

PyCAMA report generated by tropl2-proc

tropl2-proc

2023-08-02 (02:45)

1 Short Introduction

1.1 The list of parameters

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

2 Definitions

The averages shown here are *unweighed* averages:

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

with N the number of observations in the dataset.

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 1: Parameterlist and basic statistics for the analysis

Variable	mean $\pm \sigma$	Count	Mode	IQR	Median	Minimum	Maximum
qa value [1]	0.621 ± 0.379	21217220	0.995	0.700	0.830	0.0	1.000
cloud fraction [1]	0.570 ± 0.351	21217220	0.995	0.756	0.560	6.302×10^{-3}	1.000
cloud top height [m]	$(0.376 \pm 0.259) \times 10^4$	21217220	1.575×10^3	3.481×10^3	3.189×10^3	0.0	2.000×10^4
cloud optical thickness [1]	21.6 ± 35.3	21217220	10.2	13.2	11.1	1.000	250
cloud fraction crb [1]	0.569 ± 0.352	21217220	0.995	0.757	0.558	7.618×10^{-3}	1.000
cloud height crb [m]	$(0.296 \pm 0.225) \times 10^4$	21217220	75.0	3.115×10^3	2.448×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.578 ± 0.192	21217220	0.555	0.223	0.574	0.0	1.000
surface albedo fitted [1]	0.153 ± 0.191	21217220	1.500×10^{-2}	0.215	5.225×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.147 ± 0.196	21217220	1.500×10^{-2}	0.221	3.283×10^{-2}	0.0	1.000
fitted root mean square [1]	$(7.357 \pm 12.790) \times 10^{-4}$	21217220	5.000×10^{-5}	8.197×10^{-4}	3.623×10^{-4}	9.863×10^{-7}	0.250
fitted root mean square crb [1]	$(6.316 \pm 8.440) \times 10^{-4}$	21217220	5.000×10^{-5}	7.868×10^{-4}	3.089×10^{-4}	8.526×10^{-7}	0.378
wavelength shift [nm]	$(7.212 \pm 6.693) \times 10^{-3}$	21217220	3.000×10^{-4}	9.295×10^{-3}	6.743×10^{-3}	-5.731×10^{-2}	8.195×10^{-2}
cloud fraction apriori [1]	0.572 ± 0.358	21217220	0.995	0.779	0.565	0.0	1.000
reflectance blue ocra [1]	0.504 ± 0.184	21217220	0.325	0.284	0.479	0.126	1.98
reflectance green ocra [1]	0.450 ± 0.210	21217220	0.205	0.343	0.423	7.658×10^{-2}	2.15
reflectance continuum aband [1]	0.408 ± 0.241	21217220	0.335	0.362	0.385	1.215×10^{-2}	7.24

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	9.000×10^{-2}	0.250	0.950	1.000	1.000	1.000	1.000
cloud fraction [1]	2.427×10^{-2}	6.298×10^{-2}	9.945×10^{-2}	0.144	0.228	0.984	1.000	1.000	1.000	1.000
cloud top height [m]	135	581	975	1.309×10^3	1.756×10^3	5.237×10^3	6.382×10^3	7.440×10^3	8.878×10^3	1.135×10^4
cloud optical thickness [1]	1.05	2.79	4.10	5.18	6.83	20.0	29.6	43.4	74.9	241
cloud fraction crb [1]	2.390×10^{-2}	6.200×10^{-2}	9.840×10^{-2}	0.143	0.226	0.983	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	145	484	785	1.182×10^3	4.296×10^3	5.314×10^3	6.214×10^3	7.402×10^3	9.339×10^3
cloud albedo crb [1]	1.257×10^{-2}	0.241	0.350	0.417	0.472	0.695	0.763	0.826	0.909	1.000
surface albedo fitted [1]	0.0	7.393×10^{-3}	1.144×10^{-2}	1.550×10^{-2}	2.183×10^{-2}	0.237	0.317	0.436	0.559	0.860
surface albedo fitted crb [1]	6.549×10^{-5}	5.254×10^{-3}	7.794×10^{-3}	1.051×10^{-2}	1.482×10^{-2}	0.236	0.322	0.450	0.566	0.834
fitted root mean square [1]	1.056×10^{-5}	2.636×10^{-5}	4.522×10^{-5}	7.110×10^{-5}	1.193×10^{-4}	9.390×10^{-4}	1.366×10^{-3}	1.836×10^{-3}	2.524×10^{-3}	4.334×10^{-3}
fitted root mean square crb [1]	6.117×10^{-6}	1.560×10^{-5}	2.880×10^{-5}	4.495×10^{-5}	7.987×10^{-5}	8.667×10^{-4}	1.279×10^{-3}	1.720×10^{-3}	2.344×10^{-3}	3.634×10^{-3}
wavelength shift [nm]	-8.102×10^{-3}	-1.246×10^{-3}	-8.825×10^{-5}	6.244×10^{-4}	2.190×10^{-3}	1.149×10^{-2}	1.376×10^{-2}	1.580×10^{-2}	1.859×10^{-2}	2.483×10^{-2}
cloud fraction apriori [1]	1.441×10^{-2}	5.899×10^{-2}	9.193×10^{-2}	0.136	0.221	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.232	0.260	0.283	0.310	0.350	0.634	0.702	0.756	0.825	0.958
reflectance green ocra [1]	0.151	0.176	0.197	0.221	0.263	0.607	0.682	0.741	0.817	0.953
reflectance continuum aband [1]	3.251×10^{-2}	6.180×10^{-2}	9.714×10^{-2}	0.141	0.216	0.577	0.666	0.740	0.827	0.970

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]	0.597 ± 0.382	13871588	0.710	0.800	0.0	1.000	0.210	0.920
cloud fraction [1]	0.603 ± 0.355	13871588	0.749	0.629	6.302×10^{-3}	1.000	0.251	1.000
cloud top height [m]	$(0.369 \pm 0.268) \times 10^4$	13871588	3.589×10^3	3.133×10^3	0.0	2.000×10^4	1.607×10^3	5.196×10^3
cloud optical thickness [1]	20.1 ± 33.6	13871588	12.2	10.7	1.000	250	6.44	18.6
cloud fraction crb [1]	0.602 ± 0.356	13871588	0.750	0.628	7.618×10^{-3}	1.000	0.250	1.000
cloud height crb [m]	$(0.288 \pm 0.232) \times 10^4$	13871588	3.266×10^3	2.383×10^3	0.0	2.000×10^4	1.002×10^3	4.268×10^3
cloud albedo crb [1]	0.568 ± 0.200	13871588	0.237	0.569	0.0	1.000	0.458	0.695
surface albedo fitted [1]	0.199 ± 0.208	13871588	0.273	0.154	0.0	1.000	2.506×10^{-2}	0.298
surface albedo fitted crb [1]	0.197 ± 0.212	13871588	0.283	0.155	0.0	1.000	1.752×10^{-2}	0.301
fitted root mean square [1]	$(9.312 \pm 15.021) \times 10^{-4}$	13871588	1.037×10^{-3}	5.500×10^{-4}	1.296×10^{-6}	0.250	1.753×10^{-4}	1.212×10^{-3}
fitted root mean square crb [1]	$(7.992 \pm 9.400) \times 10^{-4}$	13871588	9.782×10^{-4}	4.823×10^{-4}	8.526×10^{-7}	0.378	1.484×10^{-4}	1.127×10^{-3}
wavelength shift [nm]	$(8.102 \pm 6.610) \times 10^{-3}$	13871588	8.764×10^{-3}	7.960×10^{-3}	-5.731×10^{-2}	8.195×10^{-2}	3.530×10^{-3}	1.229×10^{-2}
cloud fraction apriori [1]	0.607 ± 0.360	13871588	0.753	0.639	0.0	1.000	0.247	1.000
reflectance blue ocra [1]	0.510 ± 0.189	13871588	0.309	0.495	0.126	1.84	0.344	0.654
reflectance green ocra [1]	0.464 ± 0.215	13871588	0.368	0.450	7.658×10^{-2}	2.06	0.265	0.634
reflectance continuum aband [1]	0.439 ± 0.238	13871588	0.354	0.424	1.215×10^{-2}	7.24	0.256	0.610

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]	0.667 ± 0.369	7345632	0.600	0.900	0.0	1.000	0.400	1.000
cloud fraction [1]	0.509 ± 0.335	7345632	0.643	0.460	8.020×10^{-3}	1.000	0.197	0.840
cloud top height [m]	$(0.390 \pm 0.243) \times 10^4$	7345632	3.346×10^3	3.285×10^3	0.0	2.000×10^4	1.967×10^3	5.313×10^3
cloud optical thickness [1]	24.6 ± 38.1	7345632	15.5	12.0	1.000	250	7.56	23.0
cloud fraction crb [1]	0.506 ± 0.336	7345632	0.643	0.456	8.680×10^{-3}	1.000	0.194	0.837
cloud height crb [m]	$(0.312 \pm 0.211) \times 10^4$	7345632	2.951×10^3	2.563×10^3	0.0	2.000×10^4	1.407×10^3	4.357×10^3
cloud albedo crb [1]	0.597 ± 0.174	7345632	0.200	0.582	0.0	1.000	0.494	0.694
surface albedo fitted [1]	$(6.649 \pm 11.037) \times 10^{-2}$	7345632	4.205×10^{-2}	3.272×10^{-2}	0.0	1.000	1.883×10^{-2}	6.088×10^{-2}
surface albedo fitted crb [1]	$(5.322 \pm 11.016) \times 10^{-2}$	7345632	2.193×10^{-2}	2.085×10^{-2}	0.0	1.000	1.250×10^{-2}	3.443×10^{-2}
fitted root mean square [1]	$(3.664 \pm 5.059) \times 10^{-4}$	7345632	3.623×10^{-4}	1.838×10^{-4}	9.863×10^{-7}	5.821×10^{-2}	7.562×10^{-5}	4.380×10^{-4}
fitted root mean square crb [1]	$(3.149 \pm 4.853) \times 10^{-4}$	7345632	3.291×10^{-4}	1.132×10^{-4}	1.076×10^{-6}	2.616×10^{-2}	4.303×10^{-5}	3.721×10^{-4}
wavelength shift [nm]	$(5.532 \pm 6.523) \times 10^{-3}$	7345632	8.308×10^{-3}	4.181×10^{-3}	-4.402×10^{-2}	6.172×10^{-2}	9.305×10^{-4}	9.238×10^{-3}
cloud fraction apriori [1]	0.507 ± 0.344	7345632	0.670	0.456	0.0	1.000	0.185	0.855
reflectance blue oca [1]	0.492 ± 0.174	7345632	0.234	0.458	0.154	1.98	0.359	0.592
reflectance green oca [1]	0.422 ± 0.198	7345632	0.285	0.386	8.906×10^{-2}	2.15	0.261	0.545
reflectance continuum aband [1]	0.349 ± 0.236	7345632	0.344	0.313	1.334×10^{-2}	5.54	0.156	0.500

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]	0.616 ± 0.374	15362838	0.700	0.810	0.0	1.000	0.250	0.950
cloud fraction [1]	0.561 ± 0.351	15362838	0.752	0.544	6.302×10^{-3}	1.000	0.221	0.973
cloud top height [m]	$(0.373 \pm 0.264) \times 10^4$	15362838	3.496×10^3	3.081×10^3	0.0	2.000×10^4	1.682×10^3	5.178×10^3
cloud optical thickness [1]	23.2 ± 37.3	15362838	13.7	11.9	1.000	250	7.62	21.3
cloud fraction crb [1]	0.559 ± 0.351	15362838	0.753	0.541	8.243×10^{-3}	1.000	0.218	0.971
cloud height crb [m]	$(0.290 \pm 0.231) \times 10^4$	15362838	3.115×10^3	2.339×10^3	0.0	2.000×10^4	1.095×10^3	4.211×10^3
cloud albedo crb [1]	0.581 ± 0.187	15362838	0.216	0.575	0.0	1.000	0.476	0.692
surface albedo fitted [1]	0.106 ± 0.175	15362838	5.037×10^{-2}	3.183×10^{-2}	0.0	1.000	1.711×10^{-2}	6.749×10^{-2}
surface albedo fitted crb [1]	$(9.830 \pm 18.170) \times 10^{-2}$	15362838	3.010×10^{-2}	2.105×10^{-2}	0.0	1.000	1.159×10^{-2}	4.170×10^{-2}
fitted root mean square [1]	$(6.359 \pm 13.296) \times 10^{-4}$	15362838	6.545×10^{-4}	2.703×10^{-4}	9.863×10^{-7}	0.151	9.903×10^{-5}	7.536×10^{-4}
fitted root mean square crb [1]	$(5.112 \pm 7.244) \times 10^{-4}$	15362838	5.861×10^{-4}	2.149×10^{-4}	8.526×10^{-7}	0.151	6.624×10^{-5}	6.524×10^{-4}
wavelength shift [nm]	$(6.968 \pm 6.794) \times 10^{-3}$	15362838	9.291×10^{-3}	6.327×10^{-3}	-5.085×10^{-2}	6.499×10^{-2}	1.960×10^{-3}	1.125×10^{-2}
cloud fraction apriori [1]	0.562 ± 0.357	15362838	0.787	0.548	0.0	1.000	0.213	1.000
reflectance blue oca [1]	0.506 ± 0.175	15362838	0.271	0.488	0.160	1.98	0.361	0.631
reflectance green oca [1]	0.450 ± 0.202	15362838	0.332	0.432	9.776×10^{-2}	2.15	0.270	0.602
reflectance continuum aband [1]	0.380 ± 0.241	15362838	0.392	0.363	1.288×10^{-2}	7.24	0.165	0.557

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]	0.638 ± 0.392	3508745	0.770	0.850	0.0	1.000	0.190	0.960
cloud fraction [1]	0.555 ± 0.353	3508745	0.763	0.528	7.913×10^{-3}	1.000	0.211	0.974
cloud top height [m]	$(0.404 \pm 0.259) \times 10^4$	3508745	3.459×10^3	3.522×10^3	0.0	2.000×10^4	2.115×10^3	5.574×10^3
cloud optical thickness [1]	16.0 ± 25.8	3508745	9.56	8.80	1.000	250	5.53	15.1
cloud fraction crb [1]	0.554 ± 0.354	3508745	0.764	0.528	7.618×10^{-3}	1.000	0.209	0.974
cloud height crb [m]	$(0.321 \pm 0.215) \times 10^4$	3508745	3.074×10^3	2.713×10^3	0.0	2.000×10^4	1.546×10^3	4.620×10^3
cloud albedo crb [1]	0.588 ± 0.202	3508745	0.243	0.586	0.0	1.000	0.476	0.719
surface albedo fitted [1]	0.320 ± 0.195	3508745	0.109	0.259	0.0	1.000	0.216	0.325
surface albedo fitted crb [1]	0.316 ± 0.191	3508745	0.109	0.255	0.0	1.000	0.212	0.321
fitted root mean square [1]	$(1.099 \pm 1.035) \times 10^{-3}$	3508745	1.104×10^{-3}	8.141×10^{-4}	2.017×10^{-6}	0.146	3.956×10^{-4}	1.500×10^{-3}
fitted root mean square crb [1]	$(1.063 \pm 1.011) \times 10^{-3}$	3508745	1.102×10^{-3}	8.045×10^{-4}	1.194×10^{-6}	0.224	3.748×10^{-4}	1.477×10^{-3}
wavelength shift [nm]	$(8.067 \pm 6.168) \times 10^{-3}$	3508745	8.289×10^{-3}	7.968×10^{-3}	-4.780×10^{-2}	5.940×10^{-2}	3.744×10^{-3}	1.203×10^{-2}
cloud fraction apriori [1]	0.562 ± 0.360	3508745	0.796	0.539	0.0	1.000	0.204	1.000
reflectance blue ocrs [1]	0.496 ± 0.218	3508745	0.346	0.435	0.126	1.96	0.313	0.659
reflectance green ocrs [1]	0.451 ± 0.245	3508745	0.404	0.381	7.658×10^{-2}	2.05	0.238	0.642
reflectance continuum aband [1]	0.495 ± 0.223	3508745	0.344	0.433	1.696×10^{-2}	5.06	0.316	0.660

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	4.294×10^{-2}	-4.005×10^{-2}	-1.284×10^{-2}	4.972×10^{-2}	-7.505×10^{-3}	-1.286×10^{-2}	0.104	5.546×10^{-2}	-1.523×10^{-2}
4.294×10^{-2}	1.000	-0.108	0.187	2.863×10^{-2}	0.209	0.187	3.901×10^{-2}	-2.933×10^{-2}	0.185
-4.005×10^{-2}	-0.108	1.000	0.183	-0.134	-5.205×10^{-2}	0.185	-0.148	-0.139	0.189
-1.284×10^{-2}	0.187	0.183	1.000	-8.995×10^{-3}	0.300	1.000	4.101×10^{-2}	0.199	0.991
4.972×10^{-2}	2.863×10^{-2}	-0.134	-8.995×10^{-3}	1.000	0.139	-9.532×10^{-3}	0.953	0.112	-1.728×10^{-2}
-7.505×10^{-3}	0.209	-5.205×10^{-2}	0.300	0.139	1.000	0.297	0.191	0.503	0.295
-1.286×10^{-2}	0.187	0.185	1.000	-9.532×10^{-3}	0.297	1.000	4.069×10^{-2}	0.195	0.991
0.104	3.901×10^{-2}	-0.148	4.101×10^{-2}	0.953	0.191	4.069×10^{-2}	1.000	8.489×10^{-2}	3.248×10^{-2}
5.546×10^{-2}	-2.933×10^{-2}	-0.139	0.199	0.112	0.503	0.195	8.489×10^{-2}	1.000	0.199
-1.523×10^{-2}	0.185	0.189	0.991	-1.728×10^{-2}	0.295	0.991	3.248×10^{-2}	0.199	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
387	18.9	-36.9	-8.875×10^{-2}	2.538×10^3	-5.21	-8.905×10^{-2}	4.591×10^3	0.209	-0.107
18.9	502	-114	1.47	1.663×10^3	166	1.47	1.967×10^3	-0.126	1.48
-36.9	-114	2.198×10^3	3.01	-1.635×10^4	-86.2	3.05	-1.557×10^4	-1.25	3.18
-8.875×10^{-2}	1.47	3.01	0.123	-8.20	3.73	0.124	32.4	1.338×10^{-2}	0.125
2.538×10^3	1.663×10^3	-1.635×10^4	-8.20	6.731×10^6	1.277×10^4	-8.70	5.566×10^6	55.6	-16.0
-5.21	166	-86.2	3.73	1.277×10^4	1.247×10^3	3.69	1.521×10^4	3.41	3.73
-8.905×10^{-2}	1.47	3.05	0.124	-8.70	3.69	0.124	32.2	1.313×10^{-2}	0.125
4.591×10^3	1.967×10^3	-1.557×10^4	32.4	5.566×10^6	1.521×10^4	32.2	5.069×10^6	36.6	26.2
0.209	-0.126	-1.25	1.338×10^{-2}	55.6	3.41	1.313×10^{-2}	36.6	3.671×10^{-2}	1.362×10^{-2}
-0.107	1.48	3.18	0.125	-16.0	3.73	0.125	26.2	1.362×10^{-2}	0.128

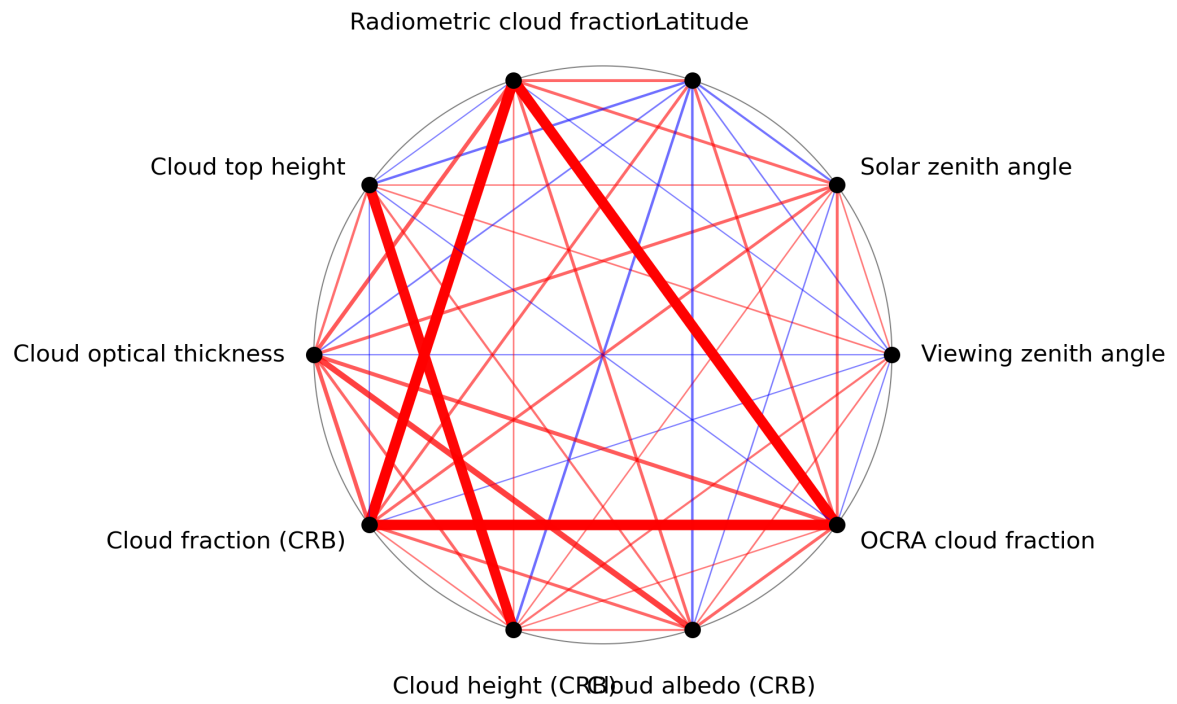


Figure 1: Map of correlation graph for 2023-07-17 to 2023-07-19.

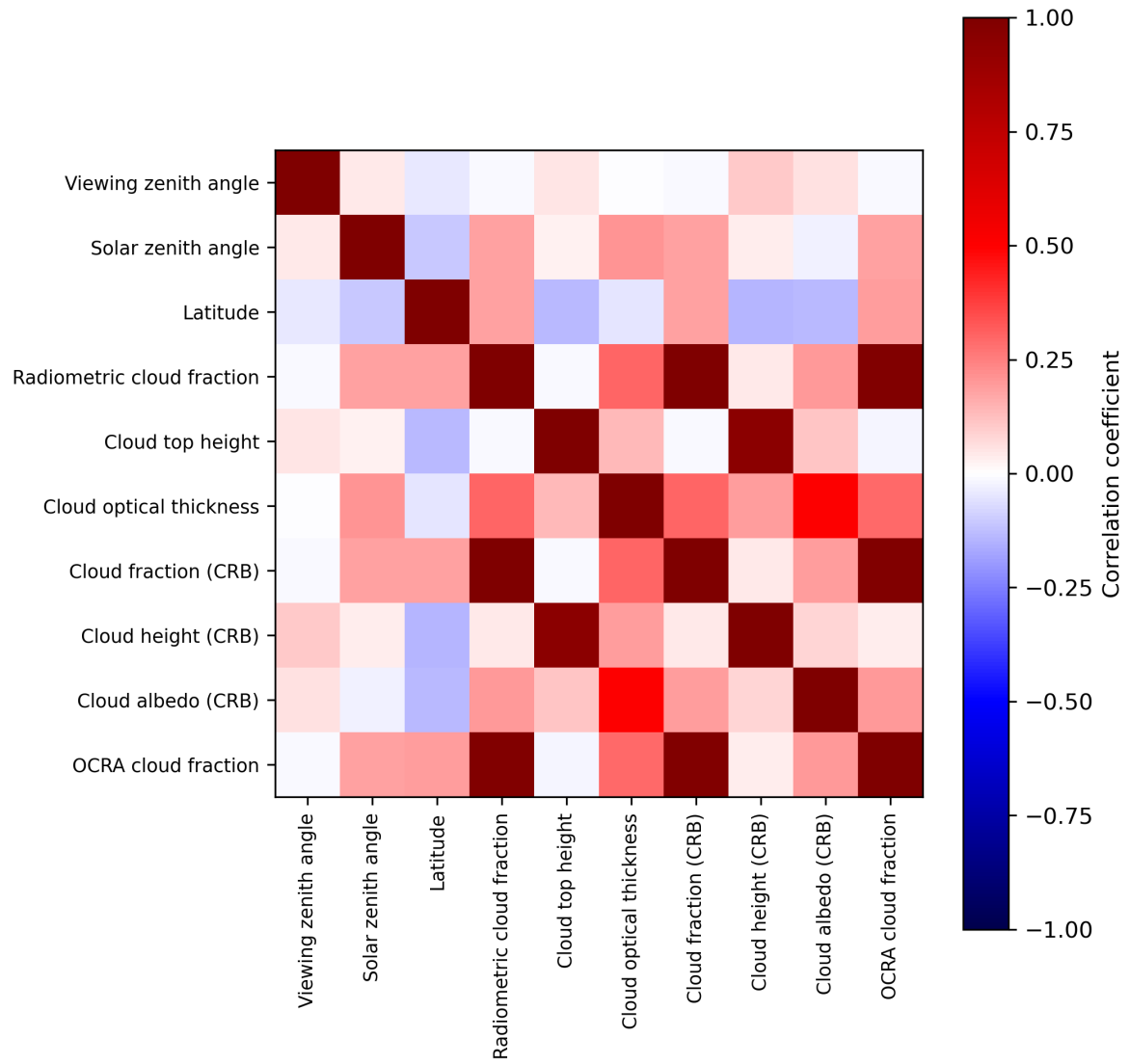


Figure 2: Map of correlation matrix for 2023-07-17 to 2023-07-19.

3 Granule outlines

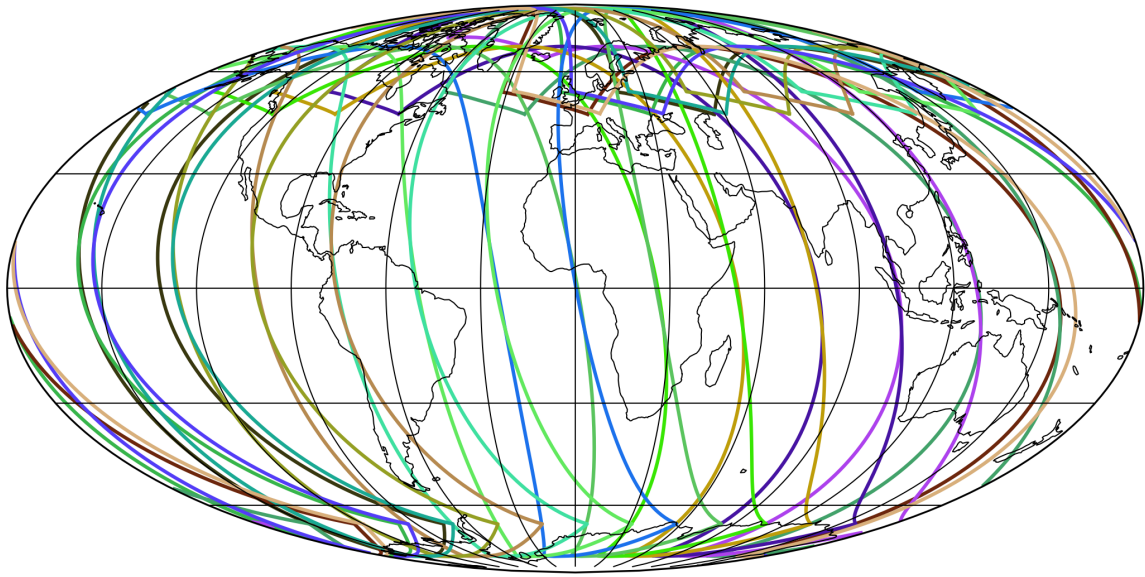


Figure 3: Outline of the granules.

4 Input data monitoring

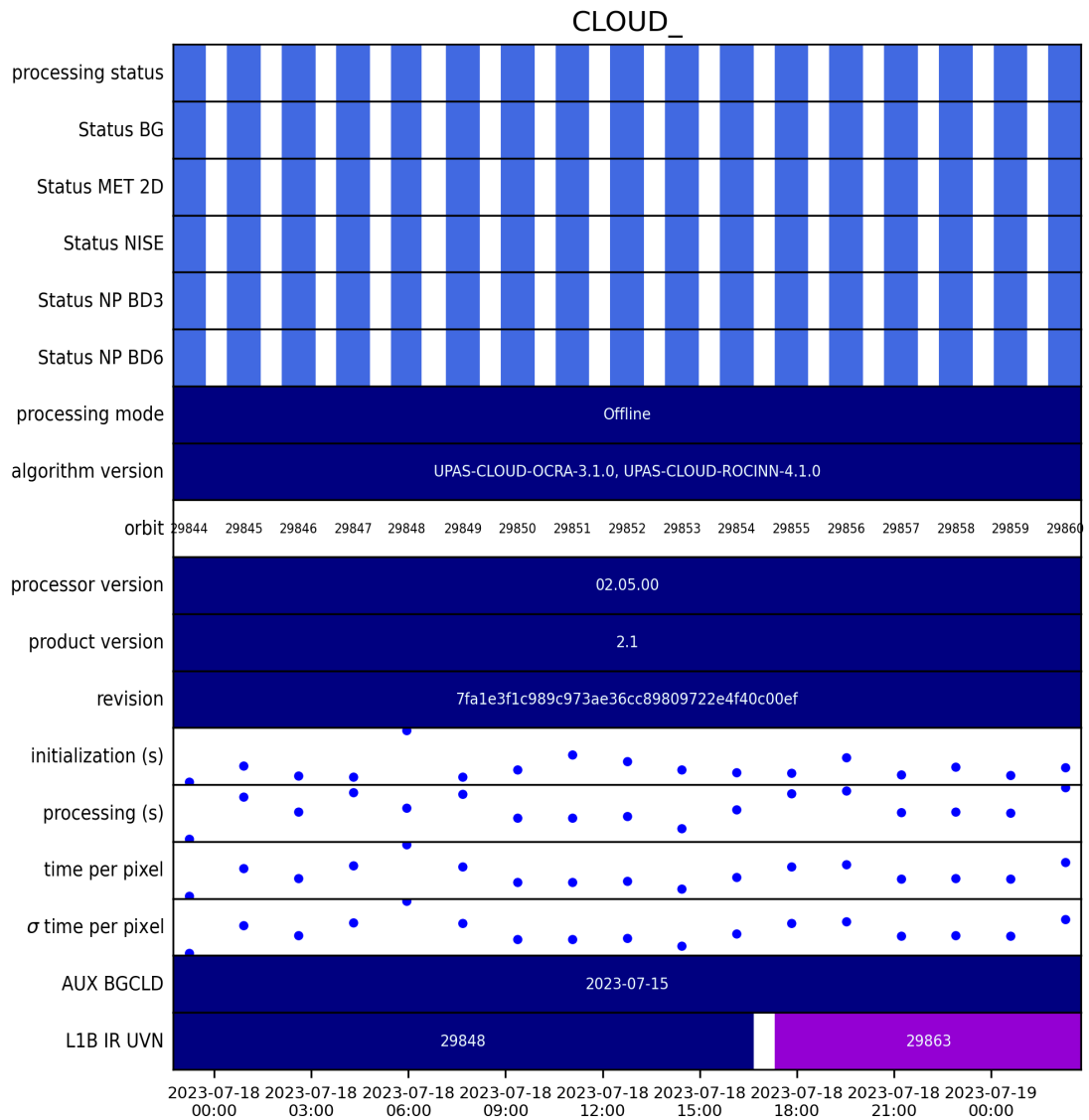


Figure 4: Input data per granule

5 Warnings and errors

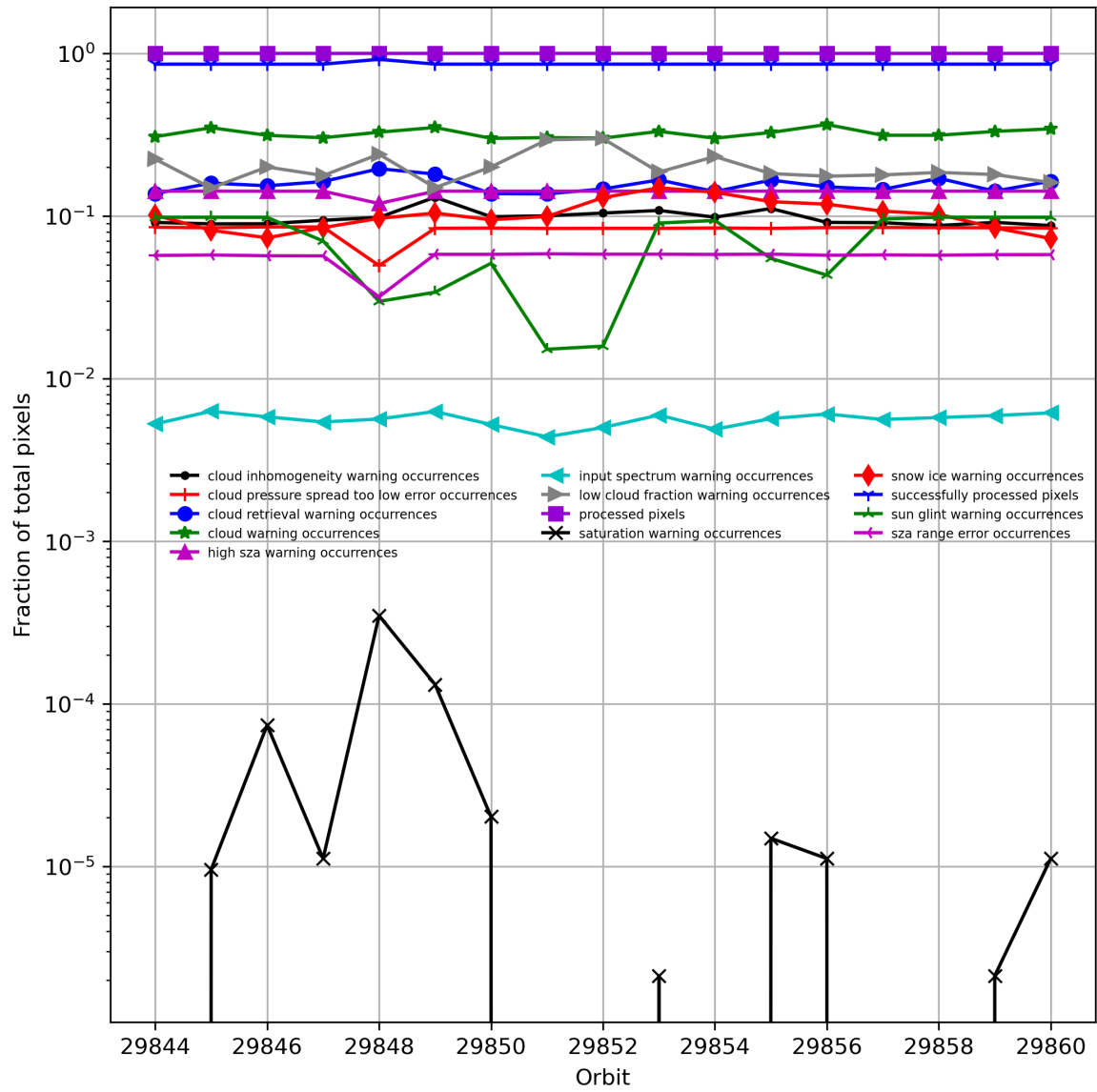


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

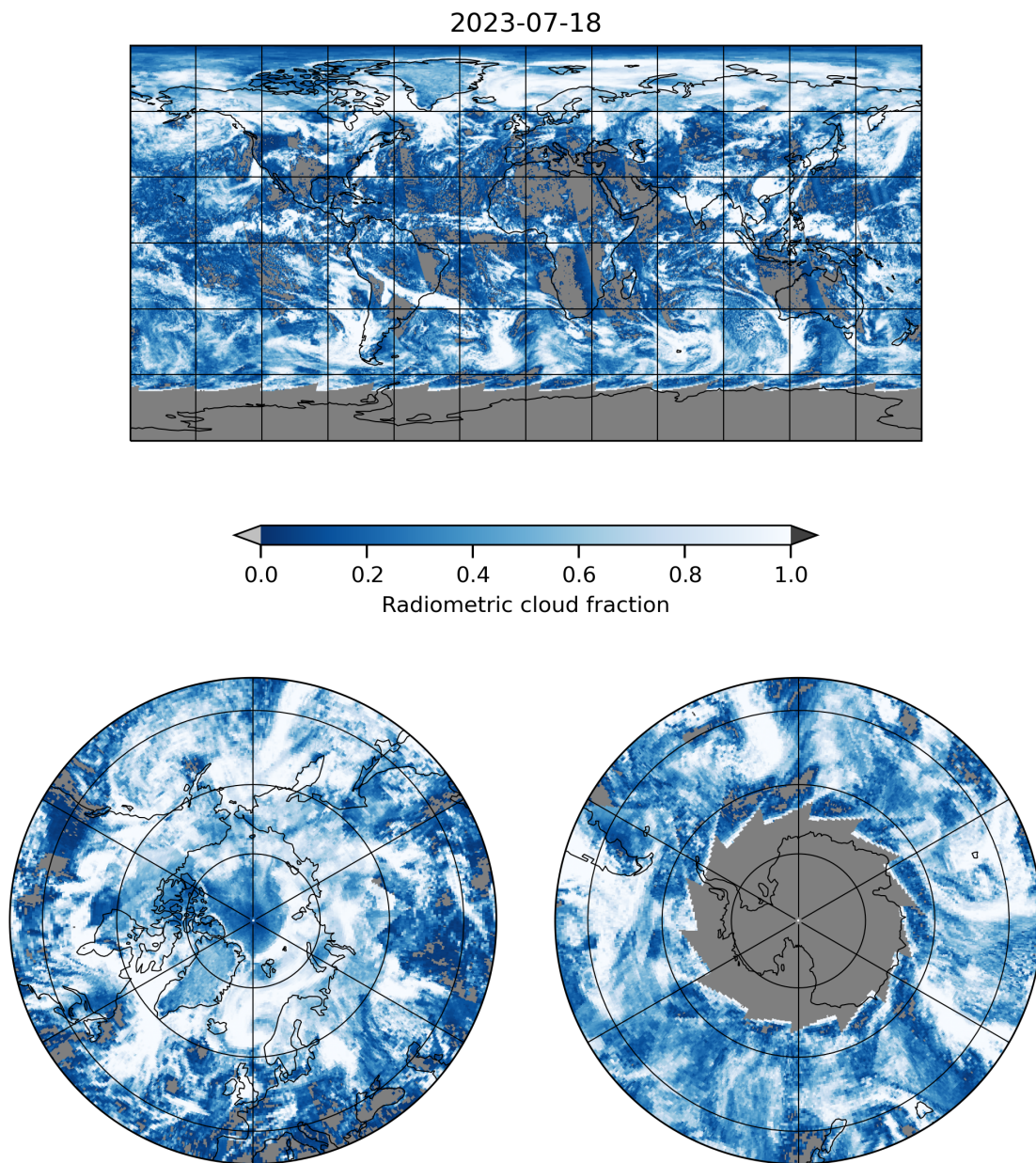


Figure 6: Map of “Radiometric cloud fraction” for 2023-07-17 to 2023-07-19

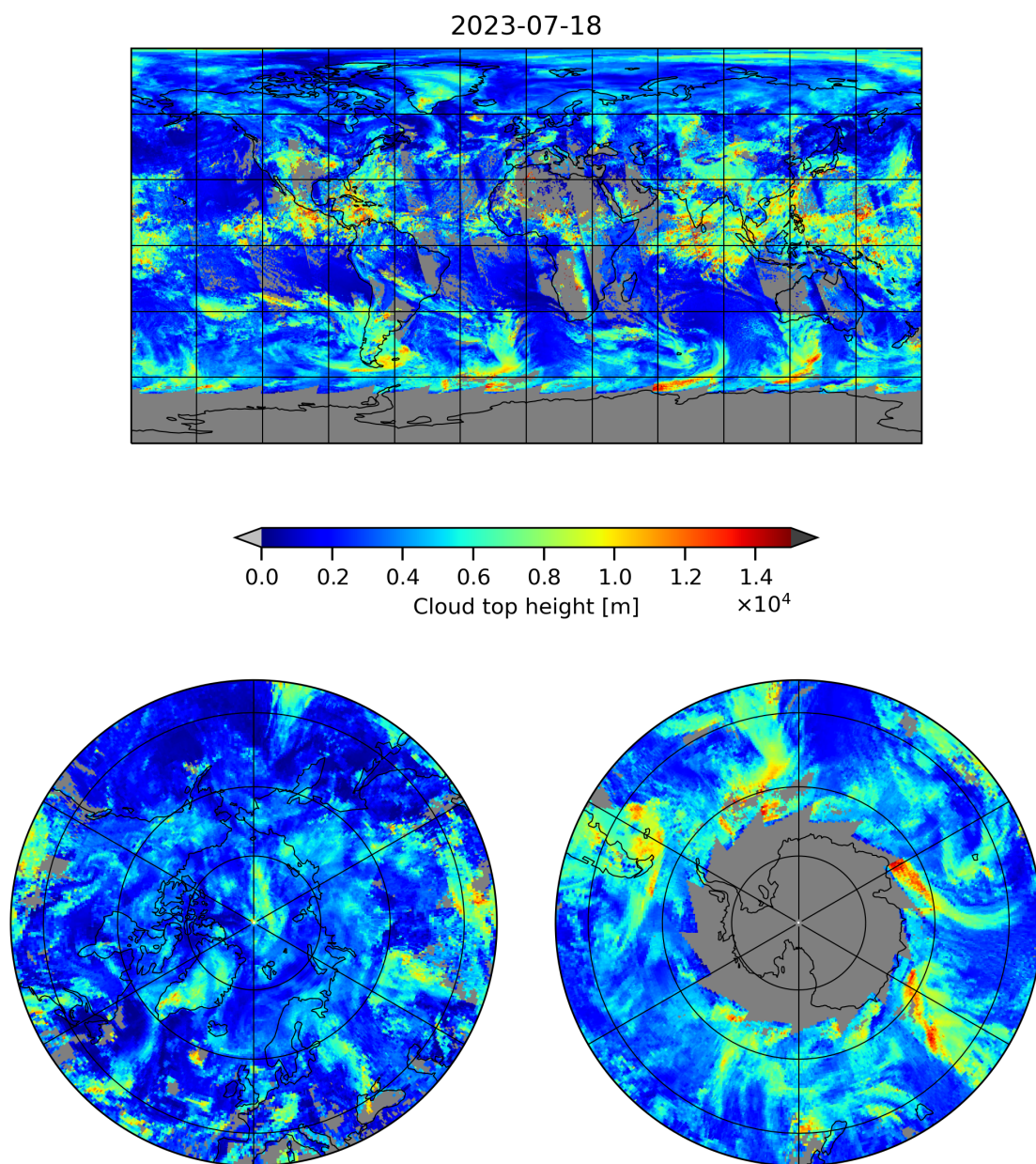


Figure 7: Map of “Cloud top height” for 2023-07-17 to 2023-07-19

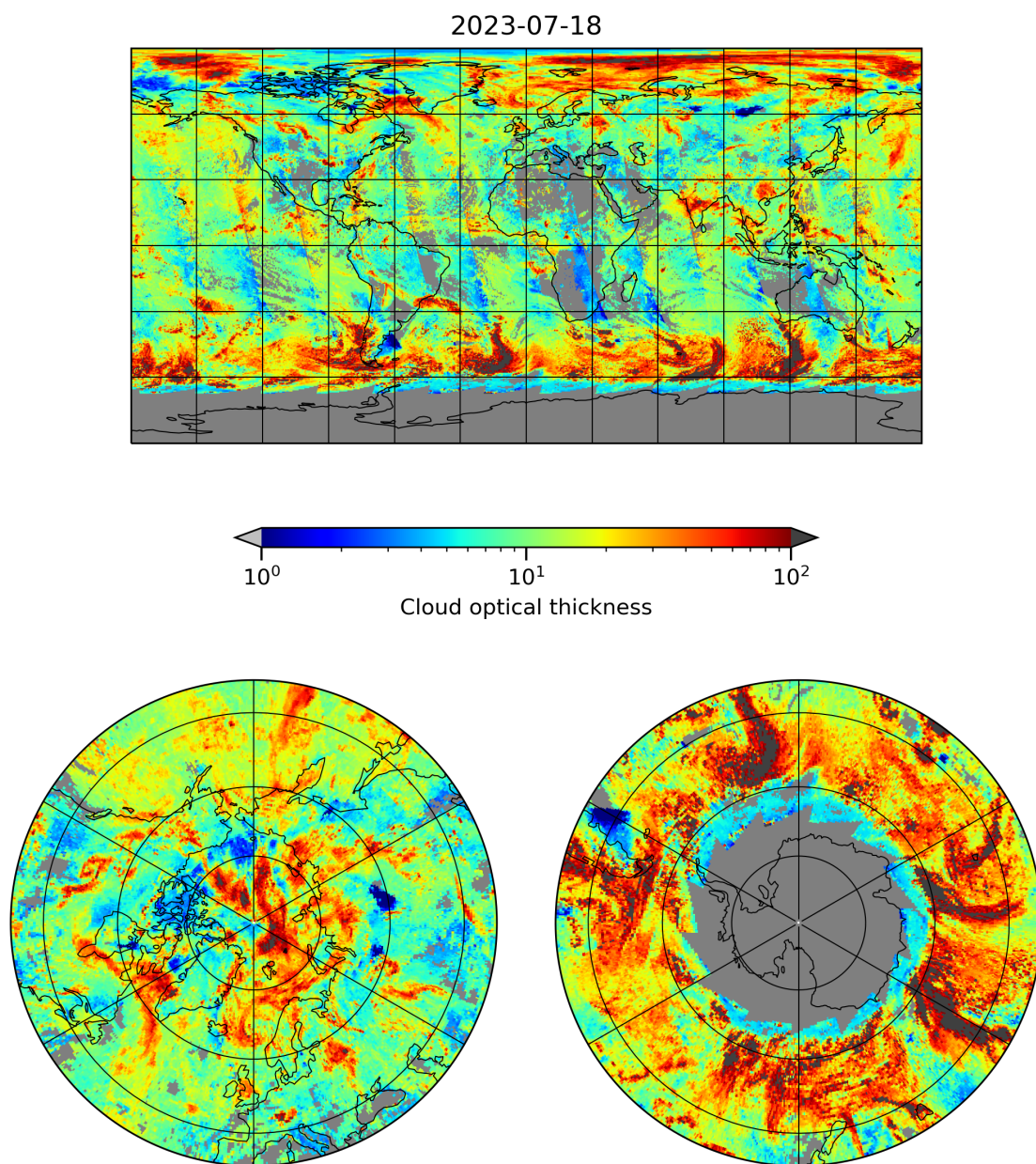


Figure 8: Map of “Cloud optical thickness” for 2023-07-17 to 2023-07-19

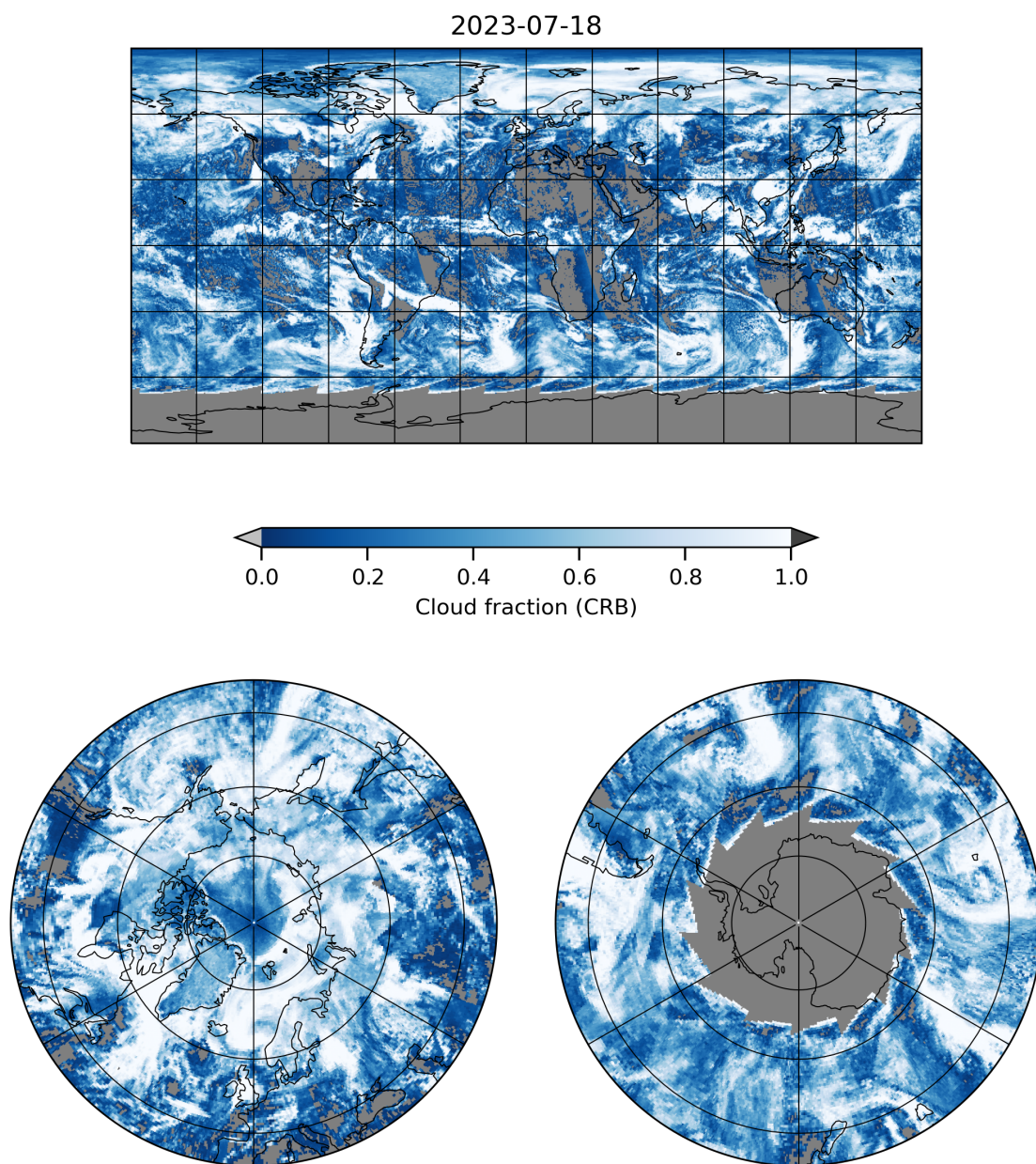


Figure 9: Map of “Cloud fraction (CRB)” for 2023-07-17 to 2023-07-19

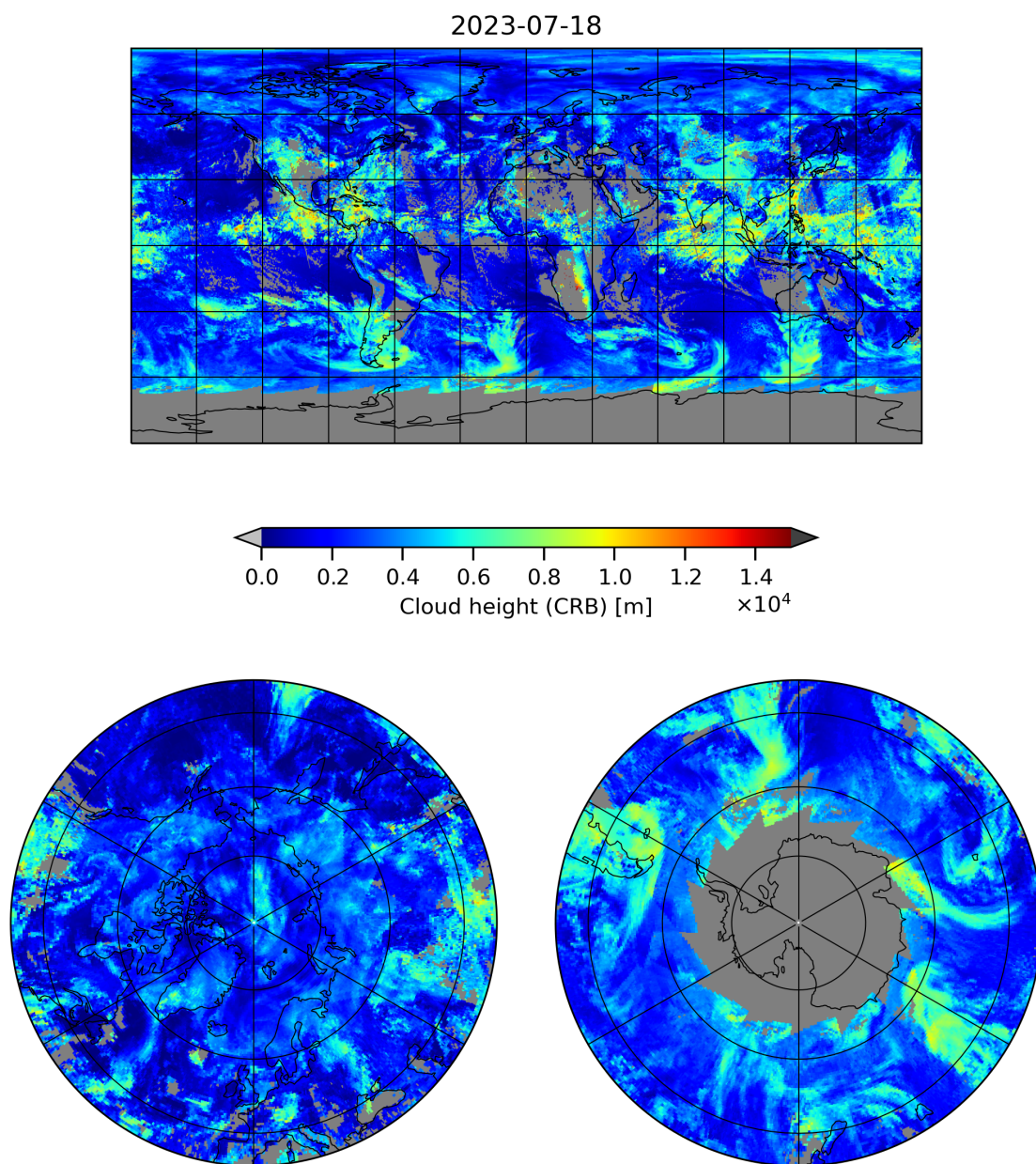


Figure 10: Map of “Cloud height (CRB)” for 2023-07-17 to 2023-07-19

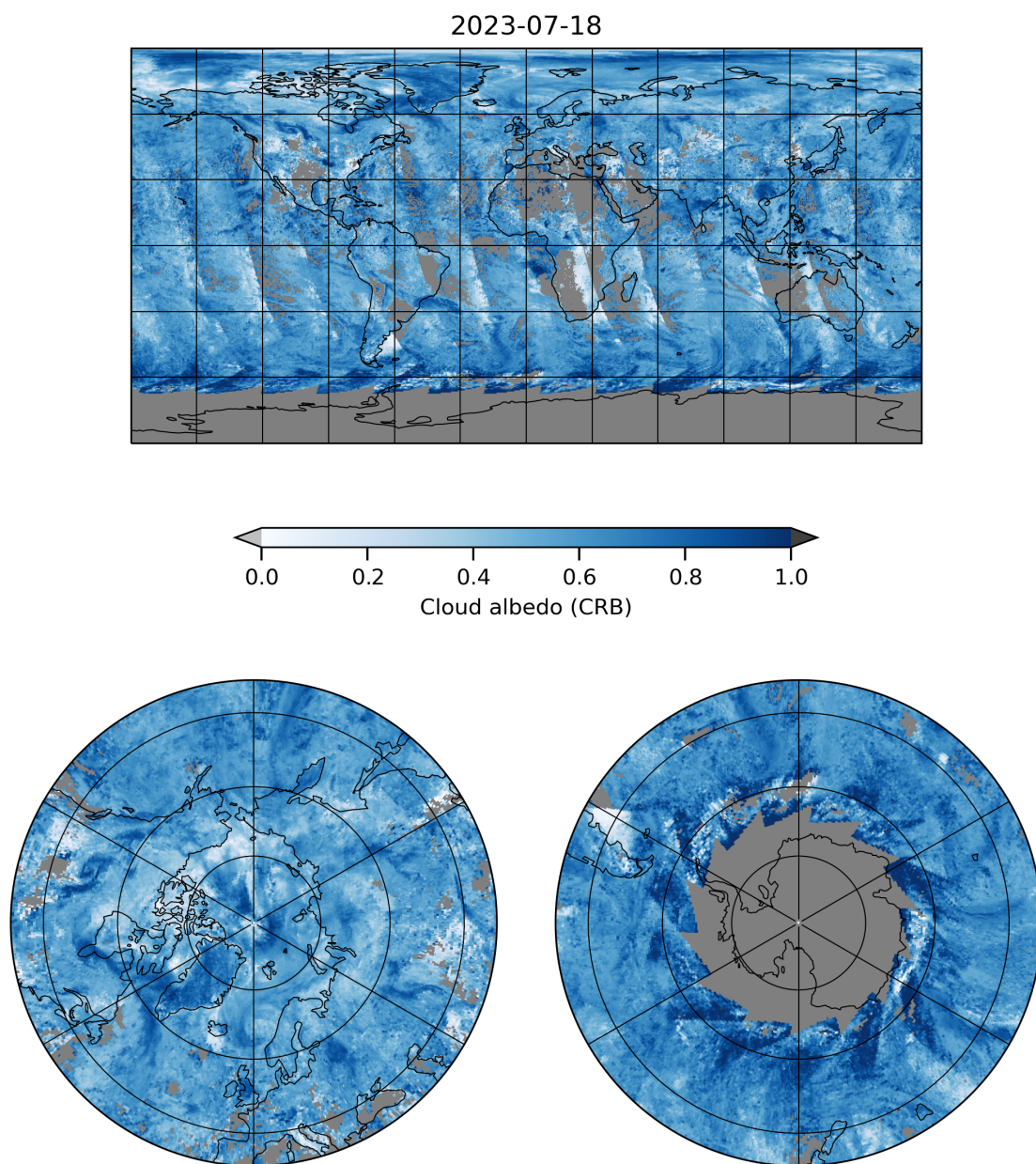


Figure 11: Map of “Cloud albedo (CRB)” for 2023-07-17 to 2023-07-19

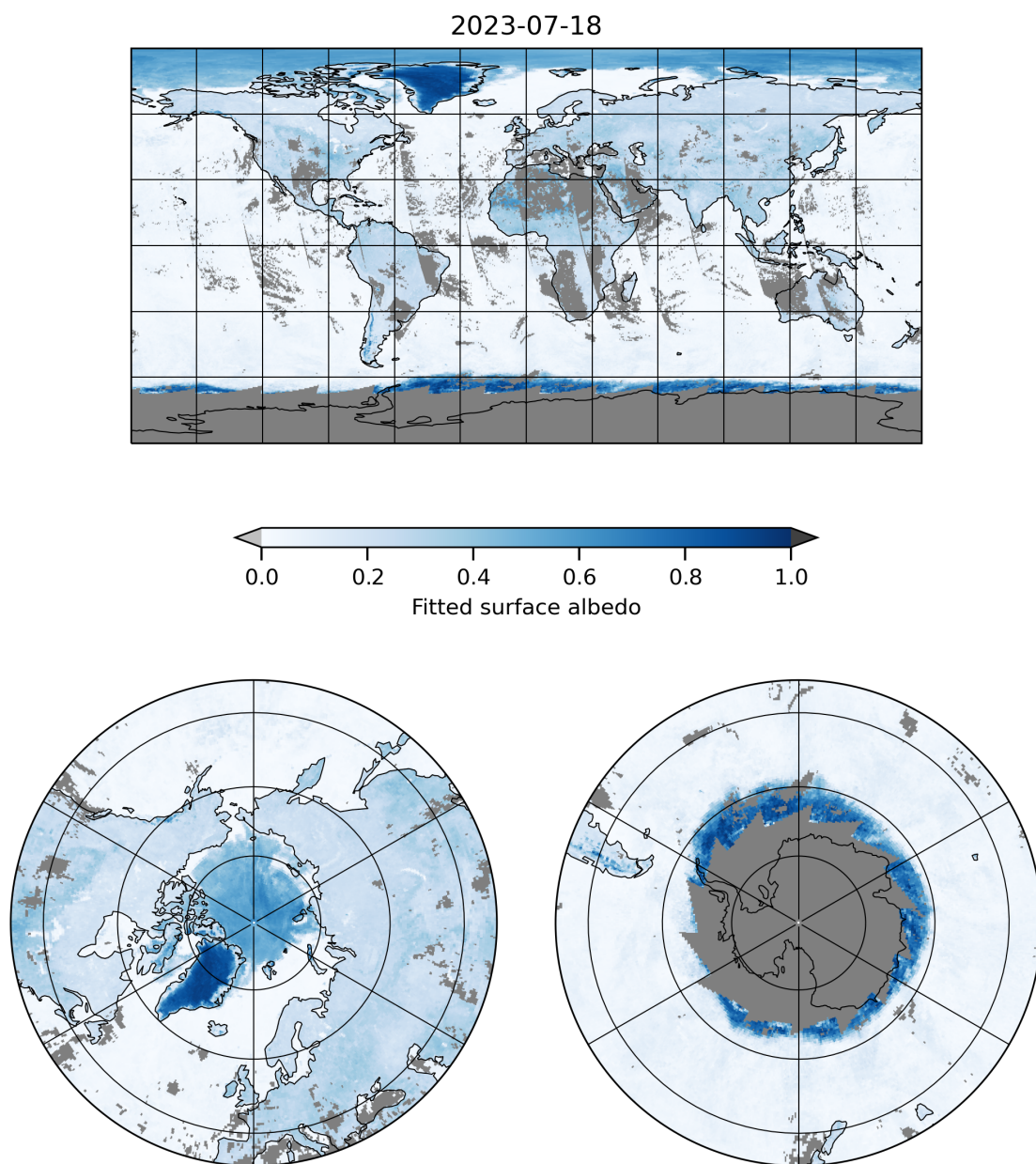


Figure 12: Map of “Fitted surface albedo” for 2023-07-17 to 2023-07-19

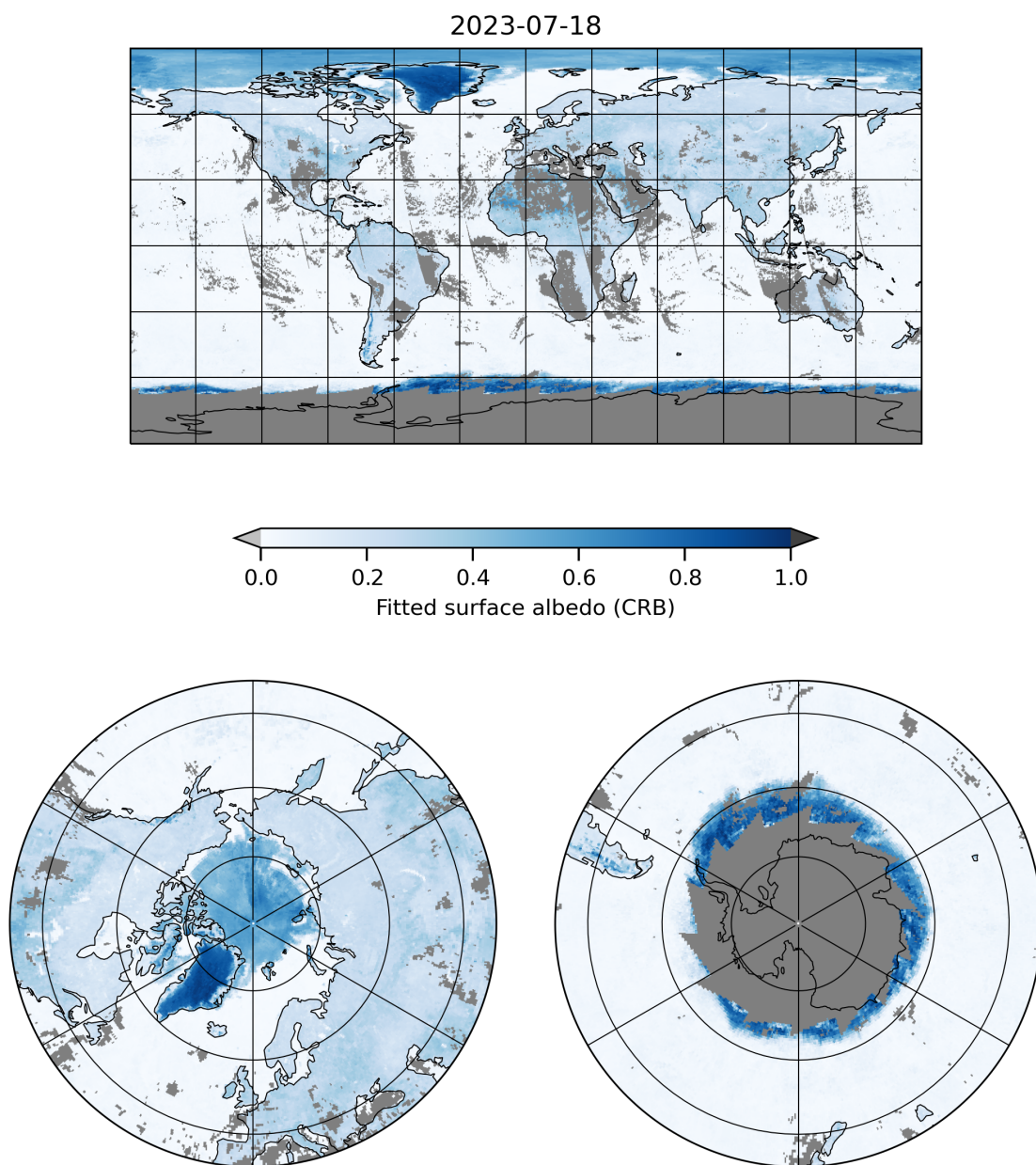


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-07-17 to 2023-07-19

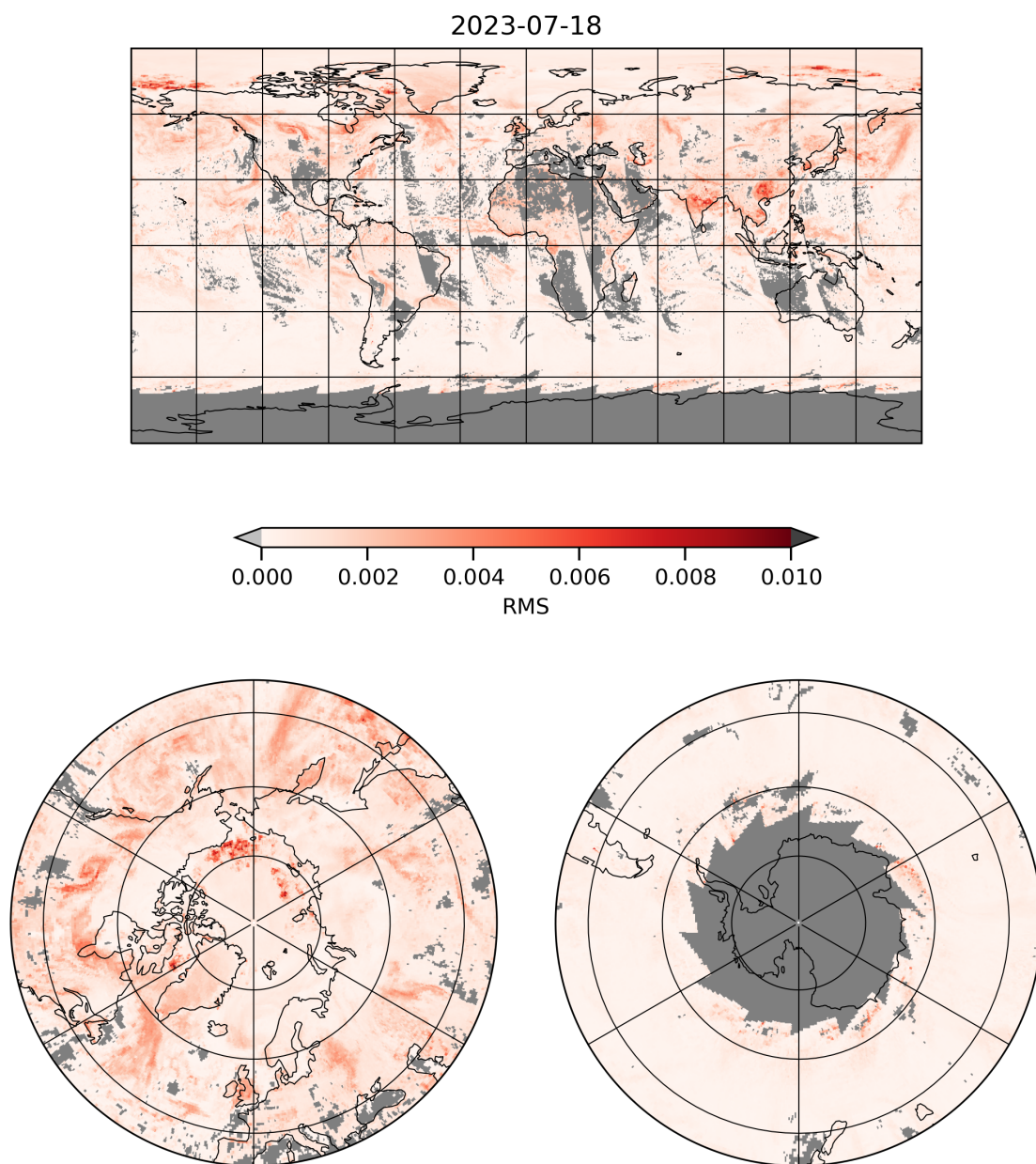


Figure 14: Map of “RMS” for 2023-07-17 to 2023-07-19

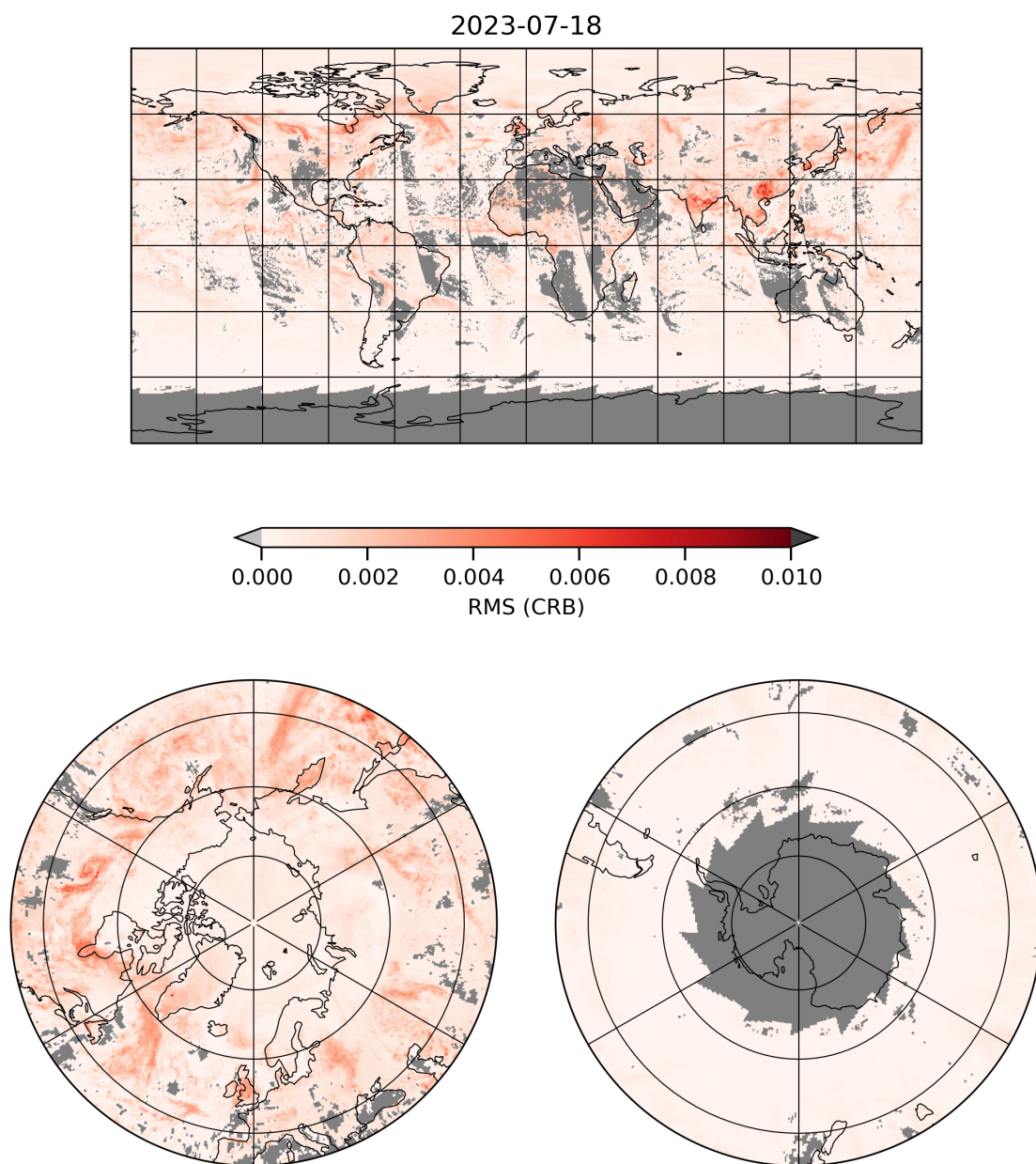


Figure 15: Map of “RMS (CRB)” for 2023-07-17 to 2023-07-19

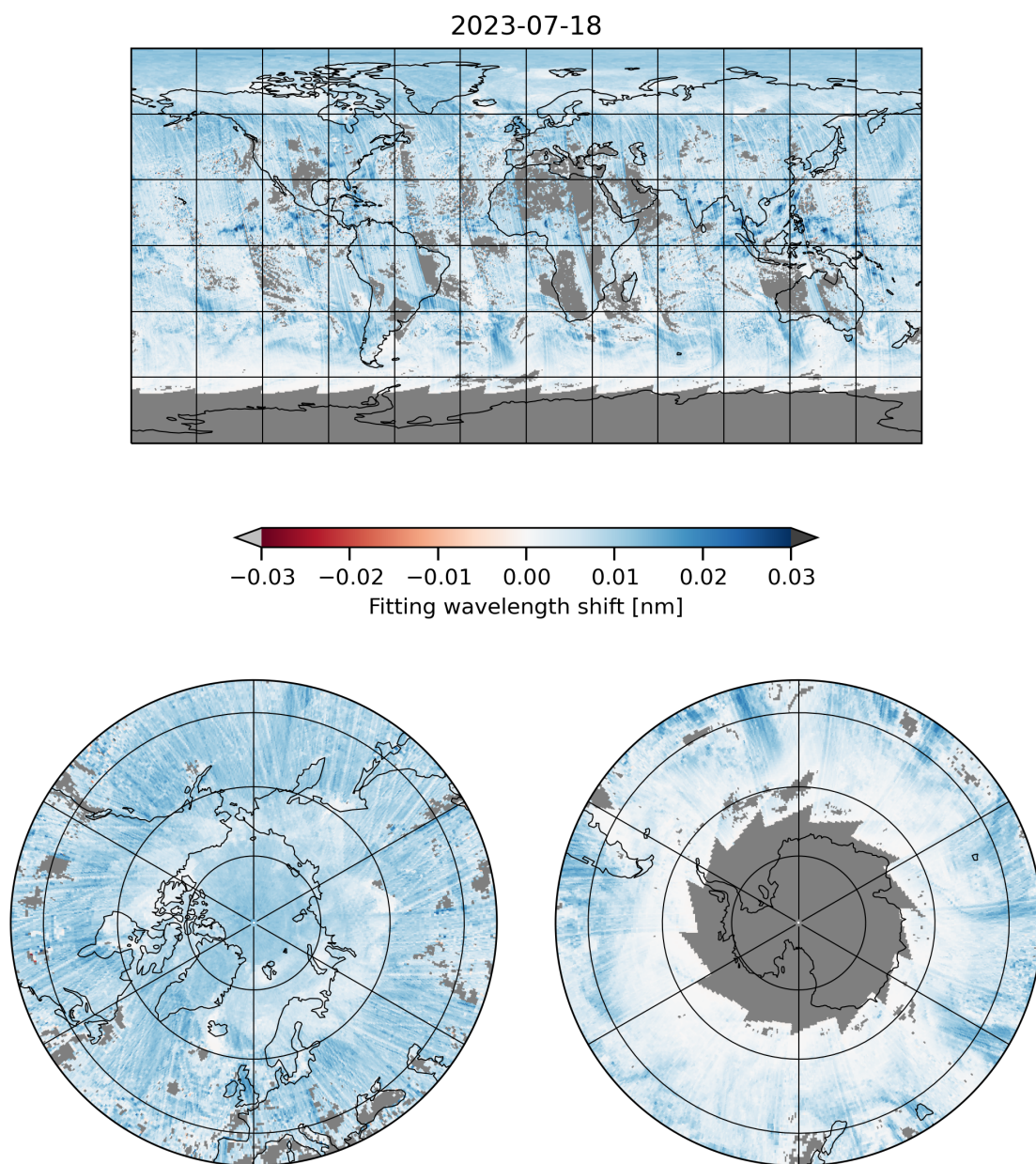


Figure 16: Map of “Fitting wavelength shift” for 2023-07-17 to 2023-07-19

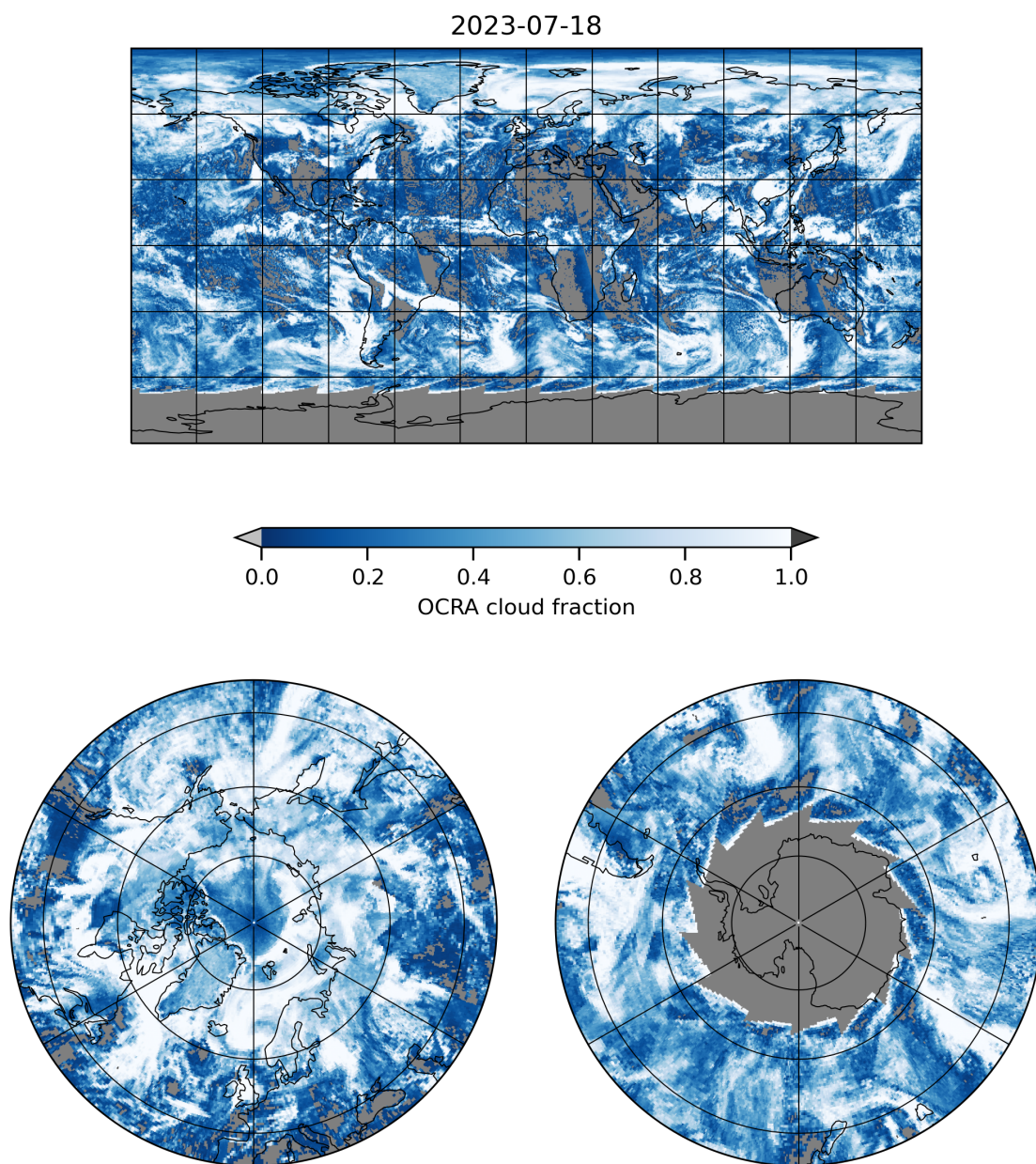


Figure 17: Map of “OCRA cloud fraction” for 2023-07-17 to 2023-07-19

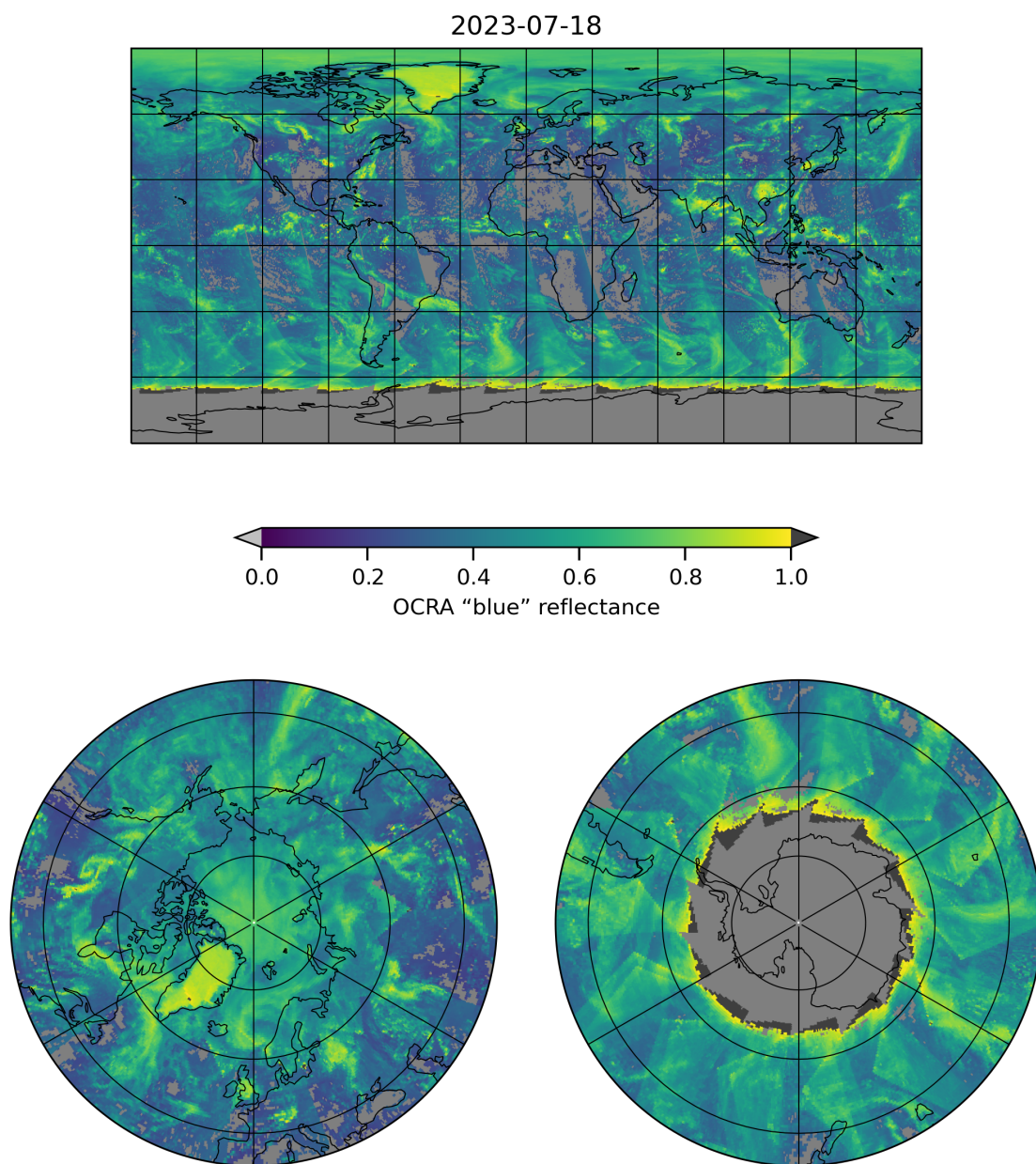


Figure 18: Map of "OCRA "blue" reflectance" for 2023-07-17 to 2023-07-19

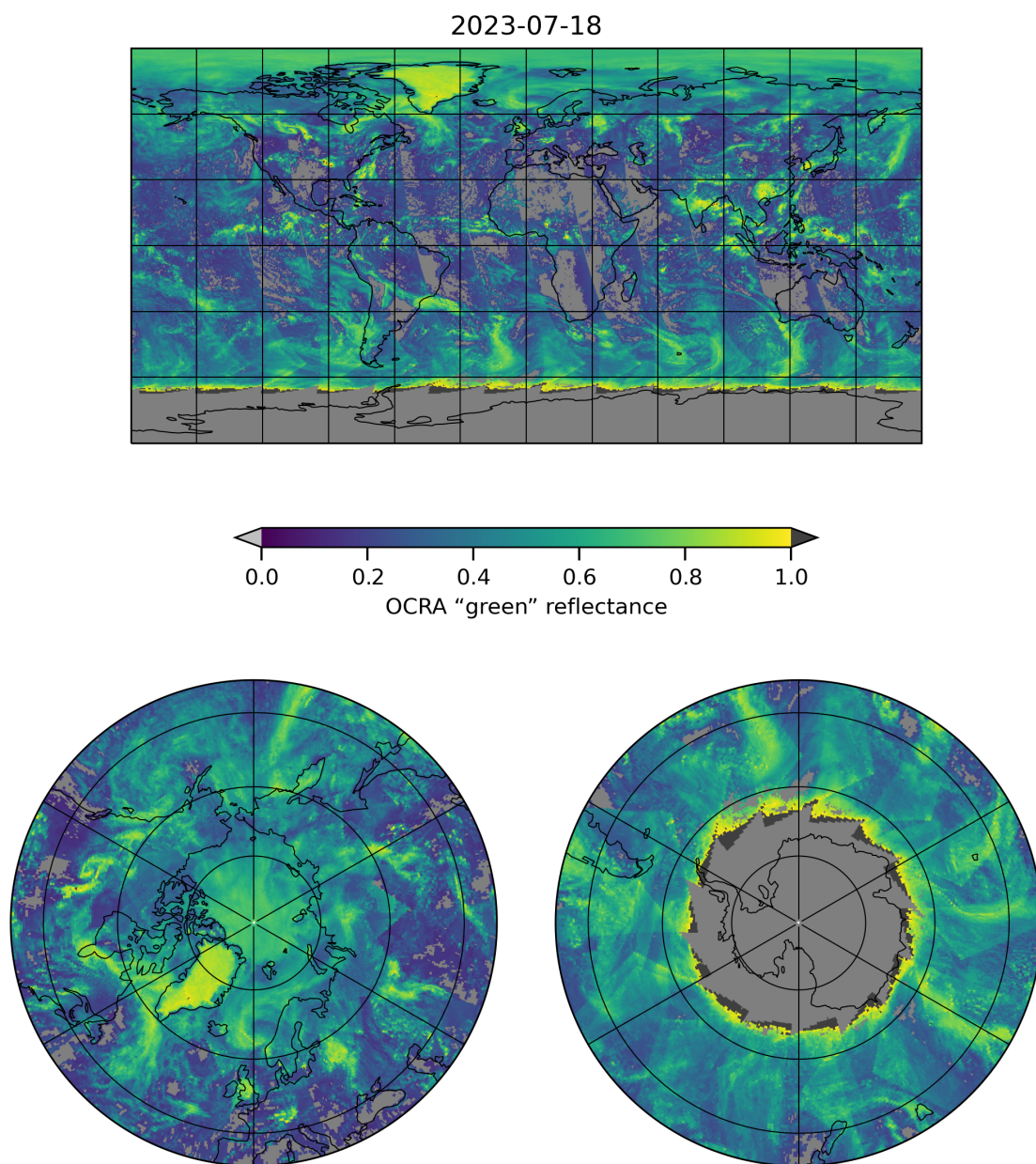


Figure 19: Map of "OCRA "green" reflectance" for 2023-07-17 to 2023-07-19

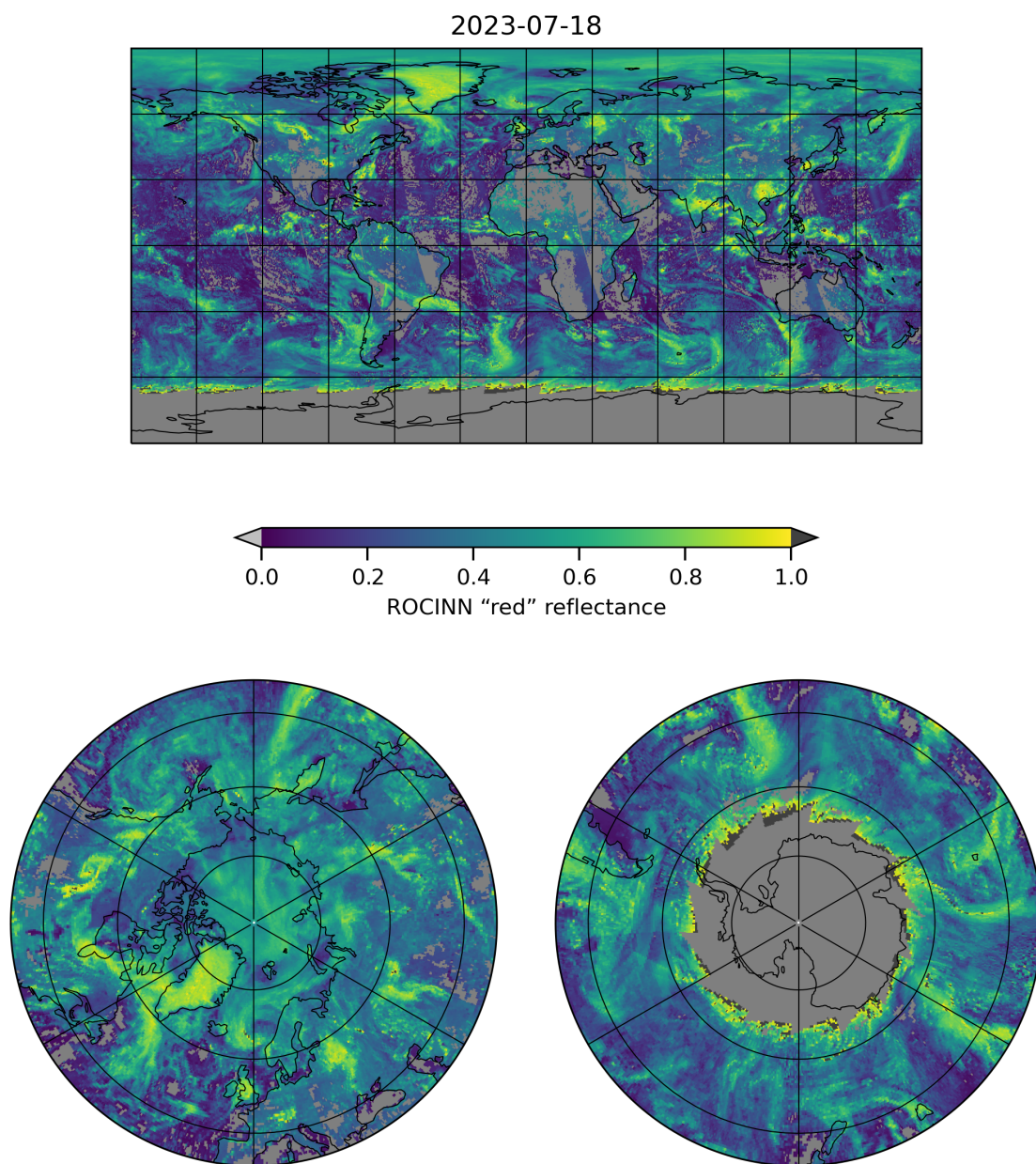


Figure 20: Map of "ROCINN "red" reflectance" for 2023-07-17 to 2023-07-19

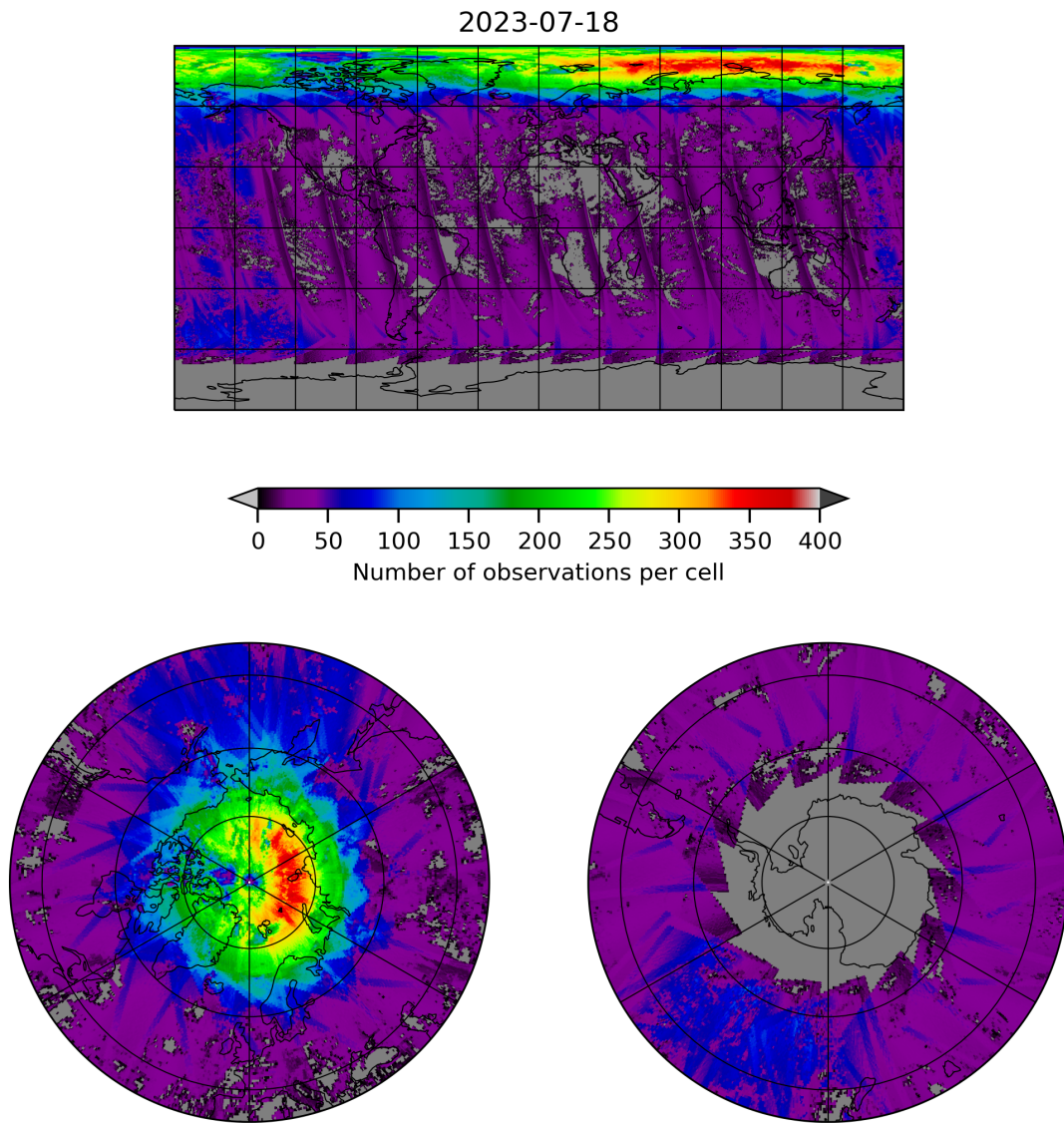


Figure 21: Map of the number of observations for 2023-07-17 to 2023-07-19

7 Zonal average

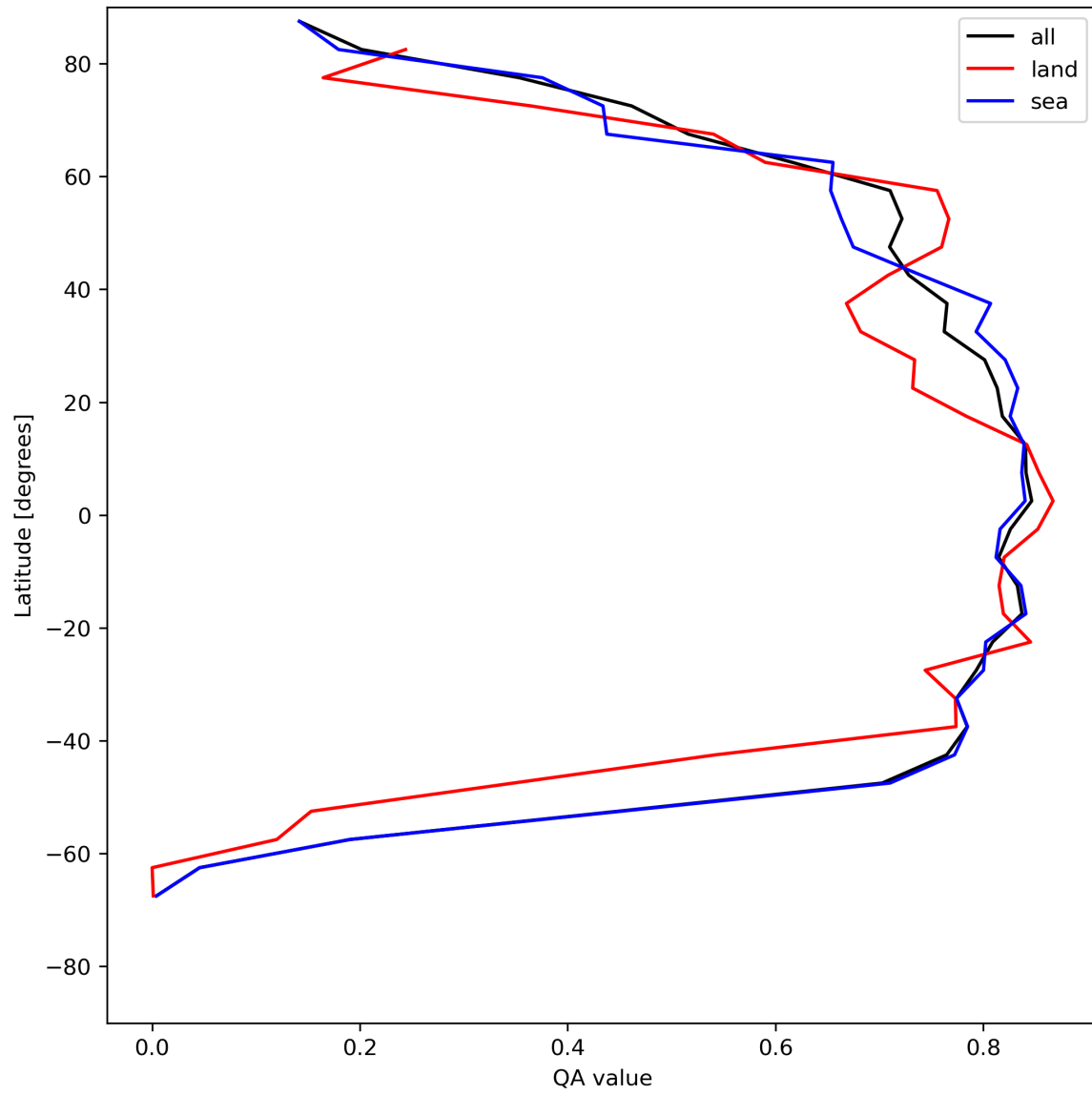


Figure 22: Zonal average of “QA value” for 2023-07-17 to 2023-07-19.

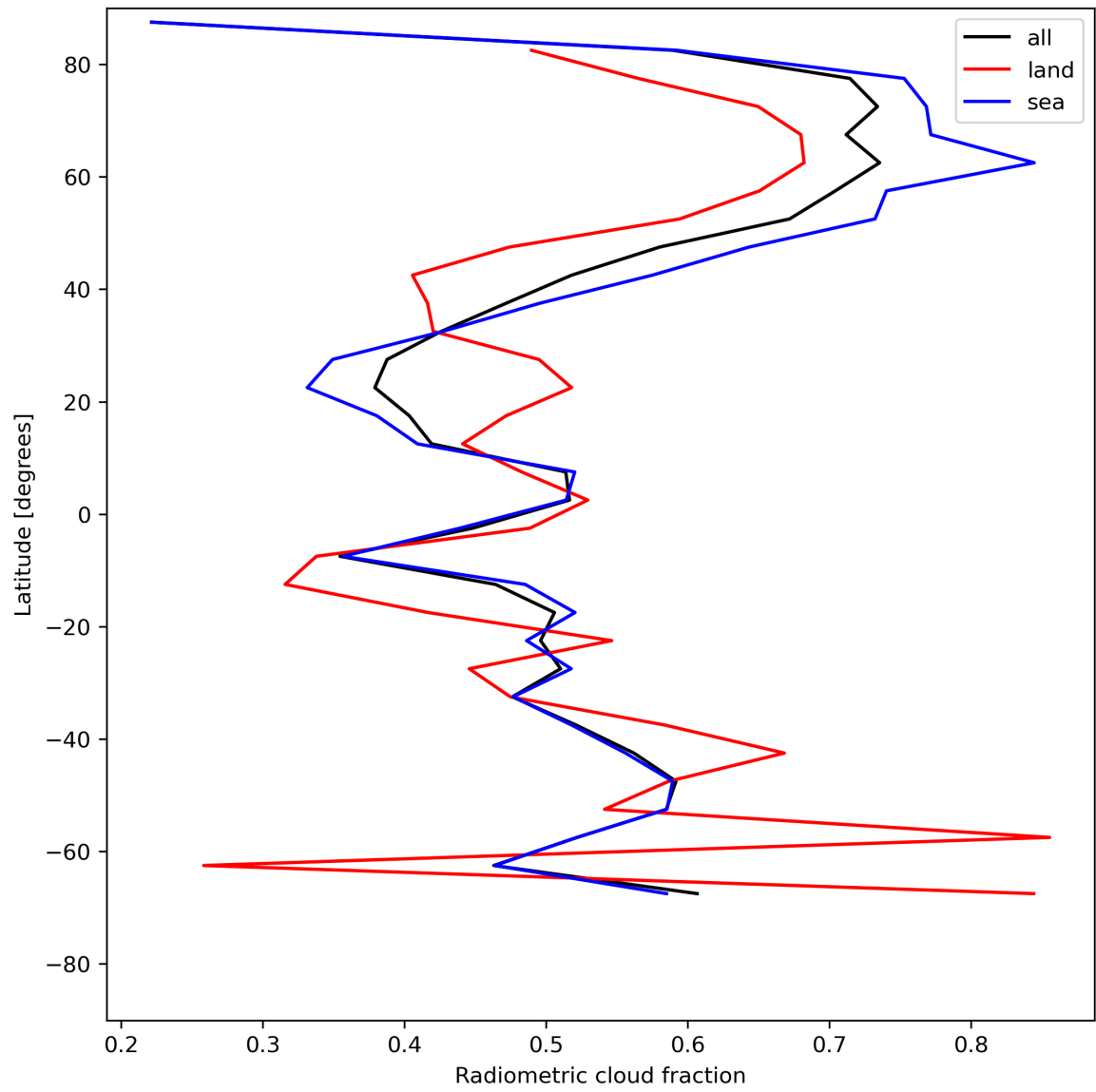


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-07-17 to 2023-07-19.

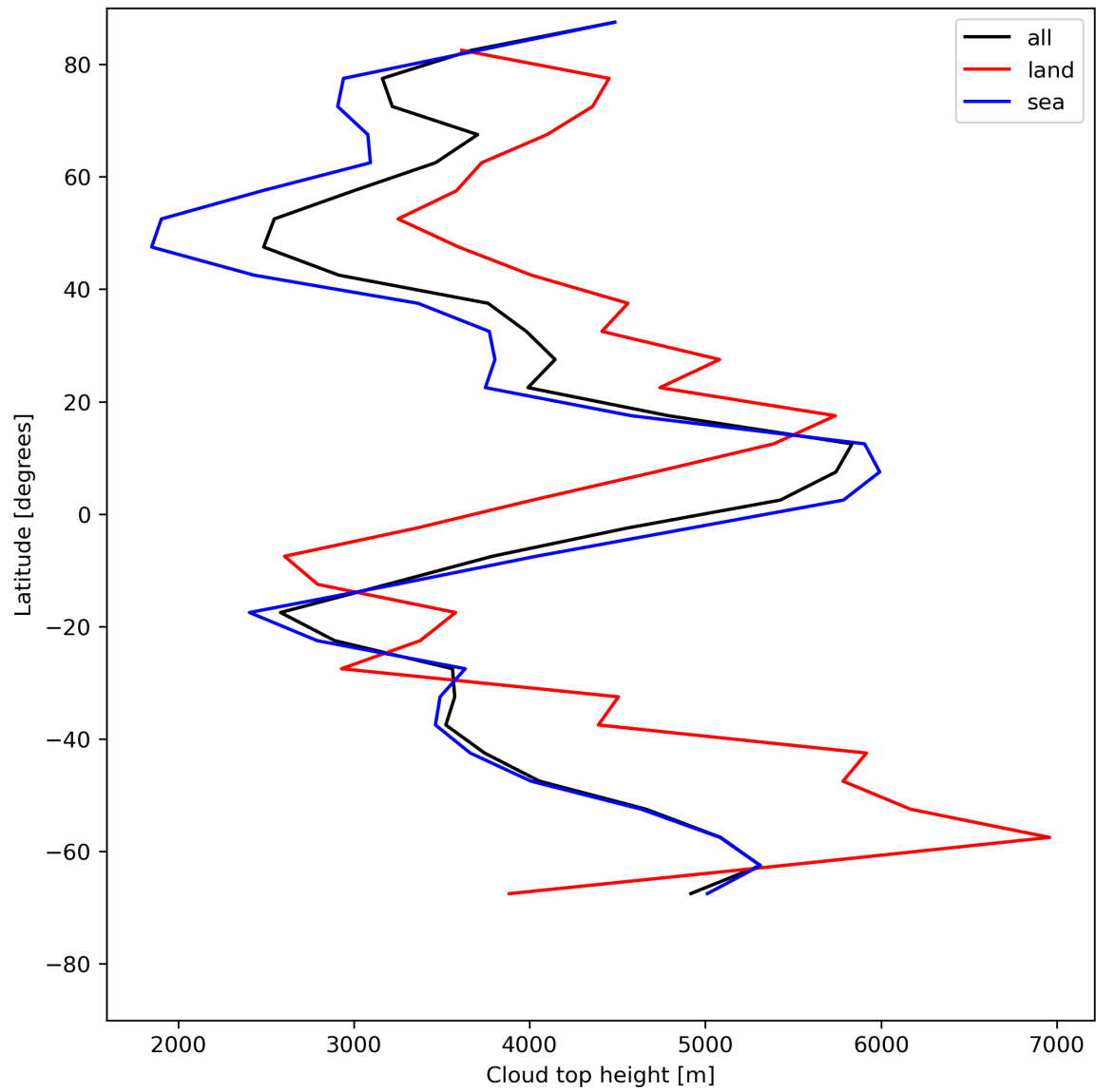


Figure 24: Zonal average of “Cloud top height” for 2023-07-17 to 2023-07-19.

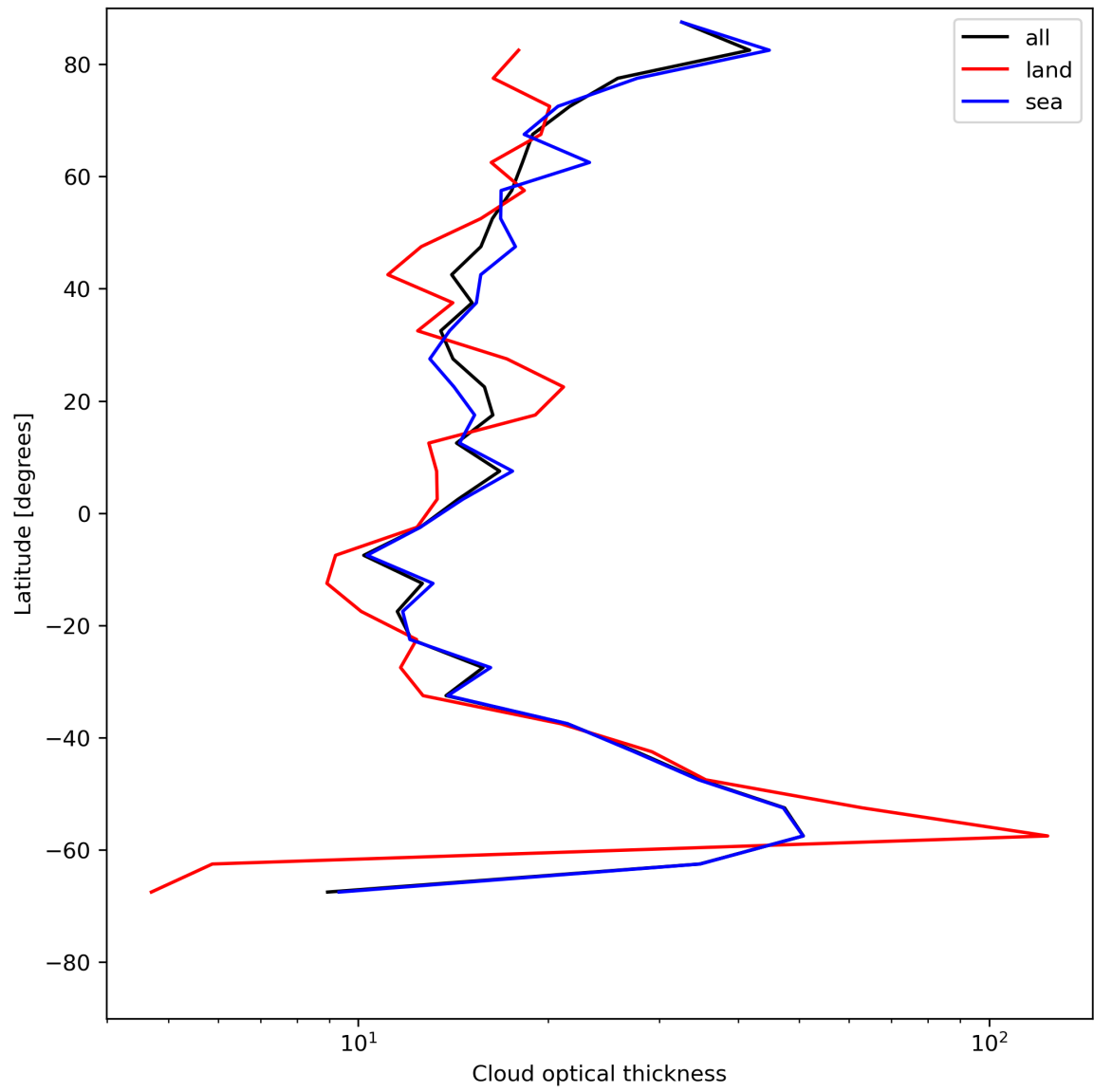


Figure 25: Zonal average of “Cloud optical thickness” for 2023-07-17 to 2023-07-19.

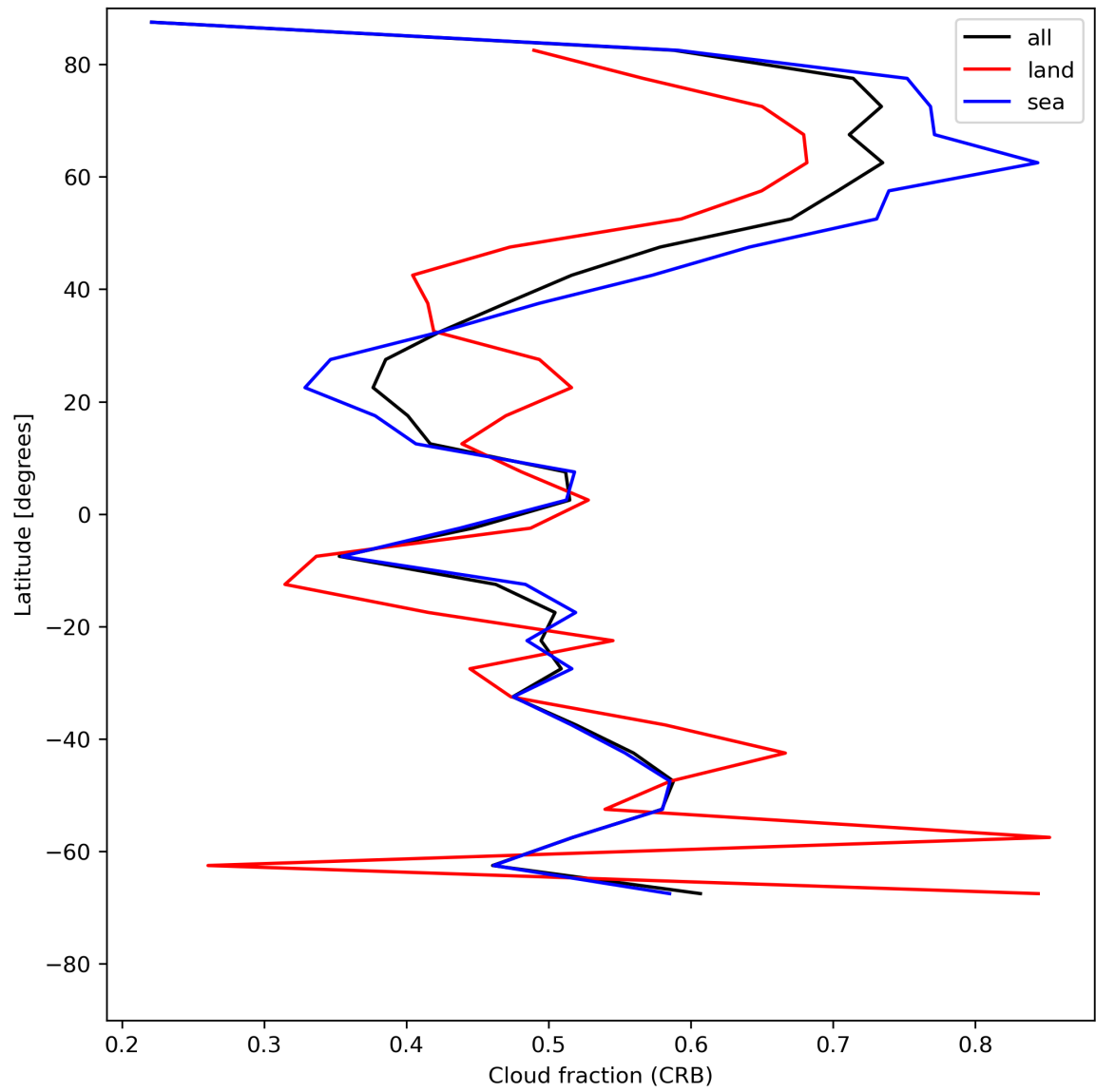


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-07-17 to 2023-07-19.

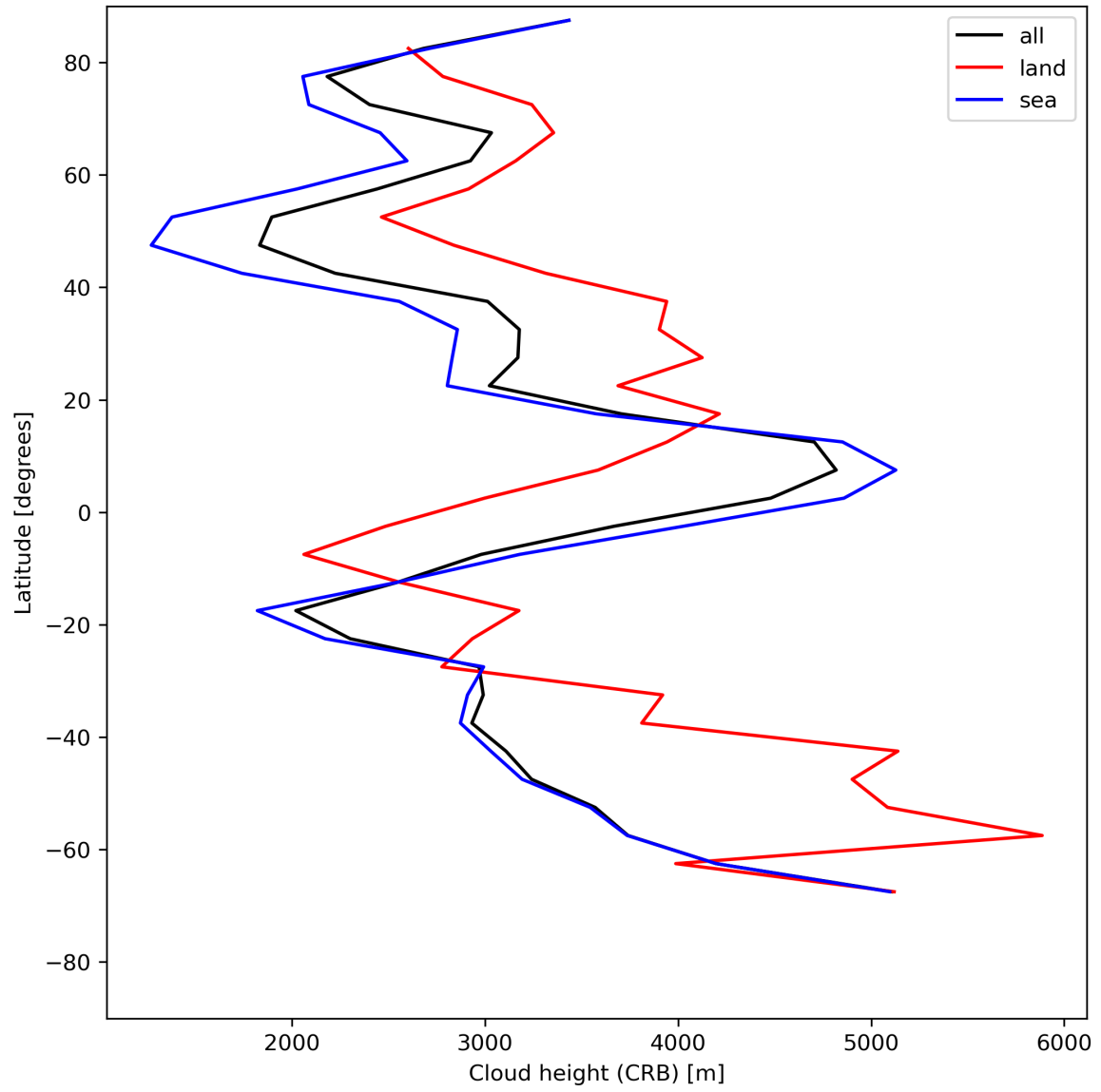


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-07-17 to 2023-07-19.

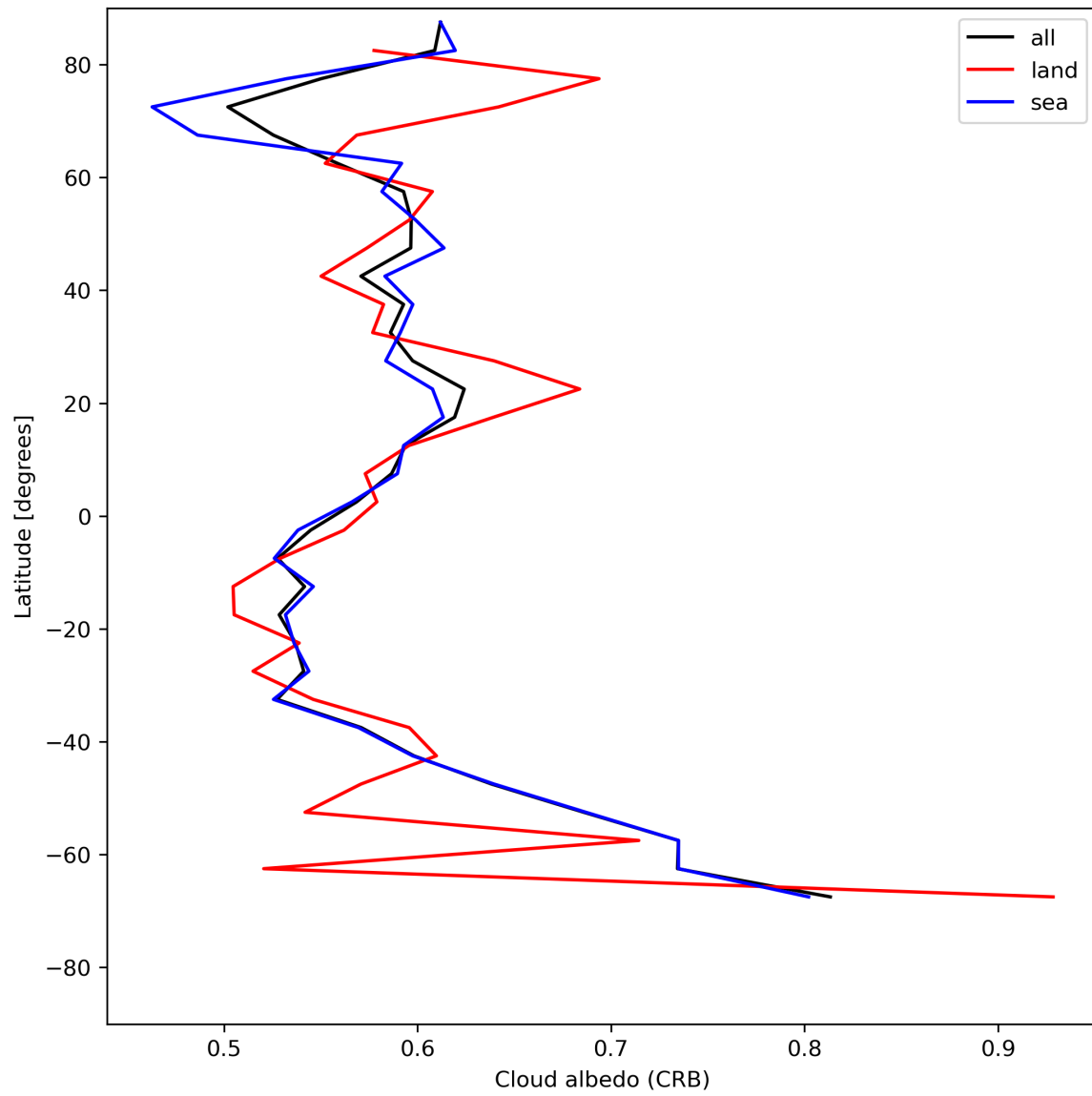


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-07-17 to 2023-07-19.

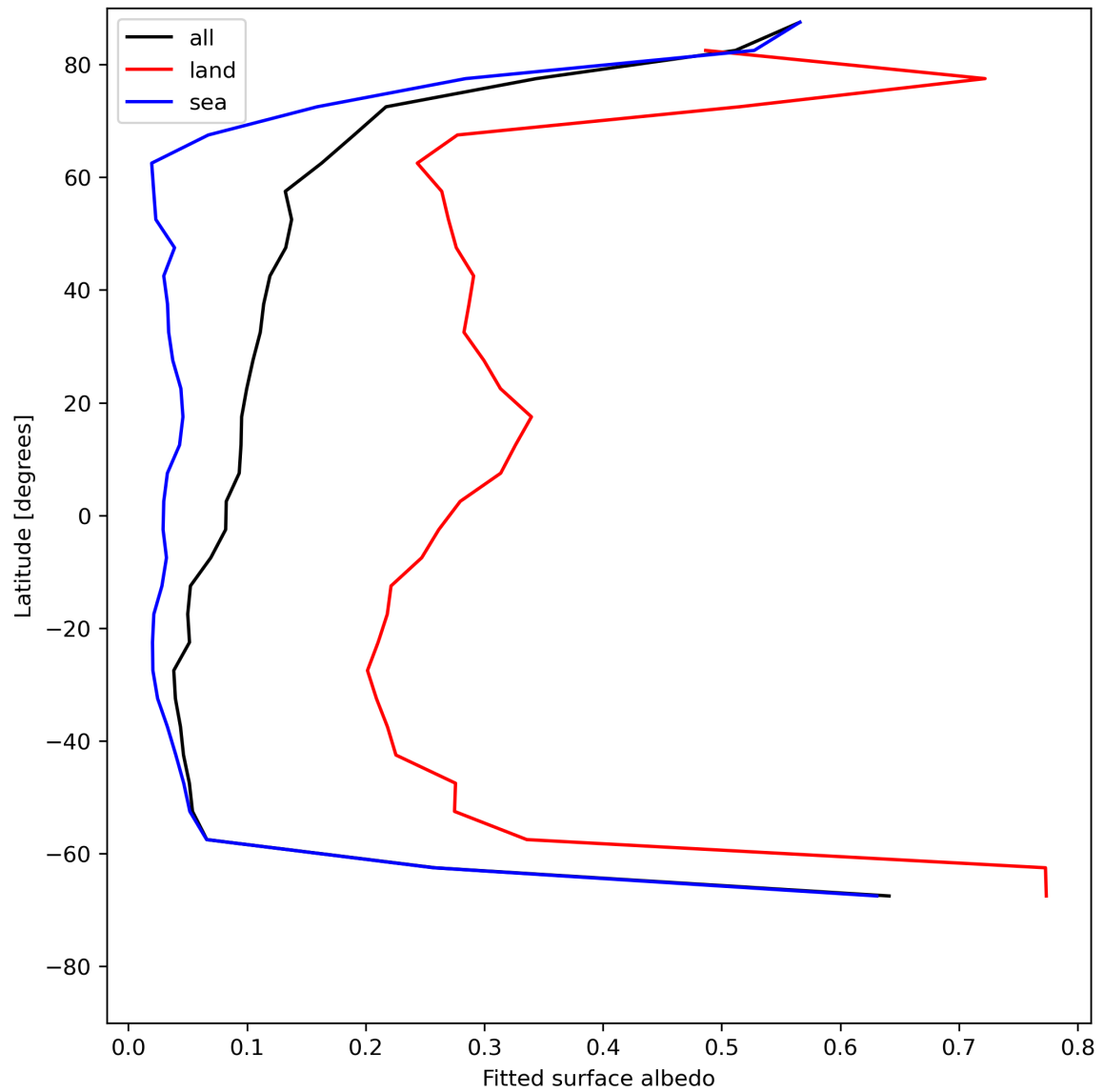


Figure 29: Zonal average of “Fitted surface albedo” for 2023-07-17 to 2023-07-19.

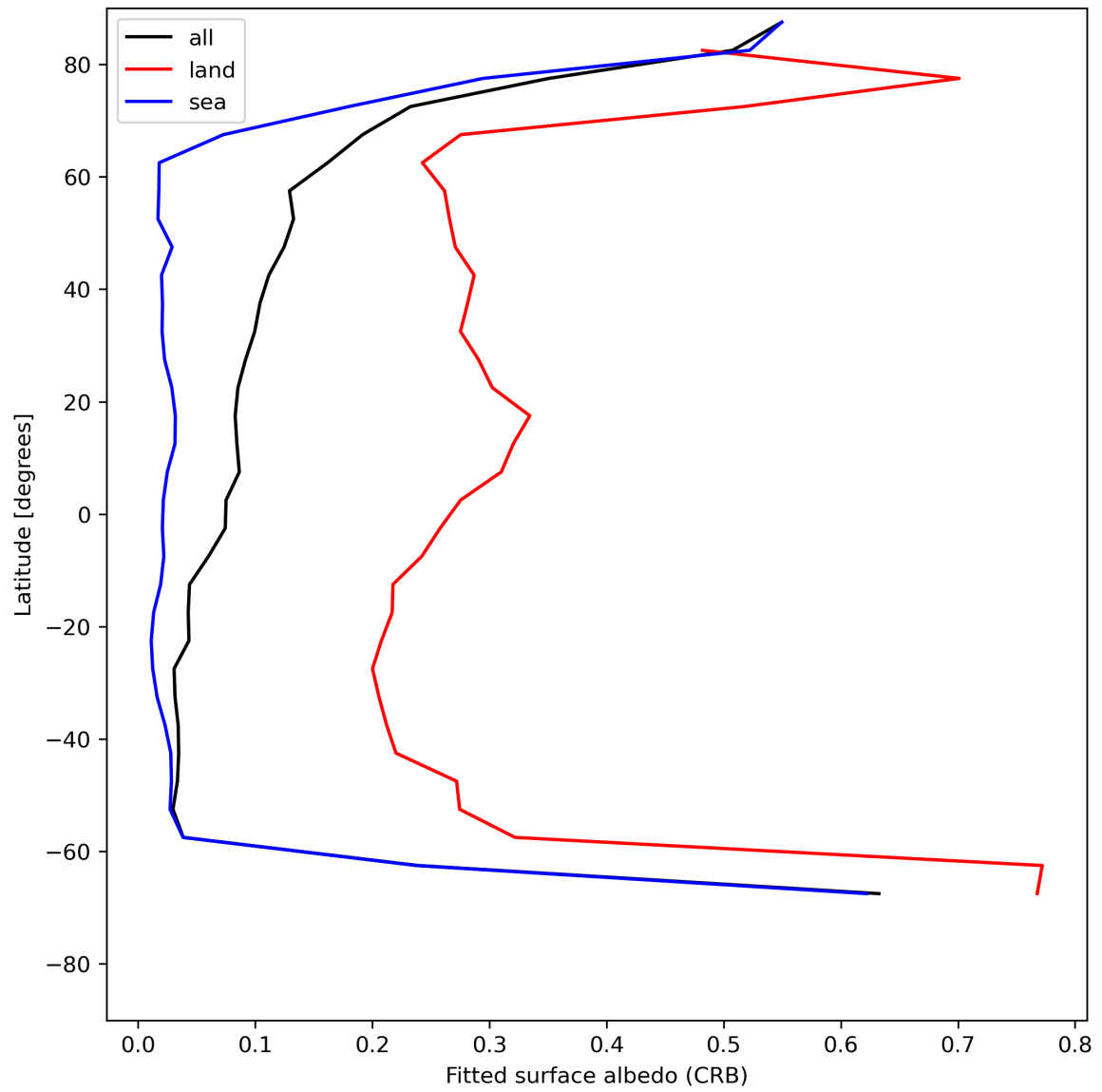


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-07-17 to 2023-07-19.

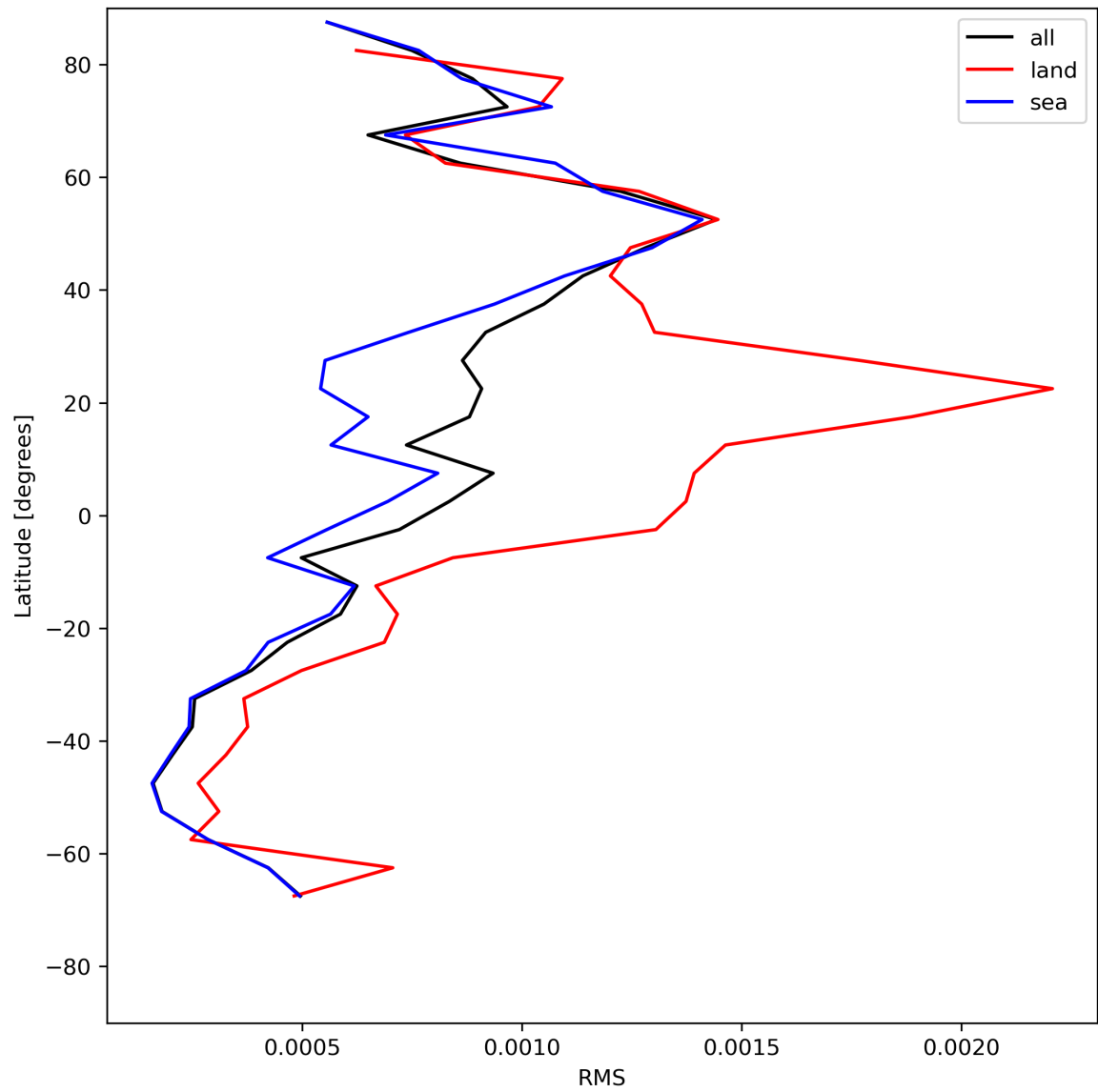


Figure 31: Zonal average of “RMS” for 2023-07-17 to 2023-07-19.

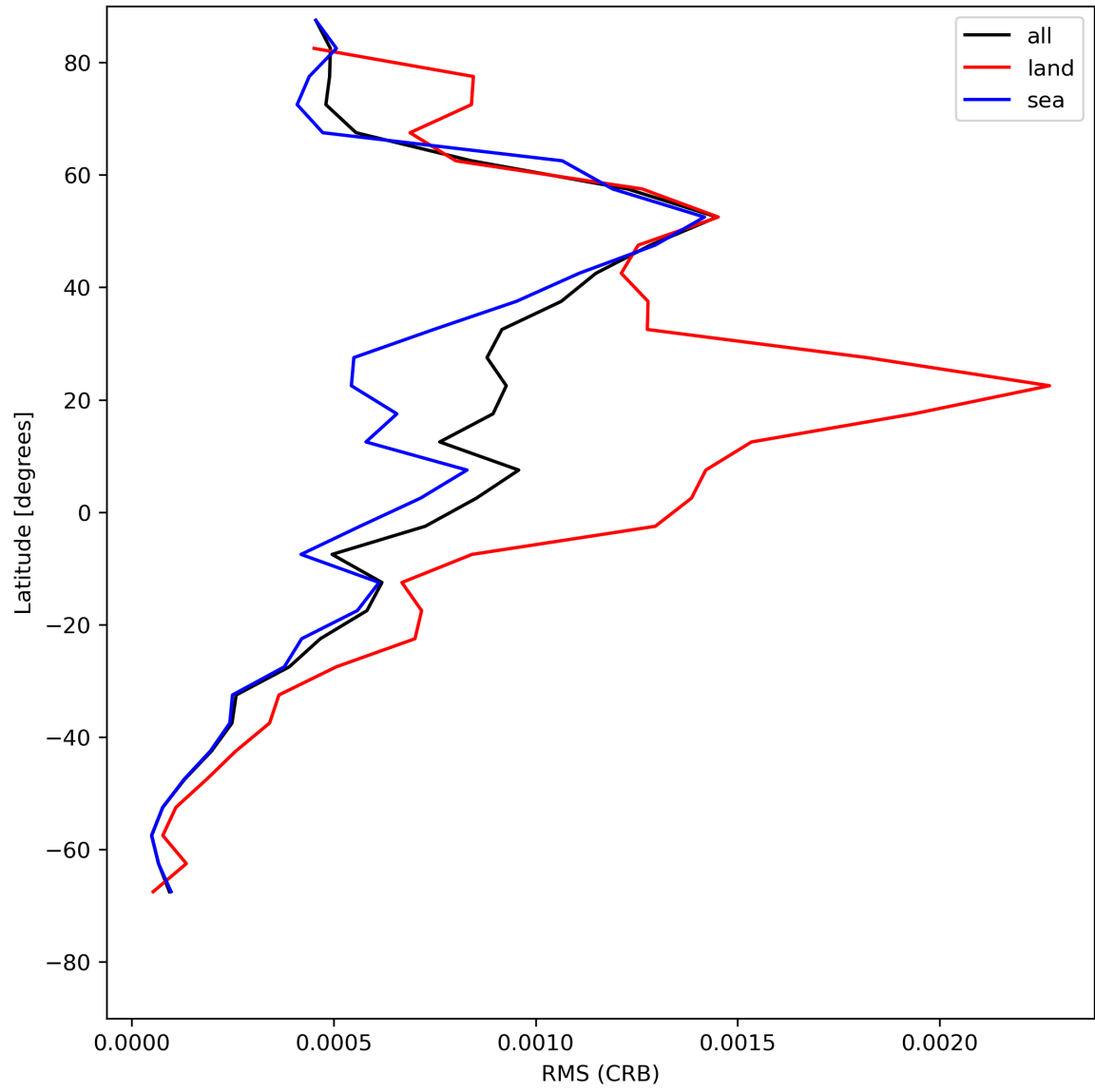


Figure 32: Zonal average of “RMS (CRB)” for 2023-07-17 to 2023-07-19.

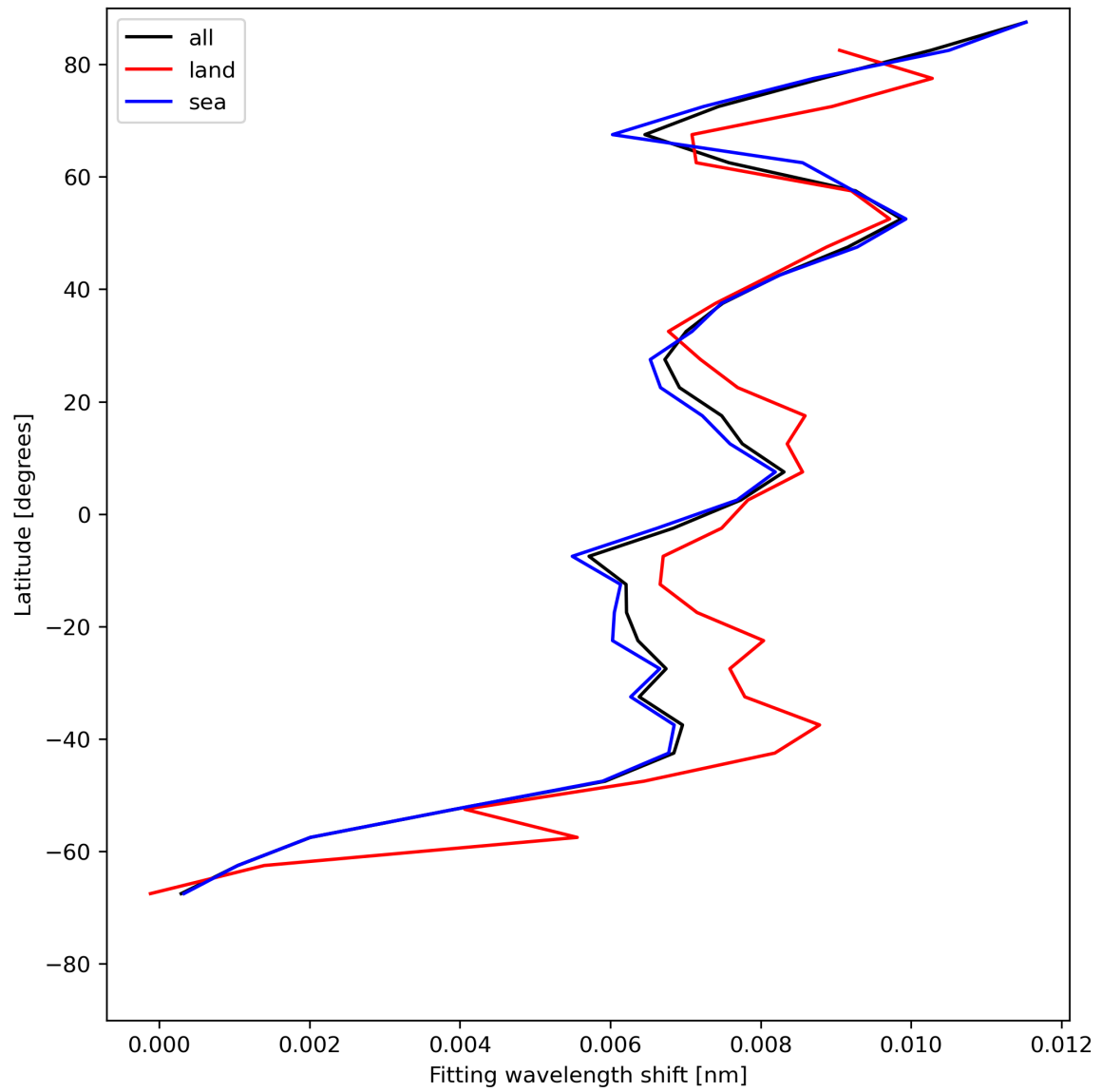


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-07-17 to 2023-07-19.

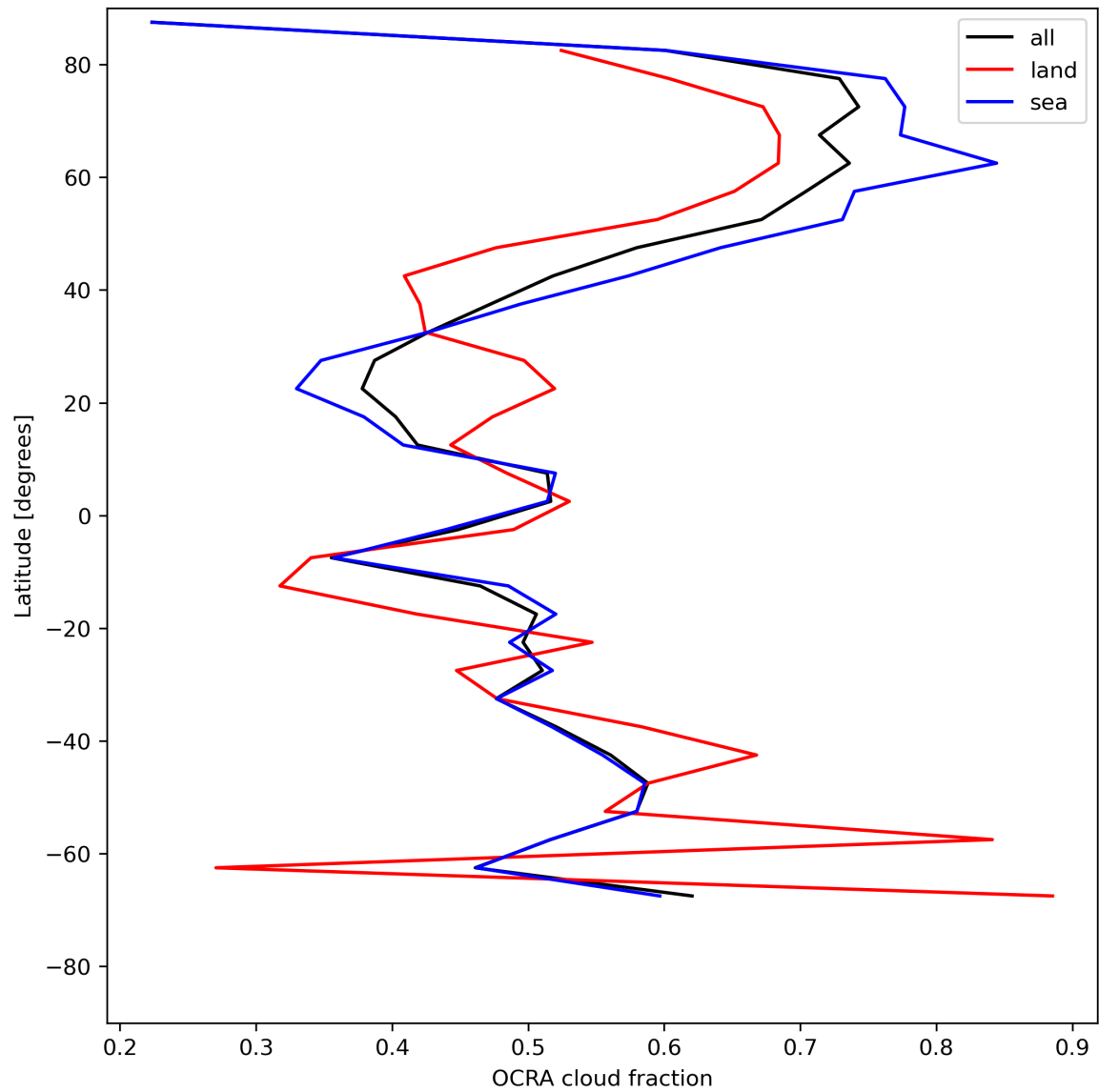


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-07-17 to 2023-07-19.

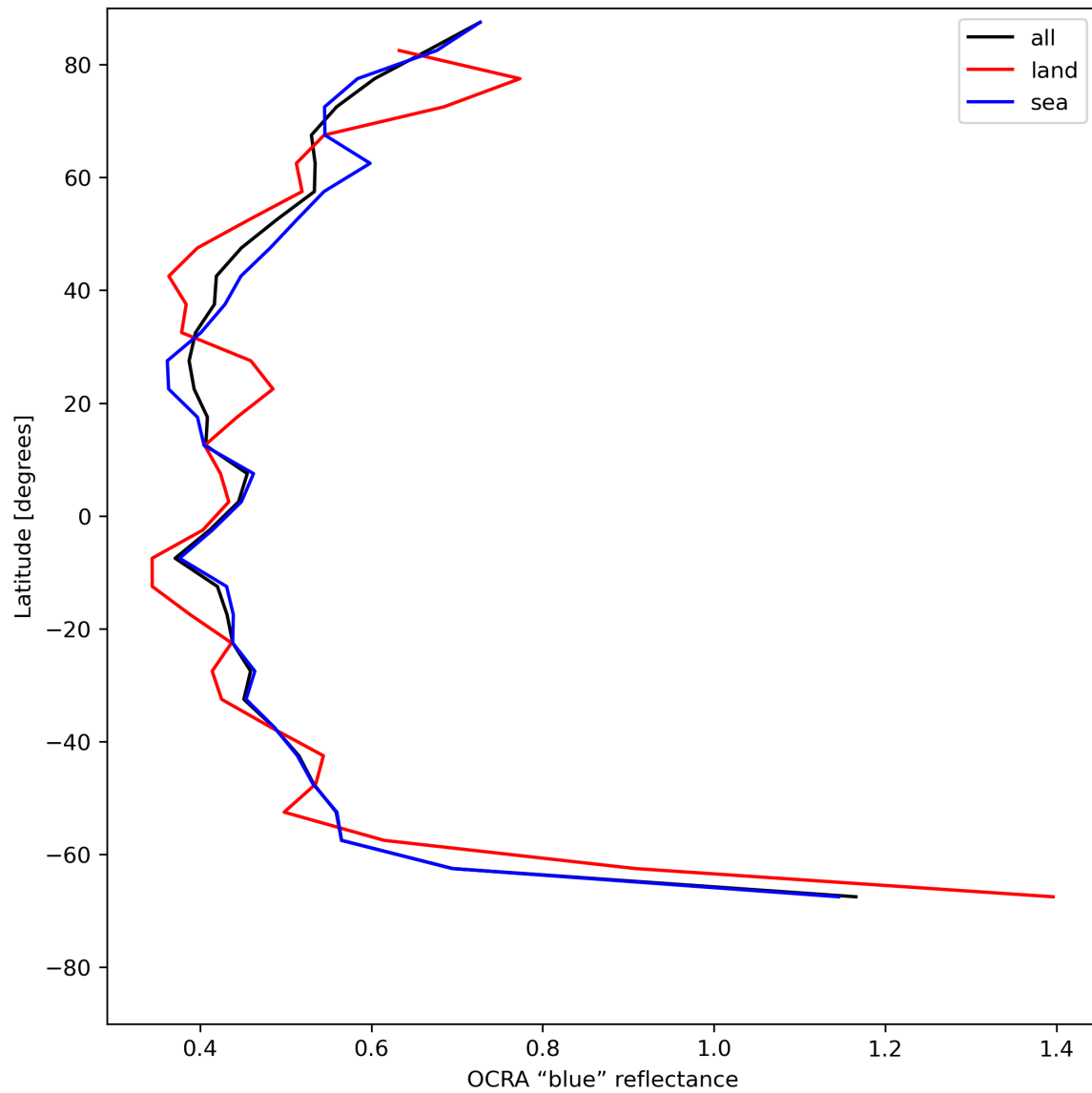


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-07-17 to 2023-07-19.

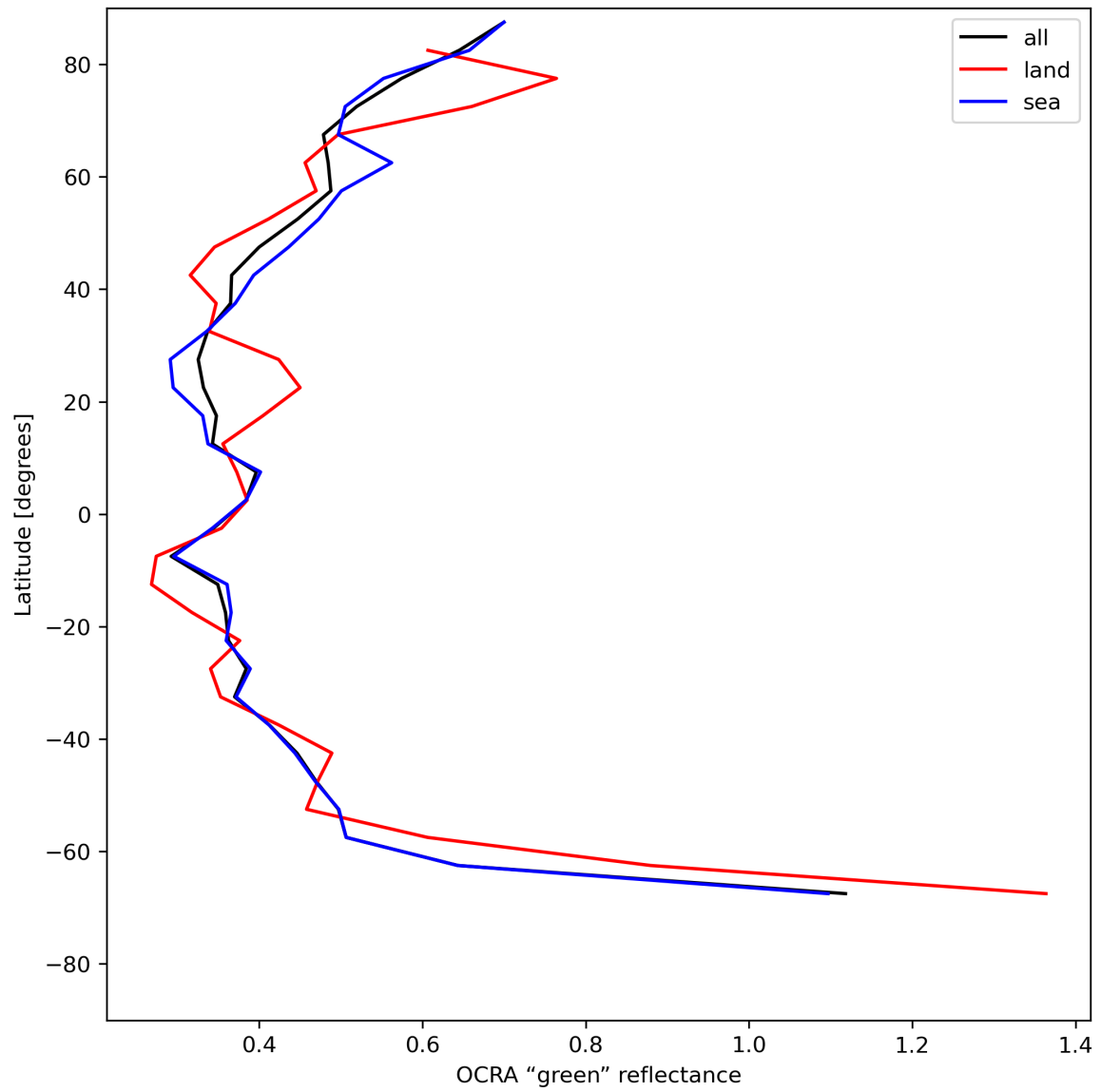


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-07-17 to 2023-07-19.

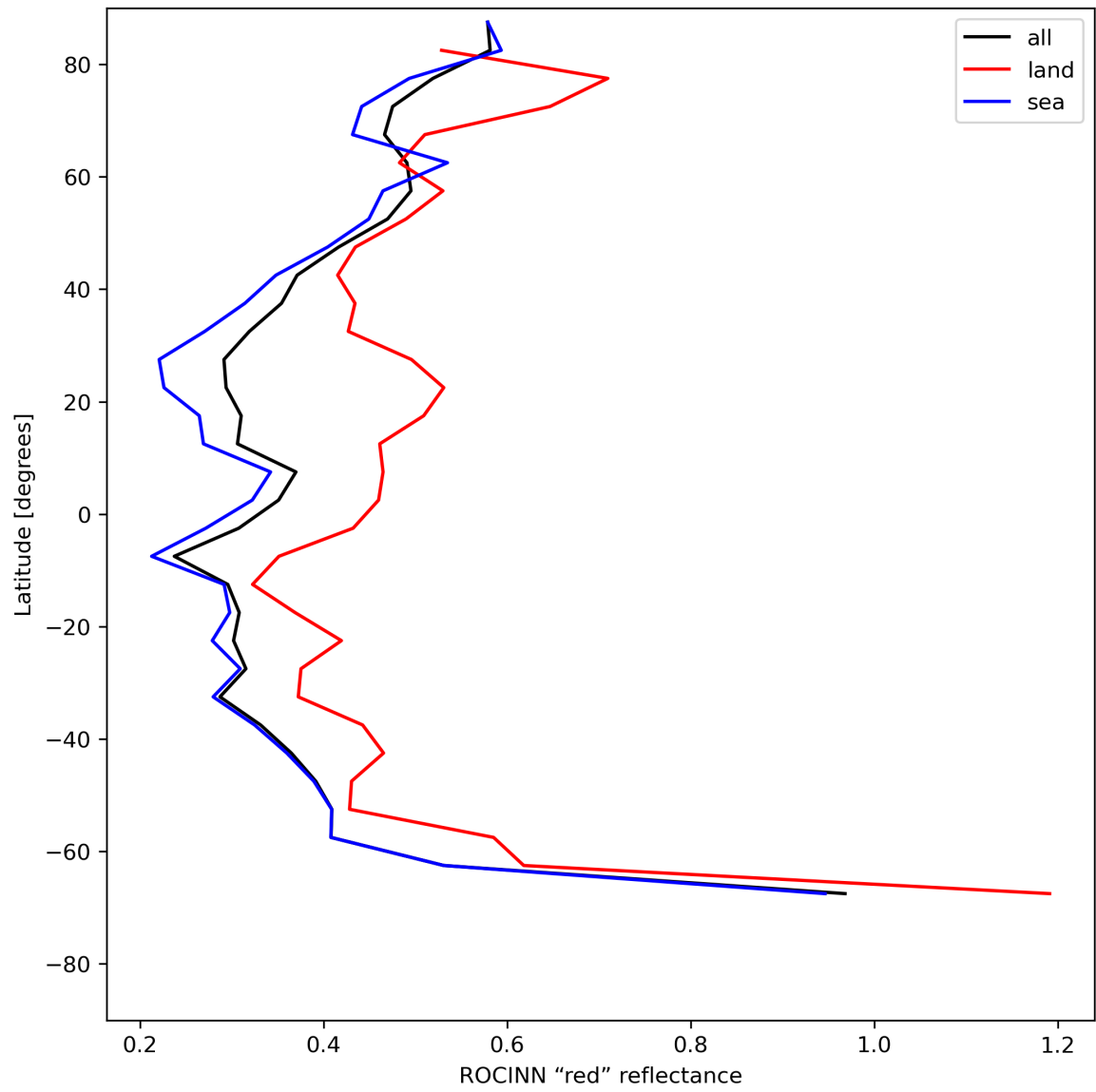


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-07-17 to 2023-07-19.

8 Histograms

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

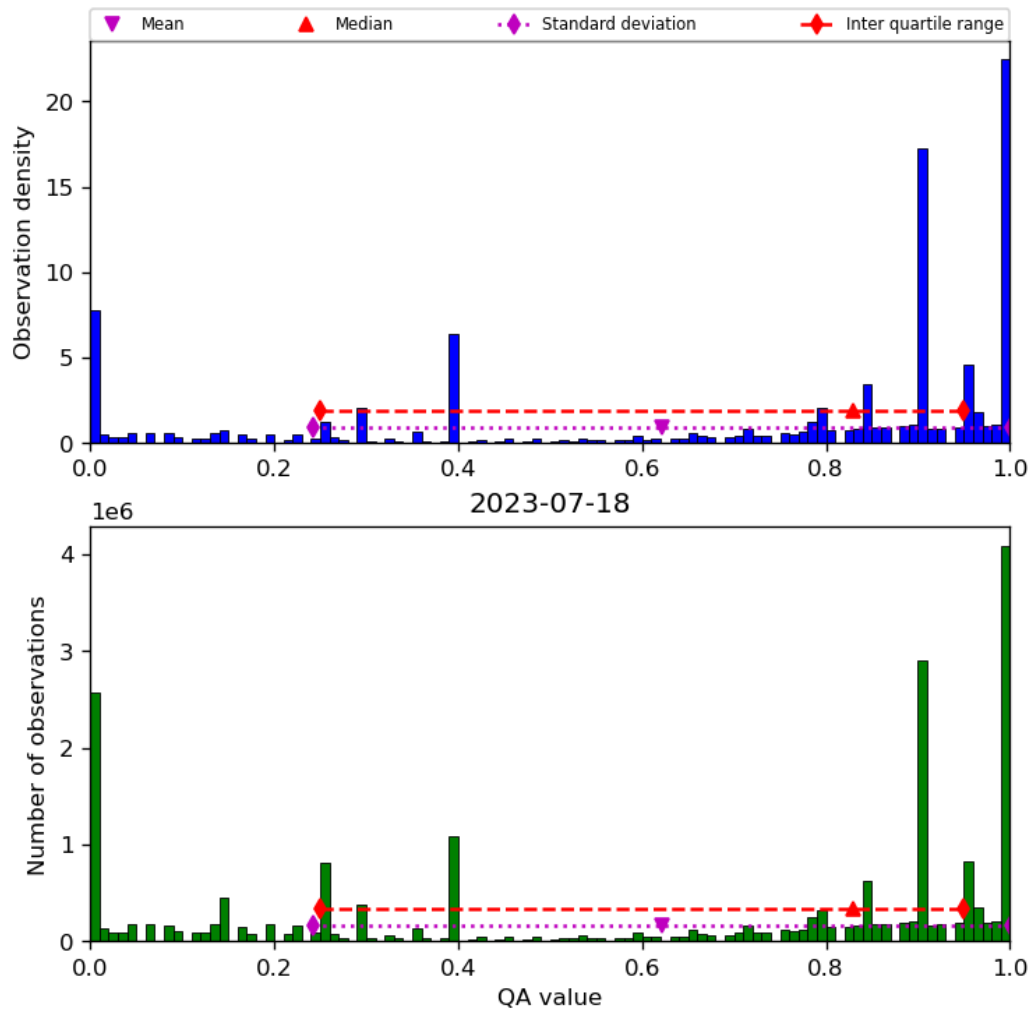


Figure 38: Histogram of “QA value” for 2023-07-17 to 2023-07-19

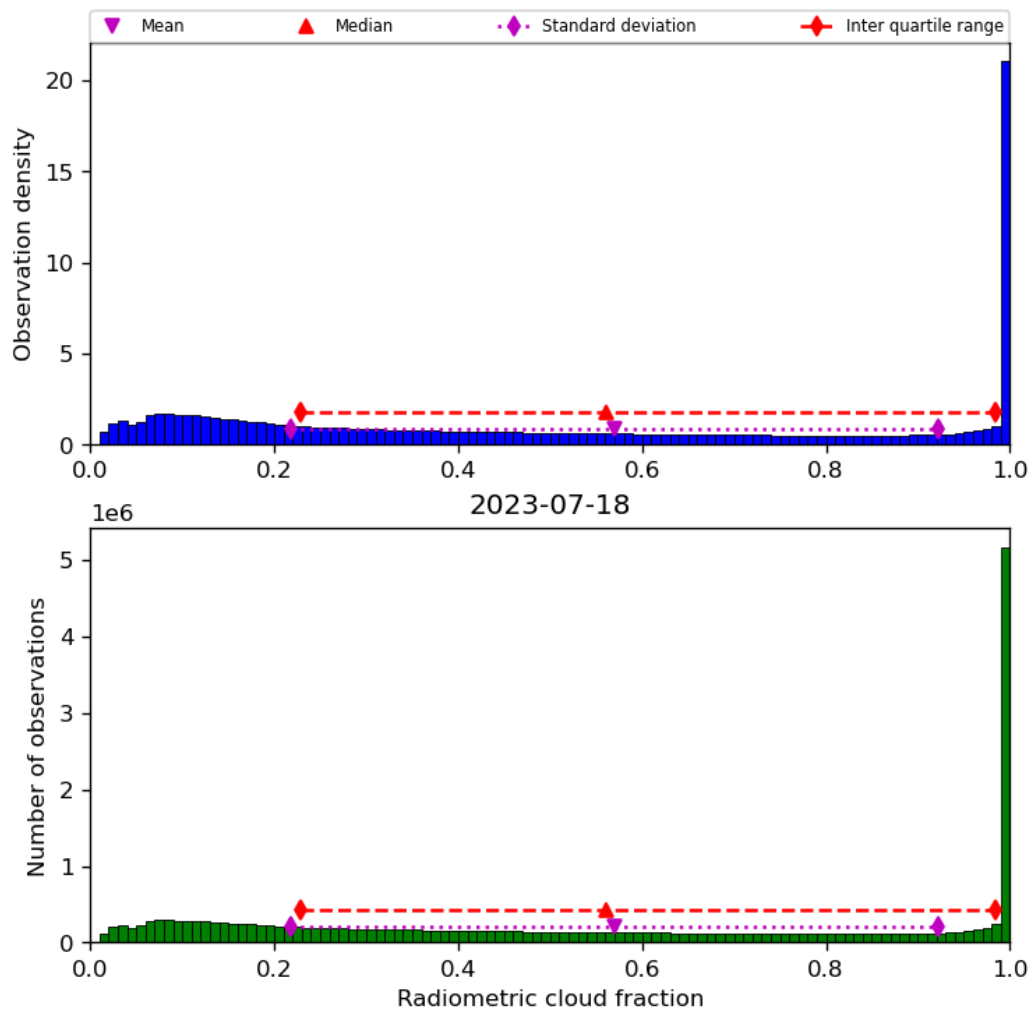


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-07-17 to 2023-07-19

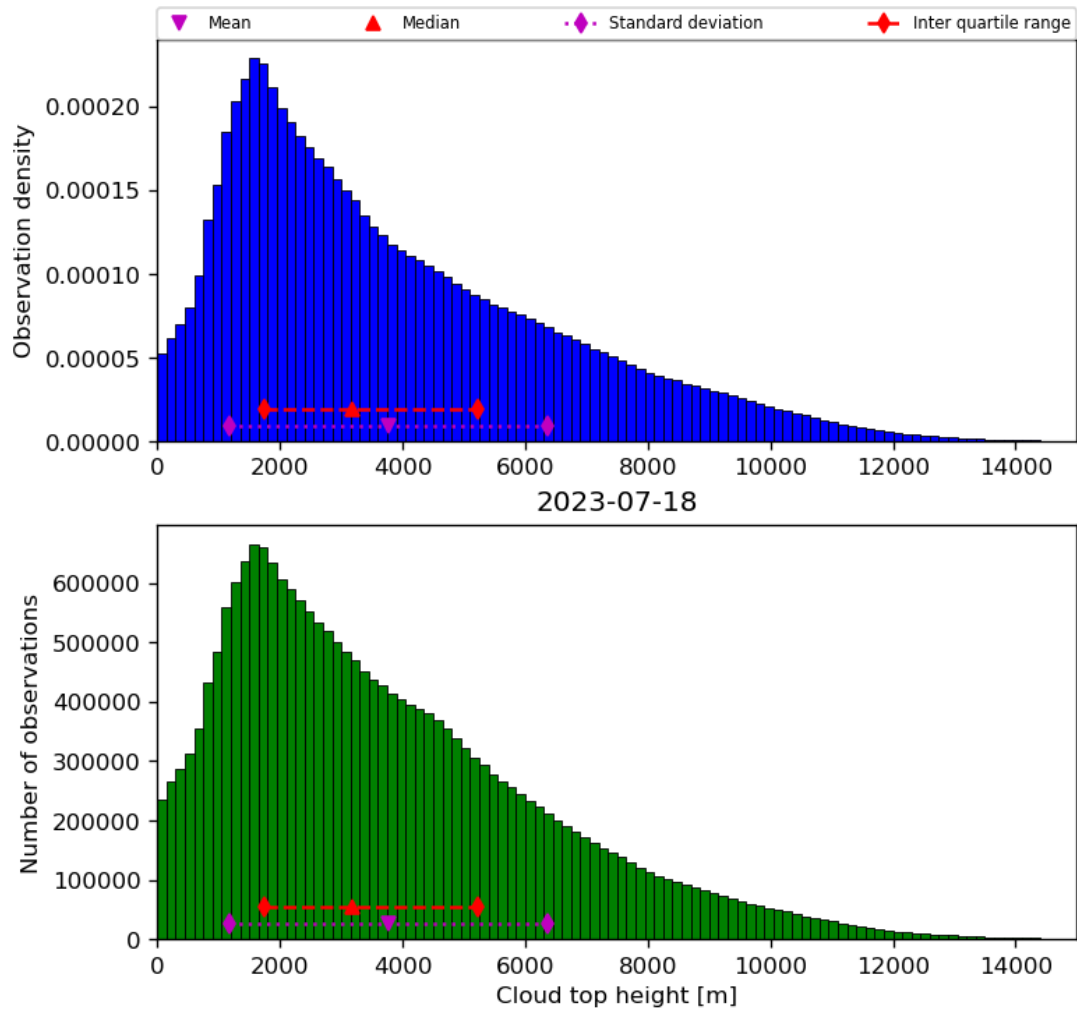


Figure 40: Histogram of “Cloud top height” for 2023-07-17 to 2023-07-19

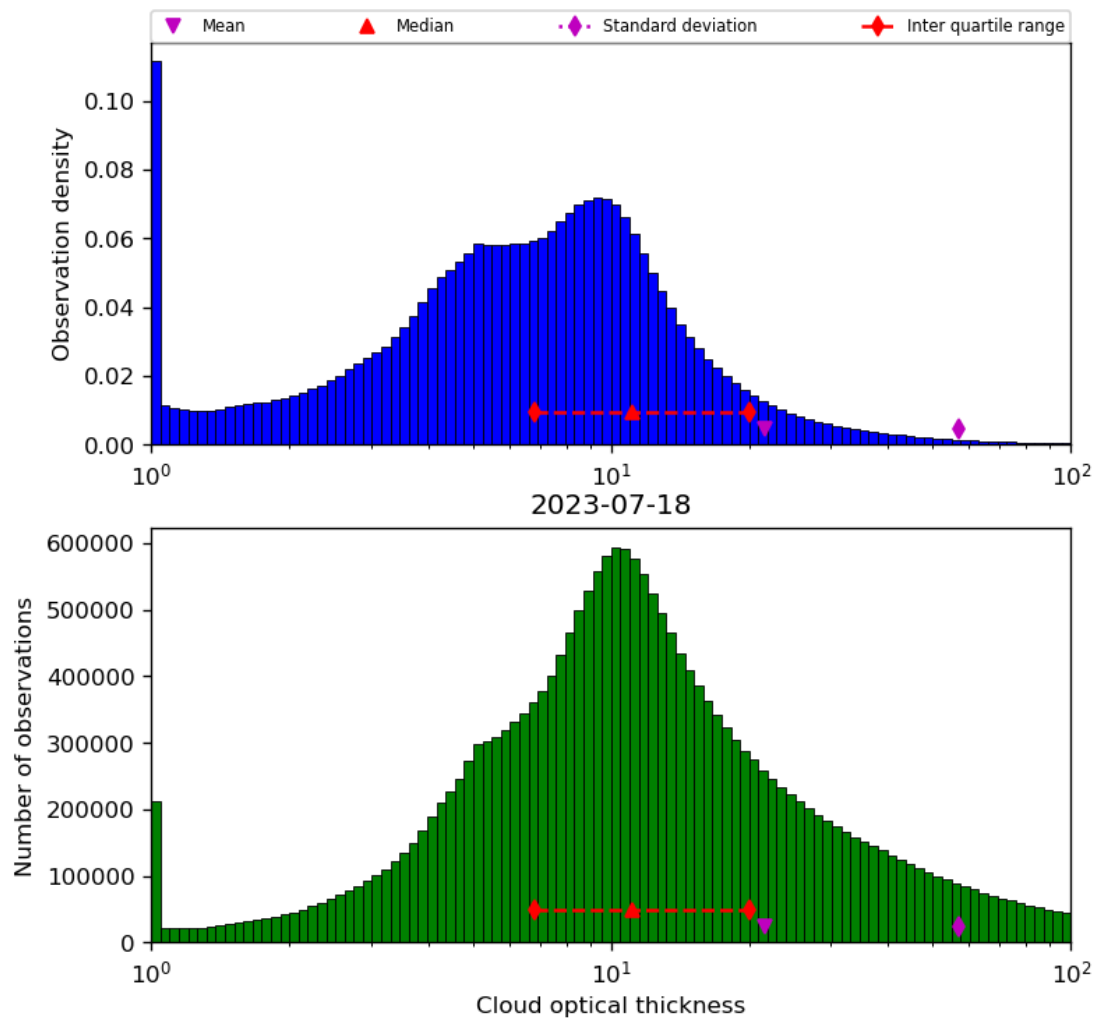


Figure 41: Histogram of “Cloud optical thickness” for 2023-07-17 to 2023-07-19

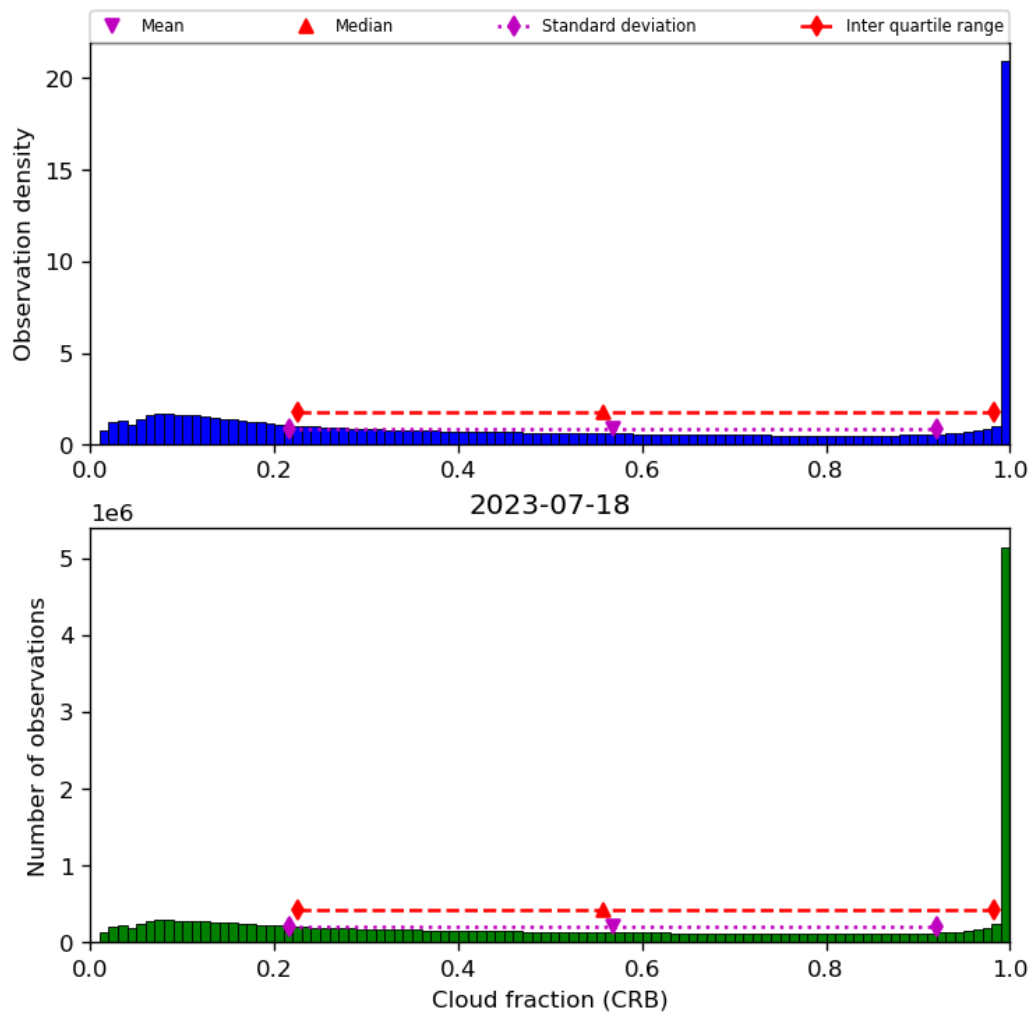


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-07-17 to 2023-07-19

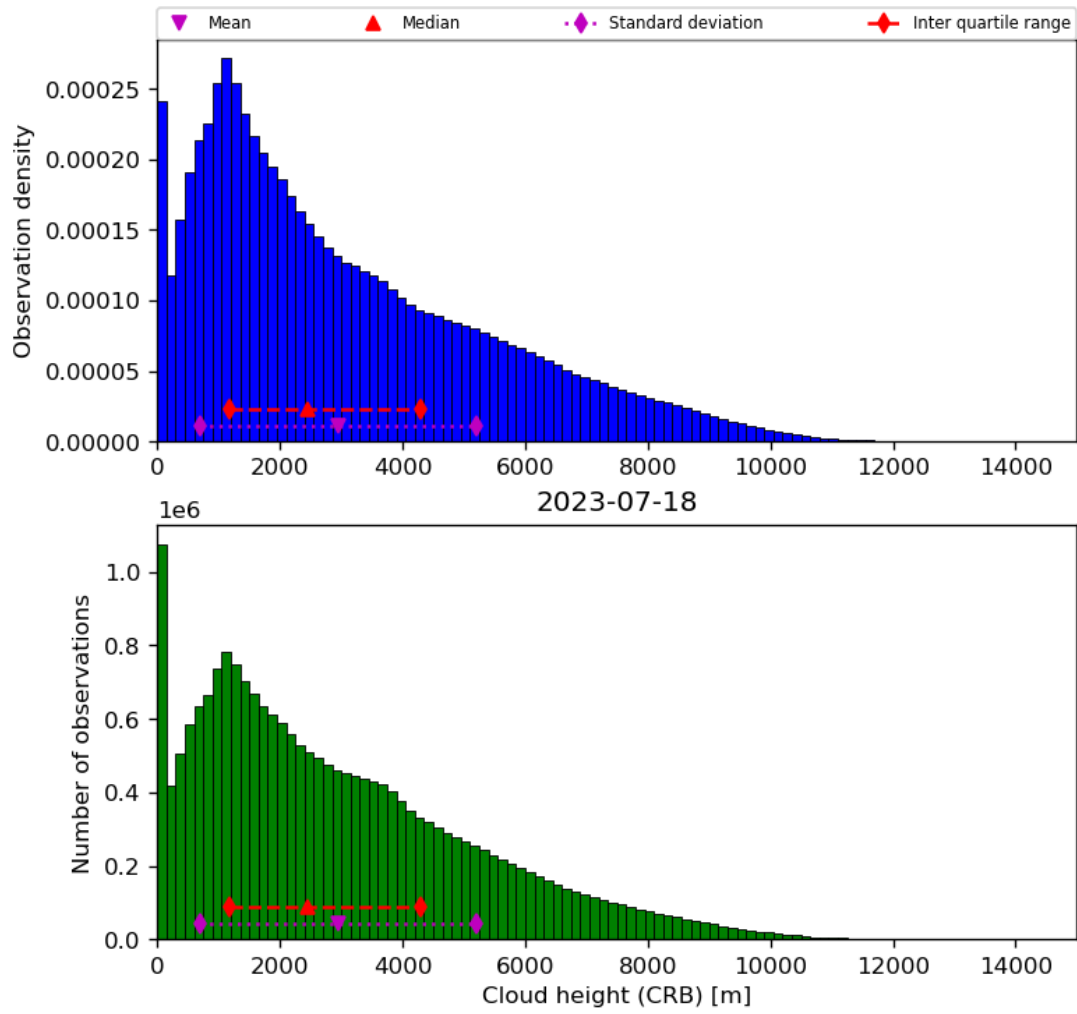


Figure 43: Histogram of “Cloud height (CRB)” for 2023-07-17 to 2023-07-19

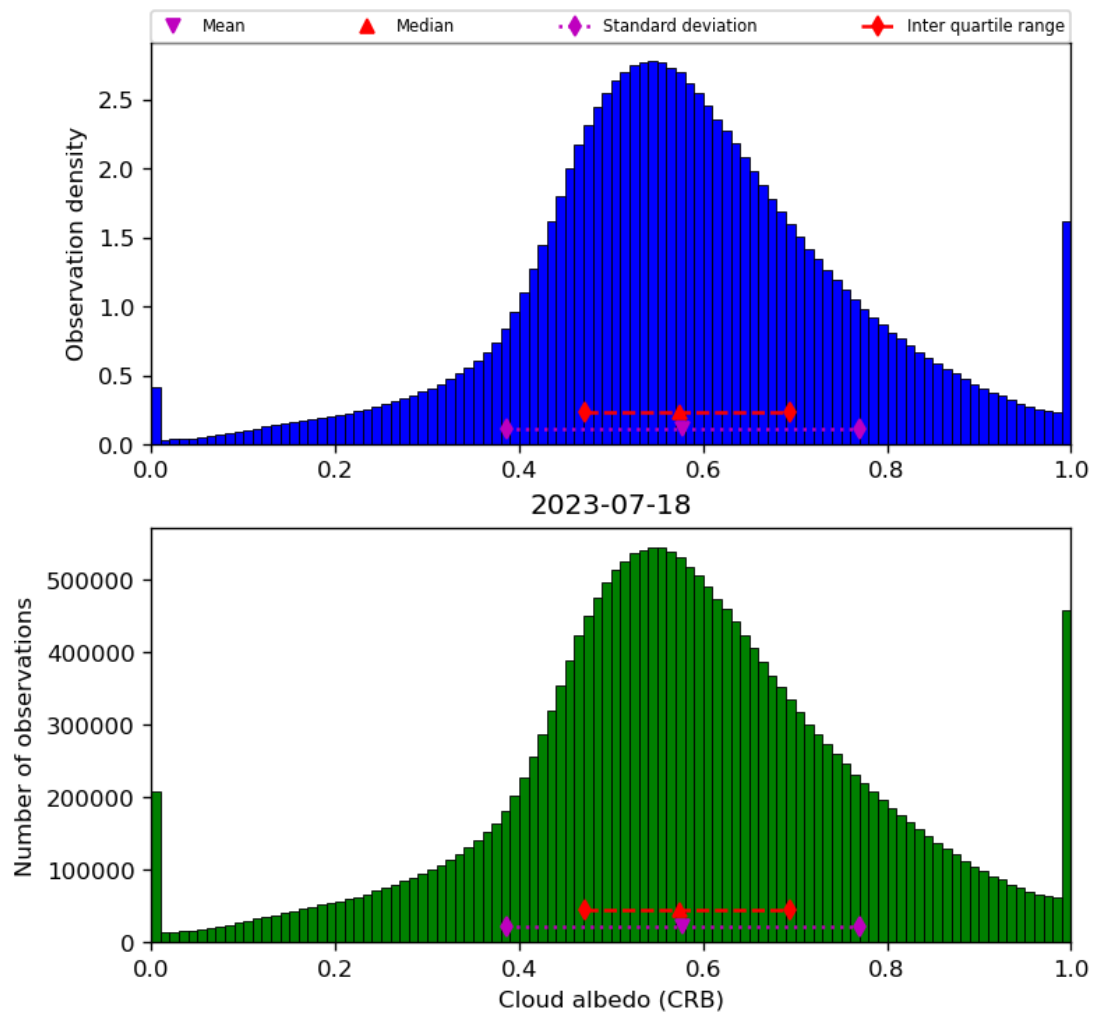


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-07-17 to 2023-07-19

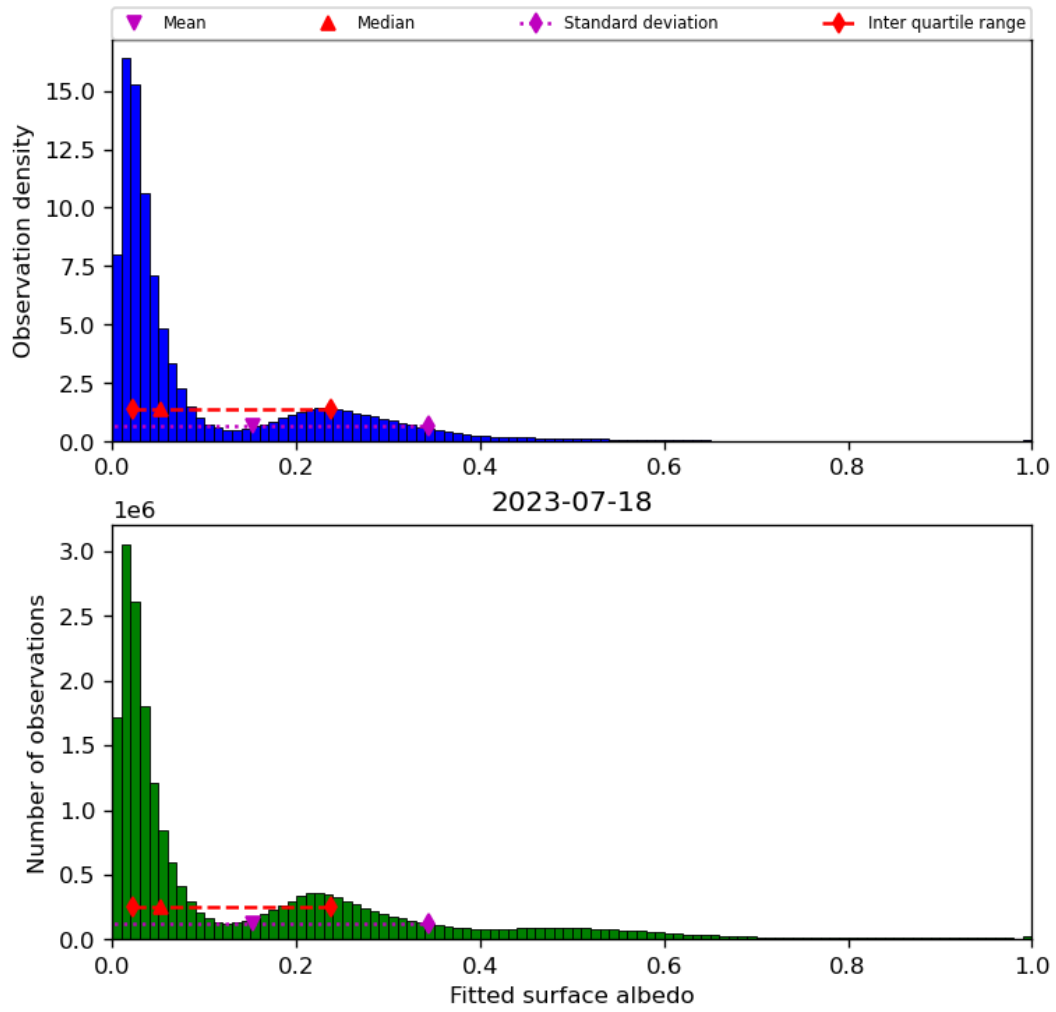


Figure 45: Histogram of “Fitted surface albedo” for 2023-07-17 to 2023-07-19

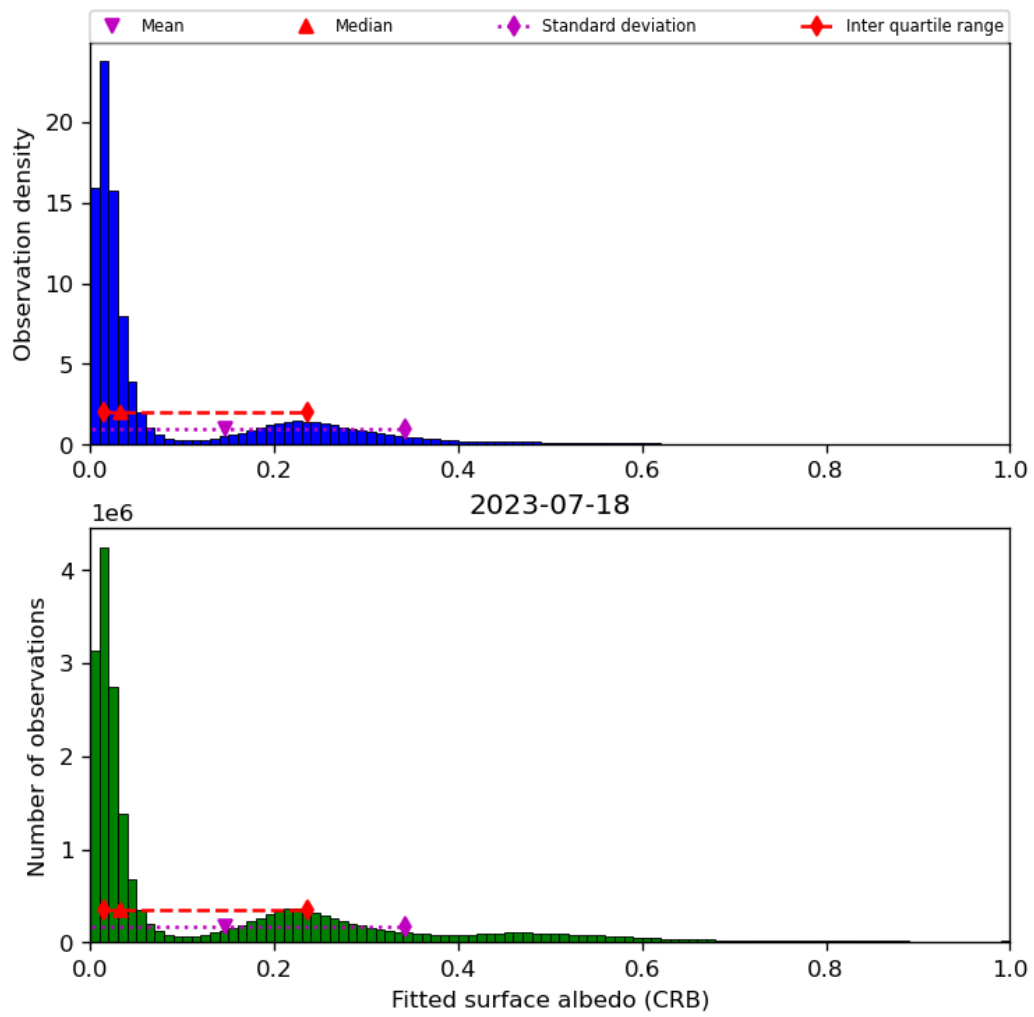


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-07-17 to 2023-07-19

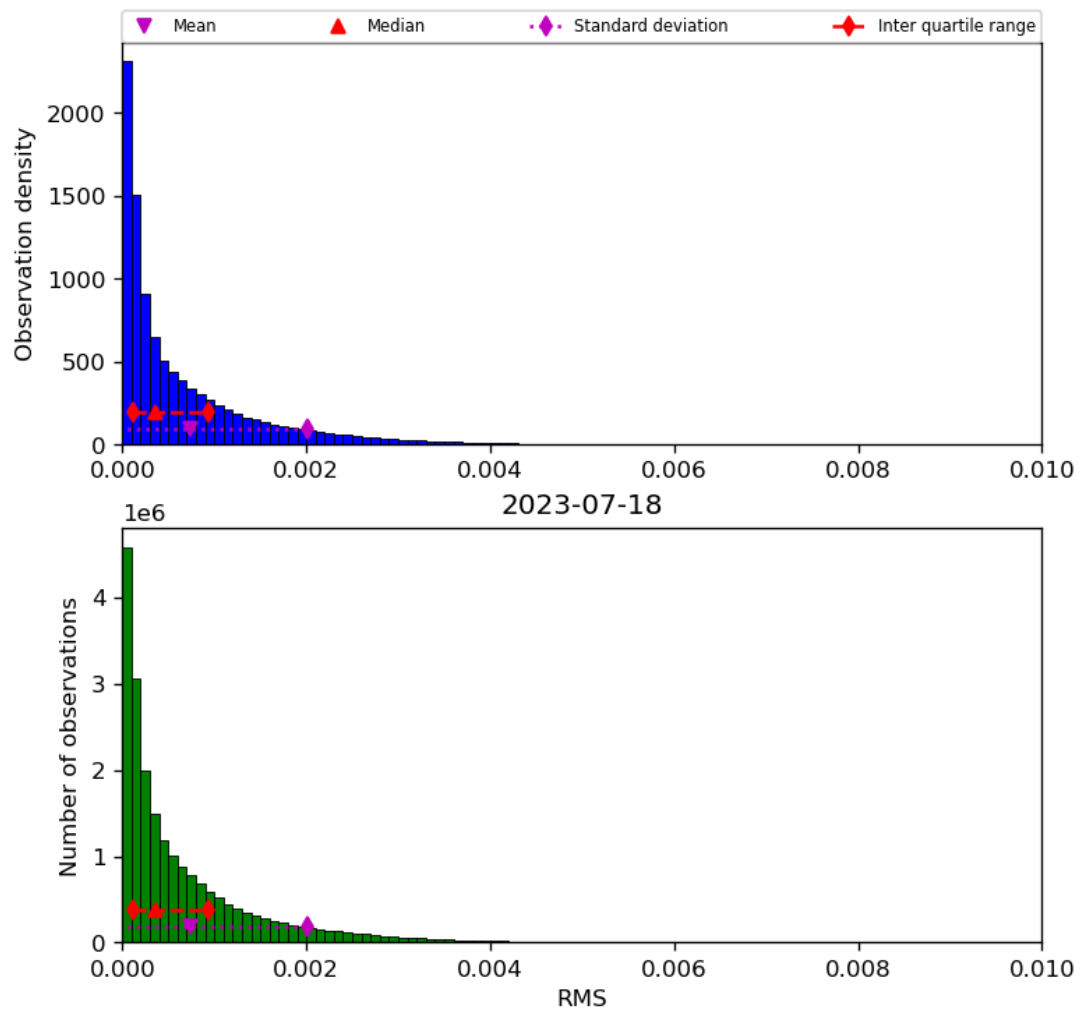


Figure 47: Histogram of “RMS” for 2023-07-17 to 2023-07-19

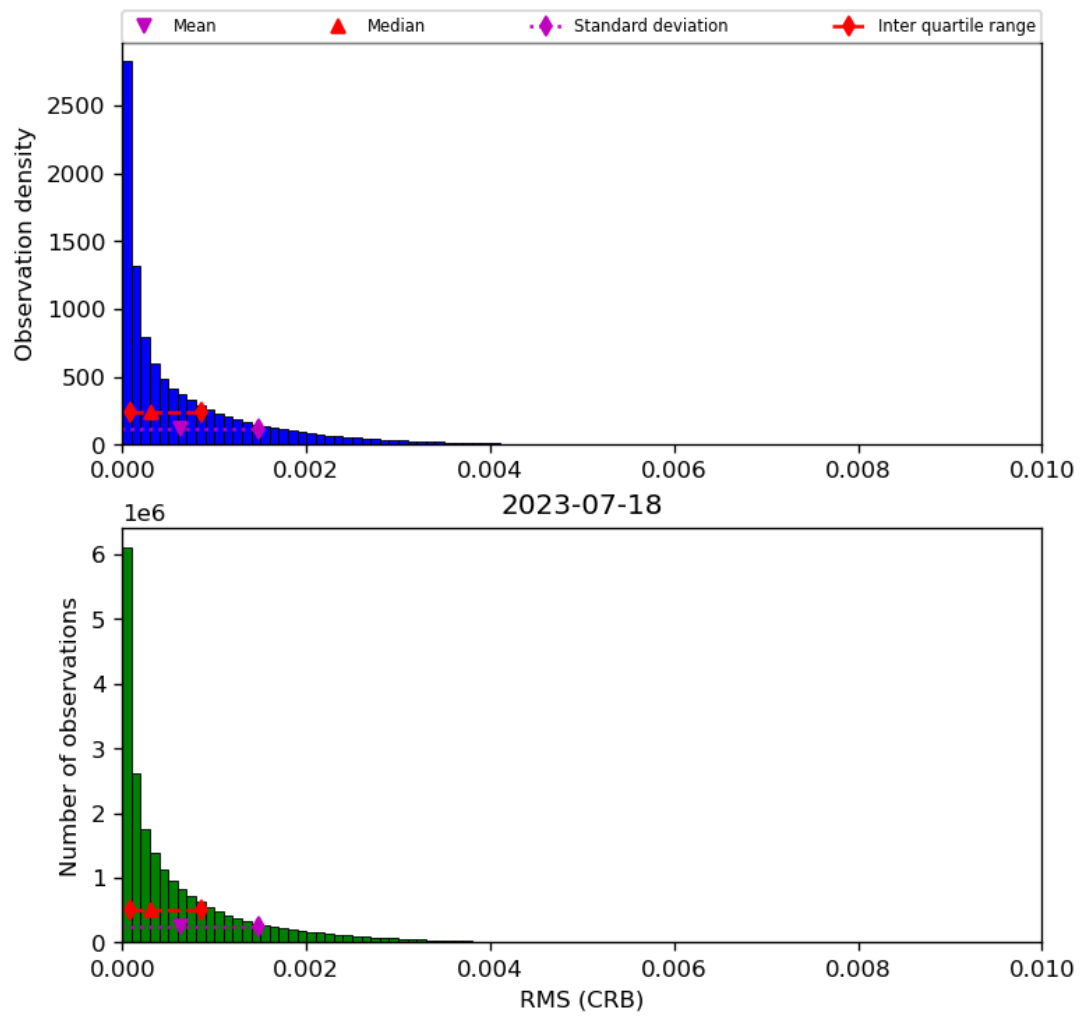


Figure 48: Histogram of “RMS (CRB)” for 2023-07-17 to 2023-07-19

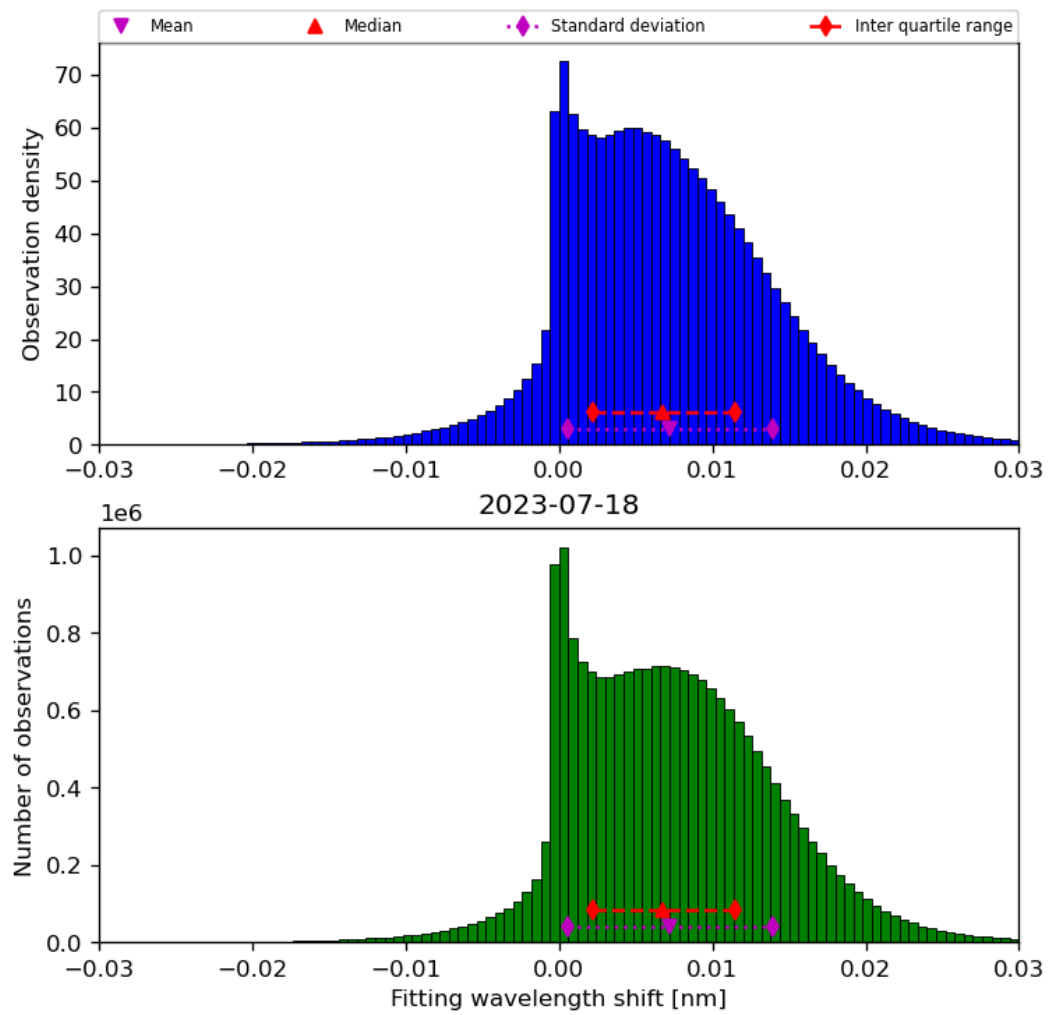


Figure 49: Histogram of “Fitting wavelength shift” for 2023-07-17 to 2023-07-19

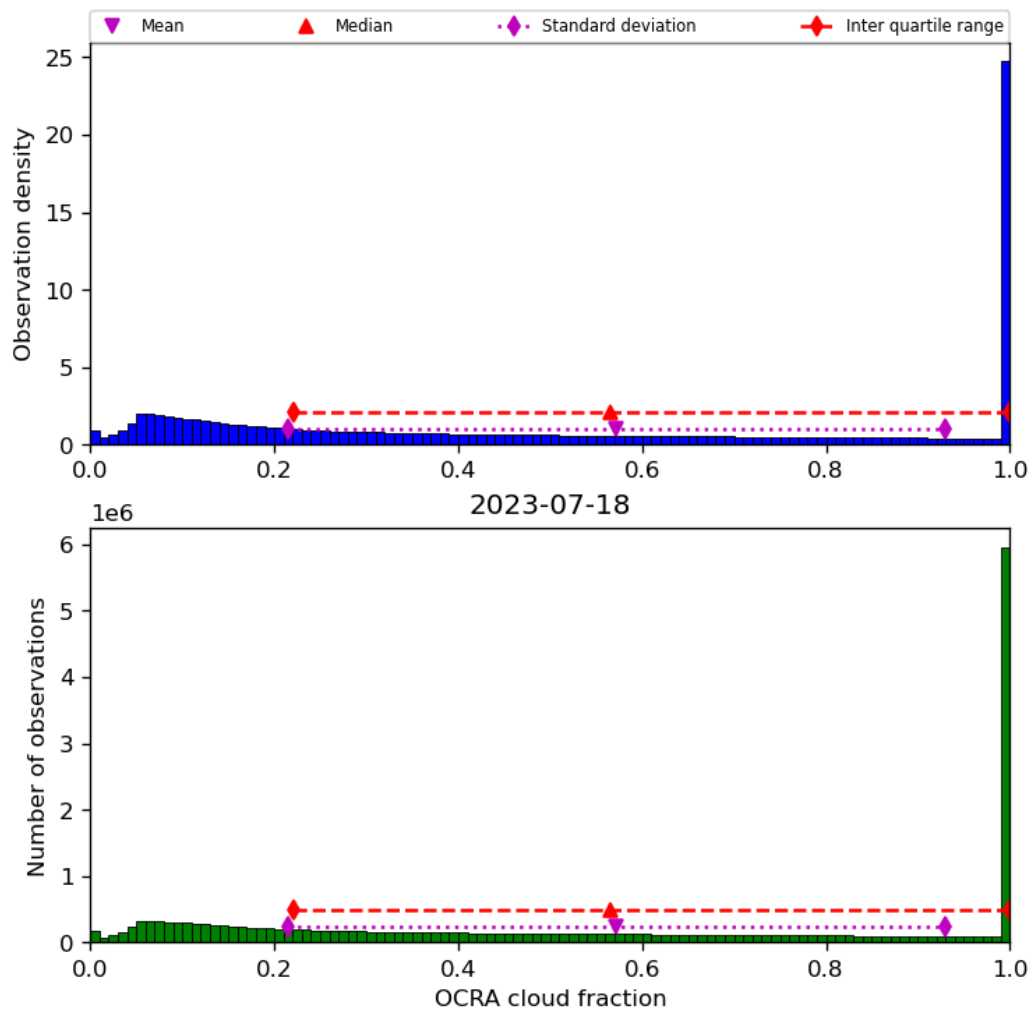


Figure 50: Histogram of “OCRA cloud fraction” for 2023-07-17 to 2023-07-19

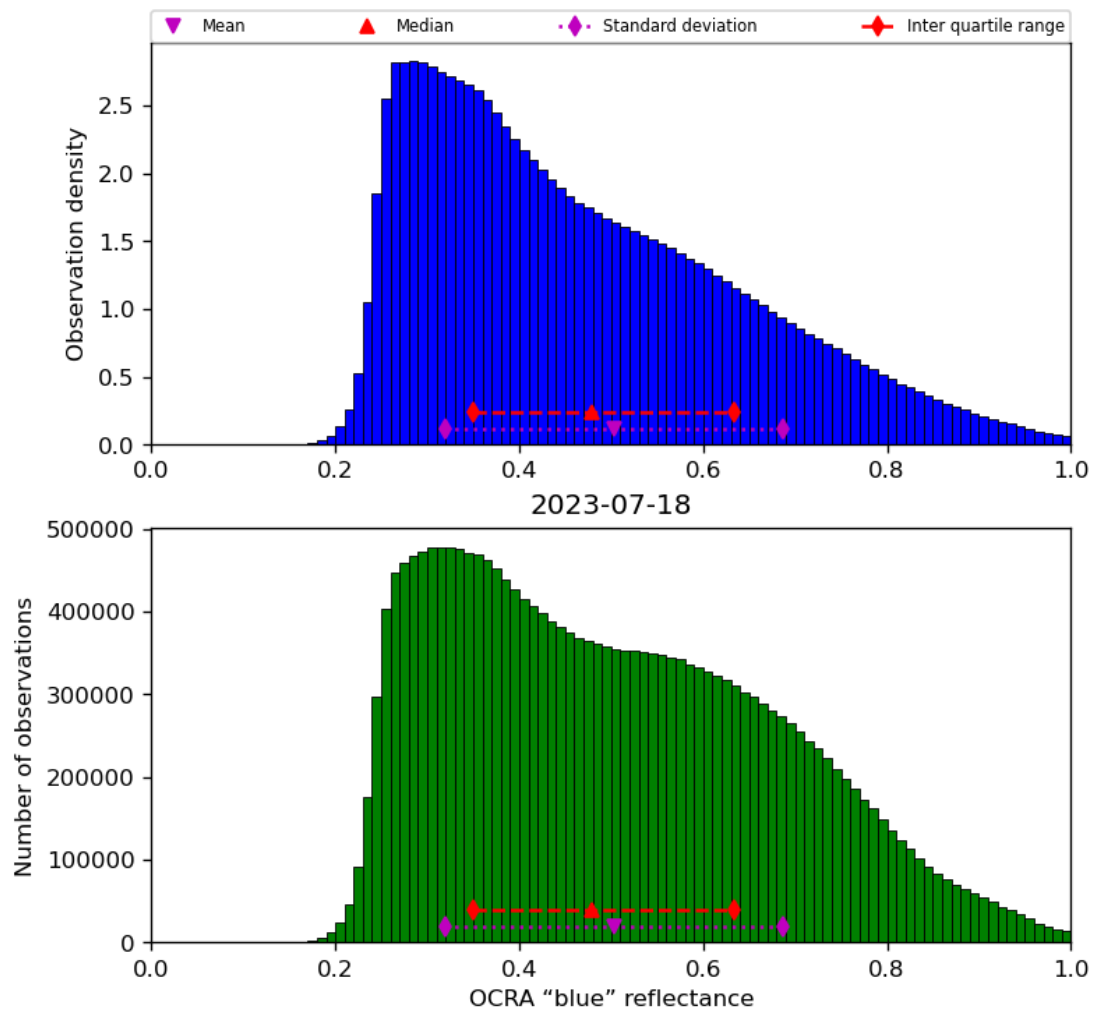


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-07-17 to 2023-07-19

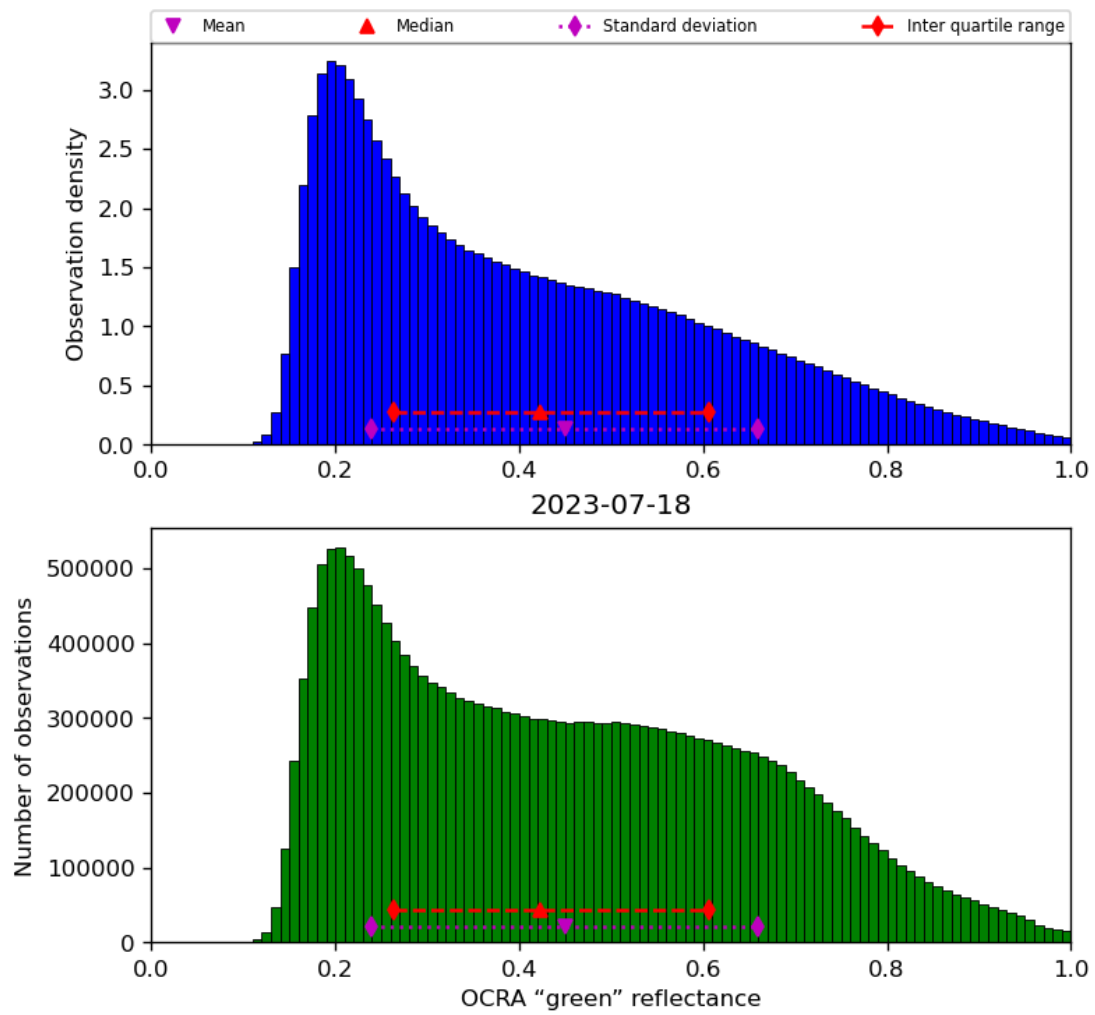


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-07-17 to 2023-07-19

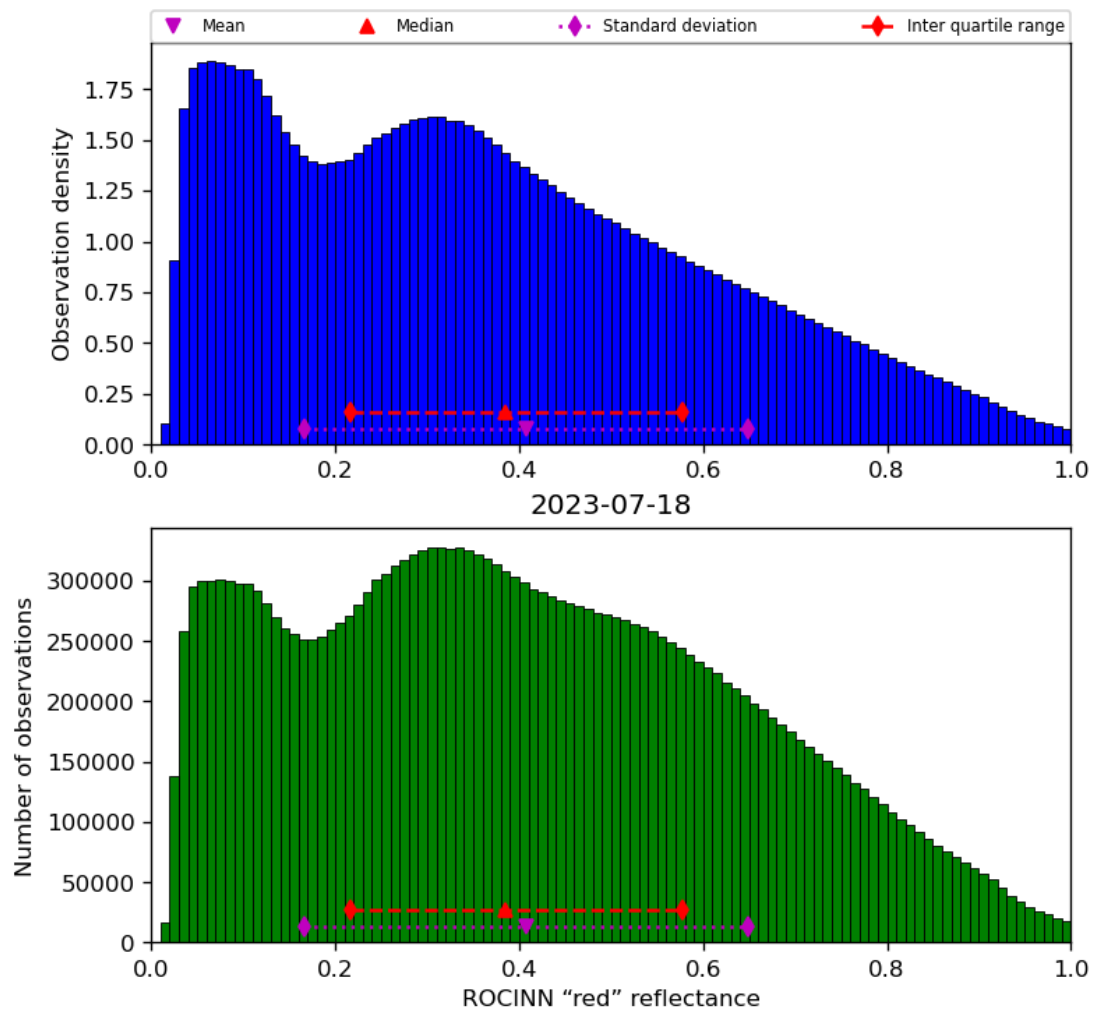


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-07-17 to 2023-07-19

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.

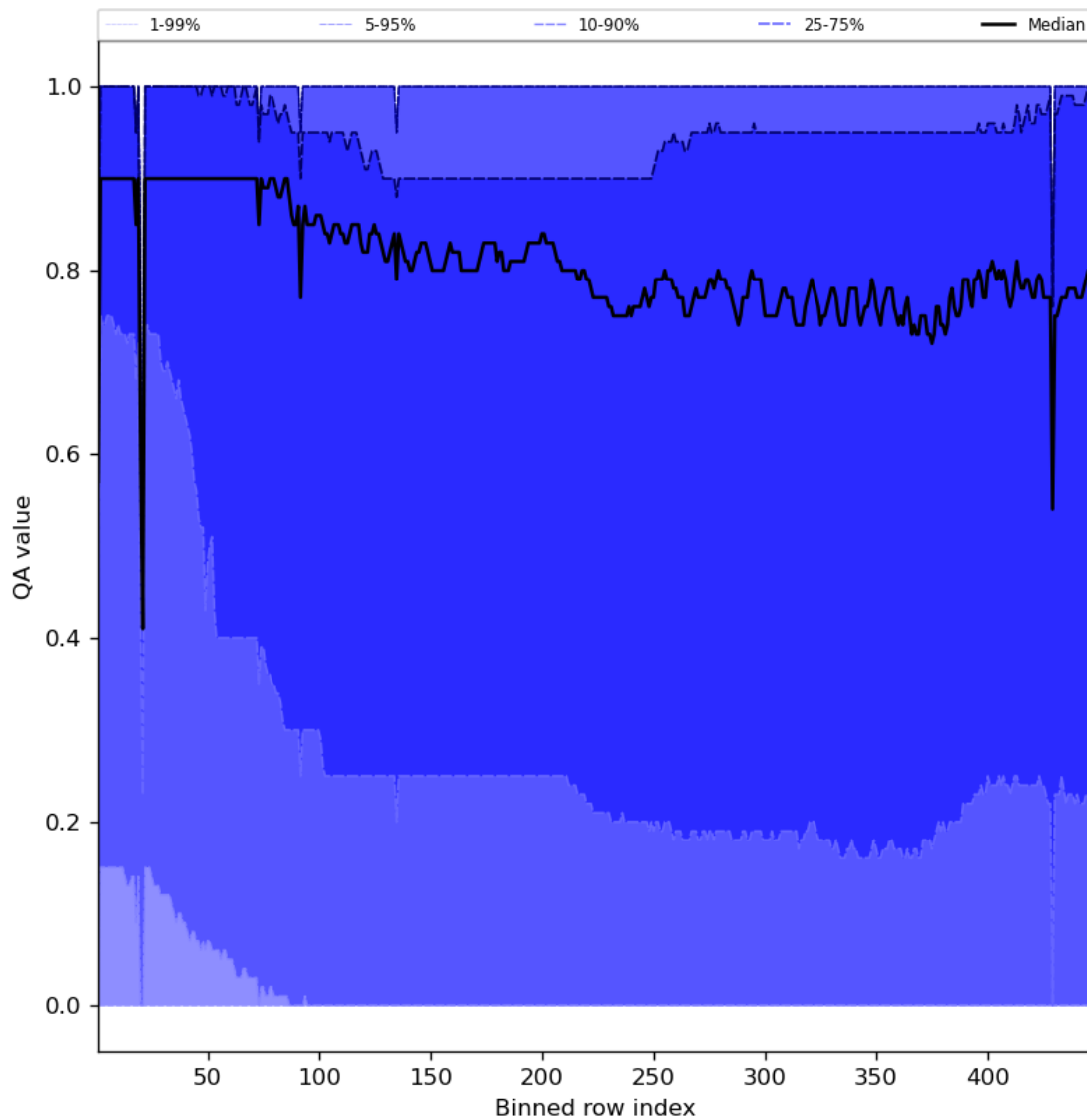


Figure 54: Along track statistics of “QA value” for 2023-07-17 to 2023-07-19

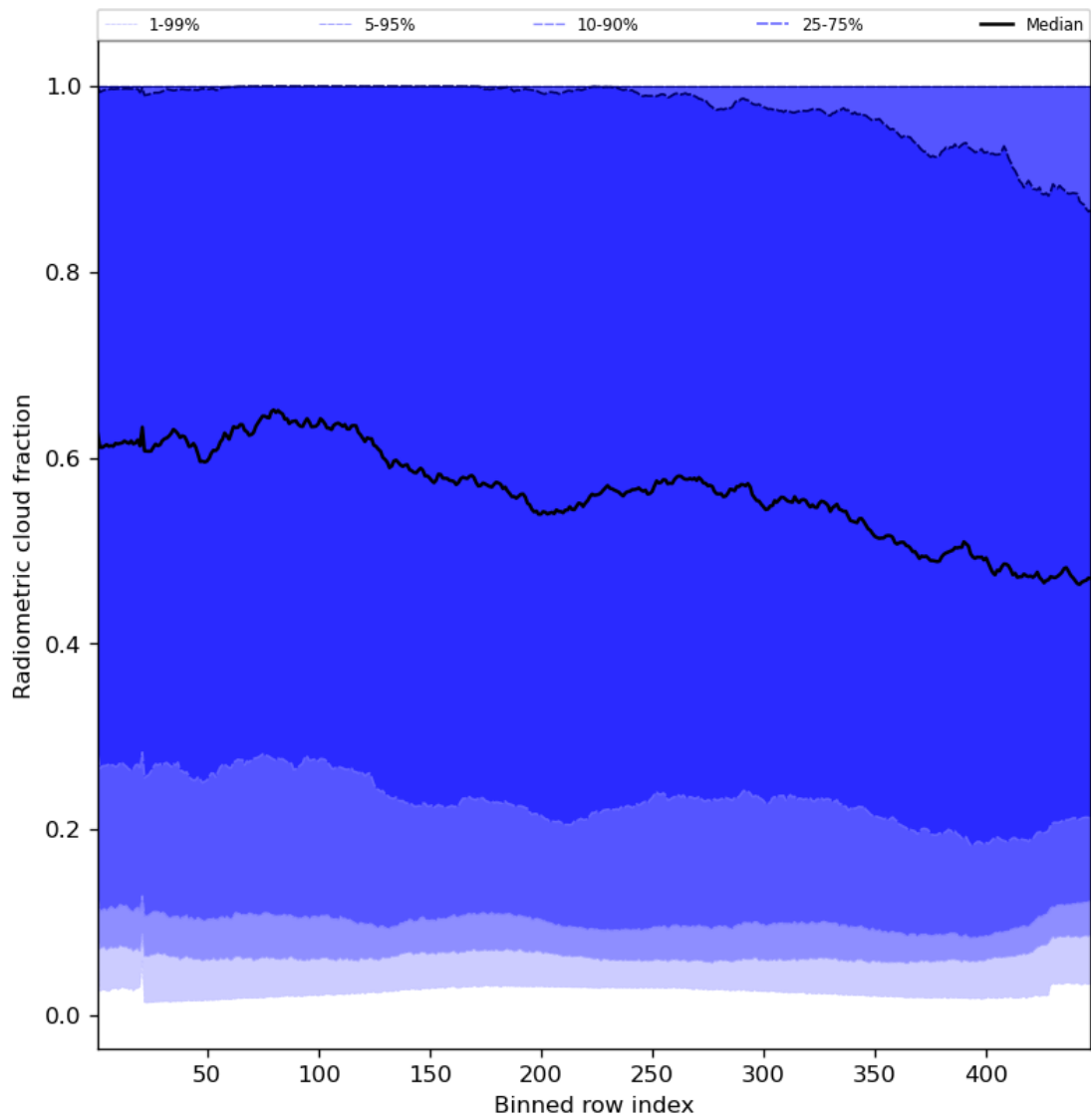


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-07-17 to 2023-07-19

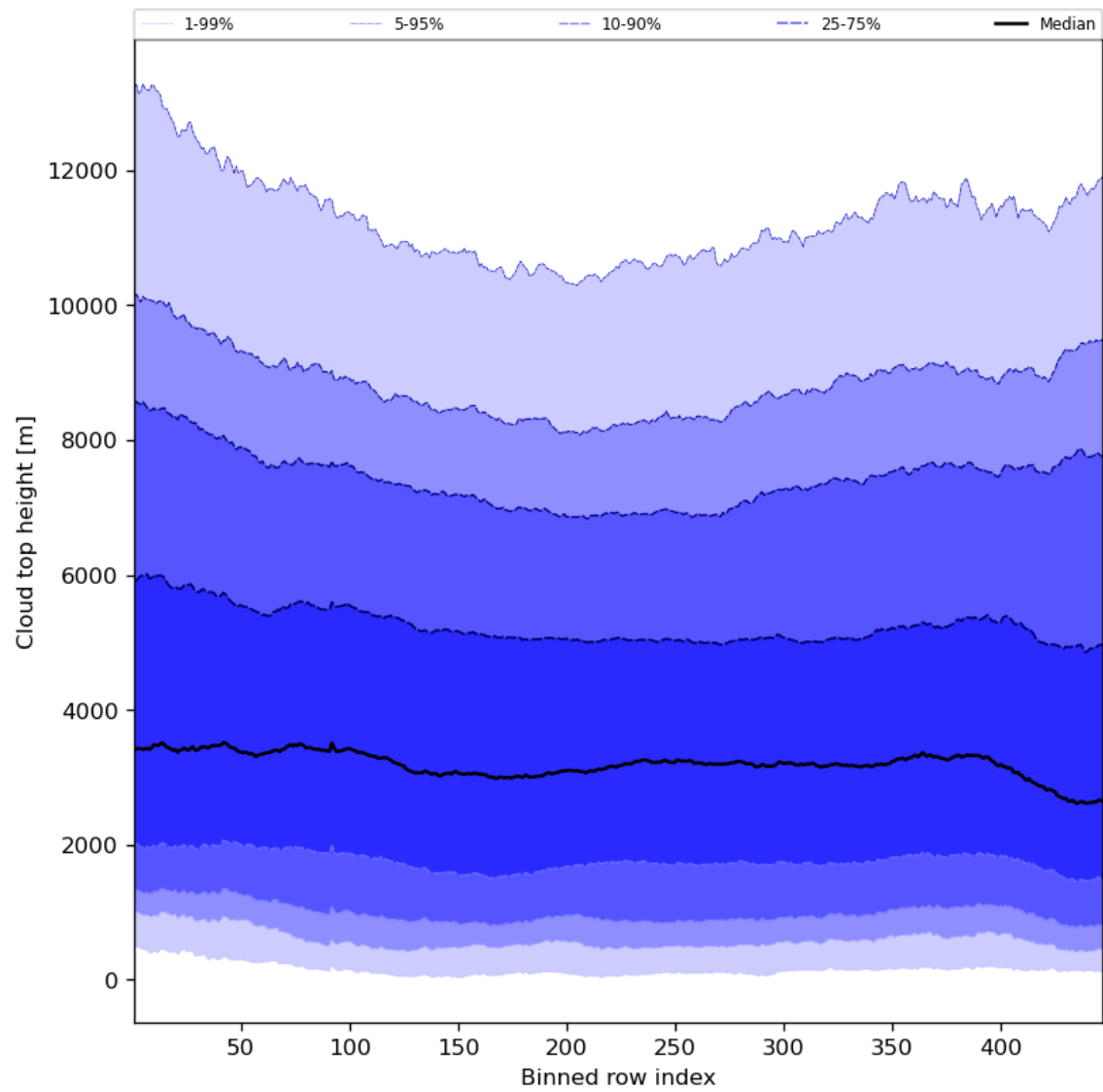


Figure 56: Along track statistics of “Cloud top height” for 2023-07-17 to 2023-07-19

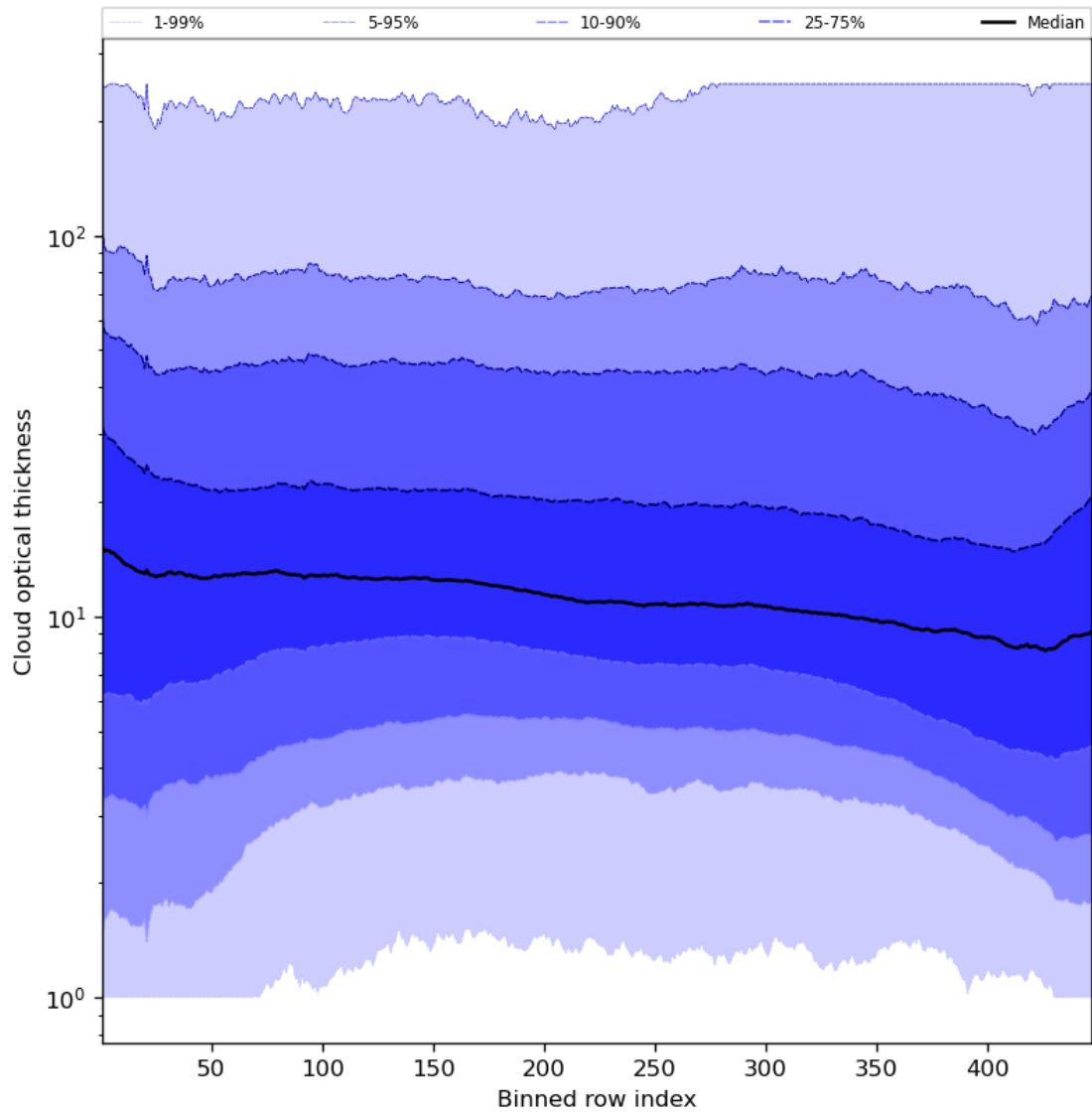


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-07-17 to 2023-07-19

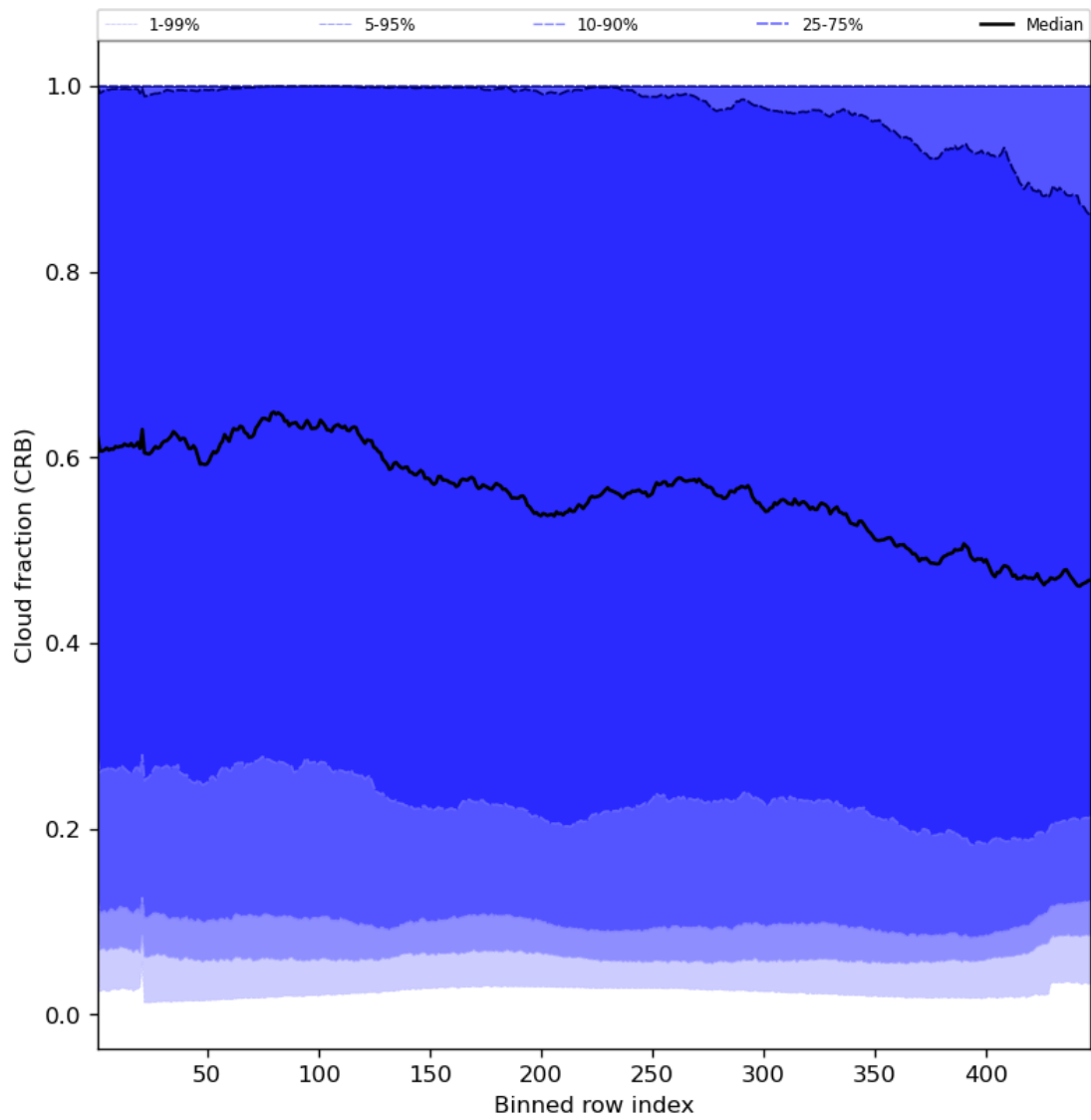


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-07-17 to 2023-07-19

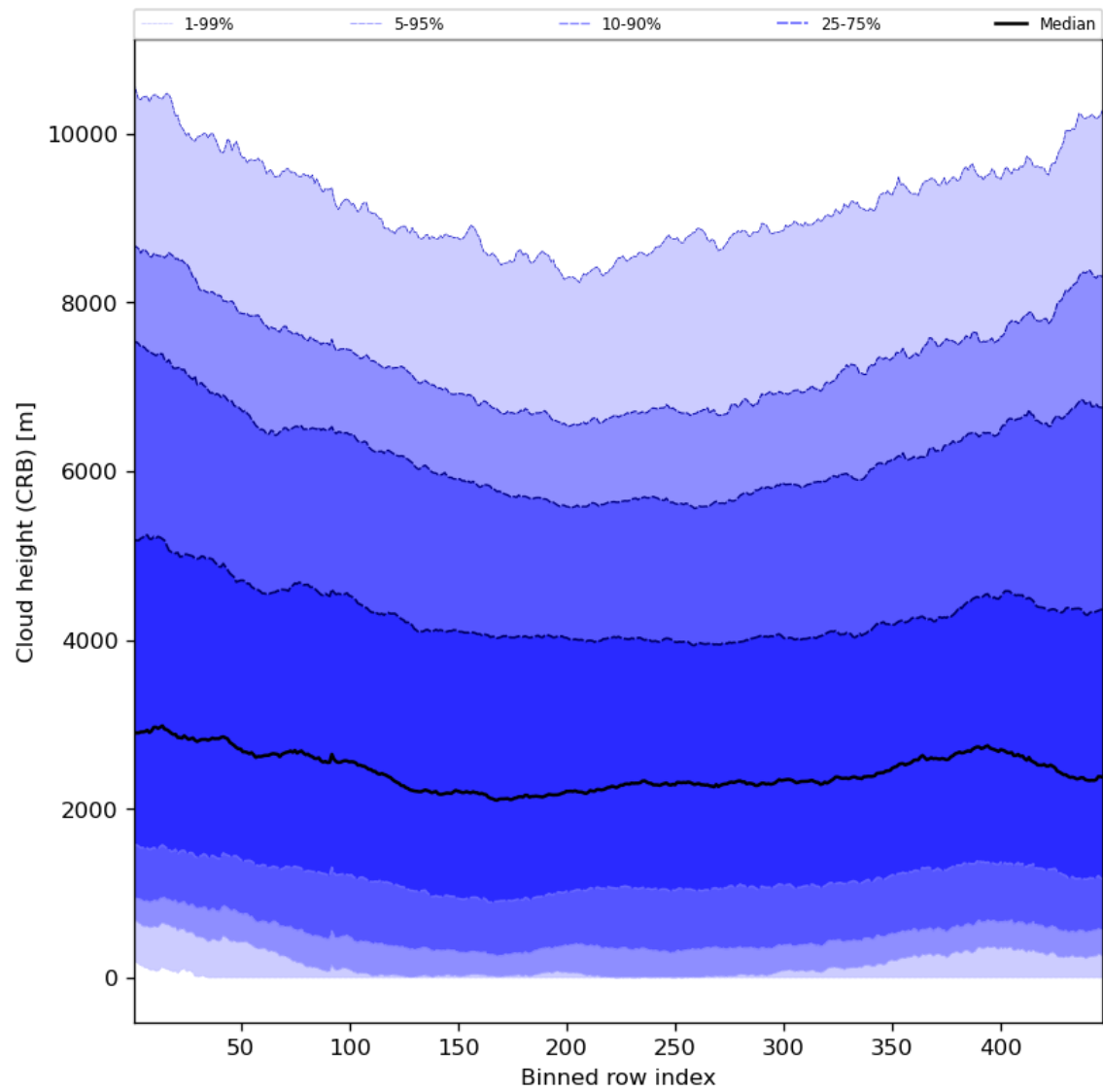


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-07-17 to 2023-07-19

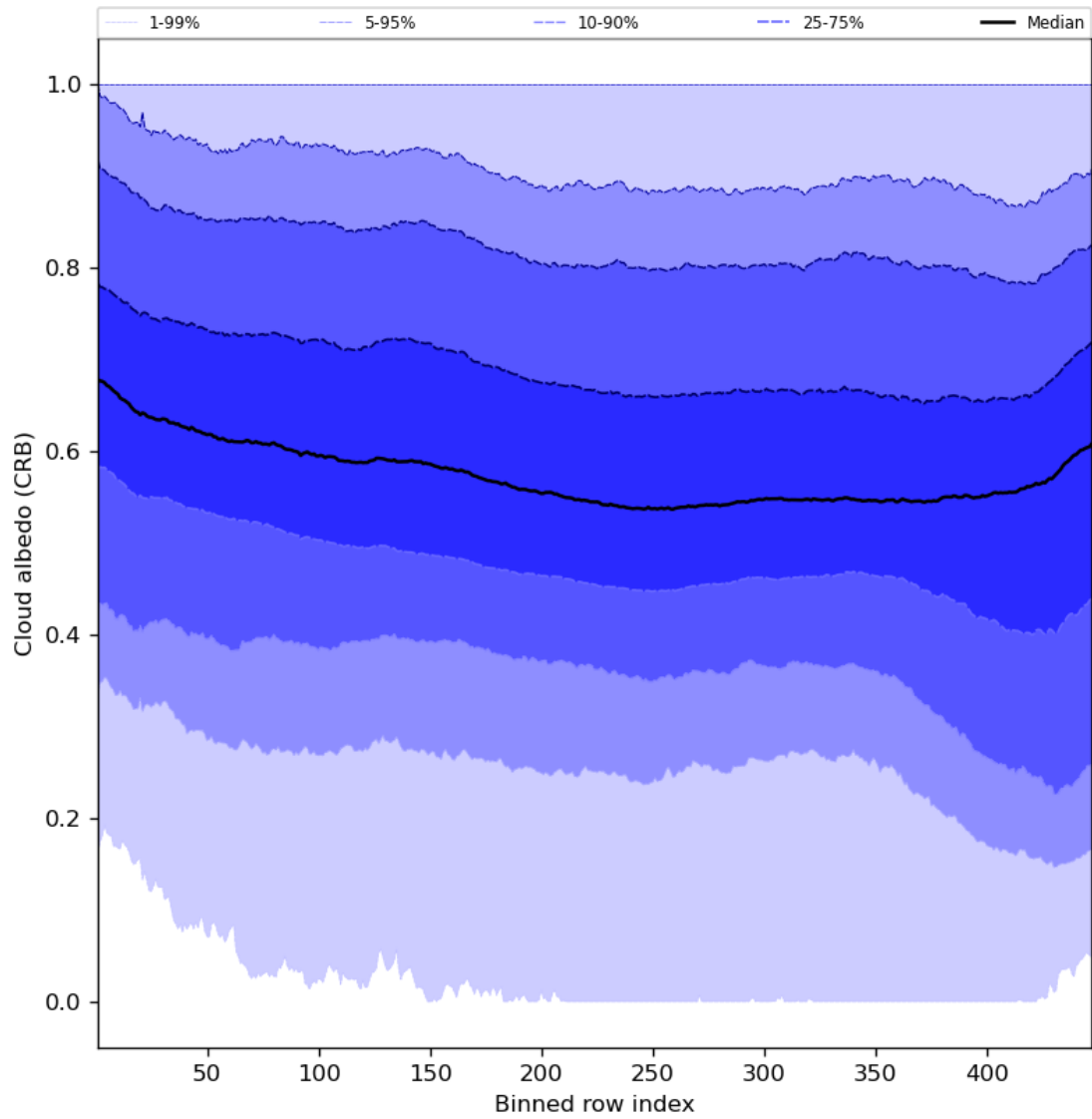


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-07-17 to 2023-07-19

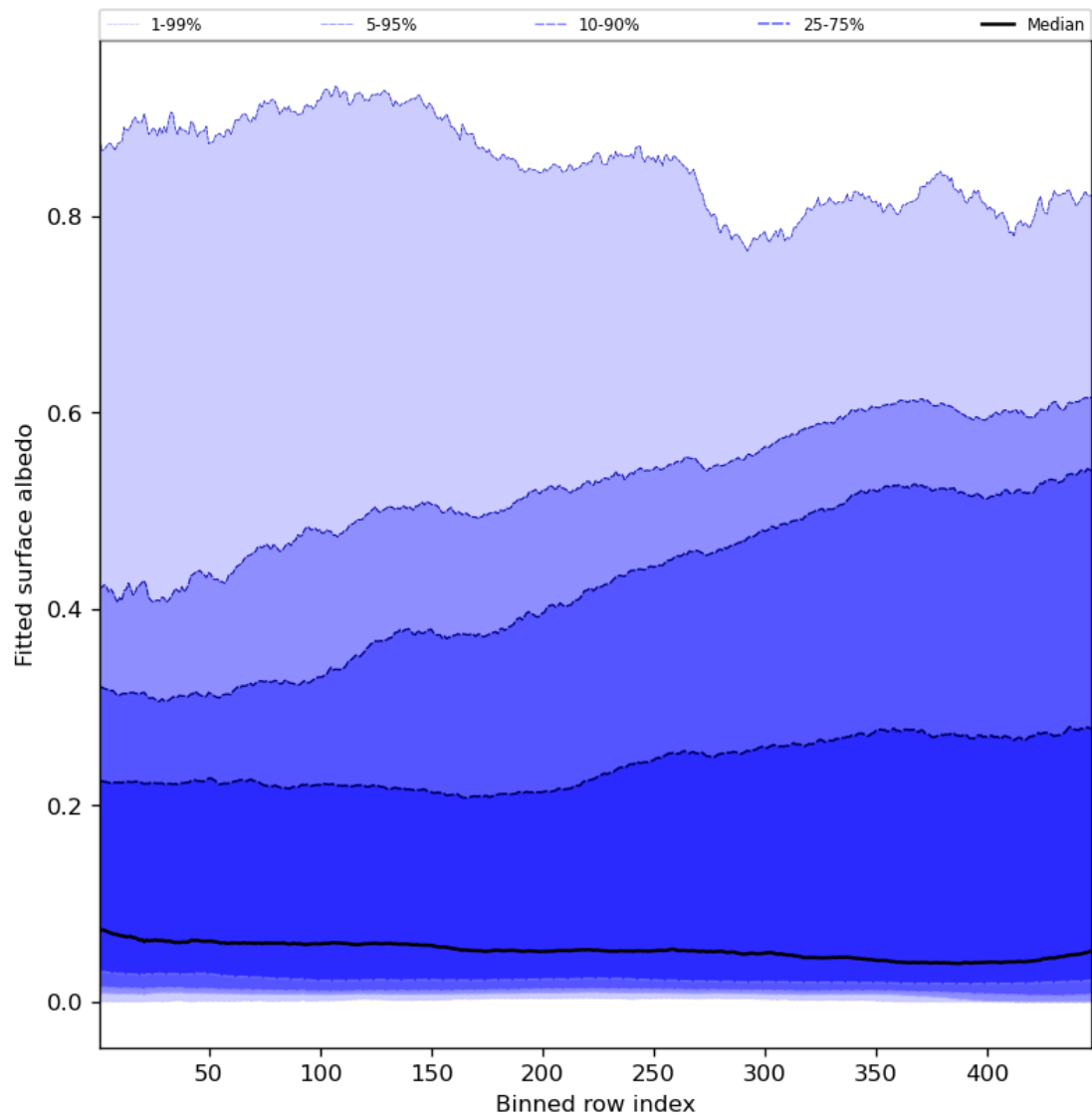


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-07-17 to 2023-07-19

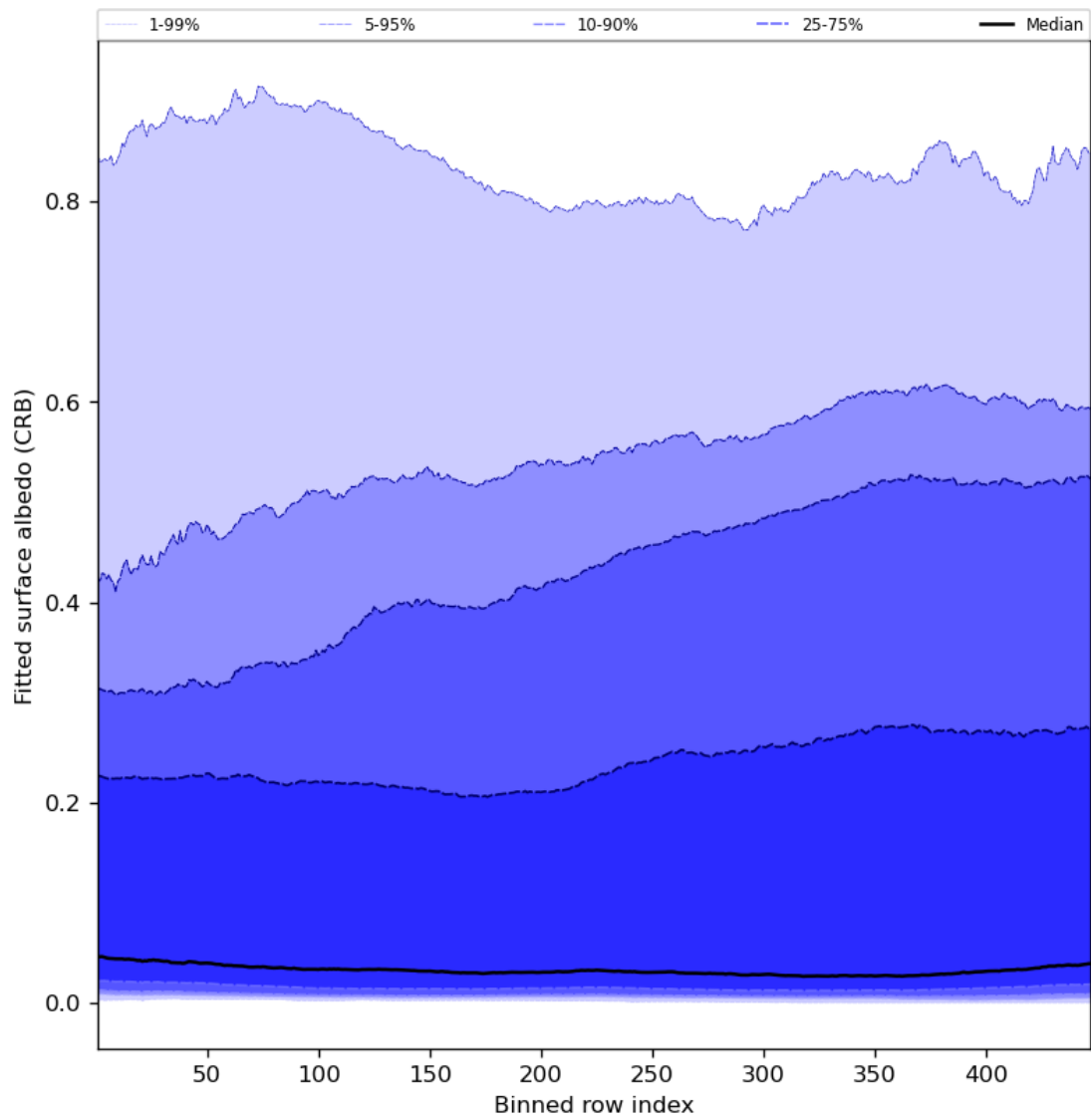


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-07-17 to 2023-07-19

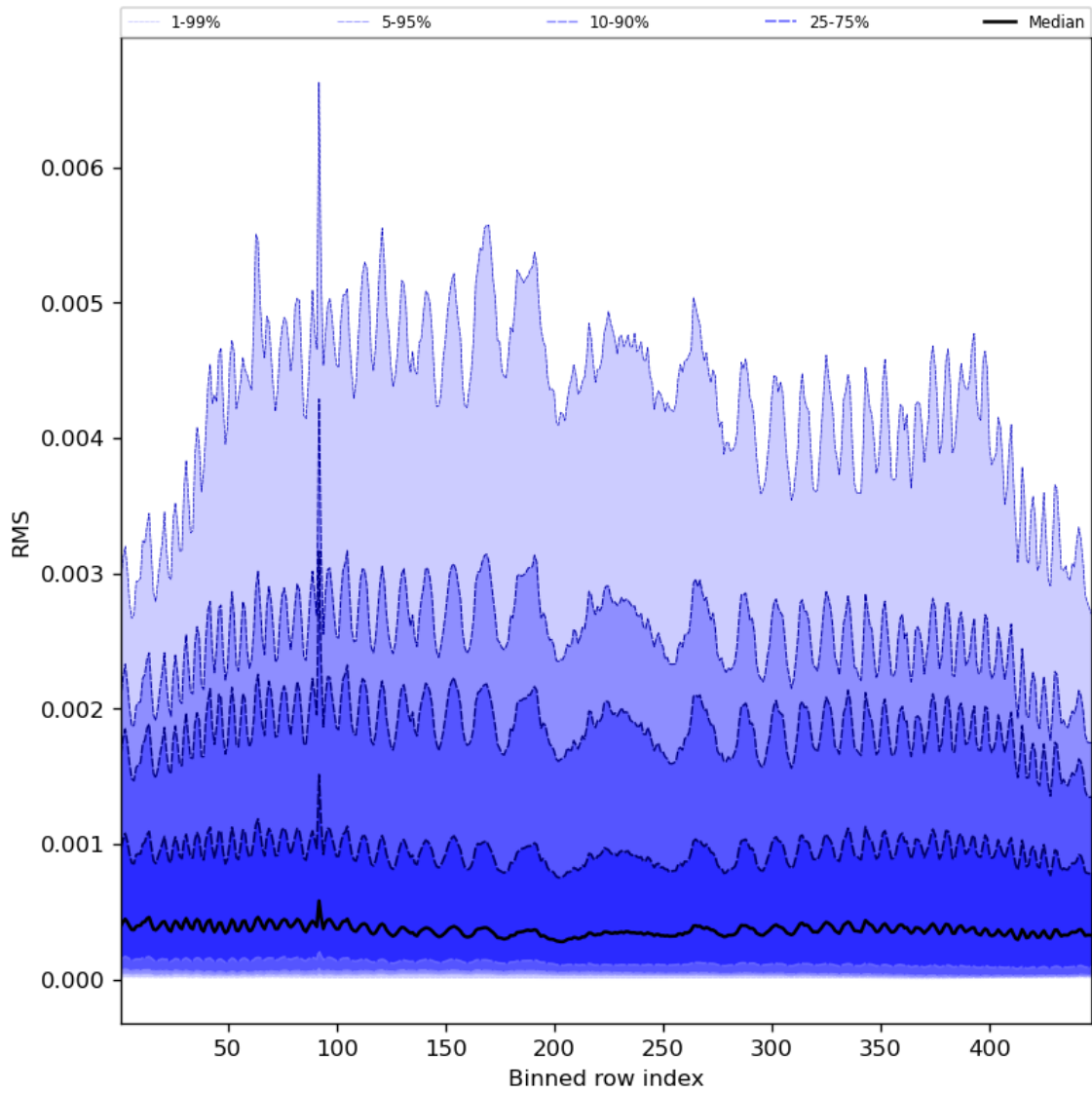


Figure 63: Along track statistics of “RMS” for 2023-07-17 to 2023-07-19

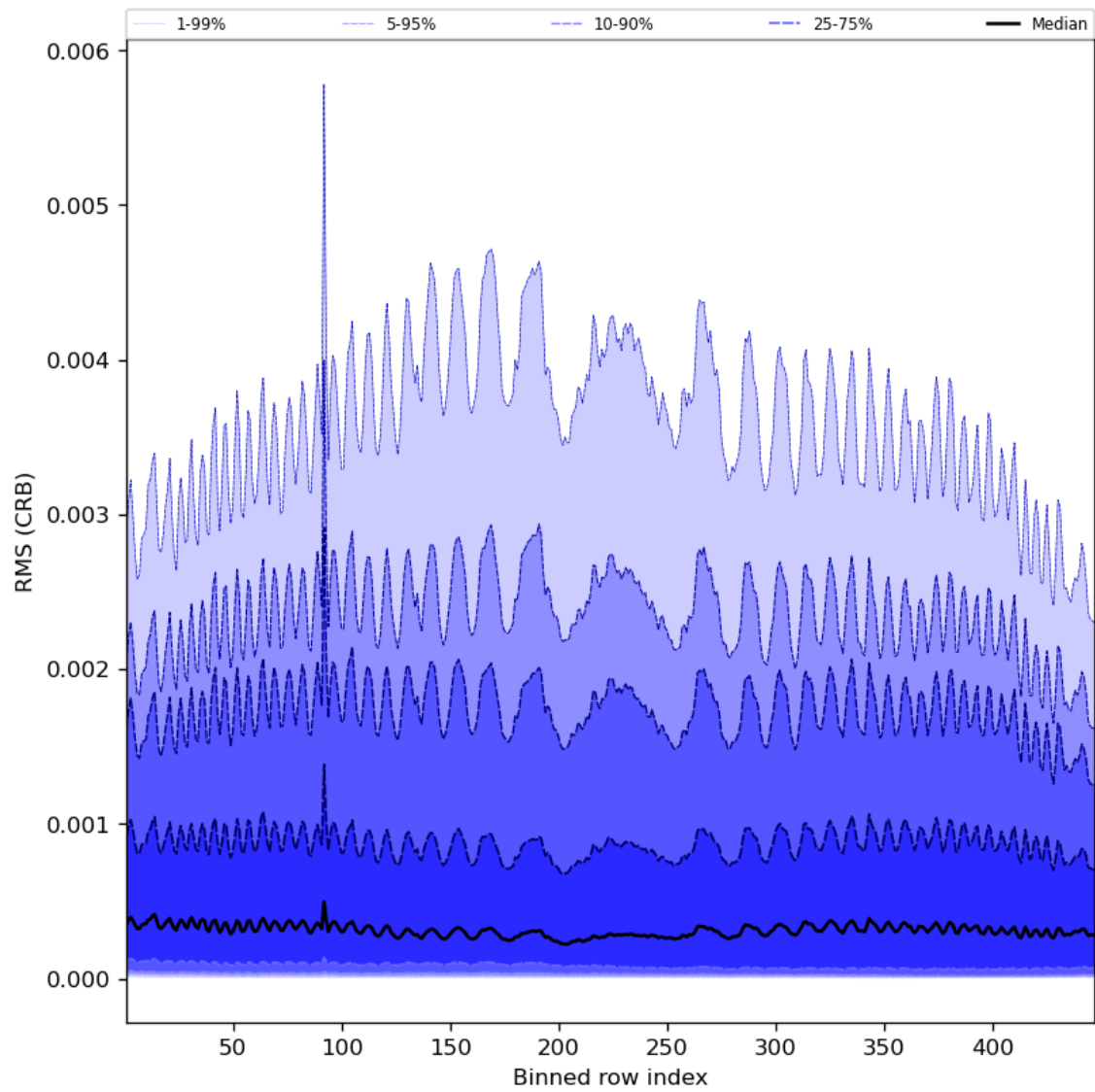


Figure 64: Along track statistics of “RMS (CRB)” for 2023-07-17 to 2023-07-19

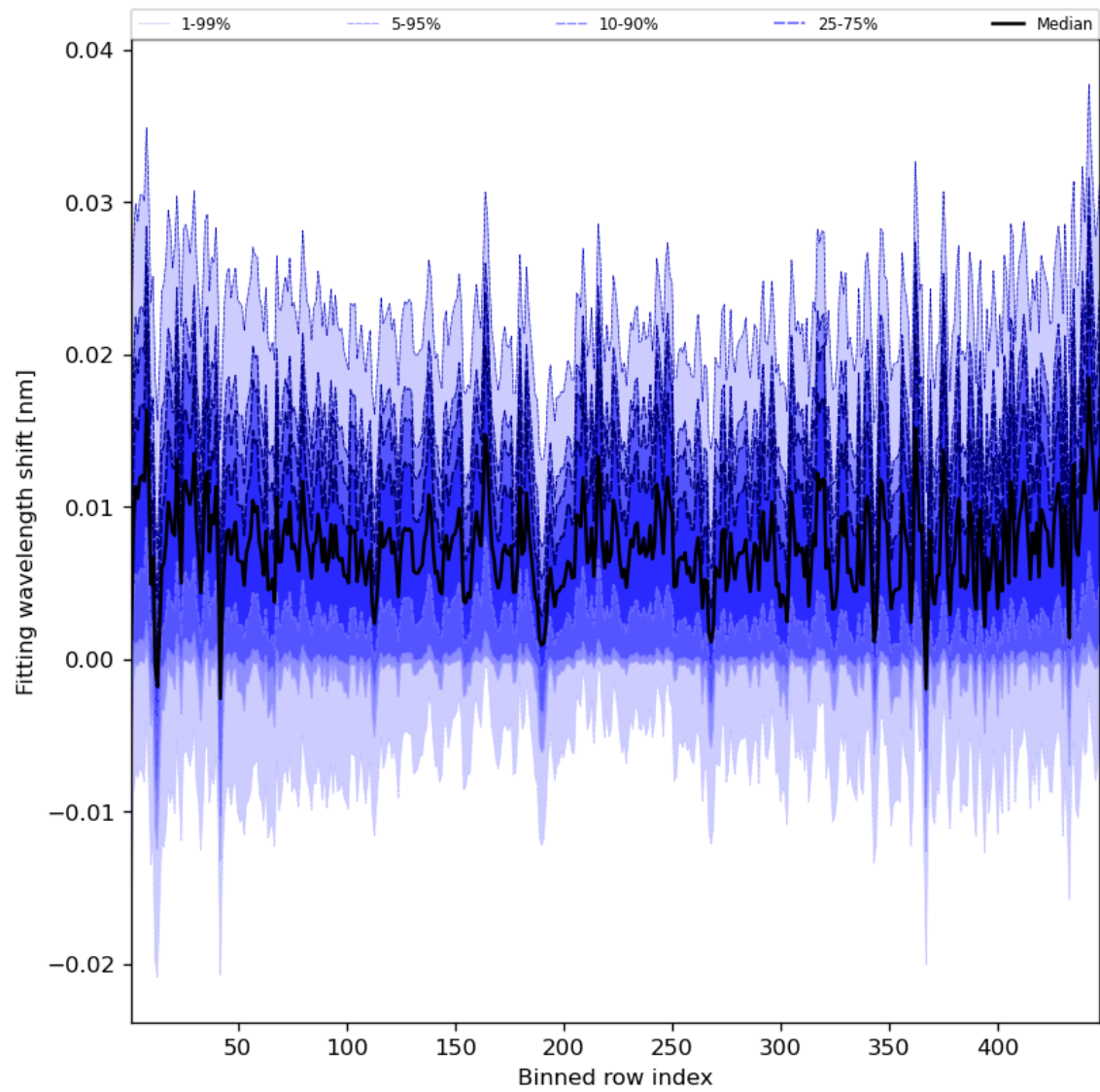


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-07-17 to 2023-07-19

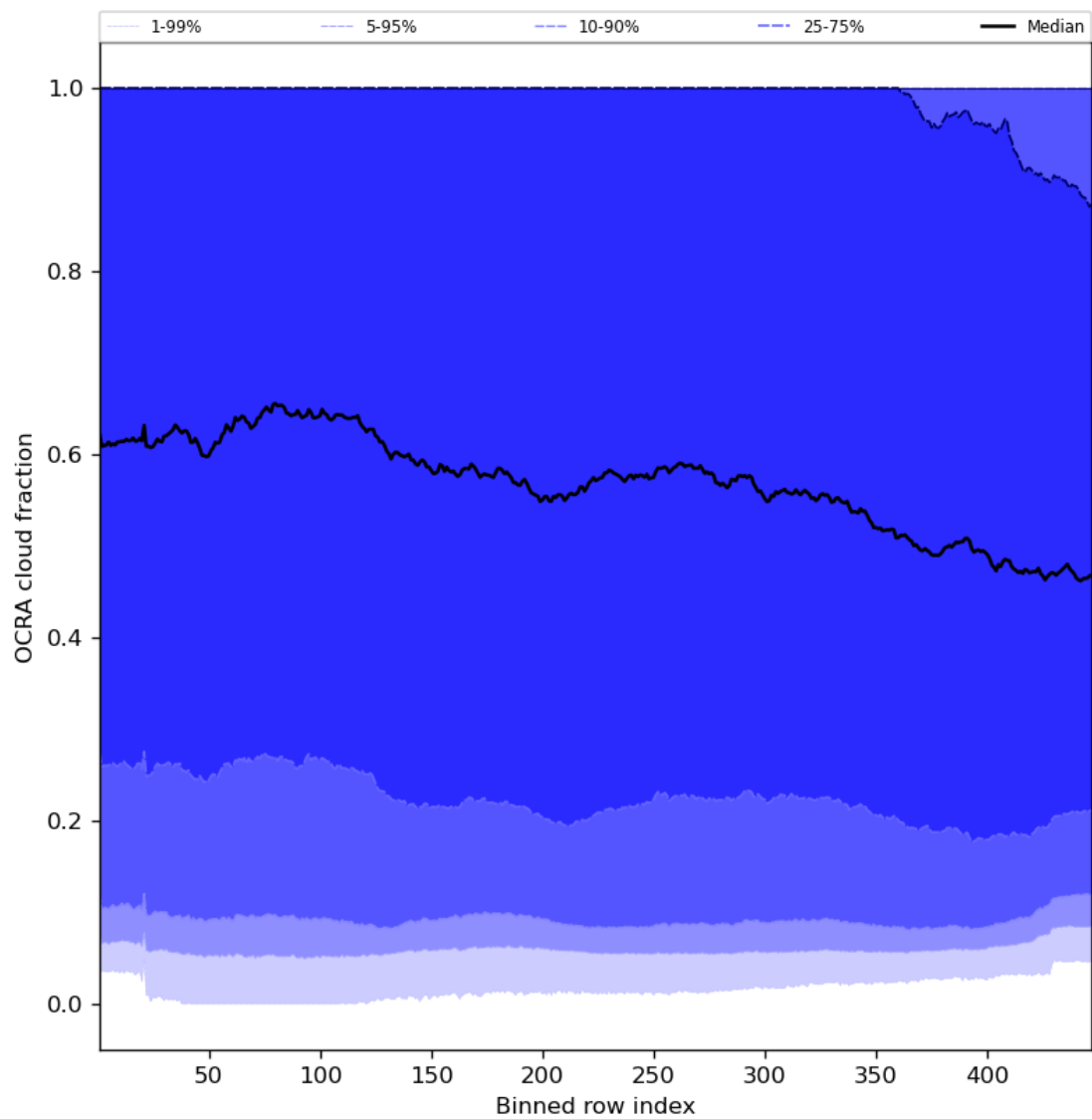


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-07-17 to 2023-07-19

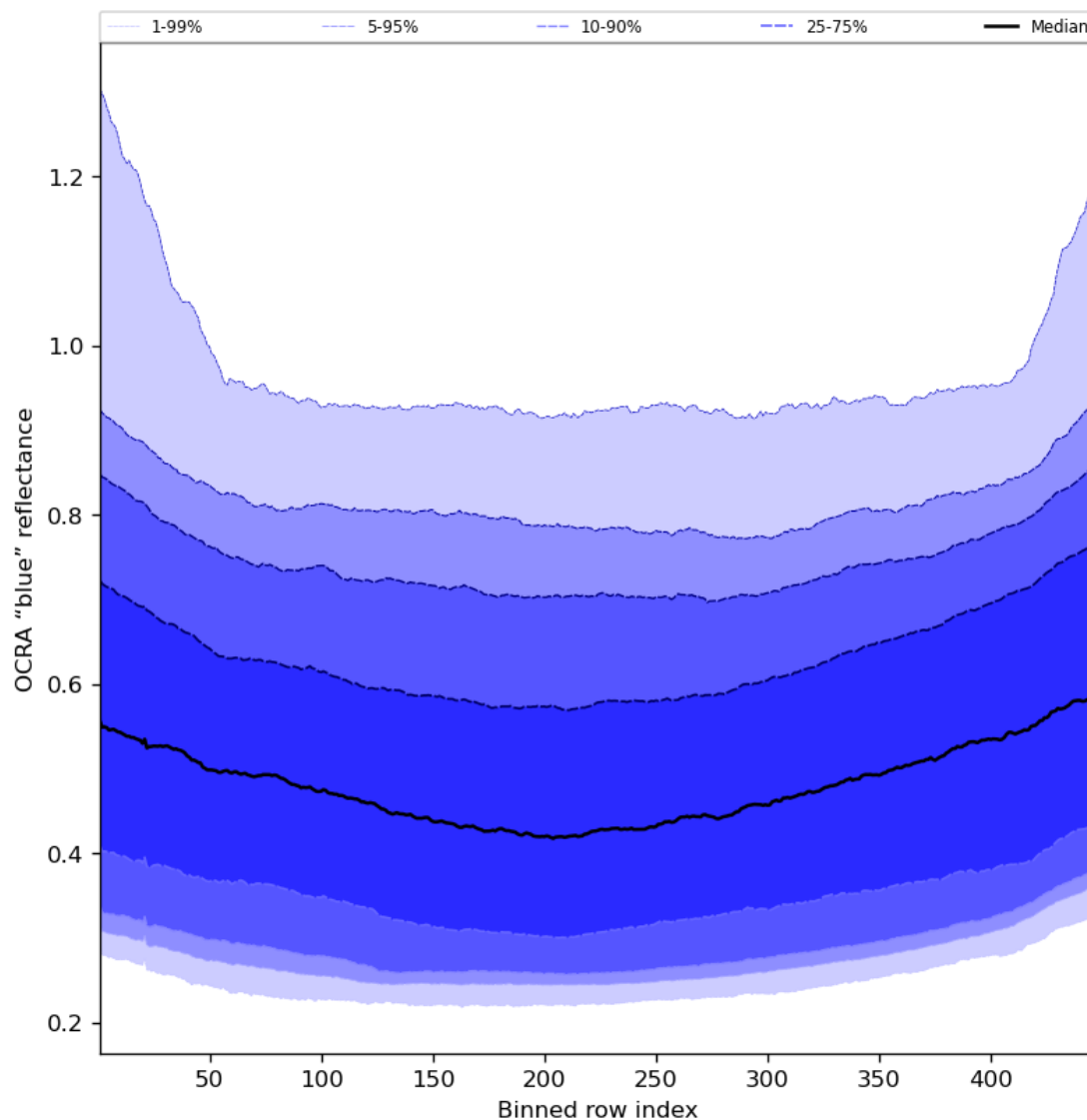


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-07-17 to 2023-07-19

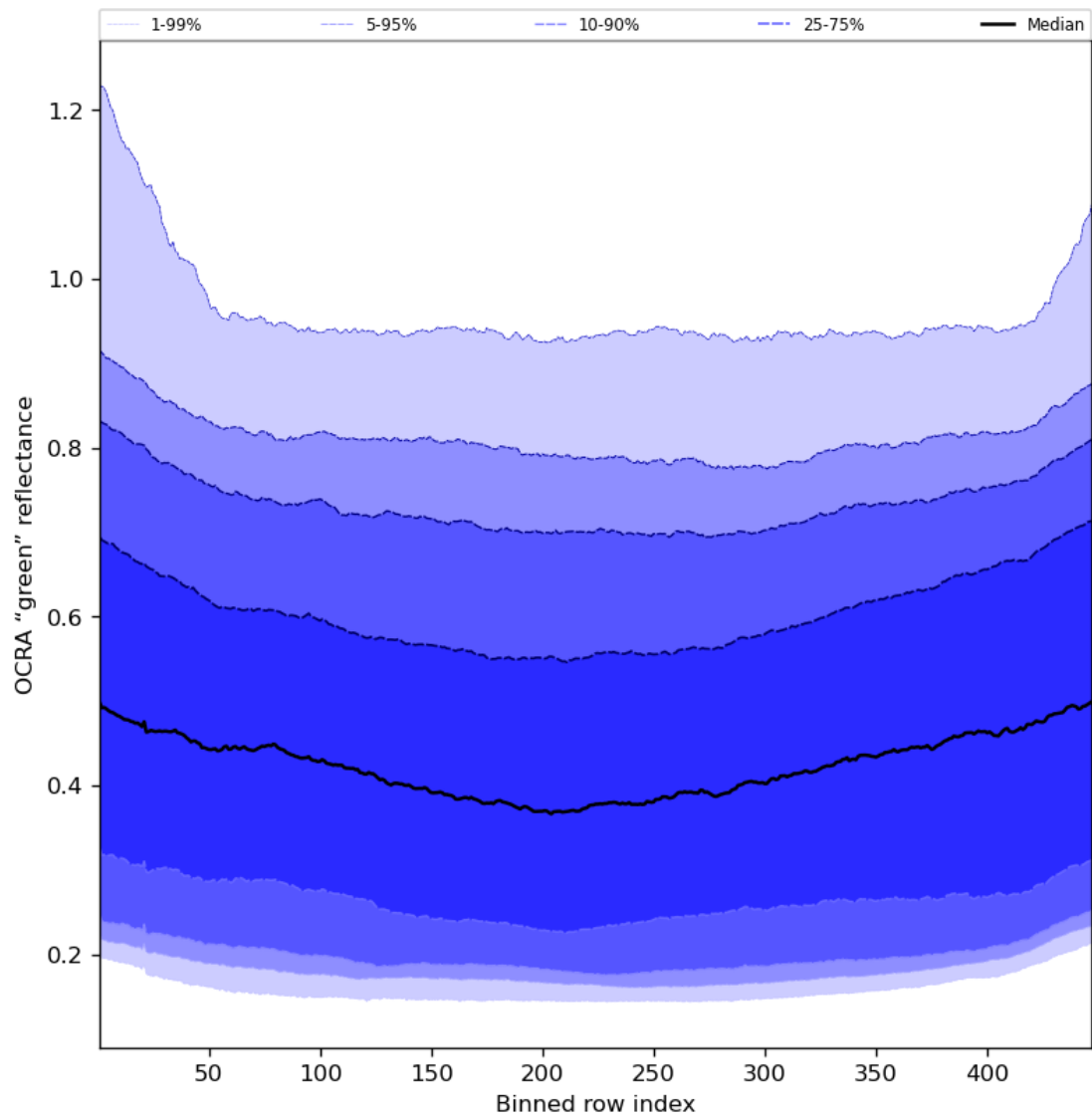


Figure 68: Along track statistics of "OCRA "green" reflectance" for 2023-07-17 to 2023-07-19

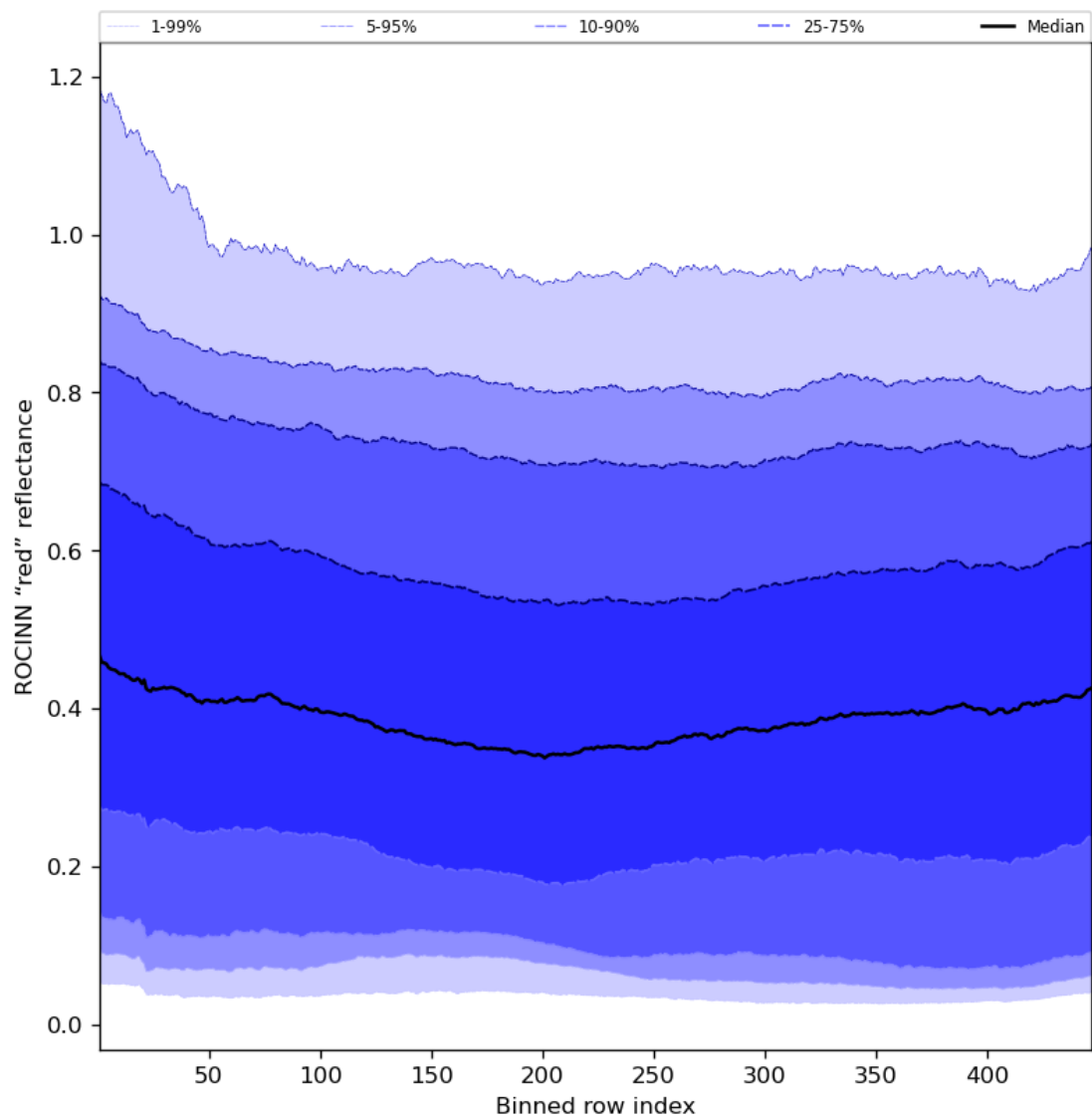


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2023-07-17 to 2023-07-19

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.

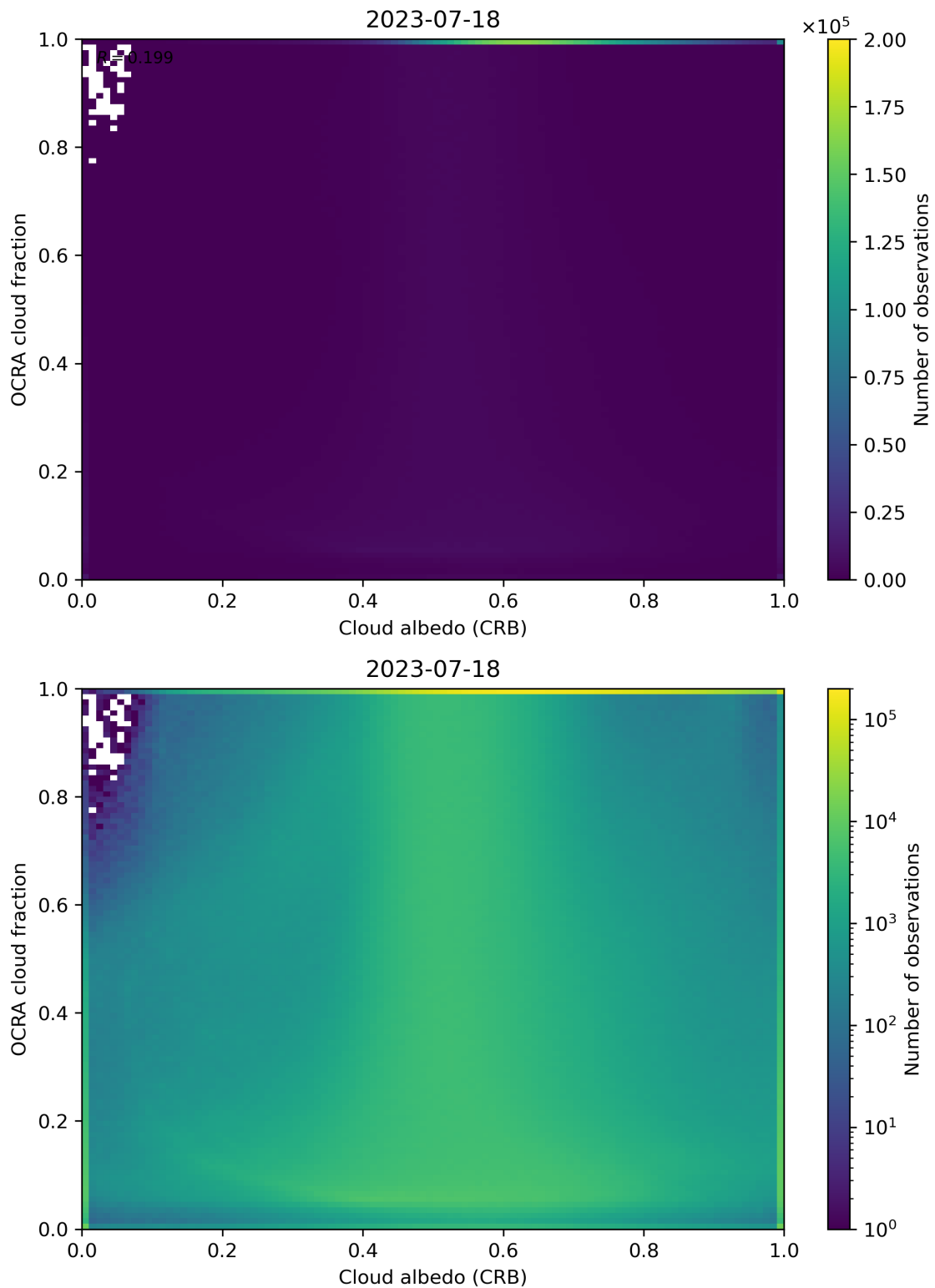


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-07-17 to 2023-07-19.

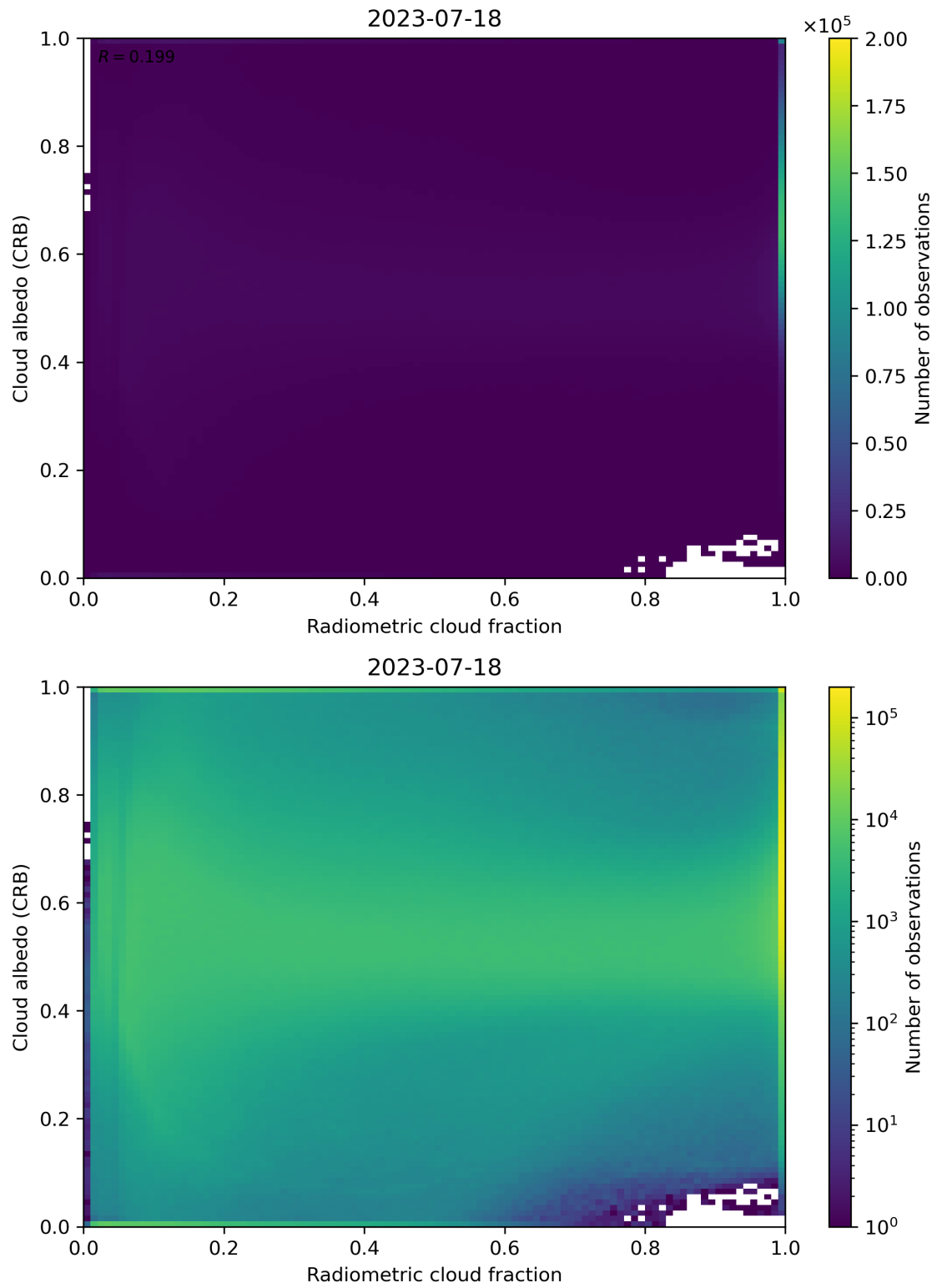


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-07-17 to 2023-07-19.

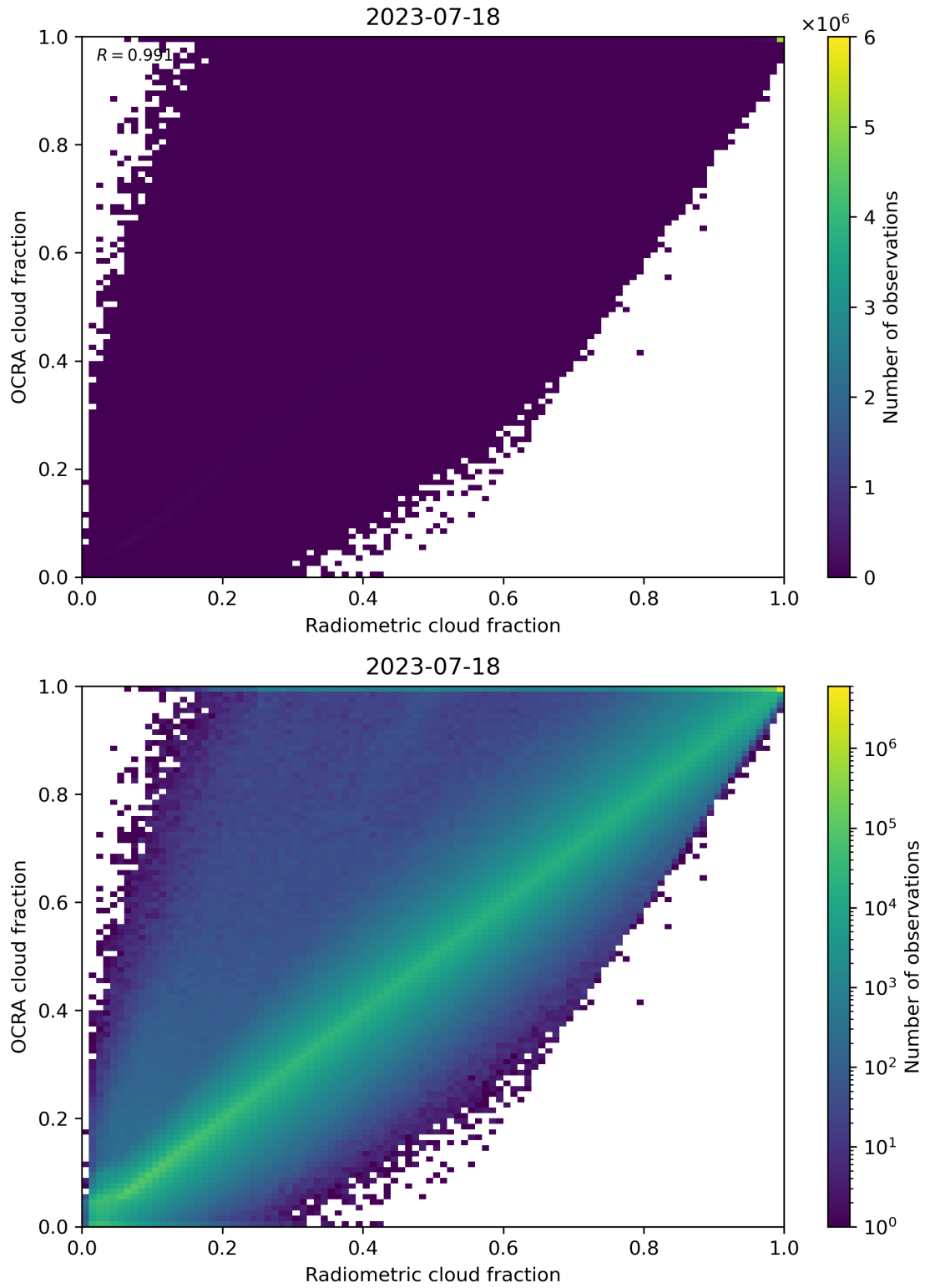


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-07-17 to 2023-07-19.

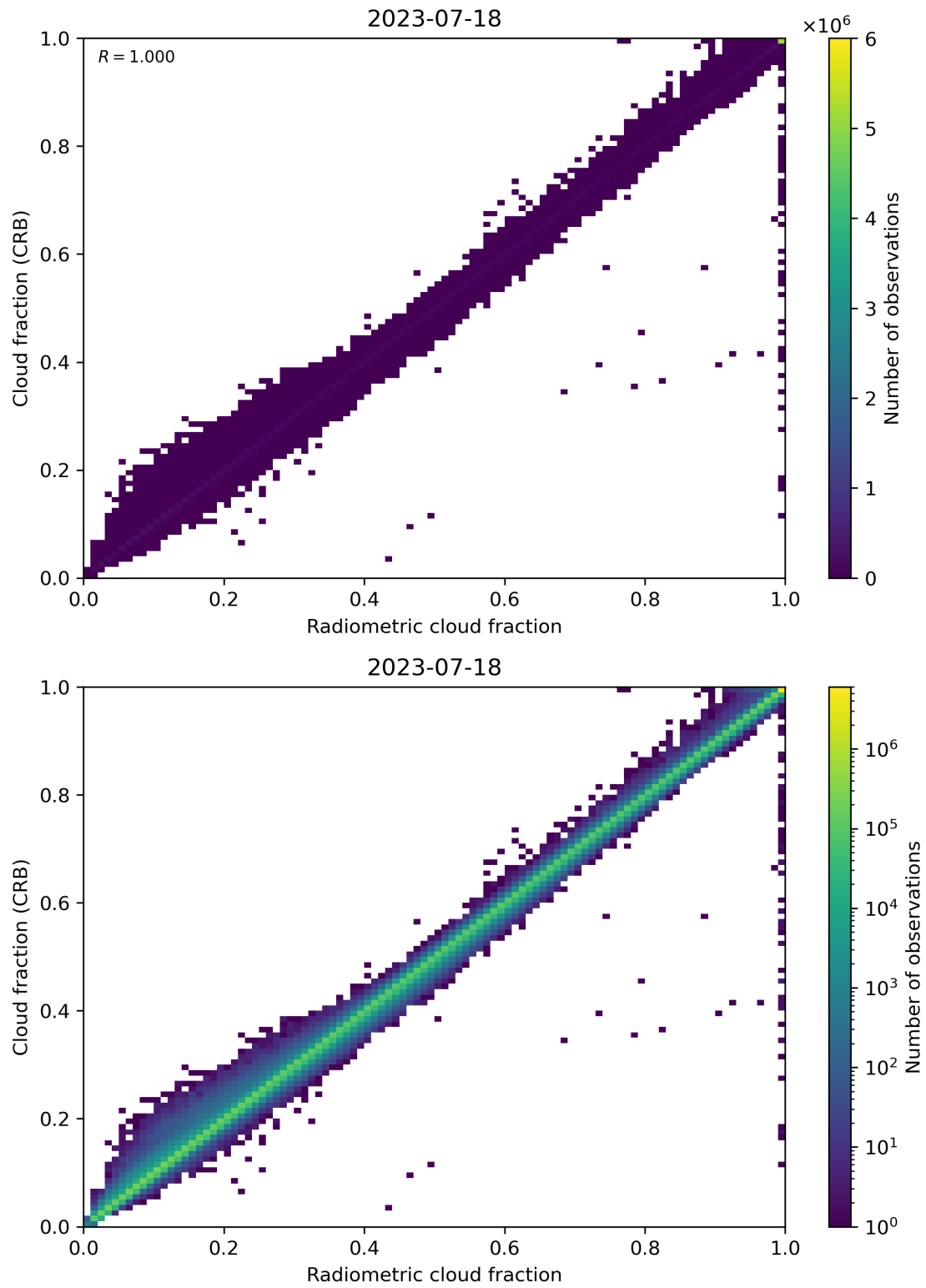


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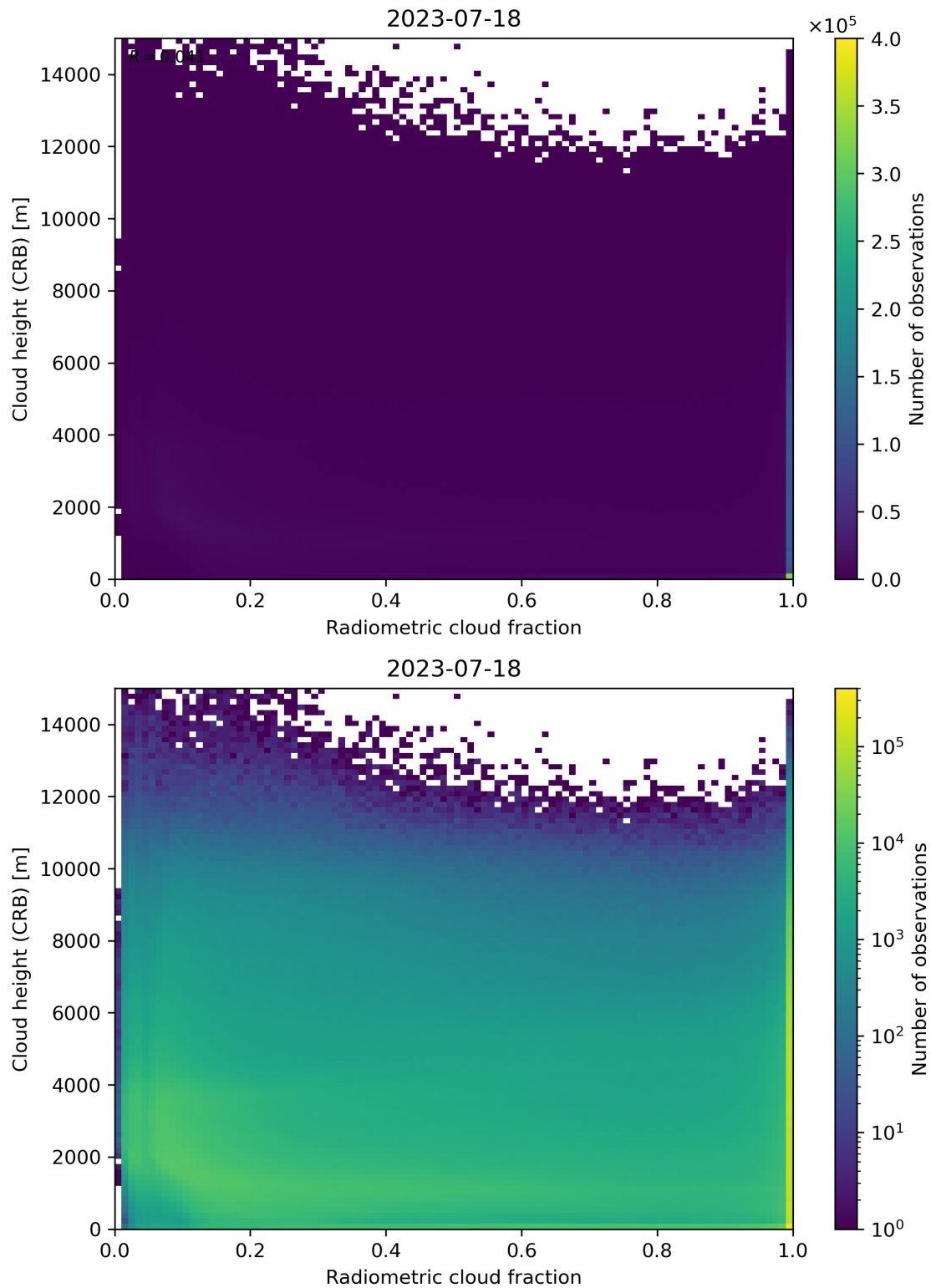


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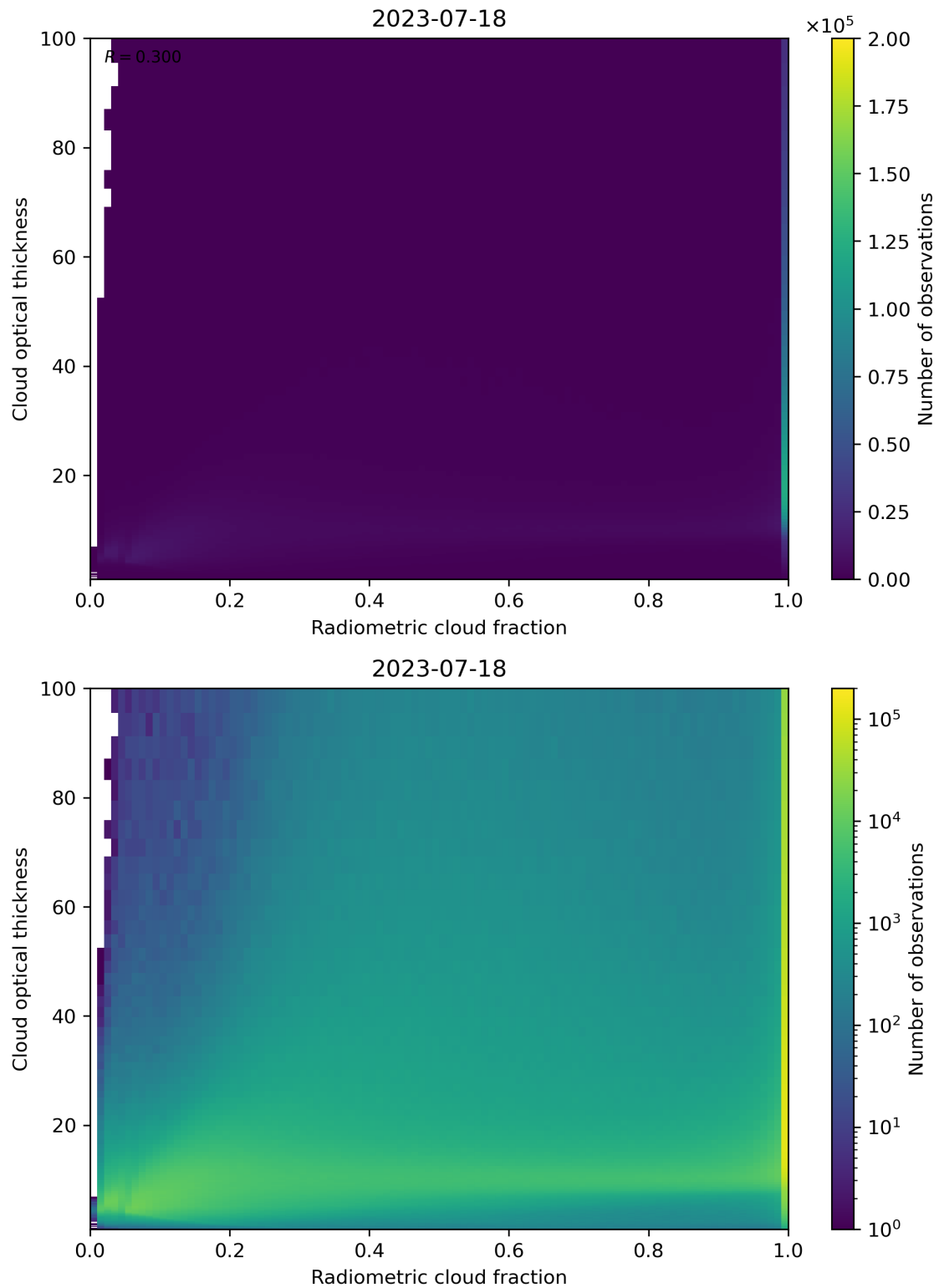


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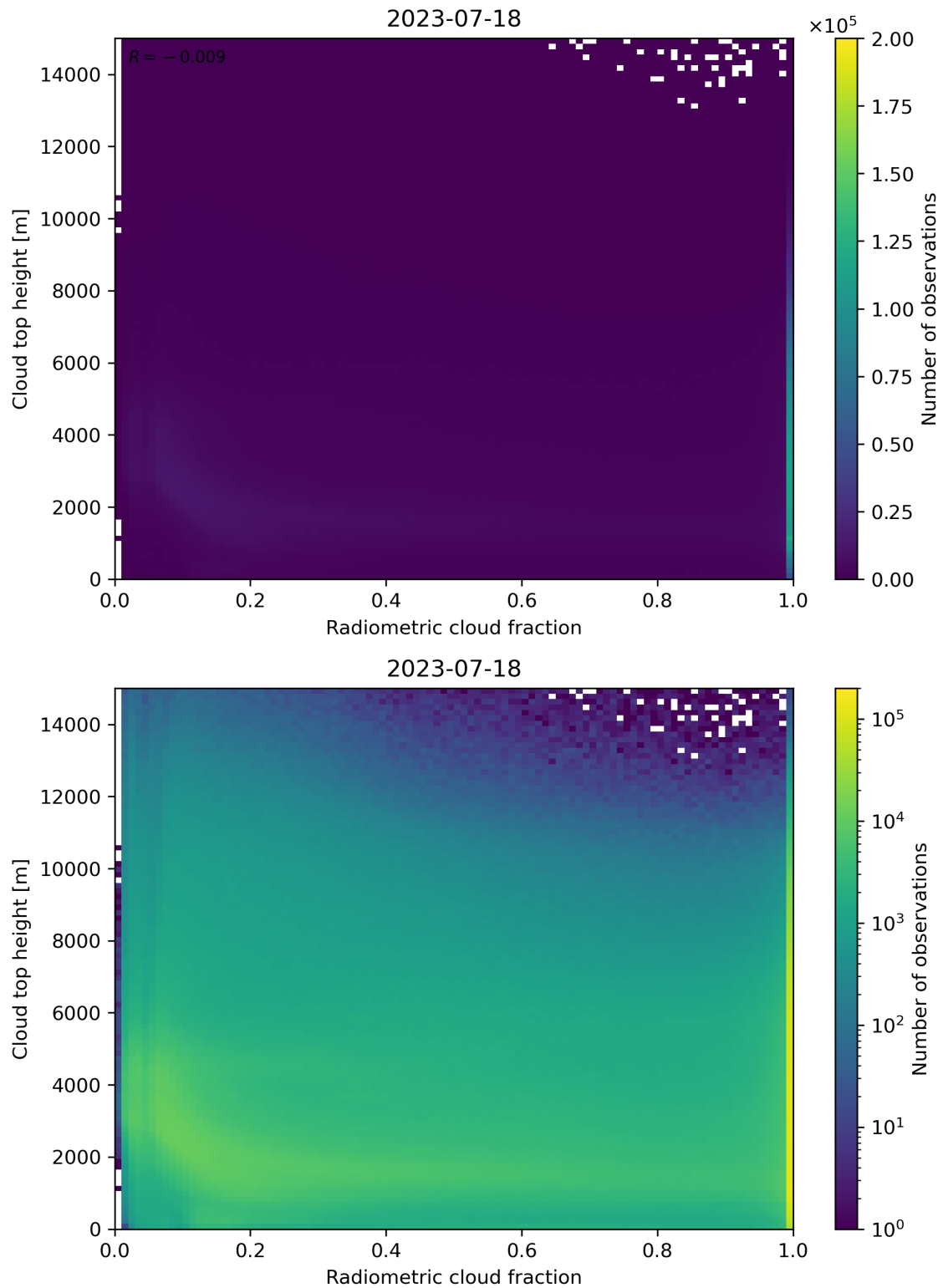


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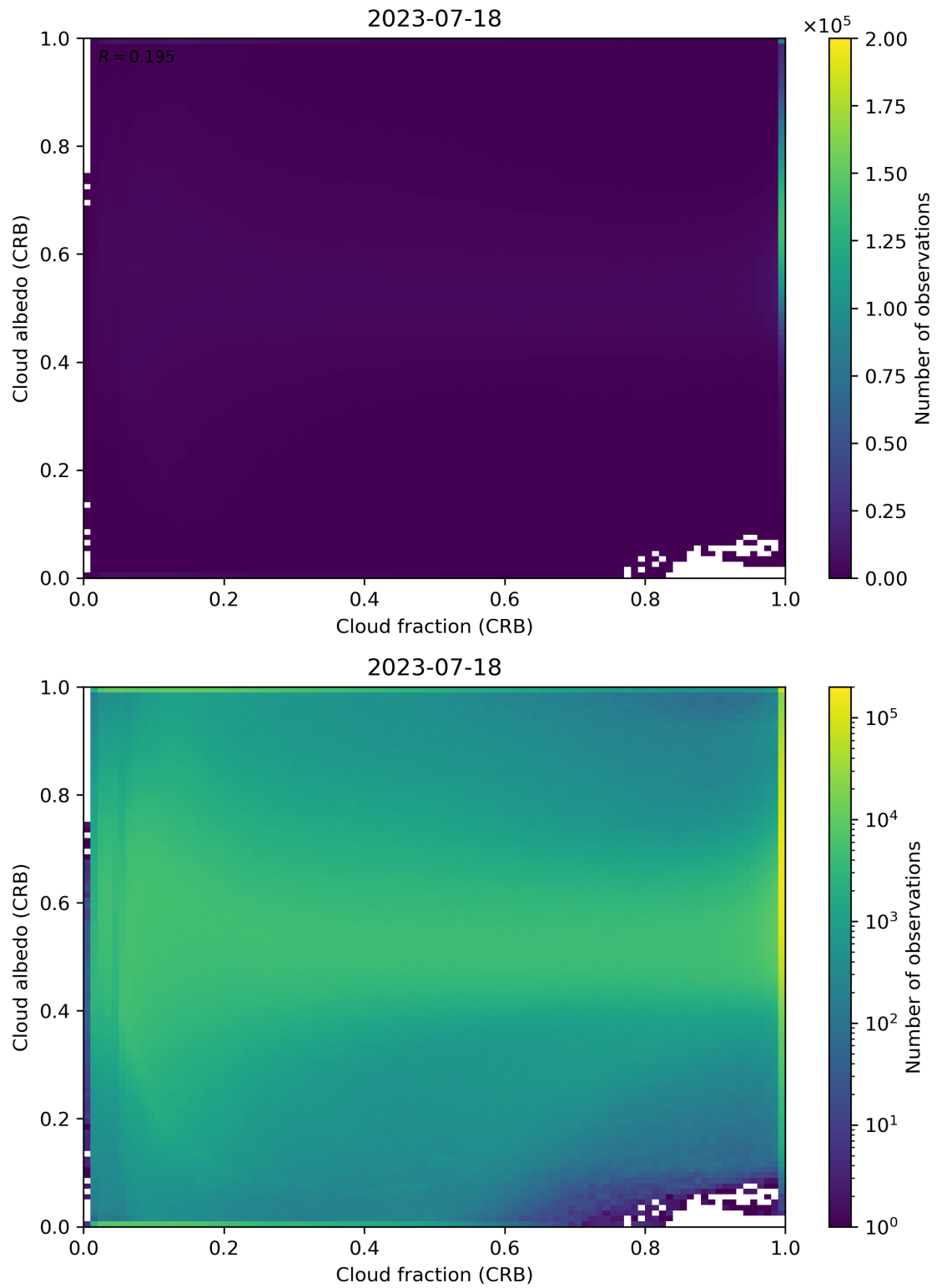


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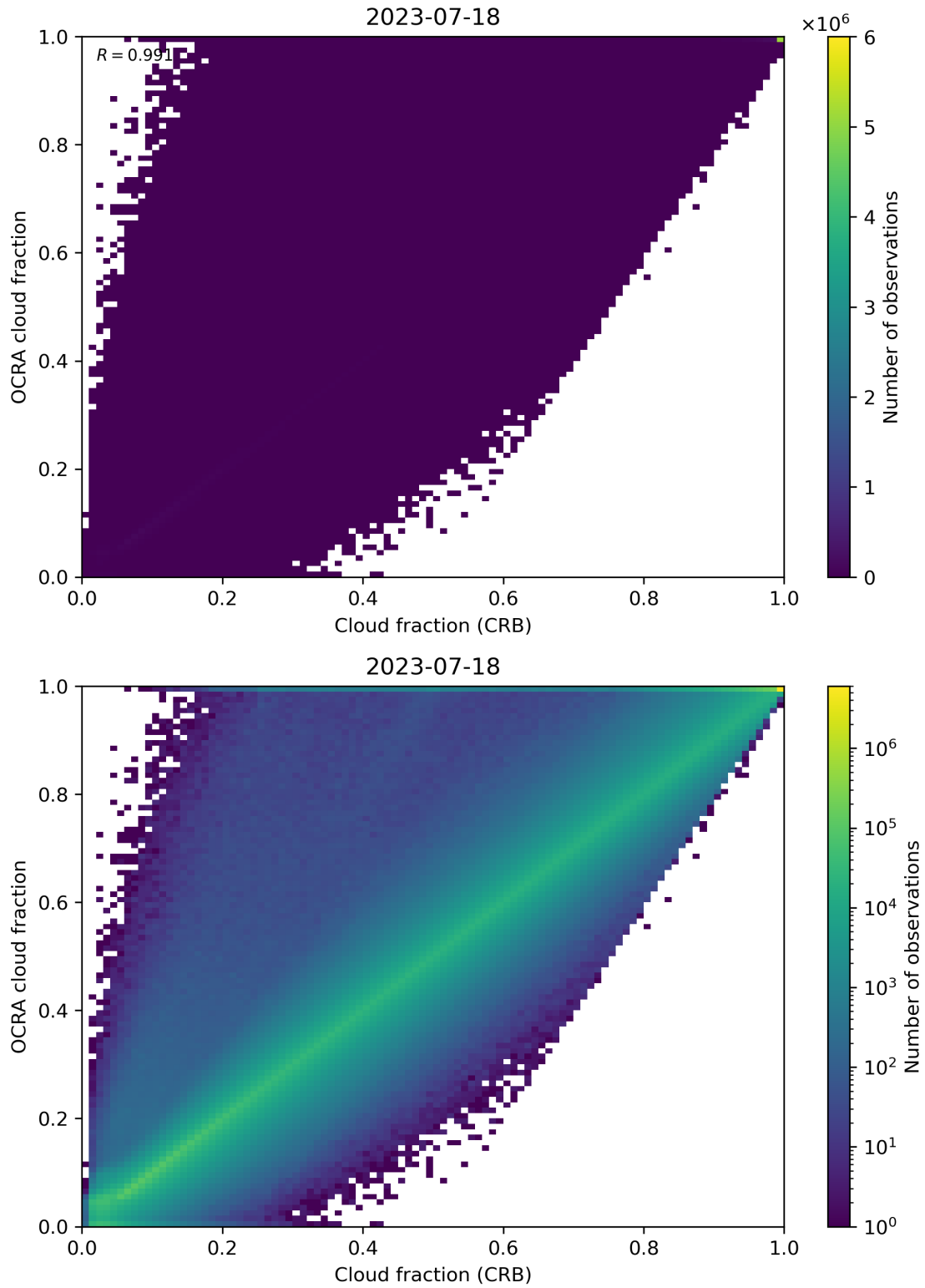


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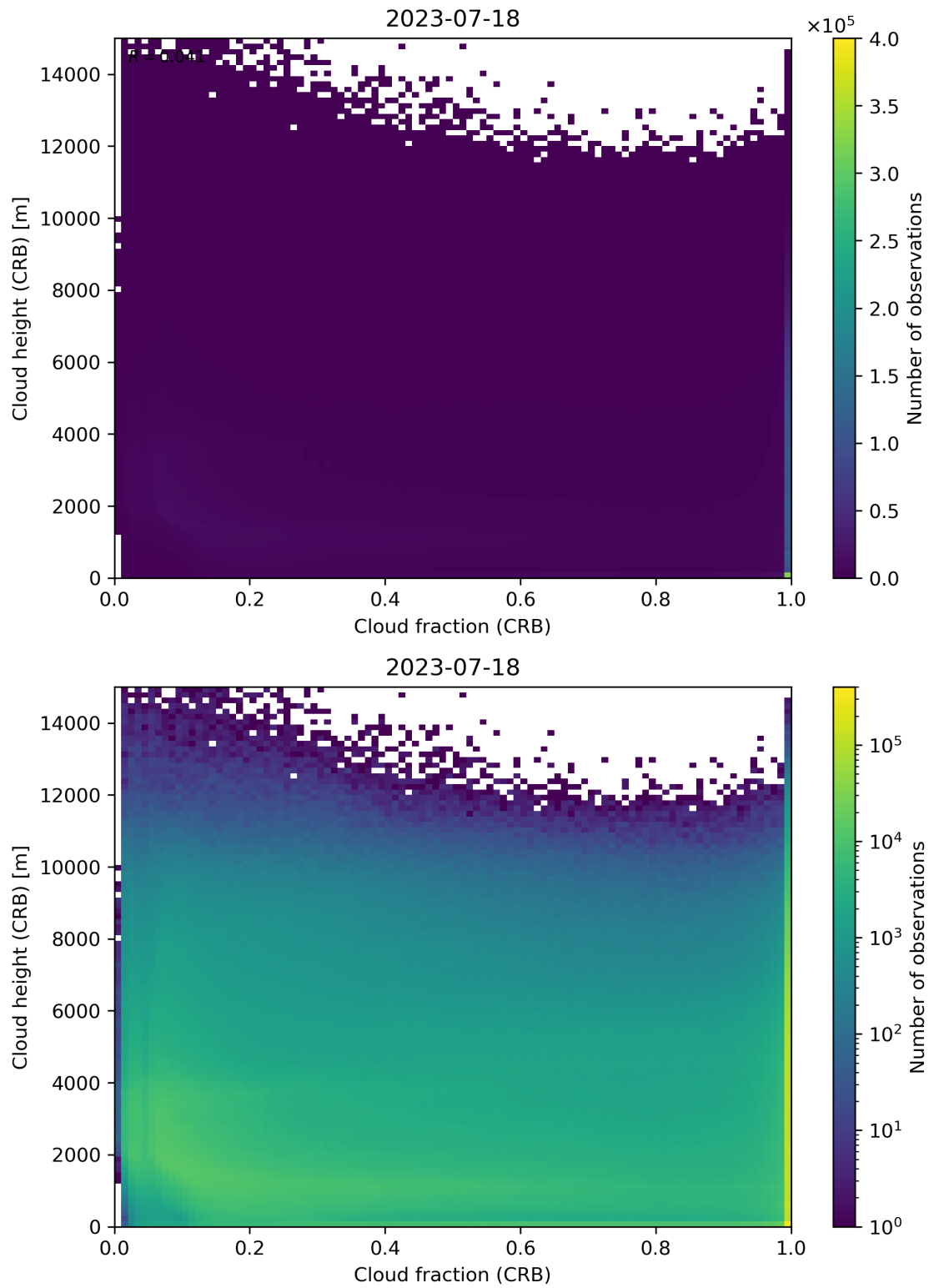


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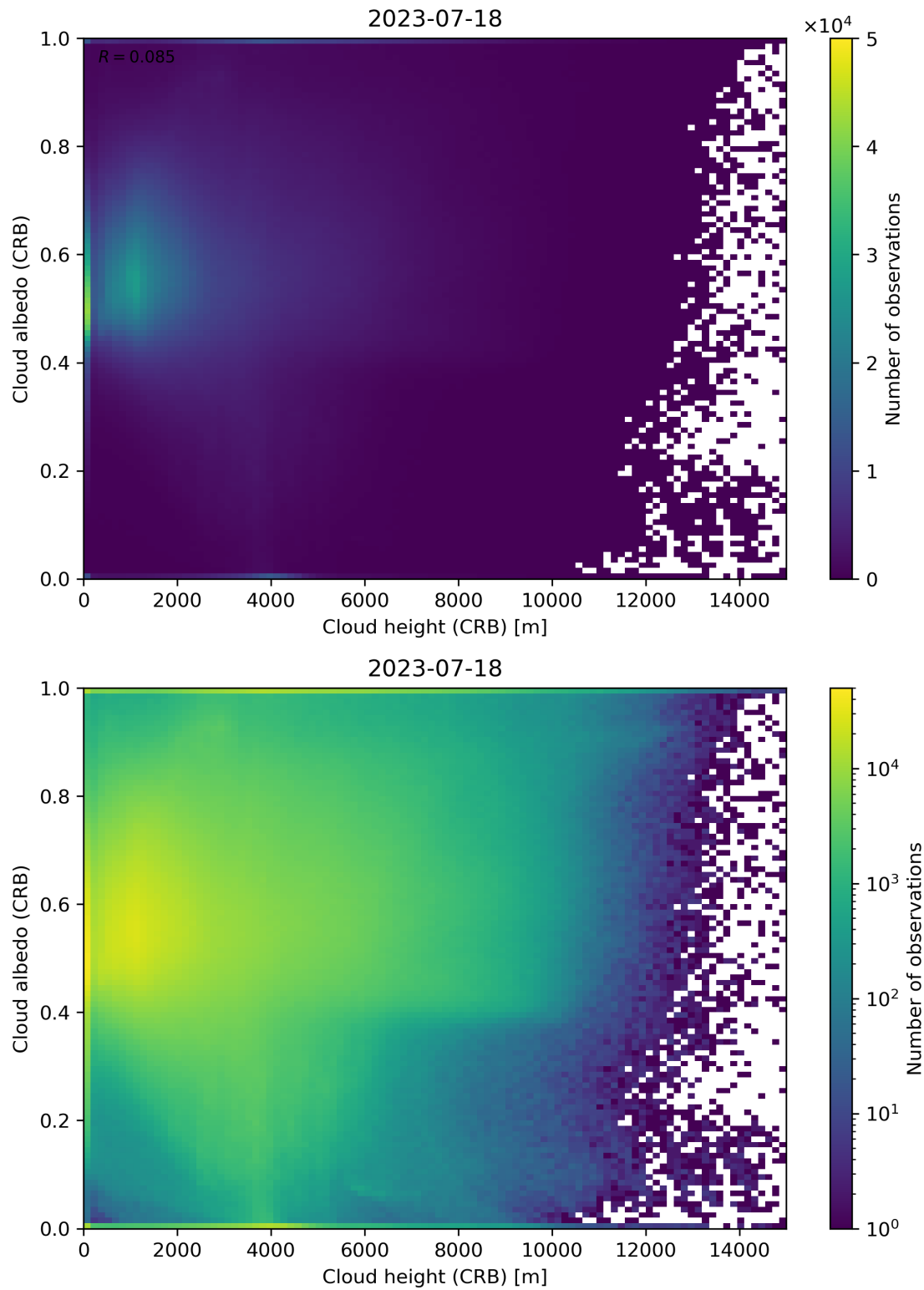


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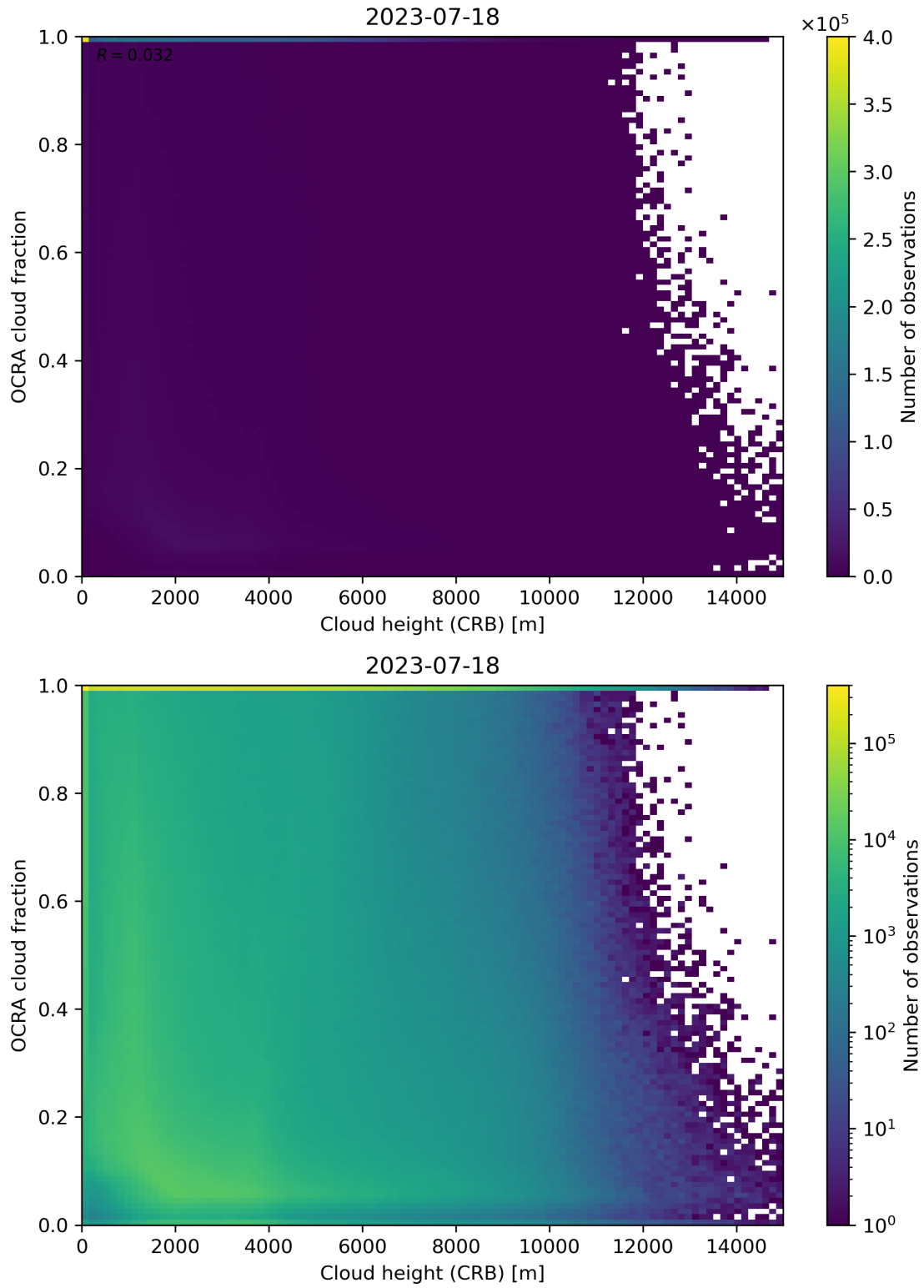


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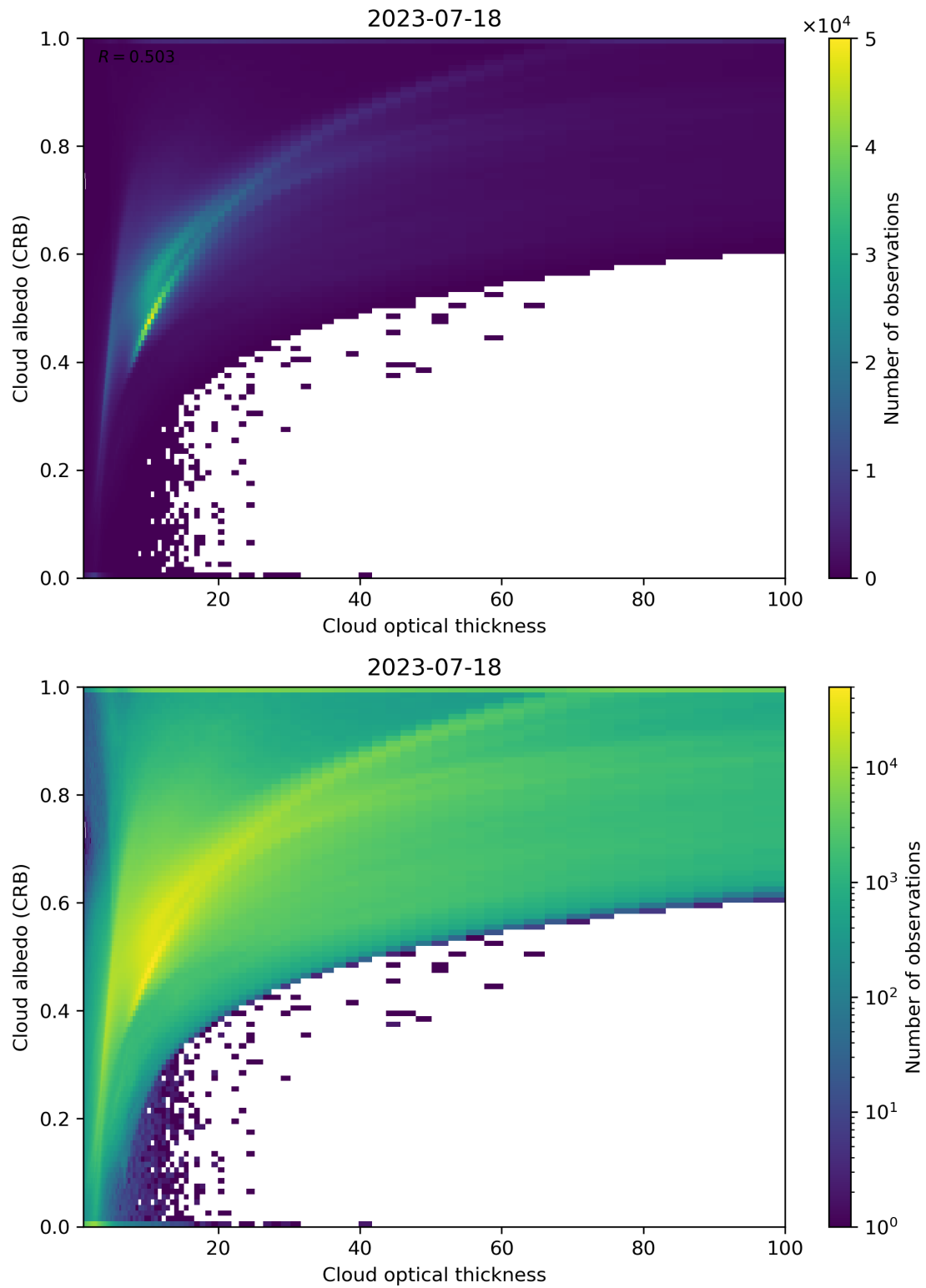


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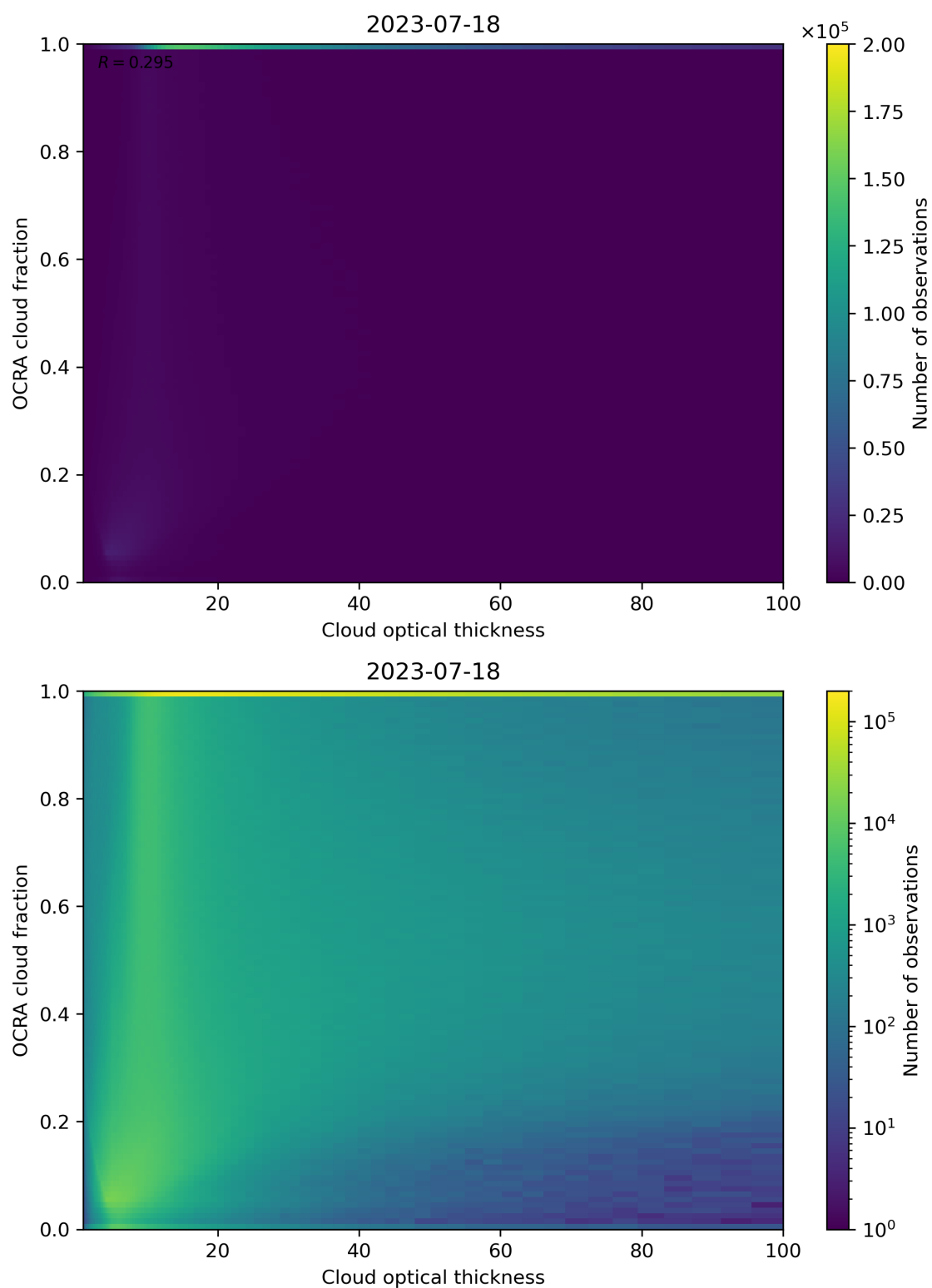


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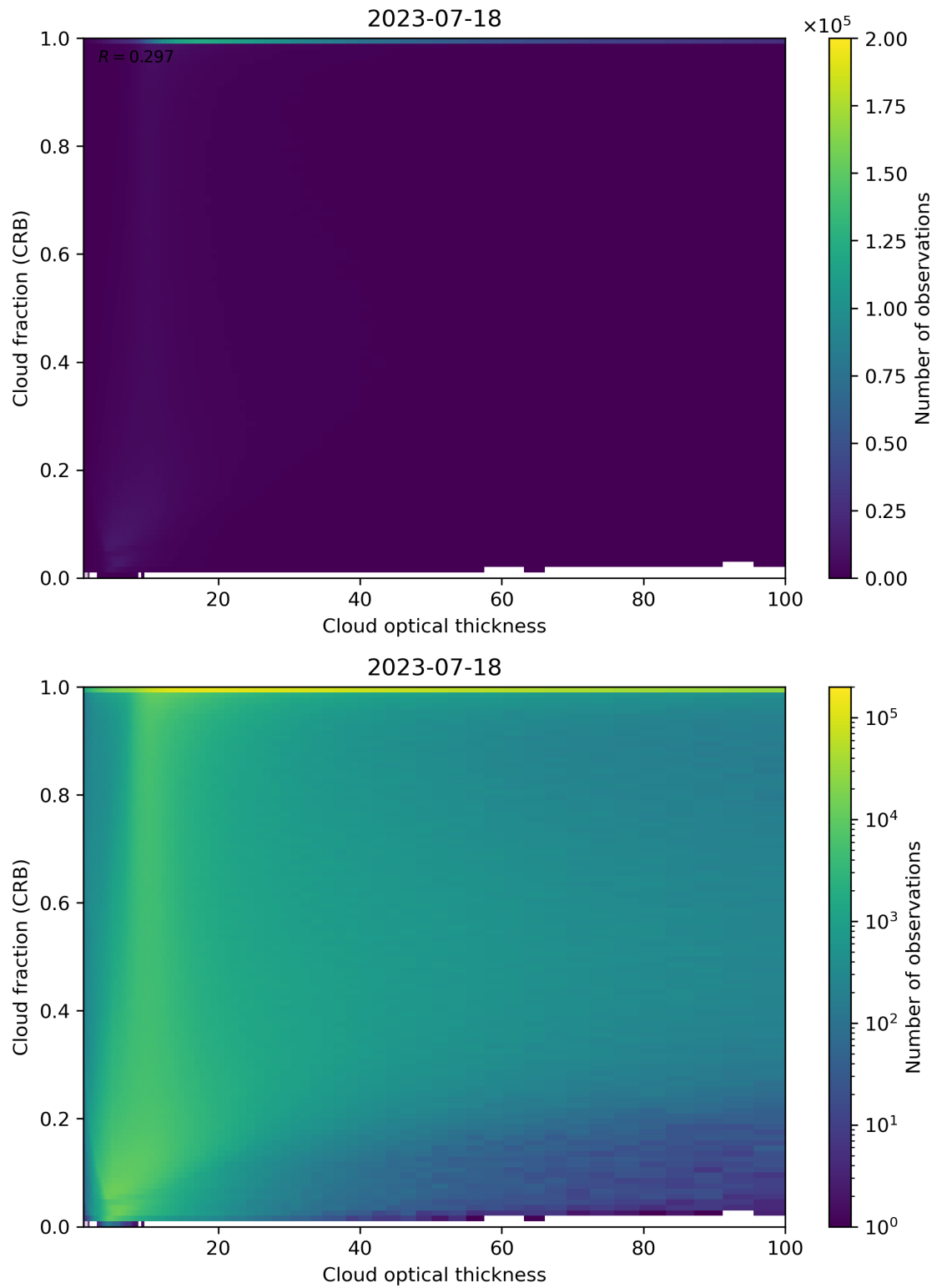


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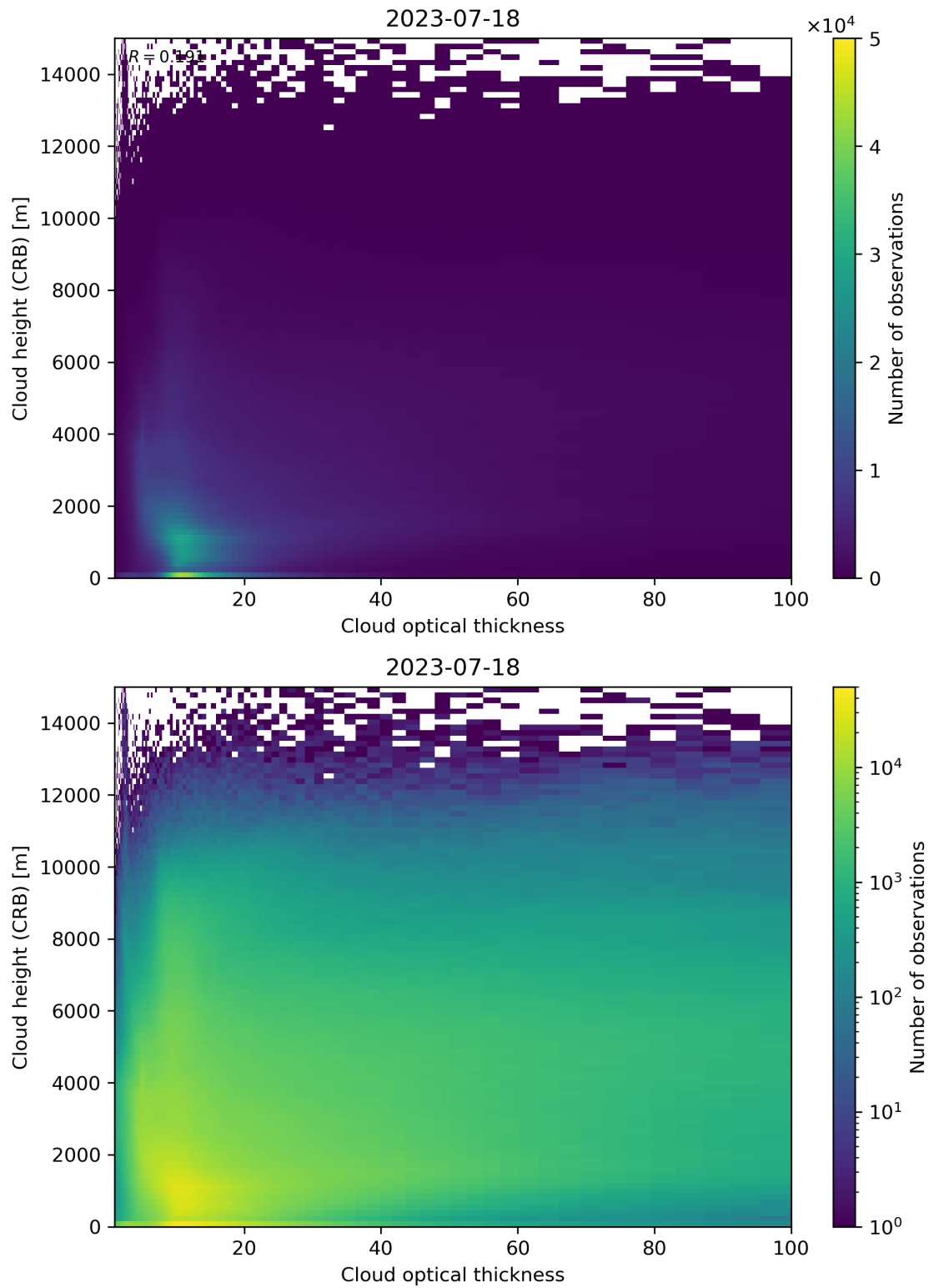


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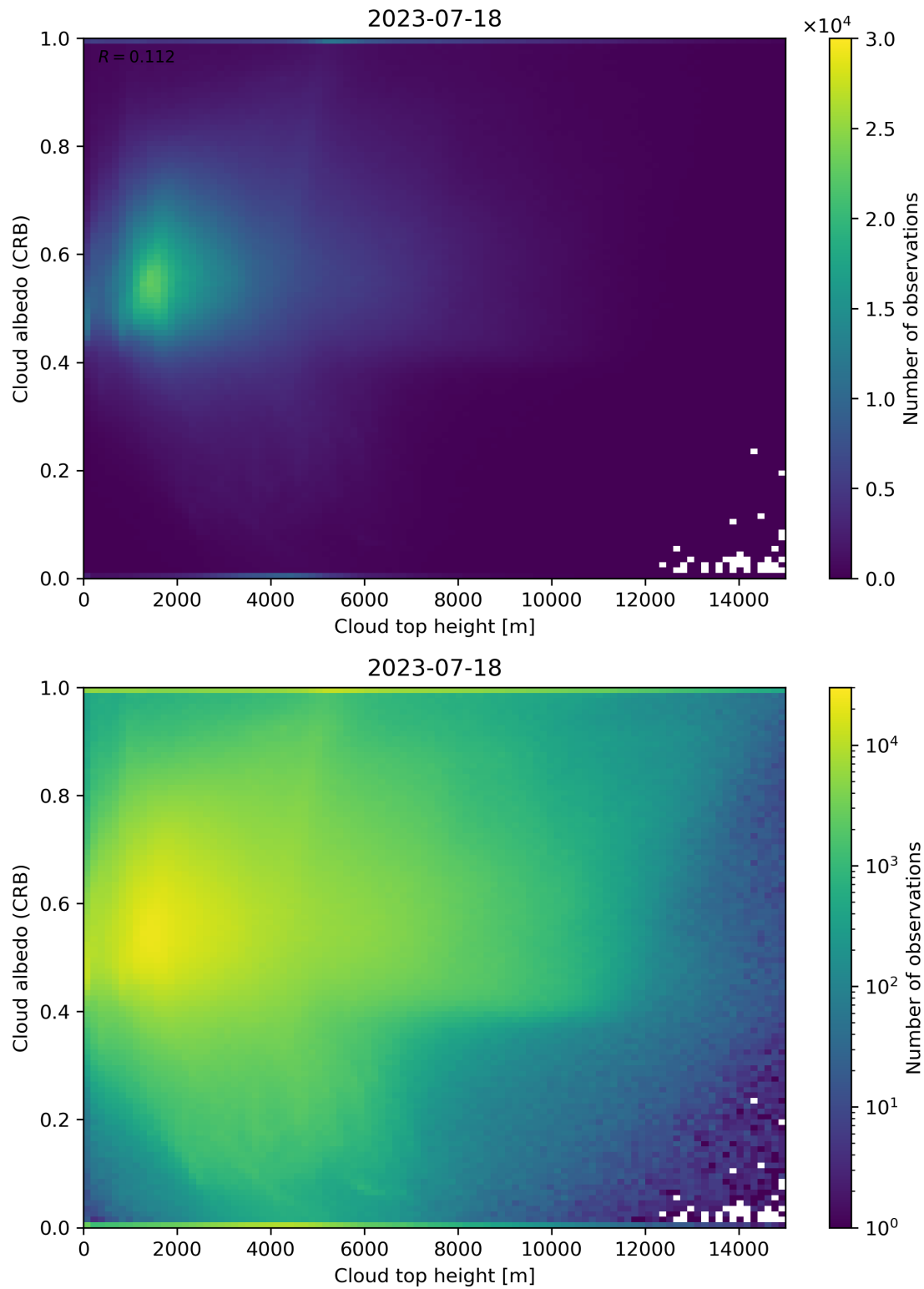


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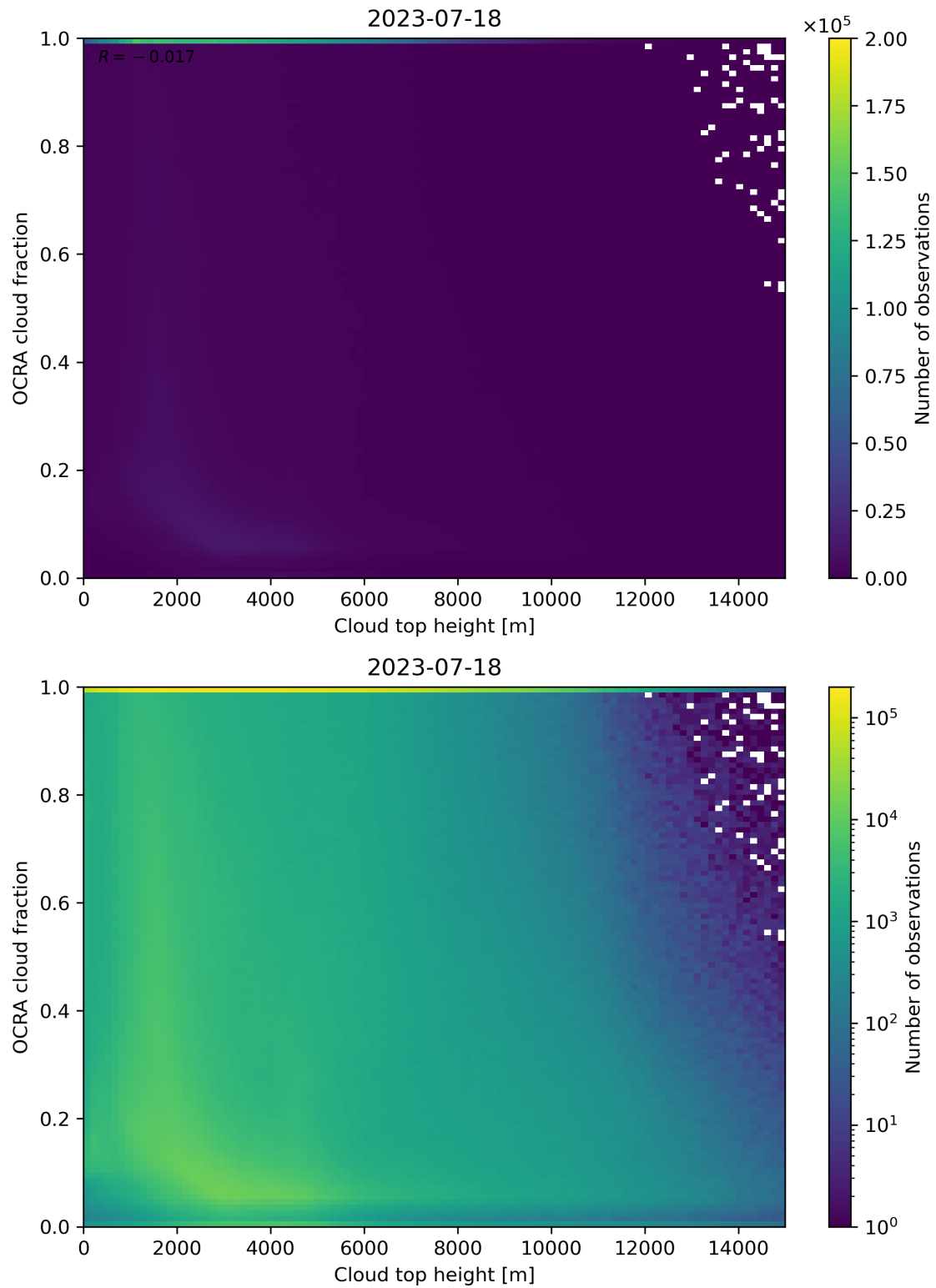


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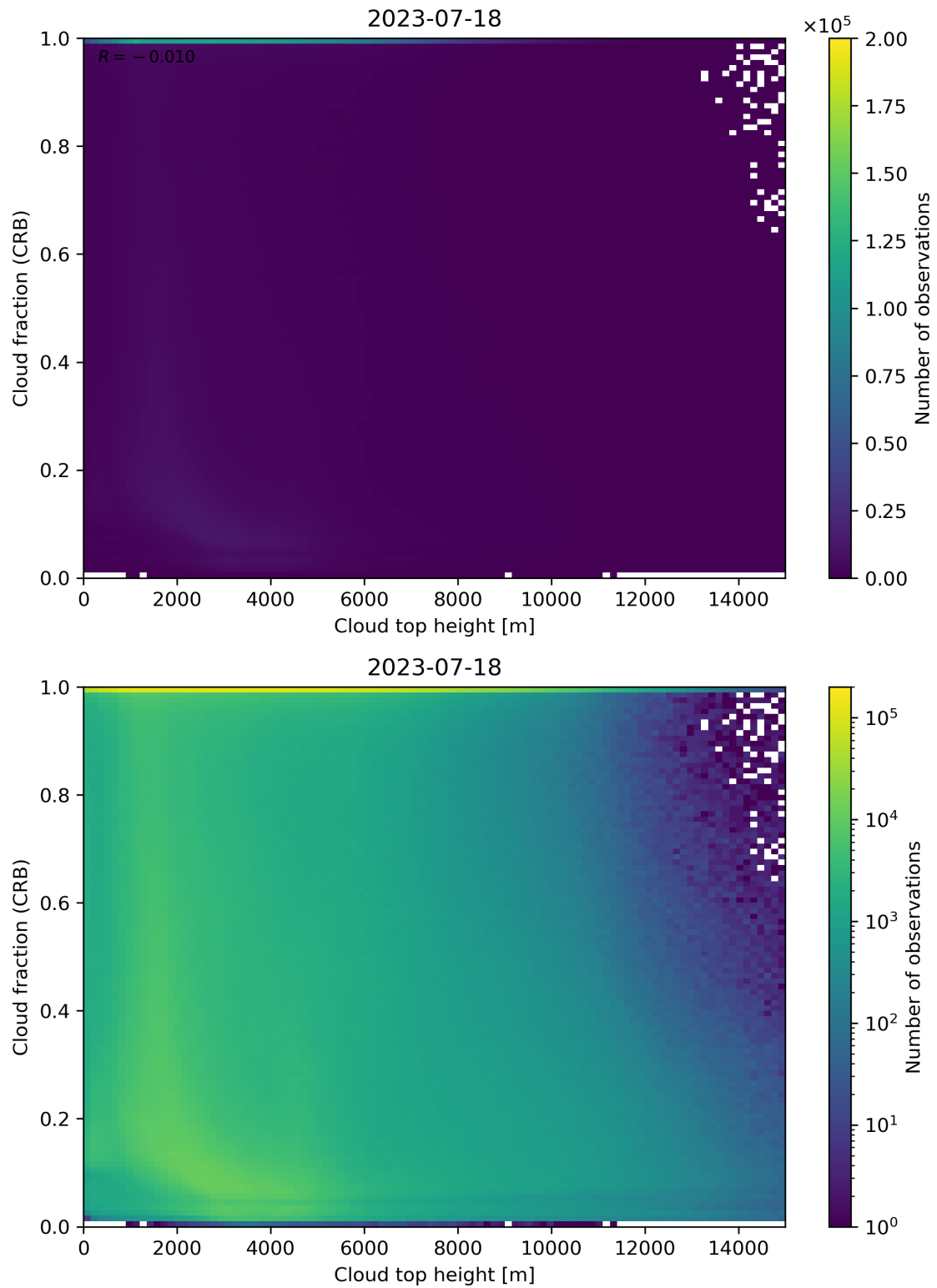


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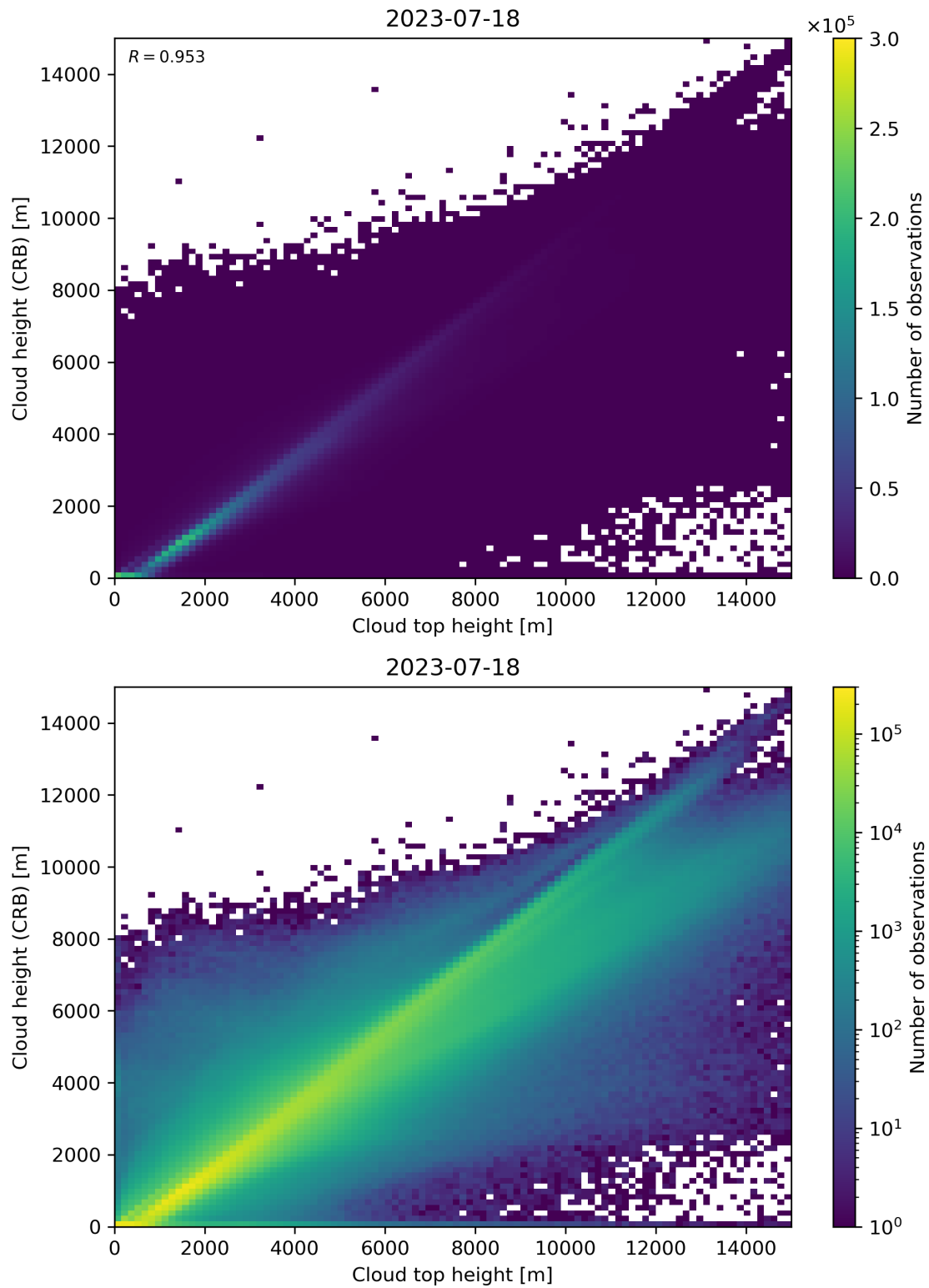


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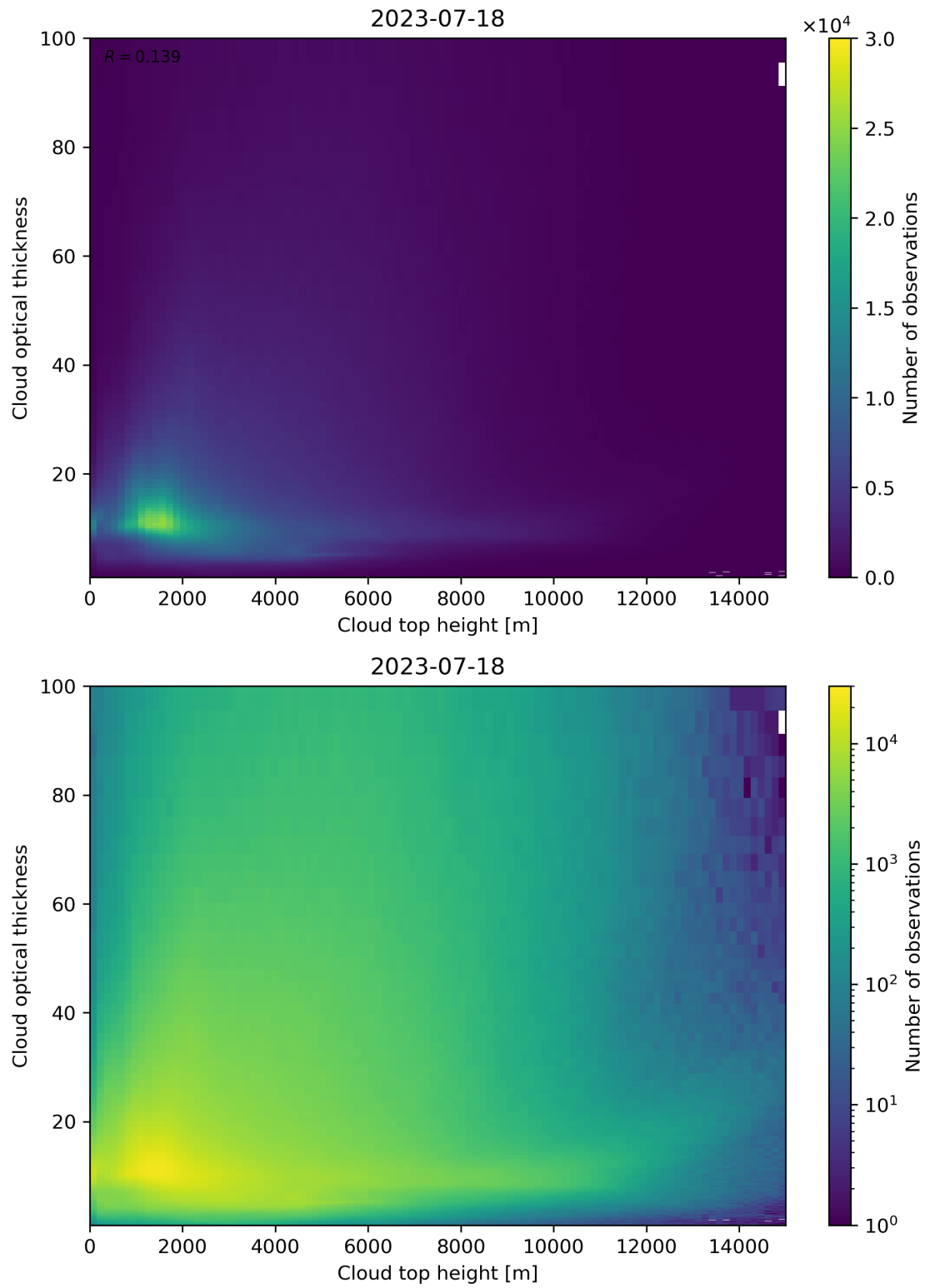


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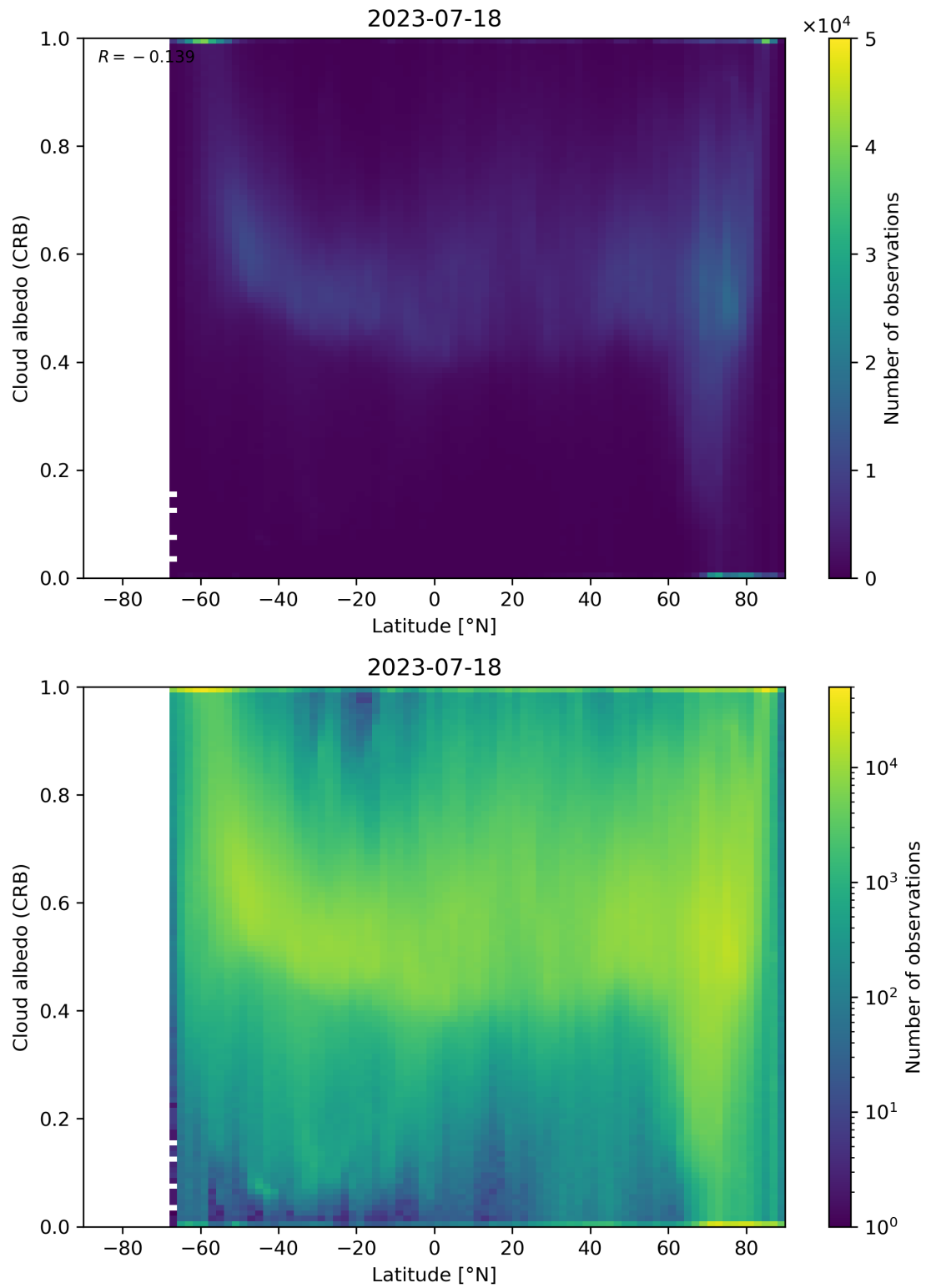


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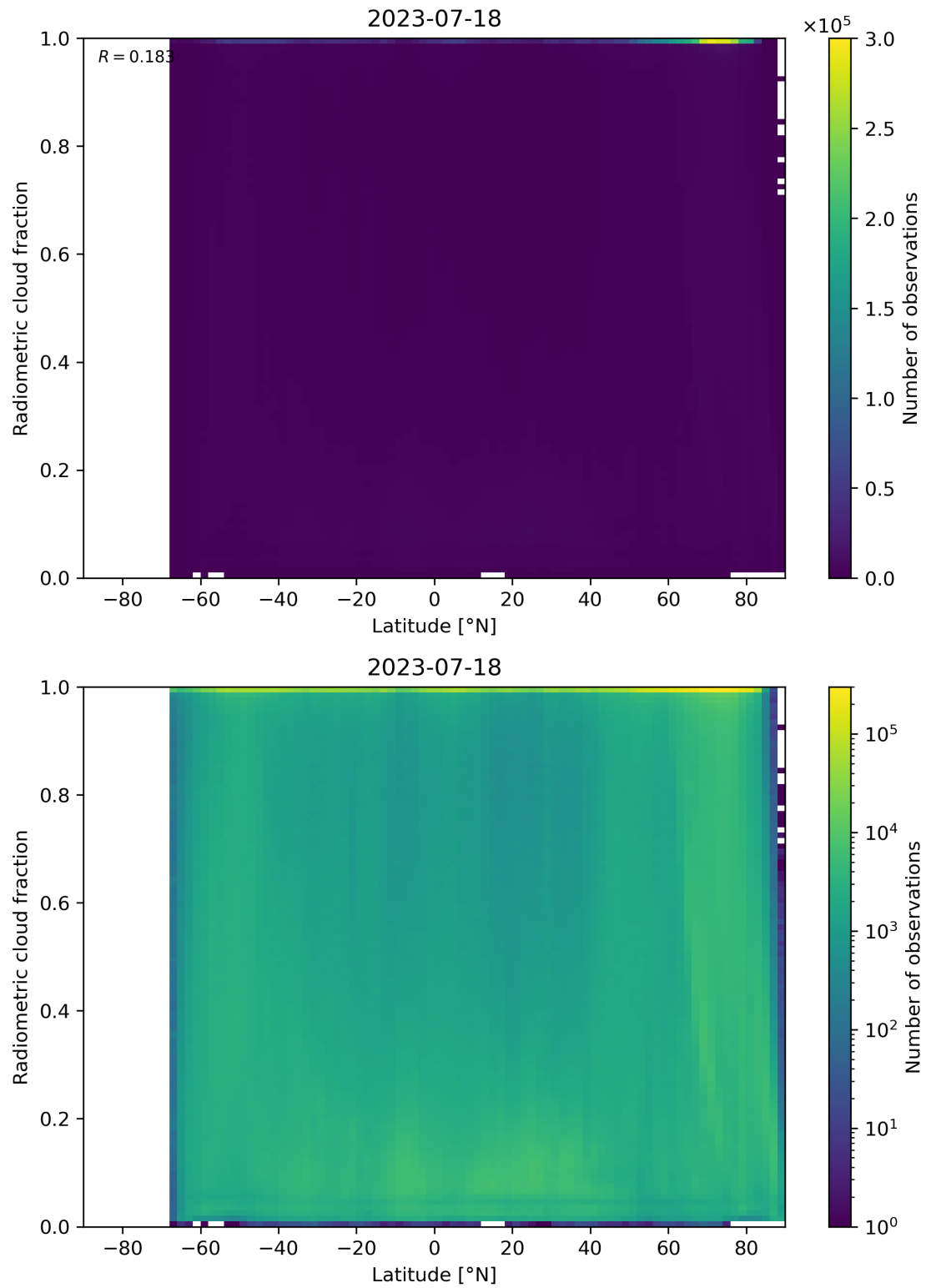


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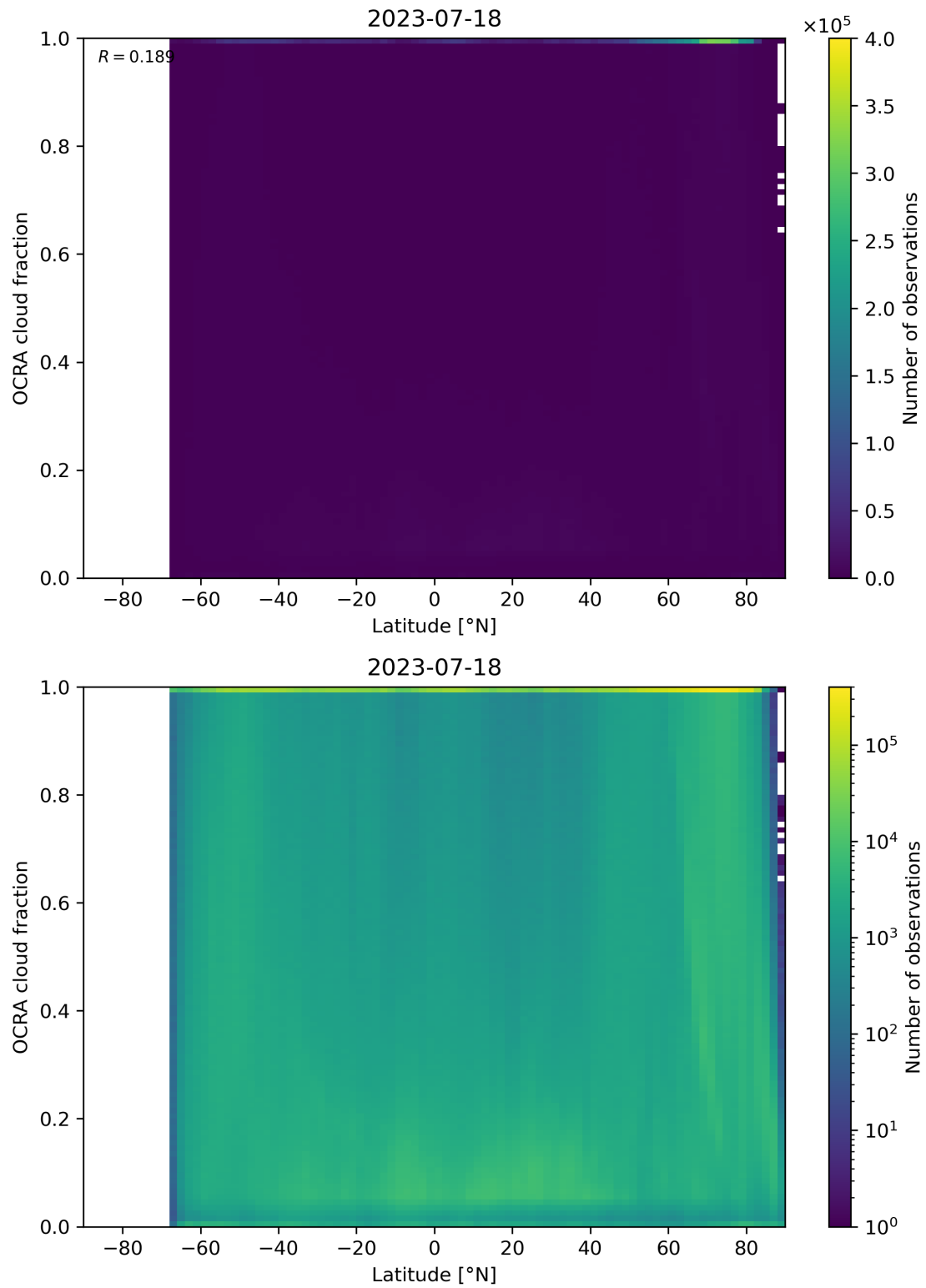


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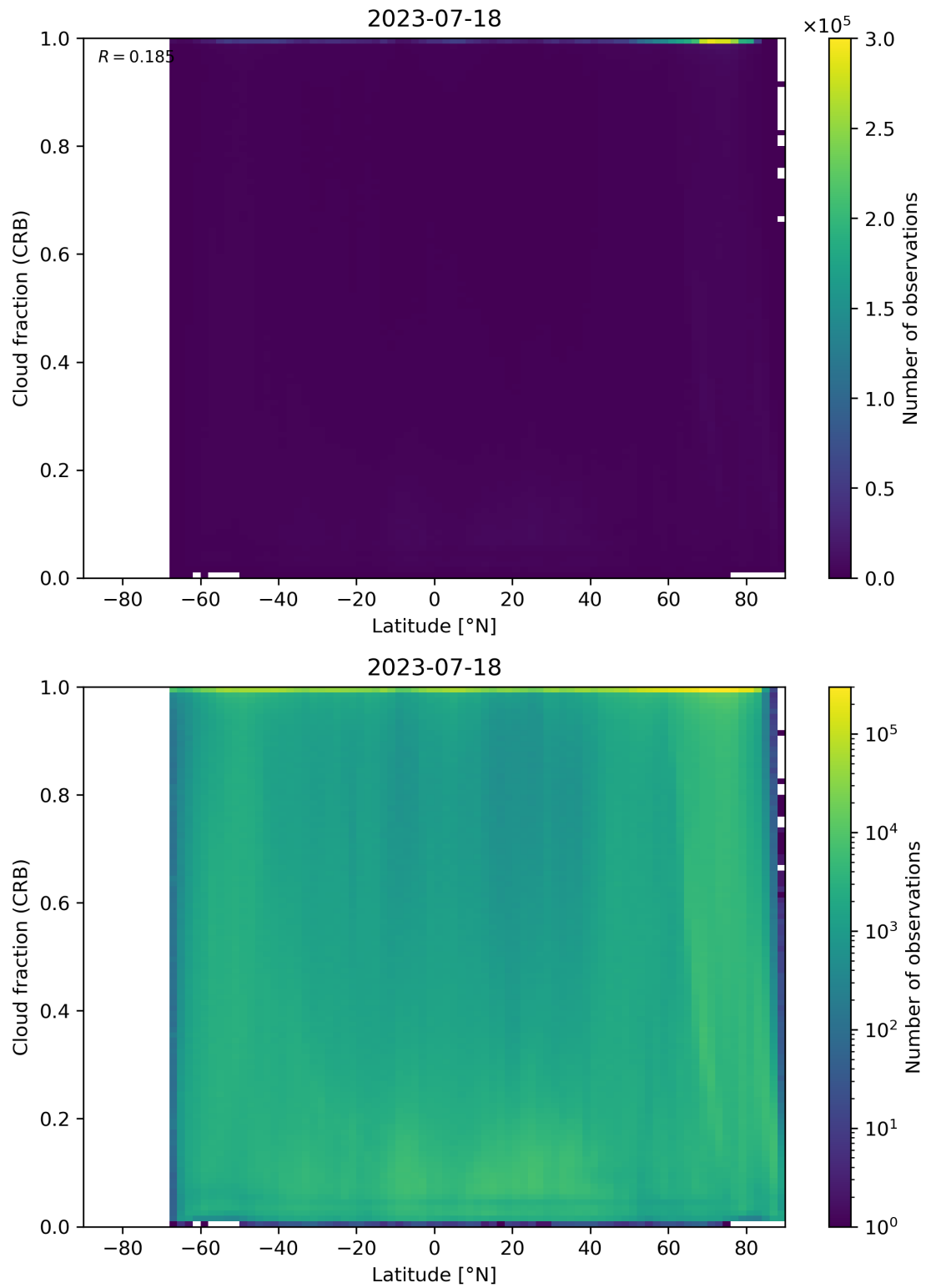


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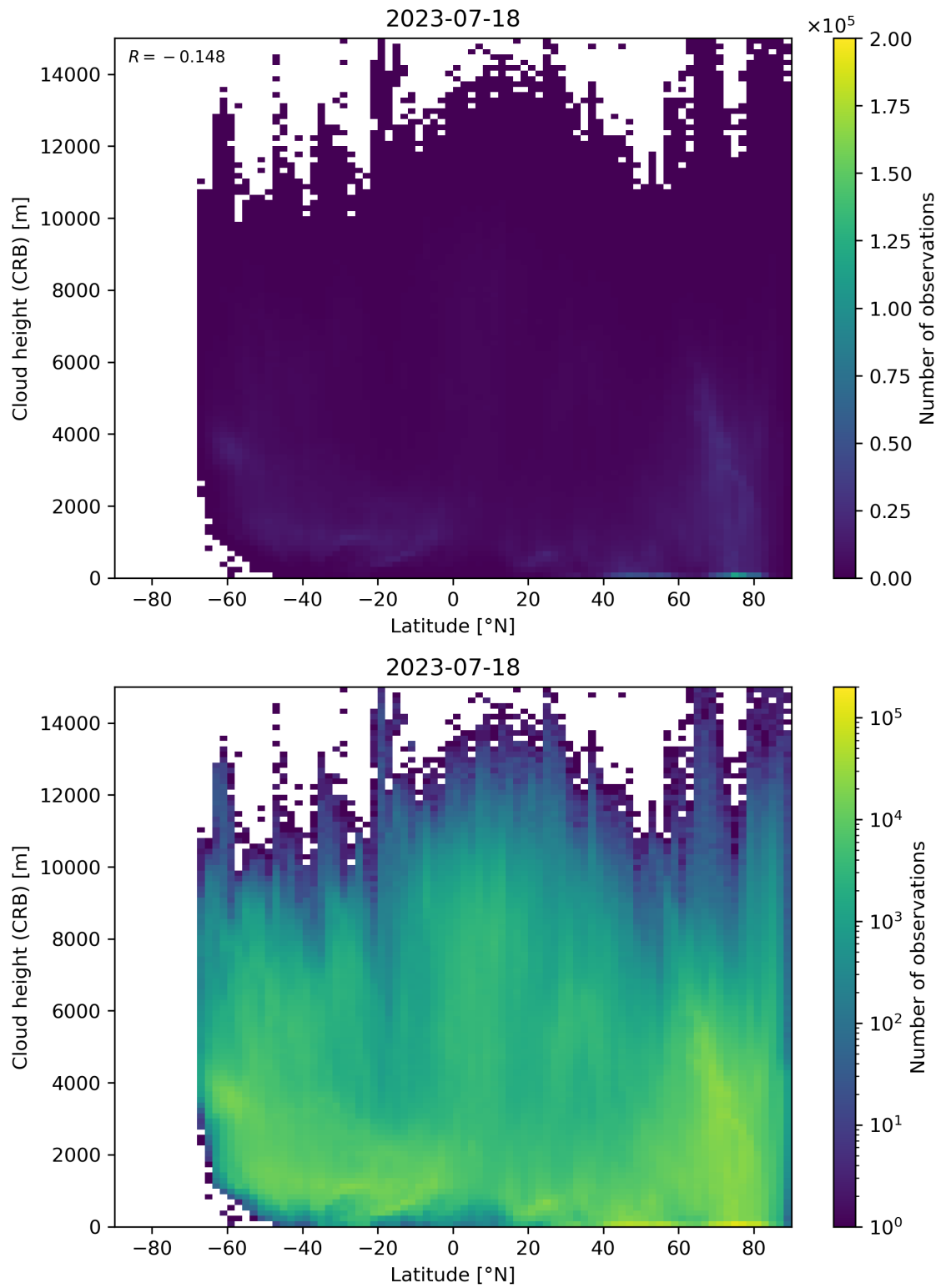


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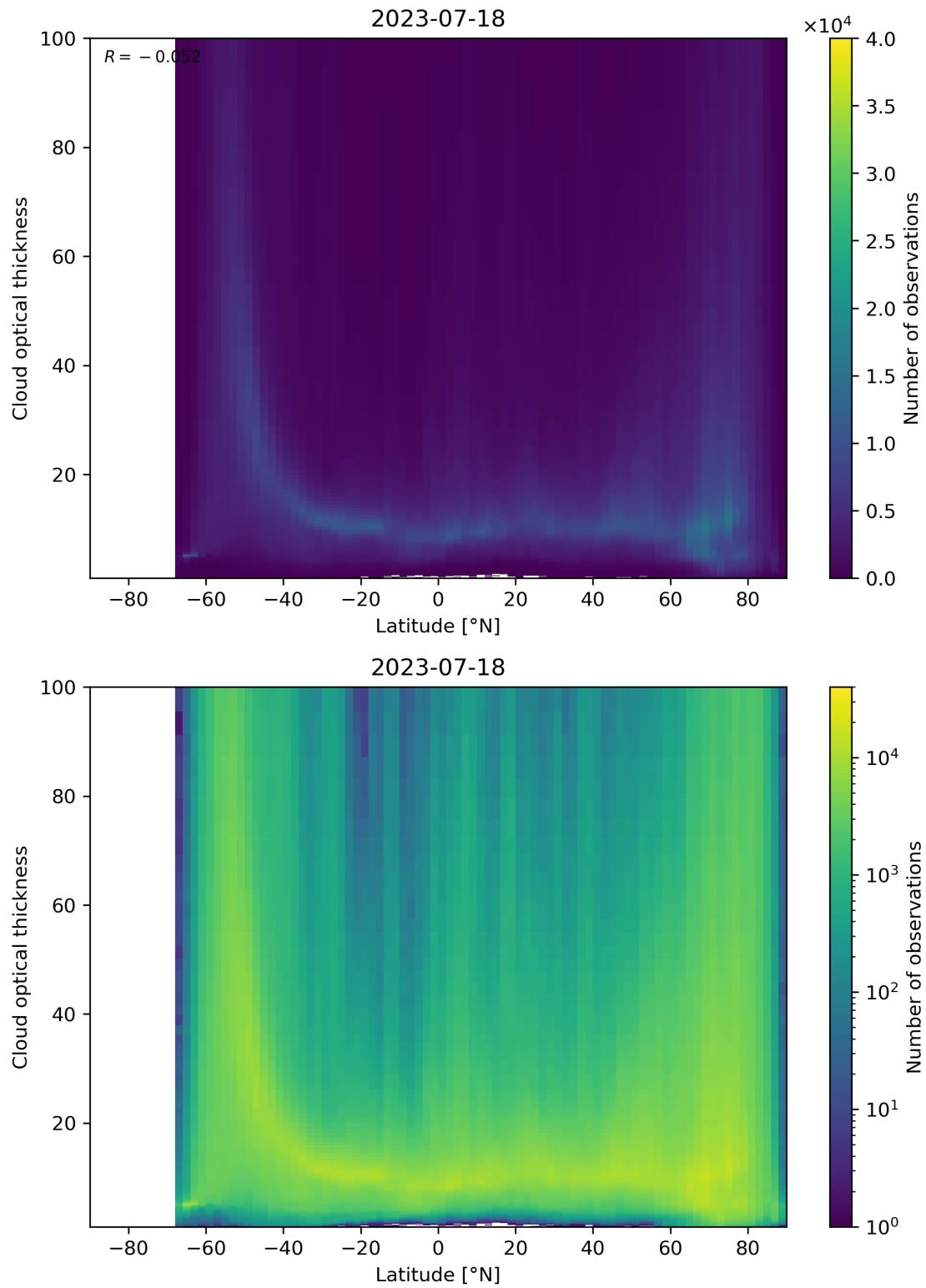


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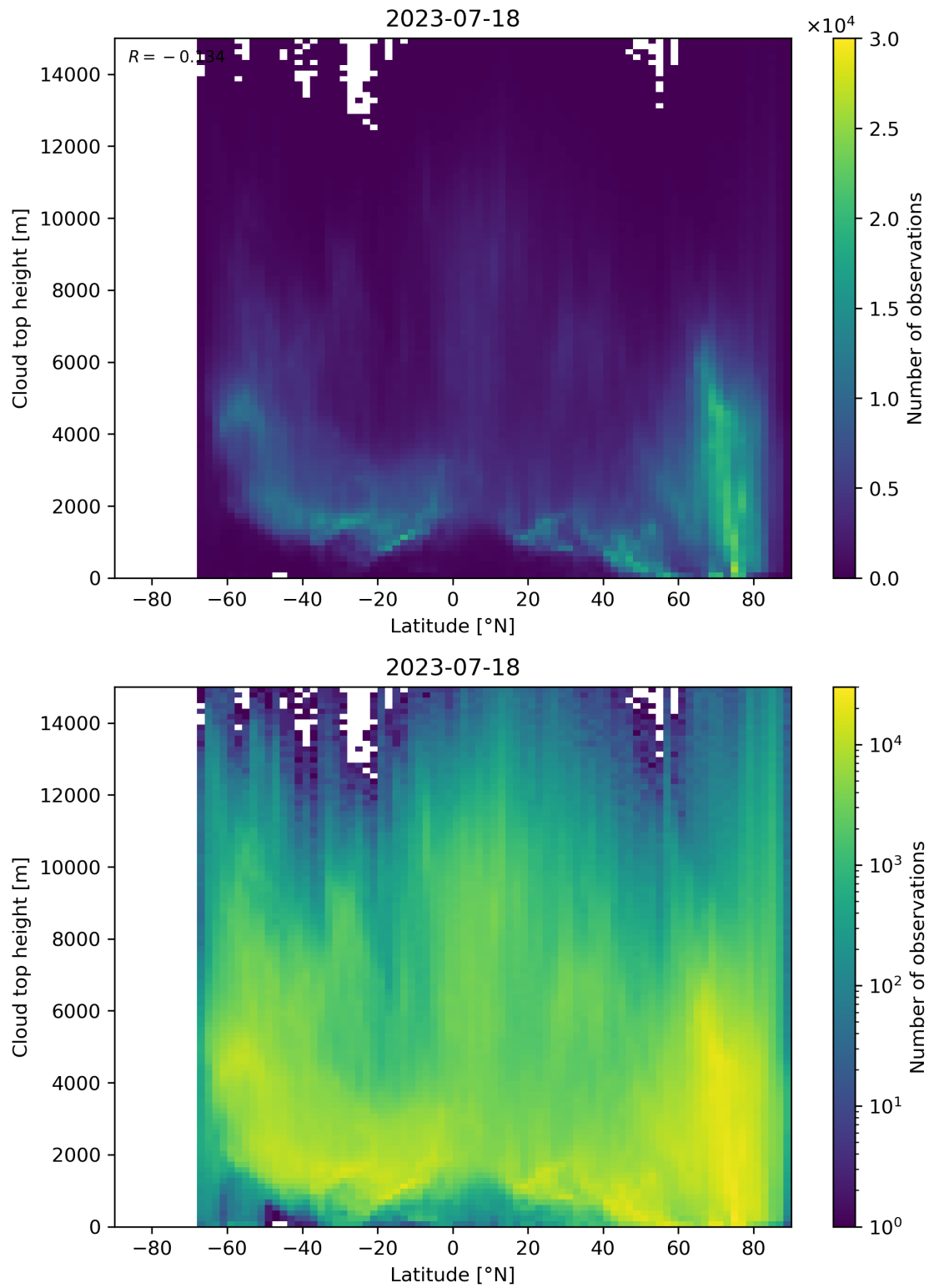


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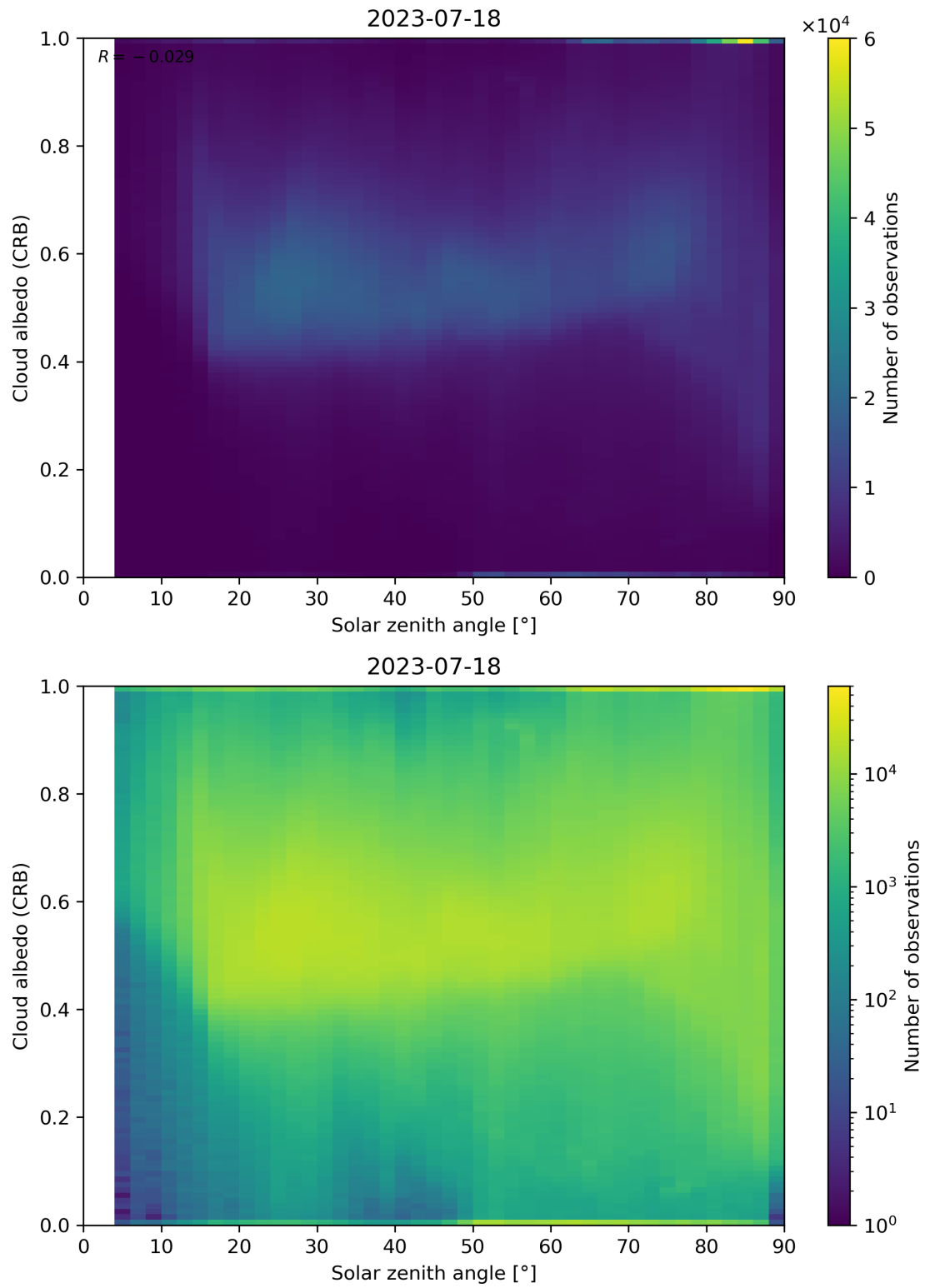


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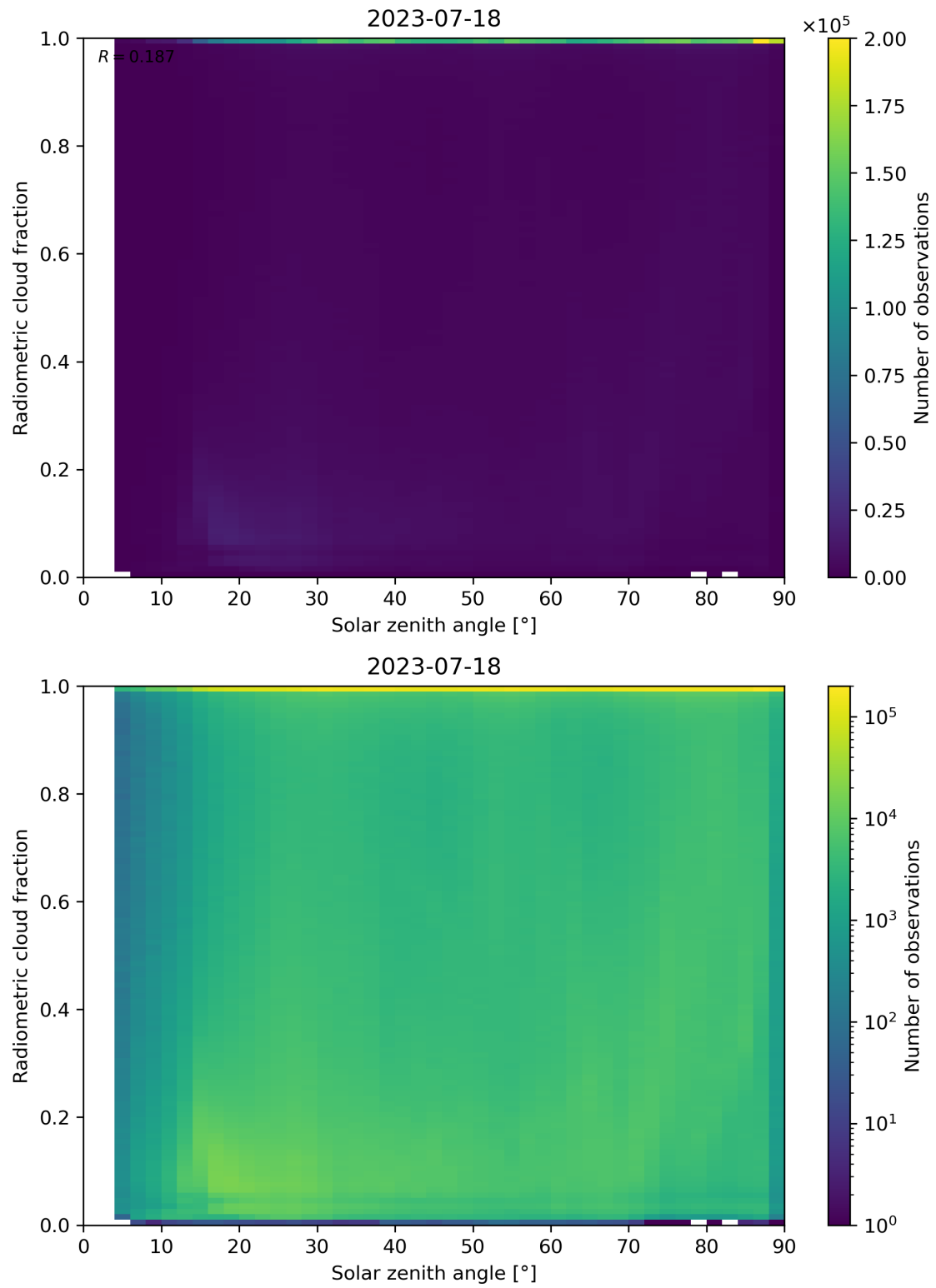


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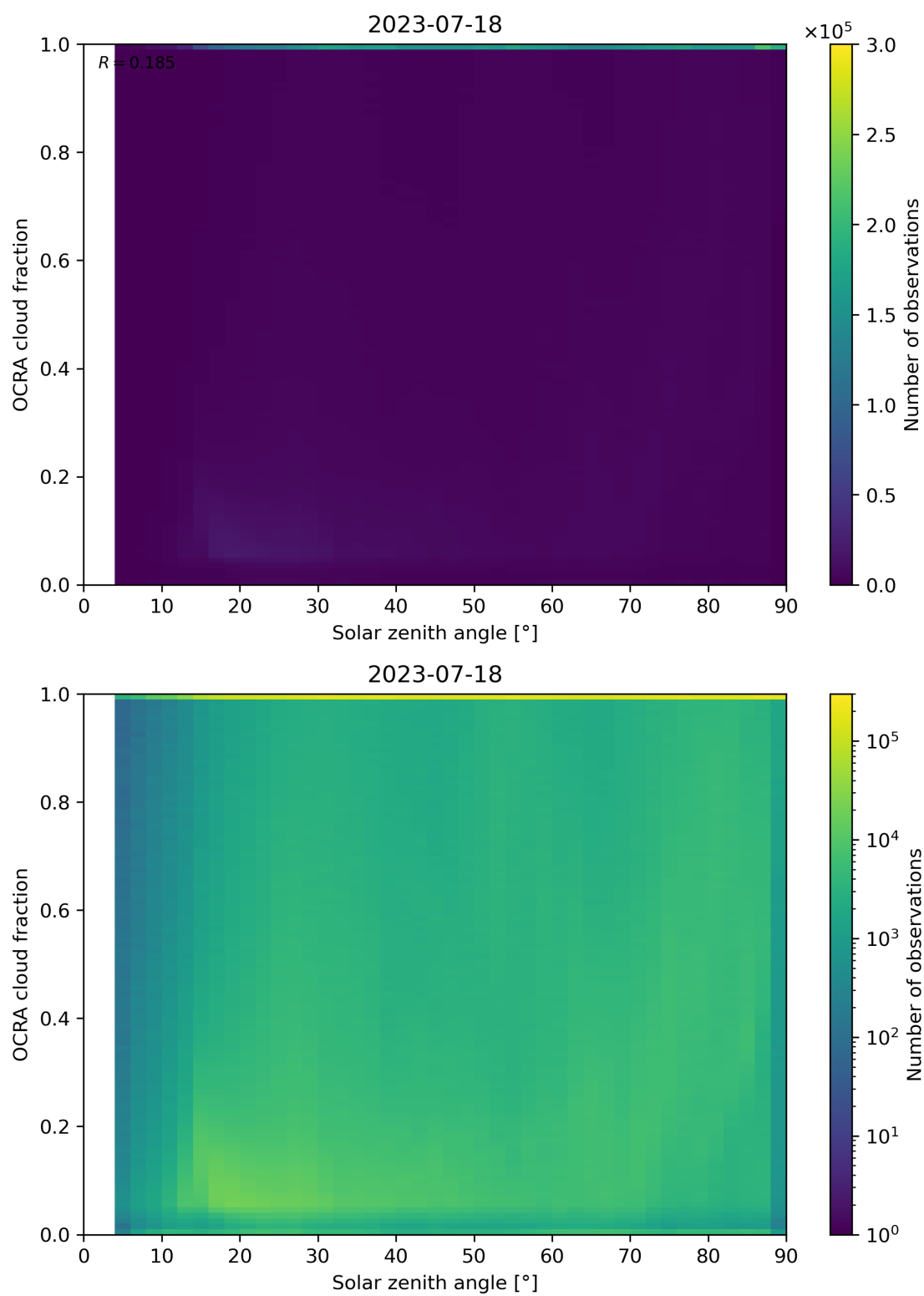


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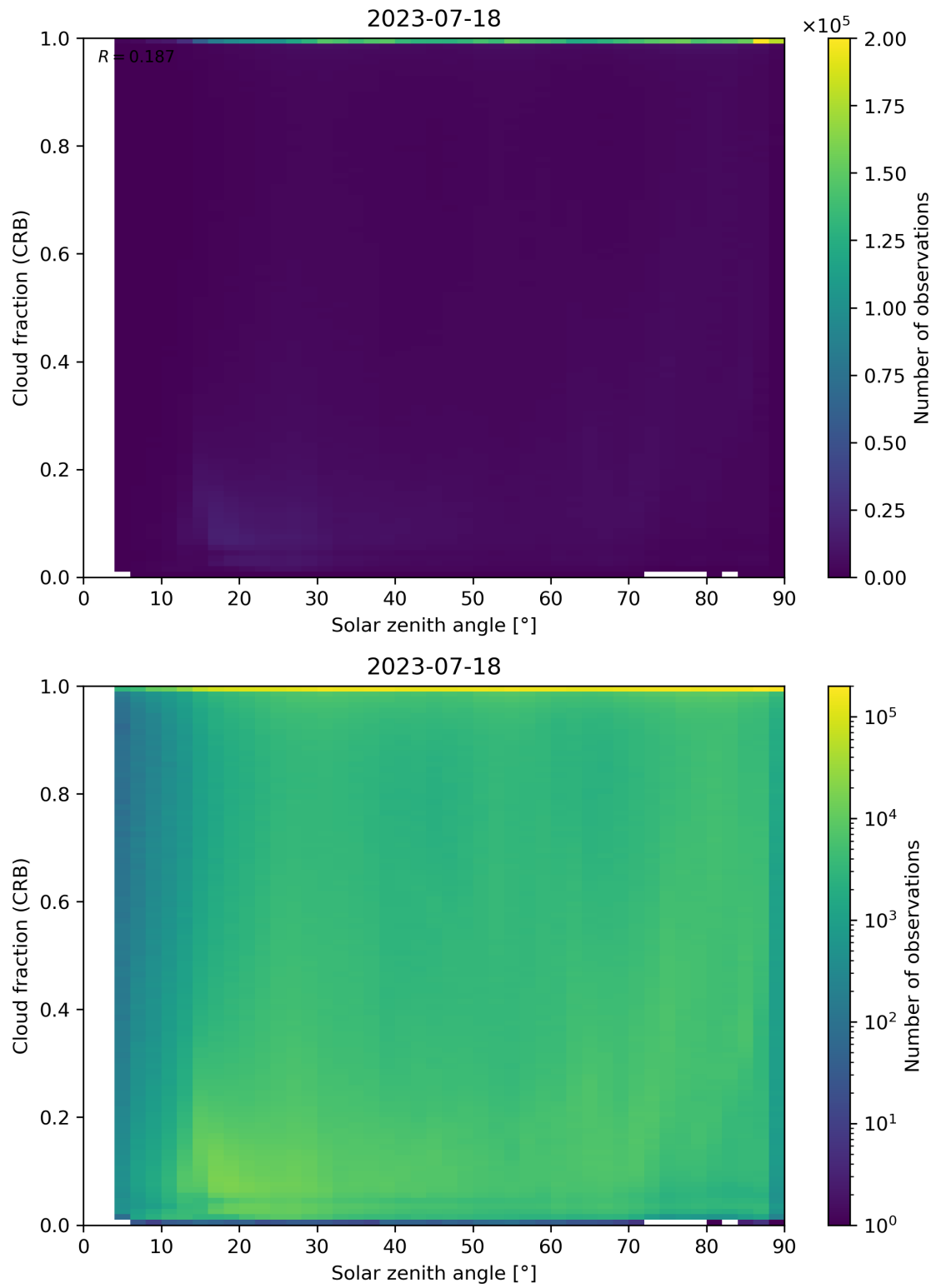


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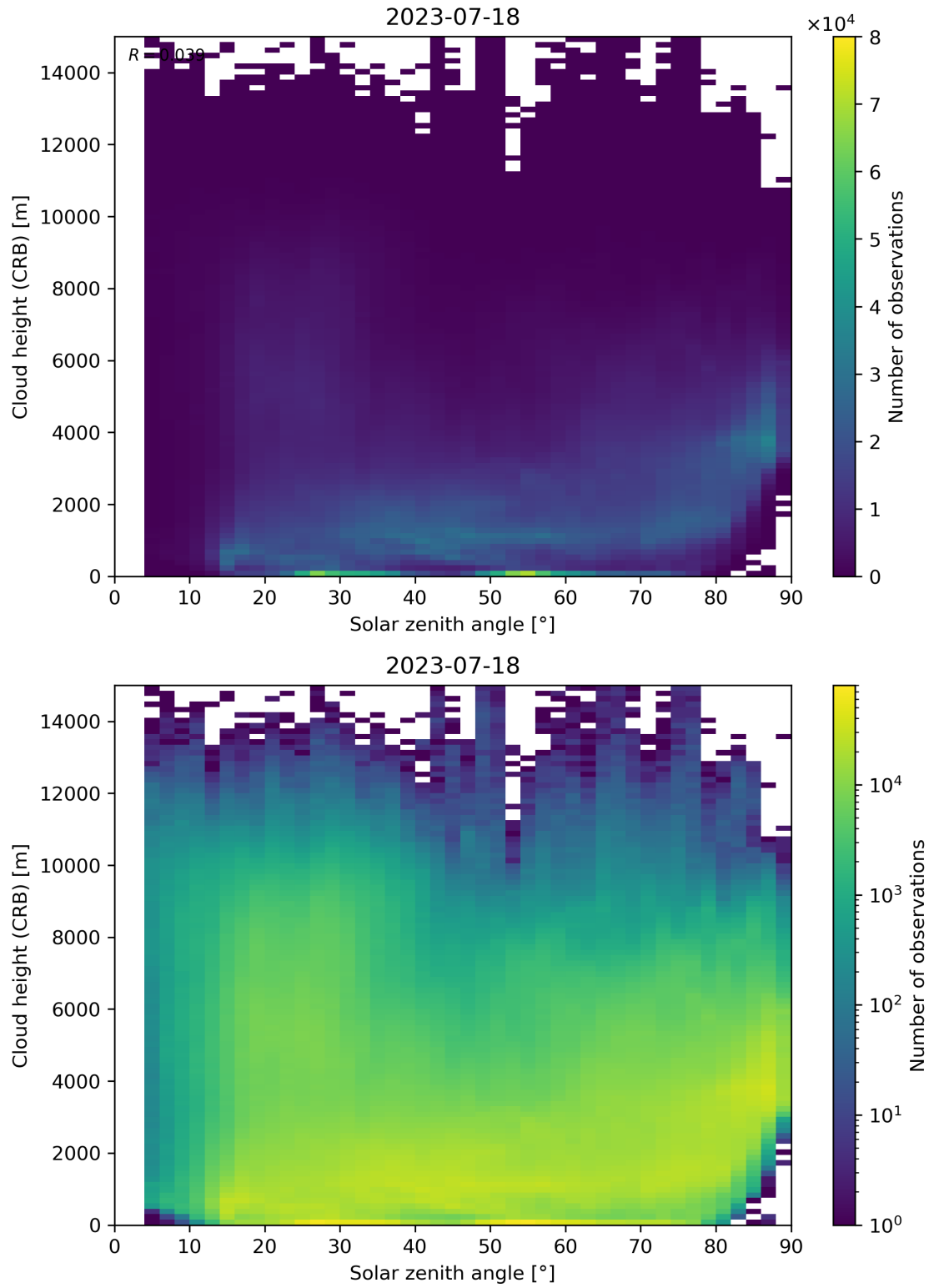


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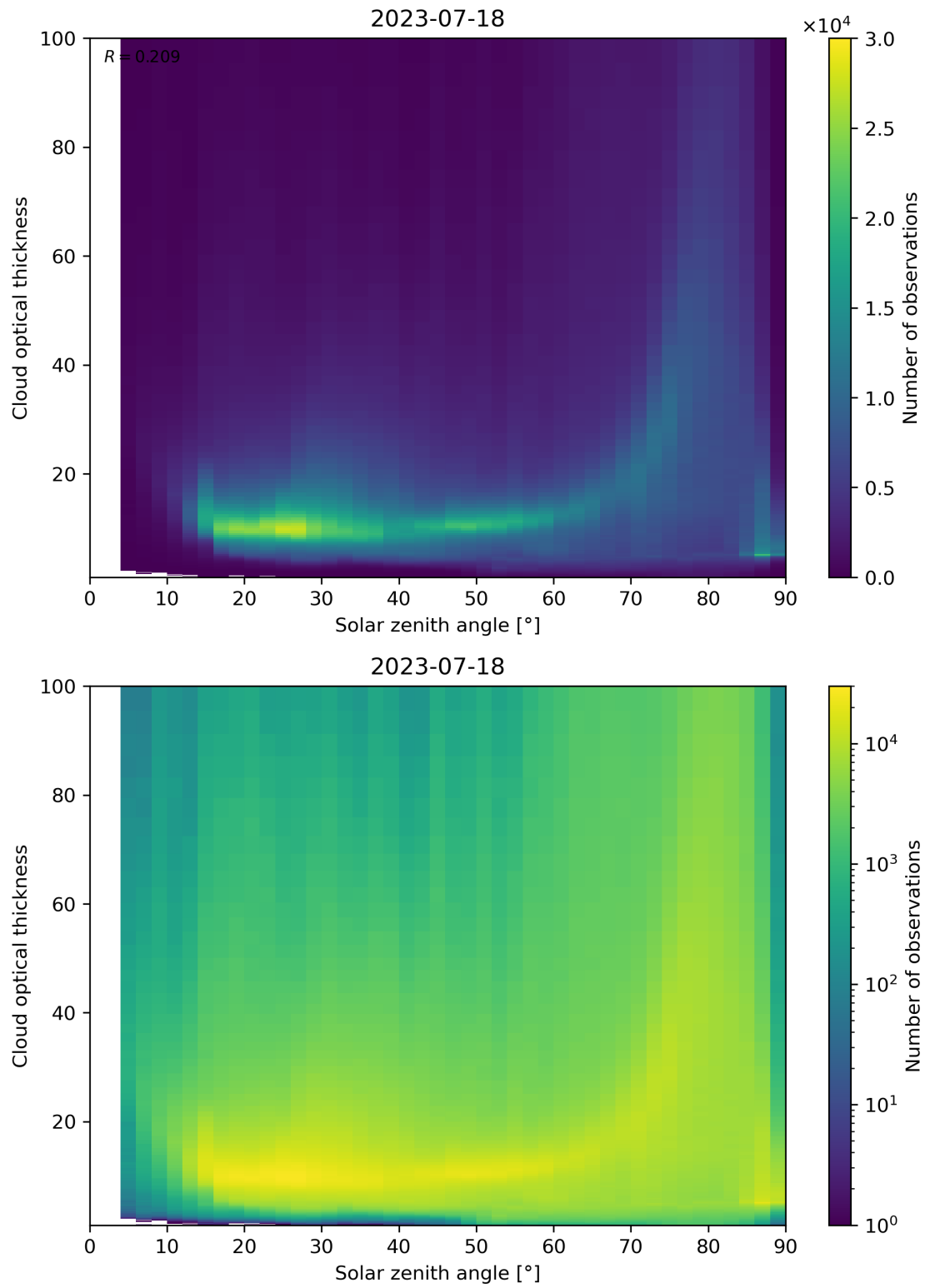


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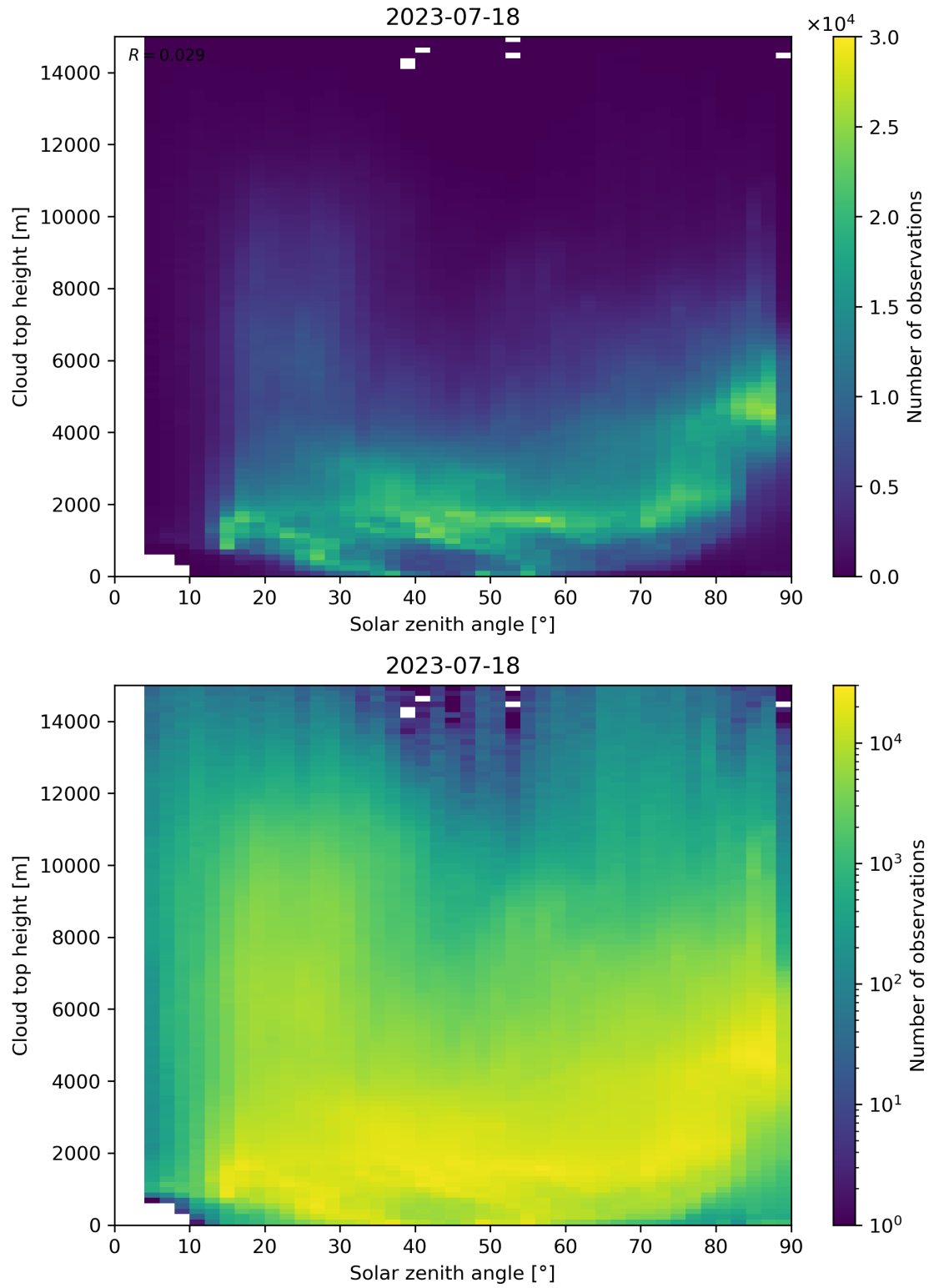


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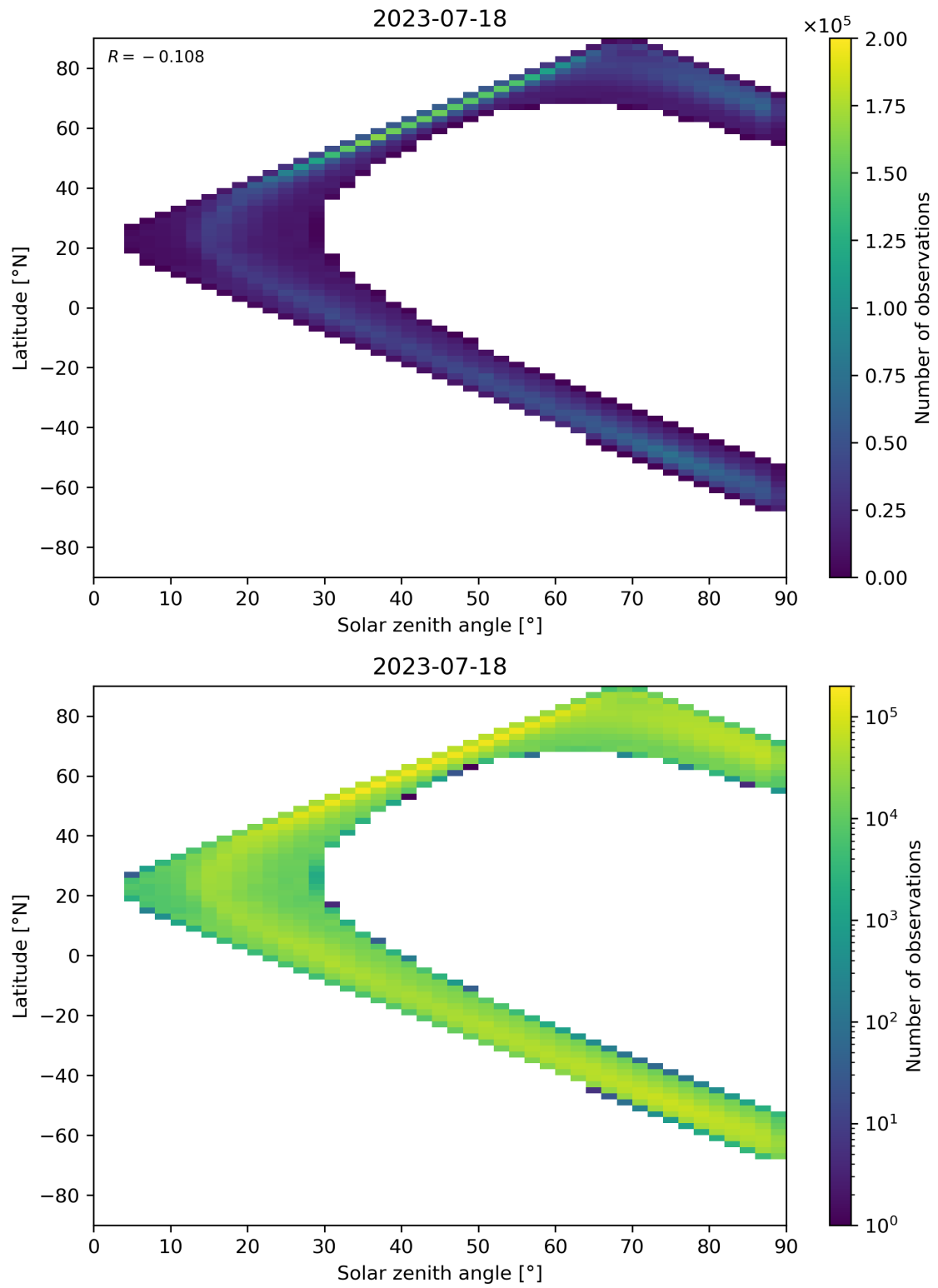


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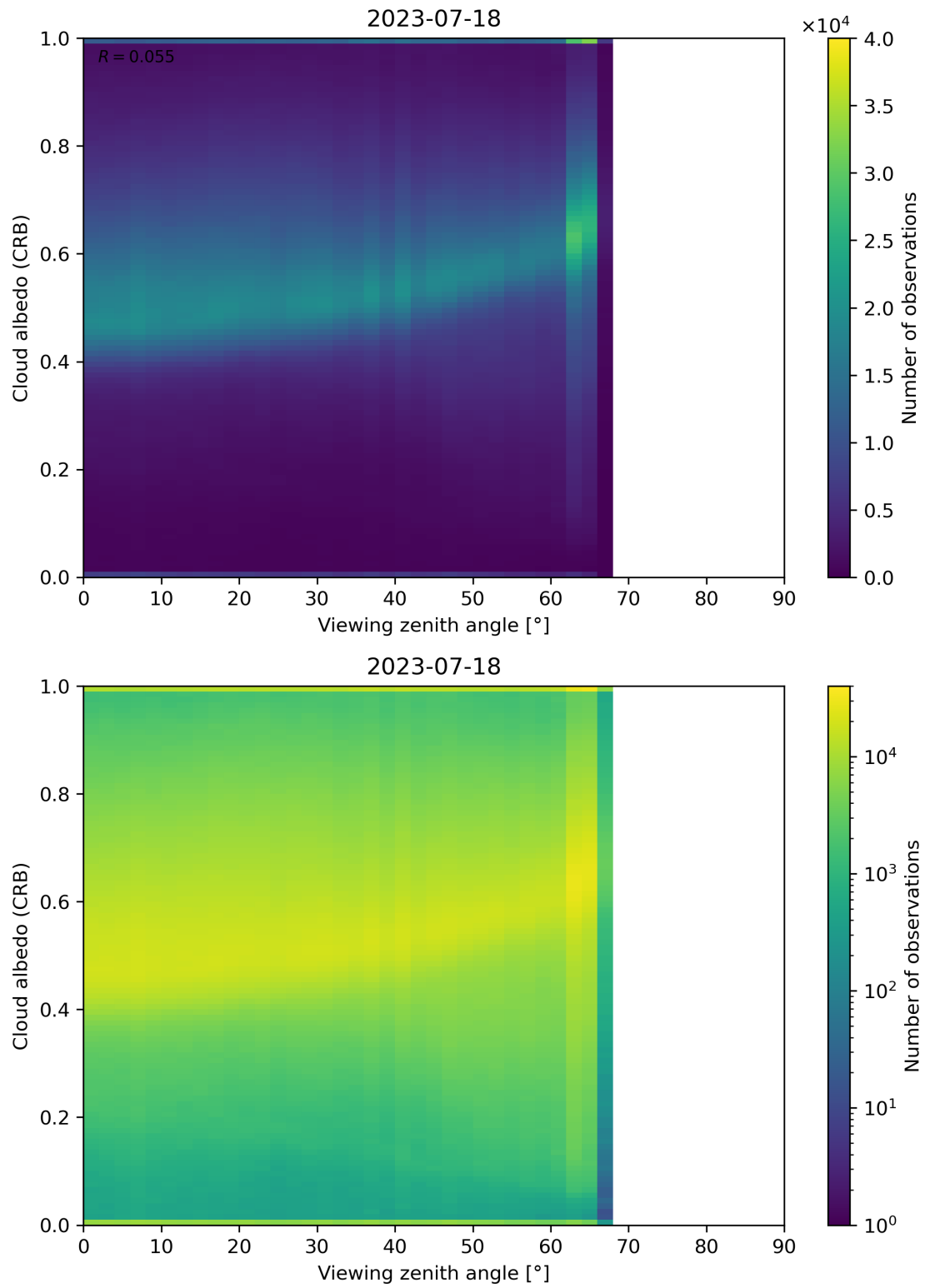


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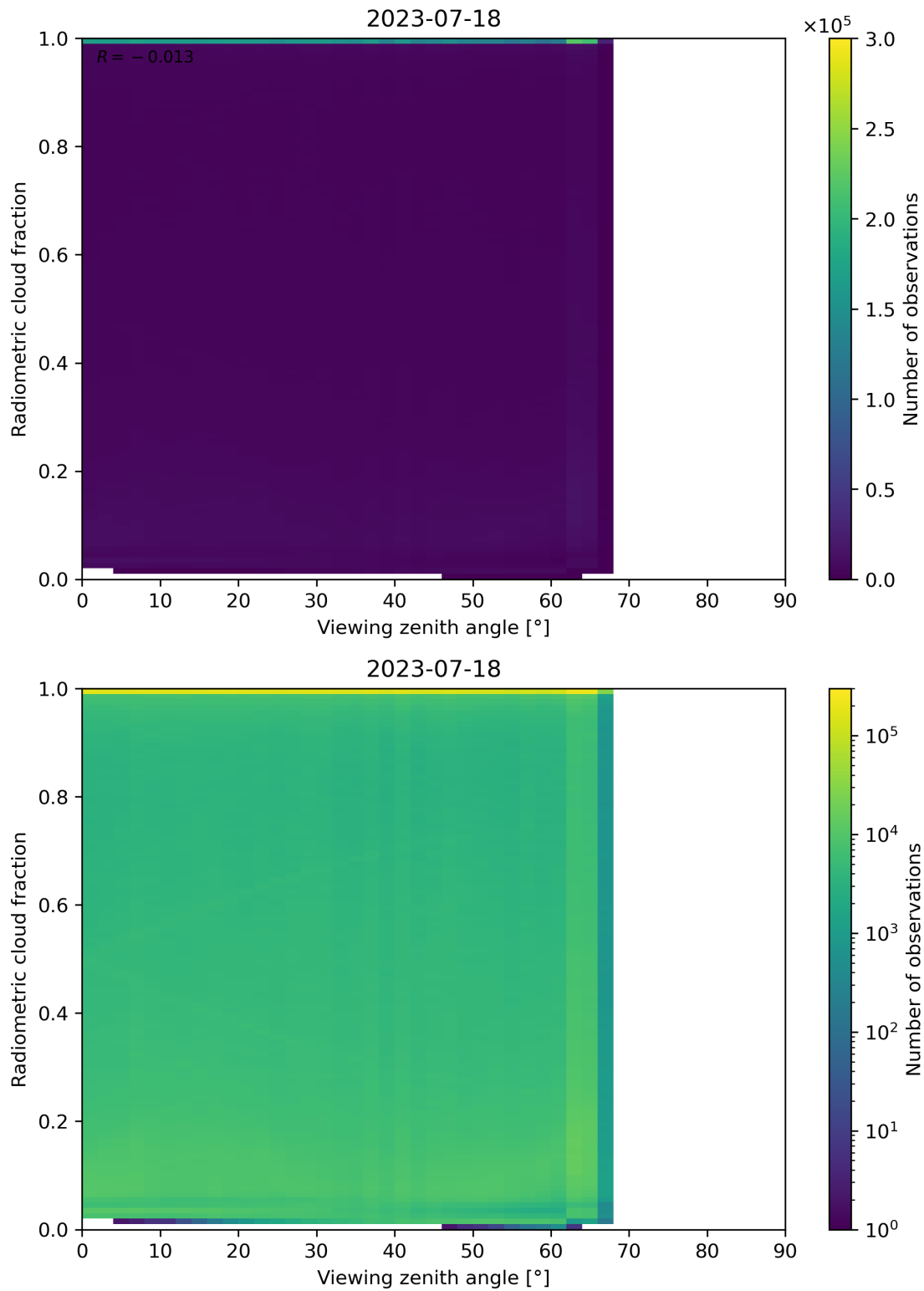


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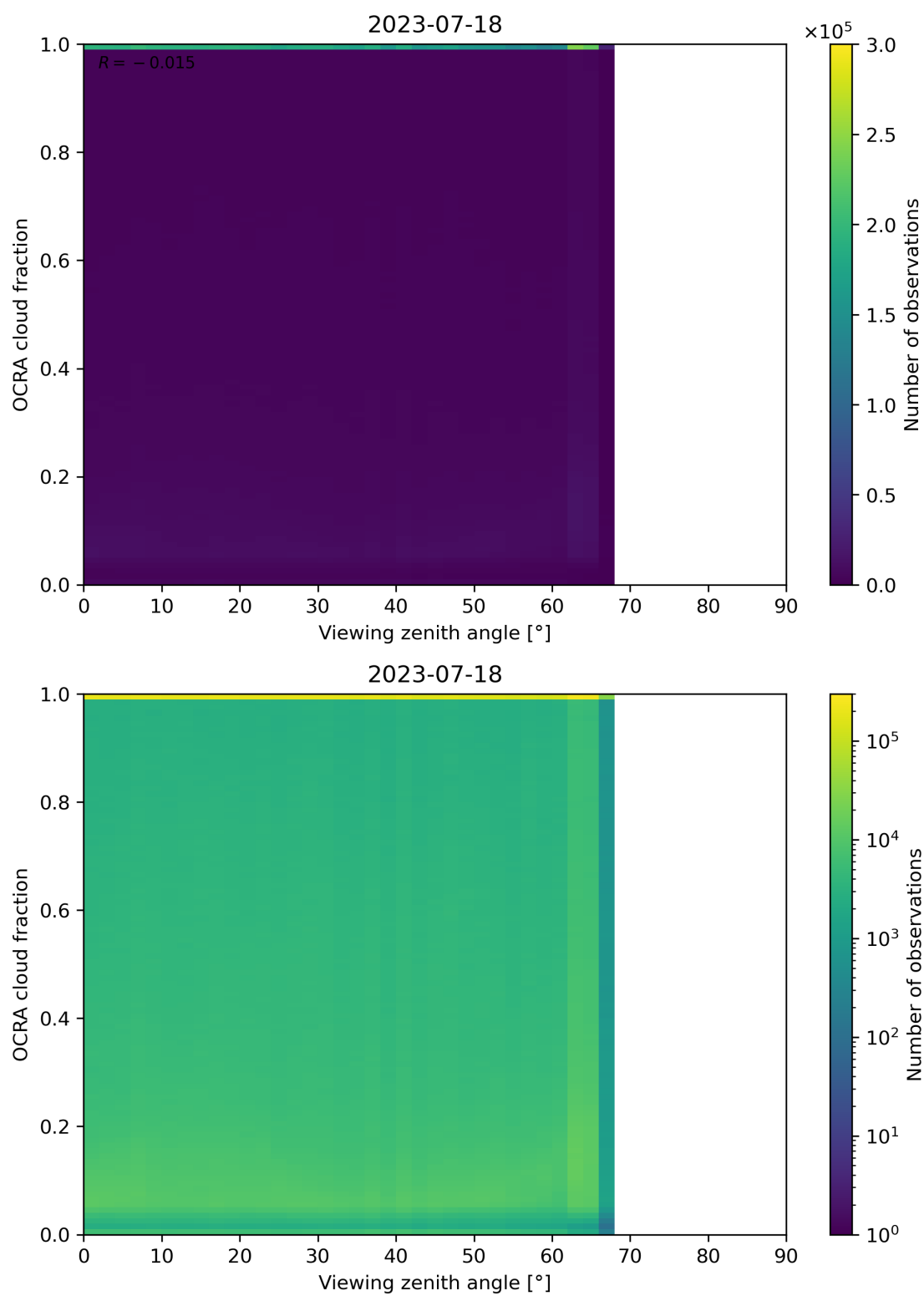


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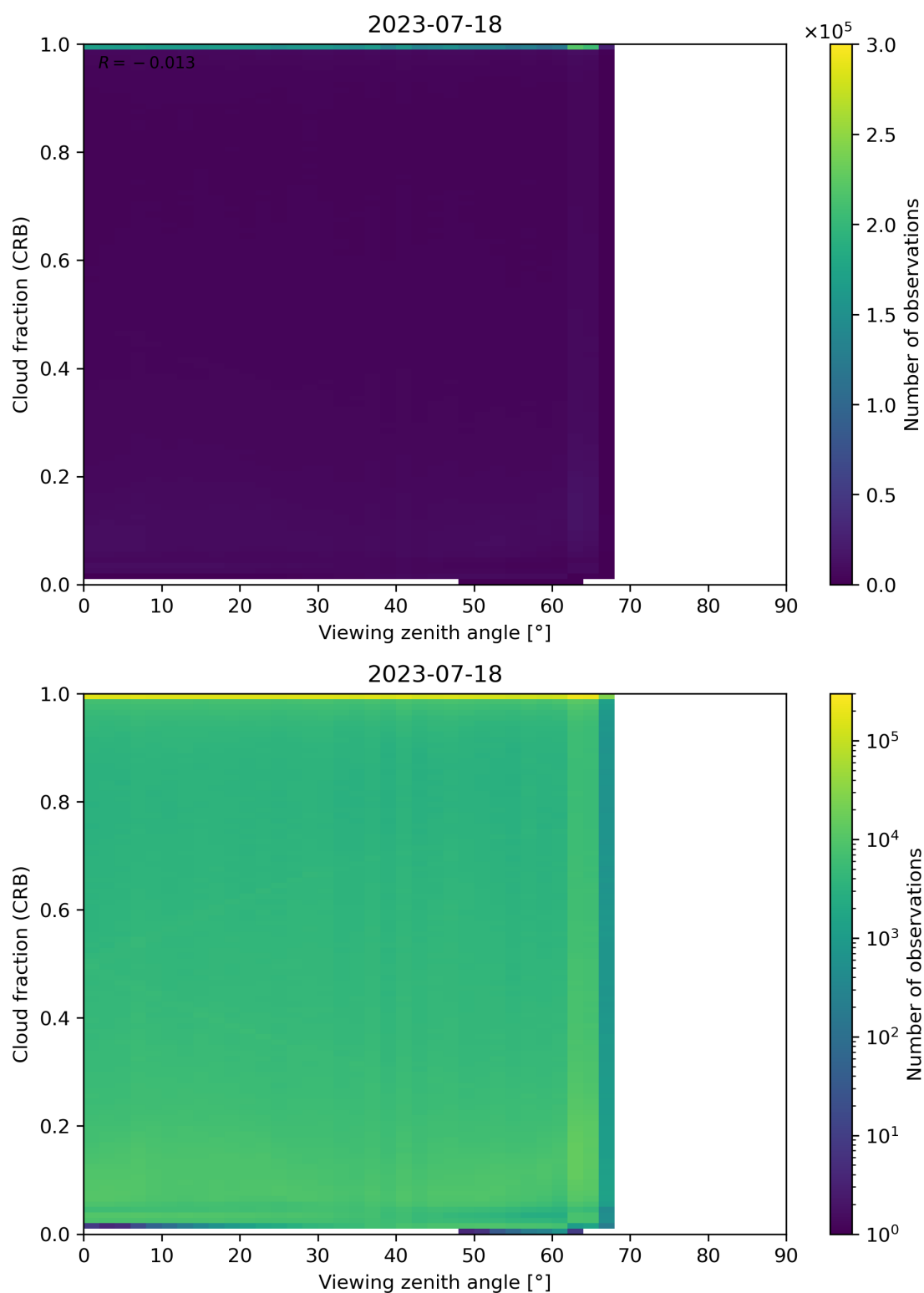


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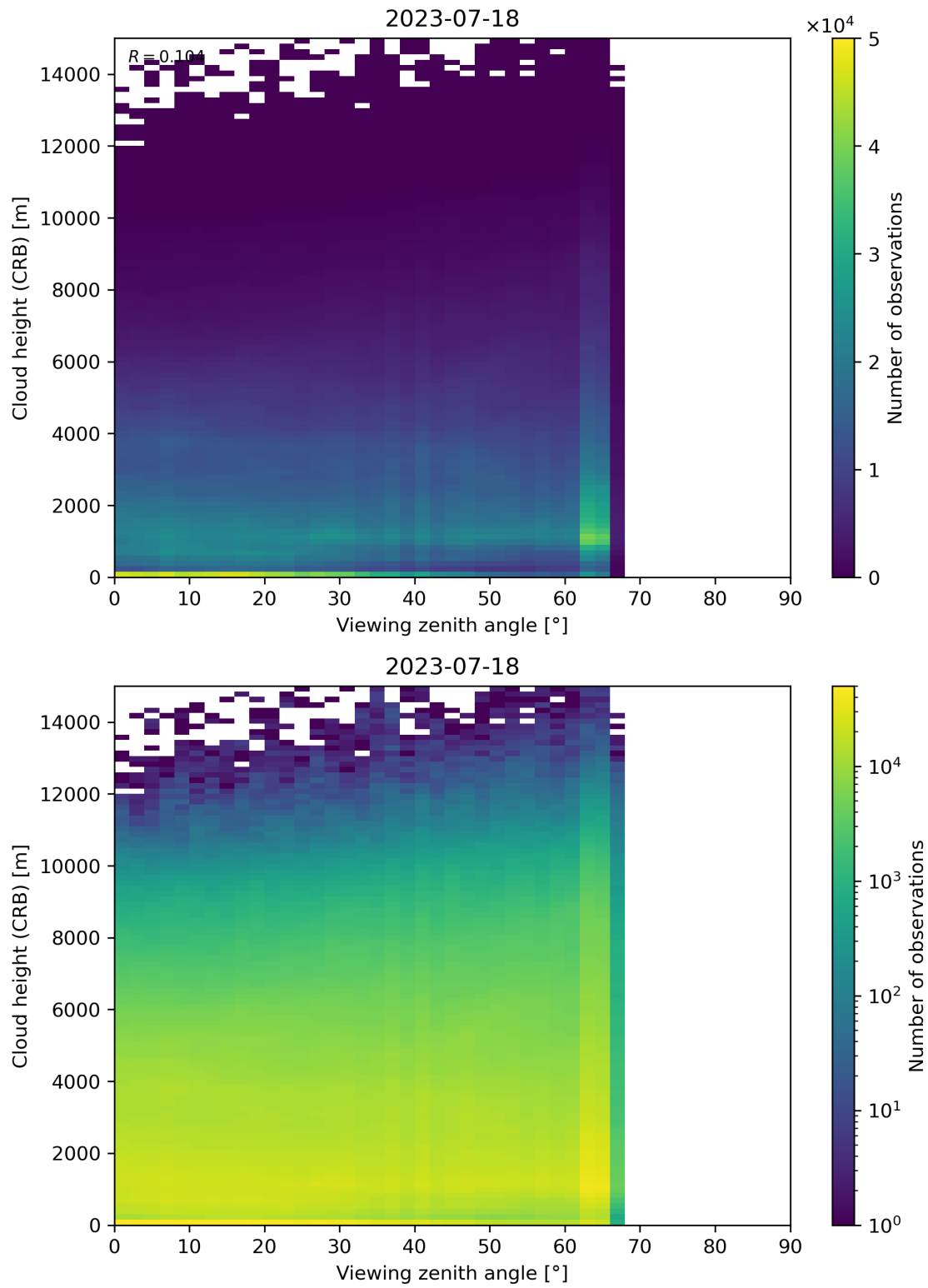


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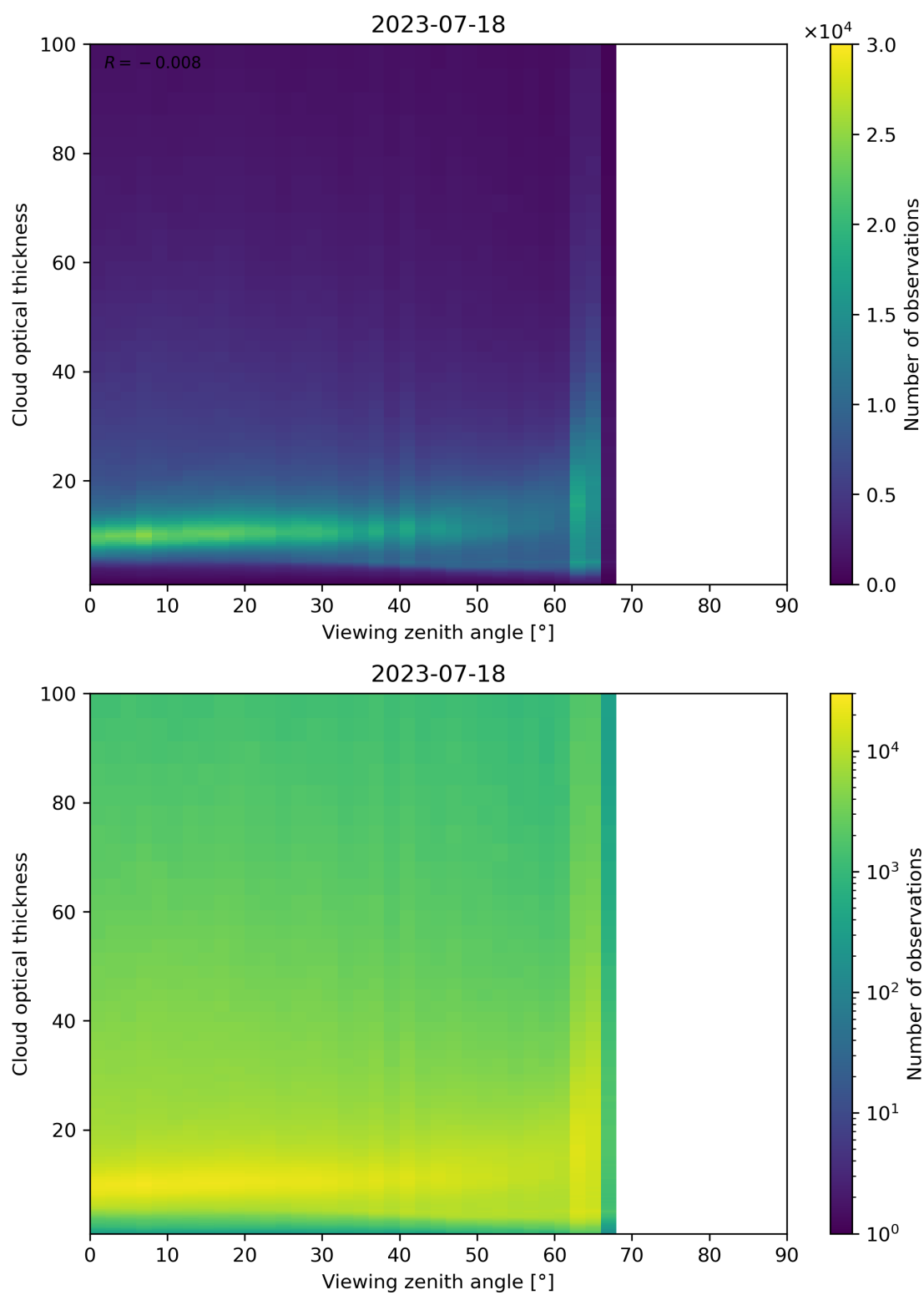


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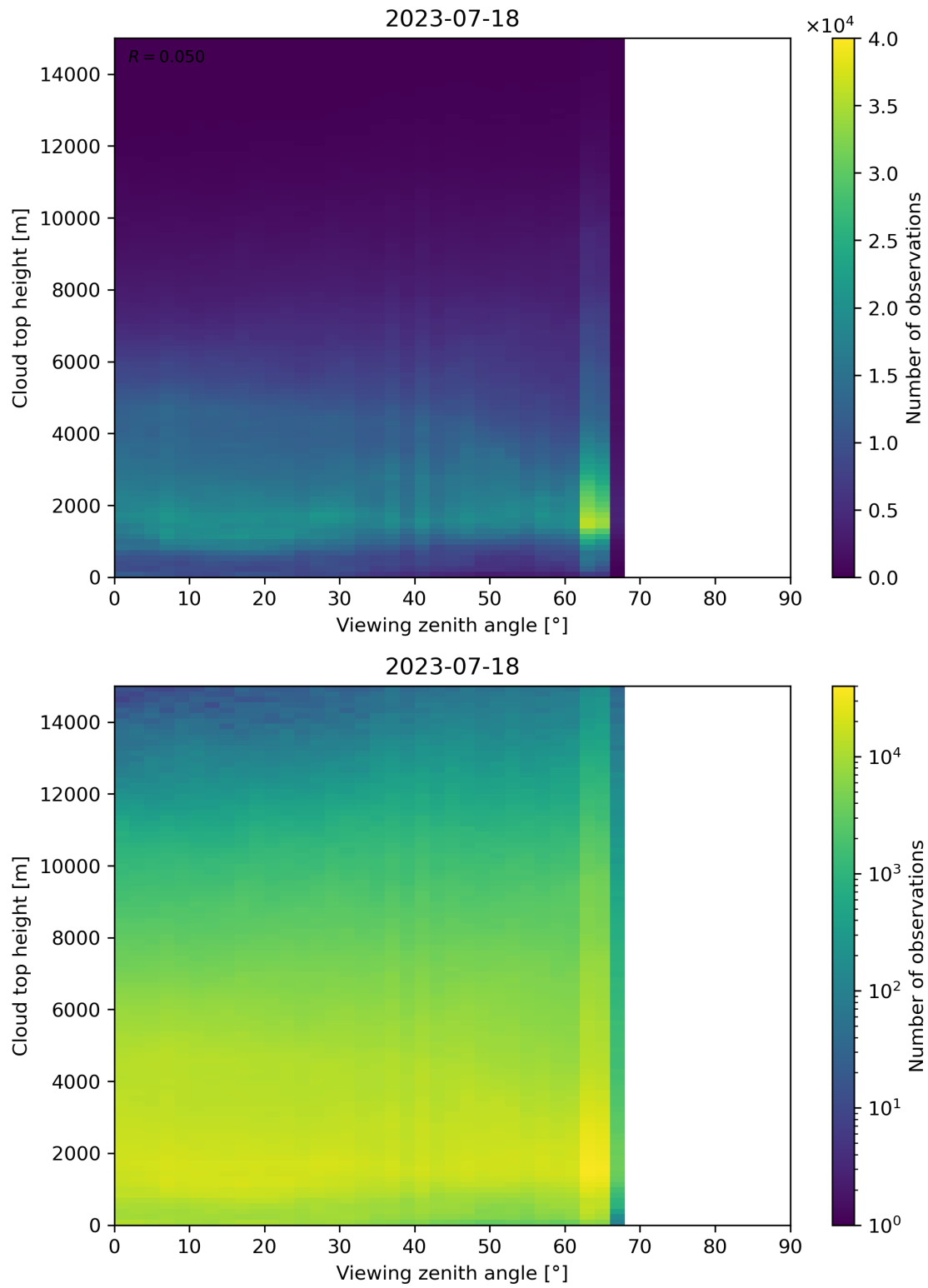


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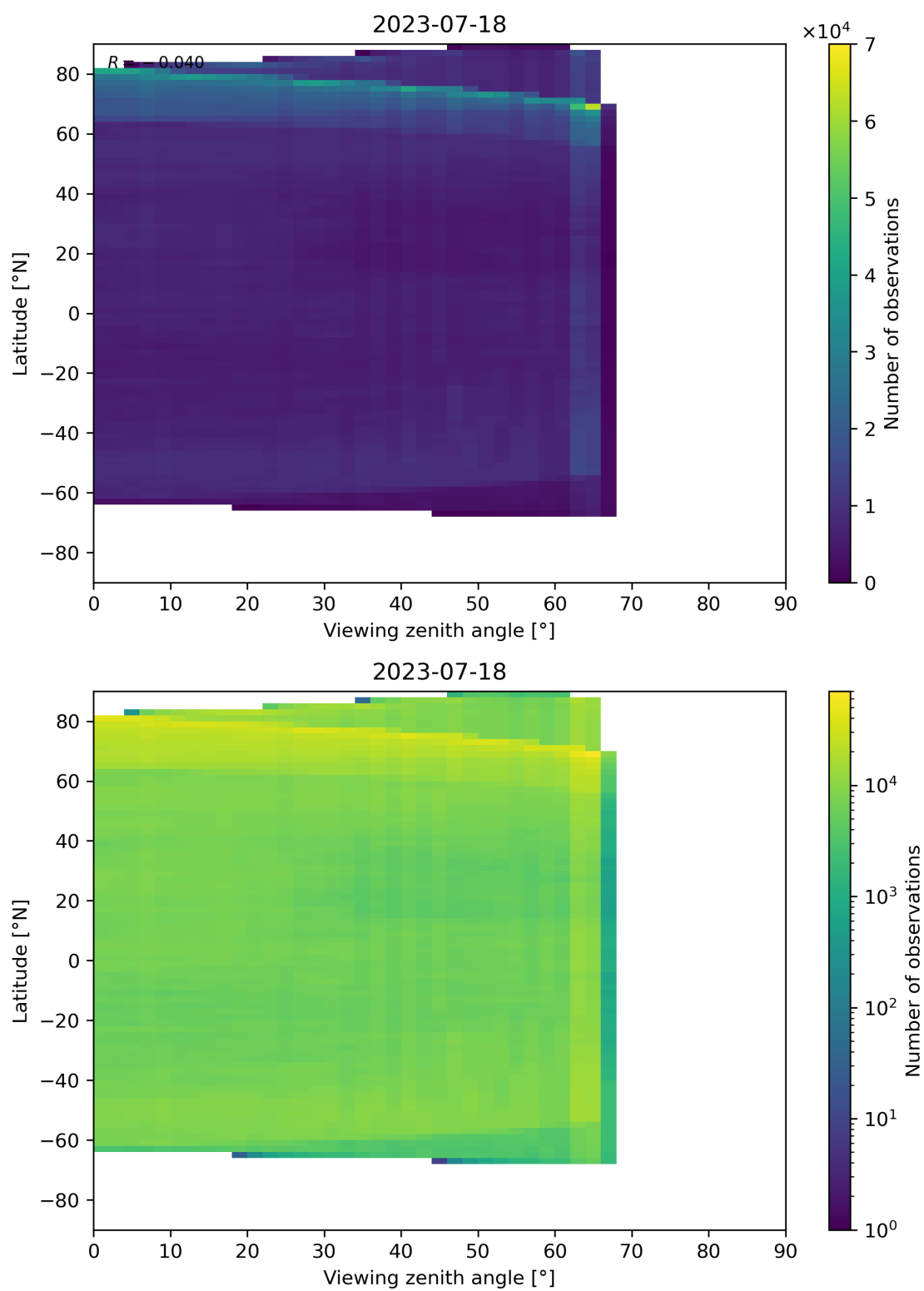


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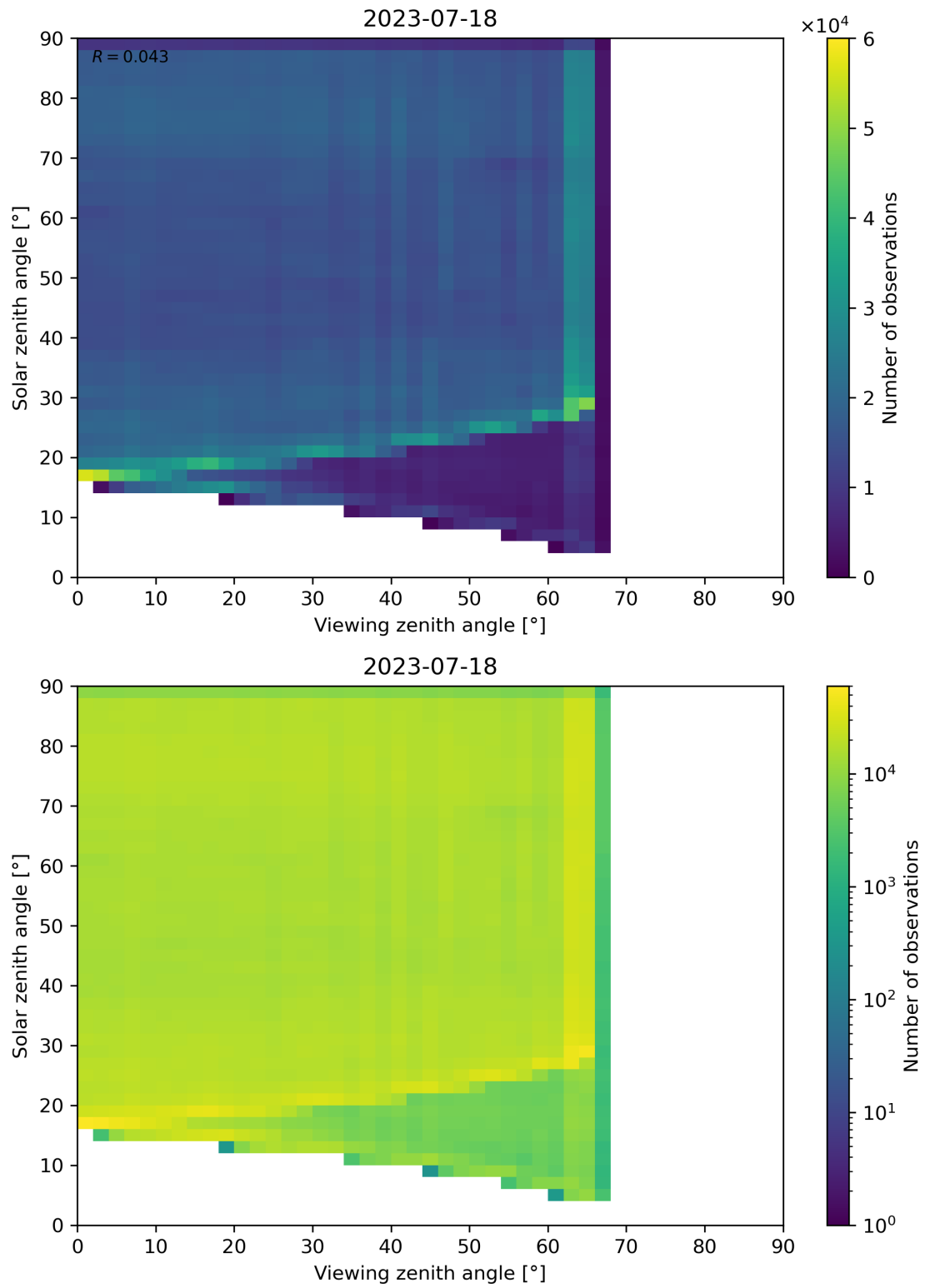


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Maarten Sneep (maarten.sneep@knmi.nl).