

PyCAMA report generated by trop12-proc

trop12-proc

2023-08-01 (20:15)

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]	0.604 ± 0.382	19574479	0.995	0.720	0.800	0.0	1.000
cloud fraction [1]	0.572 ± 0.353	19574479	0.995	0.760	0.566	6.228×10^{-3}	1.000
cloud top height [m]	$(0.377 \pm 0.267) \times 10^4$	19574479	1.425×10^3	3.677×10^3	3.185×10^3	0.0	2.000×10^4
cloud optical thickness [1]	20.8 ± 33.6	19574479	10.2	12.5	11.0	1.000	250
cloud fraction crb [1]	0.571 ± 0.353	19574479	0.995	0.761	0.564	8.123×10^{-3}	1.000
cloud height crb [m]	$(0.297 \pm 0.232) \times 10^4$	19574479	75.0	3.280×10^3	2.464×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.577 ± 0.193	19574479	0.555	0.222	0.575	0.0	1.000
surface albedo fitted [1]	0.161 ± 0.198	19574479	1.500×10^{-2}	0.221	5.600×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.157 ± 0.204	19574479	1.500×10^{-2}	0.225	3.571×10^{-2}	0.0	1.000
fitted root mean square [1]	$(7.624 \pm 12.305) \times 10^{-4}$	19574479	5.000×10^{-5}	8.747×10^{-4}	3.728×10^{-4}	9.238×10^{-7}	0.245
fitted root mean square crb [1]	$(6.713 \pm 8.854) \times 10^{-4}$	19574479	5.000×10^{-5}	8.464×10^{-4}	3.205×10^{-4}	8.367×10^{-7}	0.396
wavelength shift [nm]	$(7.100 \pm 6.712) \times 10^{-3}$	19574479	3.000×10^{-4}	9.356×10^{-3}	6.579×10^{-3}	-5.274×10^{-2}	7.036×10^{-2}
cloud fraction apriori [1]	0.577 ± 0.359	19574479	0.995	0.778	0.577	0.0	1.000
reflectance blue ocra [1]	0.510 ± 0.189	19574479	0.285	0.298	0.485	0.136	1.88
reflectance green ocra [1]	0.456 ± 0.216	19574479	0.195	0.357	0.429	7.628×10^{-2}	2.19
reflectance continuum aband [1]	0.412 ± 0.244	19574479	4.500×10^{-2}	0.367	0.392	9.062×10^{-3}	8.04

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	0.0	0.0	0.0	5.000×10^{-2}	0.220	0.940	1.000	1.000	1.000	1.000
cloud fraction [1]	2.406×10^{-2}	6.181×10^{-2}	9.769×10^{-2}	0.142	0.228	0.988	1.000	1.000	1.000	1.000
cloud top height [m]	129	465	853	1.211×10^3	1.659×10^3	5.335×10^3	6.535×10^3	7.602×10^3	8.950×10^3	1.136×10^4
cloud optical thickness [1]	1.03	2.73	4.06	5.19	6.82	19.3	28.3	41.2	70.9	223
cloud fraction crb [1]	2.378×10^{-2}	6.093×10^{-2}	9.680×10^{-2}	0.141	0.226	0.988	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	40.3	372	710	1.107×10^3	4.388×10^3	5.431×10^3	6.325×10^3	7.492×10^3	9.471×10^3
cloud albedo crb [1]	0.0	0.230	0.348	0.417	0.473	0.695	0.765	0.826	0.904	1.000
surface albedo fitted [1]	0.0	7.988×10^{-3}	1.265×10^{-2}	1.682×10^{-2}	2.334×10^{-2}	0.244	0.326	0.459	0.596	0.860
surface albedo fitted crb [1]	1.146×10^{-4}	5.986×10^{-3}	8.902×10^{-3}	1.180×10^{-2}	1.623×10^{-2}	0.241	0.332	0.478	0.611	0.848
fitted root mean square [1]	1.020×10^{-5}	2.583×10^{-5}	4.425×10^{-5}	6.948×10^{-5}	1.173×10^{-4}	9.920×10^{-4}	1.460×10^{-3}	1.974×10^{-3}	2.703×10^{-3}	4.363×10^{-3}
fitted root mean square crb [1]	5.965×10^{-6}	1.549×10^{-5}	2.848×10^{-5}	4.400×10^{-5}	7.777×10^{-5}	9.242×10^{-4}	1.372×10^{-3}	1.859×10^{-3}	2.538×10^{-3}	3.844×10^{-3}
wavelength shift [nm]	-8.195×10^{-3}	-1.305×10^{-3}	-1.216×10^{-4}	5.092×10^{-4}	2.022×10^{-3}	1.138×10^{-2}	1.370×10^{-2}	1.577×10^{-2}	1.858×10^{-2}	2.481×10^{-2}
cloud fraction apriori [1]	1.460×10^{-2}	5.848×10^{-2}	9.107×10^{-2}	0.135	0.222	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.231	0.259	0.282	0.308	0.349	0.648	0.719	0.775	0.839	0.960
reflectance green ocra [1]	0.151	0.175	0.196	0.220	0.263	0.620	0.699	0.759	0.831	0.958
reflectance continuum aband [1]	3.261×10^{-2}	5.889×10^{-2}	9.469×10^{-2}	0.140	0.218	0.585	0.675	0.751	0.837	0.975

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]	0.576 ± 0.383	12928506	0.740	0.760	0.0	1.000	0.160	0.900
cloud fraction [1]	0.606 ± 0.356	12928506	0.747	0.640	6.228×10^{-3}	1.000	0.253	1.000
cloud top height [m]	$(0.374 \pm 0.280) \times 10^4$	12928506	3.929×10^3	3.162×10^3	0.0	2.000×10^4	1.478×10^3	5.407×10^3
cloud optical thickness [1]	19.0 ± 30.9	12928506	11.6	10.6	1.000	250	6.44	18.0
cloud fraction crb [1]	0.605 ± 0.356	12928506	0.748	0.639	8.123×10^{-3}	1.000	0.252	1.000
cloud height crb [m]	$(0.292 \pm 0.242) \times 10^4$	12928506	3.561×10^3	2.422×10^3	0.0	2.000×10^4	894	4.455×10^3
cloud albedo crb [1]	0.567 ± 0.202	12928506	0.237	0.569	0.0	1.000	0.459	0.696
surface albedo fitted [1]	0.211 ± 0.218	12928506	0.282	0.172	0.0	1.000	2.670×10^{-2}	0.309
surface albedo fitted crb [1]	0.211 ± 0.225	12928506	0.293	0.172	0.0	1.000	1.905×10^{-2}	0.312
fitted root mean square [1]	$(9.745 \pm 14.279) \times 10^{-4}$	12928506	1.133×10^{-3}	5.867×10^{-4}	9.238×10^{-7}	0.245	1.780×10^{-4}	1.311×10^{-3}
fitted root mean square crb [1]	$(8.604 \pm 9.834) \times 10^{-4}$	12928506	1.074×10^{-3}	5.227×10^{-4}	8.367×10^{-7}	0.396	1.493×10^{-4}	1.223×10^{-3}
wavelength shift [nm]	$(8.046 \pm 6.601) \times 10^{-3}$	12928506	8.796×10^{-3}	7.852×10^{-3}	-5.274×10^{-2}	7.036×10^{-2}	3.446×10^{-3}	1.224×10^{-2}
cloud fraction apriori [1]	0.613 ± 0.361	12928506	0.749	0.660	0.0	1.000	0.251	1.000
reflectance blue oca [1]	0.520 ± 0.196	12928506	0.327	0.505	0.136	1.77	0.345	0.672
reflectance green oca [1]	0.474 ± 0.223	12928506	0.386	0.461	7.628×10^{-2}	2.19	0.266	0.652
reflectance continuum aband [1]	0.446 ± 0.242	12928506	0.358	0.434	9.062×10^{-3}	8.04	0.261	0.619

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]	0.658 ± 0.374	6645973	0.620	0.900	0.0	1.000	0.380	1.000
cloud fraction [1]	0.507 ± 0.337	6645973	0.649	0.455	7.369×10^{-3}	1.000	0.194	0.843
cloud top height [m]	$(0.383 \pm 0.239) \times 10^4$	6645973	3.307×10^3	3.222×10^3	0.0	2.000×10^4	1.891×10^3	5.197×10^3
cloud optical thickness [1]	24.3 ± 38.0	6645973	14.6	11.9	1.000	250	7.47	22.1
cloud fraction crb [1]	0.505 ± 0.337	6645973	0.648	0.451	8.300×10^{-3}	1.000	0.192	0.840
cloud height crb [m]	$(0.308 \pm 0.211) \times 10^4$	6645973	2.894×10^3	2.532×10^3	0.0	1.953×10^4	1.352×10^3	4.246×10^3
cloud albedo crb [1]	0.597 ± 0.171	6645973	0.197	0.584	0.0	1.000	0.497	0.694
surface albedo fitted [1]	$(6.383 \pm 8.925) \times 10^{-2}$	6645973	4.196×10^{-2}	3.429×10^{-2}	0.0	1.000	2.041×10^{-2}	6.237×10^{-2}
surface albedo fitted crb [1]	$(5.083 \pm 8.875) \times 10^{-2}$	6645973	2.201×10^{-2}	2.220×10^{-2}	0.0	1.000	1.401×10^{-2}	3.602×10^{-2}
fitted root mean square [1]	$(3.498 \pm 4.854) \times 10^{-4}$	6645973	3.449×10^{-4}	1.771×10^{-4}	9.305×10^{-7}	3.764×10^{-2}	7.115×10^{-5}	4.161×10^{-4}
fitted root mean square crb [1]	$(3.034 \pm 4.718) \times 10^{-4}$	6645973	3.176×10^{-4}	1.072×10^{-4}	1.134×10^{-6}	3.152×10^{-2}	4.088×10^{-5}	3.585×10^{-4}
wavelength shift [nm]	$(5.261 \pm 6.542) \times 10^{-3}$	6645973	8.175×10^{-3}	3.831×10^{-3}	-4.474×10^{-2}	5.931×10^{-2}	7.088×10^{-4}	8.884×10^{-3}
cloud fraction apriori [1]	0.506 ± 0.345	6645973	0.674	0.452	0.0	1.000	0.183	0.858
reflectance blue ocrs [1]	0.491 ± 0.173	6645973	0.240	0.459	0.178	1.88	0.356	0.596
reflectance green ocrs [1]	0.421 ± 0.197	6645973	0.289	0.384	9.763×10^{-2}	1.84	0.259	0.548
reflectance continuum aband [1]	0.346 ± 0.235	6645973	0.351	0.309	1.290×10^{-2}	6.17	0.150	0.501

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]	0.591 ± 0.379	13728478	0.680	0.770	0.0	1.000	0.230	0.910
cloud fraction [1]	0.559 ± 0.353	13728478	0.758	0.543	6.228×10^{-3}	1.000	0.214	0.973
cloud top height [m]	$(0.368 \pm 0.270) \times 10^4$	13728478	3.675×10^3	3.016×10^3	0.0	2.000×10^4	1.552×10^3	5.227×10^3
cloud optical thickness [1]	21.7 ± 34.6	13728478	12.7	11.5	1.000	250	7.40	20.1
cloud fraction crb [1]	0.557 ± 0.353	13728478	0.759	0.541	8.643×10^{-3}	1.000	0.212	0.971
cloud height crb [m]	$(0.289 \pm 0.238) \times 10^4$	13728478	3.273×10^3	2.305×10^3	0.0	2.000×10^4	1000	4.274×10^3
cloud albedo crb [1]	0.577 ± 0.186	13728478	0.214	0.572	0.0	1.000	0.475	0.689
surface albedo fitted [1]	0.109 ± 0.182	13728478	4.832×10^{-2}	3.257×10^{-2}	0.0	1.000	1.808×10^{-2}	6.640×10^{-2}
surface albedo fitted crb [1]	0.103 ± 0.190	13728478	2.919×10^{-2}	2.196×10^{-2}	0.0	1.000	1.266×10^{-2}	4.185×10^{-2}
fitted root mean square [1]	$(6.343 \pm 12.218) \times 10^{-4}$	13728478	6.689×10^{-4}	2.583×10^{-4}	9.238×10^{-7}	0.149	9.334×10^{-5}	7.622×10^{-4}
fitted root mean square crb [1]	$(5.349 \pm 7.767) \times 10^{-4}$	13728478	6.146×10^{-4}	2.055×10^{-4}	8.460×10^{-7}	4.375×10^{-2}	6.193×10^{-5}	6.766×10^{-4}
wavelength shift [nm]	$(6.815 \pm 6.820) \times 10^{-3}$	13728478	9.364×10^{-3}	6.096×10^{-3}	-5.274×10^{-2}	6.150×10^{-2}	1.731×10^{-3}	1.110×10^{-2}
cloud fraction apriori [1]	0.563 ± 0.359	13728478	0.792	0.553	0.0	1.000	0.208	1.000
reflectance blue oca [1]	0.511 ± 0.180	13728478	0.284	0.491	0.163	1.85	0.358	0.642
reflectance green oca [1]	0.454 ± 0.207	13728478	0.345	0.435	8.788×10^{-2}	1.84	0.268	0.612
reflectance continuum aband [1]	0.379 ± 0.244	13728478	0.399	0.364	9.062×10^{-3}	6.17	0.159	0.559

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]	0.643 ± 0.385	3528608	0.730	0.850	0.0	1.000	0.220	0.950
cloud fraction [1]	0.570 ± 0.352	3528608	0.758	0.550	7.360×10^{-3}	1.000	0.230	0.988
cloud top height [m]	$(0.421 \pm 0.269) \times 10^4$	3528608	3.637×10^3	3.722×10^3	0.0	2.000×10^4	2.162×10^3	5.798×10^3
cloud optical thickness [1]	17.7 ± 29.3	3528608	10.3	9.35	1.000	250	5.95	16.2
cloud fraction crb [1]	0.569 ± 0.352	3528608	0.759	0.550	8.123×10^{-3}	1.000	0.229	0.988
cloud height crb [m]	$(0.331 \pm 0.220) \times 10^4$	3528608	3.191×10^3	2.846×10^3	0.0	2.000×10^4	1.572×10^3	4.763×10^3
cloud albedo crb [1]	0.599 ± 0.203	3528608	0.239	0.597	0.0	1.000	0.493	0.732
surface albedo fitted [1]	0.326 ± 0.198	3528608	0.110	0.261	0.0	1.000	0.218	0.328
surface albedo fitted crb [1]	0.322 ± 0.198	3528608	0.110	0.255	2.916×10^{-3}	1.000	0.213	0.324
fitted root mean square [1]	$(1.159 \pm 1.080) \times 10^{-3}$	3528608	1.171×10^{-3}	8.460×10^{-4}	2.296×10^{-6}	0.169	4.249×10^{-4}	1.596×10^{-3}
fitted root mean square crb [1]	$(1.117 \pm 1.017) \times 10^{-3}$	3528608	1.178×10^{-3}	8.364×10^{-4}	8.367×10^{-7}	0.208	3.985×10^{-4}	1.576×10^{-3}
wavelength shift [nm]	$(7.968 \pm 6.133) \times 10^{-3}$	3528608	8.208×10^{-3}	7.857×10^{-3}	-3.393×10^{-2}	7.036×10^{-2}	3.702×10^{-3}	1.191×10^{-2}
cloud fraction apriori [1]	0.576 ± 0.359	3528608	0.777	0.562	0.0	1.000	0.223	1.000
reflectance blue ocra [1]	0.508 ± 0.220	3528608	0.368	0.454	0.136	1.88	0.317	0.685
reflectance green ocra [1]	0.464 ± 0.247	3528608	0.426	0.401	7.628×10^{-2}	2.19	0.243	0.669
reflectance continuum aband [1]	0.505 ± 0.226	3528608	0.359	0.449	1.658×10^{-2}	8.04	0.319	0.679

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	5.469×10^{-2}	-5.150×10^{-2}	1.857×10^{-2}	6.942×10^{-2}	1.420×10^{-2}	1.856×10^{-2}	0.123	4.348×10^{-2}	1.321×10^{-2}
5.469×10^{-2}	1.000	-0.131	0.162	-2.693×10^{-2}	0.182	0.163	-5.375×10^{-3}	-6.107×10^{-2}	0.164
-5.150×10^{-2}	-0.131	1.000	0.176	-0.128	-7.857×10^{-2}	0.179	-0.144	-0.144	0.190
1.857×10^{-2}	0.162	0.176	1.000	-1.008×10^{-2}	0.316	1.000	3.390×10^{-2}	0.225	0.987
6.942×10^{-2}	-2.693×10^{-2}	-0.128	-1.008×10^{-2}	1.000	0.154	-1.035×10^{-2}	0.954	9.843×10^{-2}	-2.421×10^{-2}
1.420×10^{-2}	0.182	-7.857×10^{-2}	0.316	0.154	1.000	0.313	0.205	0.497	0.310
1.856×10^{-2}	0.163	0.179	1.000	-1.035×10^{-2}	0.313	1.000	3.383×10^{-2}	0.221	0.987
0.123	-5.375×10^{-3}	-0.144	3.390×10^{-2}	0.954	0.205	3.383×10^{-2}	1.000	6.919×10^{-2}	1.950×10^{-2}
4.348×10^{-2}	-6.107×10^{-2}	-0.144	0.225	9.843×10^{-2}	0.497	0.221	6.919×10^{-2}	1.000	0.224
1.321×10^{-2}	0.164	0.190	0.987	-2.421×10^{-2}	0.310	0.987	1.950×10^{-2}	0.224	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
388	24.4	-46.8	0.129	3.654×10^3	9.40	0.129	5.623×10^3	0.165	9.350×10^{-2}
24.4	512	-137	1.30	-1.628×10^3	139	1.30	-282	-0.266	1.34
-46.8	-137	2.129×10^3	2.86	-1.574×10^4	-122	2.91	-1.537×10^4	-1.28	3.14
0.129	1.30	2.86	0.124	-9.49	3.74	0.125	27.8	1.530×10^{-2}	0.125
3.654×10^3	-1.628×10^3	-1.574×10^4	-9.49	7.133×10^6	1.382×10^4	-9.76	5.912×10^6	50.7	-23.2
9.40	139	-122	3.74	1.382×10^4	1.129×10^3	3.72	1.598×10^4	3.22	3.74
0.129	1.30	2.91	0.125	-9.76	3.72	0.125	27.7	1.507×10^{-2}	0.125
5.623×10^3	-282	-1.537×10^4	27.8	5.912×10^6	1.598×10^4	27.7	5.386×10^6	30.9	16.3
0.165	-0.266	-1.28	1.530×10^{-2}	50.7	3.22	1.507×10^{-2}	30.9	3.714×10^{-2}	1.554×10^{-2}
9.350×10^{-2}	1.34	3.14	0.125	-23.2	3.74	0.125	16.3	1.554×10^{-2}	0.129

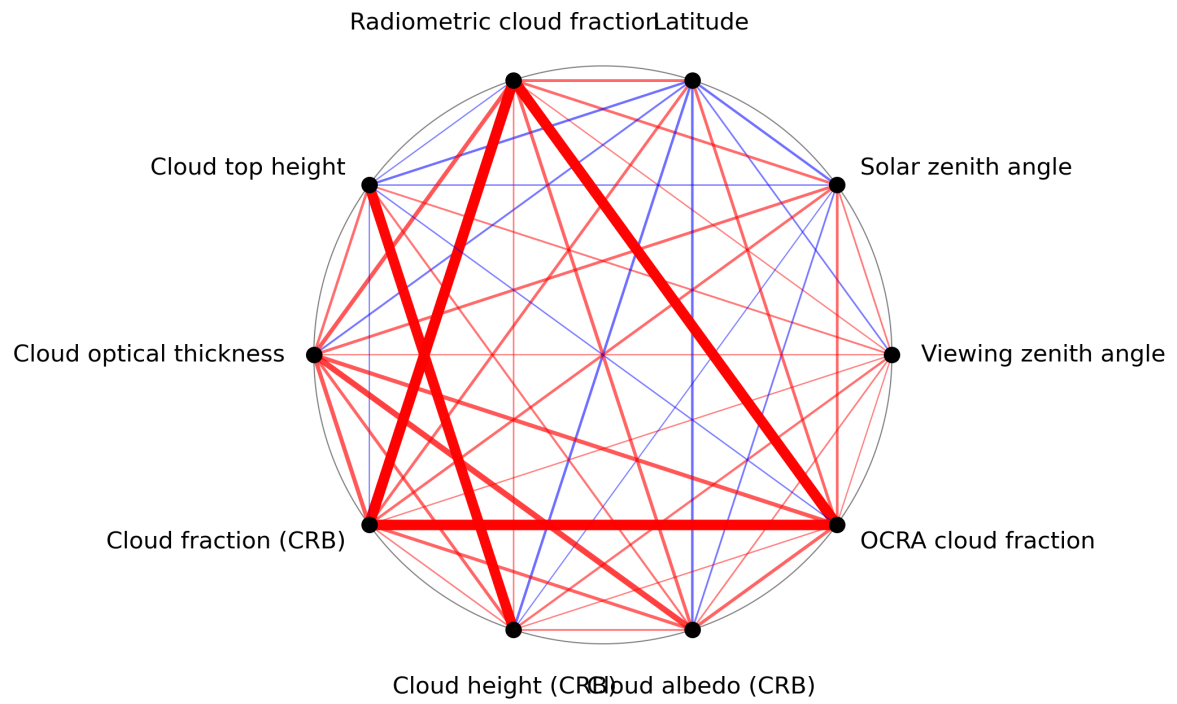


Figure 1: Map of correlation graph for 2023-07-08 to 2023-07-09.

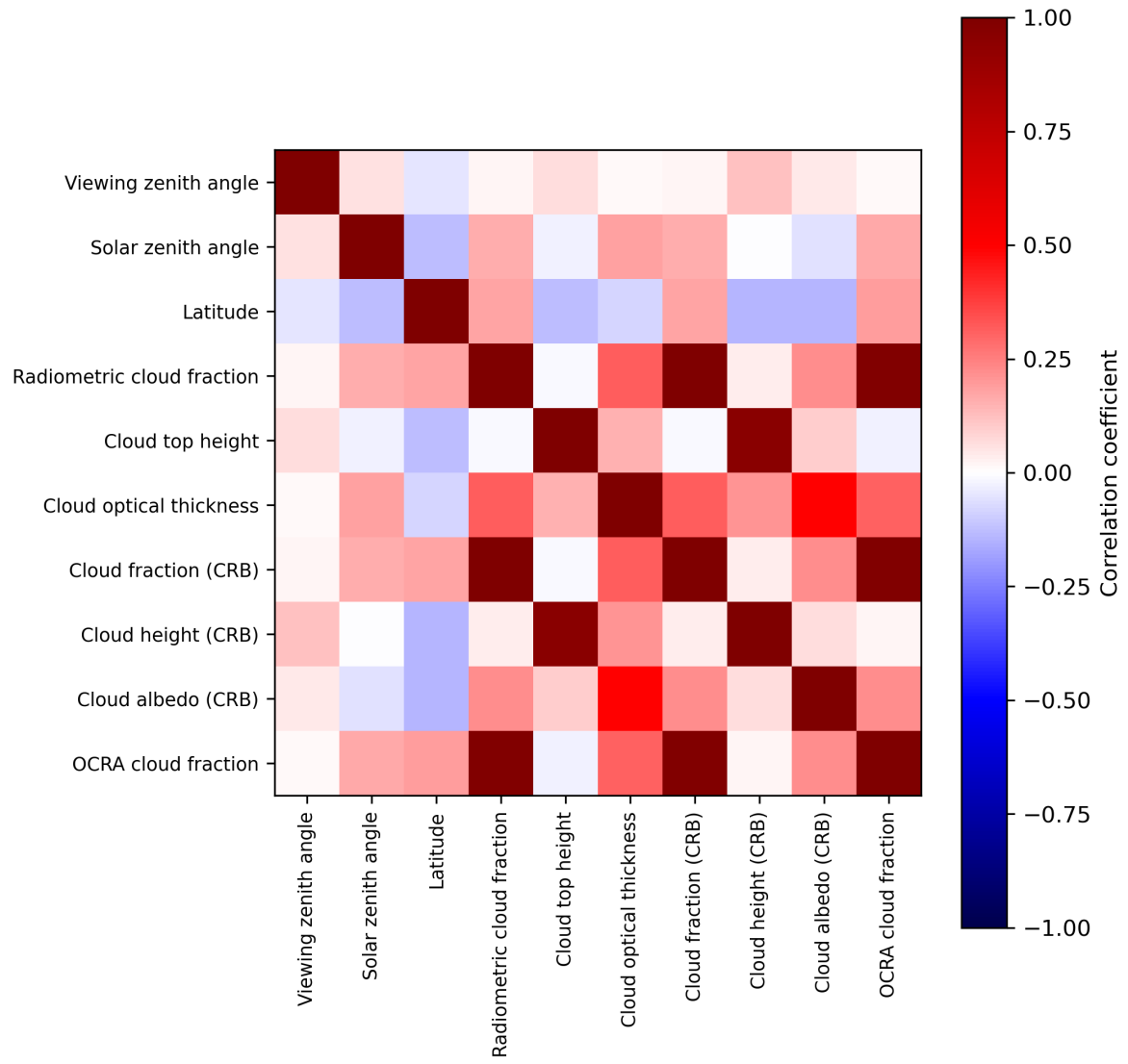


Figure 2: Map of correlation matrix for 2023-07-08 to 2023-07-09.

3 Granule outlines

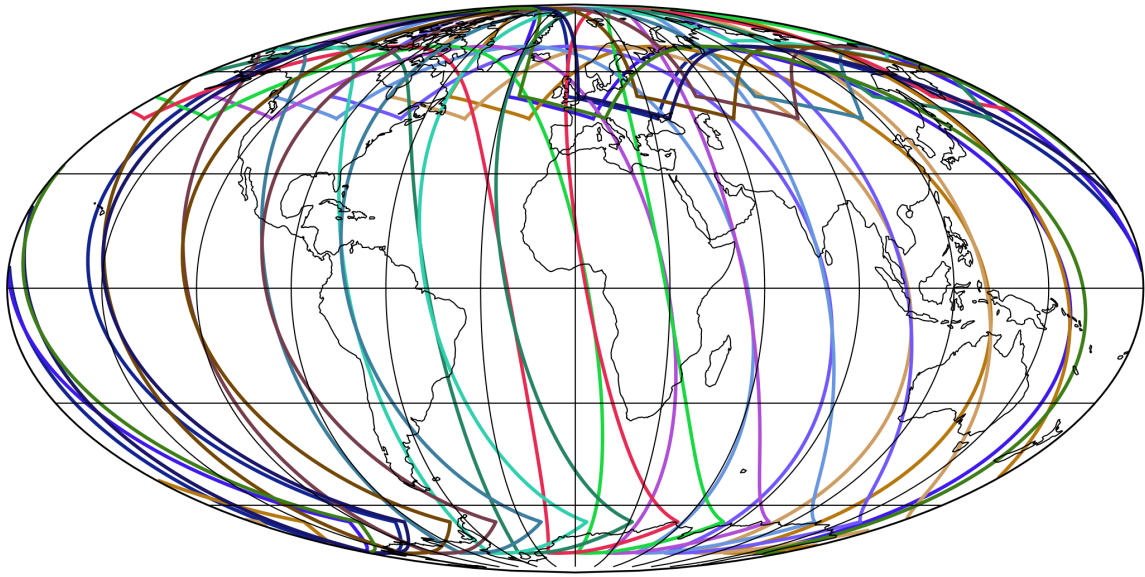


Figure 3: Outline of the granules.

4 Input data monitoring

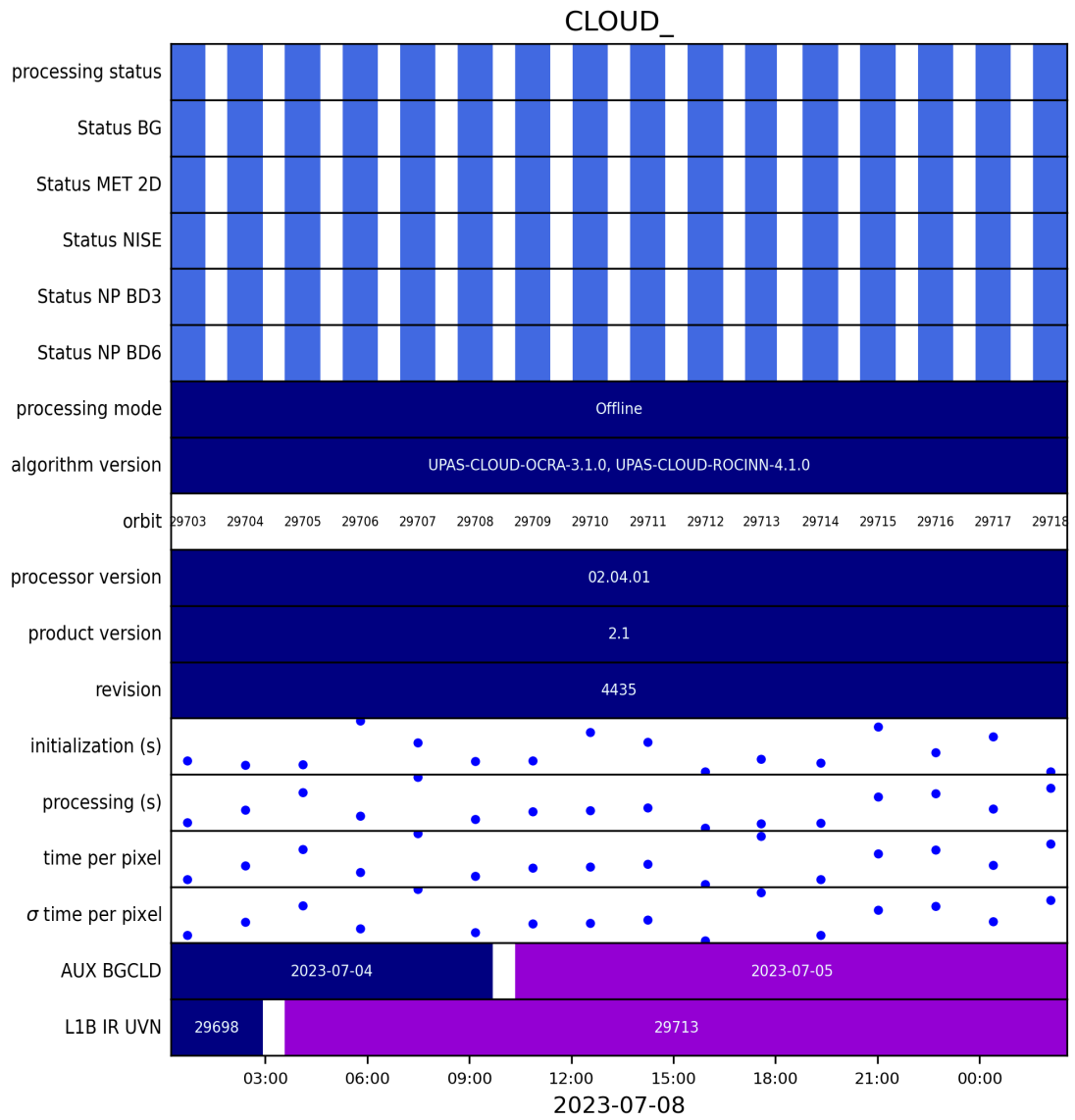


Figure 4: Input data per granule

5 Warnings and errors

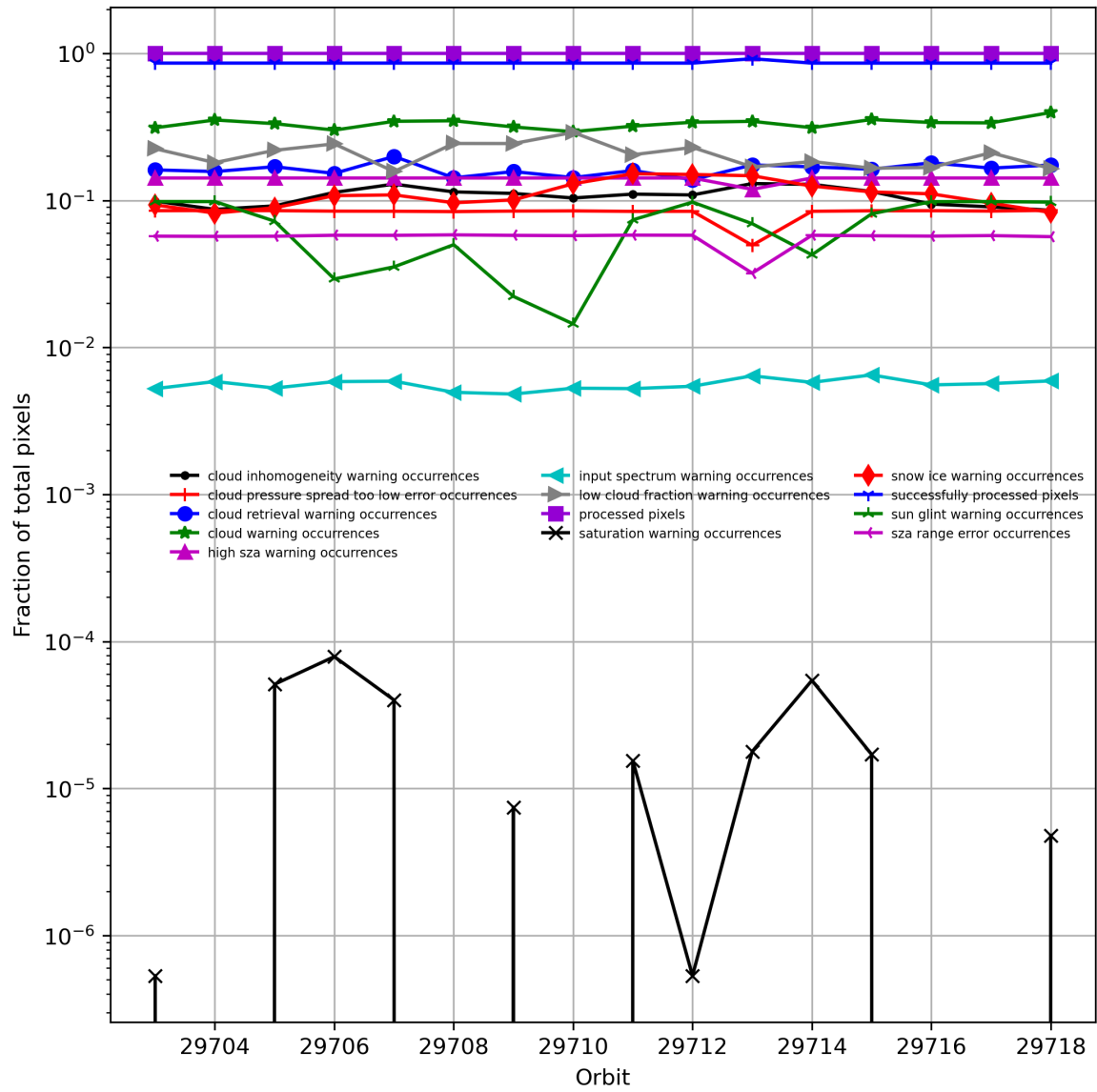


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

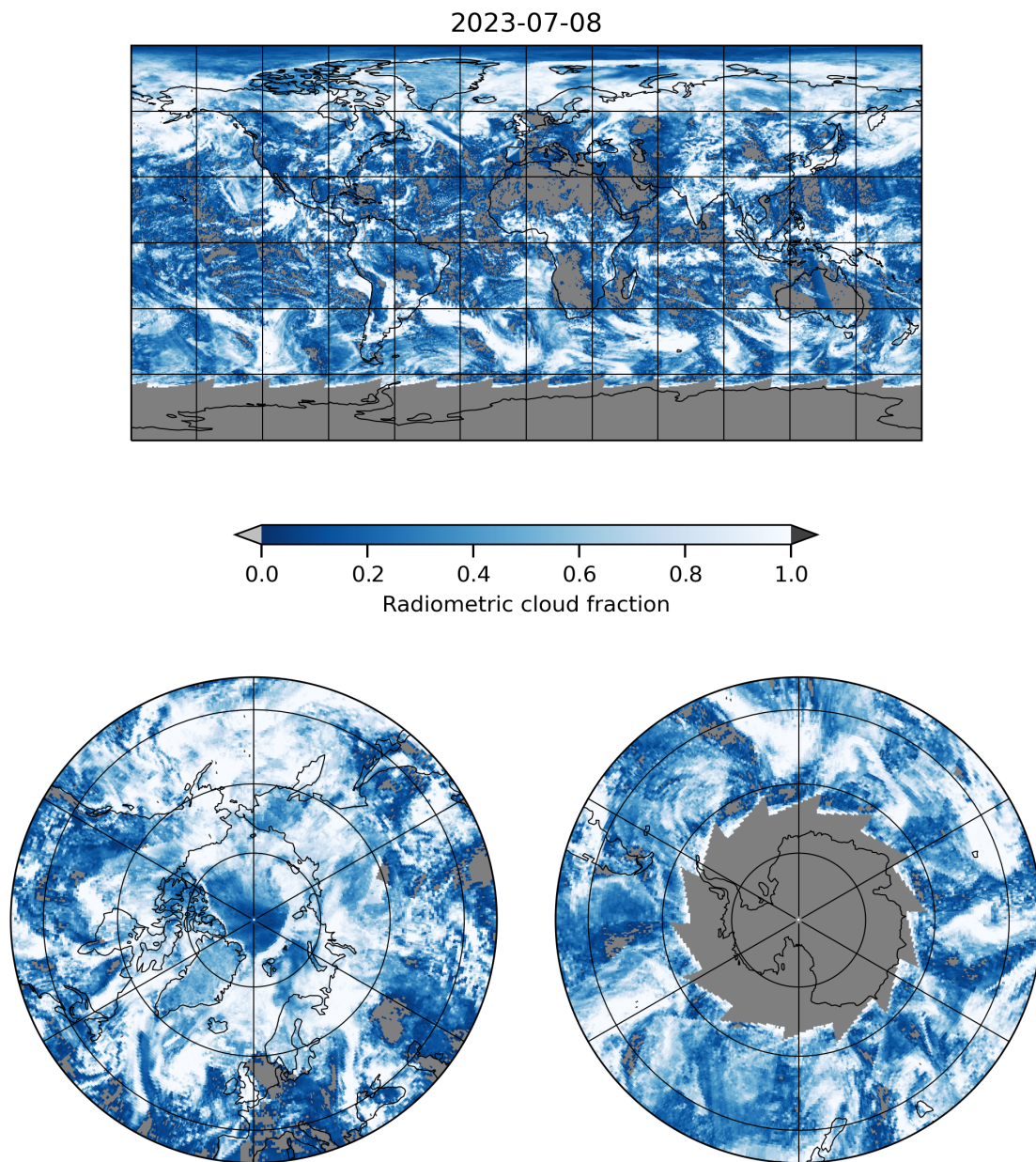


Figure 6: Map of “Radiometric cloud fraction” for 2023-07-08 to 2023-07-09

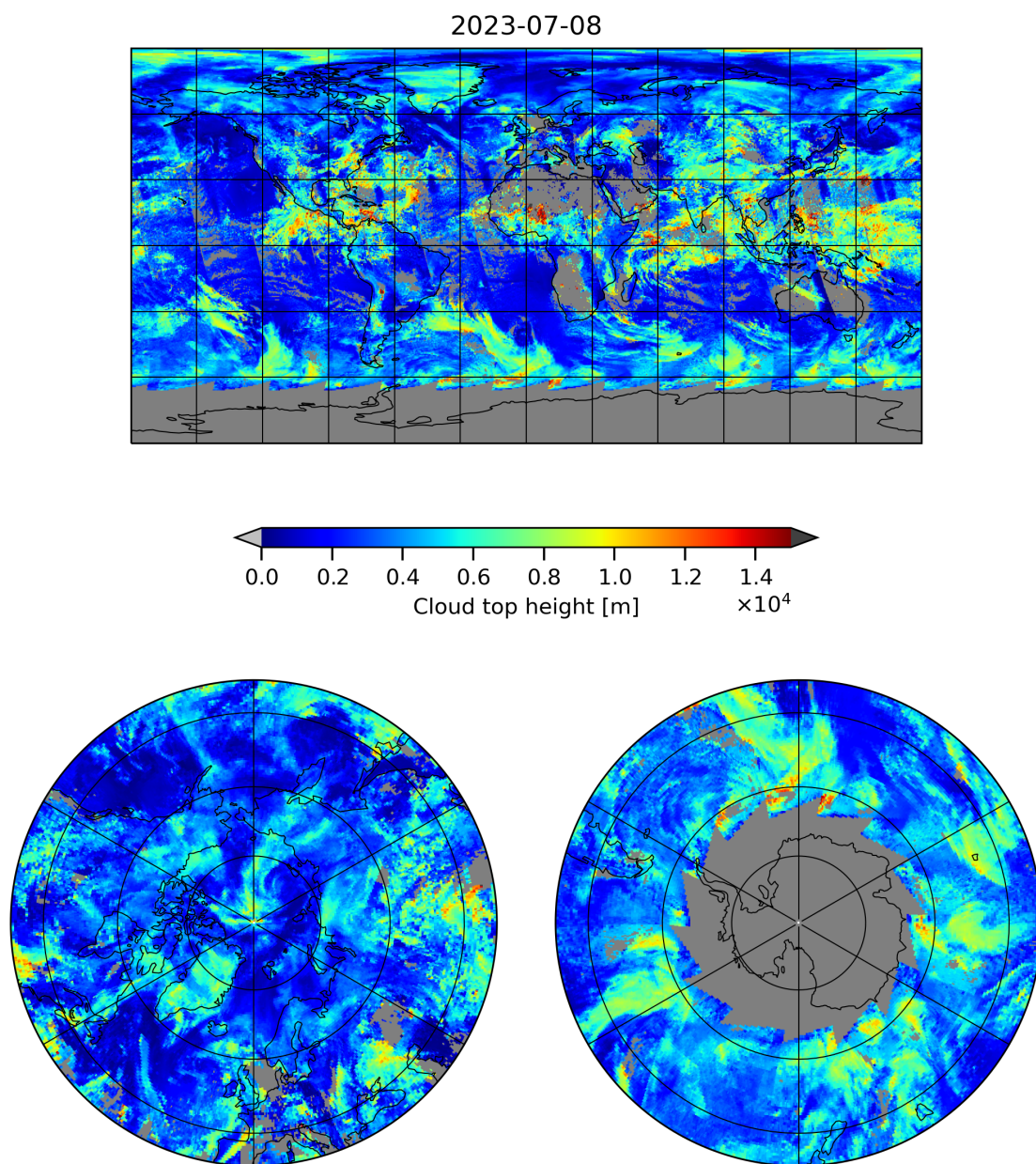


Figure 7: Map of “Cloud top height” for 2023-07-08 to 2023-07-09

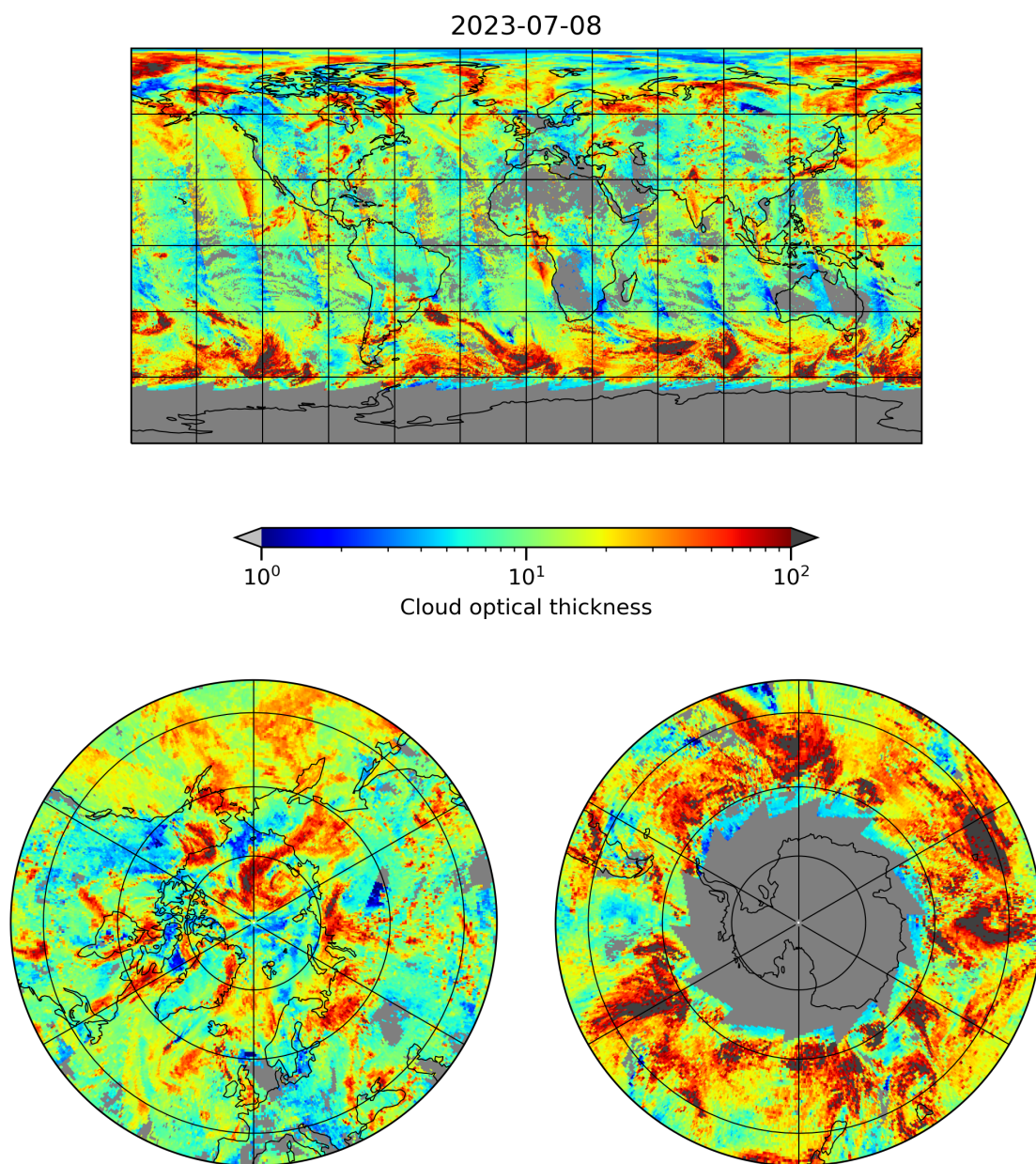


Figure 8: Map of “Cloud optical thickness” for 2023-07-08 to 2023-07-09

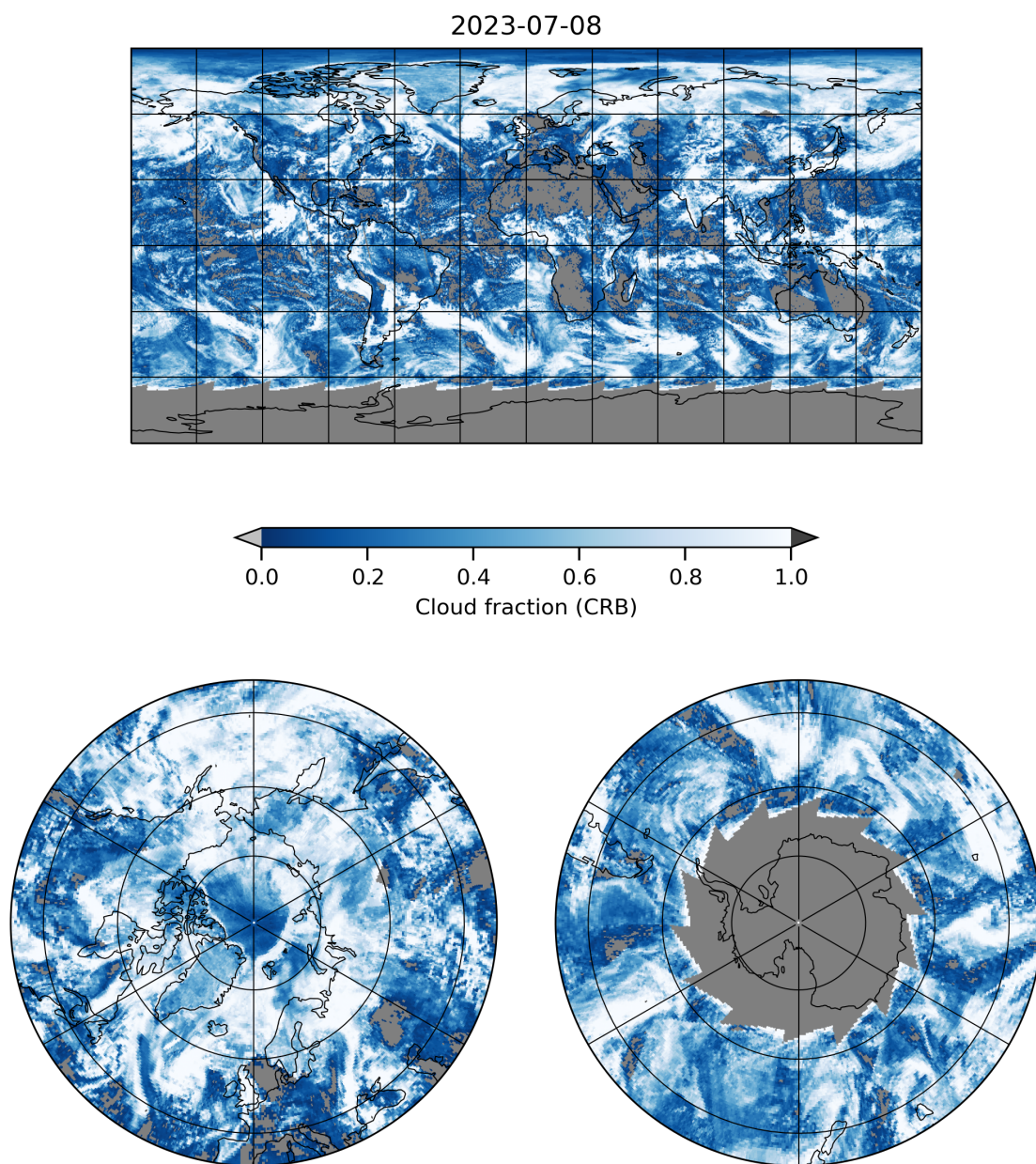


Figure 9: Map of “Cloud fraction (CRB)” for 2023-07-08 to 2023-07-09

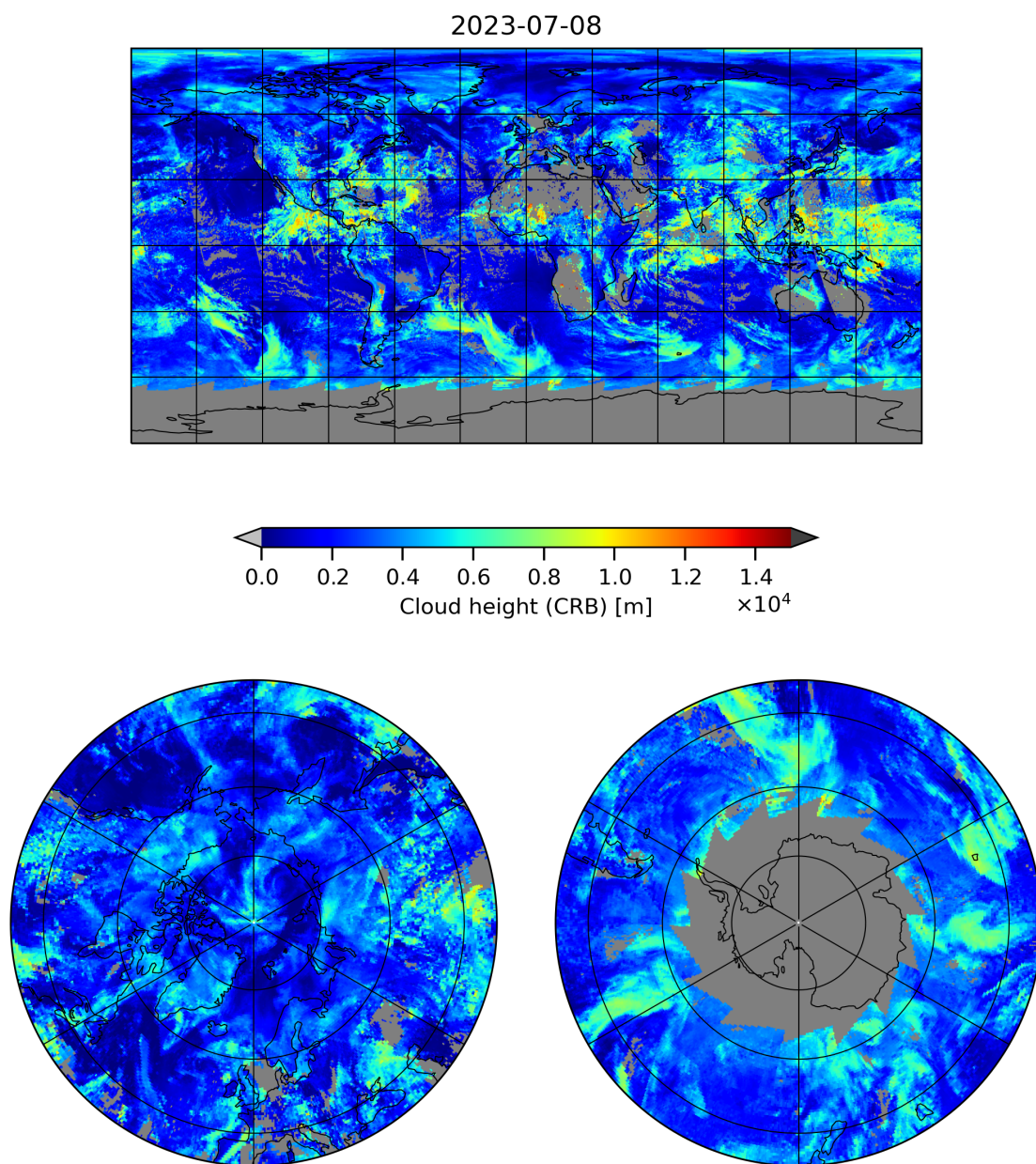


Figure 10: Map of “Cloud height (CRB)” for 2023-07-08 to 2023-07-09

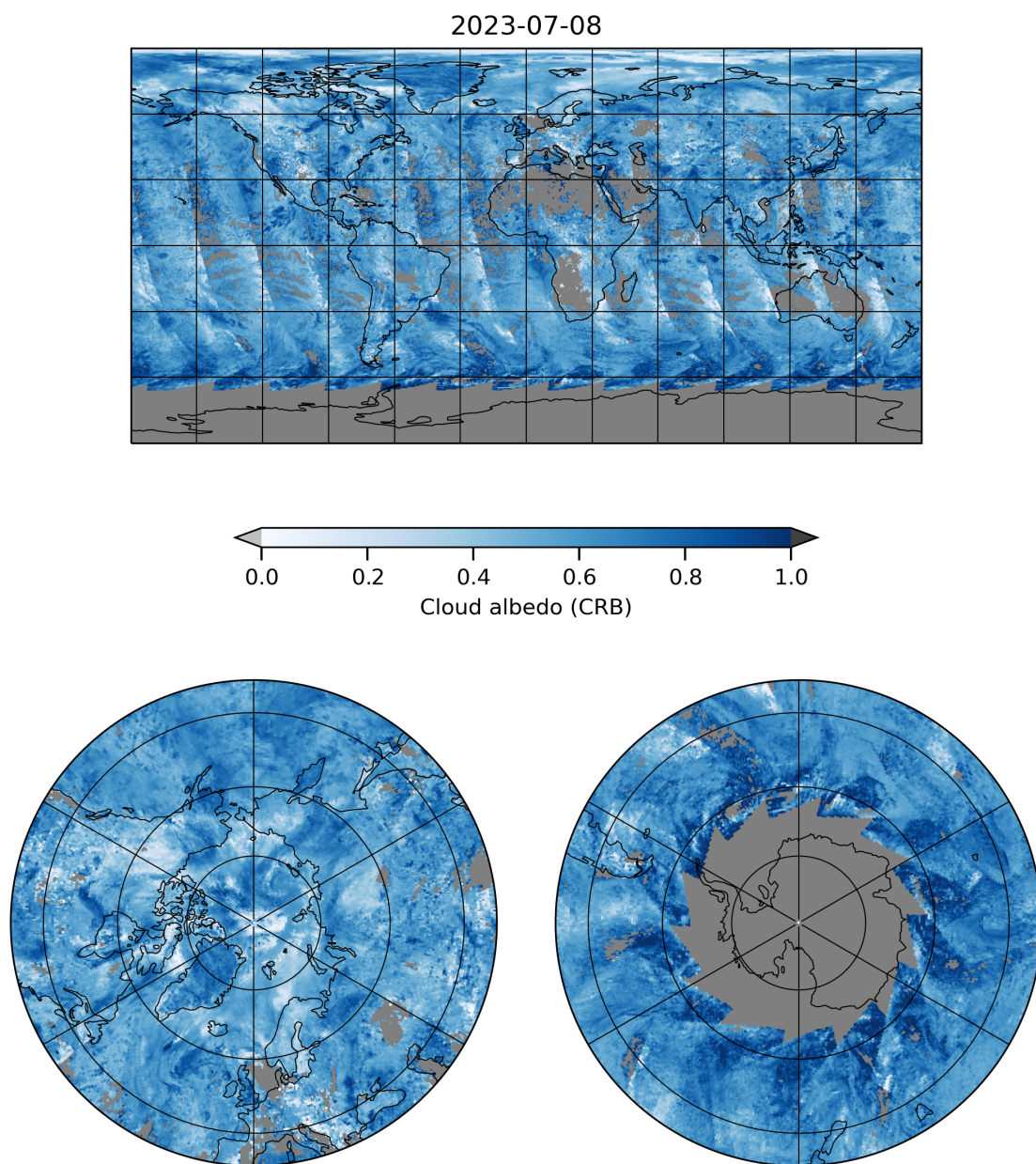


Figure 11: Map of “Cloud albedo (CRB)” for 2023-07-08 to 2023-07-09

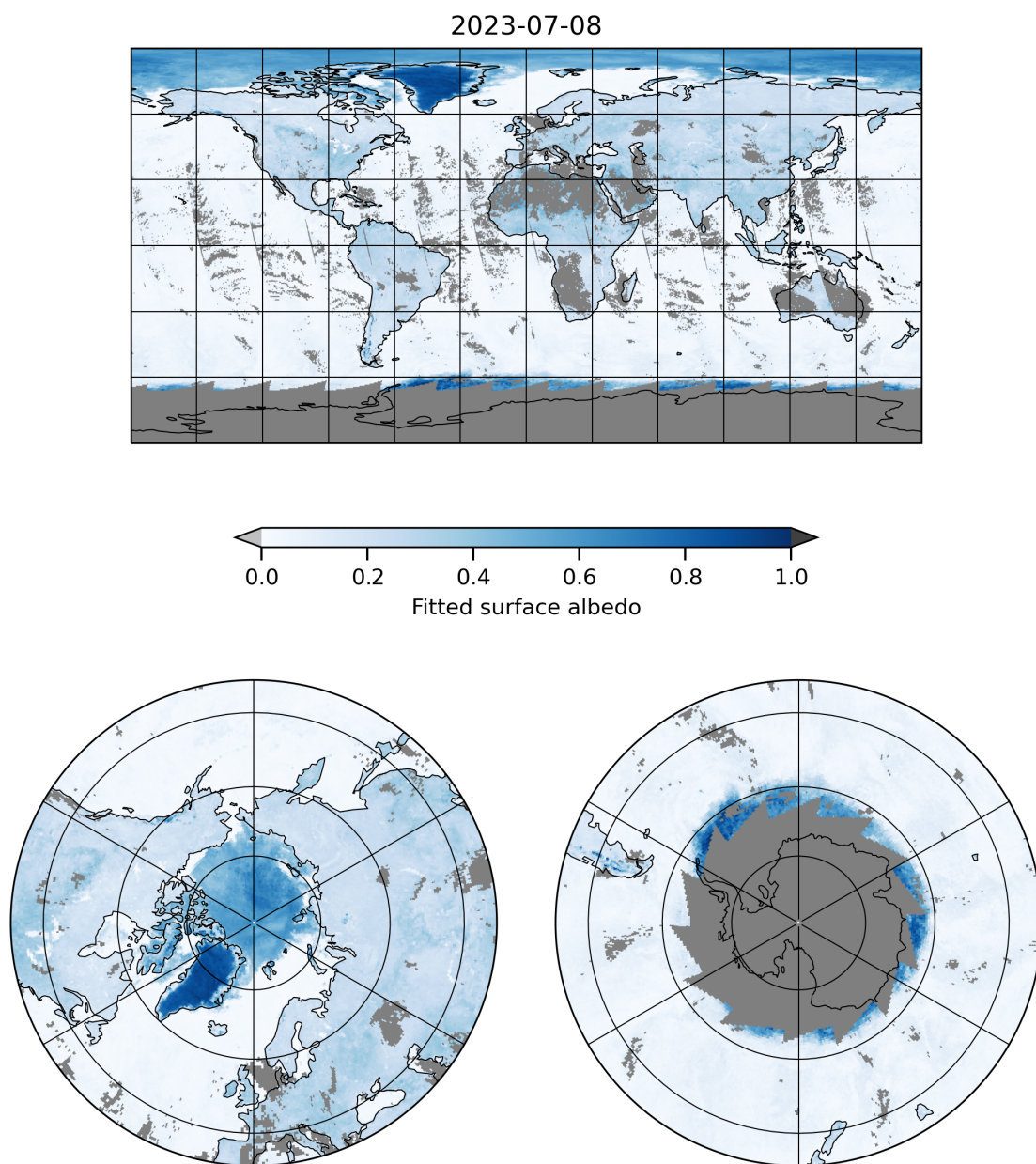


Figure 12: Map of “Fitted surface albedo” for 2023-07-08 to 2023-07-09

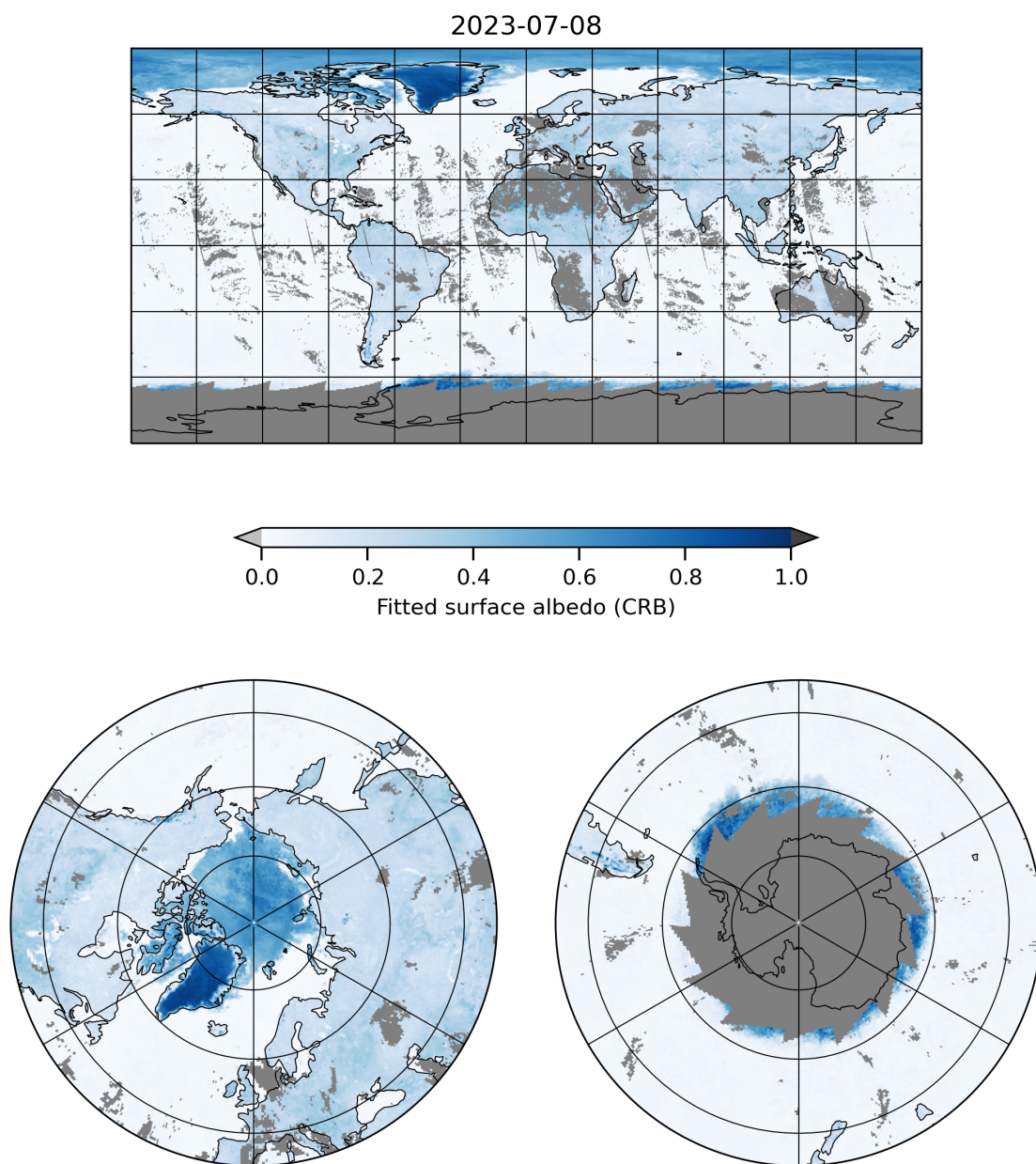


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-07-08 to 2023-07-09

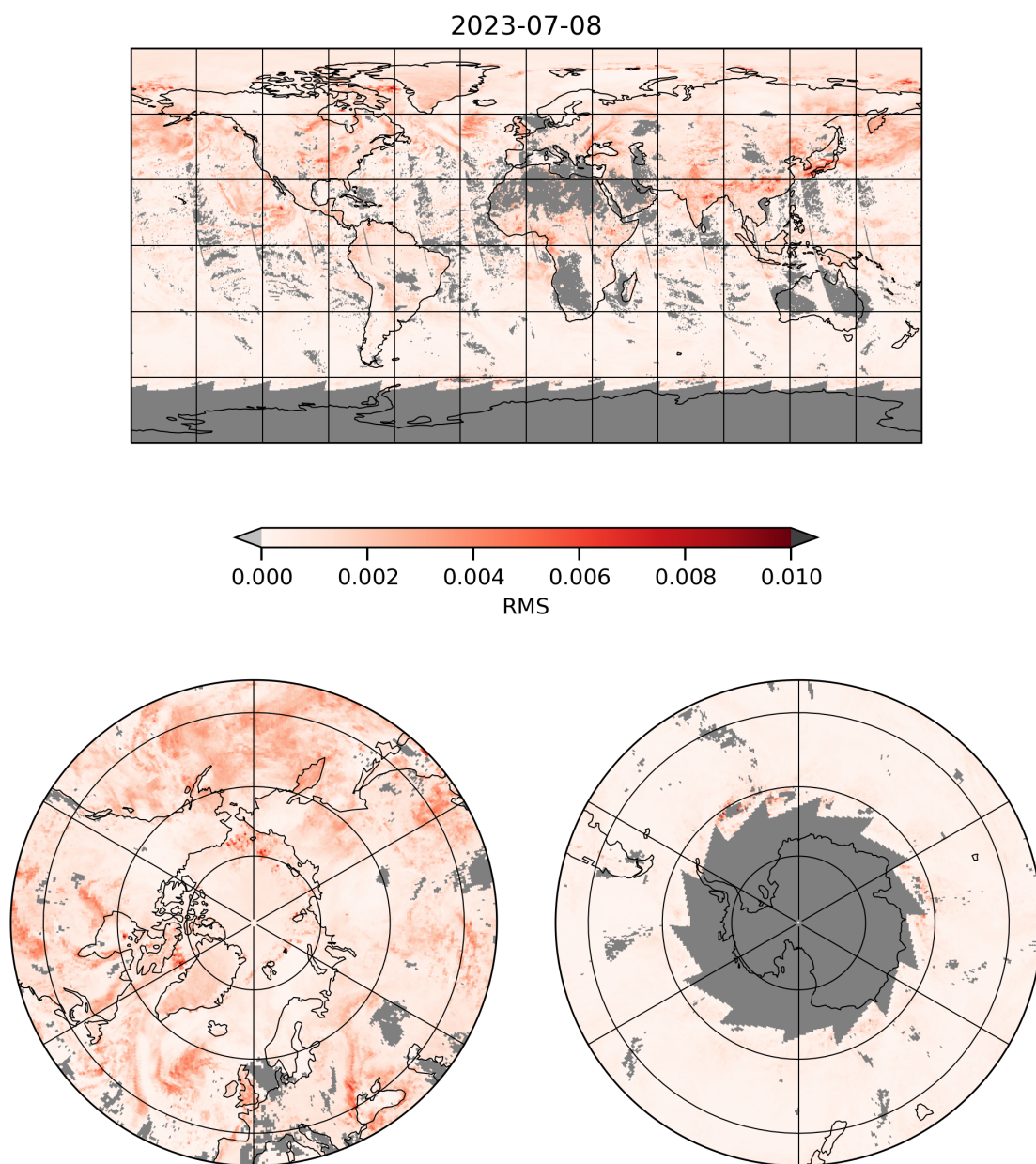


Figure 14: Map of “RMS” for 2023-07-08 to 2023-07-09

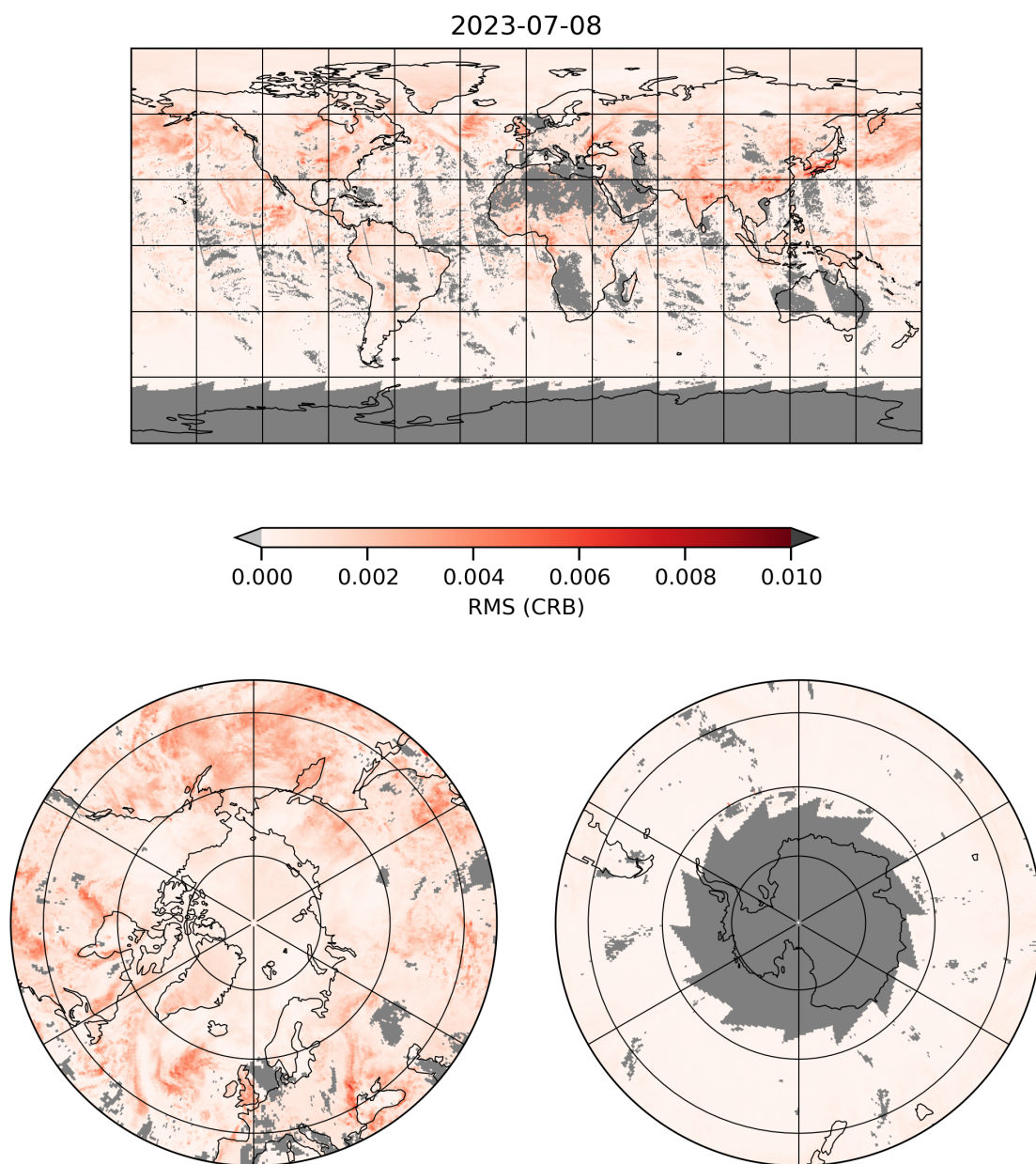


Figure 15: Map of “RMS (CRB)” for 2023-07-08 to 2023-07-09

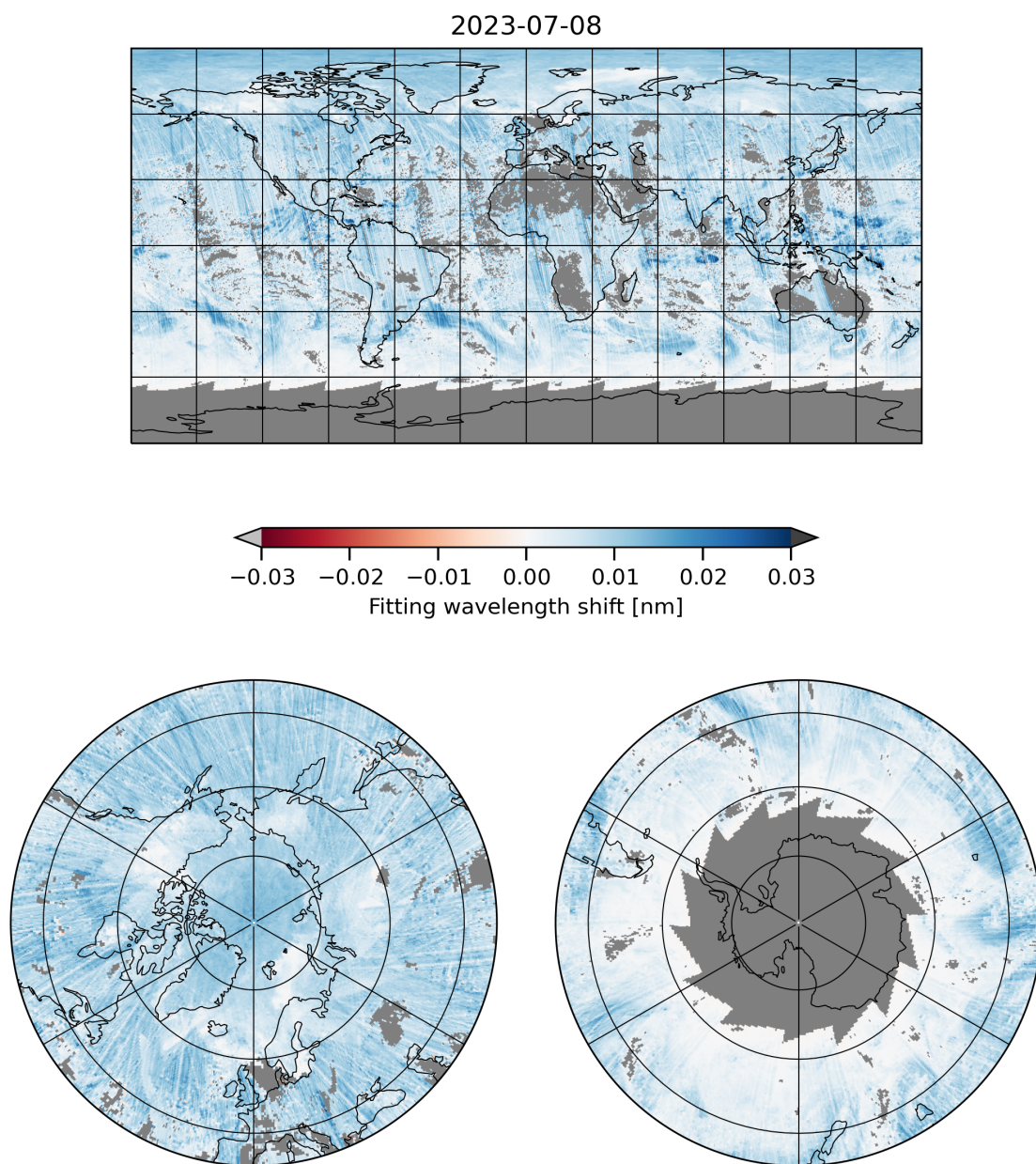


Figure 16: Map of “Fitting wavelength shift” for 2023-07-08 to 2023-07-09

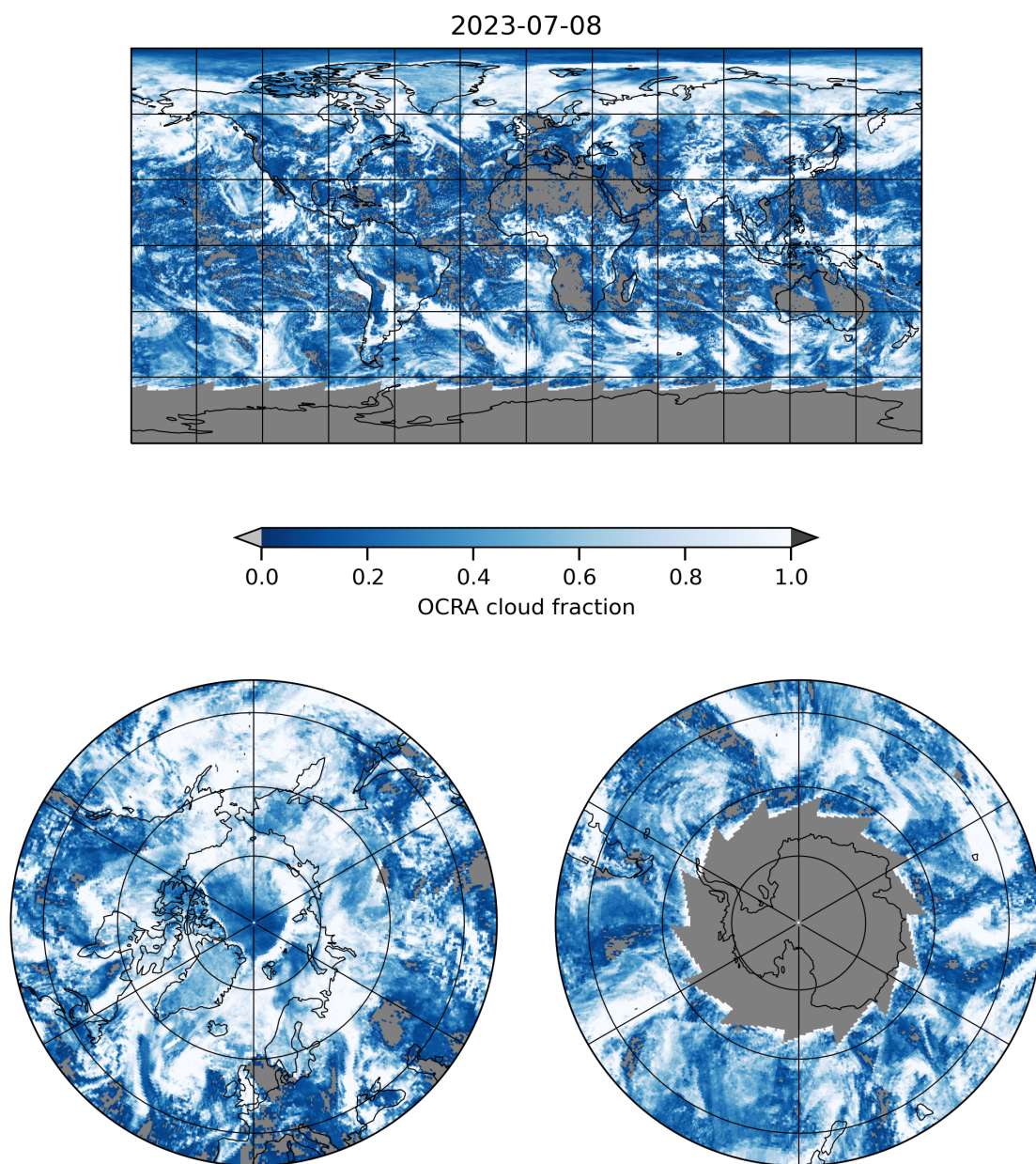


Figure 17: Map of “OCRA cloud fraction” for 2023-07-08 to 2023-07-09

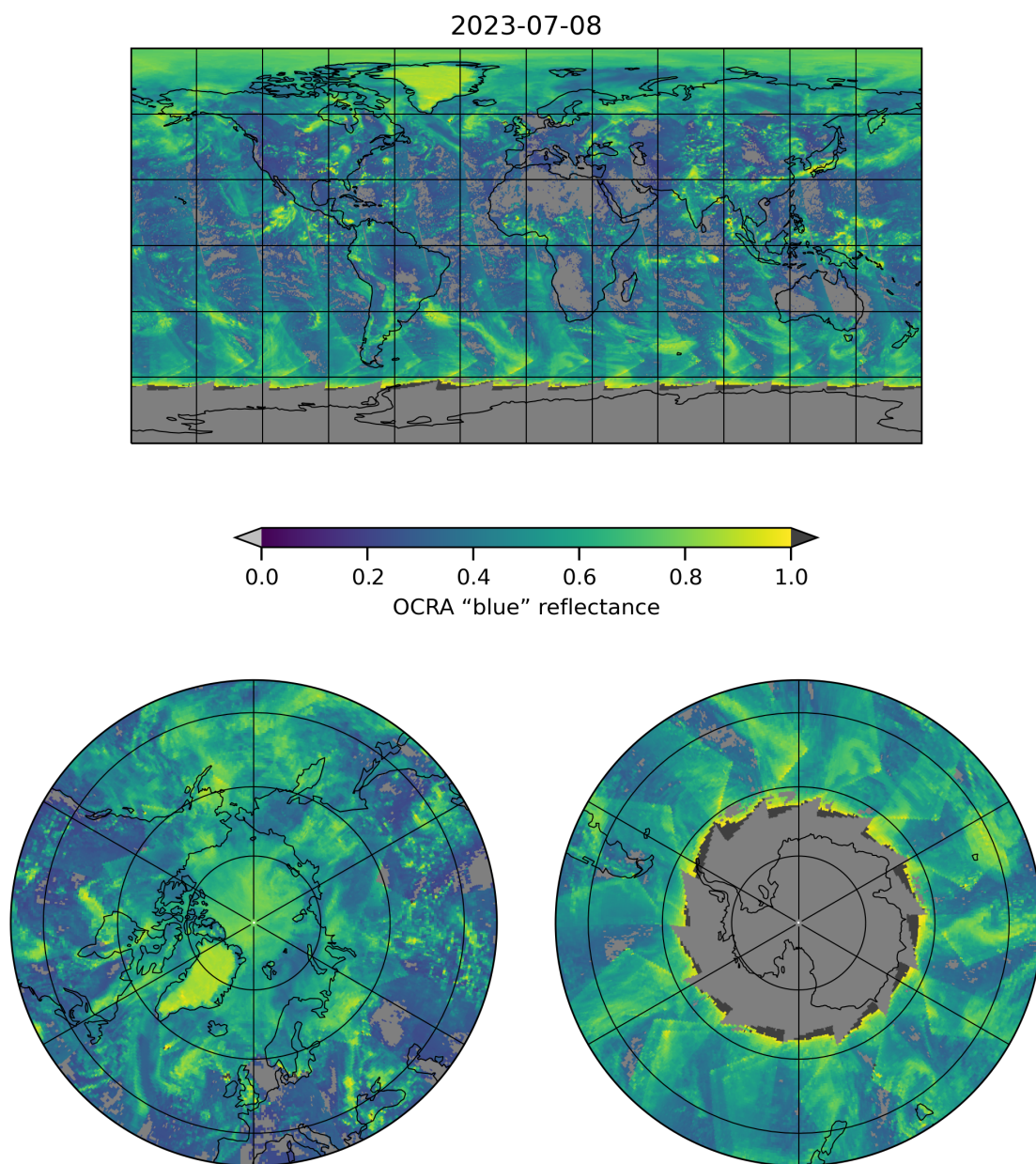


Figure 18: Map of "OCRA "blue" reflectance" for 2023-07-08 to 2023-07-09

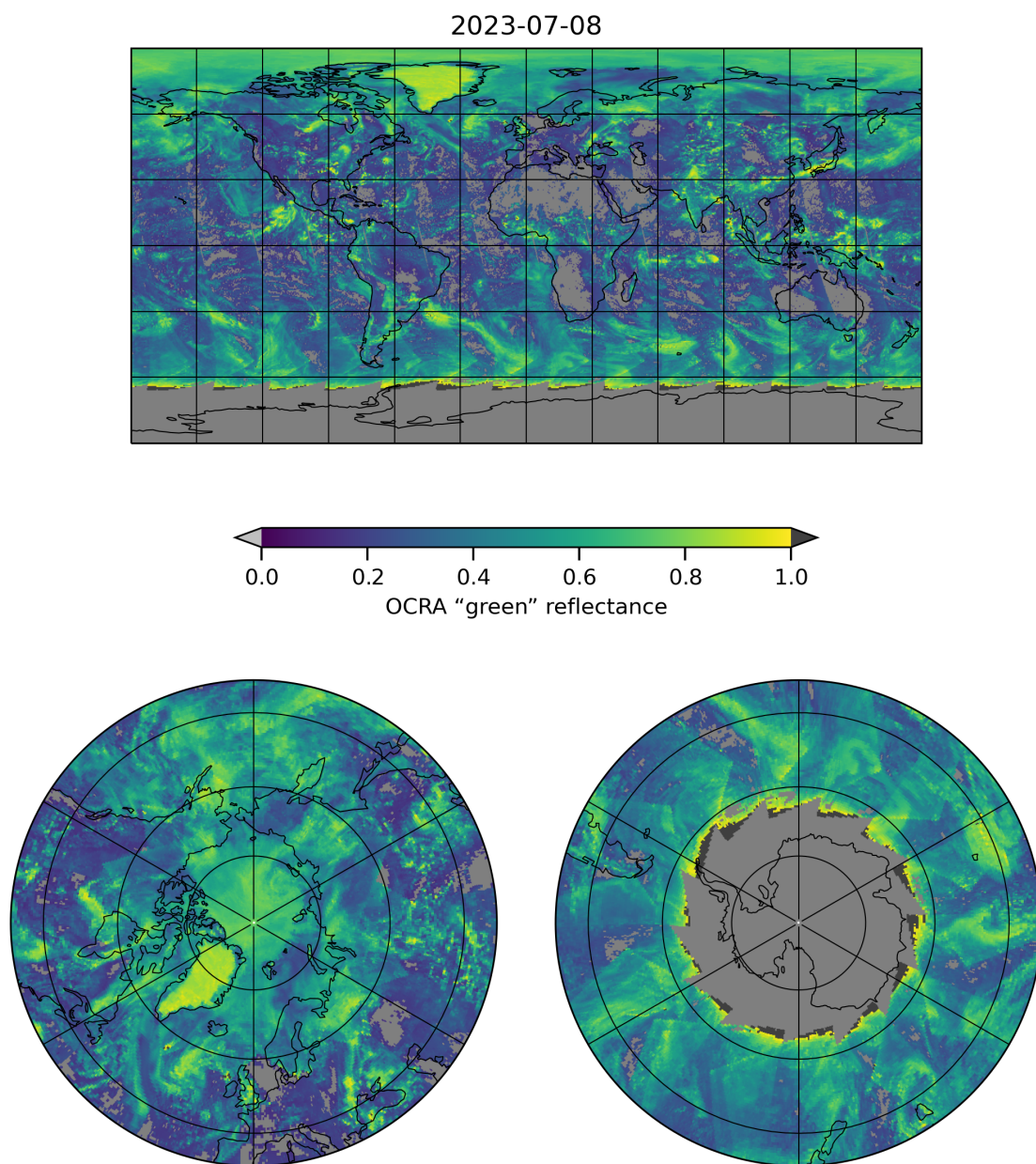


Figure 19: Map of "OCRA "green" reflectance" for 2023-07-08 to 2023-07-09

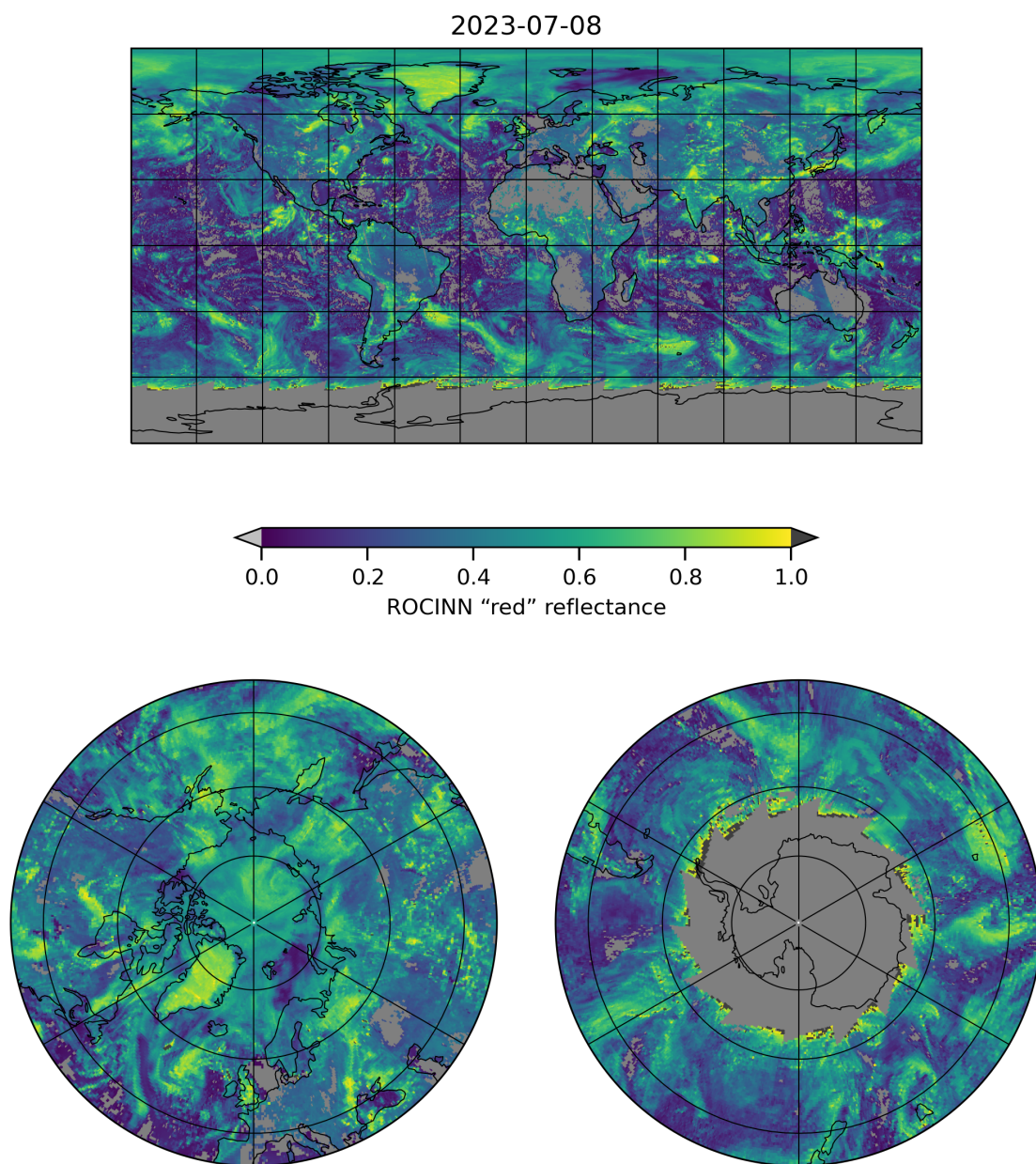


Figure 20: Map of "ROCINN "red" reflectance" for 2023-07-08 to 2023-07-09

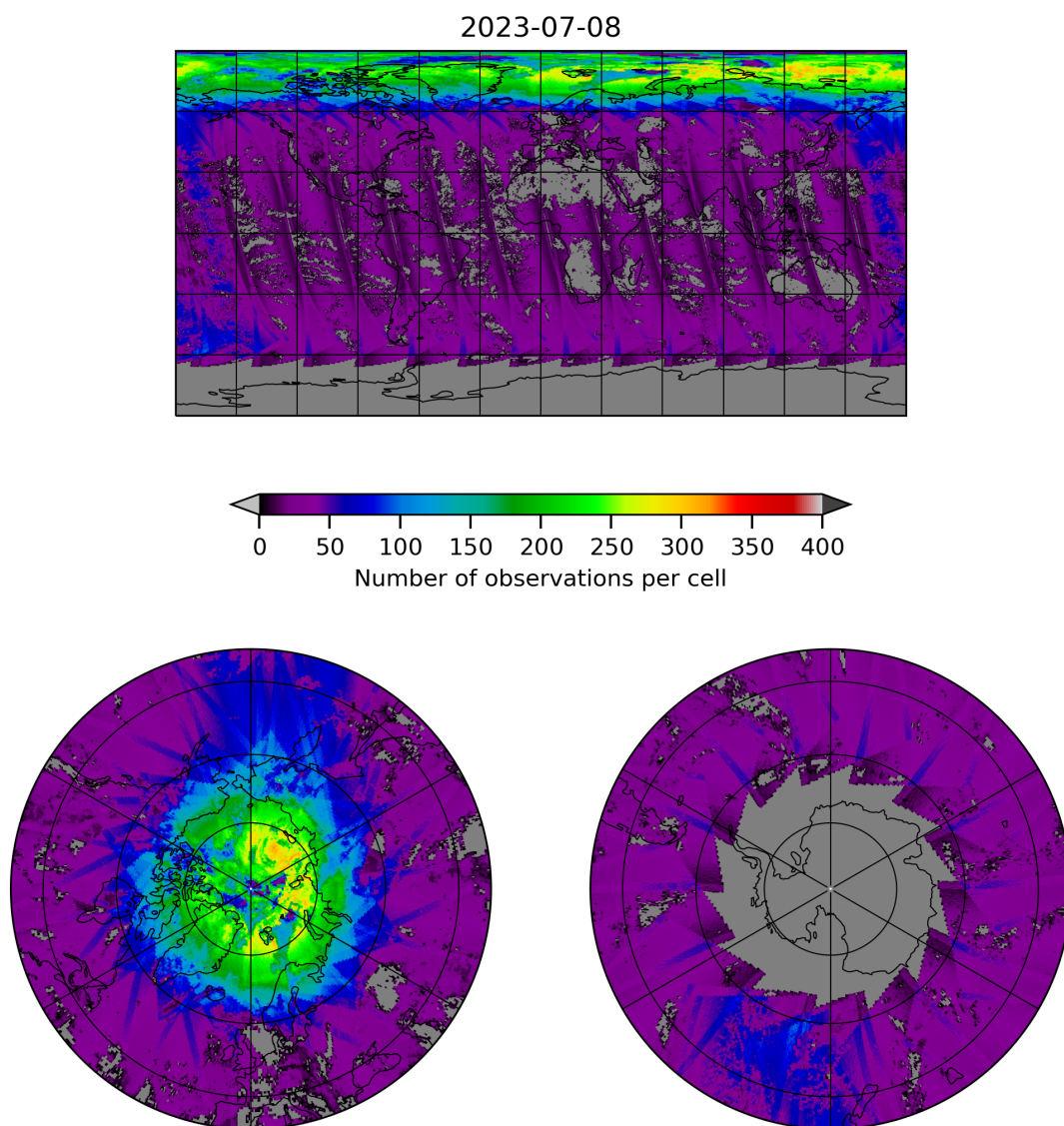


Figure 21: Map of the number of observations for 2023-07-08 to 2023-07-09

7 Zonal average

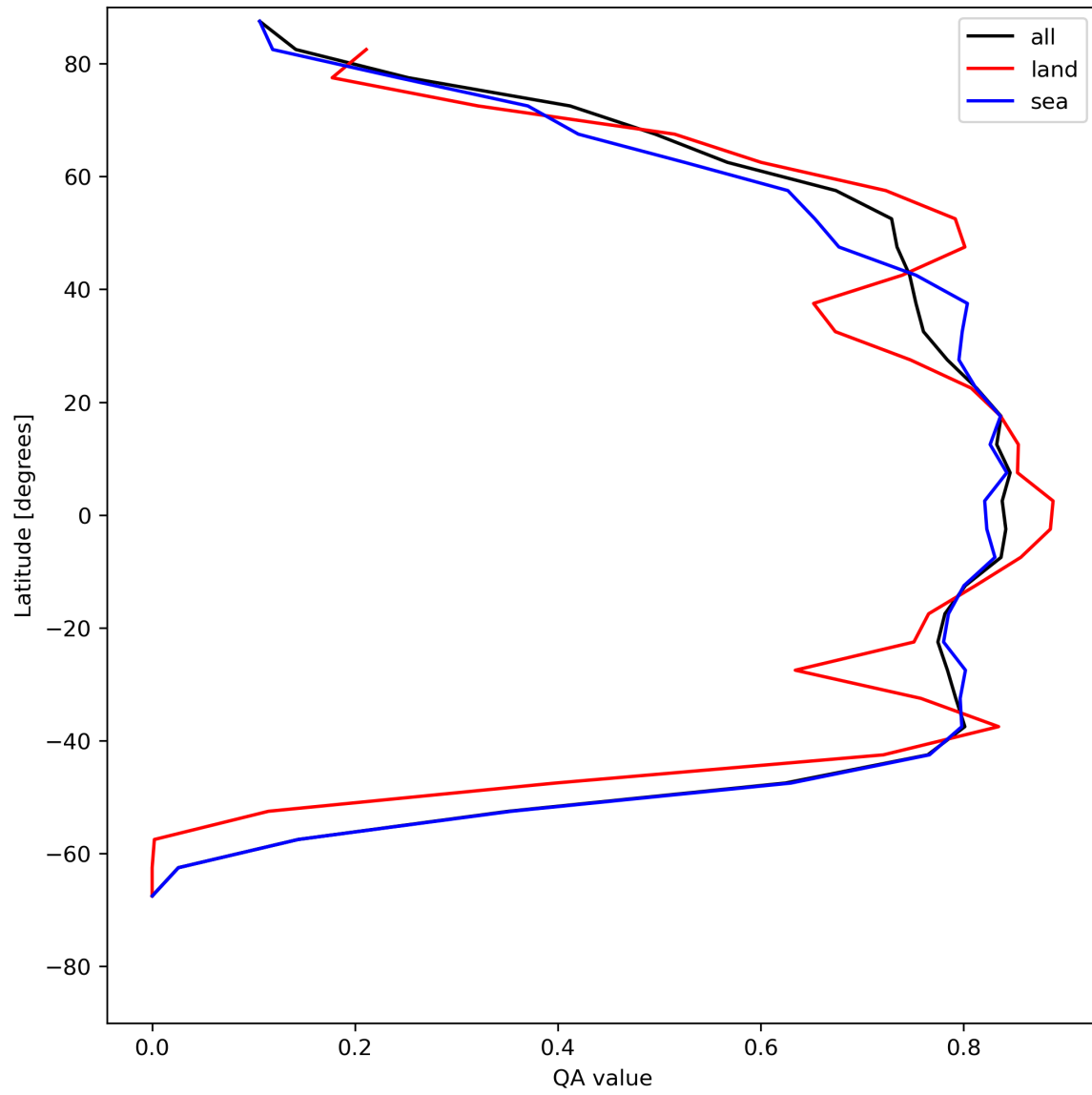


Figure 22: Zonal average of “QA value” for 2023-07-08 to 2023-07-09.

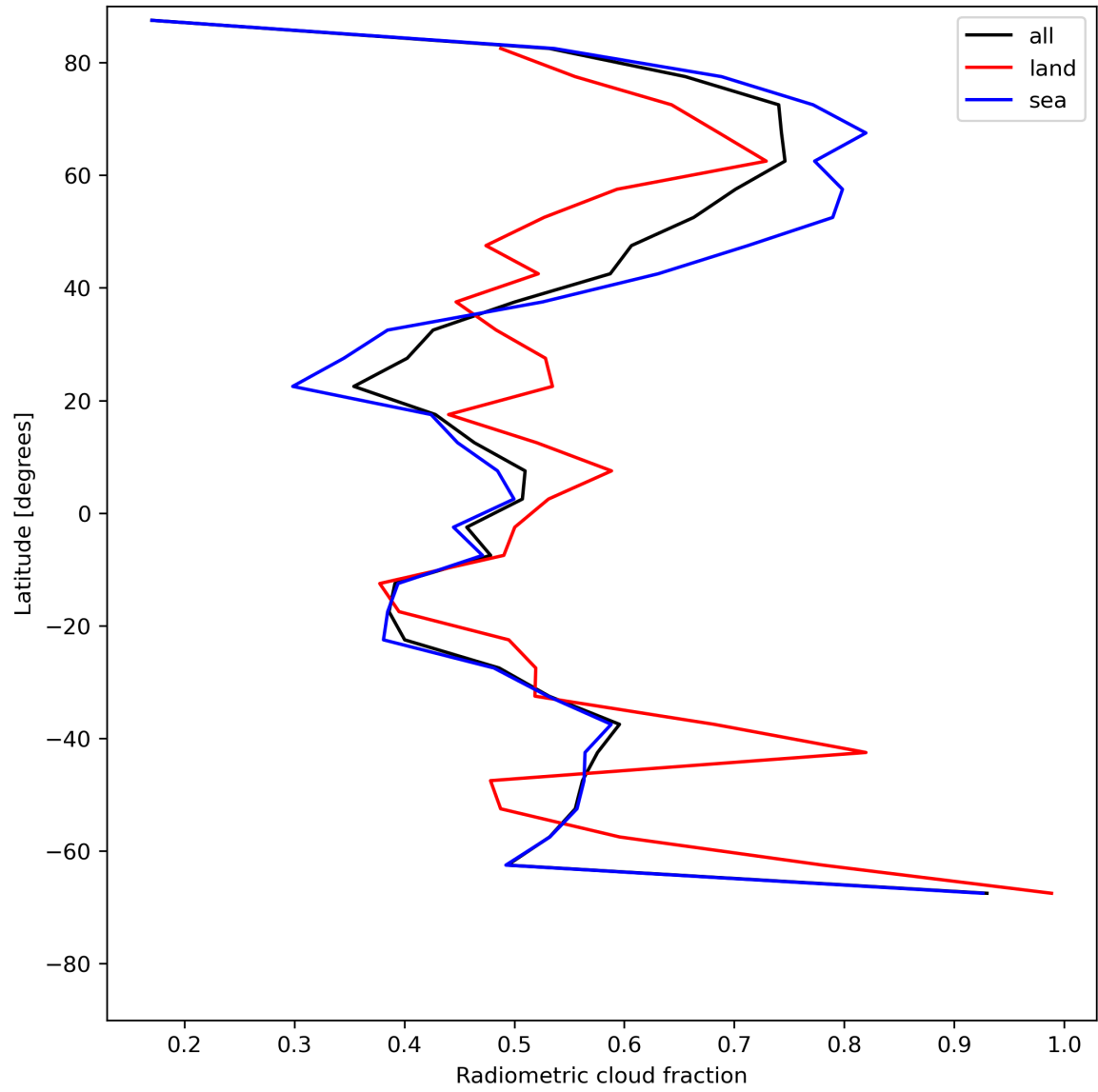


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-07-08 to 2023-07-09.

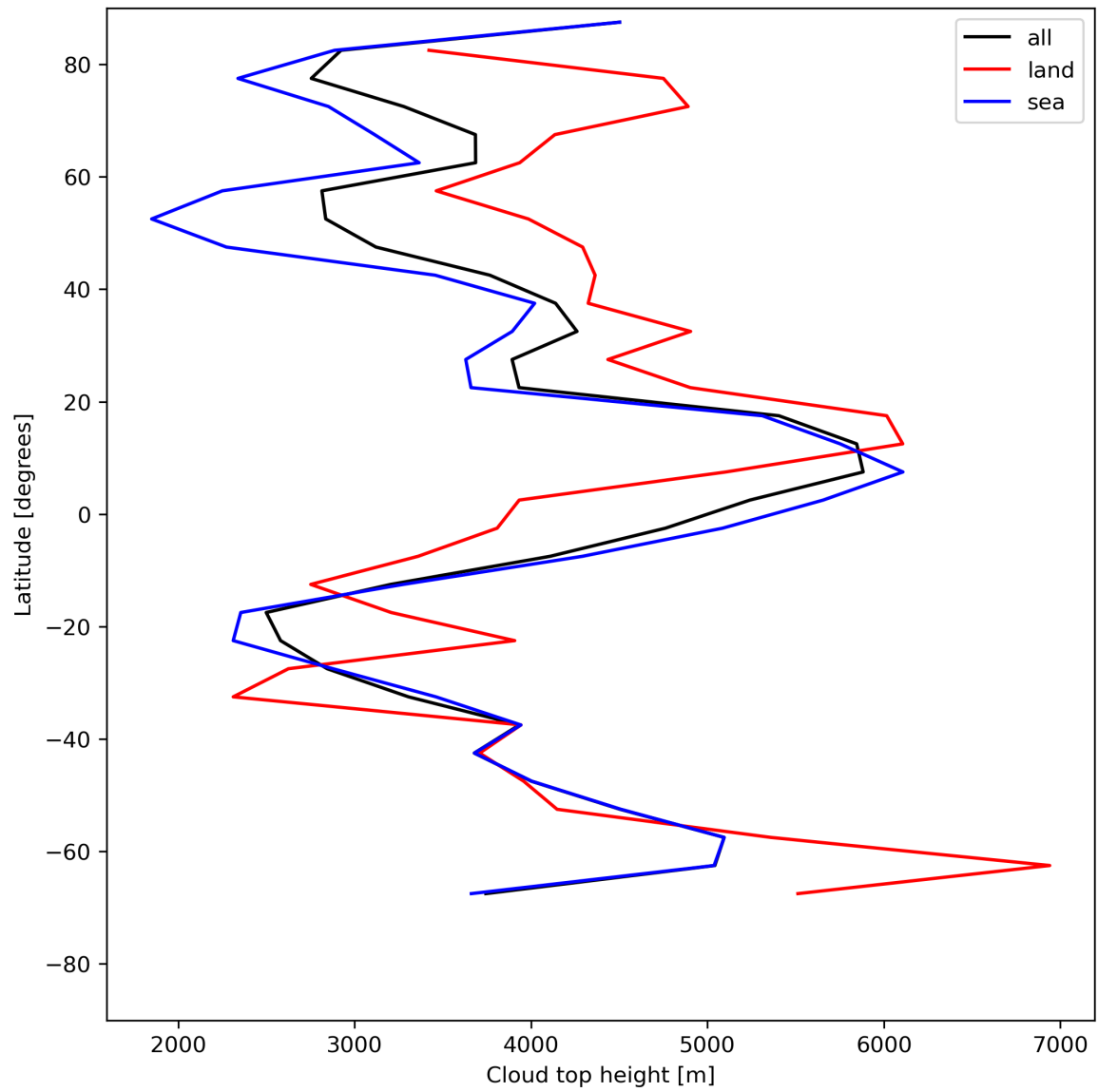


Figure 24: Zonal average of “Cloud top height” for 2023-07-08 to 2023-07-09.

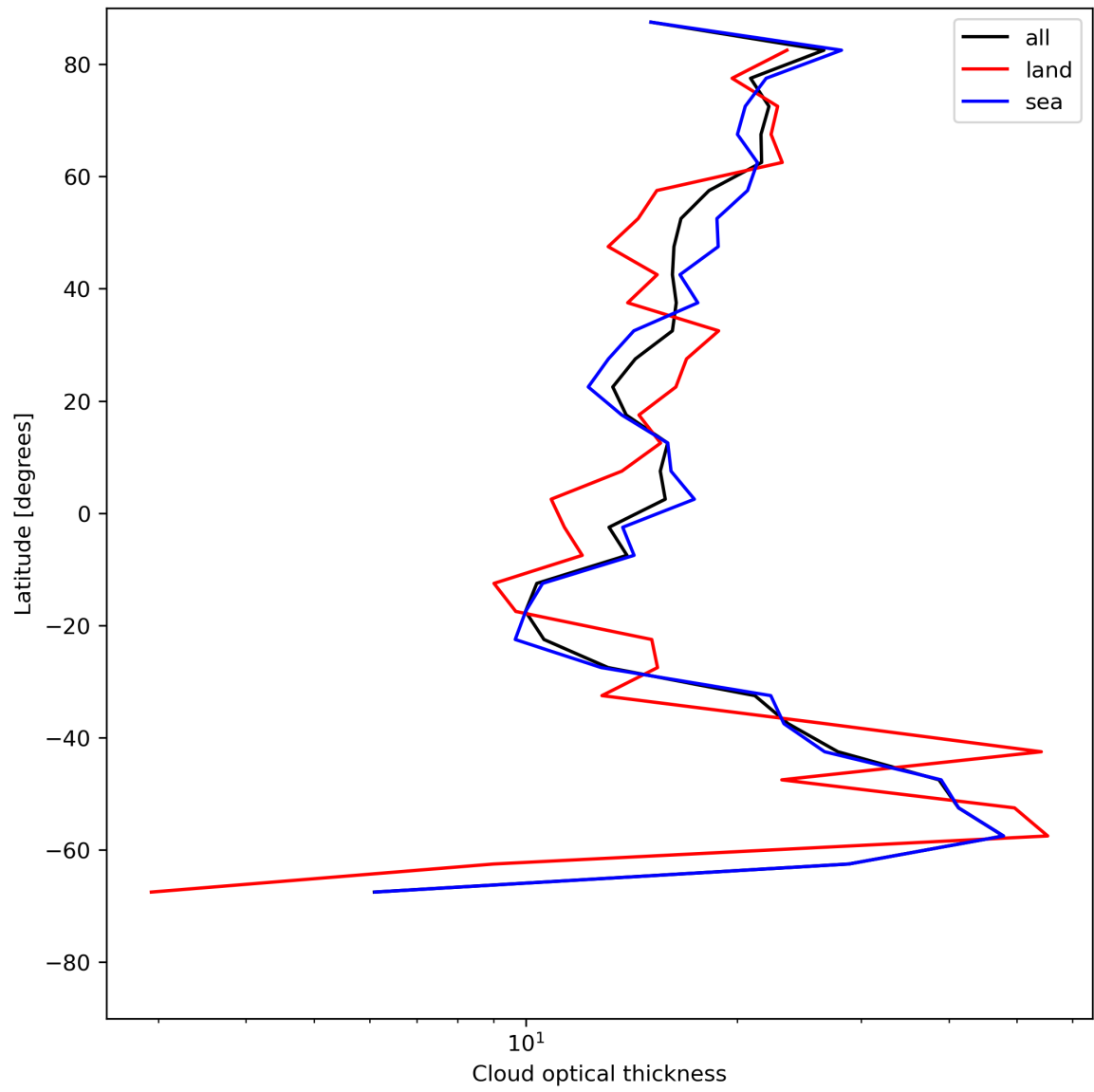


Figure 25: Zonal average of “Cloud optical thickness” for 2023-07-08 to 2023-07-09.

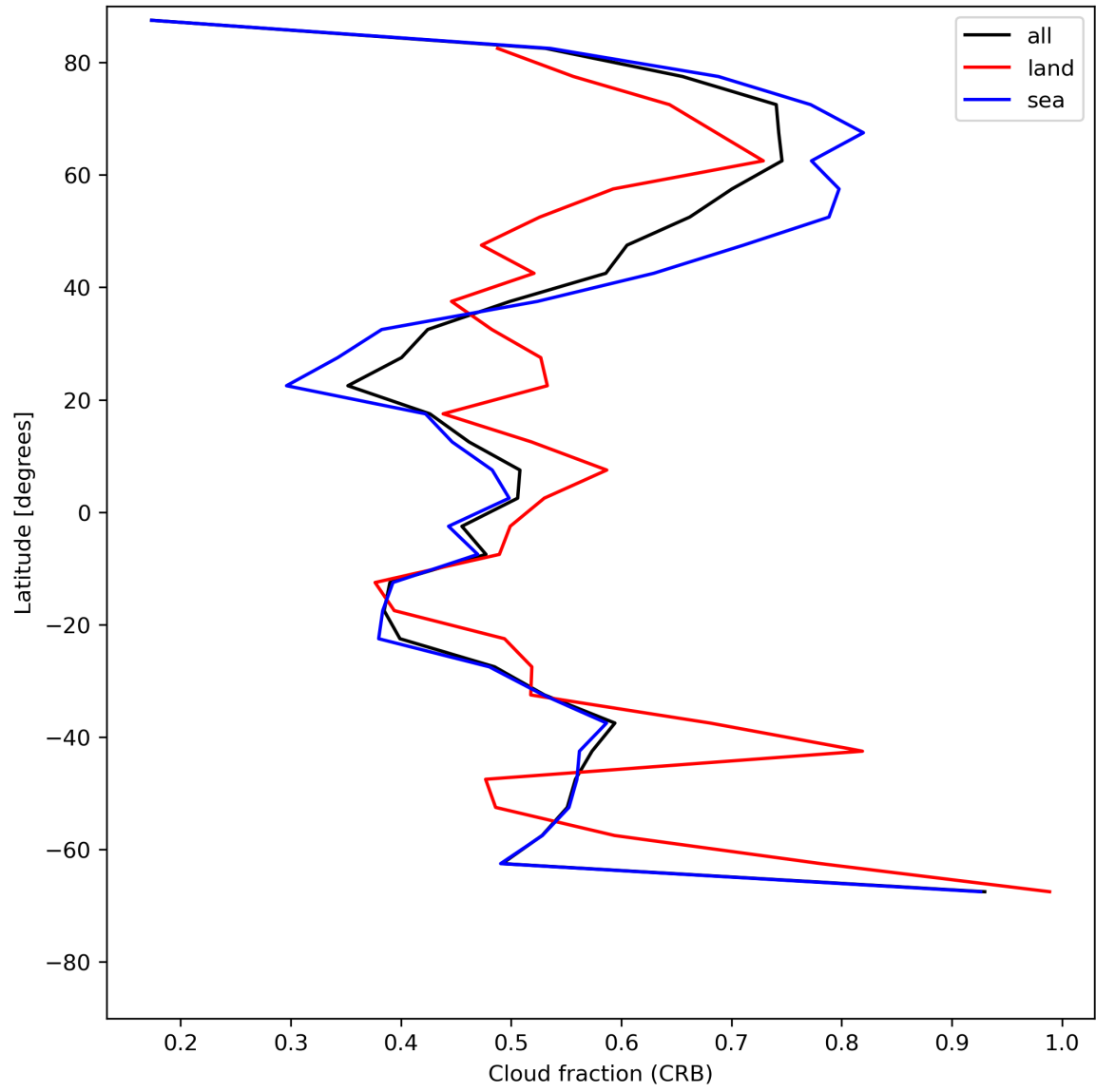


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-07-08 to 2023-07-09.

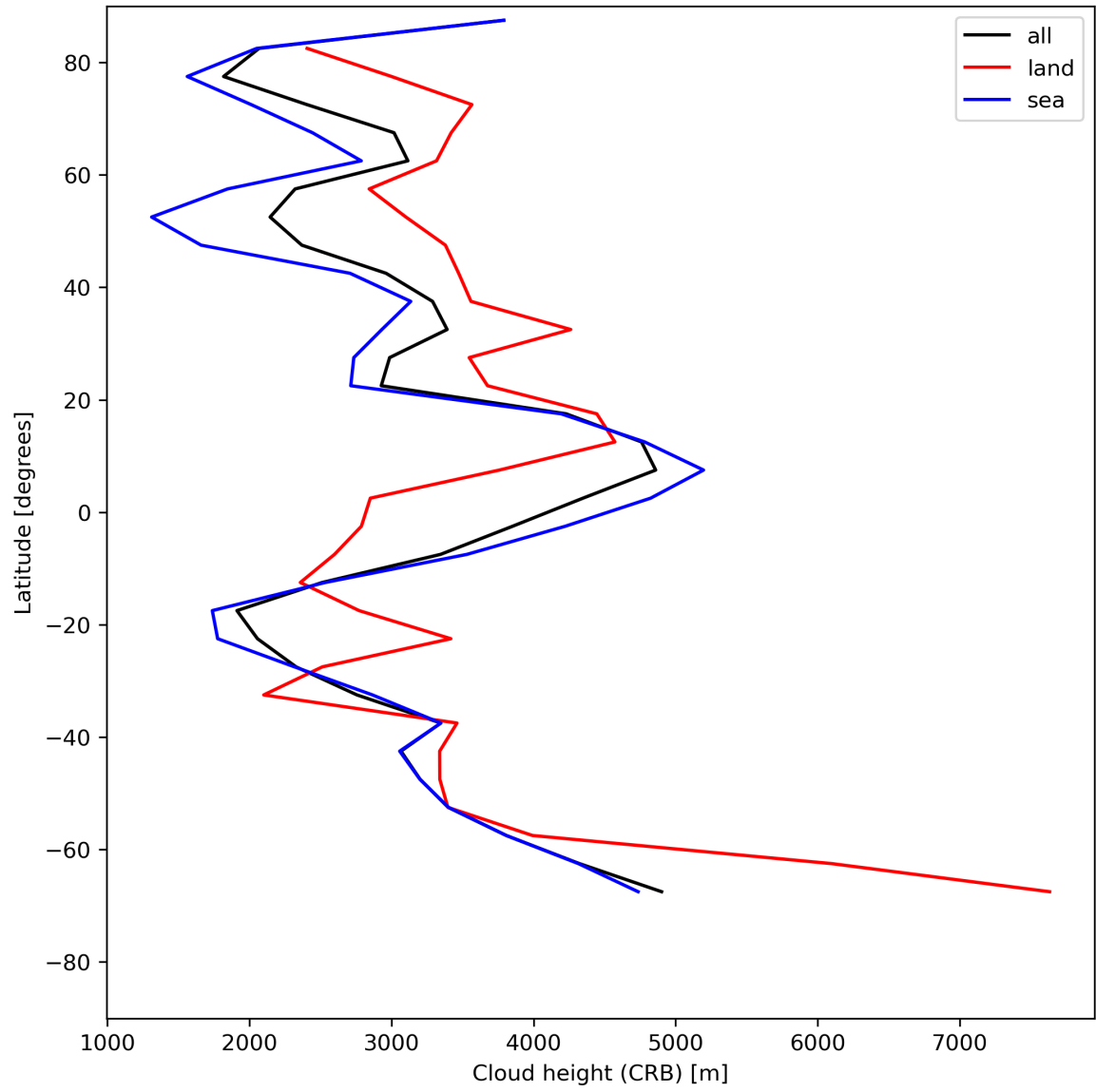


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-07-08 to 2023-07-09.

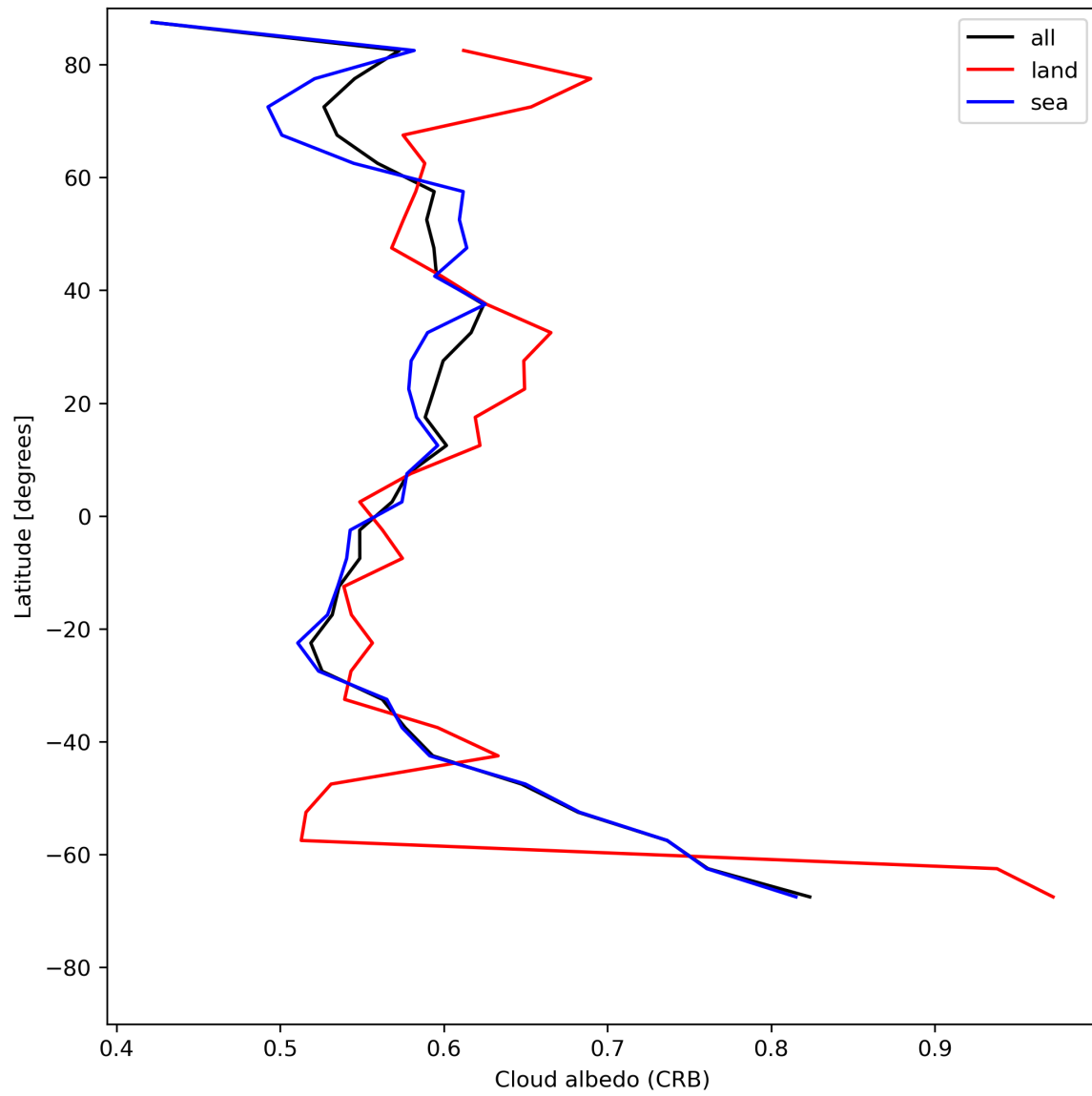


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-07-08 to 2023-07-09.

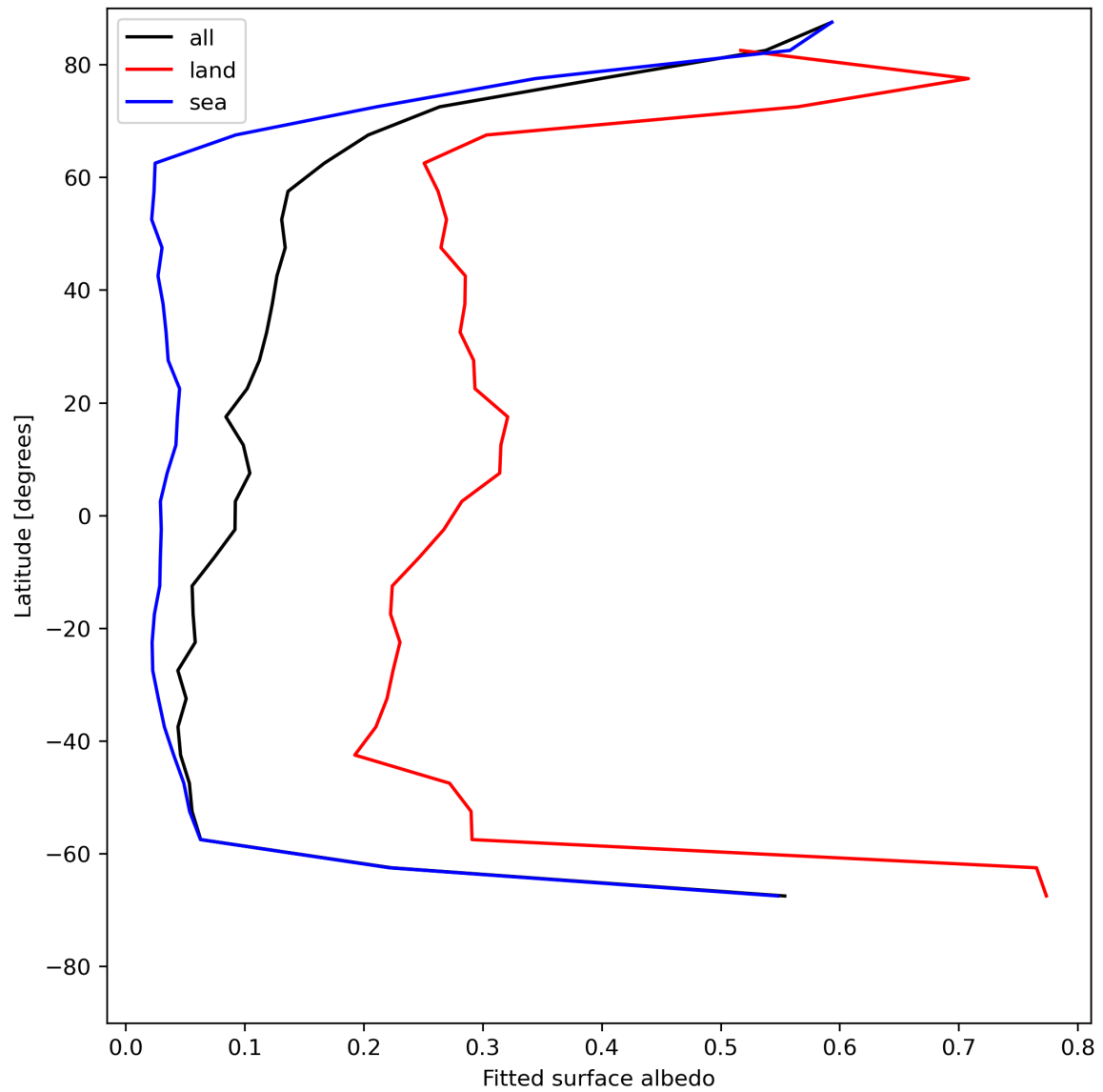


Figure 29: Zonal average of “Fitted surface albedo” for 2023-07-08 to 2023-07-09.

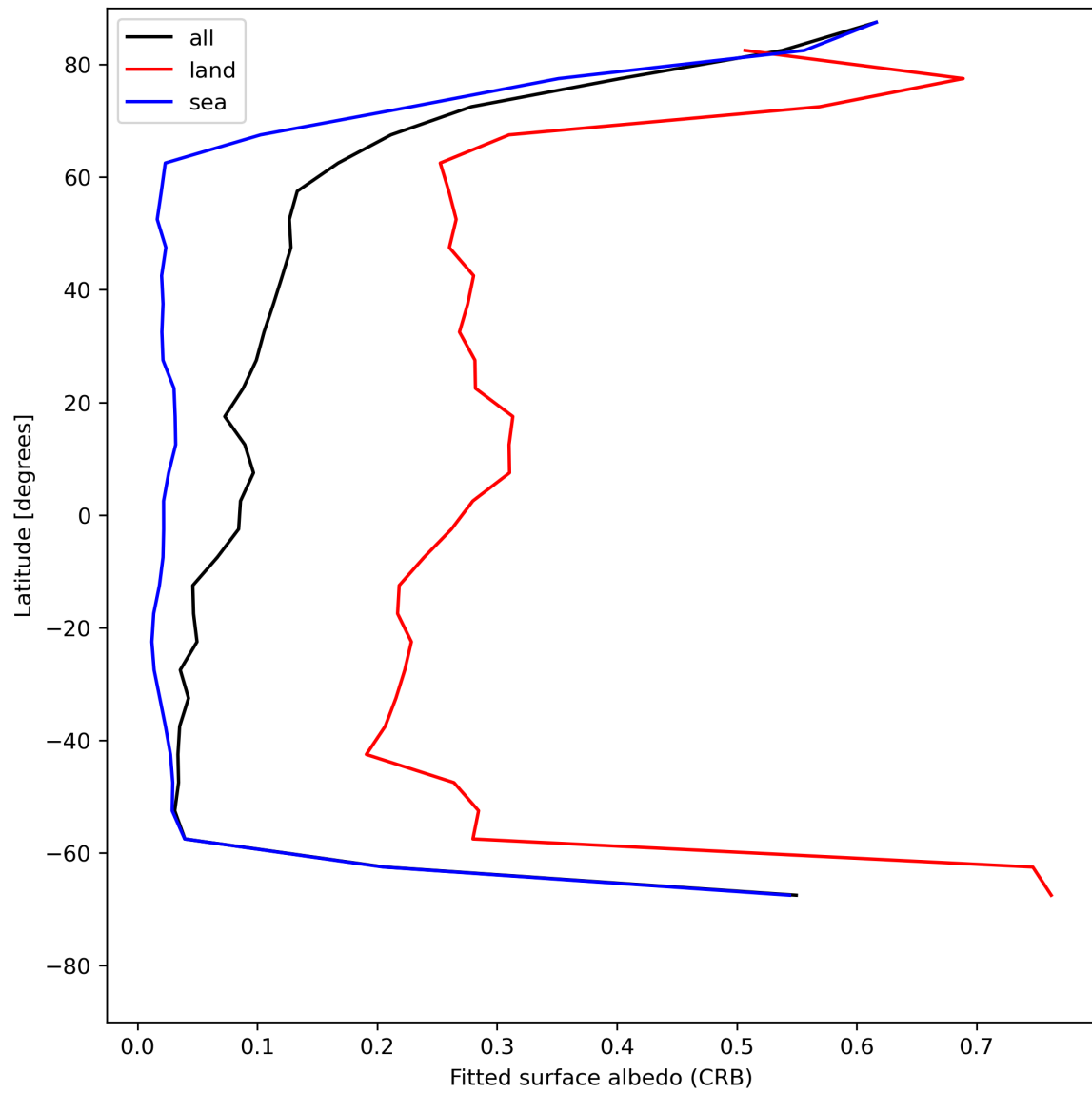


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-07-08 to 2023-07-09.

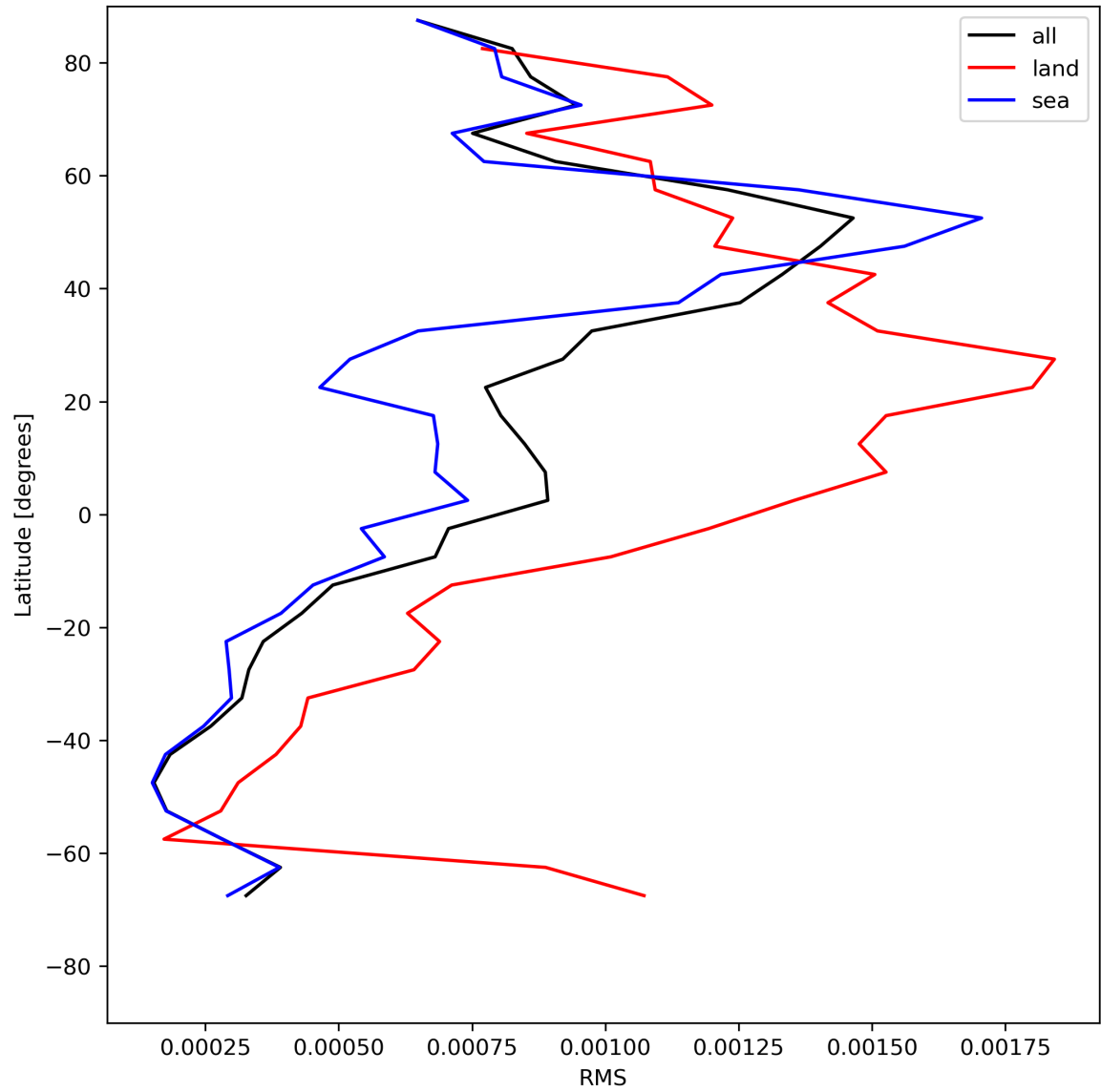


Figure 31: Zonal average of “RMS” for 2023-07-08 to 2023-07-09.

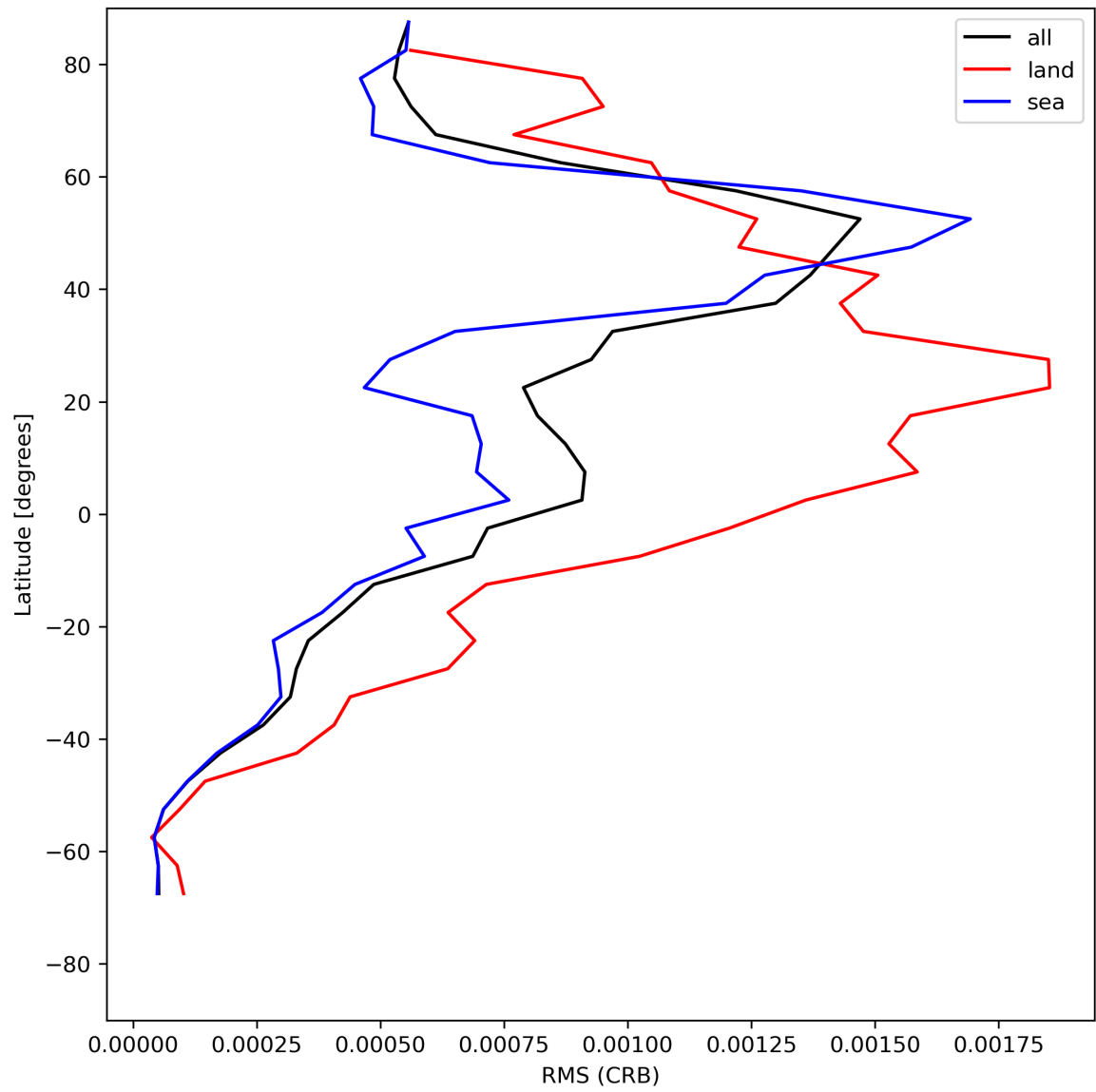


Figure 32: Zonal average of “RMS (CRB)” for 2023-07-08 to 2023-07-09.

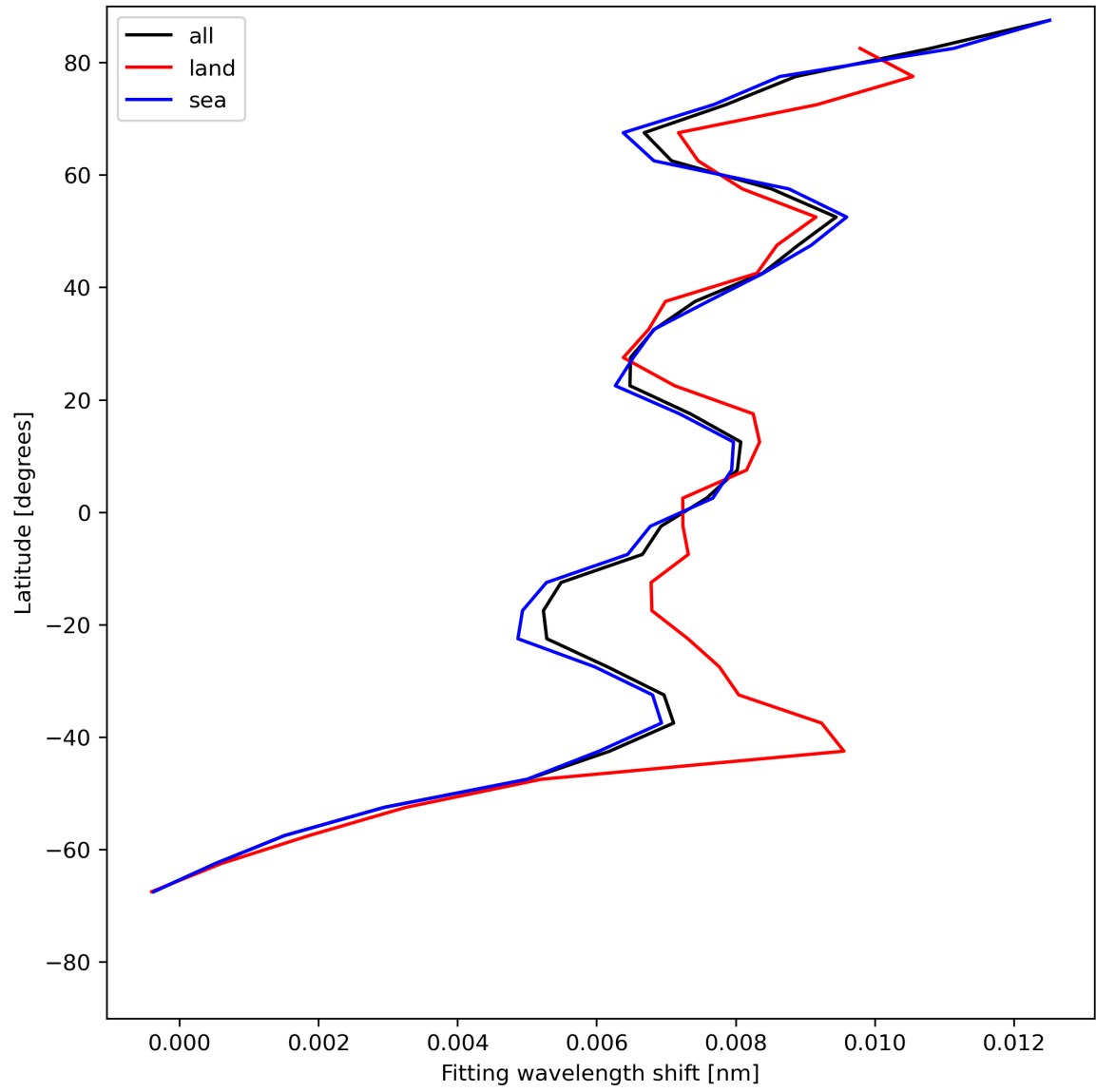


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-07-08 to 2023-07-09.

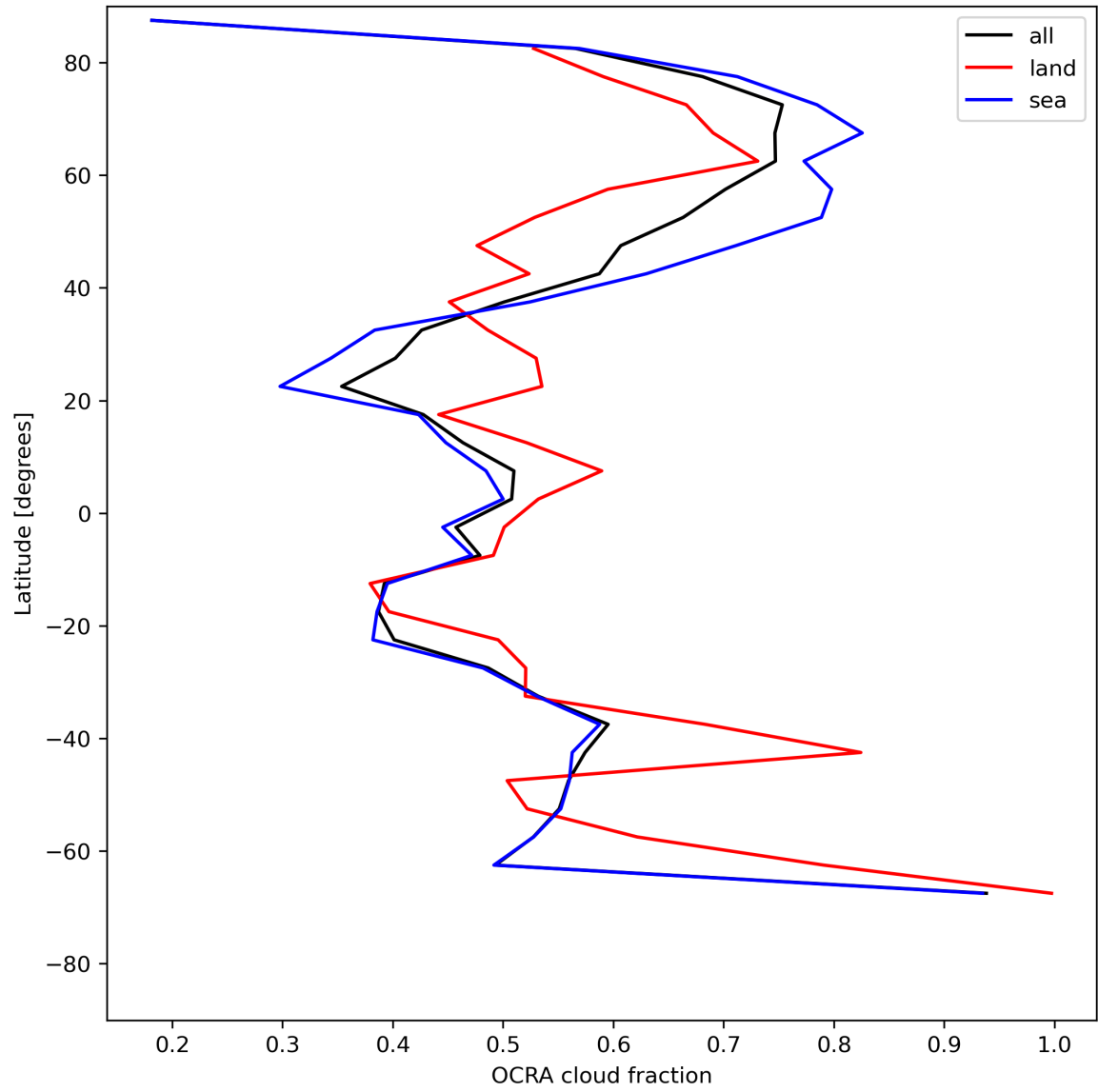


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-07-08 to 2023-07-09.

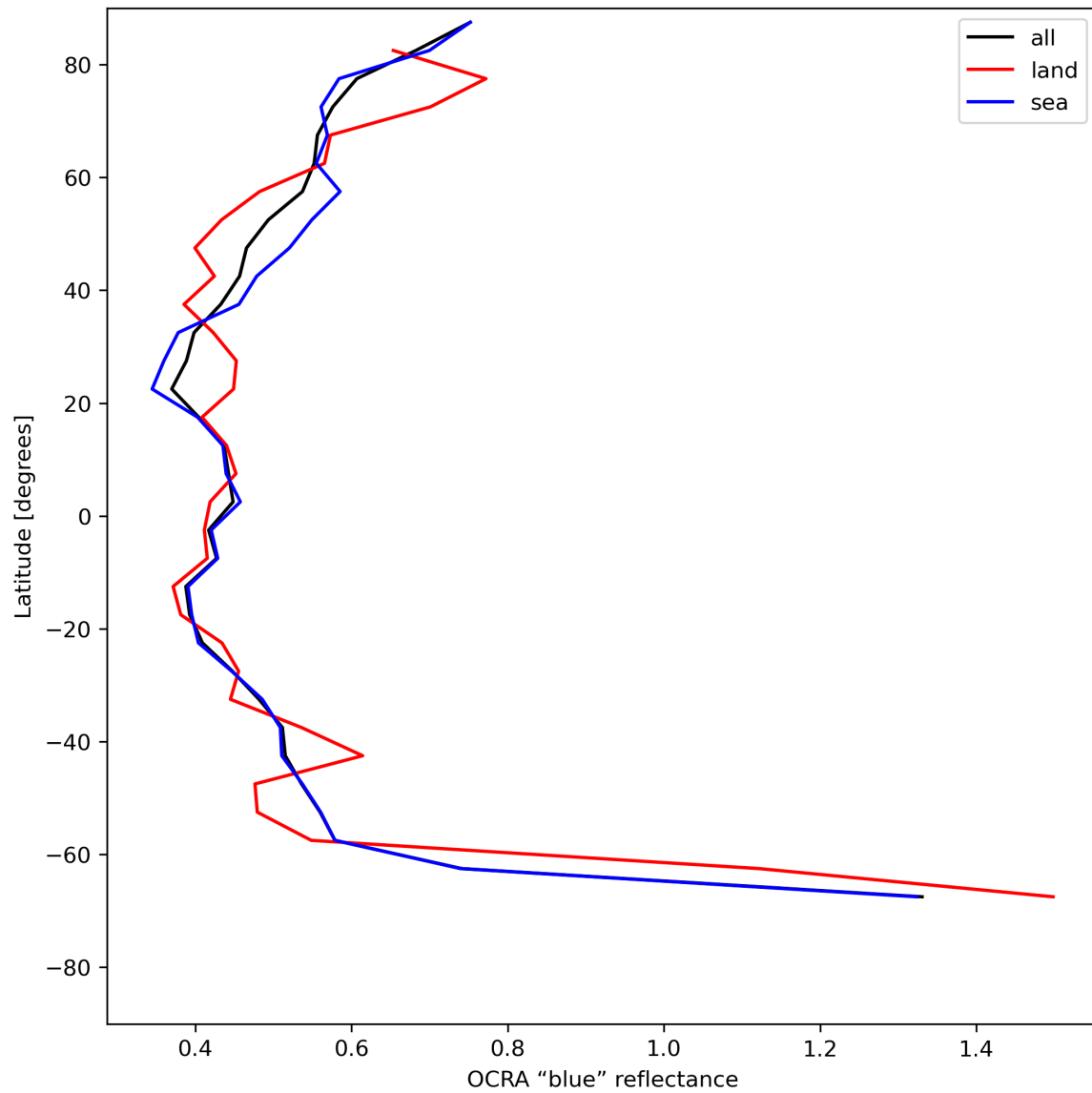


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-07-08 to 2023-07-09.

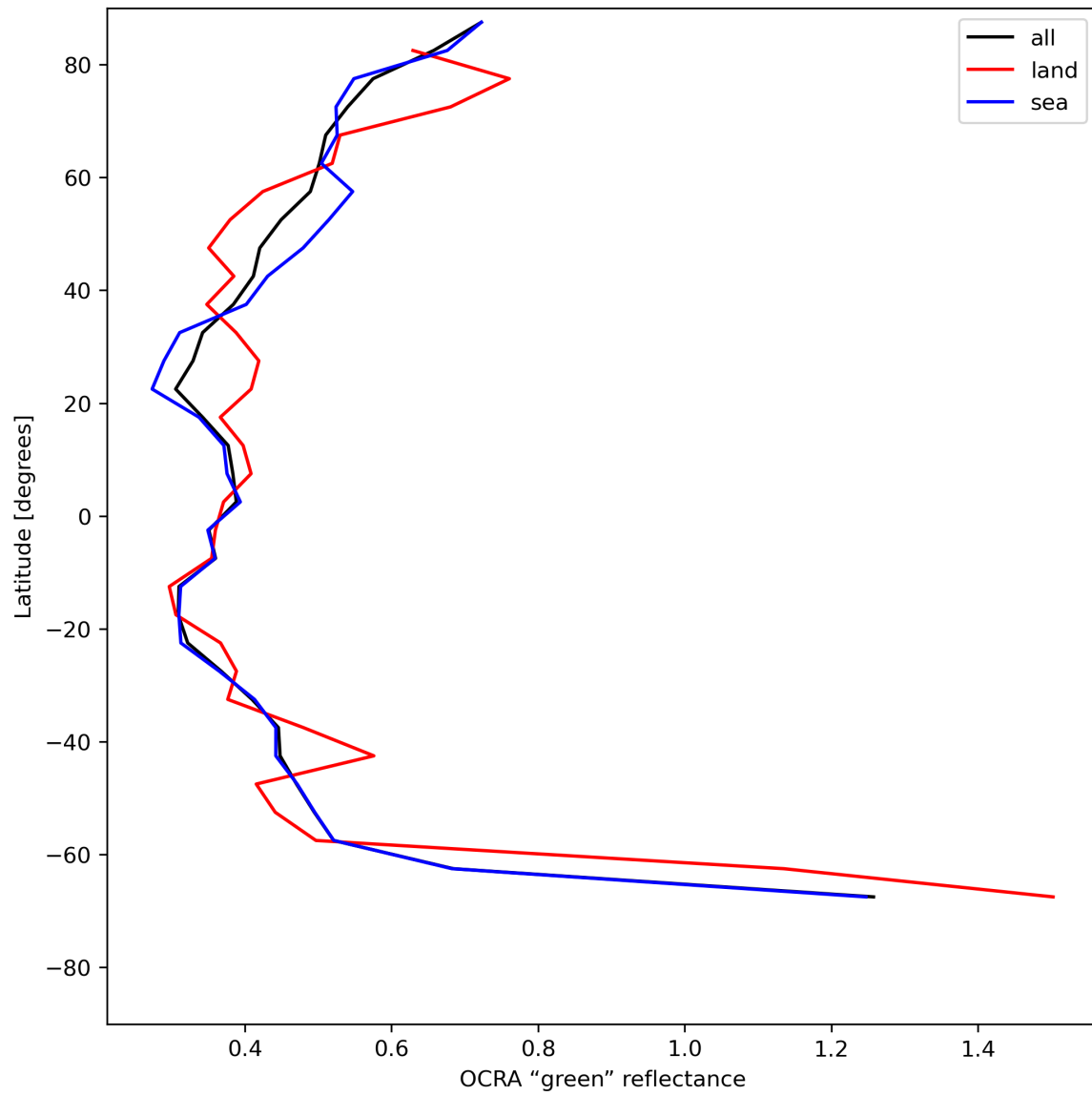


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-07-08 to 2023-07-09.

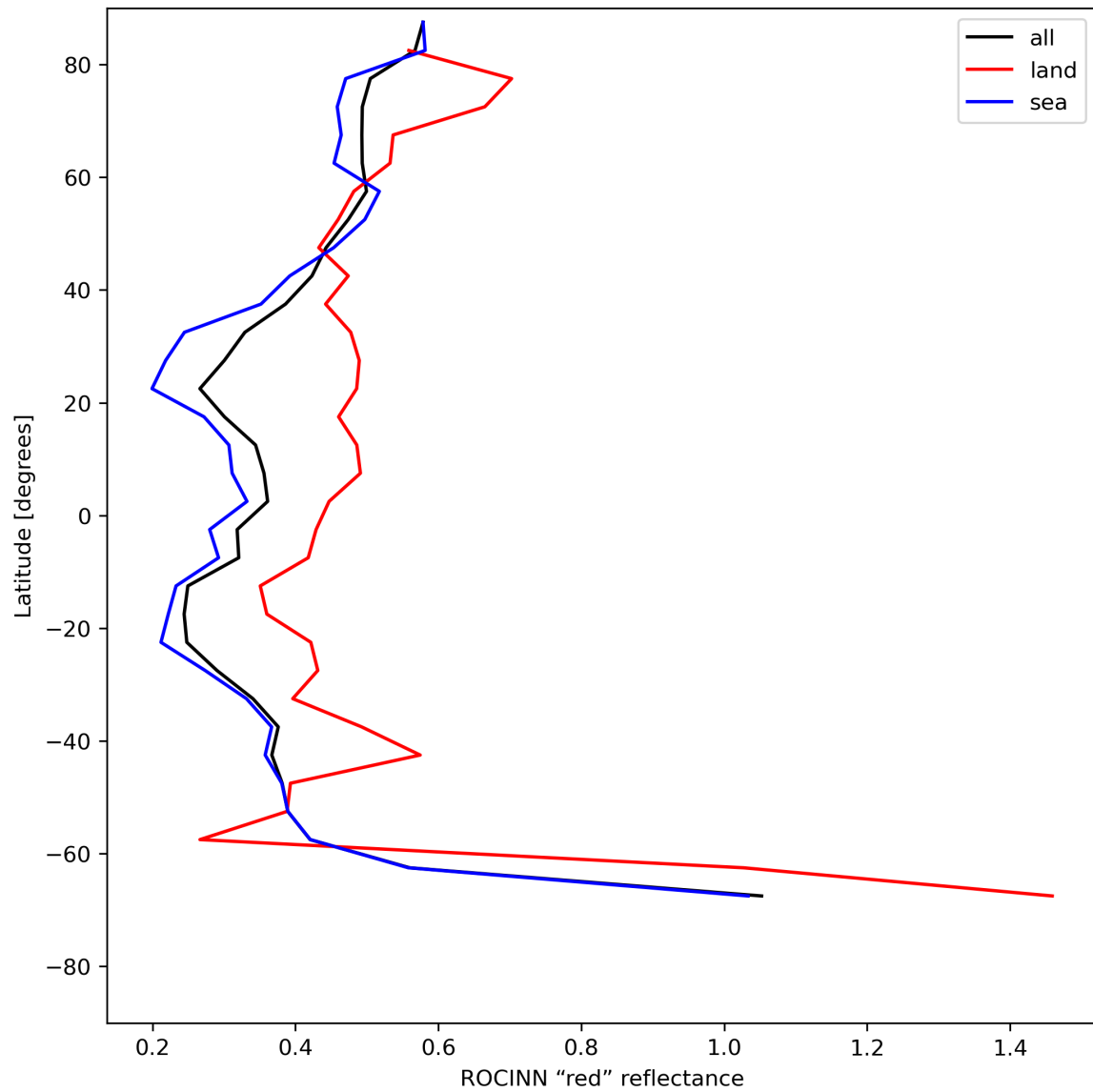


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-07-08 to 2023-07-09.

8 Histograms

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

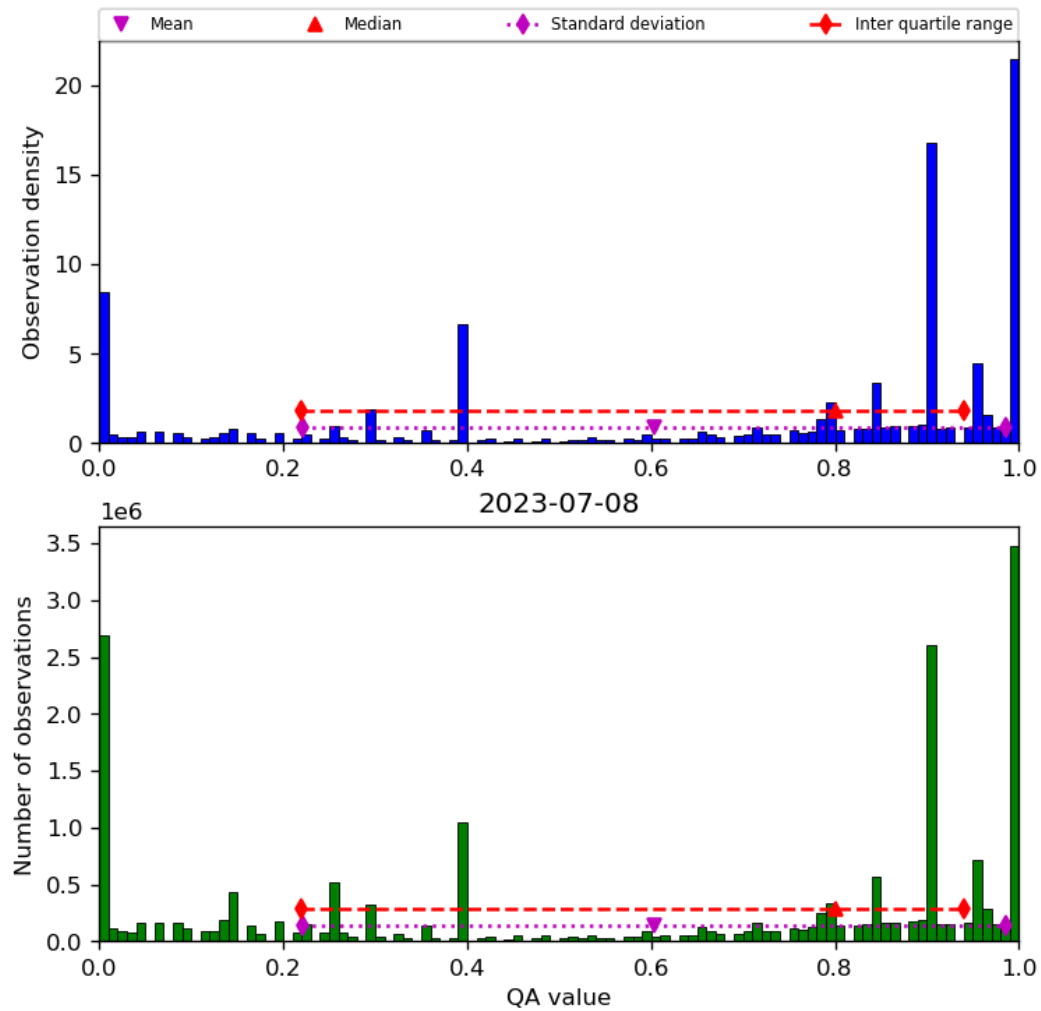


Figure 38: Histogram of “QA value” for 2023-07-08 to 2023-07-09

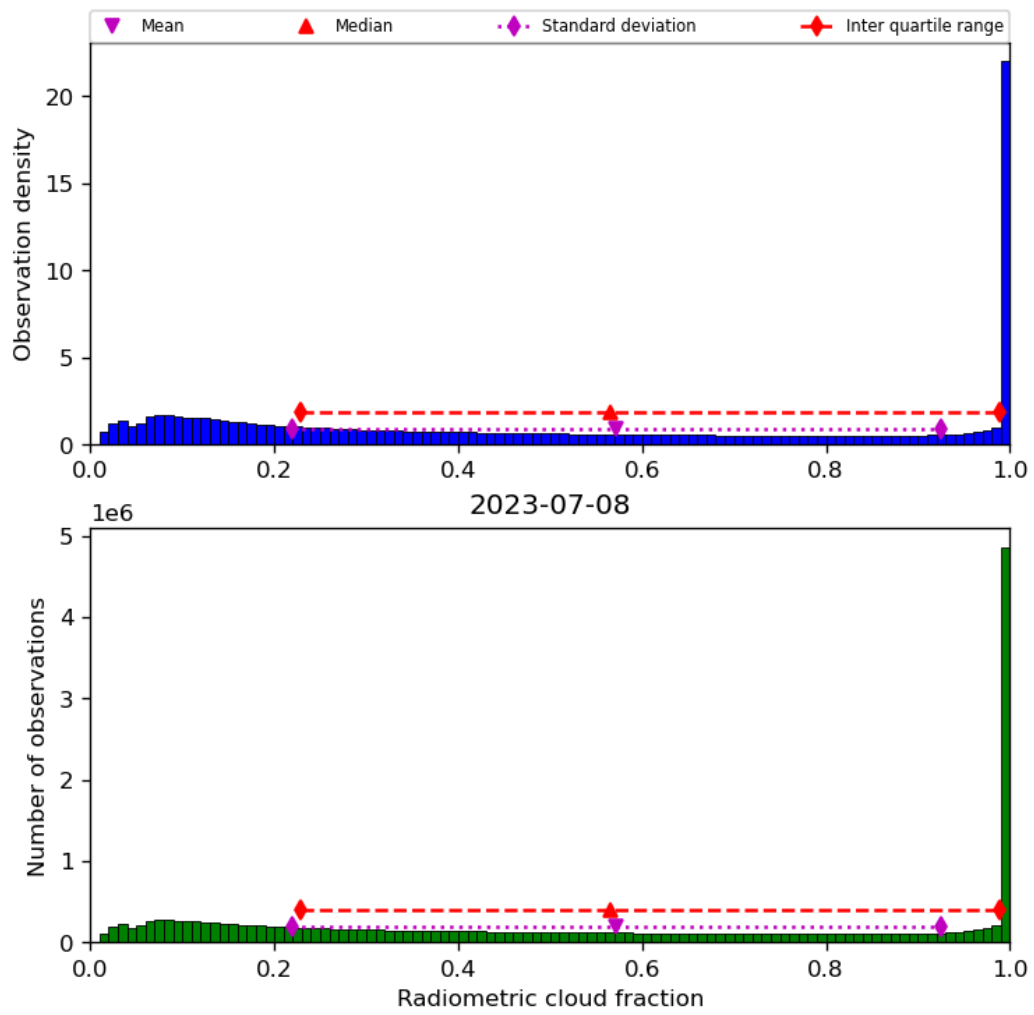


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-07-08 to 2023-07-09

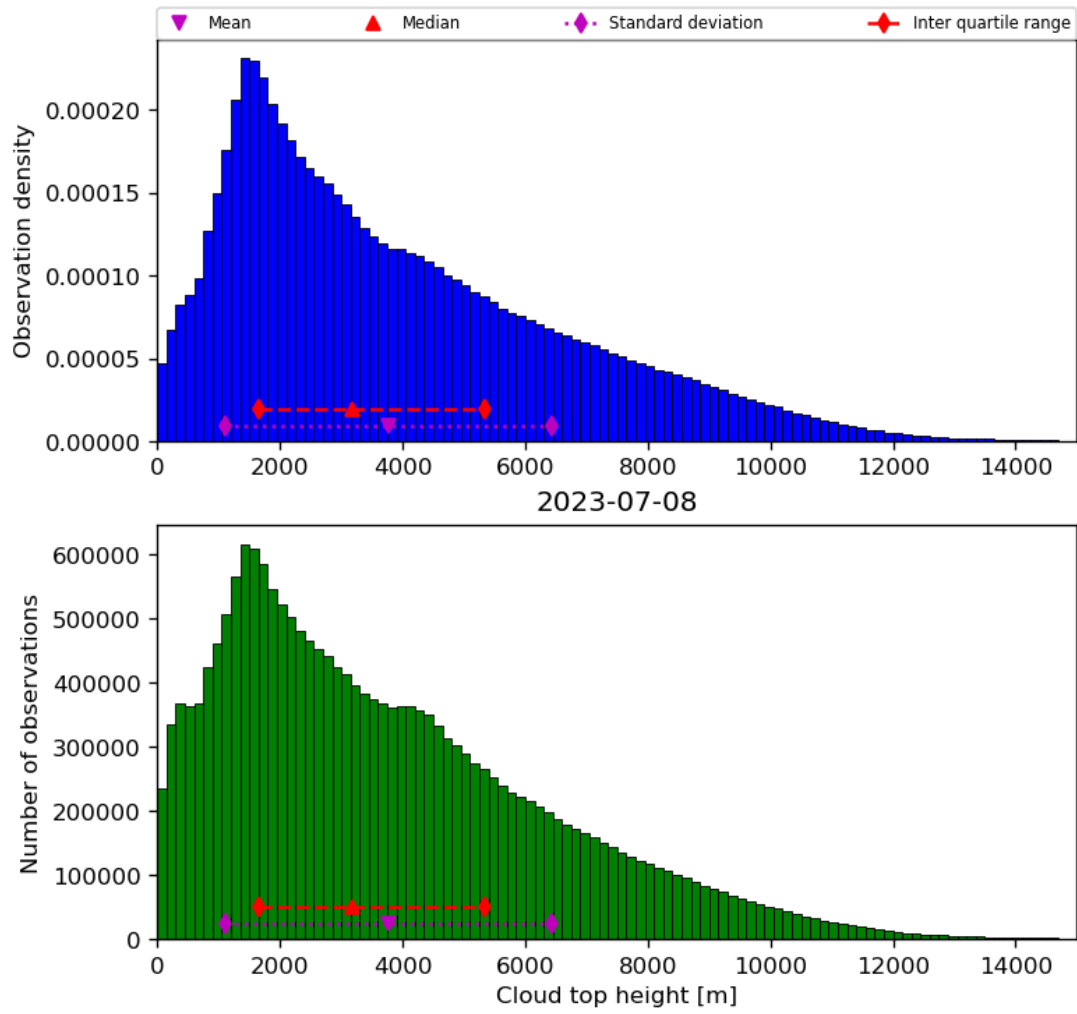


Figure 40: Histogram of “Cloud top height” for 2023-07-08 to 2023-07-09

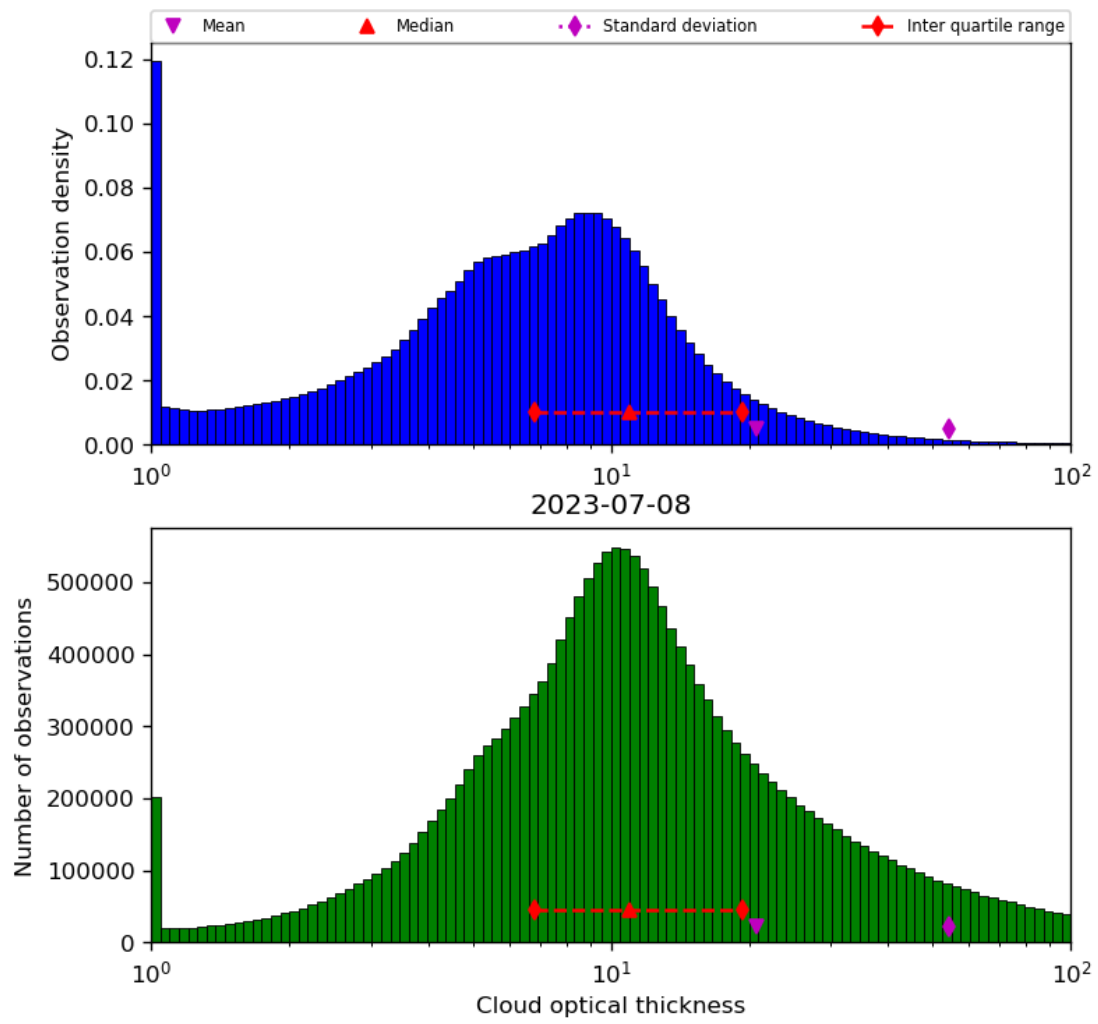


Figure 41: Histogram of “Cloud optical thickness” for 2023-07-08 to 2023-07-09

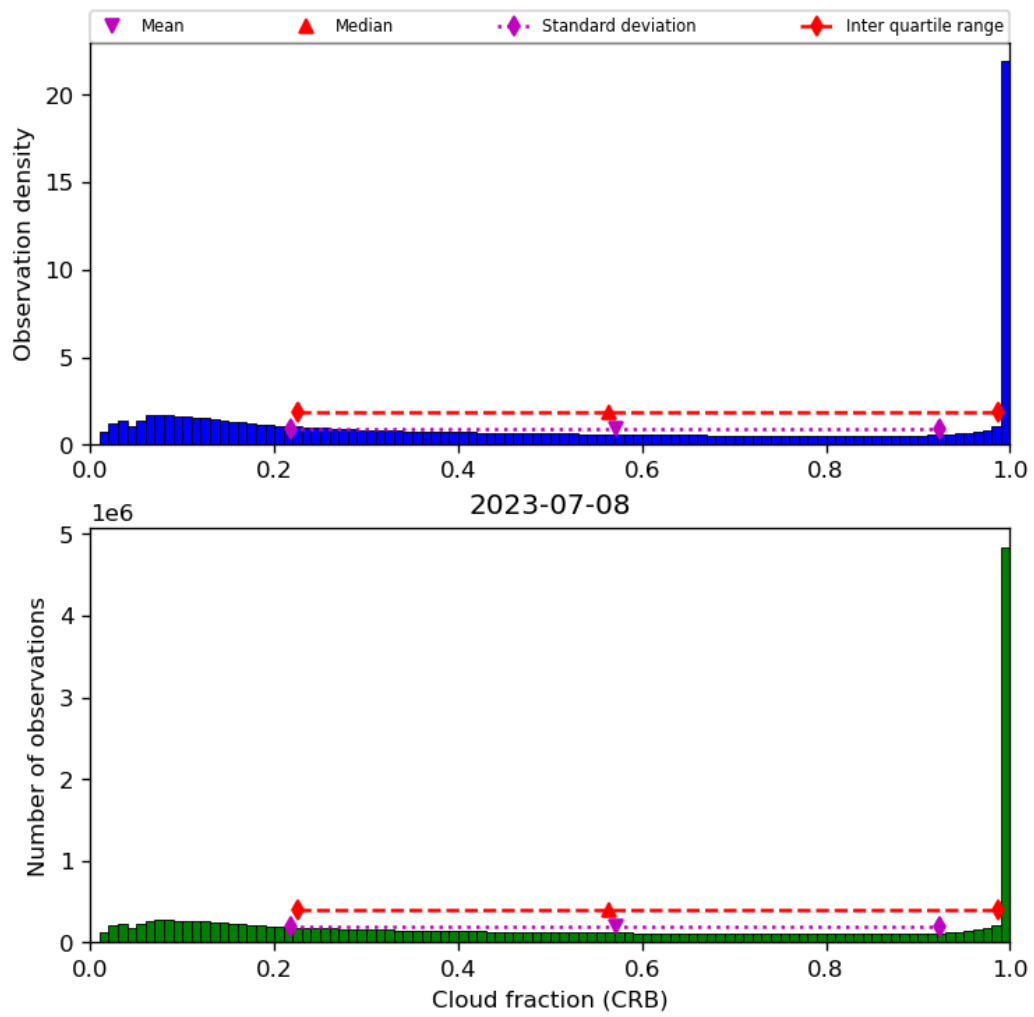


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-07-08 to 2023-07-09

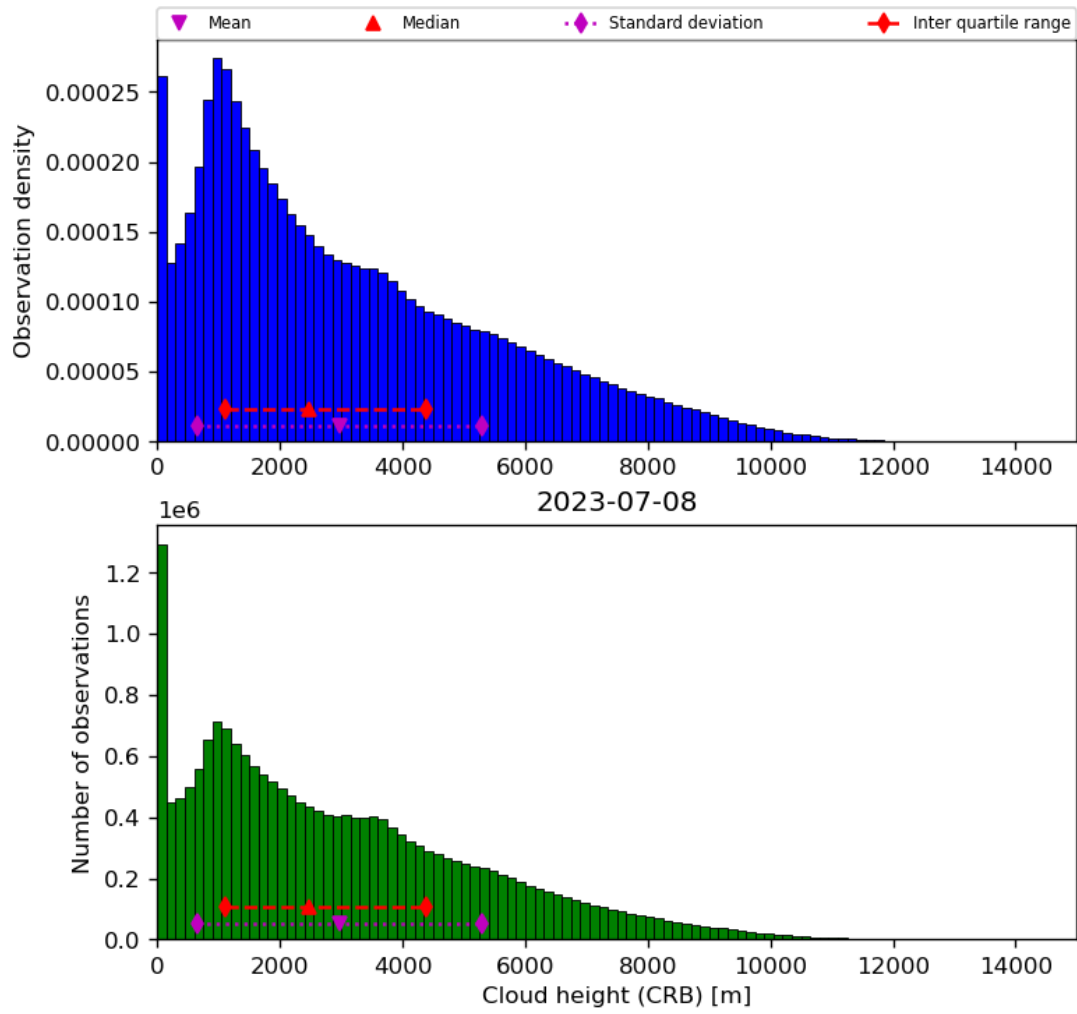


Figure 43: Histogram of “Cloud height (CRB)” for 2023-07-08 to 2023-07-09

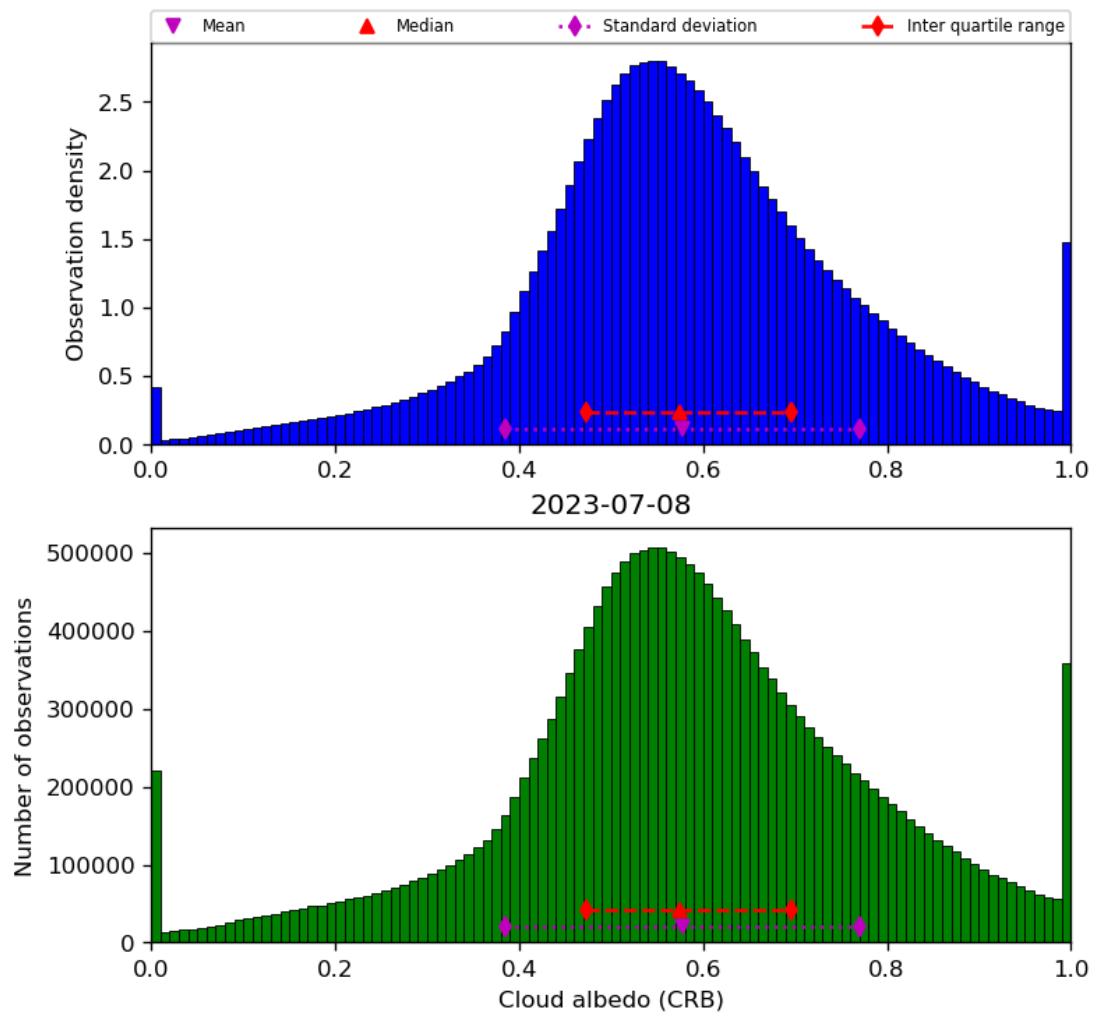


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-07-08 to 2023-07-09

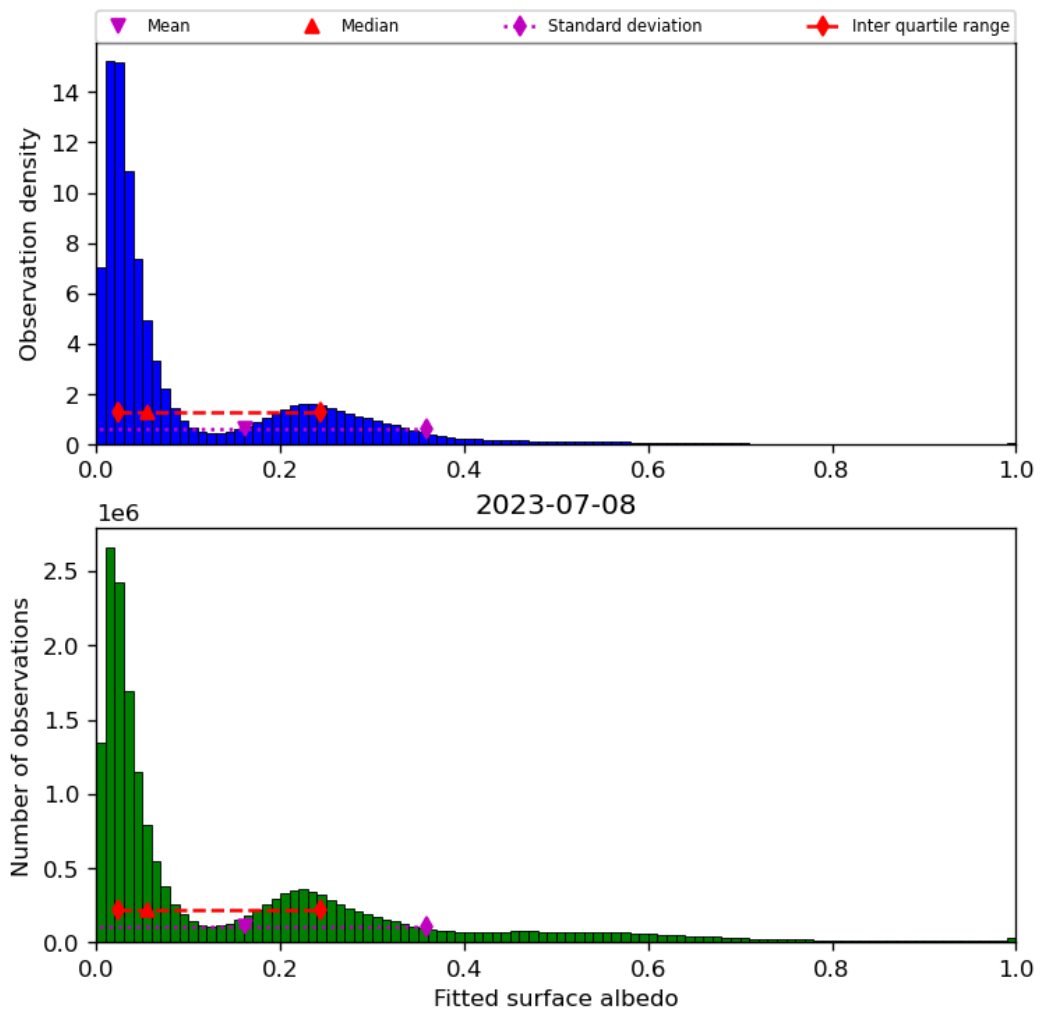


Figure 45: Histogram of “Fitted surface albedo” for 2023-07-08 to 2023-07-09

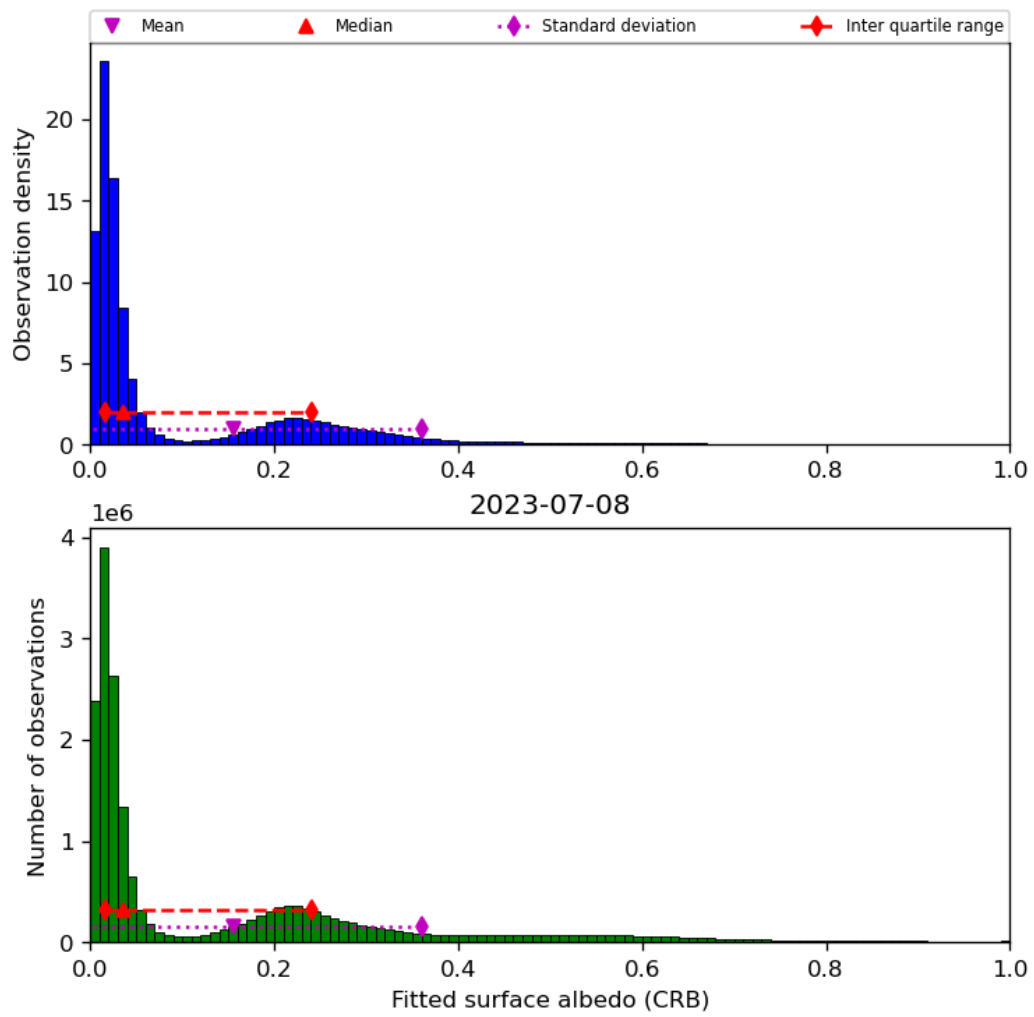


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-07-08 to 2023-07-09

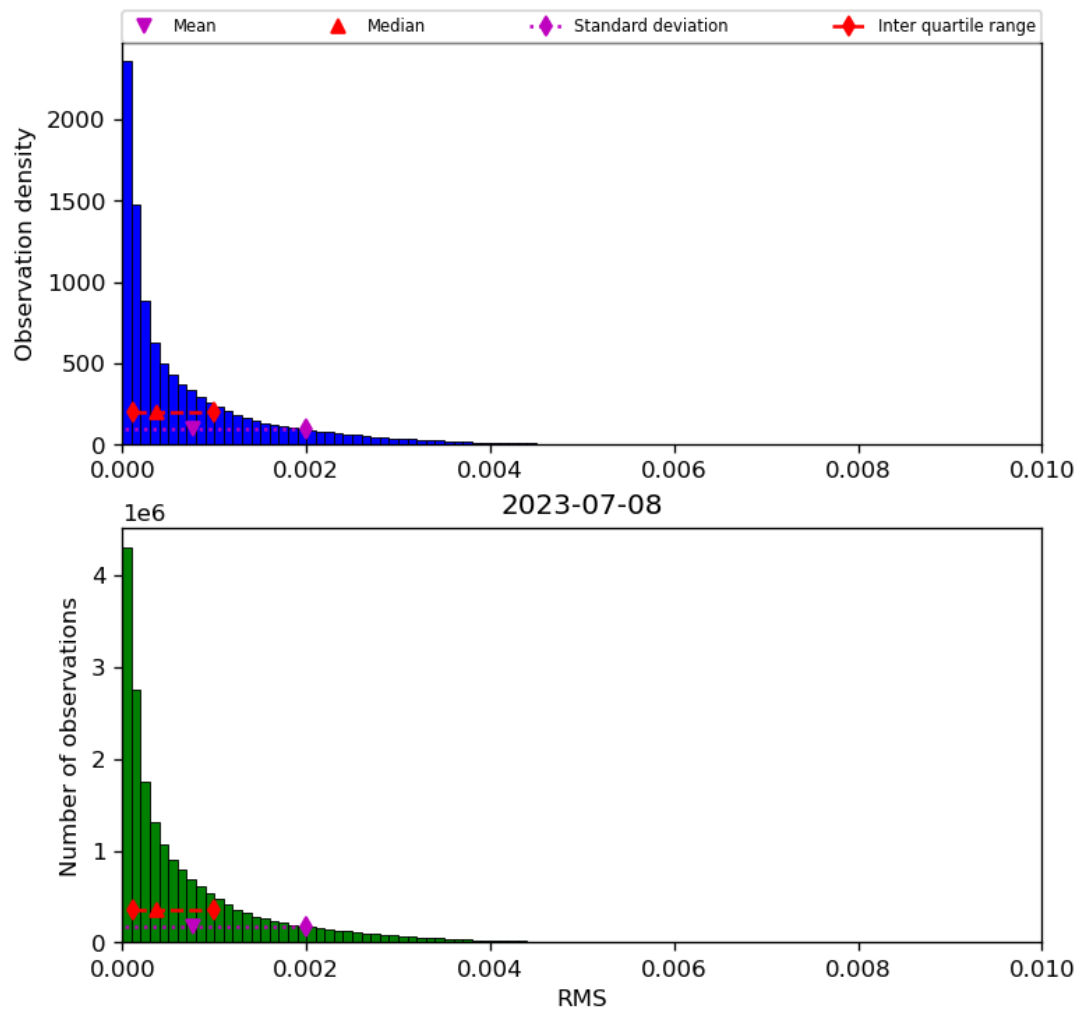


Figure 47: Histogram of “RMS” for 2023-07-08 to 2023-07-09

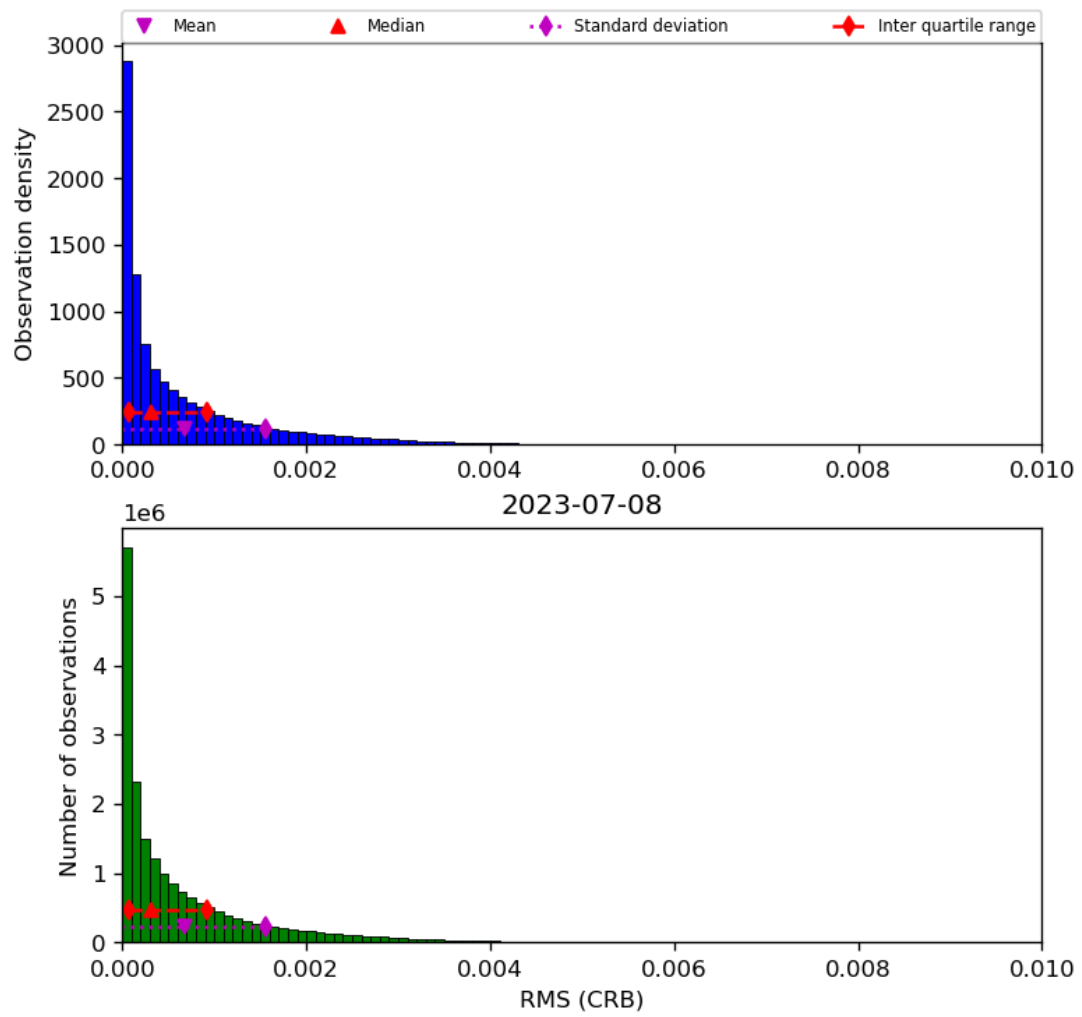


Figure 48: Histogram of “RMS (CRB)” for 2023-07-08 to 2023-07-09

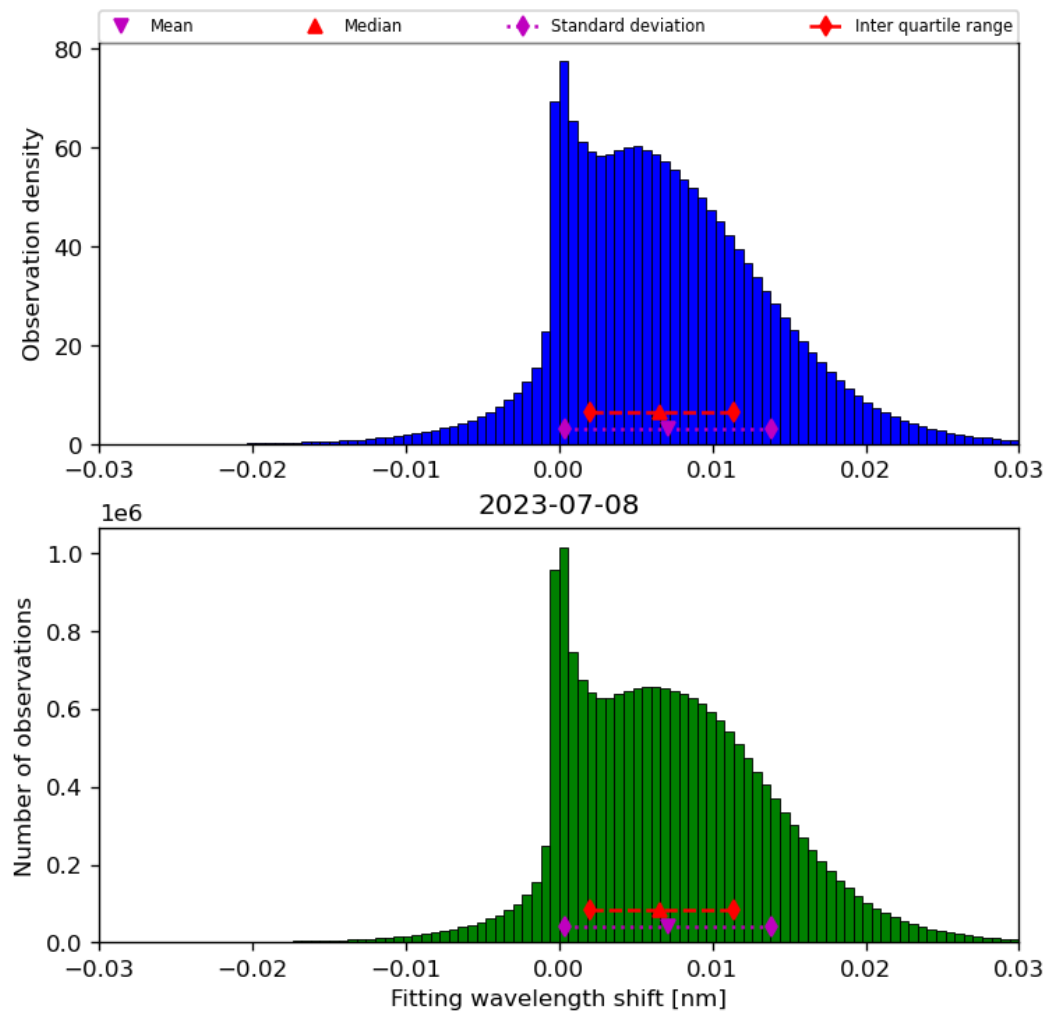


Figure 49: Histogram of “Fitting wavelength shift” for 2023-07-08 to 2023-07-09

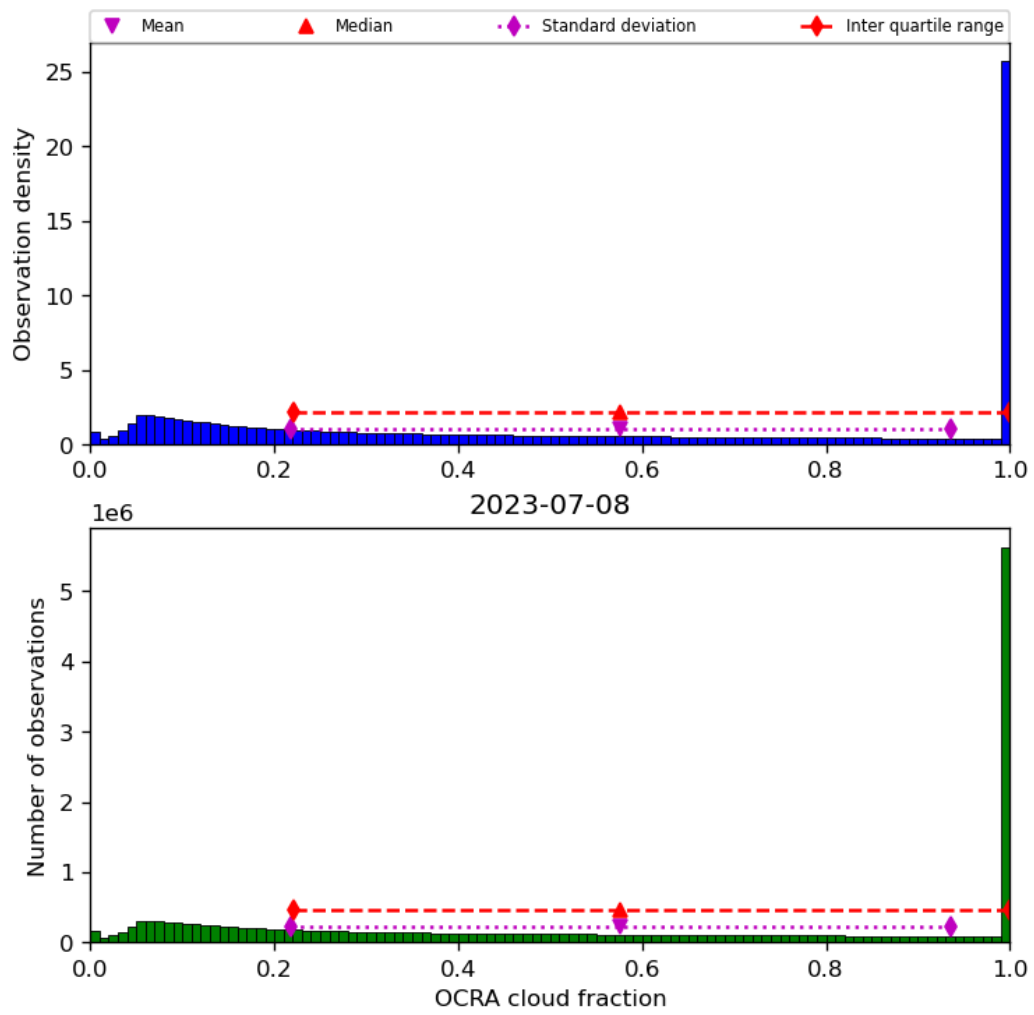


Figure 50: Histogram of “OCRA cloud fraction” for 2023-07-08 to 2023-07-09

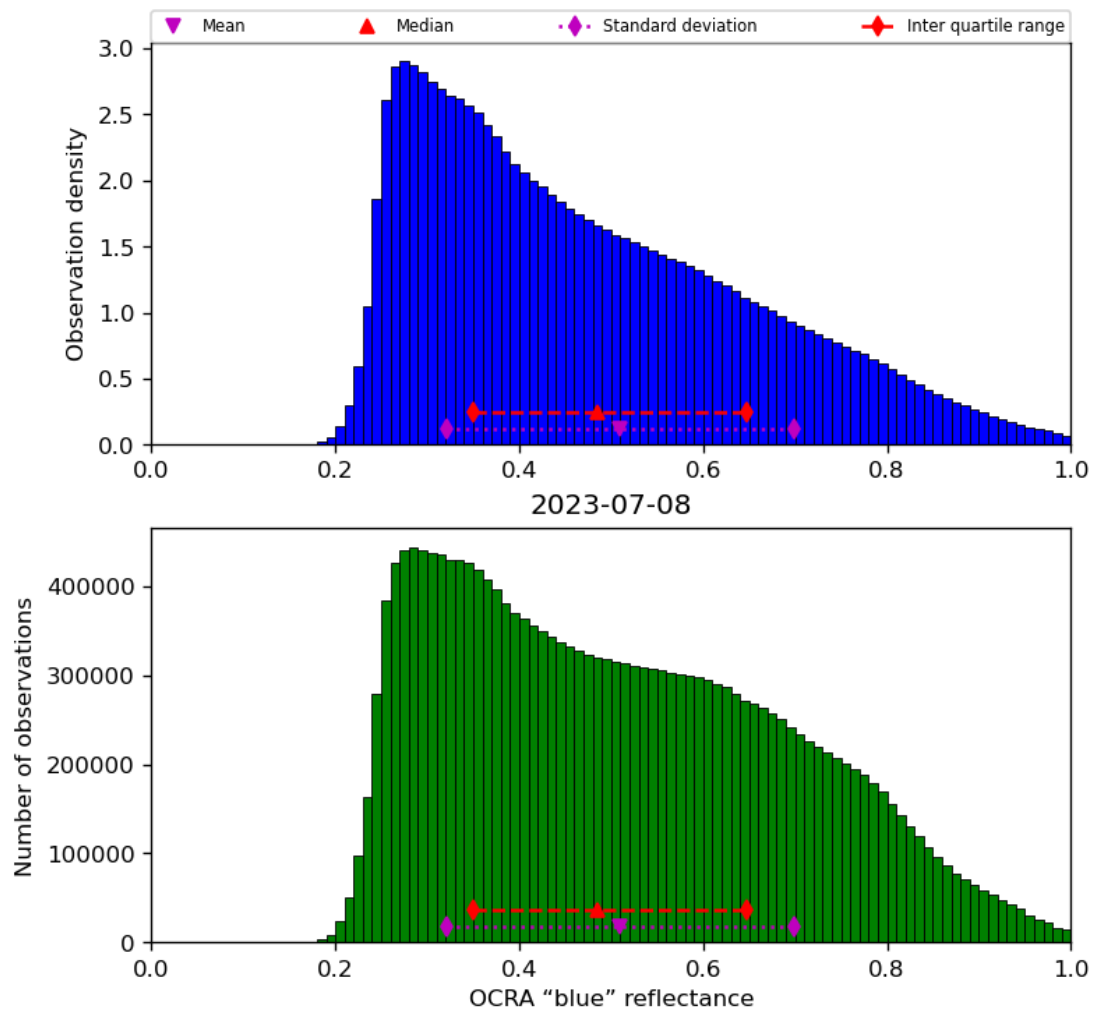


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-07-08 to 2023-07-09

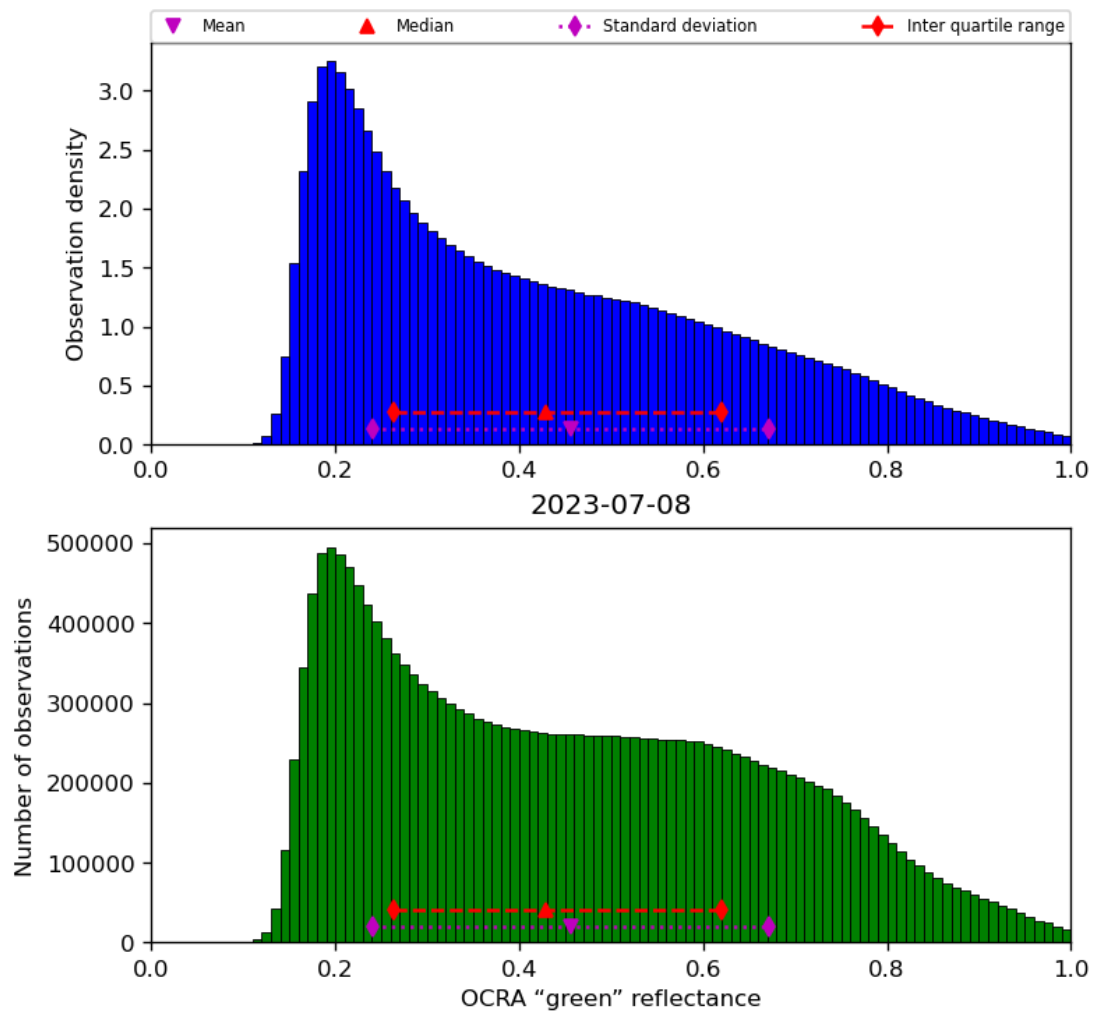


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-07-08 to 2023-07-09

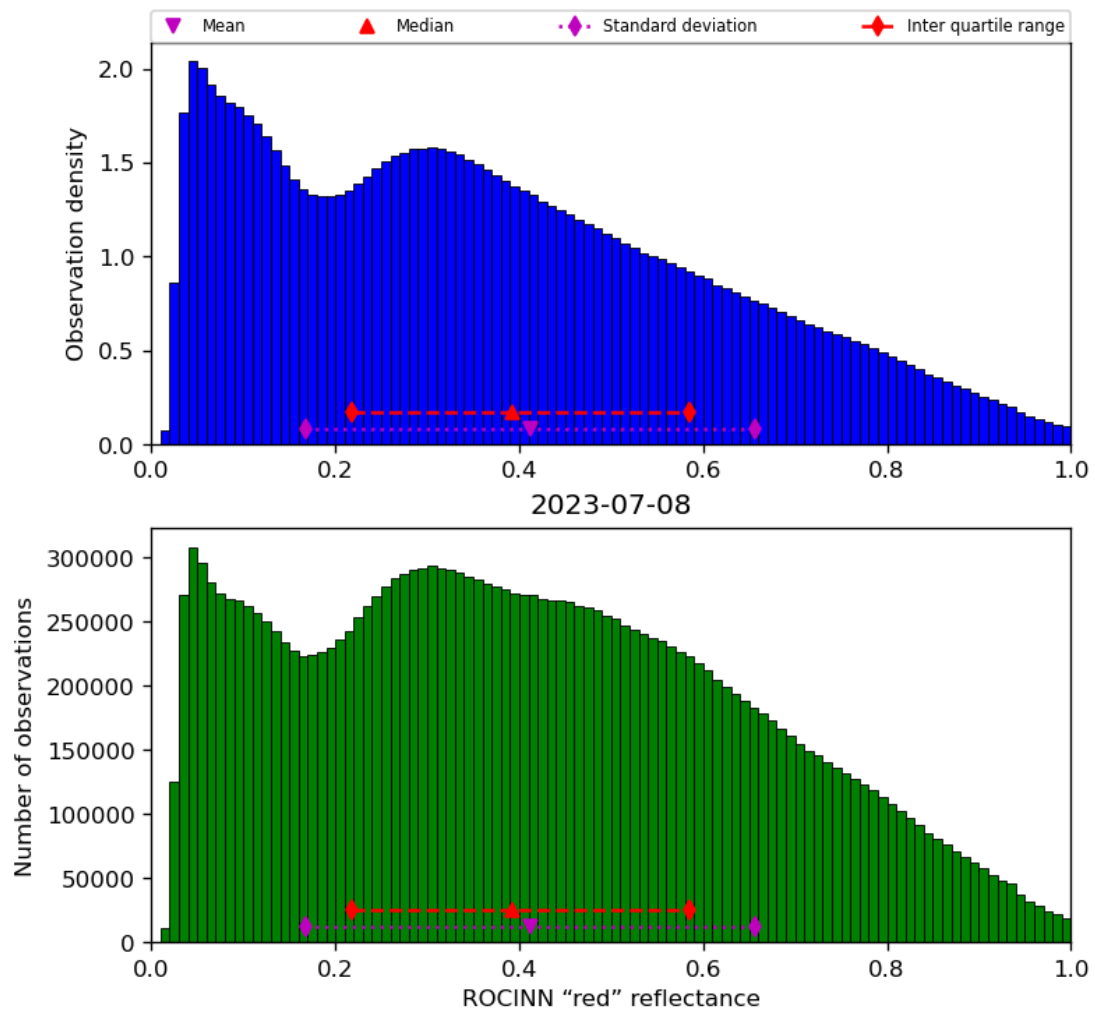


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-07-08 to 2023-07-09

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.

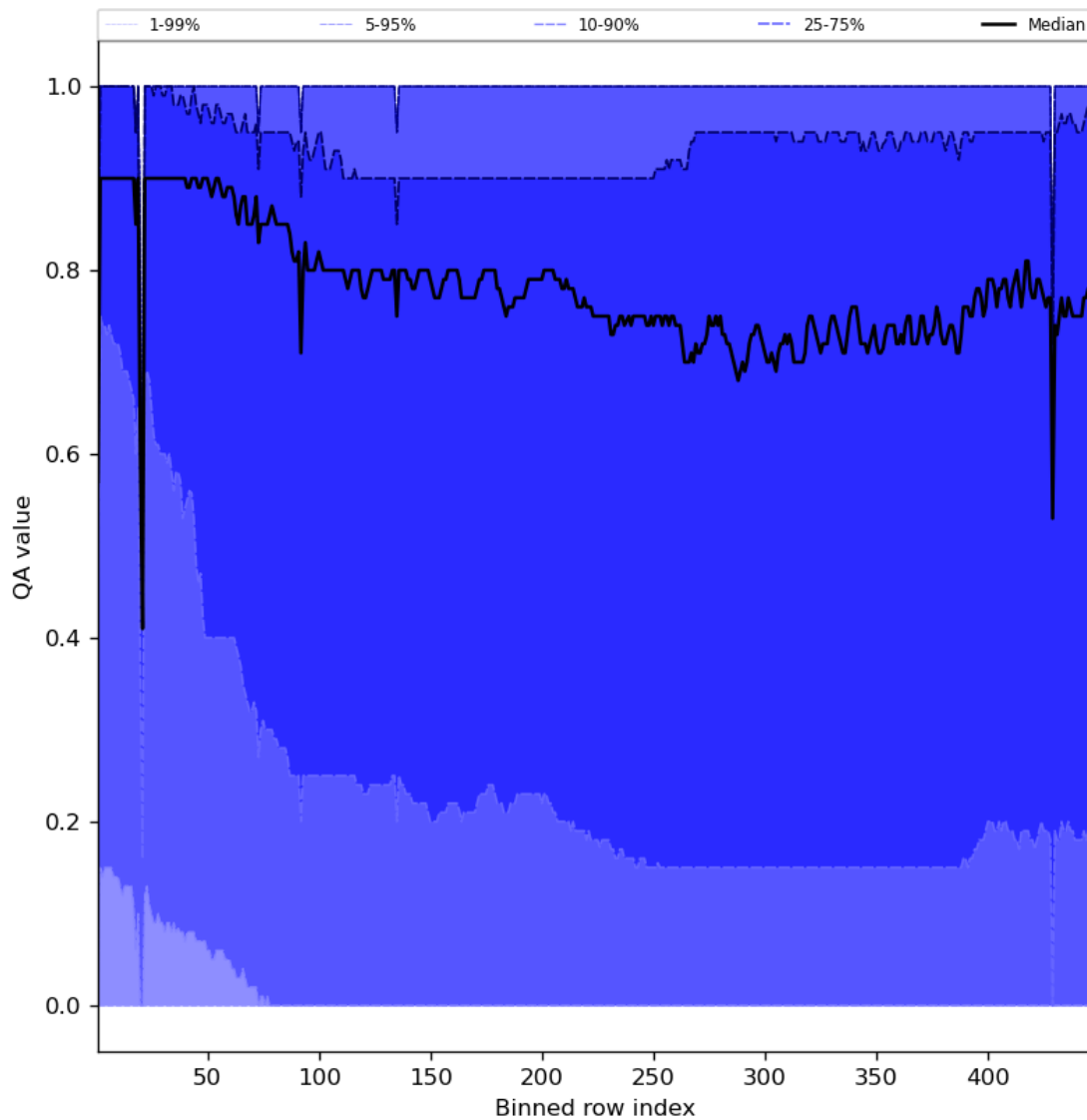


Figure 54: Along track statistics of “QA value” for 2023-07-08 to 2023-07-09

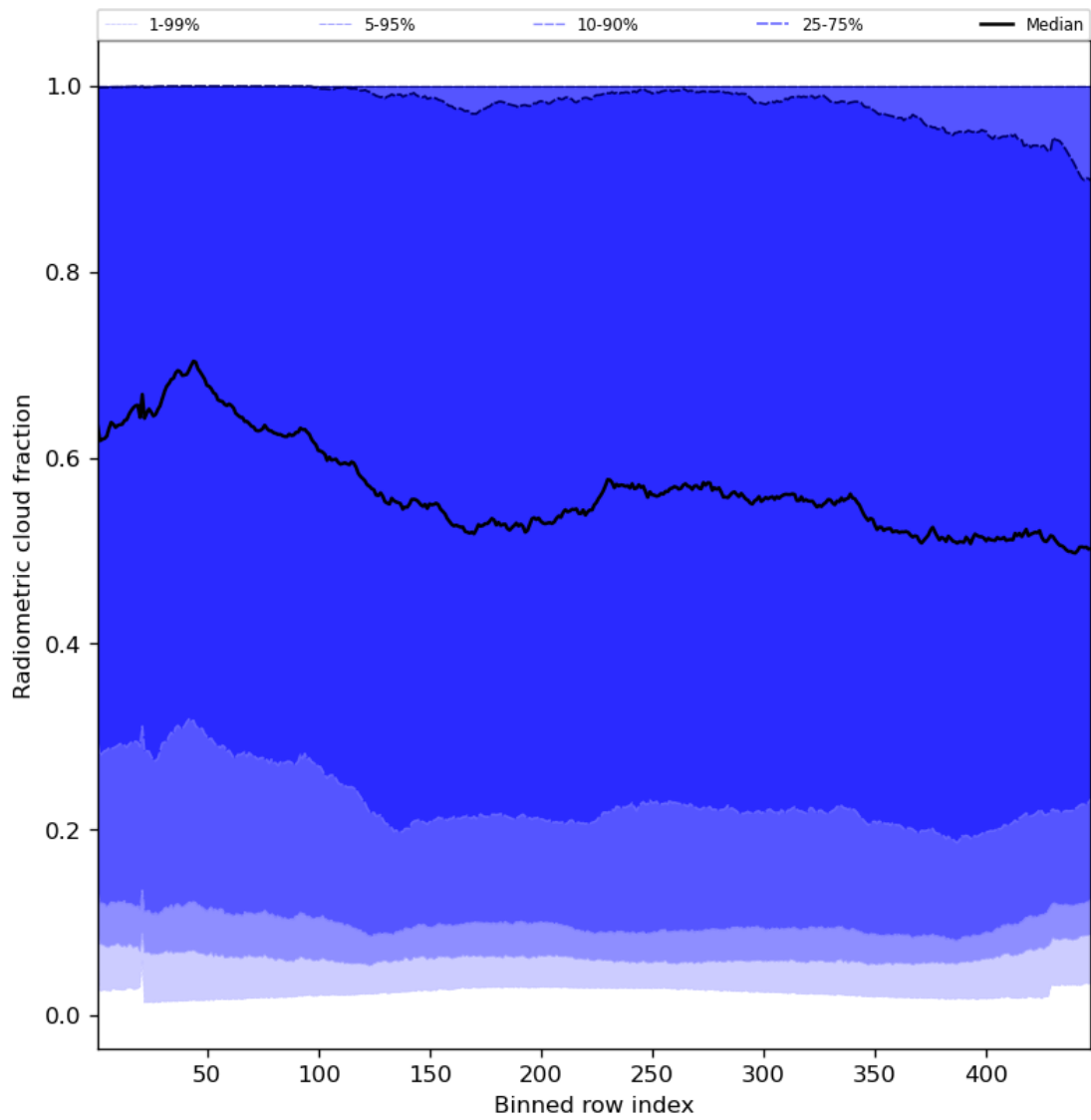


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-07-08 to 2023-07-09

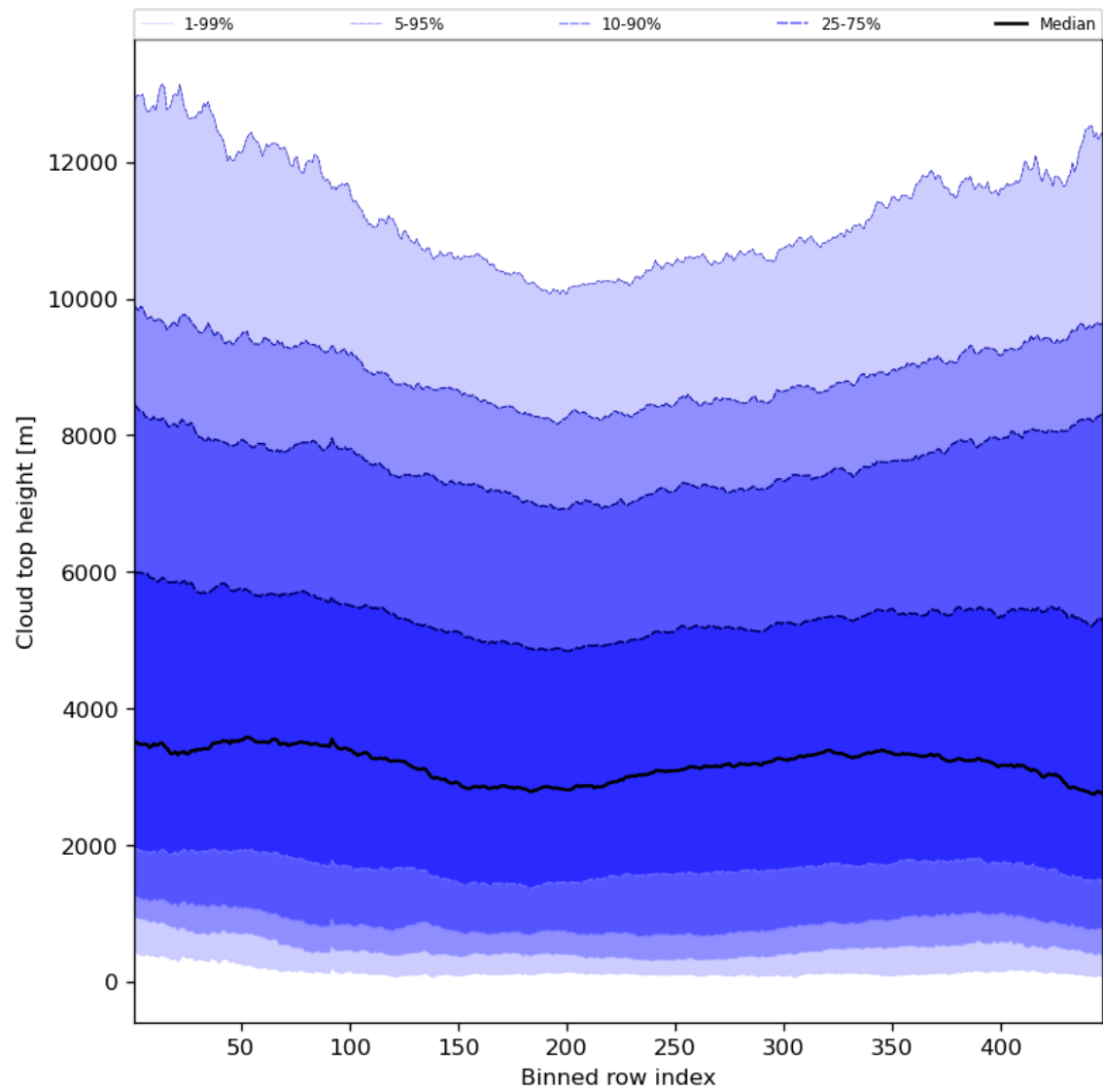


Figure 56: Along track statistics of “Cloud top height” for 2023-07-08 to 2023-07-09

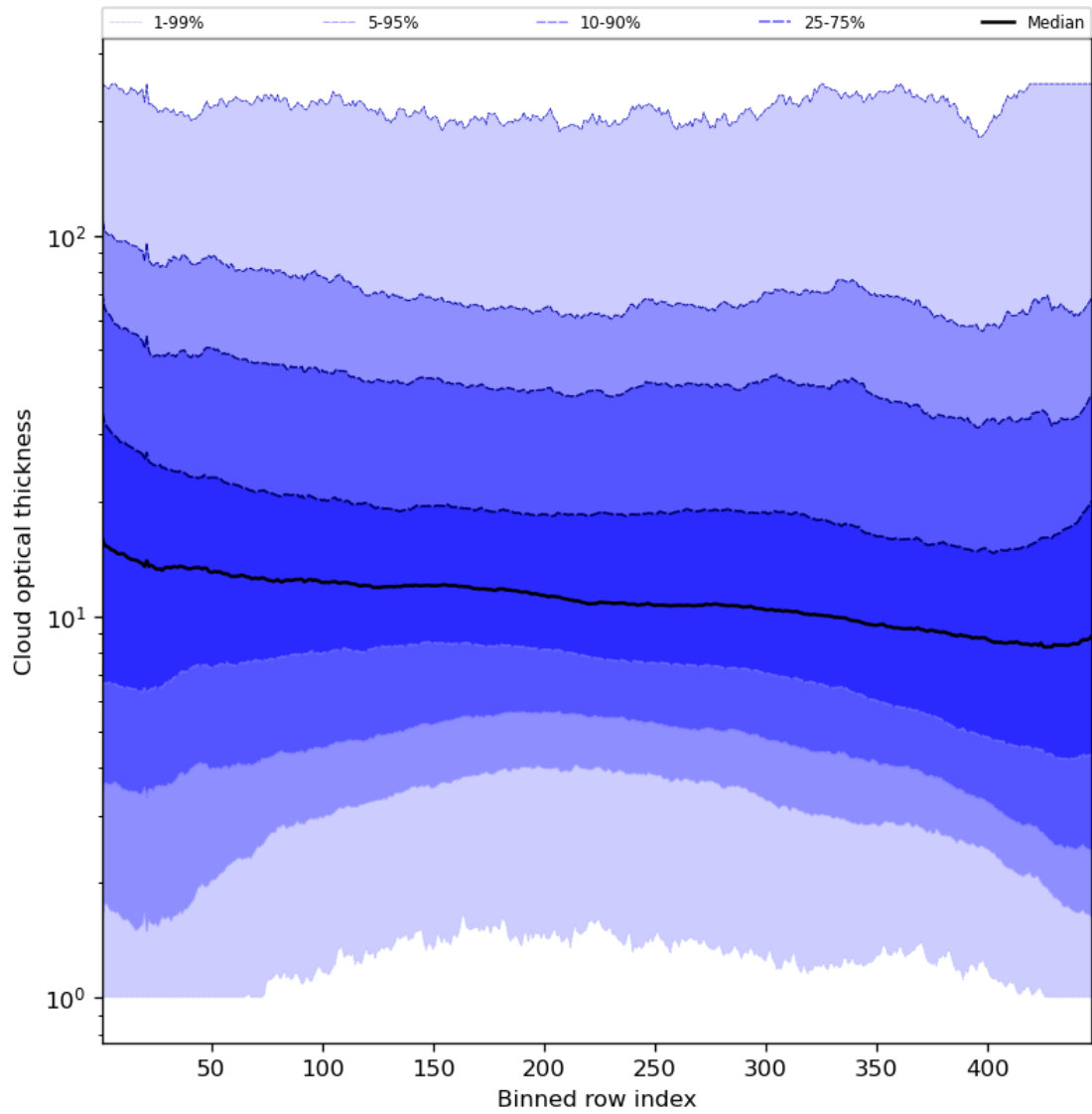


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-07-08 to 2023-07-09

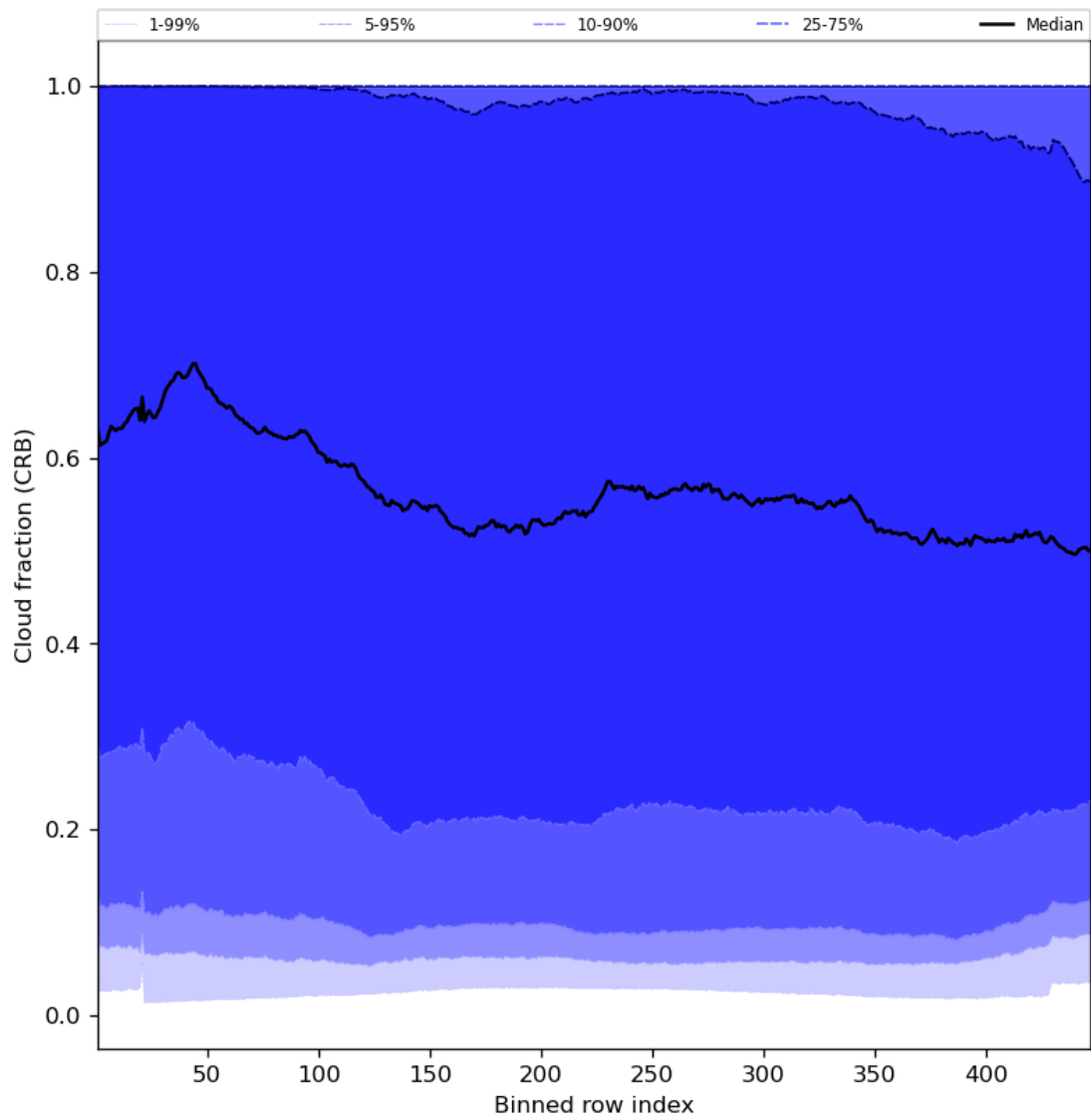


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-07-08 to 2023-07-09

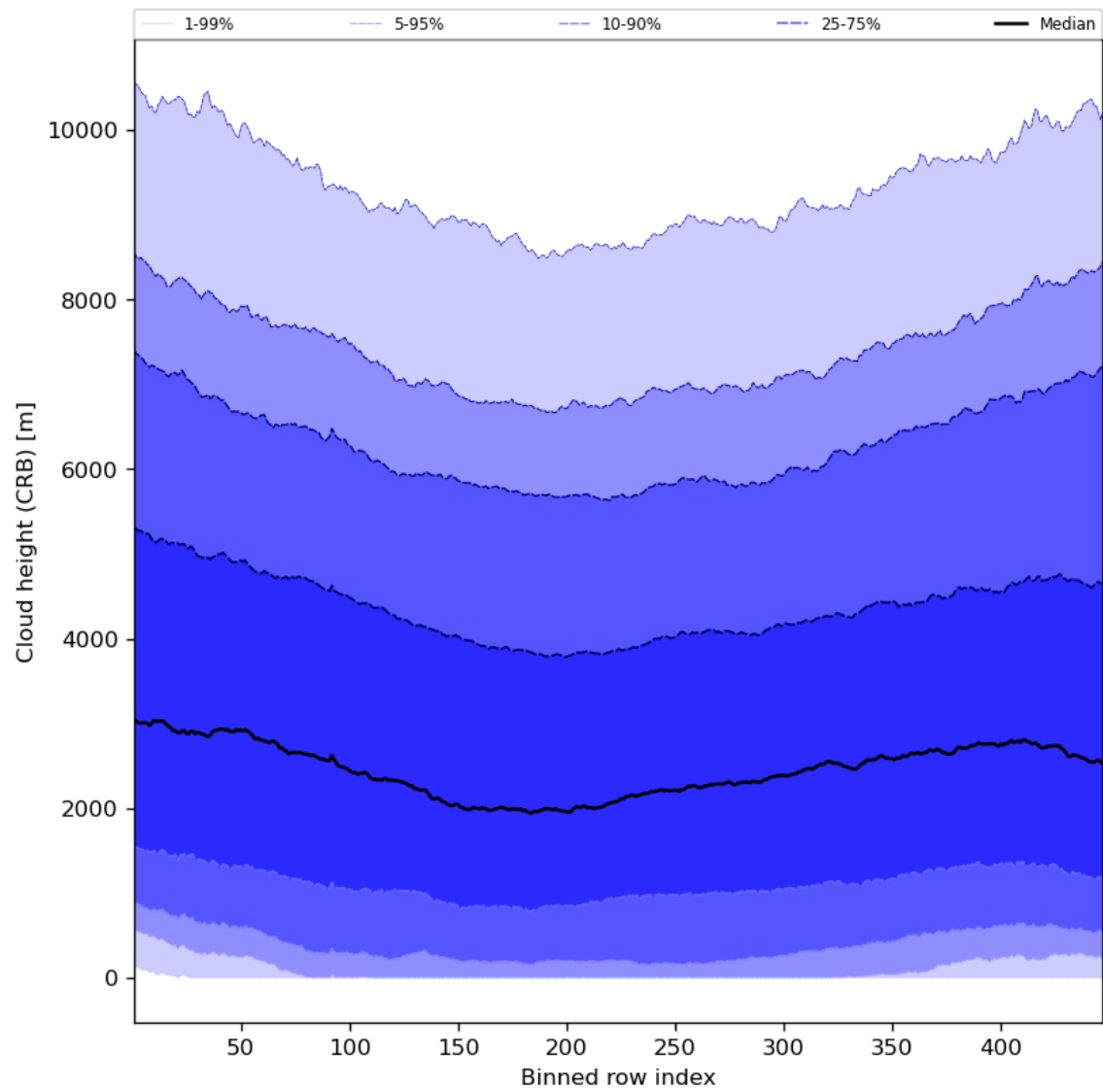


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-07-08 to 2023-07-09

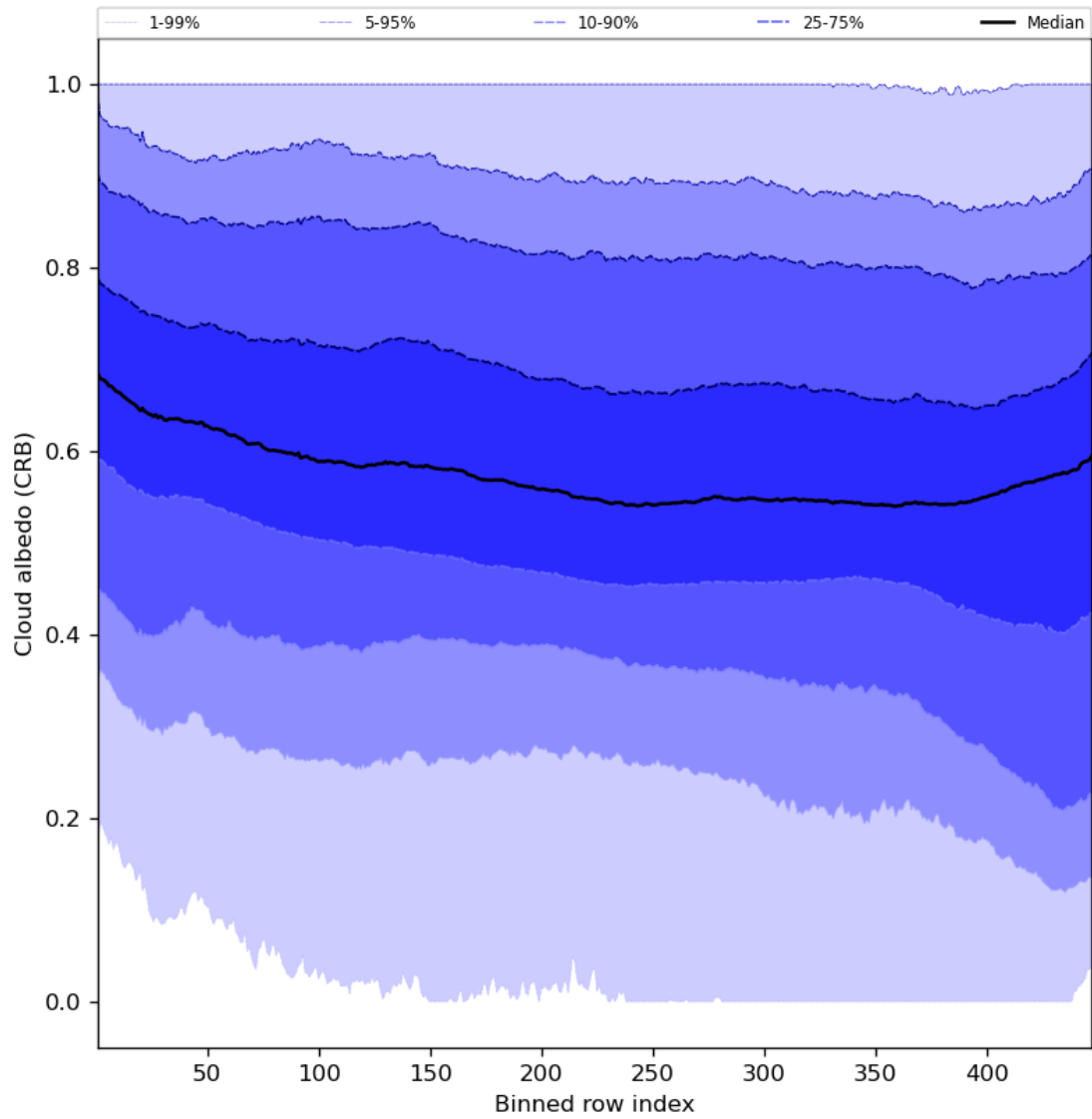


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-07-08 to 2023-07-09

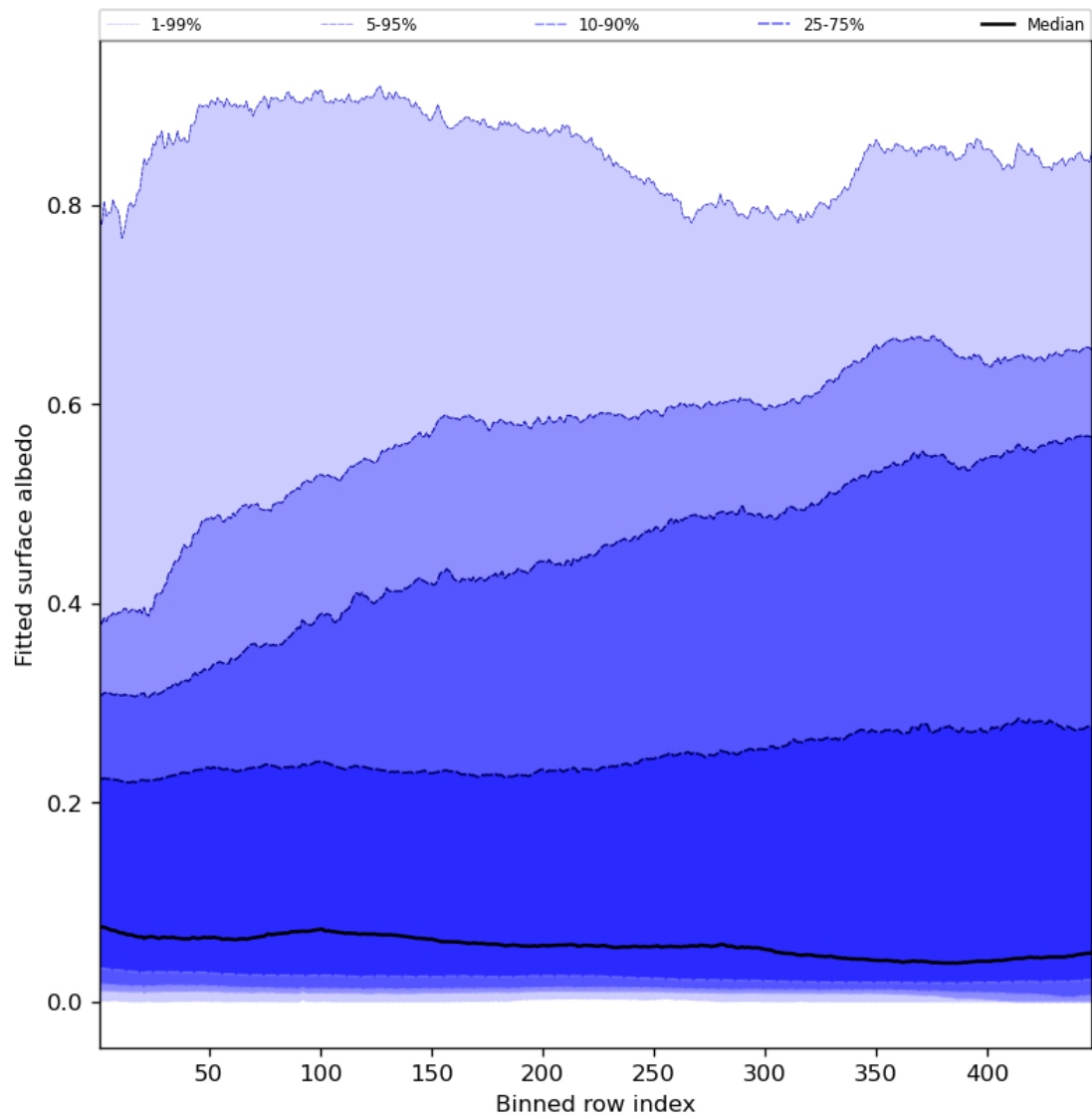


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-07-08 to 2023-07-09

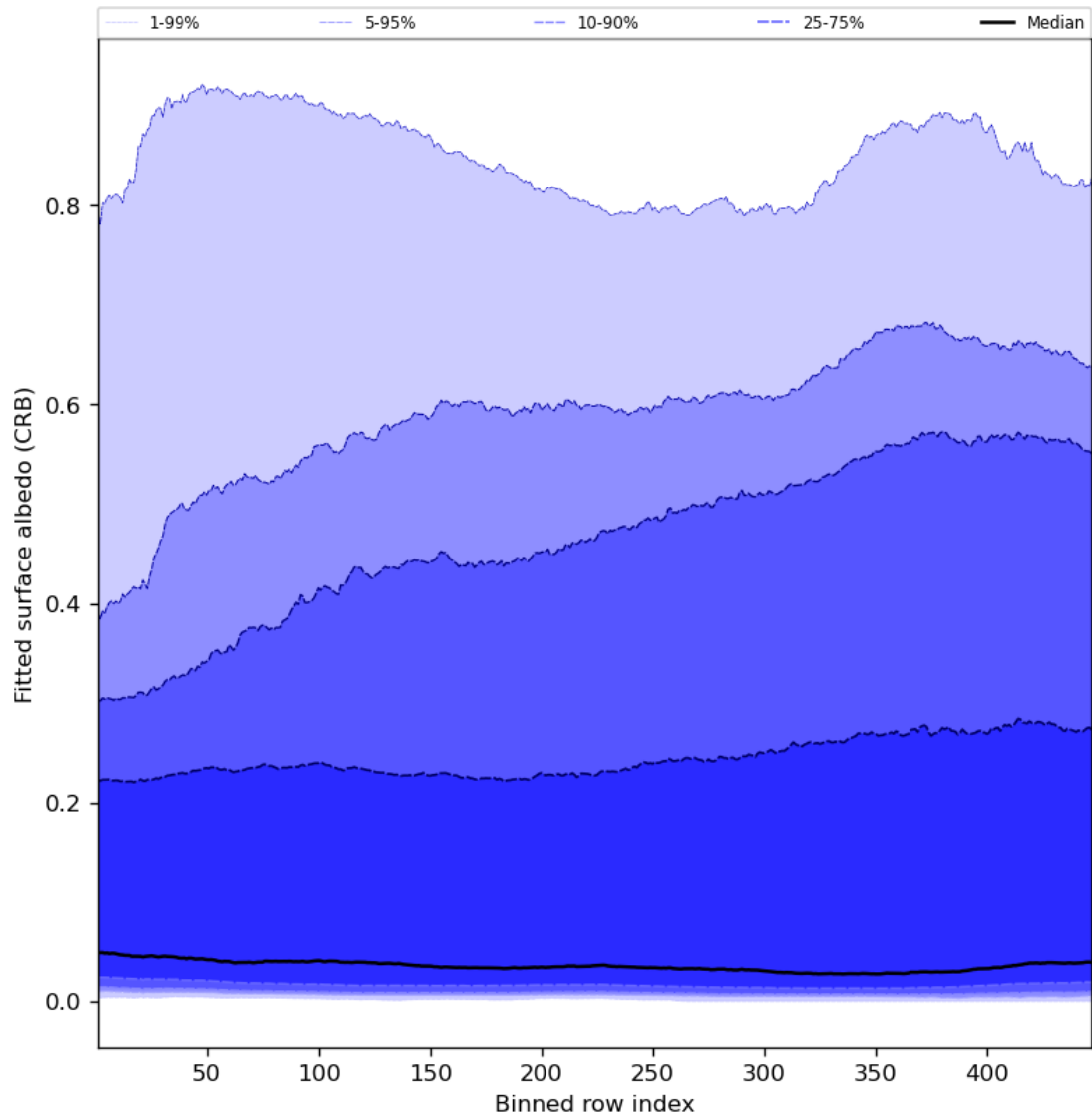


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-07-08 to 2023-07-09

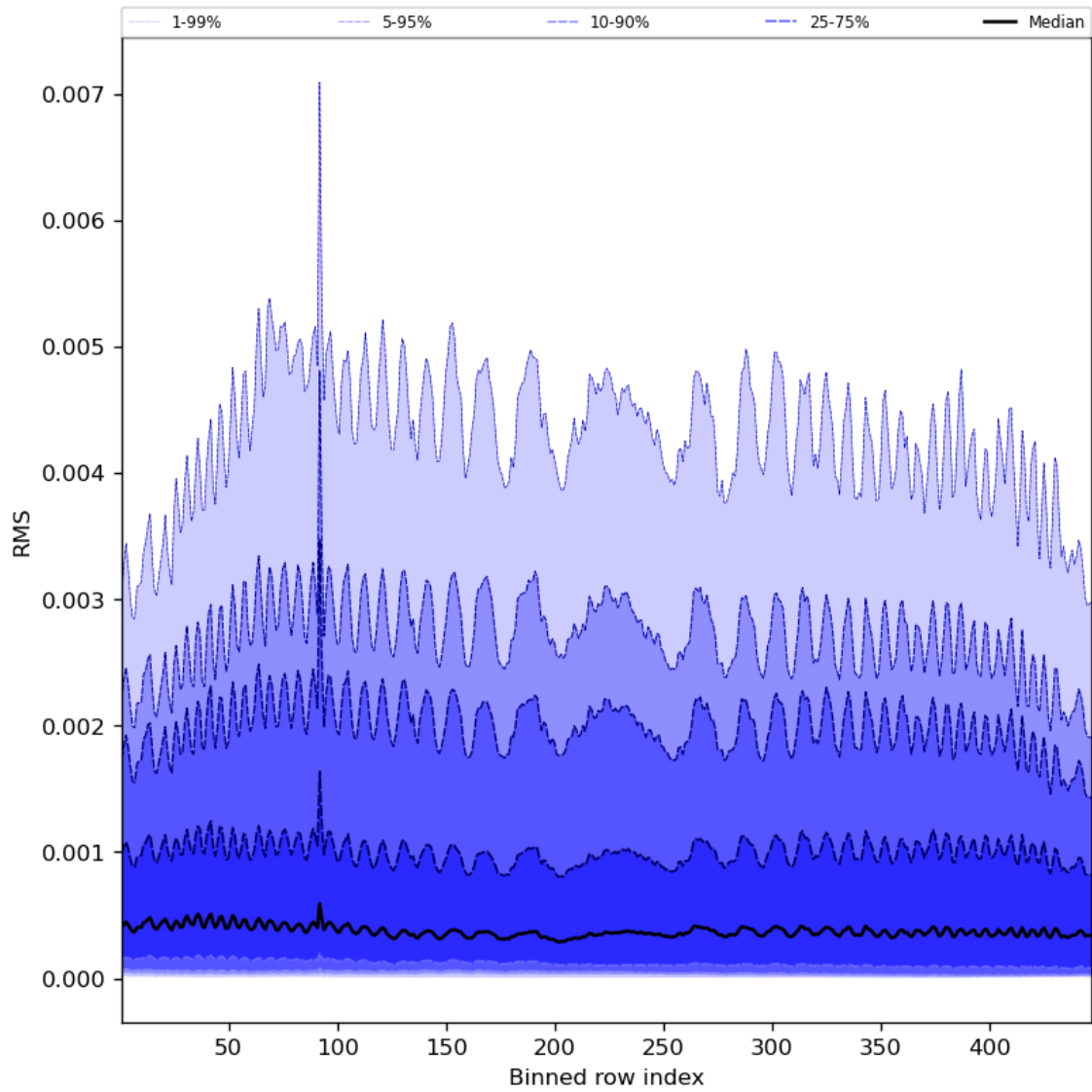


Figure 63: Along track statistics of “RMS” for 2023-07-08 to 2023-07-09

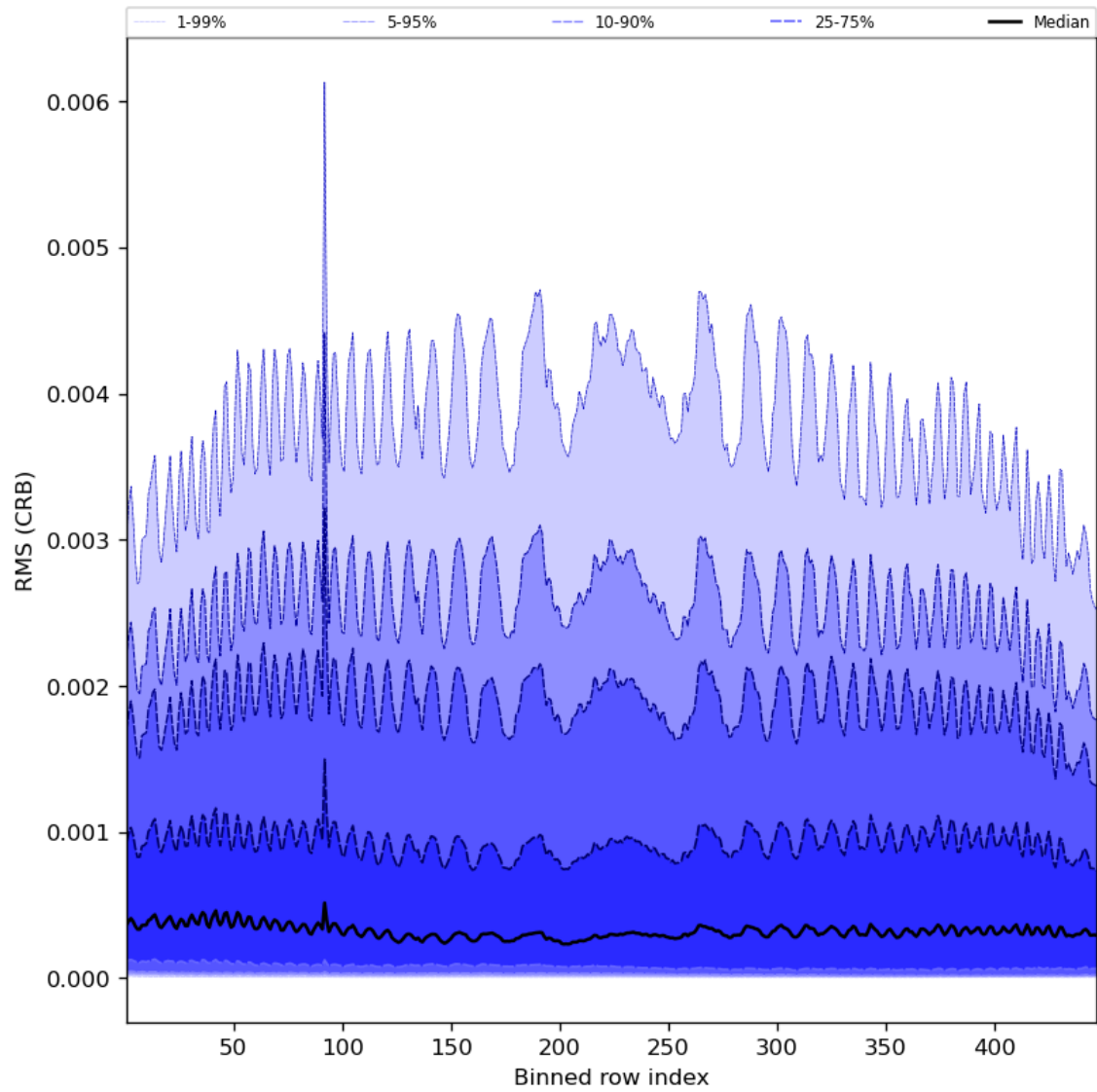


Figure 64: Along track statistics of “RMS (CRB)” for 2023-07-08 to 2023-07-09

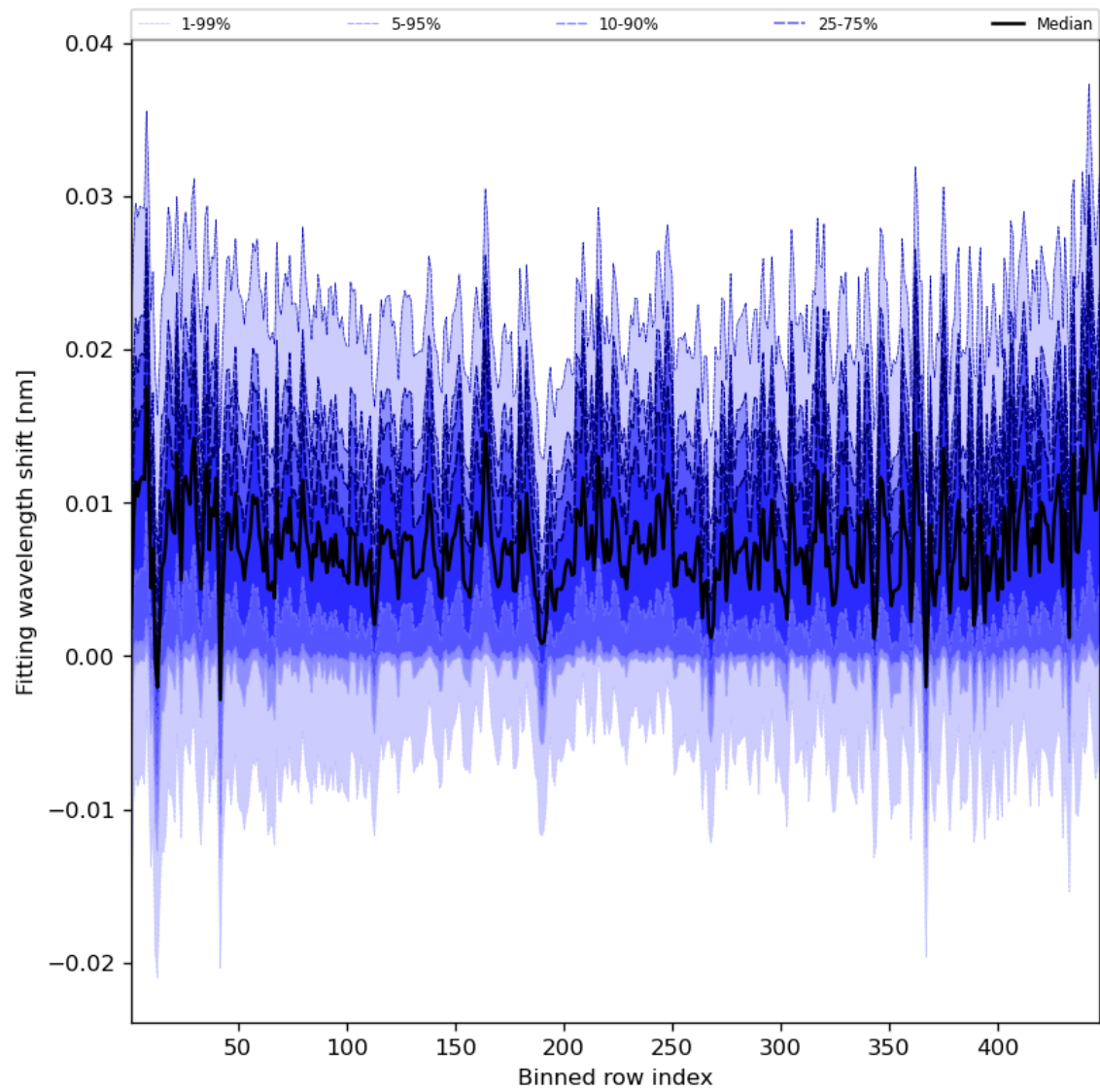


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-07-08 to 2023-07-09

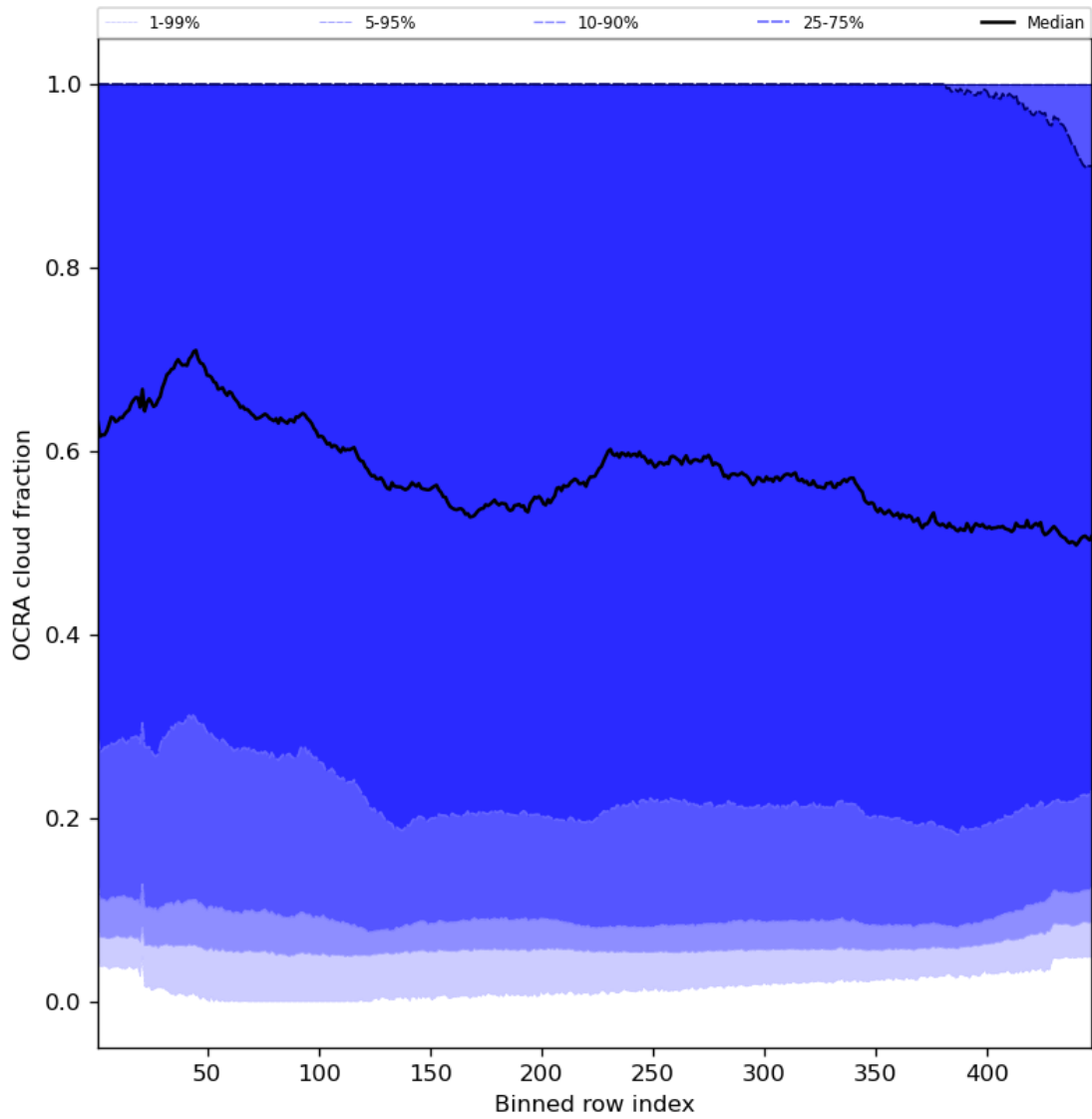


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-07-08 to 2023-07-09

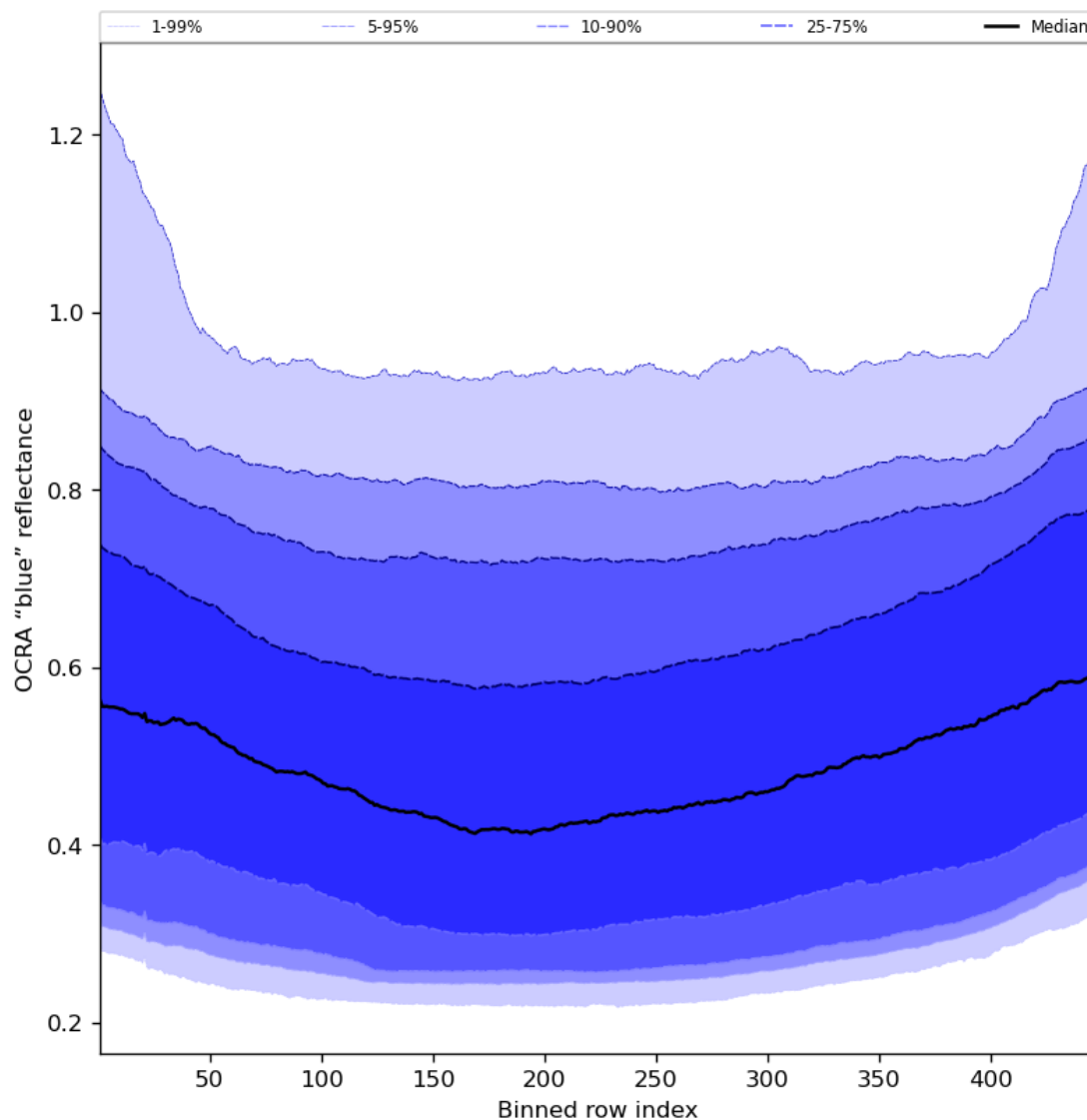


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-07-08 to 2023-07-09

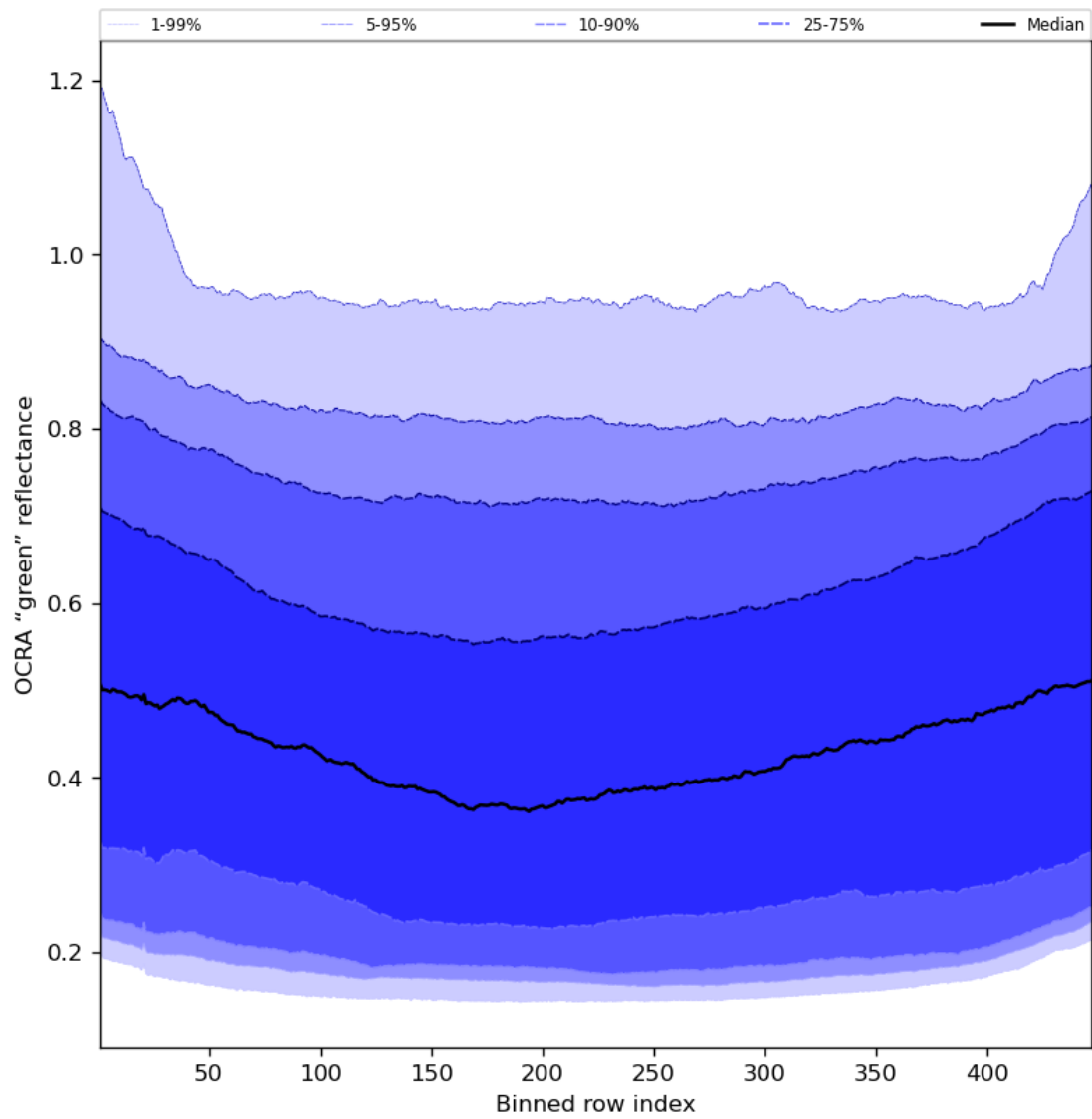


Figure 68: Along track statistics of “OCRA “green” reflectance” for 2023-07-08 to 2023-07-09

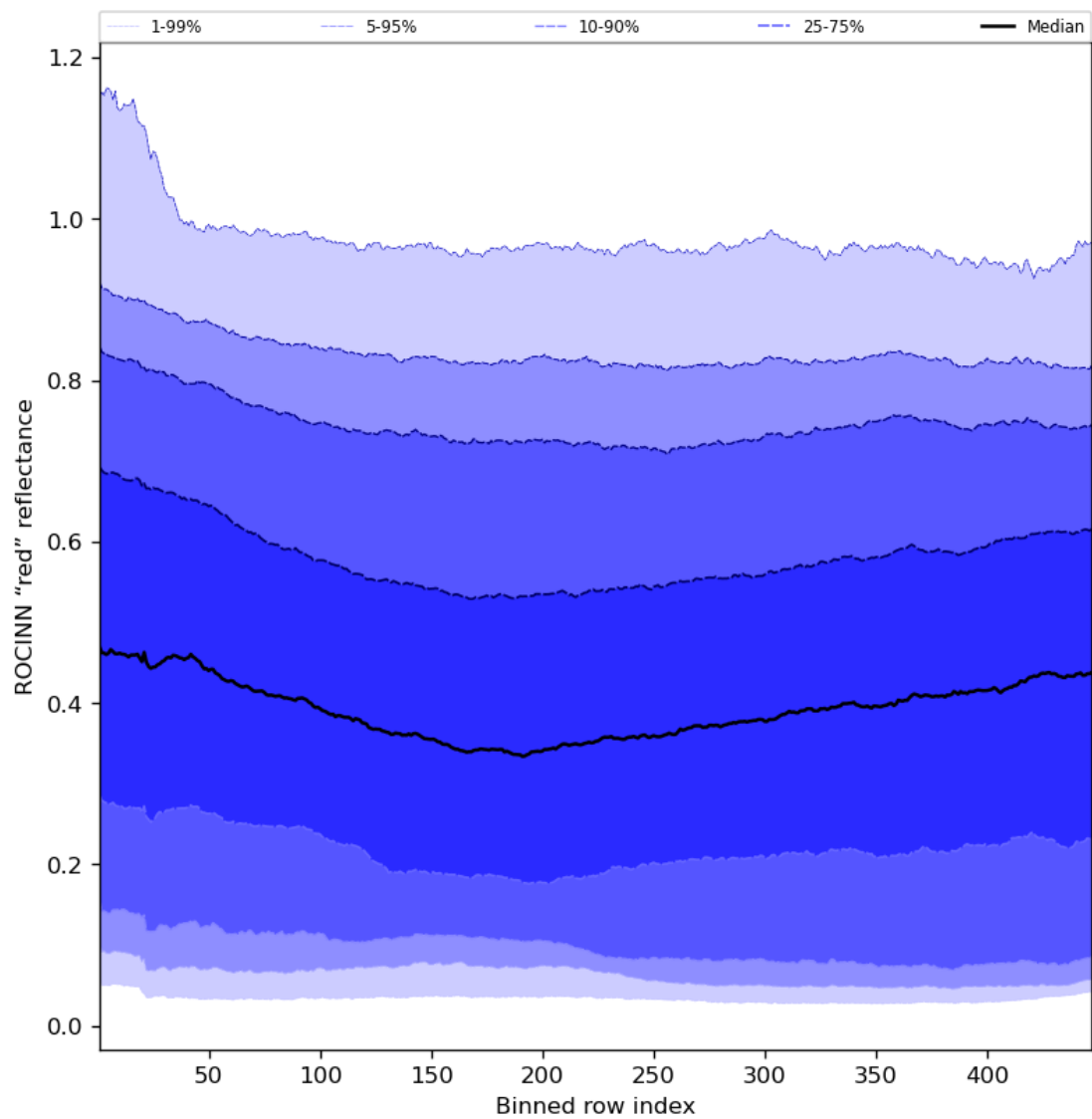


Figure 69: Along track statistics of "ROCINN "red" reflectance" for 2023-07-08 to 2023-07-09

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.

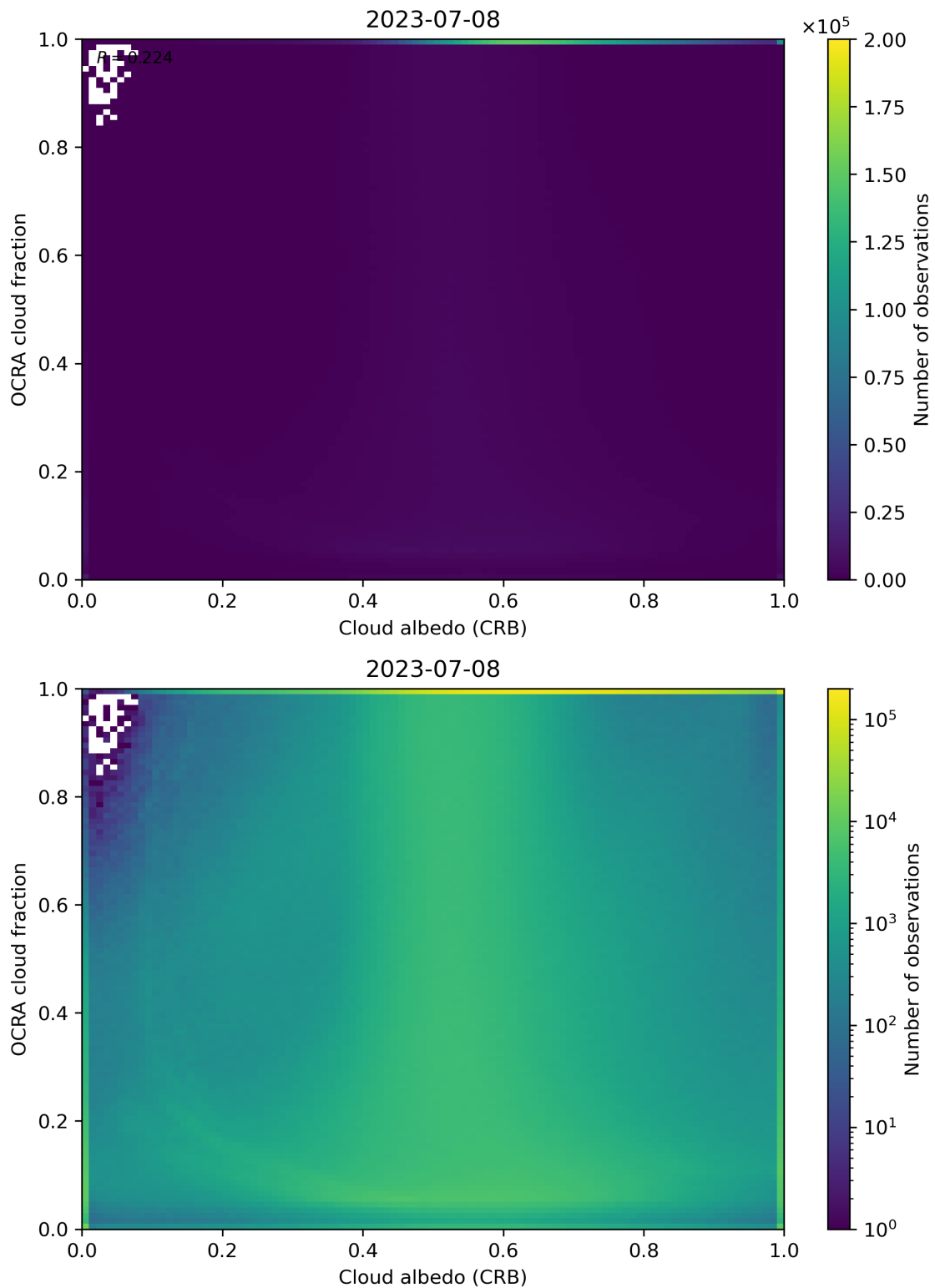


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-07-08 to 2023-07-09.

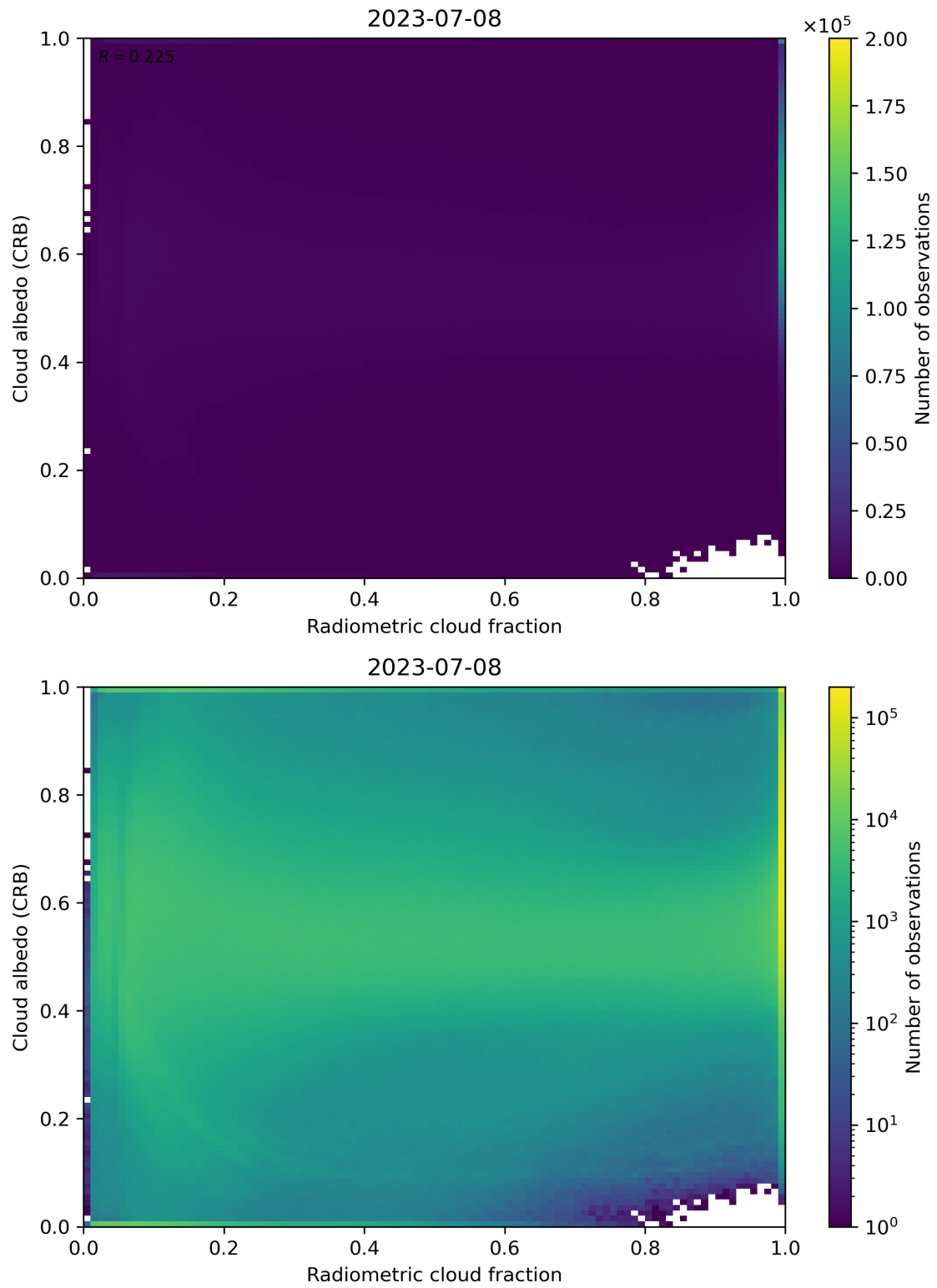


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-07-08 to 2023-07-09.

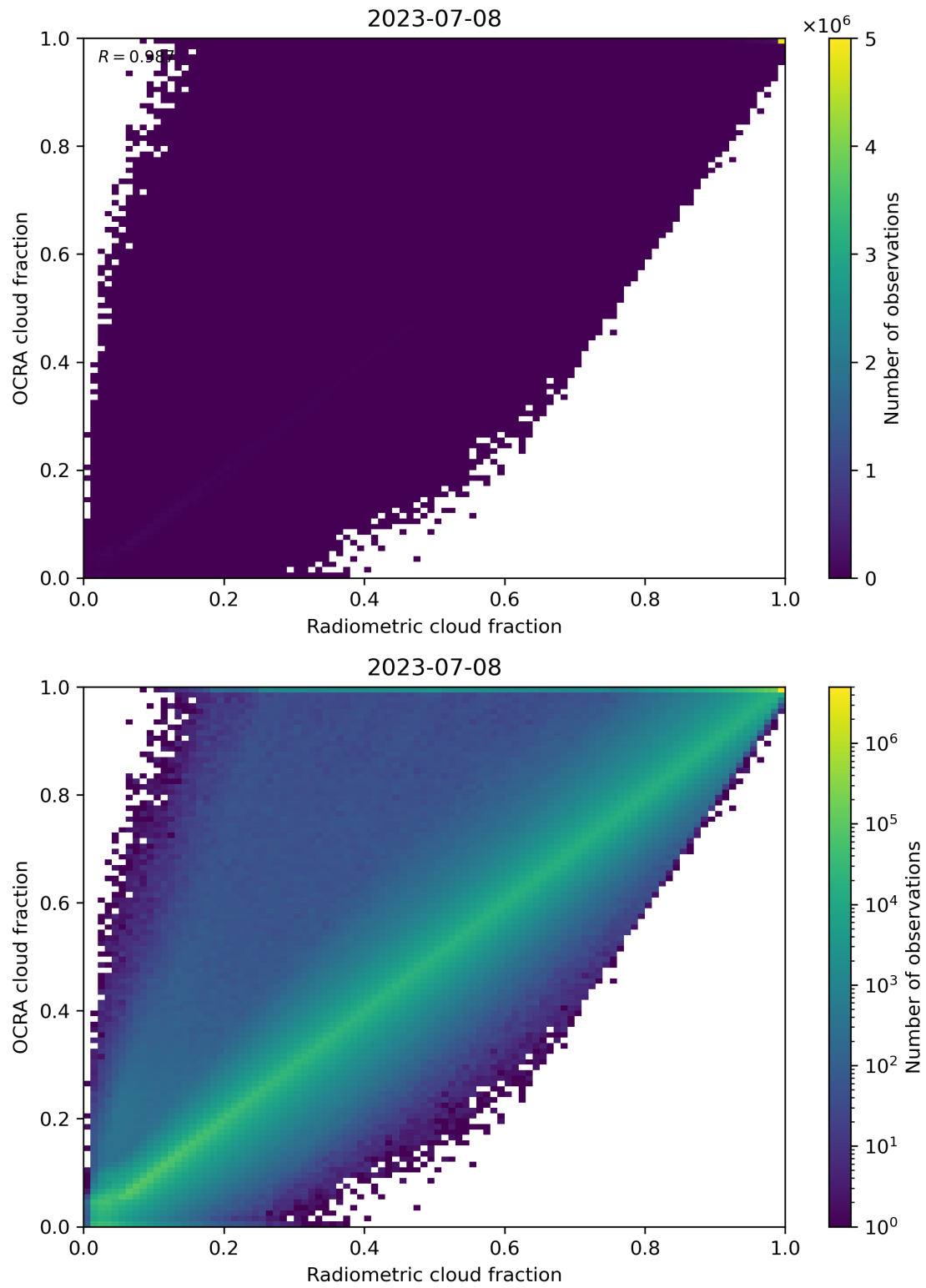


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-07-08 to 2023-07-09.

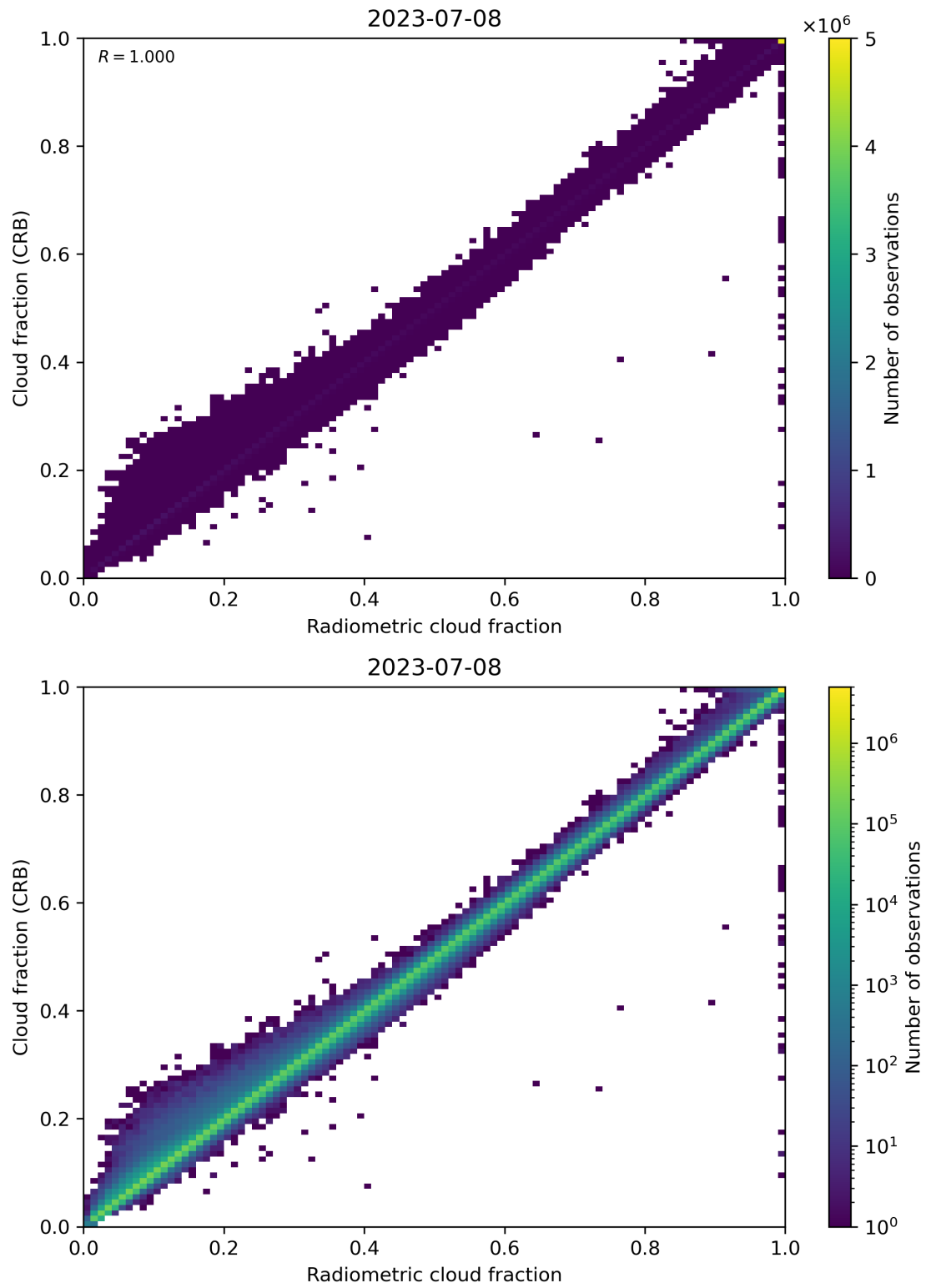


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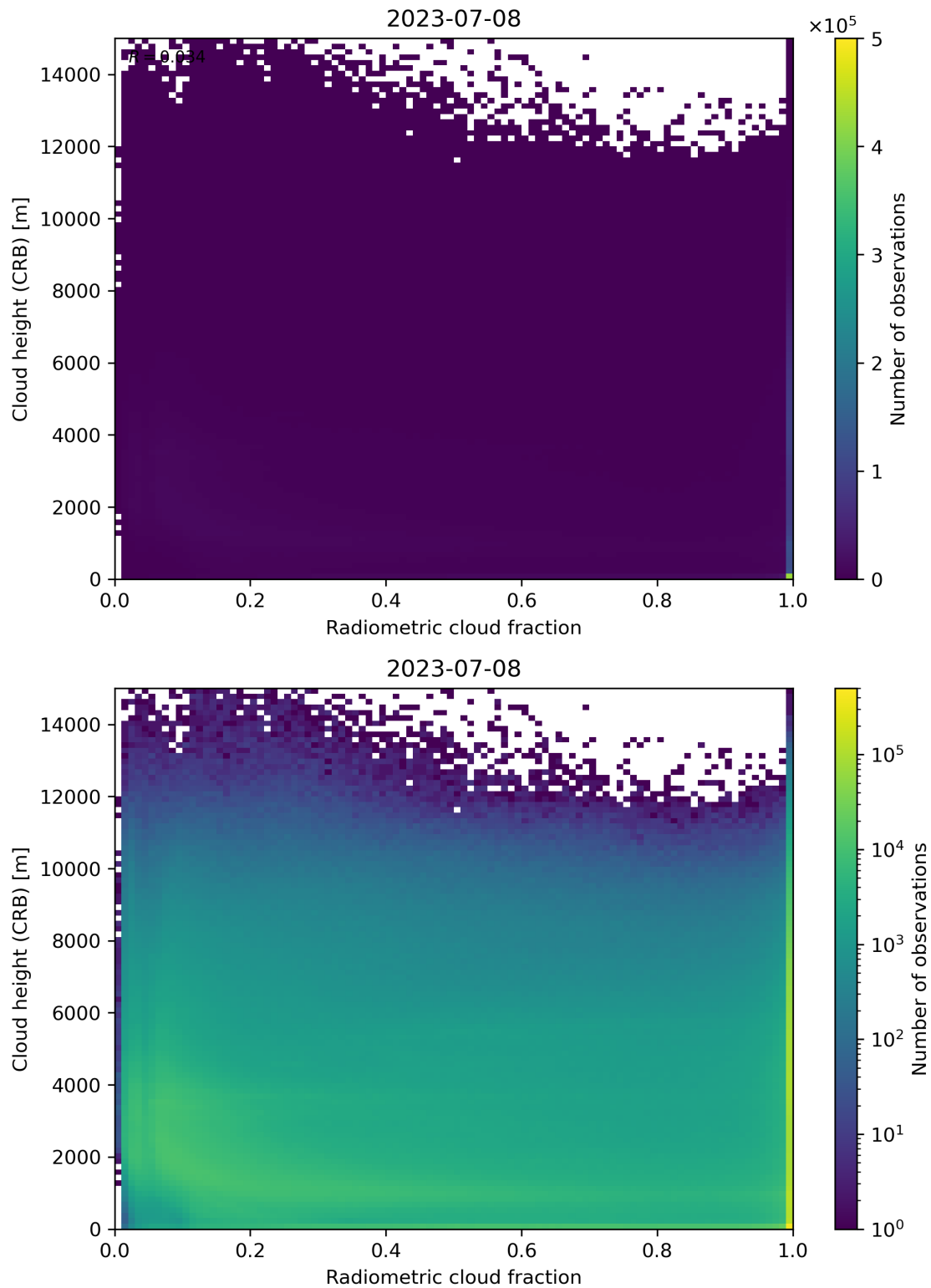


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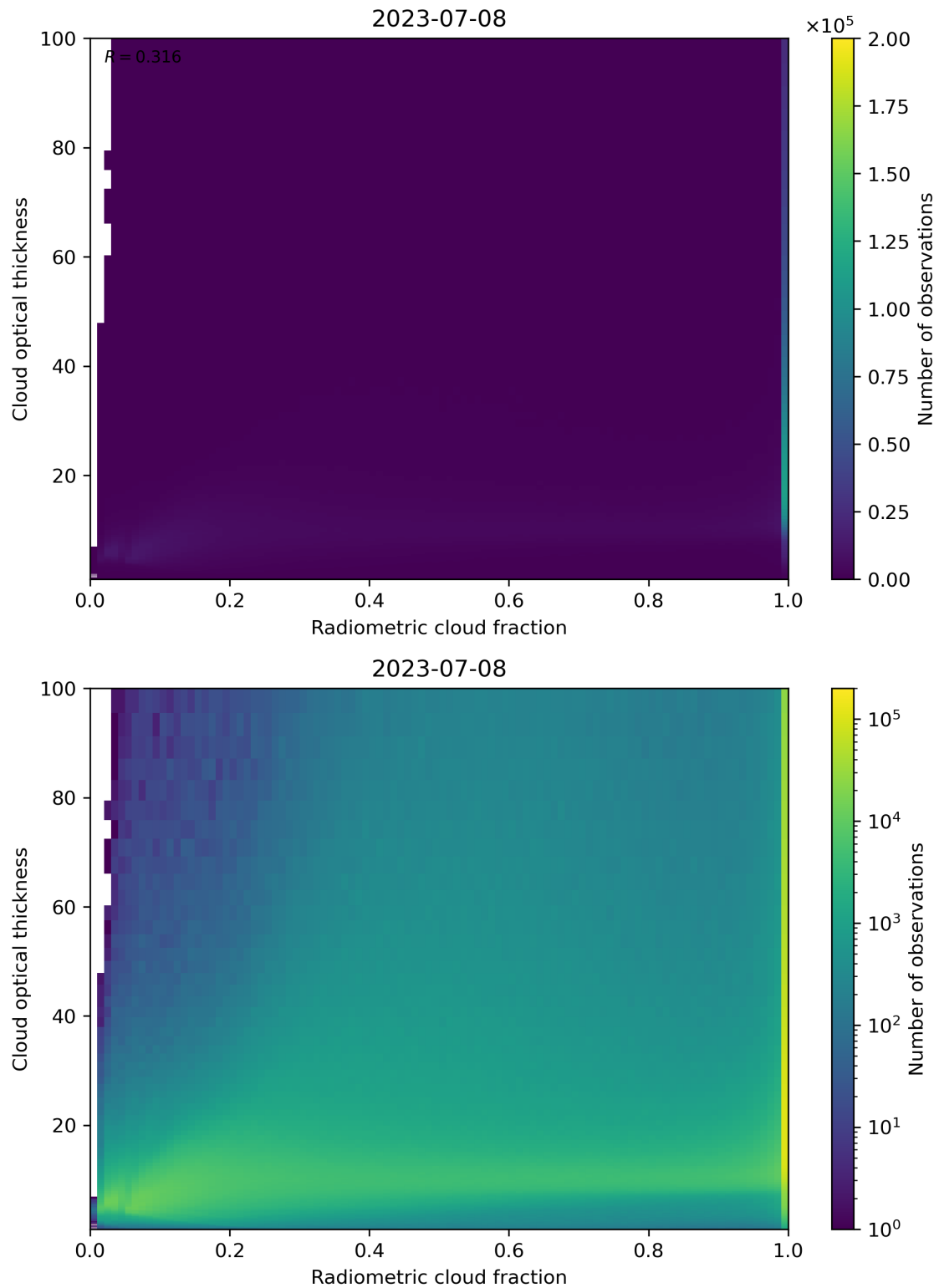


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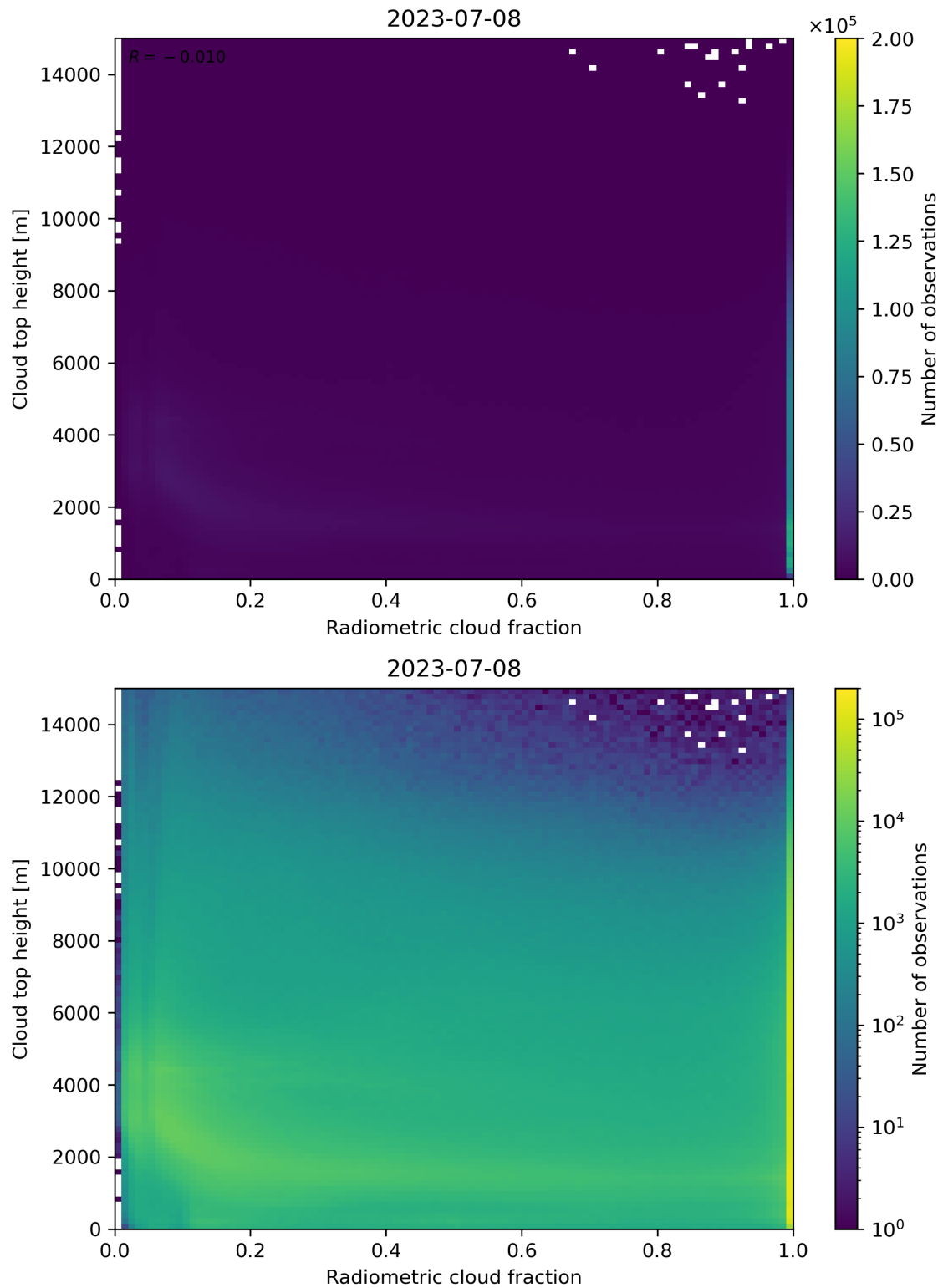


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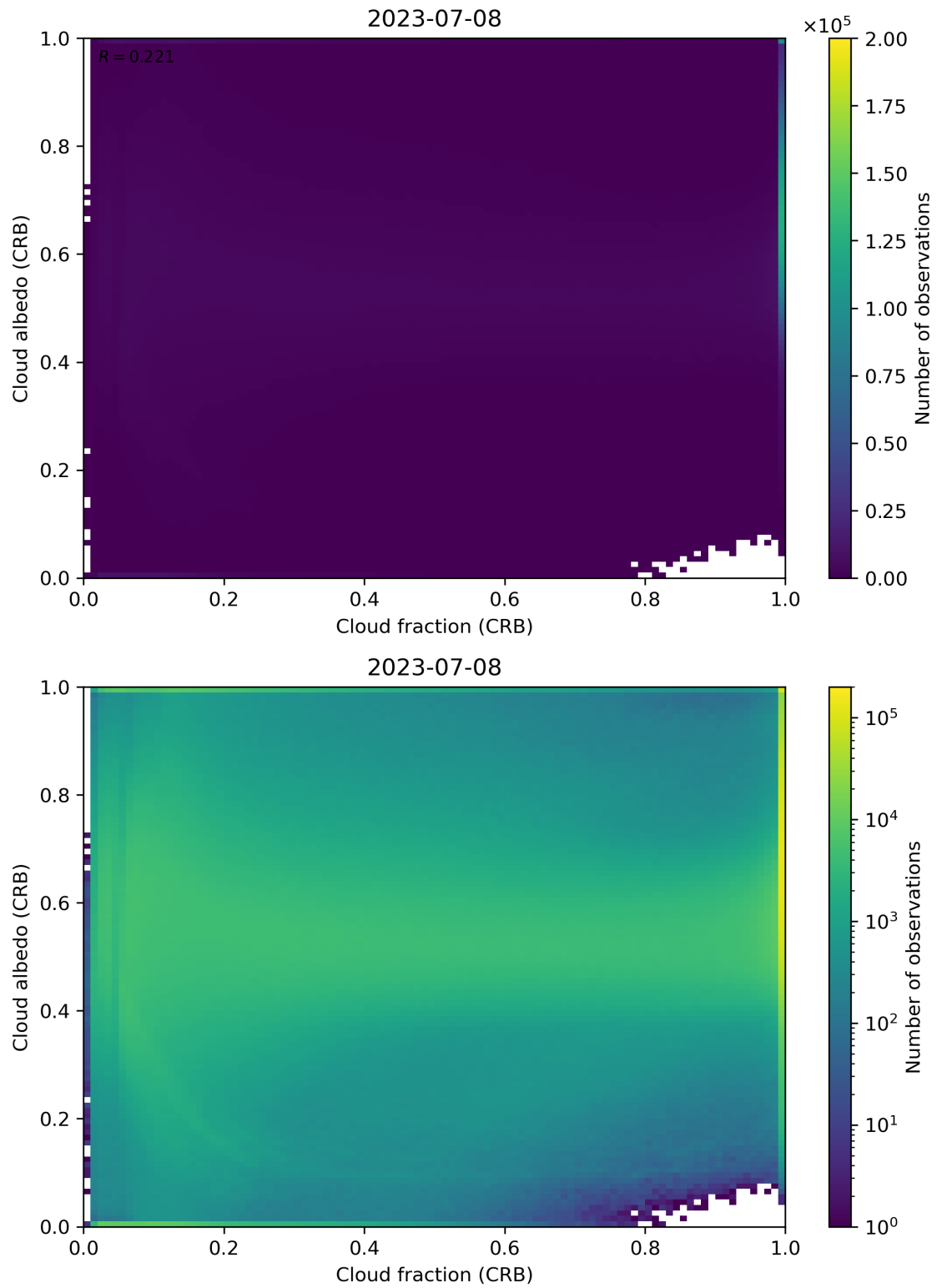


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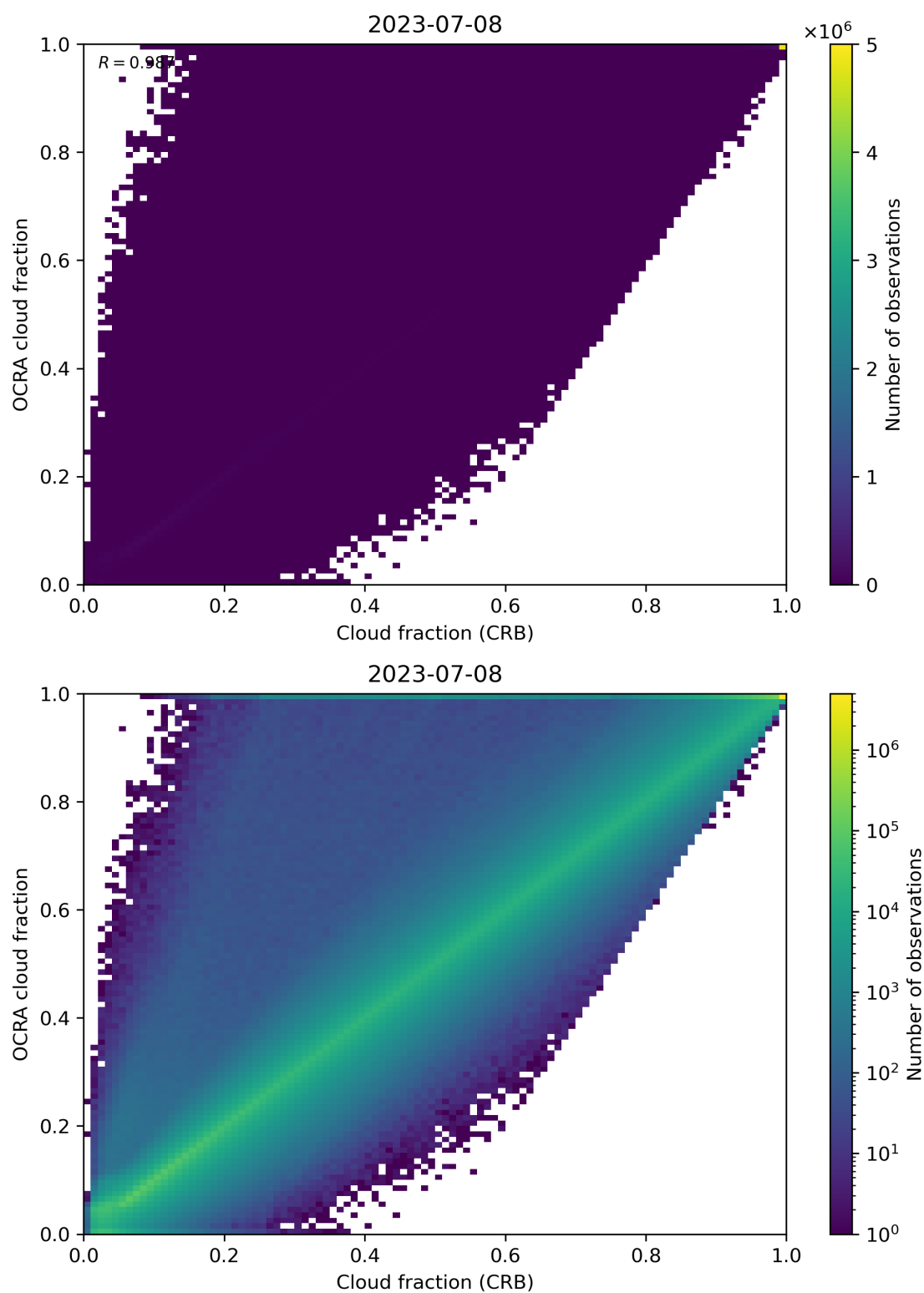


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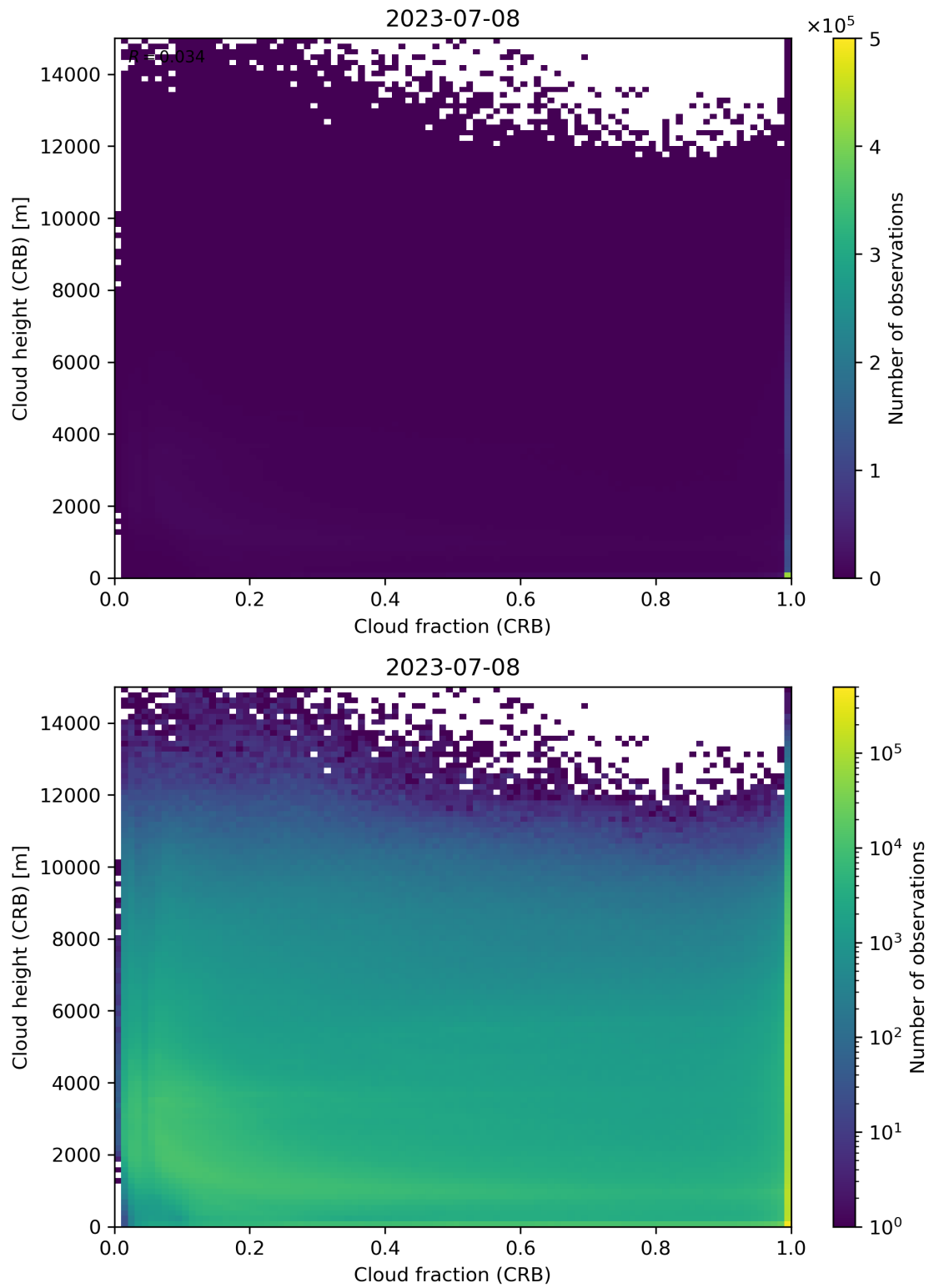


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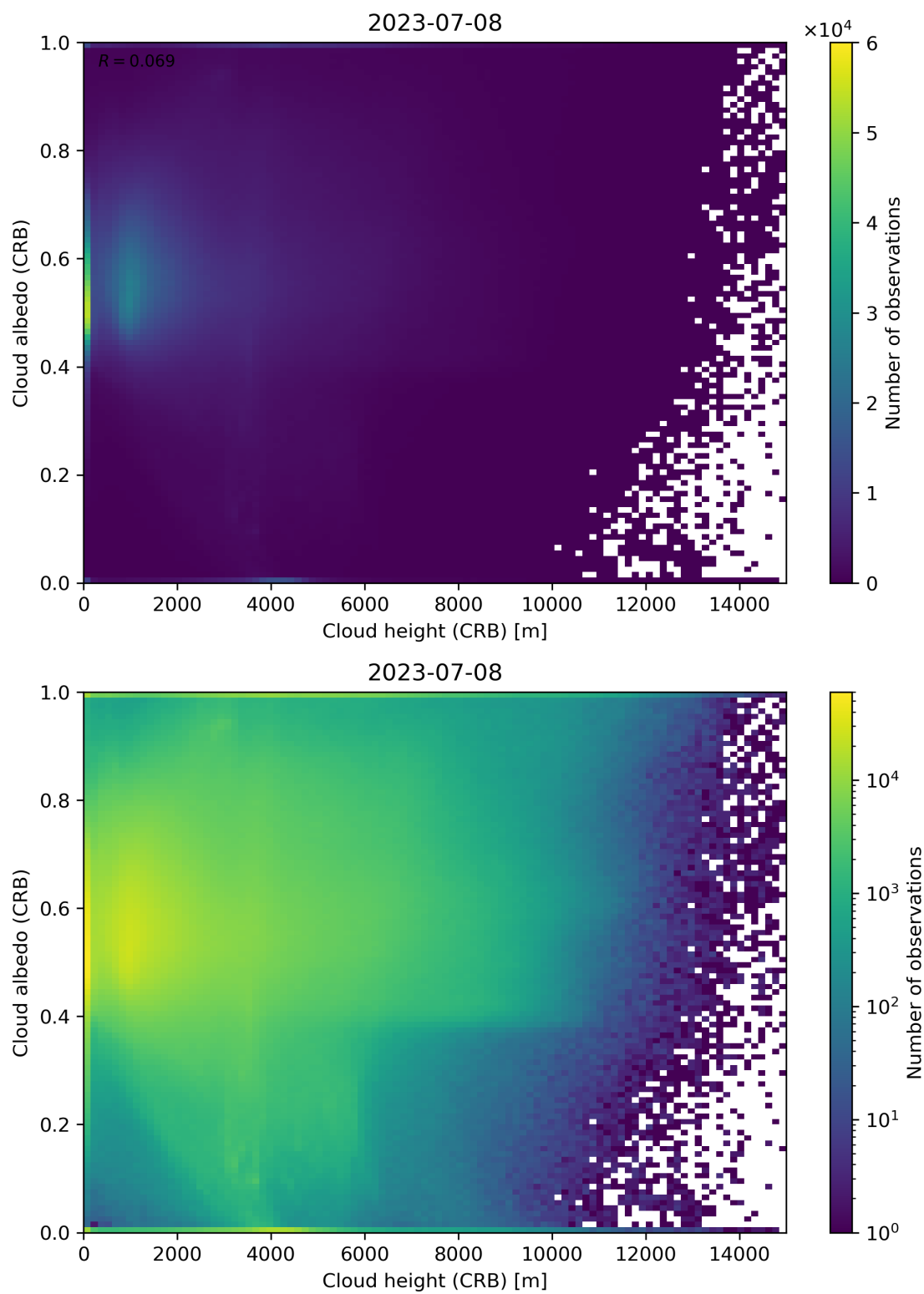


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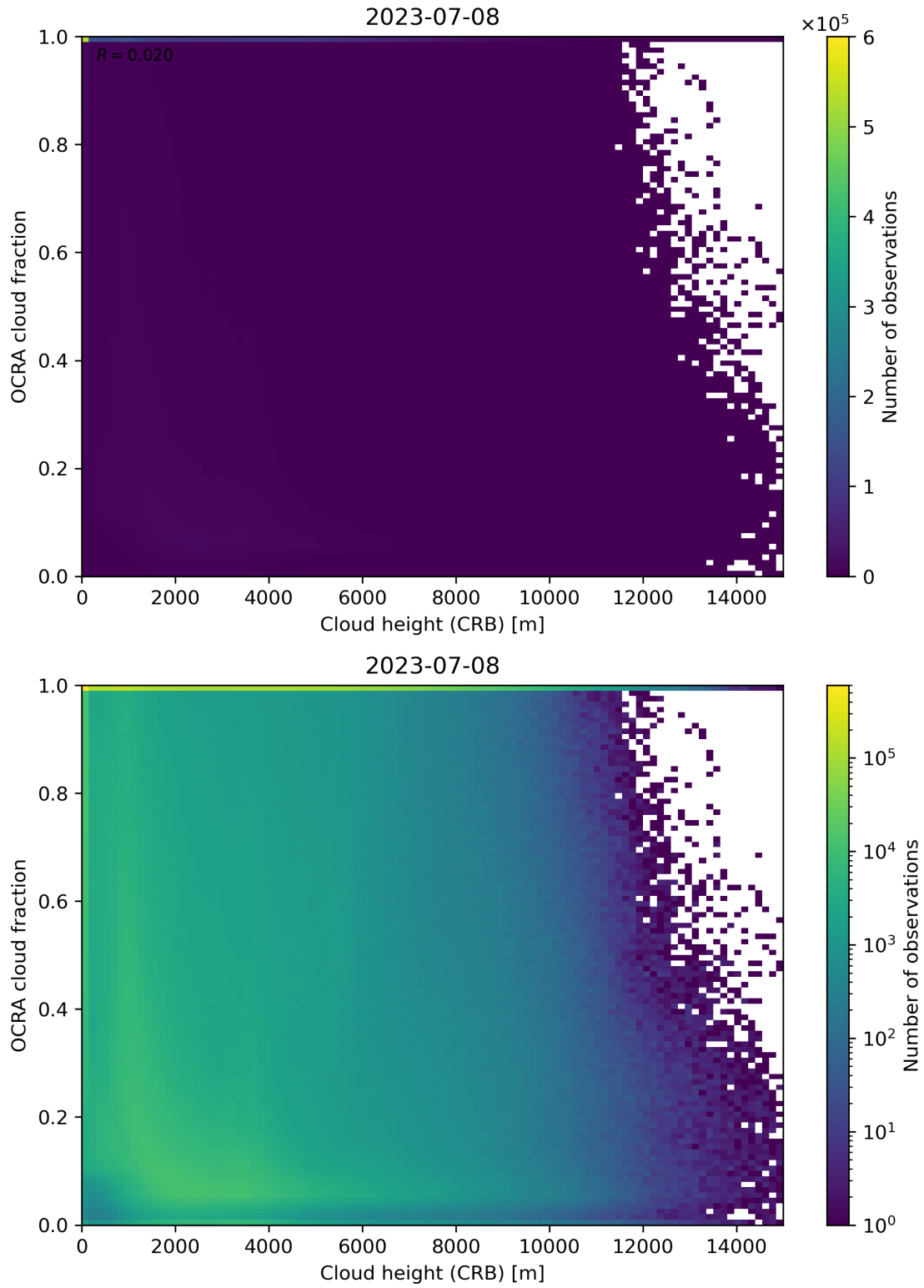


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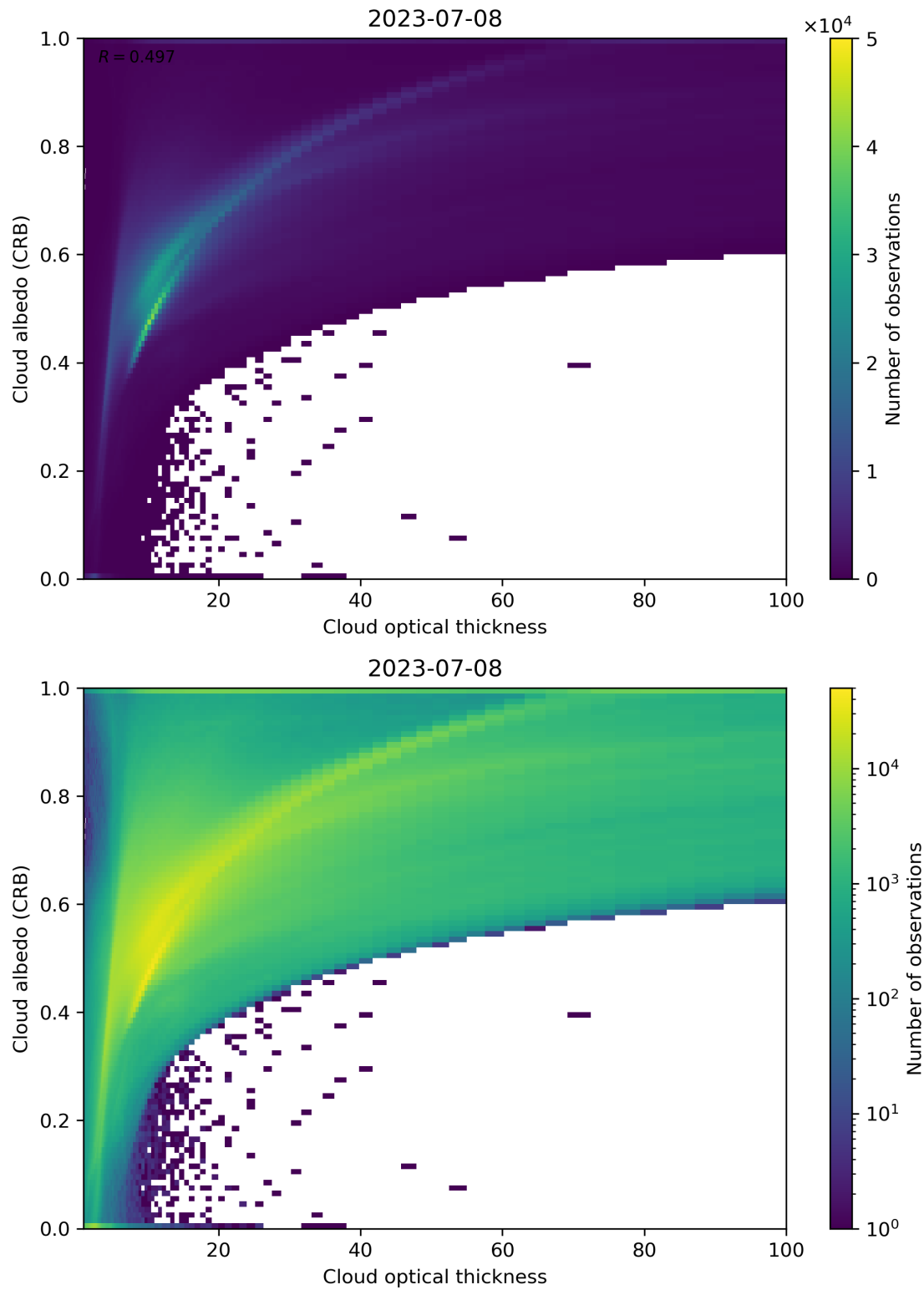


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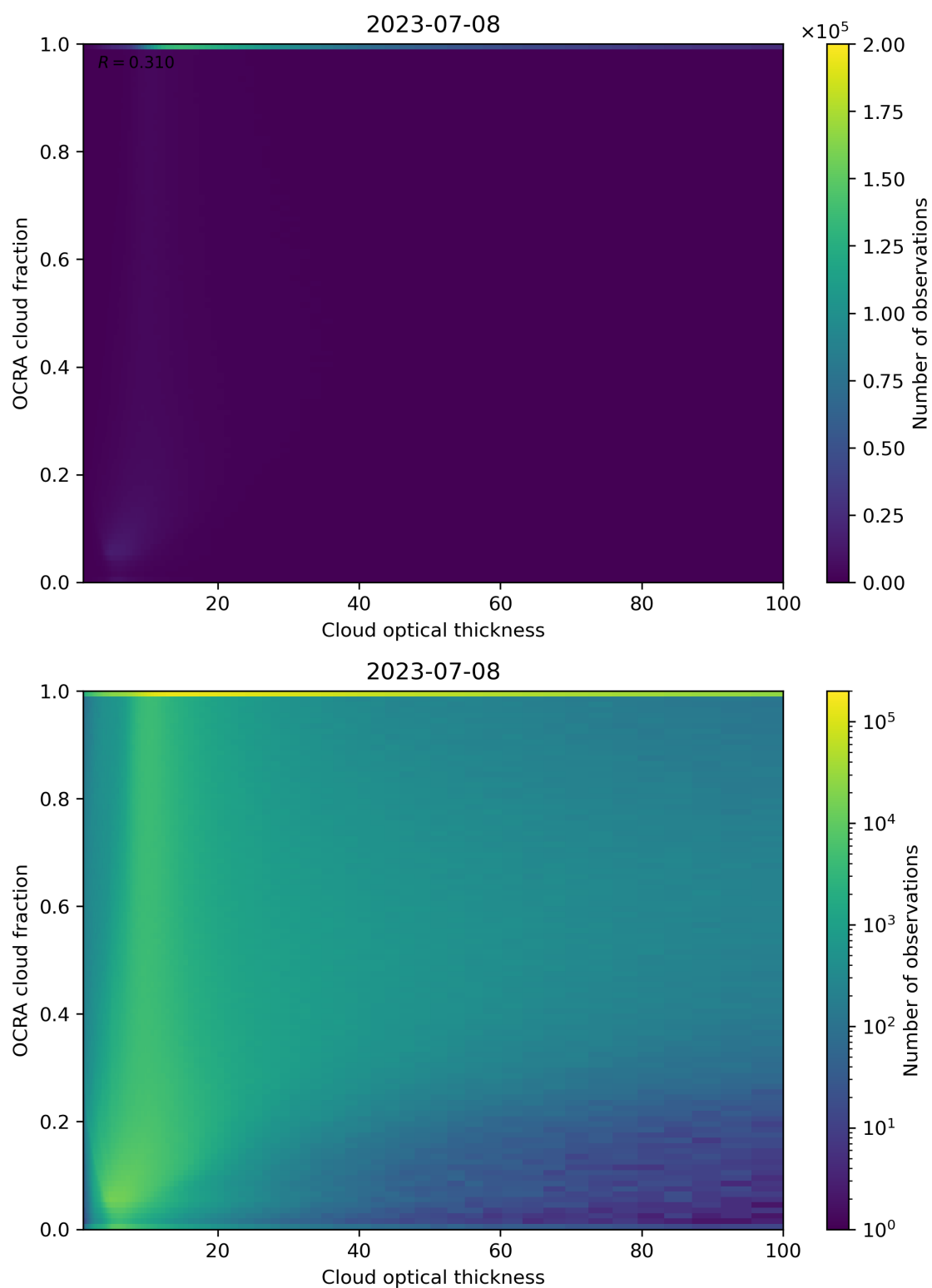


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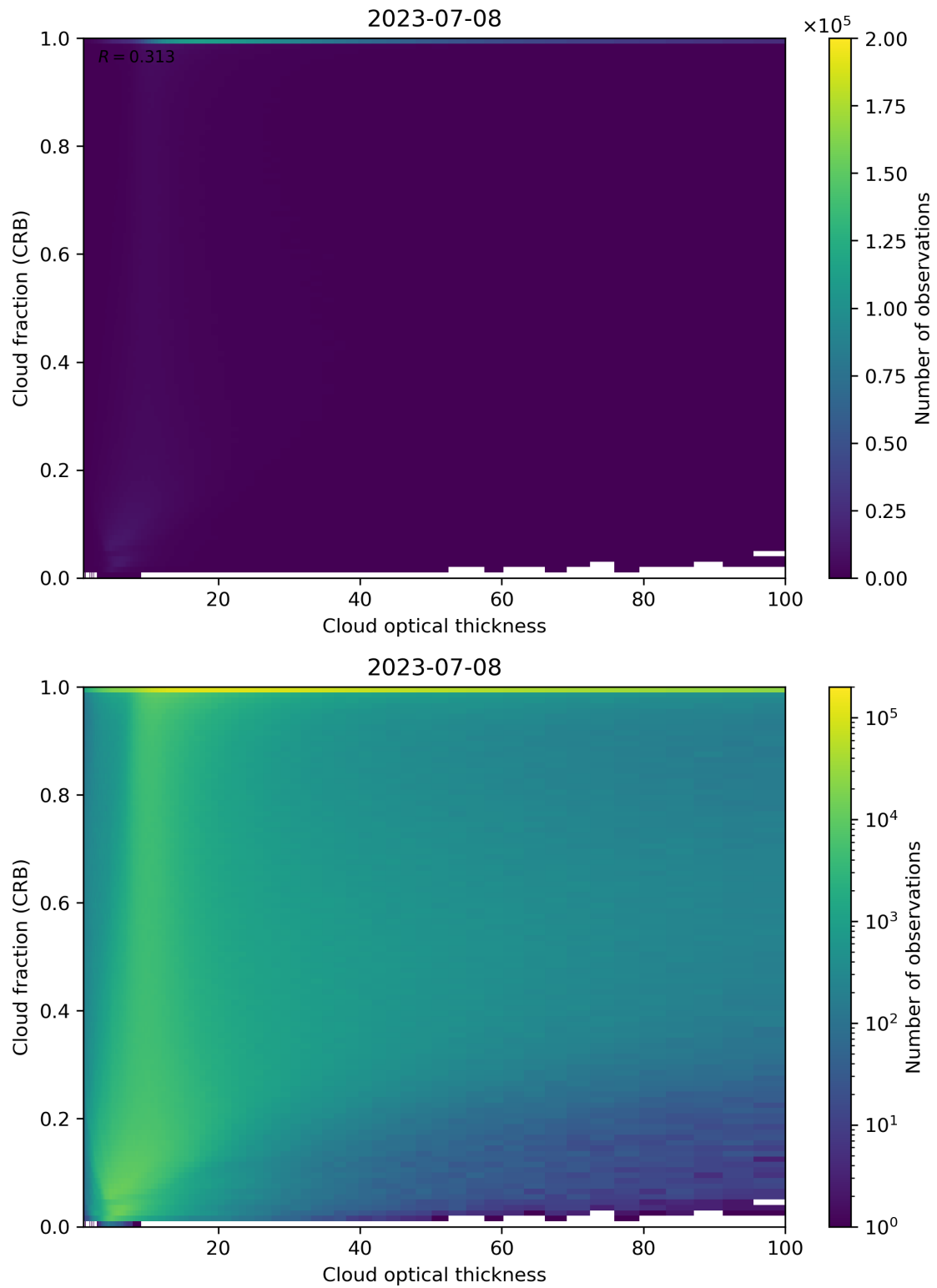


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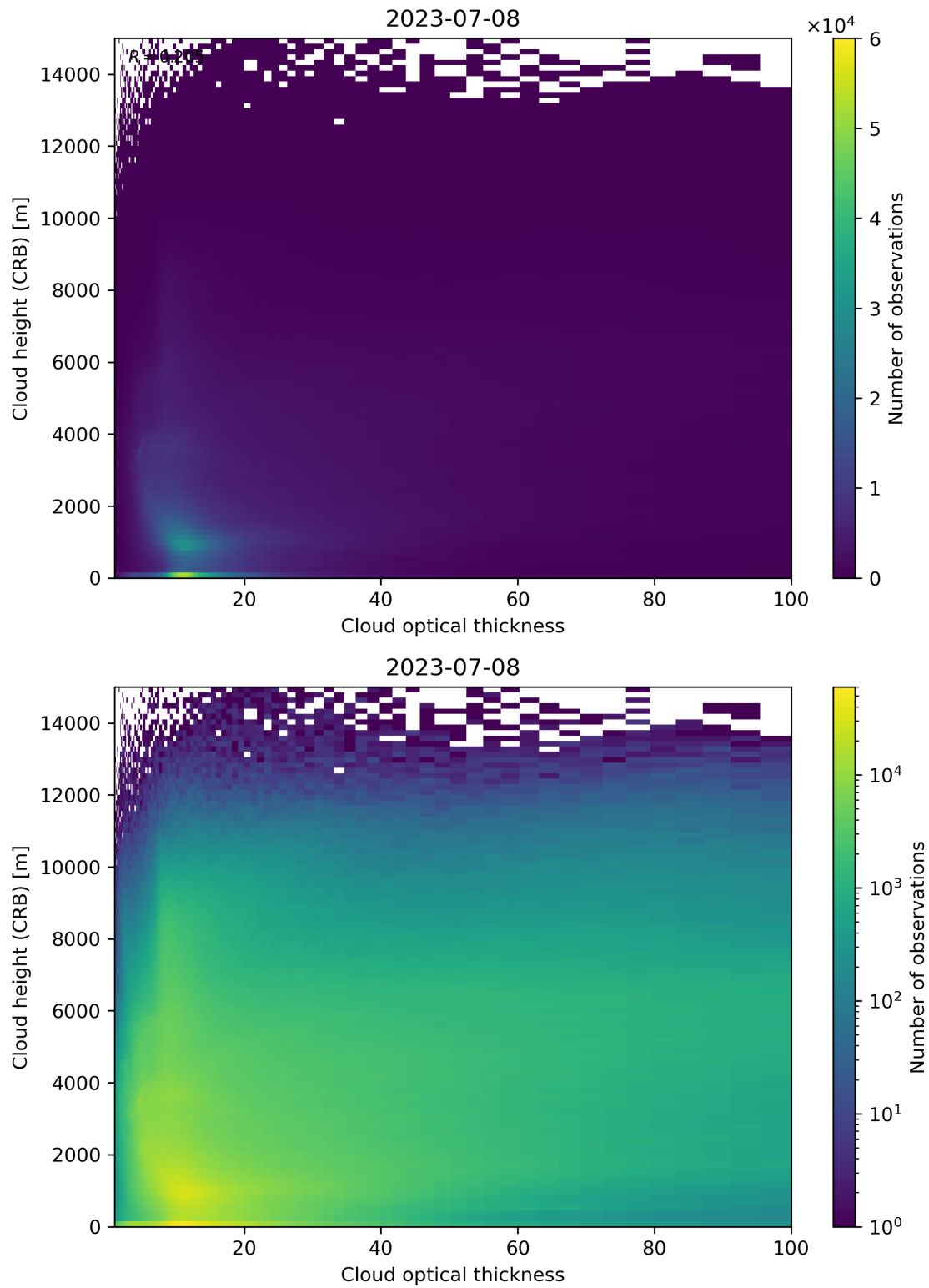


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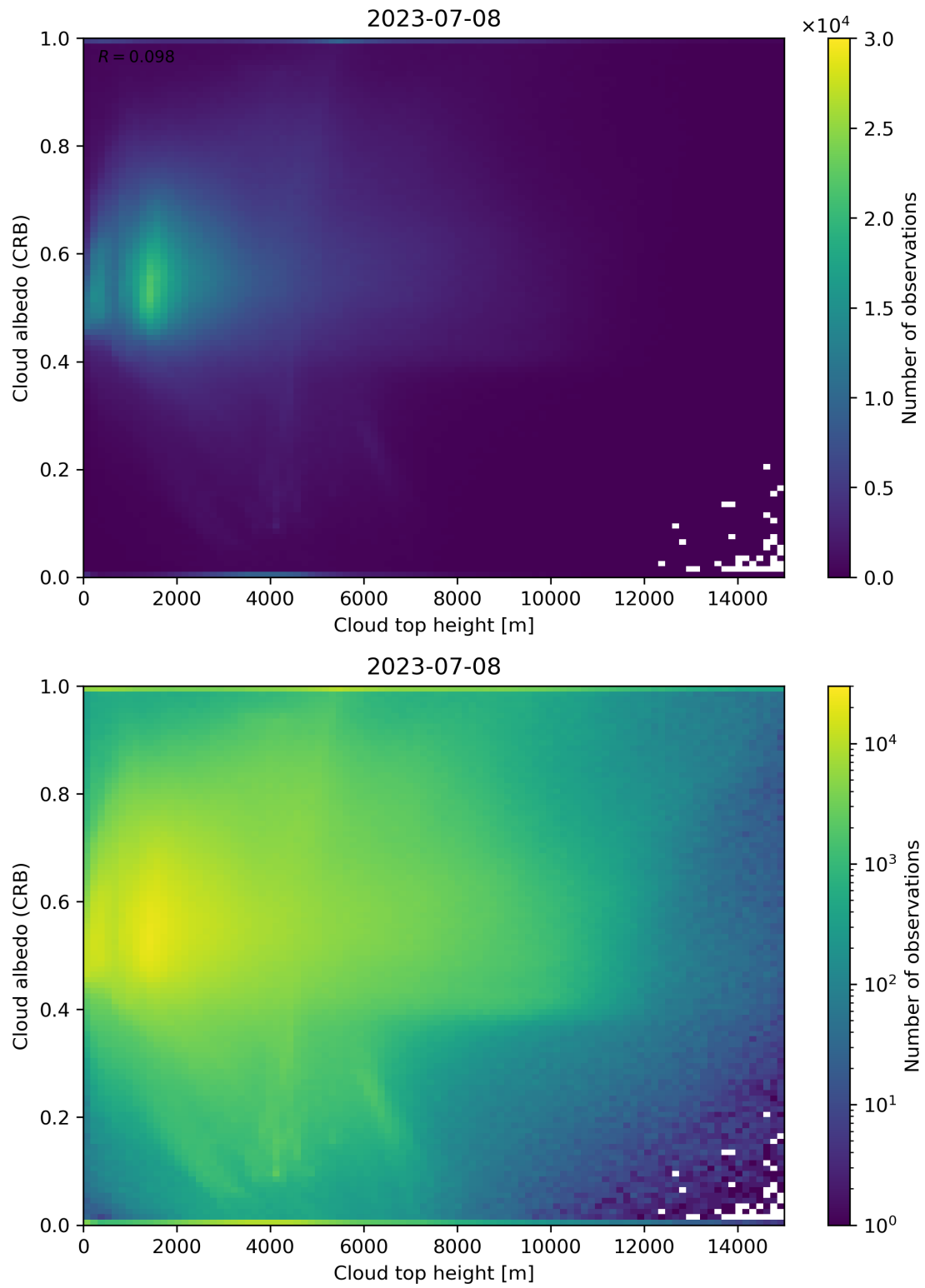


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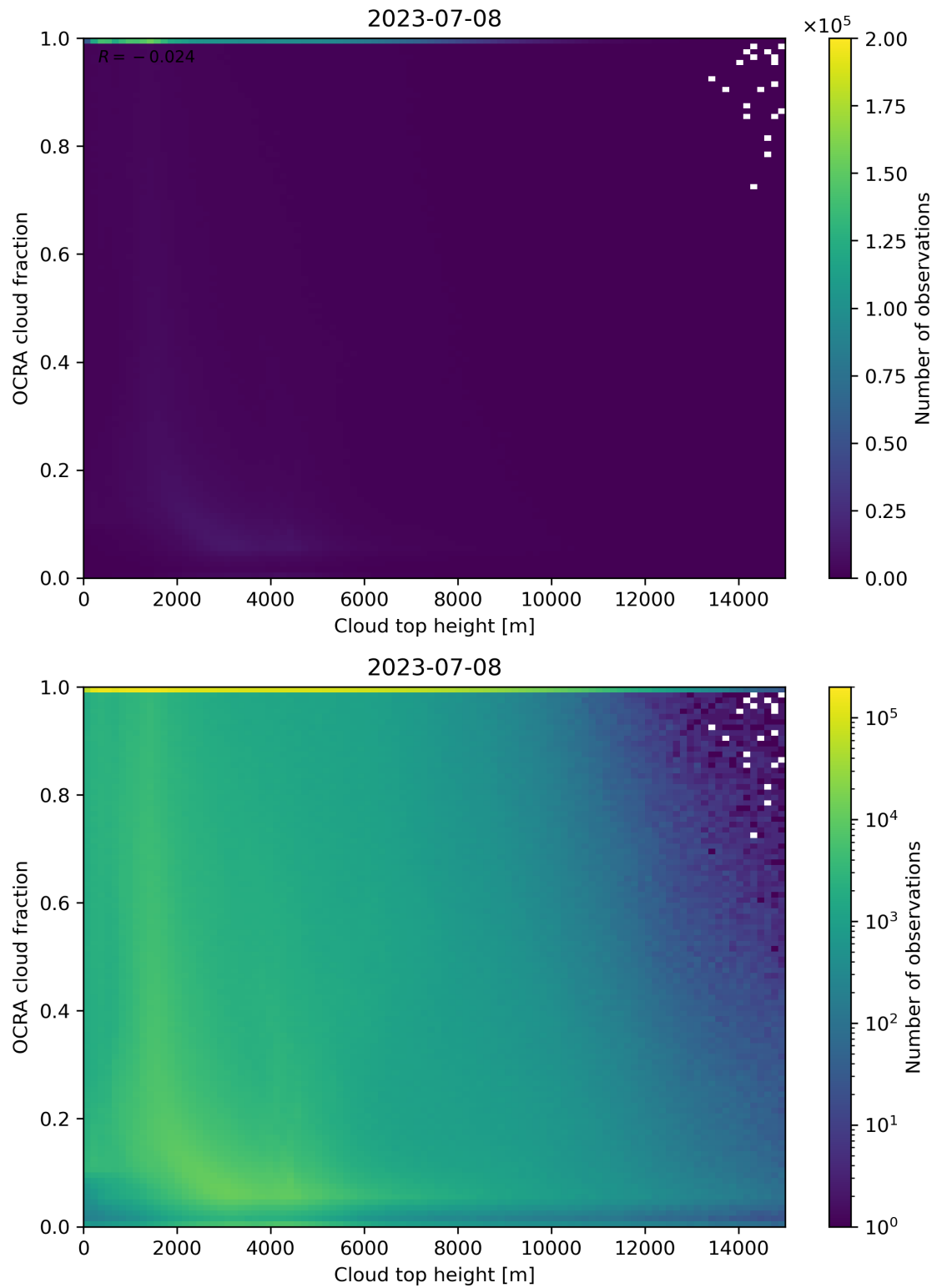


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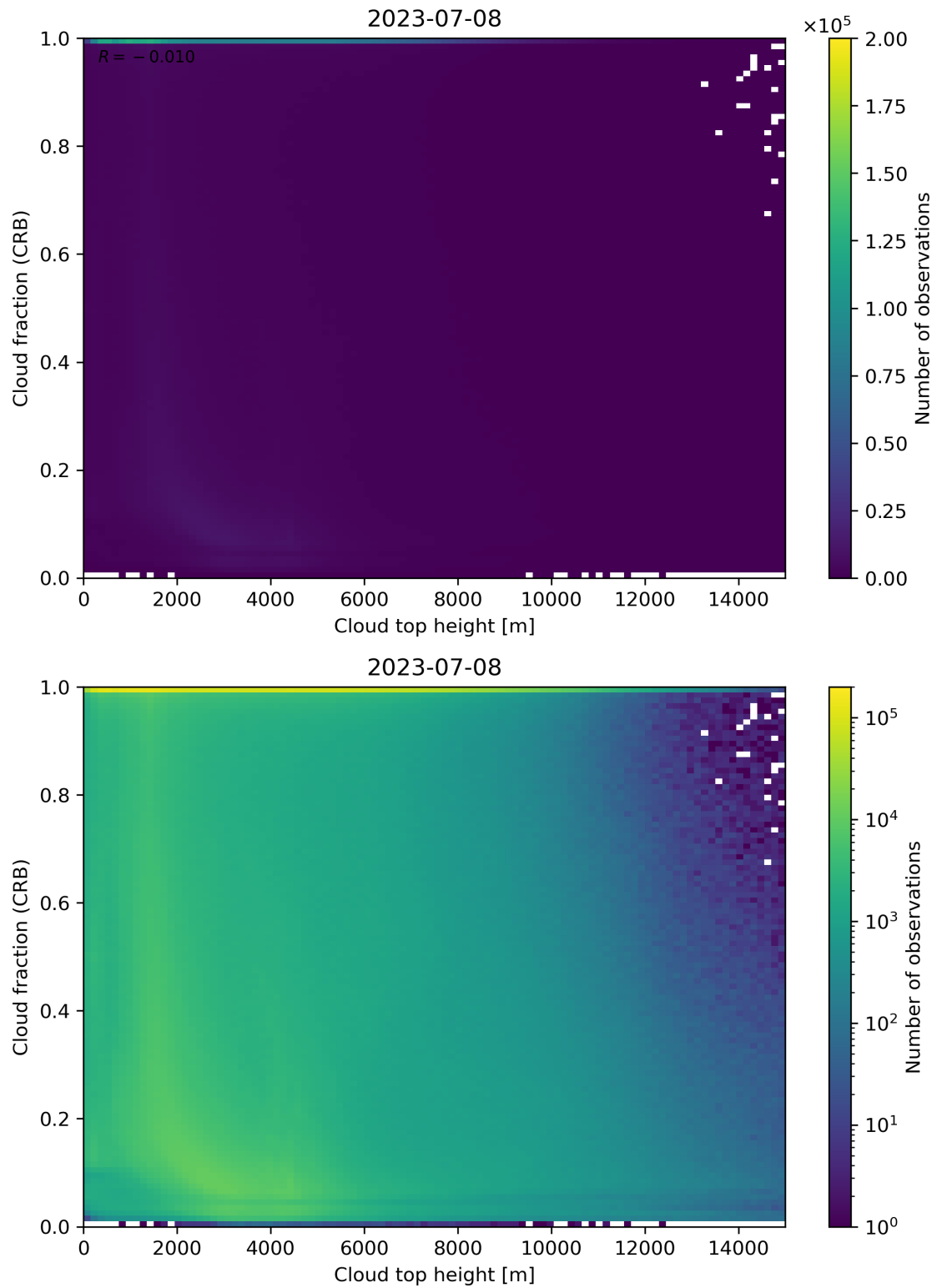


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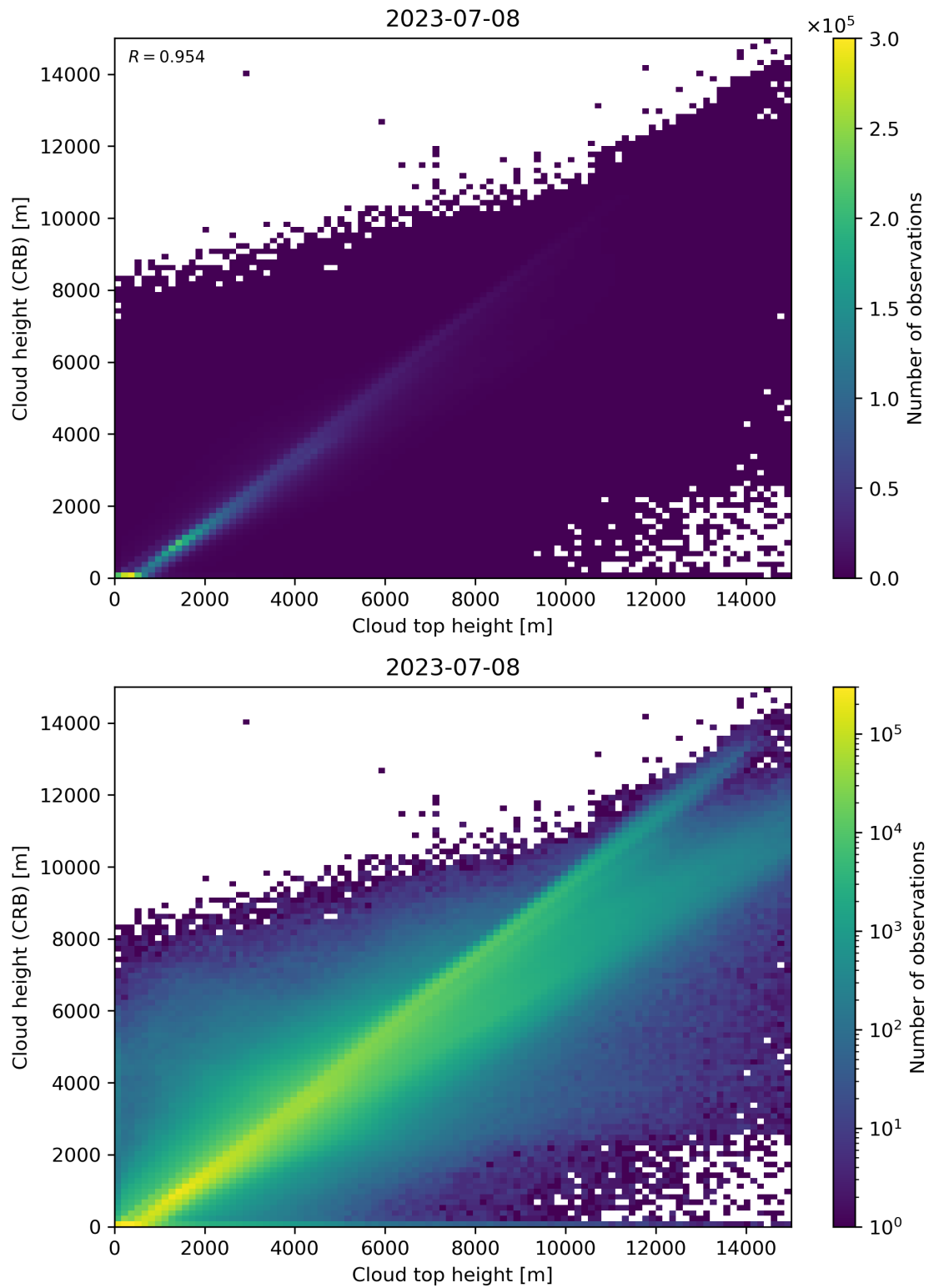


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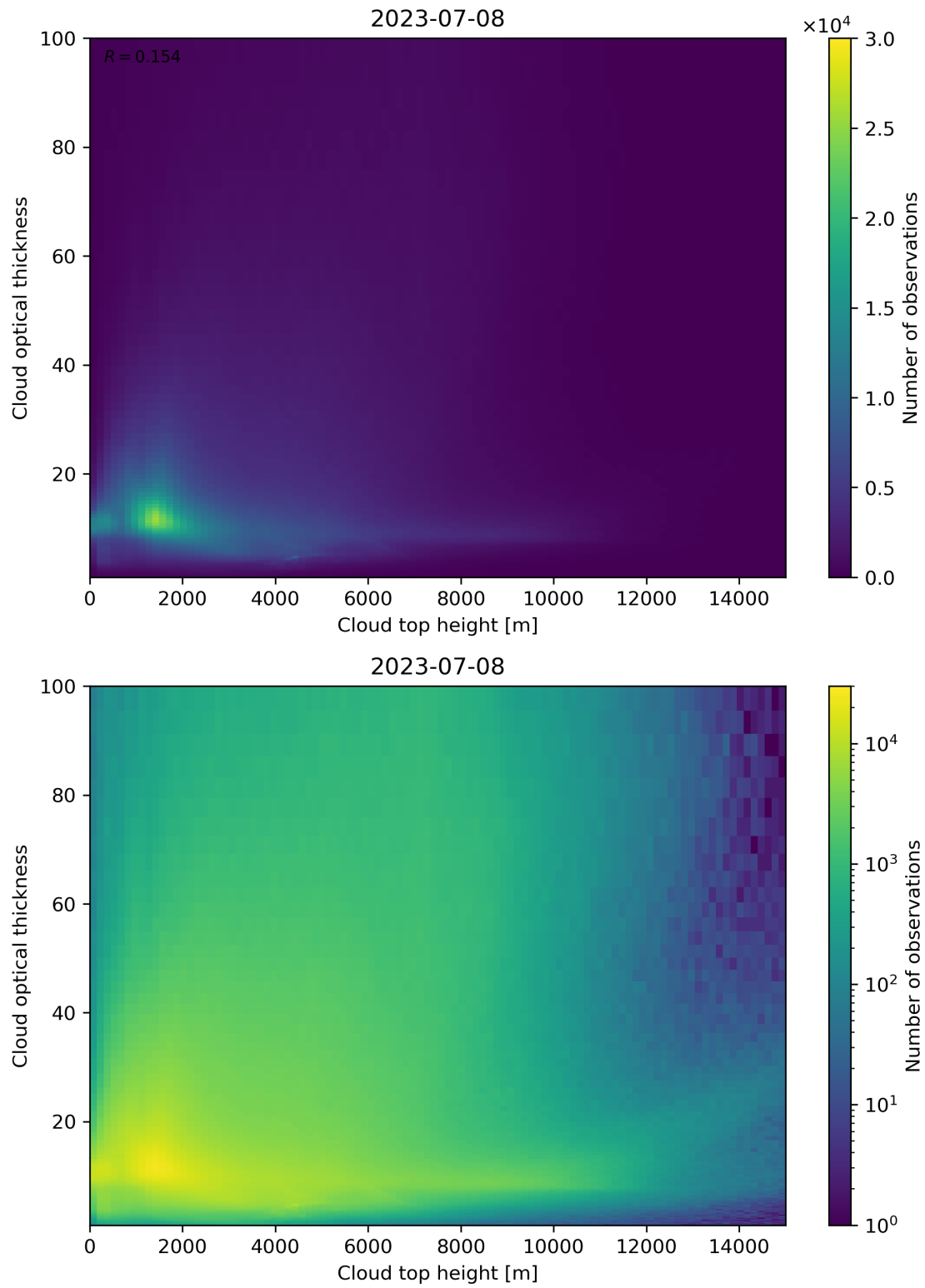


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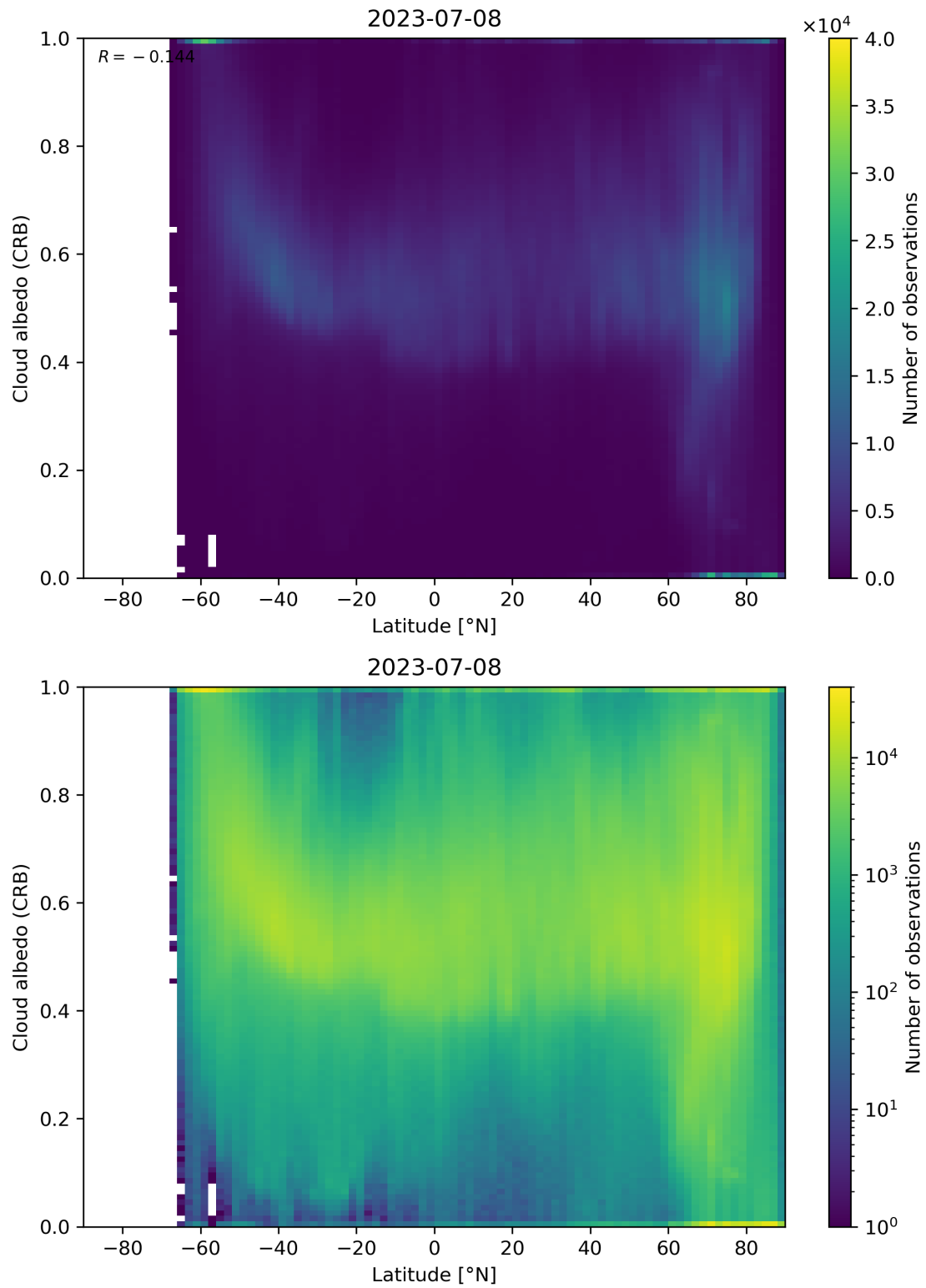


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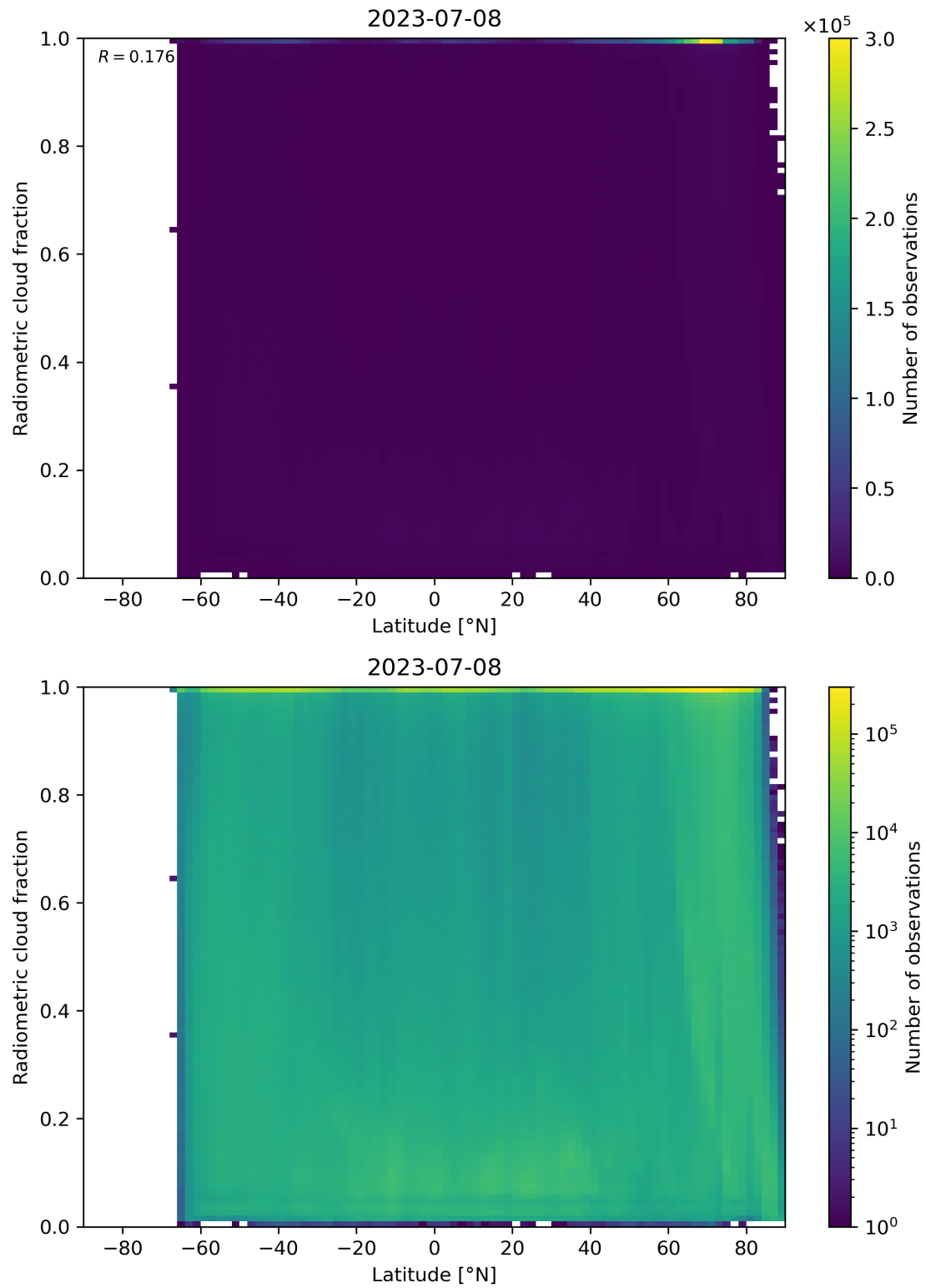


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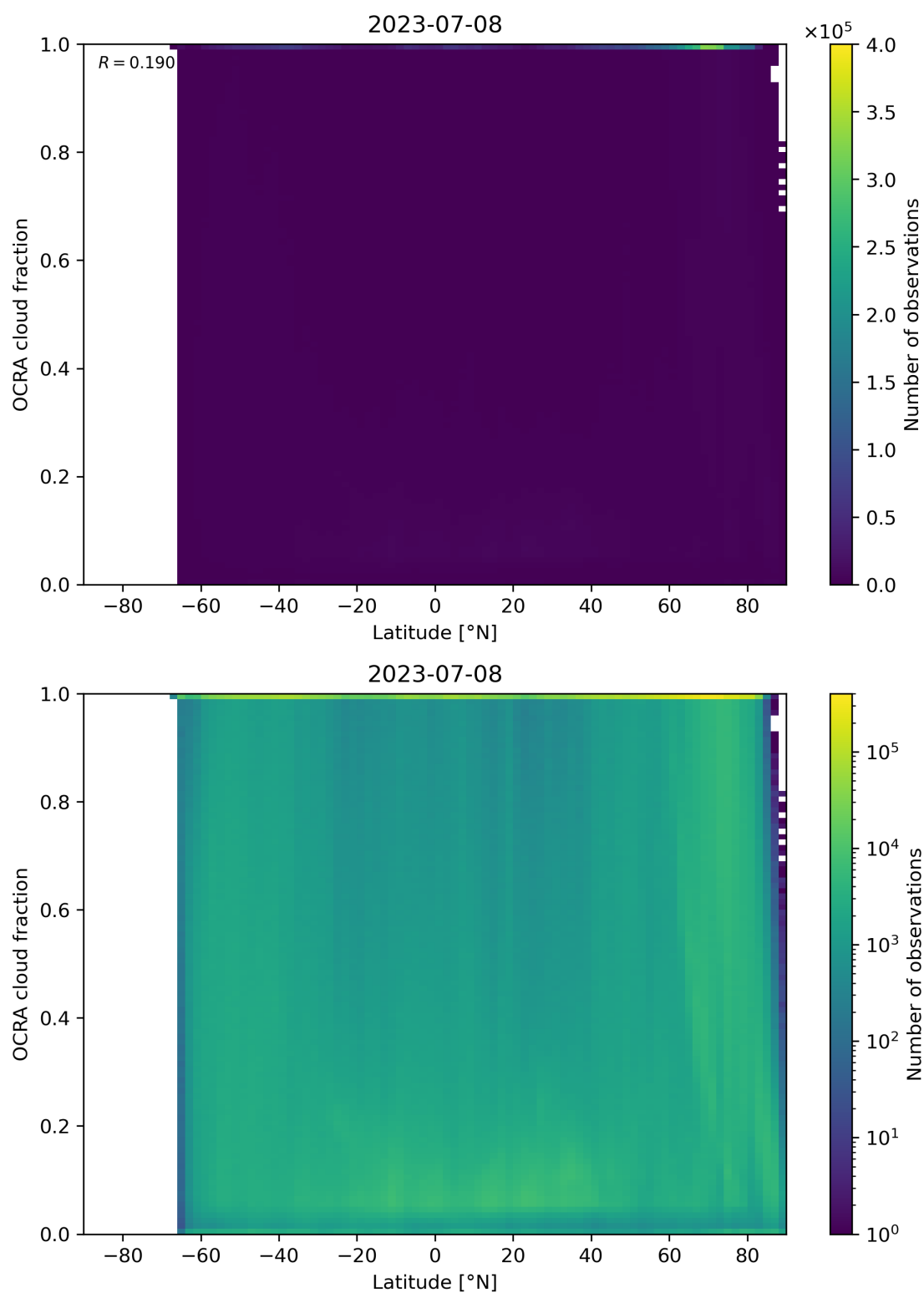


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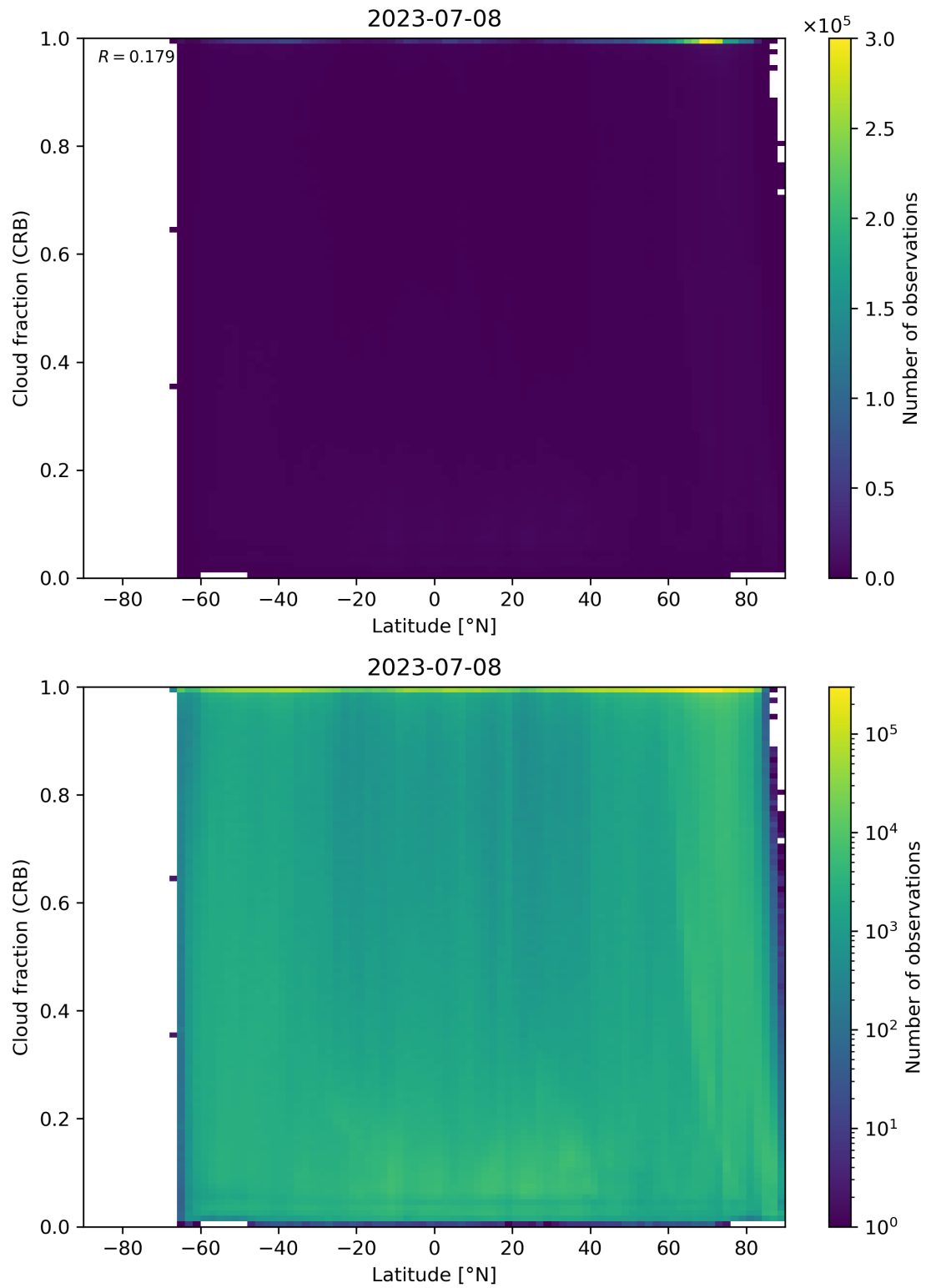


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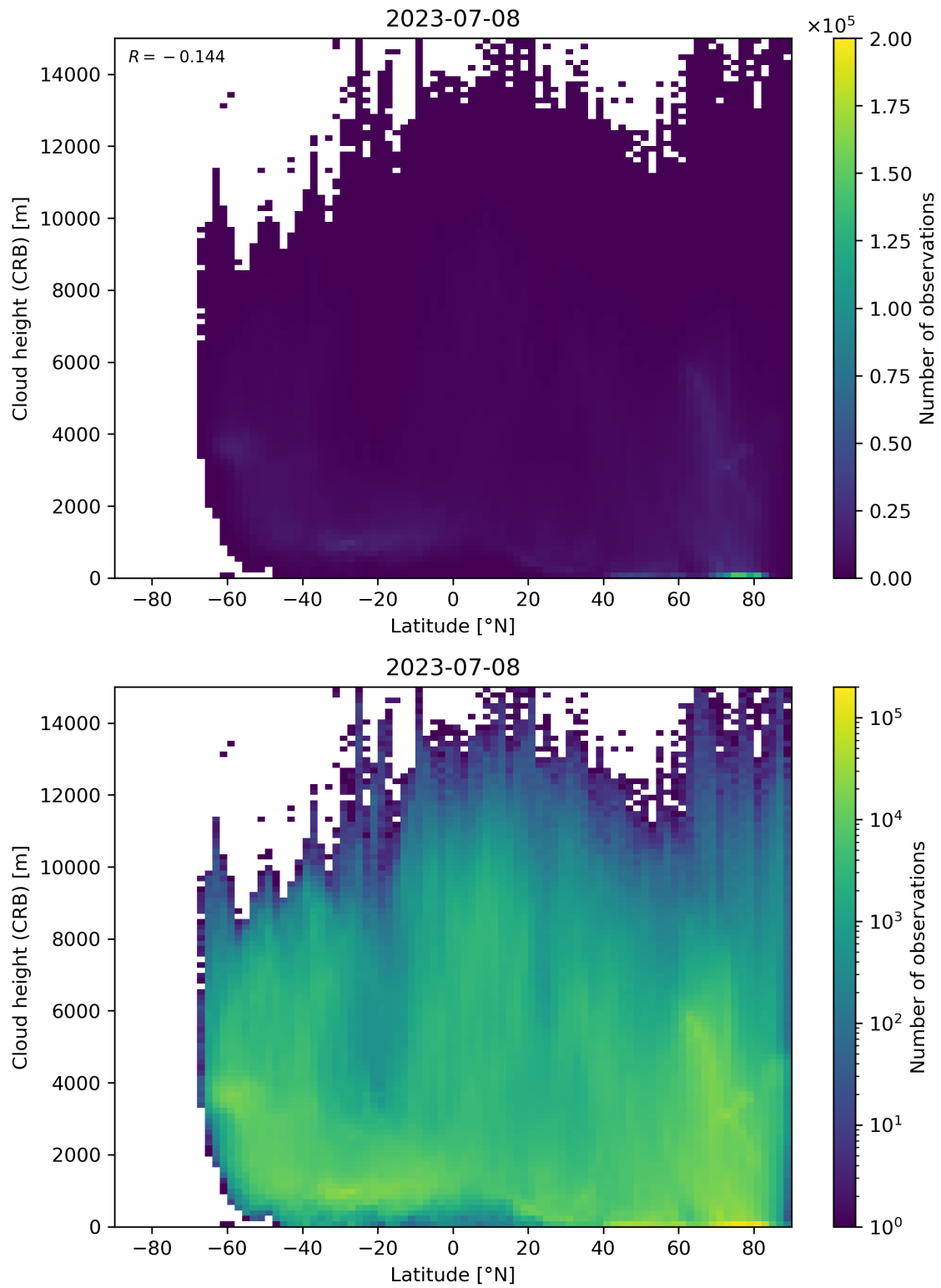


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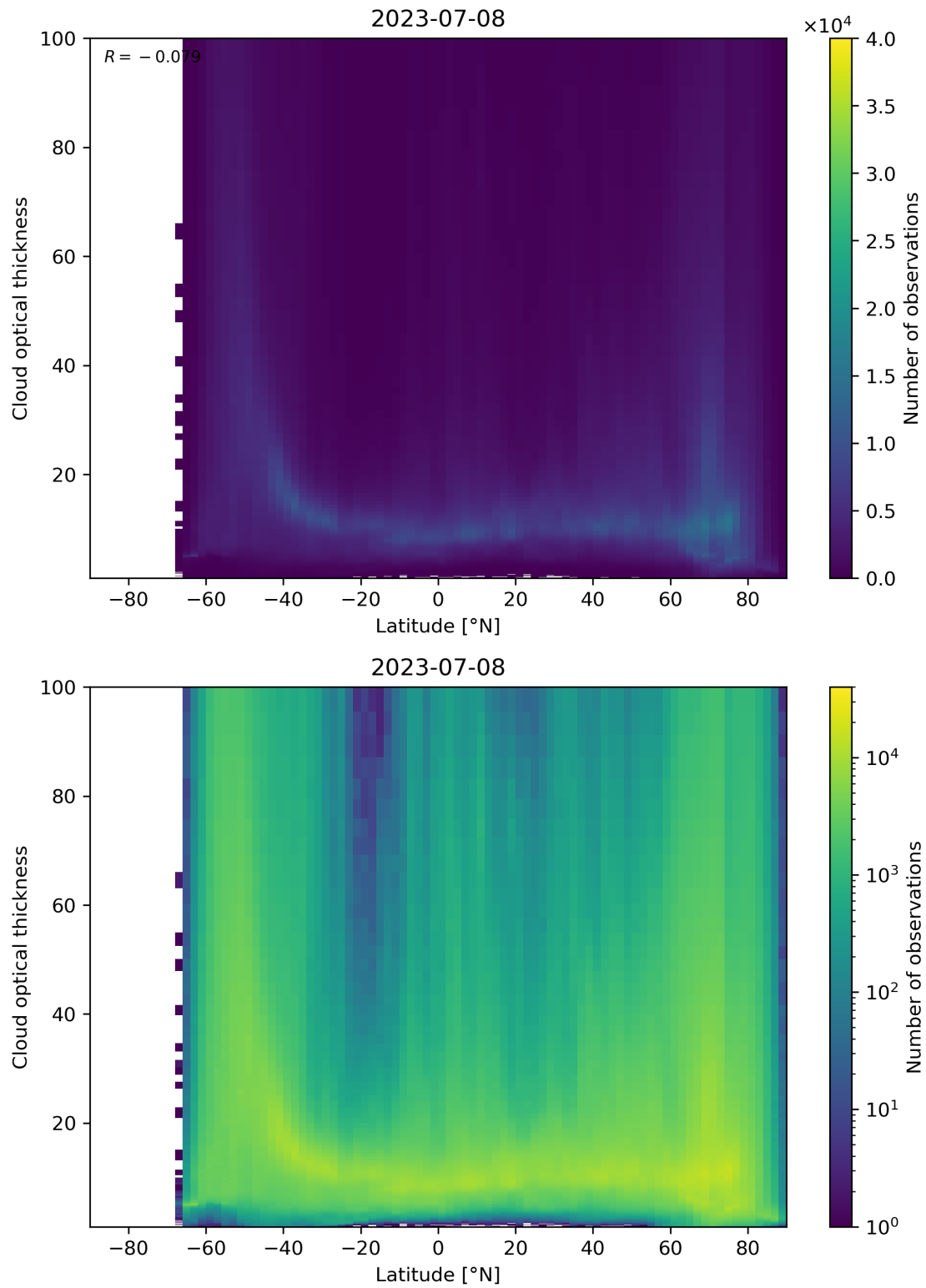


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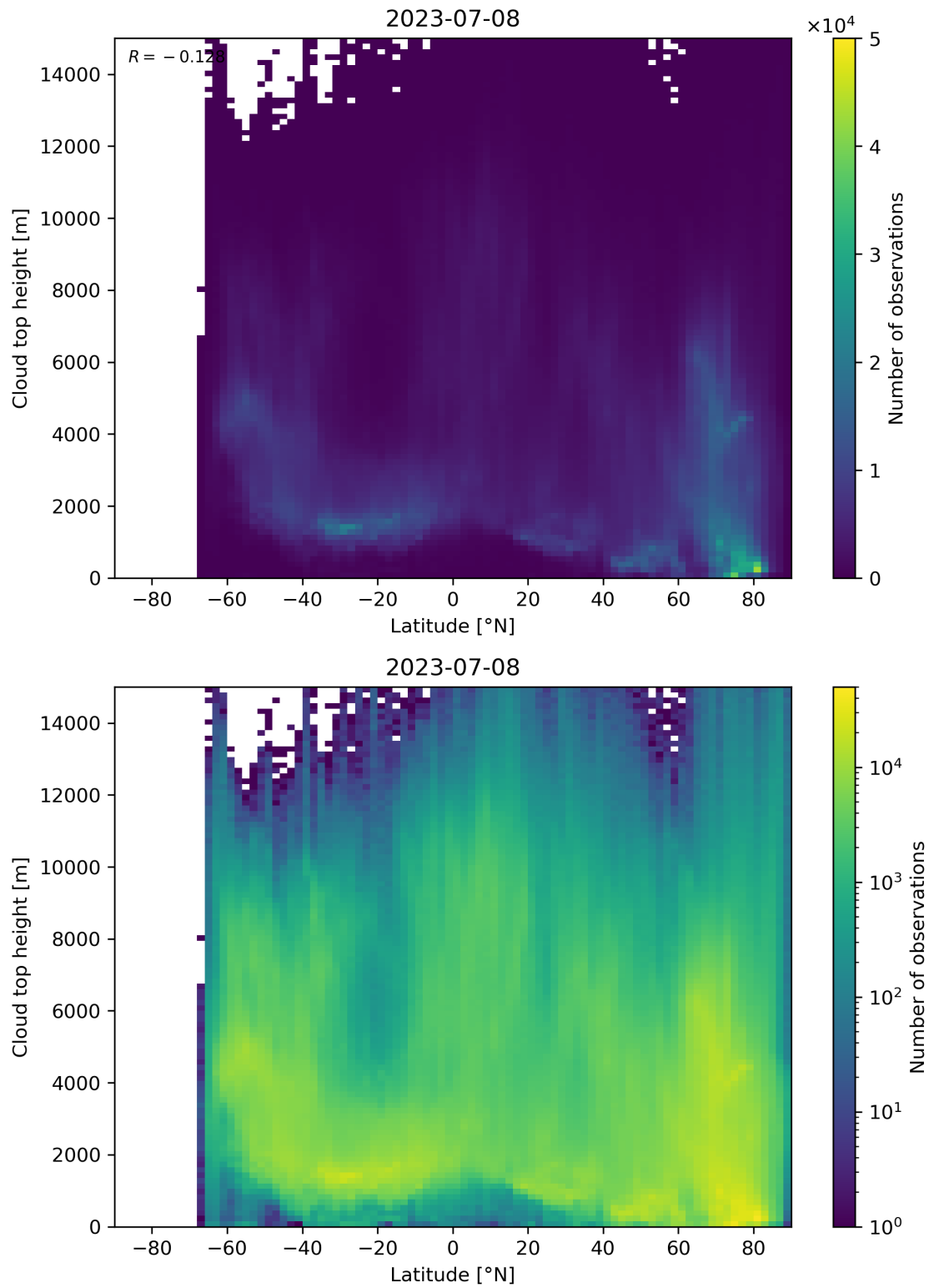


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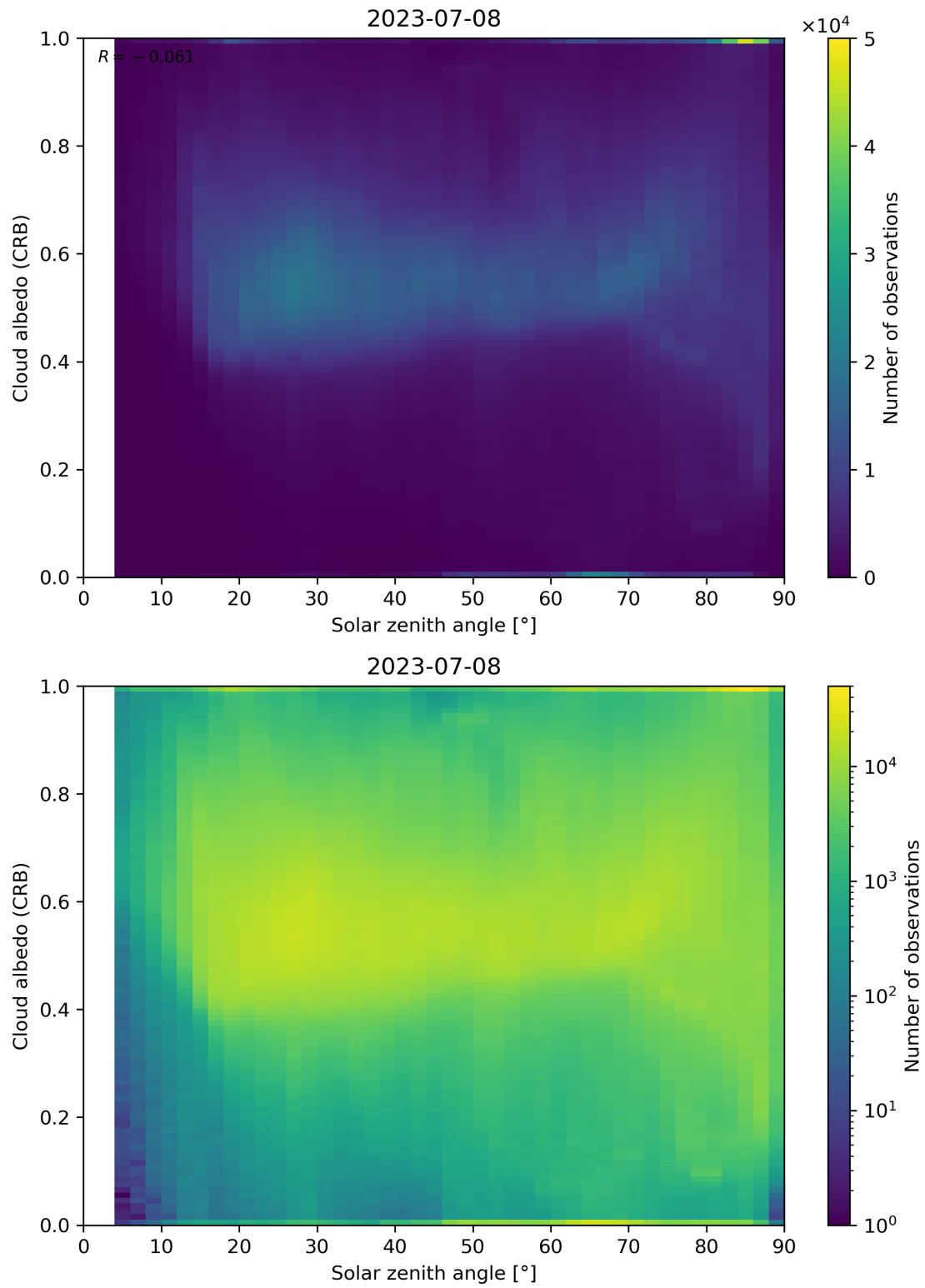


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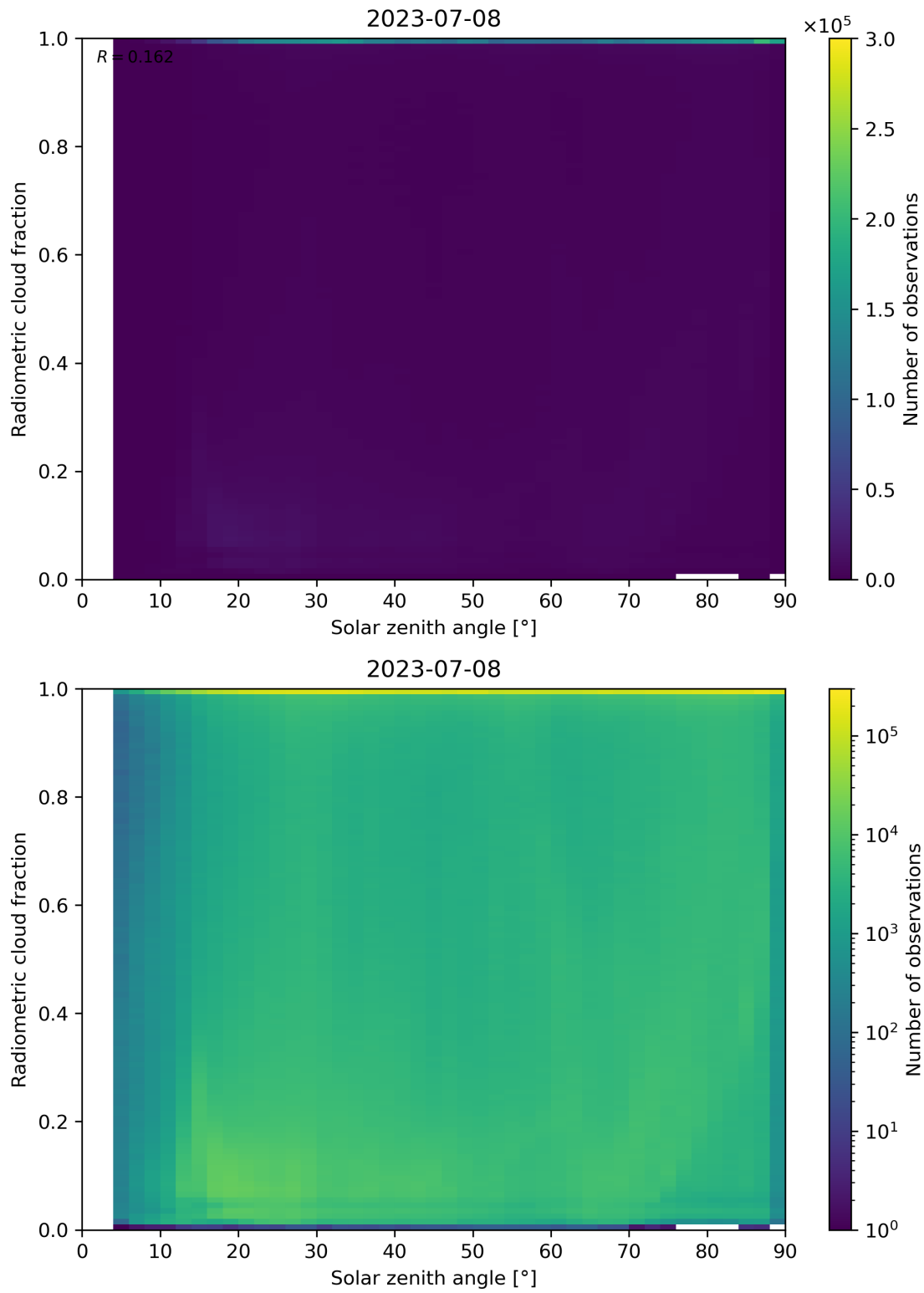


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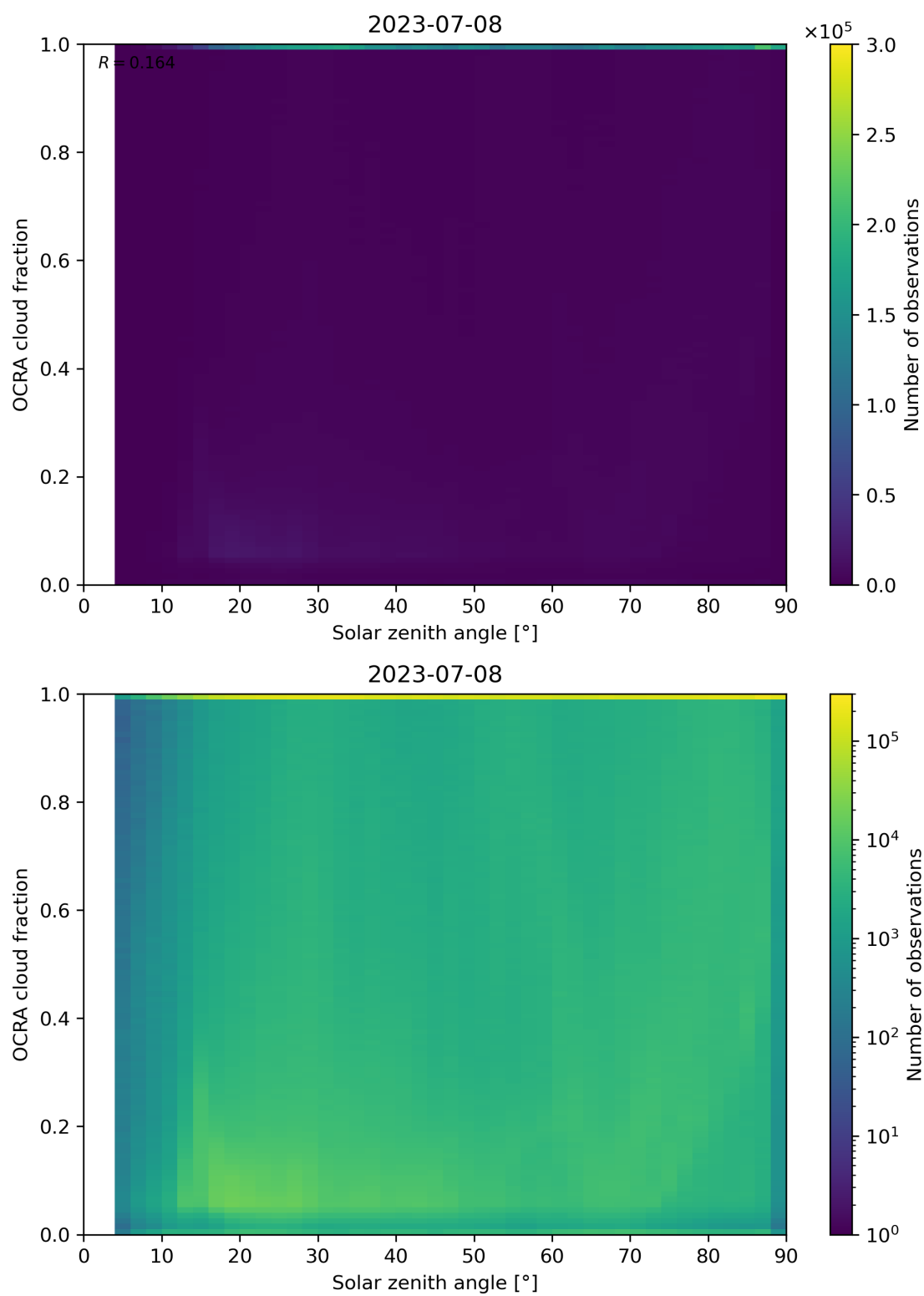


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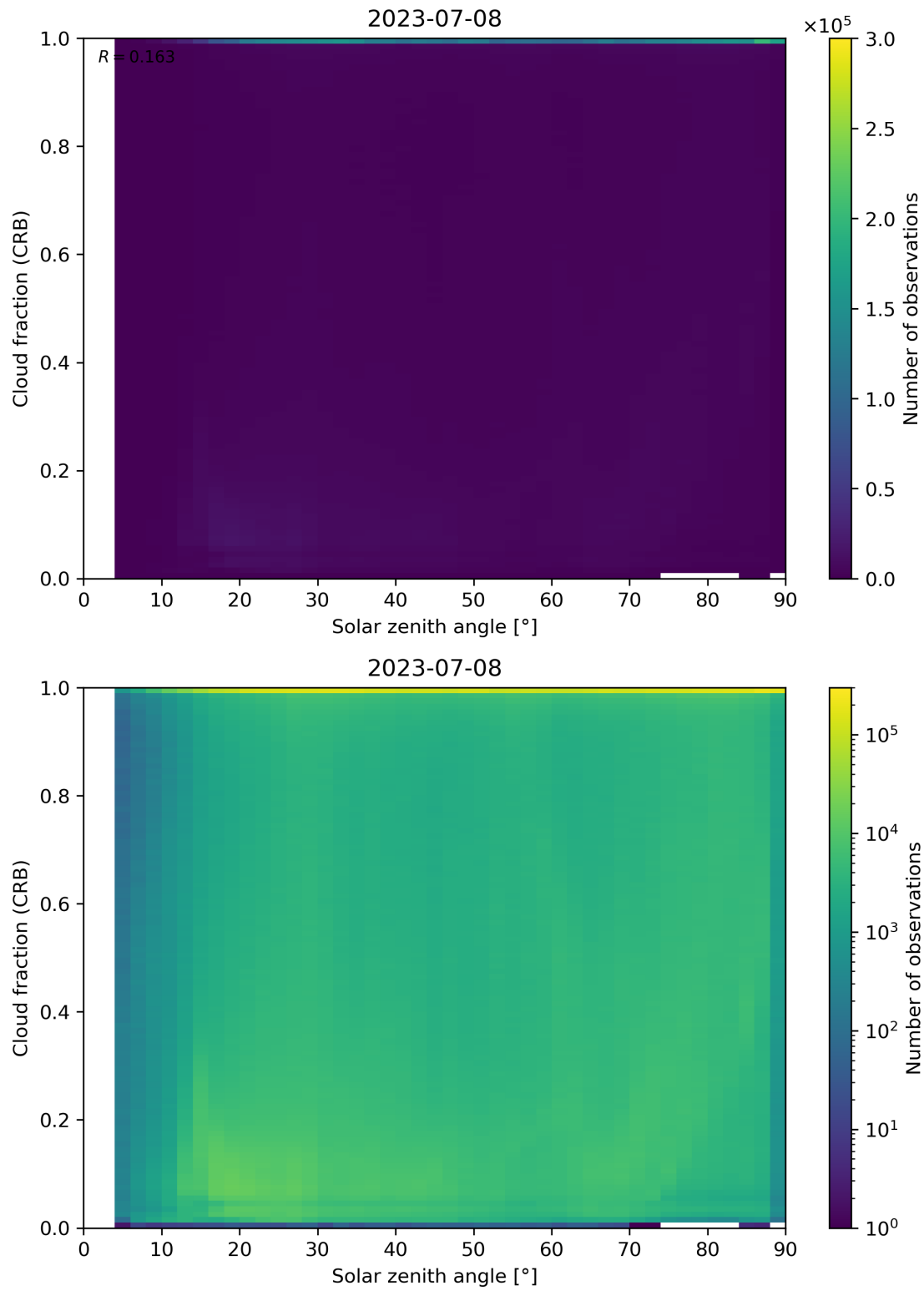


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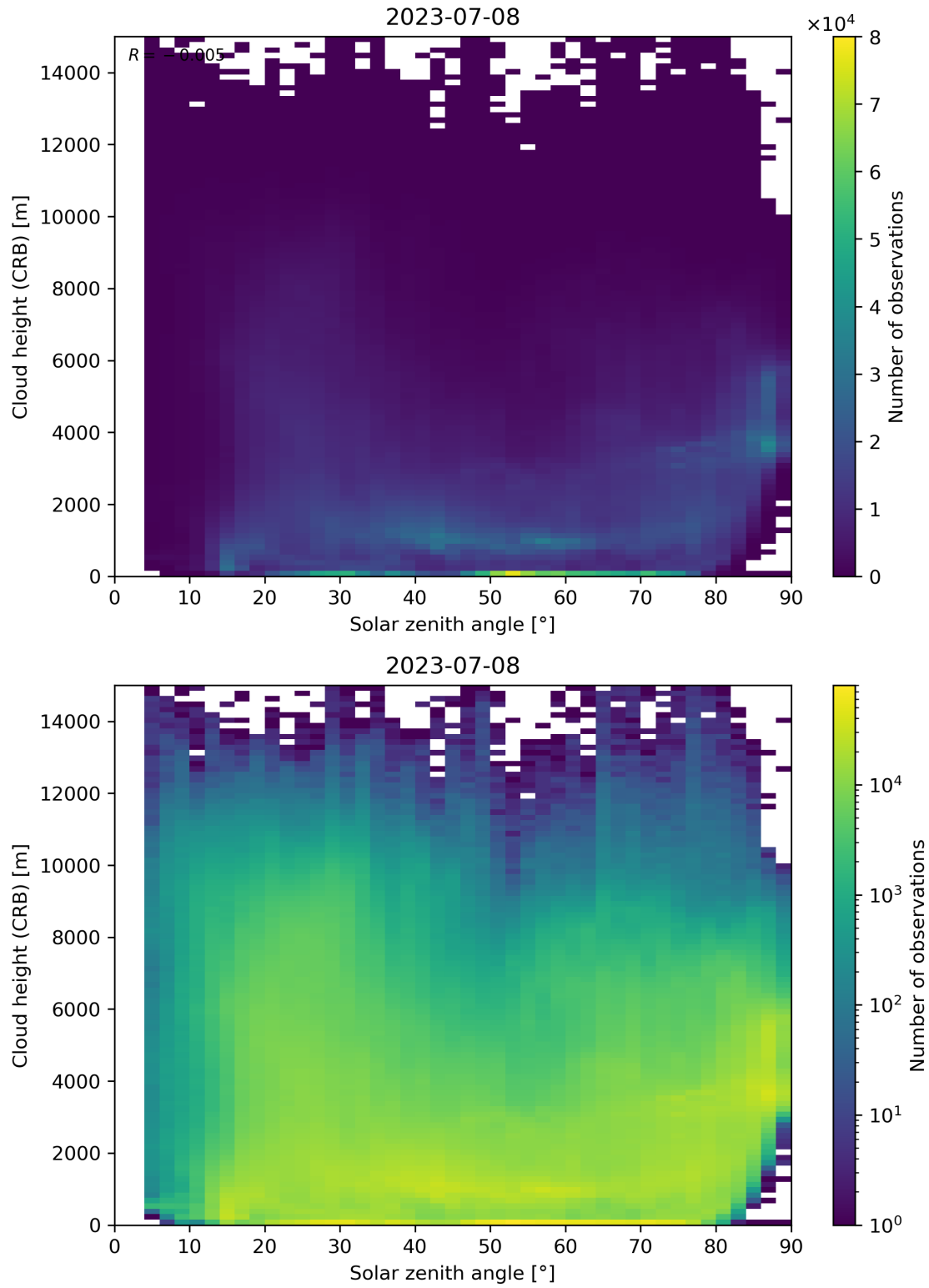


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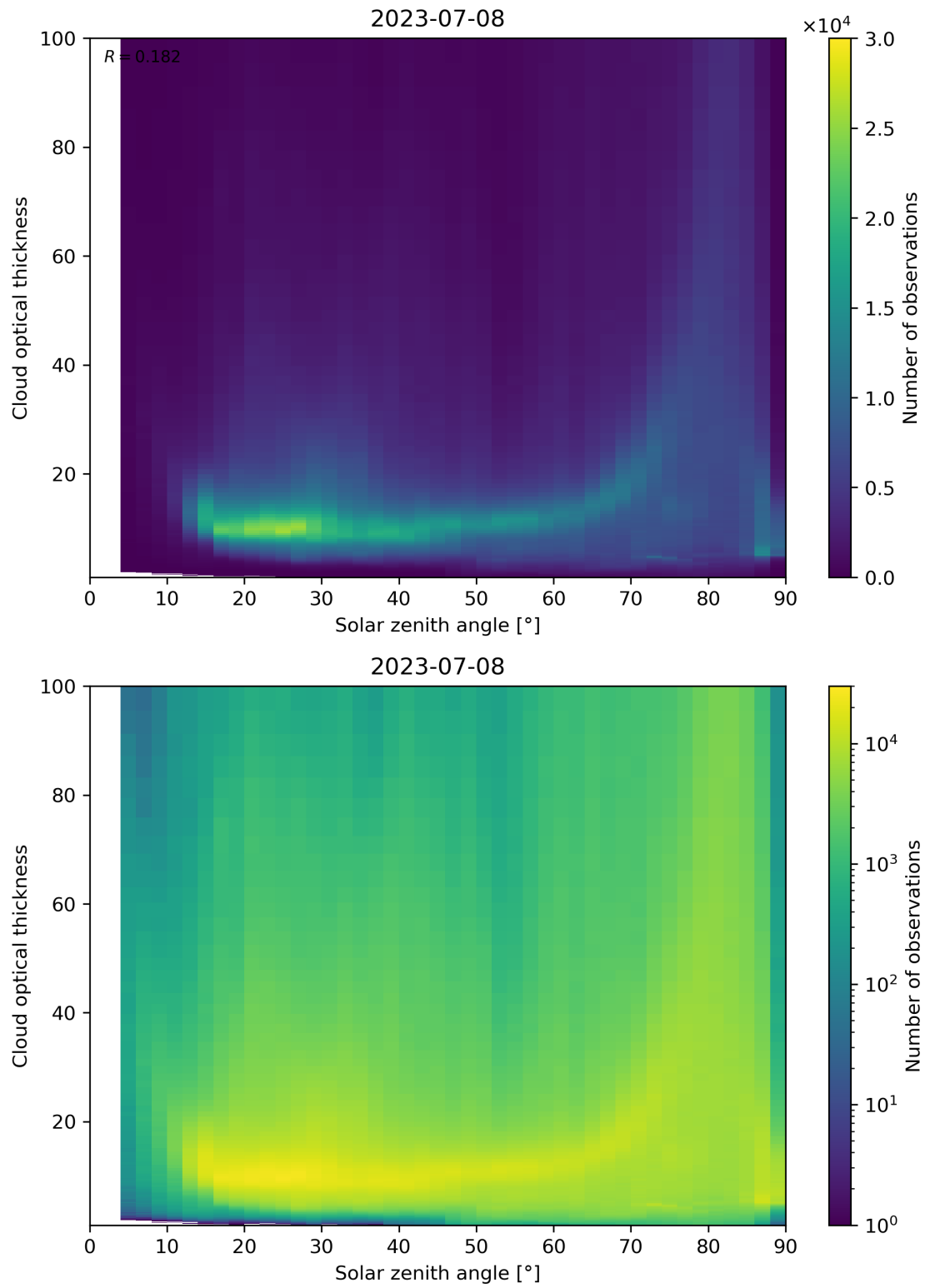


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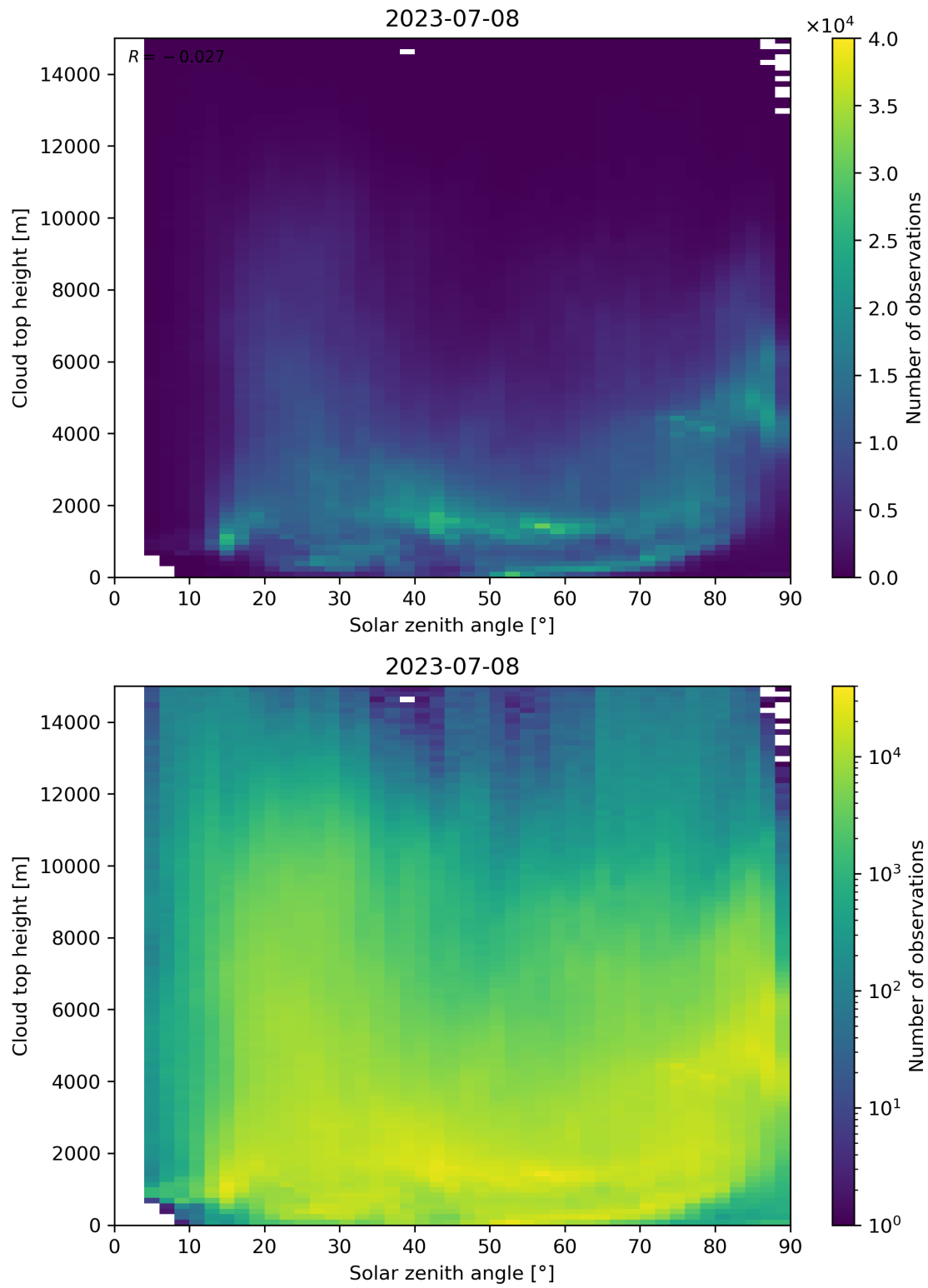


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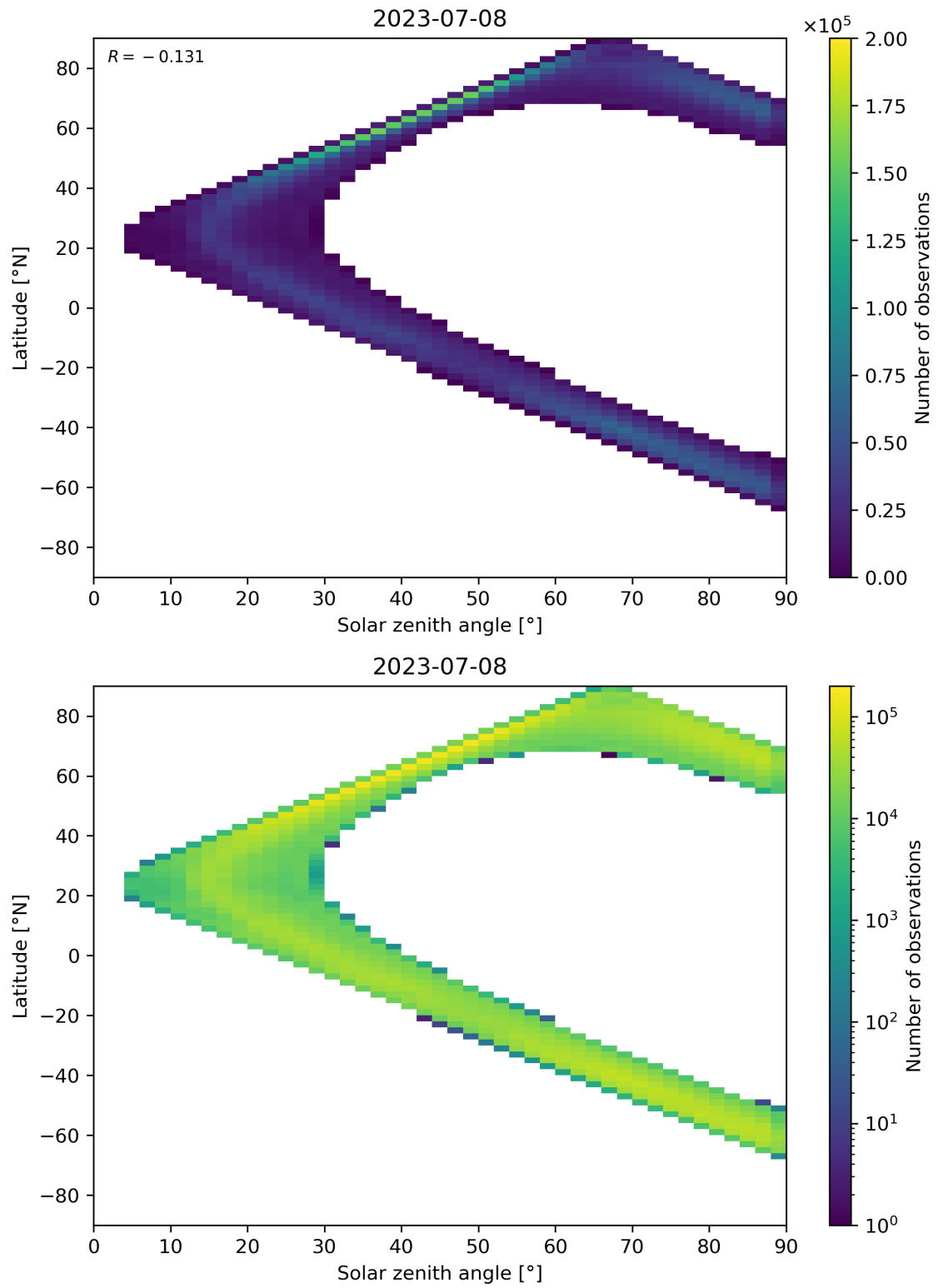


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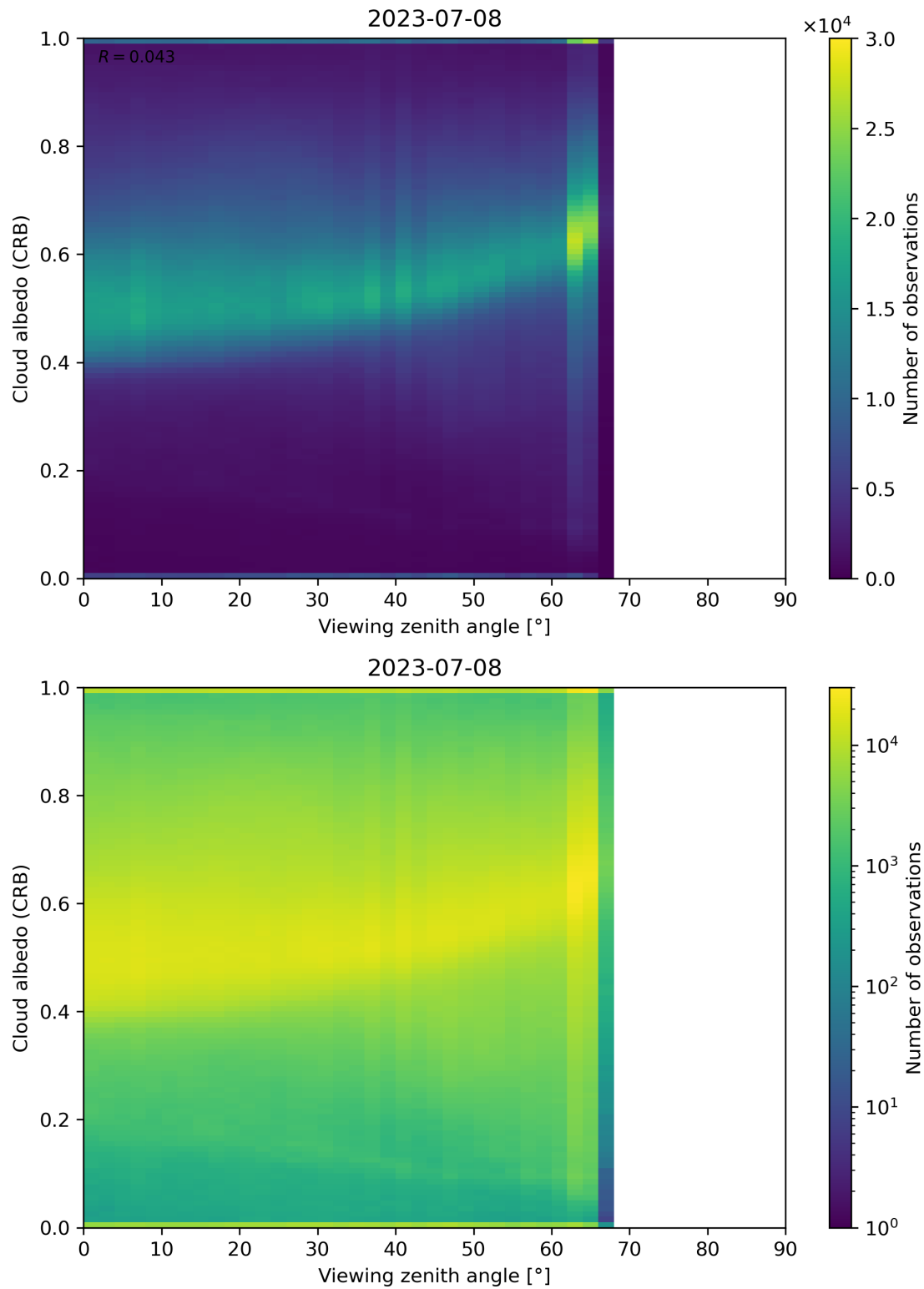


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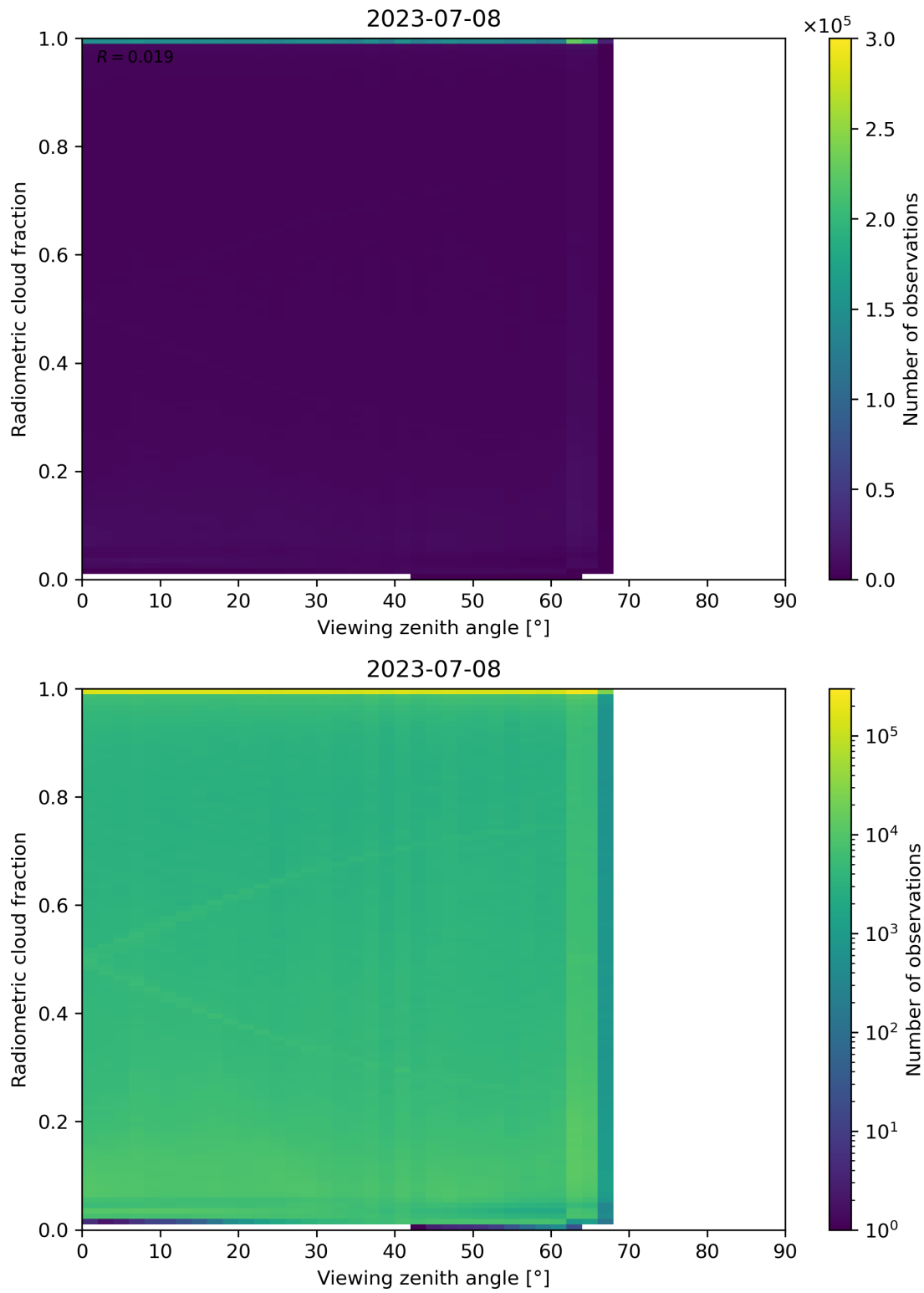


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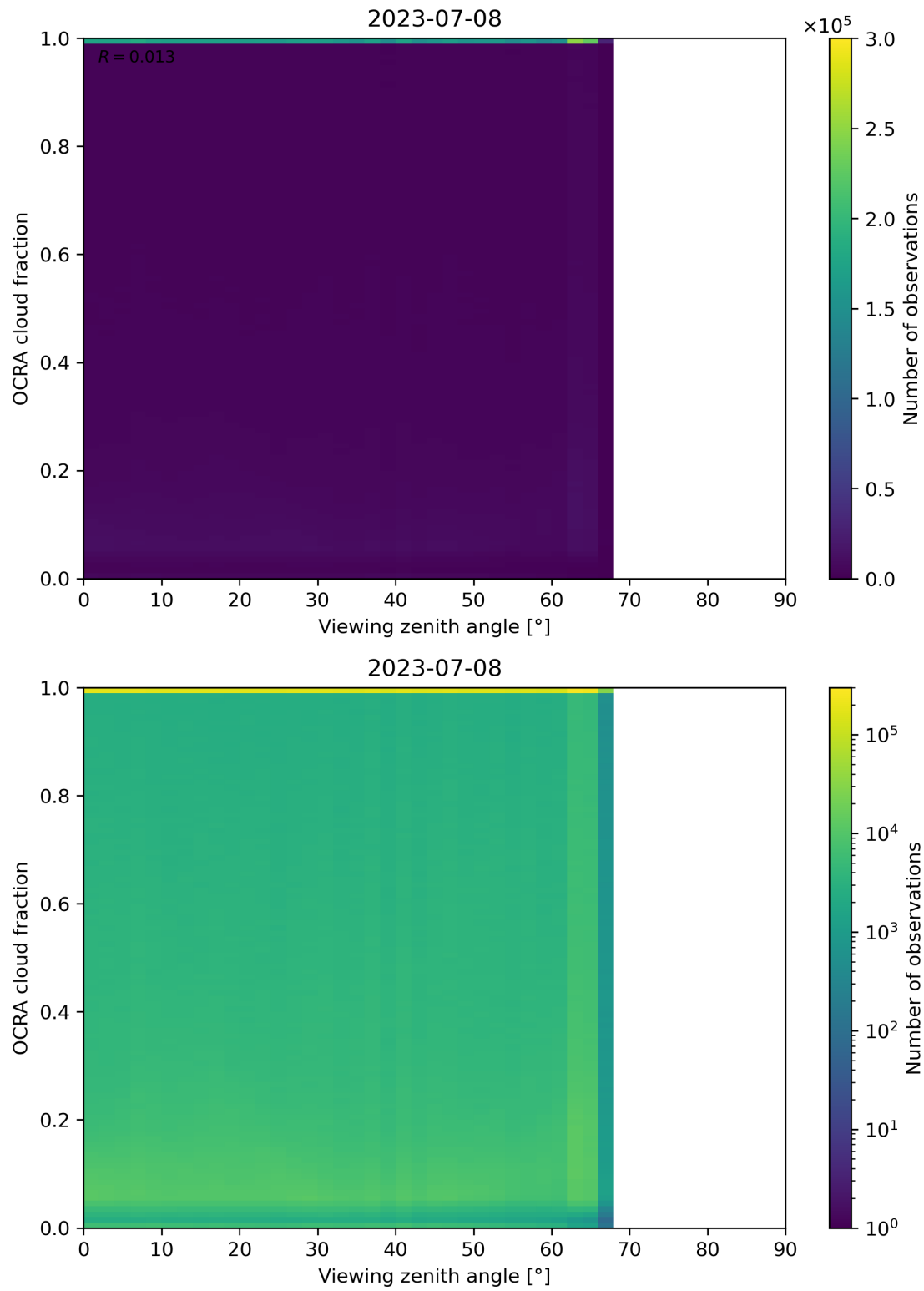


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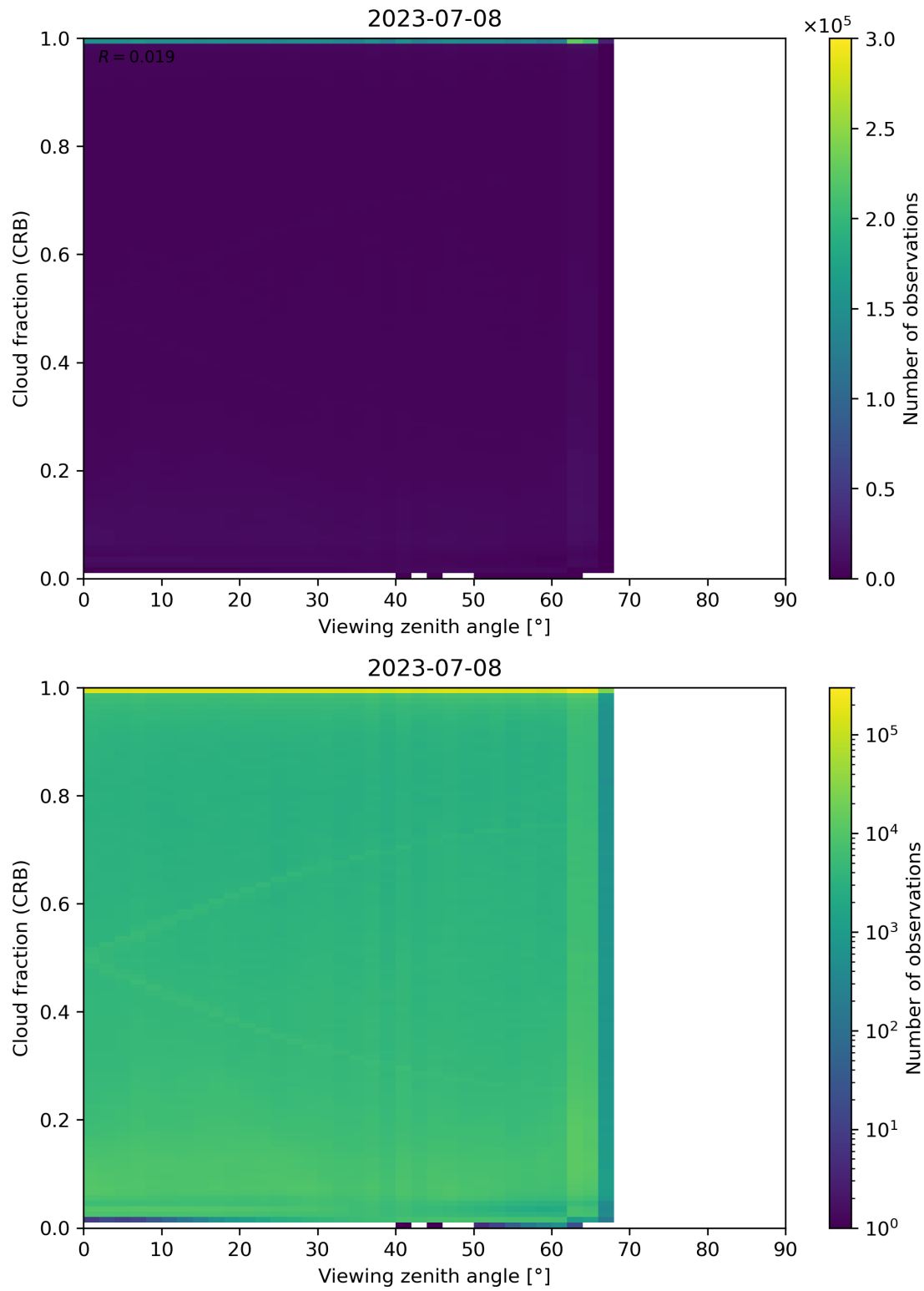


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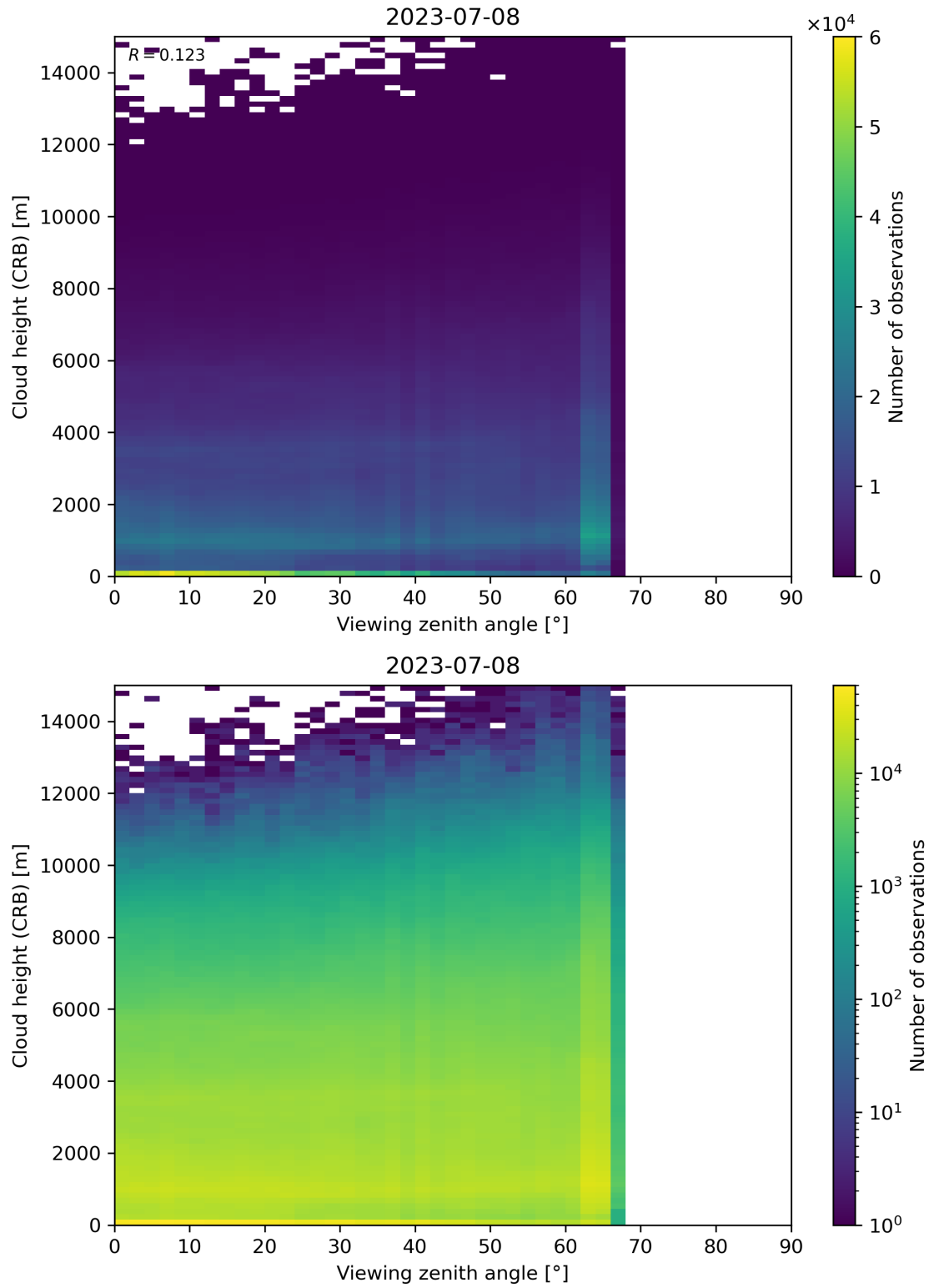


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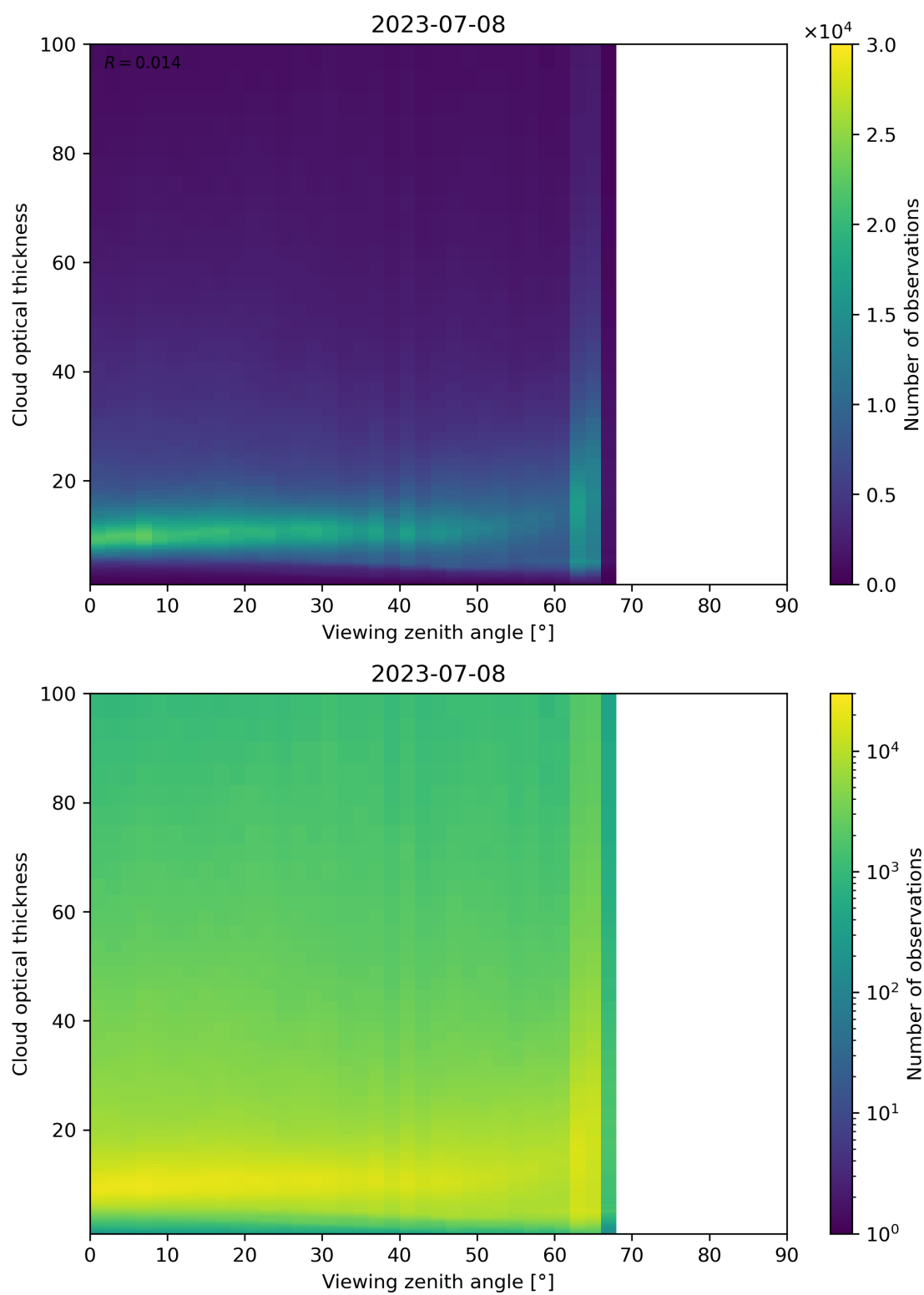


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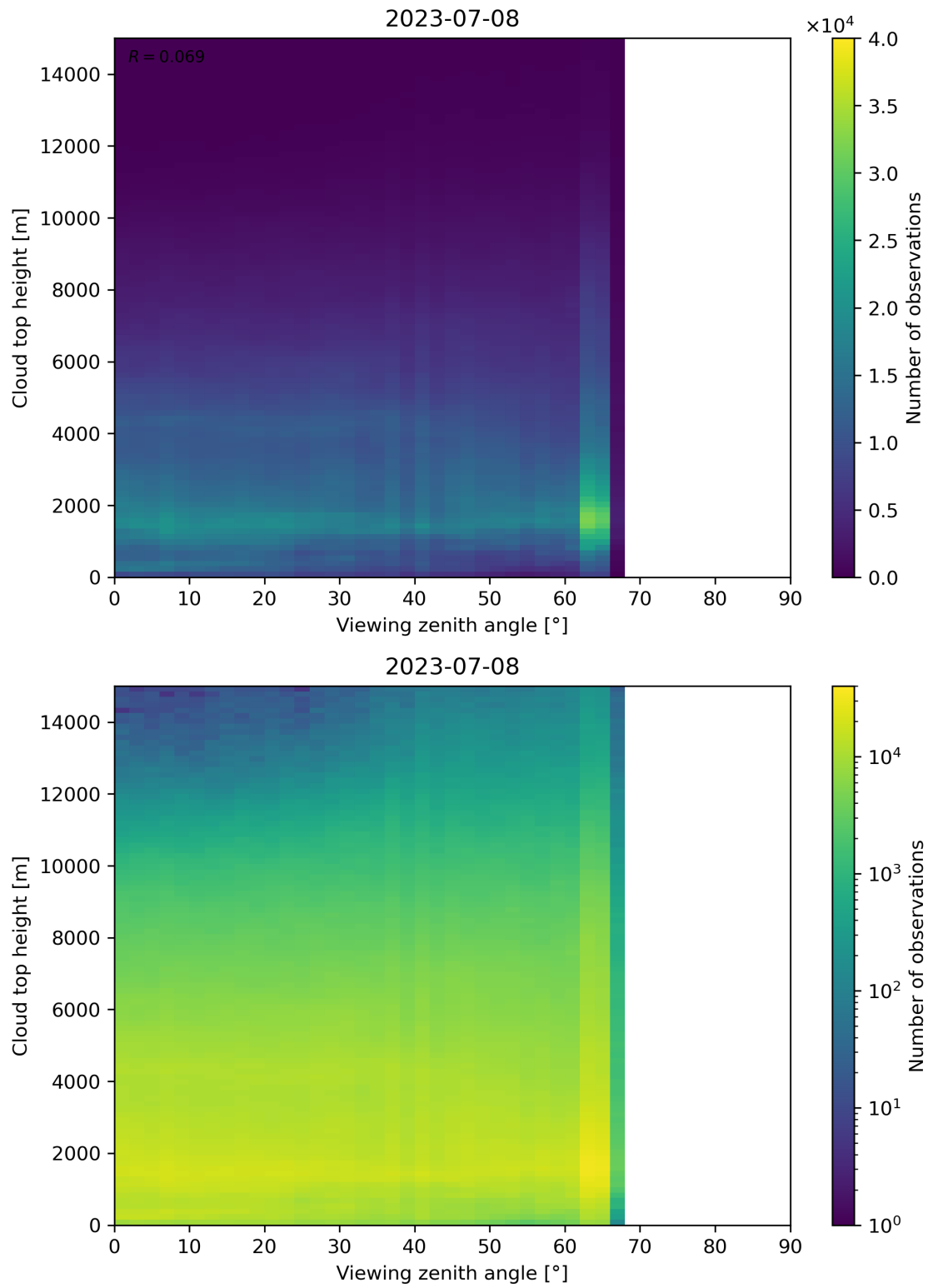


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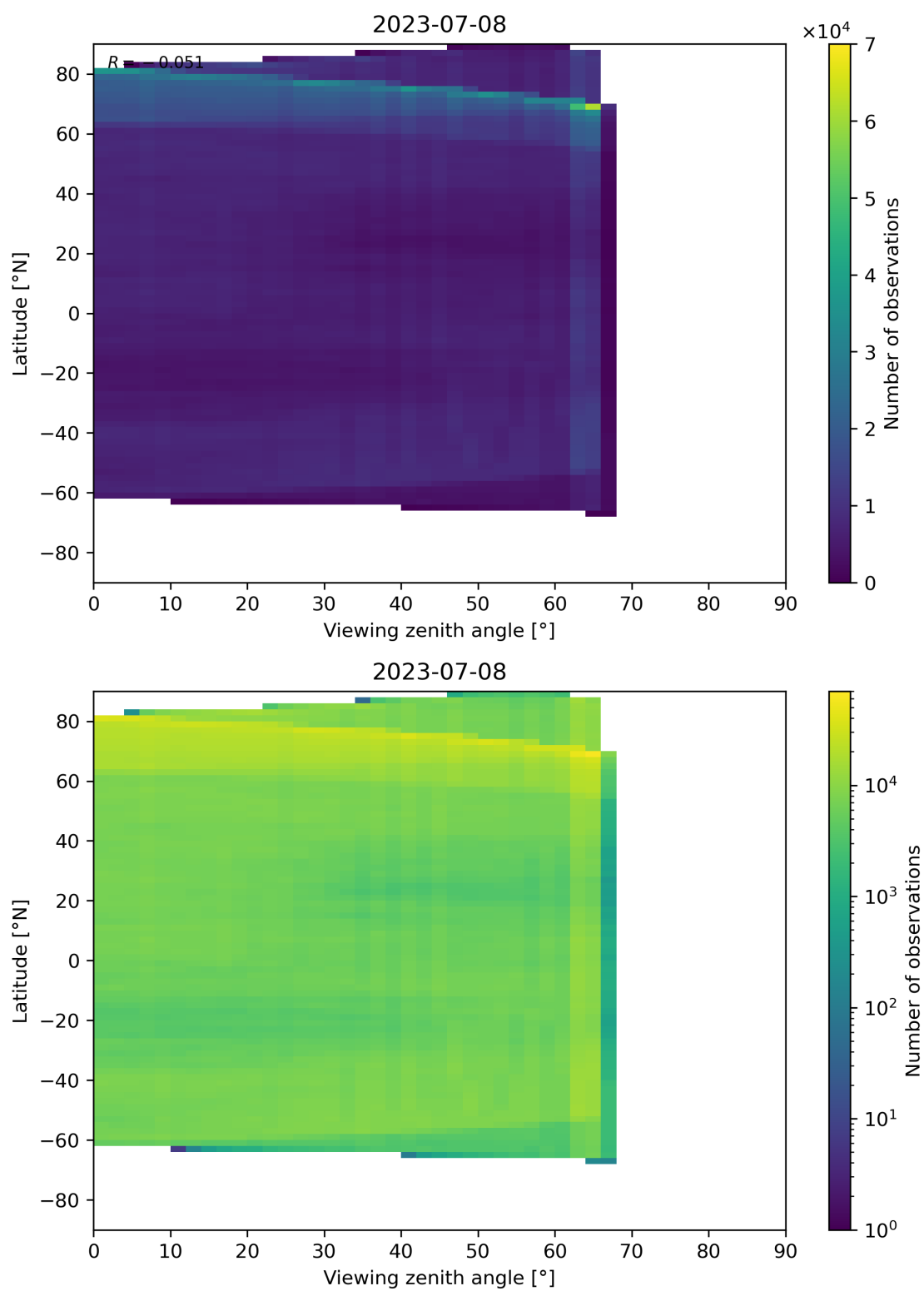


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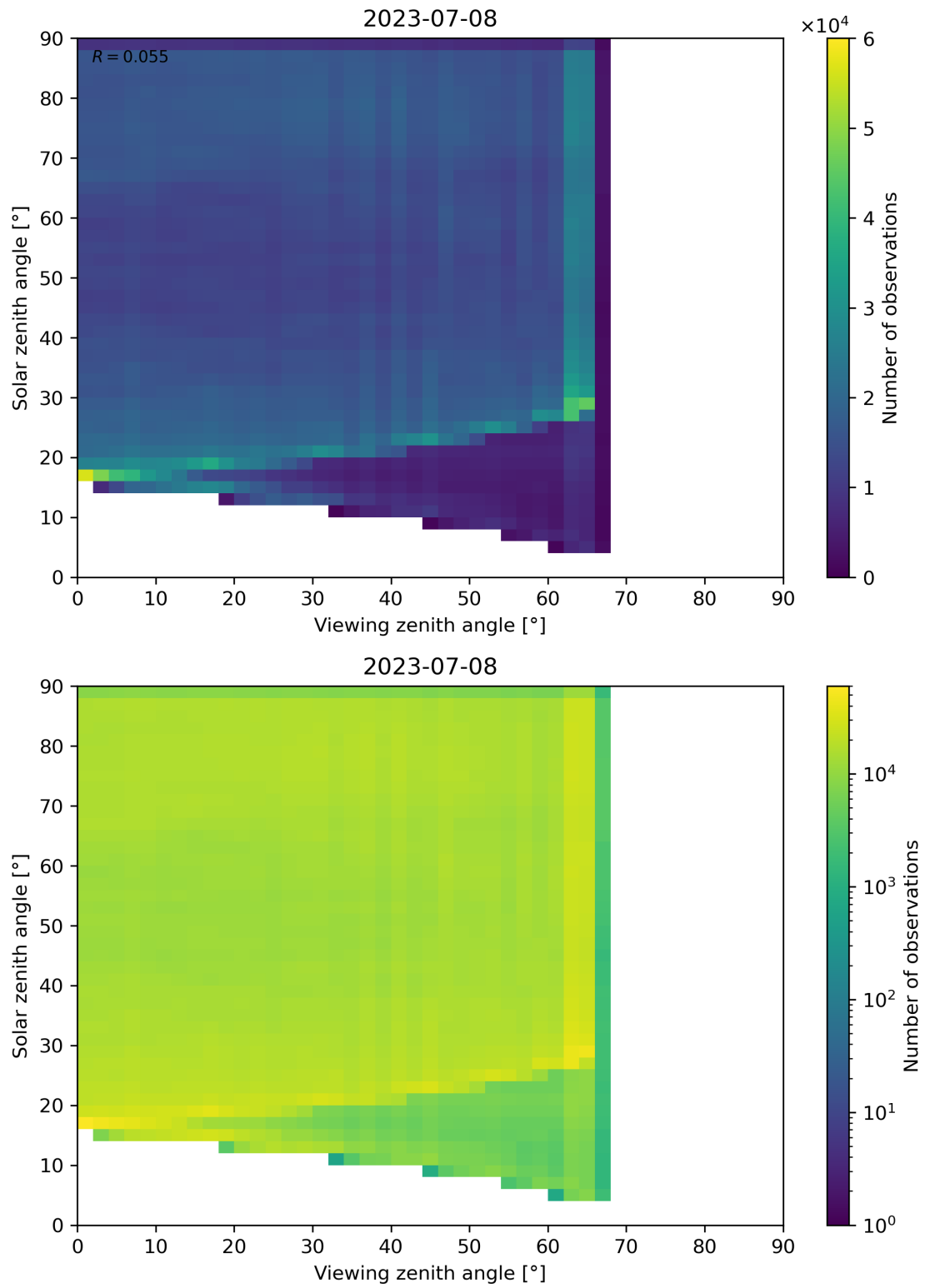


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