PyCAMA report generated by tropl2-proc

tropl2-proc

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1 Short Introduction

1.1 The list of parameters

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

2 Definitions

The averages shown here are *unweighed* averages:

$$\overline{x} = \frac{1}{N}\sum_{i=1}^{N} x_i \tag{1}$$

with N the number of observations in the dataset.

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

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

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

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

$$P(x \leq m) = P(x \geq m) = \int_{-\infty}^{m} f(x)\,\mathrm{d}x = \frac{1}{2} \tag{3}$$

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

The median is a special case of a percentile. Instead of ½ in equation 3, other threshold values can be used. We report results for 1 %, 5 %, 10 %, 15.9 %, 25 %, 75 %, 84.1 %, 90 %, 95 % and 99 %. The inter quartile range is the difference between the 75 % and 25 % percentiles. Similarly the minimum and maximum values correspond to the 0 % and 100 % percentiles respectively.

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

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

$$C_{kl} = C(x_{(k)}, x_{(l)}) = \frac{1}{N-1}\sum_{i=1}^{N}(x_{(k),i} - \overline{x_{(k)}})(x_{(l),i} - \overline{x_{(l)}}) \tag{4}$$

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

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

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

Table 1: Parameterlist and basic statistics for the analysis

Variable	mean $\pm\sigma$	Count	Mode	IQR	Median	Minimum	Maximum
qa value [1]	0.636 ± 0.358	20843972	0.995	0.520	0.770	0.0	1.000
cloud fraction [1]	0.574 ± 0.342	20843972	0.995	0.719	0.560	0.0	1.000
cloud top height [m]	$(0.398 \pm 0.259) \times 10^4$	20843972	1.575×10^3	3.682×10^3	3.472×10^3	0.0	2.000×10^4
cloud optical thickness [1]	18.8 ± 34.6	20843972	9.34	10.3	9.19	1.000	250
cloud fraction crb [1]	0.573 ± 0.342	20843972	0.995	0.720	0.560	0.0	1.000
cloud height crb [m]	$(0.302 \pm 0.222) \times 10^4$	20843972	1.125×10^3	3.121×10^3	2.548×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.607 ± 0.213	20843972	0.995	0.295	0.592	0.0	1.000
surface albedo fitted [1]	0.273 ± 0.353	20843972	1.500×10^{-2}	0.501	4.180×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.261 ± 0.342	20843972	1.500×10^{-2}	0.495	3.079×10^{-2}	0.0	1.000
fitted root mean square [1]	$(7.494 \pm 9.160) \times 10^{-4}$	20843972	5.000×10^{-5}	9.230×10^{-4}	4.579×10^{-4}	1.017×10^{-6}	0.158
fitted root mean square crb [1]	$(6.650 \pm 7.874) \times 10^{-4}$	20843972	5.000×10^{-5}	8.670×10^{-4}	3.530×10^{-4}	7.922×10^{-7}	0.183
wavelength shift [nm]	$(8.316 \pm 6.985) \times 10^{-3}$	20843972	9.000×10^{-4}	9.943×10^{-3}	8.029×10^{-3}	-5.403×10^{-2}	7.433×10^{-2}
cloud fraction apriori [1]	0.579 ± 0.346	20843972	0.995	0.746	0.570	0.0	1.000
reflectance blue ocra [1]	0.585 ± 0.233	20843972	0.265	0.415	0.572	0.132	1.98
reflectance green ocra [1]	0.538 ± 0.264	20843972	0.175	0.489	0.533	7.772×10^{-2}	2.05
reflectance continuum aband [1]	0.489 ± 0.290	20843972	4.500×10^{-2}	0.511	0.501	1.306×10^{-2}	4.63

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	2.000×10^{-2}	0.400	0.920	1.000	1.000	1.000	1.000
cloud fraction [1]	2.126×10^{-2}	6.886×10^{-2}	0.107	0.157	0.255	0.975	1.000	1.000	1.000	1.000
cloud top height [m]	351	840	1.179×10^{3}	1.467×10^{3}	1.867×10^{3}	5.549×10^{3}	6.627×10^{3}	7.602×10^{3}	8.882×10^{3}	1.127×10^{4}
cloud optical thickness [1]	1.02	2.65	3.78	4.66	5.57	15.9	24.0	35.4	62.9	250
cloud fraction crb [1]	2.091×10^{-2}	6.797×10^{-2}	0.106	0.156	0.254	0.974	1.000	1.000	1.000	1.000
cloud height crb [m]	7.52	330	634	886	1.226×10^{3}	4.347×10^{3}	5.345×10^{3}	6.251×10^{3}	7.348×10^{3}	9.279×10^{3}
cloud albedo crb [1]	5.617×10^{-3}	0.252	0.365	0.423	0.470	0.764	0.844	0.900	0.968	1.000
surface albedo fitted [1]	0.0	5.919×10^{-3}	9.864×10^{-3}	1.326×10^{-2}	1.840×10^{-2}	0.520	0.833	0.919	0.966	1.000
surface albedo fitted crb [1]	0.0	4.725×10^{-3}	7.196×10^{-3}	9.621×10^{-3}	1.343×10^{-2}	0.508	0.818	0.877	0.911	0.953
fitted root mean square [1]	1.587×10^{-5}	3.086×10^{-5}	5.145×10^{-5}	8.270×10^{-5}	1.454×10^{-4}	1.068×10^{-3}	1.469×10^{-3}	1.855×10^{-3}	2.377×10^{-3}	3.546×10^{-3}
fitted root mean square crb [1]	1.052×10^{-5}	2.314×10^{-5}	3.938×10^{-5}	6.071×10^{-5}	1.042×10^{-4}	9.712×10^{-4}	1.372×10^{-3}	1.750×10^{-3}	2.276×10^{-3}	3.375×10^{-3}
wavelength shift [nm]	-8.067×10^{-3}	-9.153×10^{-4}	2.979×10^{-4}	1.327×10^{-3}	3.097×10^{-3}	1.304×10^{-2}	1.527×10^{-2}	1.719×10^{-2}	1.977×10^{-2}	2.565×10^{-2}
cloud fraction apriori [1]	3.026×10^{-2}	6.666×10^{-2}	0.103	0.153	0.254	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.236	0.260	0.285	0.317	0.373	0.788	0.857	0.898	0.932	1.06
reflectance green ocra [1]	0.153	0.174	0.194	0.223	0.282	0.772	0.849	0.893	0.930	1.03
reflectance continuum aband [1]	2.908×10^{-2}	5.273×10^{-2}	8.636×10^{-2}	0.131	0.227	0.738	0.817	0.864	0.908	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]	0.608 ± 0.385	7645492	0.650	0.790	0.0	1.000	0.300	0.950
cloud fraction [1]	0.538 ± 0.346	7645492	0.716	0.498	0.0	1.000	0.211	0.927
cloud top height [m]	$(0.415 \pm 0.265) \times 10^4$	7645492	4.003×10^3	3.571×10^3	0.0	2.000×10^4	1.937×10^3	5.941×10^3
cloud optical thickness [1]	27.4 ± 47.9	7645492	16.2	10.4	1.000	250	6.35	22.6
cloud fraction crb [1]	0.536 ± 0.346	7645492	0.715	0.495	0.0	1.000	0.210	0.925
cloud height crb [m]	$(0.341 \pm 0.229) \times 10^4$	7645492	3.567×10^3	2.966×10^3	0.0	2.000×10^4	1.443×10^3	5.011×10^3
cloud albedo crb [1]	0.599 ± 0.201	7645492	0.252	0.583	0.0	1.000	0.474	0.727
surface albedo fitted [1]	0.181 ± 0.229	7645492	0.272	4.492×10^{-2}	0.0	1.000	2.263×10^{-2}	0.294
surface albedo fitted crb [1]	0.171 ± 0.221	7645492	0.271	3.307×10^{-2}	0.0	1.000	1.643×10^{-2}	0.287
fitted root mean square [1]	$(4.765 \pm 6.329) \times 10^{-4}$	7645492	5.063×10^{-4}	2.675×10^{-4}	1.188×10^{-6}	9.024×10^{-2}	1.053×10^{-4}	6.116×10^{-4}
fitted root mean square crb [1]	$(3.932 \pm 5.477) \times 10^{-4}$	7645492	4.187×10^{-4}	1.825×10^{-4}	1.541×10^{-6}	0.125	6.875×10^{-5}	4.875×10^{-4}
wavelength shift [nm]	$(6.984 \pm 6.715) \times 10^{-3}$	7645492	9.149×10^{-3}	6.149×10^{-3}	-4.773×10^{-2}	6.347×10^{-2}	2.074×10^{-3}	1.122×10^{-2}
cloud fraction apriori [1]	0.540 ± 0.350	7645492	0.746	0.499	0.0	1.000	0.207	0.953
reflectance blue ocra [1]	0.540 ± 0.207	7645492	0.322	0.520	0.133	1.95	0.366	0.688
reflectance green ocra [1]	0.484 ± 0.233	7645492	0.390	0.465	7.772×10^{-2}	2.05	0.273	0.662
reflectance continuum aband [1]	0.436 ± 0.267	7645492	0.429	0.425	1.306×10^{-2}	4.63	0.209	0.638

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]	0.652 ± 0.340	13198480	0.510	0.760	0.0	1.000	0.400	0.910
cloud fraction [1]	0.595 ± 0.338	13198480	0.704	0.594	0.0	1.000	0.288	0.992
cloud top height [m]	$(0.387 \pm 0.254) \times 10^4$	13198480	3.529×10^3	3.417×10^3	0.0	2.000×10^4	1.827×10^3	5.356×10^3
cloud optical thickness [1]	13.8 ± 22.3	13198480	8.29	8.69	1.000	250	5.25	13.5
cloud fraction crb [1]	0.595 ± 0.339	13198480	0.706	0.595	0.0	1.000	0.287	0.993
cloud height crb [m]	$(0.280 \pm 0.215) \times 10^4$	13198480	2.807×10^3	2.344×10^3	0.0	2.000×10^4	1.111×10^3	3.918×10^3
cloud albedo crb [1]	0.612 ± 0.219	13198480	0.318	0.599	0.0	1.000	0.467	0.785
surface albedo fitted [1]	0.327 ± 0.399	13198480	0.805	3.893×10^{-2}	0.0	1.000	1.625×10^{-2}	0.821
surface albedo fitted crb [1]	0.313 ± 0.385	13198480	0.799	2.897×10^{-2}	0.0	1.000	1.174×10^{-2}	0.811
fitted root mean square [1]	$(9.075 \pm 10.124) \times 10^{-4}$	13198480	1.129×10^{-3}	6.490×10^{-4}	1.017×10^{-6}	0.158	1.981×10^{-4}	1.328×10^{-3}
fitted root mean square crb [1]	$(8.224 \pm 8.590) \times 10^{-4}$	13198480	1.089×10^{-3}	5.517×10^{-4}	7.922×10^{-7}	0.183	1.516×10^{-4}	1.240×10^{-3}
wavelength shift [nm]	$(9.088 \pm 7.021) \times 10^{-3}$	13198480	9.839×10^{-3}	9.156×10^{-3}	-5.403×10^{-2}	7.433×10^{-2}	3.991×10^{-3}	1.383×10^{-2}
cloud fraction apriori [1]	0.601 ± 0.341	13198480	0.710	0.608	0.0	1.000	0.290	1.000
reflectance blue ocra [1]	0.611 ± 0.243	13198480	0.456	0.620	0.132	1.98	0.378	0.835
reflectance green ocra [1]	0.569 ± 0.275	13198480	0.534	0.590	8.008×10^{-2}	1.97	0.291	0.825
reflectance continuum aband [1]	0.520 ± 0.297	13198480	0.542	0.560	1.312×10^{-2}	3.81	0.244	0.786

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]	0.734 ± 0.317	13141753	0.470	0.900	0.0	1.000	0.510	0.980
cloud fraction [1]	0.603 ± 0.365	13141753	0.772	0.648	0.0	1.000	0.228	1.000
cloud top height [m]	$(0.350 \pm 0.246) \times 10^4$	13141753	3.236×10^3	2.726×10^3	0.0	2.000×10^4	1.623×10^3	4.859×10^3
cloud optical thickness [1]	17.9 ± 26.6	13141753	10.2	10.3	1.000	250	7.24	17.5
cloud fraction crb [1]	0.602 ± 0.365	13141753	0.773	0.646	0.0	1.000	0.227	1.000
cloud height crb [m]	$(0.282 \pm 0.225) \times 10^4$	13141753	3.015×10^3	2.092×10^3	0.0	2.000×10^4	1.077×10^3	4.092×10^3
cloud albedo crb [1]	0.555 ± 0.168	13141753	0.210	0.538	0.0	1.000	0.453	0.664
surface albedo fitted [1]	$(6.325 \pm 14.588) \times 10^{-2}$	13141753	2.449×10^{-2}	2.260×10^{-2}	0.0	1.000	1.325×10^{-2}	3.774×10^{-2}
surface albedo fitted crb [1]	$(5.729 \pm 14.554) \times 10^{-2}$	13141753	1.822×10^{-2}	1.659×10^{-2}	0.0	1.000	9.609×10^{-3}	2.783×10^{-2}
fitted root mean square [1]	$(6.838 \pm 9.562) \times 10^{-4}$	13141753	8.872×10^{-4}	3.197×10^{-4}	1.017×10^{-6}	0.158	9.478×10^{-5}	9.819×10^{-4}
fitted root mean square crb [1]	$(6.561 \pm 8.255) \times 10^{-4}$	13141753	8.741×10^{-4}	2.979×10^{-4}	7.922×10^{-7}	0.183	8.451×10^{-5}	9.586×10^{-4}
wavelength shift [nm]	$(7.948 \pm 7.464) \times 10^{-3}$	13141753	1.048×10^{-2}	7.321×10^{-3}	-5.120×10^{-2}	7.433×10^{-2}	2.472×10^{-3}	1.296×10^{-2}
cloud fraction apriori [1]	0.602 ± 0.370	13141753	0.783	0.646	0.0	1.000	0.217	1.000
reflectance blue ocra [1]	0.503 ± 0.194	13141753	0.313	0.470	0.160	1.95	0.335	0.648
reflectance green ocra [1]	0.443 ± 0.223	13141753	0.384	0.408	8.375×10^{-2}	1.91	0.237	0.621
reflectance continuum aband [1]	0.381 ± 0.264	13141753	0.468	0.351	1.306×10^{-2}	4.37	0.132	0.601

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]	0.480 ± 0.355	6422878	0.700	0.620	0.0	1.000	0.0	0.700
cloud fraction [1]	0.522 ± 0.286	6422878	0.449	0.494	0.0	1.000	0.296	0.745
cloud top height [m]	$(0.480 \pm 0.253) \times 10^4$	6422878	3.061×10^3	4.633×10^3	0.0	2.000×10^4	3.050×10^3	6.111×10^3
cloud optical thickness [1]	16.1 ± 37.7	6422878	6.22	5.92	1.000	250	4.43	10.7
cloud fraction crb [1]	0.523 ± 0.286	6422878	0.451	0.495	0.0	1.000	0.296	0.747
cloud height crb [m]	$(0.329 \pm 0.210) \times 10^4$	6422878	2.662×10^3	3.102×10^3	0.0	2.000×10^4	1.780×10^3	4.442×10^3
cloud albedo crb [1]	0.703 ± 0.249	6422878	0.325	0.765	0.0	1.000	0.567	0.892
surface albedo fitted [1]	0.680 ± 0.304	6422878	0.601	0.833	0.0	1.000	0.338	0.939
surface albedo fitted crb [1]	0.656 ± 0.288	6422878	0.558	0.820	0.0	1.000	0.334	0.892
fitted root mean square [1]	$(9.071 \pm 8.301) \times 10^{-4}$	6422878	8.959×10^{-4}	6.918×10^{-4}	1.714×10^{-6}	0.157	3.473×10^{-4}	1.243×10^{-3}
fitted root mean square crb [1]	$(7.322 \pm 7.205) \times 10^{-4}$	6422878	8.786×10^{-4}	5.150×10^{-4}	2.186×10^{-6}	0.125	1.871×10^{-4}	1.066×10^{-3}
wavelength shift [nm]	$(9.352 \pm 5.876) \times 10^{-3}$	6422878	8.414×10^{-3}	9.482×10^{-3}	-3.420×10^{-2}	5.844×10^{-2}	5.024×10^{-3}	1.344×10^{-2}
cloud fraction apriori [1]	0.539 ± 0.288	6422878	0.457	0.515	0.0	1.000	0.311	0.768
reflectance blue ocra [1]	0.742 ± 0.223	6422878	0.290	0.821	0.135	1.96	0.608	0.898
reflectance green ocra [1]	0.718 ± 0.246	6422878	0.321	0.811	7.772×10^{-2}	2.03	0.576	0.896
reflectance continuum aband [1]	0.695 ± 0.226	6422878	0.323	0.766	1.698×10^{-2}	3.79	0.539	0.862

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	-2.127×10^{-2}	1.917×10^{-2}	-5.300×10^{-2}	1.328×10^{-2}	-2.586×10^{-2}	-5.355×10^{-2}	8.474×10^{-2}	-1.623×10^{-2}	-5.903×10^{-2}
-2.127×10^{-2}	1.000	6.724×10^{-2}	9.660×10^{-2}	7.392×10^{-2}	0.166	9.819×10^{-2}	1.459×10^{-2}	0.262	0.112
1.917×10^{-2}	6.724×10^{-2}	1.000	−0.105	8.687×10^{-2}	0.228	−0.107	0.202	-9.889×10^{-2}	−0.115
-5.300×10^{-2}	9.660×10^{-2}	−0.105	1.000	-4.152×10^{-2}	0.259	1.000	-2.991×10^{-2}	0.303	0.982
1.328×10^{-2}	7.392×10^{-2}	8.687×10^{-2}	-4.152×10^{-2}	1.000	6.782×10^{-2}	-4.063×10^{-2}	0.921	7.745×10^{-2}	-4.704×10^{-2}
-2.586×10^{-2}	0.166	0.228	0.259	6.782×10^{-2}	1.000	0.255	0.125	0.357	0.259
-5.355×10^{-2}	9.819×10^{-2}	−0.107	1.000	-4.063×10^{-2}	0.255	1.000	-3.023×10^{-2}	0.303	0.982
8.474×10^{-2}	1.459×10^{-2}	0.202	-2.991×10^{-2}	0.921	0.125	-3.023×10^{-2}	1.000	-6.234×10^{-2}	-4.039×10^{-2}
-1.623×10^{-2}	0.262	-9.889×10^{-2}	0.303	7.745×10^{-2}	0.357	0.303	-6.234×10^{-2}	1.000	0.327
-5.903×10^{-2}	0.112	−0.115	0.982	-4.704×10^{-2}	0.259	0.982	-4.039×10^{-2}	0.327	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	-8.87	18.5	-0.355	673	-17.6	-0.359	3.692×10^{3}	-6.762×10^{-2}	-0.400
-8.87	452	70.2	0.702	4.064×10^{3}	122	0.715	689	1.18	0.822
18.5	70.2	2.413×10^{3}	-1.76	1.104×10^{4}	387	-1.81	2.203×10^{4}	-1.03	-1.96
-0.355	0.702	-1.76	0.117	-36.7	3.07	0.117	-22.7	2.203×10^{-2}	0.116
673	4.064×10^{3}	1.104×10^{4}	-36.7	6.688×10^{6}	6.074×10^{3}	-36.0	5.291×10^{6}	42.6	-42.1
-17.6	122	387	3.07	6.074×10^{3}	1.199×10^{3}	3.03	9.635×10^{3}	2.63	3.10
-0.359	0.715	-1.81	0.117	-36.0	3.03	0.117	-23.0	2.208×10^{-2}	0.116
3.692×10^{3}	689	2.203×10^{4}	-22.7	5.291×10^{6}	9.635×10^{3}	-23.0	4.939×10^{6}	-29.4	-31.0
-6.762×10^{-2}	1.18	-1.03	2.203×10^{-2}	42.6	2.63	2.208×10^{-2}	-29.4	4.516×10^{-2}	2.402×10^{-2}
-0.400	0.822	-1.96	0.116	-42.1	3.10	0.116	-31.0	2.402×10^{-2}	0.120

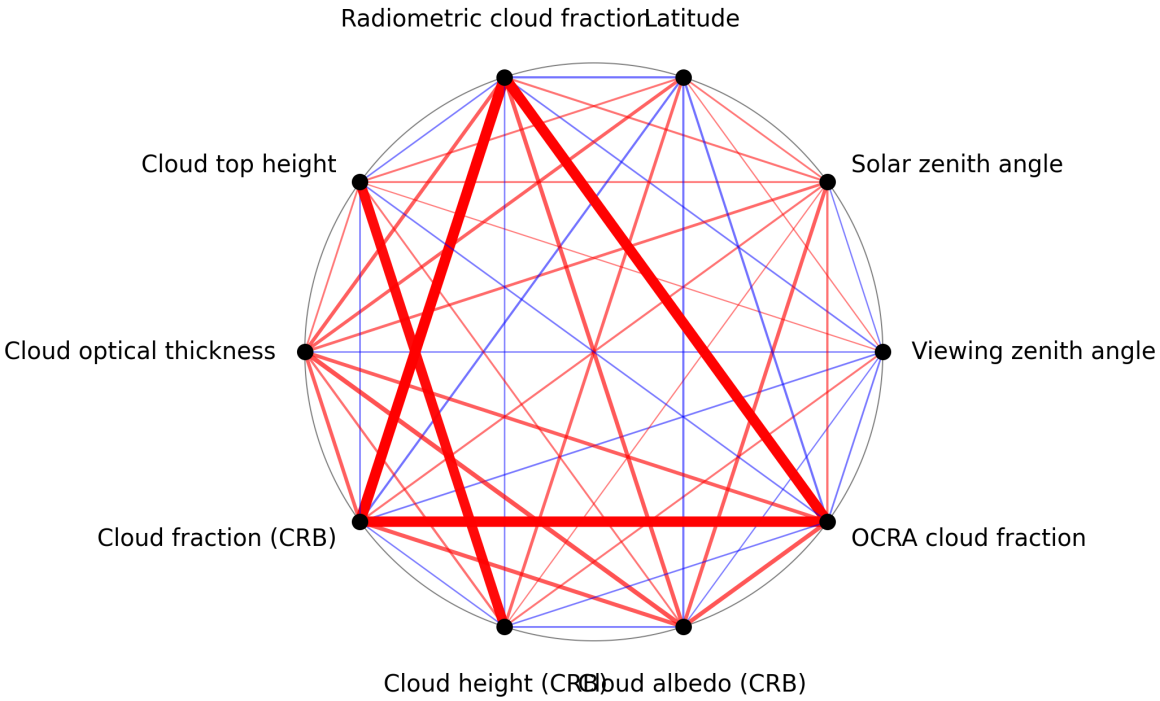


Figure 1: Map of correlation graph for 2025-01-20 to 2025-01-22.

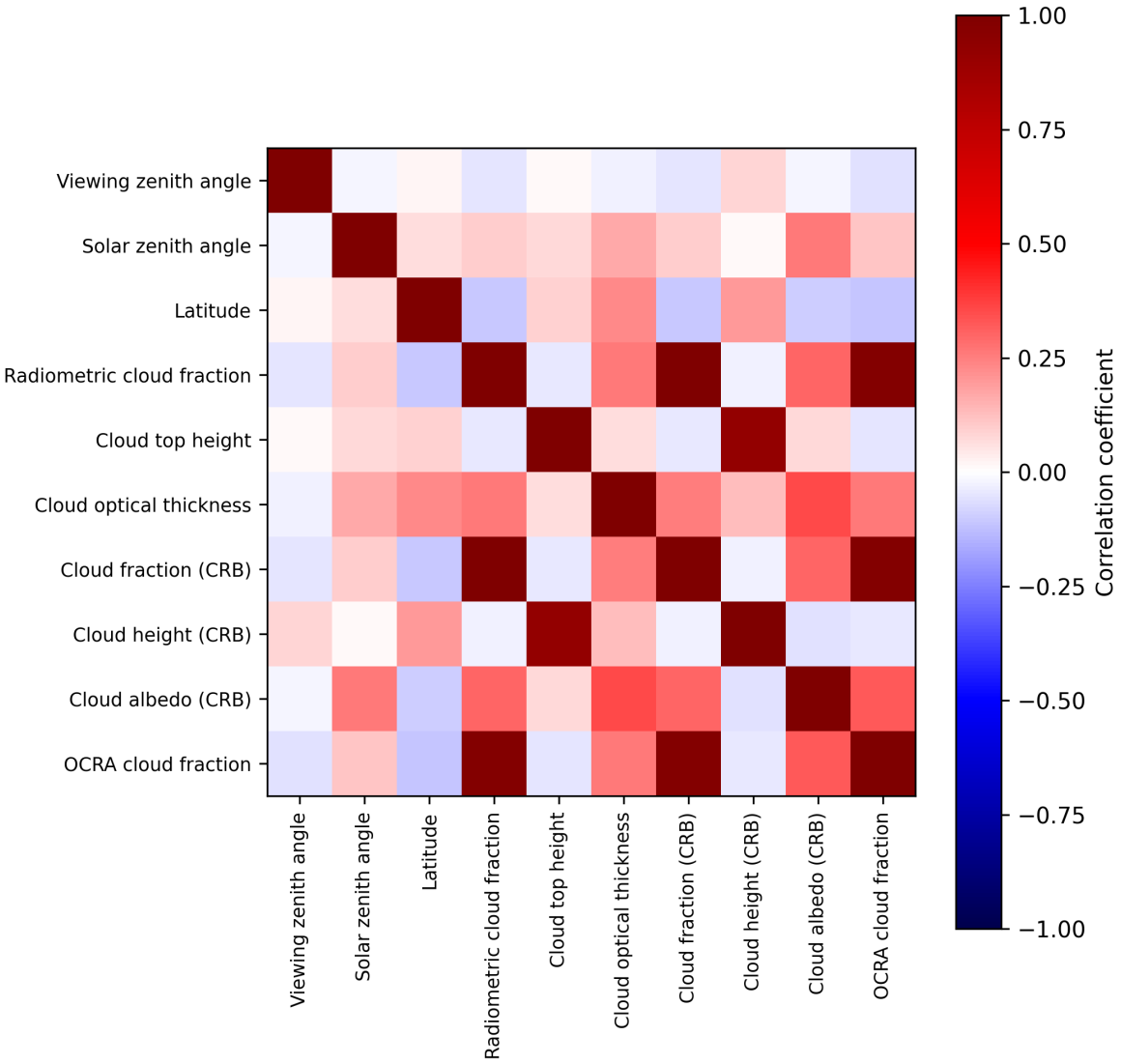


Figure 2: Map of correlation matrix for 2025-01-20 to 2025-01-22.

3 Granule outlines

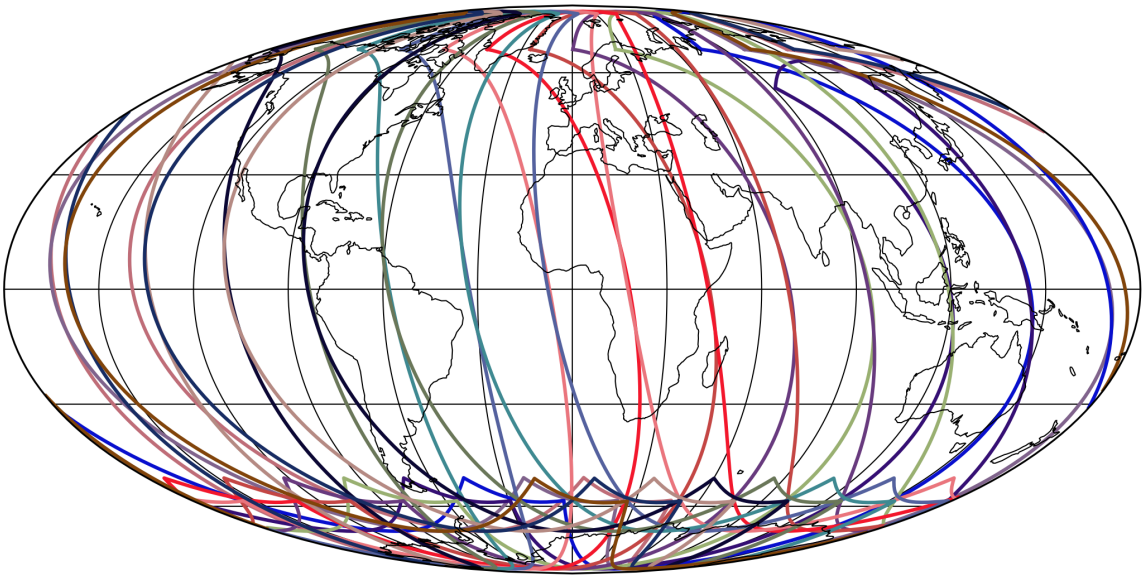


Figure 3: Outline of the granules.

4 Input data monitoring

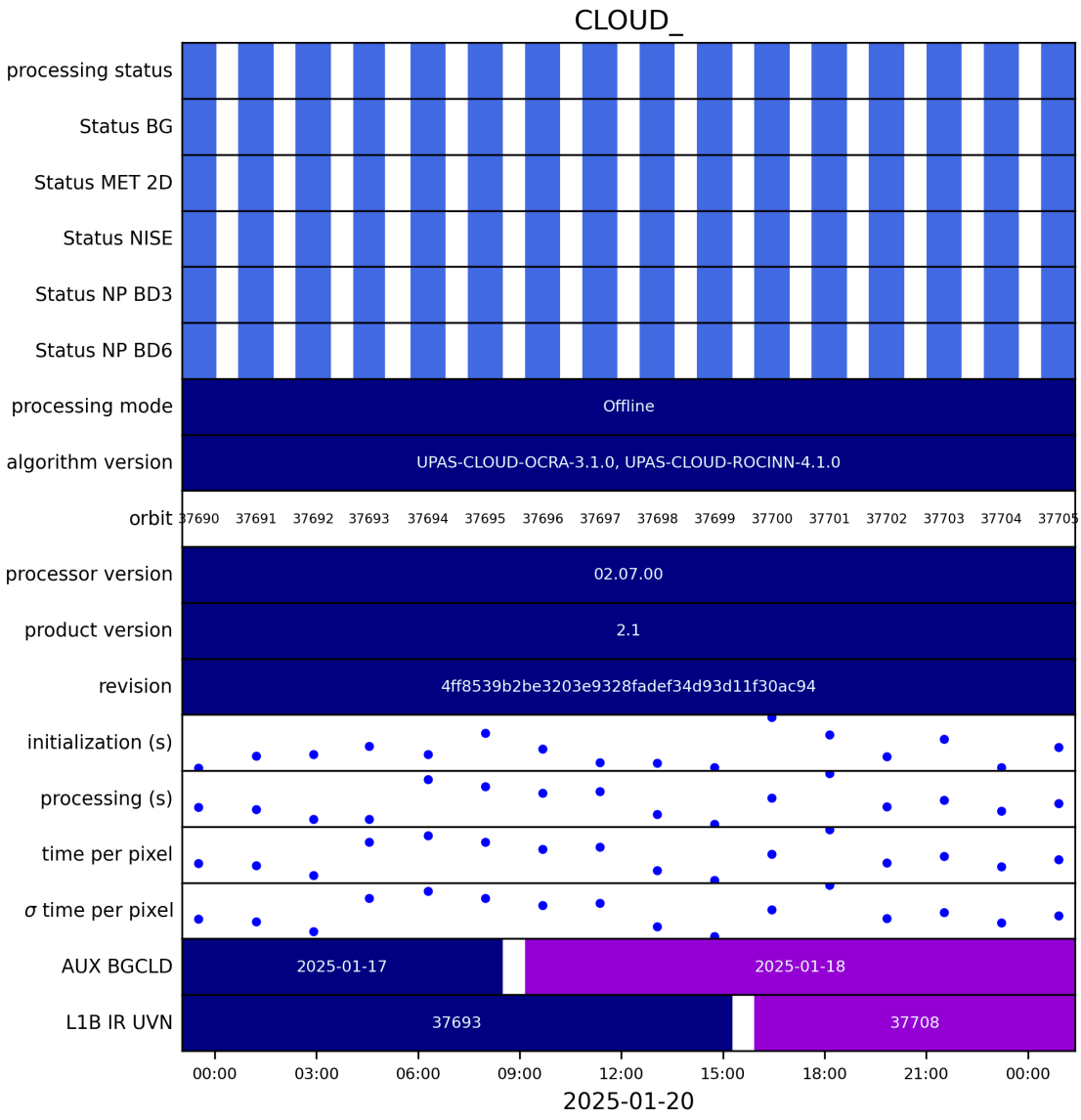


Figure 4: Input data per granule

5 Warnings and errors

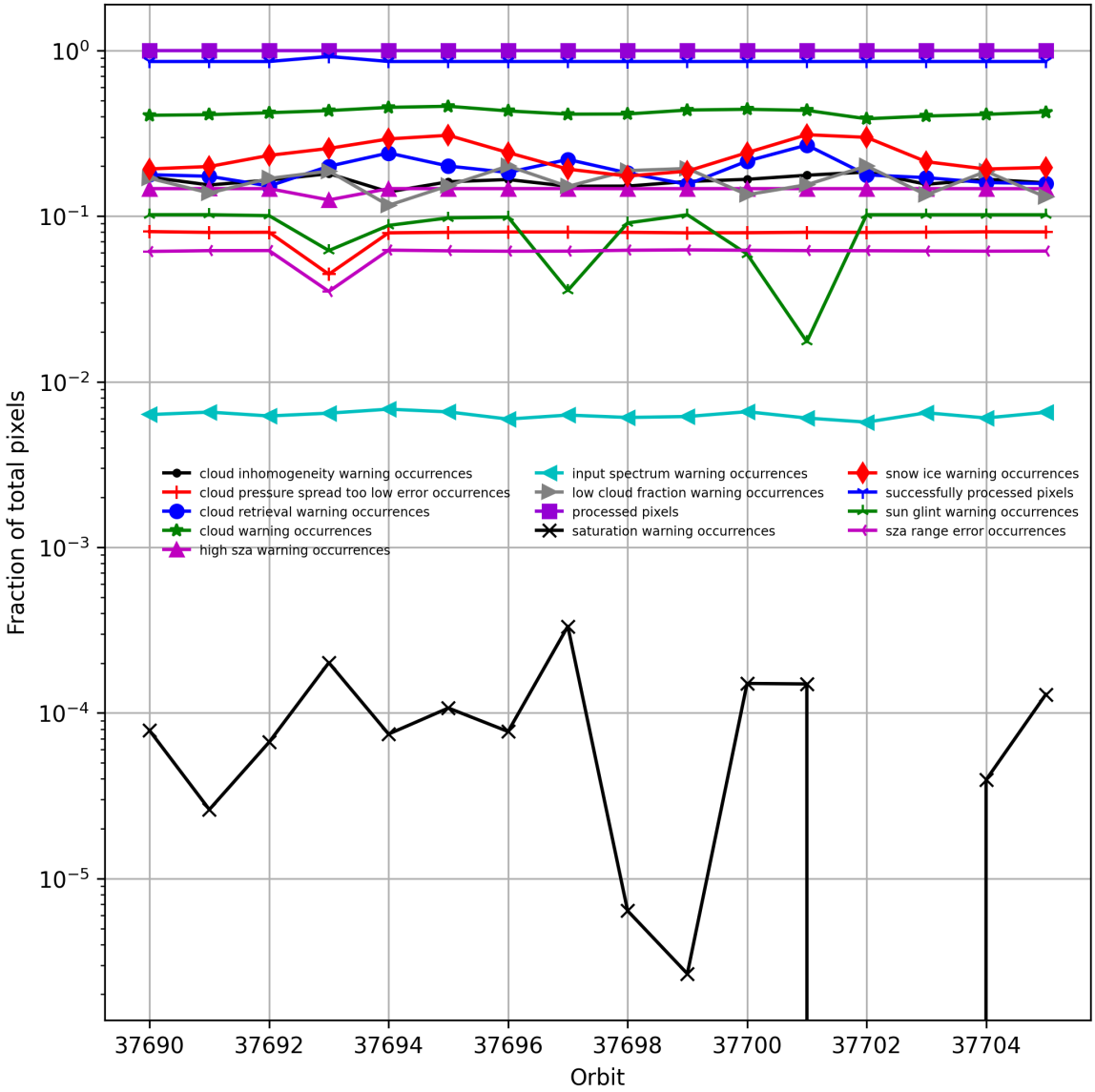


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

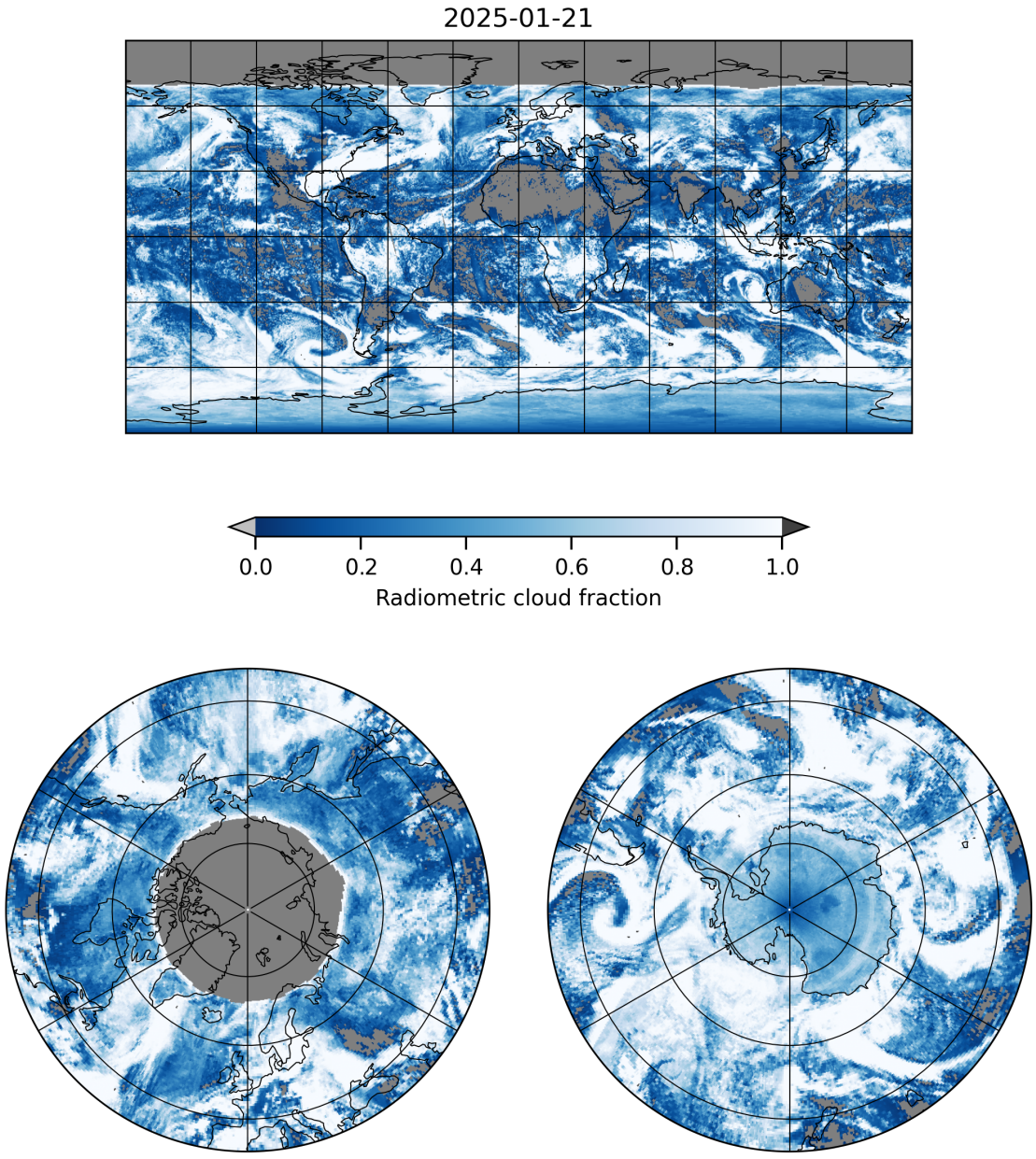


Figure 6: Map of “Radiometric cloud fraction” for 2025-01-20 to 2025-01-22

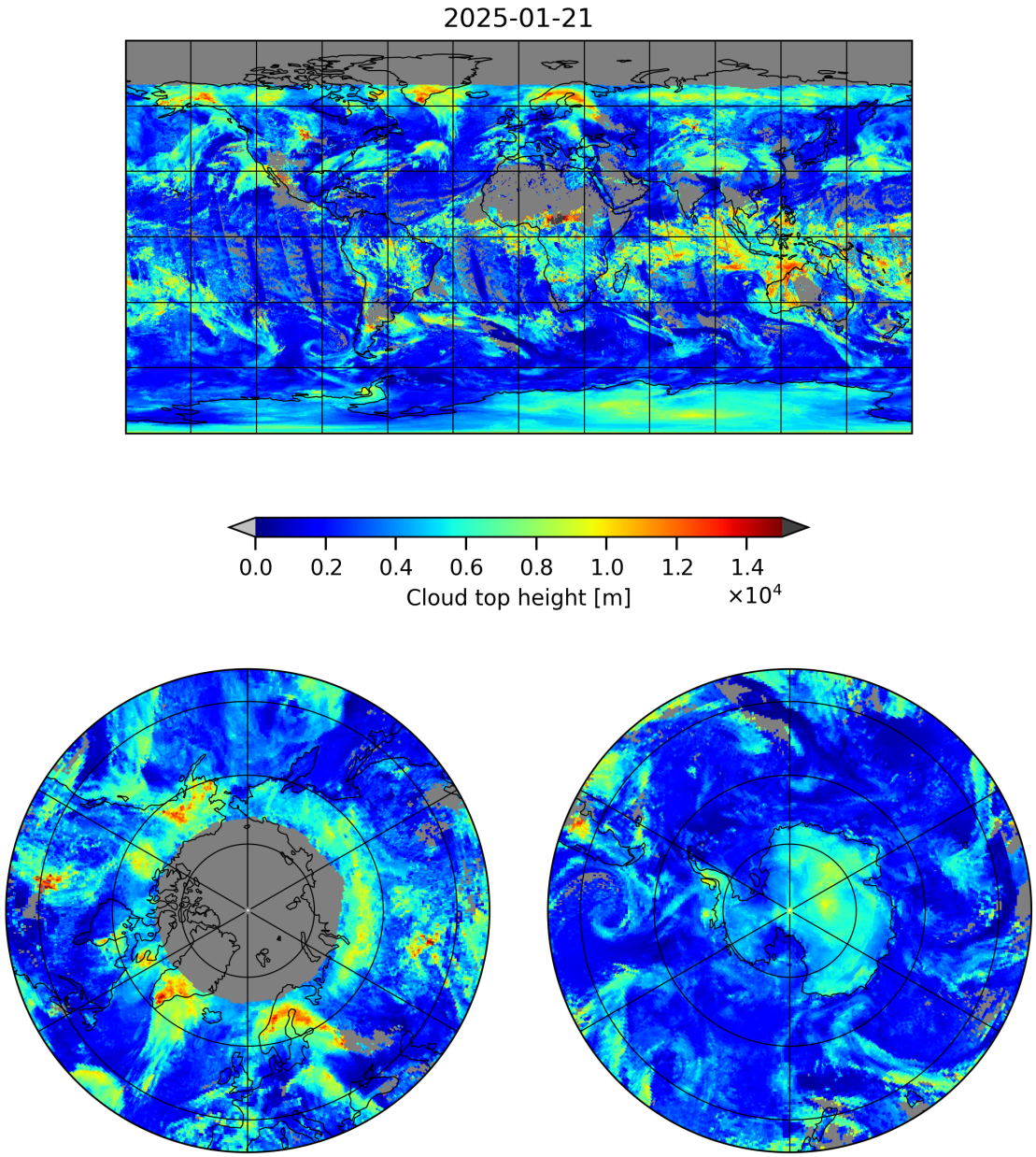


Figure 7: Map of “Cloud top height” for 2025-01-20 to 2025-01-22

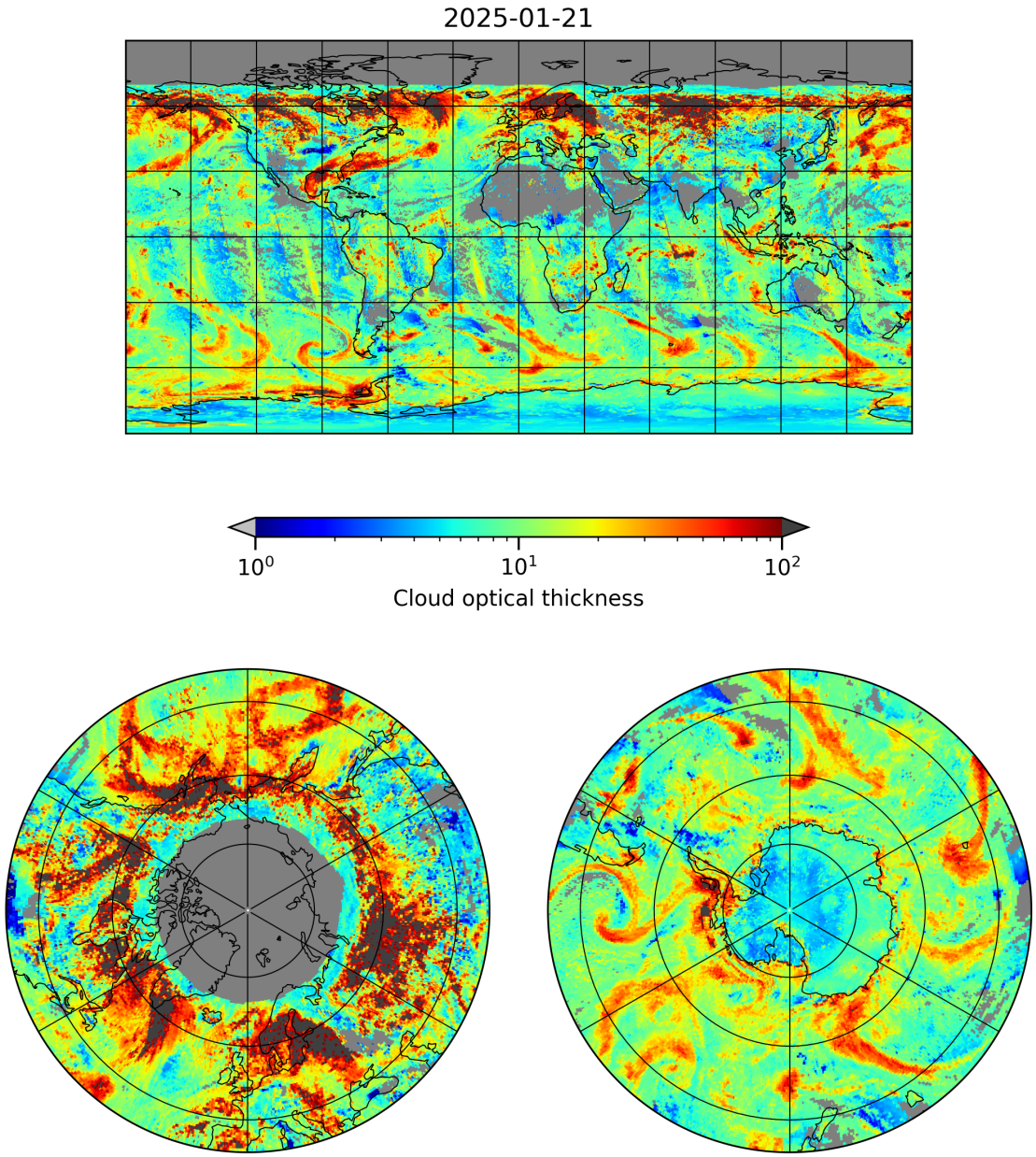


Figure 8: Map of “Cloud optical thickness” for 2025-01-20 to 2025-01-22

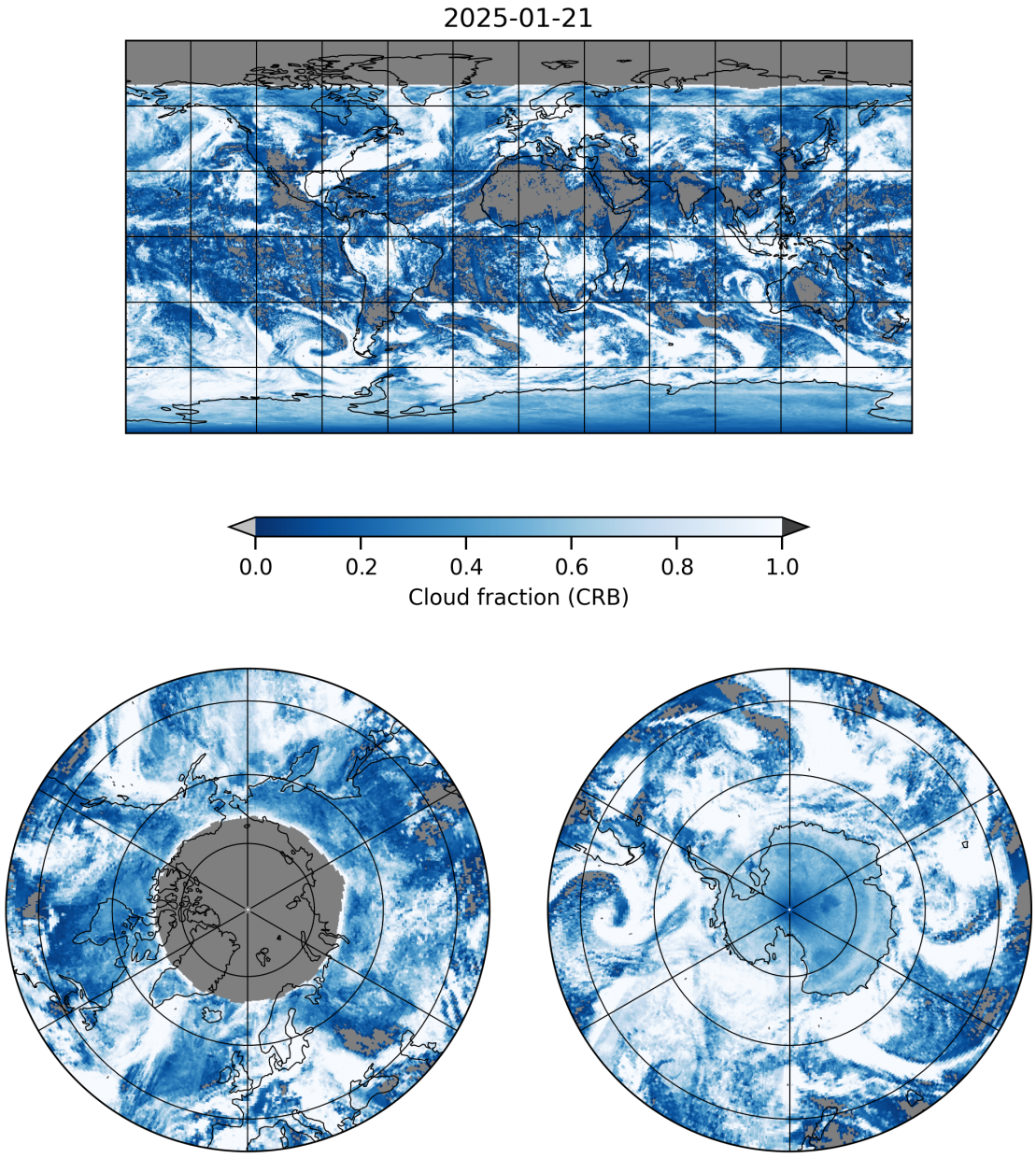


Figure 9: Map of “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22

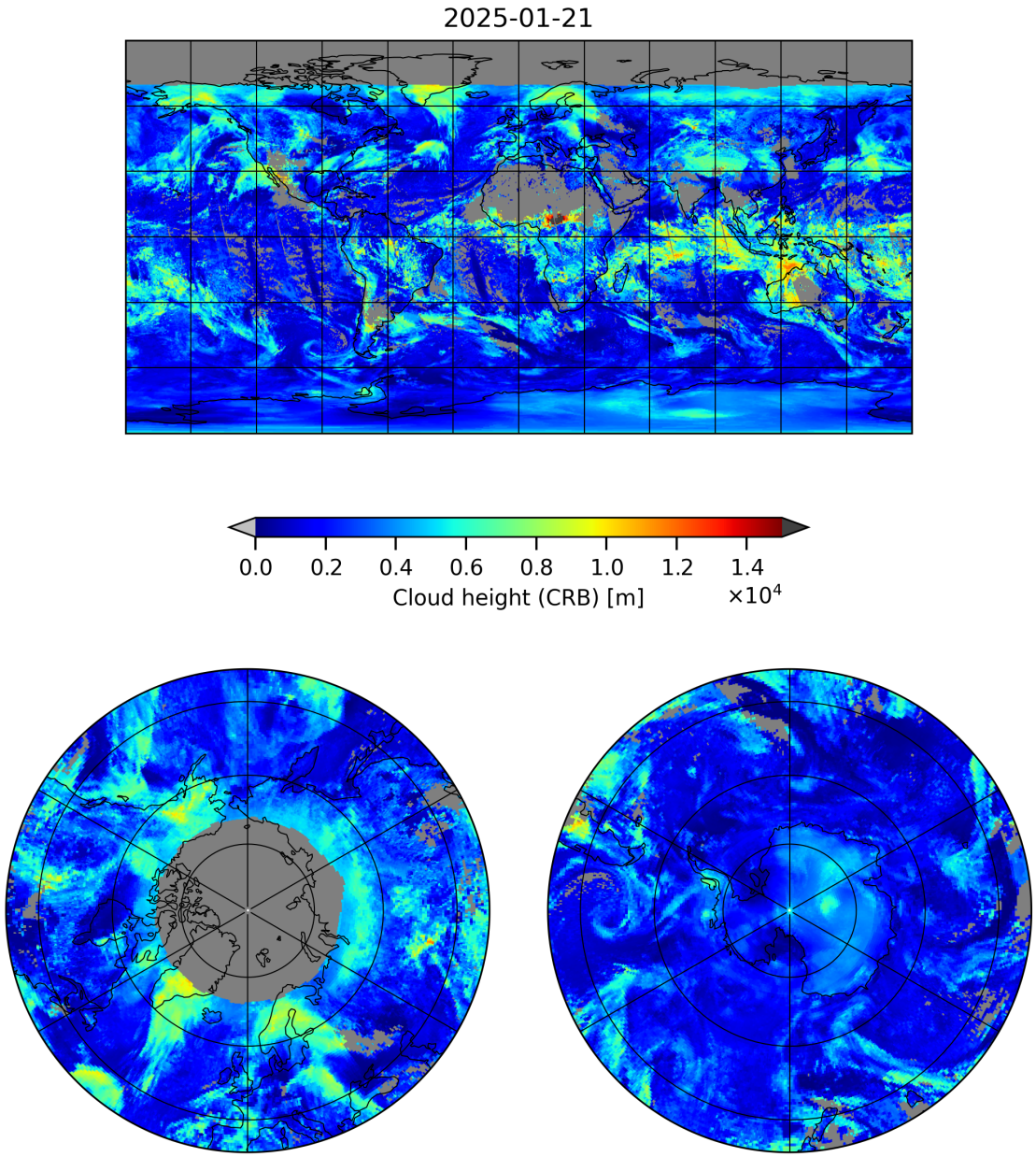


Figure 10: Map of “Cloud height (CRB)” for 2025-01-20 to 2025-01-22

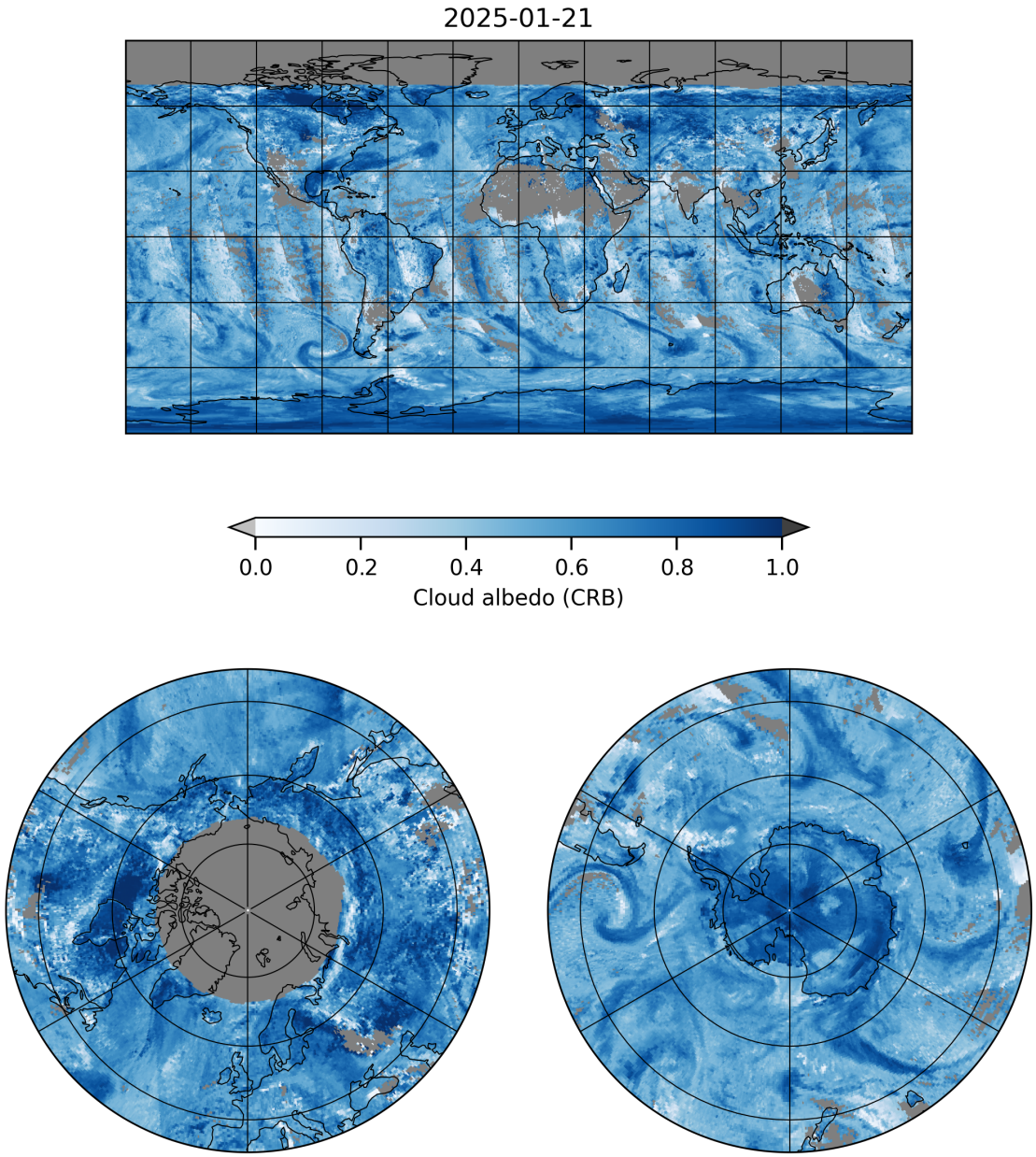


Figure 11: Map of “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22

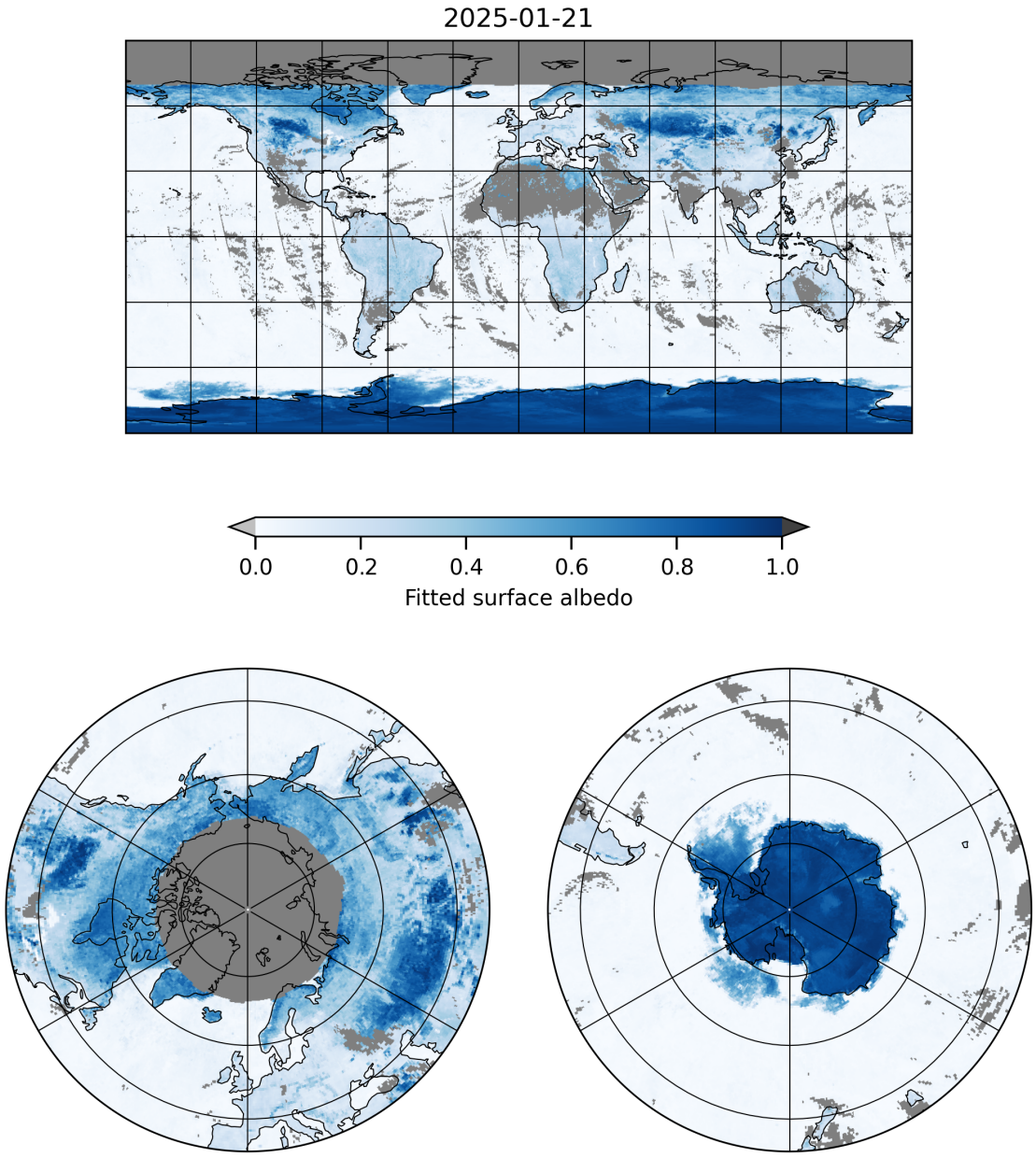


Figure 12: Map of “Fitted surface albedo” for 2025-01-20 to 2025-01-22

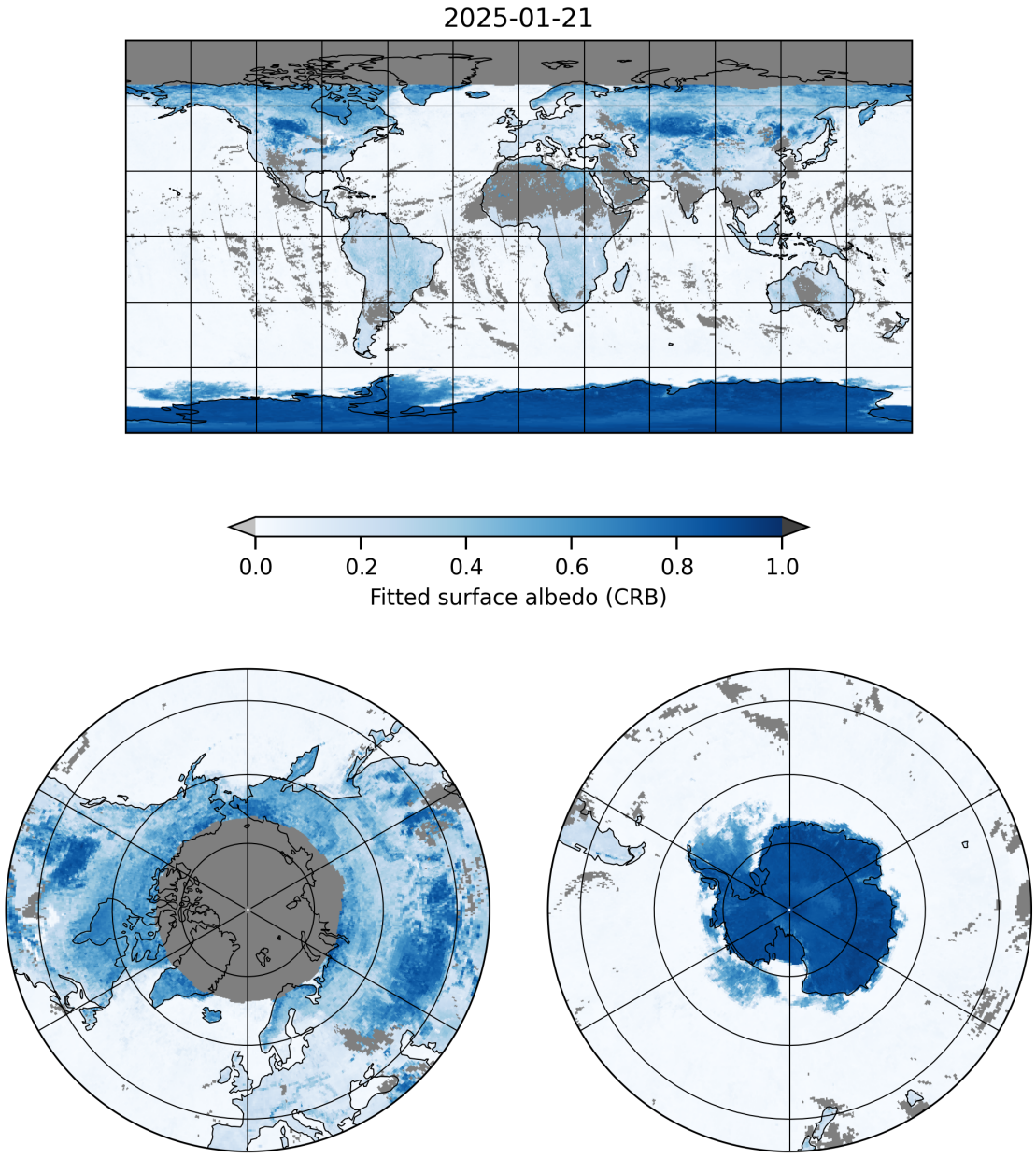


Figure 13: Map of “Fitted surface albedo (CRB)” for 2025-01-20 to 2025-01-22

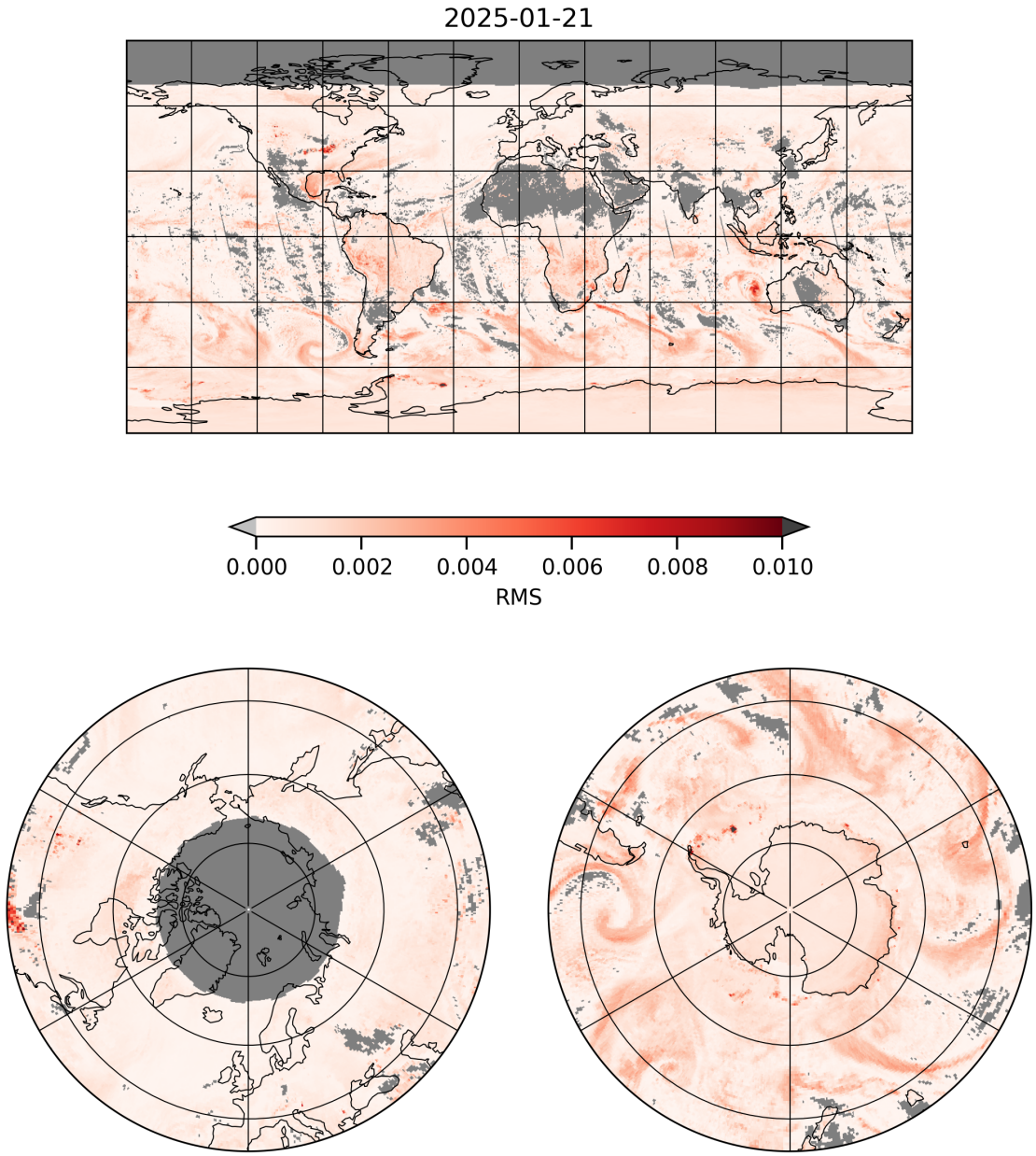


Figure 14: Map of “RMS” for 2025-01-20 to 2025-01-22

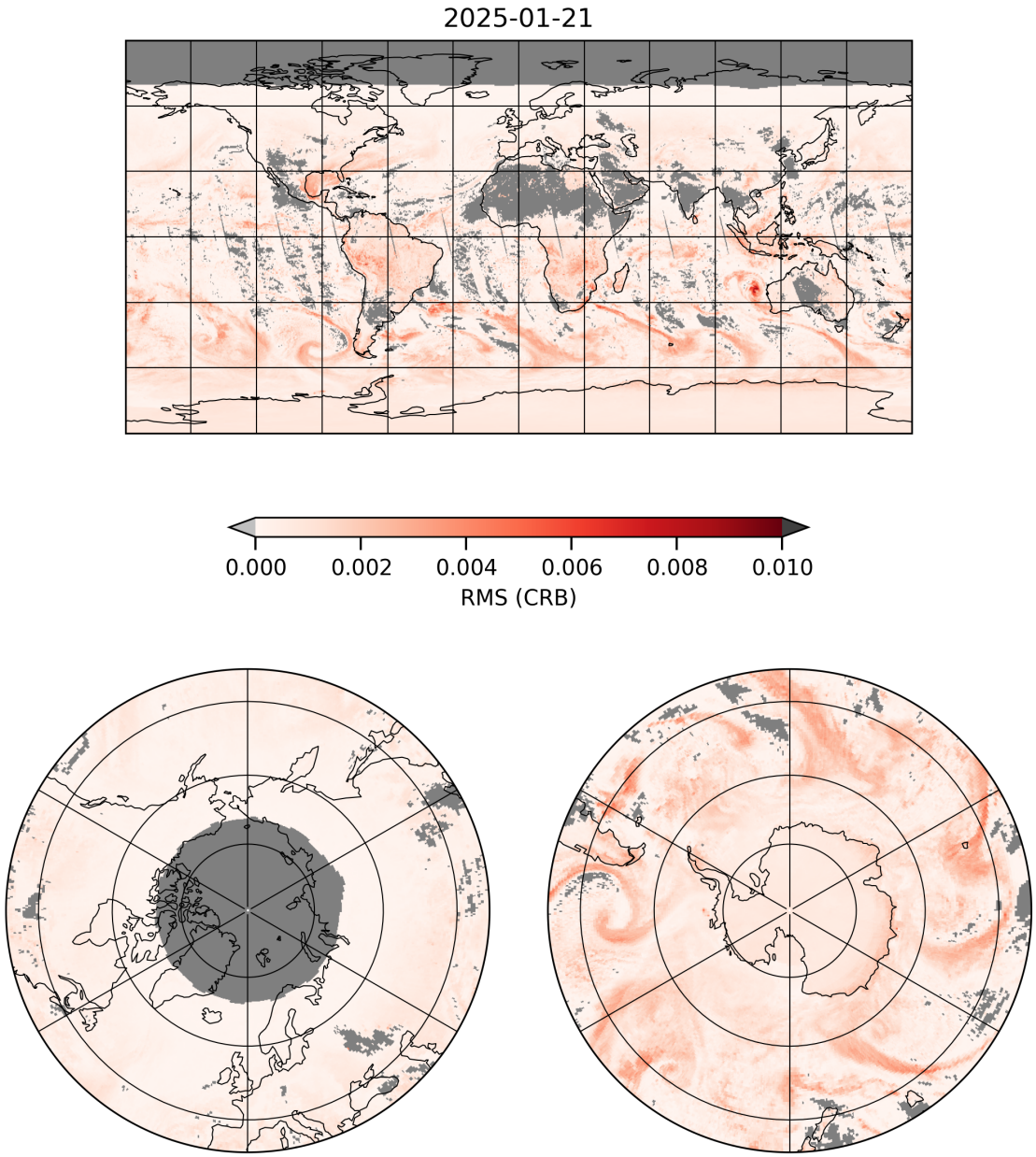


Figure 15: Map of “RMS (CRB)” for 2025-01-20 to 2025-01-22

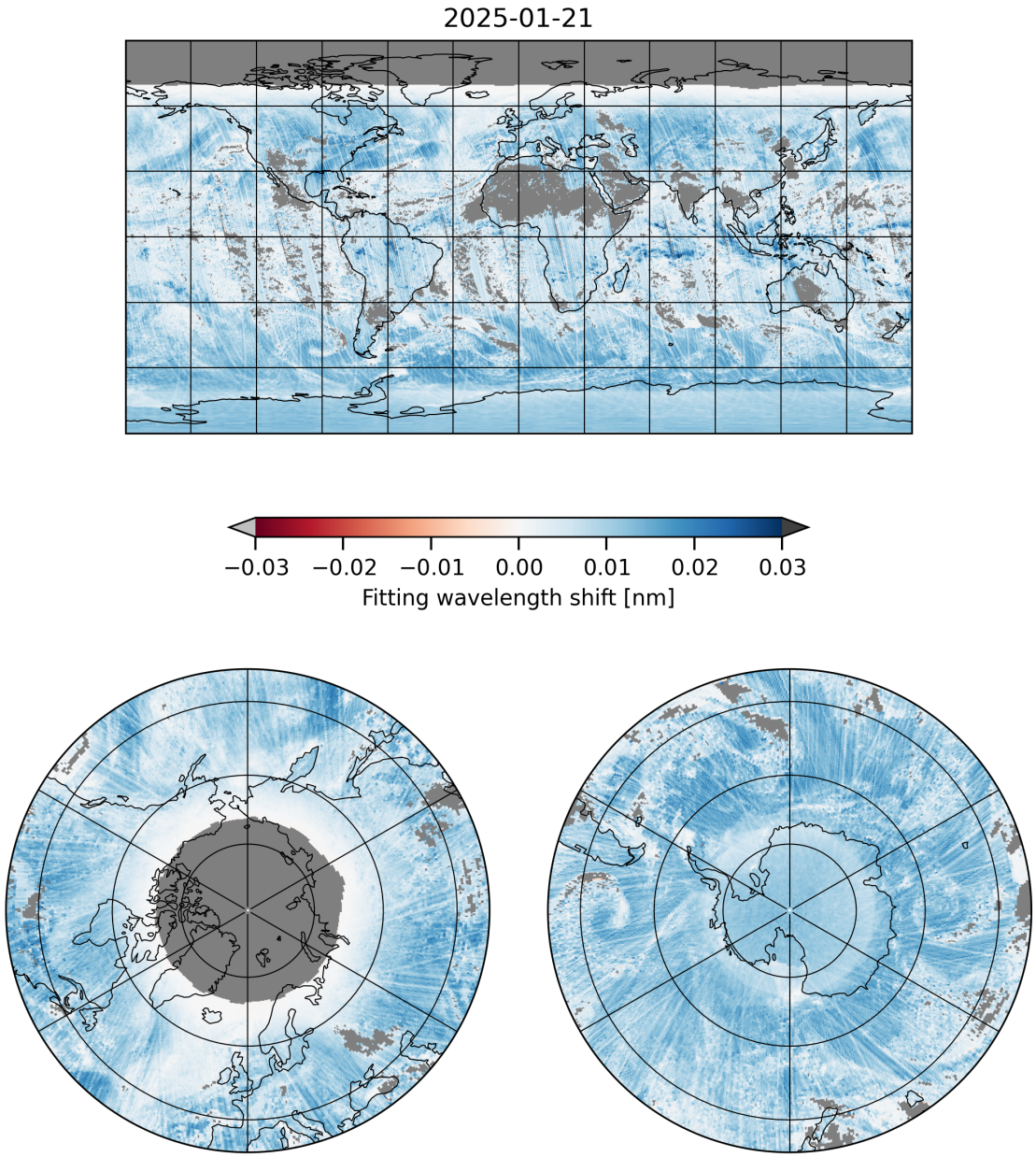


Figure 16: Map of “Fitting wavelength shift” for 2025-01-20 to 2025-01-22

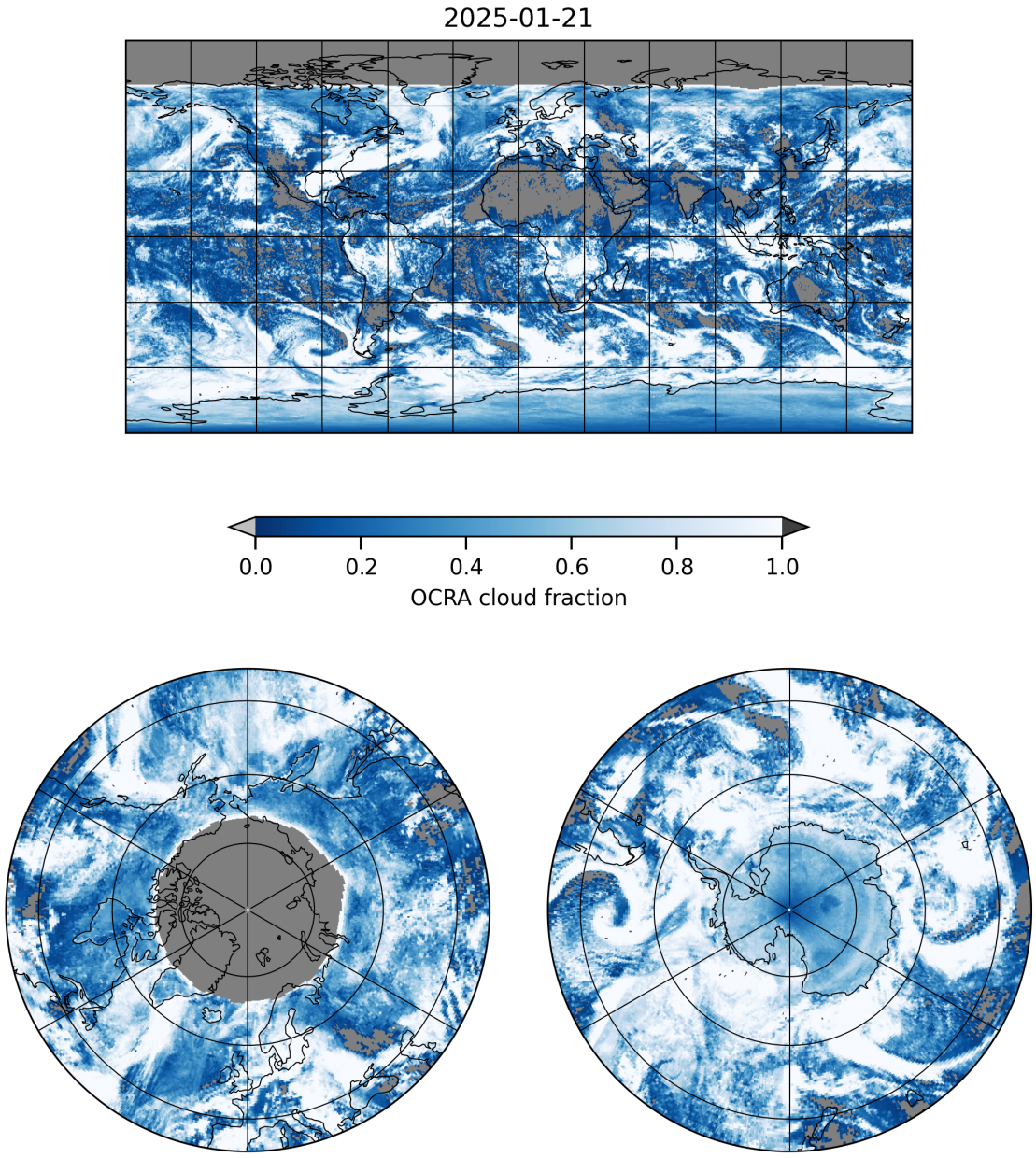


Figure 17: Map of “OCRA cloud fraction” for 2025-01-20 to 2025-01-22

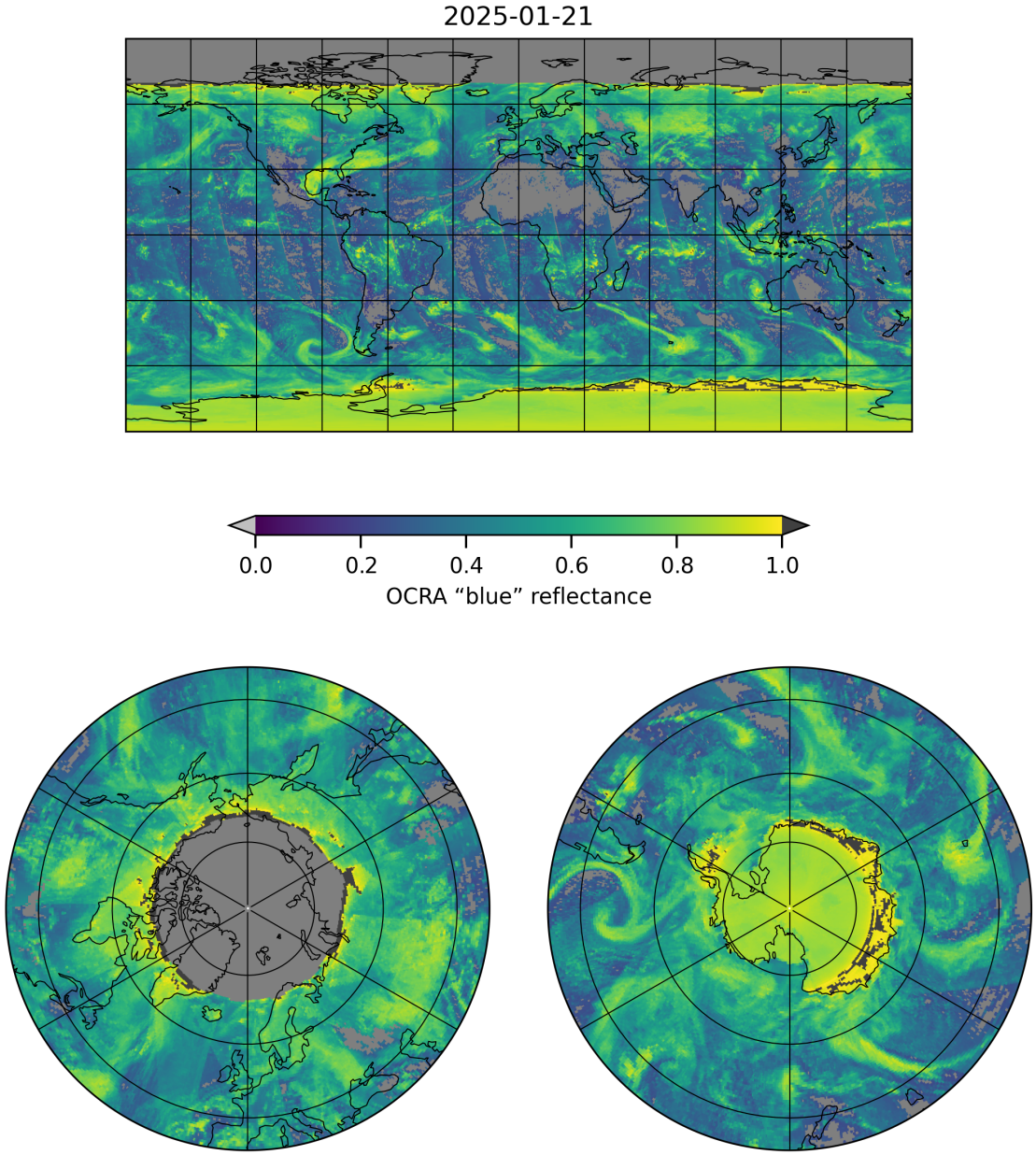


Figure 18: Map of “OCRA “blue” reflectance” for 2025-01-20 to 2025-01-22

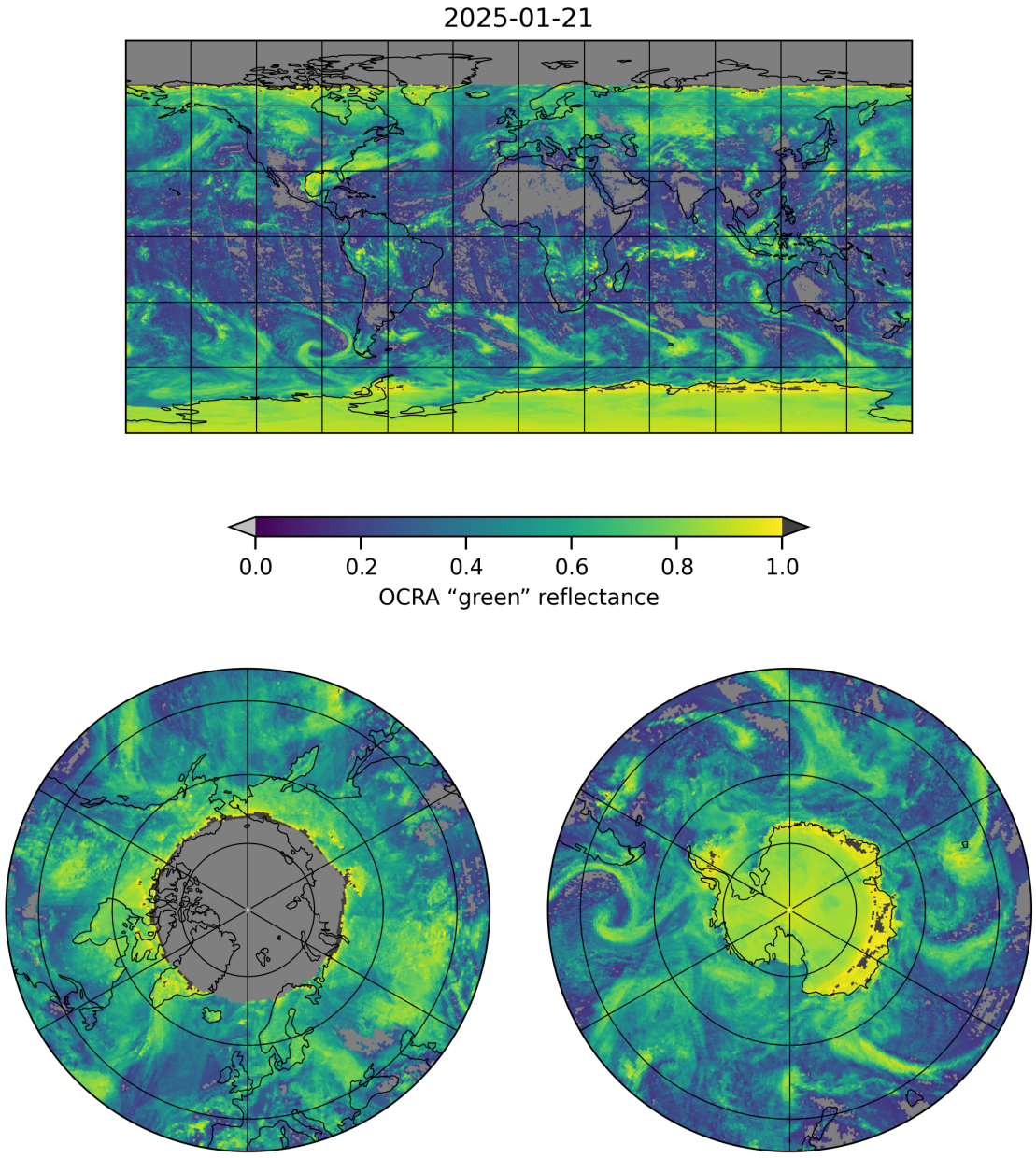


Figure 19: Map of “OCRA “green” reflectance” for 2025-01-20 to 2025-01-22

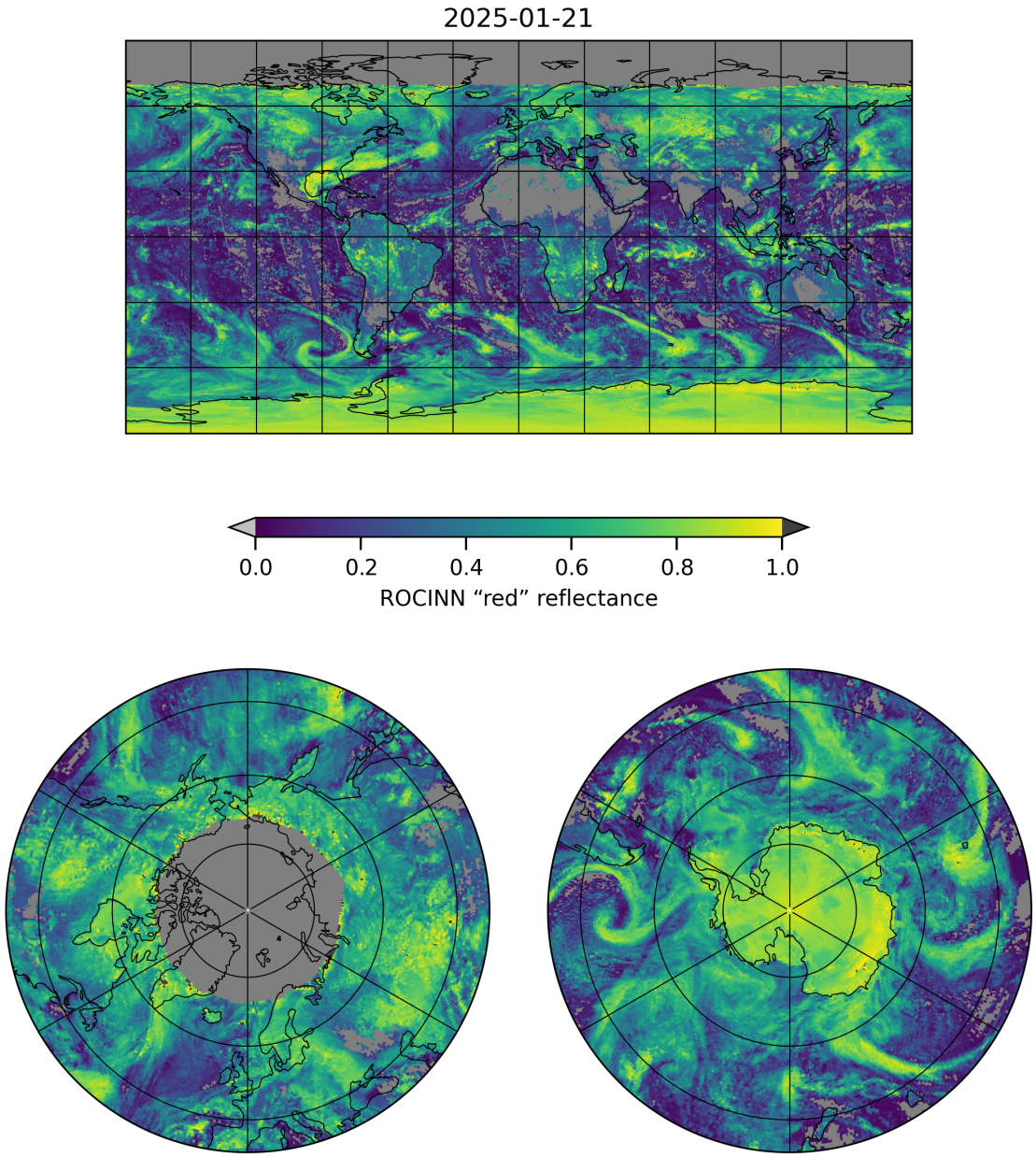


Figure 20: Map of “ROCINN “red” reflectance” for 2025-01-20 to 2025-01-22

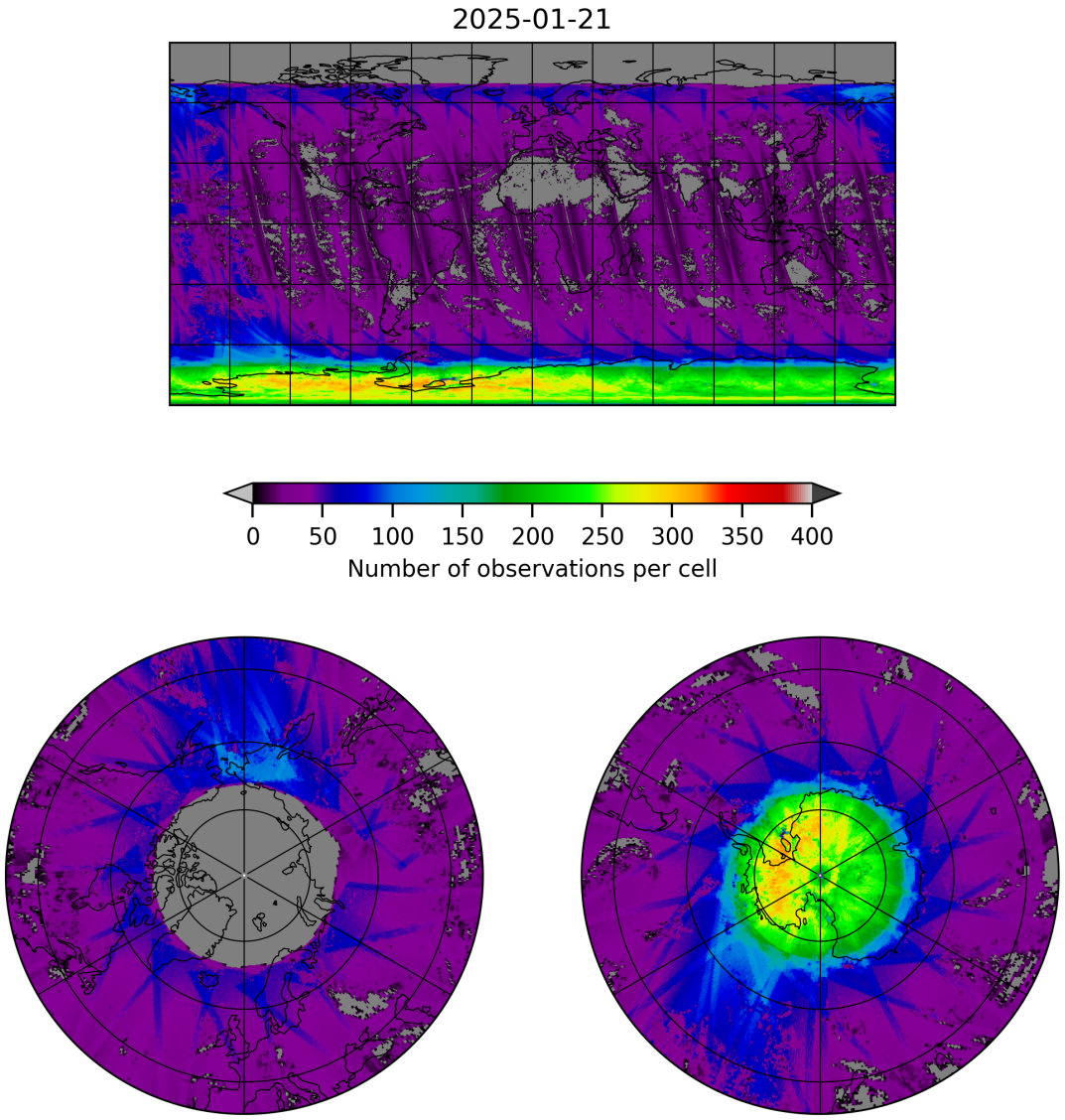


Figure 21: Map of the number of observations for 2025-01-20 to 2025-01-22

7 Zonal average

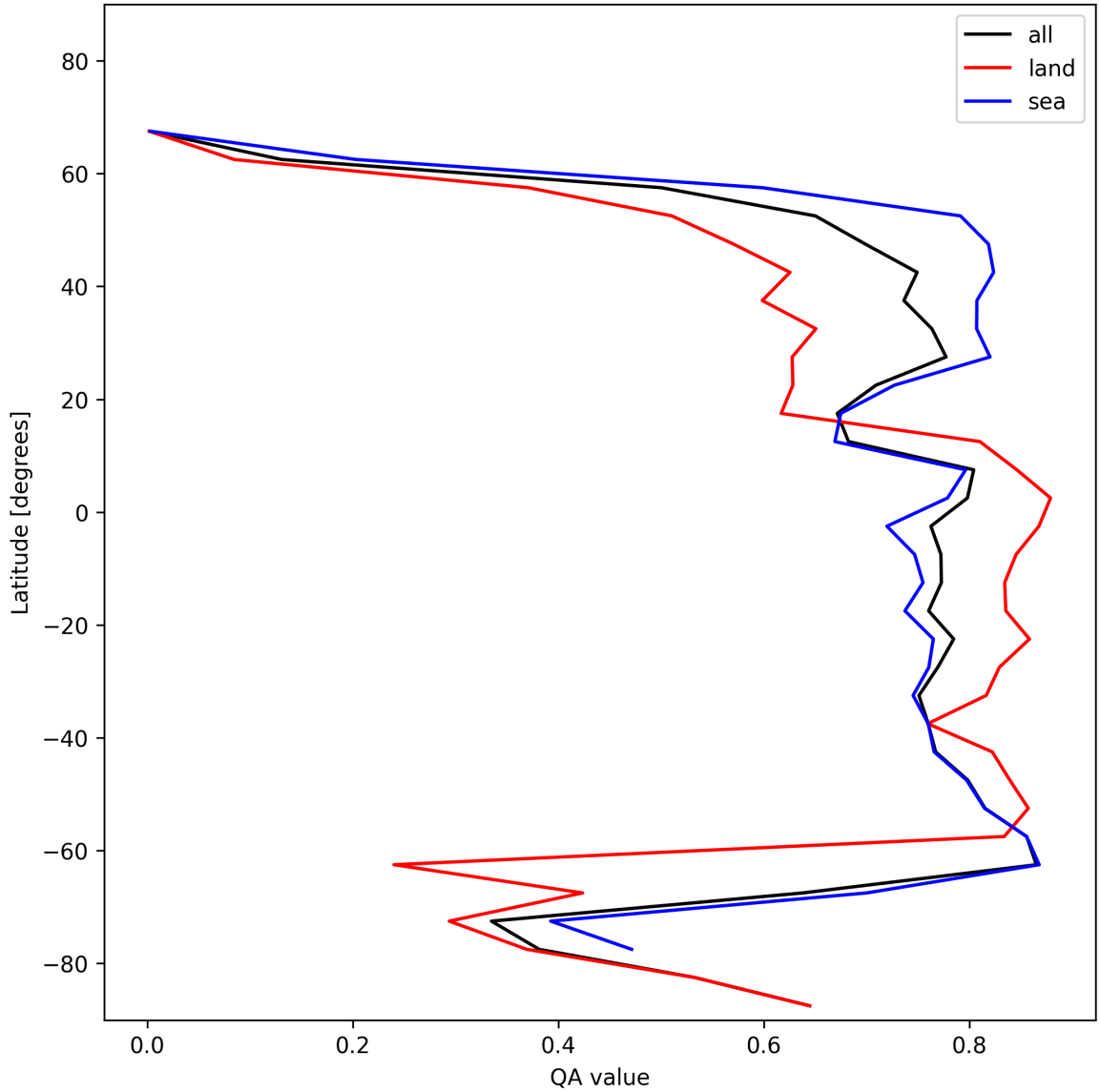


Figure 22: Zonal average of “QA value” for 2025-01-20 to 2025-01-22.

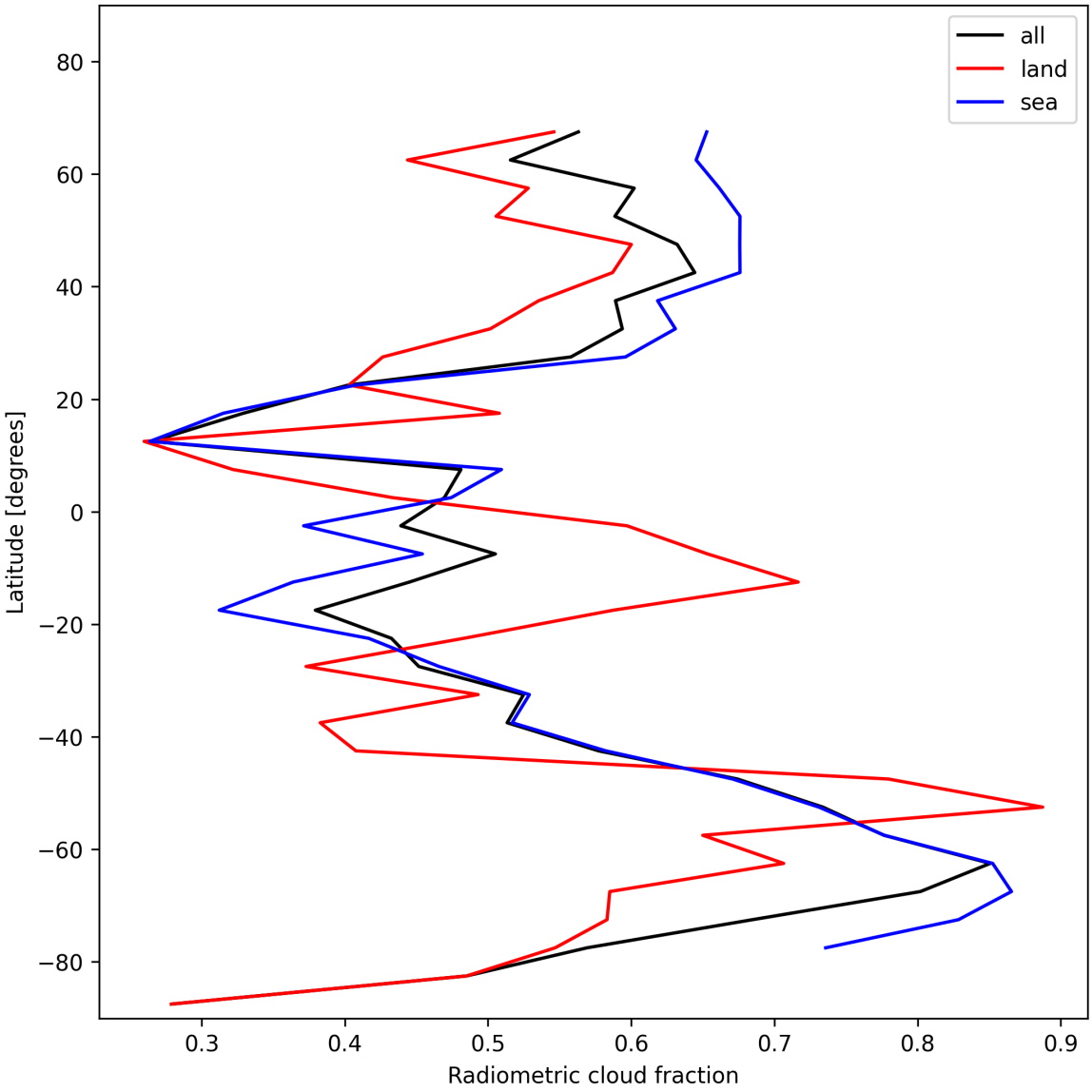


Figure 23: Zonal average of “Radiometric cloud fraction” for 2025-01-20 to 2025-01-22.

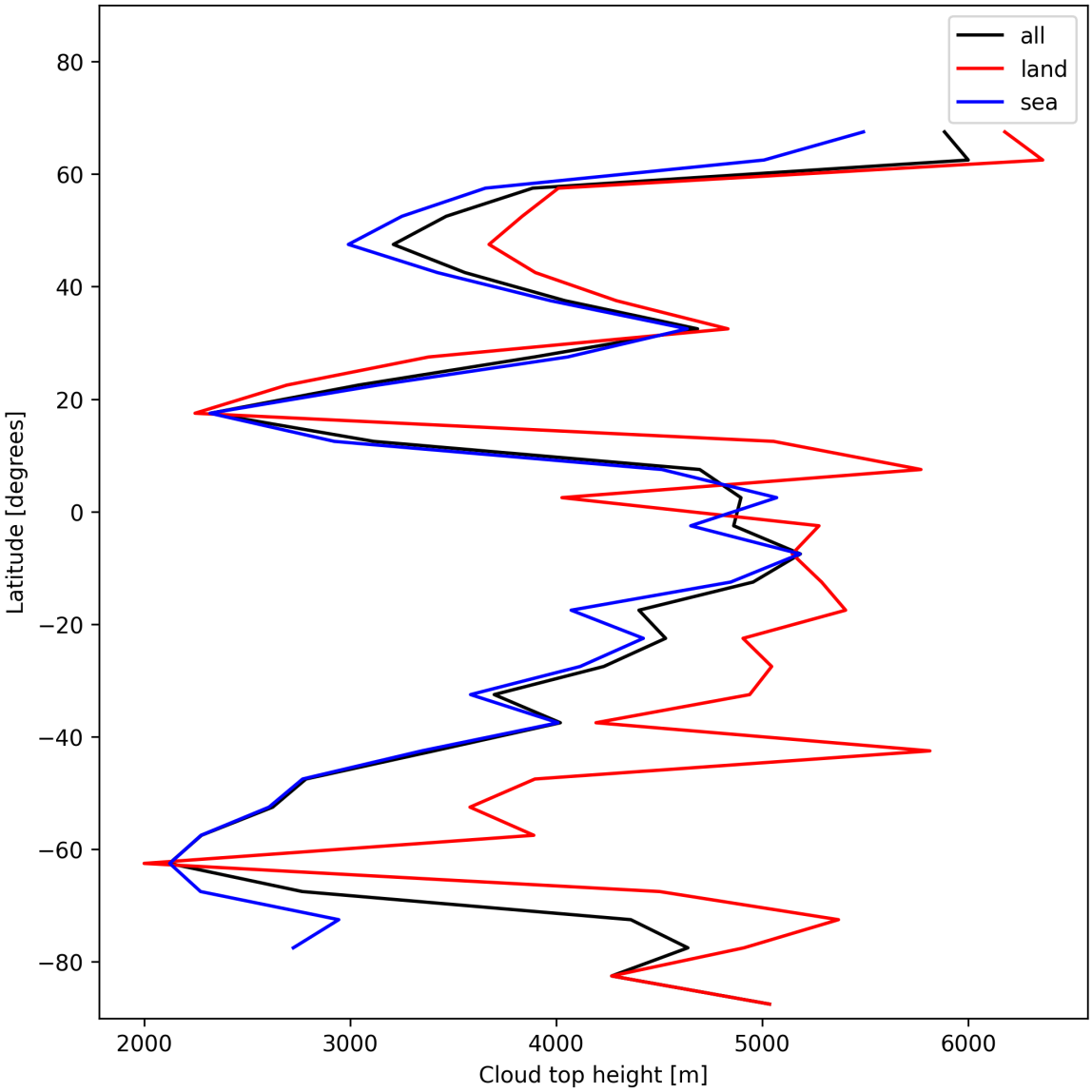


Figure 24: Zonal average of “Cloud top height” for 2025-01-20 to 2025-01-22.

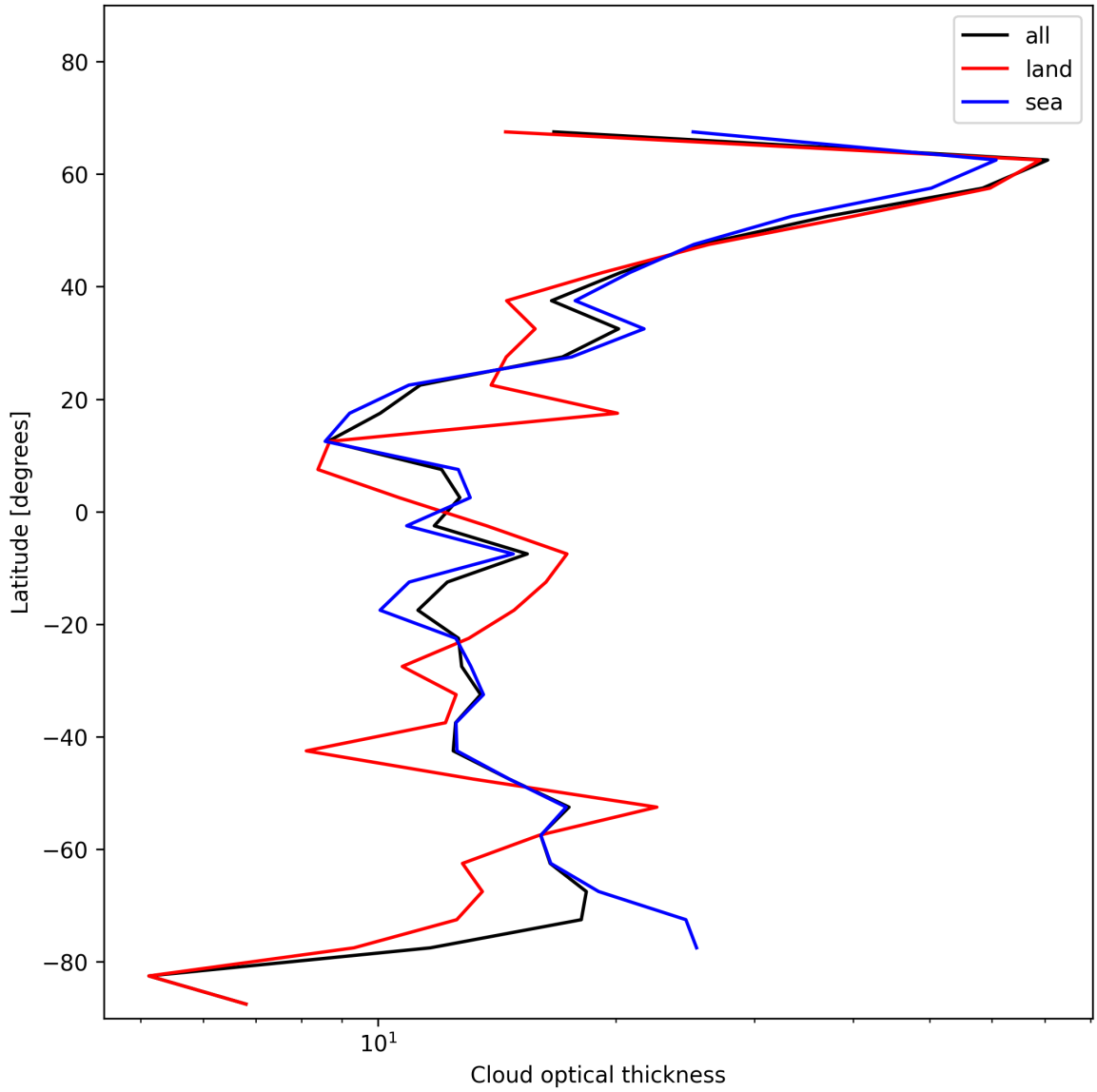


Figure 25: Zonal average of “Cloud optical thickness” for 2025-01-20 to 2025-01-22.

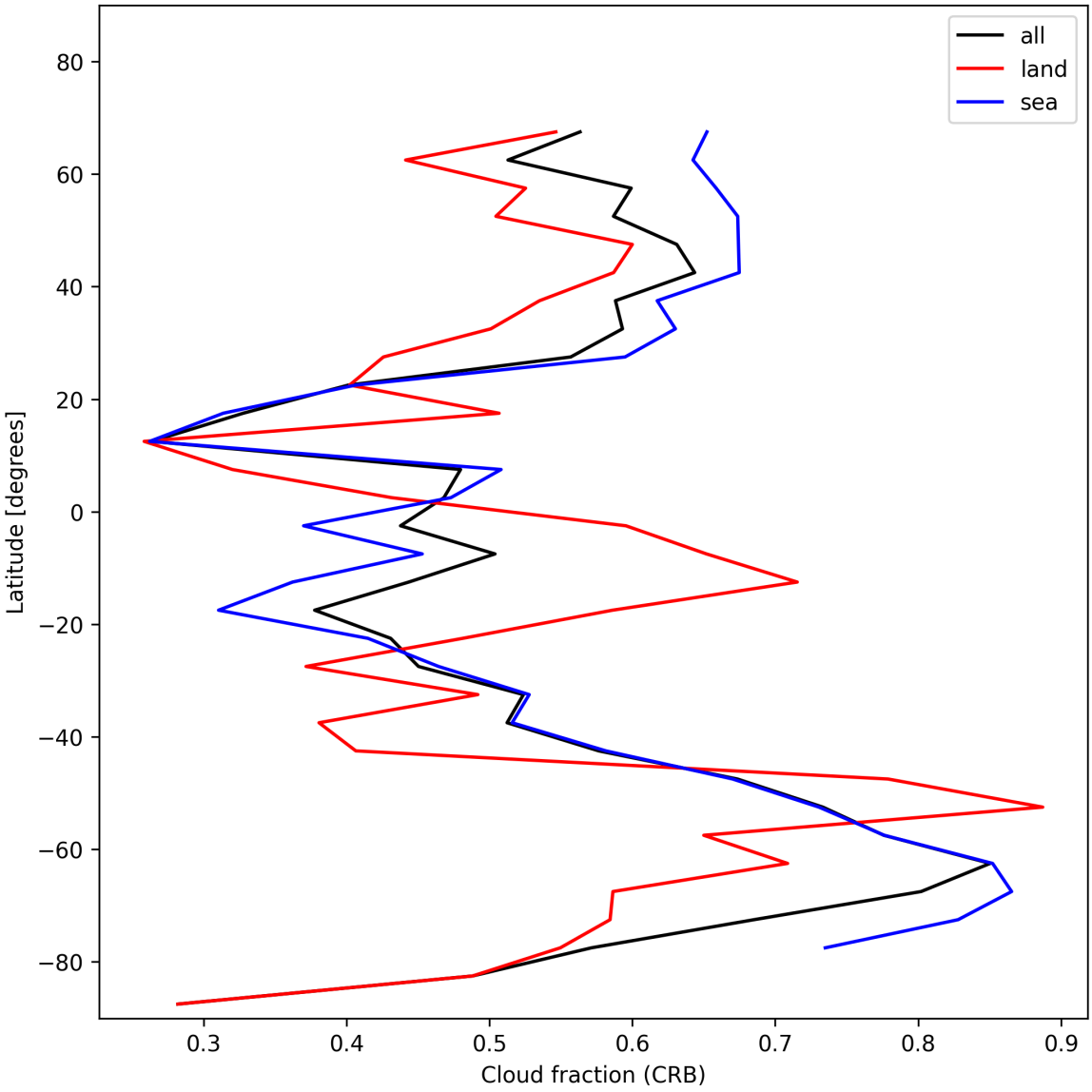


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22.

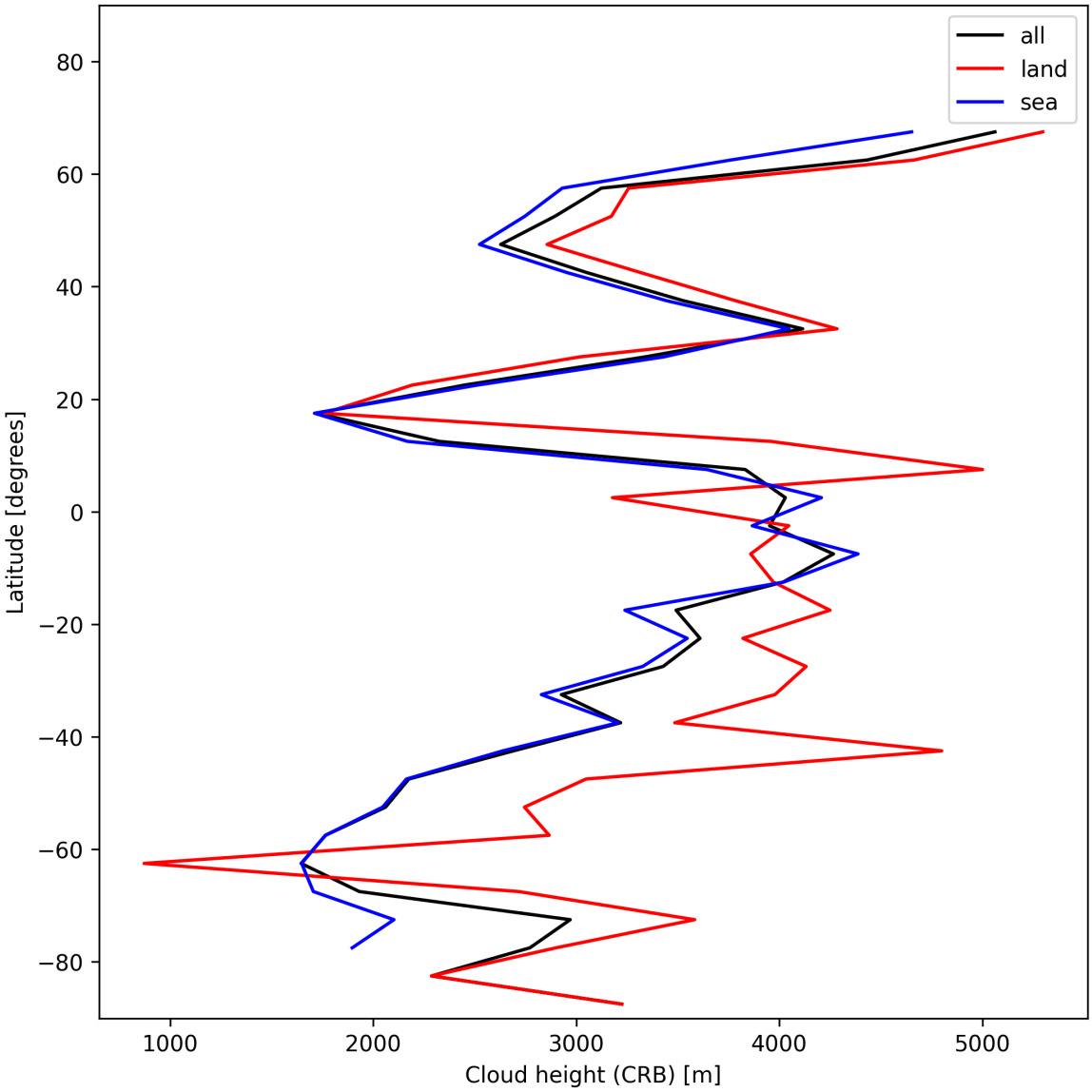


Figure 27: Zonal average of “Cloud height (CRB)” for 2025-01-20 to 2025-01-22.

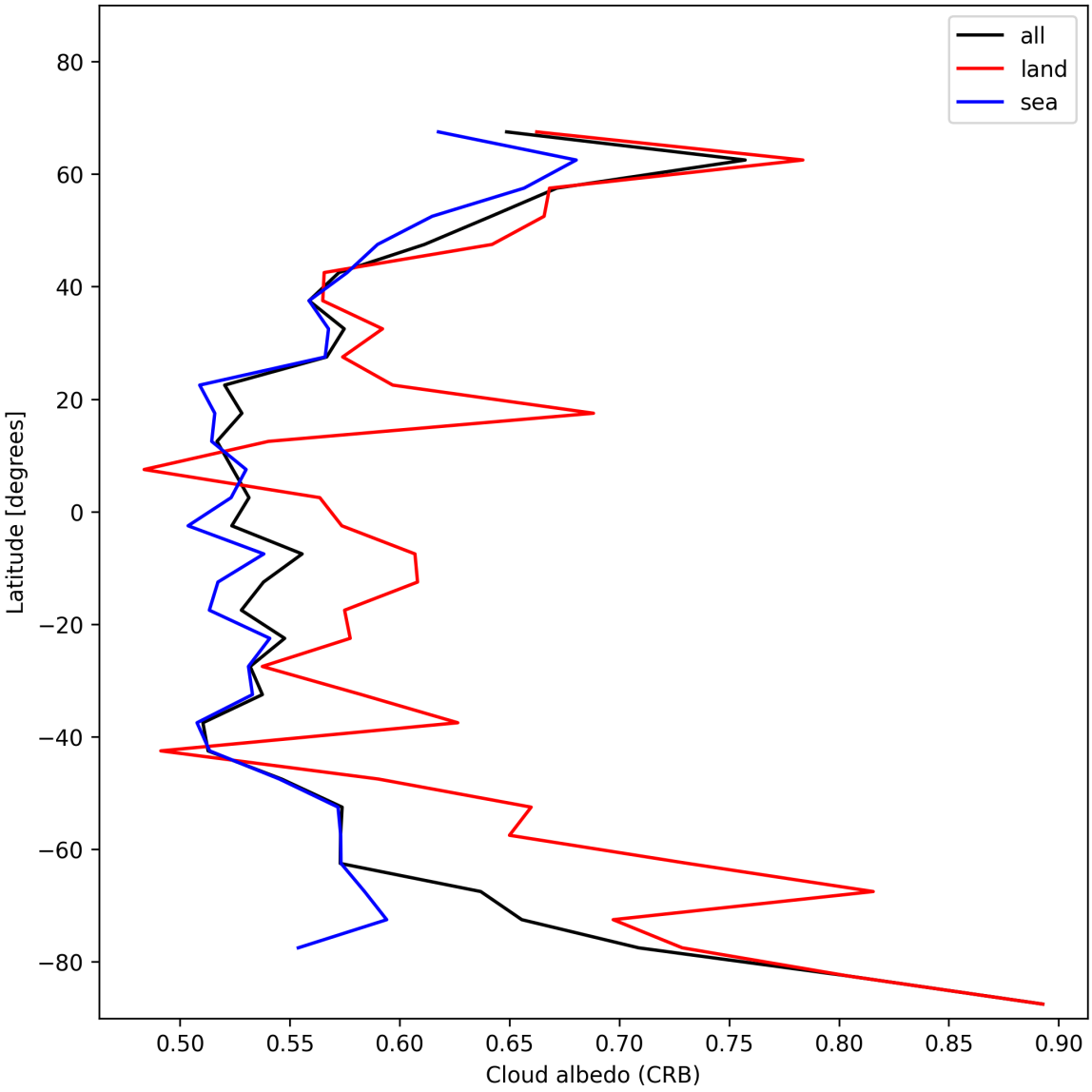


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22.

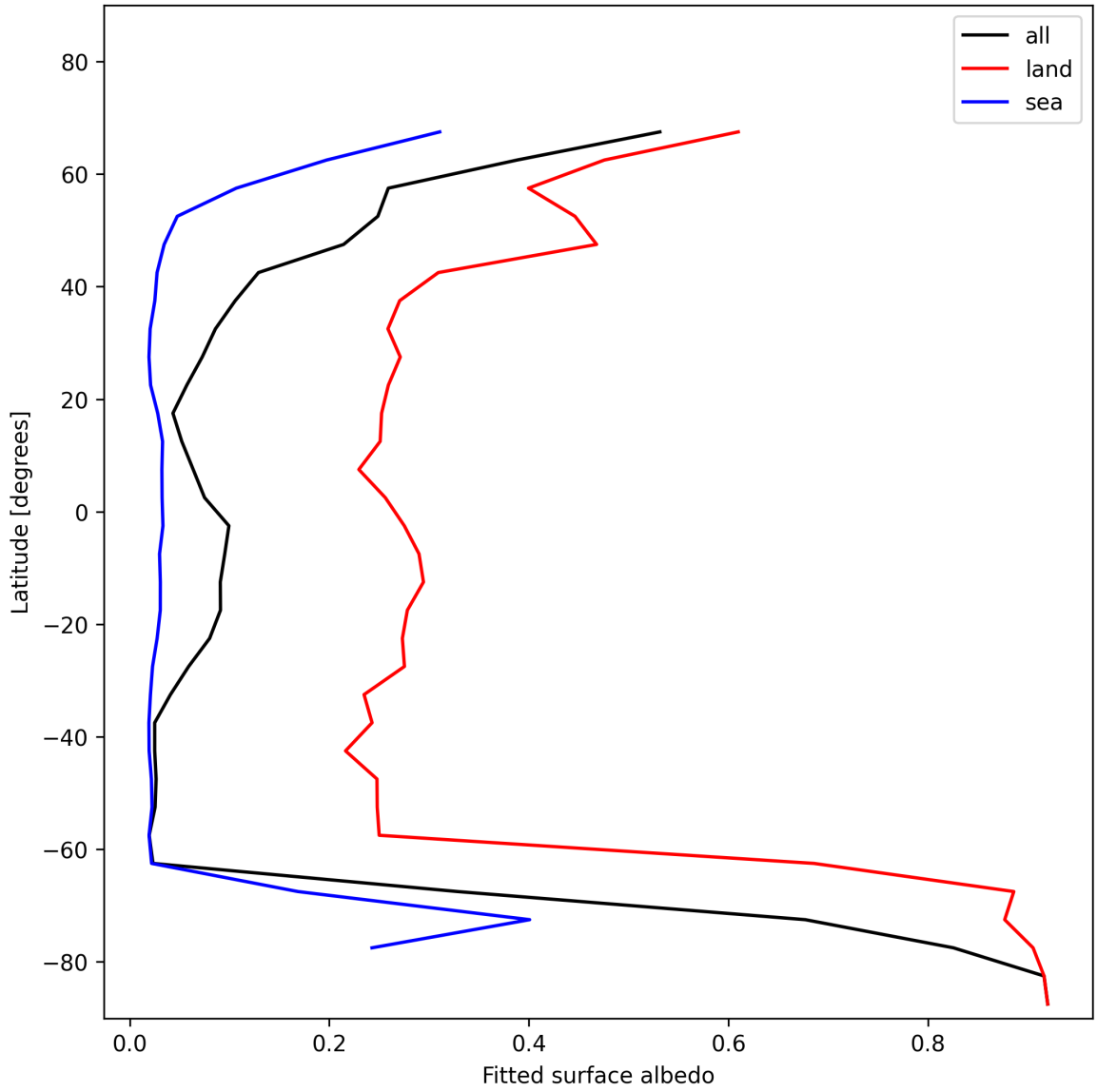


Figure 29: Zonal average of “Fitted surface albedo” for 2025-01-20 to 2025-01-22.

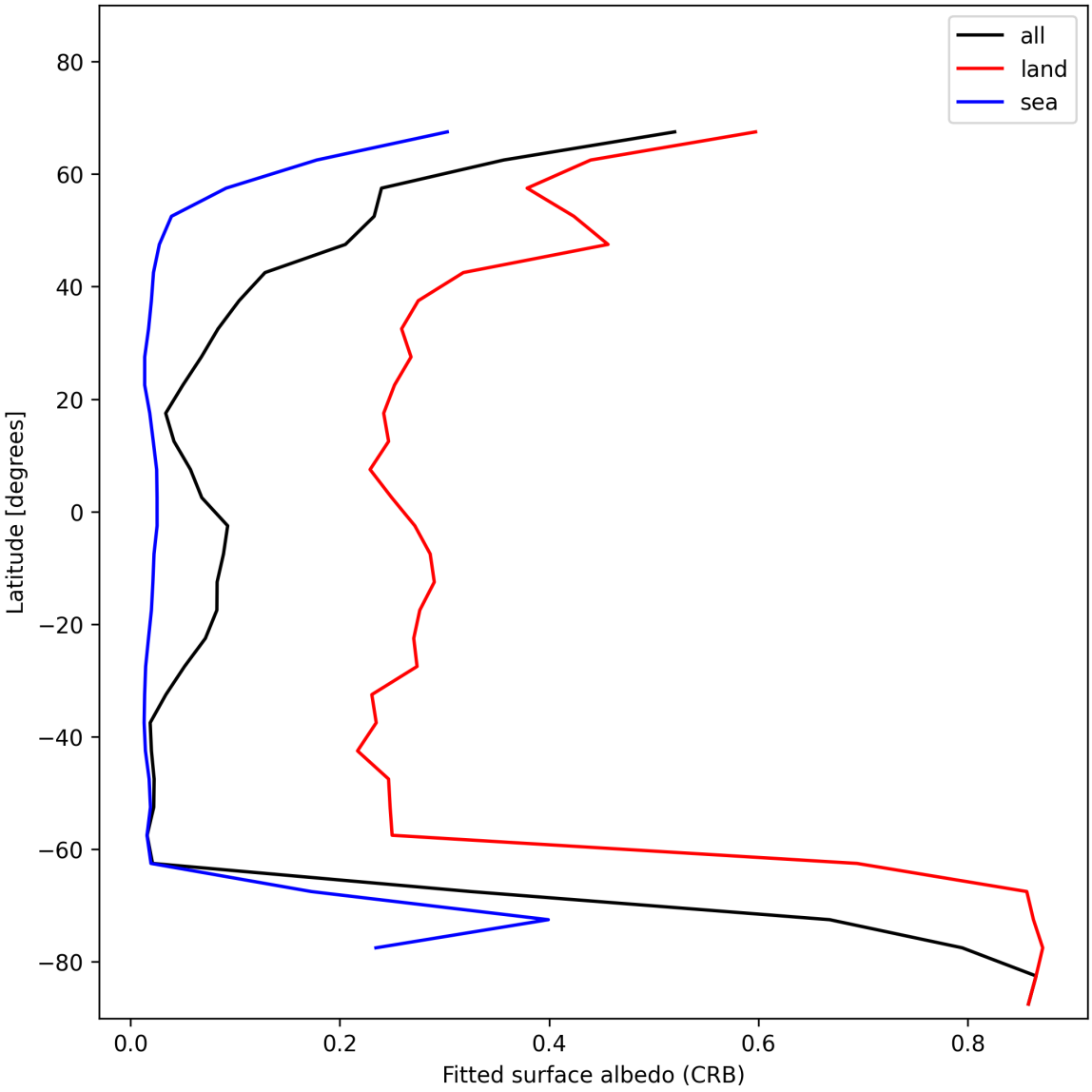


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2025-01-20 to 2025-01-22.

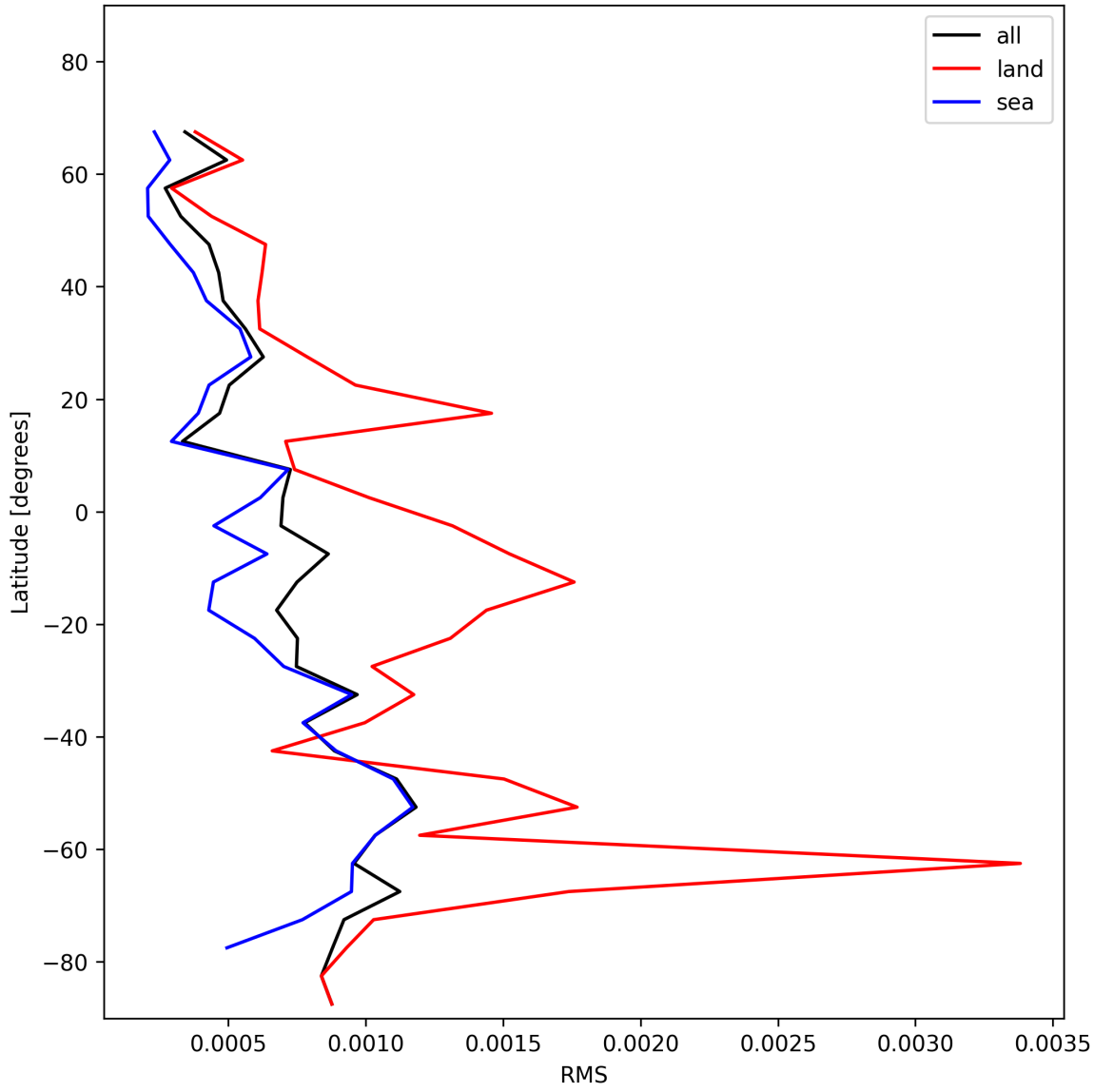


Figure 31: Zonal average of “RMS” for 2025-01-20 to 2025-01-22.

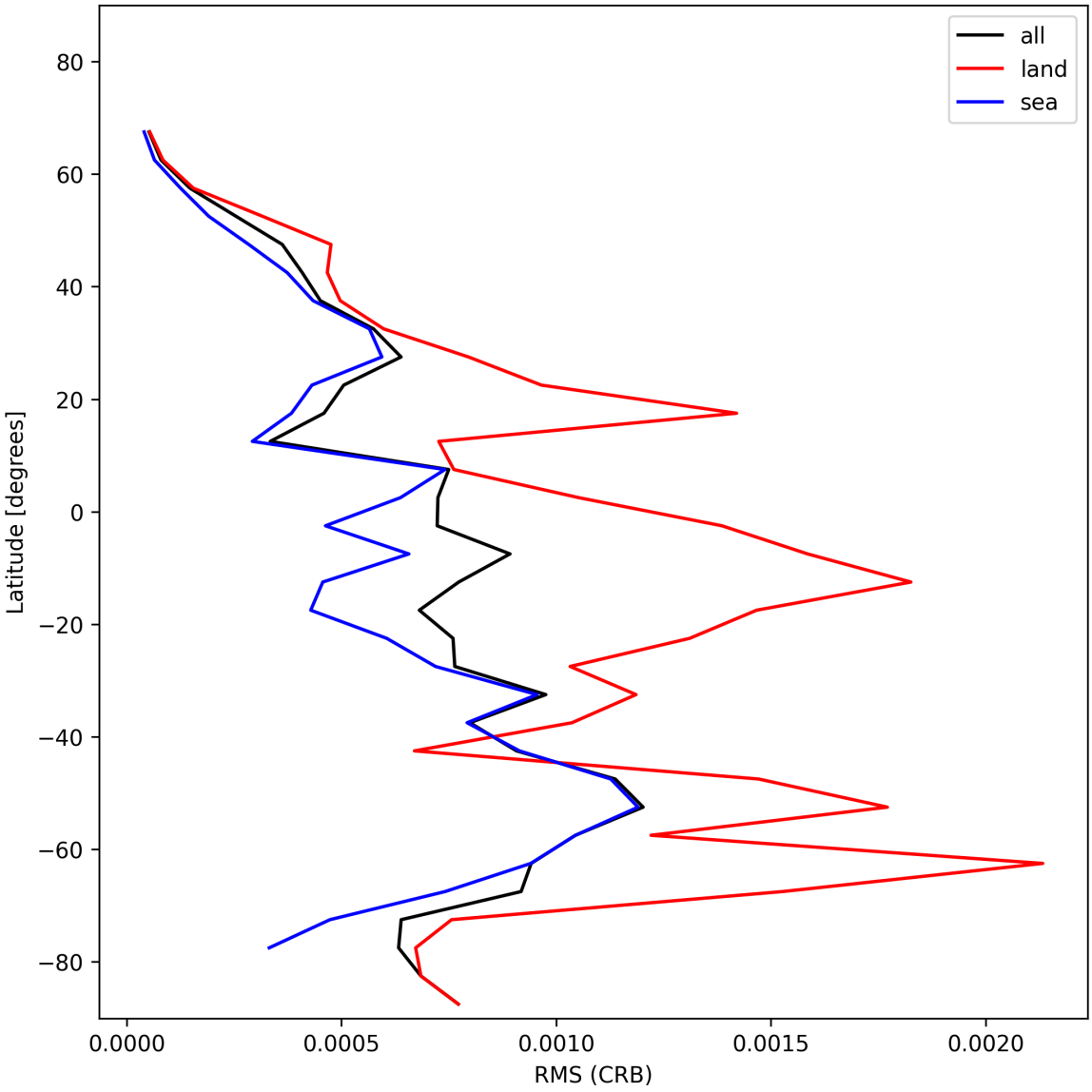


Figure 32: Zonal average of “RMS (CRB)” for 2025-01-20 to 2025-01-22.

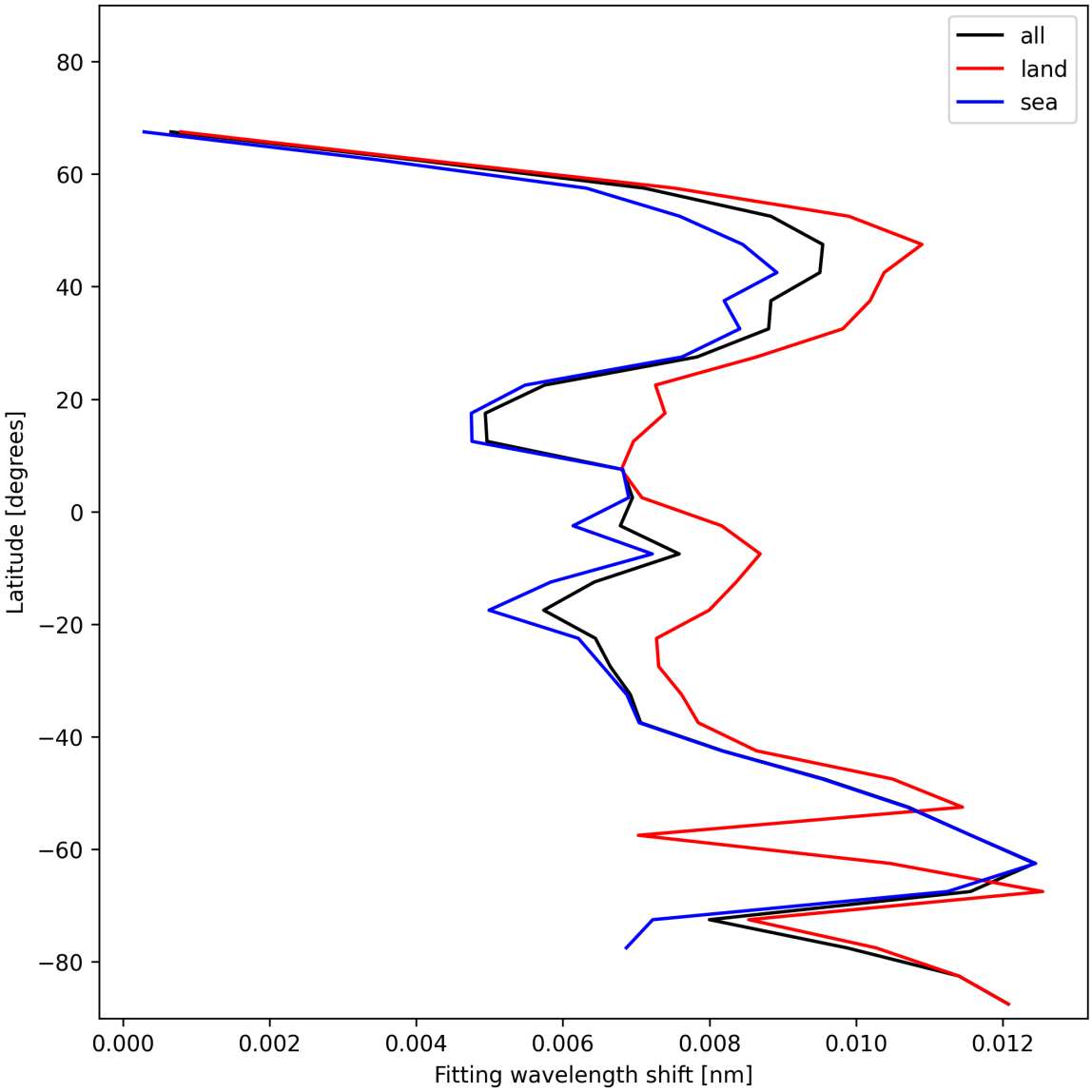


Figure 33: Zonal average of “Fitting wavelength shift” for 2025-01-20 to 2025-01-22.

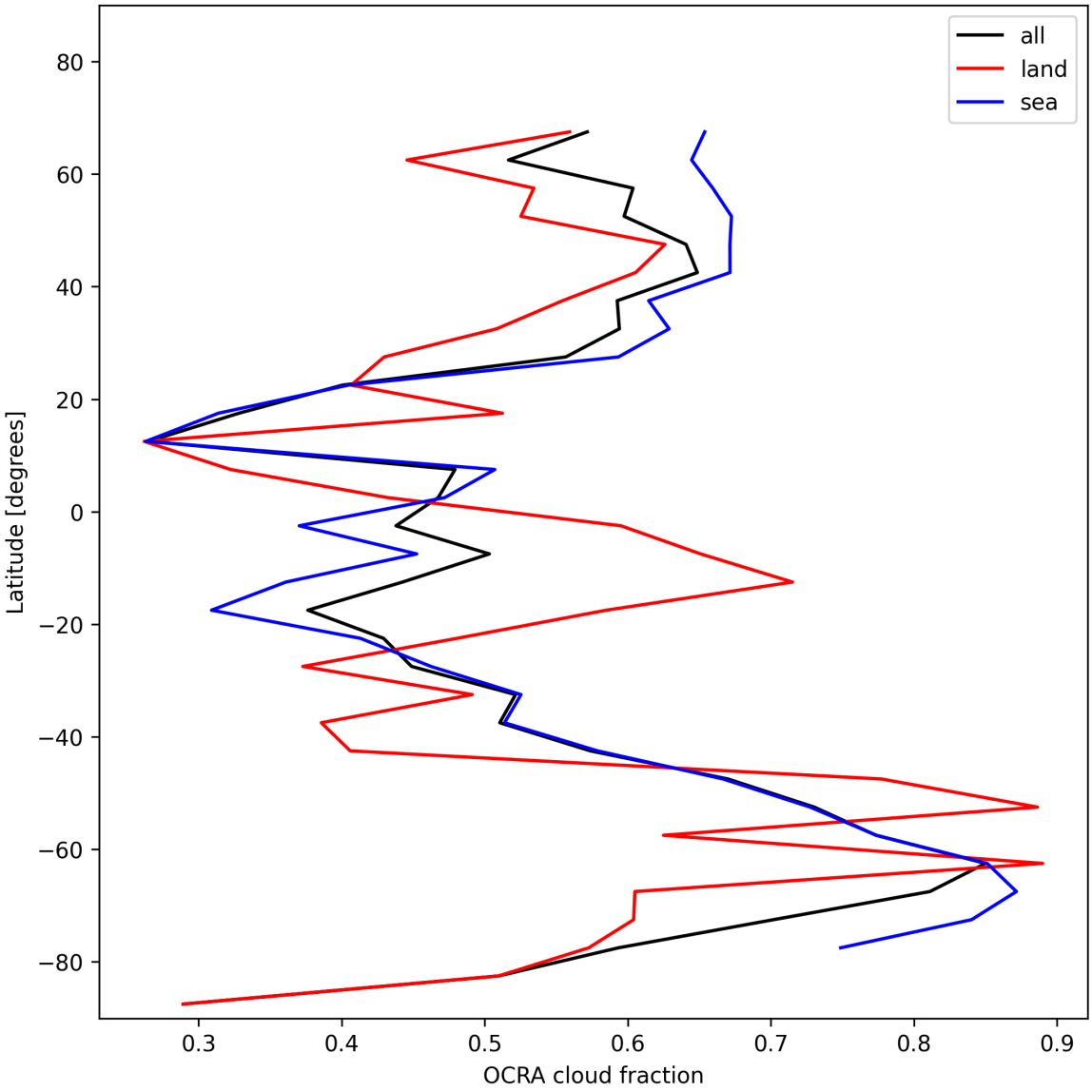


Figure 34: Zonal average of “OCRA cloud fraction” for 2025-01-20 to 2025-01-22.

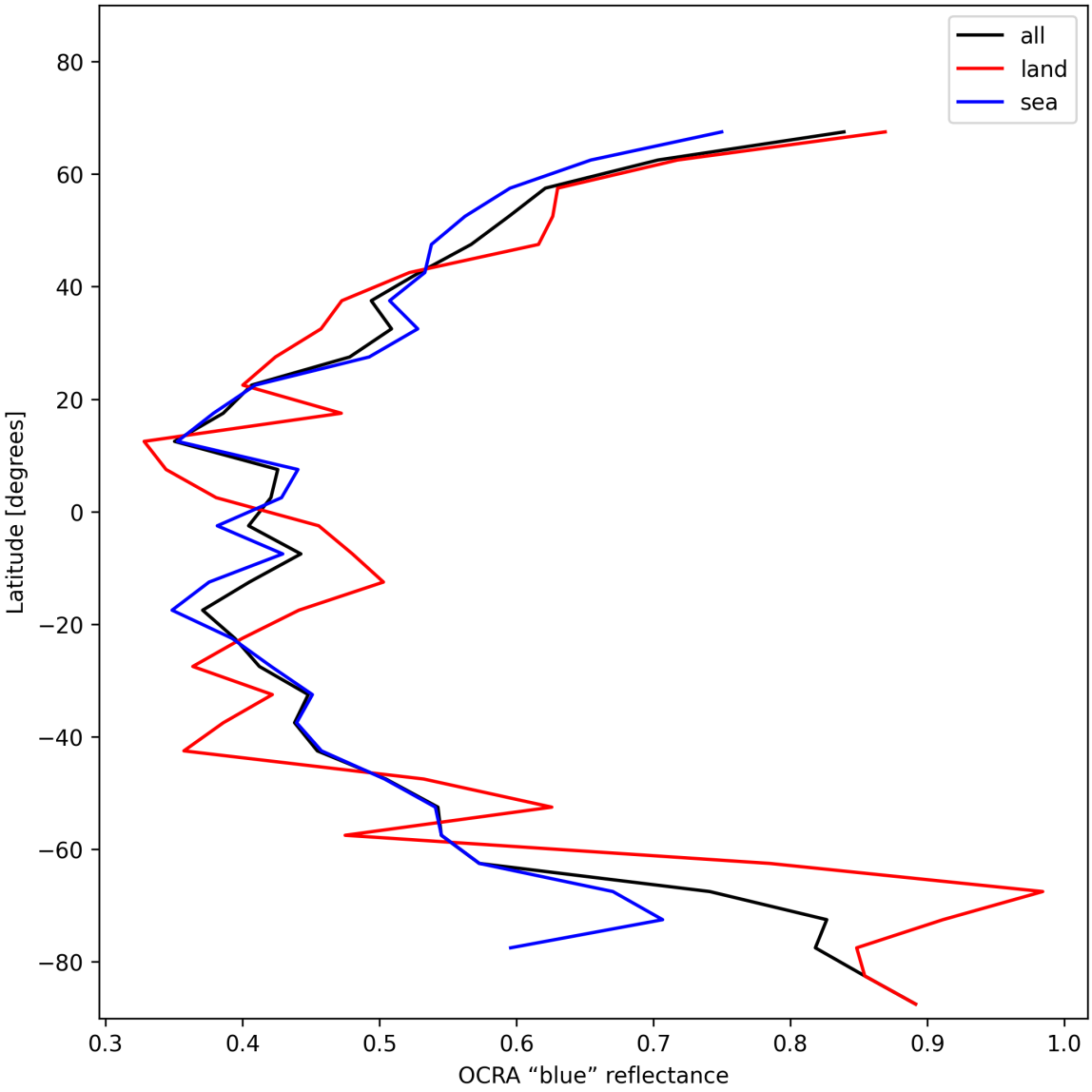


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2025-01-20 to 2025-01-22.

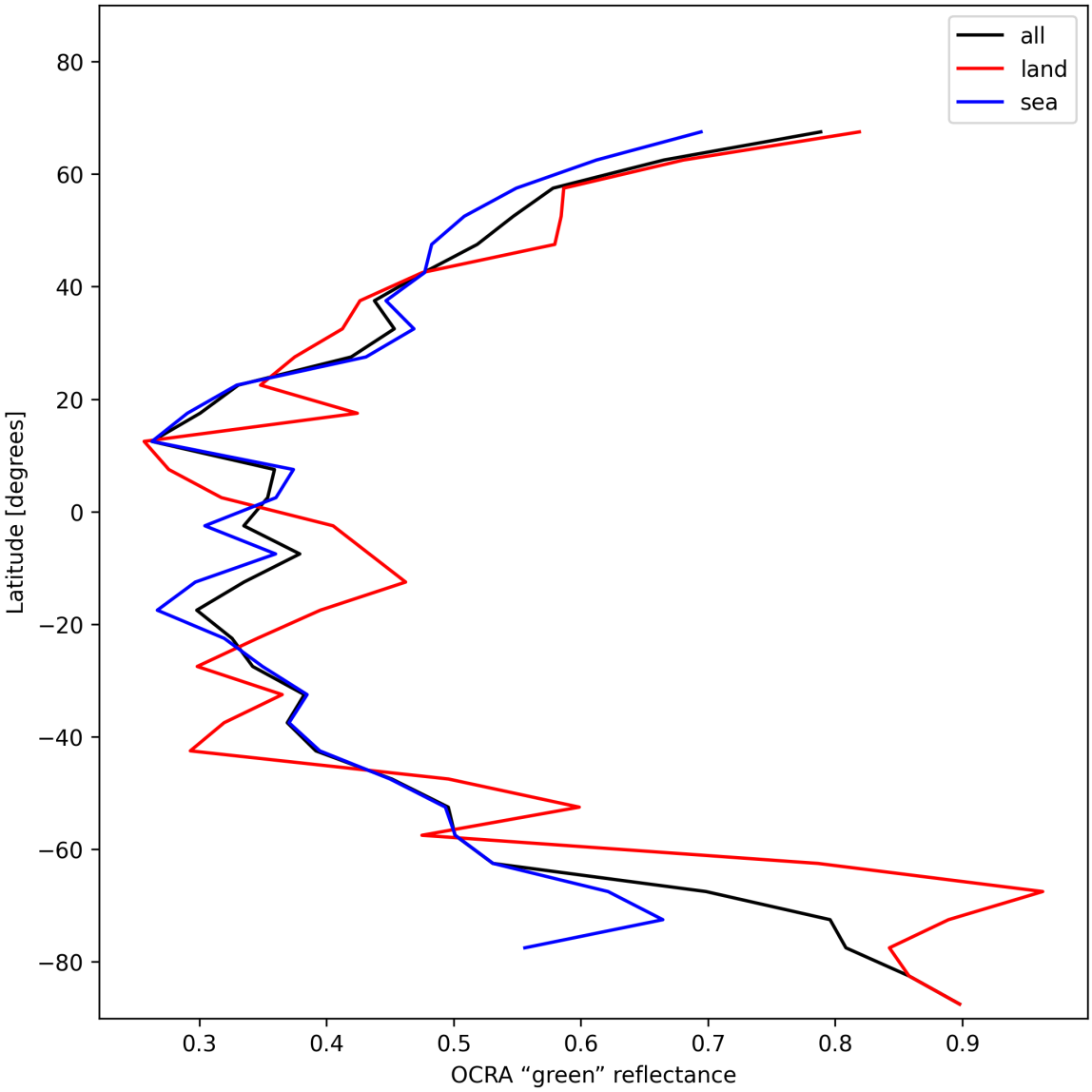


Figure 36: Zonal average of “OCRA “green” reflectance” for 2025-01-20 to 2025-01-22.

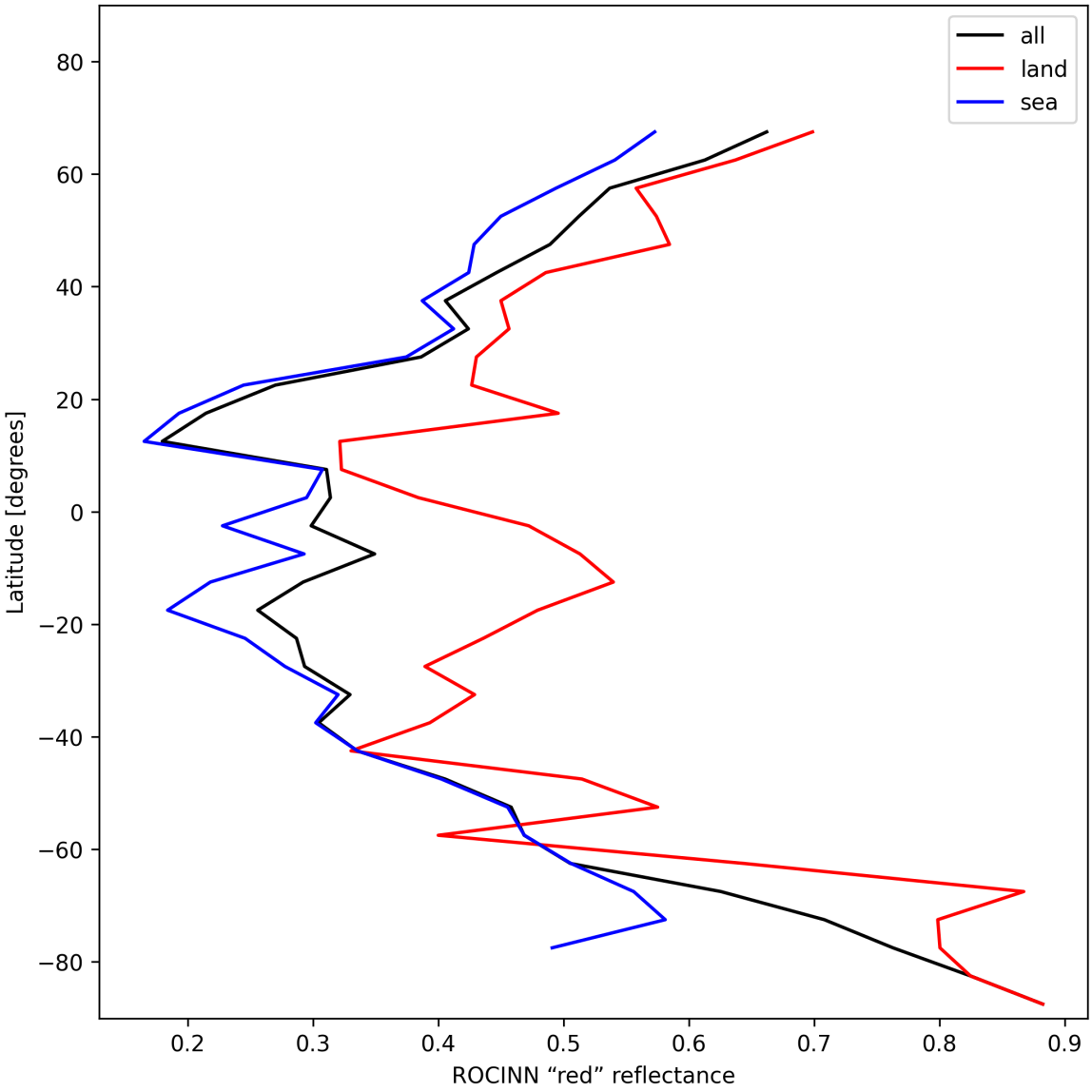


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2025-01-20 to 2025-01-22.

8 Histograms

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

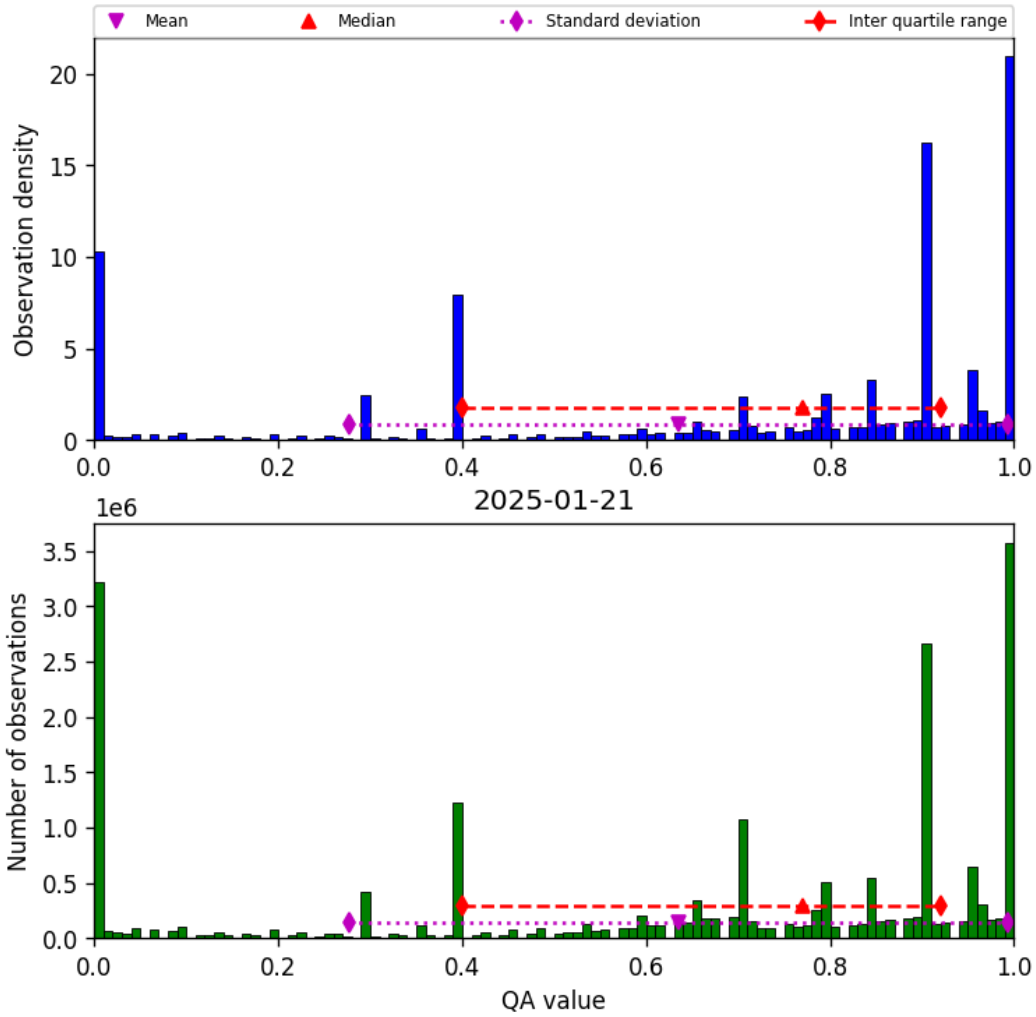


Figure 38: Histogram of “QA value” for 2025-01-20 to 2025-01-22

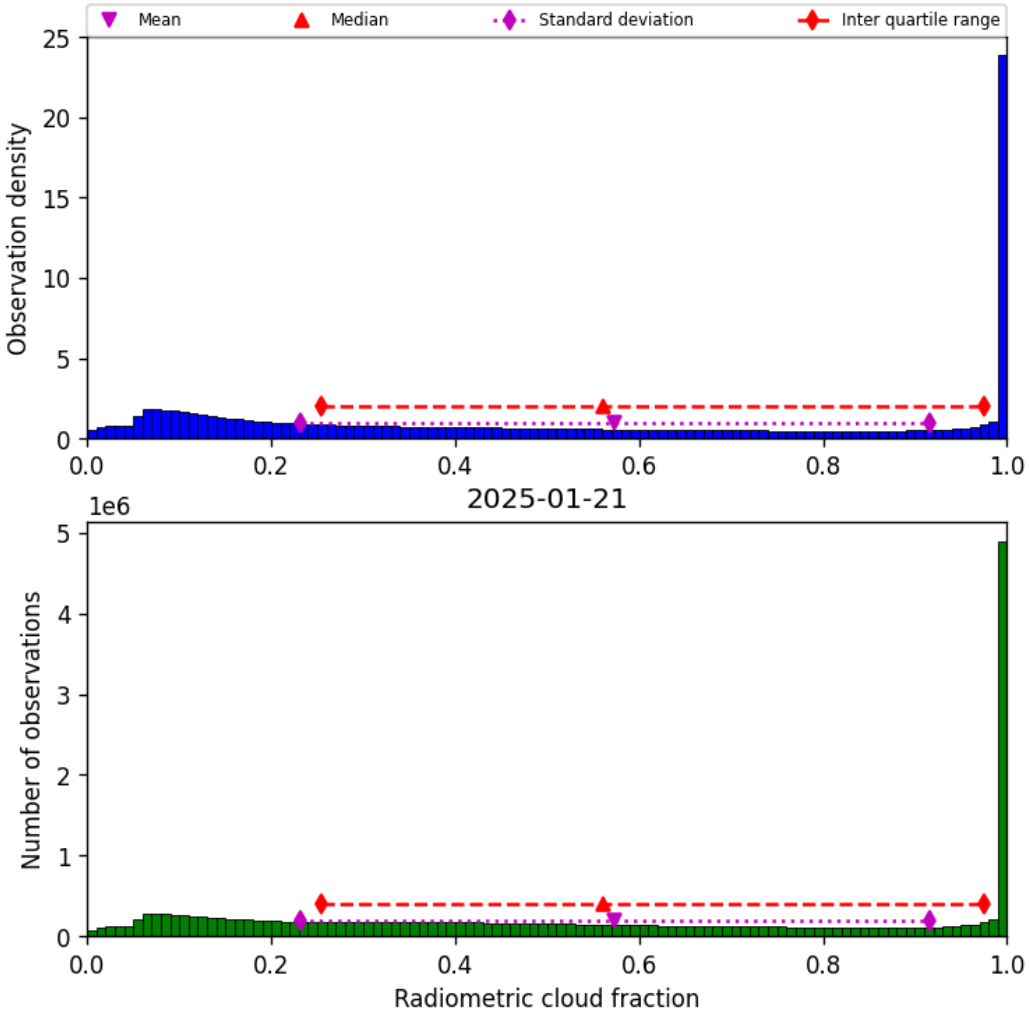


Figure 39: Histogram of “Radiometric cloud fraction” for 2025-01-20 to 2025-01-22

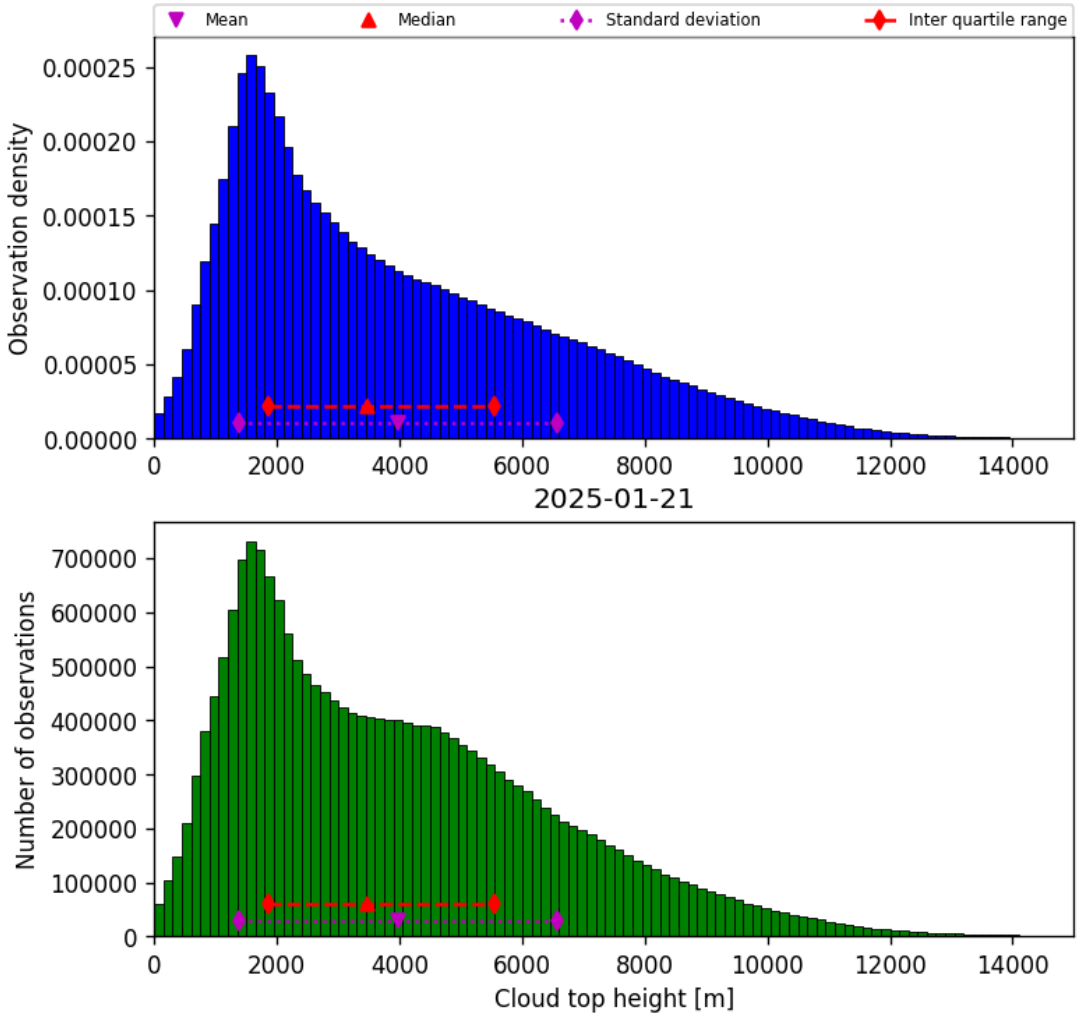


Figure 40: Histogram of “Cloud top height” for 2025-01-20 to 2025-01-22

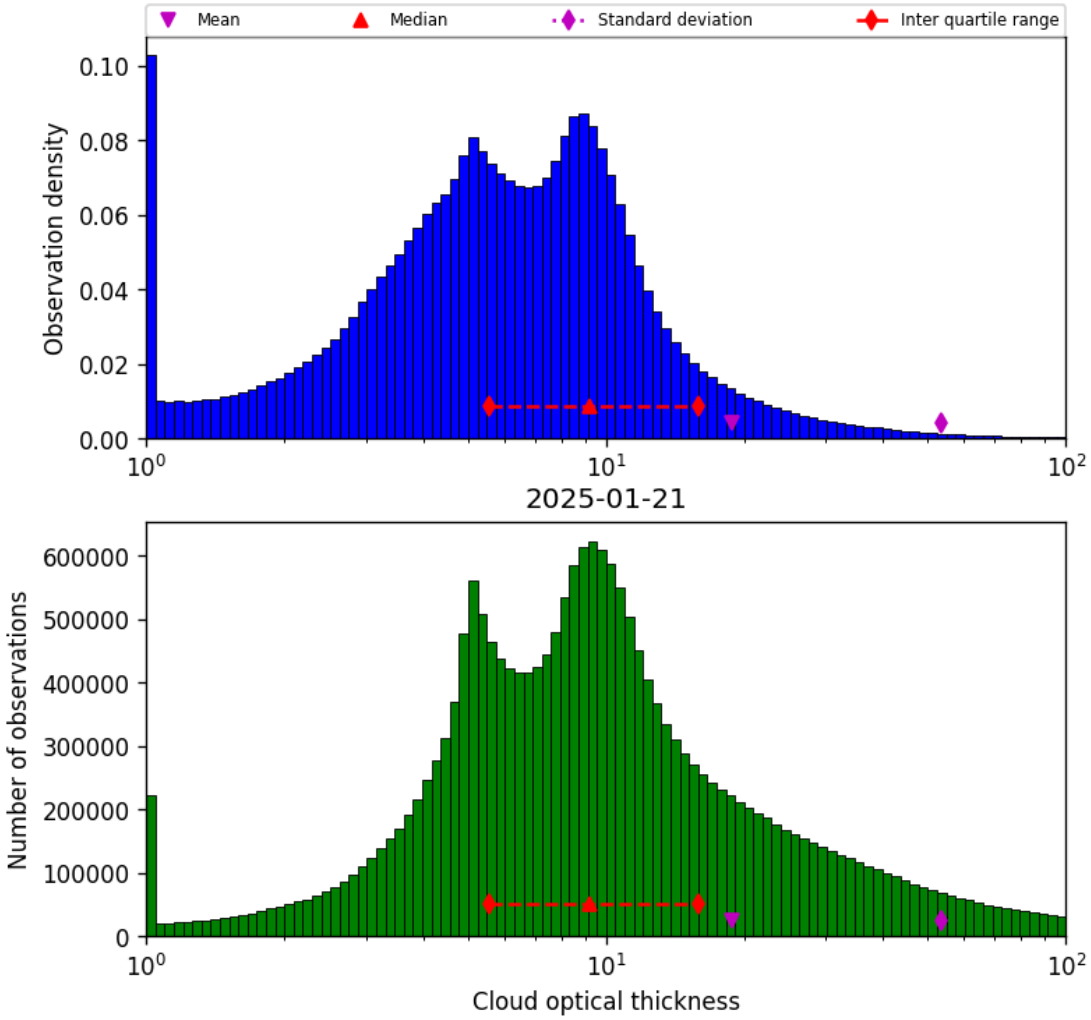


Figure 41: Histogram of “Cloud optical thickness” for 2025-01-20 to 2025-01-22

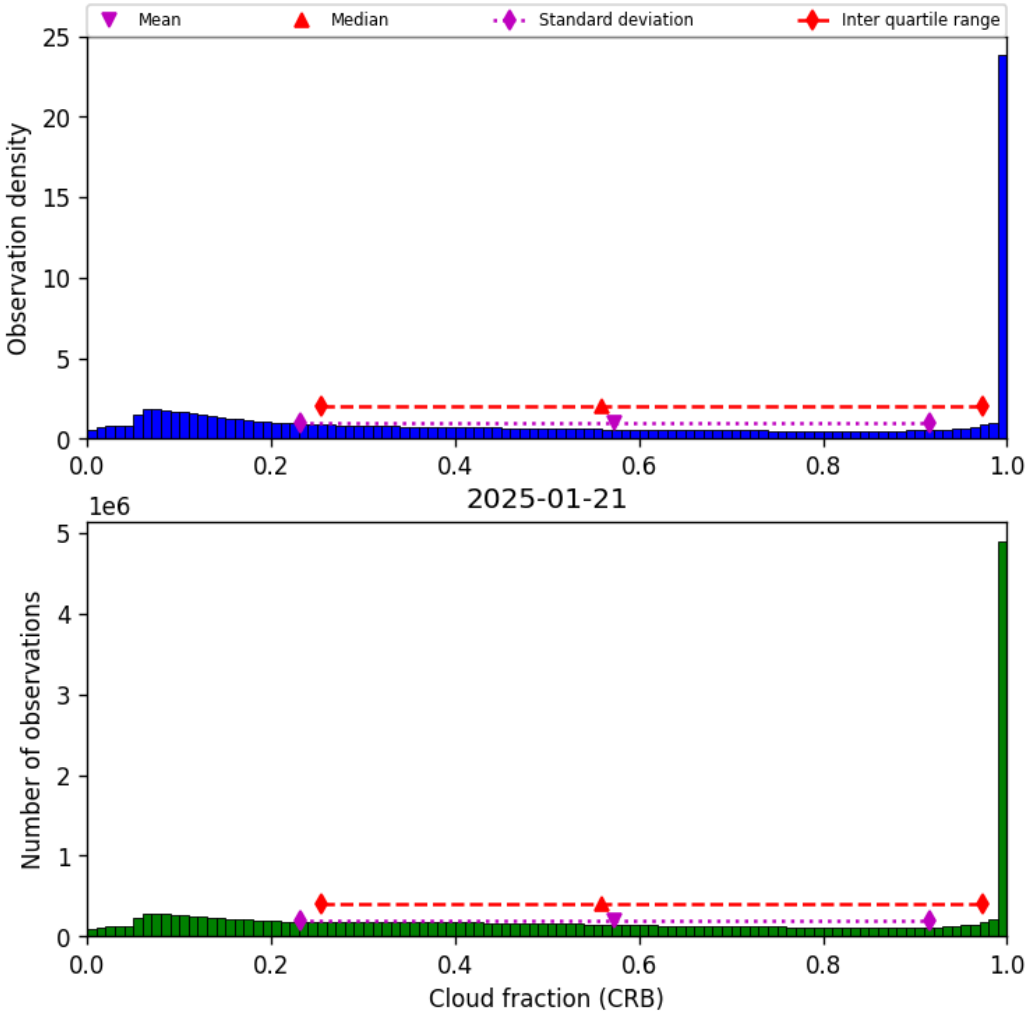


Figure 42: Histogram of “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22

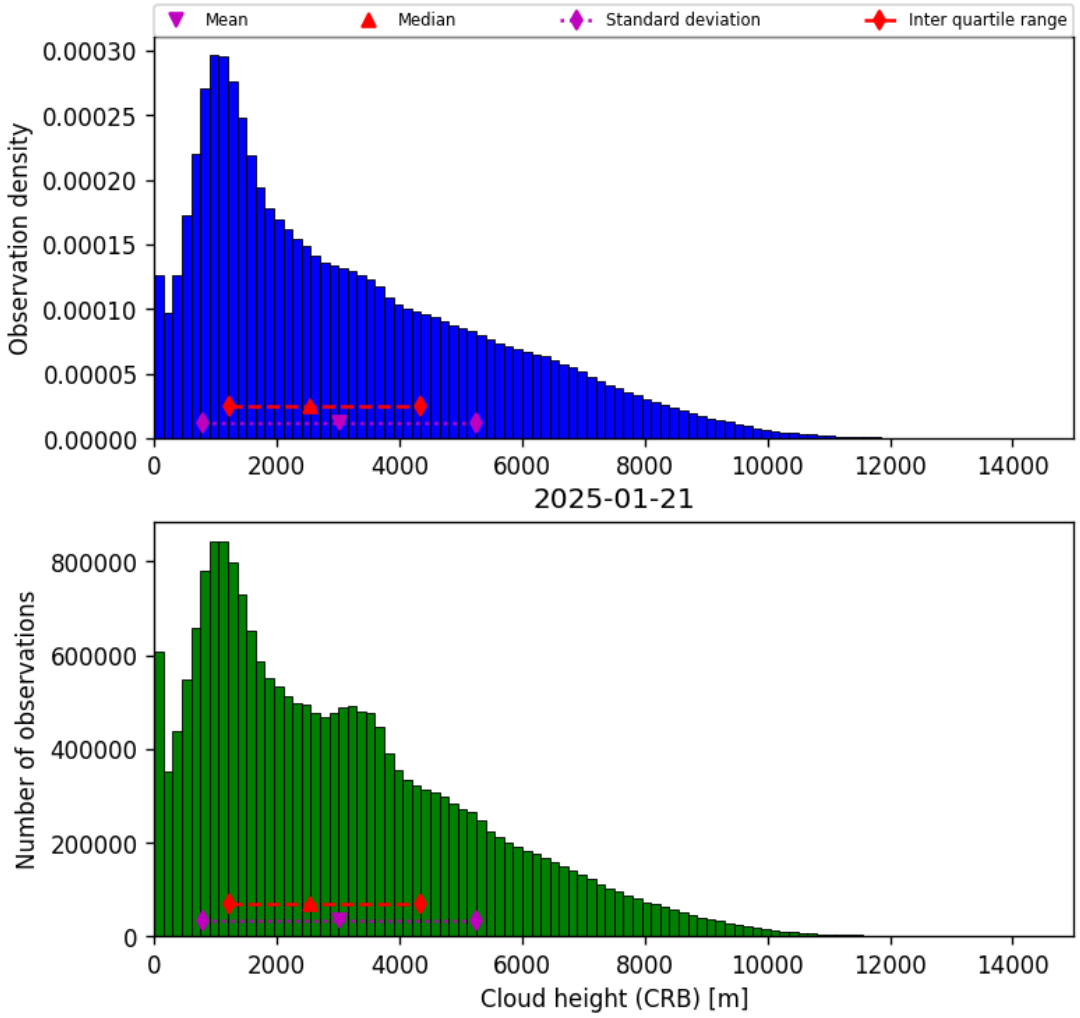


Figure 43: Histogram of “Cloud height (CRB)” for 2025-01-20 to 2025-01-22

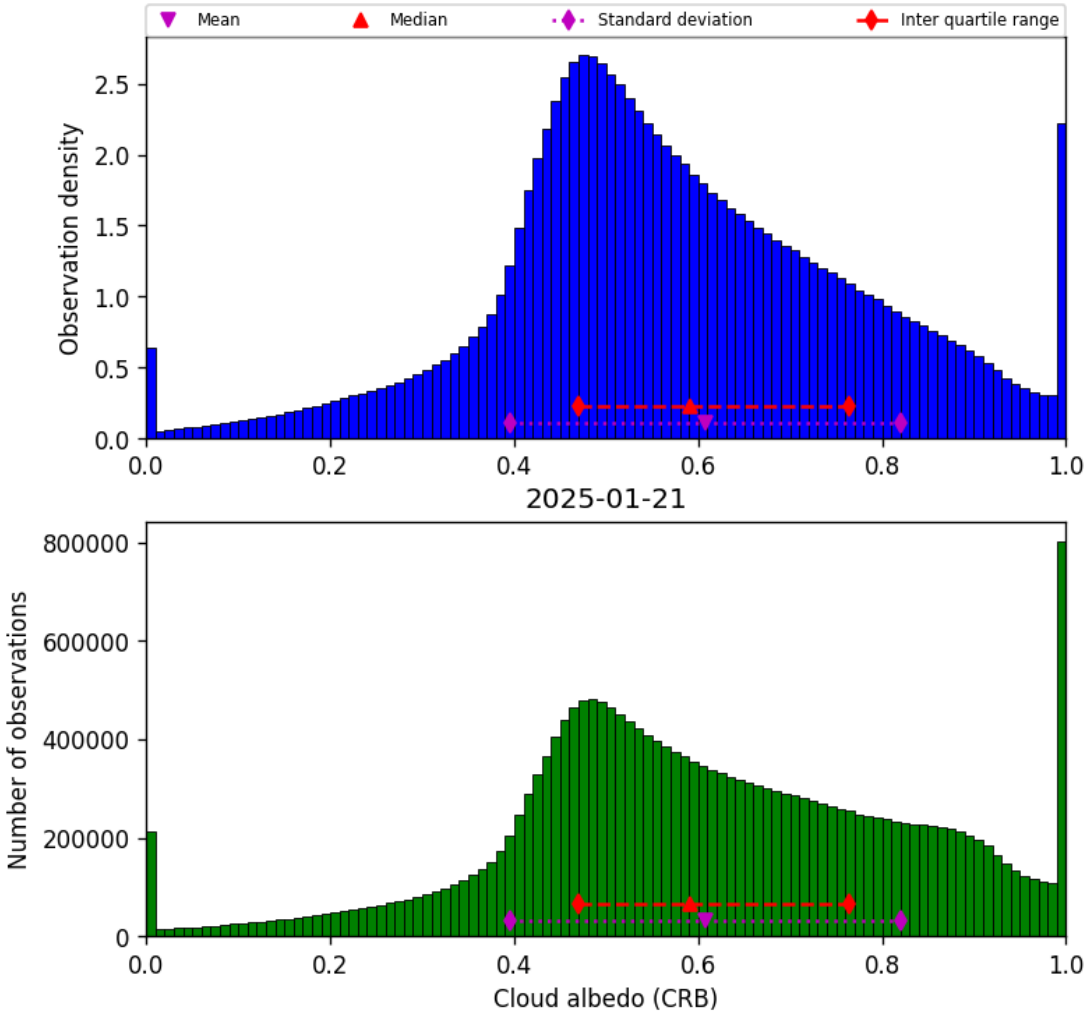


Figure 44: Histogram of “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22

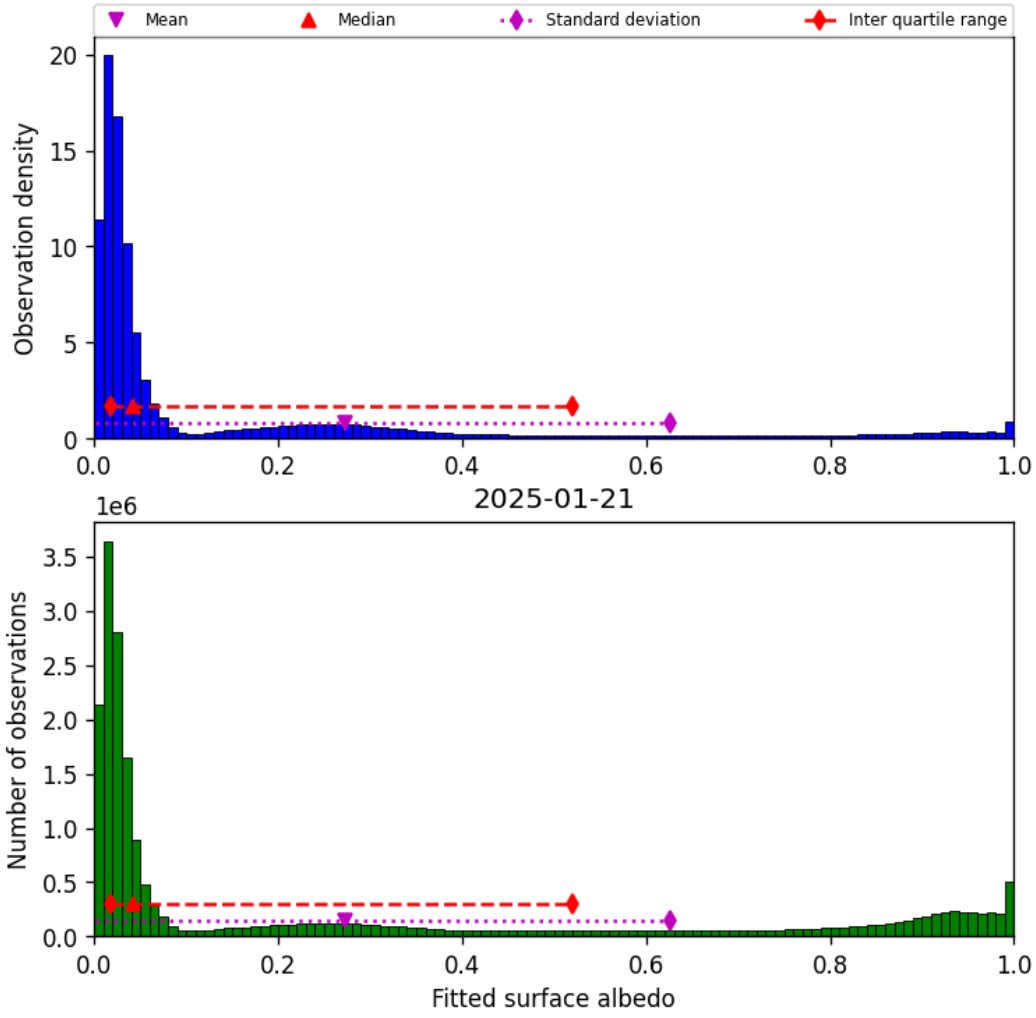


Figure 45: Histogram of “Fitted surface albedo” for 2025-01-20 to 2025-01-22

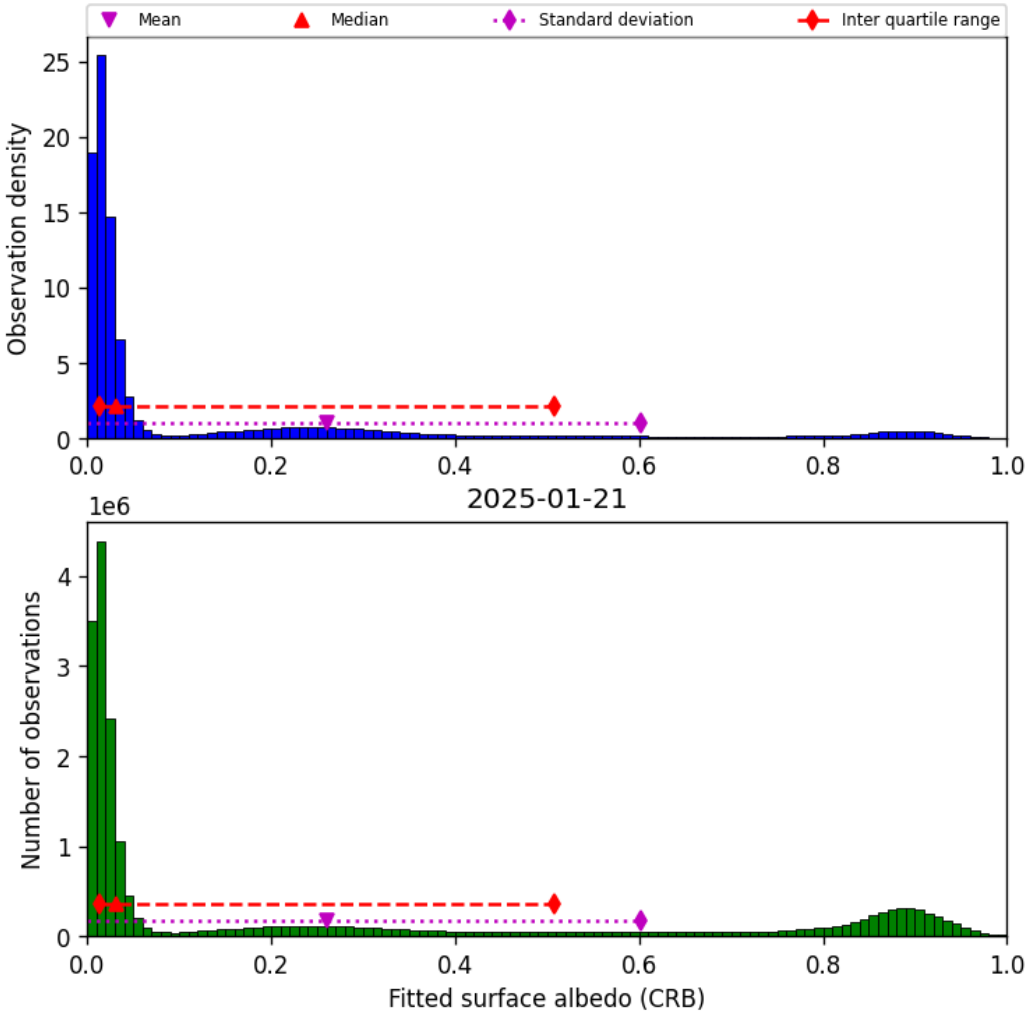


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2025-01-20 to 2025-01-22

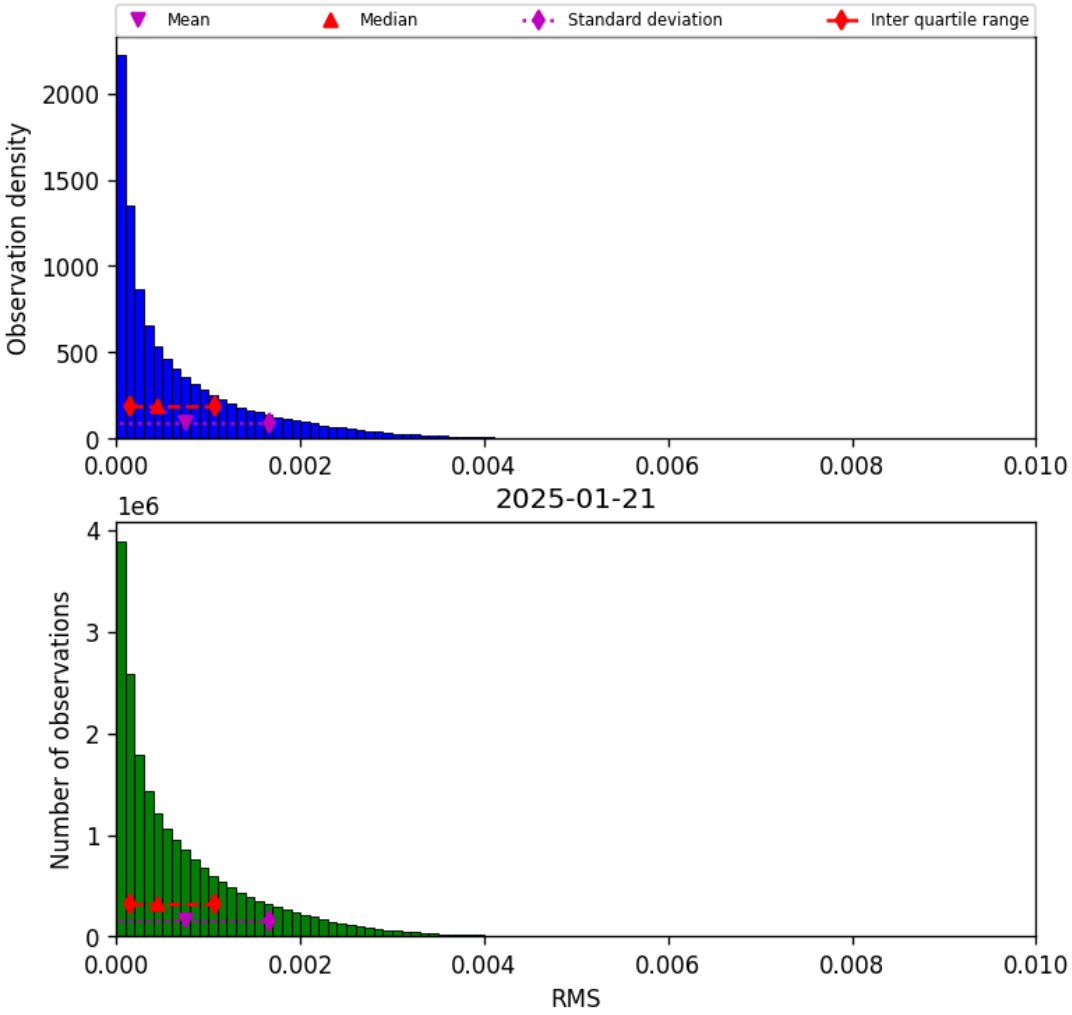


Figure 47: Histogram of “RMS” for 2025-01-20 to 2025-01-22

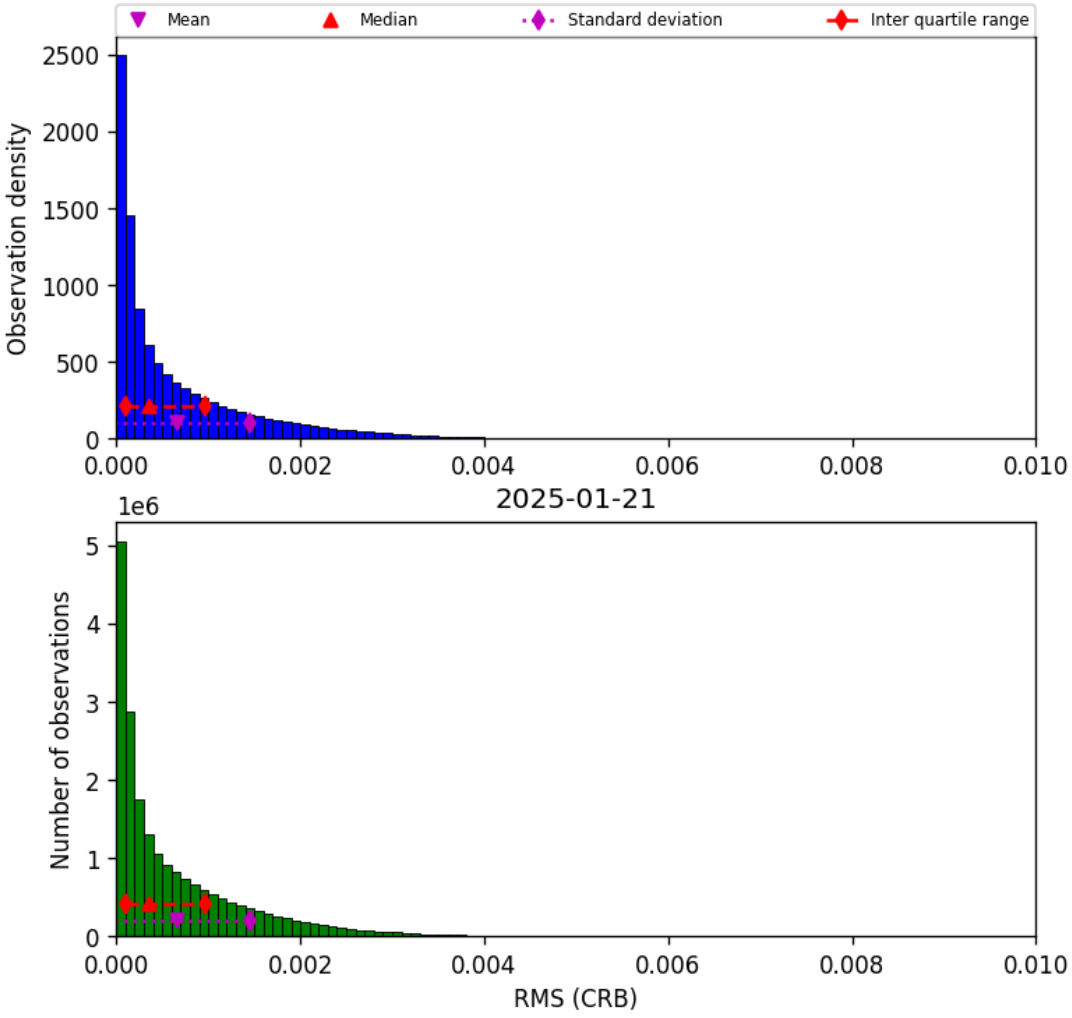


Figure 48: Histogram of “RMS (CRB)” for 2025-01-20 to 2025-01-22

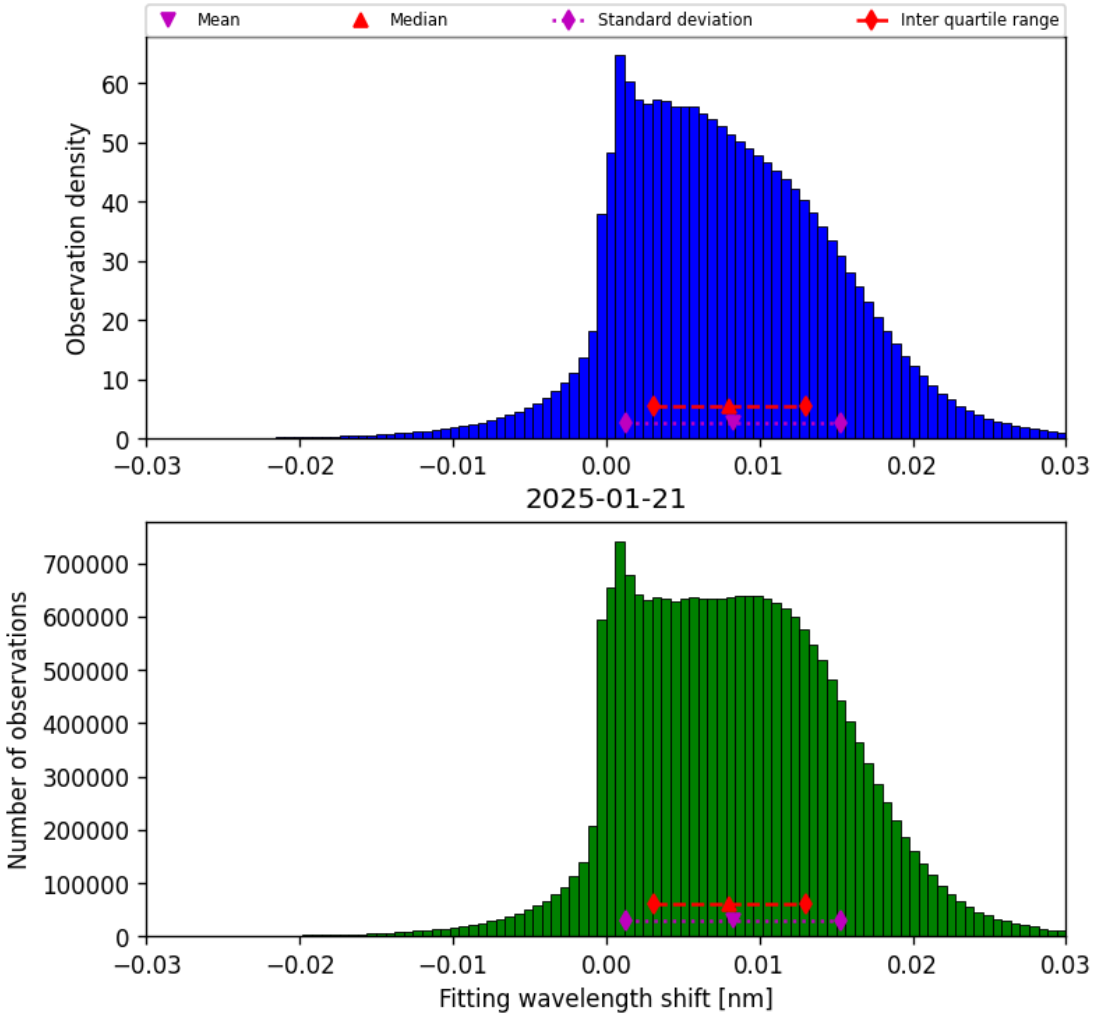


Figure 49: Histogram of “Fitting wavelength shift” for 2025-01-20 to 2025-01-22

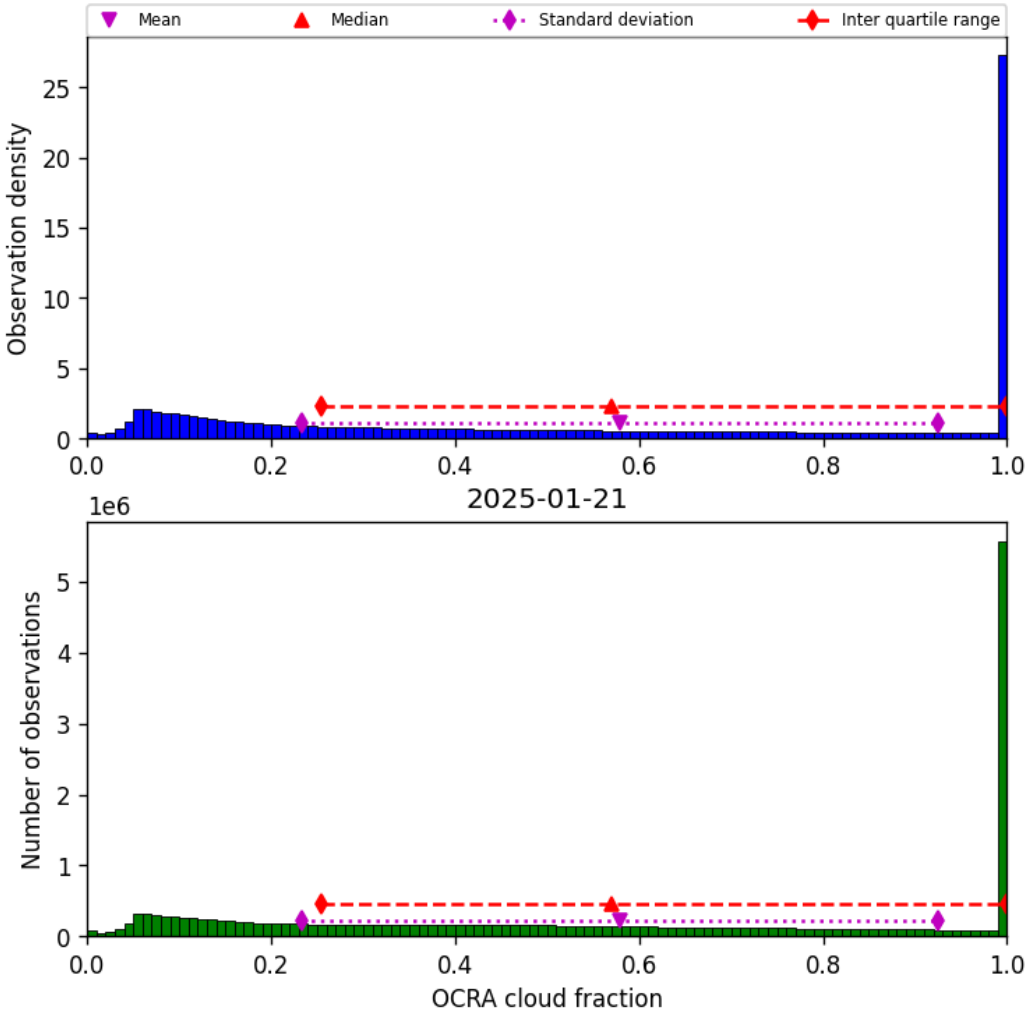


Figure 50: Histogram of “OCRA cloud fraction” for 2025-01-20 to 2025-01-22

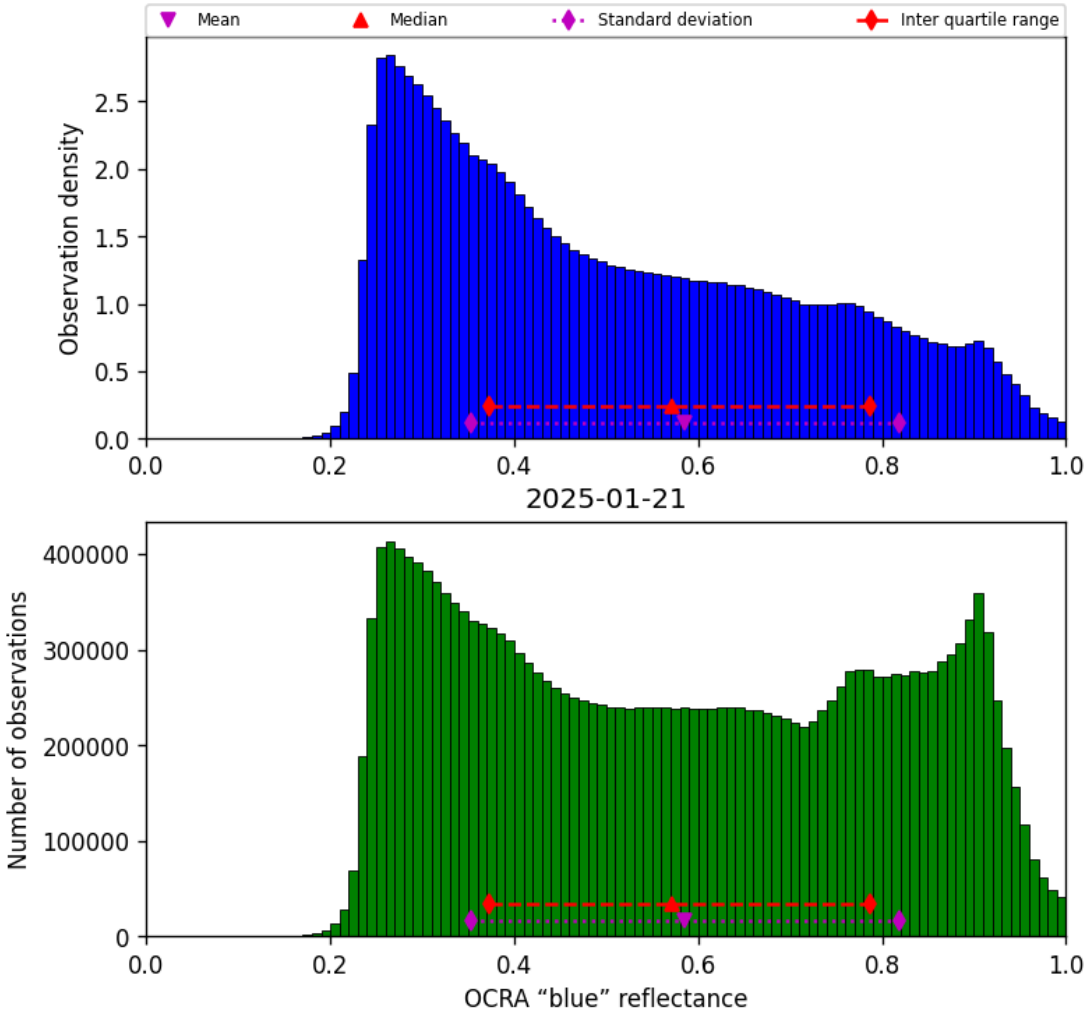


Figure 51: Histogram of “OCRA “blue” reflectance” for 2025-01-20 to 2025-01-22

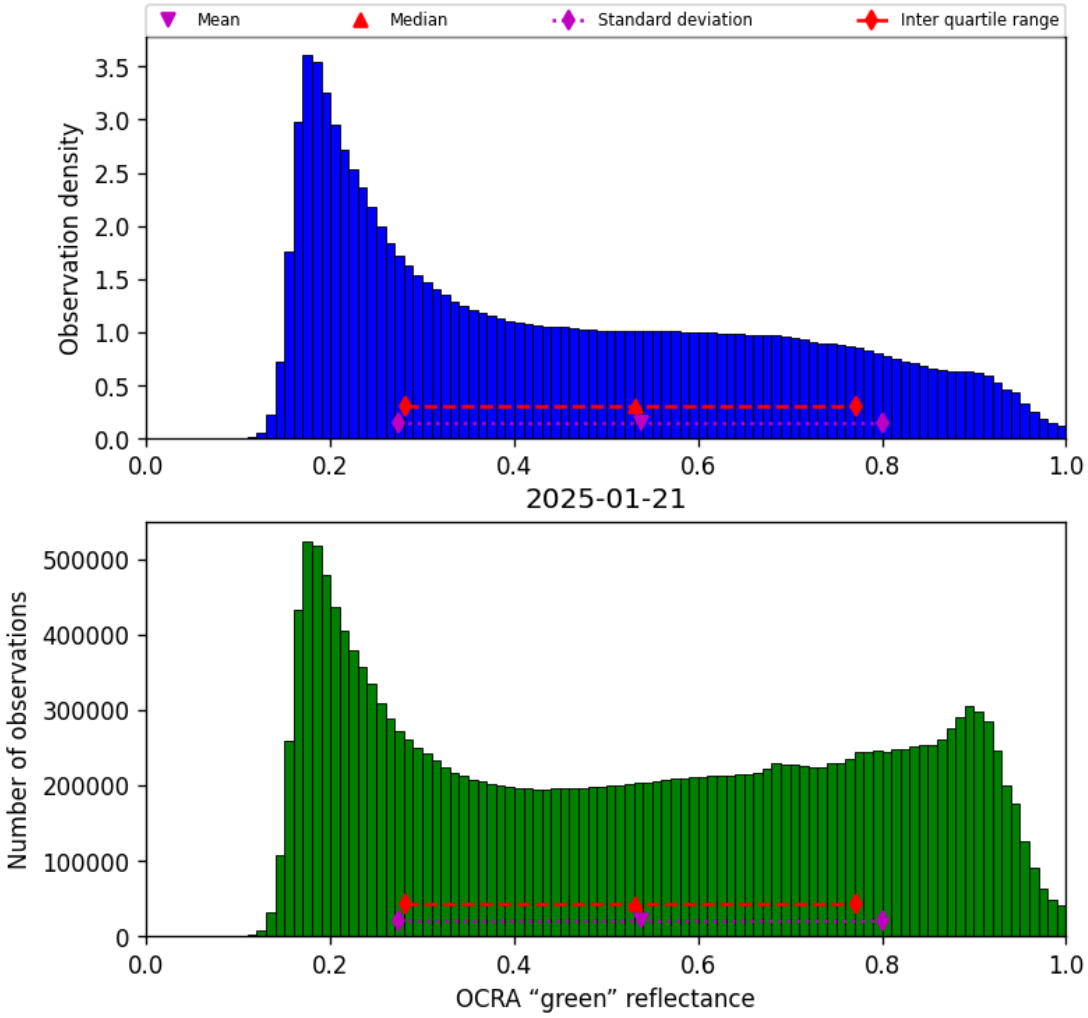


Figure 52: Histogram of “OCRA “green” reflectance” for 2025-01-20 to 2025-01-22

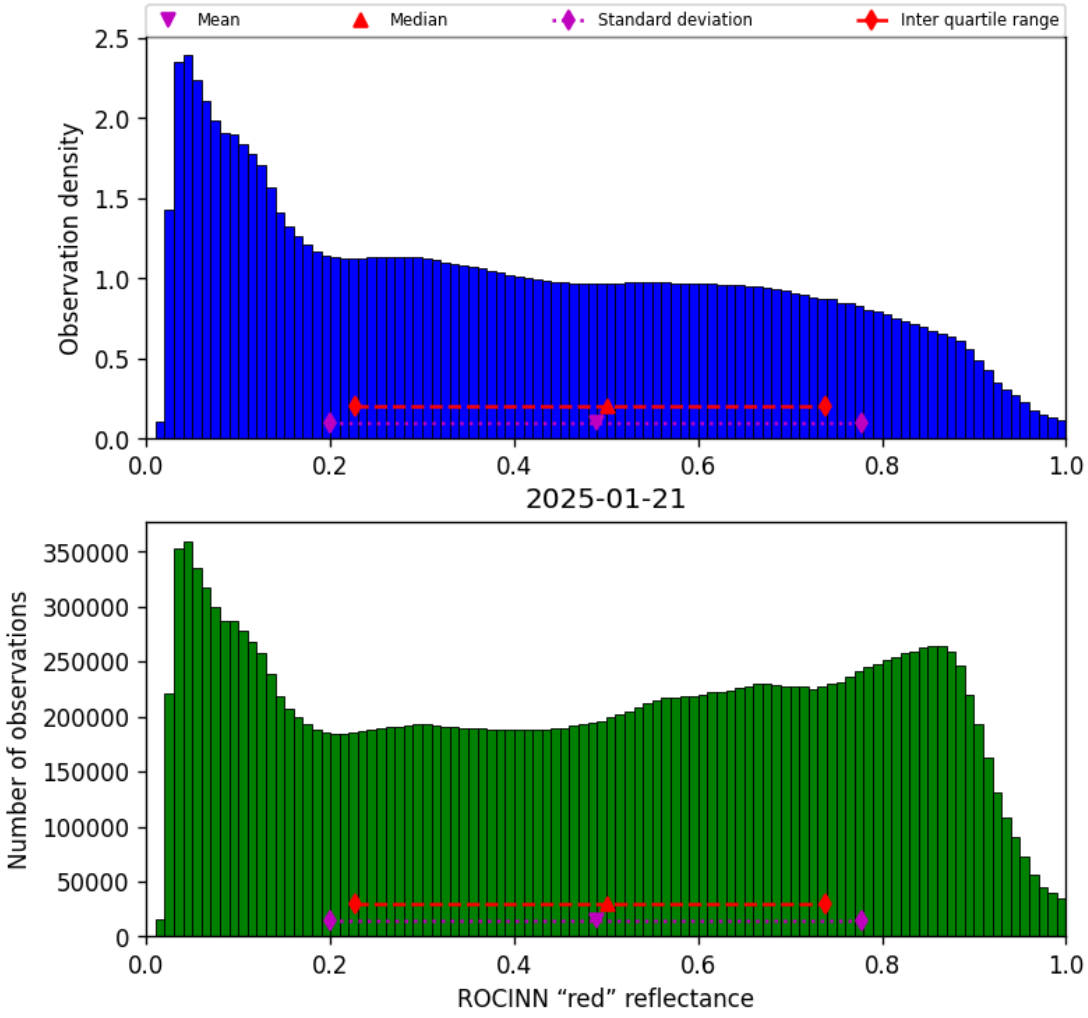


Figure 53: Histogram of “ROCINN “red” reflectance” for 2025-01-20 to 2025-01-22

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.

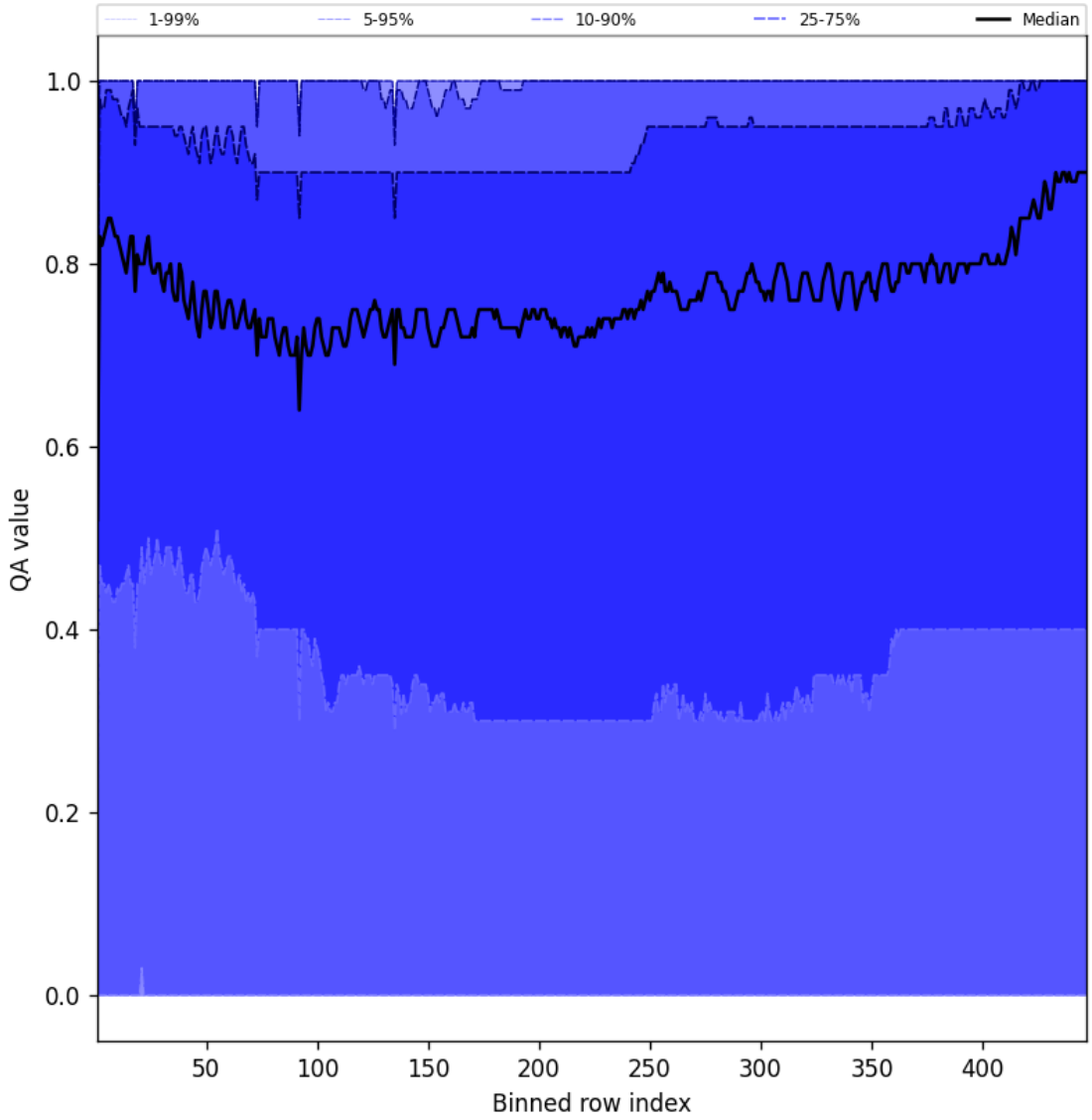


Figure 54: Along track statistics of “QA value” for 2025-01-20 to 2025-01-22

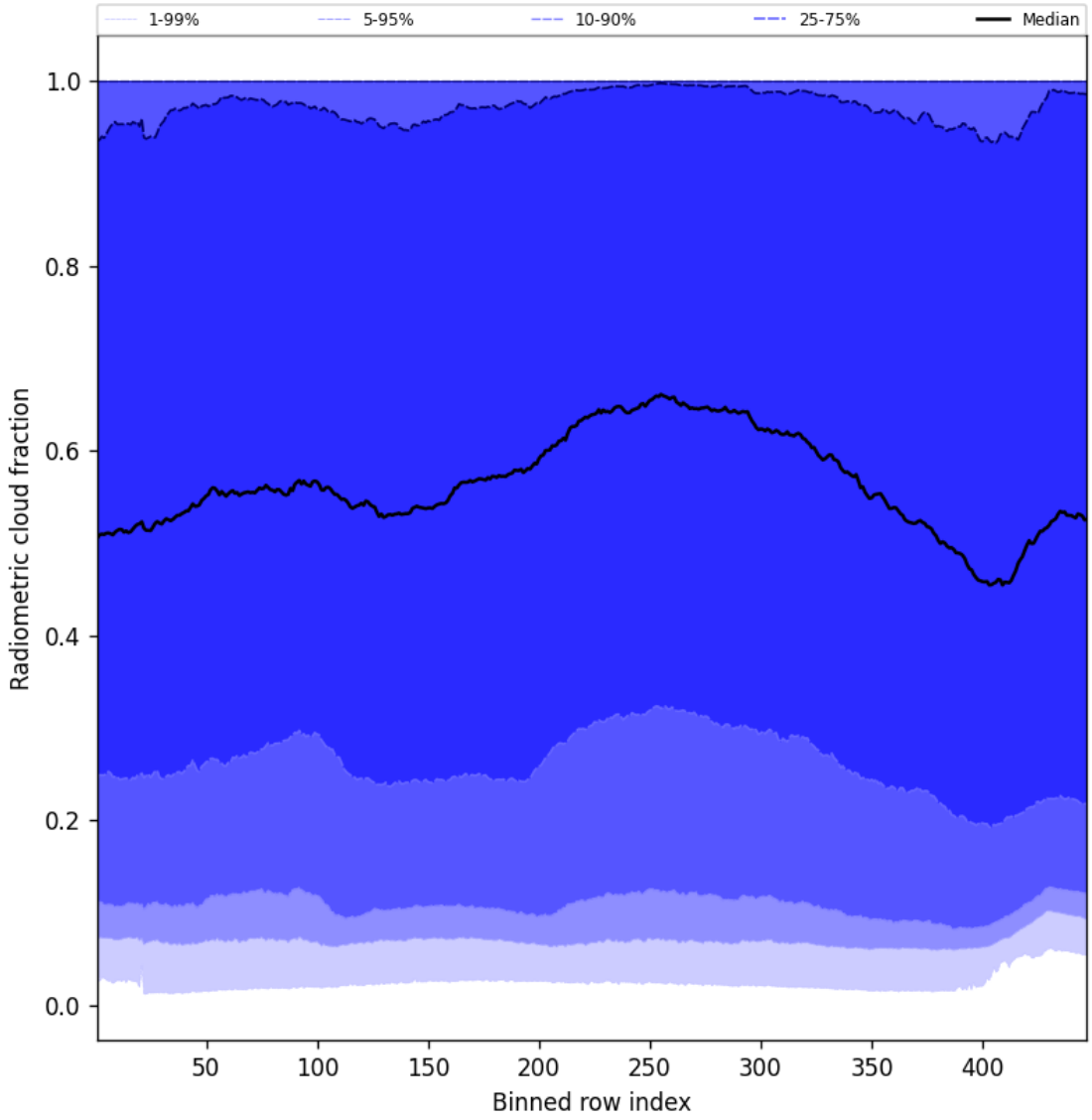


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2025-01-20 to 2025-01-22

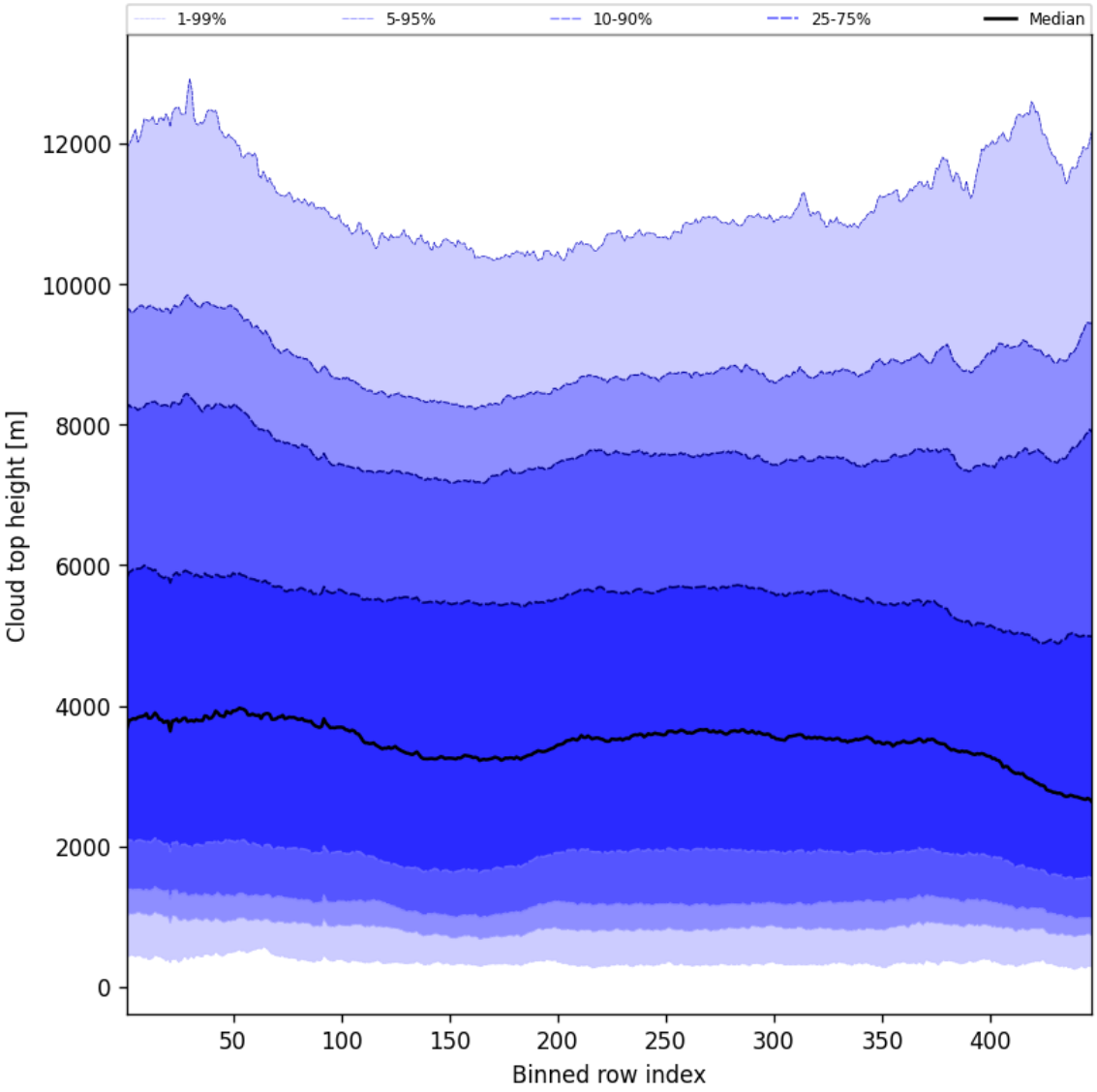


Figure 56: Along track statistics of “Cloud top height” for 2025-01-20 to 2025-01-22

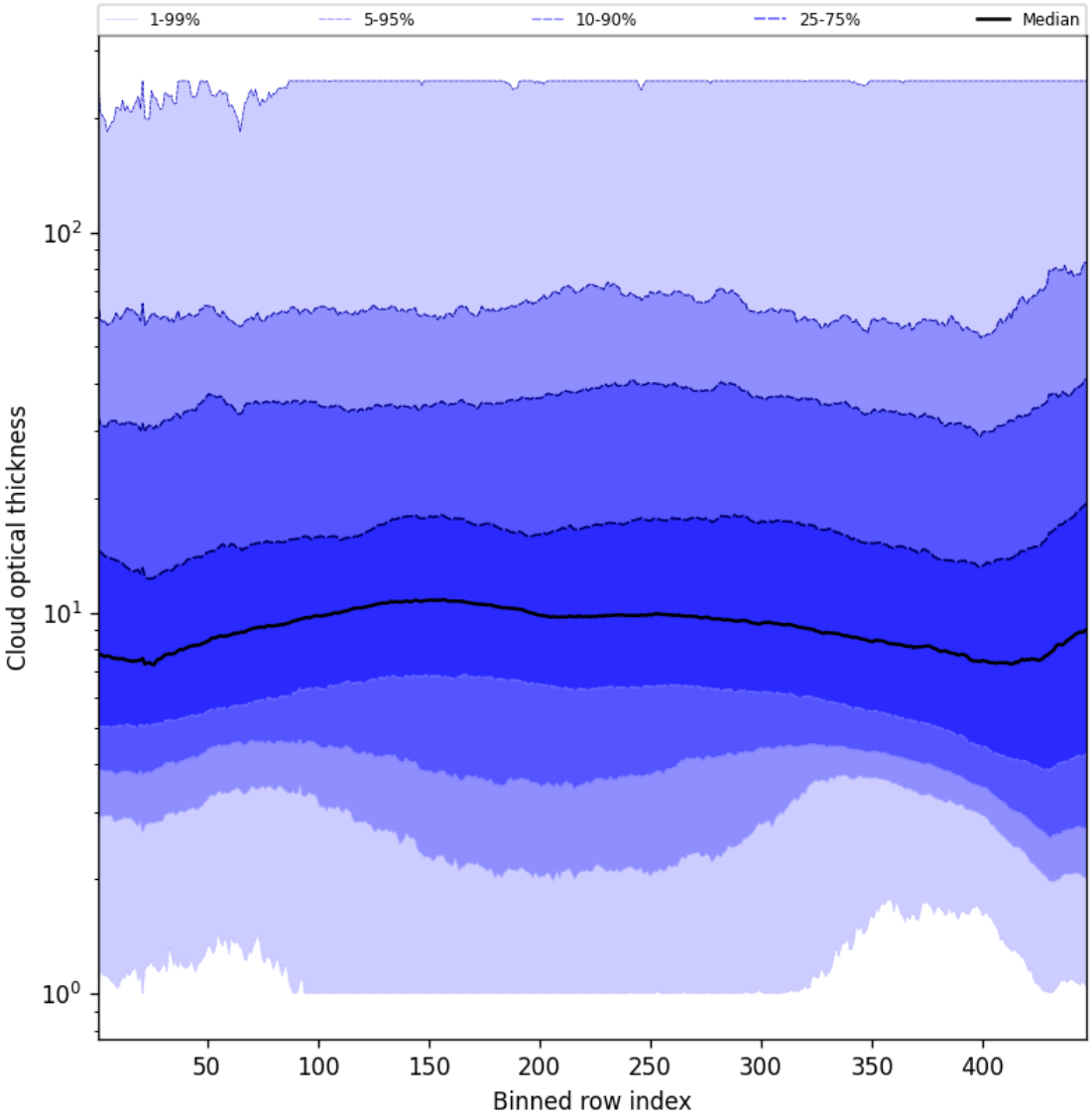


Figure 57: Along track statistics of “Cloud optical thickness” for 2025-01-20 to 2025-01-22

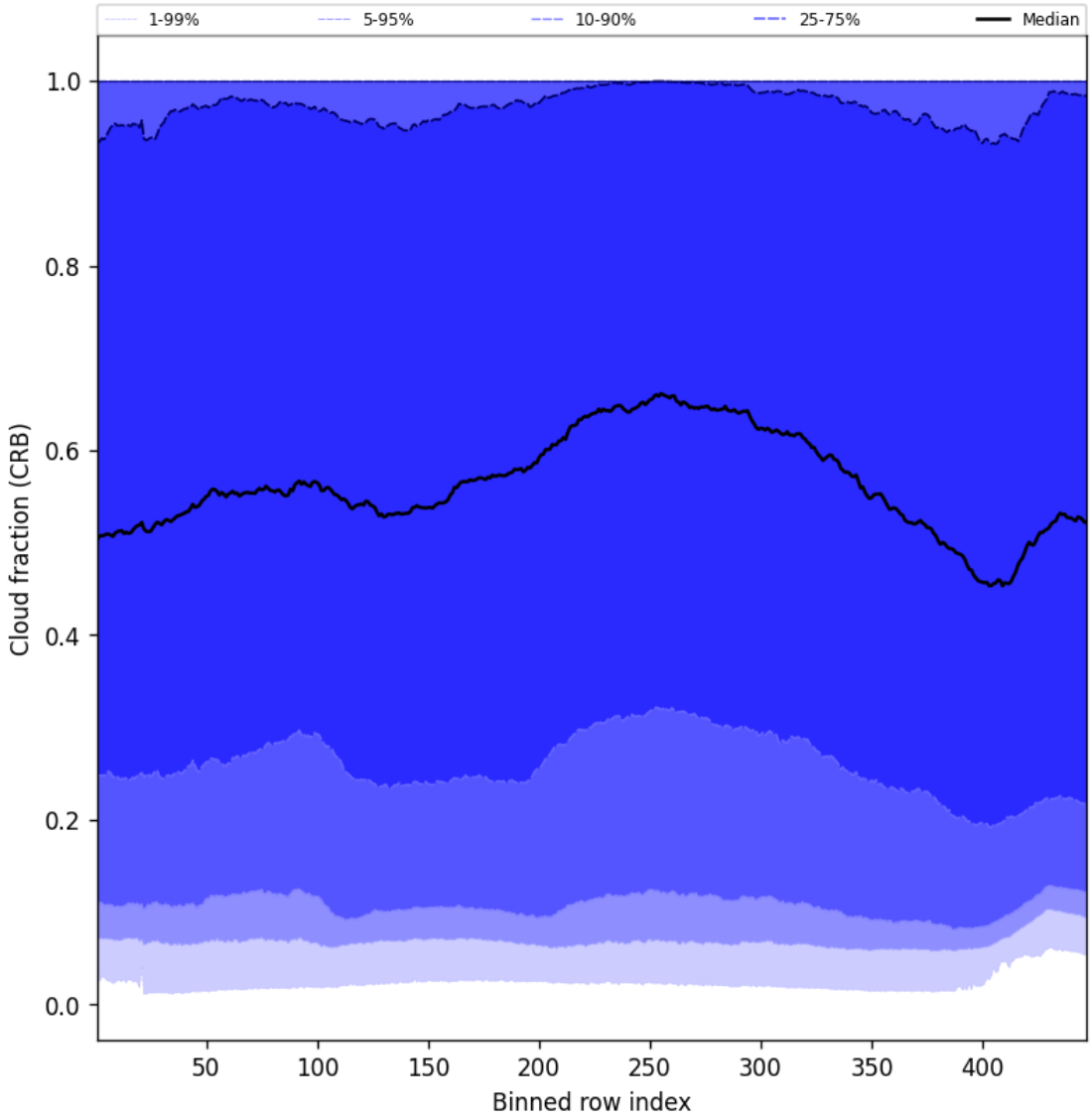


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22

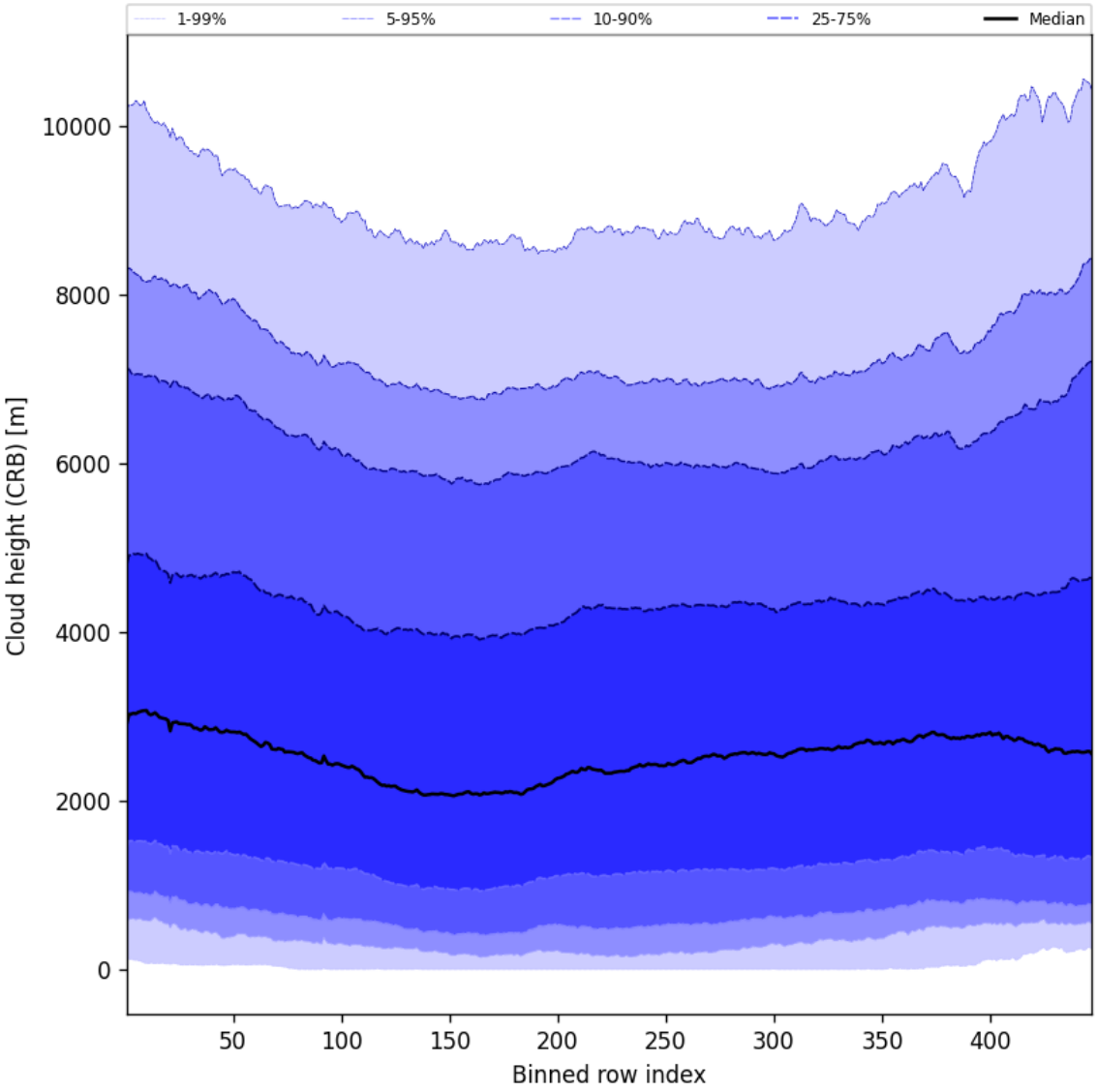


Figure 59: Along track statistics of “Cloud height (CRB)” for 2025-01-20 to 2025-01-22

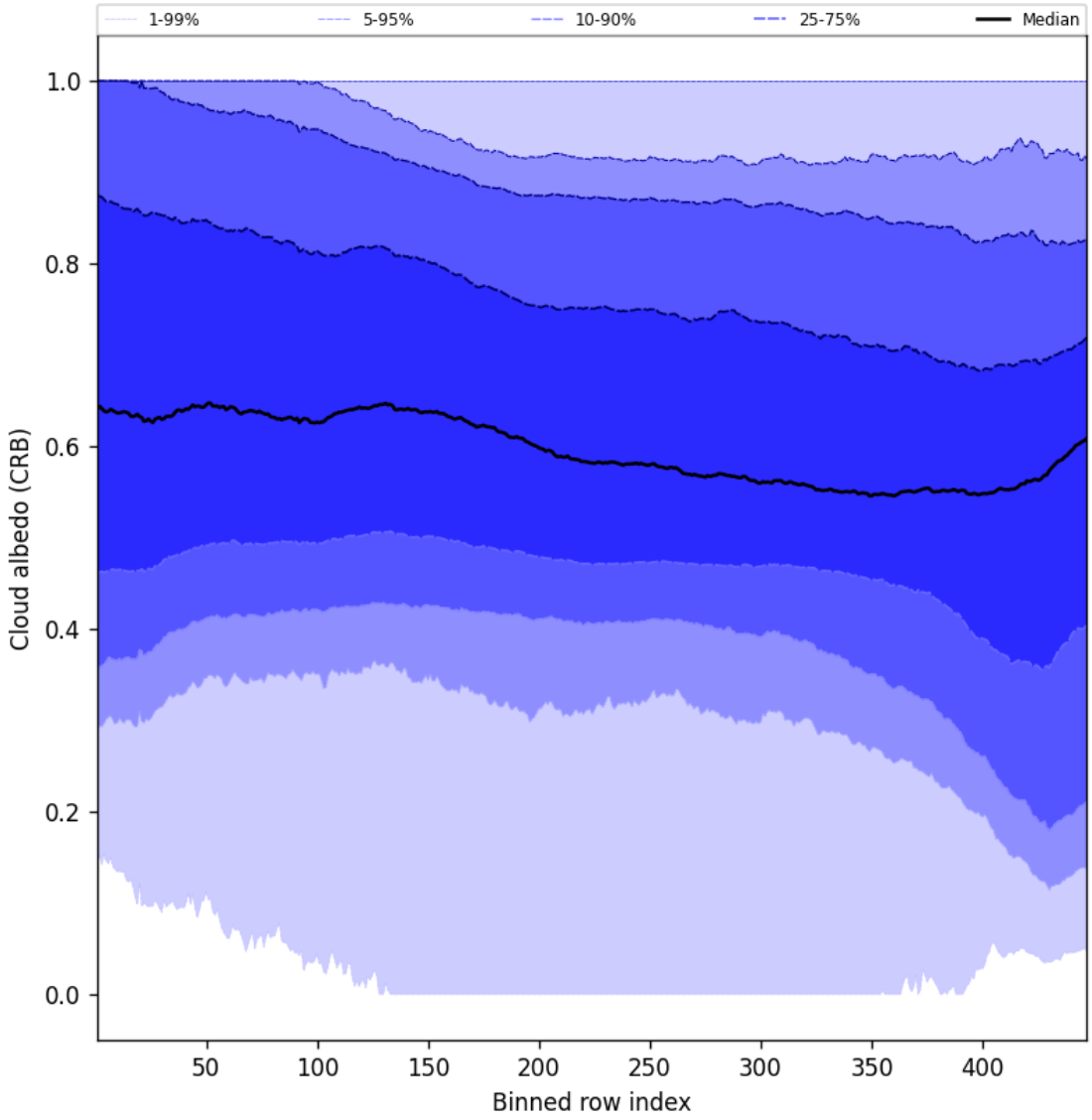


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22

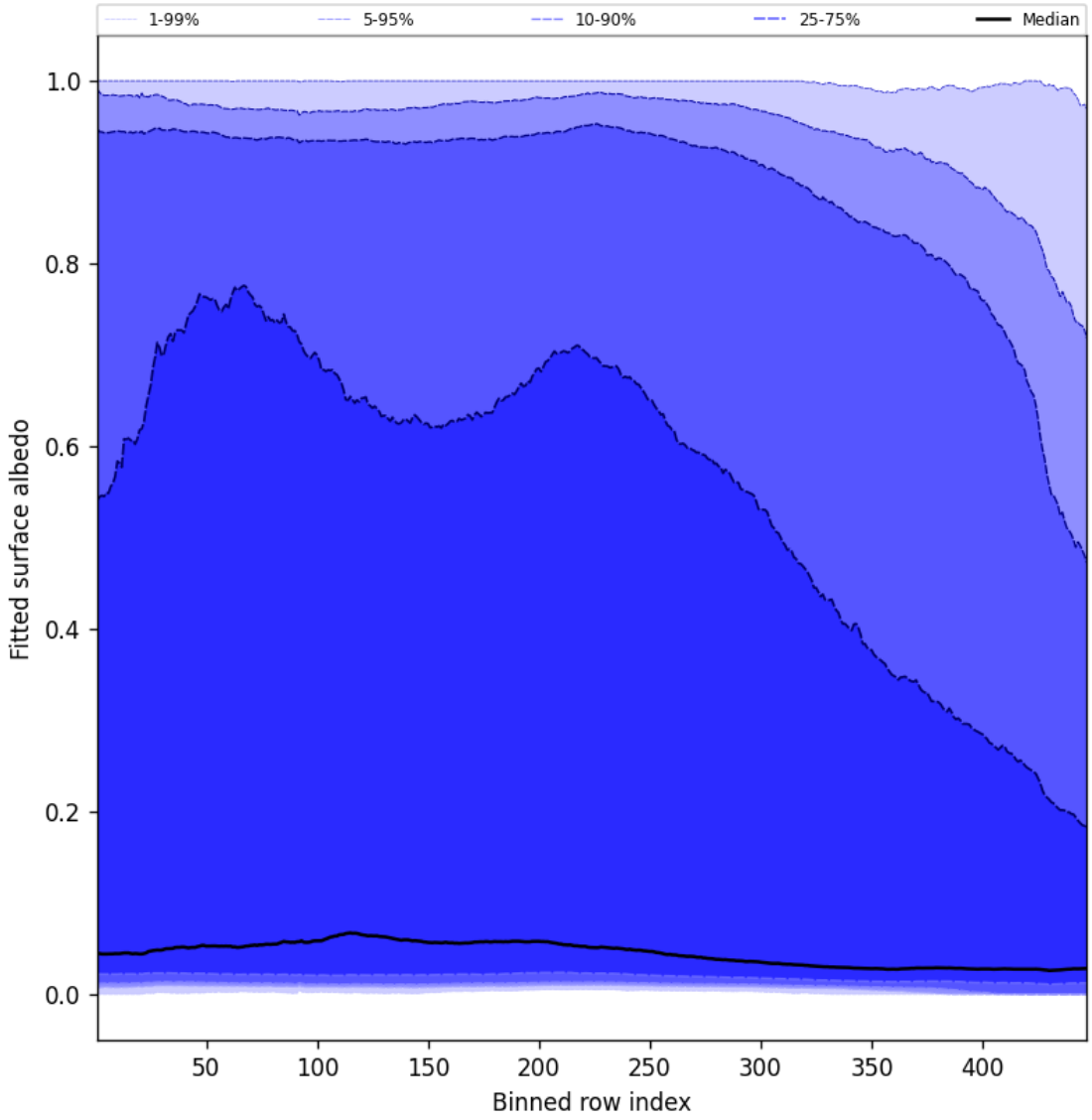


Figure 61: Along track statistics of “Fitted surface albedo” for 2025-01-20 to 2025-01-22

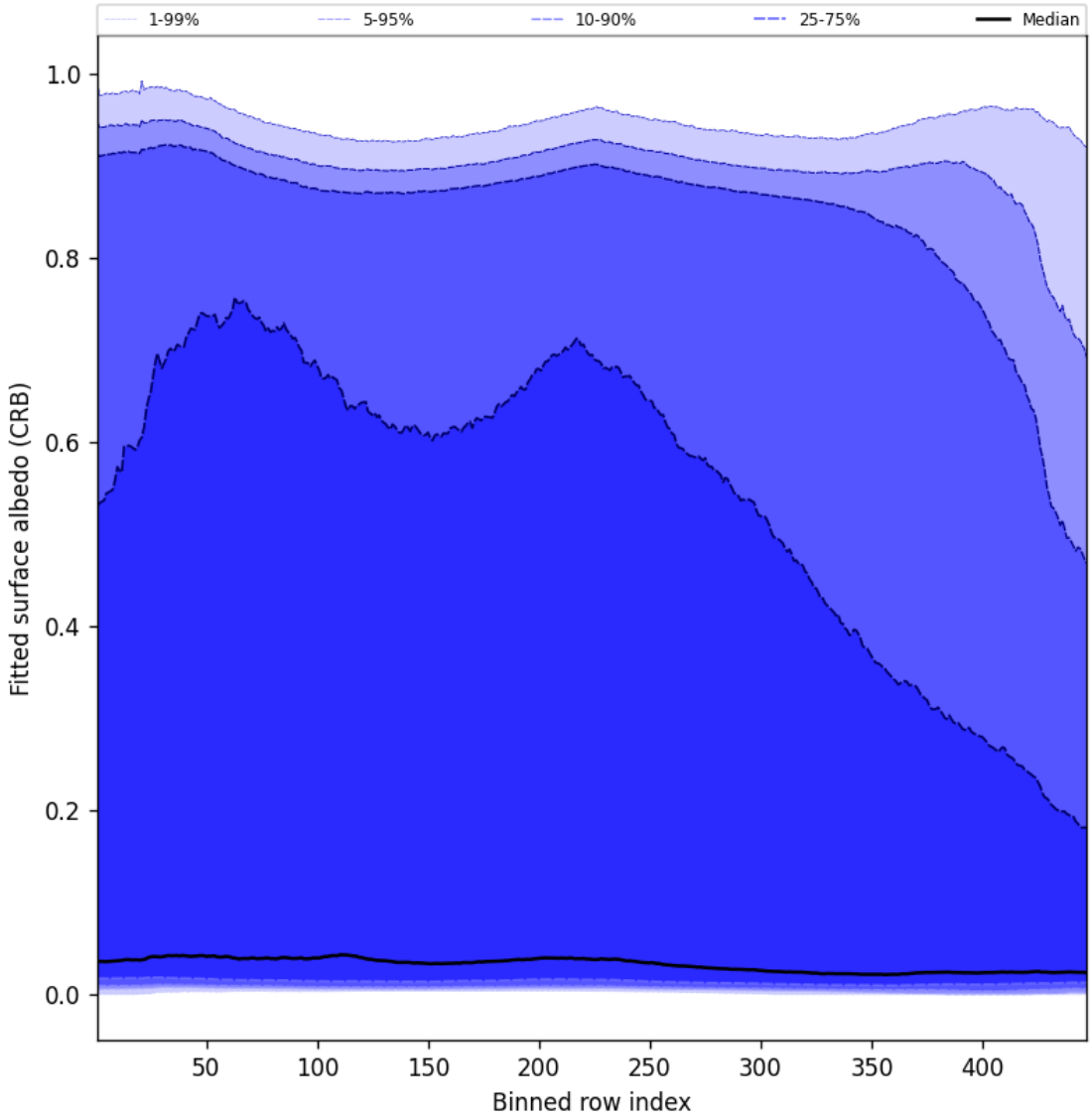


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2025-01-20 to 2025-01-22

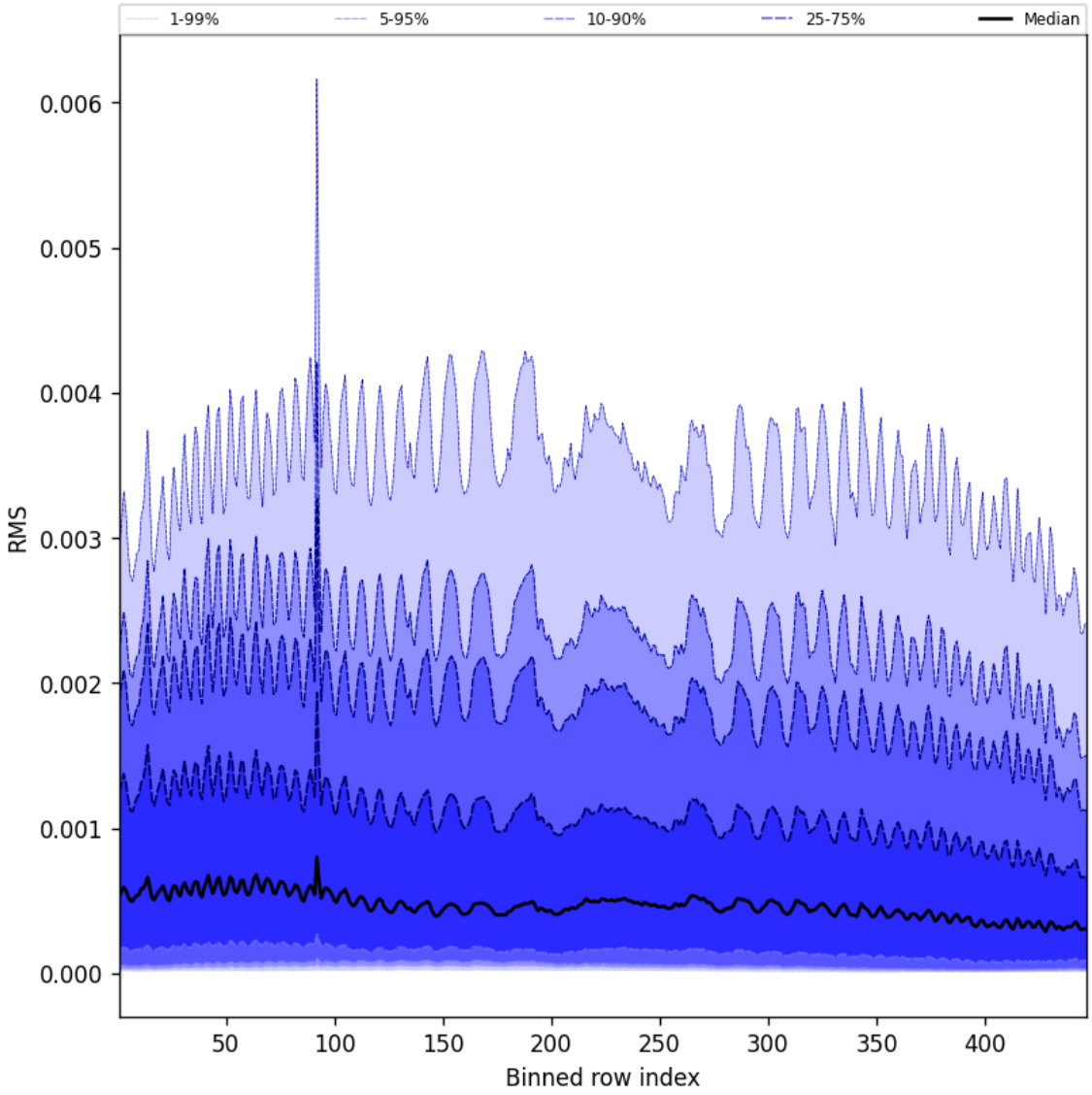


Figure 63: Along track statistics of “RMS” for 2025-01-20 to 2025-01-22

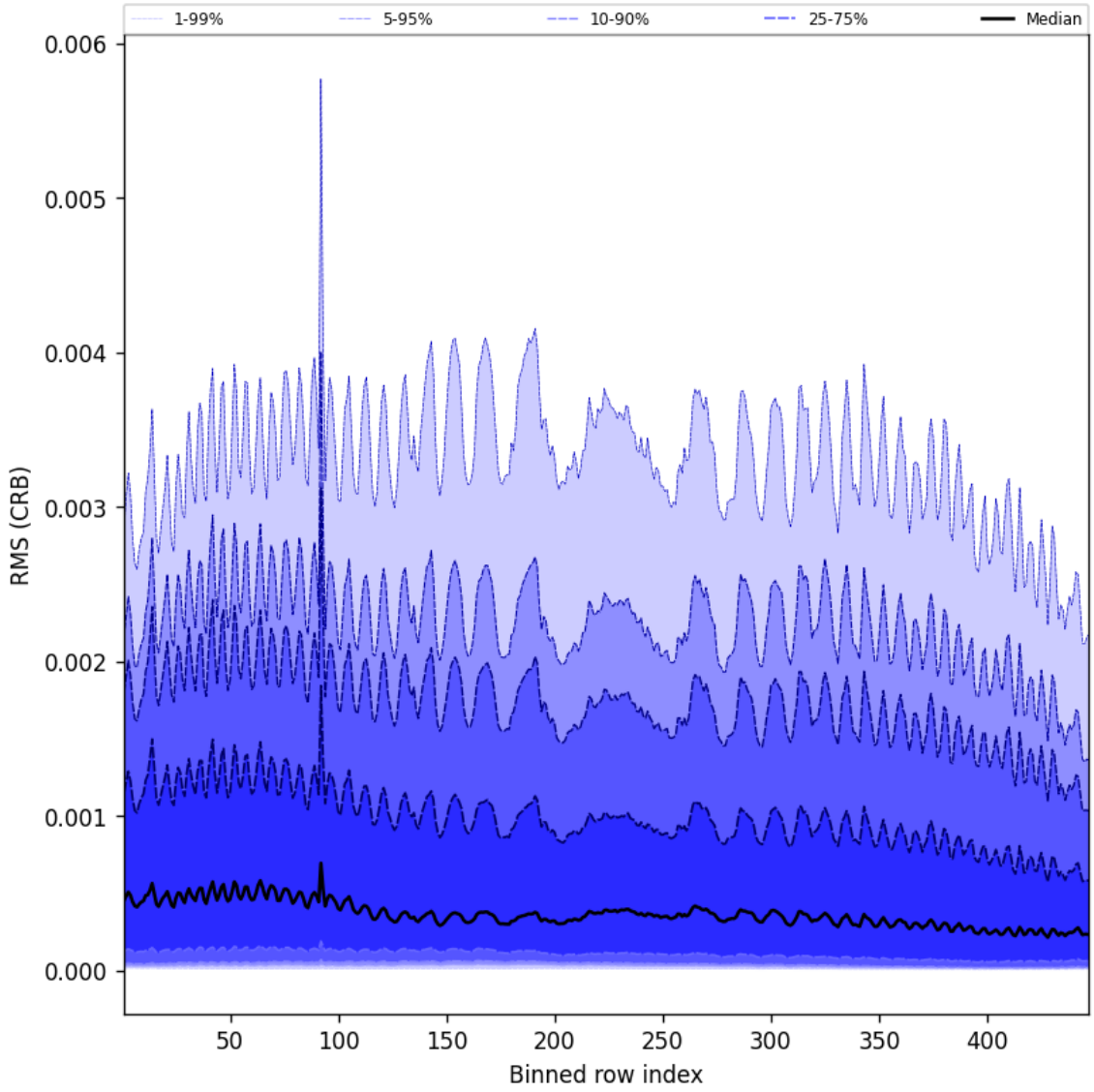


Figure 64: Along track statistics of “RMS (CRB)” for 2025-01-20 to 2025-01-22

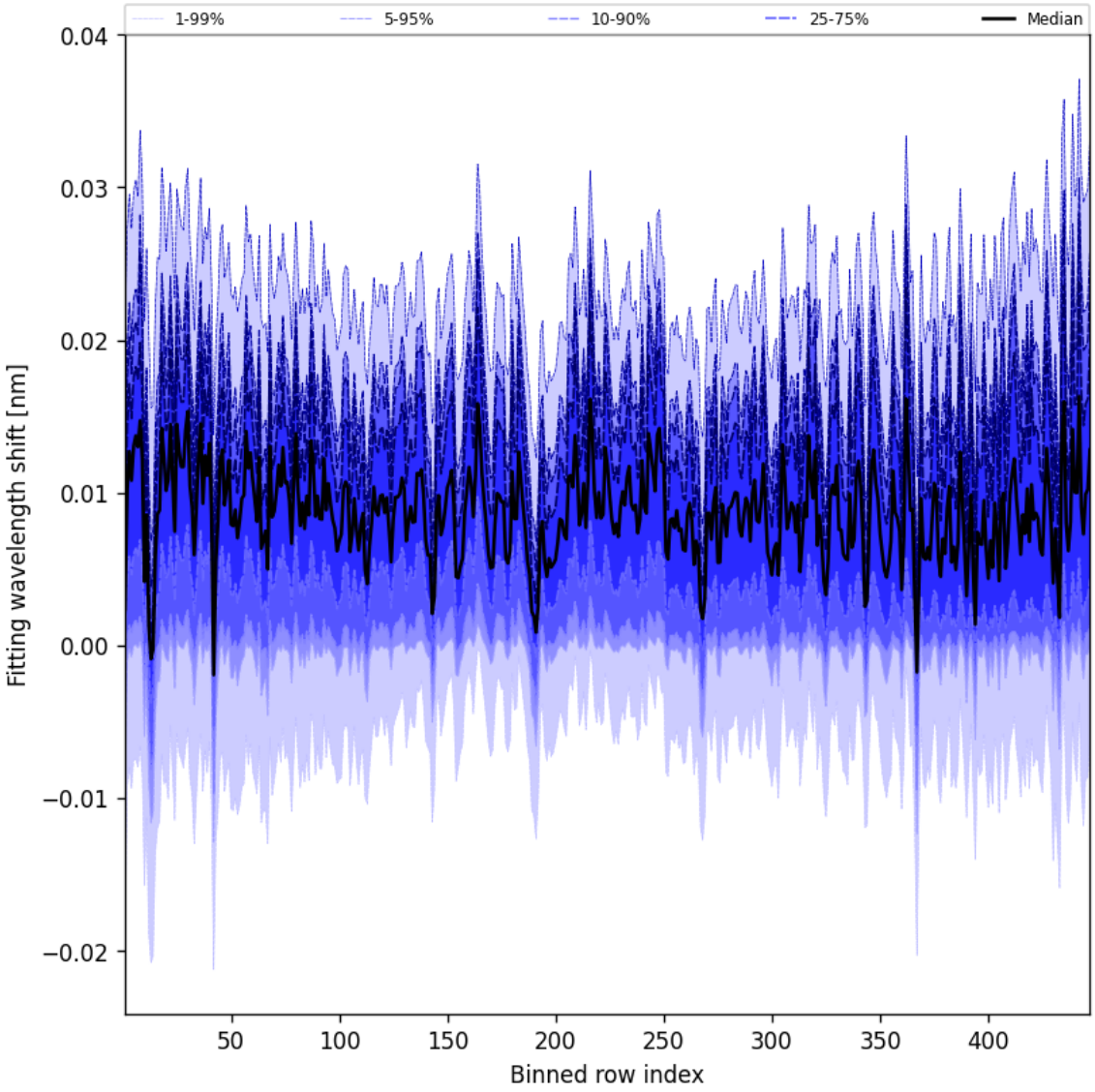


Figure 65: Along track statistics of “Fitting wavelength shift” for 2025-01-20 to 2025-01-22

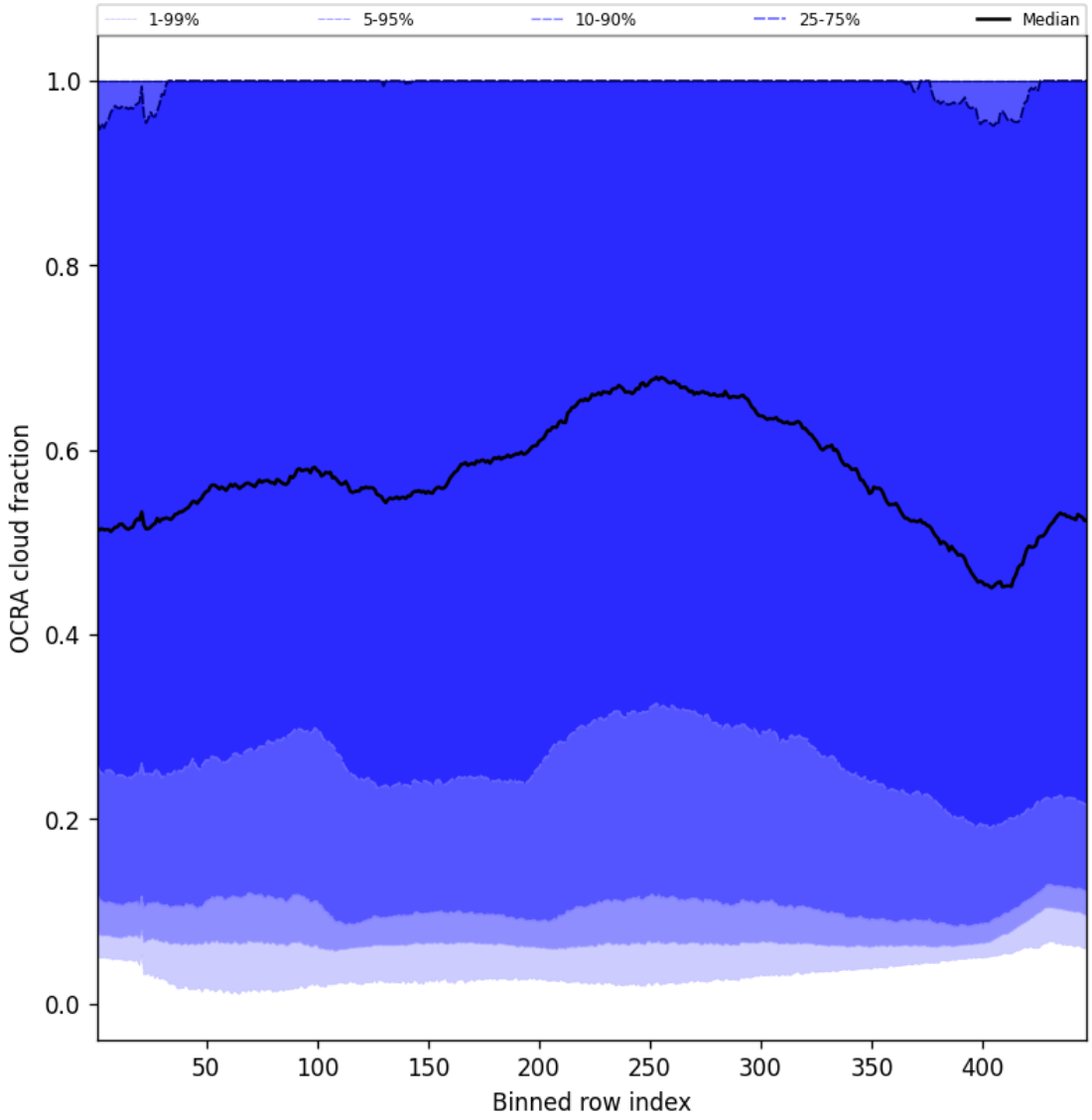


Figure 66: Along track statistics of “OCRA cloud fraction” for 2025-01-20 to 2025-01-22

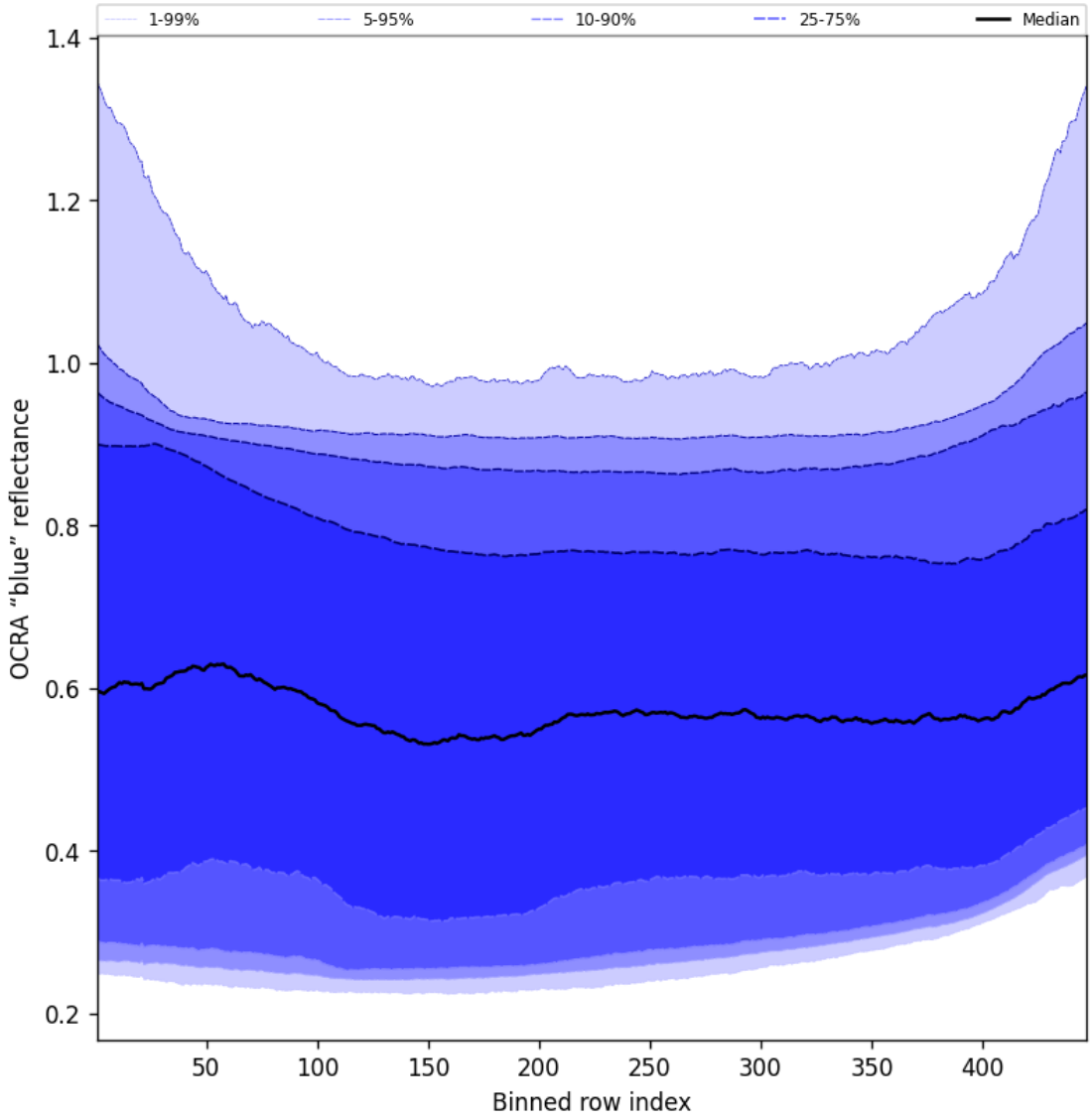


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2025-01-20 to 2025-01-22

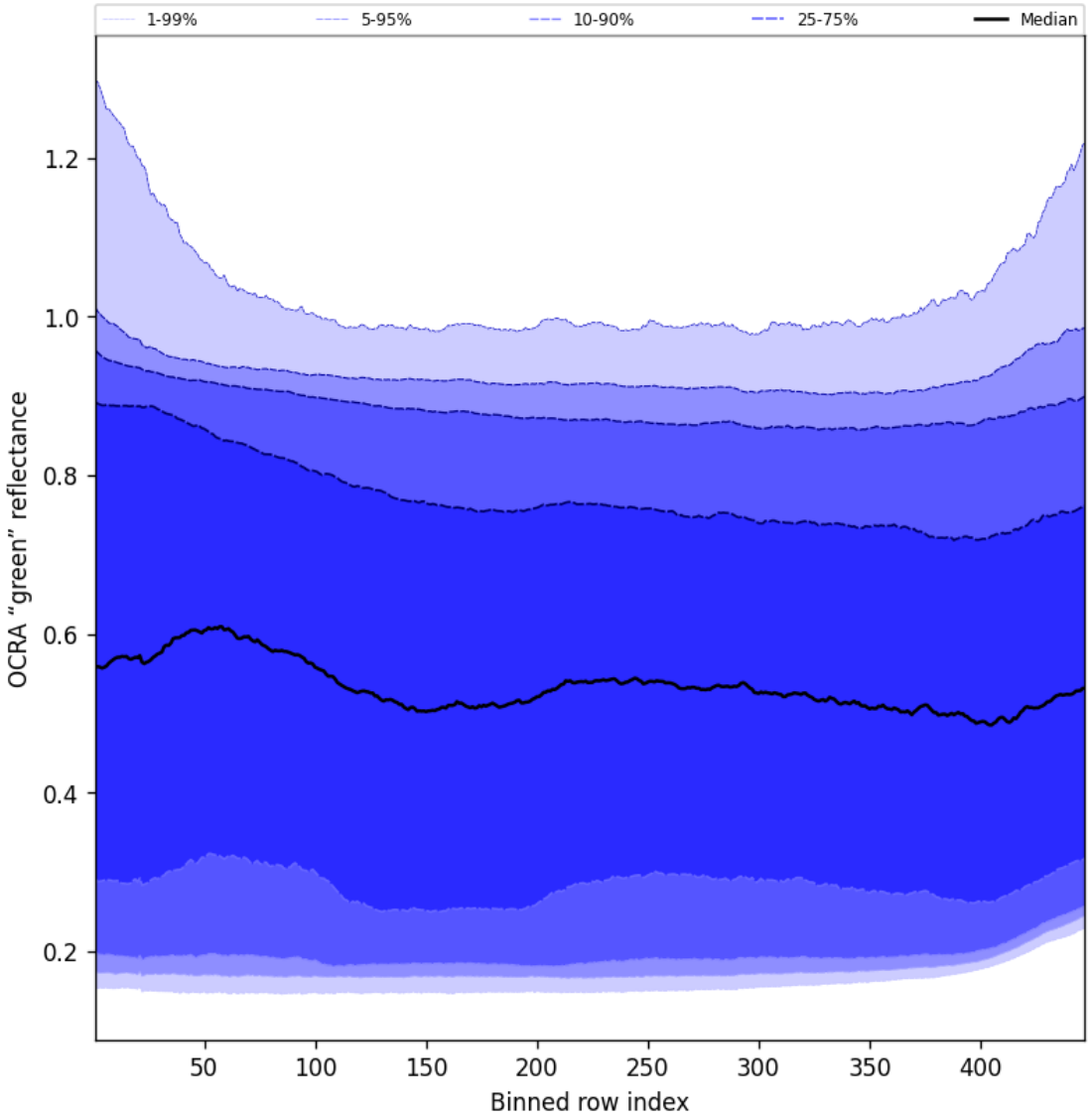


Figure 68: Along track statistics of "OCRA "green" reflectance" for 2025-01-20 to 2025-01-22

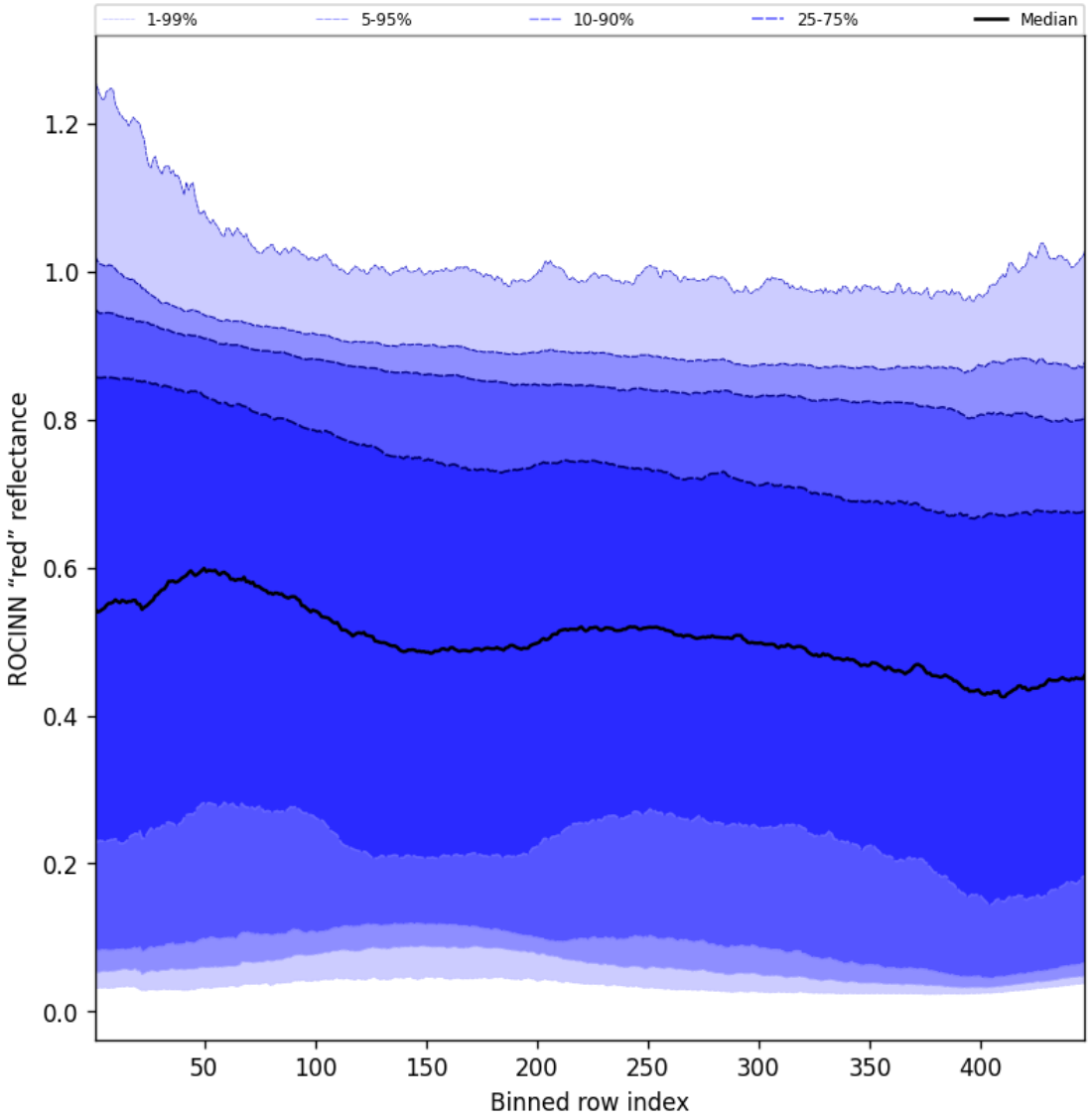


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2025-01-20 to 2025-01-22

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.

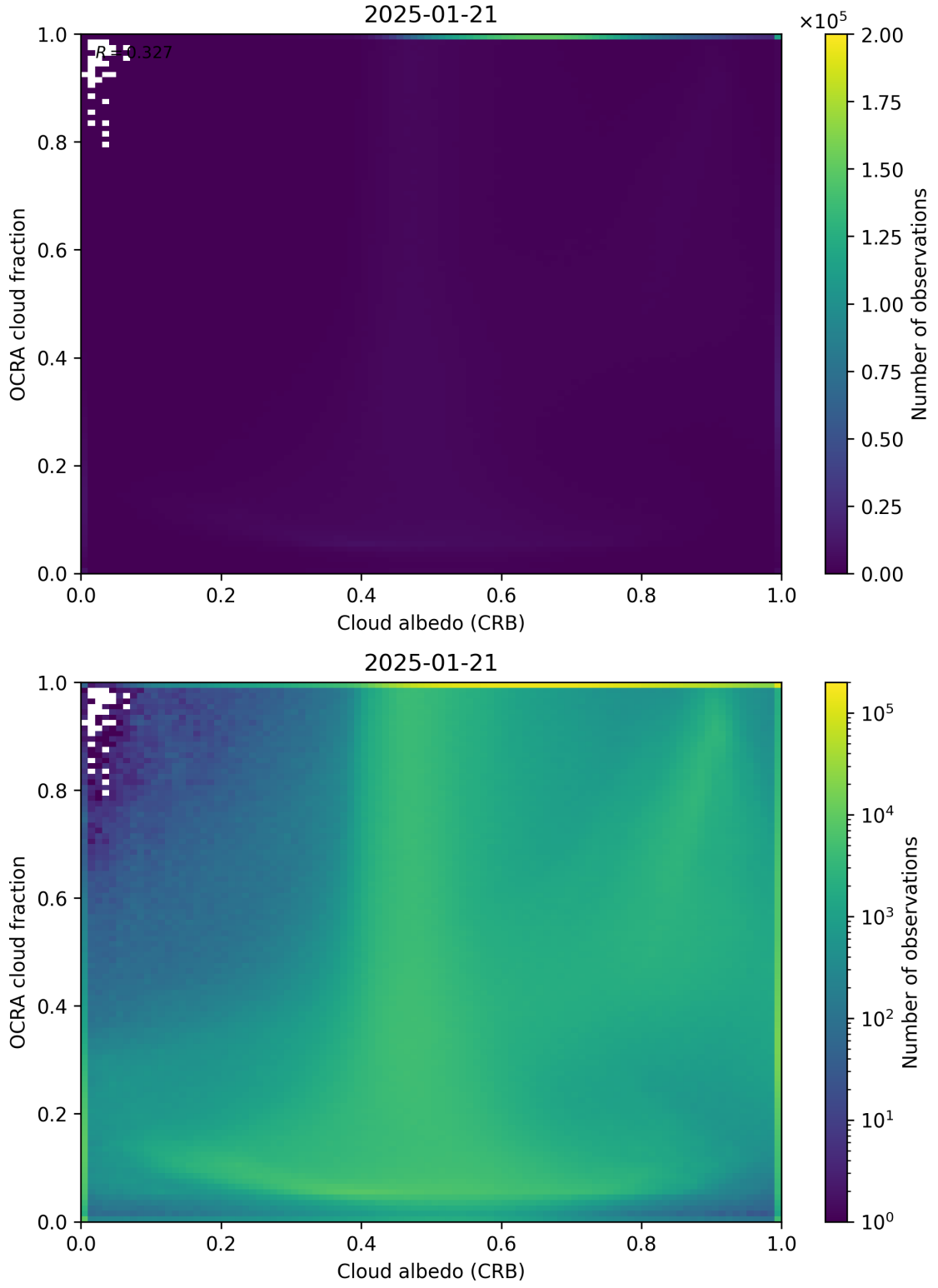


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2025-01-20 to 2025-01-22.

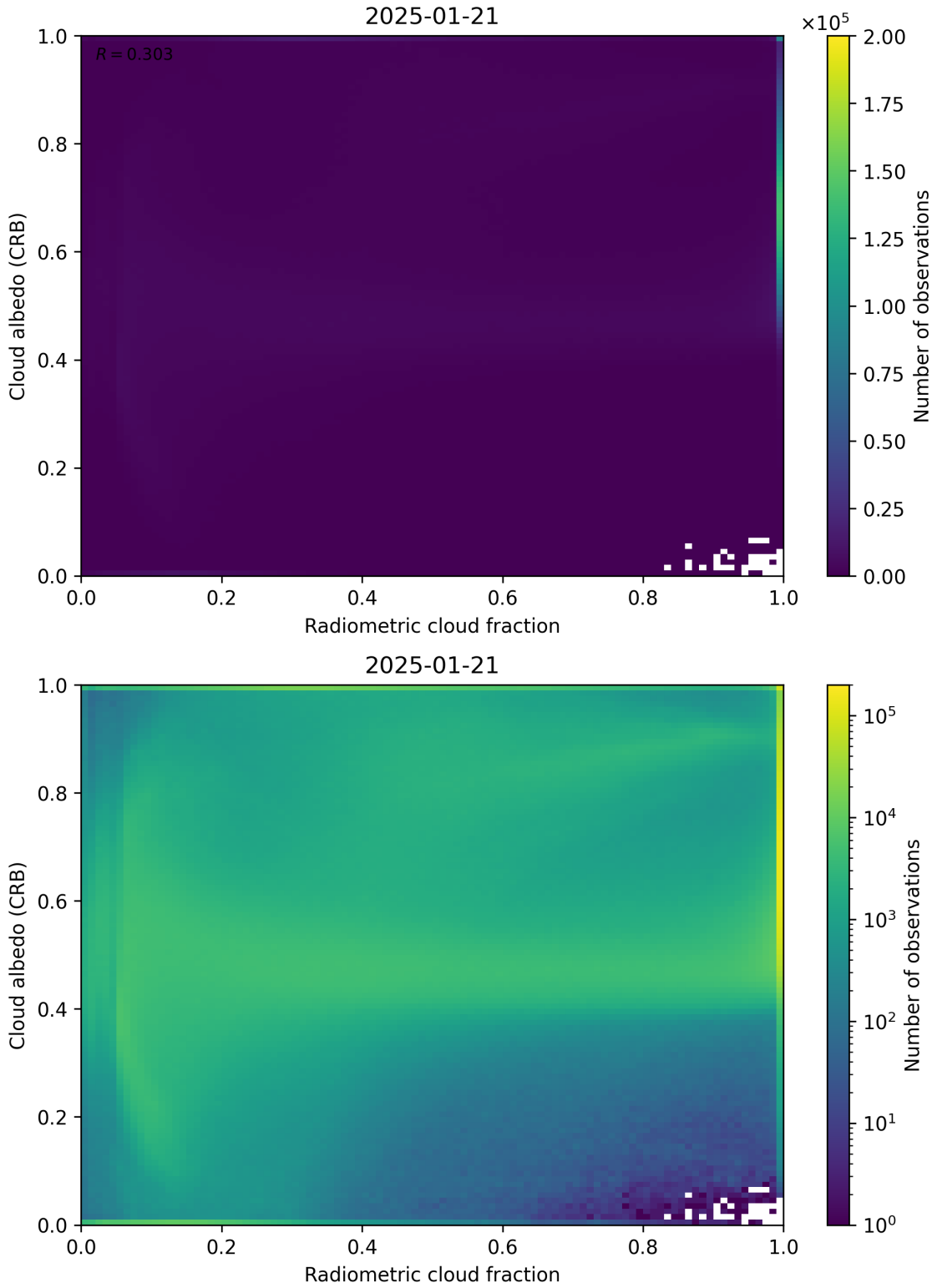


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22.

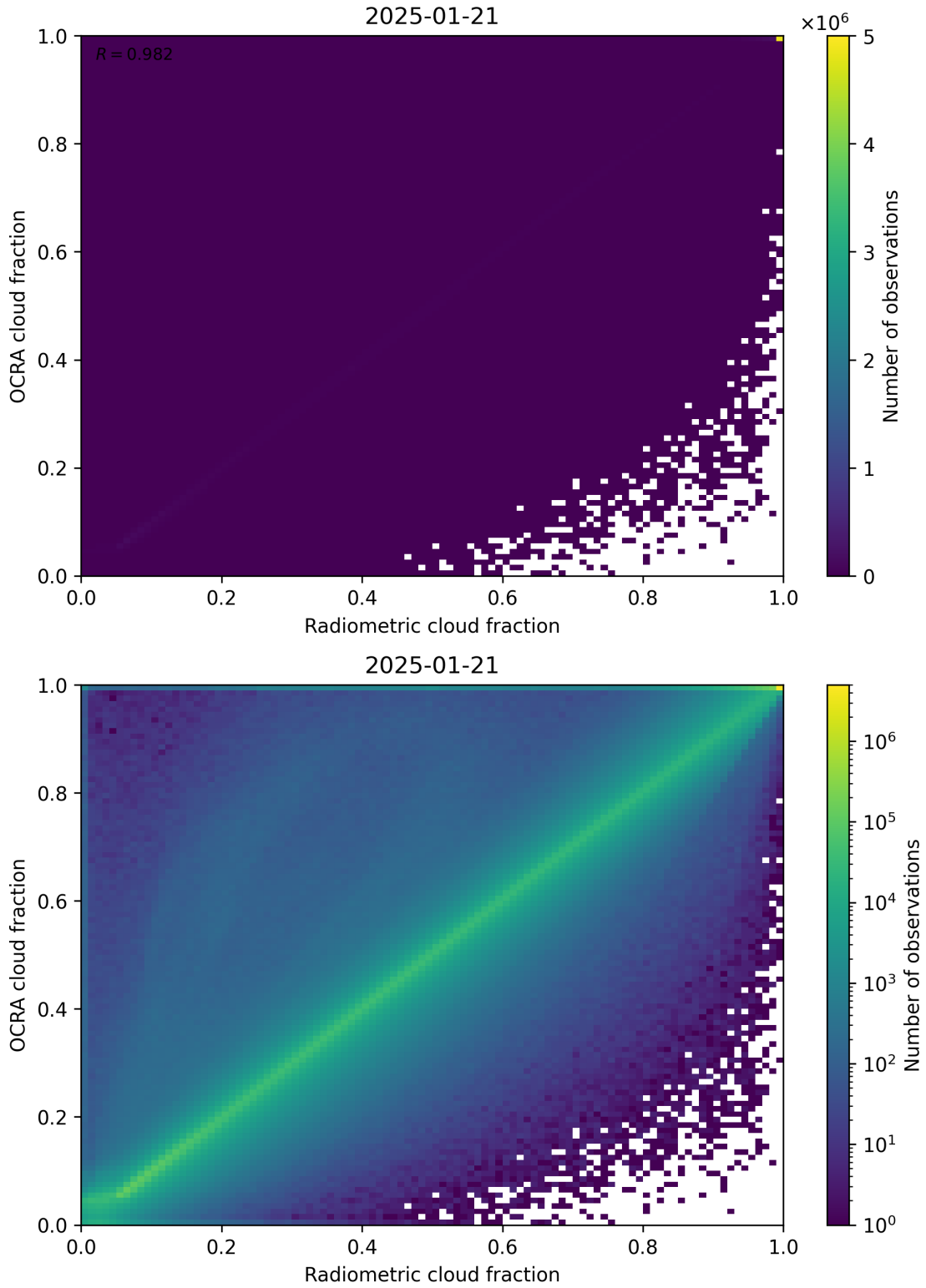


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2025-01-20 to 2025-01-22.

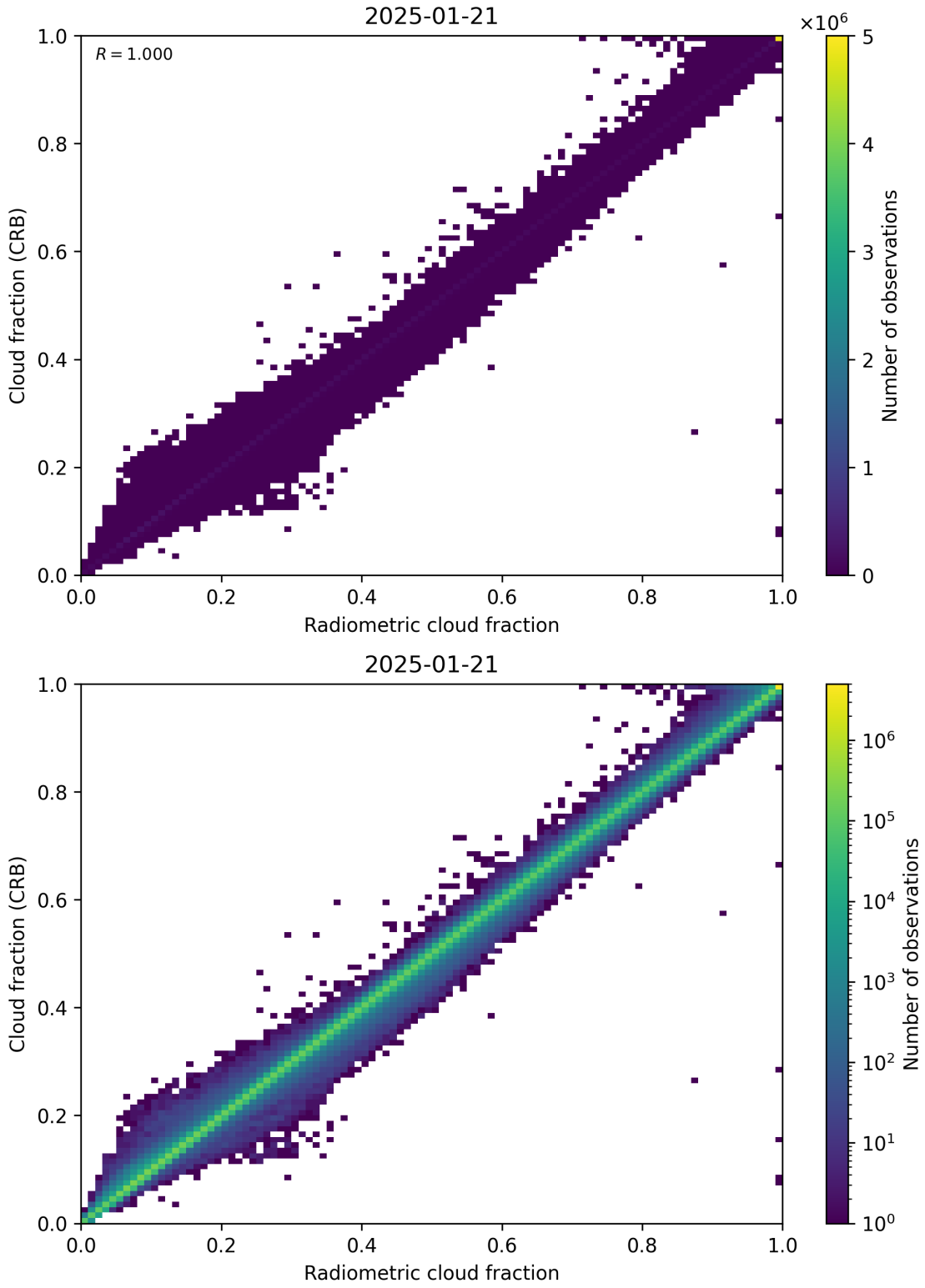


Figure 73: Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22.

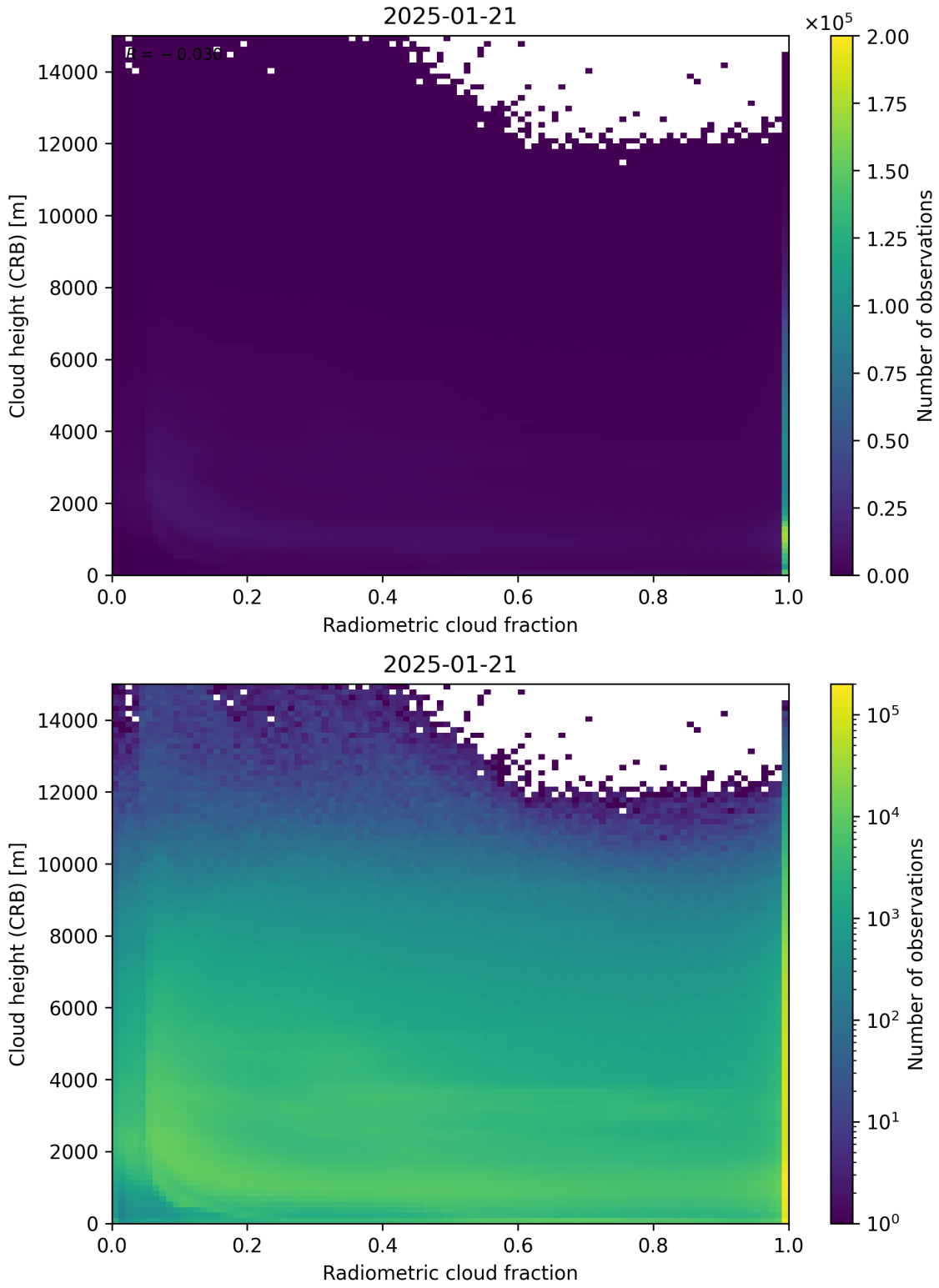


Figure 74: Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2025-01-20 to 2025-01-22.

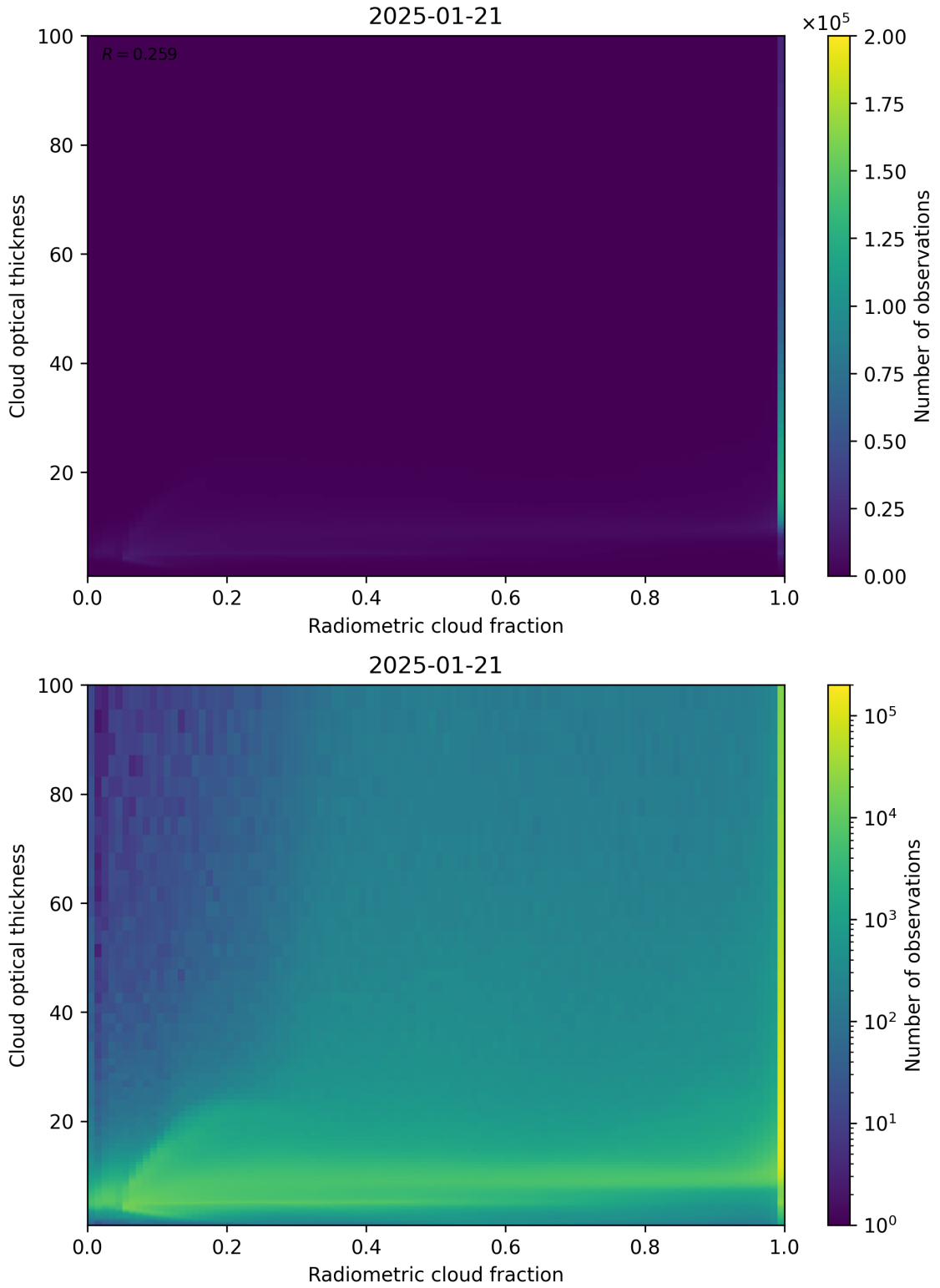


Figure 75: Scatter density plot of “Radiometric cloud fraction” against “Cloud optical thickness” for 2025-01-20 to 2025-01-22.

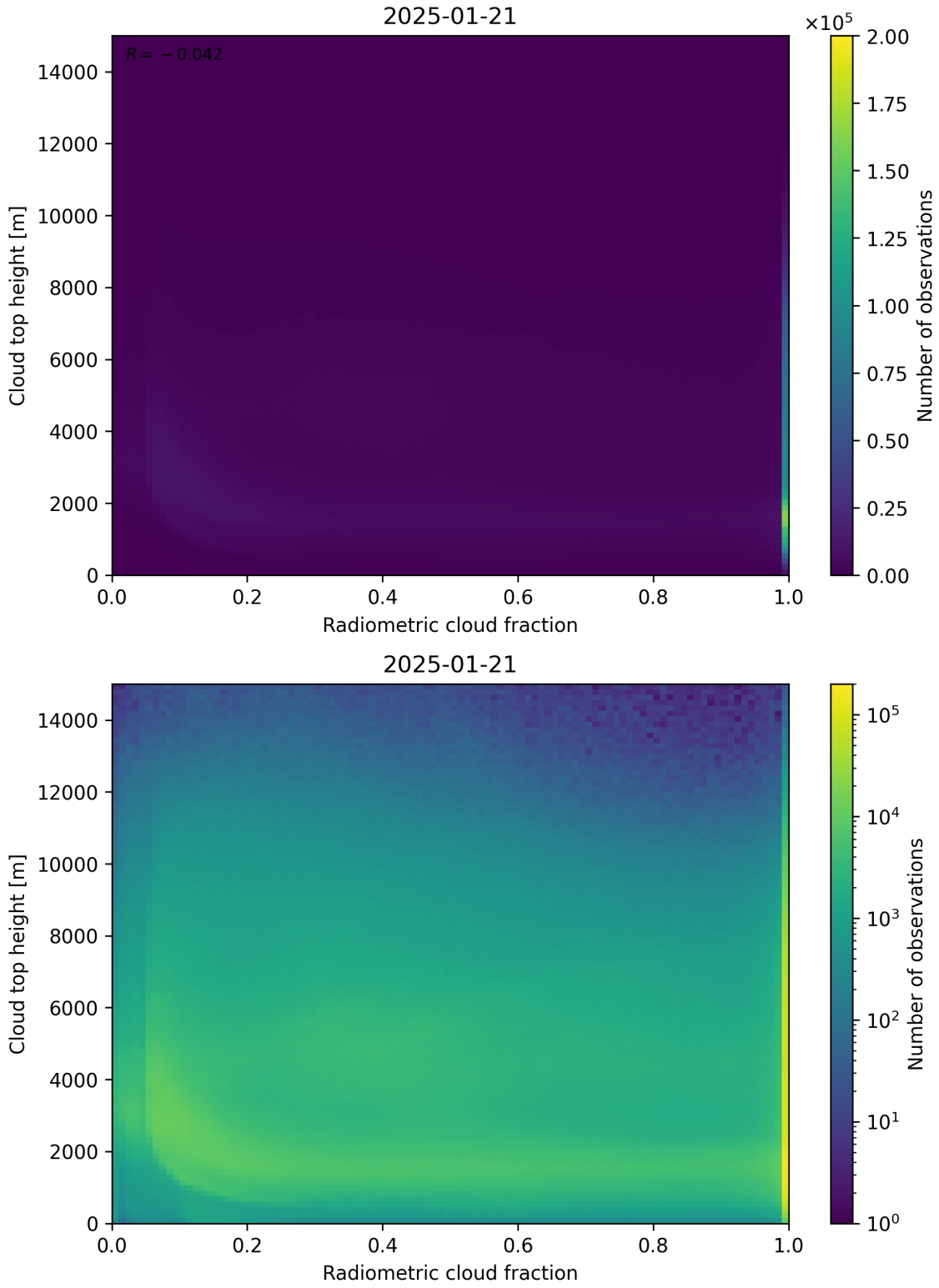


Figure 76: Scatter density plot of “Radiometric cloud fraction” against “Cloud top height” for 2025-01-20 to 2025-01-22.

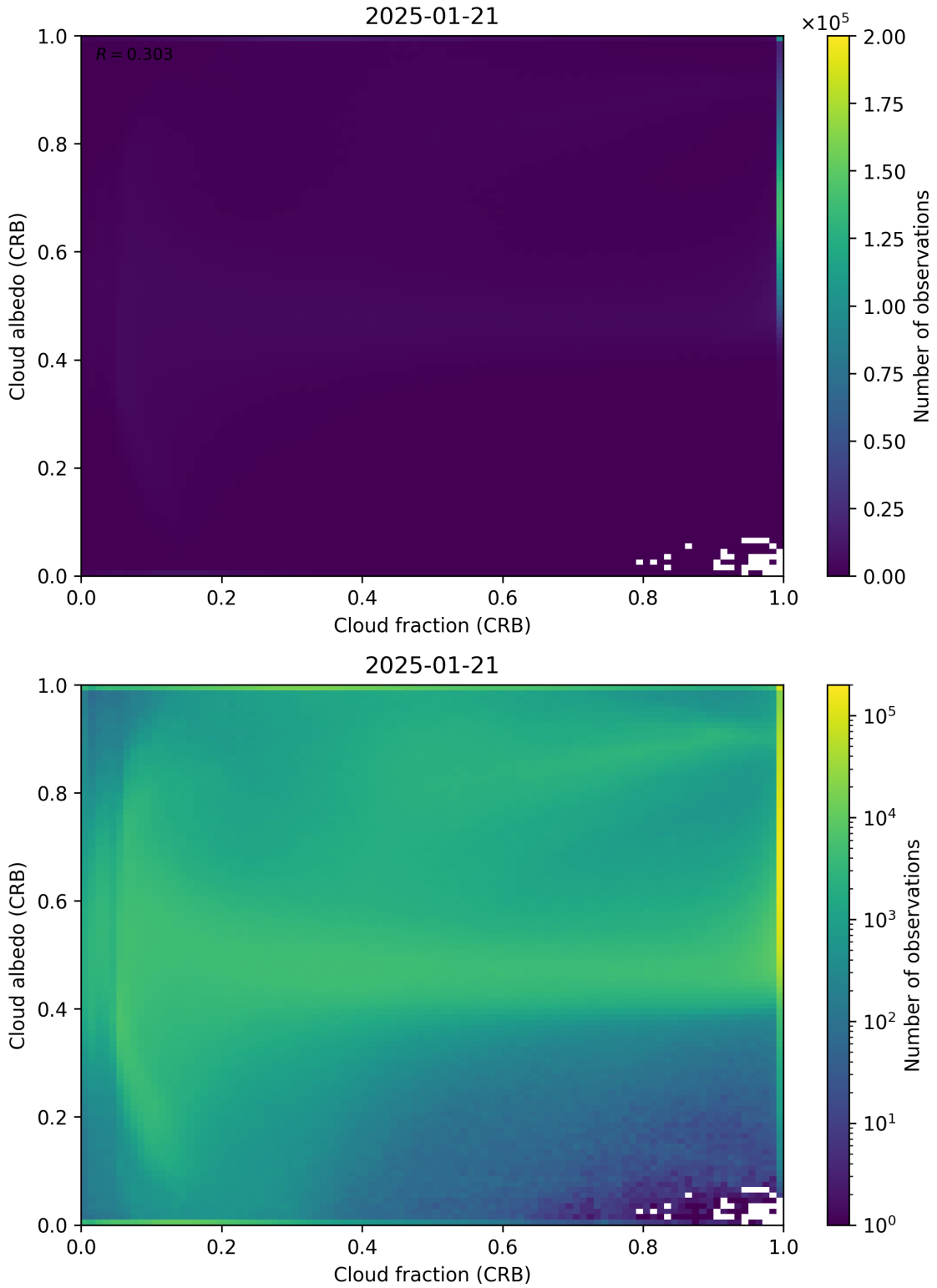


Figure 77: Scatter density plot of “Cloud fraction (CRB)” against “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22.

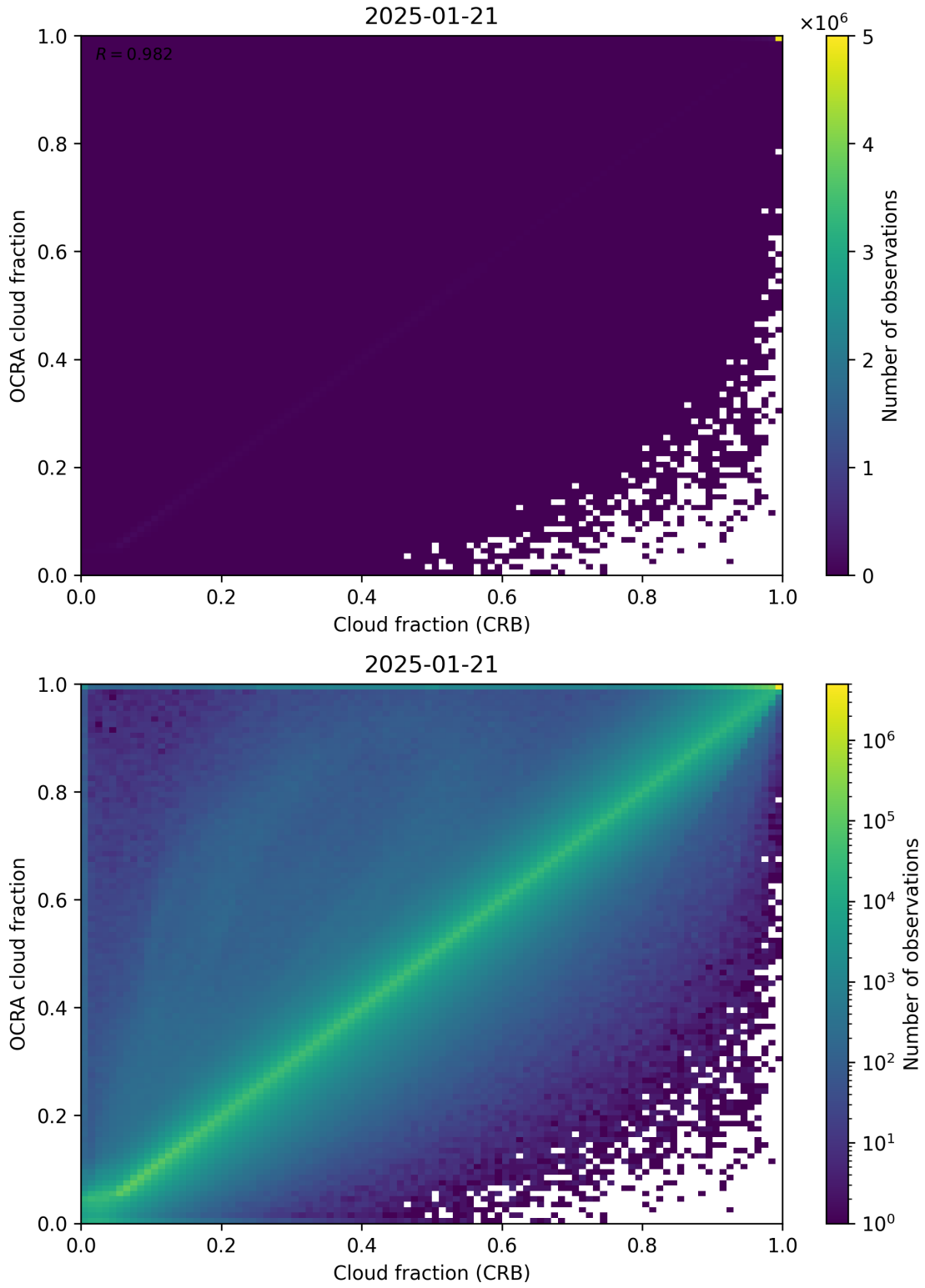


Figure 78: Scatter density plot of “Cloud fraction (CRB)” against “OCRA cloud fraction” for 2025-01-20 to 2025-01-22.

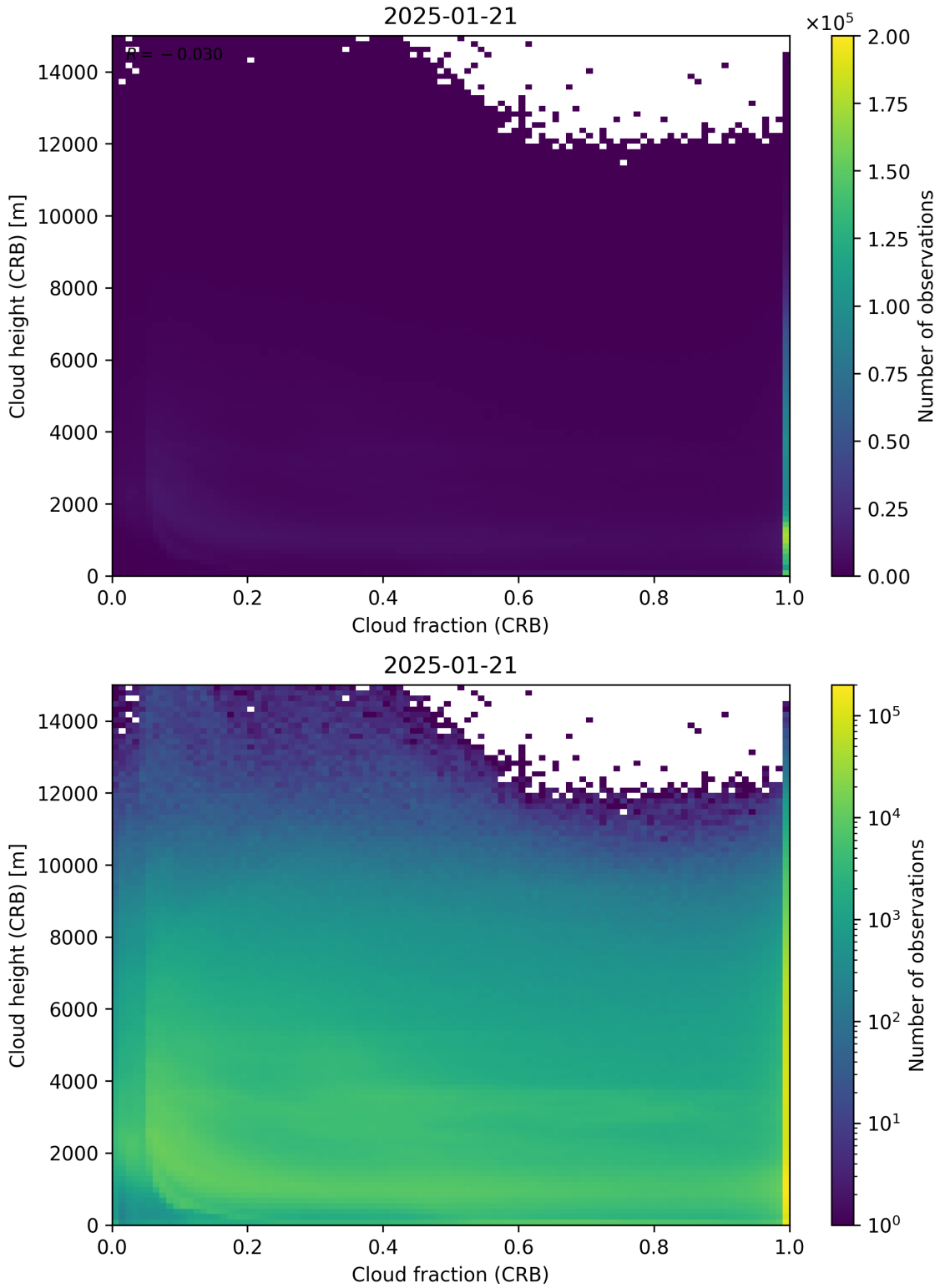


Figure 79: Scatter density plot of “Cloud fraction (CRB)” against “Cloud height (CRB)” for 2025-01-20 to 2025-01-22.

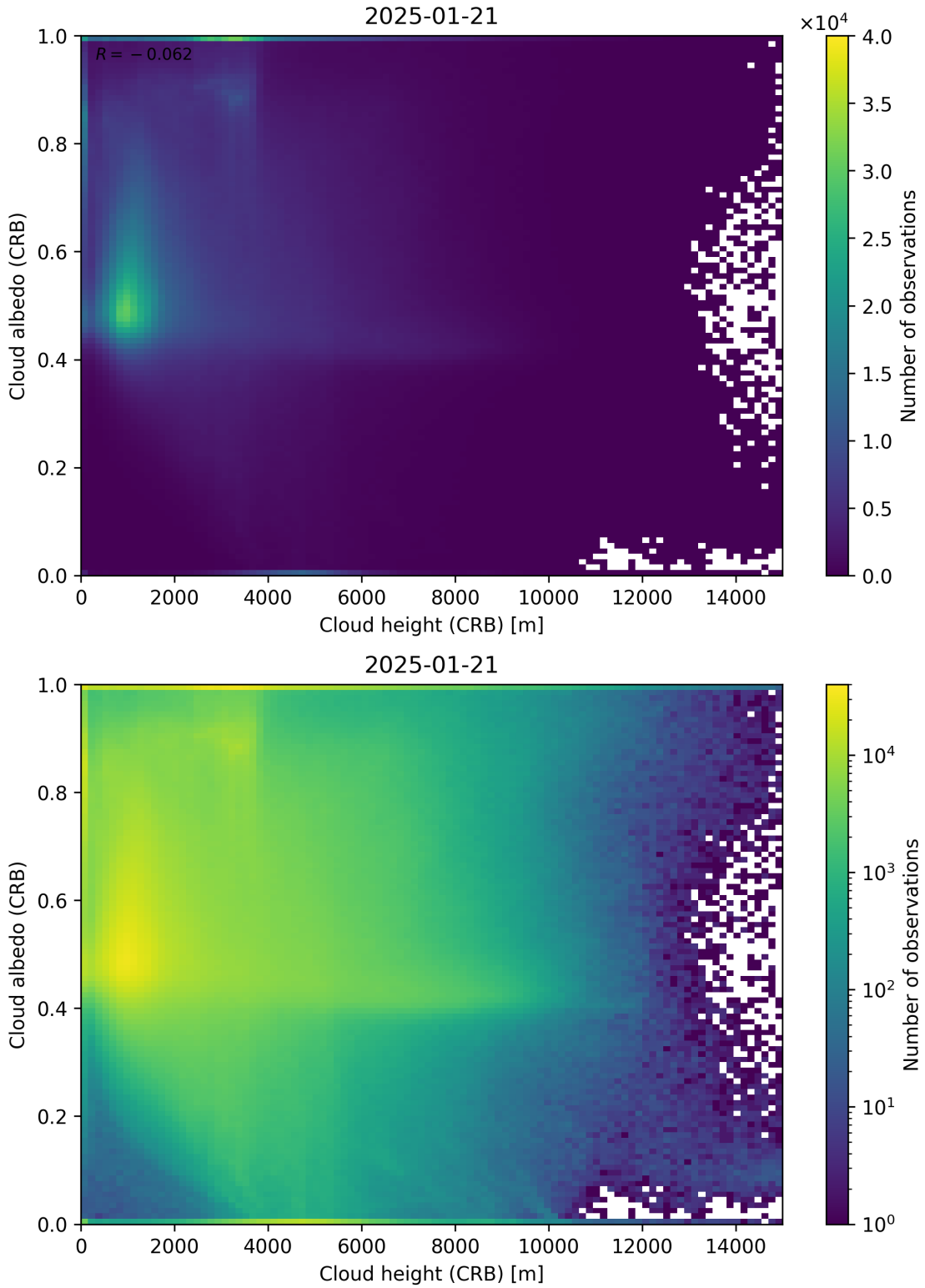


Figure 80: Scatter density plot of “Cloud height (CRB)” against “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22.

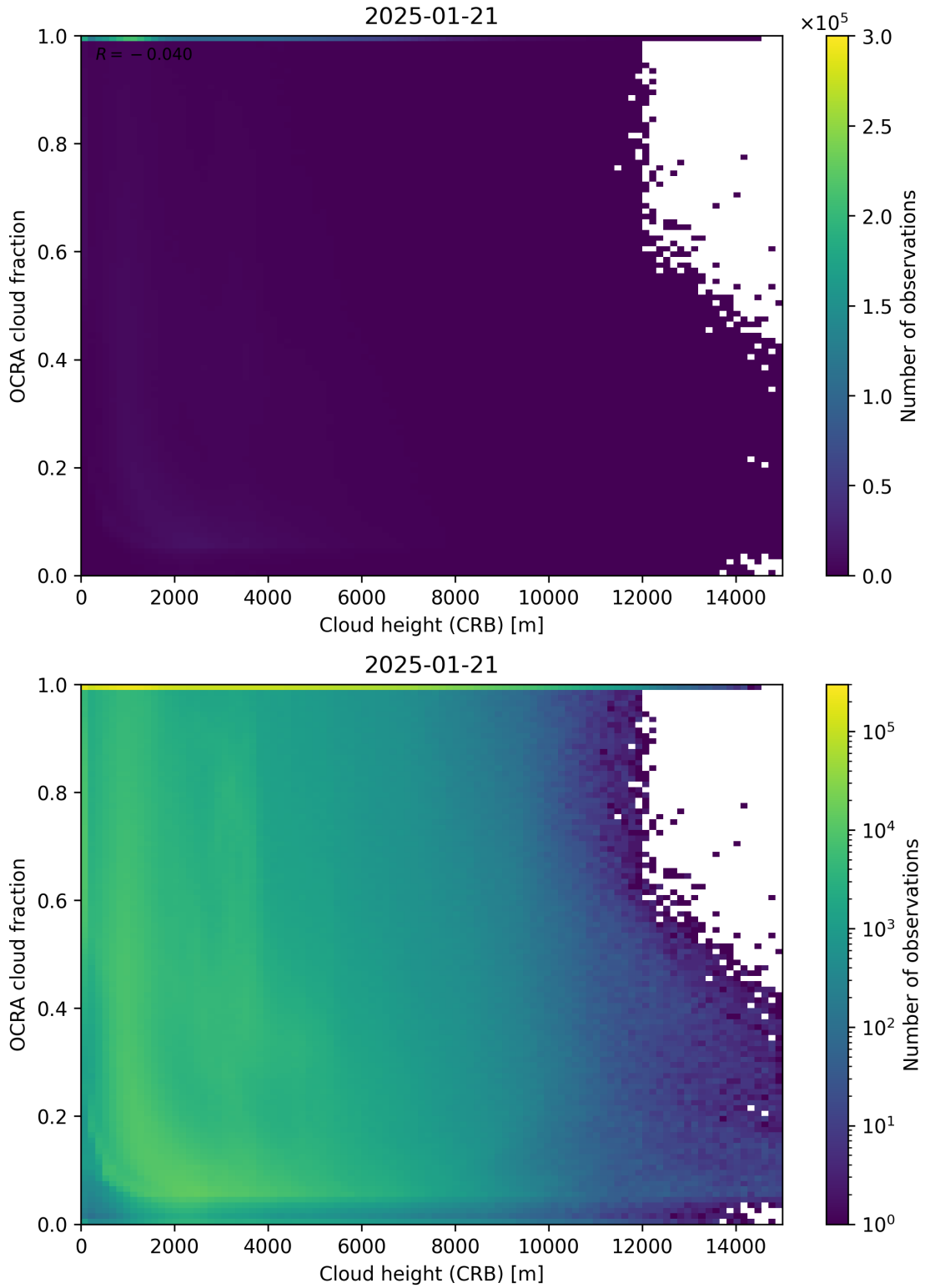


Figure 81: Scatter density plot of “Cloud height (CRB)” against “OCRA cloud fraction” for 2025-01-20 to 2025-01-22.

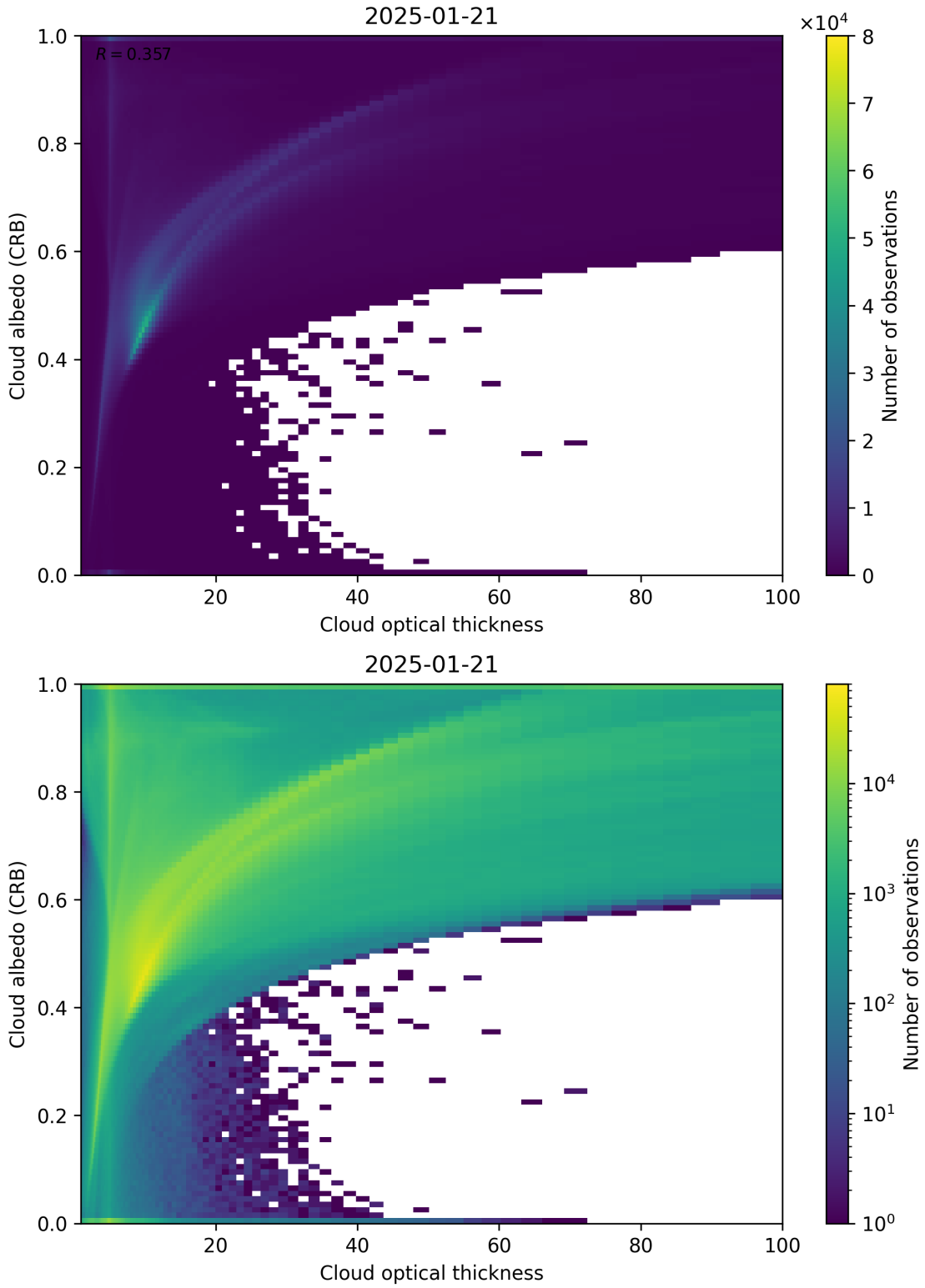


Figure 82: Scatter density plot of “Cloud optical thickness” against “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22.

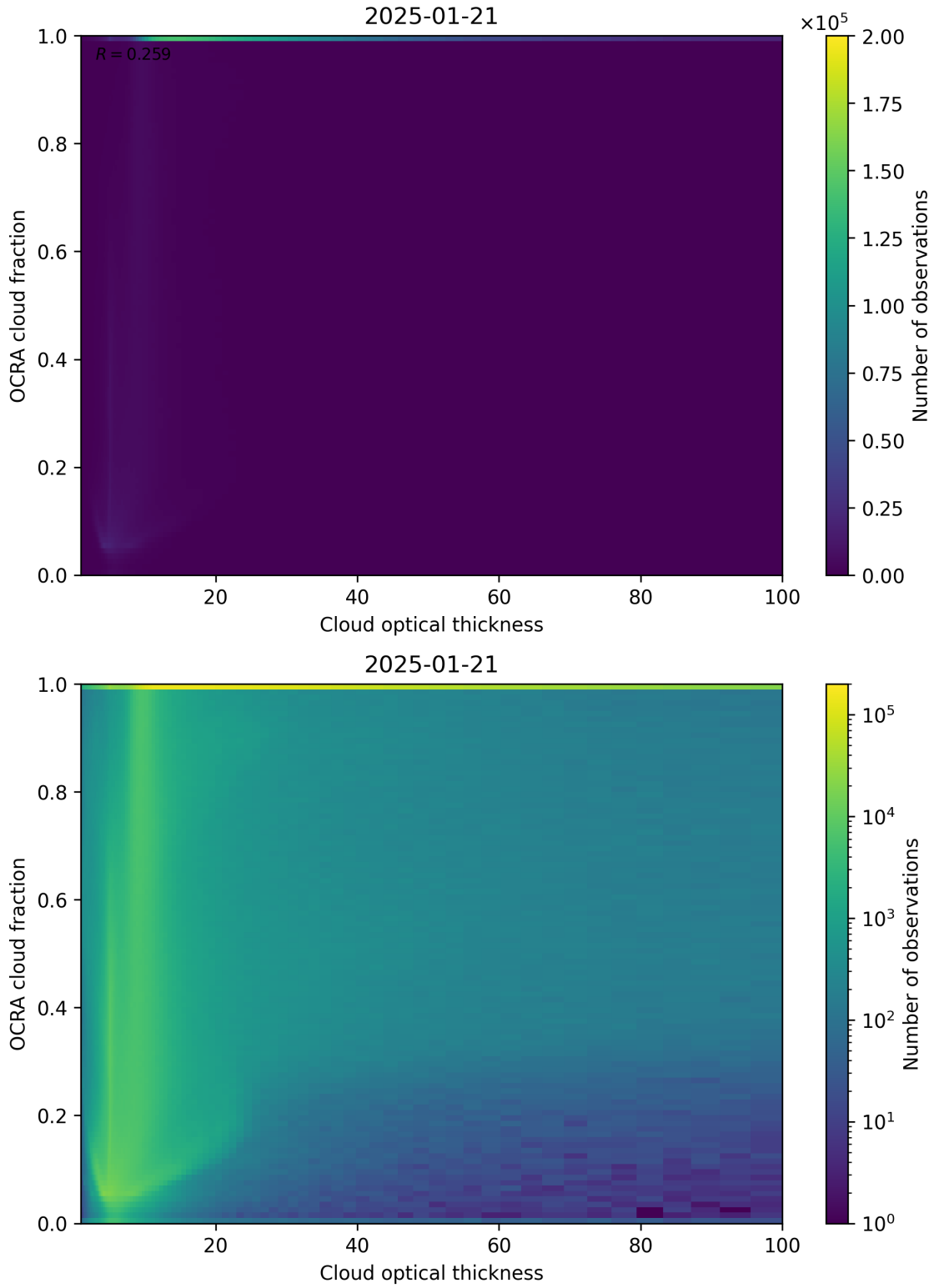


Figure 83: Scatter density plot of “Cloud optical thickness” against “OCRA cloud fraction” for 2025-01-20 to 2025-01-22.

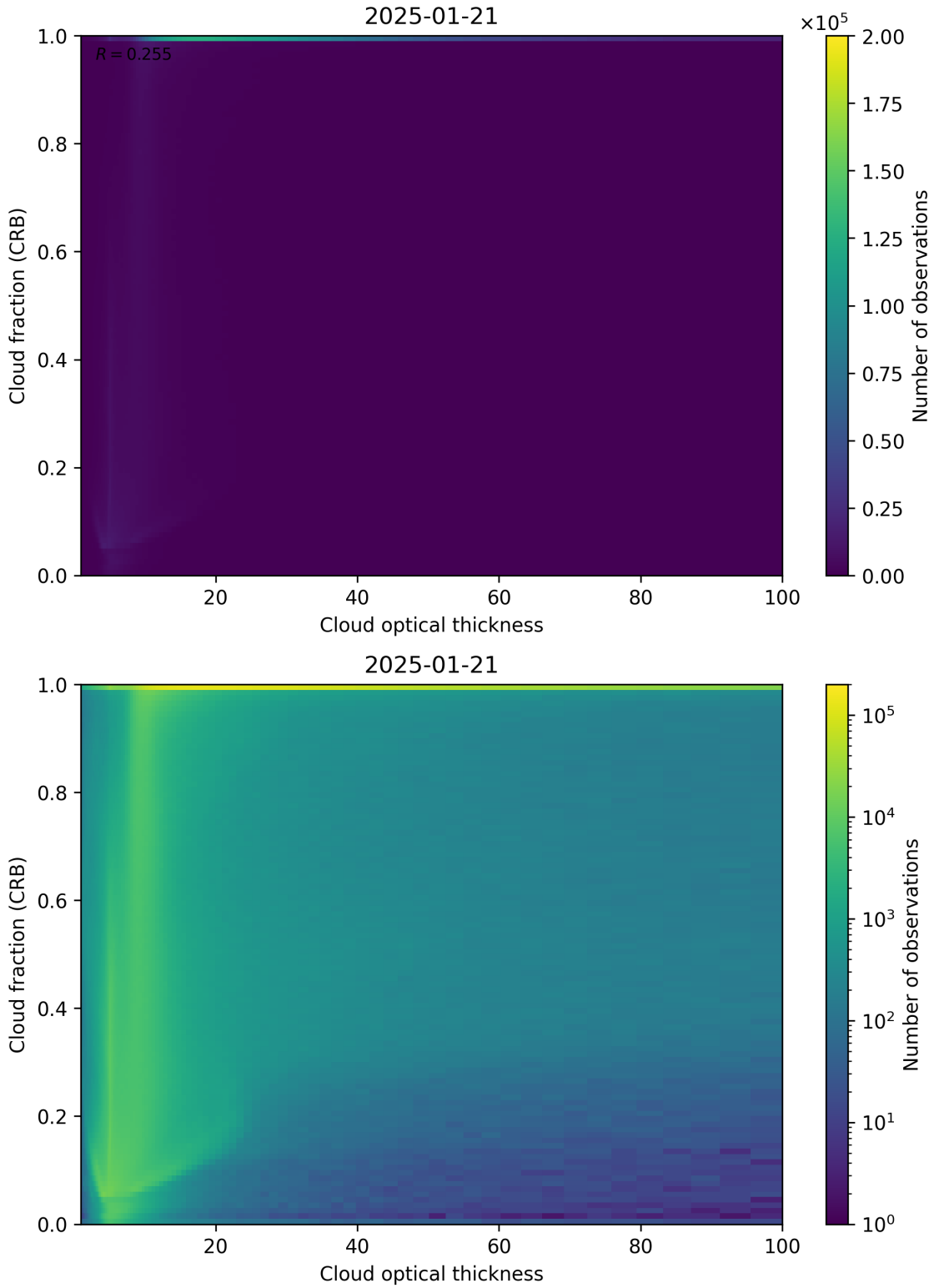


Figure 84: Scatter density plot of “Cloud optical thickness” against “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22.

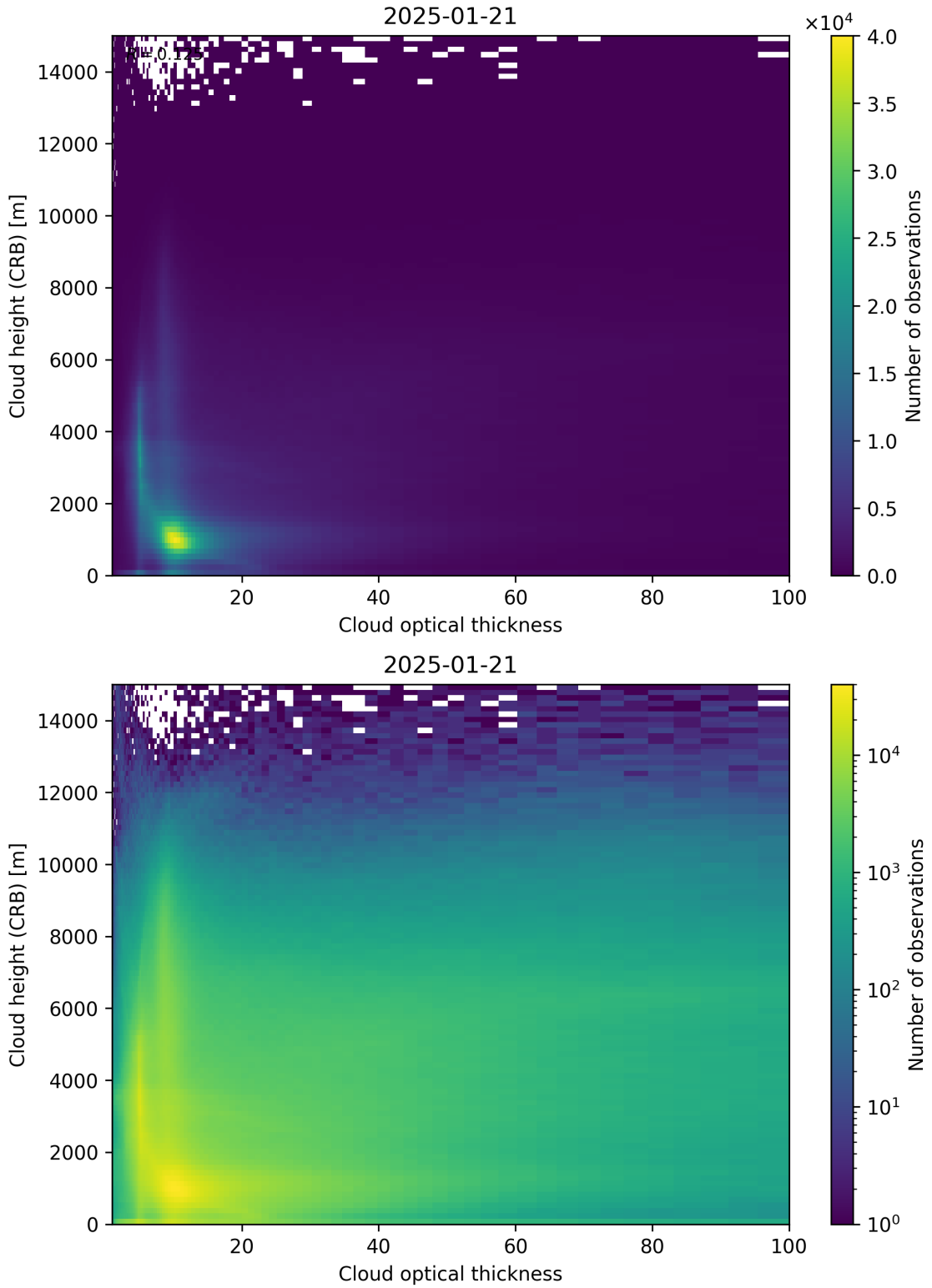


Figure 85: Scatter density plot of “Cloud optical thickness” against “Cloud height (CRB)” for 2025-01-20 to 2025-01-22.

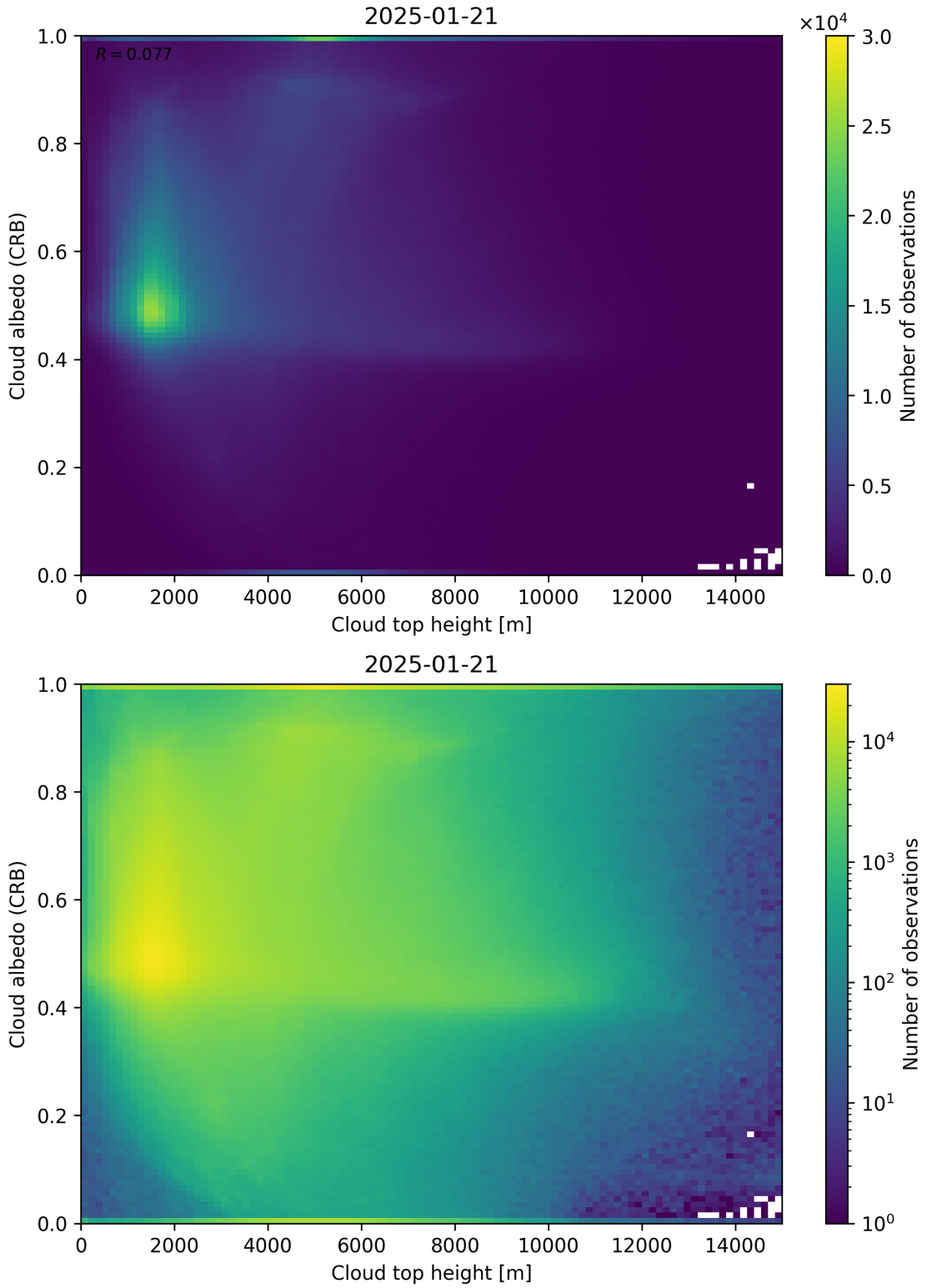


Figure 86: Scatter density plot of “Cloud top height” against “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22.

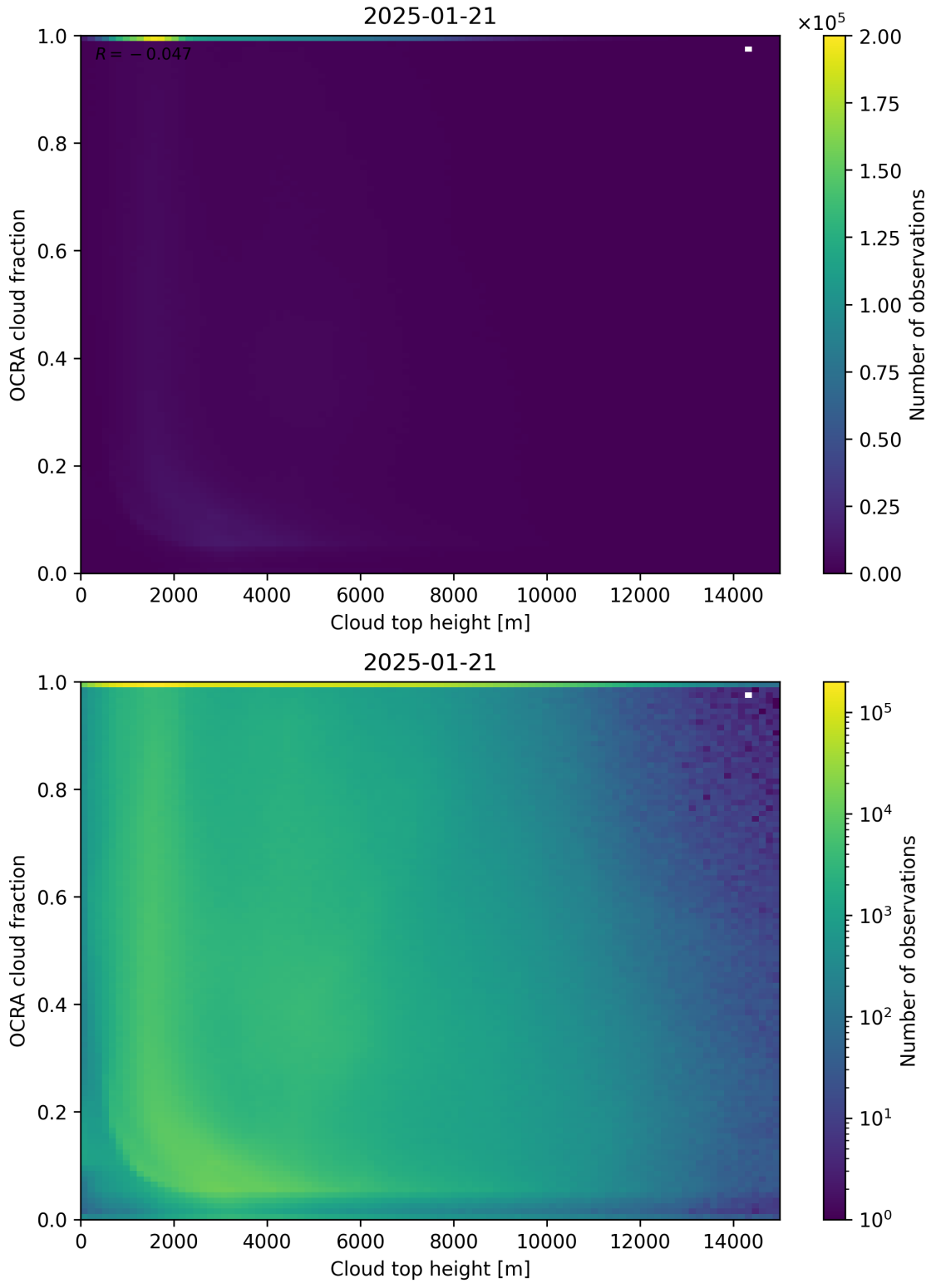


Figure 87: Scatter density plot of “Cloud top height” against “OCRA cloud fraction” for 2025-01-20 to 2025-01-22.

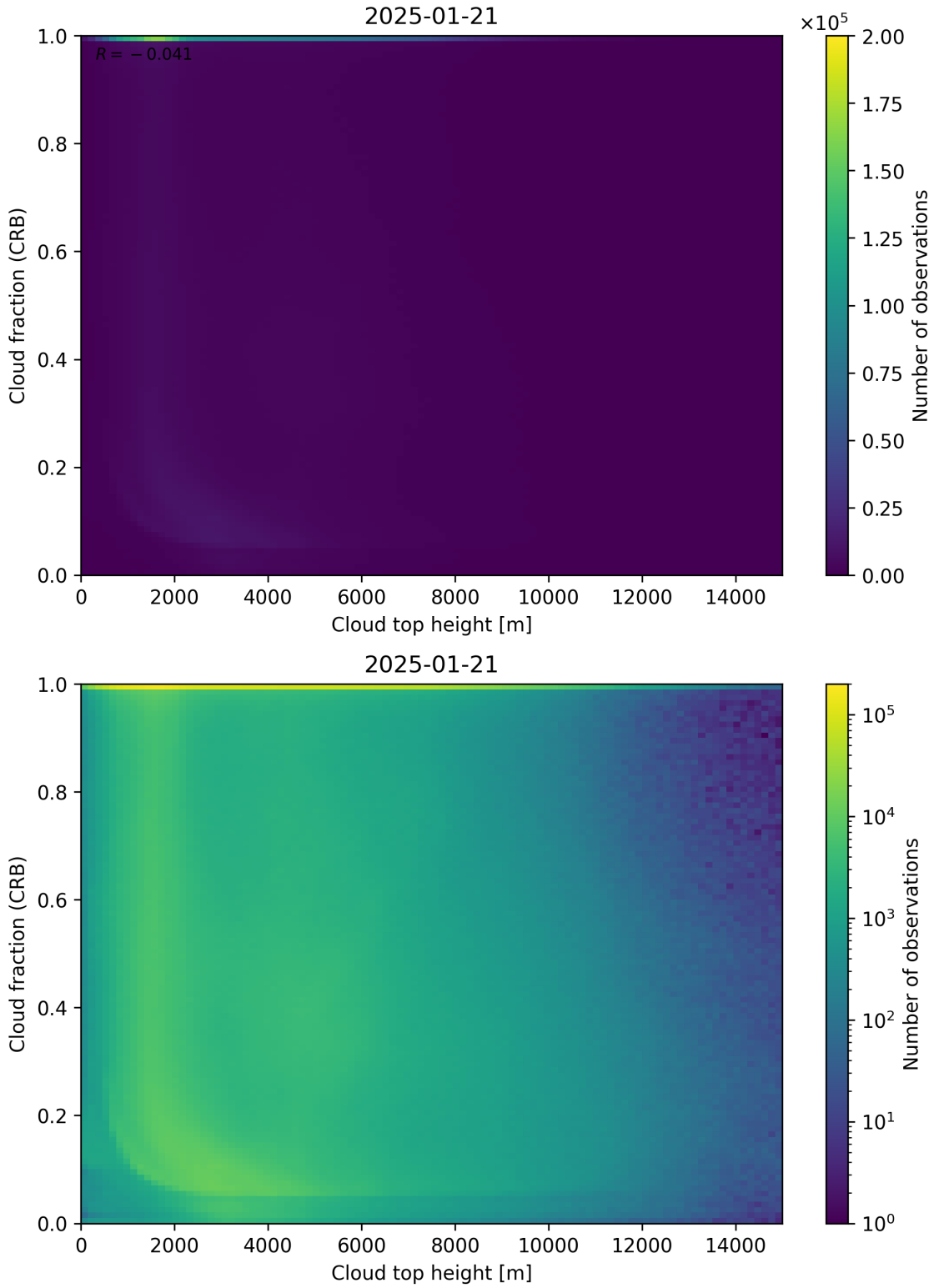


Figure 88: Scatter density plot of “Cloud top height” against “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22.

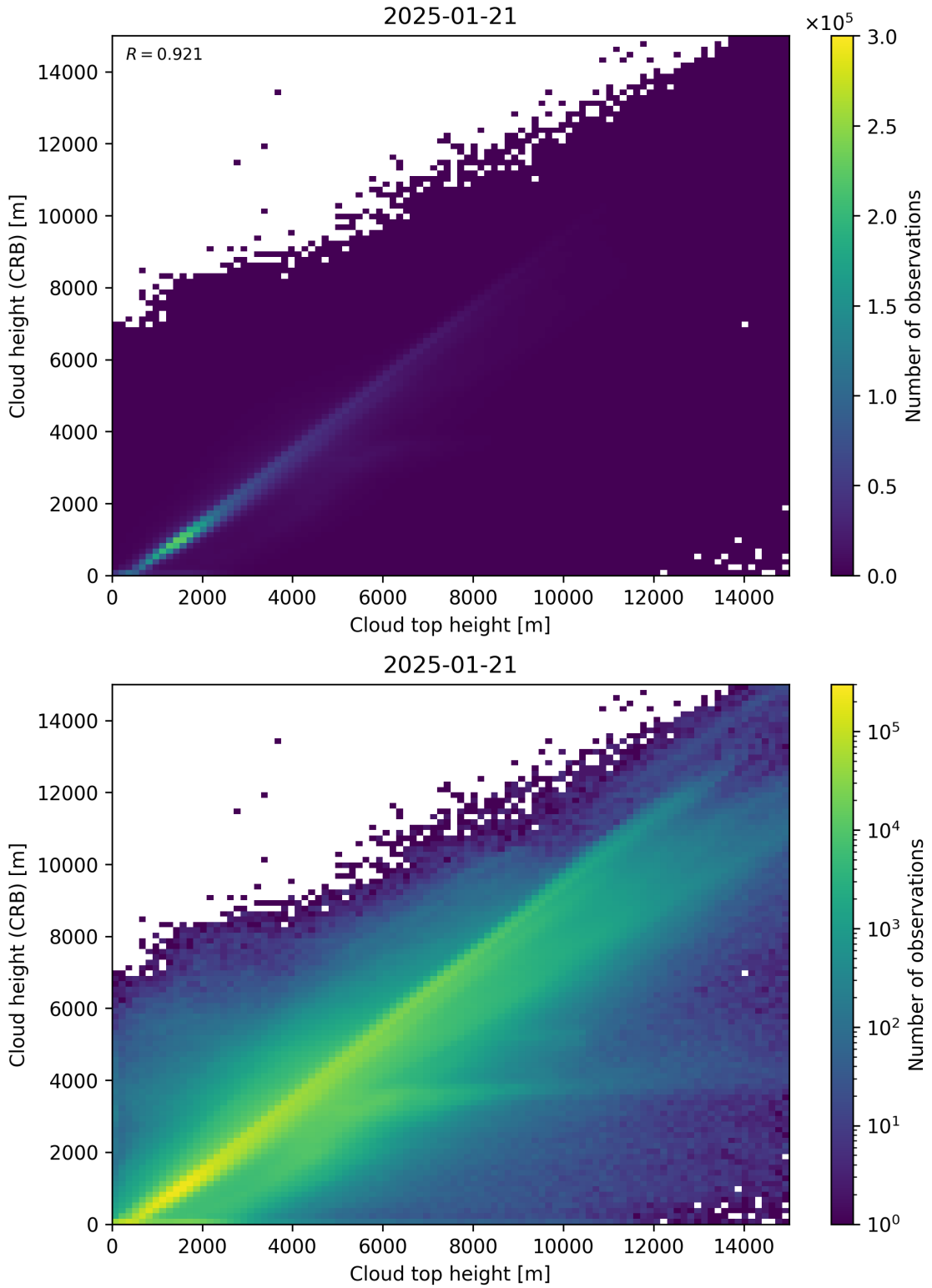


Figure 89: Scatter density plot of “Cloud top height” against “Cloud height (CRB)” for 2025-01-20 to 2025-01-22.

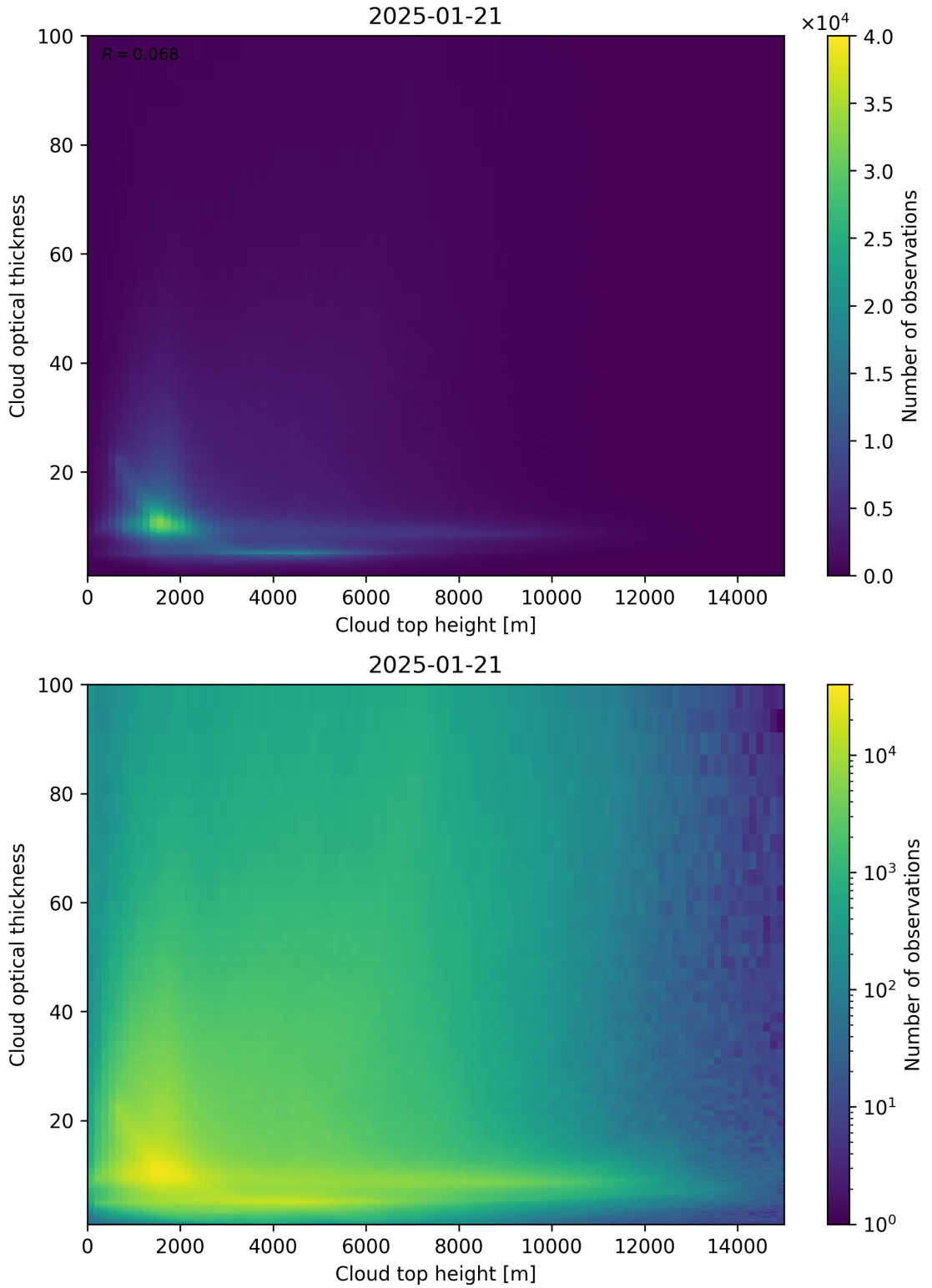


Figure 90: Scatter density plot of “Cloud top height” against “Cloud optical thickness” for 2025-01-20 to 2025-01-22.

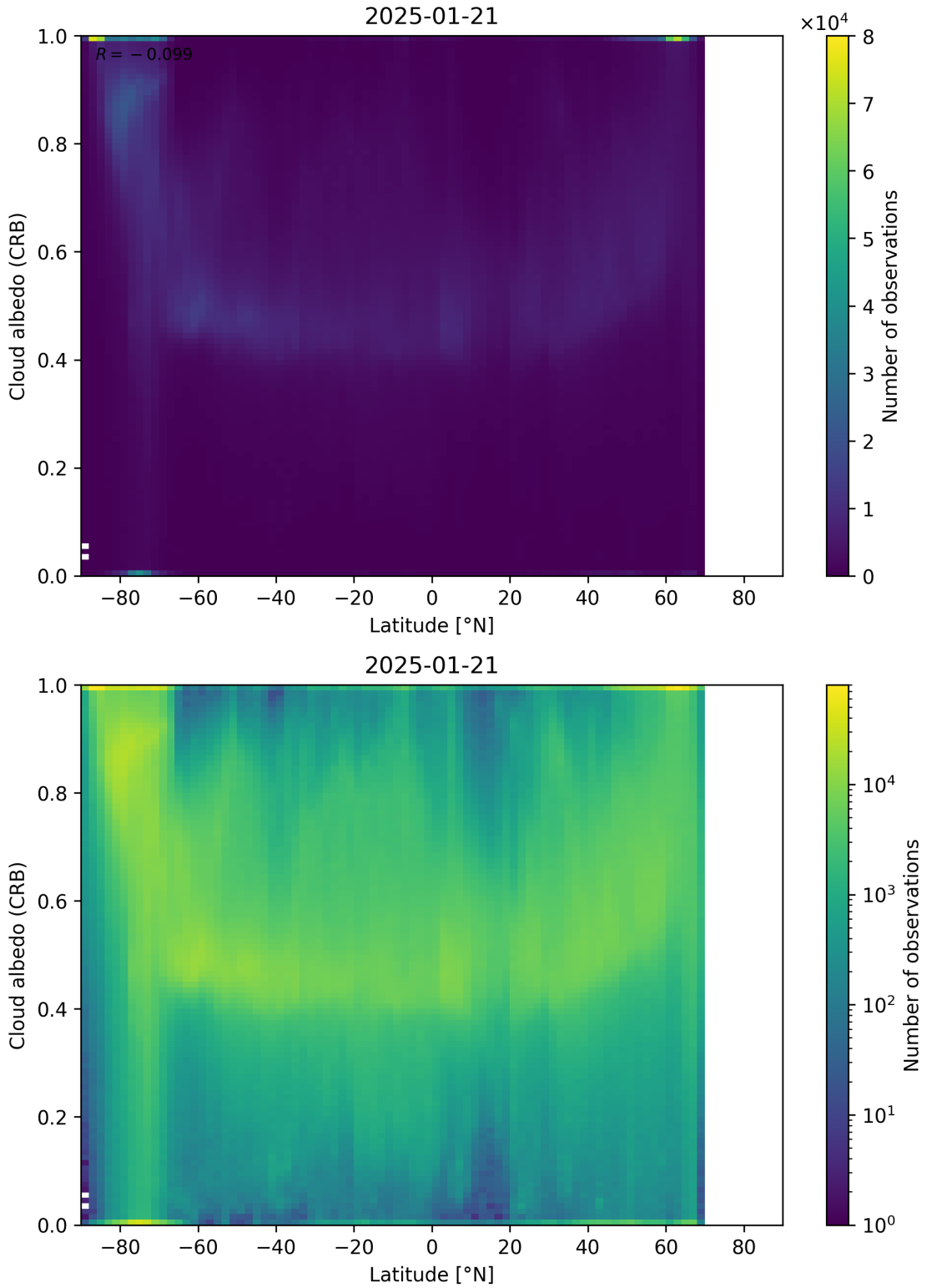


Figure 91: Scatter density plot of “Latitude” against “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22.

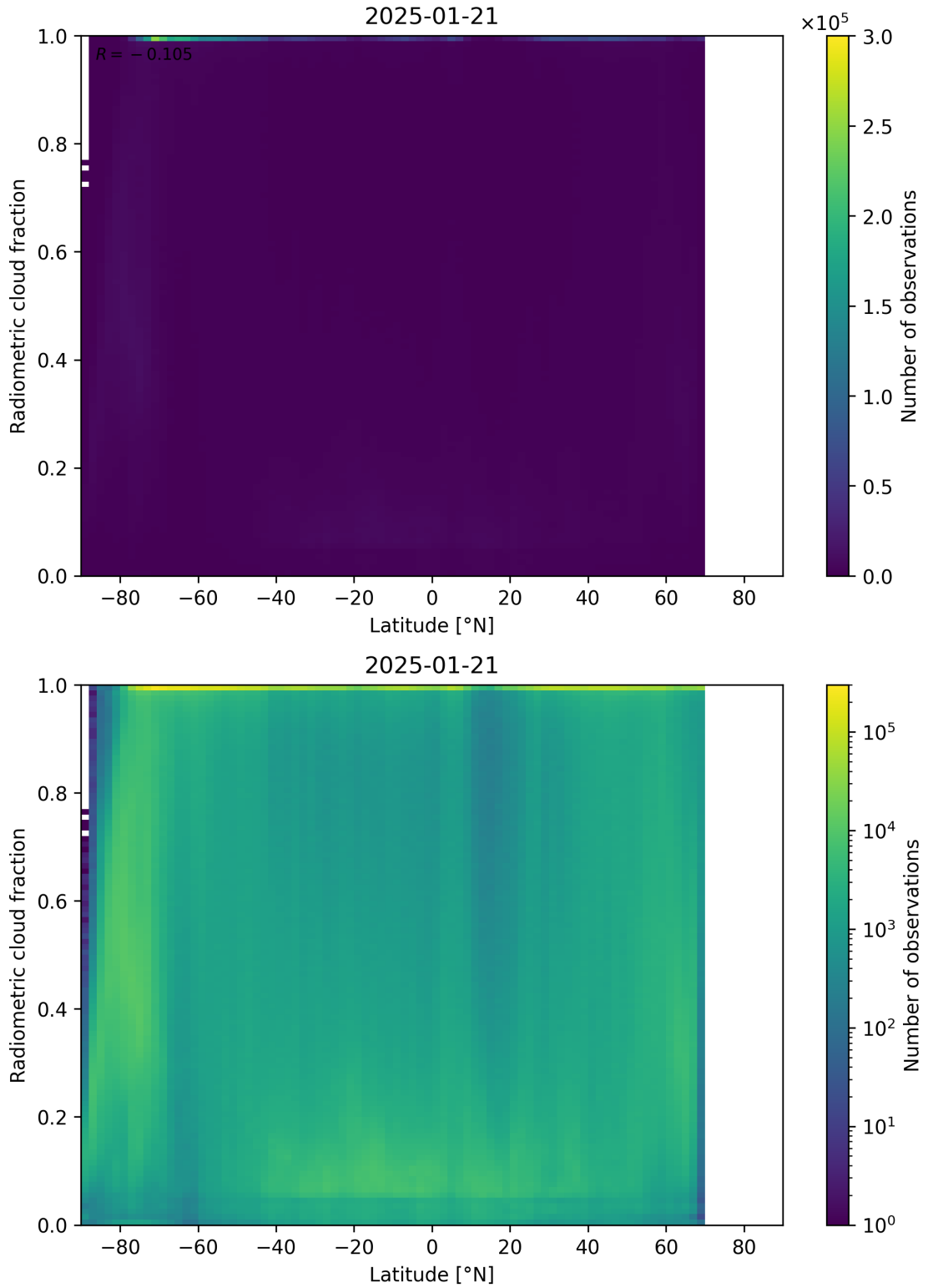


Figure 92: Scatter density plot of “Latitude” against “Radiometric cloud fraction” for 2025-01-20 to 2025-01-22.

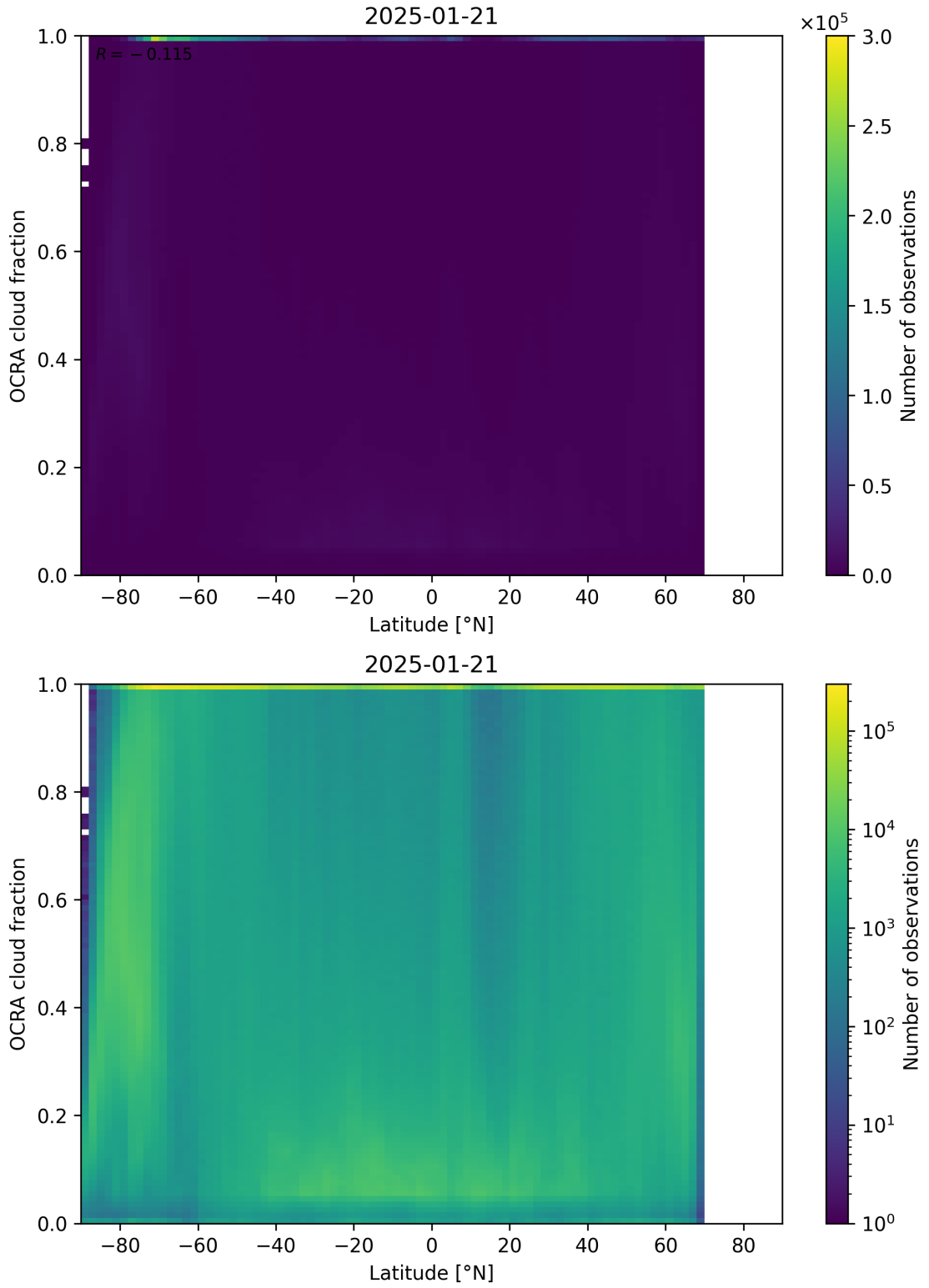


Figure 93: Scatter density plot of “Latitude” against “OCRA cloud fraction” for 2025-01-20 to 2025-01-22.

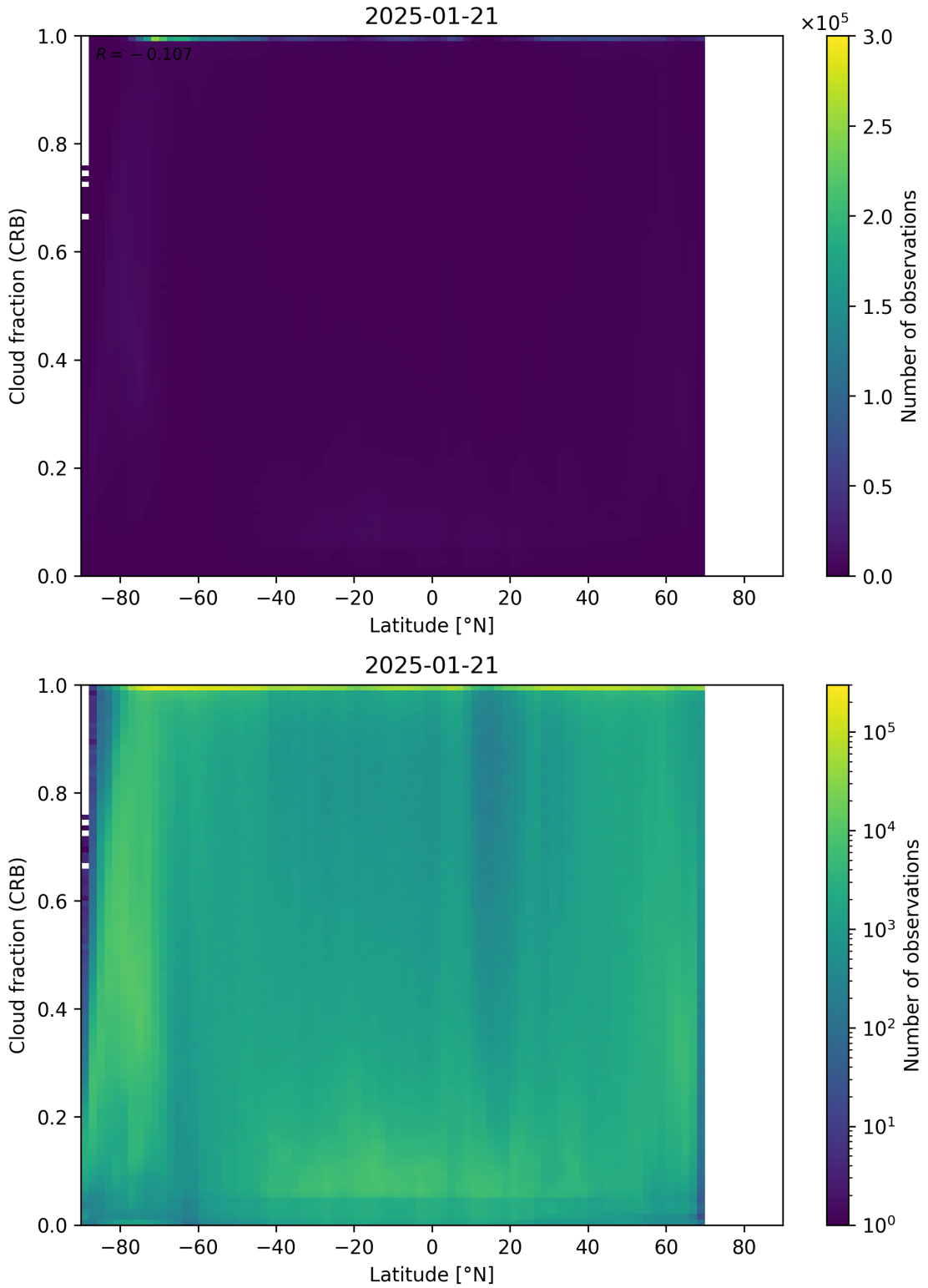


Figure 94: Scatter density plot of “Latitude” against “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22.

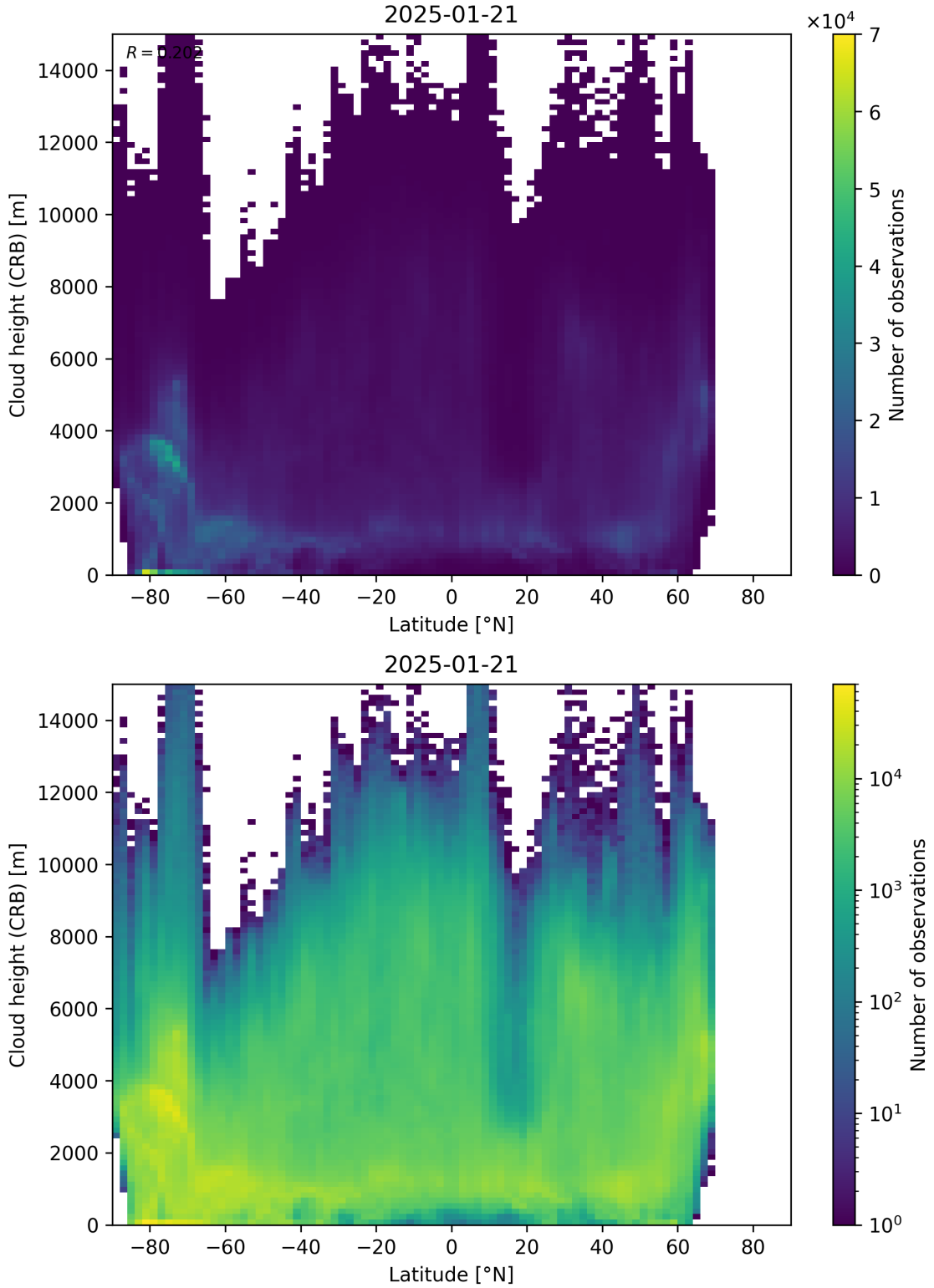


Figure 95: Scatter density plot of “Latitude” against “Cloud height (CRB)” for 2025-01-20 to 2025-01-22.

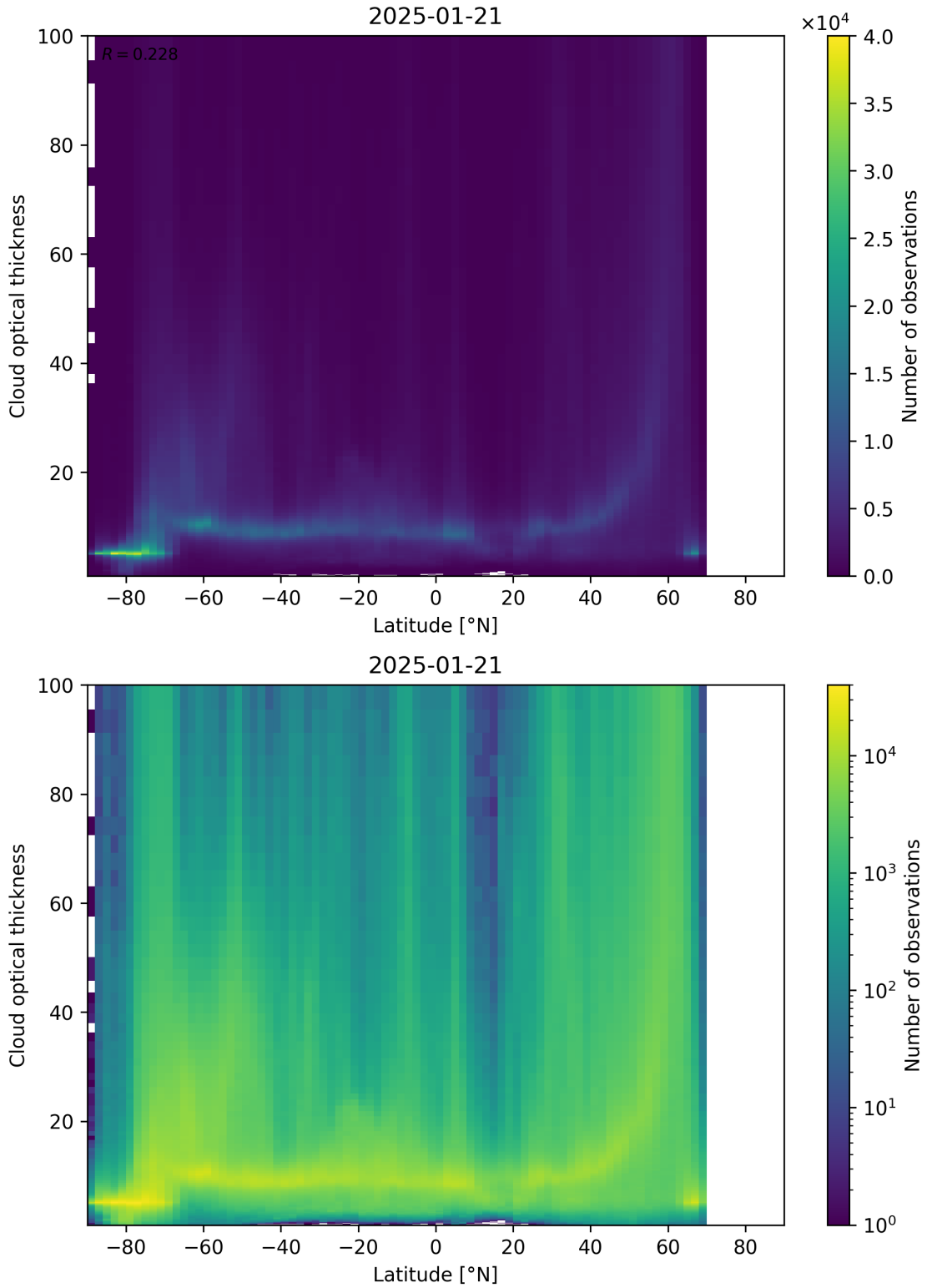


Figure 96: Scatter density plot of “Latitude” against “Cloud optical thickness” for 2025-01-20 to 2025-01-22.

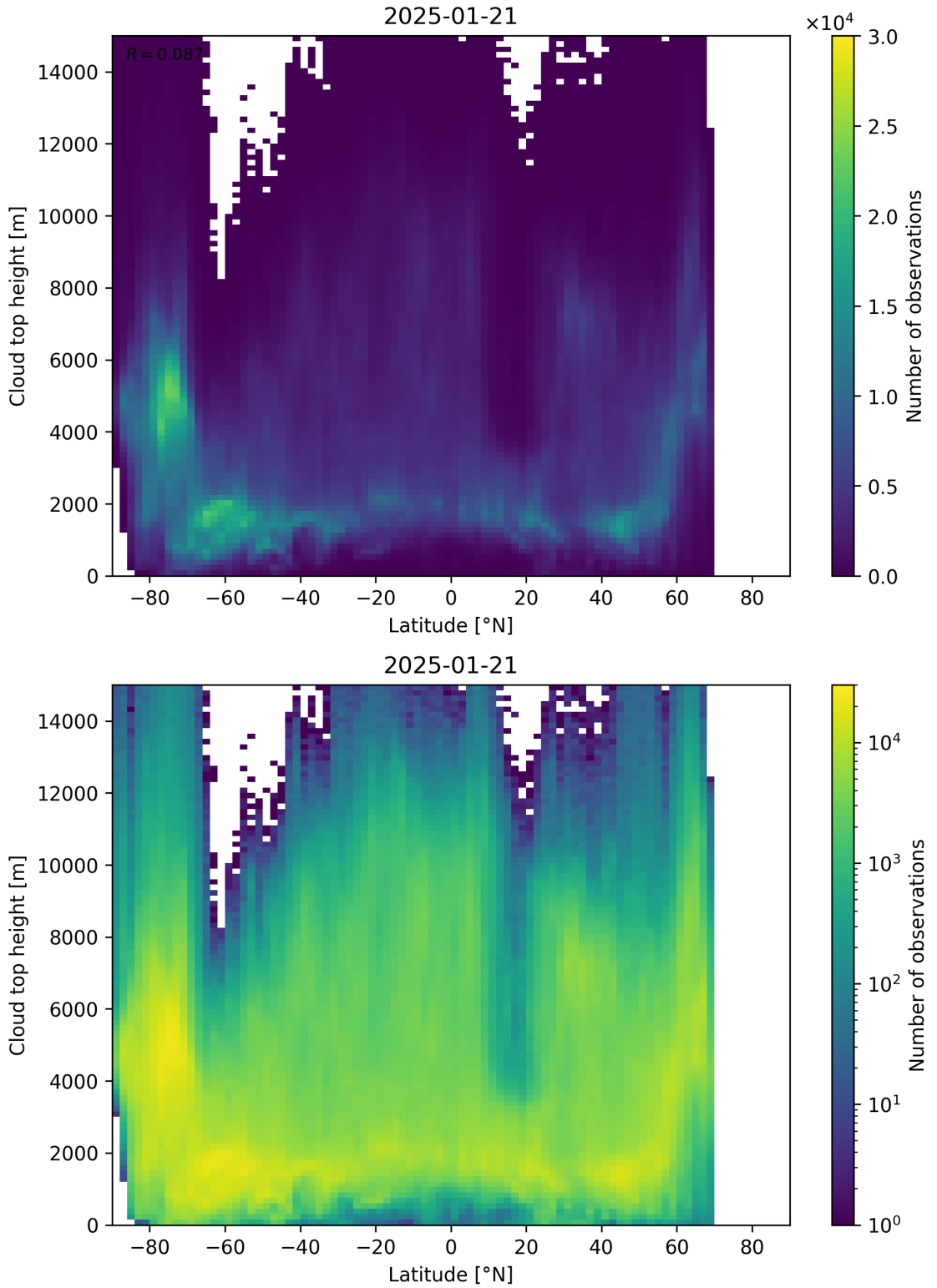


Figure 97: Scatter density plot of “Latitude” against “Cloud top height” for 2025-01-20 to 2025-01-22.

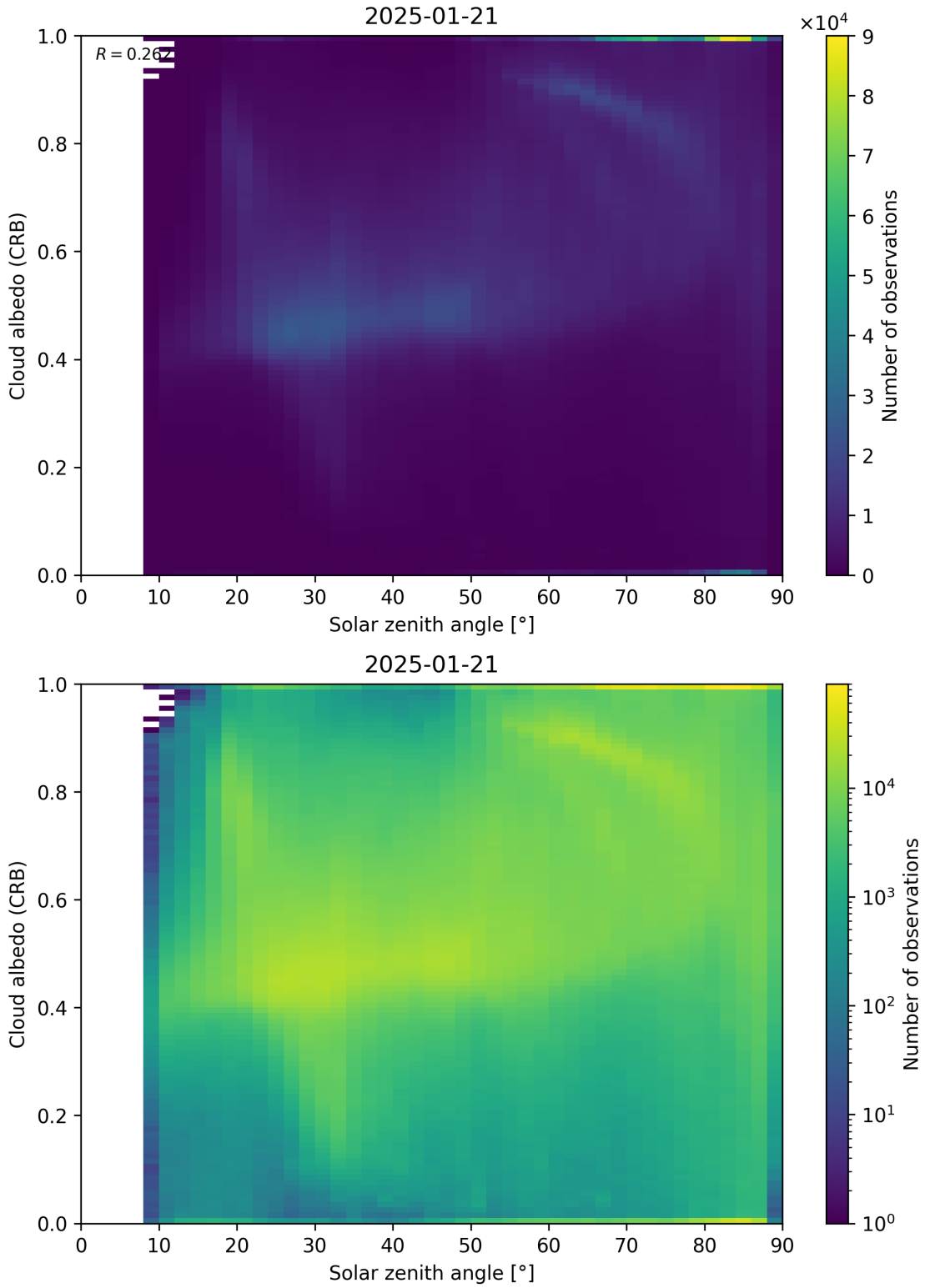


Figure 98: Scatter density plot of “Solar zenith angle” against “Cloud albedo (CRB)” for 2025-01-20 to 2025-01-22.

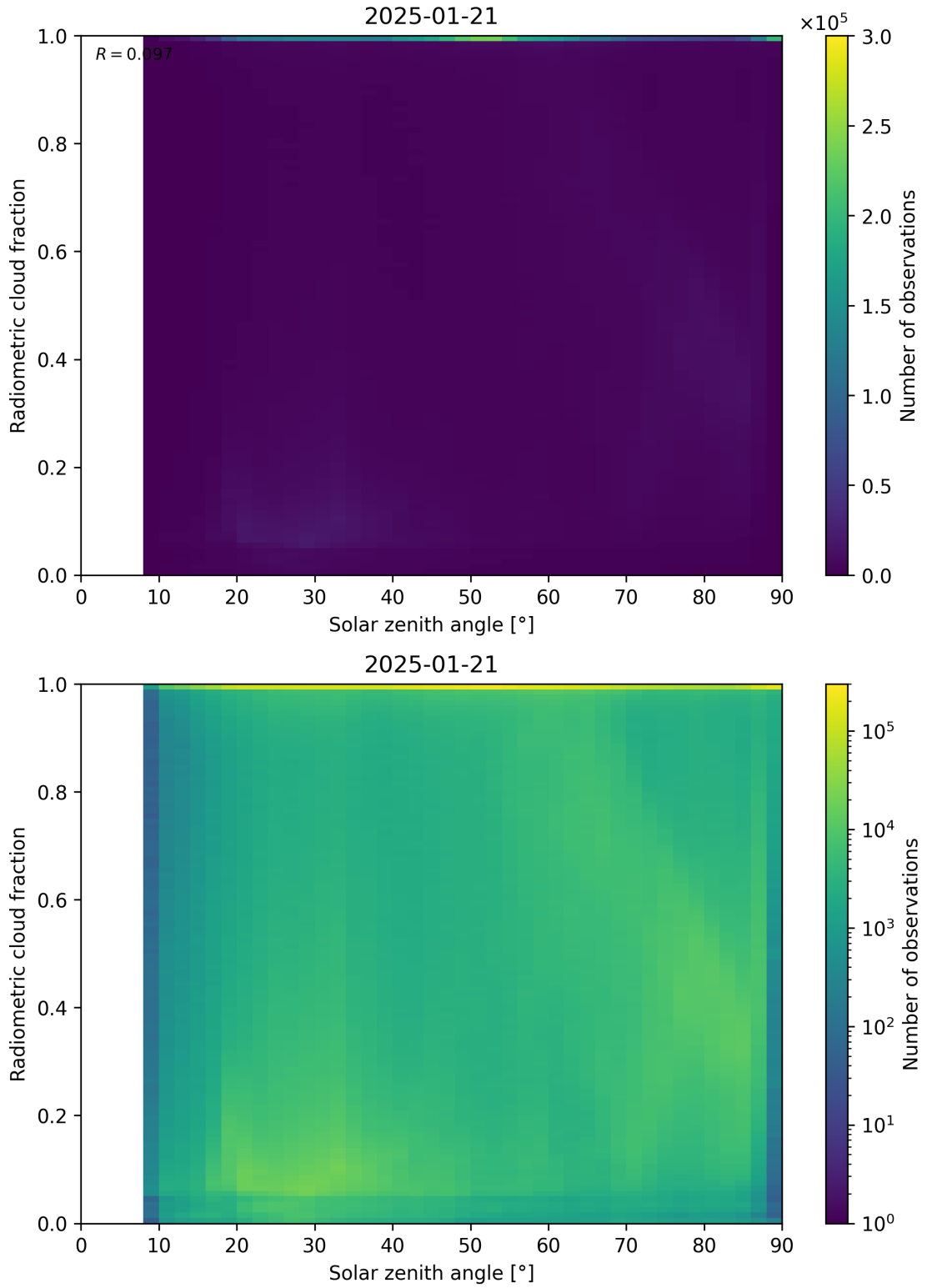
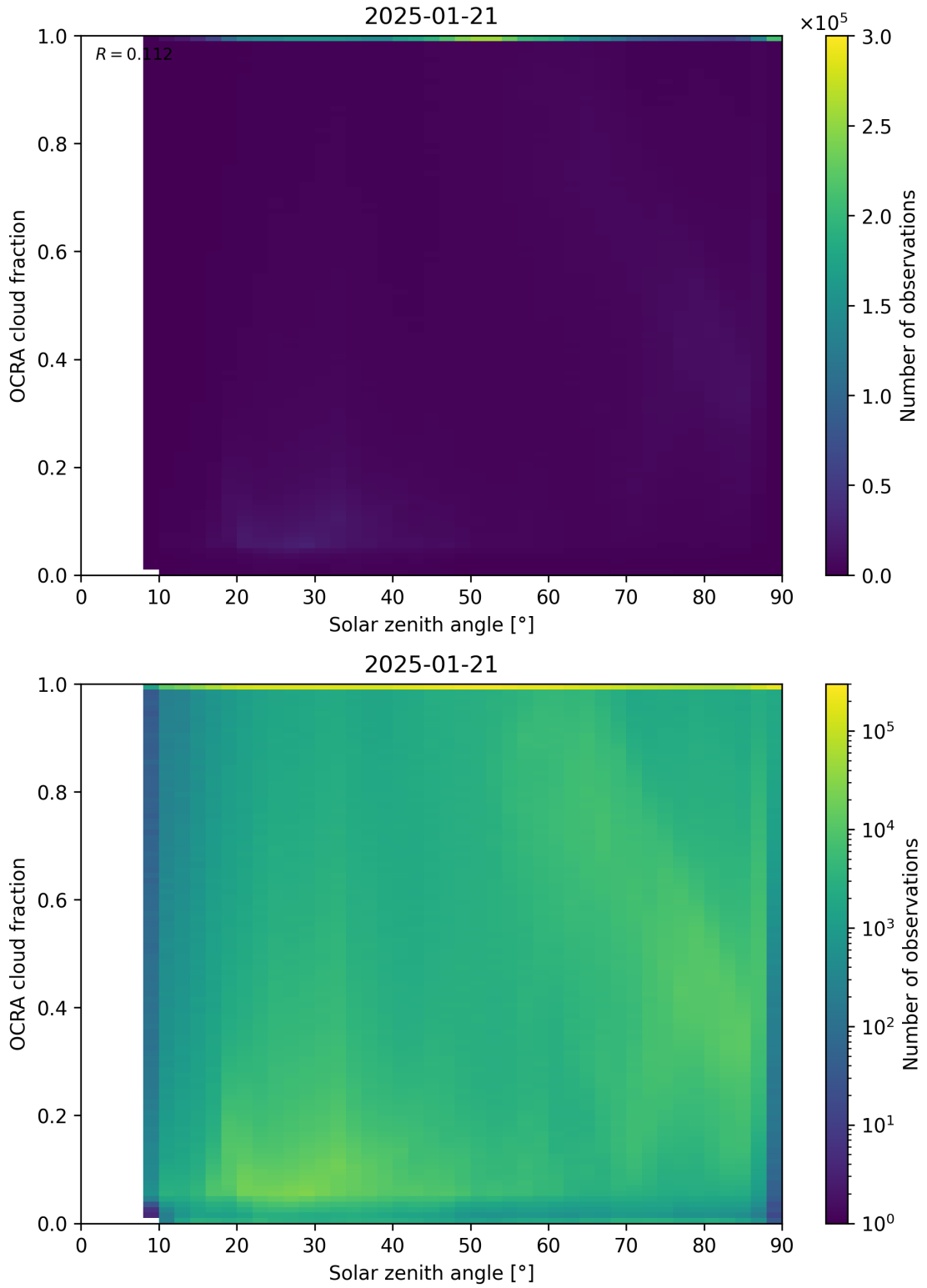


Figure 99: Scatter density plot of “Solar zenith angle” against “Radiometric cloud fraction” for 2025-01-20 to 2025-01-22.



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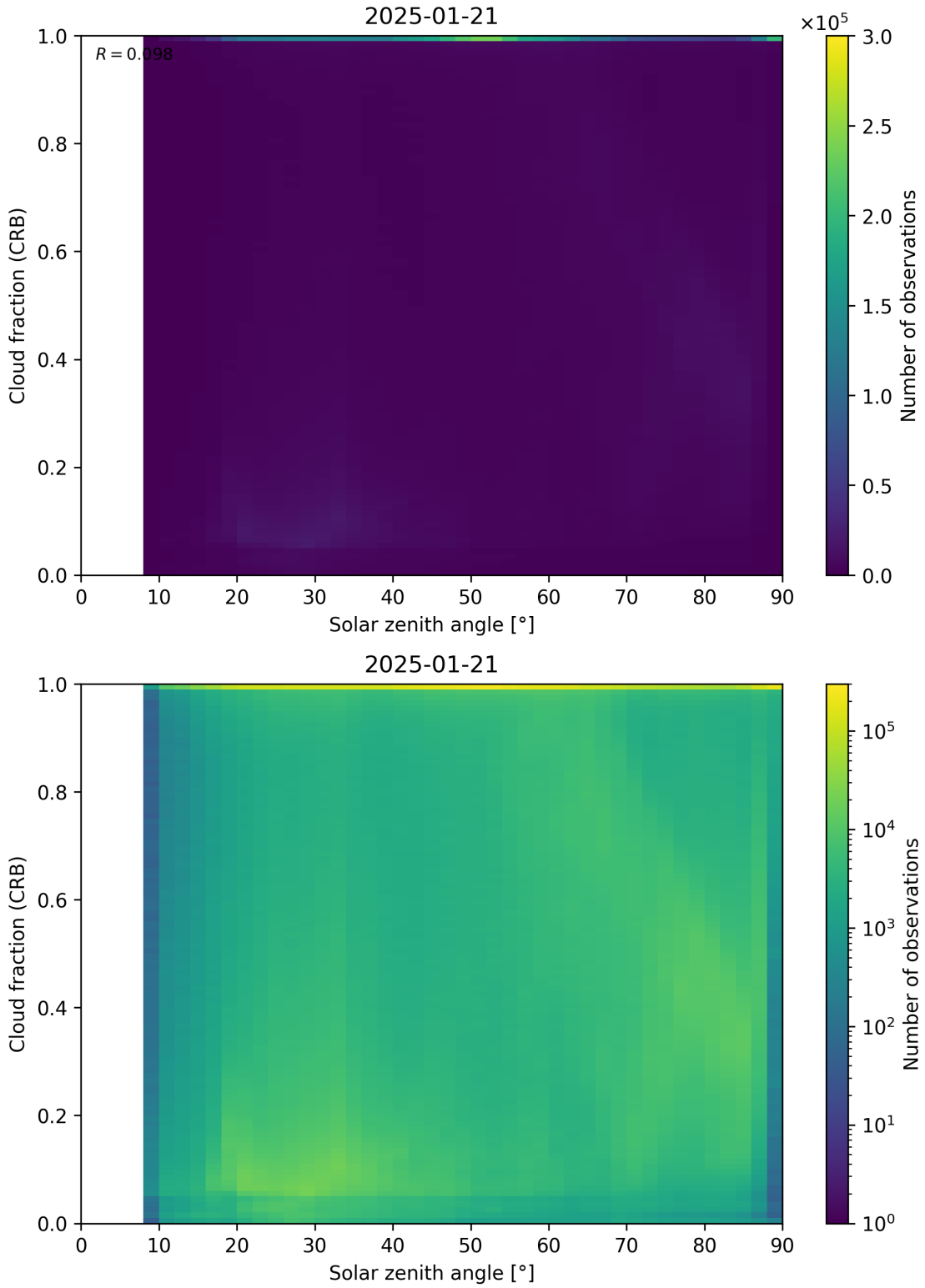
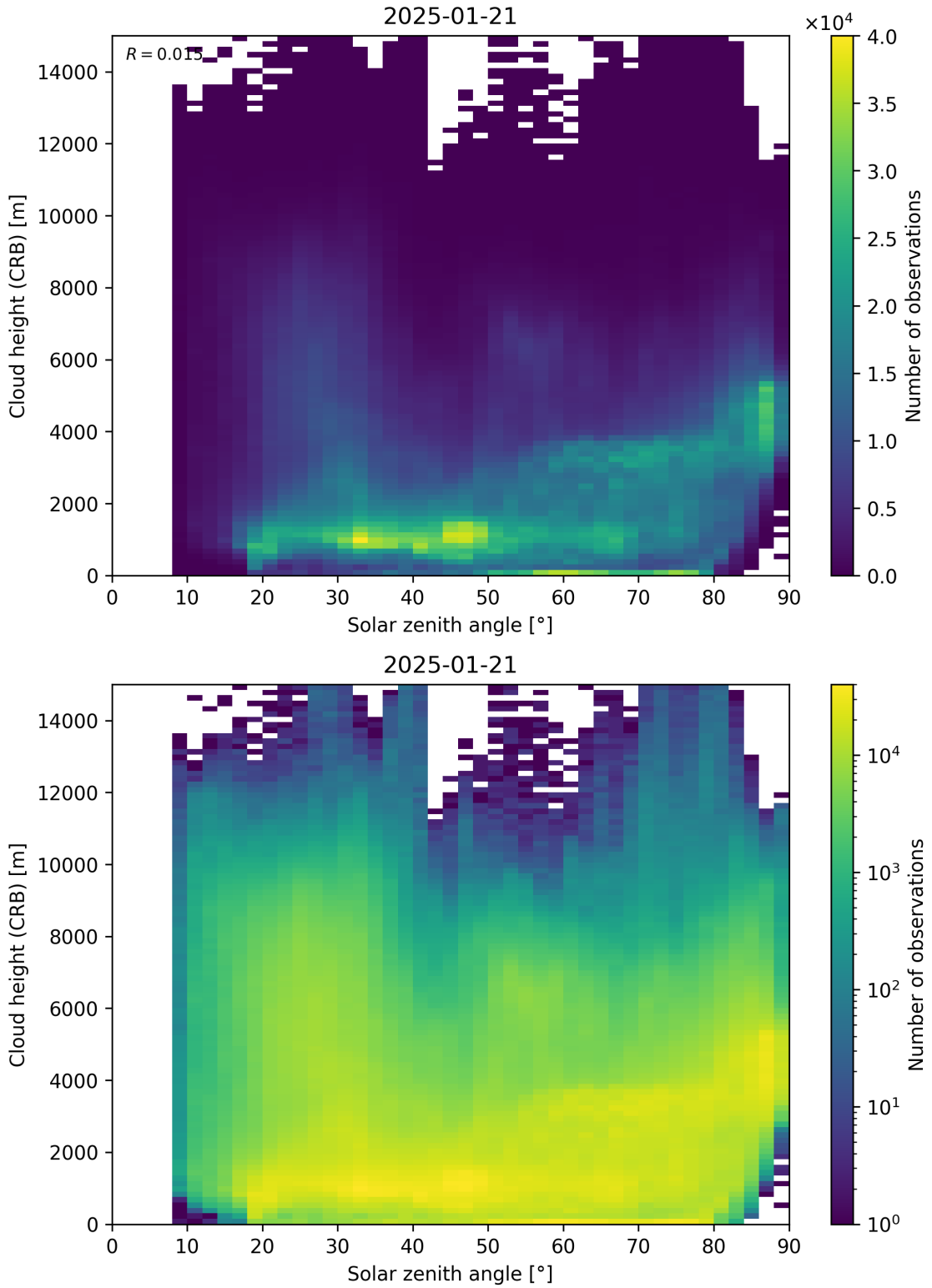


Figure 101: Scatter density plot of “Solar zenith angle” against “Cloud fraction (CRB)” for 2025-01-20 to 2025-01-22.



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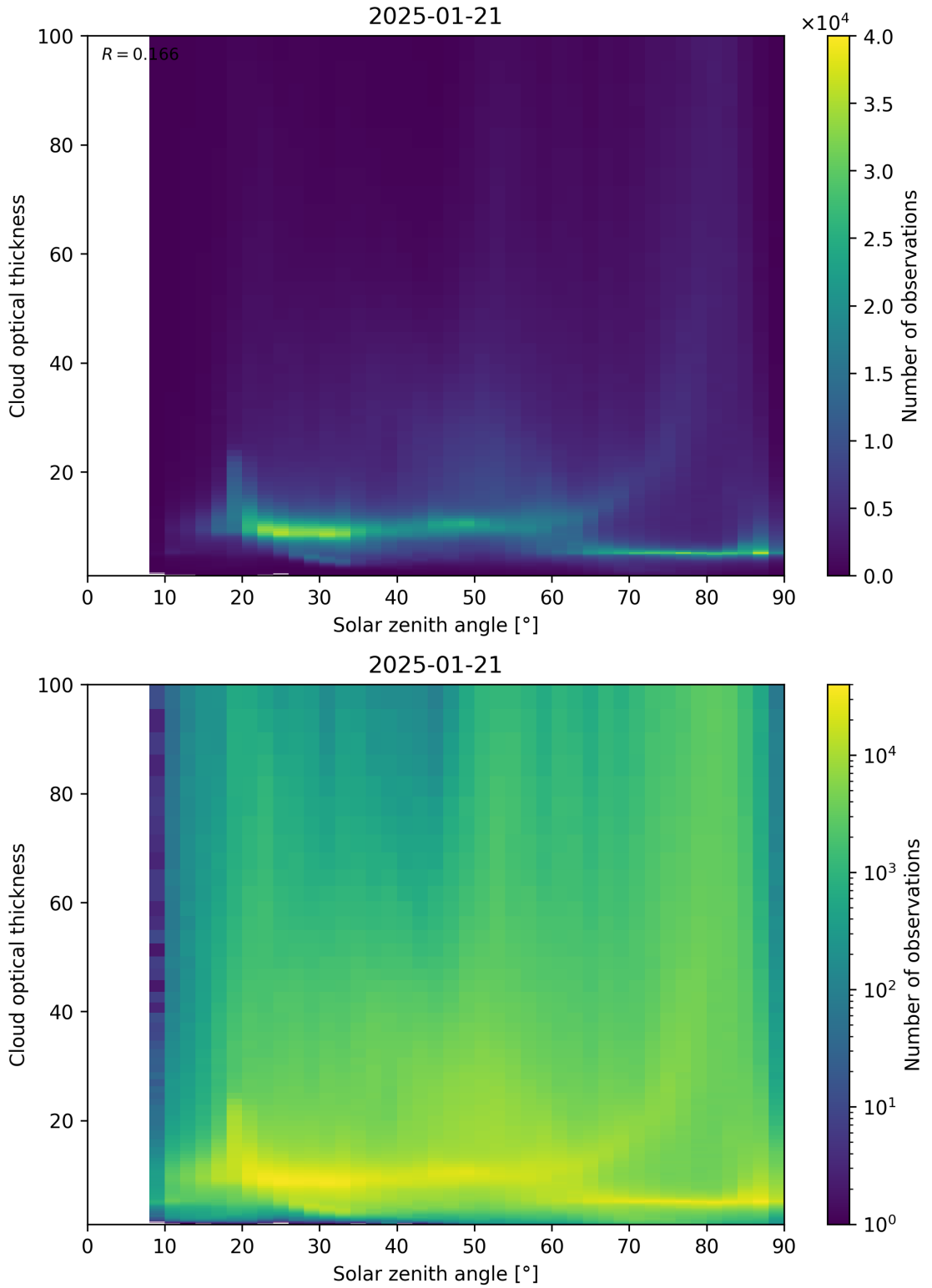

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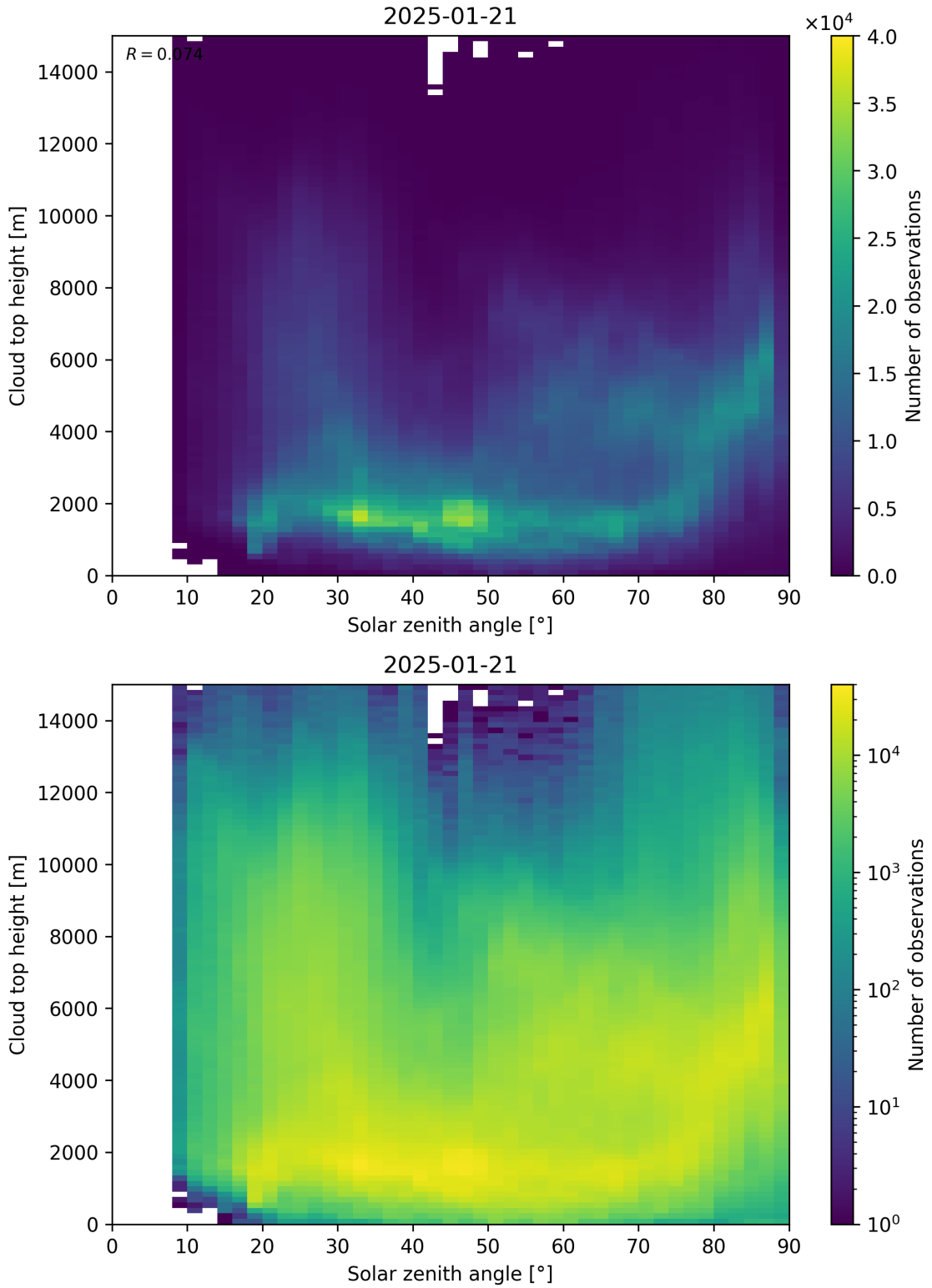

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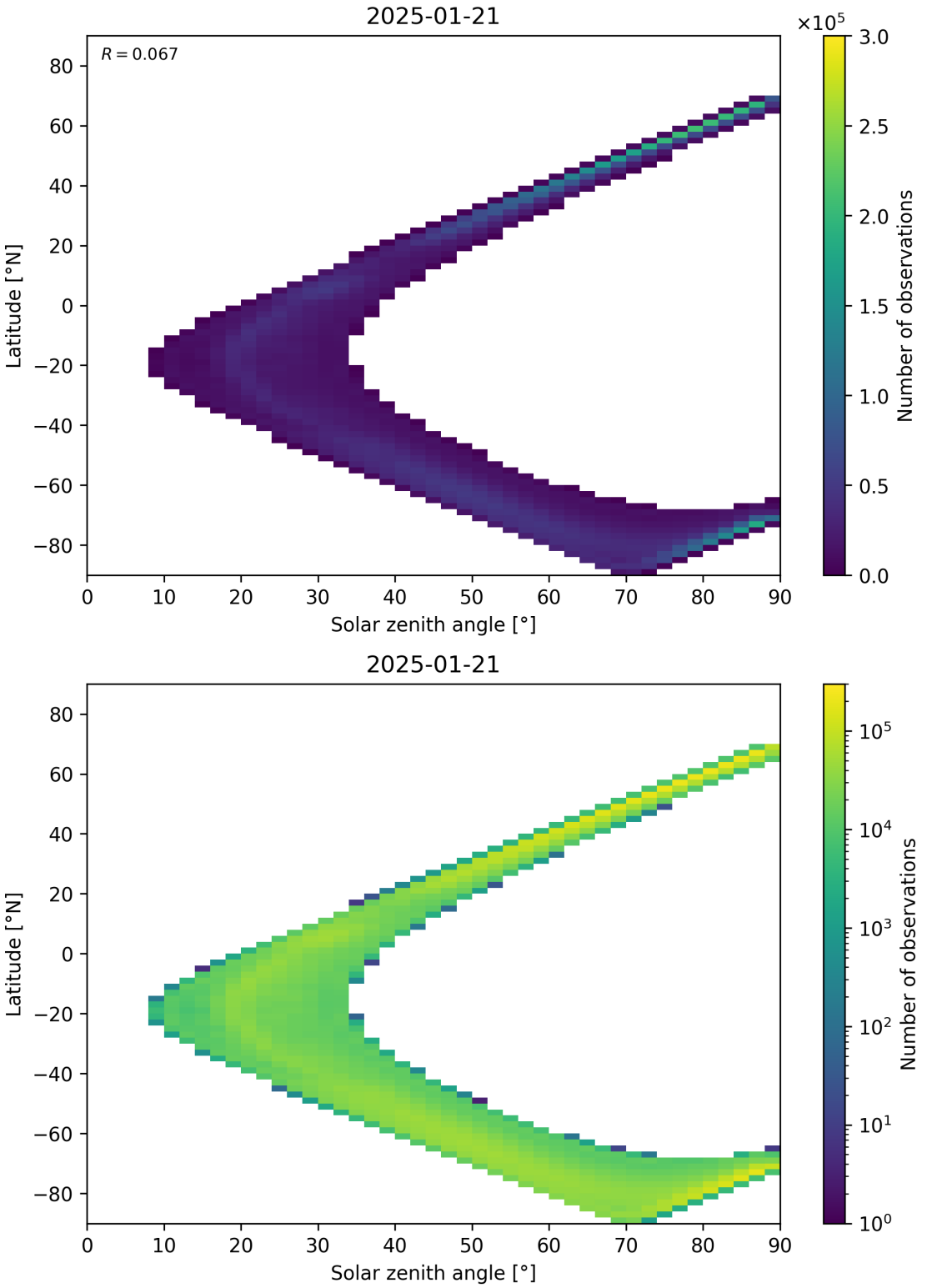

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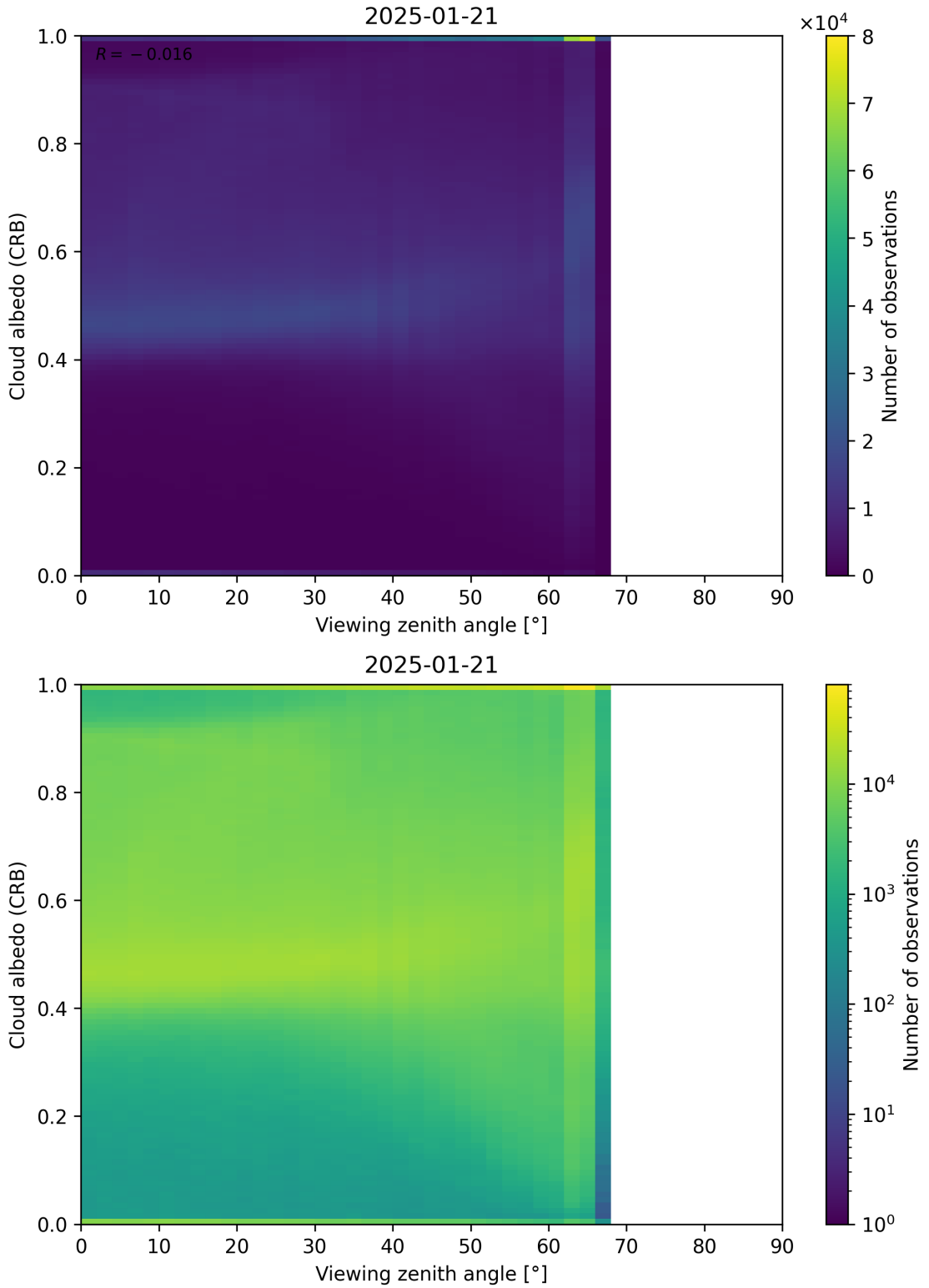

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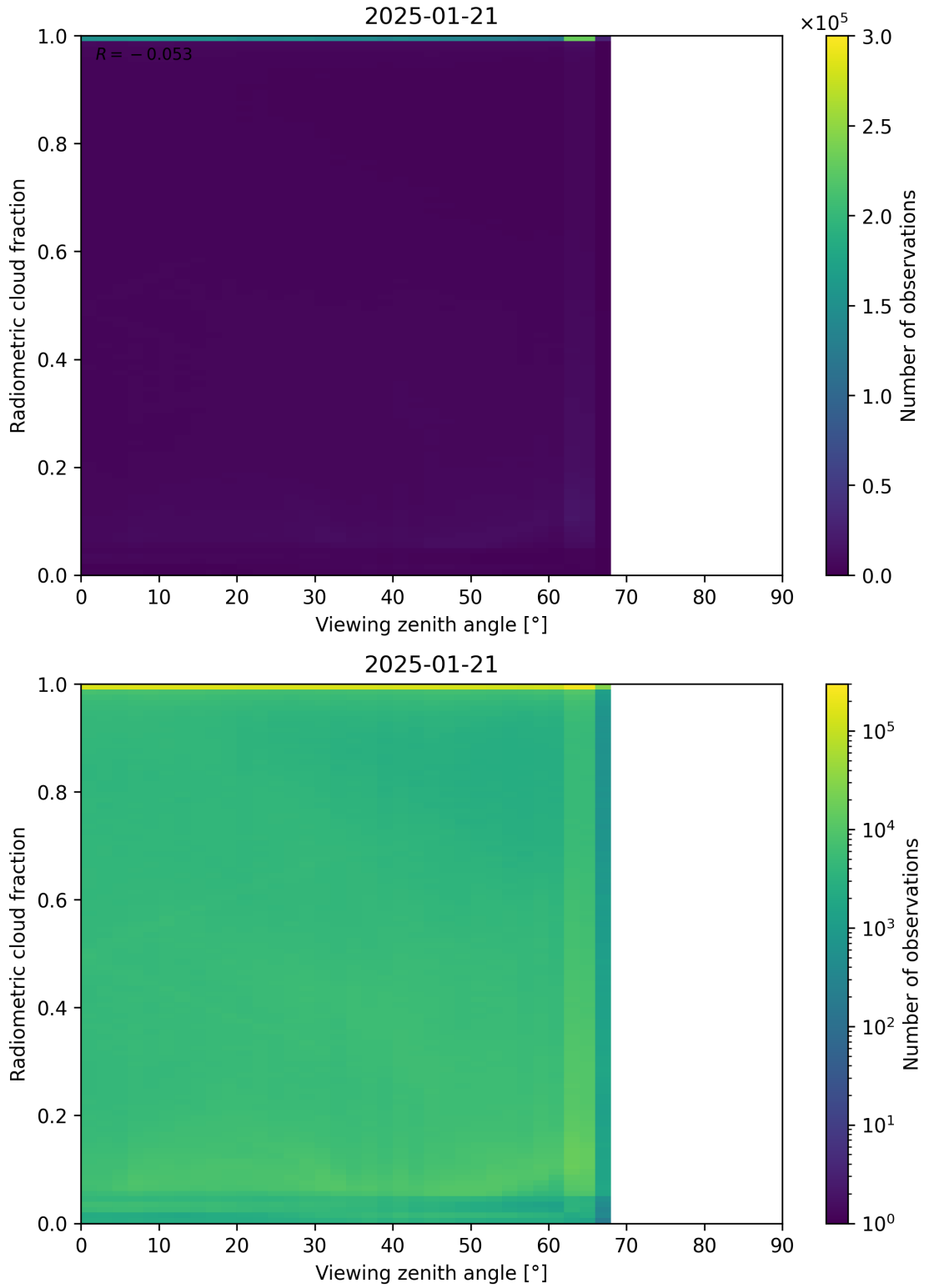

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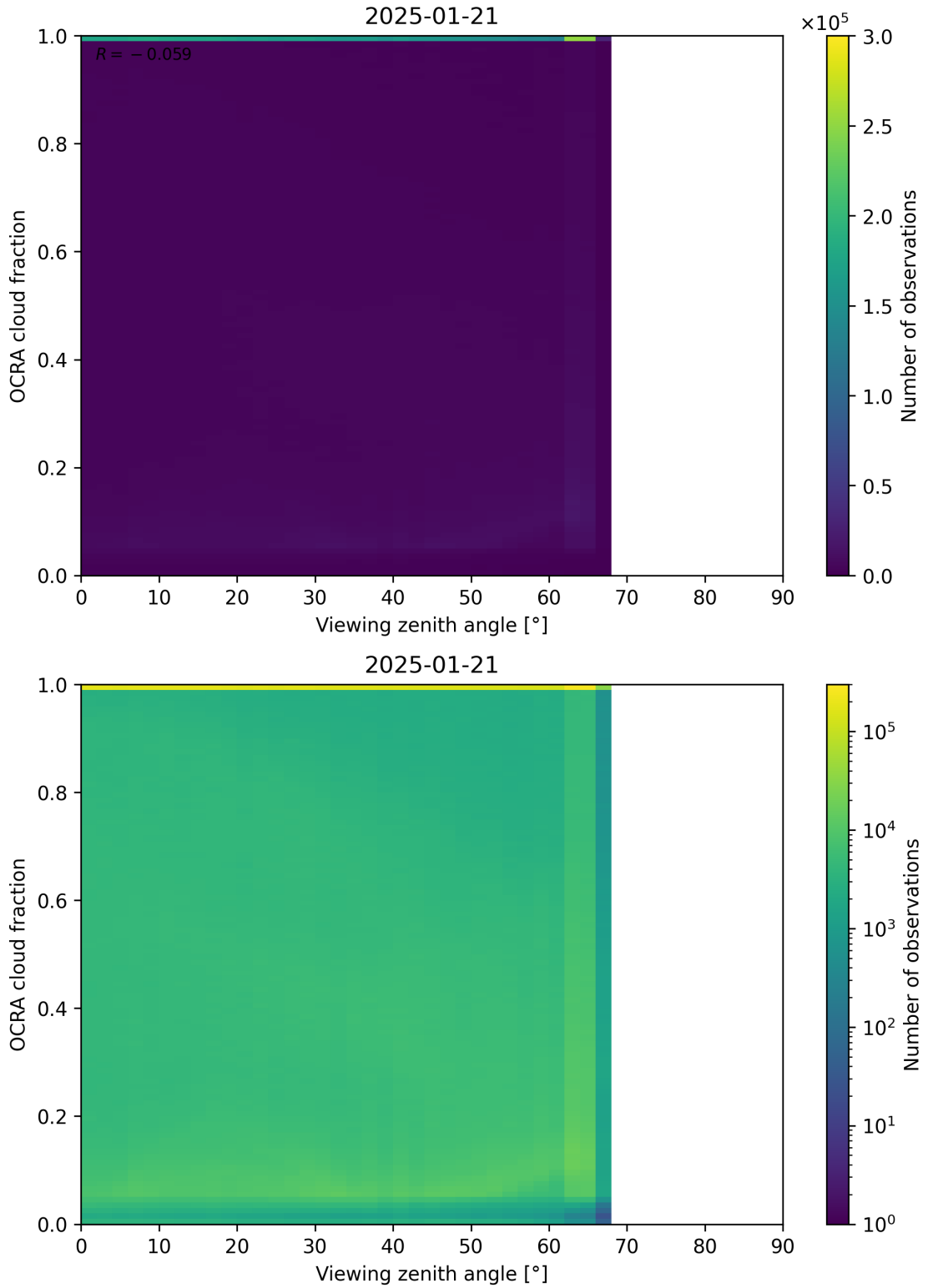

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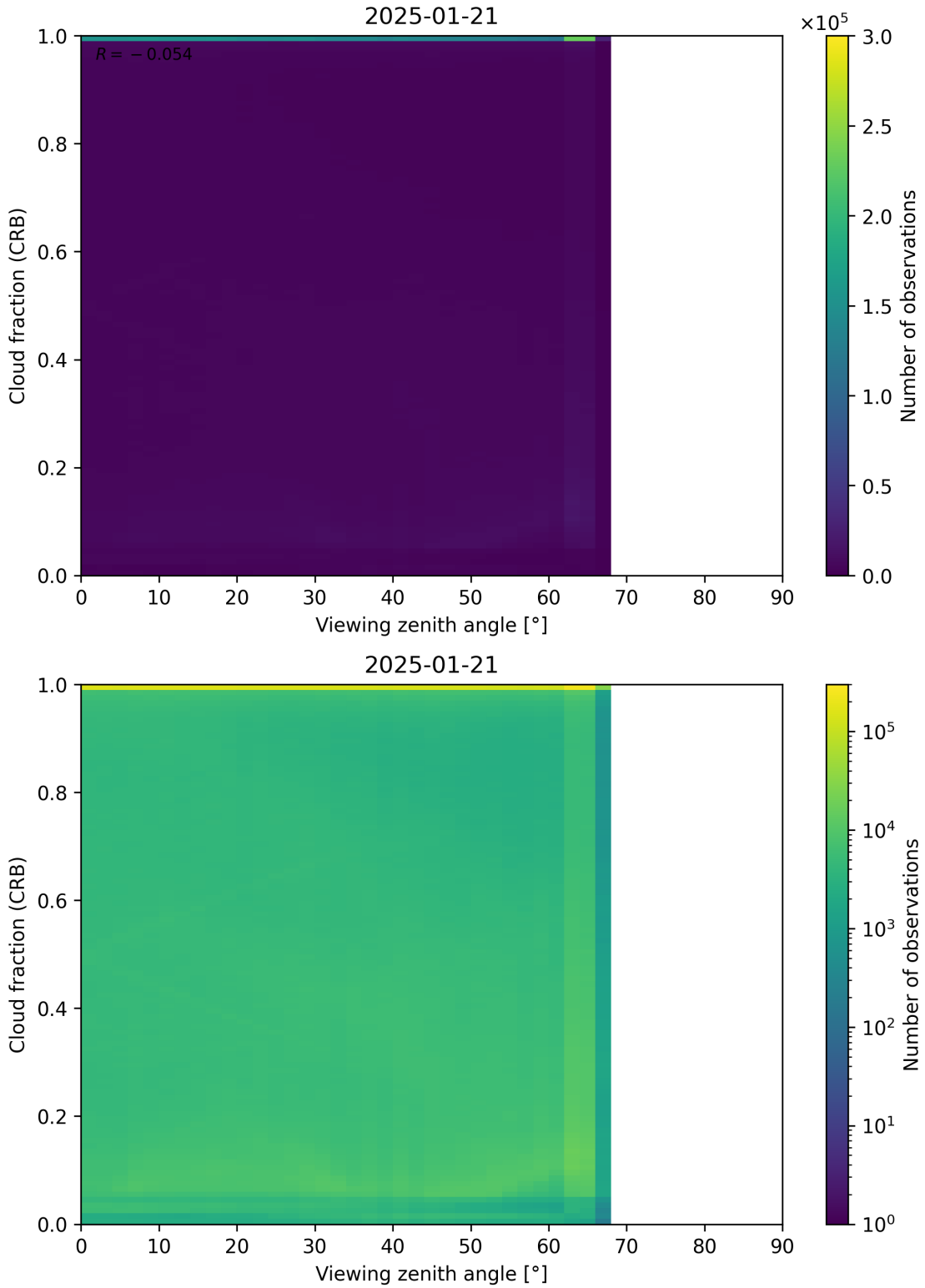

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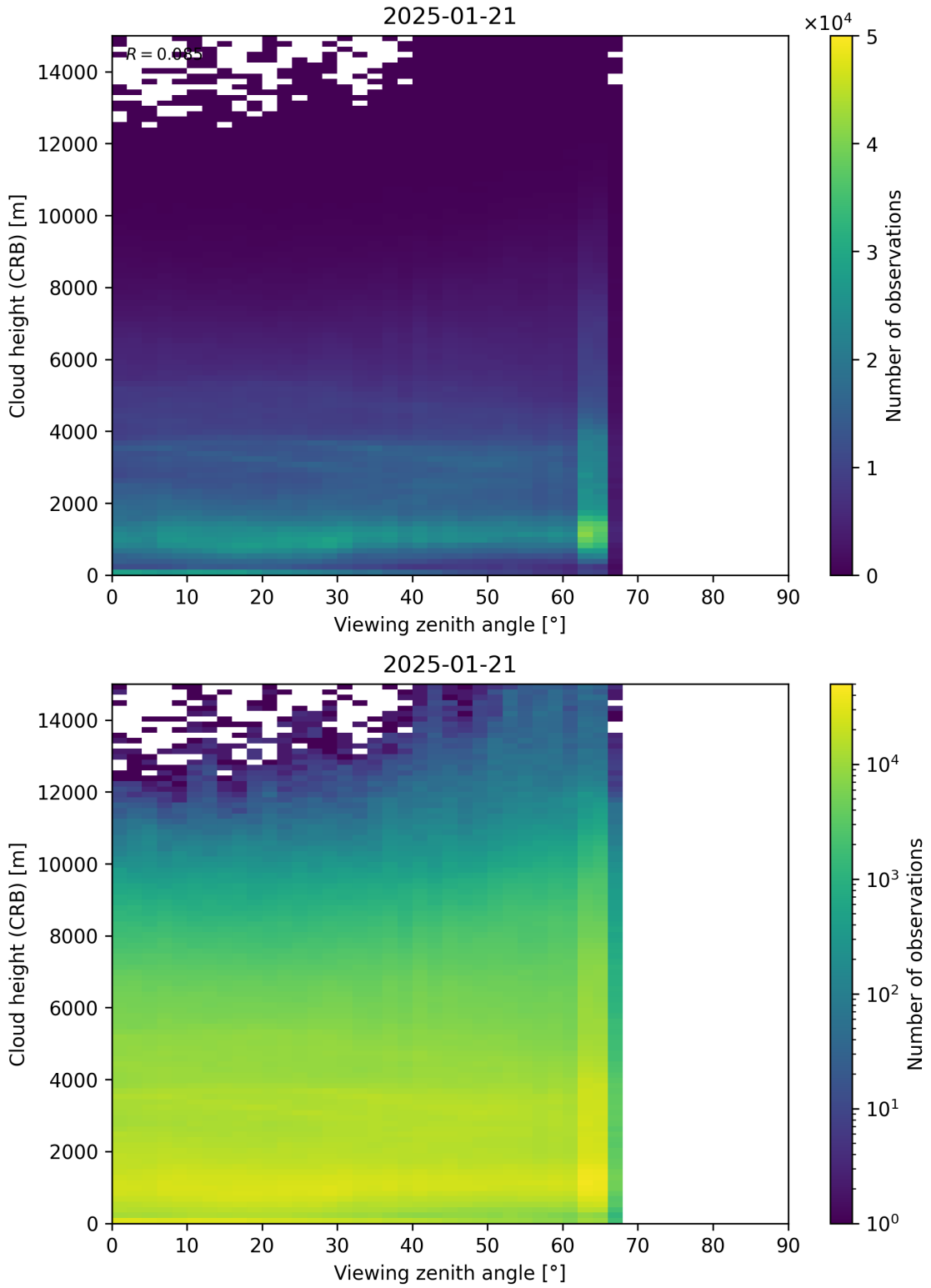

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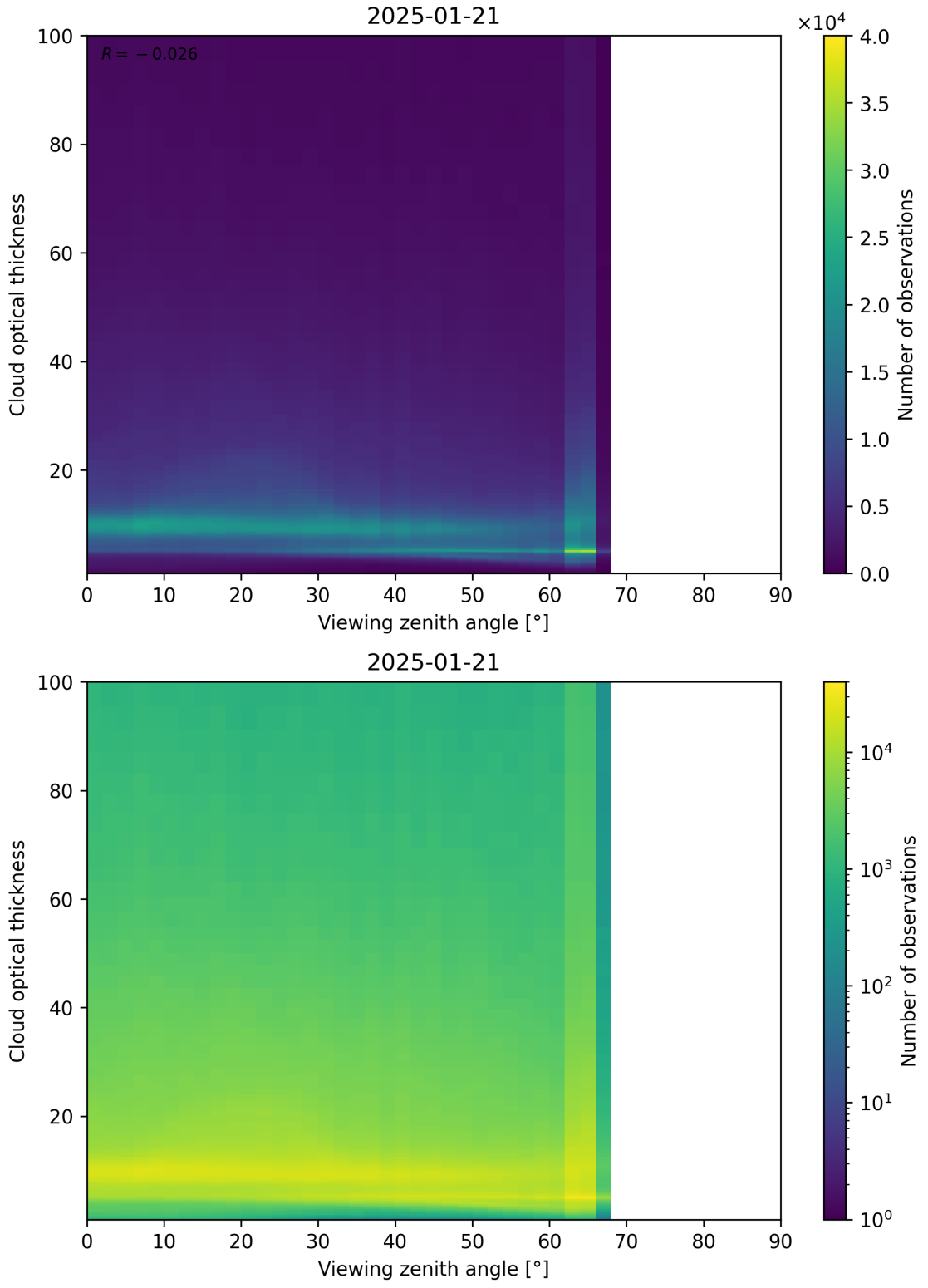

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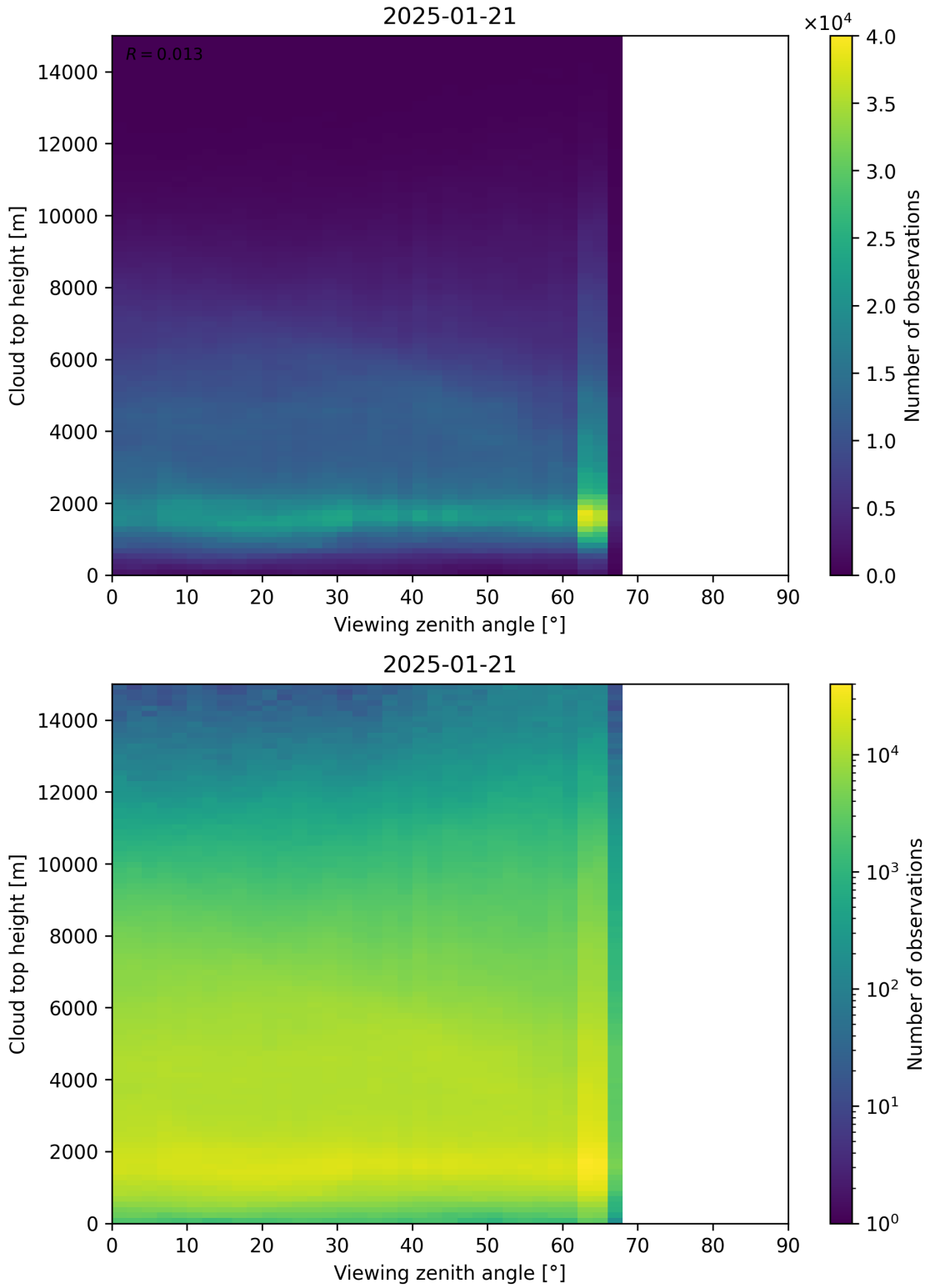

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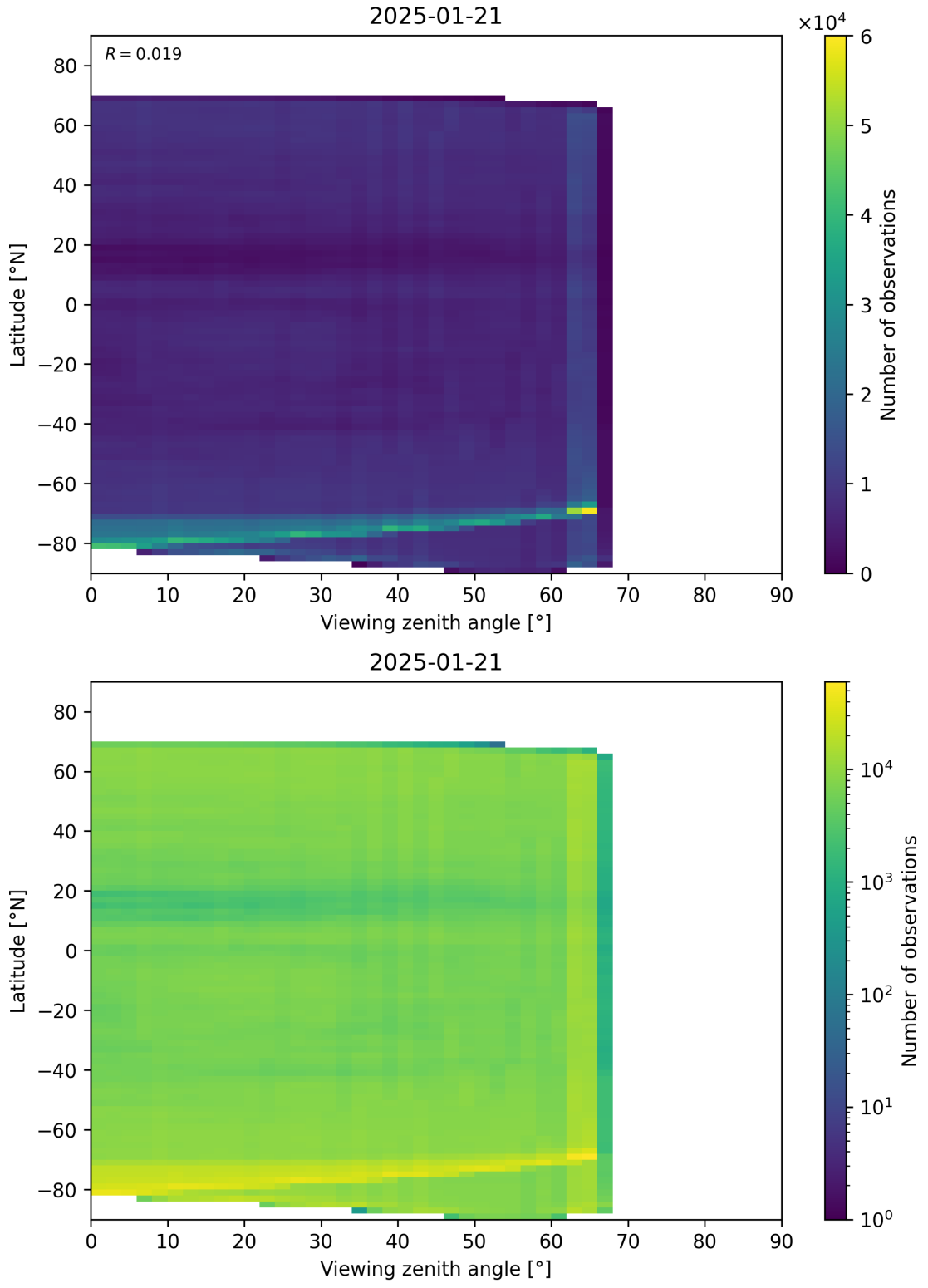

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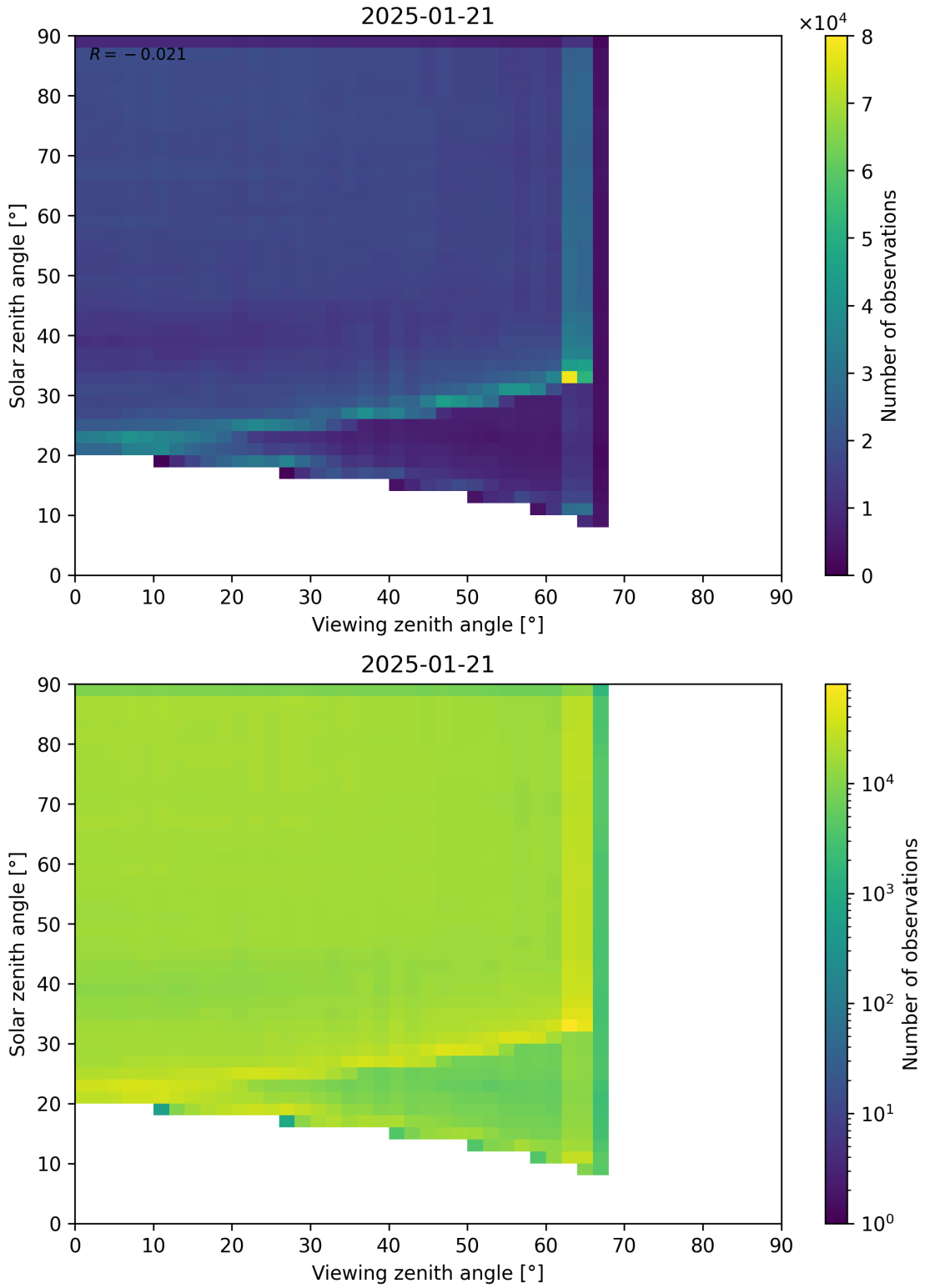

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Maarten Sneep (maarten.sneep@knmi.nl).