

PyCAMA report generated by tropl2-proc

tropl2-proc

2023-07-18 (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]	0.611 ± 0.382	19399542	0.995	0.710	0.810	0.0	1.000
cloud fraction [1]	0.570 ± 0.352	19399542	0.995	0.757	0.565	6.523×10^{-3}	1.000
cloud top height [m]	$(0.376 \pm 0.259) \times 10^4$	19399542	1.725×10^3	3.497×10^3	3.200×10^3	0.0	2.000×10^4
cloud optical thickness [1]	21.0 ± 34.5	19399542	10.2	12.7	10.9	1.000	250
cloud fraction crb [1]	0.569 ± 0.352	19399542	0.995	0.757	0.562	8.228×10^{-3}	1.000
cloud height crb [m]	$(0.298 \pm 0.227) \times 10^4$	19399542	75.0	3.151×10^3	2.502×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.572 ± 0.198	19399542	0.555	0.221	0.574	0.0	1.000
surface albedo fitted [1]	0.163 ± 0.202	19399542	1.500×10^{-2}	0.218	5.529×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.161 ± 0.213	19399542	1.500×10^{-2}	0.223	3.557×10^{-2}	0.0	1.000
fitted root mean square [1]	$(7.994 \pm 14.030) \times 10^{-4}$	19399542	5.000×10^{-5}	9.108×10^{-4}	3.833×10^{-4}	8.436×10^{-7}	0.164
fitted root mean square crb [1]	$(6.814 \pm 8.925) \times 10^{-4}$	19399542	5.000×10^{-5}	8.689×10^{-4}	3.246×10^{-4}	7.477×10^{-7}	0.160
wavelength shift [nm]	$(7.163 \pm 6.766) \times 10^{-3}$	19399542	3.000×10^{-4}	9.424×10^{-3}	6.648×10^{-3}	-5.313×10^{-2}	7.416×10^{-2}
cloud fraction apriori [1]	0.577 ± 0.359	19399542	0.995	0.778	0.579	0.0	1.000
reflectance blue ocra [1]	0.510 ± 0.189	19399542	0.315	0.298	0.485	0.138	1.87
reflectance green ocra [1]	0.456 ± 0.216	19399542	0.195	0.360	0.429	8.224×10^{-2}	2.00
reflectance continuum aband [1]	0.414 ± 0.246	19399542	4.500×10^{-2}	0.372	0.395	1.087×10^{-2}	6.44

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}	0.240	0.950	1.000	1.000	1.000	1.000
cloud fraction [1]	2.428×10^{-2}	6.160×10^{-2}	9.693×10^{-2}	0.141	0.226	0.983	1.000	1.000	1.000	1.000
cloud top height [m]	156	554	926	1.291×10^3	1.744×10^3	5.242×10^3	6.433×10^3	7.479×10^3	8.823×10^3	1.114×10^4
cloud optical thickness [1]	1.000	2.40	3.75	4.94	6.56	19.3	28.7	42.2	73.1	231
cloud fraction crb [1]	2.397×10^{-2}	6.077×10^{-2}	9.639×10^{-2}	0.140	0.225	0.982	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	95.6	442	776	1.181×10^3	4.332×10^3	5.363×10^3	6.286×10^3	7.455×10^3	9.354×10^3
cloud albedo crb [1]	0.0	0.199	0.331	0.411	0.471	0.692	0.761	0.823	0.899	1.000
surface albedo fitted [1]	0.0	7.777×10^{-3}	1.257×10^{-2}	1.679×10^{-2}	2.322×10^{-2}	0.241	0.327	0.474	0.617	0.892
surface albedo fitted crb [1]	2.813×10^{-5}	6.098×10^{-3}	9.060×10^{-3}	1.187×10^{-2}	1.612×10^{-2}	0.239	0.335	0.508	0.657	0.862
fitted root mean square [1]	9.770×10^{-6}	2.555×10^{-5}	4.382×10^{-5}	6.981×10^{-5}	1.197×10^{-4}	1.031×10^{-3}	1.509×10^{-3}	2.024×10^{-3}	2.762×10^{-3}	4.646×10^{-3}
fitted root mean square crb [1]	5.865×10^{-6}	1.536×10^{-5}	2.846×10^{-5}	4.465×10^{-5}	7.986×10^{-5}	9.488×10^{-4}	1.402×10^{-3}	1.880×10^{-3}	2.547×10^{-3}	3.855×10^{-3}
wavelength shift [nm]	-8.222×10^{-3}	-1.414×10^{-3}	-1.244×10^{-4}	5.072×10^{-4}	2.059×10^{-3}	1.148×10^{-2}	1.382×10^{-2}	1.589×10^{-2}	1.871×10^{-2}	2.499×10^{-2}
cloud fraction apriori [1]	1.543×10^{-2}	5.878×10^{-2}	9.137×10^{-2}	0.135	0.222	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.232	0.259	0.282	0.308	0.350	0.648	0.719	0.775	0.840	0.963
reflectance green ocra [1]	0.151	0.175	0.195	0.219	0.262	0.622	0.700	0.761	0.834	0.960
reflectance continuum aband [1]	3.173×10^{-2}	5.786×10^{-2}	9.303×10^{-2}	0.138	0.217	0.589	0.677	0.754	0.842	0.977

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]	0.584 ± 0.385	12758927	0.720	0.780	0.0	1.000	0.180	0.900
cloud fraction [1]	0.594 ± 0.357	12758927	0.761	0.615	6.523×10^{-3}	1.000	0.239	1.000
cloud top height [m]	$(0.364 \pm 0.263) \times 10^4$	12758927	3.510×10^3	3.123×10^3	0.0	2.000×10^4	1.592×10^3	5.102×10^3
cloud optical thickness [1]	18.0 ± 29.5	12758927	11.4	10.2	1.000	250	5.97	17.4
cloud fraction crb [1]	0.594 ± 0.357	12758927	0.762	0.614	8.228×10^{-3}	1.000	0.237	0.999
cloud height crb [m]	$(0.286 \pm 0.231) \times 10^4$	12758927	3.245×10^3	2.412×10^3	0.0	2.000×10^4	994	4.240×10^3
cloud albedo crb [1]	0.559 ± 0.210	12758927	0.238	0.567	0.0	1.000	0.454	0.692
surface albedo fitted [1]	0.217 ± 0.224	12758927	0.284	0.176	0.0	1.000	2.836×10^{-2}	0.312
surface albedo fitted crb [1]	0.220 ± 0.236	12758927	0.298	0.175	0.0	1.000	2.029×10^{-2}	0.318
fitted root mean square [1]	$(1.033 \pm 1.647) \times 10^{-3}$	12758927	1.186×10^{-3}	6.238×10^{-4}	1.268×10^{-6}	0.164	1.854×10^{-4}	1.372×10^{-3}
fitted root mean square crb [1]	$(8.779 \pm 9.913) \times 10^{-4}$	12758927	1.113×10^{-3}	5.424×10^{-4}	7.477×10^{-7}	0.160	1.523×10^{-4}	1.265×10^{-3}
wavelength shift [nm]	$(8.129 \pm 6.699) \times 10^{-3}$	12758927	8.939×10^{-3}	7.929×10^{-3}	-5.313×10^{-2}	7.416×10^{-2}	3.451×10^{-3}	1.239×10^{-2}
cloud fraction apriori [1]	0.604 ± 0.362	12758927	0.761	0.640	0.0	1.000	0.239	1.000
reflectance blue oca [1]	0.518 ± 0.196	12758927	0.328	0.500	0.138	1.79	0.343	0.671
reflectance green oca [1]	0.471 ± 0.224	12758927	0.390	0.454	8.224×10^{-2}	2.00	0.262	0.652
reflectance continuum aband [1]	0.445 ± 0.244	12758927	0.363	0.433	1.087×10^{-2}	6.44	0.256	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]	0.663 ± 0.370	6640615	0.600	0.900	0.0	1.000	0.400	1.000
cloud fraction [1]	0.525 ± 0.338	6640615	0.665	0.488	7.737×10^{-3}	1.000	0.208	0.873
cloud top height [m]	$(0.398 \pm 0.248) \times 10^4$	6640615	3.578×10^3	3.349×10^3	0.0	2.000×10^4	1.951×10^3	5.528×10^3
cloud optical thickness [1]	26.7 ± 41.8	6640615	16.5	12.3	1.000	250	7.66	24.2
cloud fraction crb [1]	0.523 ± 0.338	6640615	0.664	0.484	8.504×10^{-3}	1.000	0.206	0.870
cloud height crb [m]	$(0.322 \pm 0.219) \times 10^4$	6640615	3.120×10^3	2.672×10^3	0.0	1.820×10^4	1.424×10^3	4.544×10^3
cloud albedo crb [1]	0.597 ± 0.170	6640615	0.194	0.585	0.0	1.000	0.498	0.693
surface albedo fitted [1]	$(5.892 \pm 8.016) \times 10^{-2}$	6640615	3.961×10^{-2}	3.227×10^{-2}	0.0	1.000	1.902×10^{-2}	5.863×10^{-2}
surface albedo fitted crb [1]	$(4.675 \pm 7.991) \times 10^{-2}$	6640615	2.110×10^{-2}	2.084×10^{-2}	0.0	1.000	1.310×10^{-2}	3.420×10^{-2}
fitted root mean square [1]	$(3.510 \pm 4.821) \times 10^{-4}$	6640615	3.442×10^{-4}	1.798×10^{-4}	8.436×10^{-7}	2.289×10^{-2}	7.329×10^{-5}	4.175×10^{-4}
fitted root mean square crb [1]	$(3.040 \pm 4.718) \times 10^{-4}$	6640615	3.127×10^{-4}	1.106×10^{-4}	1.150×10^{-6}	2.083×10^{-2}	4.165×10^{-5}	3.543×10^{-4}
wavelength shift [nm]	$(5.308 \pm 6.504) \times 10^{-3}$	6640615	8.251×10^{-3}	3.982×10^{-3}	-4.133×10^{-2}	6.182×10^{-2}	7.417×10^{-4}	8.992×10^{-3}
cloud fraction apriori [1]	0.524 ± 0.347	6640615	0.697	0.484	0.0	1.000	0.195	0.892
reflectance blue ocr [1]	0.496 ± 0.173	6640615	0.242	0.467	0.162	1.87	0.361	0.602
reflectance green ocr [1]	0.428 ± 0.197	6640615	0.295	0.395	8.975×10^{-2}	1.91	0.263	0.558
reflectance continuum aband [1]	0.356 ± 0.240	6640615	0.363	0.323	1.185×10^{-2}	4.84	0.154	0.517

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]	0.600 ± 0.379	13539730	0.670	0.790	0.0	1.000	0.250	0.920
cloud fraction [1]	0.556 ± 0.353	13539730	0.755	0.541	6.523×10^{-3}	1.000	0.211	0.966
cloud top height [m]	$(0.370 \pm 0.263) \times 10^4$	13539730	3.558×10^3	3.059×10^3	0.0	2.000×10^4	1.643×10^3	5.200×10^3
cloud optical thickness [1]	22.3 ± 36.2	13539730	13.3	11.5	1.000	250	7.15	20.4
cloud fraction crb [1]	0.555 ± 0.353	13539730	0.756	0.538	8.556×10^{-3}	1.000	0.209	0.965
cloud height crb [m]	$(0.293 \pm 0.234) \times 10^4$	13539730	3.206×10^3	2.401×10^3	0.0	2.000×10^4	1.073×10^3	4.279×10^3
cloud albedo crb [1]	0.570 ± 0.193	13539730	0.212	0.571	0.0	1.000	0.472	0.685
surface albedo fitted [1]	0.110 ± 0.187	13539730	4.643×10^{-2}	3.210×10^{-2}	0.0	1.000	1.799×10^{-2}	6.442×10^{-2}
surface albedo fitted crb [1]	0.107 ± 0.202	13539730	2.859×10^{-2}	2.157×10^{-2}	0.0	1.000	1.266×10^{-2}	4.125×10^{-2}
fitted root mean square [1]	$(6.709 \pm 14.262) \times 10^{-4}$	13539730	7.068×10^{-4}	2.645×10^{-4}	8.436×10^{-7}	0.164	9.488×10^{-5}	8.017×10^{-4}
fitted root mean square crb [1]	$(5.411 \pm 7.926) \times 10^{-4}$	13539730	6.302×10^{-4}	2.073×10^{-4}	7.477×10^{-7}	0.160	6.339×10^{-5}	6.936×10^{-4}
wavelength shift [nm]	$(6.866 \pm 6.897) \times 10^{-3}$	13539730	9.502×10^{-3}	6.144×10^{-3}	-5.313×10^{-2}	7.416×10^{-2}	1.724×10^{-3}	1.123×10^{-2}
cloud fraction apriori [1]	0.562 ± 0.359	13539730	0.794	0.554	0.0	1.000	0.206	1.000
reflectance blue oca [1]	0.513 ± 0.181	13539730	0.287	0.494	0.171	1.86	0.359	0.646
reflectance green oca [1]	0.455 ± 0.208	13539730	0.352	0.436	9.283×10^{-2}	2.00	0.267	0.619
reflectance continuum aband [1]	0.382 ± 0.247	13539730	0.409	0.369	1.185×10^{-2}	5.57	0.158	0.567

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]	0.650 ± 0.385	3590247	0.710	0.850	0.0	1.000	0.250	0.960
cloud fraction [1]	0.579 ± 0.349	3590247	0.745	0.572	7.345×10^{-3}	1.000	0.245	0.990
cloud top height [m]	$(0.401 \pm 0.252) \times 10^4$	3590247	3.282×10^3	3.521×10^3	0.0	2.000×10^4	2.150×10^3	5.432×10^3
cloud optical thickness [1]	16.7 ± 26.7	3590247	9.88	9.27	1.000	250	5.85	15.7
cloud fraction crb [1]	0.579 ± 0.349	3590247	0.746	0.572	8.436×10^{-3}	1.000	0.244	0.990
cloud height crb [m]	$(0.319 \pm 0.216) \times 10^4$	3590247	2.992×10^3	2.689×10^3	0.0	2.000×10^4	1.539×10^3	4.531×10^3
cloud albedo crb [1]	0.599 ± 0.202	3590247	0.239	0.595	0.0	1.000	0.494	0.733
surface albedo fitted [1]	0.321 ± 0.201	3590247	0.112	0.256	0.0	1.000	0.212	0.324
surface albedo fitted crb [1]	0.318 ± 0.199	3590247	0.114	0.252	2.763×10^{-3}	1.000	0.208	0.321
fitted root mean square [1]	$(1.180 \pm 1.159) \times 10^{-3}$	3590247	1.188×10^{-3}	8.610×10^{-4}	2.445×10^{-6}	0.145	4.254×10^{-4}	1.613×10^{-3}
fitted root mean square crb [1]	$(1.133 \pm 1.038) \times 10^{-3}$	3590247	1.183×10^{-3}	8.517×10^{-4}	1.076×10^{-6}	0.105	4.021×10^{-4}	1.585×10^{-3}
wavelength shift [nm]	$(8.013 \pm 6.172) \times 10^{-3}$	3590247	8.219×10^{-3}	7.904×10^{-3}	-4.611×10^{-2}	6.733×10^{-2}	3.713×10^{-3}	1.193×10^{-2}
cloud fraction apriori [1]	0.590 ± 0.355	3590247	0.757	0.592	0.0	1.000	0.243	1.000
reflectance blue ocra [1]	0.506 ± 0.218	3590247	0.350	0.452	0.138	1.87	0.321	0.671
reflectance green ocra [1]	0.462 ± 0.246	3590247	0.407	0.399	8.224×10^{-2}	1.96	0.246	0.653
reflectance continuum aband [1]	0.504 ± 0.226	3590247	0.354	0.448	1.482×10^{-2}	6.44	0.321	0.676

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	5.122×10^{-2}	-4.634×10^{-2}	-2.351×10^{-5}	4.132×10^{-2}	-1.593×10^{-2}	1.053×10^{-4}	0.101	1.352×10^{-2}	-6.741×10^{-3}
5.122×10^{-2}	1.000	-0.149	0.162	1.758×10^{-2}	0.206	0.162	4.875×10^{-2}	-7.309×10^{-2}	0.167
-4.634×10^{-2}	-0.149	1.000	0.120	-0.178	-0.141	0.124	-0.186	-0.186	0.142
-2.351×10^{-5}	0.162	0.120	1.000	1.921×10^{-2}	0.332	1.000	4.628×10^{-2}	0.273	0.984
4.132×10^{-2}	1.758×10^{-2}	-0.178	1.921×10^{-2}	1.000	0.162	1.859×10^{-2}	0.949	9.425×10^{-2}	7.692×10^{-5}
-1.593×10^{-2}	0.206	-0.141	0.332	0.162	1.000	0.329	0.208	0.494	0.323
1.053×10^{-4}	0.162	0.124	1.000	1.859×10^{-2}	0.329	1.000	4.607×10^{-2}	0.268	0.984
0.101	4.875×10^{-2}	-0.186	4.628×10^{-2}	0.949	0.208	4.607×10^{-2}	1.000	5.379×10^{-2}	2.759×10^{-2}
1.352×10^{-2}	-7.309×10^{-2}	-0.186	0.273	9.425×10^{-2}	0.494	0.268	5.379×10^{-2}	1.000	0.270
-6.741×10^{-3}	0.167	0.142	0.984	7.692×10^{-5}	0.323	0.984	2.759×10^{-2}	0.270	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	22.8	-41.9	-1.632×10^{-4}	2.105×10^3	-10.8	7.317×10^{-4}	4.506×10^3	5.283×10^{-2}	-4.766×10^{-2}
22.8	511	-155	1.29	1.027×10^3	160	1.29	2.507×10^3	-0.328	1.35
-41.9	-155	2.109×10^3	1.95	-2.116×10^4	-224	2.00	-1.938×10^4	-1.69	2.34
-1.632×10^{-4}	1.29	1.95	0.124	17.5	4.03	0.124	37.1	1.903×10^{-2}	0.124
2.105×10^3	1.027×10^3	-2.116×10^4	17.5	6.683×10^6	1.448×10^4	16.9	5.579×10^6	48.3	7.133×10^{-2}
-10.8	160	-224	4.03	1.448×10^4	1.188×10^3	4.00	1.631×10^4	3.37	4.00
7.317×10^{-4}	1.29	2.00	0.124	16.9	4.00	0.124	36.9	1.875×10^{-2}	0.124
4.506×10^3	2.507×10^3	-1.938×10^4	37.1	5.579×10^6	1.631×10^4	36.9	5.172×10^6	24.3	22.5
5.283×10^{-2}	-0.328	-1.69	1.903×10^{-2}	48.3	3.37	1.875×10^{-2}	24.3	3.931×10^{-2}	1.918×10^{-2}
-4.766×10^{-2}	1.35	2.34	0.124	7.133×10^{-2}	4.00	0.124	22.5	1.918×10^{-2}	0.129

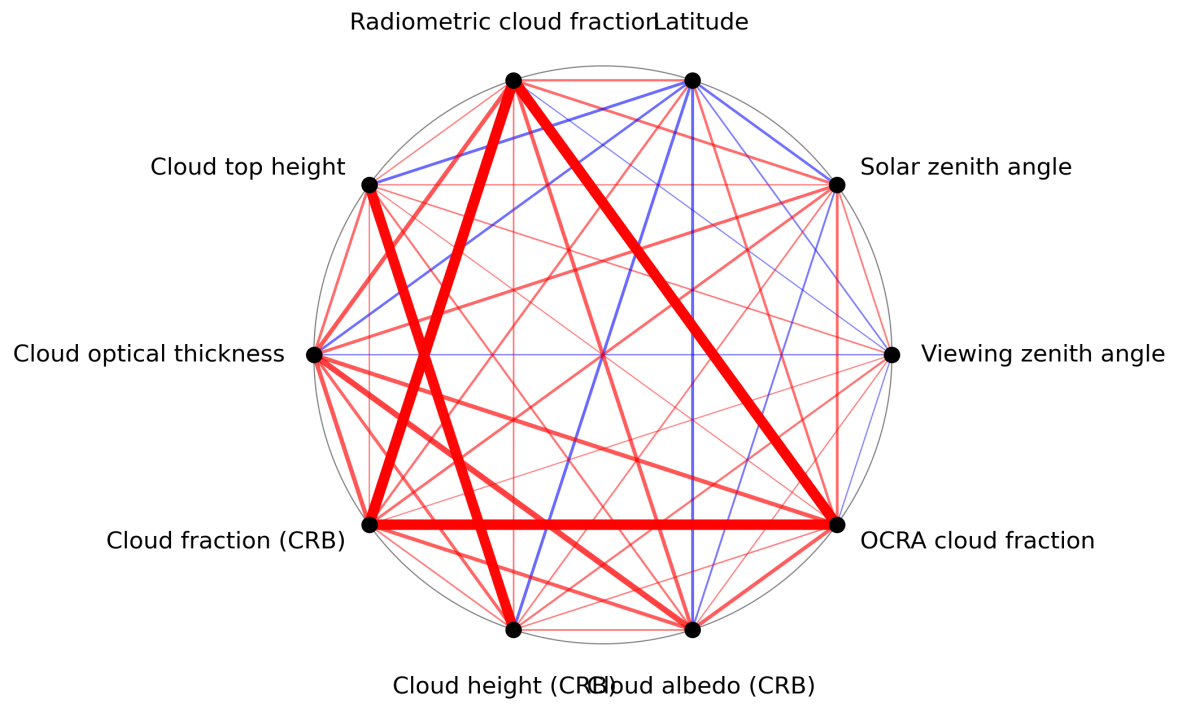


Figure 1: Map of correlation graph for 2023-07-03 to 2023-07-04.

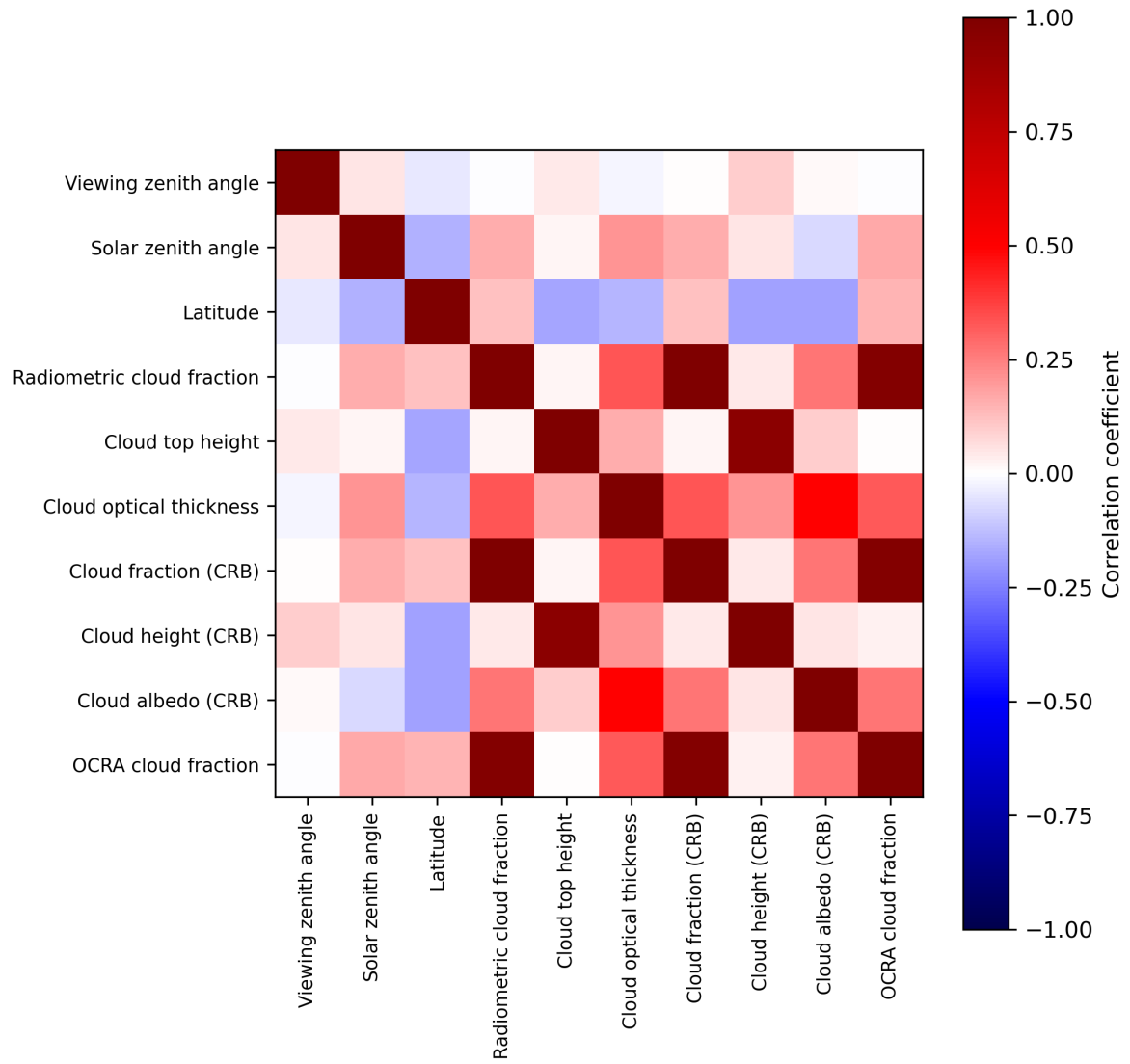


Figure 2: Map of correlation matrix for 2023-07-03 to 2023-07-04.

3 Granule outlines

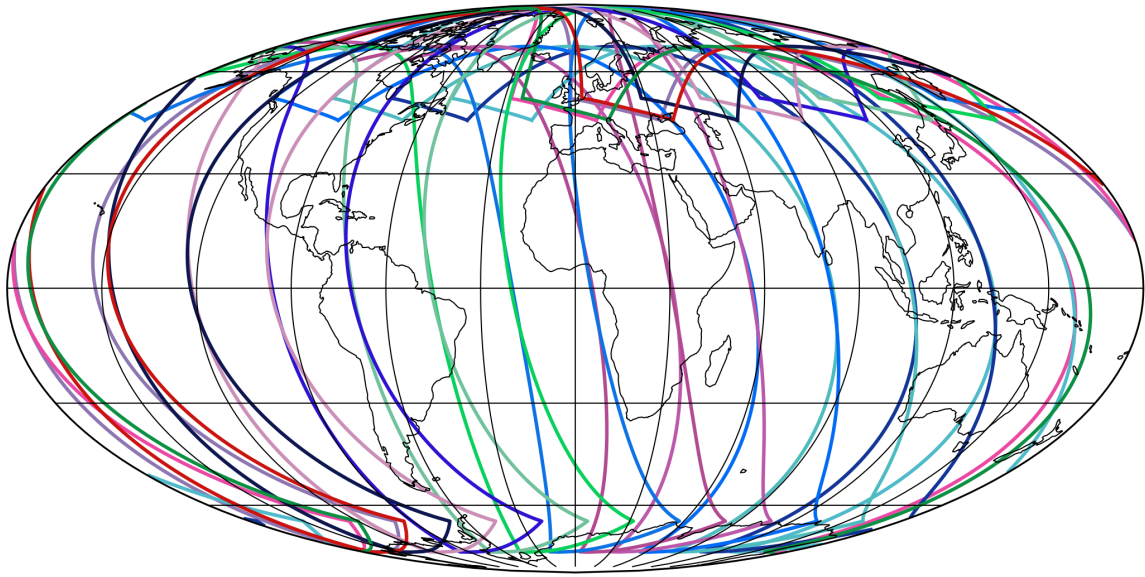


Figure 3: Outline of the granules.

4 Input data monitoring

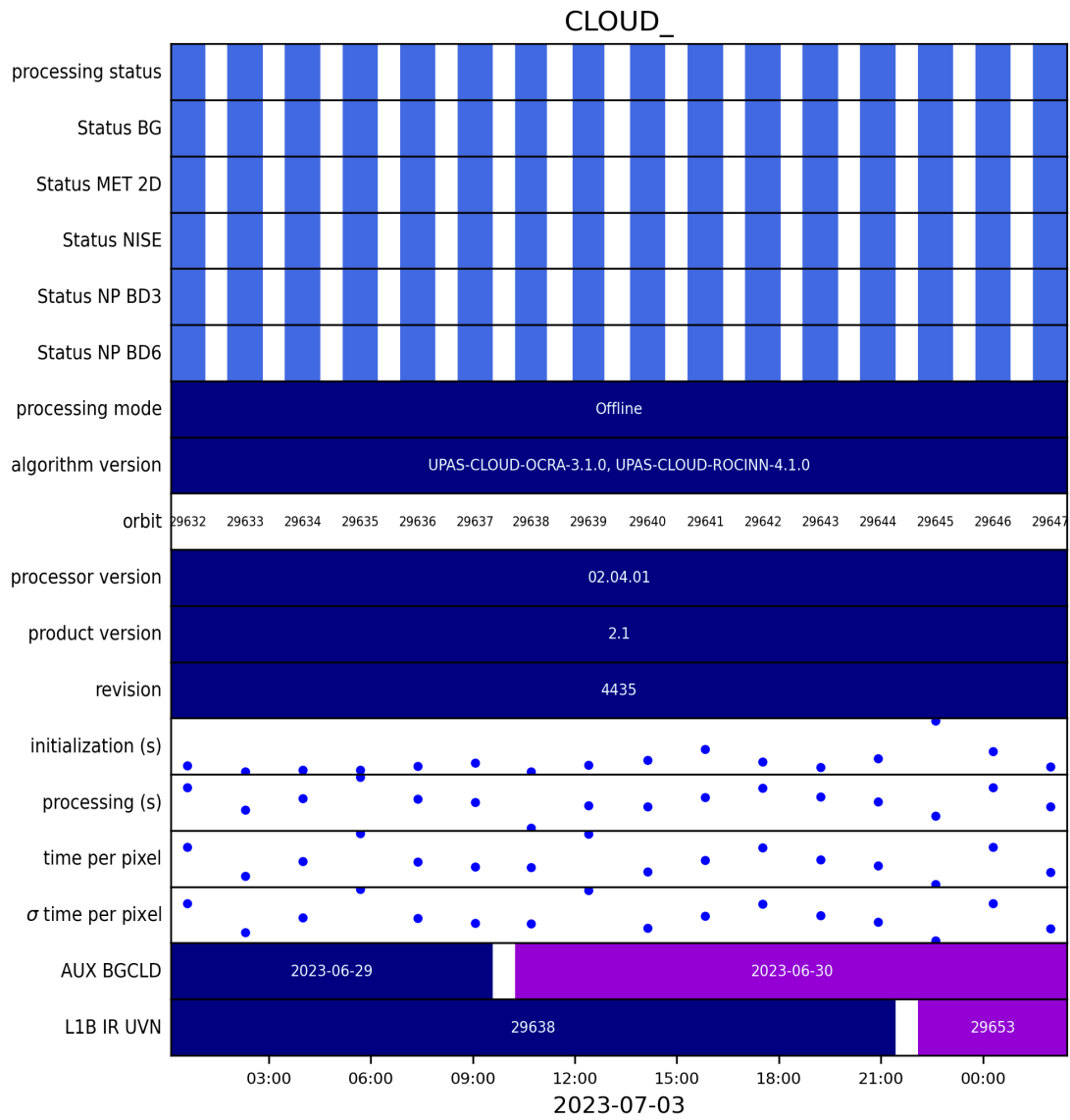


Figure 4: Input data per granule

5 Warnings and errors

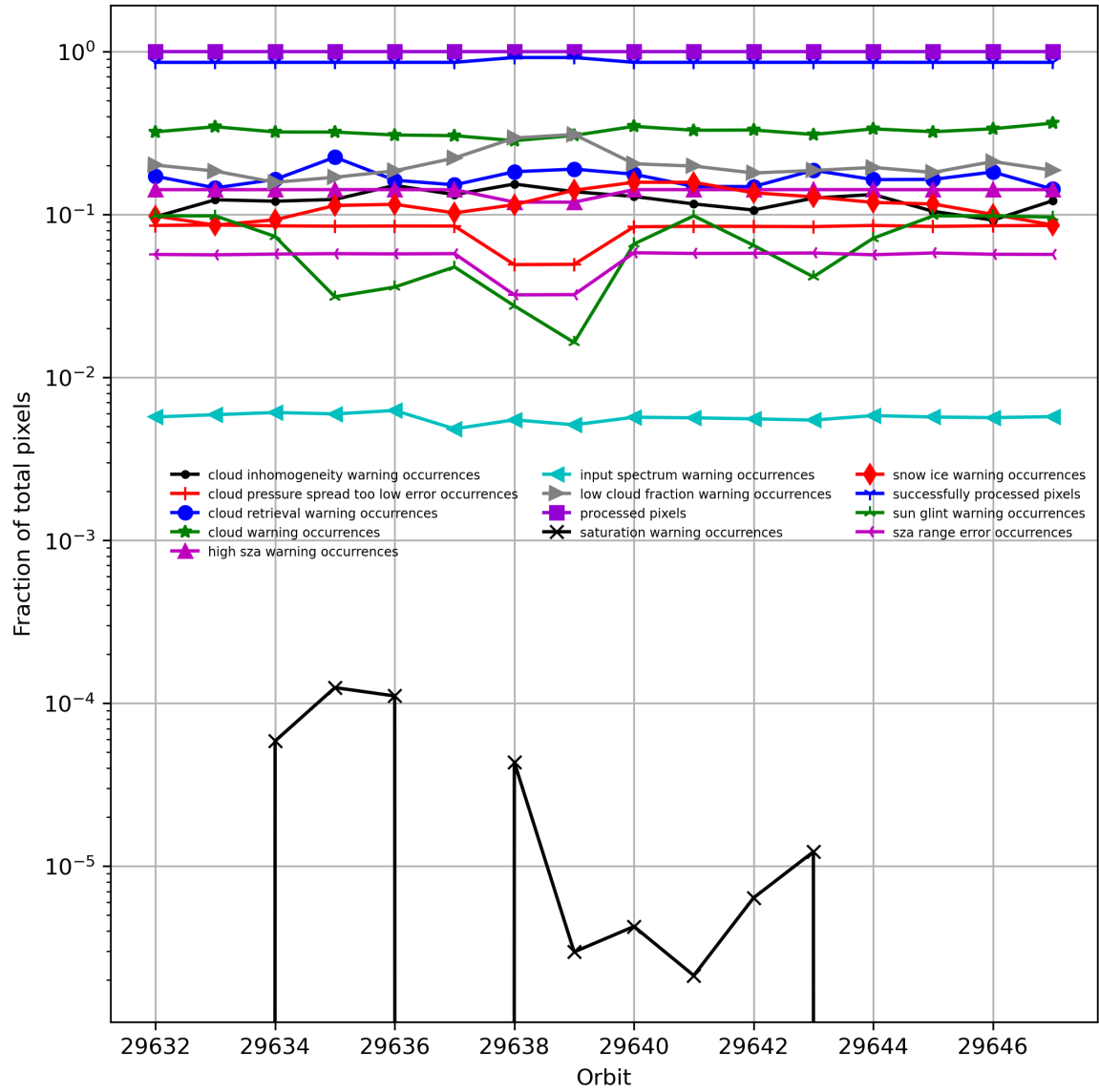


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

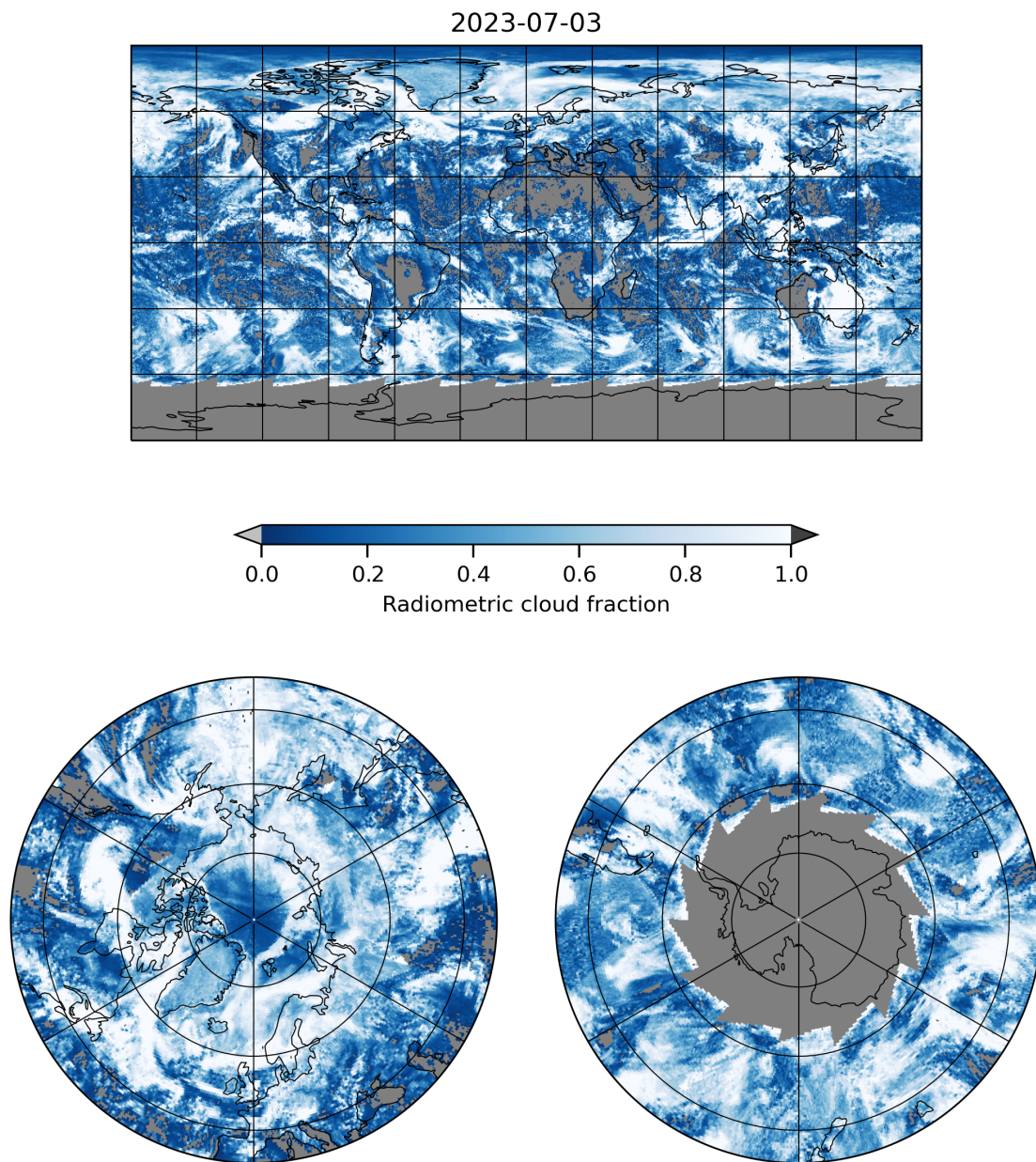


Figure 6: Map of “Radiometric cloud fraction” for 2023-07-03 to 2023-07-04

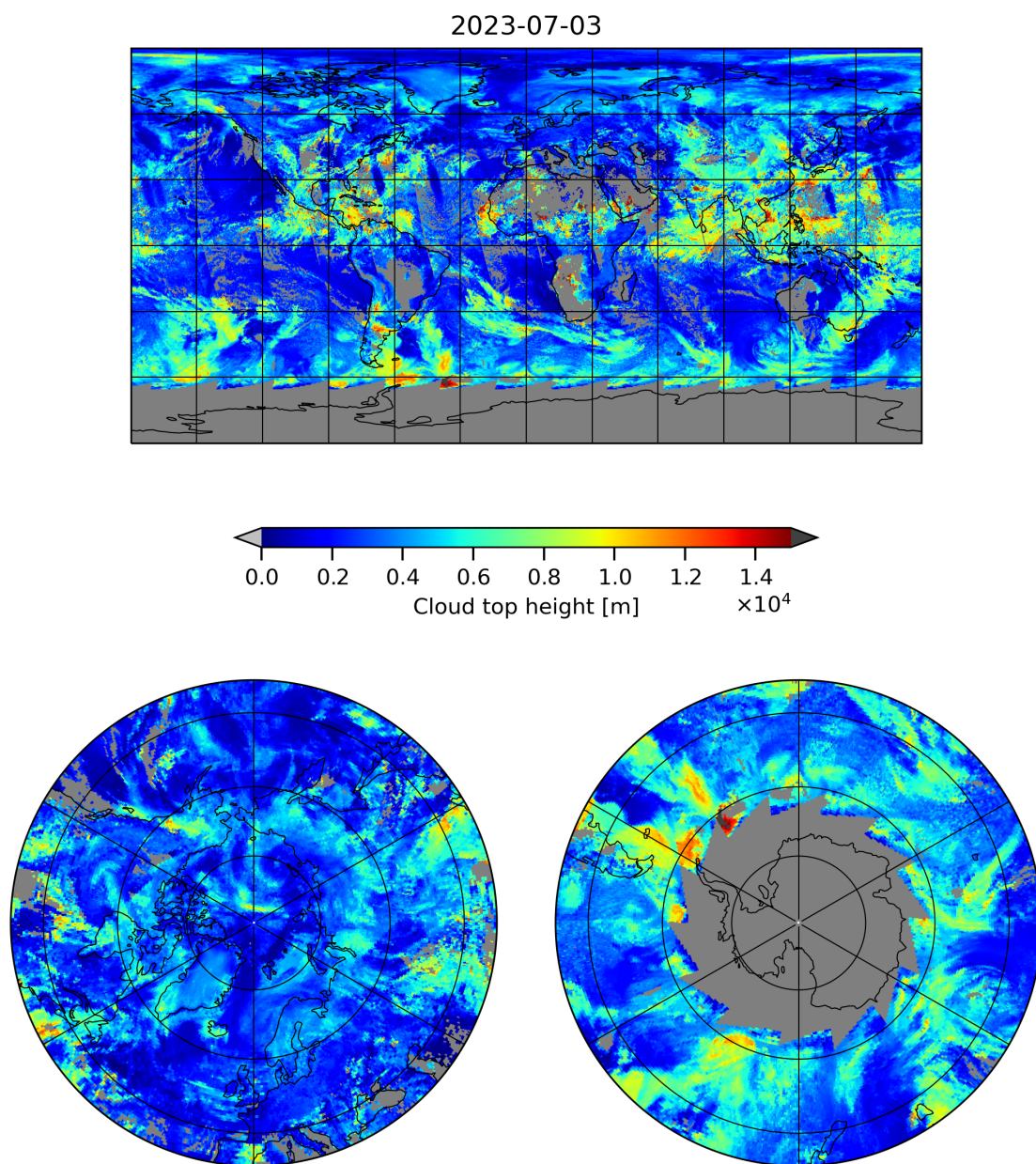


Figure 7: Map of “Cloud top height” for 2023-07-03 to 2023-07-04

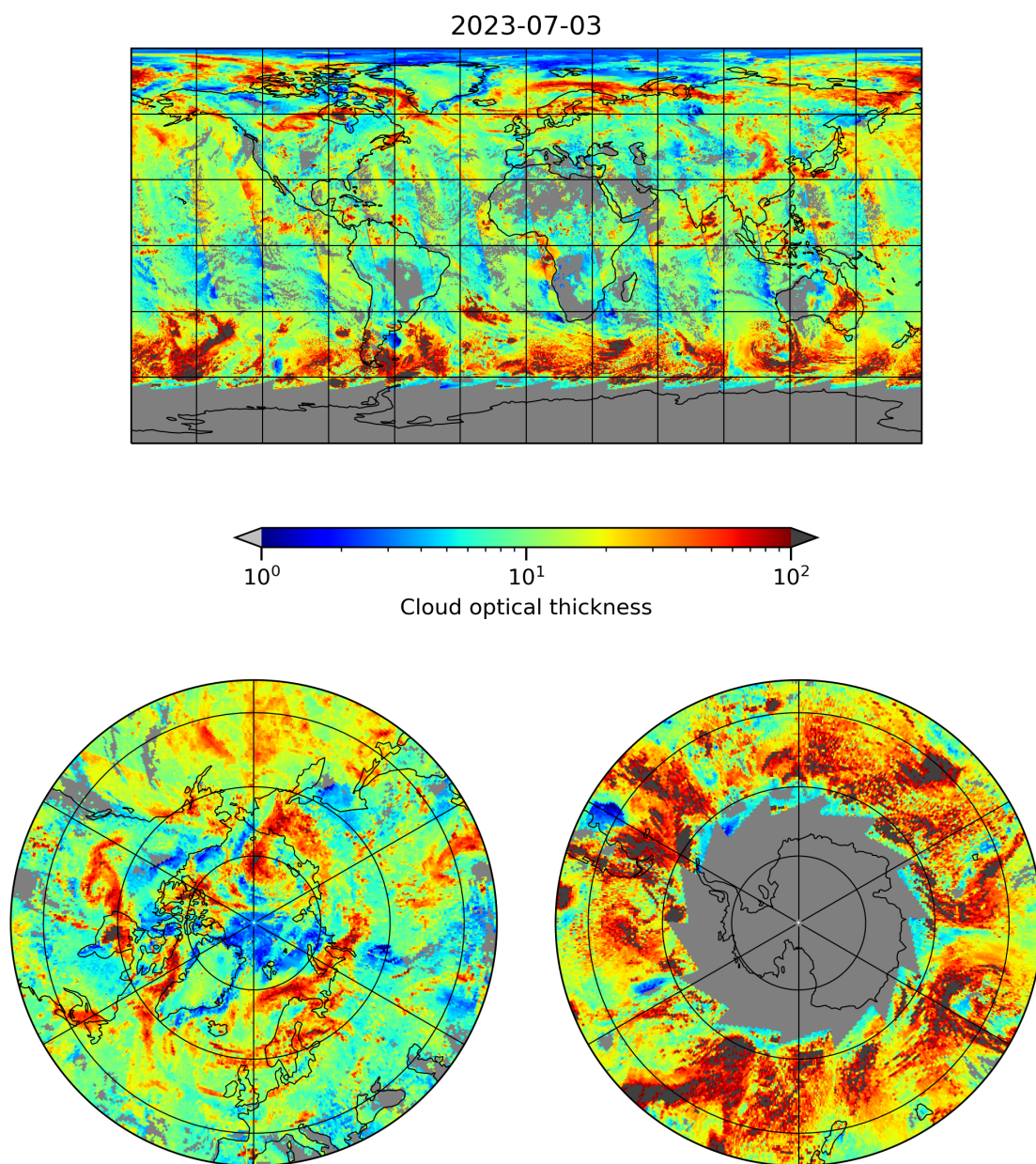


Figure 8: Map of “Cloud optical thickness” for 2023-07-03 to 2023-07-04

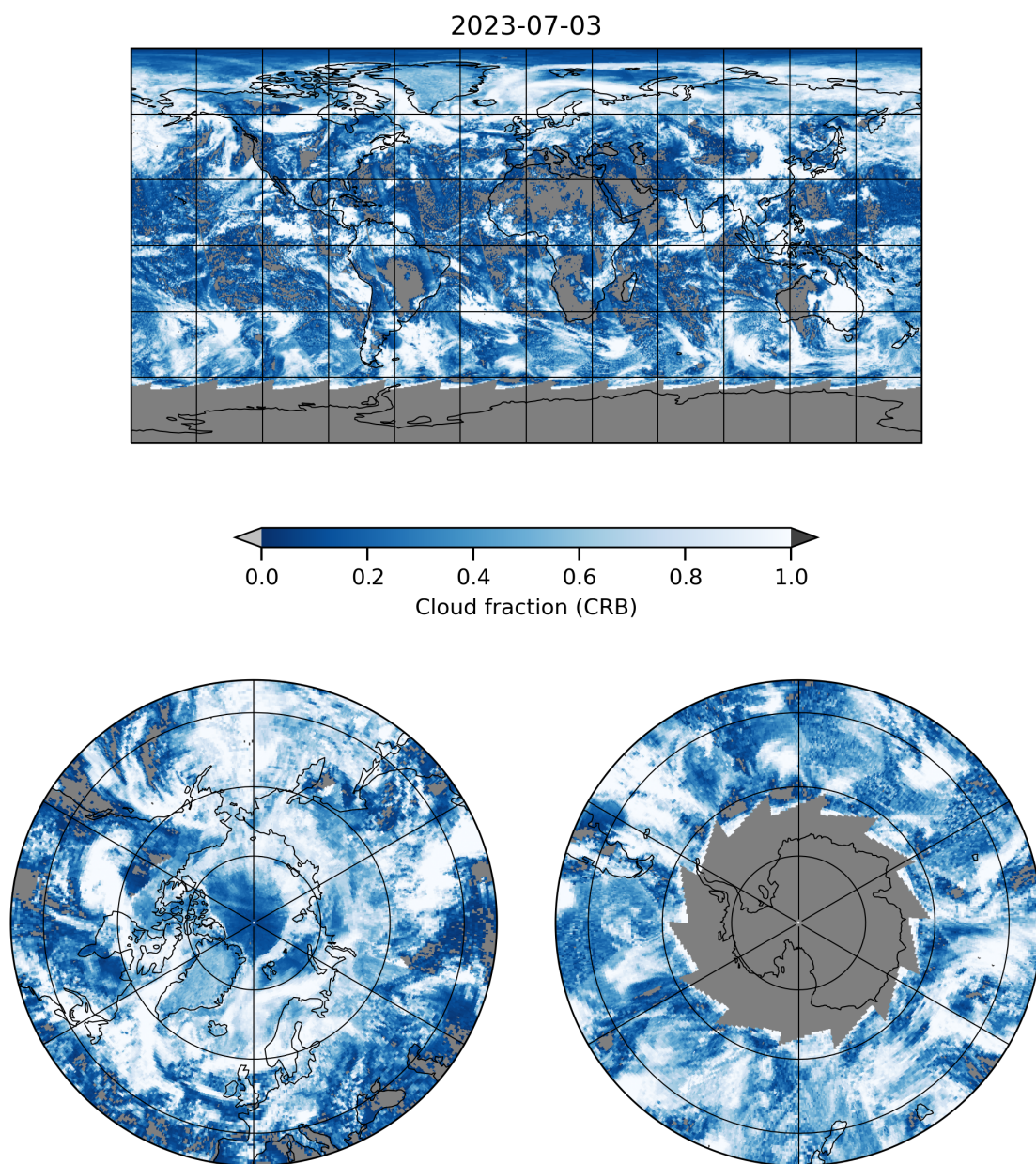


Figure 9: Map of “Cloud fraction (CRB)” for 2023-07-03 to 2023-07-04

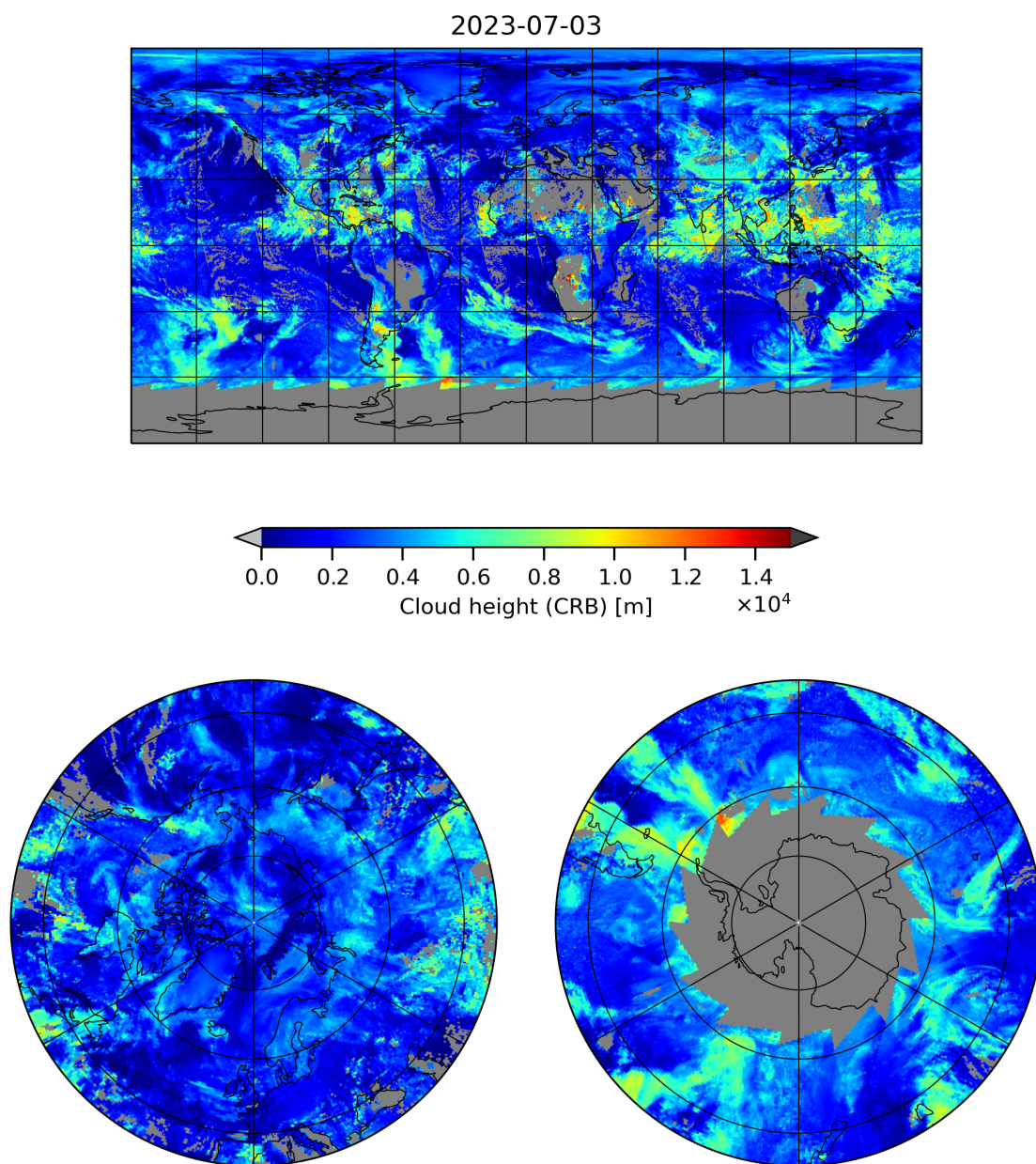


Figure 10: Map of “Cloud height (CRB)” for 2023-07-03 to 2023-07-04

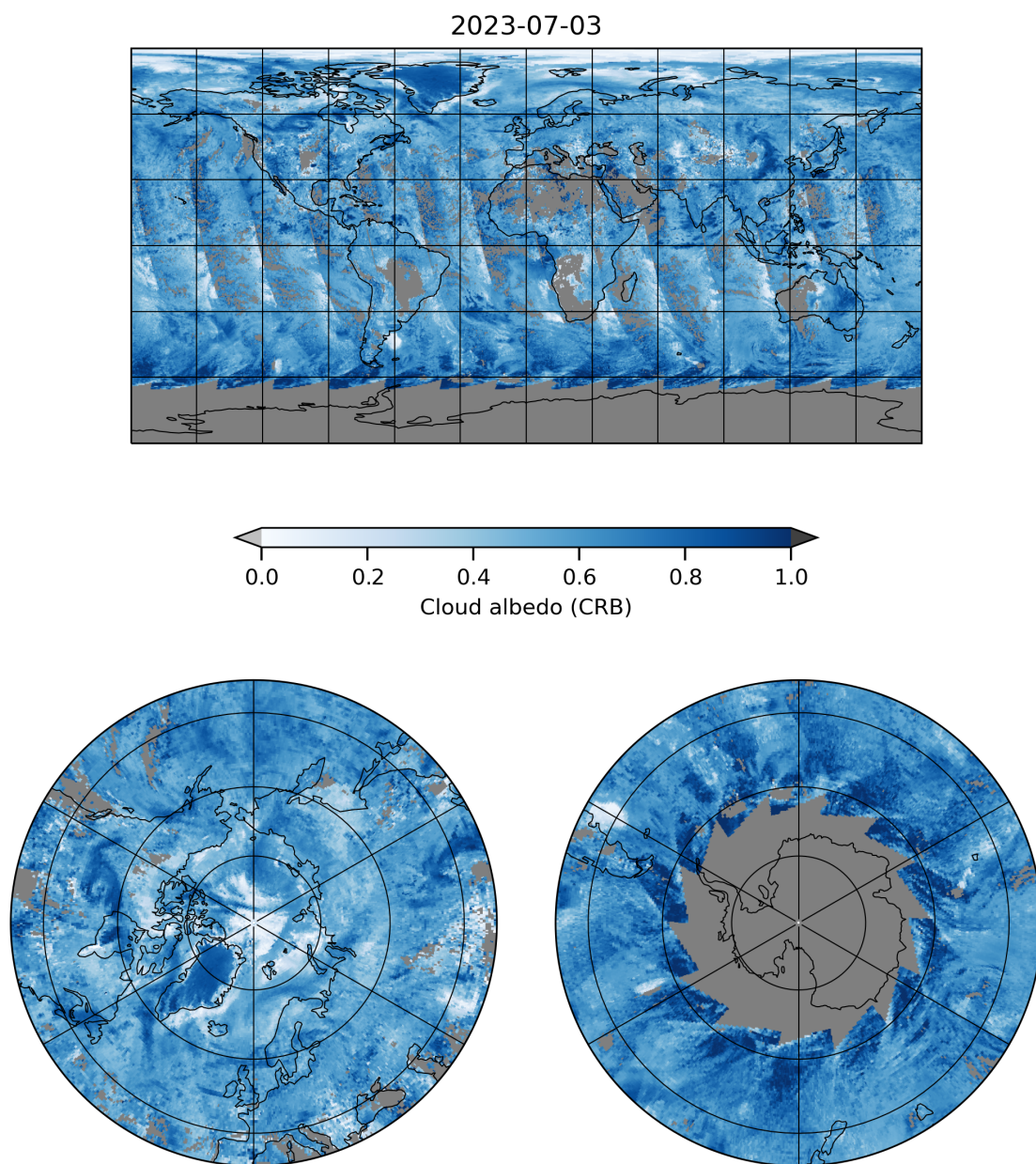


Figure 11: Map of “Cloud albedo (CRB)” for 2023-07-03 to 2023-07-04

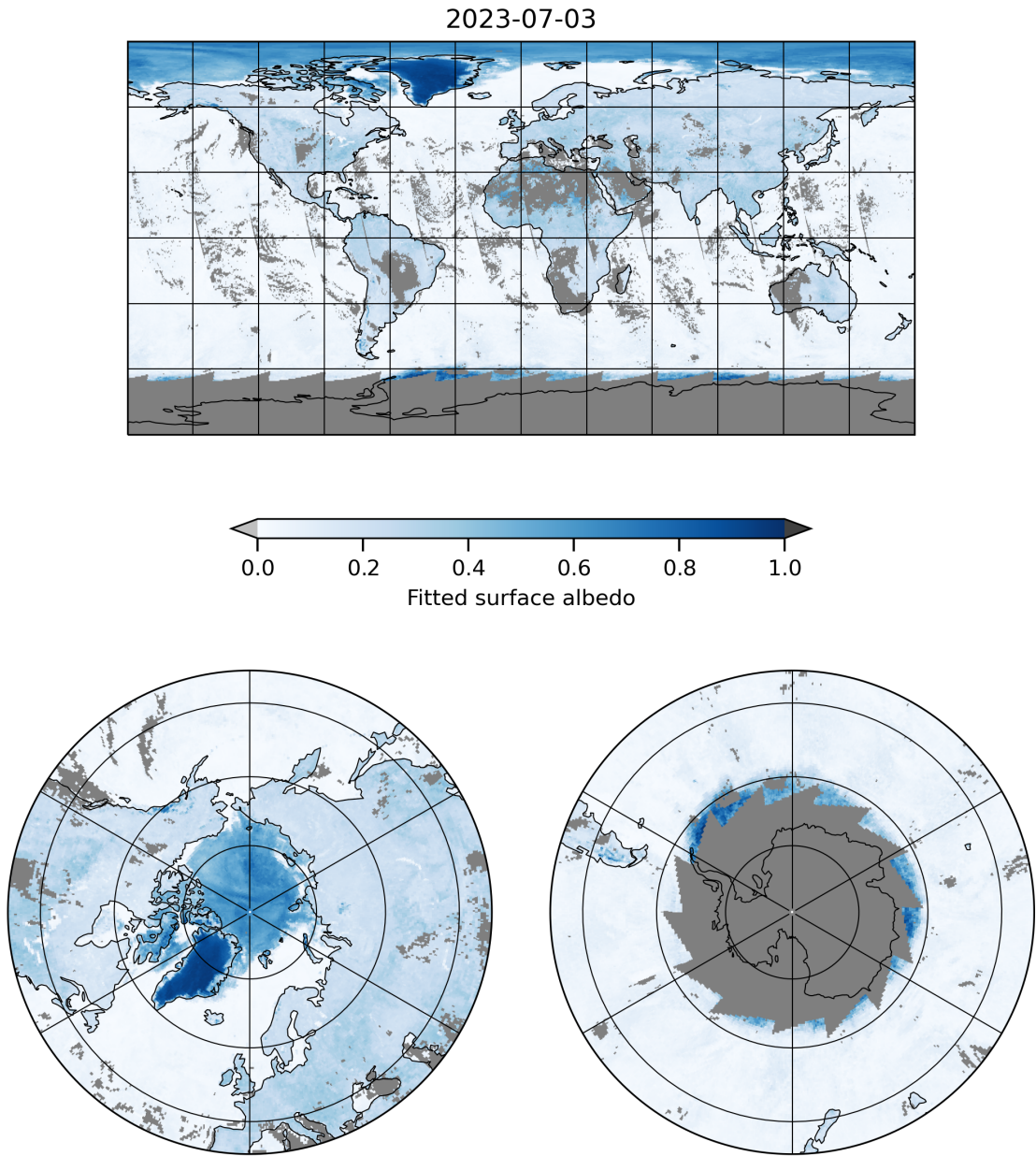


Figure 12: Map of “Fitted surface albedo” for 2023-07-03 to 2023-07-04

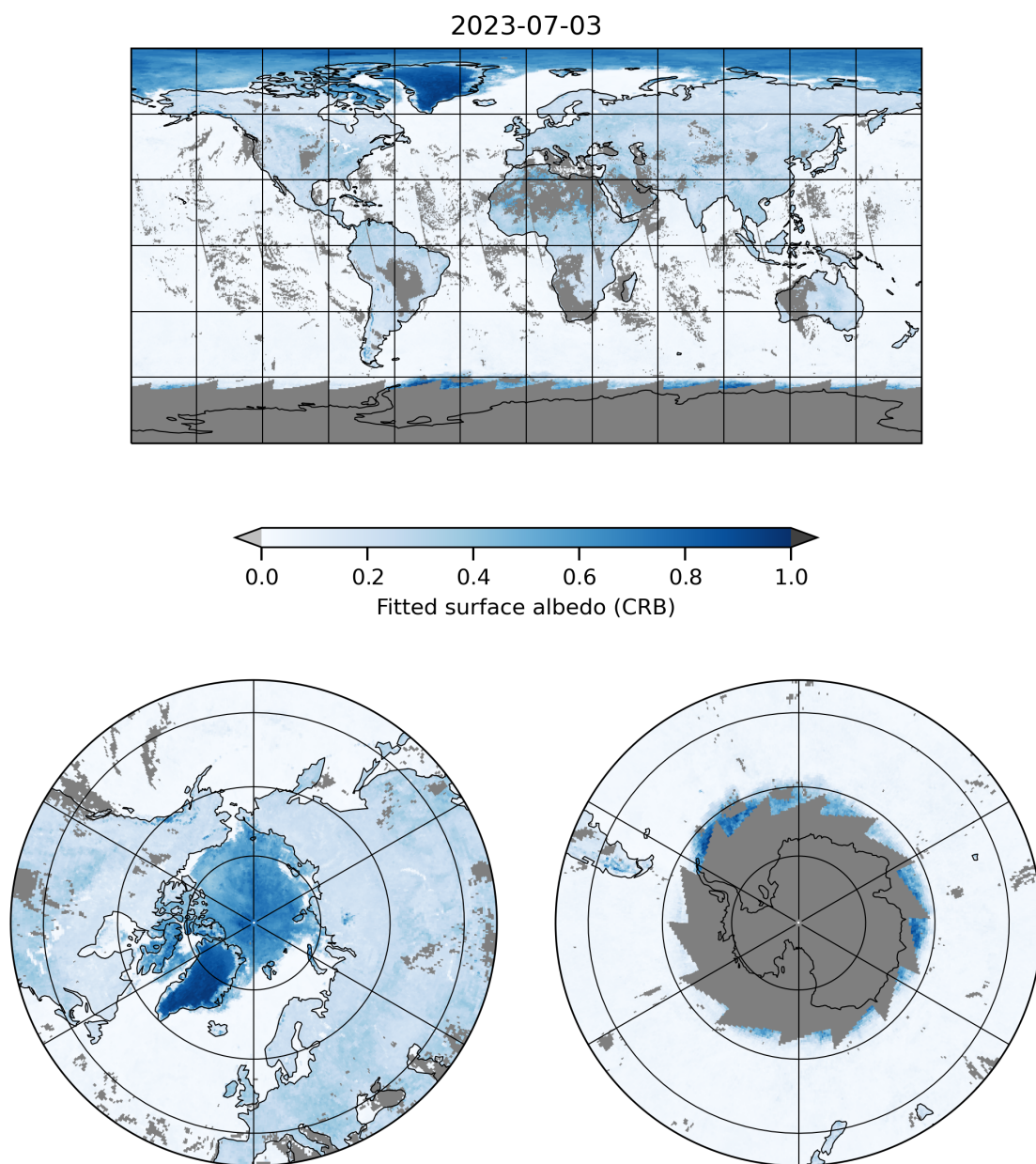


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-07-03 to 2023-07-04

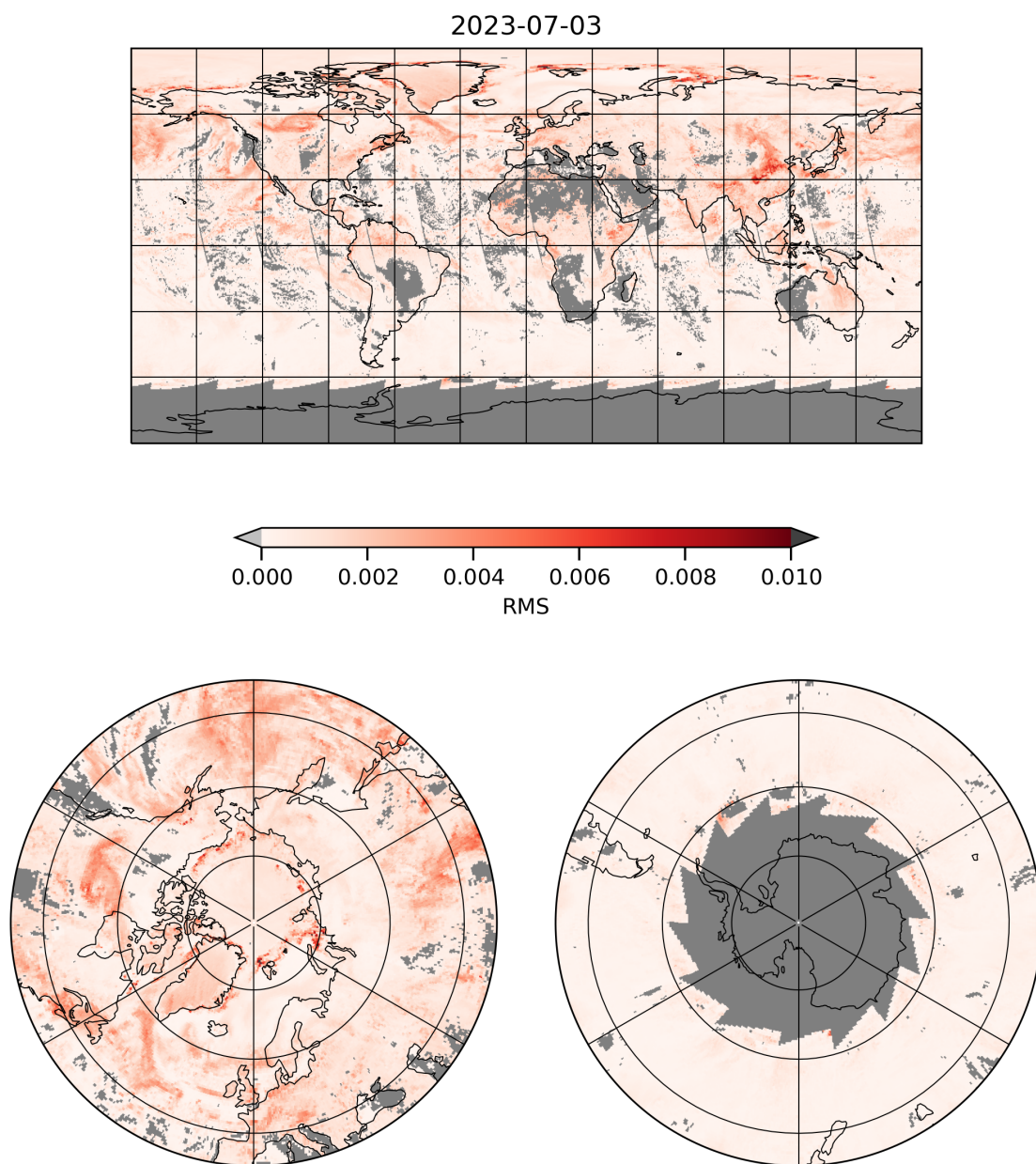


Figure 14: Map of “RMS” for 2023-07-03 to 2023-07-04

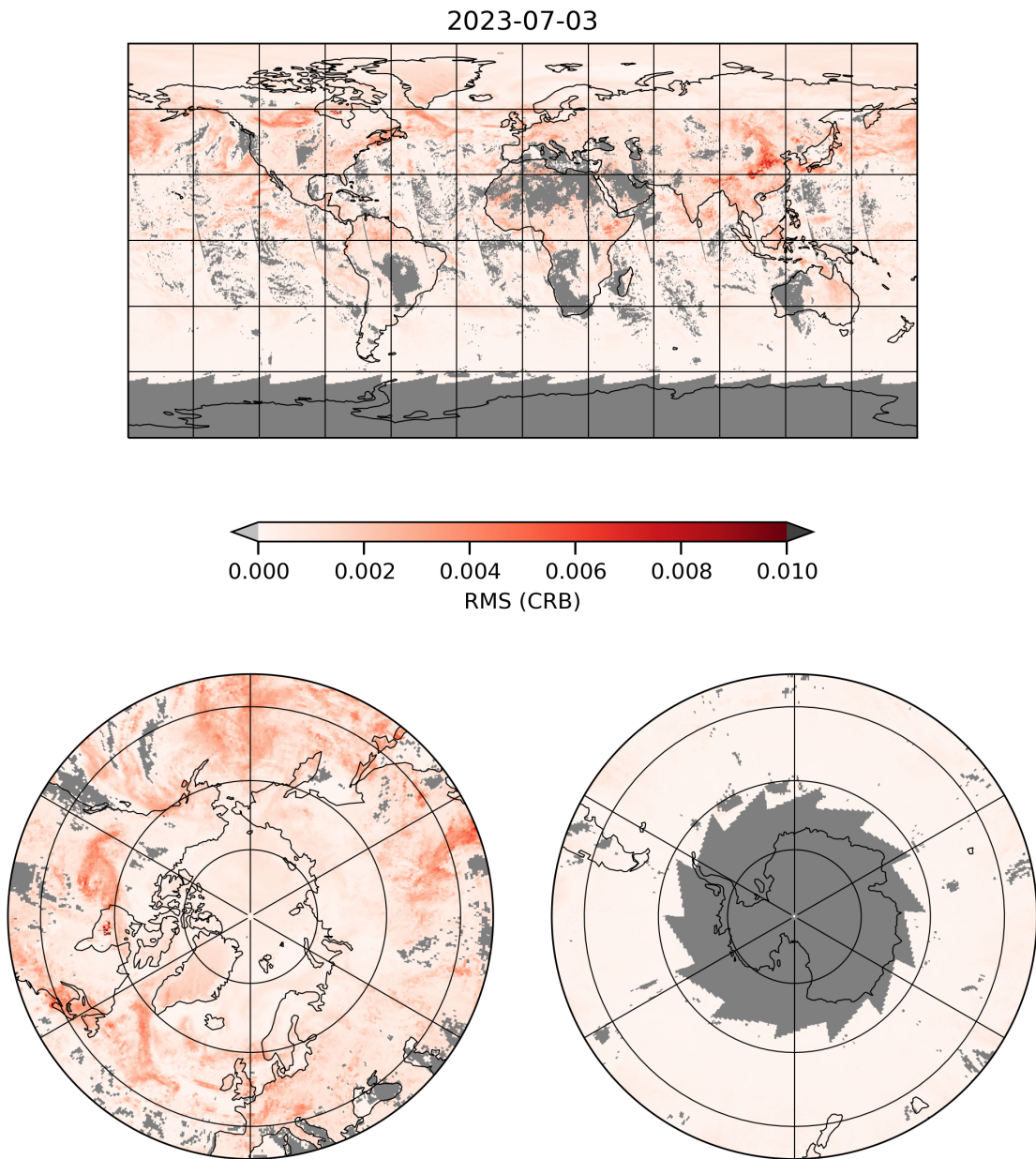


Figure 15: Map of “RMS (CRB)” for 2023-07-03 to 2023-07-04

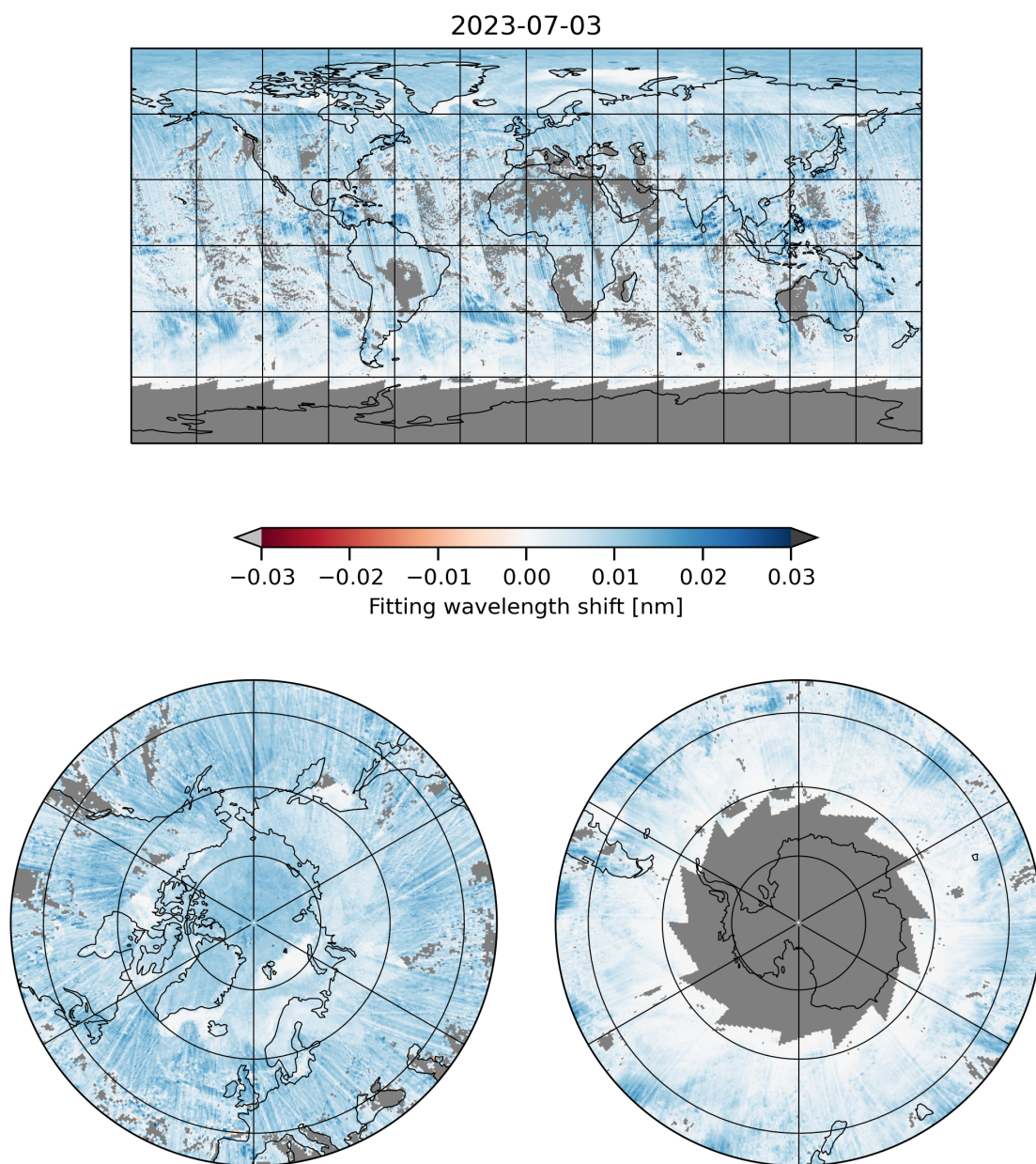


Figure 16: Map of “Fitting wavelength shift” for 2023-07-03 to 2023-07-04

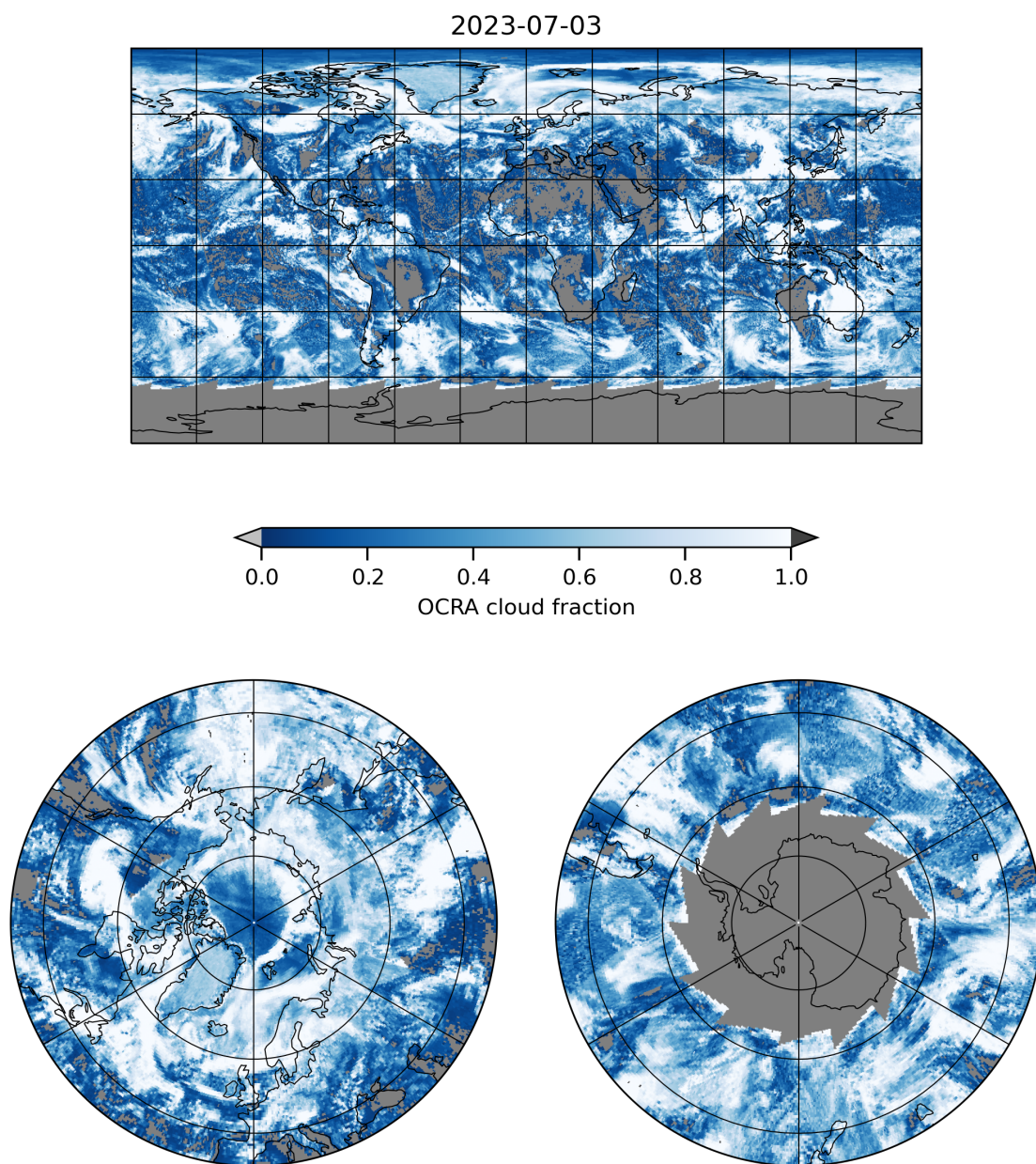


Figure 17: Map of “OCRA cloud fraction” for 2023-07-03 to 2023-07-04

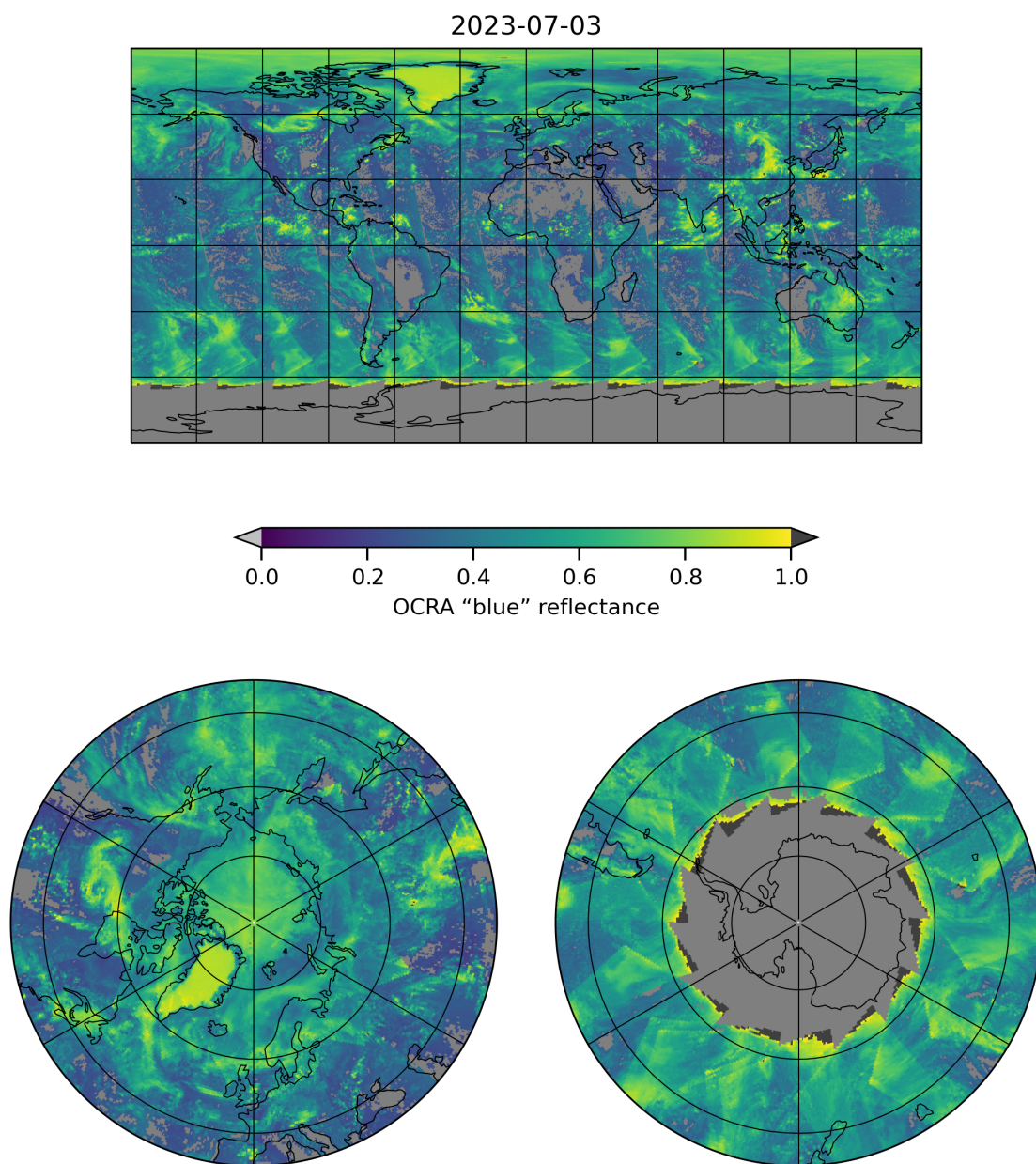


Figure 18: Map of "OCRA "blue" reflectance" for 2023-07-03 to 2023-07-04

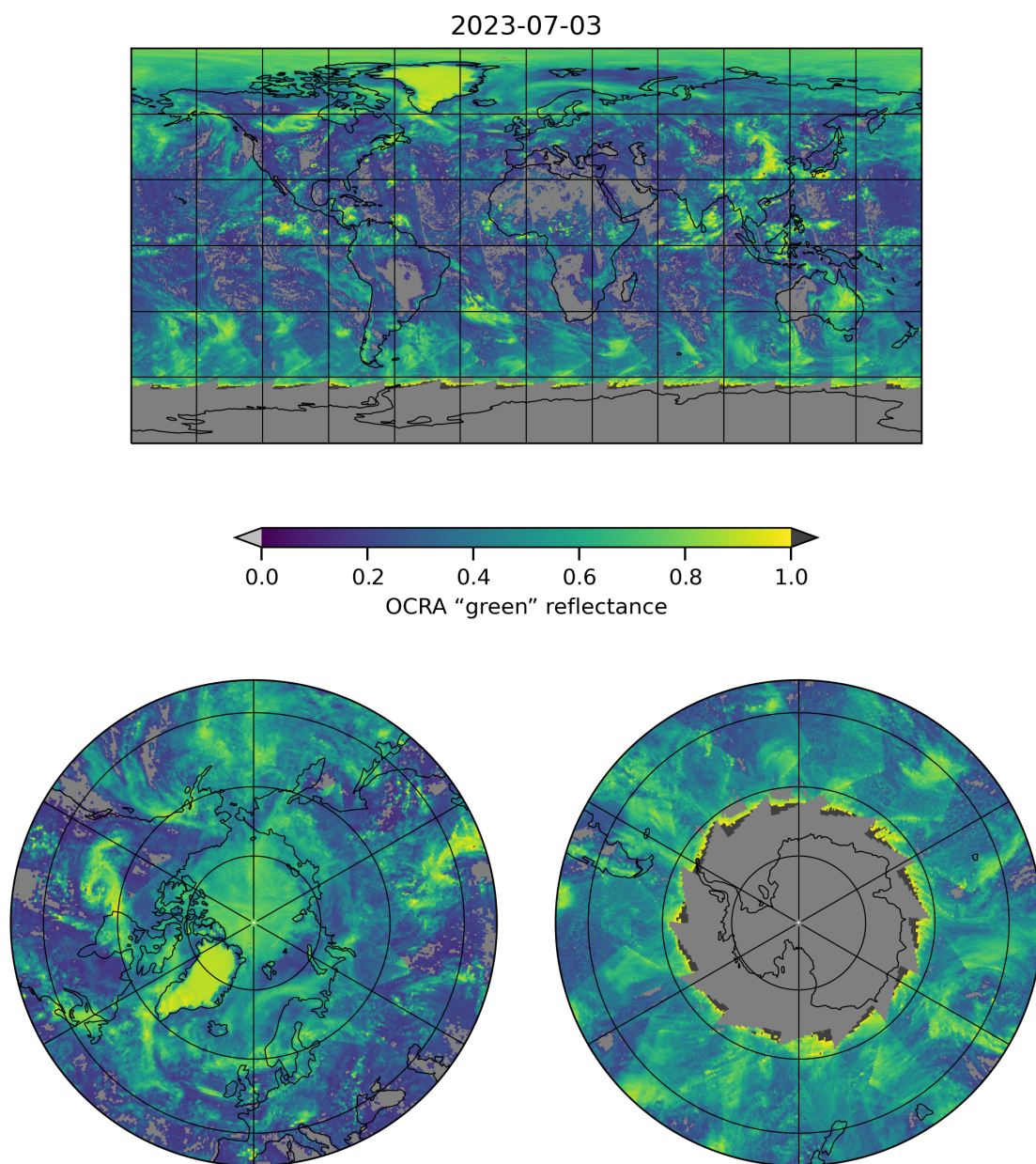


Figure 19: Map of "OCRA "green" reflectance" for 2023-07-03 to 2023-07-04

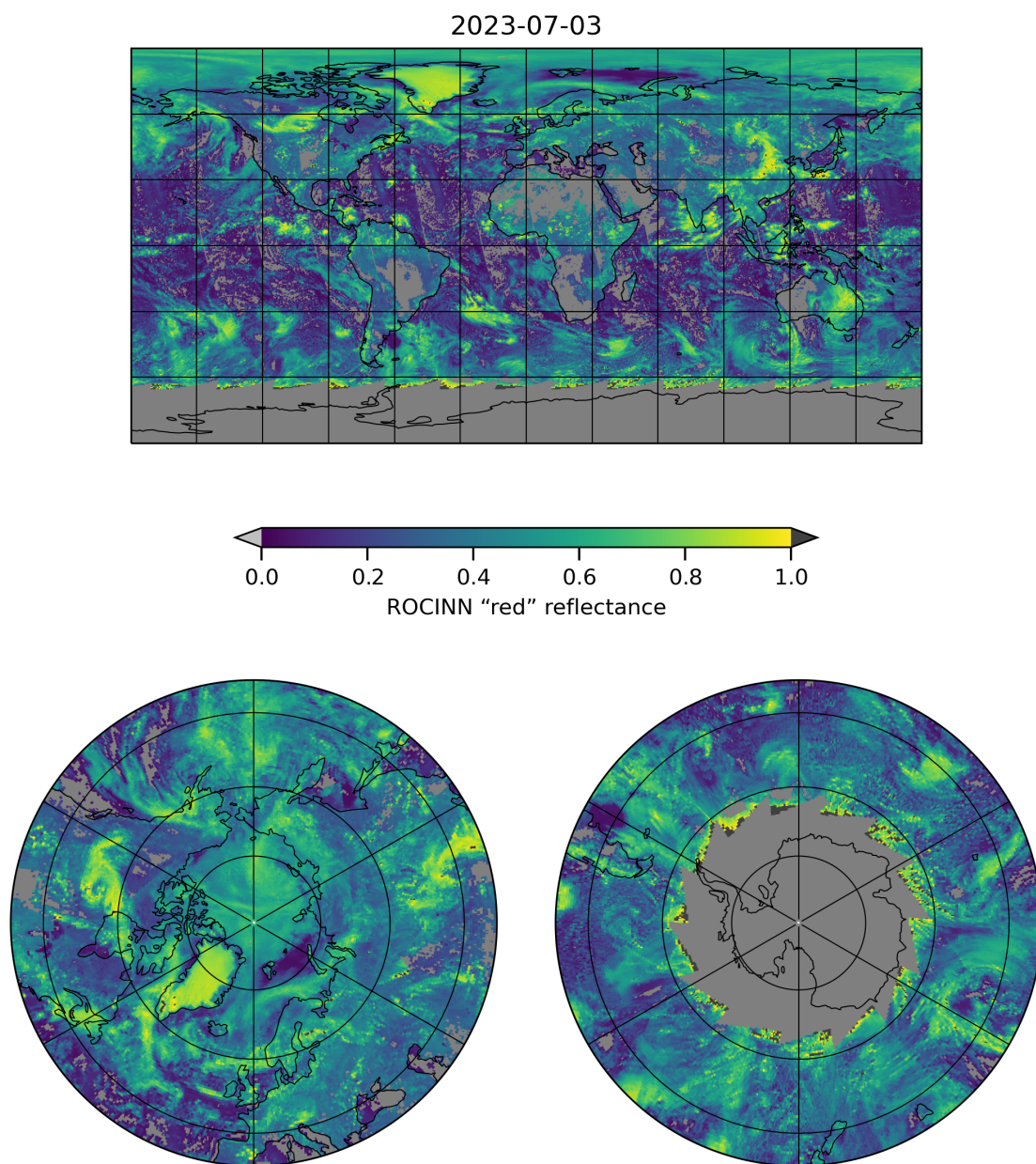


Figure 20: Map of "ROCINN "red" reflectance" for 2023-07-03 to 2023-07-04

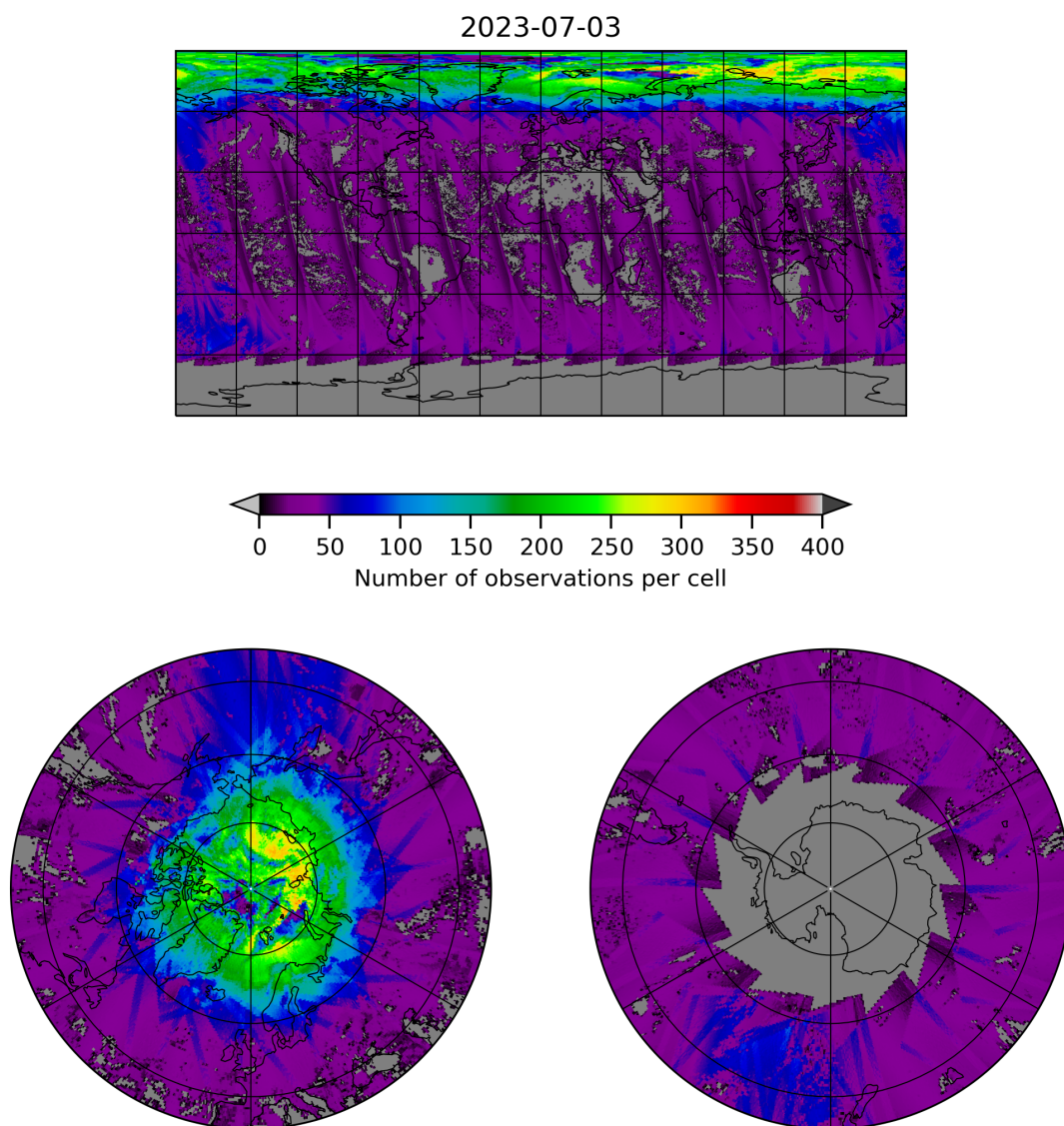


Figure 21: Map of the number of observations for 2023-07-03 to 2023-07-04

7 Zonal average

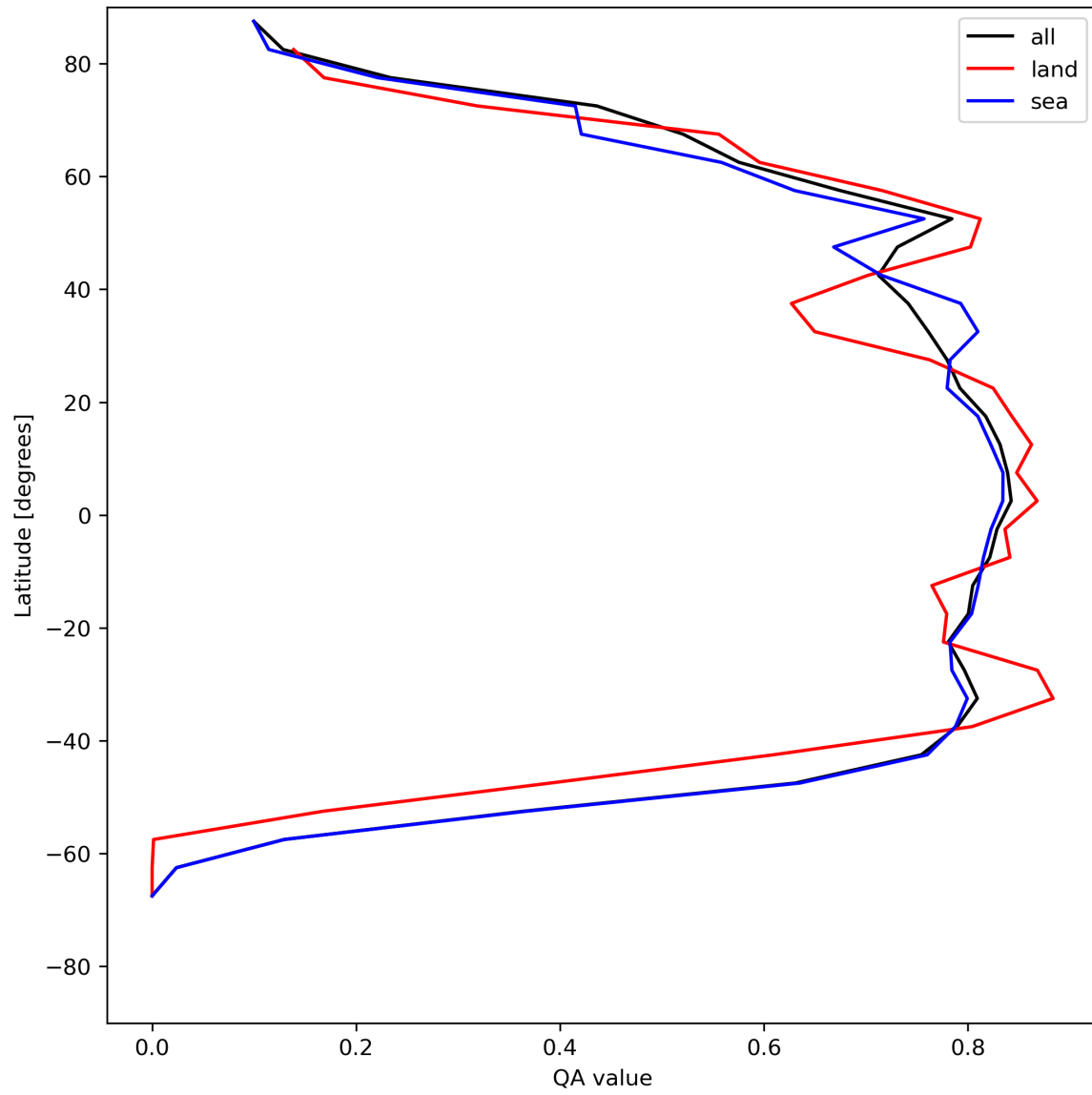


Figure 22: Zonal average of “QA value” for 2023-07-03 to 2023-07-04.

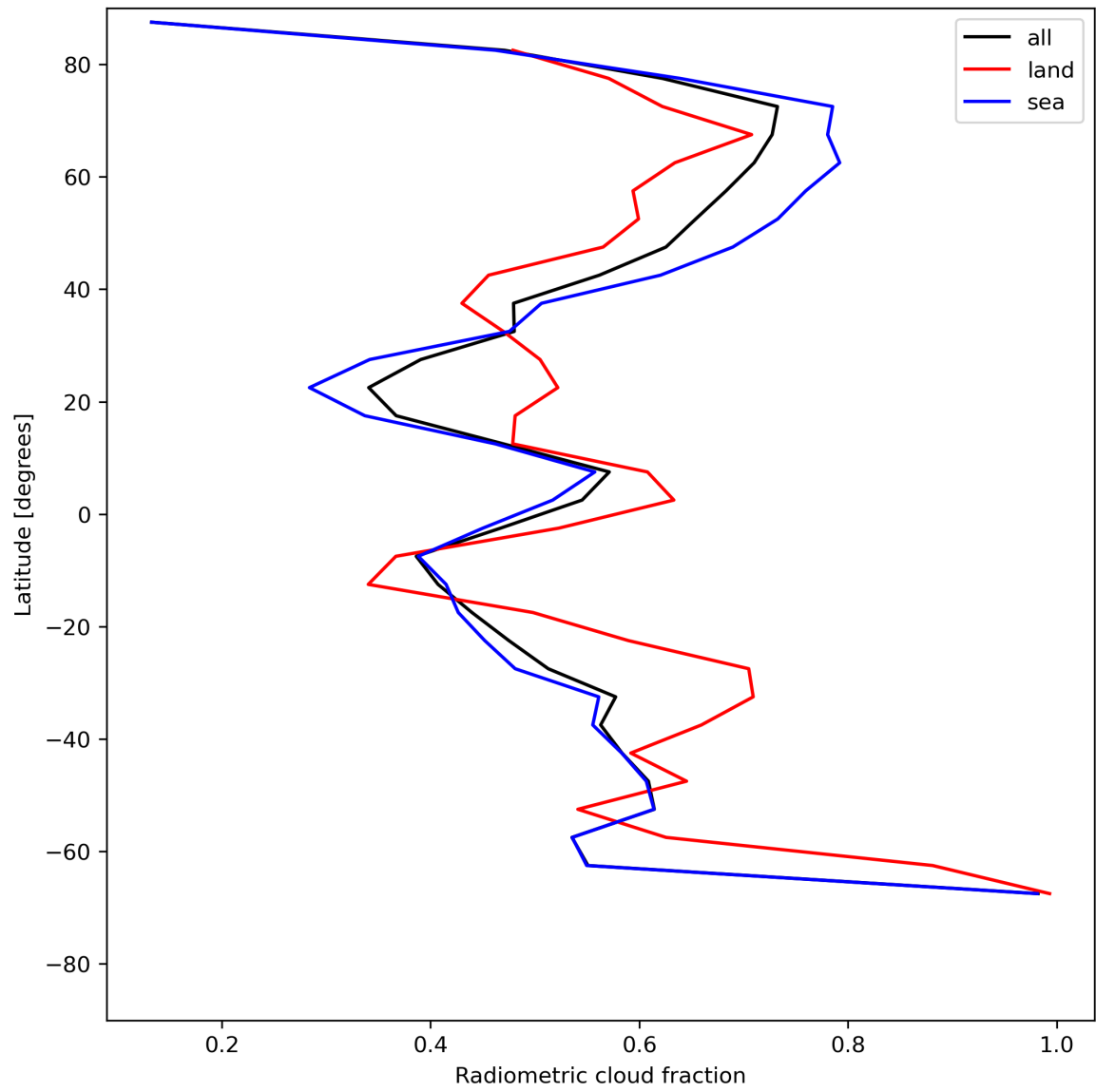


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-07-03 to 2023-07-04.

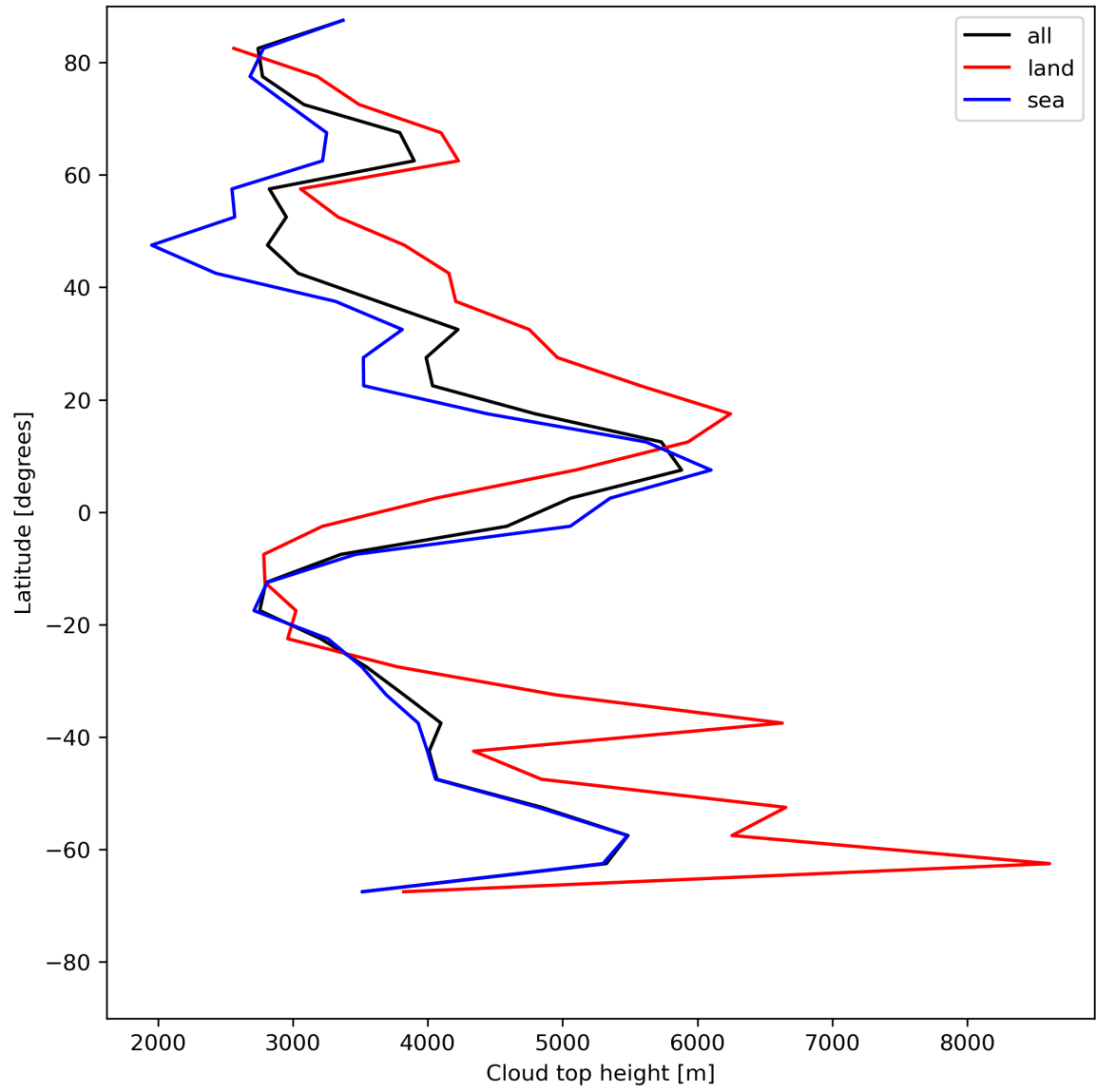


Figure 24: Zonal average of “Cloud top height” for 2023-07-03 to 2023-07-04.

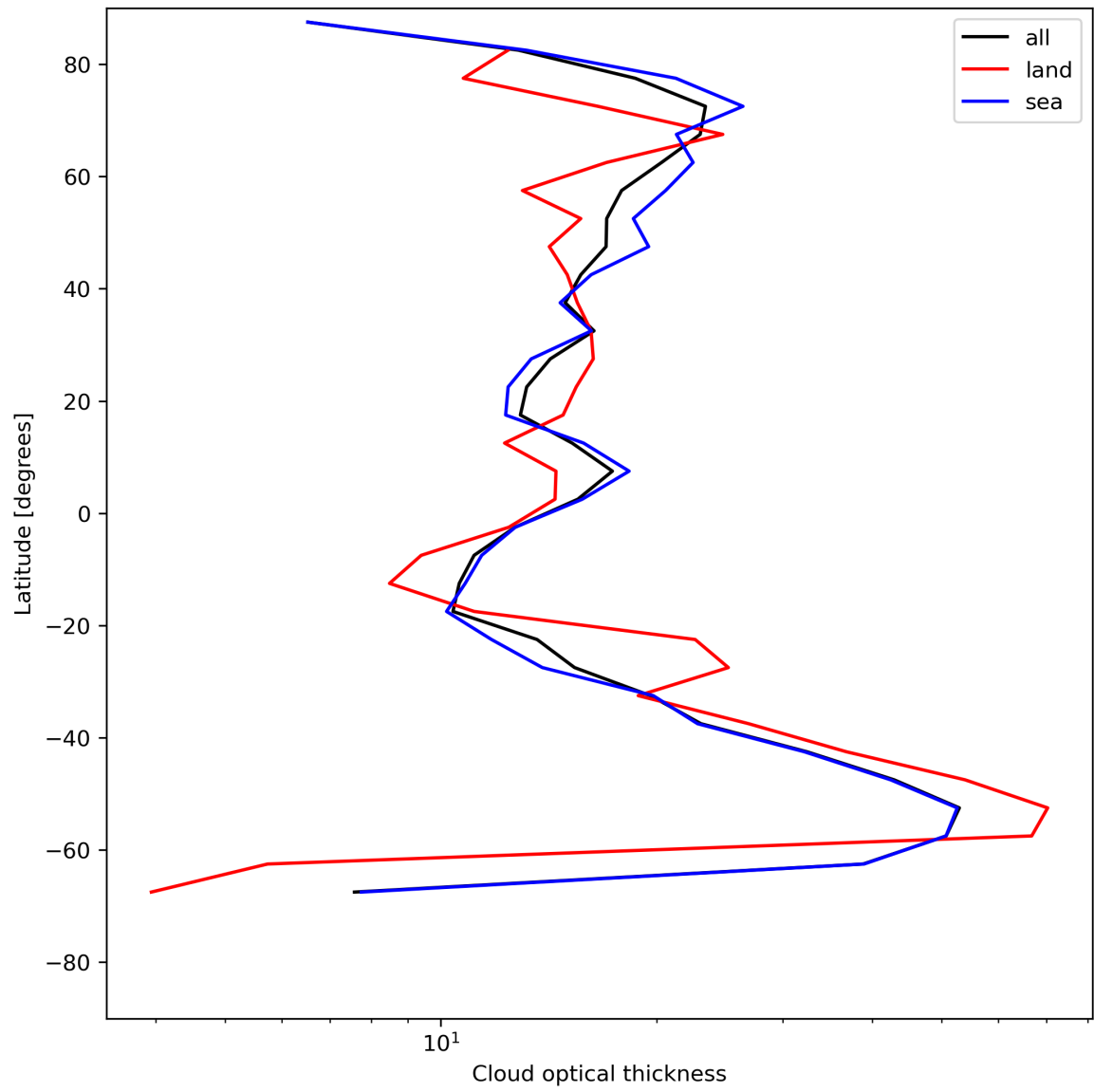


Figure 25: Zonal average of “Cloud optical thickness” for 2023-07-03 to 2023-07-04.

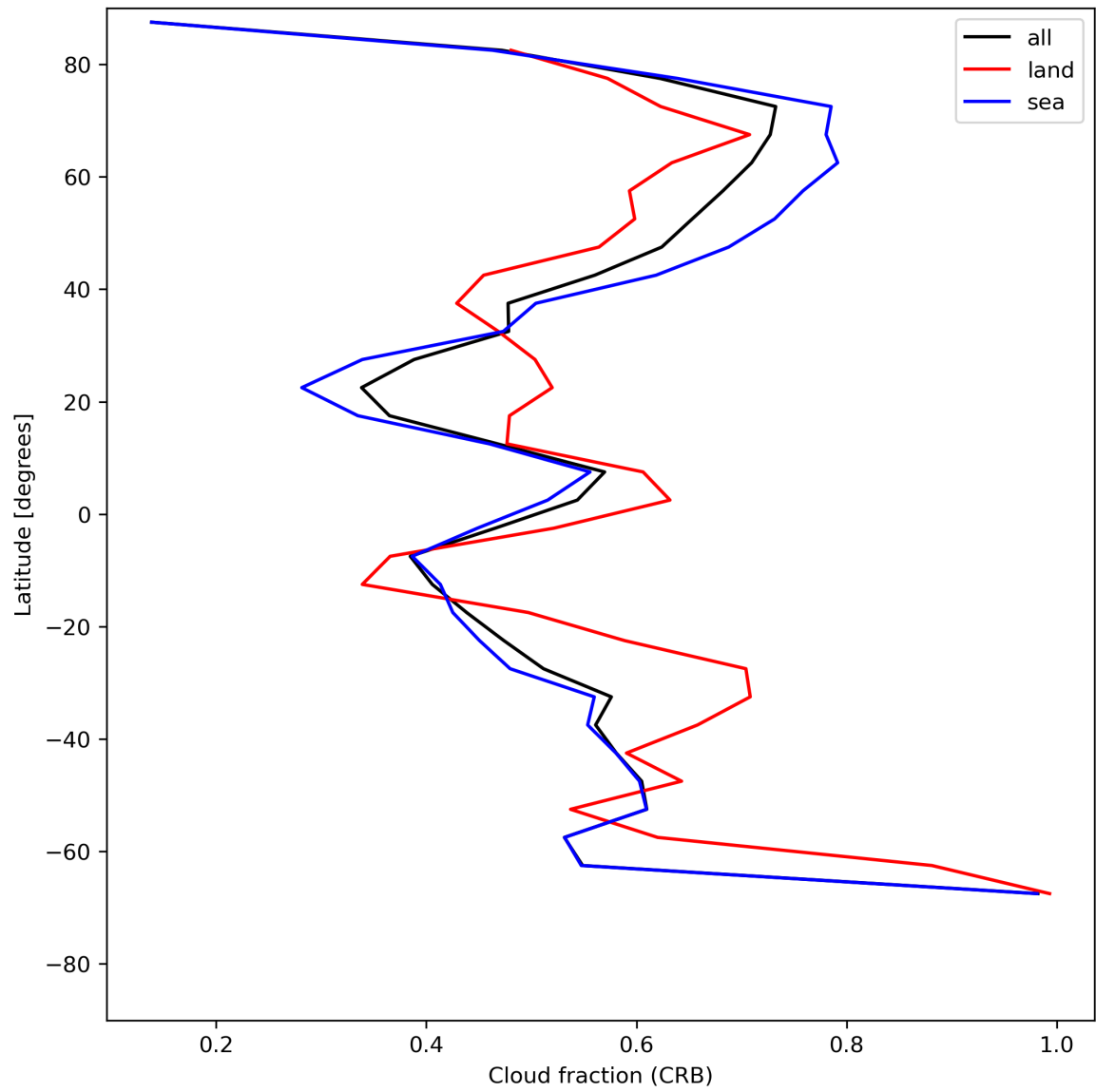


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-07-03 to 2023-07-04.

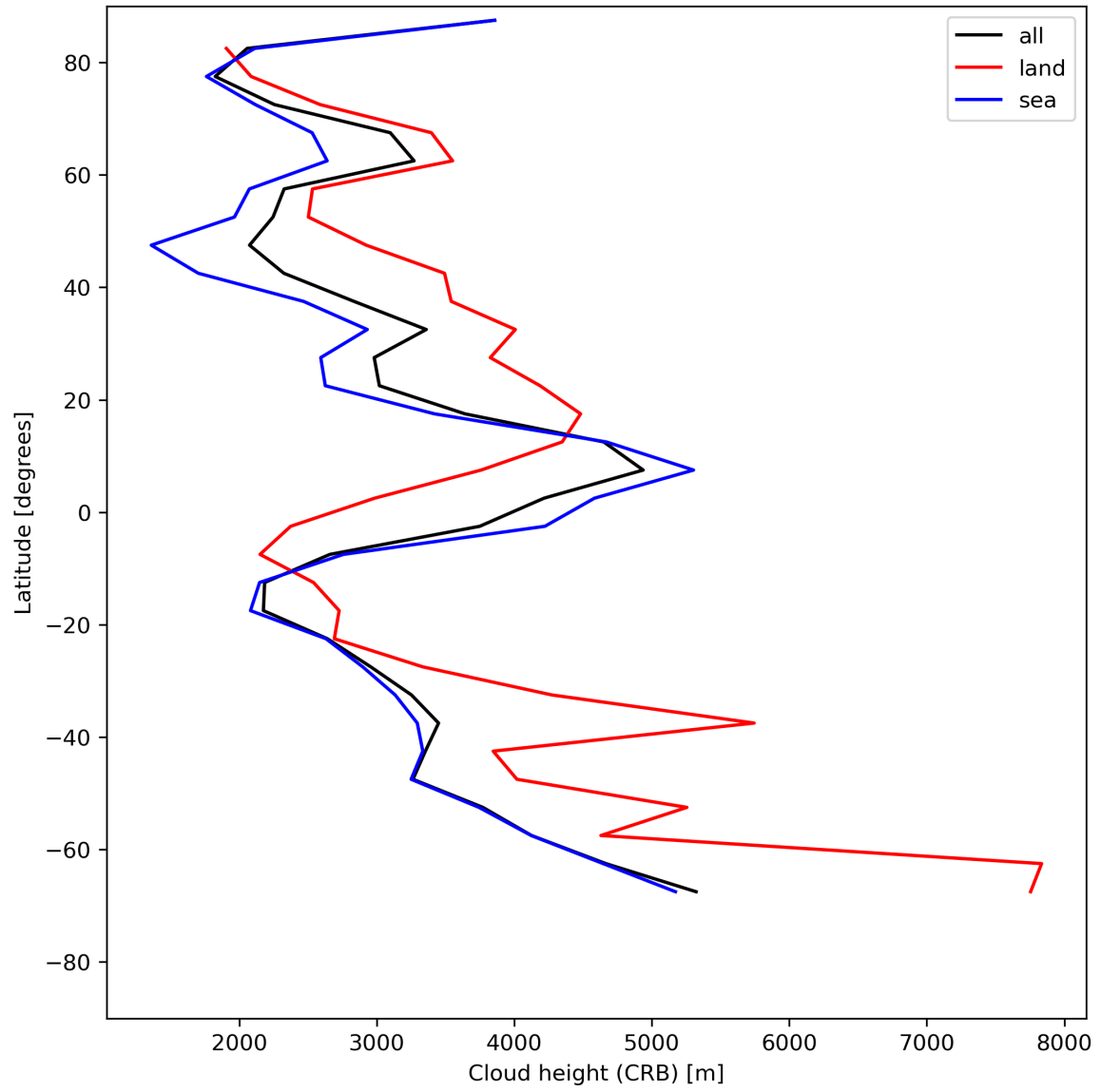


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-07-03 to 2023-07-04.

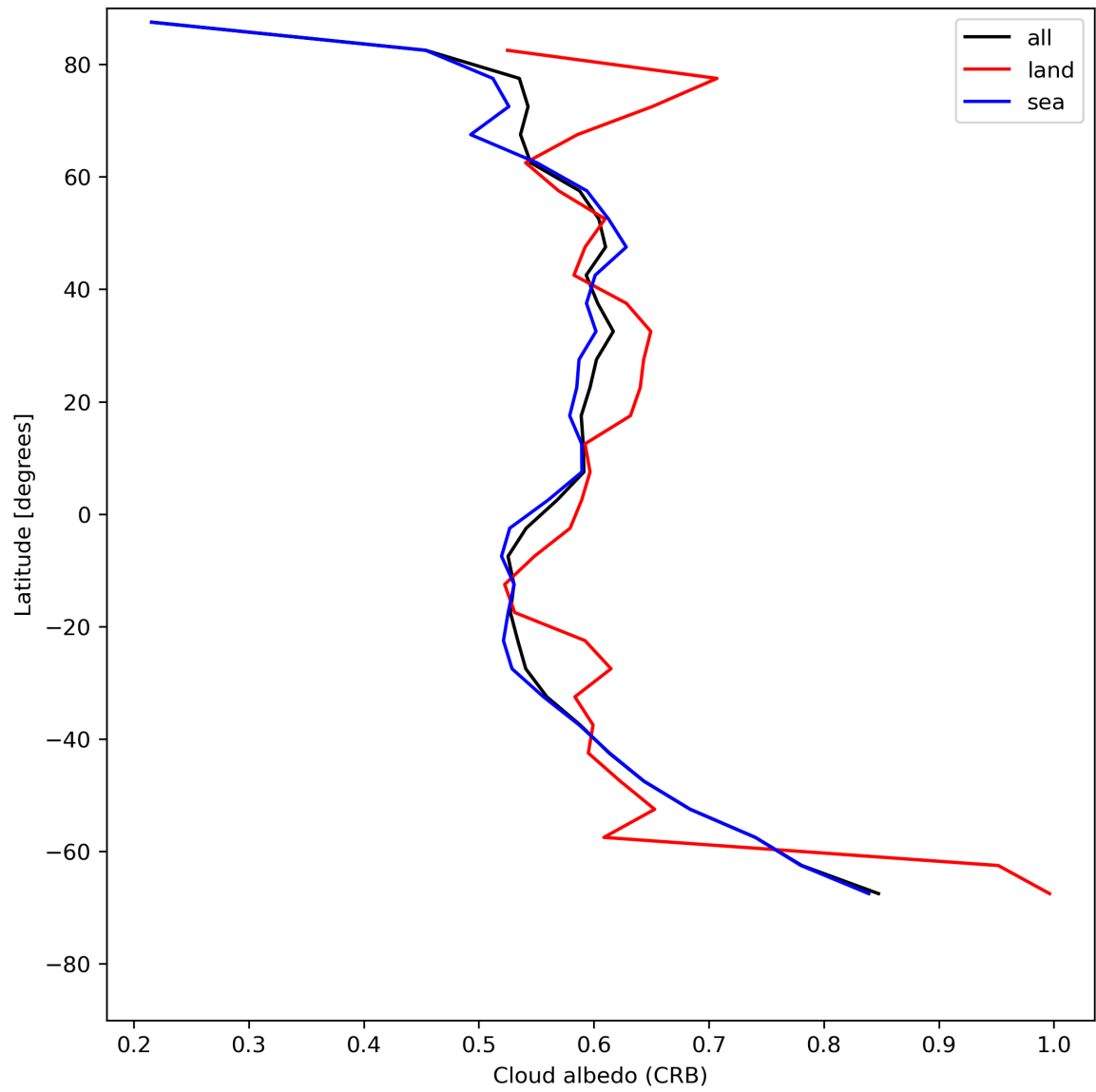


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-07-03 to 2023-07-04.

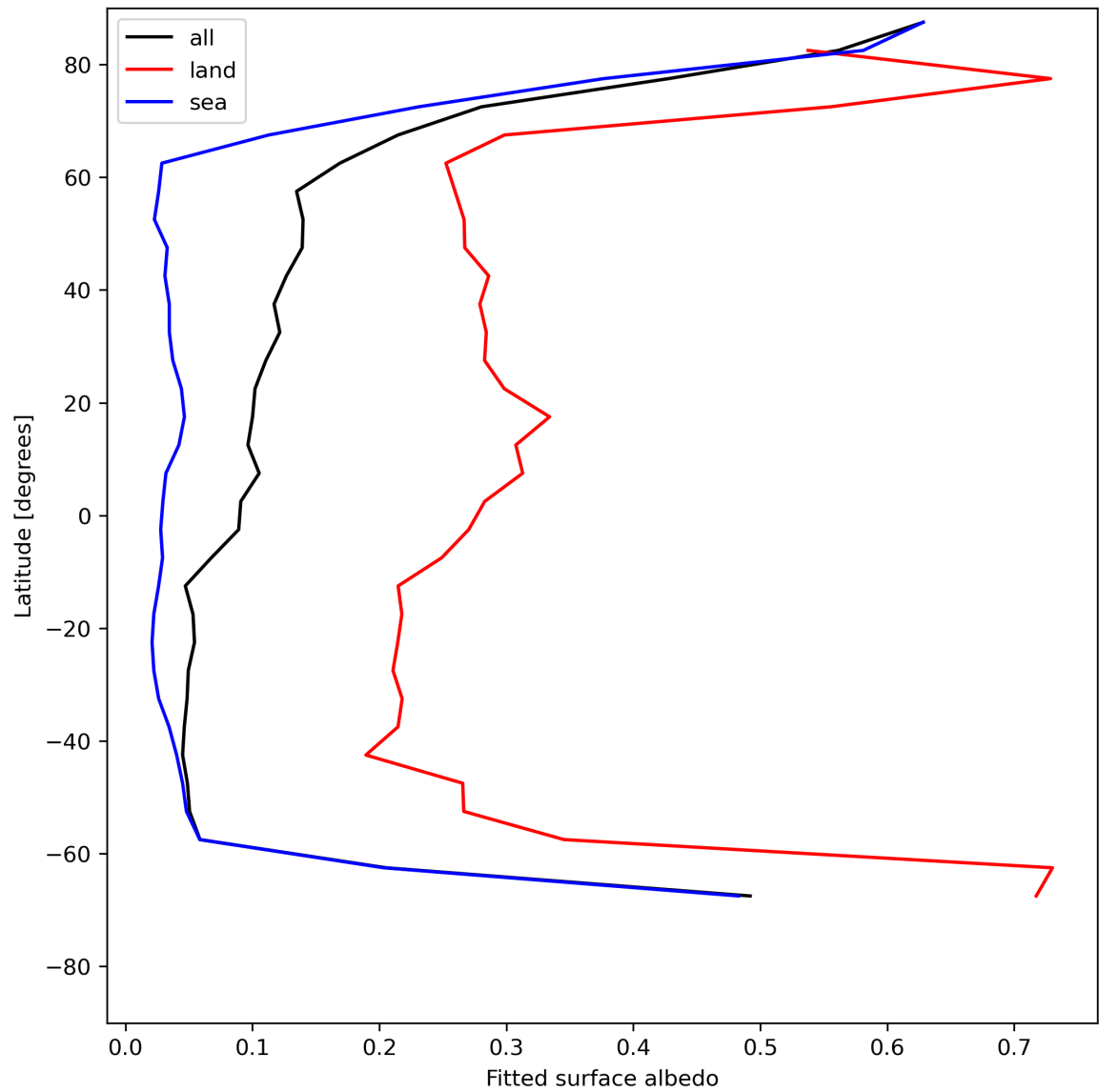


Figure 29: Zonal average of “Fitted surface albedo” for 2023-07-03 to 2023-07-04.

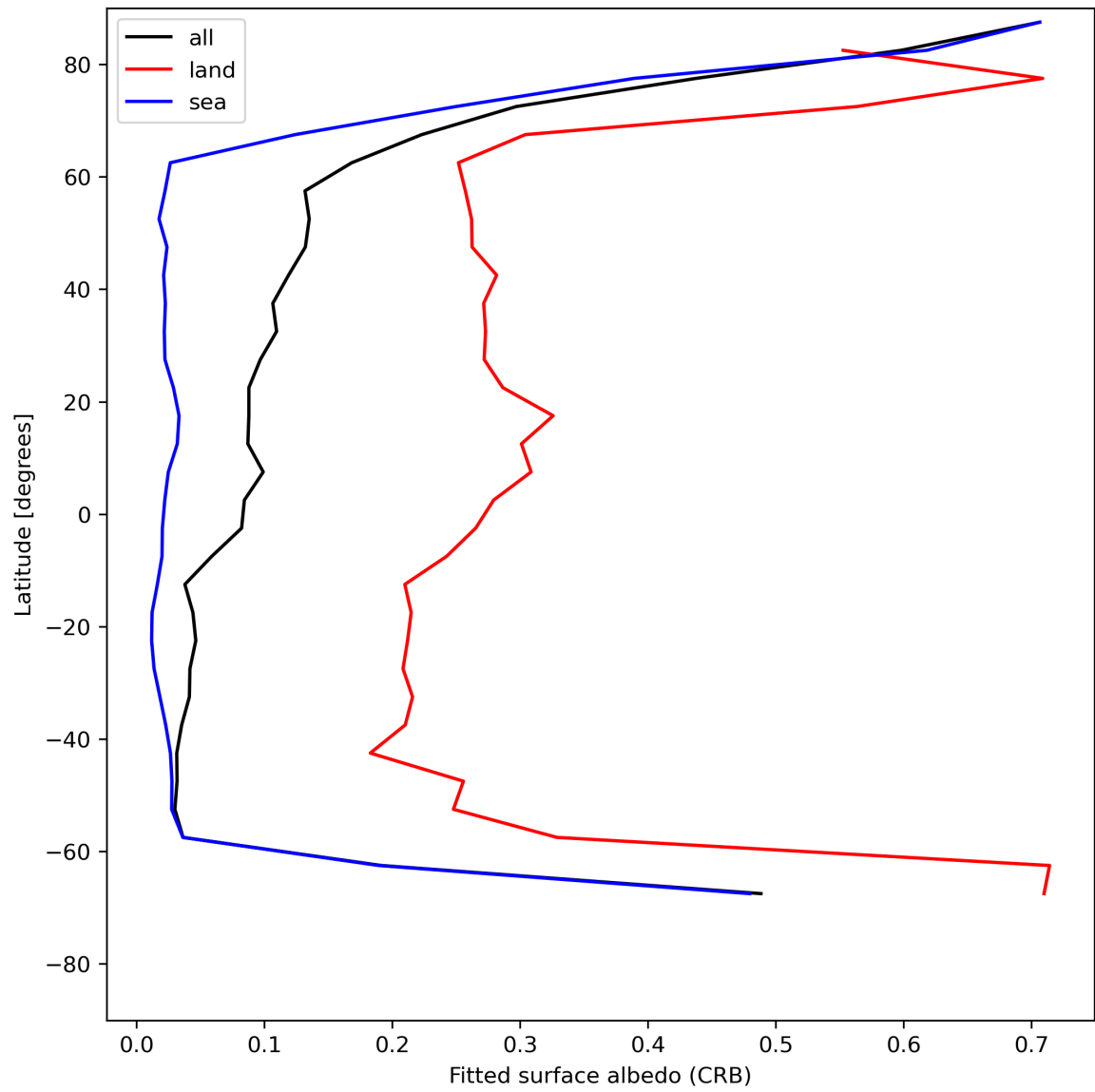


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-07-03 to 2023-07-04.

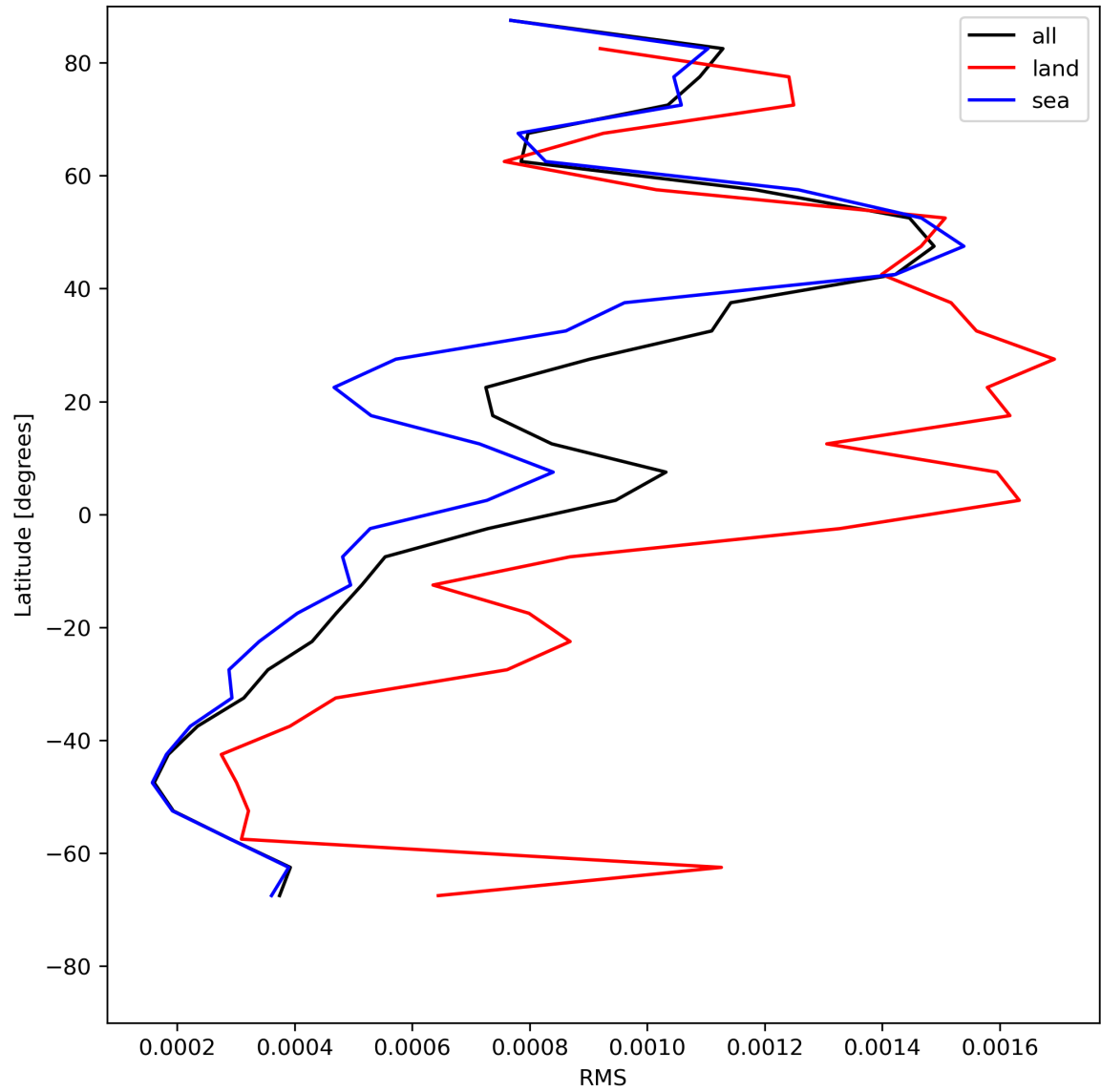


Figure 31: Zonal average of “RMS” for 2023-07-03 to 2023-07-04.

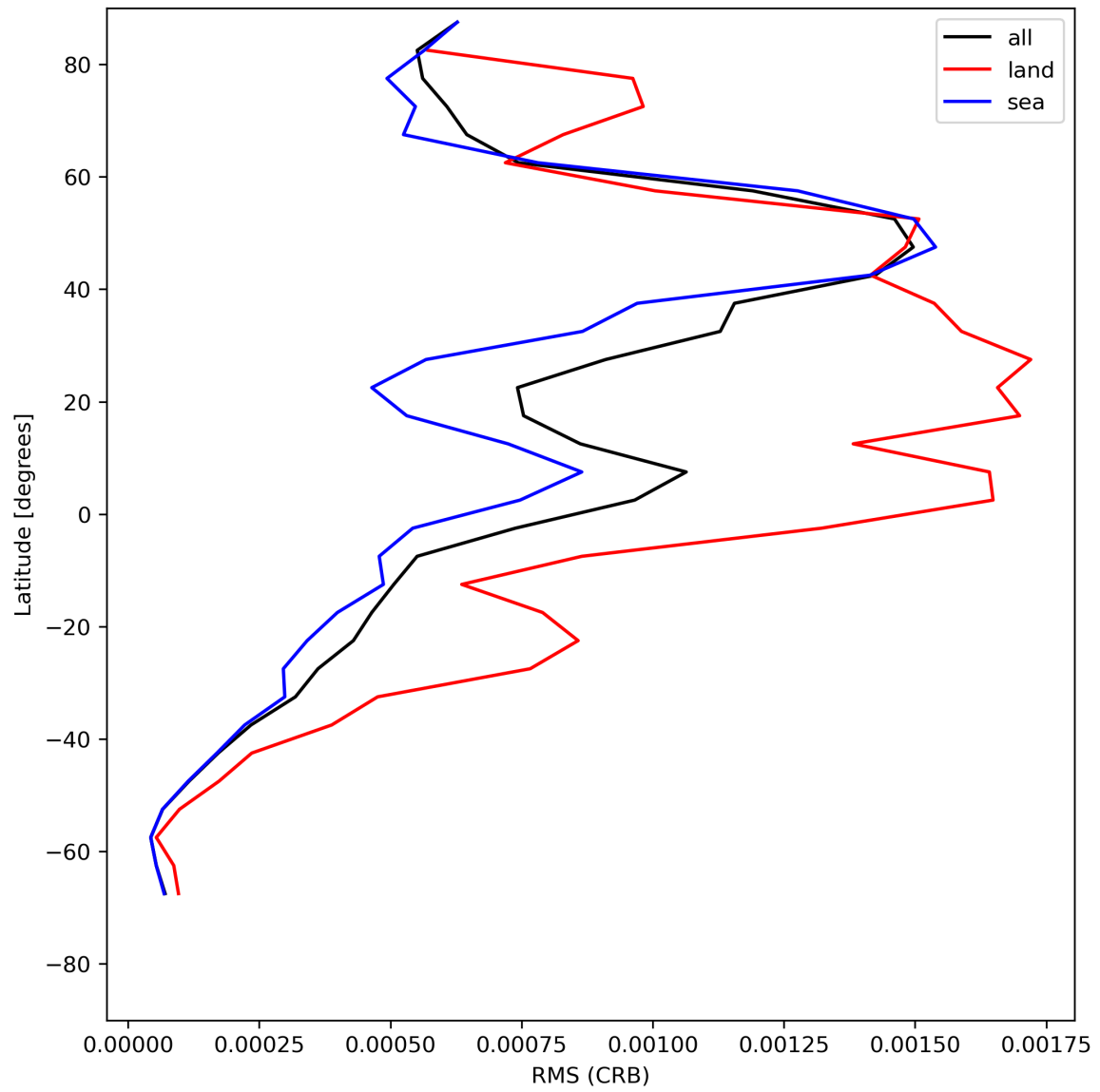


Figure 32: Zonal average of “RMS (CRB)” for 2023-07-03 to 2023-07-04.

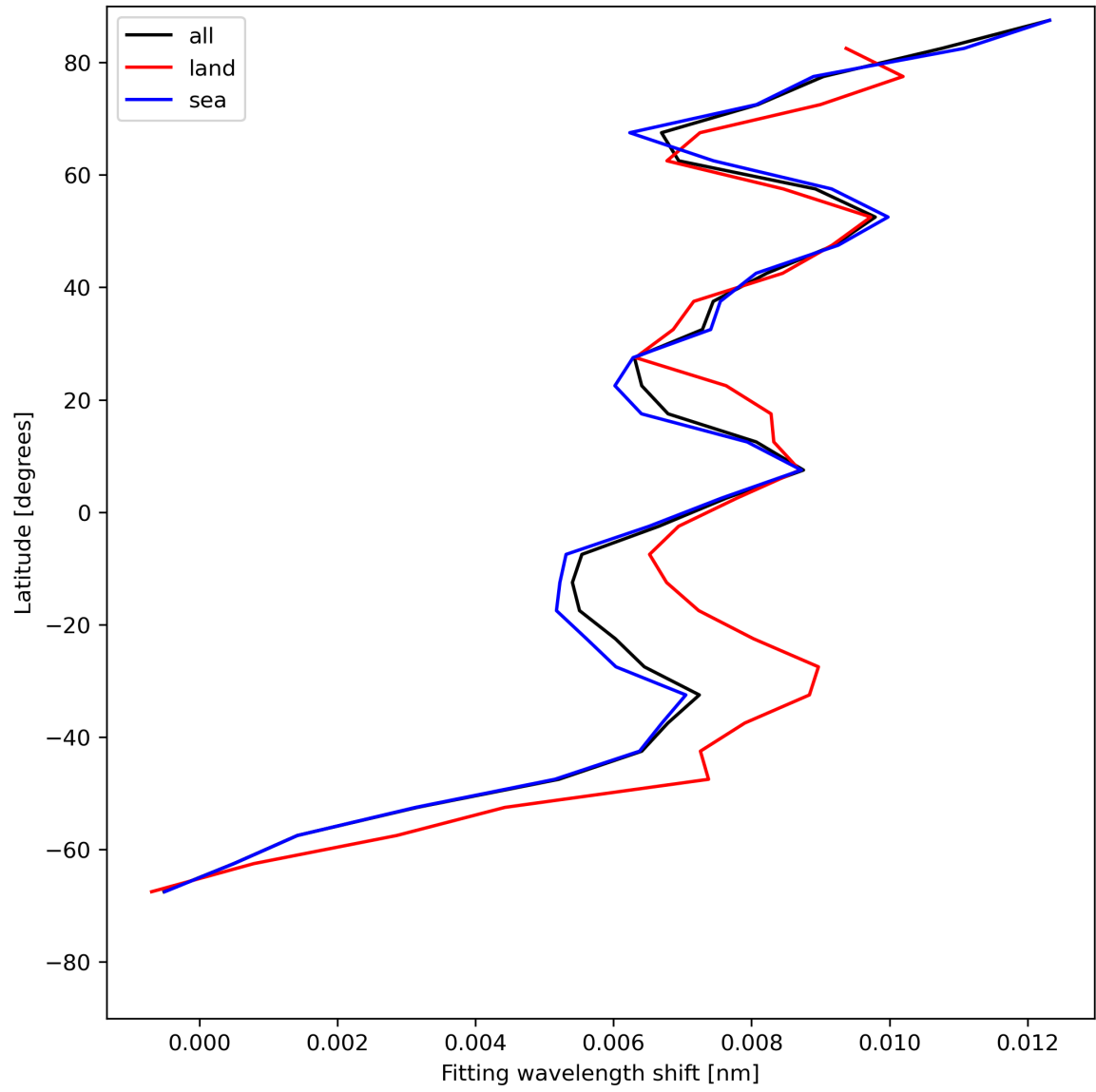


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-07-03 to 2023-07-04.

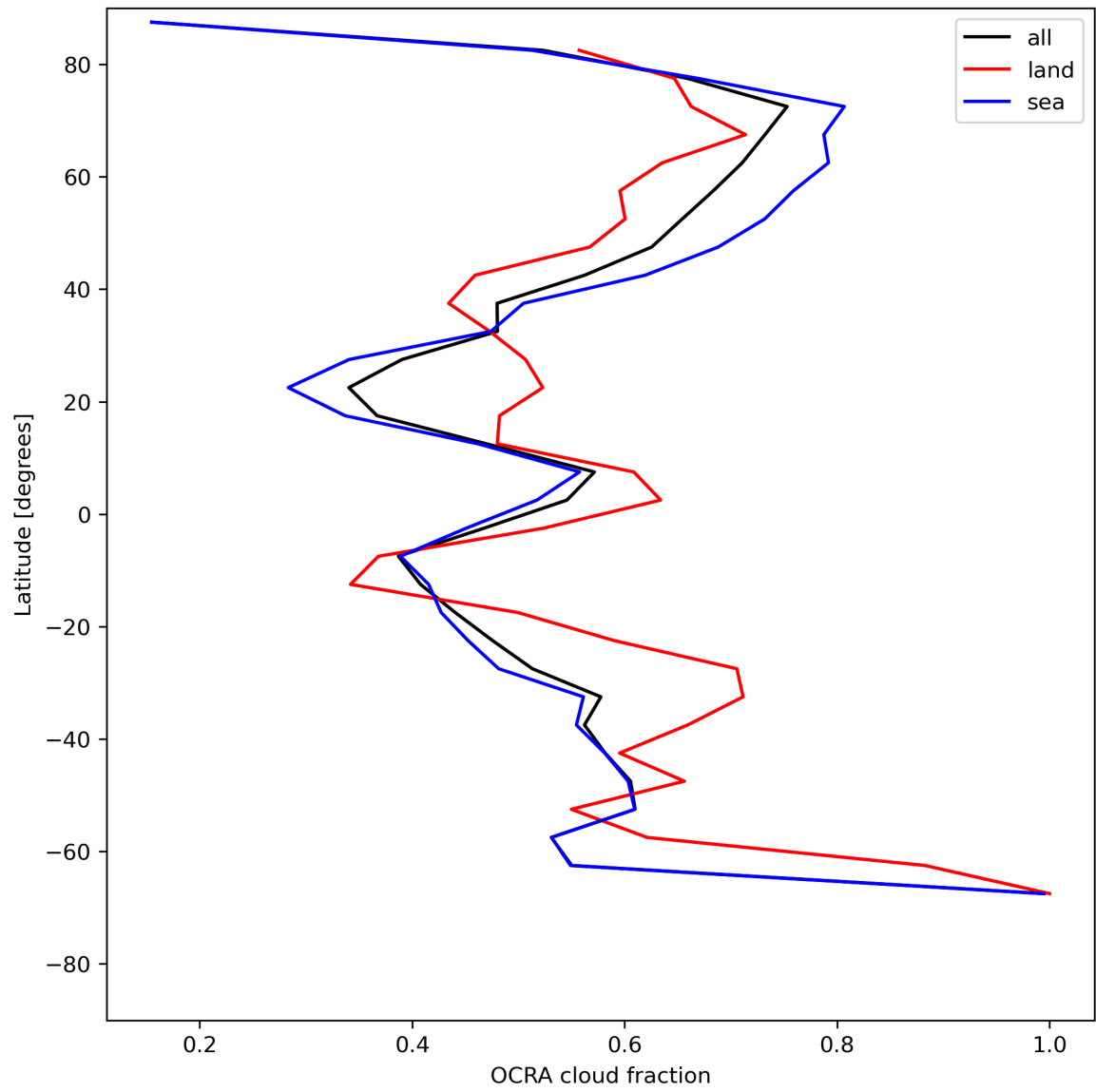


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-07-03 to 2023-07-04.

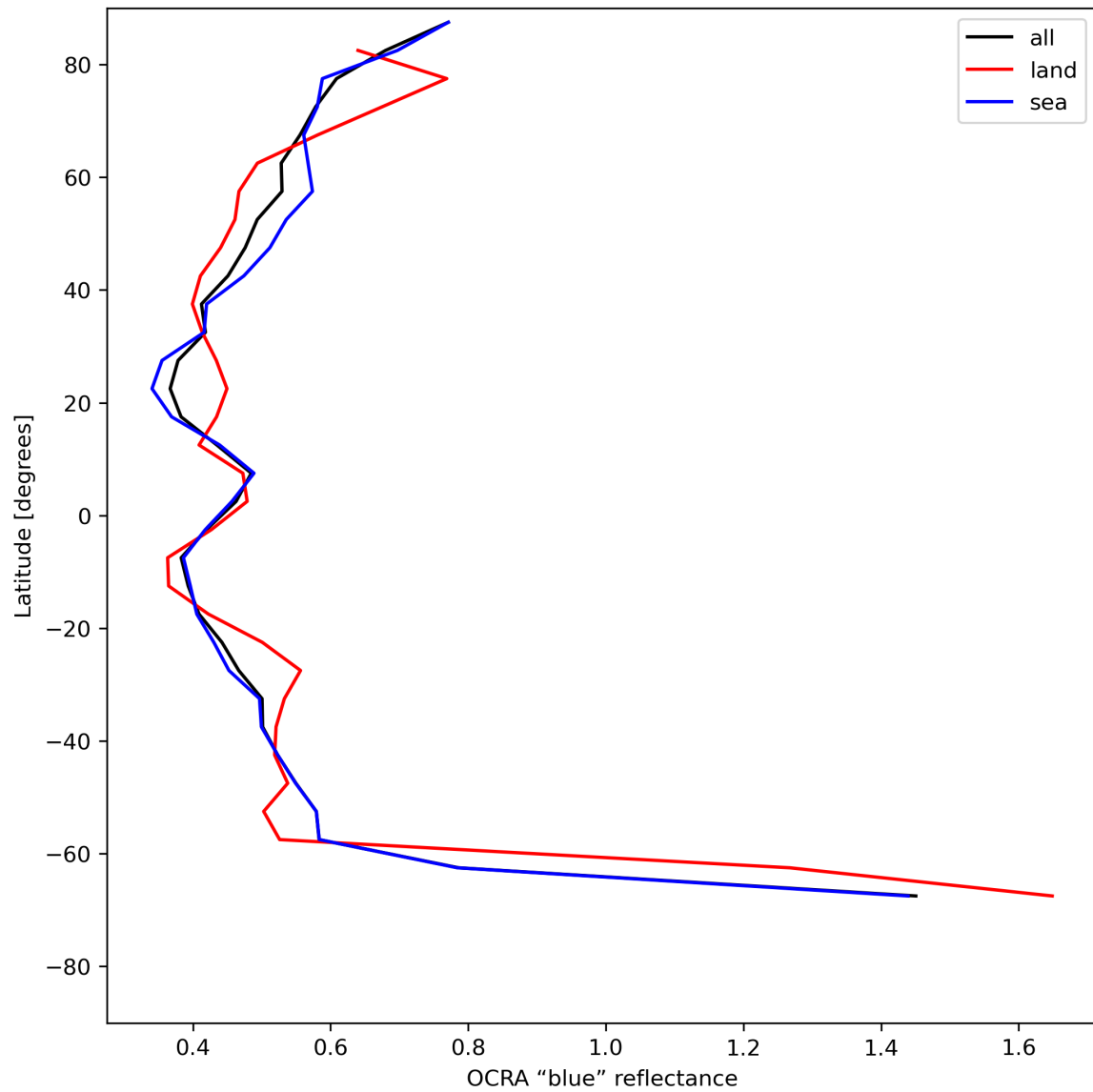


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-07-03 to 2023-07-04.

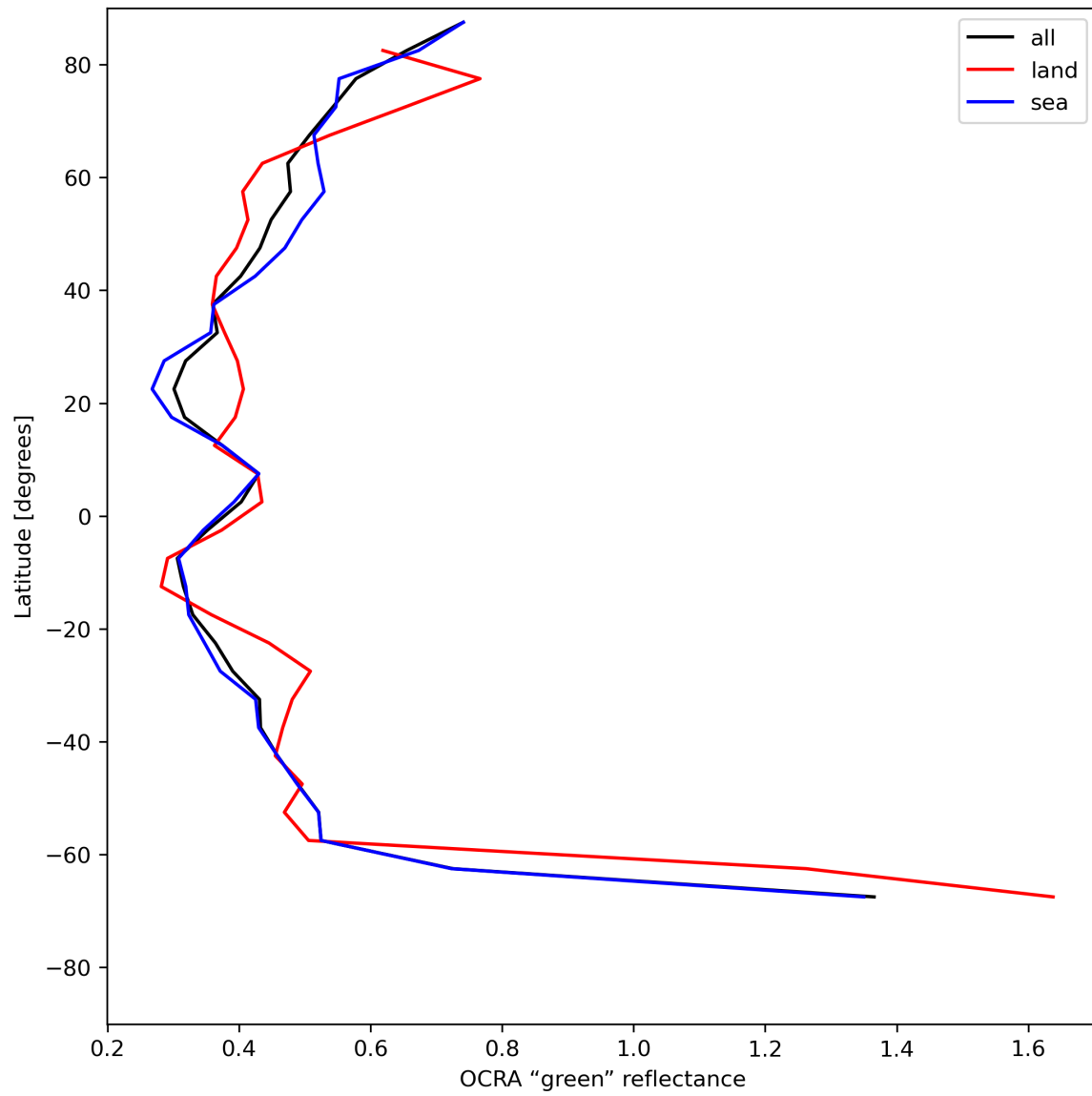


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-07-03 to 2023-07-04.

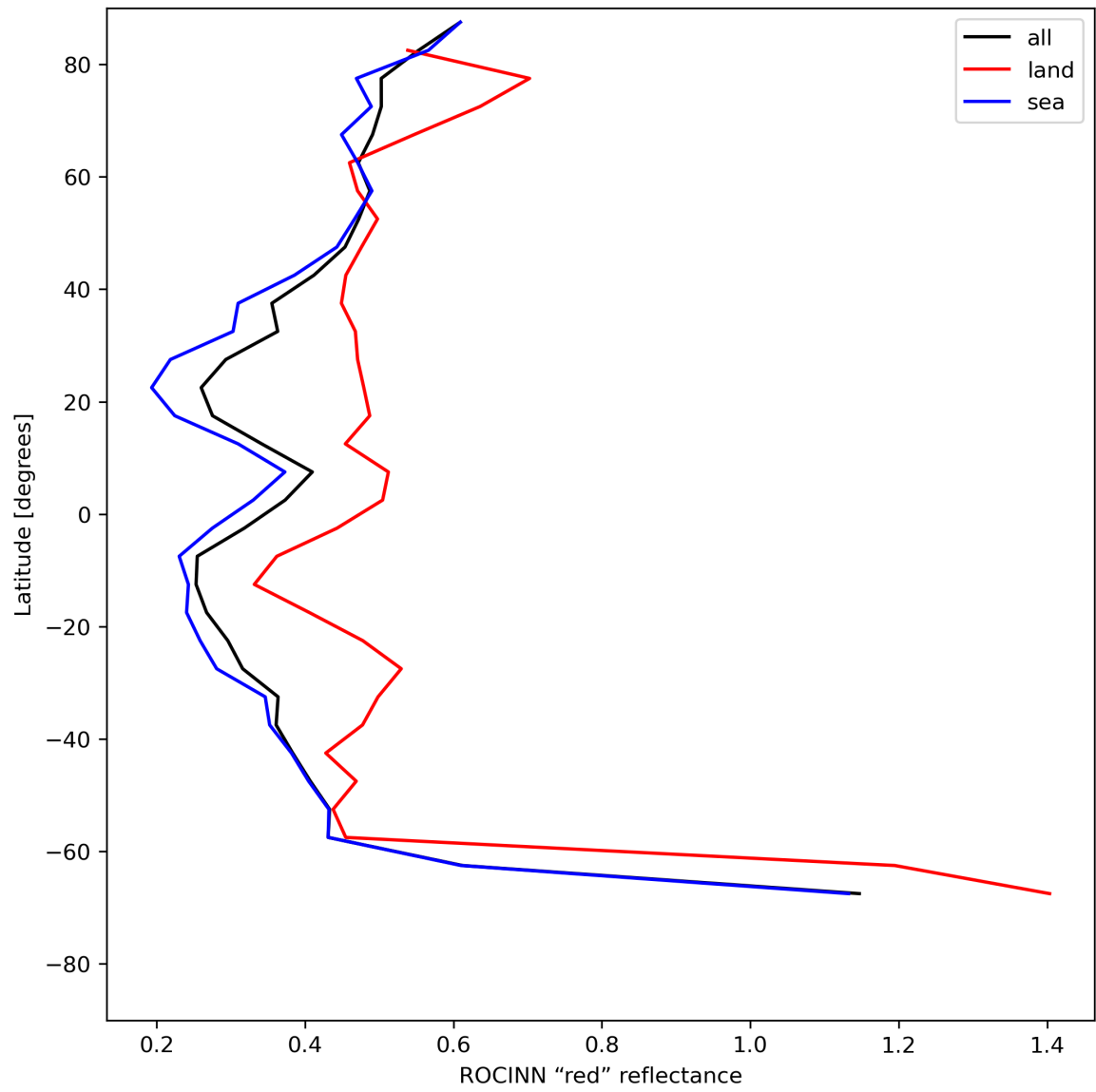


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-07-03 to 2023-07-04.

8 Histograms

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

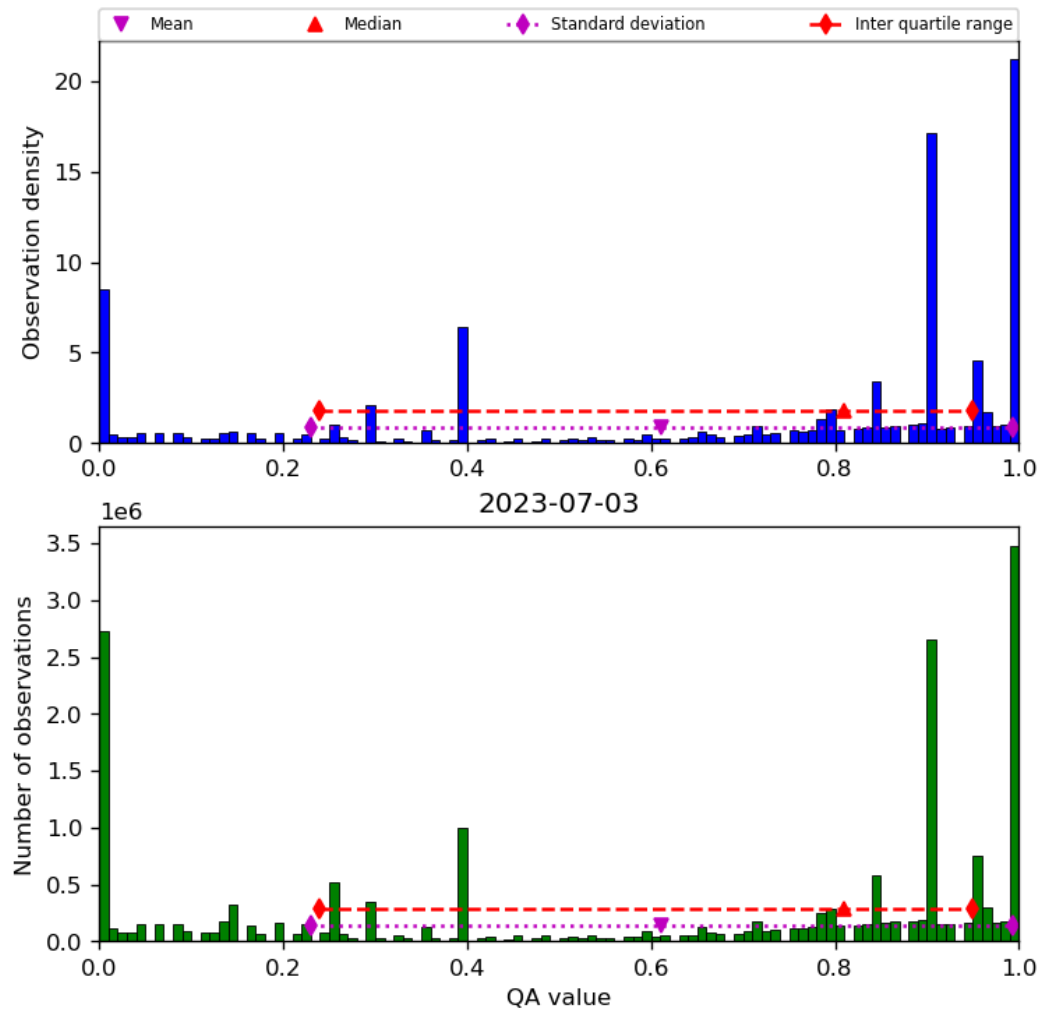


Figure 38: Histogram of “QA value” for 2023-07-03 to 2023-07-04

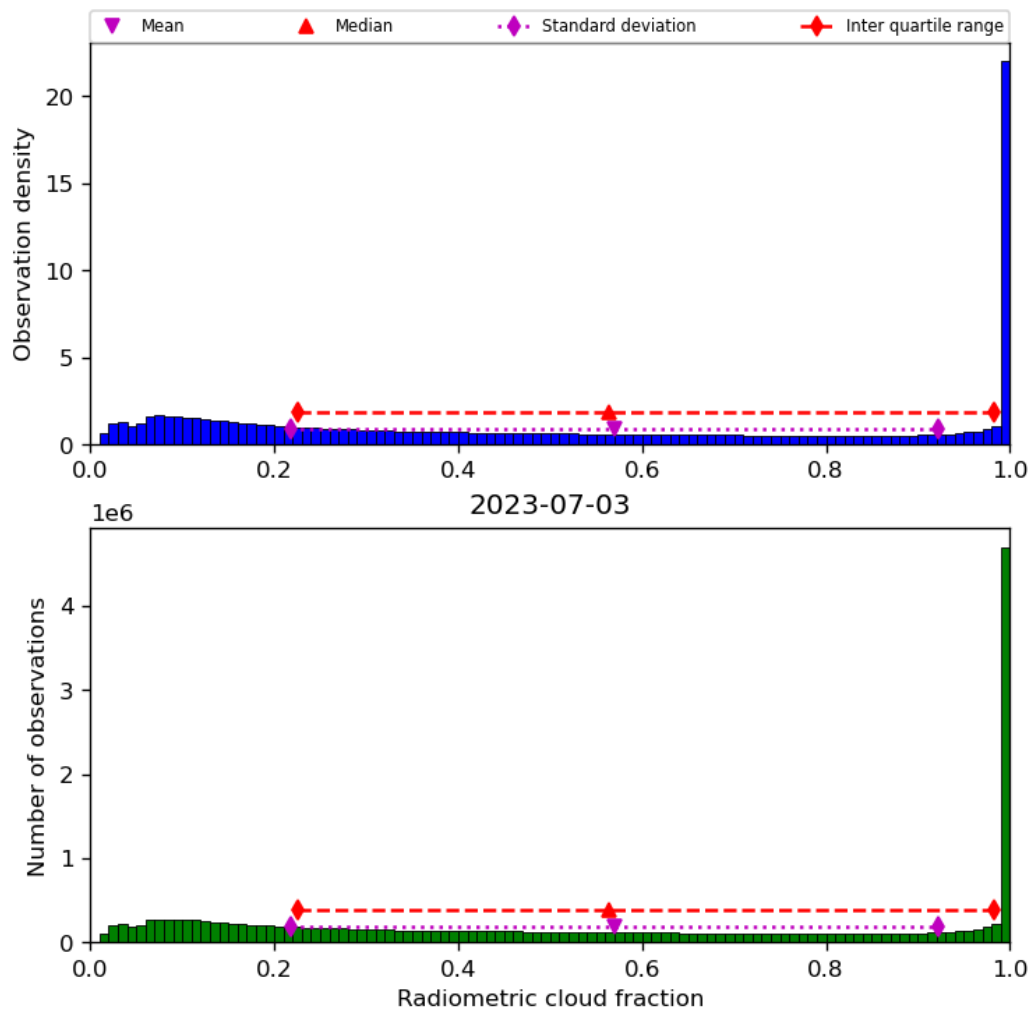


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-07-03 to 2023-07-04

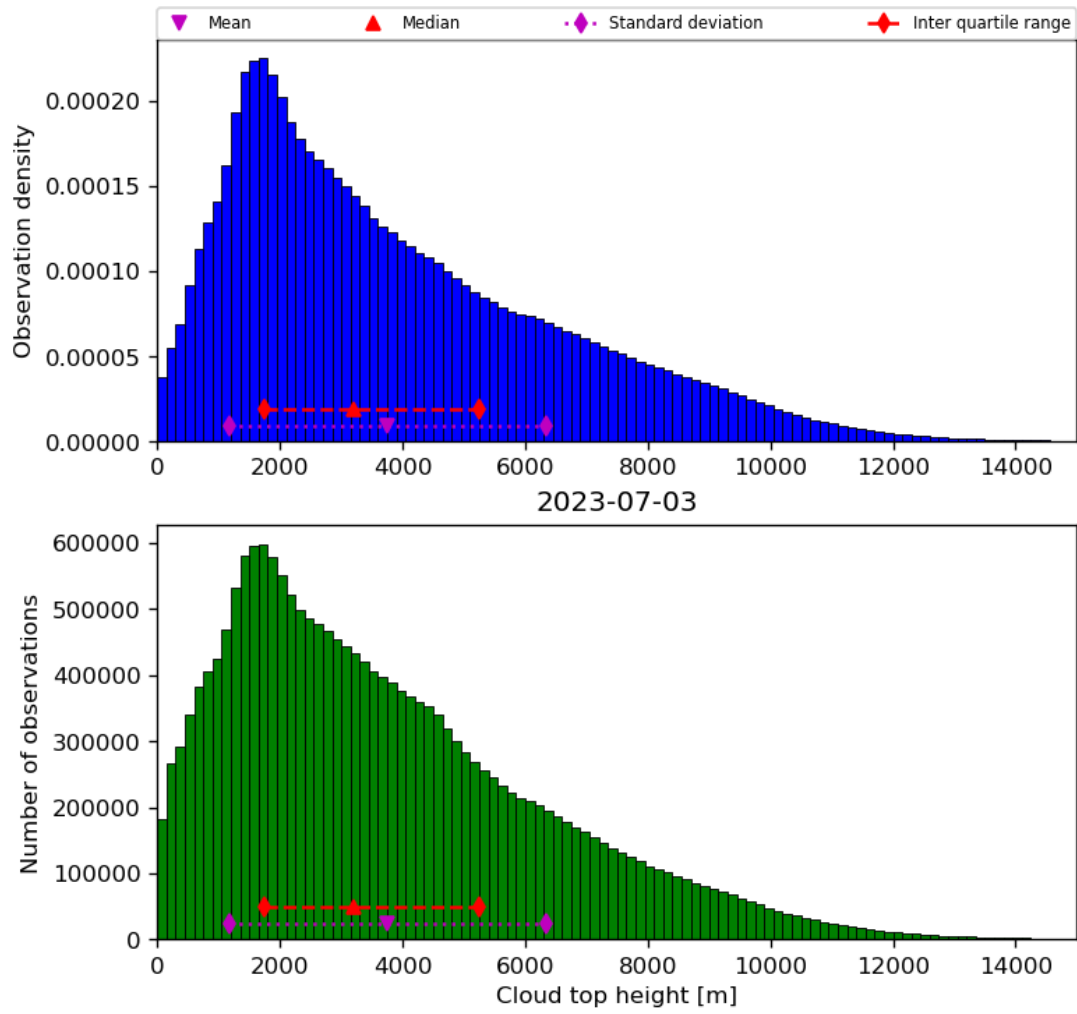


Figure 40: Histogram of “Cloud top height” for 2023-07-03 to 2023-07-04

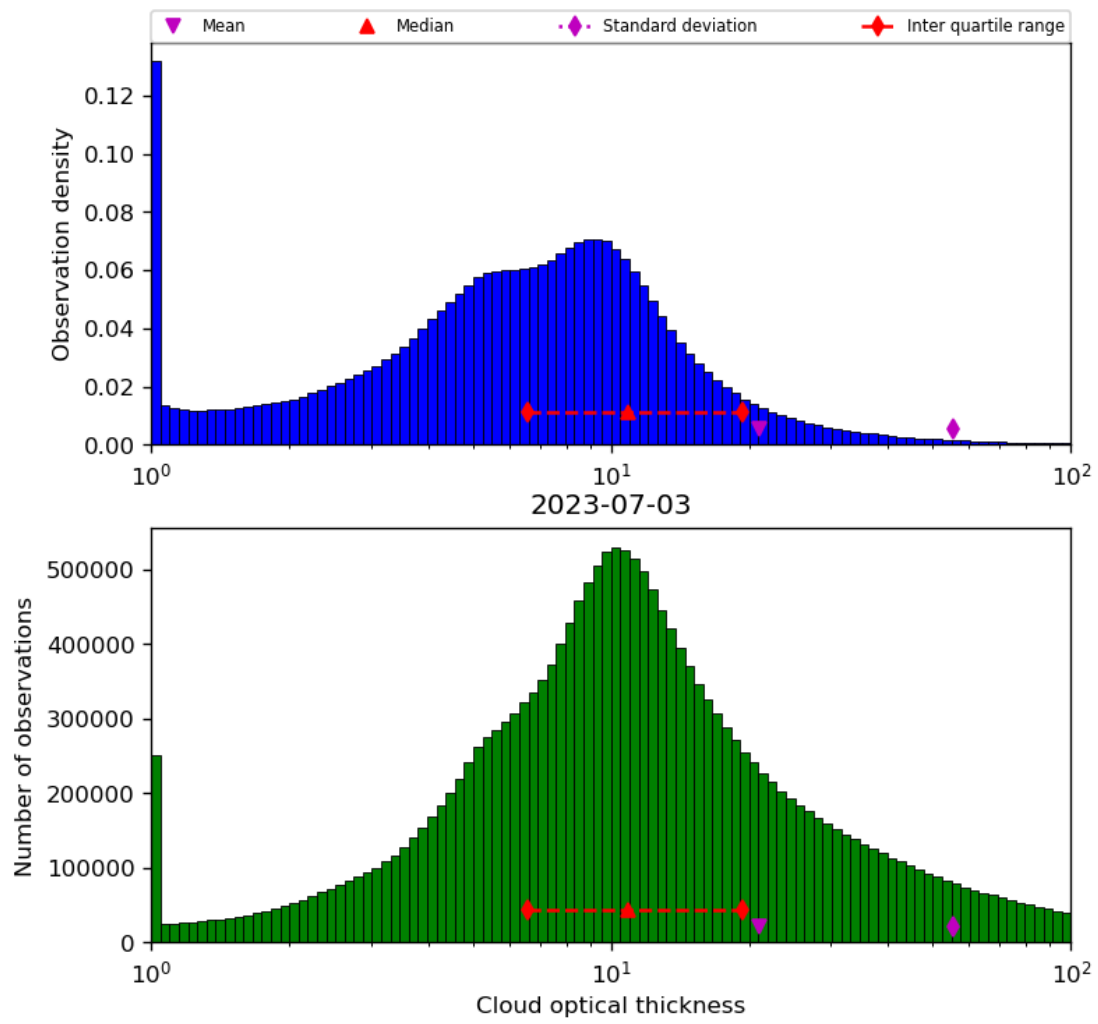


Figure 41: Histogram of “Cloud optical thickness” for 2023-07-03 to 2023-07-04

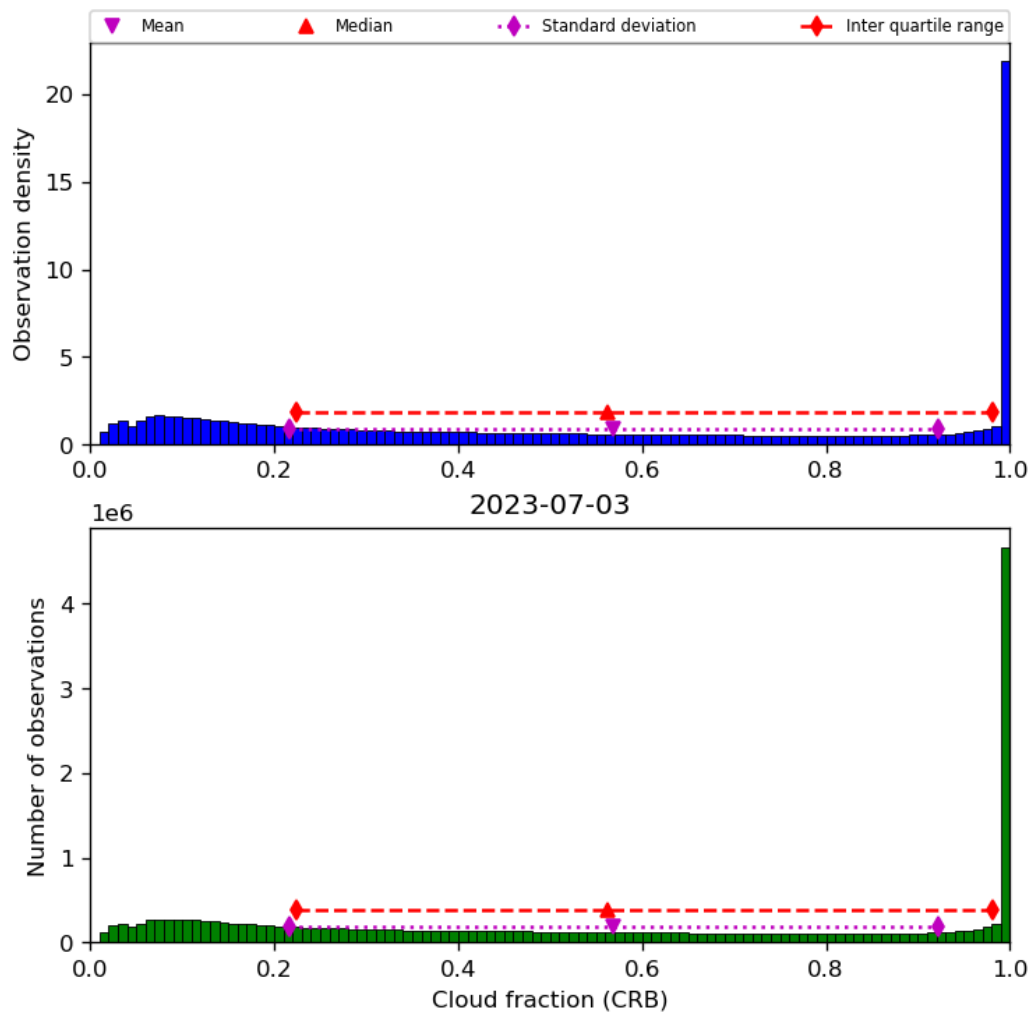


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-07-03 to 2023-07-04

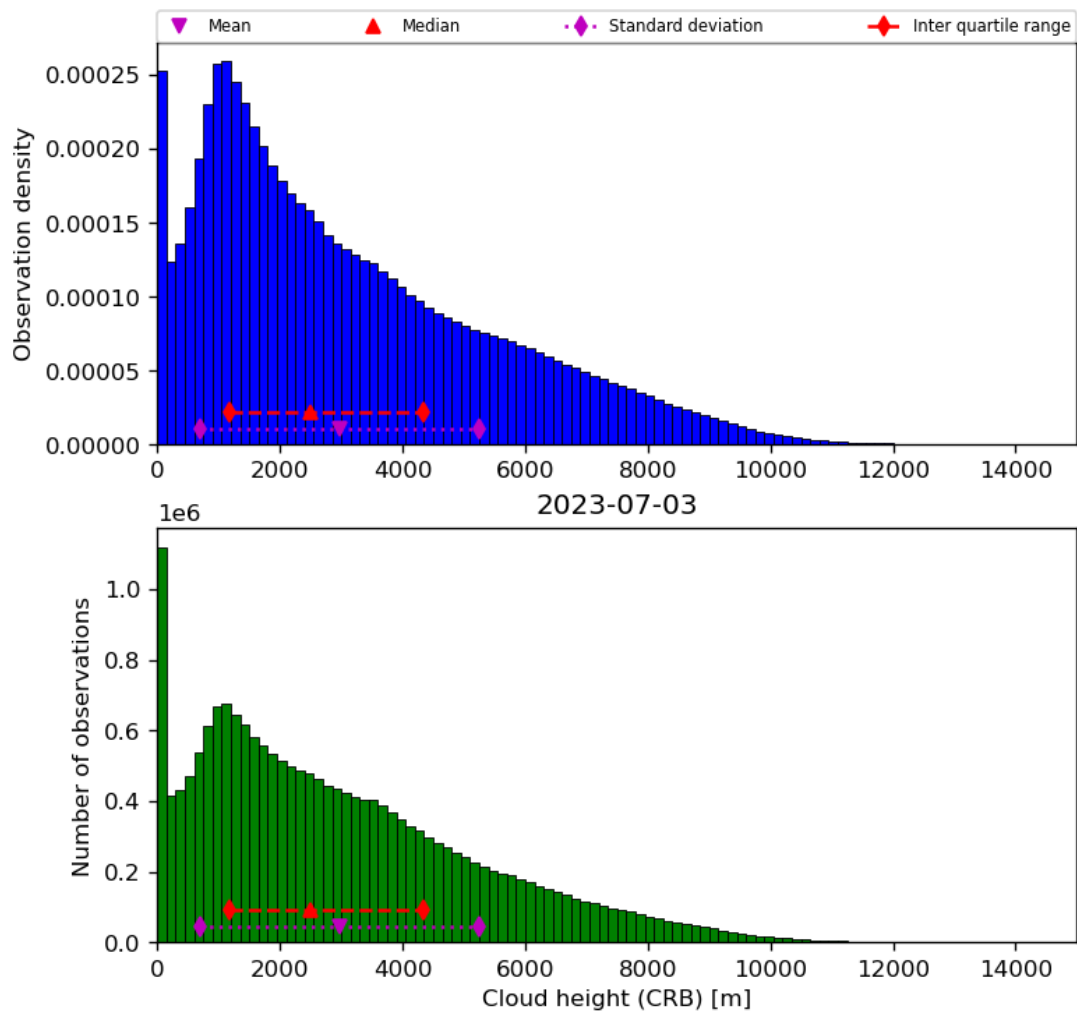


Figure 43: Histogram of “Cloud height (CRB)” for 2023-07-03 to 2023-07-04

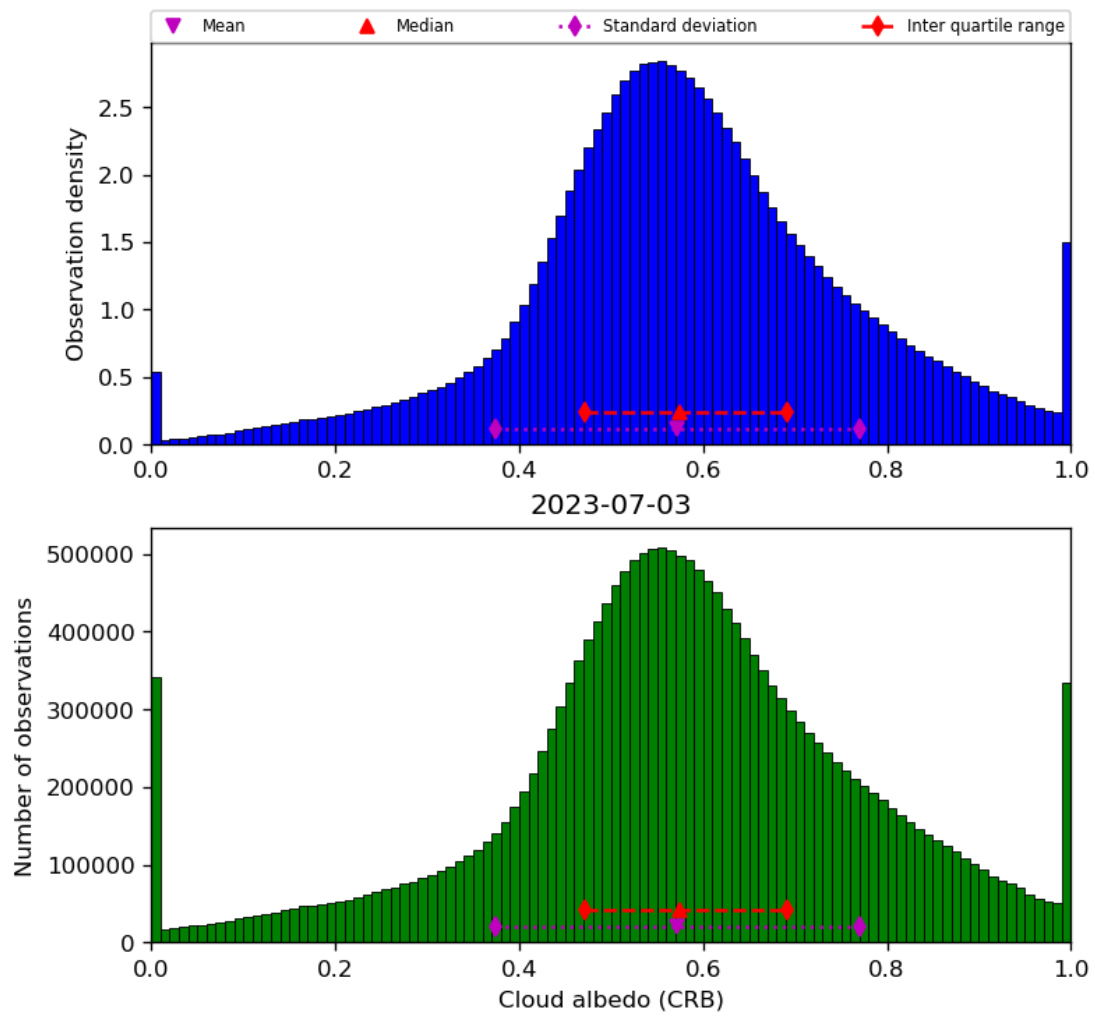


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-07-03 to 2023-07-04

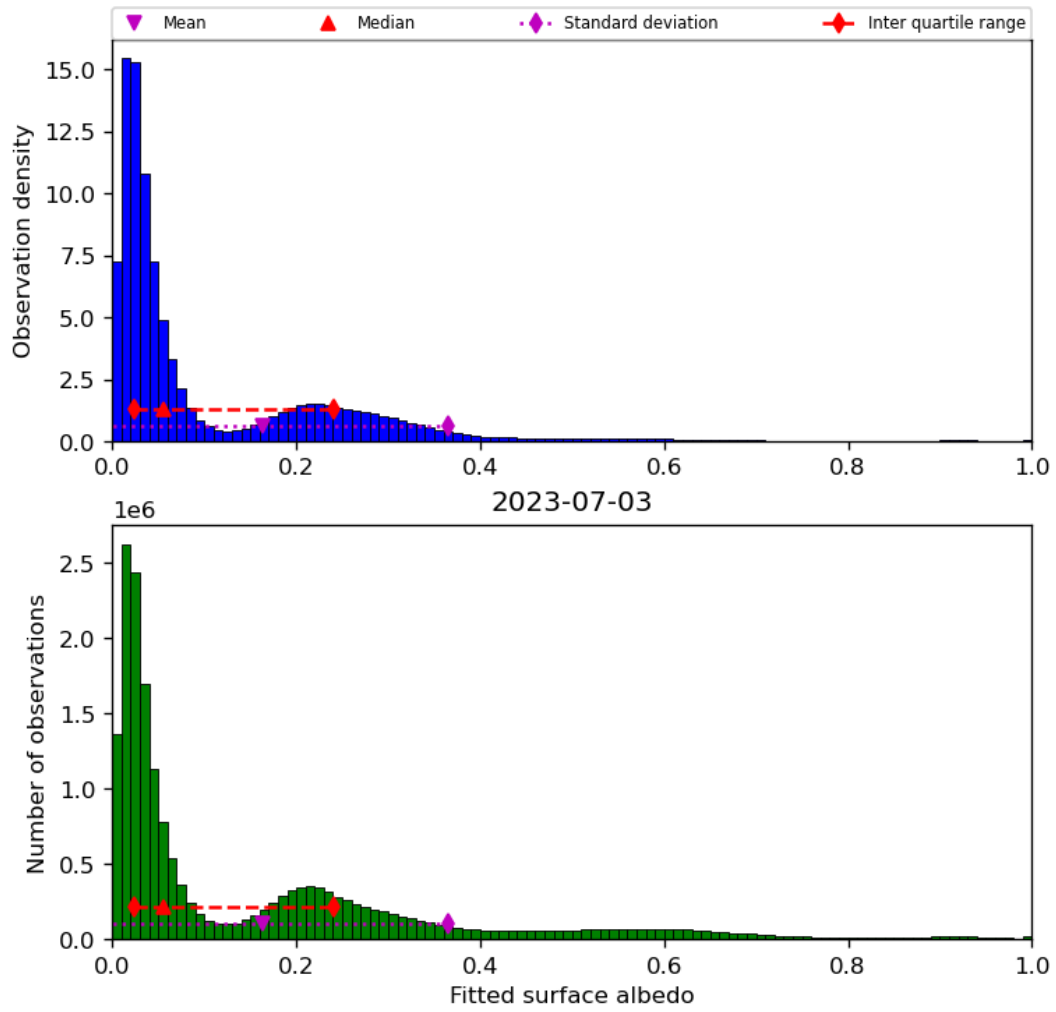


Figure 45: Histogram of “Fitted surface albedo” for 2023-07-03 to 2023-07-04

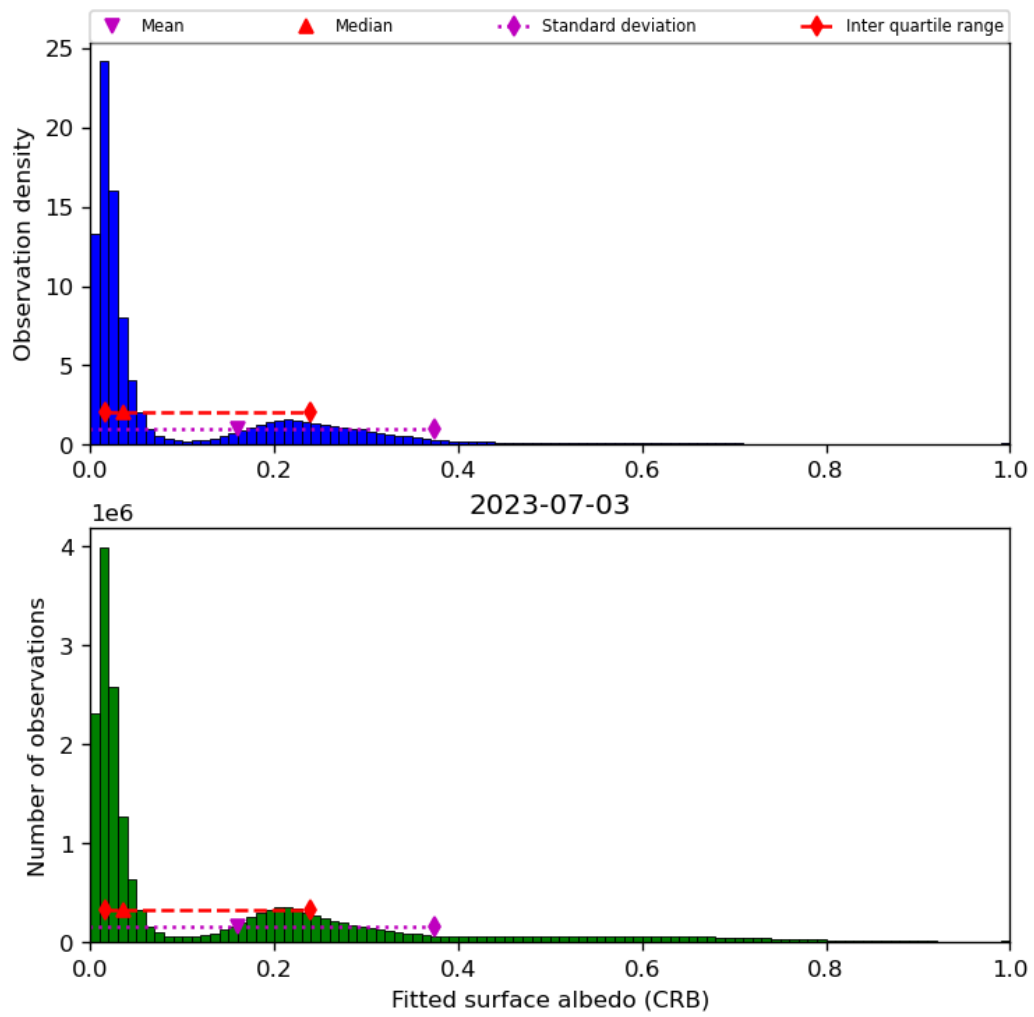


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-07-03 to 2023-07-04

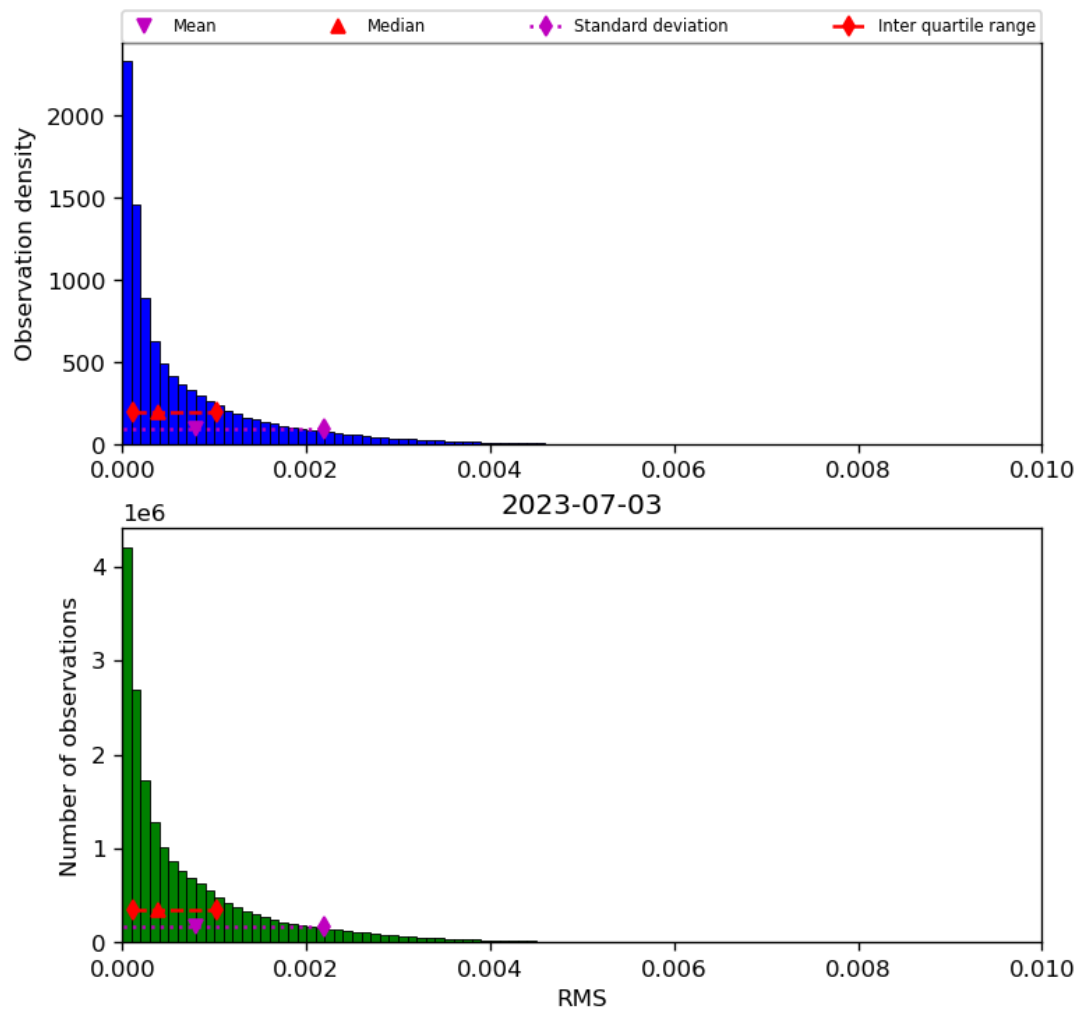


Figure 47: Histogram of “RMS” for 2023-07-03 to 2023-07-04

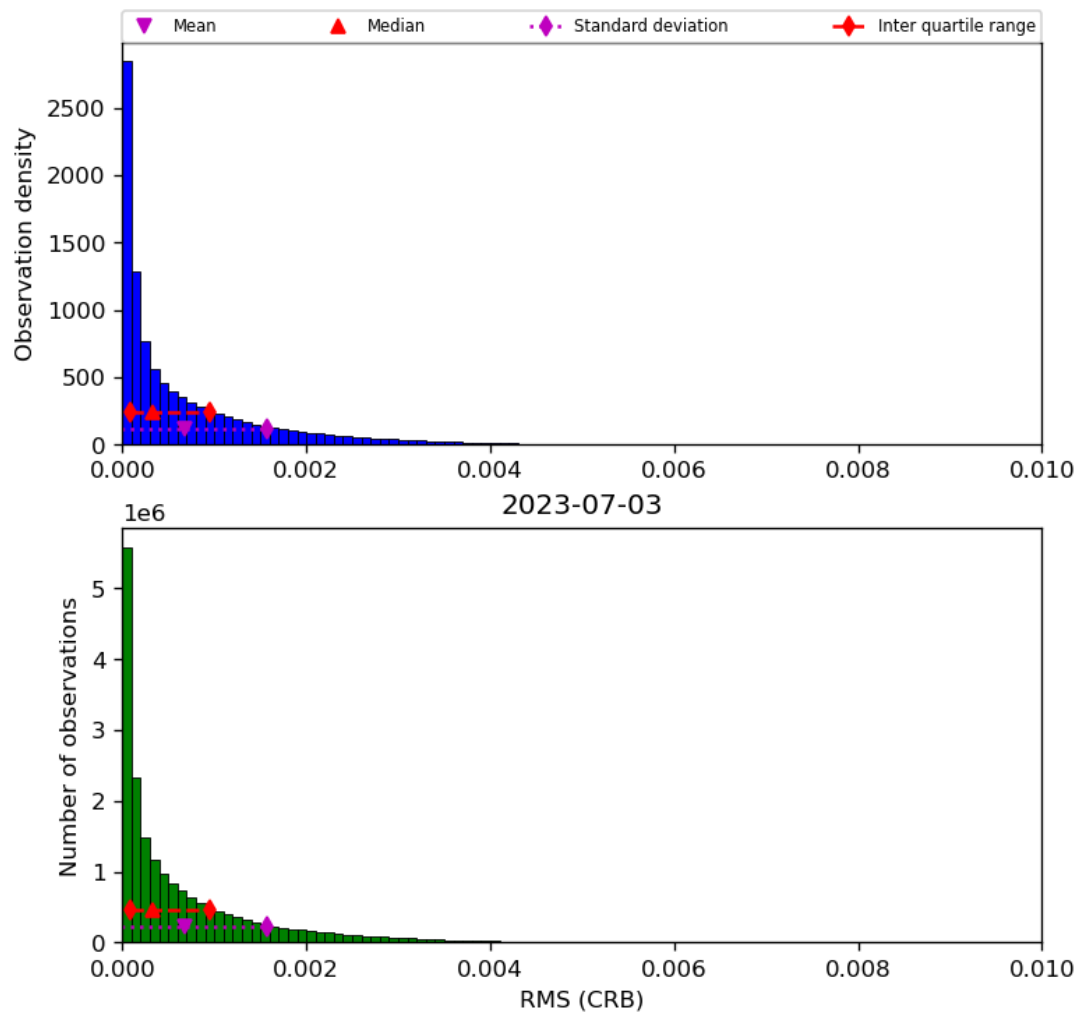


Figure 48: Histogram of “RMS (CRB)” for 2023-07-03 to 2023-07-04

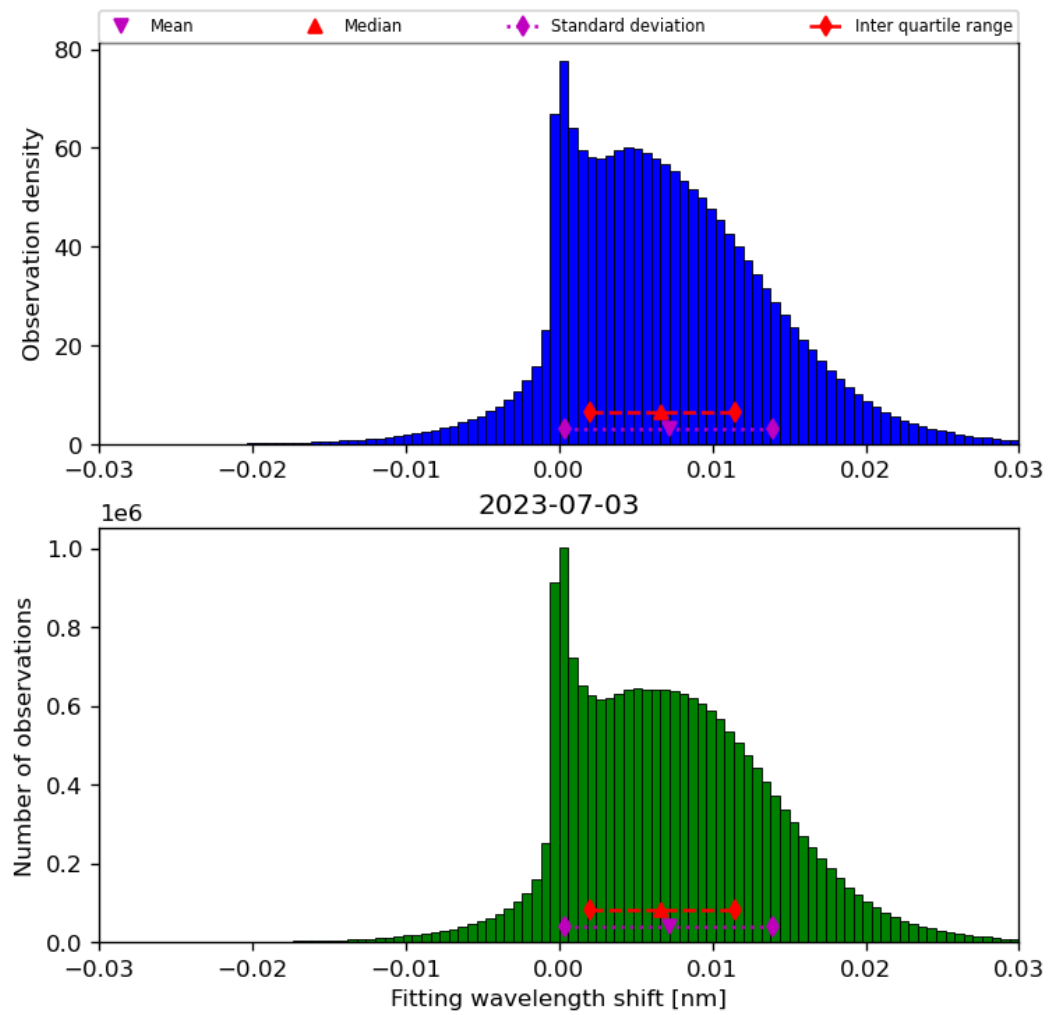


Figure 49: Histogram of “Fitting wavelength shift” for 2023-07-03 to 2023-07-04

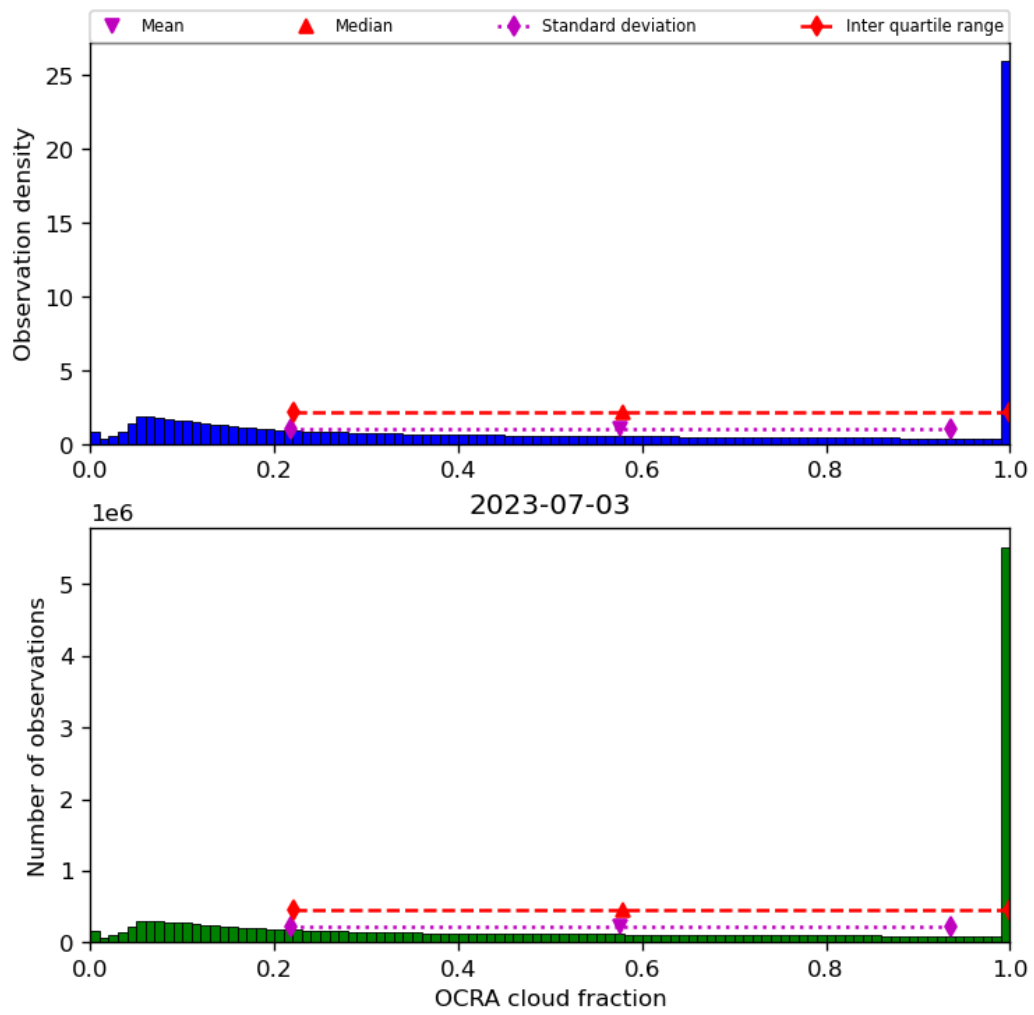


Figure 50: Histogram of “OCRA cloud fraction” for 2023-07-03 to 2023-07-04

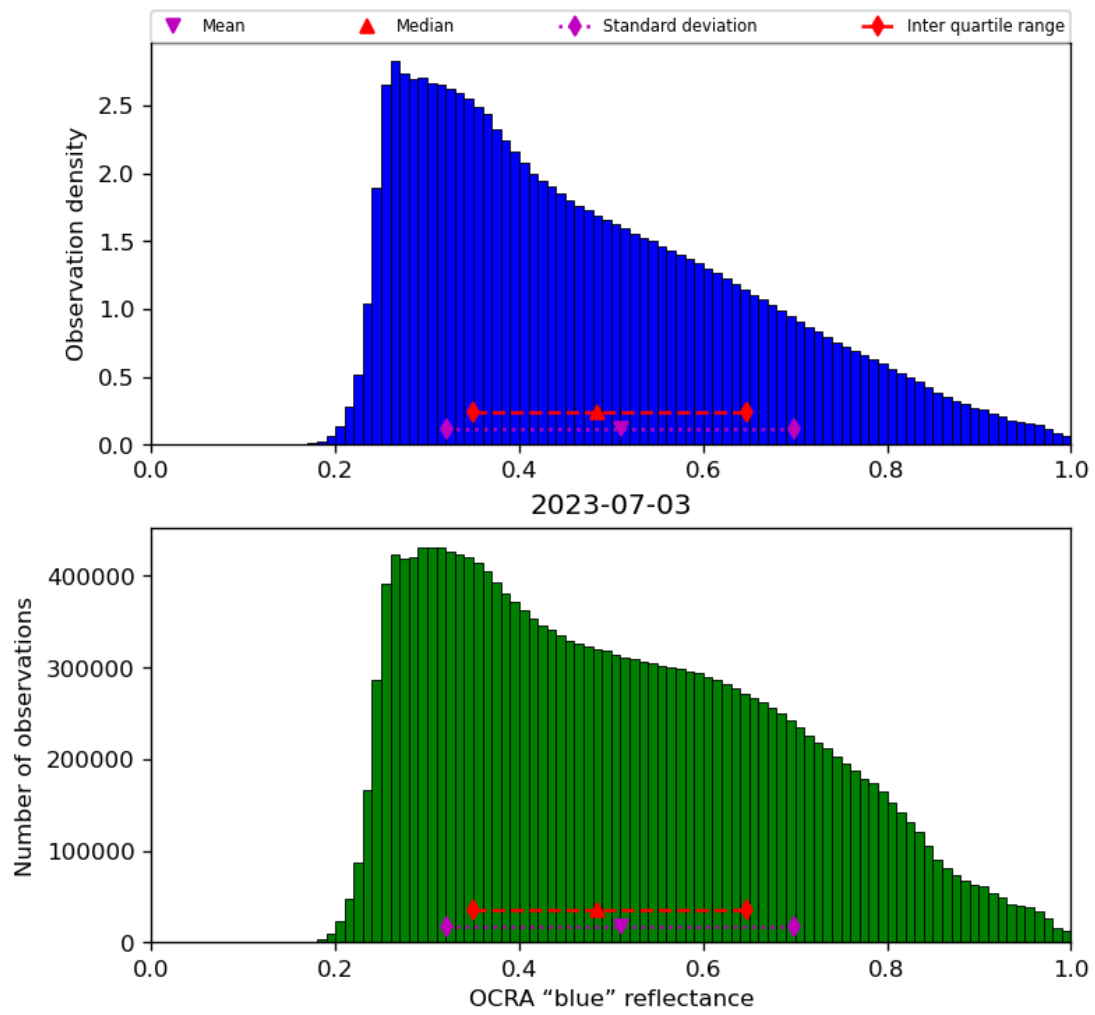


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-07-03 to 2023-07-04

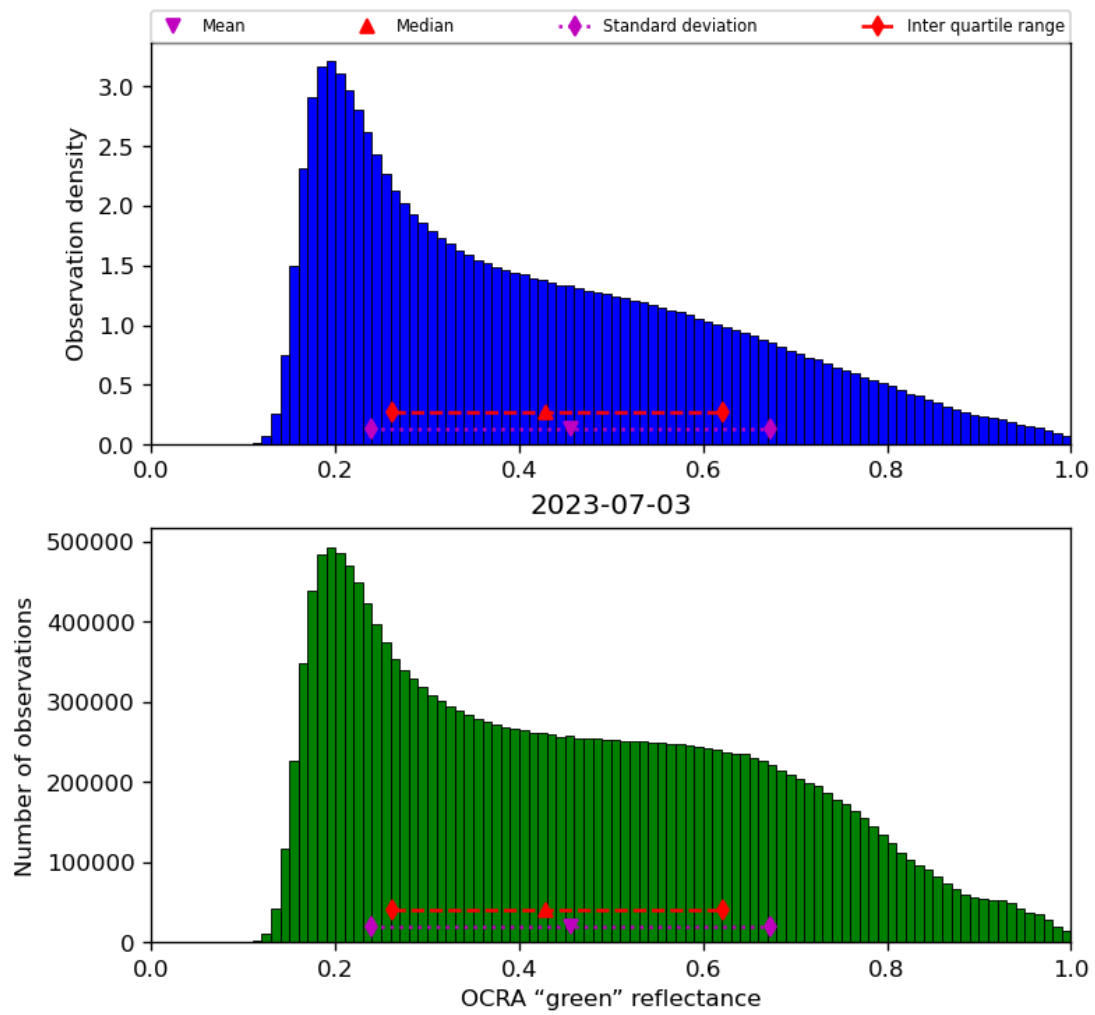


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-07-03 to 2023-07-04

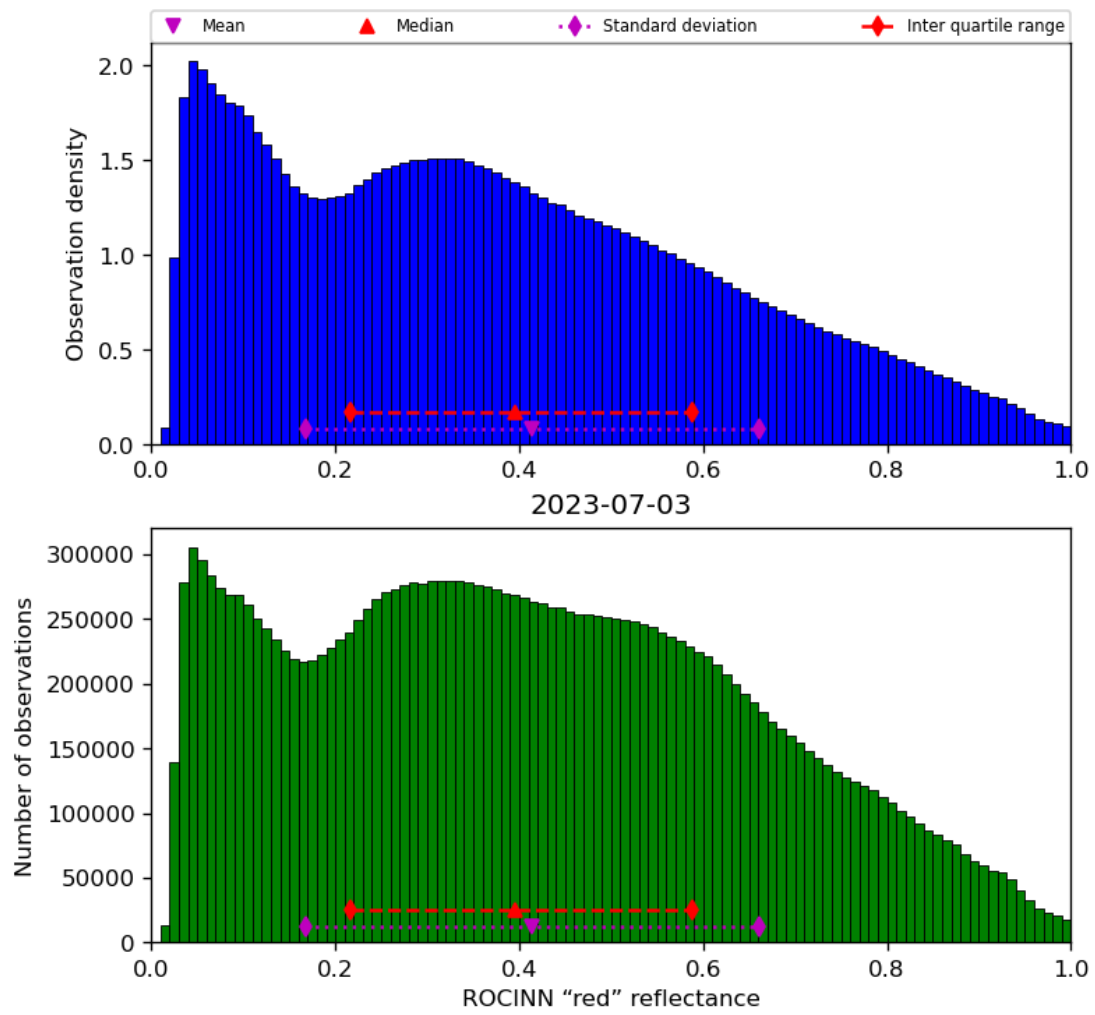


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-07-03 to 2023-07-04

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.

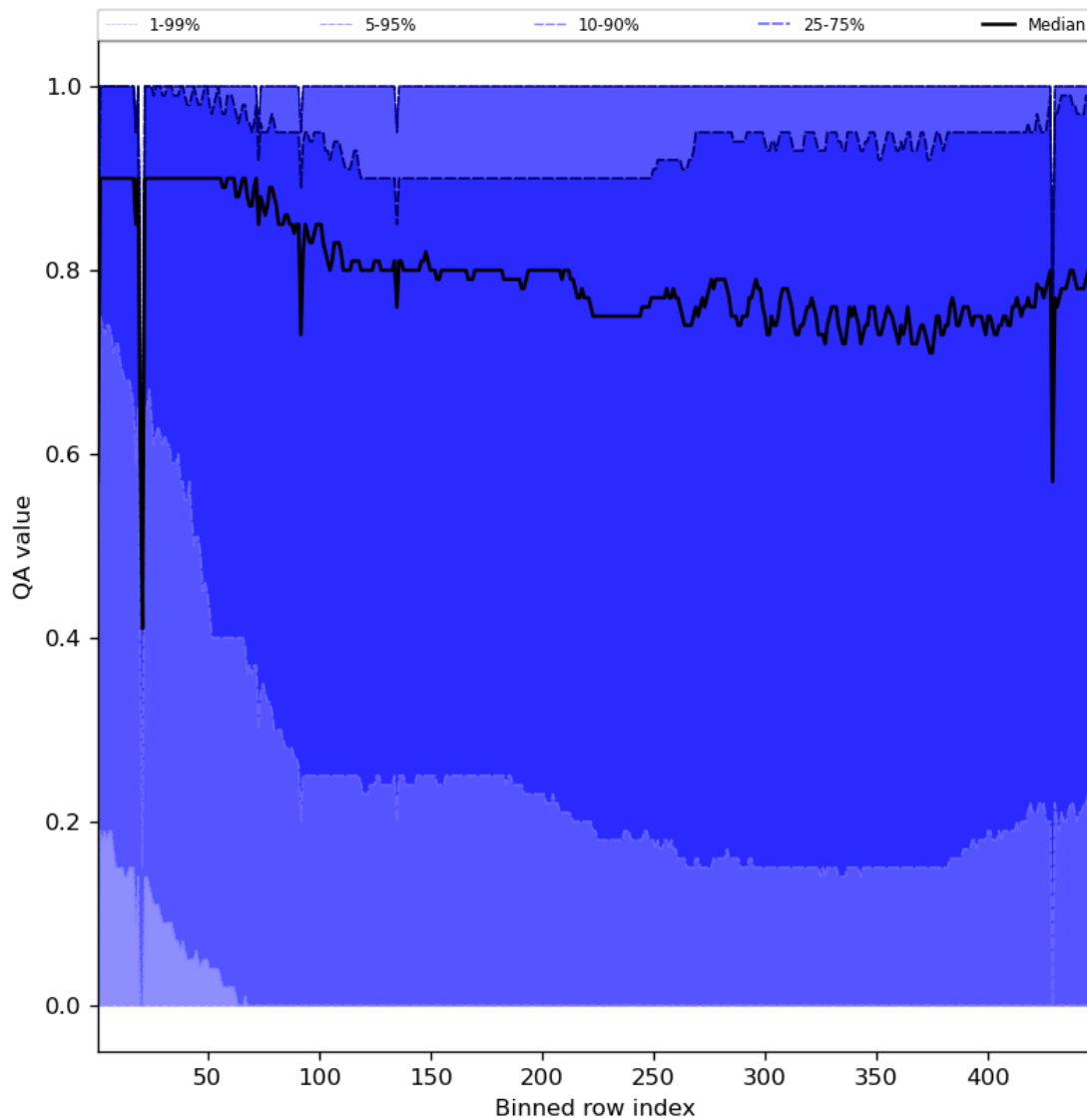


Figure 54: Along track statistics of “QA value” for 2023-07-03 to 2023-07-04

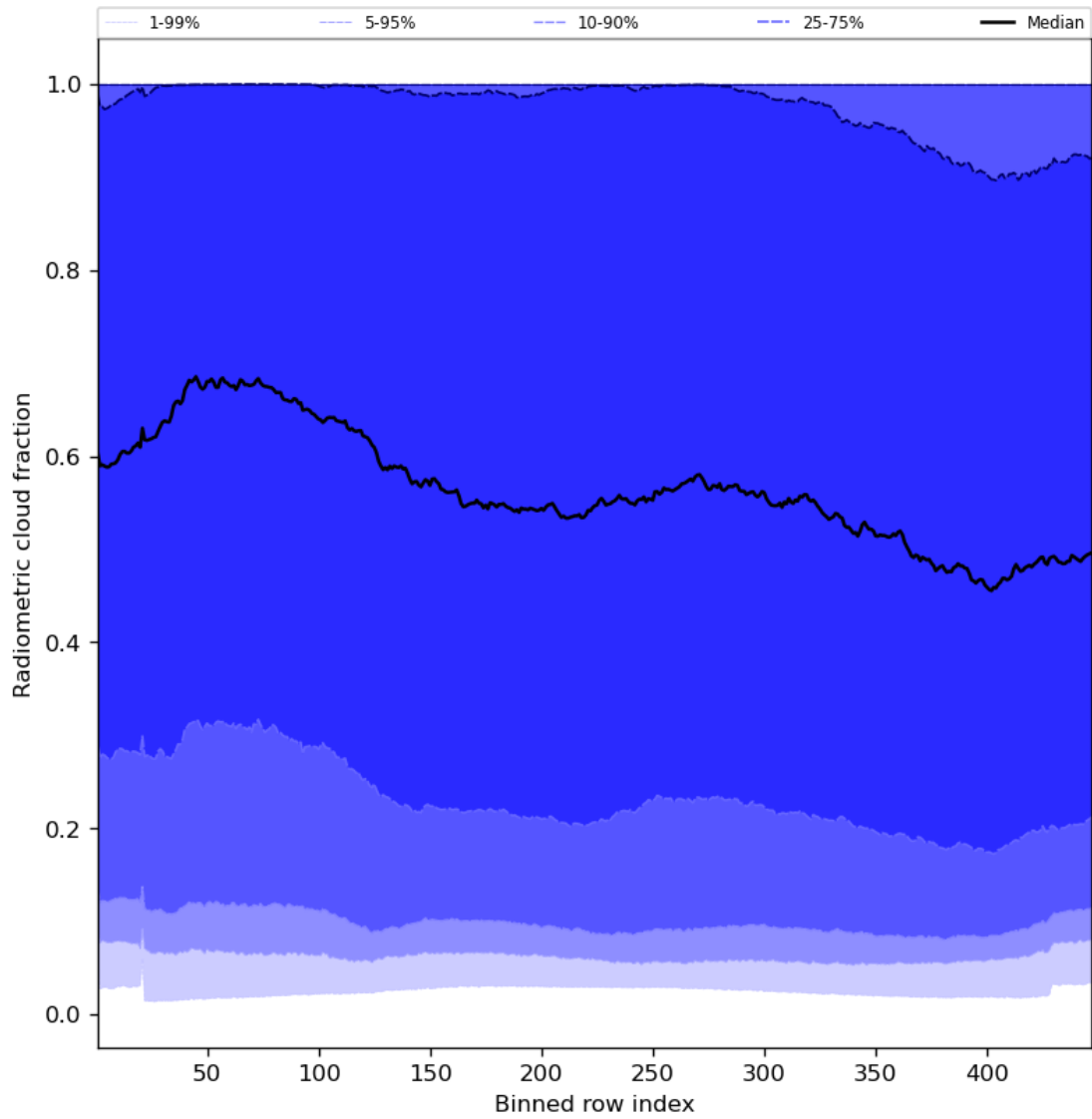


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-07-03 to 2023-07-04

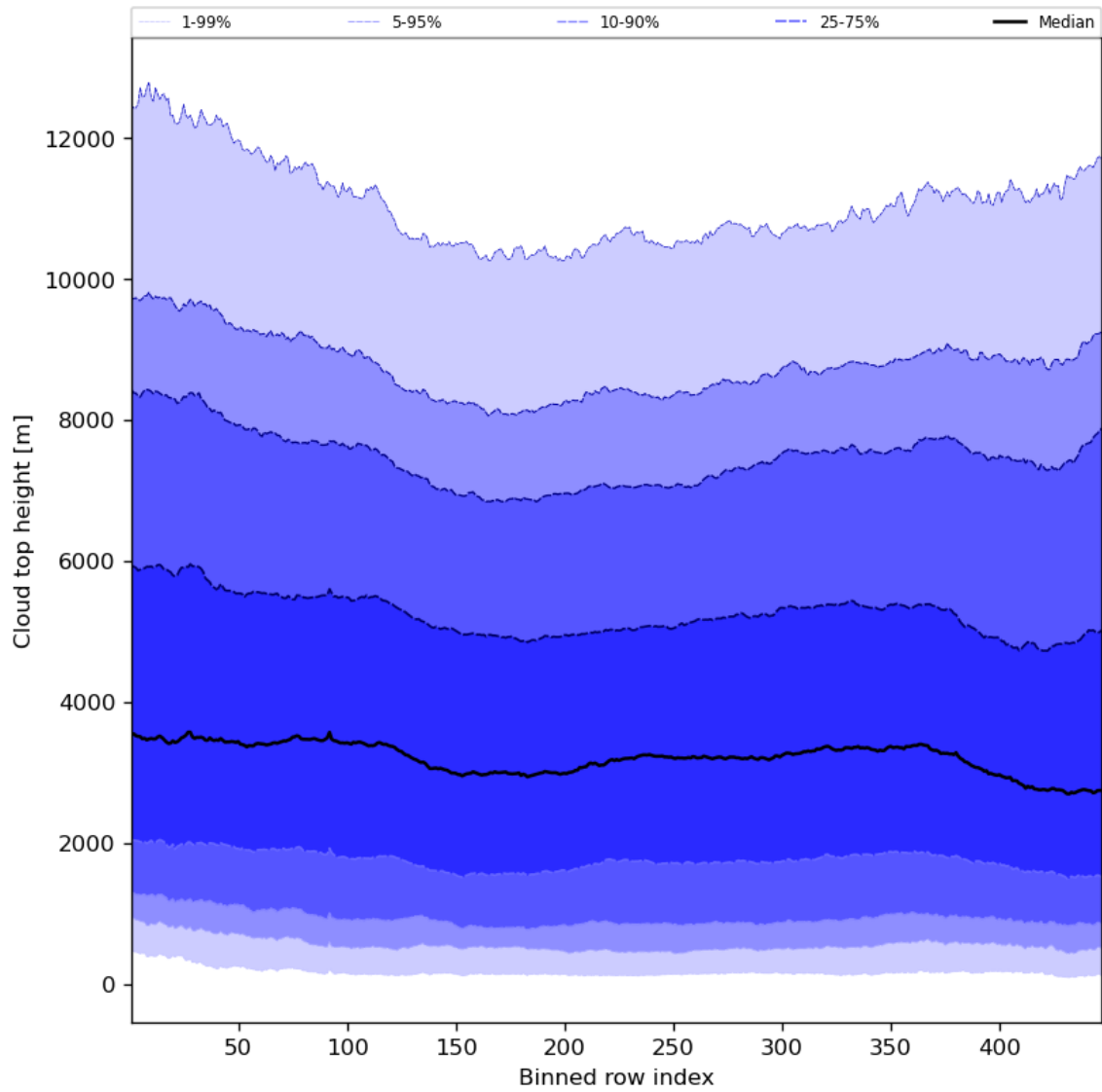


Figure 56: Along track statistics of “Cloud top height” for 2023-07-03 to 2023-07-04

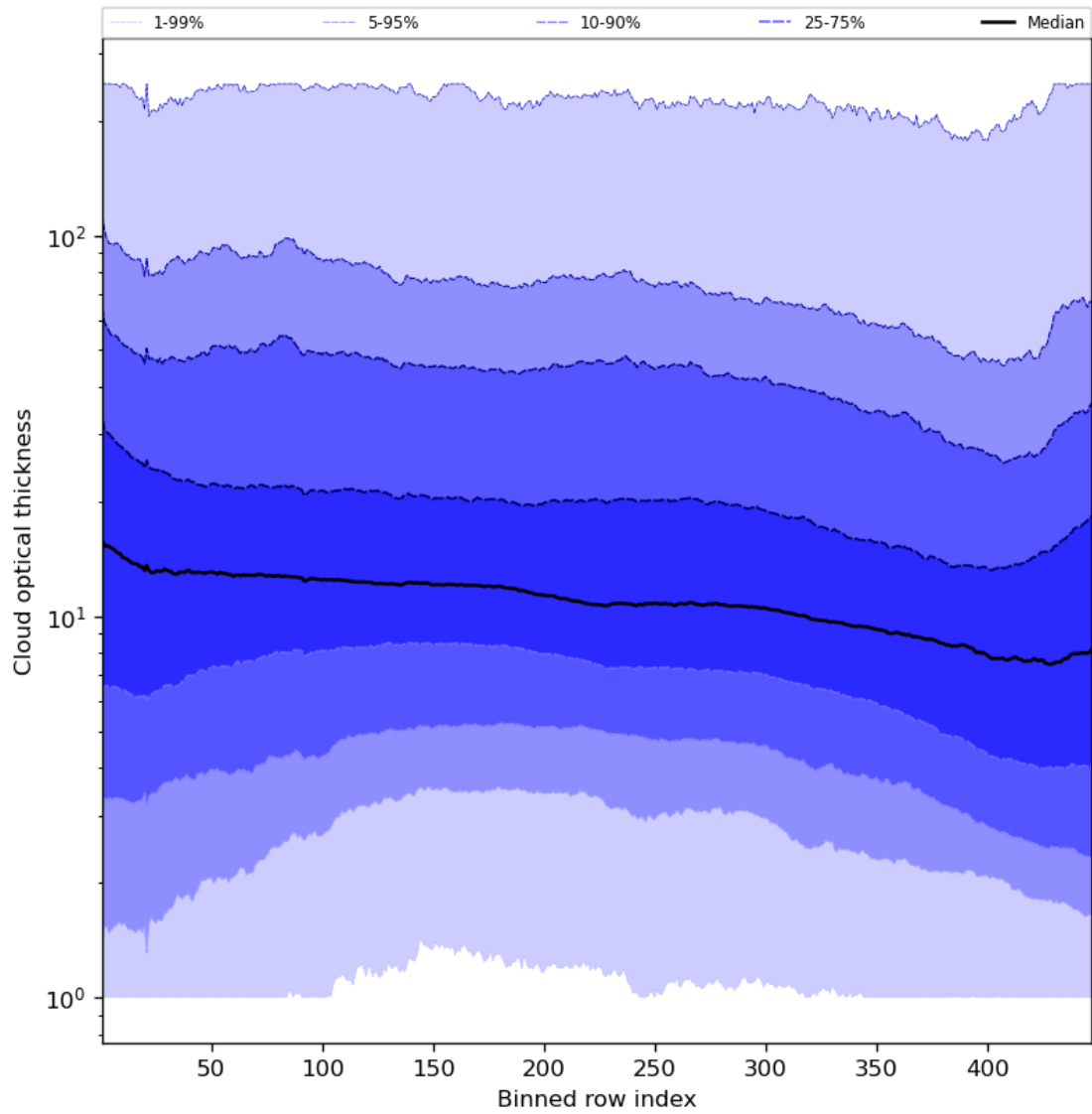


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-07-03 to 2023-07-04

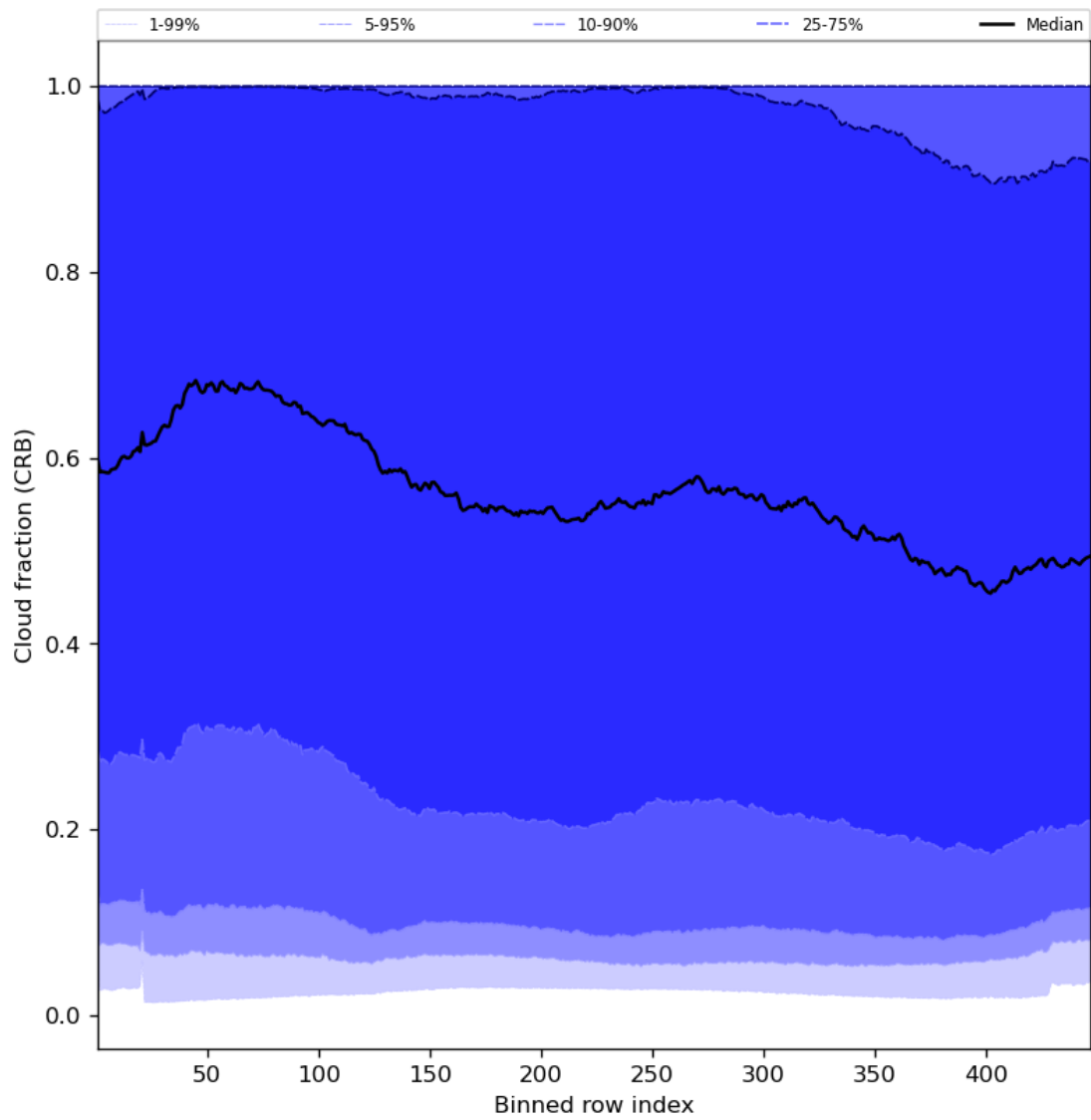


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-07-03 to 2023-07-04

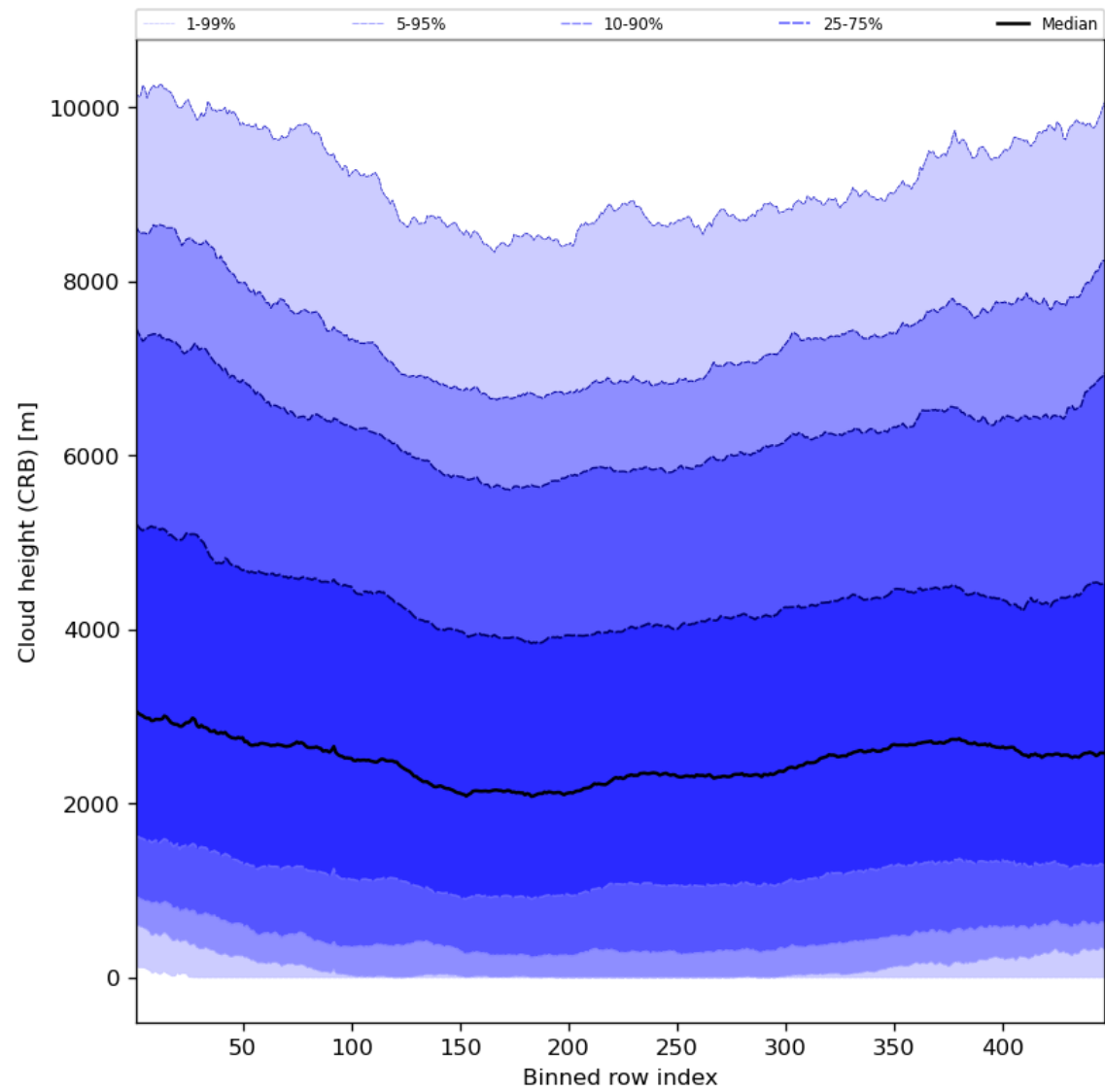


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-07-03 to 2023-07-04

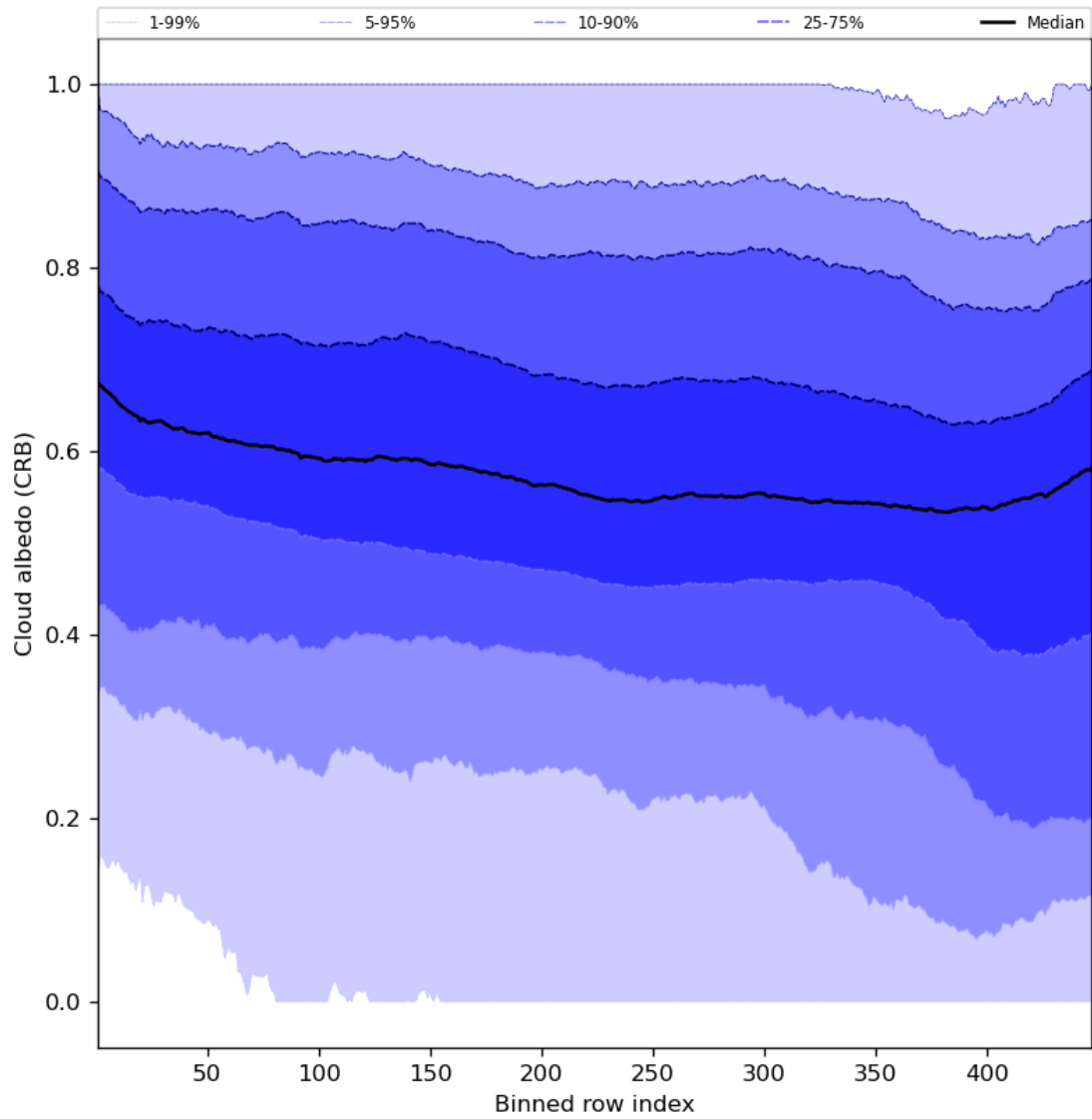


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-07-03 to 2023-07-04

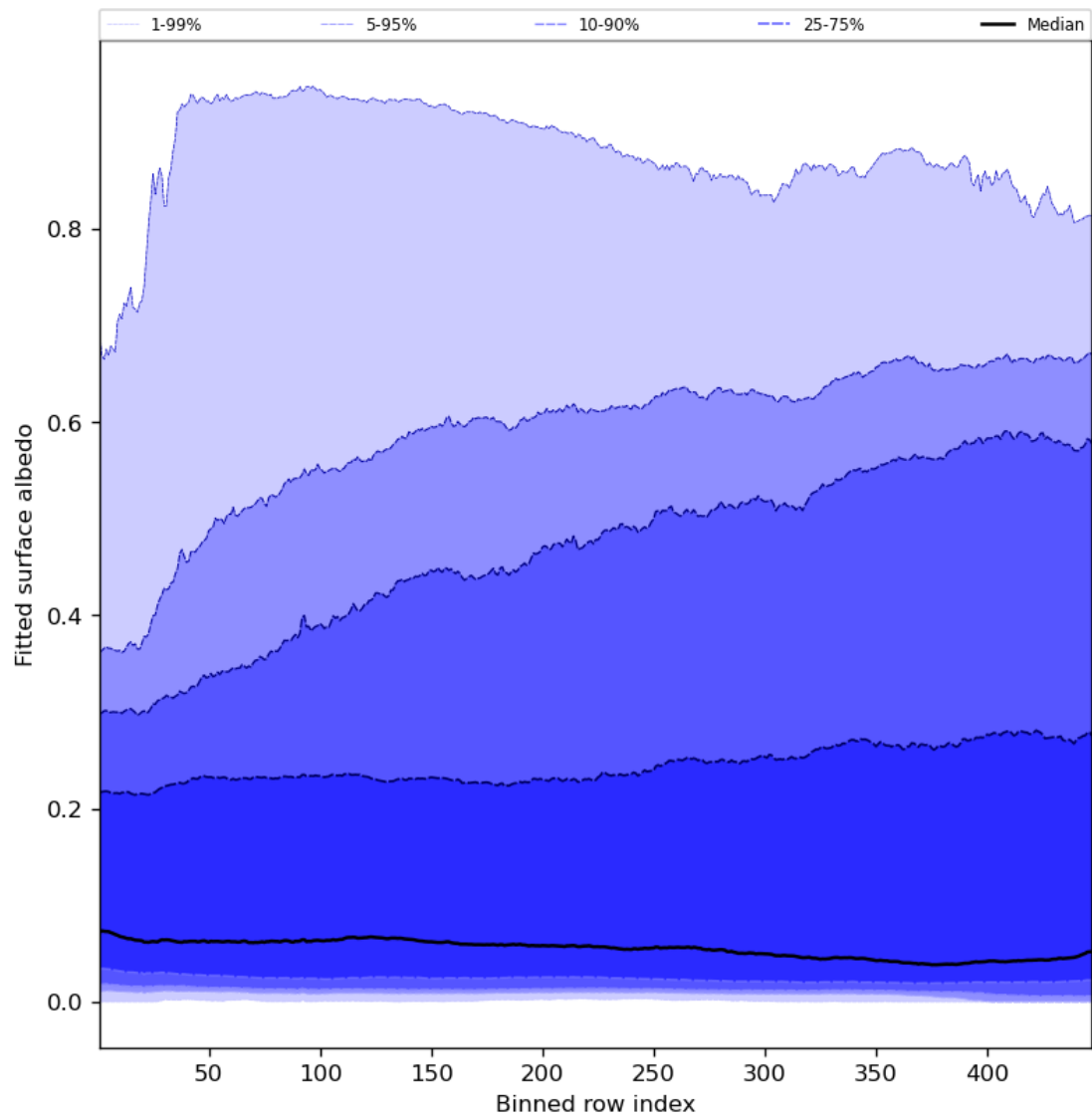


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-07-03 to 2023-07-04

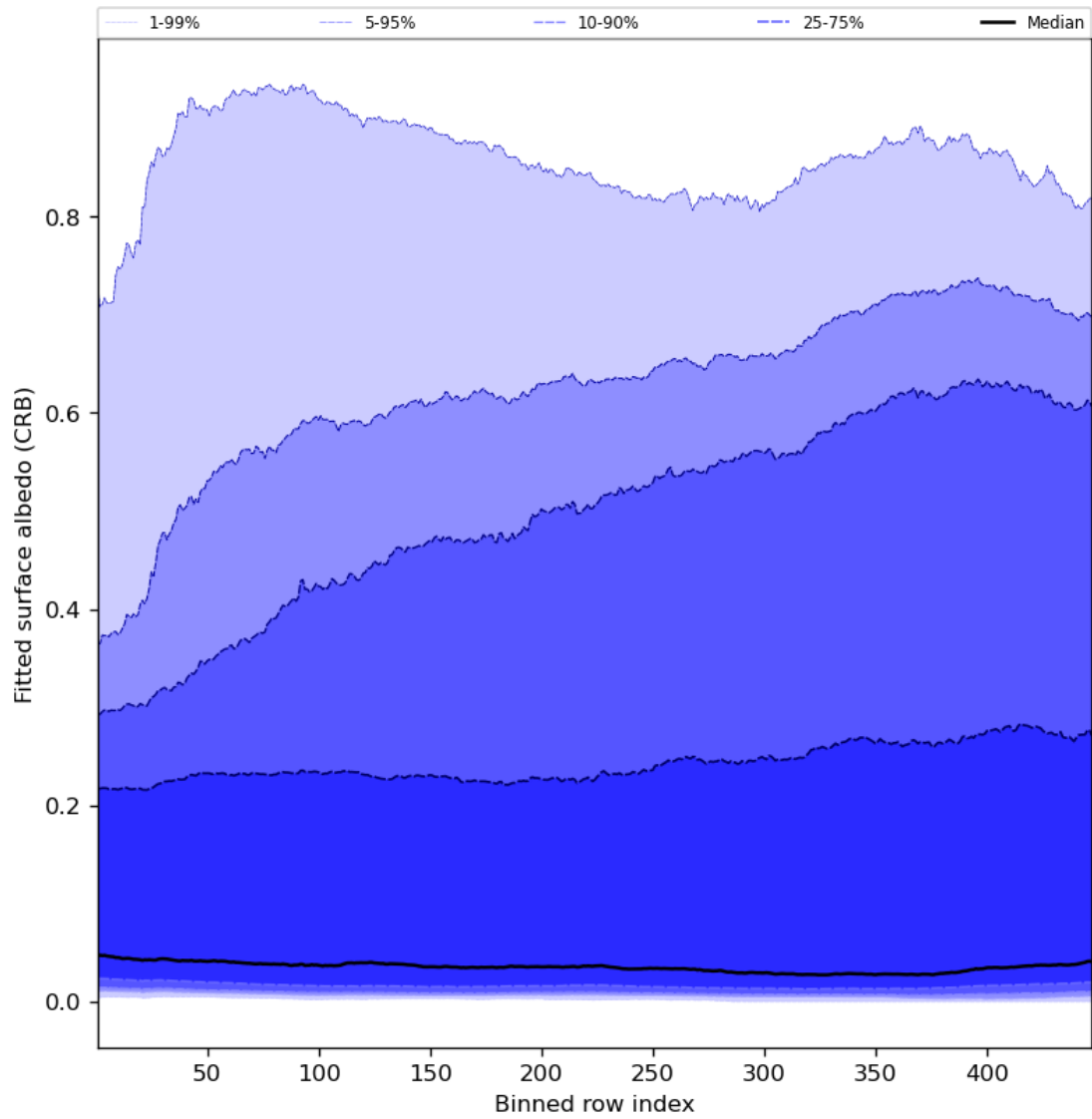


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-07-03 to 2023-07-04

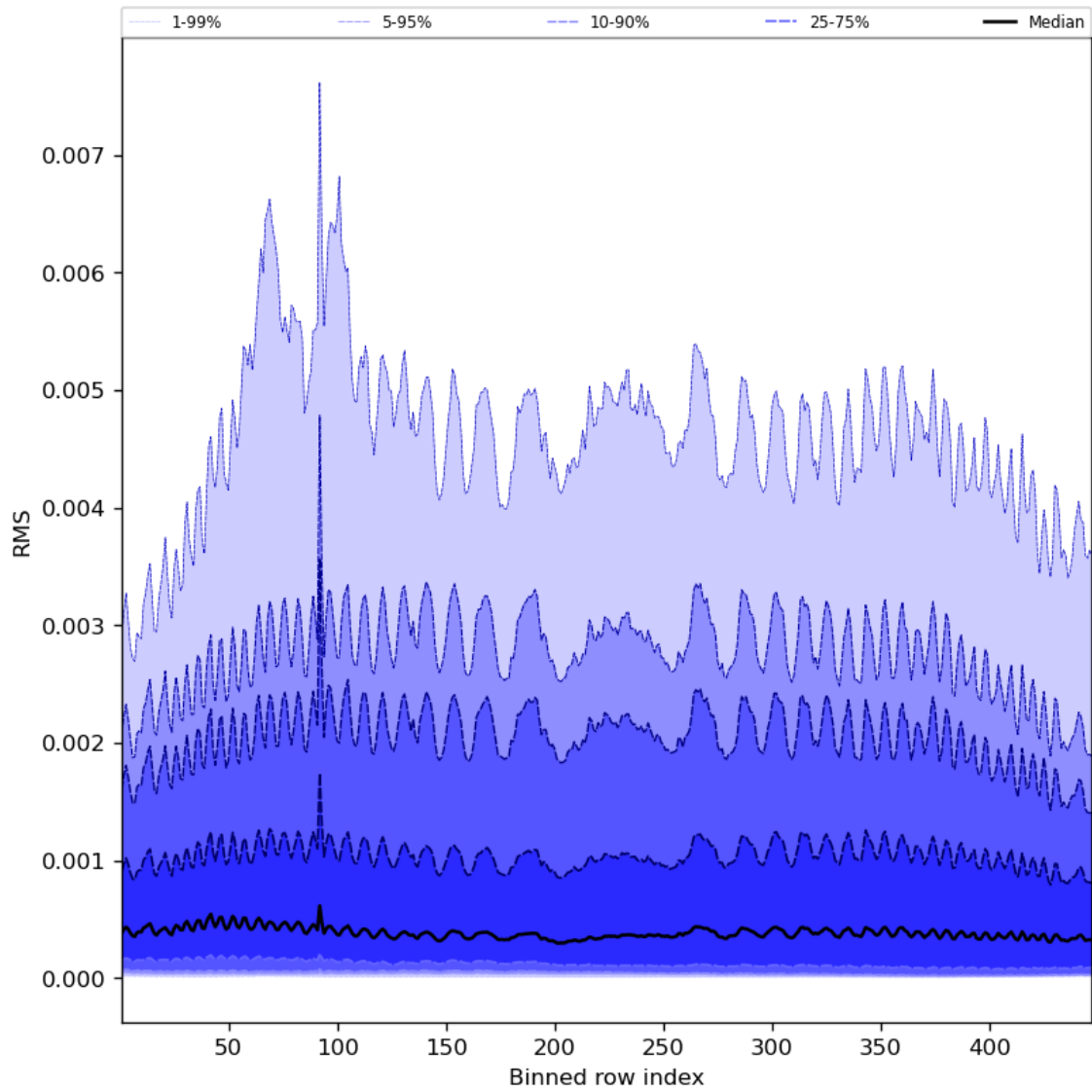


Figure 63: Along track statistics of “RMS” for 2023-07-03 to 2023-07-04

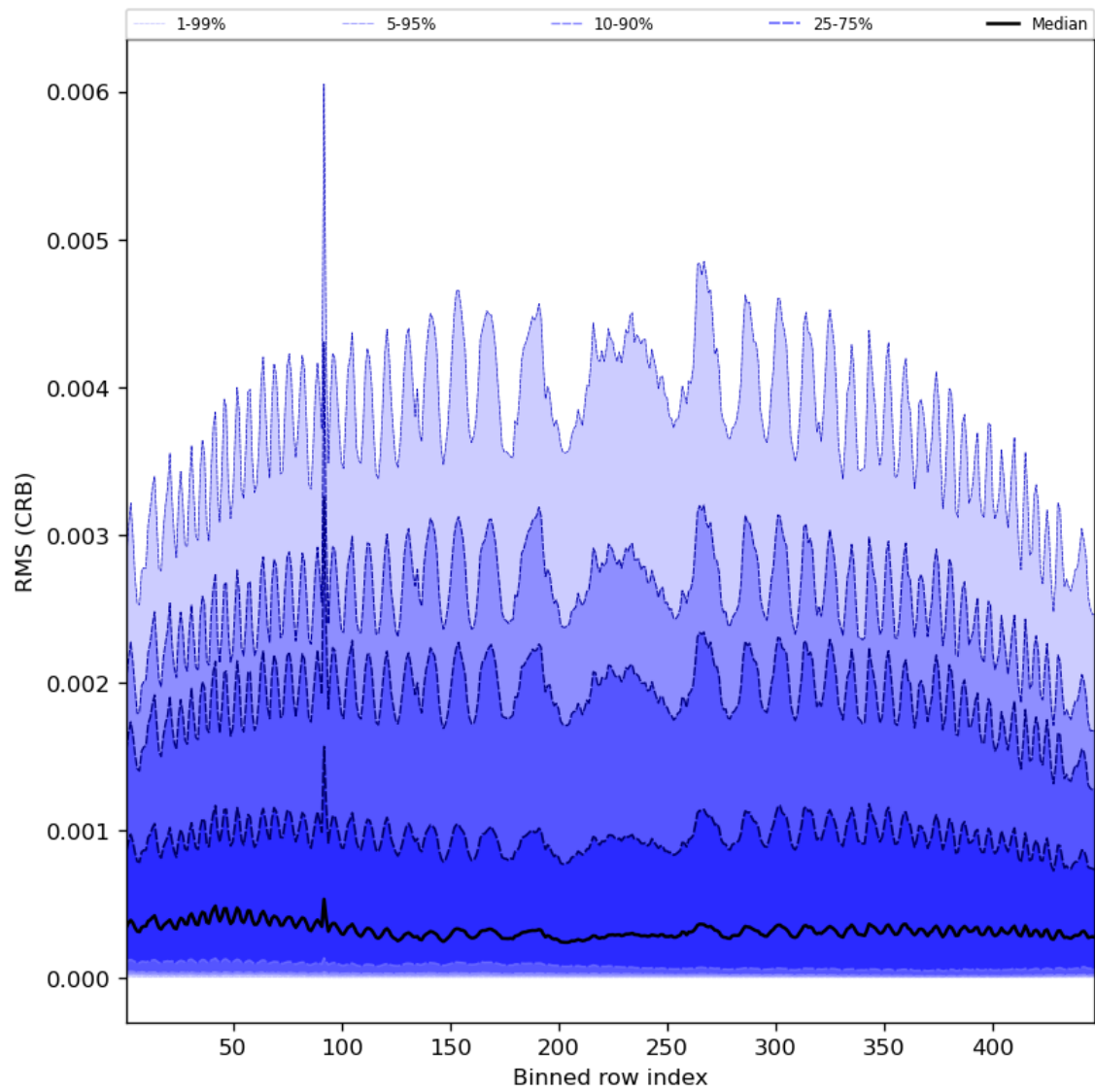


Figure 64: Along track statistics of “RMS (CRB)” for 2023-07-03 to 2023-07-04

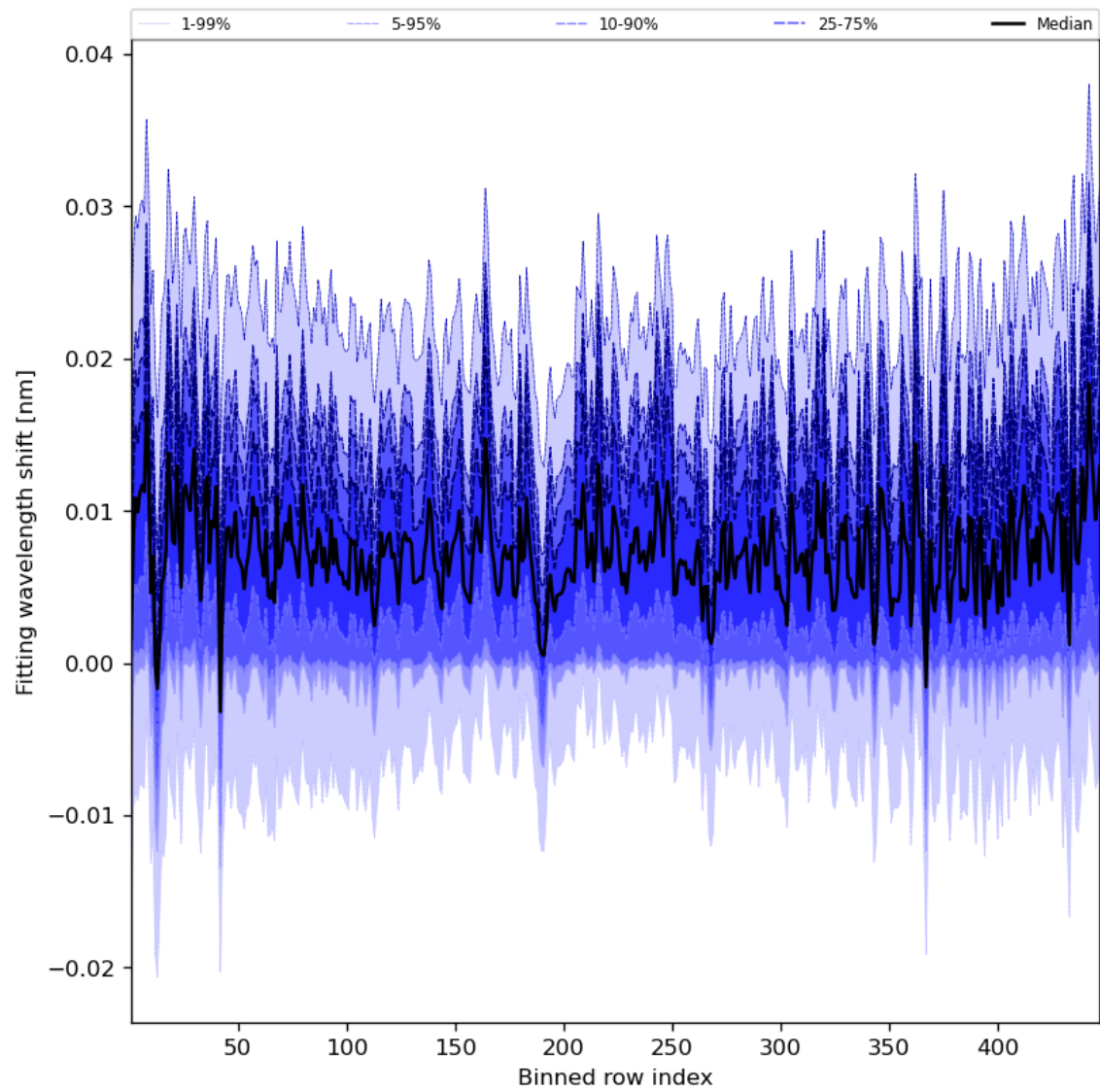


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-07-03 to 2023-07-04

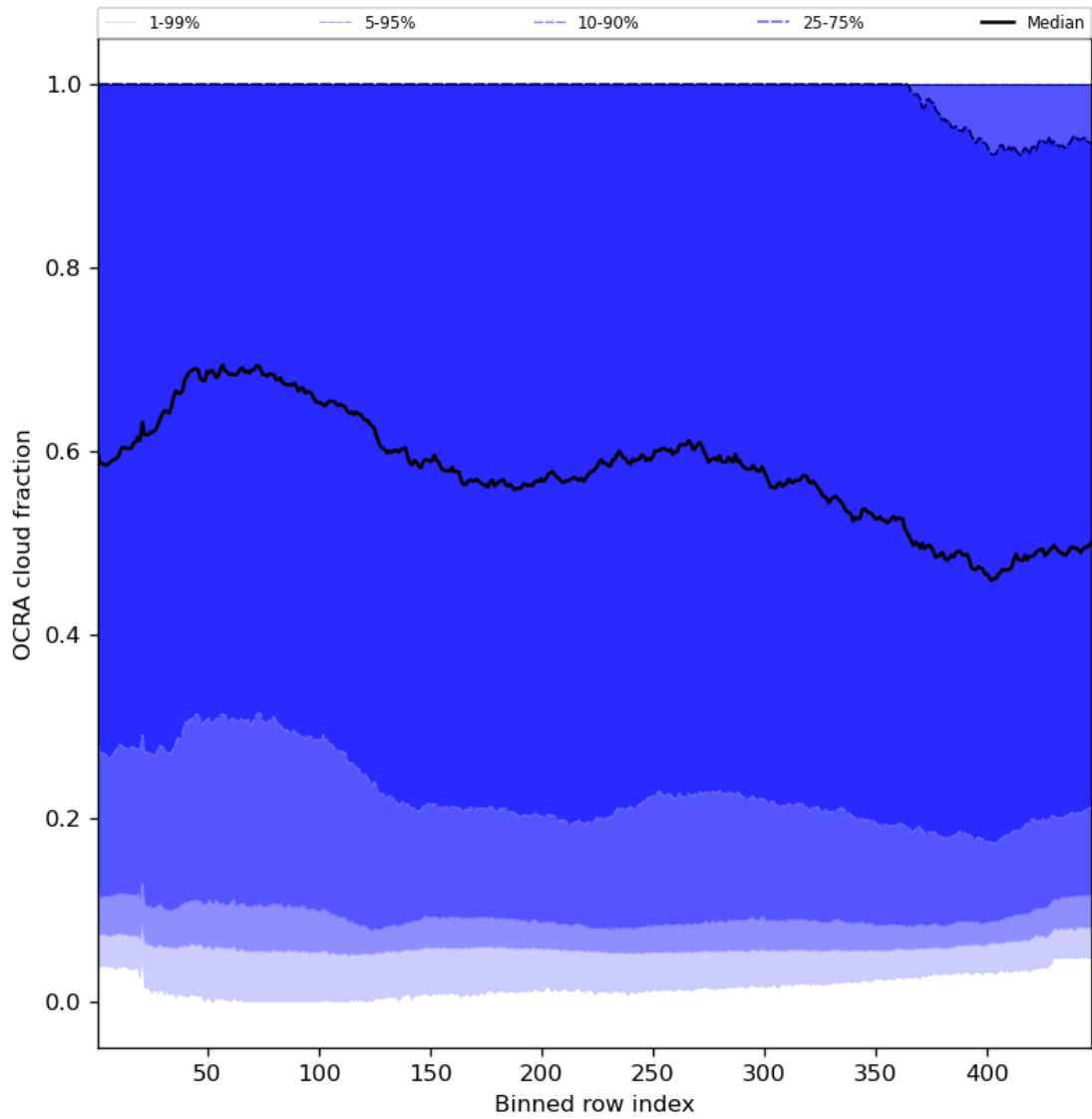


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-07-03 to 2023-07-04

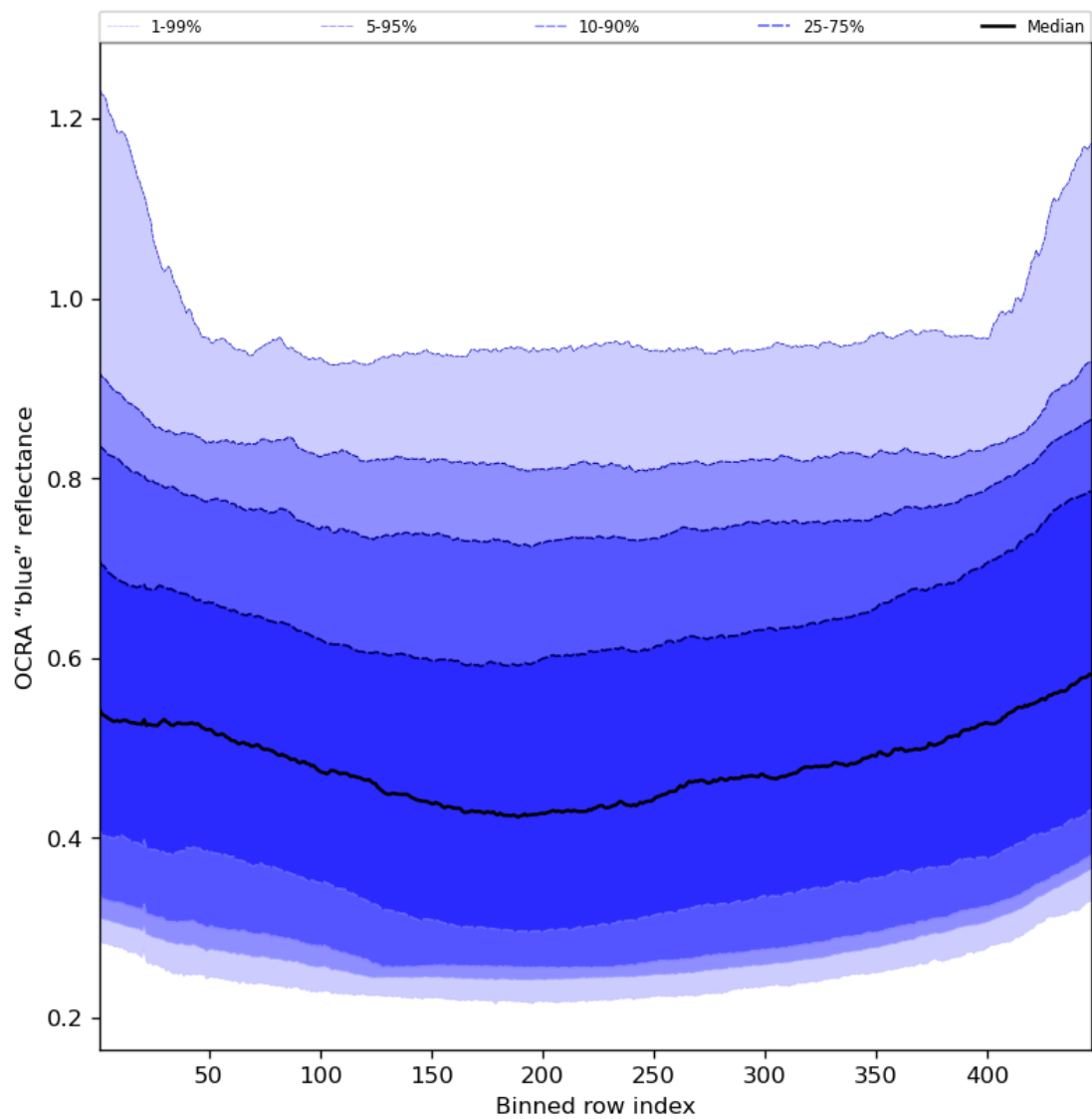


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-07-03 to 2023-07-04

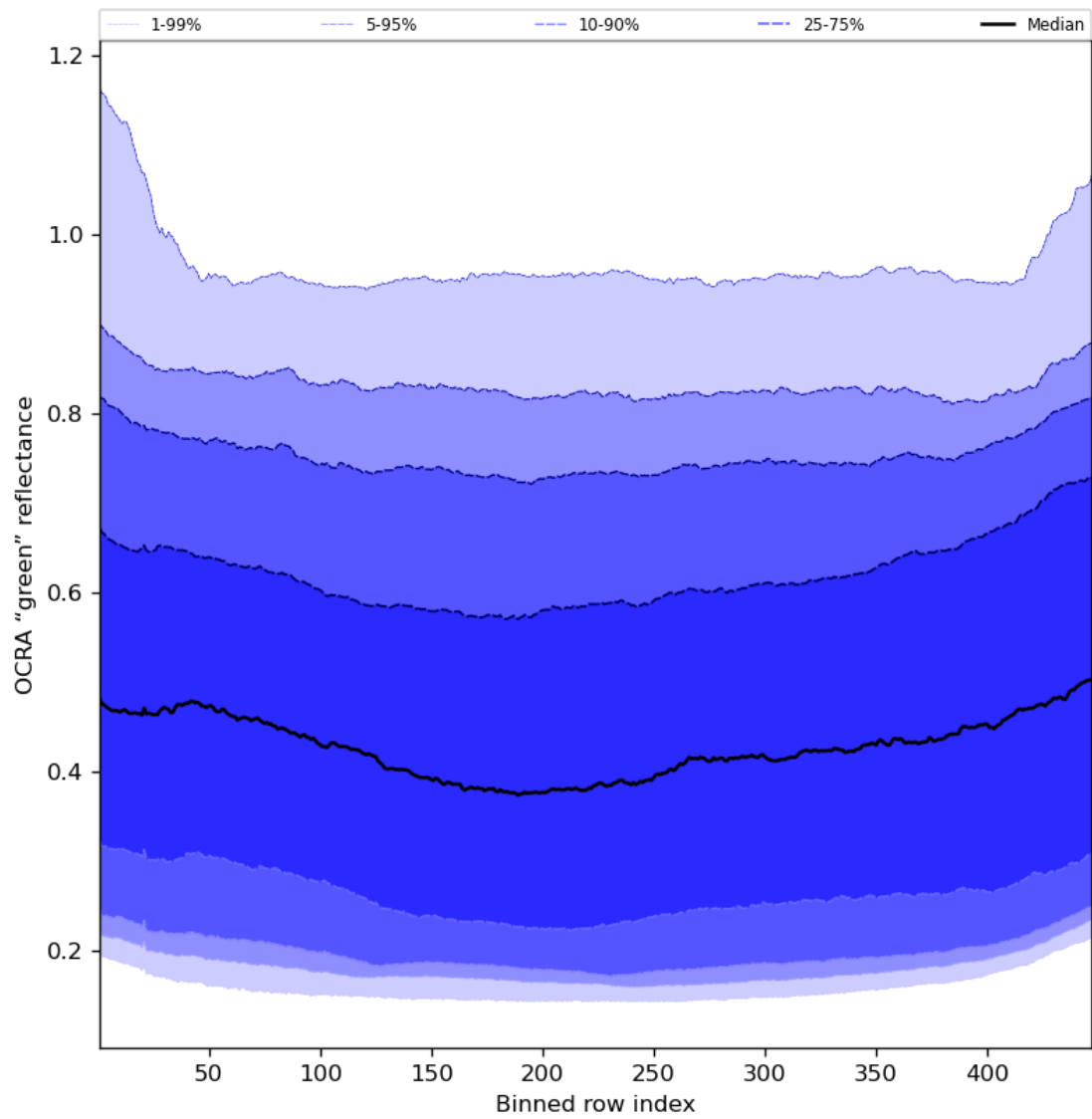


Figure 68: Along track statistics of “OCRA “green” reflectance” for 2023-07-03 to 2023-07-04

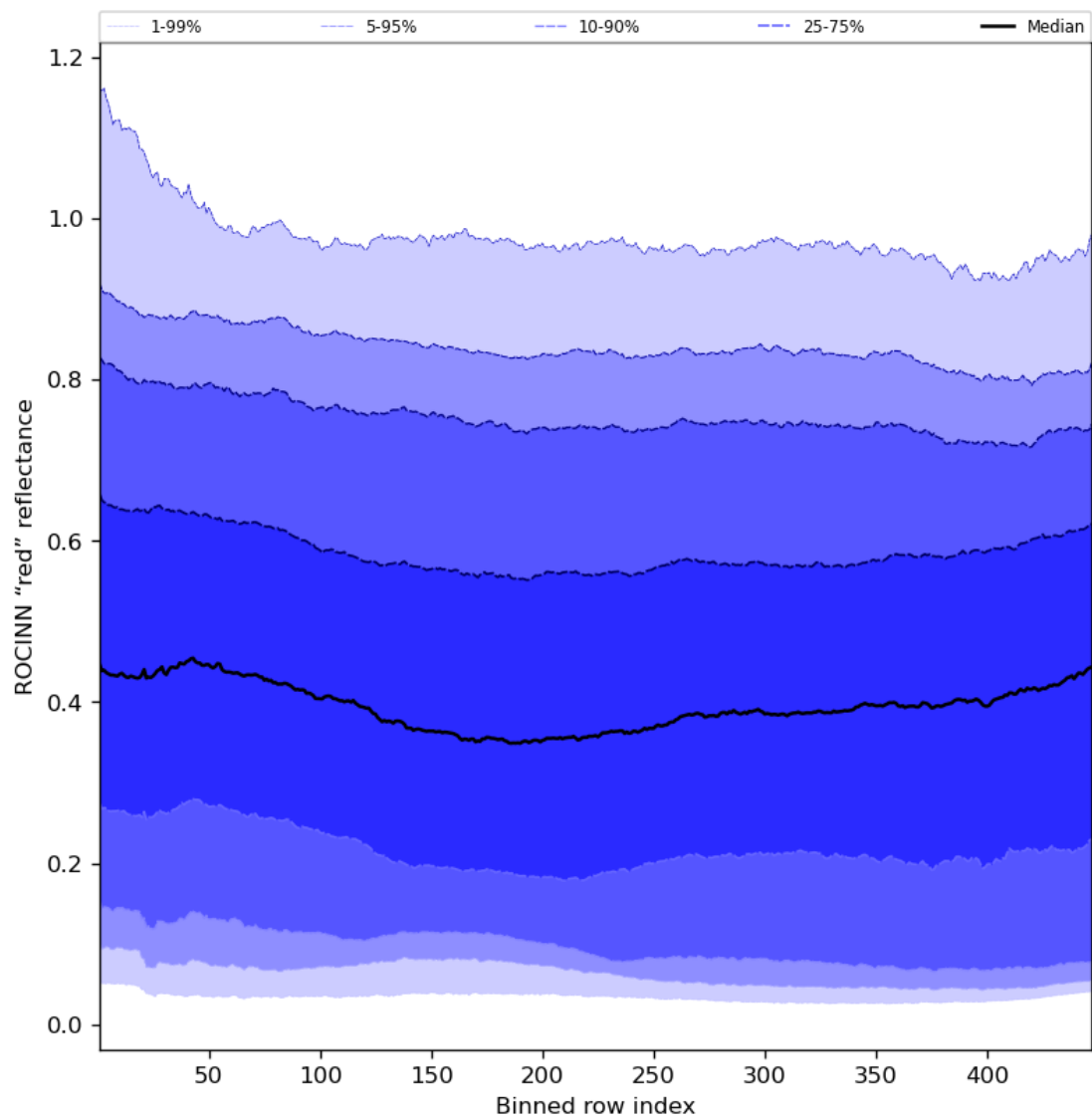


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2023-07-03 to 2023-07-04

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.

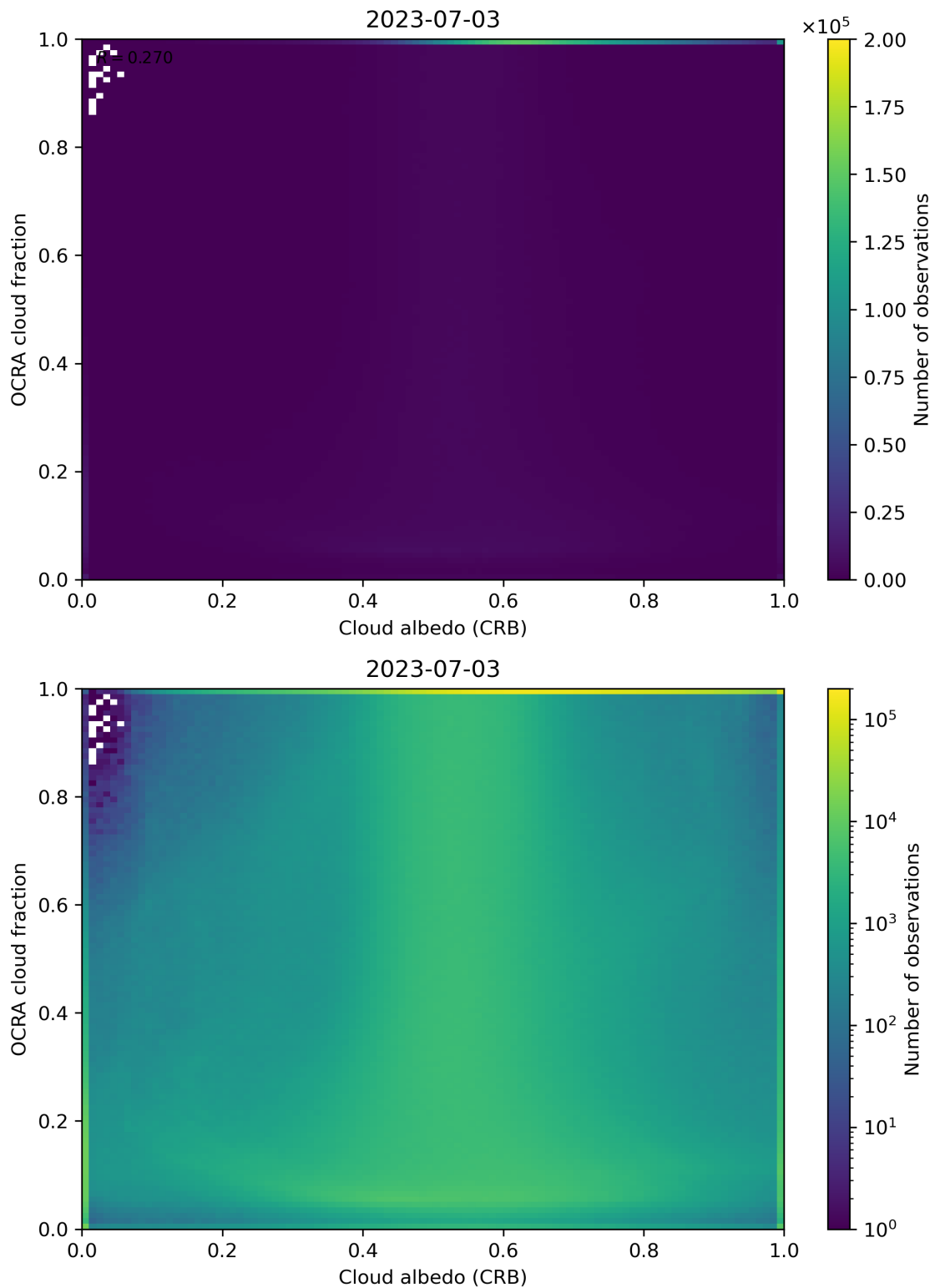


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-07-03 to 2023-07-04.

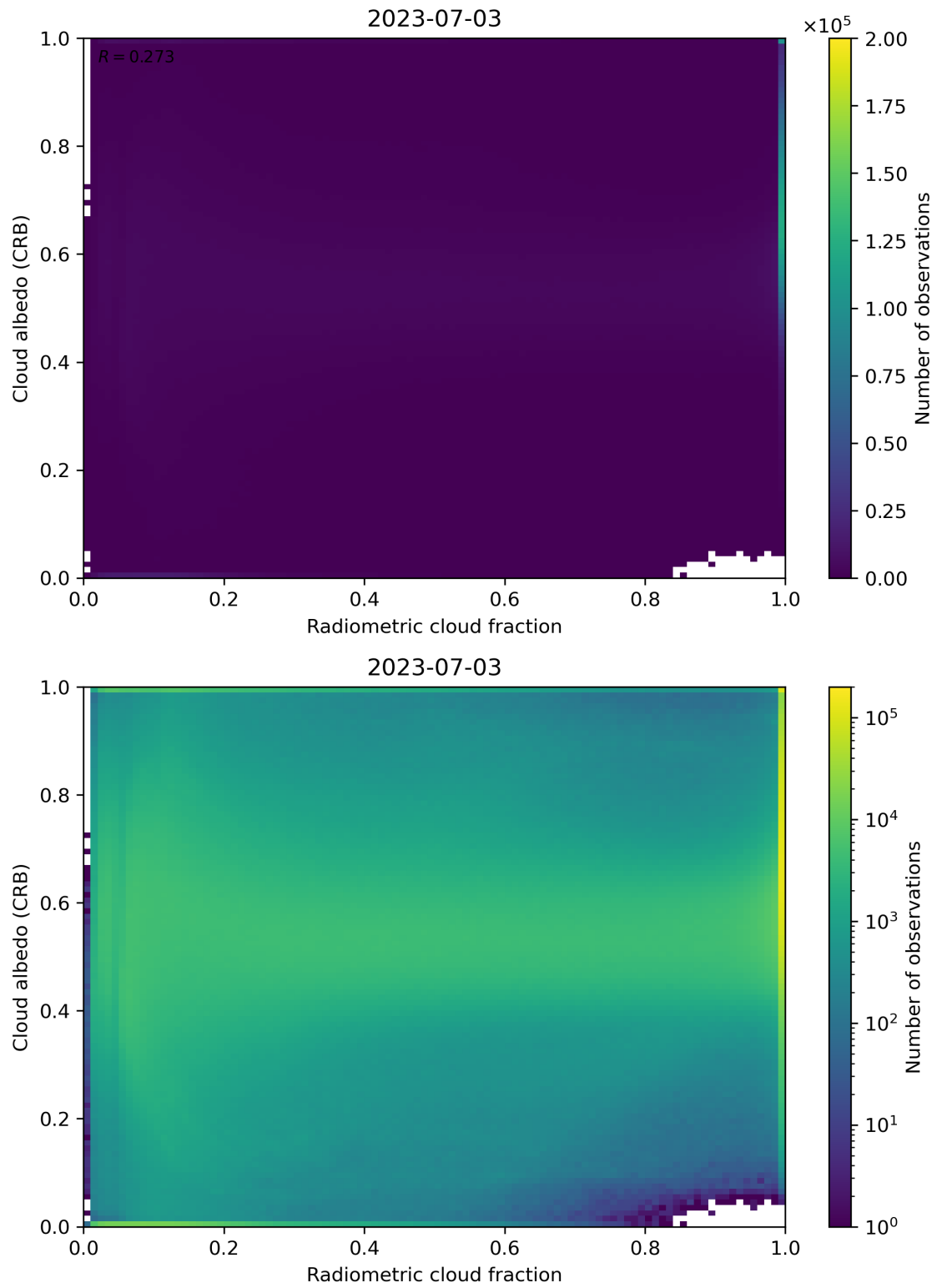


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-07-03 to 2023-07-04.

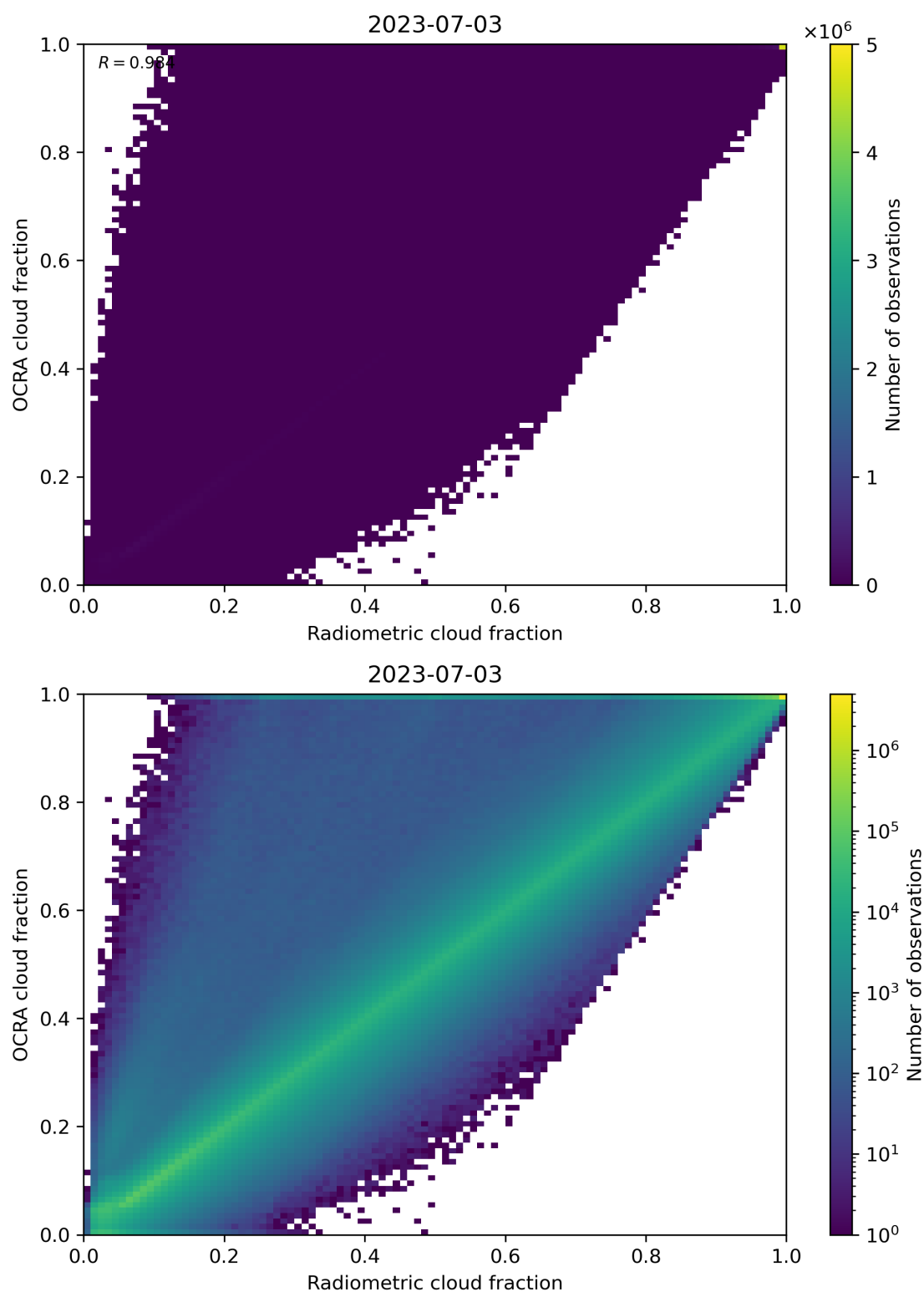


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-07-03 to 2023-07-04.

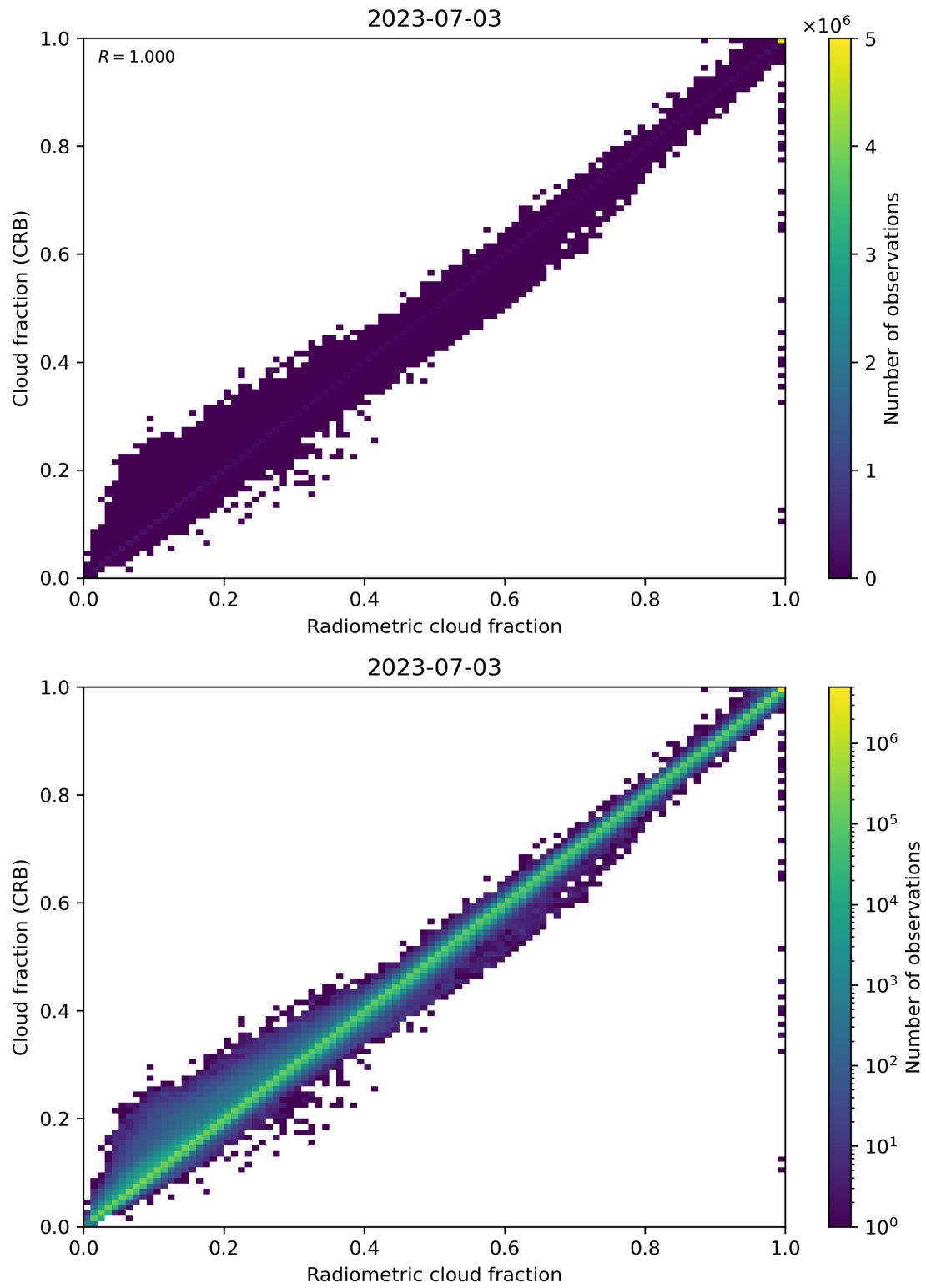


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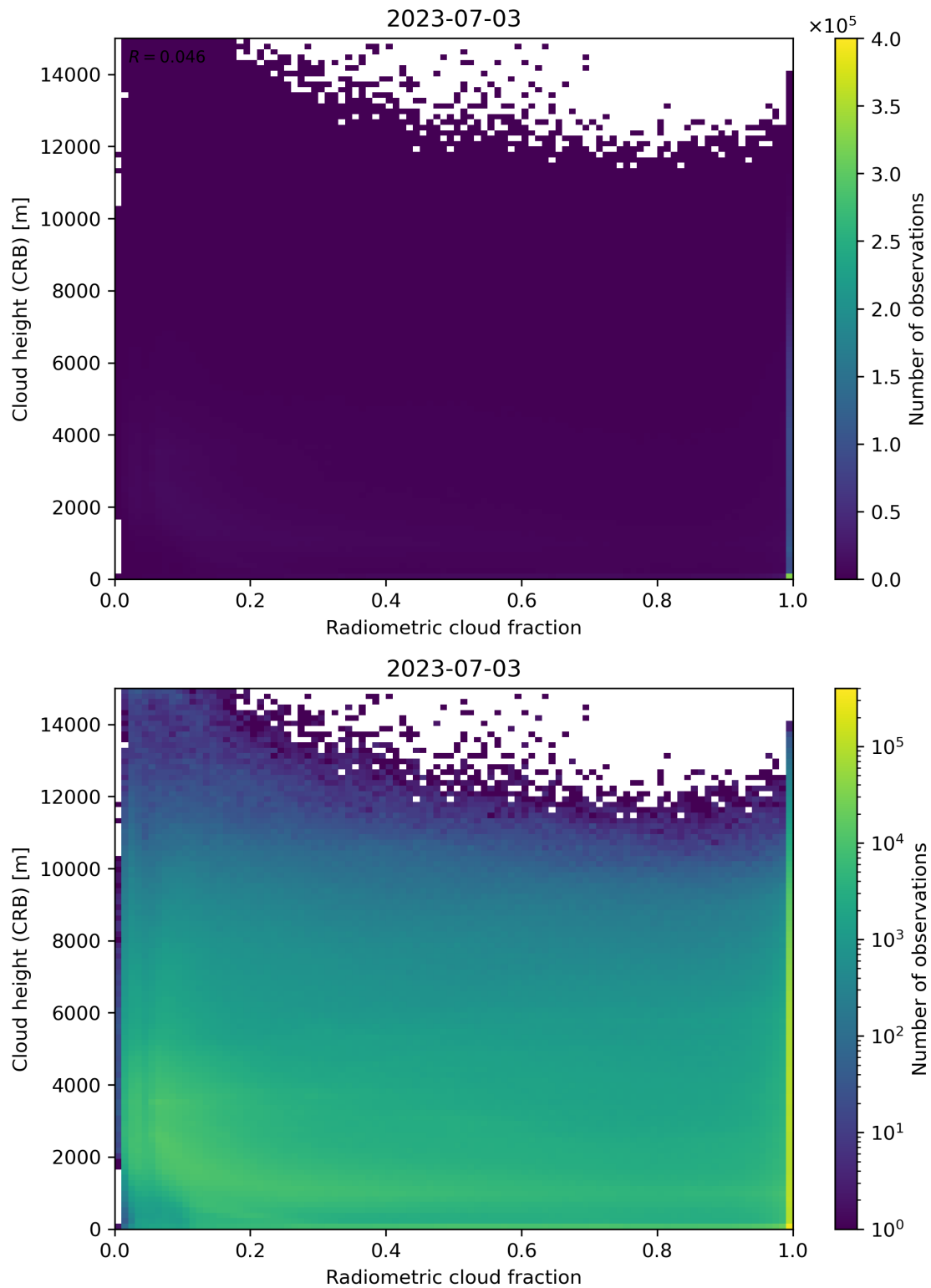


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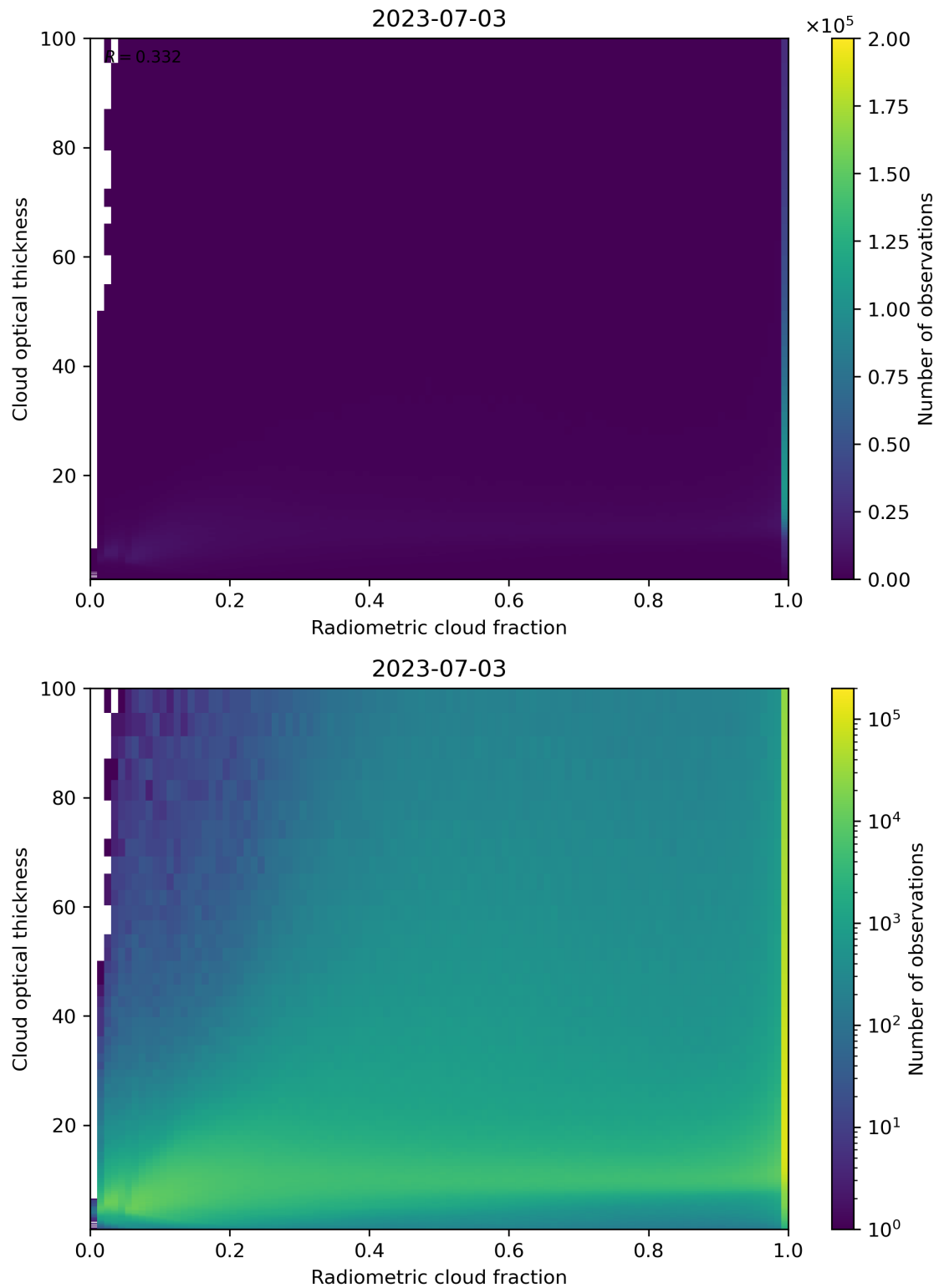


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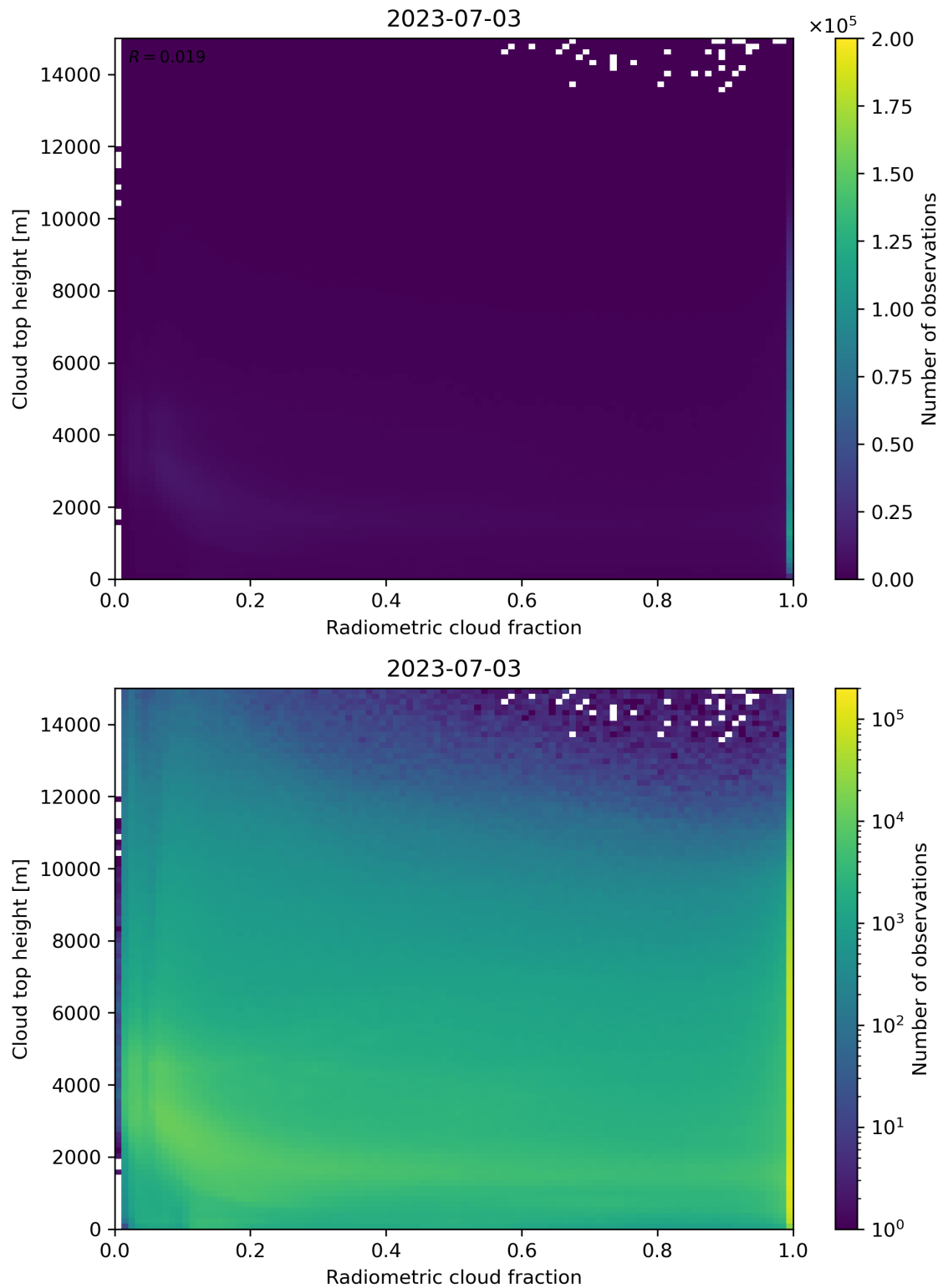


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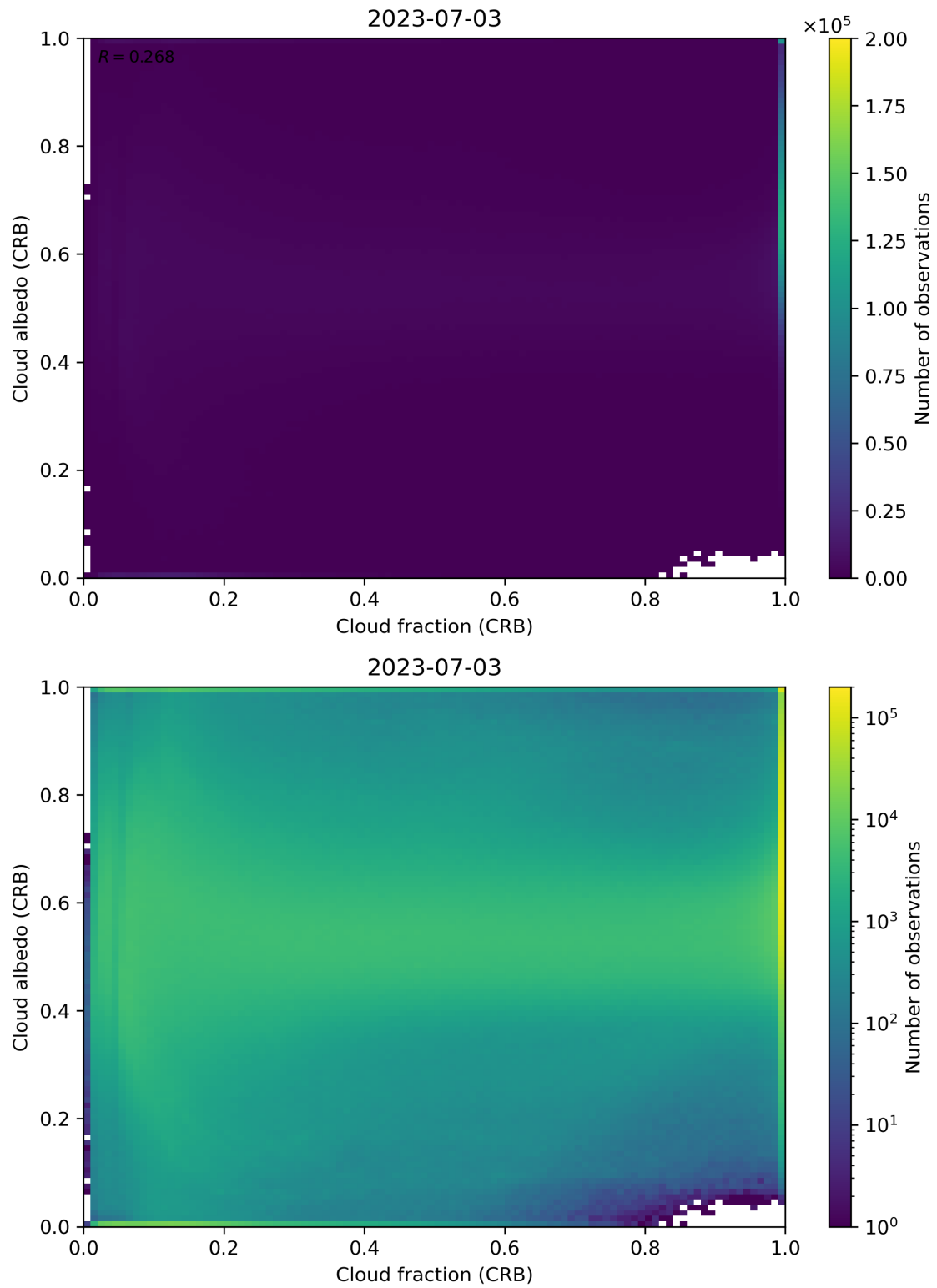


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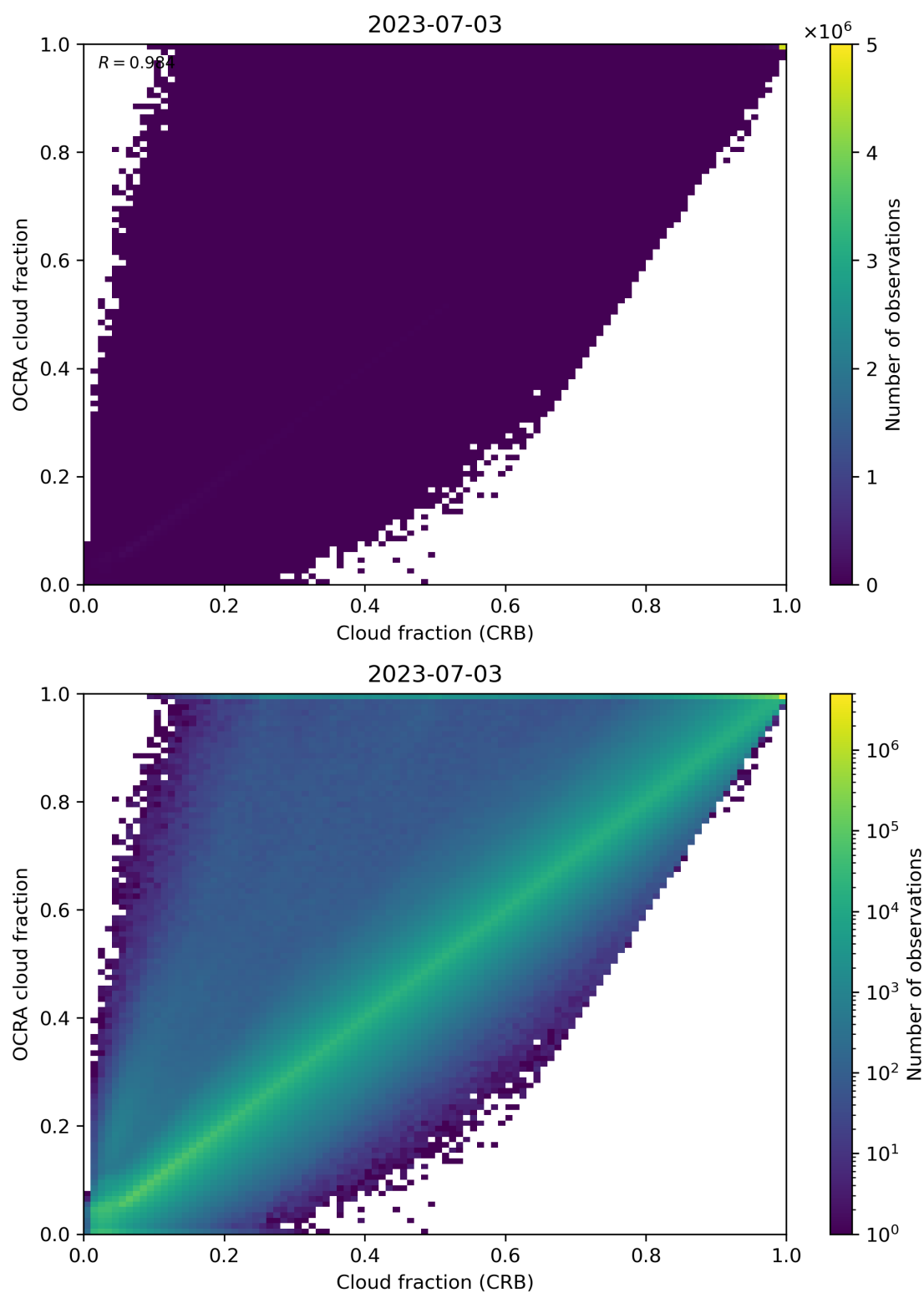


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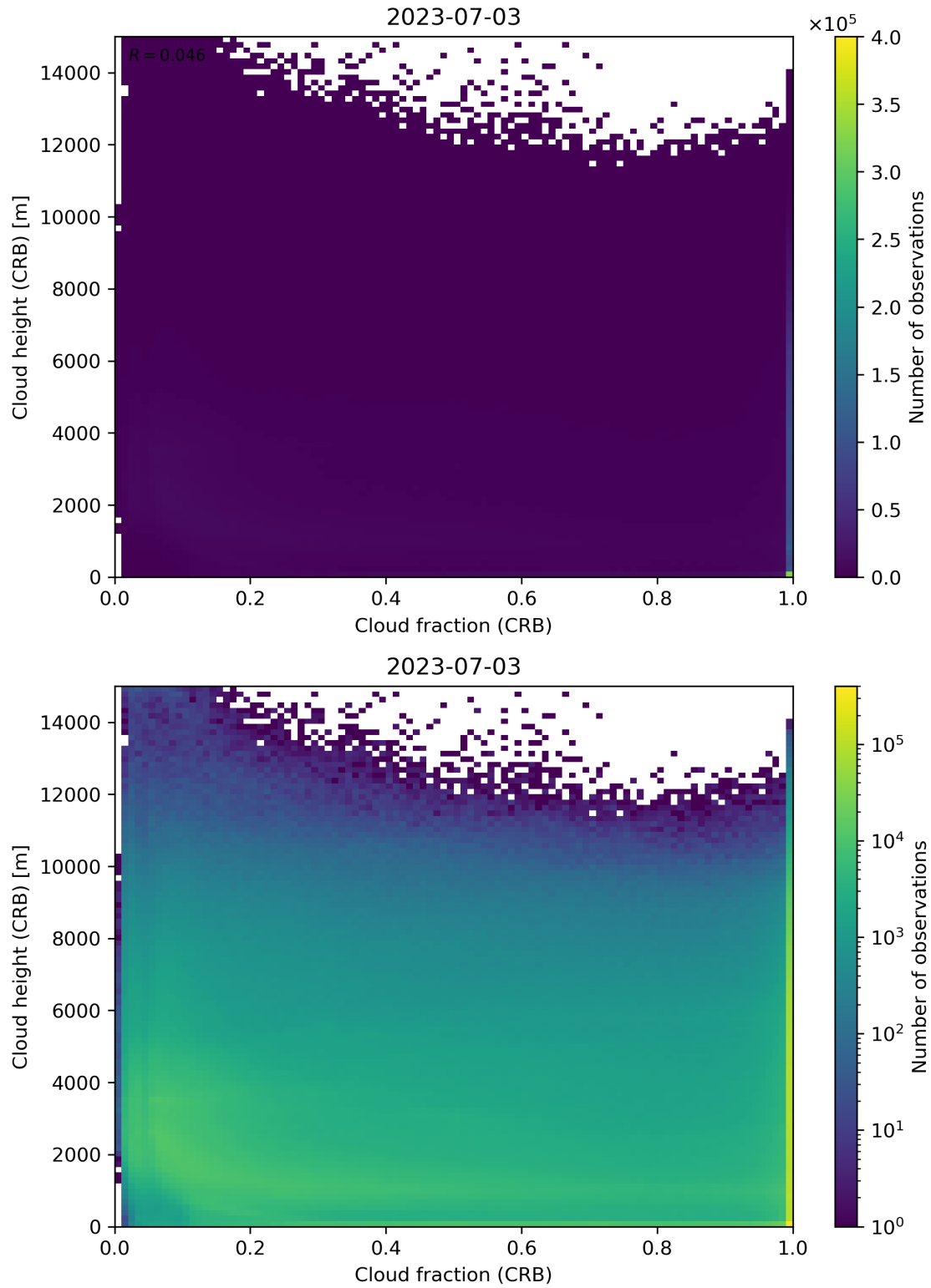


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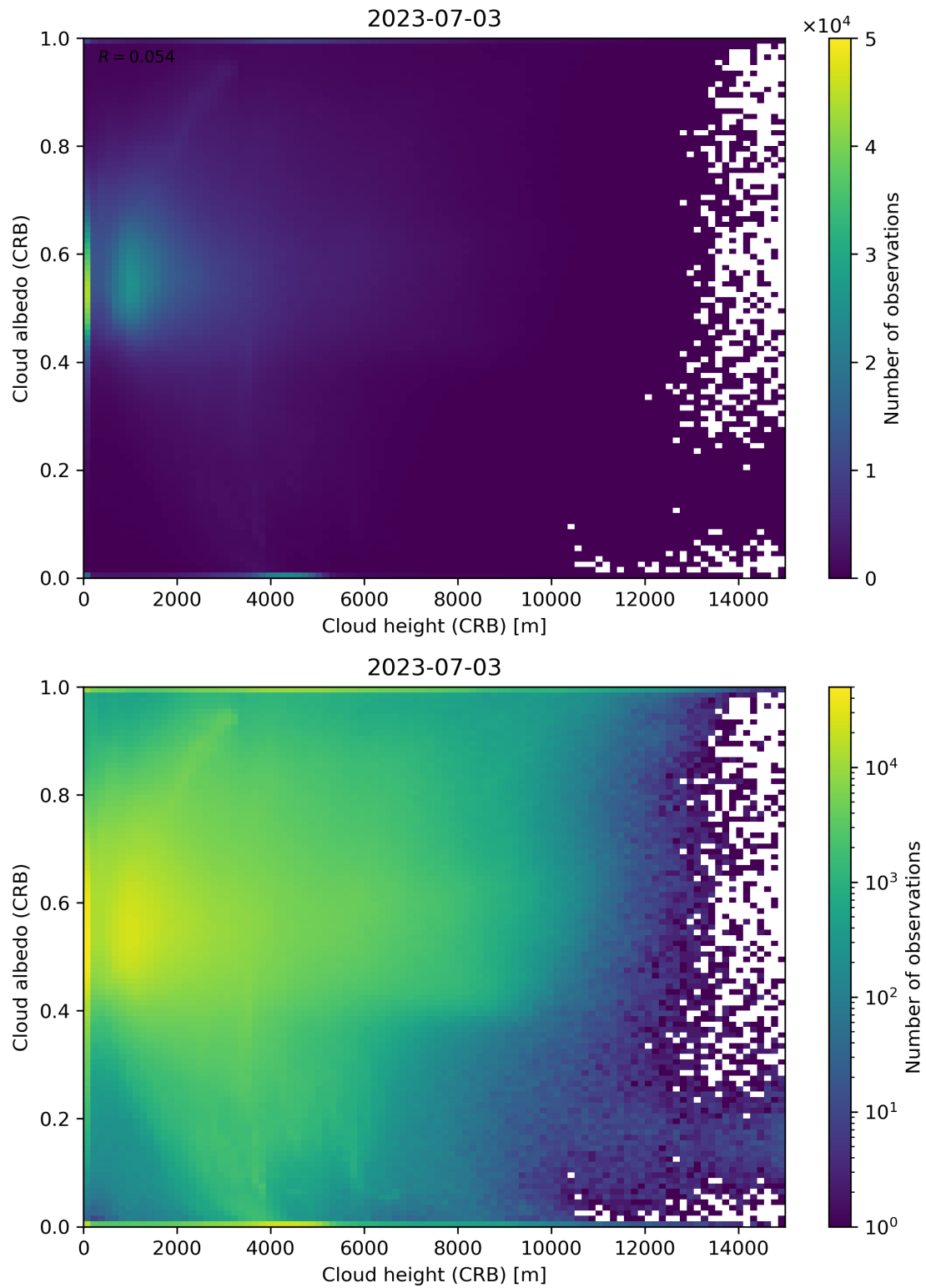


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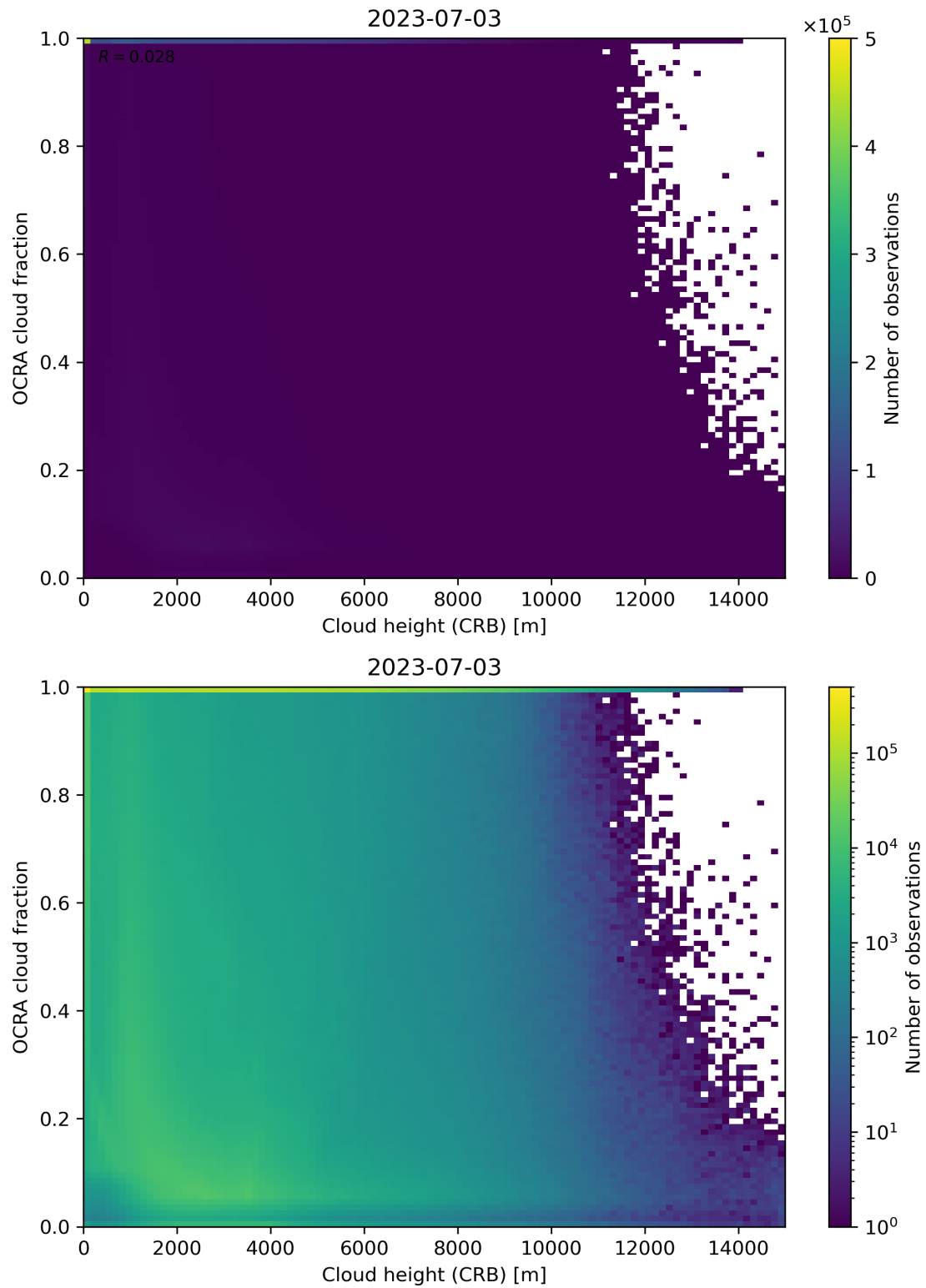


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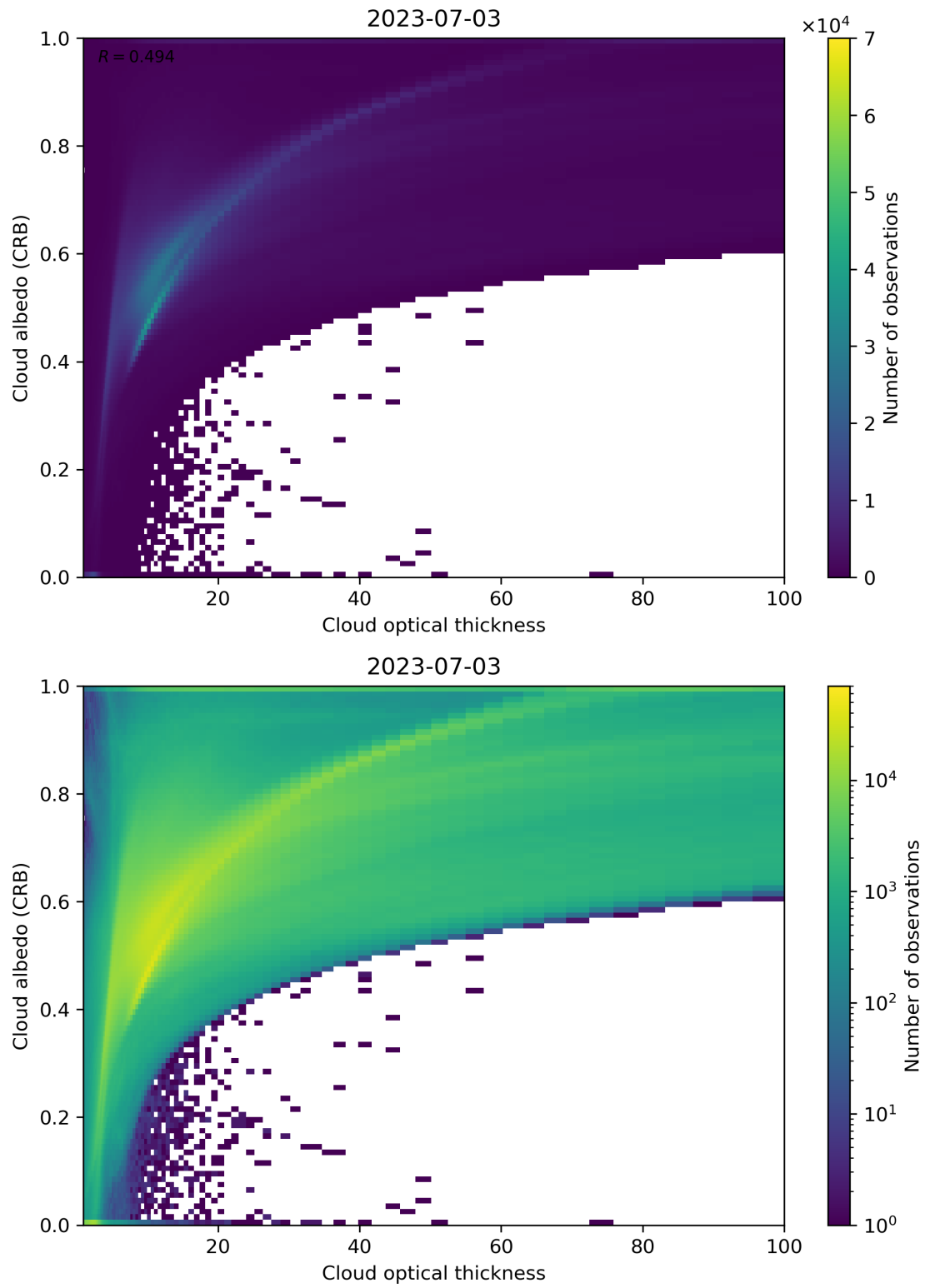


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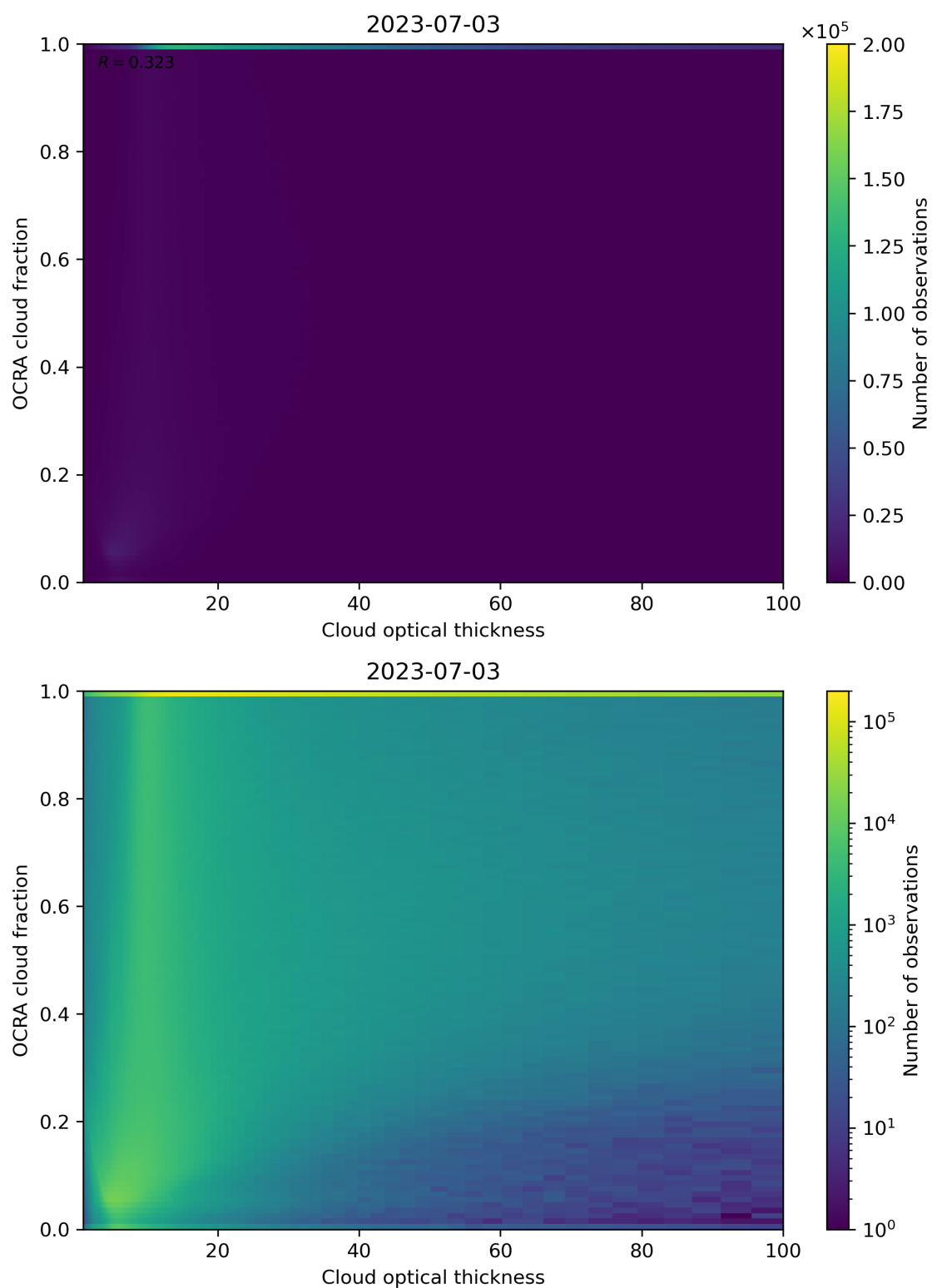


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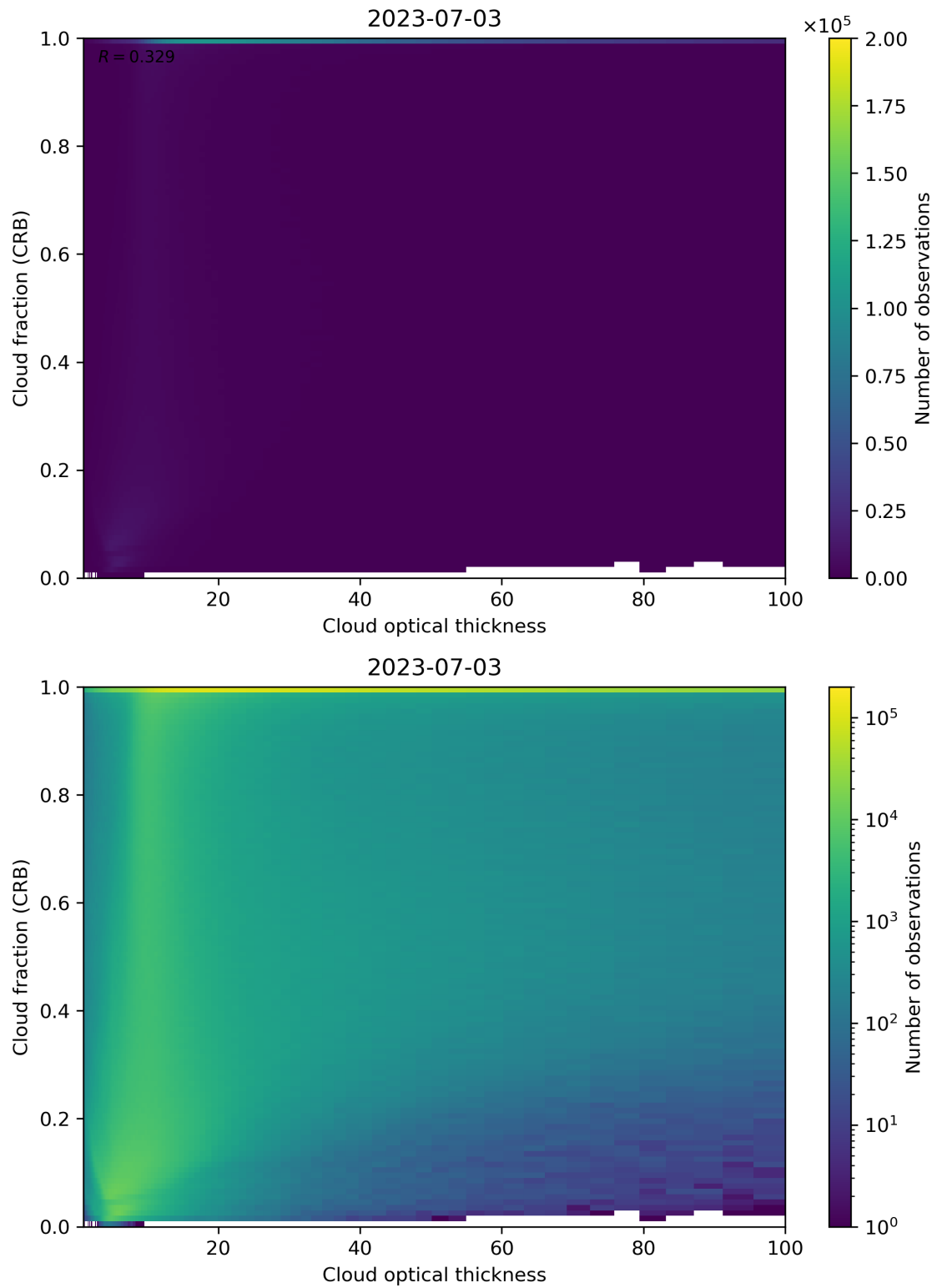


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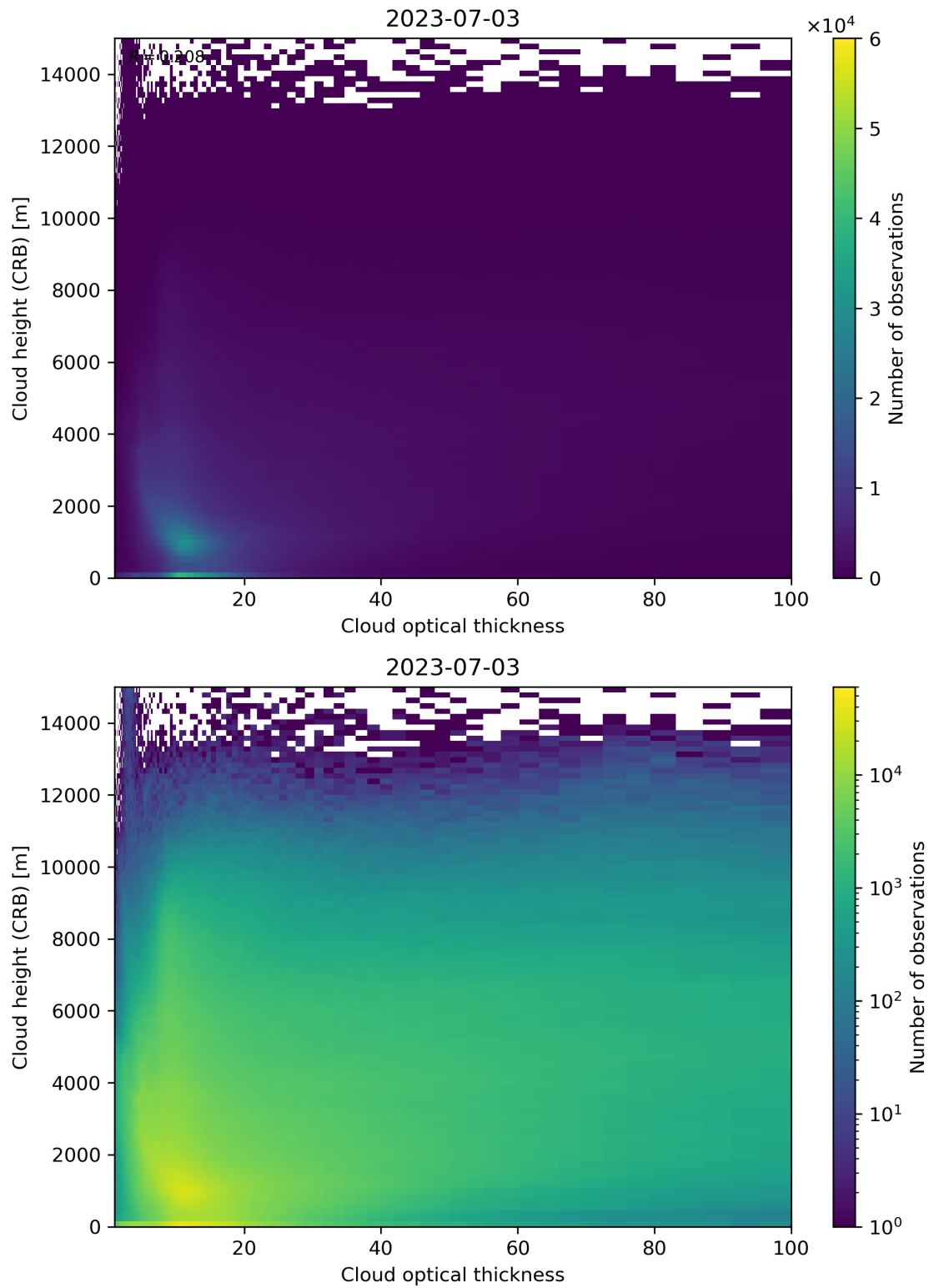


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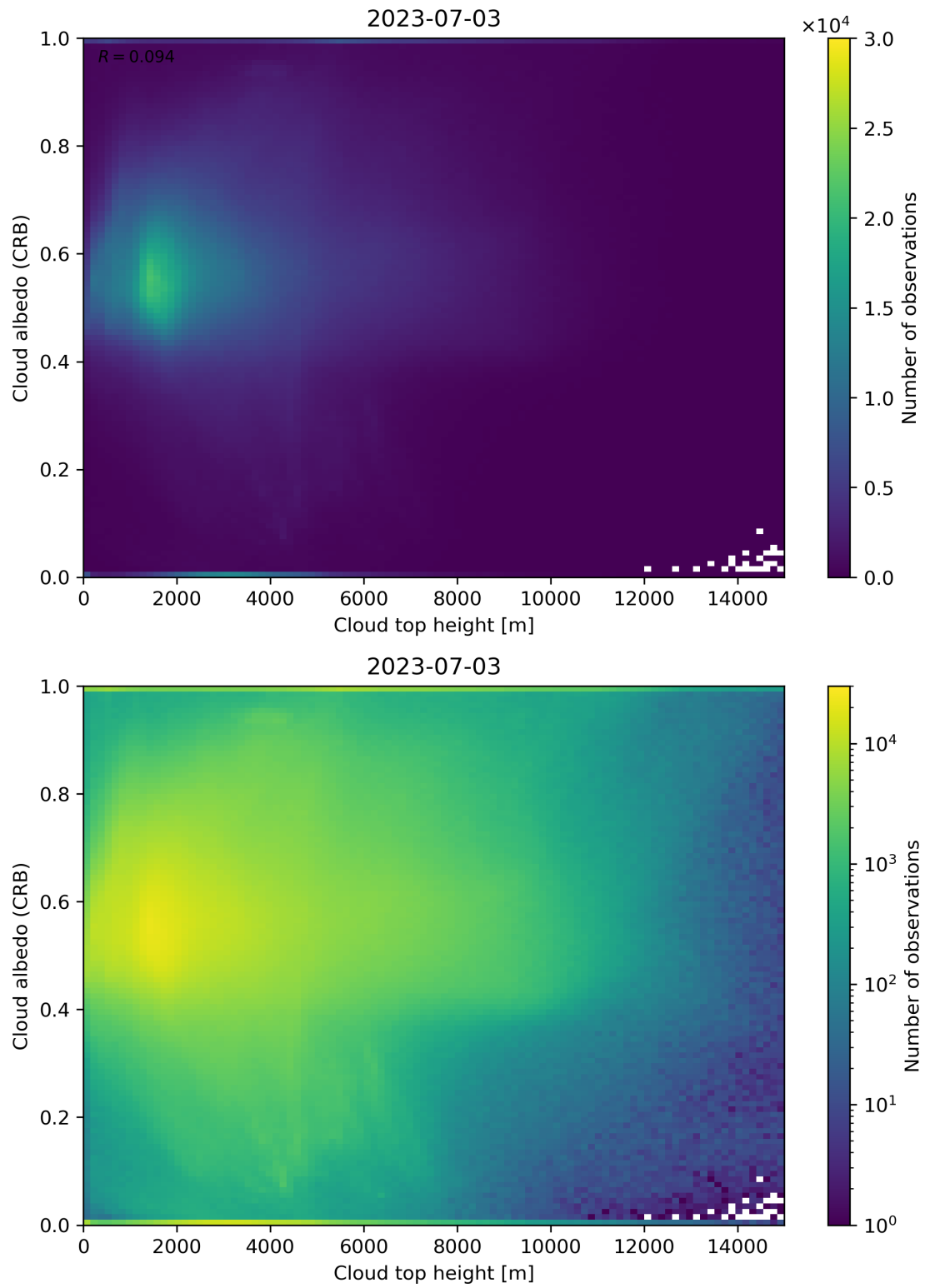


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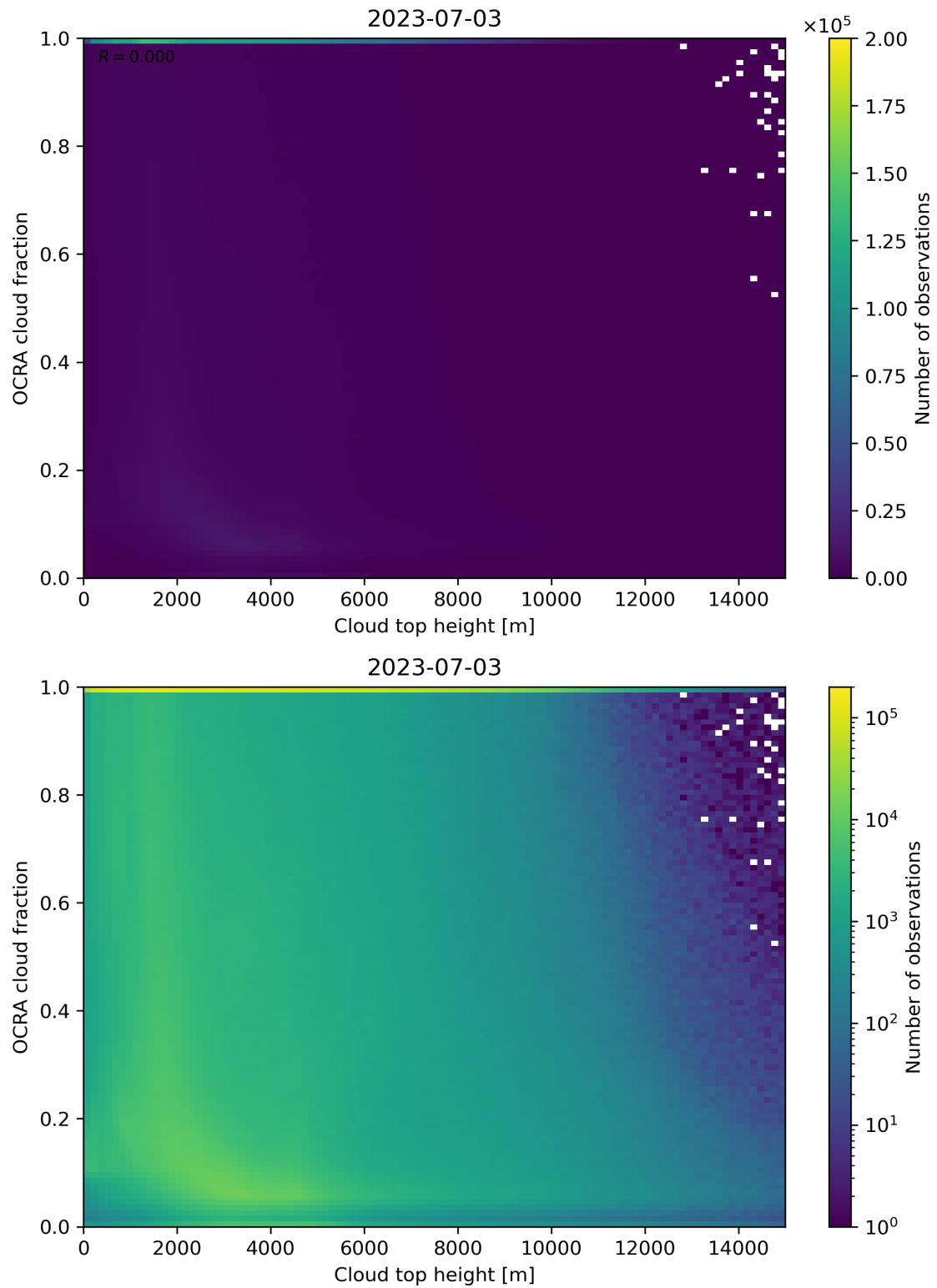


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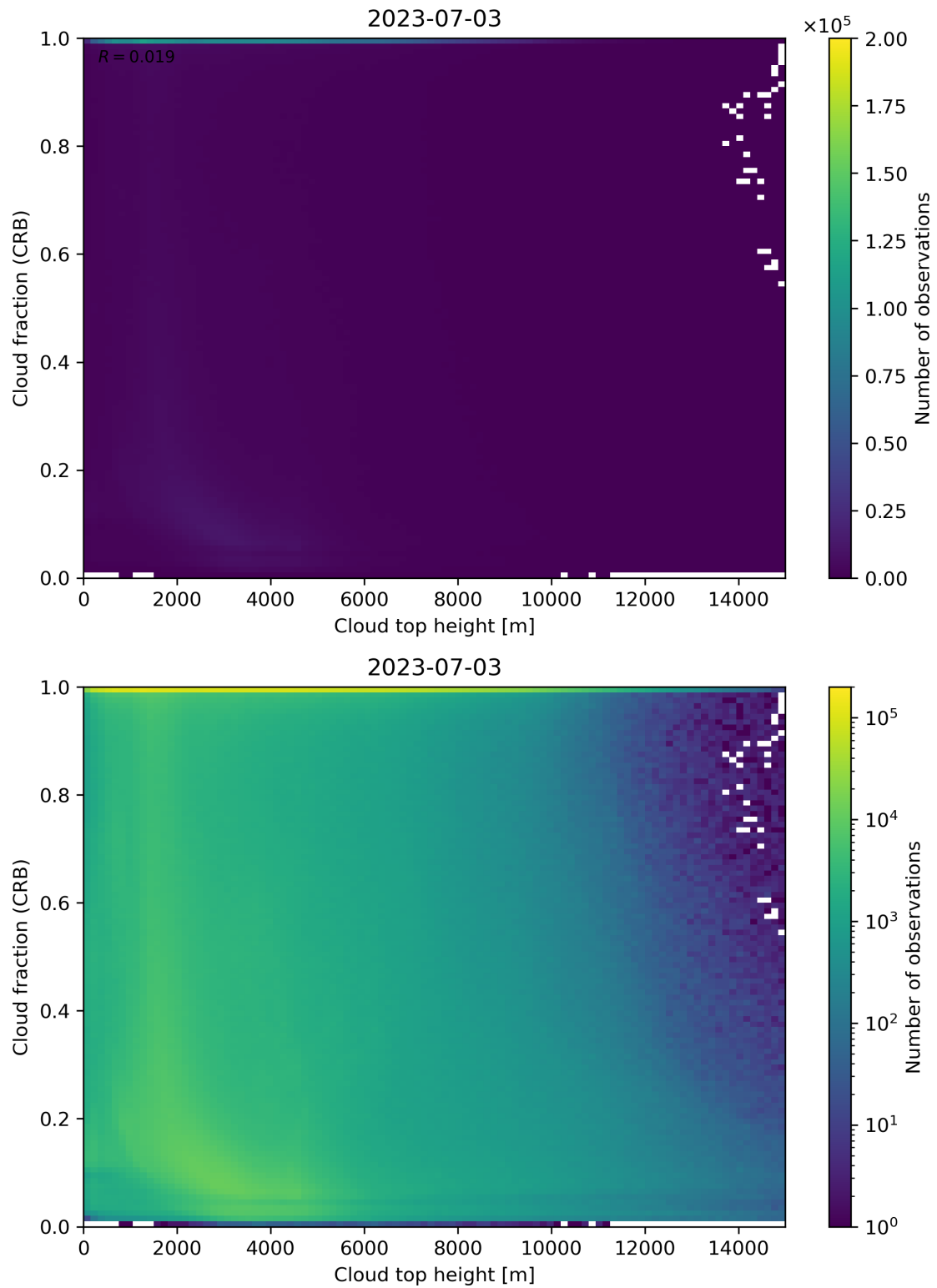


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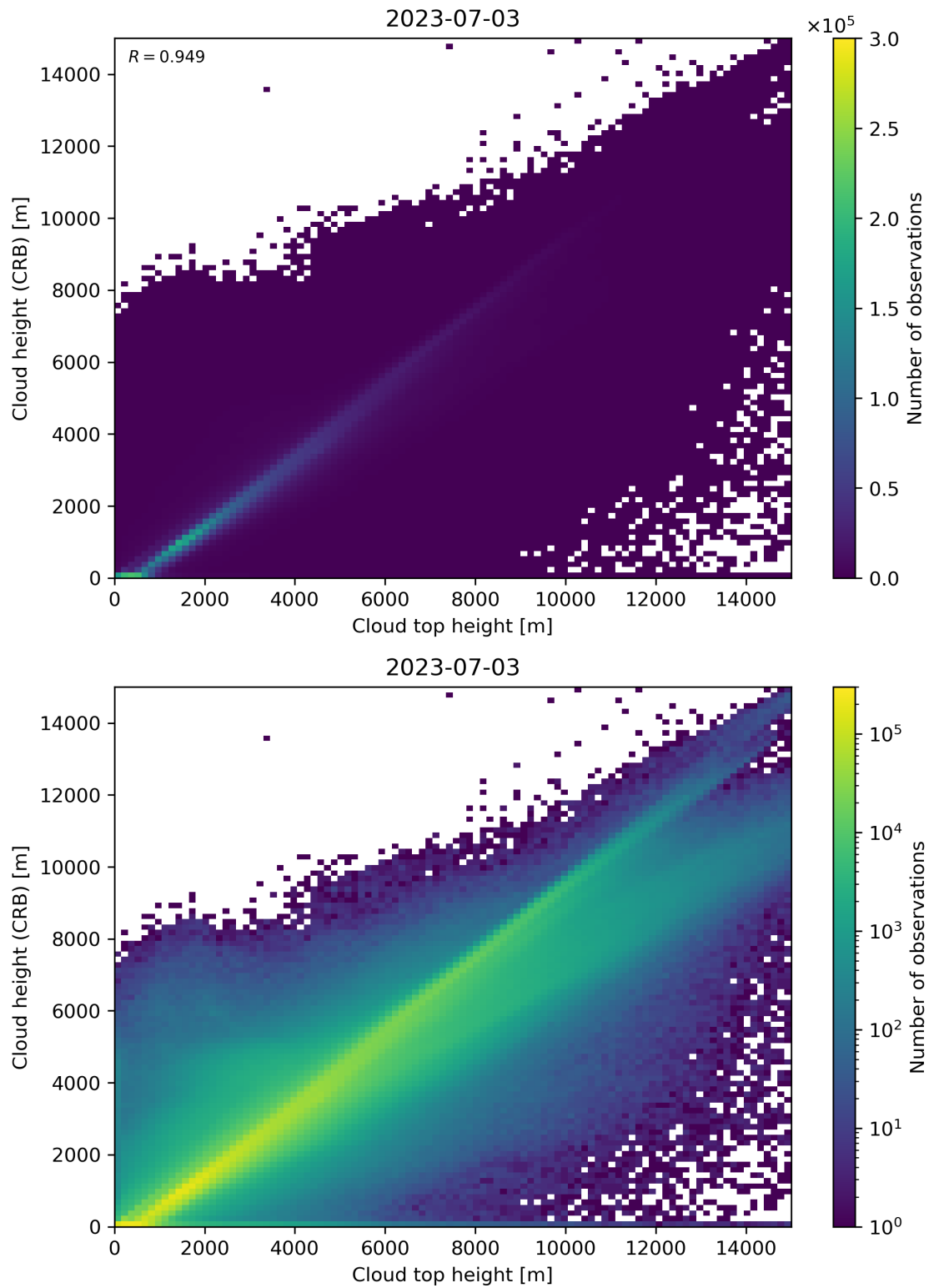


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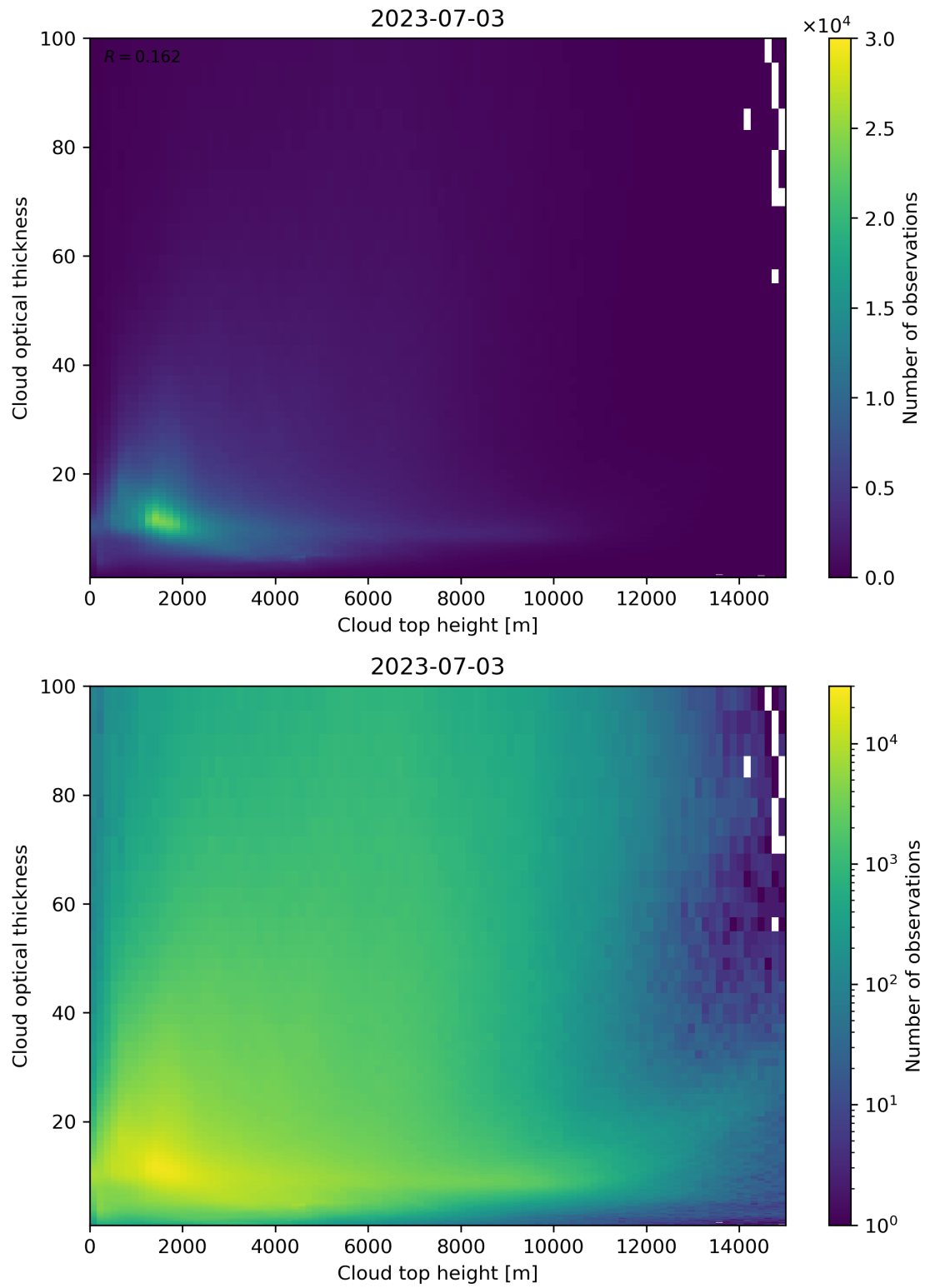


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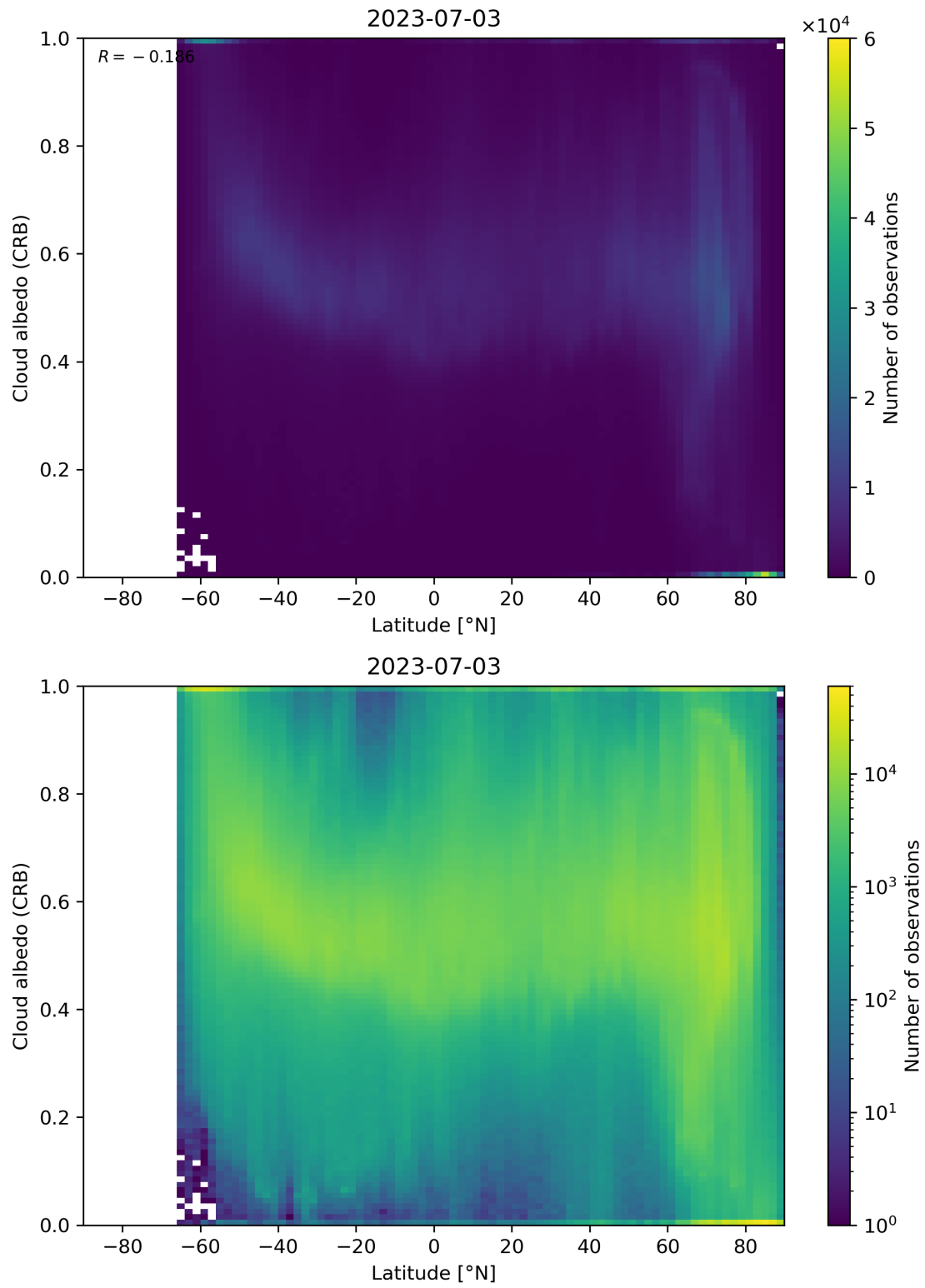


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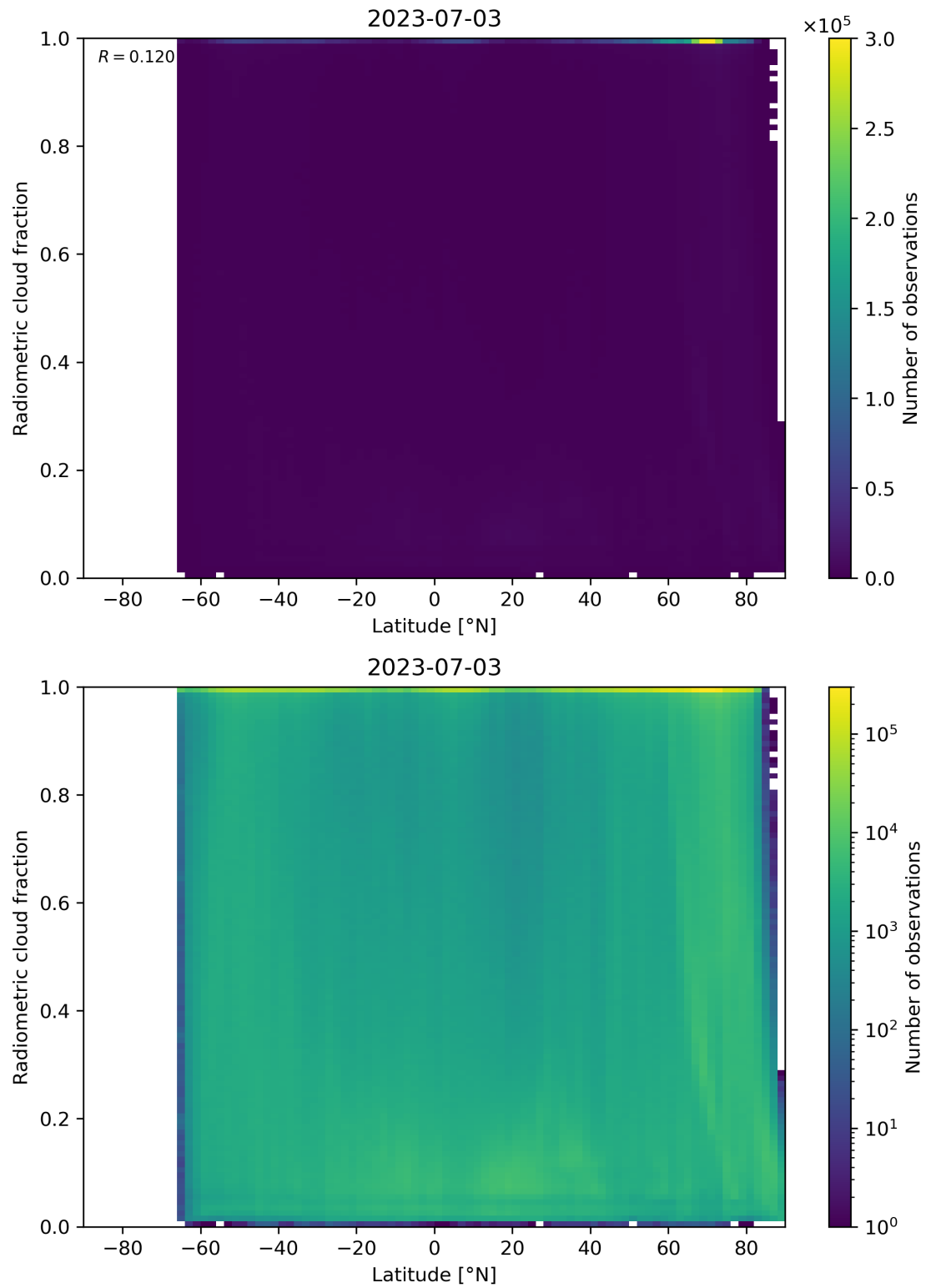


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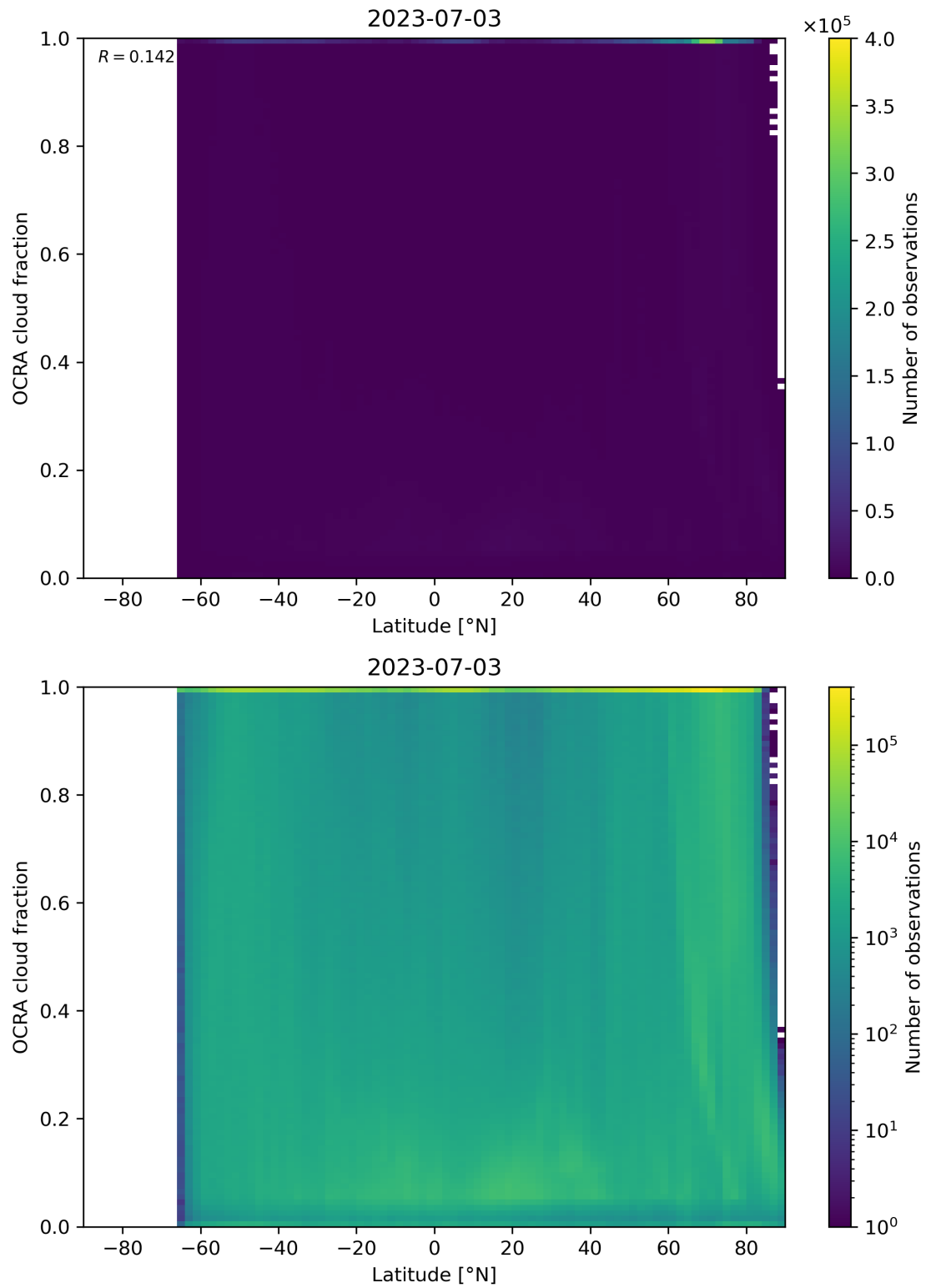


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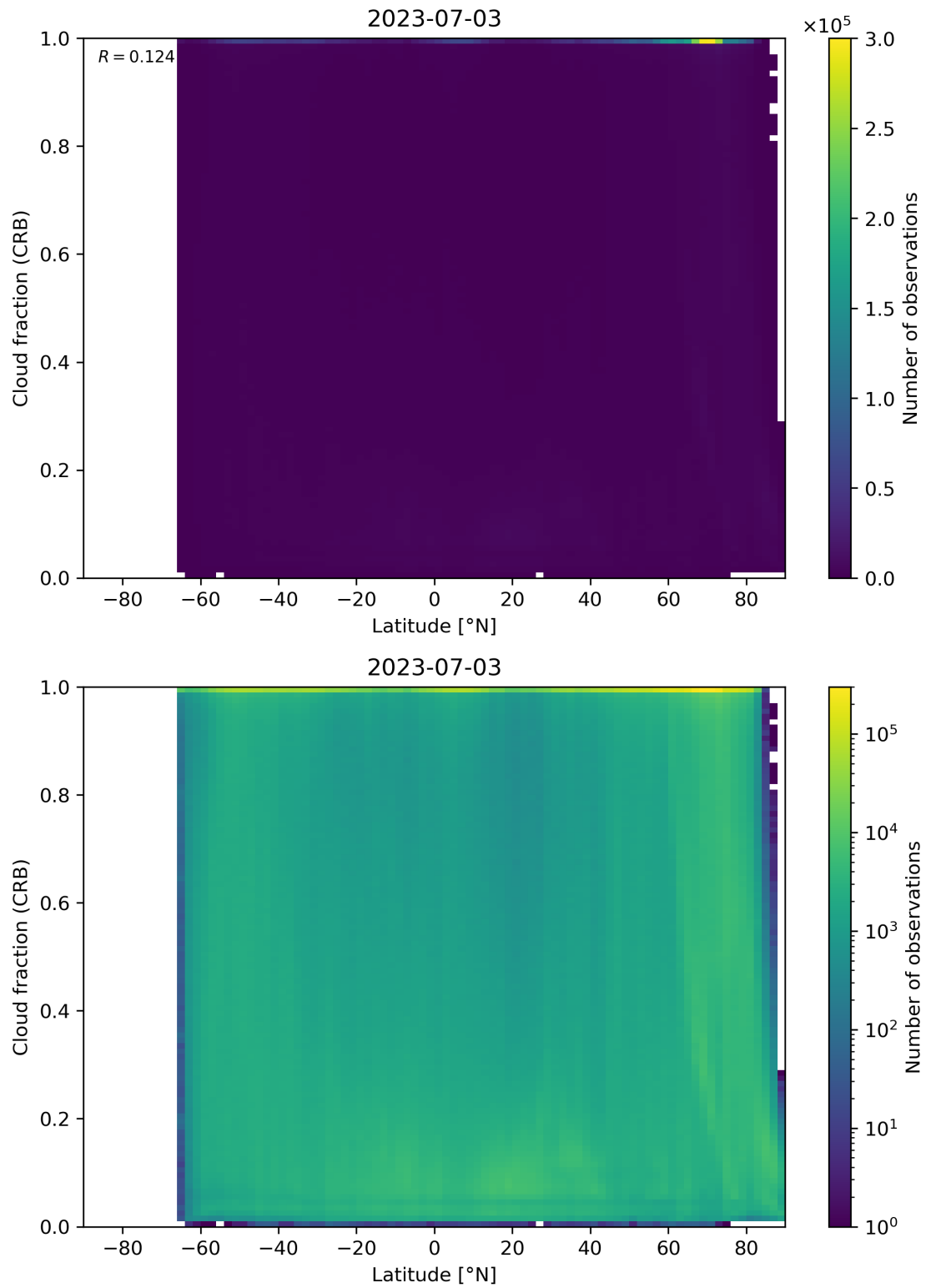


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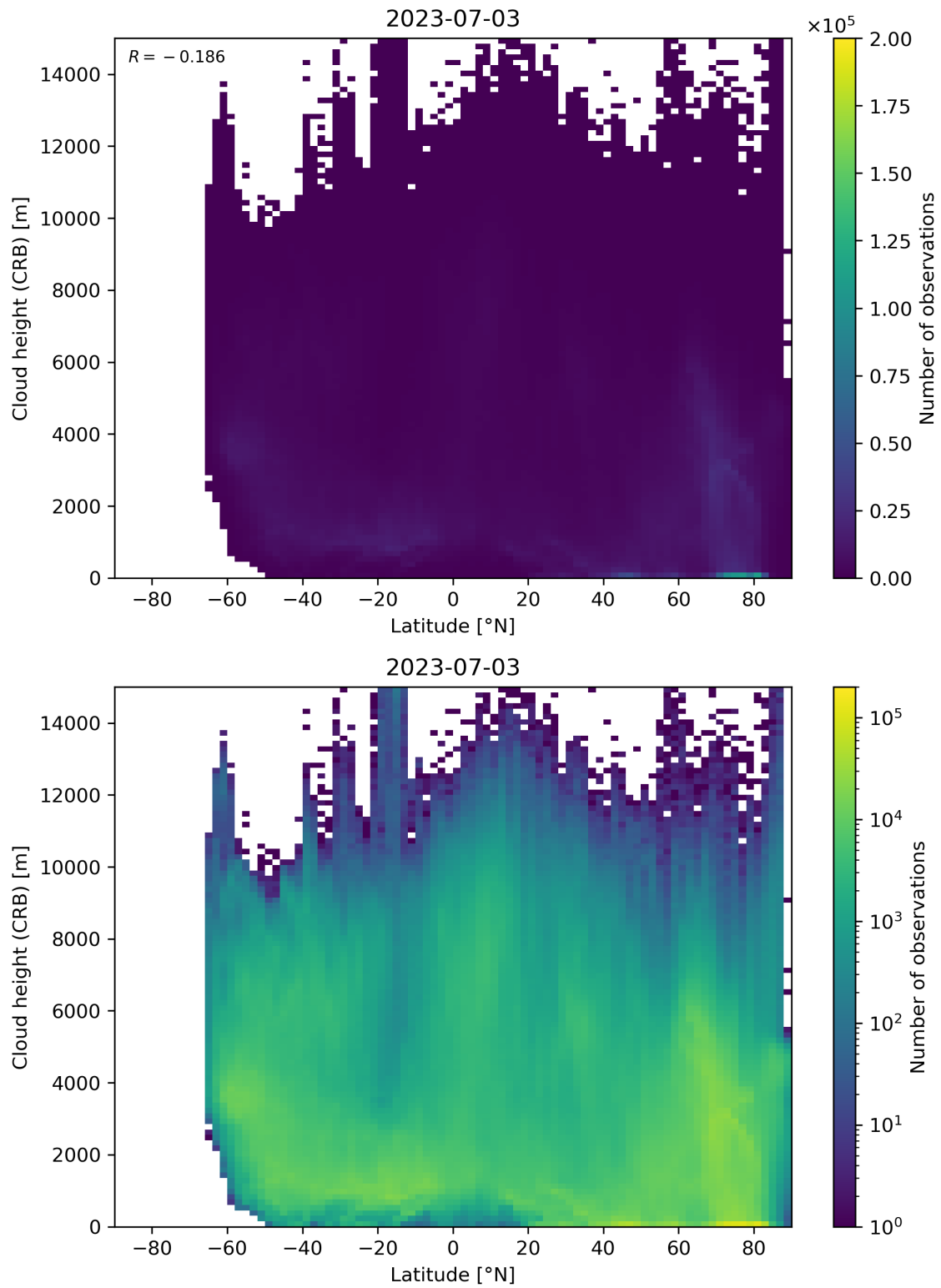


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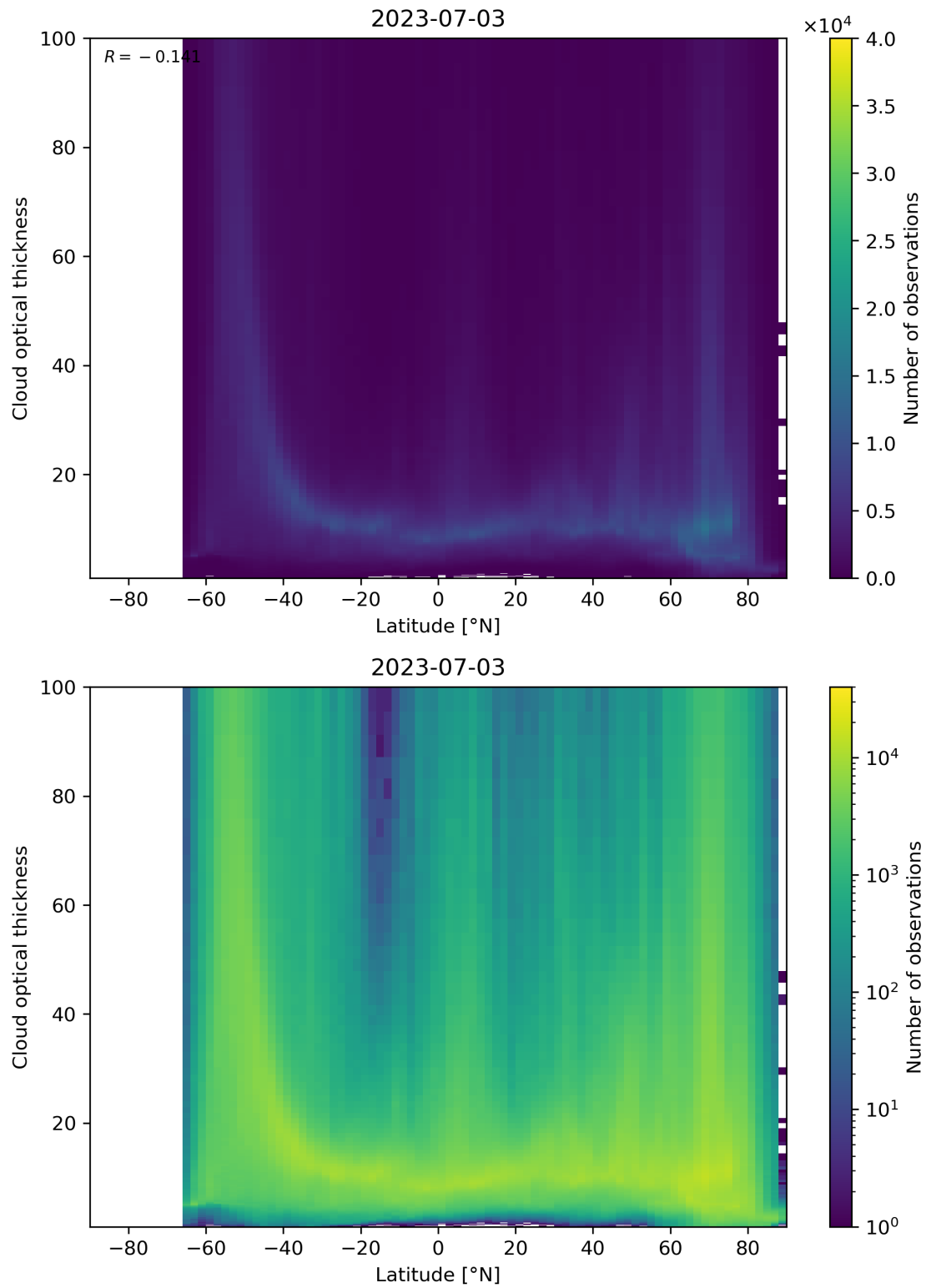


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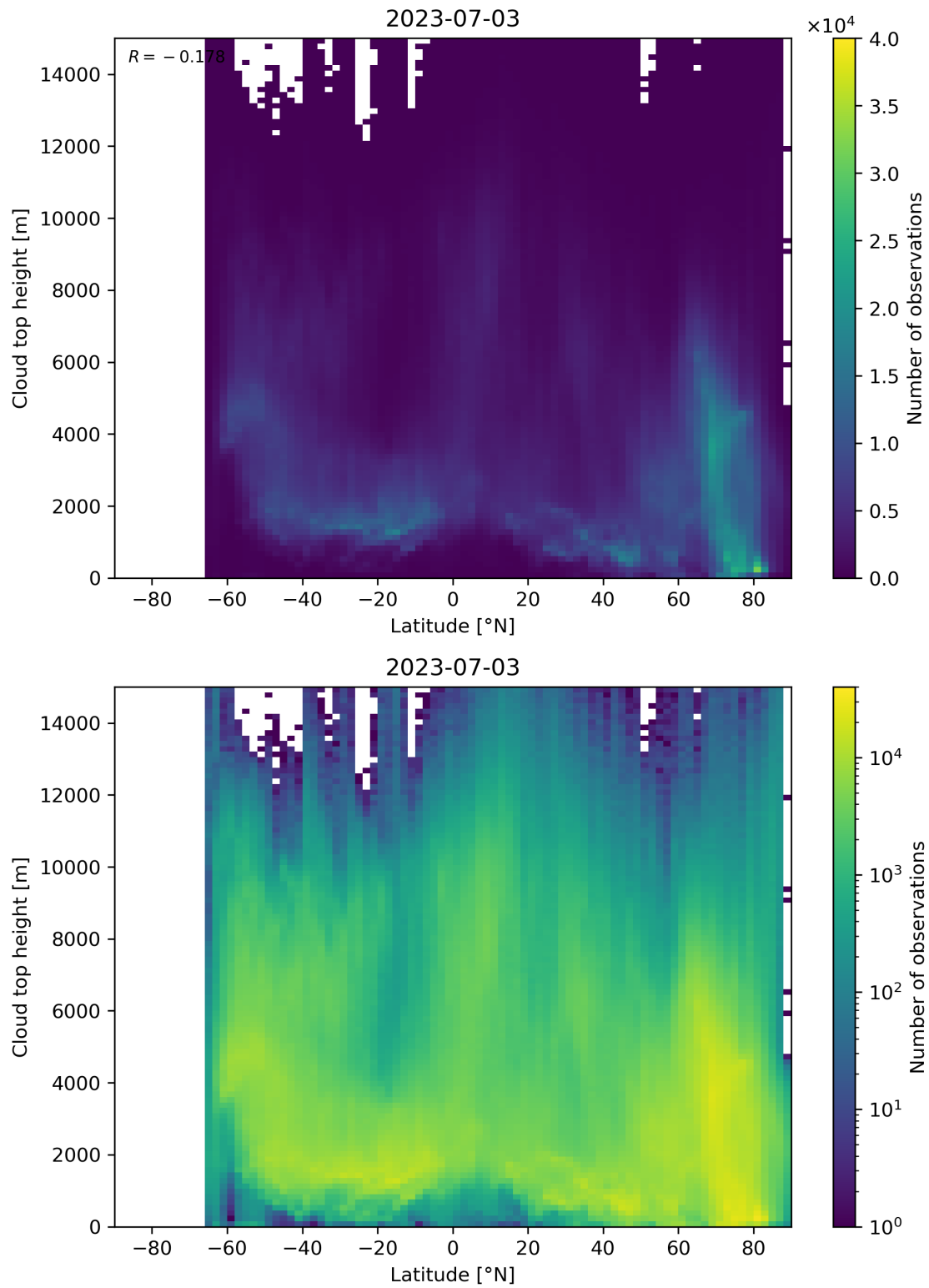


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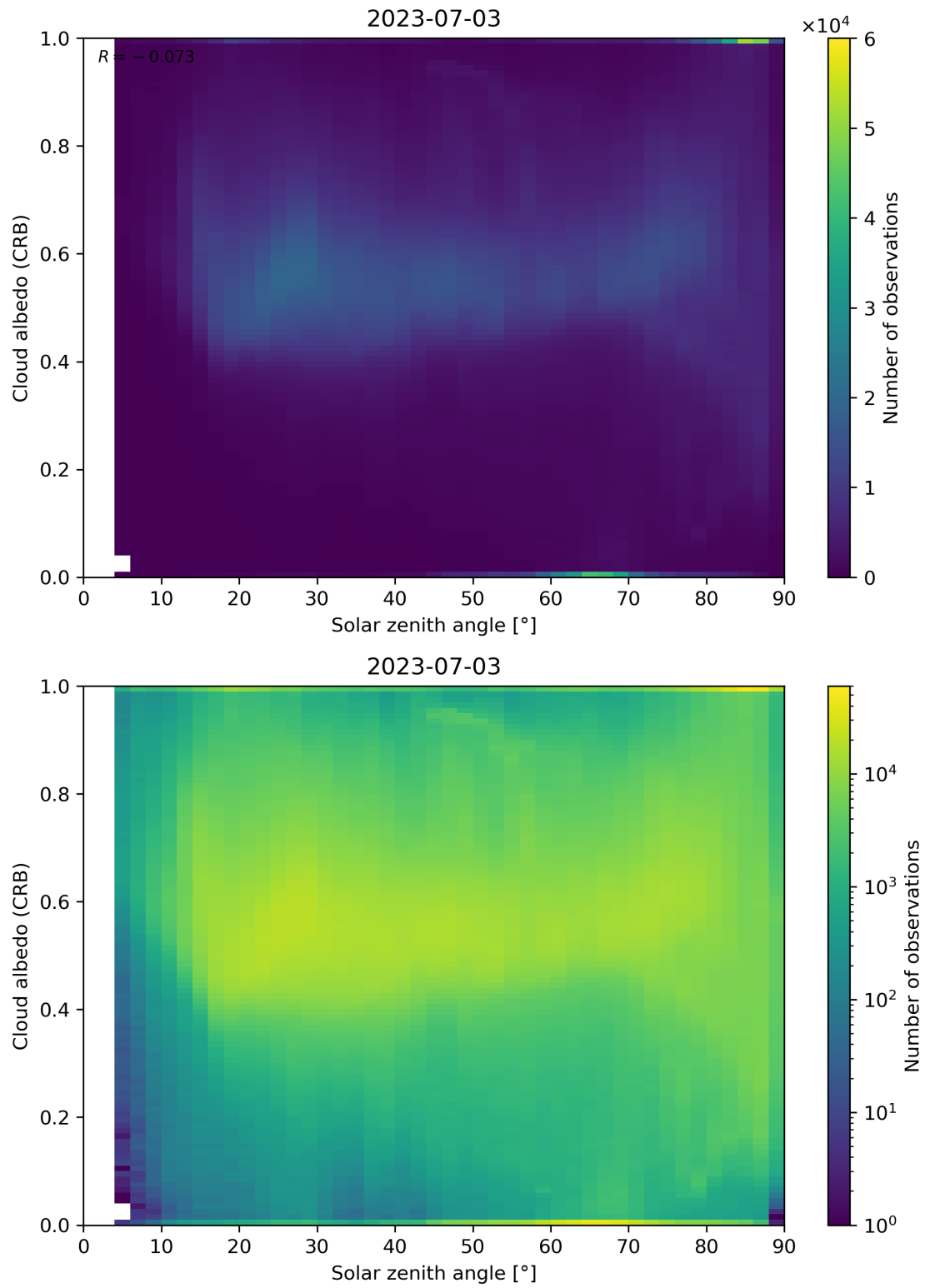


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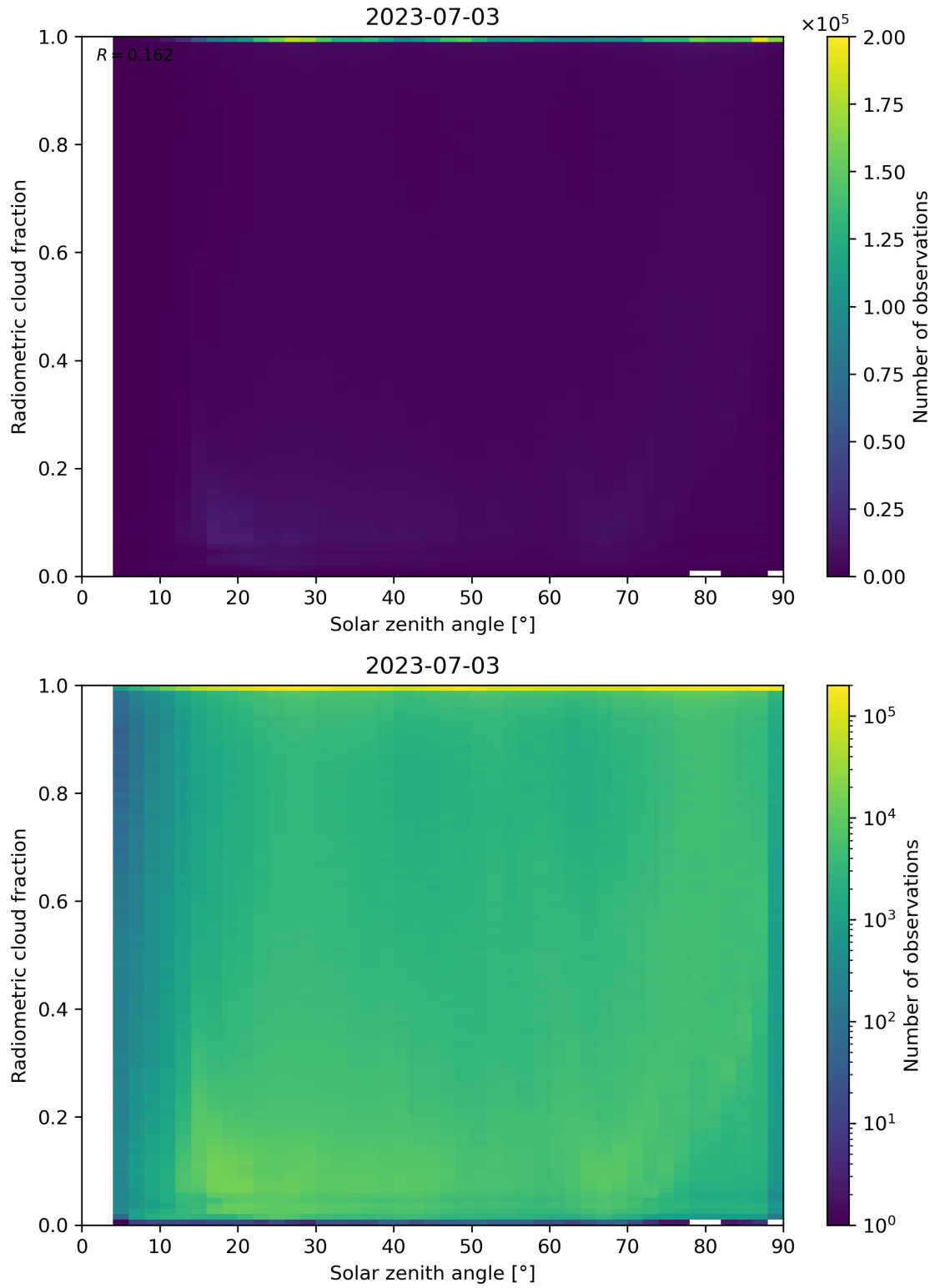


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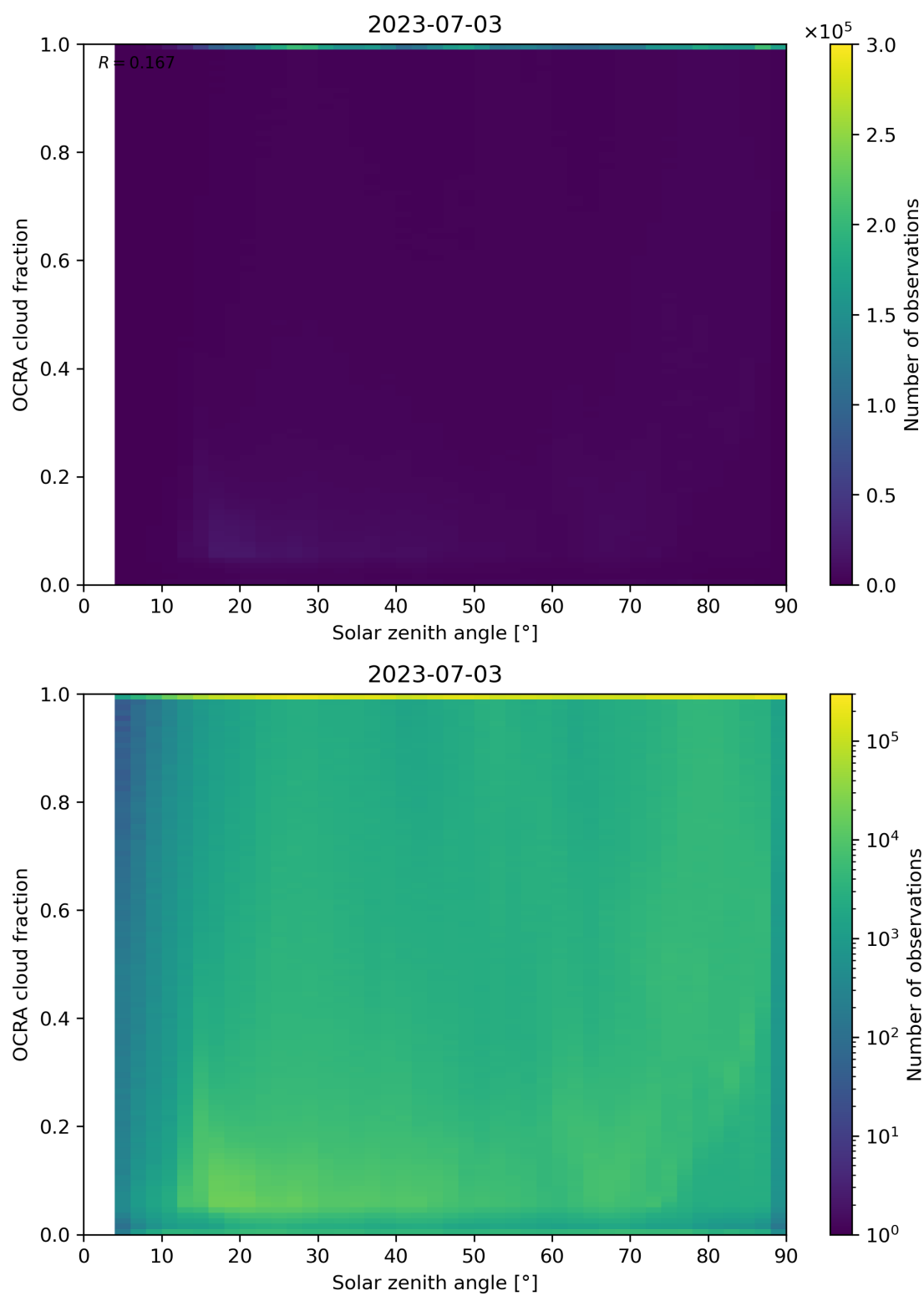


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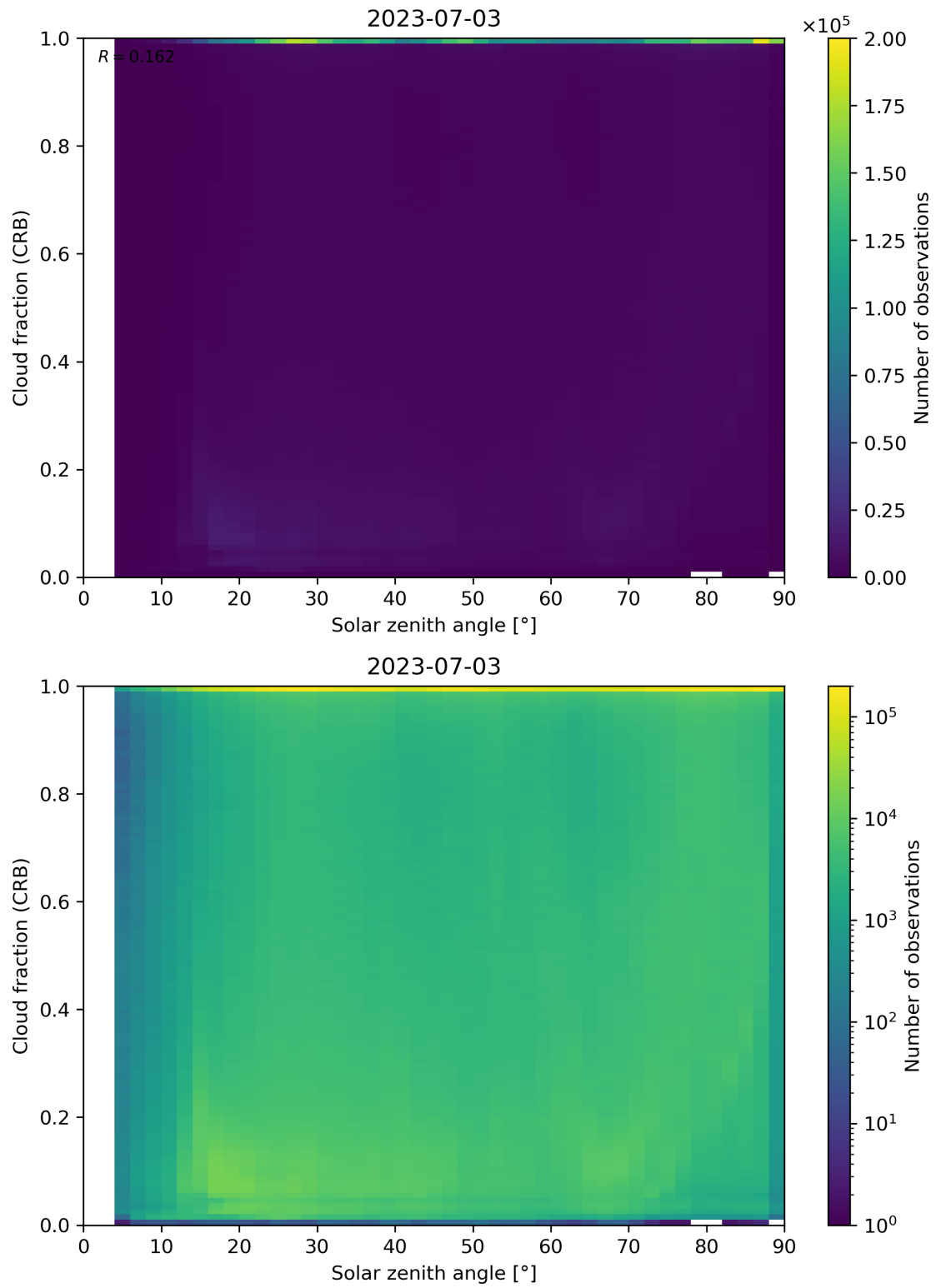


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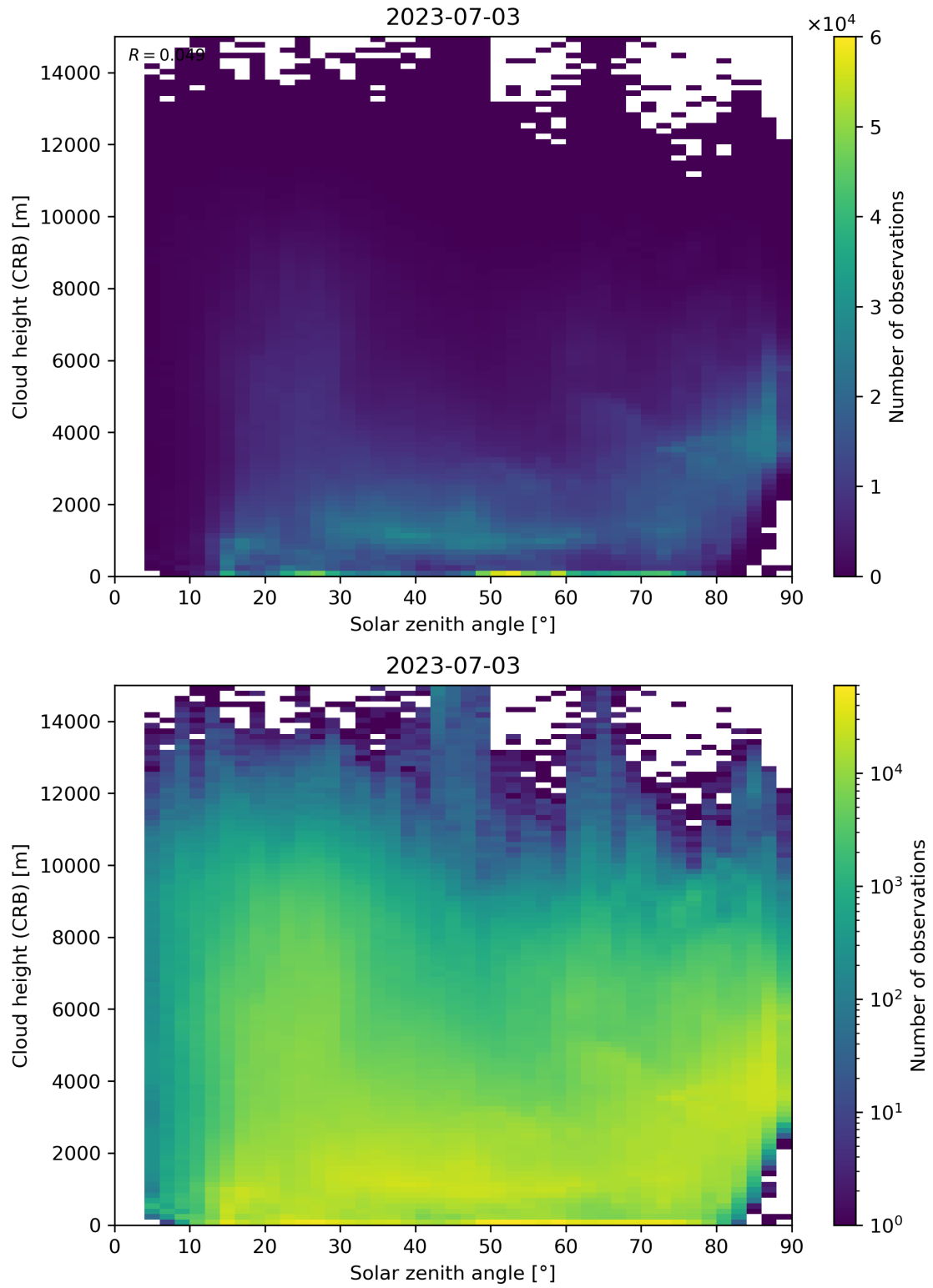


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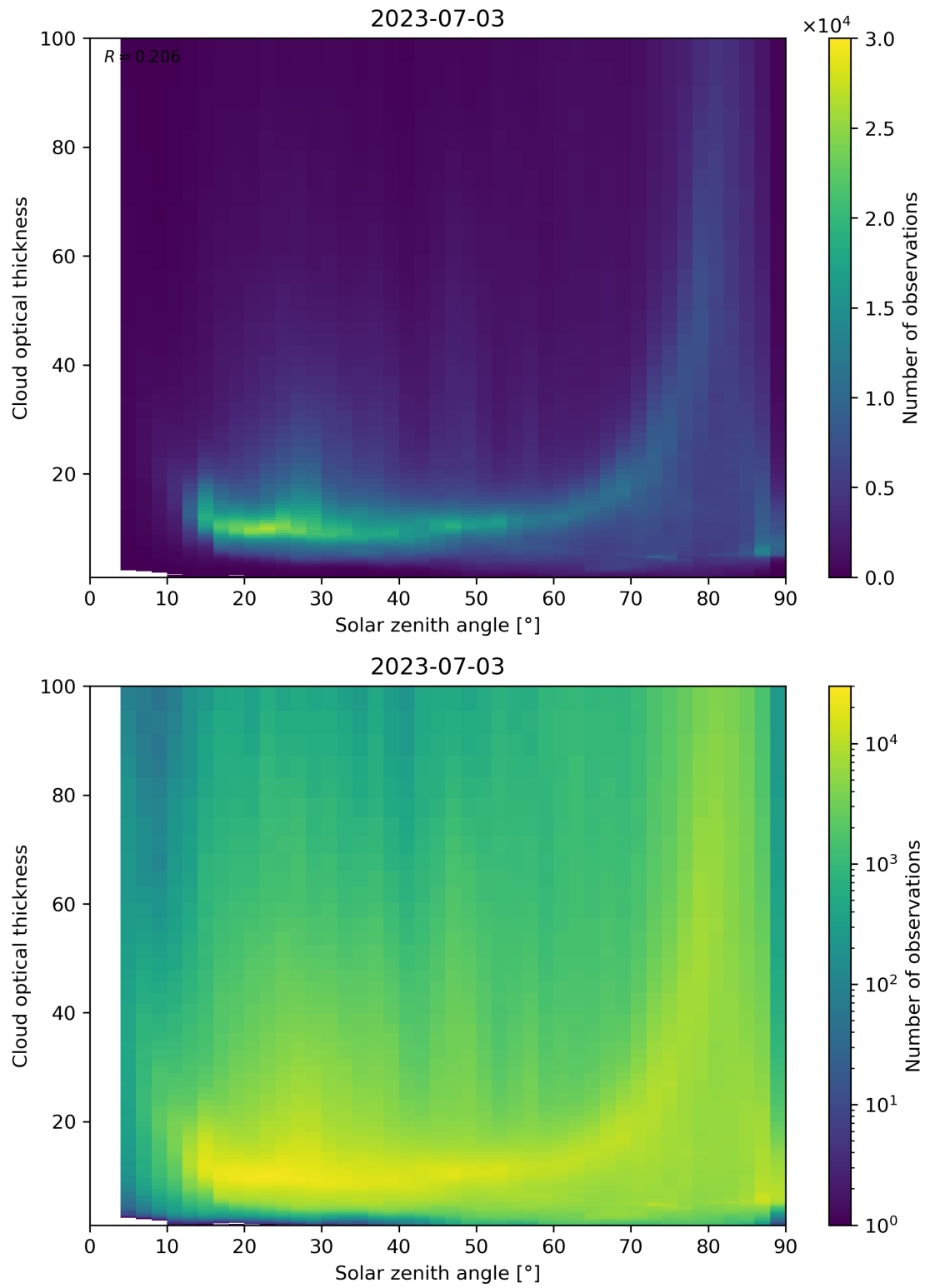


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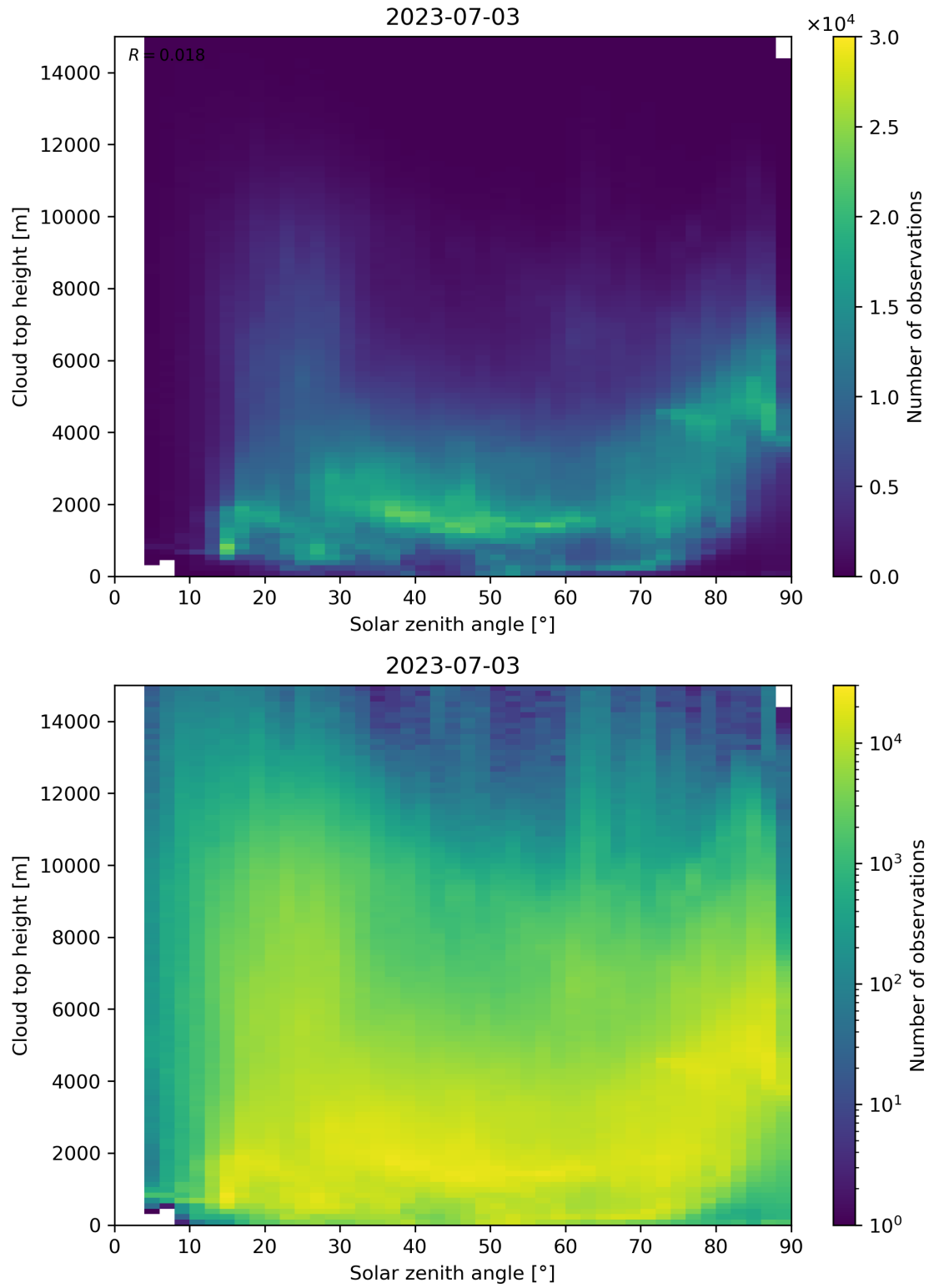


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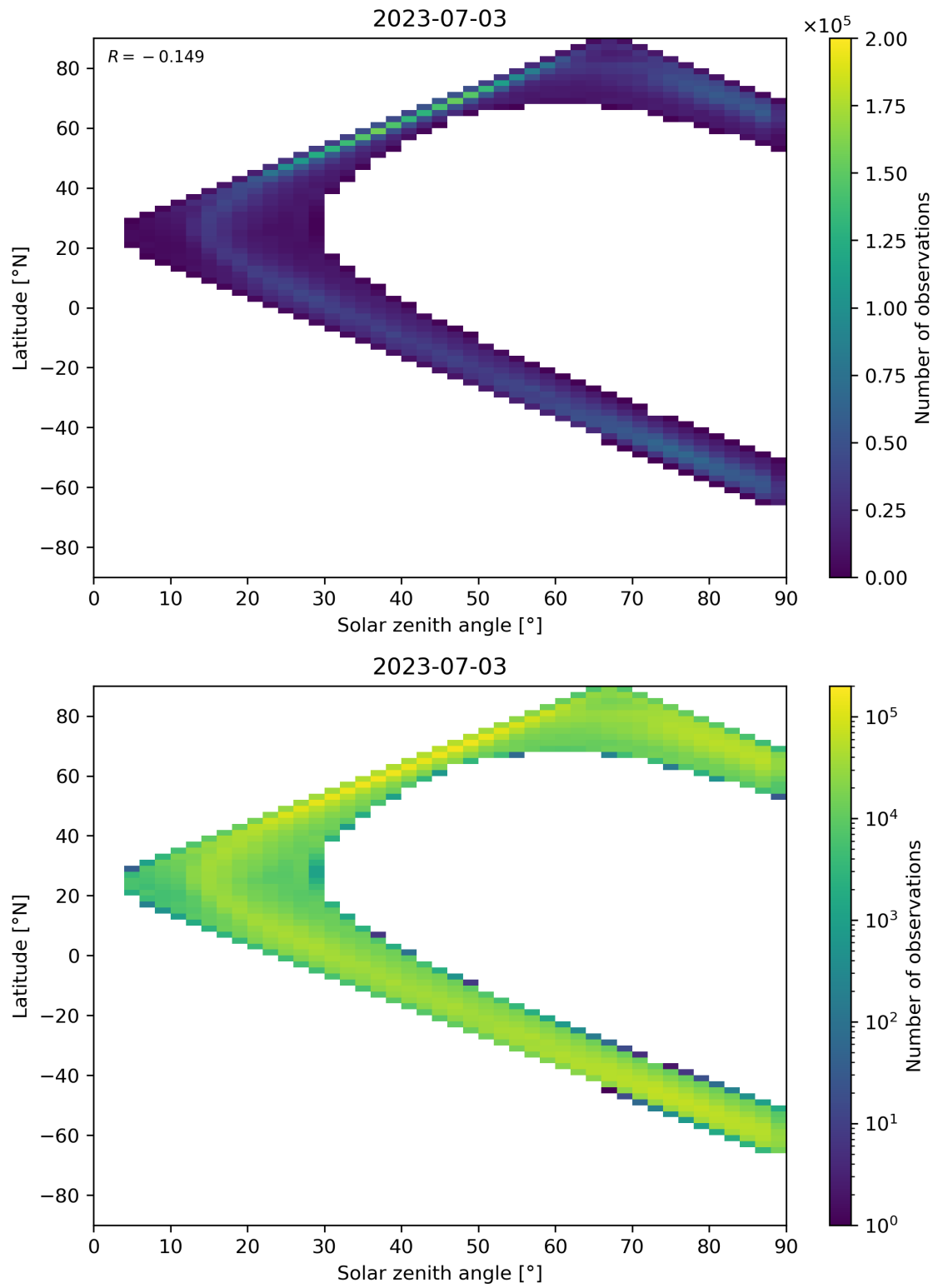


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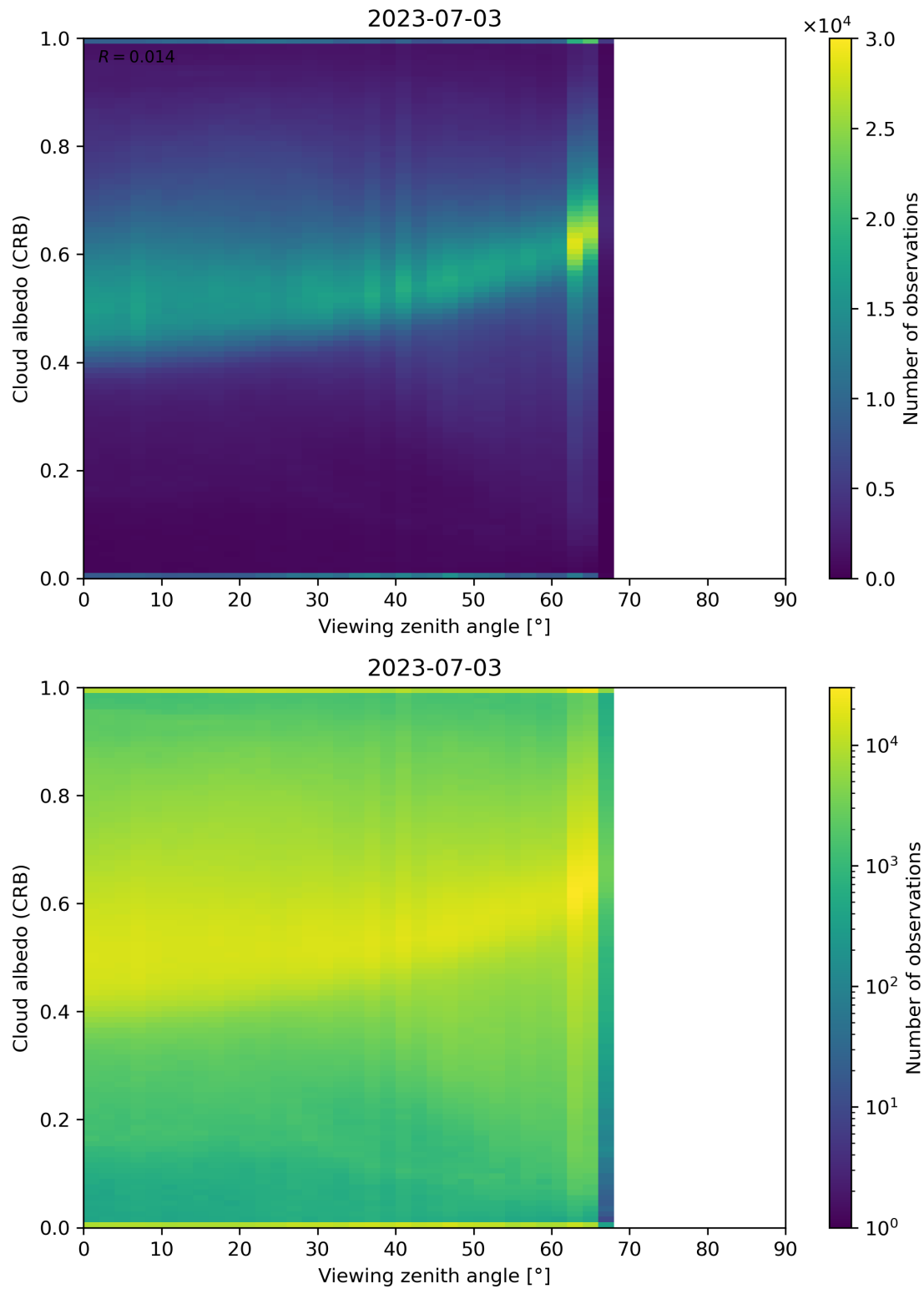


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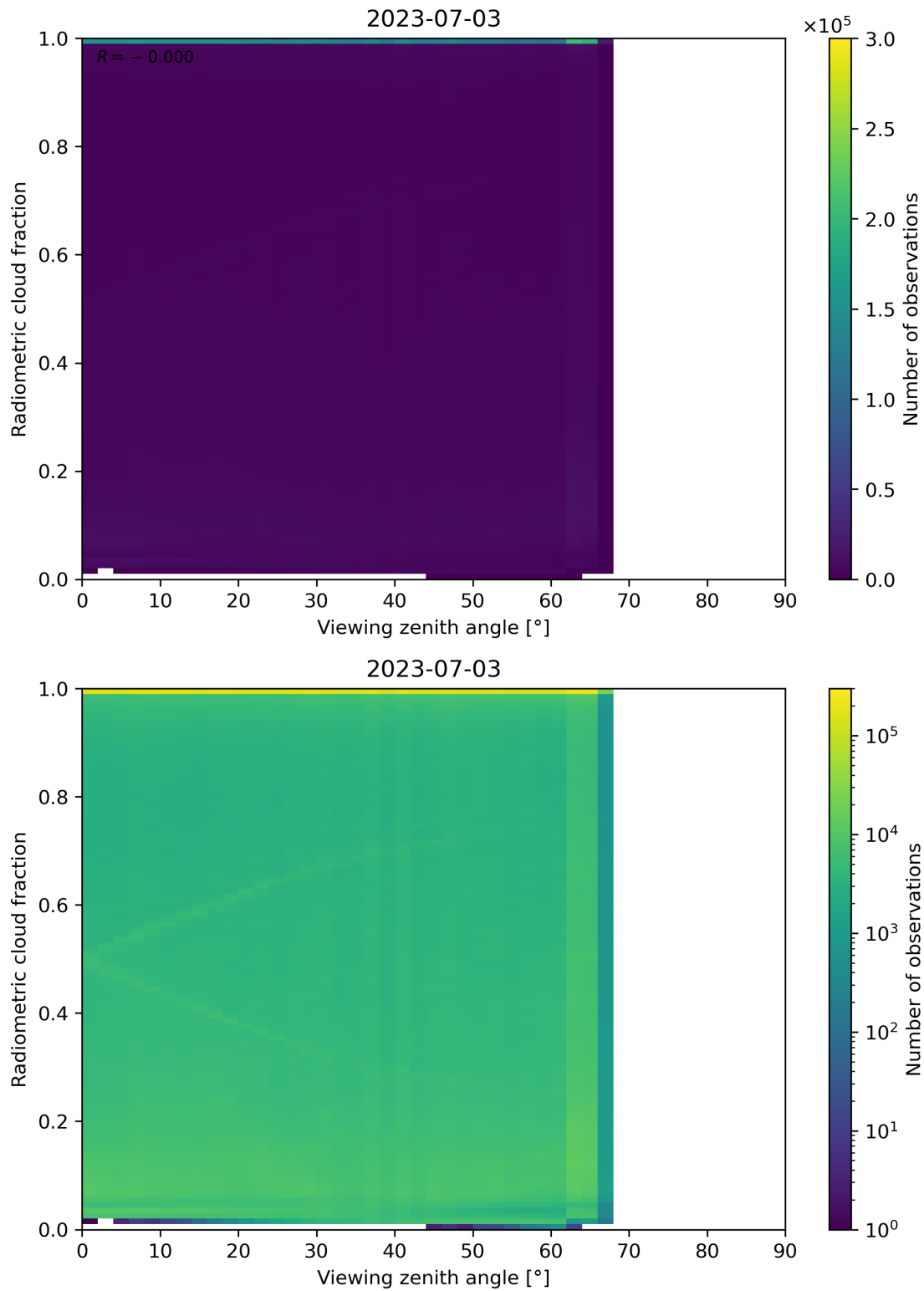


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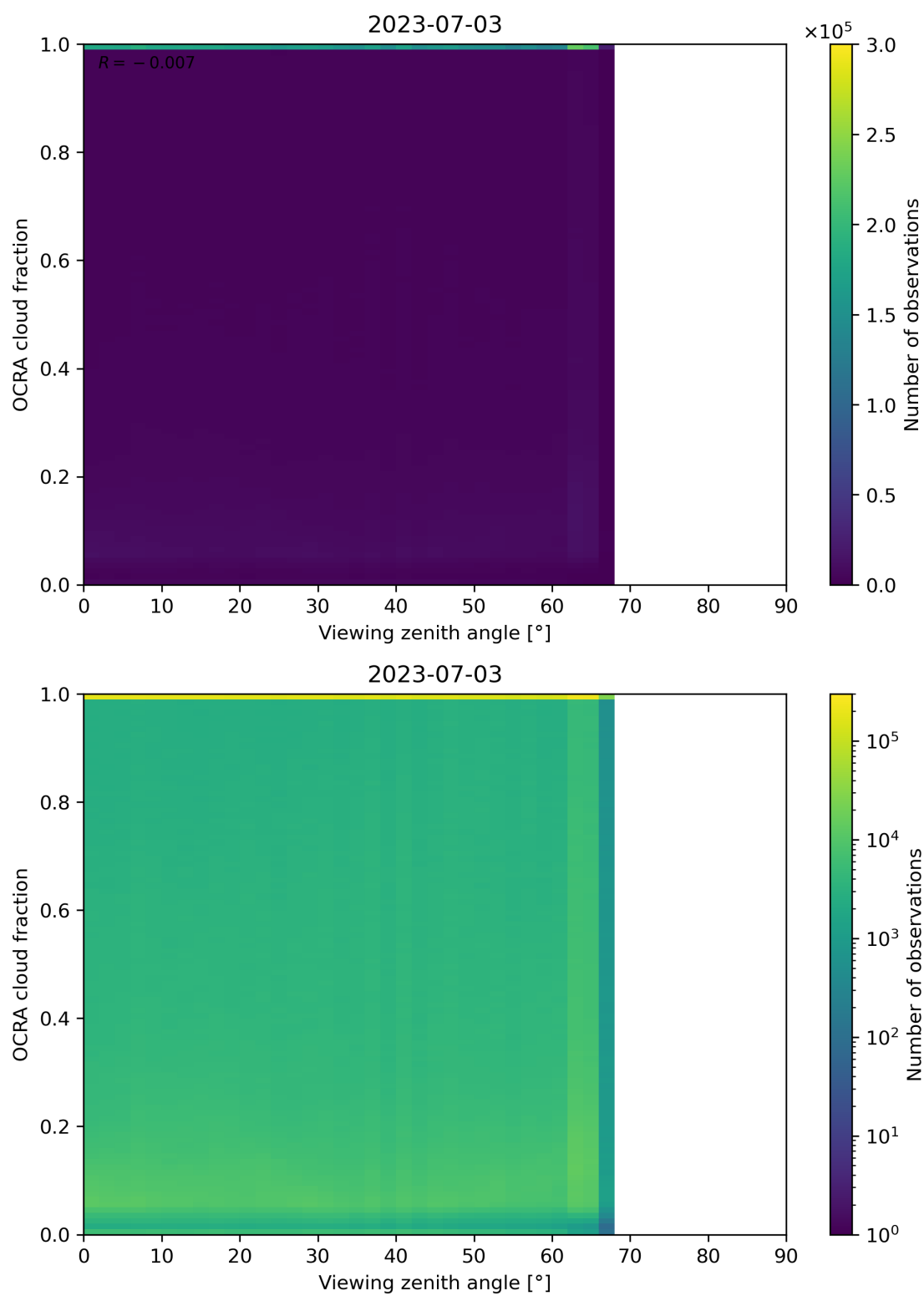


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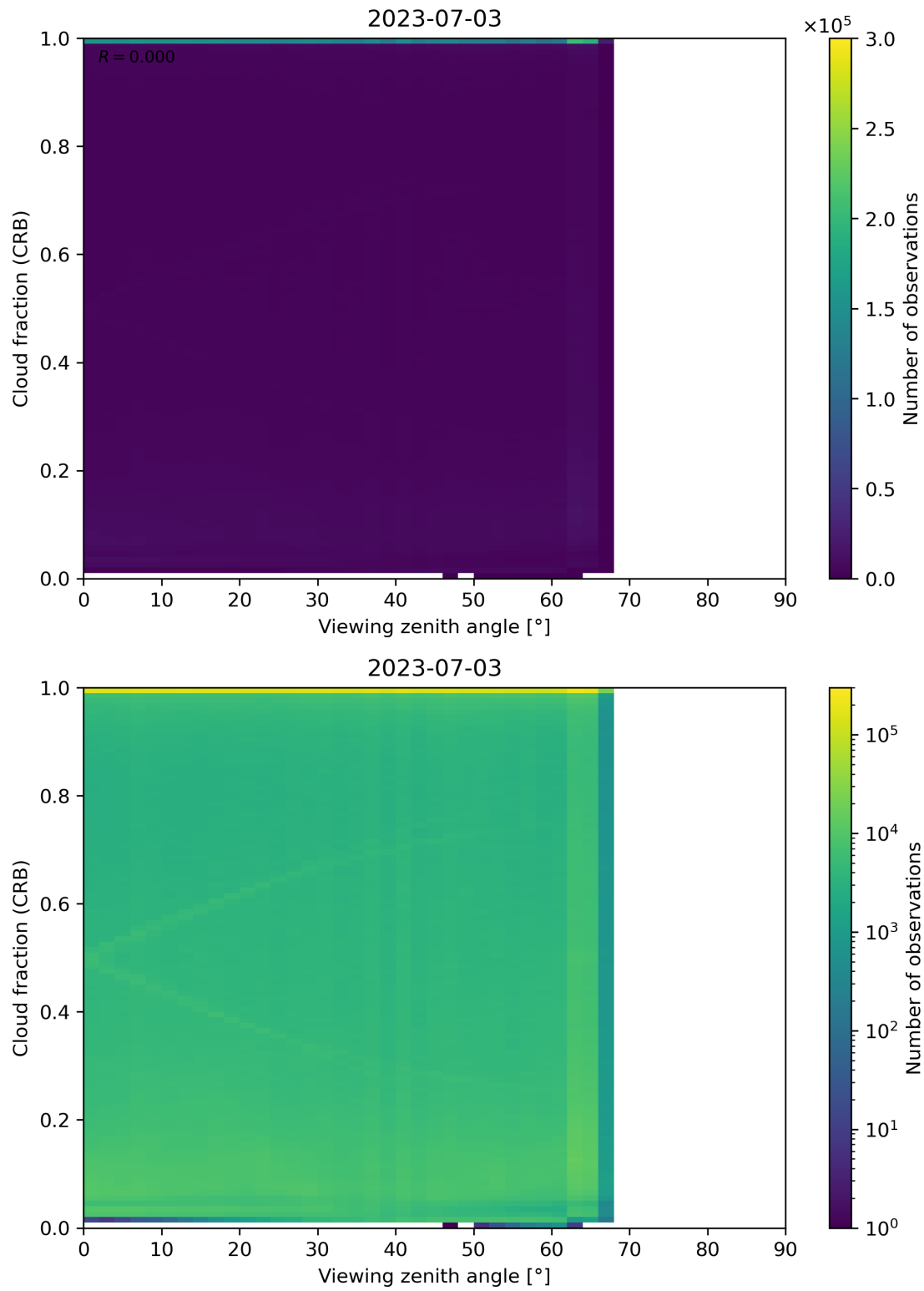


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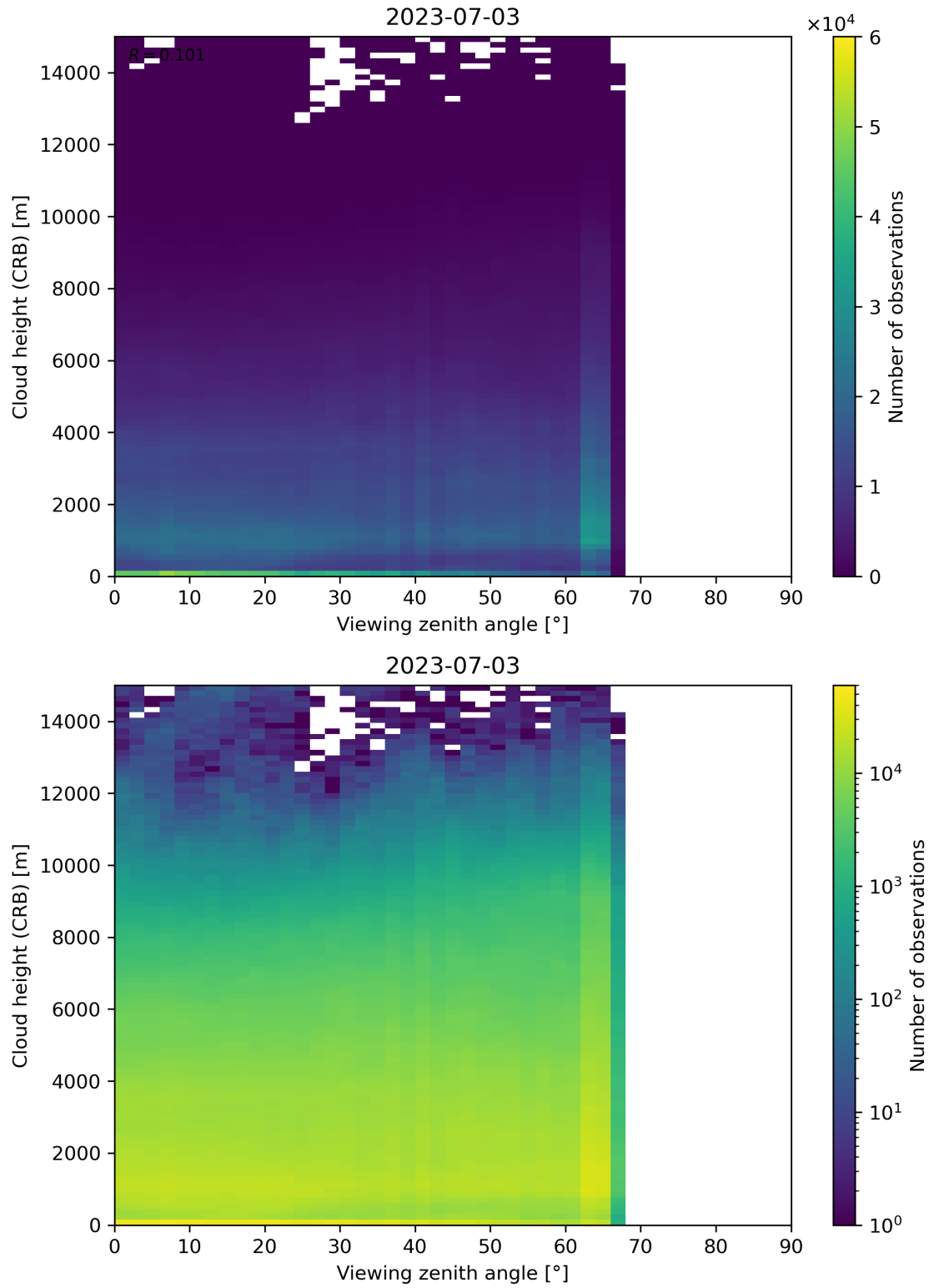


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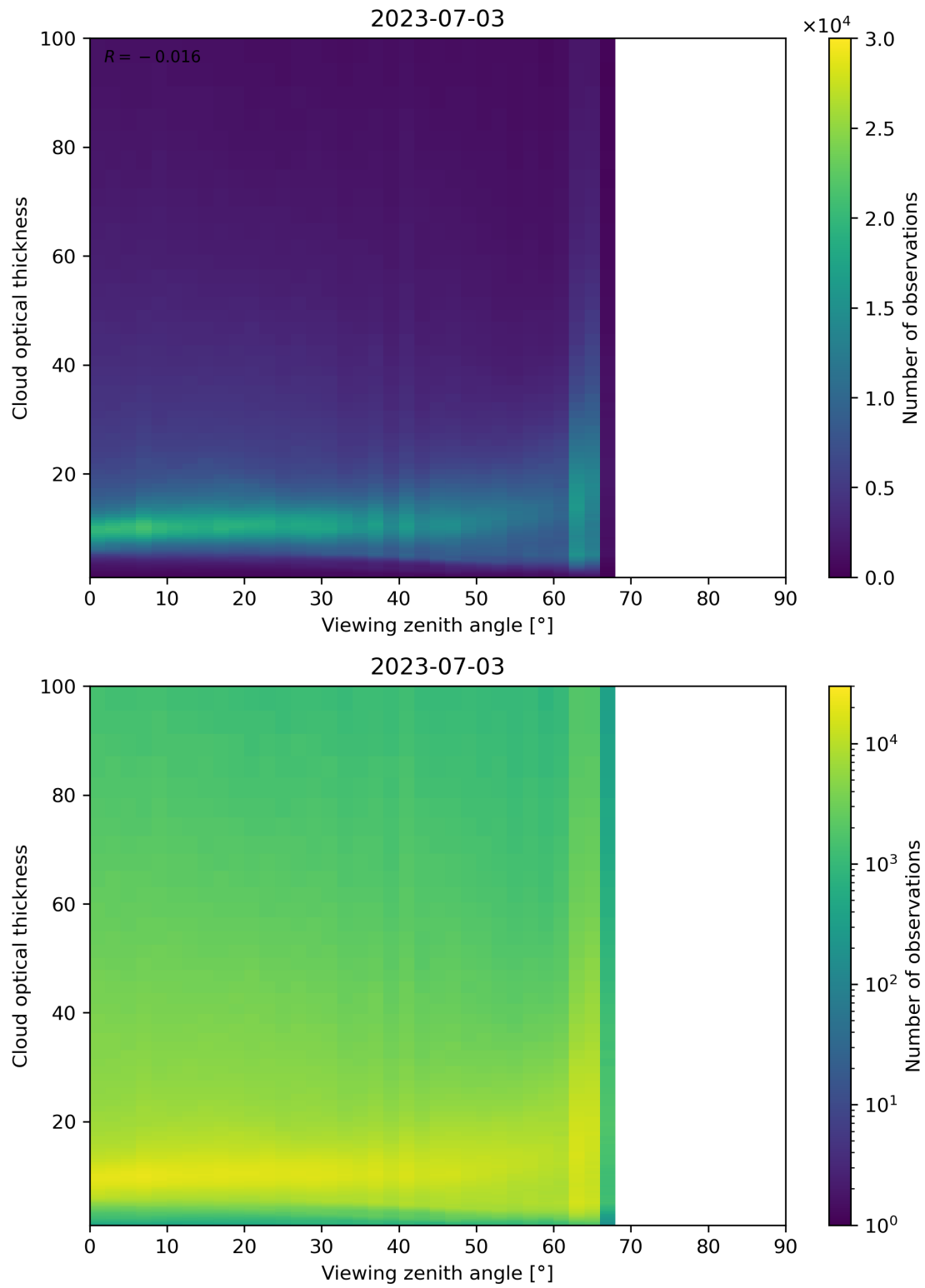


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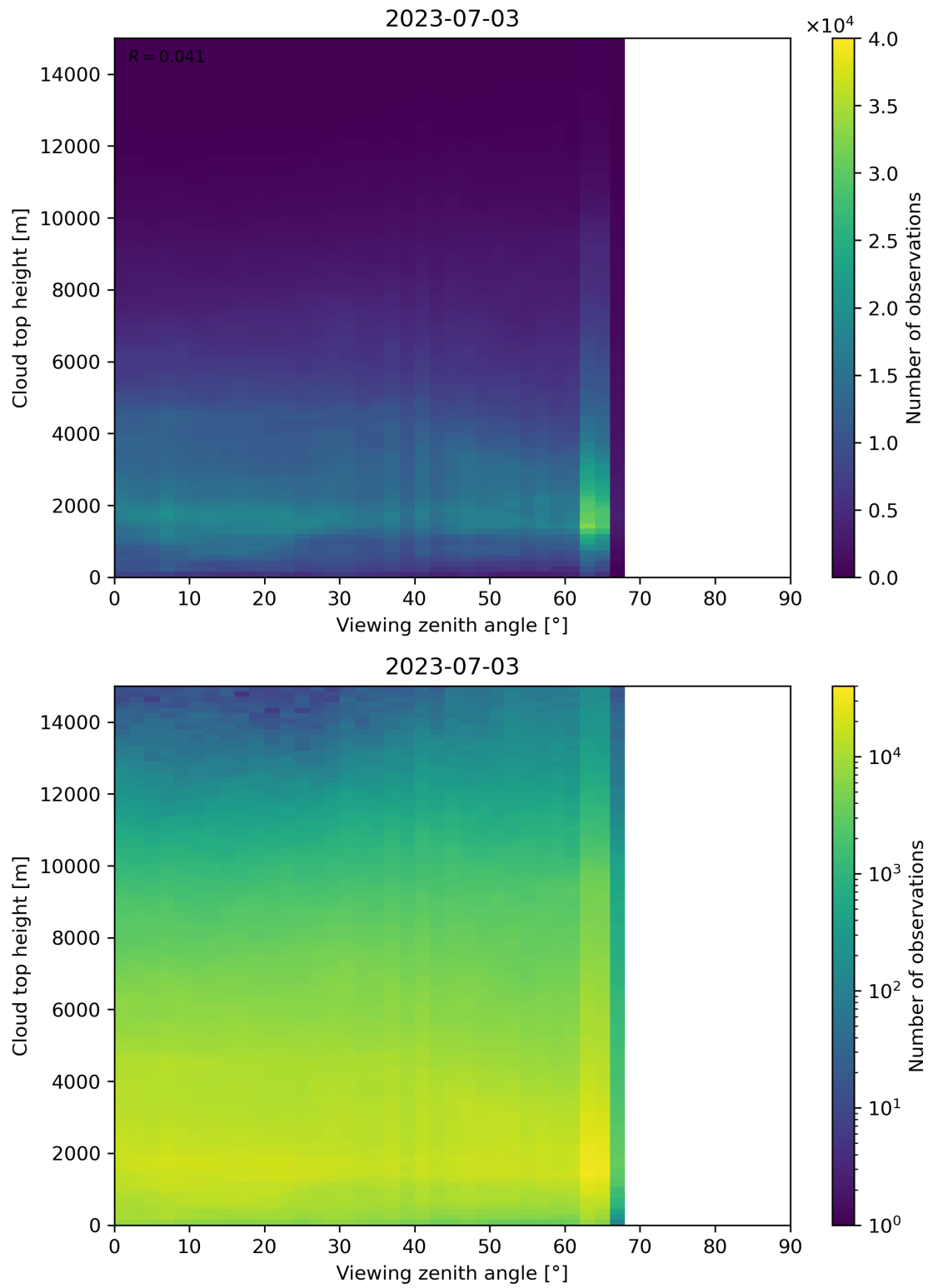


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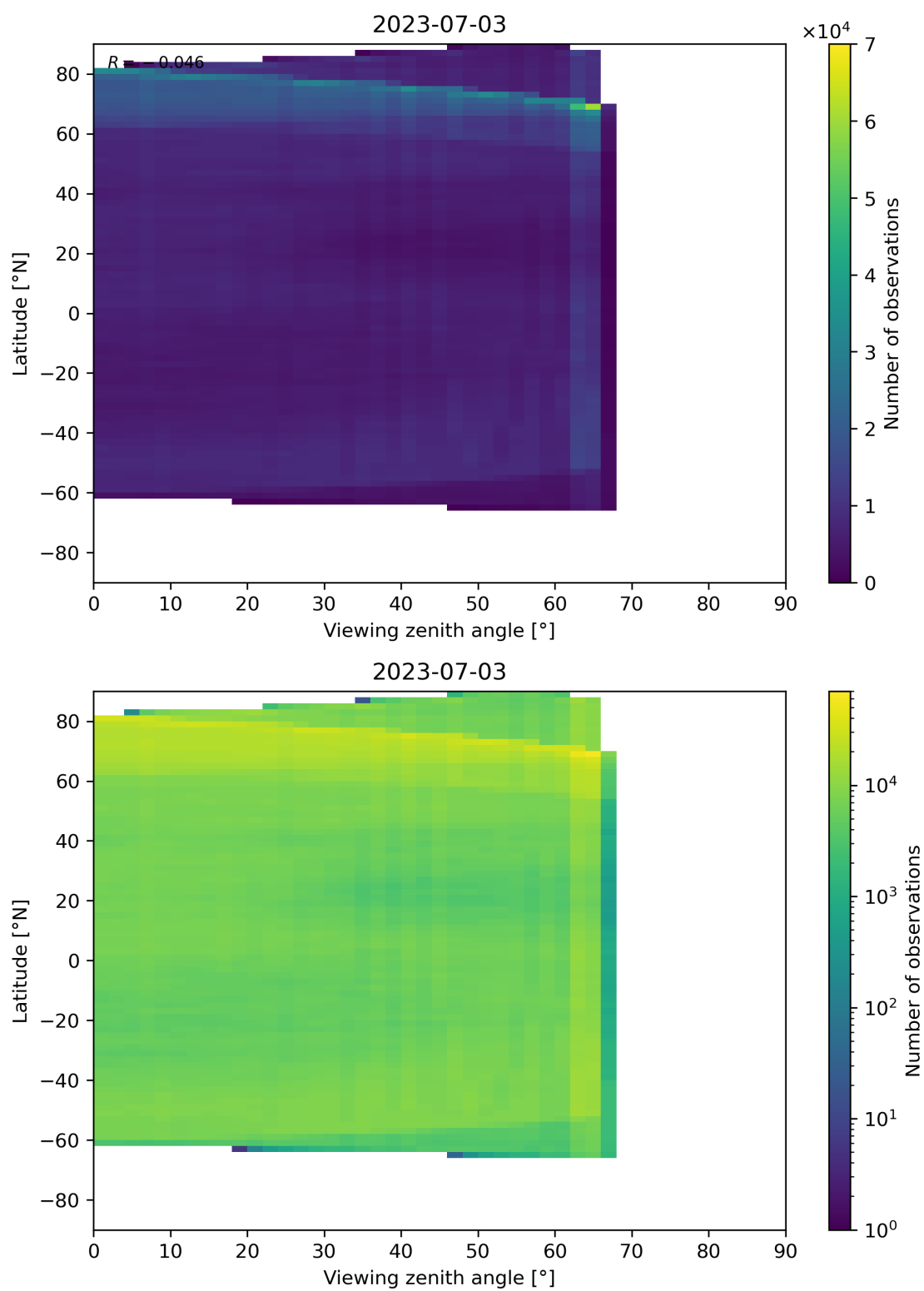


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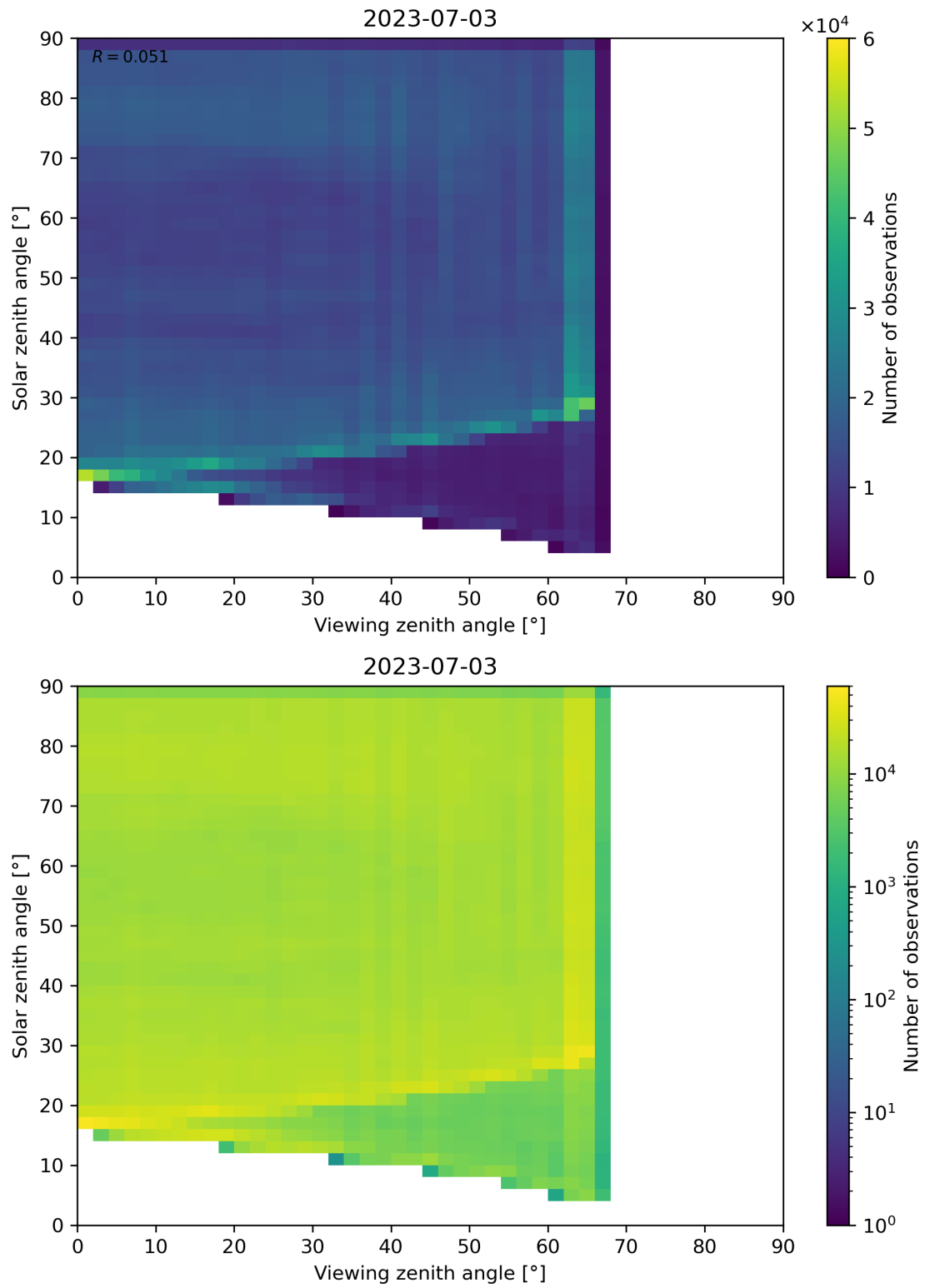


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Maarten Sneep (maarten.sneep@knmi.nl).