PyCAMA report generated by tropl2-proc

tropl2-proc

2025-01-26 (01:30)

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]	0.623 ± 0.355	22567800	0.995	0.500	0.720	0.0	1.000
cloud fraction [1]	0.588 ± 0.344	22567800	0.995	0.725	0.588	0.0	1.000
cloud top height [m]	$(0.390 \pm 0.262) \times 10^4$	22567800	1.575×10^3	3.685×10^3	3.385×10^3	0.0	2.000×10^4
cloud optical thickness [1]	18.5 ± 33.8	22567800	9.34	10.4	9.21	1.000	250
cloud fraction crb [1]	0.587 ± 0.344	22567800	0.995	0.726	0.588	0.0	1.000
cloud height crb [m]	$(0.294 \pm 0.224) \times 10^4$	22567800	75.0	2.926×10^3	2.467×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.610 ± 0.210	22567800	0.995	0.297	0.592	0.0	1.000
surface albedo fitted [1]	0.274 ± 0.354	22567800	1.500×10^{-2}	0.481	4.400×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.261 ± 0.340	22567800	1.500×10^{-2}	0.480	3.238×10^{-2}	0.0	1.000
fitted root mean square [1]	$(7.906 \pm 12.679) \times 10^{-4}$	22567800	5.000×10^{-5}	1.004×10^{-3}	4.660×10^{-4}	8.099×10^{-7}	1.15
fitted root mean square crb [1]	$(7.075 \pm 11.943) \times 10^{-4}$	22567800	5.000×10^{-5}	9.578×10^{-4}	3.760×10^{-4}	7.132×10^{-7}	1.32
wavelength shift [nm]	$(8.527 \pm 7.096) \times 10^{-3}$	22567800	9.000×10^{-4}	1.027×10^{-2}	8.212×10^{-3}	-6.945×10^{-2}	0.535
cloud fraction apriori [1]	0.593 ± 0.348	22567800	0.995	0.738	0.599	0.0	1.000
reflectance blue ocra [1]	0.586 ± 0.233	22567800	0.265	0.416	0.574	0.135	1.95
reflectance green ocra [1]	0.538 ± 0.264	22567800	0.185	0.490	0.534	7.748×10^{-2}	1.95
reflectance continuum aband [1]	0.491 ± 0.291	22567800	4.500×10^{-2}	0.512	0.500	1.192×10^{-2}	6.04

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	0.0	0.0	0.0	4.000×10^{-2}	0.400	0.900	0.990	1.000	1.000	1.000
cloud fraction [1]	2.225×10^{-2}	7.035×10^{-2}	0.109	0.160	0.264	0.989	1.000	1.000	1.000	1.000
cloud top height [m]	199	676	1.052×10^{3}	1.369×10^{3}	1.790×10^{3}	5.474×10^{3}	6.587×10^{3}	7.612×10^{3}	8.960×10^{3}	1.126×10^{4}
cloud optical thickness [1]	1.000	2.61	3.72	4.61	5.58	16.0	23.7	34.7	60.5	249
cloud fraction crb [1]	2.187×10^{-2}	6.939×10^{-2}	0.108	0.159	0.263	0.989	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	223	542	823	1.182×10^{3}	4.108×10^{3}	5.216×10^{3}	6.245×10^{3}	7.464×10^{3}	9.464×10^{3}
cloud albedo crb [1]	5.670×10^{-2}	0.266	0.371	0.424	0.469	0.766	0.849	0.905	0.969	1.000
surface albedo fitted [1]	0.0	6.166×10^{-3}	1.042×10^{-2}	1.385×10^{-2}	1.896×10^{-2}	0.500	0.840	0.930	0.972	1.000
surface albedo fitted crb [1]	0.0	4.810×10^{-3}	7.558×10^{-3}	1.016×10^{-2}	1.409×10^{-2}	0.494	0.813	0.877	0.913	0.954
fitted root mean square [1]	1.511×10^{-5}	2.977×10^{-5}	5.011×10^{-5}	8.072×10^{-5}	1.416×10^{-4}	1.146×10^{-3}	1.580×10^{-3}	1.984×10^{-3}	2.507×10^{-3}	3.626×10^{-3}
fitted root mean square crb [1]	9.130×10^{-6}	2.126×10^{-5}	3.650×10^{-5}	5.770×10^{-5}	1.024×10^{-4}	1.060×10^{-3}	1.477×10^{-3}	1.862×10^{-3}	2.382×10^{-3}	3.442×10^{-3}
wavelength shift [nm]	-7.800×10^{-3}	-7.285×10^{-4}	3.324×10^{-4}	1.330×10^{-3}	3.132×10^{-3}	1.341×10^{-2}	1.567×10^{-2}	1.761×10^{-2}	2.016×10^{-2}	2.592×10^{-2}
cloud fraction apriori [1]	3.271×10^{-2}	6.811×10^{-2}	0.105	0.155	0.262	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.235	0.259	0.284	0.316	0.373	0.788	0.859	0.903	0.935	1.04
reflectance green ocra [1]	0.153	0.174	0.194	0.223	0.282	0.771	0.850	0.900	0.936	1.02
reflectance continuum aband [1]	2.918×10^{-2}	5.377×10^{-2}	8.747×10^{-2}	0.133	0.229	0.741	0.822	0.872	0.915	1.03

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]	0.598 ± 0.385	7982277	0.690	0.770	0.0	1.000	0.260	0.950
cloud fraction [1]	0.536 ± 0.349	7982277	0.731	0.501	0.0	1.000	0.199	0.930
cloud top height [m]	$(0.405 \pm 0.259) \times 10^4$	7982277	3.820×10^3	3.439×10^3	0.0	2.000×10^4	1.944×10^3	5.764×10^3
cloud optical thickness [1]	26.6 ± 46.7	7982277	15.7	10.2	1.000	250	6.18	21.9
cloud fraction crb [1]	0.535 ± 0.349	7982277	0.730	0.498	0.0	1.000	0.198	0.928
cloud height crb [m]	$(0.339 \pm 0.229) \times 10^4$	7982277	3.489×10^3	2.882×10^3	0.0	2.000×10^4	1.456×10^3	4.945×10^3
cloud albedo crb [1]	0.584 ± 0.198	7982277	0.245	0.573	0.0	1.000	0.464	0.709
surface albedo fitted [1]	0.157 ± 0.202	7982277	0.228	4.233×10^{-2}	0.0	1.000	2.224×10^{-2}	0.250
surface albedo fitted crb [1]	0.148 ± 0.198	7982277	0.229	3.118×10^{-2}	0.0	1.000	1.640×10^{-2}	0.245
fitted root mean square [1]	$(4.428 \pm 6.447) \times 10^{-4}$	7982277	4.620×10^{-4}	2.317×10^{-4}	8.099×10^{-7}	0.104	8.988×10^{-5}	5.519×10^{-4}
fitted root mean square crb [1]	$(3.784 \pm 5.502) \times 10^{-4}$	7982277	4.028×10^{-4}	1.650×10^{-4}	9.518×10^{-7}	2.178×10^{-2}	5.890×10^{-5}	4.617×10^{-4}
wavelength shift [nm]	$(6.509 \pm 6.610) \times 10^{-3}$	7982277	8.801×10^{-3}	5.614×10^{-3}	-4.660×10^{-2}	6.018×10^{-2}	1.722×10^{-3}	1.052×10^{-2}
cloud fraction apriori [1]	0.539 ± 0.354	7982277	0.763	0.501	0.0	1.000	0.194	0.957
reflectance blue ocra [1]	0.528 ± 0.201	7982277	0.317	0.503	0.135	1.95	0.357	0.674
reflectance green ocra [1]	0.468 ± 0.228	7982277	0.384	0.443	7.748×10^{-2}	1.95	0.261	0.645
reflectance continuum aband [1]	0.418 ± 0.265	7982277	0.426	0.398	1.332×10^{-2}	5.43	0.191	0.617

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]	0.637 ± 0.337	14585523	0.500	0.700	0.0	1.000	0.400	0.900
cloud fraction [1]	0.616 ± 0.338	14585523	0.688	0.634	0.0	1.000	0.312	0.999
cloud top height [m]	$(0.382 \pm 0.263) \times 10^4$	14585523	3.654×10^3	3.354×10^3	0.0	2.000×10^4	1.688×10^3	5.342×10^3
cloud optical thickness [1]	14.0 ± 22.7	14585523	8.64	8.83	1.000	250	5.33	14.0
cloud fraction crb [1]	0.616 ± 0.338	14585523	0.688	0.635	0.0	1.000	0.311	1.000
cloud height crb [m]	$(0.270 \pm 0.218) \times 10^4$	14585523	2.690×10^3	2.280×10^3	0.0	2.000×10^4	1.012×10^3	3.701×10^3
cloud albedo crb [1]	0.624 ± 0.215	14585523	0.325	0.608	0.0	1.000	0.472	0.797
surface albedo fitted [1]	0.338 ± 0.400	14585523	0.808	4.625×10^{-2}	0.0	1.000	1.722×10^{-2}	0.825
surface albedo fitted crb [1]	0.322 ± 0.383	14585523	0.790	3.363×10^{-2}	0.0	1.000	1.271×10^{-2}	0.803
fitted root mean square [1]	$(9.809 \pm 14.689) \times 10^{-4}$	14585523	1.234×10^{-3}	7.064×10^{-4}	1.004×10^{-6}	1.15	2.157×10^{-4}	1.450×10^{-3}
fitted root mean square crb [1]	$(8.876 \pm 13.963) \times 10^{-4}$	14585523	1.187×10^{-3}	6.221×10^{-4}	7.132×10^{-7}	1.32	1.657×10^{-4}	1.353×10^{-3}
wavelength shift [nm]	$(9.632 \pm 7.109) \times 10^{-3}$	14585523	1.010×10^{-2}	9.775×10^{-3}	-6.945×10^{-2}	0.535	4.413×10^{-3}	1.452×10^{-2}
cloud fraction apriori [1]	0.622 ± 0.341	14585523	0.685	0.649	0.0	1.000	0.315	1.000
reflectance blue ocra [1]	0.618 ± 0.242	14585523	0.452	0.633	0.138	1.93	0.386	0.838
reflectance green ocra [1]	0.577 ± 0.274	14585523	0.524	0.604	8.677×10^{-2}	1.89	0.303	0.827
reflectance continuum aband [1]	0.531 ± 0.297	14585523	0.527	0.570	1.192×10^{-2}	6.04	0.265	0.793

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]	0.708 ± 0.326	14484841	0.550	0.880	0.0	1.000	0.400	0.950
cloud fraction [1]	0.614 ± 0.366	14484841	0.766	0.683	0.0	1.000	0.234	1.000
cloud top height [m]	$(0.347 \pm 0.257) \times 10^4$	14484841	3.254×10^3	2.659×10^3	0.0	2.000×10^4	1.558×10^3	4.812×10^3
cloud optical thickness [1]	18.2 ± 28.4	14484841	10.3	10.3	1.000	250	7.16	17.5
cloud fraction crb [1]	0.613 ± 0.366	14484841	0.768	0.681	0.0	1.000	0.232	1.000
cloud height crb [m]	$(0.278 \pm 0.234) \times 10^4$	14484841	2.995×10^3	2.022×10^3	0.0	2.000×10^4	1.007×10^3	4.002×10^3
cloud albedo crb [1]	0.555 ± 0.171	14484841	0.215	0.538	0.0	1.000	0.451	0.666
surface albedo fitted [1]	$(7.401 \pm 16.014) \times 10^{-2}$	14484841	2.693×10^{-2}	2.356×10^{-2}	0.0	1.000	1.401×10^{-2}	4.094×10^{-2}
surface albedo fitted crb [1]	$(6.875 \pm 16.209) \times 10^{-2}$	14484841	1.993×10^{-2}	1.758×10^{-2}	0.0	1.000	1.027×10^{-2}	3.020×10^{-2}
fitted root mean square [1]	$(7.266 \pm 12.291) \times 10^{-4}$	14484841	9.707×10^{-4}	3.337×10^{-4}	8.099×10^{-7}	0.425	9.537×10^{-5}	1.066×10^{-3}
fitted root mean square crb [1]	$(6.896 \pm 10.832) \times 10^{-4}$	14484841	9.588×10^{-4}	3.087×10^{-4}	7.132×10^{-7}	0.522	8.130×10^{-5}	1.040×10^{-3}
wavelength shift [nm]	$(7.968 \pm 7.418) \times 10^{-3}$	14484841	1.049×10^{-2}	7.312×10^{-3}	-4.660×10^{-2}	0.444	2.465×10^{-3}	1.295×10^{-2}
cloud fraction apriori [1]	0.613 ± 0.371	14484841	0.778	0.683	0.0	1.000	0.222	1.000
reflectance blue ocra [1]	0.509 ± 0.197	14484841	0.321	0.479	0.152	1.90	0.338	0.659
reflectance green ocra [1]	0.450 ± 0.225	14484841	0.391	0.420	8.681×10^{-2}	1.95	0.240	0.631
reflectance continuum aband [1]	0.388 ± 0.264	14484841	0.468	0.366	1.192×10^{-2}	6.04	0.136	0.605

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]	0.477 ± 0.346	6875900	0.700	0.600	0.0	1.000	0.0	0.700
cloud fraction [1]	0.535 ± 0.289	6875900	0.462	0.509	0.0	1.000	0.310	0.771
cloud top height [m]	$(0.474 \pm 0.247) \times 10^4$	6875900	2.924×10^3	4.633×10^3	0.0	2.000×10^4	3.093×10^3	6.017×10^3
cloud optical thickness [1]	15.9 ± 36.7	6875900	6.55	5.99	1.000	250	4.41	11.0
cloud fraction crb [1]	0.536 ± 0.289	6875900	0.463	0.511	0.0	1.000	0.310	0.773
cloud height crb [m]	$(0.319 \pm 0.197) \times 10^4$	6875900	2.235×10^3	3.038×10^3	0.0	2.000×10^4	1.835×10^3	4.070×10^3
cloud albedo crb [1]	0.722 ± 0.234	6875900	0.324	0.779	0.0	1.000	0.581	0.906
surface albedo fitted [1]	0.682 ± 0.311	6875900	0.619	0.849	0.0	1.000	0.332	0.951
surface albedo fitted crb [1]	0.653 ± 0.291	6875900	0.566	0.820	0.0	1.000	0.328	0.894
fitted root mean square [1]	$(9.604 \pm 11.781) \times 10^{-4}$	6875900	1.015×10^{-3}	7.030×10^{-4}	1.578×10^{-6}	1.15	3.387×10^{-4}	1.354×10^{-3}
fitted root mean square crb [1]	$(7.912 \pm 11.620) \times 10^{-4}$	6875900	9.639×10^{-4}	5.509×10^{-4}	1.270×10^{-6}	1.32	2.042×10^{-4}	1.168×10^{-3}
wavelength shift [nm]	$(1.004 \pm 0.621) \times 10^{-2}$	6875900	8.994×10^{-3}	1.020×10^{-2}	-6.945×10^{-2}	9.594×10^{-2}	5.421×10^{-3}	1.442×10^{-2}
cloud fraction apriori [1]	0.553 ± 0.291	6875900	0.470	0.531	0.0	1.000	0.327	0.797
reflectance blue ocra [1]	0.741 ± 0.226	6875900	0.299	0.824	0.135	1.93	0.606	0.905
reflectance green ocra [1]	0.719 ± 0.250	6875900	0.336	0.815	7.748×10^{-2}	1.89	0.570	0.906
reflectance continuum aband [1]	0.700 ± 0.232	6875900	0.339	0.777	1.590×10^{-2}	4.19	0.535	0.874

Table 7: Correlation matrix

Viewing zenith angle	Solar zenith angle	Latitude	Radiometric cloud fraction	Cloud top height	Cloud optical thickness	Cloud fraction (CRB)	Cloud height (CRB)	Cloud albedo (CRB)	OCRA cloud fraction
1.000	-2.143×10^{-2}	1.938×10^{-2}	-4.089×10^{-2}	4.077×10^{-2}	-1.999×10^{-2}	-4.120×10^{-2}	0.111	-3.074×10^{-3}	-4.621×10^{-2}
-2.143×10^{-2}	1.000	6.723×10^{-2}	0.105	6.782×10^{-2}	0.163	0.107	1.760×10^{-2}	0.265	0.121
1.938×10^{-2}	6.723×10^{-2}	1.000	−0.137	8.774×10^{-2}	0.213	−0.140	0.233	−0.177	−0.149
-4.089×10^{-2}	0.105	−0.137	1.000	-7.264×10^{-2}	0.275	1.000	-6.247×10^{-2}	0.298	0.982
4.077×10^{-2}	6.782×10^{-2}	8.774×10^{-2}	-7.264×10^{-2}	1.000	5.502×10^{-2}	-7.145×10^{-2}	0.920	9.737×10^{-2}	-7.659×10^{-2}
-1.999×10^{-2}	0.163	0.213	0.275	5.502×10^{-2}	1.000	0.271	0.127	0.349	0.275
-4.120×10^{-2}	0.107	−0.140	1.000	-7.145×10^{-2}	0.271	1.000	-6.253×10^{-2}	0.298	0.982
0.111	1.760×10^{-2}	0.233	-6.247×10^{-2}	0.920	0.127	-6.253×10^{-2}	1.000	-3.926×10^{-2}	-7.158×10^{-2}
-3.074×10^{-3}	0.265	−0.177	0.298	9.737×10^{-2}	0.349	0.298	-3.926×10^{-2}	1.000	0.321
-4.621×10^{-2}	0.121	−0.149	0.982	-7.659×10^{-2}	0.275	0.982	-7.158×10^{-2}	0.321	1.000

Table 8: Covariance matrix

Viewing zenith angle	Solar zenith angle	Latitude	Radiometric cloud fraction	Cloud top height	Cloud optical thickness	Cloud fraction (CRB)	Cloud height (CRB)	Cloud albedo (CRB)	OCRA cloud fraction
384	-8.82	18.2	-0.275	2.089×10^{3}	-13.2	-0.278	4.858×10^{3}	-1.266×10^{-2}	-0.315
-8.82	441	67.8	0.759	3.728×10^{3}	116	0.771	829	1.17	0.881
18.2	67.8	2.303×10^{3}	-2.26	1.101×10^{4}	345	-2.31	2.507×10^{4}	-1.79	-2.49
-0.275	0.759	-2.26	0.118	-65.4	3.19	0.118	-48.2	2.153×10^{-2}	0.117
2.089×10^{3}	3.728×10^{3}	1.101×10^{4}	-65.4	6.843×10^{6}	4.859×10^{3}	-64.3	5.399×10^{6}	53.6	-69.7
-13.2	116	345	3.19	4.859×10^{3}	1.140×10^{3}	3.15	9.610×10^{3}	2.48	3.23
-0.278	0.771	-2.31	0.118	-64.3	3.15	0.119	-48.3	2.159×10^{-2}	0.118
4.858×10^{3}	829	2.507×10^{4}	-48.2	5.399×10^{6}	9.610×10^{3}	-48.3	5.028×10^{6}	-18.5	-55.8
-1.266×10^{-2}	1.17	-1.79	2.153×10^{-2}	53.6	2.48	2.159×10^{-2}	-18.5	4.421×10^{-2}	2.349×10^{-2}
-0.315	0.881	-2.49	0.117	-69.7	3.23	0.118	-55.8	2.349×10^{-2}	0.121

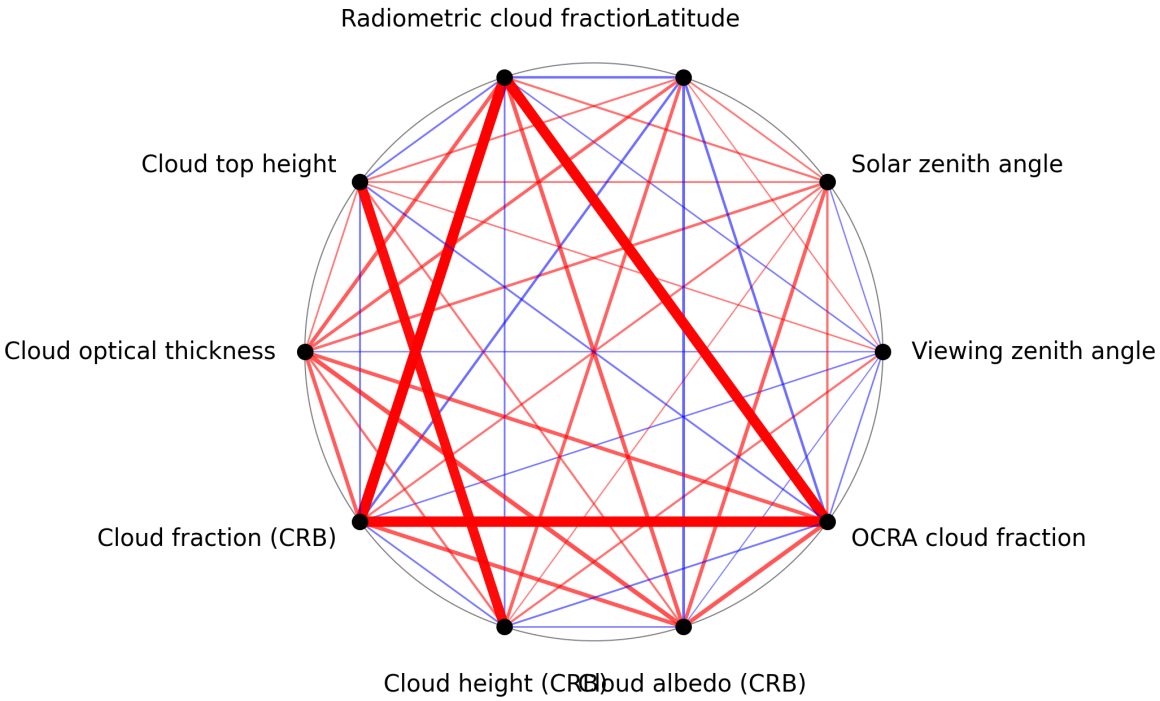

Figure 1: Map of correlation graph for 2025-01-10 to 2025-01-12.

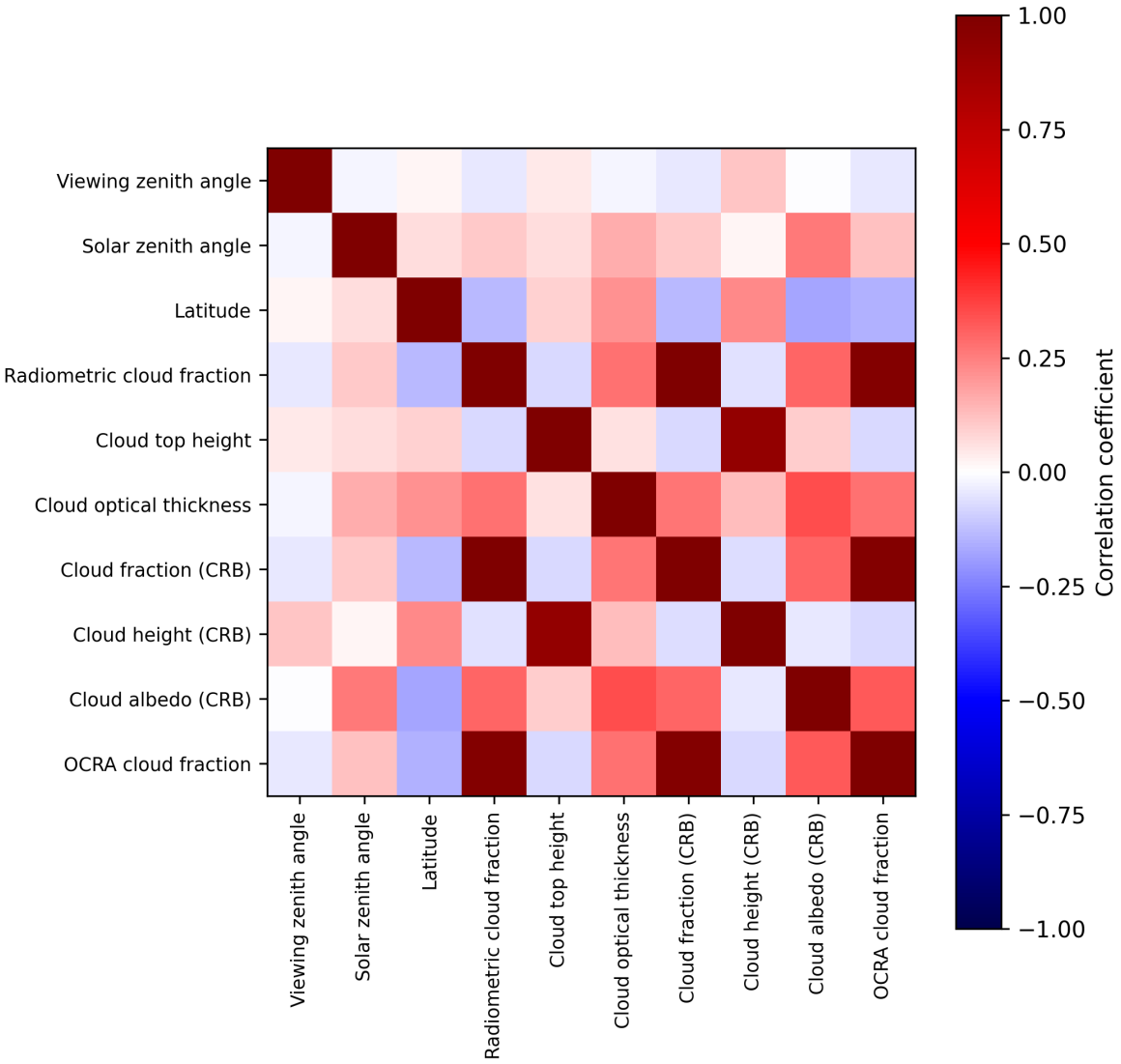

Figure 2: Map of correlation matrix for 2025-01-10 to 2025-01-12.

3 Granule outlines

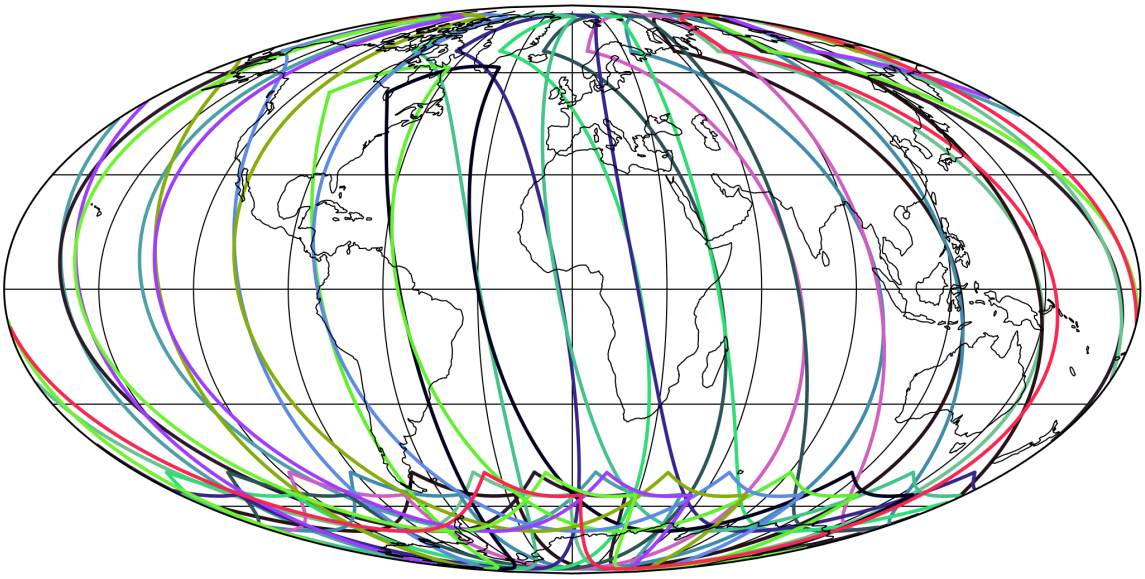

Figure 3: Outline of the granules.

4 Input data monitoring

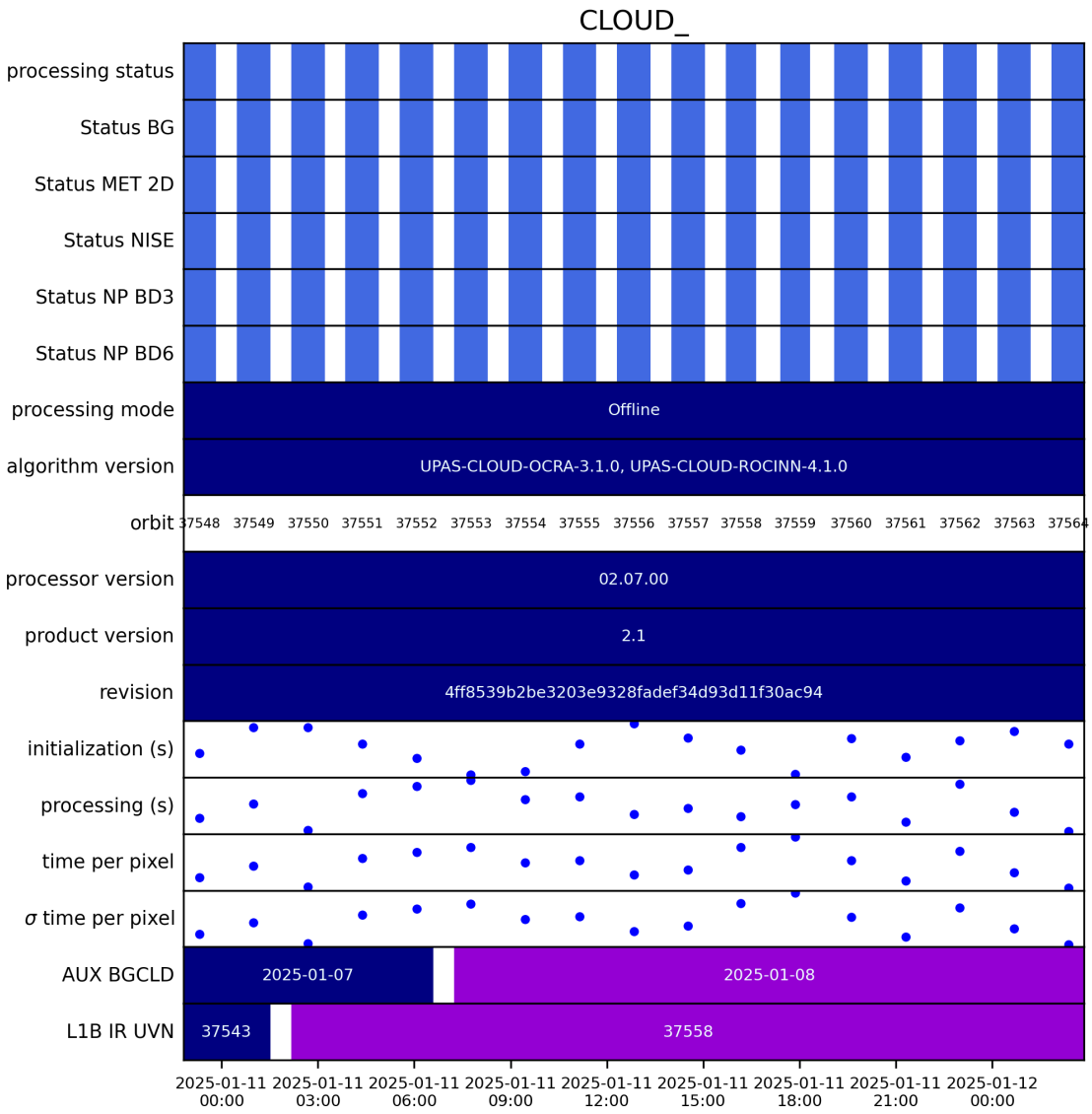

Figure 4: Input data per granule

5 Warnings and errors

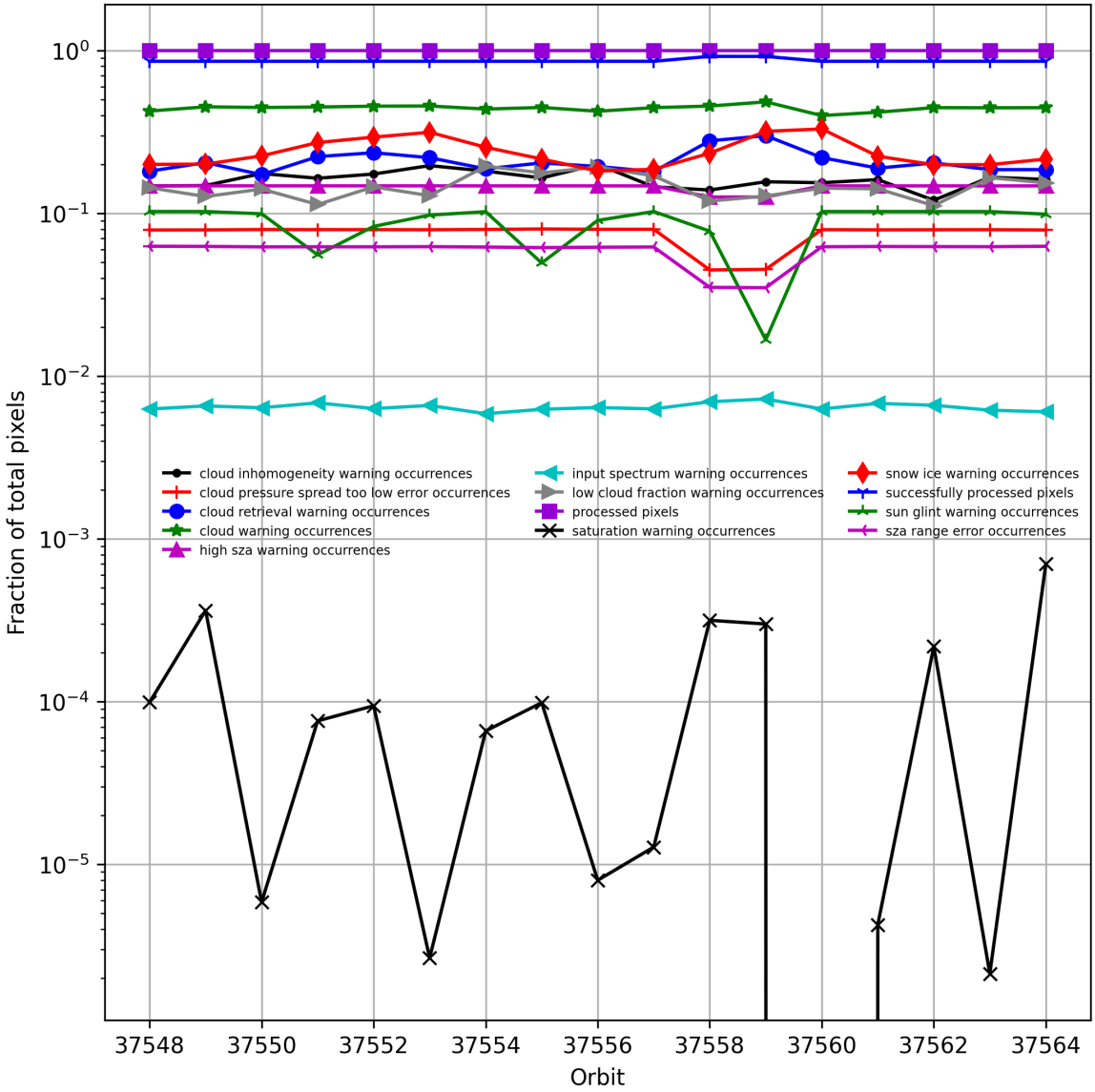

Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

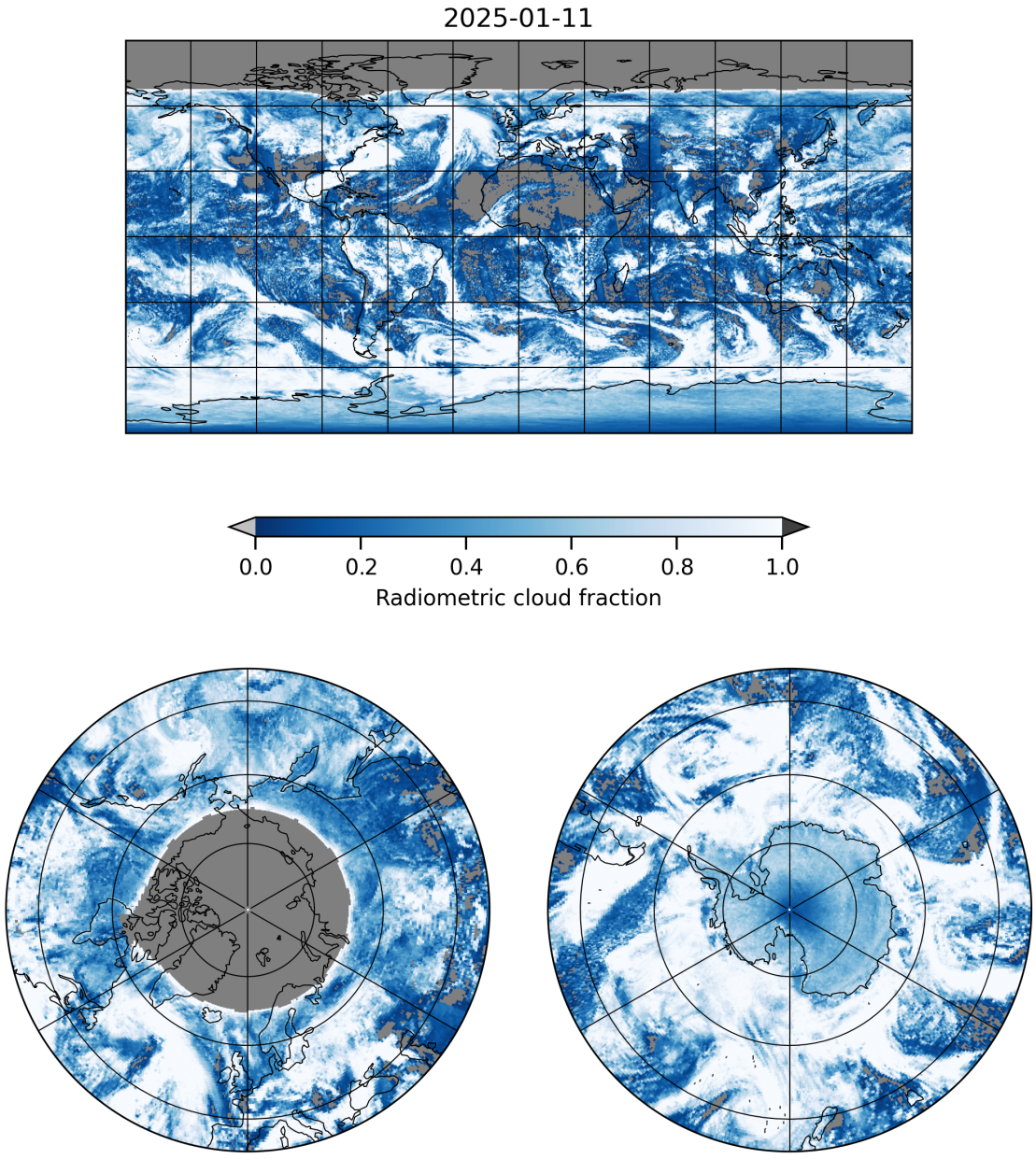

Figure 6: Map of “Radiometric cloud fraction” for 2025-01-10 to 2025-01-12

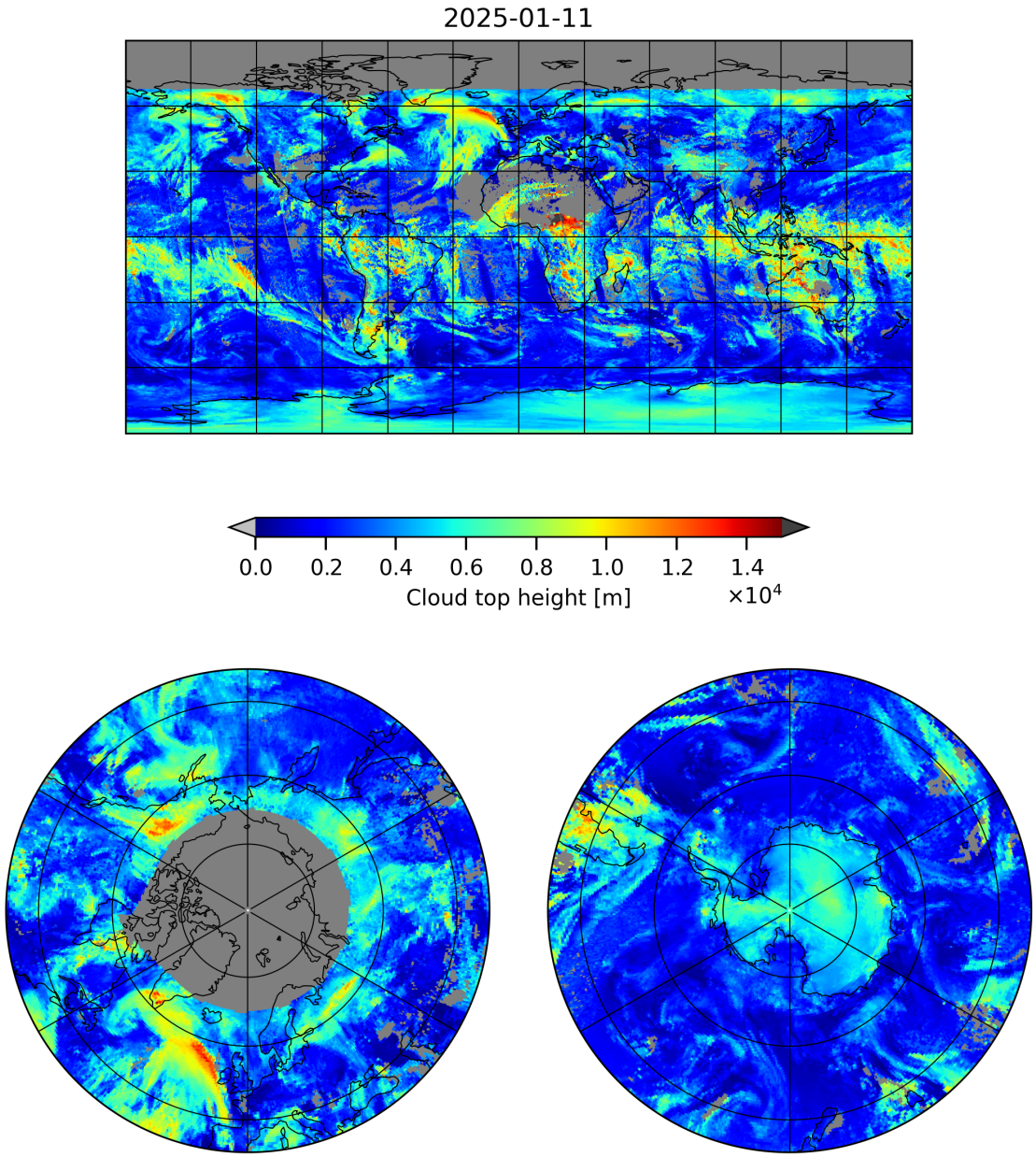

Figure 7: Map of “Cloud top height” for 2025-01-10 to 2025-01-12

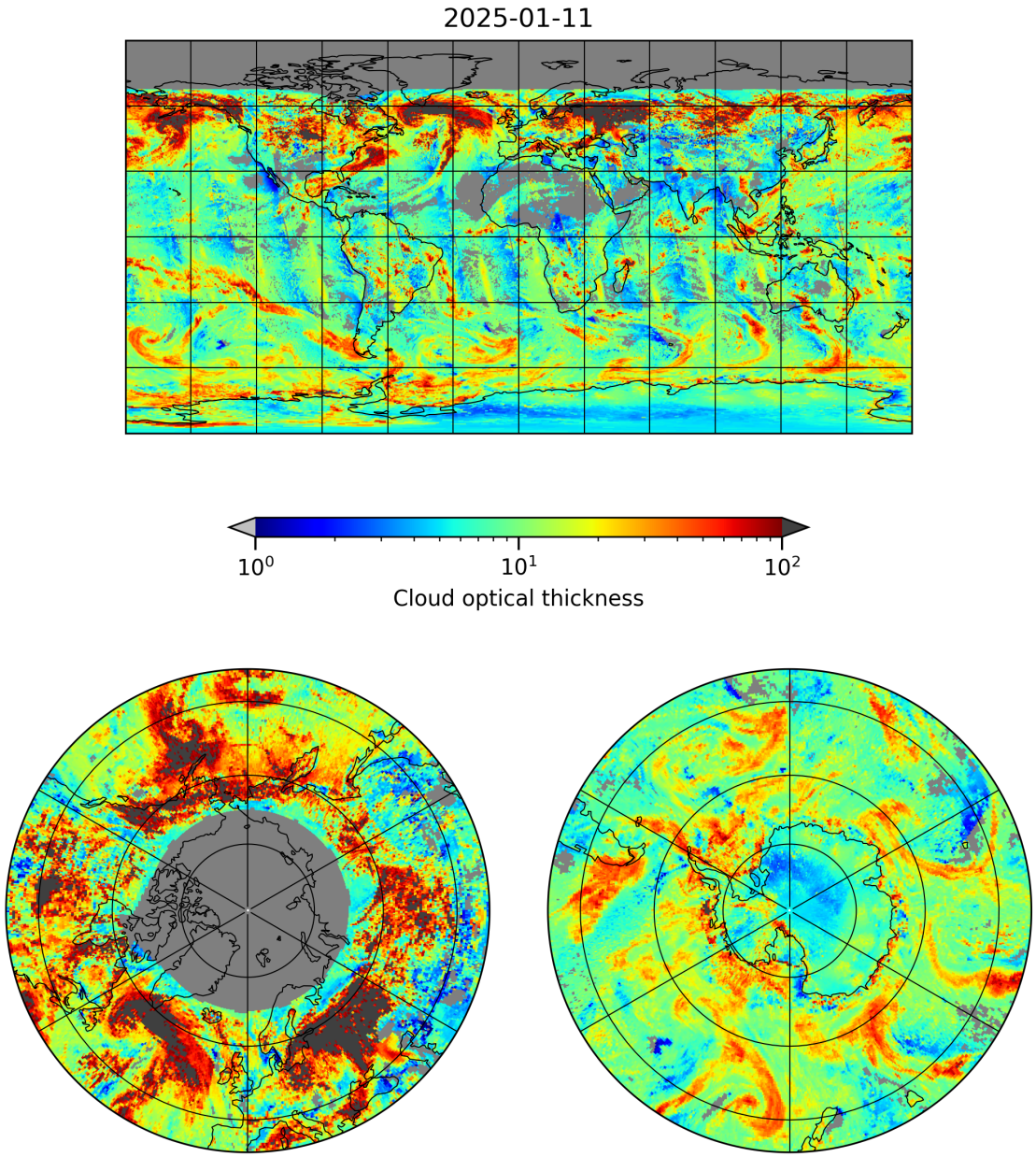

Figure 8: Map of “Cloud optical thickness” for 2025-01-10 to 2025-01-12

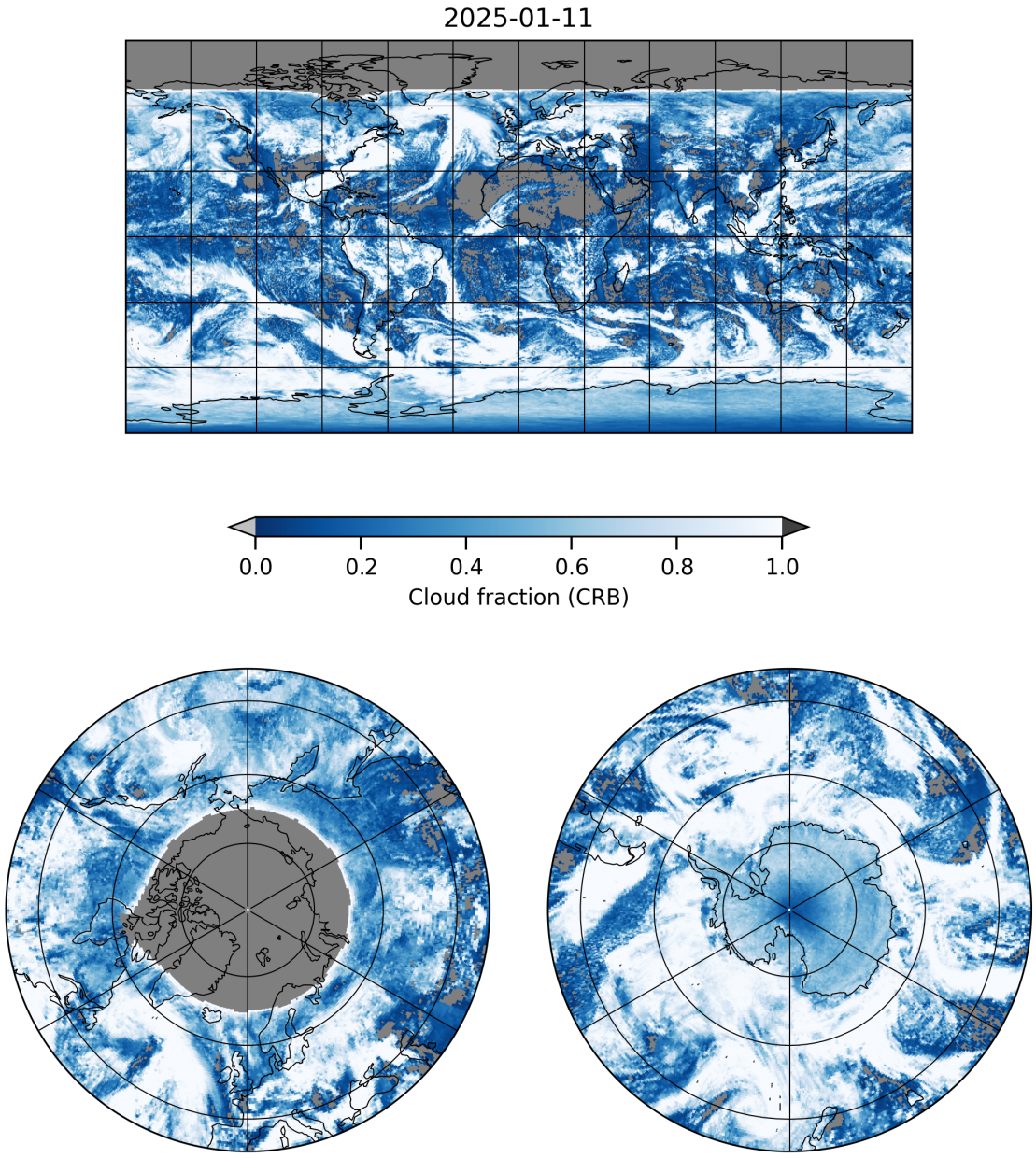

Figure 9: Map of “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12

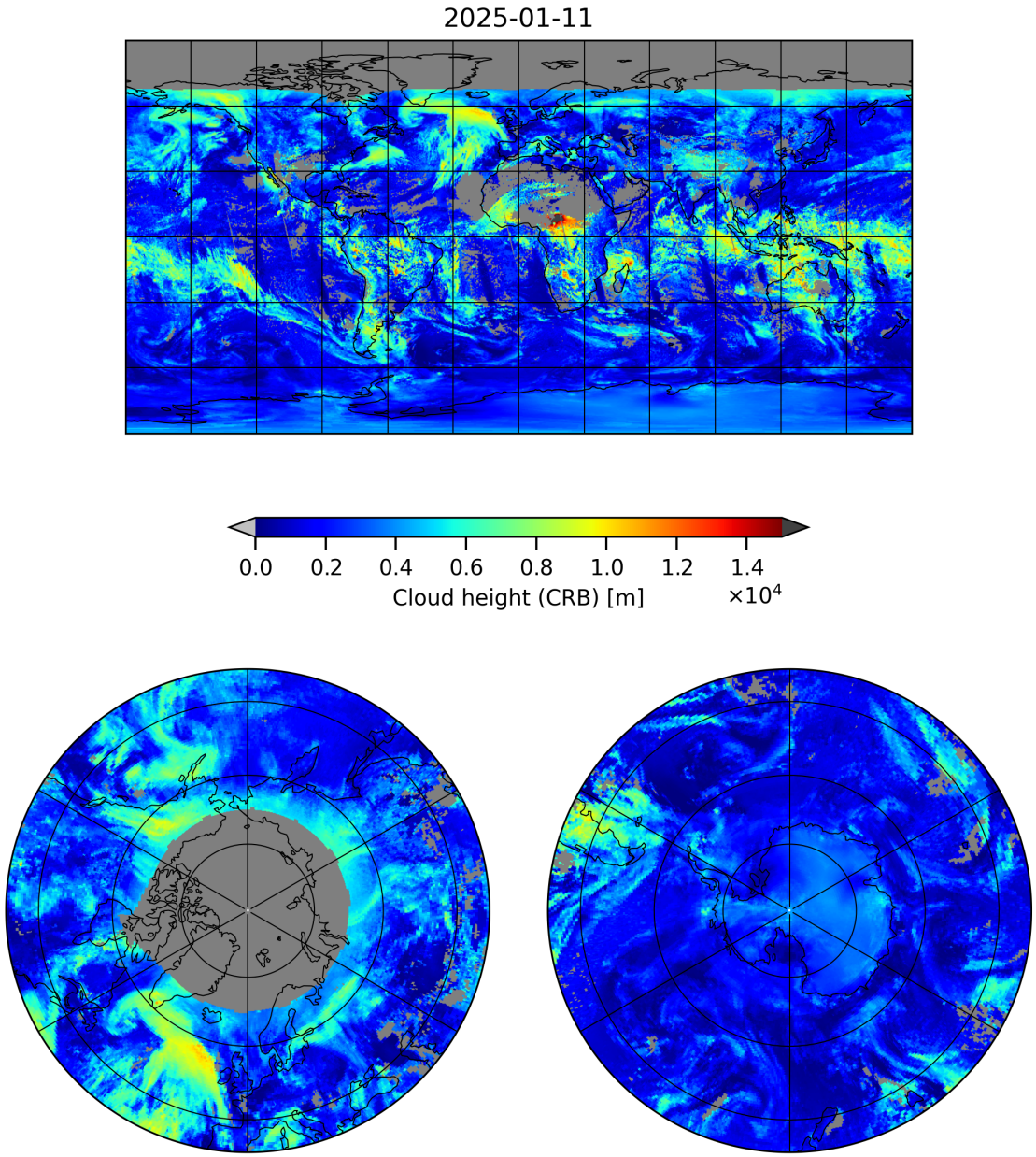

Figure 10: Map of “Cloud height (CRB)” for 2025-01-10 to 2025-01-12

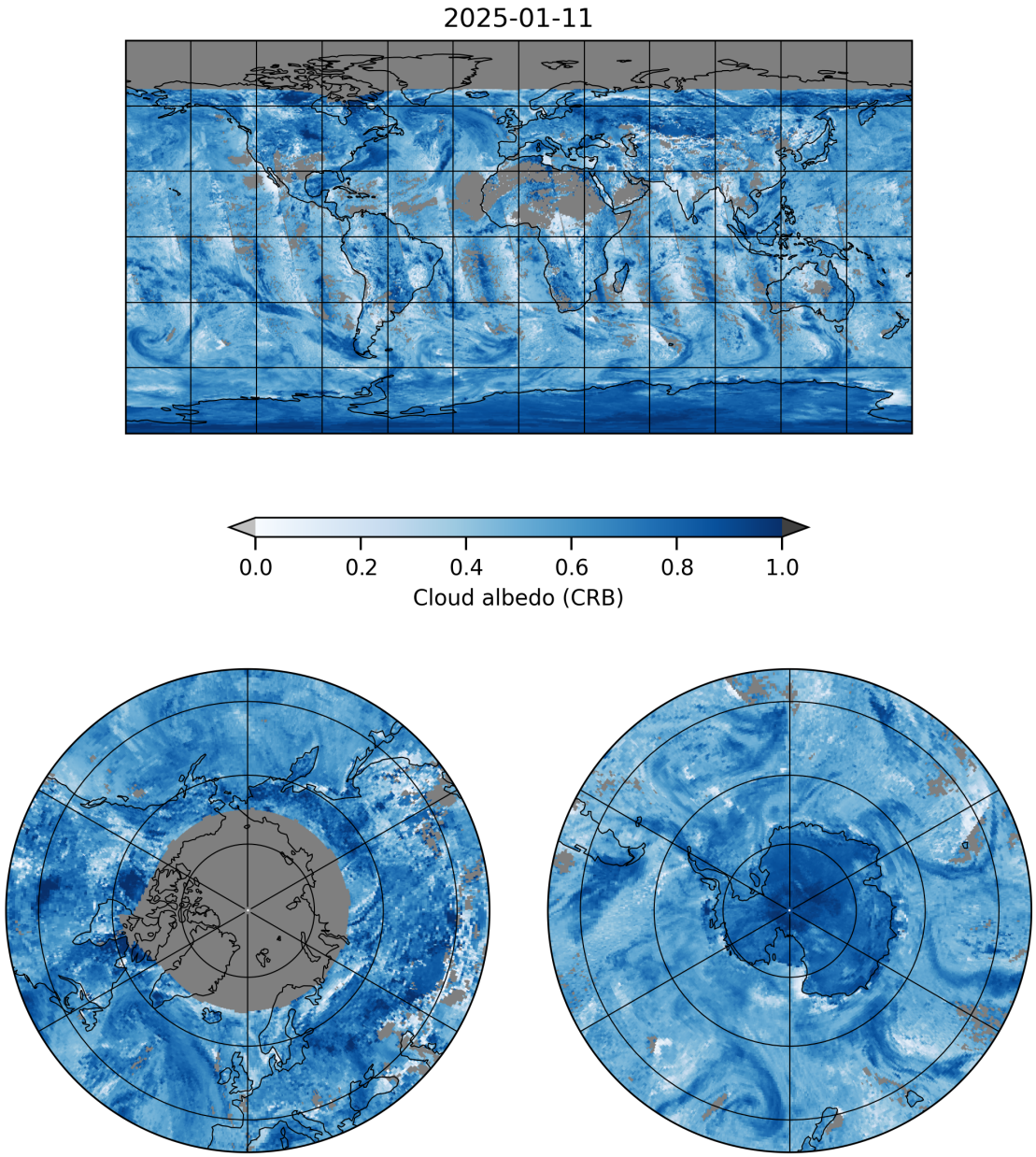

Figure 11: Map of “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12

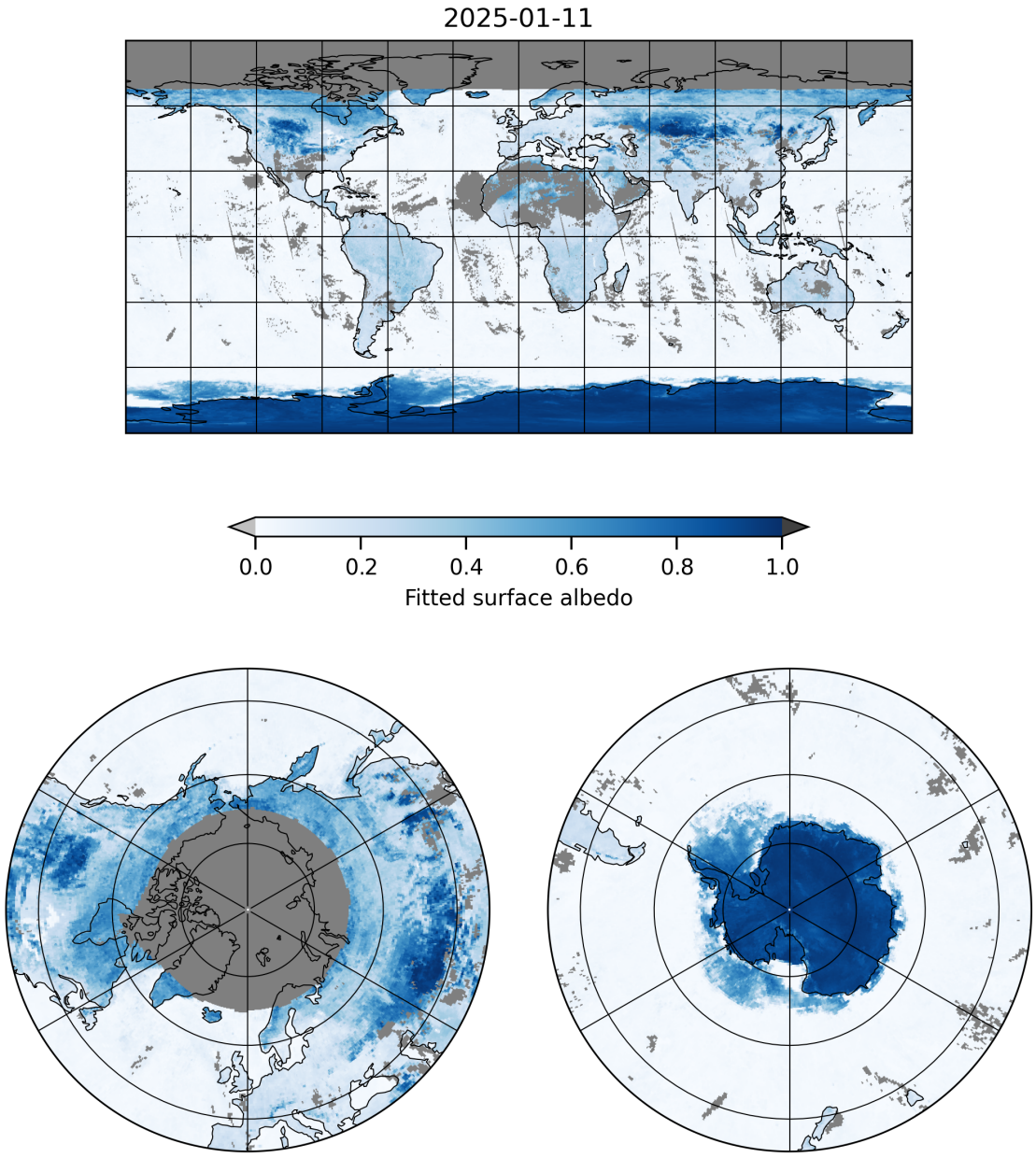

Figure 12: Map of “Fitted surface albedo” for 2025-01-10 to 2025-01-12

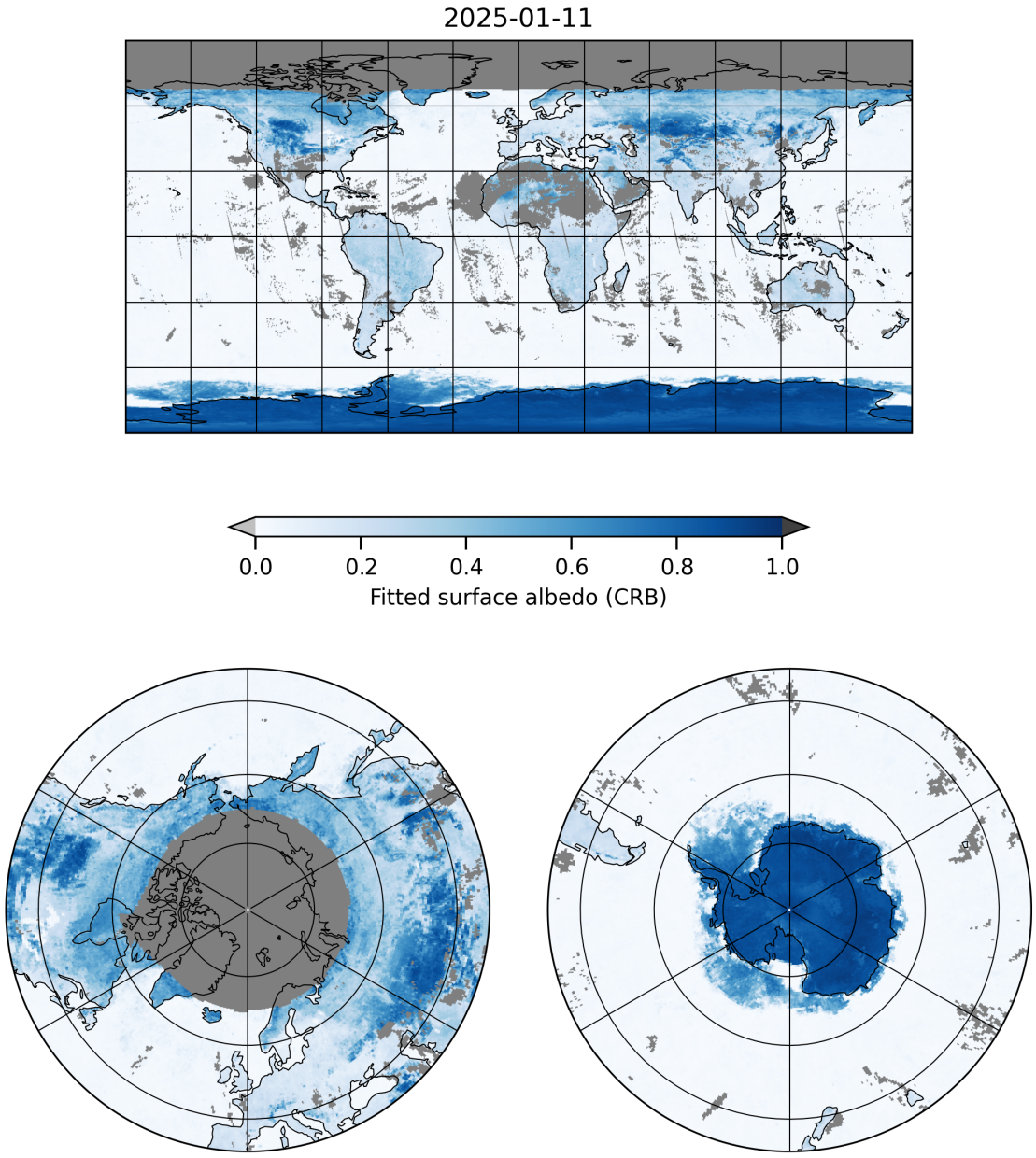

Figure 13: Map of “Fitted surface albedo (CRB)” for 2025-01-10 to 2025-01-12

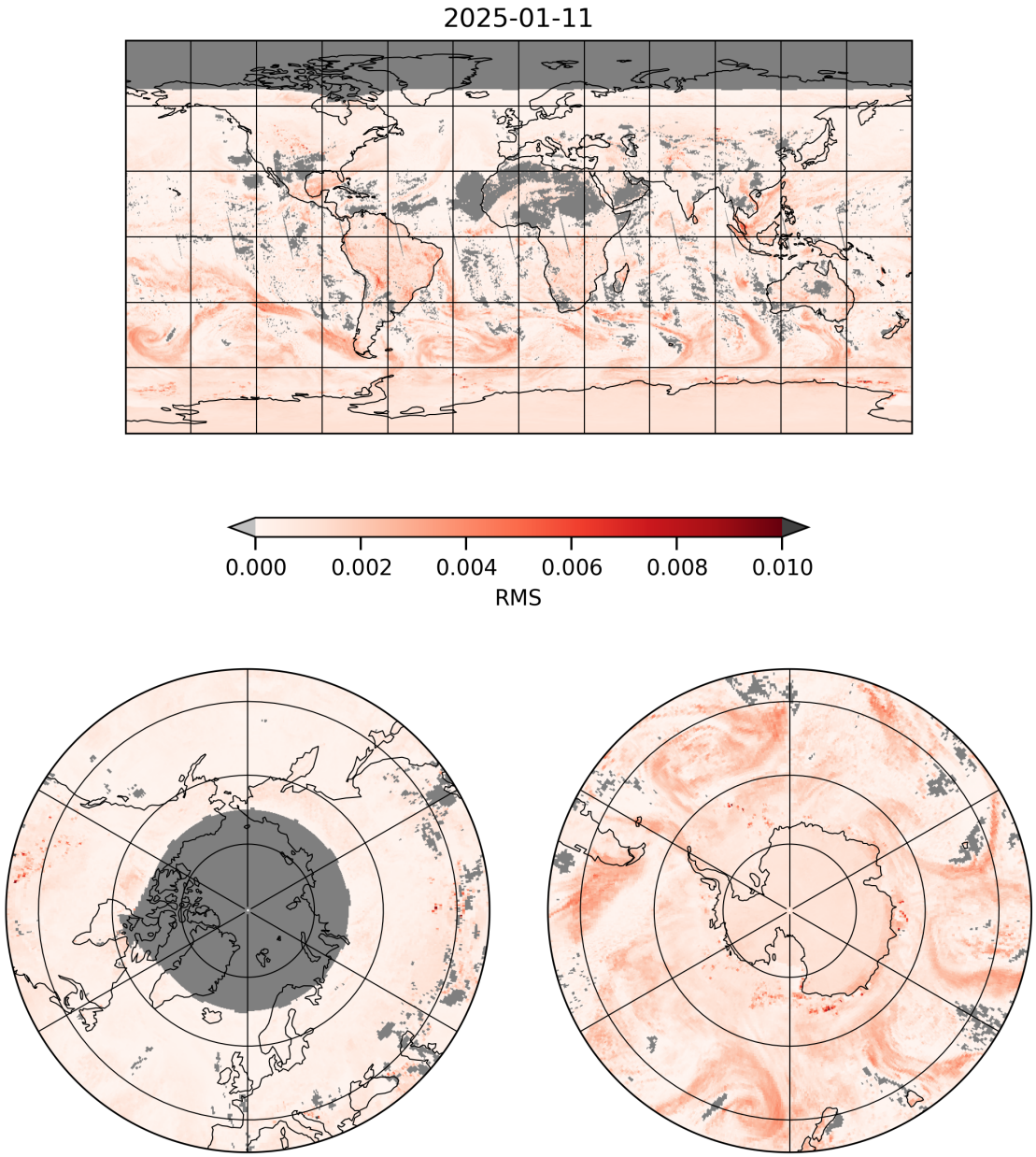

Figure 14: Map of “RMS” for 2025-01-10 to 2025-01-12

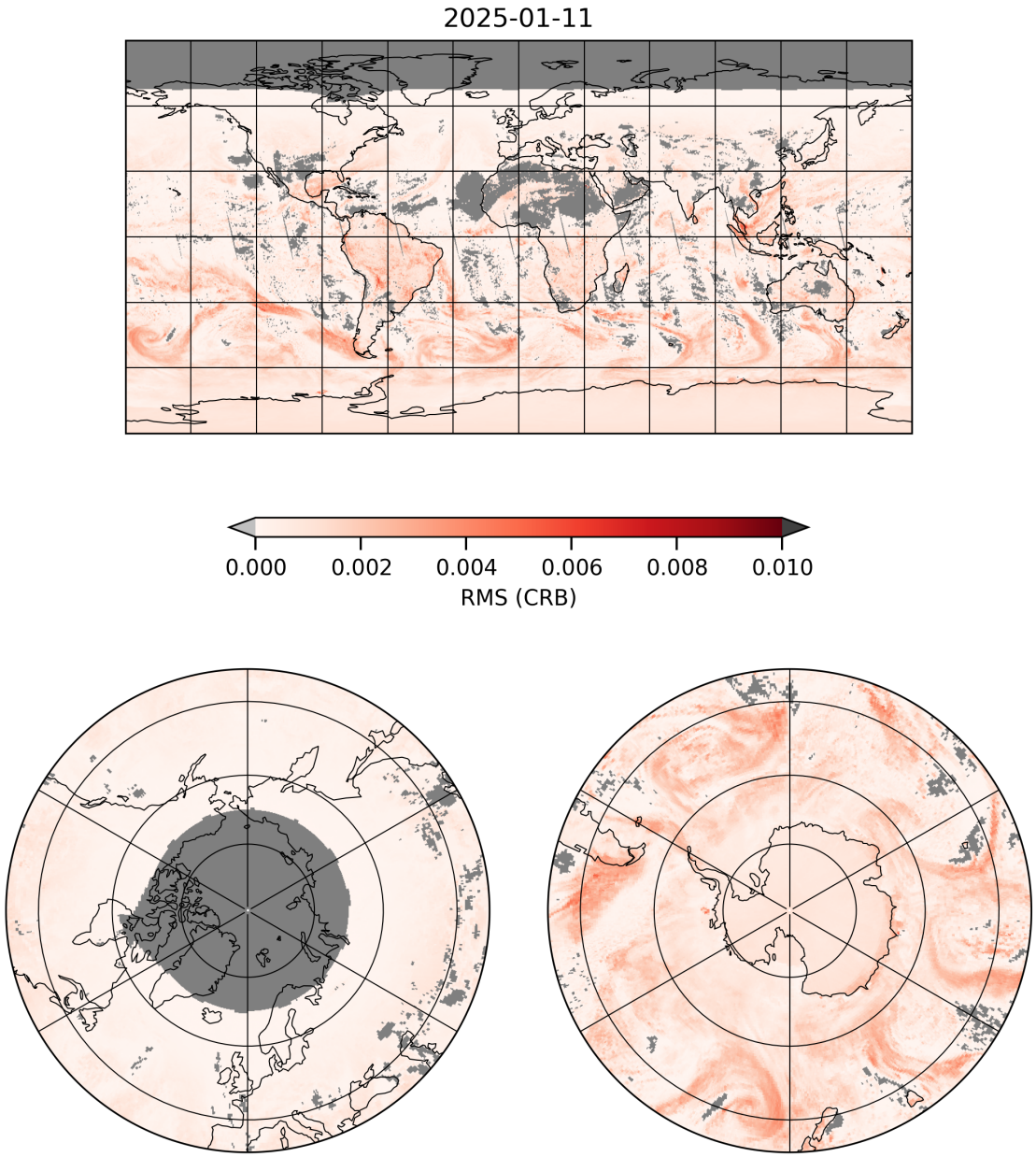

Figure 15: Map of “RMS (CRB)” for 2025-01-10 to 2025-01-12

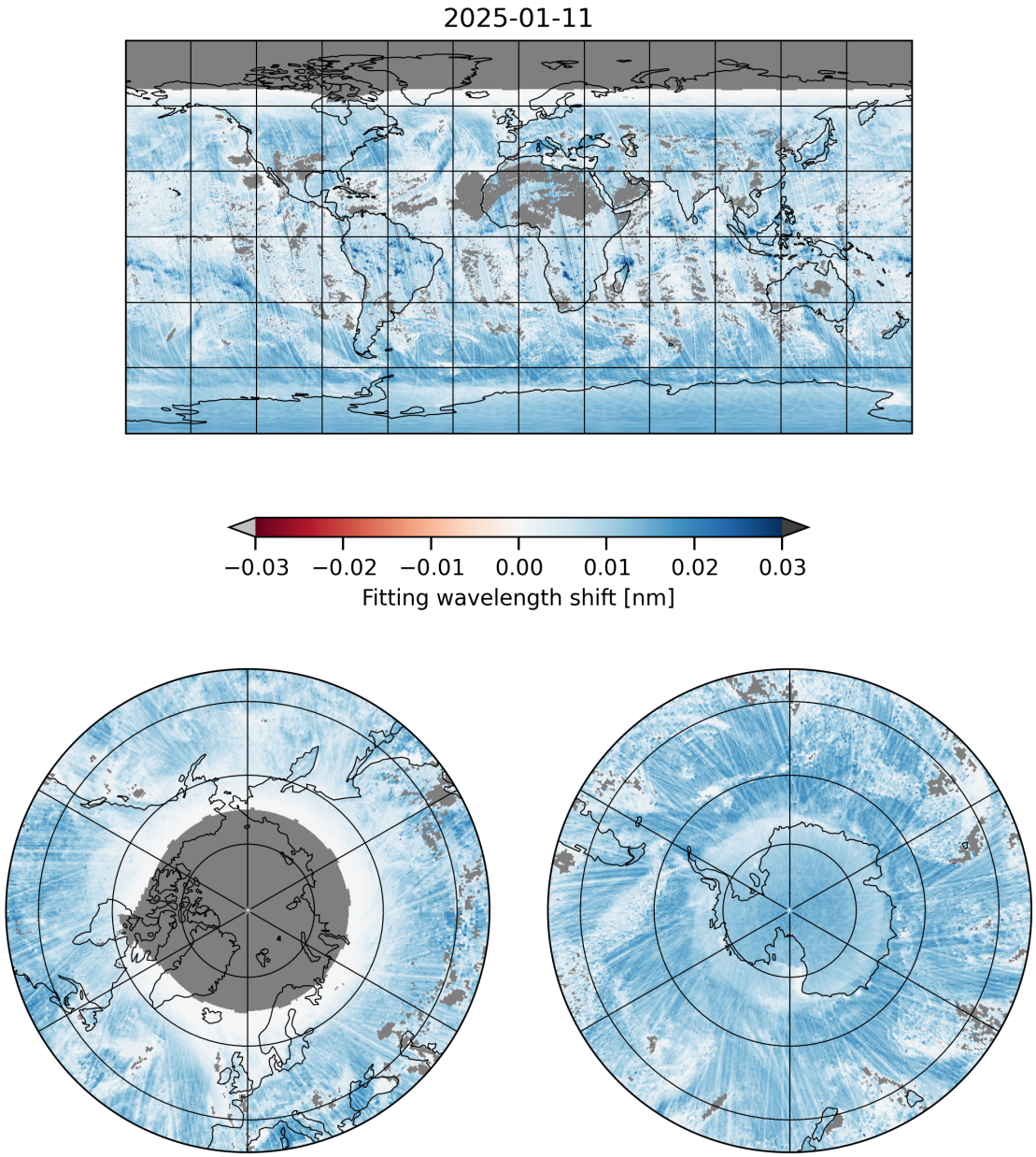

Figure 16: Map of “Fitting wavelength shift” for 2025-01-10 to 2025-01-12

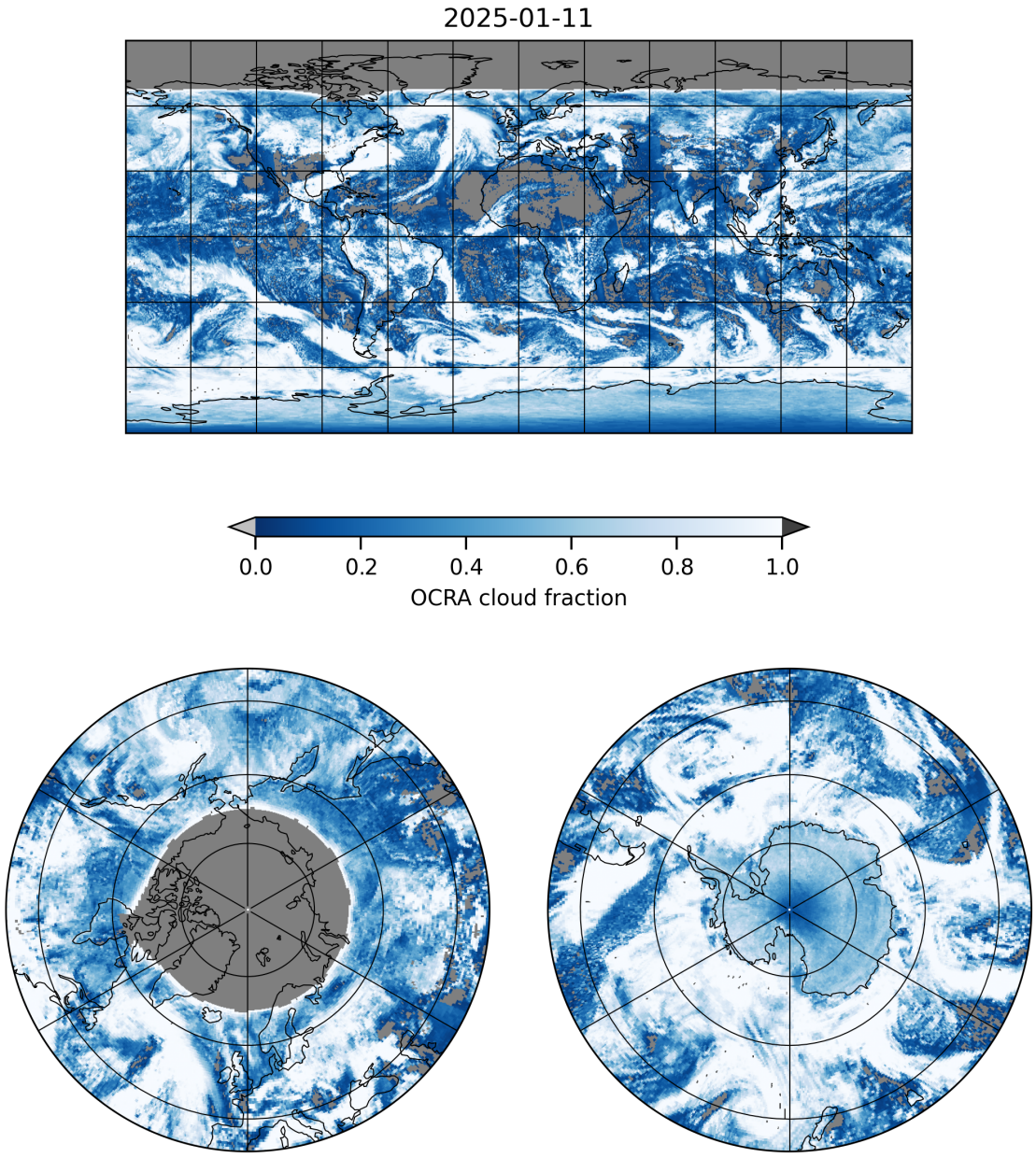

Figure 17: Map of “OCRA cloud fraction” for 2025-01-10 to 2025-01-12

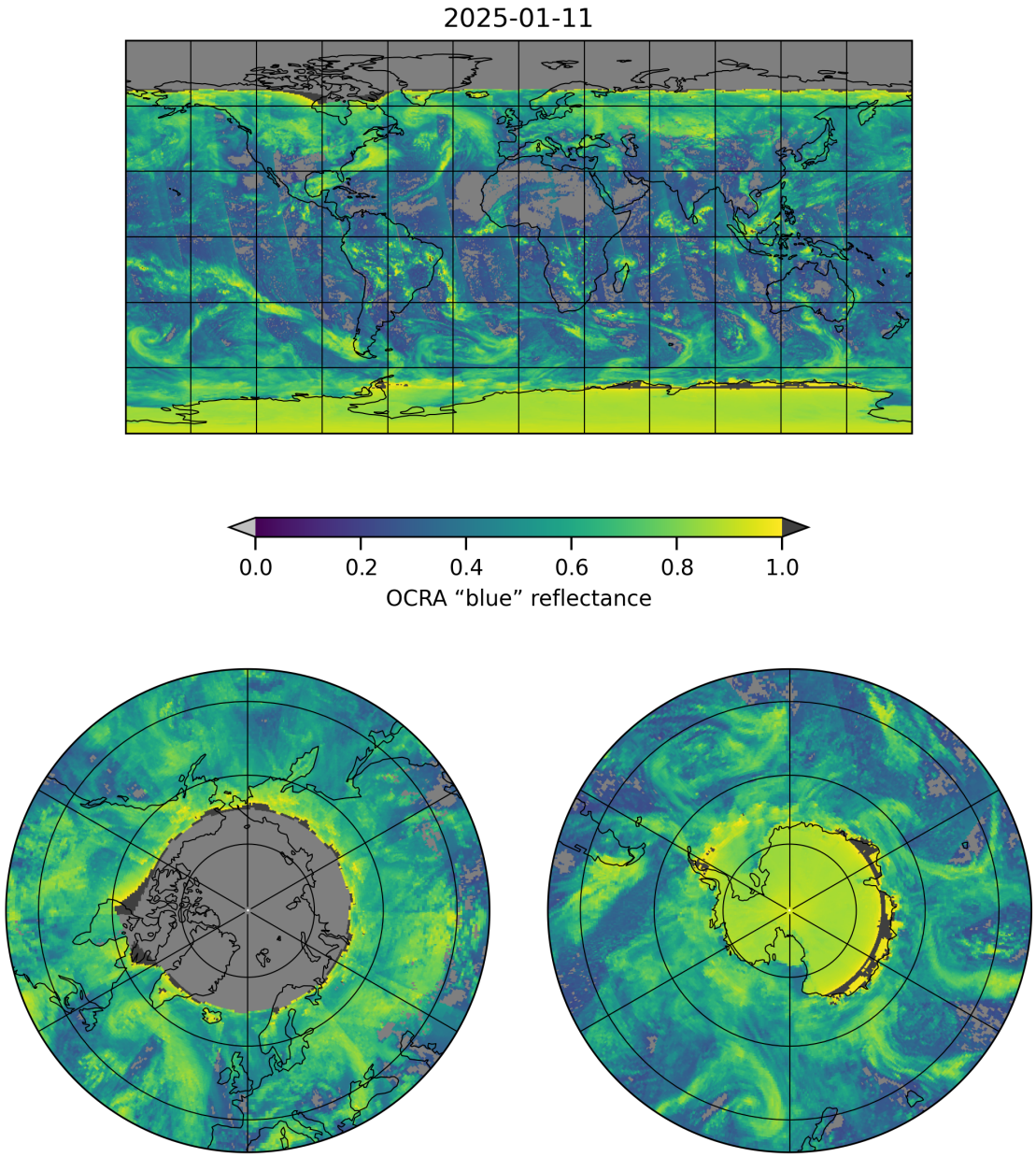

Figure 18: Map of “OCRA “blue” reflectance” for 2025-01-10 to 2025-01-12

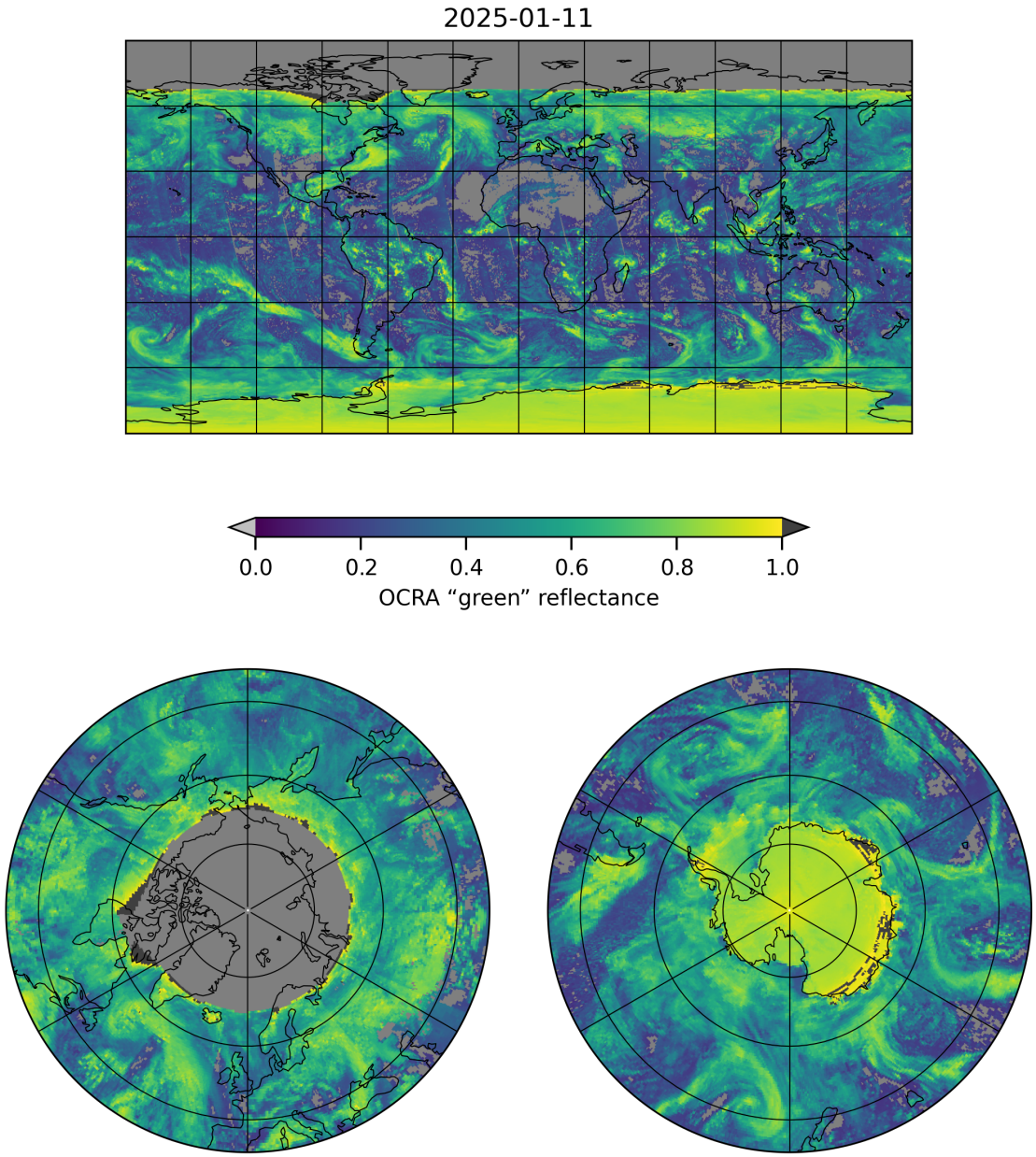

Figure 19: Map of “OCRA “green” reflectance” for 2025-01-10 to 2025-01-12

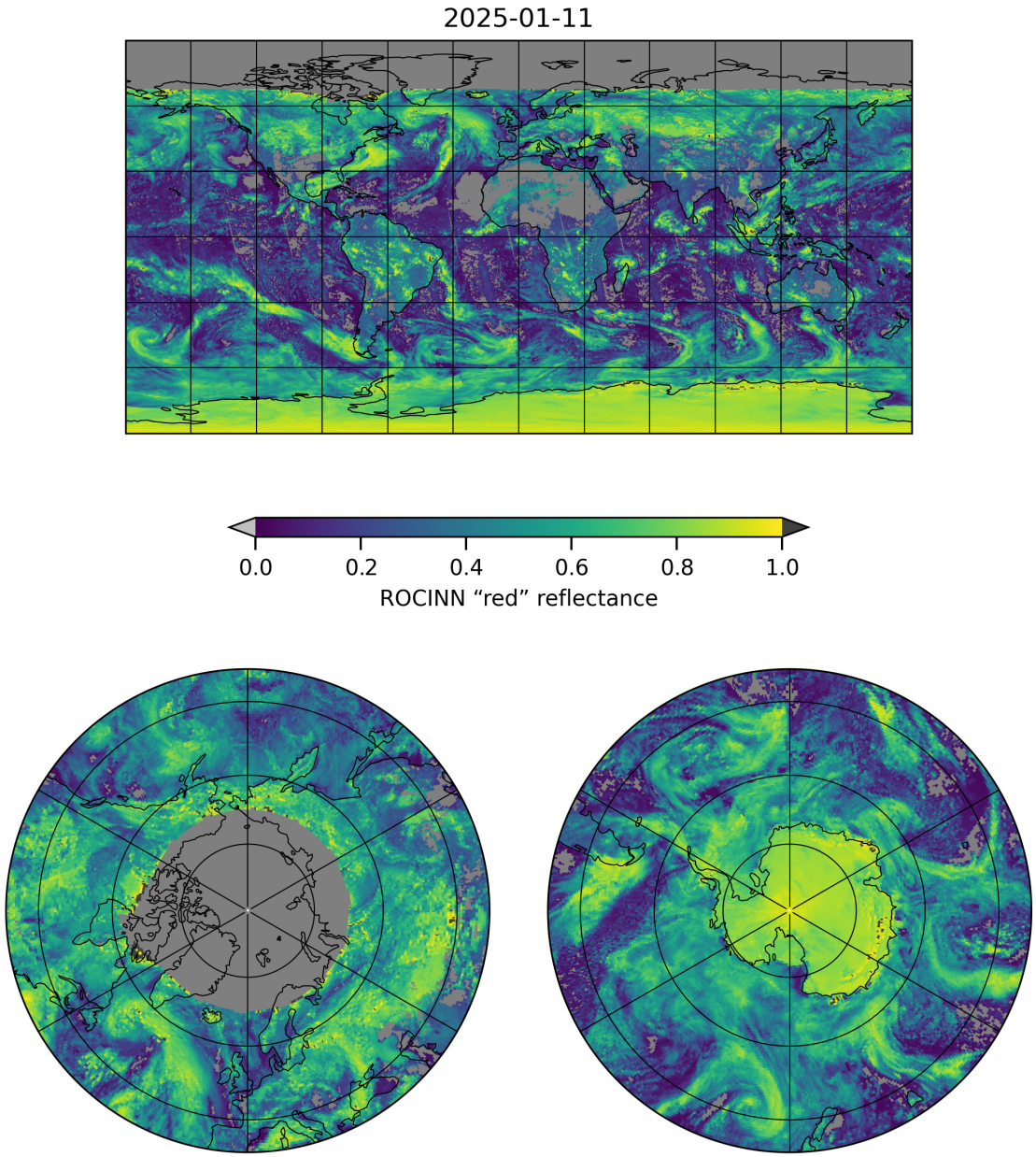

Figure 20: Map of “ROCINN “red” reflectance” for 2025-01-10 to 2025-01-12

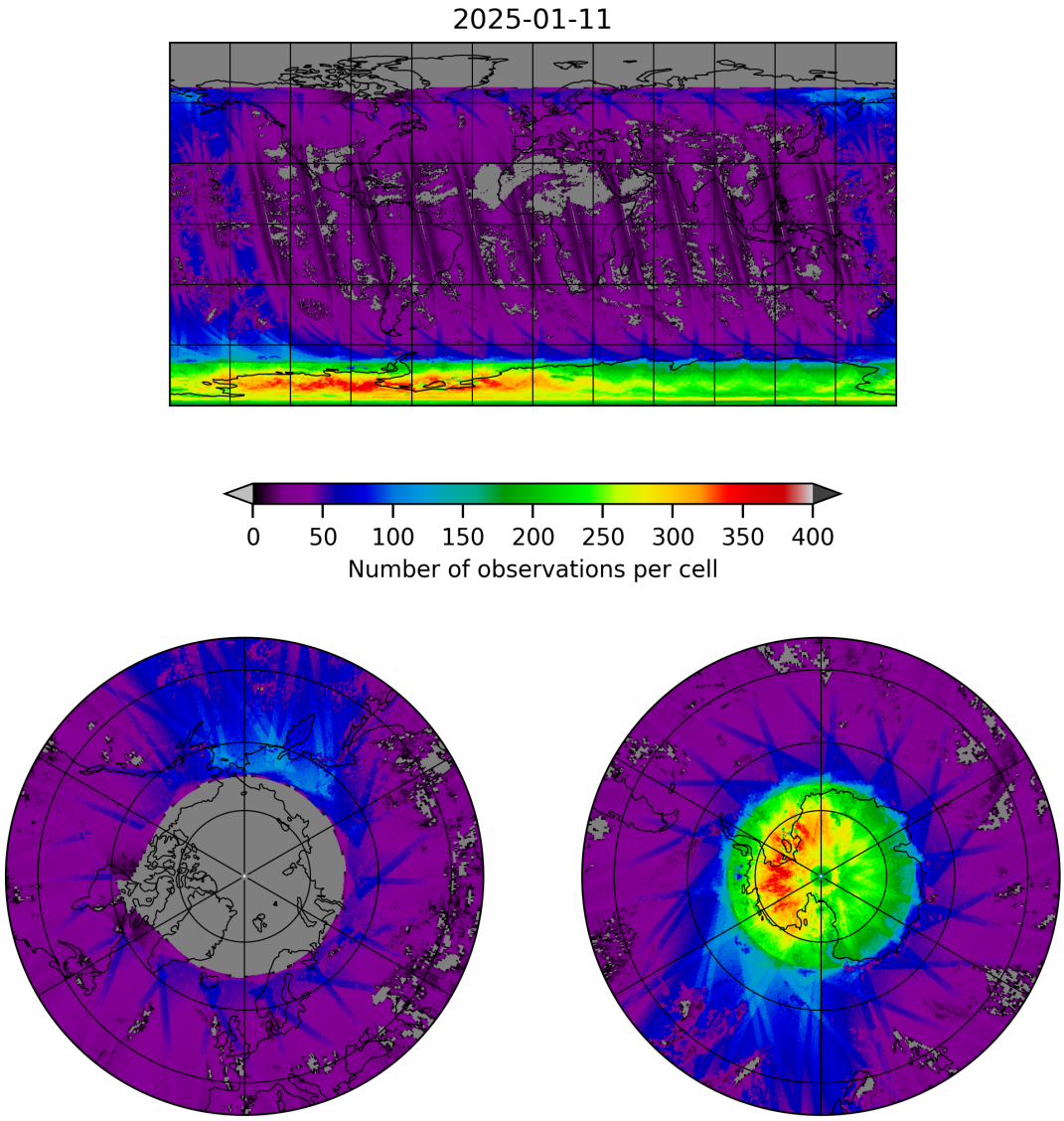

Figure 21: Map of the number of observations for 2025-01-10 to 2025-01-12

7 Zonal average

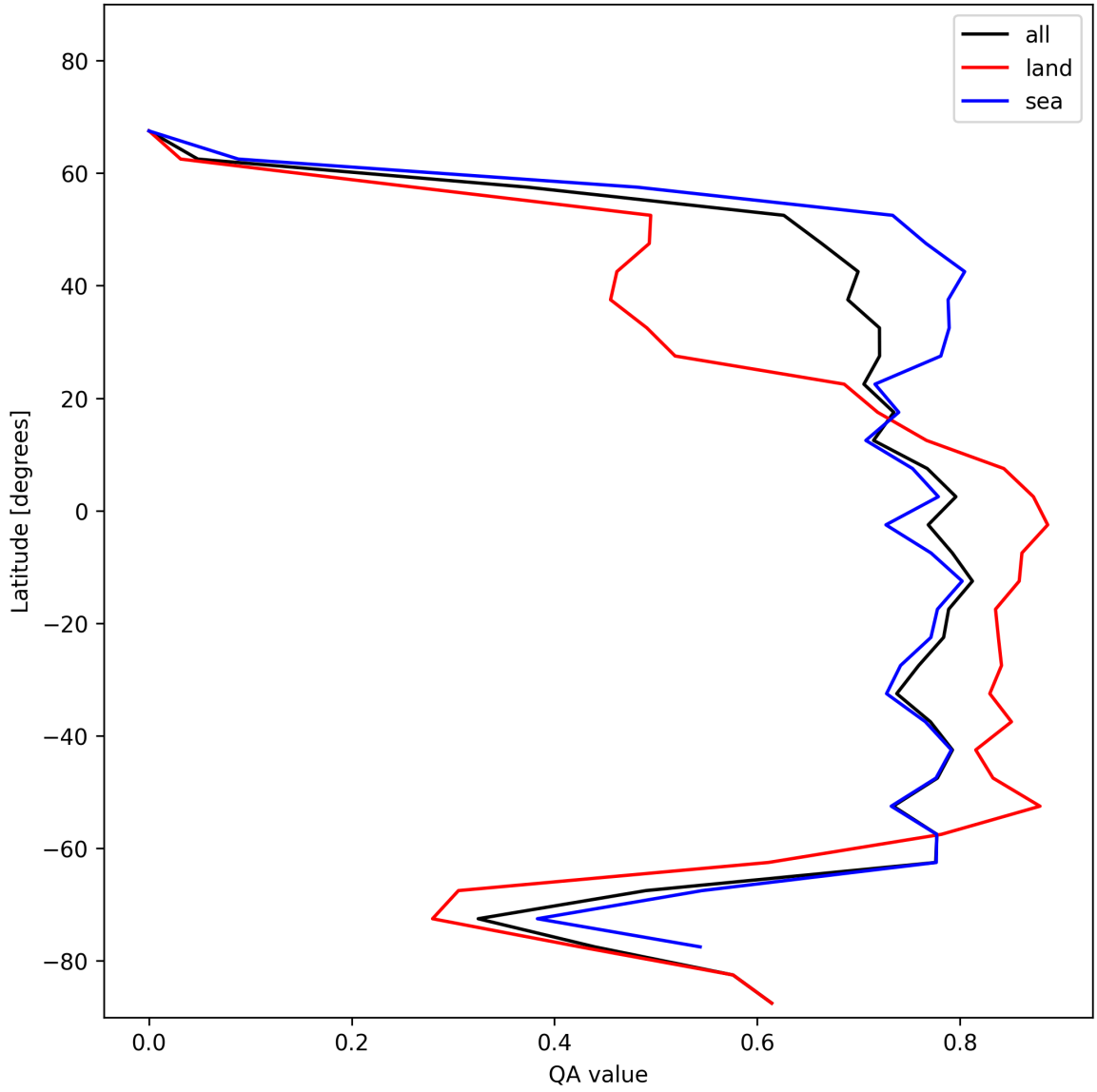

Figure 22: Zonal average of “QA value” for 2025-01-10 to 2025-01-12.

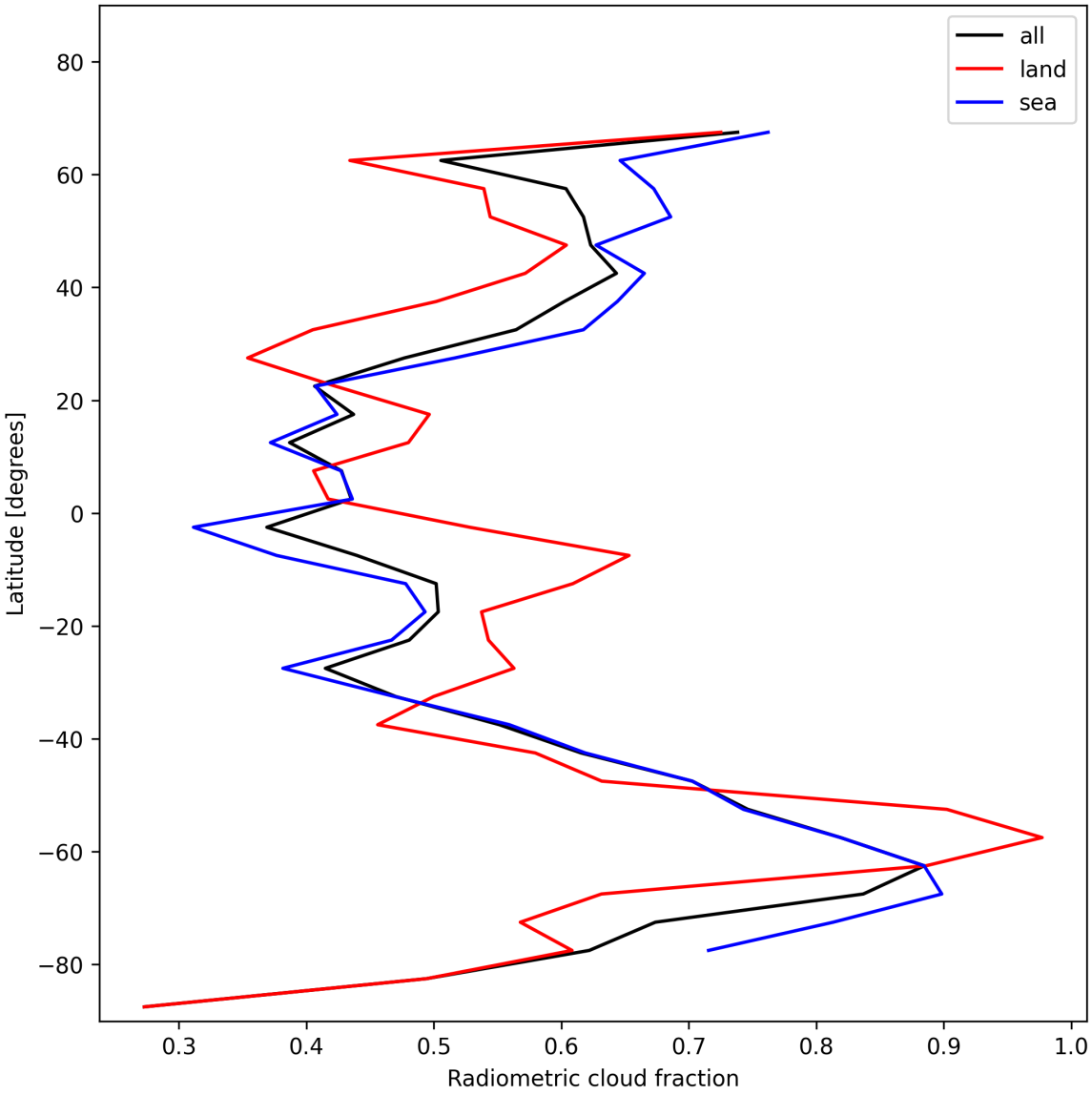

Figure 23: Zonal average of “Radiometric cloud fraction” for 2025-01-10 to 2025-01-12.

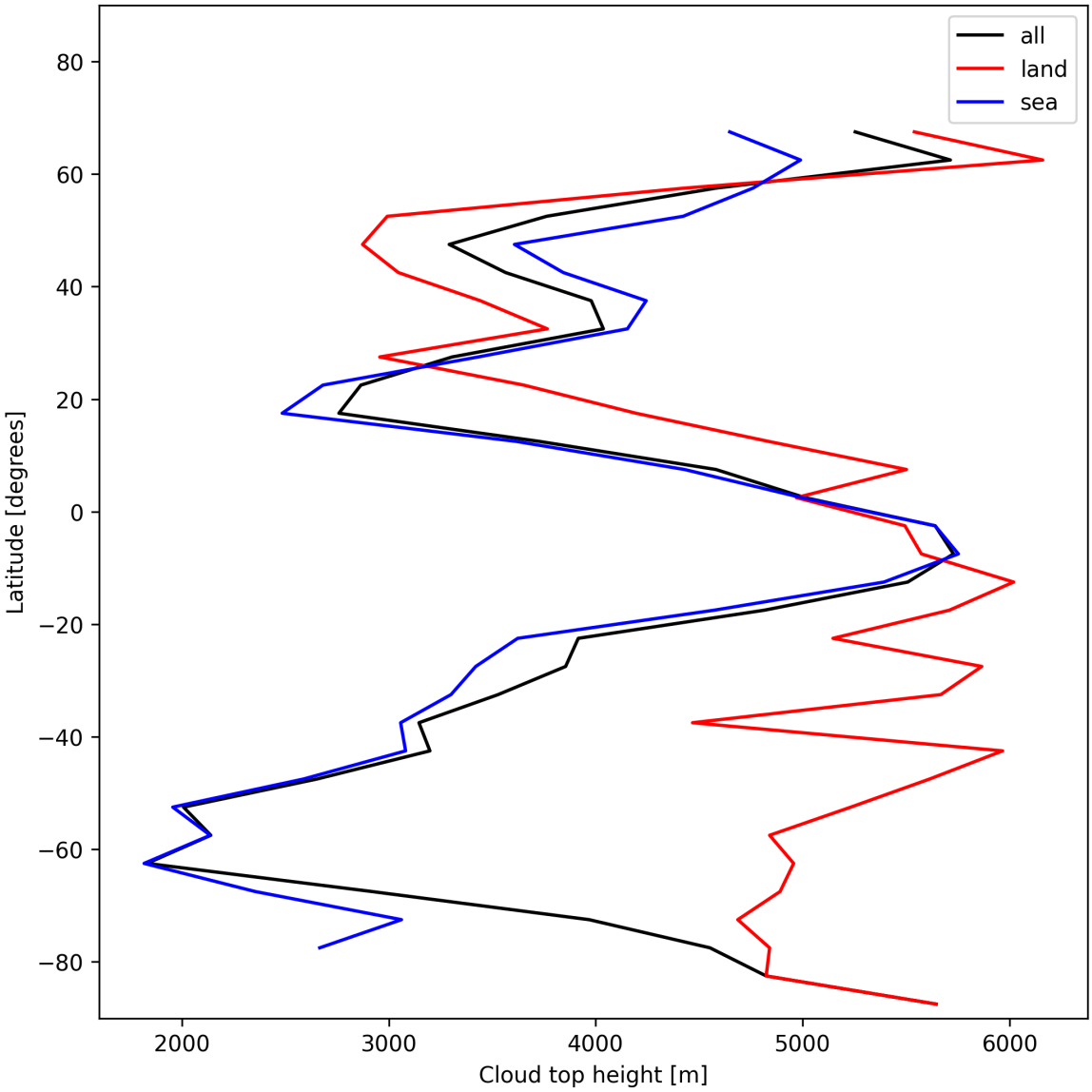

Figure 24: Zonal average of “Cloud top height” for 2025-01-10 to 2025-01-12.

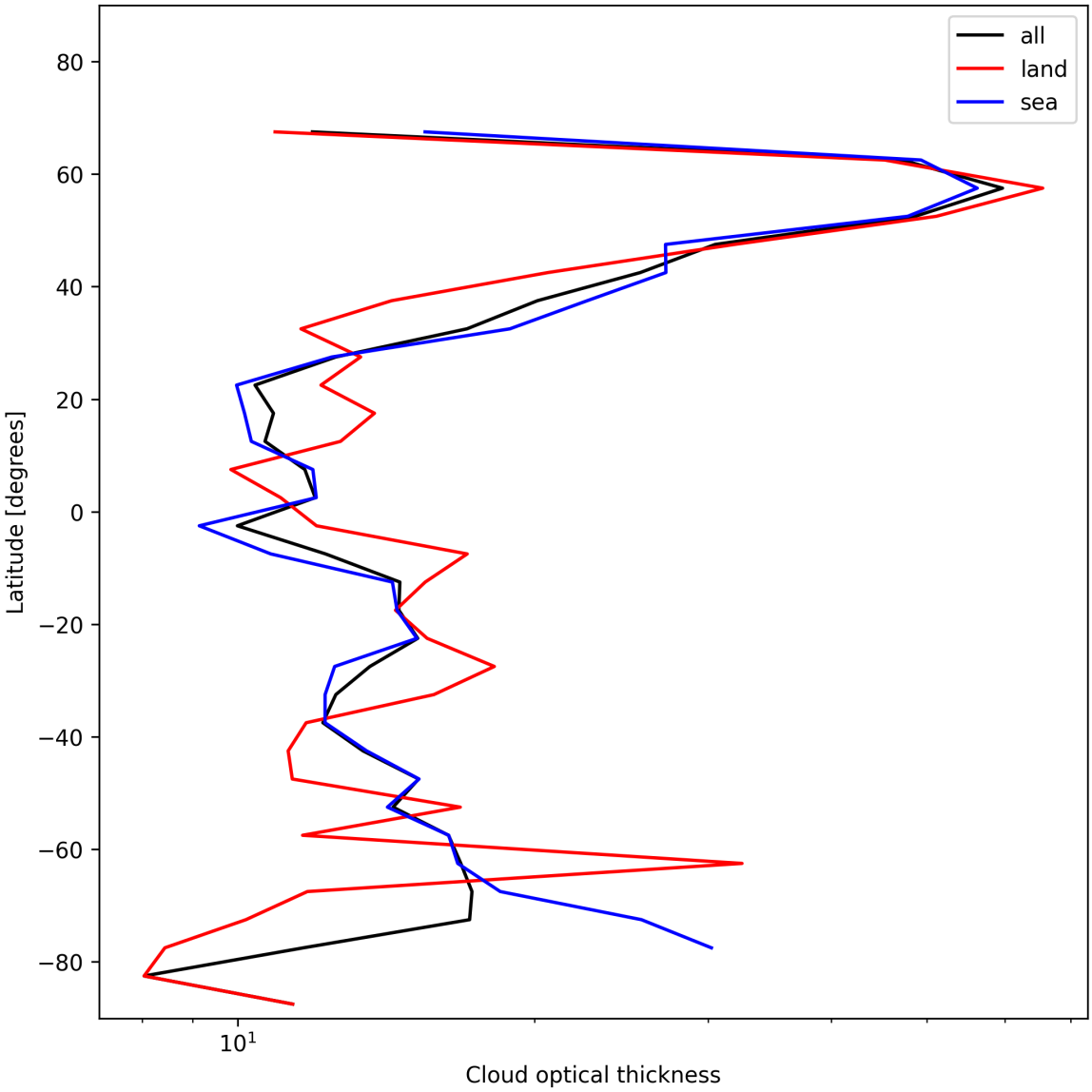

Figure 25: Zonal average of “Cloud optical thickness” for 2025-01-10 to 2025-01-12.

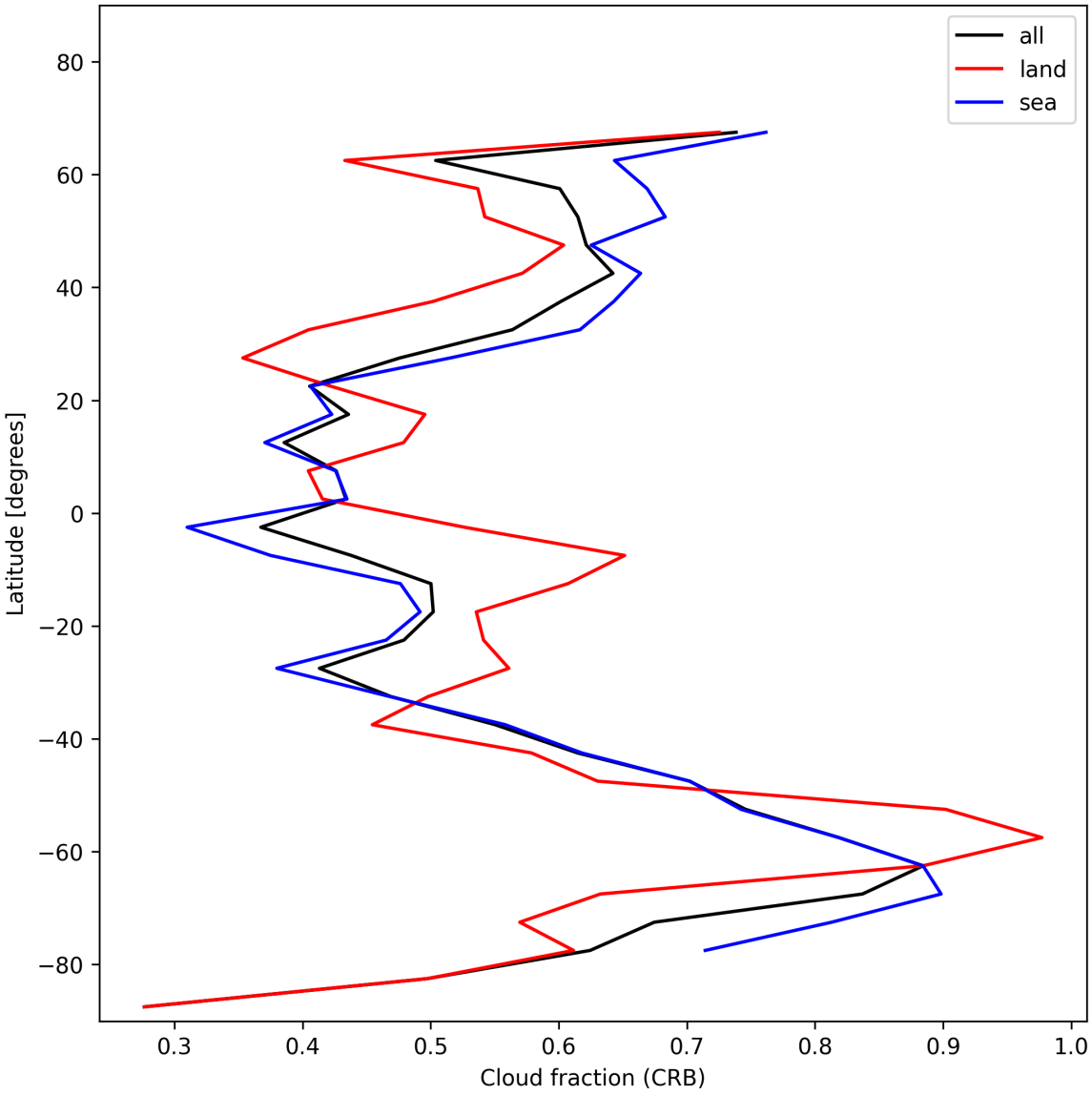

Figure 26: Zonal average of “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12.

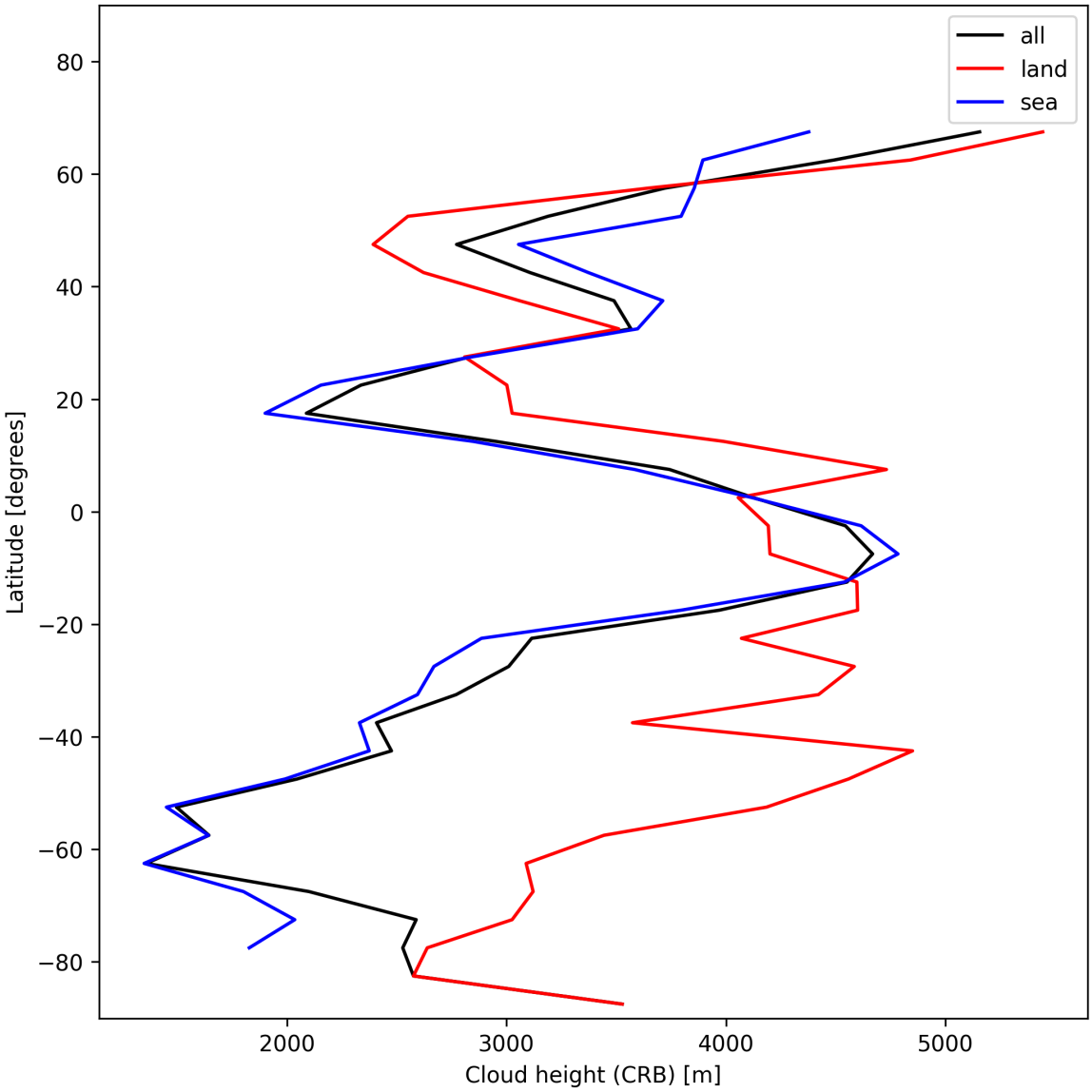

Figure 27: Zonal average of “Cloud height (CRB)” for 2025-01-10 to 2025-01-12.

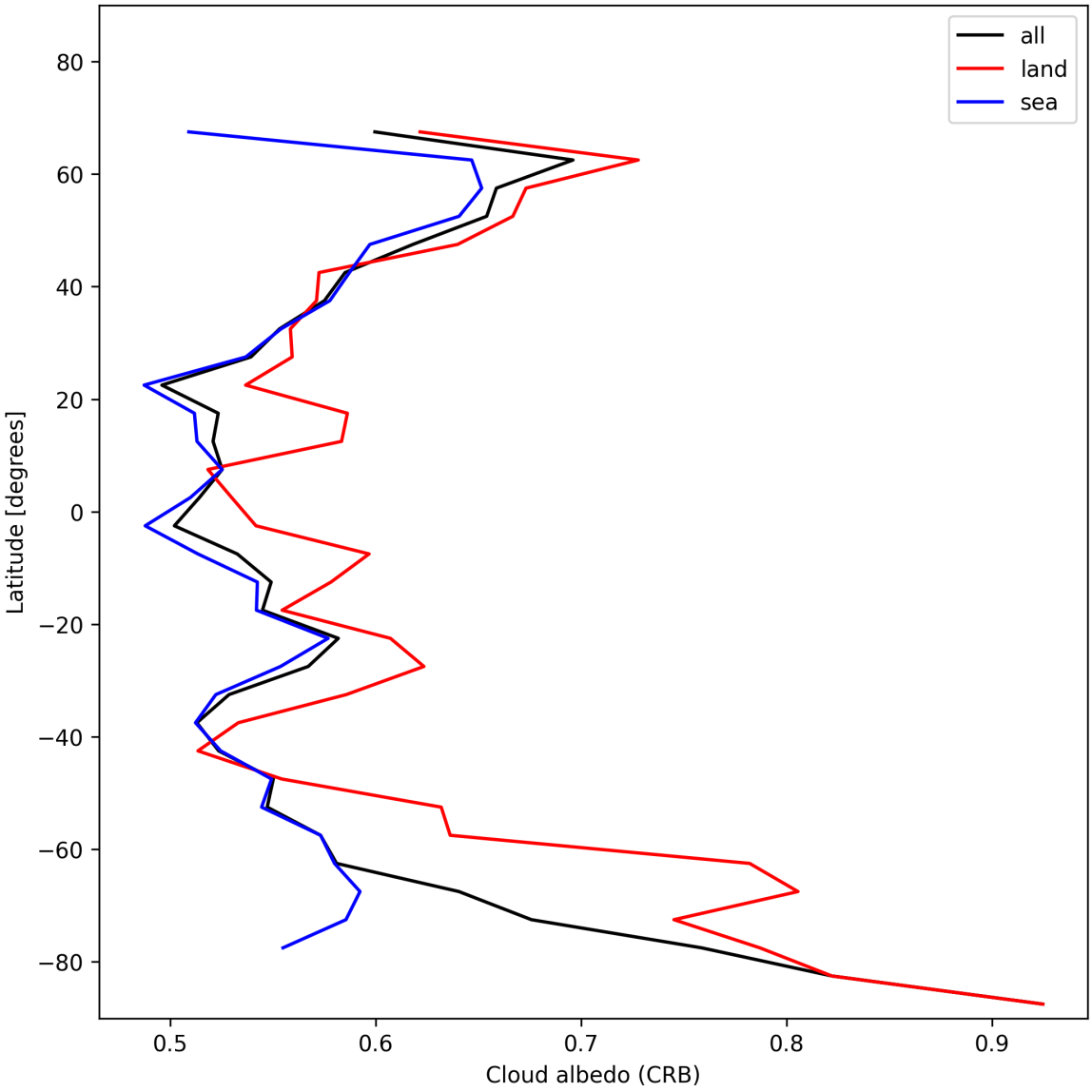

Figure 28: Zonal average of “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

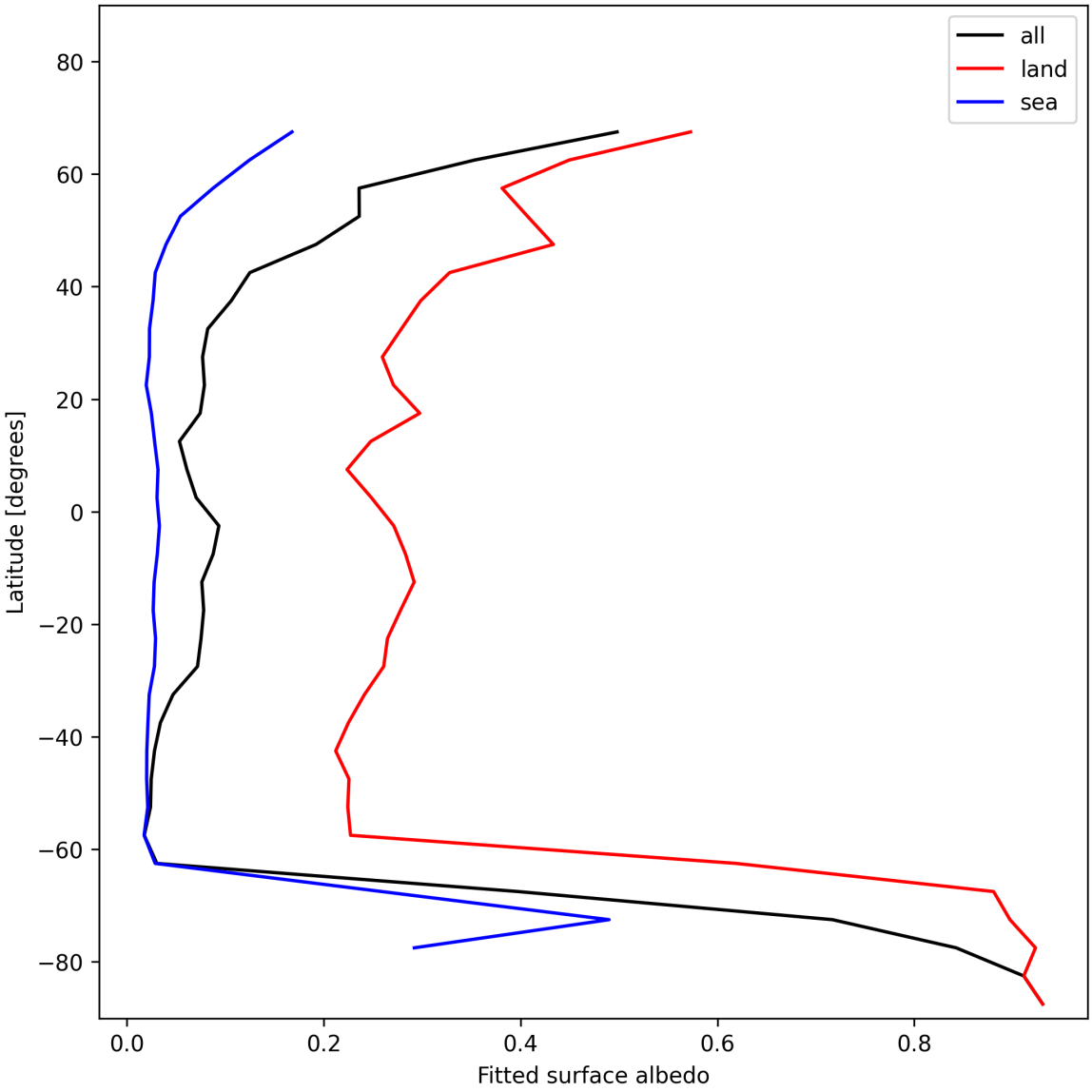

Figure 29: Zonal average of “Fitted surface albedo” for 2025-01-10 to 2025-01-12.

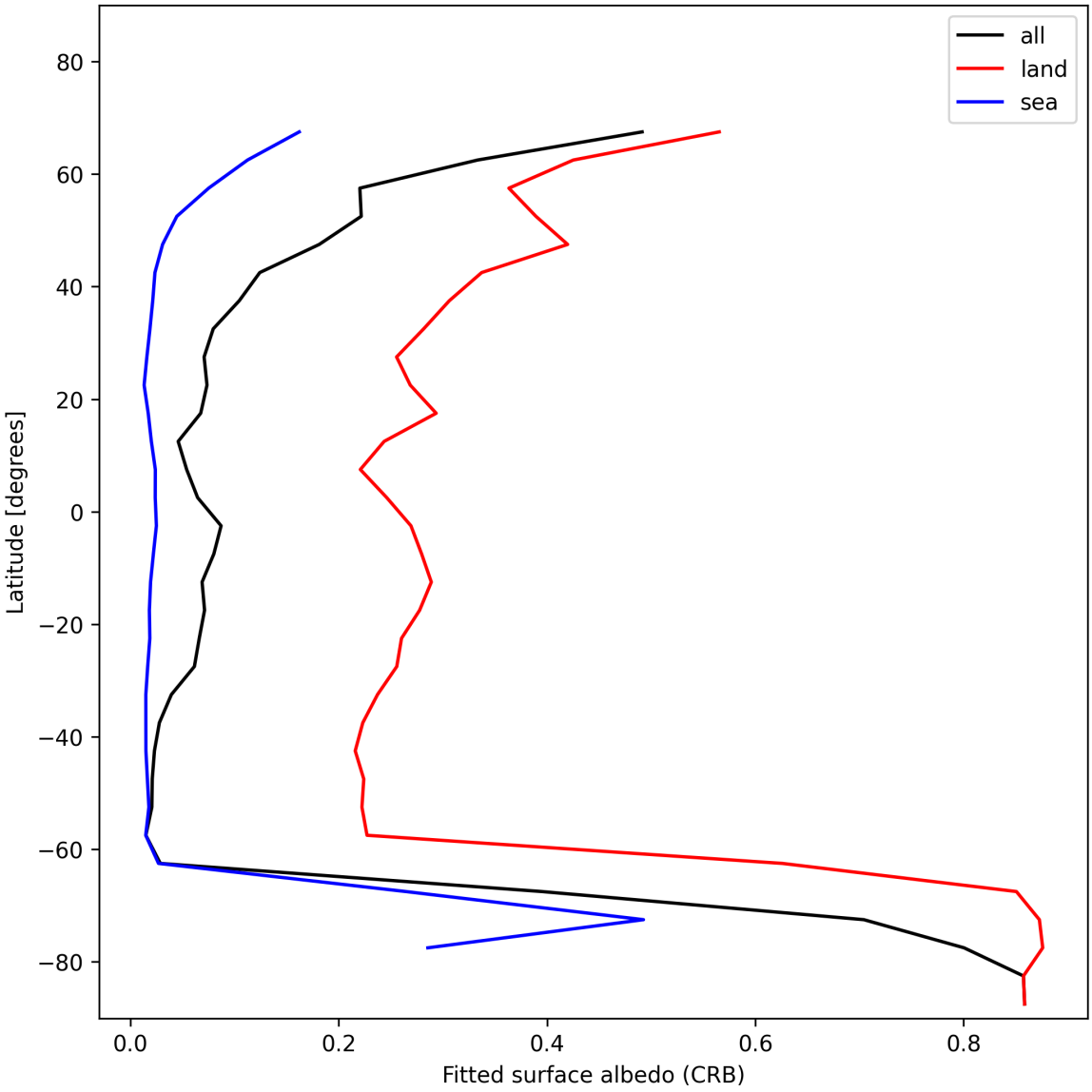

Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2025-01-10 to 2025-01-12.

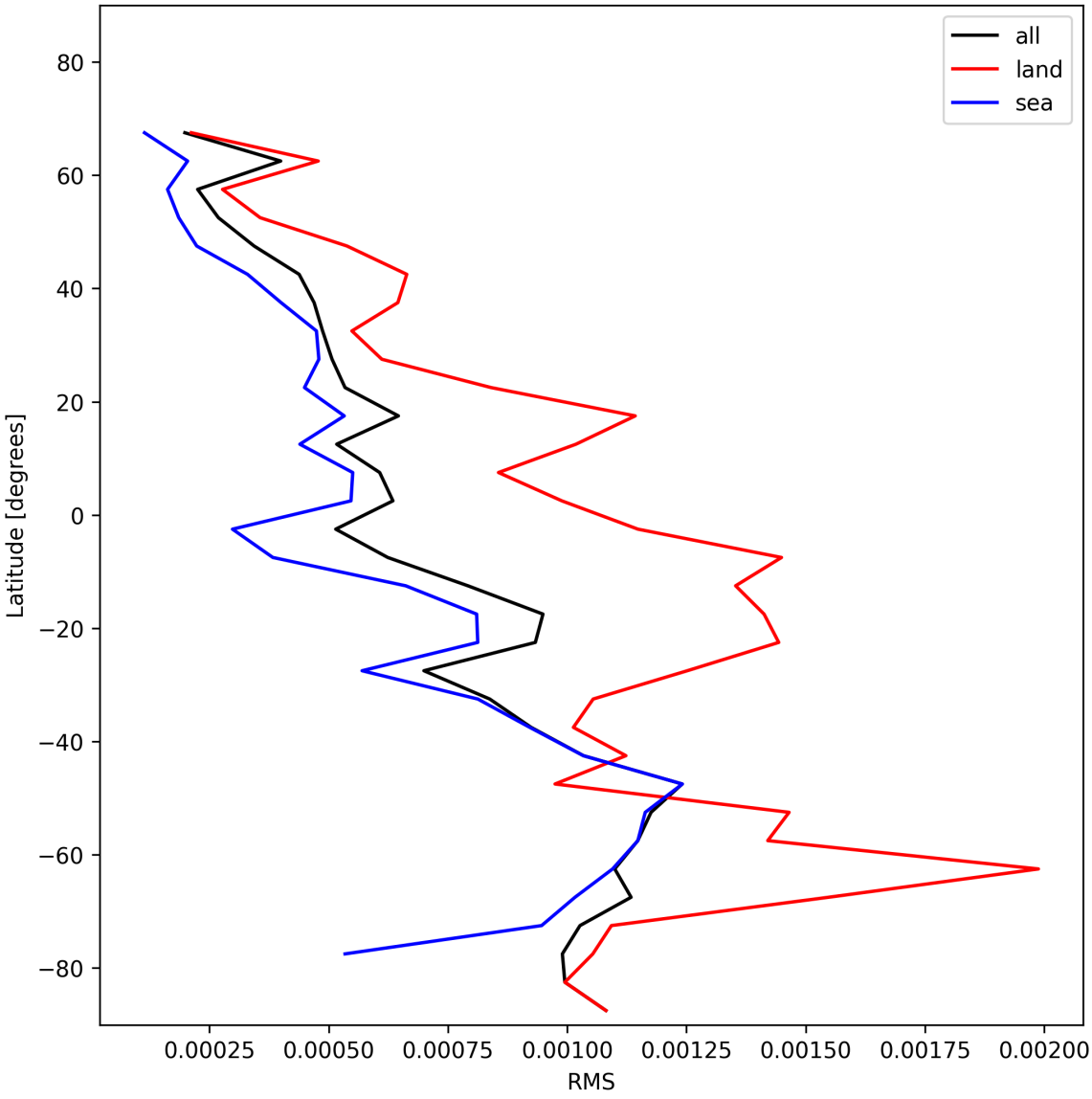

Figure 31: Zonal average of “RMS” for 2025-01-10 to 2025-01-12.

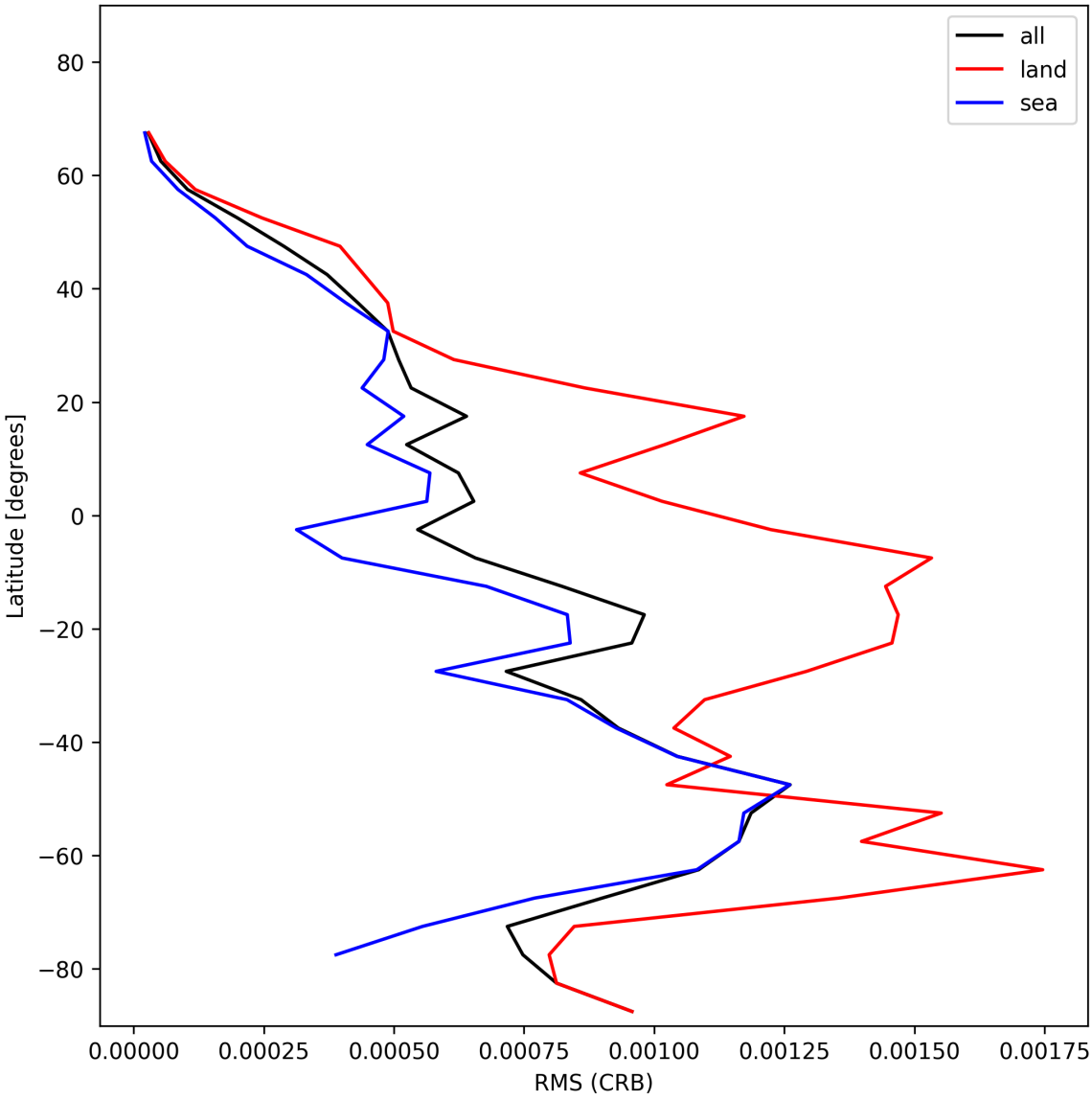

Figure 32: Zonal average of “RMS (CRB)” for 2025-01-10 to 2025-01-12.

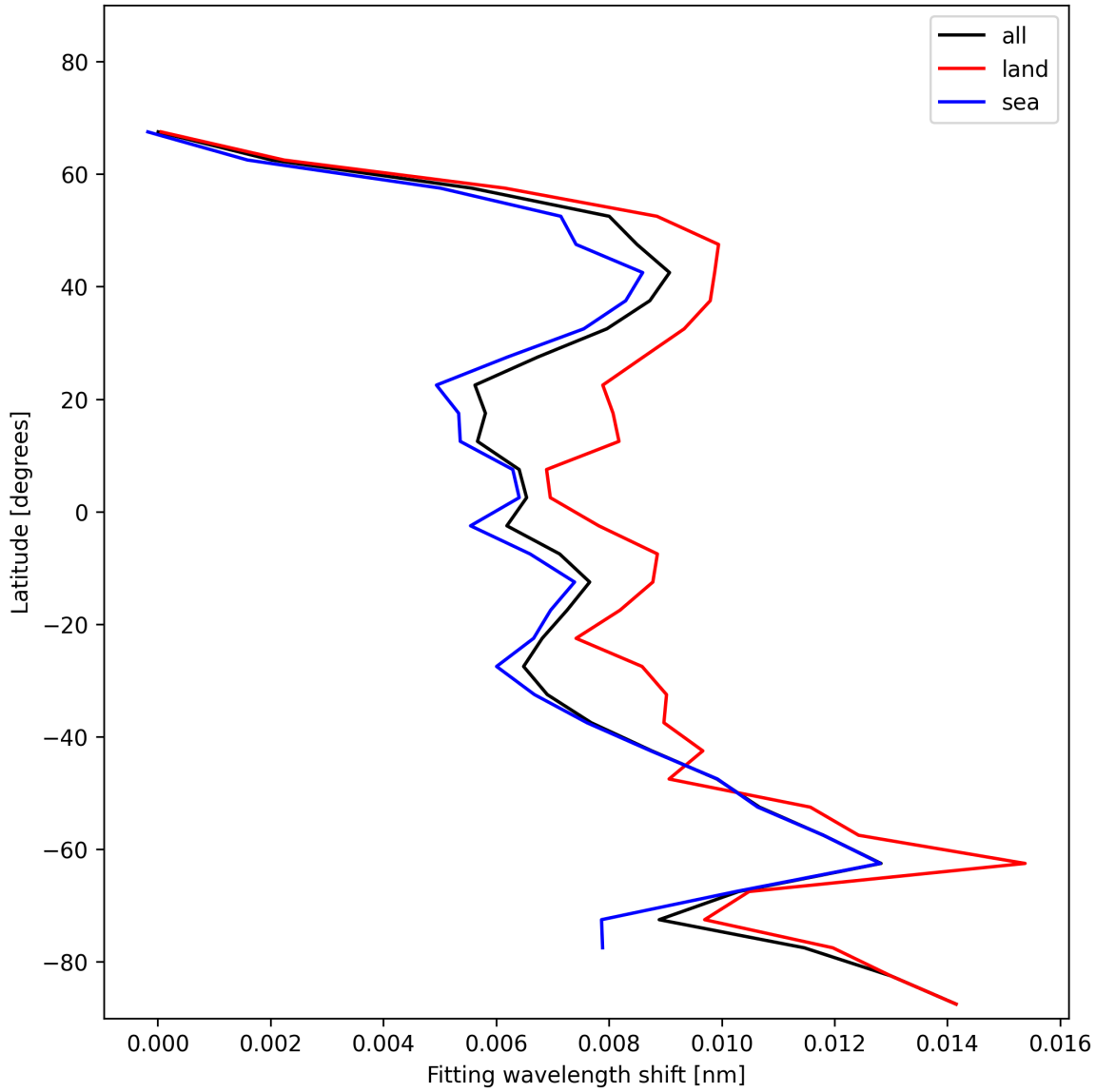

Figure 33: Zonal average of “Fitting wavelength shift” for 2025-01-10 to 2025-01-12.

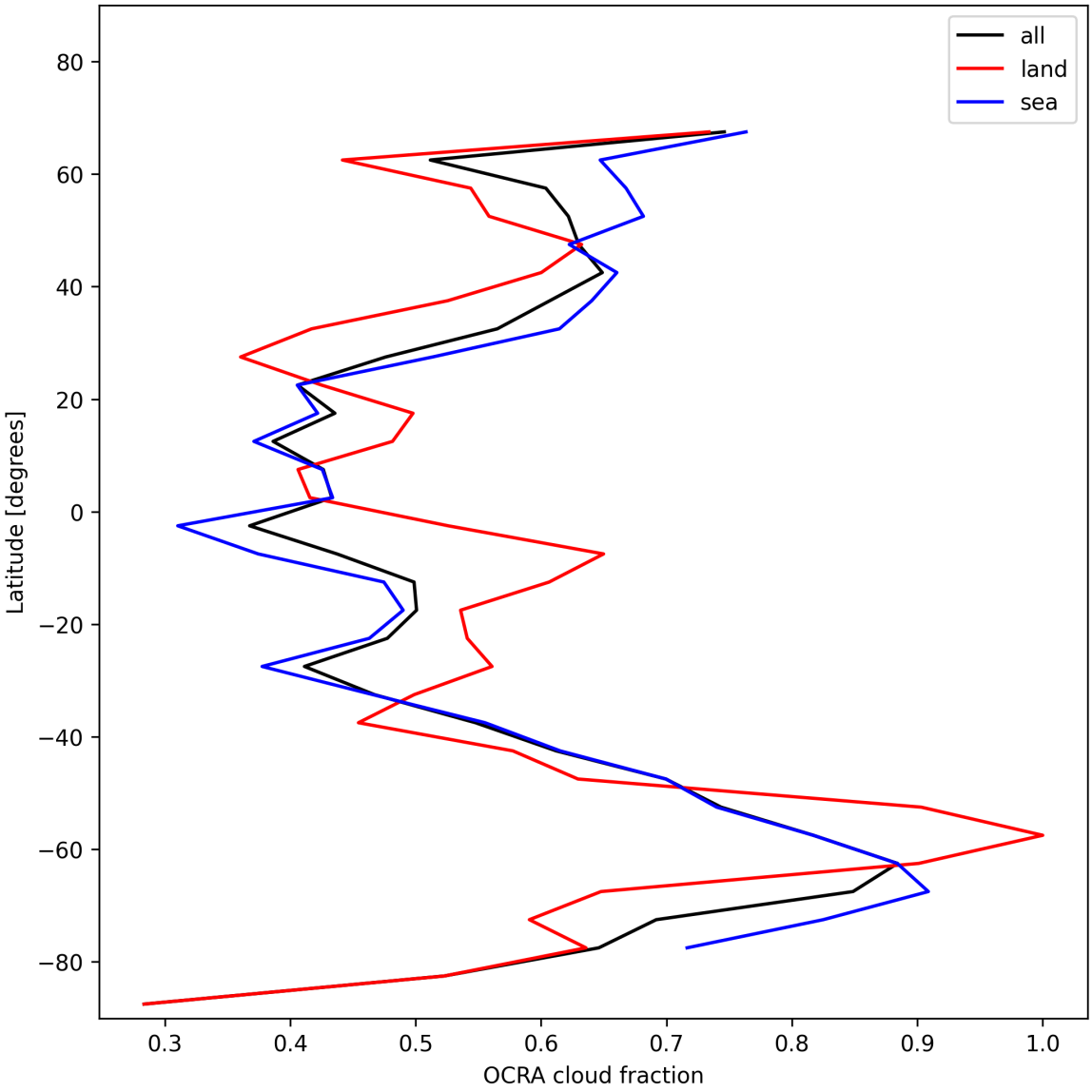

Figure 34: Zonal average of “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

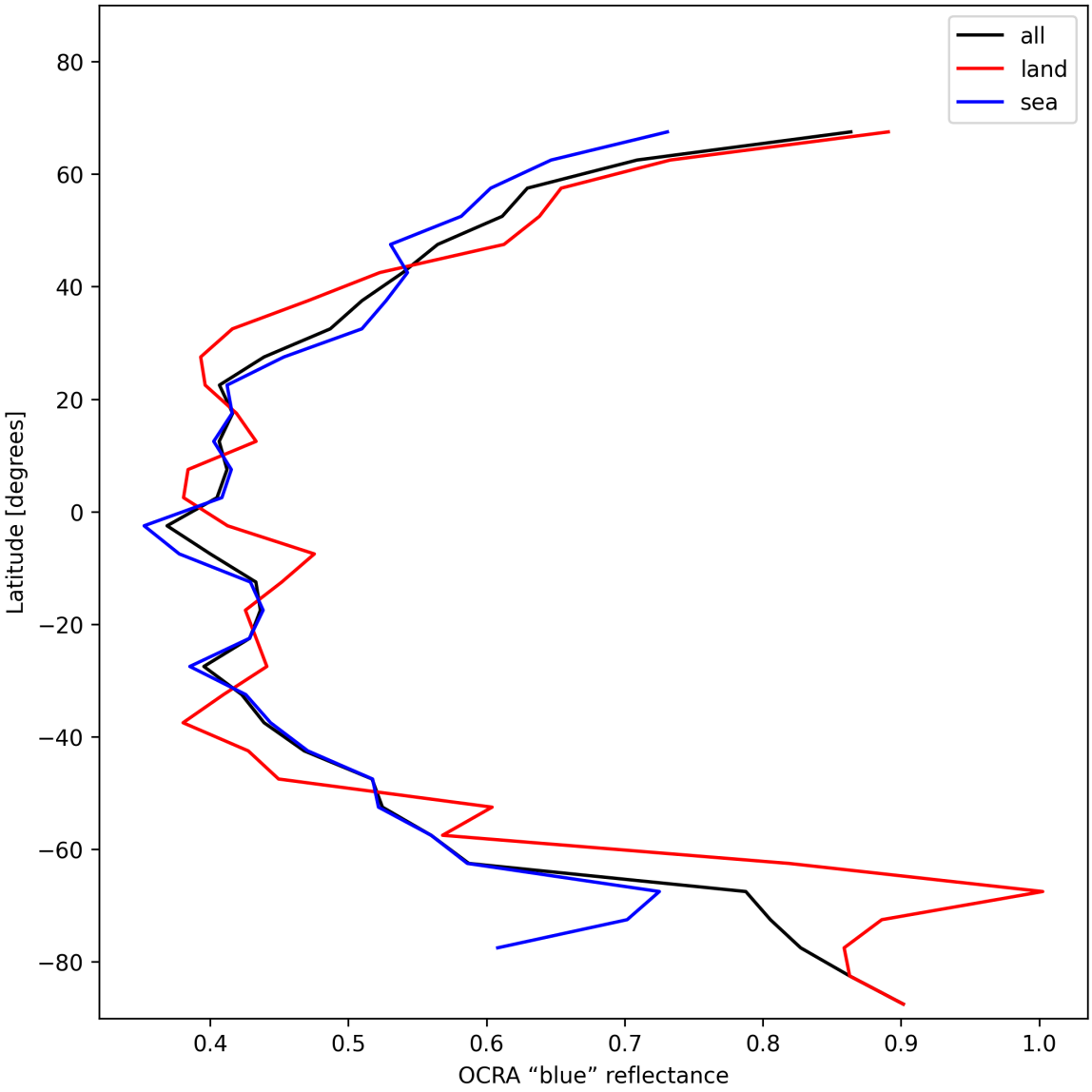

Figure 35: Zonal average of “OCRA “blue” reflectance” for 2025-01-10 to 2025-01-12.

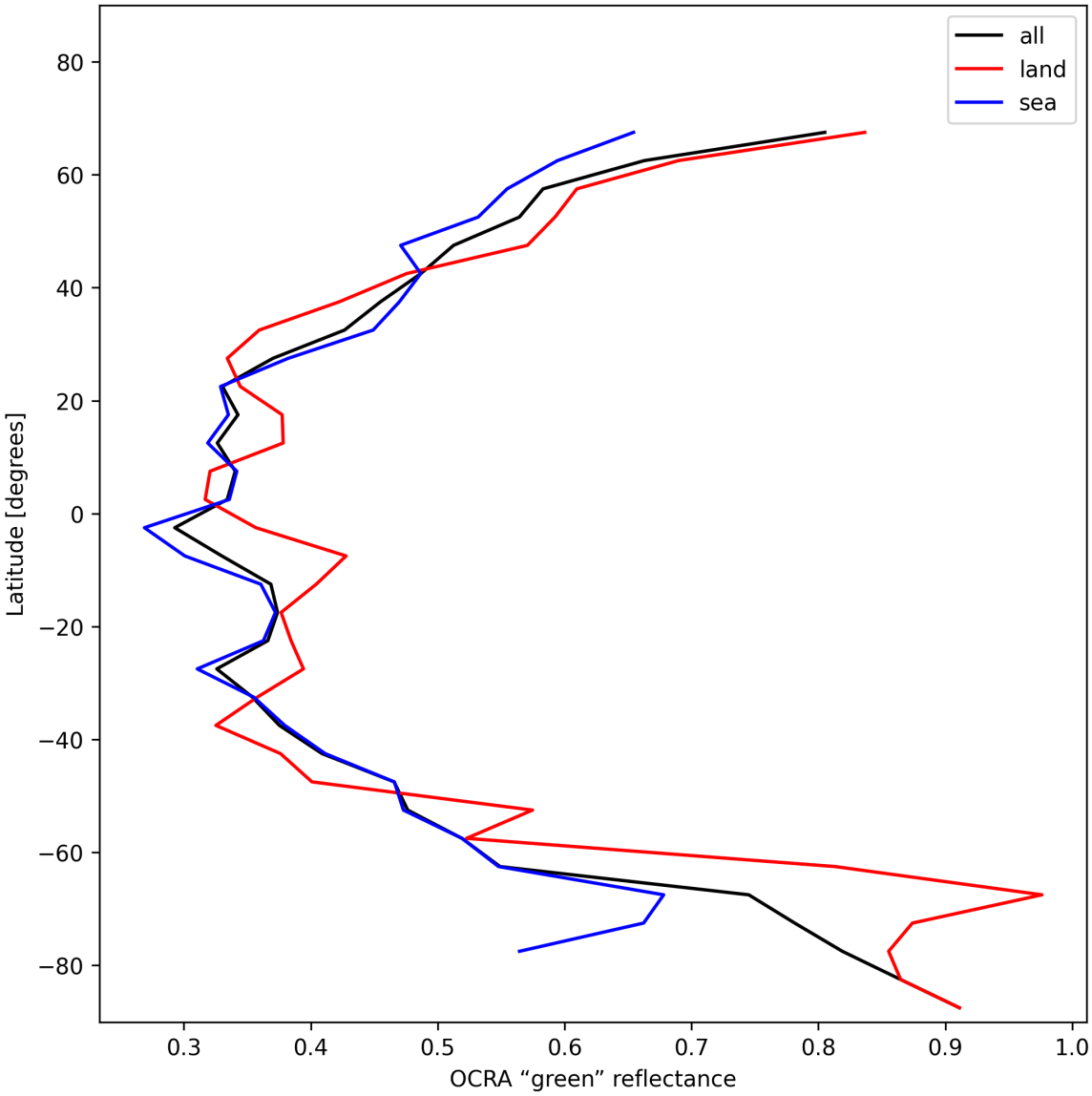

Figure 36: Zonal average of “OCRA “green” reflectance” for 2025-01-10 to 2025-01-12.

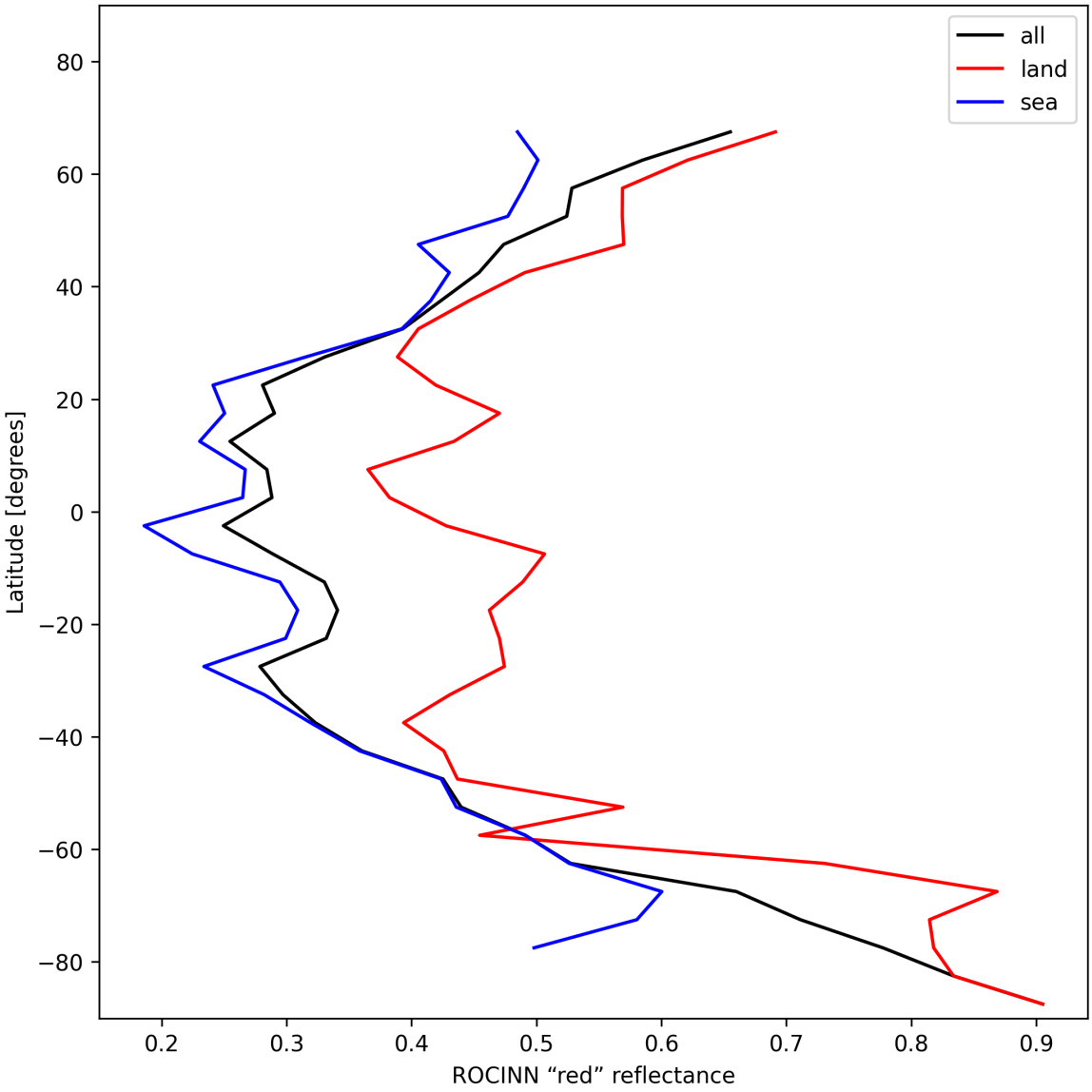

Figure 37: Zonal average of “ROCINN “red” reflectance” for 2025-01-10 to 2025-01-12.

8 Histograms

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

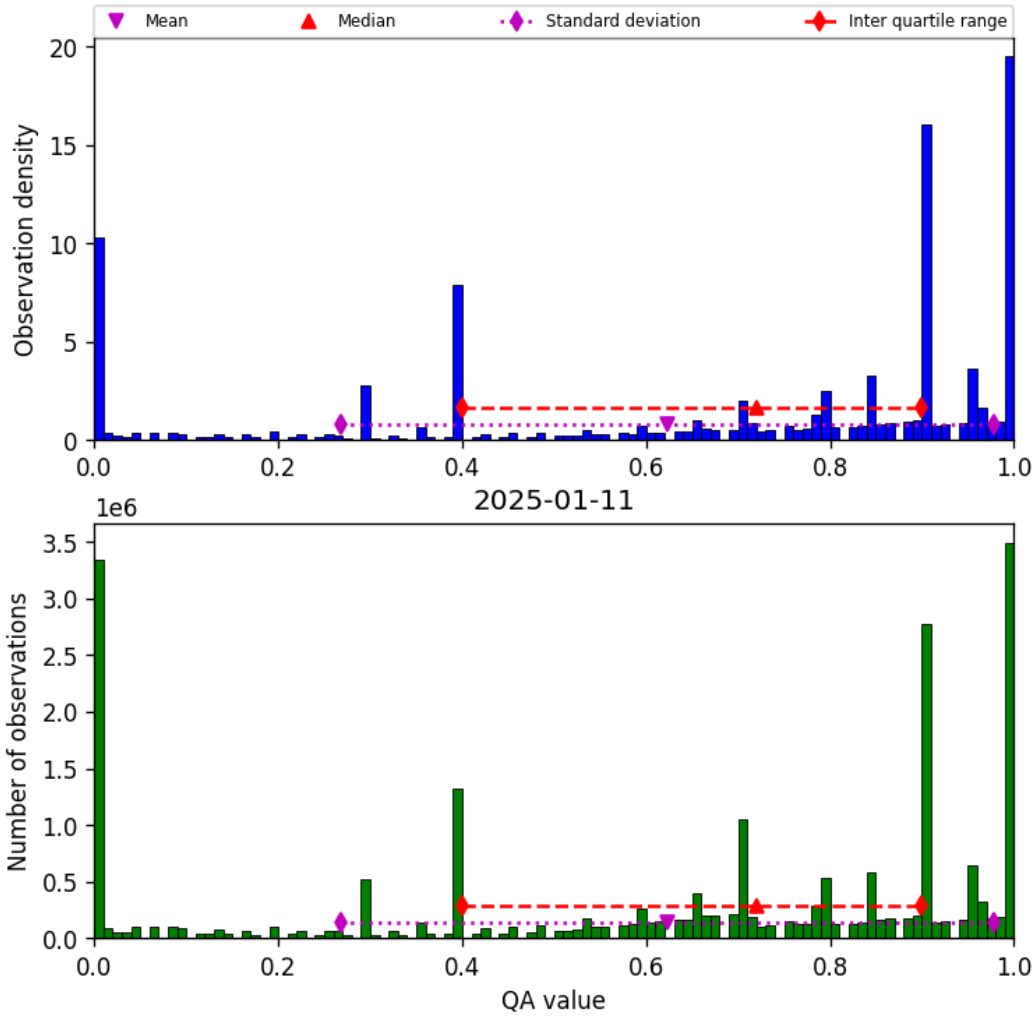

Figure 38: Histogram of “QA value” for 2025-01-10 to 2025-01-12

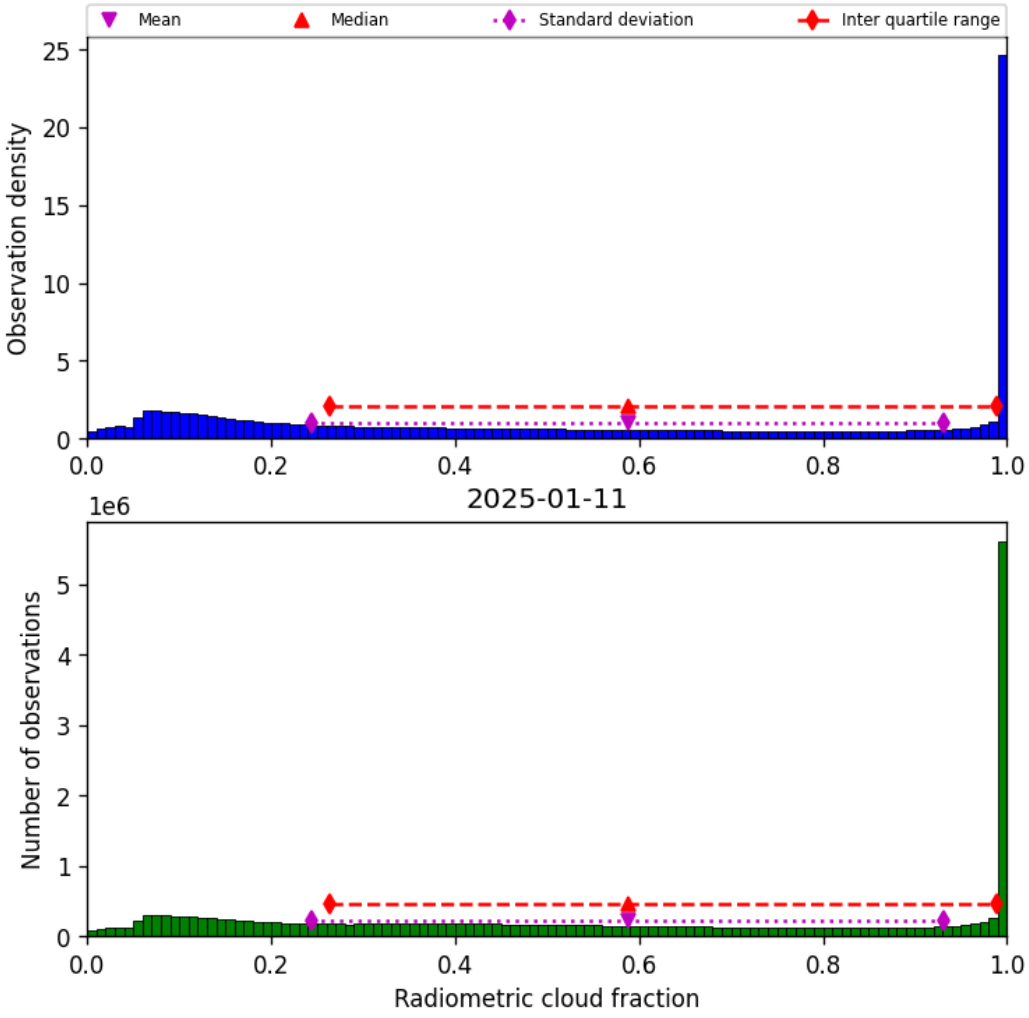

Figure 39: Histogram of “Radiometric cloud fraction” for 2025-01-10 to 2025-01-12

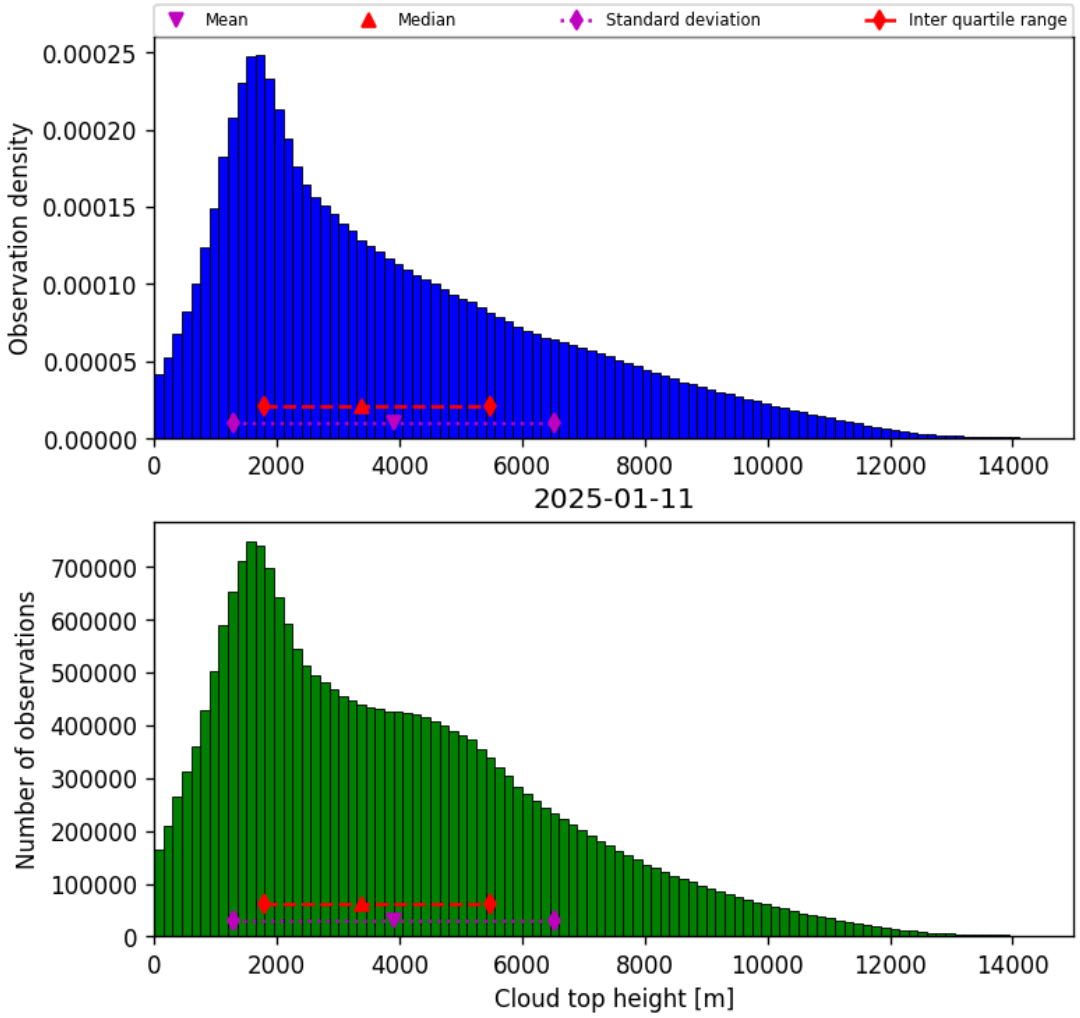

Figure 40: Histogram of “Cloud top height” for 2025-01-10 to 2025-01-12

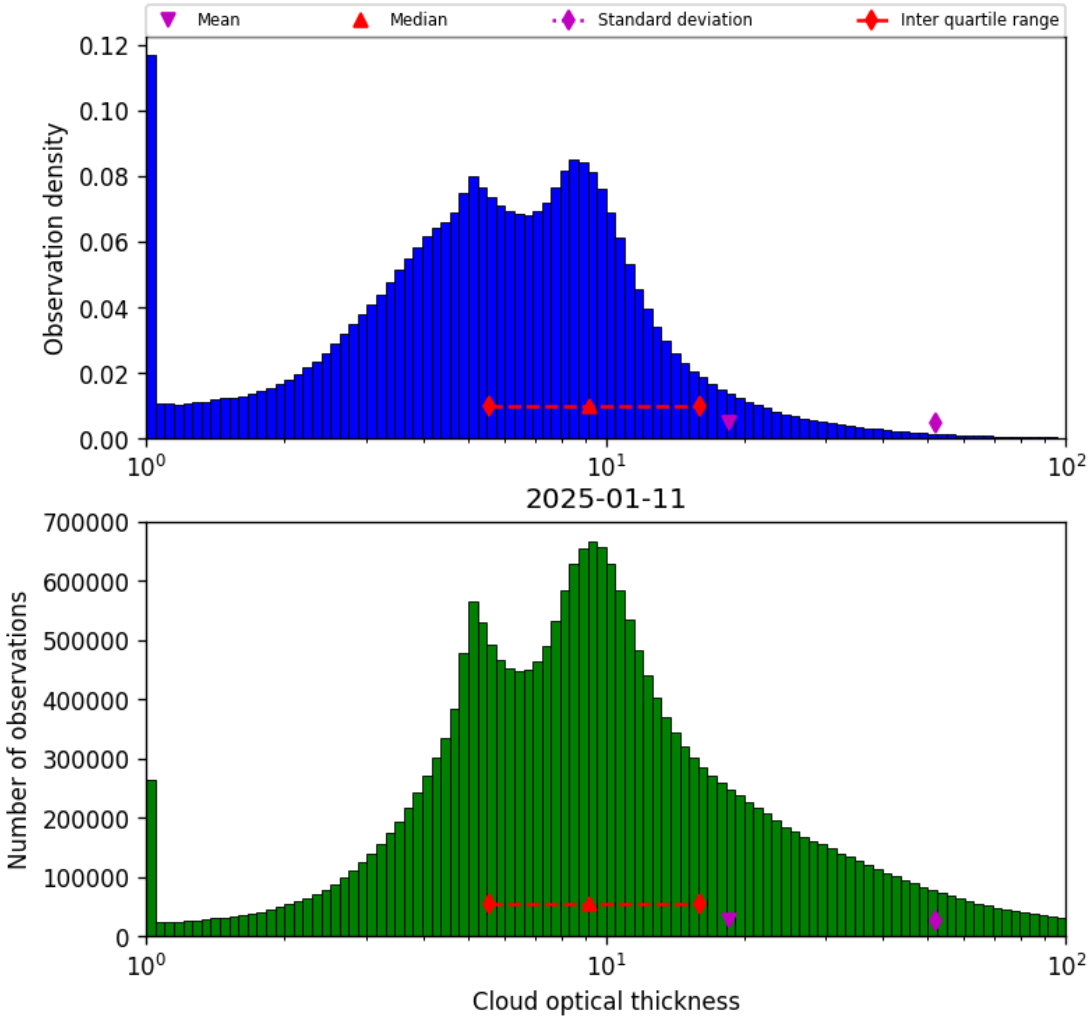

Figure 41: Histogram of “Cloud optical thickness” for 2025-01-10 to 2025-01-12

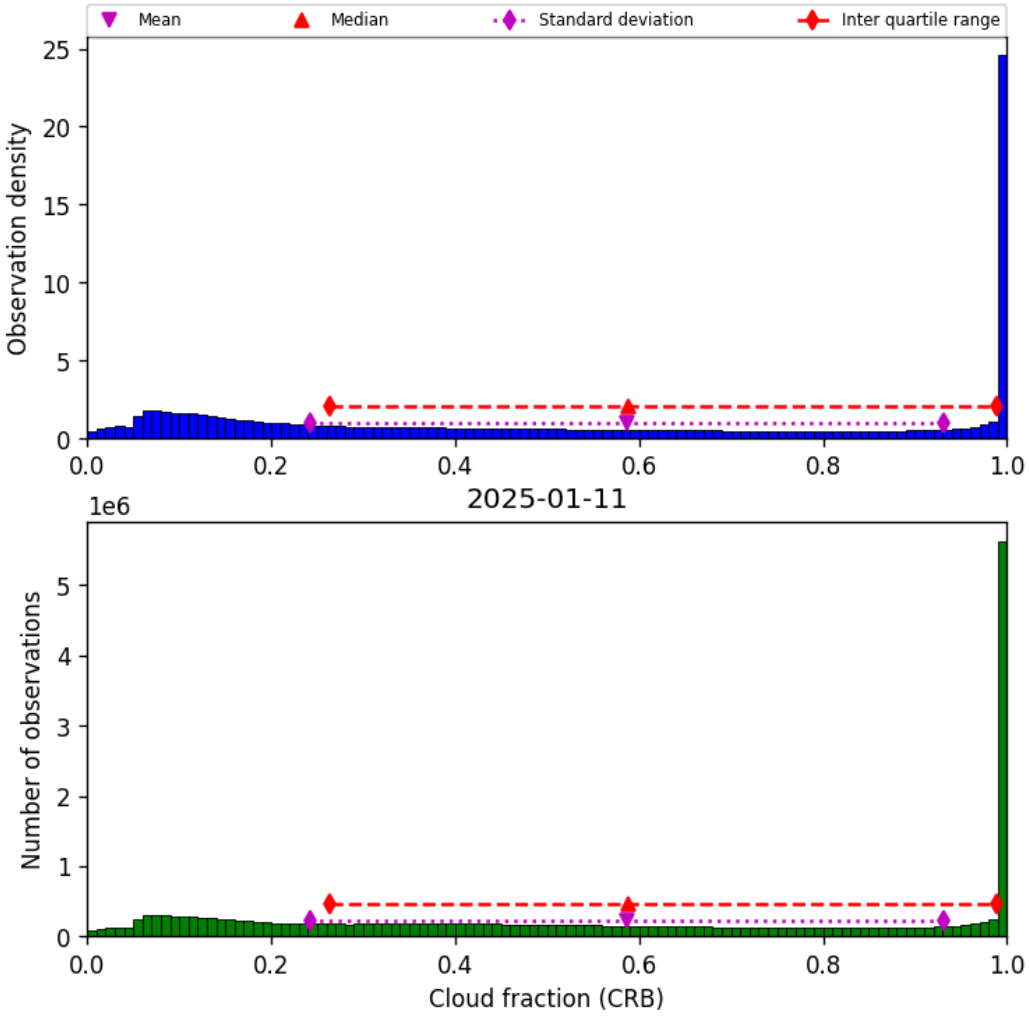

Figure 42: Histogram of “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12

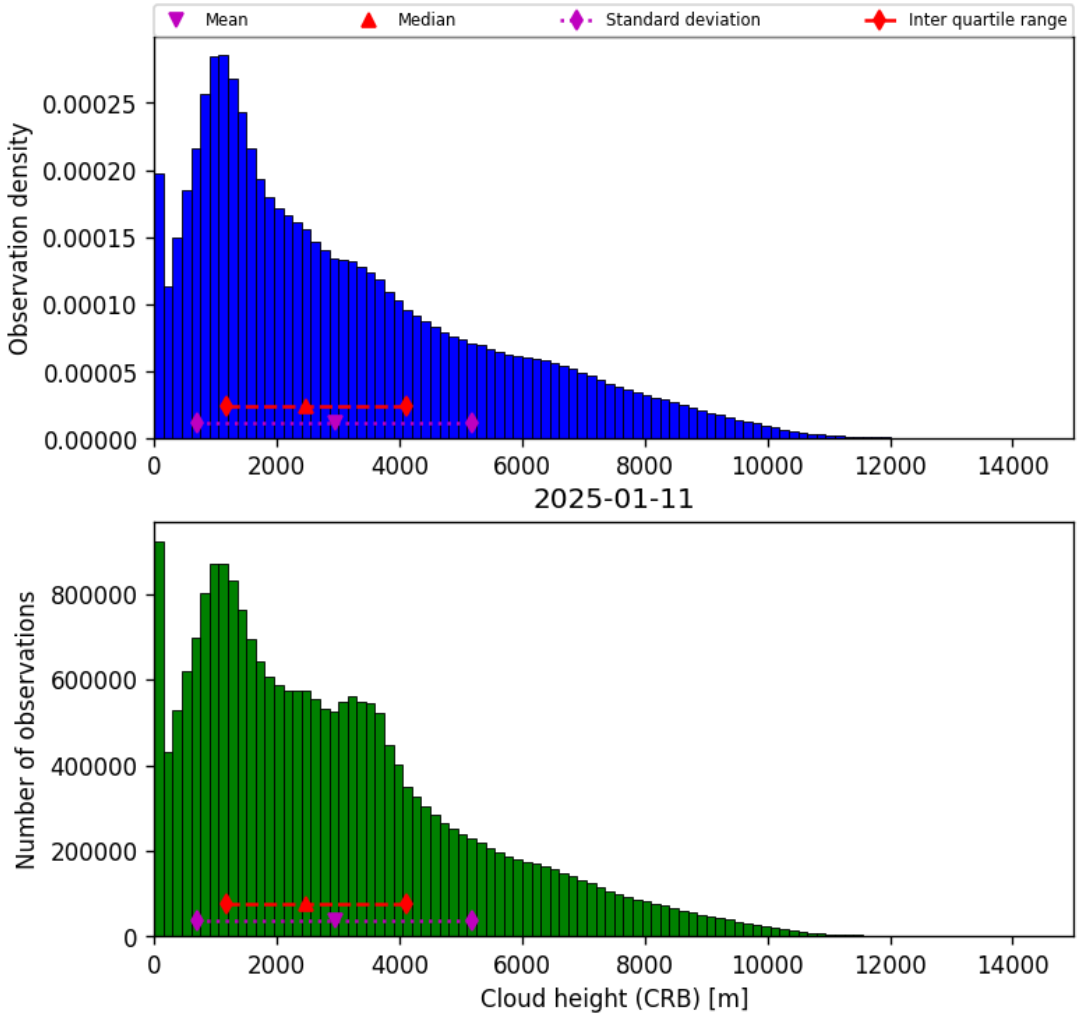

Figure 43: Histogram of “Cloud height (CRB)” for 2025-01-10 to 2025-01-12

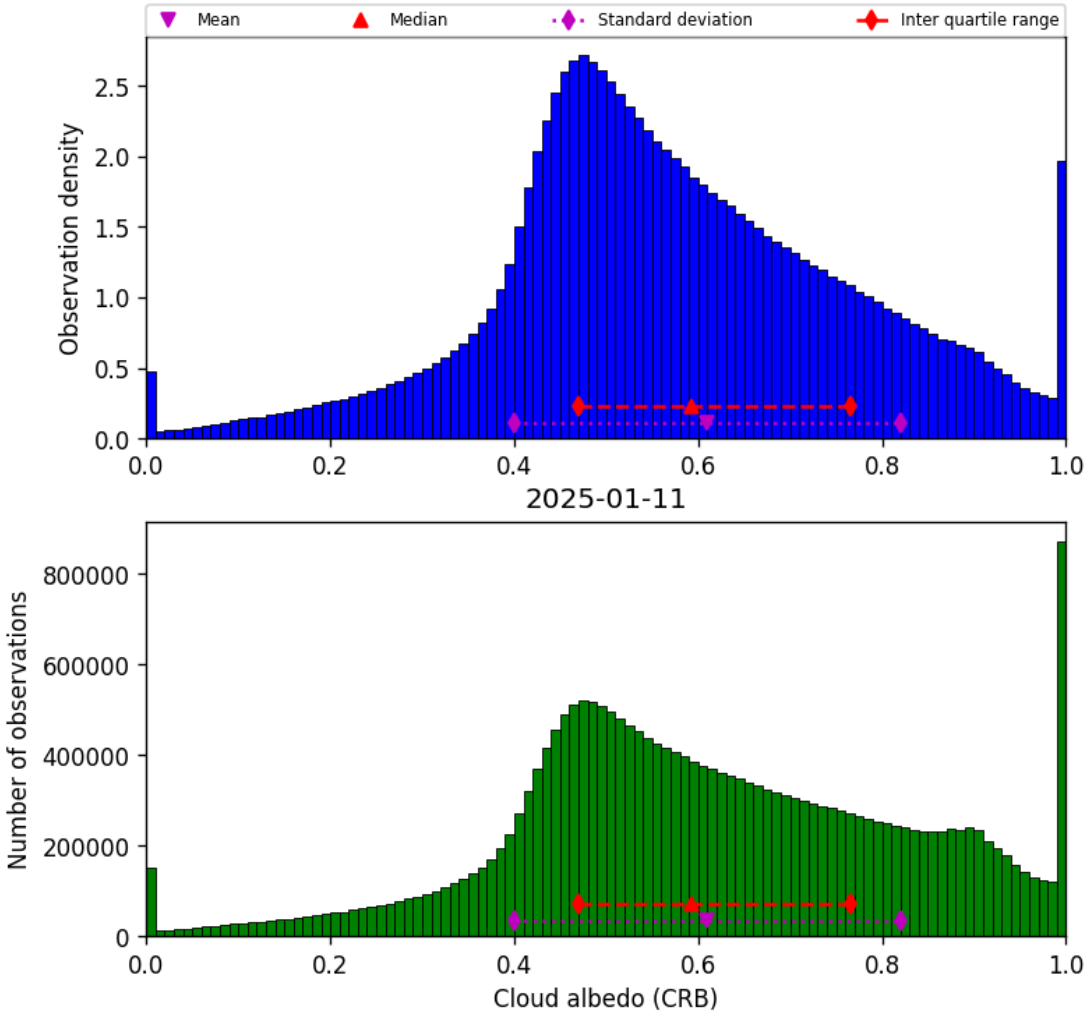

Figure 44: Histogram of “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12

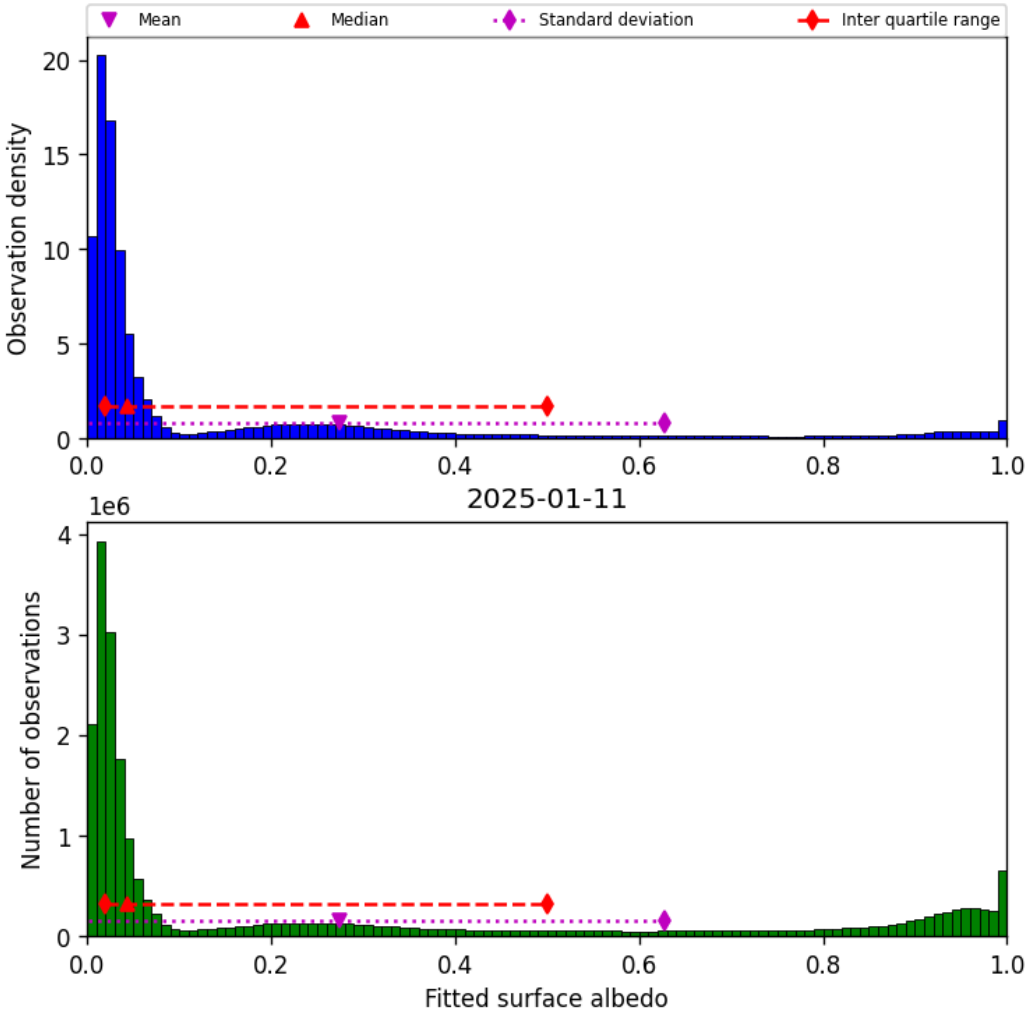

Figure 45: Histogram of “Fitted surface albedo” for 2025-01-10 to 2025-01-12

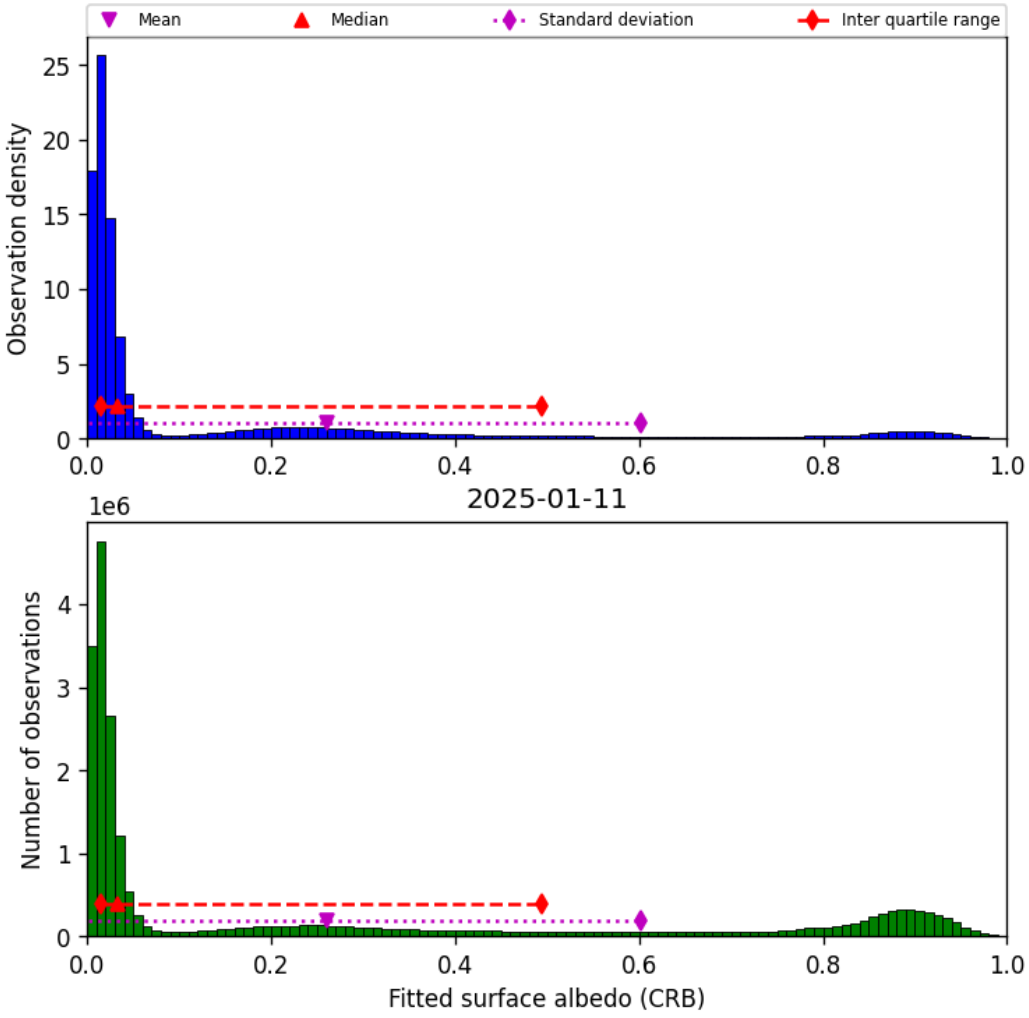

Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2025-01-10 to 2025-01-12

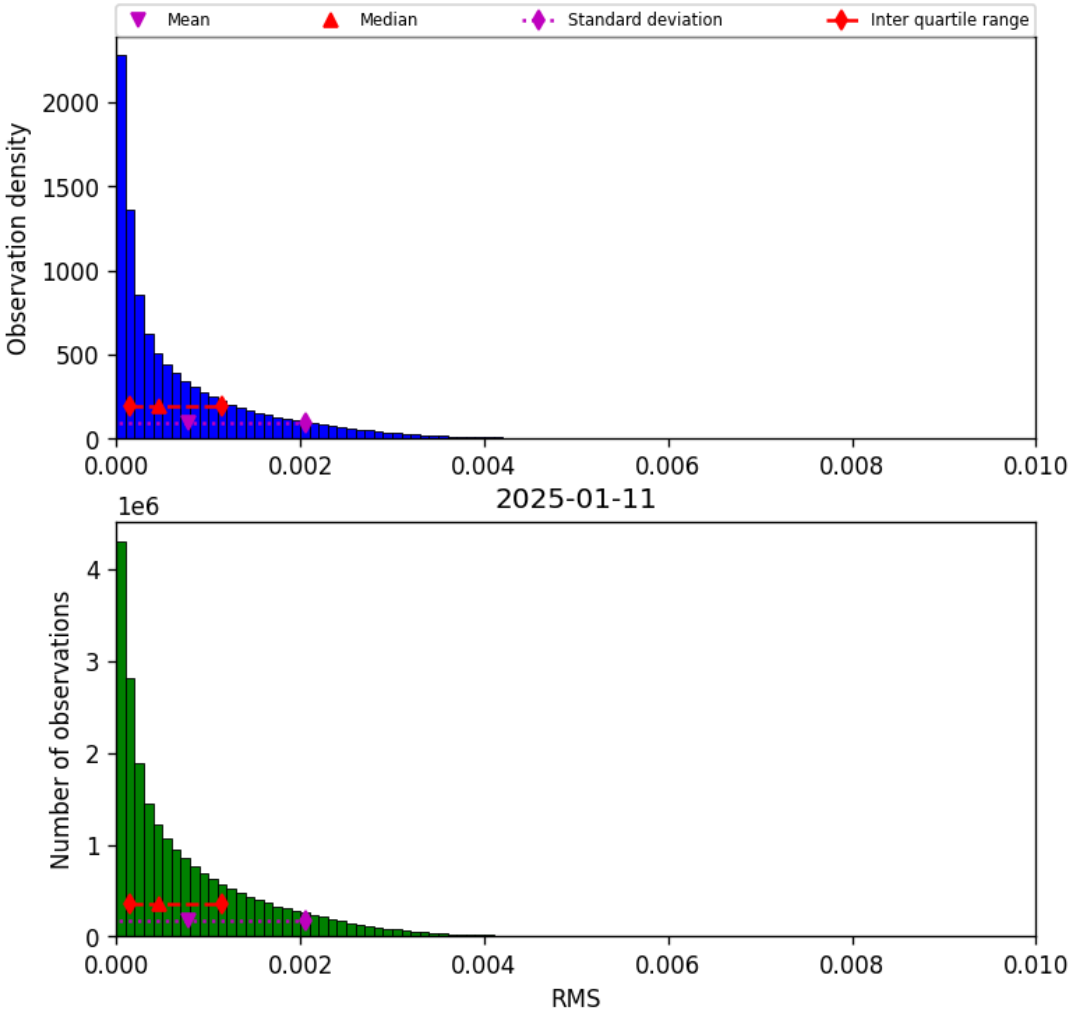

Figure 47: Histogram of “RMS” for 2025-01-10 to 2025-01-12

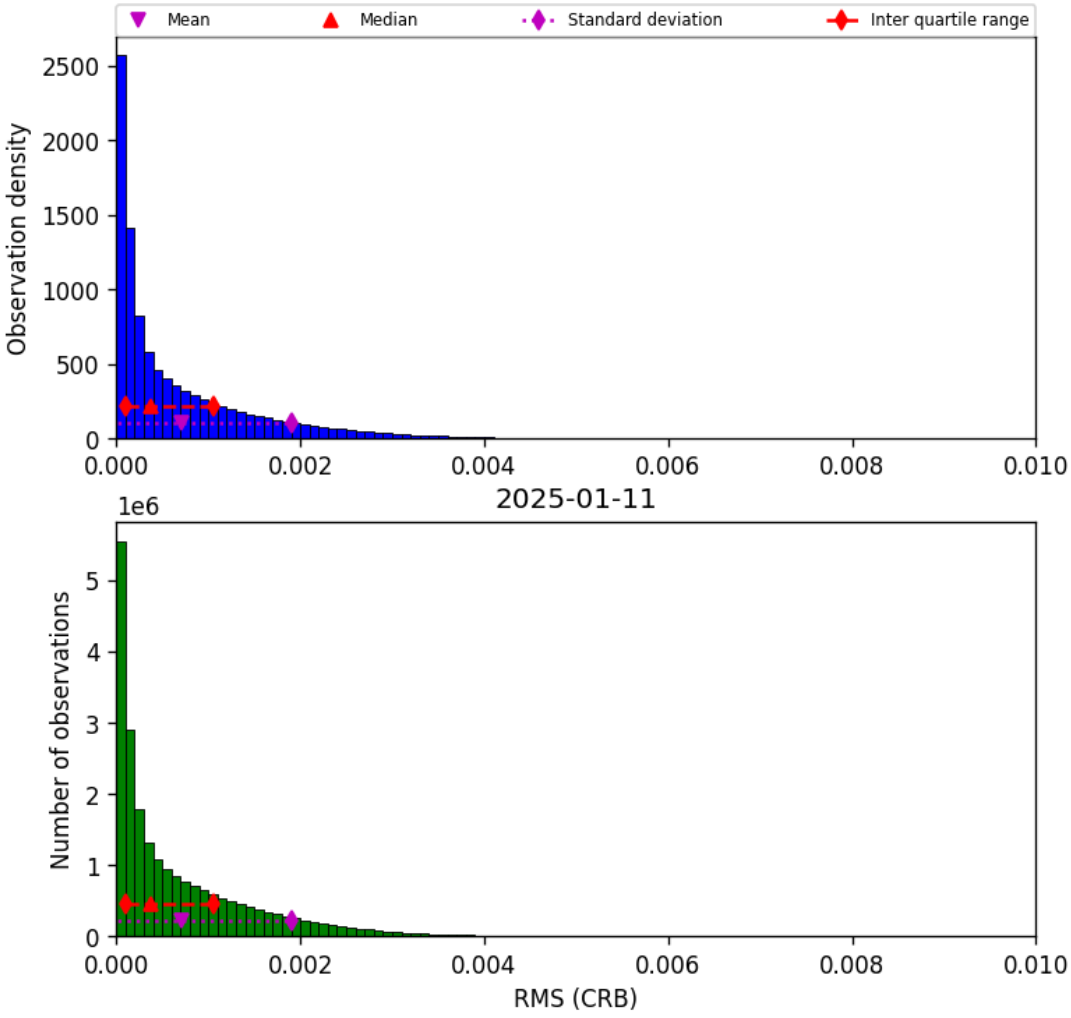

Figure 48: Histogram of “RMS (CRB)” for 2025-01-10 to 2025-01-12

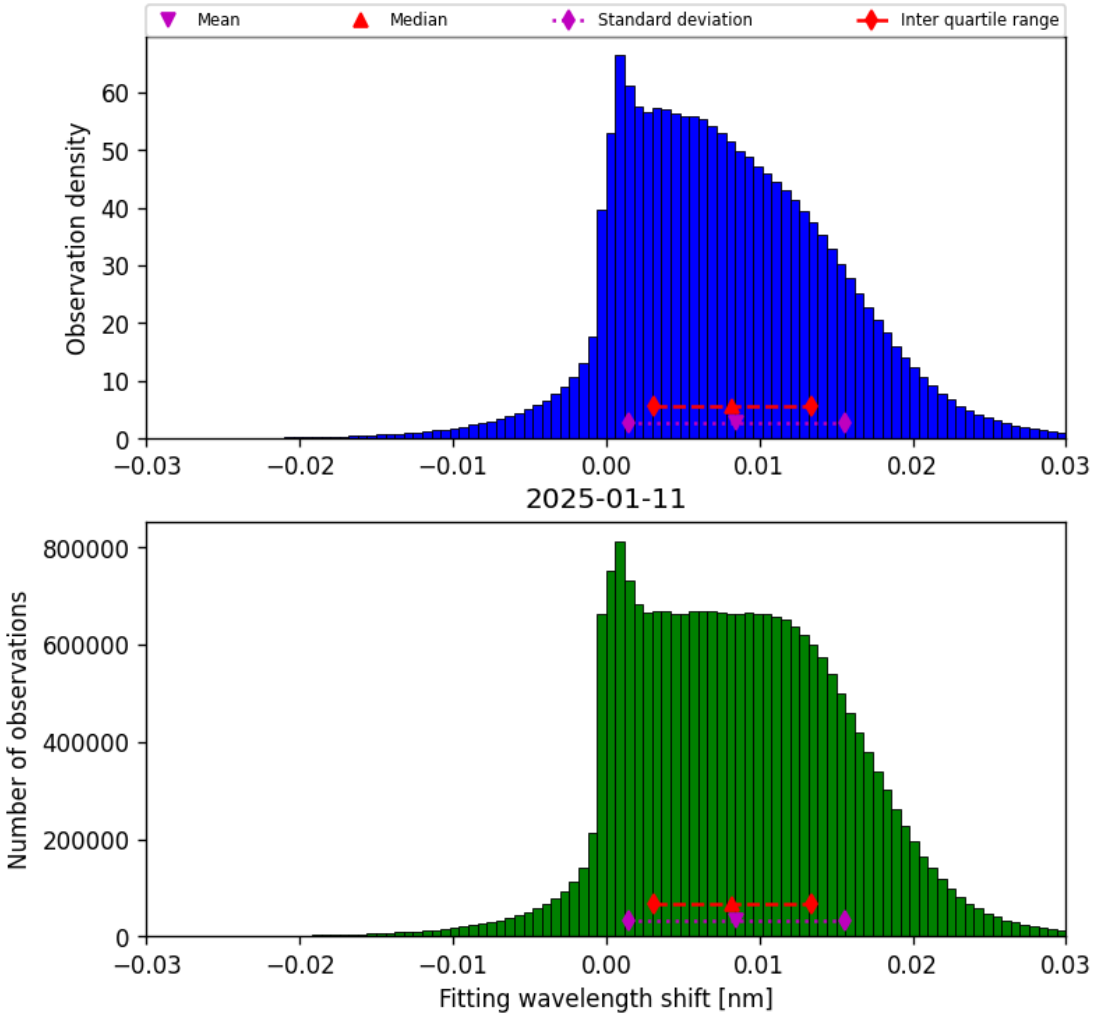

Figure 49: Histogram of “Fitting wavelength shift” for 2025-01-10 to 2025-01-12

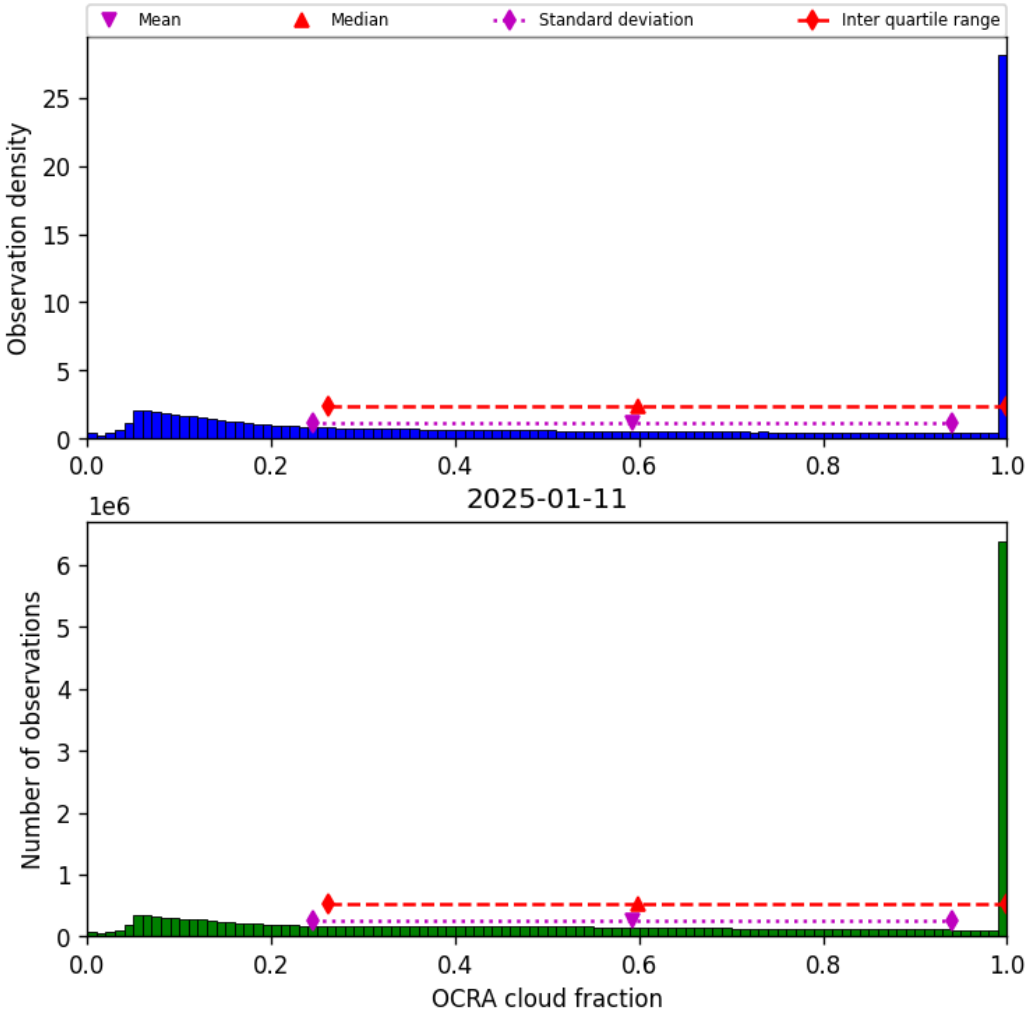

Figure 50: Histogram of “OCRA cloud fraction” for 2025-01-10 to 2025-01-12

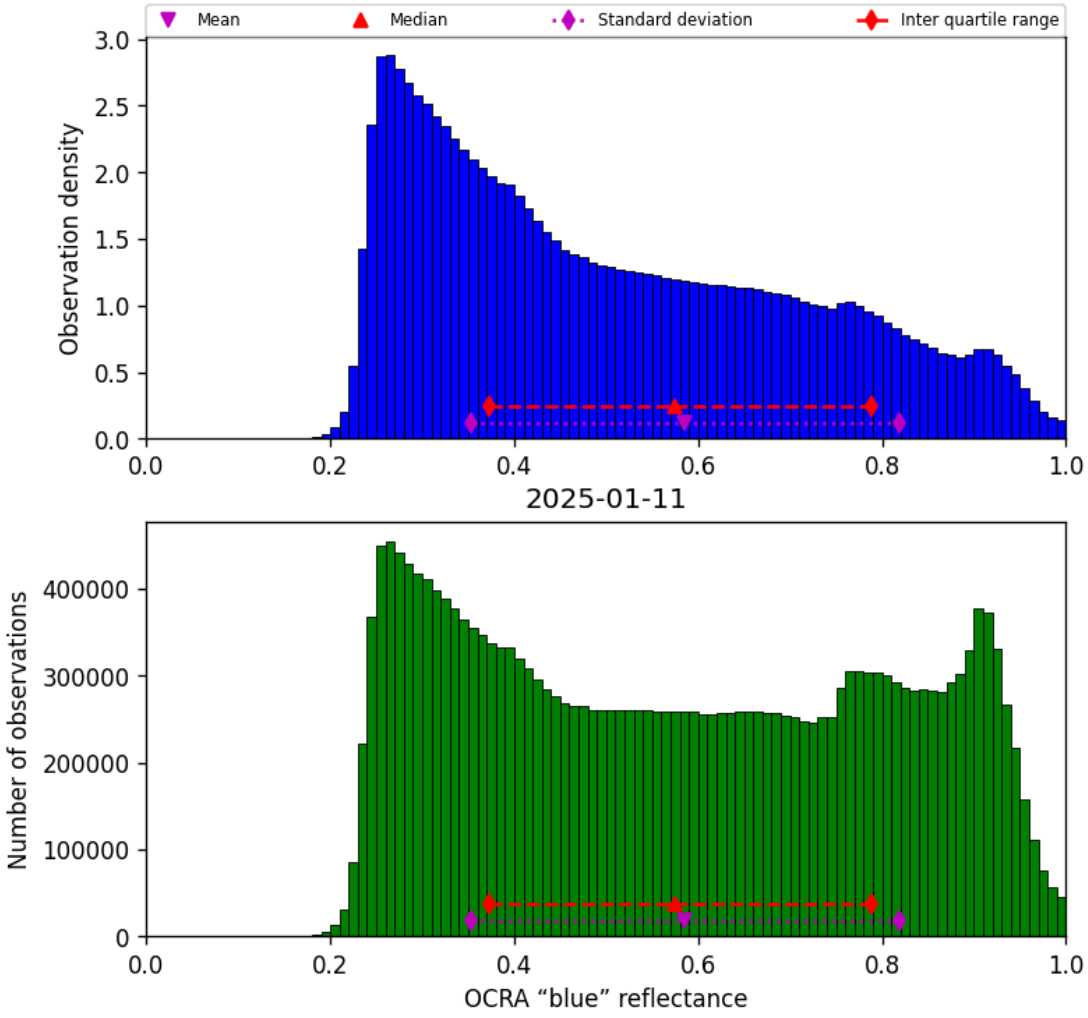

Figure 51: Histogram of “OCRA “blue” reflectance” for 2025-01-10 to 2025-01-12

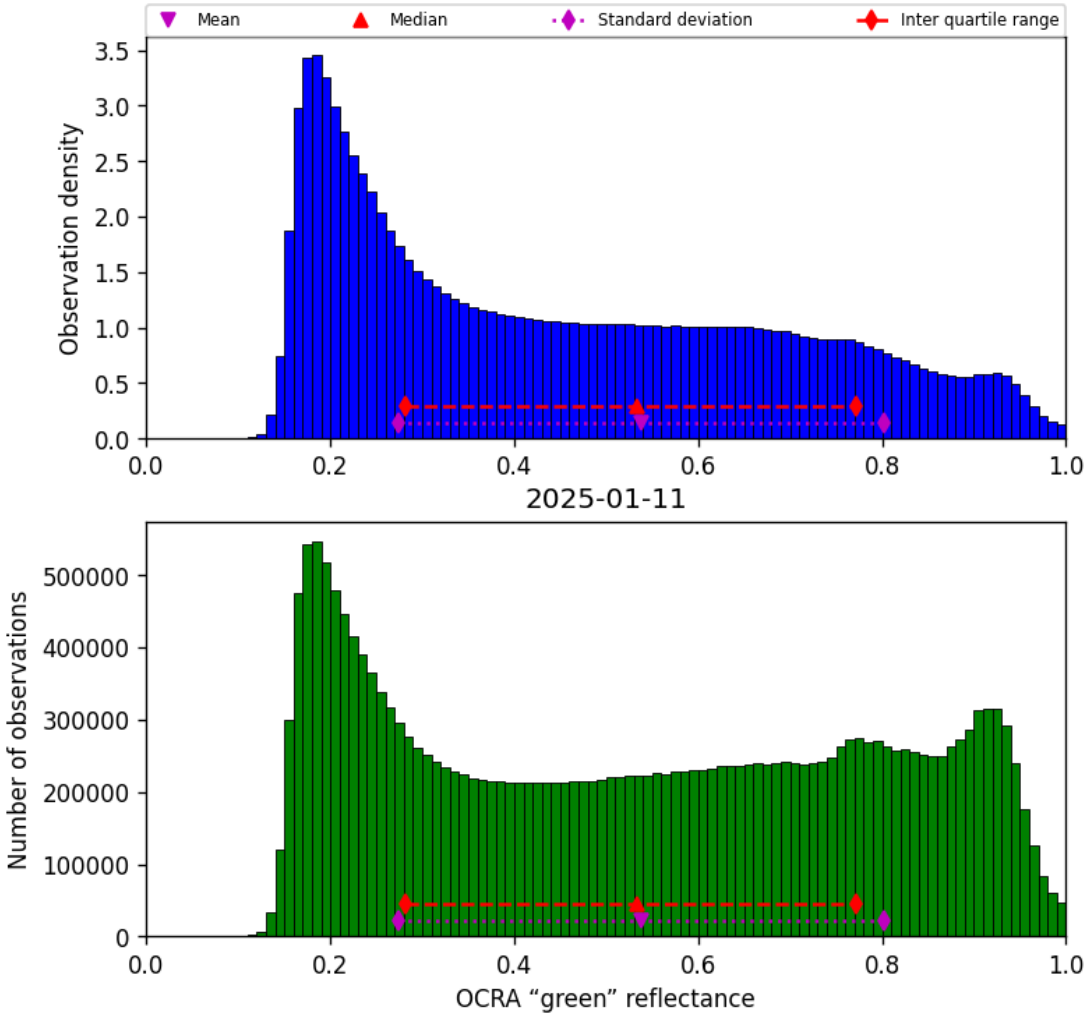

Figure 52: Histogram of “OCRA “green” reflectance” for 2025-01-10 to 2025-01-12

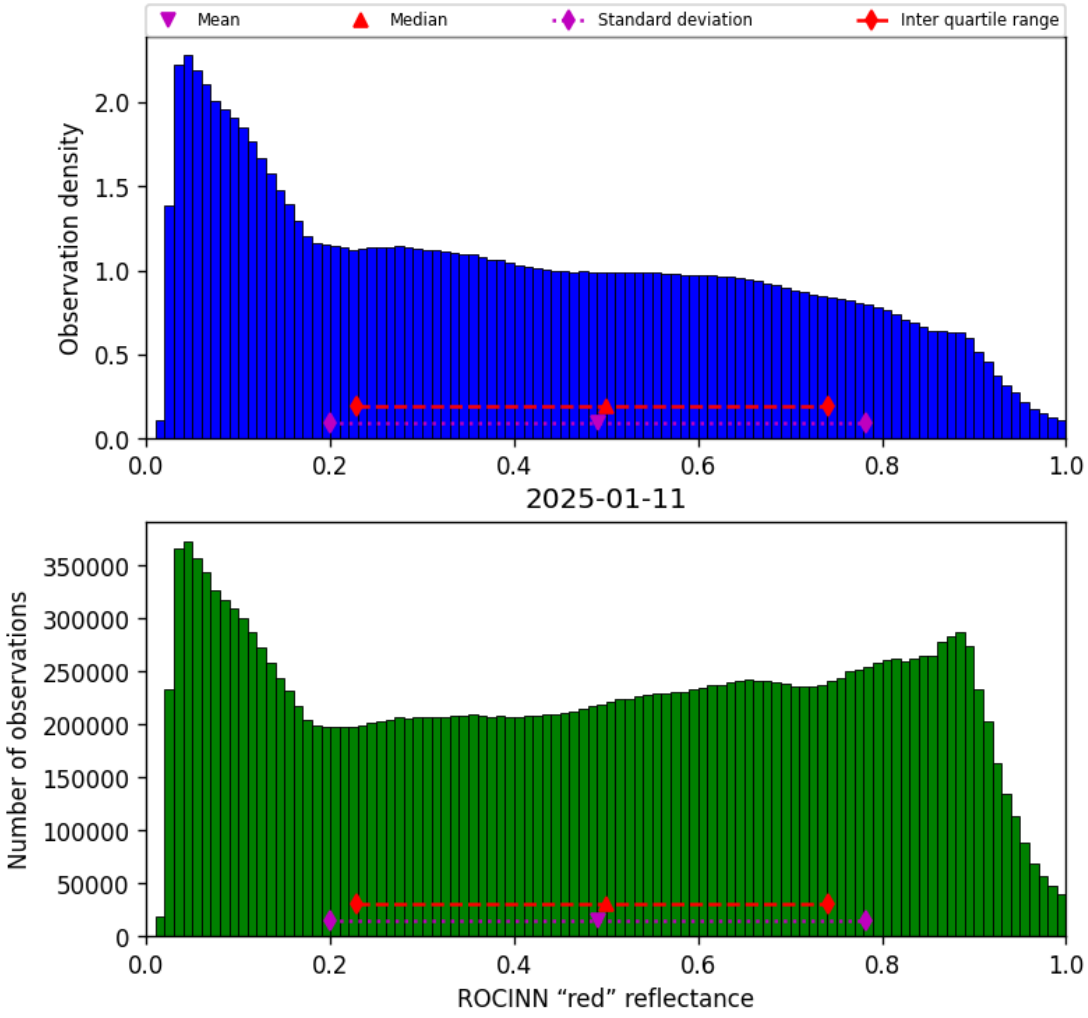

Figure 53: Histogram of “ROCINN “red” reflectance” for 2025-01-10 to 2025-01-12

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.

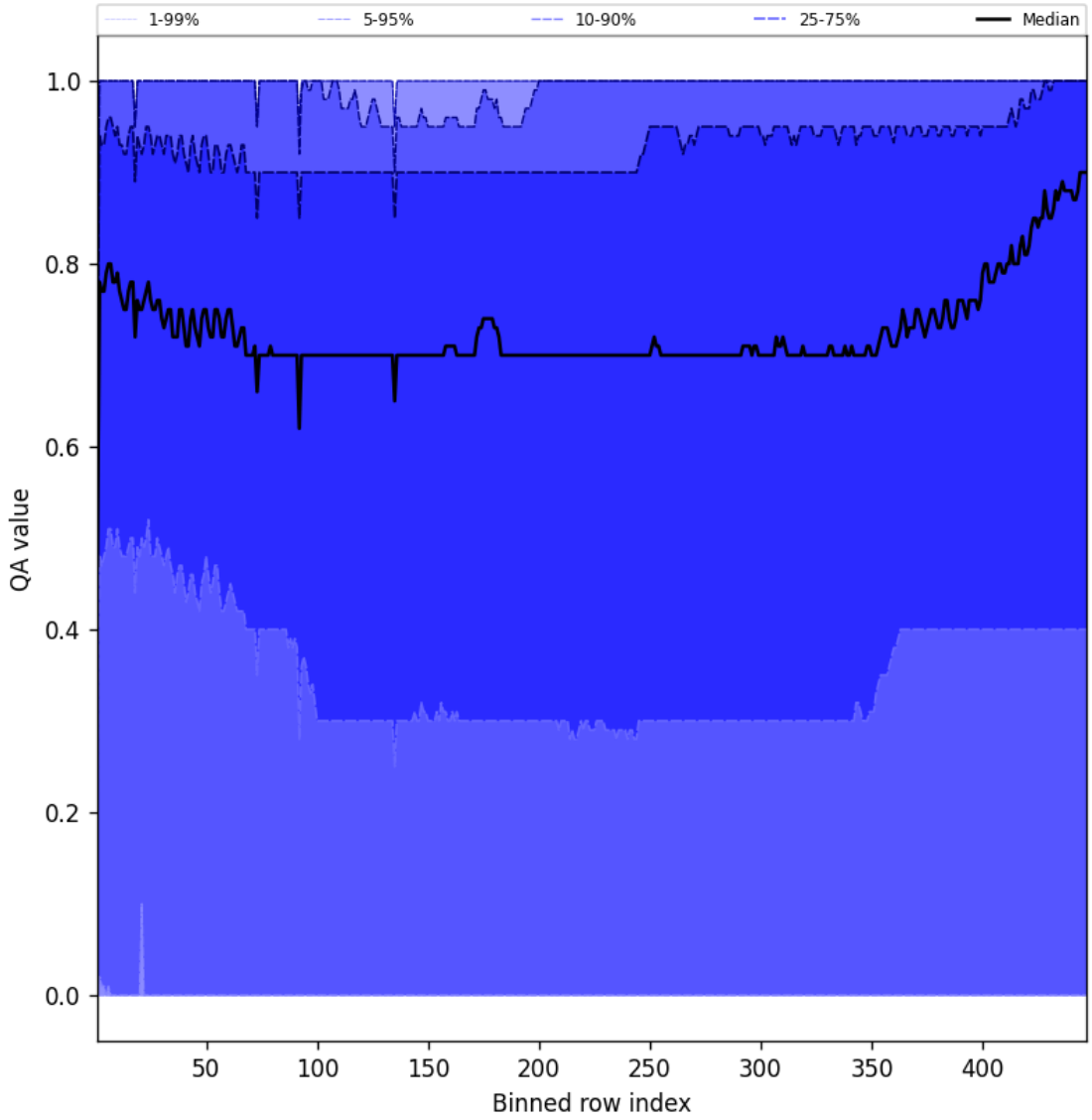

Figure 54: Along track statistics of “QA value” for 2025-01-10 to 2025-01-12

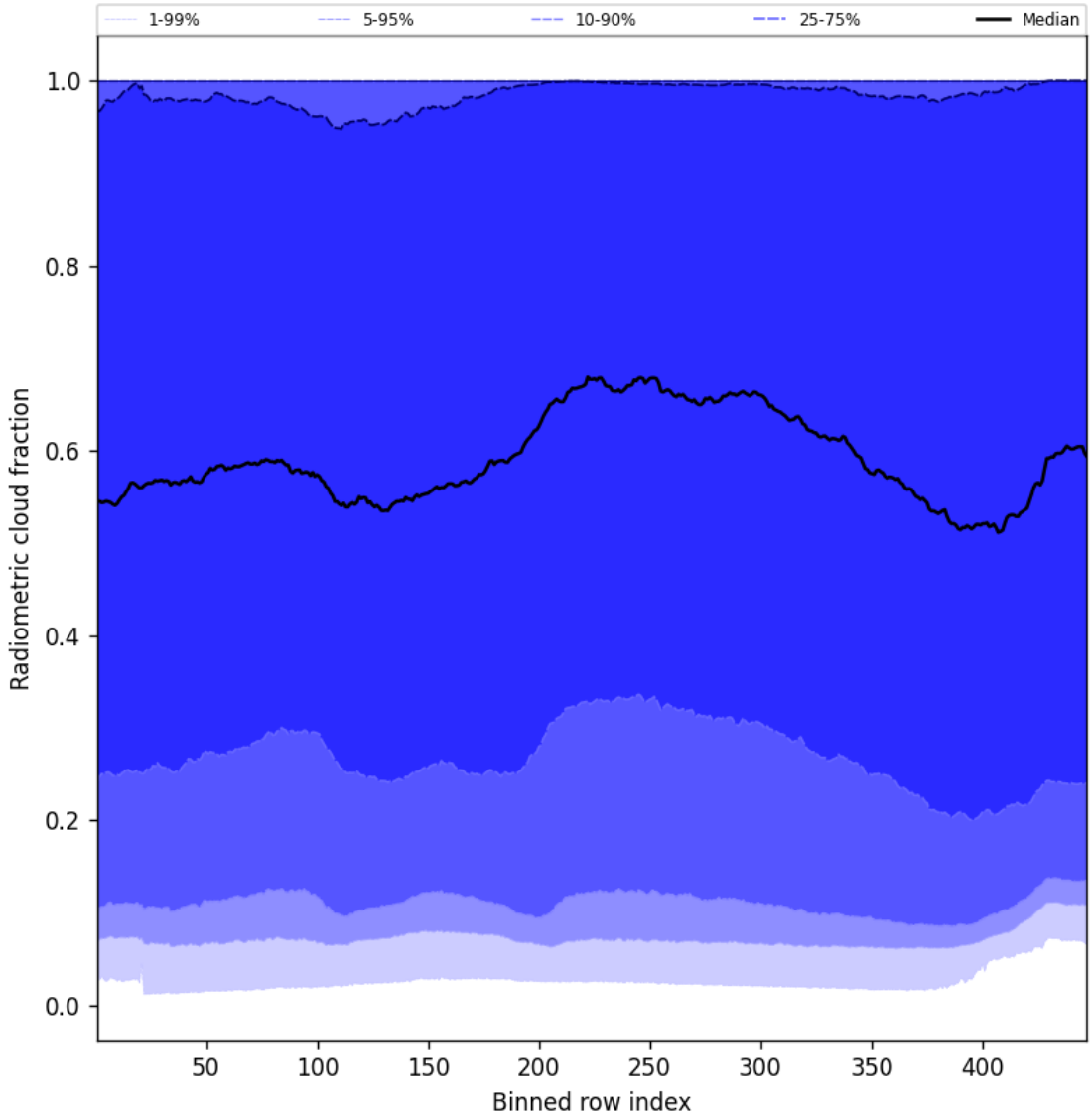

Figure 55: Along track statistics of “Radiometric cloud fraction” for 2025-01-10 to 2025-01-12

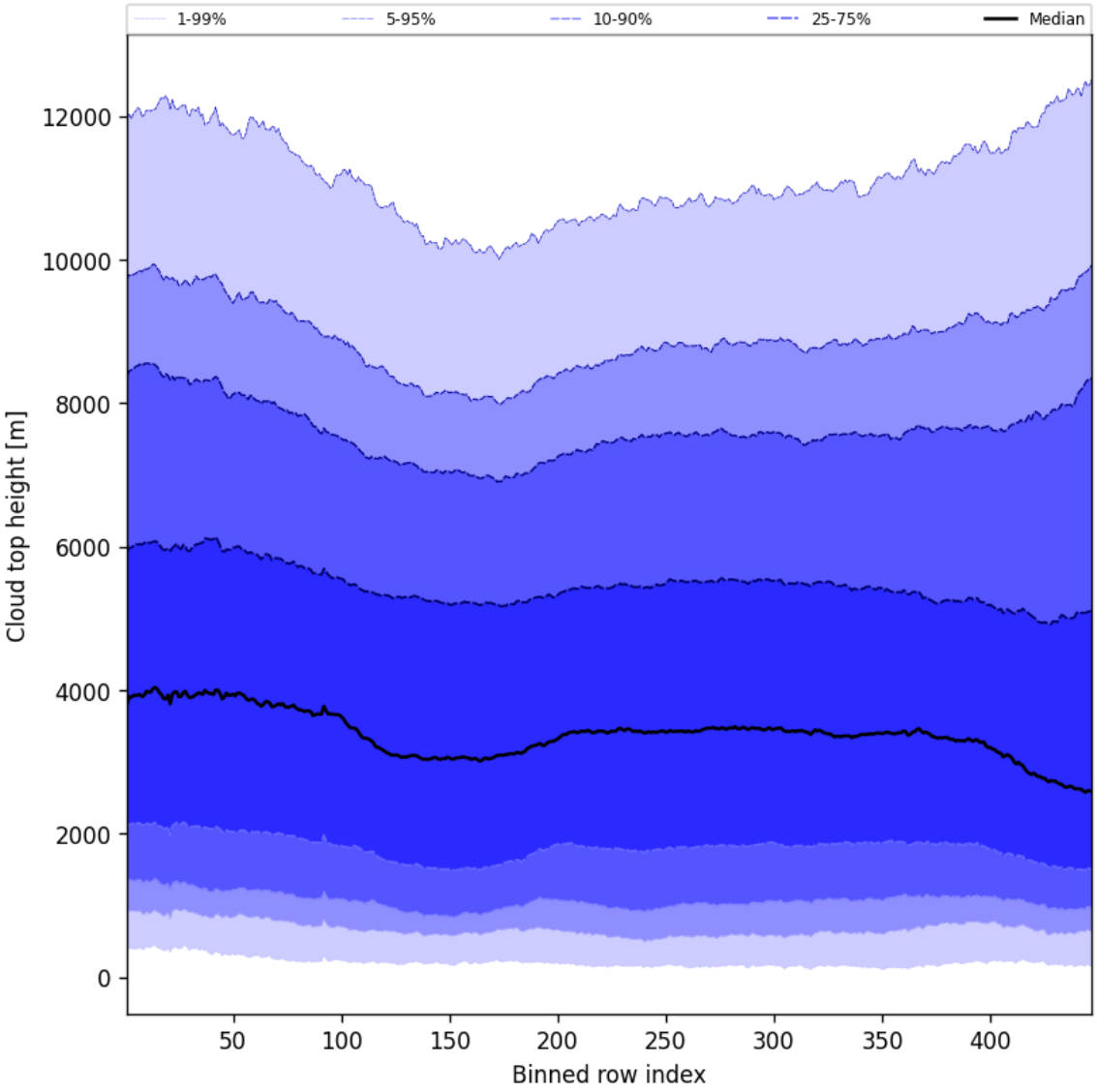

Figure 56: Along track statistics of “Cloud top height” for 2025-01-10 to 2025-01-12

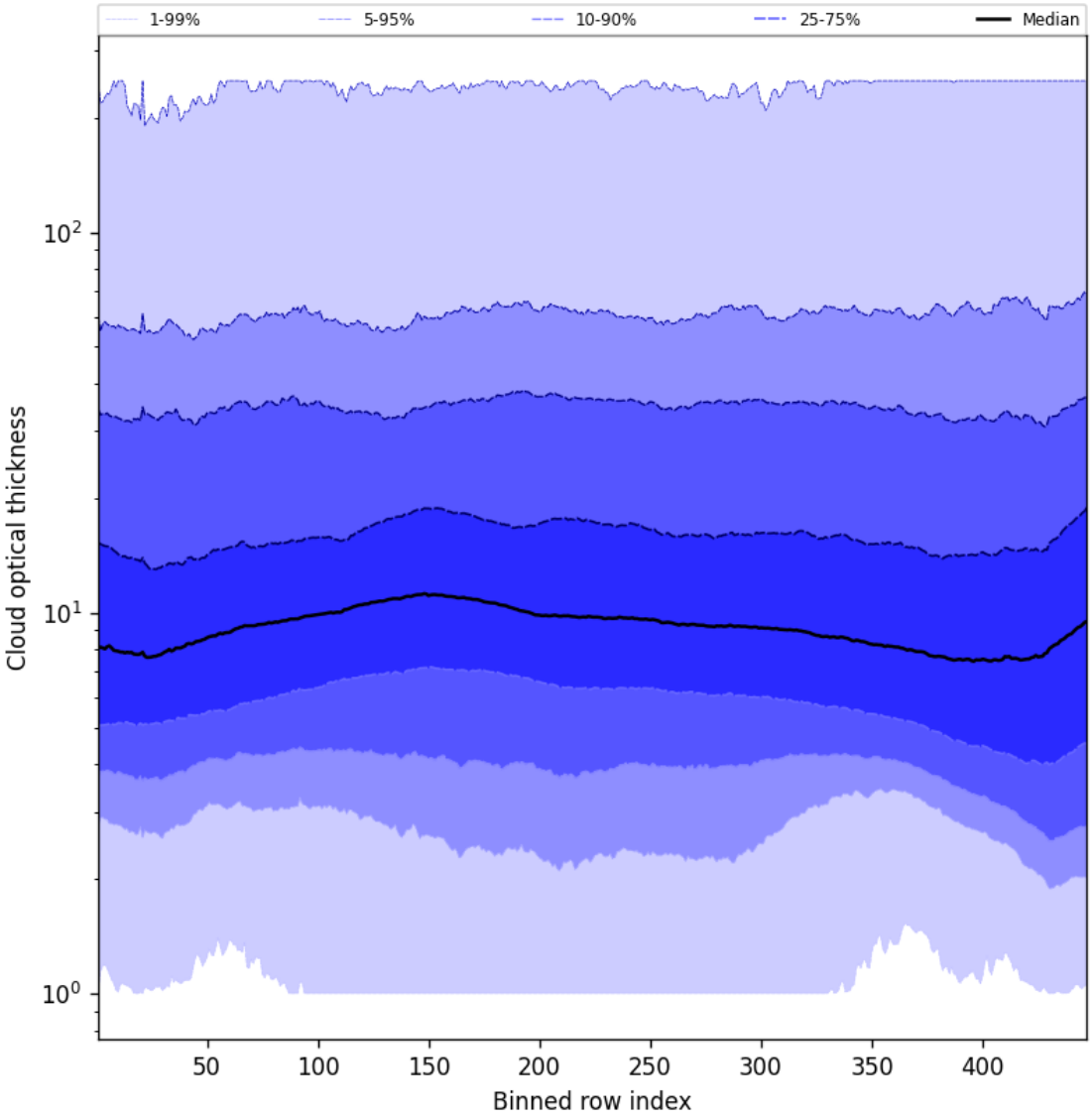

Figure 57: Along track statistics of “Cloud optical thickness” for 2025-01-10 to 2025-01-12

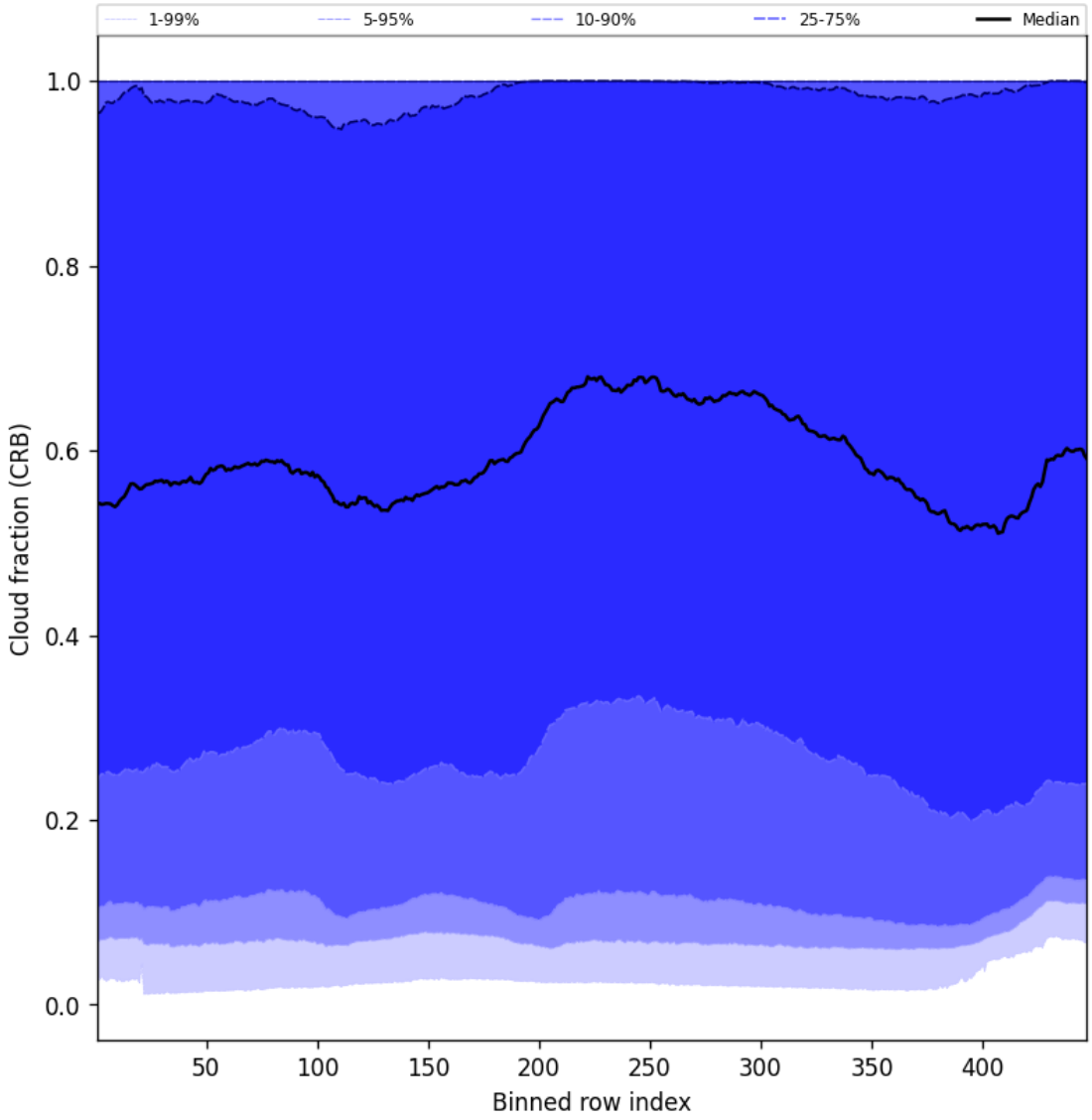

Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12

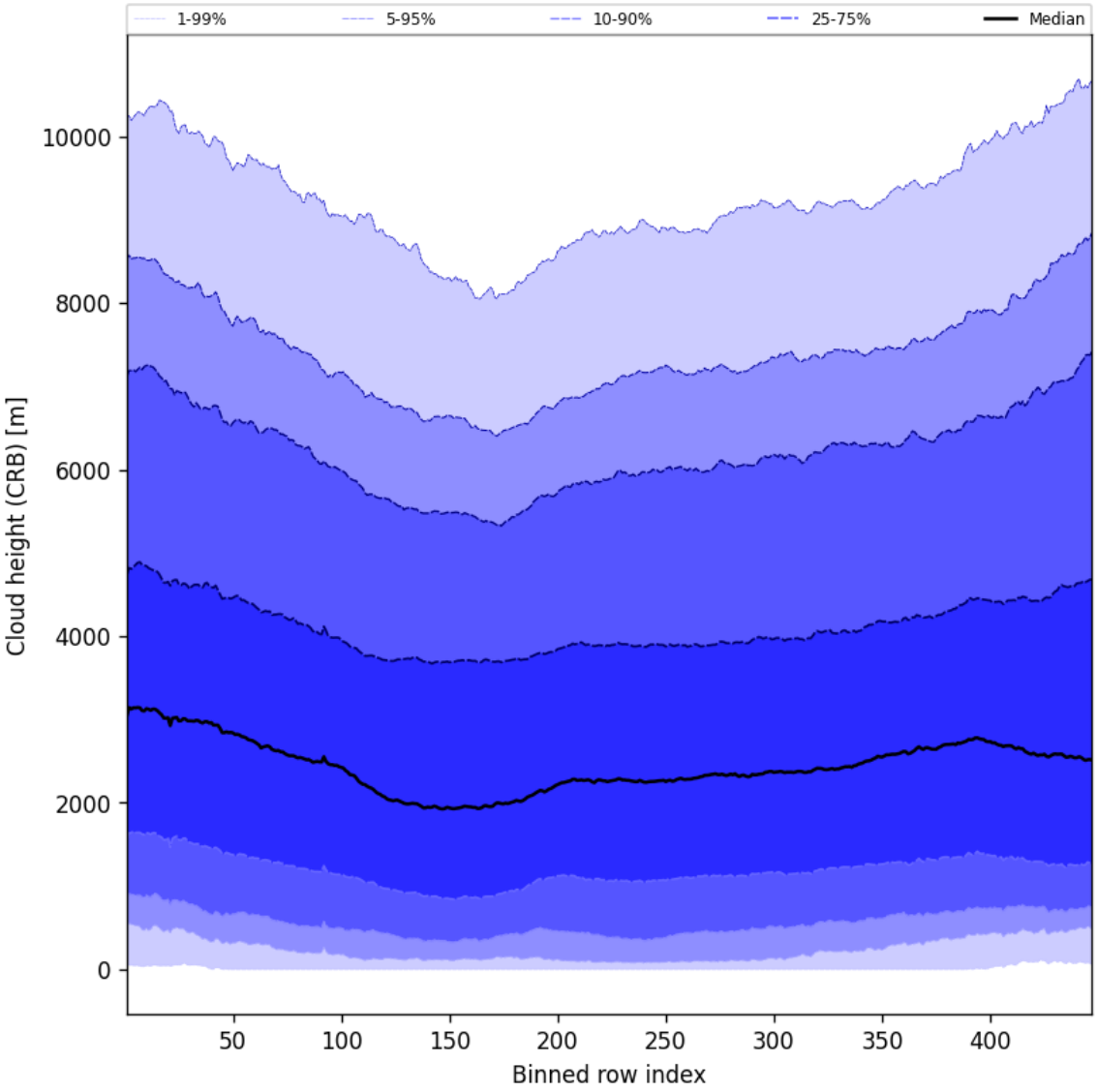

Figure 59: Along track statistics of “Cloud height (CRB)” for 2025-01-10 to 2025-01-12

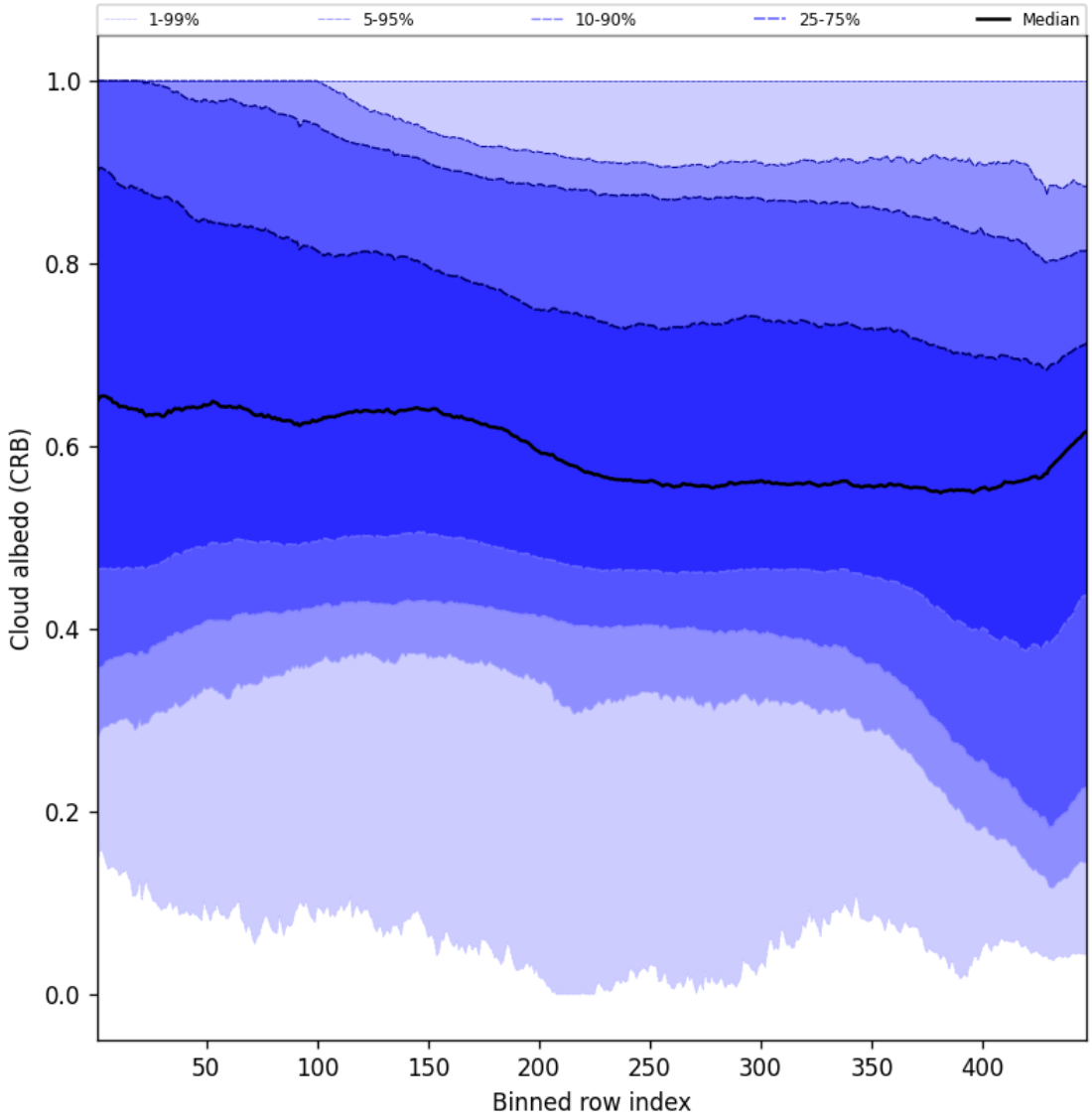

Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12

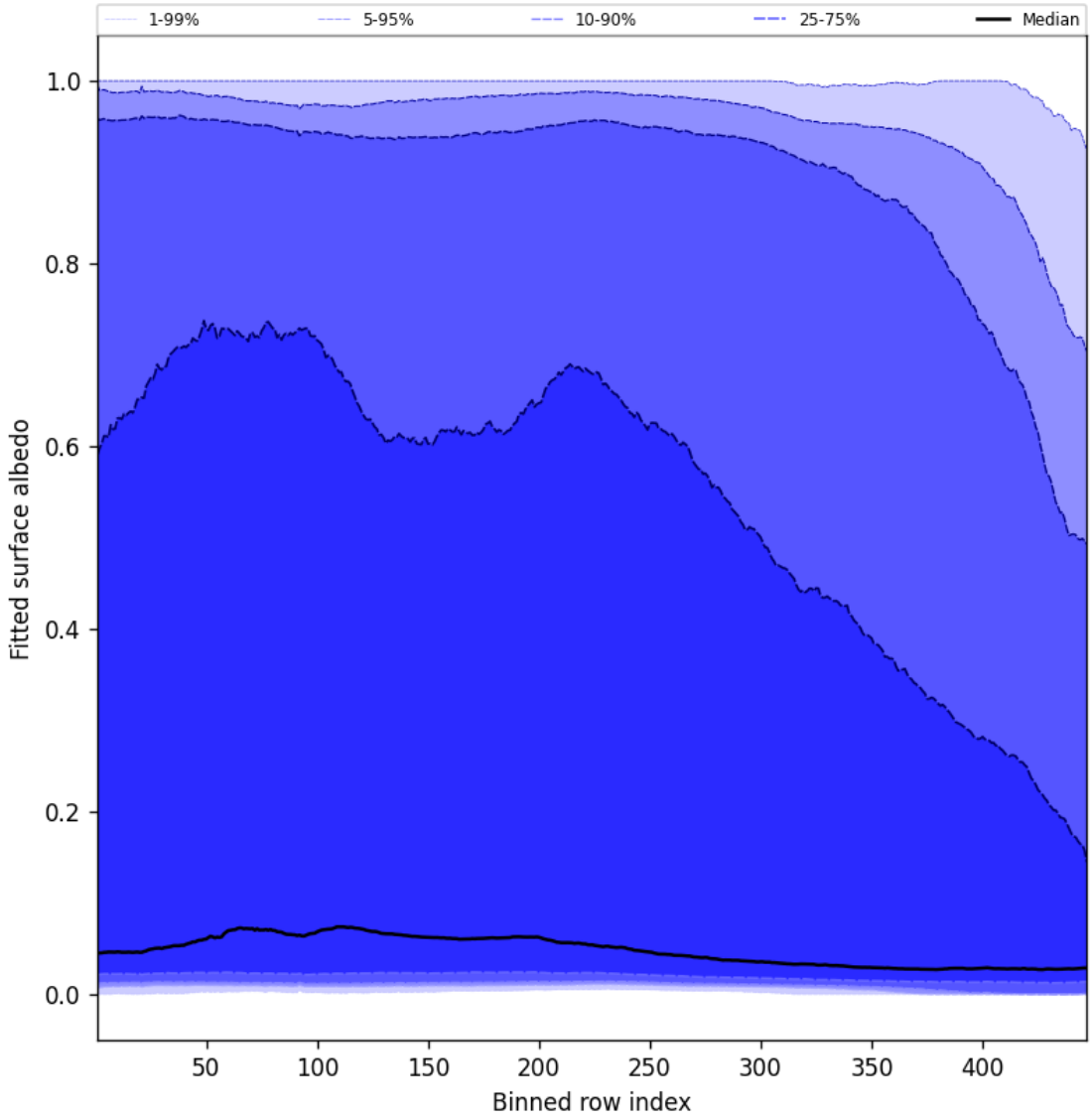

Figure 61: Along track statistics of “Fitted surface albedo” for 2025-01-10 to 2025-01-12

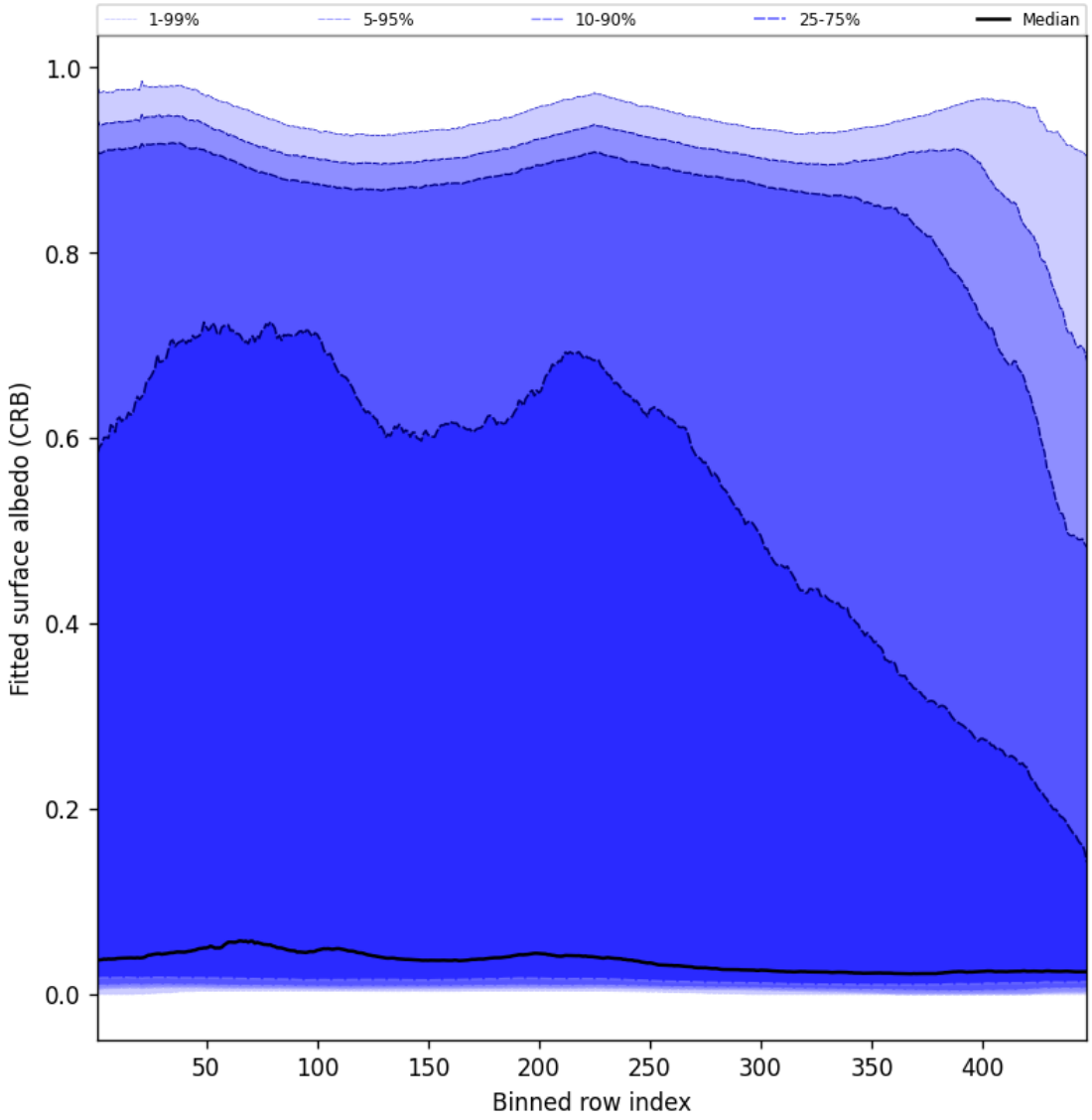

Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2025-01-10 to 2025-01-12

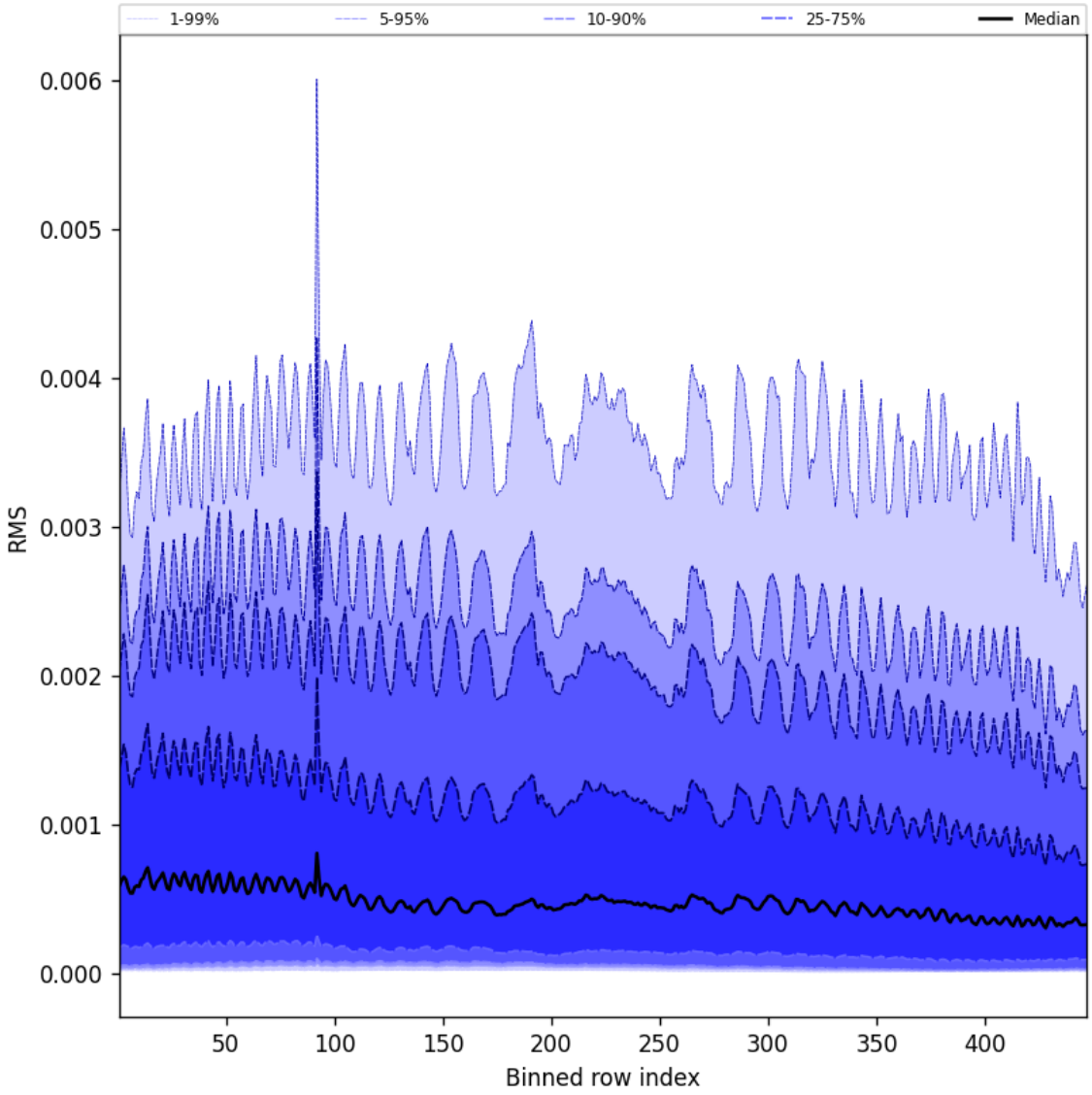

Figure 63: Along track statistics of “RMS” for 2025-01-10 to 2025-01-12

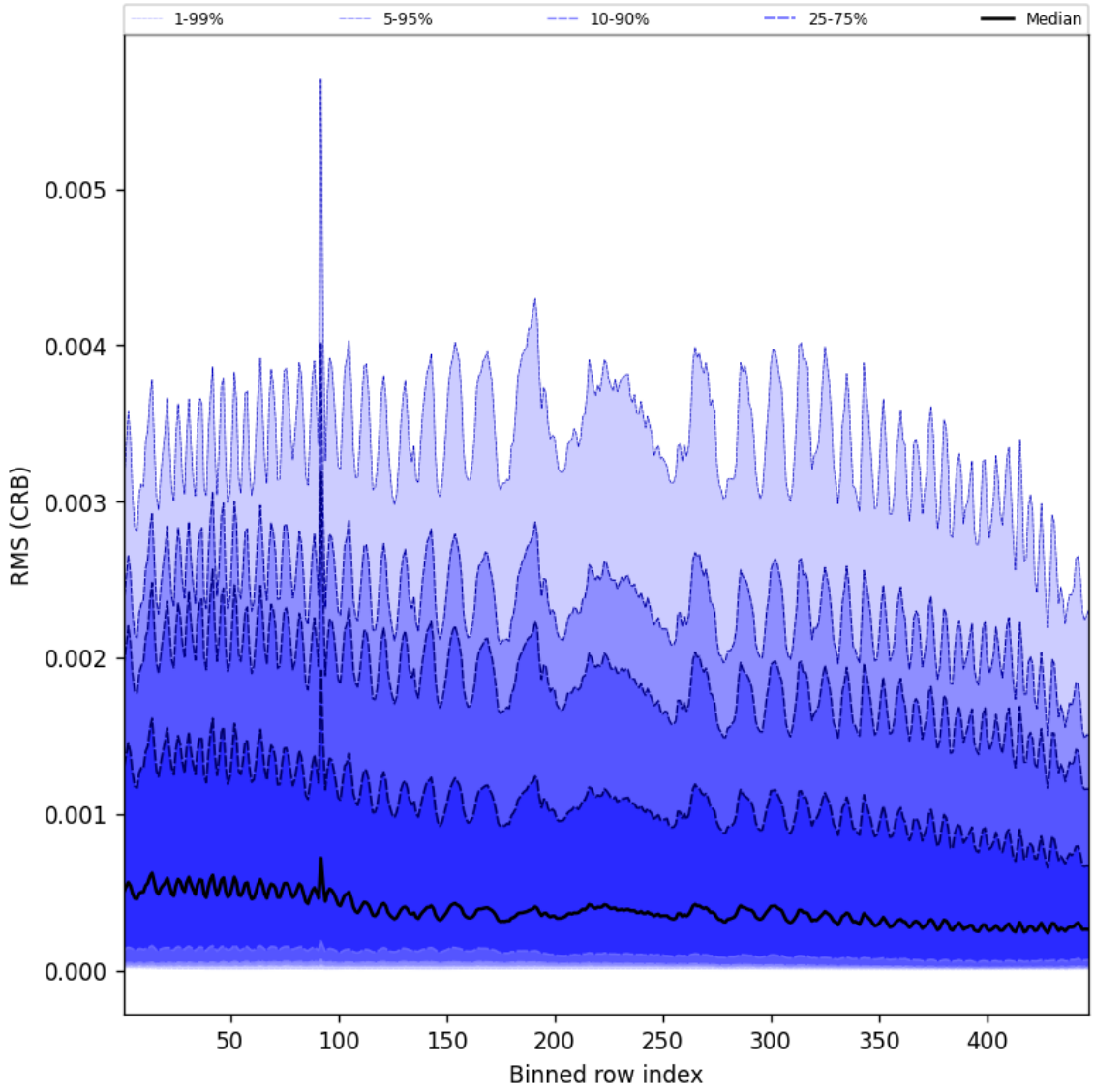

Figure 64: Along track statistics of “RMS (CRB)” for 2025-01-10 to 2025-01-12

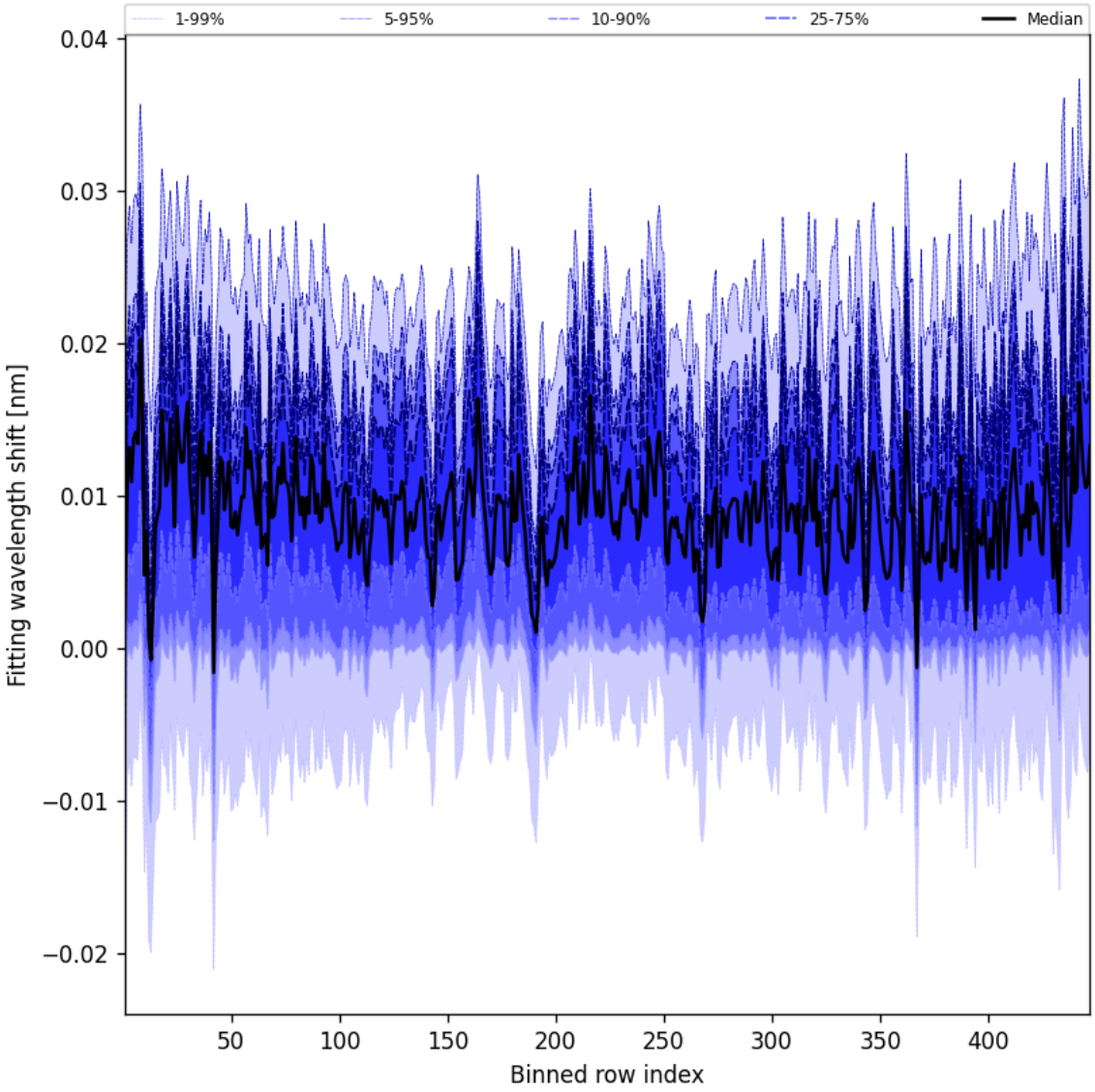

Figure 65: Along track statistics of “Fitting wavelength shift” for 2025-01-10 to 2025-01-12

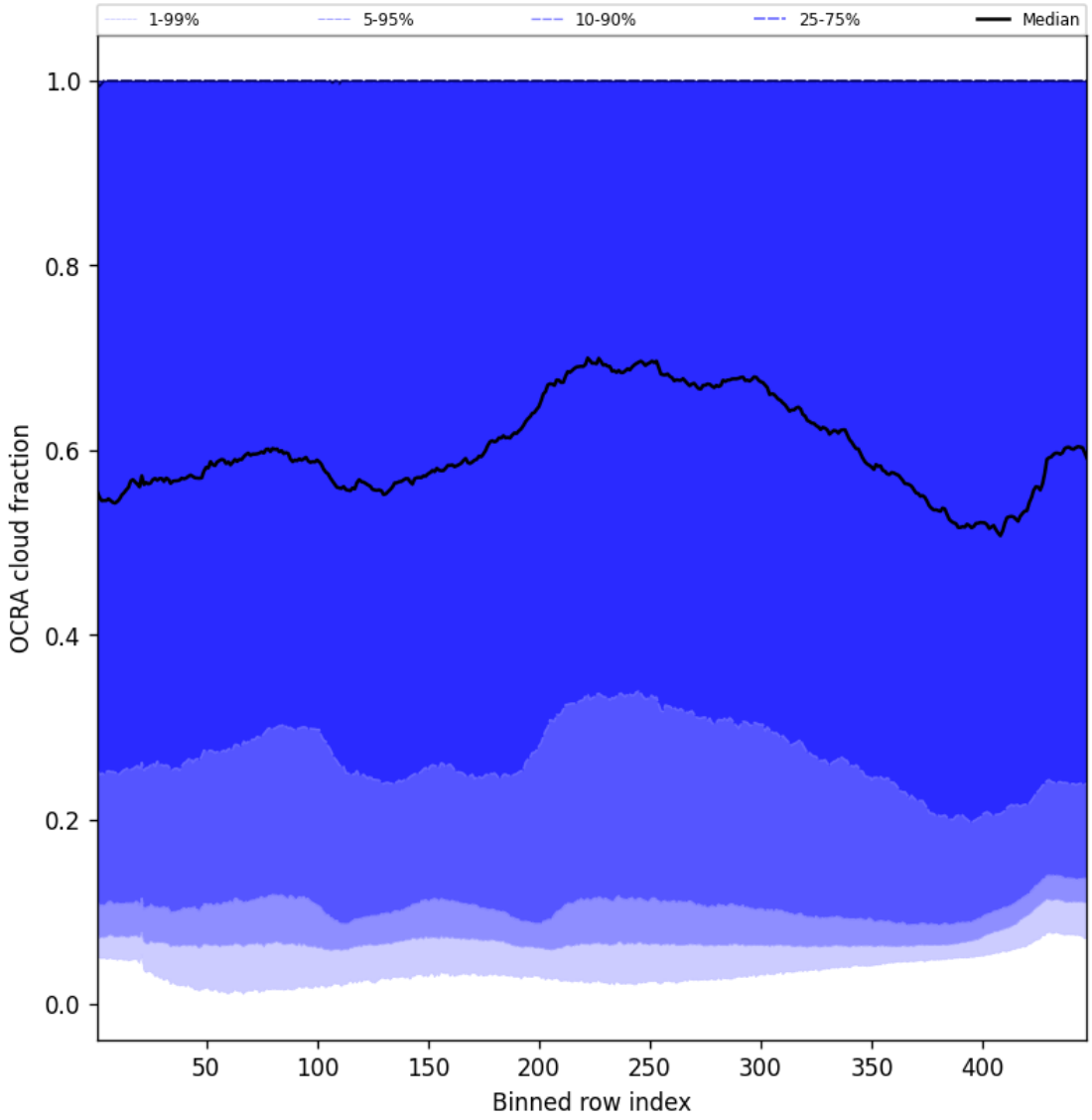

Figure 66: Along track statistics of “OCRA cloud fraction” for 2025-01-10 to 2025-01-12

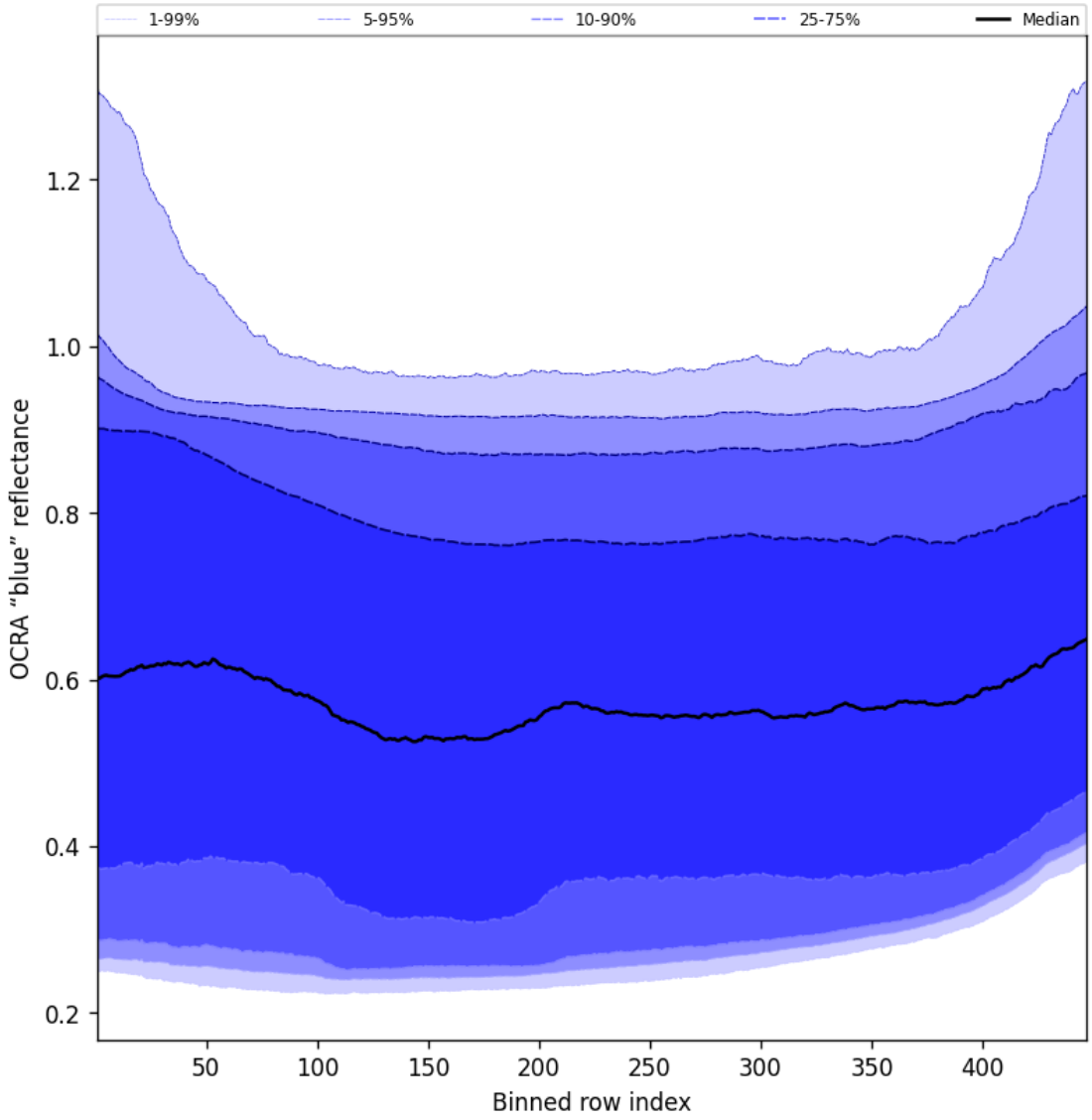

Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2025-01-10 to 2025-01-12

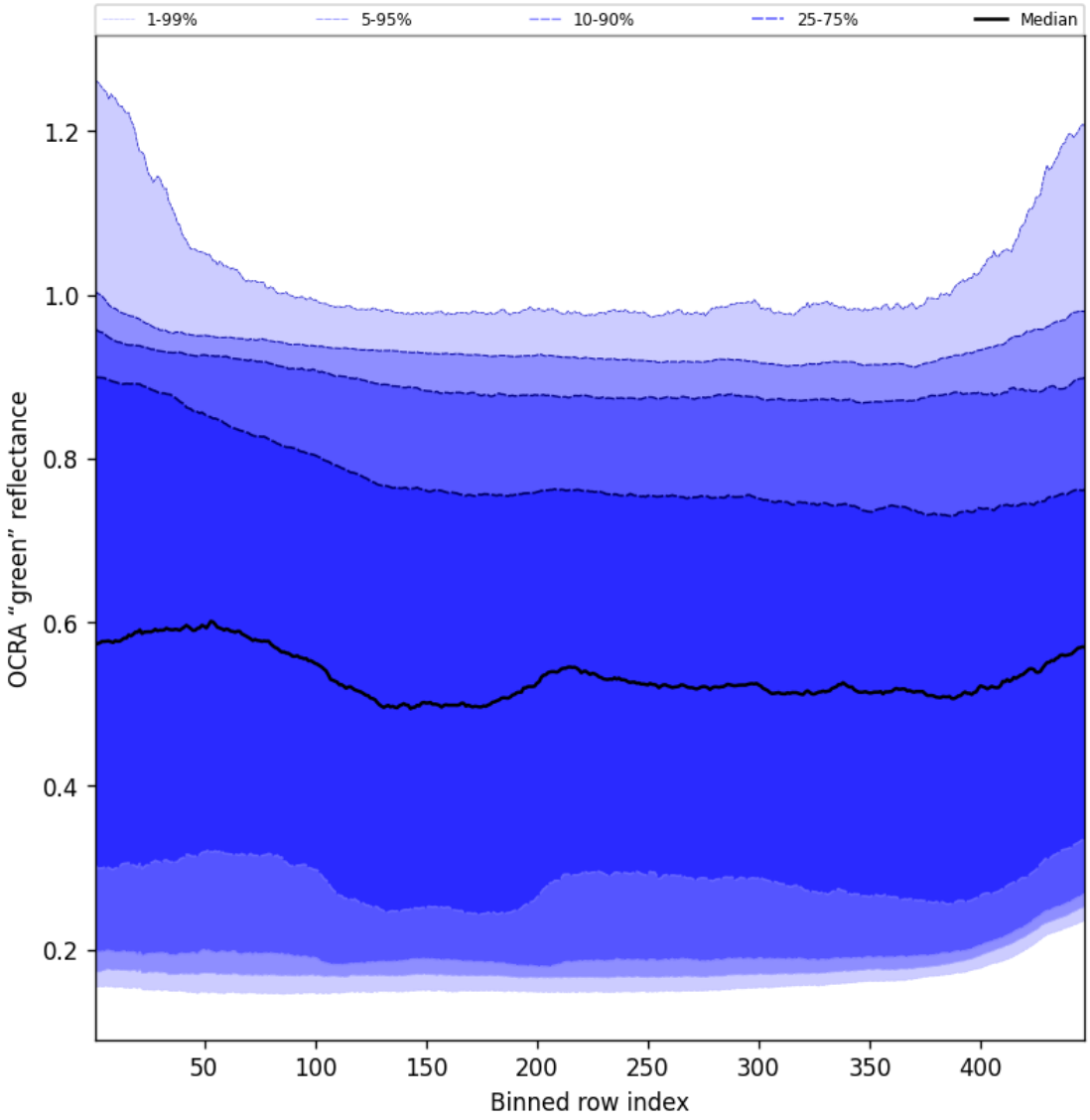

Figure 68: Along track statistics of "OCRA "green" reflectance" for 2025-01-10 to 2025-01-12

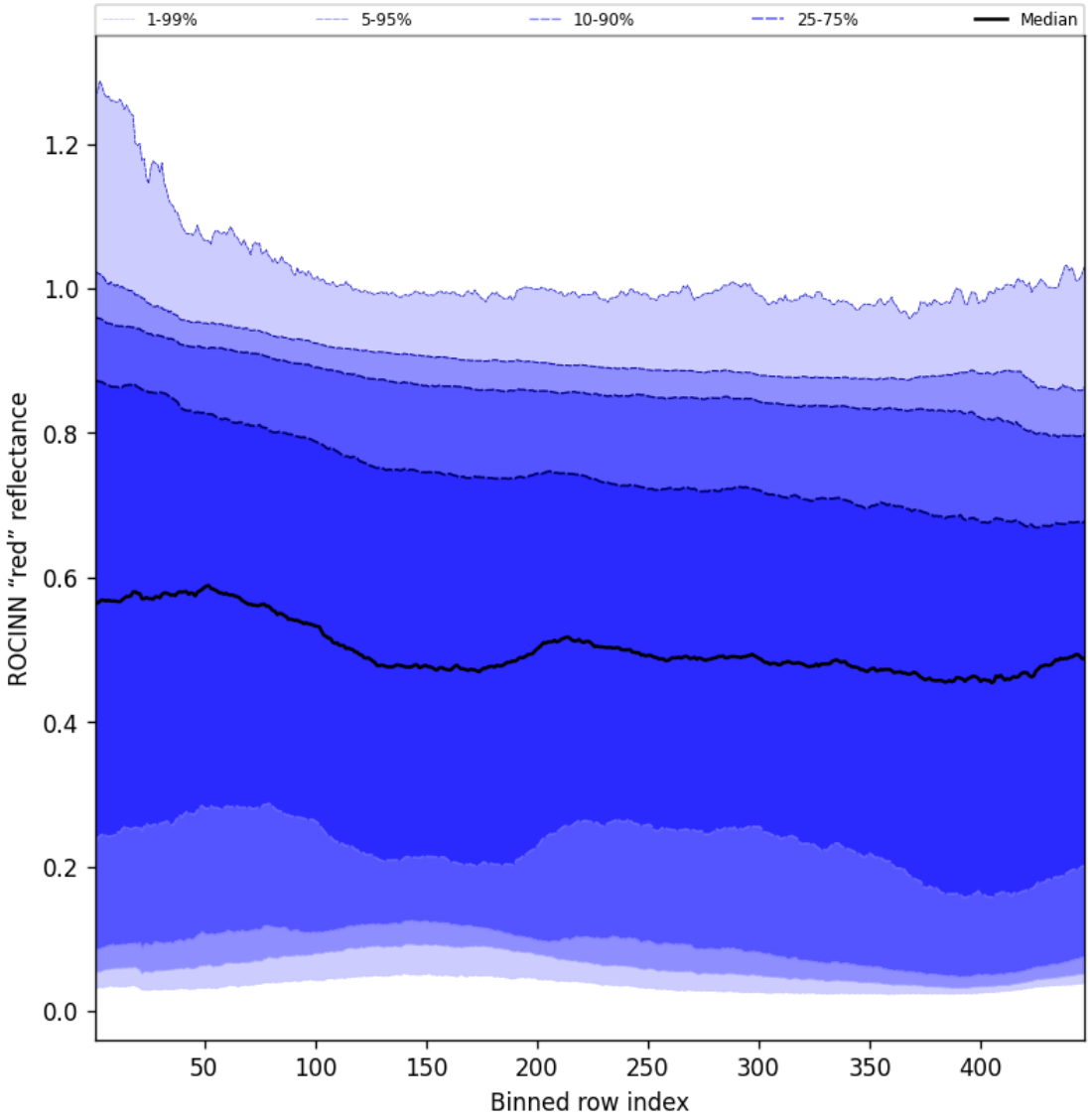

Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2025-01-10 to 2025-01-12

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.

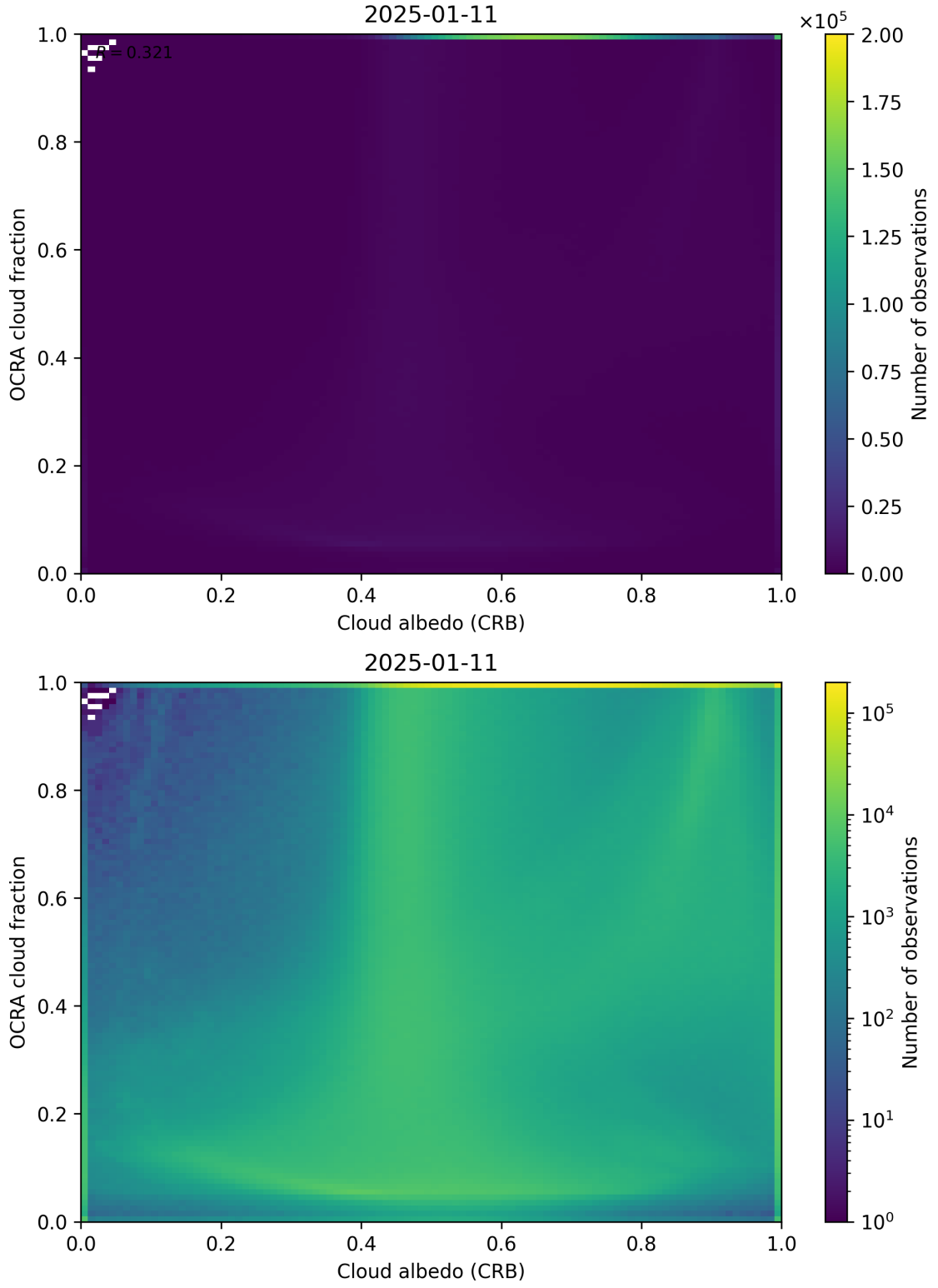

Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

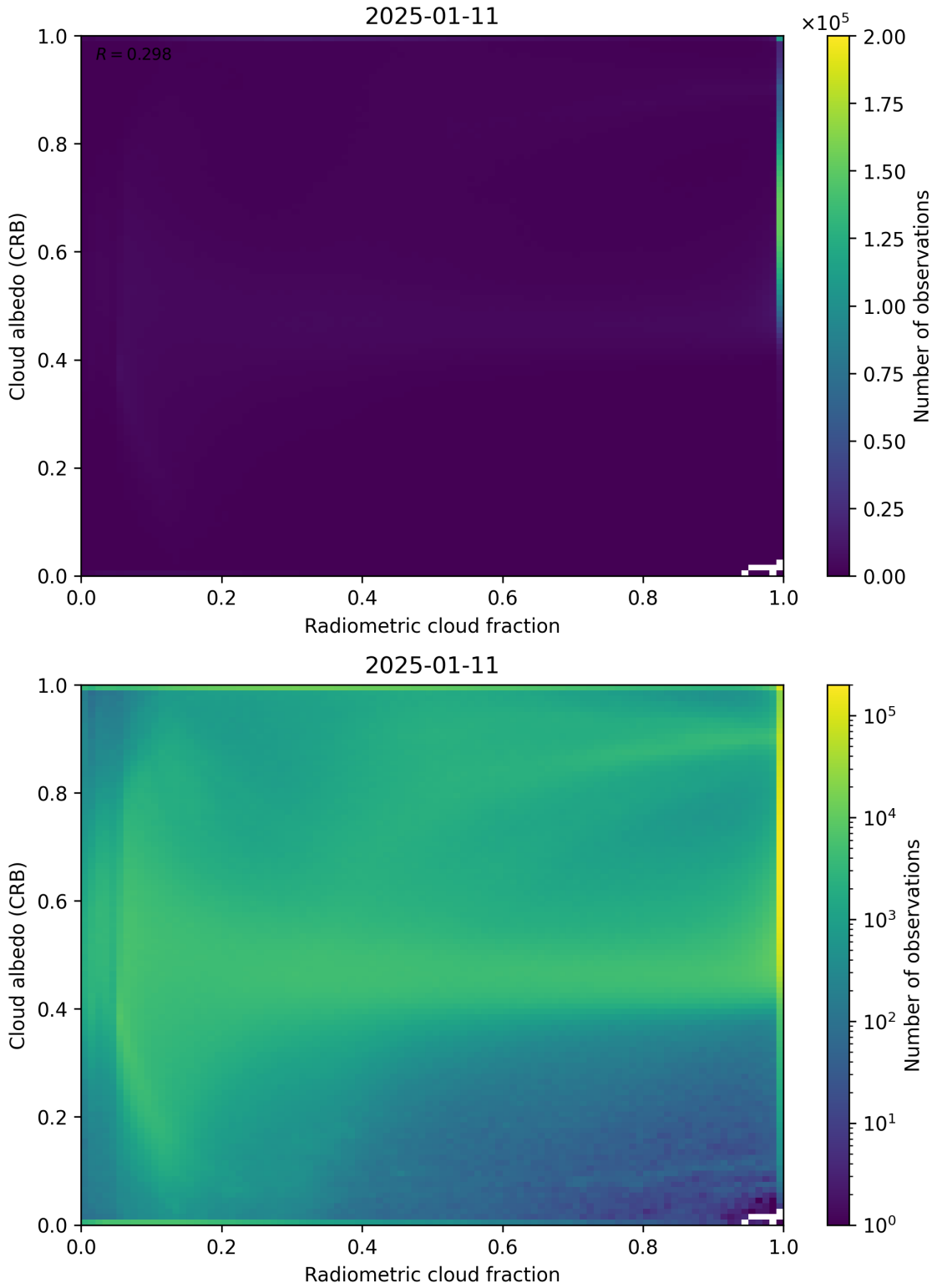

Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

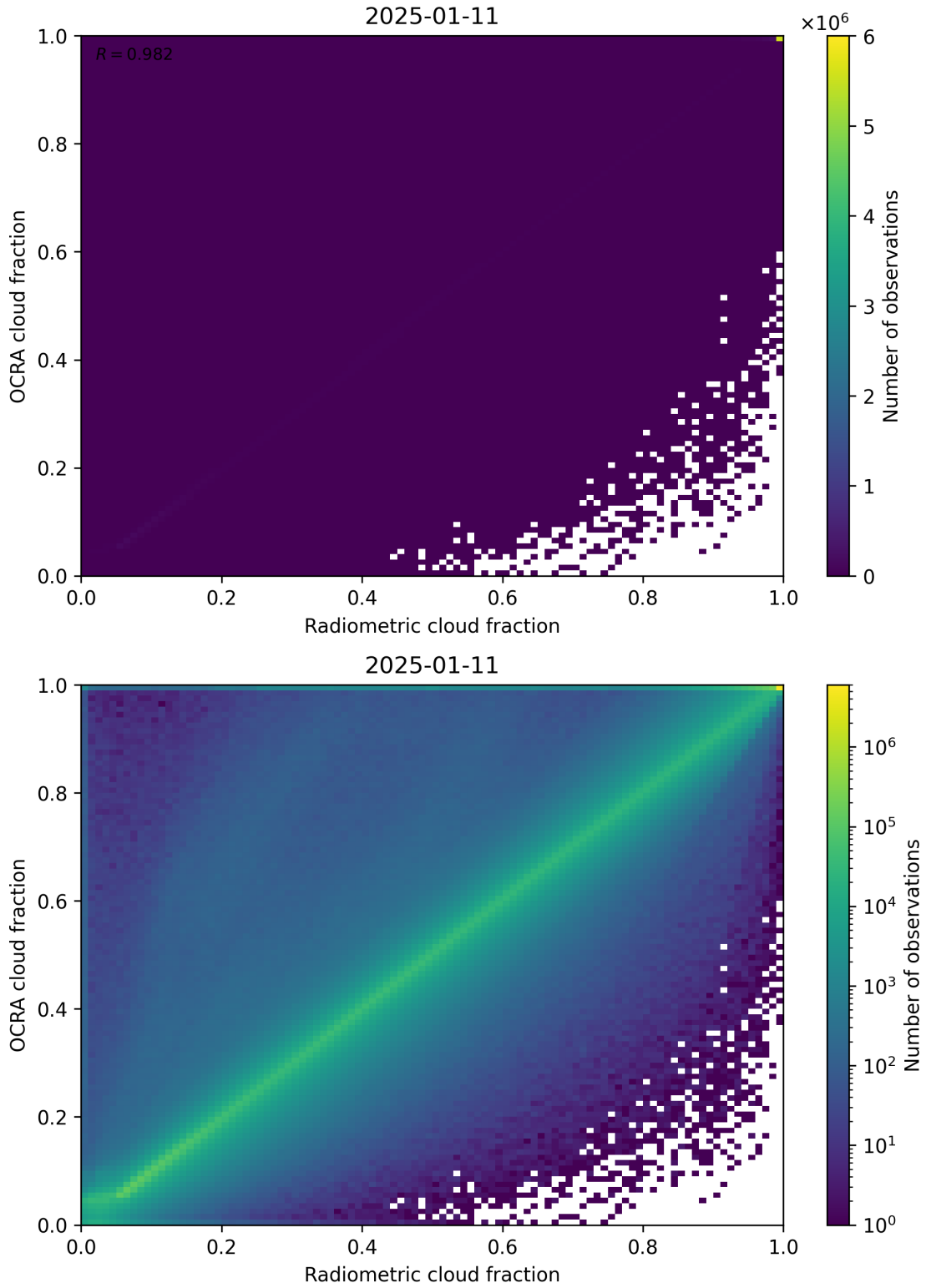

Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

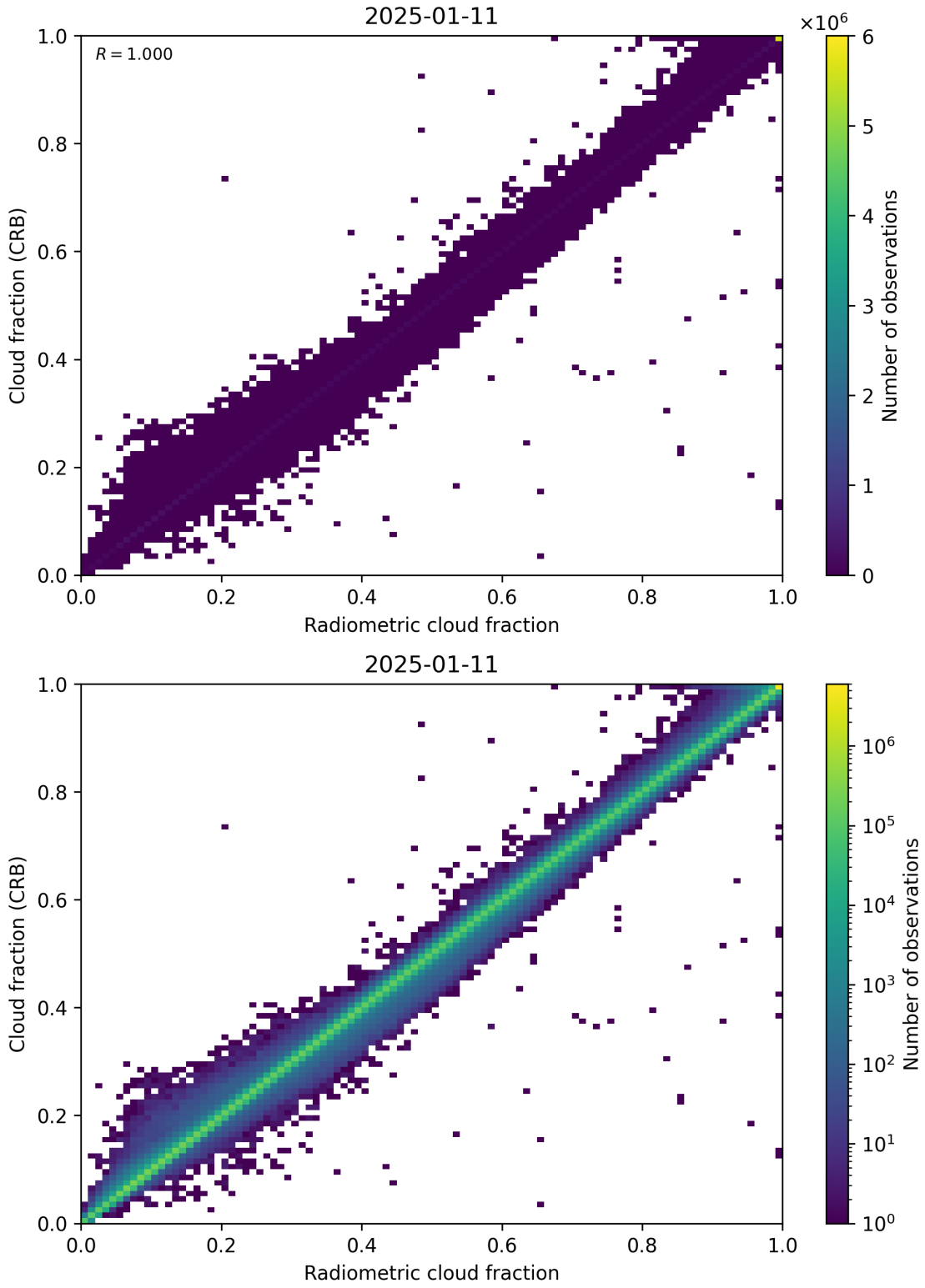

Figure 73: Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12.

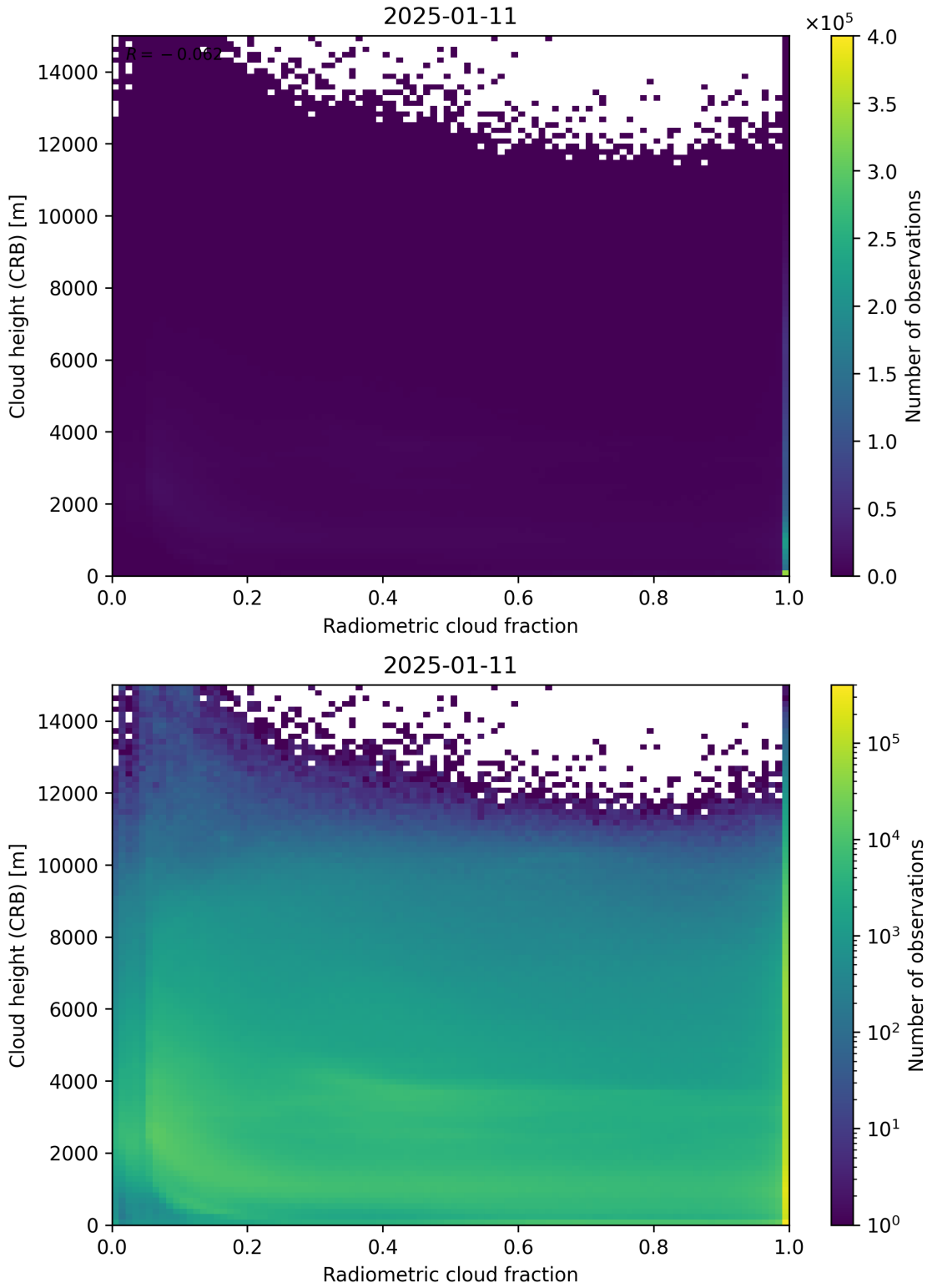

Figure 74: Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2025-01-10 to 2025-01-12.

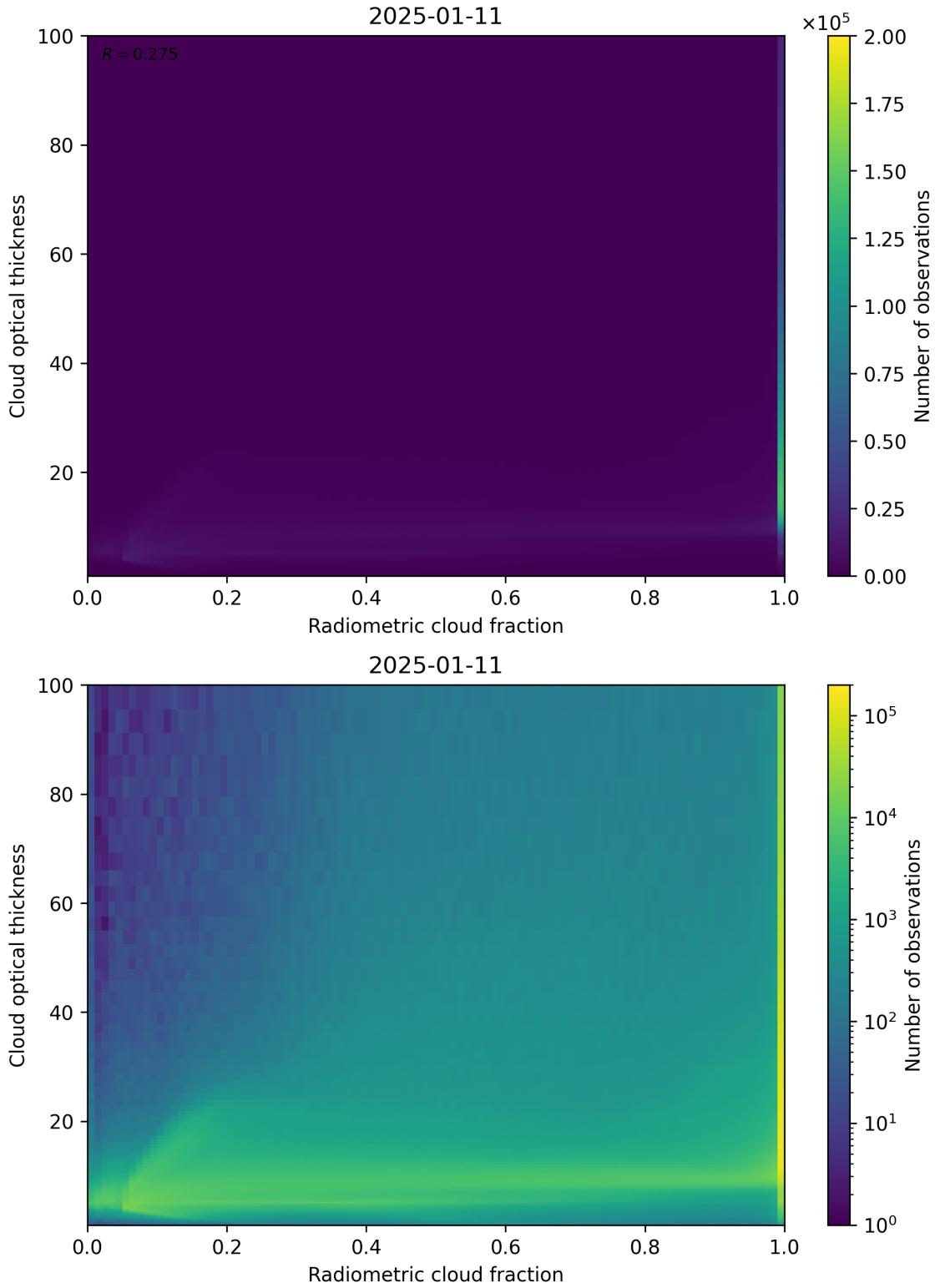

Figure 75: Scatter density plot of “Radiometric cloud fraction” against “Cloud optical thickness” for 2025-01-10 to 2025-01-12.

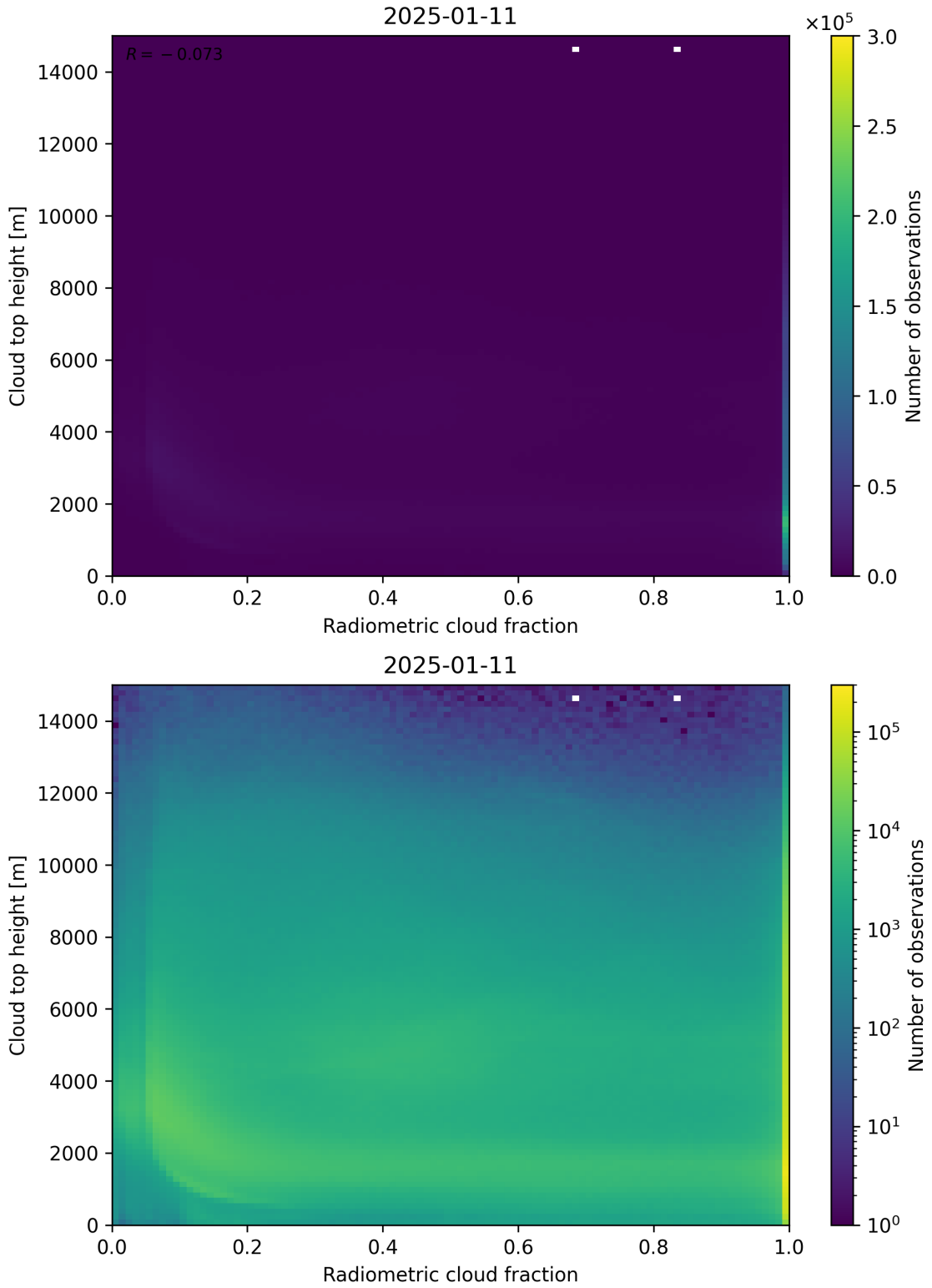

Figure 76: Scatter density plot of “Radiometric cloud fraction” against “Cloud top height” for 2025-01-10 to 2025-01-12.

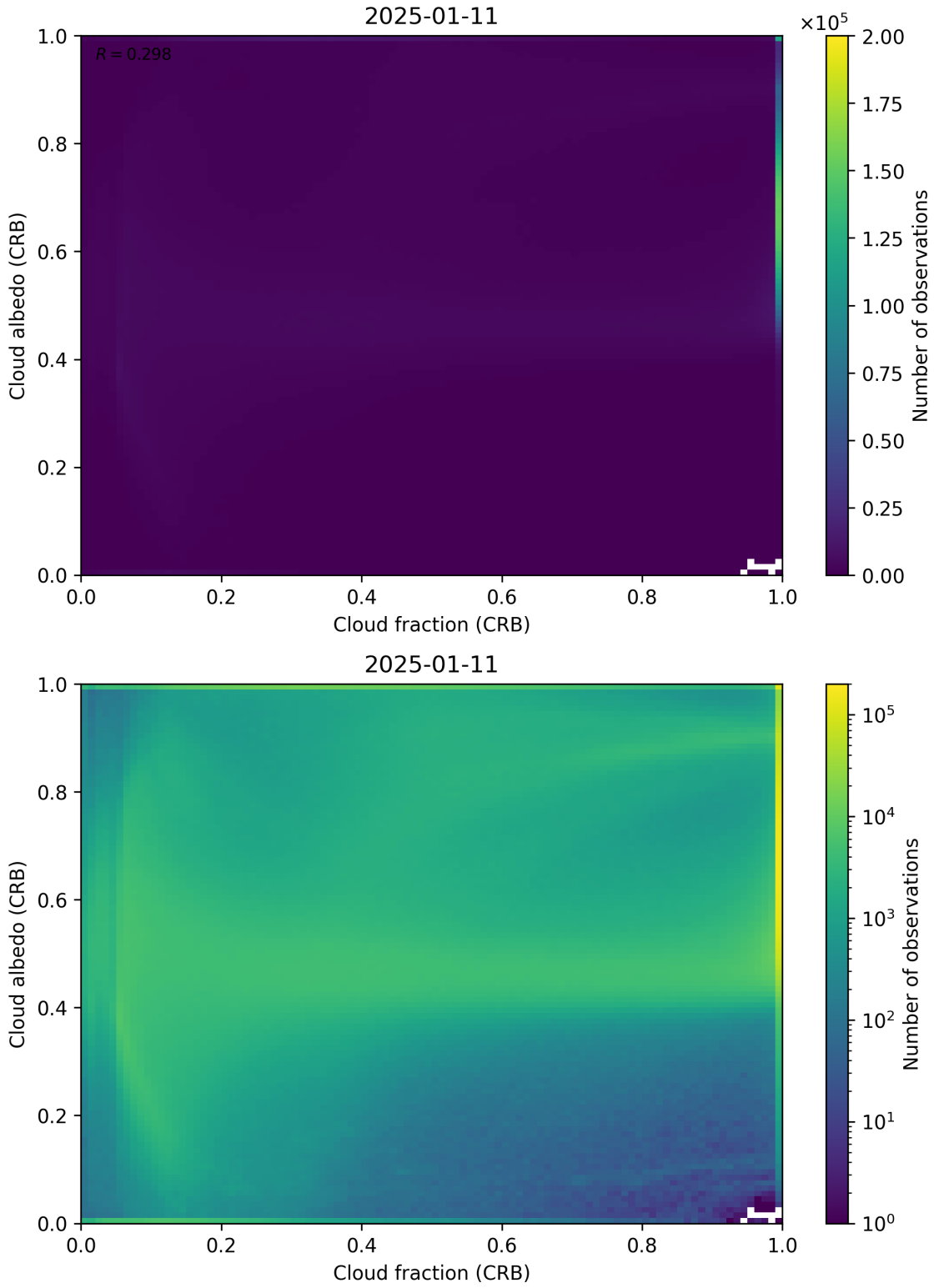

Figure 77: Scatter density plot of “Cloud fraction (CRB)” against “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

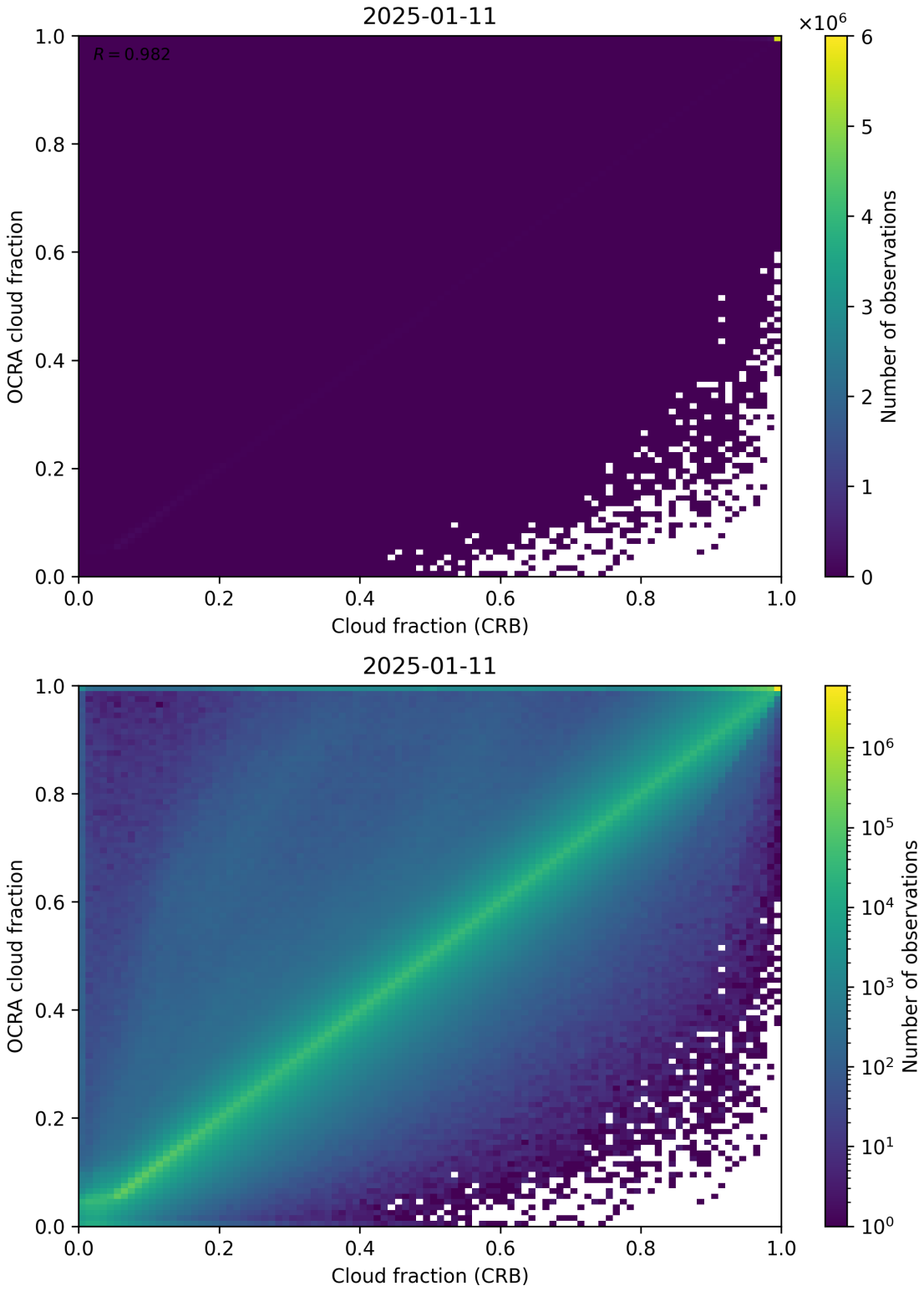

Figure 78: Scatter density plot of “Cloud fraction (CRB)” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

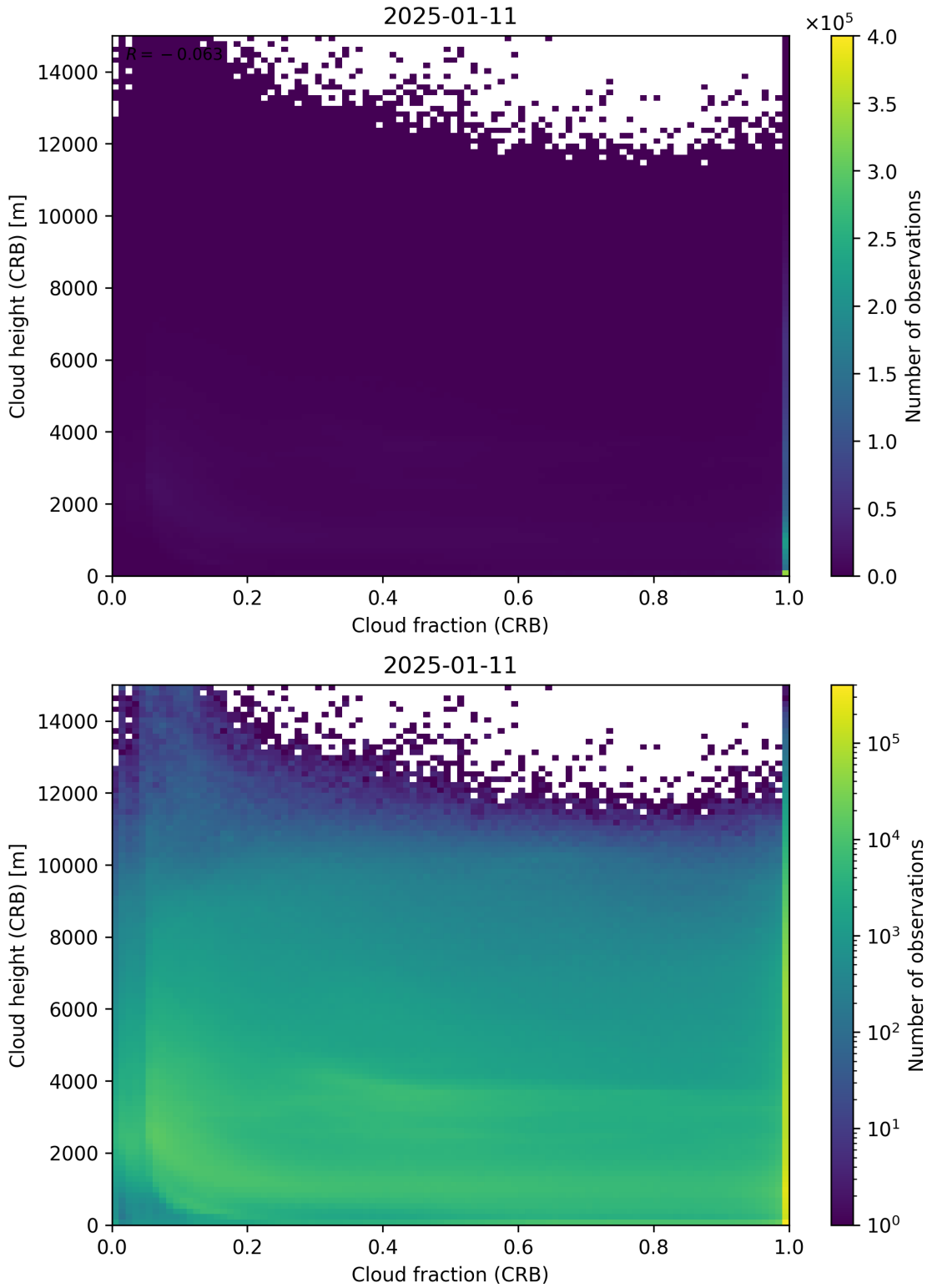

Figure 79: Scatter density plot of “Cloud fraction (CRB)” against “Cloud height (CRB)” for 2025-01-10 to 2025-01-12.

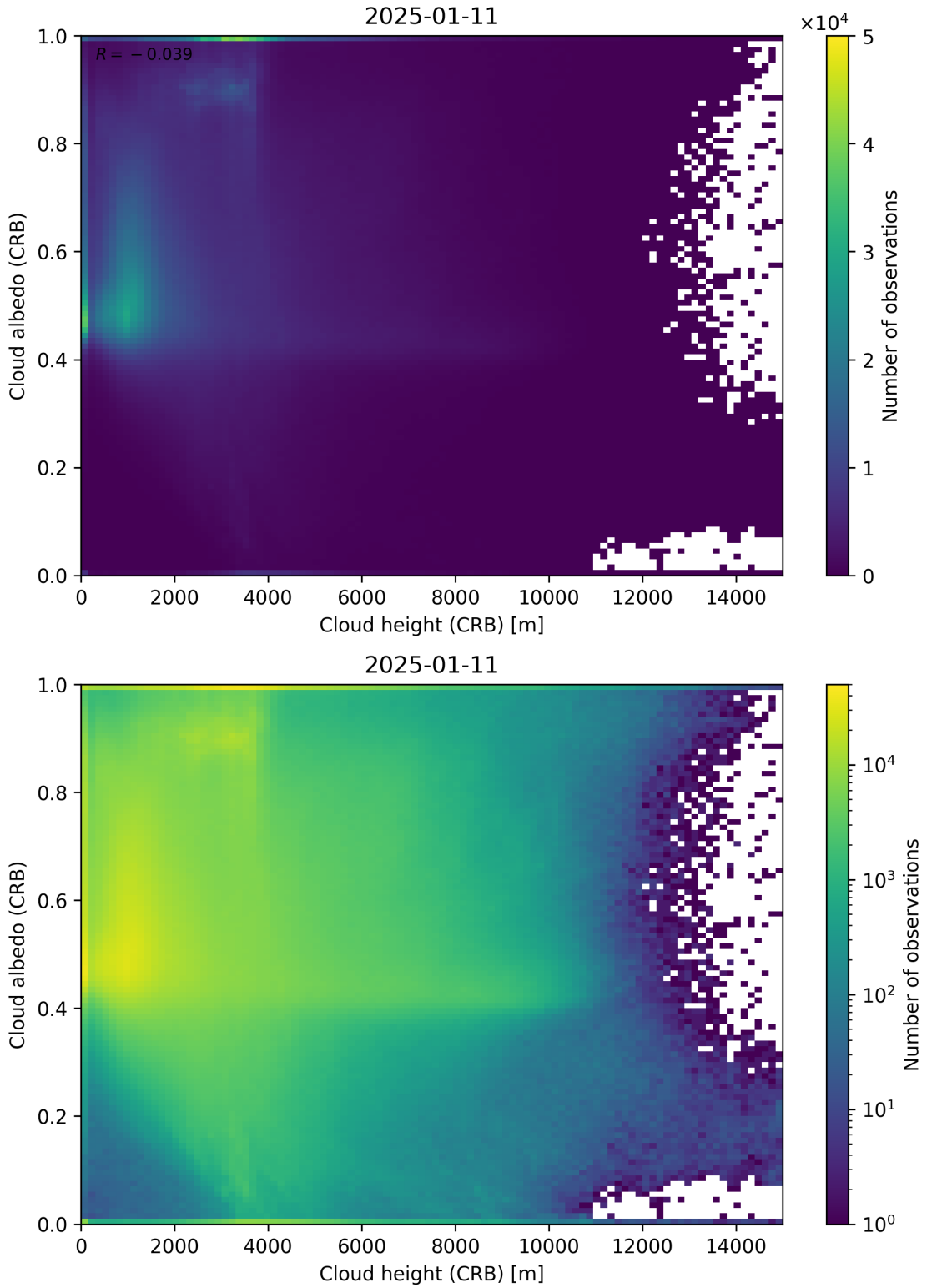

Figure 80: Scatter density plot of “Cloud height (CRB)” against “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

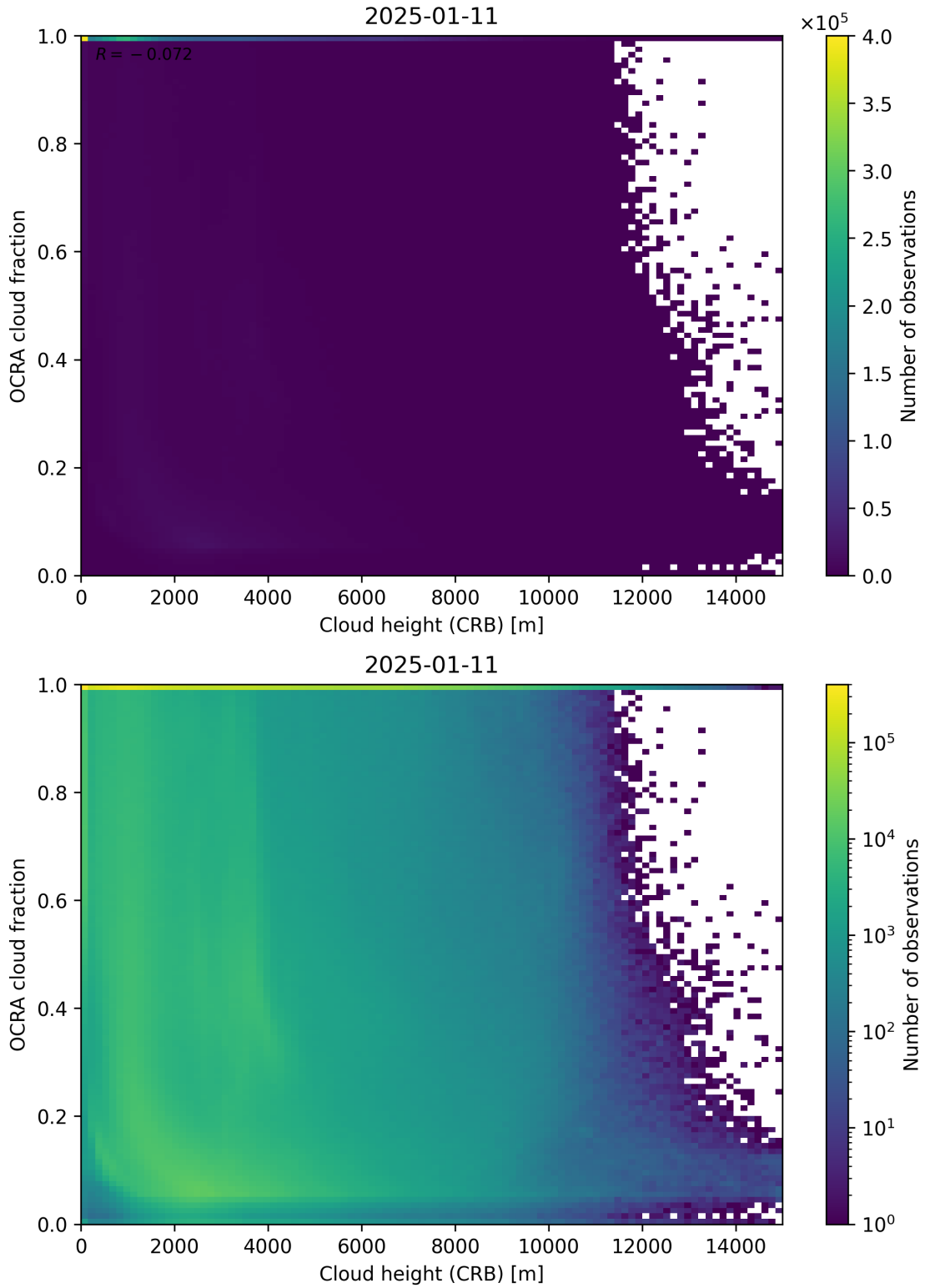

Figure 81: Scatter density plot of “Cloud height (CRB)” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

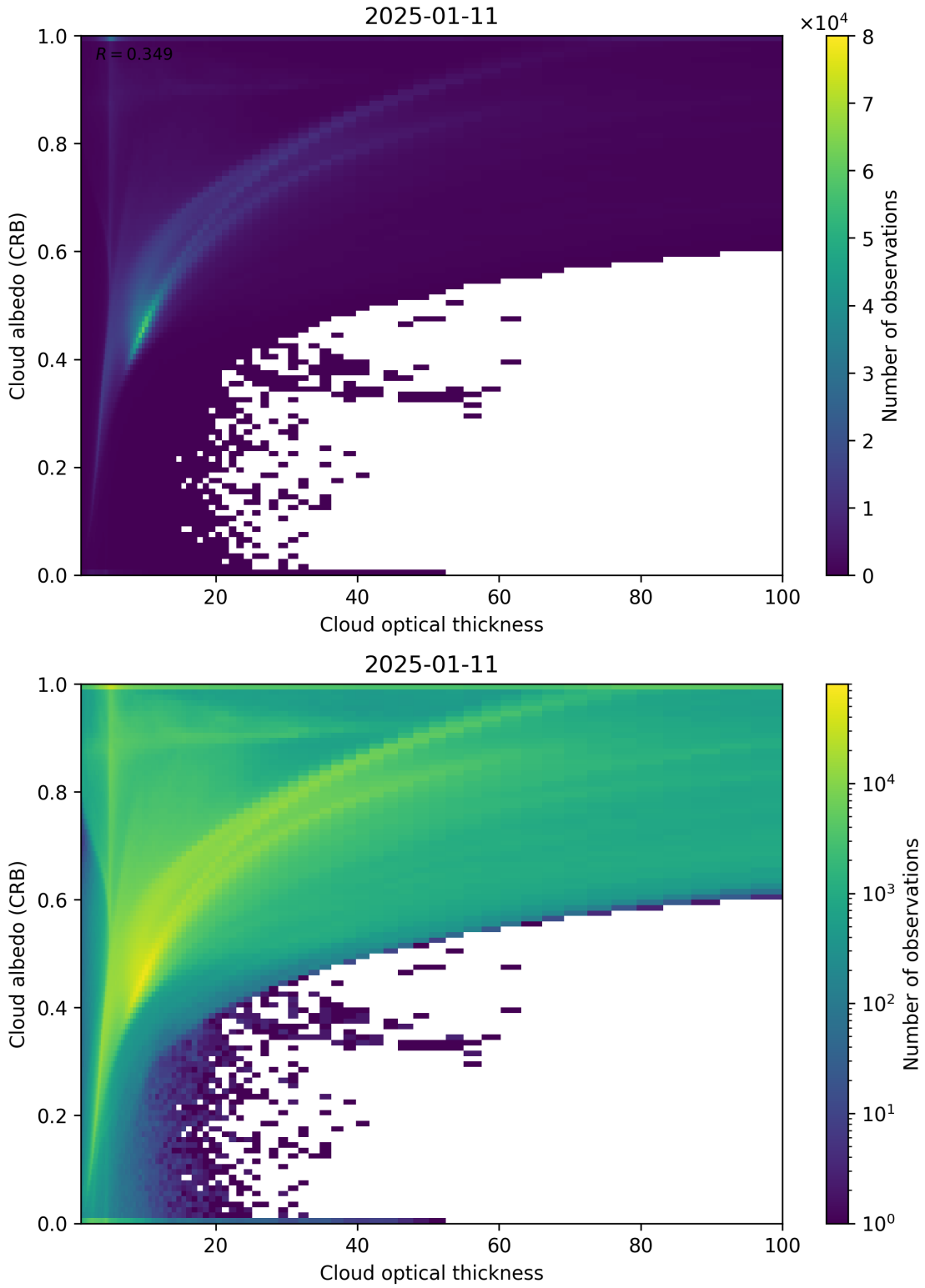

Figure 82: Scatter density plot of “Cloud optical thickness” against “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

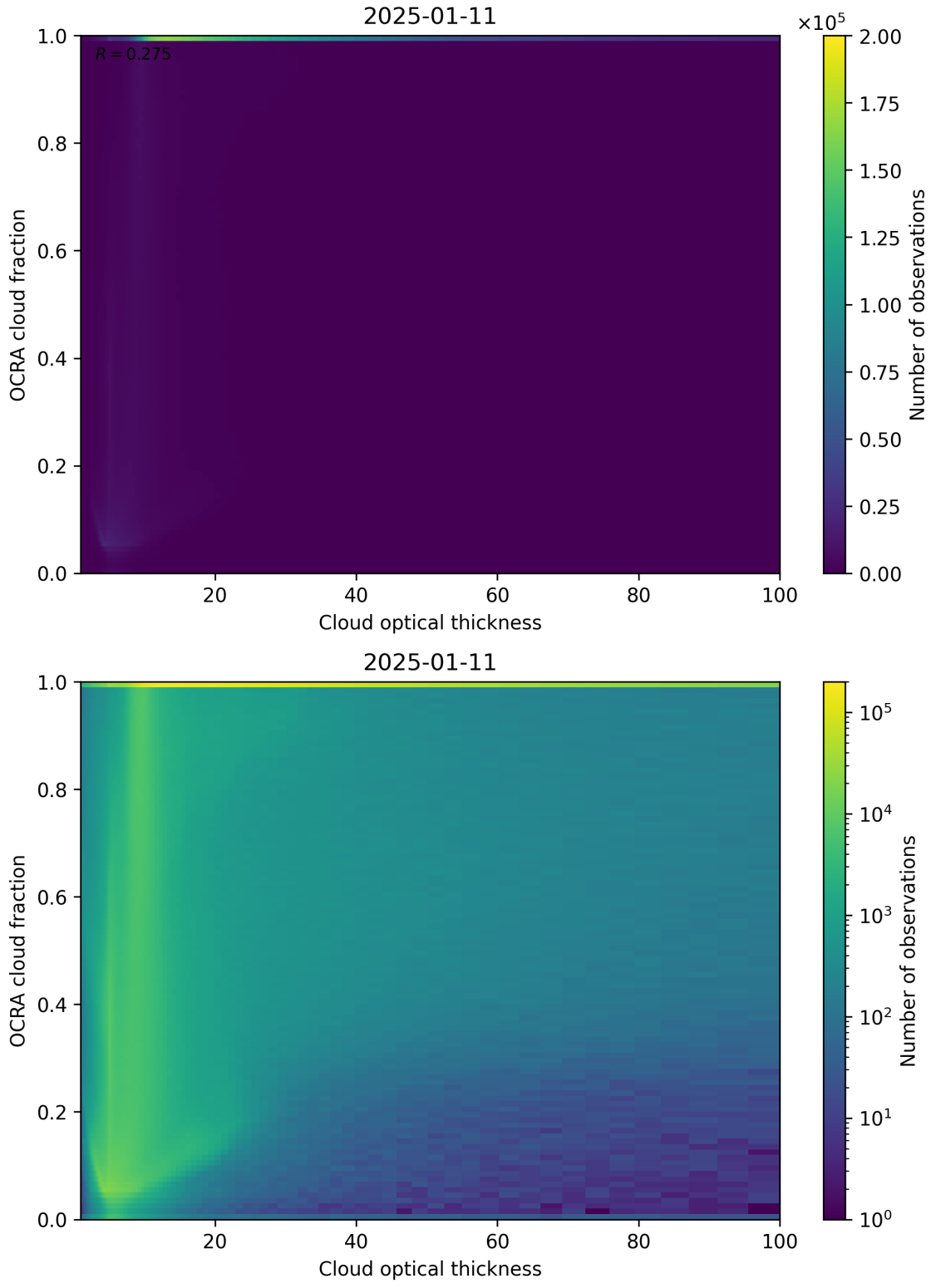

Figure 83: Scatter density plot of “Cloud optical thickness” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

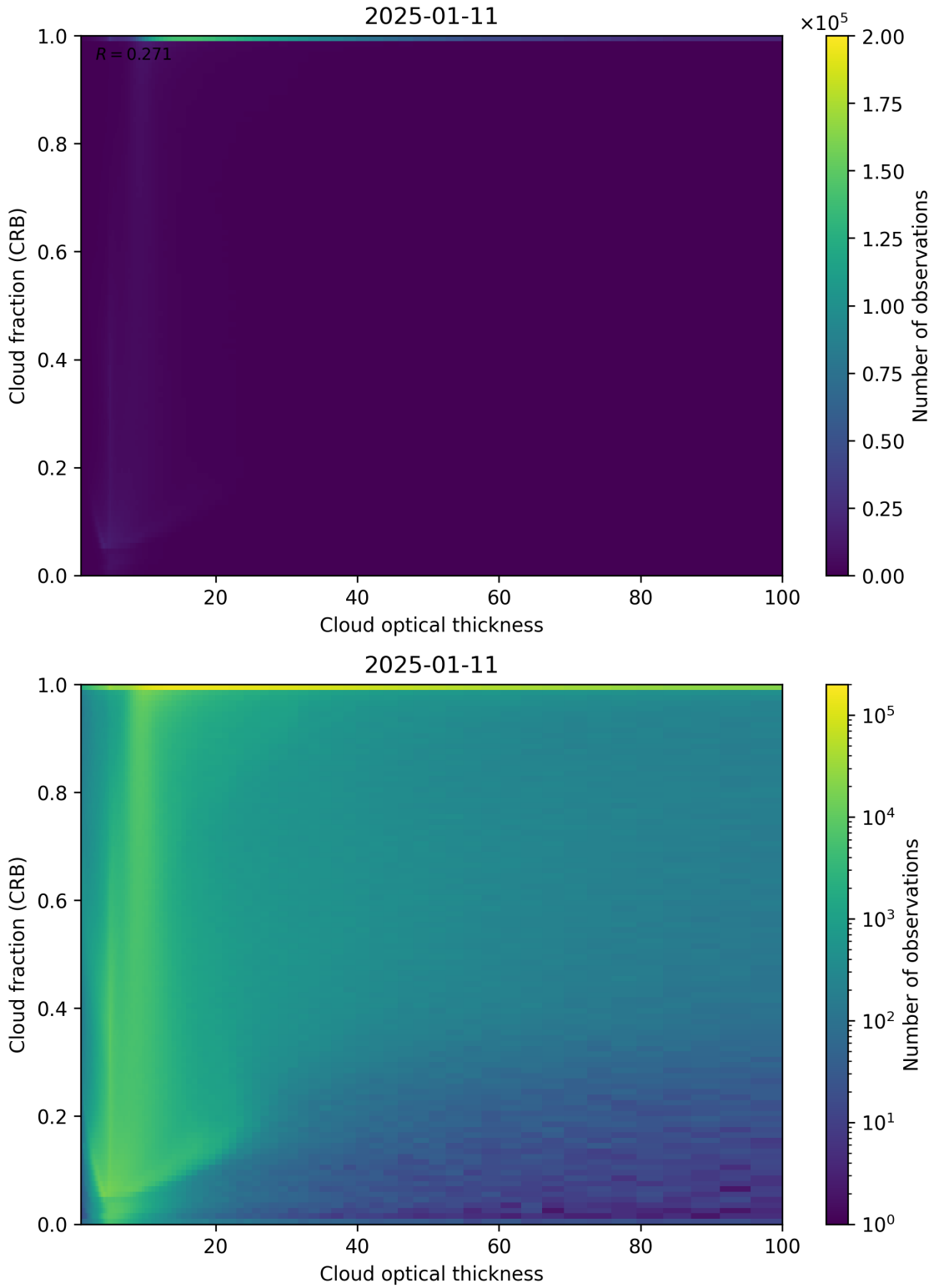

Figure 84: Scatter density plot of “Cloud optical thickness” against “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12.

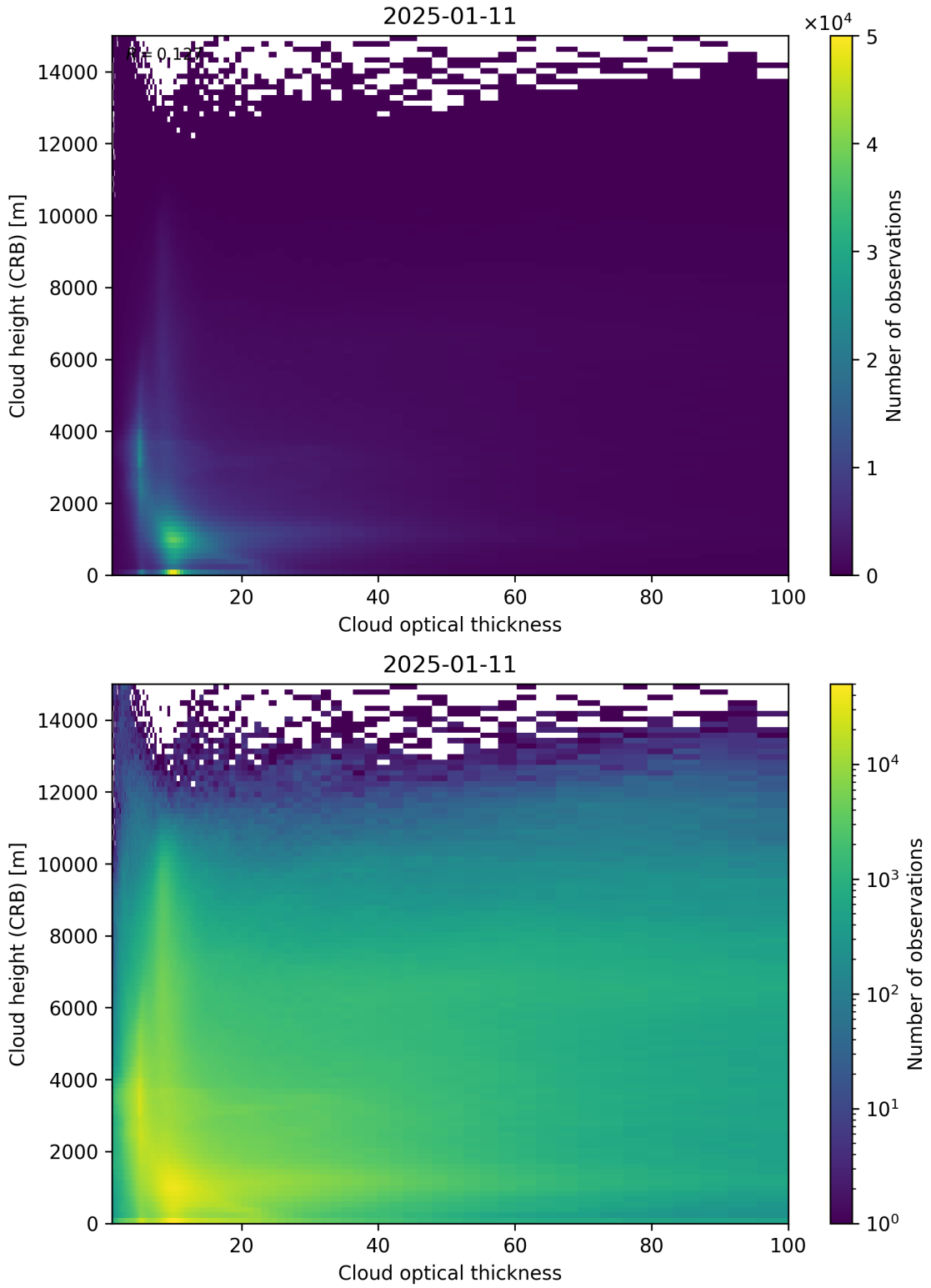

Figure 85: Scatter density plot of “Cloud optical thickness” against “Cloud height (CRB)” for 2025-01-10 to 2025-01-12.

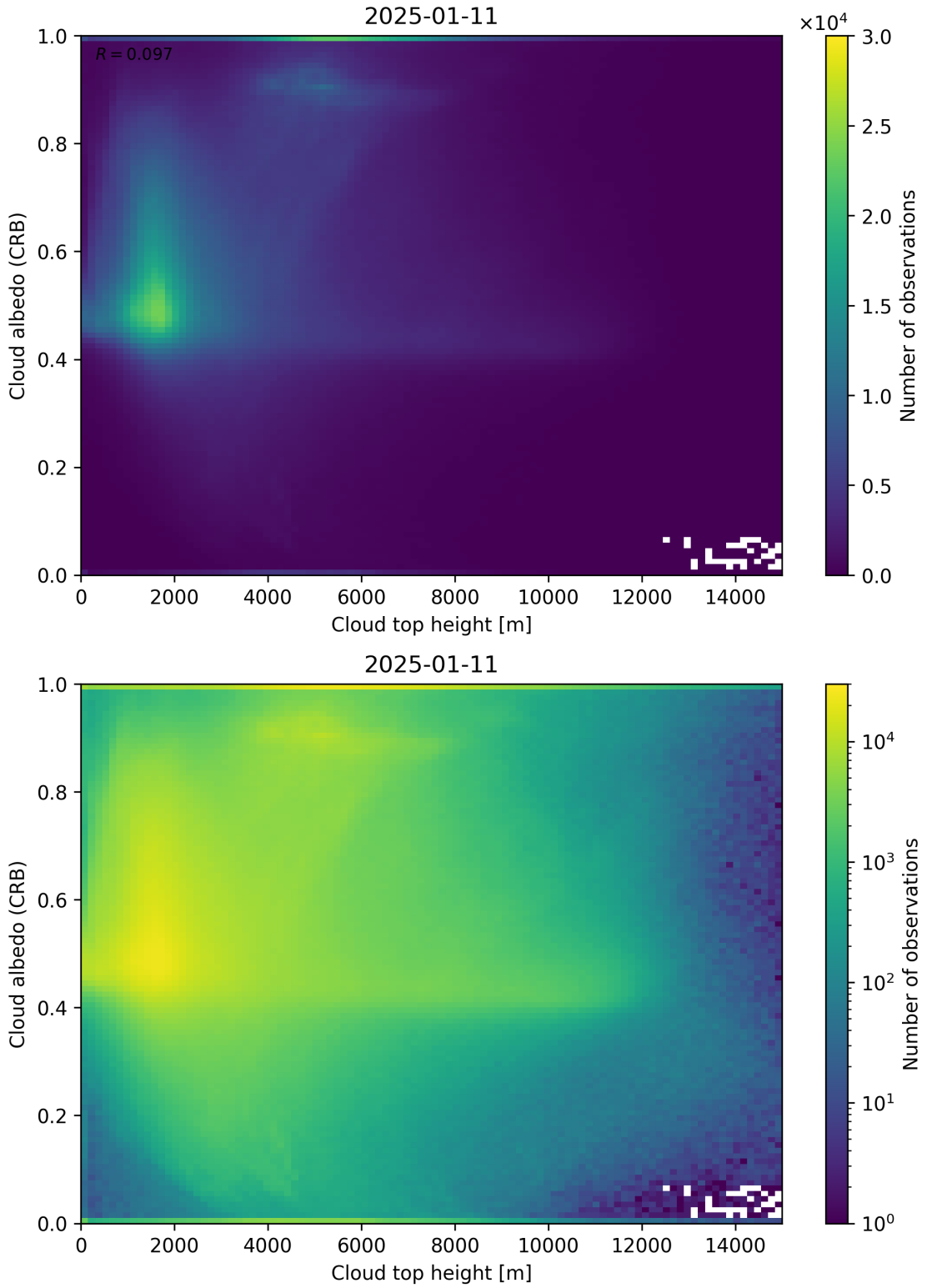

Figure 86: Scatter density plot of “Cloud top height” against “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

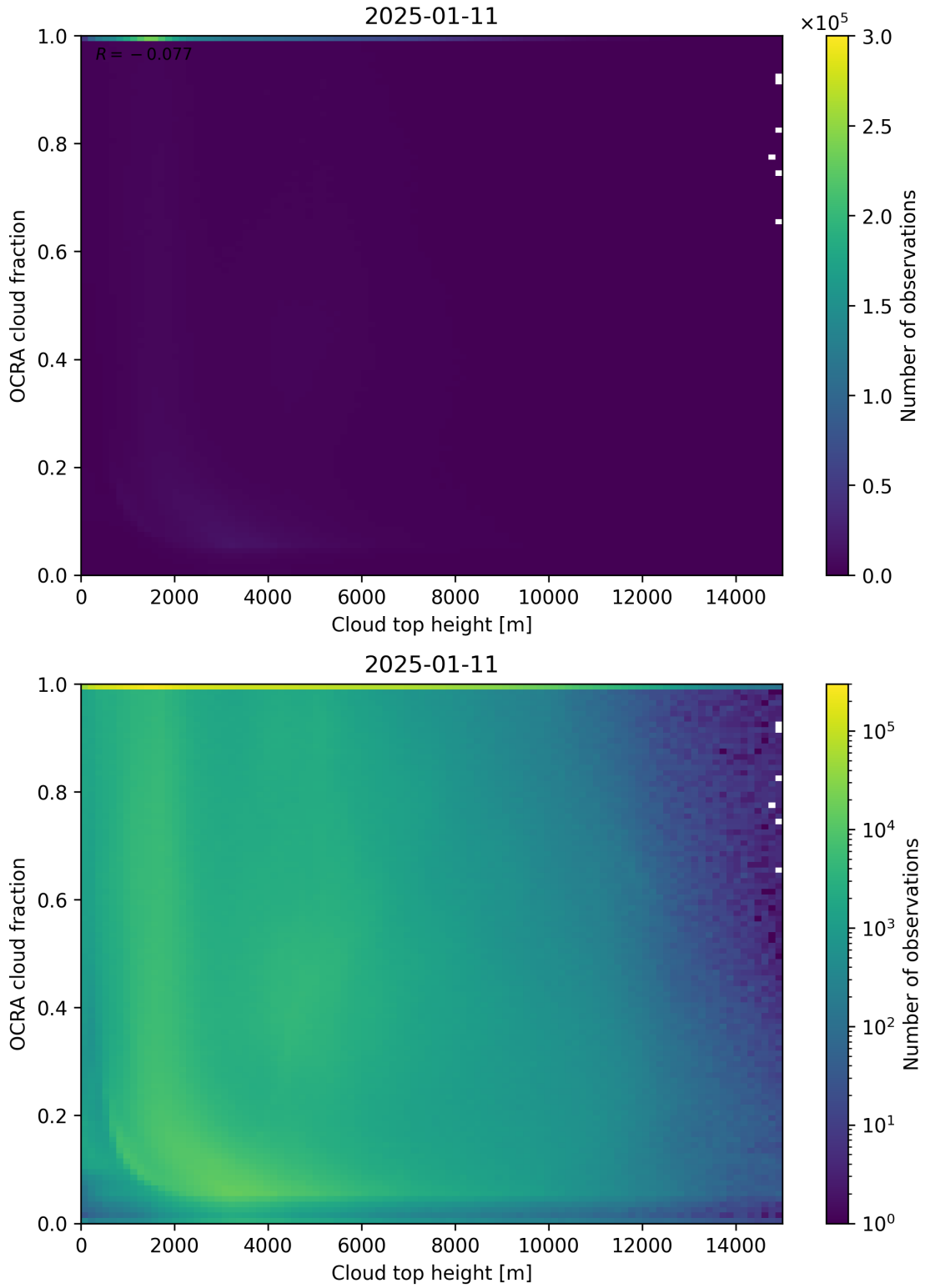

Figure 87: Scatter density plot of “Cloud top height” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

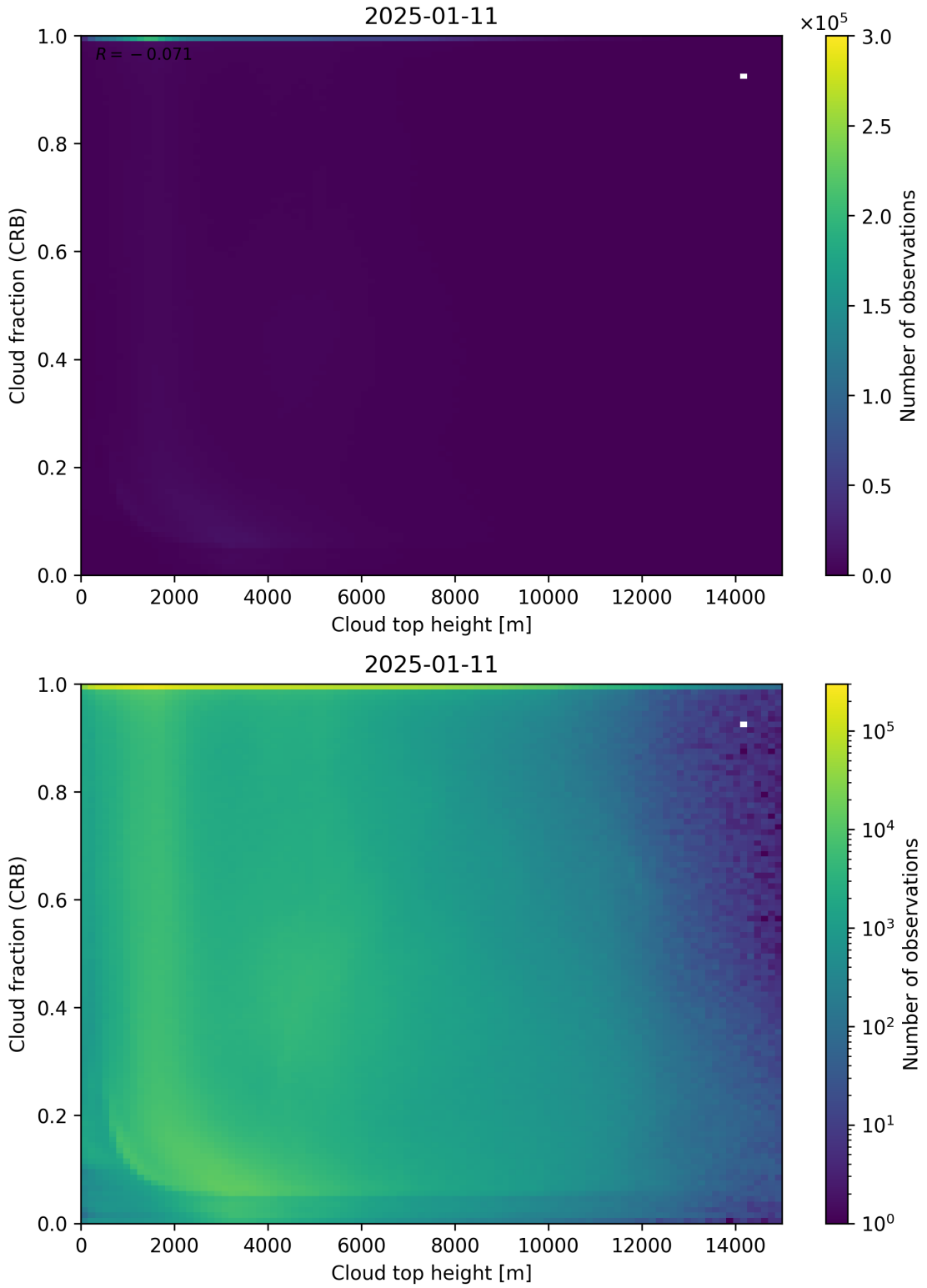

Figure 88: Scatter density plot of “Cloud top height” against “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12.

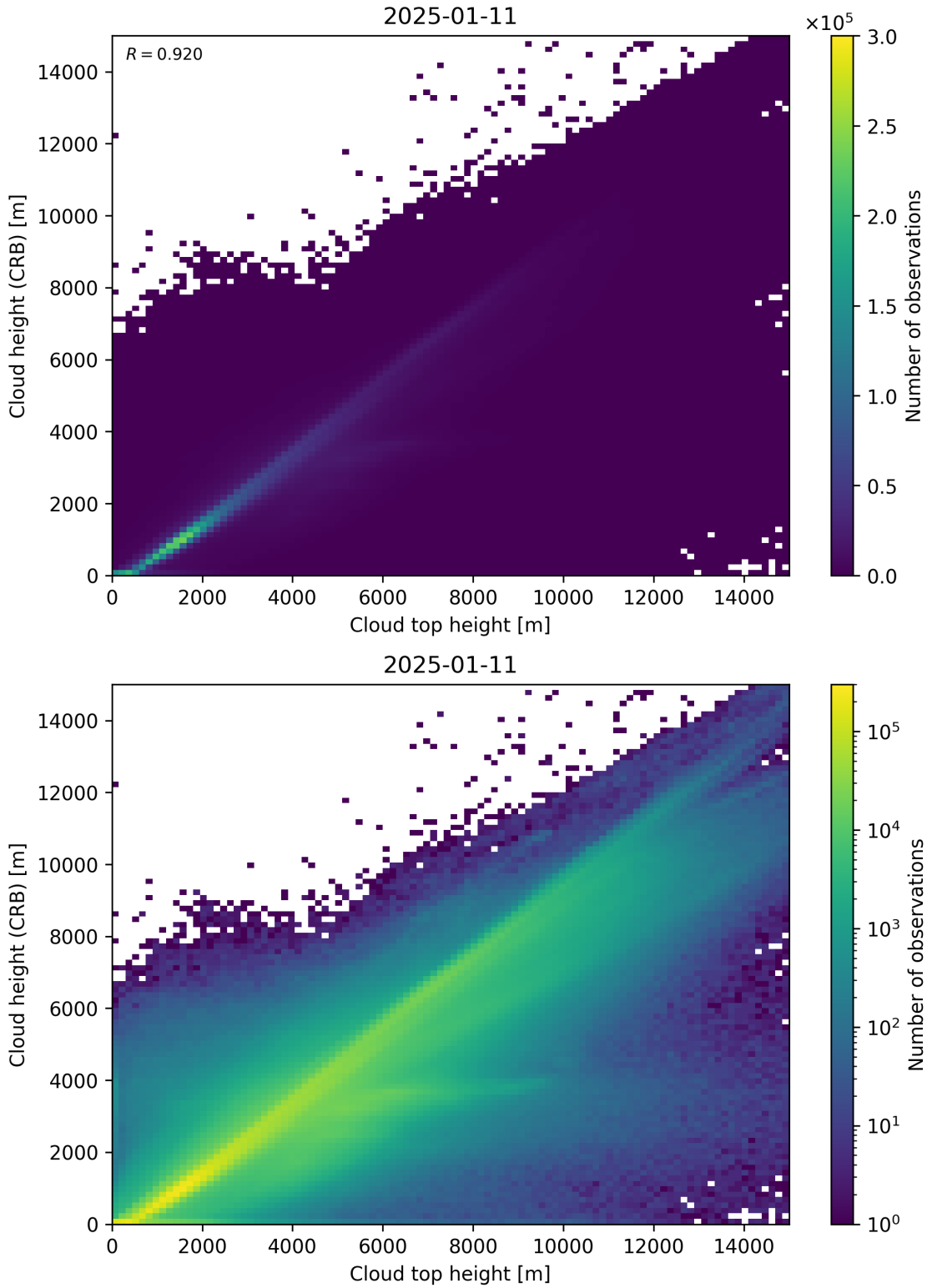

Figure 89: Scatter density plot of “Cloud top height” against “Cloud height (CRB)” for 2025-01-10 to 2025-01-12.

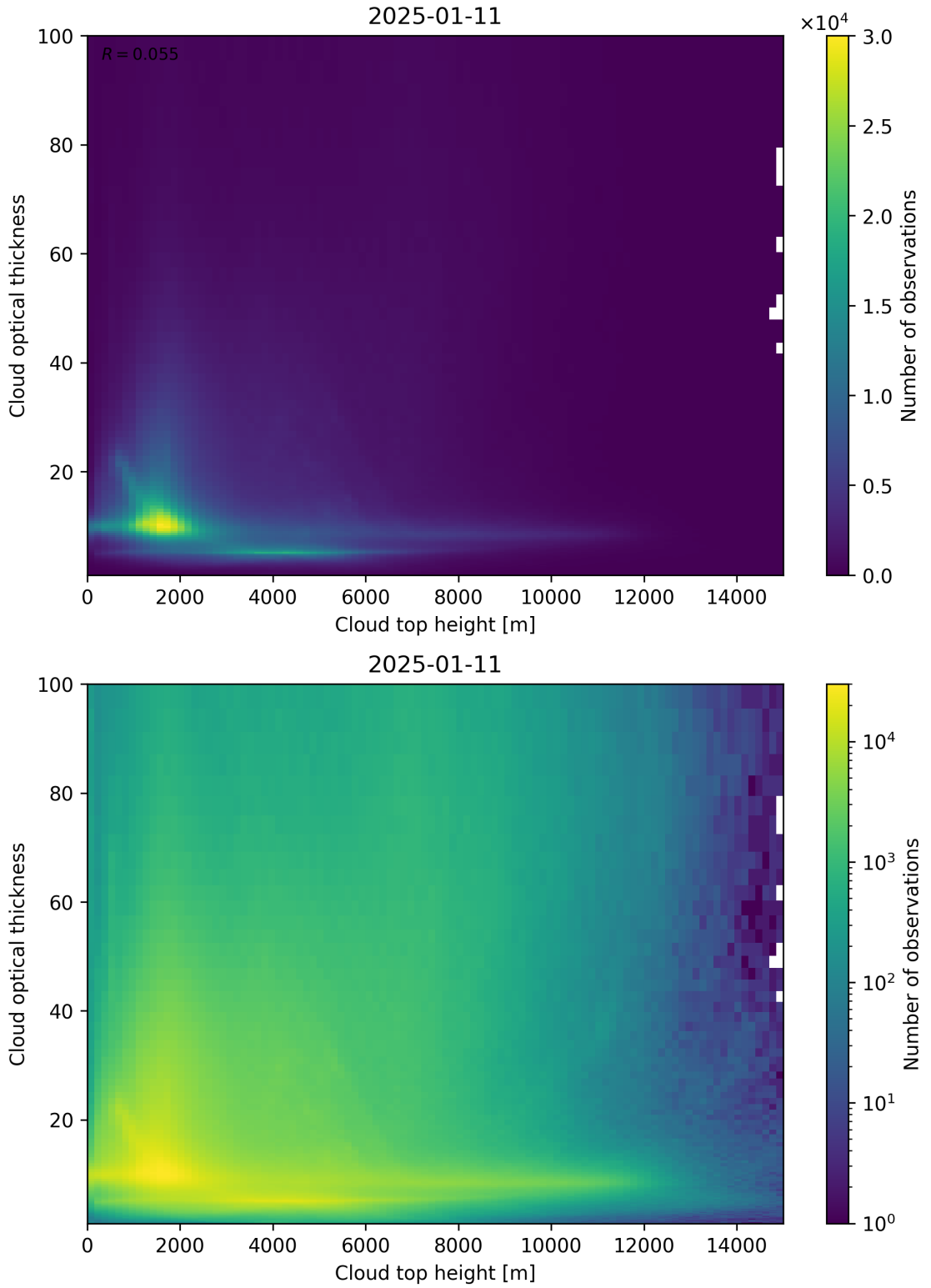

Figure 90: Scatter density plot of “Cloud top height” against “Cloud optical thickness” for 2025-01-10 to 2025-01-12.

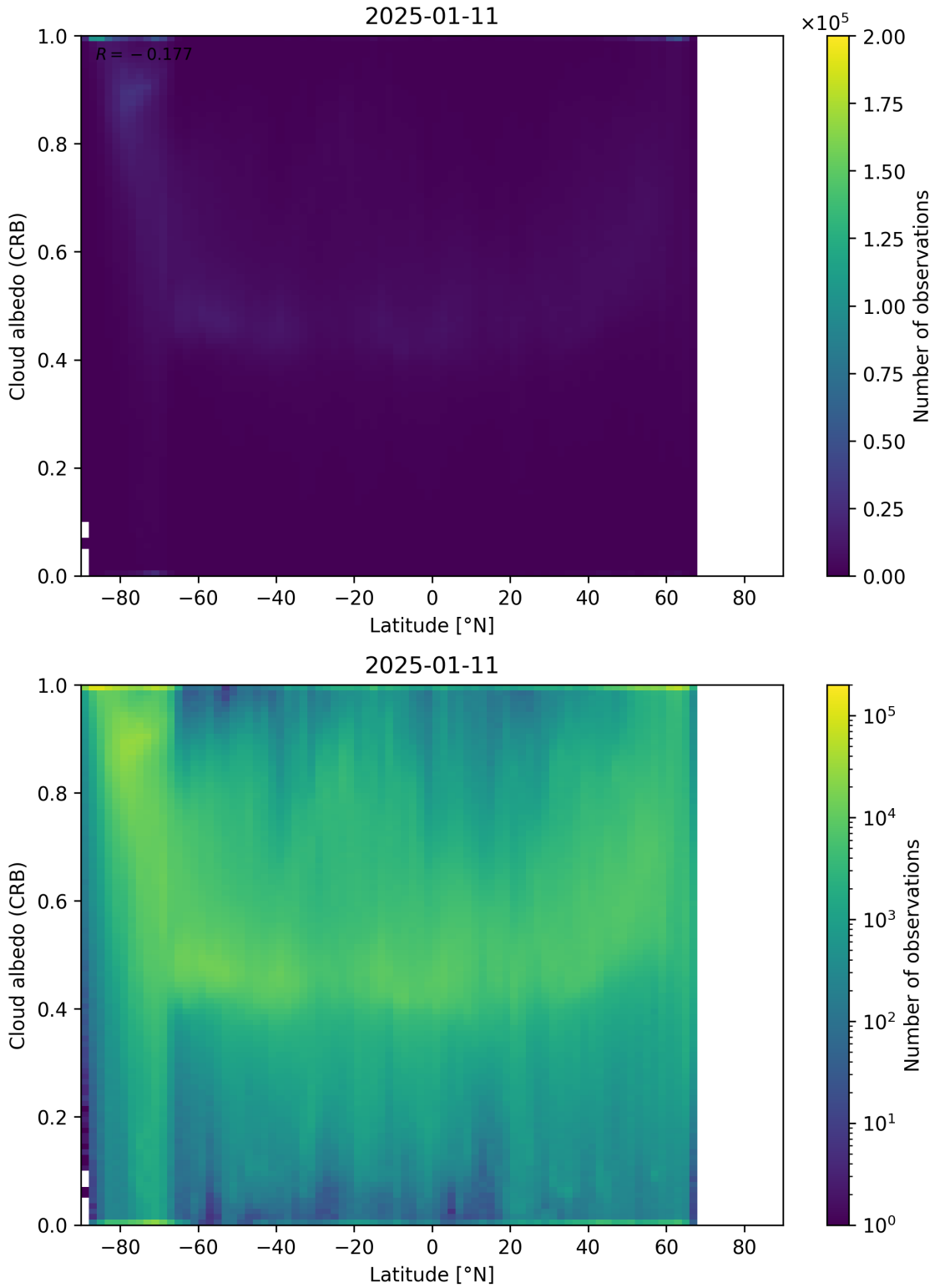

Figure 91: Scatter density plot of “Latitude” against “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

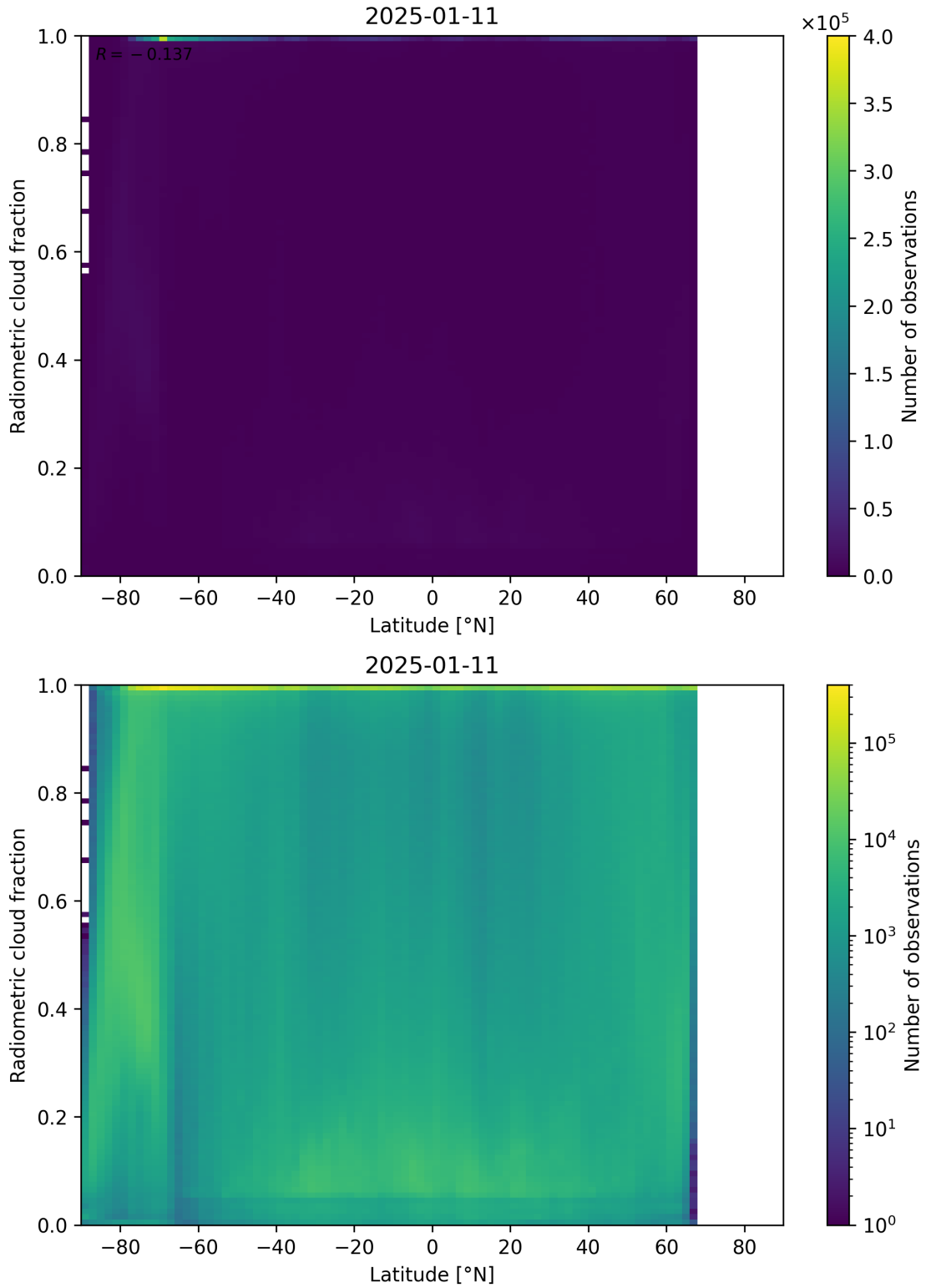

Figure 92: Scatter density plot of “Latitude” against “Radiometric cloud fraction” for 2025-01-10 to 2025-01-12.

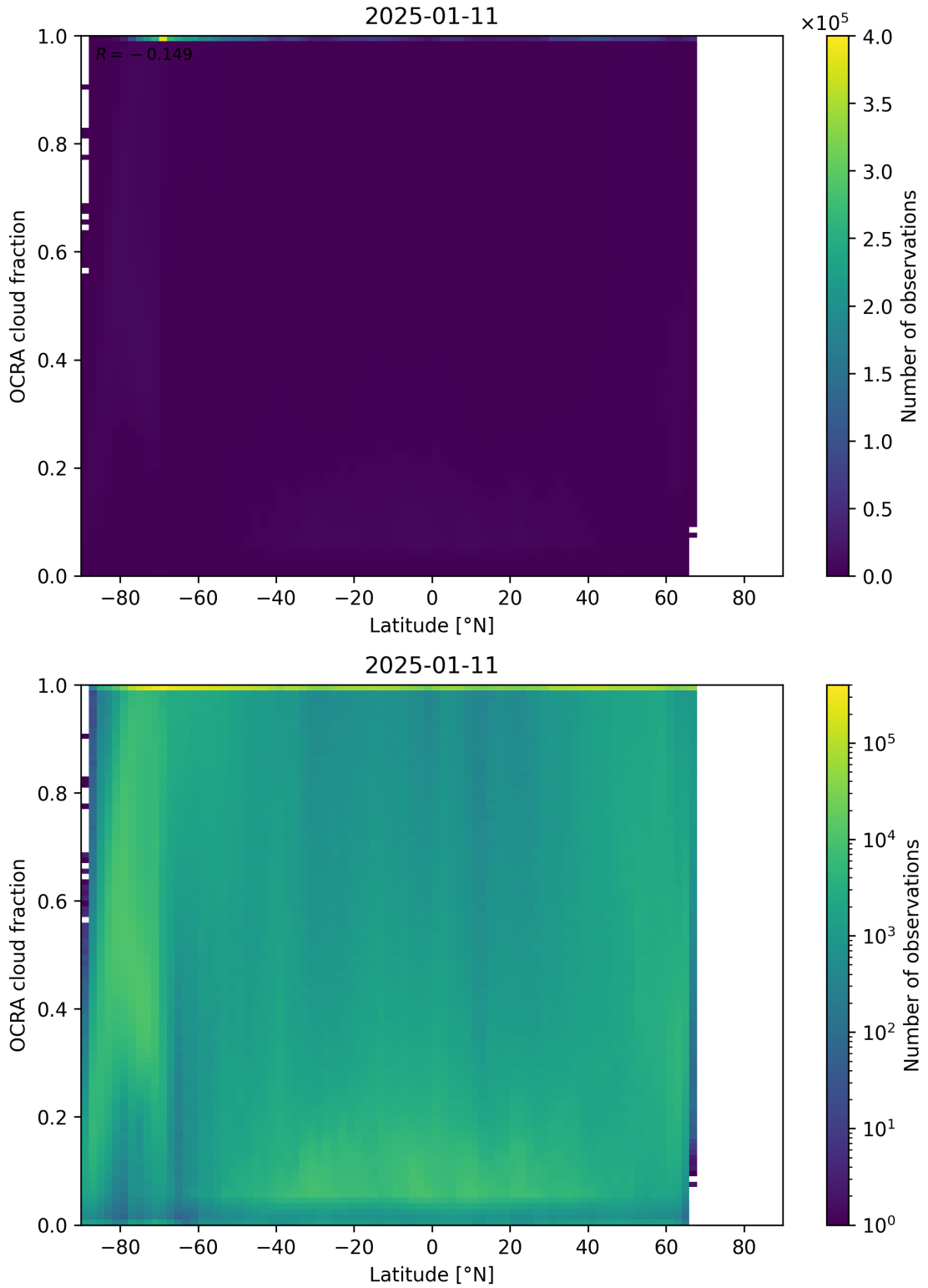

Figure 93: Scatter density plot of “Latitude” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

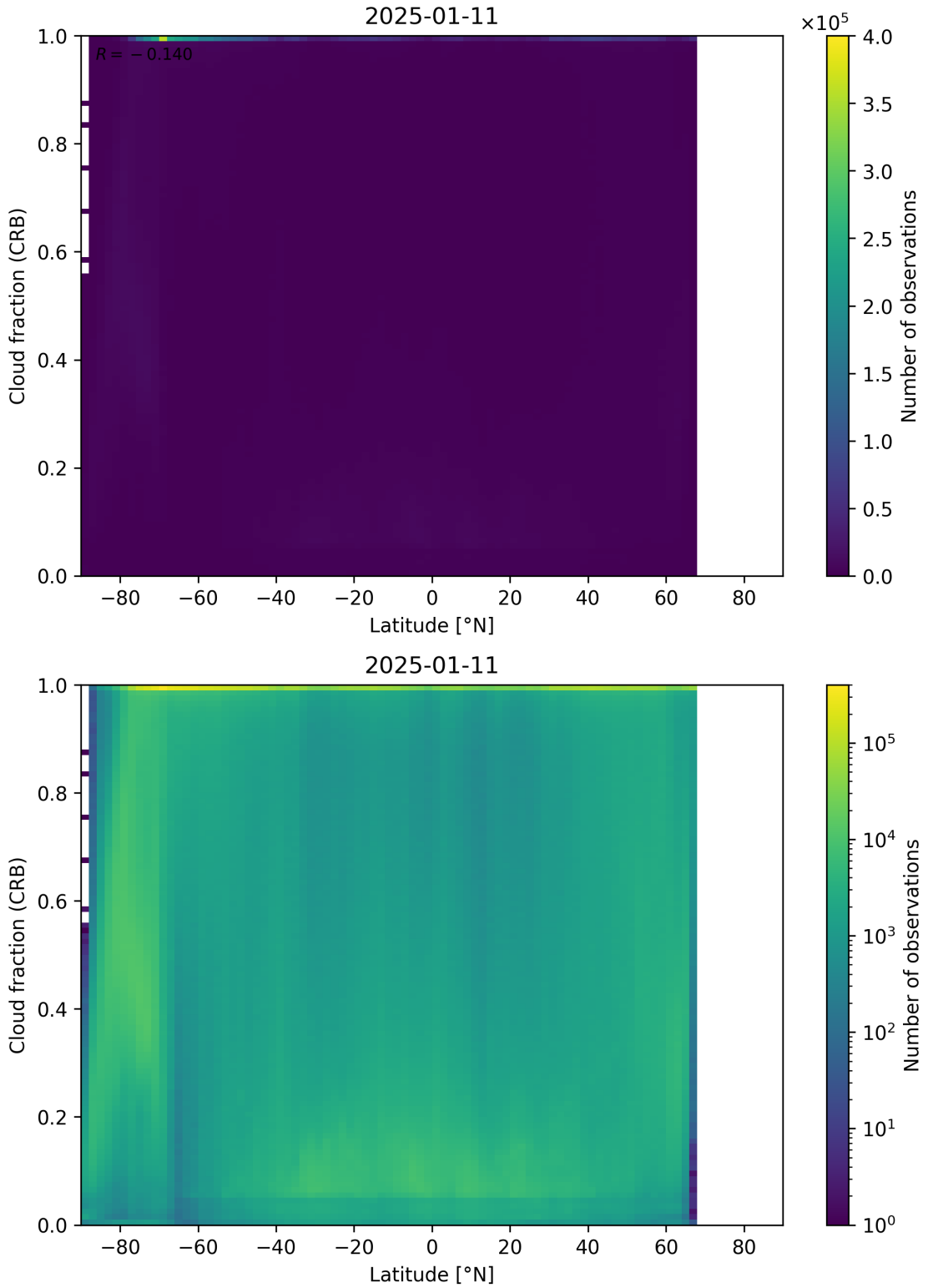

Figure 94: Scatter density plot of “Latitude” against “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12.

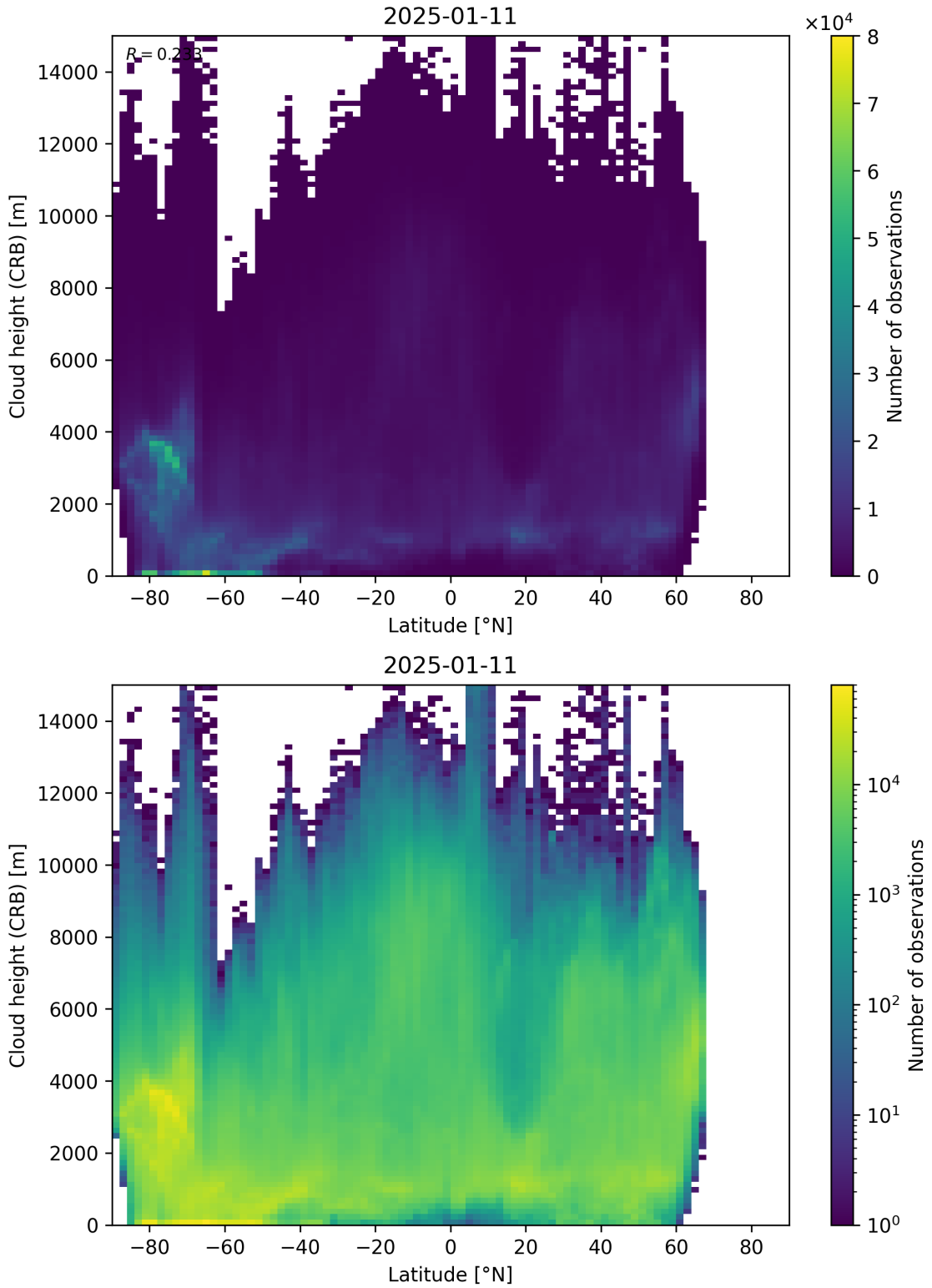

Figure 95: Scatter density plot of “Latitude” against “Cloud height (CRB)” for 2025-01-10 to 2025-01-12.

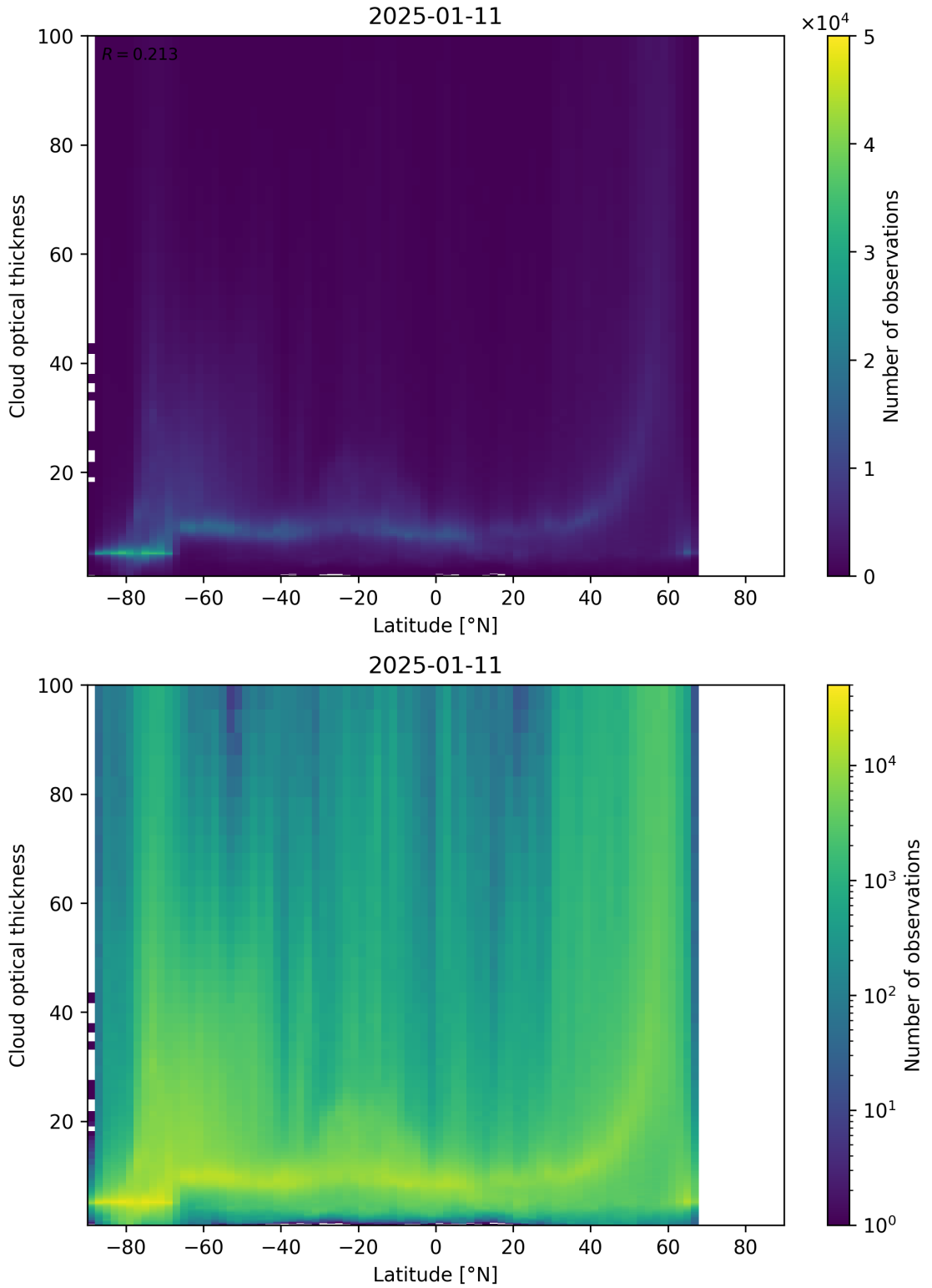

Figure 96: Scatter density plot of “Latitude” against “Cloud optical thickness” for 2025-01-10 to 2025-01-12.

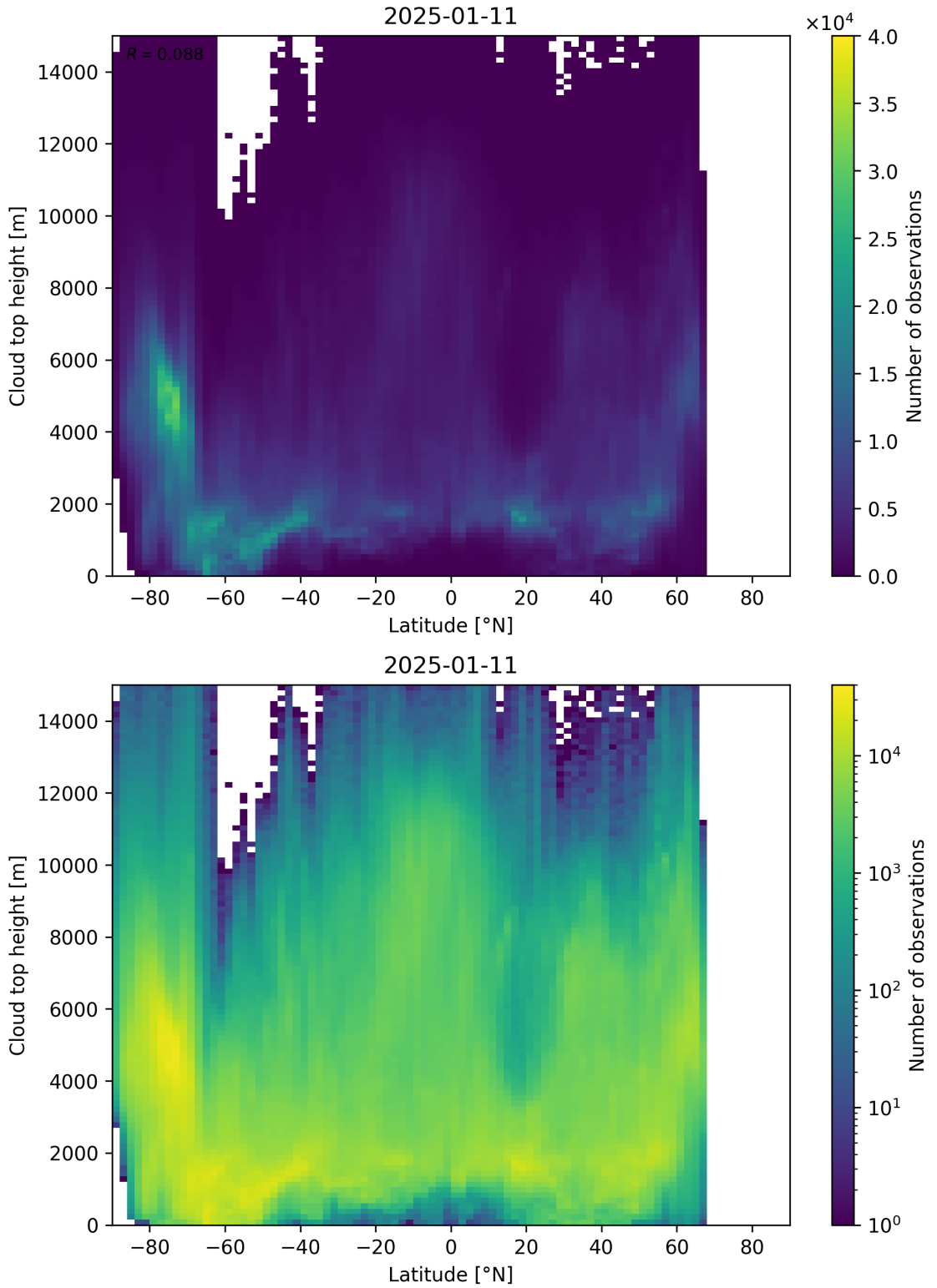

Figure 97: Scatter density plot of “Latitude” against “Cloud top height” for 2025-01-10 to 2025-01-12.

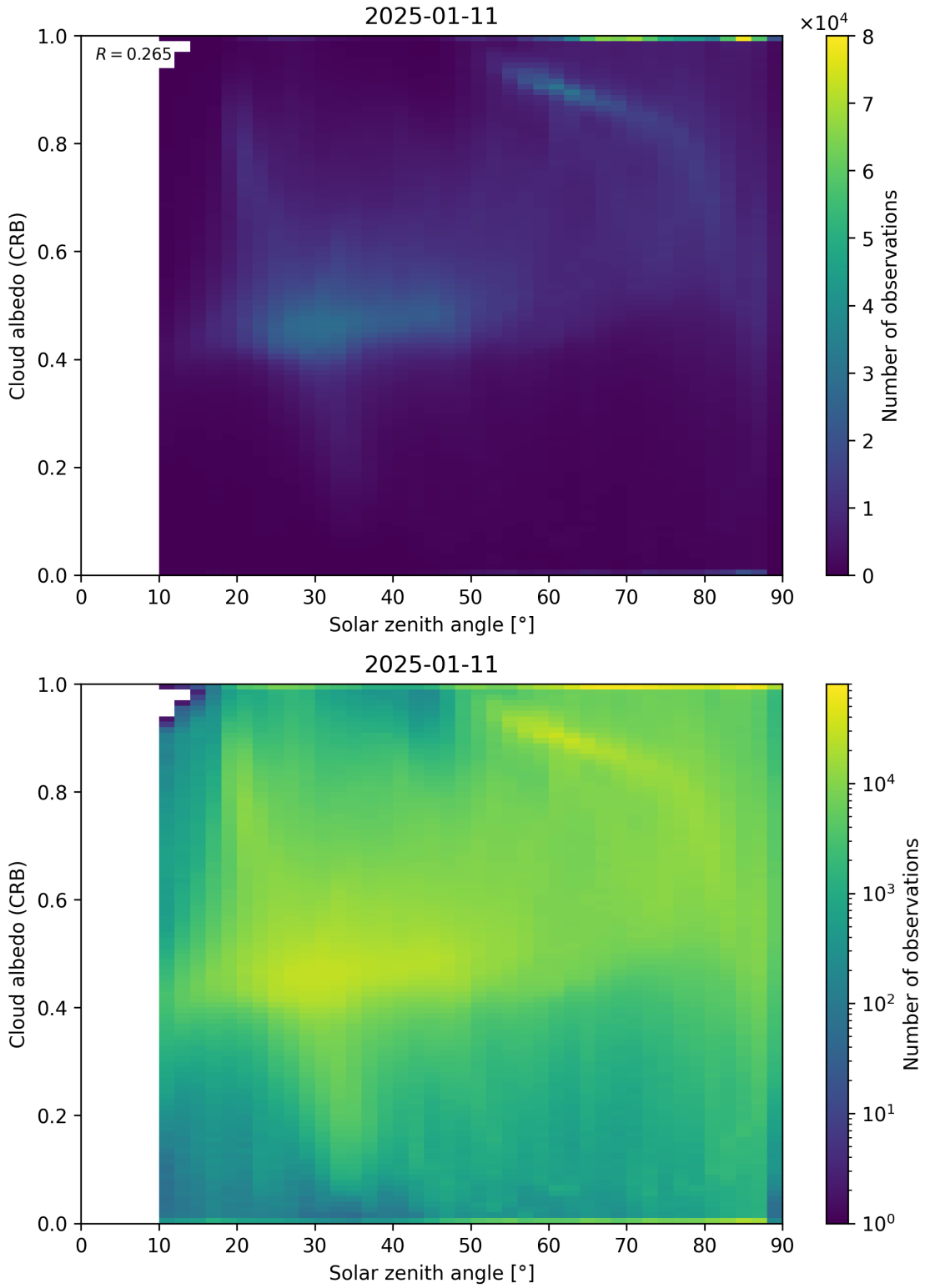

Figure 98: Scatter density plot of “Solar zenith angle” against “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

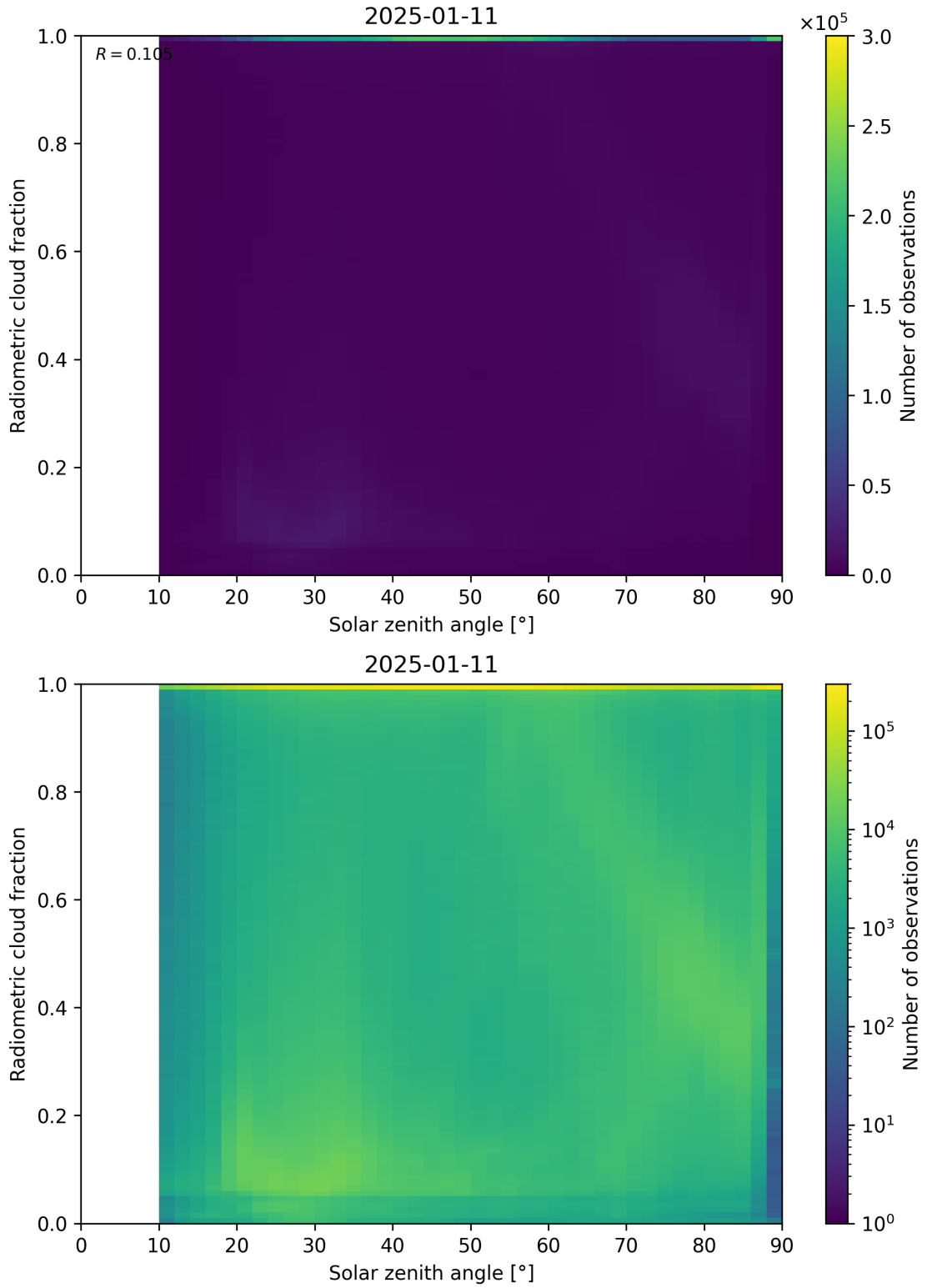

Figure 99: Scatter density plot of “Solar zenith angle” against “Radiometric cloud fraction” for 2025-01-10 to 2025-01-12.

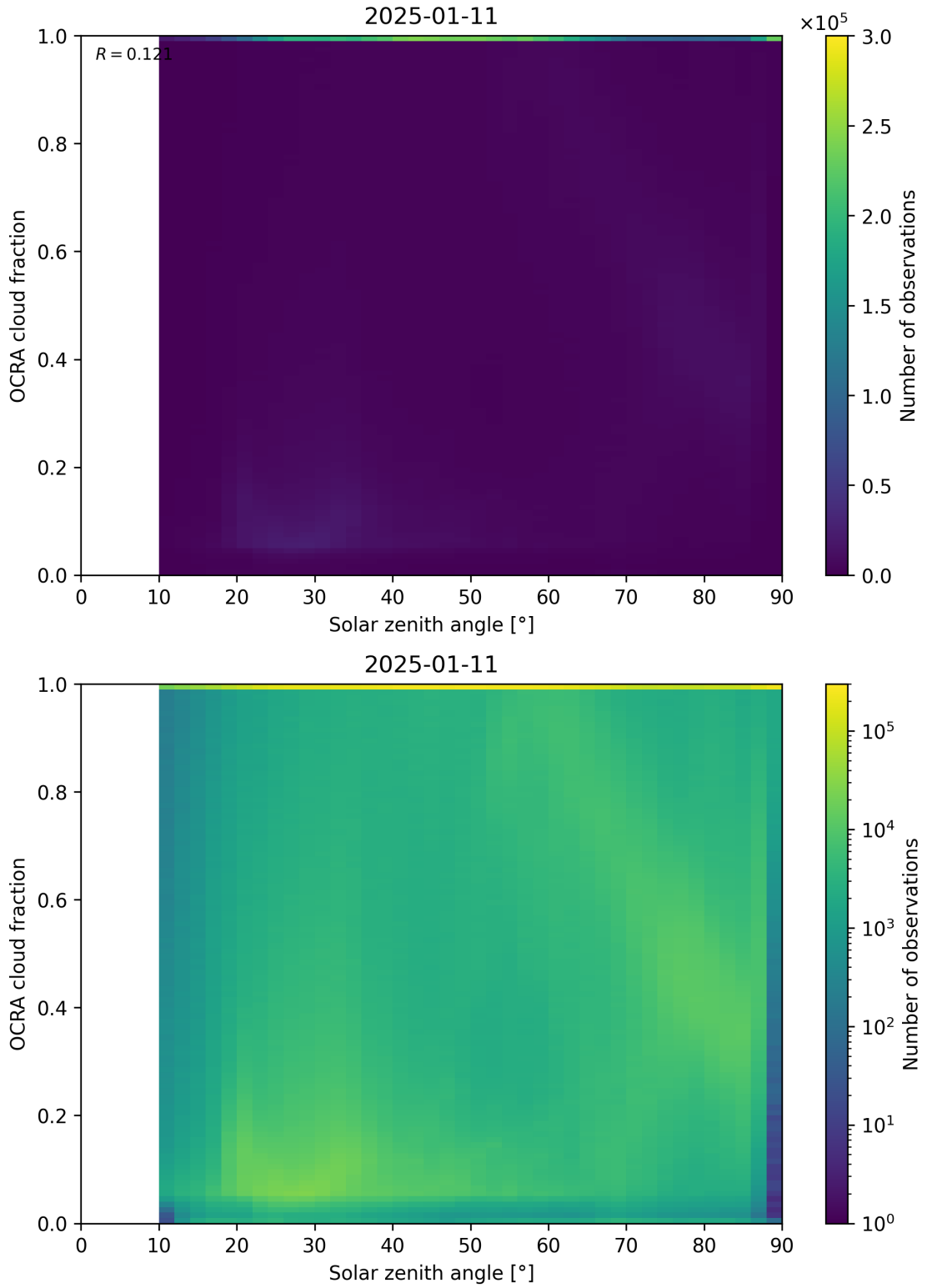

Figure 100: Scatter density plot of “Solar zenith angle” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

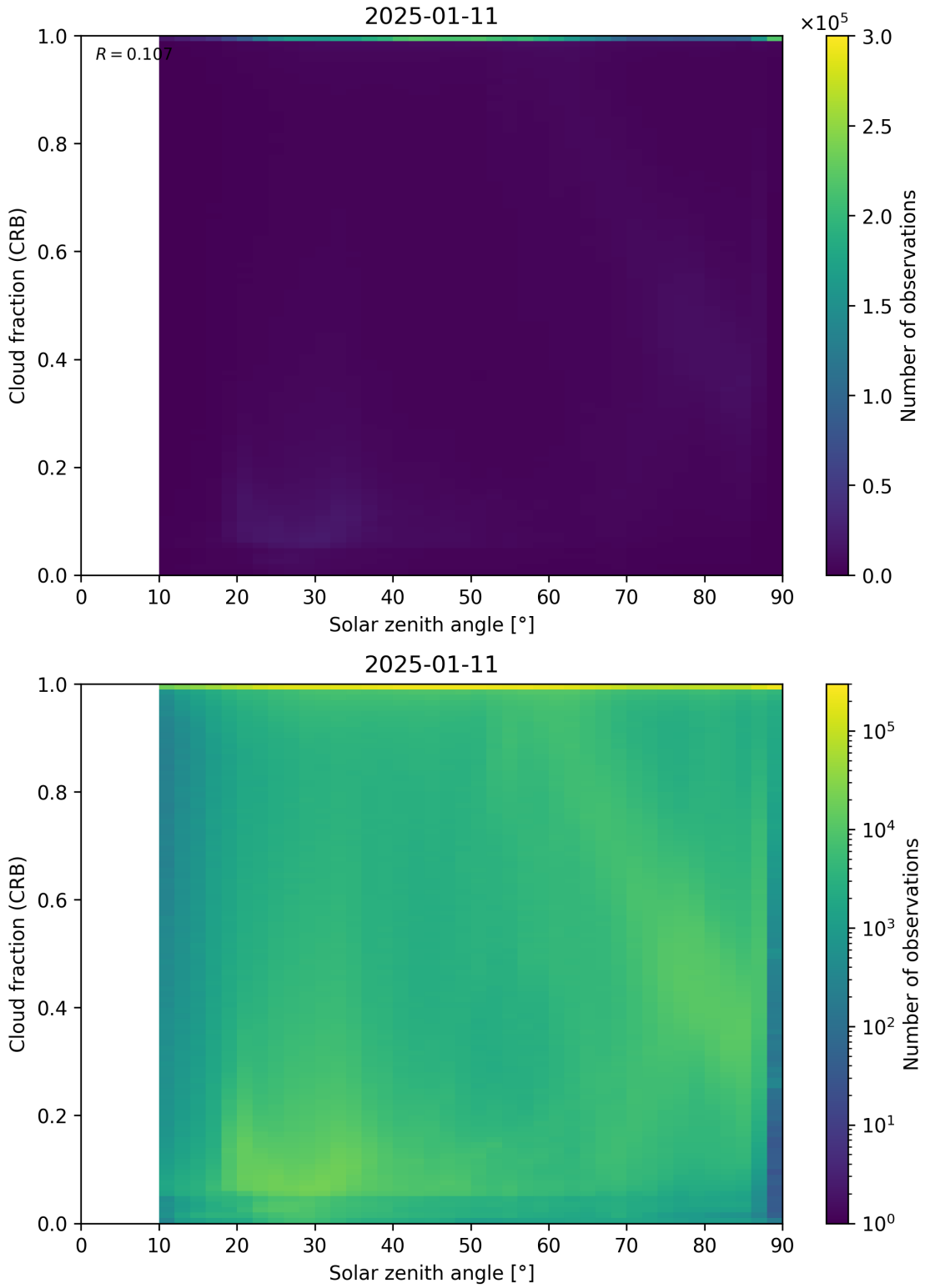

Figure 101: Scatter density plot of “Solar zenith angle” against “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12.

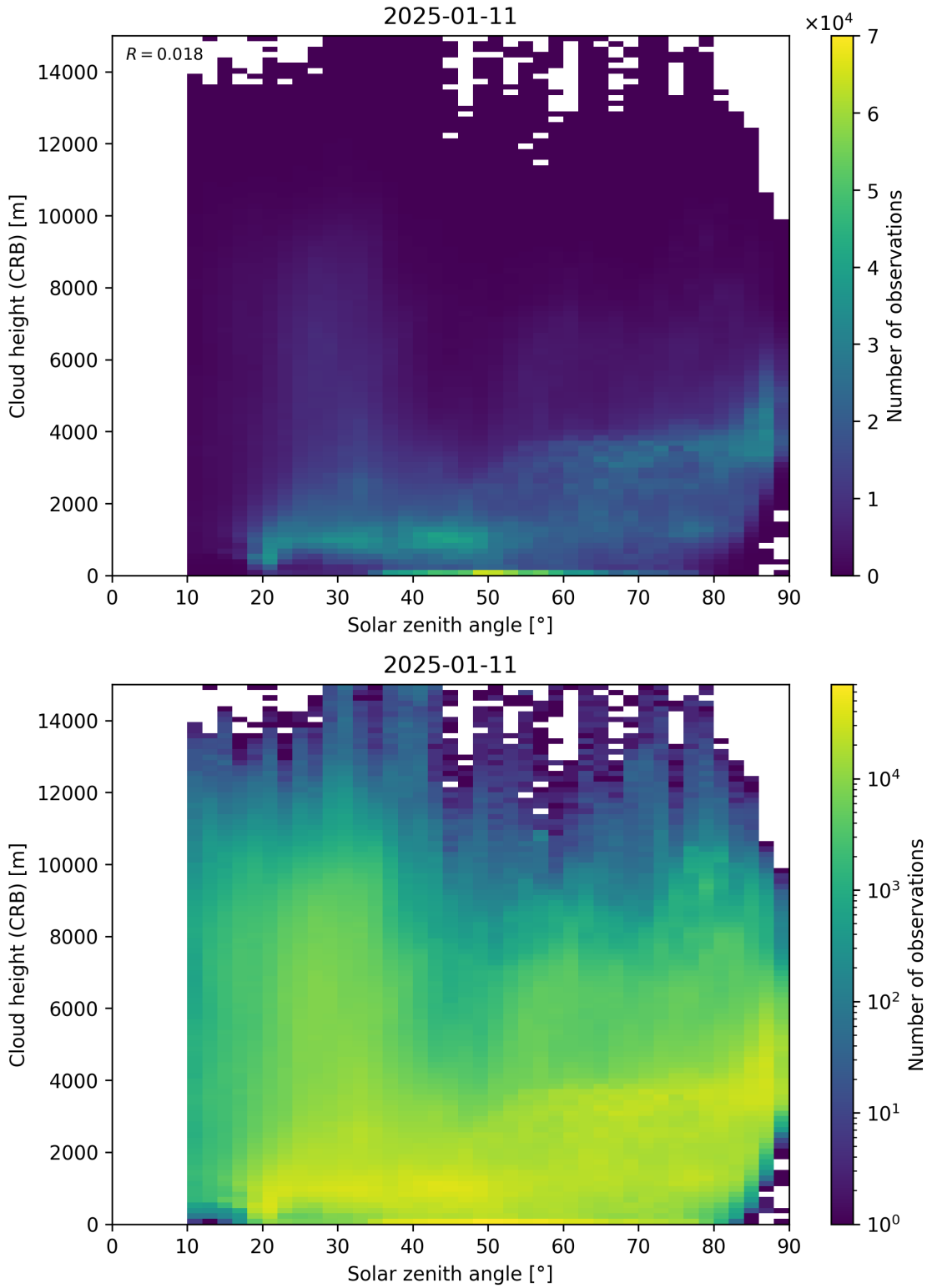

Figure 102: Scatter density plot of “Solar zenith angle” against “Cloud height (CRB)” for 2025-01-10 to 2025-01-12.

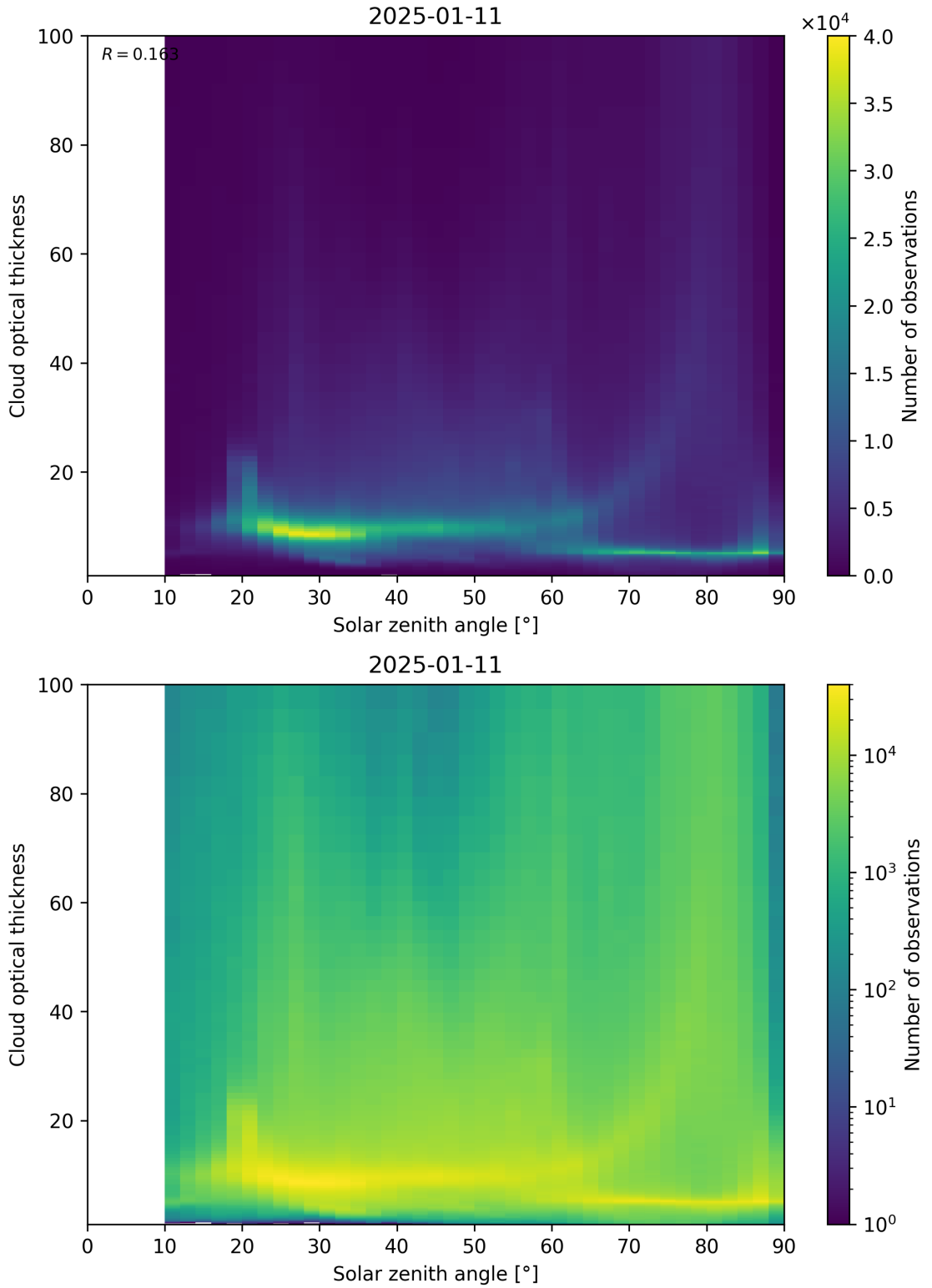

Figure 103: Scatter density plot of “Solar zenith angle” against “Cloud optical thickness” for 2025-01-10 to 2025-01-12.

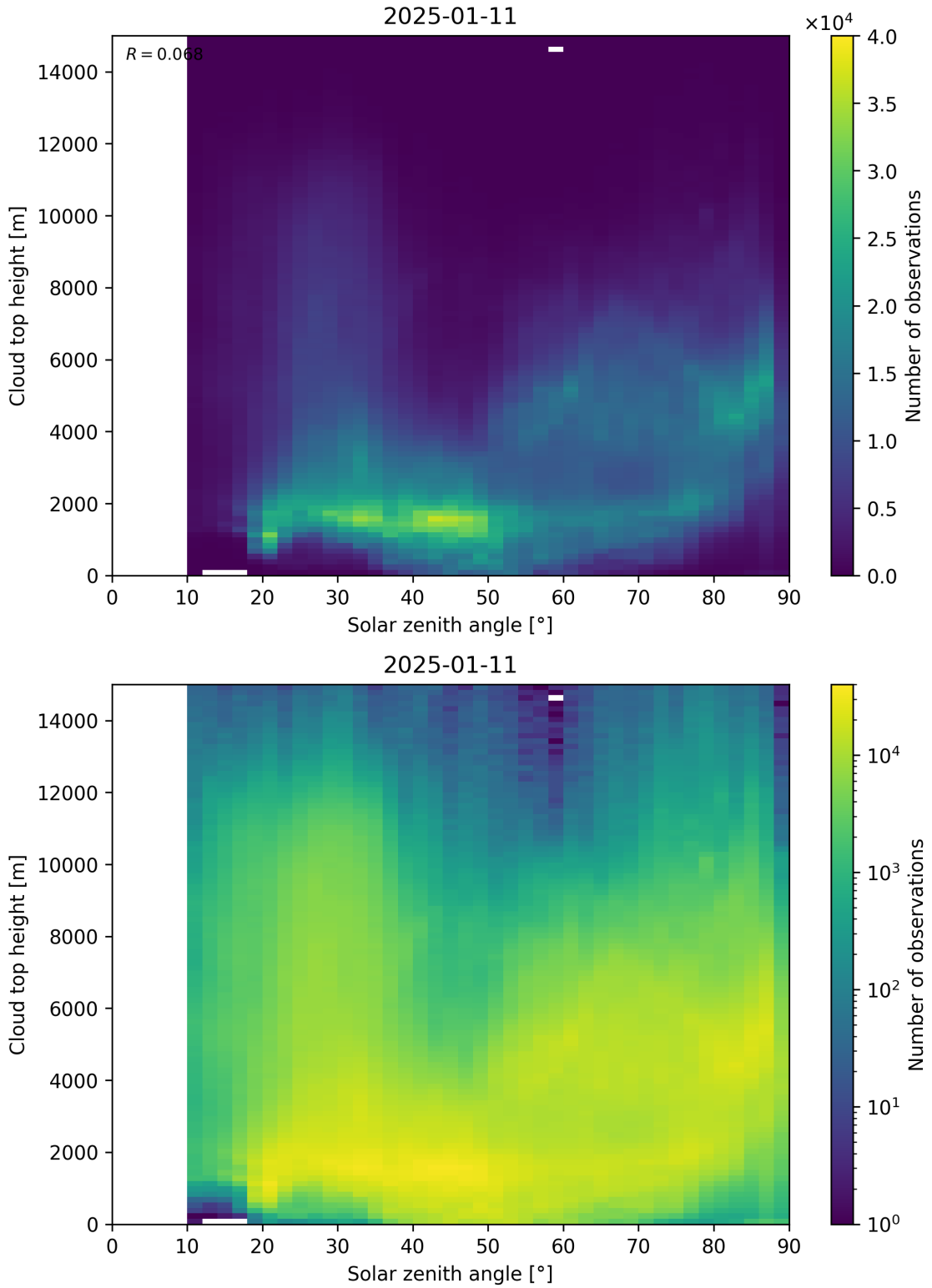

Figure 104: Scatter density plot of “Solar zenith angle” against “Cloud top height” for 2025-01-10 to 2025-01-12.

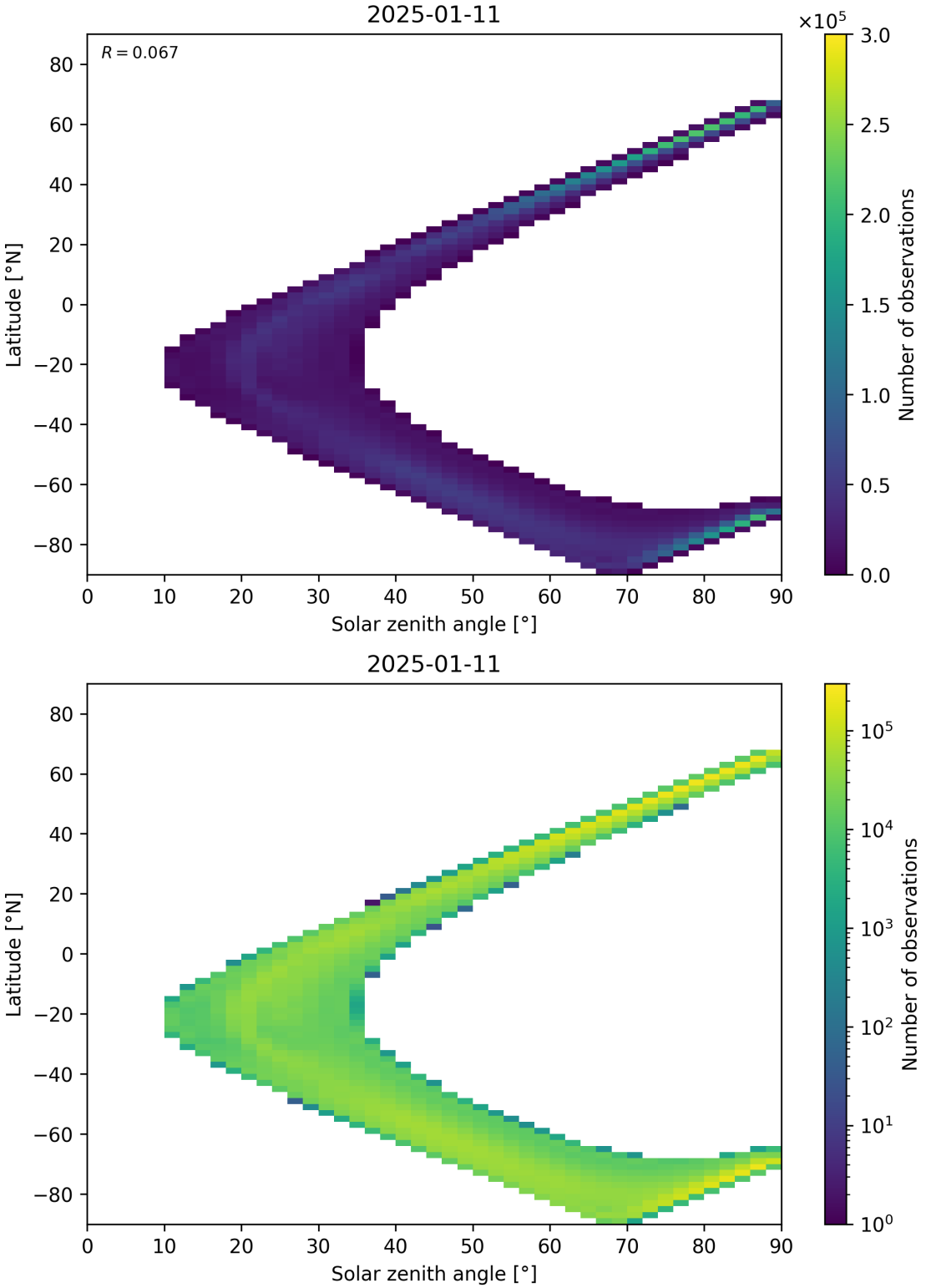

Figure 105: Scatter density plot of “Solar zenith angle” against “Latitude” for 2025-01-10 to 2025-01-12.

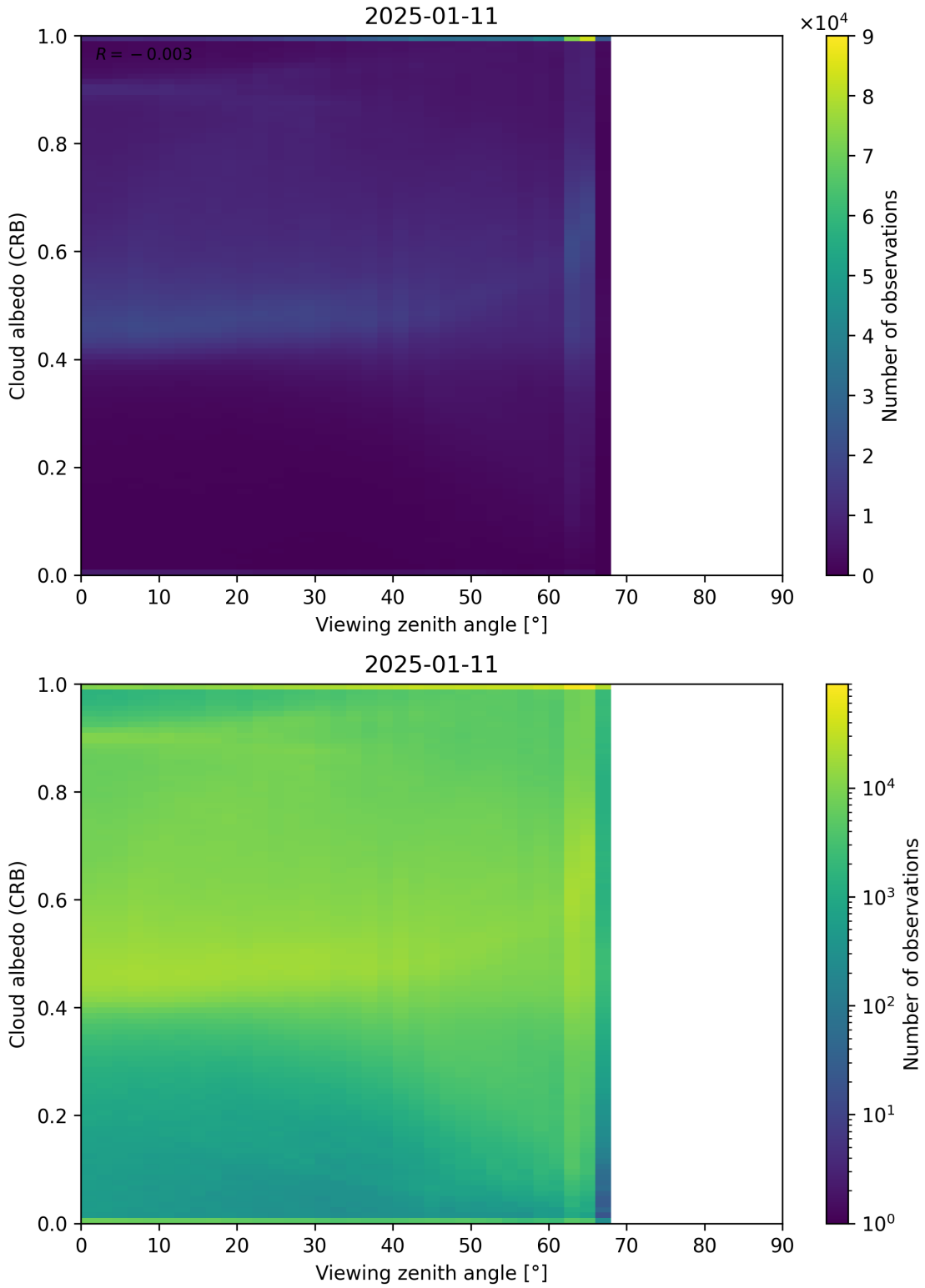

Figure 106: Scatter density plot of “Viewing zenith angle” against “Cloud albedo (CRB)” for 2025-01-10 to 2025-01-12.

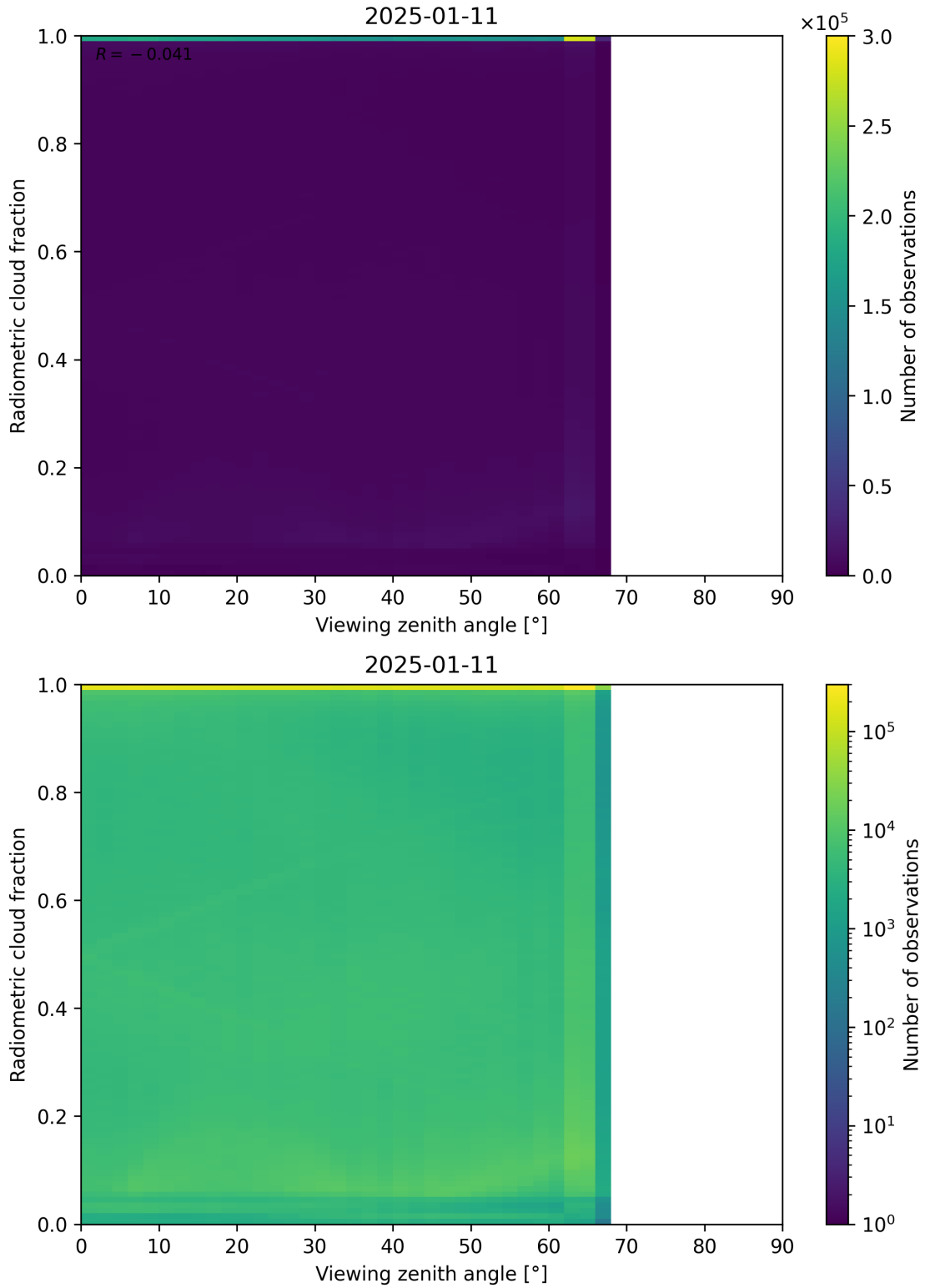

Figure 107: Scatter density plot of “Viewing zenith angle” against “Radiometric cloud fraction” for 2025-01-10 to 2025-01-12.

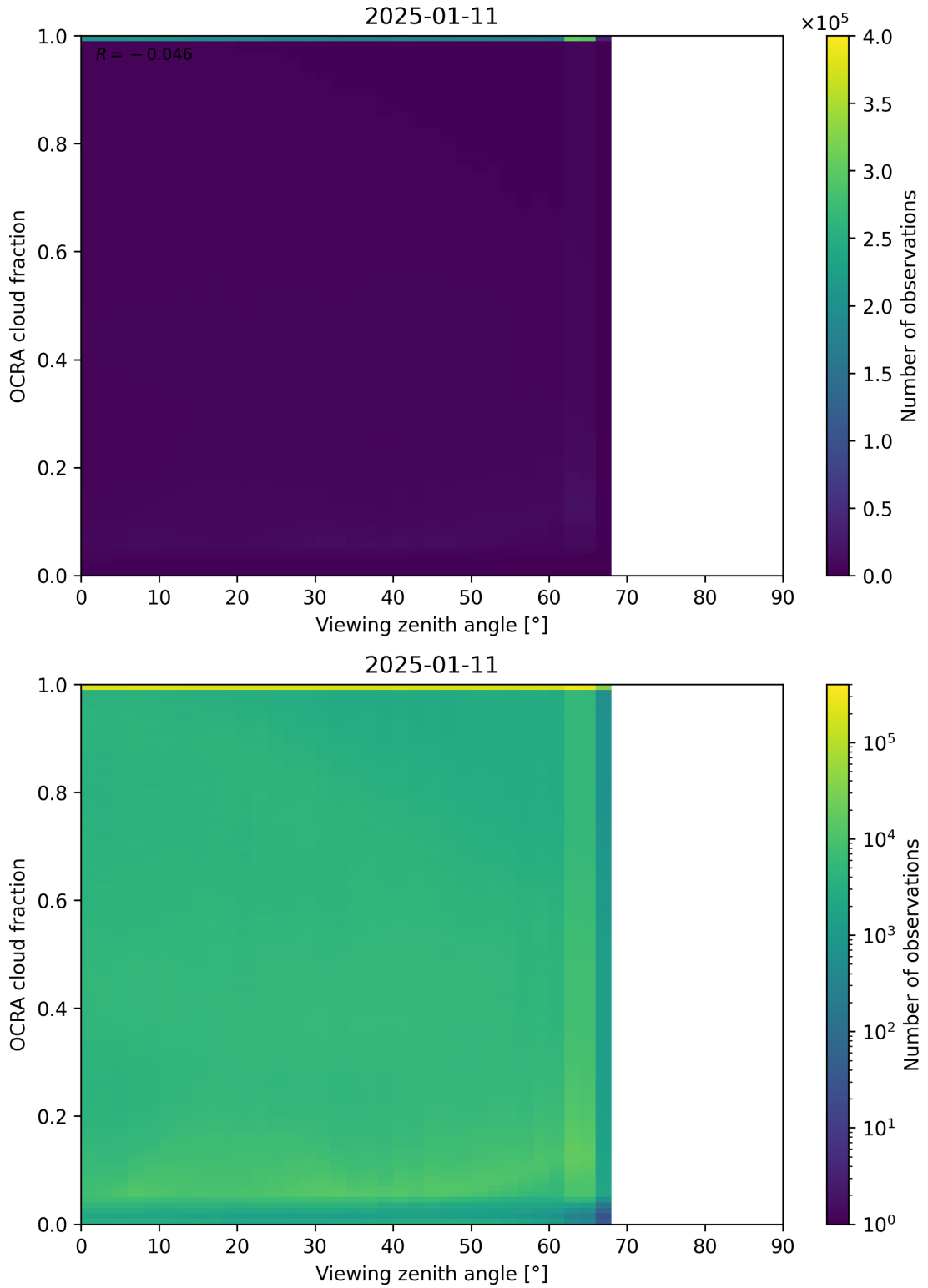

Figure 108: Scatter density plot of “Viewing zenith angle” against “OCRA cloud fraction” for 2025-01-10 to 2025-01-12.

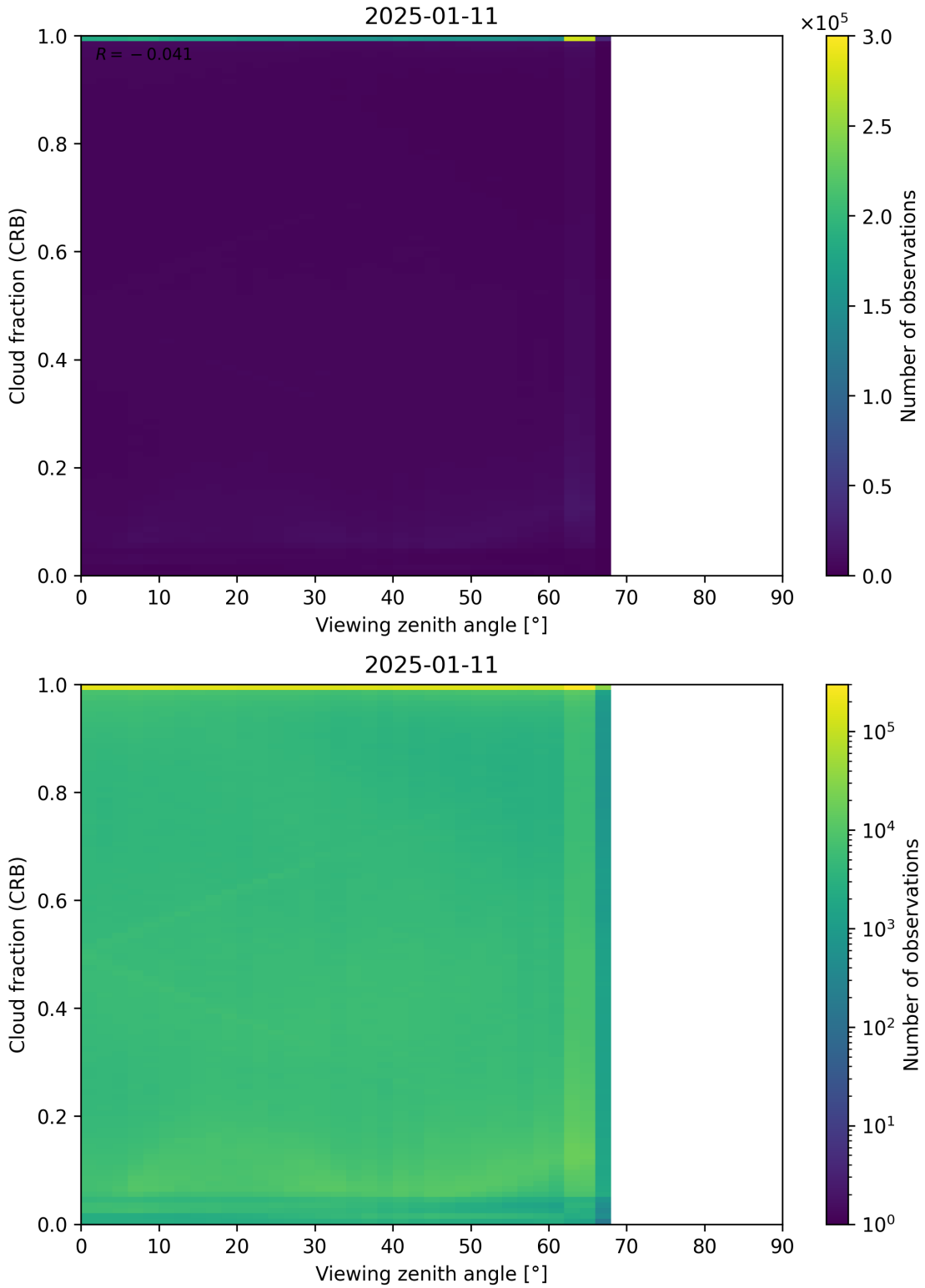

Figure 109: Scatter density plot of “Viewing zenith angle” against “Cloud fraction (CRB)” for 2025-01-10 to 2025-01-12.

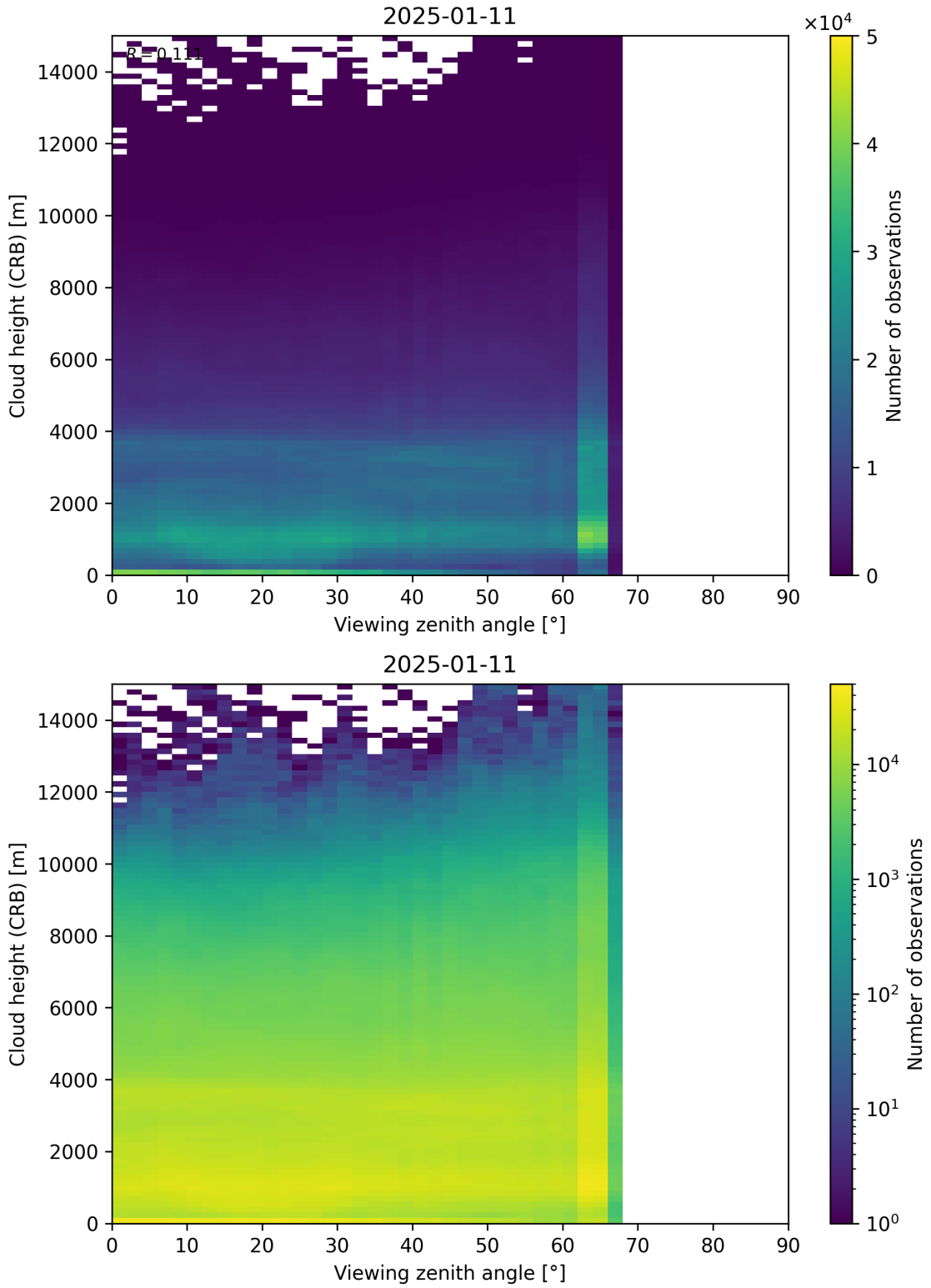

Figure 110: Scatter density plot of “Viewing zenith angle” against “Cloud height (CRB)” for 2025-01-10 to 2025-01-12.

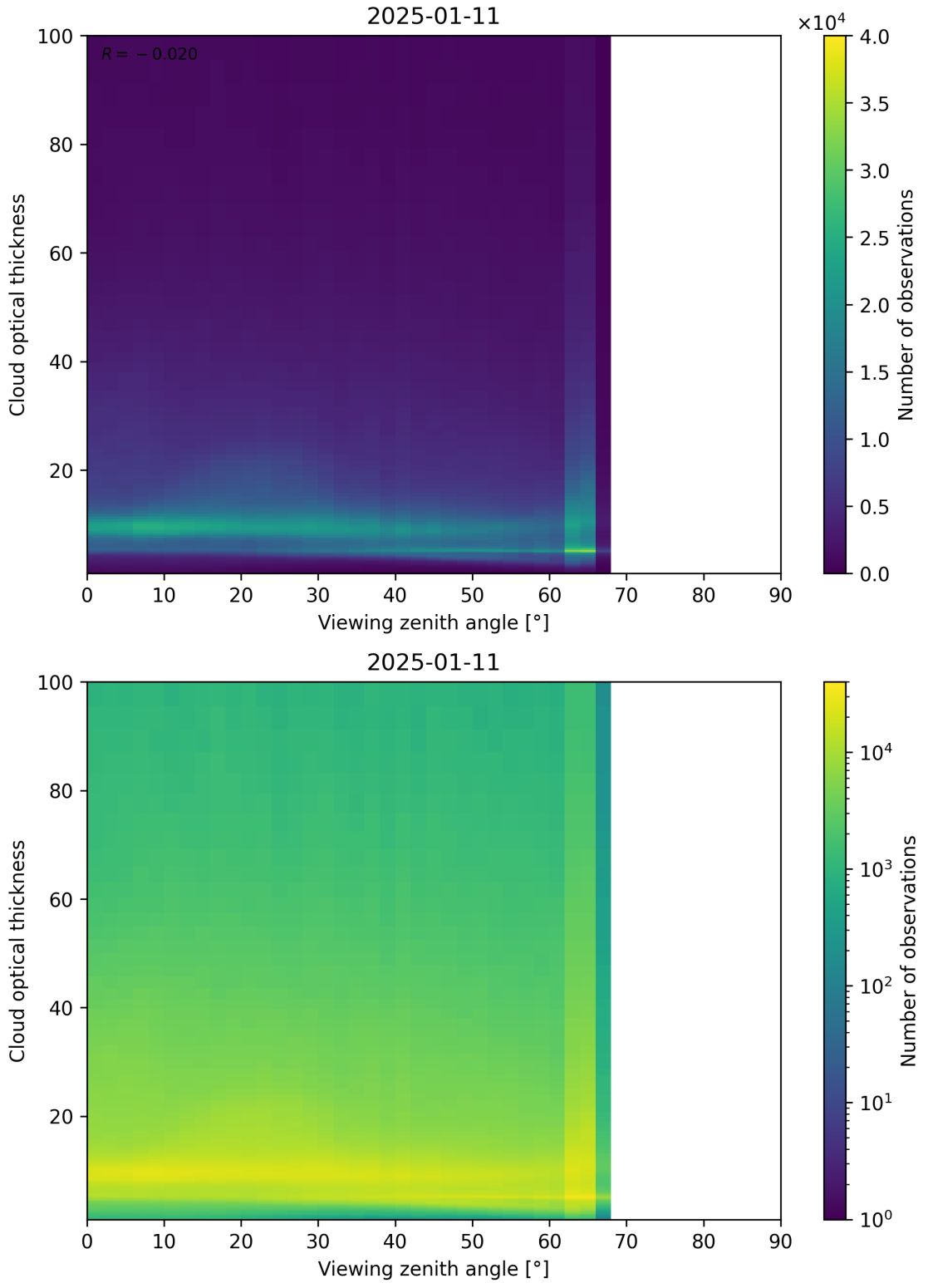

Figure 111: Scatter density plot of “Viewing zenith angle” against “Cloud optical thickness” for 2025-01-10 to 2025-01-12.

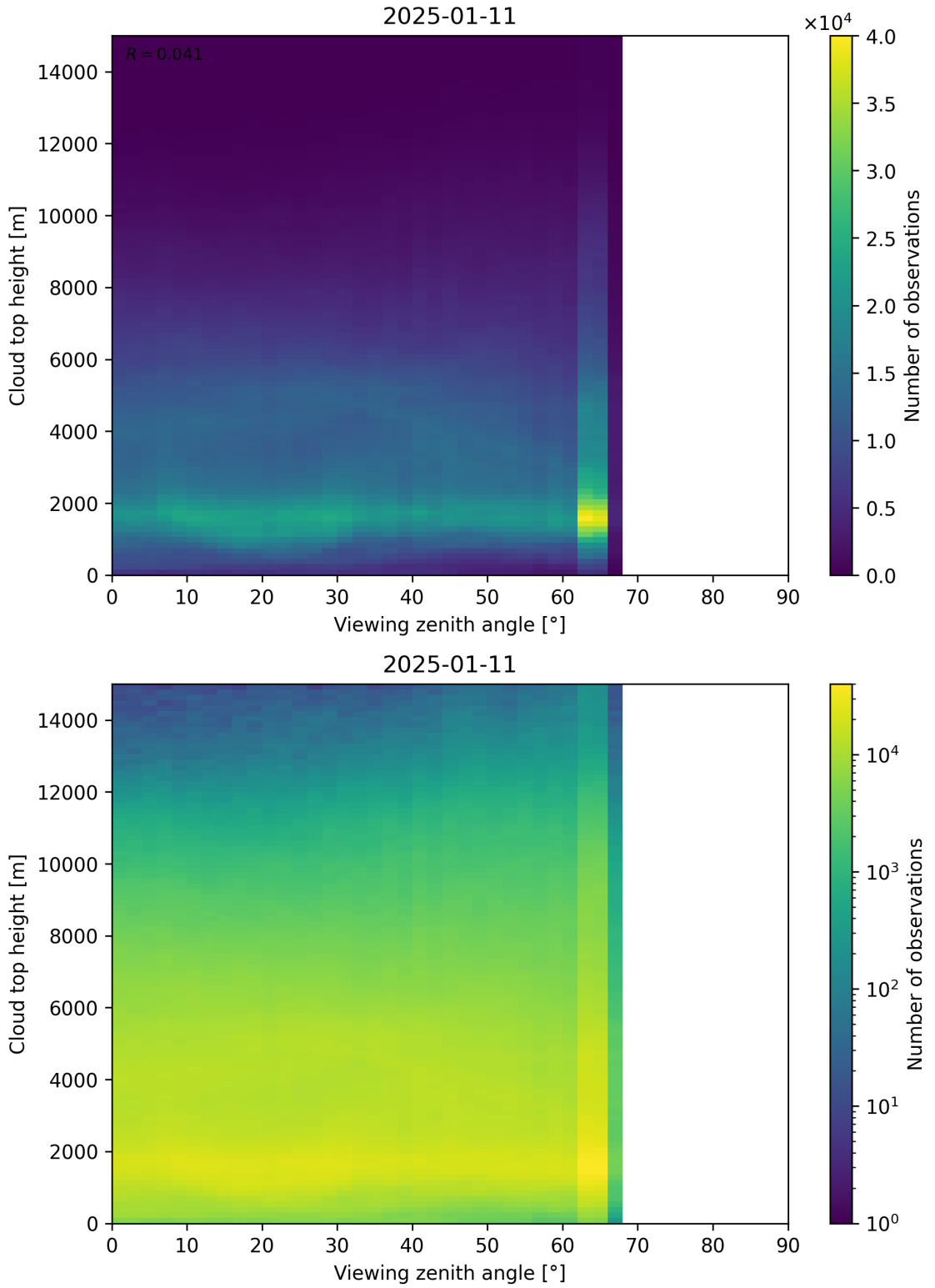

Figure 112: Scatter density plot of “Viewing zenith angle” against “Cloud top height” for 2025-01-10 to 2025-01-12.

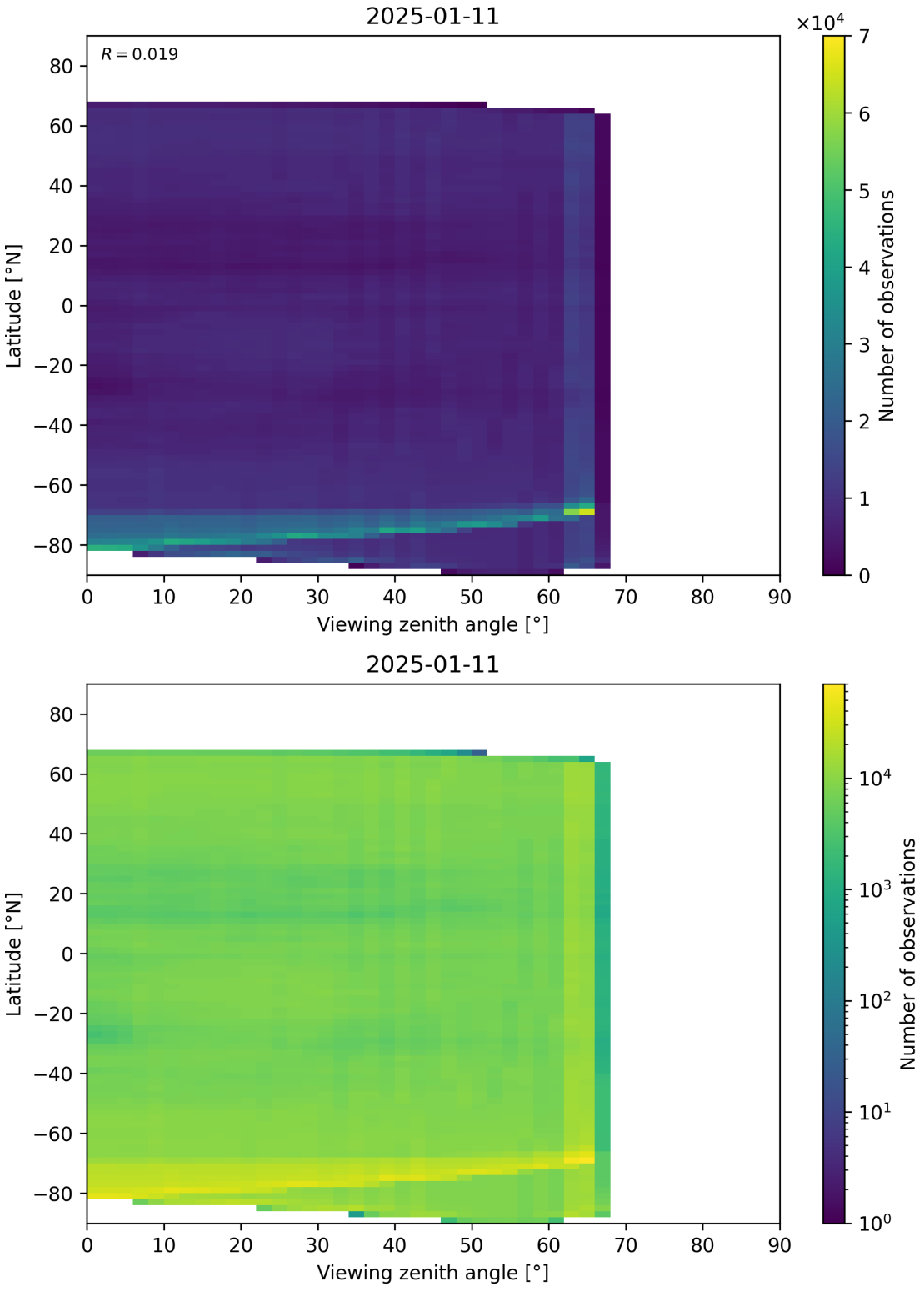

Figure 113: Scatter density plot of “Viewing zenith angle” against “Latitude” for 2025-01-10 to 2025-01-12.

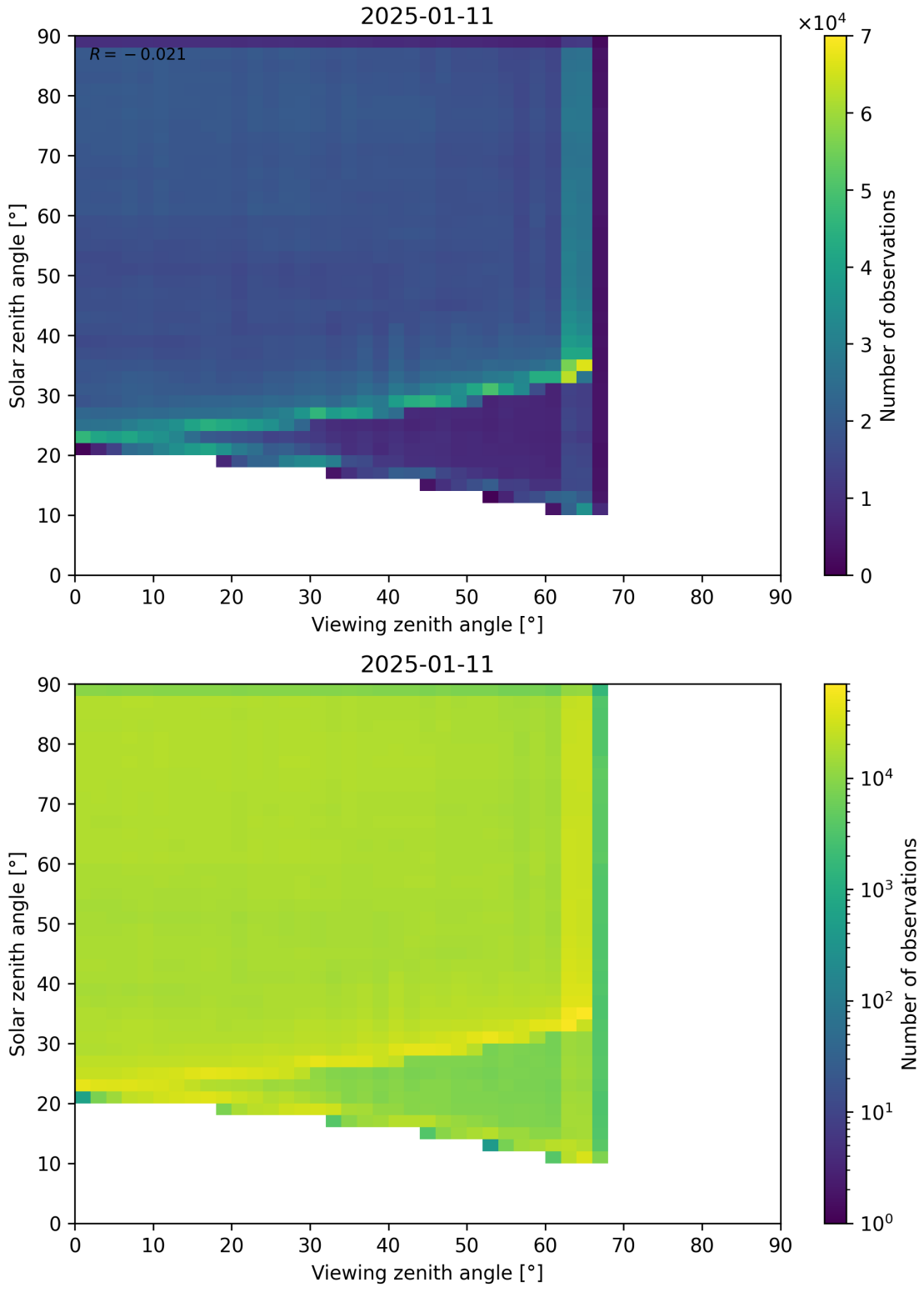

Figure 114: Scatter density plot of “Viewing zenith angle” against “Solar zenith angle” for 2025-01-10 to 2025-01-12.

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