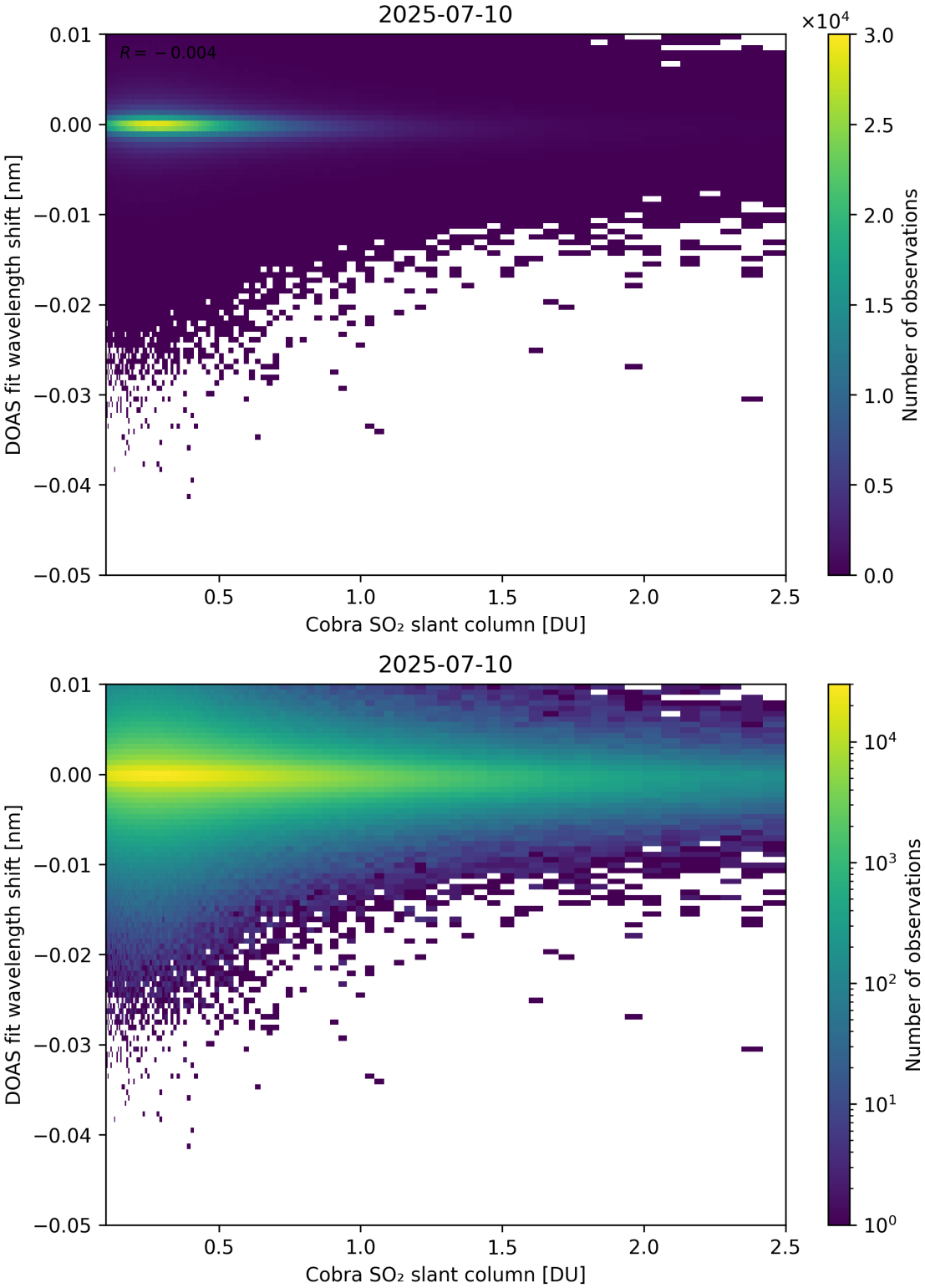

Figure 196: Scatter density plot of "Cobra SO_2 slant column" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

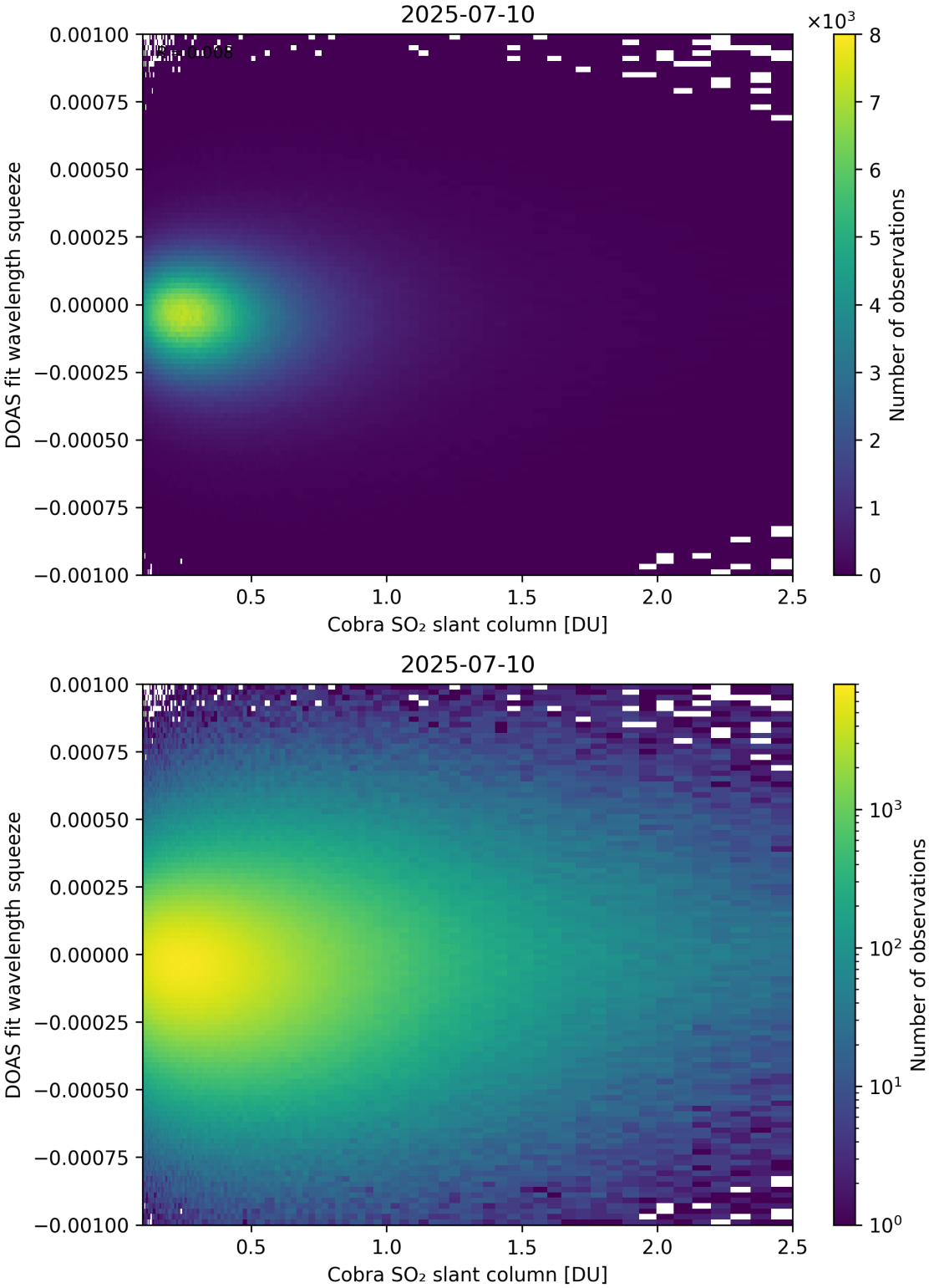

Figure 197: Scatter density plot of "Cobra SO_2 slant column" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

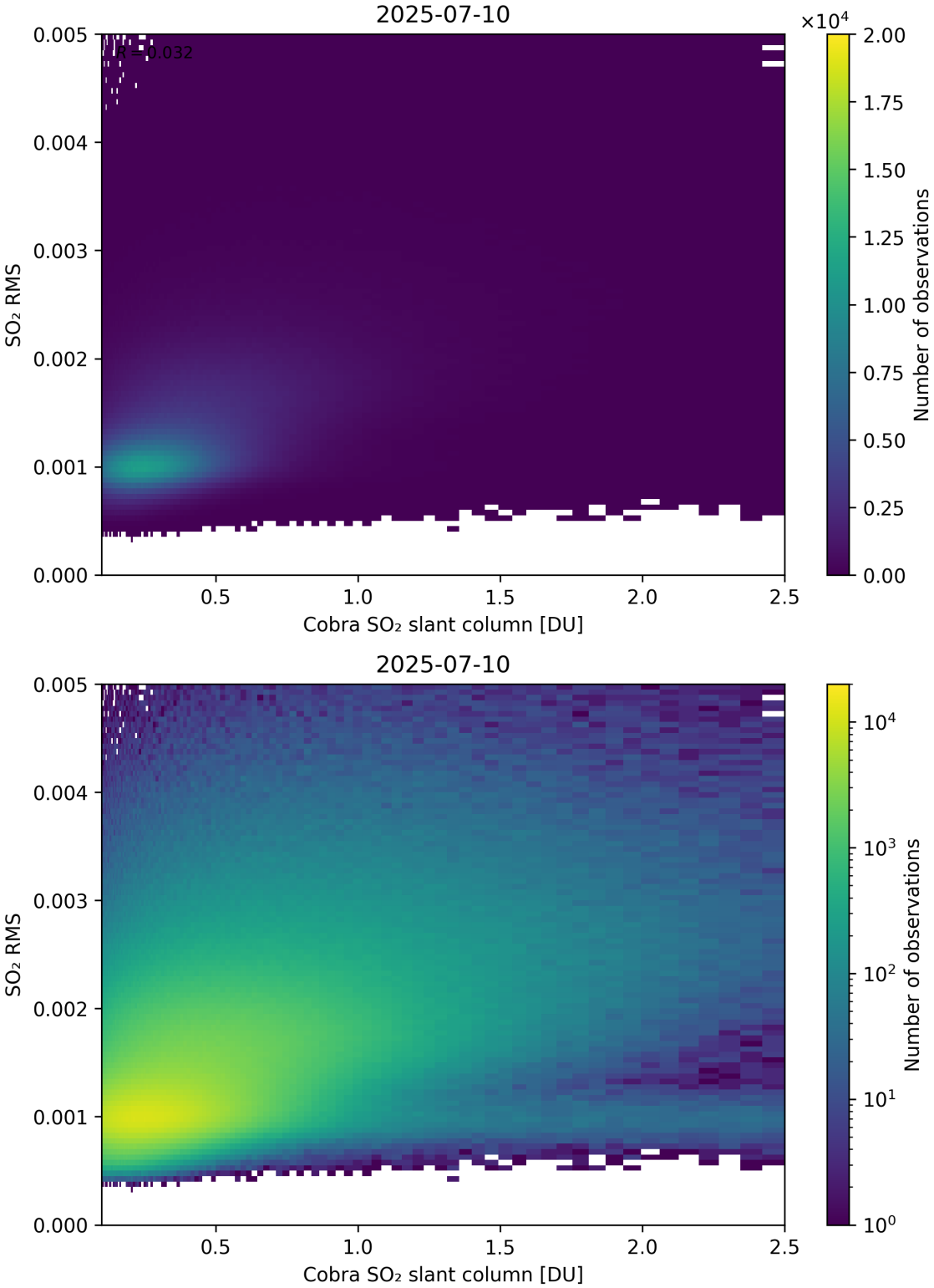

Figure 198: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

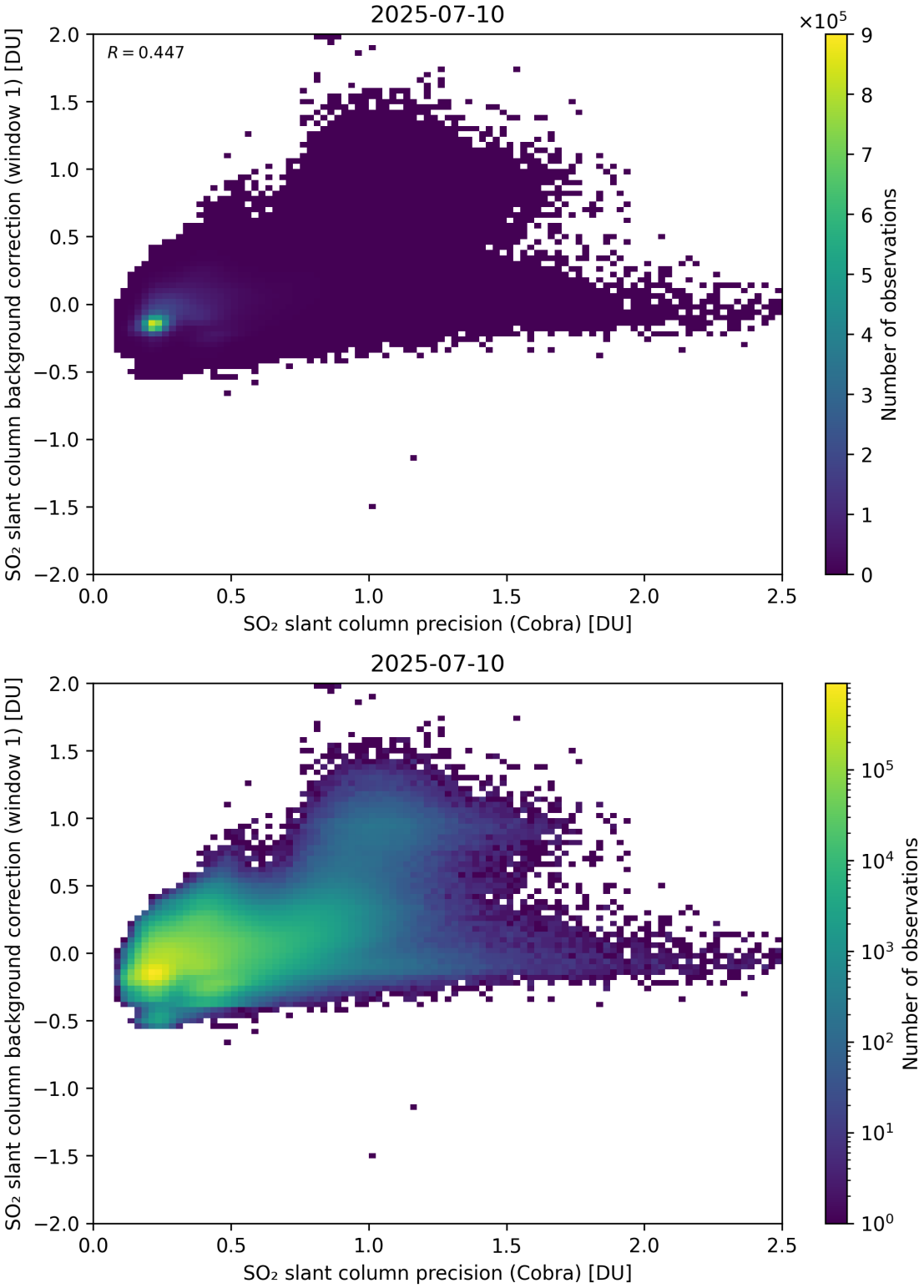

Figure 199: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

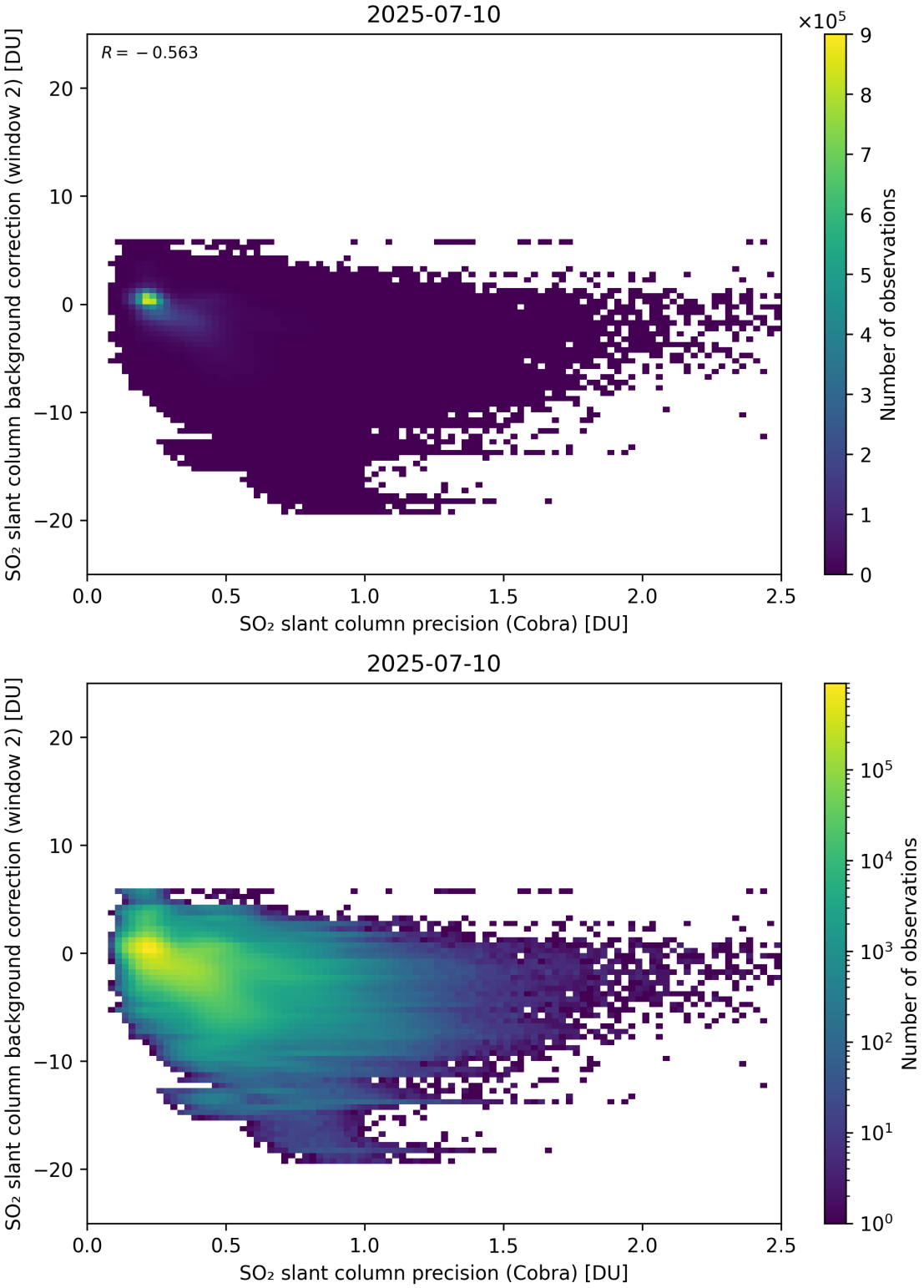

Figure 200: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

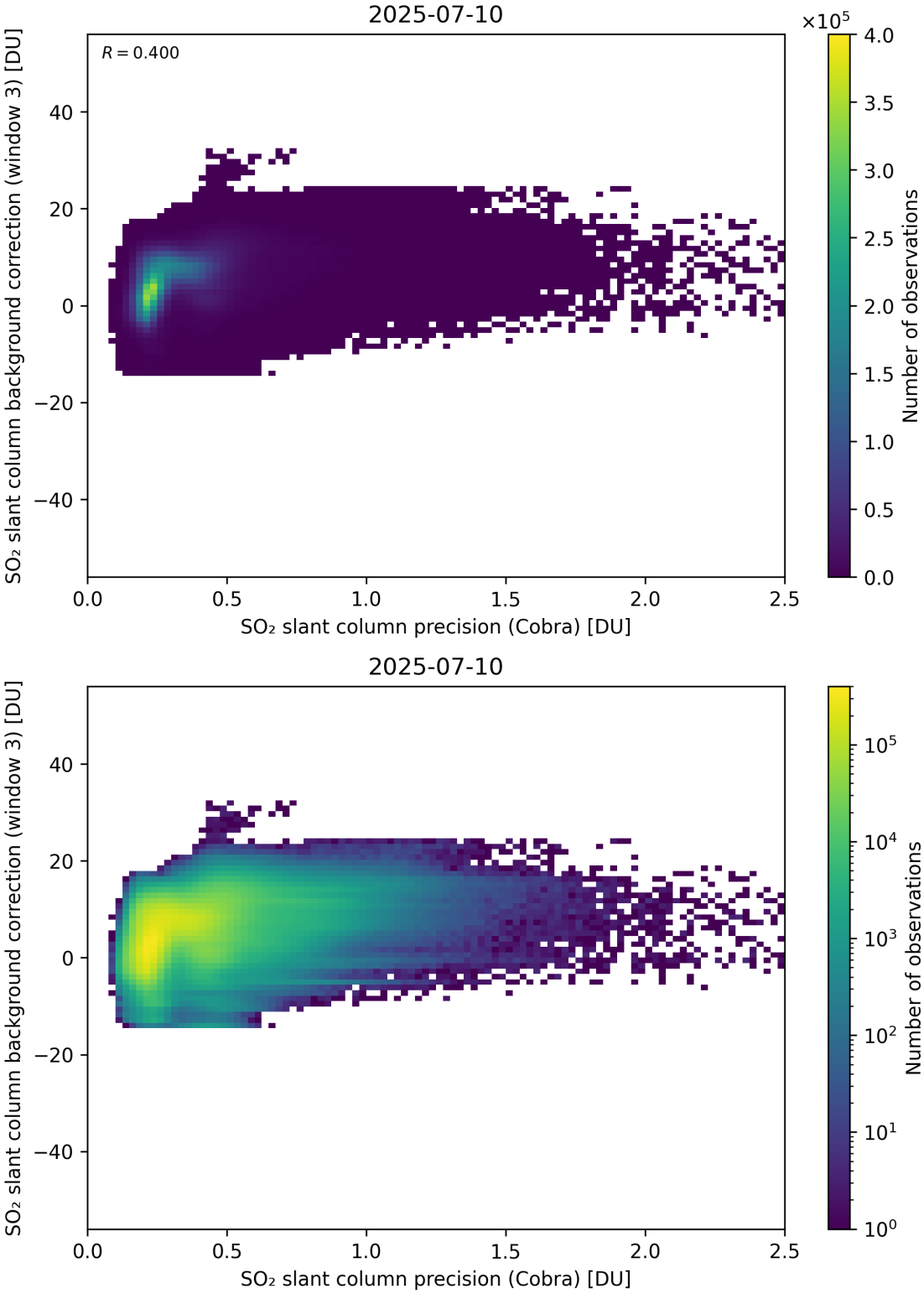

Figure 201: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

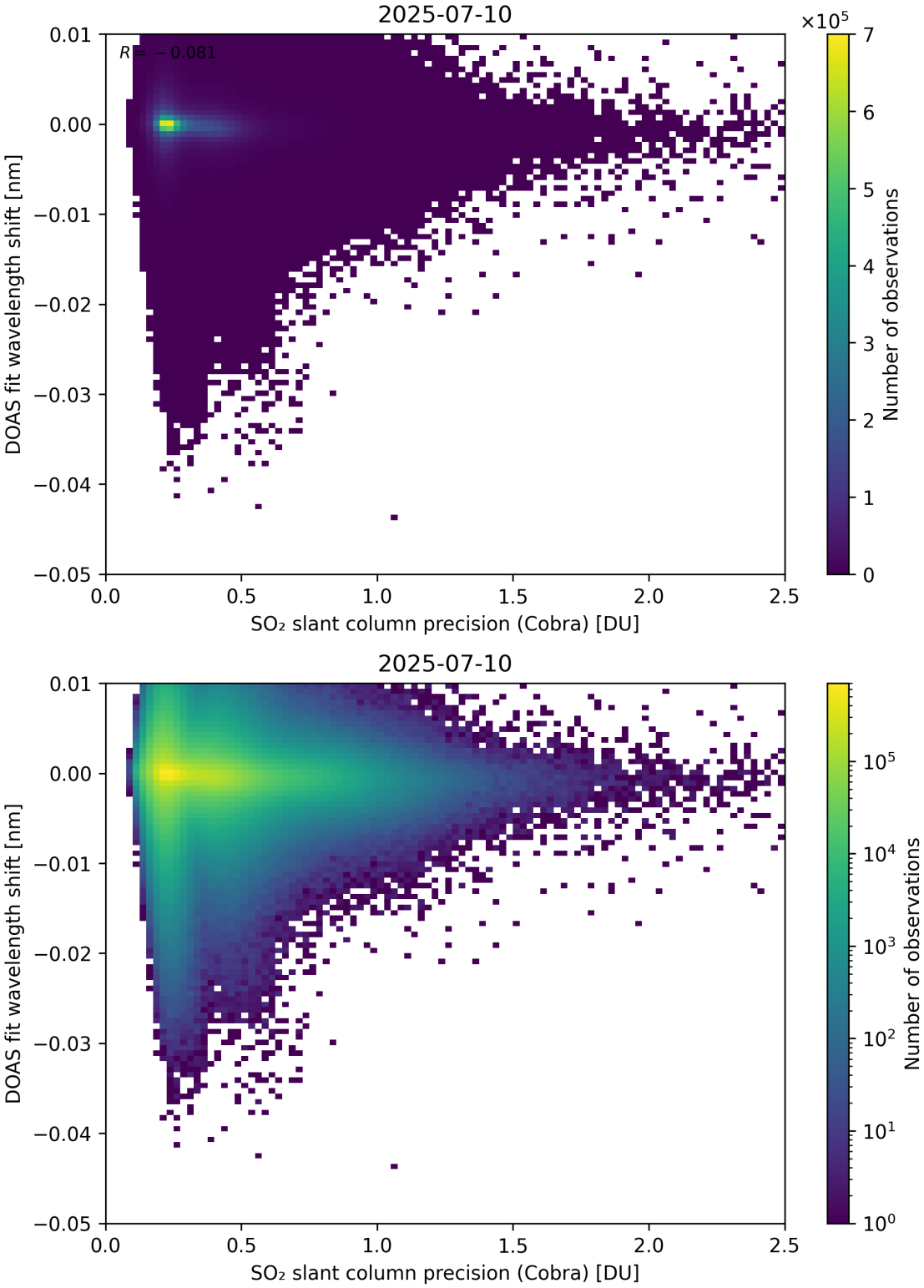

Figure 202: Scatter density plot of "SO_2 slant column precision (Cobra)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

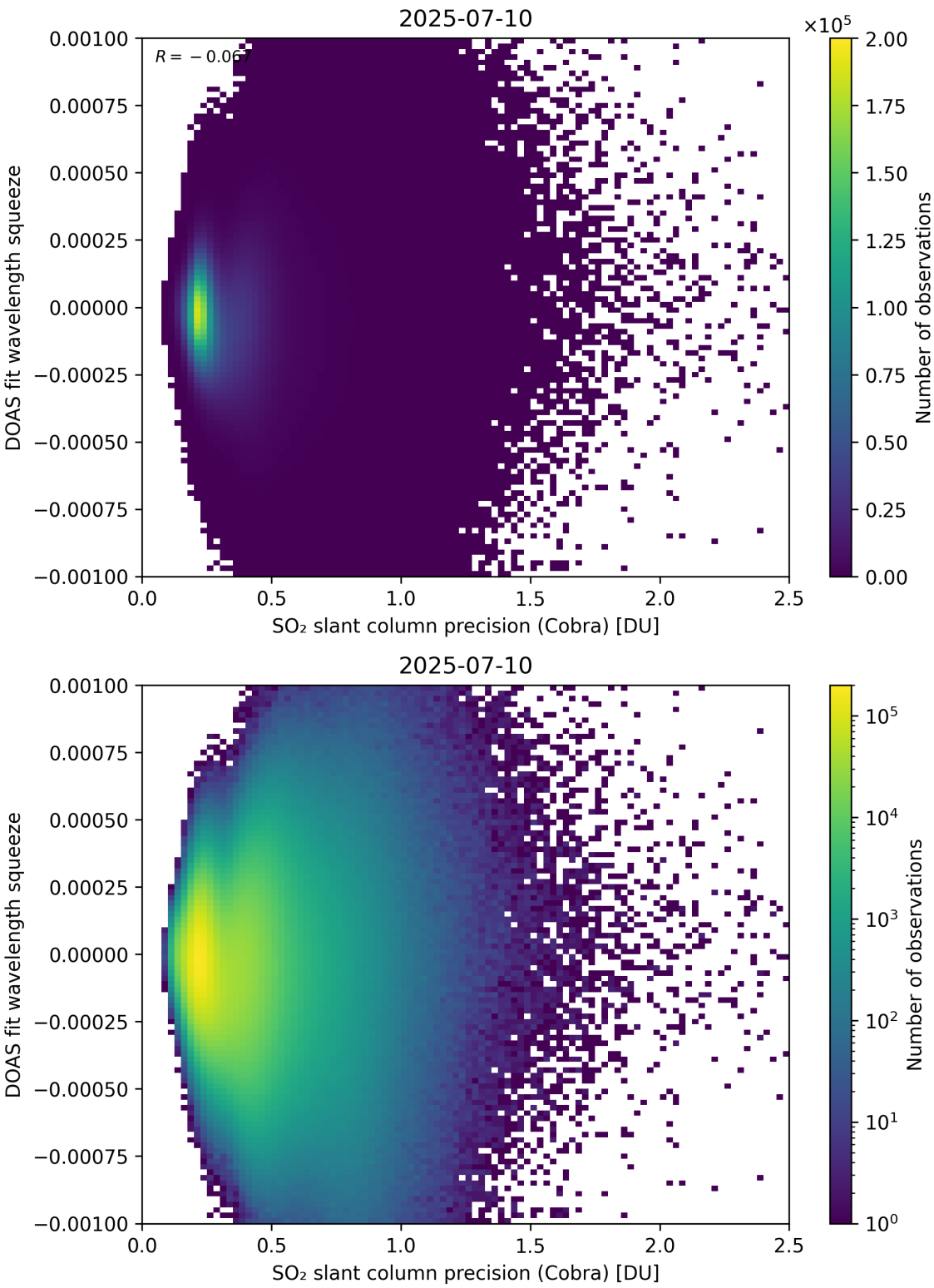

Figure 203: Scatter density plot of "SO_2 slant column precision (Cobra)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

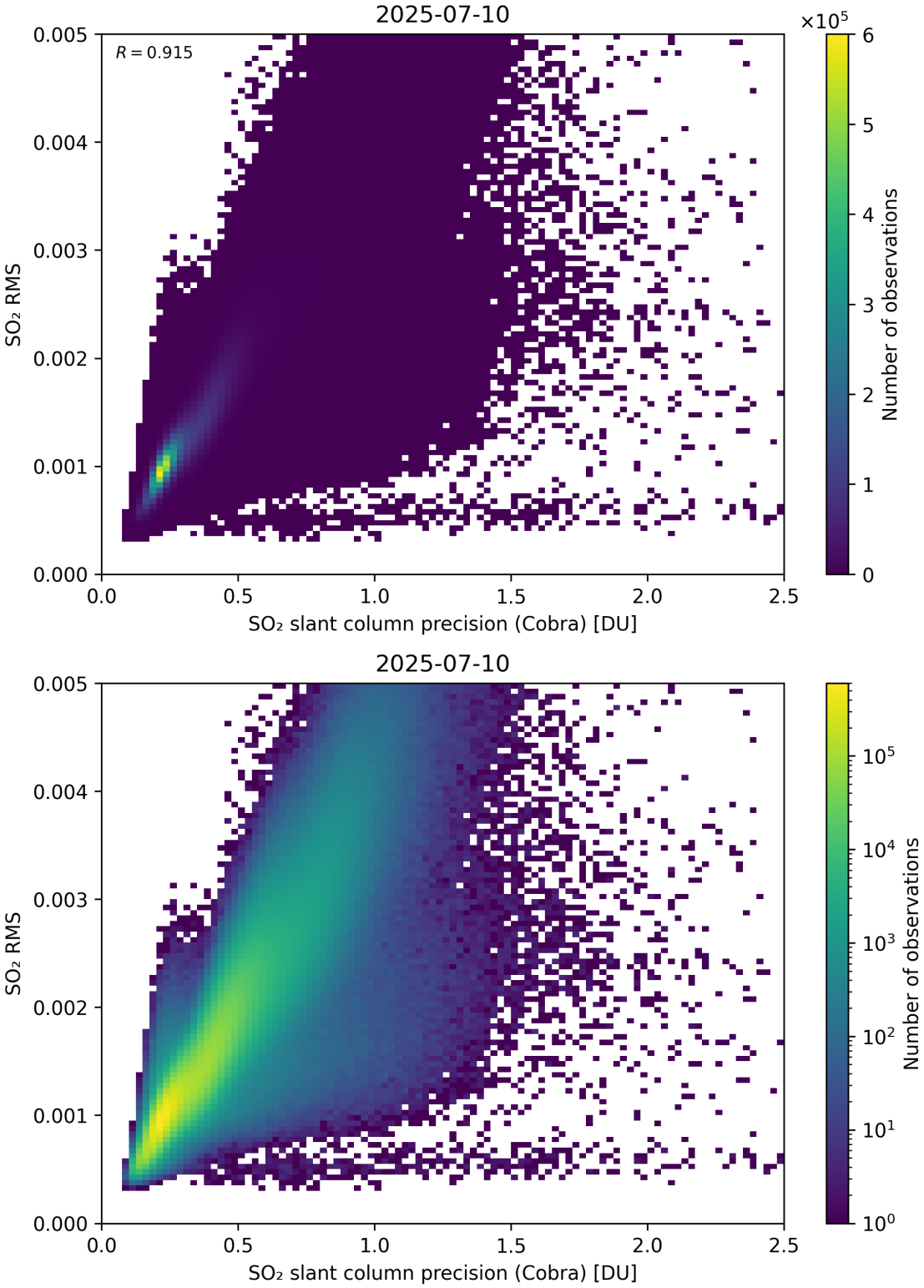

Figure 204: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

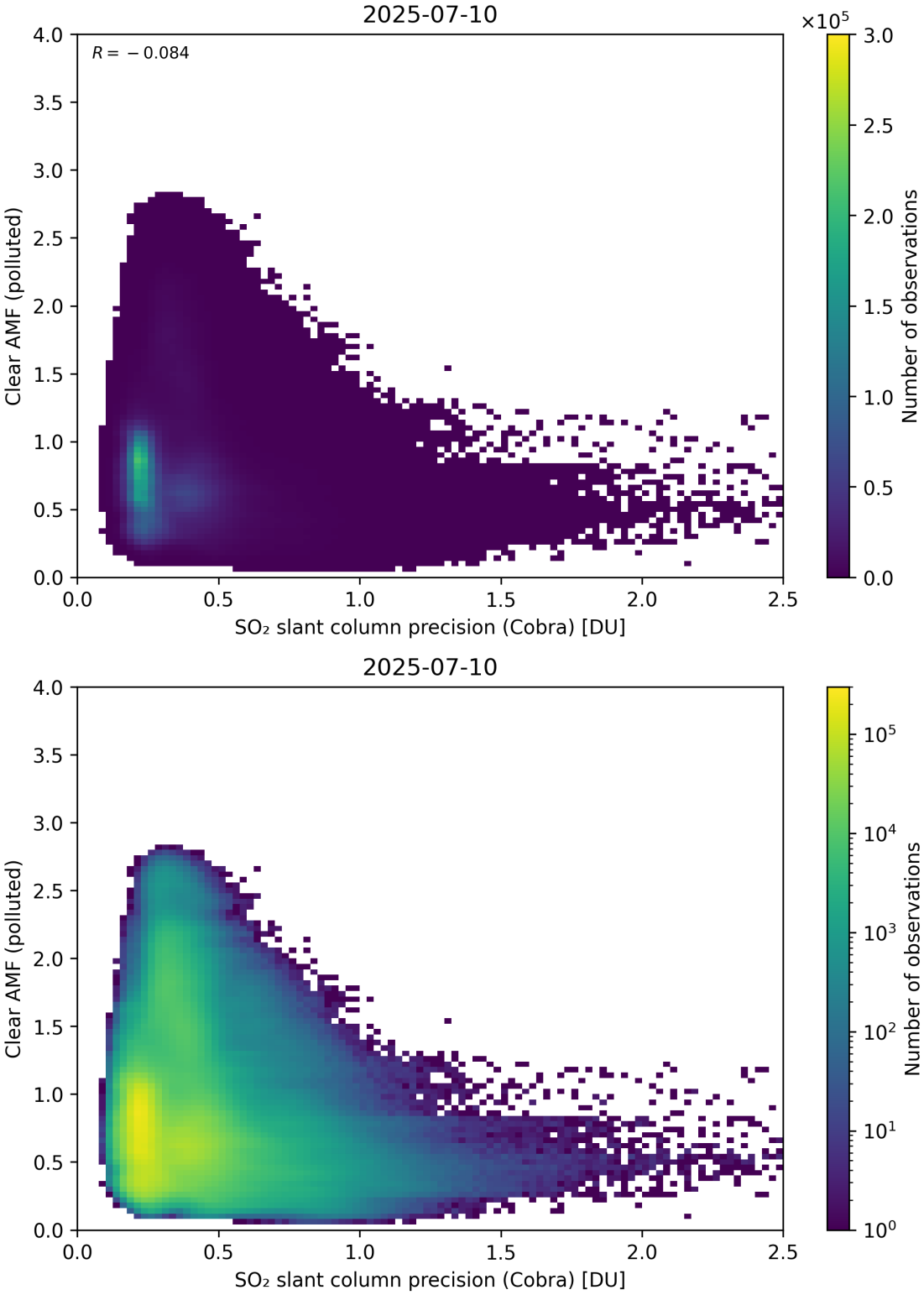

Figure 205: Scatter density plot of "SO_2 slant column precision (Cobra)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

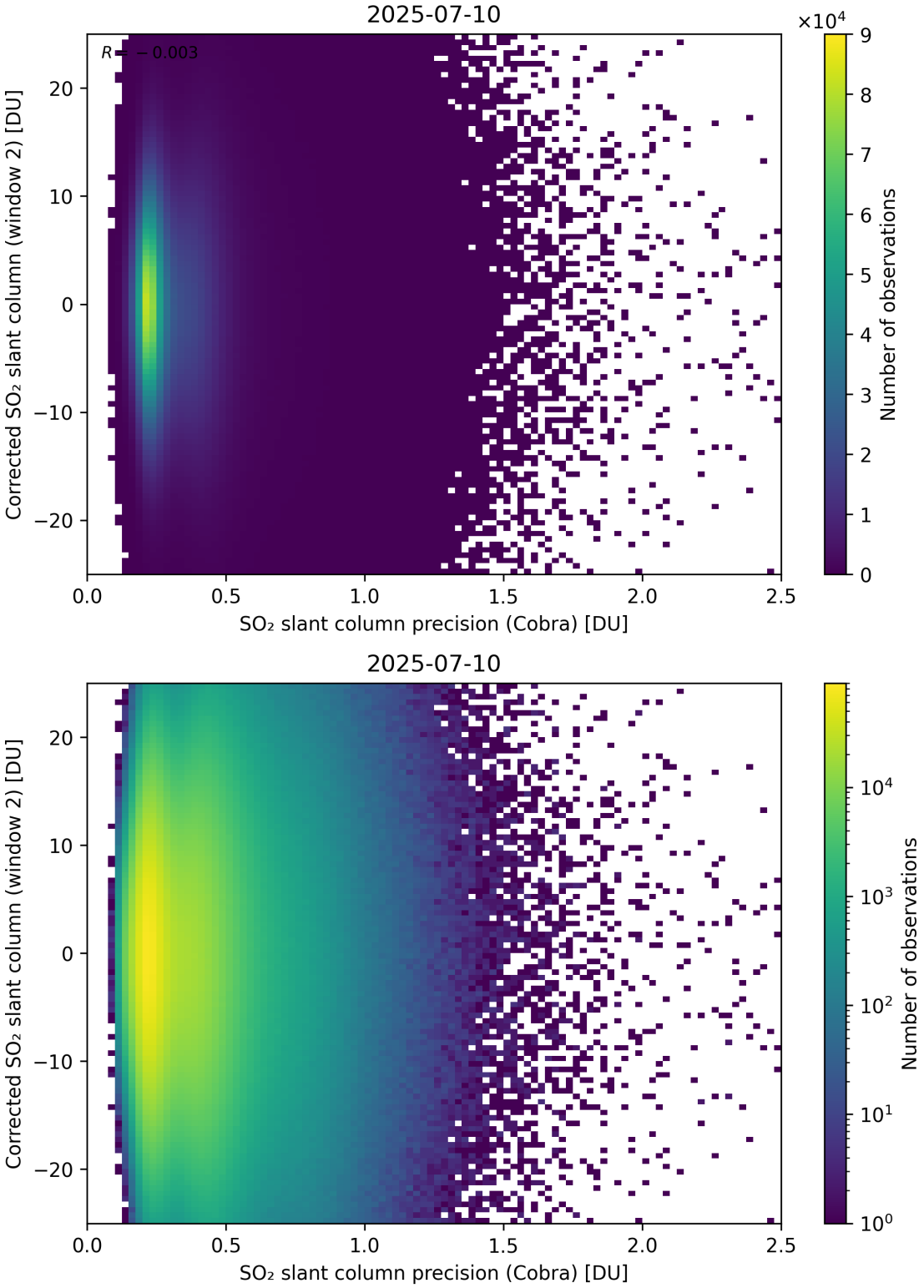

Figure 206: Scatter density plot of "SO_2 slant column precision (Cobra)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

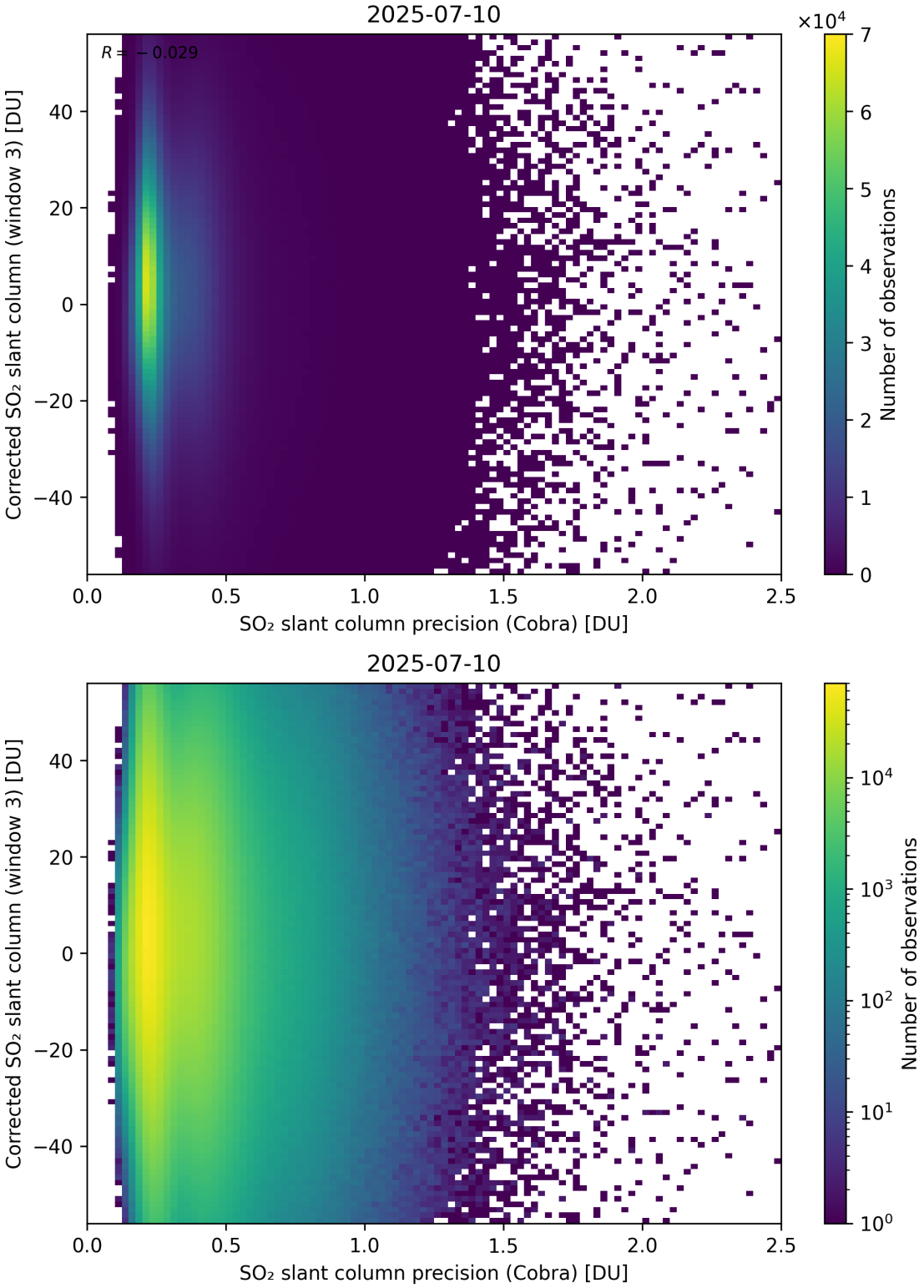

Figure 207: Scatter density plot of "SO_2 slant column precision (Cobra)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

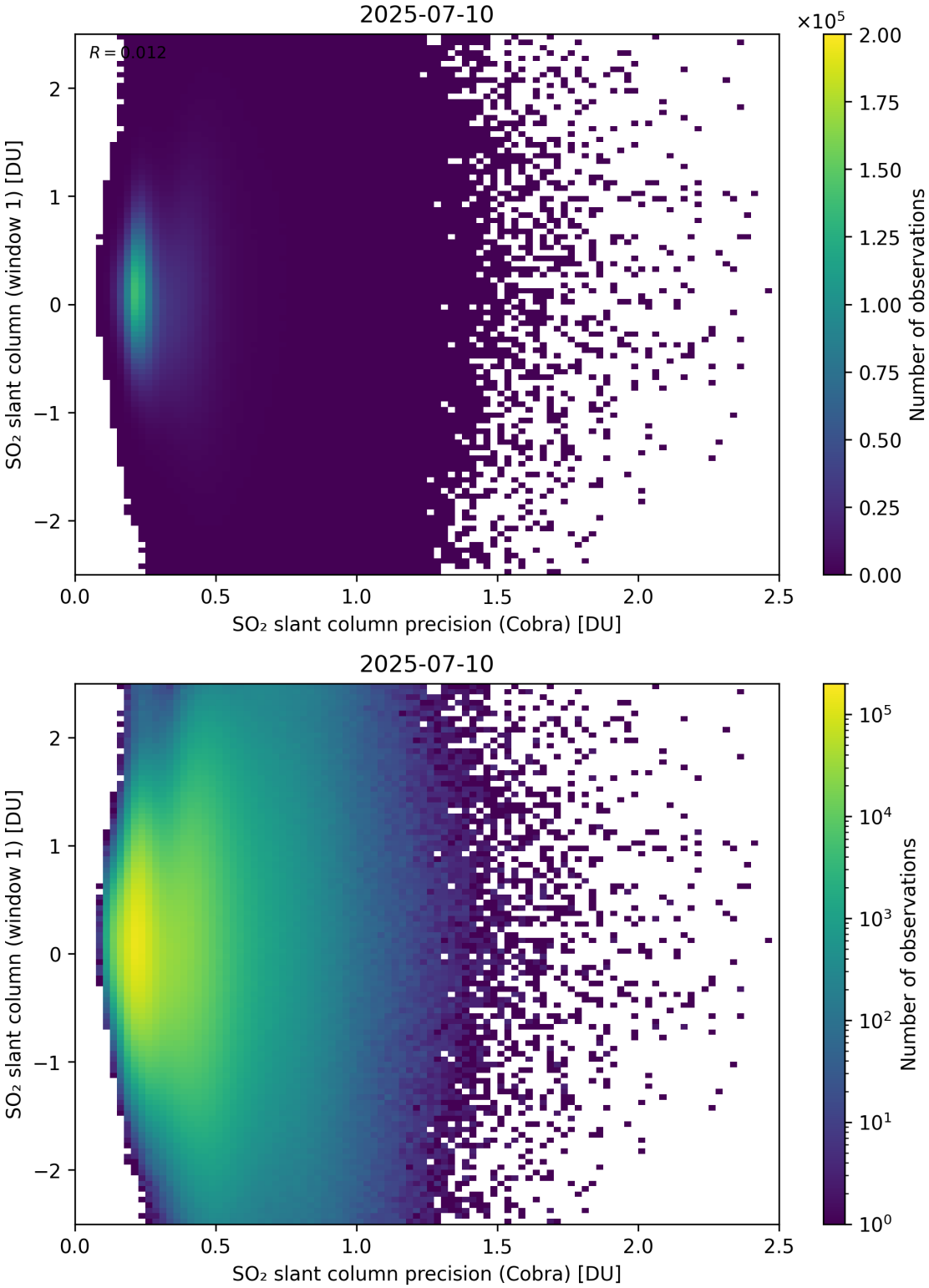

Figure 208: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

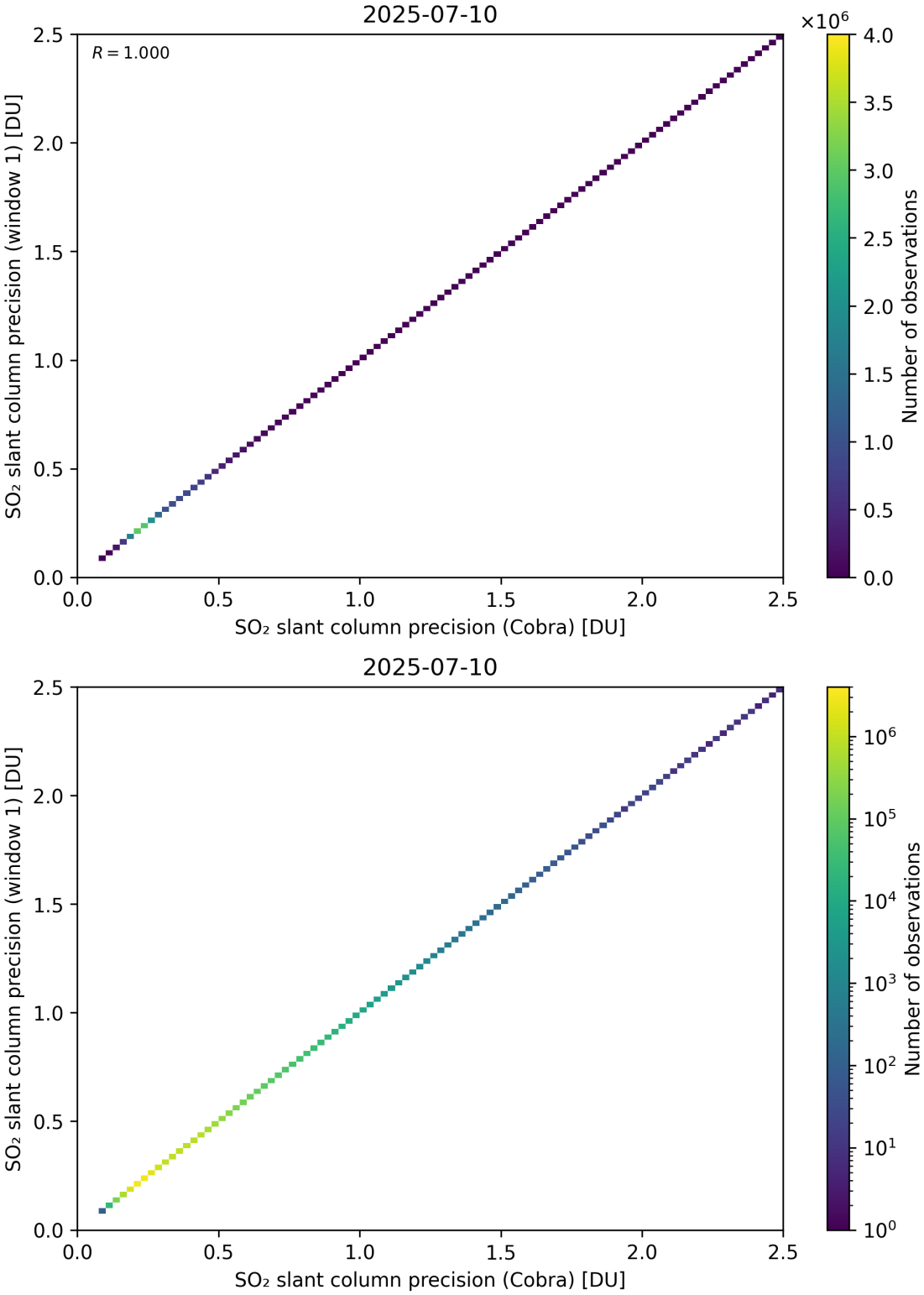

Figure 209: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

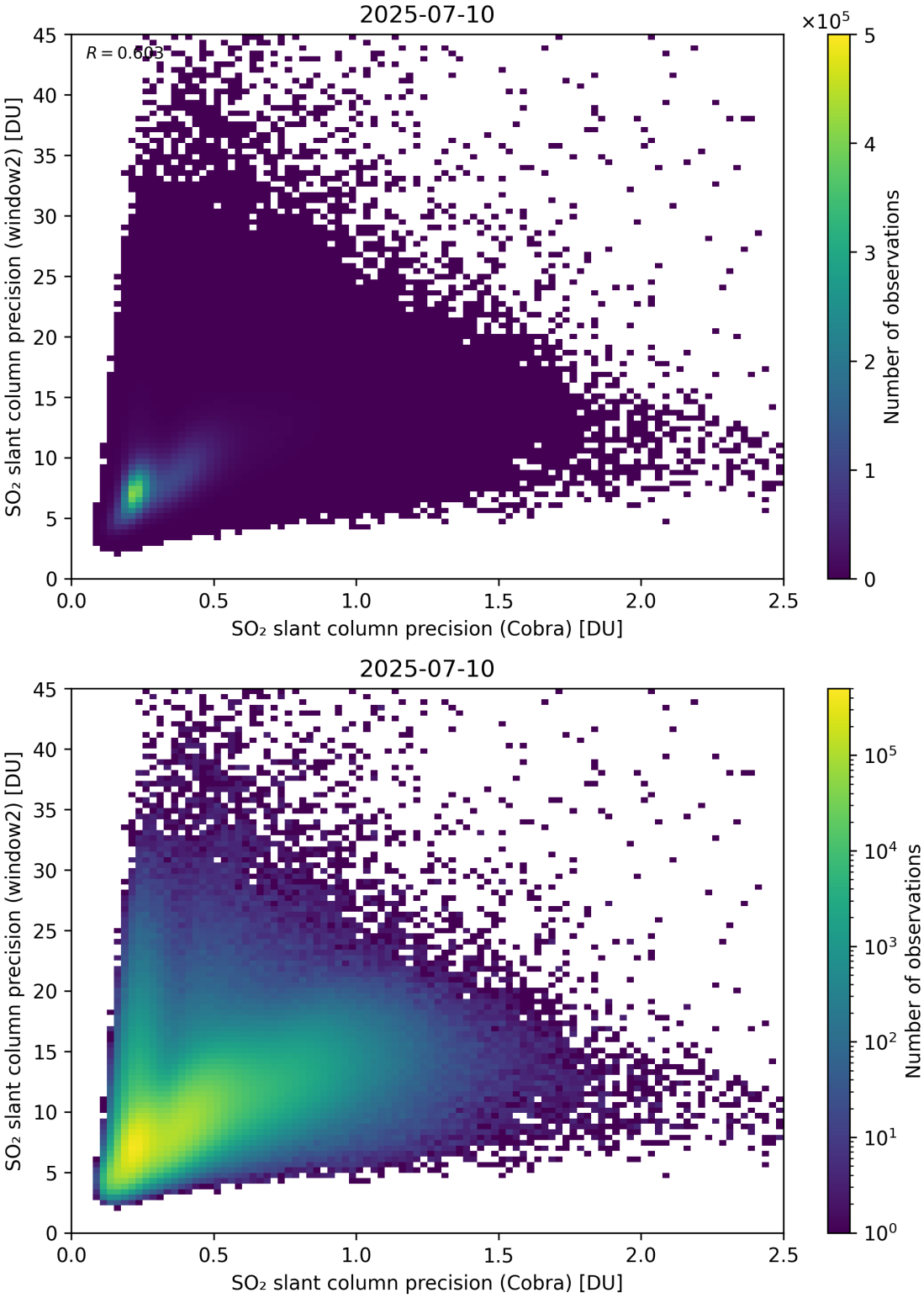

Figure 210: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

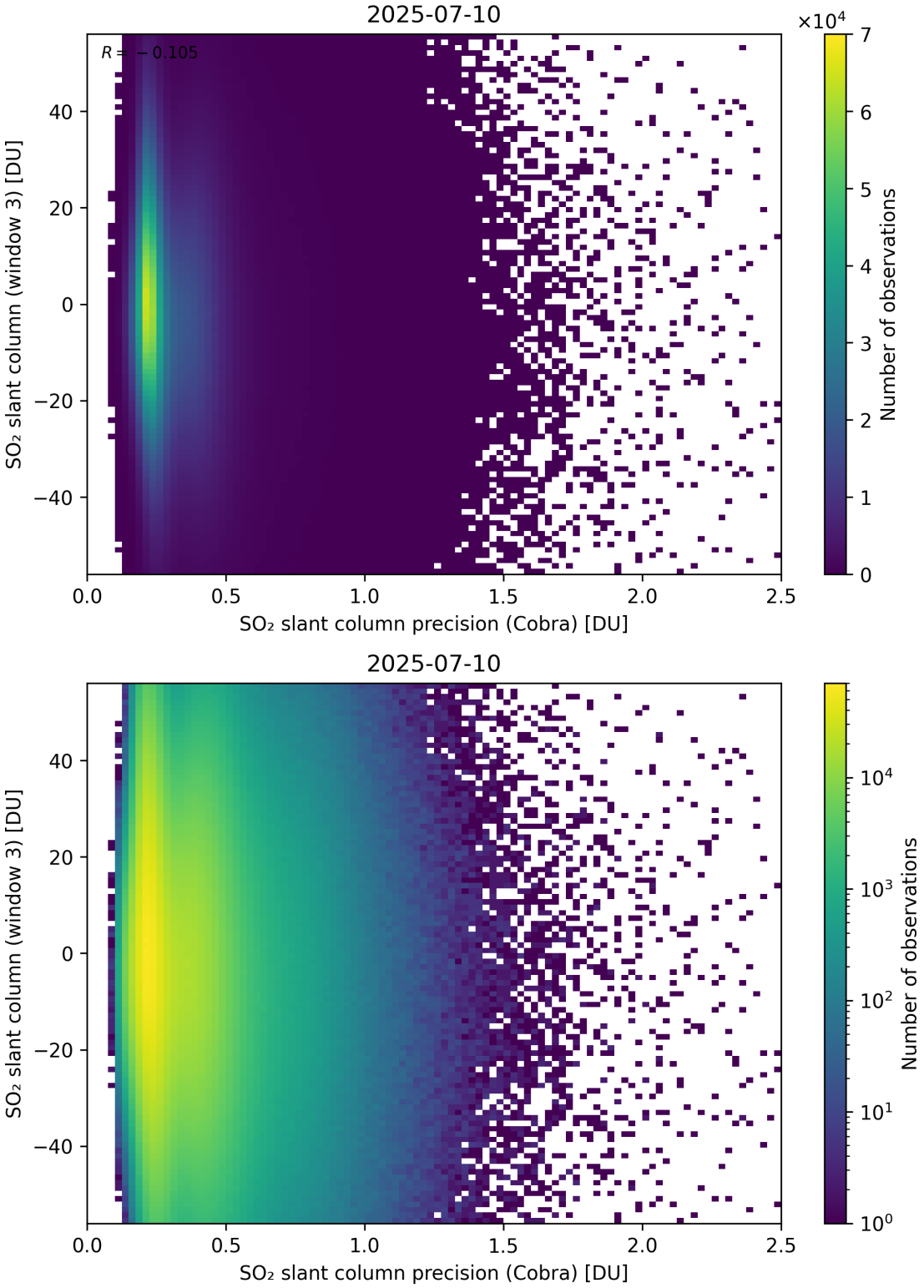

Figure 211: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

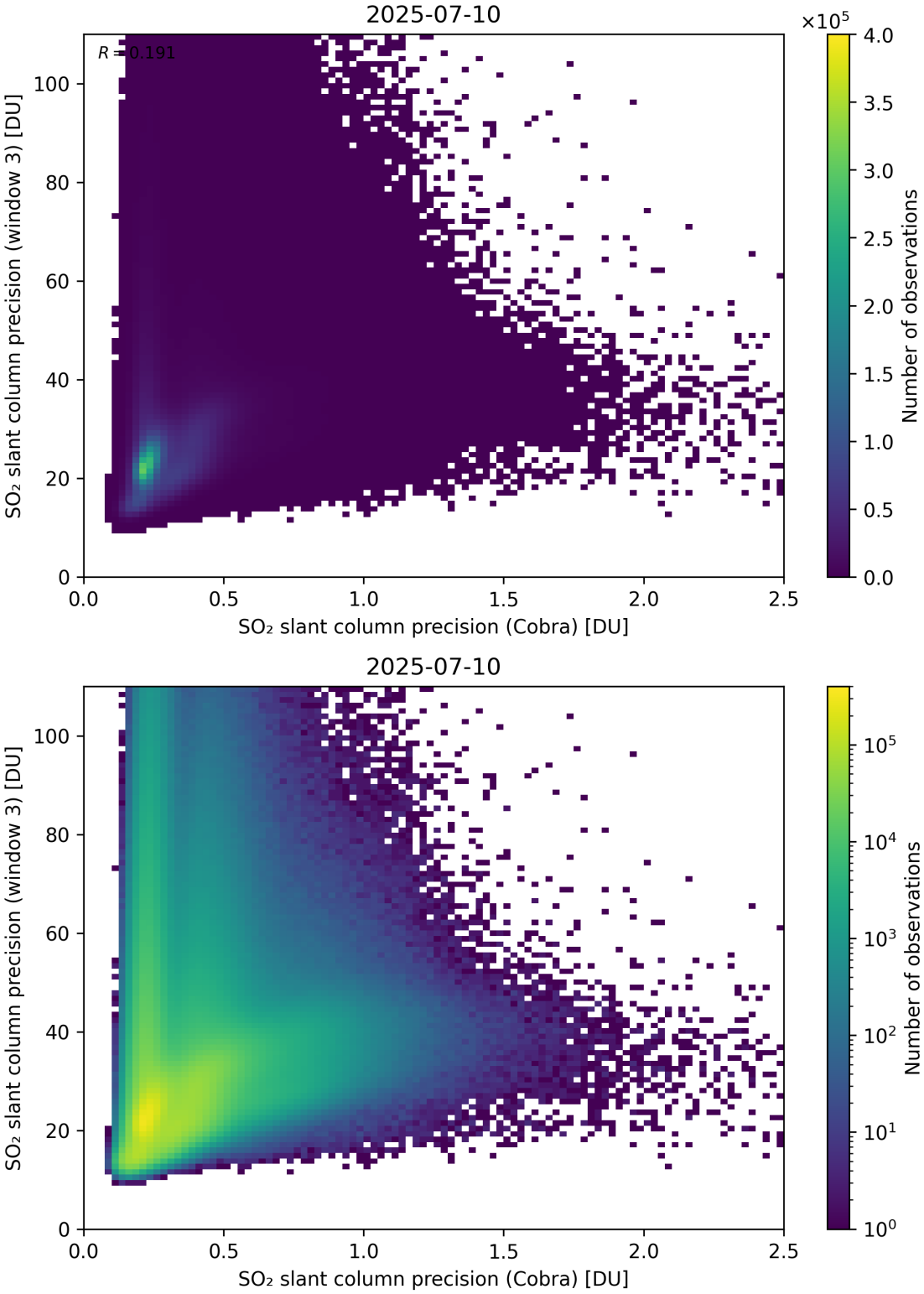

Figure 212: Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

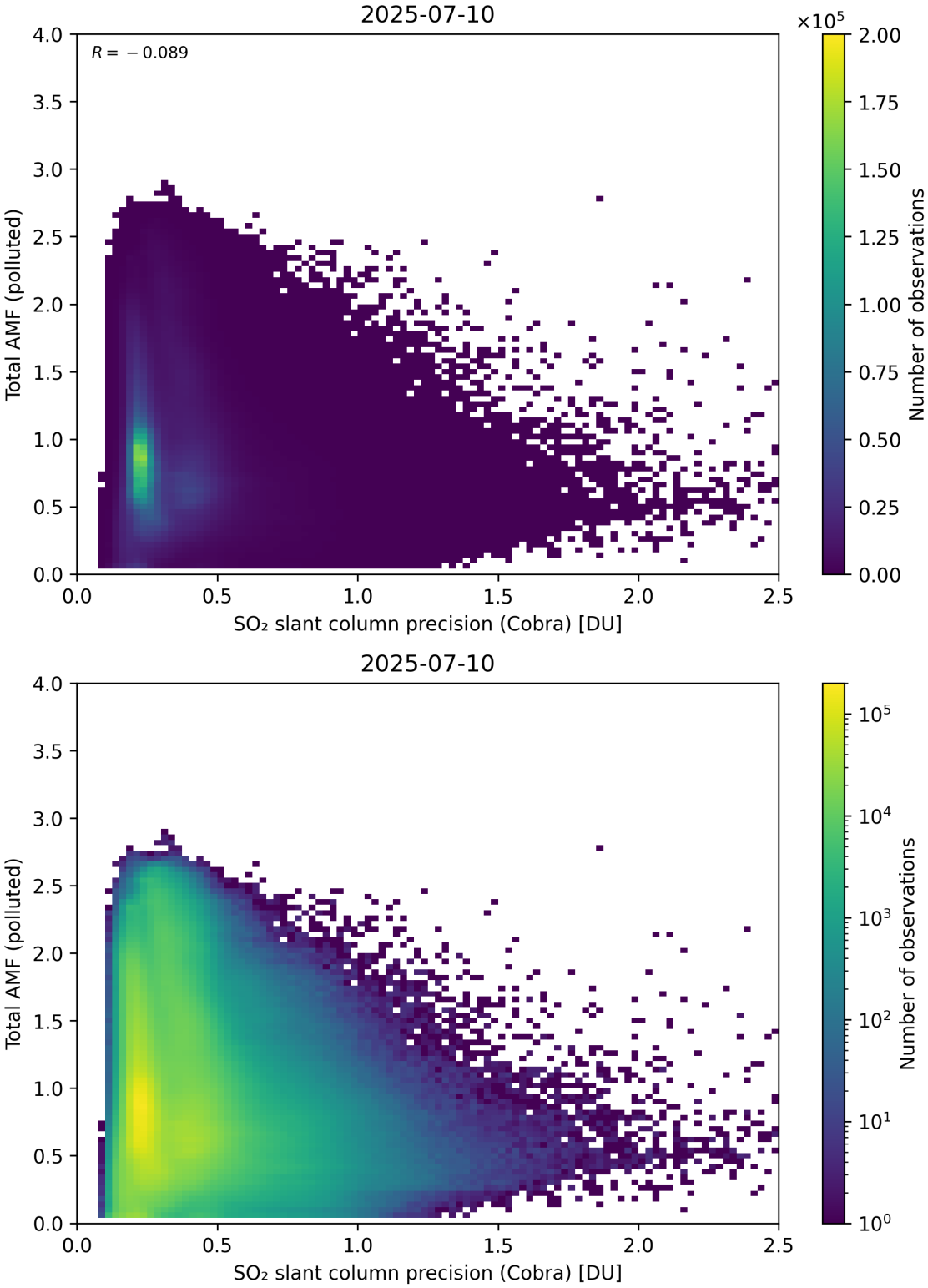

Figure 213: Scatter density plot of "SO_2 slant column precision (Cobra)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

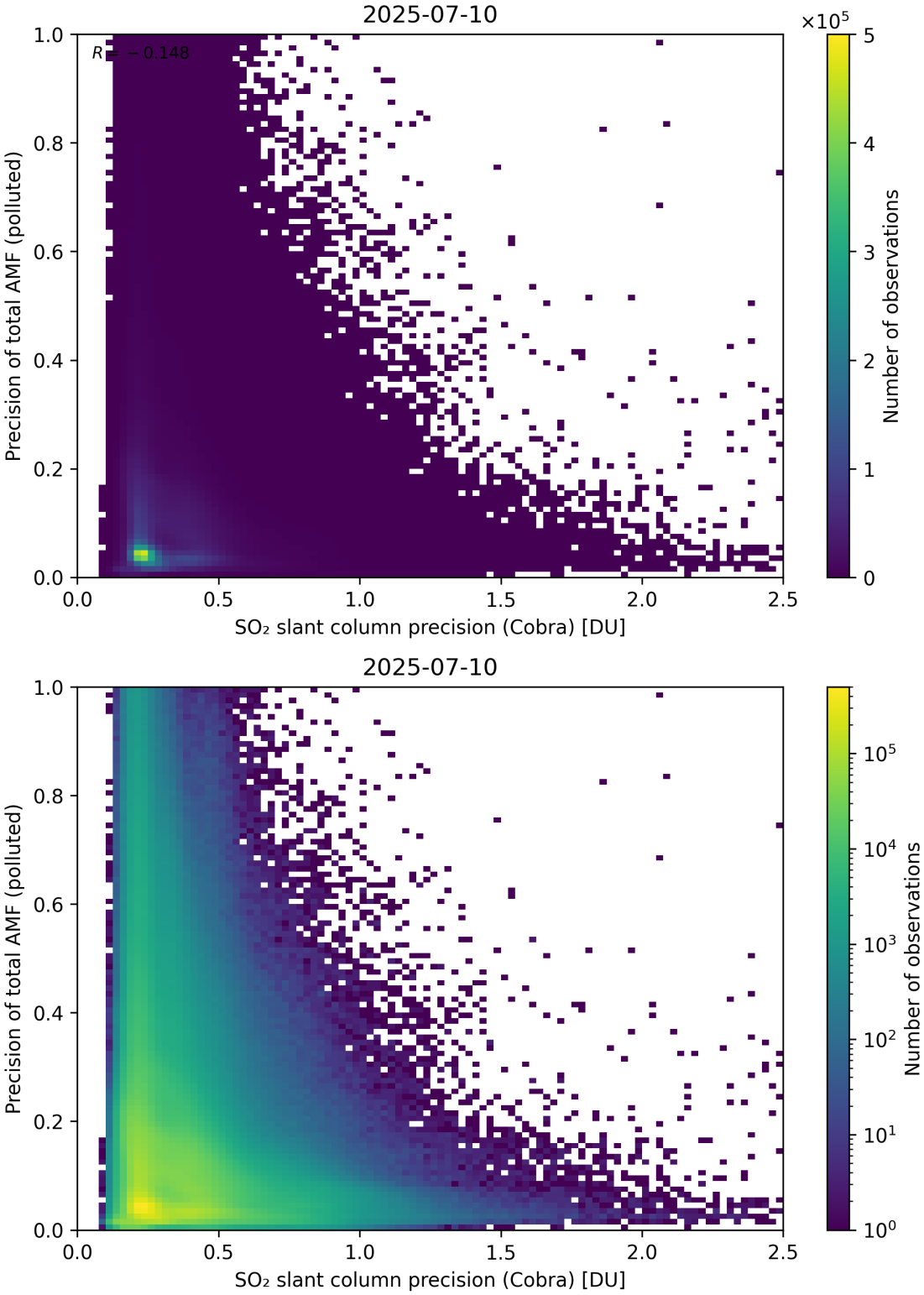

Figure 214: Scatter density plot of "SO_2 slant column precision (Cobra)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

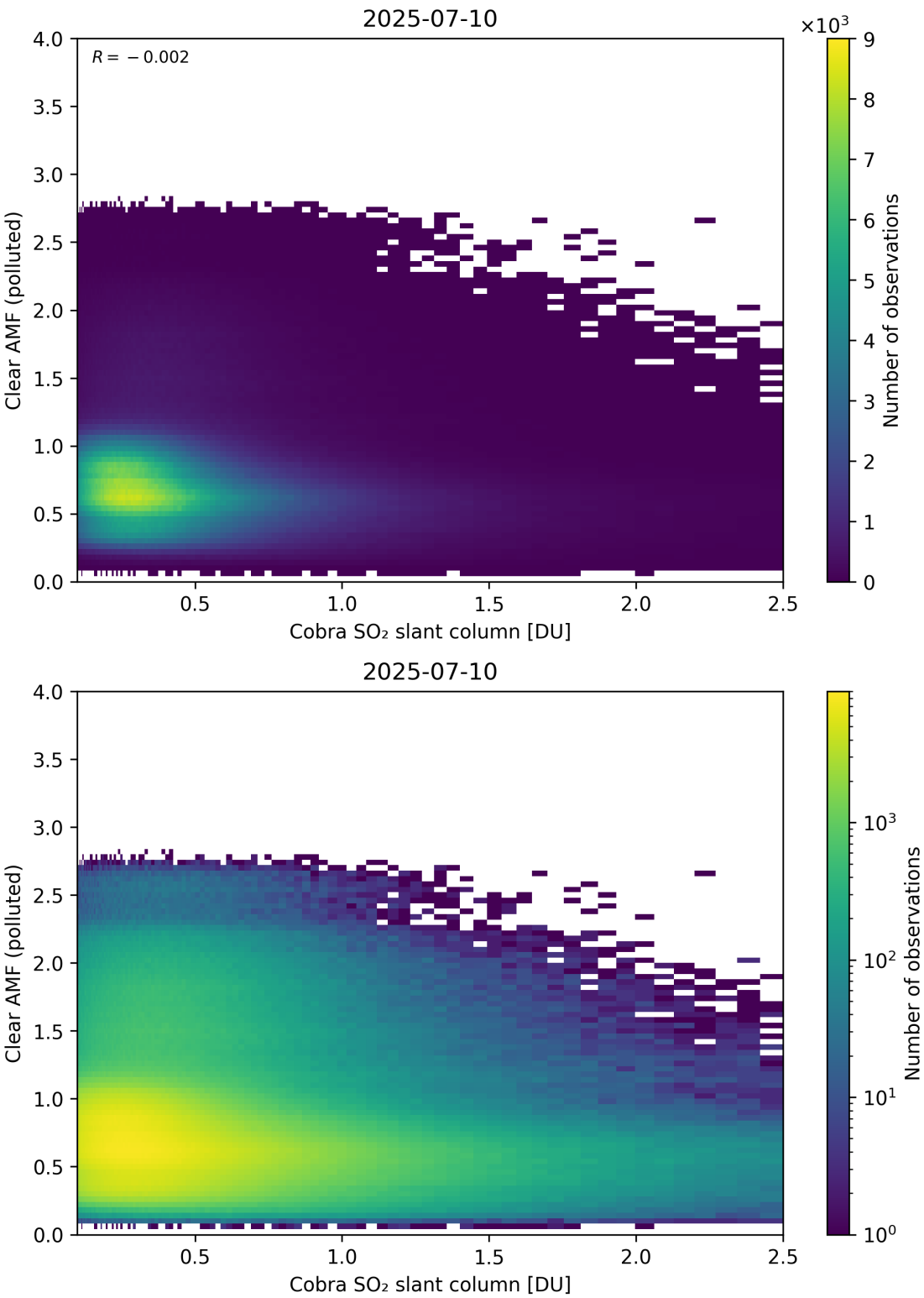

Figure 215: Scatter density plot of "Cobra SO_2 slant column" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

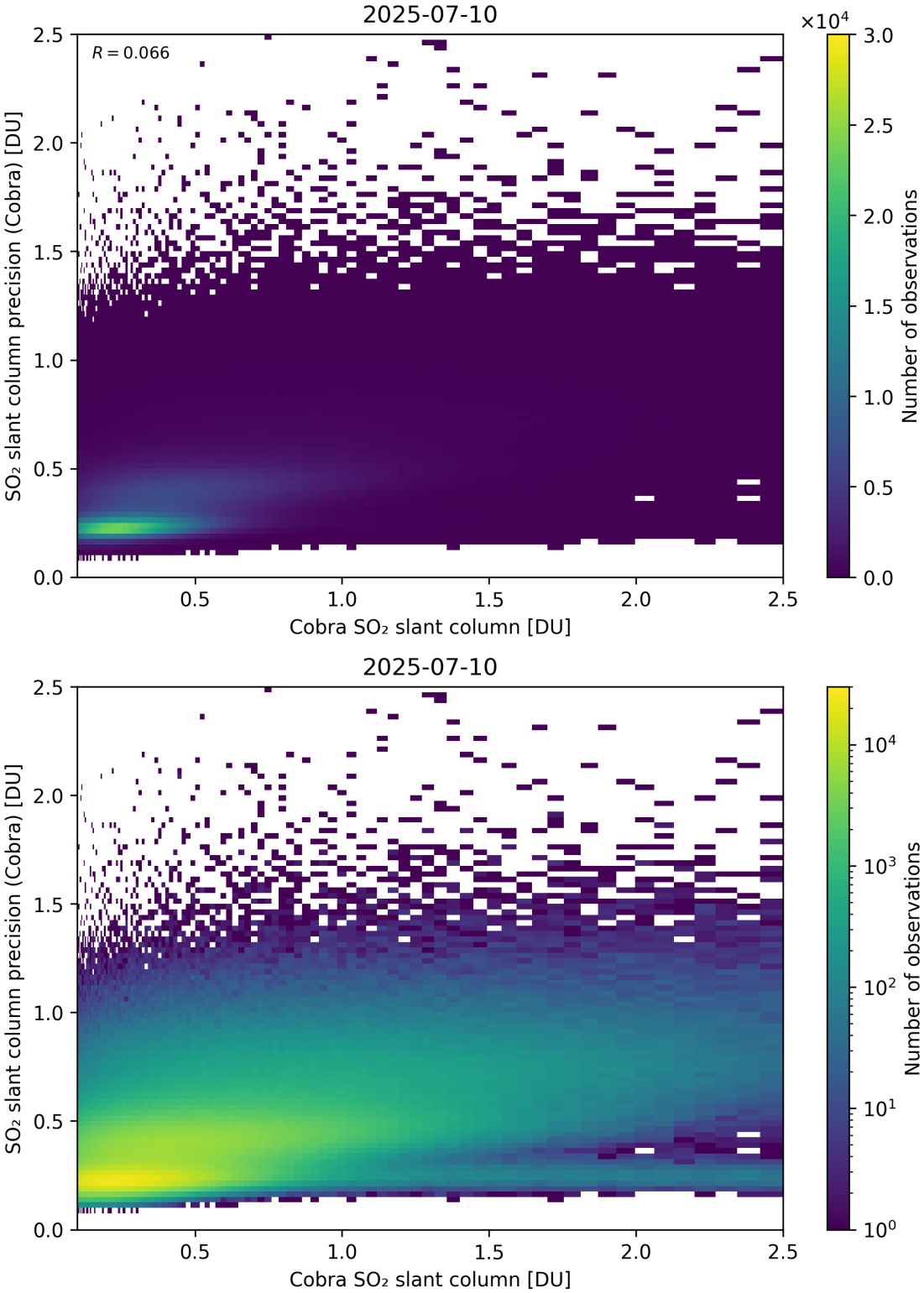

Figure 216: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11.

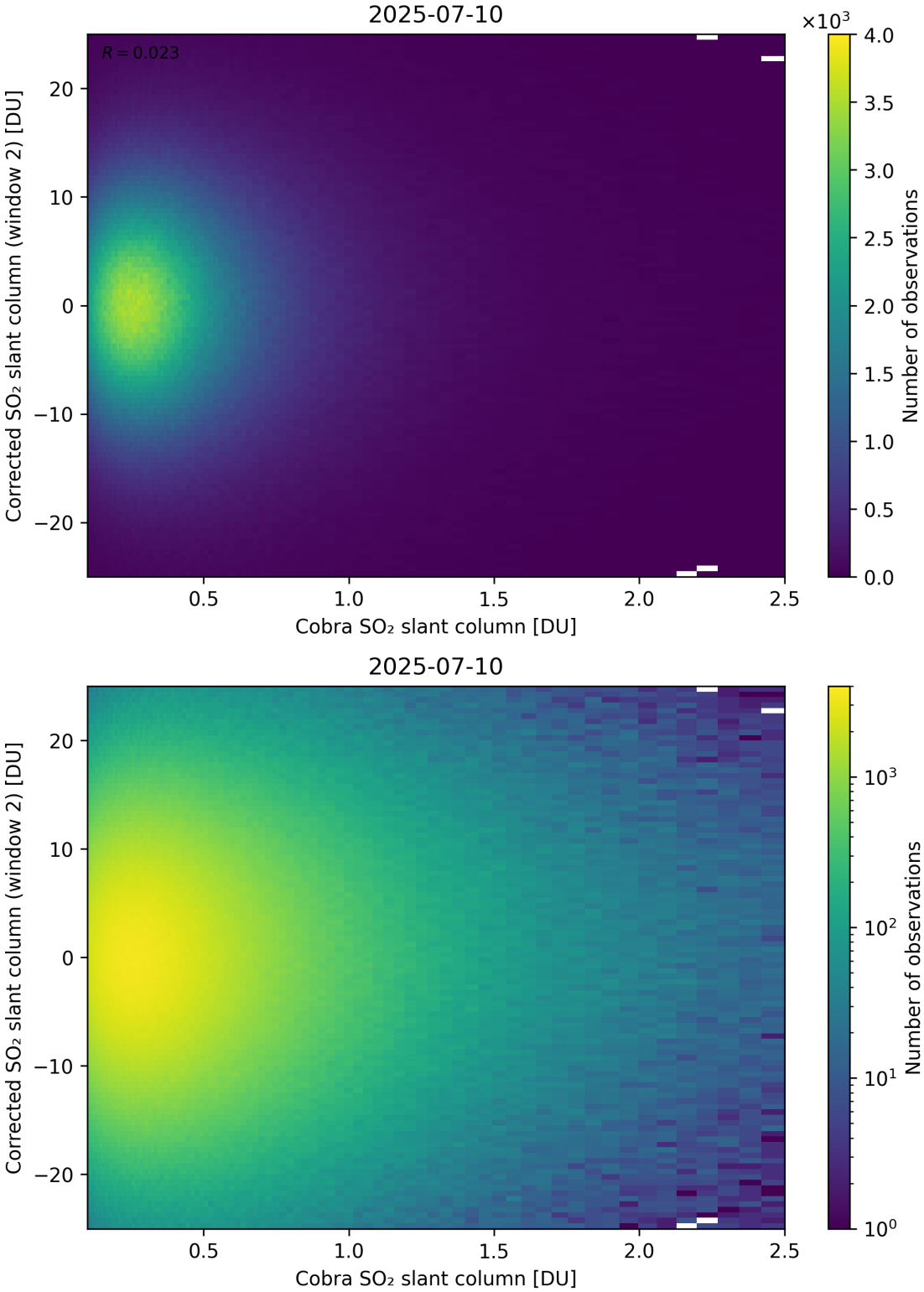

Figure 217: Scatter density plot of "Cobra SO_2 slant column" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

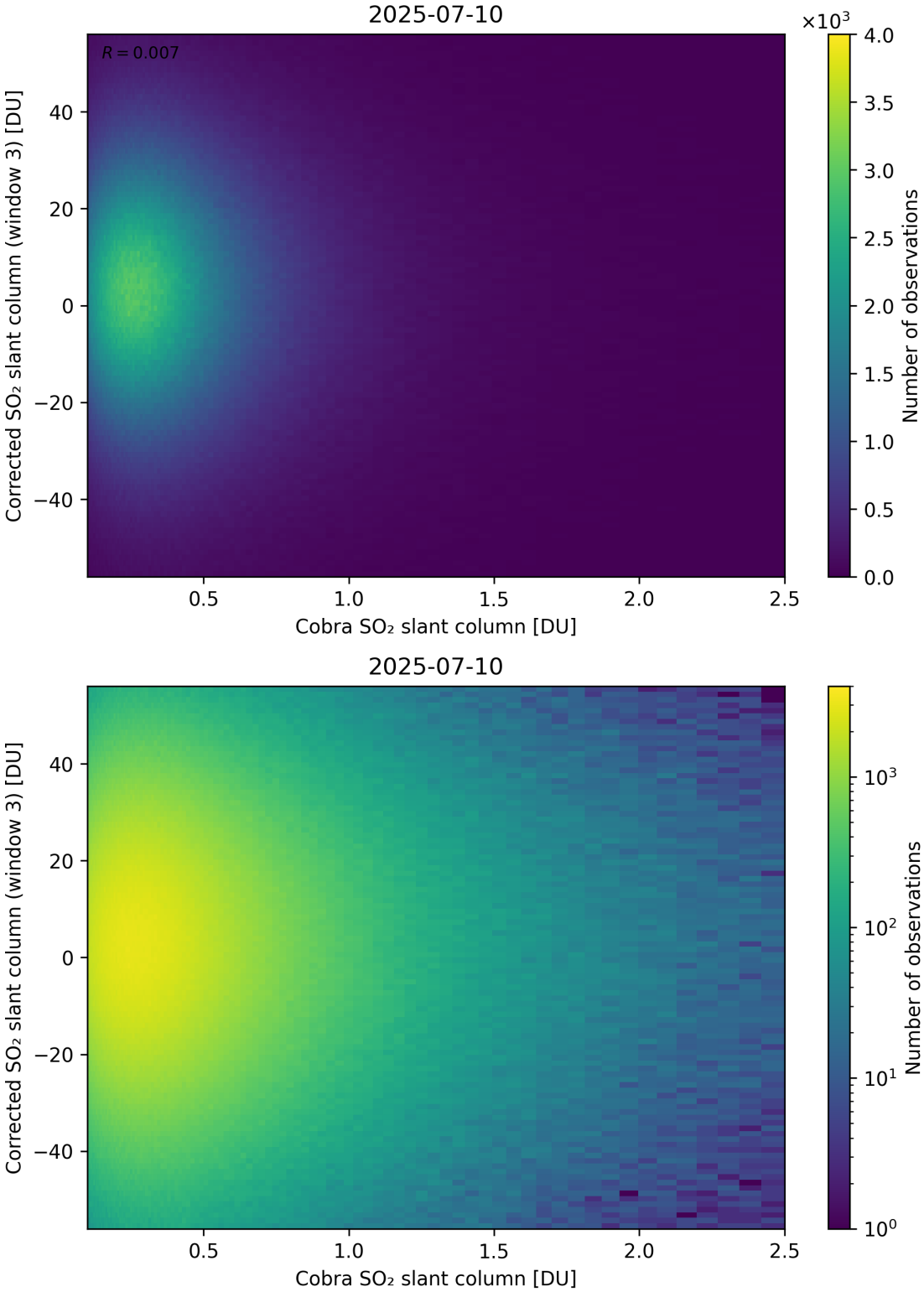

Figure 218: Scatter density plot of "Cobra SO_2 slant column" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

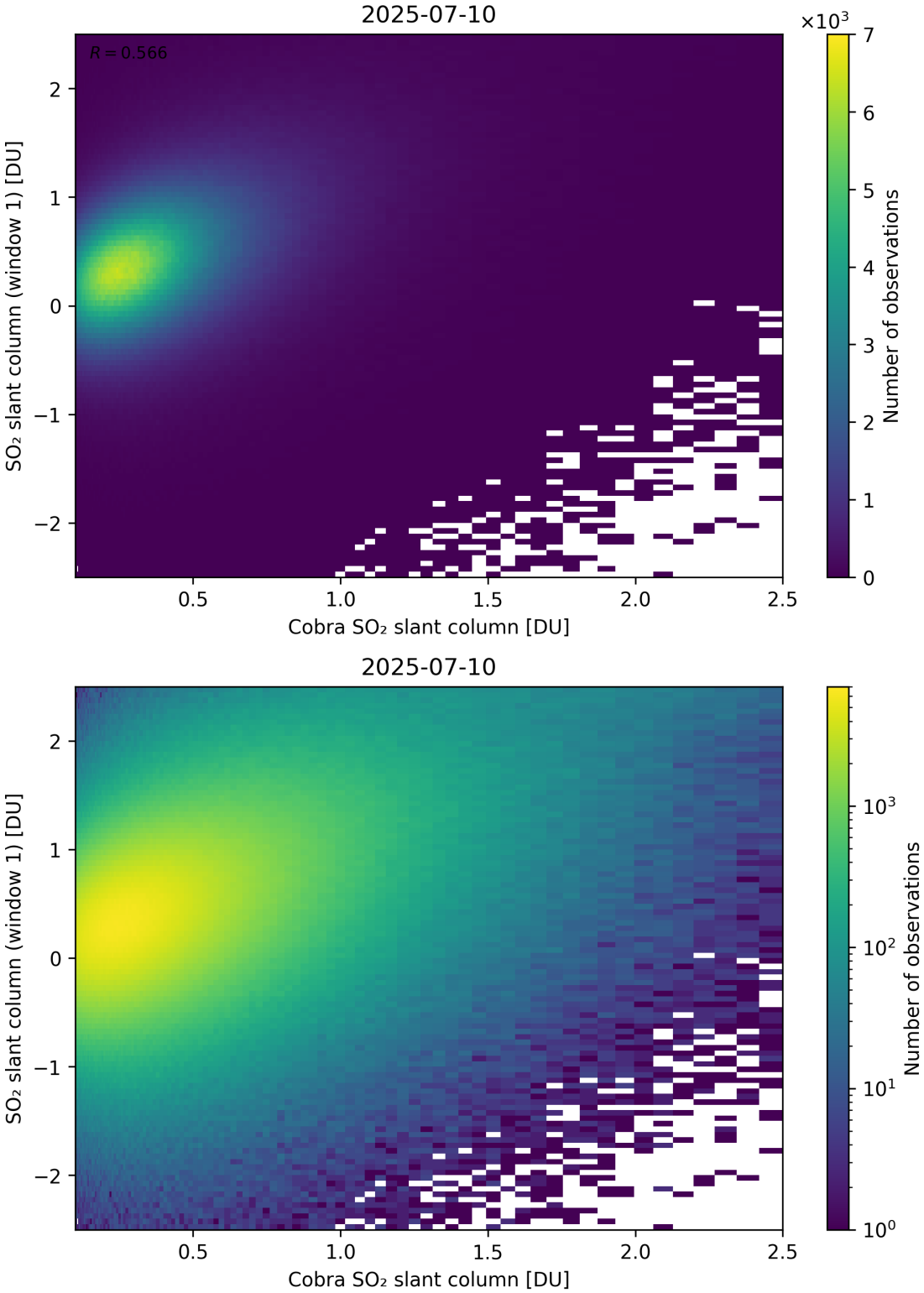

Figure 219: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

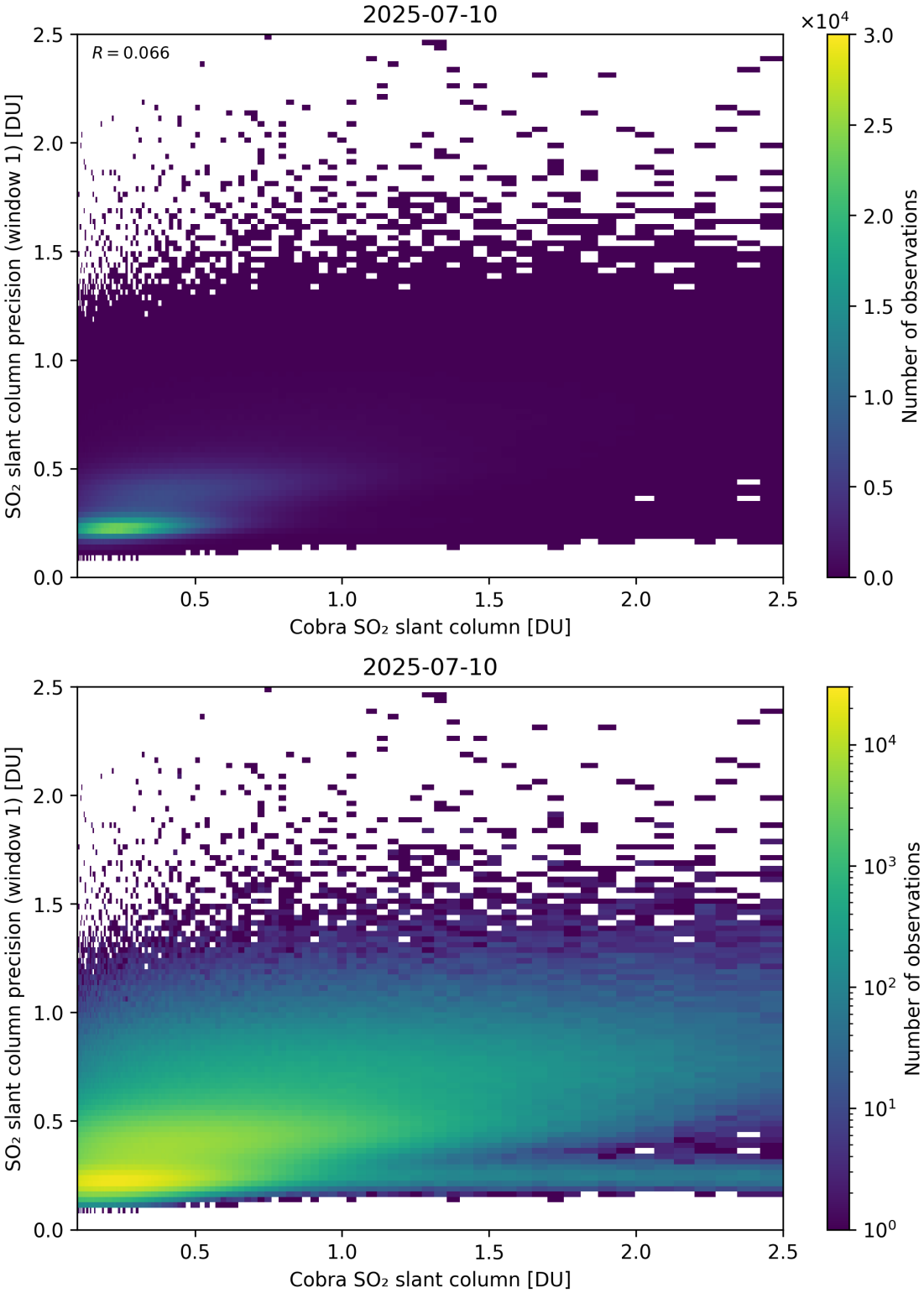

Figure 220: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

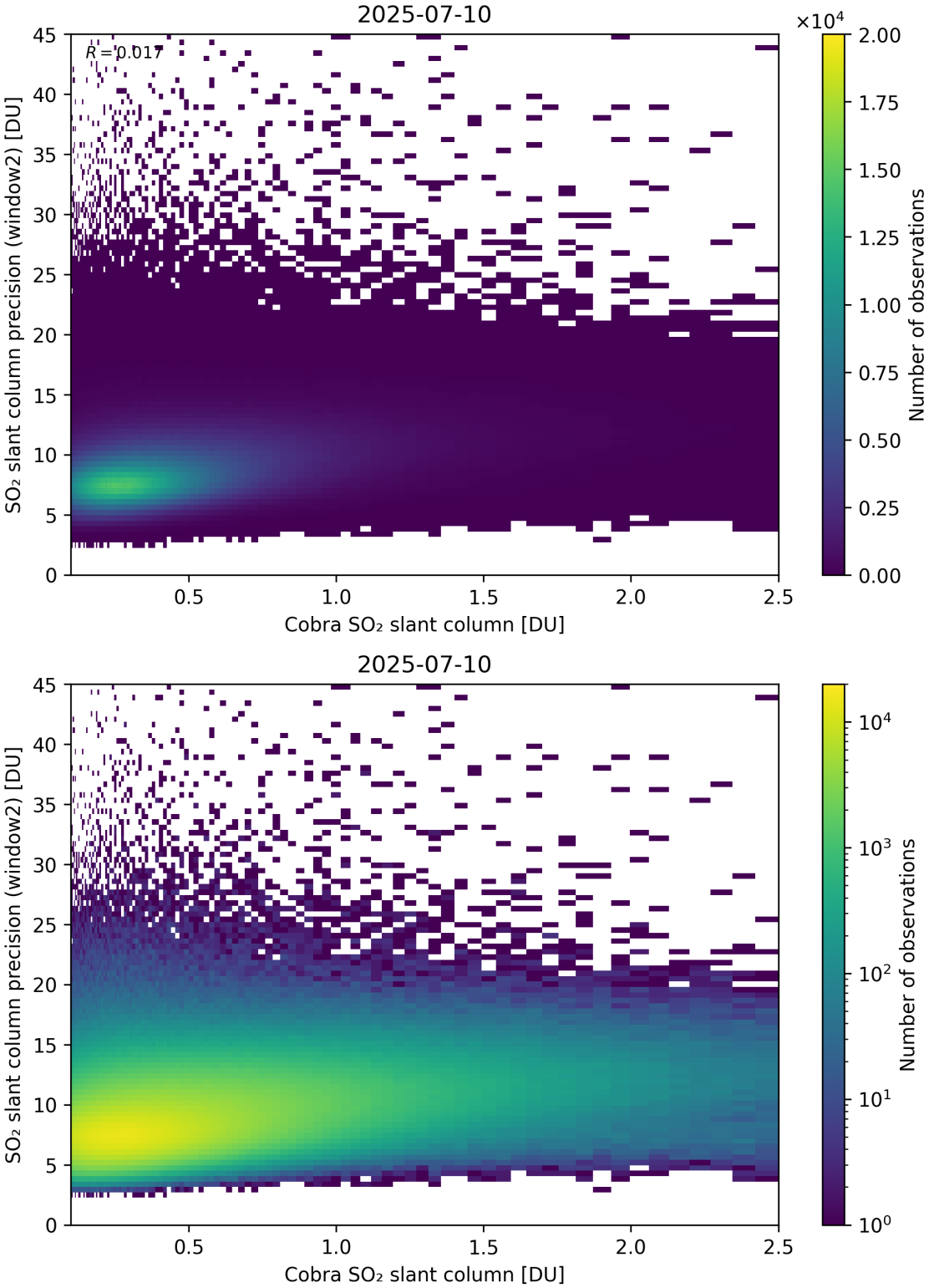

Figure 221: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

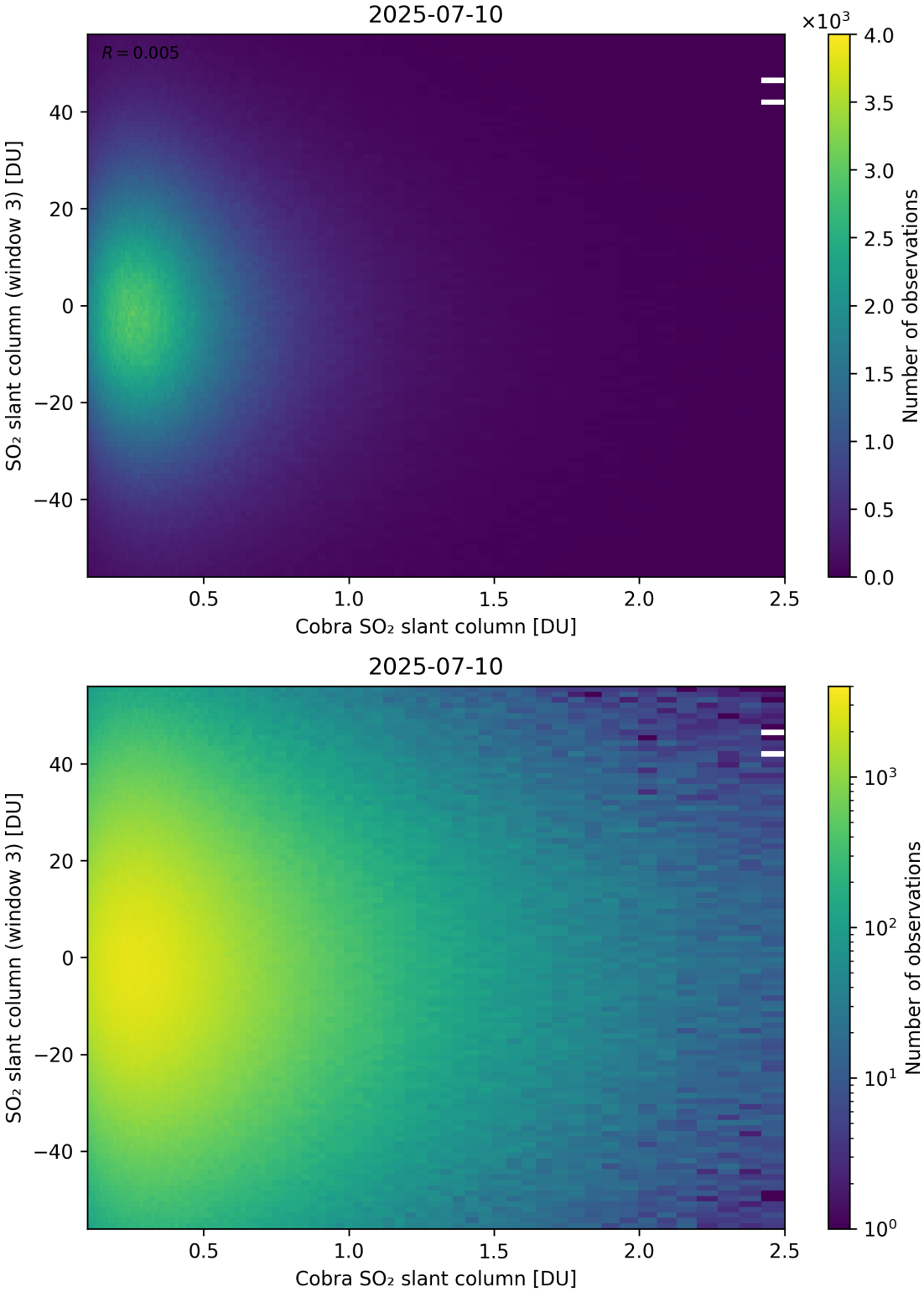

Figure 222: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

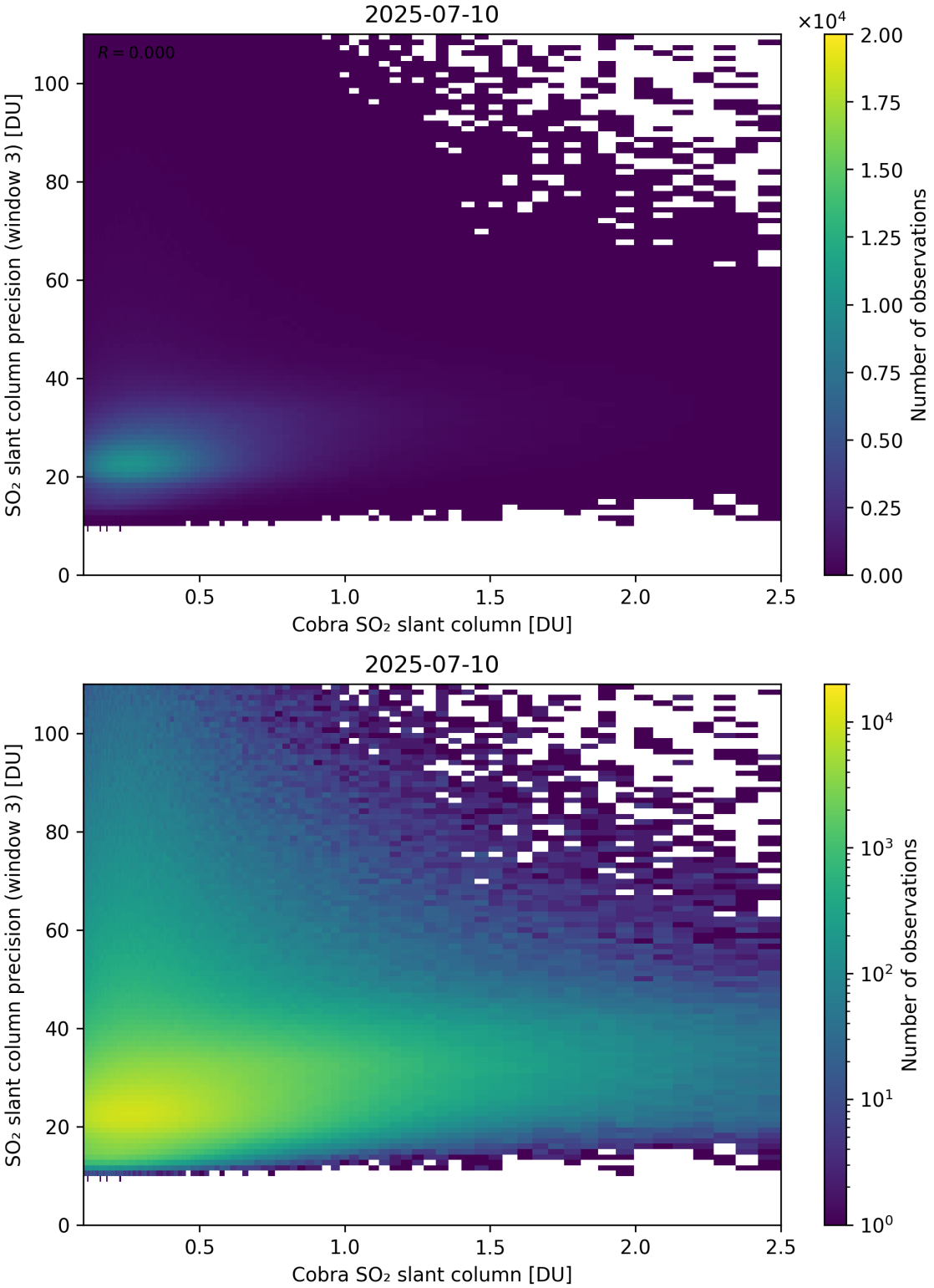

Figure 223: Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

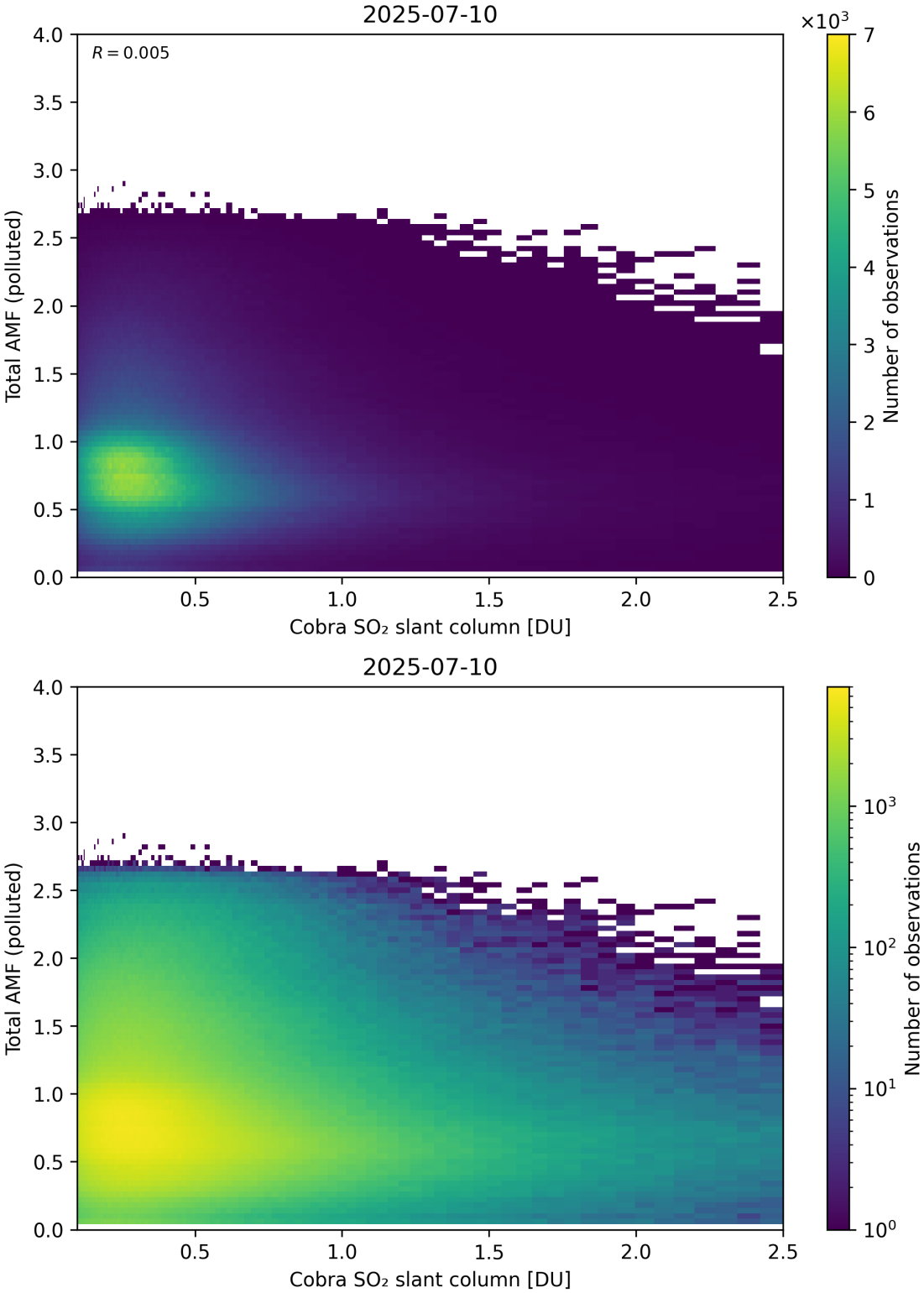

Figure 224: Scatter density plot of "Cobra SO_2 slant column" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

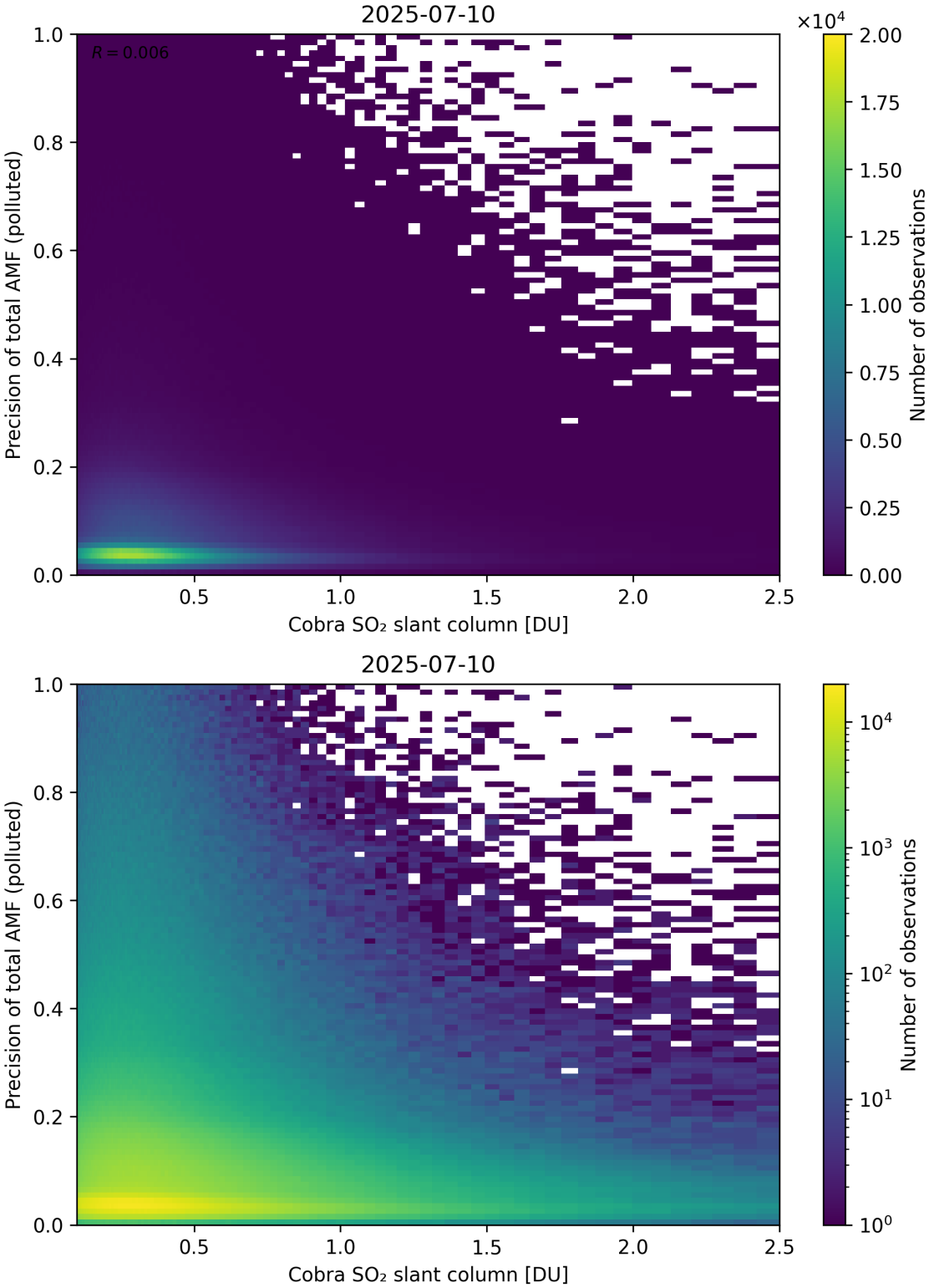

Figure 225: Scatter density plot of "Cobra SO_2 slant column" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

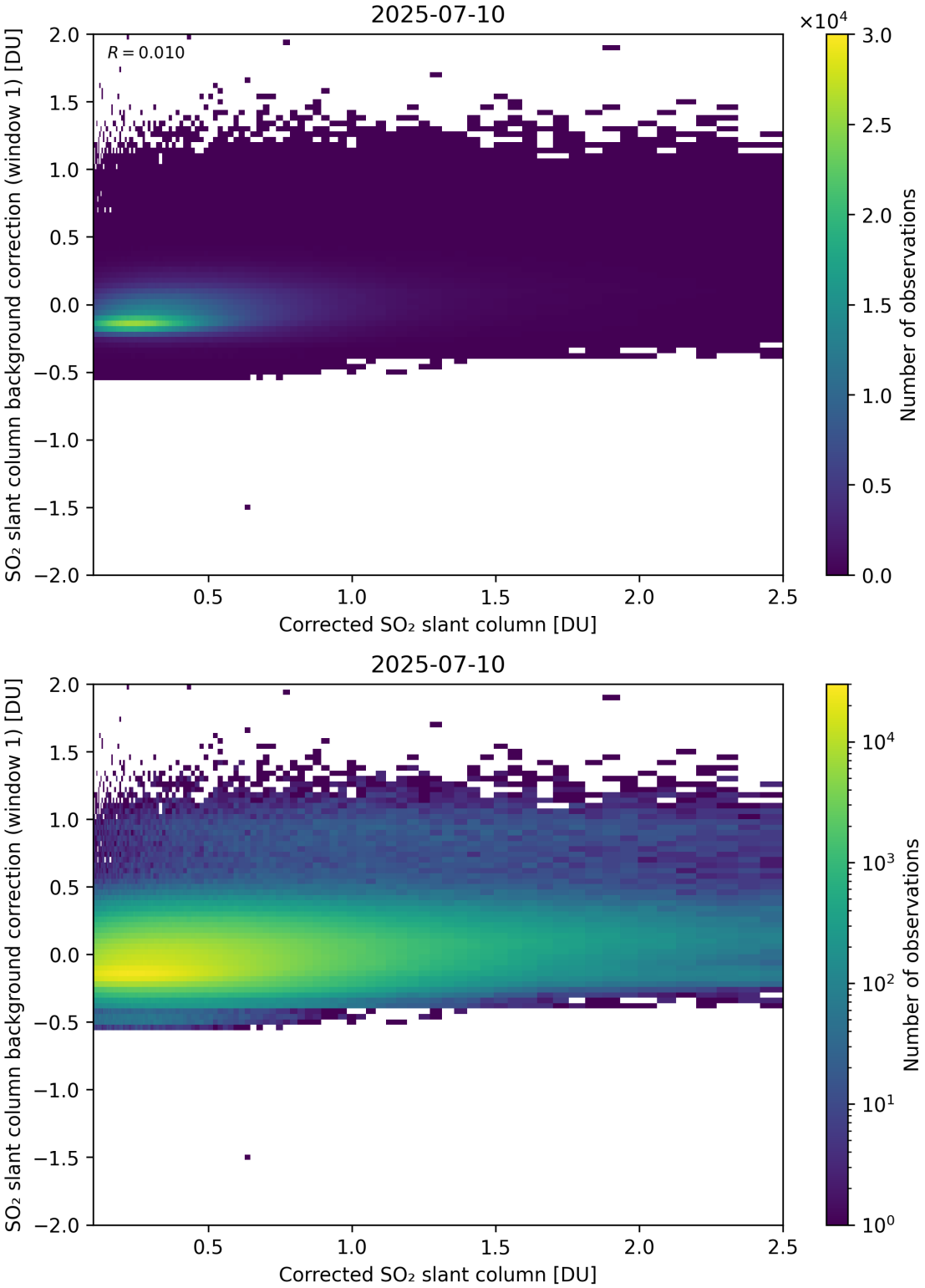

Figure 226: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

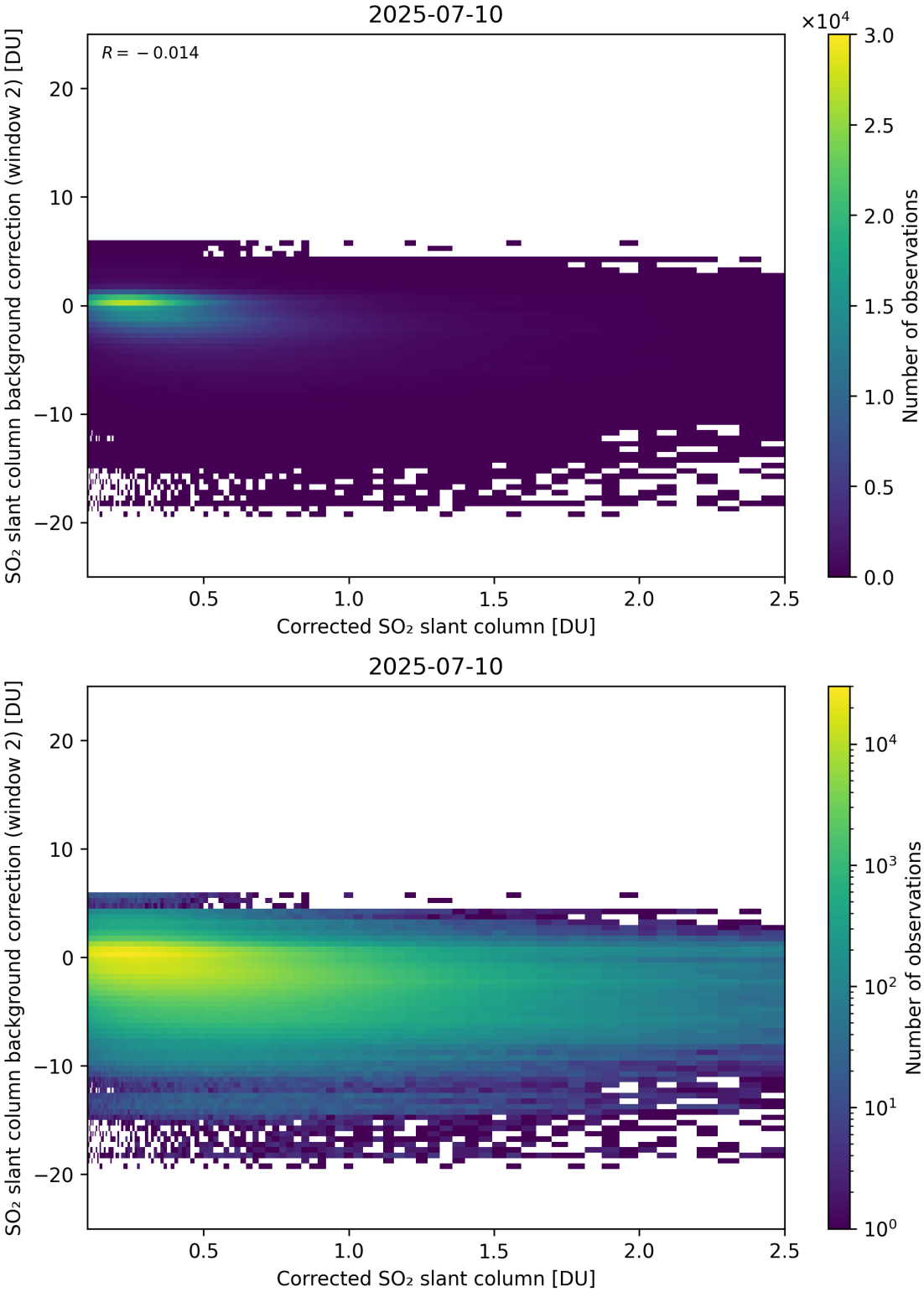

Figure 227: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

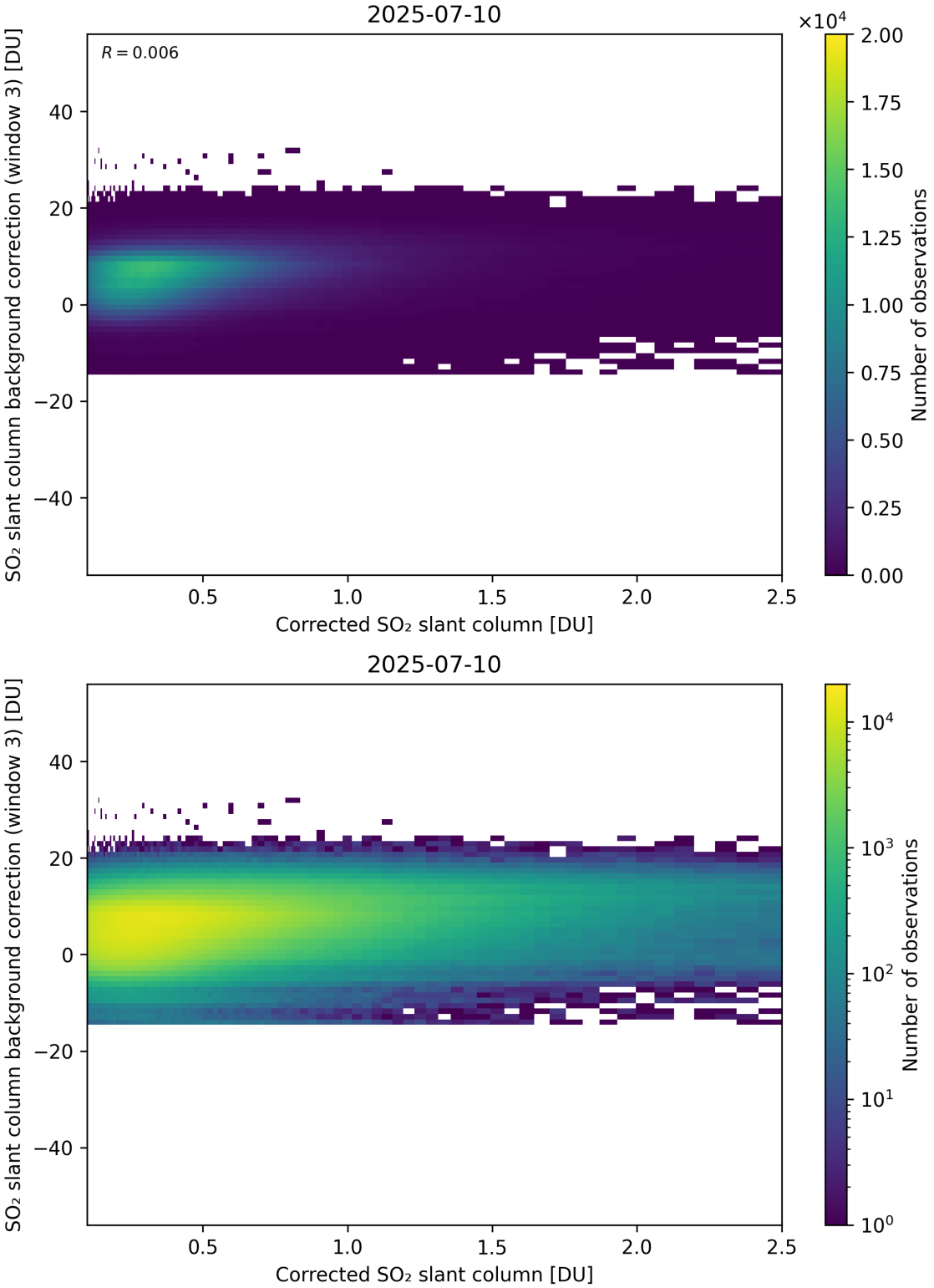

Figure 228: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

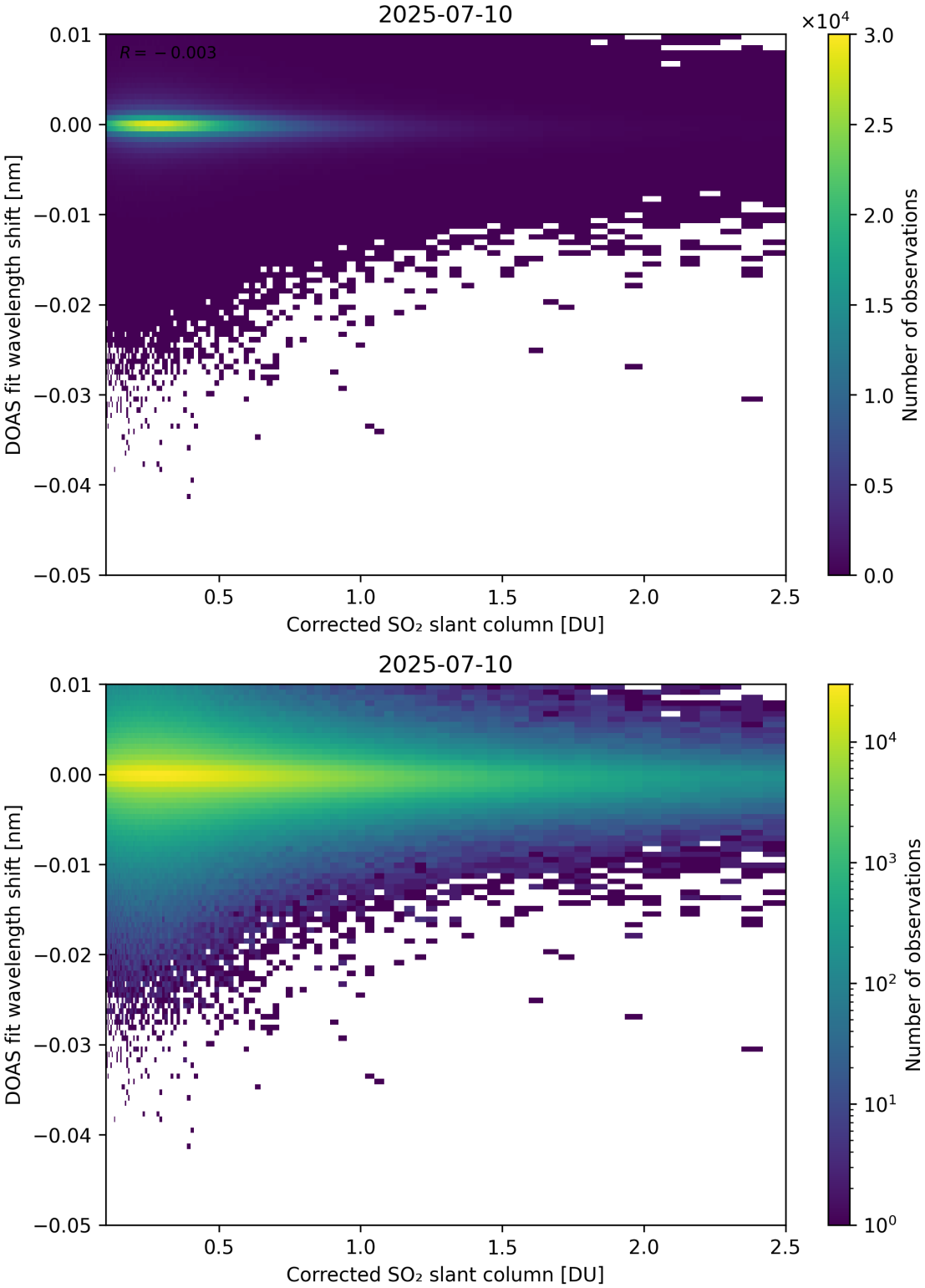

Figure 229: Scatter density plot of "Corrected SO_2 slant column" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

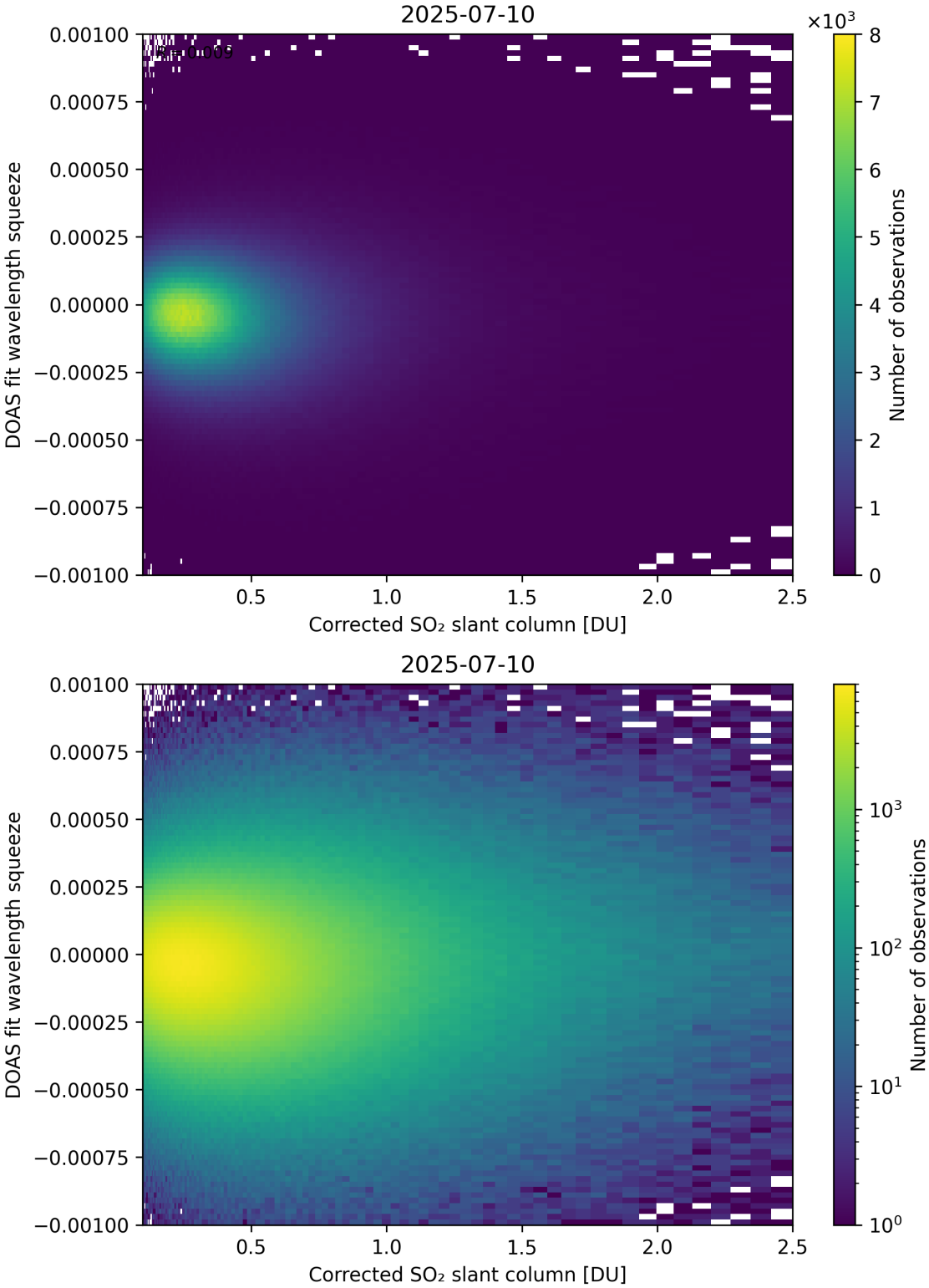

Figure 230: Scatter density plot of "Corrected SO_2 slant column" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

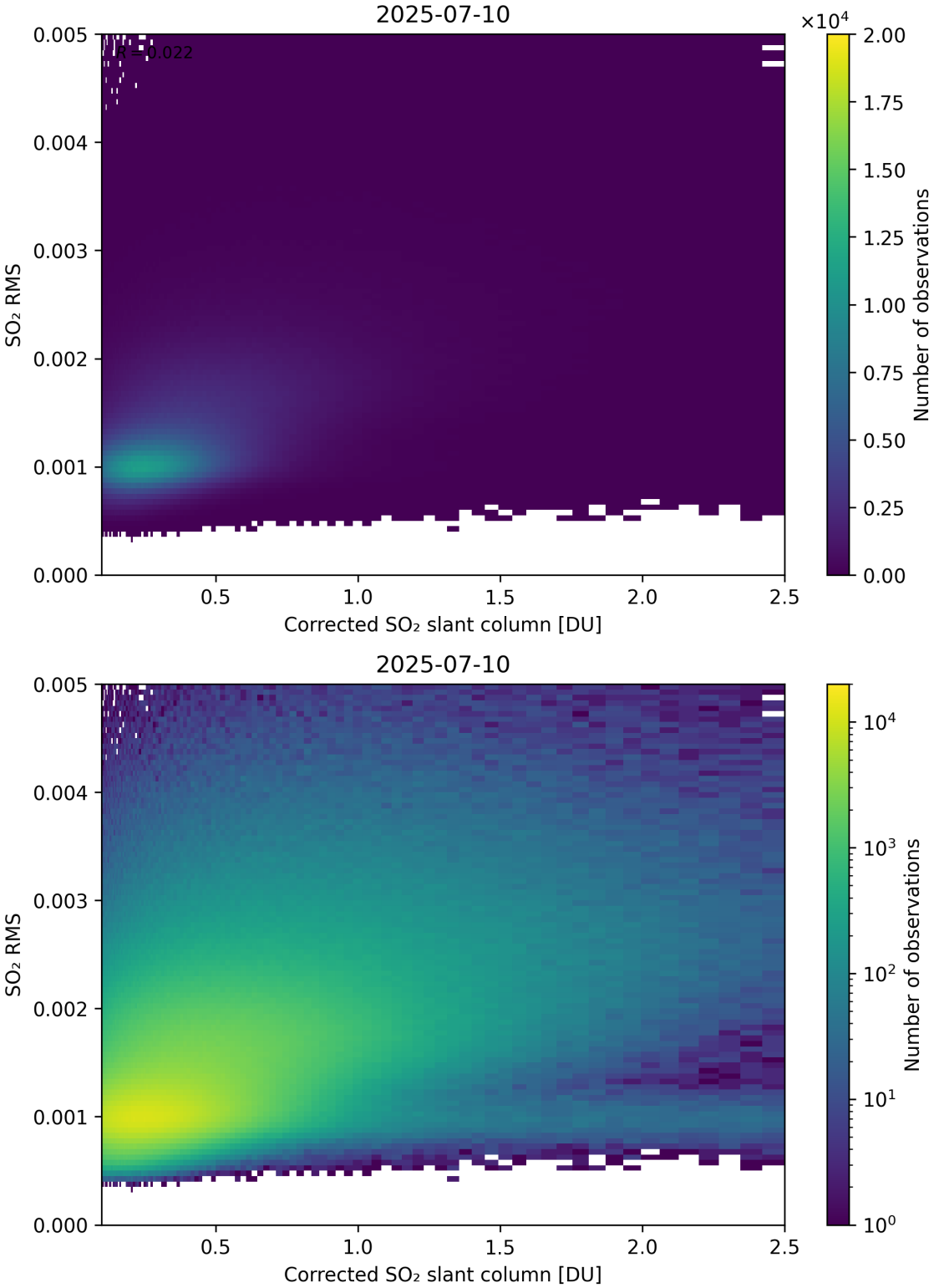

Figure 231: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

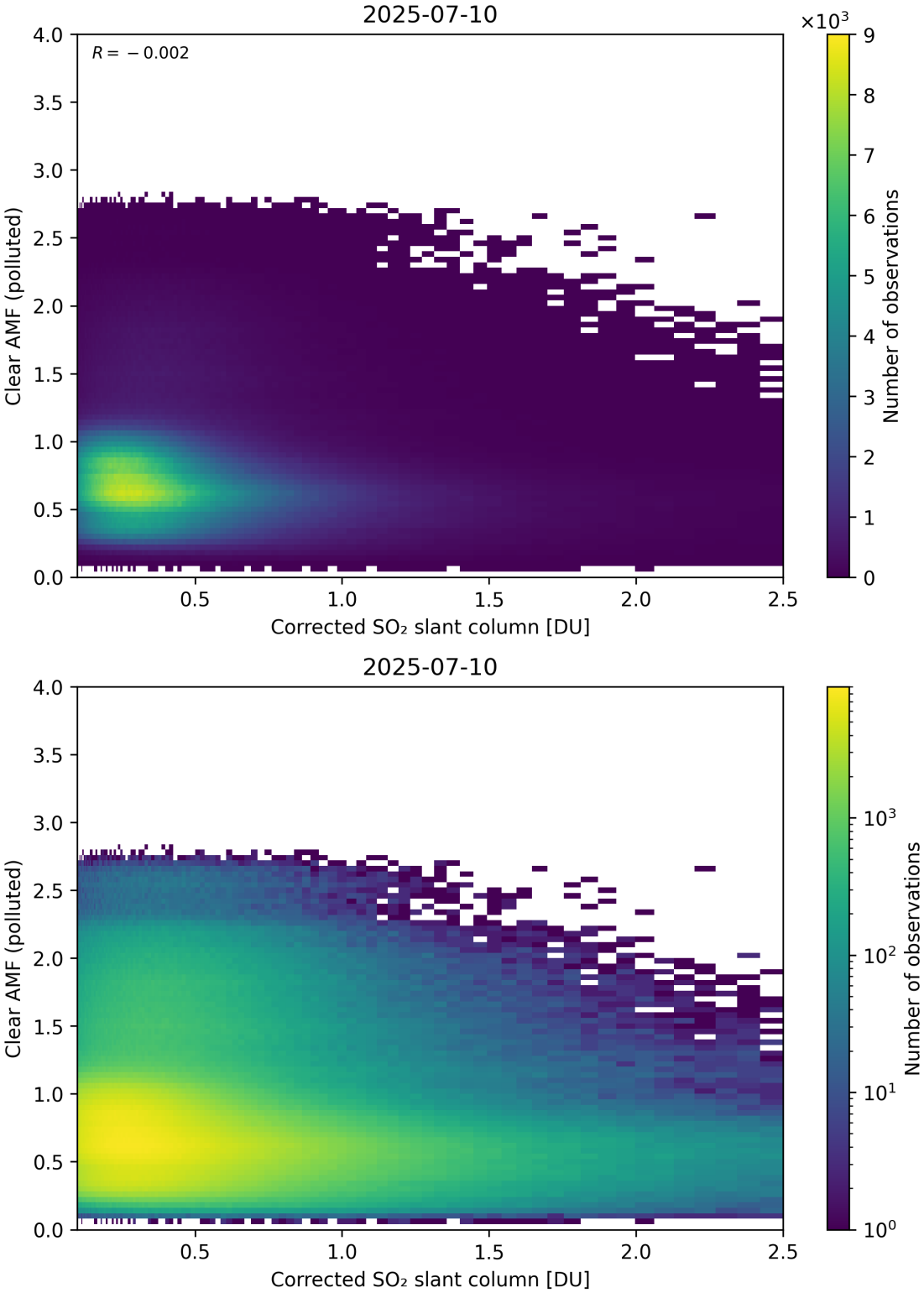

Figure 232: Scatter density plot of "Corrected SO_2 slant column" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

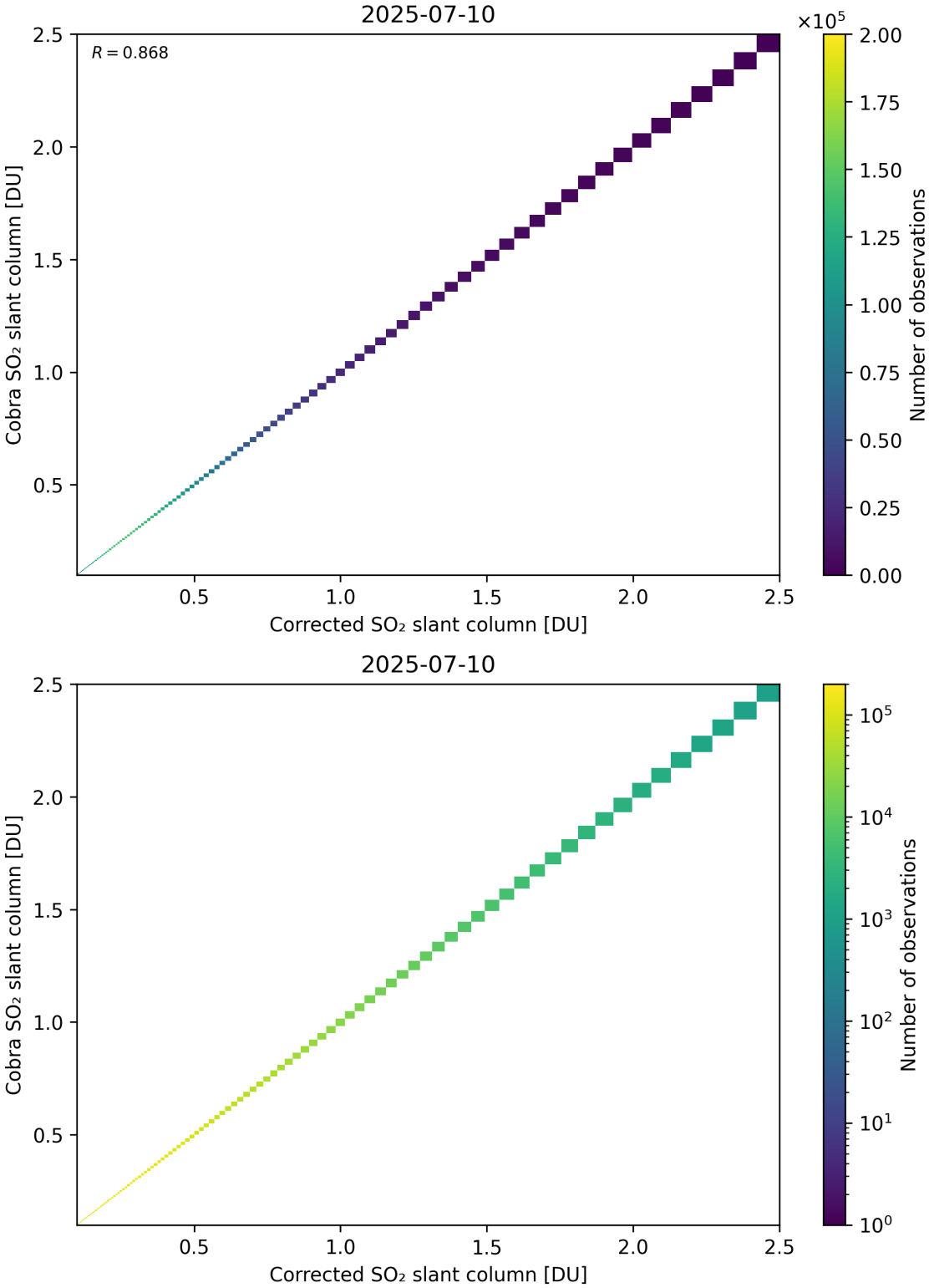

Figure 233: Scatter density plot of "Corrected SO_2 slant column" against "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11.

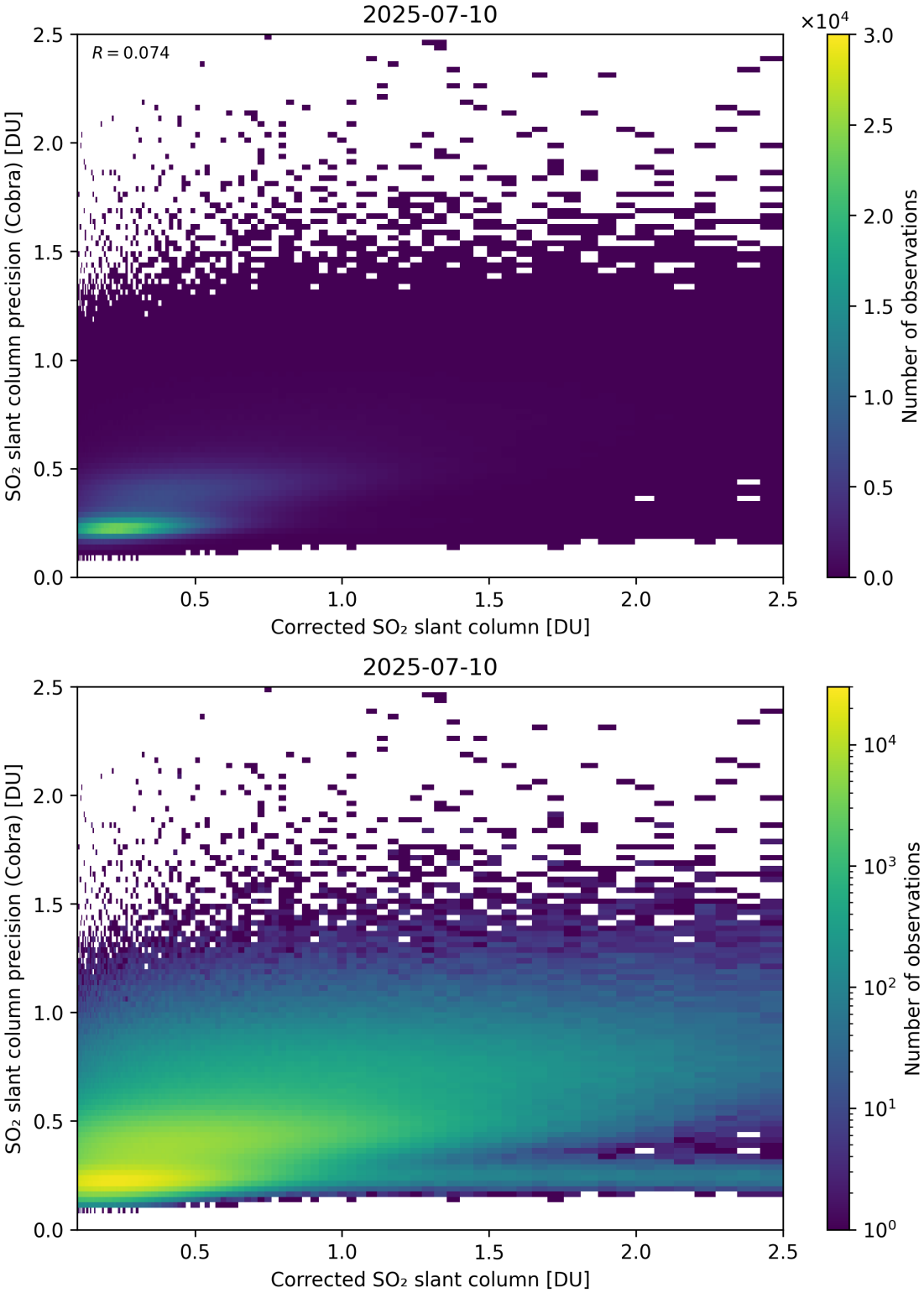

Figure 234: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11.

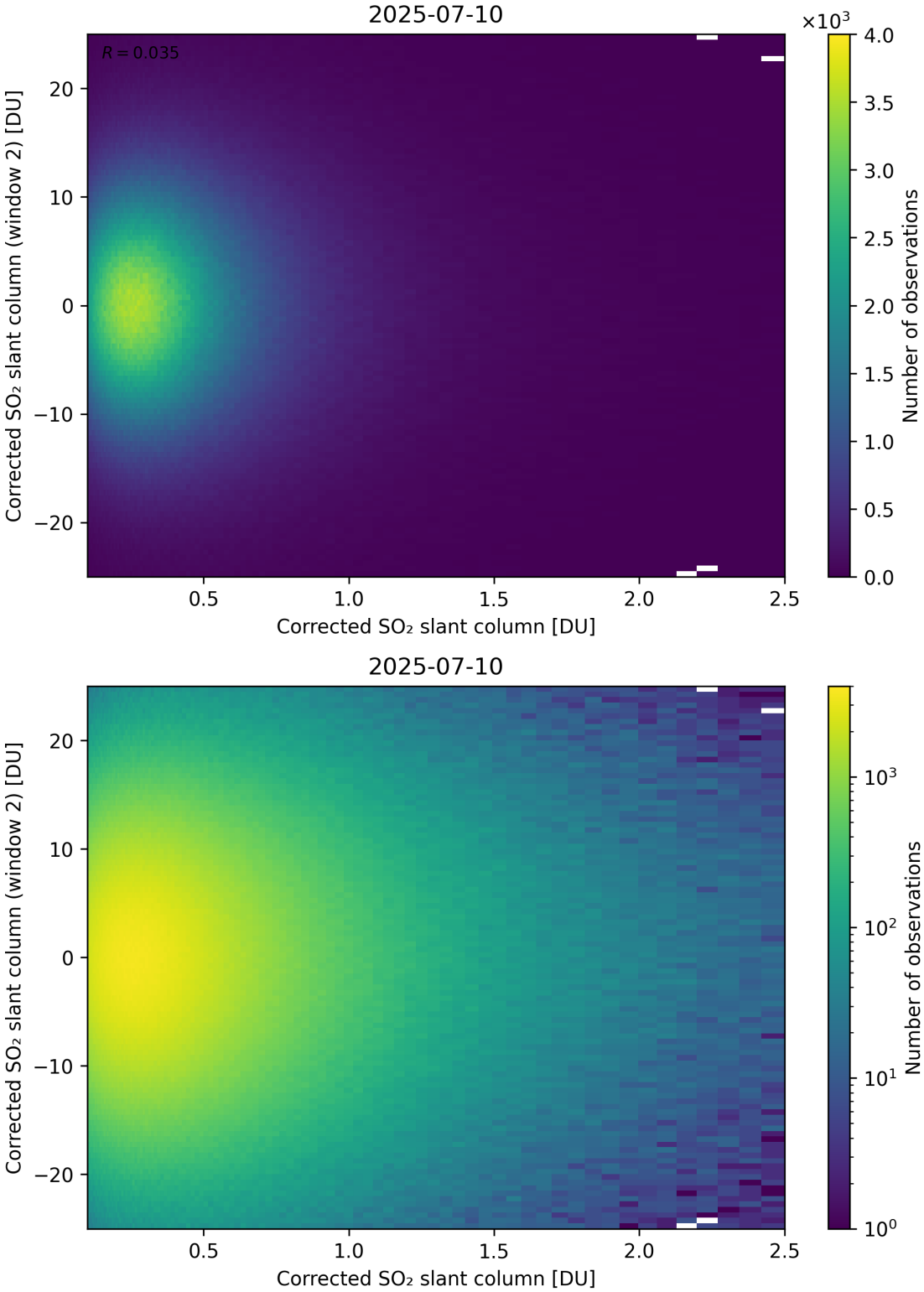

Figure 235: Scatter density plot of "Corrected SO_2 slant column" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

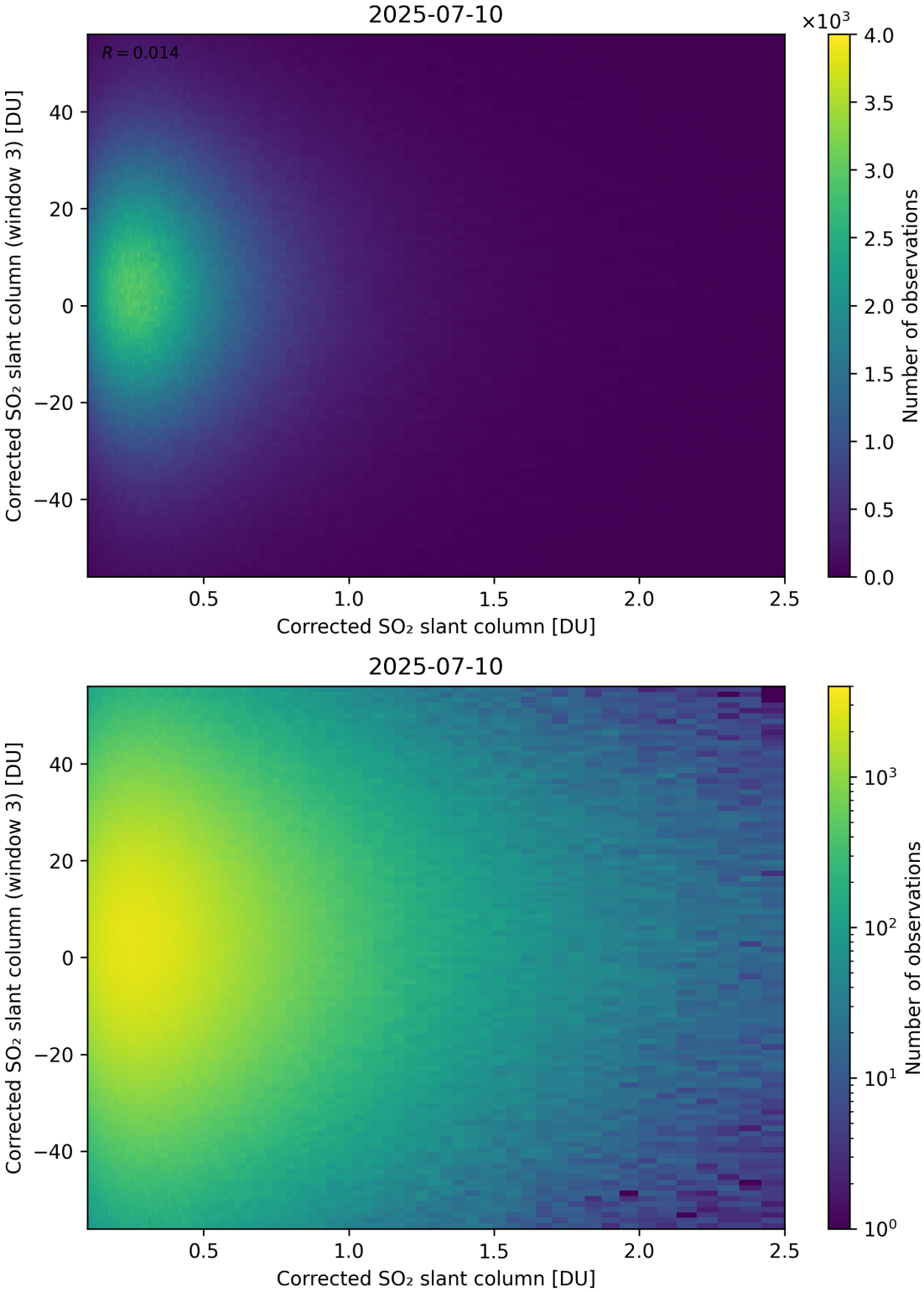

Figure 236: Scatter density plot of "Corrected SO_2 slant column" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

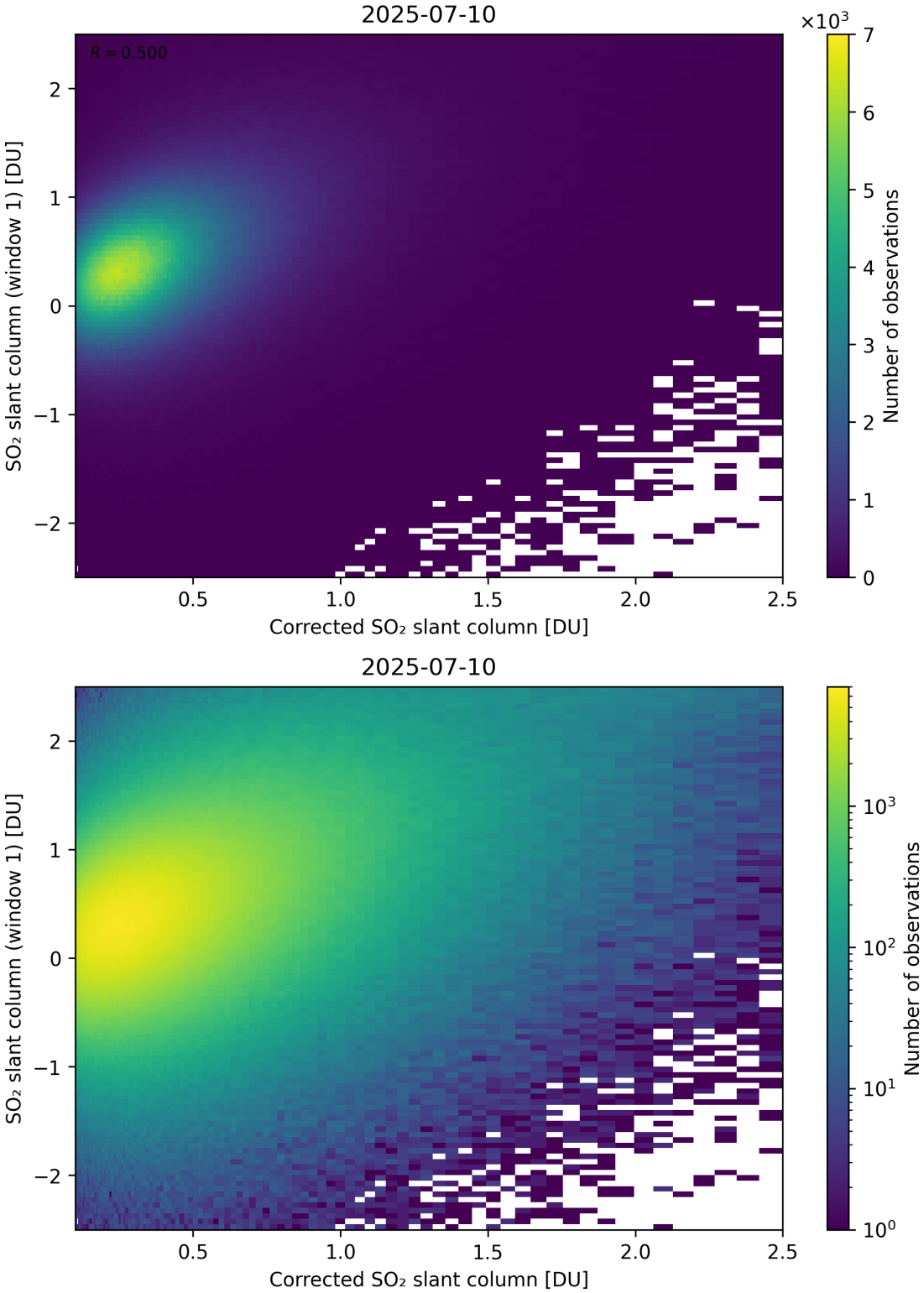

Figure 237: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

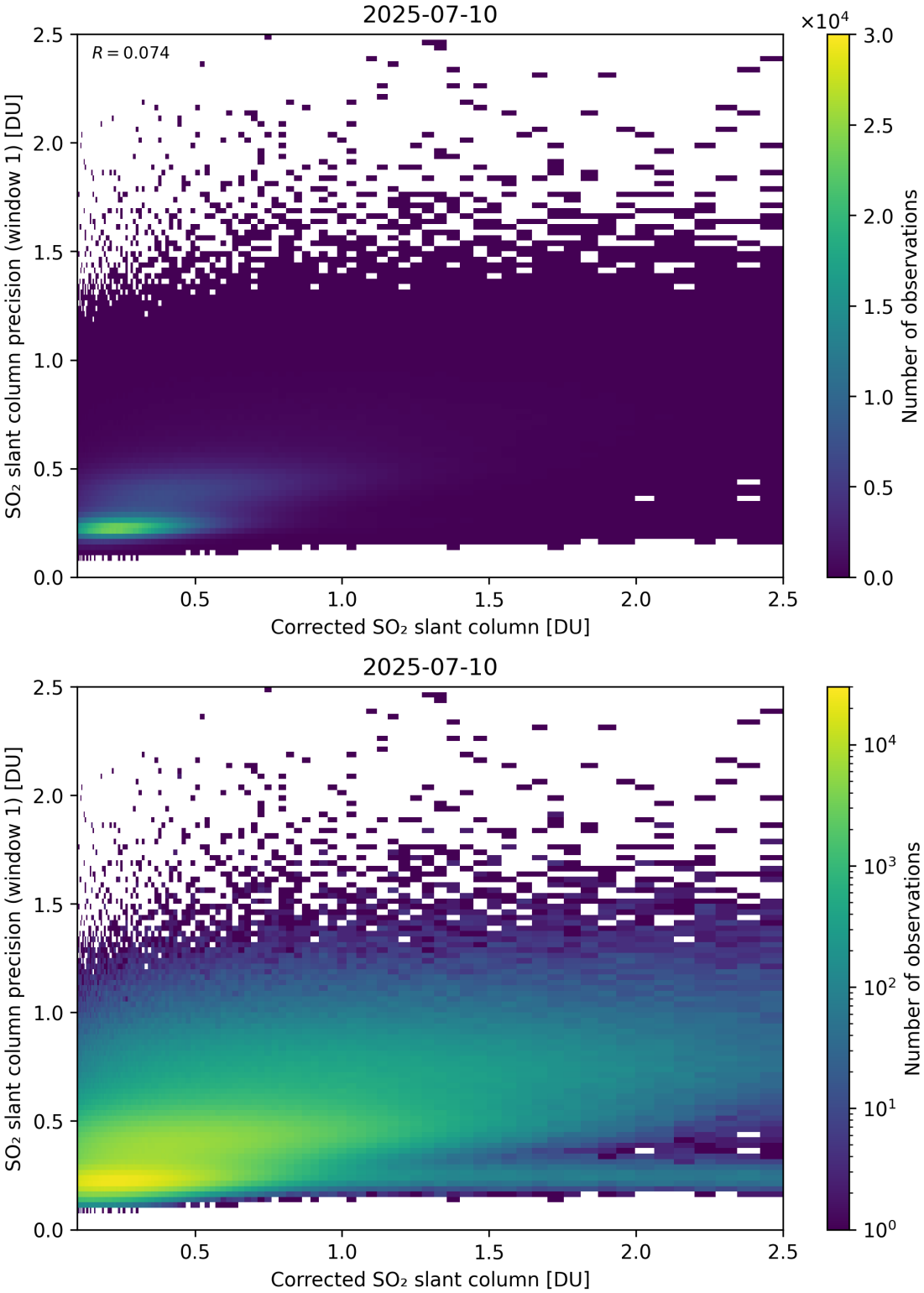

Figure 238: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

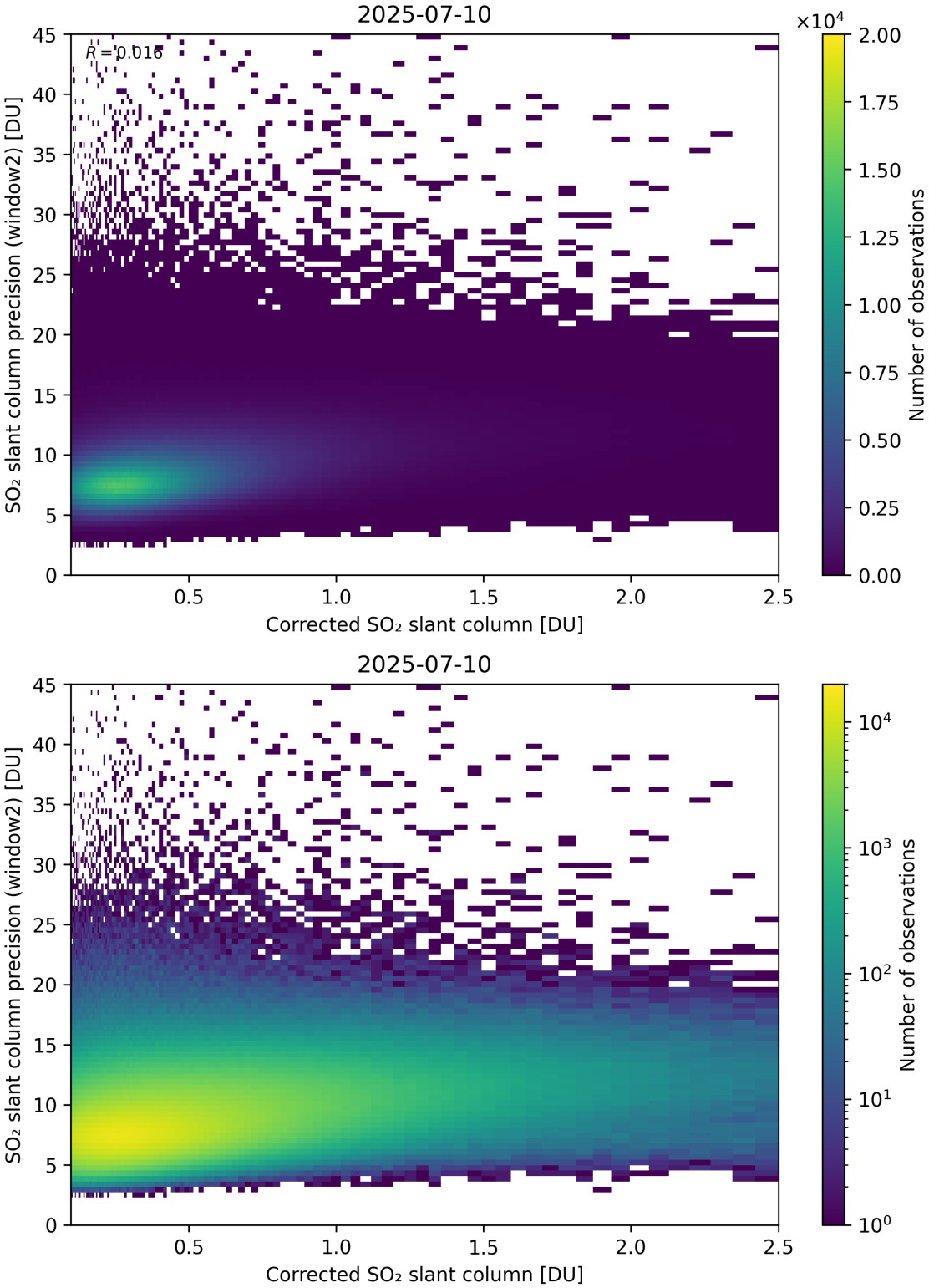

Figure 239: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

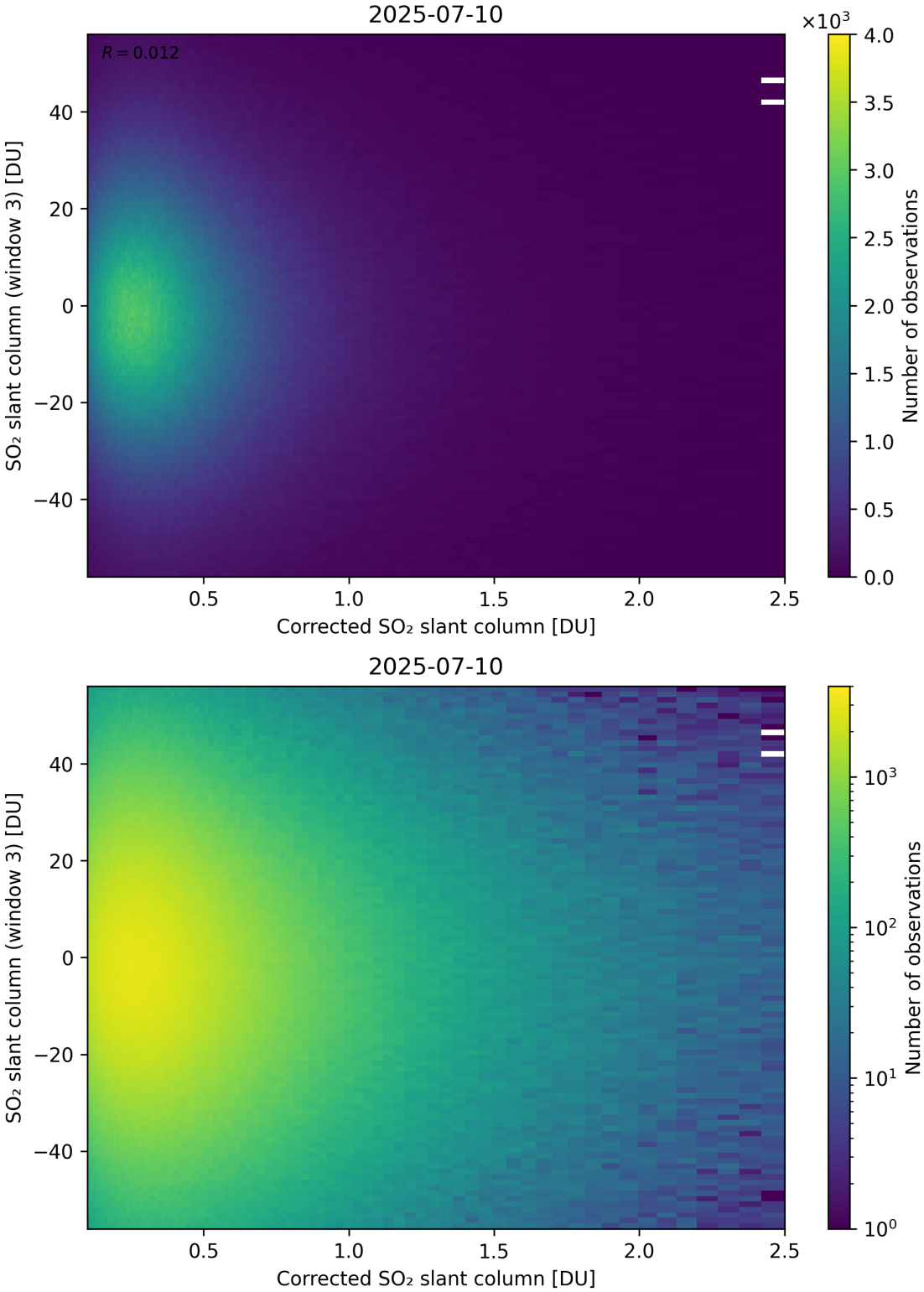

Figure 240: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

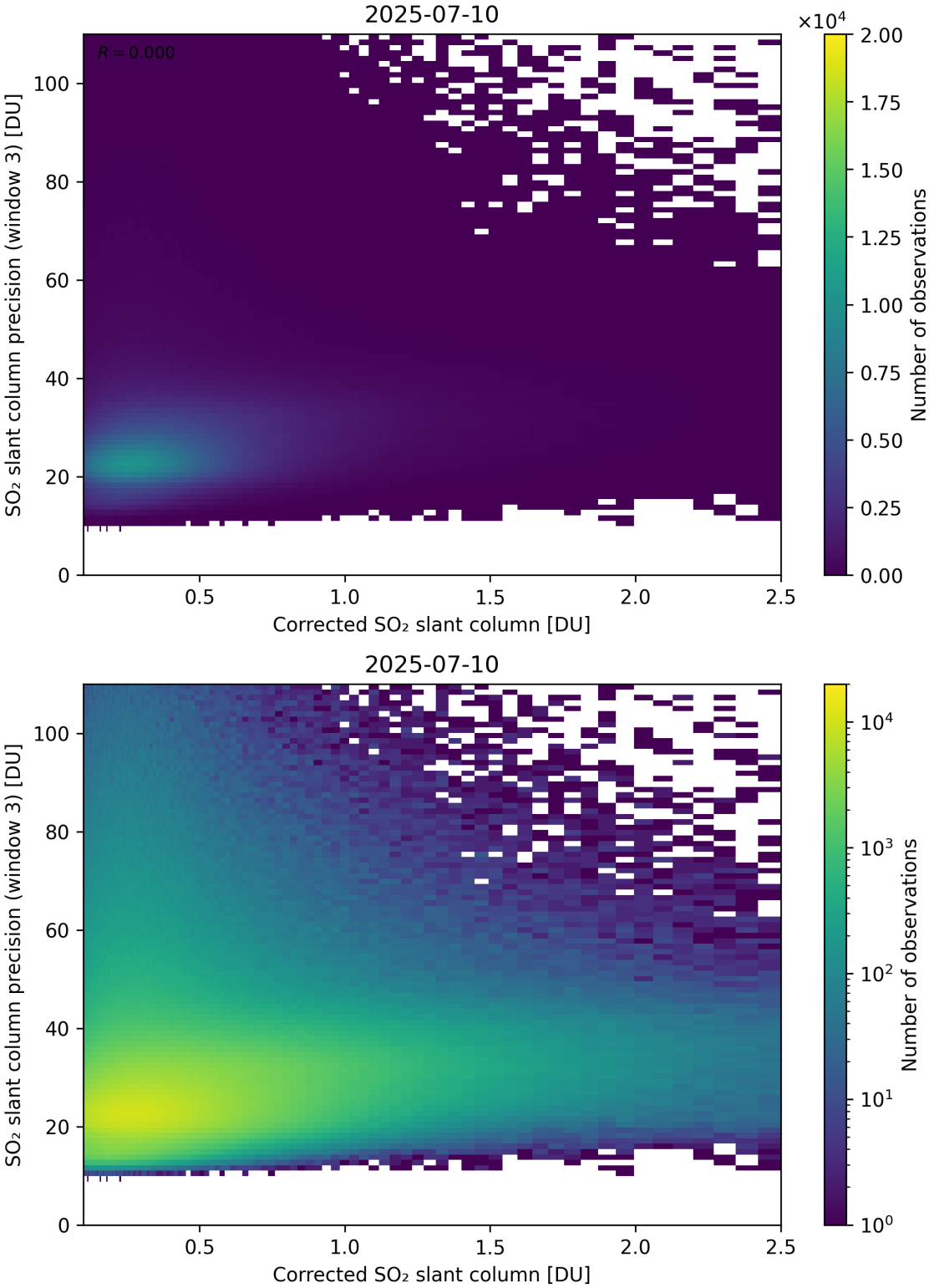

Figure 241: Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

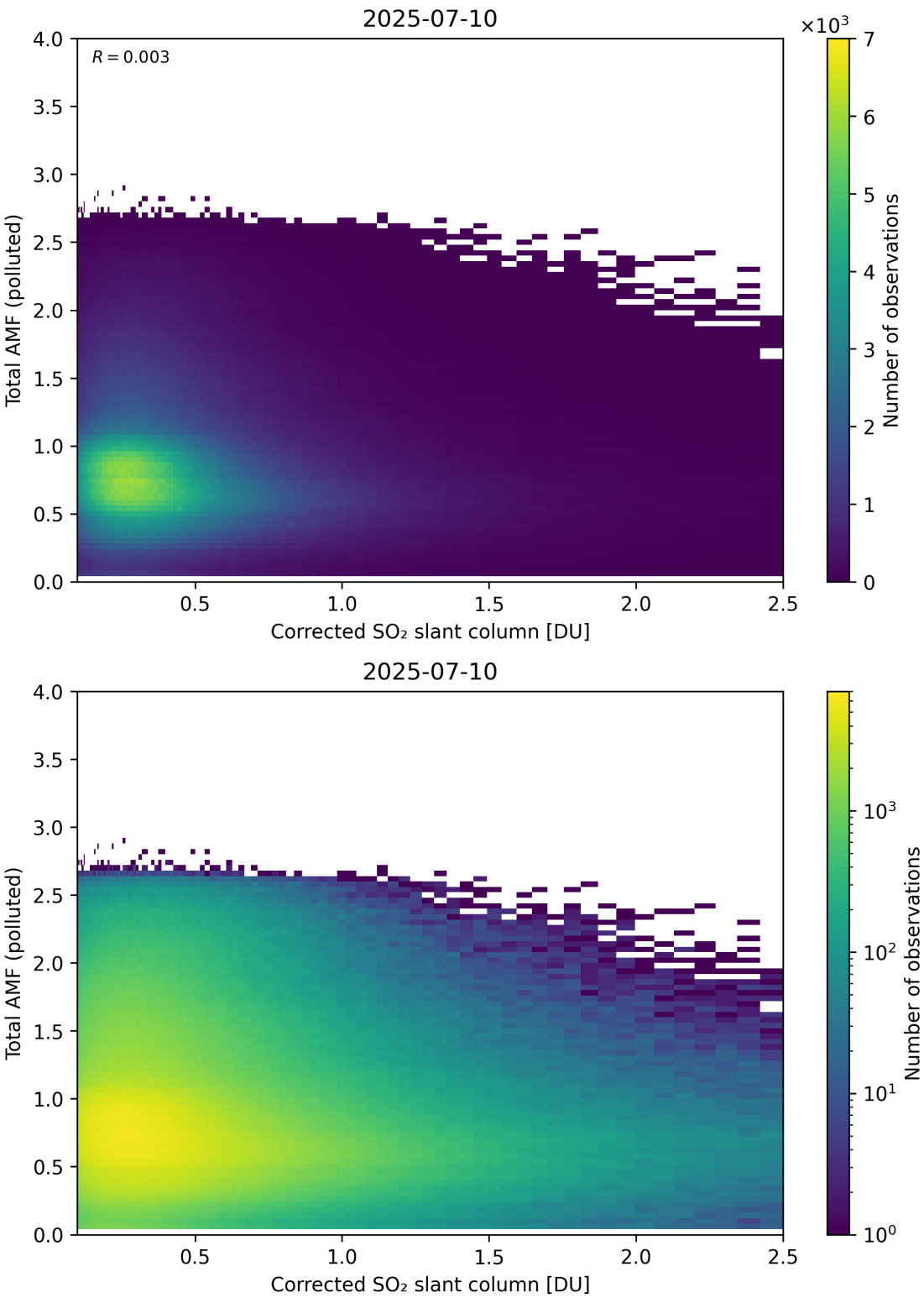

Figure 242: Scatter density plot of "Corrected SO_2 slant column" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

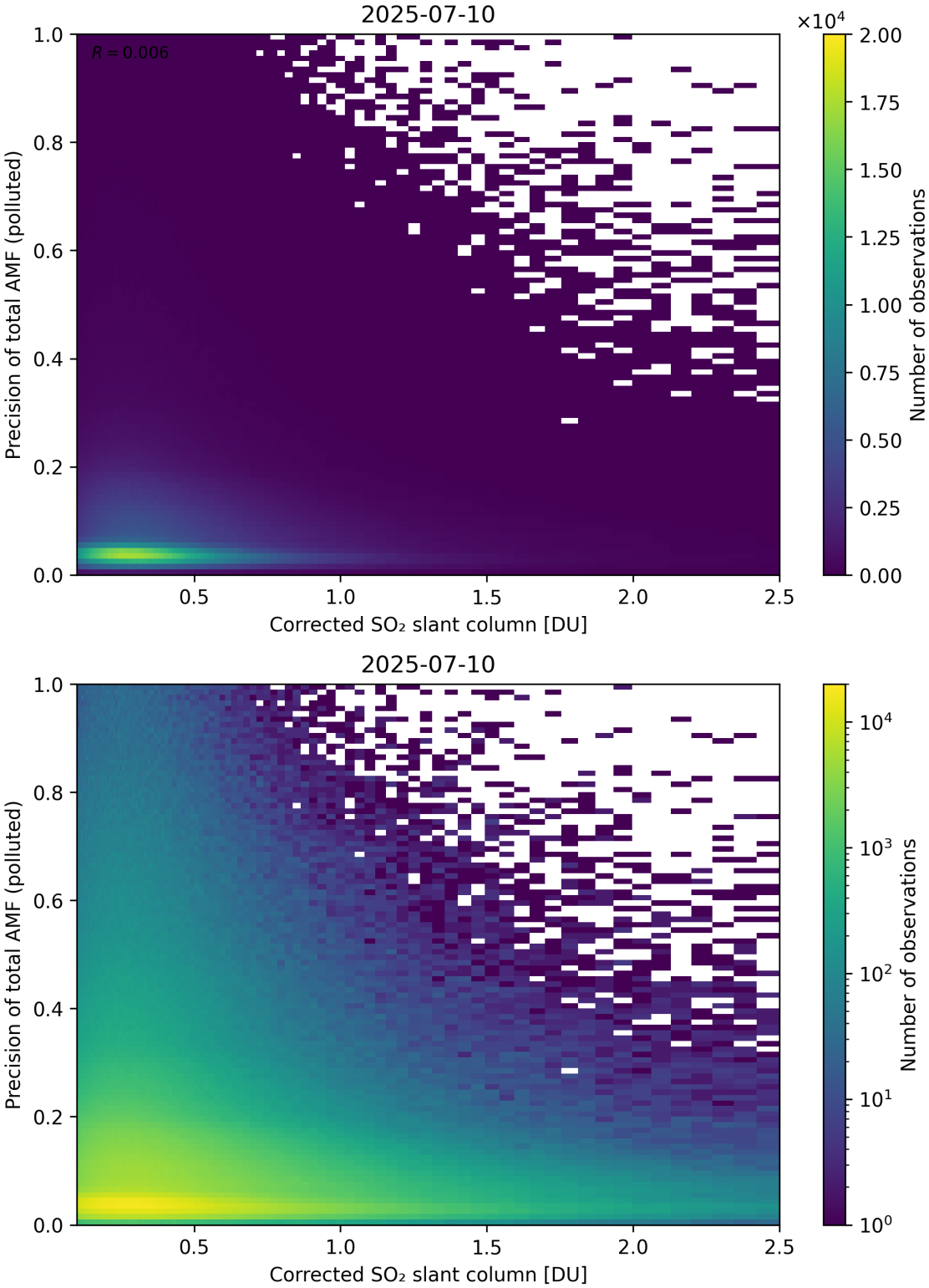

Figure 243: Scatter density plot of "Corrected SO_2 slant column" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

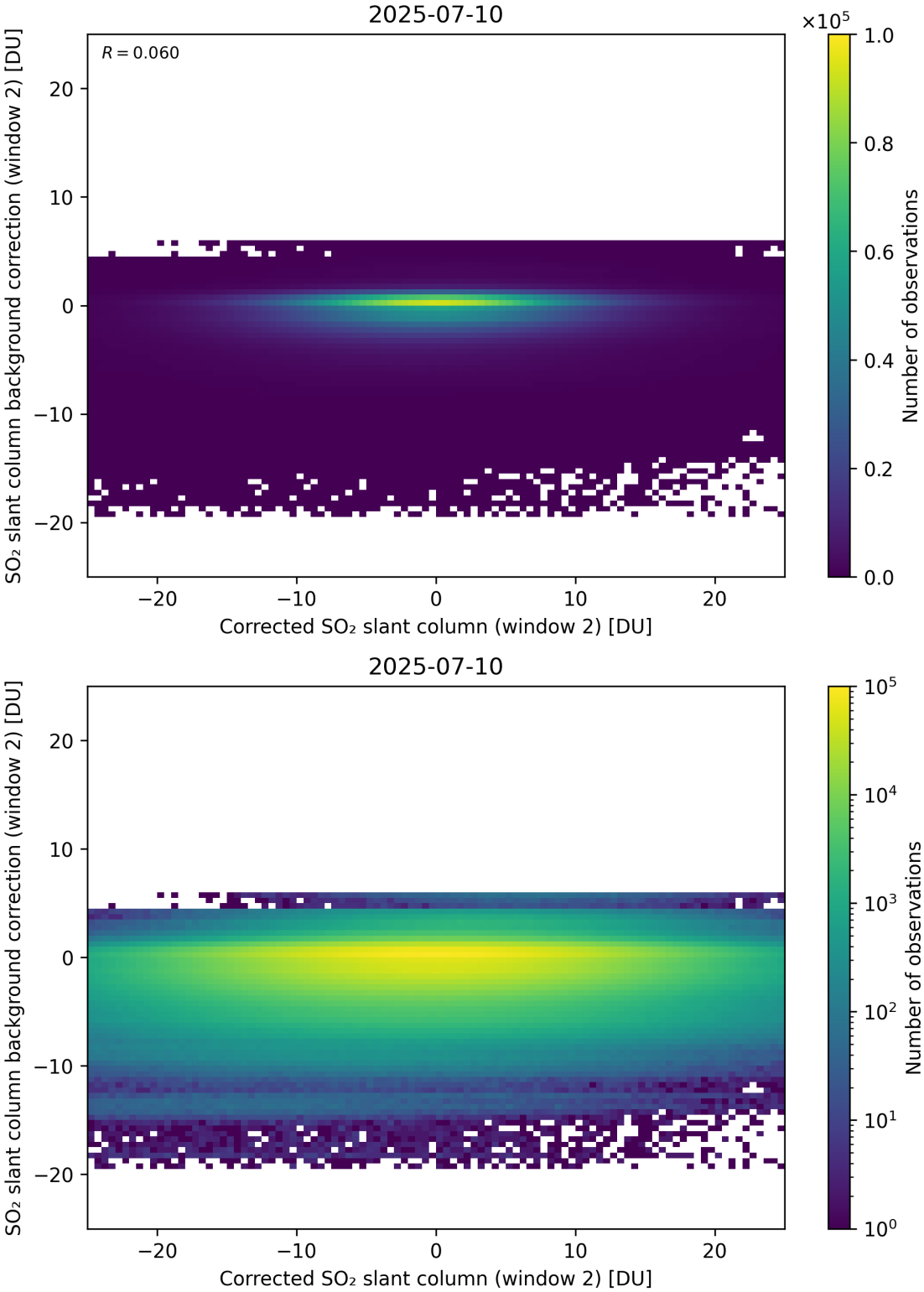

Figure 244: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

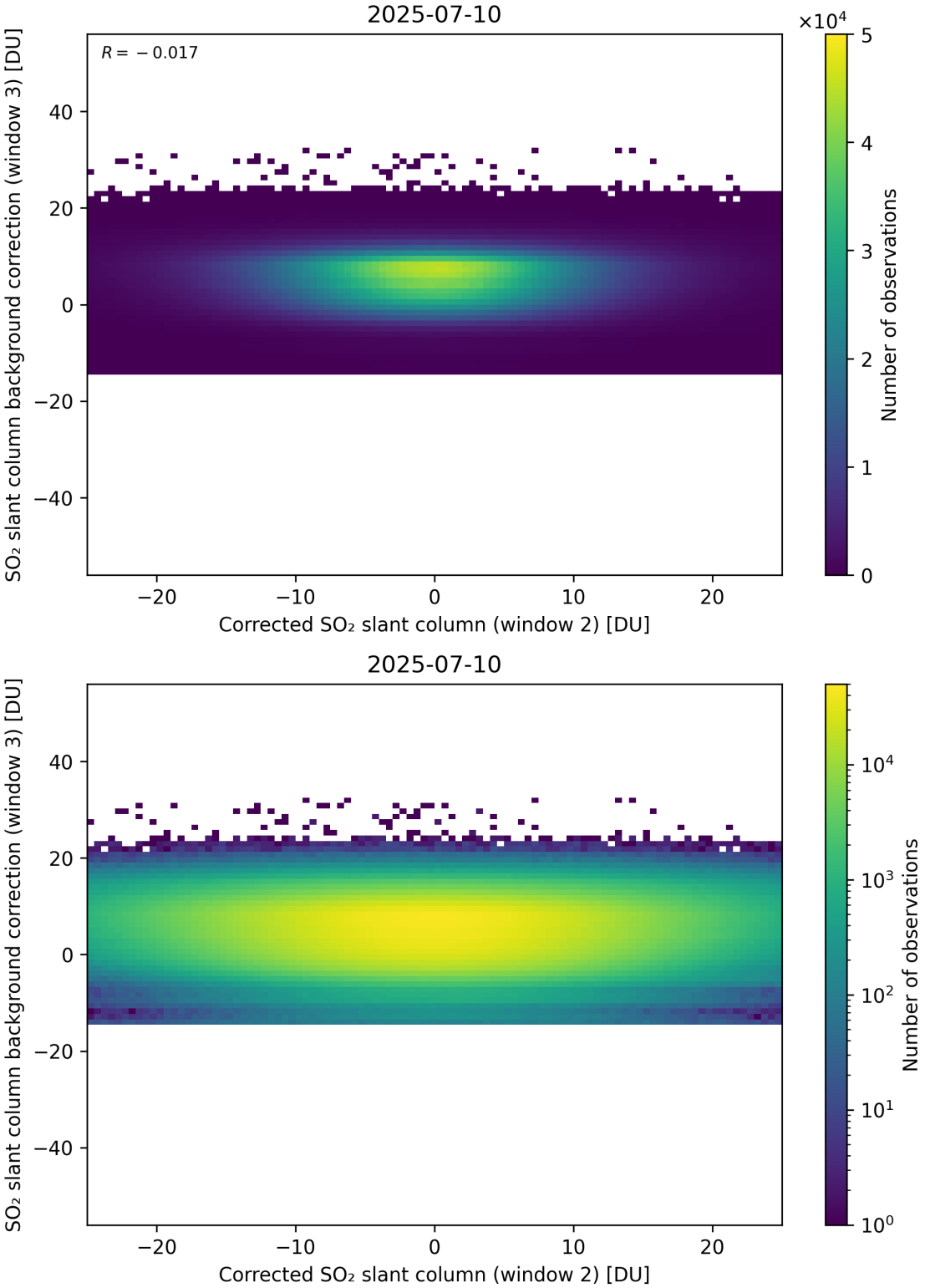

Figure 245: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

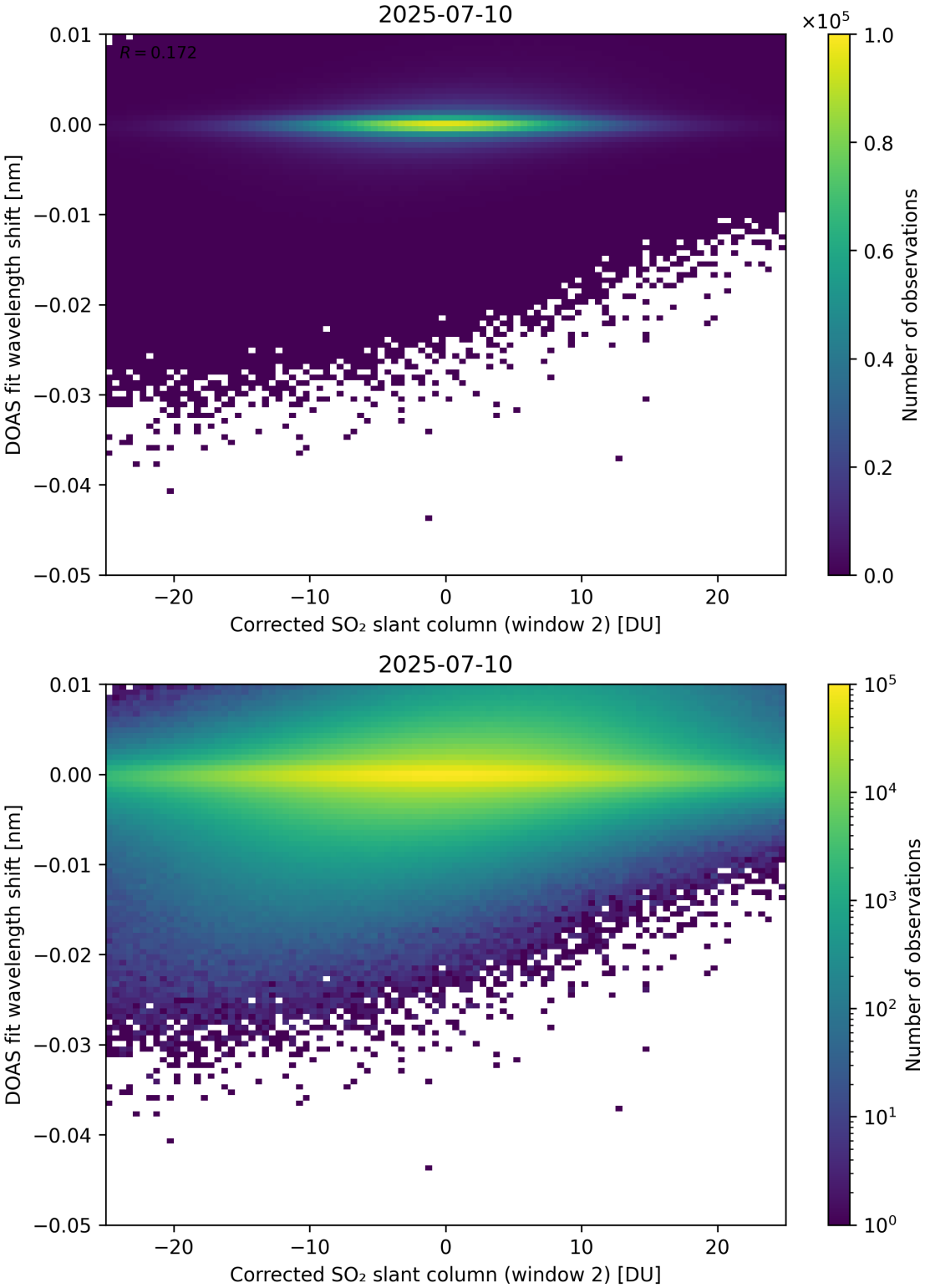

Figure 246: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

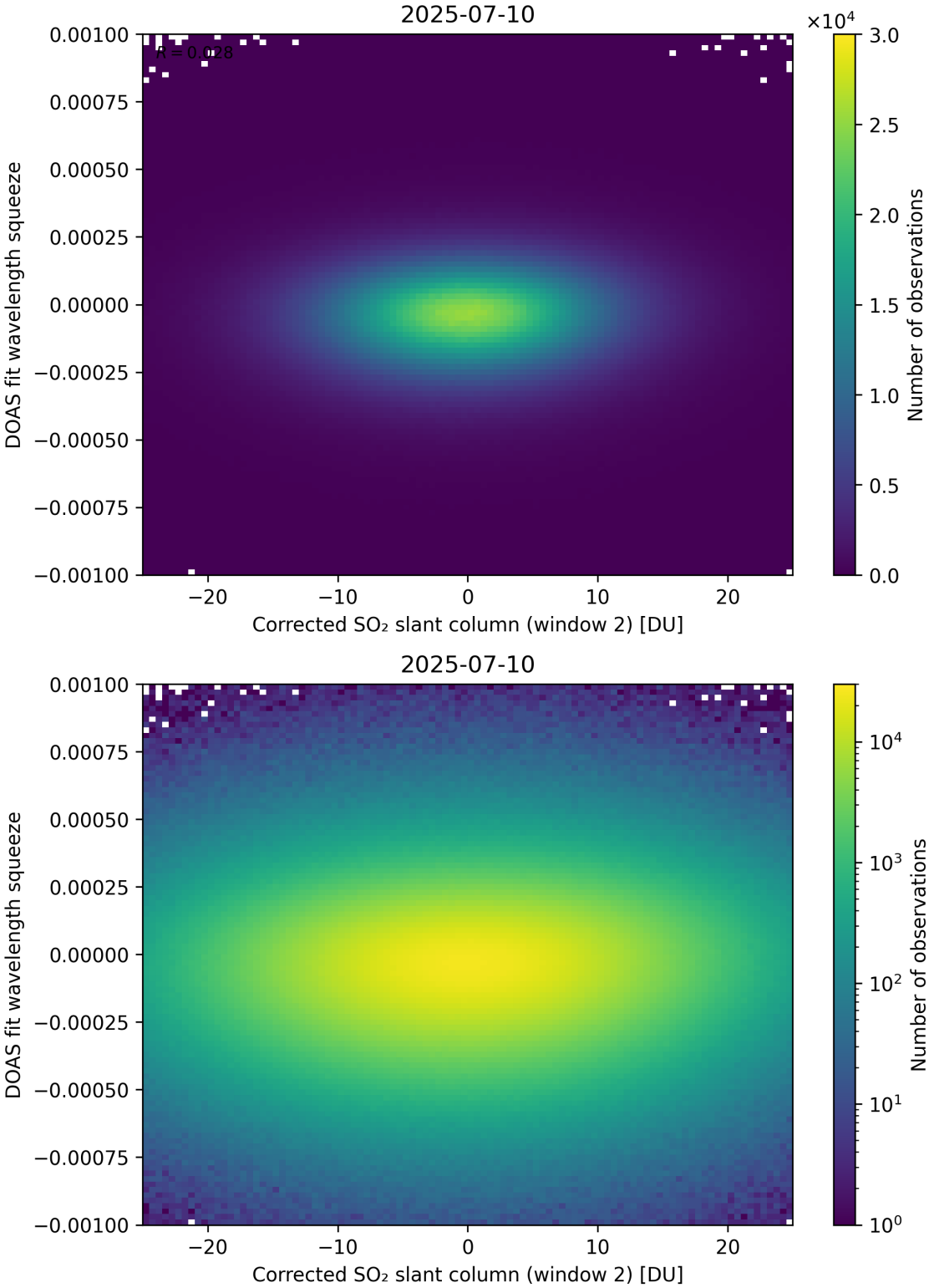

Figure 247: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

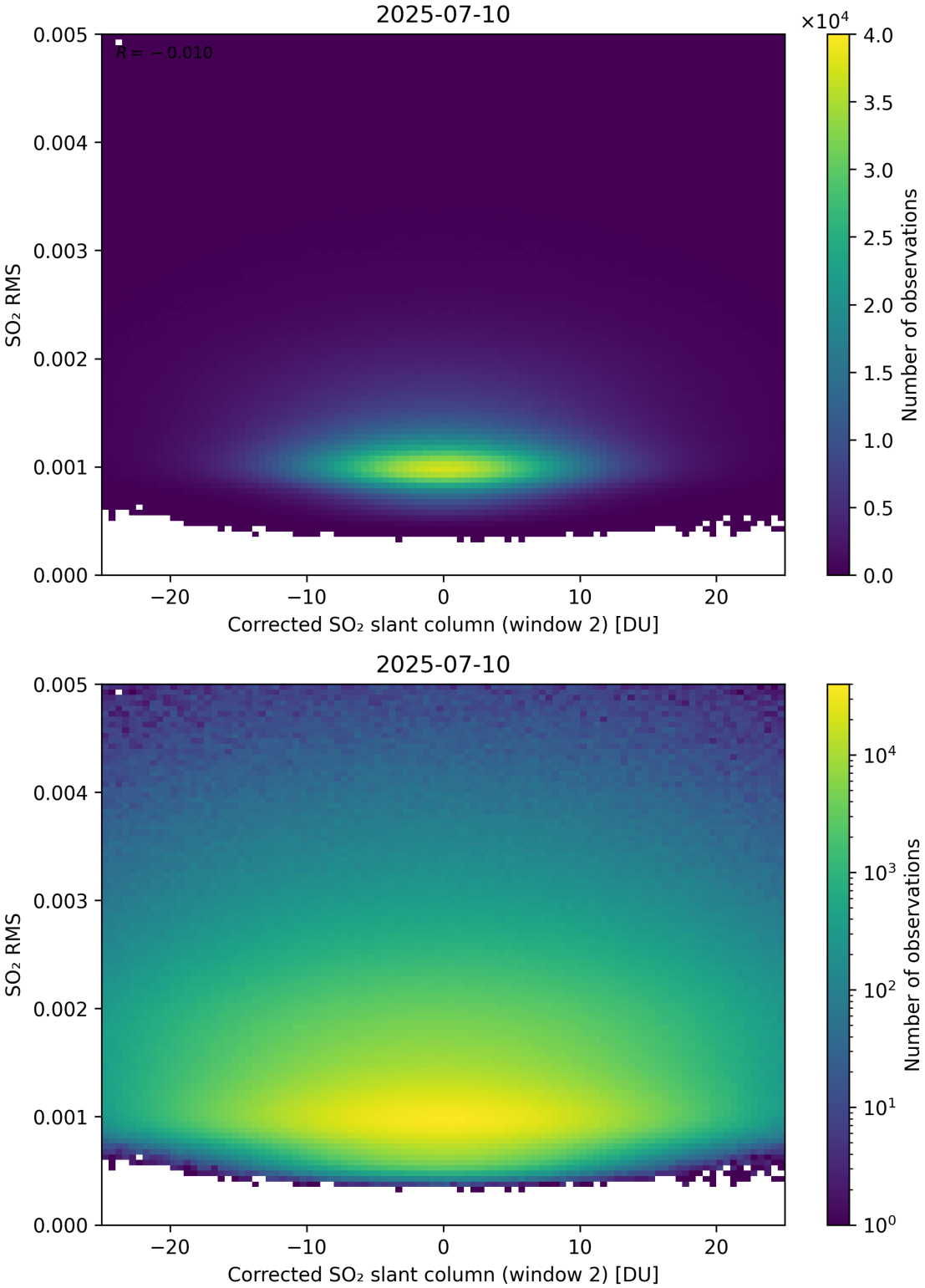

Figure 248: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

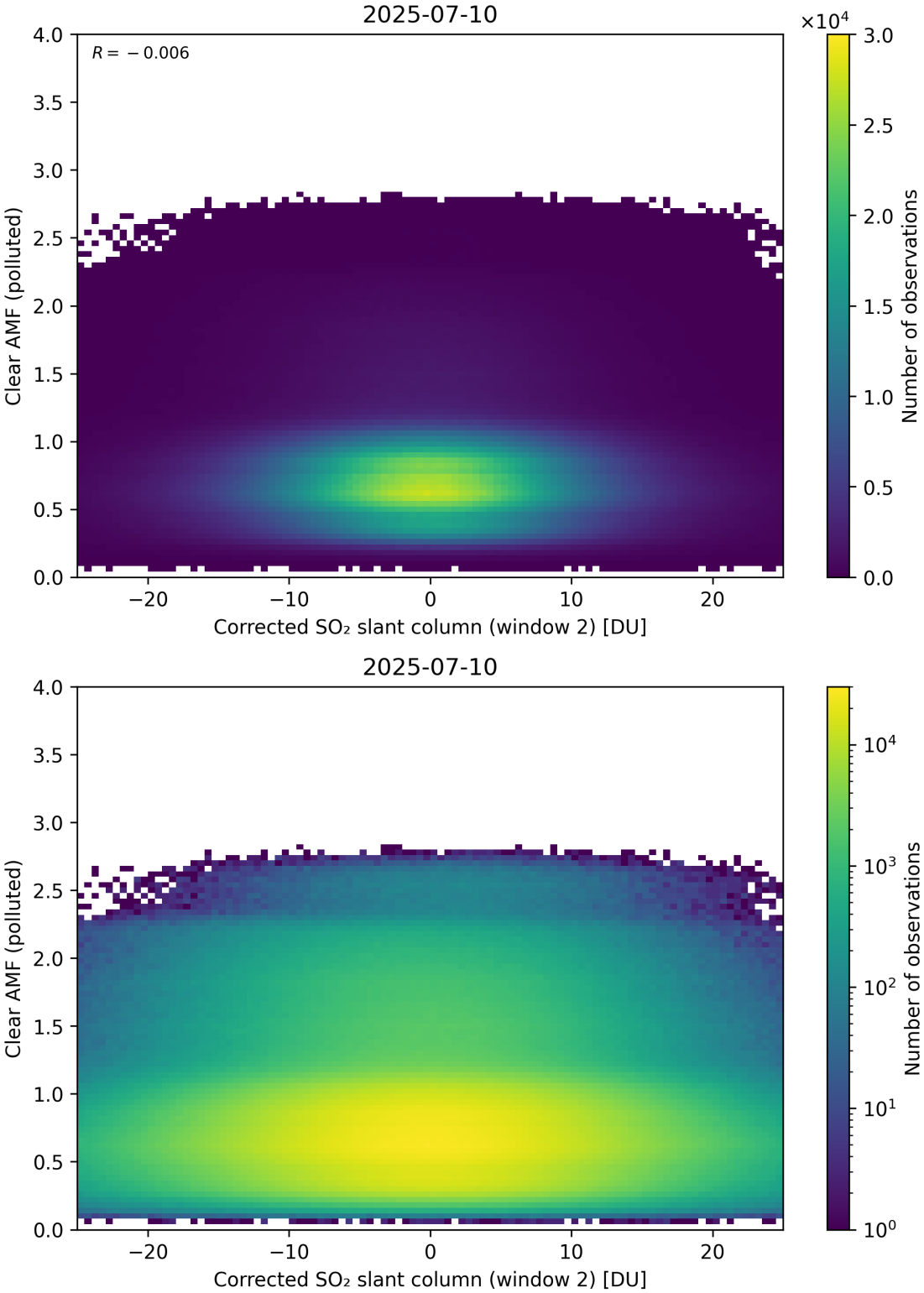

Figure 249: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

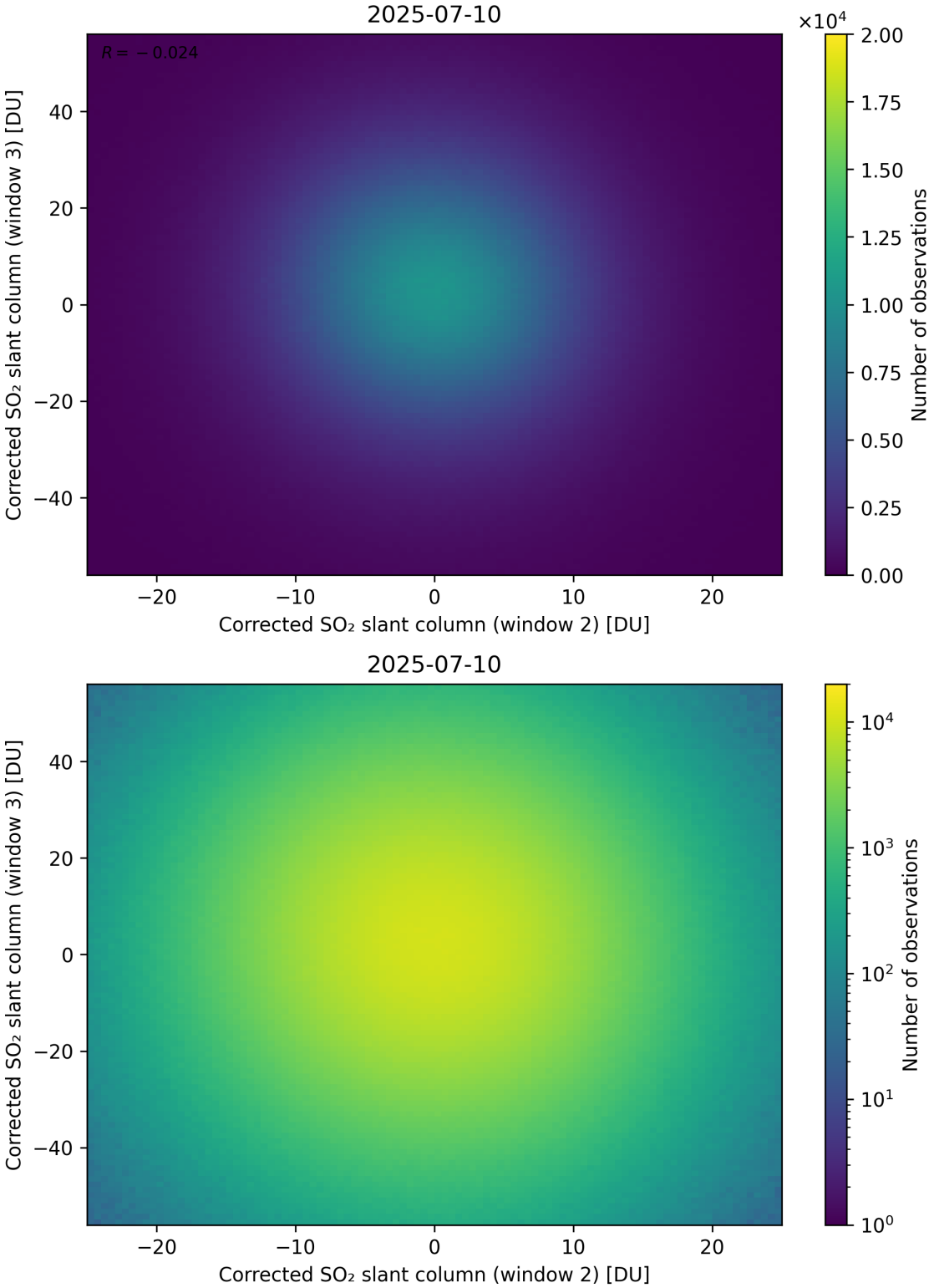

Figure 250: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

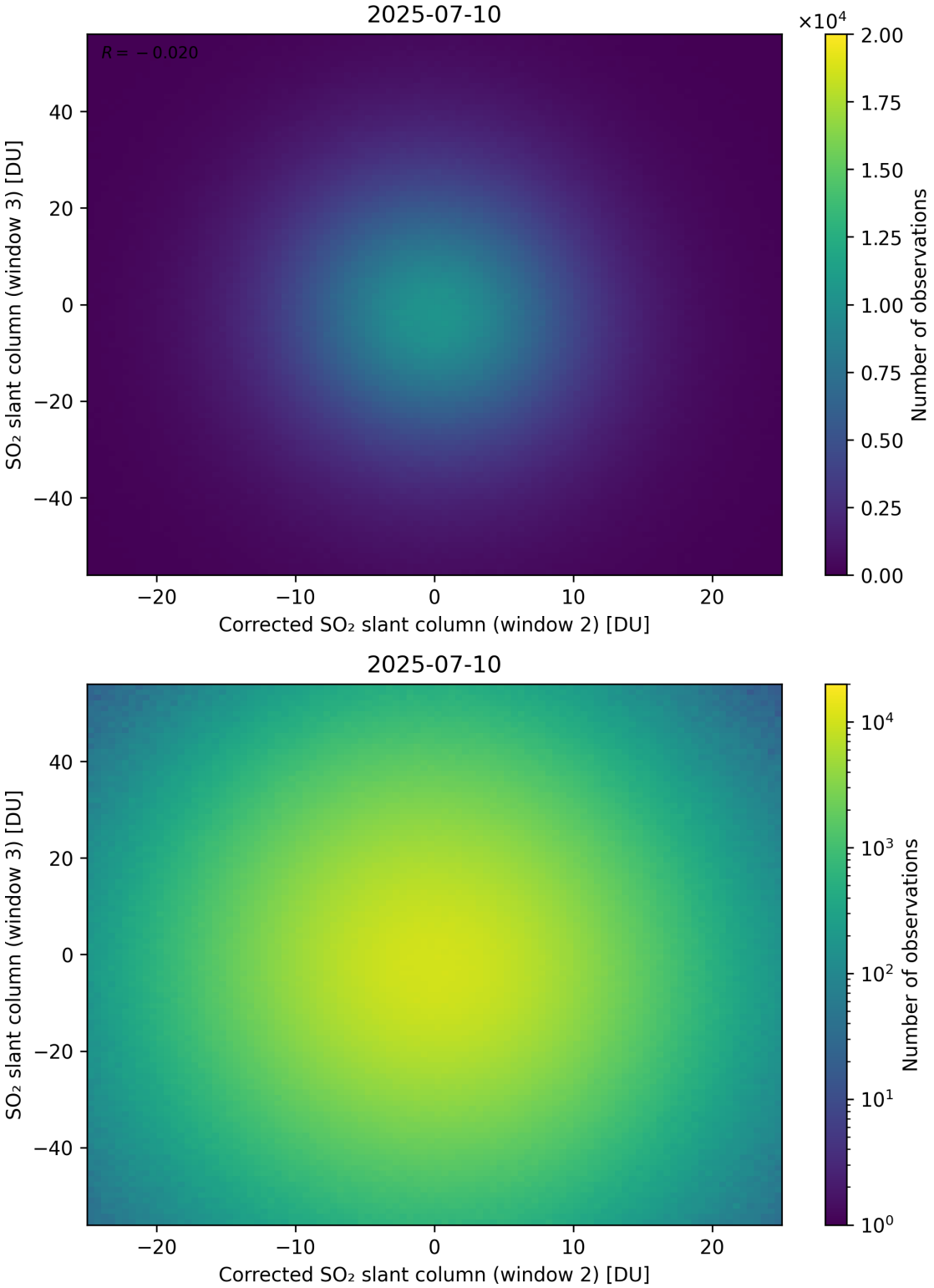

Figure 251: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

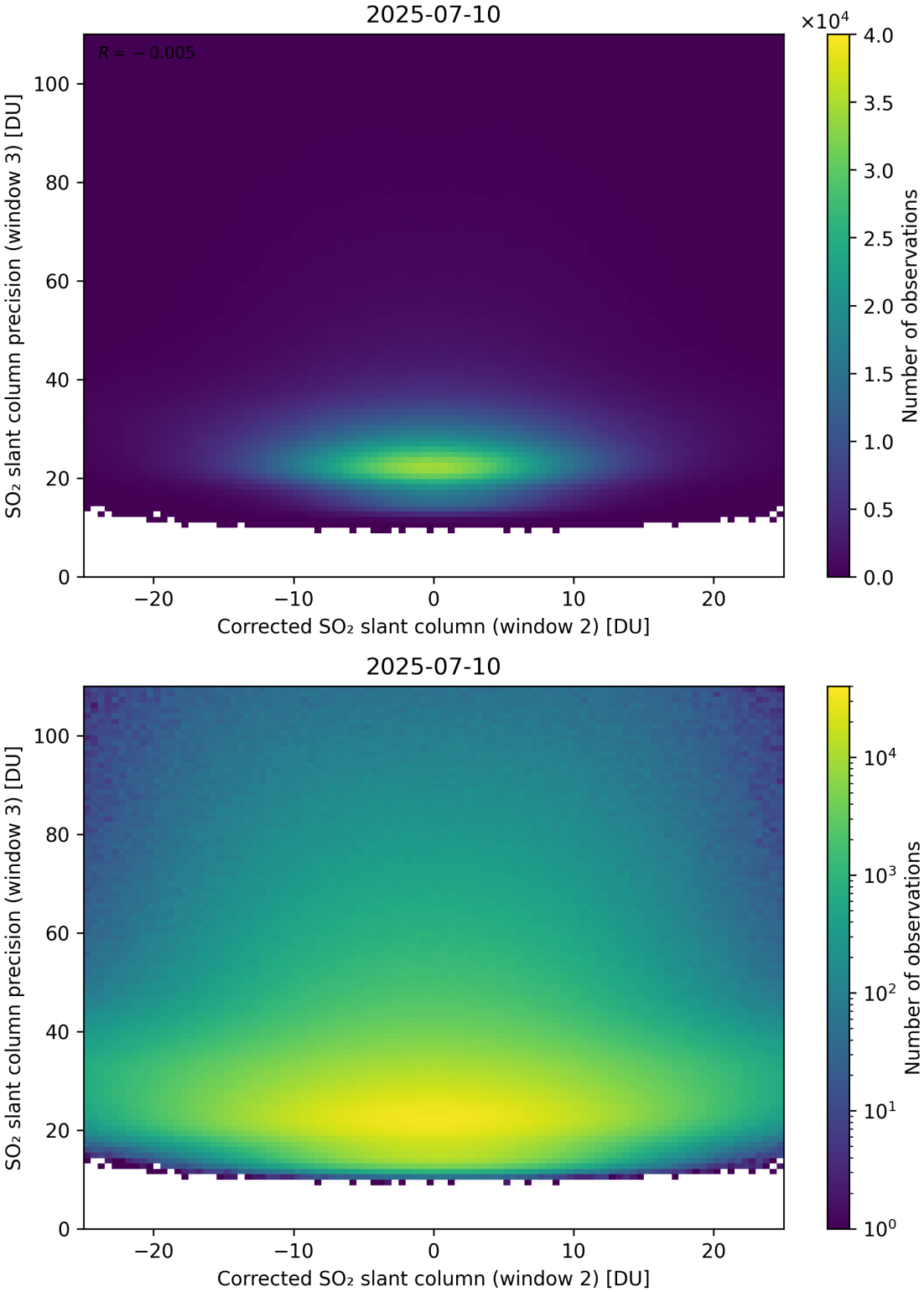

Figure 252: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

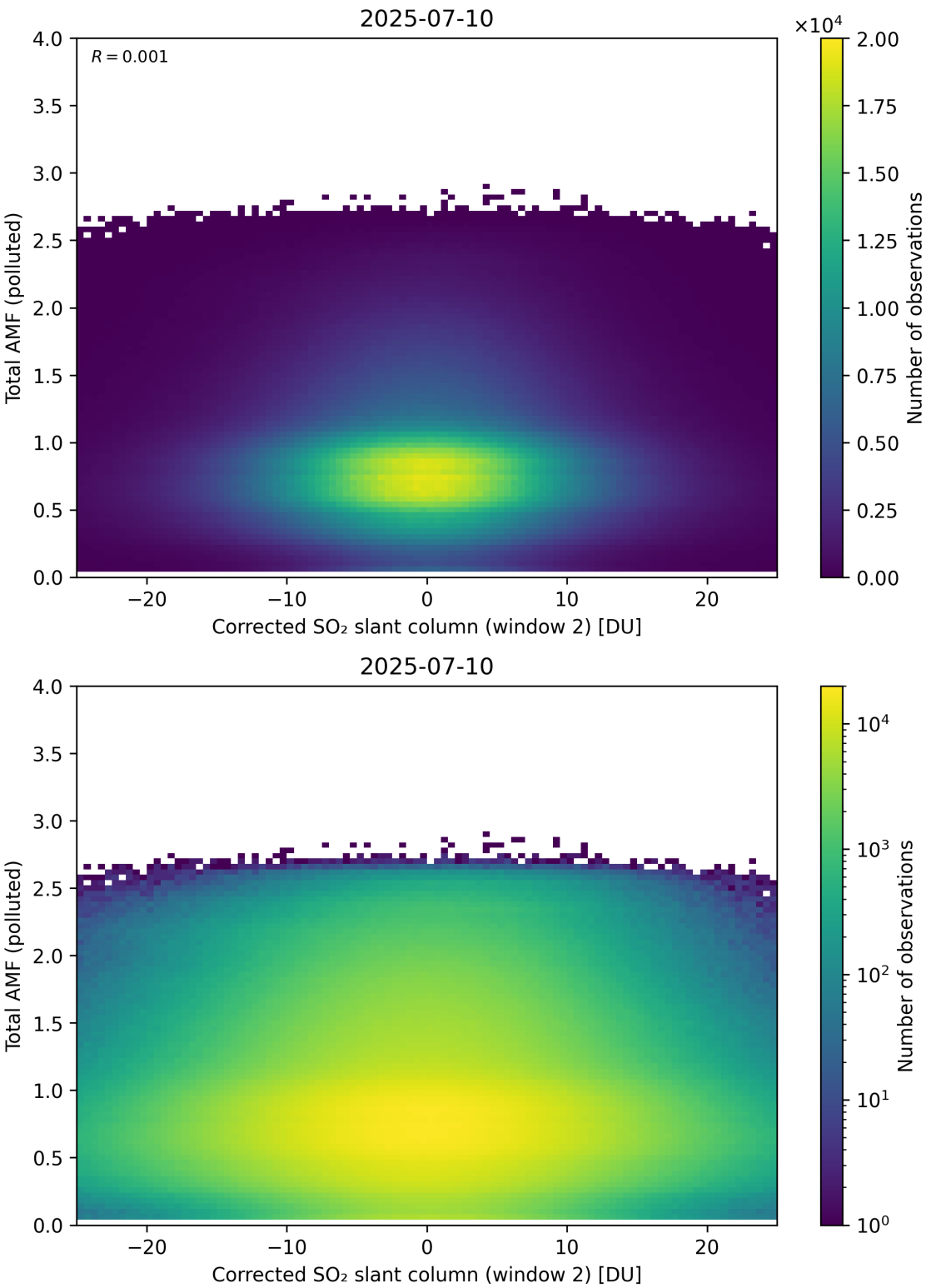

Figure 253: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

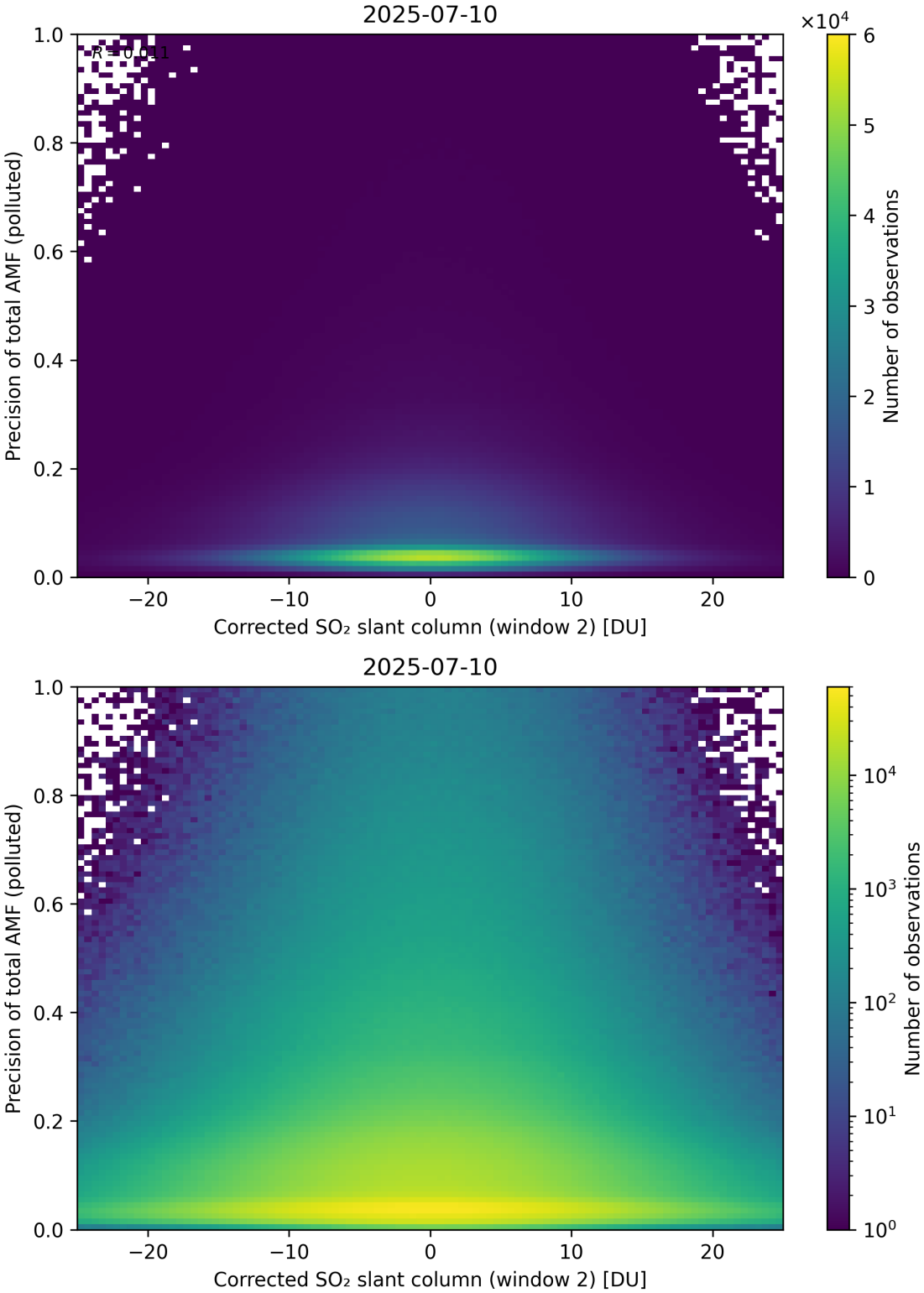

Figure 254: Scatter density plot of "Corrected SO_2 slant column (window 2)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

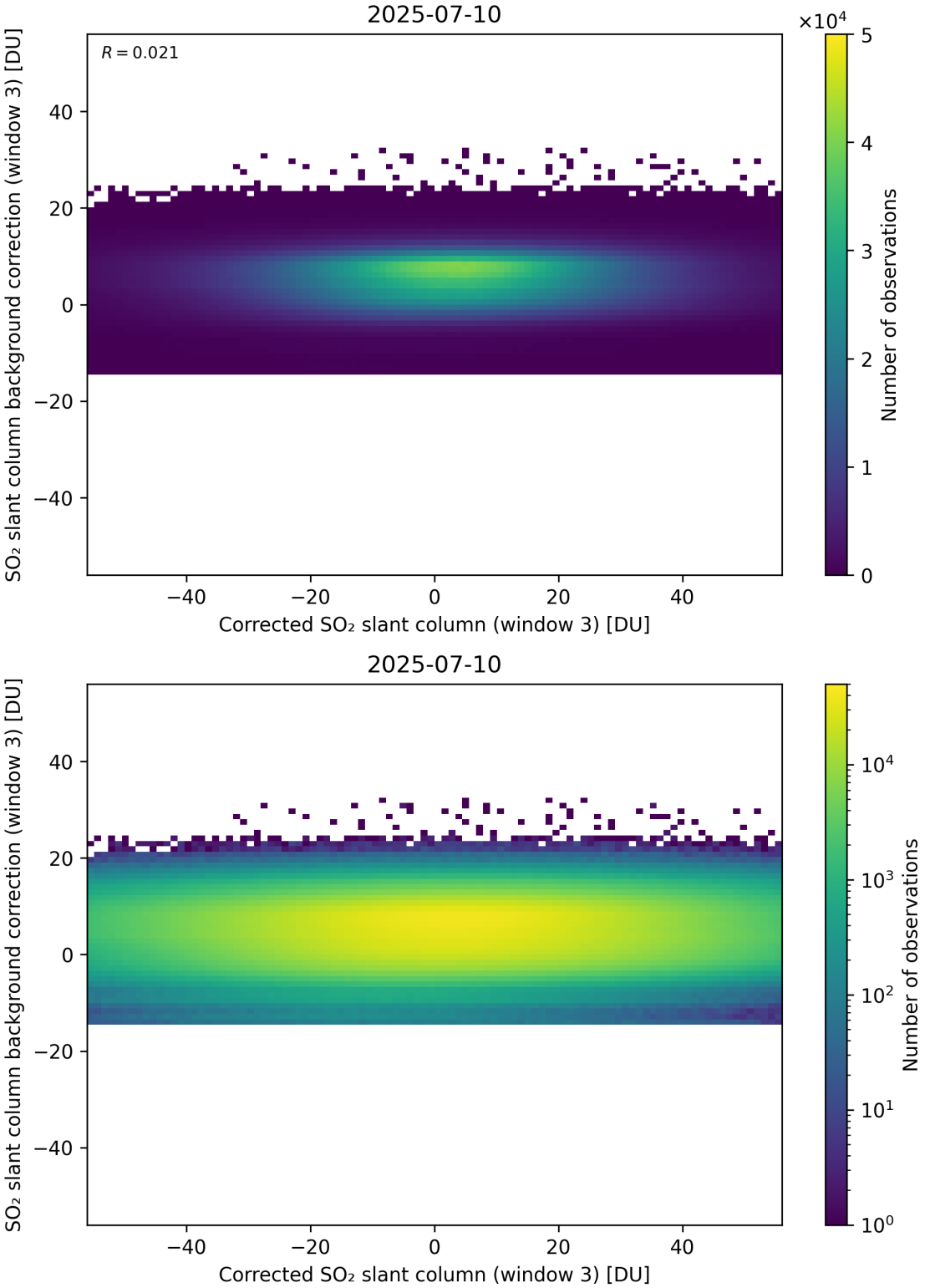

Figure 255: Scatter density plot of "Corrected SO_2 slant column (window 3)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

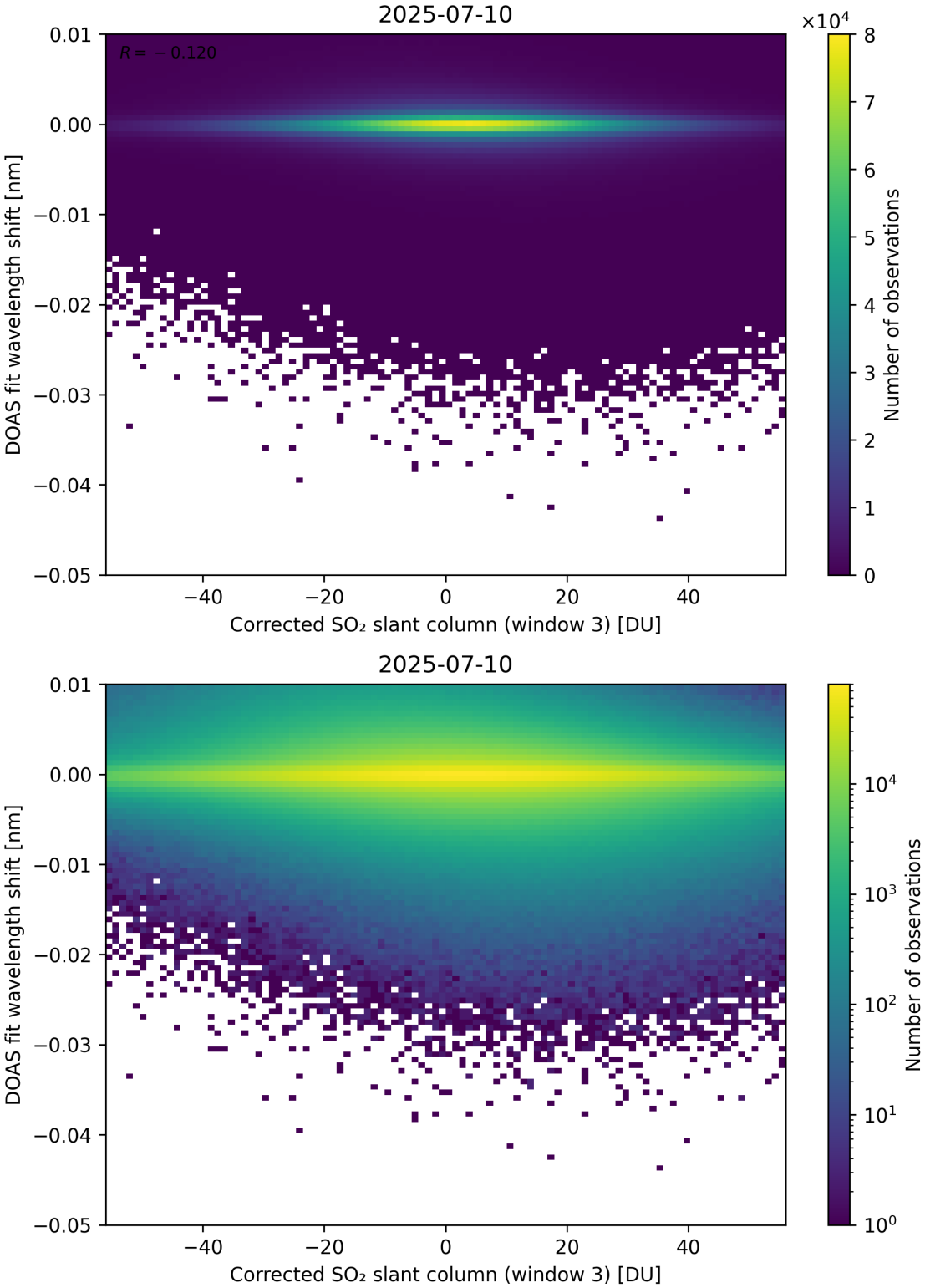

Figure 256: Scatter density plot of "Corrected SO_2 slant column (window 3)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

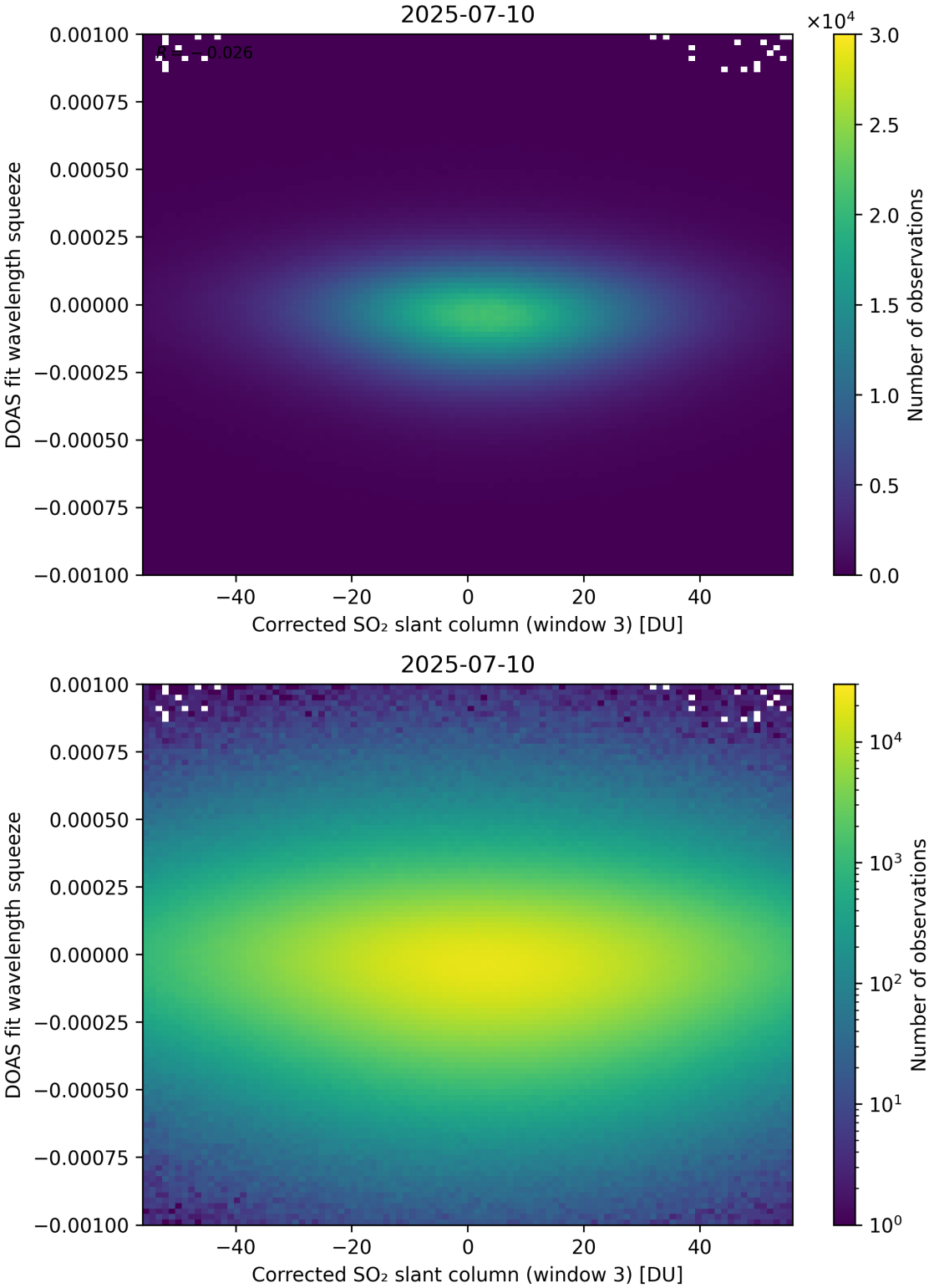

Figure 257: Scatter density plot of "Corrected SO_2 slant column (window 3)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

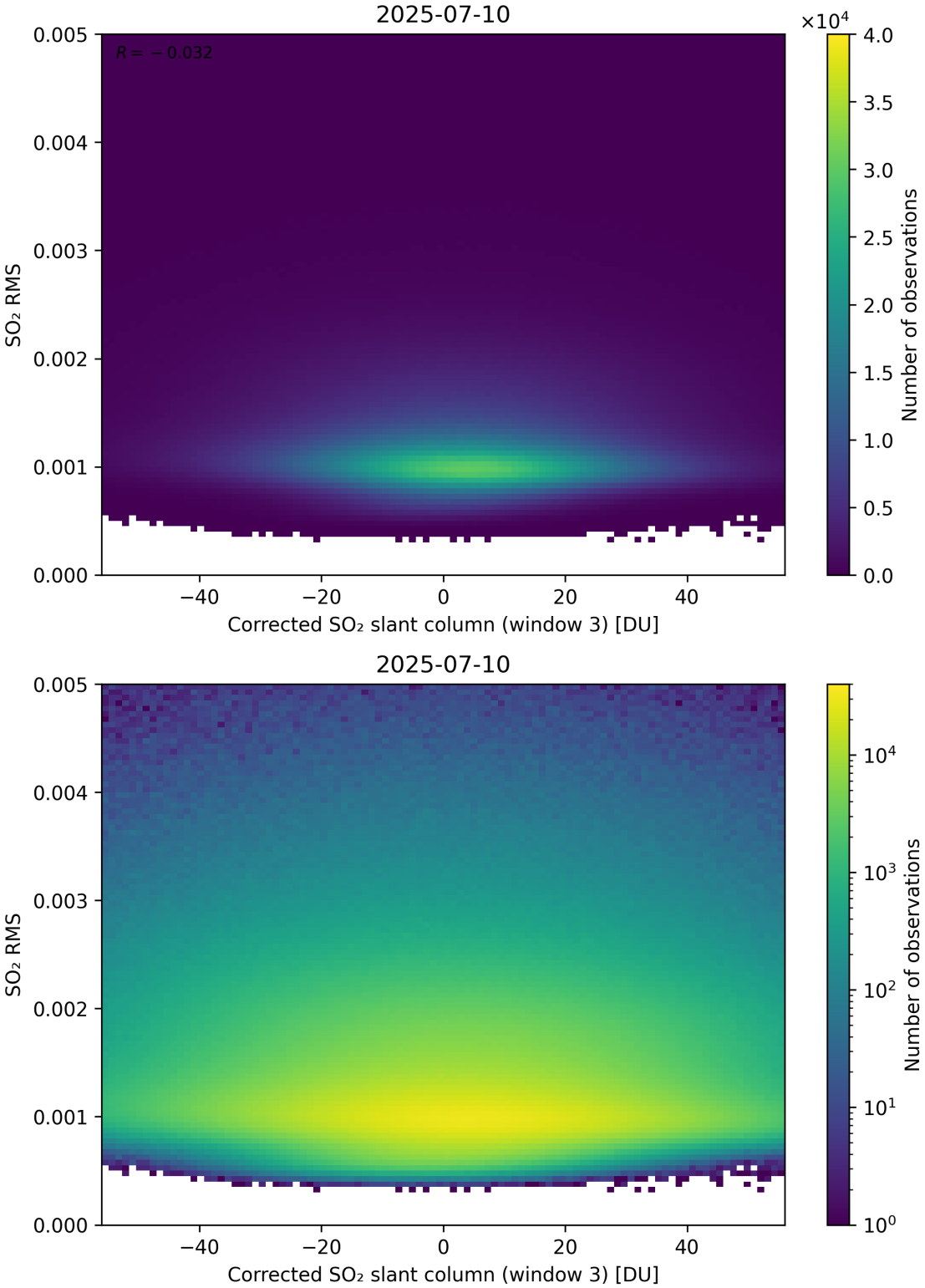

Figure 258: Scatter density plot of "Corrected SO_2 slant column (window 3)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

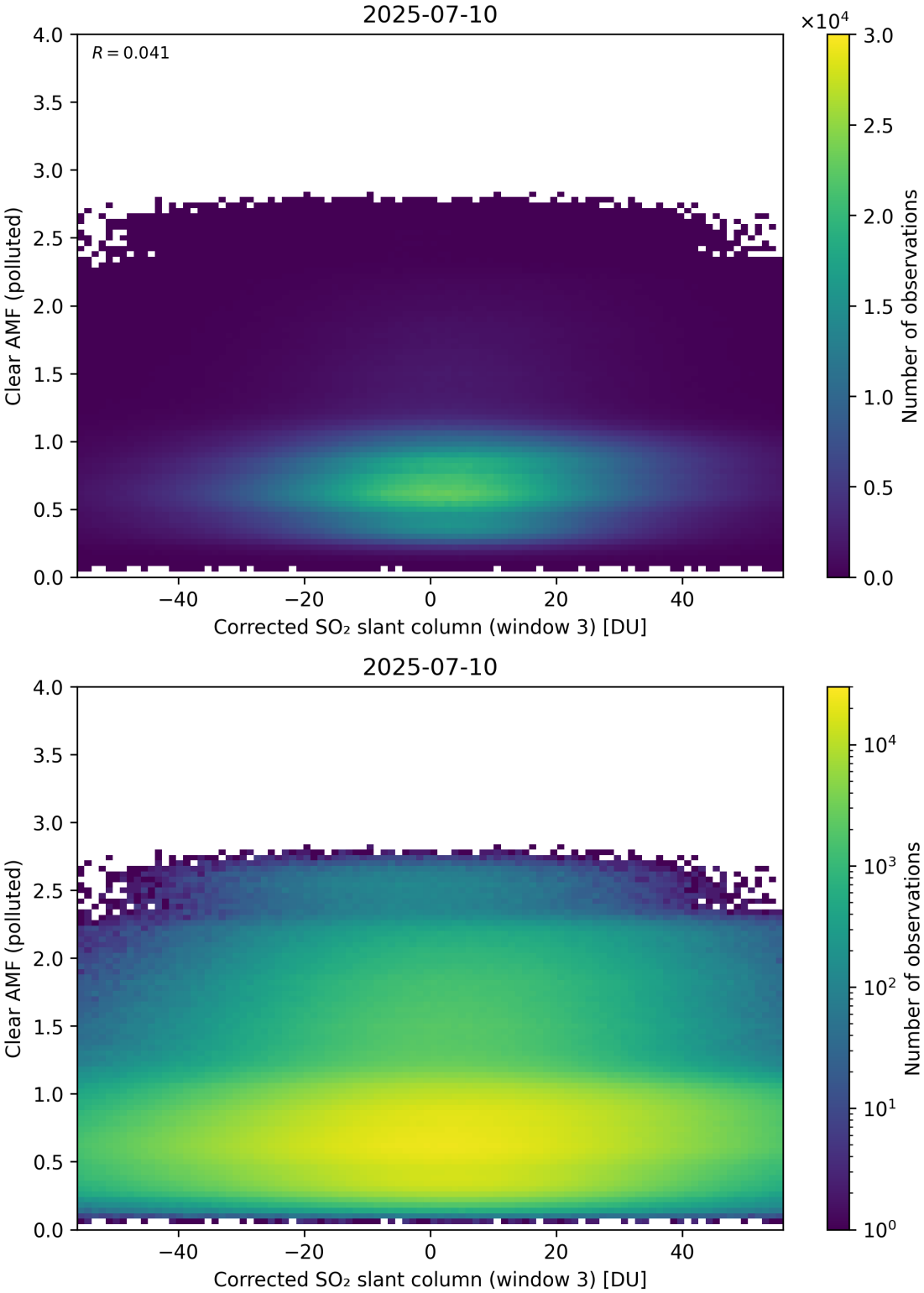

Figure 259: Scatter density plot of "Corrected SO_2 slant column (window 3)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

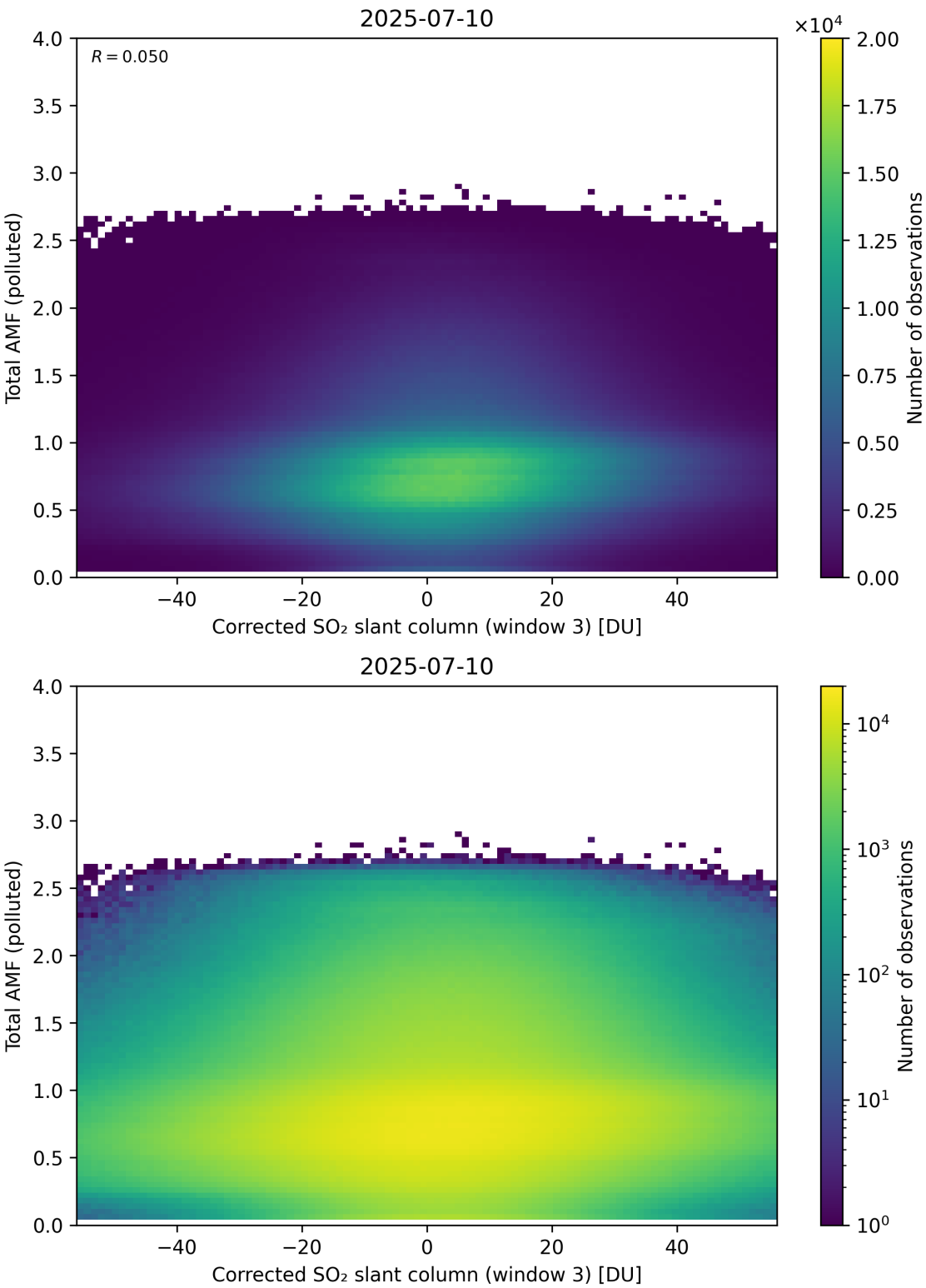

Figure 260: Scatter density plot of "Corrected SO_2 slant column (window 3)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

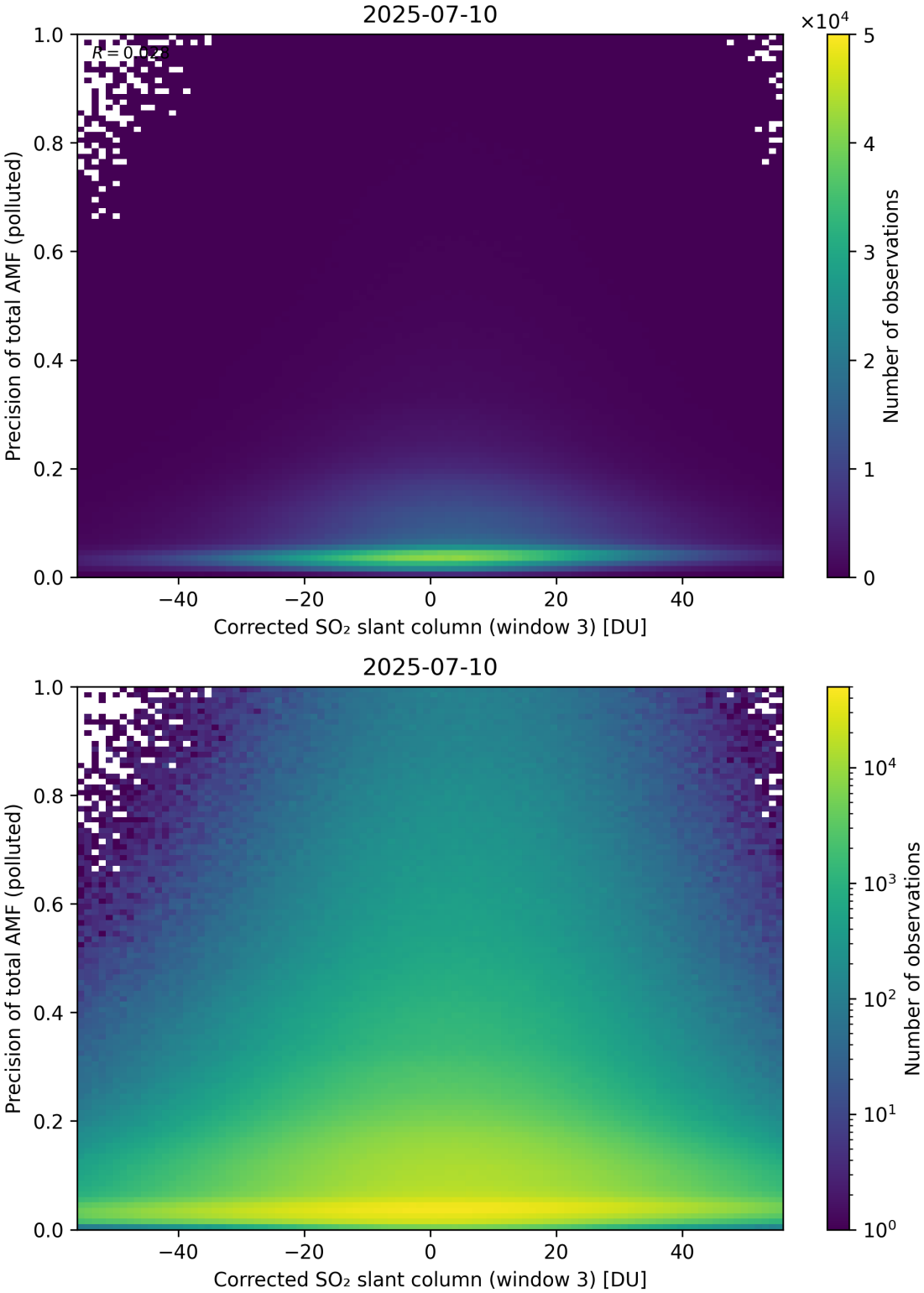

Figure 261: Scatter density plot of "Corrected SO_2 slant column (window 3)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

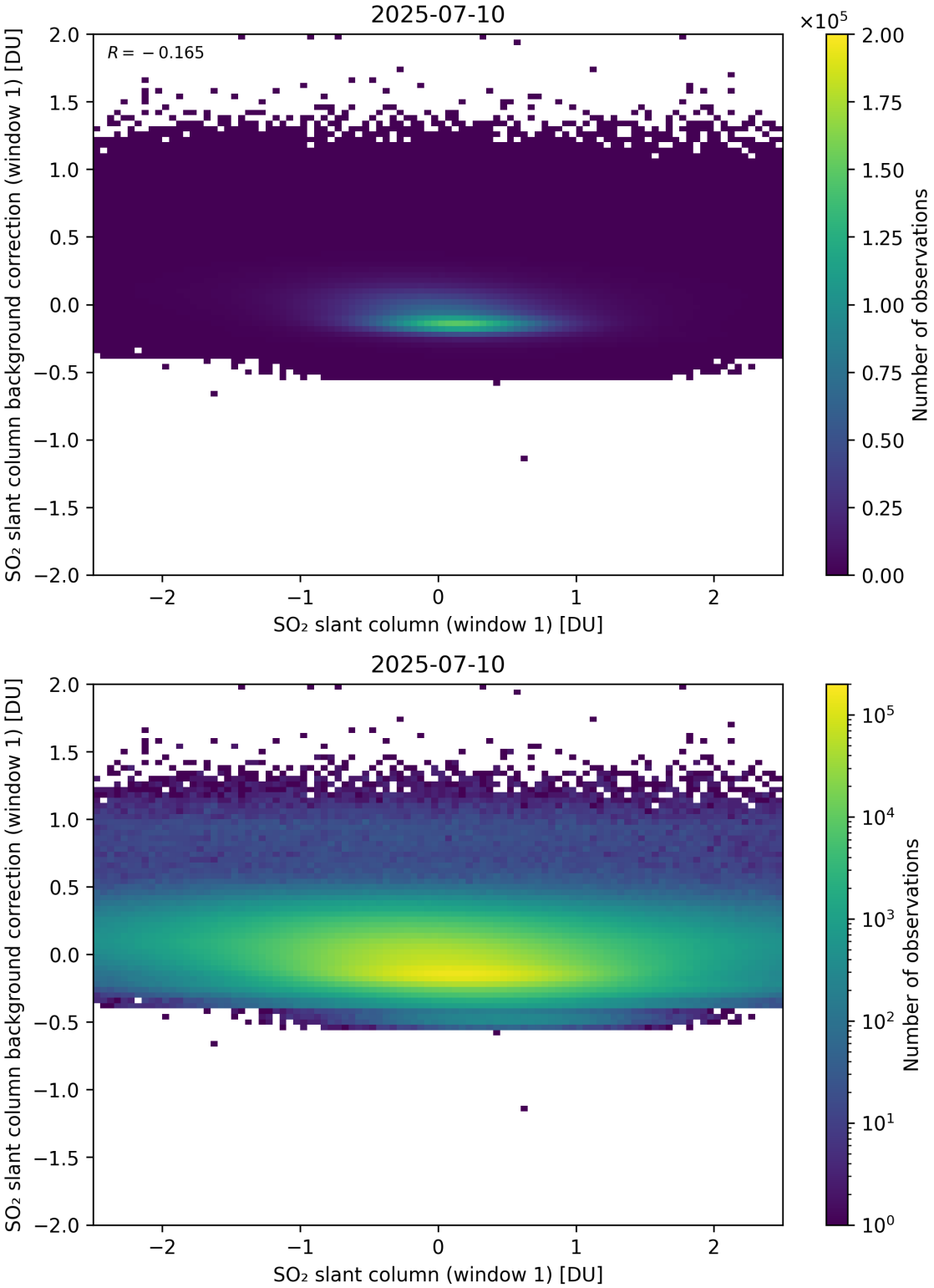

Figure 262: Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

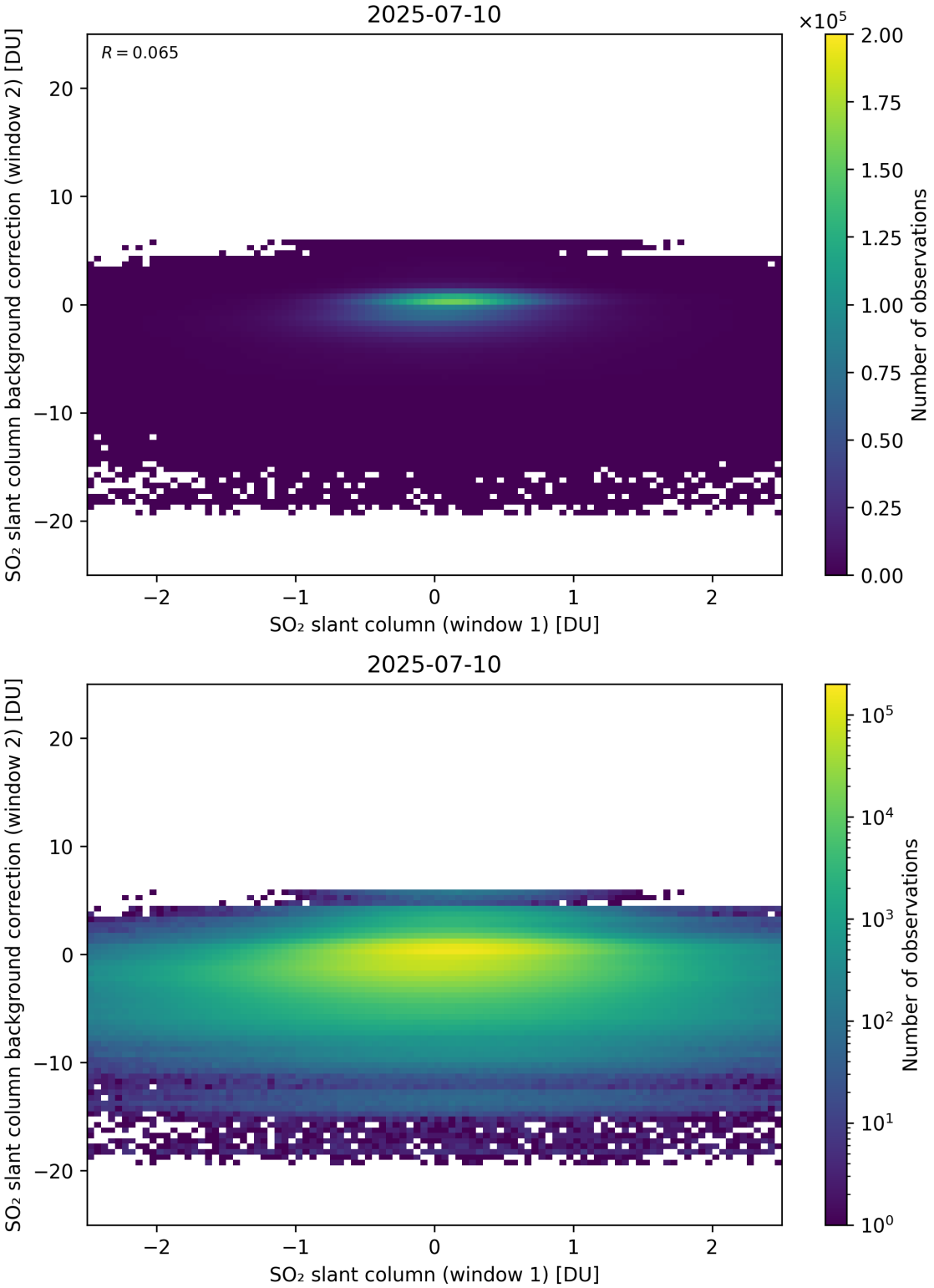

Figure 263: Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

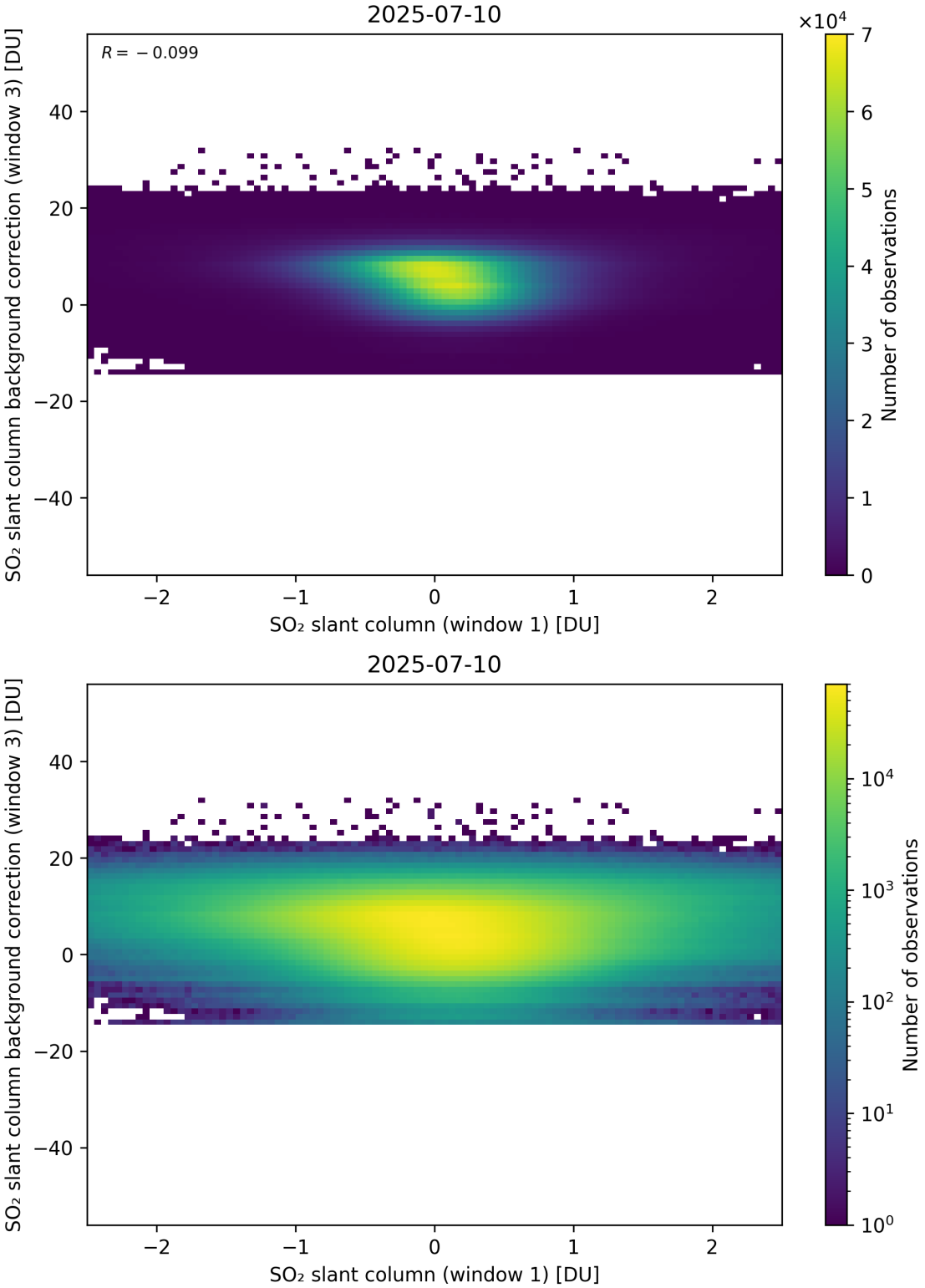

Figure 264: Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

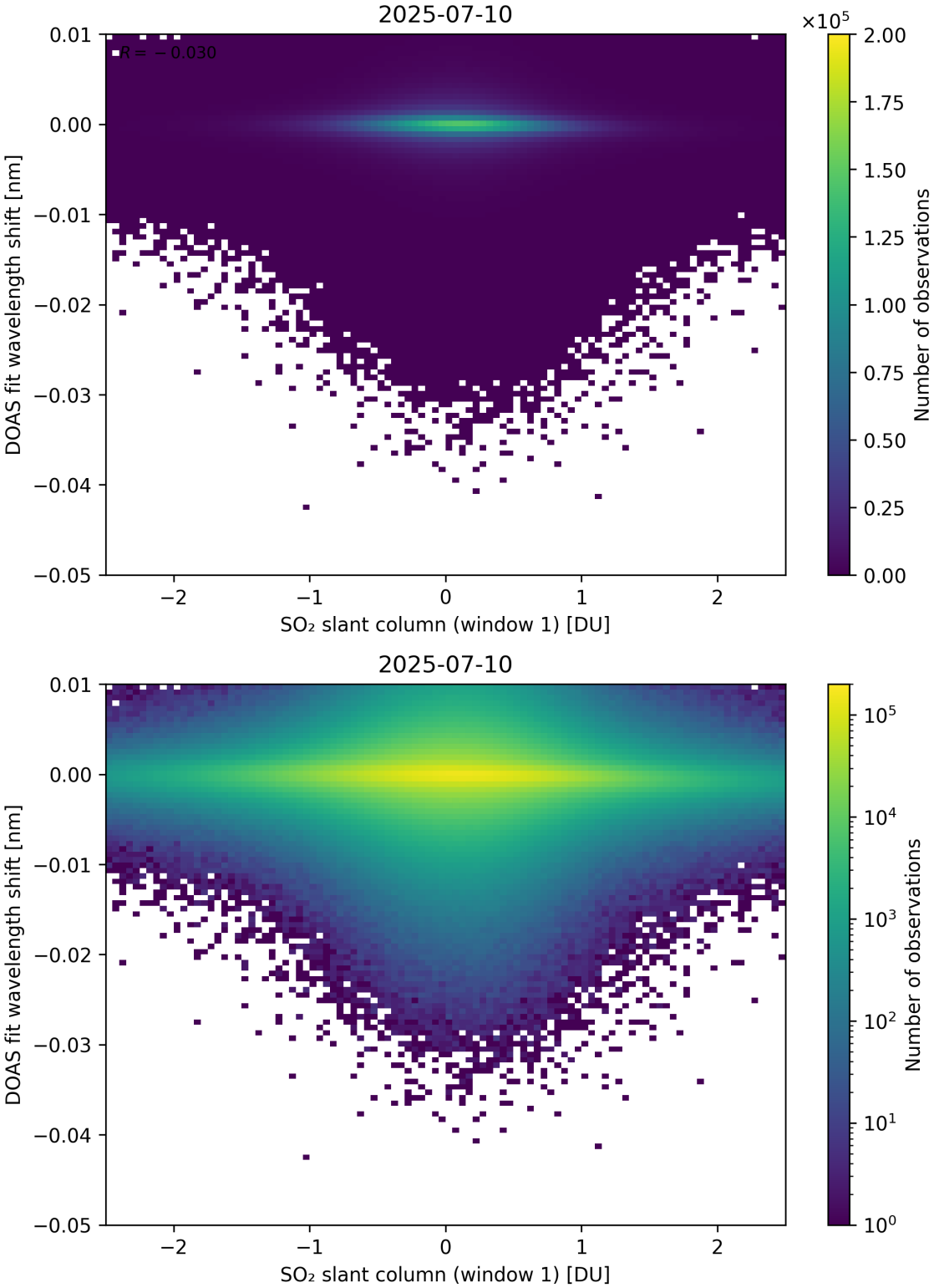

Figure 265: Scatter density plot of "SO_2 slant column (window 1)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

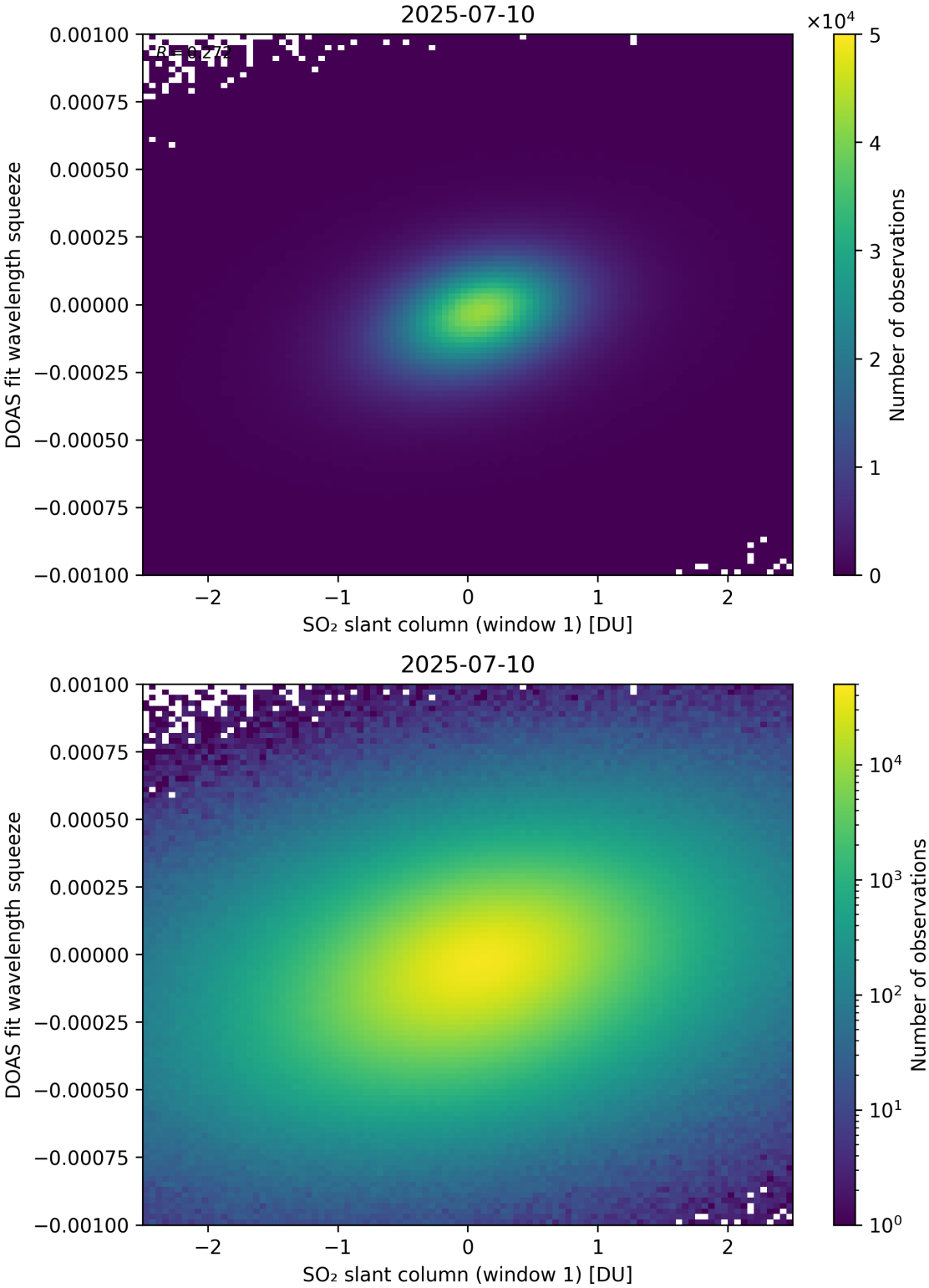

Figure 266: Scatter density plot of "SO_2 slant column (window 1)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

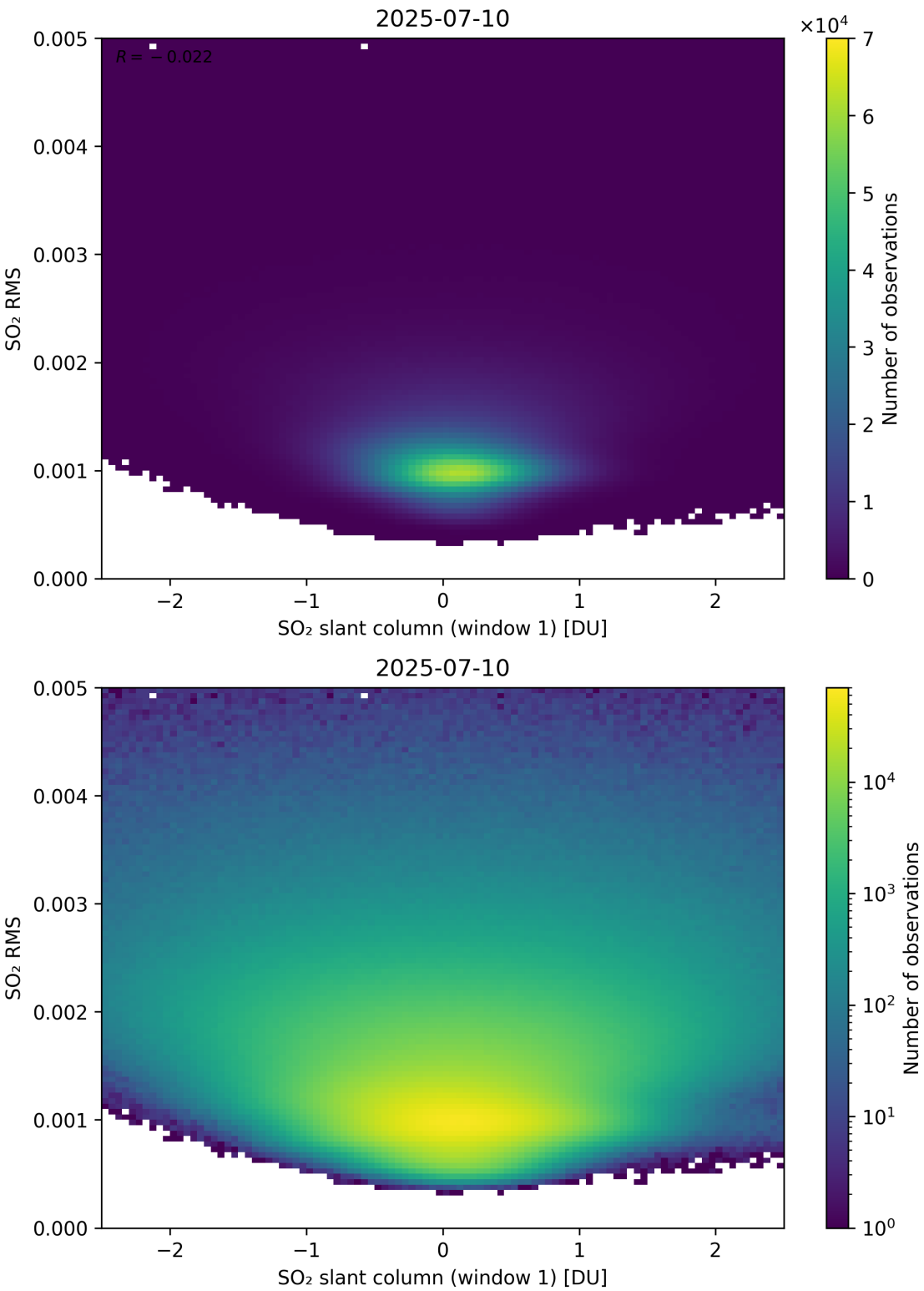

Figure 267: Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

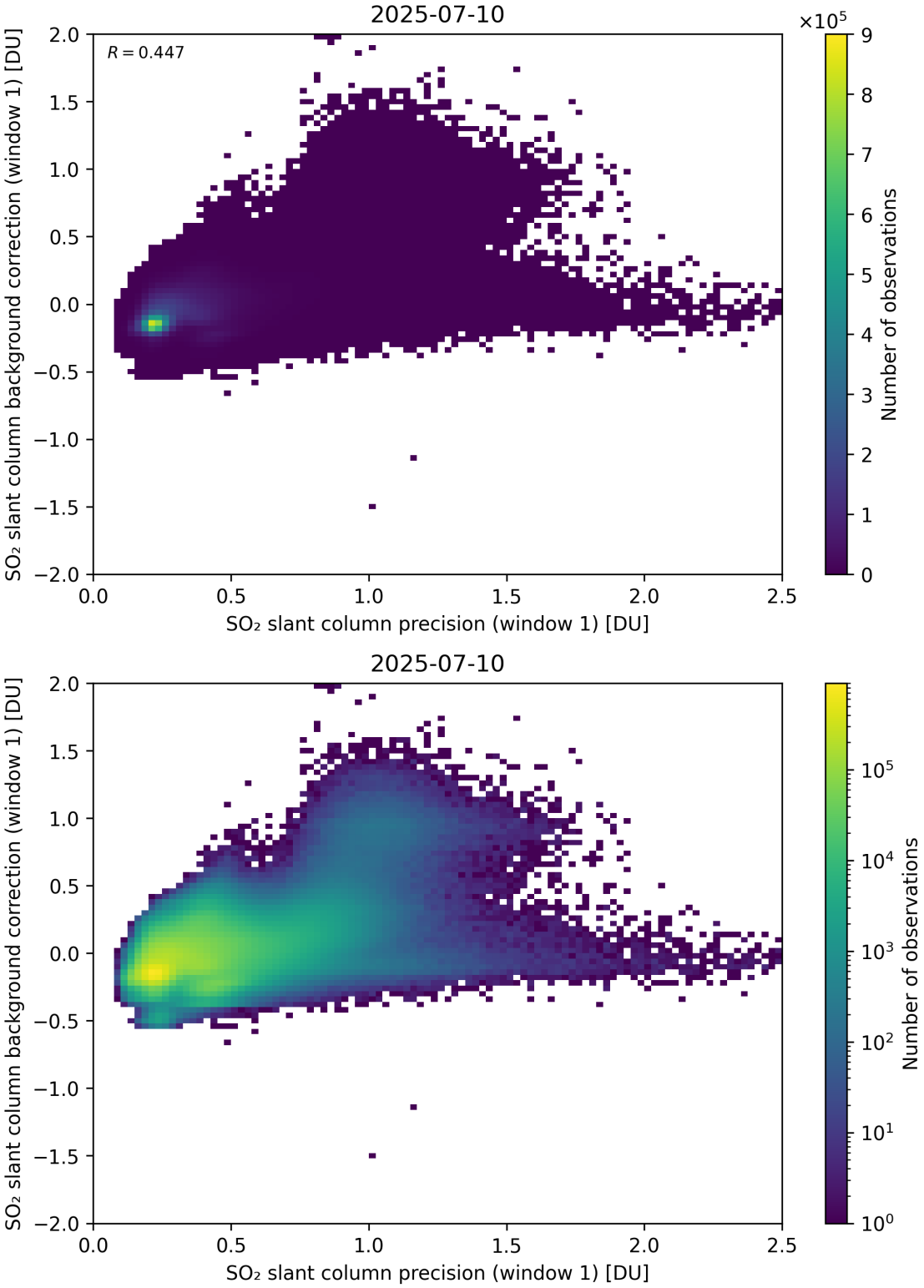

Figure 268: Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

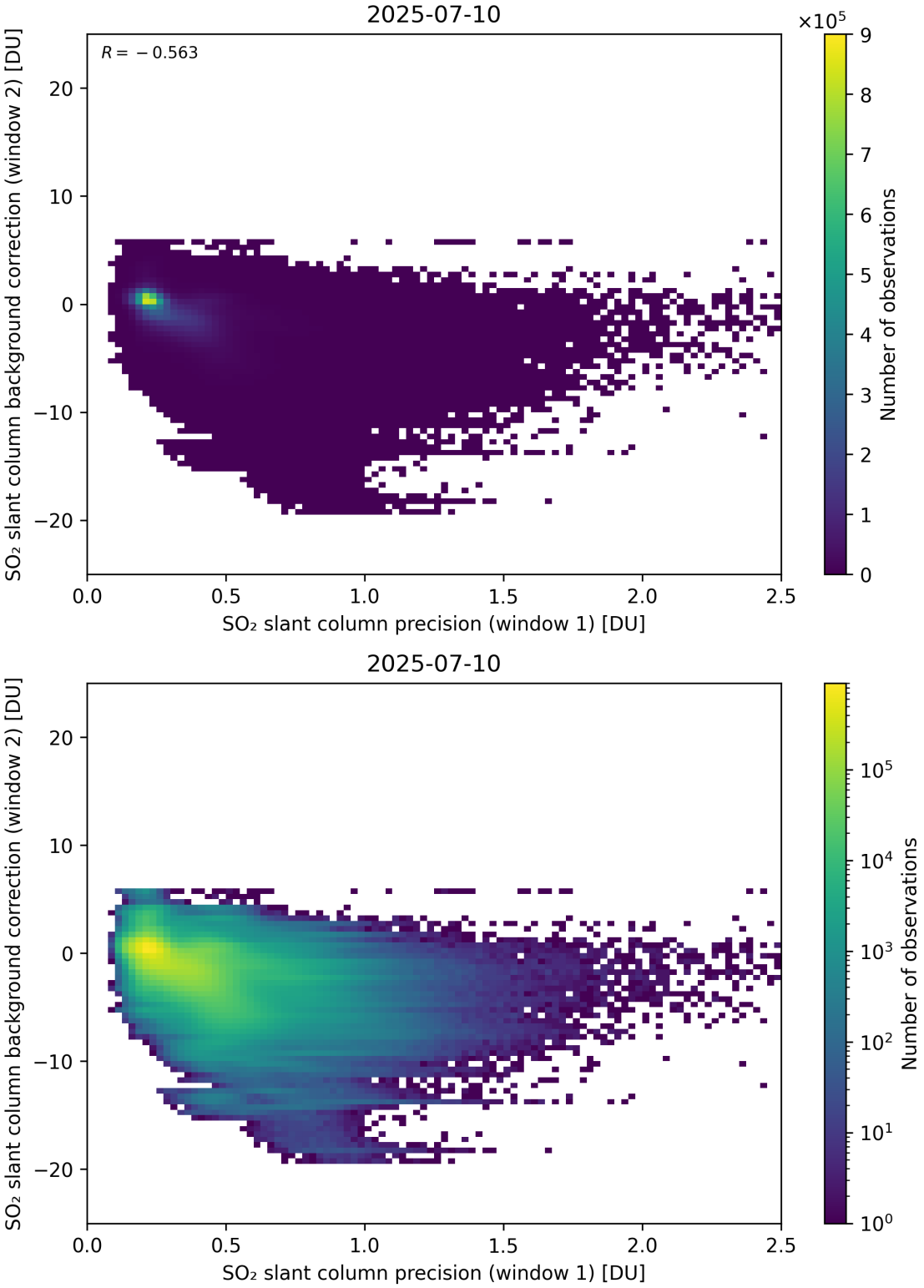

Figure 269: Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

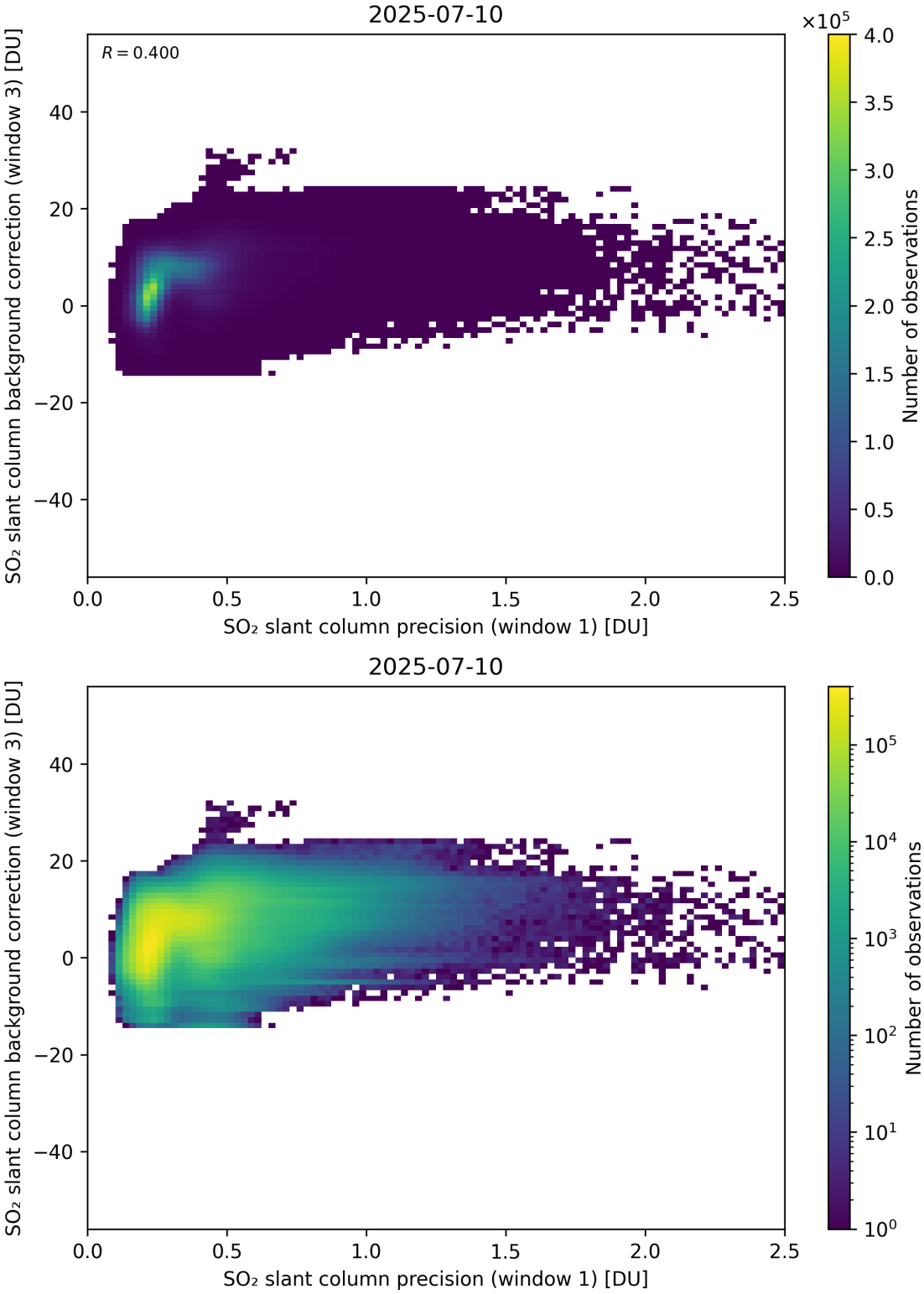

Figure 270: Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

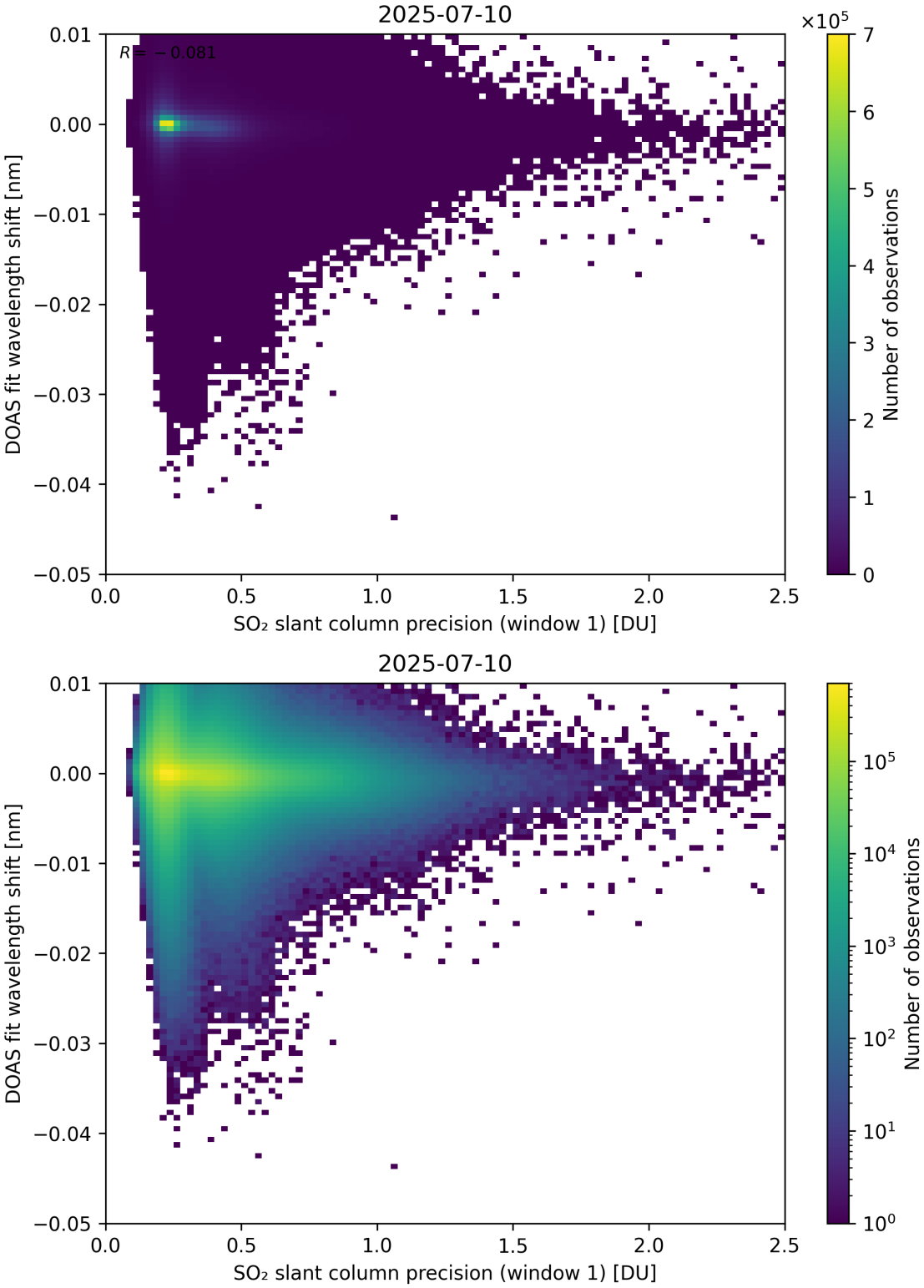

Figure 271: Scatter density plot of "SO_2 slant column precision (window 1)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

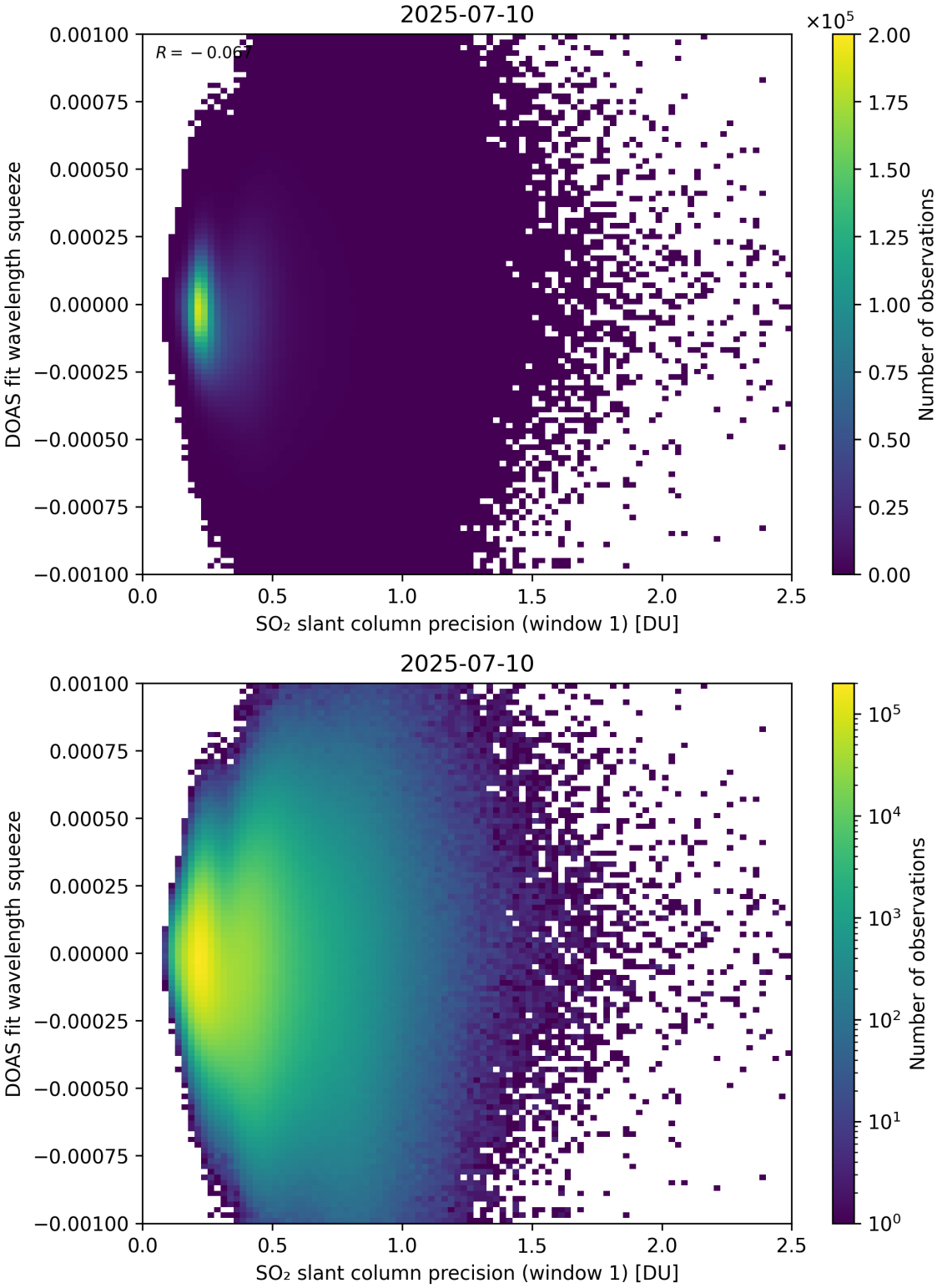

Figure 272: Scatter density plot of "SO_2 slant column precision (window 1)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

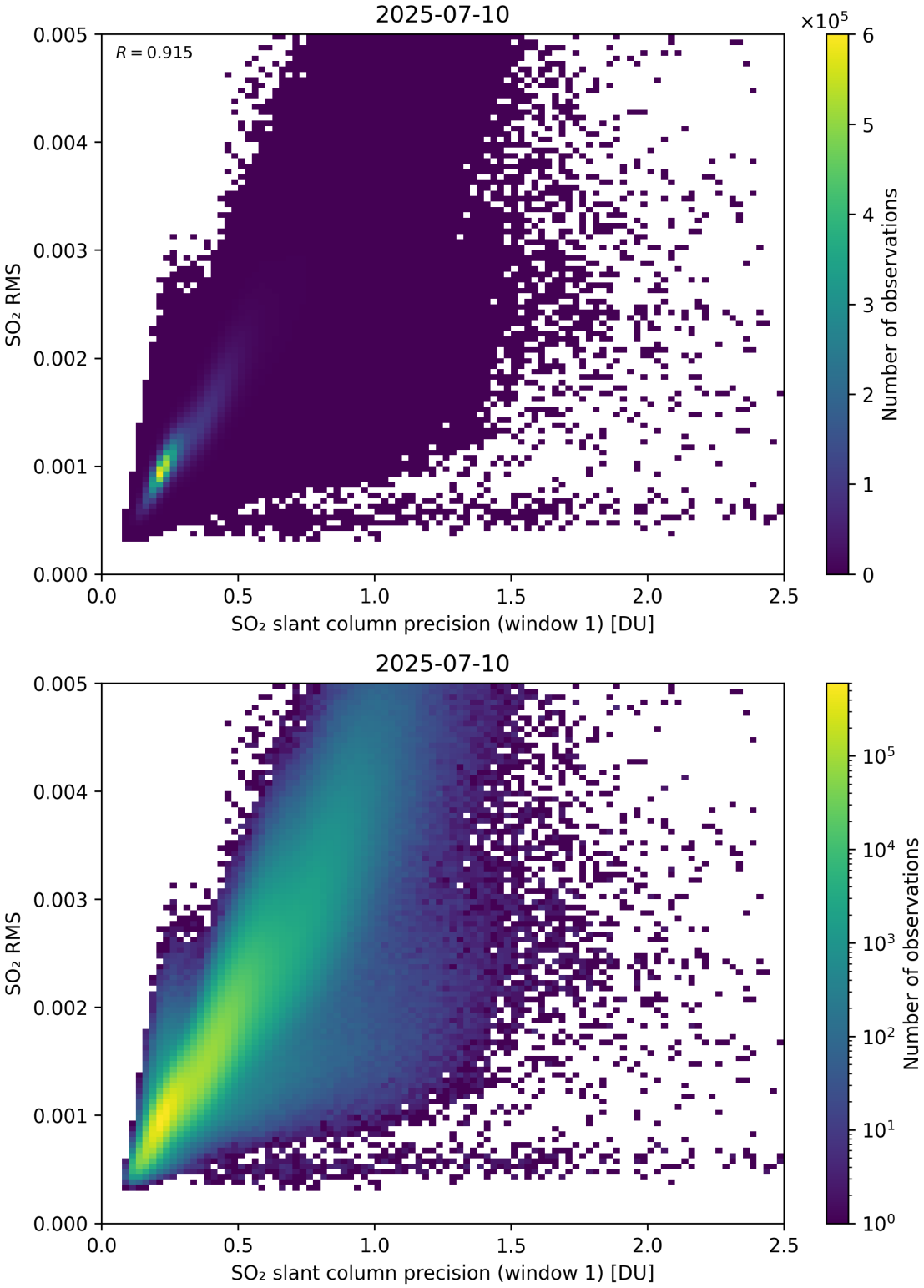

Figure 273: Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

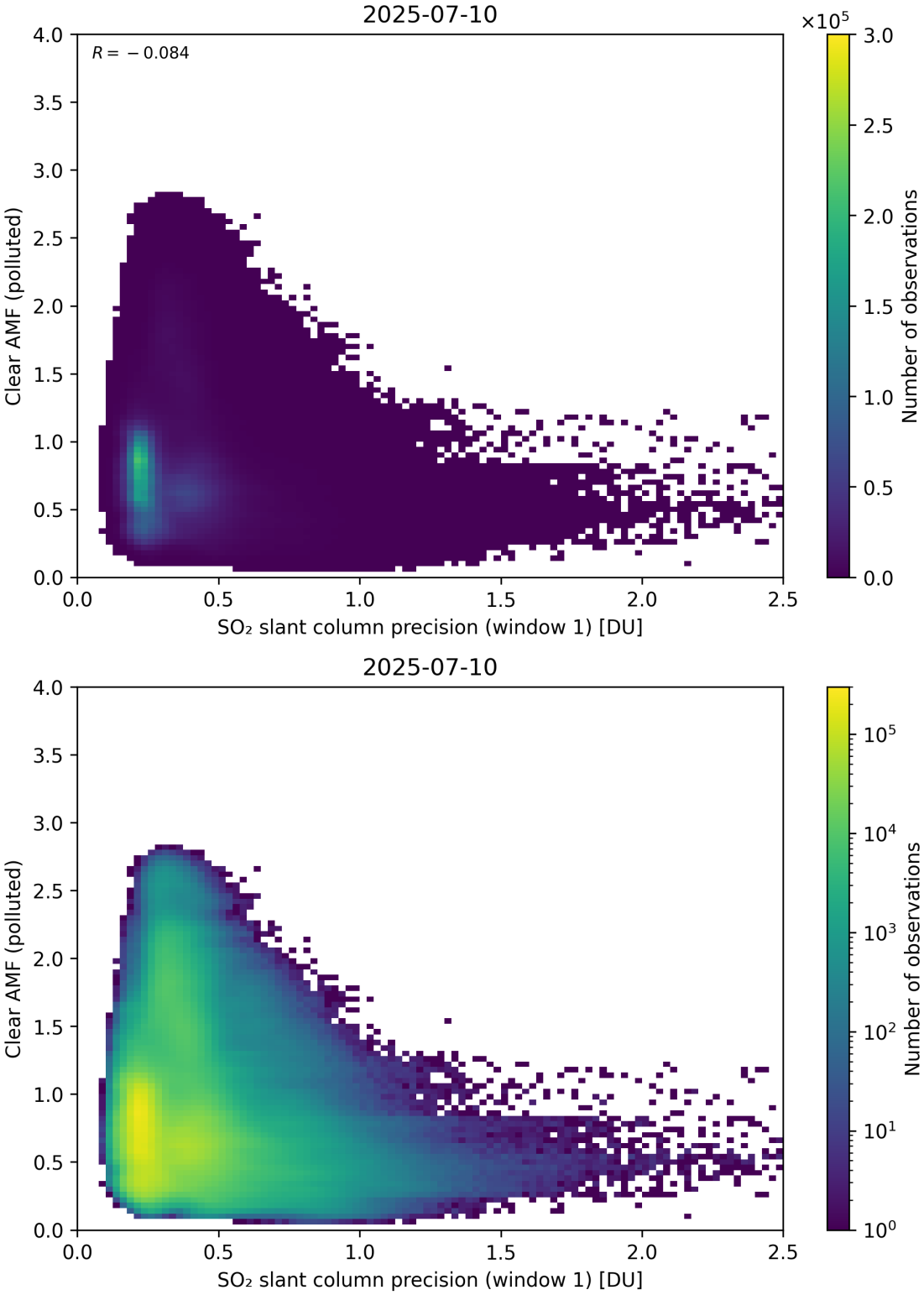

Figure 274: Scatter density plot of "SO_2 slant column precision (window 1)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

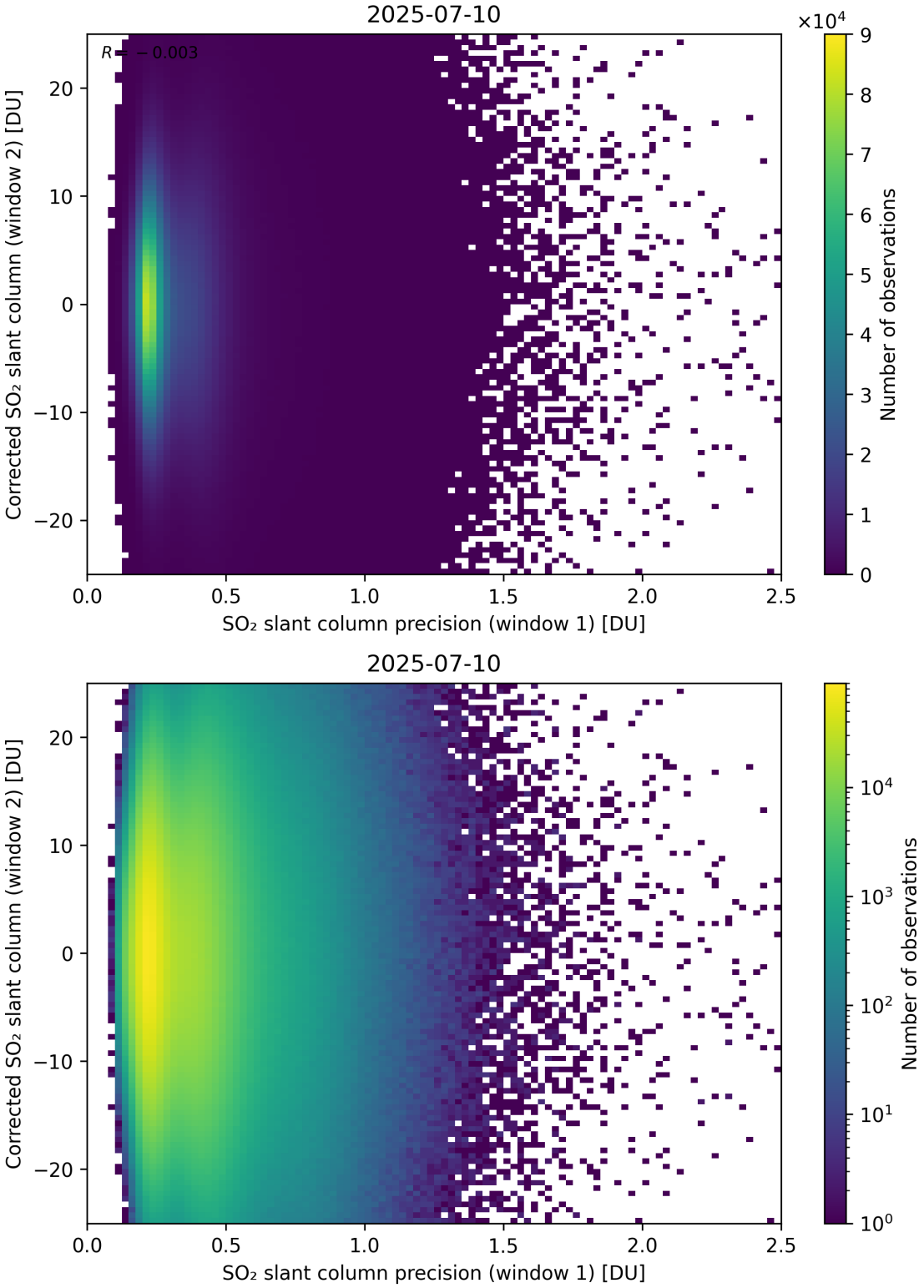

Figure 275: Scatter density plot of "SO_2 slant column precision (window 1)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

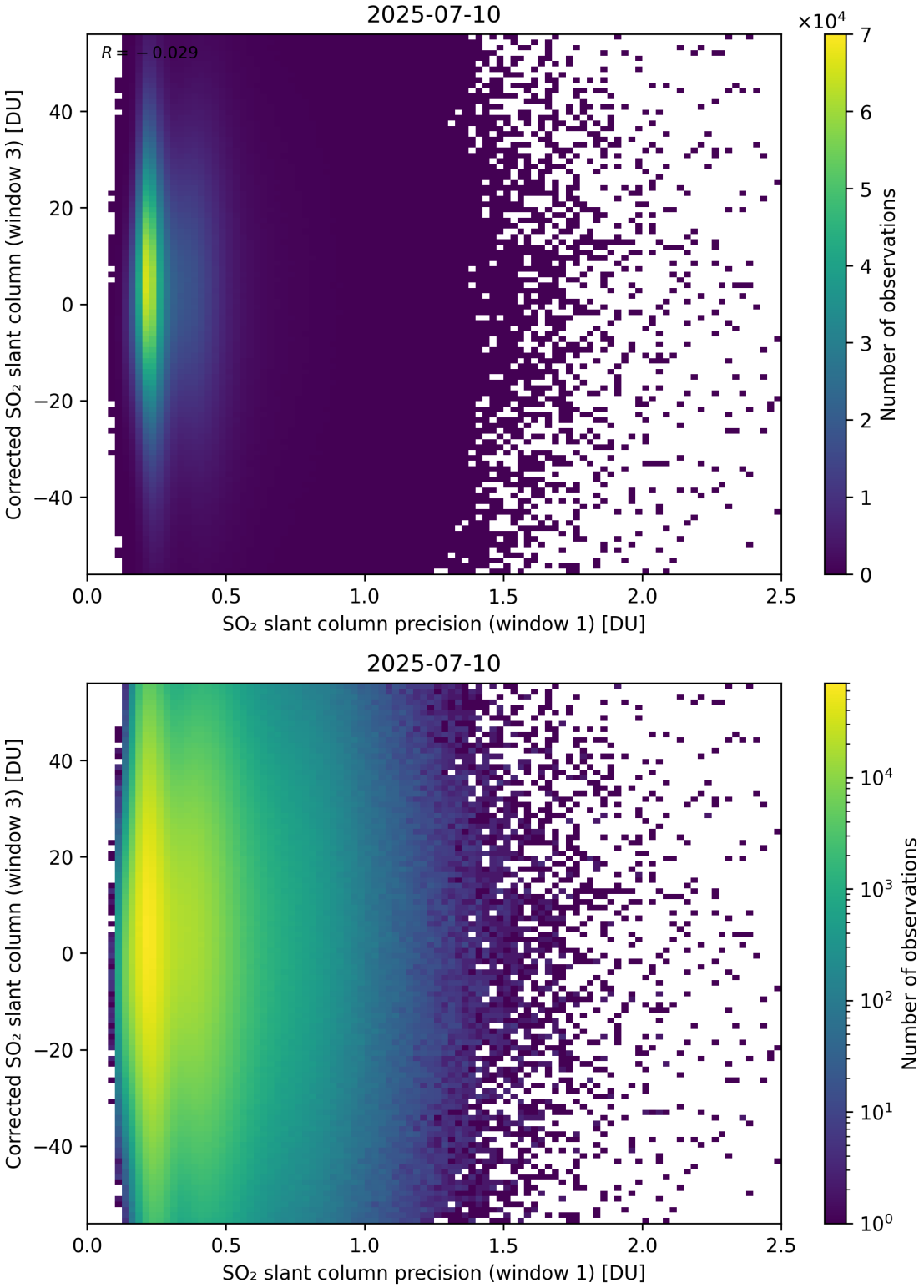

Figure 276: Scatter density plot of "SO_2 slant column precision (window 1)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

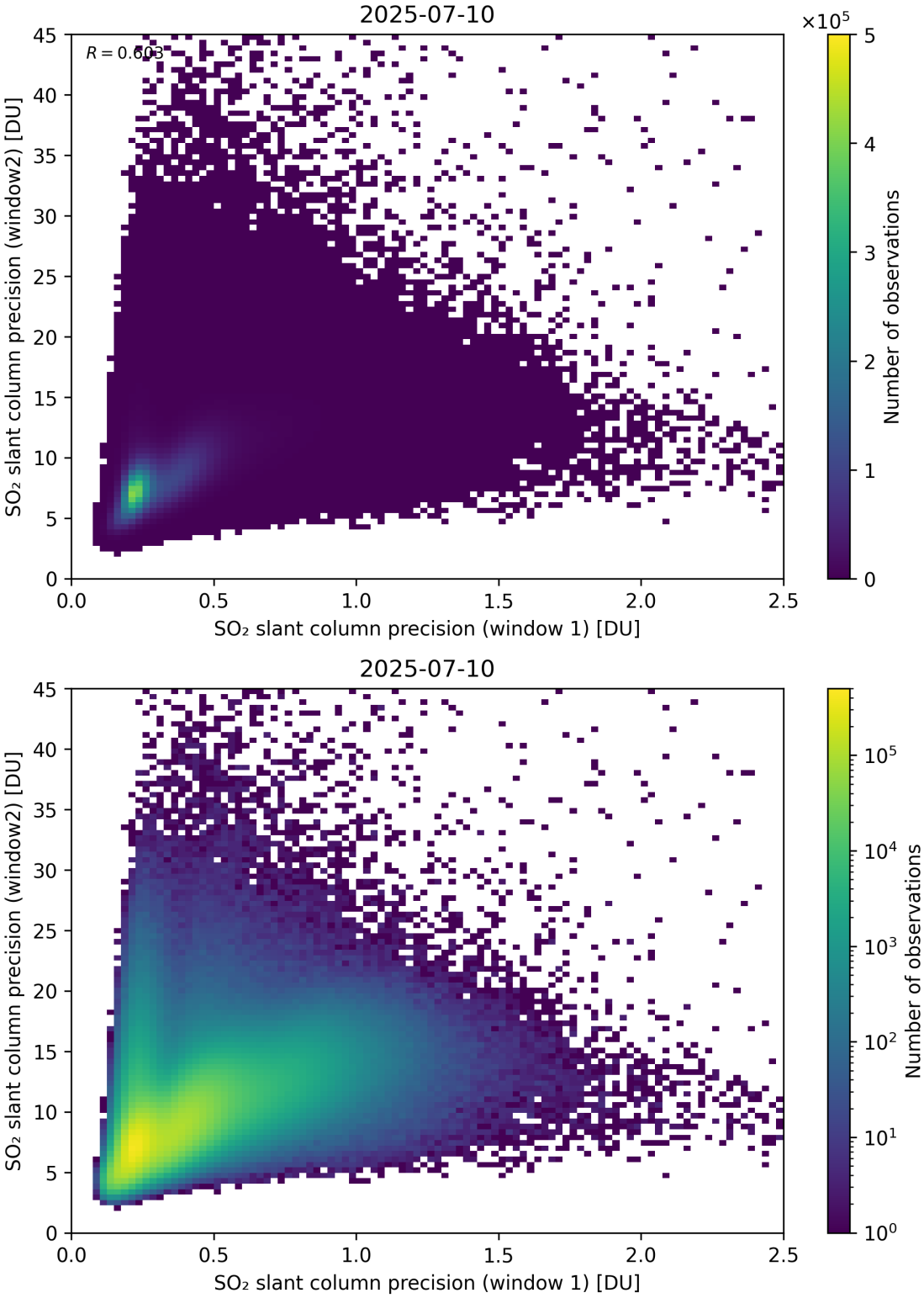

Figure 277: Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

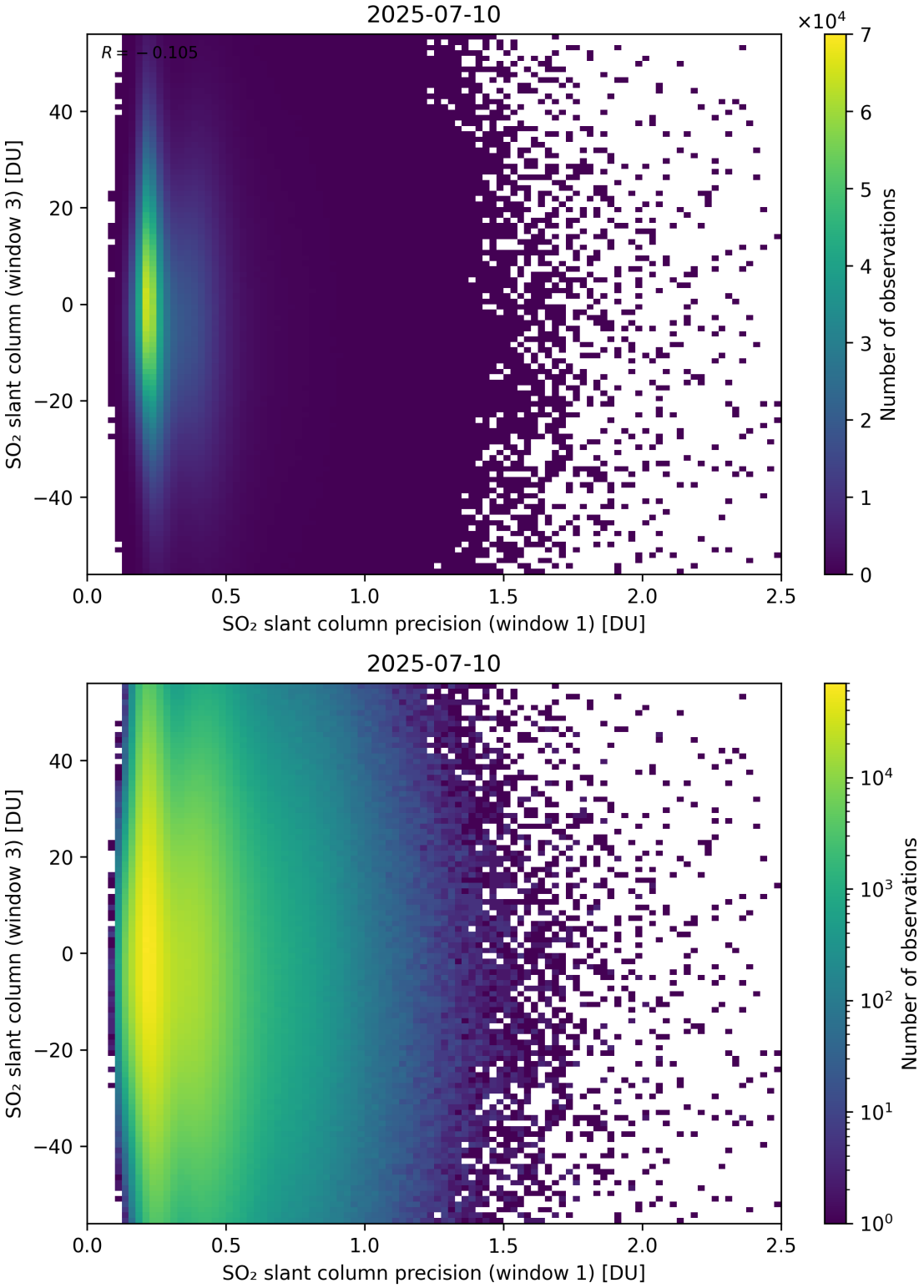

Figure 278: Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

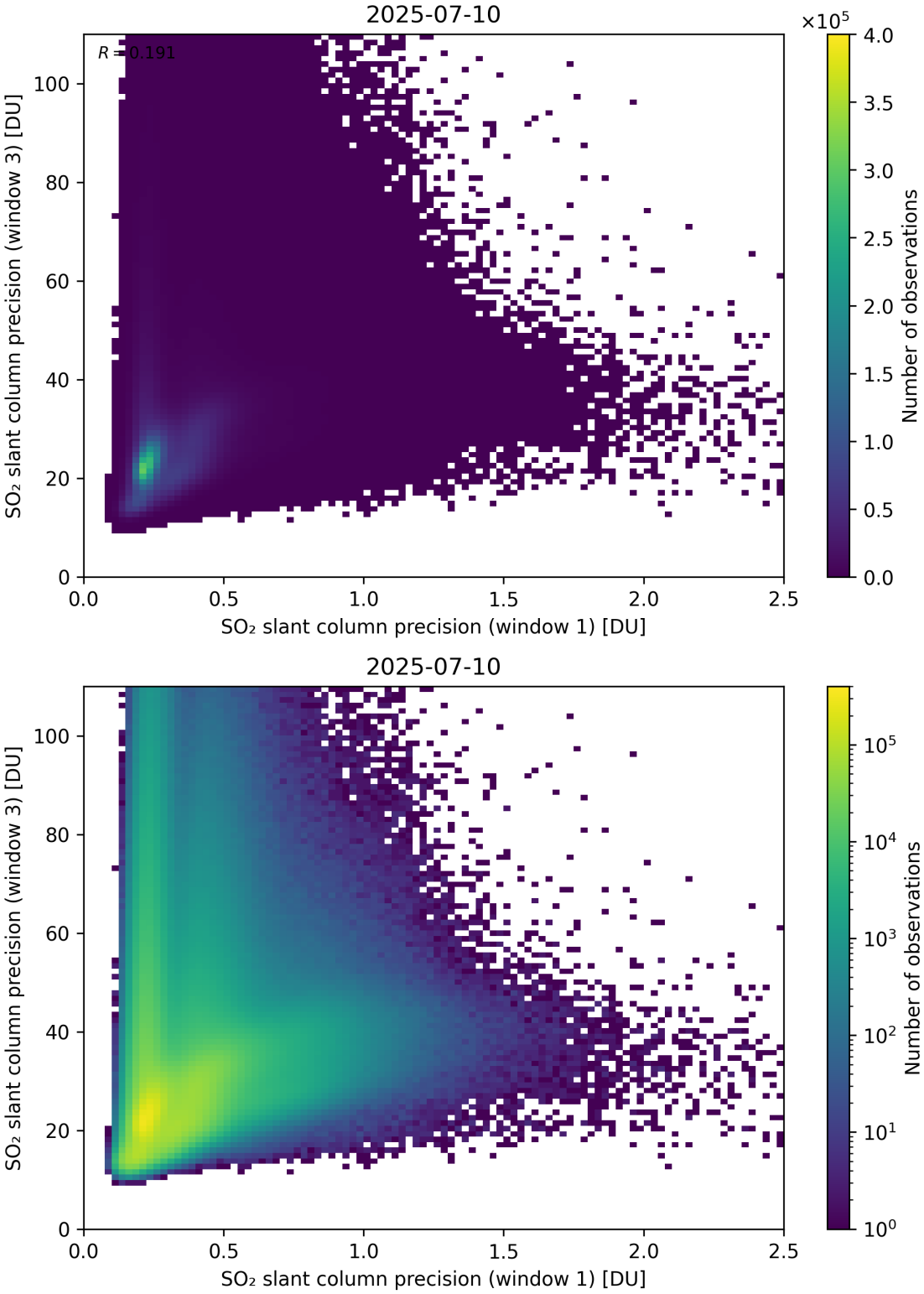

Figure 279: Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

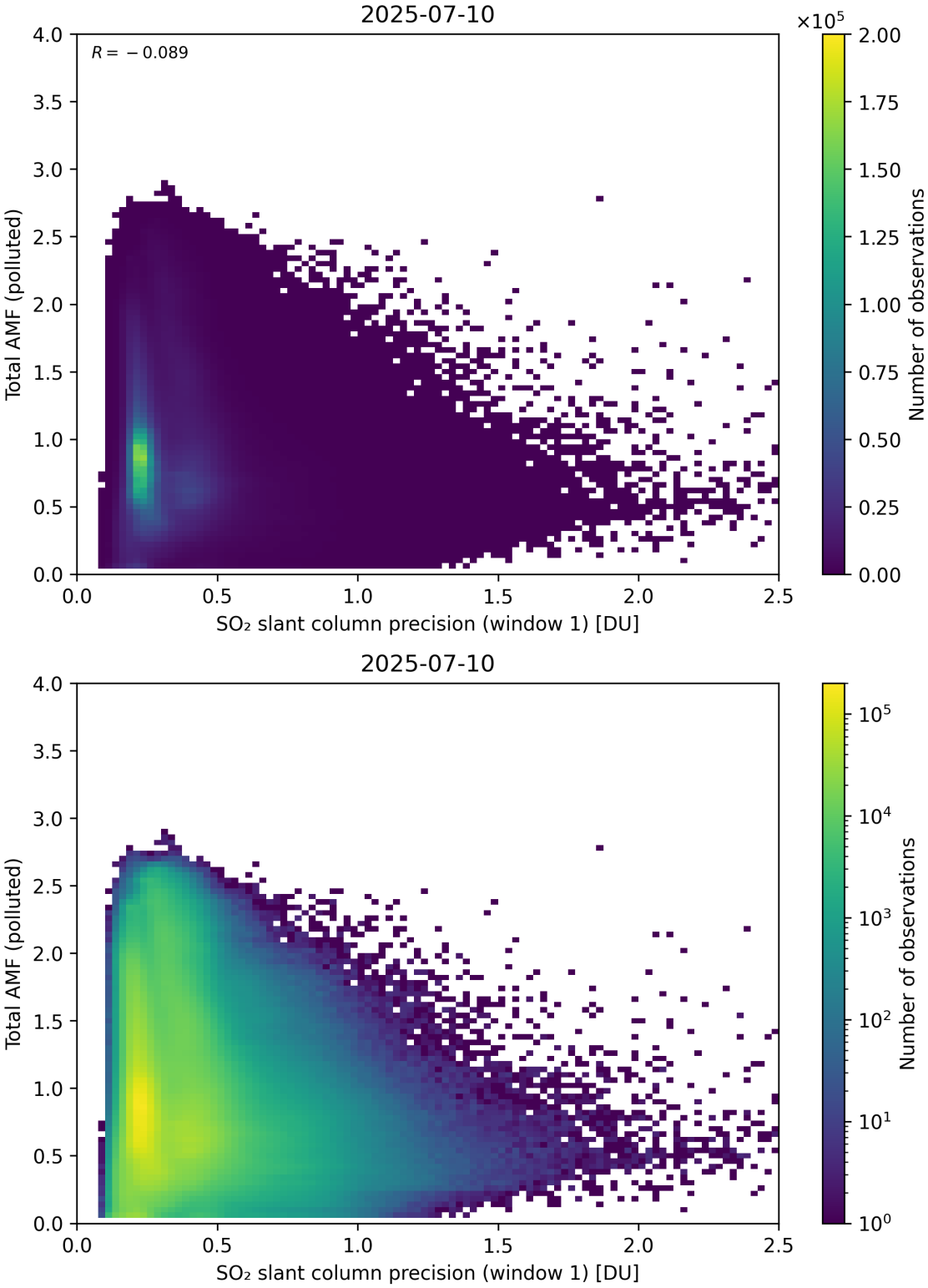

Figure 280: Scatter density plot of "SO_2 slant column precision (window 1)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

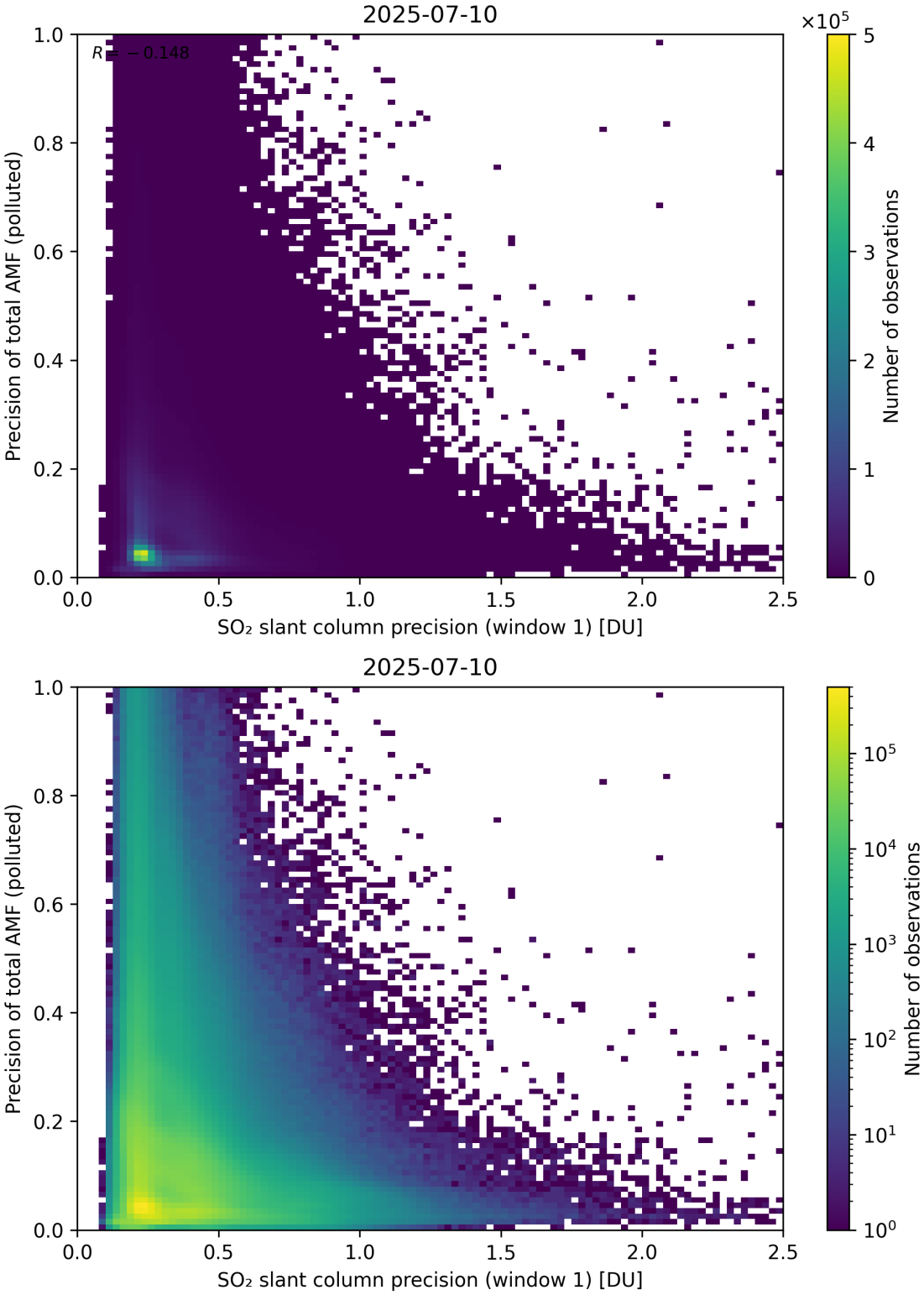

Figure 281: Scatter density plot of "SO_2 slant column precision (window 1)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

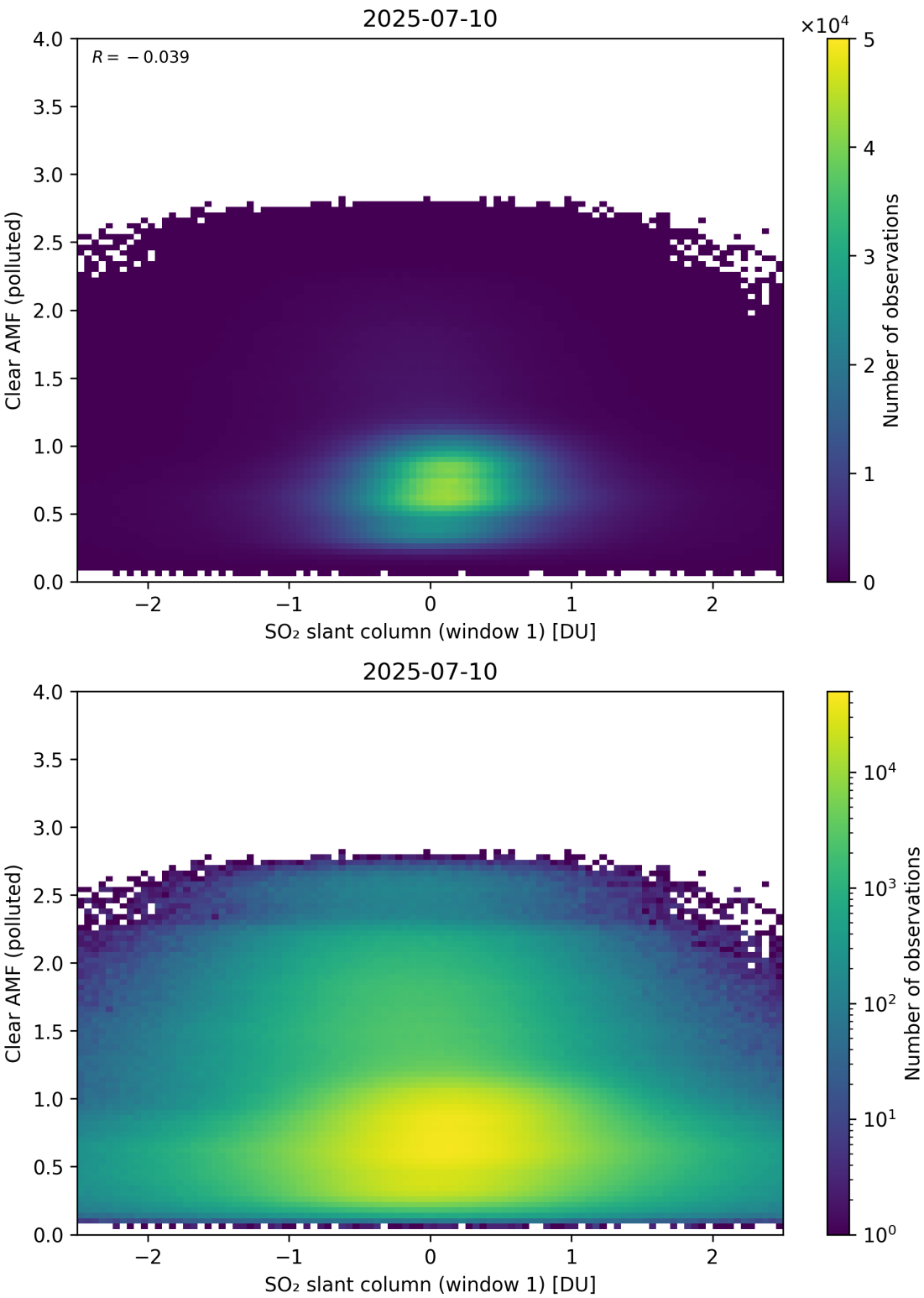

Figure 282: Scatter density plot of "SO_2 slant column (window 1)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

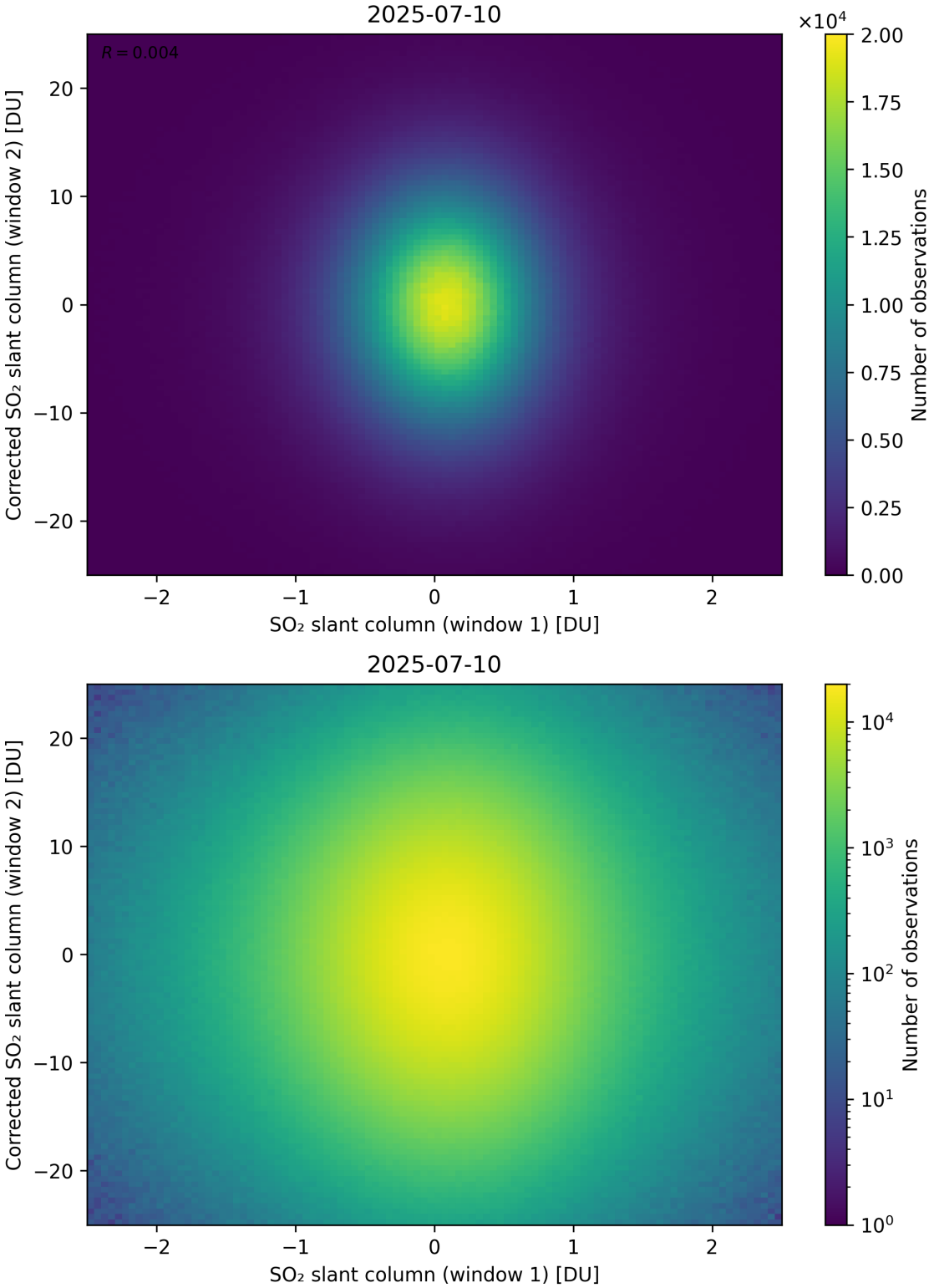

Figure 283: Scatter density plot of "SO_2 slant column (window 1)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

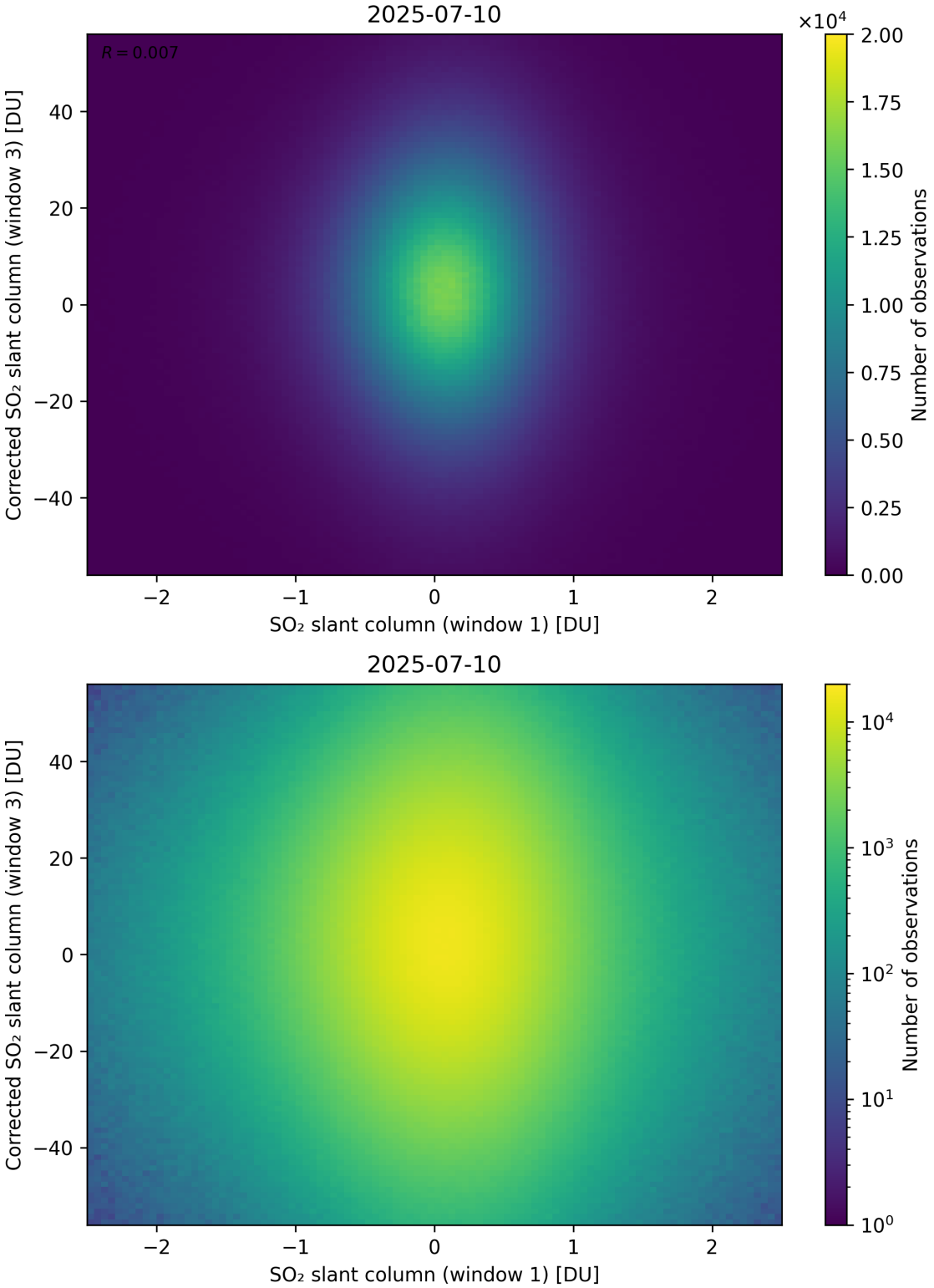

Figure 284: Scatter density plot of "SO_2 slant column (window 1)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

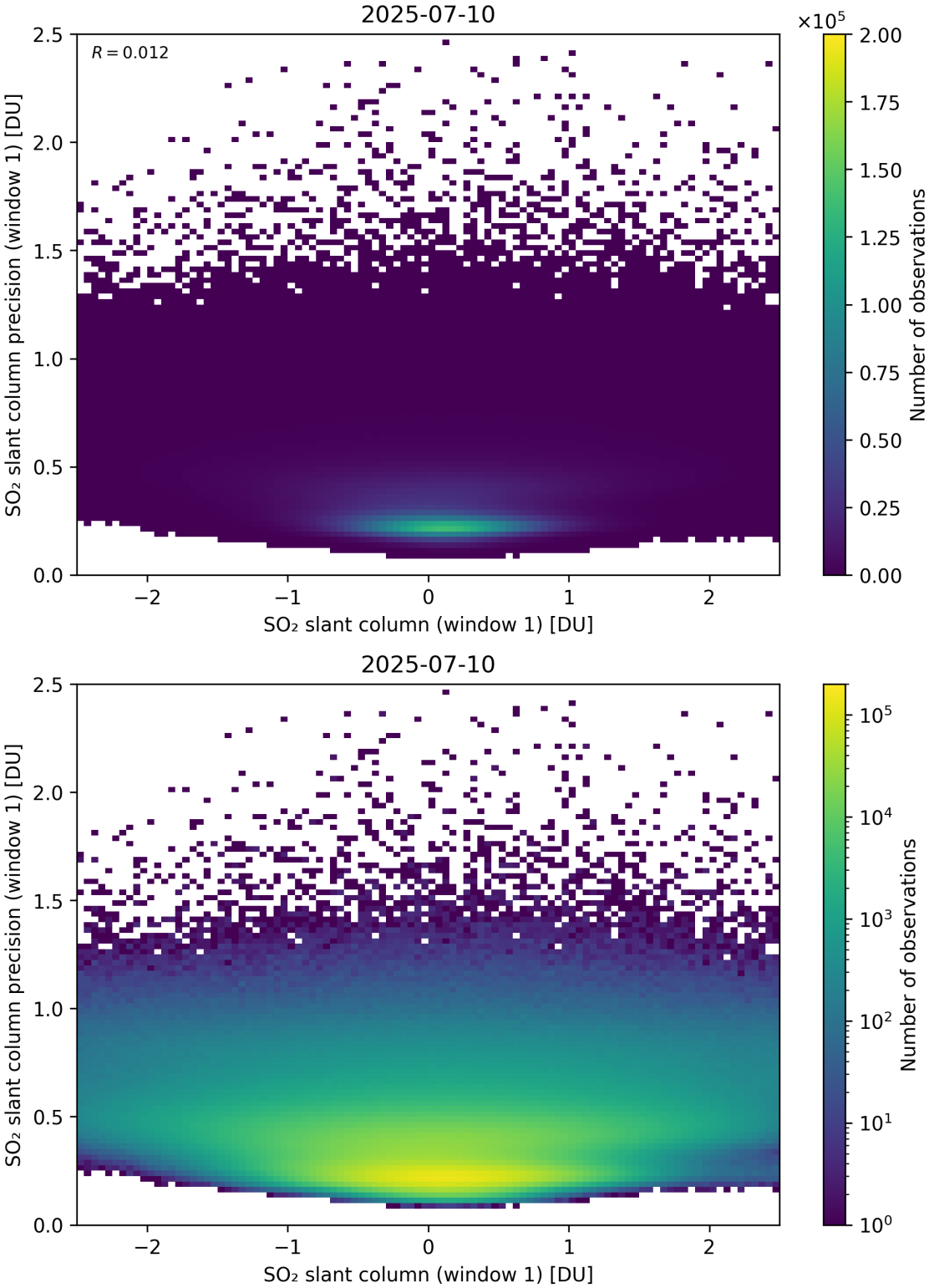

Figure 285: Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

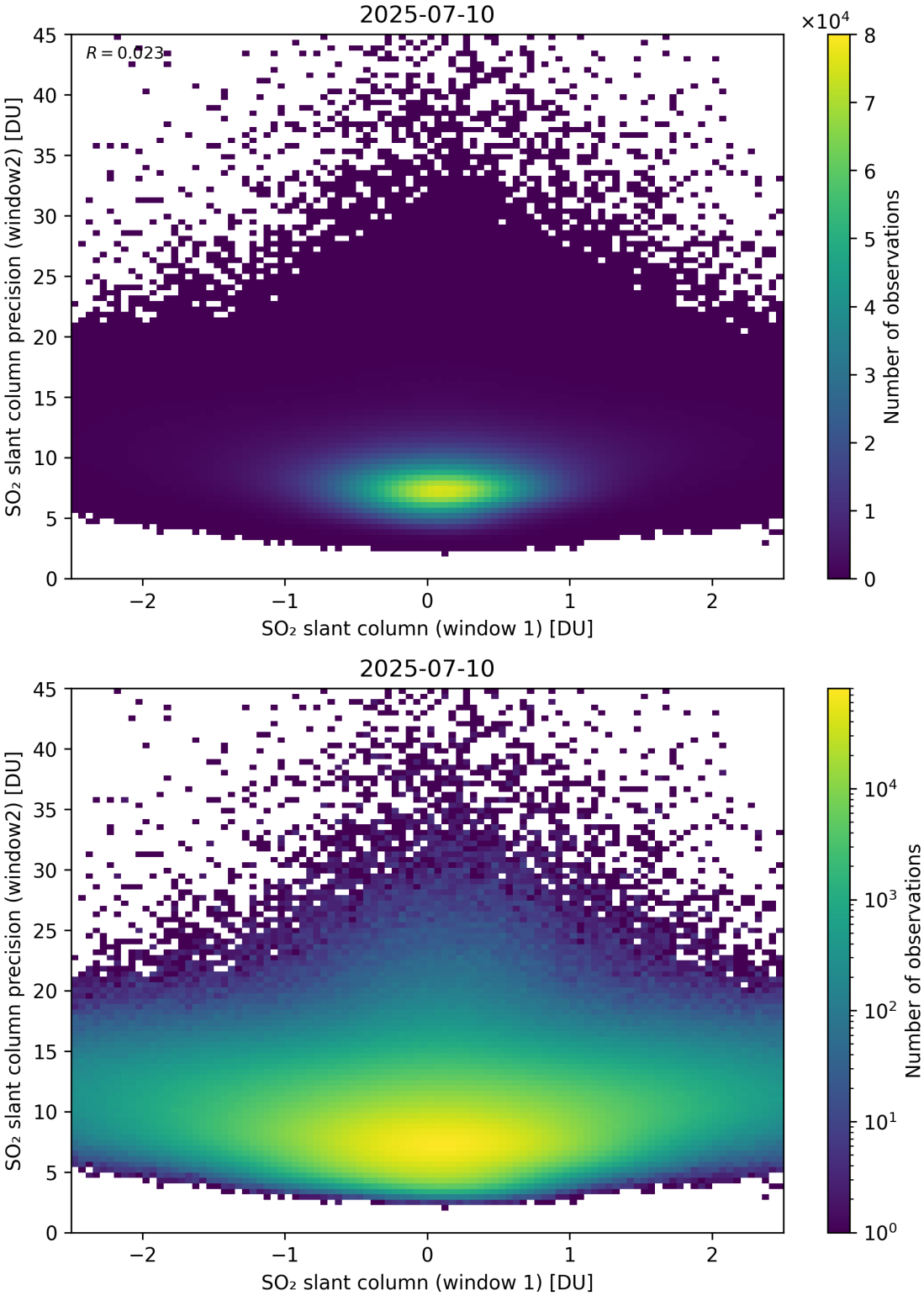

Figure 286: Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

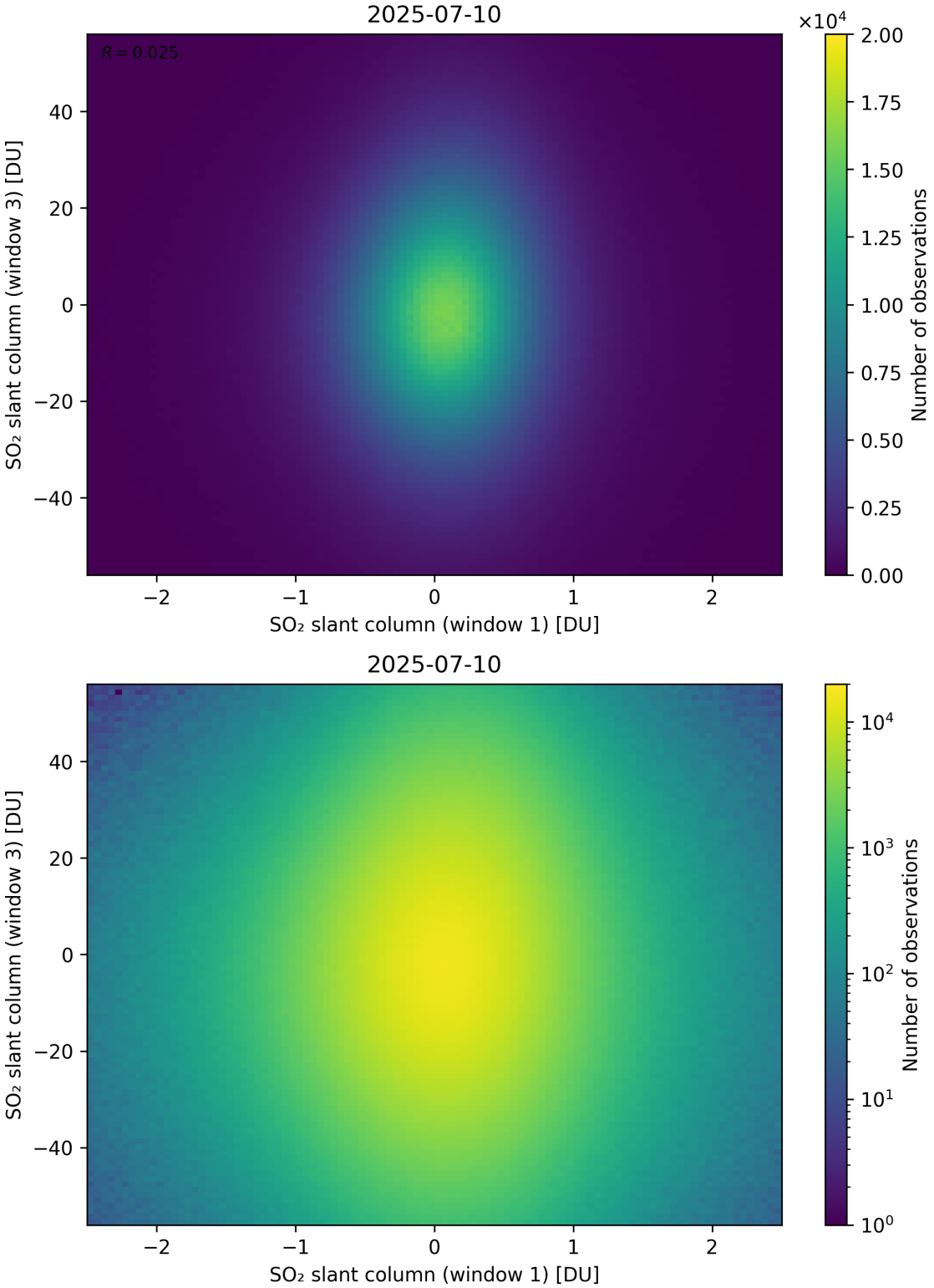

Figure 287: Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

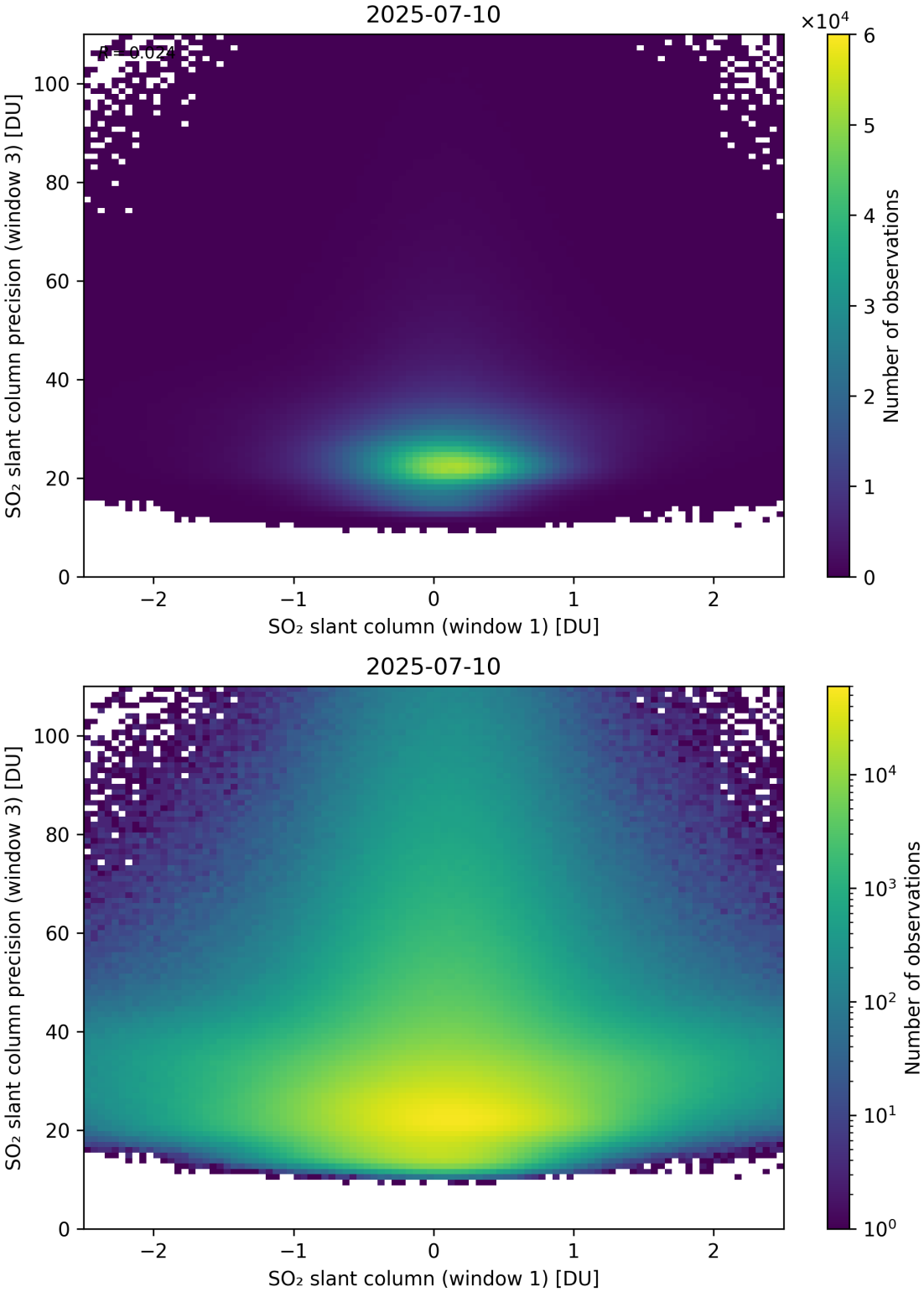

Figure 288: Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

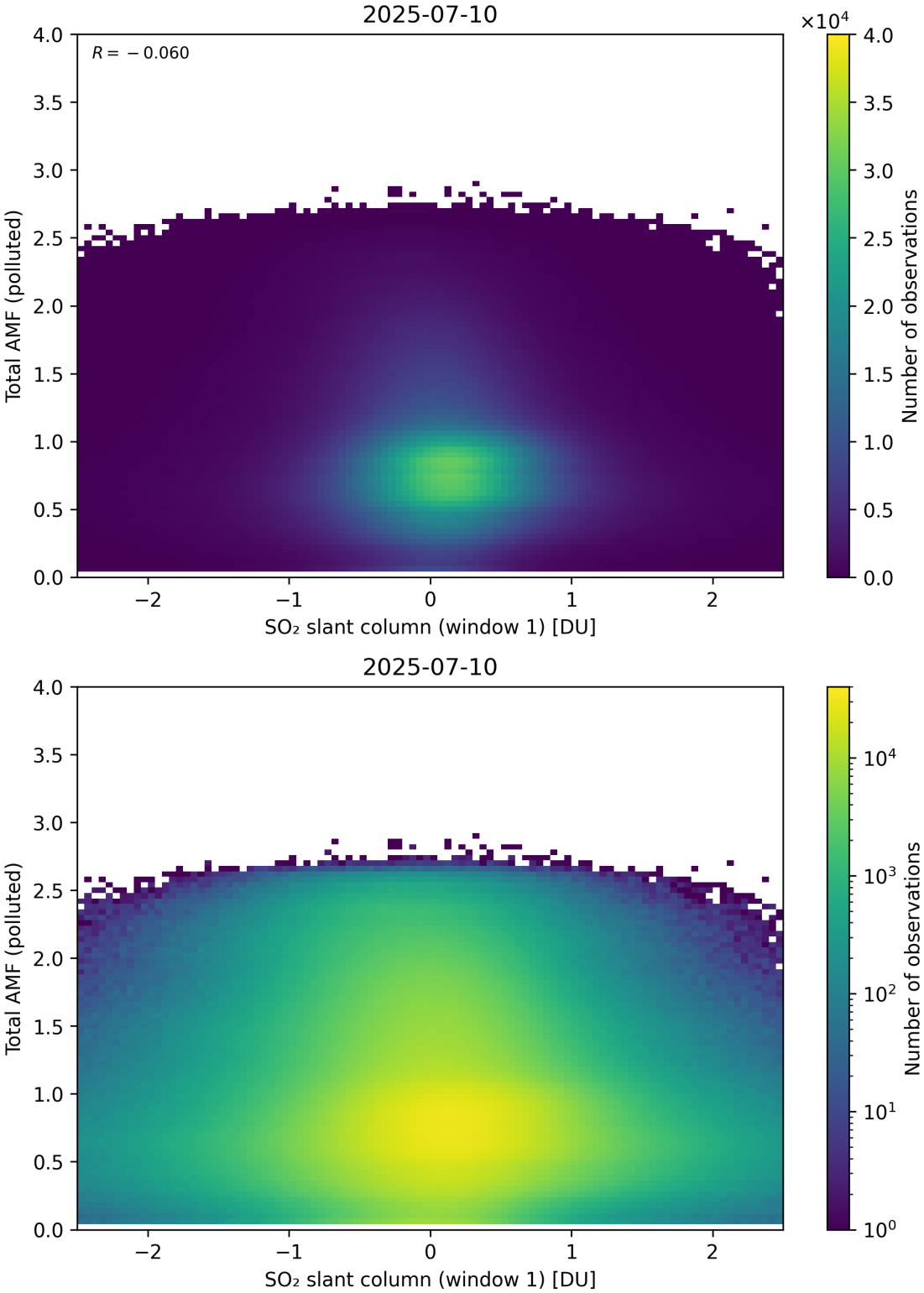

Figure 289: Scatter density plot of "SO_2 slant column (window 1)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

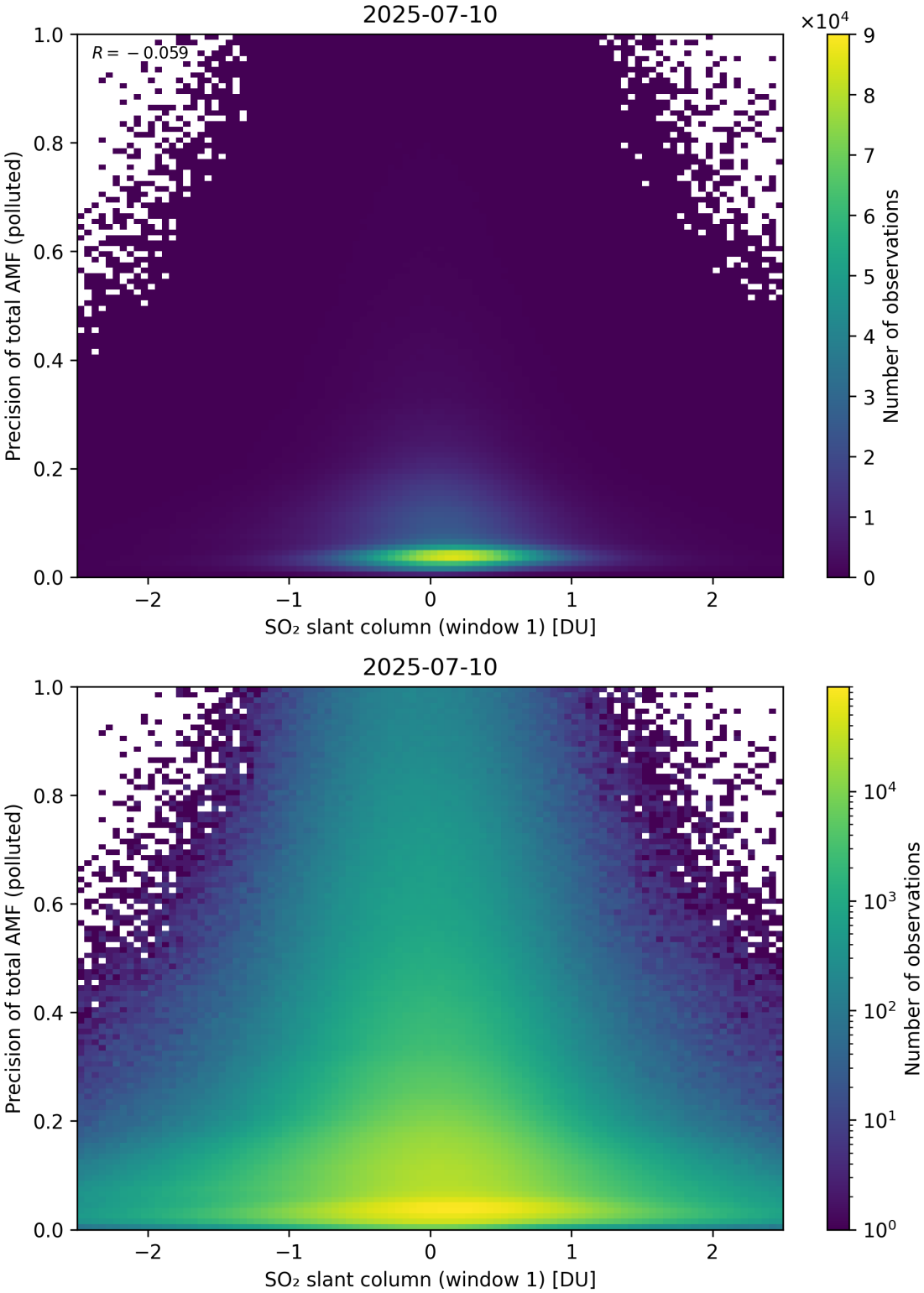

Figure 290: Scatter density plot of "SO_2 slant column (window 1)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

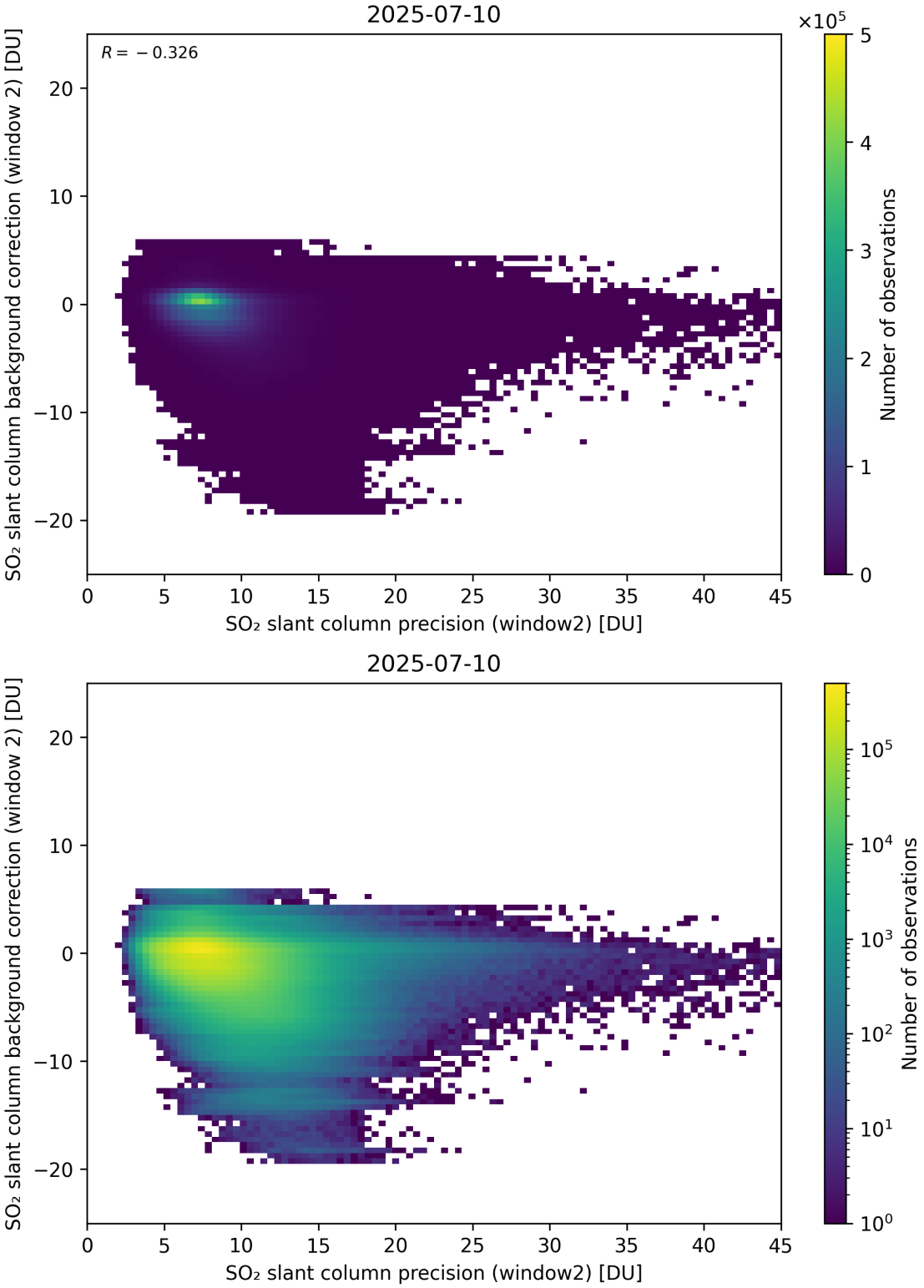

Figure 291: Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

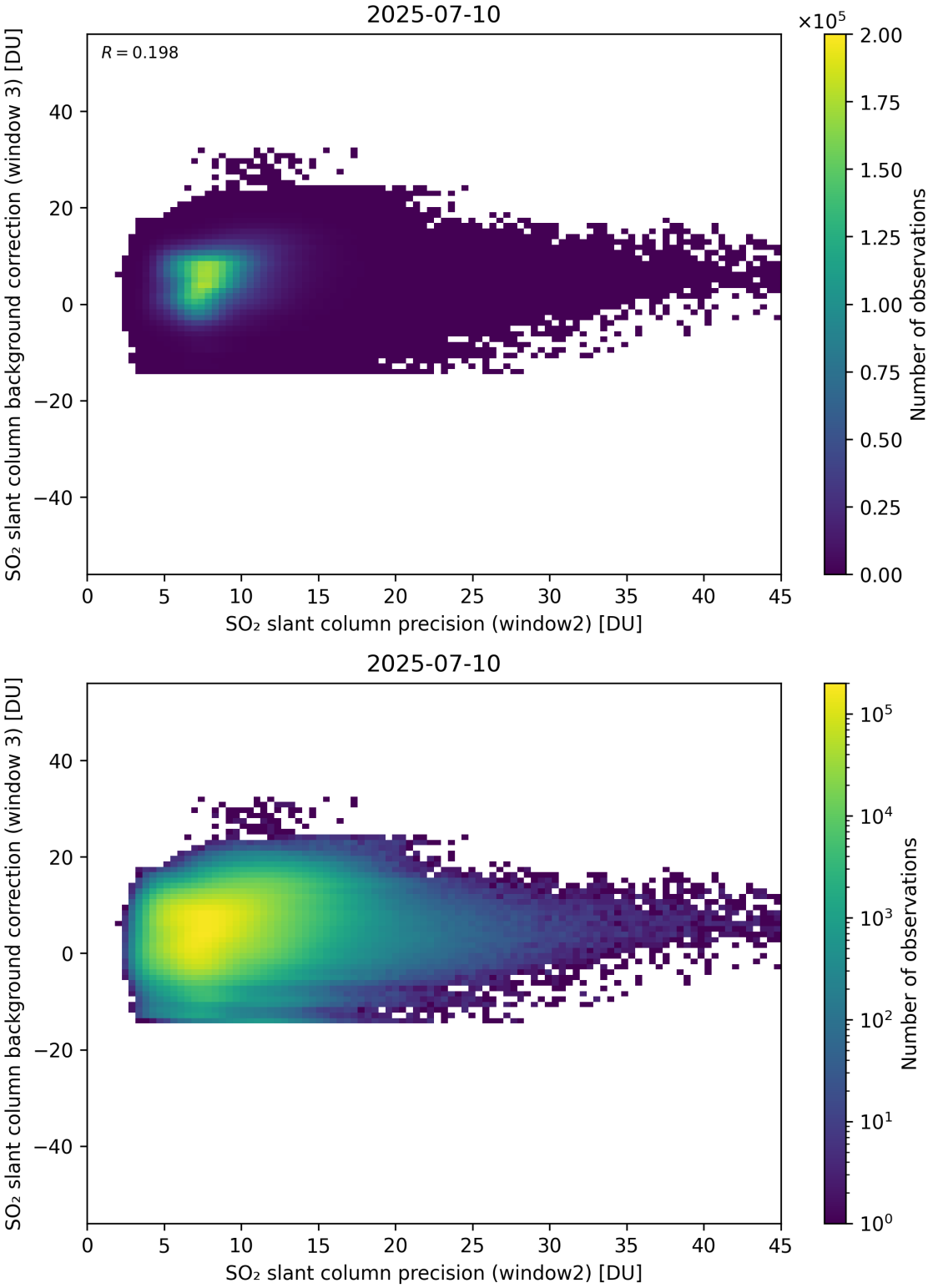

Figure 292: Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

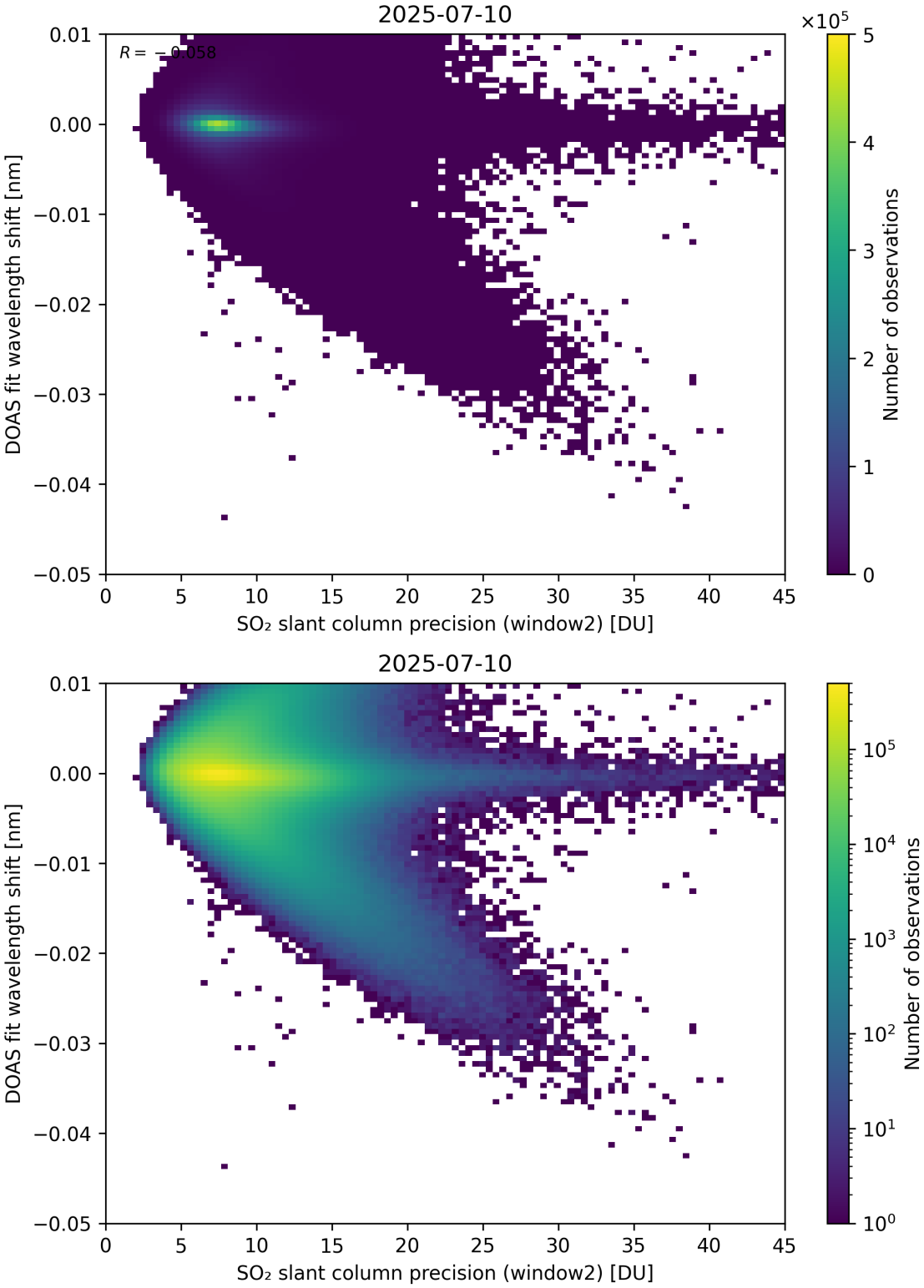

Figure 293: Scatter density plot of "SO_2 slant column precision (window2)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

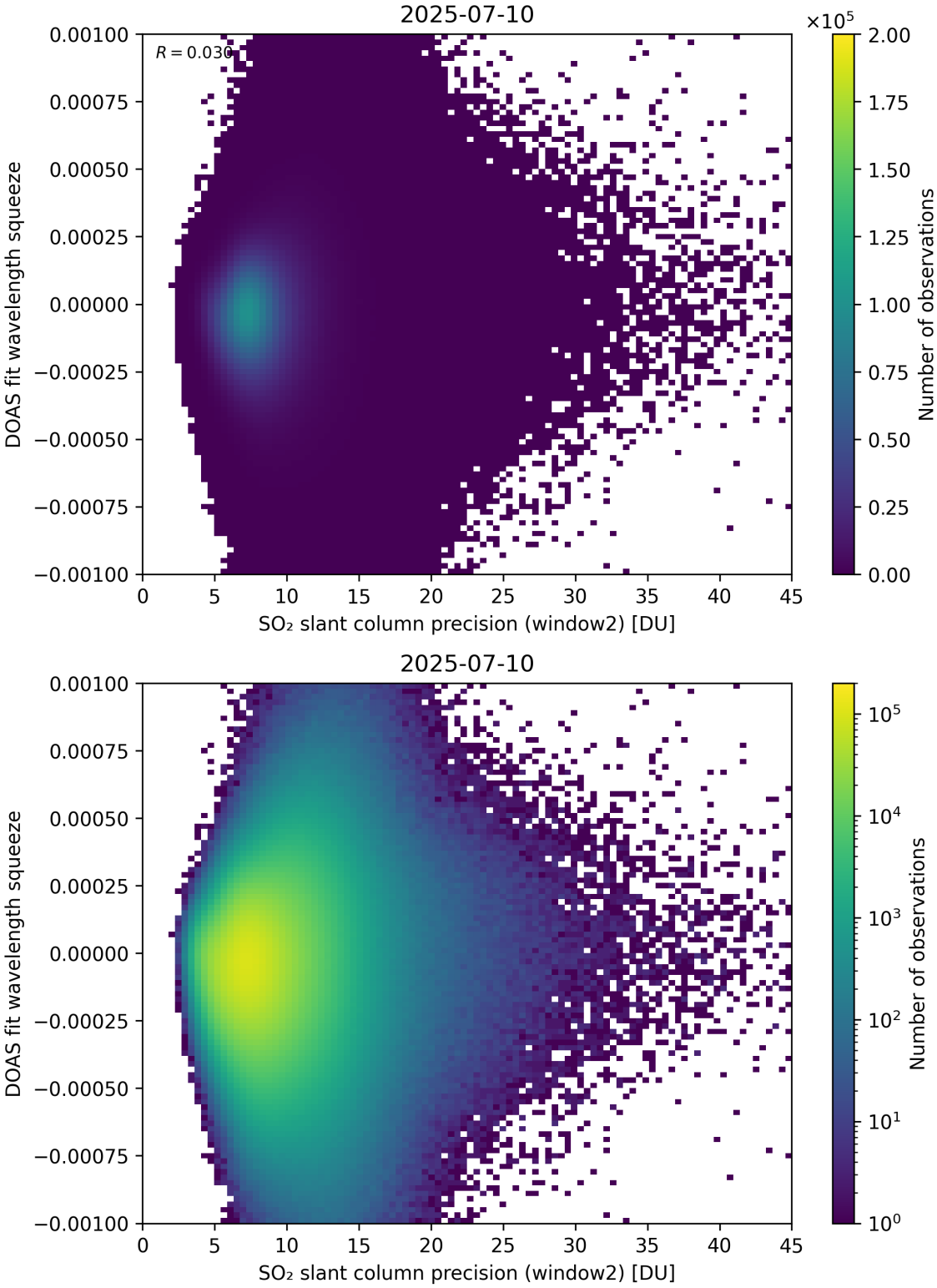

Figure 294: Scatter density plot of "SO_2 slant column precision (window2)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

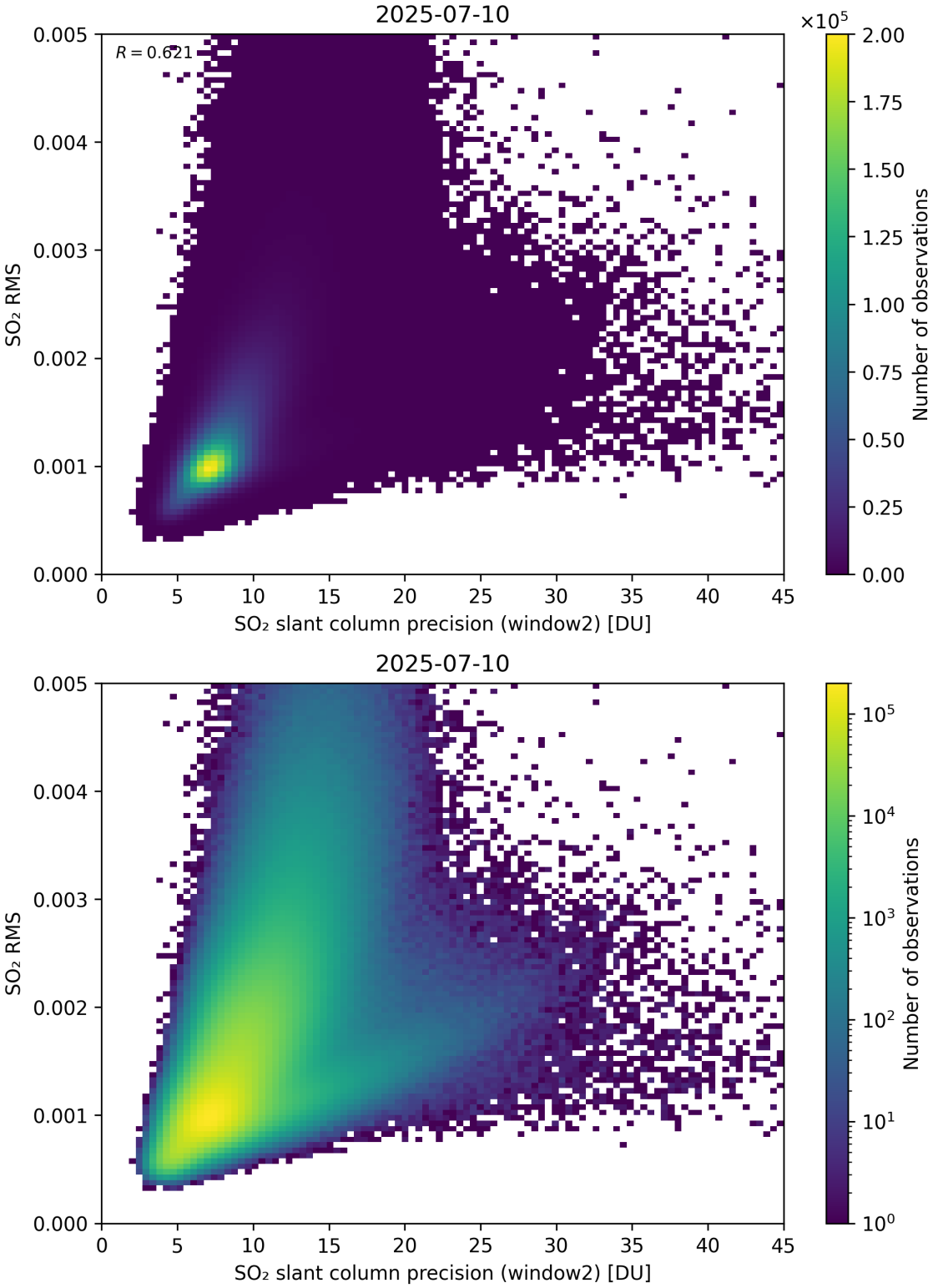

Figure 295: Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

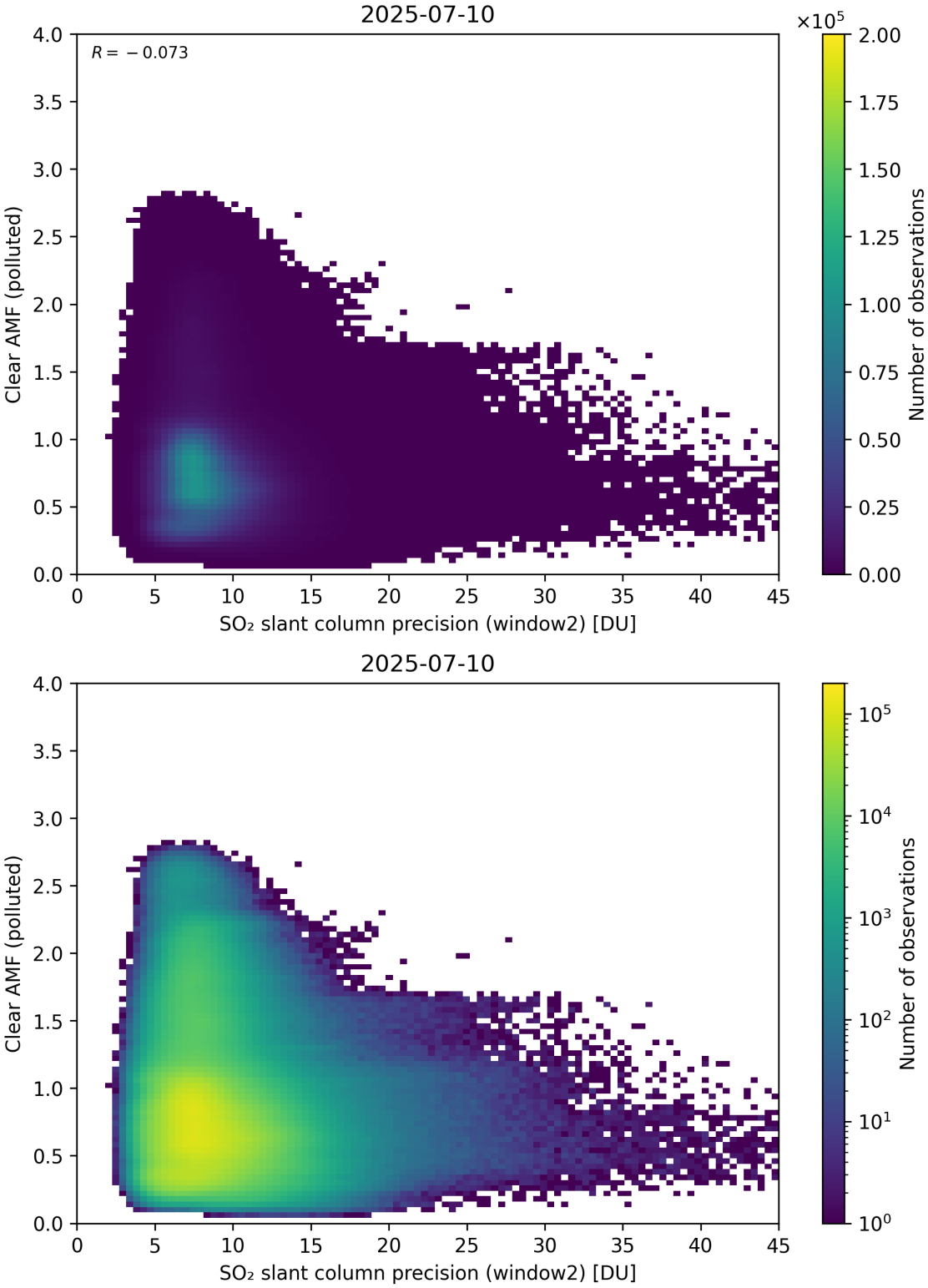

Figure 296: Scatter density plot of "SO_2 slant column precision (window2)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

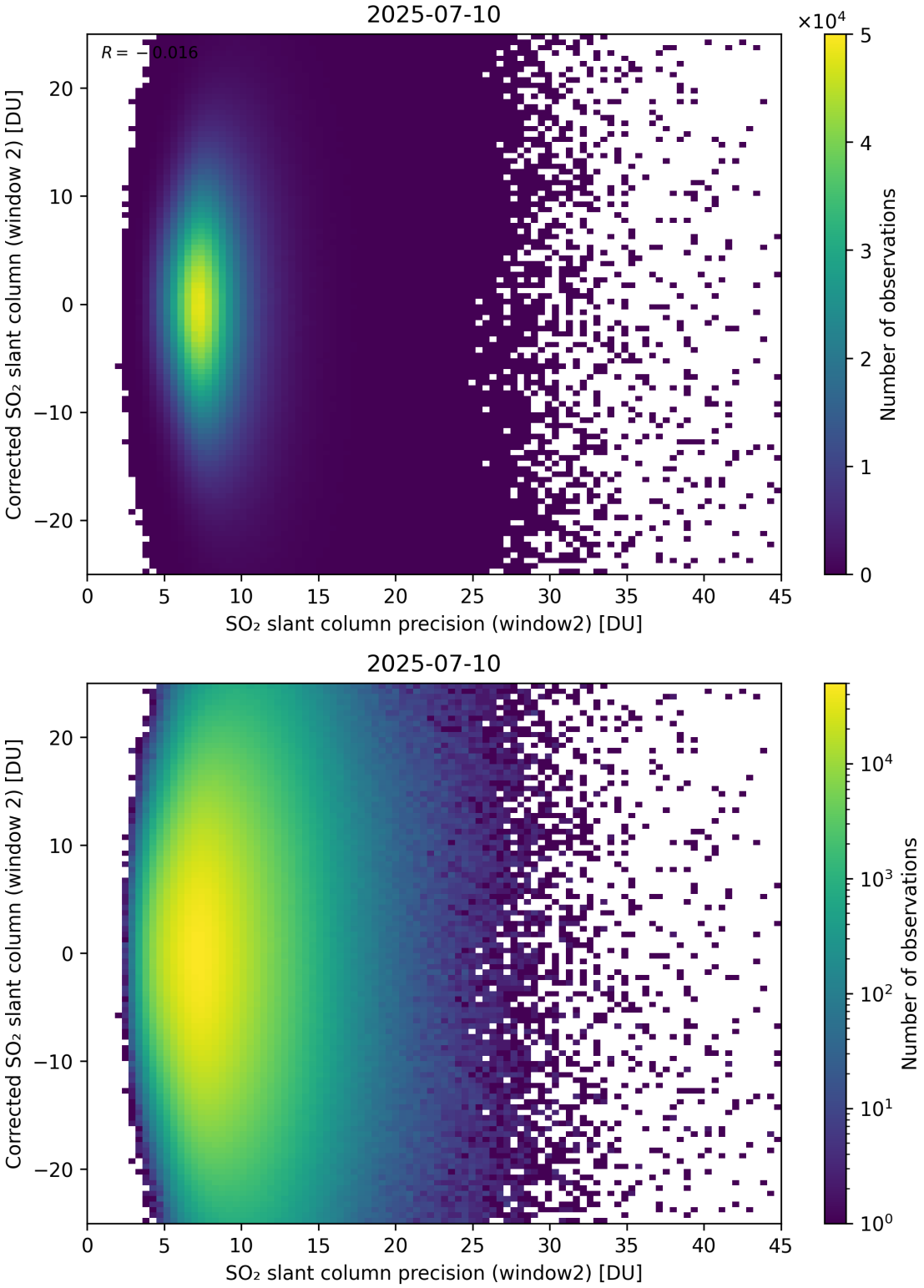

Figure 297: Scatter density plot of "SO_2 slant column precision (window2)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

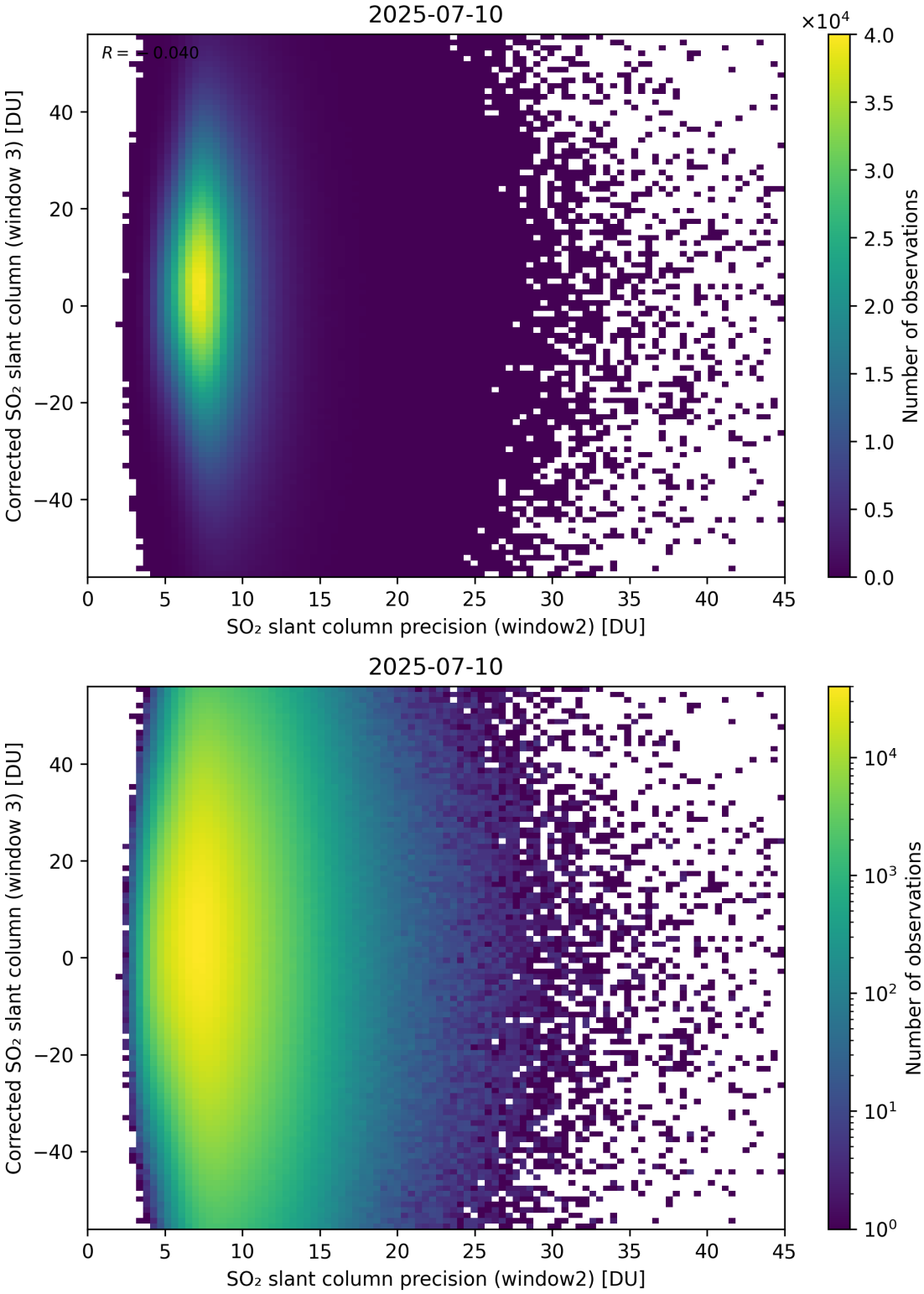

Figure 298: Scatter density plot of "SO_2 slant column precision (window2)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

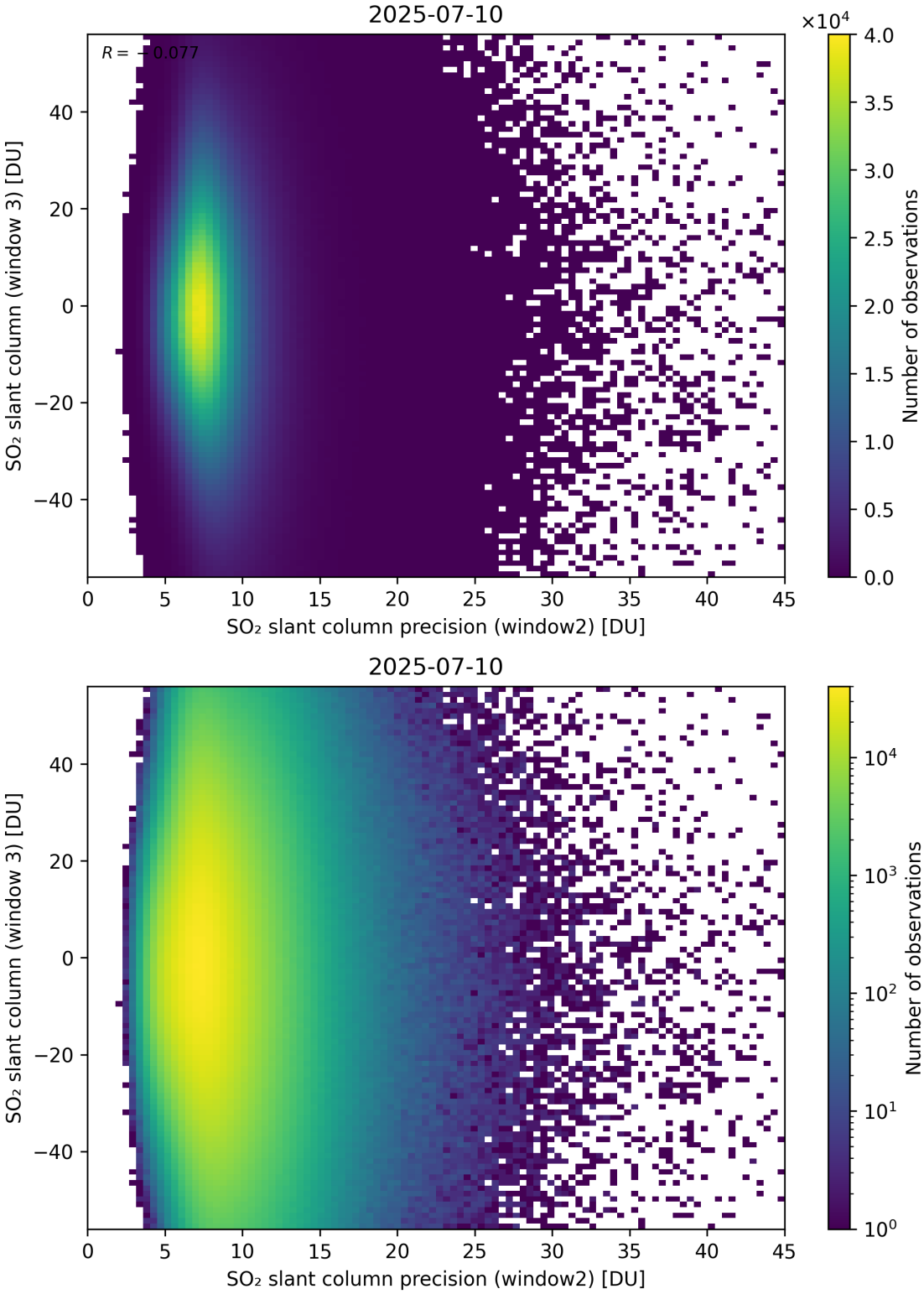

Figure 299: Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

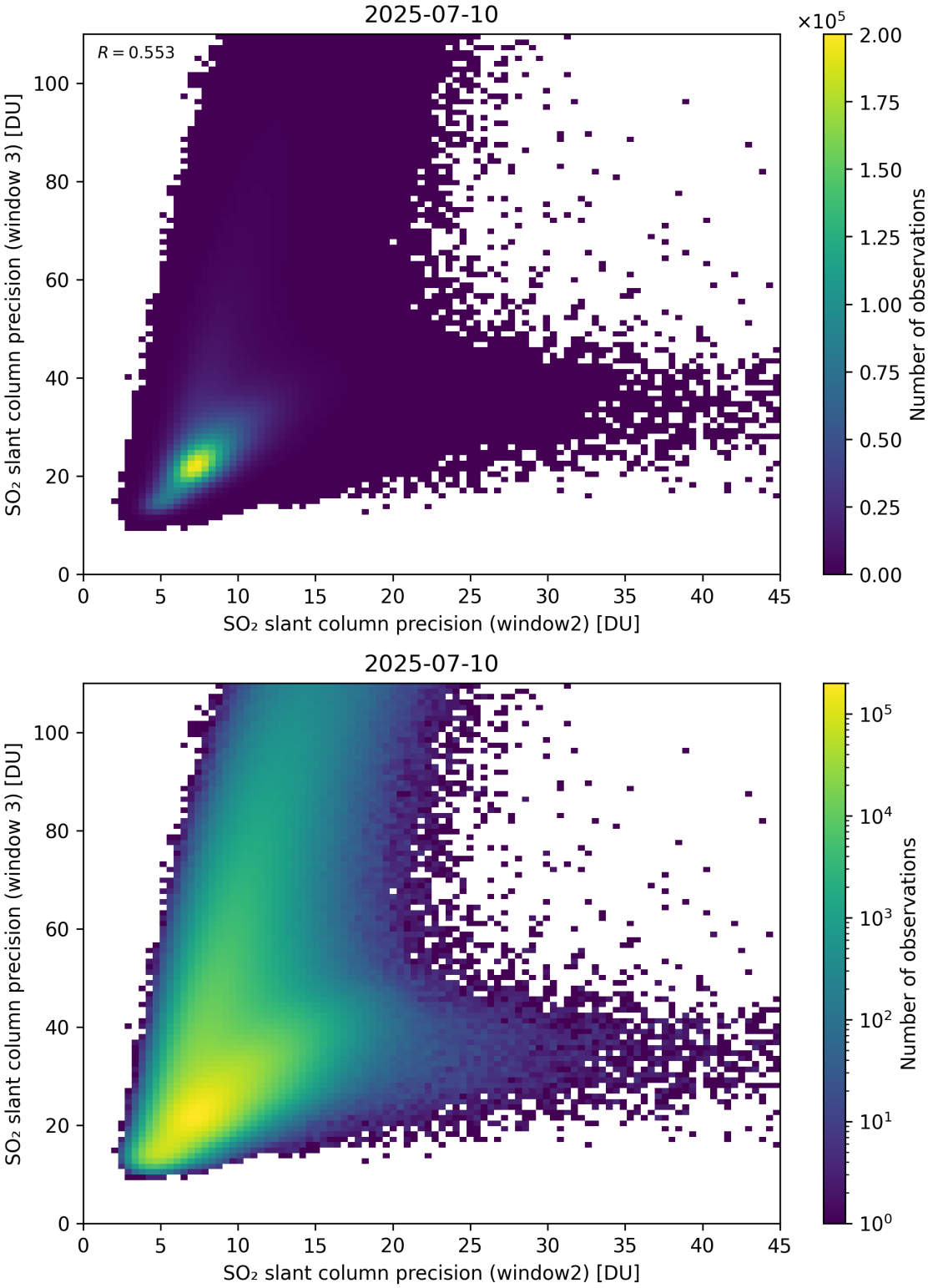

Figure 300: Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

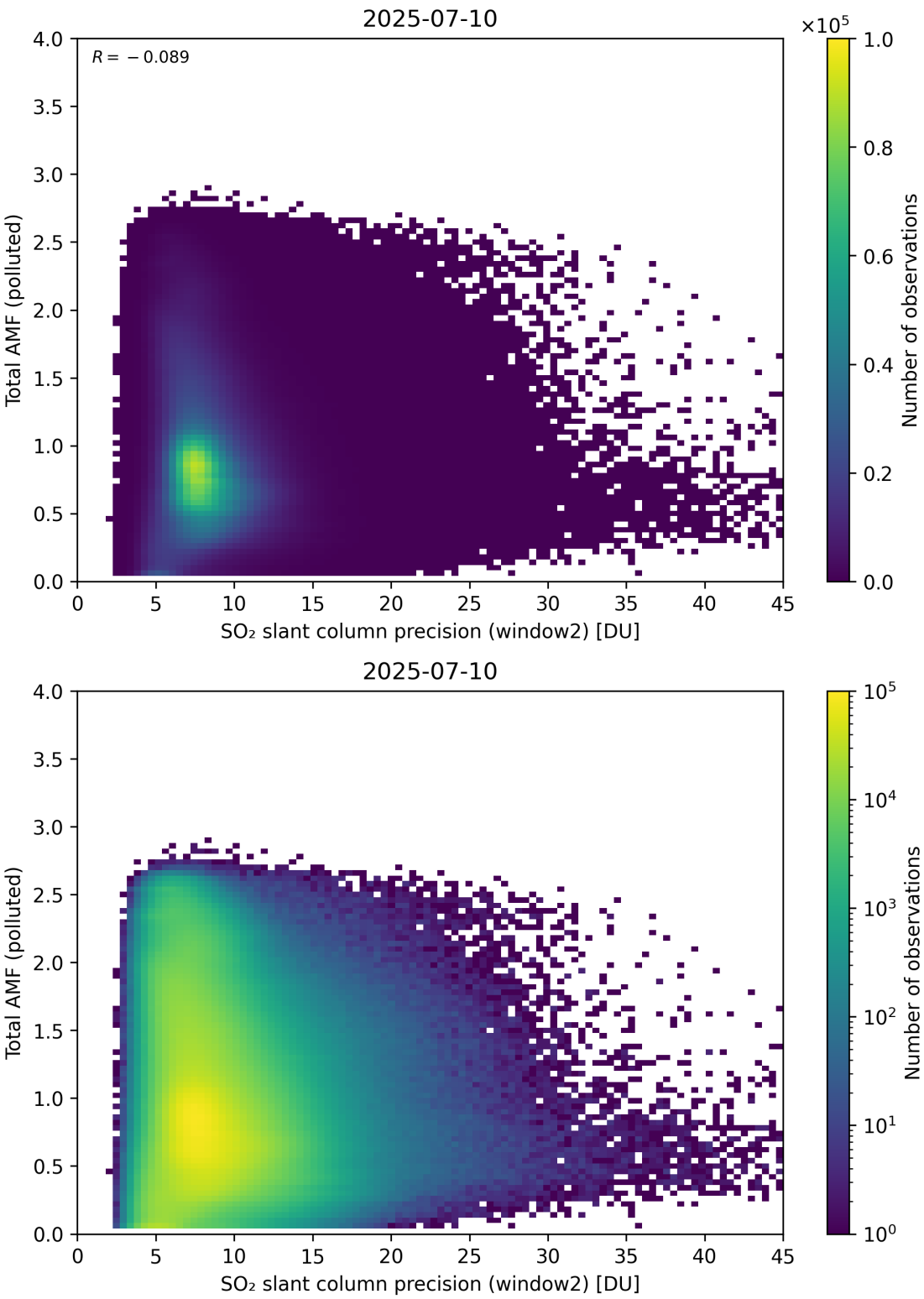

Figure 301: Scatter density plot of "SO_2 slant column precision (window2)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

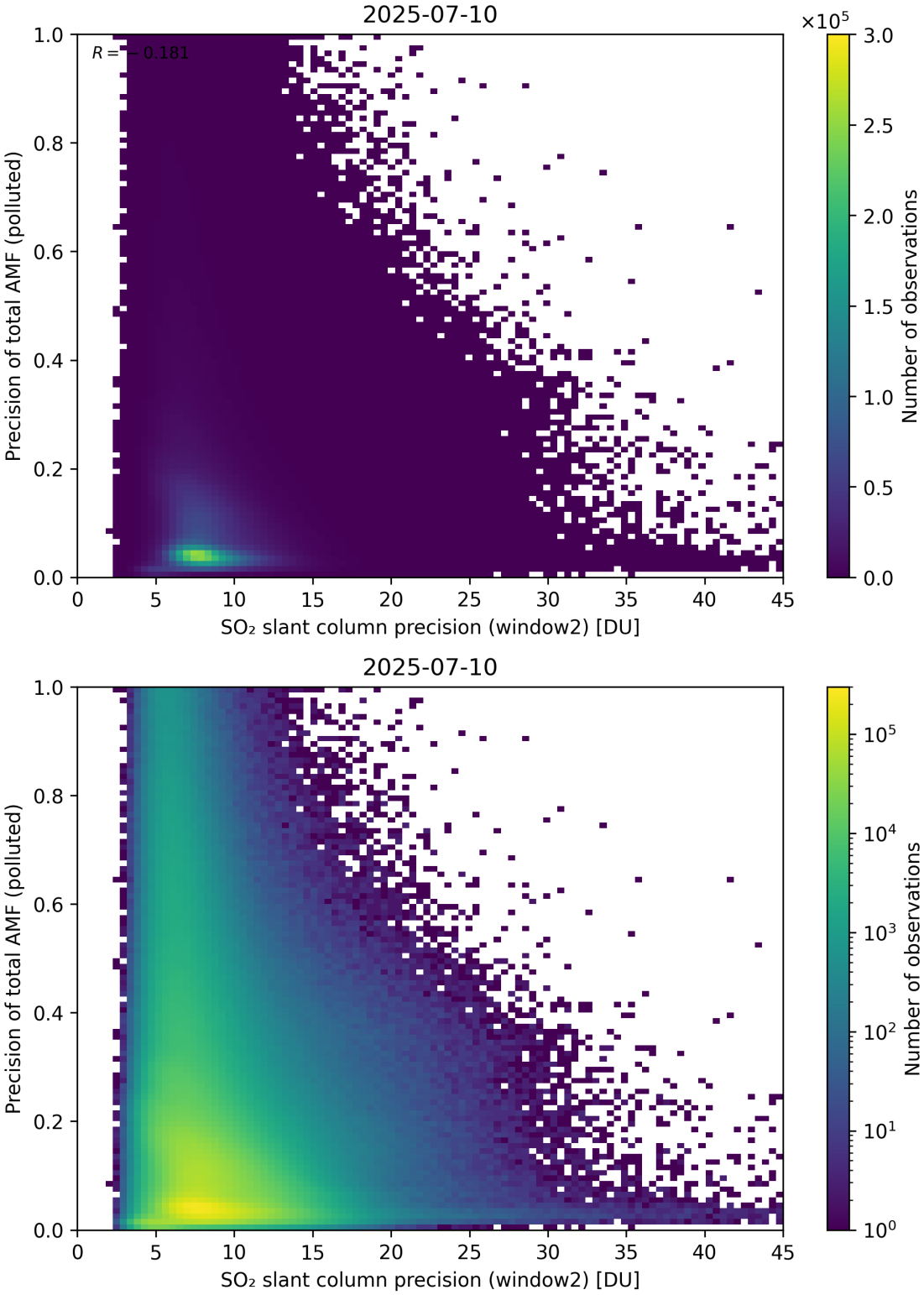

Figure 302: Scatter density plot of "SO_2 slant column precision (window2)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

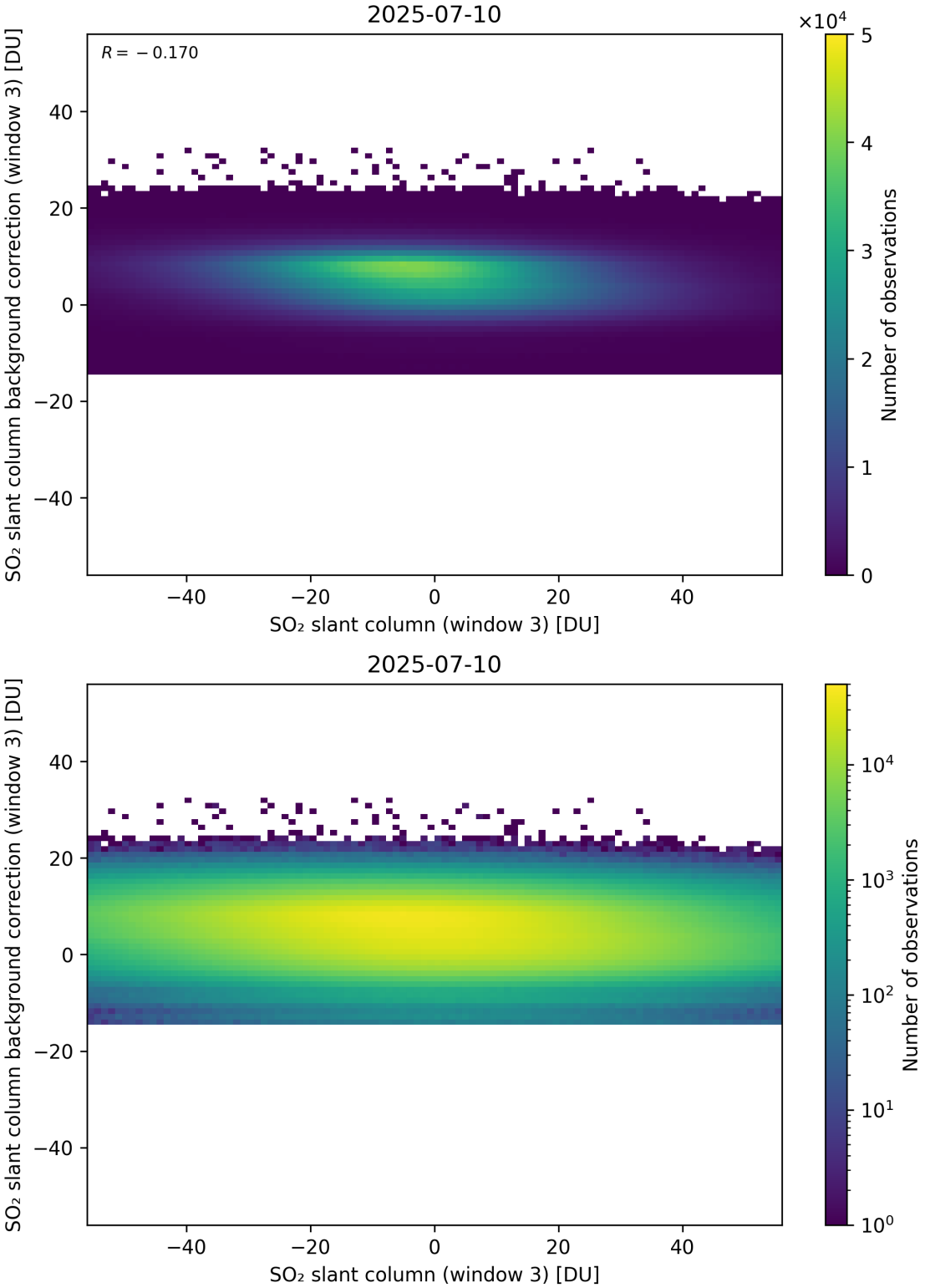

Figure 303: Scatter density plot of "SO_2 slant column (window 3)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

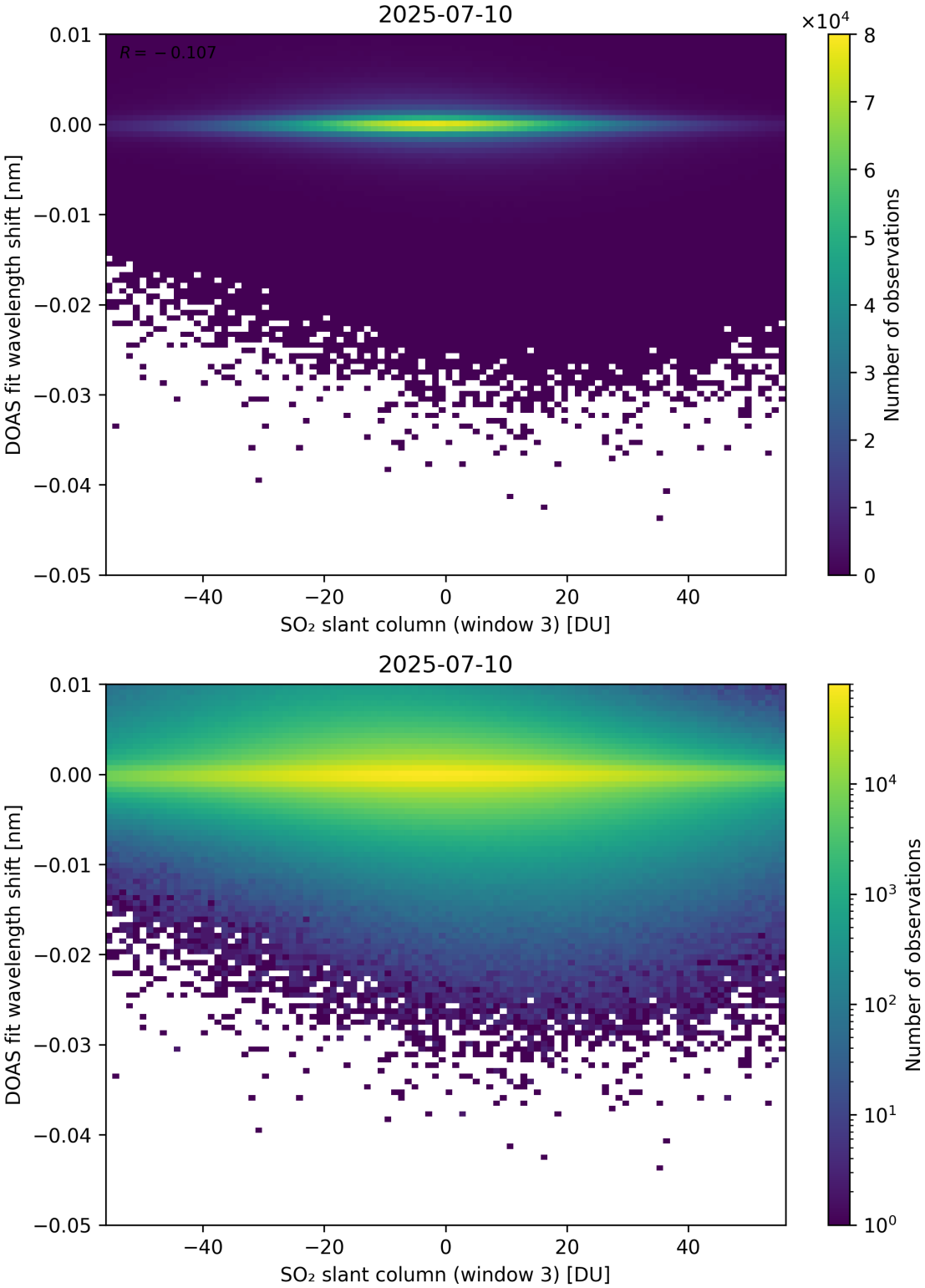

Figure 304: Scatter density plot of "SO_2 slant column (window 3)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

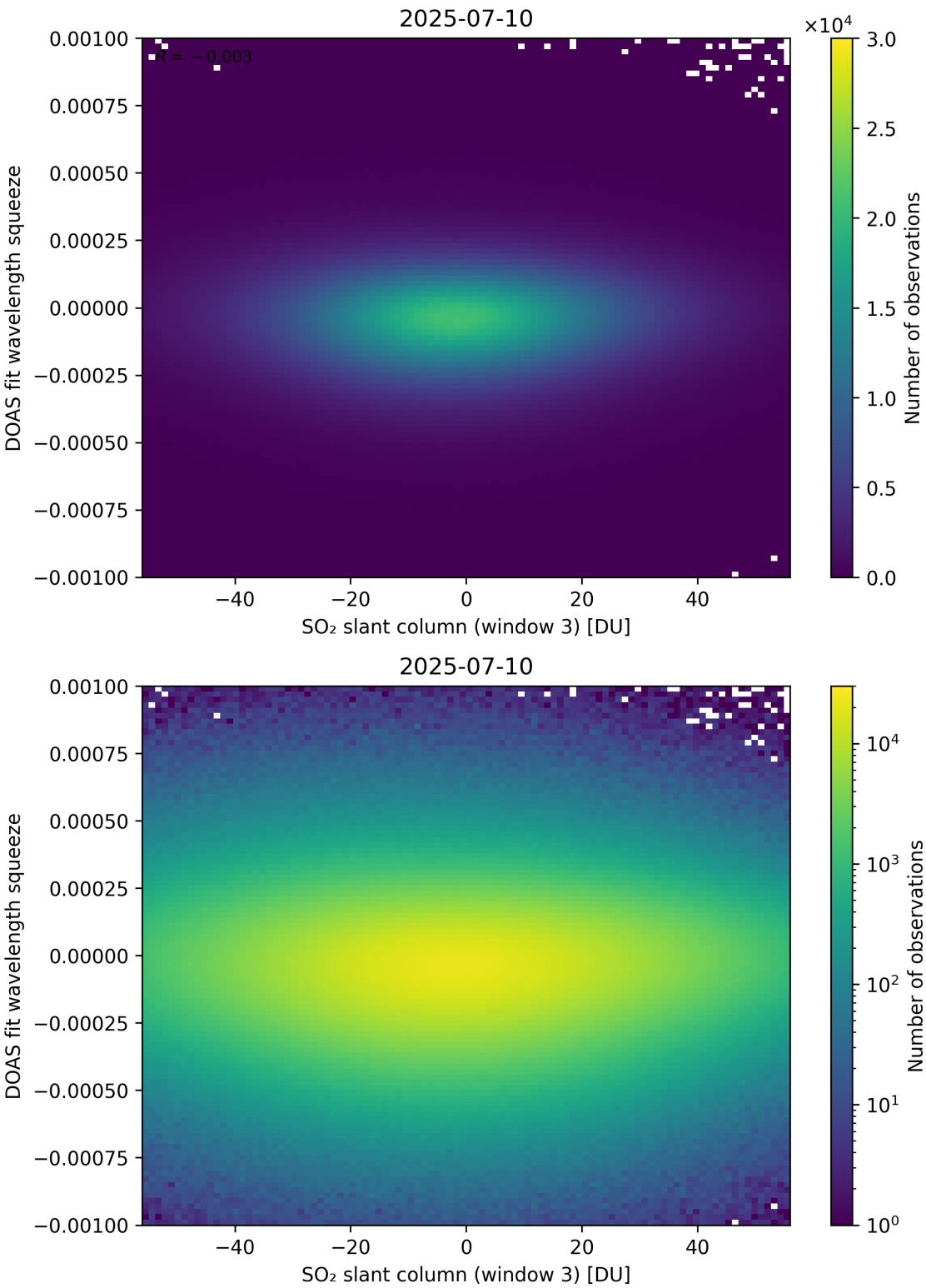

Figure 305: Scatter density plot of "SO_2 slant column (window 3)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

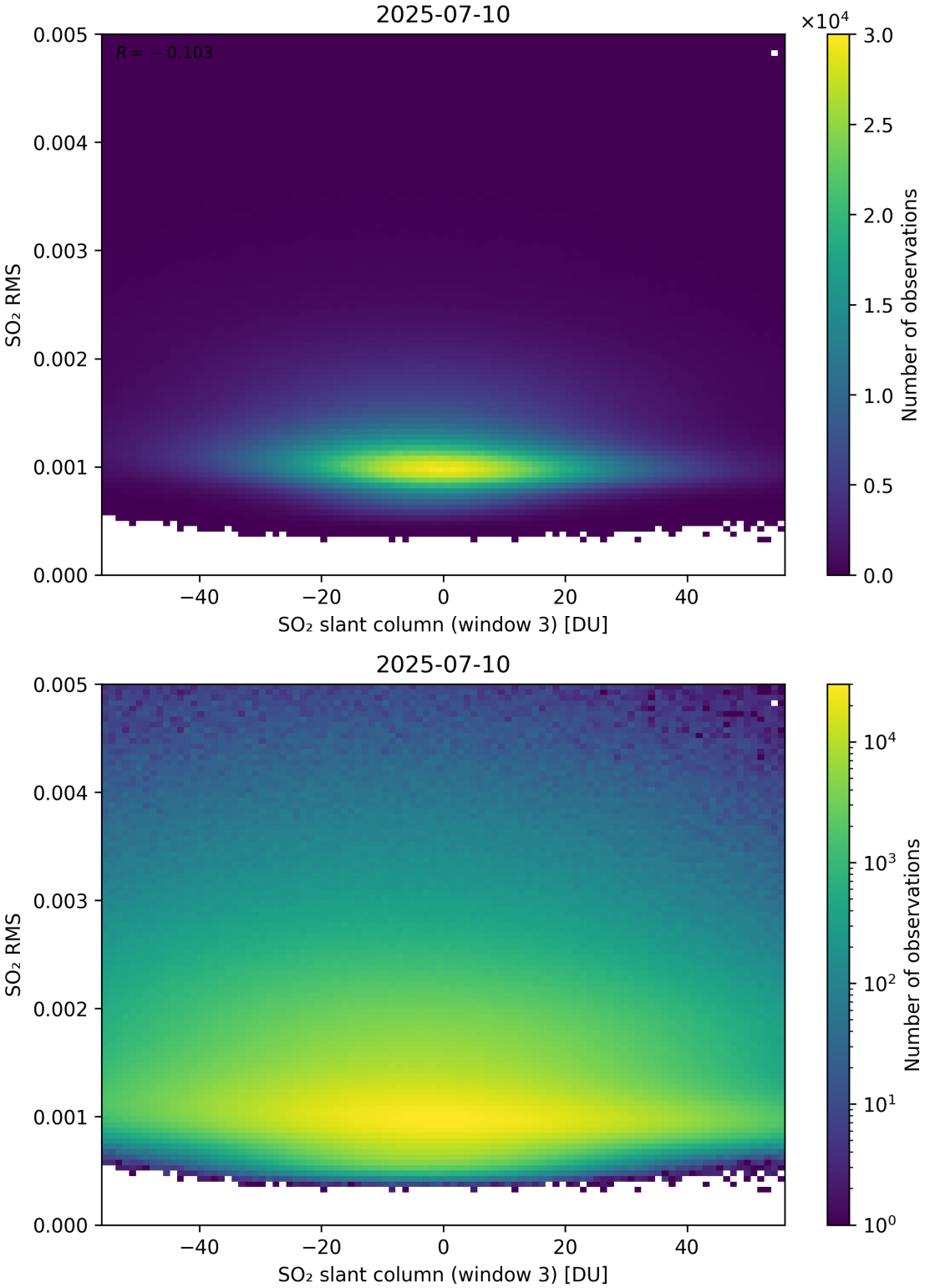

Figure 306: Scatter density plot of "SO_2 slant column (window 3)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

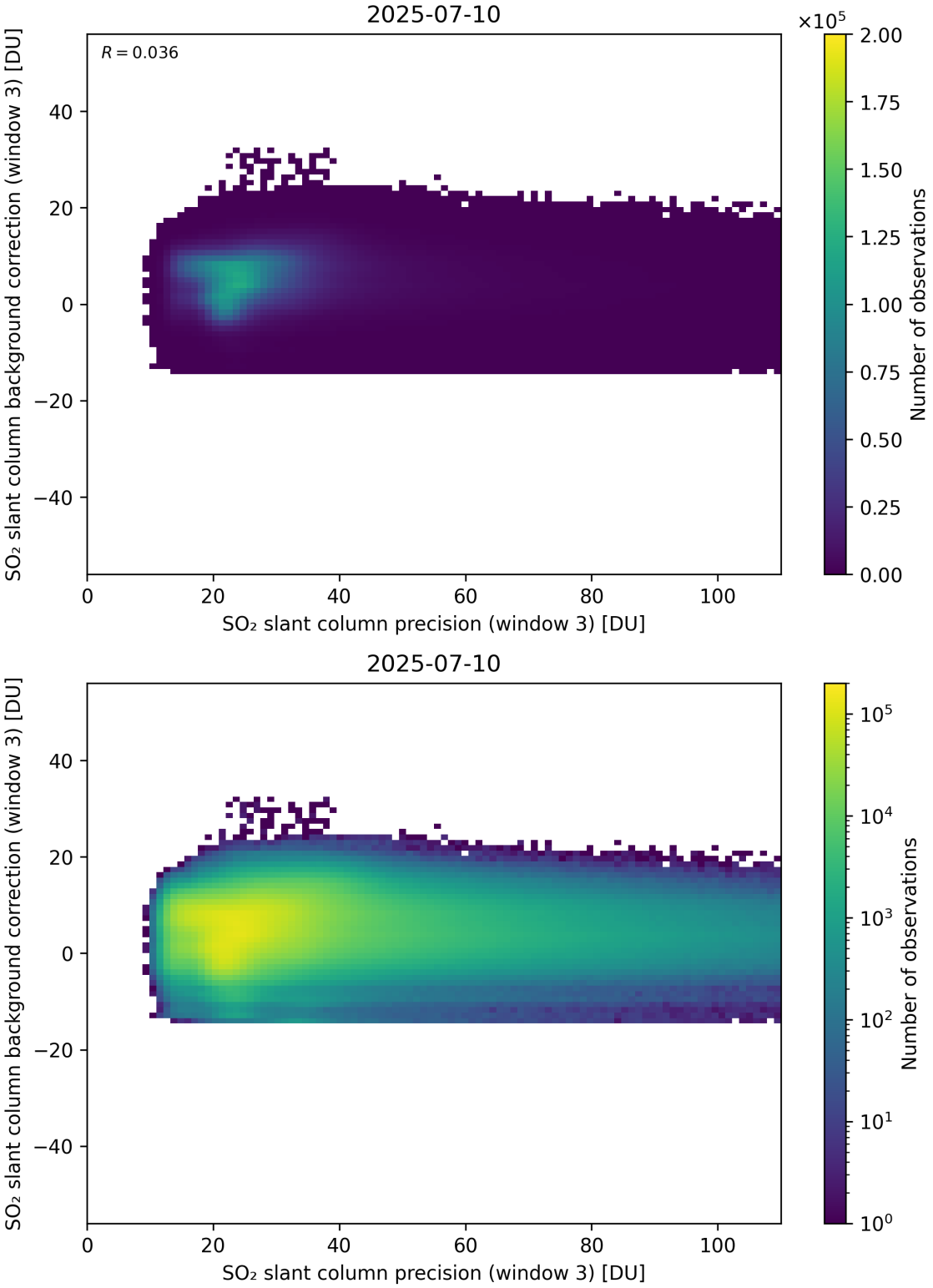

Figure 307: Scatter density plot of "SO_2 slant column precision (window 3)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

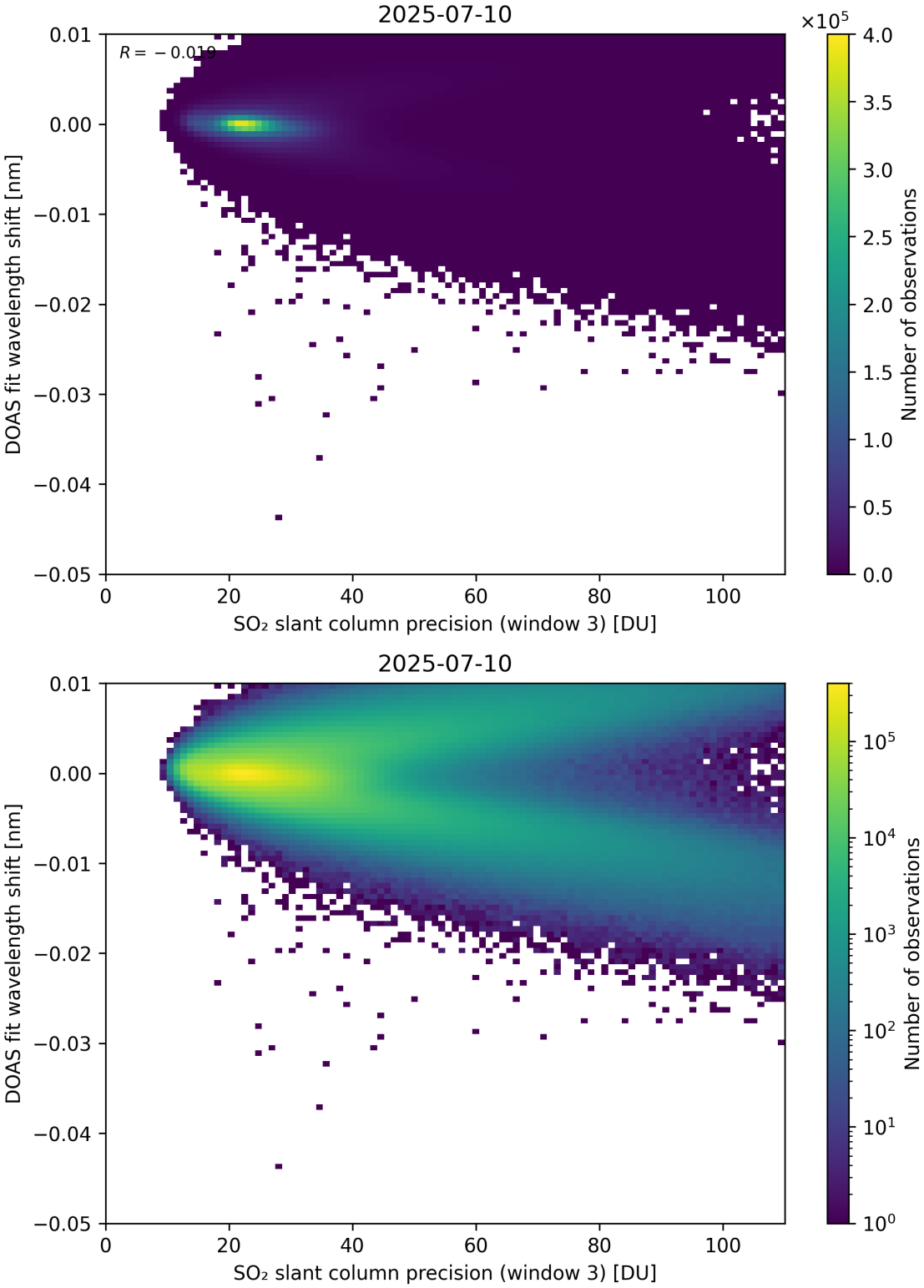

Figure 308: Scatter density plot of "SO_2 slant column precision (window 3)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

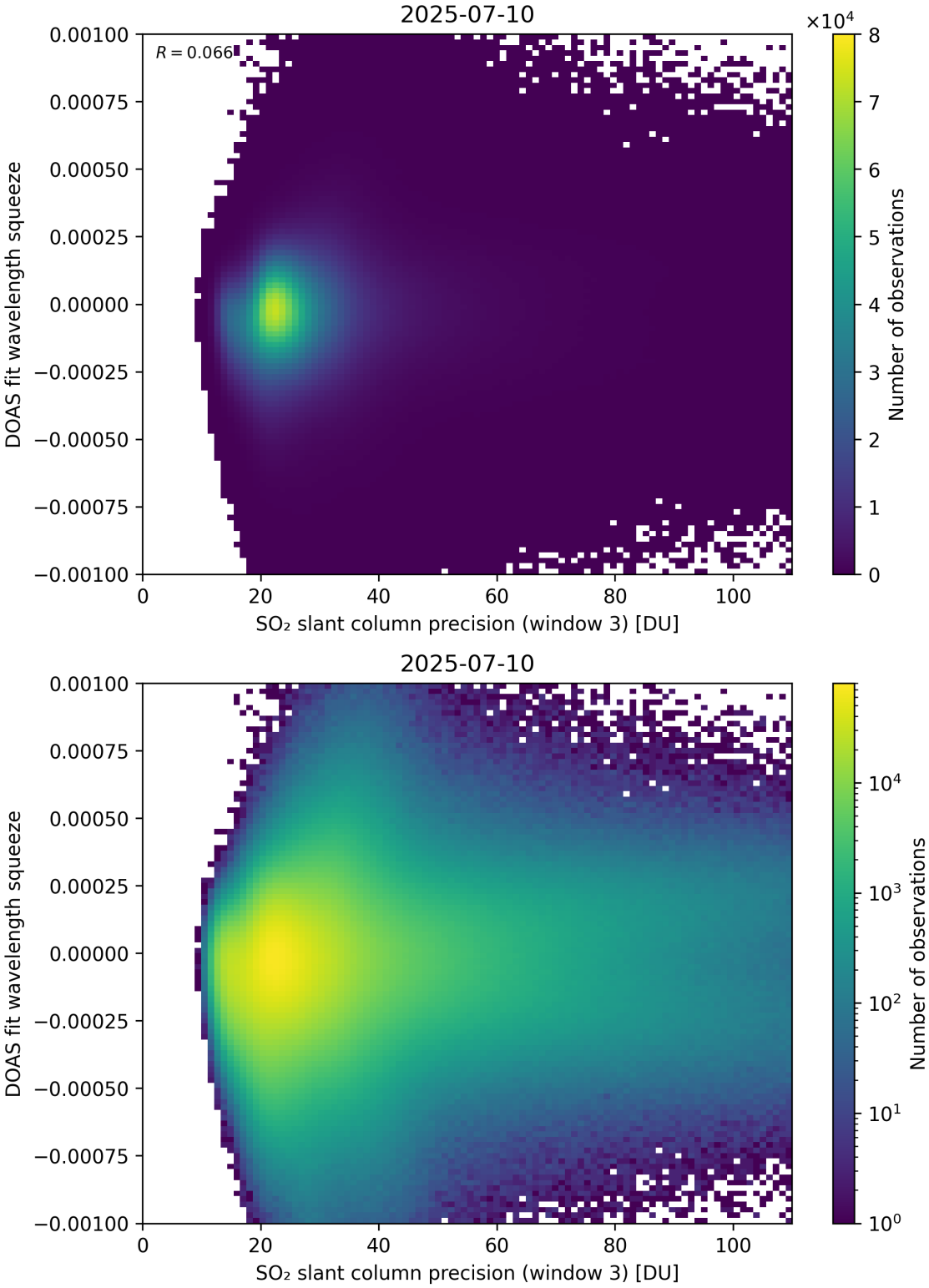

Figure 309: Scatter density plot of "SO_2 slant column precision (window 3)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

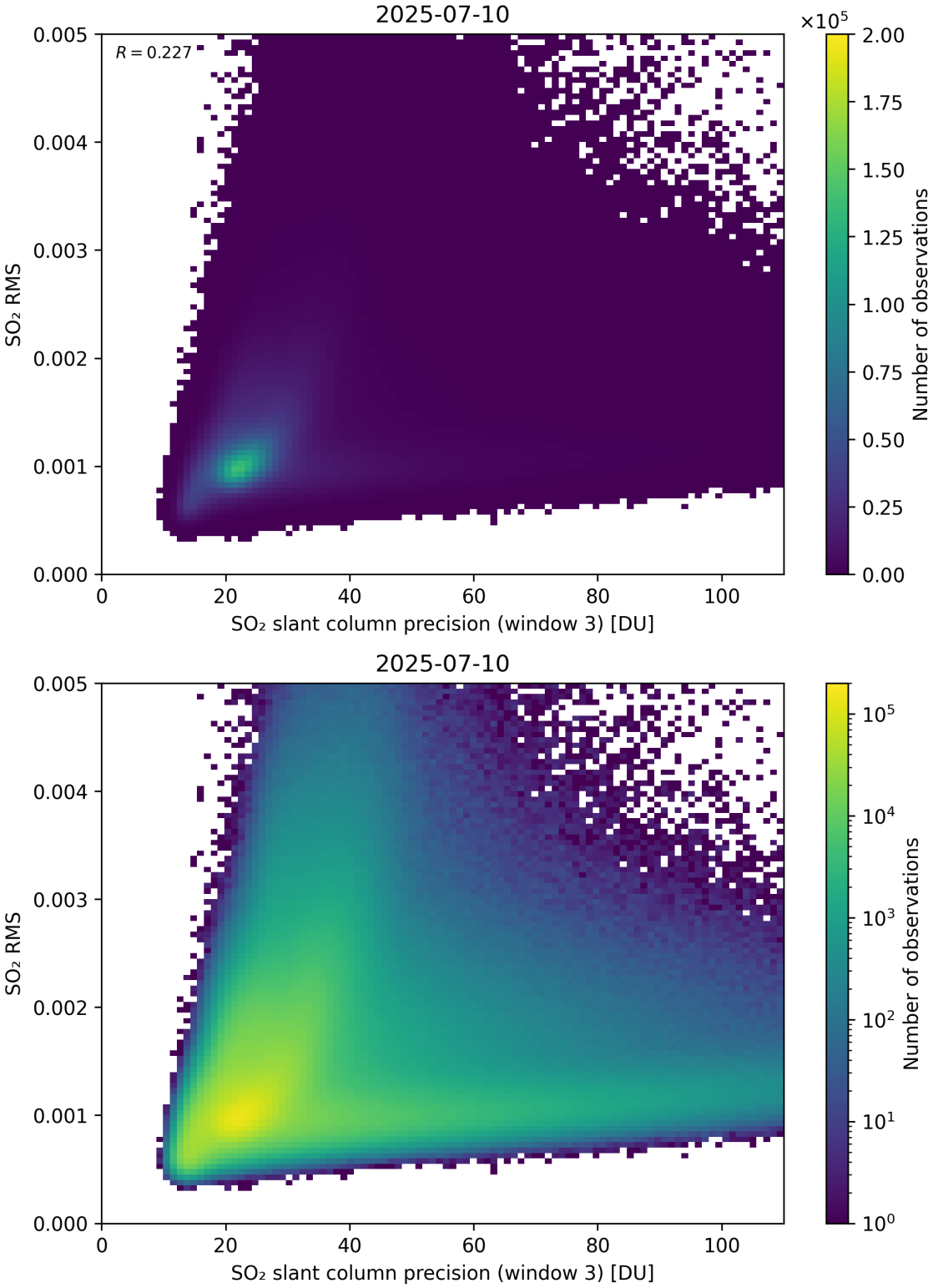

Figure 310: Scatter density plot of "SO_2 slant column precision (window 3)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

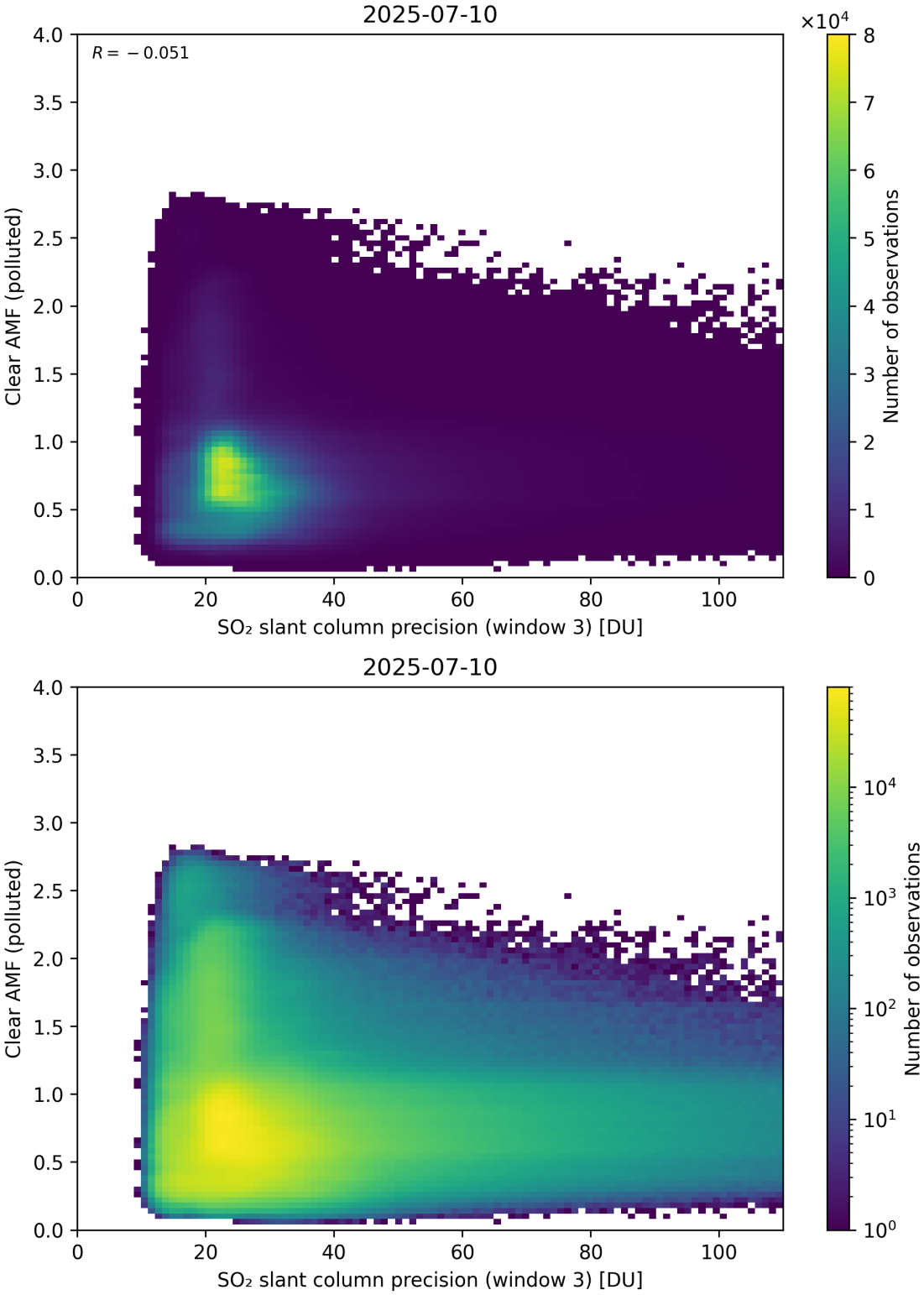

Figure 311: Scatter density plot of "SO_2 slant column precision (window 3)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

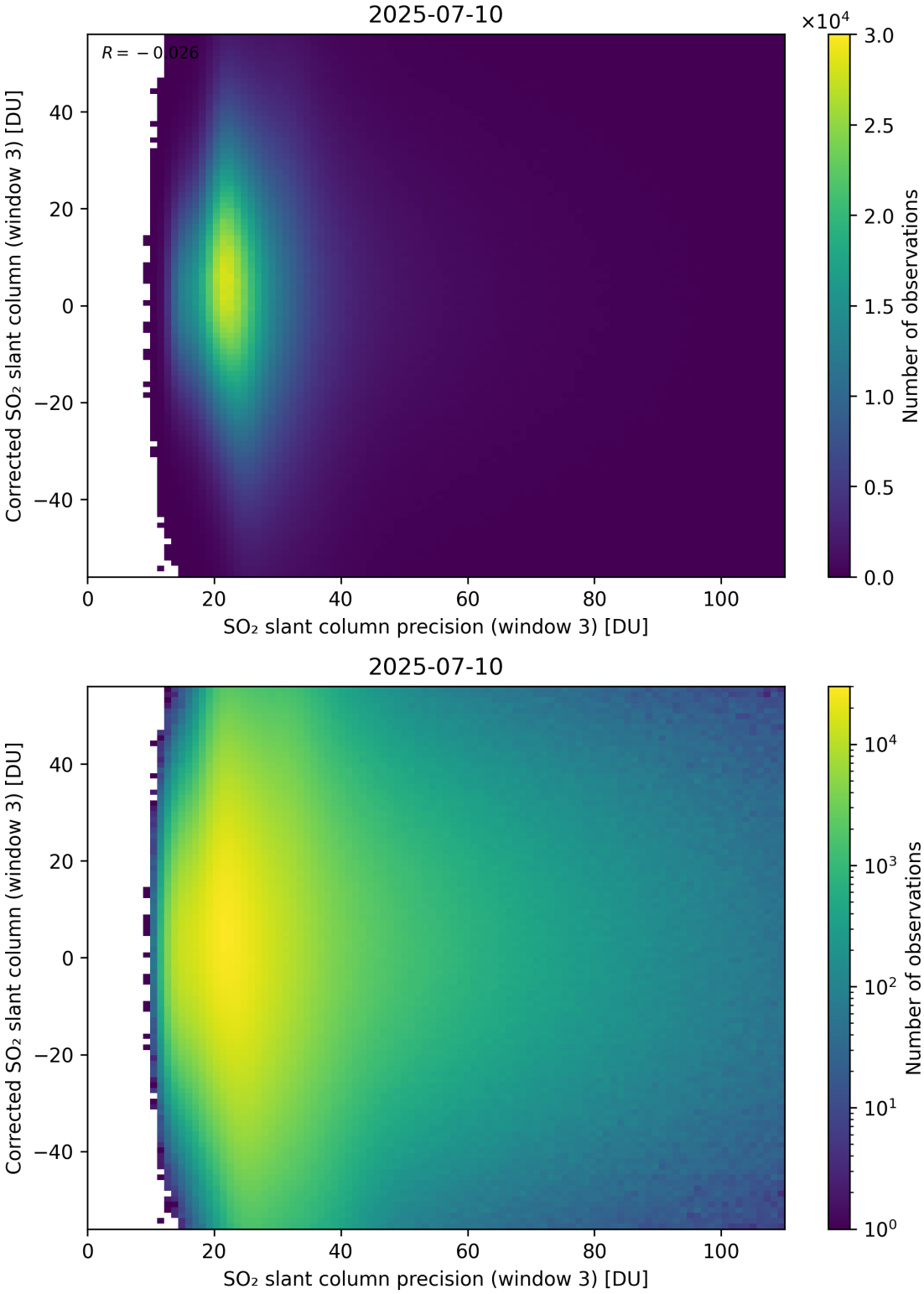

Figure 312: Scatter density plot of "SO_2 slant column precision (window 3)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

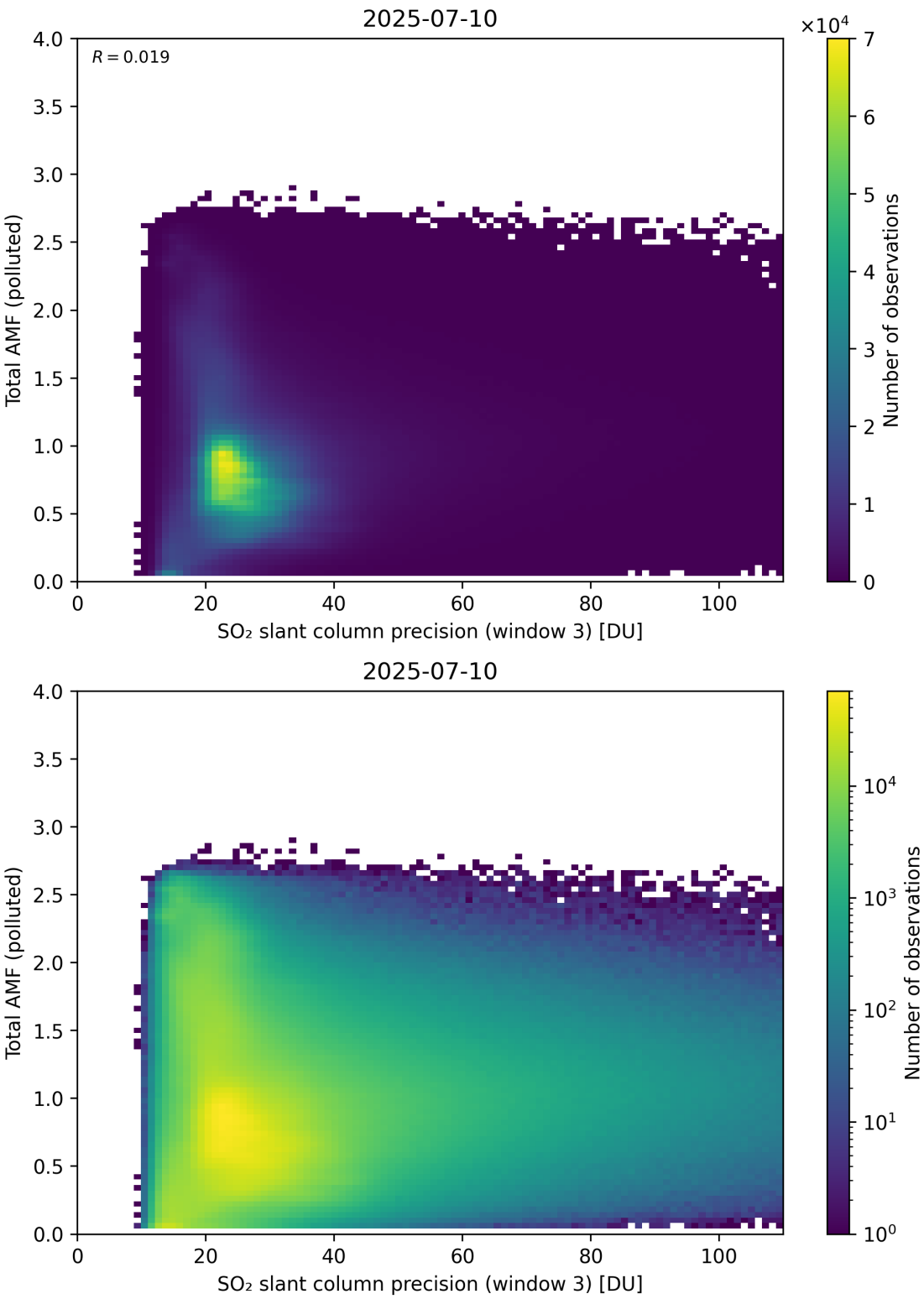

Figure 313: Scatter density plot of "SO_2 slant column precision (window 3)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

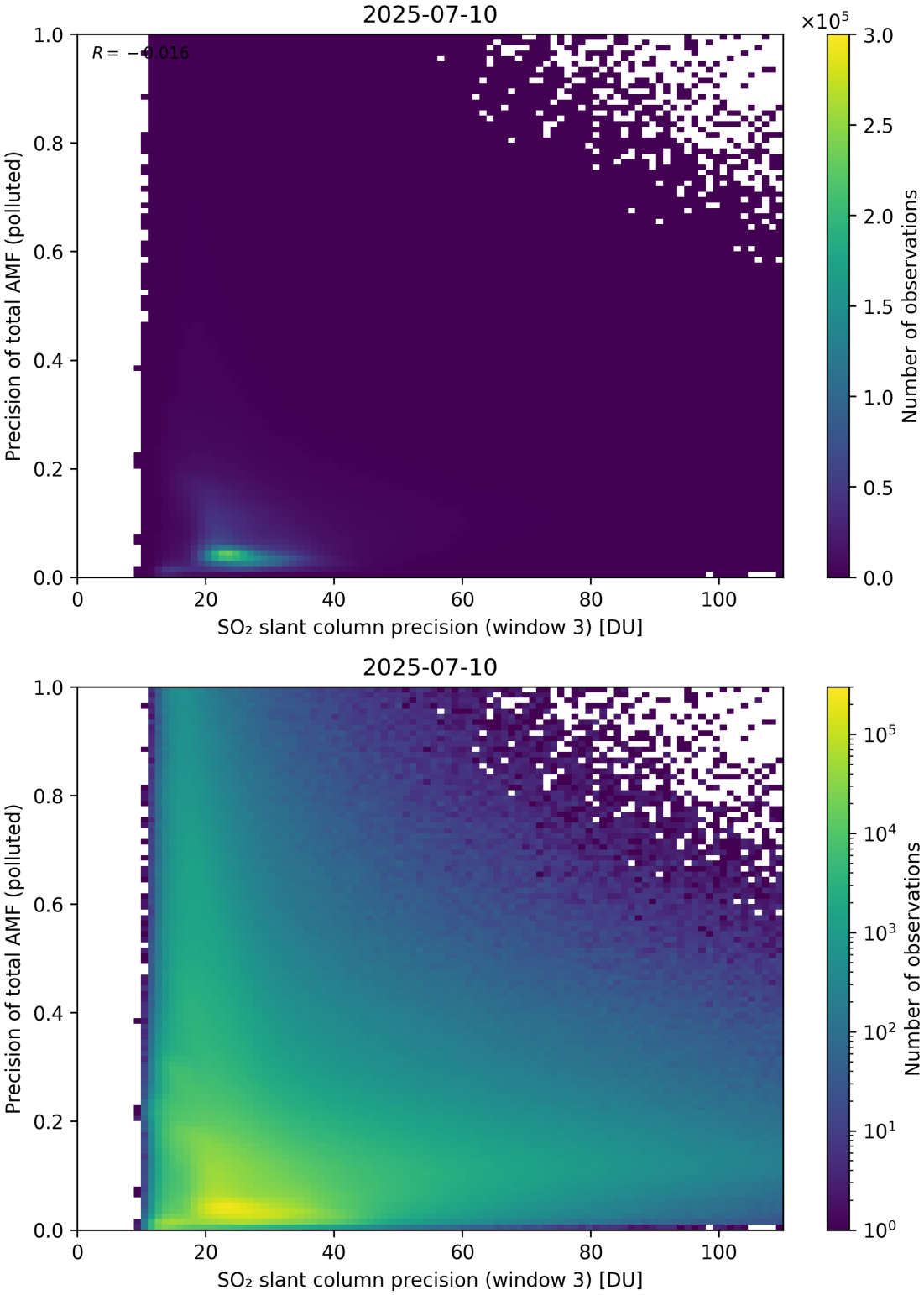

Figure 314: Scatter density plot of "SO_2 slant column precision (window 3)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

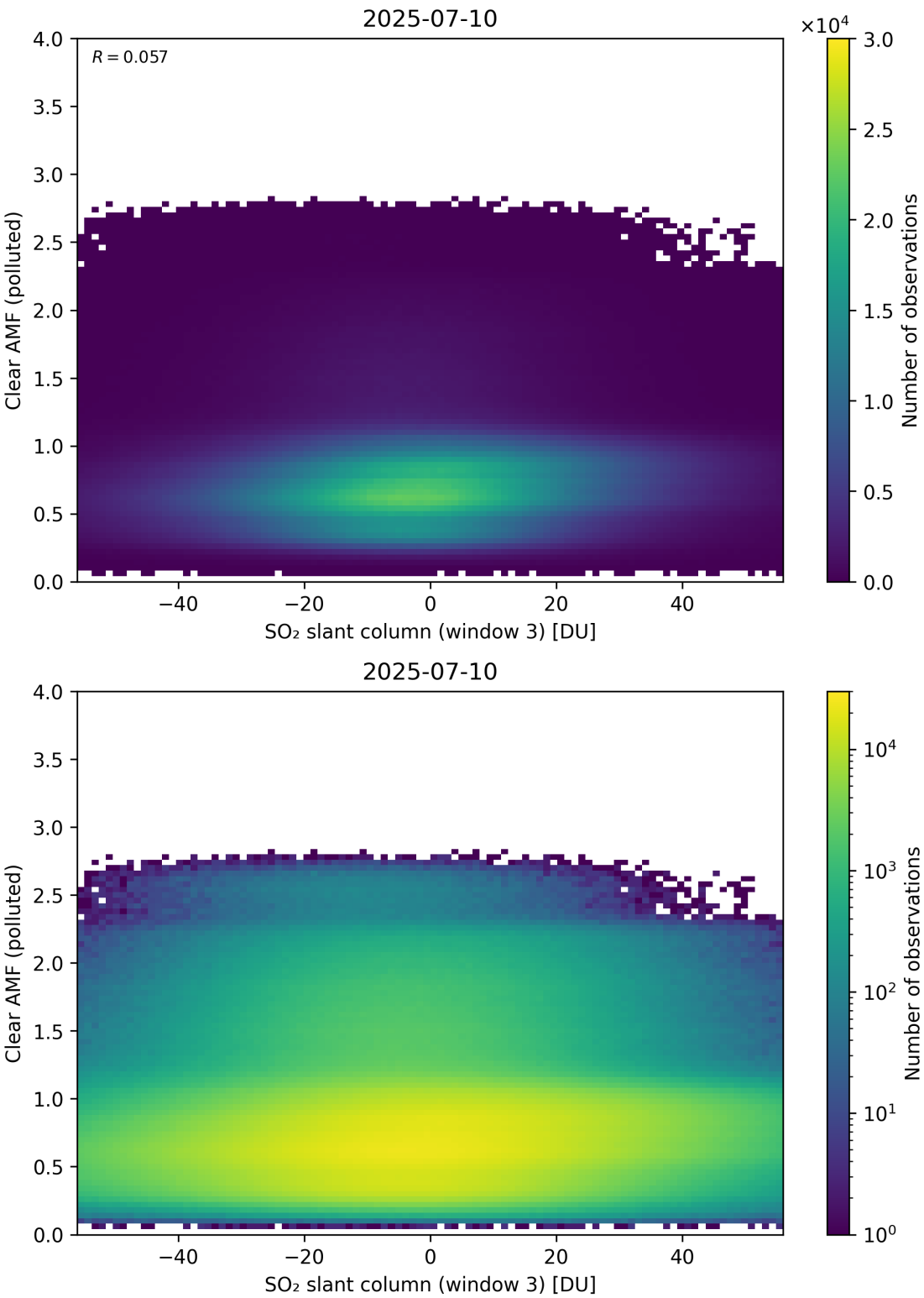

Figure 315: Scatter density plot of "SO_2 slant column (window 3)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

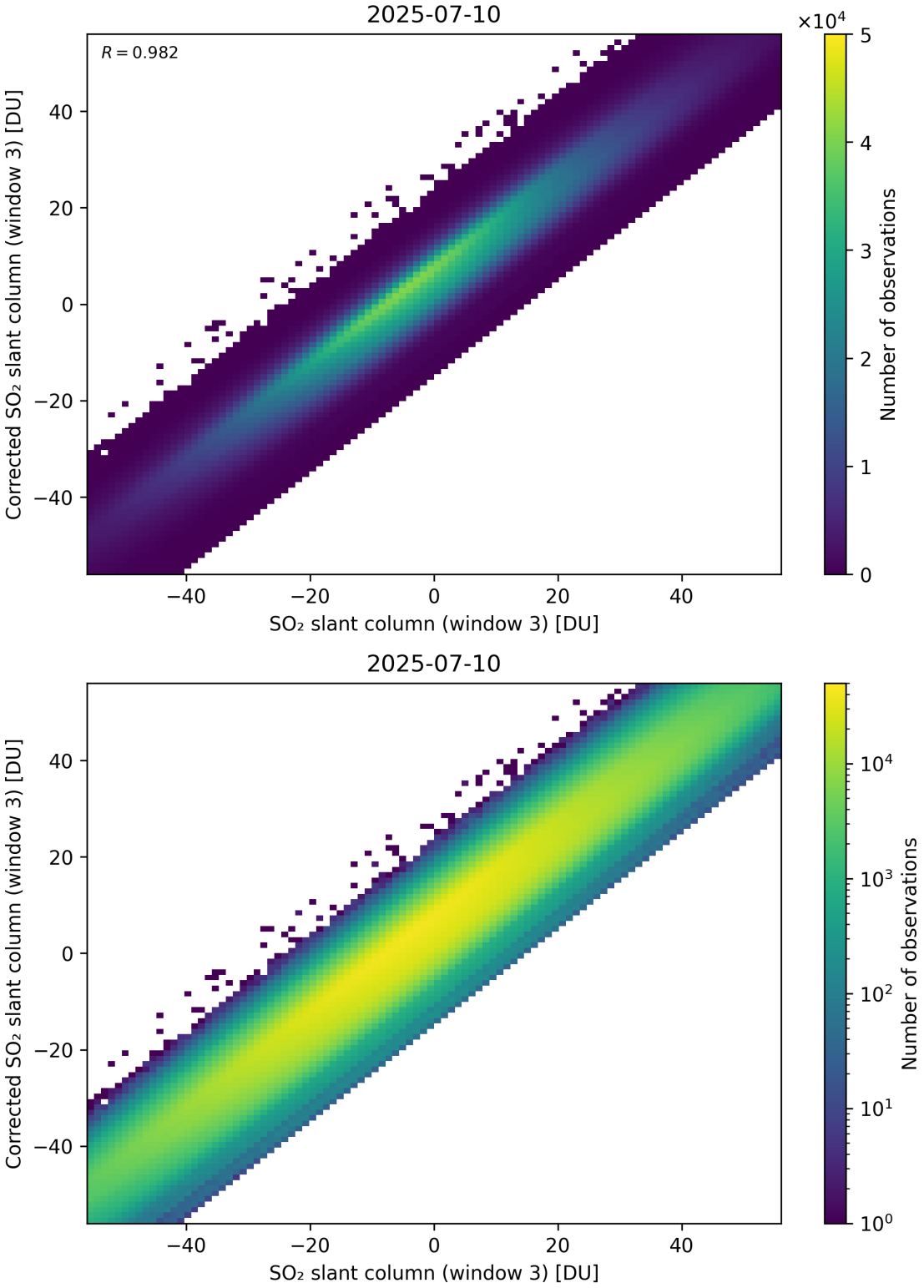

Figure 316: Scatter density plot of "SO_2 slant column (window 3)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

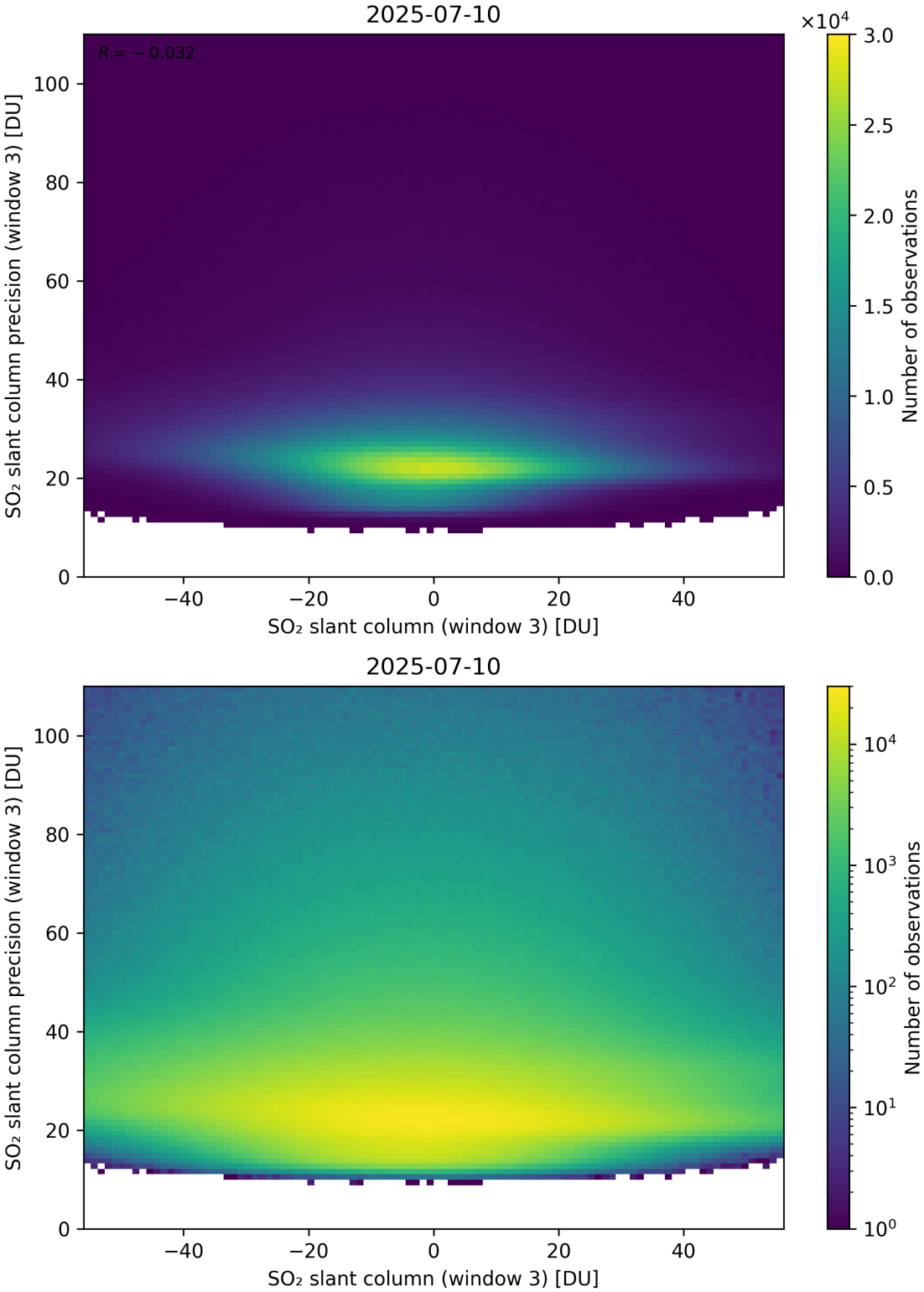

Figure 317: Scatter density plot of "SO_2 slant column (window 3)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

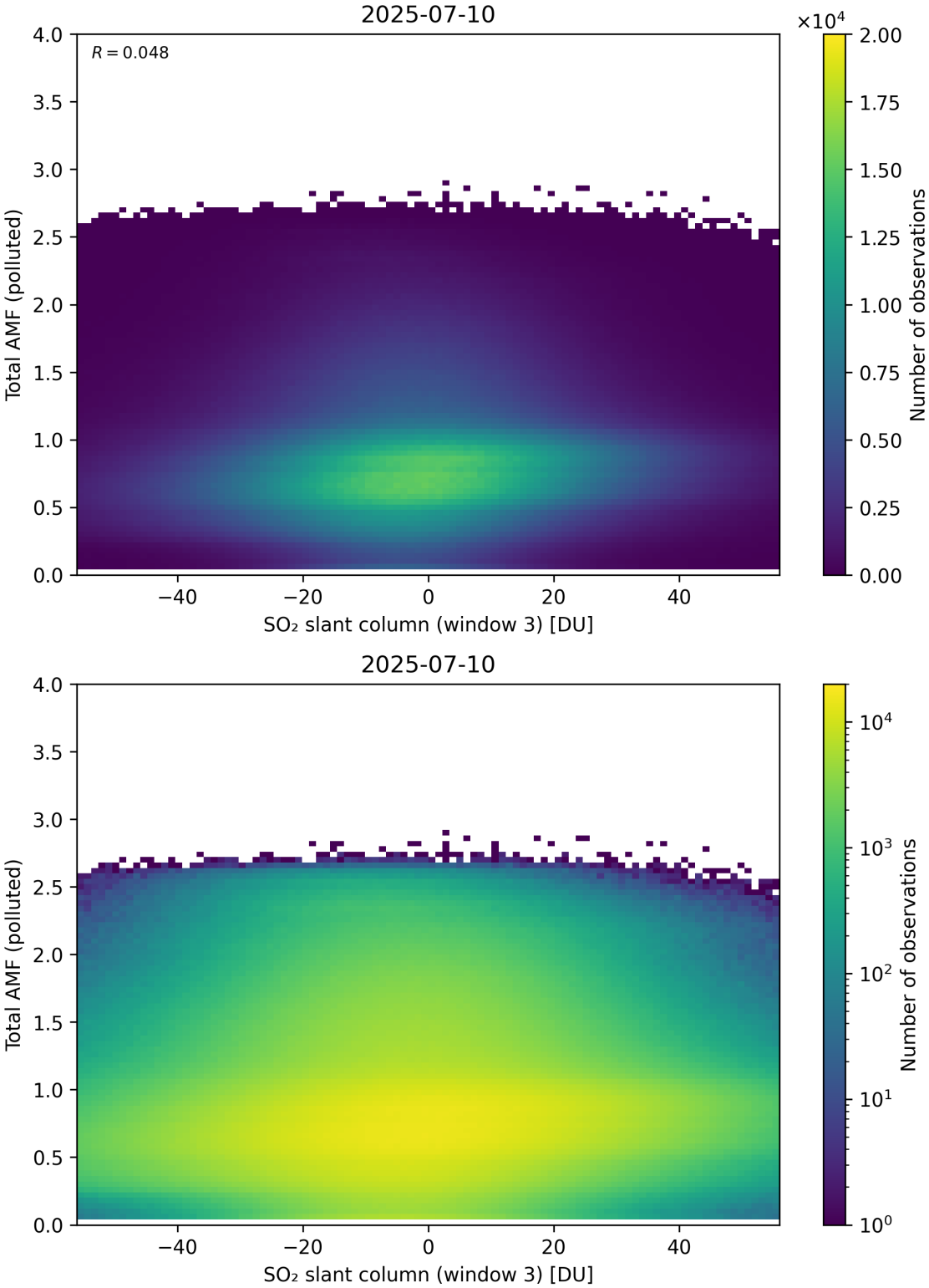

Figure 318: Scatter density plot of "SO_2 slant column (window 3)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

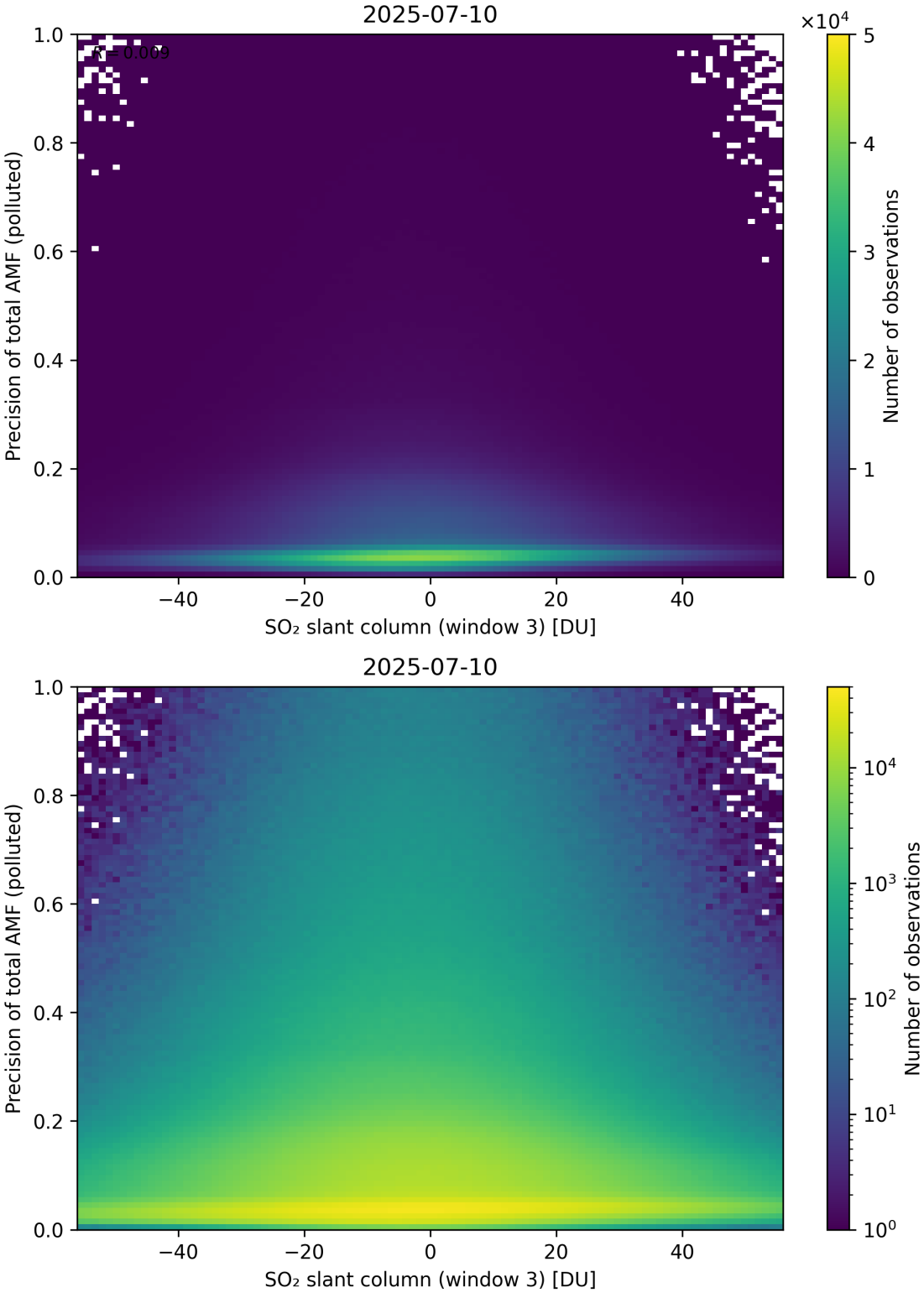

Figure 319: Scatter density plot of "SO_2 slant column (window 3)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

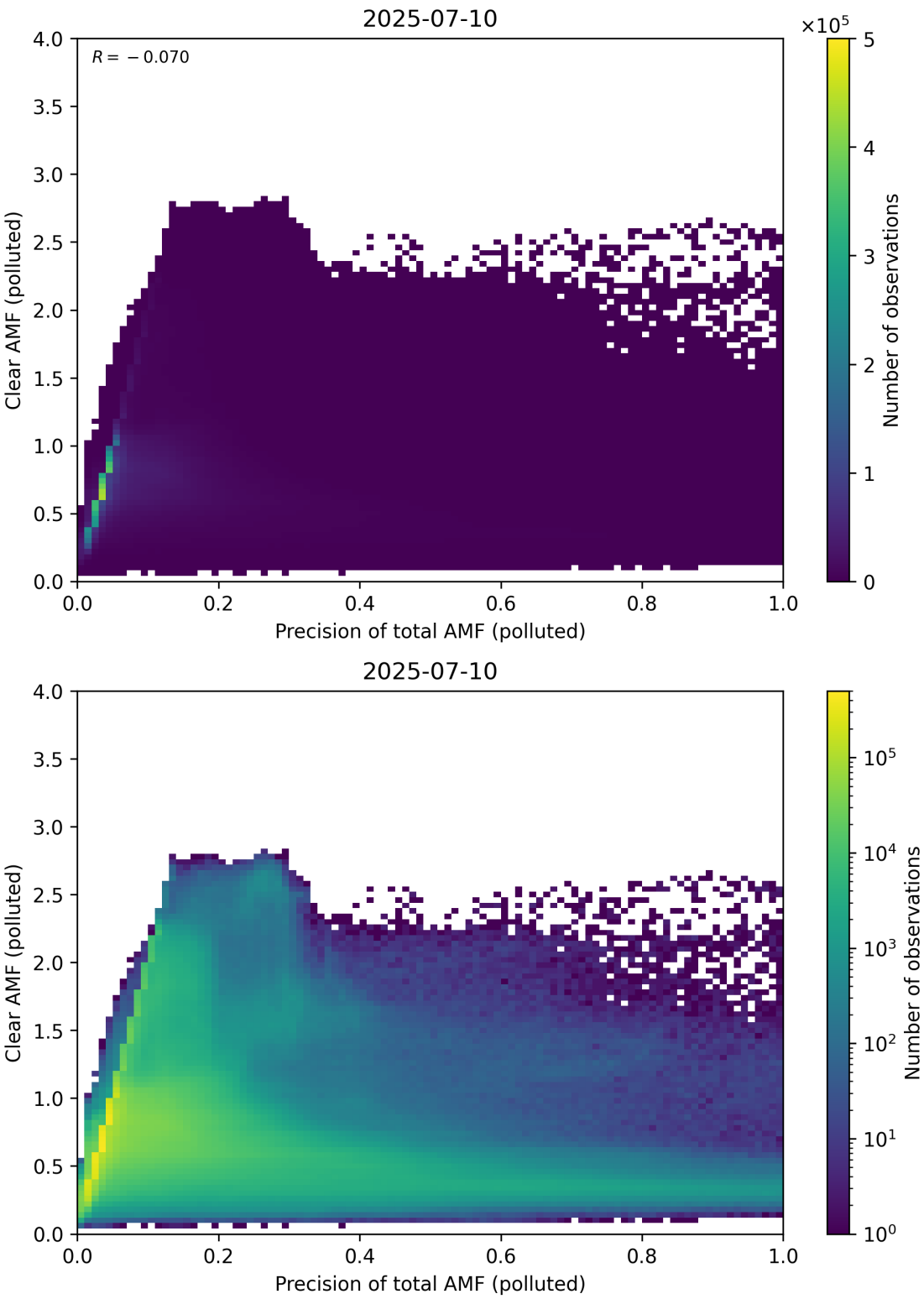

Figure 320: Scatter density plot of “Precision of total AMF (polluted)” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11.

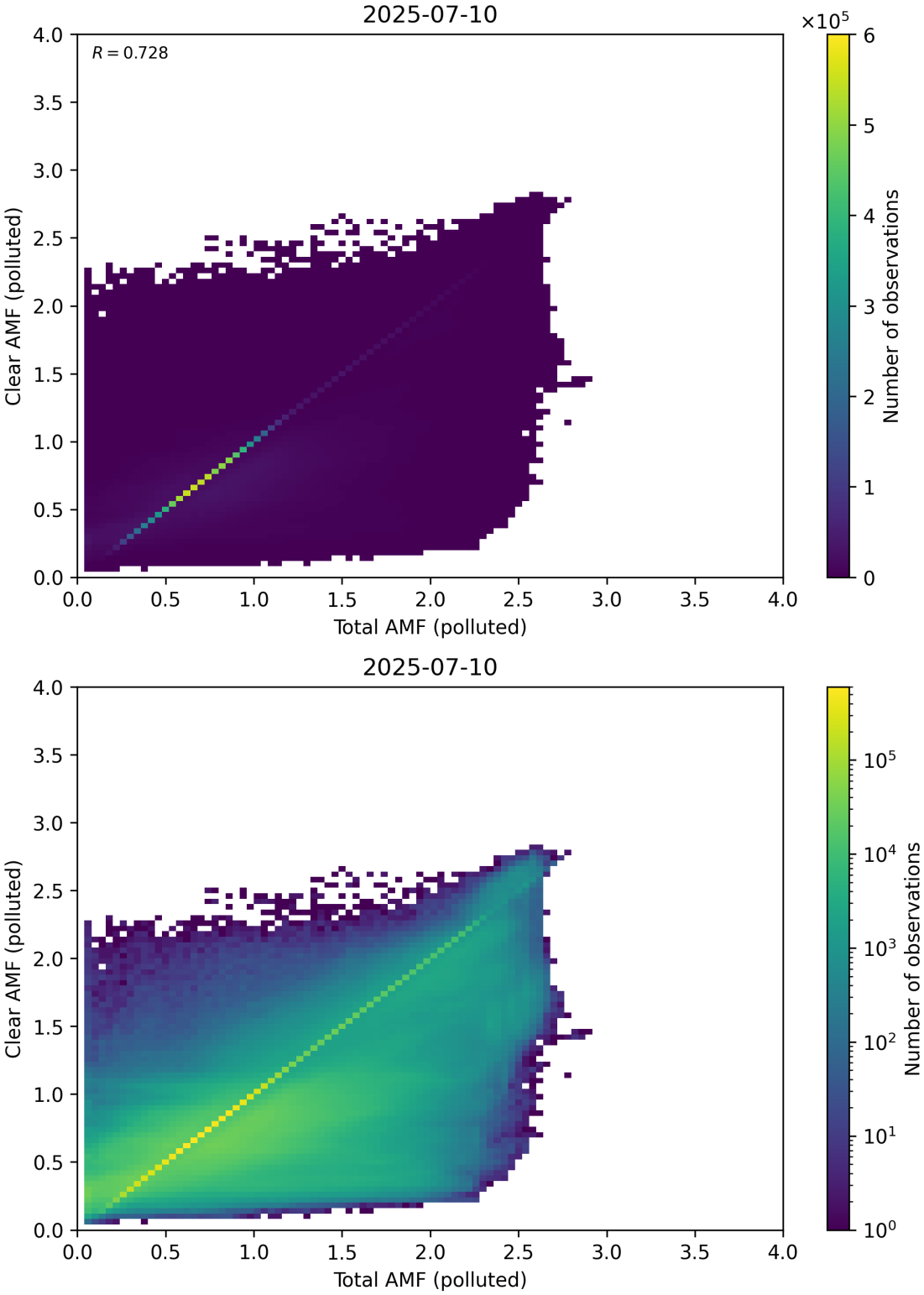

Figure 321: Scatter density plot of “Total AMF (polluted)” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11.

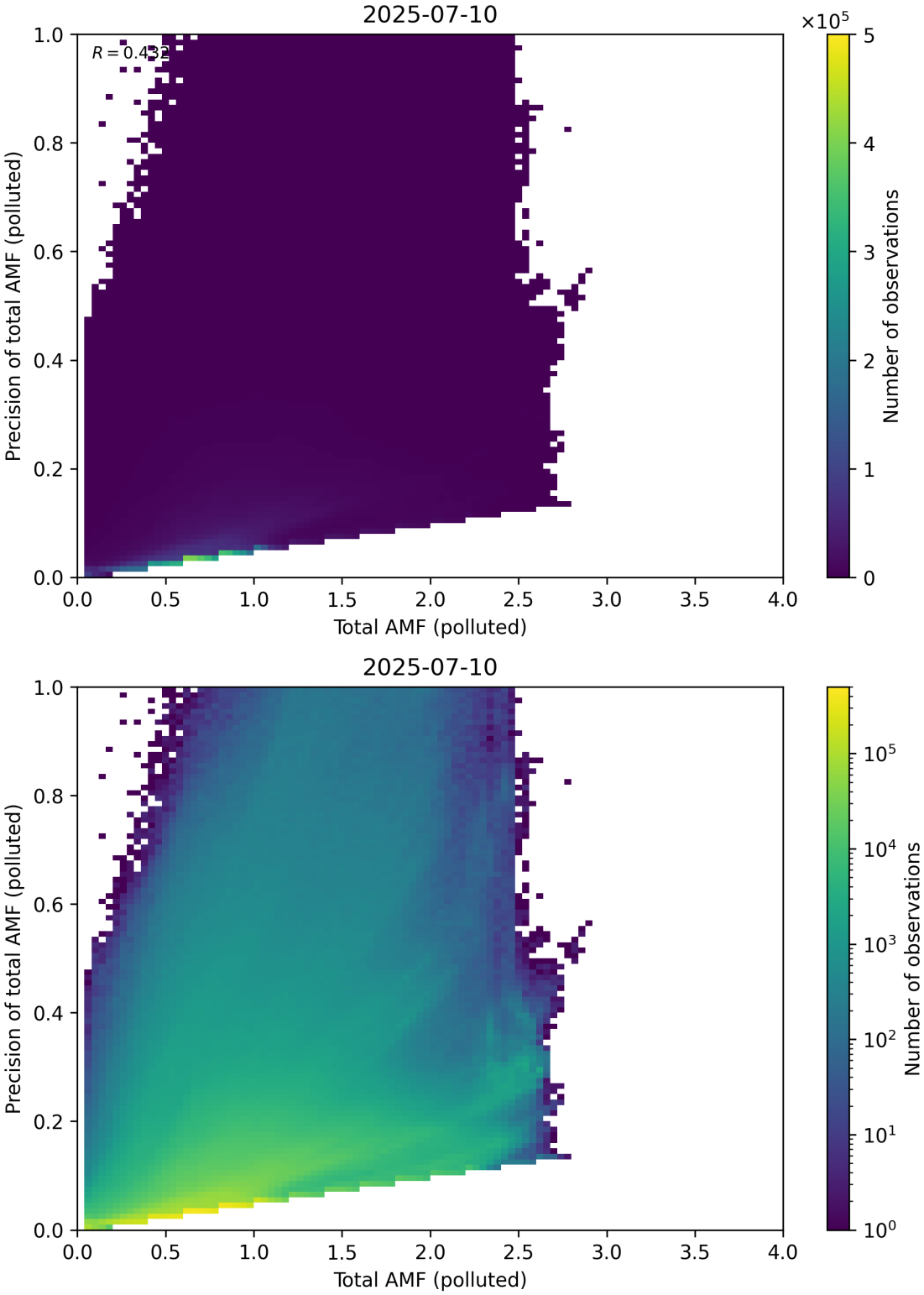

Figure 322: Scatter density plot of “Total AMF (polluted)” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11.

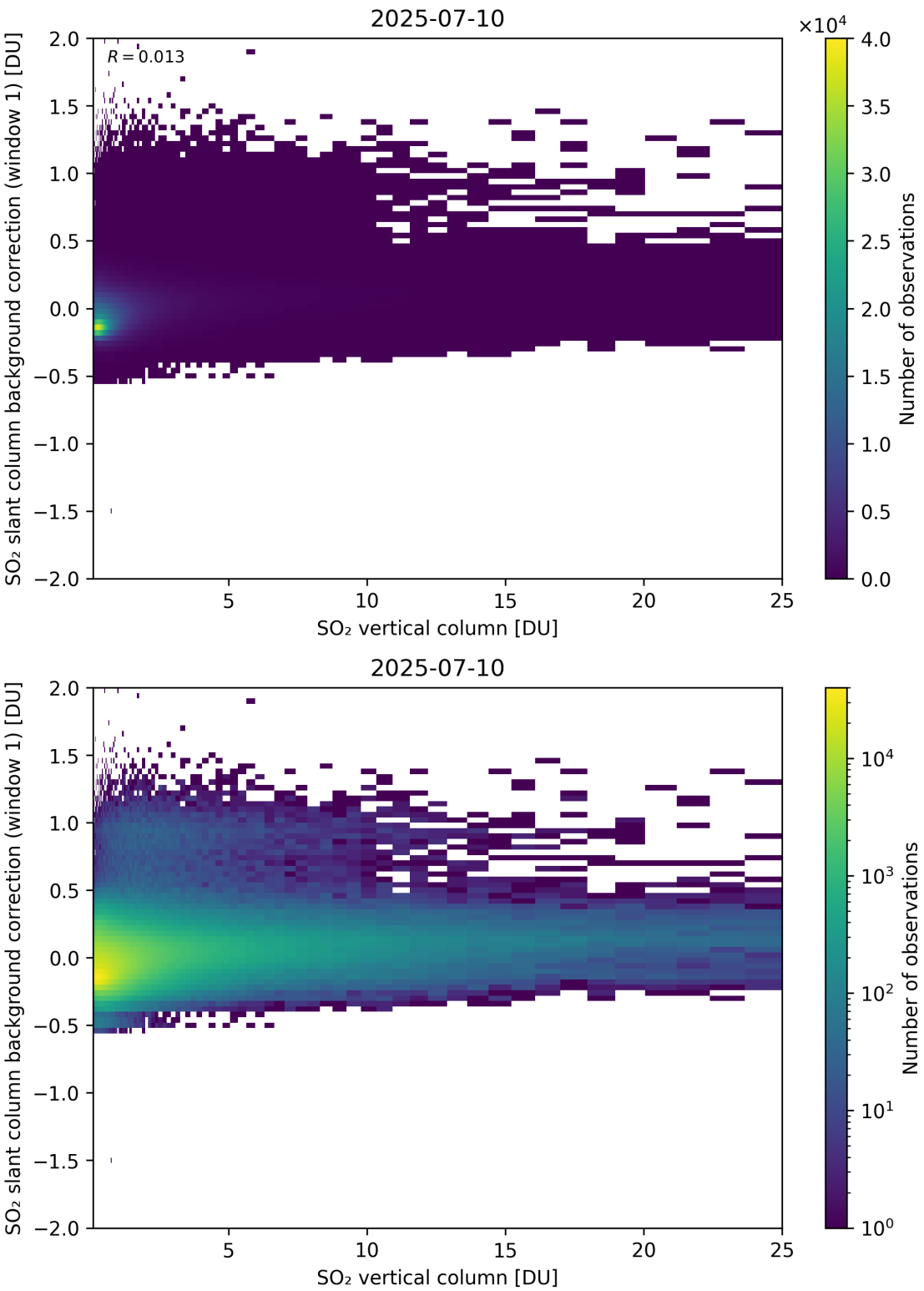

Figure 323: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

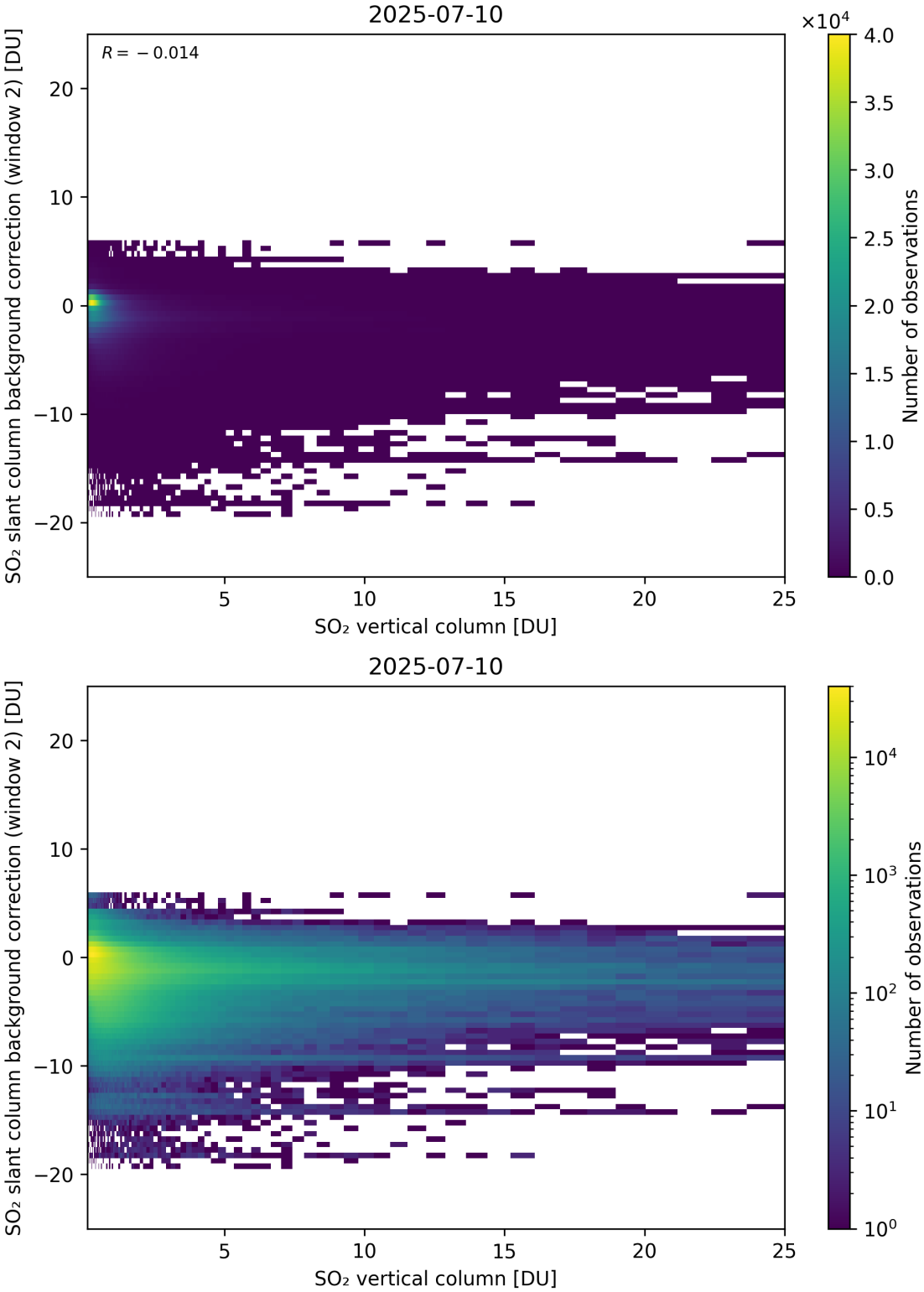

Figure 324: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

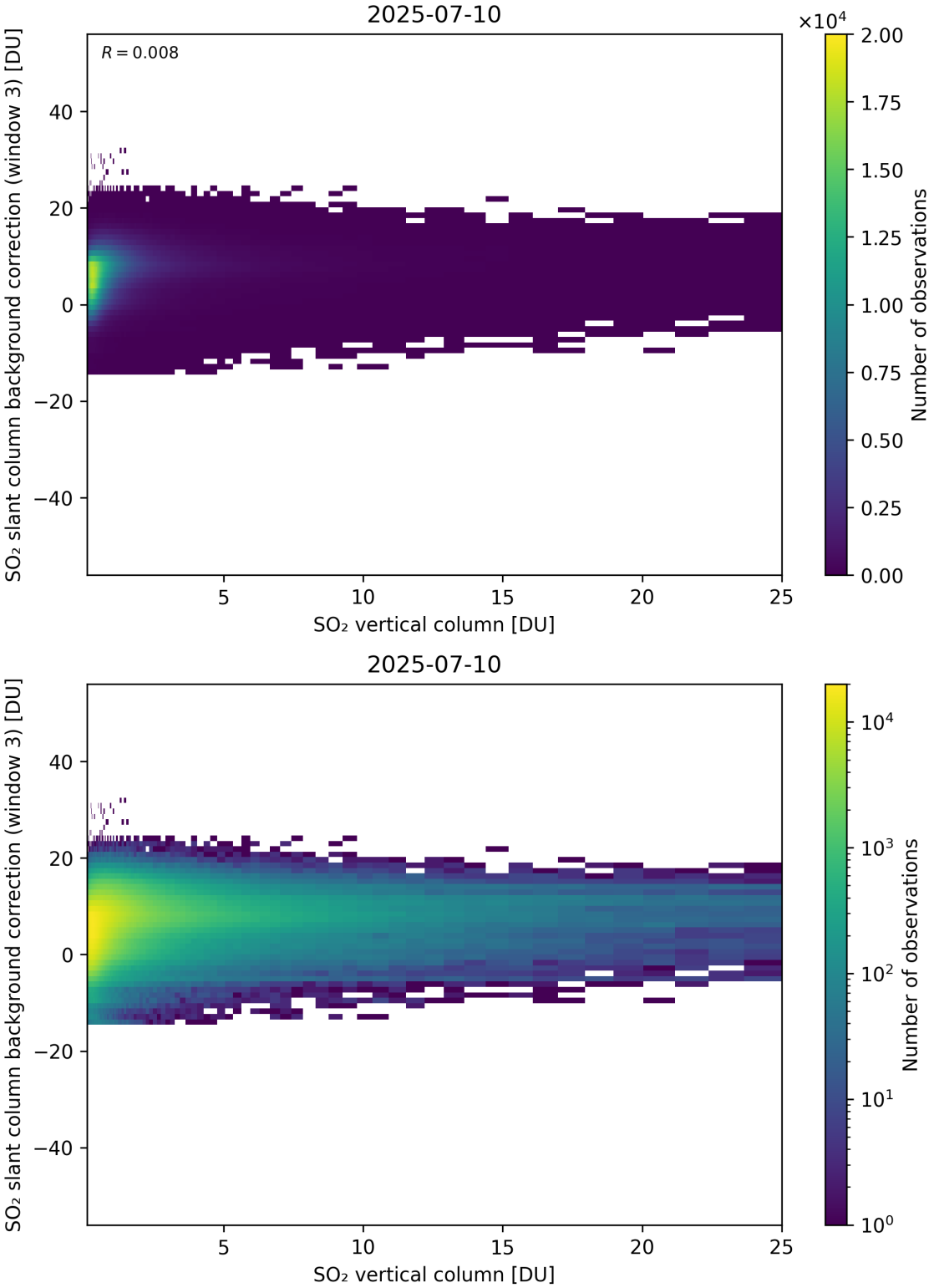

Figure 325: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

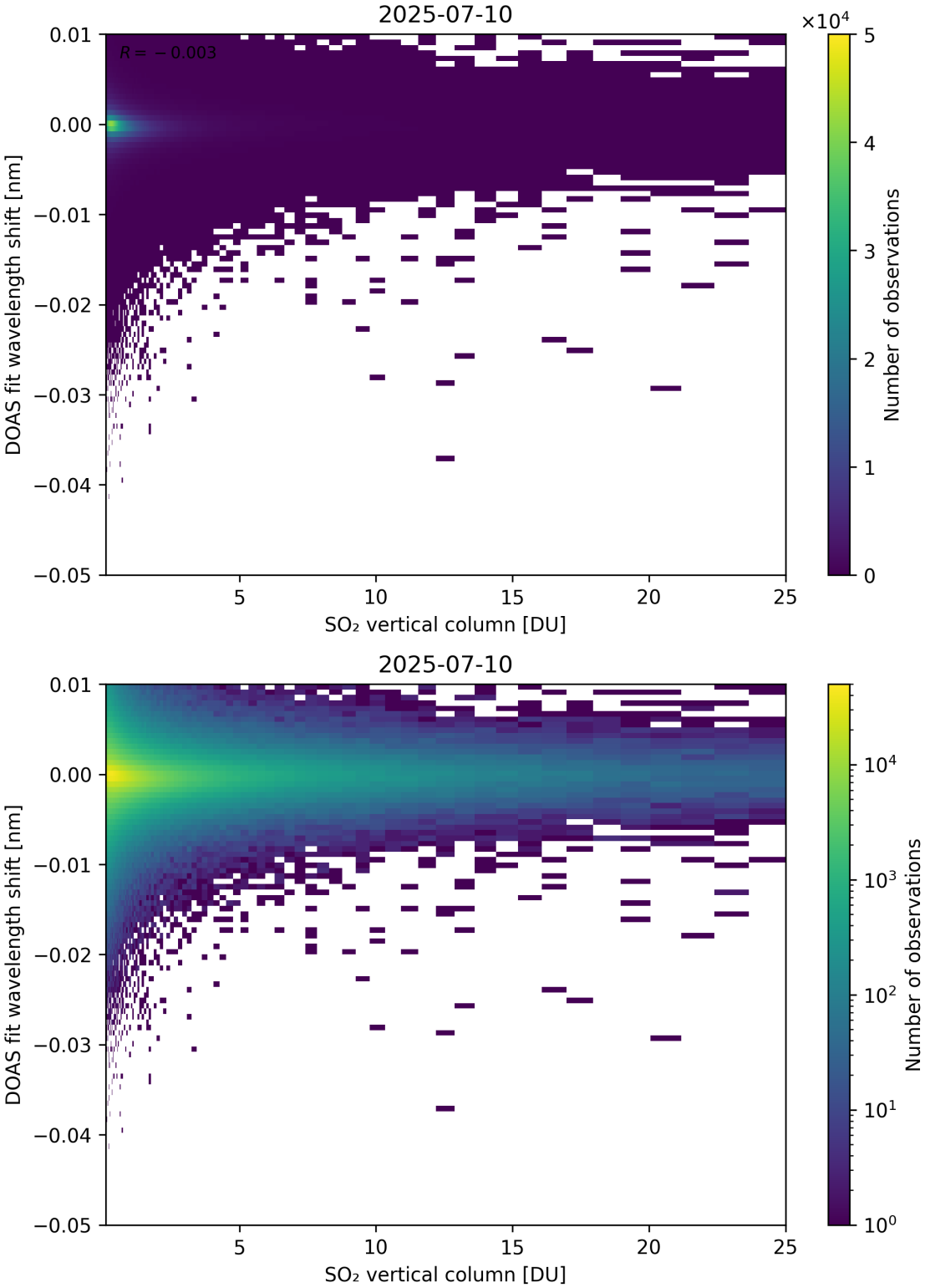

Figure 326: Scatter density plot of "SO_2 vertical column" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

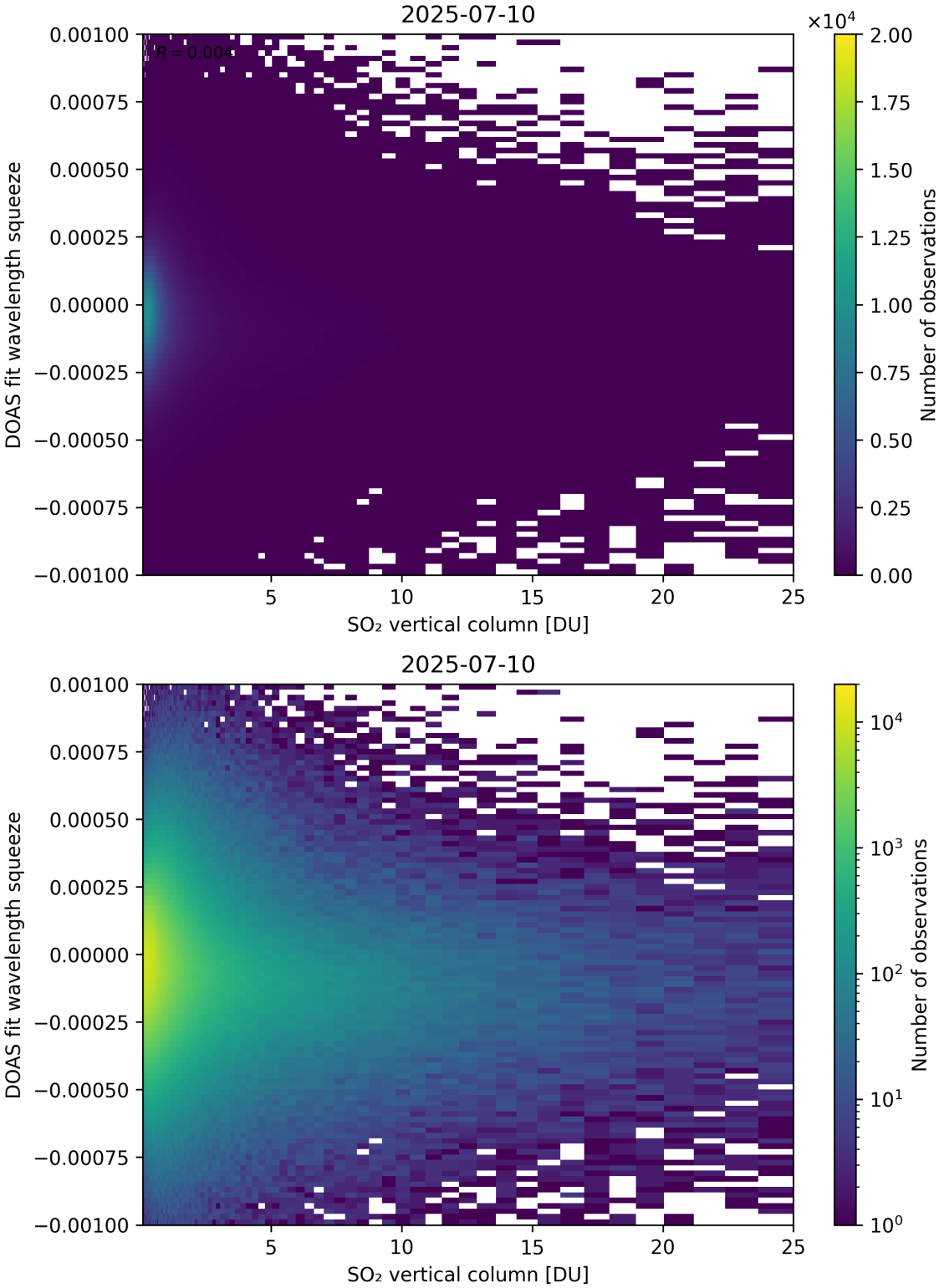

Figure 327: Scatter density plot of "SO_2 vertical column" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

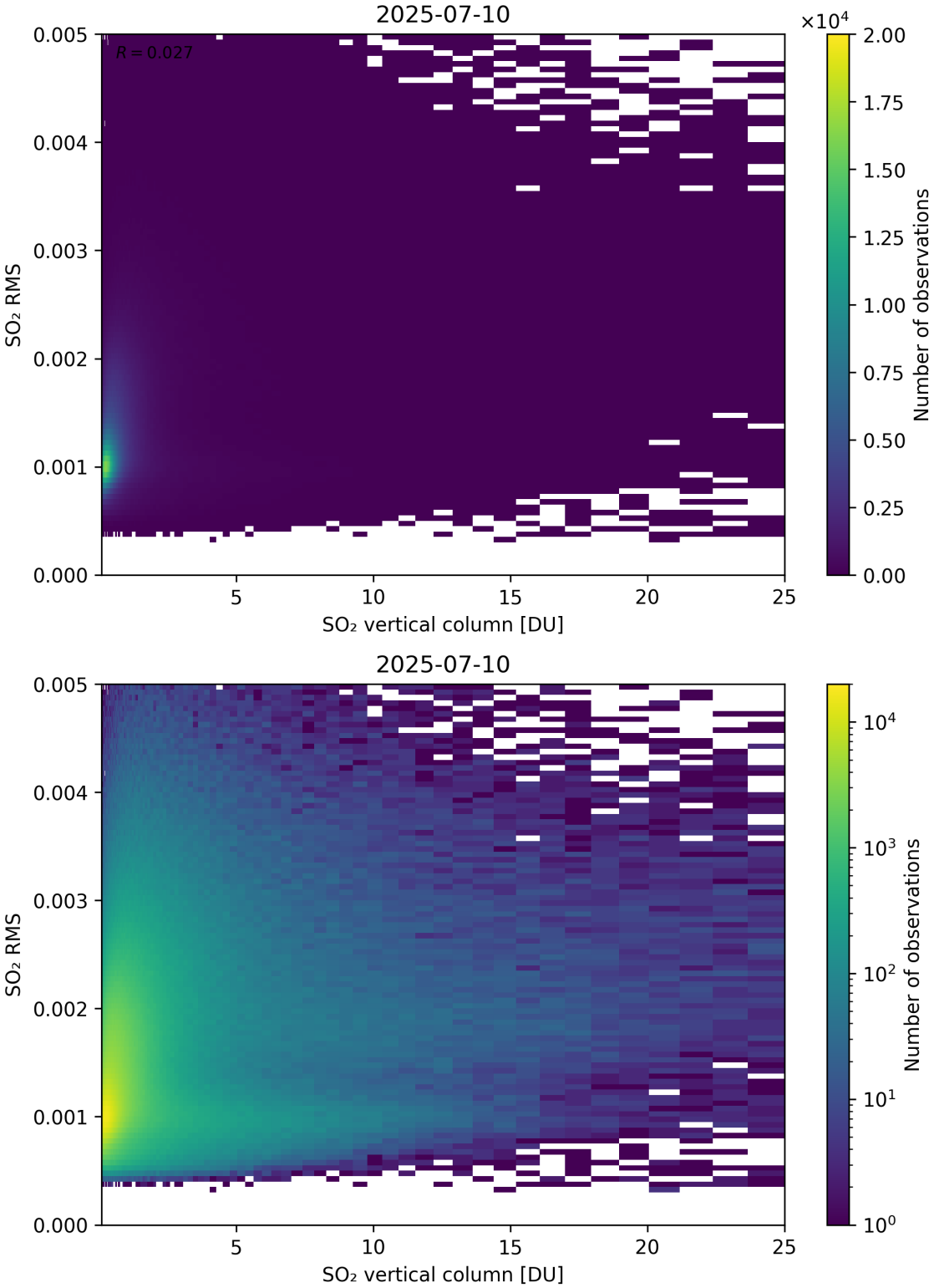

Figure 328: Scatter density plot of "SO_2 vertical column" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

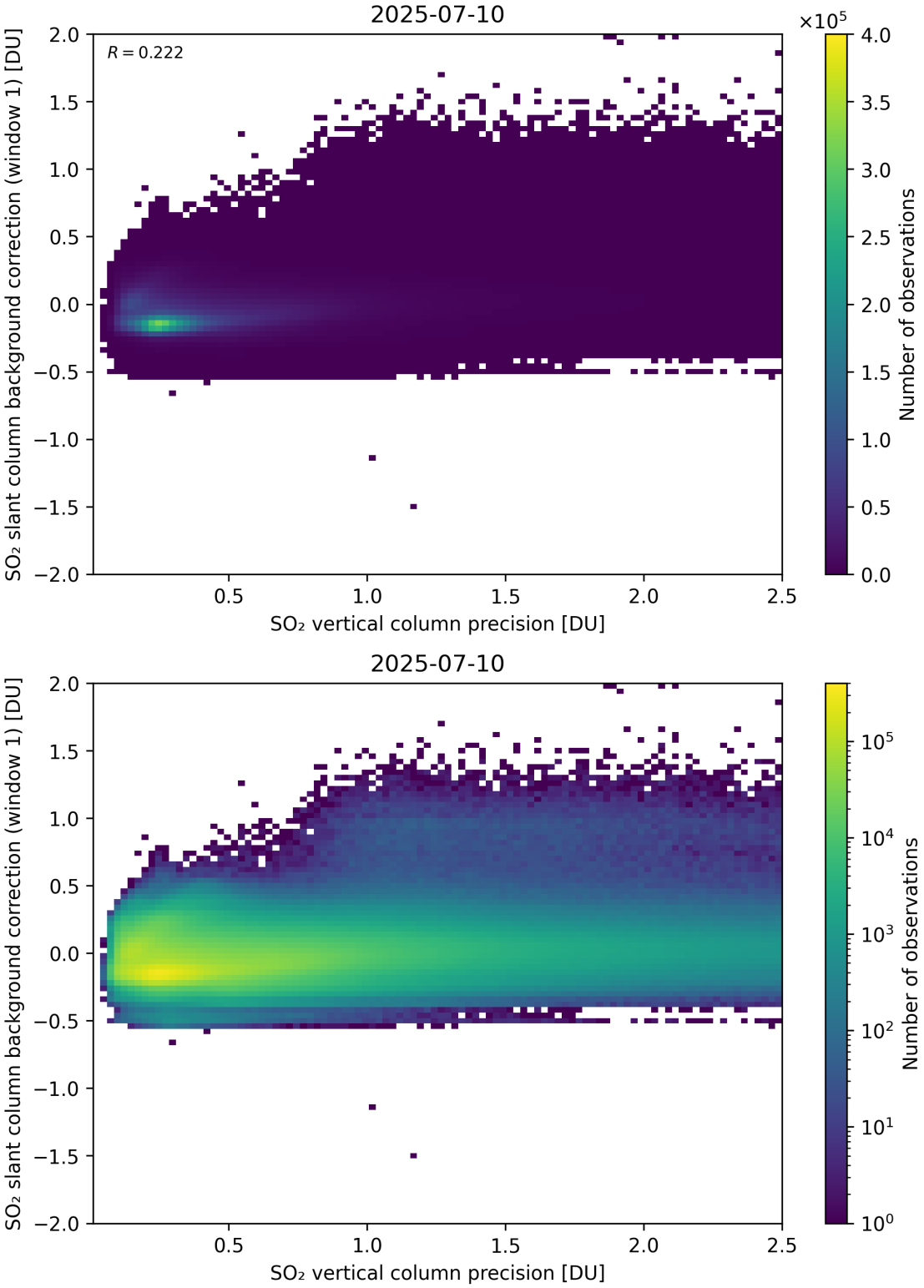

Figure 329: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

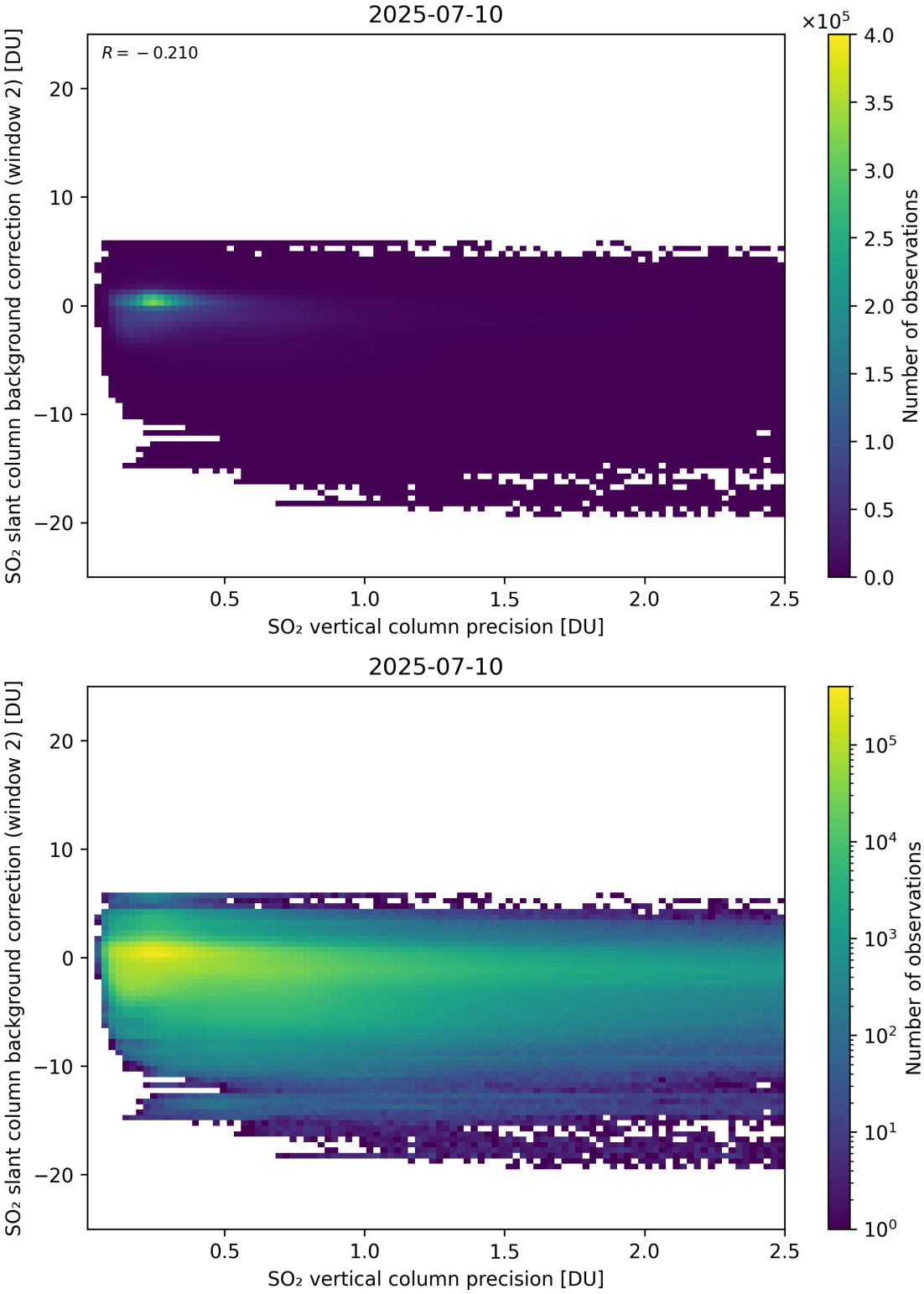

Figure 330: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

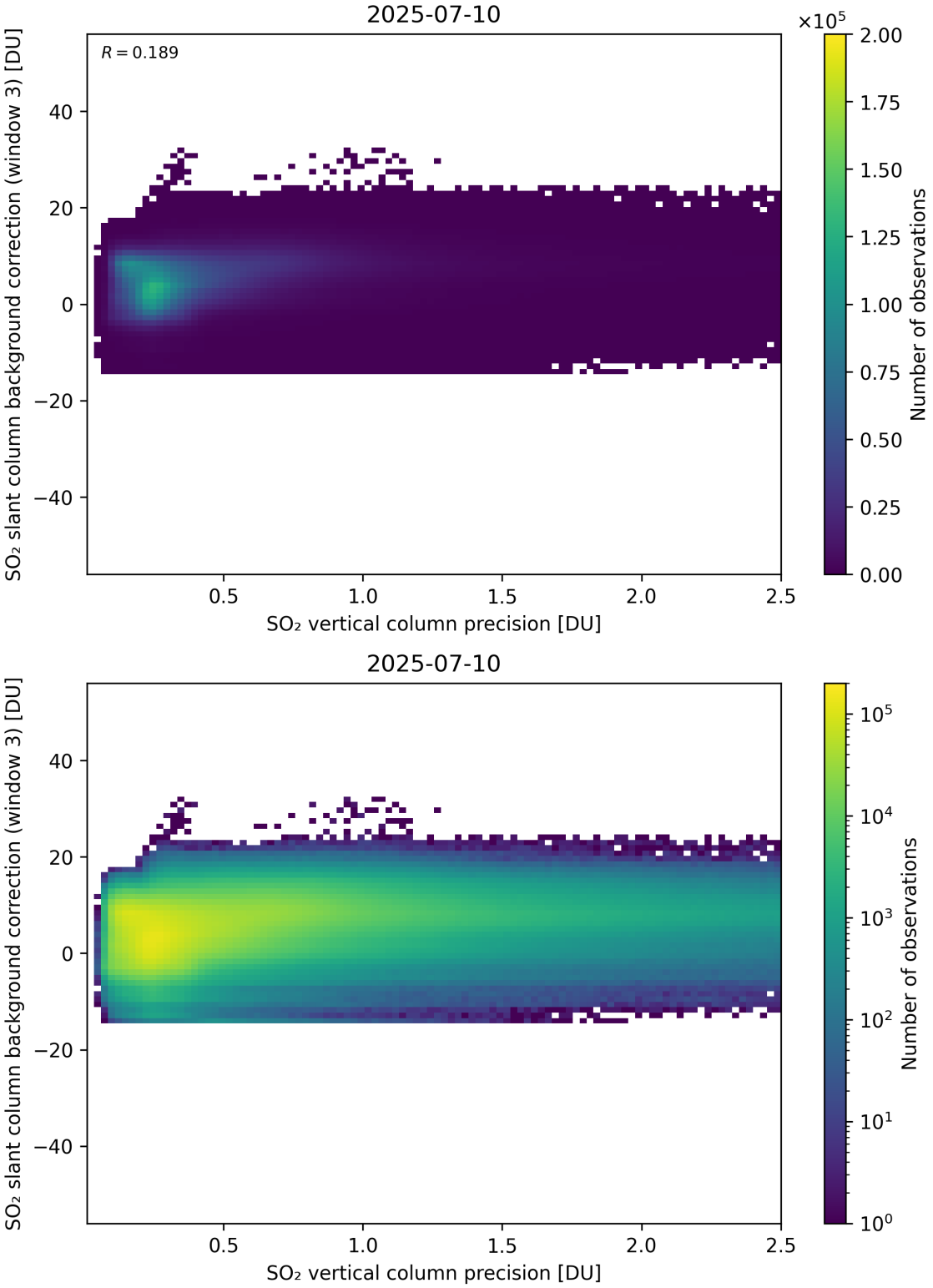

Figure 331: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

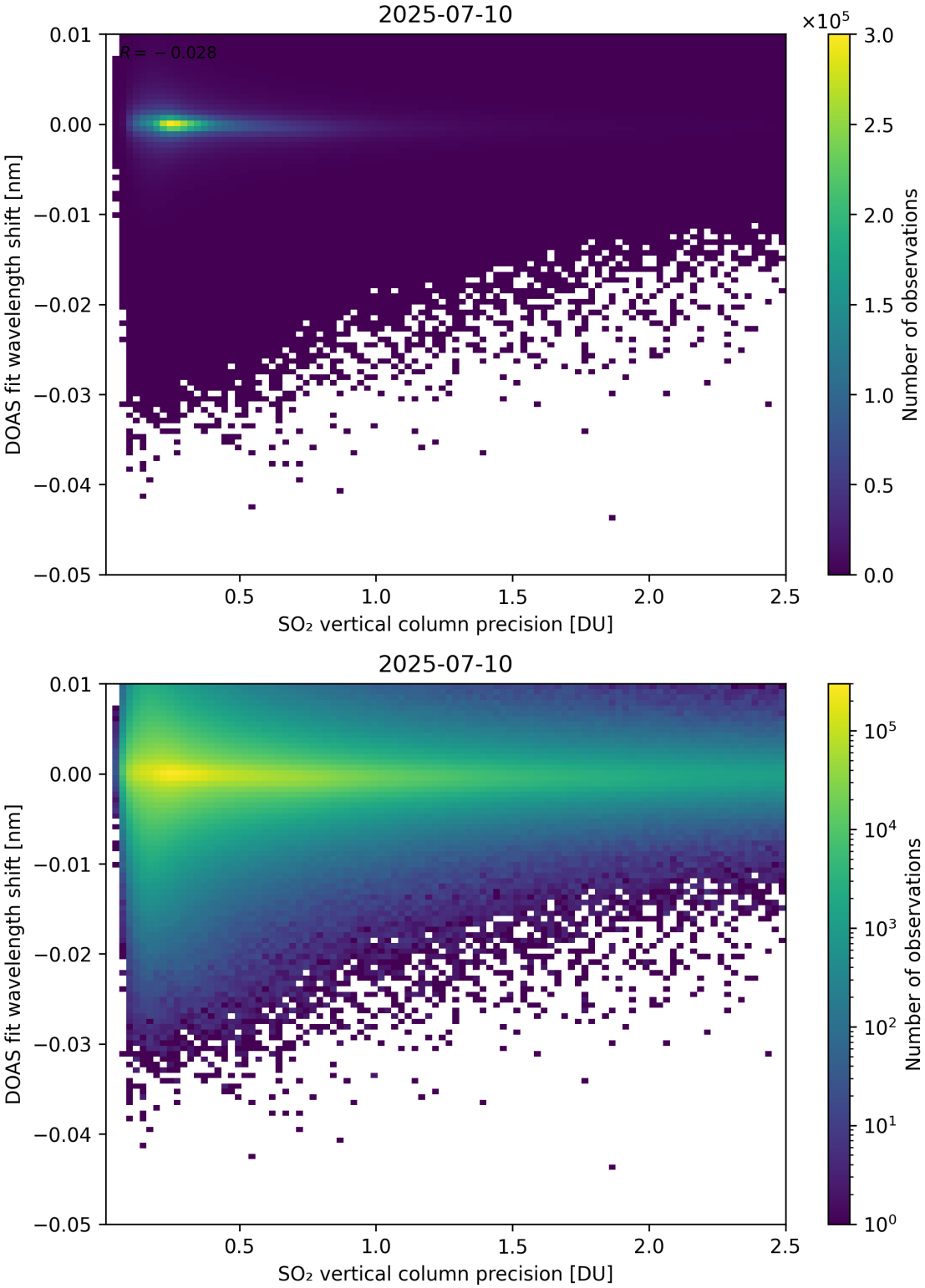

Figure 332: Scatter density plot of "SO_2 vertical column precision" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11.

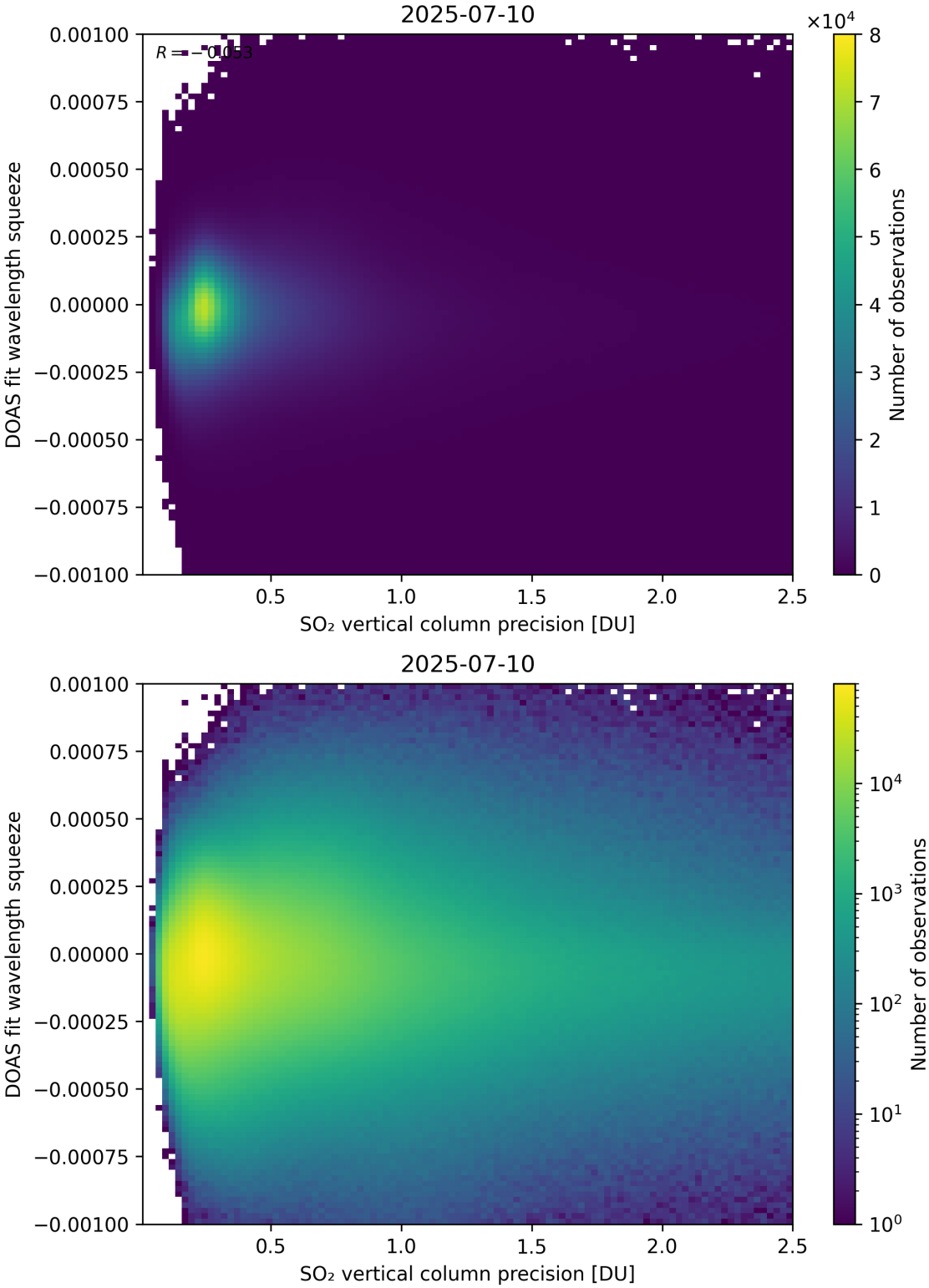

Figure 333: Scatter density plot of "SO_2 vertical column precision" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11.

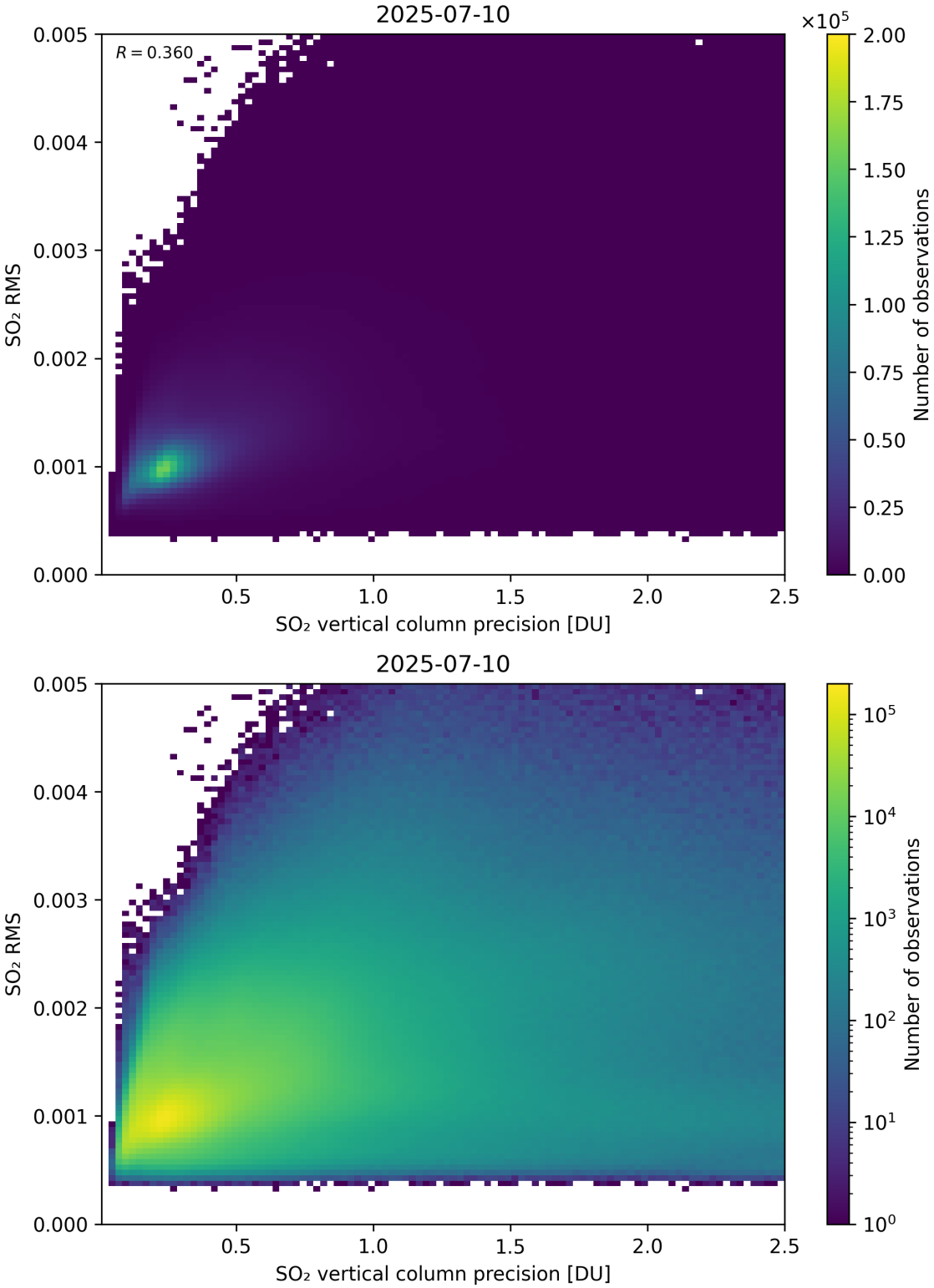

Figure 334: Scatter density plot of "SO_2 vertical column precision" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

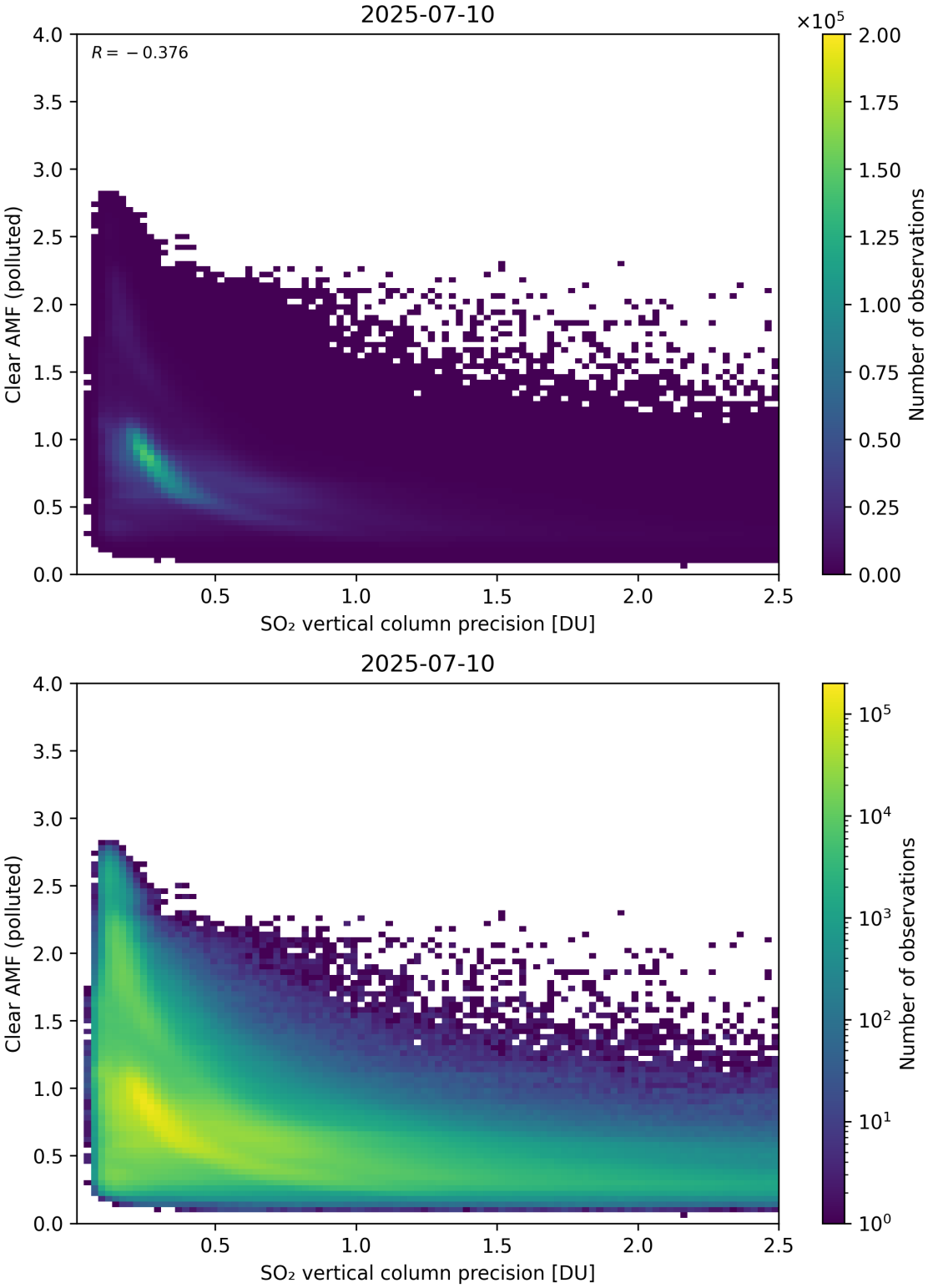

Figure 335: Scatter density plot of "SO_2 vertical column precision" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

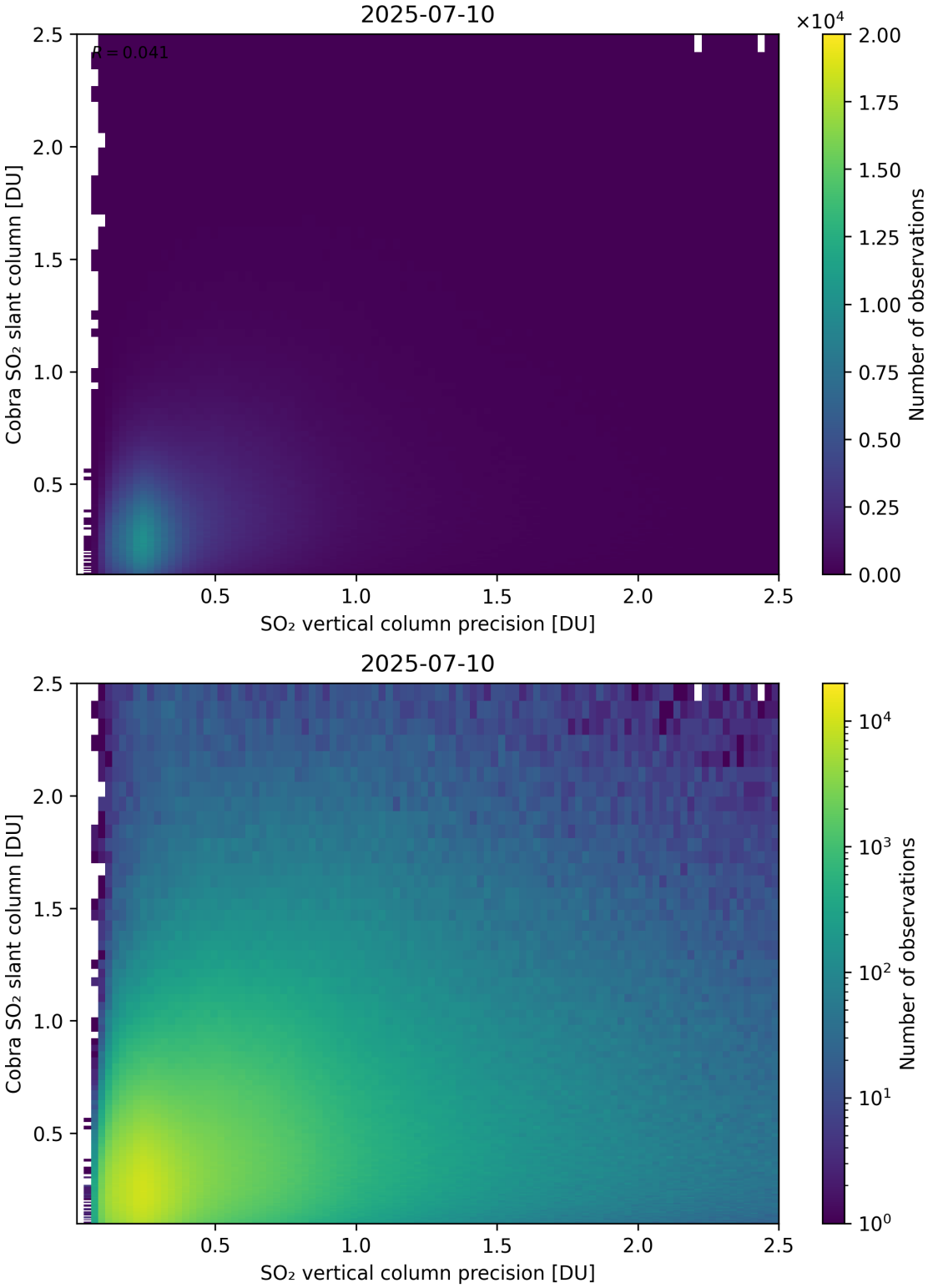

Figure 336: Scatter density plot of "SO_2 vertical column precision" against "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11.

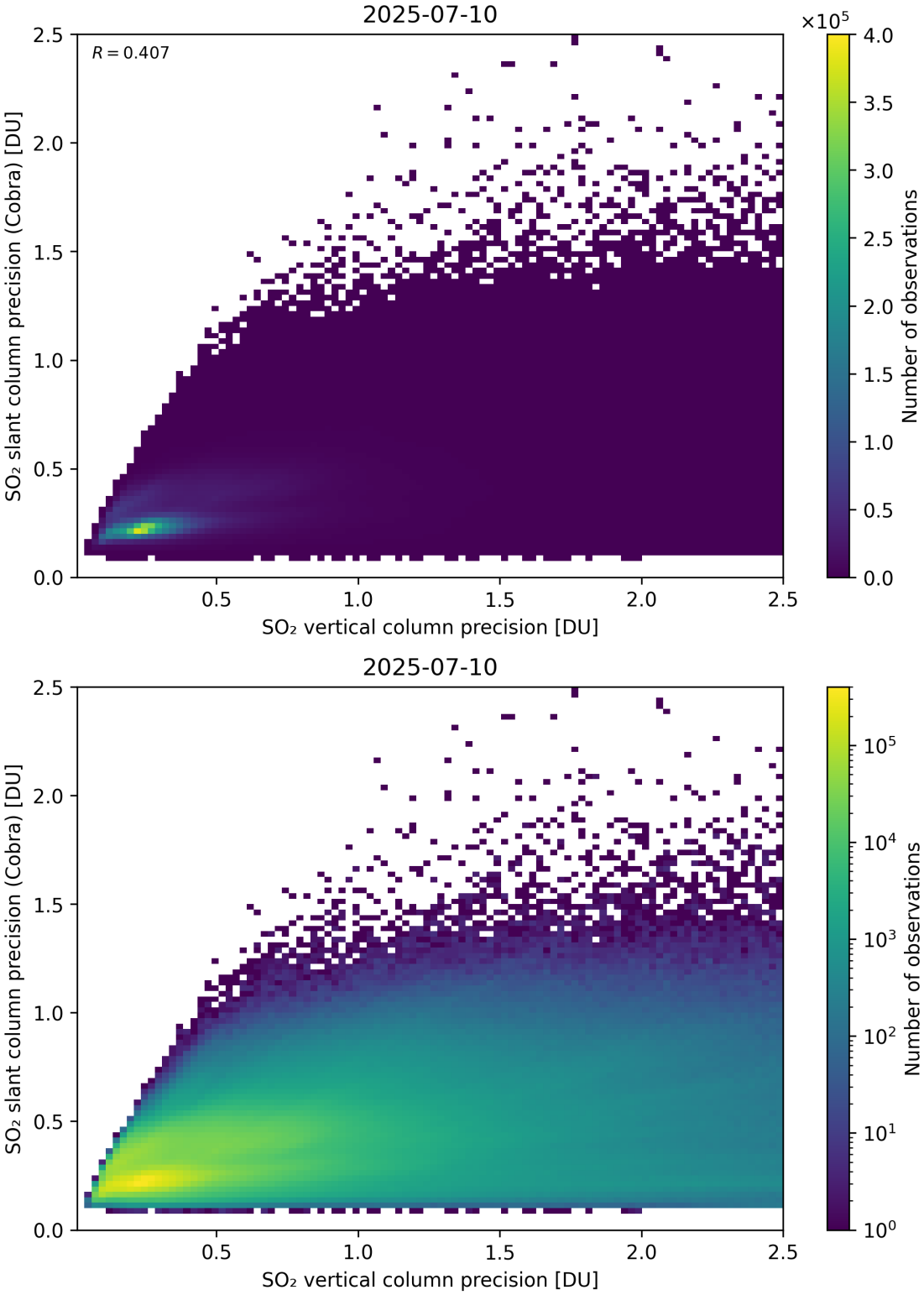

Figure 337: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11.

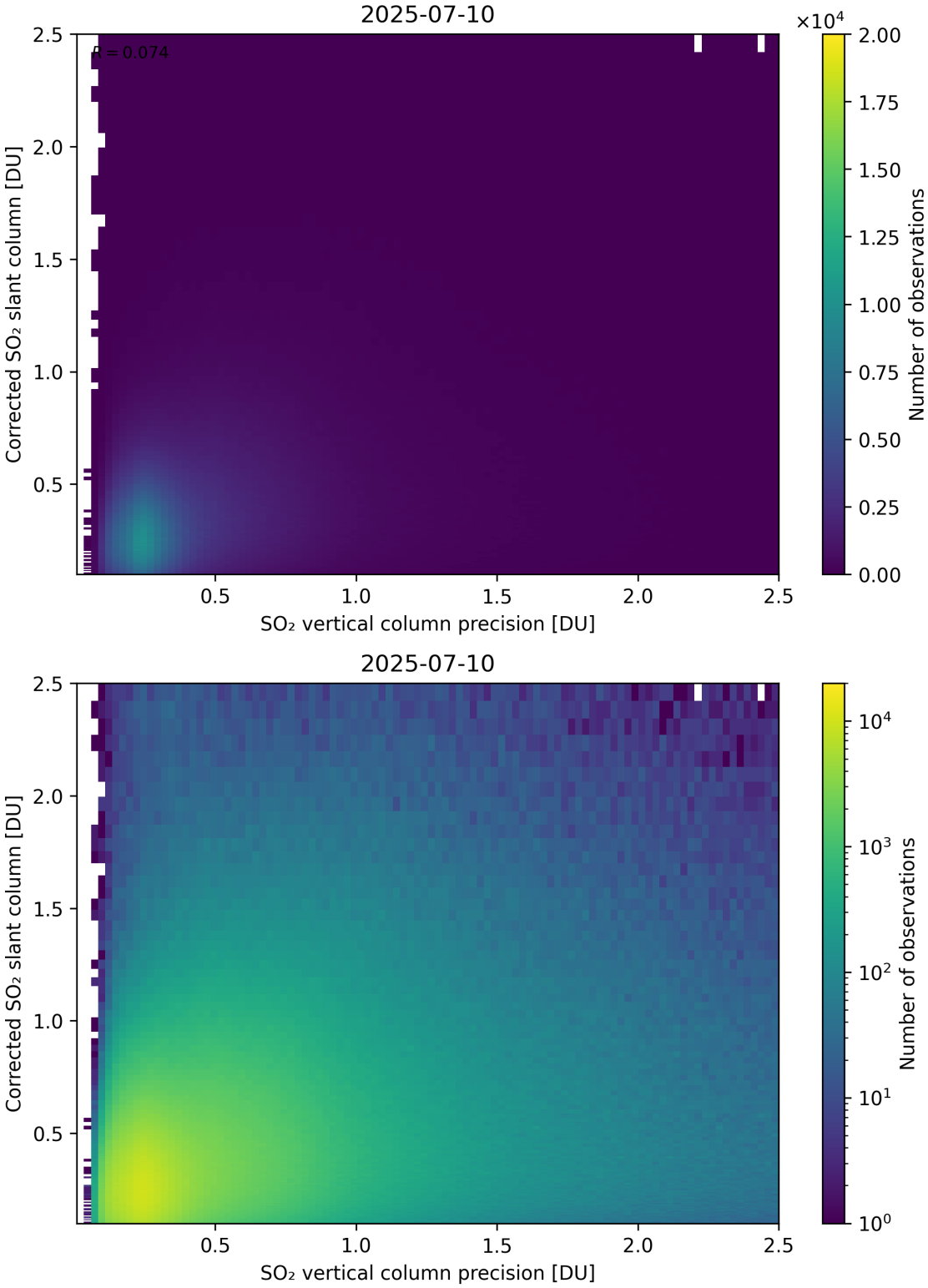

Figure 338: Scatter density plot of "SO_2 vertical column precision" against "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11.

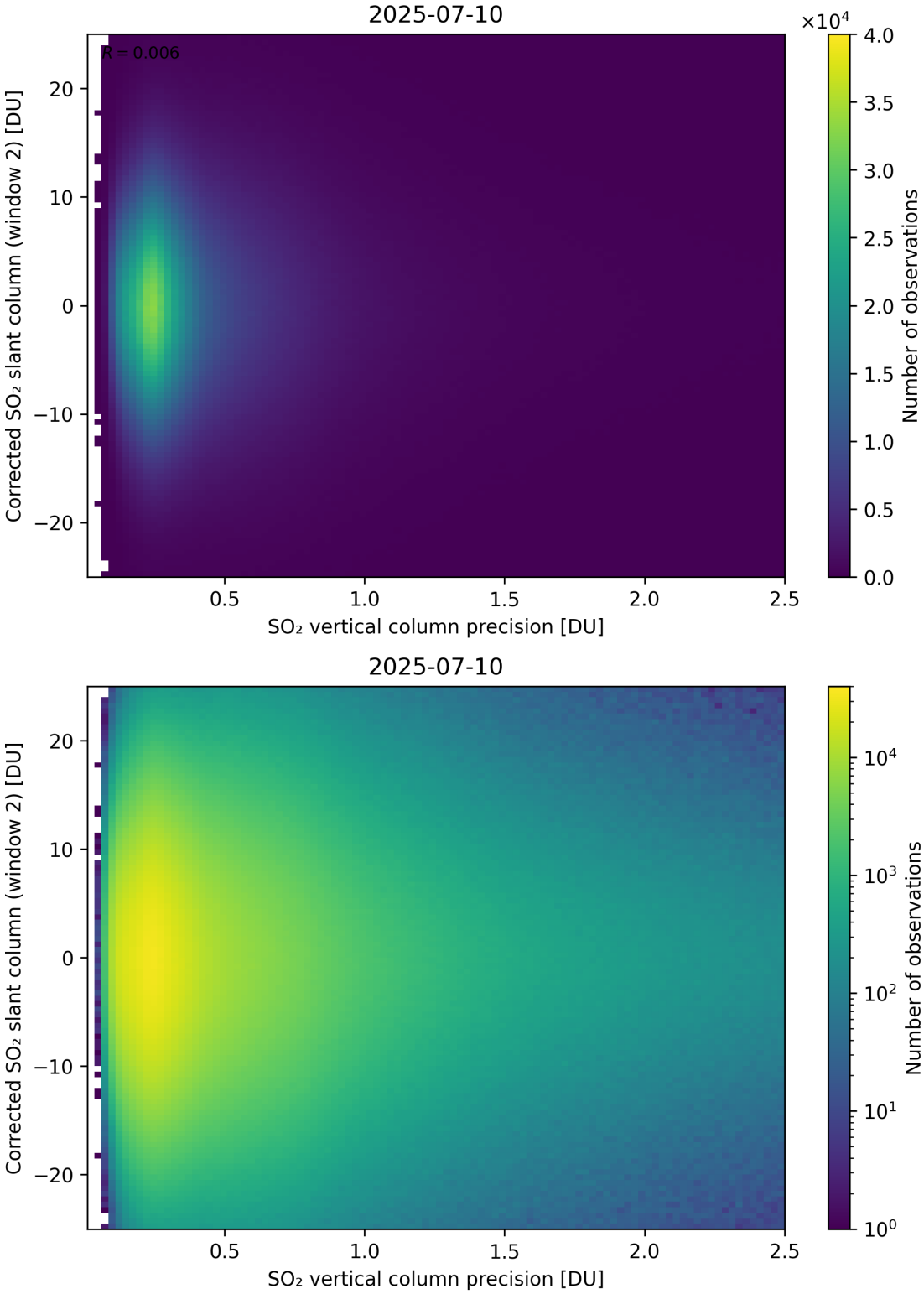

Figure 339: Scatter density plot of "SO_2 vertical column precision" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

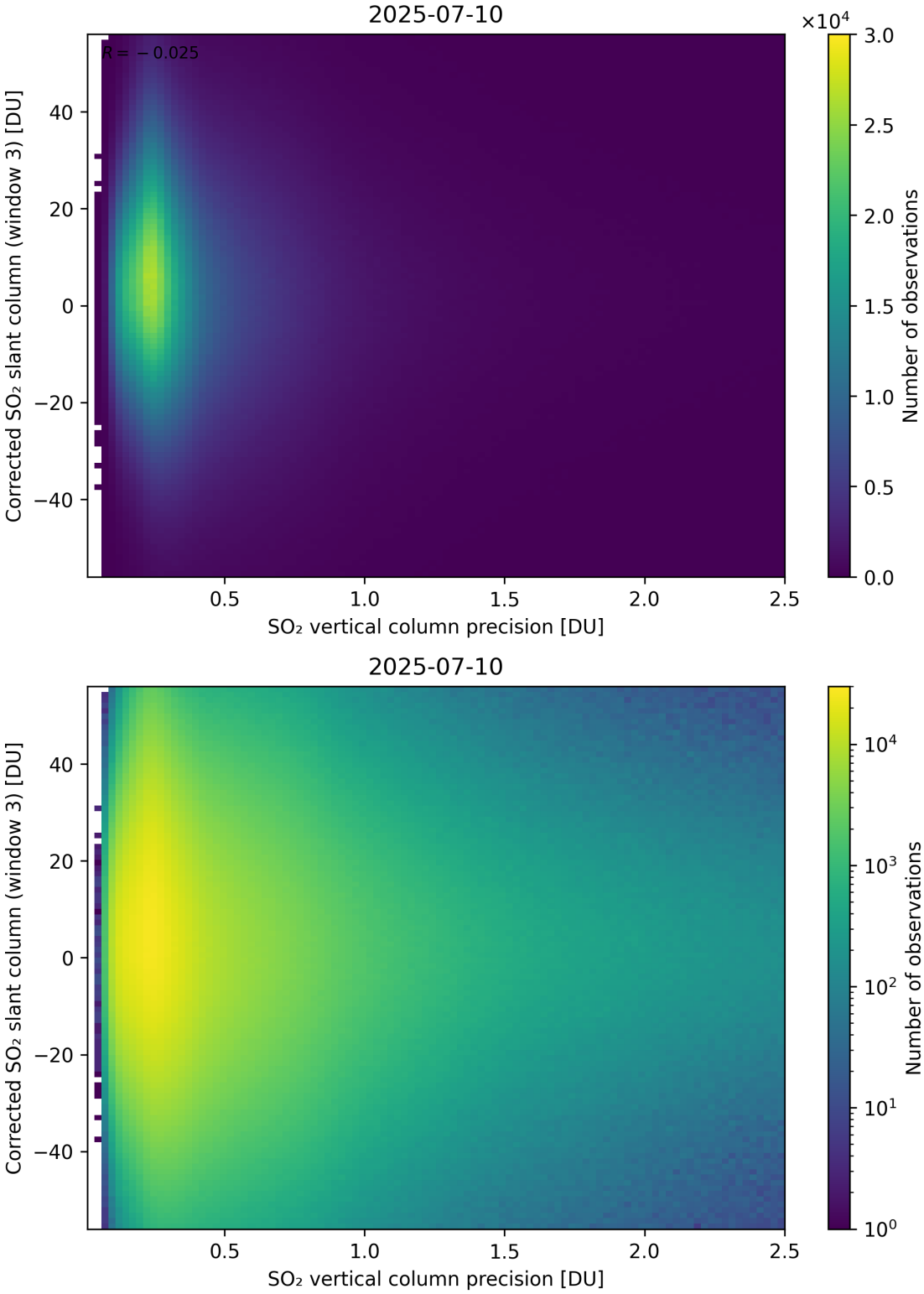

Figure 340: Scatter density plot of "SO_2 vertical column precision" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

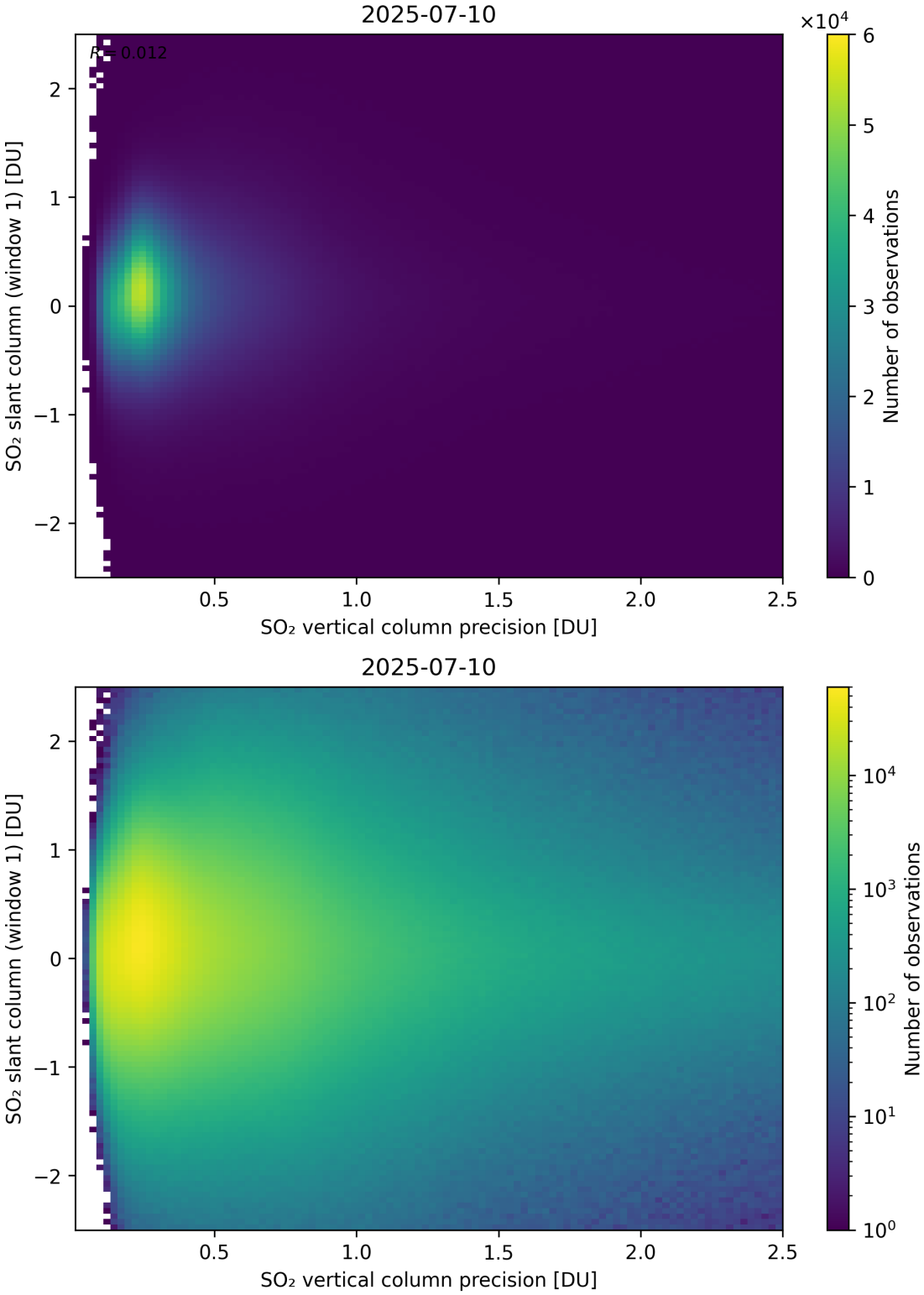

Figure 341: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

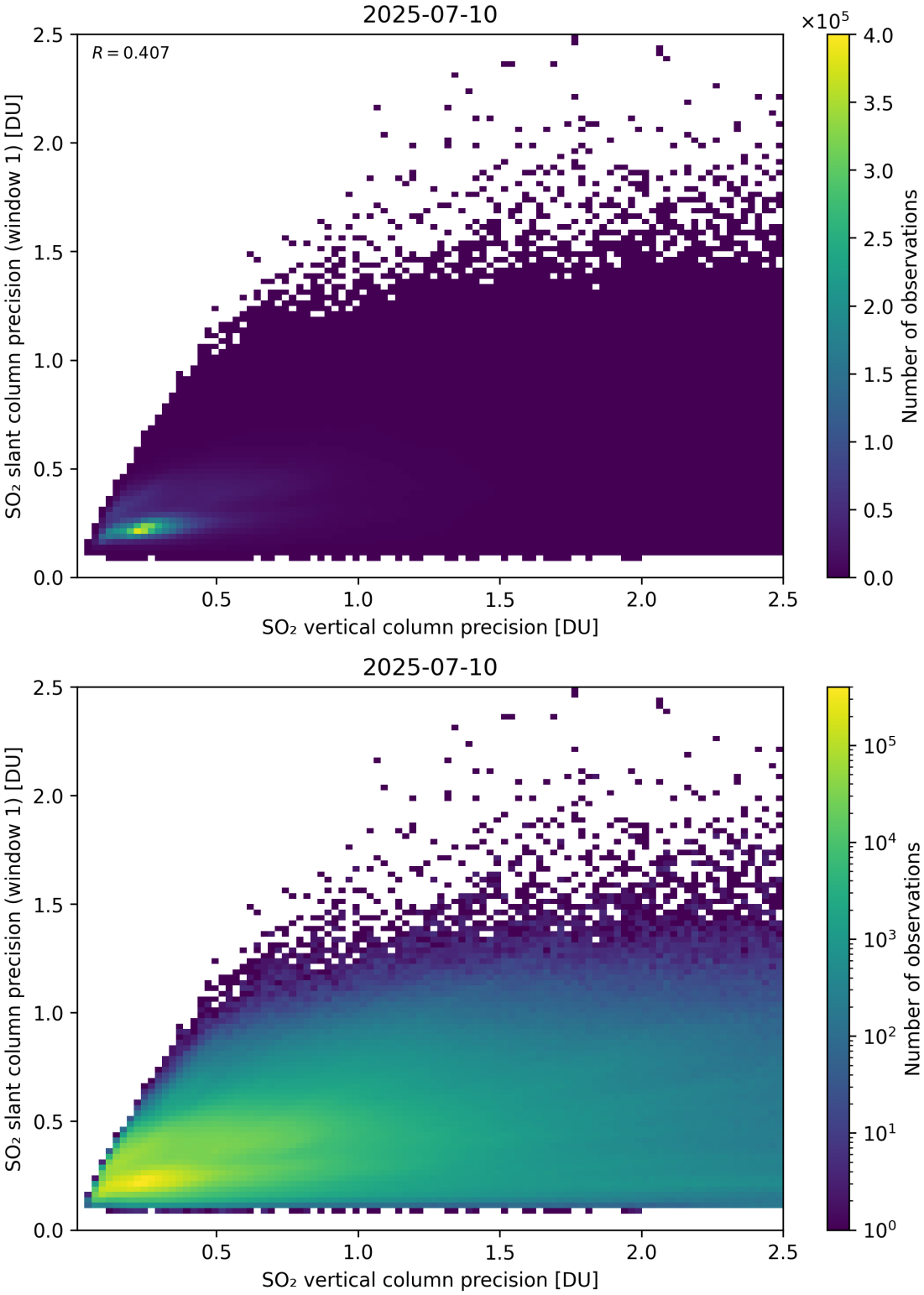

Figure 342: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

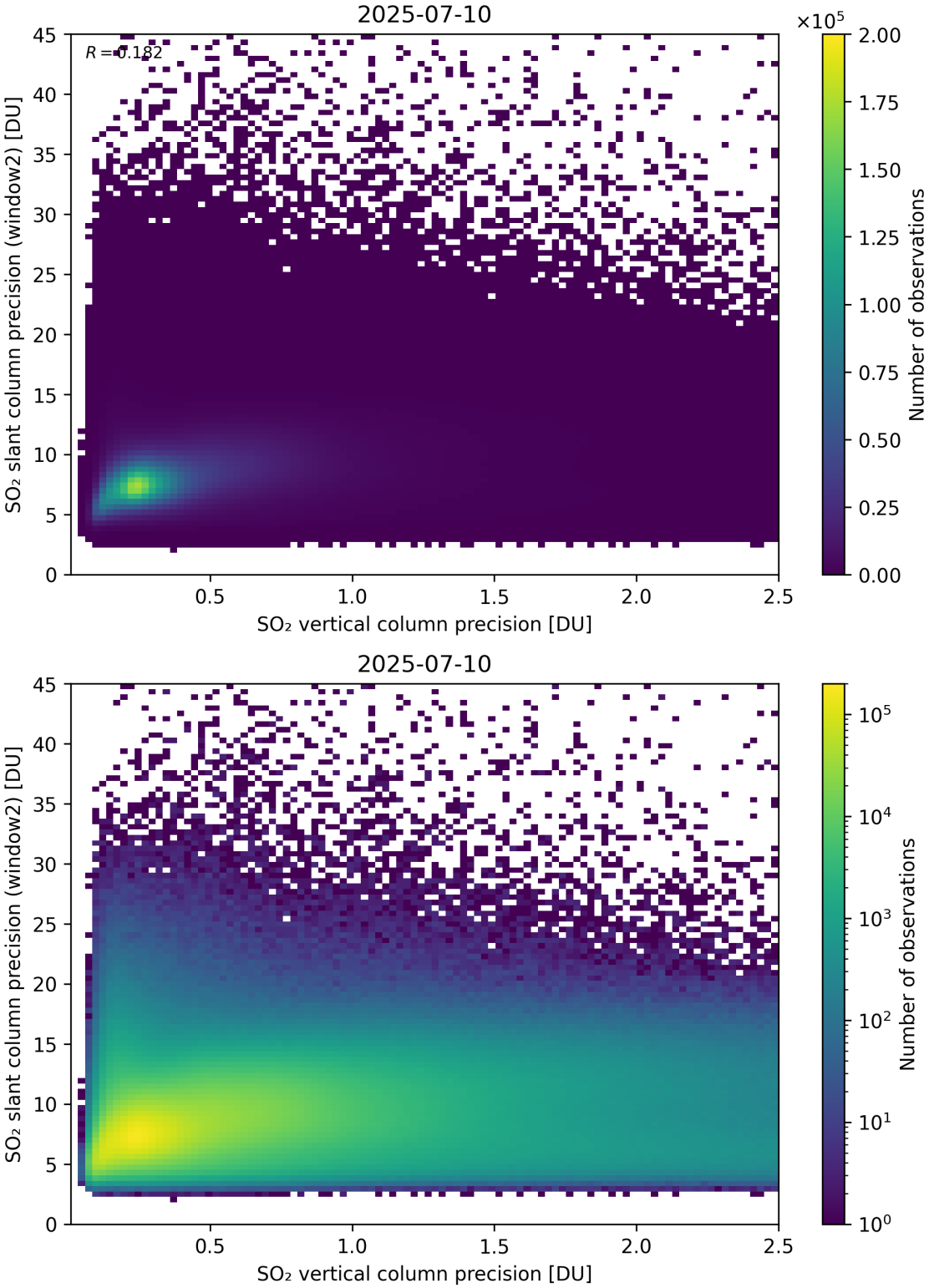

Figure 343: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

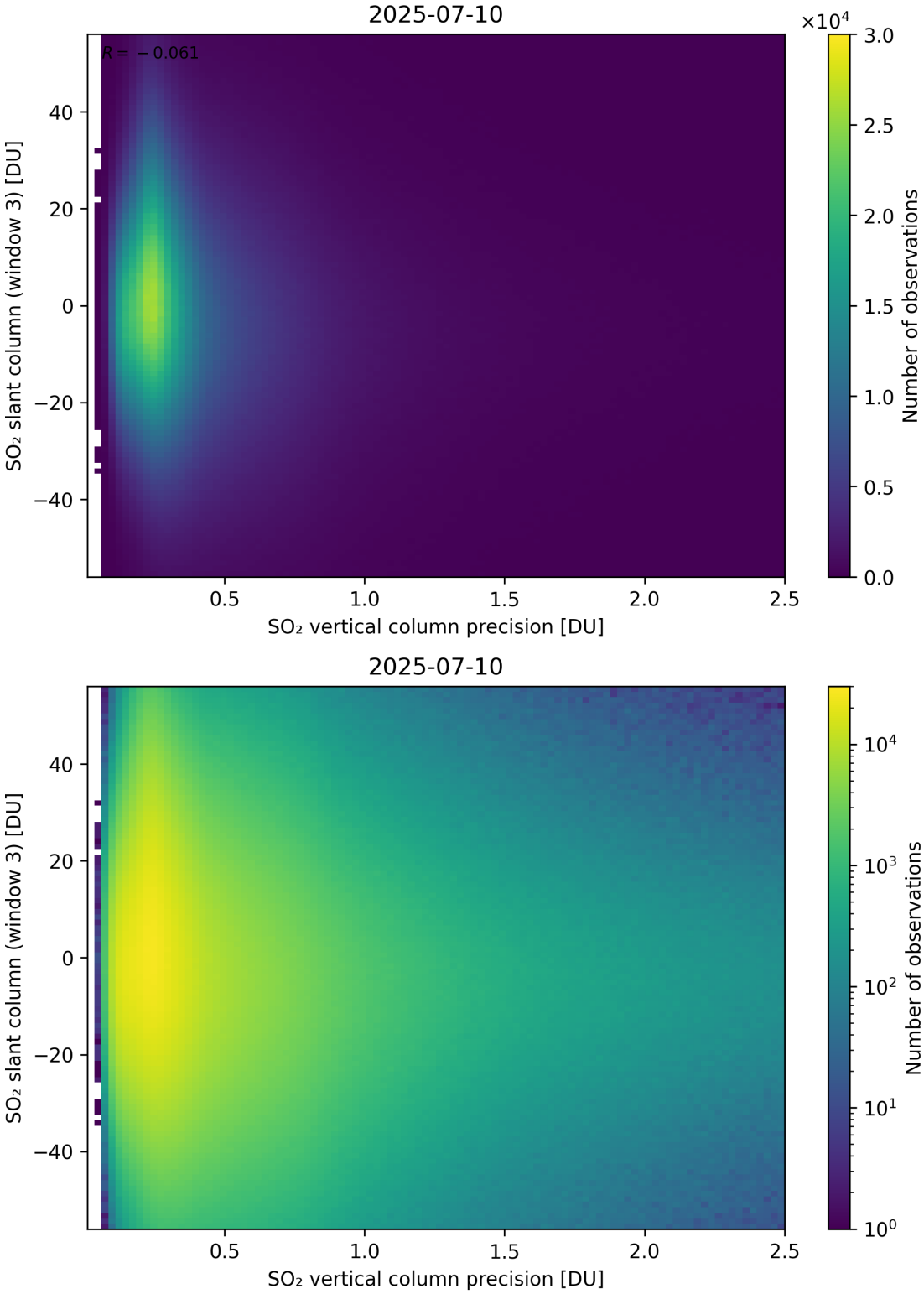

Figure 344: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

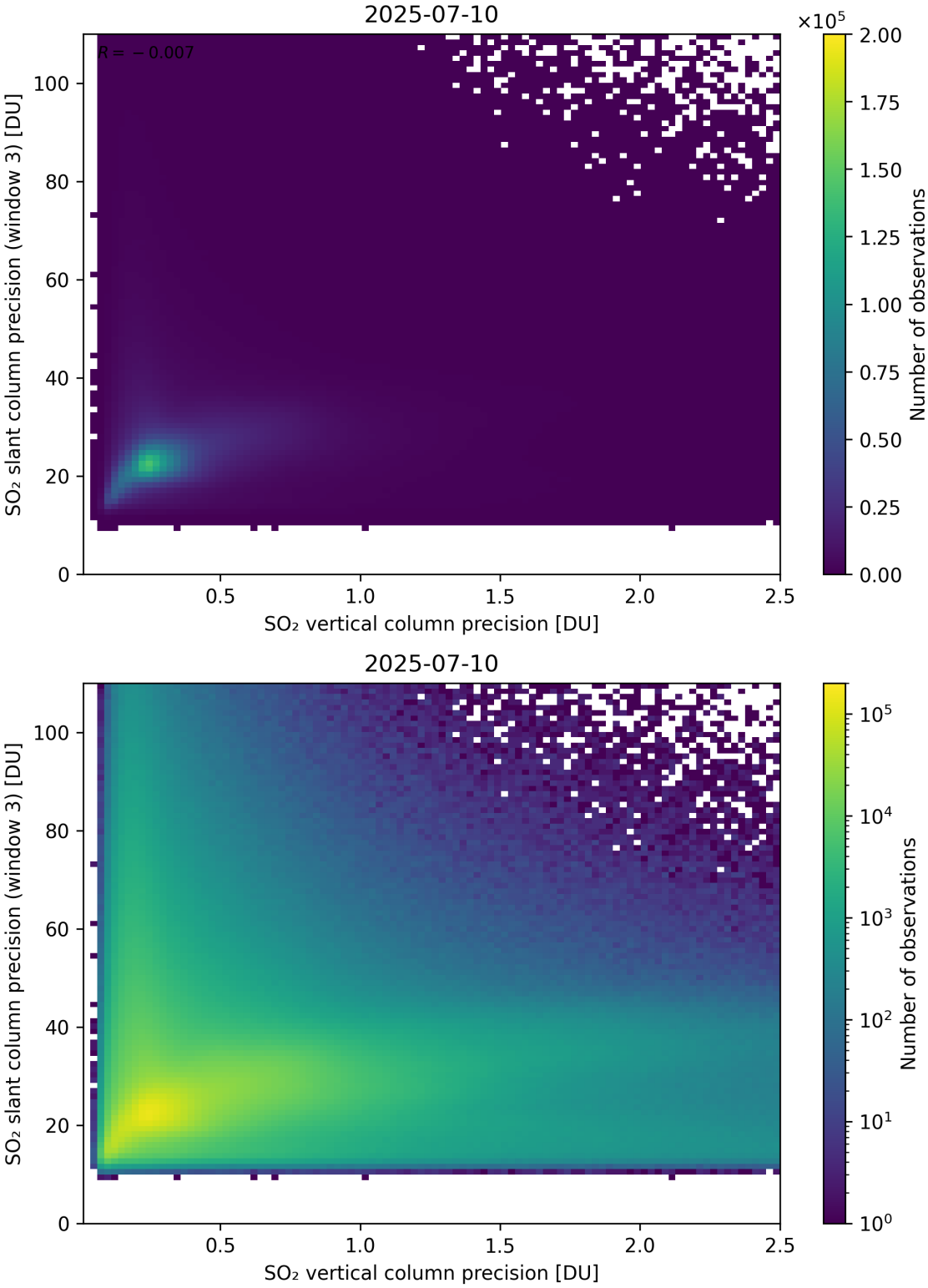

Figure 345: Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

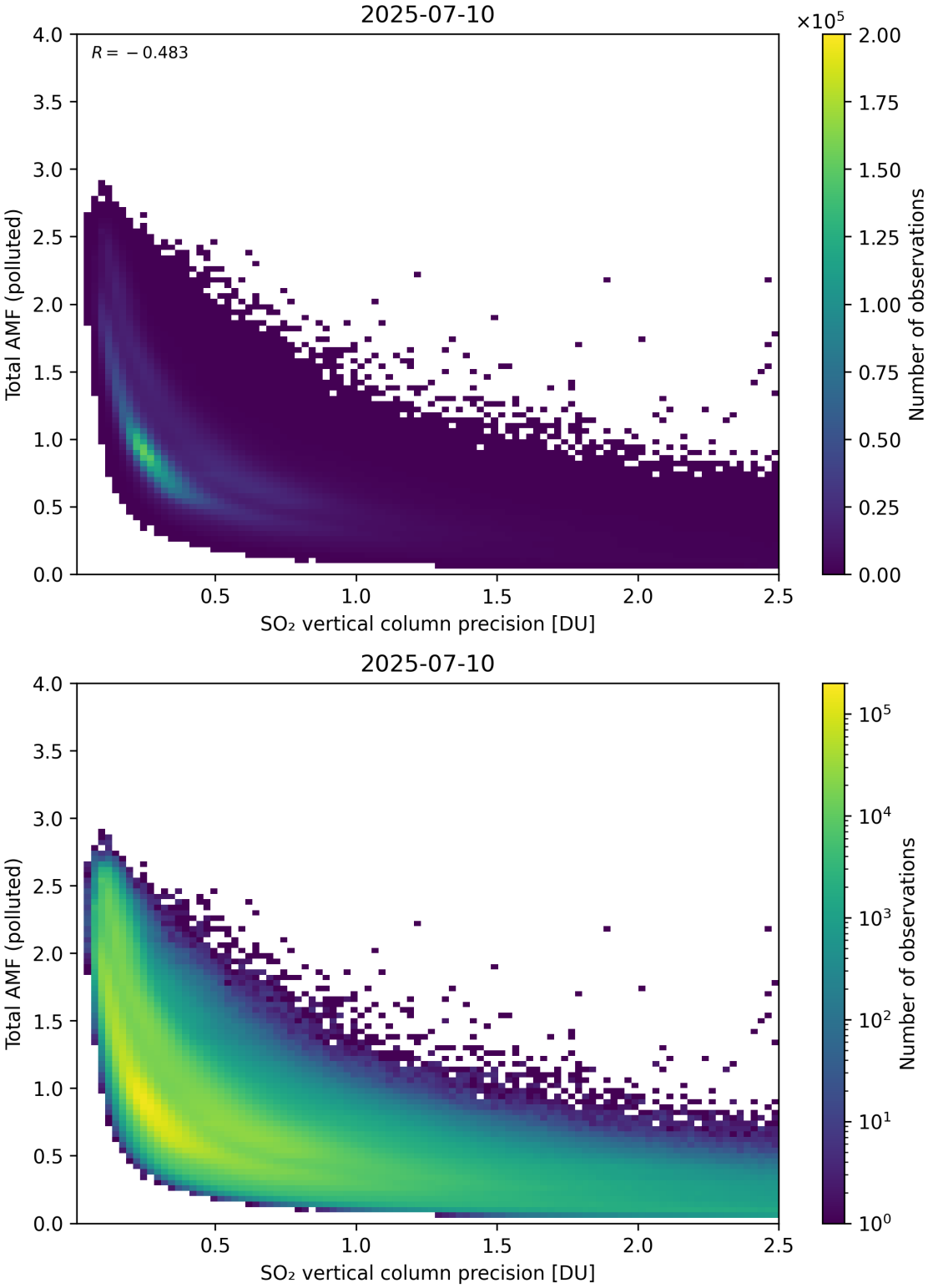

Figure 346: Scatter density plot of "SO_2 vertical column precision" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

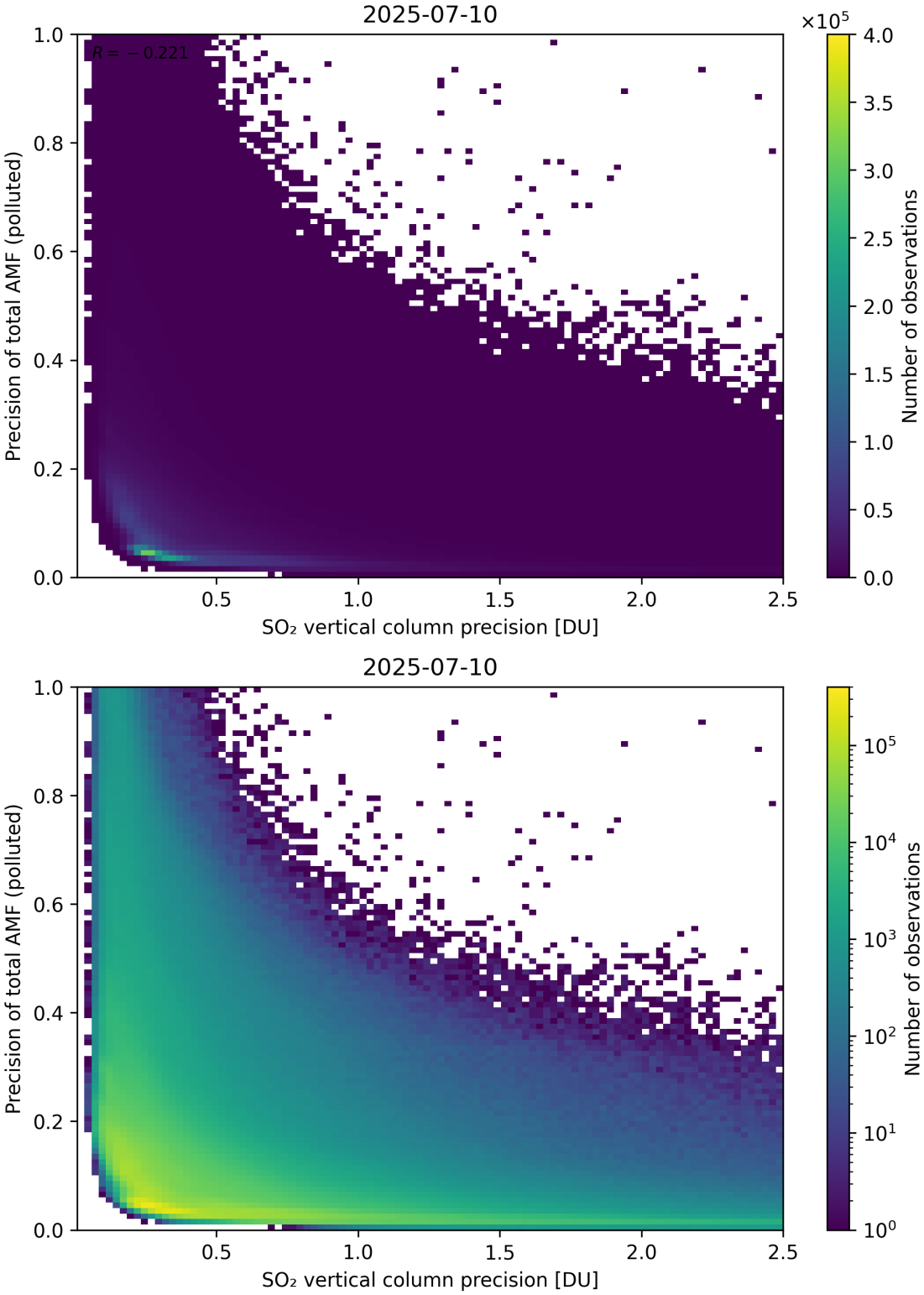

Figure 347: Scatter density plot of "SO_2 vertical column precision" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

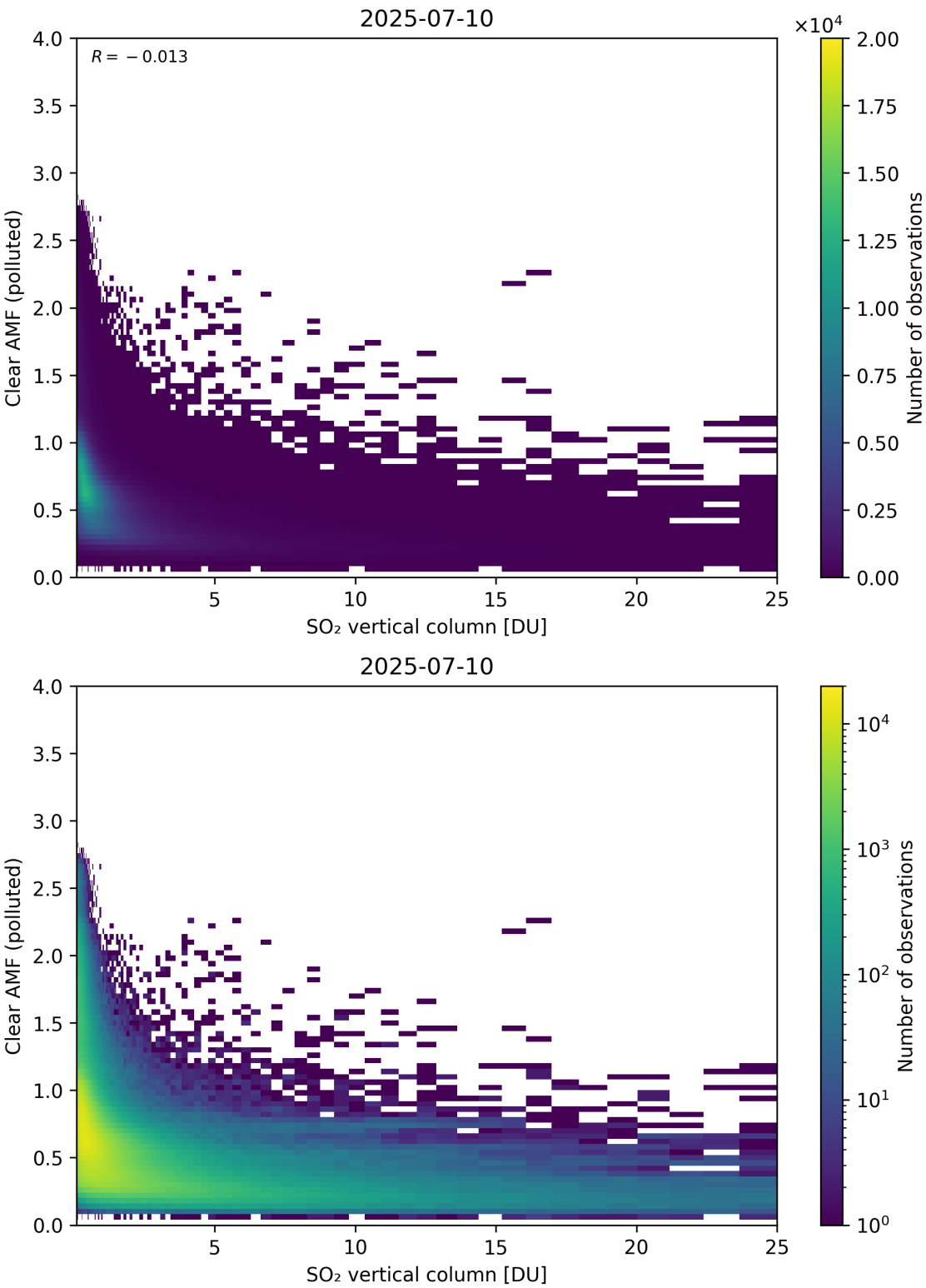

Figure 348: Scatter density plot of "SO_2 vertical column" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11.

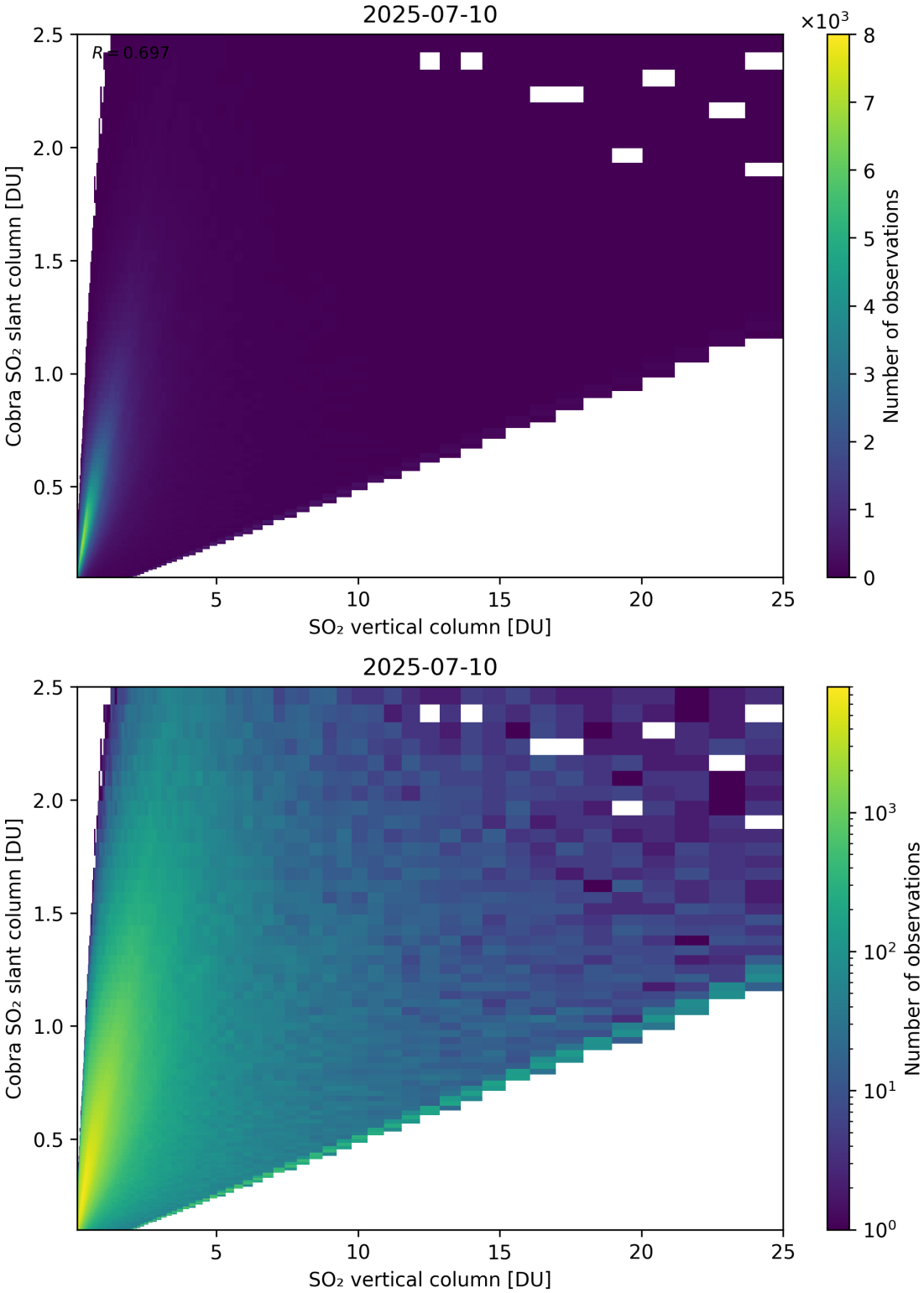

Figure 349: Scatter density plot of "SO_2 vertical column" against "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11.

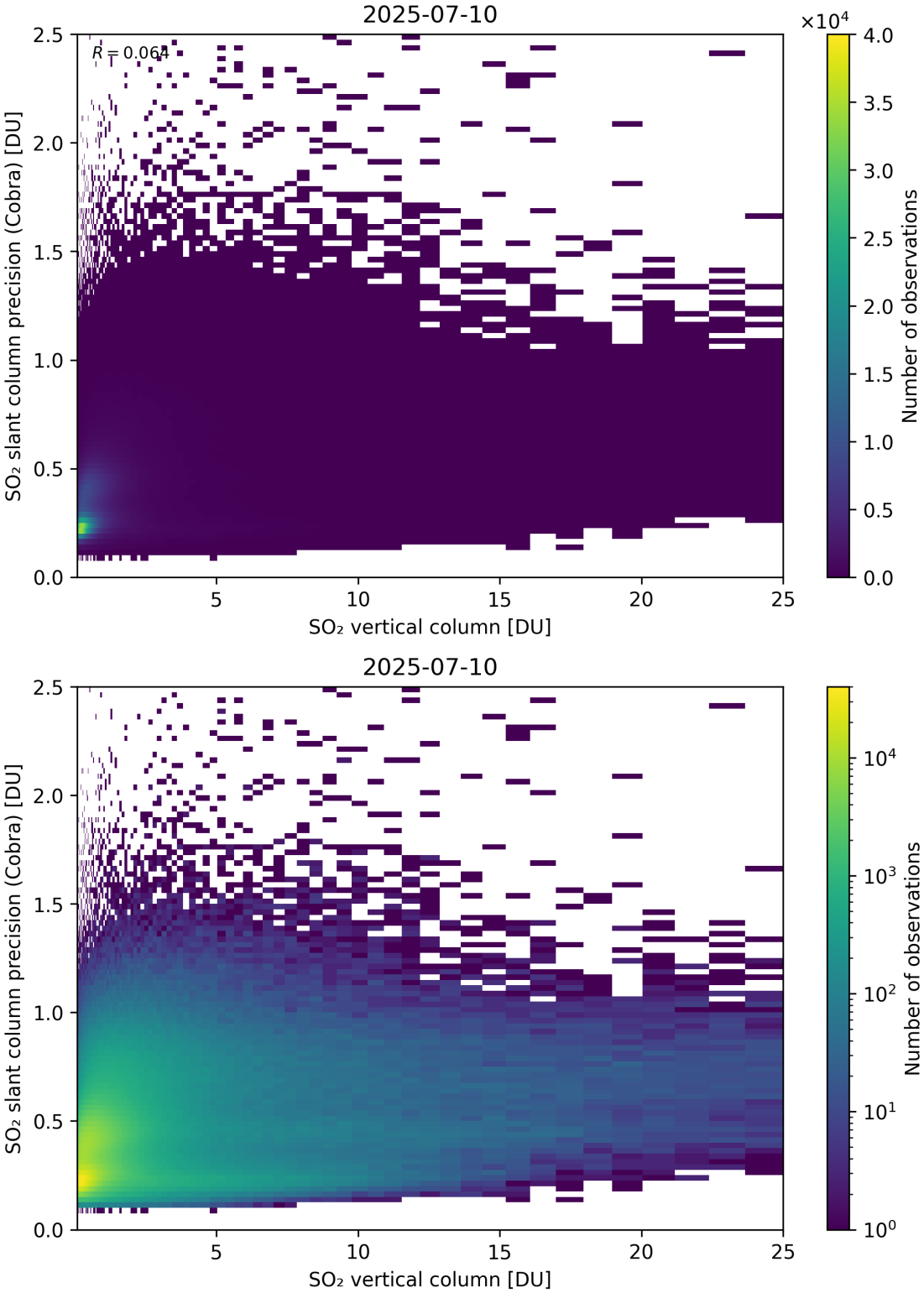

Figure 350: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11.

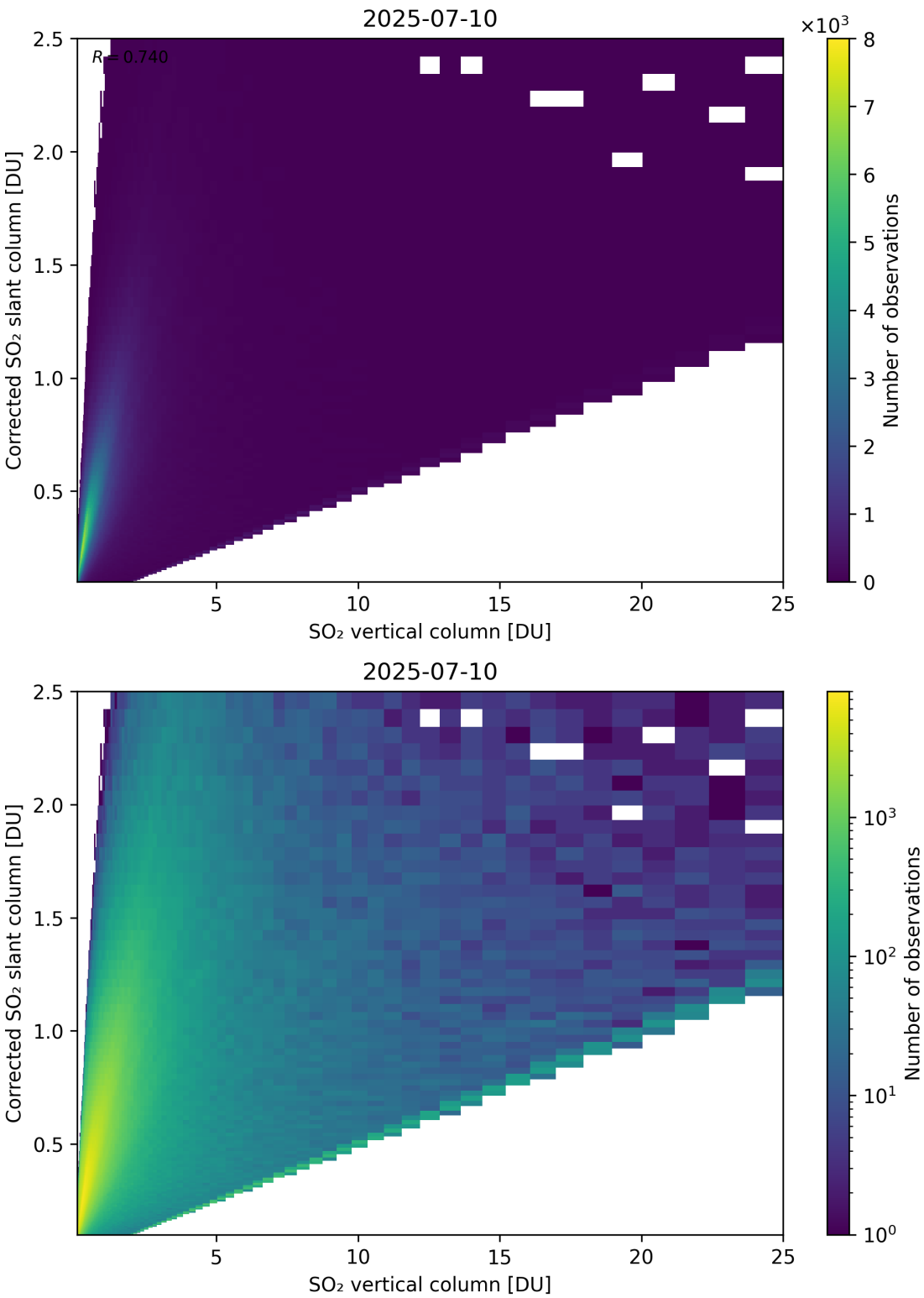

Figure 351: Scatter density plot of "SO_2 vertical column" against "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11.

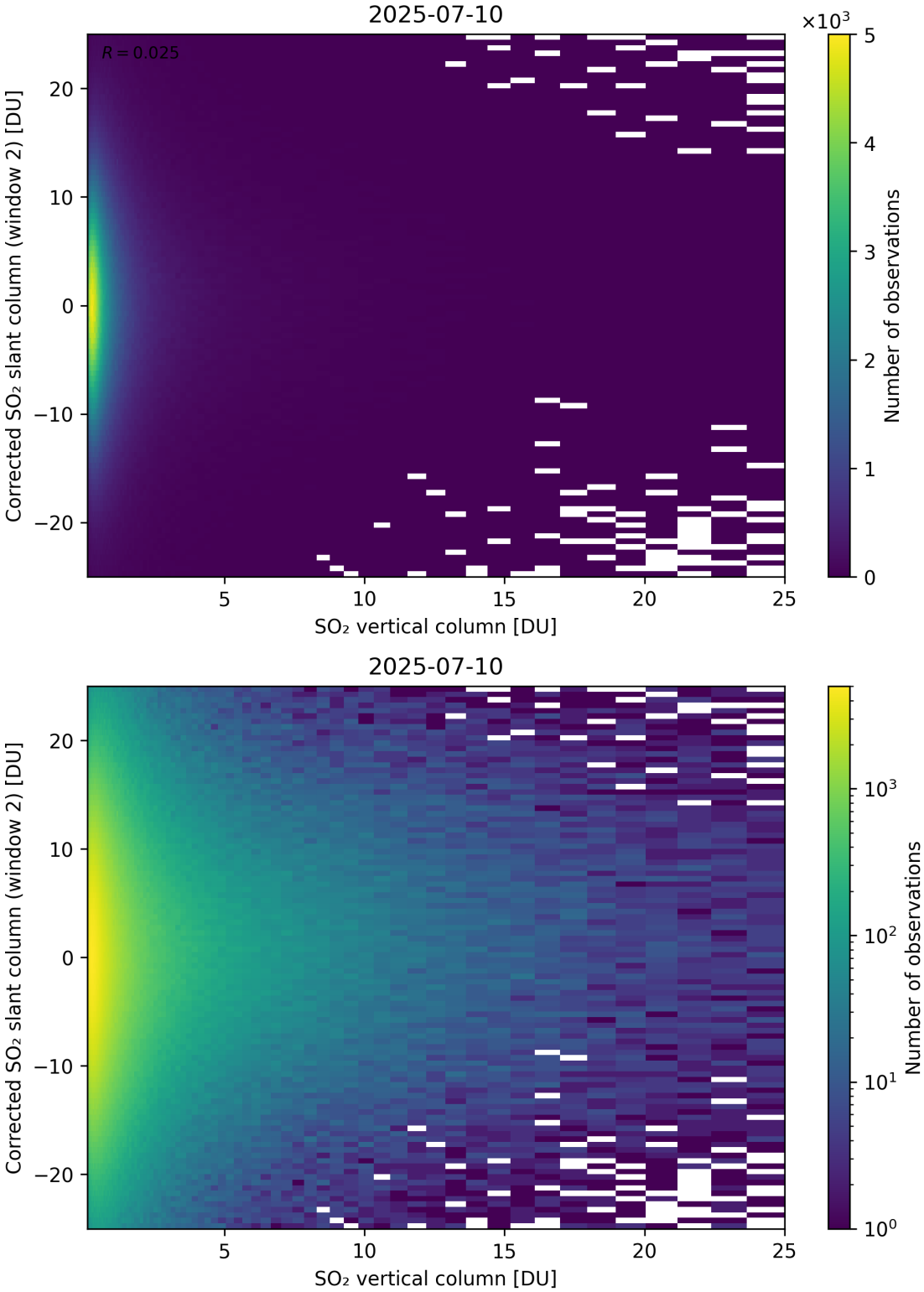

Figure 352: Scatter density plot of "SO_2 vertical column" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

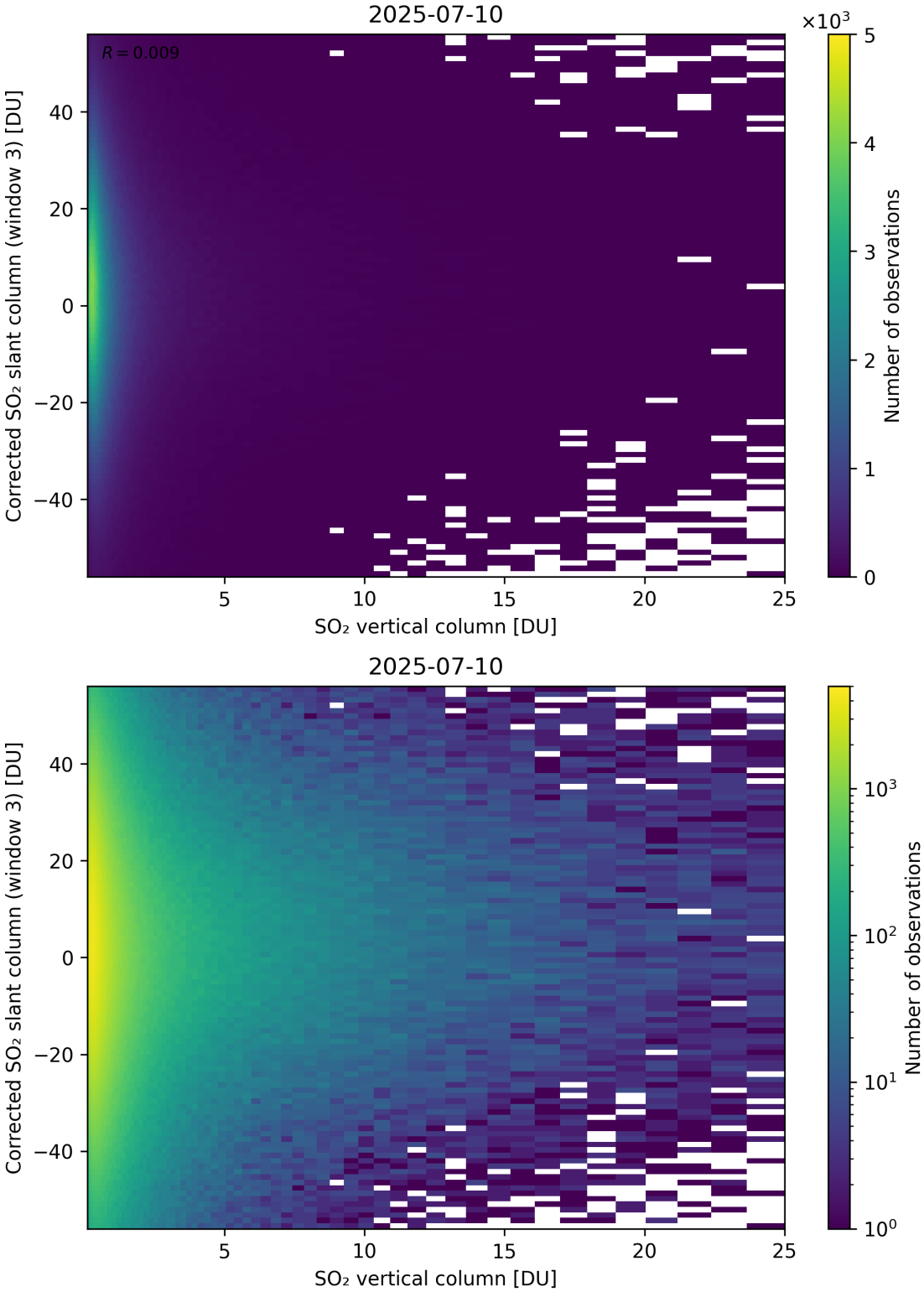

Figure 353: Scatter density plot of "SO_2 vertical column" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

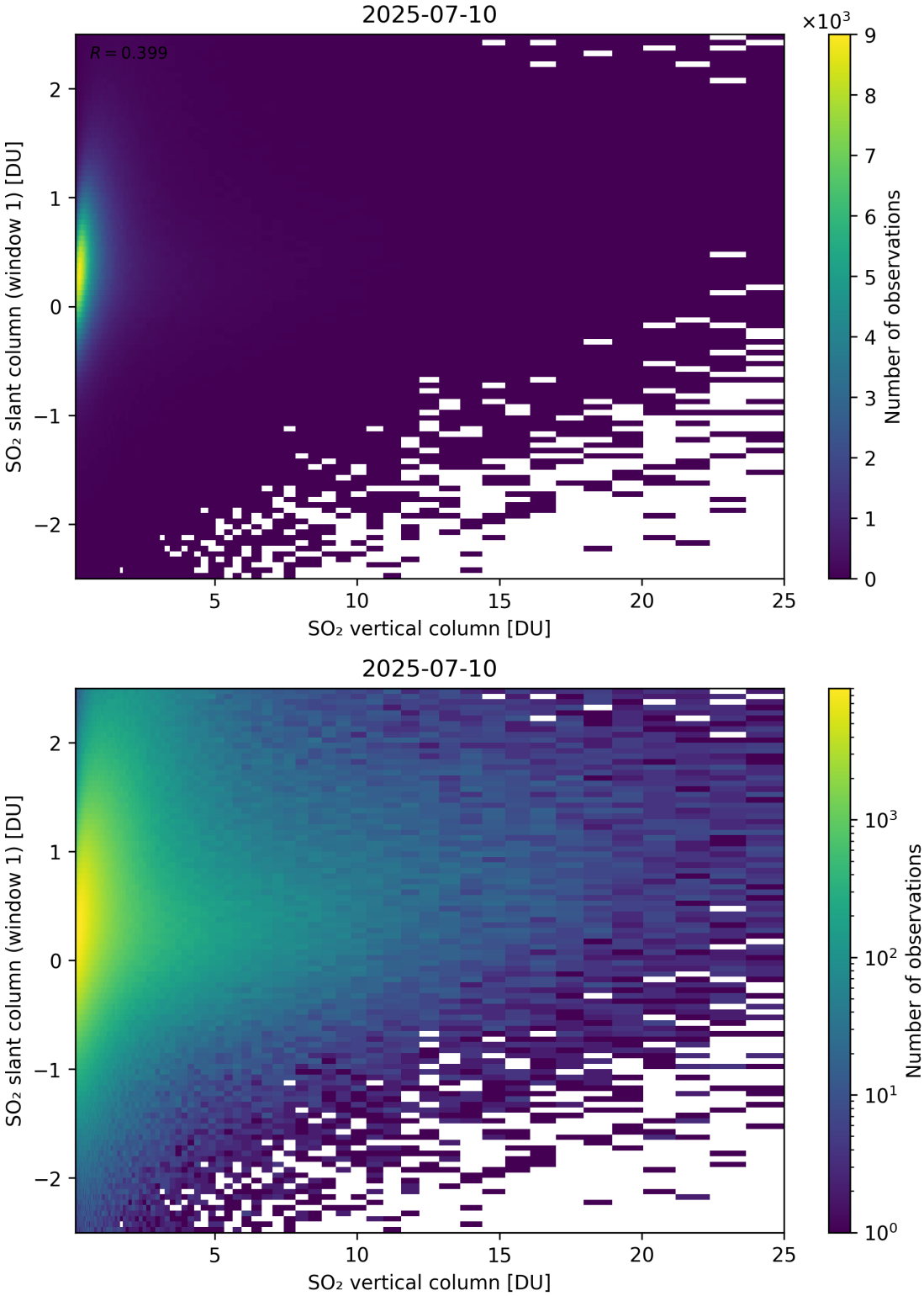

Figure 354: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

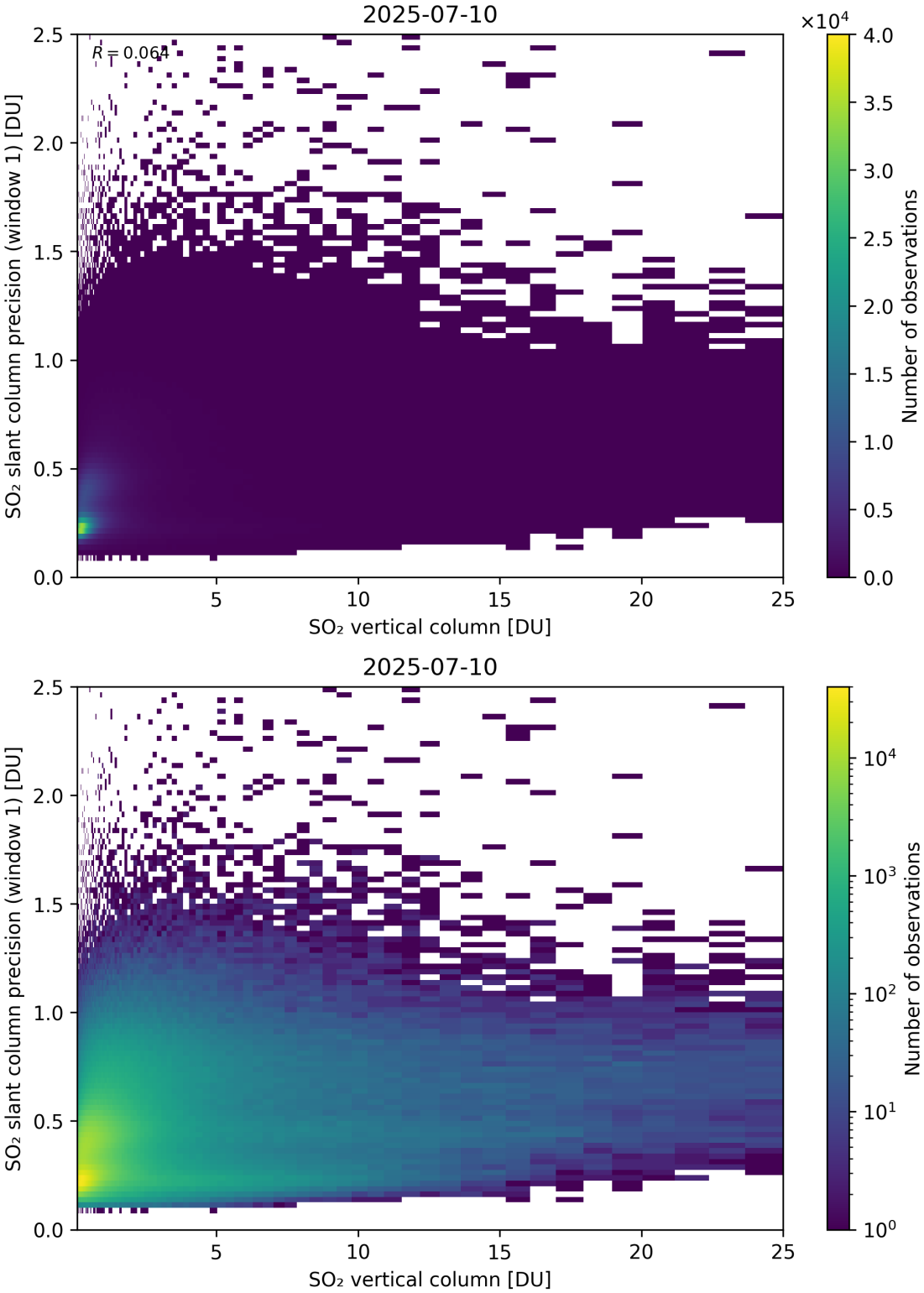

Figure 355: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

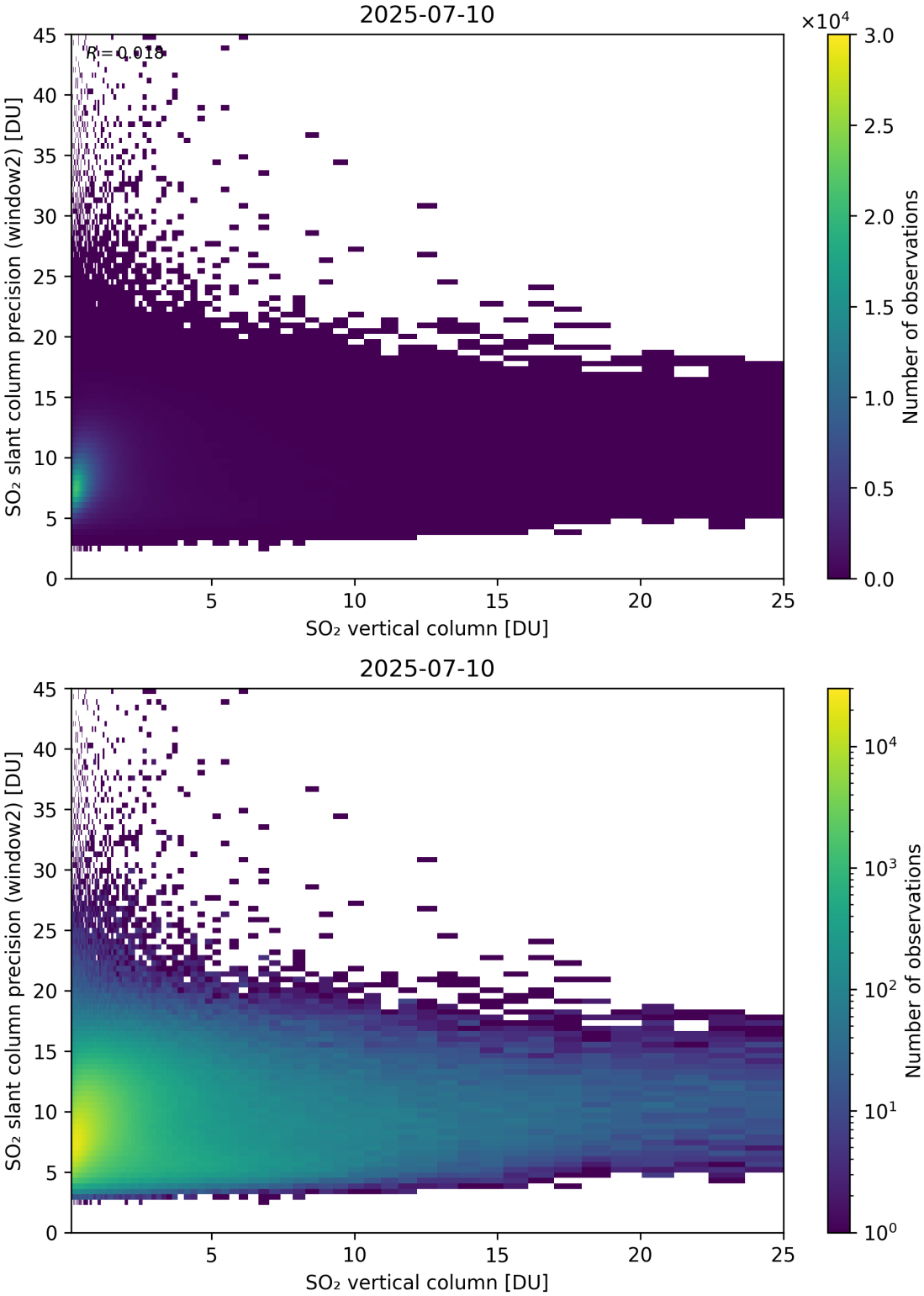

Figure 356: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

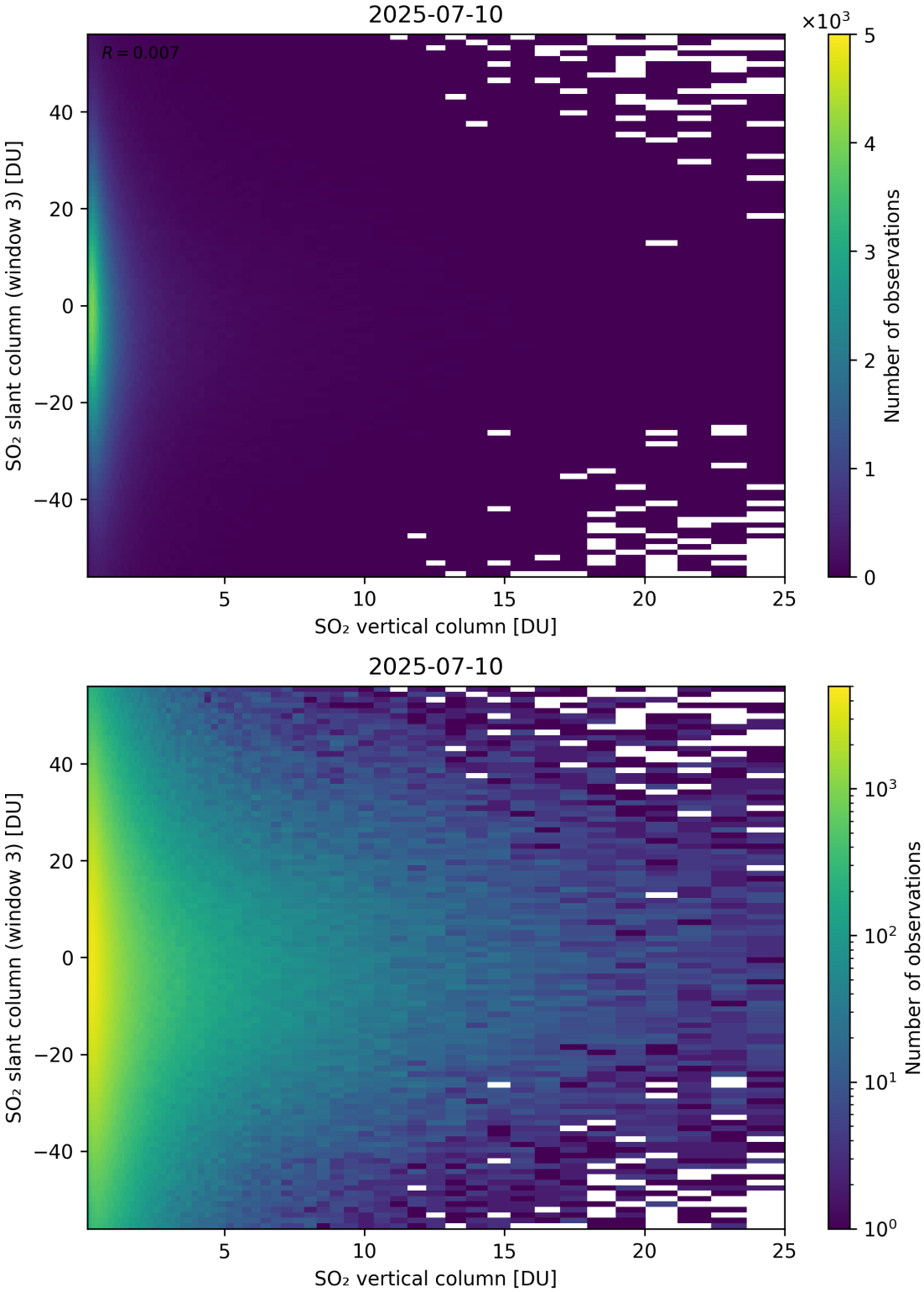

Figure 357: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

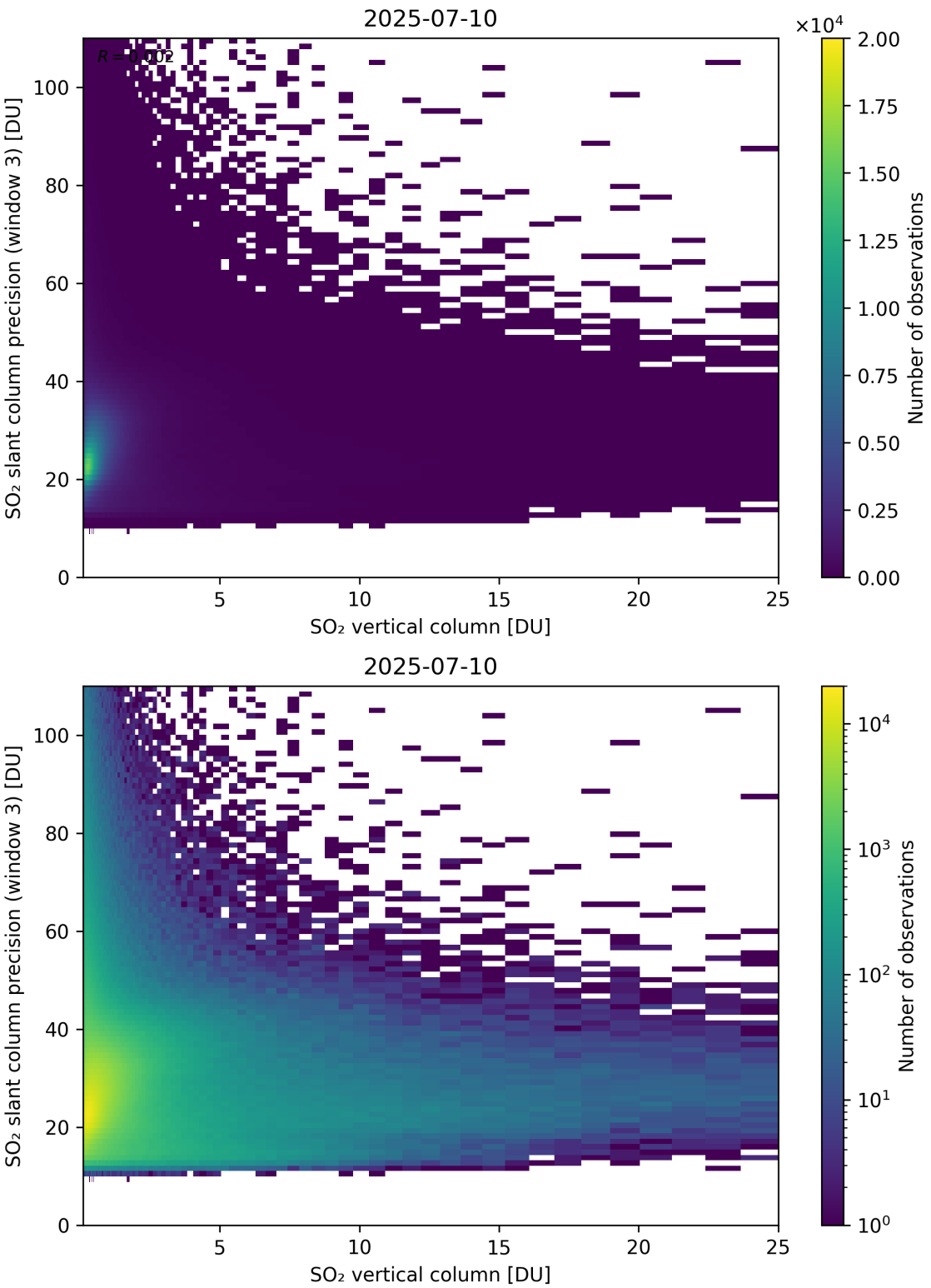

Figure 358: Scatter density plot of "SO_2 vertical column" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

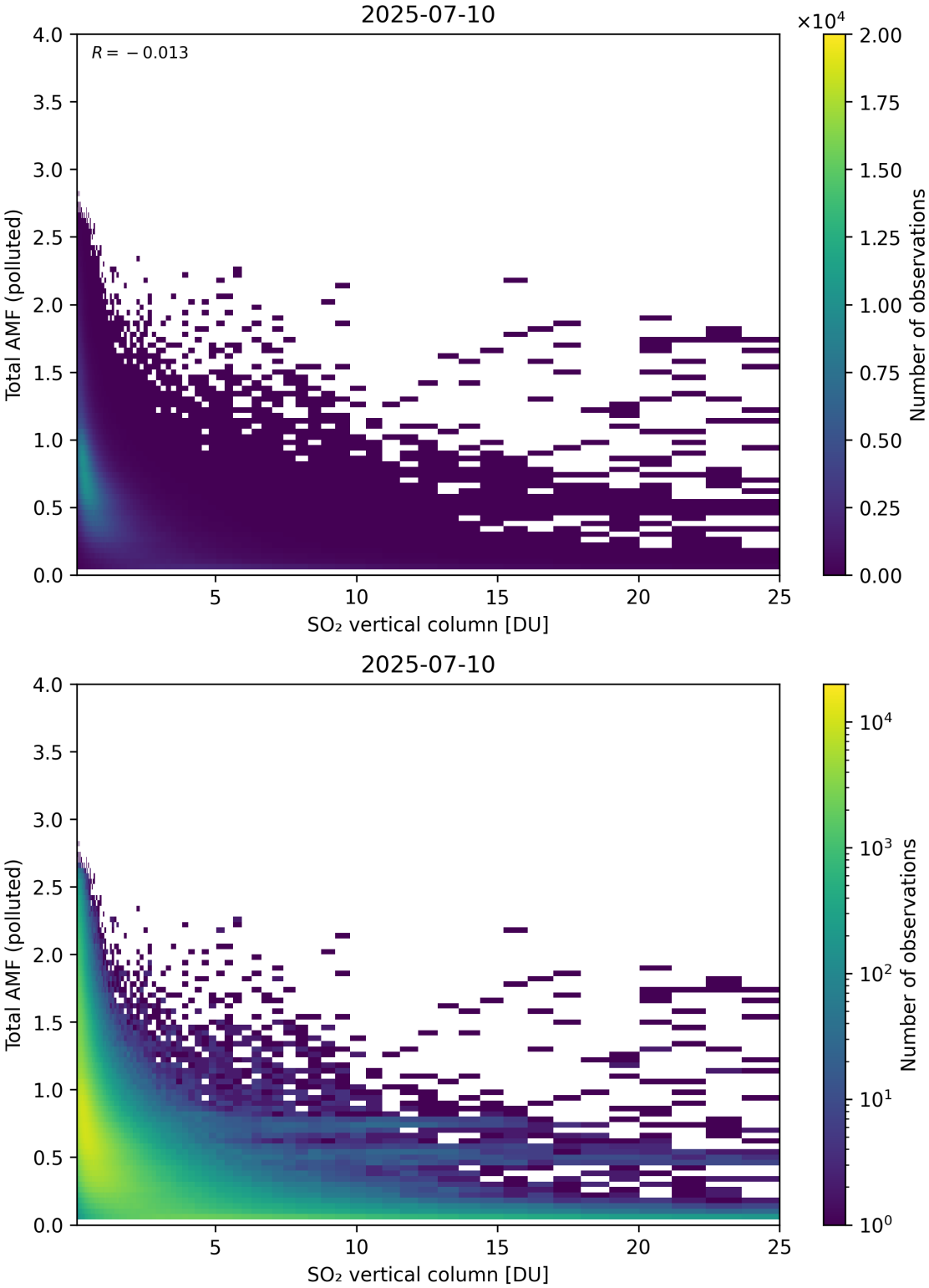

Figure 359: Scatter density plot of "SO_2 vertical column" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11.

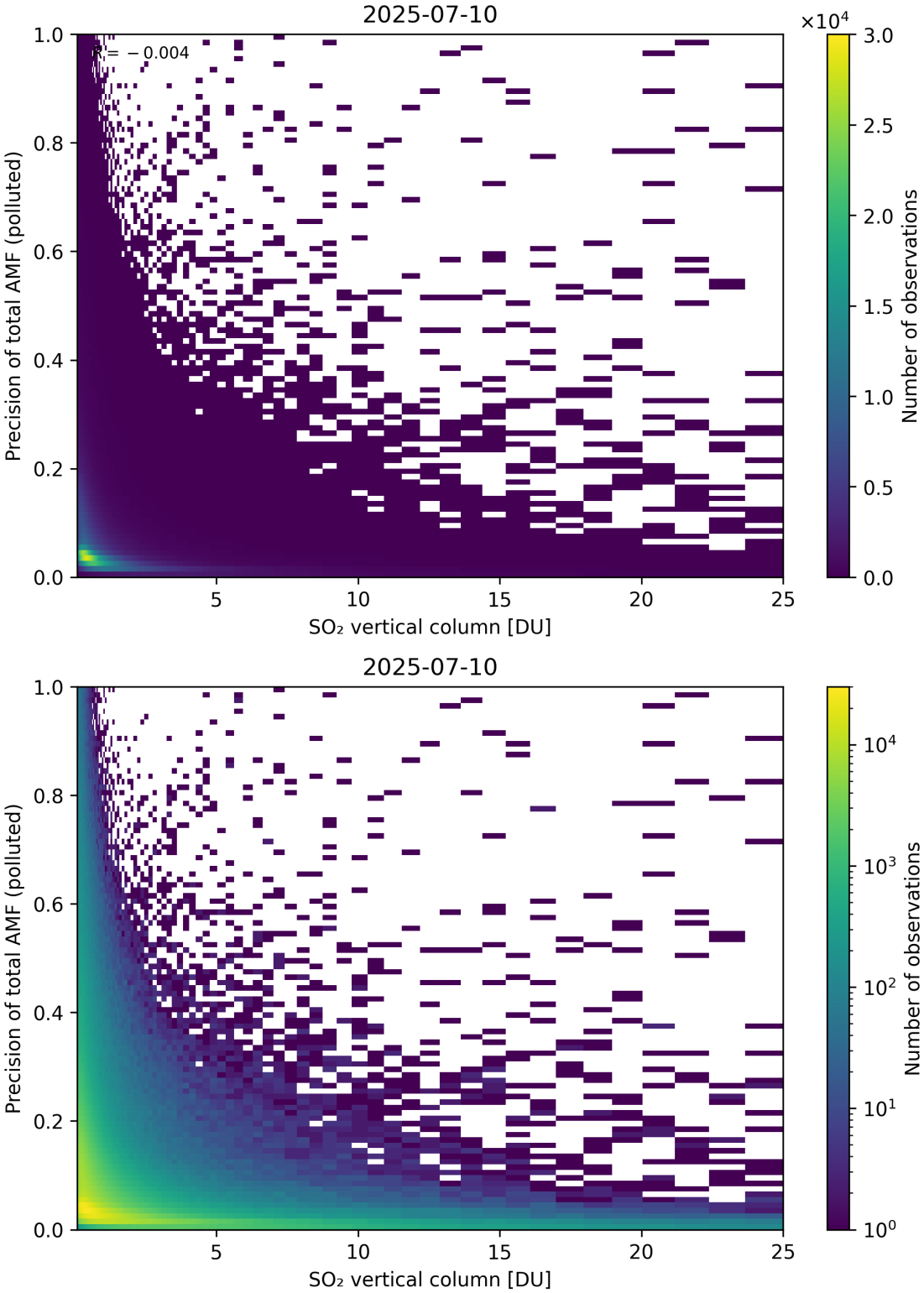

Figure 360: Scatter density plot of "SO_2 vertical column" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11.

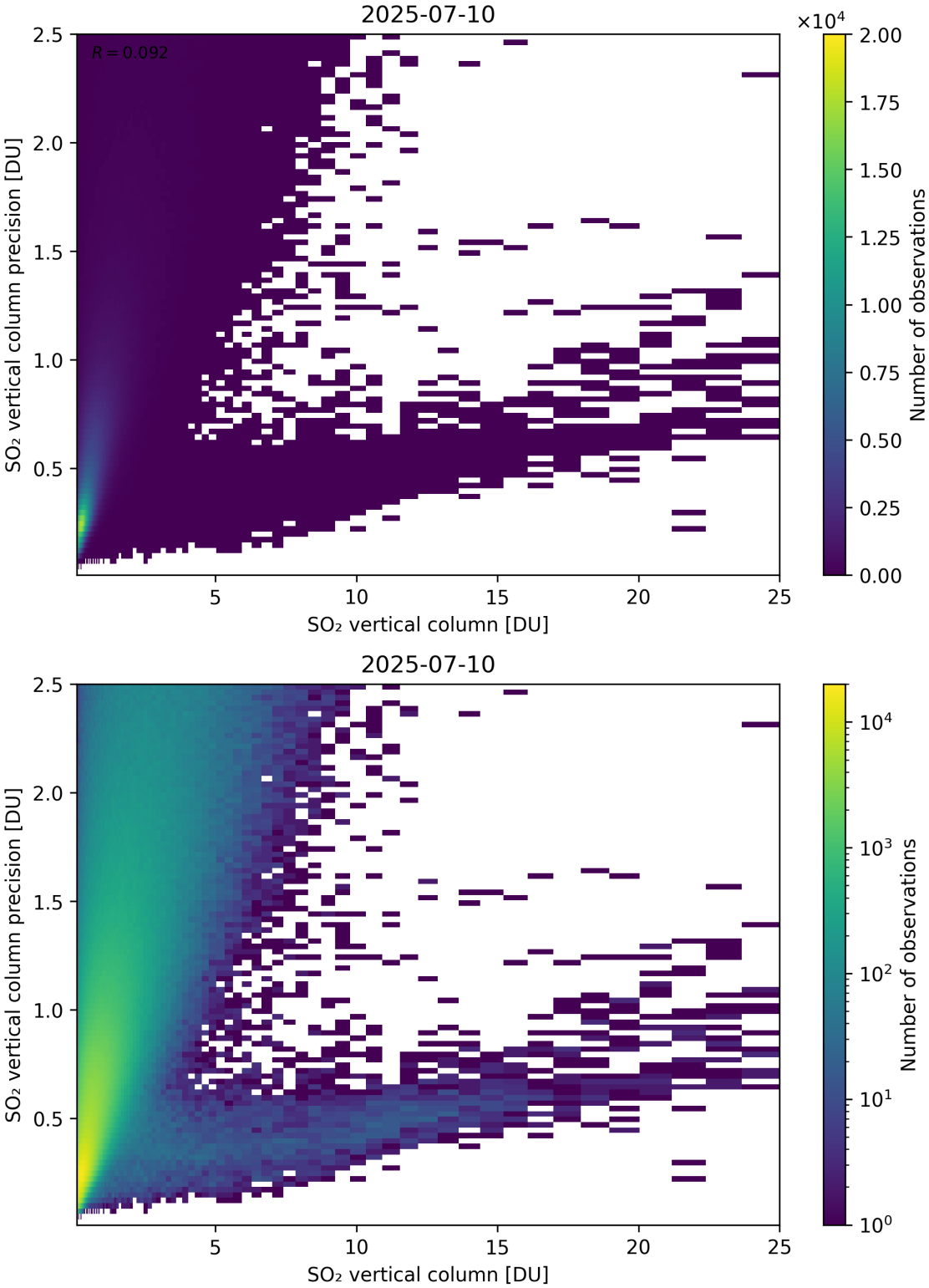

Figure 361: Scatter density plot of "SO_2 vertical column" against "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11.

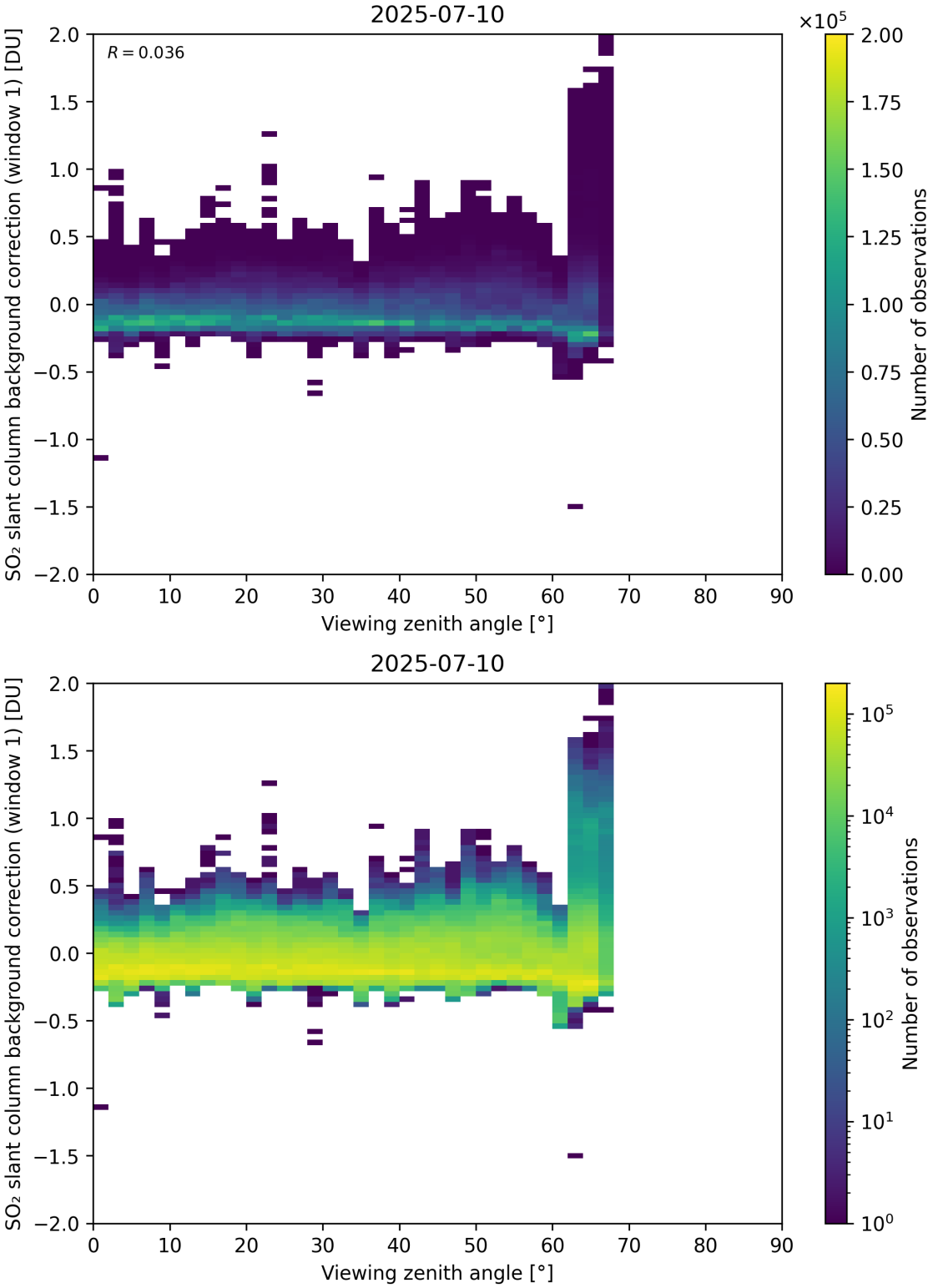

Figure 362: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11.

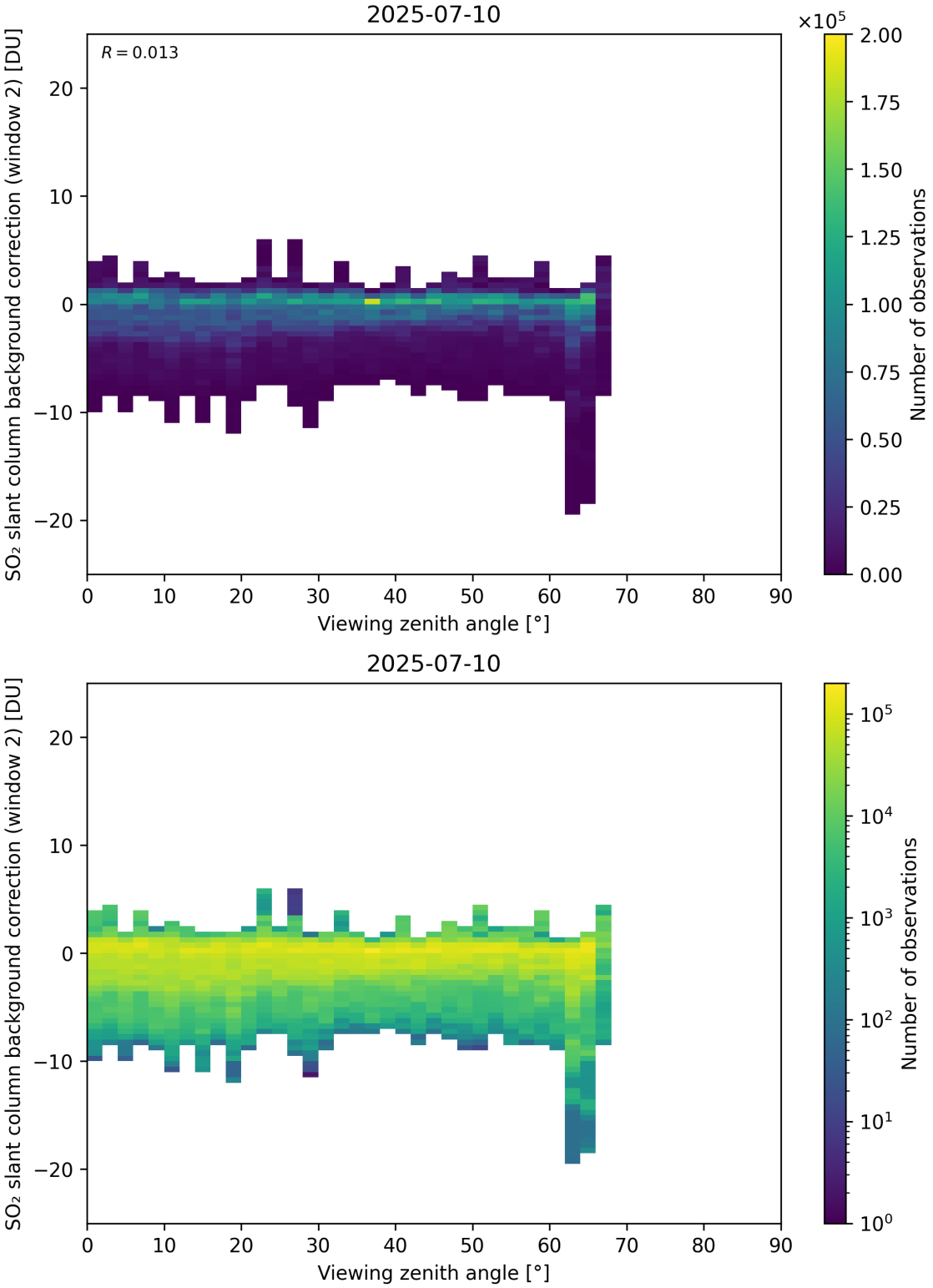

Figure 363: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11.

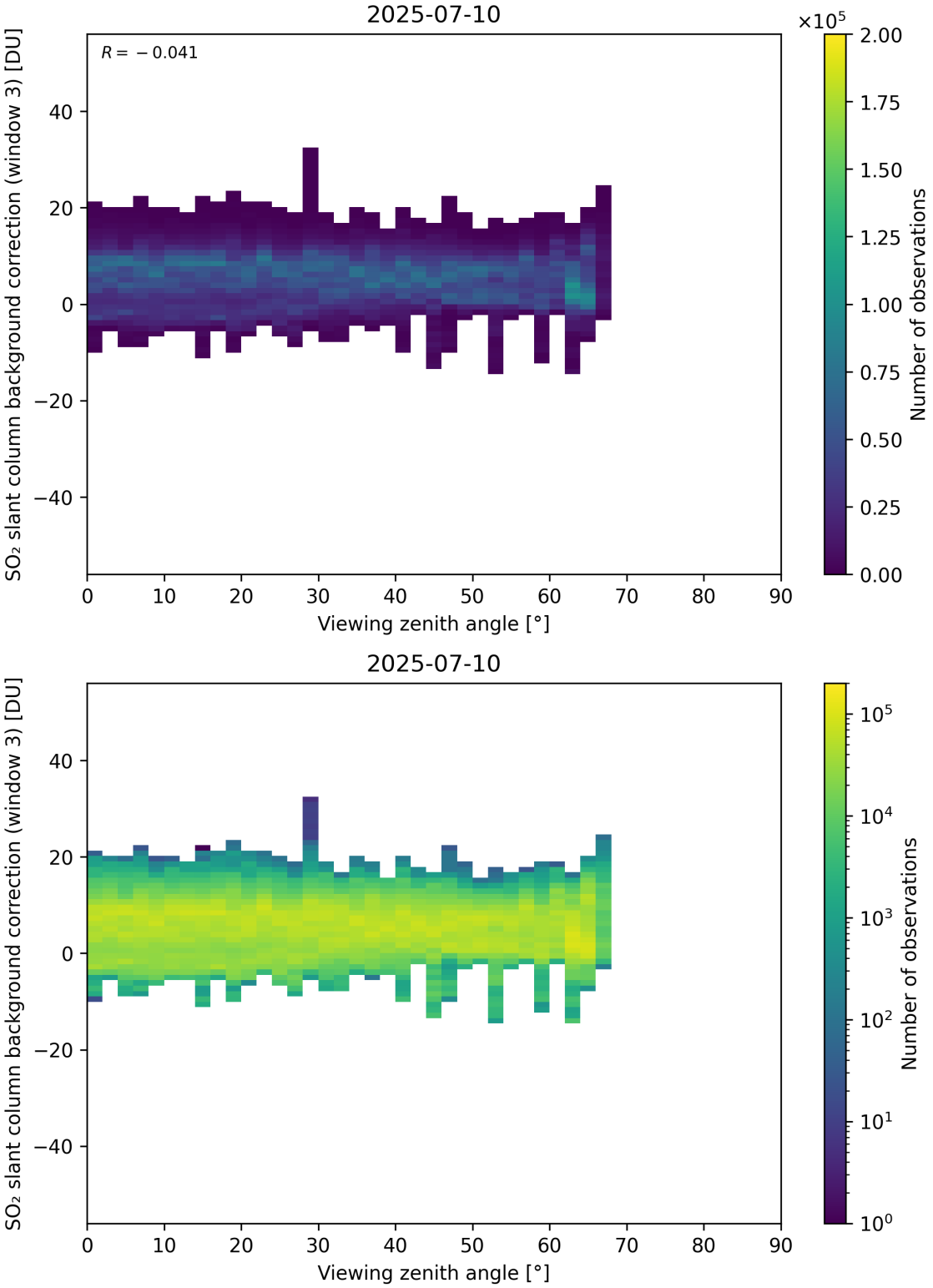

Figure 364: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11.

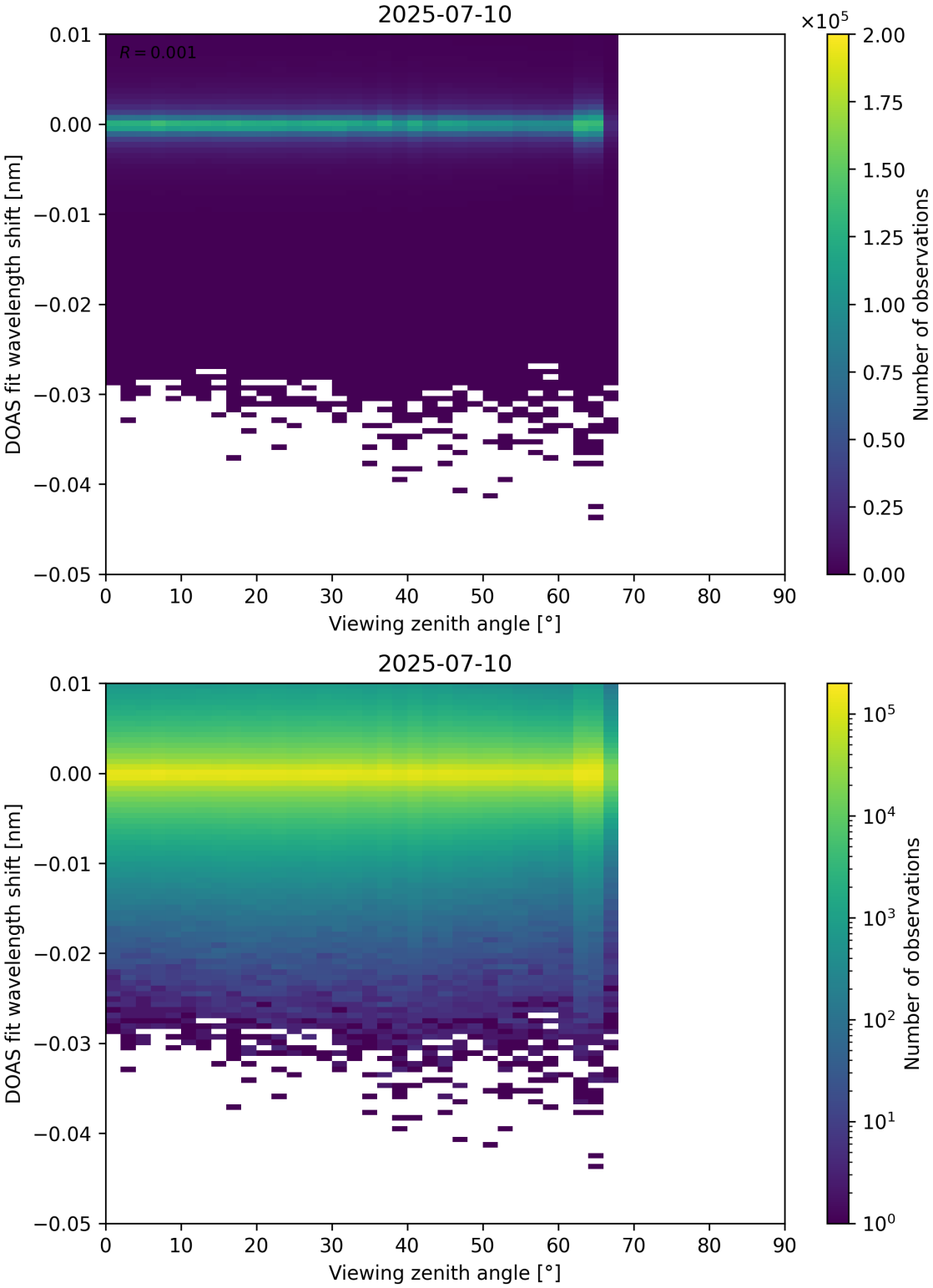

Figure 365: Scatter density plot of “Viewing zenith angle” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11.

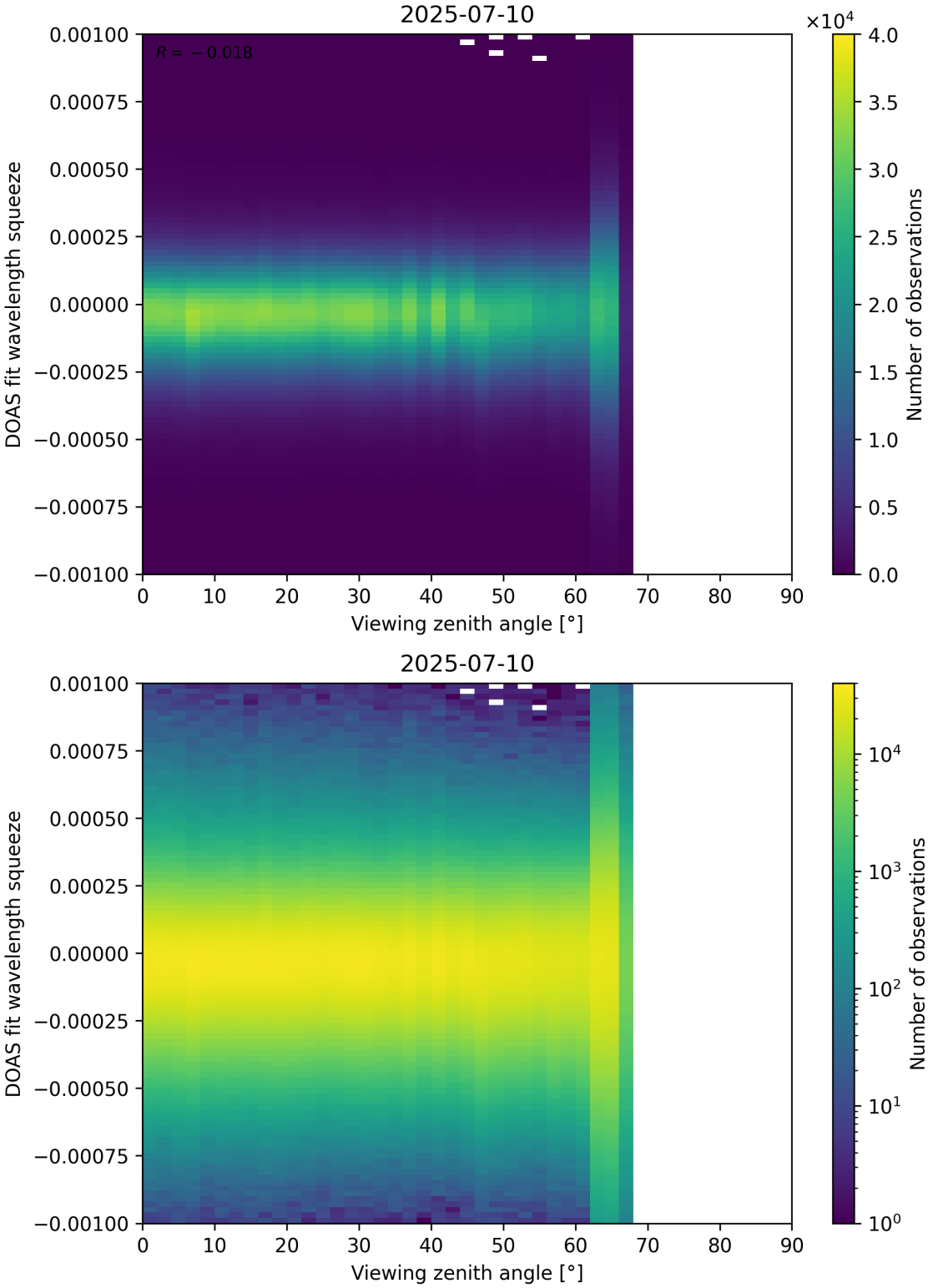

Figure 366: Scatter density plot of “Viewing zenith angle” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11.

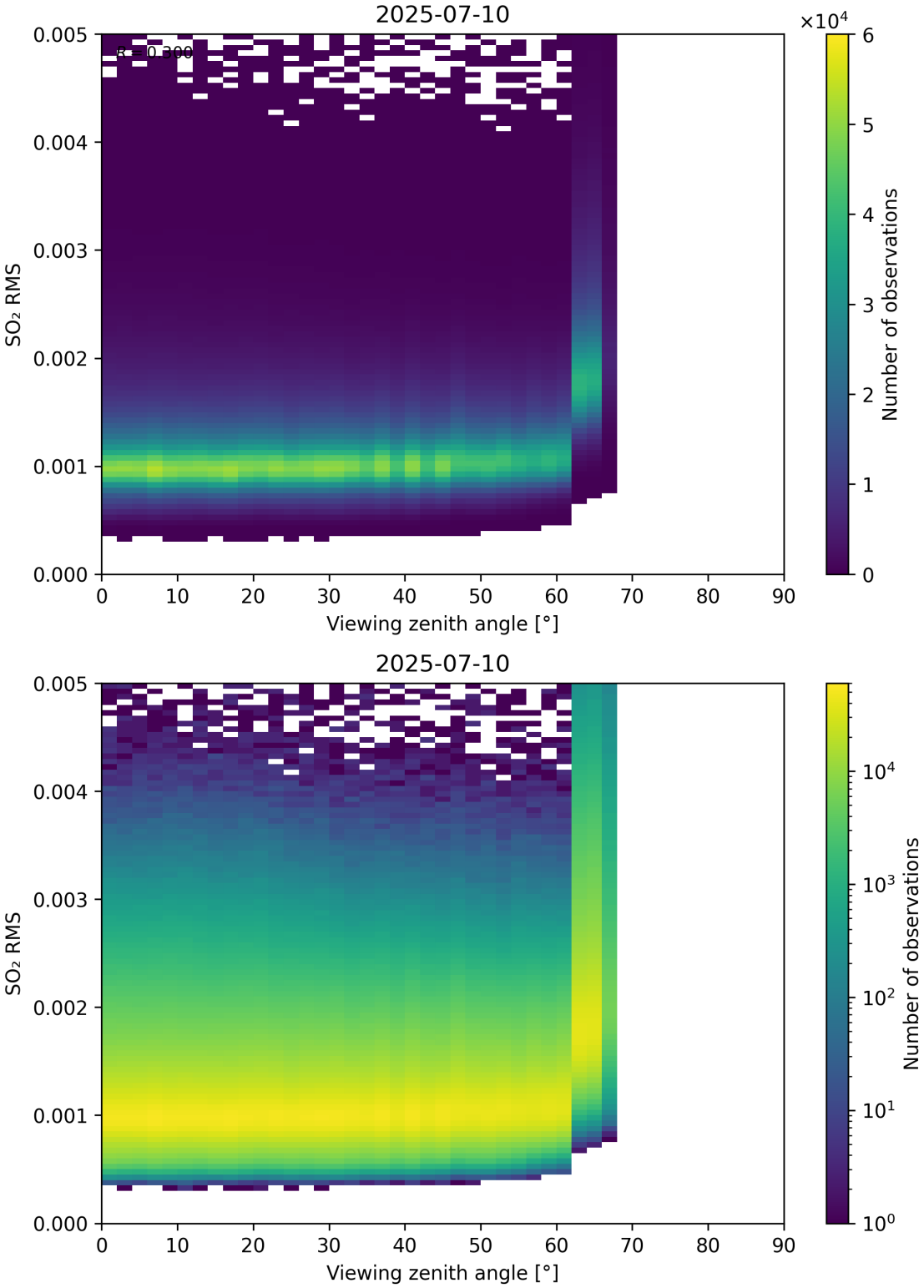

Figure 367: Scatter density plot of "Viewing zenith angle" against "SO_2 RMS" for 2025-07-09 to 2025-07-11.

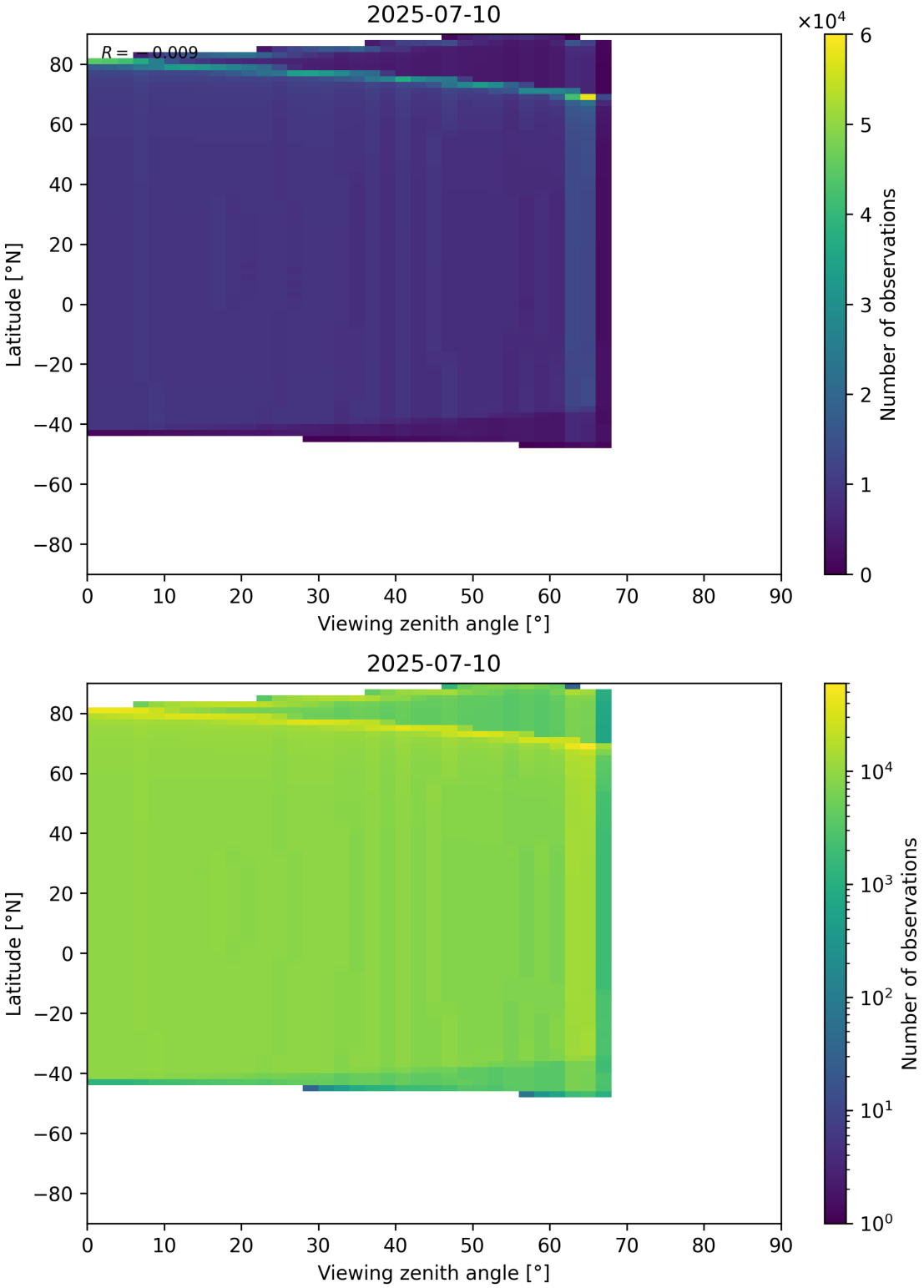

Figure 368: Scatter density plot of “Viewing zenith angle” against “Latitude” for 2025-07-09 to 2025-07-11.

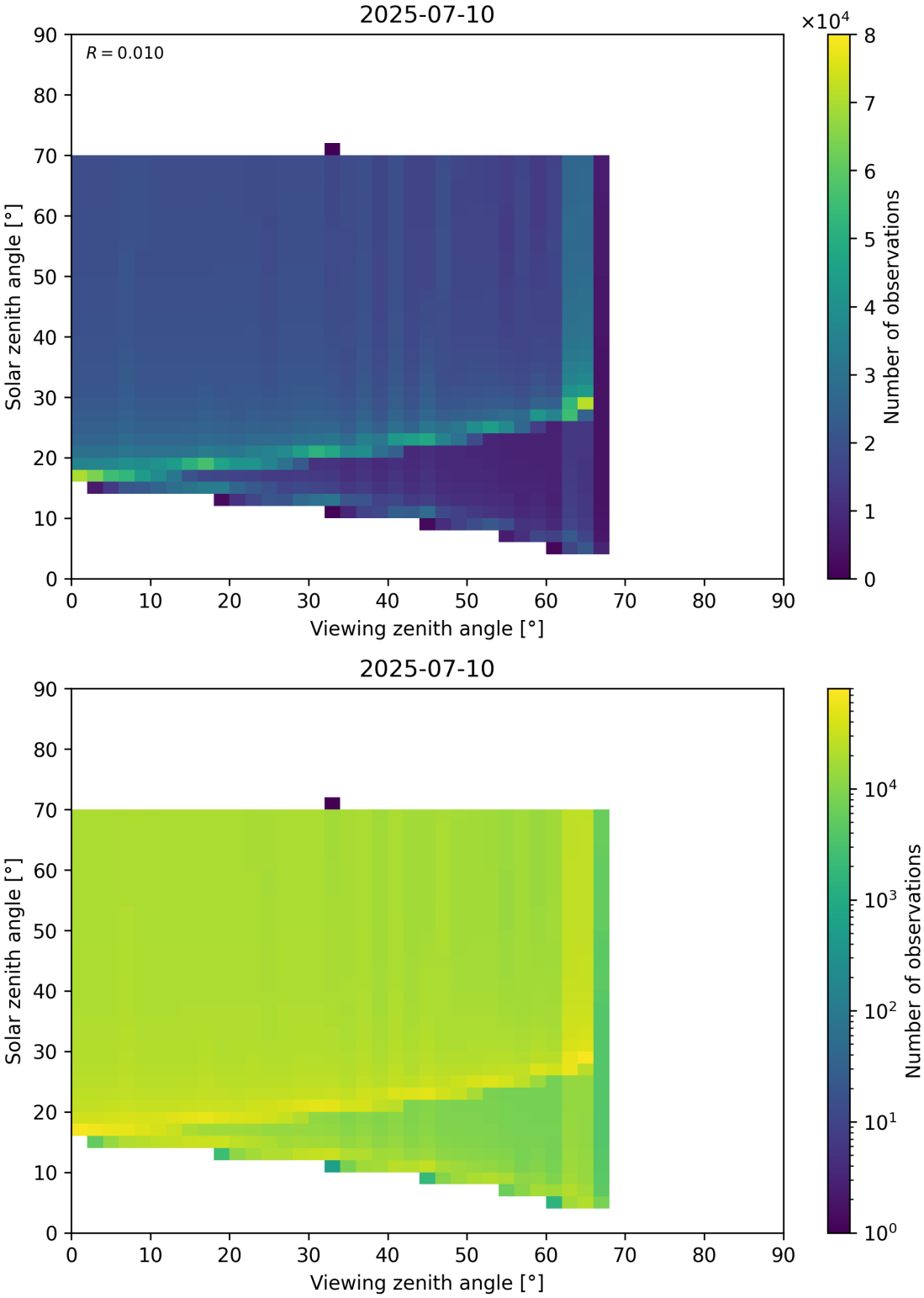

Figure 369: Scatter density plot of “Viewing zenith angle” against “Solar zenith angle” for 2025-07-09 to 2025-07-11.

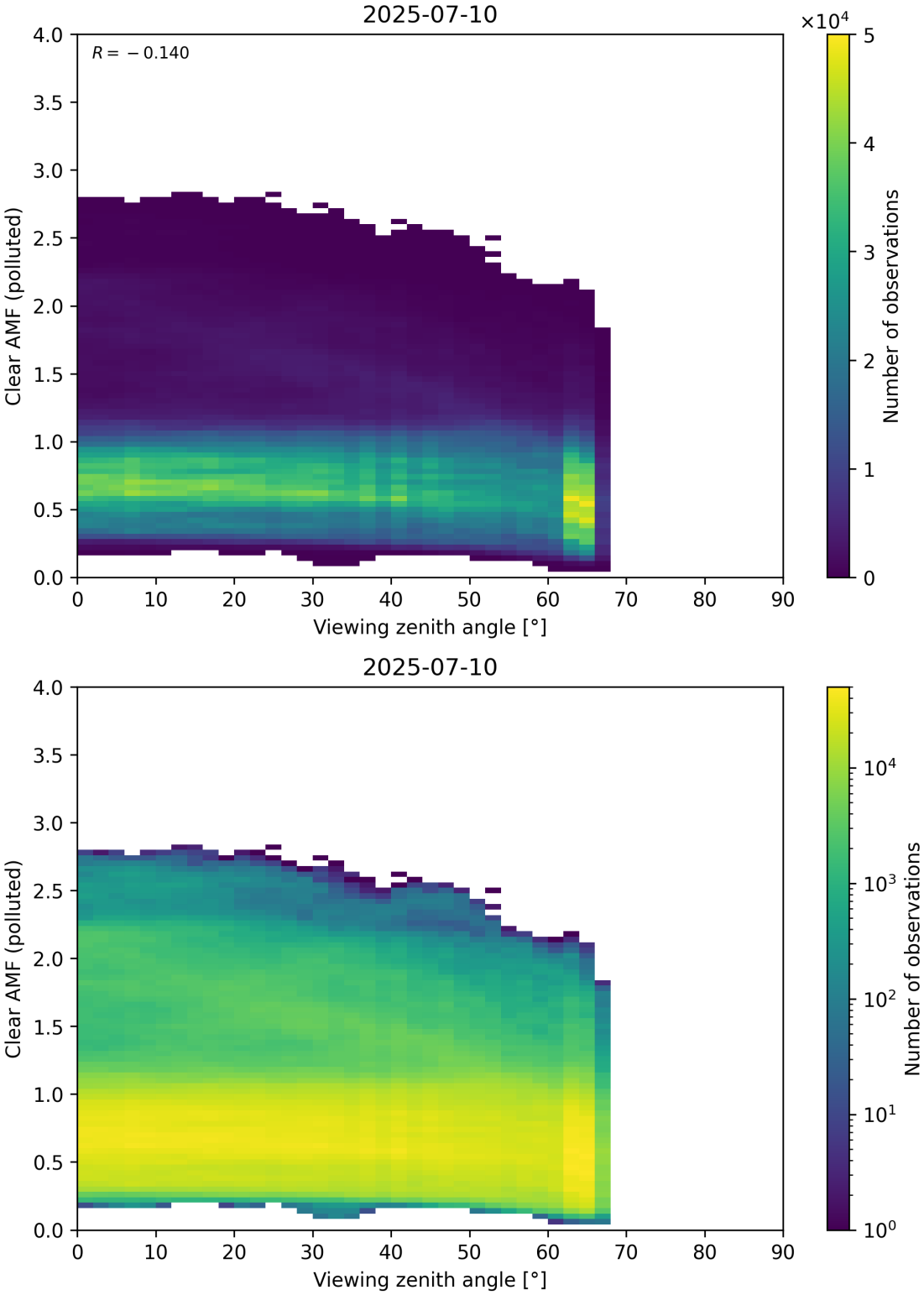

Figure 370: Scatter density plot of “Viewing zenith angle” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11.

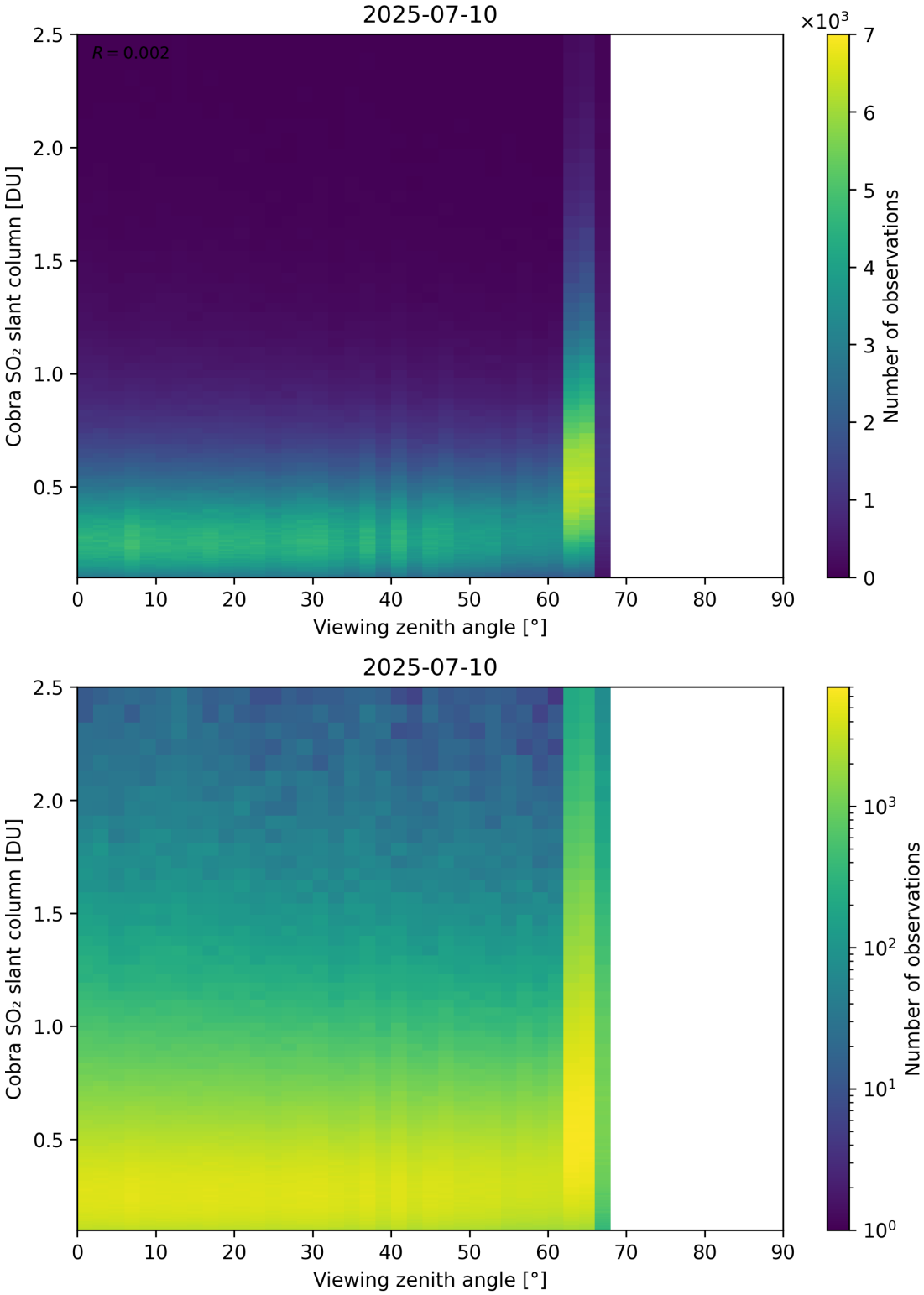

Figure 371: Scatter density plot of "Viewing zenith angle" against "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11.

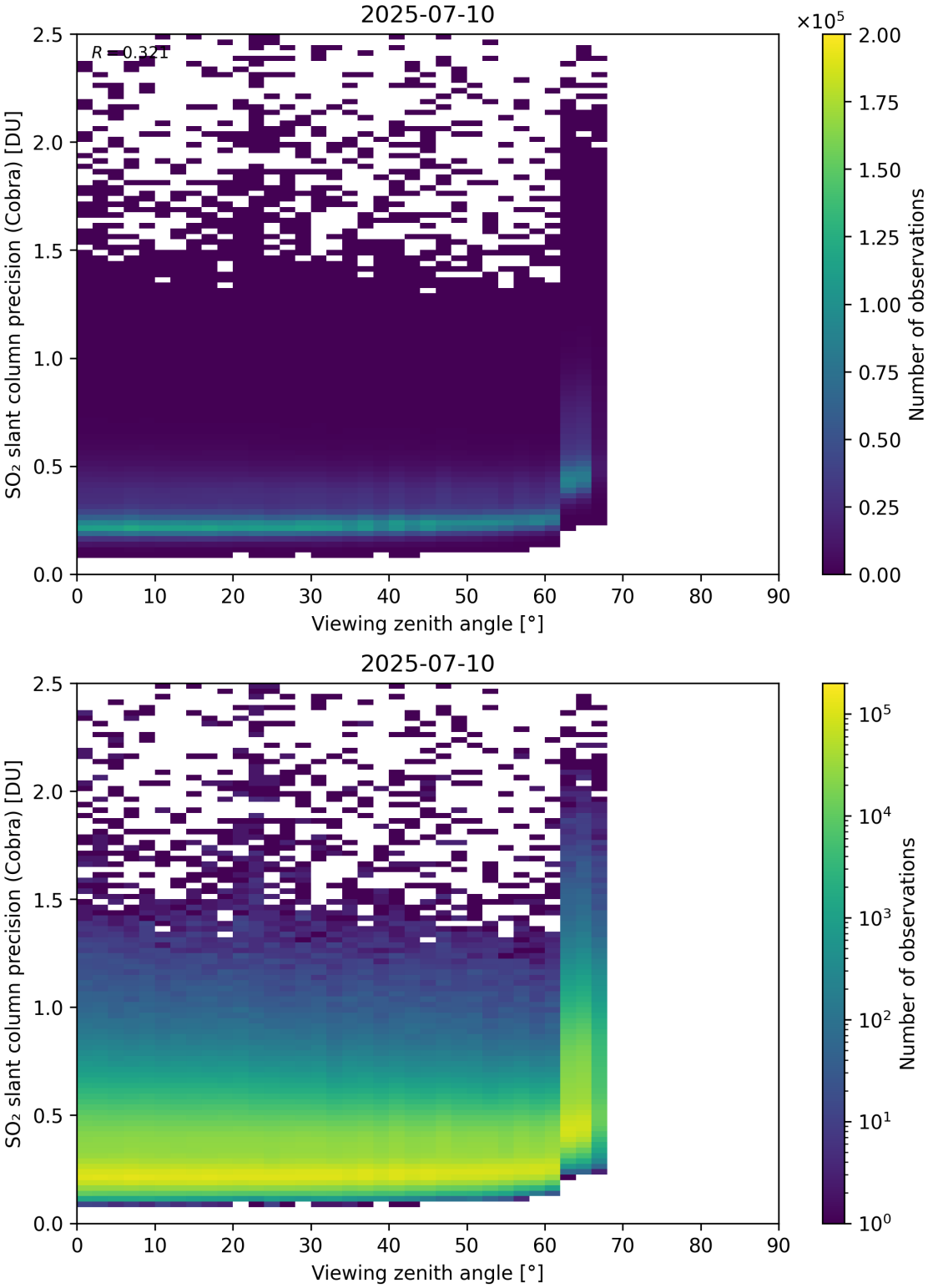

Figure 372: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11.

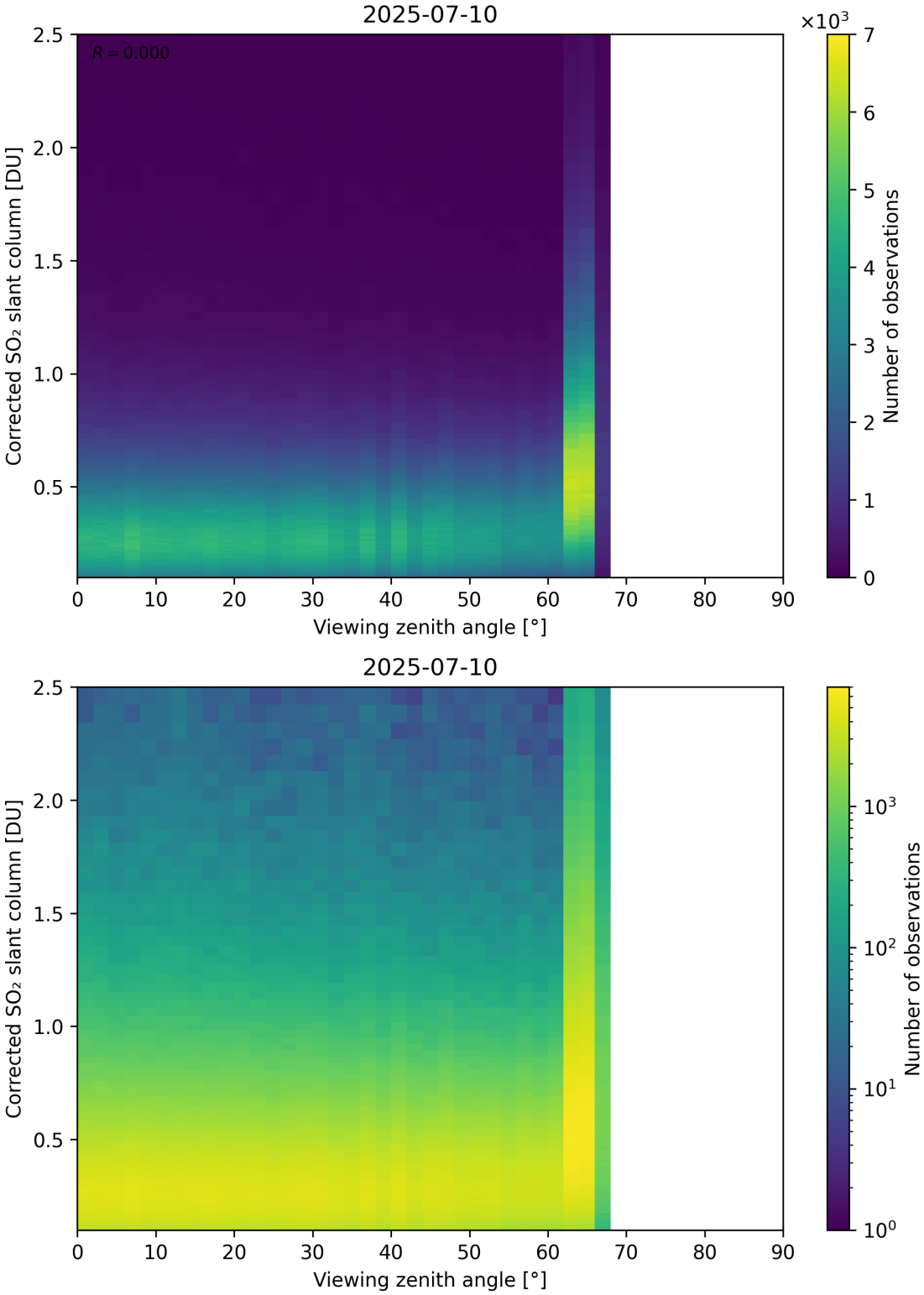

Figure 373: Scatter density plot of "Viewing zenith angle" against "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11.

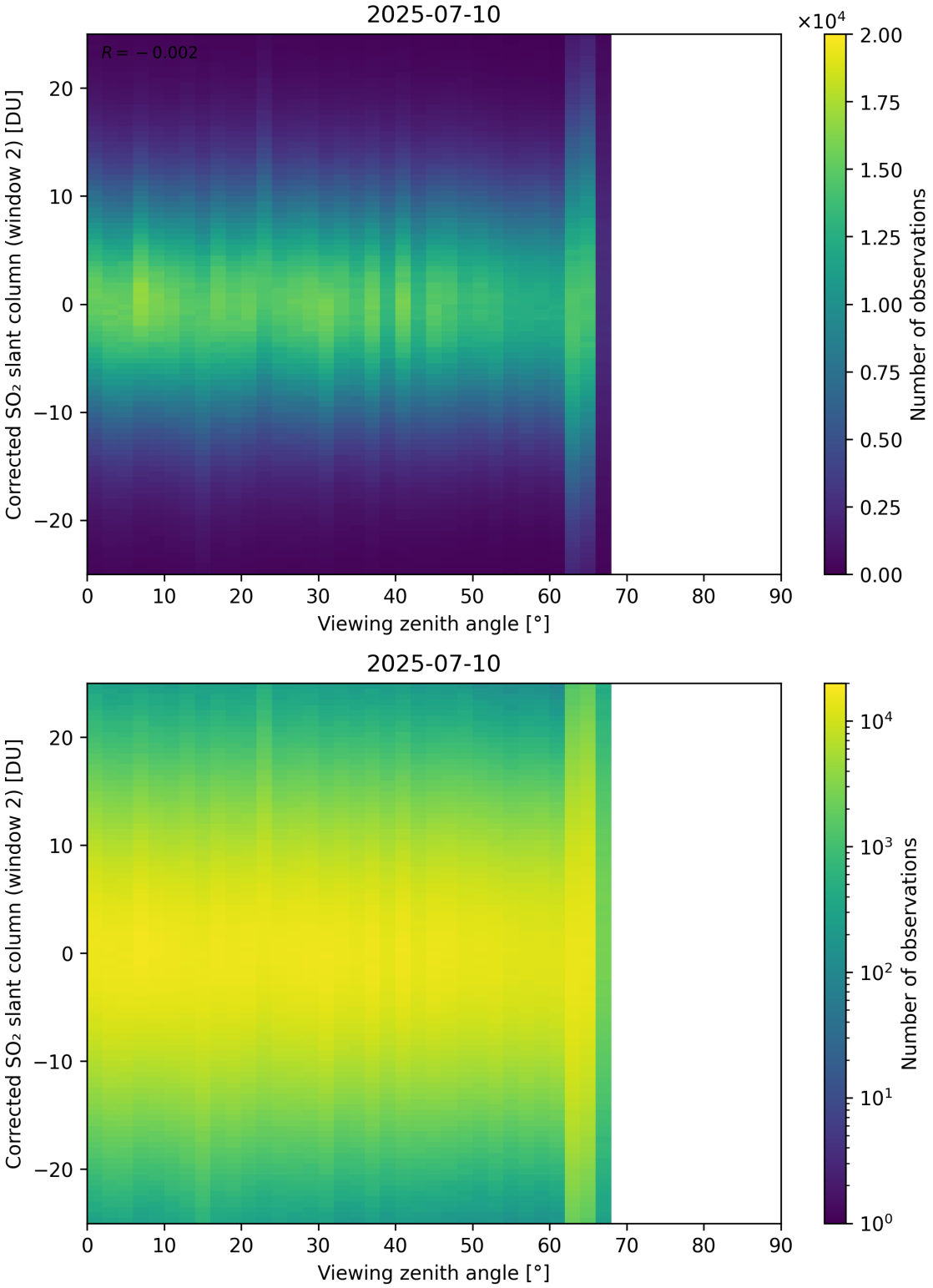

Figure 374: Scatter density plot of "Viewing zenith angle" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11.

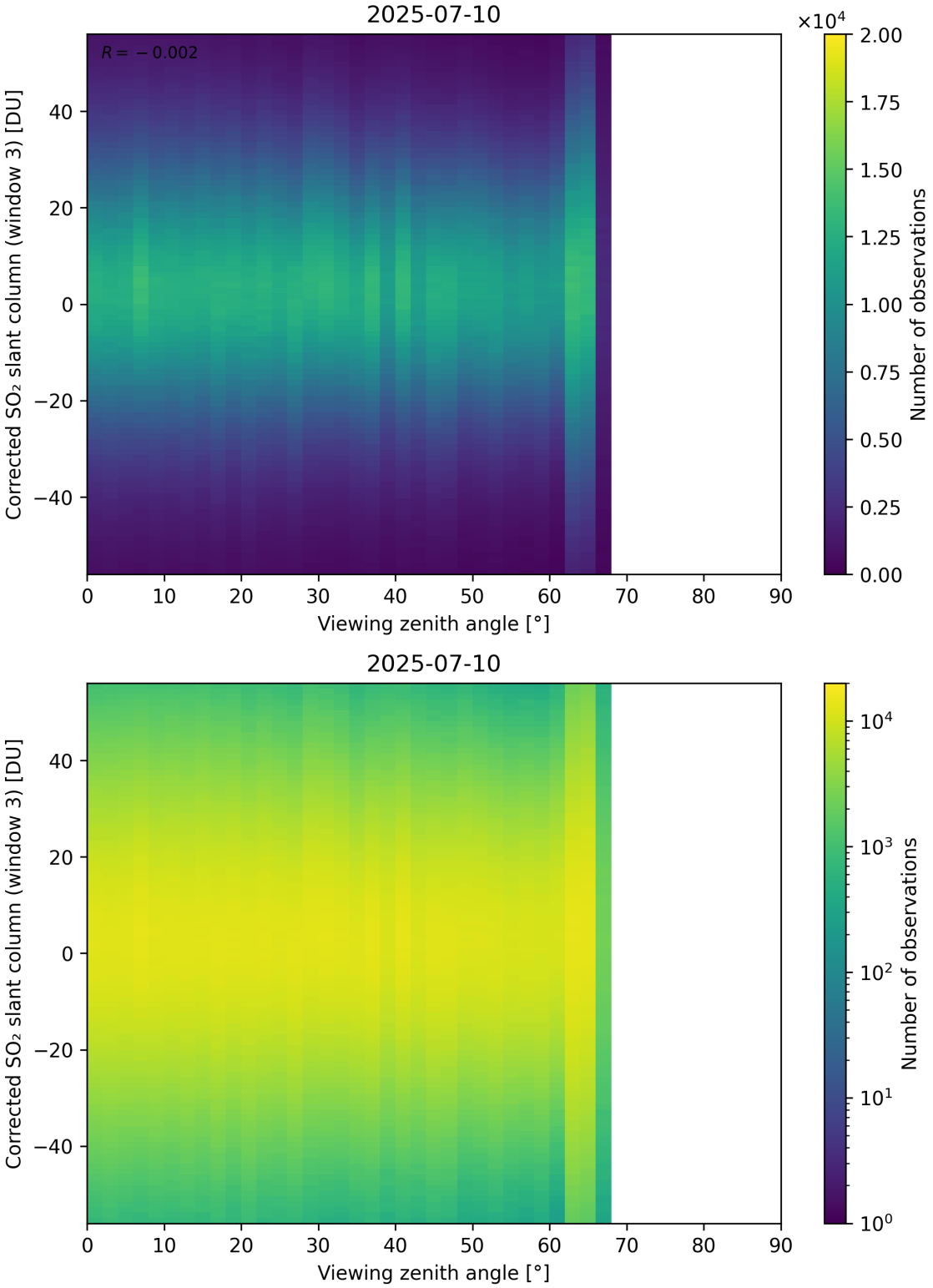

Figure 375: Scatter density plot of "Viewing zenith angle" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

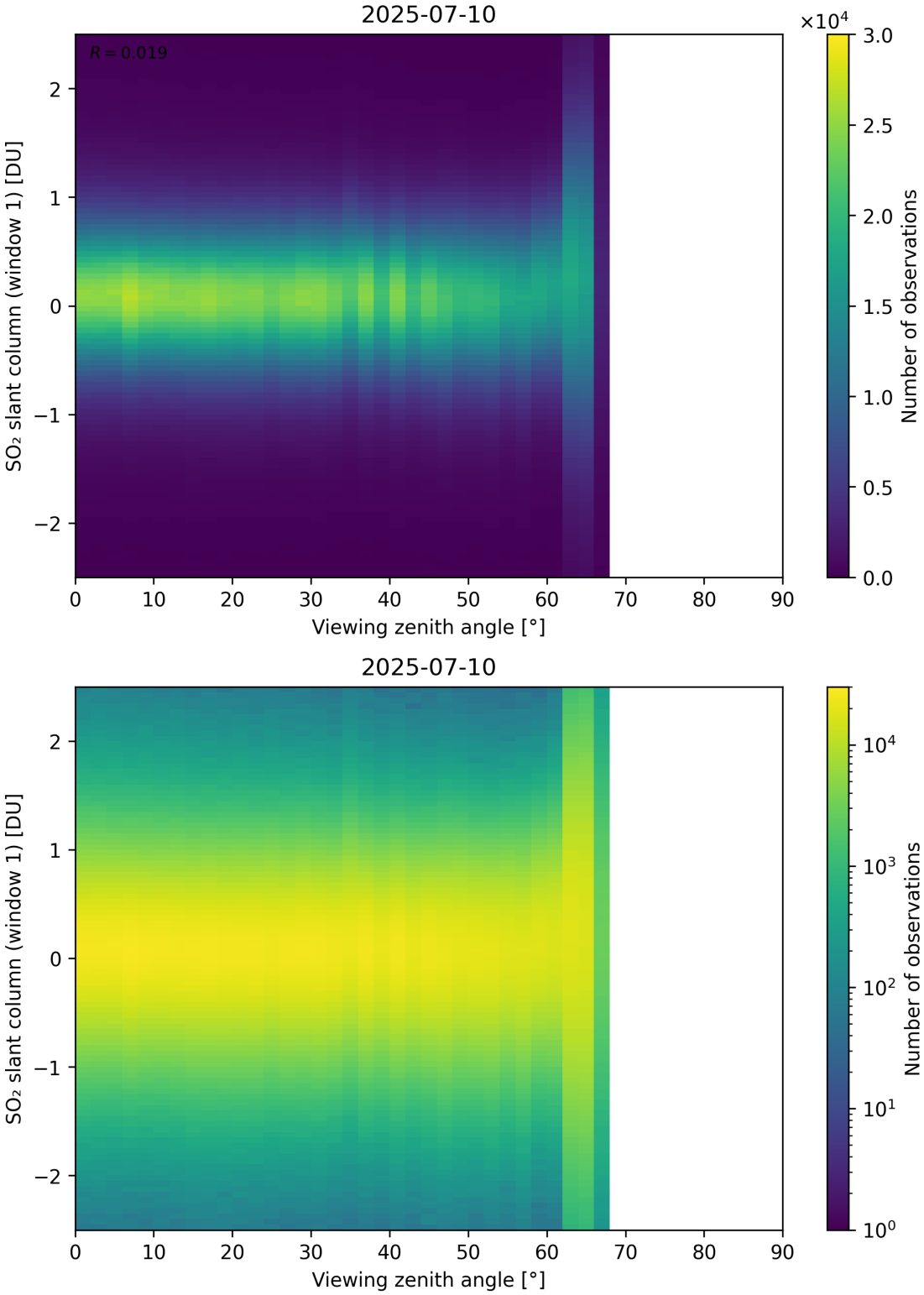

Figure 376: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11.

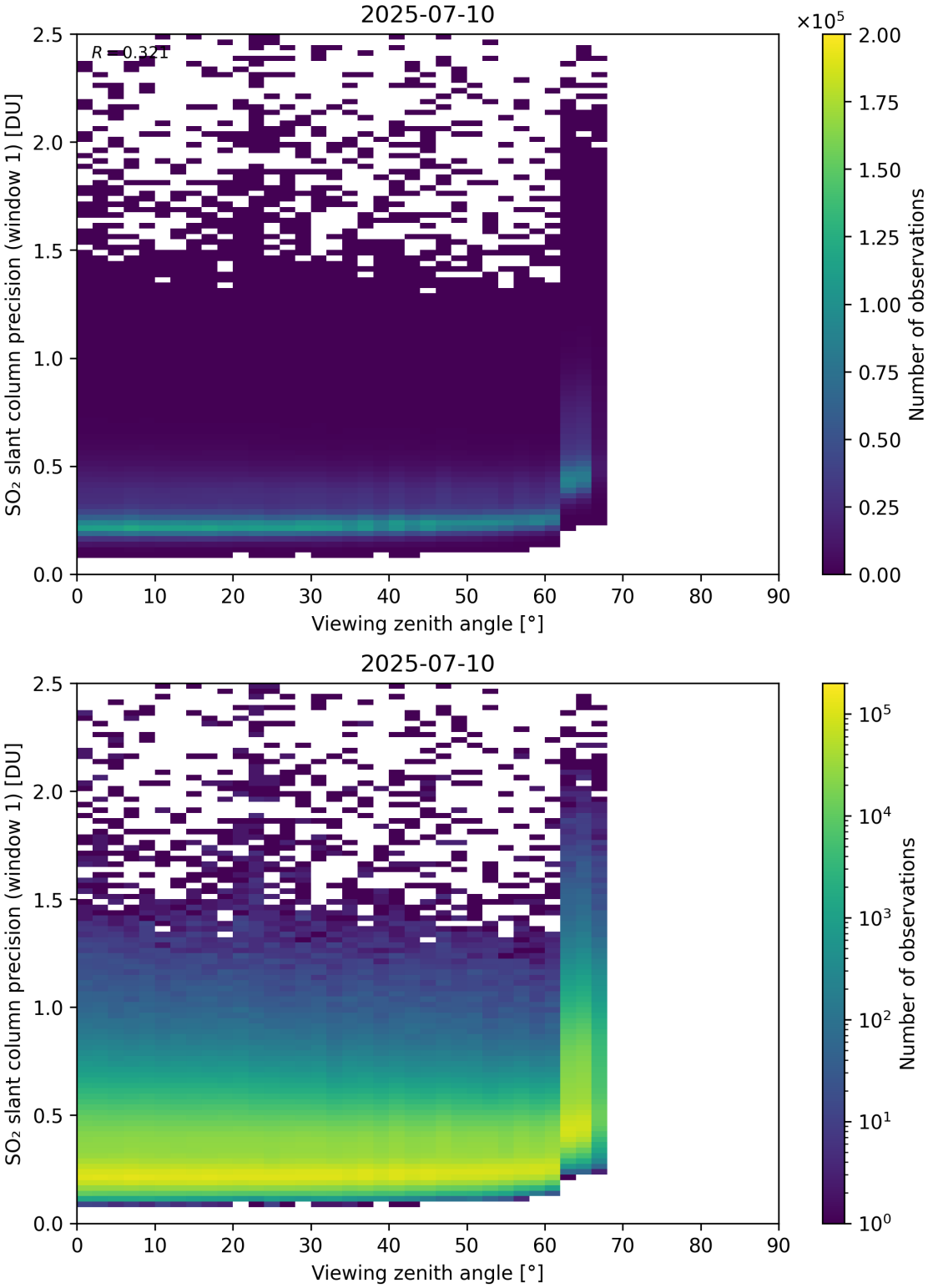

Figure 377: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11.

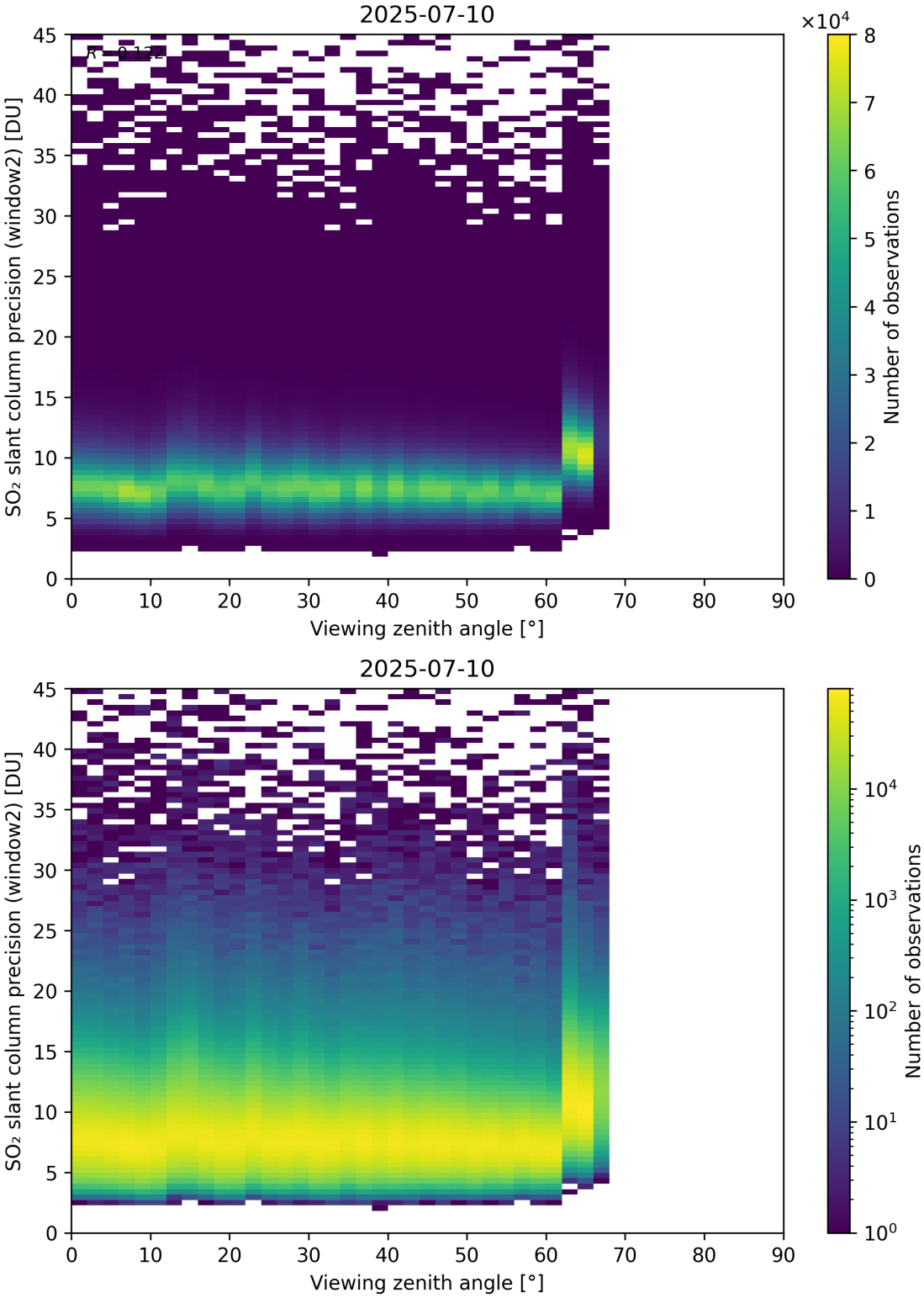

Figure 378: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11.

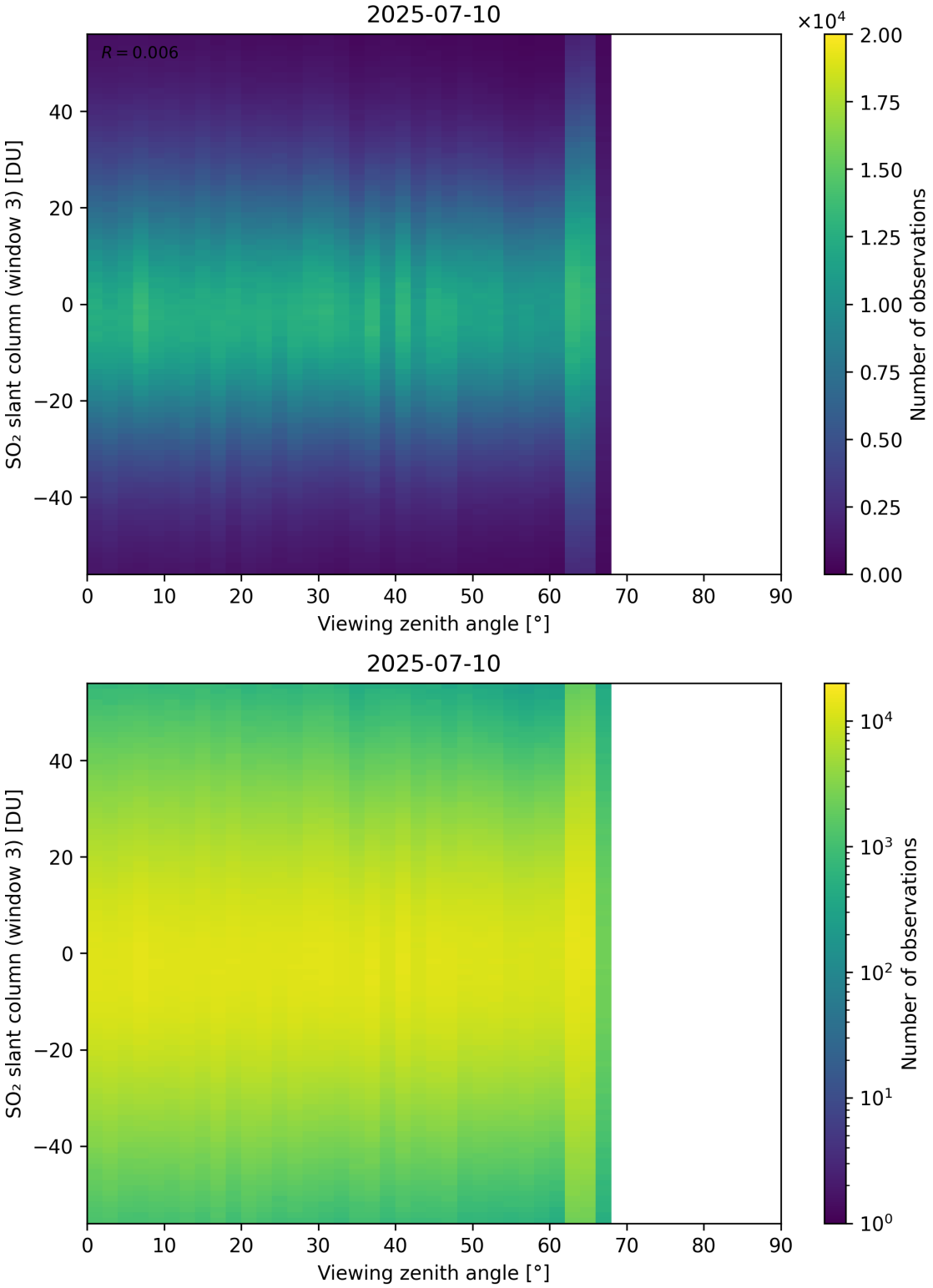

Figure 379: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11.

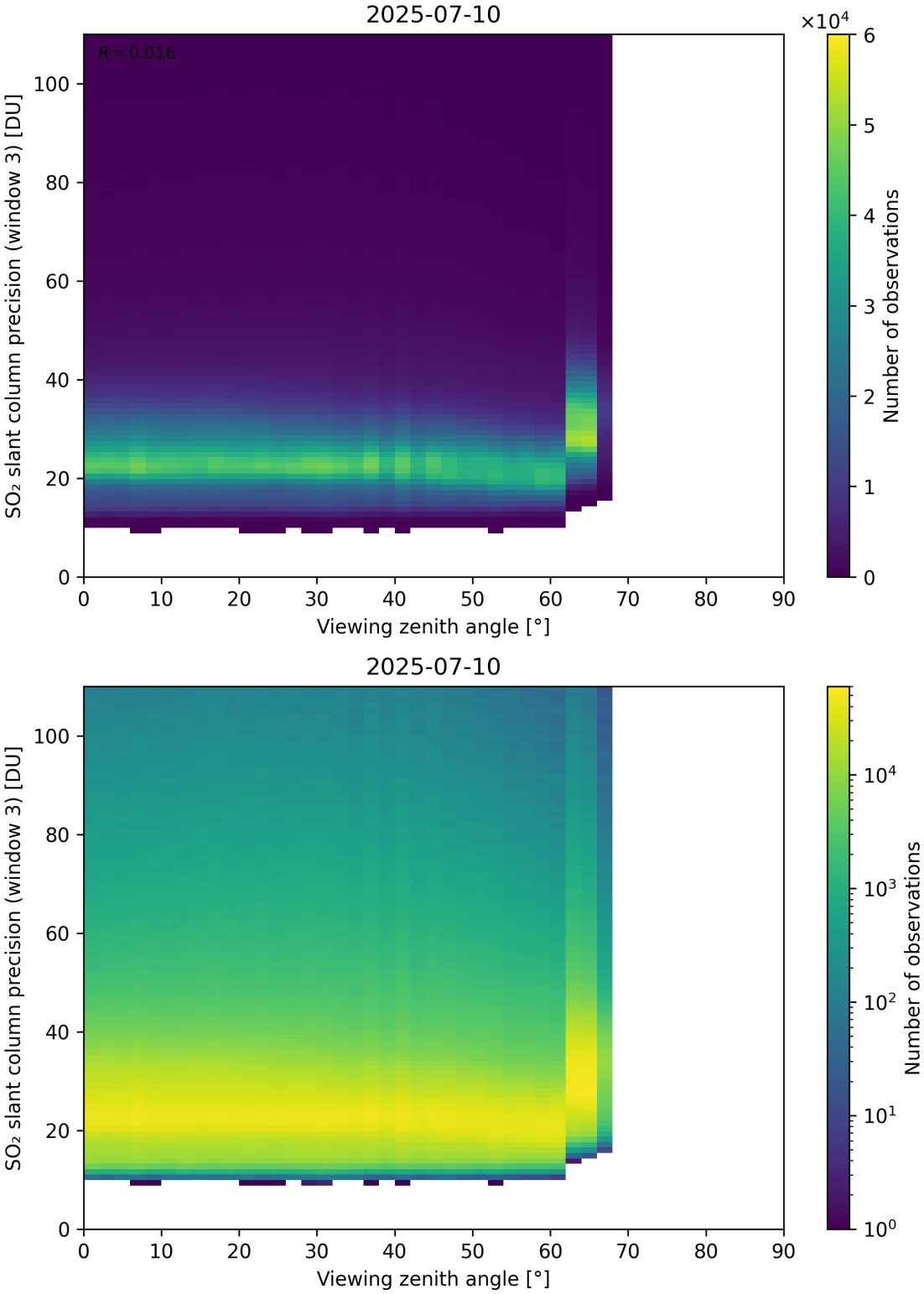

Figure 380: Scatter density plot of "Viewing zenith angle" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11.

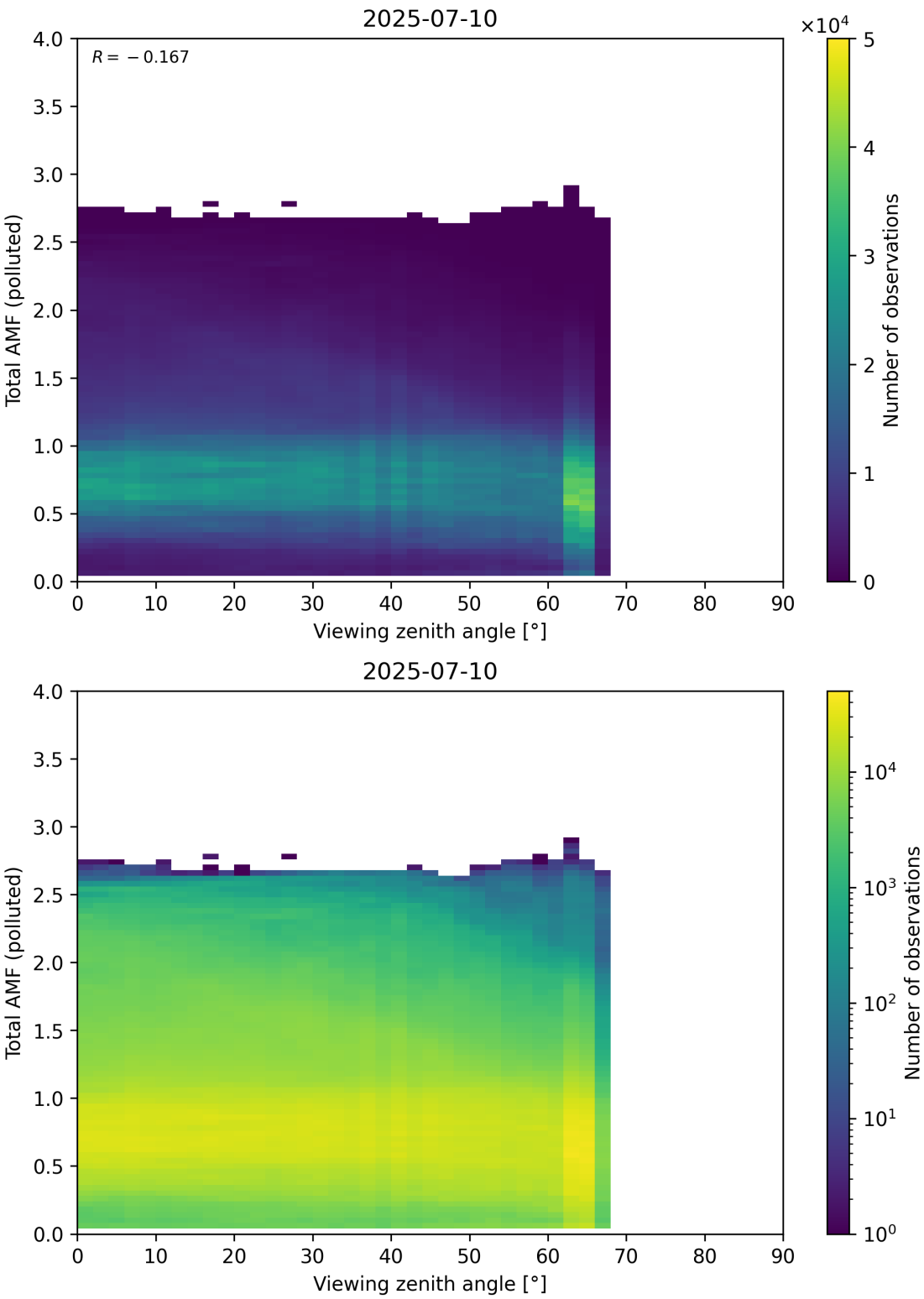

Figure 381: Scatter density plot of “Viewing zenith angle” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11.

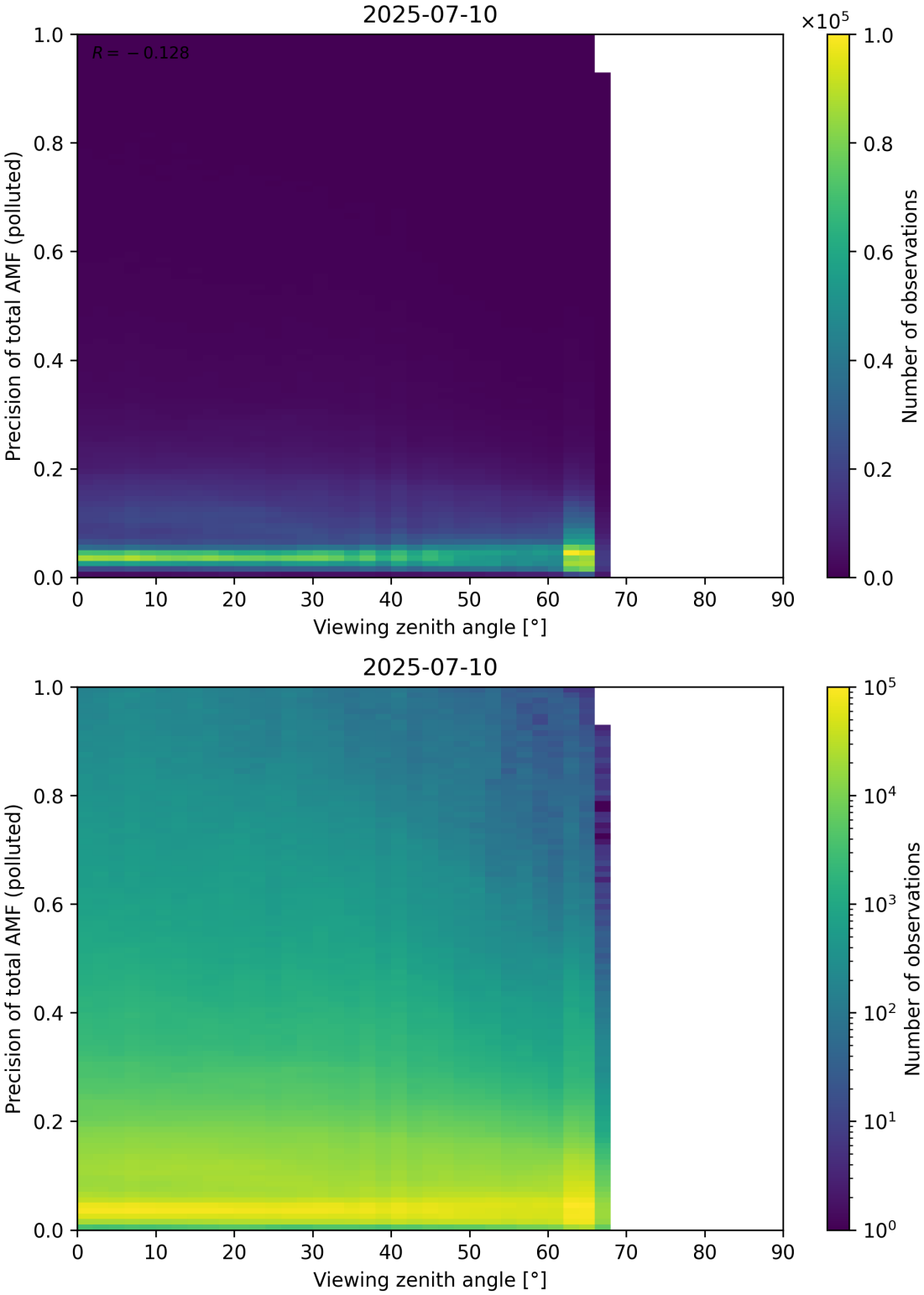

Figure 382: Scatter density plot of “Viewing zenith angle” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11.

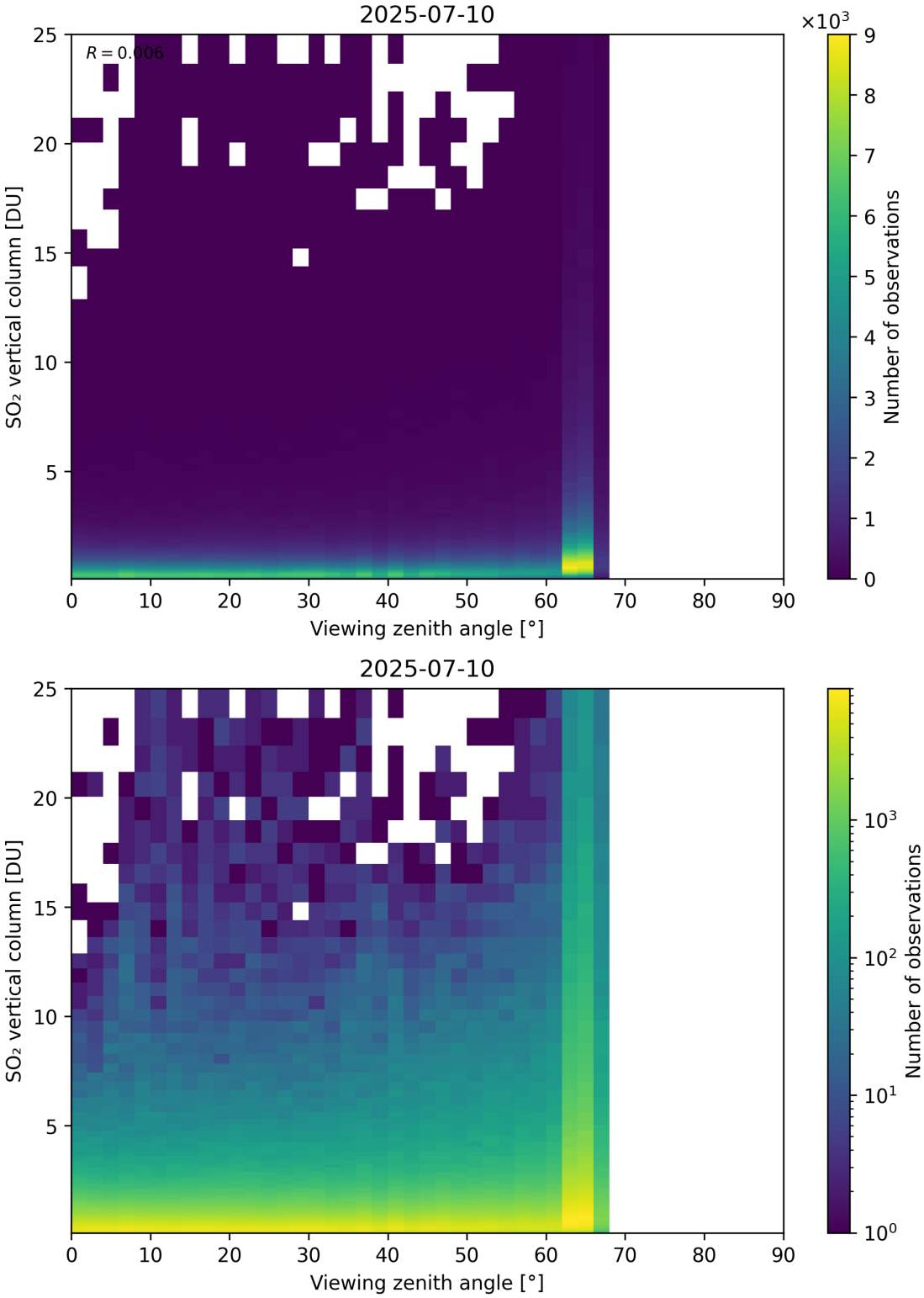

Figure 383: Scatter density plot of "Viewing zenith angle" against "SO_2 vertical column" for 2025-07-09 to 2025-07-11.

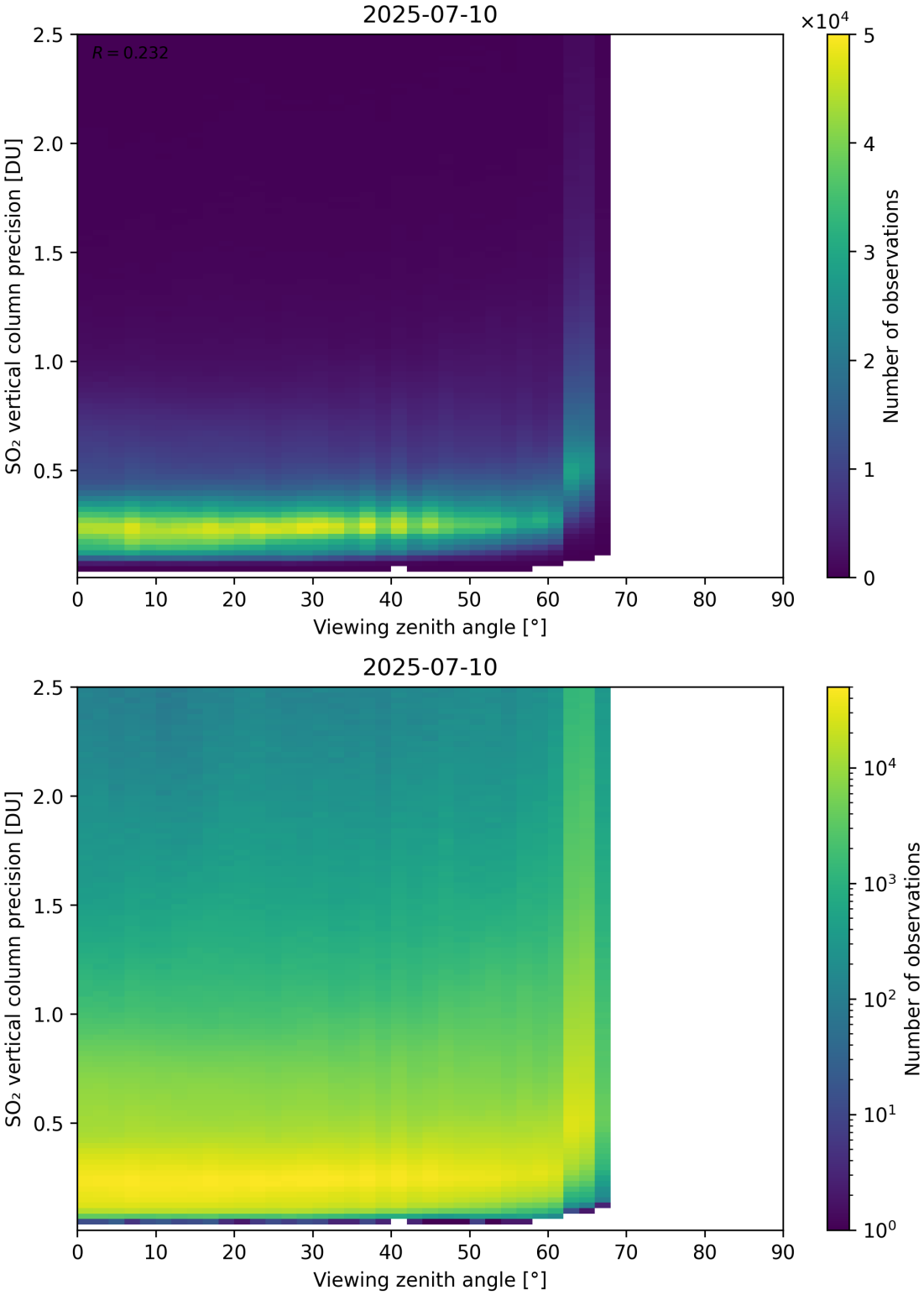

Figure 384: Scatter density plot of "Viewing zenith angle" against "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11.

Contents

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

2 Definitions **1**

3 Granule outlines **12**

4 Input data monitoring **13**

5 Warnings and errors **14**

6 World maps **15**

7 Zonal average **40**

8 Histograms **66**

9 Along track statistics **92**

10 Coincidence density **118**

11 Copyright information of 'PyCAMA' **394**

List of Figures

1 Map of correlation graph for 2025-07-09 to 2025-07-11. . . . 10
2 Map of correlation matrix for 2025-07-09 to 2025-07-11. . . . 11
3 Outline of the granules. . . . 12
4 Input data per granule . . . 13
5 Fraction of pixels with specific warnings and errors during processing . . . 14
6 Map of "SO_2 vertical column" for 2025-07-09 to 2025-07-11 . . . 15
7 Map of "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11 . . . 16
8 Map of "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11 . . . 17
9 Map of "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11 . . . 18
10 Map of "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11 . . . 19
11 Map of "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11 . . . 20
12 Map of "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11 . . . 21
13 Map of "Corrected SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11 . . . 22
14 Map of "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11 . . . 23
15 Map of "SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11 . . . 24
16 Map of "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11 . . . 25
17 Map of "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11 . . . 26
18 Map of "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11 . . . 27
19 Map of "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11 . . . 28
20 Map of "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11 . . . 29
21 Map of "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11 . . . 30
22 Map of "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11 . . . 31
23 Map of "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11 . . . 32
24 Map of "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11 . . . 33
25 Map of "SO_2 RMS" for 2025-07-09 to 2025-07-11 . . . 34
26 Map of "Total AMF (polluted)" for 2025-07-09 to 2025-07-11 . . . 35
27 Map of "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11 . . . 36
28 Map of "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11 . . . 37
29 Map of "Number of spectral points in retrieval" for 2025-07-09 to 2025-07-11 . . . 38
30 Map of the number of observations for 2025-07-09 to 2025-07-11 . . . 39
31 Zonal average of "QA value" for 2025-07-09 to 2025-07-11. . . . 40
32 Zonal average of "SO_2 vertical column" for 2025-07-09 to 2025-07-11. . . . 41
33 Zonal average of "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11. . . . 42
34 Zonal average of "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11. . . . 43
35 Zonal average of "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11. . . . 44
36 Zonal average of "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11. . . . 45

37 Zonal average of “SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11. 46
38 Zonal average of “SO_2 slant column precision (window 1)” for 2025-07-09 to 2025-07-11. 47
39 Zonal average of “Corrected SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11. 48
40 Zonal average of “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11. . . 49
41 Zonal average of “SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11. 50
42 Zonal average of “SO_2 slant column precision (window2)” for 2025-07-09 to 2025-07-11. 51
43 Zonal average of “Corrected SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11. 52
44 Zonal average of “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11. . . 53
45 Zonal average of “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. 54
46 Zonal average of “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11. 55
47 Zonal average of “Corrected SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. 56
48 Zonal average of “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. . . 57
49 Zonal average of “SO_2 Cobra Flag” for 2025-07-09 to 2025-07-11. 58
50 Zonal average of “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11. 59
51 Zonal average of “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. 60
52 Zonal average of “SO_2 RMS” for 2025-07-09 to 2025-07-11. 61
53 Zonal average of “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. 62
54 Zonal average of “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. 63
55 Zonal average of “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. 64
56 Zonal average of “Number of spectral points in retrieval” for 2025-07-09 to 2025-07-11. 65
57 Histogram of “QA value” for 2025-07-09 to 2025-07-11 66
58 Histogram of “SO_2 vertical column” for 2025-07-09 to 2025-07-11 67
59 Histogram of “SO_2 vertical column precision” for 2025-07-09 to 2025-07-11 68
60 Histogram of “Corrected SO_2 slant column” for 2025-07-09 to 2025-07-11 69
61 Histogram of “Cobra SO_2 slant column” for 2025-07-09 to 2025-07-11 70
62 Histogram of “SO_2 slant column precision (Cobra)” for 2025-07-09 to 2025-07-11 71
63 Histogram of “SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11 72
64 Histogram of “SO_2 slant column precision (window 1)” for 2025-07-09 to 2025-07-11 73
65 Histogram of “Corrected SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11 74
66 Histogram of “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11 75
67 Histogram of “SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11 76
68 Histogram of “SO_2 slant column precision (window2)” for 2025-07-09 to 2025-07-11 77
69 Histogram of “Corrected SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11 78
70 Histogram of “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11 79
71 Histogram of “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11 80
72 Histogram of “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11 81
73 Histogram of “Corrected SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11 82
74 Histogram of “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11 83
75 Histogram of “SO_2 Cobra Flag” for 2025-07-09 to 2025-07-11 84
76 Histogram of “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11 85
77 Histogram of “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11 86
78 Histogram of “SO_2 RMS” for 2025-07-09 to 2025-07-11 87
79 Histogram of “Total AMF (polluted)” for 2025-07-09 to 2025-07-11 88
80 Histogram of “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11 89
81 Histogram of “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11 90
82 Histogram of “Number of spectral points in retrieval” for 2025-07-09 to 2025-07-11 91
83 Along track statistics of “QA value” for 2025-07-09 to 2025-07-11 92
84 Along track statistics of “SO_2 vertical column” for 2025-07-09 to 2025-07-11 93
85 Along track statistics of “SO_2 vertical column precision” for 2025-07-09 to 2025-07-11 94
86 Along track statistics of “Corrected SO_2 slant column” for 2025-07-09 to 2025-07-11 95
87 Along track statistics of “Cobra SO_2 slant column” for 2025-07-09 to 2025-07-11 96
88 Along track statistics of “SO_2 slant column precision (Cobra)” for 2025-07-09 to 2025-07-11 97
89 Along track statistics of “SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11 98
90 Along track statistics of “SO_2 slant column precision (window 1)” for 2025-07-09 to 2025-07-11 99
91 Along track statistics of “Corrected SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11 100
92 Along track statistics of “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11 101
93 Along track statistics of “SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11 102
94 Along track statistics of “SO_2 slant column precision (window2)” for 2025-07-09 to 2025-07-11 103
95 Along track statistics of “Corrected SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11 104
96 Along track statistics of “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11 105
97 Along track statistics of “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11 106
98 Along track statistics of “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11 107

99 Along track statistics of "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11 108
100 Along track statistics of "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11 109
101 Along track statistics of "SO_2 Cobra Flag" for 2025-07-09 to 2025-07-11 110
102 Along track statistics of "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11 111
103 Along track statistics of "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11 112
104 Along track statistics of "SO_2 RMS" for 2025-07-09 to 2025-07-11 113
105 Along track statistics of "Total AMF (polluted)" for 2025-07-09 to 2025-07-11 114
106 Along track statistics of "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11 115
107 Along track statistics of "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11 116
108 Along track statistics of "Number of spectral points in retrieval" for 2025-07-09 to 2025-07-11 117
109 Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11. 118
110 Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. 119
111 Scatter density plot of "SO_2 slant column background correction (window 1)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. 120
112 Scatter density plot of "SO_2 slant column background correction (window 1)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. 121
113 Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. 122
114 Scatter density plot of "SO_2 slant column background correction (window 1)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. 123
115 Scatter density plot of "SO_2 slant column background correction (window 1)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11. 124
116 Scatter density plot of "SO_2 slant column background correction (window 1)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. 125
117 Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11. 126
118 Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. 127
119 Scatter density plot of "SO_2 slant column background correction (window 1)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. 128
120 Scatter density plot of "SO_2 slant column background correction (window 1)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. 129
121 Scatter density plot of "SO_2 slant column background correction (window 1)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. 130
122 Scatter density plot of "SO_2 slant column background correction (window 2)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. 131
123 Scatter density plot of "SO_2 slant column background correction (window 2)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. 132
124 Scatter density plot of "SO_2 slant column background correction (window 2)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. 133
125 Scatter density plot of "SO_2 slant column background correction (window 2)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. 134
126 Scatter density plot of "SO_2 slant column background correction (window 2)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. 135
127 Scatter density plot of "SO_2 slant column background correction (window 2)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. 136
128 Scatter density plot of "SO_2 slant column background correction (window 2)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. 137
129 Scatter density plot of "SO_2 slant column background correction (window 2)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. 138
130 Scatter density plot of "SO_2 slant column background correction (window 2)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. 139
131 Scatter density plot of "SO_2 slant column background correction (window 2)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. 140
132 Scatter density plot of "SO_2 slant column background correction (window 3)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. 141
133 Scatter density plot of "SO_2 slant column background correction (window 3)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. 142
134 Scatter density plot of "SO_2 slant column background correction (window 3)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. 143

135 Scatter density plot of “SO_2 slant column background correction (window 3)” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. 144
136 Scatter density plot of “SO_2 slant column background correction (window 3)” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. 145
137 Scatter density plot of “SO_2 slant column background correction (window 3)” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. 146
138 Scatter density plot of “DOAS fit wavelength shift” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. 147
139 Scatter density plot of “DOAS fit wavelength shift” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. . . 148
140 Scatter density plot of “DOAS fit wavelength shift” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. 149
141 Scatter density plot of “DOAS fit wavelength shift” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. 150
142 Scatter density plot of “DOAS fit wavelength shift” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. 151
143 Scatter density plot of “DOAS fit wavelength squeeze” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. 152
144 Scatter density plot of “DOAS fit wavelength squeeze” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. 153
145 Scatter density plot of “DOAS fit wavelength squeeze” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. 154
146 Scatter density plot of “DOAS fit wavelength squeeze” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. 155
147 Scatter density plot of “SO_2 RMS” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. 156
148 Scatter density plot of “SO_2 RMS” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. 157
149 Scatter density plot of “SO_2 RMS” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11.158
150 Scatter density plot of “Latitude” against “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11. 159
151 Scatter density plot of “Latitude” against “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11. 160
152 Scatter density plot of “Latitude” against “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. 161
153 Scatter density plot of “Latitude” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11. . . . 162
154 Scatter density plot of “Latitude” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. . 163
155 Scatter density plot of “Latitude” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. 164
156 Scatter density plot of “Latitude” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. 165
157 Scatter density plot of “Latitude” against “Cobra SO_2 slant column” for 2025-07-09 to 2025-07-11. 166
158 Scatter density plot of “Latitude” against “SO_2 slant column precision (Cobra)” for 2025-07-09 to 2025-07-11.167
159 Scatter density plot of “Latitude” against “Corrected SO_2 slant column” for 2025-07-09 to 2025-07-11. . . 168
160 Scatter density plot of “Latitude” against “Corrected SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11. 169
161 Scatter density plot of “Latitude” against “Corrected SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. 170
162 Scatter density plot of “Latitude” against “SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11. . 171
163 Scatter density plot of “Latitude” against “SO_2 slant column precision (window 1)” for 2025-07-09 to 2025-07-11. 172
164 Scatter density plot of “Latitude” against “SO_2 slant column precision (window2)” for 2025-07-09 to 2025-07-11. 173
165 Scatter density plot of “Latitude” against “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. . 174
166 Scatter density plot of “Latitude” against “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11. 175
167 Scatter density plot of “Latitude” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. 176
168 Scatter density plot of “Latitude” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. 177
169 Scatter density plot of “Latitude” against “SO_2 vertical column” for 2025-07-09 to 2025-07-11. 178
170 Scatter density plot of “Latitude” against “SO_2 vertical column precision” for 2025-07-09 to 2025-07-11. . 179
171 Scatter density plot of “Solar zenith angle” against “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11. 180
172 Scatter density plot of “Solar zenith angle” against “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11. 181
173 Scatter density plot of “Solar zenith angle” against “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. 182
174 Scatter density plot of “Solar zenith angle” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11.183

175 Scatter density plot of “Solar zenith angle” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. 184
176 Scatter density plot of “Solar zenith angle” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. 185
177 Scatter density plot of “Solar zenith angle” against “Latitude” for 2025-07-09 to 2025-07-11. 186
178 Scatter density plot of “Solar zenith angle” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. . 187
179 Scatter density plot of “Solar zenith angle” against “Cobra SO_2 slant column” for 2025-07-09 to 2025-07-11. 188
180 Scatter density plot of “Solar zenith angle” against “SO_2 slant column precision (Cobra)” for 2025-07-09 to 2025-07-11. 189
181 Scatter density plot of “Solar zenith angle” against “Corrected SO_2 slant column” for 2025-07-09 to 2025-07-11. 190
182 Scatter density plot of “Solar zenith angle” against “Corrected SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11. 191
183 Scatter density plot of “Solar zenith angle” against “Corrected SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. 192
184 Scatter density plot of “Solar zenith angle” against “SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11. 193
185 Scatter density plot of “Solar zenith angle” against “SO_2 slant column precision (window 1)” for 2025-07-09 to 2025-07-11. 194
186 Scatter density plot of “Solar zenith angle” against “SO_2 slant column precision (window2)” for 2025-07-09 to 2025-07-11. 195
187 Scatter density plot of “Solar zenith angle” against “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. 196
188 Scatter density plot of “Solar zenith angle” against “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11. 197
189 Scatter density plot of “Solar zenith angle” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. . 198
190 Scatter density plot of “Solar zenith angle” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. 199
191 Scatter density plot of “Solar zenith angle” against “SO_2 vertical column” for 2025-07-09 to 2025-07-11. . 200
192 Scatter density plot of “Solar zenith angle” against “SO_2 vertical column precision” for 2025-07-09 to 2025-07-11. 201
193 Scatter density plot of “Cobra SO_2 slant column” against “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11. 202
194 Scatter density plot of “Cobra SO_2 slant column” against “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11. 203
195 Scatter density plot of “Cobra SO_2 slant column” against “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. 204
196 Scatter density plot of “Cobra SO_2 slant column” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11. 205
197 Scatter density plot of “Cobra SO_2 slant column” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. 206
198 Scatter density plot of “Cobra SO_2 slant column” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. . . . 207
199 Scatter density plot of “SO_2 slant column precision (Cobra)” against “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11. 208
200 Scatter density plot of “SO_2 slant column precision (Cobra)” against “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11. 209
201 Scatter density plot of “SO_2 slant column precision (Cobra)” against “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. 210
202 Scatter density plot of “SO_2 slant column precision (Cobra)” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11. 211
203 Scatter density plot of “SO_2 slant column precision (Cobra)” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. 212
204 Scatter density plot of “SO_2 slant column precision (Cobra)” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. 213
205 Scatter density plot of “SO_2 slant column precision (Cobra)” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. 214
206 Scatter density plot of “SO_2 slant column precision (Cobra)” against “Corrected SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11. 215
207 Scatter density plot of “SO_2 slant column precision (Cobra)” against “Corrected SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. 216
208 Scatter density plot of “SO_2 slant column precision (Cobra)” against “SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11. 217

209 Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11. . . . 218
210 Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11. . . . 219
211 Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 220
212 Scatter density plot of "SO_2 slant column precision (Cobra)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. . . . 221
213 Scatter density plot of "SO_2 slant column precision (Cobra)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 222
214 Scatter density plot of "SO_2 slant column precision (Cobra)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 223
215 Scatter density plot of "Cobra SO_2 slant column" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 224
216 Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11. . . . 225
217 Scatter density plot of "Cobra SO_2 slant column" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11. . . . 226
218 Scatter density plot of "Cobra SO_2 slant column" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 227
219 Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11. . . . 228
220 Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11. . . . 229
221 Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11. . . . 230
222 Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 231
223 Scatter density plot of "Cobra SO_2 slant column" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. . . . 232
224 Scatter density plot of "Cobra SO_2 slant column" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 233
225 Scatter density plot of "Cobra SO_2 slant column" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 234
226 Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11. . . . 235
227 Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11. . . . 236
228 Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. . . . 237
229 Scatter density plot of "Corrected SO_2 slant column" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. . . . 238
230 Scatter density plot of "Corrected SO_2 slant column" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. . . . 239
231 Scatter density plot of "Corrected SO_2 slant column" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. . 240
232 Scatter density plot of "Corrected SO_2 slant column" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 241
233 Scatter density plot of "Corrected SO_2 slant column" against "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11. . . . 242
234 Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11. . . . 243
235 Scatter density plot of "Corrected SO_2 slant column" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11. . . . 244
236 Scatter density plot of "Corrected SO_2 slant column" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 245
237 Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11. . . . 246
238 Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11. . . . 247
239 Scatter density plot of "Corrected SO_2 slant column" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11. . . . 248

240 Scatter density plot of “Corrected SO_2 slant column” against “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. . . . 249
241 Scatter density plot of “Corrected SO_2 slant column” against “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11. . . . 250
242 Scatter density plot of “Corrected SO_2 slant column” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. . . . 251
243 Scatter density plot of “Corrected SO_2 slant column” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. . . . 252
244 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11. . . . 253
245 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. . . . 254
246 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11. . . . 255
247 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. . . . 256
248 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. . . . 257
249 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. . . . 258
250 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “Corrected SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. . . . 259
251 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. . . . 260
252 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11. . . . 261
253 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. . . . 262
254 Scatter density plot of “Corrected SO_2 slant column (window 2)” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. . . . 263
255 Scatter density plot of “Corrected SO_2 slant column (window 3)” against “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. . . . 264
256 Scatter density plot of “Corrected SO_2 slant column (window 3)” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11. . . . 265
257 Scatter density plot of “Corrected SO_2 slant column (window 3)” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. . . . 266
258 Scatter density plot of “Corrected SO_2 slant column (window 3)” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. . . . 267
259 Scatter density plot of “Corrected SO_2 slant column (window 3)” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. . . . 268
260 Scatter density plot of “Corrected SO_2 slant column (window 3)” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. . . . 269
261 Scatter density plot of “Corrected SO_2 slant column (window 3)” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. . . . 270
262 Scatter density plot of “SO_2 slant column (window 1)” against “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11. . . . 271
263 Scatter density plot of “SO_2 slant column (window 1)” against “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11. . . . 272
264 Scatter density plot of “SO_2 slant column (window 1)” against “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. . . . 273
265 Scatter density plot of “SO_2 slant column (window 1)” against “DOAS fit wavelength shift” for 2025-07-09 to 2025-07-11. . . . 274
266 Scatter density plot of “SO_2 slant column (window 1)” against “DOAS fit wavelength squeeze” for 2025-07-09 to 2025-07-11. . . . 275
267 Scatter density plot of “SO_2 slant column (window 1)” against “SO_2 RMS” for 2025-07-09 to 2025-07-11. . 276
268 Scatter density plot of “SO_2 slant column precision (window 1)” against “SO_2 slant column background correction (window 1)” for 2025-07-09 to 2025-07-11. . . . 277
269 Scatter density plot of “SO_2 slant column precision (window 1)” against “SO_2 slant column background correction (window 2)” for 2025-07-09 to 2025-07-11. . . . 278
270 Scatter density plot of “SO_2 slant column precision (window 1)” against “SO_2 slant column background correction (window 3)” for 2025-07-09 to 2025-07-11. . . . 279

271 Scatter density plot of "SO_2 slant column precision (window 1)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. . . . 280
272 Scatter density plot of "SO_2 slant column precision (window 1)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. . . . 281
273 Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. . . . 282
274 Scatter density plot of "SO_2 slant column precision (window 1)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 283
275 Scatter density plot of "SO_2 slant column precision (window 1)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11. . . . 284
276 Scatter density plot of "SO_2 slant column precision (window 1)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 285
277 Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11. . . . 286
278 Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 287
279 Scatter density plot of "SO_2 slant column precision (window 1)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. . . . 288
280 Scatter density plot of "SO_2 slant column precision (window 1)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 289
281 Scatter density plot of "SO_2 slant column precision (window 1)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 290
282 Scatter density plot of "SO_2 slant column (window 1)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 291
283 Scatter density plot of "SO_2 slant column (window 1)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11. . . . 292
284 Scatter density plot of "SO_2 slant column (window 1)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 293
285 Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11. . . . 294
286 Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11. . . . 295
287 Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 296
288 Scatter density plot of "SO_2 slant column (window 1)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. . . . 297
289 Scatter density plot of "SO_2 slant column (window 1)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 298
290 Scatter density plot of "SO_2 slant column (window 1)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 299
291 Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11. . . . 300
292 Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. . . . 301
293 Scatter density plot of "SO_2 slant column precision (window2)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. . . . 302
294 Scatter density plot of "SO_2 slant column precision (window2)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. . . . 303
295 Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. . . . 304
296 Scatter density plot of "SO_2 slant column precision (window2)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 305
297 Scatter density plot of "SO_2 slant column precision (window2)" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11. . . . 306
298 Scatter density plot of "SO_2 slant column precision (window2)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 307
299 Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 308
300 Scatter density plot of "SO_2 slant column precision (window2)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. . . . 309
301 Scatter density plot of "SO_2 slant column precision (window2)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 310

302 Scatter density plot of "SO_2 slant column precision (window2)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 311
303 Scatter density plot of "SO_2 slant column (window 3)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. . . . 312
304 Scatter density plot of "SO_2 slant column (window 3)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. . . . 313
305 Scatter density plot of "SO_2 slant column (window 3)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. . . . 314
306 Scatter density plot of "SO_2 slant column (window 3)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. . 315
307 Scatter density plot of "SO_2 slant column precision (window 3)" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. . . . 316
308 Scatter density plot of "SO_2 slant column precision (window 3)" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. . . . 317
309 Scatter density plot of "SO_2 slant column precision (window 3)" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. . . . 318
310 Scatter density plot of "SO_2 slant column precision (window 3)" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. . . . 319
311 Scatter density plot of "SO_2 slant column precision (window 3)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 320
312 Scatter density plot of "SO_2 slant column precision (window 3)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 321
313 Scatter density plot of "SO_2 slant column precision (window 3)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 322
314 Scatter density plot of "SO_2 slant column precision (window 3)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 323
315 Scatter density plot of "SO_2 slant column (window 3)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 324
316 Scatter density plot of "SO_2 slant column (window 3)" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. . . . 325
317 Scatter density plot of "SO_2 slant column (window 3)" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. . . . 326
318 Scatter density plot of "SO_2 slant column (window 3)" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 327
319 Scatter density plot of "SO_2 slant column (window 3)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 328
320 Scatter density plot of "Precision of total AMF (polluted)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 329
321 Scatter density plot of "Total AMF (polluted)" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. 330
322 Scatter density plot of "Total AMF (polluted)" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. . . . 331
323 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11. . . . 332
324 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11. . . . 333
325 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. . . . 334
326 Scatter density plot of "SO_2 vertical column" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. . . . 335
327 Scatter density plot of "SO_2 vertical column" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. . . . 336
328 Scatter density plot of "SO_2 vertical column" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. 337
329 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11. . . . 338
330 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11. . . . 339
331 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. . . . 340
332 Scatter density plot of "SO_2 vertical column precision" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. . . . 341
333 Scatter density plot of "SO_2 vertical column precision" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. . . . 342
334 Scatter density plot of "SO_2 vertical column precision" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. 343

335 Scatter density plot of "SO_2 vertical column precision" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. 344
336 Scatter density plot of "SO_2 vertical column precision" against "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11. 345
337 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11. 346
338 Scatter density plot of "SO_2 vertical column precision" against "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11. 347
339 Scatter density plot of "SO_2 vertical column precision" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11. 348
340 Scatter density plot of "SO_2 vertical column precision" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. 349
341 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11. 350
342 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11. 351
343 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11. 352
344 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. 353
345 Scatter density plot of "SO_2 vertical column precision" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. 354
346 Scatter density plot of "SO_2 vertical column precision" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. 355
347 Scatter density plot of "SO_2 vertical column precision" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. 356
348 Scatter density plot of "SO_2 vertical column" against "Clear AMF (polluted)" for 2025-07-09 to 2025-07-11. 357
349 Scatter density plot of "SO_2 vertical column" against "Cobra SO_2 slant column" for 2025-07-09 to 2025-07-11.358
350 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column precision (Cobra)" for 2025-07-09 to 2025-07-11. 359
351 Scatter density plot of "SO_2 vertical column" against "Corrected SO_2 slant column" for 2025-07-09 to 2025-07-11. 360
352 Scatter density plot of "SO_2 vertical column" against "Corrected SO_2 slant column (window 2)" for 2025-07-09 to 2025-07-11. 361
353 Scatter density plot of "SO_2 vertical column" against "Corrected SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. 362
354 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column (window 1)" for 2025-07-09 to 2025-07-11. 363
355 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column precision (window 1)" for 2025-07-09 to 2025-07-11. 364
356 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column precision (window2)" for 2025-07-09 to 2025-07-11. 365
357 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column (window 3)" for 2025-07-09 to 2025-07-11. 366
358 Scatter density plot of "SO_2 vertical column" against "SO_2 slant column precision (window 3)" for 2025-07-09 to 2025-07-11. 367
359 Scatter density plot of "SO_2 vertical column" against "Total AMF (polluted)" for 2025-07-09 to 2025-07-11. 368
360 Scatter density plot of "SO_2 vertical column" against "Precision of total AMF (polluted)" for 2025-07-09 to 2025-07-11. 369
361 Scatter density plot of "SO_2 vertical column" against "SO_2 vertical column precision" for 2025-07-09 to 2025-07-11. 370
362 Scatter density plot of "Viewing zenith angle" against "SO_2 slant column background correction (window 1)" for 2025-07-09 to 2025-07-11. 371
363 Scatter density plot of "Viewing zenith angle" against "SO_2 slant column background correction (window 2)" for 2025-07-09 to 2025-07-11. 372
364 Scatter density plot of "Viewing zenith angle" against "SO_2 slant column background correction (window 3)" for 2025-07-09 to 2025-07-11. 373
365 Scatter density plot of "Viewing zenith angle" against "DOAS fit wavelength shift" for 2025-07-09 to 2025-07-11. 374
366 Scatter density plot of "Viewing zenith angle" against "DOAS fit wavelength squeeze" for 2025-07-09 to 2025-07-11. 375
367 Scatter density plot of "Viewing zenith angle" against "SO_2 RMS" for 2025-07-09 to 2025-07-11. 376

368 Scatter density plot of “Viewing zenith angle” against “Latitude” for 2025-07-09 to 2025-07-11. 377
369 Scatter density plot of “Viewing zenith angle” against “Solar zenith angle” for 2025-07-09 to 2025-07-11. . 378
370 Scatter density plot of “Viewing zenith angle” against “Clear AMF (polluted)” for 2025-07-09 to 2025-07-11. 379
371 Scatter density plot of “Viewing zenith angle” against “Cobra SO_2 slant column” for 2025-07-09 to 2025-07-11.380
372 Scatter density plot of “Viewing zenith angle” against “SO_2 slant column precision (Cobra)” for 2025-07-09 to 2025-07-11. 381
373 Scatter density plot of “Viewing zenith angle” against “Corrected SO_2 slant column” for 2025-07-09 to 2025-07-11. 382
374 Scatter density plot of “Viewing zenith angle” against “Corrected SO_2 slant column (window 2)” for 2025-07-09 to 2025-07-11. 383
375 Scatter density plot of “Viewing zenith angle” against “Corrected SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. 384
376 Scatter density plot of “Viewing zenith angle” against “SO_2 slant column (window 1)” for 2025-07-09 to 2025-07-11. 385
377 Scatter density plot of “Viewing zenith angle” against “SO_2 slant column precision (window 1)” for 2025-07-09 to 2025-07-11. 386
378 Scatter density plot of “Viewing zenith angle” against “SO_2 slant column precision (window2)” for 2025-07-09 to 2025-07-11. 387
379 Scatter density plot of “Viewing zenith angle” against “SO_2 slant column (window 3)” for 2025-07-09 to 2025-07-11. 388
380 Scatter density plot of “Viewing zenith angle” against “SO_2 slant column precision (window 3)” for 2025-07-09 to 2025-07-11. 389
381 Scatter density plot of “Viewing zenith angle” against “Total AMF (polluted)” for 2025-07-09 to 2025-07-11. 390
382 Scatter density plot of “Viewing zenith angle” against “Precision of total AMF (polluted)” for 2025-07-09 to 2025-07-11. 391
383 Scatter density plot of “Viewing zenith angle” against “SO_2 vertical column” for 2025-07-09 to 2025-07-11. 392
384 Scatter density plot of “Viewing zenith angle” against “SO_2 vertical column precision” for 2025-07-09 to 2025-07-11. 393

List of Tables

1 Parameterlist and basic statistics for the analysis 2
2 Percentile ranges 3
3 Parameterlist and basic statistics for the analysis for observations in the northern hemisphere 4
4 Parameterlist and basic statistics for the analysis for observations in the southern hemisphere 5
5 Parameterlist and basic statistics for the analysis for observations over water 6
6 Parameterlist and basic statistics for the analysis for observations over land 7
7 Correlation matrix 8
8 Covariance matrix 9

11 Copyright information of ‘PyCAMA’

Copyright © 2005 – 2023, Maarten Sneep (KNMI).

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

3. Neither the name of the copyright holder nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

This software is provided by the copyright holders and contributors “as is” and any express or implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall the copyright holder or contributors be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or

profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.

Maarten Sneep (maarten.sneep@knmi.nl).