

# PyCAMA report generated by tropl2-proc

tropl2-proc

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## 1 Short Introduction

### 1.1 The list of parameters

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

## 2 Definitions

The averages shown here are *unweighed* averages:

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

with  $N$  the number of observations in the dataset.

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

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

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

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

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

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

The median is a special case of a percentile. Instead of 1/2 in equation 3, other threshold values can be used. We report results for 1 %, 5 %, 10 %, 15.9 %, 25 %, 75 %, 84.1 %, 90 %, 95 % and 99 %. The inter quartile range is the difference between the 75 % and 25 % percentiles. Similarly the minimum and maximum values correspond to the 0 % and 100 % percentiles respectively.

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

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

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

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

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

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

Table 1: Parameterlist and basic statistics for the analysis

| Variable                                                   | mean $\pm \sigma$                    | Count    | Mode                    | IQR                    | Median                  | Minimum                 | Maximum                |
|------------------------------------------------------------|--------------------------------------|----------|-------------------------|------------------------|-------------------------|-------------------------|------------------------|
| qa value [1]                                               | $0.654 \pm 0.398$                    | 17301360 | 0.995                   | 0.770                  | 1.000                   | 0.0                     | 1.000                  |
| sulfurdioxide total vertical column [DU]                   | $(3.614 \pm 110.370) \times 10^{-2}$ | 17301360 | 0.263                   | 0.481                  | $1.194 \times 10^{-2}$  | -55.5                   | 796                    |
| sulfurdioxide total vertical column precision [DU]         | $0.553 \pm 0.775$                    | 17301360 | 0.222                   | 0.367                  | 0.343                   | $4.712 \times 10^{-2}$  | 54.0                   |
| sulfurdioxide slant column density corrected [DU]          | $(2.177 \pm 43.892) \times 10^{-2}$  | 17301360 | 0.250                   | 0.376                  | $1.002 \times 10^{-2}$  | -15.4                   | 656                    |
| sulfurdioxide slant column density cobra [DU]              | $(2.147 \pm 38.120) \times 10^{-2}$  | 17301360 | 0.250                   | 0.376                  | $1.002 \times 10^{-2}$  | -15.4                   | 102                    |
| sulfurdioxide slant column density cobra precision [DU]    | $0.302 \pm 0.137$                    | 17301360 | 0.213                   | 0.141                  | 0.262                   | $8.411 \times 10^{-2}$  | 27.1                   |
| sulfurdioxide slant column density window1 [DU]            | $0.165 \pm 0.709$                    | 17301360 | 0.225                   | 0.753                  | 0.175                   | -64.0                   | 79.0                   |
| sulfurdioxide slant column density window1 precision [DU]  | $0.302 \pm 0.137$                    | 17301360 | 0.213                   | 0.141                  | 0.262                   | $8.411 \times 10^{-2}$  | 27.1                   |
| sulfurdioxide slant column density corrected win1 [DU]     | $(3.560 \pm 70.201) \times 10^{-2}$  | 17301360 | $-2.500 \times 10^{-2}$ | 0.741                  | $1.290 \times 10^{-2}$  | -64.0                   | 79.6                   |
| background so2 slant column offset window1 [DU]            | $-0.130 \pm 0.162$                   | 17301360 | -0.220                  | 0.171                  | -0.166                  | -1.40                   | 3.06                   |
| sulfurdioxide slant column density window2 [DU]            | $1.99 \pm 9.23$                      | 17301360 | 1.75                    | 11.7                   | 1.85                    | $-1.305 \times 10^3$    | $1.367 \times 10^3$    |
| sulfurdioxide slant column density window2 precision [DU]  | $8.10 \pm 2.24$                      | 17301360 | 7.43                    | 2.50                   | 7.77                    | 2.32                    | 578                    |
| sulfurdioxide slant column density corrected win2 [DU]     | $-0.493 \pm 8.839$                   | 17301360 | -0.250                  | 11.1                   | -0.470                  | $-1.305 \times 10^3$    | $1.367 \times 10^3$    |
| background so2 slant column offset window2 [DU]            | $-2.49 \pm 3.14$                     | 17301360 | 0.250                   | 4.11                   | -1.47                   | -15.5                   | 8.52                   |
| sulfurdioxide slant column density window3 [DU]            | $-9.46 \pm 23.88$                    | 17301360 | -11.8                   | 30.1                   | -9.76                   | -507                    | 352                    |
| sulfurdioxide slant column density window3 precision [DU]  | $28.0 \pm 13.3$                      | 17301360 | 22.5                    | 9.51                   | 24.5                    | 9.42                    | 272                    |
| sulfurdioxide slant column density corrected win3 [DU]     | $1.73 \pm 23.05$                     | 17301360 | 1.68                    | 28.8                   | 1.84                    | -493                    | 359                    |
| background so2 slant column offset window3 [DU]            | $11.2 \pm 6.8$                       | 17301360 | 5.04                    | 11.7                   | 11.0                    | -12.4                   | 36.9                   |
| sulfurdioxide slant column cobra flag [1]                  | $1.98 \pm 0.22$                      | 17301360 | 1.67                    | 0.0                    | 2.00                    | 0.0                     | 2.00                   |
| integrated so2 profile apriori [DU]                        | $(3.398 \pm 8.993) \times 10^{-2}$   | 17301360 | $1.316 \times 10^{-2}$  | $1.939 \times 10^{-2}$ | $1.386 \times 10^{-2}$  | $2.204 \times 10^{-4}$  | 2.60                   |
| fitted radiance shift [nm]                                 | $(-3.410 \pm 25.639) \times 10^{-4}$ | 17301360 | $-5.000 \times 10^{-4}$ | $1.716 \times 10^{-3}$ | $-3.171 \times 10^{-4}$ | $-4.966 \times 10^{-2}$ | 0.110                  |
| fitted radiance squeeze [1]                                | $(-1.583 \pm 18.068) \times 10^{-5}$ | 17301360 | $-1.000 \times 10^{-5}$ | $2.038 \times 10^{-4}$ | $-1.014 \times 10^{-5}$ | $-1.363 \times 10^{-2}$ | $6.547 \times 10^{-2}$ |
| fitted root mean square [1]                                | $(1.315 \pm 0.565) \times 10^{-3}$   | 17301360 | $9.750 \times 10^{-4}$  | $5.653 \times 10^{-4}$ | $1.150 \times 10^{-3}$  | $2.631 \times 10^{-4}$  | $6.925 \times 10^{-2}$ |
| sulfurdioxide total air mass factor polluted [1]           | $0.837 \pm 0.422$                    | 17301360 | 0.820                   | 0.554                  | 0.791                   | $5.000 \times 10^{-2}$  | 2.85                   |
| sulfurdioxide total air mass factor polluted precision [1] | $0.102 \pm 0.107$                    | 17301360 | $3.500 \times 10^{-2}$  | $9.910 \times 10^{-2}$ | $6.261 \times 10^{-2}$  | $2.785 \times 10^{-3}$  | 1.66                   |
| sulfurdioxide clear air mass factor polluted [1]           | $0.722 \pm 0.295$                    | 17301360 | 0.580                   | 0.393                  | 0.696                   | $4.575 \times 10^{-2}$  | 2.54                   |
| number of spectral points in retrieval [1]                 | $73.4 \pm 0.5$                       | 17301360 | 73.0                    | 1.000                  | 73.0                    | 52.0                    | 74.0                   |



Table 2: Percentile ranges

| Variable                                                   | 1 %                     | 5 %                     | 10 %                    | 15.9 %                  | 25 %                    | 75 %                    | 84.1 %                  | 90 %                   | 95 %                   | 99 %                   |
|------------------------------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|
| qa value [1]                                               | 0.0                     | 0.0                     | $5.000 \times 10^{-2}$  | 0.130                   | 0.230                   | 1.000                   | 1.000                   | 1.000                  | 1.000                  | 1.000                  |
| sulfurdioxide total vertical column [DU]                   | -2.43                   | -0.926                  | -0.565                  | -0.380                  | -0.225                  | 0.256                   | 0.426                   | 0.634                  | 1.05                   | 2.85                   |
| sulfurdioxide total vertical column precision [DU]         | 0.110                   | 0.147                   | 0.174                   | 0.197                   | 0.229                   | 0.596                   | 0.791                   | 1.02                   | 1.52                   | 3.71                   |
| sulfurdioxide slant column density corrected [DU]          | -0.881                  | -0.507                  | -0.366                  | -0.273                  | -0.176                  | 0.200                   | 0.303                   | 0.406                  | 0.570                  | 1.10                   |
| sulfurdioxide slant column density cobra [DU]              | -0.881                  | -0.507                  | -0.366                  | -0.273                  | -0.176                  | 0.200                   | 0.303                   | 0.406                  | 0.570                  | 1.10                   |
| sulfurdioxide slant column density cobra precision [DU]    | 0.146                   | 0.173                   | 0.186                   | 0.197                   | 0.211                   | 0.353                   | 0.407                   | 0.463                  | 0.561                  | 0.806                  |
| sulfurdioxide slant column density window1 [DU]            | -1.78                   | -0.928                  | -0.614                  | -0.412                  | -0.206                  | 0.547                   | 0.742                   | 0.930                  | 1.22                   | 2.02                   |
| sulfurdioxide slant column density window1 precision [DU]  | 0.146                   | 0.173                   | 0.186                   | 0.197                   | 0.211                   | 0.353                   | 0.407                   | 0.463                  | 0.561                  | 0.806                  |
| sulfurdioxide slant column density corrected win1 [DU]     | -1.71                   | -0.986                  | -0.718                  | -0.540                  | -0.351                  | 0.390                   | 0.597                   | 0.803                  | 1.13                   | 2.07                   |
| background so2 slant column offset window1 [DU]            | -0.373                  | -0.303                  | -0.277                  | -0.258                  | -0.235                  | $-6.330 \times 10^{-2}$ | $-3.009 \times 10^{-3}$ | $6.524 \times 10^{-2}$ | 0.180                  | 0.441                  |
| sulfurdioxide slant column density window2 [DU]            | -19.6                   | -12.7                   | -9.30                   | -6.78                   | -3.94                   | 7.78                    | 10.8                    | 13.5                   | 17.1                   | 24.8                   |
| sulfurdioxide slant column density window2 precision [DU]  | 4.36                    | 5.24                    | 5.76                    | 6.17                    | 6.66                    | 9.16                    | 10.0                    | 10.9                   | 12.1                   | 14.7                   |
| sulfurdioxide slant column density corrected win2 [DU]     | -22.0                   | -14.8                   | -11.4                   | -8.85                   | -6.05                   | 5.09                    | 7.86                    | 10.3                   | 13.7                   | 20.8                   |
| background so2 slant column offset window2 [DU]            | -11.1                   | -9.00                   | -7.43                   | -5.94                   | -4.22                   | -0.117                  | 0.197                   | 0.420                  | 0.725                  | 2.32                   |
| sulfurdioxide slant column density window3 [DU]            | -68.2                   | -48.1                   | -38.7                   | -32.0                   | -24.6                   | 5.58                    | 13.5                    | 20.6                   | 30.2                   | 49.0                   |
| sulfurdioxide slant column density window3 precision [DU]  | 13.7                    | 16.1                    | 17.9                    | 19.3                    | 20.9                    | 30.4                    | 35.1                    | 40.9                   | 52.9                   | 85.4                   |
| sulfurdioxide slant column density corrected win3 [DU]     | -56.3                   | -36.2                   | -26.7                   | -19.9                   | -12.6                   | 16.3                    | 23.6                    | 30.2                   | 39.2                   | 57.6                   |
| background so2 slant column offset window3 [DU]            | -1.17                   | 1.86                    | 3.07                    | 4.00                    | 5.13                    | 16.8                    | 18.7                    | 20.3                   | 22.1                   | 25.3                   |
| sulfurdioxide slant column cobra flag [1]                  | 0.0                     | 2.00                    | 2.00                    | 2.00                    | 2.00                    | 2.00                    | 2.00                    | 2.00                   | 2.00                   | 2.00                   |
| integrated so2 profile apriori [DU]                        | $7.733 \times 10^{-4}$  | $1.627 \times 10^{-3}$  | $2.815 \times 10^{-3}$  | $4.797 \times 10^{-3}$  | $7.414 \times 10^{-3}$  | $2.680 \times 10^{-2}$  | $3.948 \times 10^{-2}$  | $6.416 \times 10^{-2}$ | 0.116                  | 0.406                  |
| fitted radiance shift [nm]                                 | $-8.197 \times 10^{-3}$ | $-4.096 \times 10^{-3}$ | $-2.695 \times 10^{-3}$ | $-1.903 \times 10^{-3}$ | $-1.226 \times 10^{-3}$ | $4.894 \times 10^{-4}$  | $1.131 \times 10^{-3}$  | $1.971 \times 10^{-3}$ | $3.475 \times 10^{-3}$ | $7.763 \times 10^{-3}$ |
| fitted radiance squeeze [1]                                | $-5.218 \times 10^{-4}$ | $-3.062 \times 10^{-4}$ | $-2.237 \times 10^{-4}$ | $-1.695 \times 10^{-4}$ | $-1.137 \times 10^{-4}$ | $9.013 \times 10^{-5}$  | $1.414 \times 10^{-4}$  | $1.887 \times 10^{-4}$ | $2.564 \times 10^{-4}$ | $4.163 \times 10^{-4}$ |
| fitted root mean square [1]                                | $6.077 \times 10^{-4}$  | $7.516 \times 10^{-4}$  | $8.248 \times 10^{-4}$  | $8.810 \times 10^{-4}$  | $9.512 \times 10^{-4}$  | $1.516 \times 10^{-3}$  | $1.769 \times 10^{-3}$  | $2.022 \times 10^{-3}$ | $2.398 \times 10^{-3}$ | $3.381 \times 10^{-3}$ |
| sulfurdioxide total air mass factor polluted [1]           | $9.136 \times 10^{-2}$  | 0.234                   | 0.334                   | 0.418                   | 0.527                   | 1.08                    | 1.26                    | 1.43                   | 1.64                   | 1.98                   |
| sulfurdioxide total air mass factor polluted precision [1] | $1.020 \times 10^{-2}$  | $1.754 \times 10^{-2}$  | $2.293 \times 10^{-2}$  | $2.807 \times 10^{-2}$  | $3.617 \times 10^{-2}$  | 0.135                   | 0.180                   | 0.222                  | 0.296                  | 0.528                  |
| sulfurdioxide clear air mass factor polluted [1]           | 0.208                   | 0.304                   | 0.369                   | 0.431                   | 0.507                   | 0.900                   | 0.994                   | 1.08                   | 1.23                   | 1.64                   |
| 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]                                               | $0.641 \pm 0.399$                    | 10485848 | 0.770                  | 1.000                   | 0.0                     | 1.000                  | 0.230                   | 1.000                   |
| sulfurdioxide total vertical column [DU]                   | $(4.013 \pm 119.871) \times 10^{-2}$ | 10485848 | 0.511                  | $1.121 \times 10^{-2}$  | -55.5                   | 155                    | -0.239                  | 0.271                   |
| sulfurdioxide total vertical column precision [DU]         | $0.616 \pm 0.881$                    | 10485848 | 0.431                  | 0.373                   | $4.712 \times 10^{-2}$  | 36.7                   | 0.235                   | 0.666                   |
| sulfurdioxide slant column density corrected [DU]          | $(2.172 \pm 39.972) \times 10^{-2}$  | 10485848 | 0.380                  | $9.117 \times 10^{-3}$  | -15.1                   | 205                    | -0.179                  | 0.201                   |
| sulfurdioxide slant column density cobra [DU]              | $(2.154 \pm 38.759) \times 10^{-2}$  | 10485848 | 0.380                  | $9.117 \times 10^{-3}$  | -15.1                   | 19.9                   | -0.179                  | 0.201                   |
| sulfurdioxide slant column density cobra precision [DU]    | $0.309 \pm 0.145$                    | 10485848 | 0.155                  | 0.265                   | $8.852 \times 10^{-2}$  | 18.2                   | 0.210                   | 0.365                   |
| sulfurdioxide slant column density window1 [DU]            | $0.161 \pm 0.733$                    | 10485848 | 0.764                  | 0.175                   | -41.7                   | 40.6                   | -0.212                  | 0.552                   |
| sulfurdioxide slant column density window1 precision [DU]  | $0.309 \pm 0.145$                    | 10485848 | 0.155                  | 0.265                   | $8.852 \times 10^{-2}$  | 18.2                   | 0.210                   | 0.365                   |
| sulfurdioxide slant column density corrected win1 [DU]     | $(4.085 \pm 72.584) \times 10^{-2}$  | 10485848 | 0.753                  | $1.458 \times 10^{-2}$  | -41.7                   | 40.7                   | -0.354                  | 0.399                   |
| background so2 slant column offset window1 [DU]            | $-0.120 \pm 0.181$                   | 10485848 | 0.184                  | -0.169                  | -1.25                   | 3.06                   | -0.238                  | $-5.332 \times 10^{-2}$ |
| sulfurdioxide slant column density window2 [DU]            | $2.58 \pm 9.04$                      | 10485848 | 11.7                   | 2.43                    | -693                    | 490                    | -3.33                   | 8.33                    |
| sulfurdioxide slant column density window2 precision [DU]  | $7.85 \pm 2.05$                      | 10485848 | 2.32                   | 7.54                    | 2.39                    | 341                    | 6.50                    | 8.82                    |
| sulfurdioxide slant column density corrected win2 [DU]     | $-0.626 \pm 8.483$                   | 10485848 | 10.9                   | -0.575                  | -700                    | 487                    | -6.02                   | 4.83                    |
| background so2 slant column offset window2 [DU]            | $-3.21 \pm 3.59$                     | 10485848 | 5.88                   | -2.35                   | -15.5                   | 8.52                   | -5.95                   | $-6.767 \times 10^{-2}$ |
| sulfurdioxide slant column density window3 [DU]            | $-10.8 \pm 23.0$                     | 10485848 | 28.9                   | -11.3                   | -215                    | 175                    | -25.4                   | 3.49                    |
| sulfurdioxide slant column density window3 precision [DU]  | $26.6 \pm 12.6$                      | 10485848 | 7.88                   | 23.3                    | 9.42                    | 260                    | 20.3                    | 28.1                    |
| sulfurdioxide slant column density corrected win3 [DU]     | $1.95 \pm 22.01$                     | 10485848 | 27.5                   | 2.12                    | -197                    | 187                    | -11.6                   | 15.8                    |
| background so2 slant column offset window3 [DU]            | $12.8 \pm 7.1$                       | 10485848 | 12.7                   | 14.0                    | -12.0                   | 36.9                   | 5.84                    | 18.5                    |
| sulfurdioxide slant column cobra flag [1]                  | $1.98 \pm 0.20$                      | 10485848 | 0.0                    | 2.00                    | 0.0                     | 2.00                   | 2.00                    | 2.00                    |
| integrated so2 profile apriori [DU]                        | $(4.443 \pm 11.180) \times 10^{-2}$  | 10485848 | $3.016 \times 10^{-2}$ | $1.587 \times 10^{-2}$  | $2.204 \times 10^{-4}$  | 2.60                   | $5.847 \times 10^{-3}$  | $3.601 \times 10^{-2}$  |
| fitted radiance shift [nm]                                 | $(-2.066 \pm 24.212) \times 10^{-4}$ | 10485848 | $1.476 \times 10^{-3}$ | $-2.046 \times 10^{-4}$ | $-4.530 \times 10^{-2}$ | $4.265 \times 10^{-2}$ | $-9.662 \times 10^{-4}$ | $5.098 \times 10^{-4}$  |
| fitted radiance squeeze [1]                                | $(-3.364 \pm 18.275) \times 10^{-5}$ | 10485848 | $2.048 \times 10^{-4}$ | $-2.218 \times 10^{-5}$ | $-9.324 \times 10^{-3}$ | $1.417 \times 10^{-2}$ | $-1.283 \times 10^{-4}$ | $7.654 \times 10^{-5}$  |
| fitted root mean square [1]                                | $(1.344 \pm 0.608) \times 10^{-3}$   | 10485848 | $6.062 \times 10^{-4}$ | $1.156 \times 10^{-3}$  | $3.453 \times 10^{-4}$  | $3.027 \times 10^{-2}$ | $9.492 \times 10^{-4}$  | $1.555 \times 10^{-3}$  |
| sulfurdioxide total air mass factor polluted [1]           | $0.813 \pm 0.447$                    | 10485848 | 0.595                  | 0.745                   | $5.000 \times 10^{-2}$  | 2.85                   | 0.473                   | 1.07                    |
| sulfurdioxide total air mass factor polluted precision [1] | $0.101 \pm 0.118$                    | 10485848 | $9.518 \times 10^{-2}$ | $5.733 \times 10^{-2}$  | $2.785 \times 10^{-3}$  | 1.66                   | $3.156 \times 10^{-2}$  | 0.127                   |
| sulfurdioxide clear air mass factor polluted [1]           | $0.697 \pm 0.331$                    | 10485848 | 0.442                  | 0.643                   | $4.575 \times 10^{-2}$  | 2.54                   | 0.446                   | 0.888                   |
| number of spectral points in retrieval [1]                 | $73.5 \pm 0.5$                       | 10485848 | 1.000                  | 73.0                    | 71.0                    | 74.0                   | 73.0                    | 74.0                    |

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

| Variable                                                   | mean $\pm \sigma$                    | Count   | IQR                    | Median                  | Minimum                 | Maximum                | 25 % percentile         | 75 % percentile         |
|------------------------------------------------------------|--------------------------------------|---------|------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|
| qa value [1]                                               | $0.675 \pm 0.395$                    | 6815512 | 0.730                  | 1.000                   | 0.0                     | 1.000                  | 0.270                   | 1.000                   |
| sulfurdioxide total vertical column [DU]                   | $(3.001 \pm 93.891) \times 10^{-2}$  | 6815512 | 0.443                  | $1.296 \times 10^{-2}$  | -45.0                   | 796                    | -0.206                  | 0.237                   |
| sulfurdioxide total vertical column precision [DU]         | $0.457 \pm 0.559$                    | 6815512 | 0.277                  | 0.311                   | $5.427 \times 10^{-2}$  | 54.0                   | 0.223                   | 0.500                   |
| sulfurdioxide slant column density corrected [DU]          | $(2.186 \pm 49.319) \times 10^{-2}$  | 6815512 | 0.369                  | $1.137 \times 10^{-2}$  | -15.4                   | 656                    | -0.171                  | 0.198                   |
| sulfurdioxide slant column density cobra [DU]              | $(2.137 \pm 37.116) \times 10^{-2}$  | 6815512 | 0.369                  | $1.137 \times 10^{-2}$  | -15.4                   | 102                    | -0.171                  | 0.198                   |
| sulfurdioxide slant column density cobra precision [DU]    | $0.291 \pm 0.122$                    | 6815512 | 0.123                  | 0.259                   | $8.411 \times 10^{-2}$  | 27.1                   | 0.213                   | 0.336                   |
| sulfurdioxide slant column density window1 [DU]            | $0.172 \pm 0.670$                    | 6815512 | 0.736                  | 0.175                   | -64.0                   | 79.0                   | -0.196                  | 0.539                   |
| sulfurdioxide slant column density window1 precision [DU]  | $0.291 \pm 0.122$                    | 6815512 | 0.123                  | 0.259                   | $8.411 \times 10^{-2}$  | 27.1                   | 0.213                   | 0.336                   |
| sulfurdioxide slant column density corrected win1 [DU]     | $(2.753 \pm 66.359) \times 10^{-2}$  | 6815512 | 0.724                  | $1.044 \times 10^{-2}$  | -64.0                   | 79.6                   | -0.347                  | 0.377                   |
| background so2 slant column offset window1 [DU]            | $-0.144 \pm 0.124$                   | 6815512 | 0.152                  | -0.163                  | -1.40                   | 1.95                   | -0.230                  | $-7.786 \times 10^{-2}$ |
| sulfurdioxide slant column density window2 [DU]            | $1.09 \pm 9.43$                      | 6815512 | 11.7                   | 0.942                   | $-1.305 \times 10^3$    | $1.367 \times 10^3$    | -4.84                   | 6.86                    |
| sulfurdioxide slant column density window2 precision [DU]  | $8.49 \pm 2.46$                      | 6815512 | 2.69                   | 8.16                    | 2.32                    | 578                    | 6.97                    | 9.66                    |
| sulfurdioxide slant column density corrected win2 [DU]     | $-0.289 \pm 9.356$                   | 6815512 | 11.6                   | -0.297                  | $-1.305 \times 10^3$    | $1.367 \times 10^3$    | -6.10                   | 5.51                    |
| background so2 slant column offset window2 [DU]            | $-1.37 \pm 1.80$                     | 6815512 | 2.18                   | -0.983                  | -12.1                   | 8.09                   | -2.35                   | -0.167                  |
| sulfurdioxide slant column density window3 [DU]            | $-7.33 \pm 25.04$                    | 6815512 | 31.6                   | -7.22                   | -507                    | 352                    | -23.0                   | 8.66                    |
| sulfurdioxide slant column density window3 precision [DU]  | $30.3 \pm 14.0$                      | 6815512 | 11.1                   | 26.6                    | 9.80                    | 272                    | 22.4                    | 33.4                    |
| sulfurdioxide slant column density corrected win3 [DU]     | $1.40 \pm 24.56$                     | 6815512 | 31.1                   | 1.36                    | -493                    | 359                    | -14.1                   | 17.0                    |
| background so2 slant column offset window3 [DU]            | $8.72 \pm 5.40$                      | 6815512 | 8.36                   | 7.47                    | -12.4                   | 27.9                   | 4.65                    | 13.0                    |
| sulfurdioxide slant column cobra flag [1]                  | $1.97 \pm 0.23$                      | 6815512 | 0.0                    | 2.00                    | 0.0                     | 2.00                   | 2.00                    | 2.00                    |
| integrated so2 profile apriori [DU]                        | $(1.789 \pm 2.948) \times 10^{-2}$   | 6815512 | $1.107 \times 10^{-2}$ | $1.234 \times 10^{-2}$  | $1.109 \times 10^{-3}$  | 1.03                   | $8.384 \times 10^{-3}$  | $1.946 \times 10^{-2}$  |
| fitted radiance shift [nm]                                 | $(-5.477 \pm 27.562) \times 10^{-4}$ | 6815512 | $2.081 \times 10^{-3}$ | $-5.534 \times 10^{-4}$ | $-4.966 \times 10^{-2}$ | 0.110                  | $-1.639 \times 10^{-3}$ | $4.421 \times 10^{-4}$  |
| fitted radiance squeeze [1]                                | $(1.156 \pm 17.393) \times 10^{-5}$  | 6815512 | $2.023 \times 10^{-4}$ | $8.324 \times 10^{-6}$  | $-1.363 \times 10^{-2}$ | $6.547 \times 10^{-2}$ | $-9.154 \times 10^{-5}$ | $1.108 \times 10^{-4}$  |
| fitted root mean square [1]                                | $(1.270 \pm 0.487) \times 10^{-3}$   | 6815512 | $5.088 \times 10^{-4}$ | $1.143 \times 10^{-3}$  | $2.631 \times 10^{-4}$  | $6.925 \times 10^{-2}$ | $9.543 \times 10^{-4}$  | $1.463 \times 10^{-3}$  |
| sulfurdioxide total air mass factor polluted [1]           | $0.875 \pm 0.377$                    | 6815512 | 0.482                  | 0.840                   | $5.000 \times 10^{-2}$  | 2.58                   | 0.614                   | 1.10                    |
| sulfurdioxide total air mass factor polluted precision [1] | $0.104 \pm 0.086$                    | 6815512 | 0.103                  | $7.157 \times 10^{-2}$  | $4.720 \times 10^{-3}$  | 1.18                   | $4.267 \times 10^{-2}$  | 0.145                   |
| sulfurdioxide clear air mass factor polluted [1]           | $0.761 \pm 0.222$                    | 6815512 | 0.317                  | 0.751                   | 0.133                   | 1.72                   | 0.594                   | 0.911                   |
| number of spectral points in retrieval [1]                 | $73.4 \pm 0.5$                       | 6815512 | 1.000                  | 73.0                    | 52.0                    | 74.0                   | 73.0                    | 74.0                    |

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

| Variable                                                   | mean $\pm \sigma$                     | Count    | IQR                    | Median                  | Minimum                 | Maximum                | 25 % percentile         | 75 % percentile         |
|------------------------------------------------------------|---------------------------------------|----------|------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|
| qa value [1]                                               | $0.676 \pm 0.395$                     | 11454475 | 0.750                  | 1.000                   | 0.0                     | 1.000                  | 0.250                   | 1.000                   |
| sulfurdioxide total vertical column [DU]                   | $(2.812 \pm 93.469) \times 10^{-2}$   | 11454475 | 0.450                  | $1.032 \times 10^{-2}$  | -55.5                   | 110                    | -0.212                  | 0.238                   |
| sulfurdioxide total vertical column precision [DU]         | $0.494 \pm 0.673$                     | 11454475 | 0.313                  | 0.314                   | $5.899 \times 10^{-2}$  | 28.7                   | 0.223                   | 0.535                   |
| sulfurdioxide slant column density corrected [DU]          | $(1.713 \pm 36.071) \times 10^{-2}$   | 11454475 | 0.365                  | $8.823 \times 10^{-3}$  | -15.1                   | 33.2                   | -0.172                  | 0.193                   |
| sulfurdioxide slant column density cobra [DU]              | $(1.710 \pm 35.961) \times 10^{-2}$   | 11454475 | 0.365                  | $8.823 \times 10^{-3}$  | -15.1                   | 19.9                   | -0.172                  | 0.193                   |
| sulfurdioxide slant column density cobra precision [DU]    | $0.296 \pm 0.136$                     | 11454475 | 0.142                  | 0.251                   | $8.411 \times 10^{-2}$  | 18.2                   | 0.206                   | 0.348                   |
| sulfurdioxide slant column density window1 [DU]            | $0.162 \pm 0.685$                     | 11454475 | 0.736                  | 0.175                   | -57.1                   | 31.8                   | -0.198                  | 0.538                   |
| sulfurdioxide slant column density window1 precision [DU]  | $0.296 \pm 0.136$                     | 11454475 | 0.142                  | 0.251                   | $8.411 \times 10^{-2}$  | 18.2                   | 0.206                   | 0.348                   |
| sulfurdioxide slant column density corrected win1 [DU]     | $(2.654 \pm 67.786) \times 10^{-2}$   | 11454475 | 0.725                  | $8.798 \times 10^{-3}$  | -57.1                   | 31.7                   | -0.348                  | 0.377                   |
| background so2 slant column offset window1 [DU]            | $-0.136 \pm 0.151$                    | 11454475 | 0.167                  | -0.168                  | -1.33                   | 2.19                   | -0.235                  | $-6.839 \times 10^{-2}$ |
| sulfurdioxide slant column density window2 [DU]            | $1.65 \pm 9.11$                       | 11454475 | 11.6                   | 1.45                    | $-1.099 \times 10^3$    | 625                    | -4.24                   | 7.32                    |
| sulfurdioxide slant column density window2 precision [DU]  | $8.06 \pm 2.15$                       | 11454475 | 2.50                   | 7.74                    | 2.32                    | 578                    | 6.64                    | 9.14                    |
| sulfurdioxide slant column density corrected win2 [DU]     | $-0.444 \pm 8.783$                    | 11454475 | 11.1                   | -0.428                  | $-1.100 \times 10^3$    | 623                    | -6.00                   | 5.13                    |
| background so2 slant column offset window2 [DU]            | $-2.09 \pm 2.93$                      | 11454475 | 3.30                   | -1.18                   | -15.5                   | 8.52                   | -3.34                   | $-3.889 \times 10^{-2}$ |
| sulfurdioxide slant column density window3 [DU]            | $-6.43 \pm 23.97$                     | 11454475 | 30.5                   | -6.74                   | -260                    | 158                    | -21.7                   | 8.84                    |
| sulfurdioxide slant column density window3 precision [DU]  | $27.4 \pm 11.9$                       | 11454475 | 9.10                   | 24.3                    | 9.42                    | 243                    | 20.9                    | 30.0                    |
| sulfurdioxide slant column density corrected win3 [DU]     | $3.94 \pm 22.87$                      | 11454475 | 29.0                   | 3.76                    | -256                    | 165                    | -10.6                   | 18.4                    |
| background so2 slant column offset window3 [DU]            | $10.4 \pm 6.5$                        | 11454475 | 10.8                   | 9.49                    | -12.4                   | 36.9                   | 4.81                    | 15.6                    |
| sulfurdioxide slant column cobra flag [1]                  | $1.97 \pm 0.24$                       | 11454475 | 0.0                    | 2.00                    | 0.0                     | 2.00                   | 2.00                    | 2.00                    |
| integrated so2 profile apriori [DU]                        | $(2.259 \pm 5.110) \times 10^{-2}$    | 11454475 | $1.469 \times 10^{-2}$ | $1.347 \times 10^{-2}$  | $2.204 \times 10^{-4}$  | 1.99                   | $8.232 \times 10^{-3}$  | $2.292 \times 10^{-2}$  |
| fitted radiance shift [nm]                                 | $(-3.782 \pm 23.228) \times 10^{-4}$  | 11454475 | $1.724 \times 10^{-3}$ | $-3.397 \times 10^{-4}$ | $-3.977 \times 10^{-2}$ | $4.092 \times 10^{-2}$ | $-1.266 \times 10^{-3}$ | $4.587 \times 10^{-4}$  |
| fitted radiance squeeze [1]                                | $(-8.250 \pm 176.624) \times 10^{-6}$ | 11454475 | $1.993 \times 10^{-4}$ | $-4.064 \times 10^{-6}$ | $-1.363 \times 10^{-2}$ | $1.395 \times 10^{-2}$ | $-1.047 \times 10^{-4}$ | $9.463 \times 10^{-5}$  |
| fitted root mean square [1]                                | $(1.294 \pm 0.559) \times 10^{-3}$    | 11454475 | $5.827 \times 10^{-4}$ | $1.115 \times 10^{-3}$  | $3.337 \times 10^{-4}$  | $4.157 \times 10^{-2}$ | $9.292 \times 10^{-4}$  | $1.512 \times 10^{-3}$  |
| sulfurdioxide total air mass factor polluted [1]           | $0.855 \pm 0.380$                     | 11454475 | 0.486                  | 0.832                   | $5.000 \times 10^{-2}$  | 2.49                   | 0.590                   | 1.08                    |
| sulfurdioxide total air mass factor polluted precision [1] | $(9.735 \pm 8.976) \times 10^{-2}$    | 11454475 | $8.899 \times 10^{-2}$ | $6.354 \times 10^{-2}$  | $3.194 \times 10^{-3}$  | 1.59                   | $4.029 \times 10^{-2}$  | 0.129                   |
| sulfurdioxide clear air mass factor polluted [1]           | $0.743 \pm 0.255$                     | 11454475 | 0.350                  | 0.735                   | $5.731 \times 10^{-2}$  | 2.38                   | 0.555                   | 0.905                   |
| number of spectral points in retrieval [1]                 | $73.4 \pm 0.5$                        | 11454475 | 1.000                  | 73.0                    | 70.0                    | 74.0                   | 73.0                    | 74.0                    |

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

| Variable                                                   | mean $\pm \sigma$                    | Count   | IQR                    | Median                  | Minimum                 | Maximum                | 25 % percentile         | 75 % percentile         |
|------------------------------------------------------------|--------------------------------------|---------|------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|
| qa value [1]                                               | 0.663 $\pm$ 0.400                    | 4100170 | 0.760                  | 1.000                   | 0.0                     | 1.000                  | 0.240                   | 1.000                   |
| sulfurdioxide total vertical column [DU]                   | $(4.210 \pm 126.996) \times 10^{-2}$ | 4100170 | 0.535                  | $1.360 \times 10^{-2}$  | -49.0                   | 796                    | -0.248                  | 0.288                   |
| sulfurdioxide total vertical column precision [DU]         | 0.613 $\pm$ 0.809                    | 4100170 | 0.427                  | 0.399                   | $4.712 \times 10^{-2}$  | 54.0                   | 0.254                   | 0.681                   |
| sulfurdioxide slant column density corrected [DU]          | $(2.618 \pm 57.382) \times 10^{-2}$  | 4100170 | 0.379                  | $1.085 \times 10^{-2}$  | -10.7                   | 656                    | -0.176                  | 0.203                   |
| sulfurdioxide slant column density cobra [DU]              | $(2.533 \pm 39.565) \times 10^{-2}$  | 4100170 | 0.379                  | $1.085 \times 10^{-2}$  | -10.7                   | 102                    | -0.176                  | 0.203                   |
| sulfurdioxide slant column density cobra precision [DU]    | 0.298 $\pm$ 0.128                    | 4100170 | 0.121                  | 0.265                   | $8.852 \times 10^{-2}$  | 27.1                   | 0.218                   | 0.339                   |
| sulfurdioxide slant column density window1 [DU]            | 0.190 $\pm$ 0.707                    | 4100170 | 0.752                  | 0.191                   | -64.0                   | 47.3                   | -0.187                  | 0.565                   |
| sulfurdioxide slant column density window1 precision [DU]  | 0.298 $\pm$ 0.128                    | 4100170 | 0.121                  | 0.265                   | $8.852 \times 10^{-2}$  | 27.1                   | 0.218                   | 0.339                   |
| sulfurdioxide slant column density corrected win1 [DU]     | $(4.388 \pm 70.054) \times 10^{-2}$  | 4100170 | 0.740                  | $1.757 \times 10^{-2}$  | -64.0                   | 47.1                   | -0.345                  | 0.395                   |
| background so2 slant column offset window1 [DU]            | -0.147 $\pm$ 0.156                   | 4100170 | 0.153                  | -0.183                  | -1.40                   | 3.06                   | -0.243                  | $-8.983 \times 10^{-2}$ |
| sulfurdioxide slant column density window2 [DU]            | 1.94 $\pm$ 9.44                      | 4100170 | 11.9                   | 1.89                    | $-1.305 \times 10^3$    | $1.367 \times 10^3$    | -4.03                   | 7.86                    |
| sulfurdioxide slant column density window2 precision [DU]  | 8.28 $\pm$ 2.48                      | 4100170 | 2.50                   | 7.92                    | 2.39                    | 518                    | 6.80                    | 9.30                    |
| sulfurdioxide slant column density corrected win2 [DU]     | -0.593 $\pm$ 9.084                   | 4100170 | 11.3                   | -0.570                  | $-1.305 \times 10^3$    | $1.367 \times 10^3$    | -6.23                   | 5.06                    |
| background so2 slant column offset window2 [DU]            | -2.53 $\pm$ 3.13                     | 4100170 | 4.40                   | -1.48                   | -14.7                   | 8.52                   | -4.52                   | -0.127                  |
| sulfurdioxide slant column density window3 [DU]            | -15.3 $\pm$ 23.2                     | 4100170 | 29.0                   | -15.0                   | -507                    | 352                    | -29.6                   | -0.614                  |
| sulfurdioxide slant column density window3 precision [DU]  | 30.5 $\pm$ 16.6                      | 4100170 | 11.2                   | 25.6                    | 9.97                    | 272                    | 21.4                    | 32.6                    |
| sulfurdioxide slant column density corrected win3 [DU]     | -3.76 $\pm$ 23.45                    | 4100170 | 29.3                   | -2.98                   | -493                    | 359                    | -18.0                   | 11.2                    |
| background so2 slant column offset window3 [DU]            | 11.5 $\pm$ 6.8                       | 4100170 | 11.9                   | 11.5                    | -12.4                   | 32.6                   | 5.32                    | 17.2                    |
| sulfurdioxide slant column cobra flag [1]                  | 1.99 $\pm$ 0.14                      | 4100170 | 0.0                    | 2.00                    | 0.0                     | 2.00                   | 2.00                    | 2.00                    |
| integrated so2 profile apriori [DU]                        | $(5.870 \pm 13.214) \times 10^{-2}$  | 4100170 | $4.372 \times 10^{-2}$ | $1.758 \times 10^{-2}$  | $2.883 \times 10^{-4}$  | 2.50                   | $6.545 \times 10^{-3}$  | $5.027 \times 10^{-2}$  |
| fitted radiance shift [nm]                                 | $(-2.423 \pm 31.944) \times 10^{-4}$ | 4100170 | $1.761 \times 10^{-3}$ | $-2.485 \times 10^{-4}$ | $-4.583 \times 10^{-2}$ | $5.226 \times 10^{-2}$ | $-1.157 \times 10^{-3}$ | $6.038 \times 10^{-4}$  |
| fitted radiance squeeze [1]                                | $(-1.989 \pm 17.803) \times 10^{-5}$ | 4100170 | $2.059 \times 10^{-4}$ | $-1.440 \times 10^{-5}$ | $-1.239 \times 10^{-2}$ | $1.503 \times 10^{-2}$ | $-1.190 \times 10^{-4}$ | $8.689 \times 10^{-5}$  |
| fitted root mean square [1]                                | $(1.293 \pm 0.523) \times 10^{-3}$   | 4100170 | $4.619 \times 10^{-4}$ | $1.163 \times 10^{-3}$  | $2.631 \times 10^{-4}$  | $6.925 \times 10^{-2}$ | $9.793 \times 10^{-4}$  | $1.441 \times 10^{-3}$  |
| sulfurdioxide total air mass factor polluted [1]           | 0.790 $\pm$ 0.475                    | 4100170 | 0.610                  | 0.654                   | $5.000 \times 10^{-2}$  | 2.85                   | 0.447                   | 1.06                    |
| sulfurdioxide total air mass factor polluted precision [1] | 0.114 $\pm$ 0.136                    | 4100170 | 0.126                  | $5.903 \times 10^{-2}$  | $2.909 \times 10^{-3}$  | 1.66                   | $2.840 \times 10^{-2}$  | 0.154                   |
| sulfurdioxide clear air mass factor polluted [1]           | 0.670 $\pm$ 0.329                    | 4100170 | 0.399                  | 0.595                   | $5.554 \times 10^{-2}$  | 2.54                   | 0.434                   | 0.832                   |
| number of spectral points in retrieval [1]                 | 73.4 $\pm$ 0.5                       | 4100170 | 1.000                  | 73.0                    | 52.0                    | 74.0                   | 73.0                    | 74.0                    |

### 3 Granule outlines

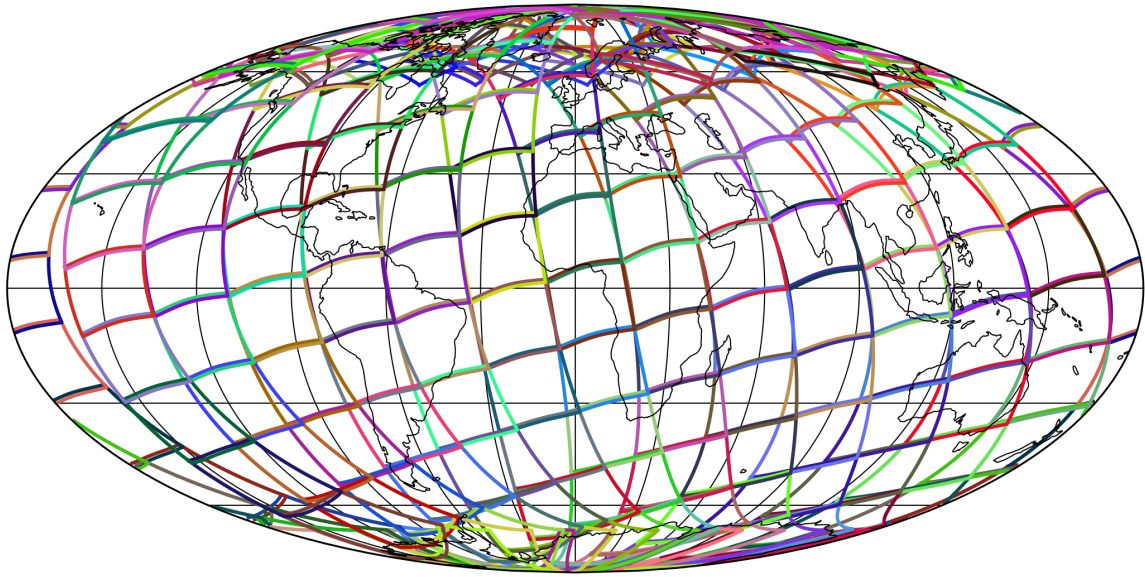


Figure 1: Outline of the granules.

## 4 Input data monitoring

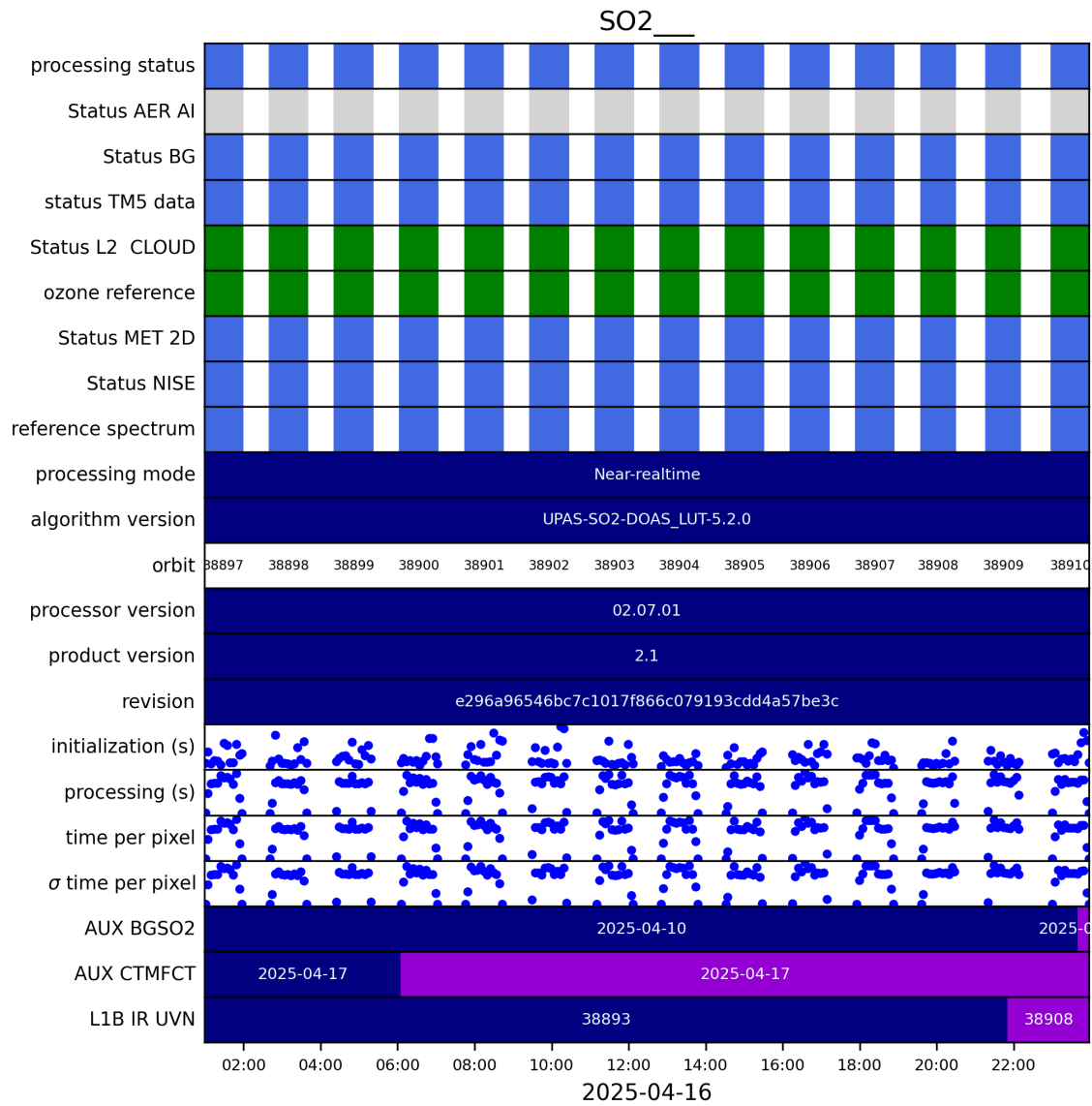


Figure 2: Input data per granule

## 5 Warnings and errors

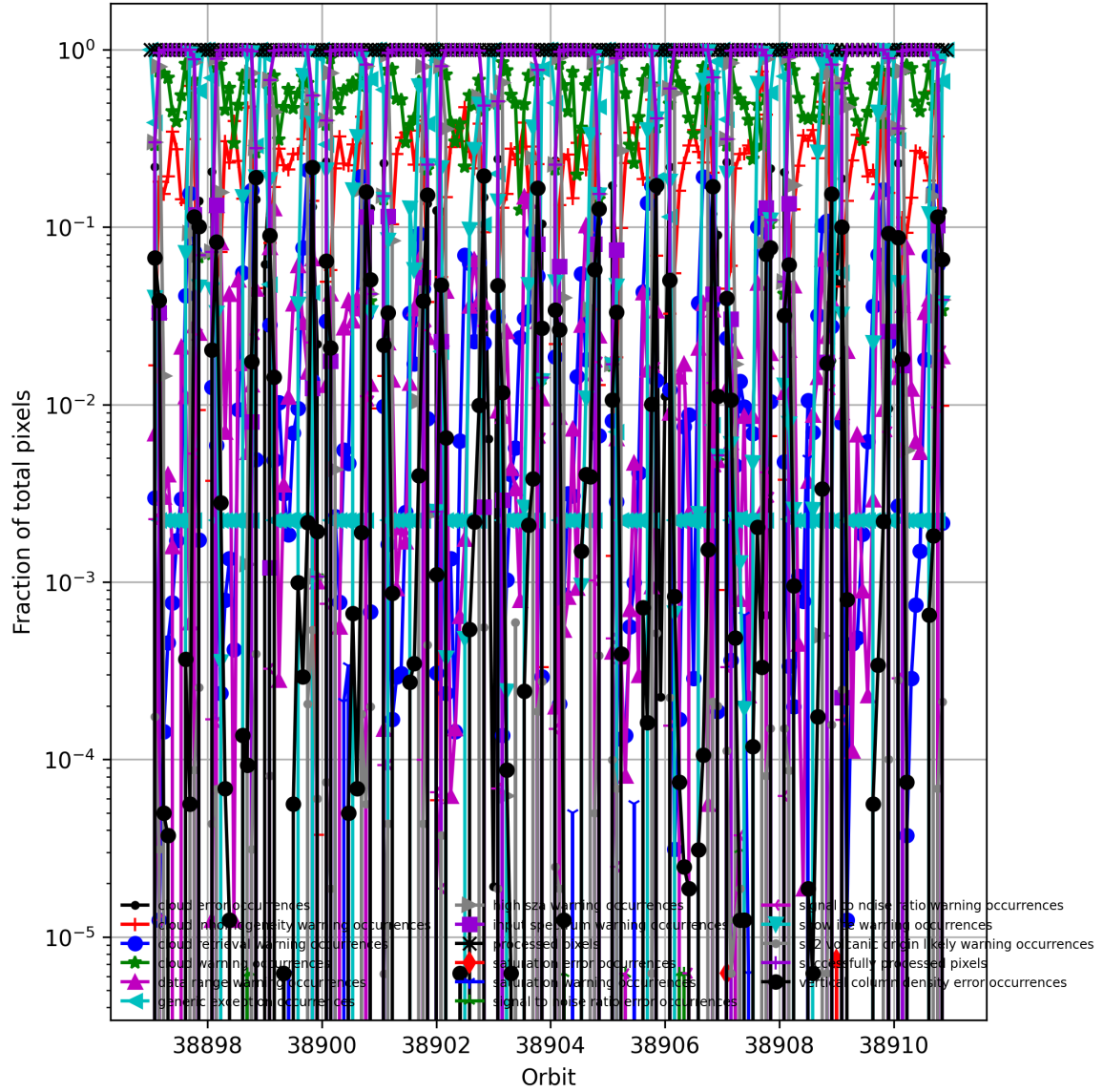


Figure 3: Fraction of pixels with specific warnings and errors during processing



## 6 World maps

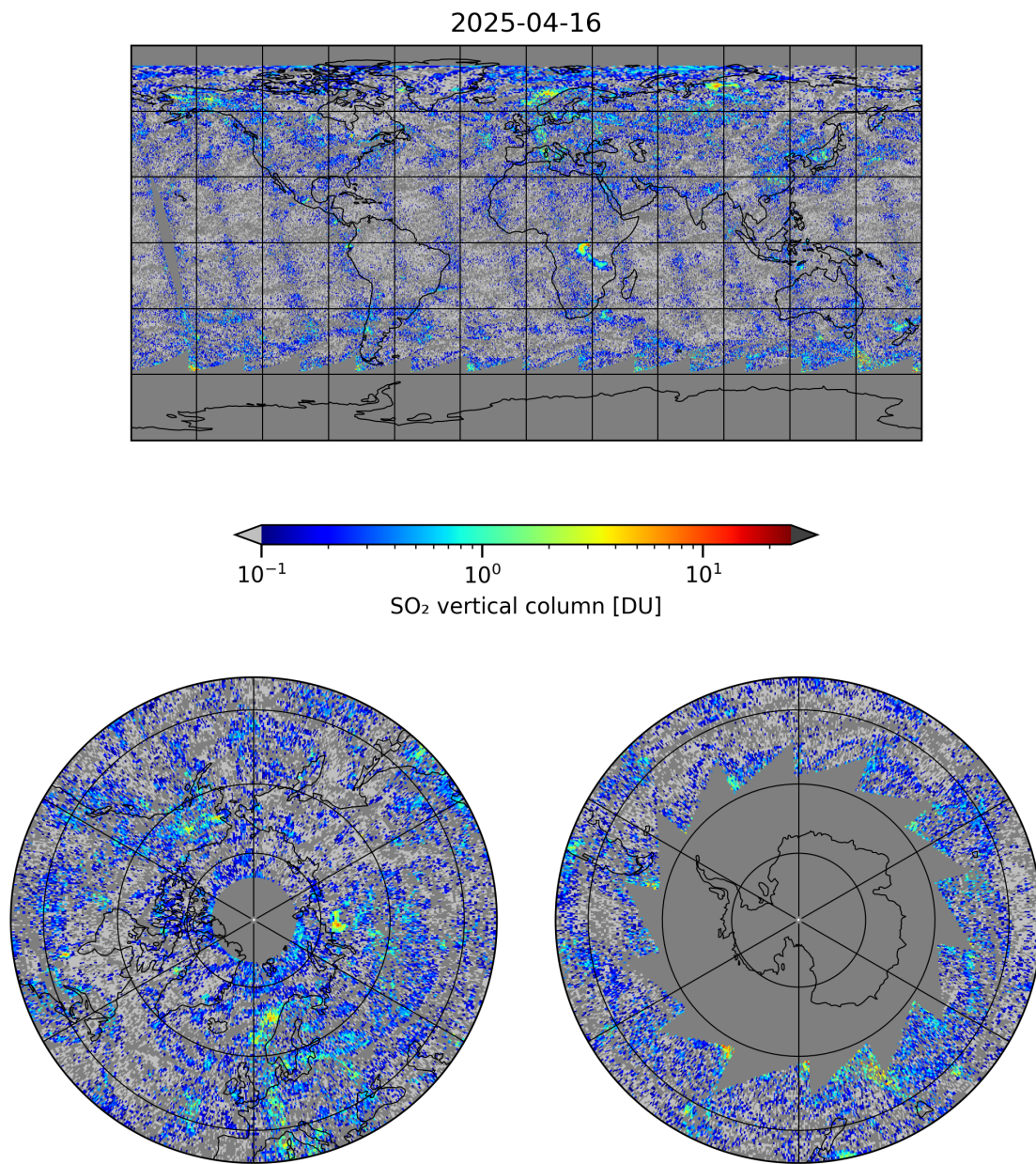


Figure 4: Map of “SO<sub>2</sub> vertical column” for 2025-04-16 to 2025-04-16

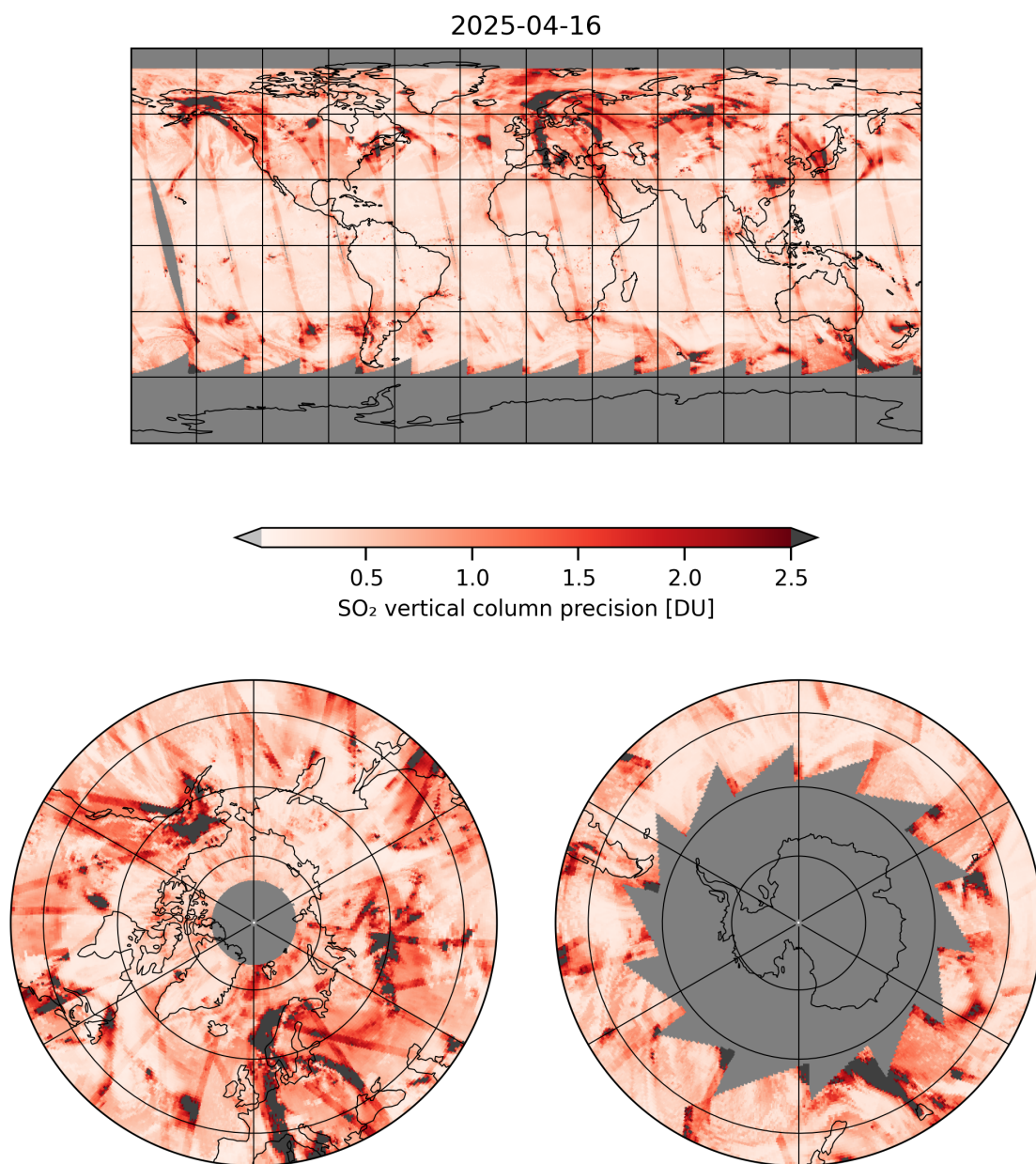


Figure 5: Map of “SO<sub>2</sub> vertical column precision” for 2025-04-16 to 2025-04-16



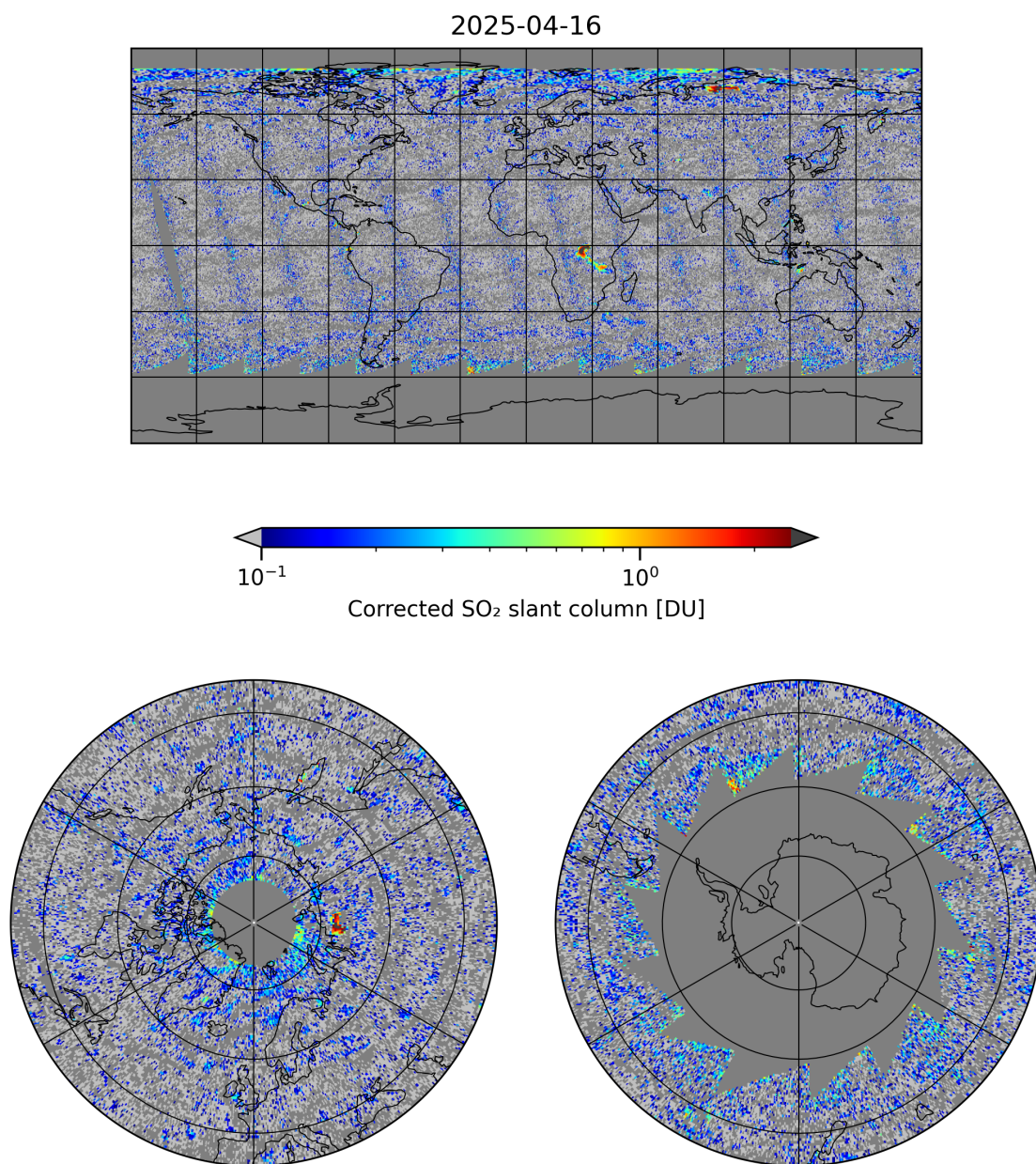


Figure 6: Map of “Corrected SO<sub>2</sub> slant column” for 2025-04-16 to 2025-04-16

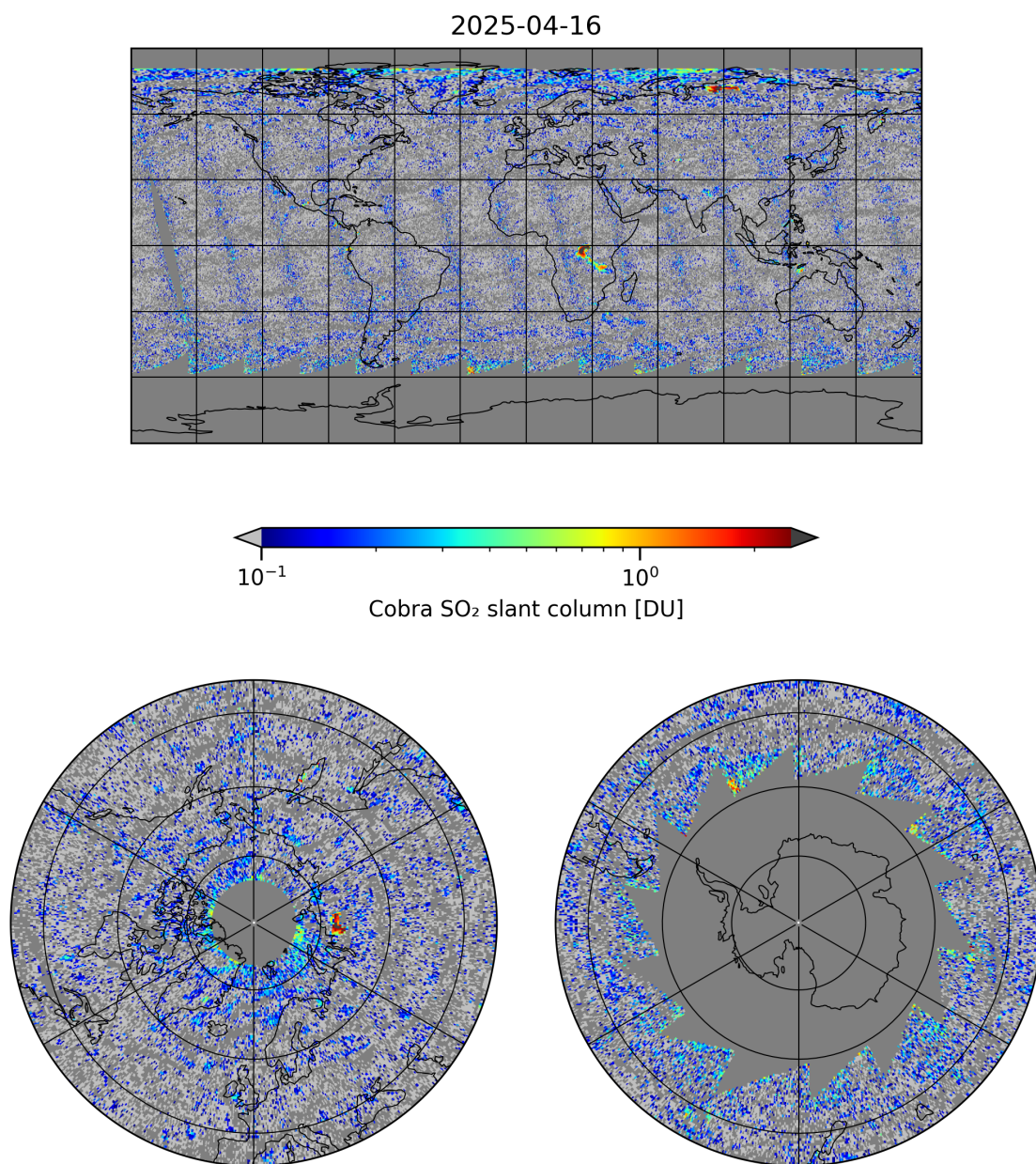


Figure 7: Map of “Cobra SO<sub>2</sub> slant column” for 2025-04-16 to 2025-04-16

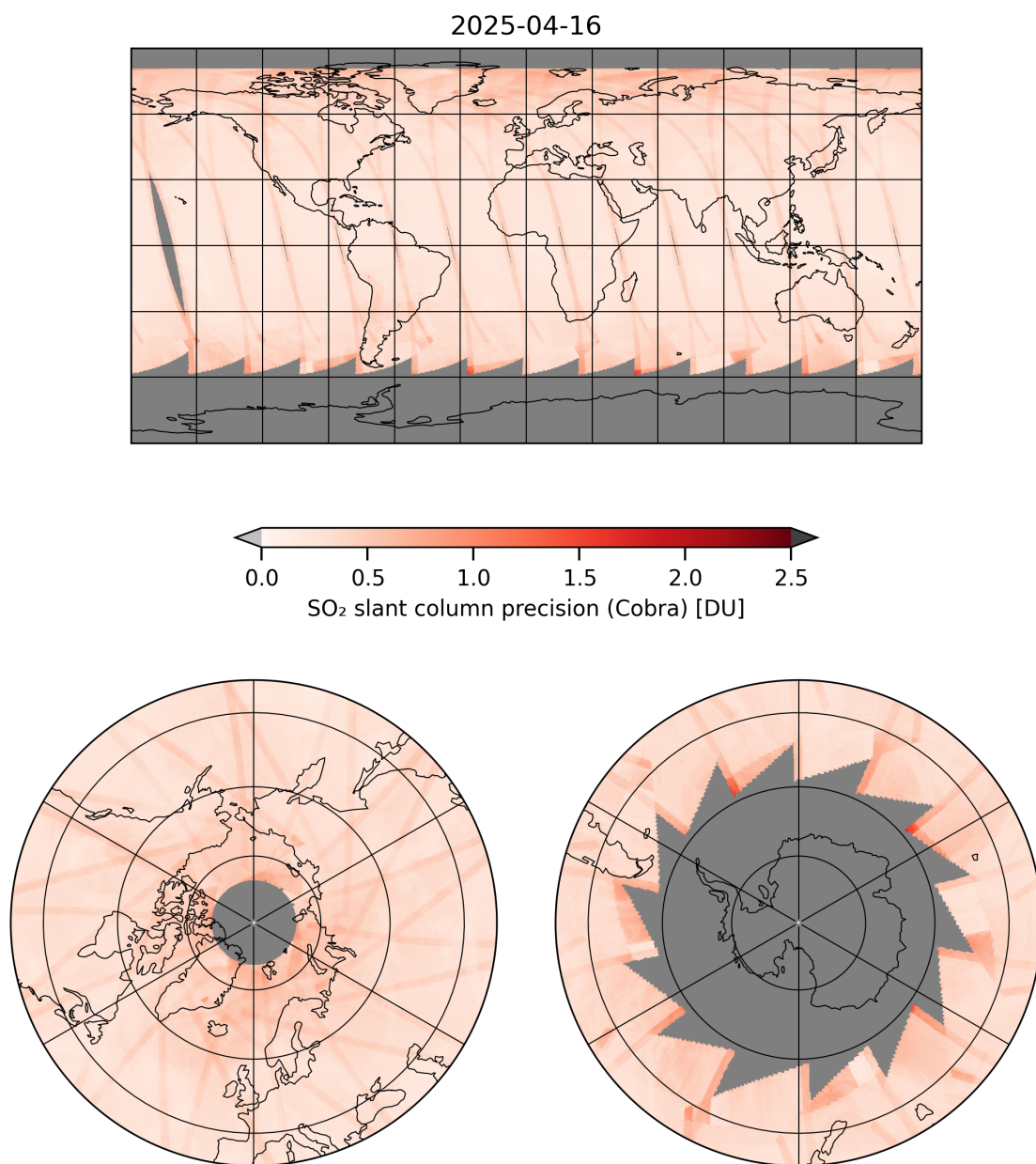


Figure 8: Map of “SO<sub>2</sub> slant column precision (Cobra)” for 2025-04-16 to 2025-04-16



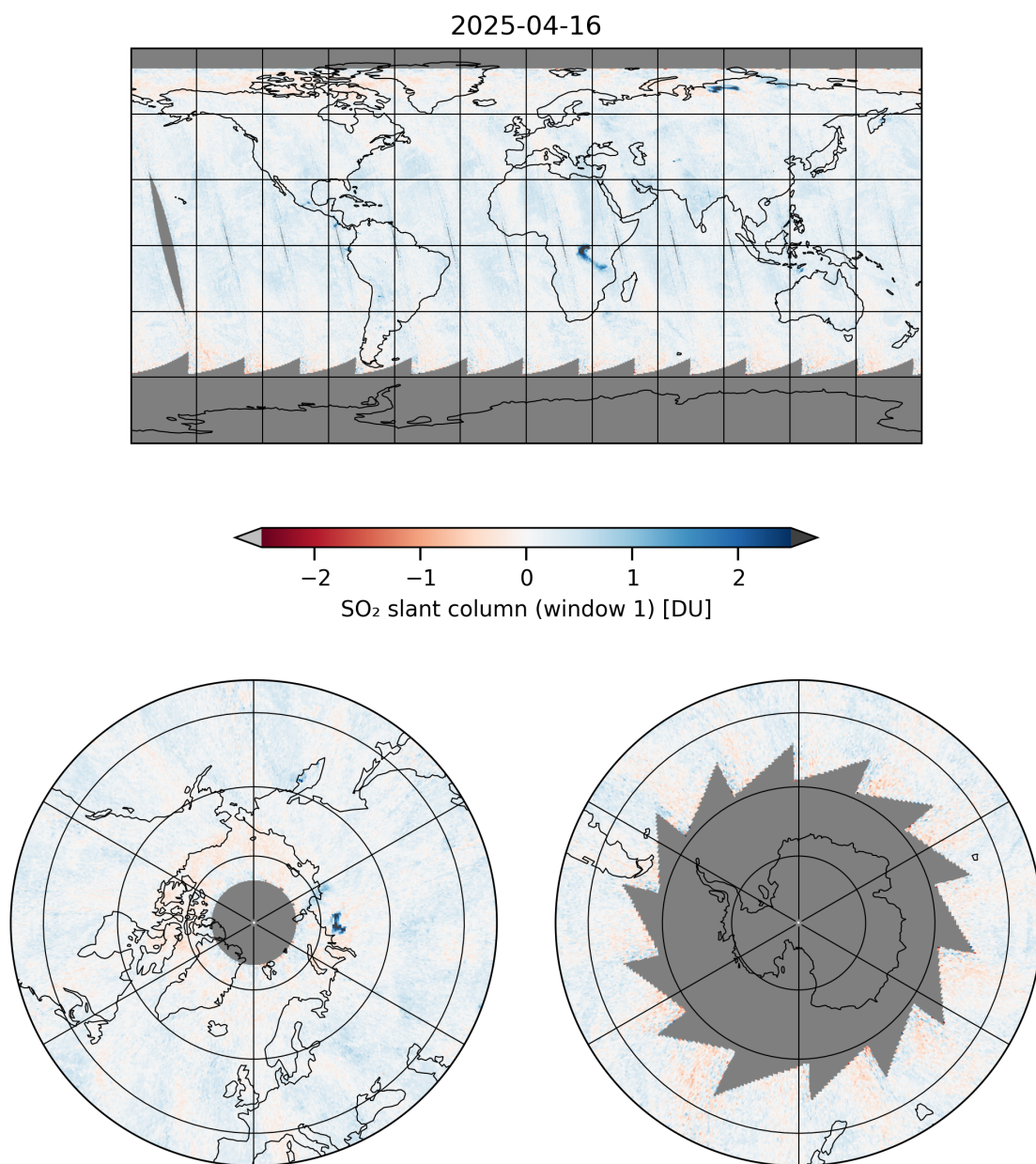


Figure 9: Map of “SO<sub>2</sub> slant column (window 1)” for 2025-04-16 to 2025-04-16

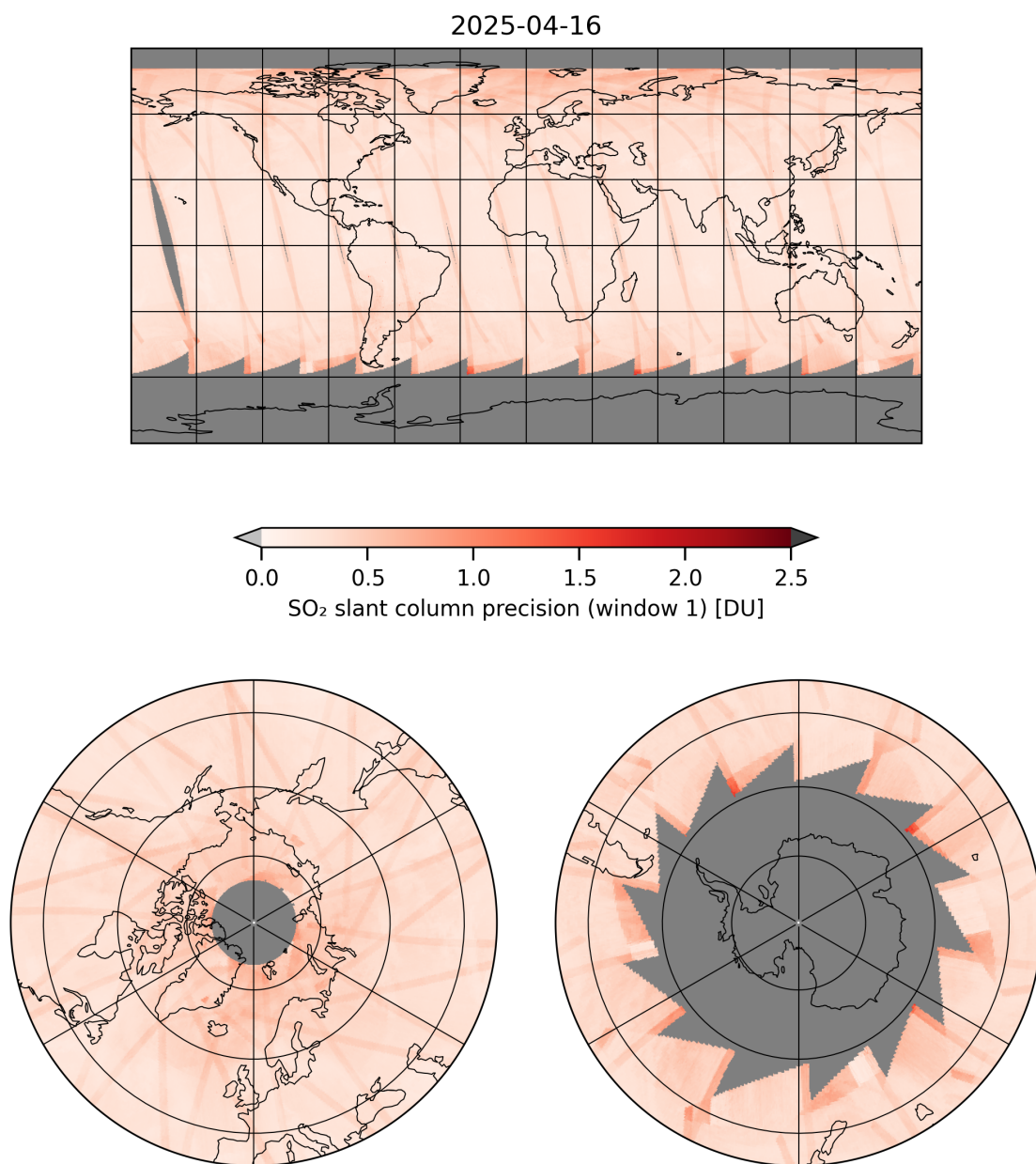


Figure 10: Map of “SO<sub>2</sub> slant column precision (window 1)” for 2025-04-16 to 2025-04-16

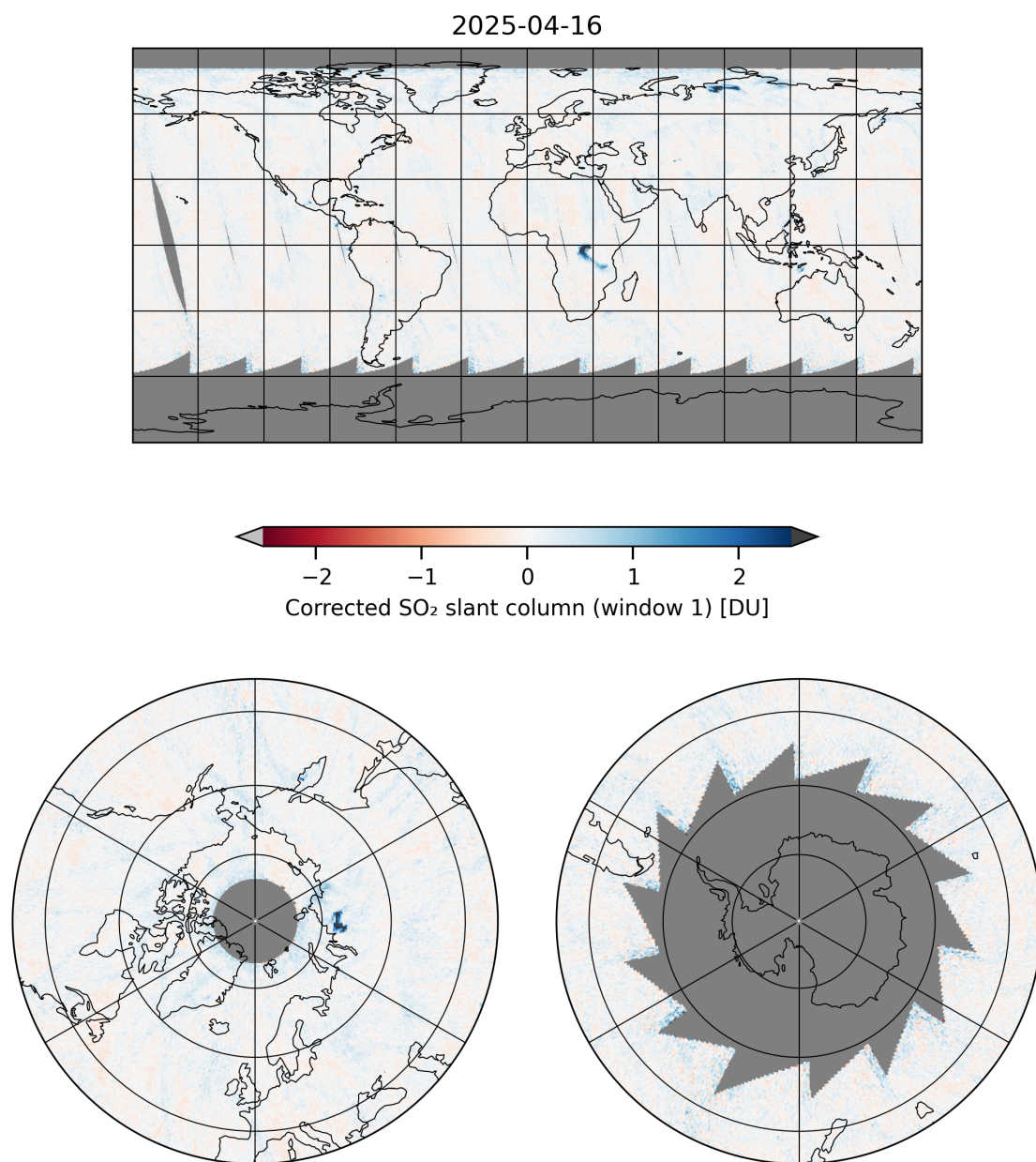


Figure 11: Map of "Corrected SO<sub>2</sub> slant column (window 1)" for 2025-04-16 to 2025-04-16



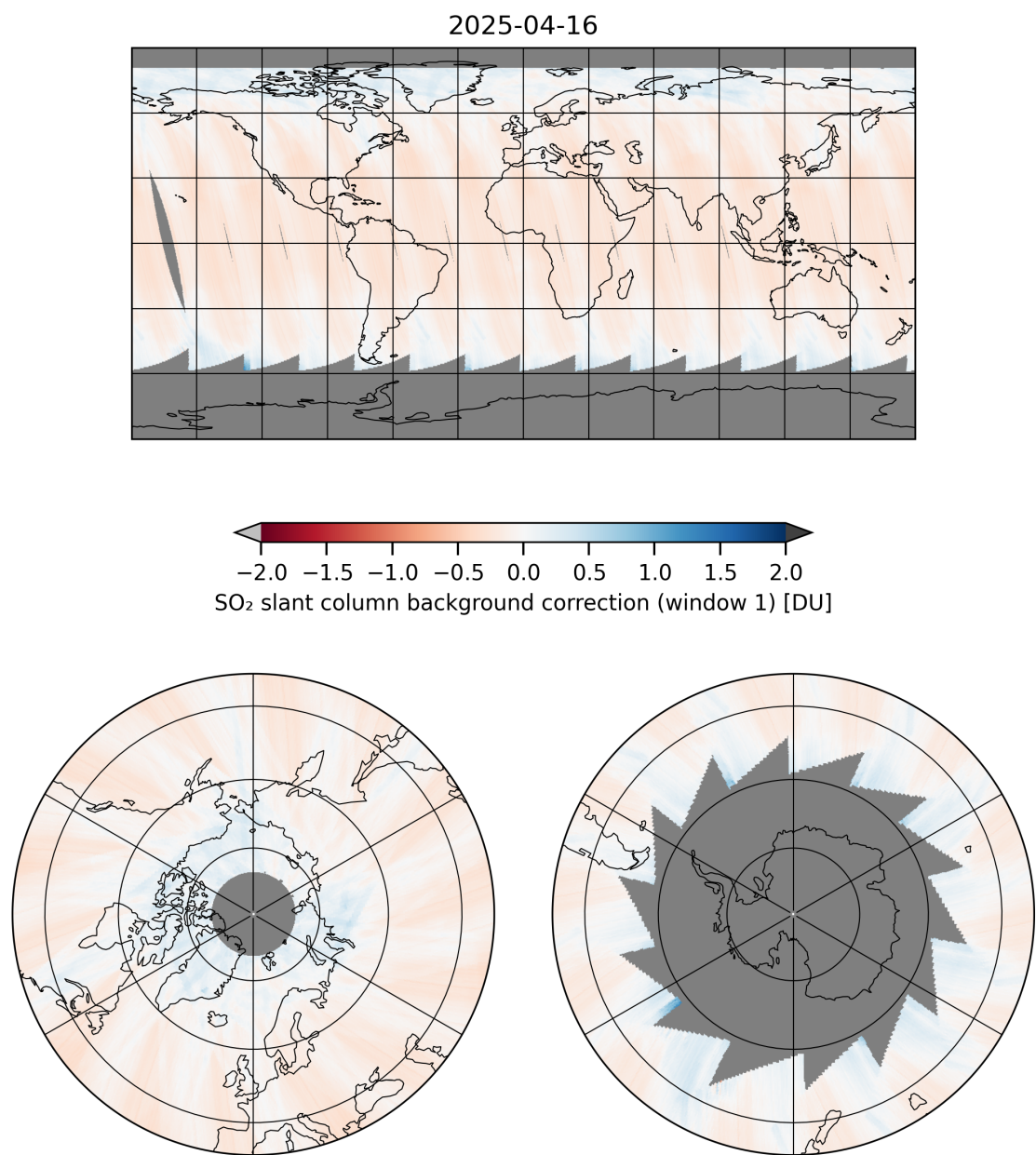


Figure 12: Map of “SO<sub>2</sub> slant column background correction (window 1)” for 2025-04-16 to 2025-04-16

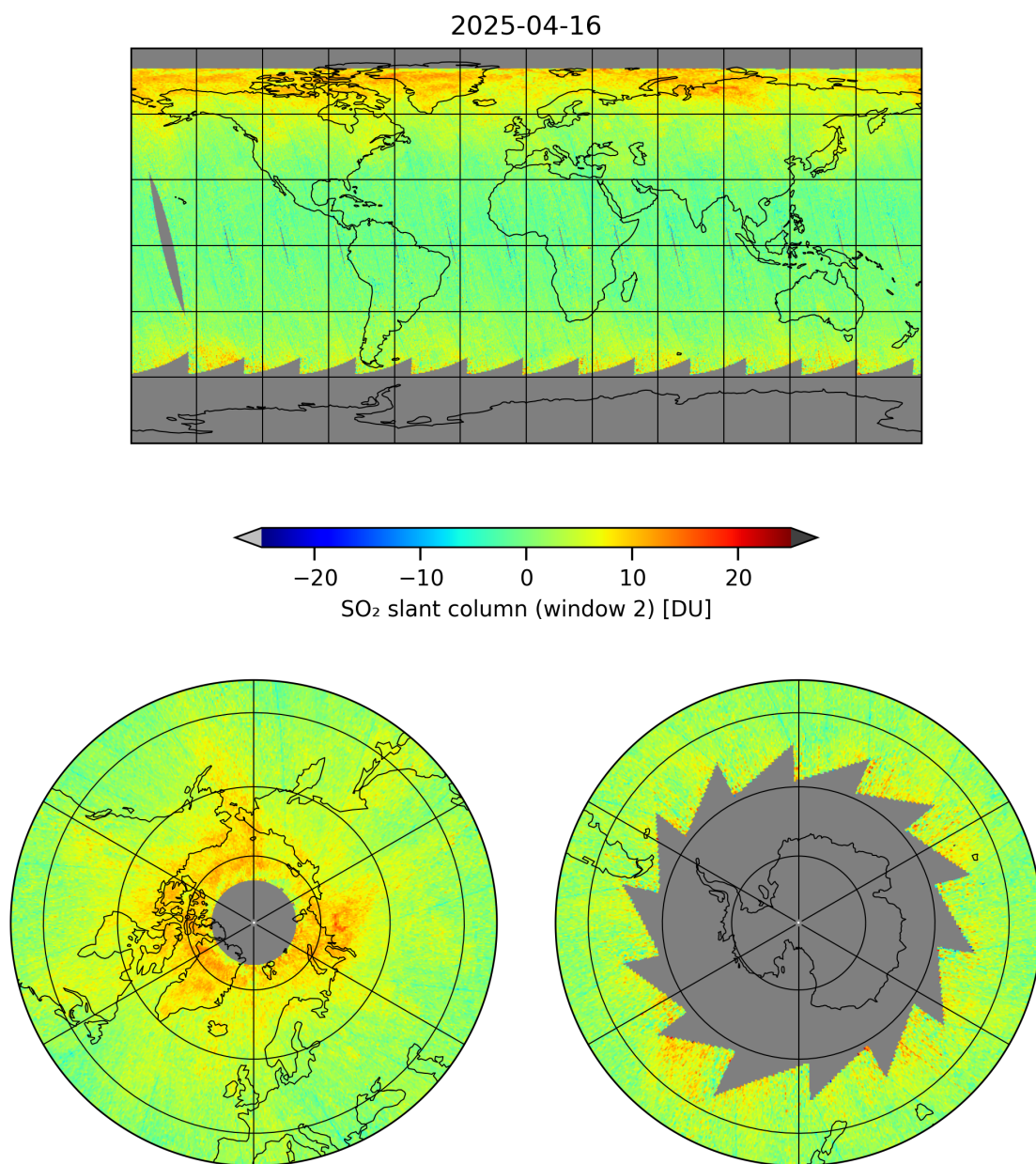


Figure 13: Map of “SO<sub>2</sub> slant column (window 2)” for 2025-04-16 to 2025-04-16

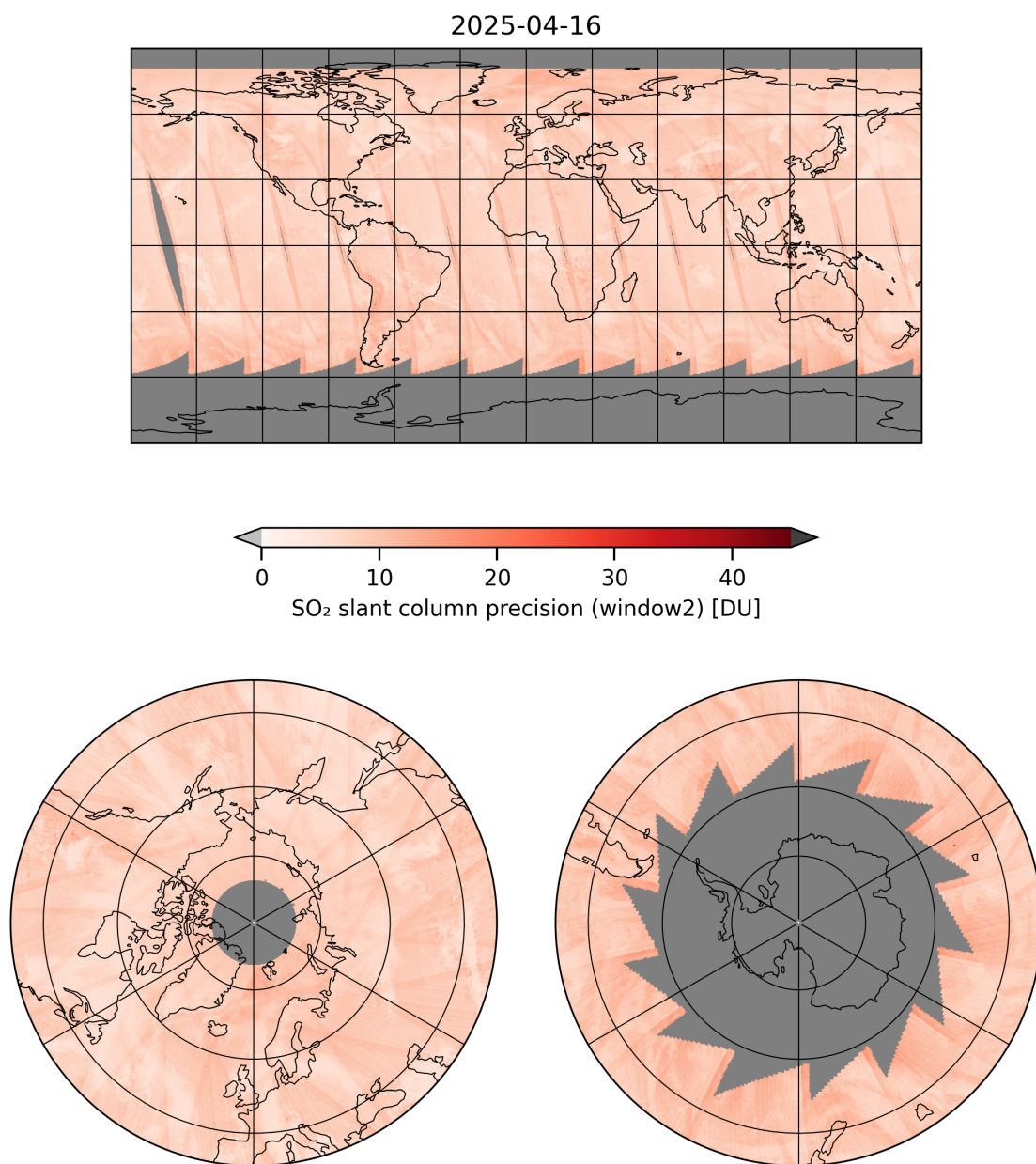


Figure 14: Map of “SO<sub>2</sub> slant column precision (window2)” for 2025-04-16 to 2025-04-16



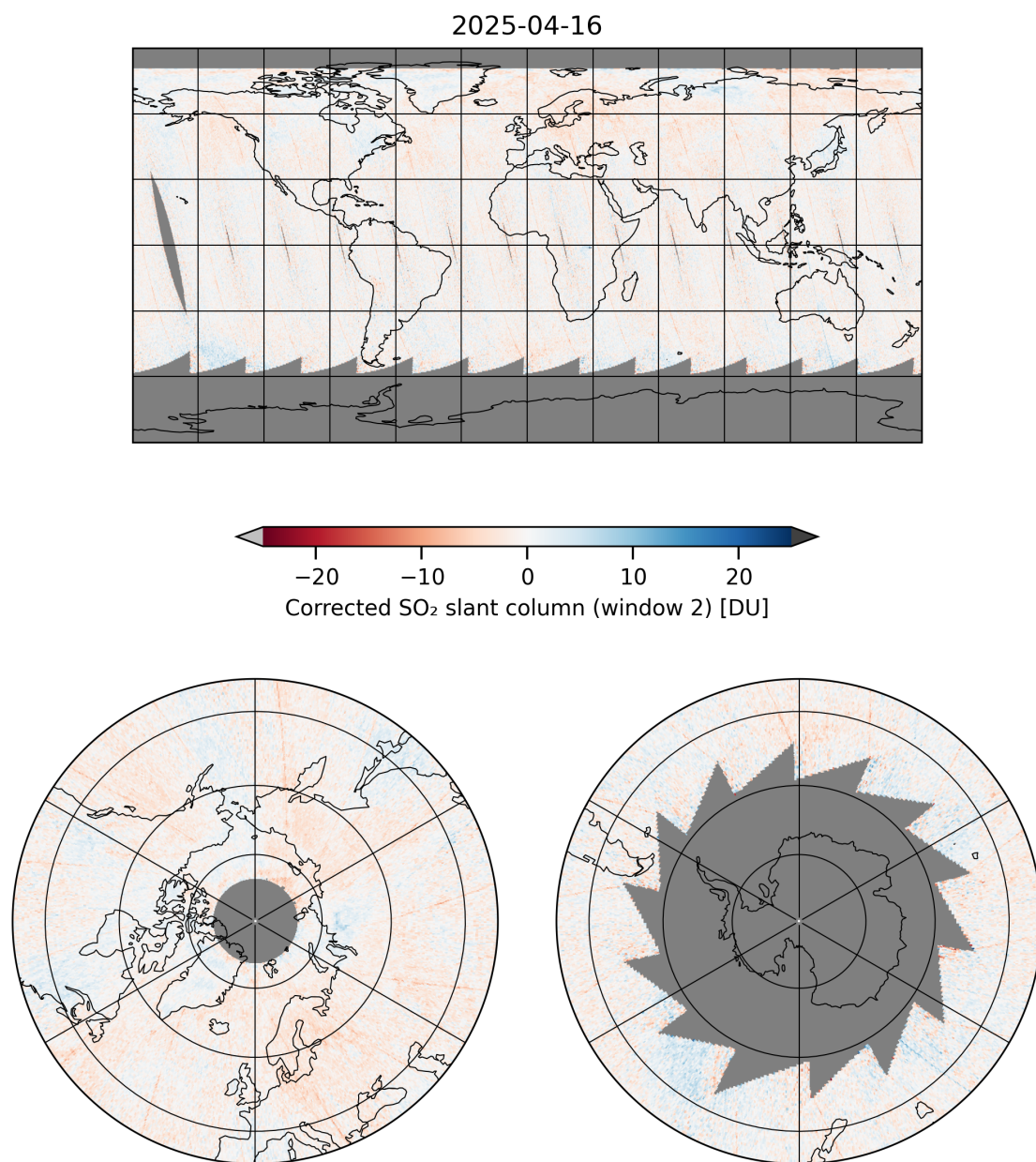


Figure 15: Map of “Corrected SO<sub>2</sub> slant column (window 2)” for 2025-04-16 to 2025-04-16

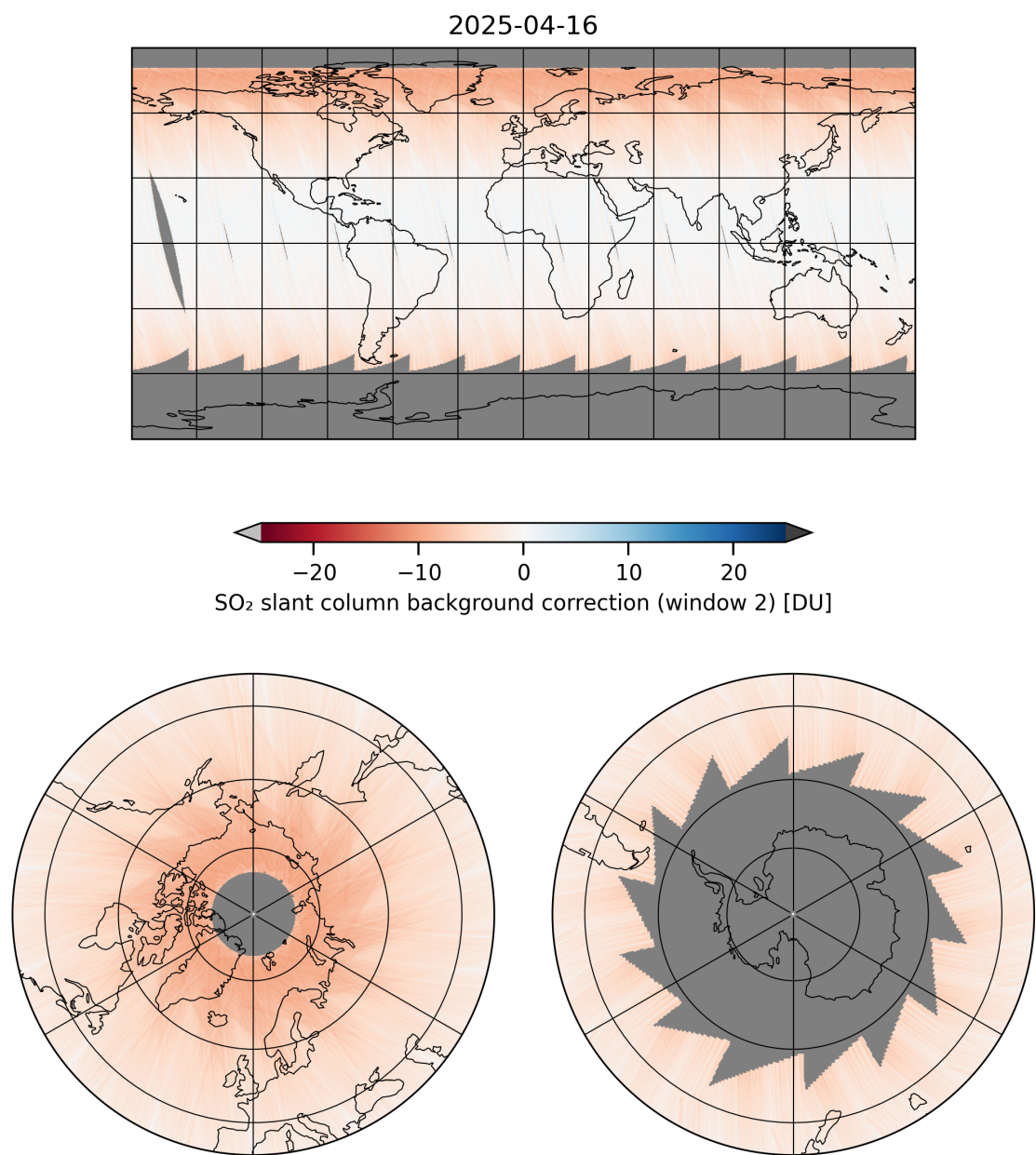


Figure 16: Map of “SO<sub>2</sub> slant column background correction (window 2)” for 2025-04-16 to 2025-04-16



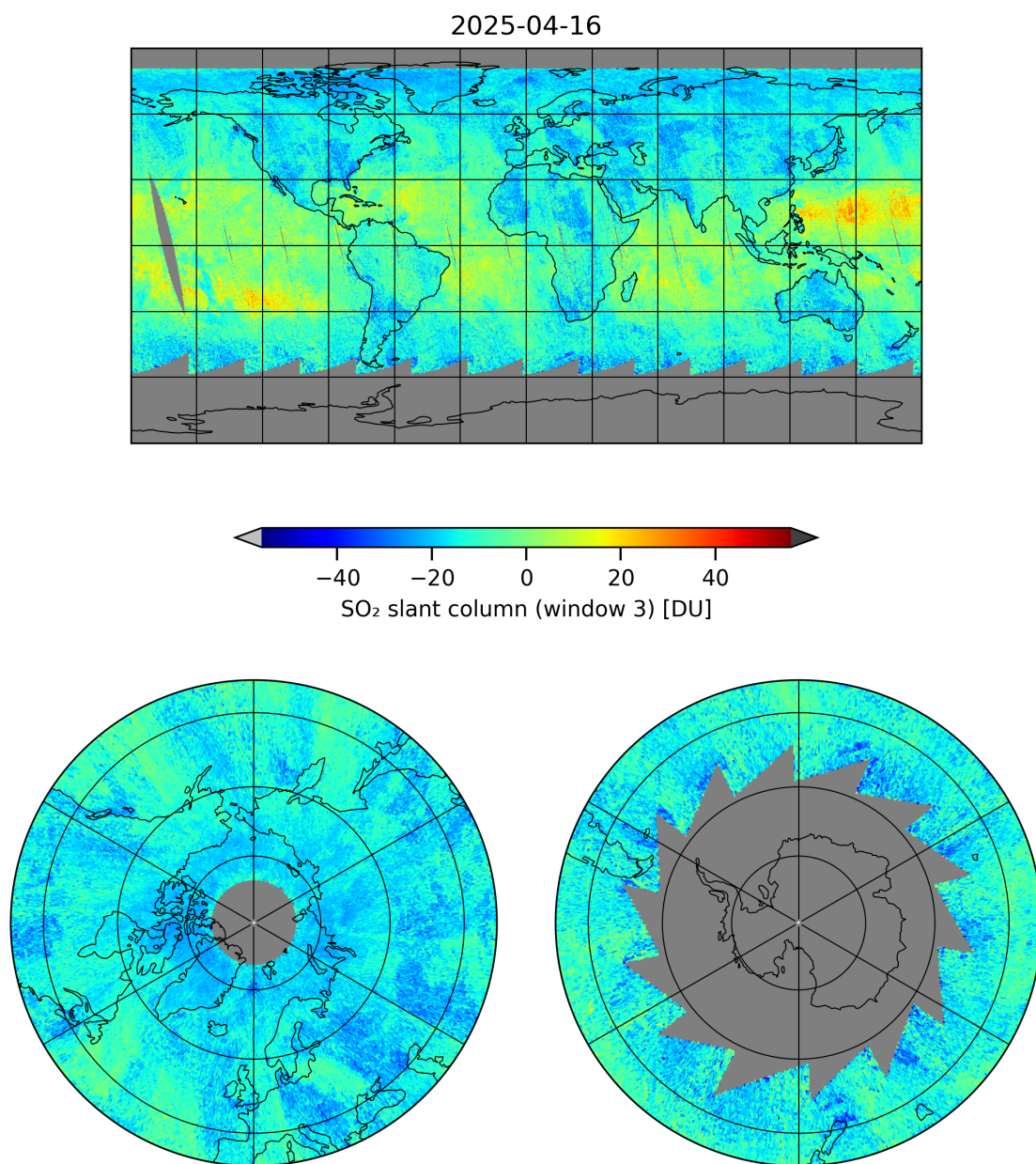


Figure 17: Map of “SO<sub>2</sub> slant column (window 3)” for 2025-04-16 to 2025-04-16

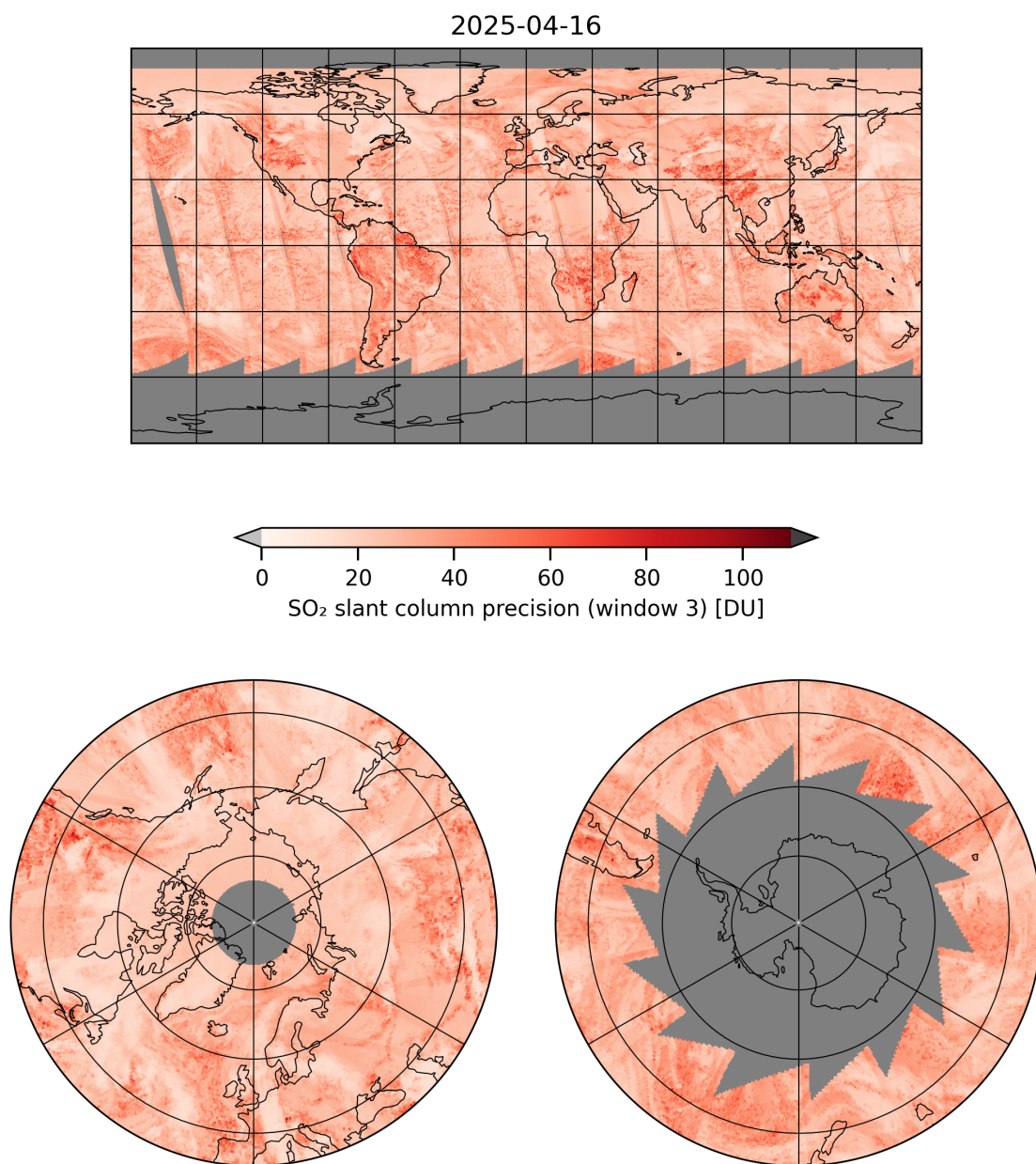


Figure 18: Map of “SO<sub>2</sub> slant column precision (window 3)” for 2025-04-16 to 2025-04-16

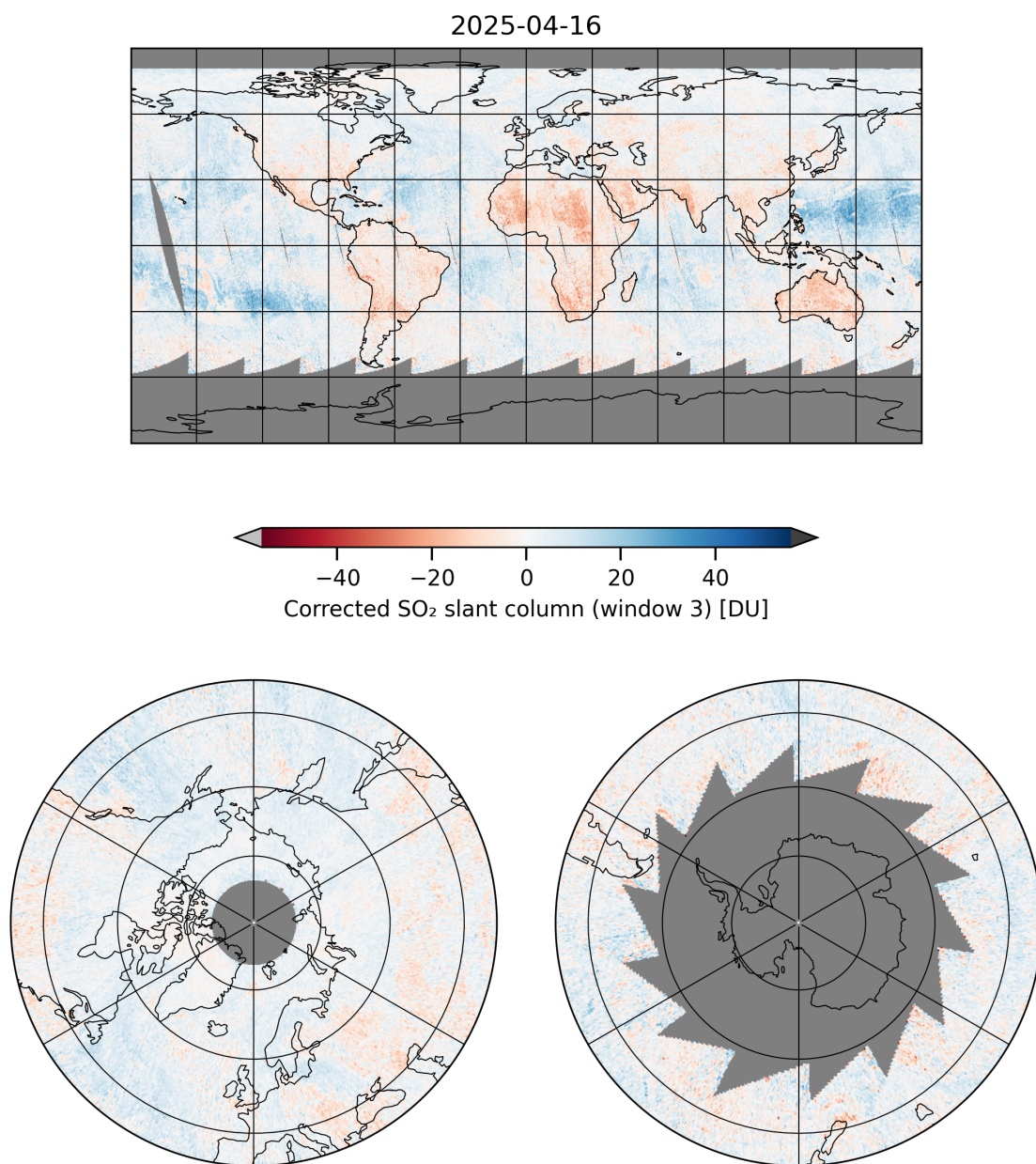


Figure 19: Map of “Corrected SO<sub>2</sub> slant column (window 3)” for 2025-04-16 to 2025-04-16



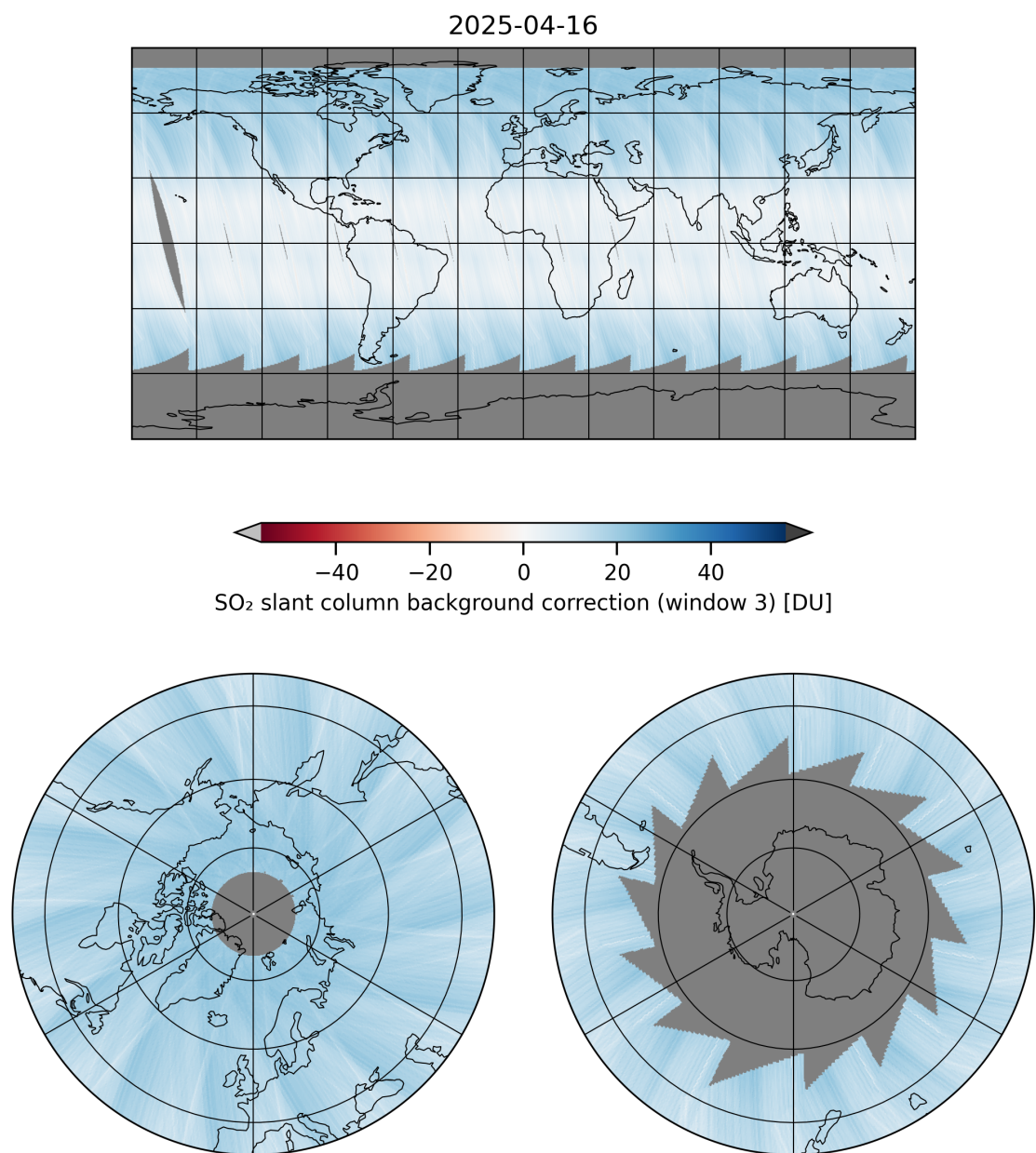


Figure 20: Map of “SO<sub>2</sub> slant column background correction (window 3)” for 2025-04-16 to 2025-04-16

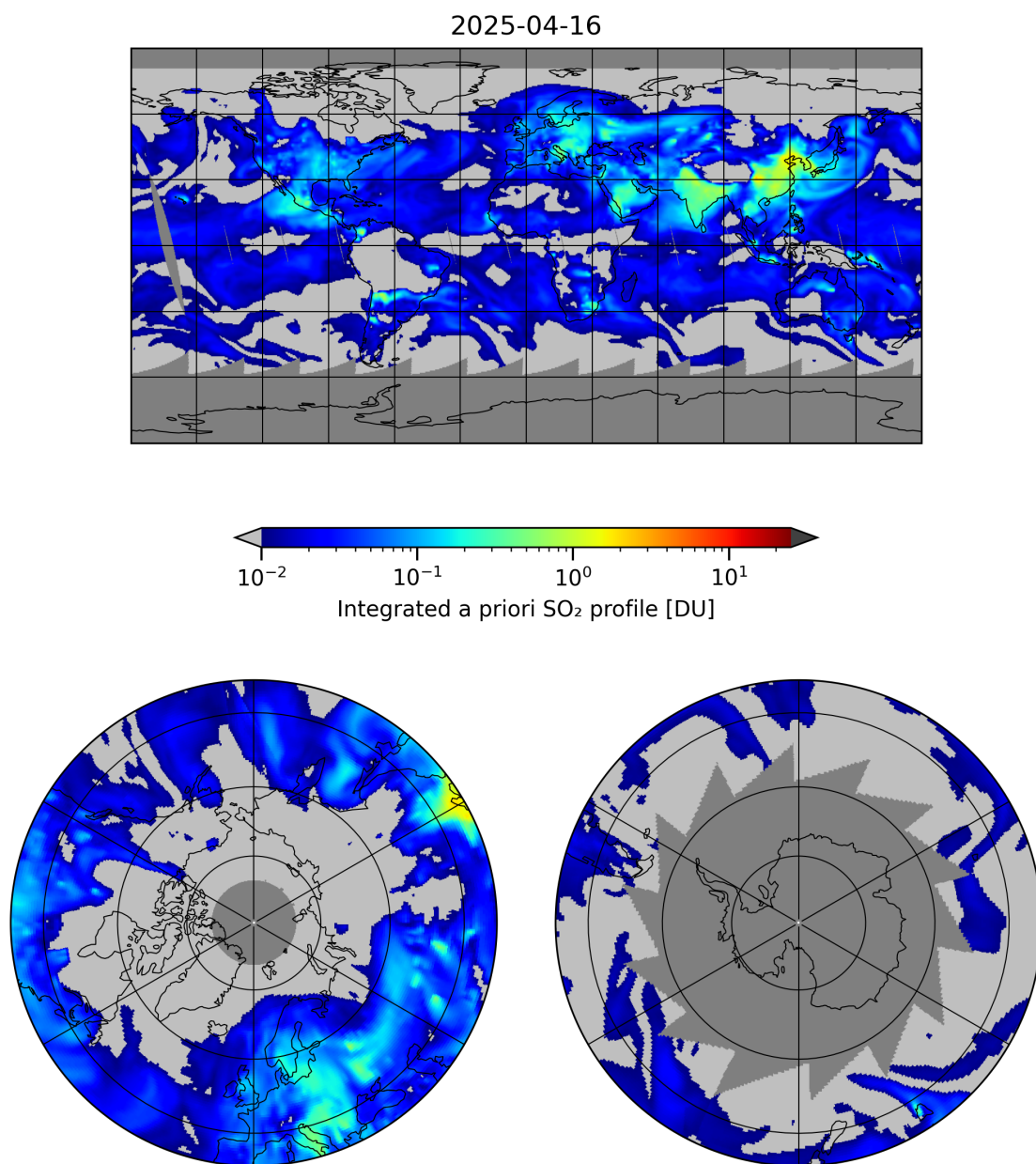


Figure 21: Map of “Integrated a priori SO<sub>2</sub> profile” for 2025-04-16 to 2025-04-16



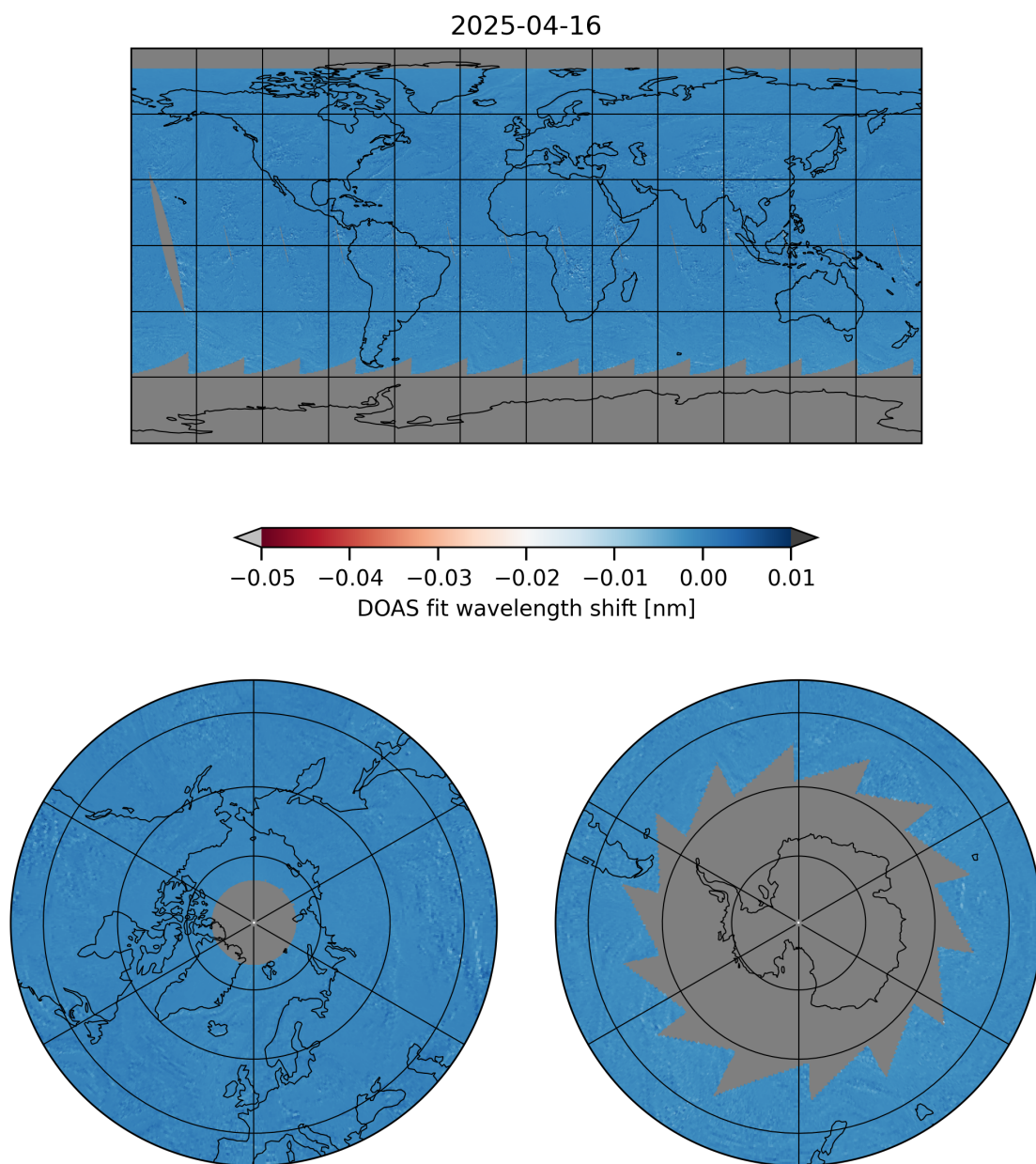


Figure 22: Map of “DOAS fit wavelength shift” for 2025-04-16 to 2025-04-16

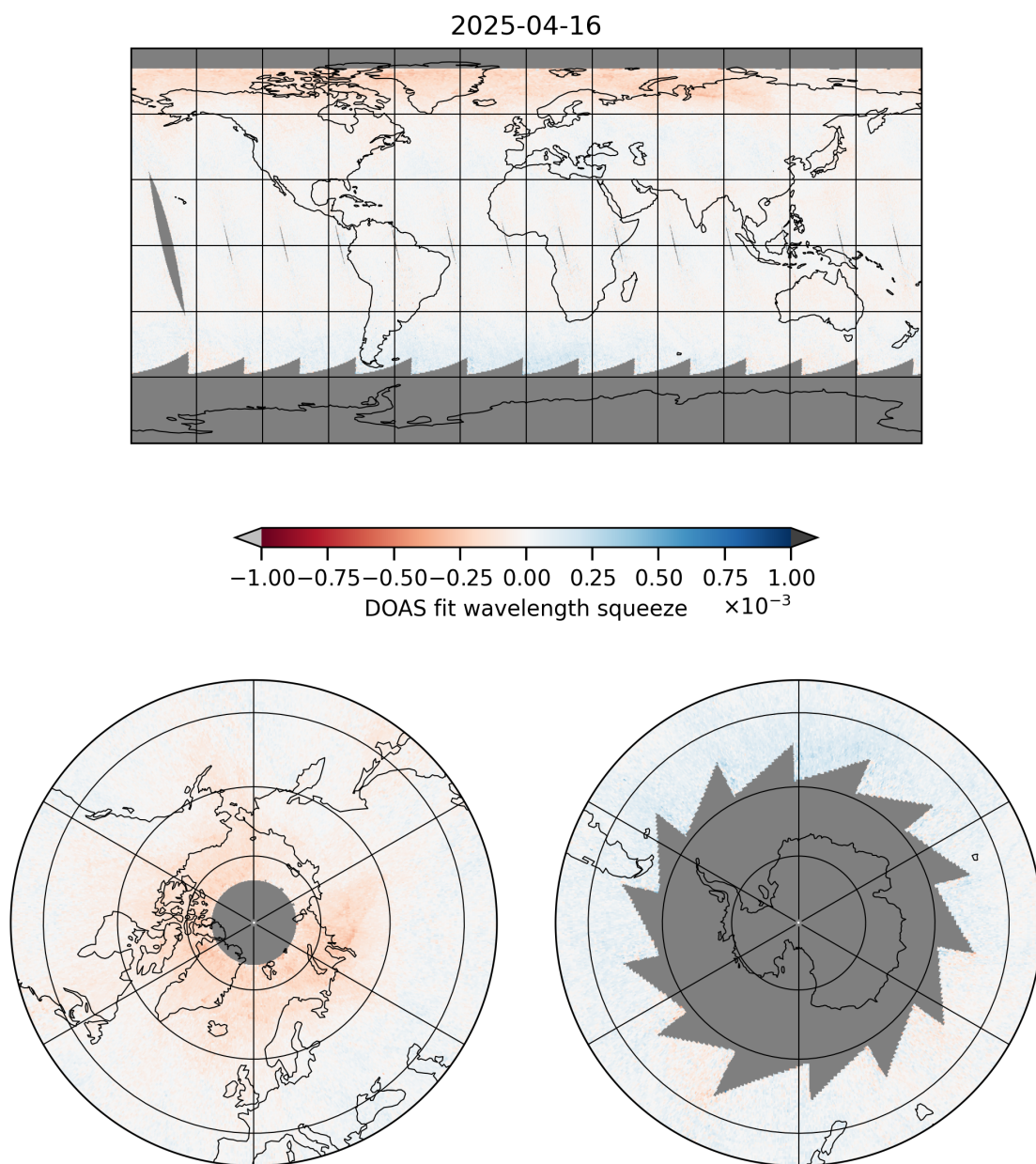


Figure 23: Map of "DOAS fit wavelength squeeze" for 2025-04-16 to 2025-04-16

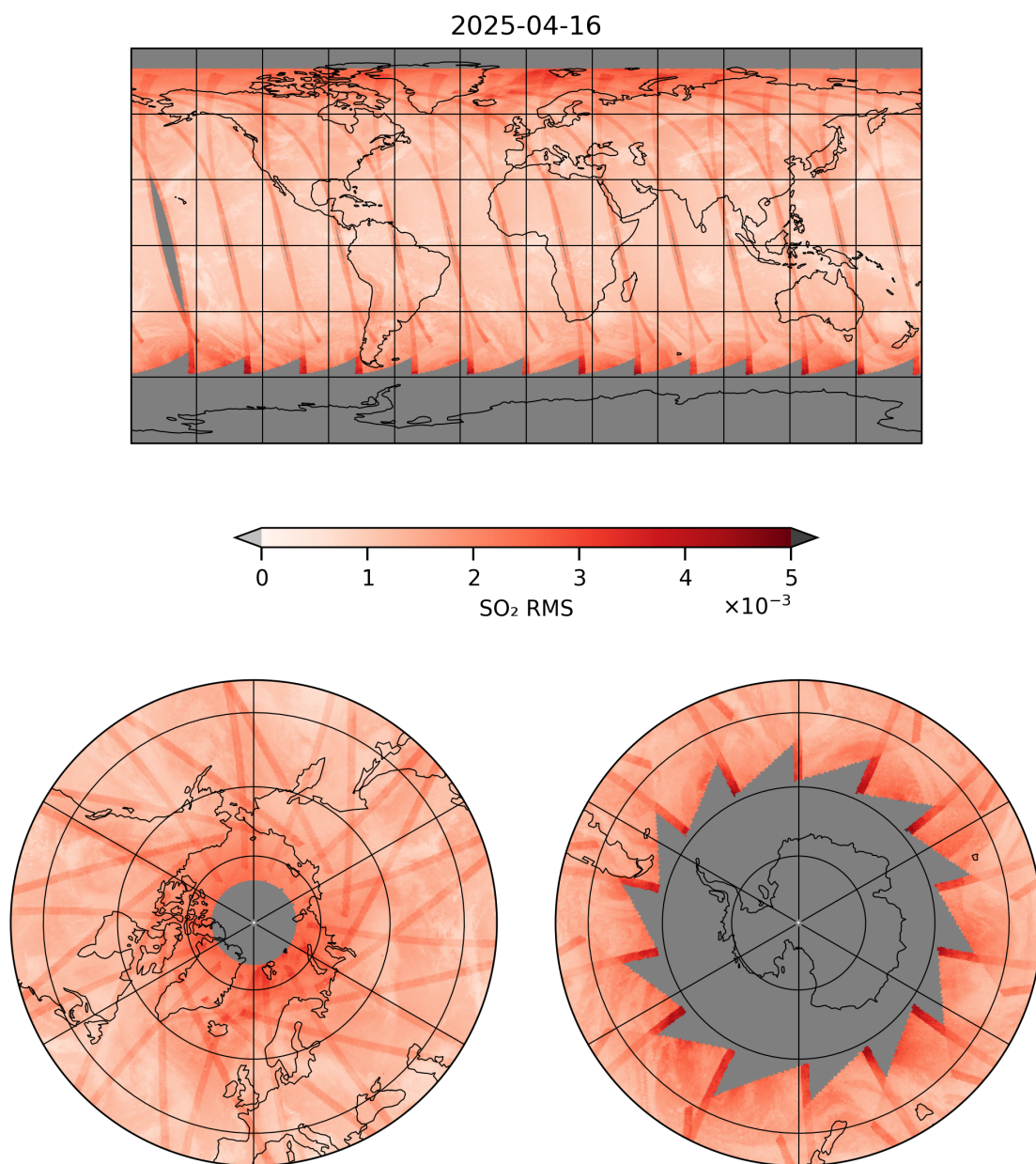


Figure 24: Map of “SO<sub>2</sub> RMS” for 2025-04-16 to 2025-04-16



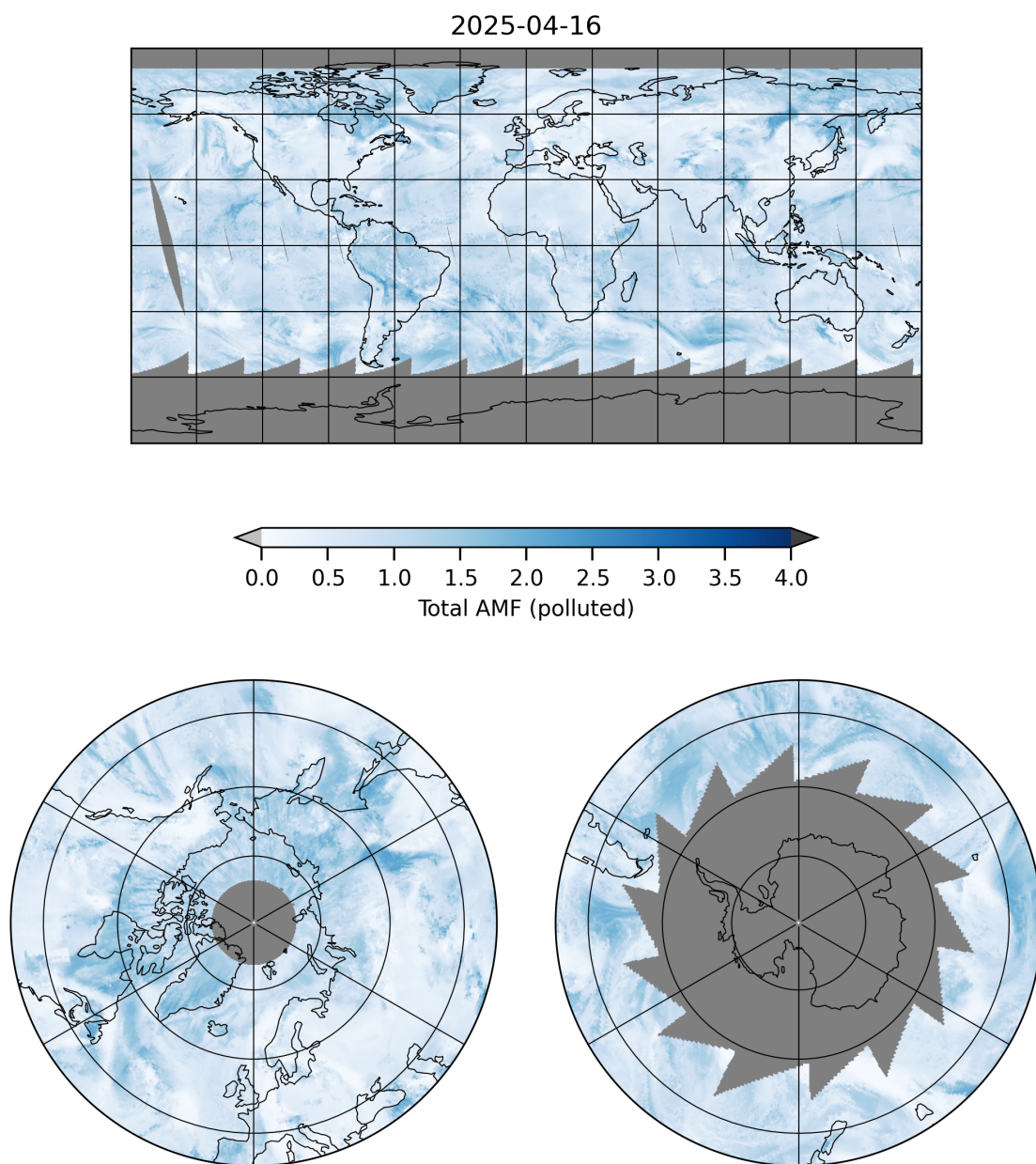


Figure 25: Map of “Total AMF (polluted)” for 2025-04-16 to 2025-04-16



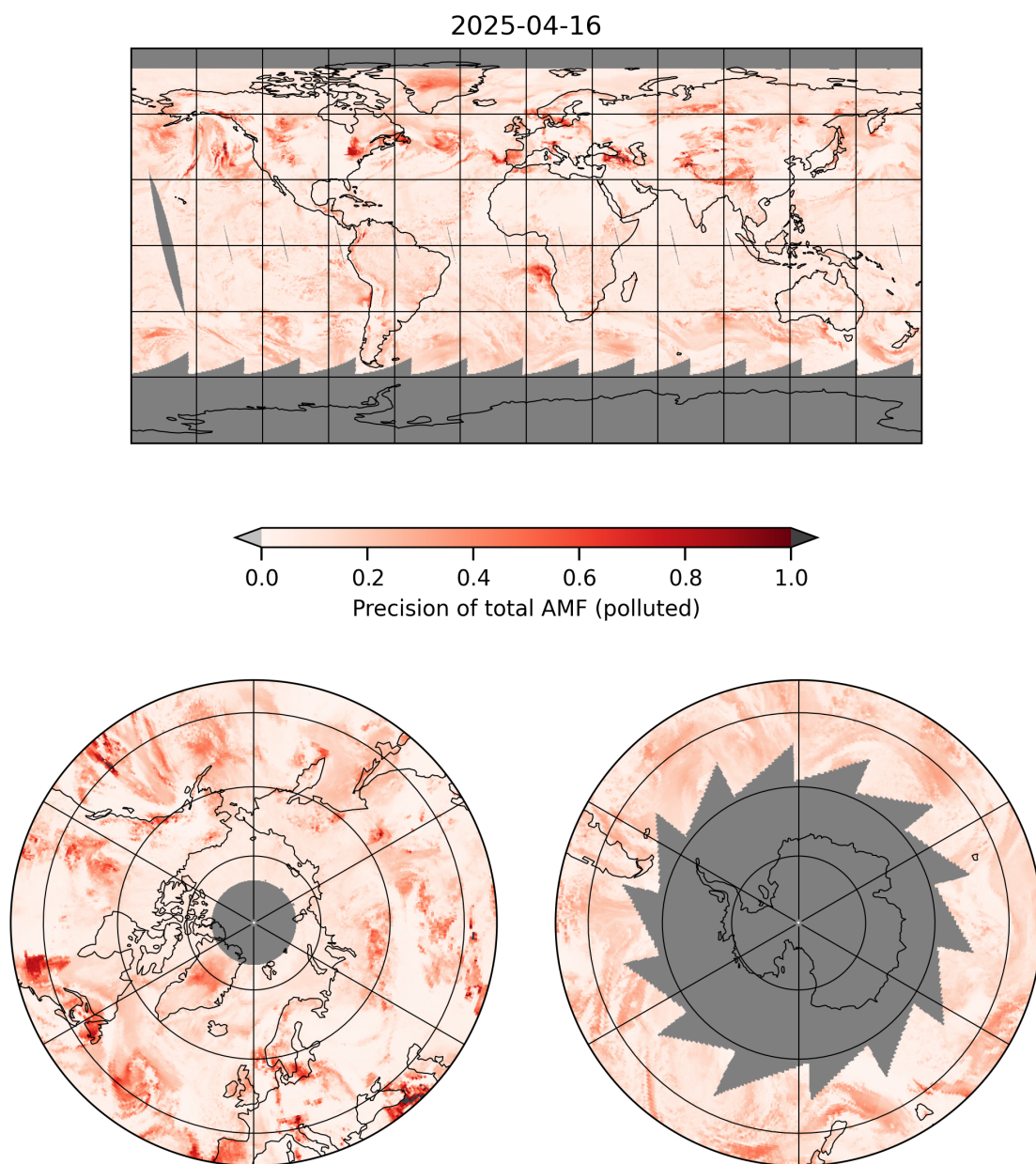


Figure 26: Map of “Precision of total AMF (polluted)” for 2025-04-16 to 2025-04-16

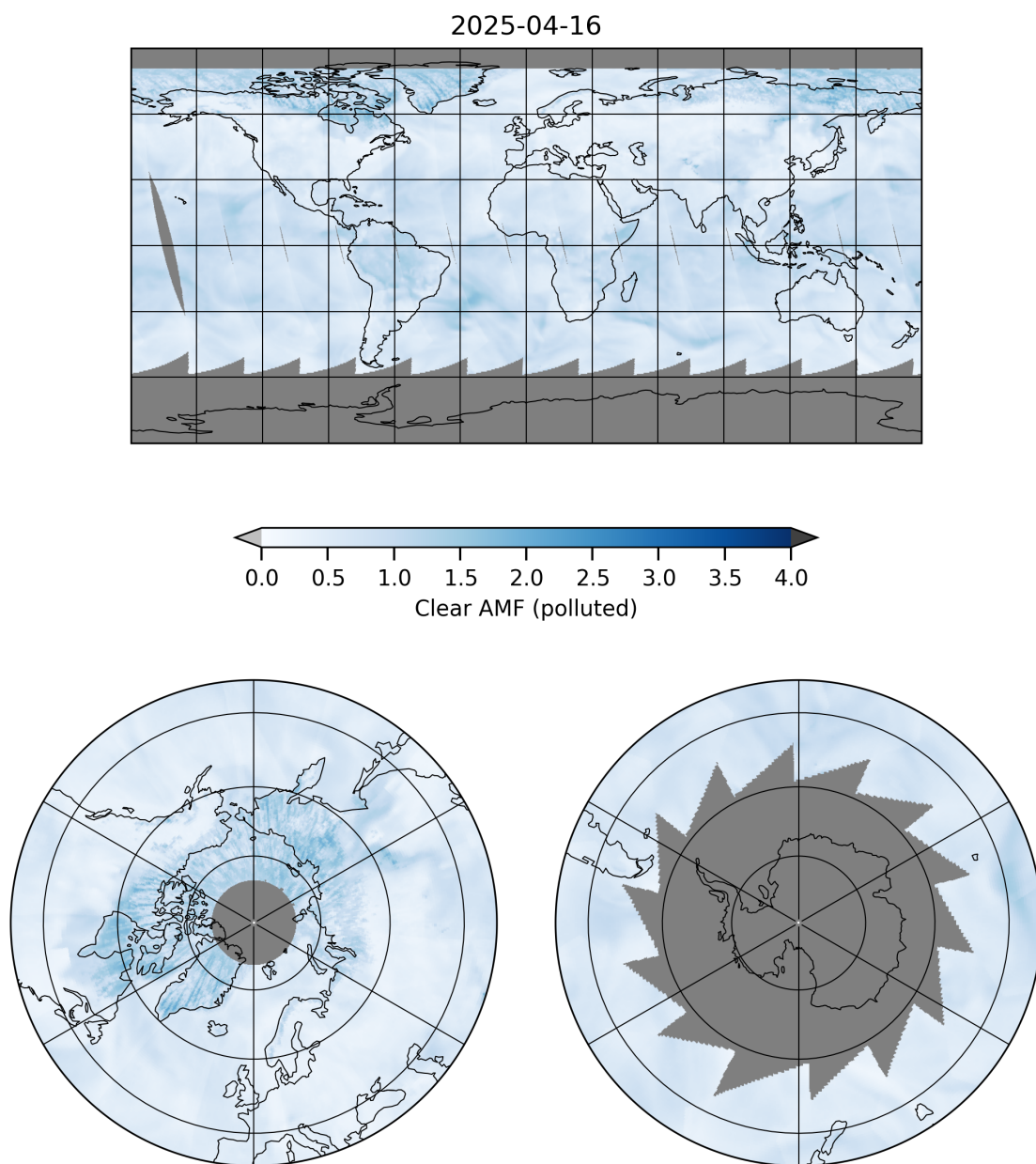


Figure 27: Map of “Clear AMF (polluted)” for 2025-04-16 to 2025-04-16

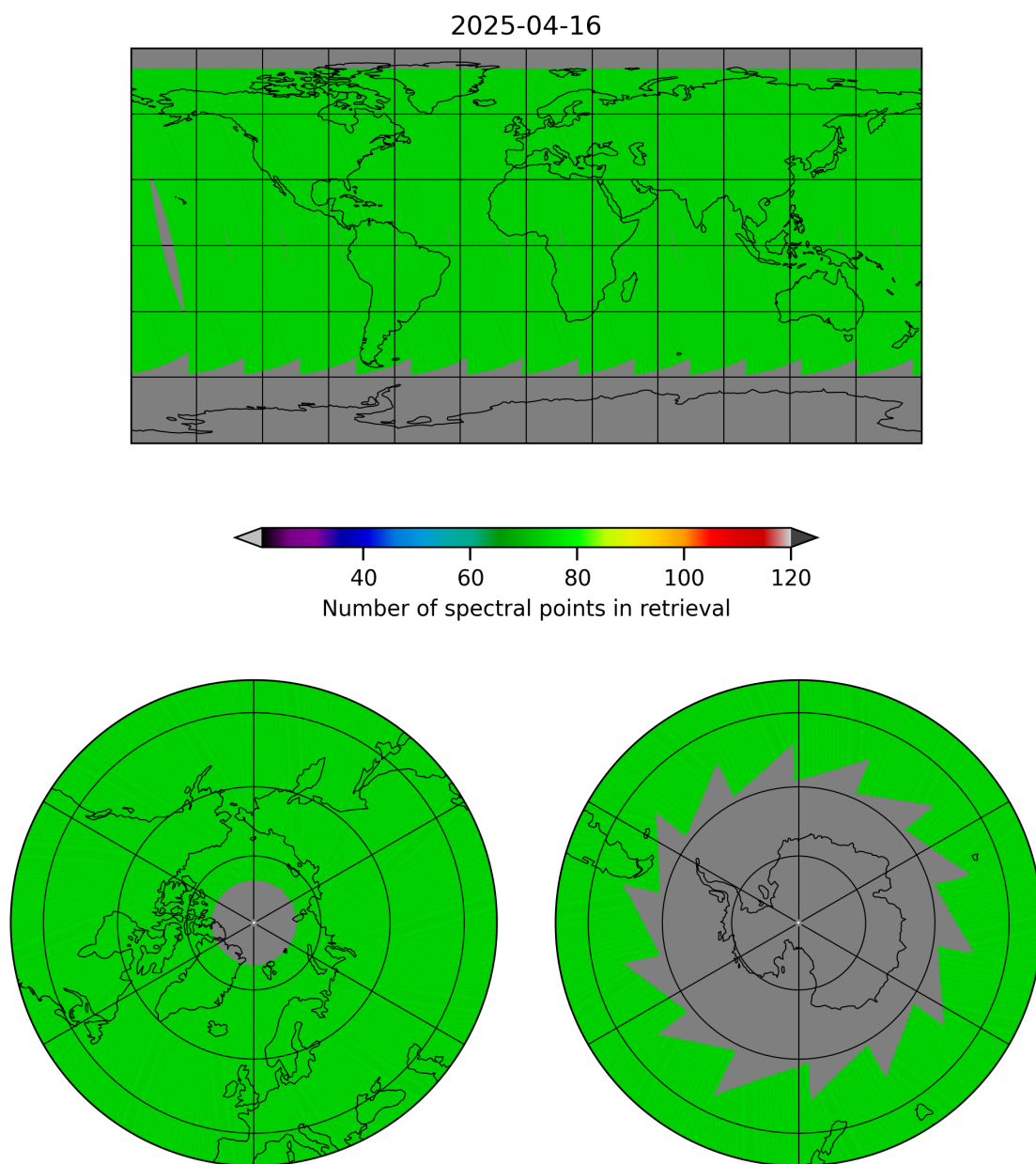


Figure 28: Map of “Number of spectral points in retrieval” for 2025-04-16 to 2025-04-16

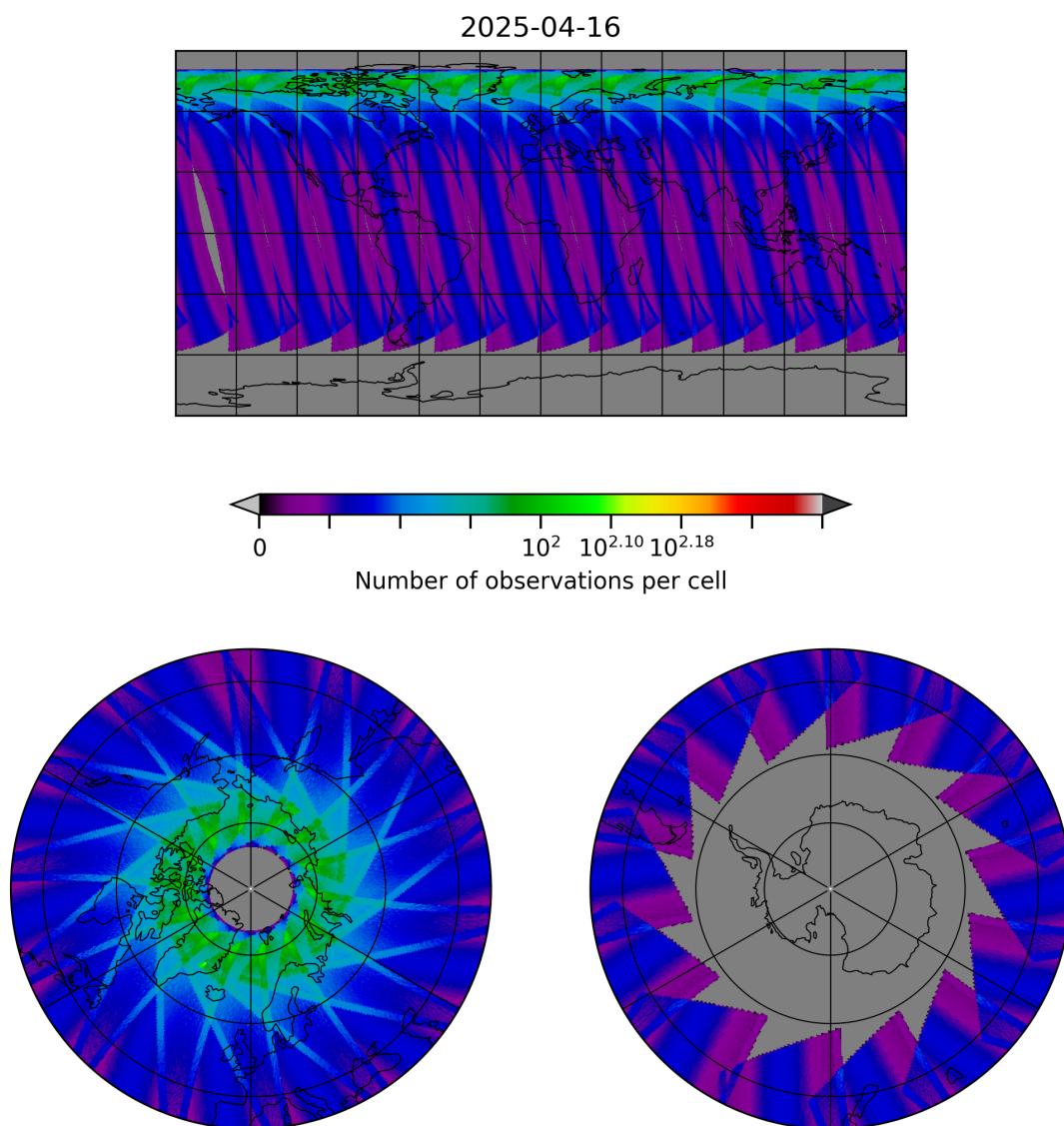


Figure 29: Map of the number of observations for 2025-04-16 to 2025-04-16



## 7 Zonal average

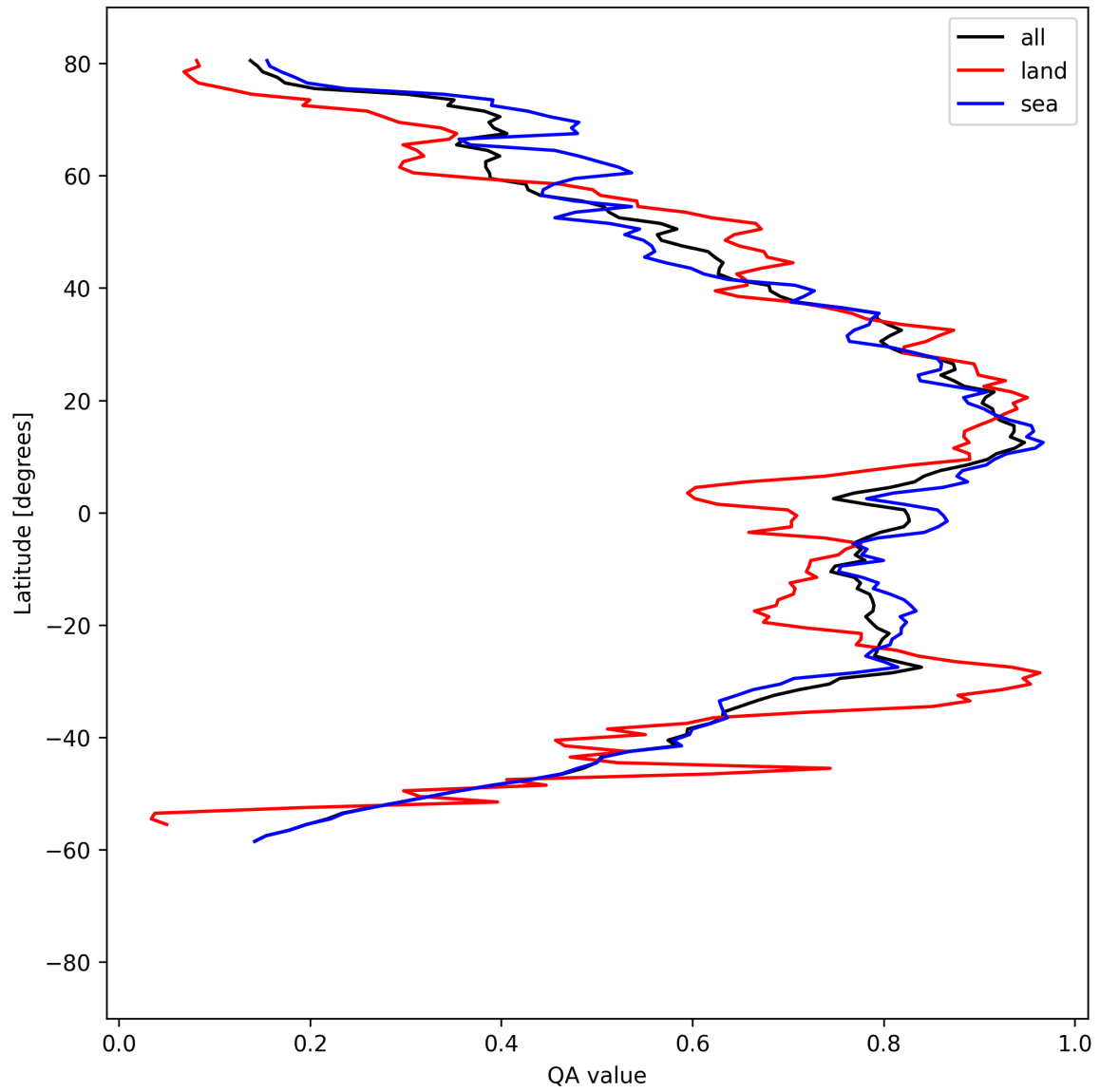


Figure 30: Zonal average of “QA value” for 2025-04-16 to 2025-04-16.

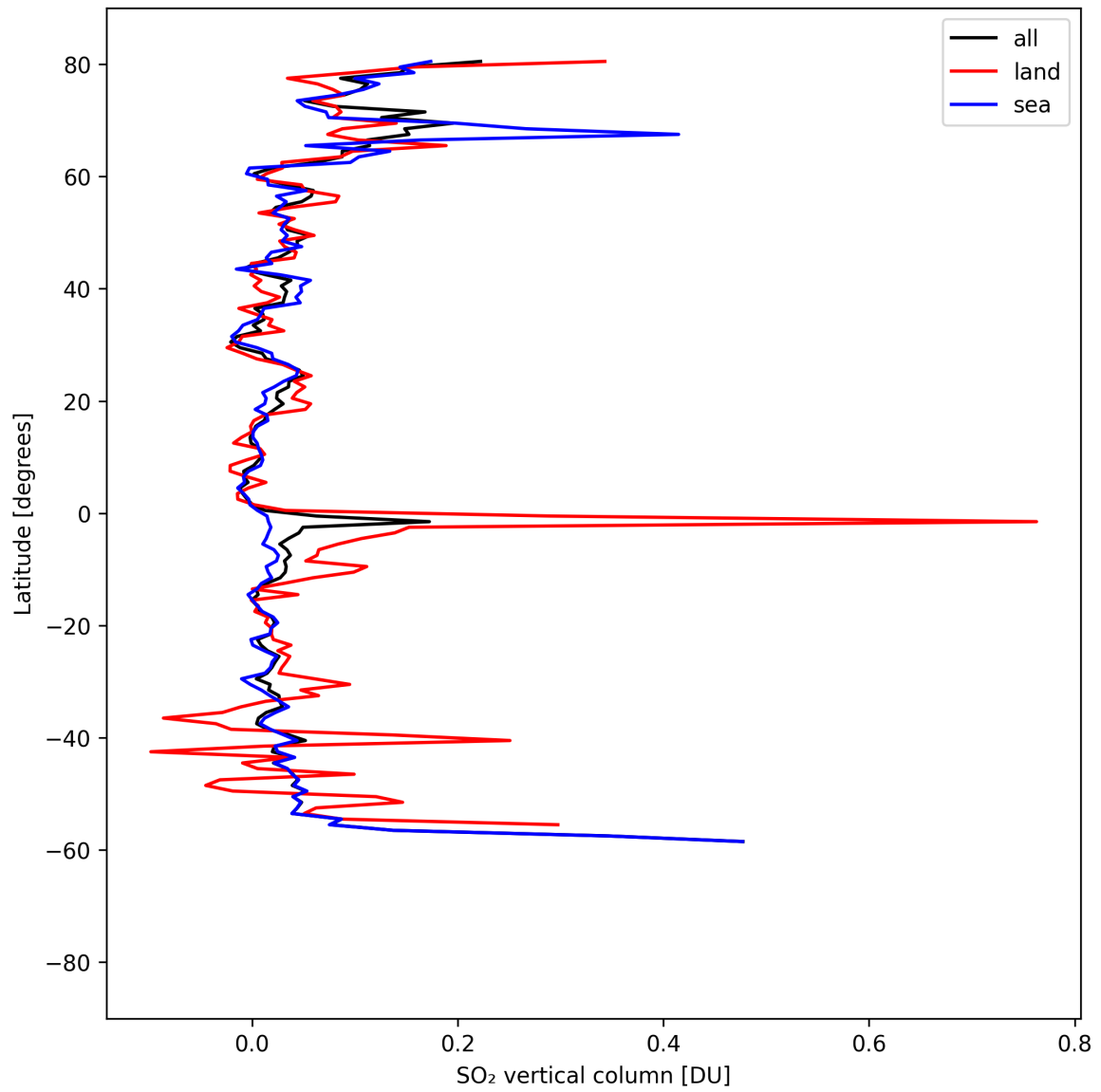


Figure 31: Zonal average of “SO<sub>2</sub> vertical column” for 2025-04-16 to 2025-04-16.

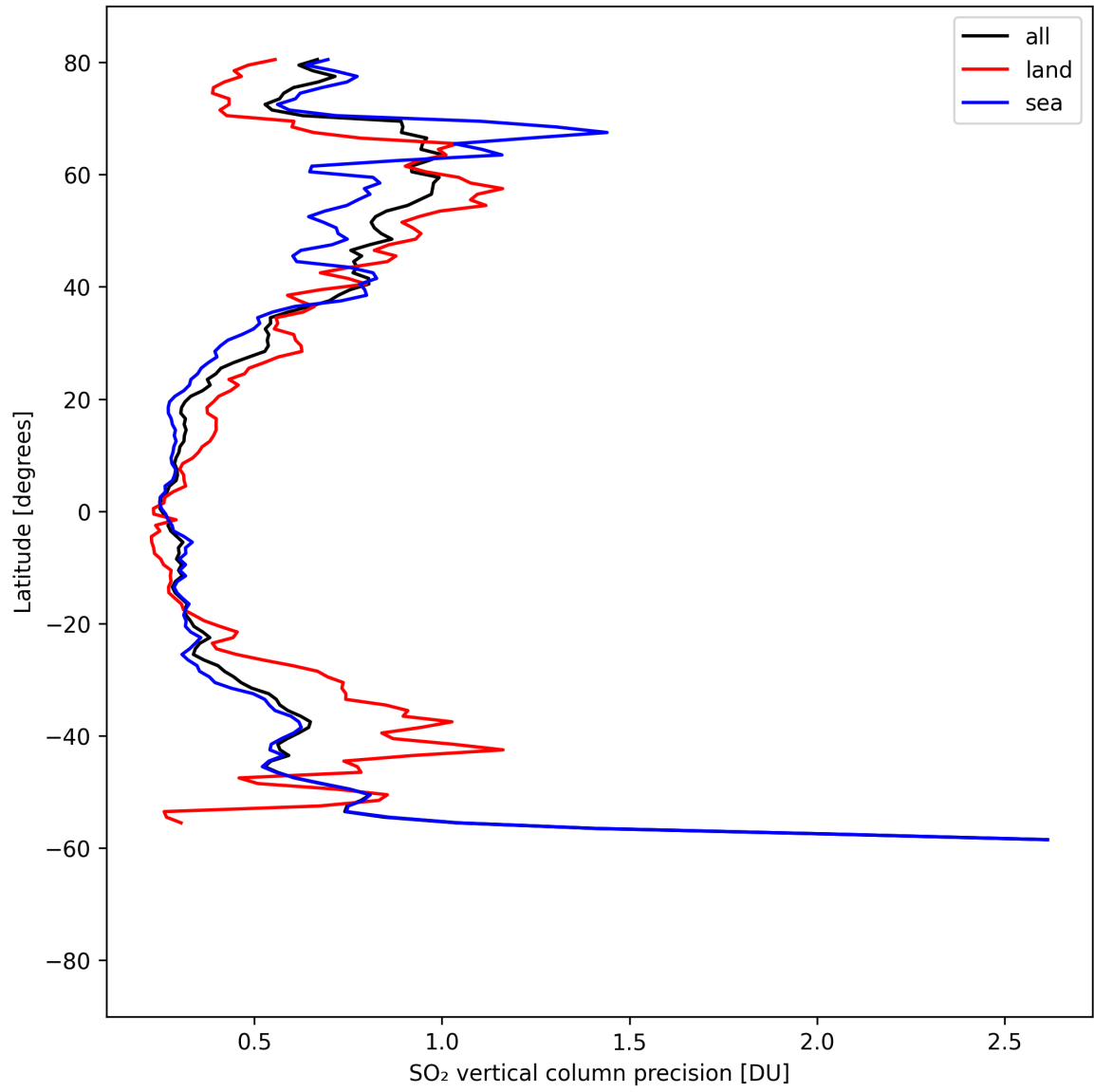


Figure 32: Zonal average of “SO<sub>2</sub> vertical column precision” for 2025-04-16 to 2025-04-16.

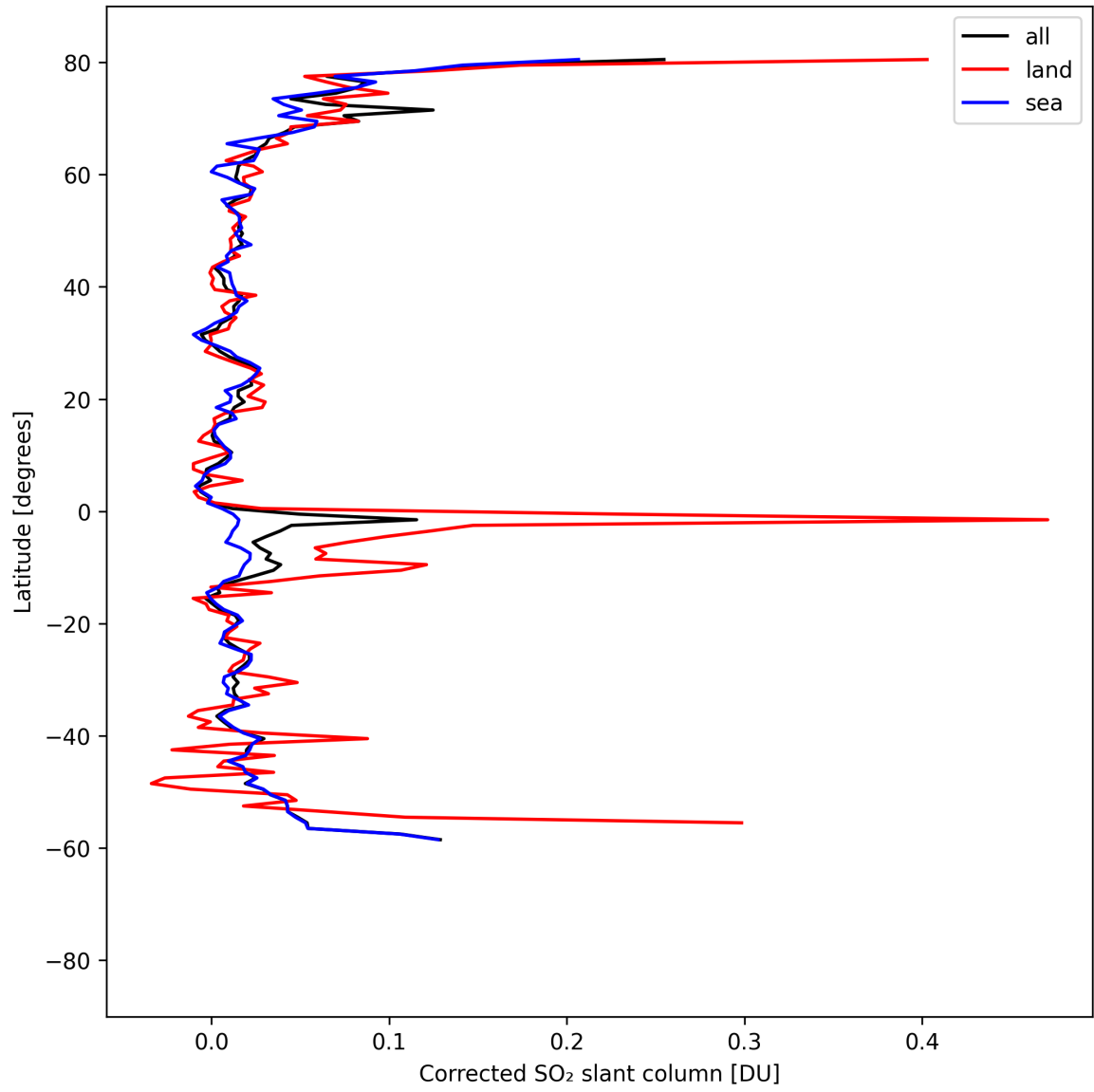


Figure 33: Zonal average of “Corrected SO<sub>2</sub> slant column” for 2025-04-16 to 2025-04-16.



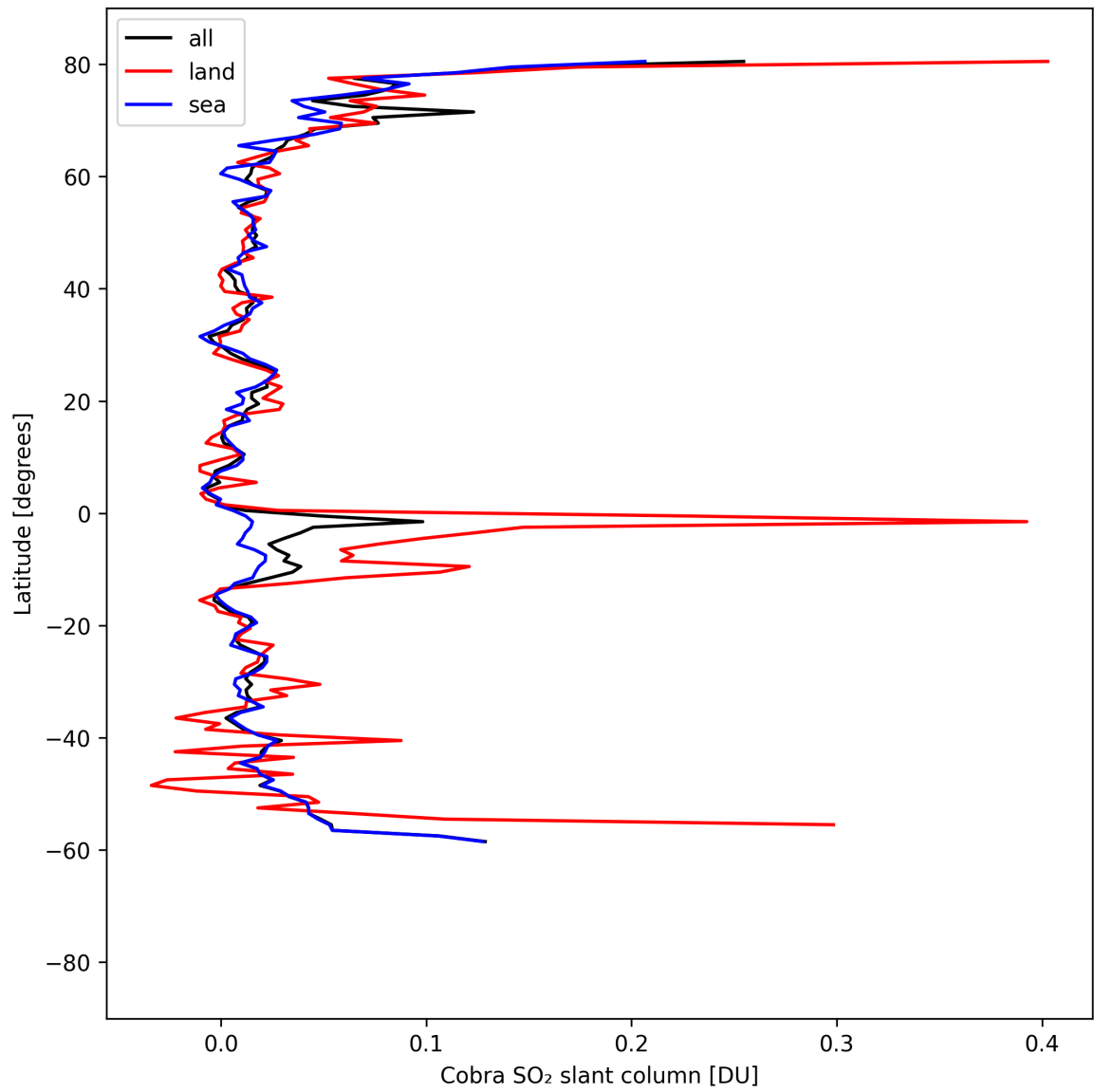


Figure 34: Zonal average of “Cobra SO<sub>2</sub> slant column” for 2025-04-16 to 2025-04-16.

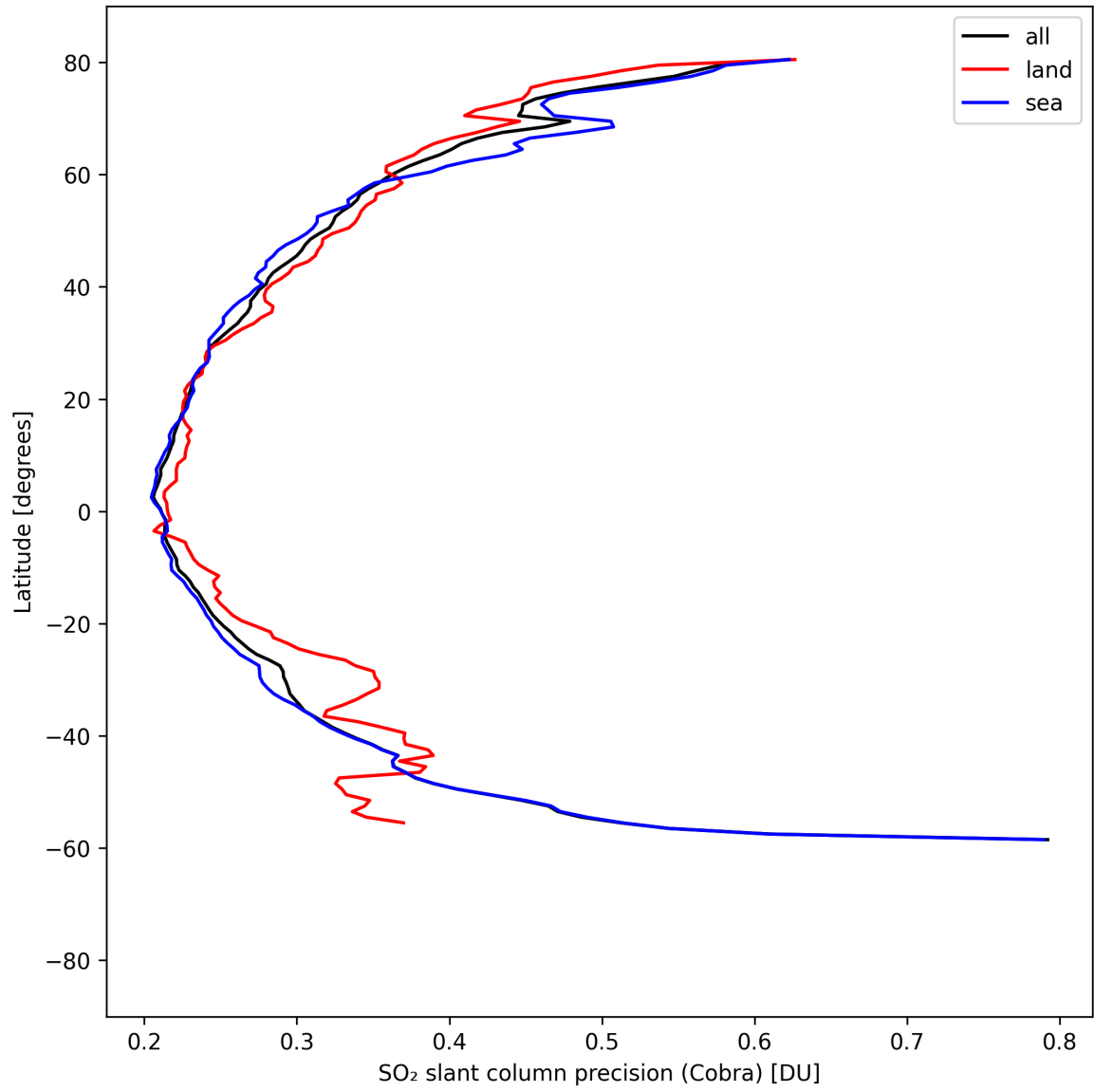


Figure 35: Zonal average of “SO<sub>2</sub> slant column precision (Cobra)” for 2025-04-16 to 2025-04-16.

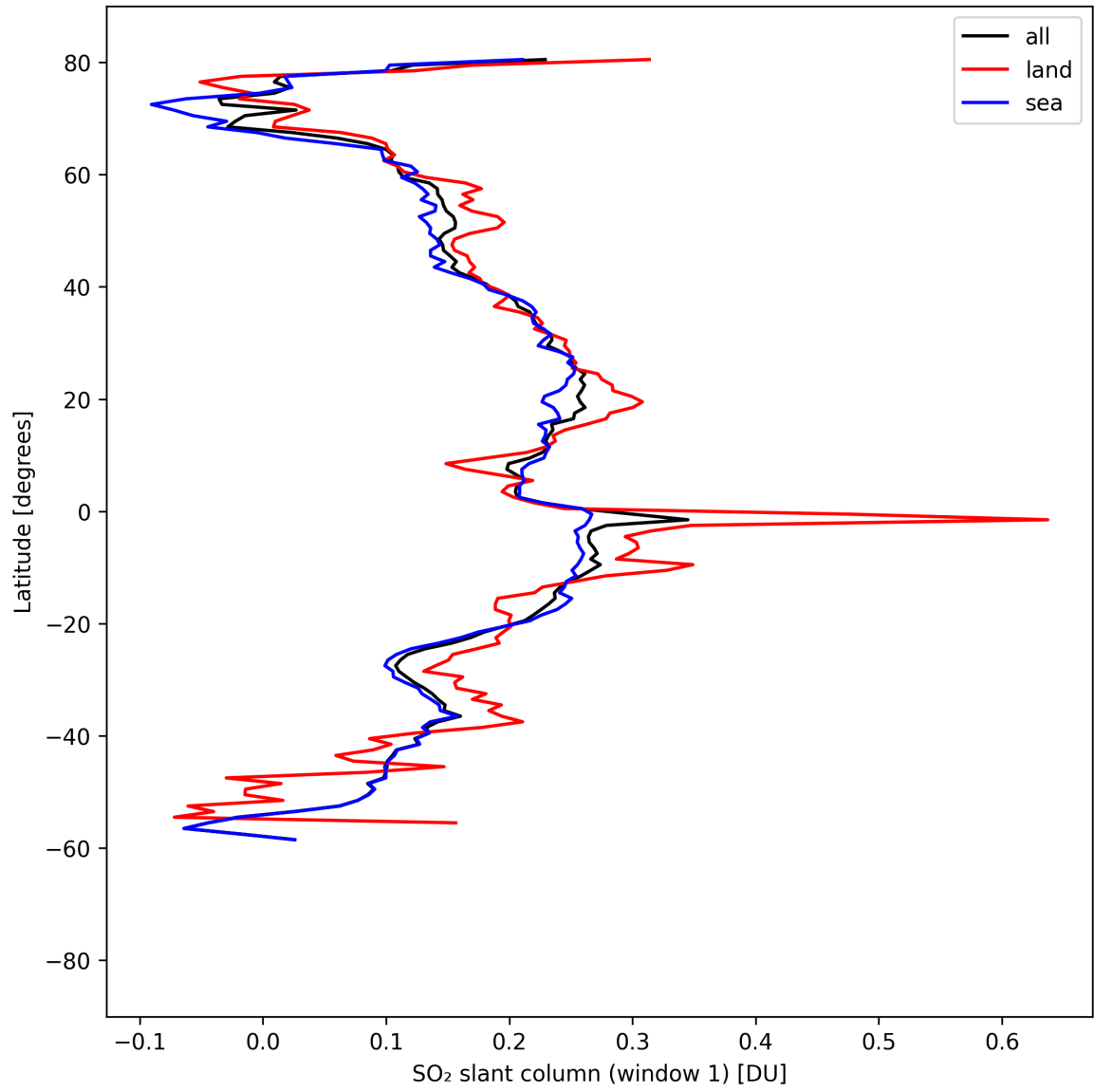


Figure 36: Zonal average of “SO<sub>2</sub> slant column (window 1)” for 2025-04-16 to 2025-04-16.

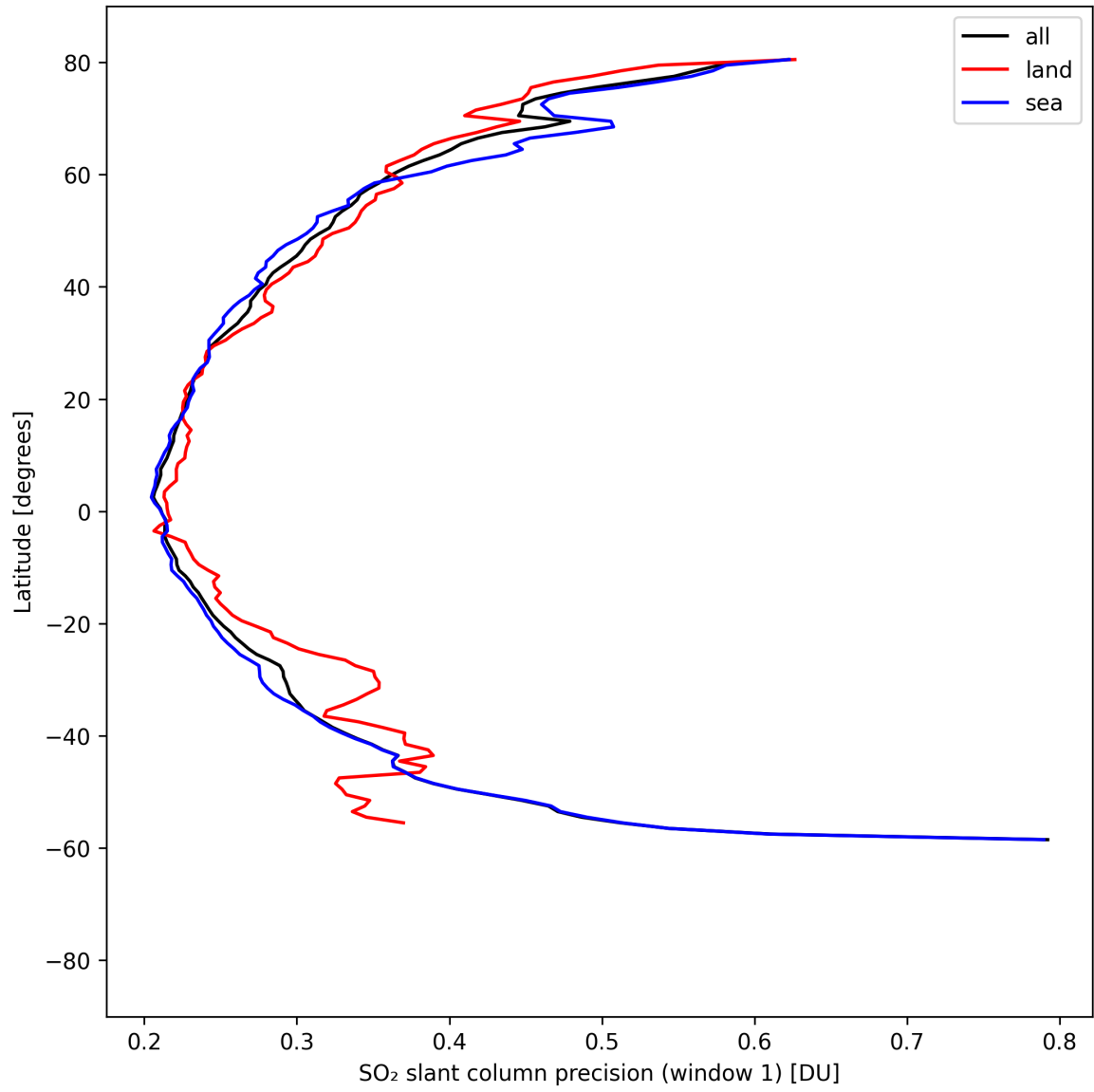


Figure 37: Zonal average of “SO<sub>2</sub> slant column precision (window 1)” for 2025-04-16 to 2025-04-16.

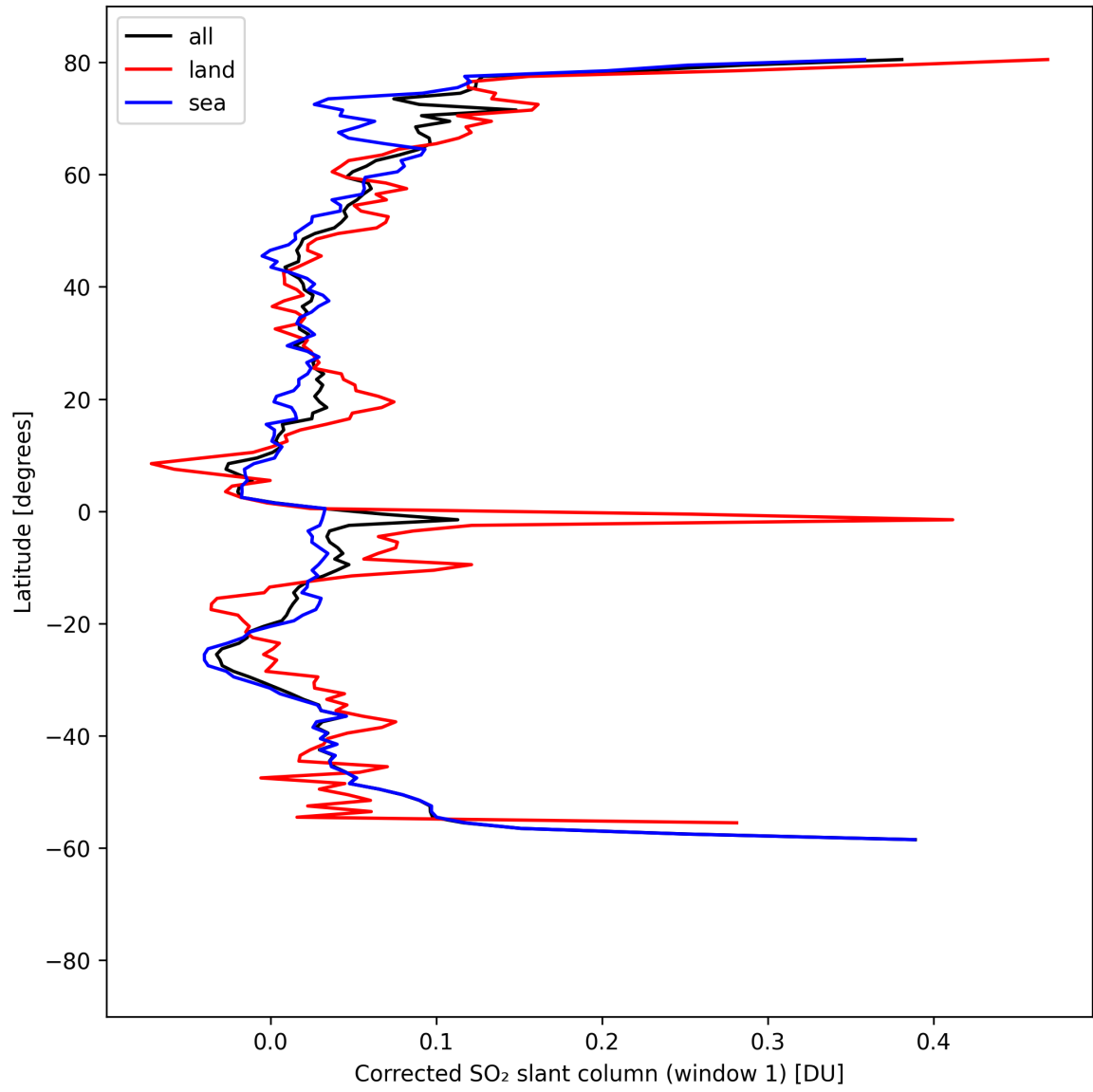


Figure 38: Zonal average of “Corrected SO<sub>2</sub> slant column (window 1)” for 2025-04-16 to 2025-04-16.



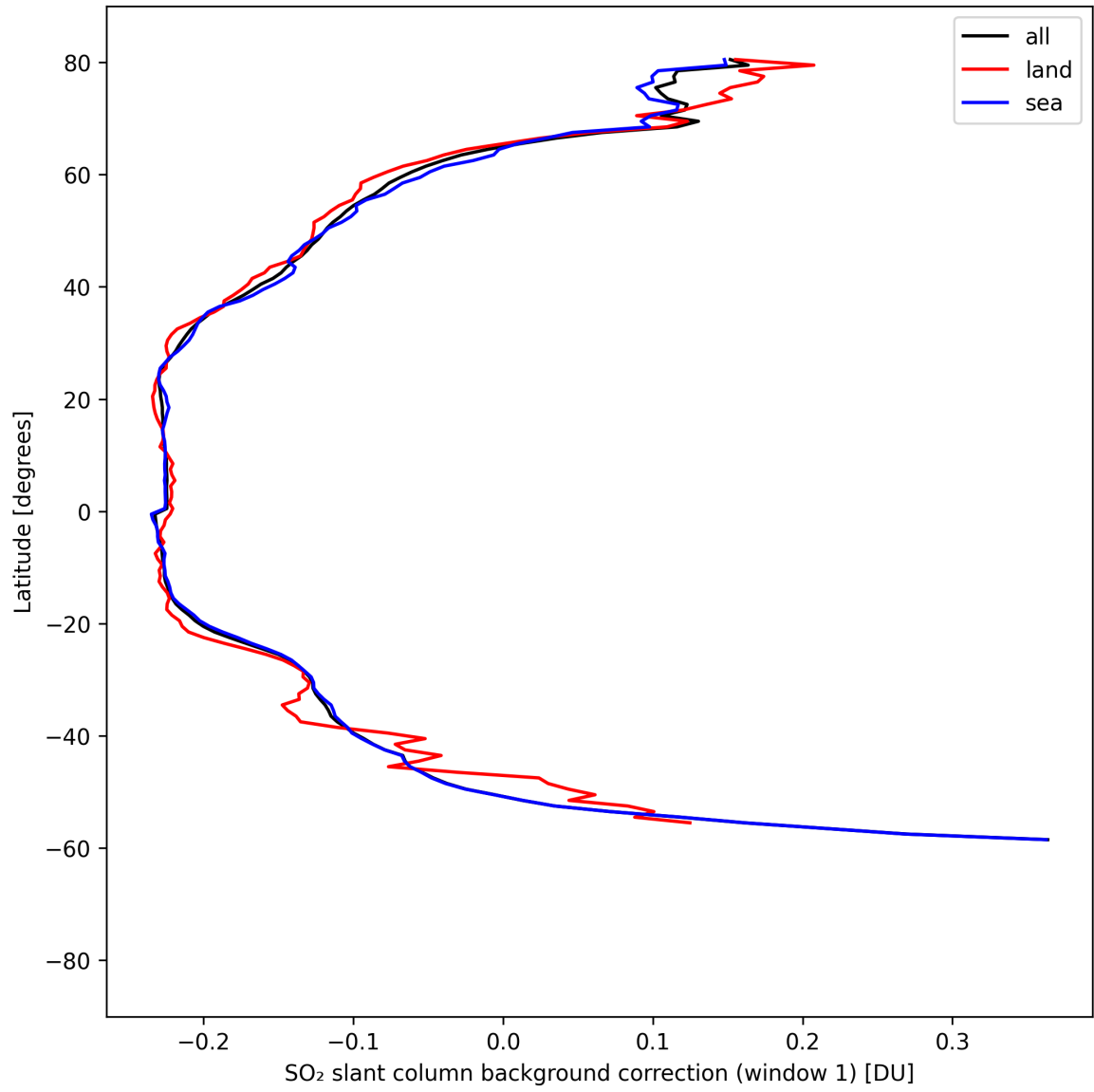


Figure 39: Zonal average of "SO<sub>2</sub> slant column background correction (window 1)" for 2025-04-16 to 2025-04-16.

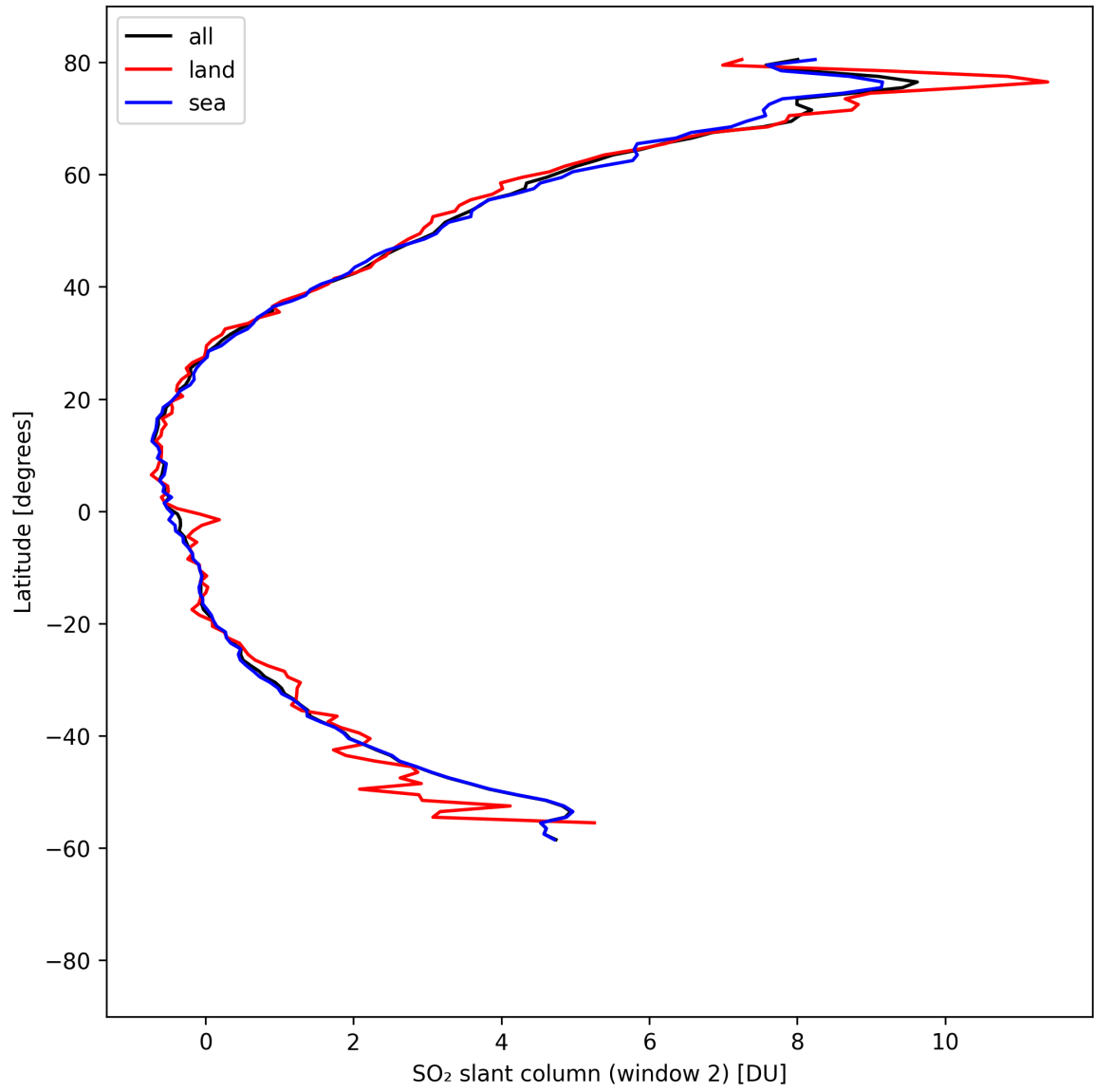


Figure 40: Zonal average of “SO<sub>2</sub> slant column (window 2)” for 2025-04-16 to 2025-04-16.

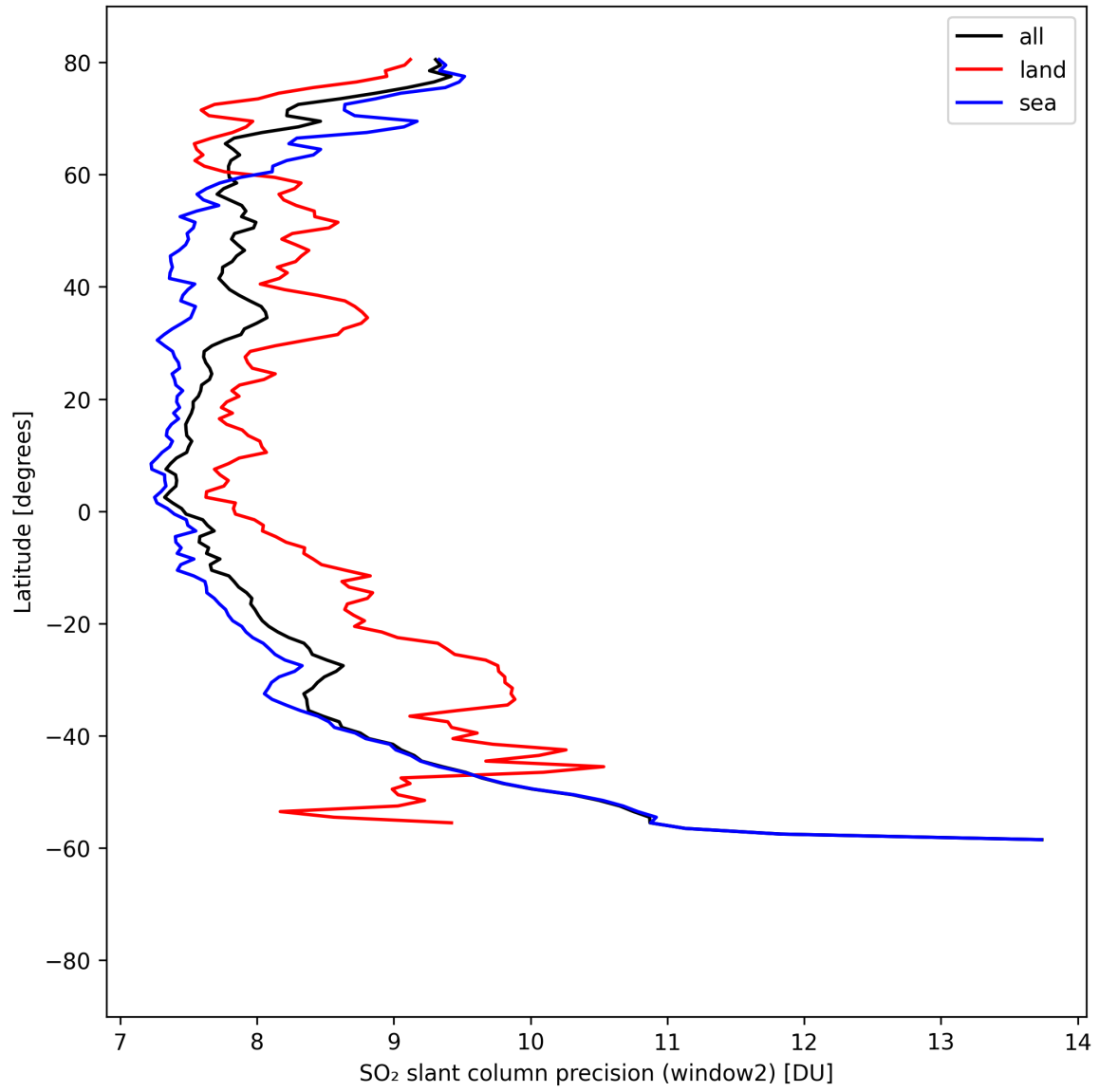


Figure 41: Zonal average of “SO<sub>2</sub> slant column precision (window2)” for 2025-04-16 to 2025-04-16.

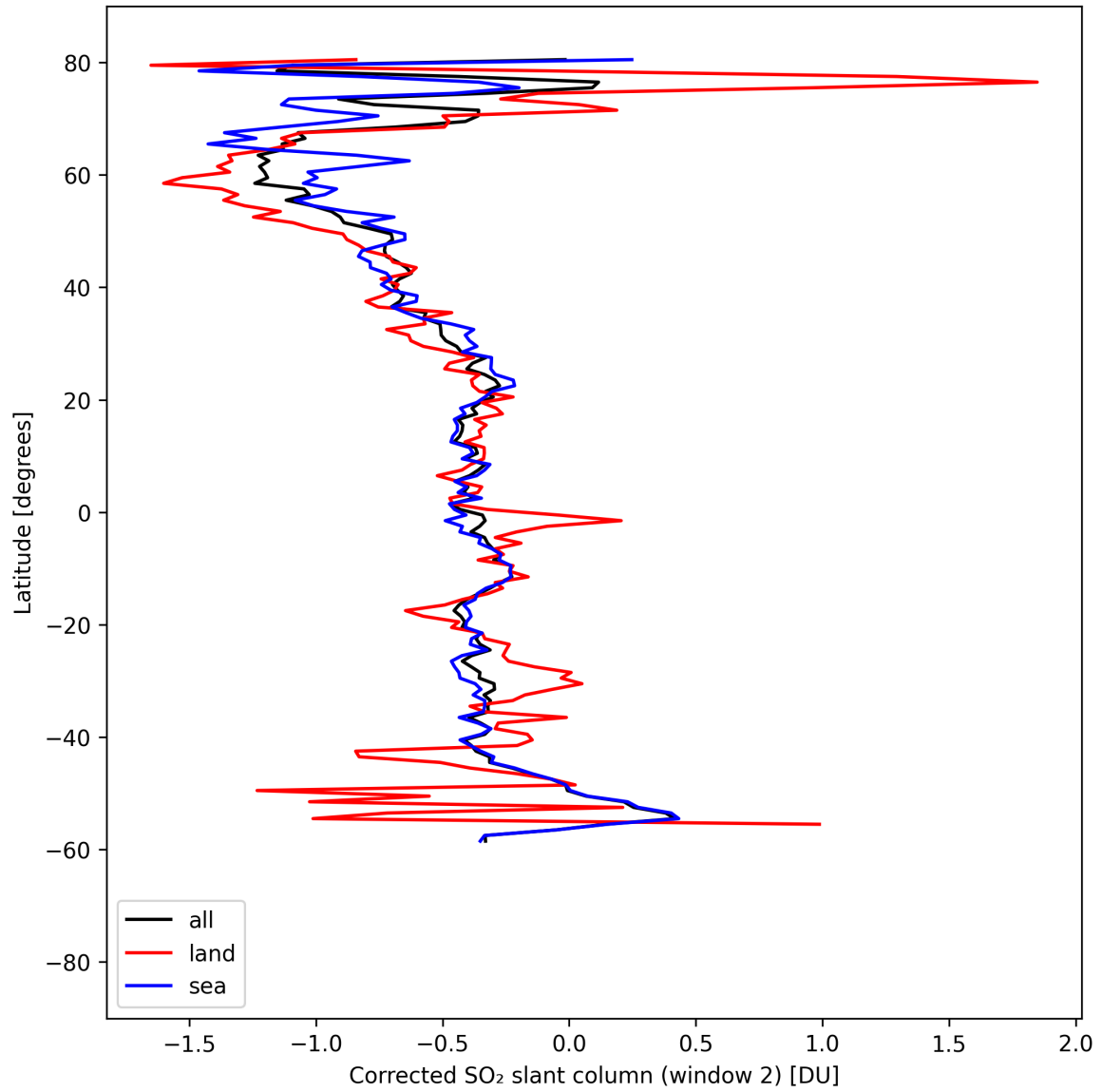


Figure 42: Zonal average of “Corrected SO<sub>2</sub> slant column (window 2)” for 2025-04-16 to 2025-04-16.

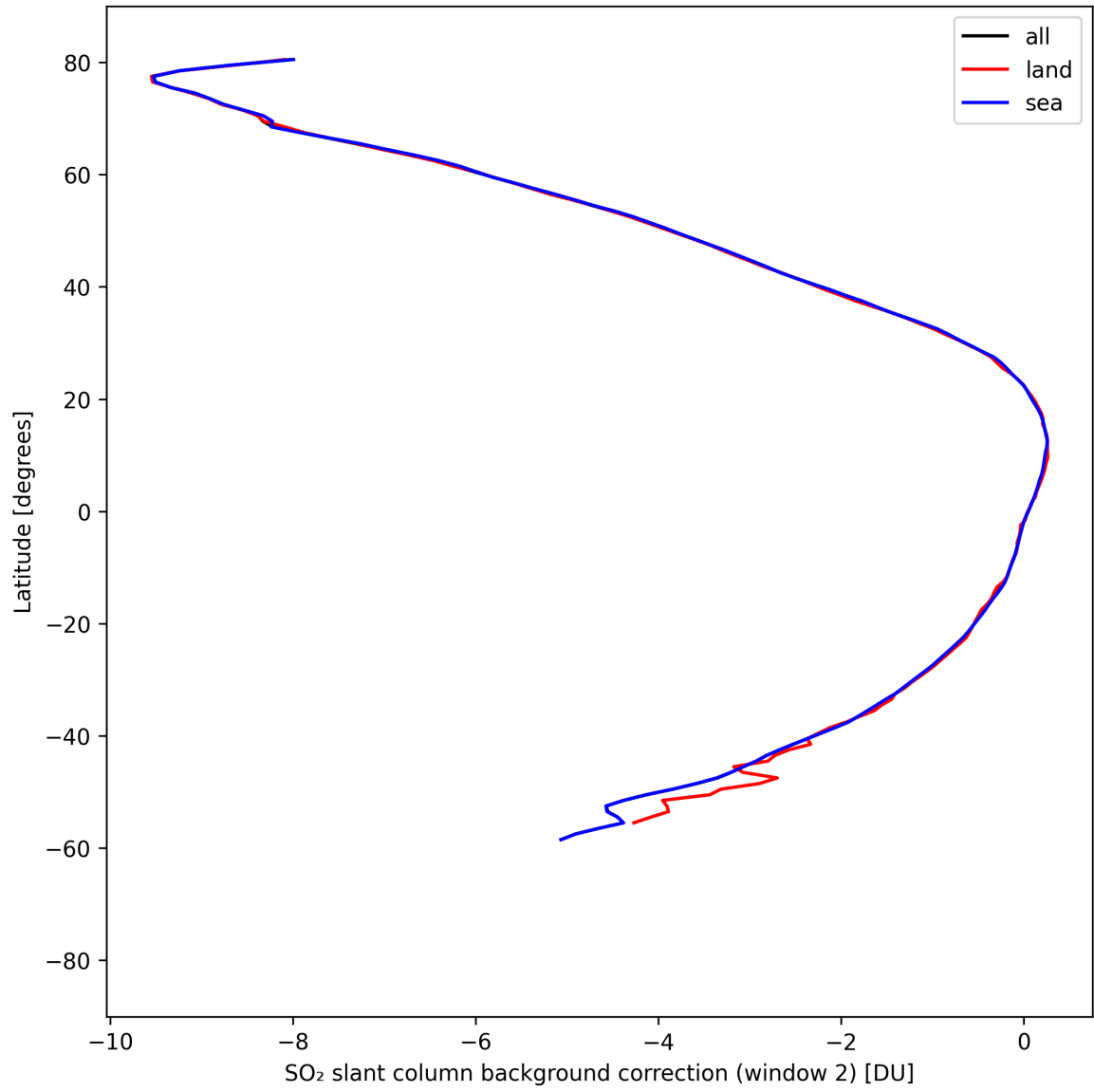


Figure 43: Zonal average of “SO<sub>2</sub> slant column background correction (window 2)” for 2025-04-16 to 2025-04-16.



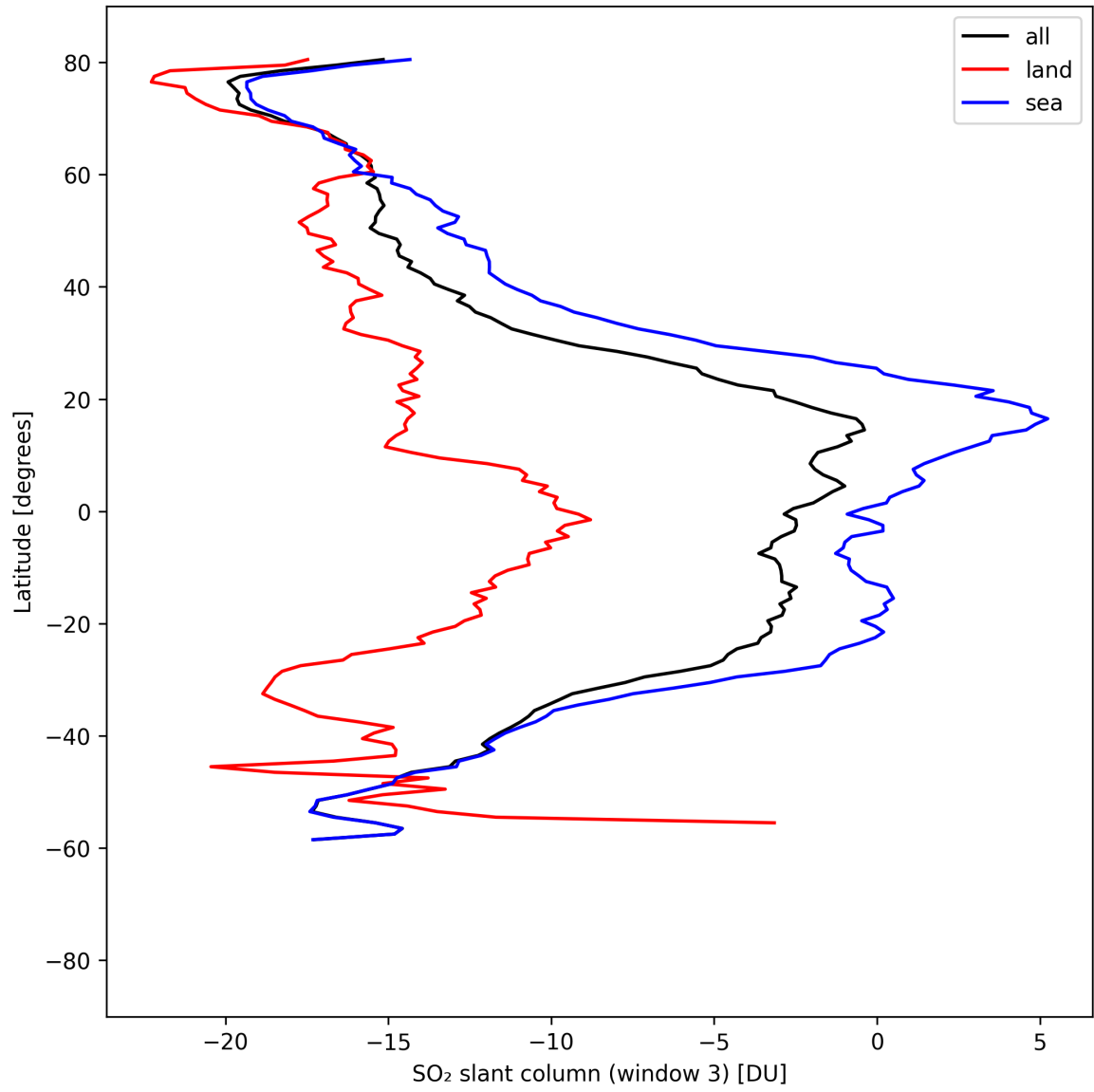


Figure 44: Zonal average of “SO<sub>2</sub> slant column (window 3)” for 2025-04-16 to 2025-04-16.

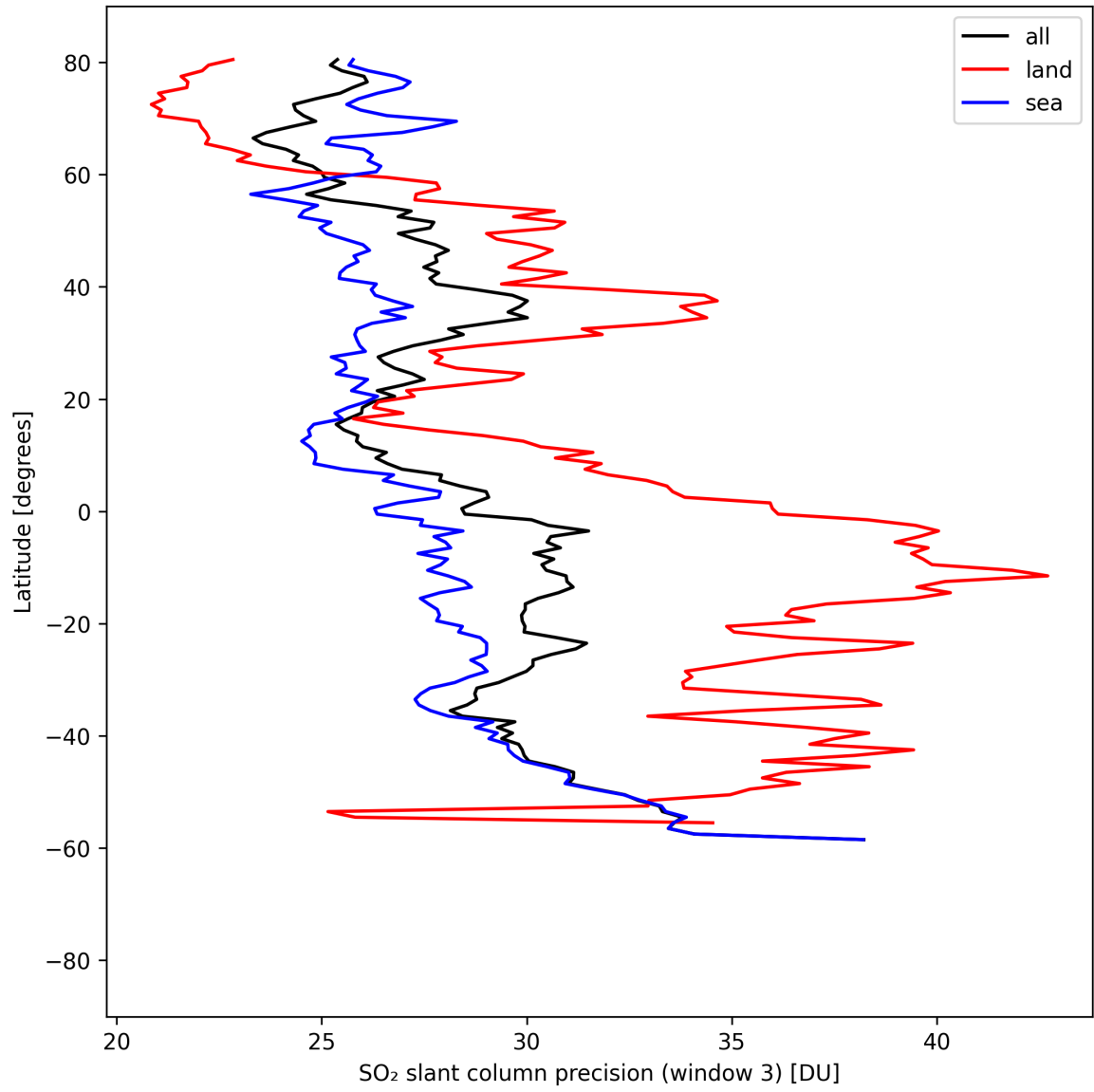


Figure 45: Zonal average of “SO<sub>2</sub> slant column precision (window 3)” for 2025-04-16 to 2025-04-16.

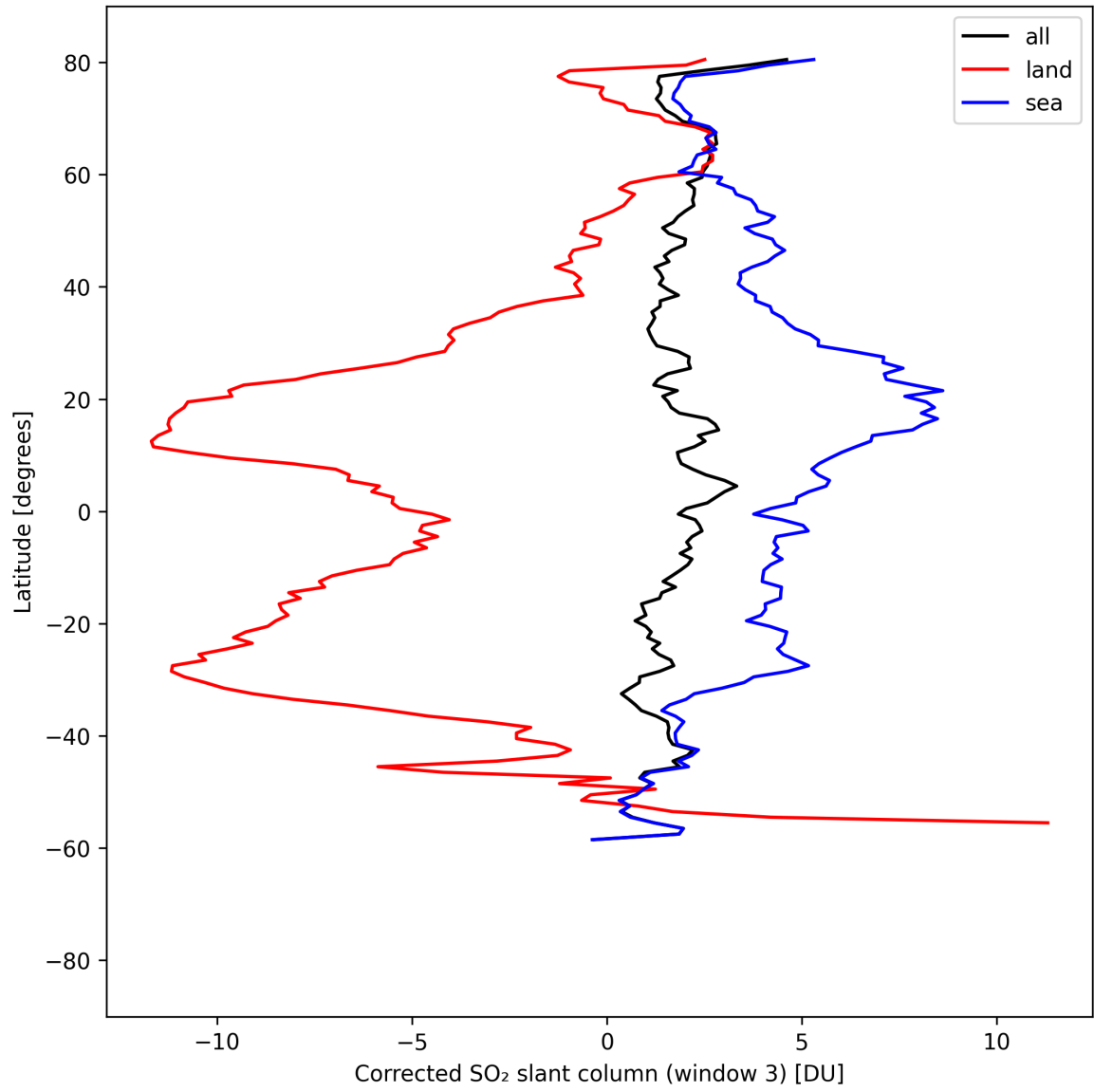


Figure 46: Zonal average of “Corrected SO<sub>2</sub> slant column (window 3)” for 2025-04-16 to 2025-04-16.

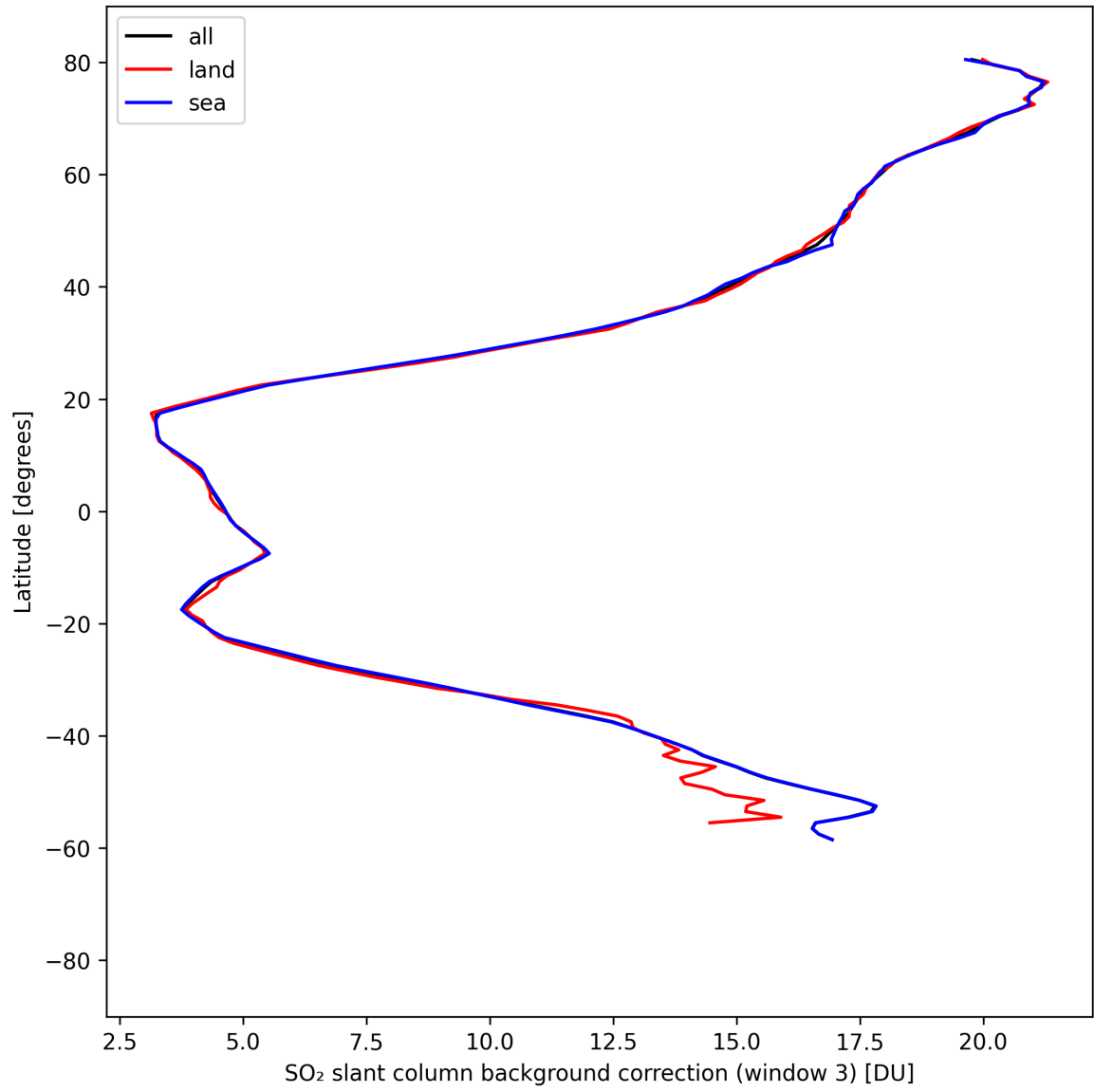


Figure 47: Zonal average of “SO<sub>2</sub> slant column background correction (window 3)” for 2025-04-16 to 2025-04-16.

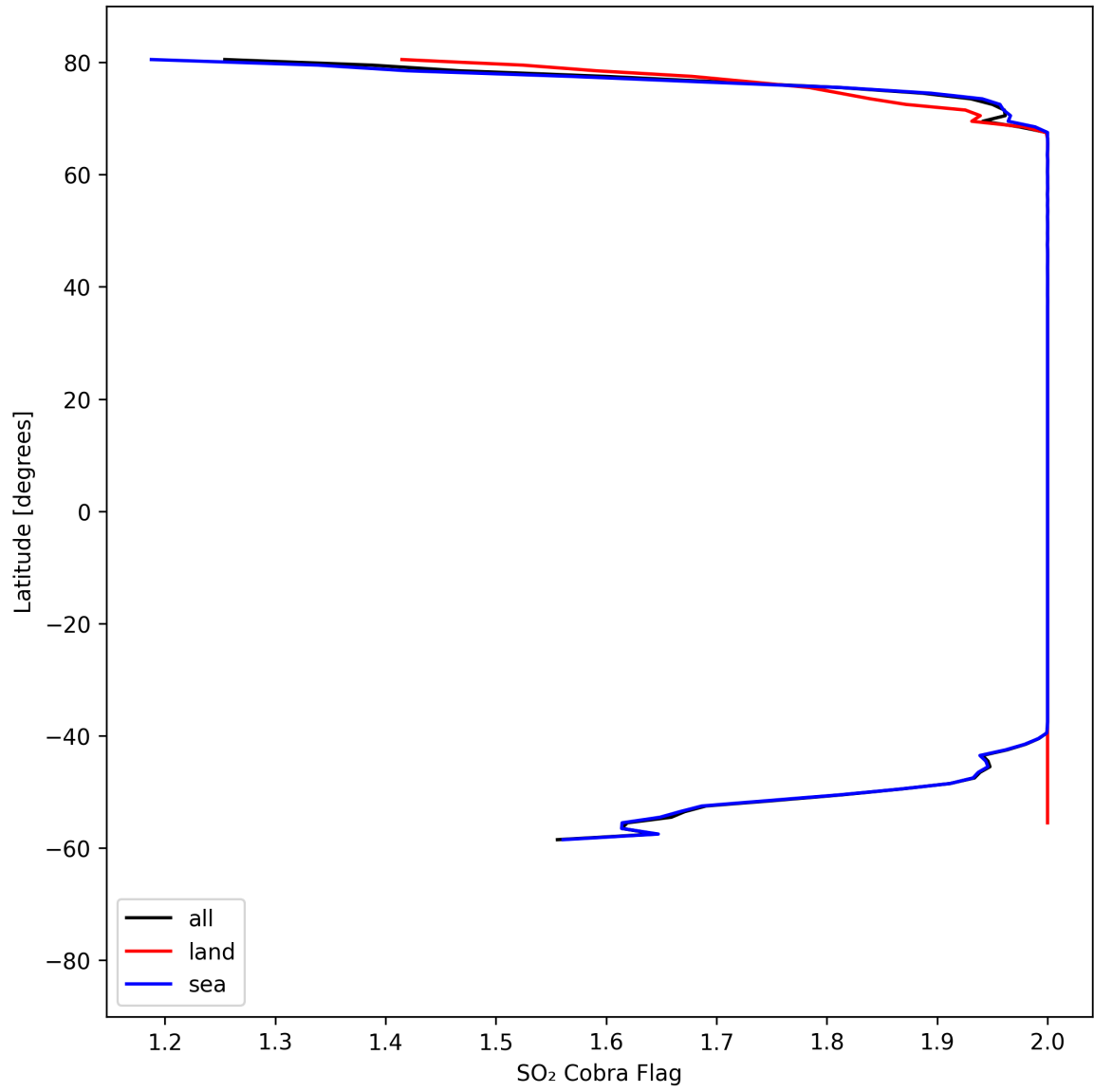


Figure 48: Zonal average of "SO<sub>2</sub> Cobra Flag" for 2025-04-16 to 2025-04-16.

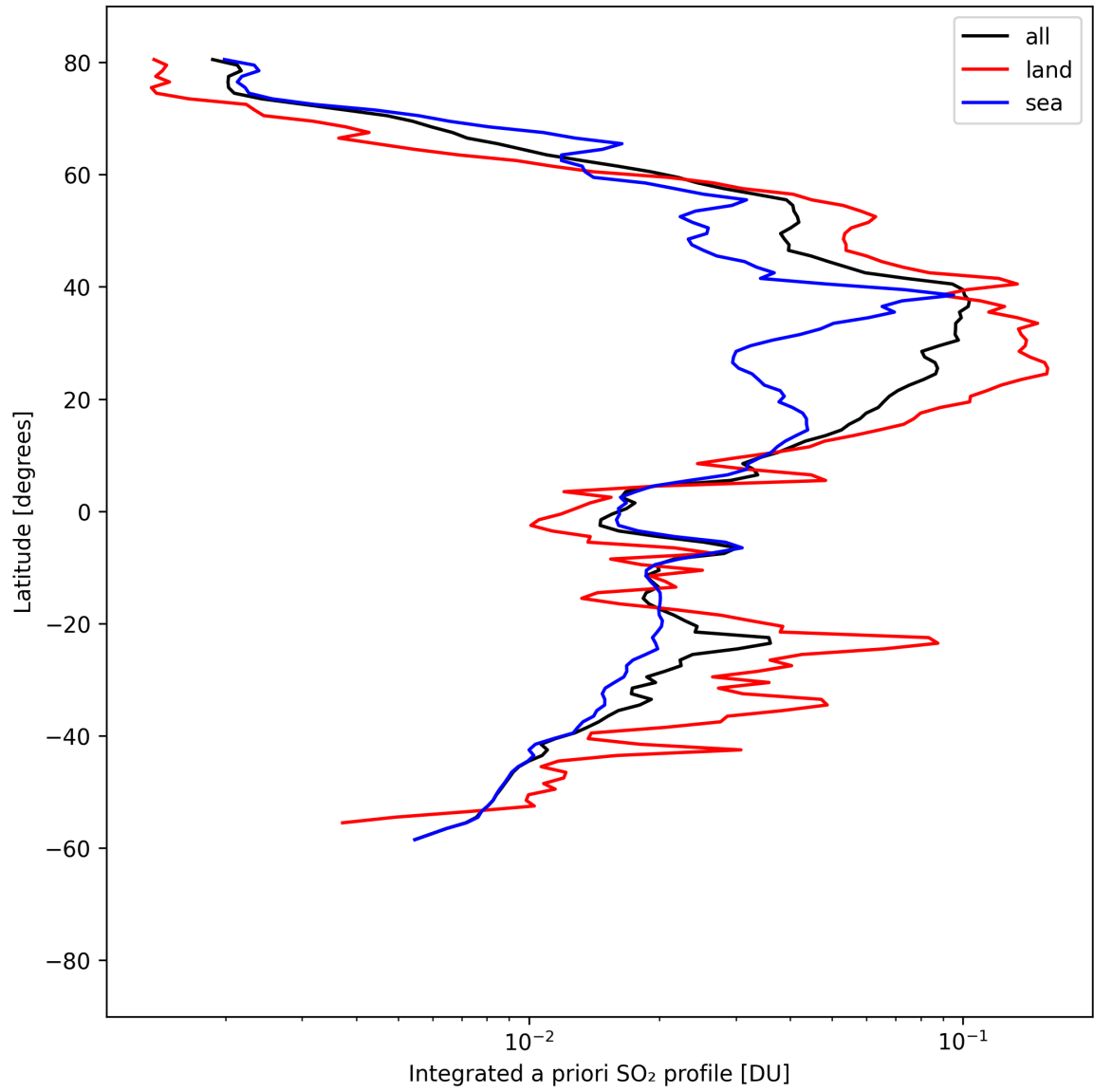


Figure 49: Zonal average of “Integrated a priori SO<sub>2</sub> profile” for 2025-04-16 to 2025-04-16.



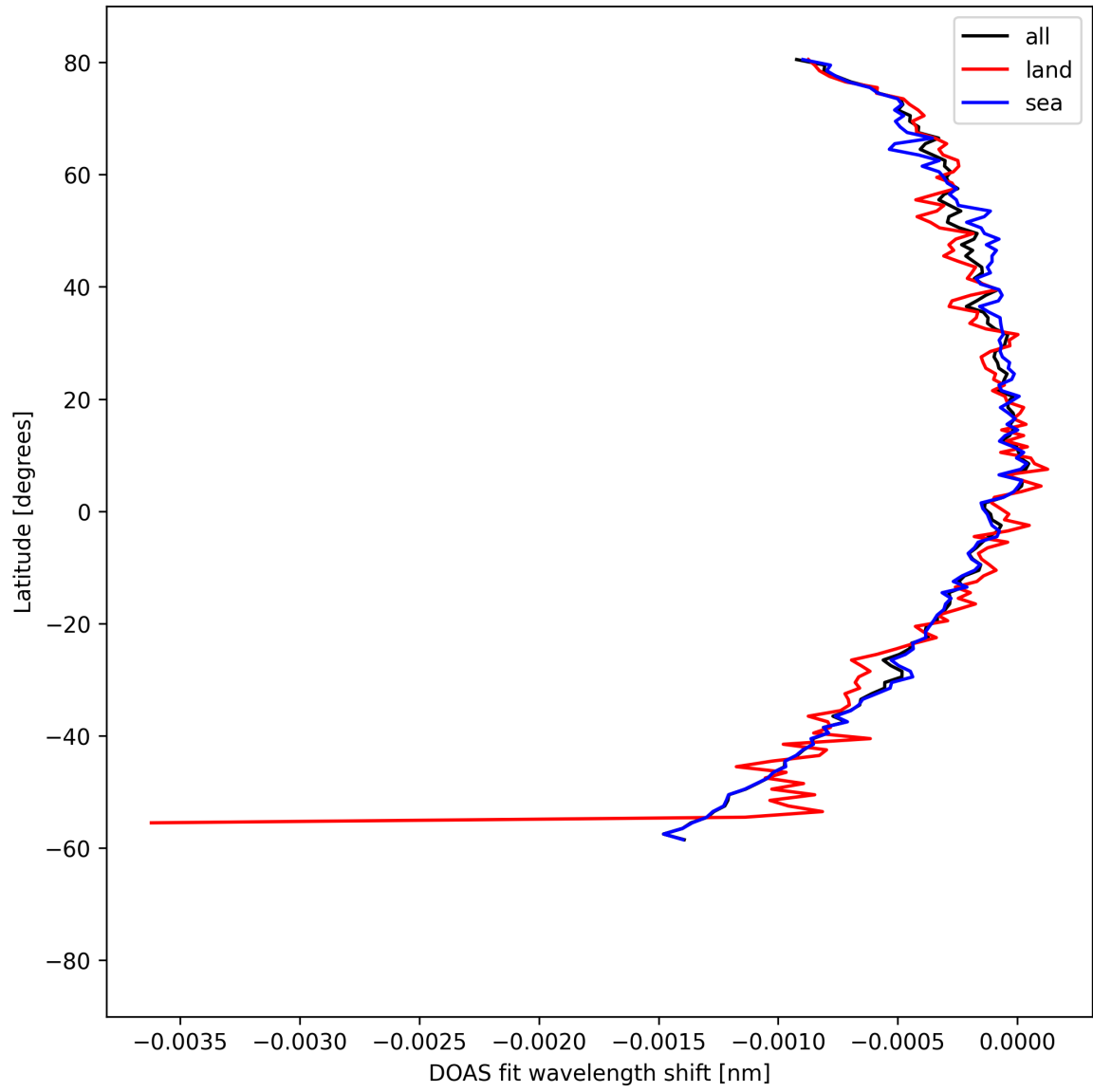


Figure 50: Zonal average of “DOAS fit wavelength shift” for 2025-04-16 to 2025-04-16.

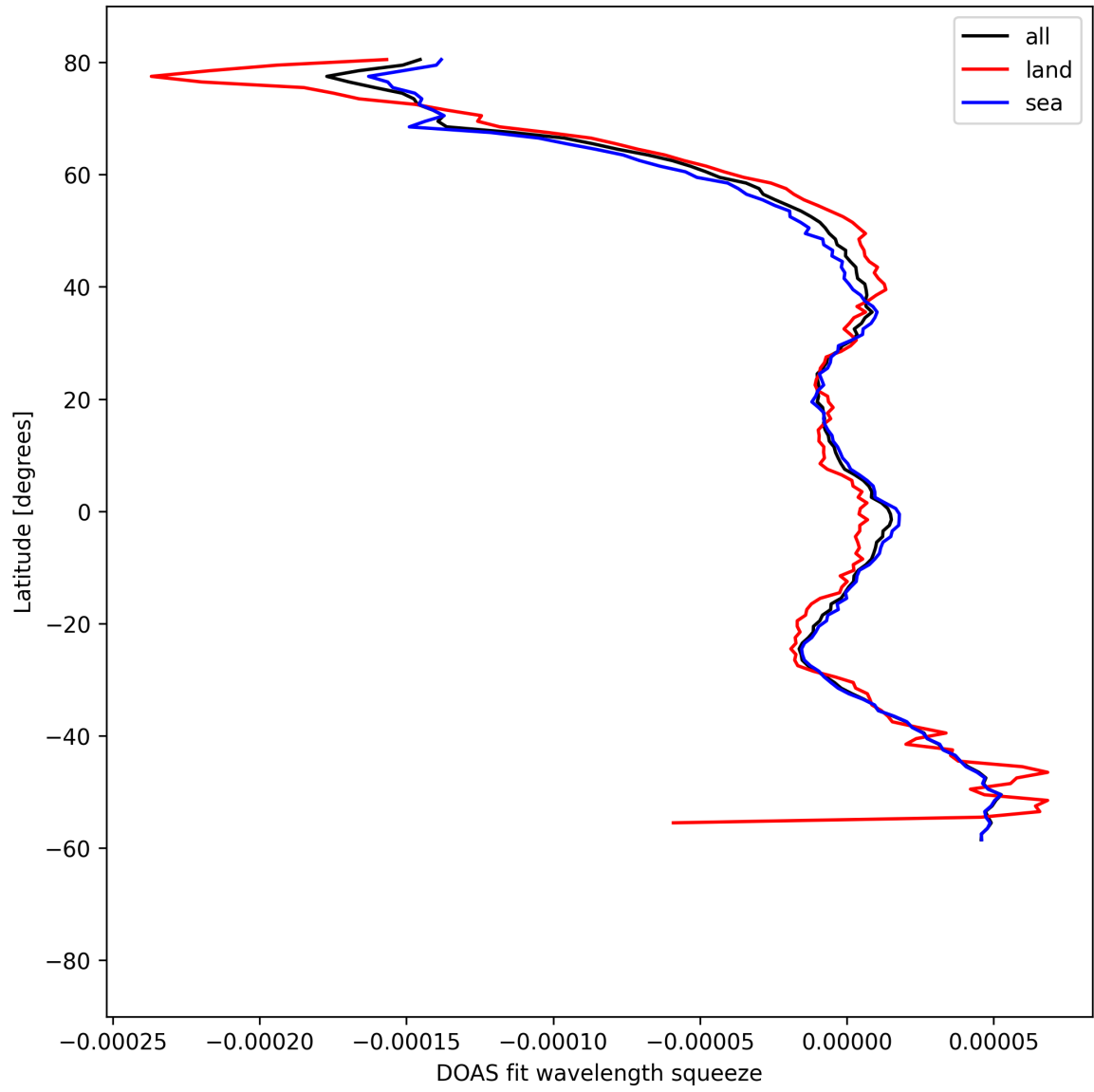


Figure 51: Zonal average of “DOAS fit wavelength squeeze” for 2025-04-16 to 2025-04-16.

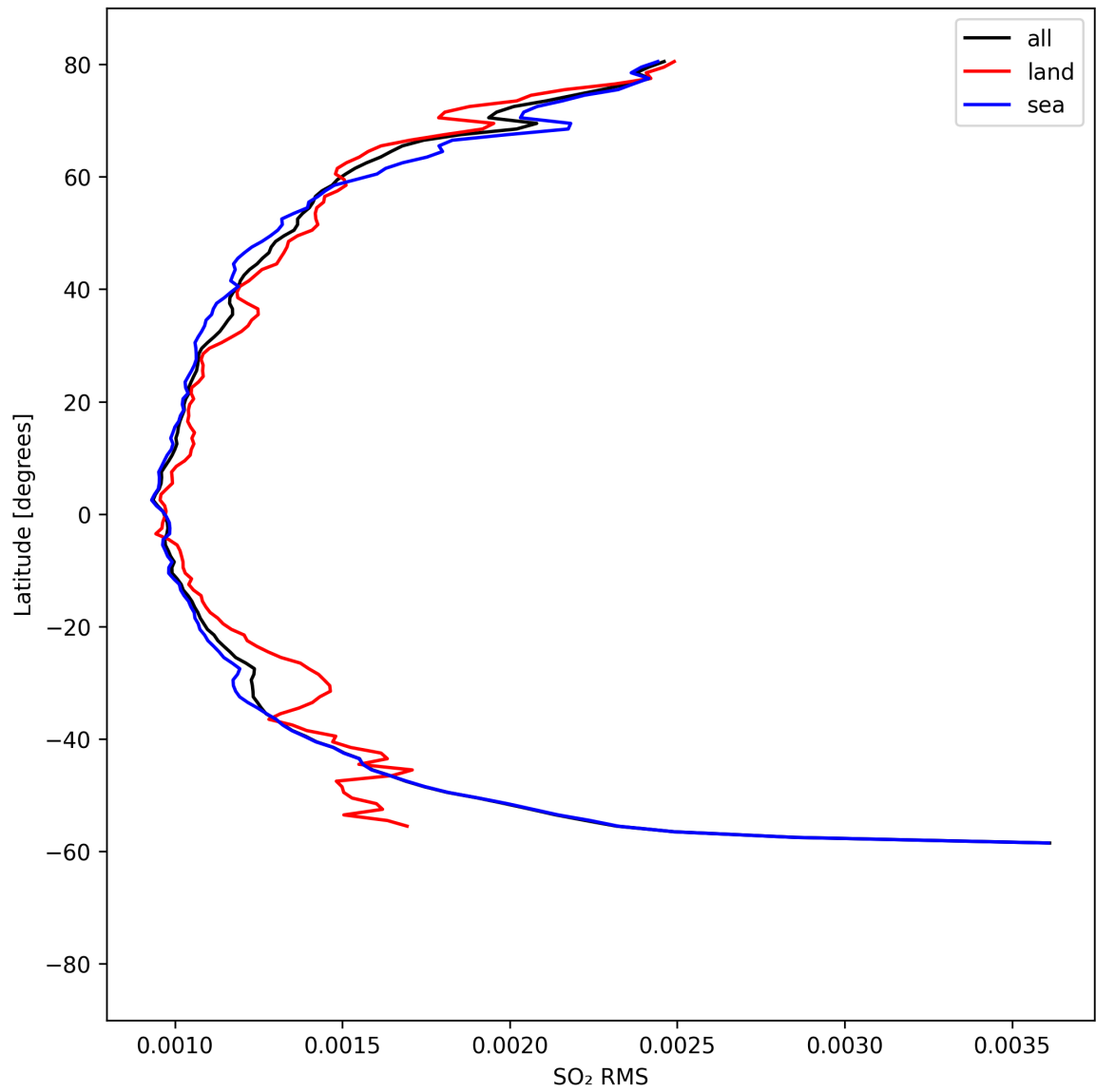


Figure 52: Zonal average of “SO<sub>2</sub> RMS” for 2025-04-16 to 2025-04-16.

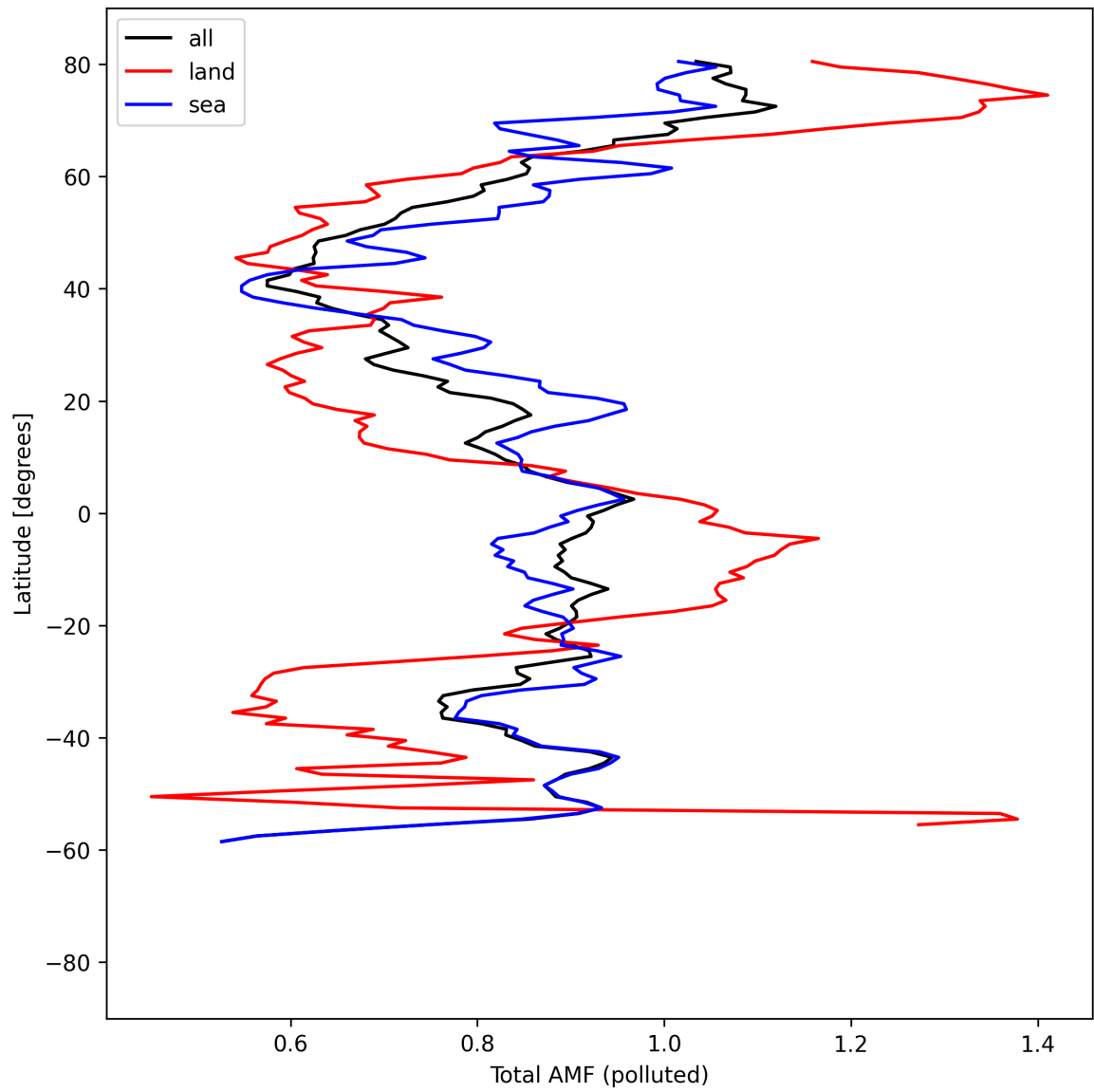


Figure 53: Zonal average of “Total AMF (polluted)” for 2025-04-16 to 2025-04-16.

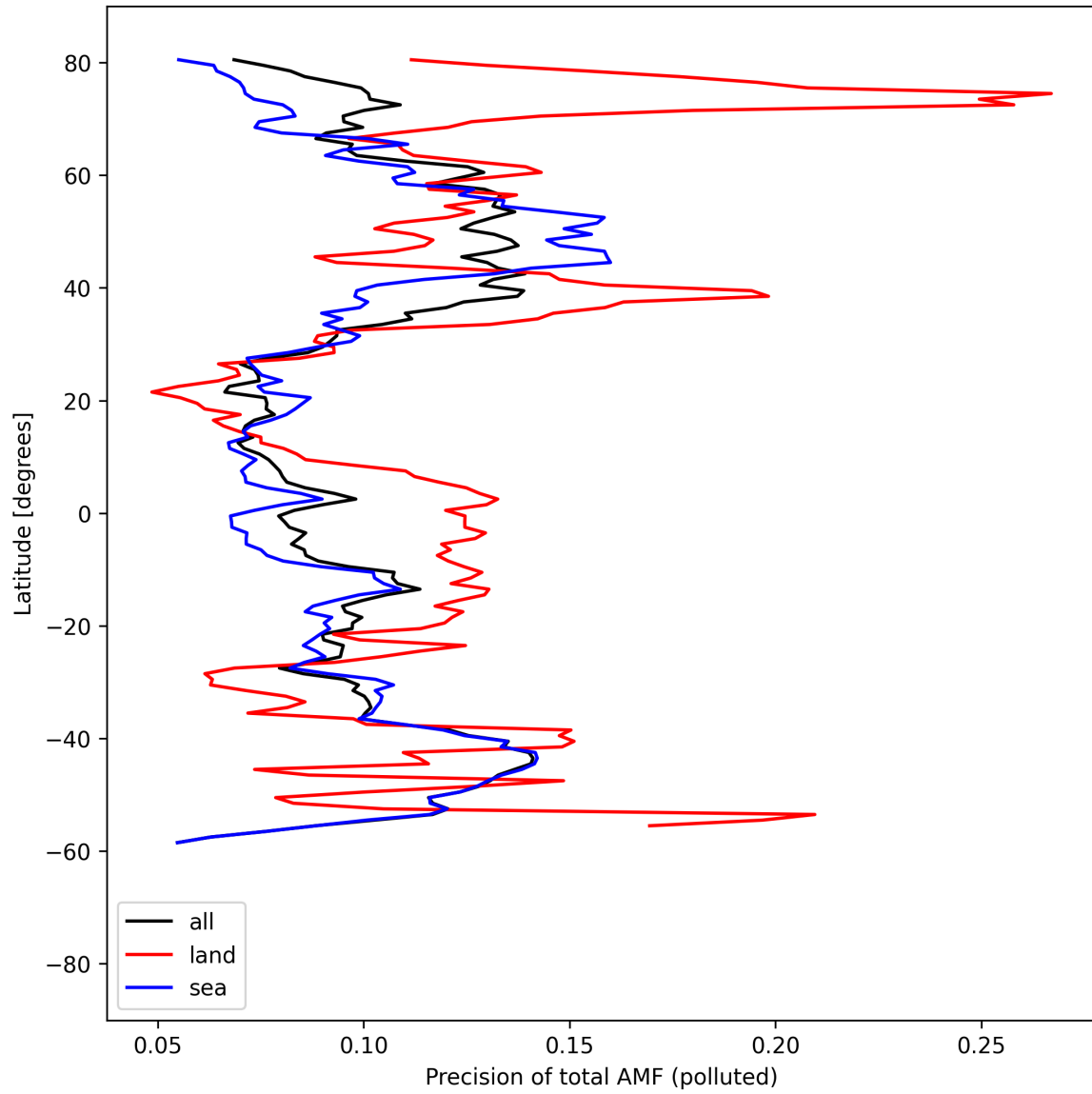


Figure 54: Zonal average of “Precision of total AMF (polluted)” for 2025-04-16 to 2025-04-16.

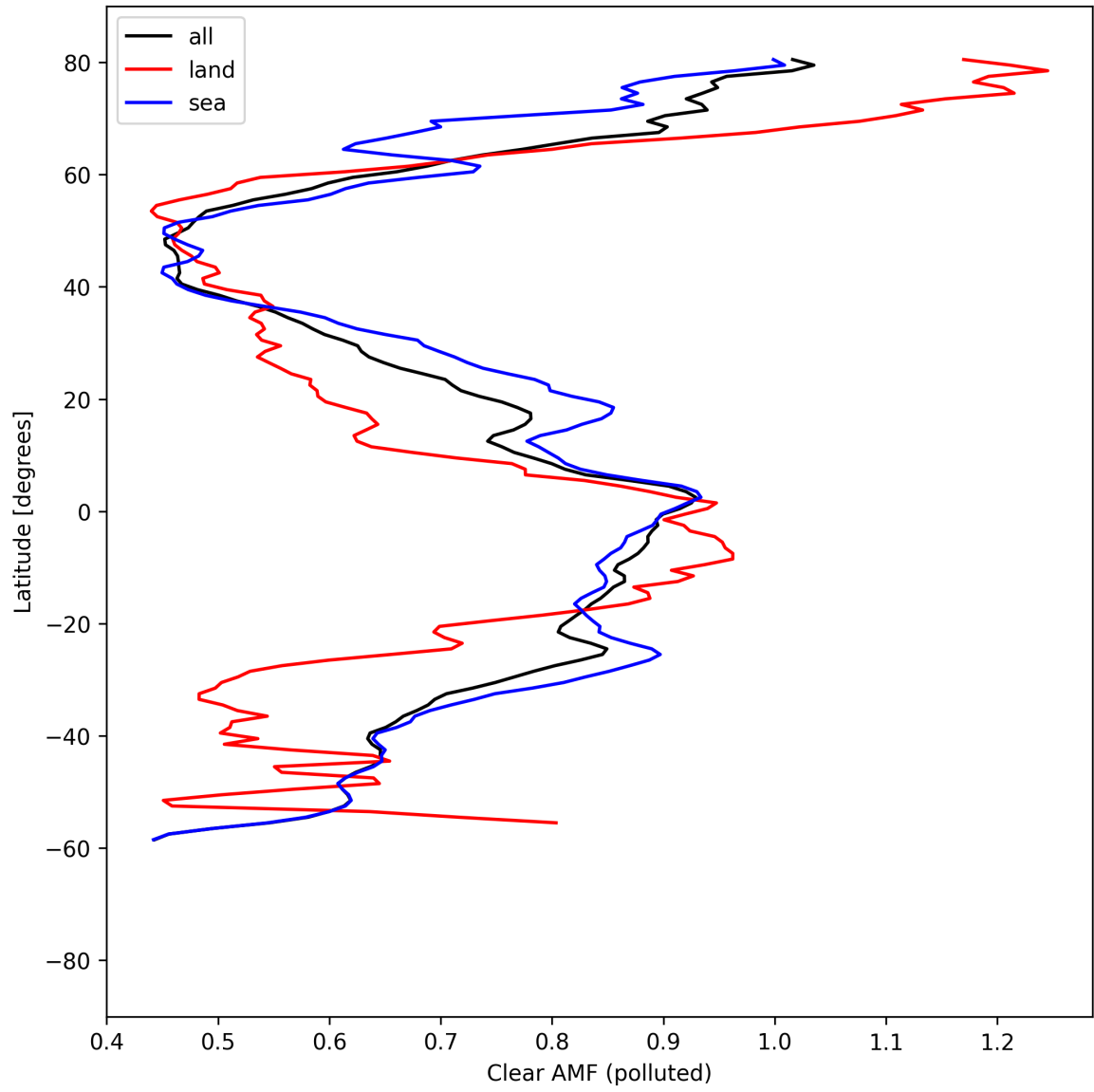


Figure 55: Zonal average of “Clear AMF (polluted)” for 2025-04-16 to 2025-04-16.



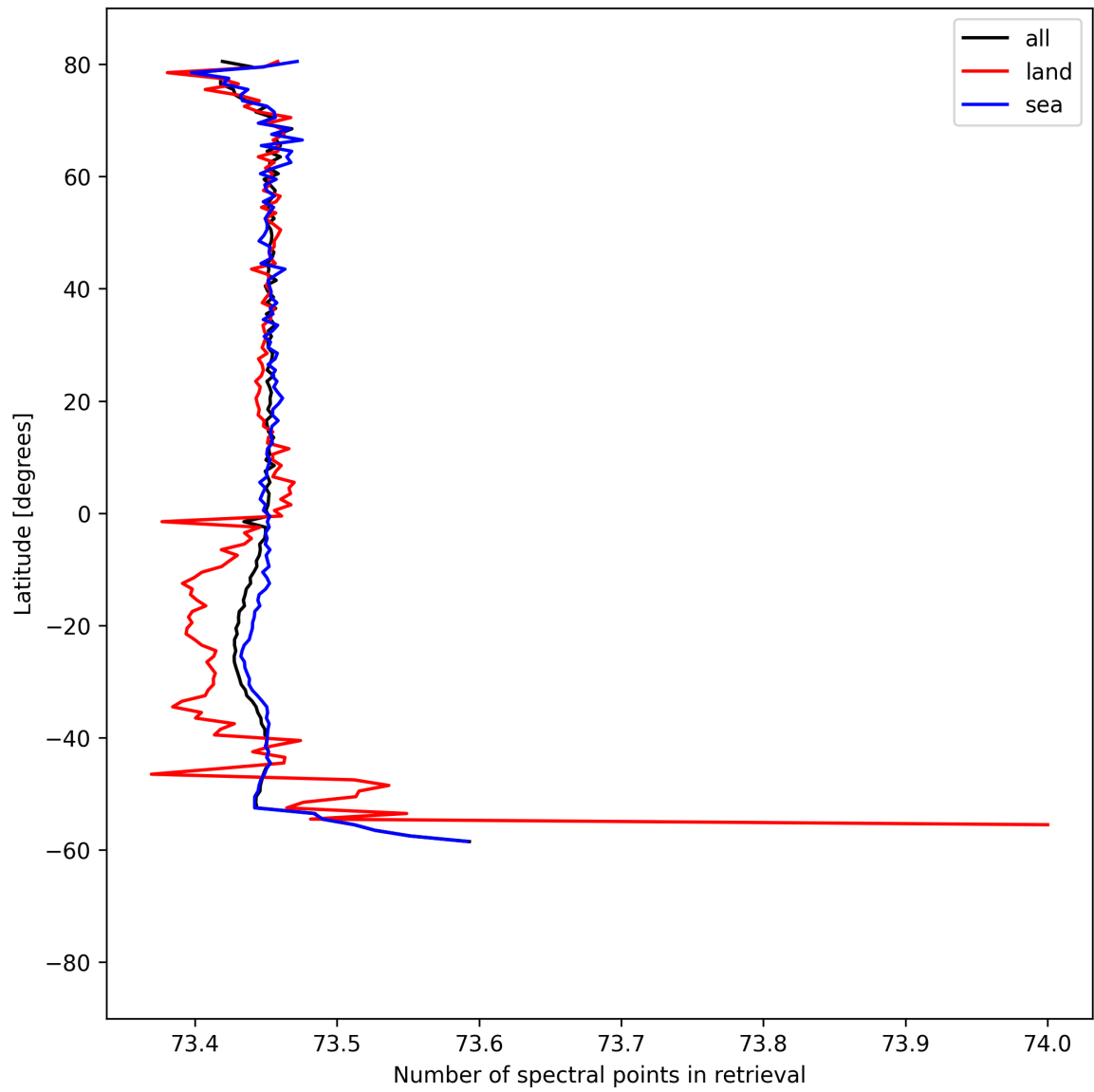


Figure 56: Zonal average of “Number of spectral points in retrieval” for 2025-04-16 to 2025-04-16.

## 8 Histograms

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

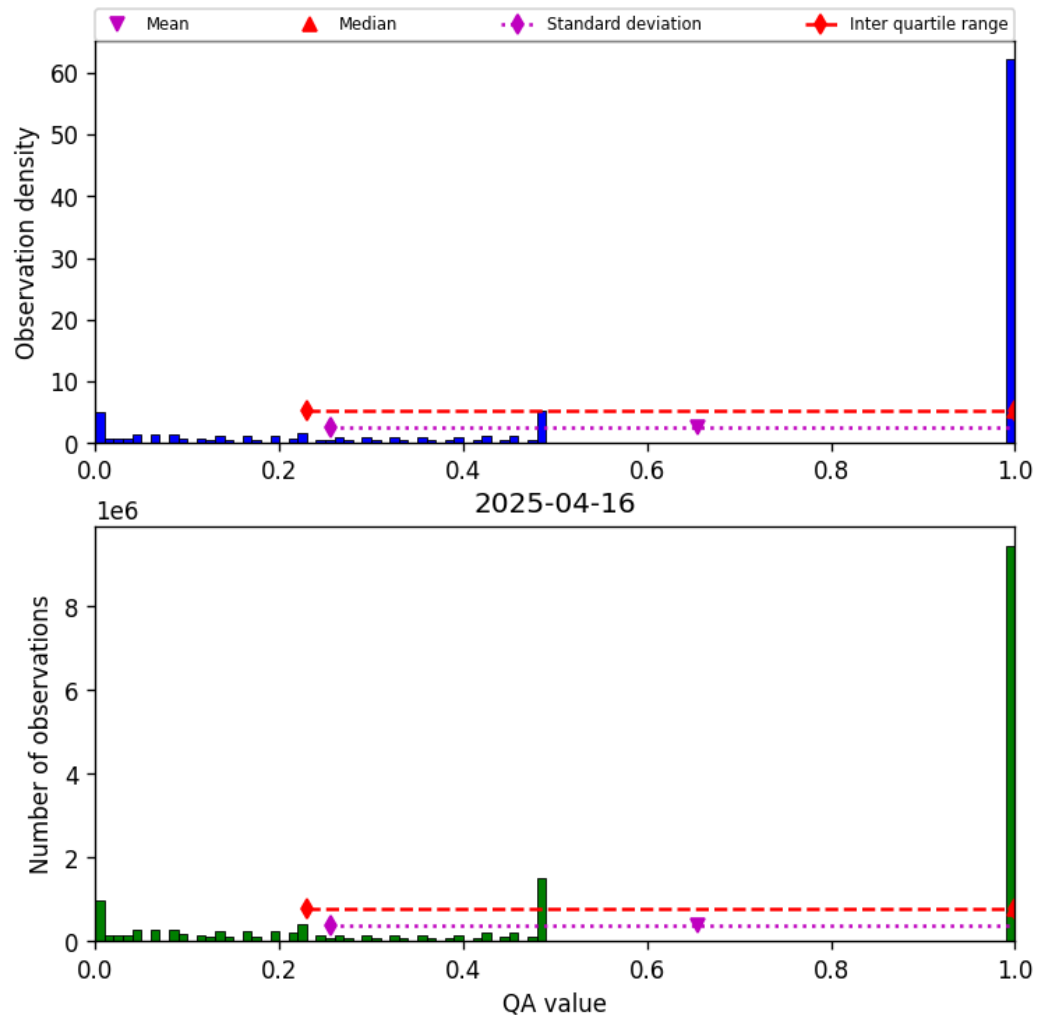


Figure 57: Histogram of “QA value” for 2025-04-16 to 2025-04-16

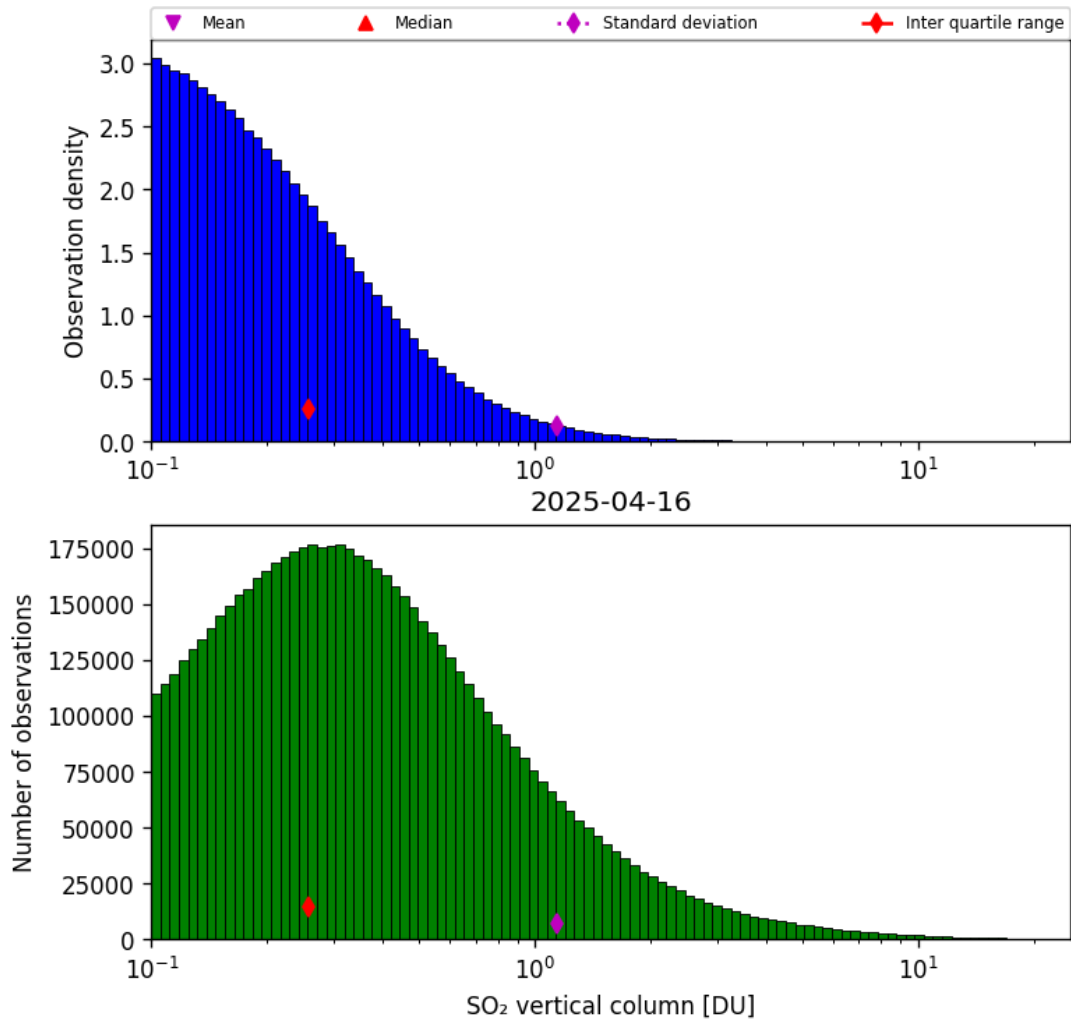


Figure 58: Histogram of “SO<sub>2</sub> vertical column” for 2025-04-16 to 2025-04-16

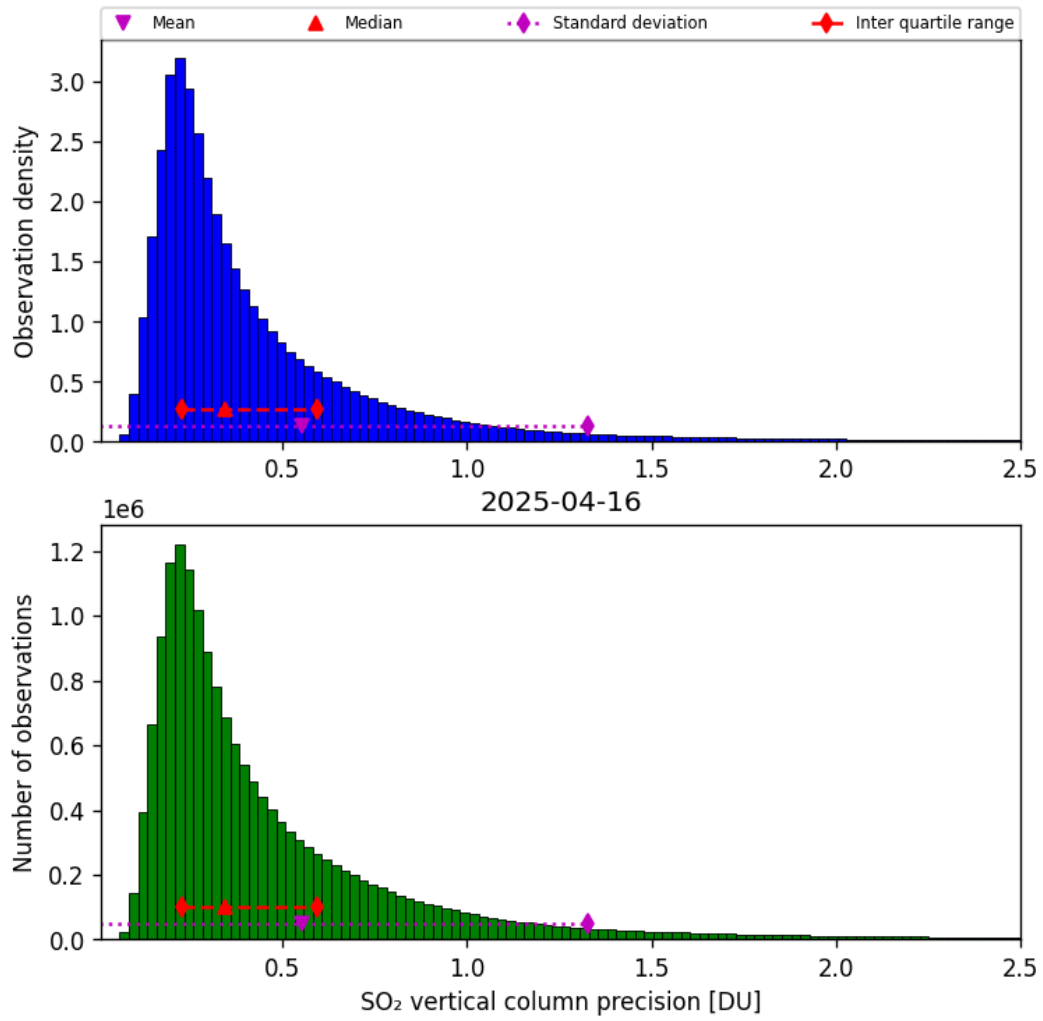


Figure 59: Histogram of “SO<sub>2</sub> vertical column precision” for 2025-04-16 to 2025-04-16

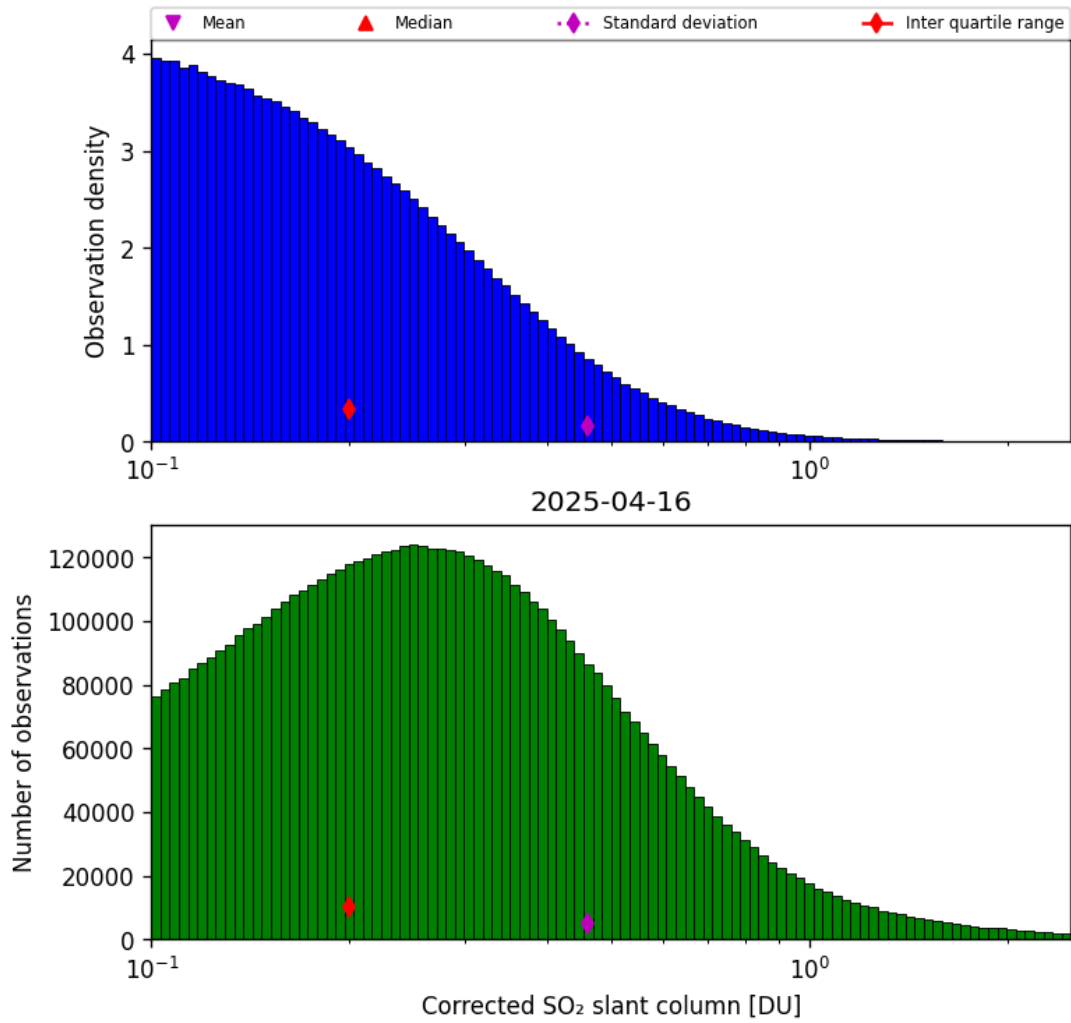


Figure 60: Histogram of “Corrected SO<sub>2</sub> slant column” for 2025-04-16 to 2025-04-16

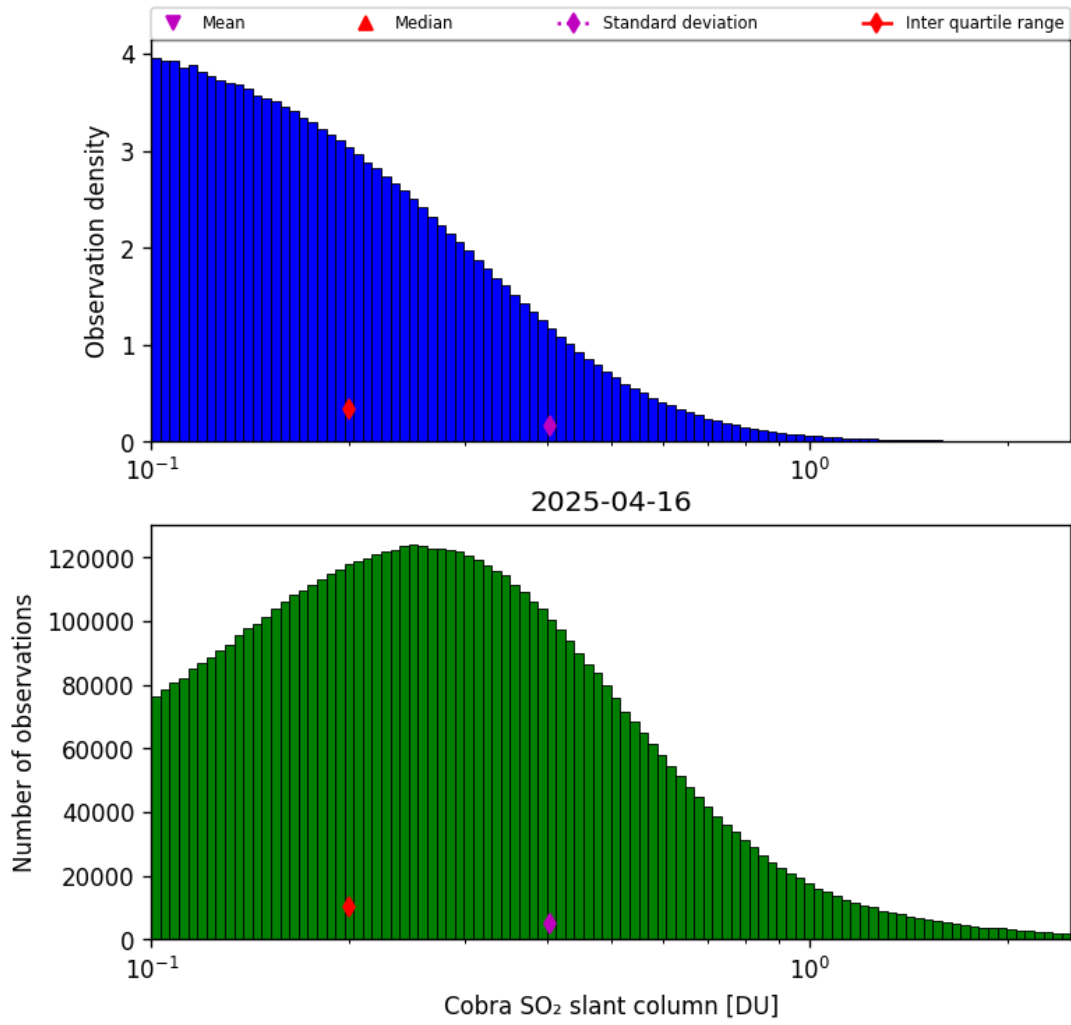


Figure 61: Histogram of “Cobra SO<sub>2</sub> slant column” for 2025-04-16 to 2025-04-16

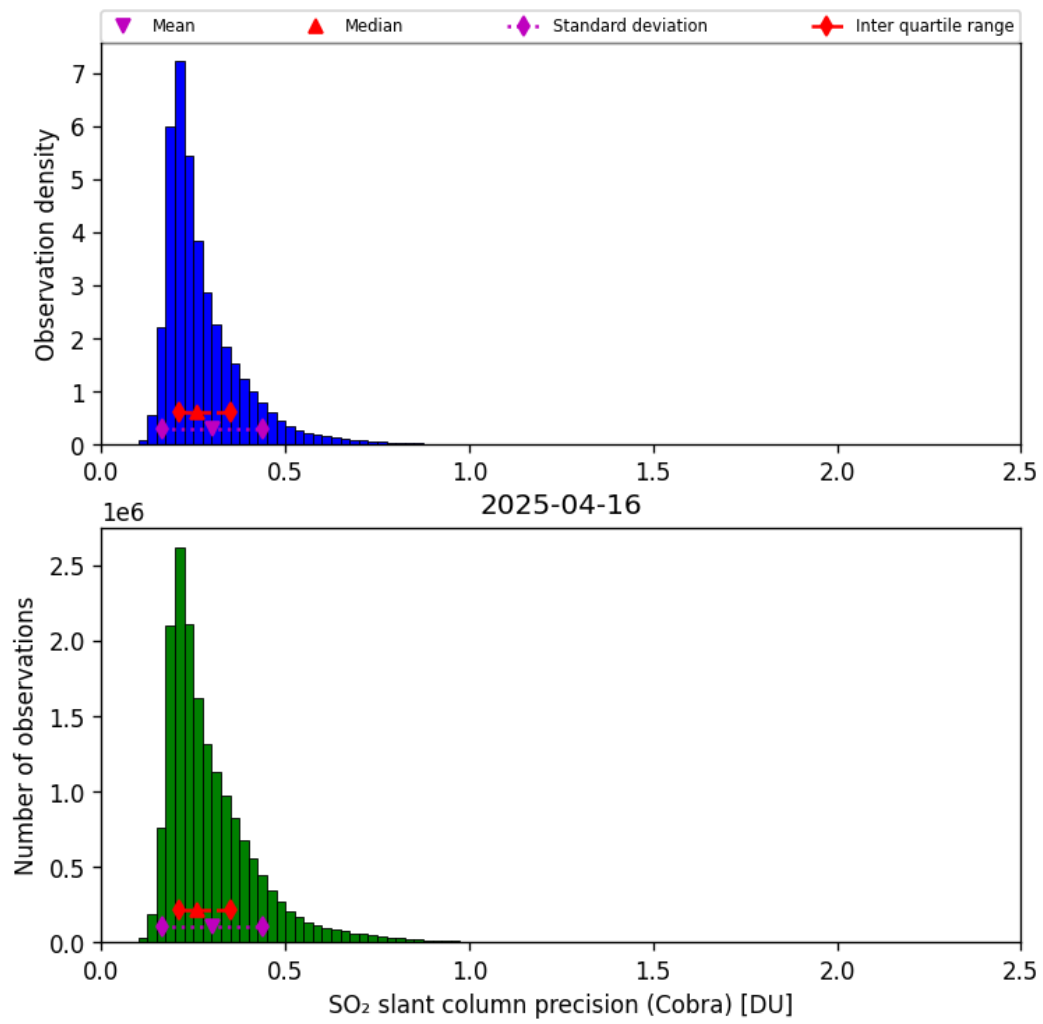


Figure 62: Histogram of “SO<sub>2</sub> slant column precision (Cobra)” for 2025-04-16 to 2025-04-16



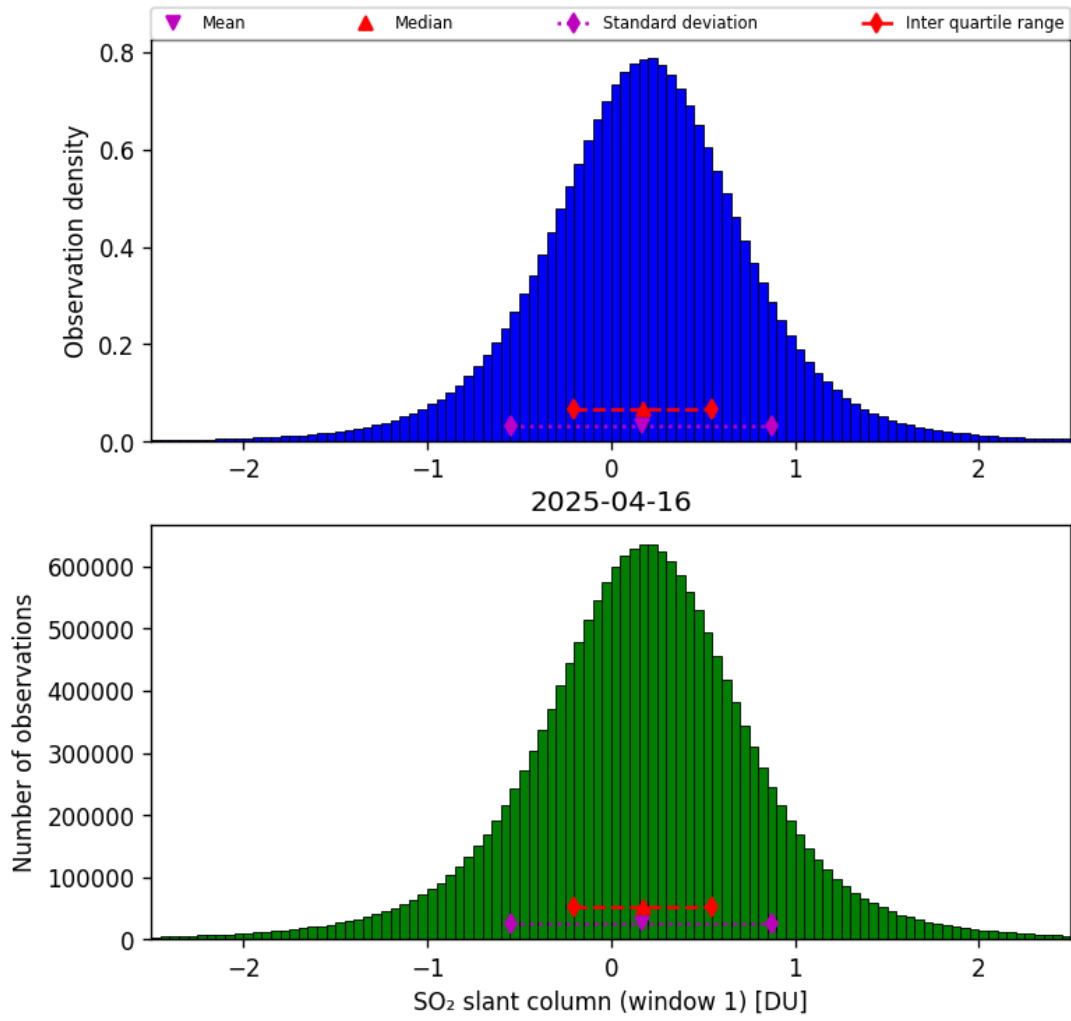


Figure 63: Histogram of “SO<sub>2</sub> slant column (window 1)” for 2025-04-16 to 2025-04-16

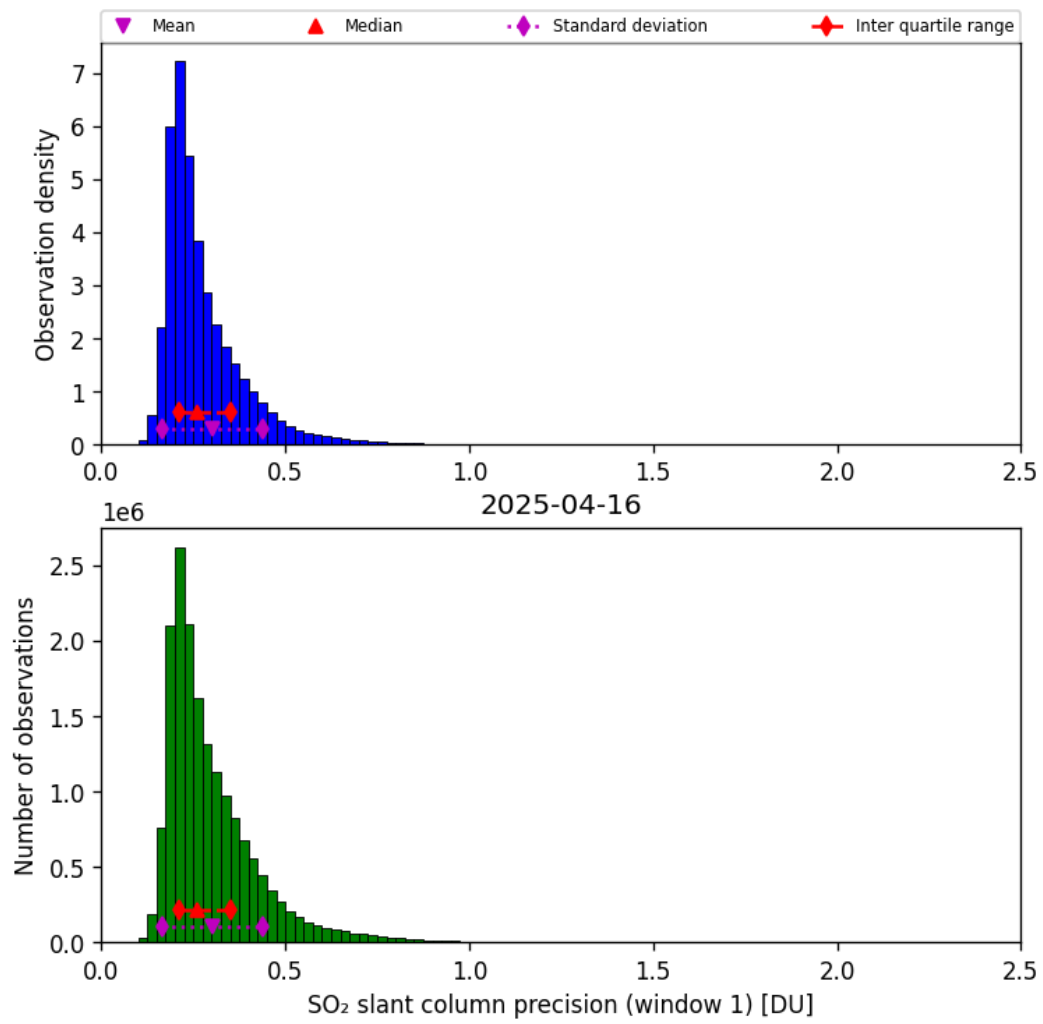


Figure 64: Histogram of “SO<sub>2</sub> slant column precision (window 1)” for 2025-04-16 to 2025-04-16

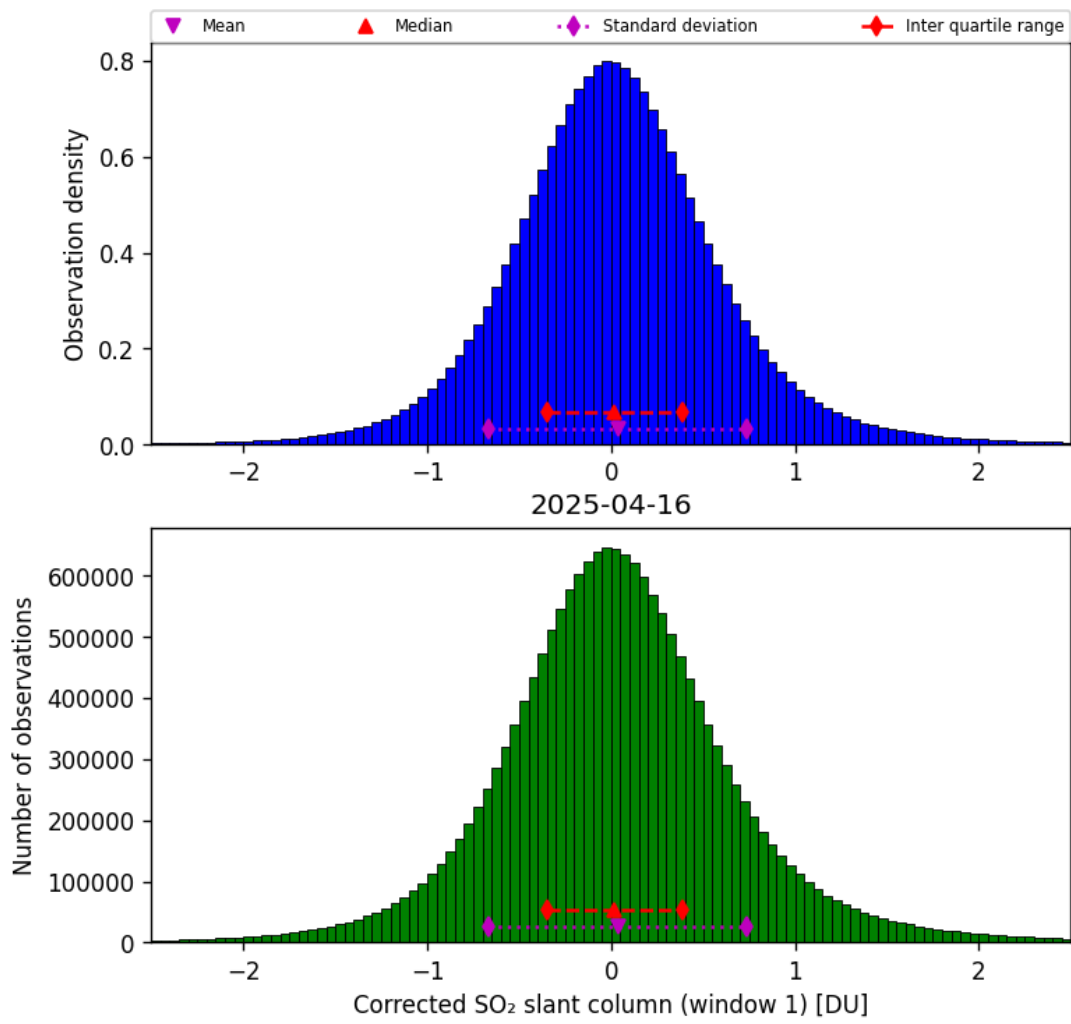


Figure 65: Histogram of “Corrected SO<sub>2</sub> slant column (window 1)” for 2025-04-16 to 2025-04-16

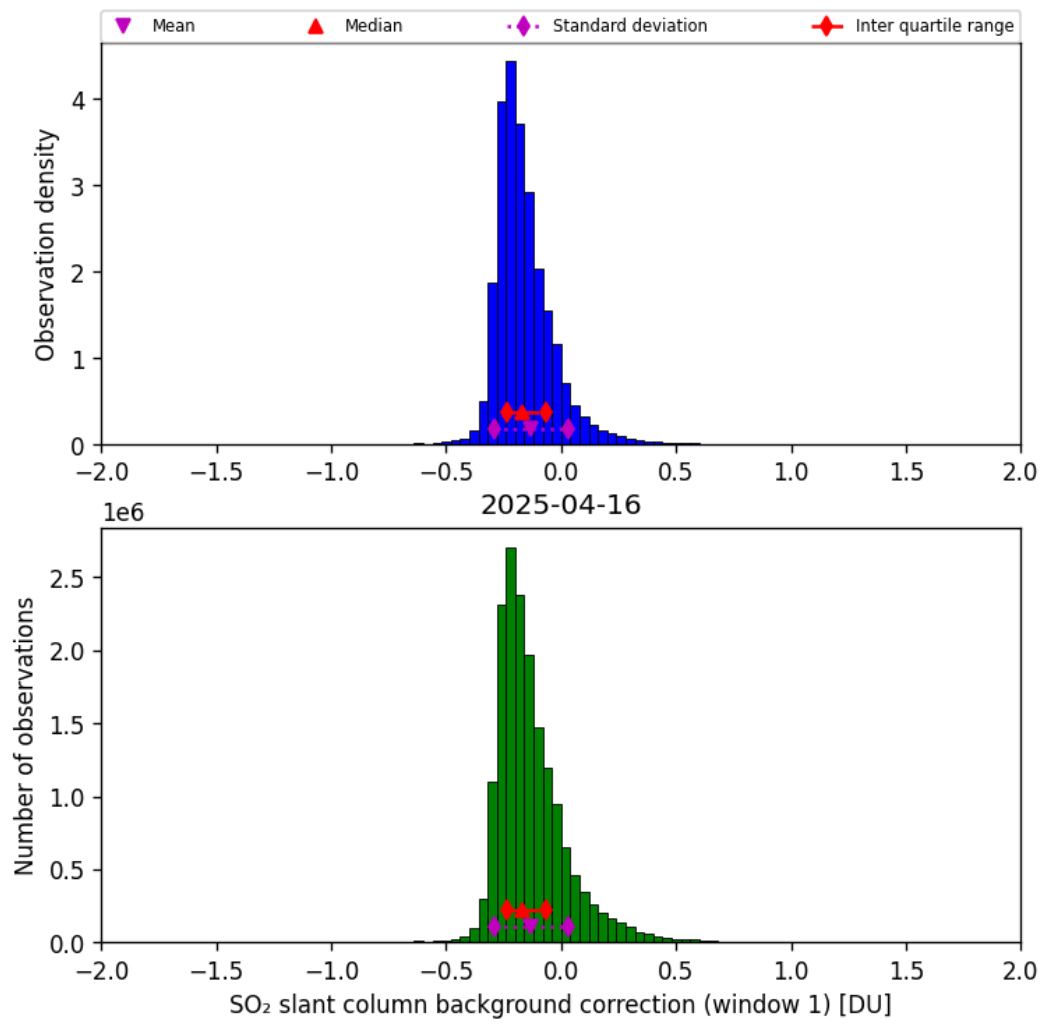


Figure 66: Histogram of “SO<sub>2</sub> slant column background correction (window 1)” for 2025-04-16 to 2025-04-16

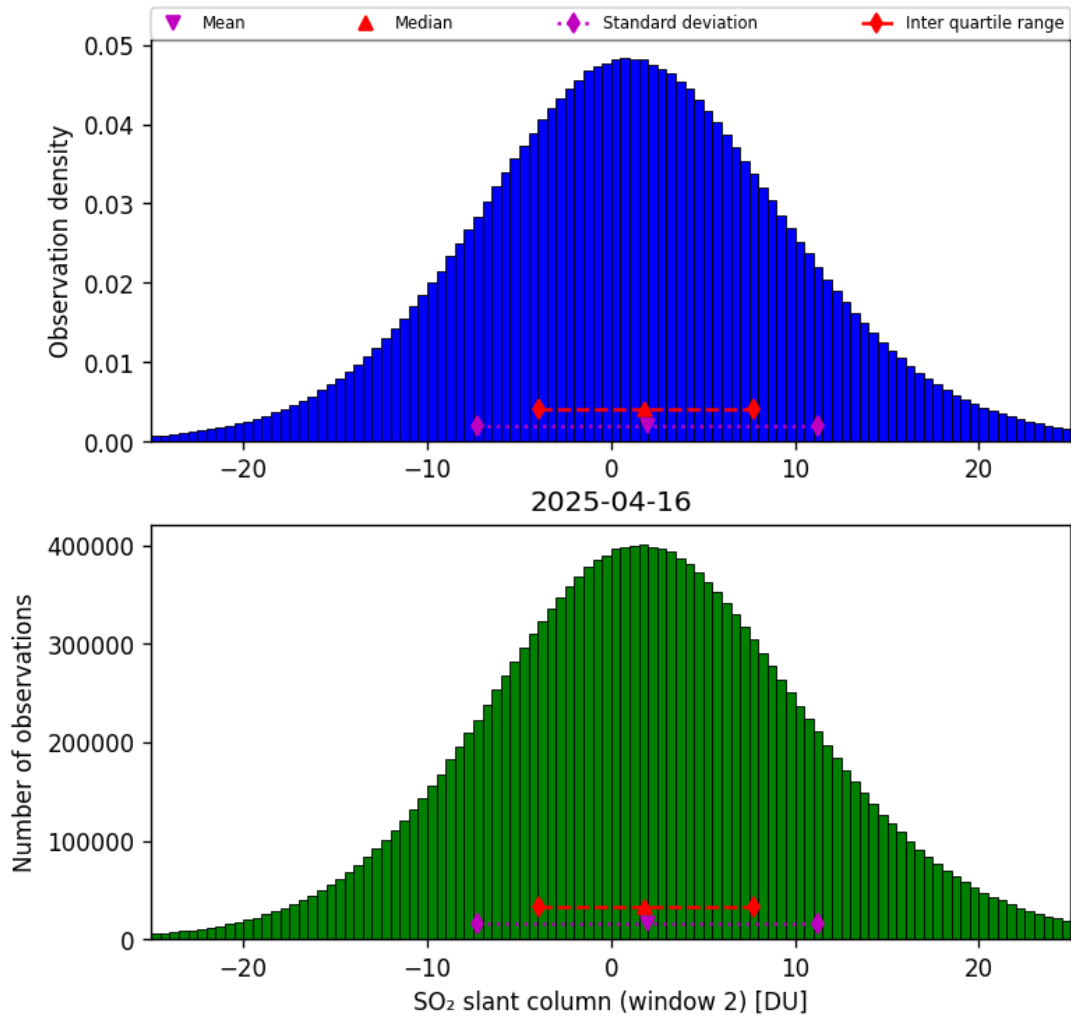


Figure 67: Histogram of “SO<sub>2</sub> slant column (window 2)” for 2025-04-16 to 2025-04-16

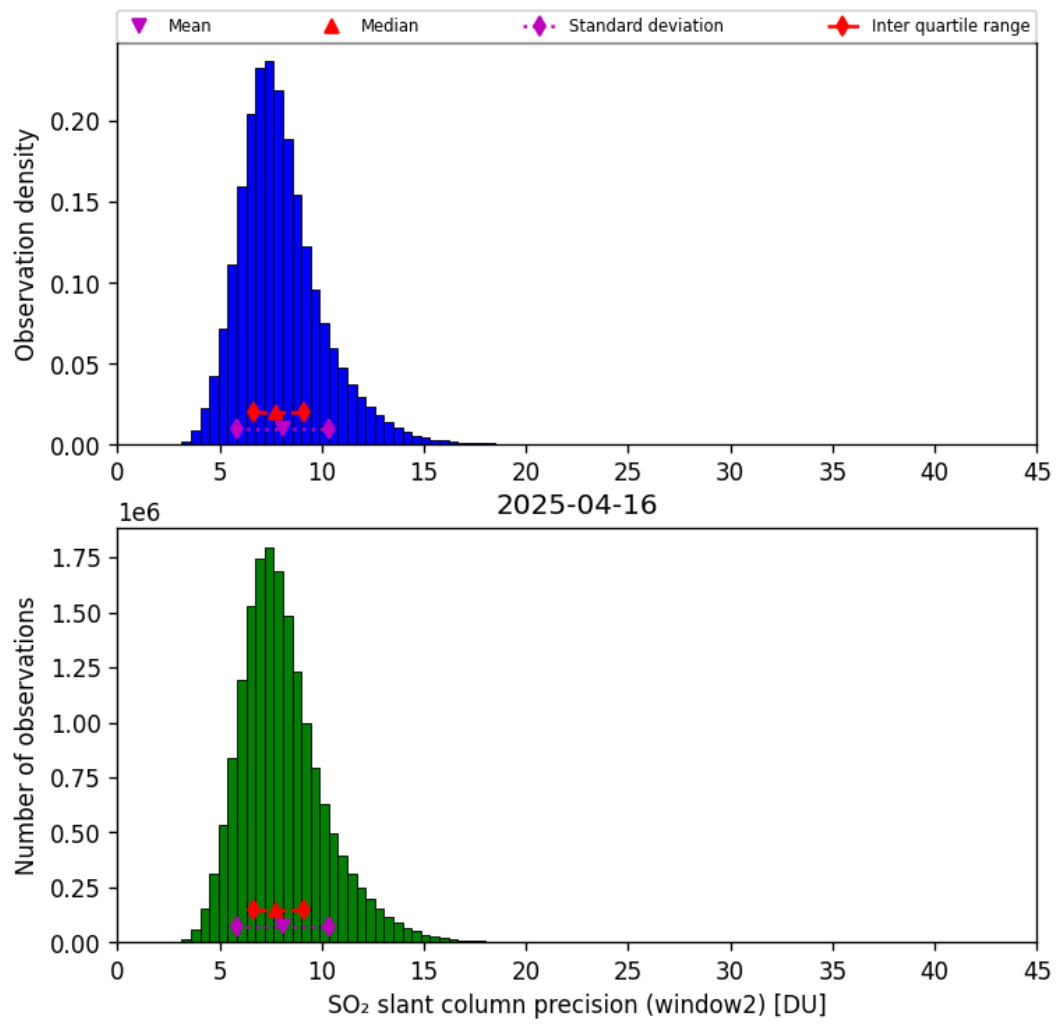


Figure 68: Histogram of “SO<sub>2</sub> slant column precision (window2)” for 2025-04-16 to 2025-04-16

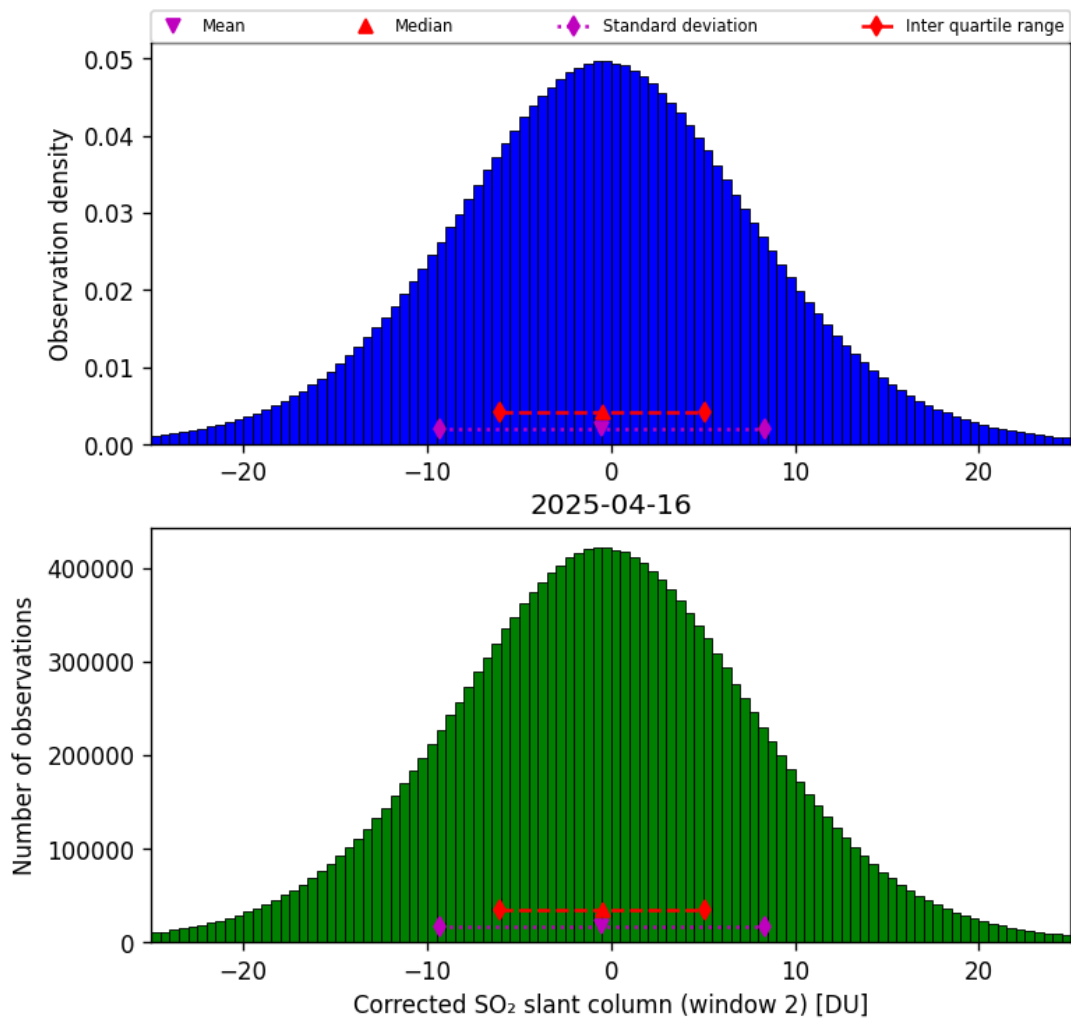


Figure 69: Histogram of “Corrected SO<sub>2</sub> slant column (window 2)” for 2025-04-16 to 2025-04-16



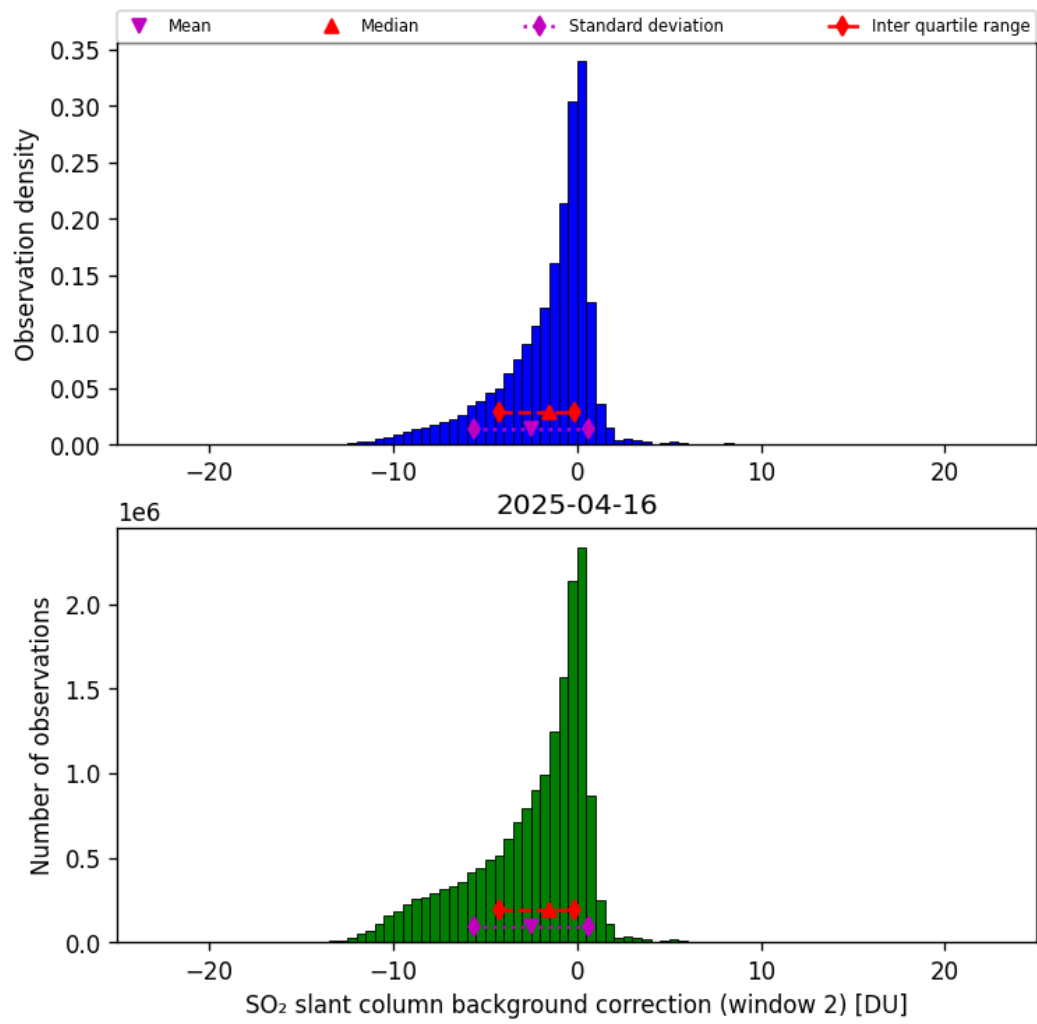


Figure 70: Histogram of “SO<sub>2</sub> slant column background correction (window 2)” for 2025-04-16 to 2025-04-16

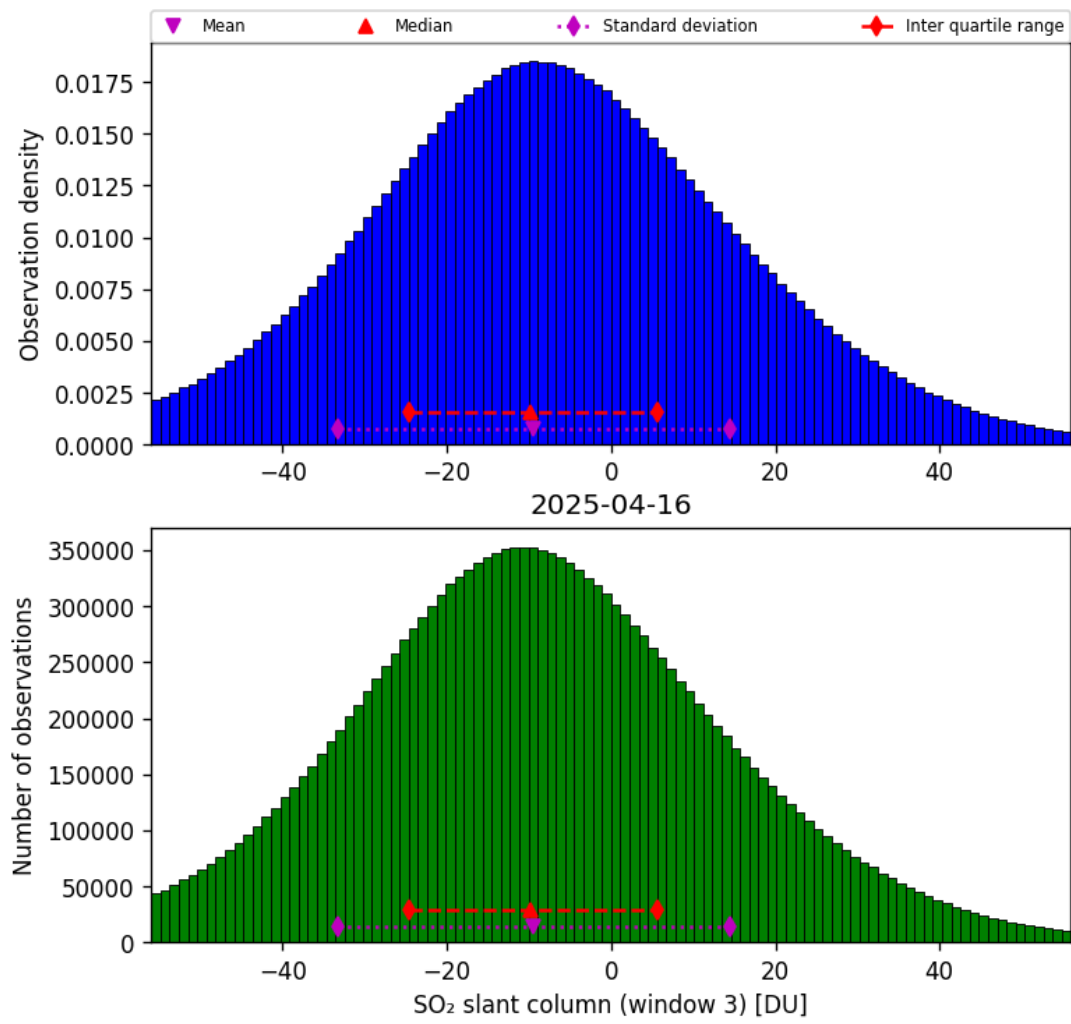


Figure 71: Histogram of “SO<sub>2</sub> slant column (window 3)” for 2025-04-16 to 2025-04-16

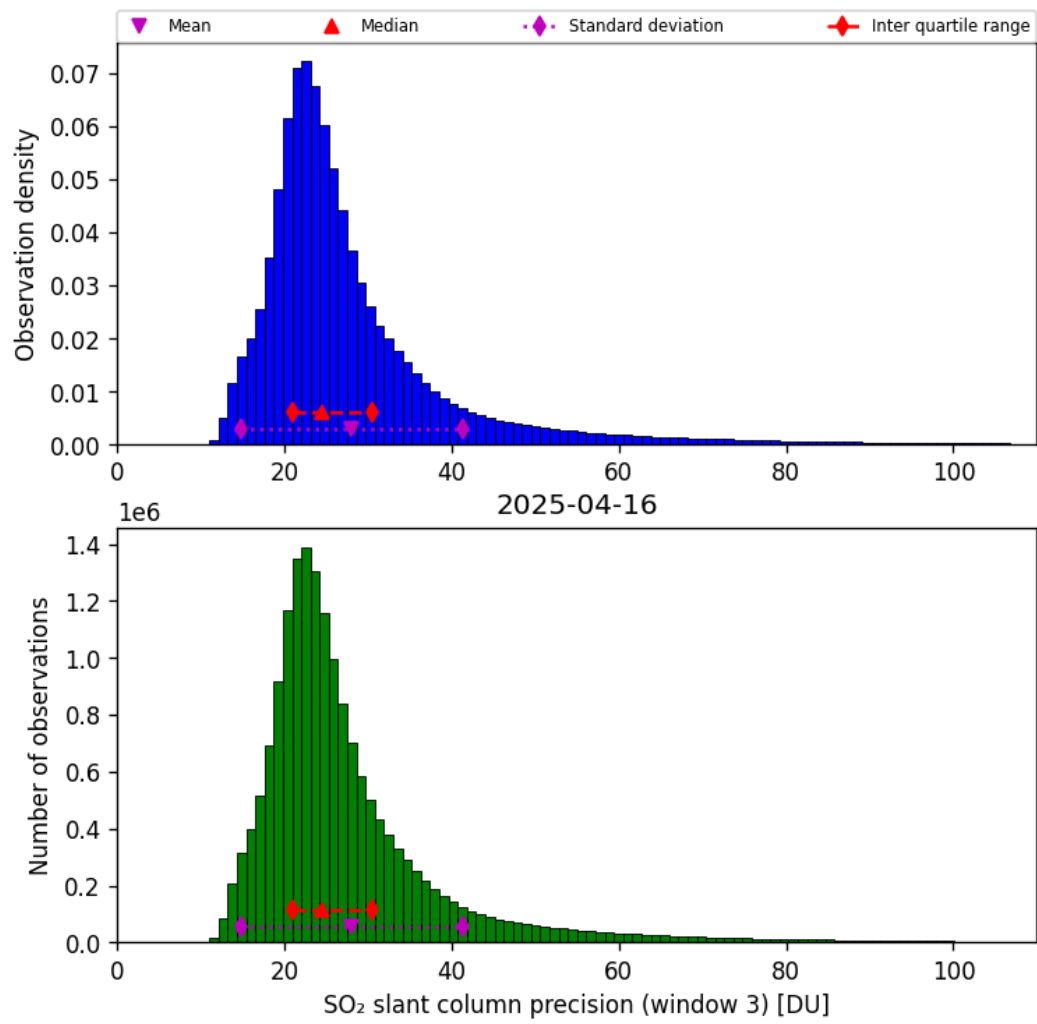


Figure 72: Histogram of “SO<sub>2</sub> slant column precision (window 3)” for 2025-04-16 to 2025-04-16

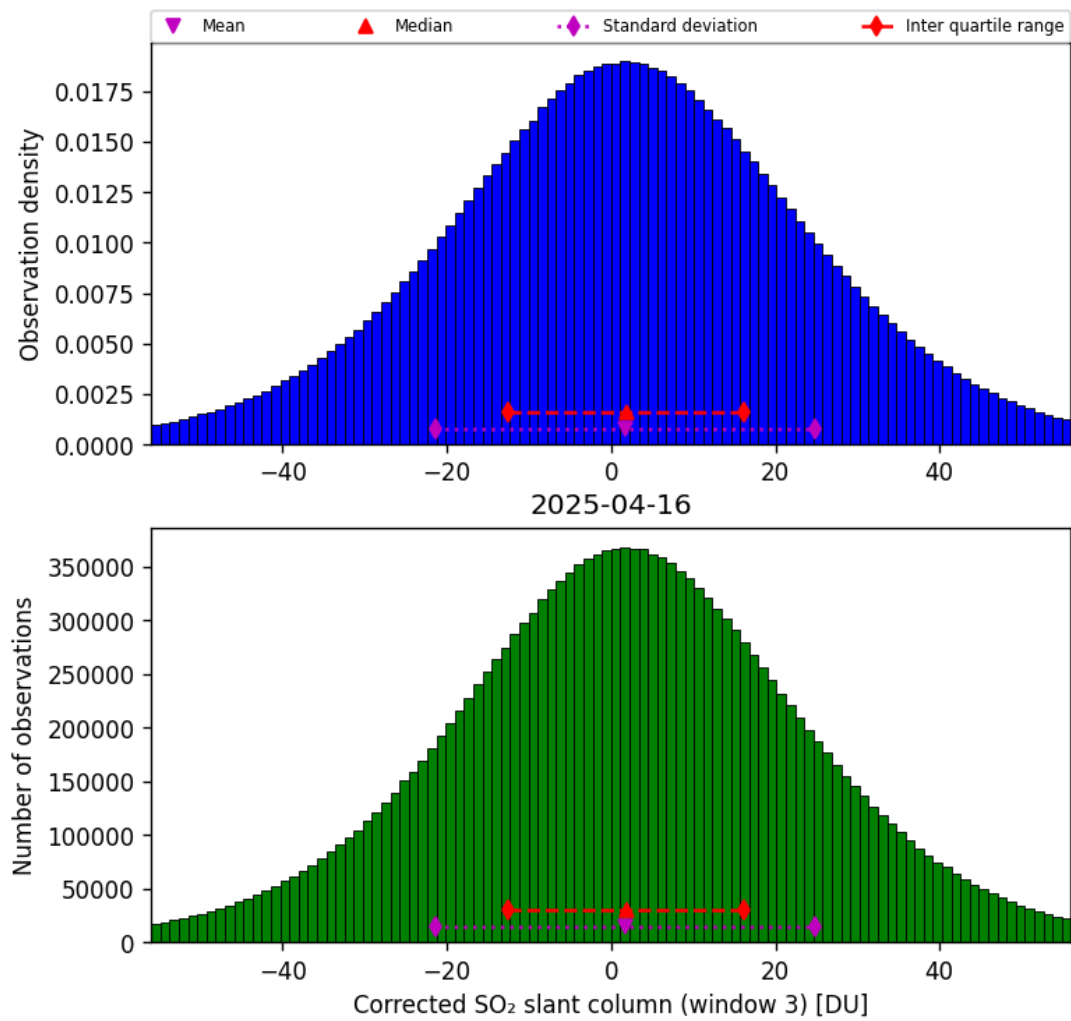


Figure 73: Histogram of “Corrected SO<sub>2</sub> slant column (window 3)” for 2025-04-16 to 2025-04-16

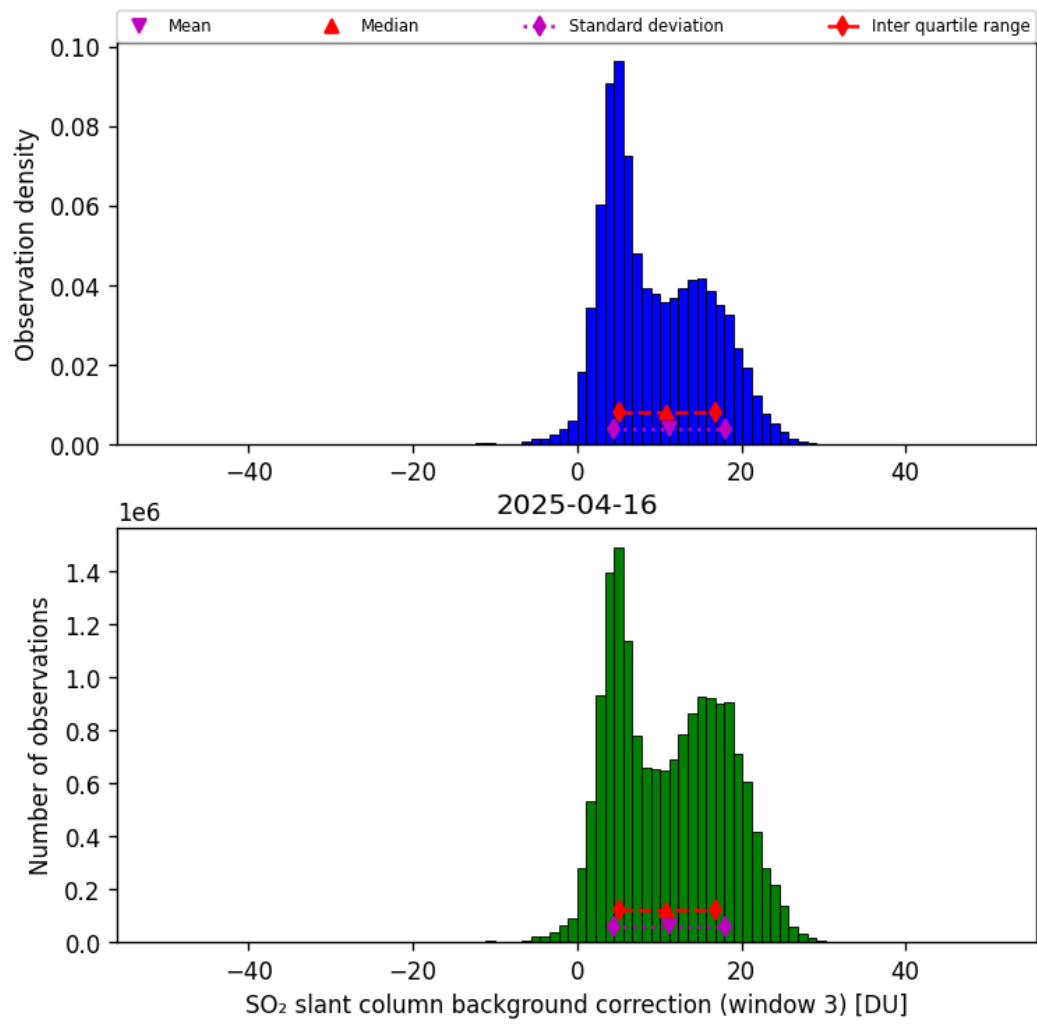


Figure 74: Histogram of “SO<sub>2</sub> slant column background correction (window 3)” for 2025-04-16 to 2025-04-16

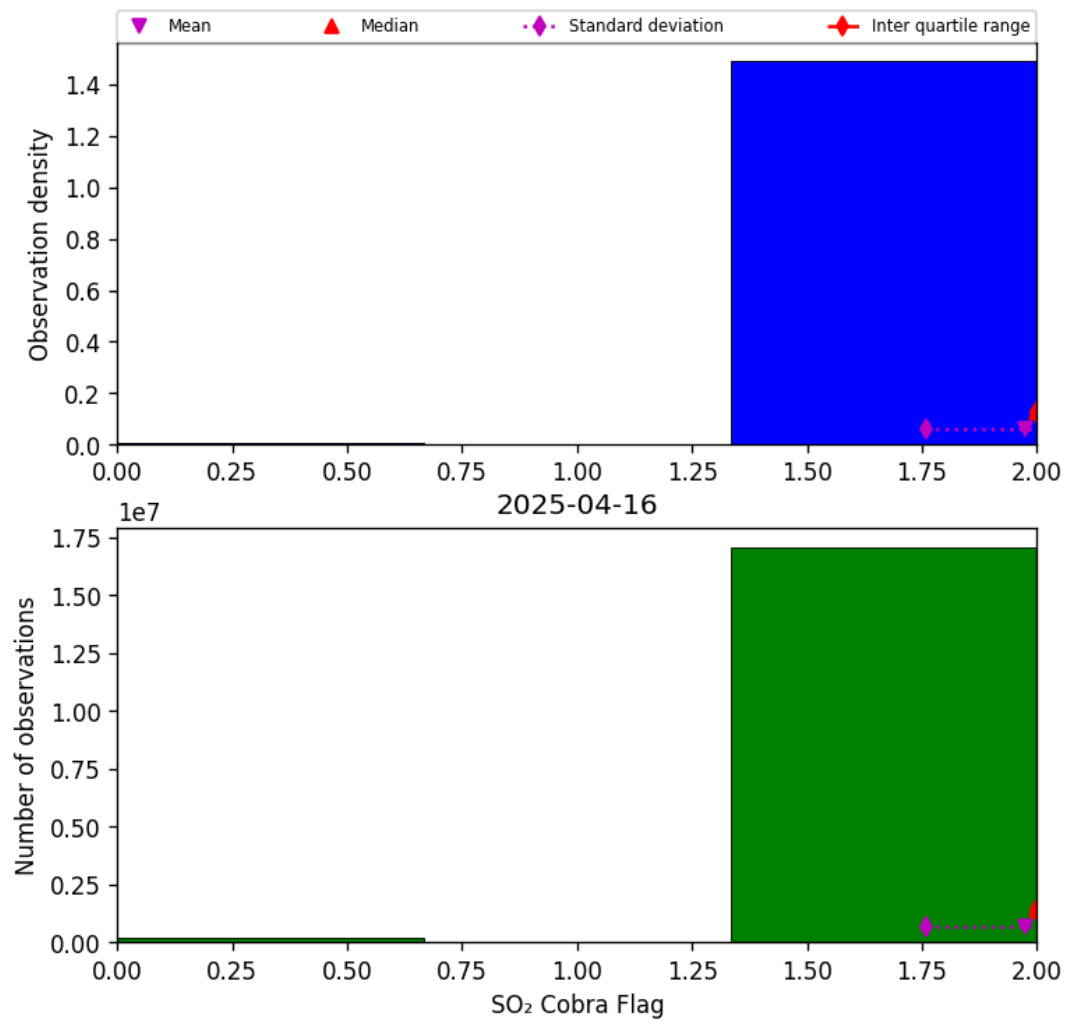


Figure 75: Histogram of “SO<sub>2</sub> Cobra Flag” for 2025-04-16 to 2025-04-16

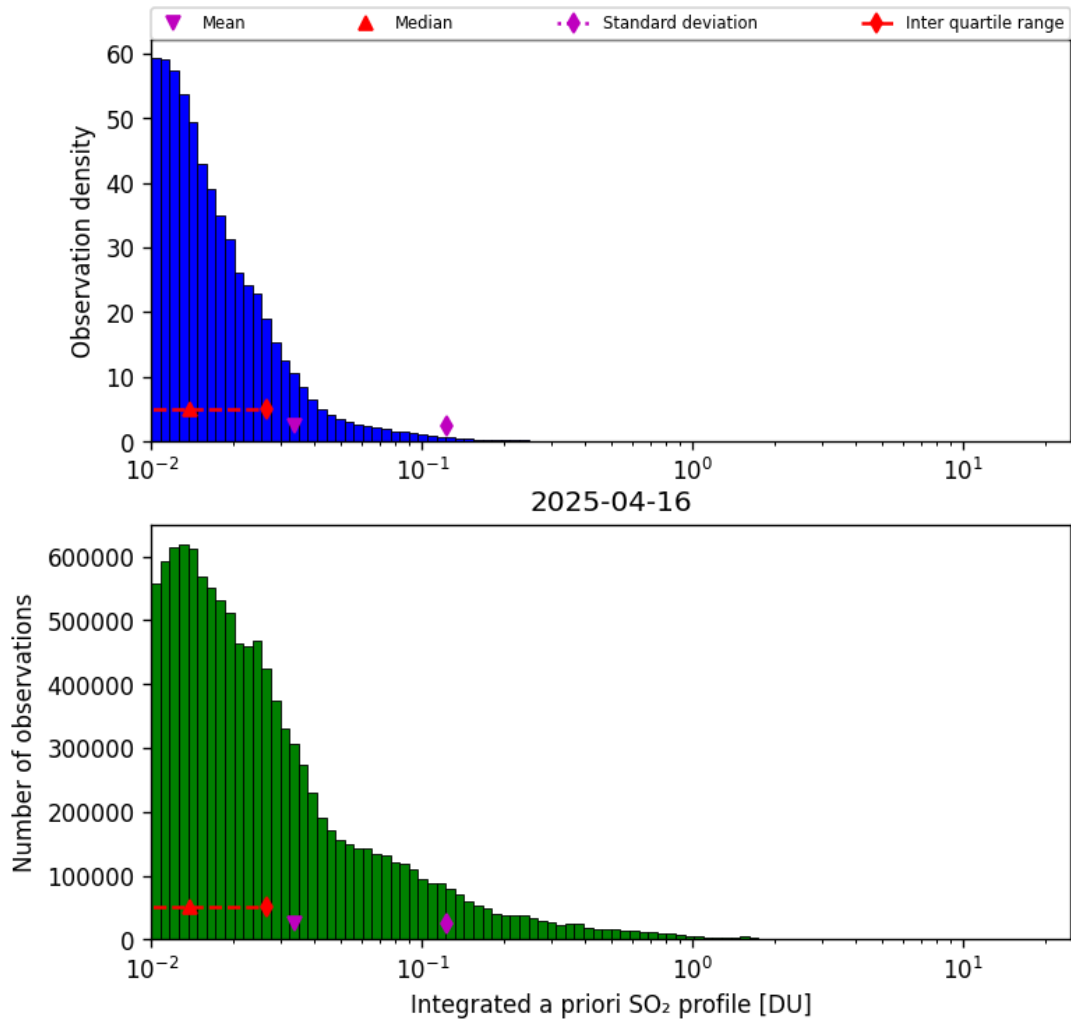


Figure 76: Histogram of “Integrated a priori SO<sub>2</sub> profile” for 2025-04-16 to 2025-04-16

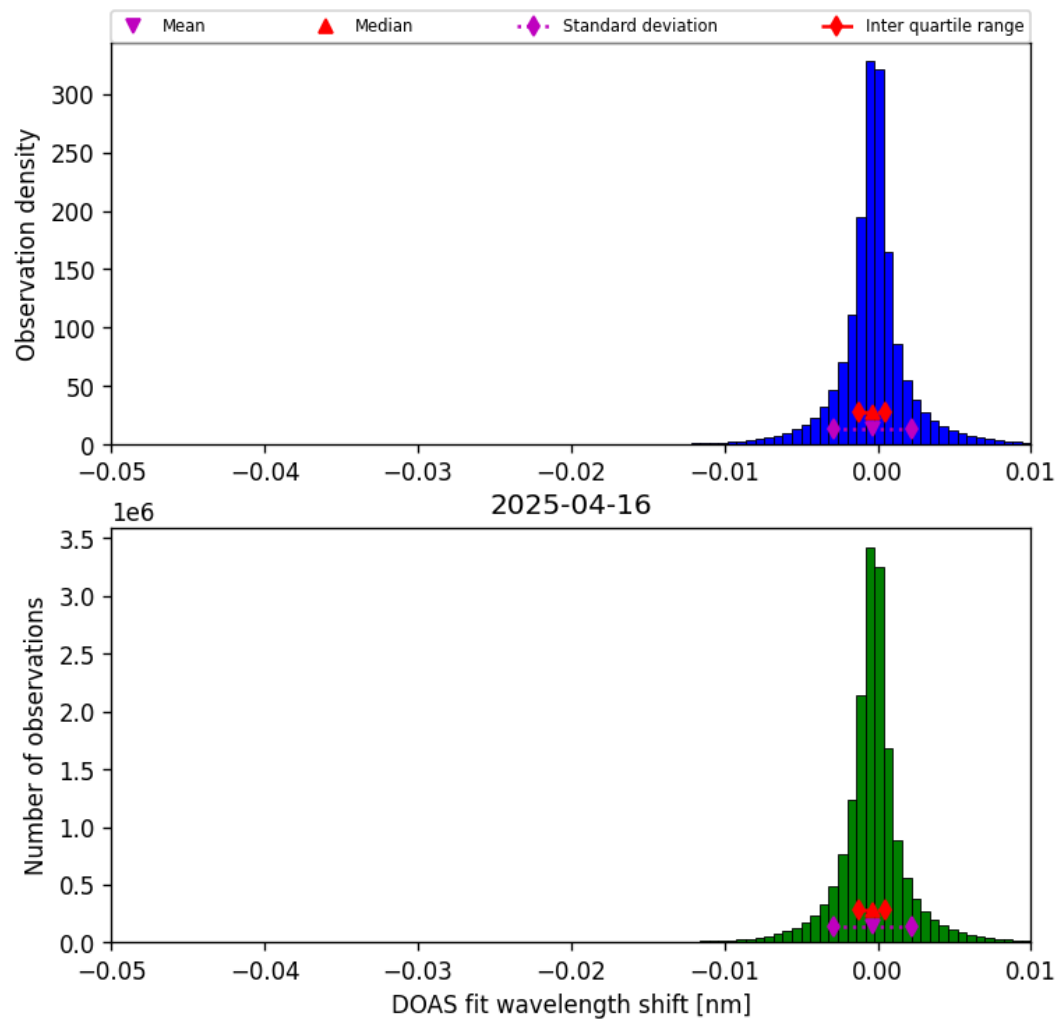


Figure 77: Histogram of “DOAS fit wavelength shift” for 2025-04-16 to 2025-04-16



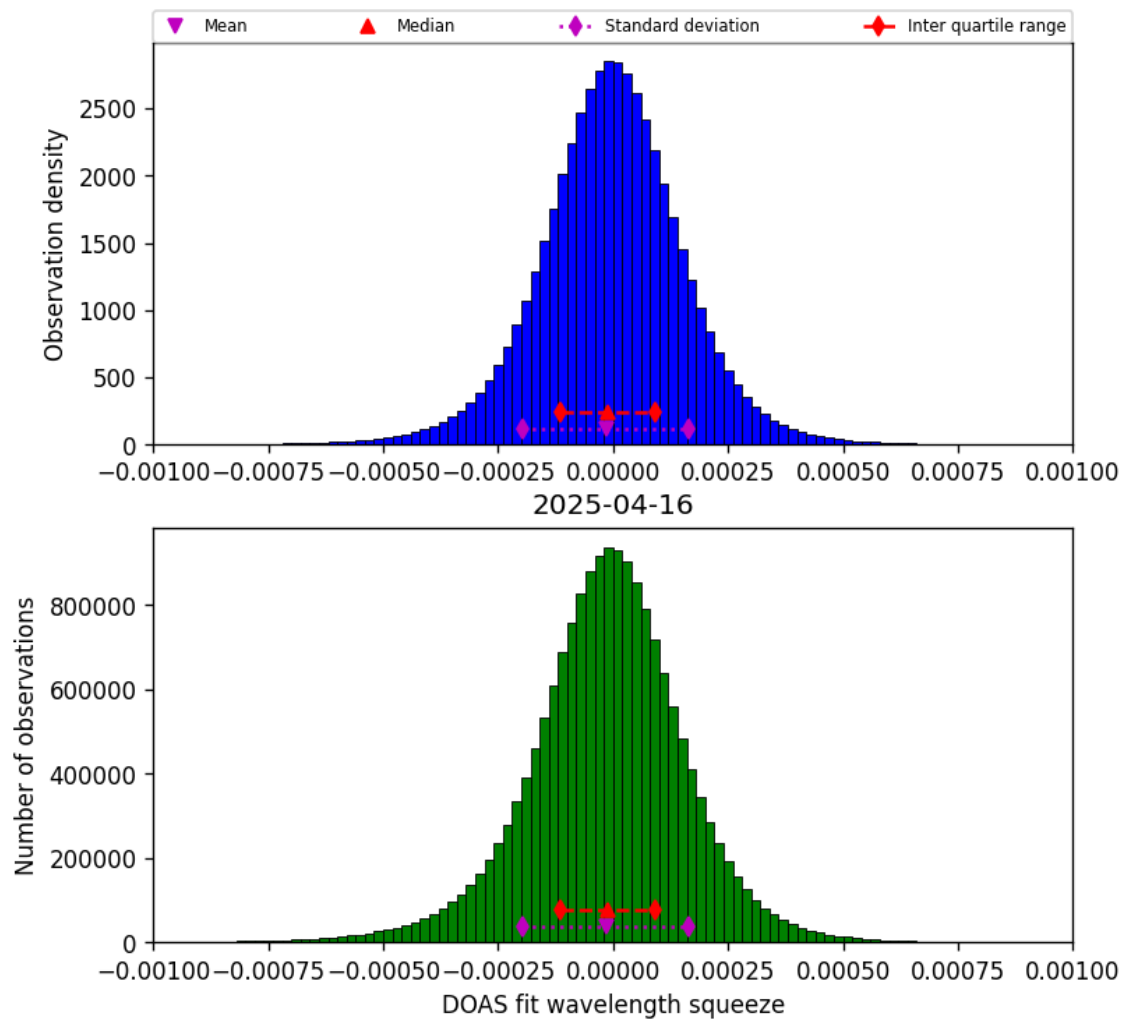


Figure 78: Histogram of “DOAS fit wavelength squeeze” for 2025-04-16 to 2025-04-16

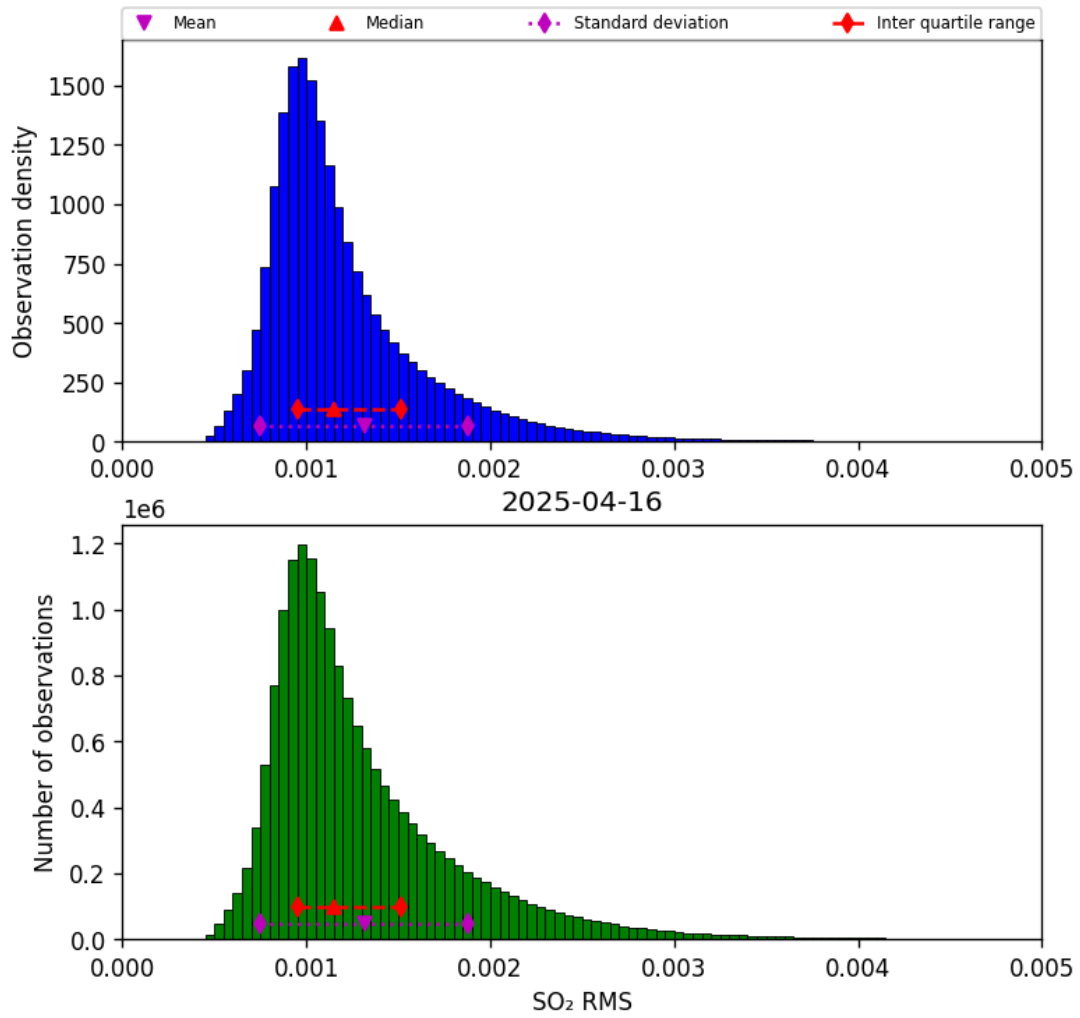


Figure 79: Histogram of “SO<sub>2</sub> RMS” for 2025-04-16 to 2025-04-16

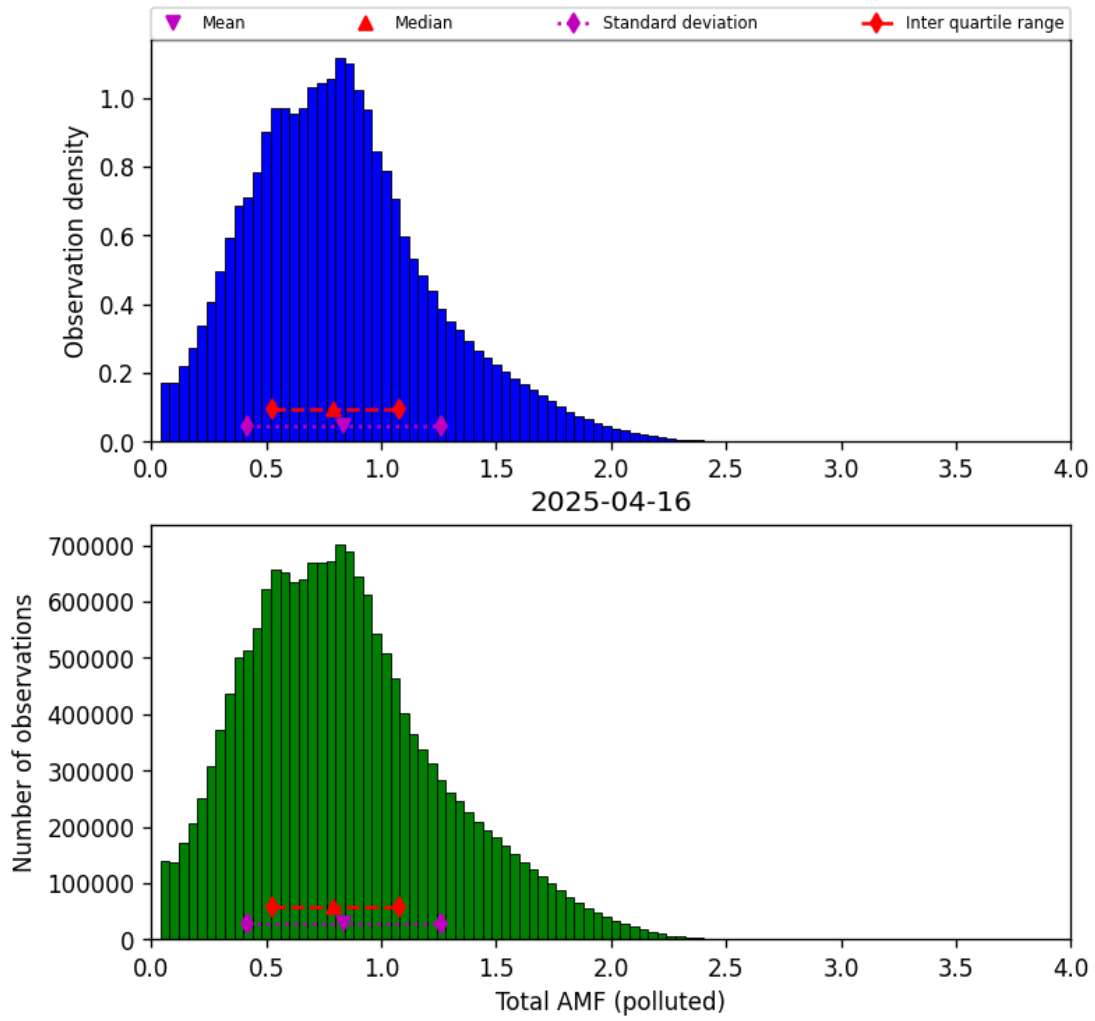


Figure 80: Histogram of “Total AMF (polluted)” for 2025-04-16 to 2025-04-16

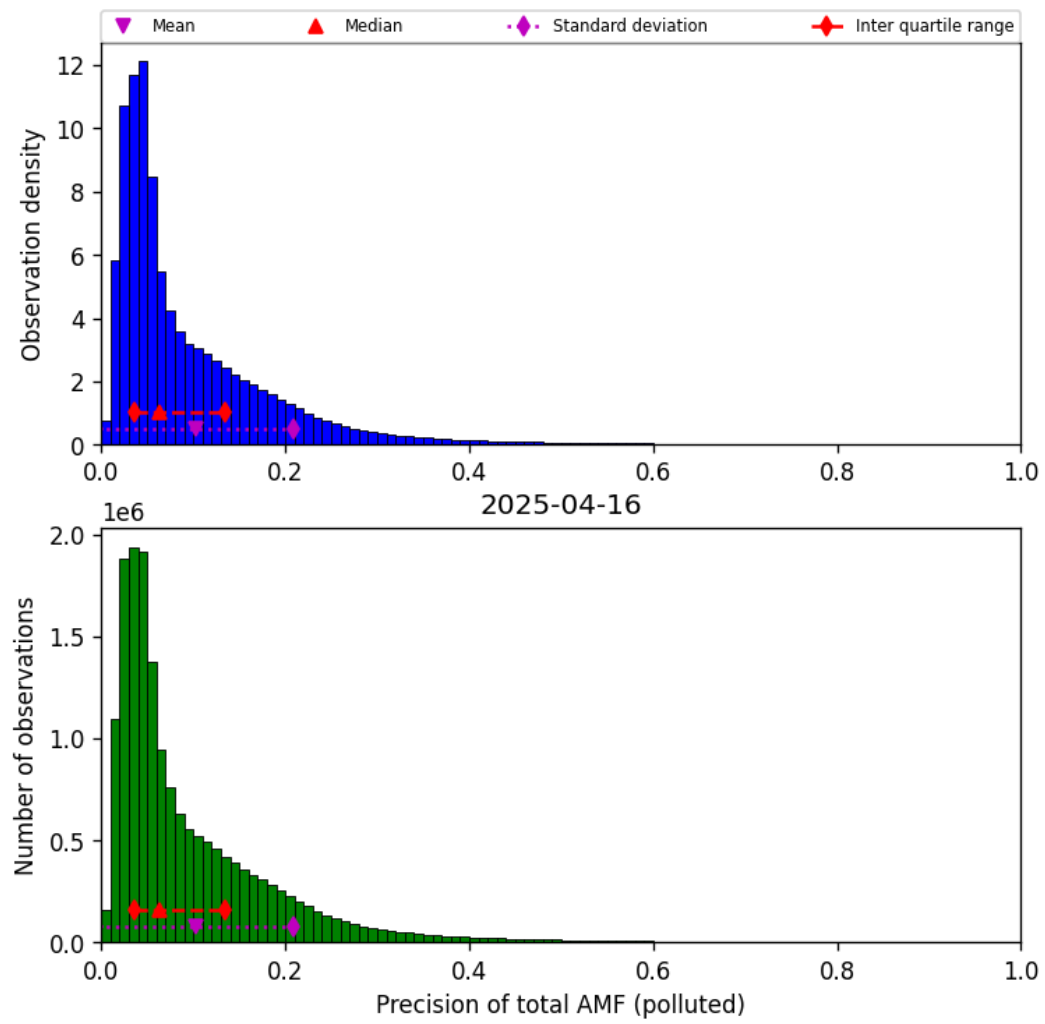


Figure 81: Histogram of “Precision of total AMF (polluted)” for 2025-04-16 to 2025-04-16

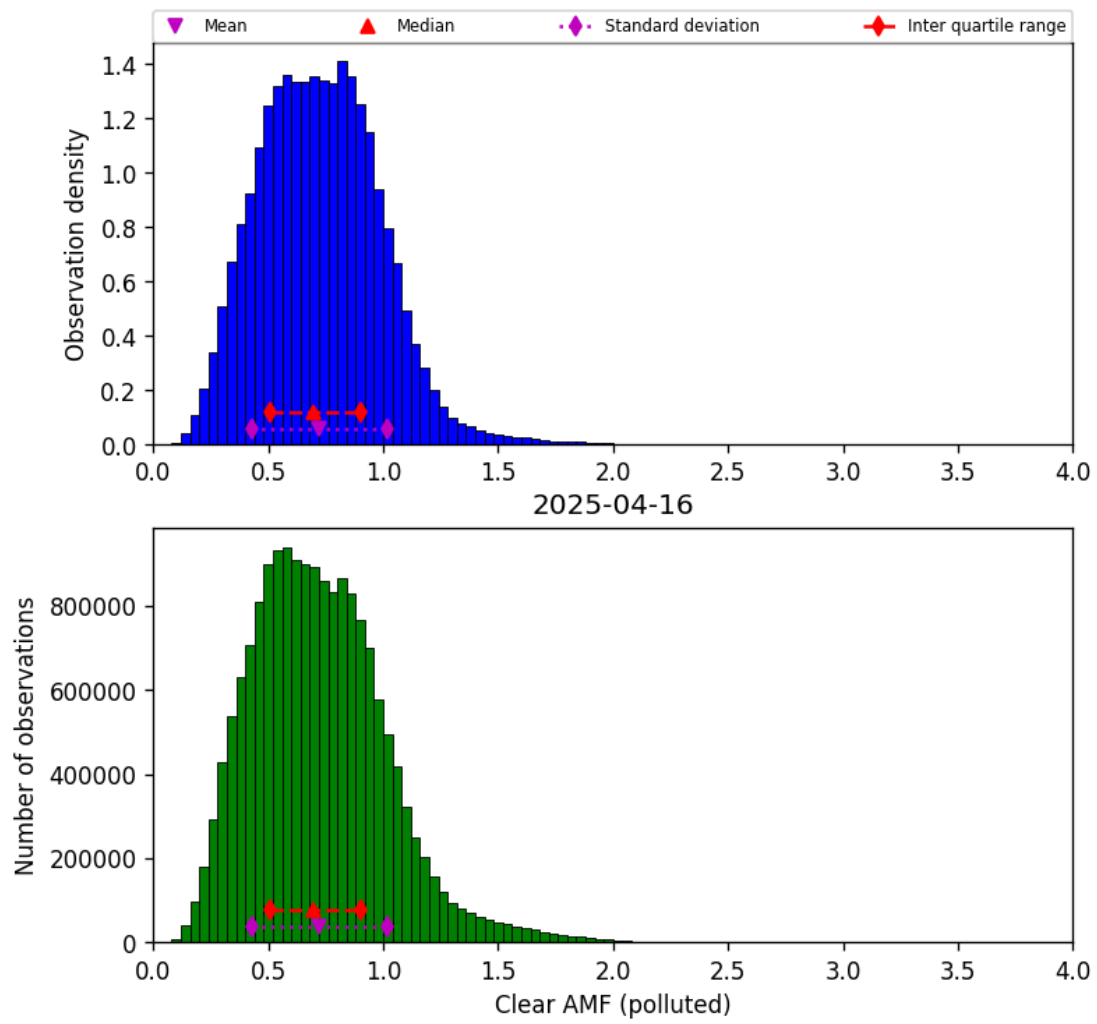


Figure 82: Histogram of “Clear AMF (polluted)” for 2025-04-16 to 2025-04-16

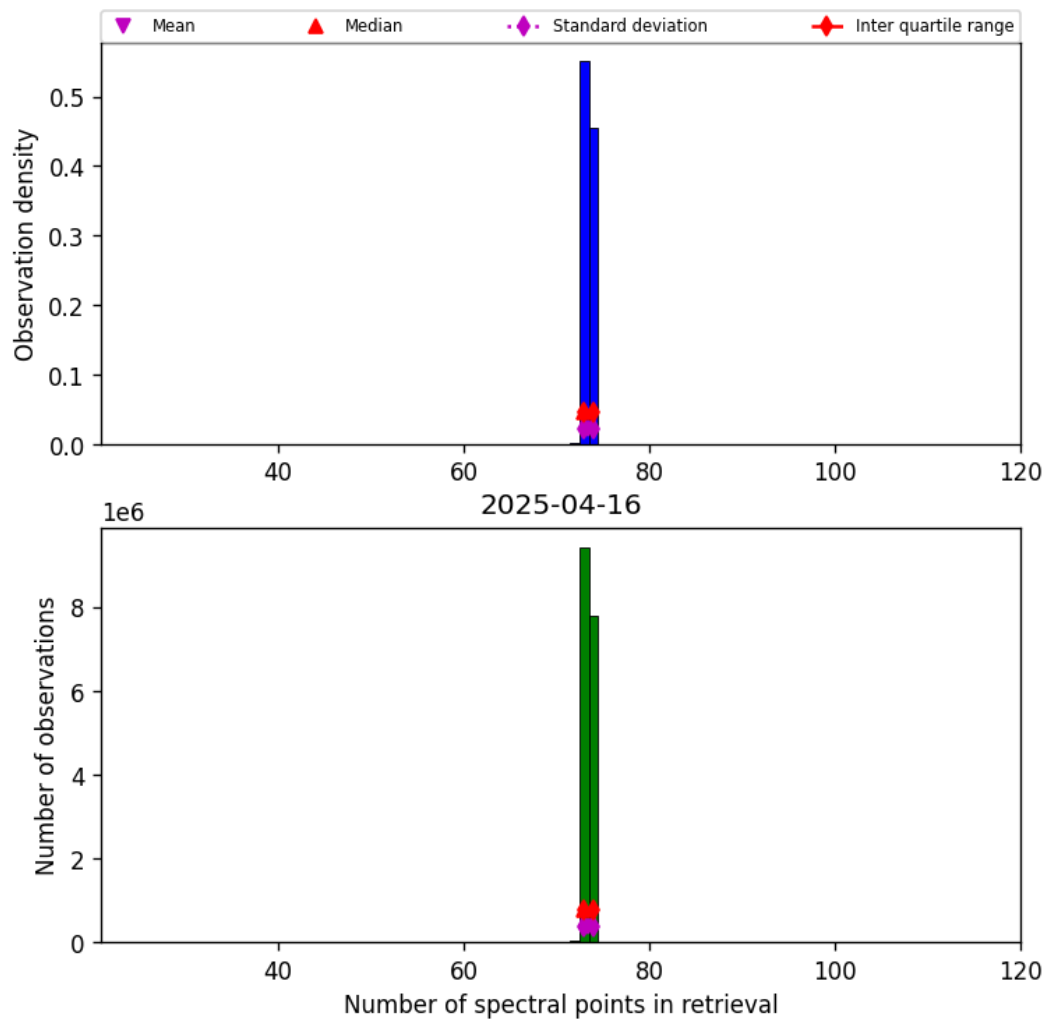


Figure 83: Histogram of "Number of spectral points in retrieval" for 2025-04-16 to 2025-04-16

## 9 Along track statistics

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

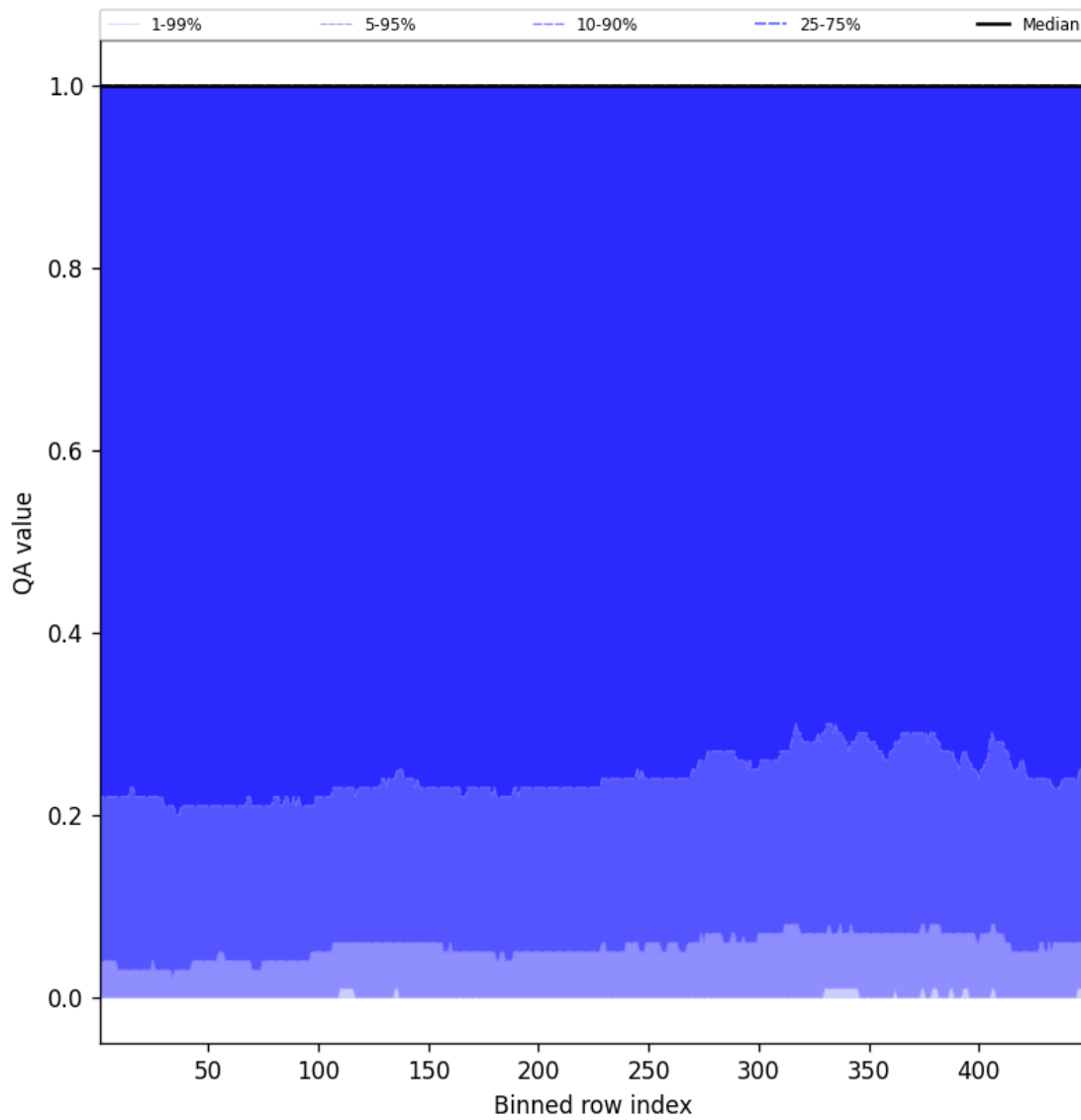


Figure 84: Along track statistics of “QA value” for 2025-04-16 to 2025-04-16

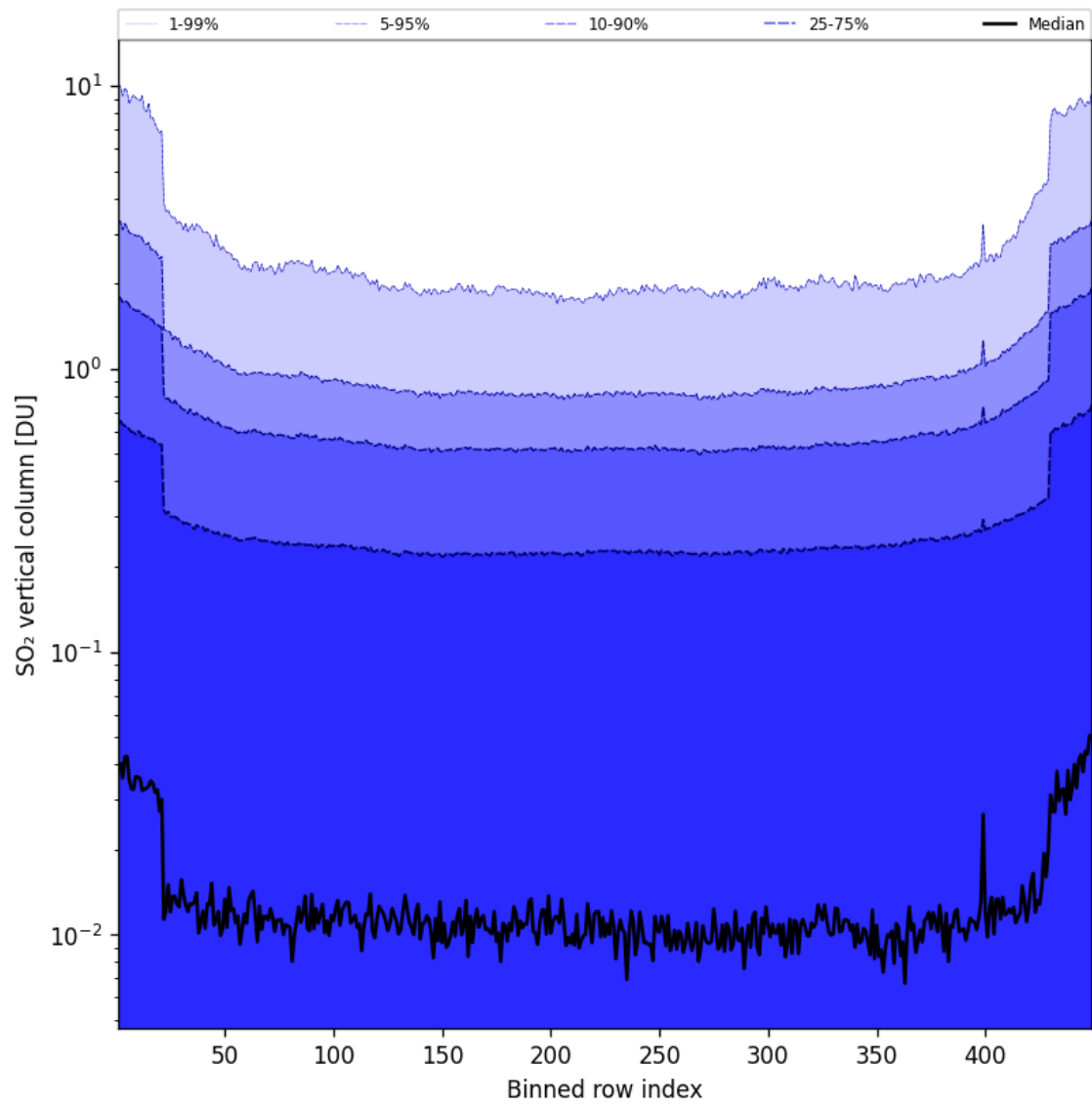


Figure 85: Along track statistics of “SO<sub>2</sub> vertical column” for 2025-04-16 to 2025-04-16



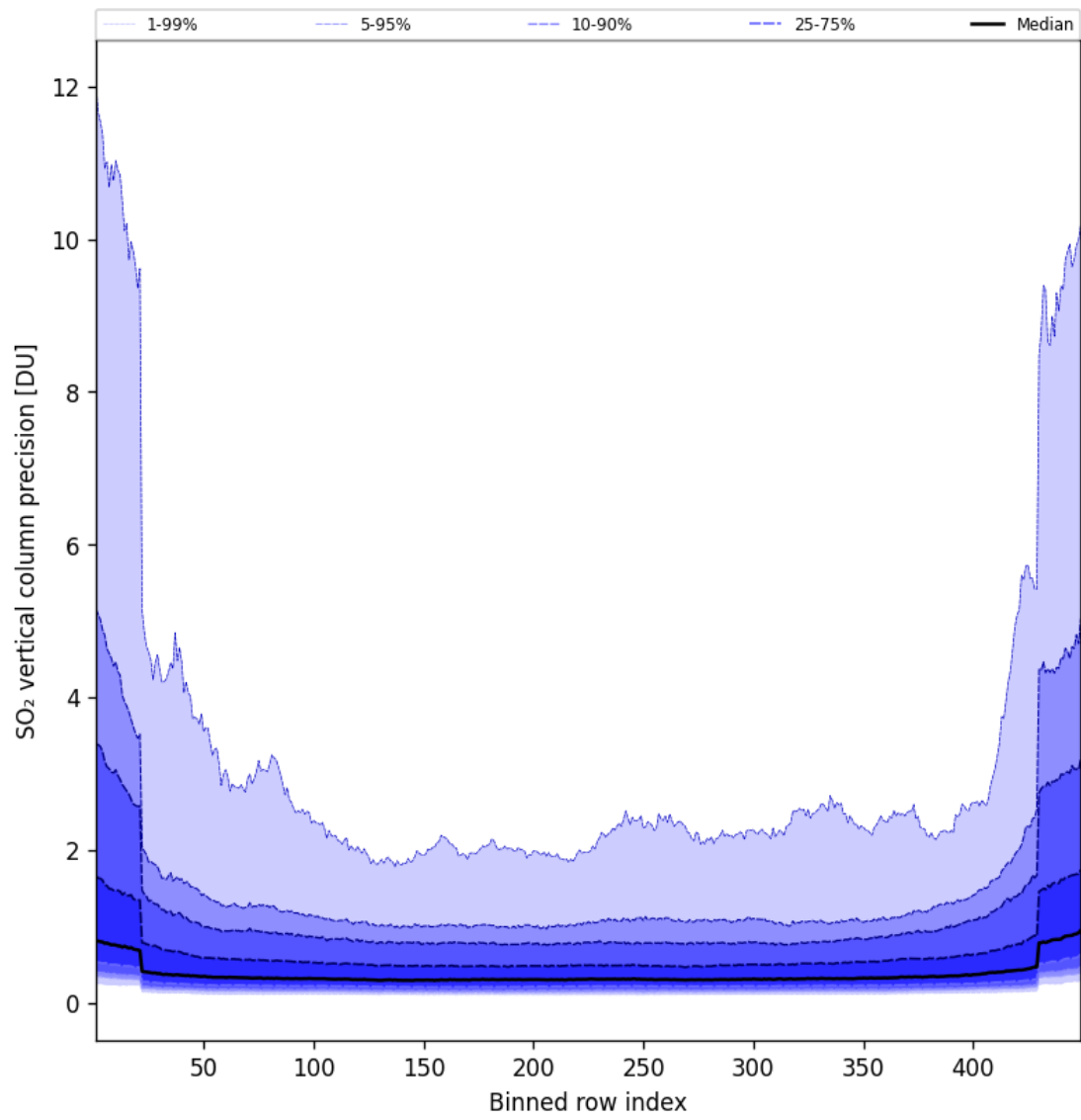


Figure 86: Along track statistics of “SO<sub>2</sub> vertical column precision” for 2025-04-16 to 2025-04-16

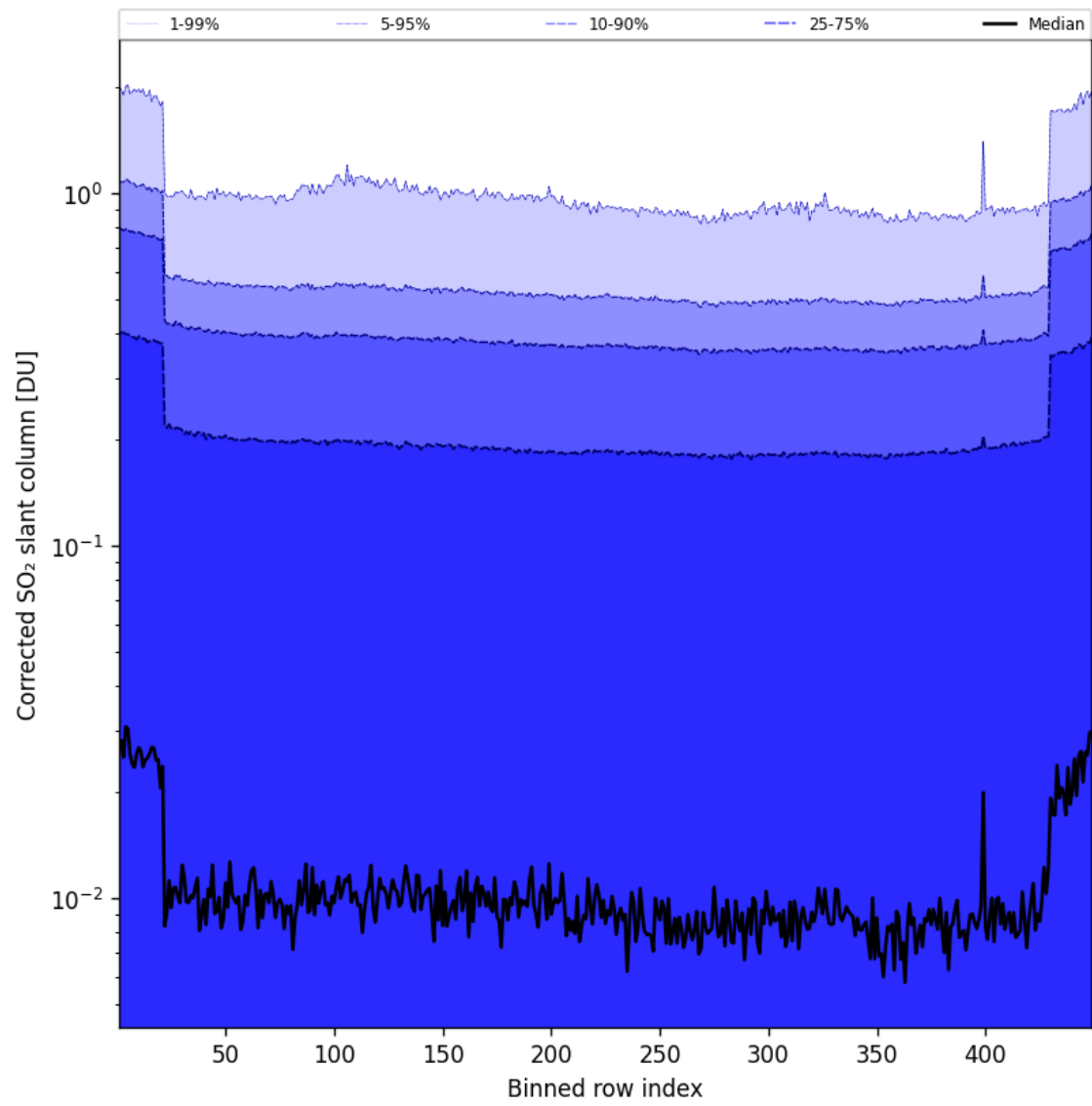


Figure 87: Along track statistics of "Corrected SO<sub>2</sub> slant column" for 2025-04-16 to 2025-04-16

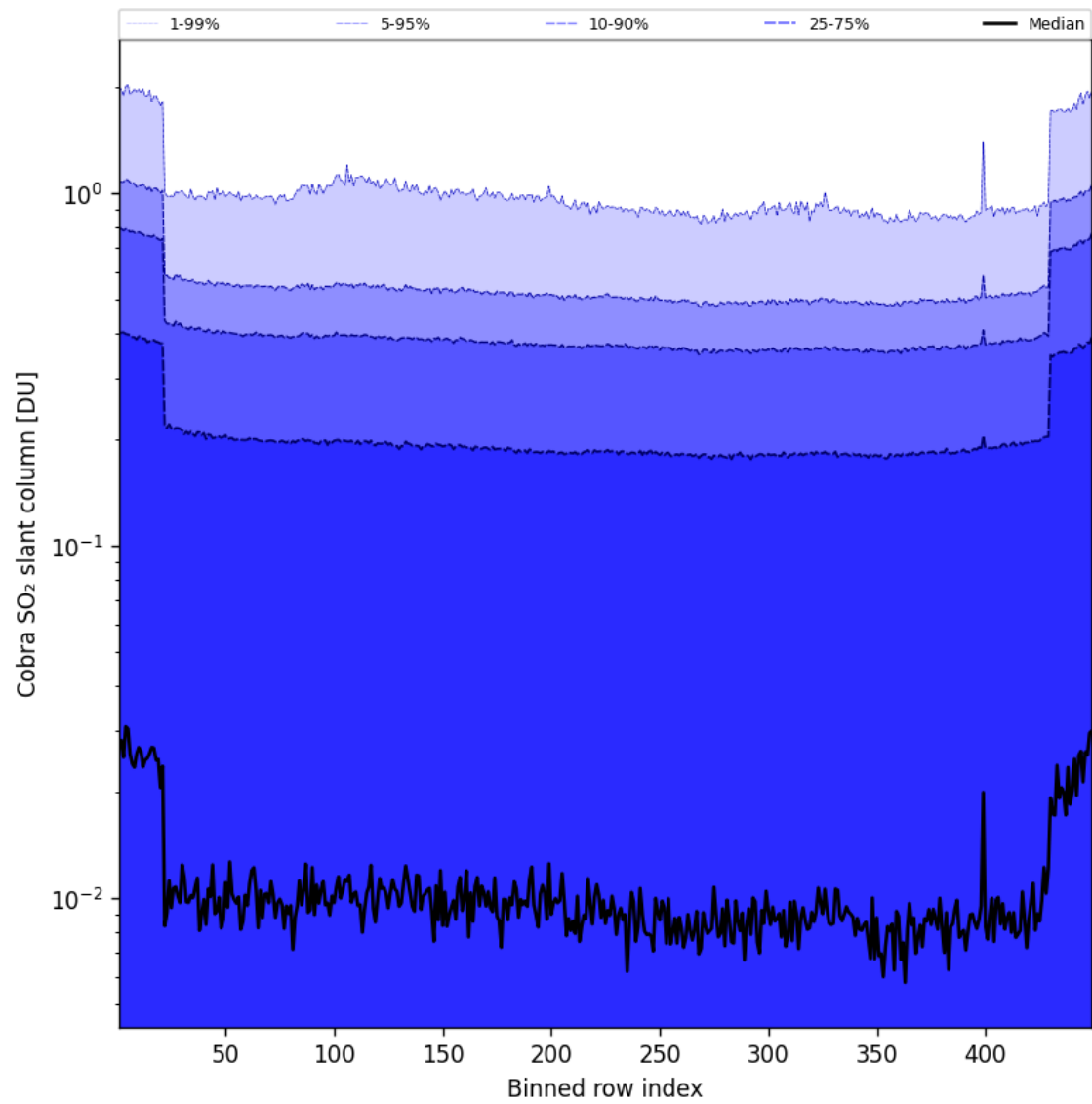


Figure 88: Along track statistics of “Cobra SO<sub>2</sub> slant column” for 2025-04-16 to 2025-04-16

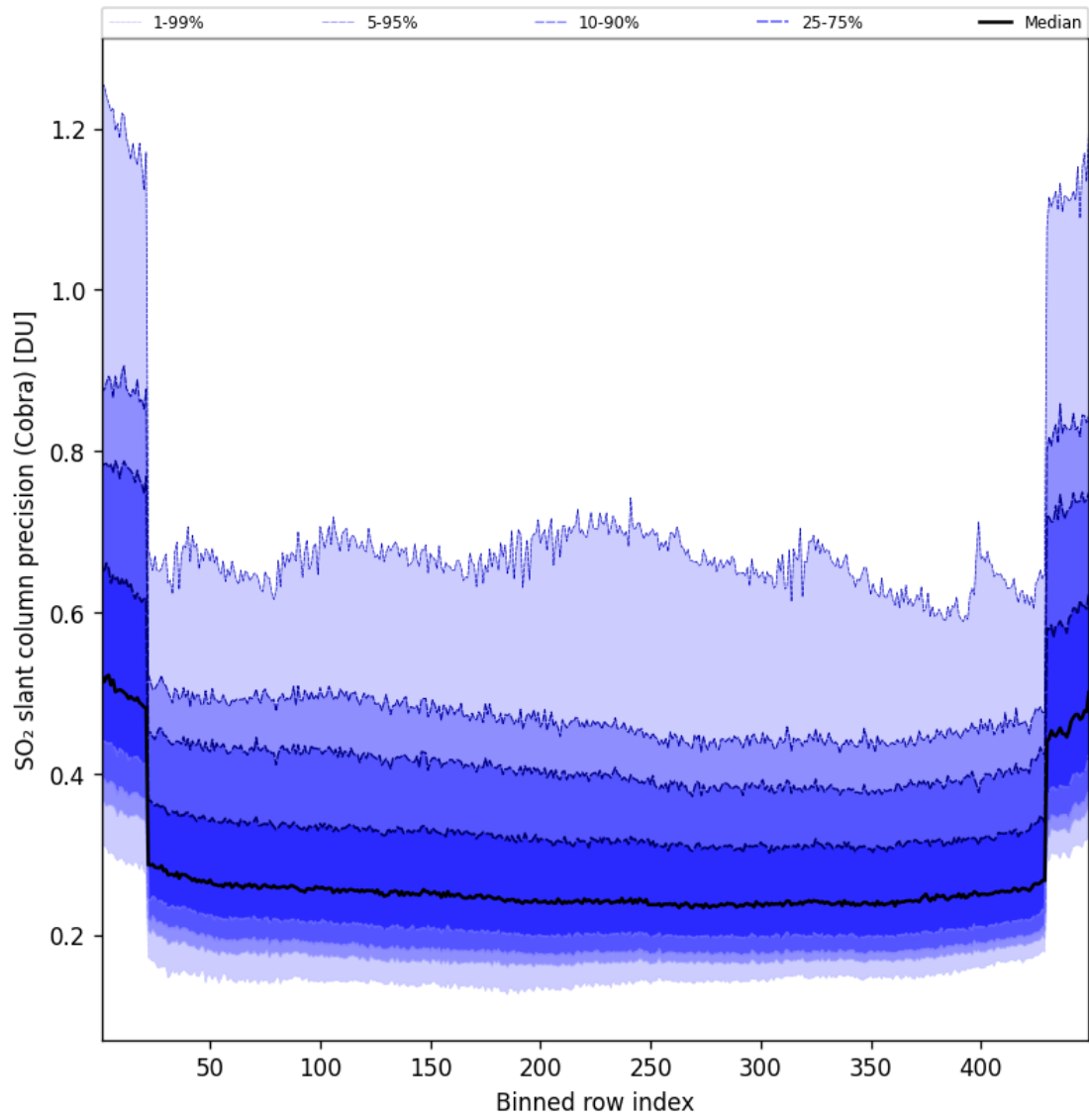


Figure 89: Along track statistics of “SO<sub>2</sub> slant column precision (Cobra)” for 2025-04-16 to 2025-04-16

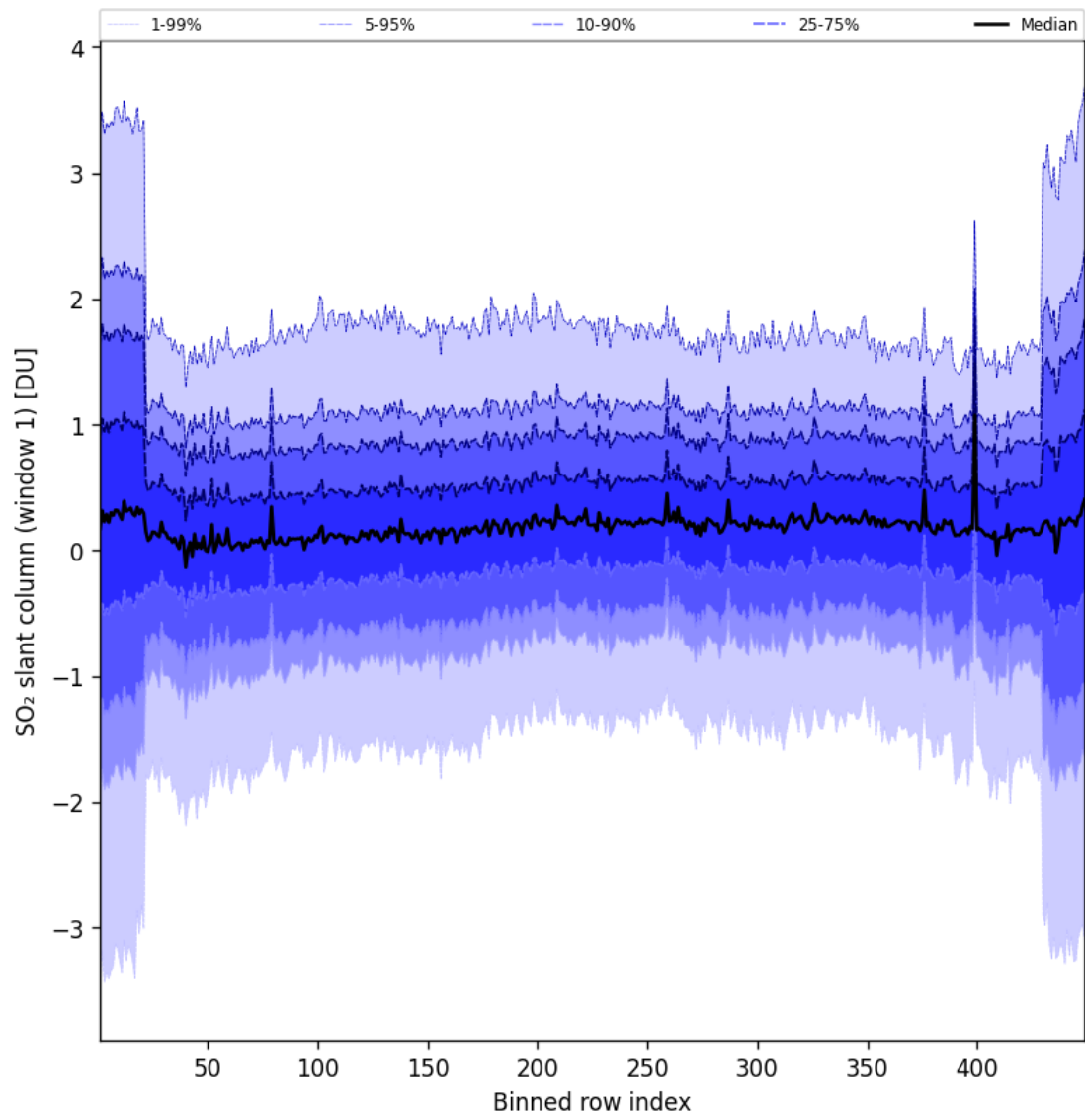


Figure 90: Along track statistics of “SO<sub>2</sub> slant column (window 1)” for 2025-04-16 to 2025-04-16

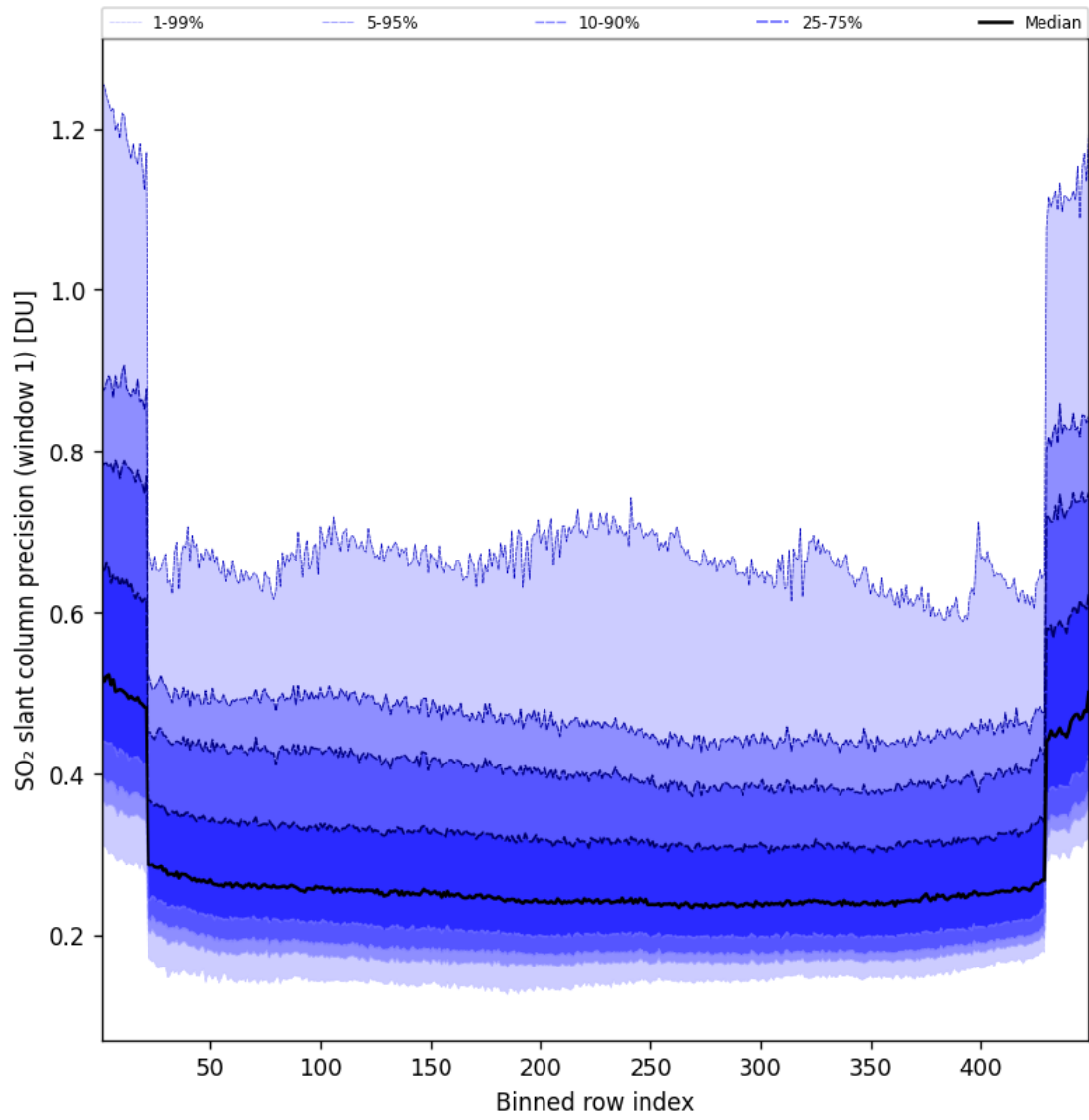


Figure 91: Along track statistics of “SO<sub>2</sub> slant column precision (window 1)” for 2025-04-16 to 2025-04-16

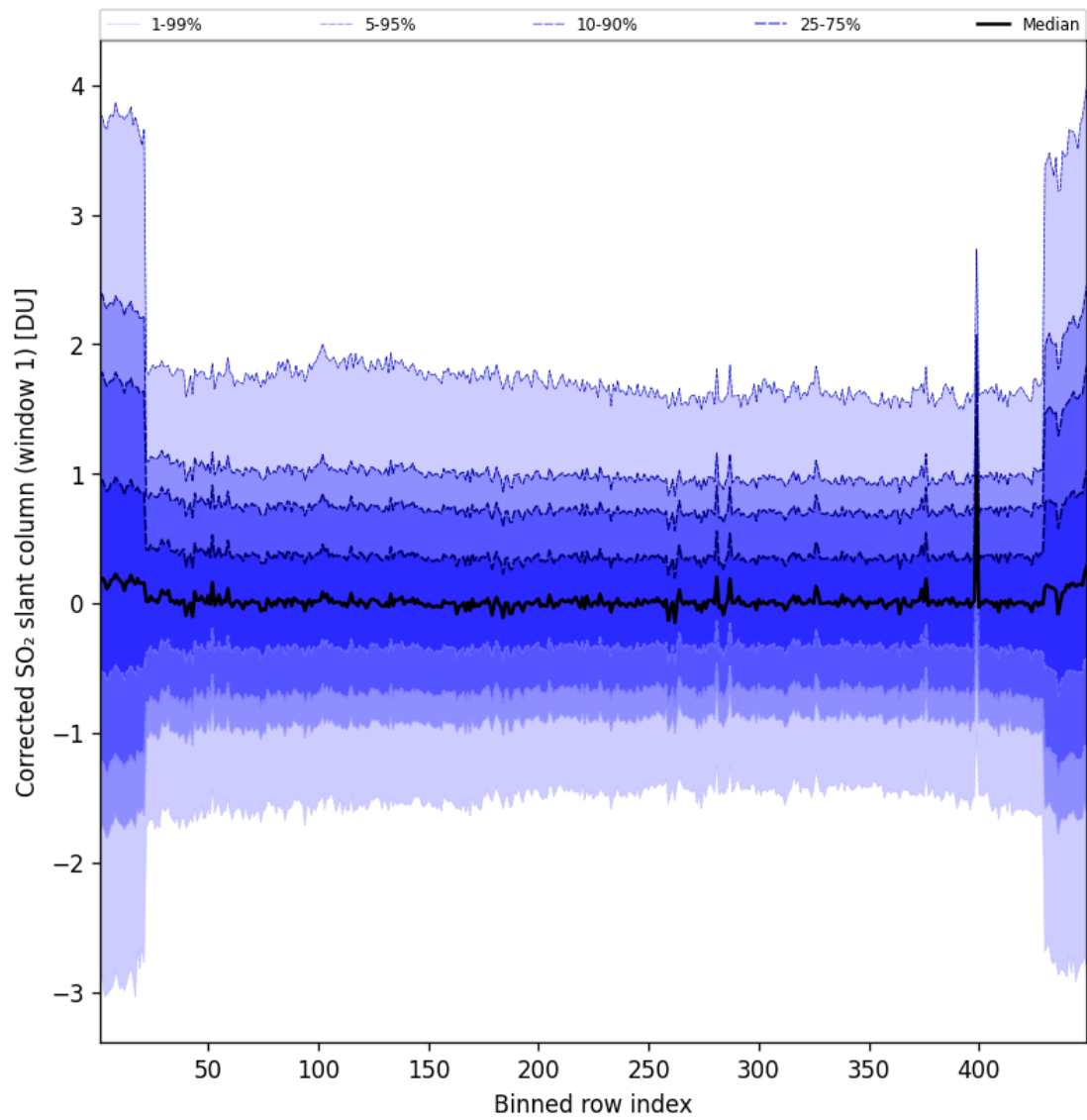


Figure 92: Along track statistics of “Corrected SO<sub>2</sub> slant column (window 1)” for 2025-04-16 to 2025-04-16

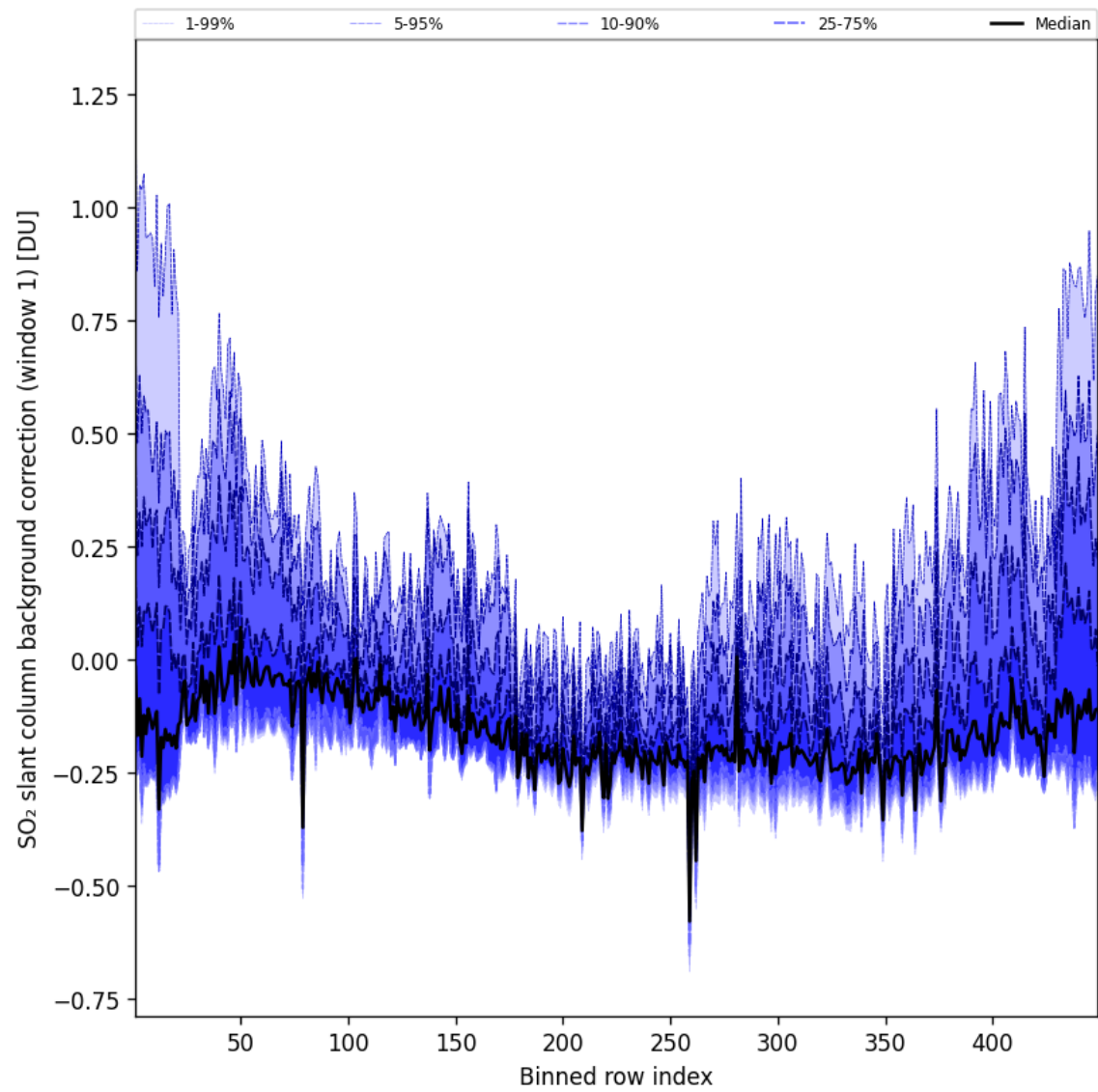


Figure 93: Along track statistics of “SO<sub>2</sub> slant column background correction (window 1)” for 2025-04-16 to 2025-04-16



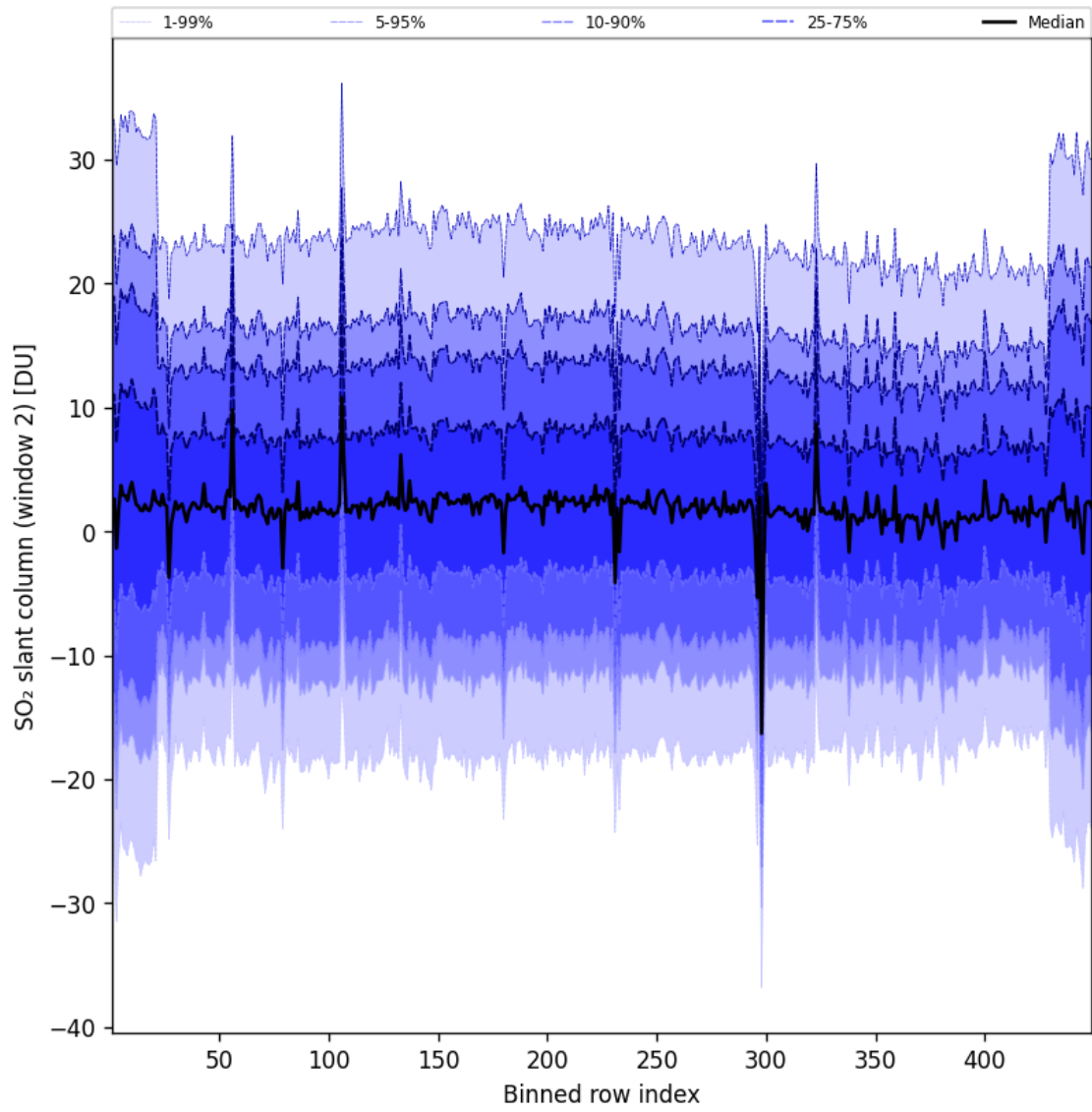


Figure 94: Along track statistics of “SO<sub>2</sub> slant column (window 2)” for 2025-04-16 to 2025-04-16

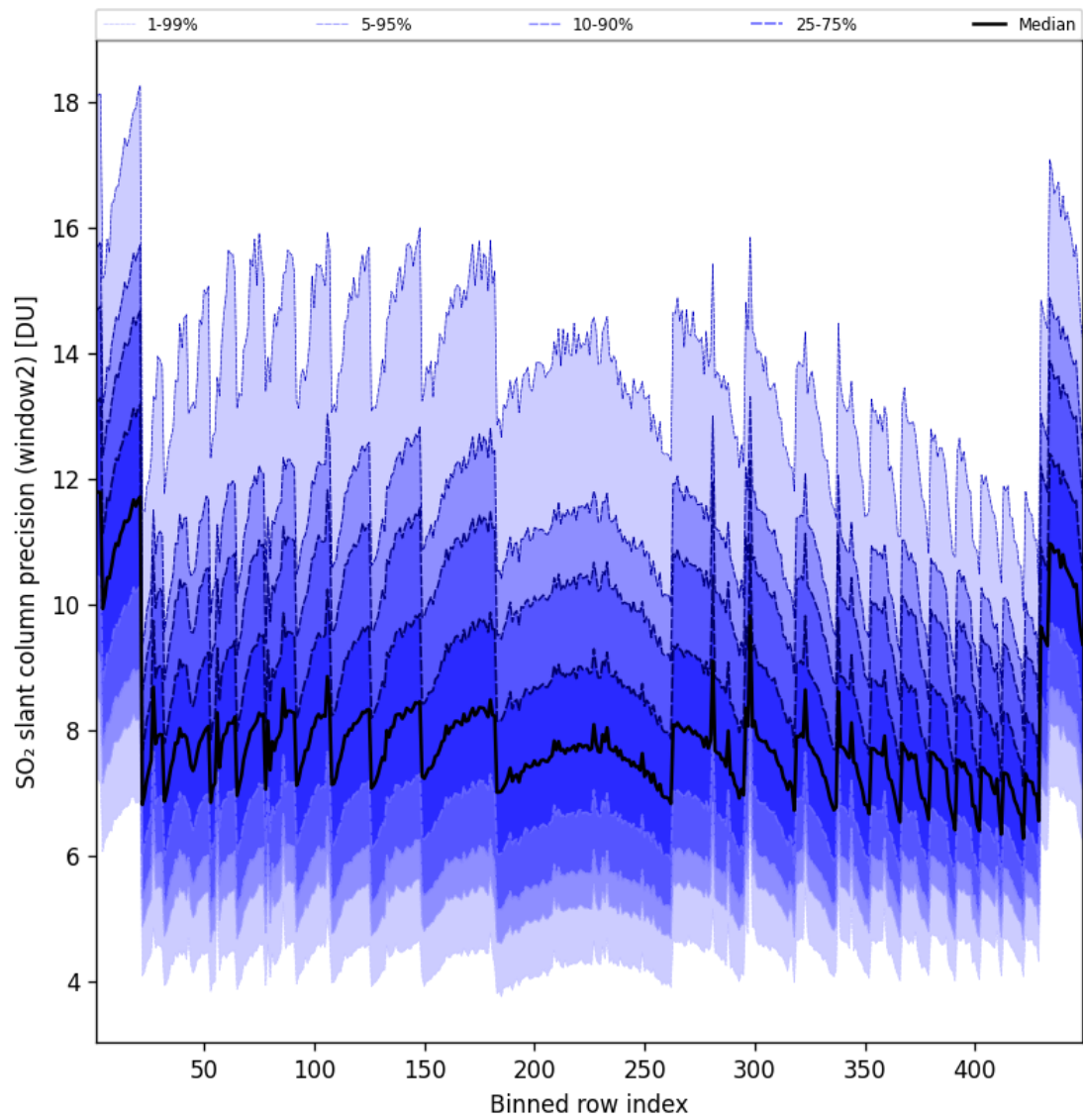


Figure 95: Along track statistics of “SO<sub>2</sub> slant column precision (window2)” for 2025-04-16 to 2025-04-16

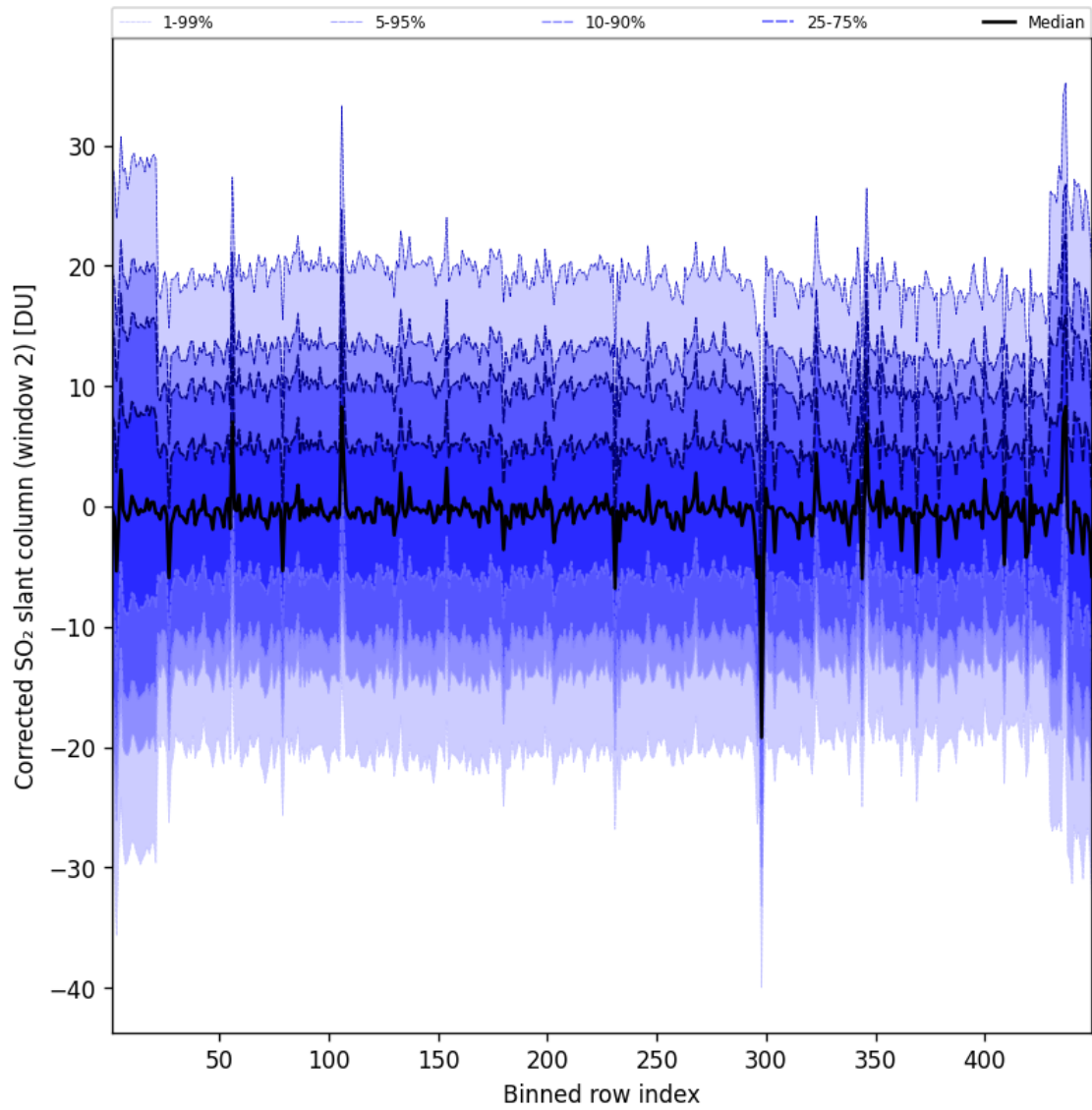


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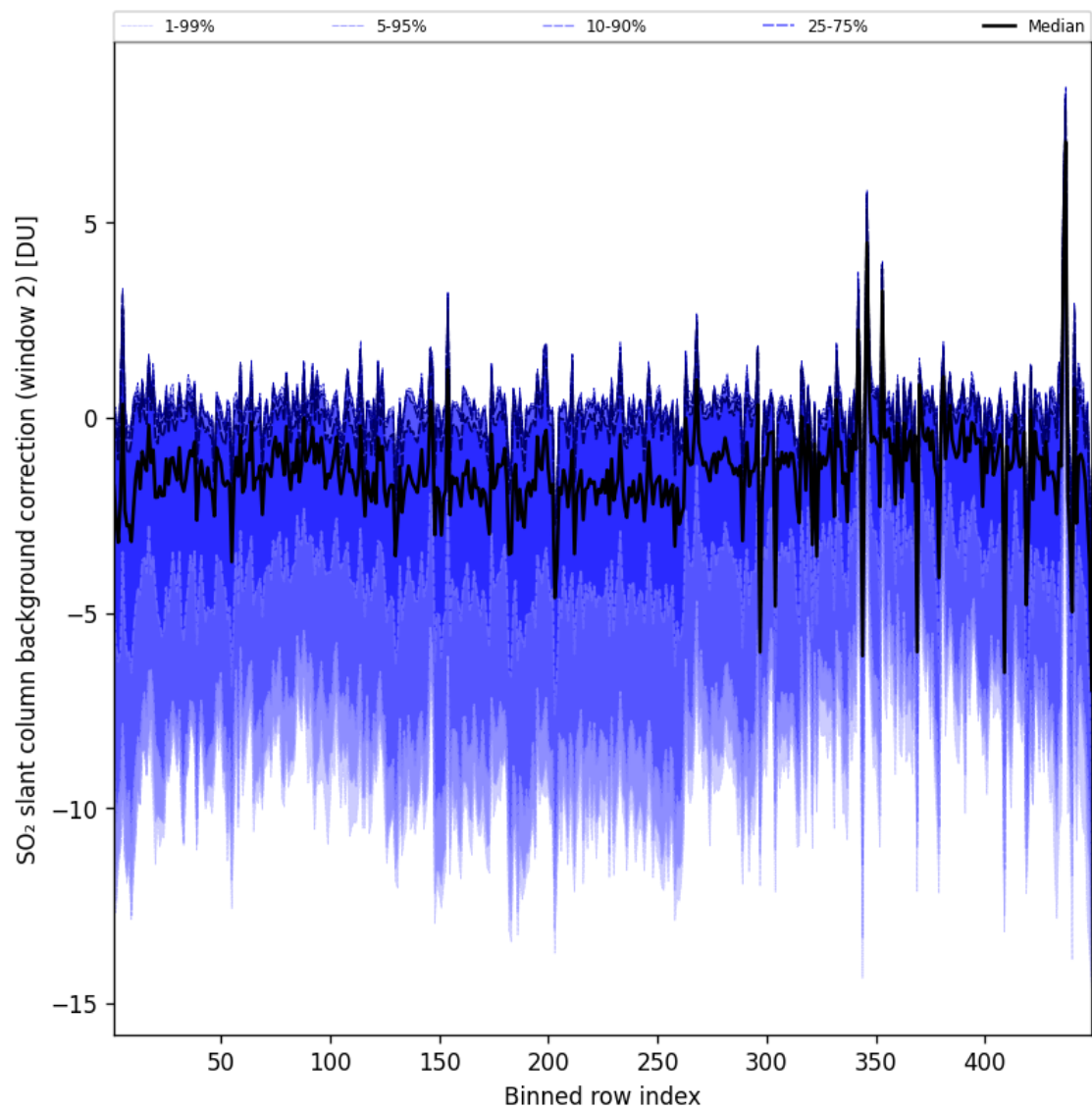


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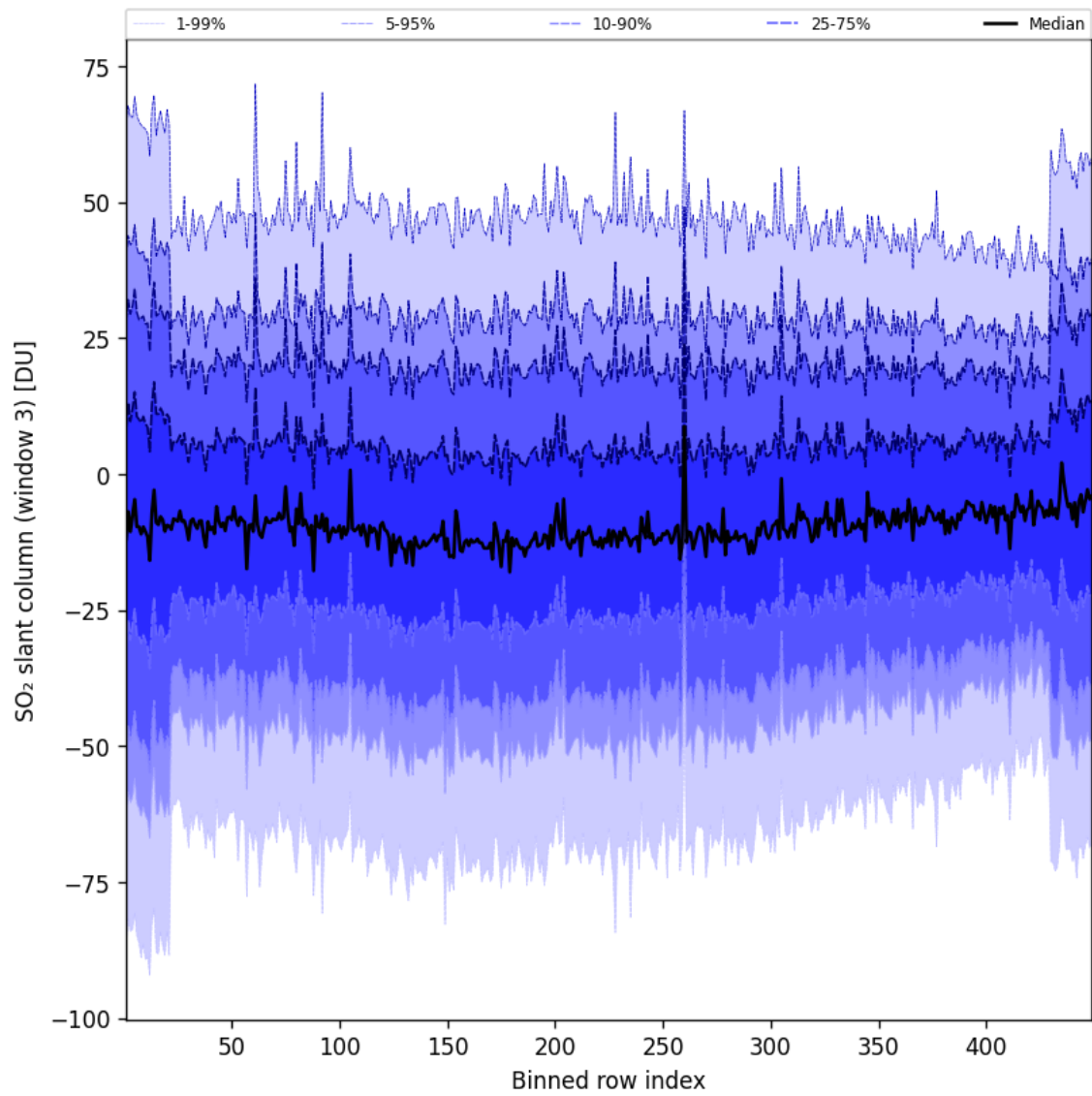


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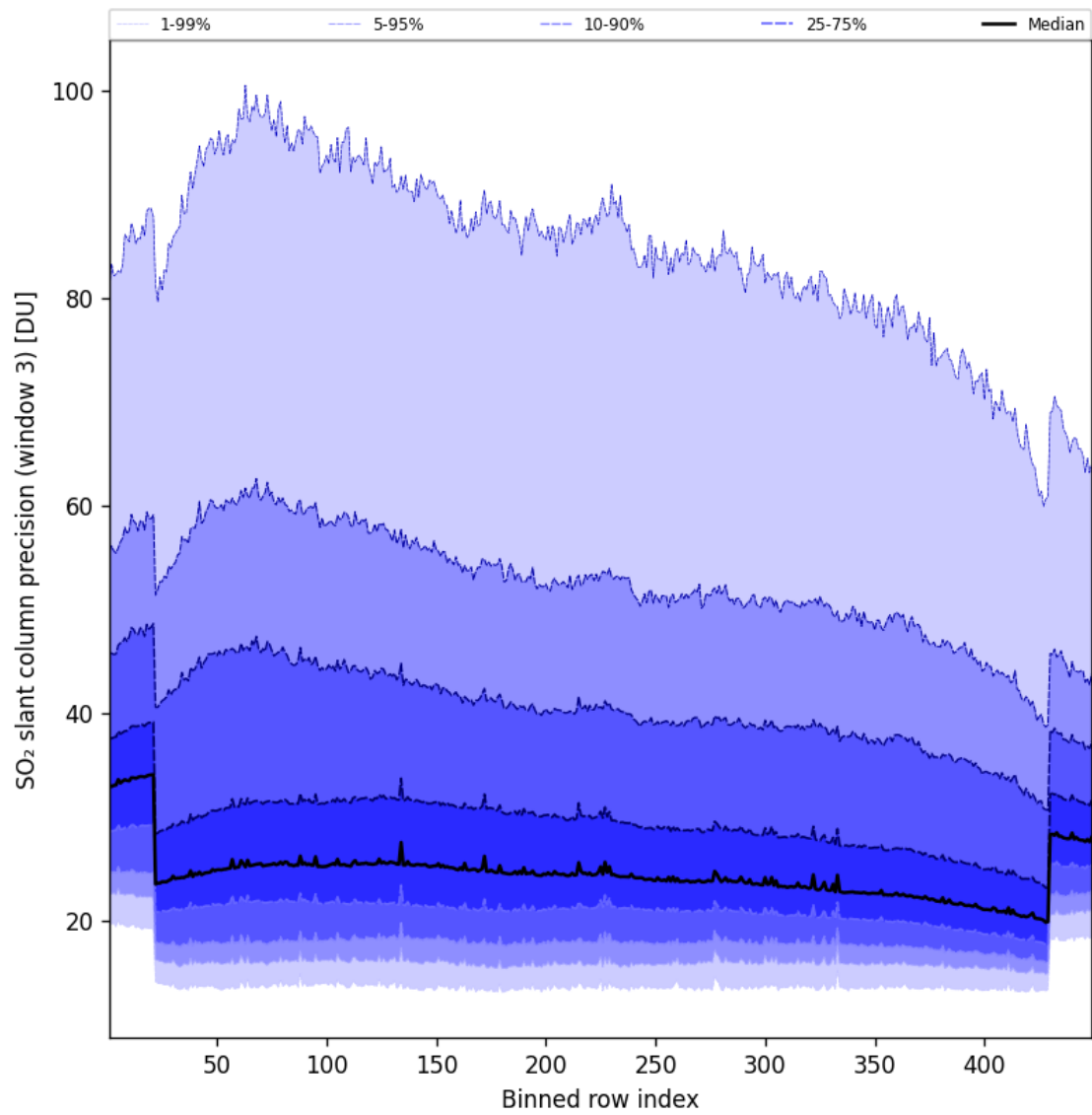


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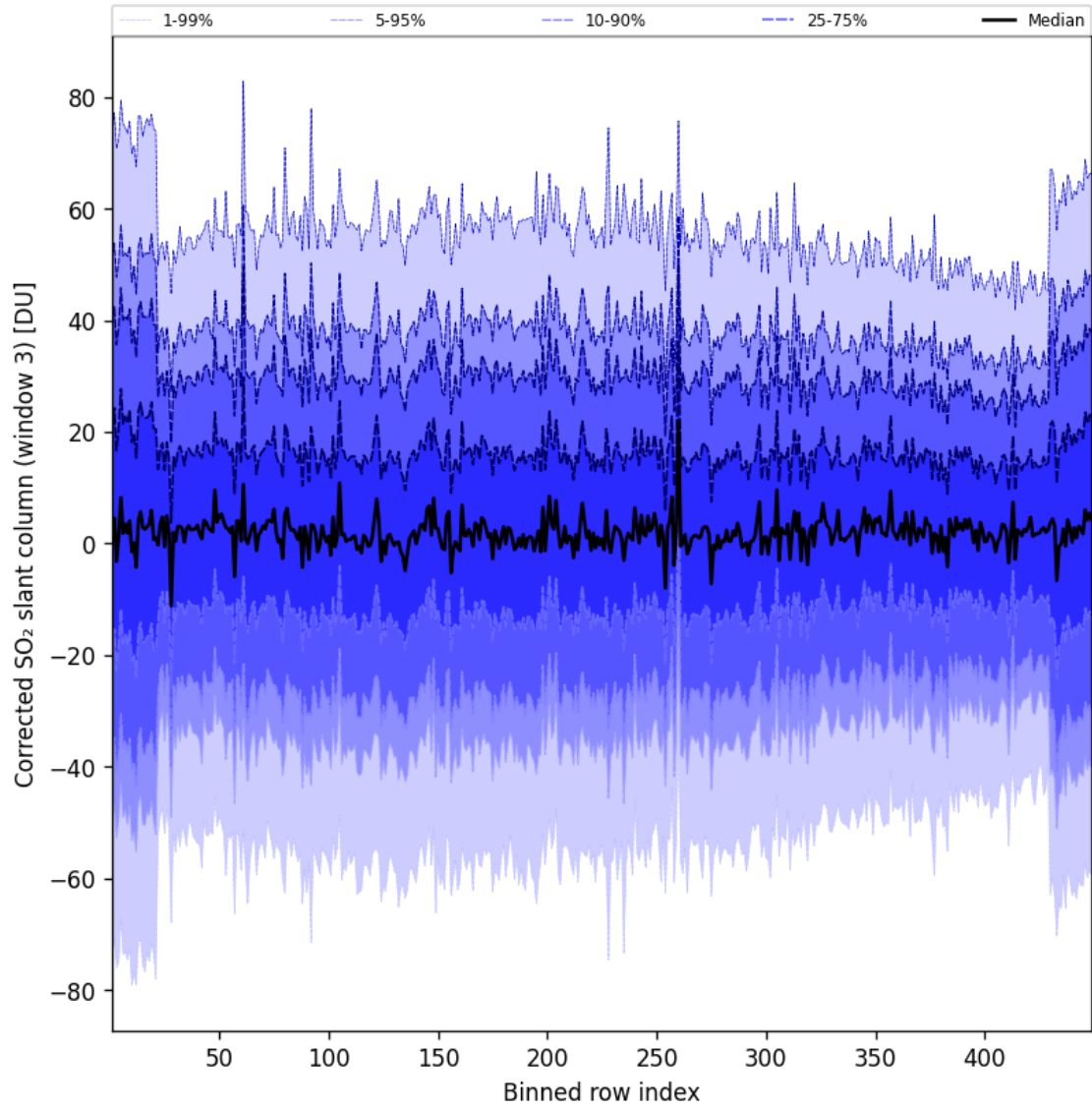


Figure 100: Along track statistics of “Corrected SO<sub>2</sub> slant column (window 3)” for 2025-04-16 to 2025-04-16

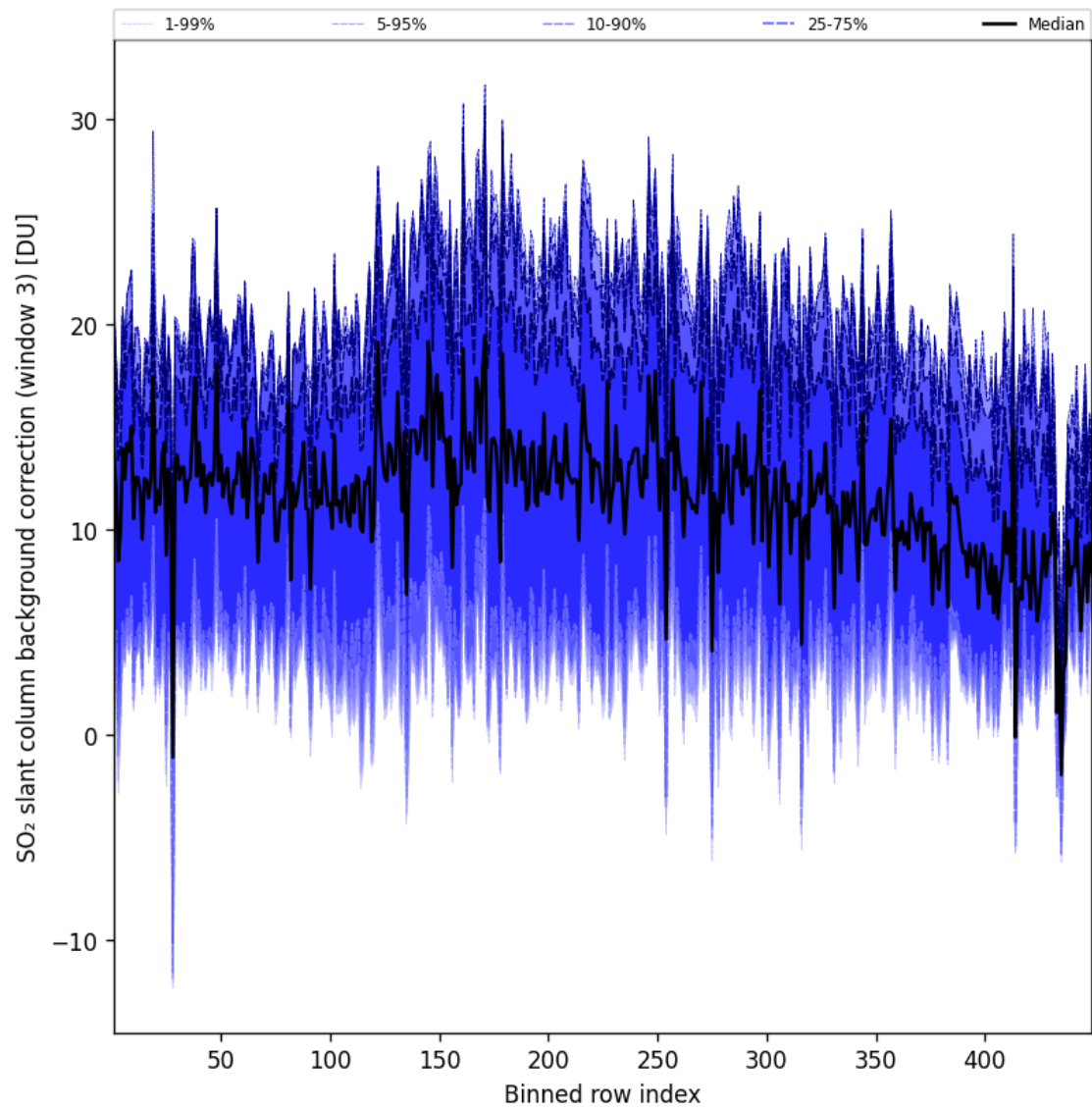


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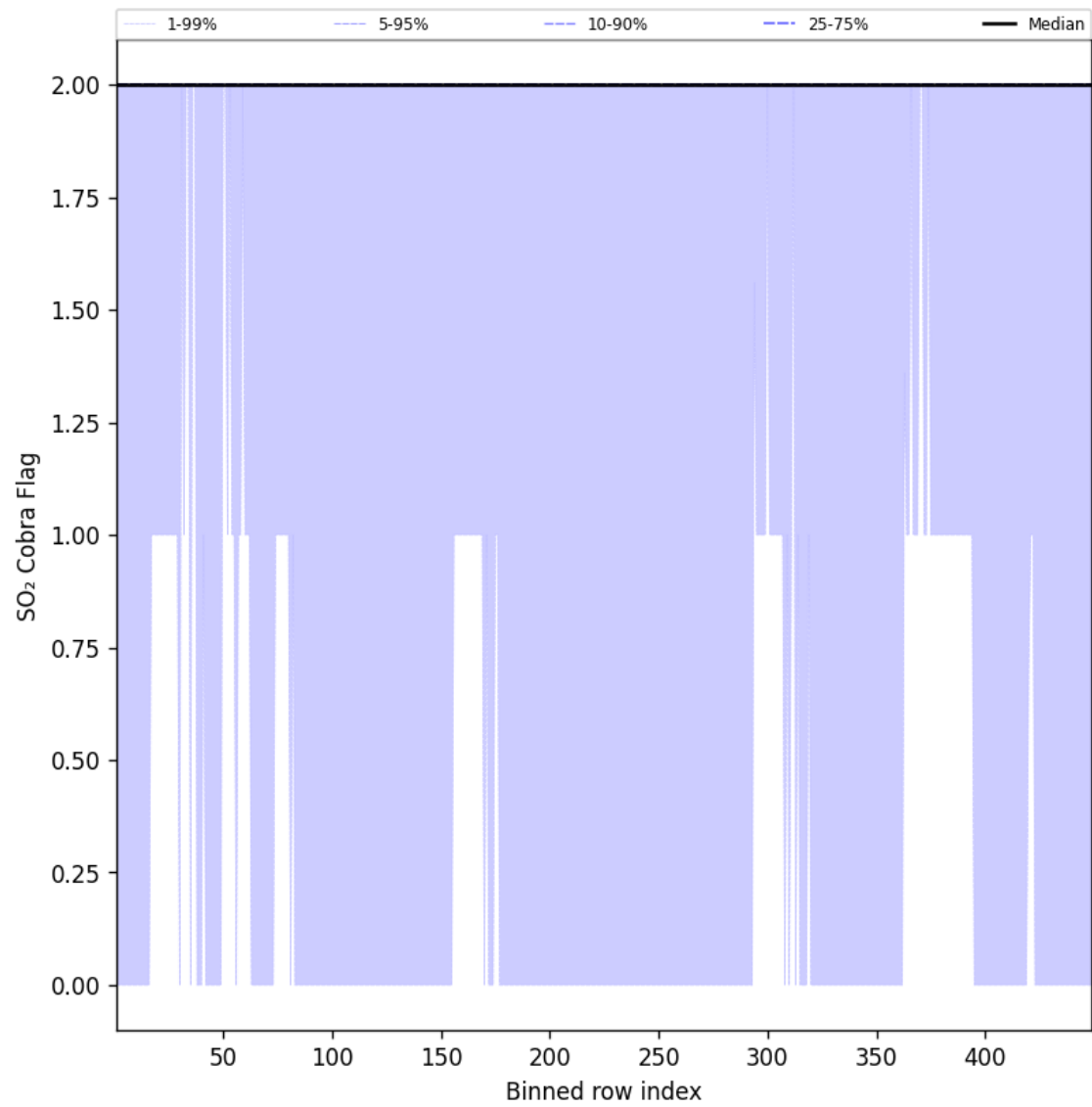


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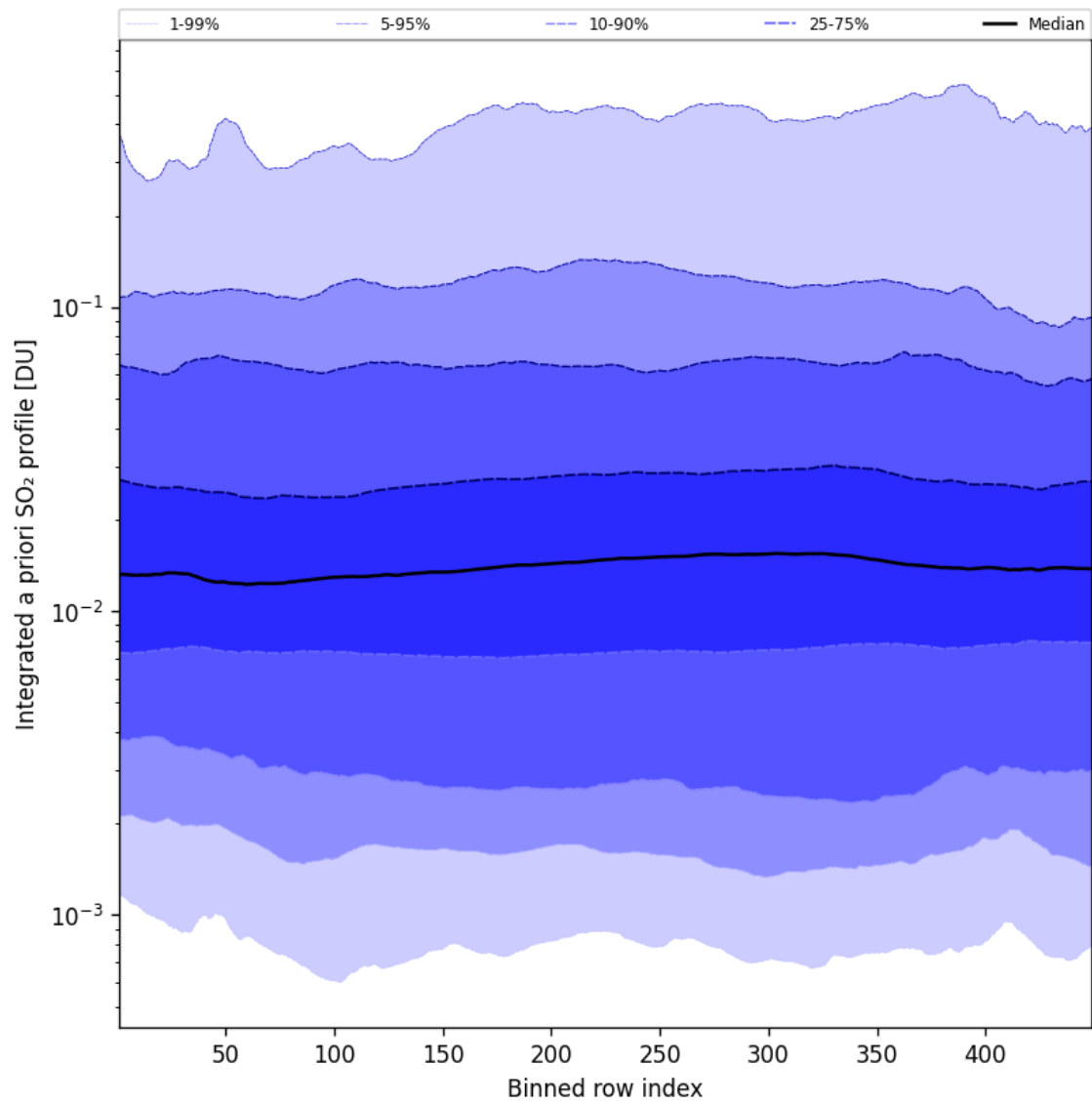


Figure 103: Along track statistics of “Integrated a priori SO<sub>2</sub> profile” for 2025-04-16 to 2025-04-16

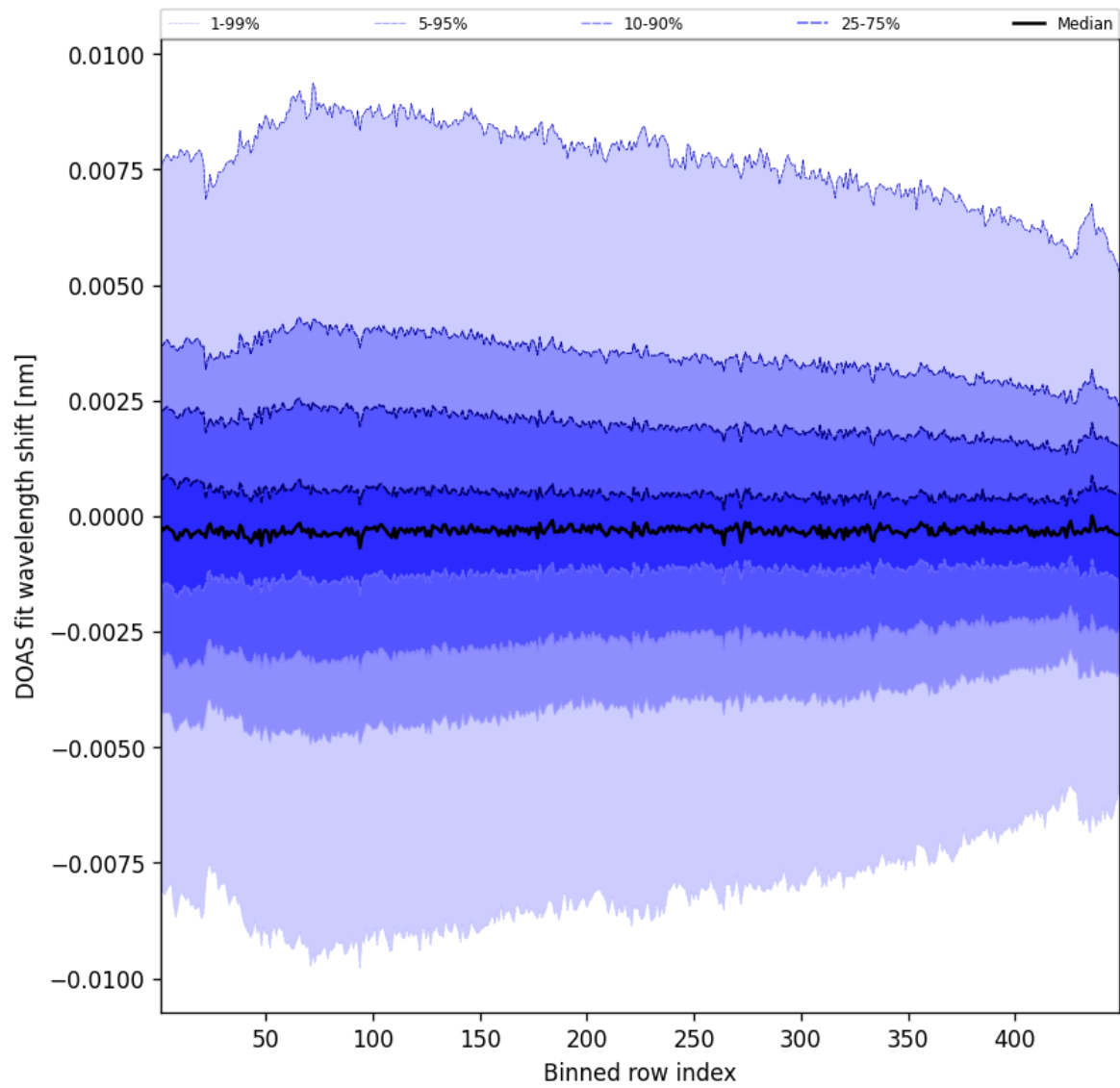


Figure 104: Along track statistics of “DOAS fit wavelength shift” for 2025-04-16 to 2025-04-16

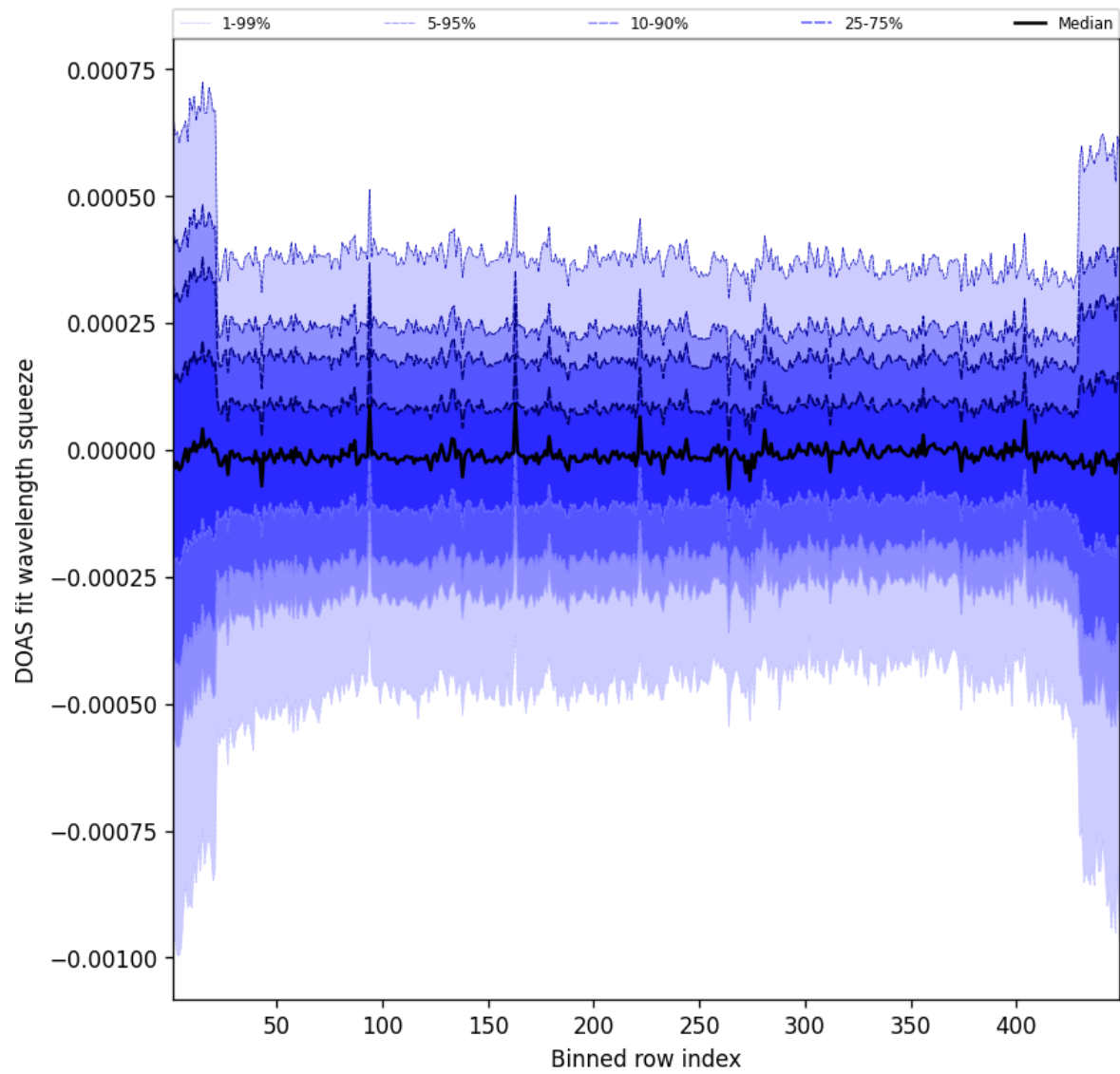


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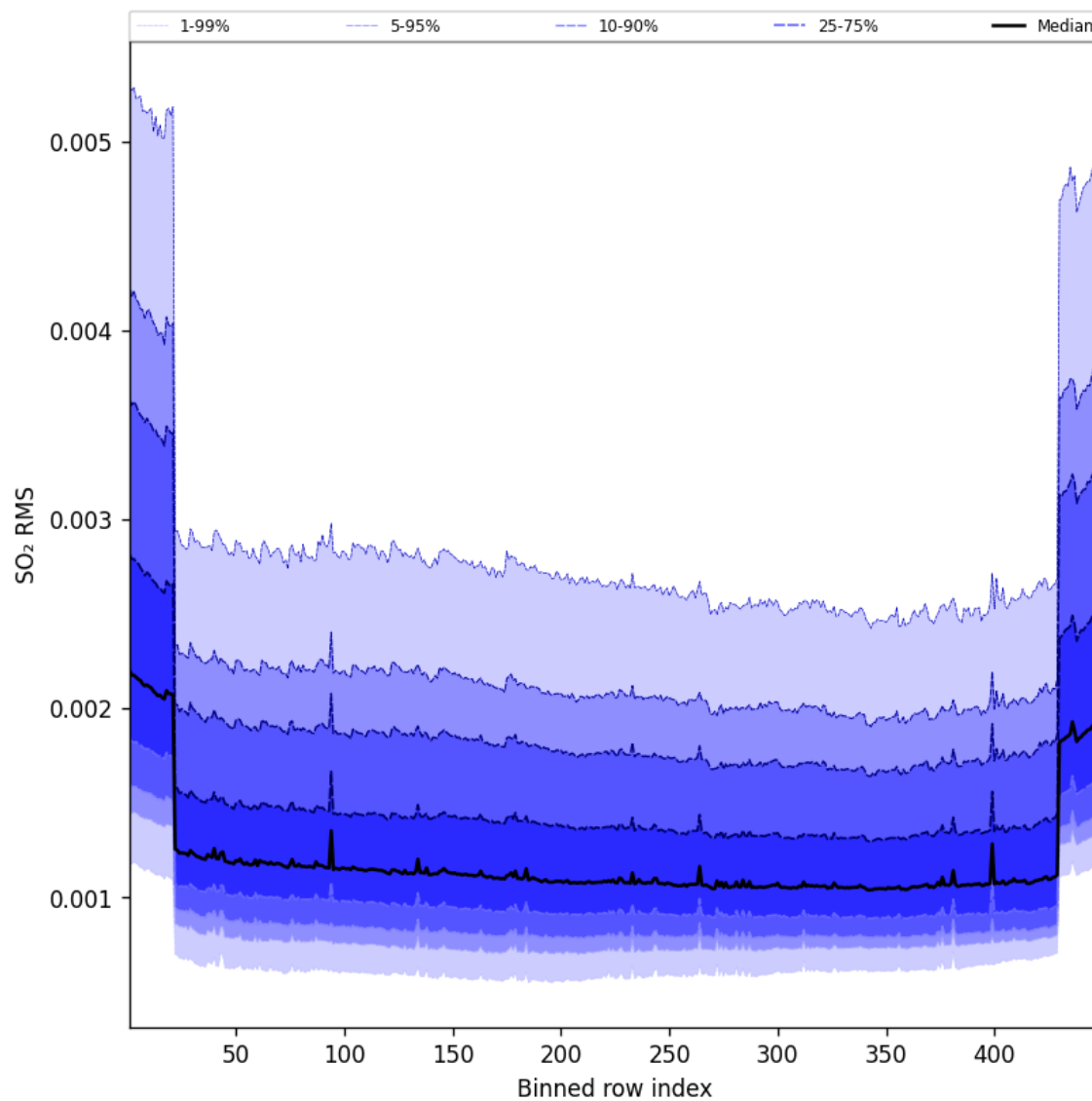


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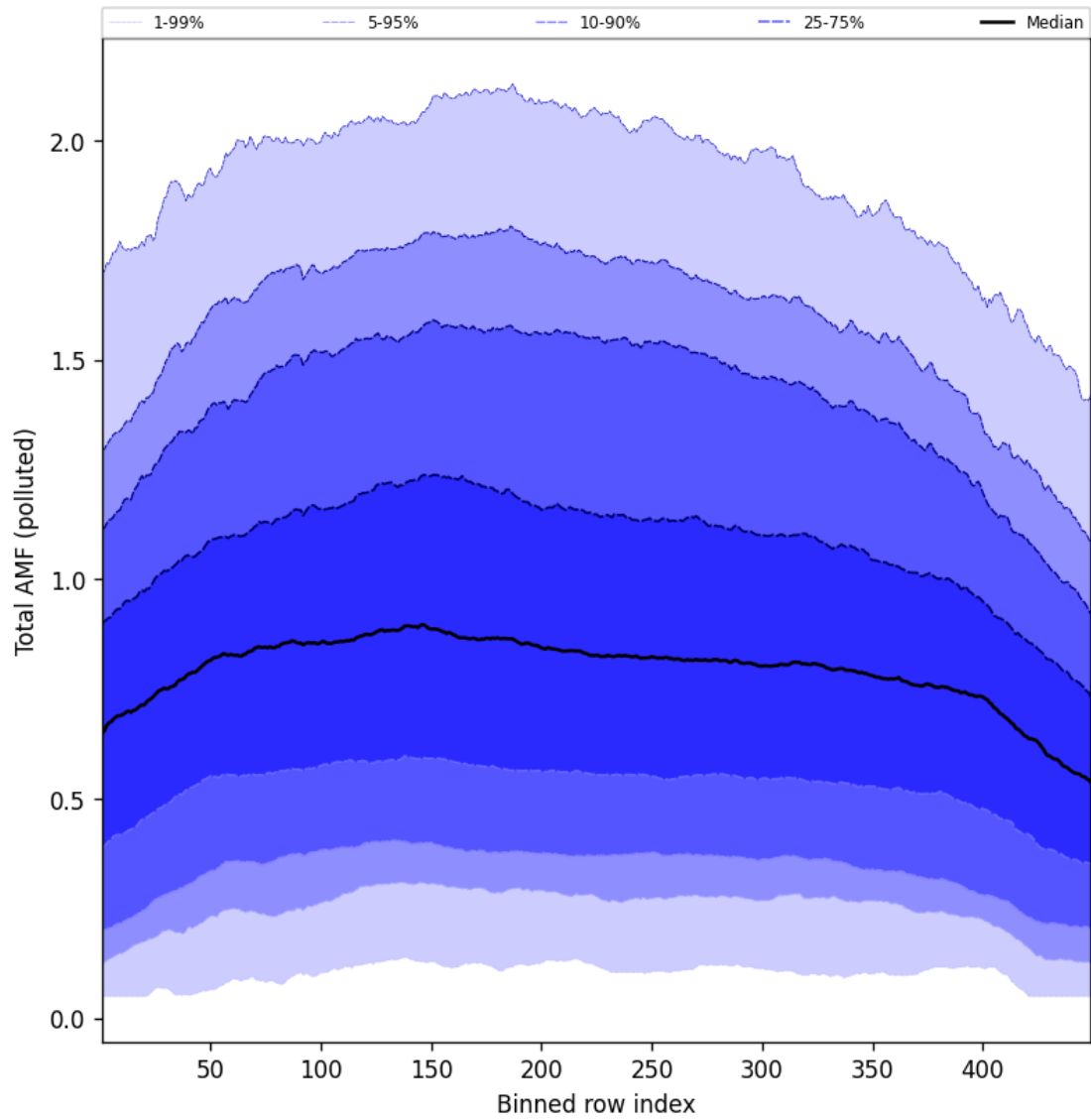


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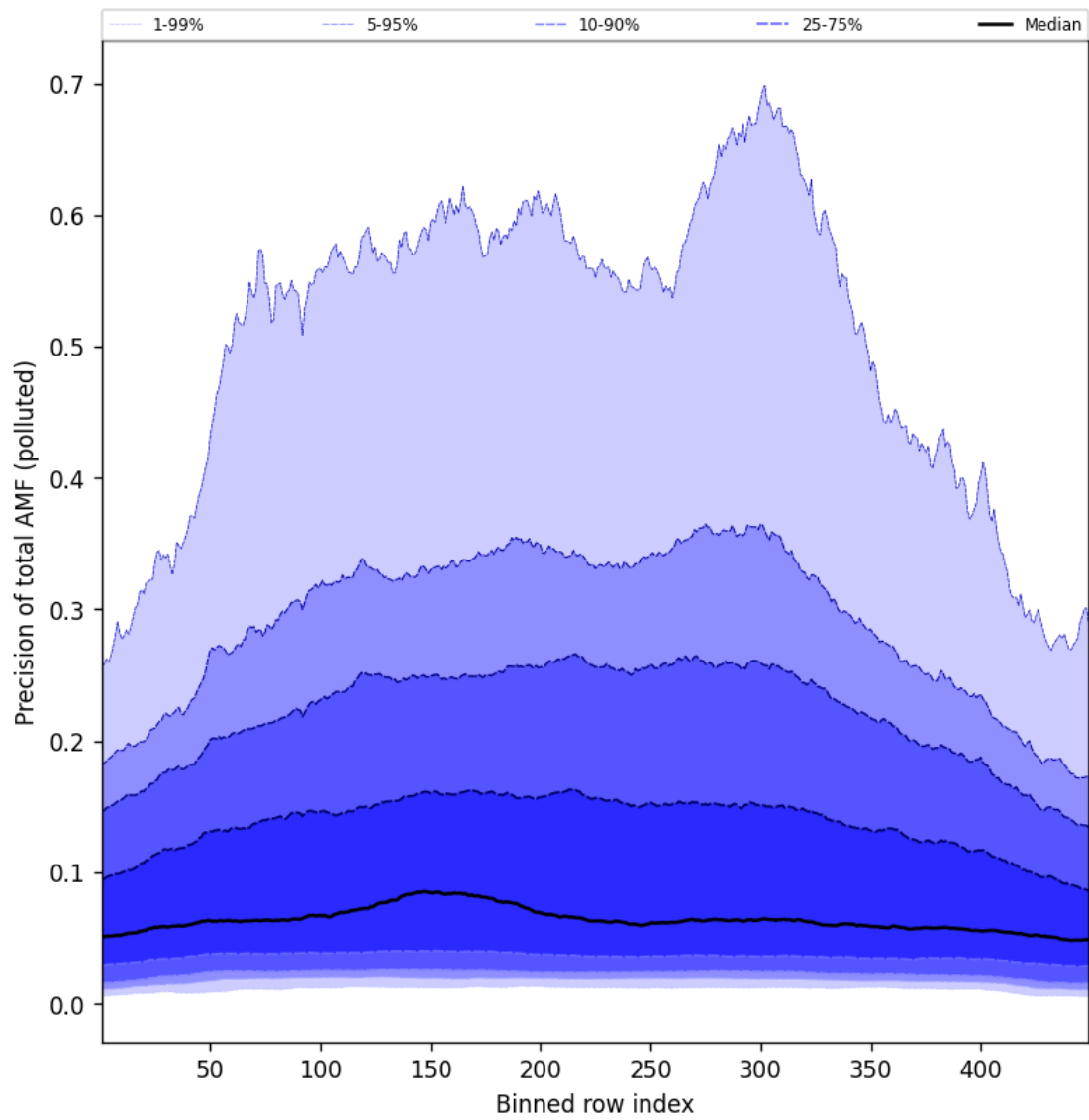


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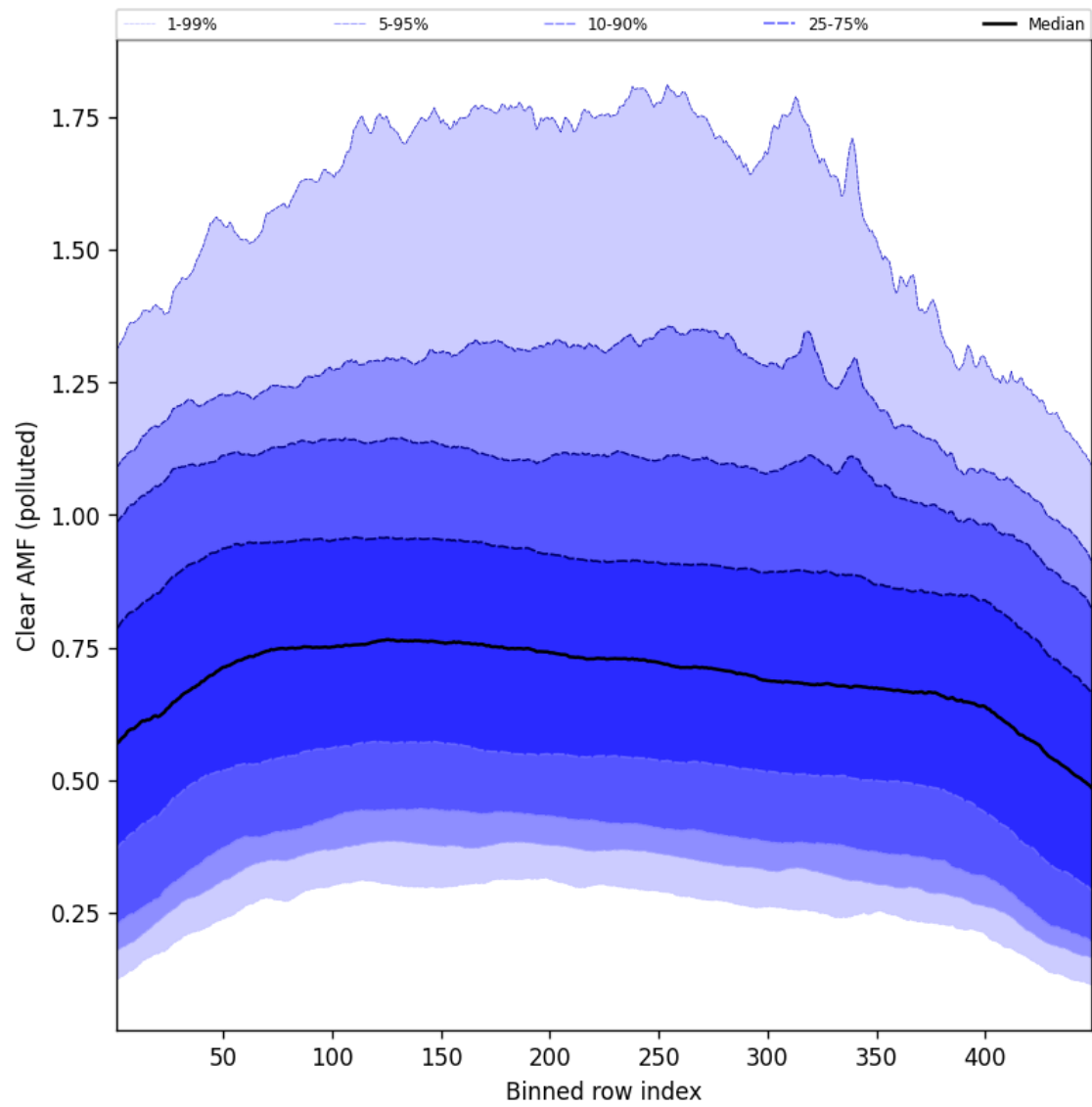


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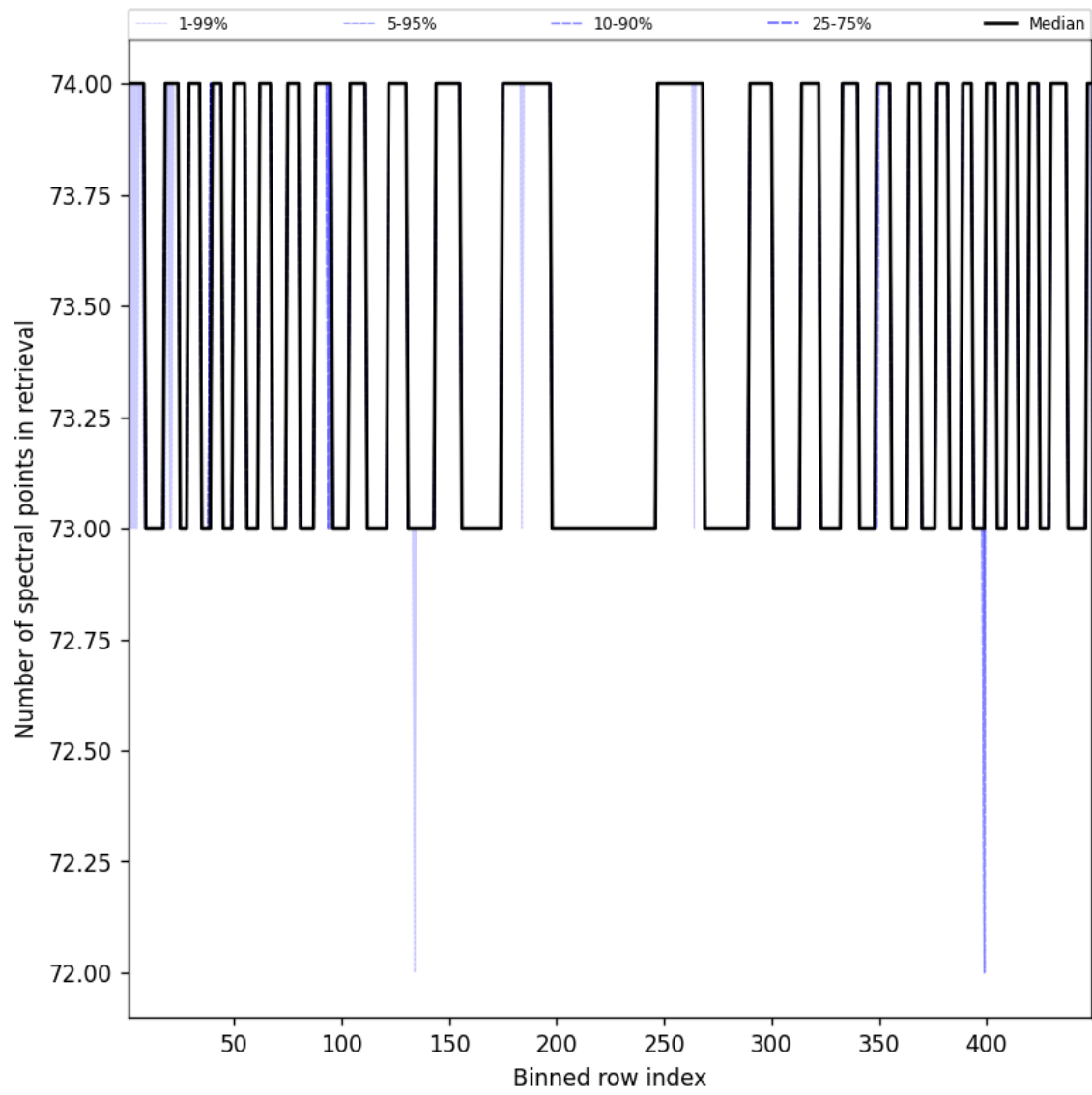


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## 10 Coincidence density

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

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