

PyCAMA report generated by trop12-proc

trop12-proc

2023-08-02 (00:34)

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]	0.613 ± 0.381	19484682	0.995	0.700	0.810	0.0	1.000
cloud fraction [1]	0.571 ± 0.353	19484682	0.995	0.762	0.558	5.880×10^{-3}	1.000
cloud top height [m]	$(0.385 \pm 0.265) \times 10^4$	19484682	1.425×10^3	3.575×10^3	3.322×10^3	0.0	2.000×10^4
cloud optical thickness [1]	22.7 ± 37.6	19484682	10.7	13.8	11.3	1.000	250
cloud fraction crb [1]	0.570 ± 0.353	19484682	0.995	0.764	0.556	7.562×10^{-3}	1.000
cloud height crb [m]	$(0.304 \pm 0.229) \times 10^4$	19484682	75.0	3.196×10^3	2.573×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.585 ± 0.197	19484682	0.995	0.234	0.580	0.0	1.000
surface albedo fitted [1]	0.156 ± 0.190	19484682	1.500×10^{-2}	0.216	5.661×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.150 ± 0.195	19484682	1.500×10^{-2}	0.222	3.554×10^{-2}	0.0	1.000
fitted root mean square [1]	$(7.797 \pm 18.658) \times 10^{-4}$	19484682	5.000×10^{-5}	8.916×10^{-4}	3.760×10^{-4}	1.037×10^{-6}	1.39
fitted root mean square crb [1]	$(6.743 \pm 15.569) \times 10^{-4}$	19484682	5.000×10^{-5}	8.615×10^{-4}	3.155×10^{-4}	7.720×10^{-7}	1.31
wavelength shift [nm]	$(7.106 \pm 6.729) \times 10^{-3}$	19484682	3.000×10^{-4}	9.316×10^{-3}	6.572×10^{-3}	-5.373×10^{-2}	0.726
cloud fraction apriori [1]	0.575 ± 0.359	19484682	0.995	0.777	0.566	0.0	1.000
reflectance blue ocra [1]	0.509 ± 0.189	19484682	0.325	0.295	0.481	0.140	2.77
reflectance green ocra [1]	0.455 ± 0.216	19484682	0.195	0.354	0.423	8.525×10^{-2}	3.19
reflectance continuum aband [1]	0.414 ± 0.250	19484682	0.325	0.376	0.386	1.265×10^{-2}	11.7

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	7.000×10^{-2}	0.250	0.950	1.000	1.000	1.000	1.000
cloud fraction [1]	2.442×10^{-2}	6.226×10^{-2}	9.873×10^{-2}	0.144	0.229	0.991	1.000	1.000	1.000	1.000
cloud top height [m]	116	534	967	1.318×10^3	1.784×10^3	5.359×10^3	6.469×10^3	7.519×10^3	8.954×10^3	1.164×10^4
cloud optical thickness [1]	1.04	2.75	4.11	5.23	6.88	20.7	31.1	45.9	80.6	250
cloud fraction crb [1]	2.397×10^{-2}	6.118×10^{-2}	9.757×10^{-2}	0.142	0.227	0.990	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	111	498	817	1.216×10^3	4.412×10^3	5.408×10^3	6.306×10^3	7.525×10^3	9.580×10^3
cloud albedo crb [1]	1.421×10^{-2}	0.233	0.346	0.416	0.474	0.709	0.781	0.844	0.924	1.000
surface albedo fitted [1]	0.0	7.182×10^{-3}	1.172×10^{-2}	1.612×10^{-2}	2.295×10^{-2}	0.239	0.314	0.434	0.569	0.856
surface albedo fitted crb [1]	0.0	5.492×10^{-3}	8.232×10^{-3}	1.119×10^{-2}	1.573×10^{-2}	0.237	0.317	0.445	0.574	0.831
fitted root mean square [1]	9.916×10^{-6}	2.486×10^{-5}	4.279×10^{-5}	6.767×10^{-5}	1.161×10^{-4}	1.008×10^{-3}	1.468×10^{-3}	1.962×10^{-3}	2.665×10^{-3}	4.475×10^{-3}
fitted root mean square crb [1]	5.899×10^{-6}	1.507×10^{-5}	2.758×10^{-5}	4.348×10^{-5}	7.736×10^{-5}	9.389×10^{-4}	1.385×10^{-3}	1.848×10^{-3}	2.486×10^{-3}	3.808×10^{-3}
wavelength shift [nm]	-8.133×10^{-3}	-1.306×10^{-3}	-1.024×10^{-4}	5.430×10^{-4}	2.051×10^{-3}	1.137×10^{-2}	1.369×10^{-2}	1.577×10^{-2}	1.858×10^{-2}	2.484×10^{-2}
cloud fraction apriori [1]	1.411×10^{-2}	5.875×10^{-2}	9.190×10^{-2}	0.136	0.223	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.231	0.259	0.283	0.310	0.351	0.646	0.720	0.776	0.841	0.962
reflectance green ocra [1]	0.151	0.176	0.197	0.222	0.264	0.618	0.700	0.762	0.836	0.961
reflectance continuum aband [1]	3.199×10^{-2}	5.941×10^{-2}	9.376×10^{-2}	0.137	0.215	0.591	0.687	0.764	0.848	0.992

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]	0.587 ± 0.384	12761952	0.720	0.780	0.0	1.000	0.190	0.910
cloud fraction [1]	0.604 ± 0.357	12761952	0.747	0.629	5.880×10^{-3}	1.000	0.253	1.000
cloud top height [m]	$(0.381 \pm 0.275) \times 10^4$	12761952	3.723×10^3	3.310×10^3	0.0	2.000×10^4	1.663×10^3	5.385×10^3
cloud optical thickness [1]	21.7 ± 37.0	12761952	13.2	10.9	1.000	250	6.58	19.8
cloud fraction crb [1]	0.603 ± 0.357	12761952	0.749	0.627	7.562×10^{-3}	1.000	0.251	1.000
cloud height crb [m]	$(0.299 \pm 0.238) \times 10^4$	12761952	3.398×10^3	2.538×10^3	0.0	2.000×10^4	1.064×10^3	4.463×10^3
cloud albedo crb [1]	0.578 ± 0.207	12761952	0.252	0.577	0.0	1.000	0.462	0.714
surface albedo fitted [1]	0.203 ± 0.208	12761952	0.270	0.168	0.0	1.000	2.706×10^{-2}	0.297
surface albedo fitted crb [1]	0.201 ± 0.212	12761952	0.280	0.169	0.0	1.000	1.877×10^{-2}	0.299
fitted root mean square [1]	$(9.890 \pm 22.449) \times 10^{-4}$	12761952	1.130×10^{-3}	5.818×10^{-4}	1.526×10^{-6}	1.39	1.715×10^{-4}	1.302×10^{-3}
fitted root mean square crb [1]	$(8.535 \pm 18.616) \times 10^{-4}$	12761952	1.077×10^{-3}	5.095×10^{-4}	7.720×10^{-7}	1.31	1.410×10^{-4}	1.218×10^{-3}
wavelength shift [nm]	$(7.989 \pm 6.654) \times 10^{-3}$	12761952	8.808×10^{-3}	7.755×10^{-3}	-5.373×10^{-2}	0.726	3.369×10^{-3}	1.218×10^{-2}
cloud fraction apriori [1]	0.610 ± 0.361	12761952	0.748	0.645	0.0	1.000	0.252	1.000
reflectance blue ocr [1]	0.518 ± 0.197	12761952	0.327	0.497	0.140	1.81	0.344	0.671
reflectance green ocr [1]	0.472 ± 0.224	12761952	0.385	0.451	8.637×10^{-2}	3.19	0.266	0.651
reflectance continuum aband [1]	0.447 ± 0.248	12761952	0.374	0.428	1.265×10^{-2}	11.7	0.255	0.629

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]	0.664 ± 0.370	6722730	0.600	0.900	0.0	1.000	0.400	1.000
cloud fraction [1]	0.509 ± 0.337	6722730	0.650	0.458	8.336×10^{-3}	1.000	0.197	0.847
cloud top height [m]	$(0.392 \pm 0.244) \times 10^4$	6722730	3.370×10^3	3.345×10^3	0.0	2.000×10^4	1.941×10^3	5.311×10^3
cloud optical thickness [1]	24.5 ± 38.6	6722730	15.1	12.0	1.000	250	7.41	22.6
cloud fraction crb [1]	0.507 ± 0.337	6722730	0.649	0.454	8.587×10^{-3}	1.000	0.195	0.844
cloud height crb [m]	$(0.314 \pm 0.212) \times 10^4$	6722730	2.901×10^3	2.630×10^3	0.0	1.579×10^4	1.407×10^3	4.309×10^3
cloud albedo crb [1]	0.598 ± 0.178	6722730	0.205	0.585	0.0	1.000	0.494	0.699
surface albedo fitted [1]	$(6.584 \pm 10.091) \times 10^{-2}$	6722730	4.330×10^{-2}	3.391×10^{-2}	0.0	1.000	1.943×10^{-2}	6.273×10^{-2}
surface albedo fitted crb [1]	$(5.273 \pm 10.027) \times 10^{-2}$	6722730	2.233×10^{-2}	2.169×10^{-2}	0.0	1.000	1.341×10^{-2}	3.575×10^{-2}
fitted root mean square [1]	$(3.825 \pm 5.305) \times 10^{-4}$	6722730	3.864×10^{-4}	1.843×10^{-4}	1.037×10^{-6}	2.473×10^{-2}	7.186×10^{-5}	4.583×10^{-4}
fitted root mean square crb [1]	$(3.342 \pm 5.197) \times 10^{-4}$	6722730	3.470×10^{-4}	1.122×10^{-4}	9.996×10^{-7}	1.566×10^{-2}	4.158×10^{-5}	3.885×10^{-4}
wavelength shift [nm]	$(5.429 \pm 6.550) \times 10^{-3}$	6722730	8.356×10^{-3}	4.051×10^{-3}	-4.301×10^{-2}	5.920×10^{-2}	8.058×10^{-4}	9.162×10^{-3}
cloud fraction apriori [1]	0.508 ± 0.345	6722730	0.679	0.454	0.0	1.000	0.186	0.864
reflectance blue oca [1]	0.493 ± 0.172	6722730	0.235	0.460	0.154	2.77	0.361	0.596
reflectance green oca [1]	0.424 ± 0.198	6722730	0.286	0.387	8.525×10^{-2}	2.92	0.262	0.548
reflectance continuum aband [1]	0.351 ± 0.241	6722730	0.349	0.311	1.337×10^{-2}	3.99	0.154	0.503

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]	0.602 ± 0.379	13684134	0.690	0.800	0.0	1.000	0.250	0.940
cloud fraction [1]	0.551 ± 0.351	13684134	0.750	0.523	5.880×10^{-3}	1.000	0.212	0.962
cloud top height [m]	$(0.383 \pm 0.271) \times 10^4$	13684134	3.632×10^3	3.252×10^3	0.0	2.000×10^4	1.712×10^3	5.344×10^3
cloud optical thickness [1]	23.8 ± 39.1	13684134	14.0	11.9	1.000	250	7.46	21.4
cloud fraction crb [1]	0.549 ± 0.351	13684134	0.751	0.519	7.562×10^{-3}	1.000	0.210	0.961
cloud height crb [m]	$(0.301 \pm 0.236) \times 10^4$	13684134	3.217×10^3	2.508×10^3	0.0	2.000×10^4	1.136×10^3	4.353×10^3
cloud albedo crb [1]	0.584 ± 0.194	13684134	0.227	0.578	0.0	1.000	0.475	0.703
surface albedo fitted [1]	0.106 ± 0.177	13684134	4.984×10^{-2}	3.258×10^{-2}	0.0	1.000	1.748×10^{-2}	6.732×10^{-2}
surface albedo fitted crb [1]	$(9.791 \pm 18.223) \times 10^{-2}$	13684134	2.987×10^{-2}	2.157×10^{-2}	0.0	1.000	1.208×10^{-2}	4.195×10^{-2}
fitted root mean square [1]	$(6.530 \pm 20.921) \times 10^{-4}$	13684134	6.646×10^{-4}	2.582×10^{-4}	1.037×10^{-6}	1.39	9.162×10^{-5}	7.563×10^{-4}
fitted root mean square crb [1]	$(5.235 \pm 17.178) \times 10^{-4}$	13684134	5.878×10^{-4}	1.992×10^{-4}	7.720×10^{-7}	1.31	6.190×10^{-5}	6.497×10^{-4}
wavelength shift [nm]	$(6.752 \pm 6.837) \times 10^{-3}$	13684134	9.254×10^{-3}	6.007×10^{-3}	-5.373×10^{-2}	0.726	1.722×10^{-3}	1.098×10^{-2}
cloud fraction apriori [1]	0.553 ± 0.357	13684134	0.795	0.528	0.0	1.000	0.205	1.000
reflectance blue oca [1]	0.508 ± 0.181	13684134	0.278	0.483	0.173	2.69	0.358	0.636
reflectance green oca [1]	0.450 ± 0.208	13684134	0.338	0.425	9.883×10^{-2}	2.84	0.267	0.605
reflectance continuum aband [1]	0.378 ± 0.249	13684134	0.400	0.352	1.271×10^{-2}	4.60	0.157	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]	0.649 ± 0.383	3503544	0.700	0.850	0.0	1.000	0.250	0.950
cloud fraction [1]	0.585 ± 0.355	3503544	0.760	0.580	8.336×10^{-3}	1.000	0.239	1.000
cloud top height [m]	$(0.396 \pm 0.254) \times 10^4$	3503544	3.347×10^3	3.473×10^3	0.0	2.000×10^4	2.072×10^3	5.419×10^3
cloud optical thickness [1]	17.8 ± 29.1	3503544	11.0	9.45	1.000	250	5.90	16.9
cloud fraction crb [1]	0.584 ± 0.355	3503544	0.760	0.580	8.352×10^{-3}	1.000	0.238	0.998
cloud height crb [m]	$(0.316 \pm 0.216) \times 10^4$	3503544	3.027×10^3	2.654×10^3	0.0	2.000×10^4	1.495×10^3	4.522×10^3
cloud albedo crb [1]	0.600 ± 0.202	3503544	0.247	0.598	0.0	1.000	0.490	0.737
surface albedo fitted [1]	0.314 ± 0.187	3503544	0.105	0.257	0.0	1.000	0.215	0.320
surface albedo fitted crb [1]	0.310 ± 0.185	3503544	0.103	0.252	4.240×10^{-3}	1.000	0.212	0.315
fitted root mean square [1]	$(1.186 \pm 1.069) \times 10^{-3}$	3503544	1.219×10^{-3}	9.007×10^{-4}	1.575×10^{-6}	0.170	4.444×10^{-4}	1.663×10^{-3}
fitted root mean square crb [1]	$(1.151 \pm 1.006) \times 10^{-3}$	3503544	1.221×10^{-3}	9.003×10^{-4}	1.039×10^{-6}	0.113	4.203×10^{-4}	1.642×10^{-3}
wavelength shift [nm]	$(8.121 \pm 6.234) \times 10^{-3}$	3503544	8.378×10^{-3}	8.000×10^{-3}	-3.486×10^{-2}	4.676×10^{-2}	3.753×10^{-3}	1.213×10^{-2}
cloud fraction apriori [1]	0.593 ± 0.361	3503544	0.763	0.597	0.0	1.000	0.237	1.000
reflectance blue ocra [1]	0.508 ± 0.217	3503544	0.358	0.455	0.140	2.77	0.321	0.679
reflectance green ocra [1]	0.465 ± 0.245	3503544	0.417	0.402	8.525×10^{-2}	3.19	0.248	0.665
reflectance continuum aband [1]	0.508 ± 0.227	3503544	0.359	0.453	1.883×10^{-2}	11.7	0.324	0.683

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	5.515×10^{-2}	-3.840×10^{-2}	-3.898×10^{-3}	5.578×10^{-2}	1.206×10^{-2}	-4.140×10^{-3}	0.106	4.526×10^{-2}	-8.729×10^{-3}
5.515×10^{-2}	1.000	-0.121	0.165	2.563×10^{-2}	0.211	0.165	4.558×10^{-2}	-3.798×10^{-2}	0.167
-3.840×10^{-2}	-0.121	1.000	0.191	-0.103	-1.724×10^{-2}	0.193	-0.111	-0.111	0.202
-3.898×10^{-3}	0.165	0.191	1.000	1.629×10^{-2}	0.313	1.000	6.574×10^{-2}	0.220	0.989
5.578×10^{-2}	2.563×10^{-2}	-0.103	1.629×10^{-2}	1.000	0.147	1.568×10^{-2}	0.953	9.481×10^{-2}	3.458×10^{-3}
1.206×10^{-2}	0.211	-1.724×10^{-2}	0.313	0.147	1.000	0.310	0.202	0.509	0.307
-4.140×10^{-3}	0.165	0.193	1.000	1.568×10^{-2}	0.310	1.000	6.543×10^{-2}	0.216	0.989
0.106	4.558×10^{-2}	-0.111	6.574×10^{-2}	0.953	0.202	6.543×10^{-2}	1.000	7.341×10^{-2}	5.312×10^{-2}
4.526×10^{-2}	-3.798×10^{-2}	-0.111	0.220	9.481×10^{-2}	0.509	0.216	7.341×10^{-2}	1.000	0.217
-8.729×10^{-3}	0.167	0.202	0.989	3.458×10^{-3}	0.307	0.989	5.312×10^{-2}	0.217	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	24.4	-35.1	-2.706×10^{-2}	2.906×10^3	8.91	-2.877×10^{-2}	4.805×10^3	0.176	-6.165×10^{-2}
24.4	504	-126	1.31	1.524×10^3	178	1.31	2.347×10^3	-0.168	1.35
-35.1	-126	2.156×10^3	3.13	-1.262×10^4	-30.1	3.17	-1.187×10^4	-1.02	3.37
-2.706×10^{-2}	1.31	3.13	0.124	15.2	4.15	0.125	53.2	1.529×10^{-2}	0.125
2.906×10^3	1.524×10^3	-1.262×10^4	15.2	7.012×10^6	1.462×10^4	14.7	5.787×10^6	49.6	3.29
8.91	178	-30.1	4.15	1.462×10^4	1.411×10^3	4.12	1.745×10^4	3.78	4.14
-2.877×10^{-2}	1.31	3.17	0.125	14.7	4.12	0.125	53.0	1.505×10^{-2}	0.125
4.805×10^3	2.347×10^3	-1.187×10^4	53.2	5.787×10^6	1.745×10^4	53.0	5.262×10^6	33.2	43.7
0.176	-0.168	-1.02	1.529×10^{-2}	49.6	3.78	1.505×10^{-2}	33.2	3.898×10^{-2}	1.540×10^{-2}
-6.165×10^{-2}	1.35	3.37	0.125	3.29	4.14	0.125	43.7	1.540×10^{-2}	0.129

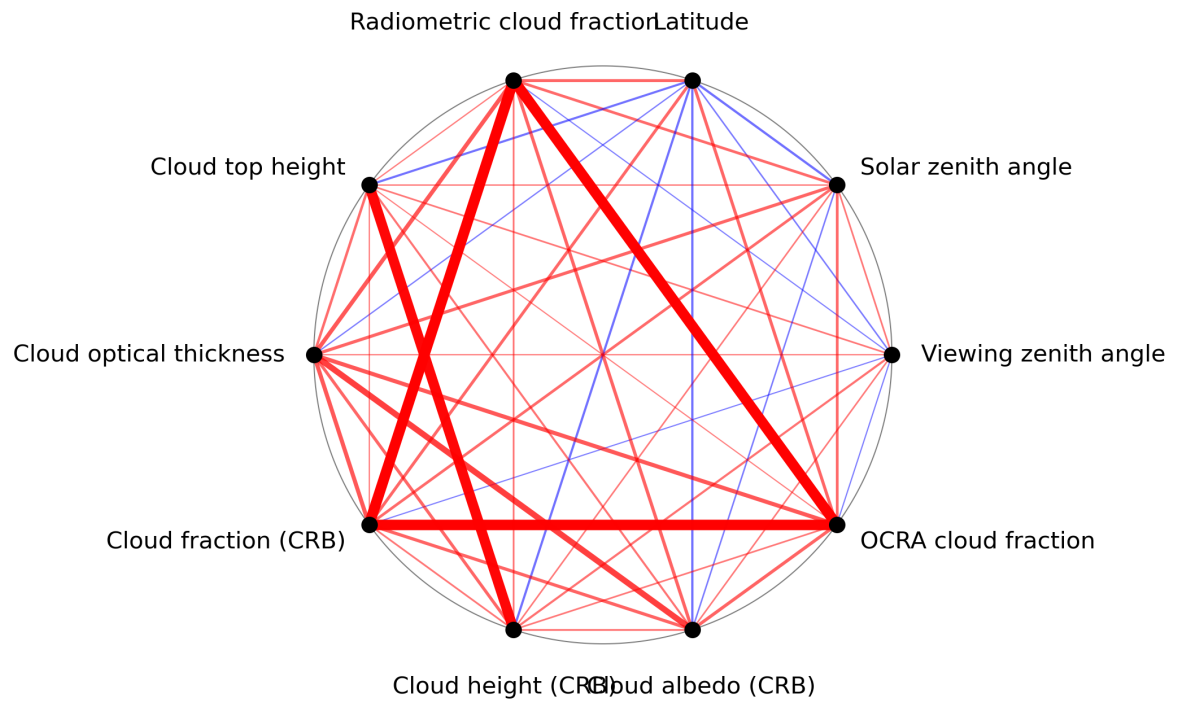


Figure 1: Map of correlation graph for 2023-07-13 to 2023-07-14.

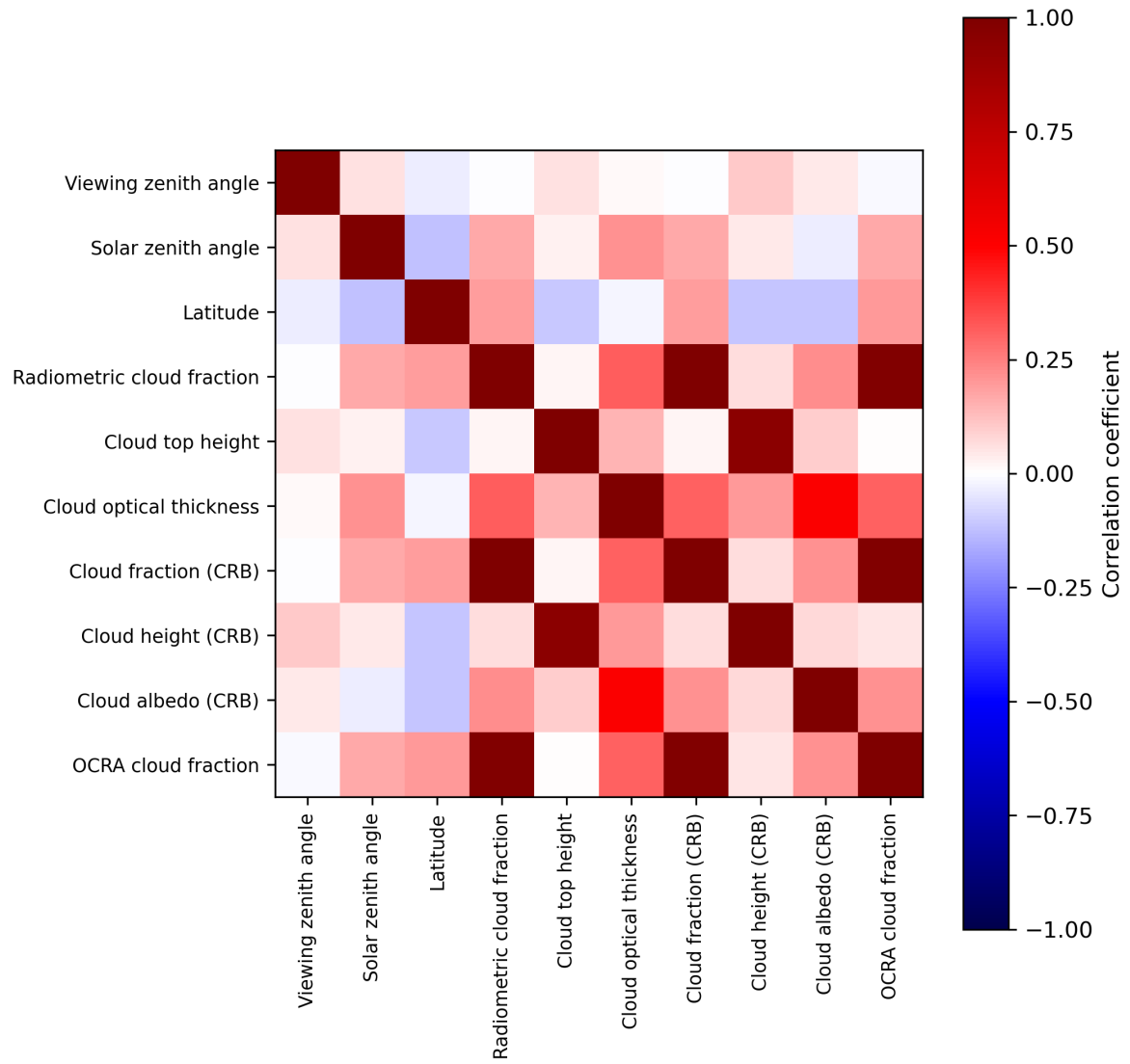


Figure 2: Map of correlation matrix for 2023-07-13 to 2023-07-14.

3 Granule outlines

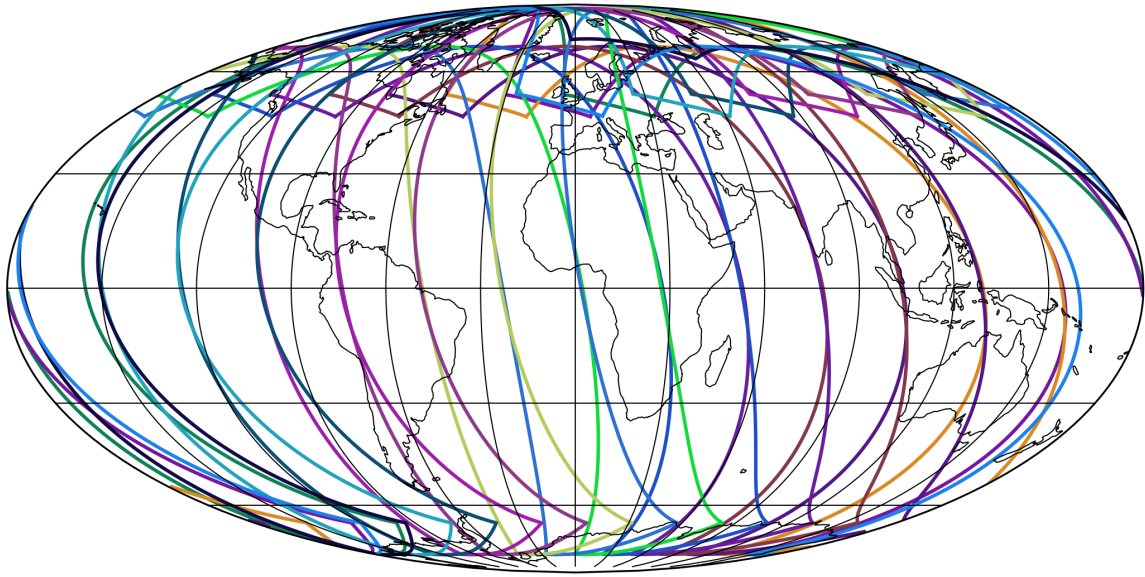


Figure 3: Outline of the granules.

4 Input data monitoring

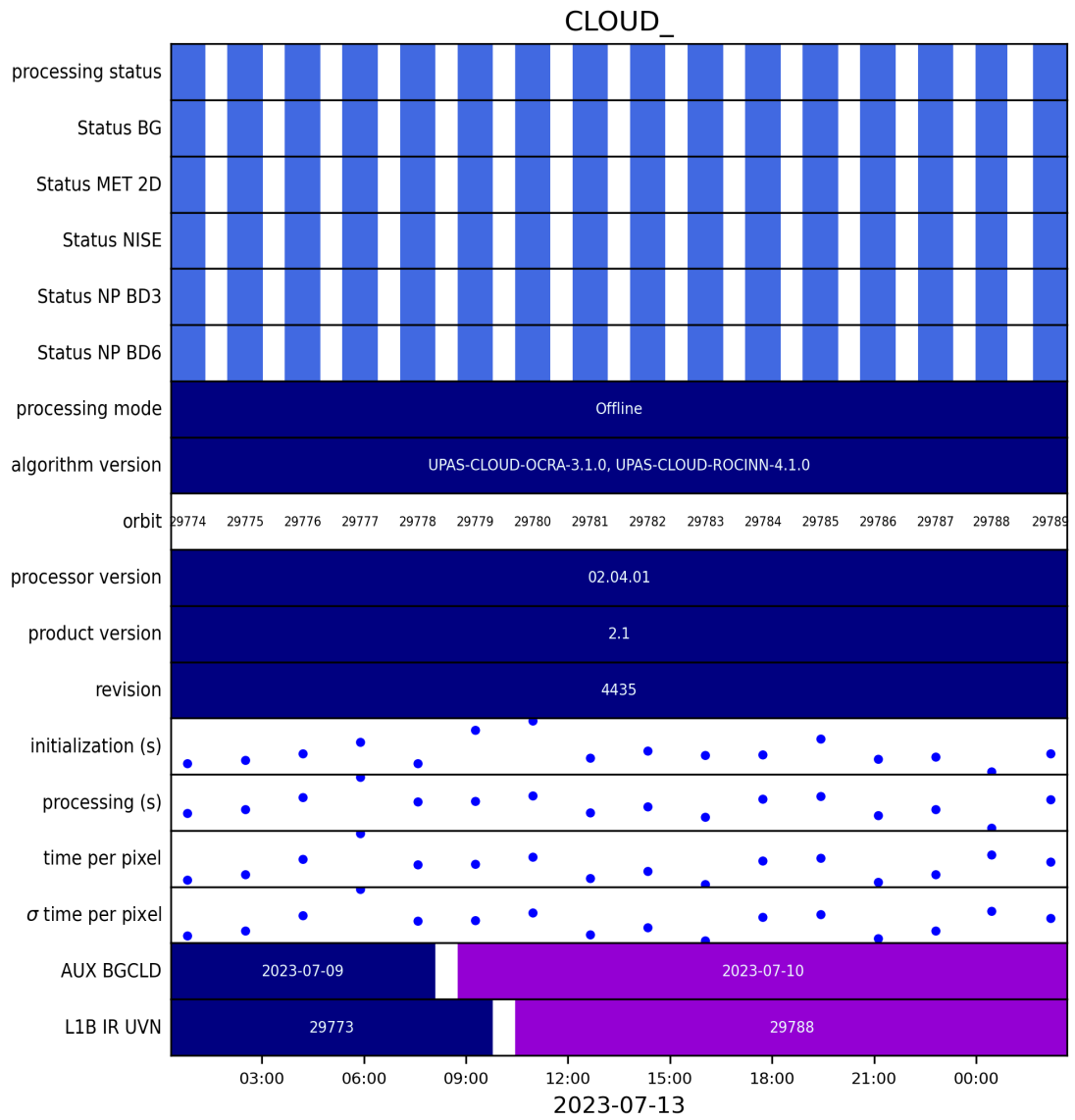


Figure 4: Input data per granule

5 Warnings and errors

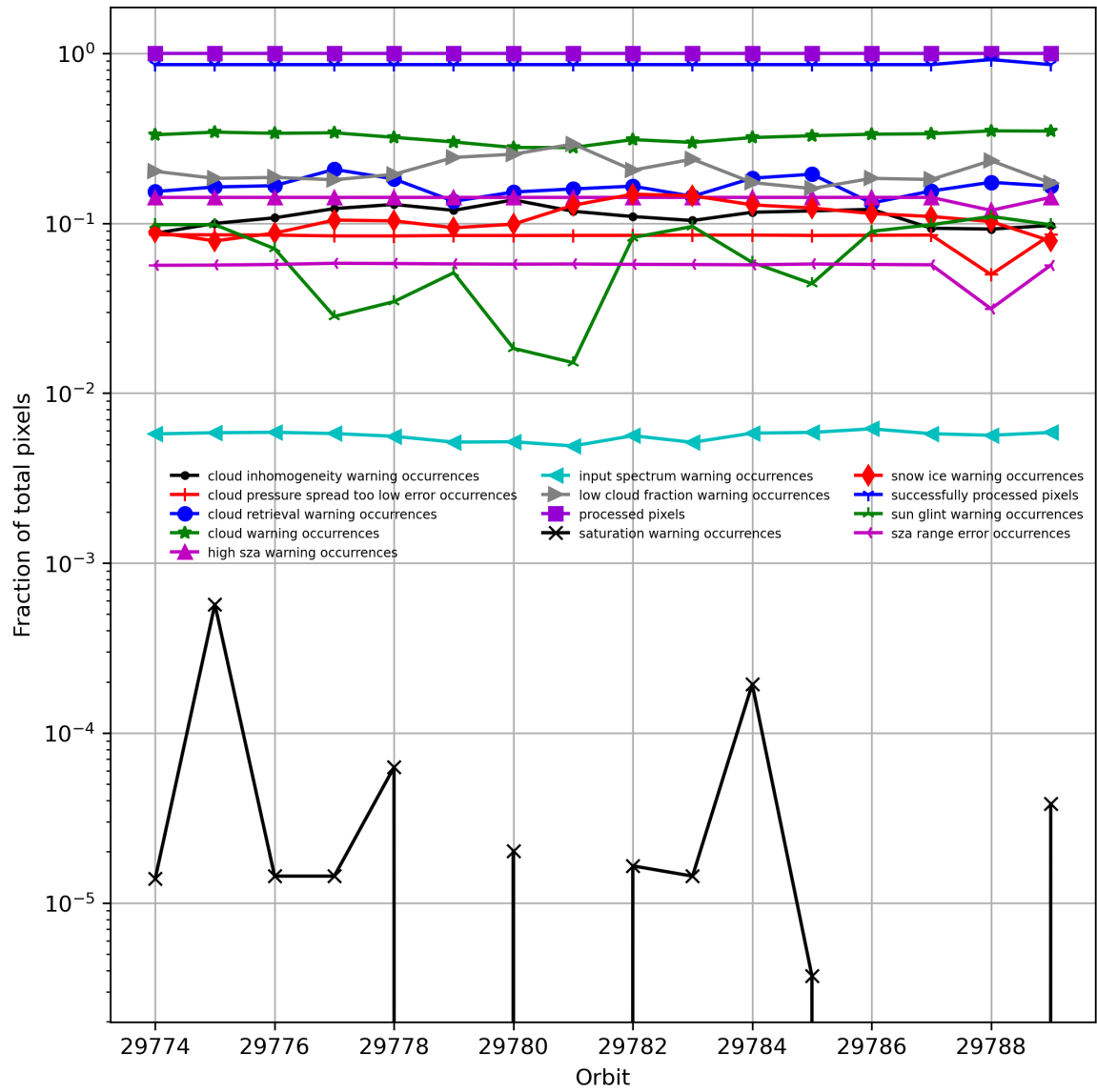


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

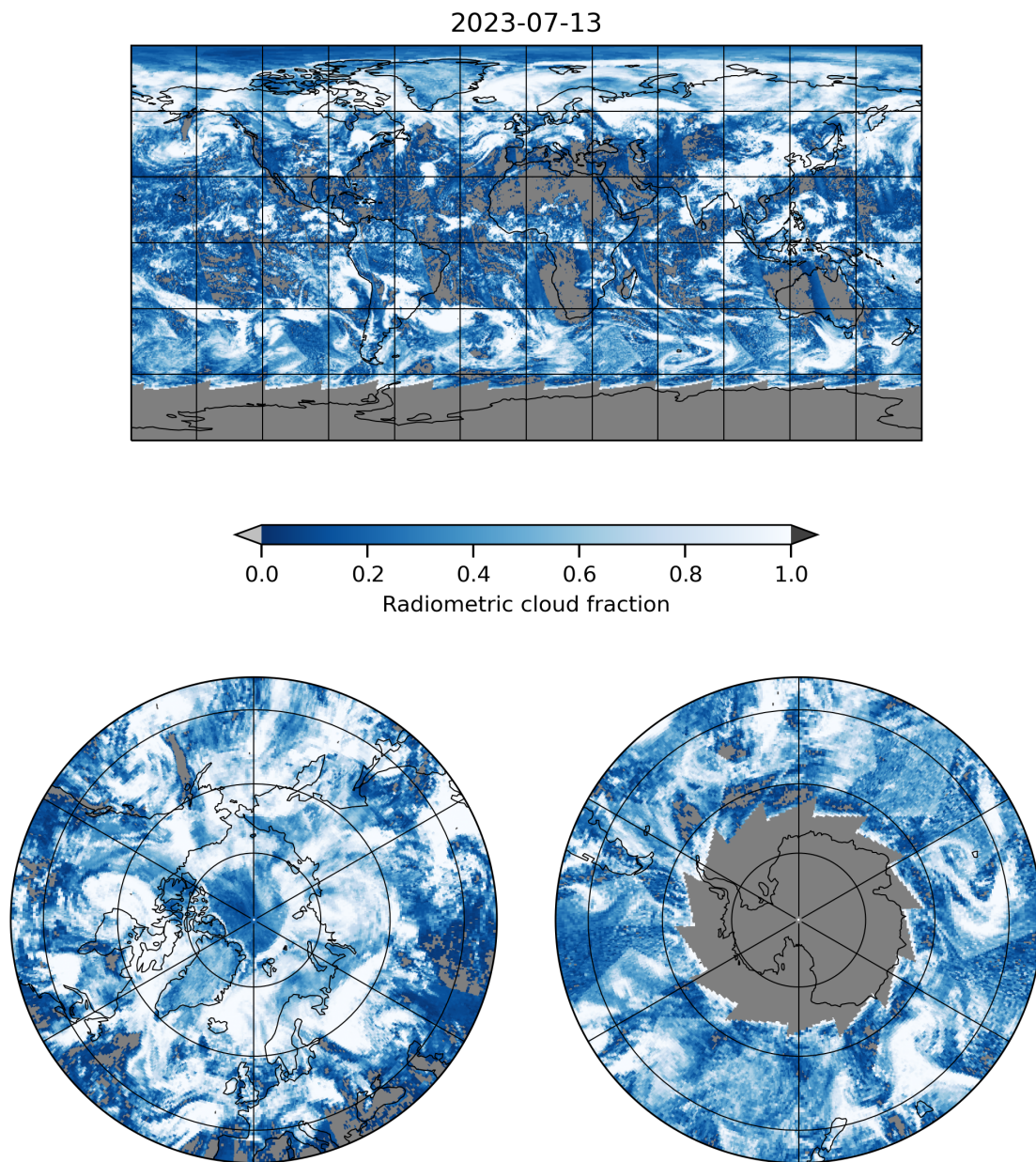


Figure 6: Map of “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14

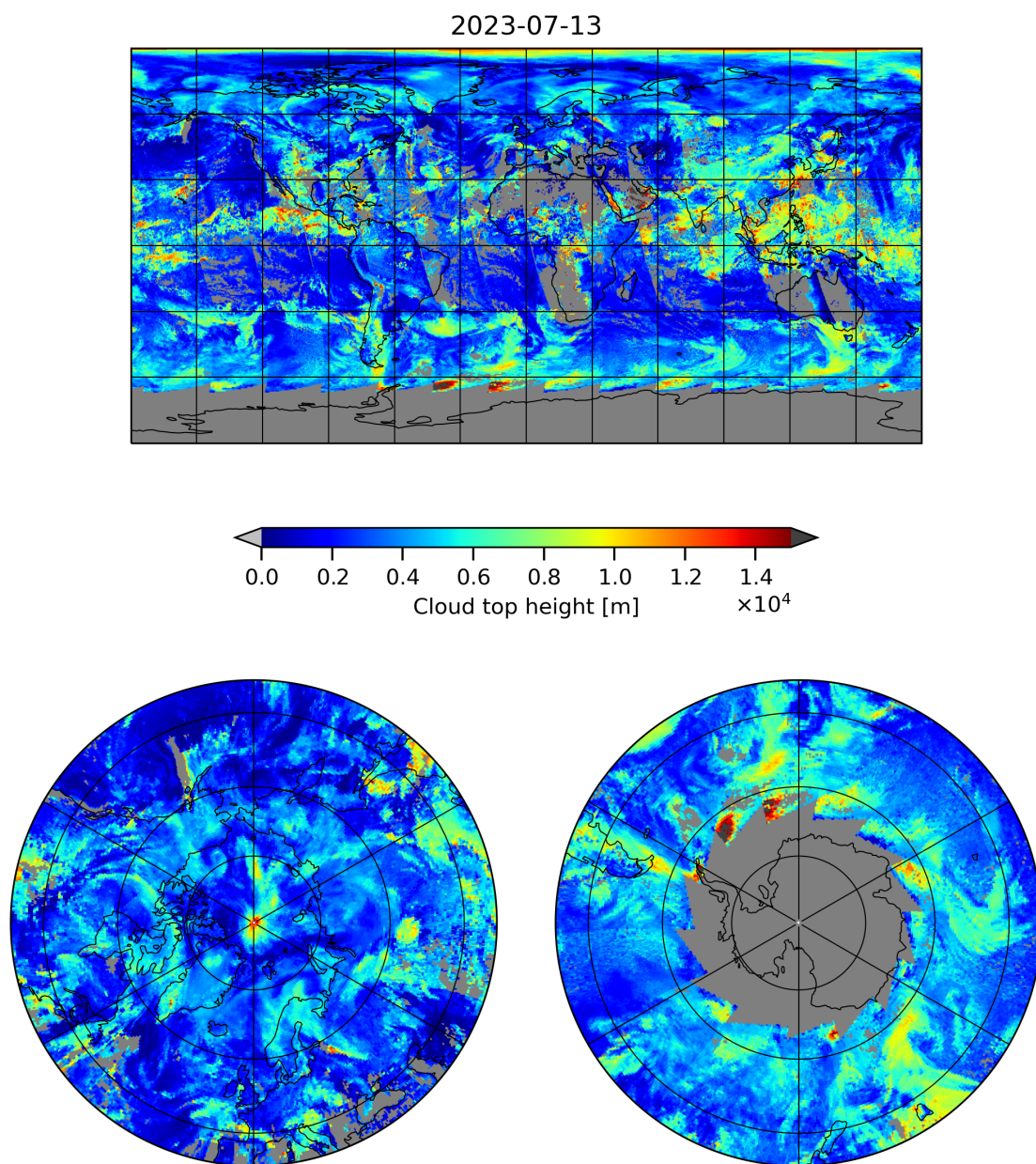


Figure 7: Map of “Cloud top height” for 2023-07-13 to 2023-07-14

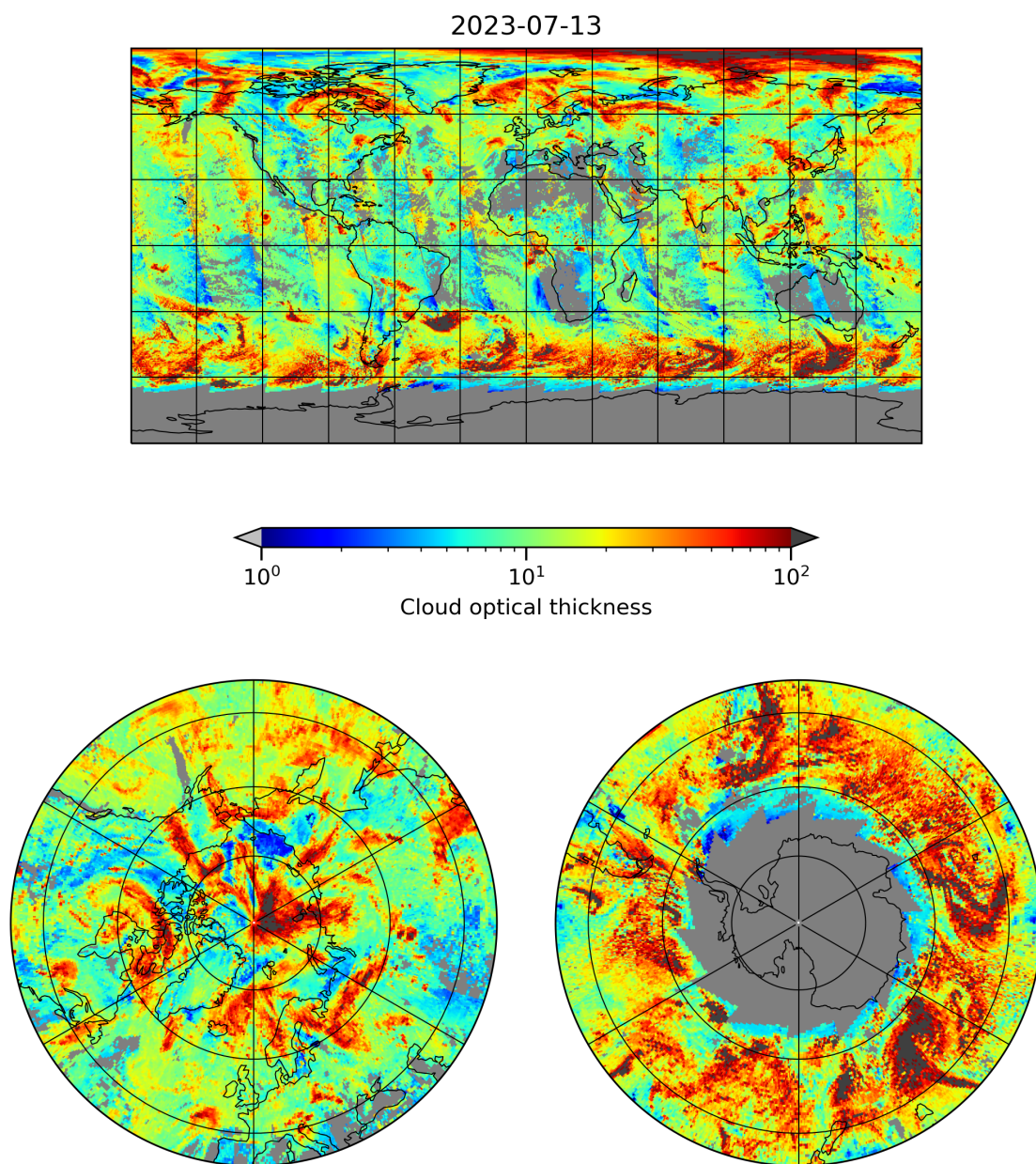


Figure 8: Map of “Cloud optical thickness” for 2023-07-13 to 2023-07-14

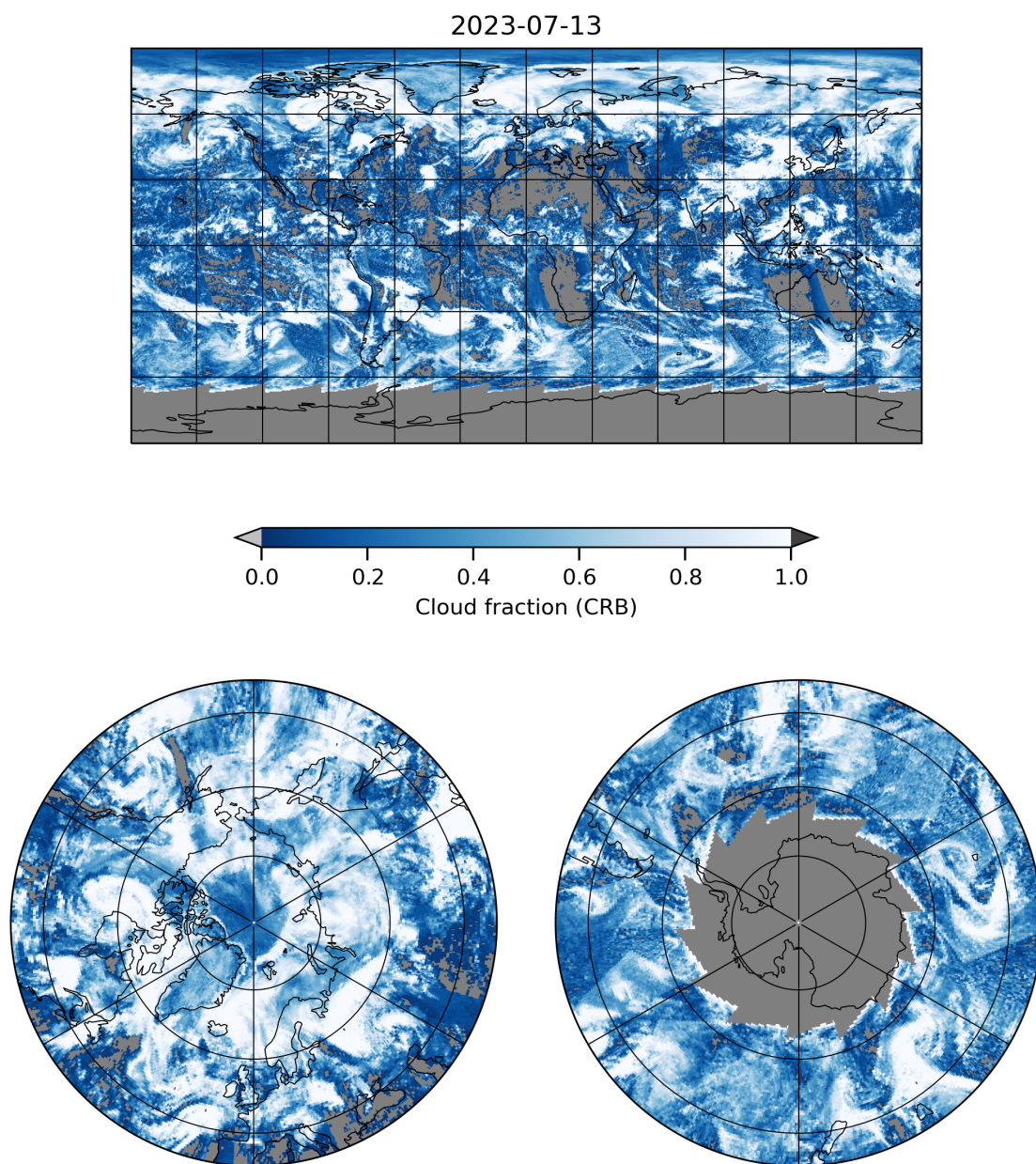


Figure 9: Map of “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14

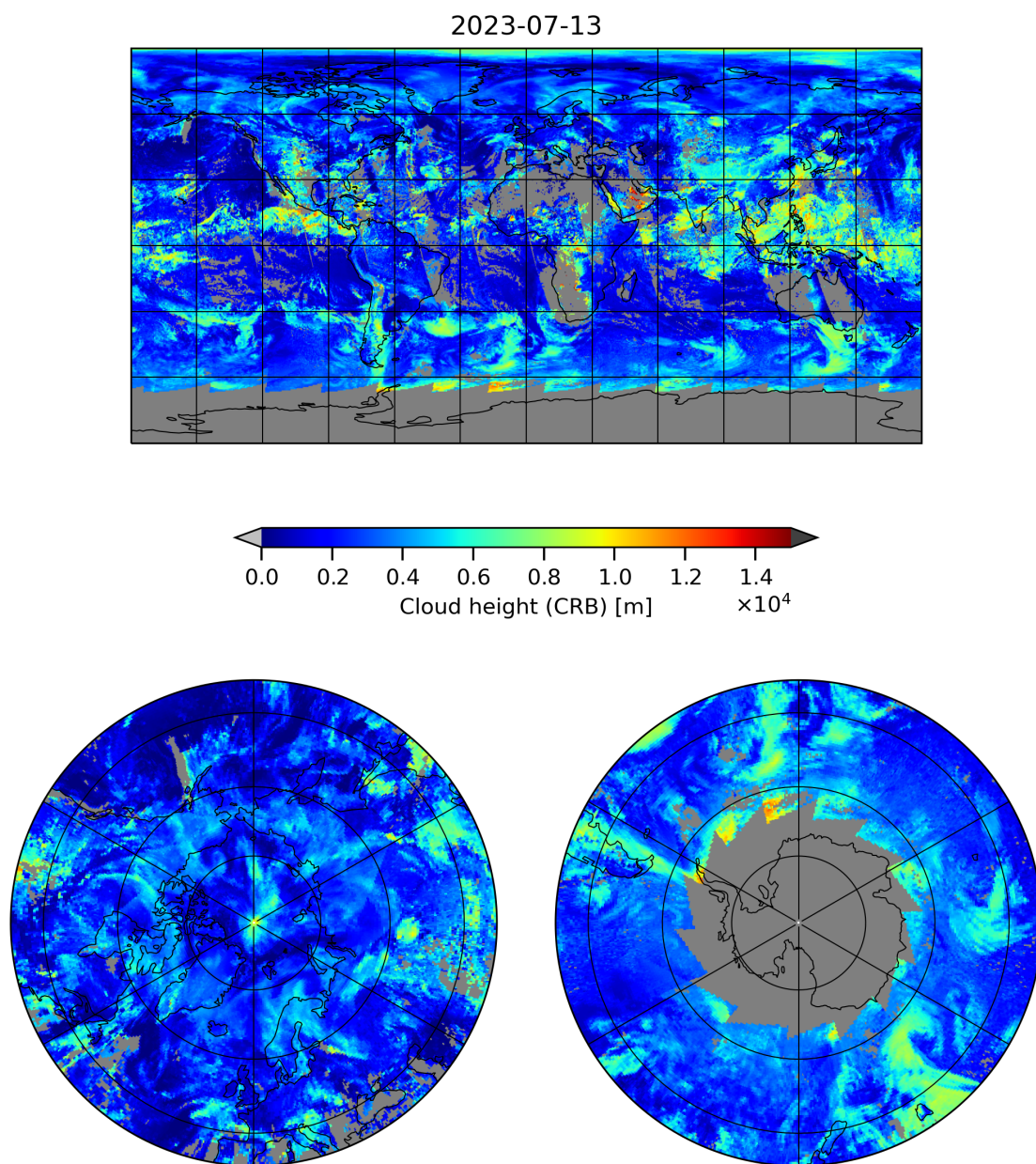


Figure 10: Map of “Cloud height (CRB)” for 2023-07-13 to 2023-07-14

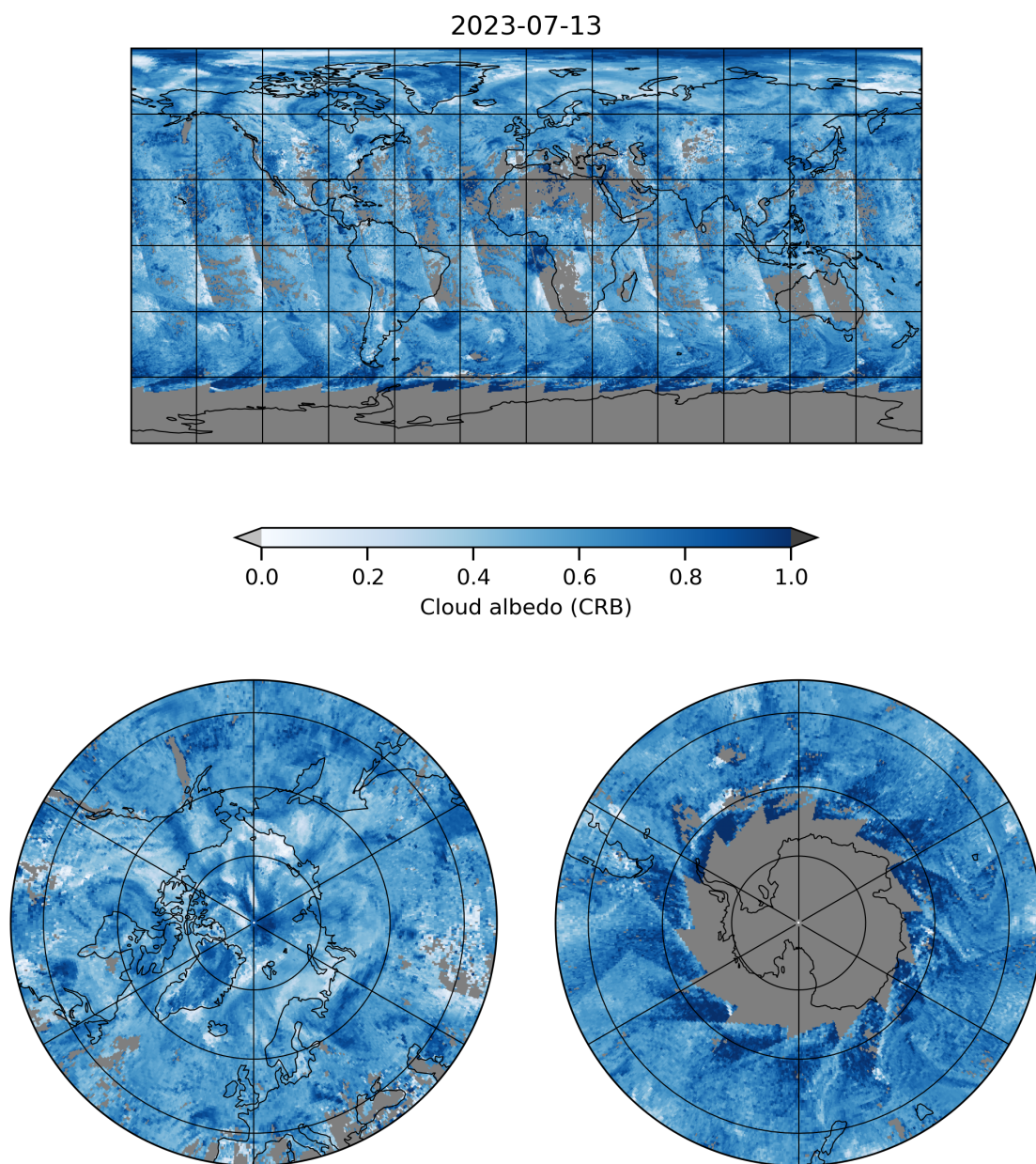


Figure 11: Map of “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14

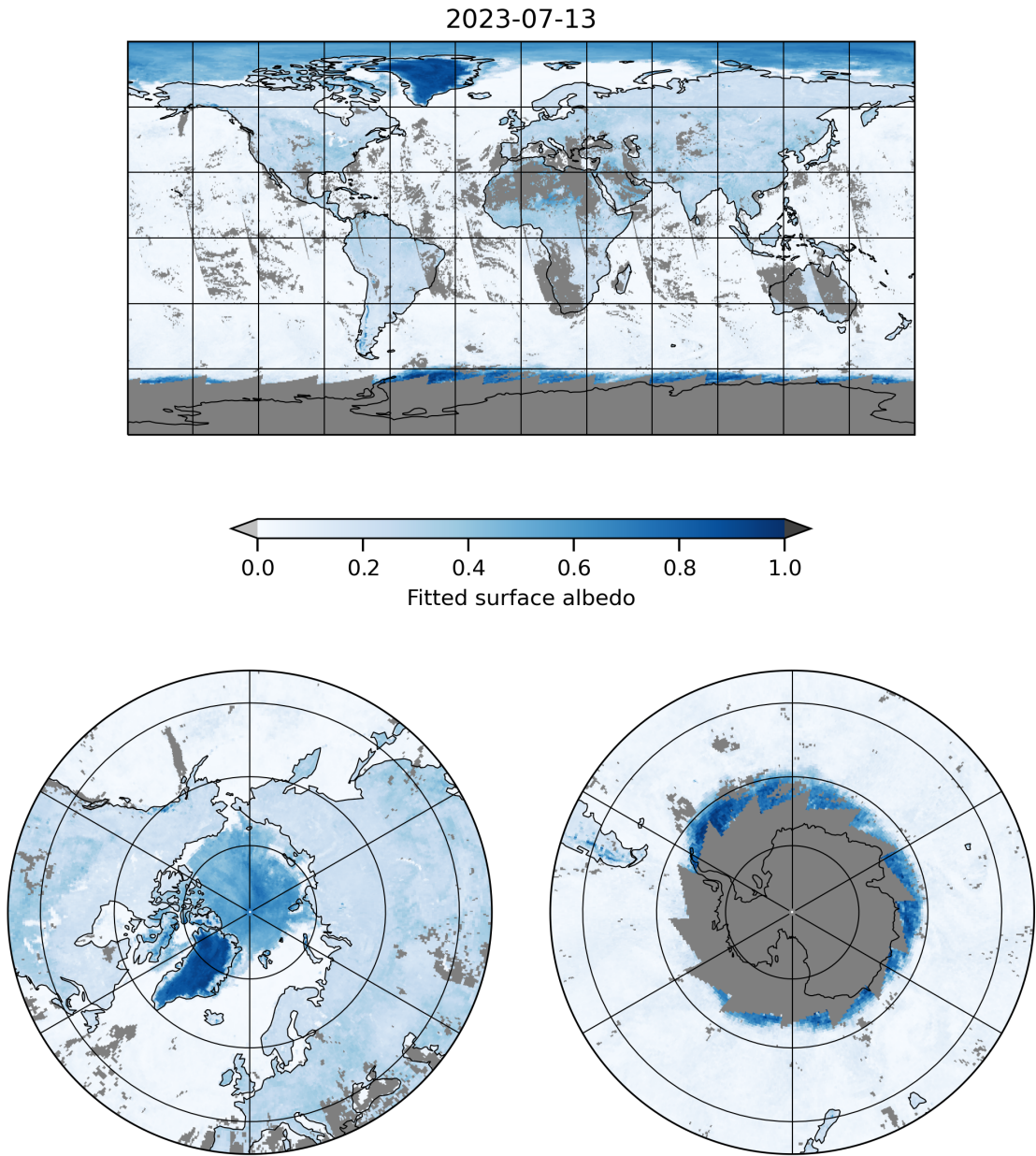


Figure 12: Map of “Fitted surface albedo” for 2023-07-13 to 2023-07-14

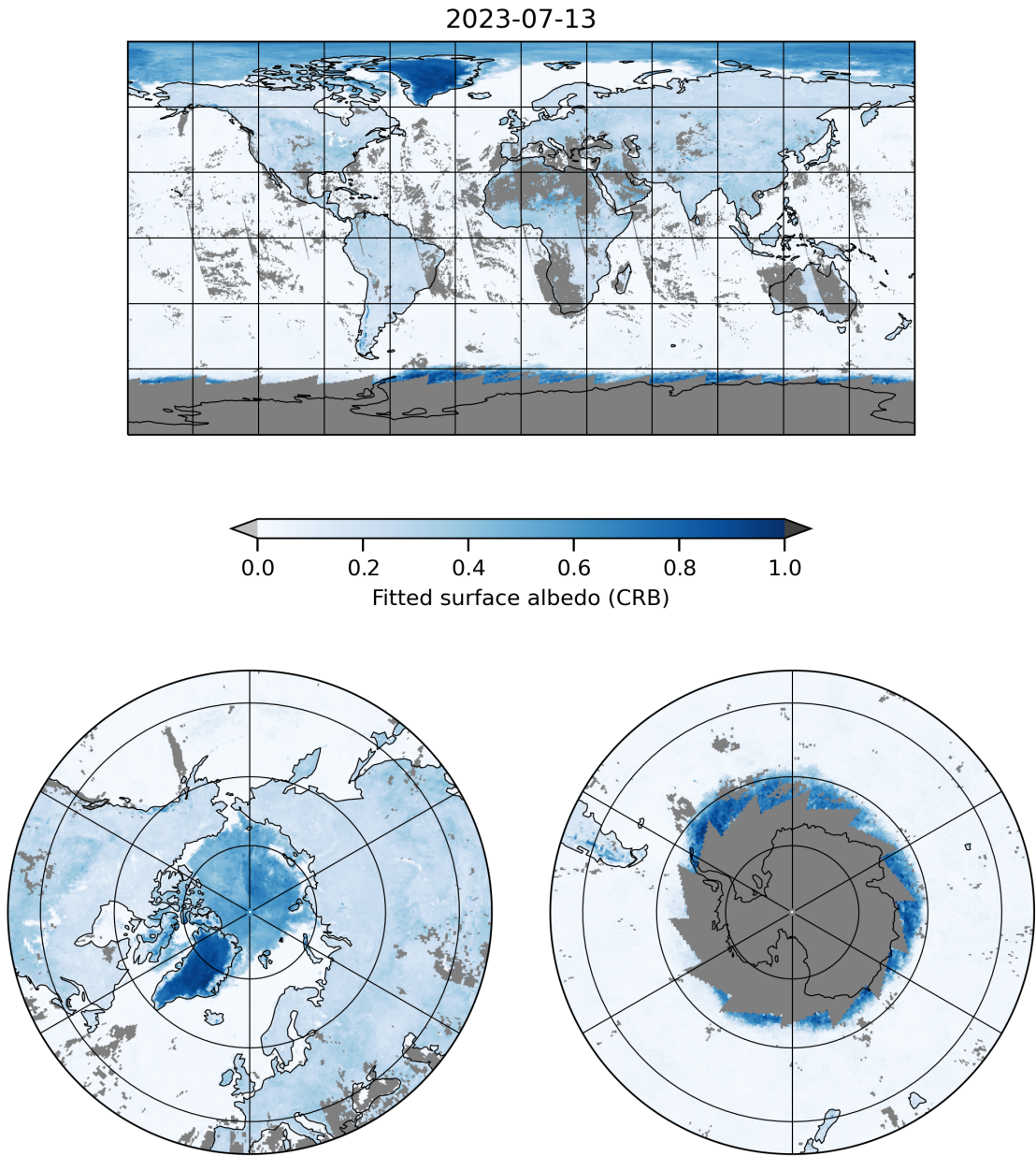


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-07-13 to 2023-07-14

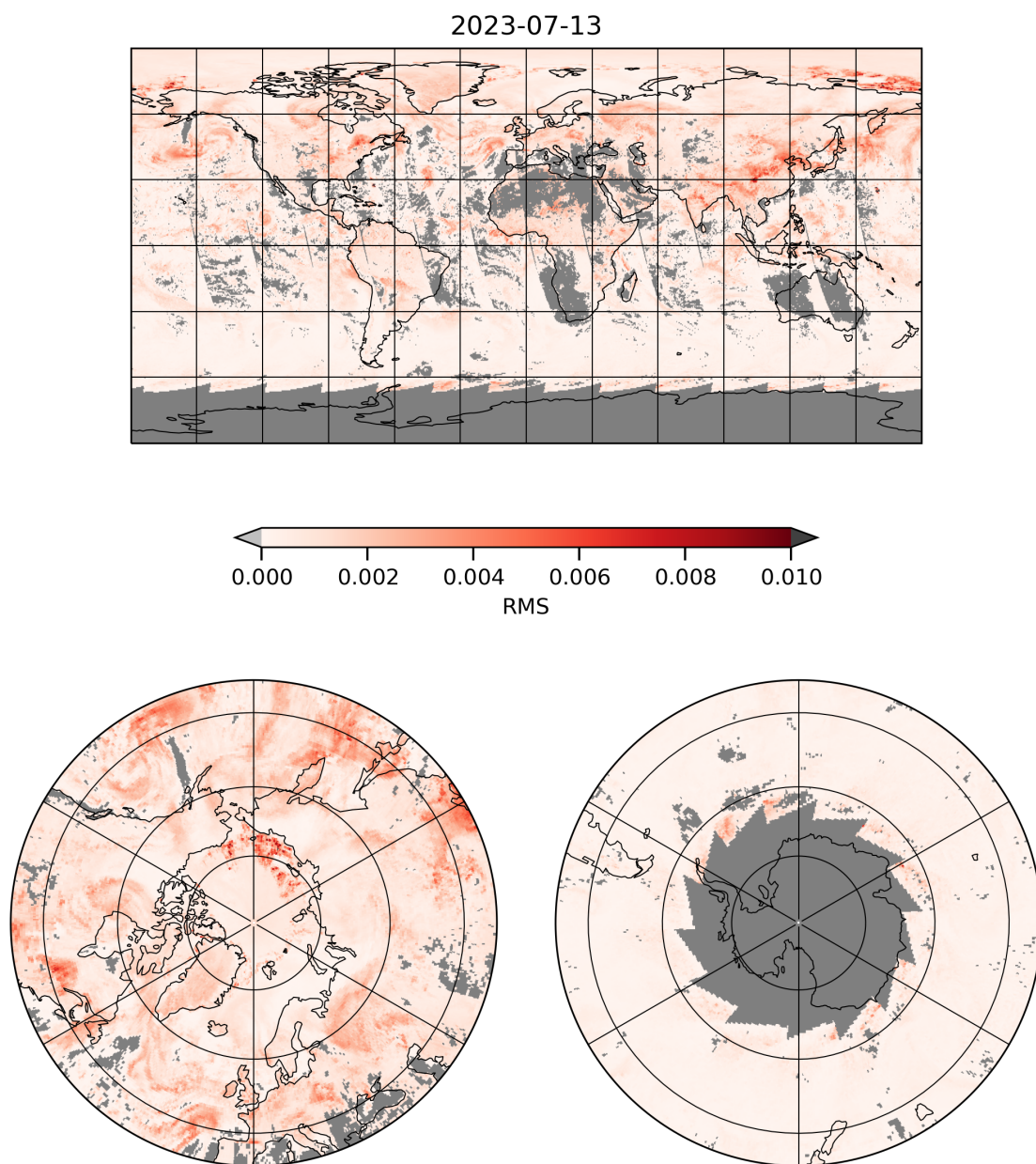
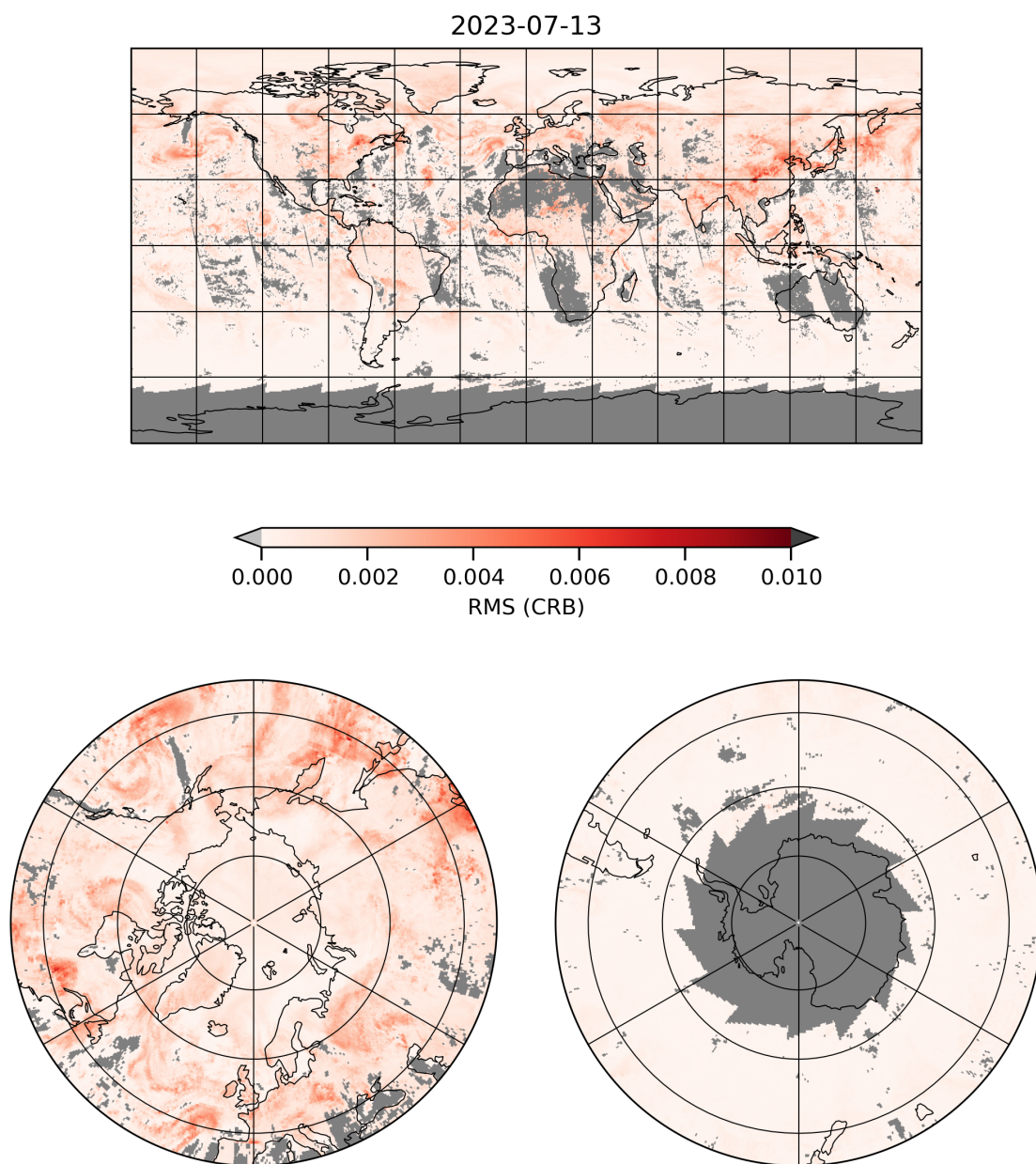


Figure 14: Map of “RMS” for 2023-07-13 to 2023-07-14



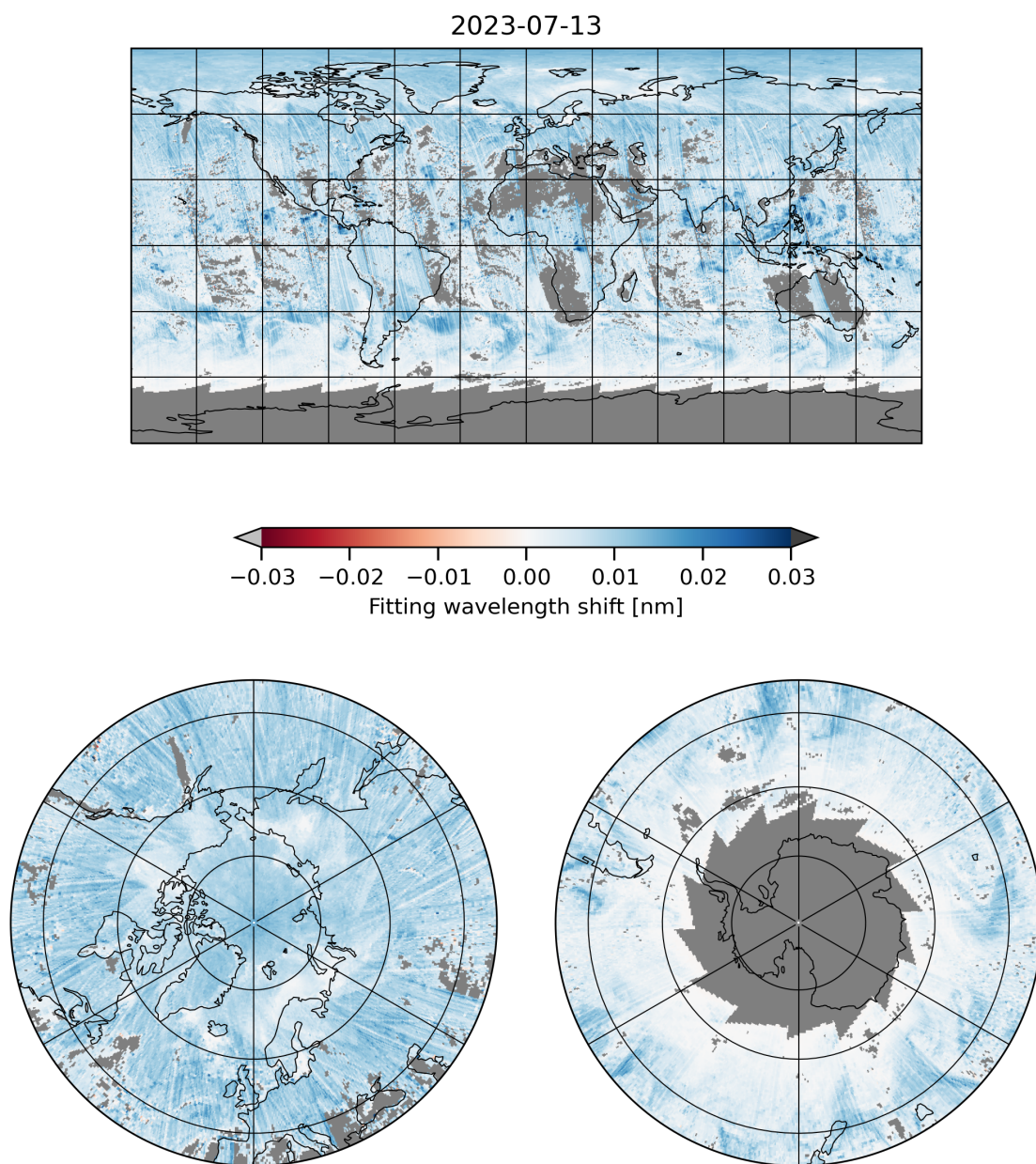


Figure 16: Map of “Fitting wavelength shift” for 2023-07-13 to 2023-07-14

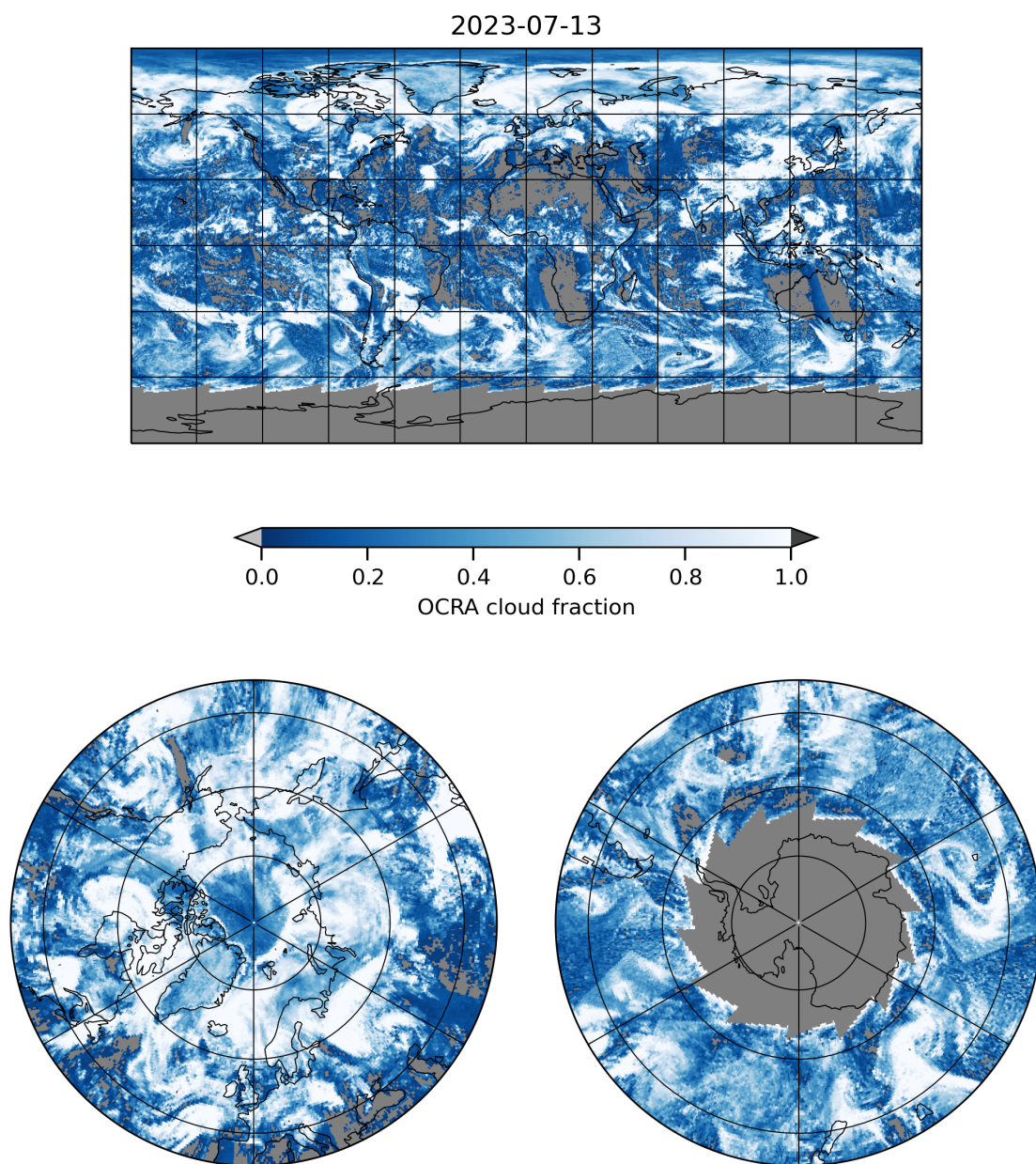


Figure 17: Map of “OCRA cloud fraction” for 2023-07-13 to 2023-07-14

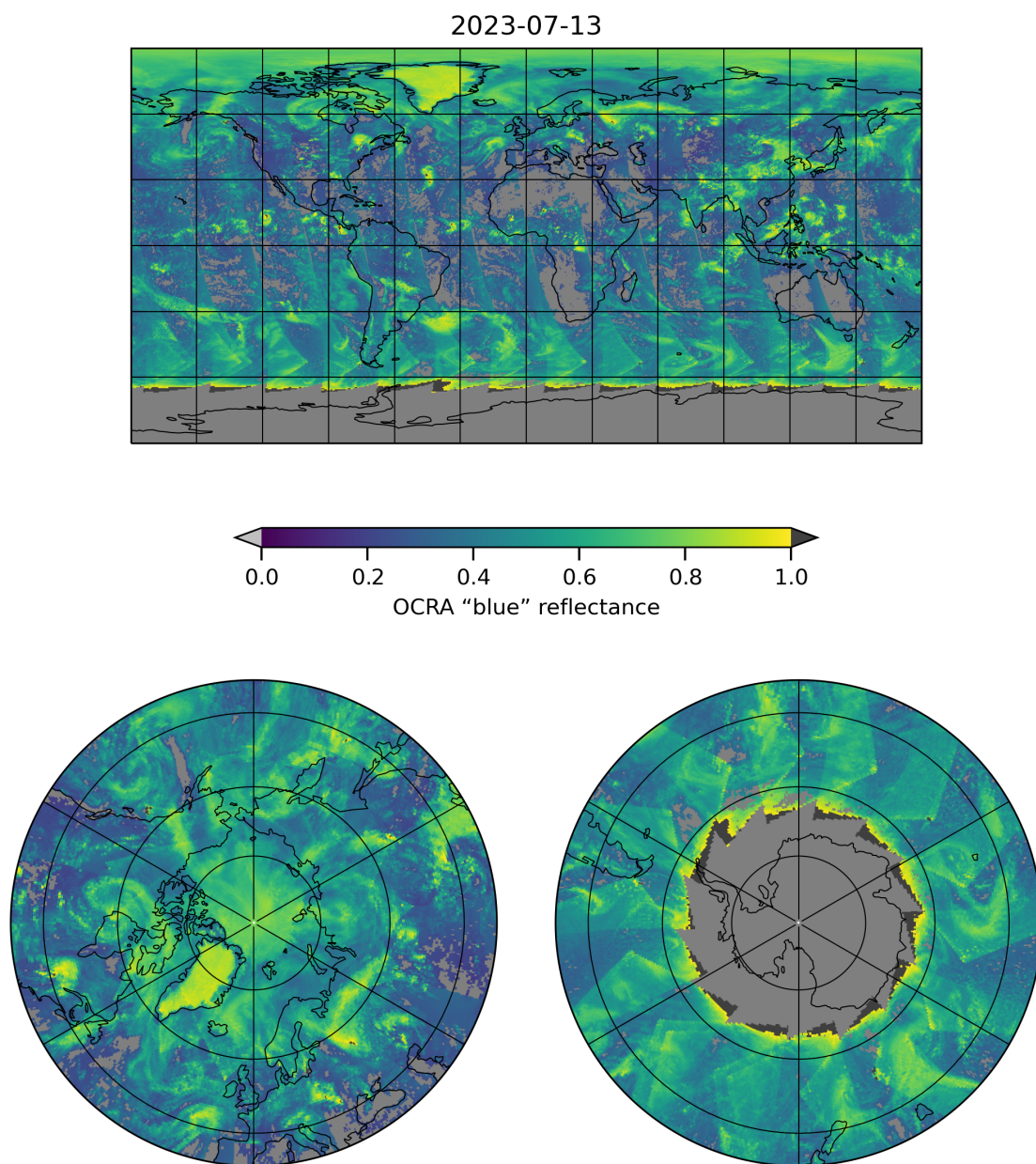


Figure 18: Map of "OCRA "blue" reflectance" for 2023-07-13 to 2023-07-14

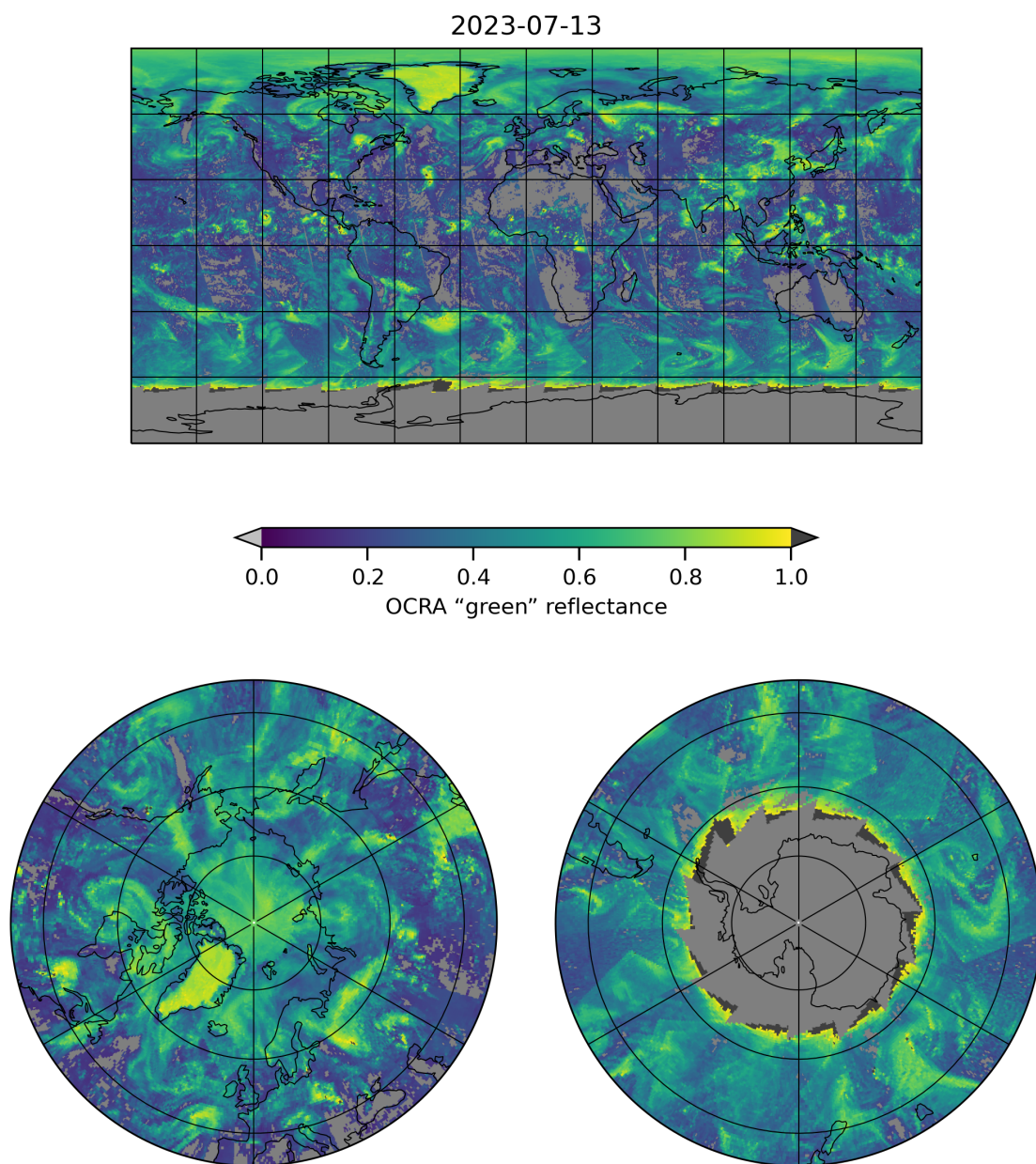


Figure 19: Map of "OCRA "green" reflectance" for 2023-07-13 to 2023-07-14

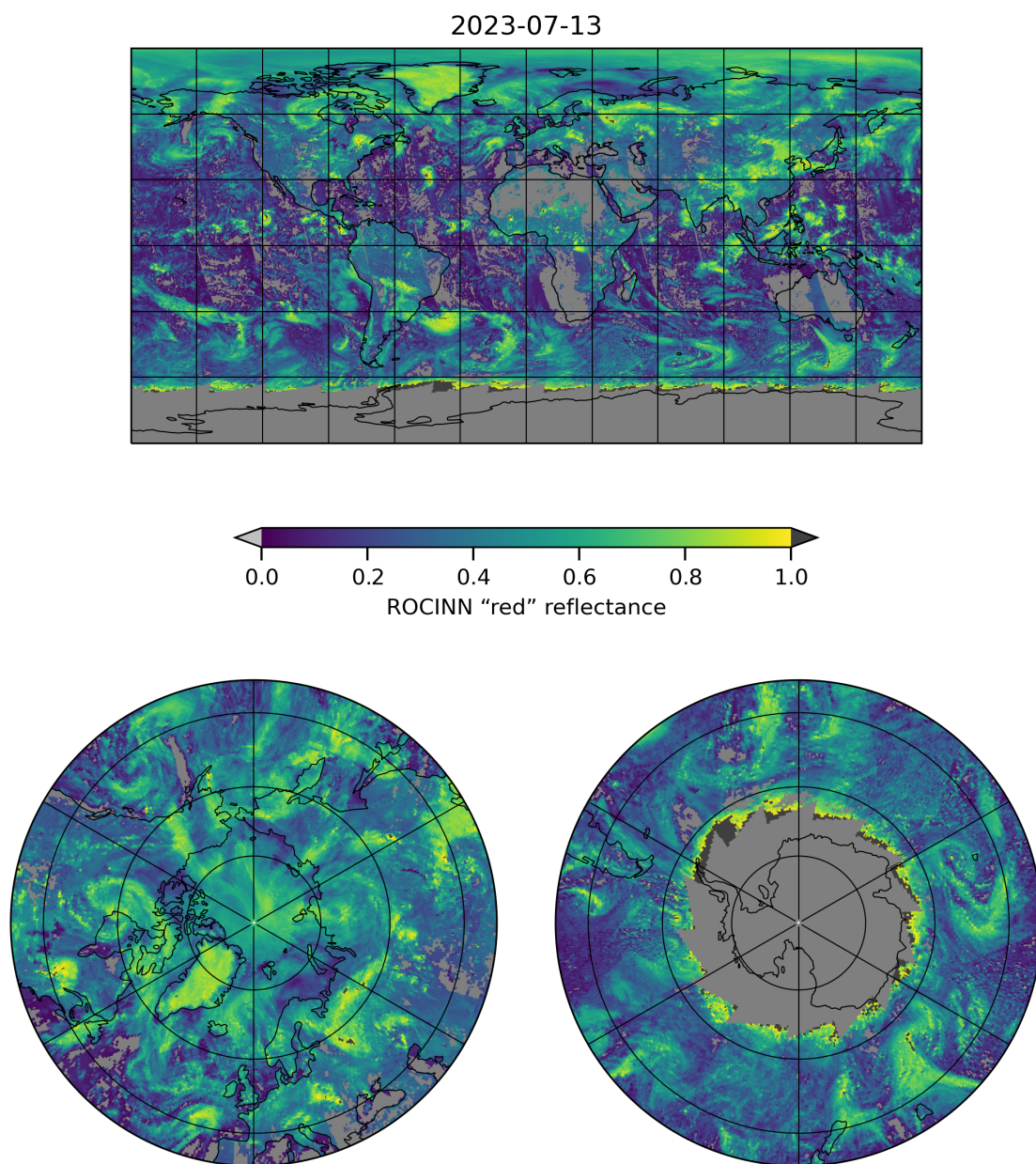


Figure 20: Map of "ROCINN "red" reflectance" for 2023-07-13 to 2023-07-14

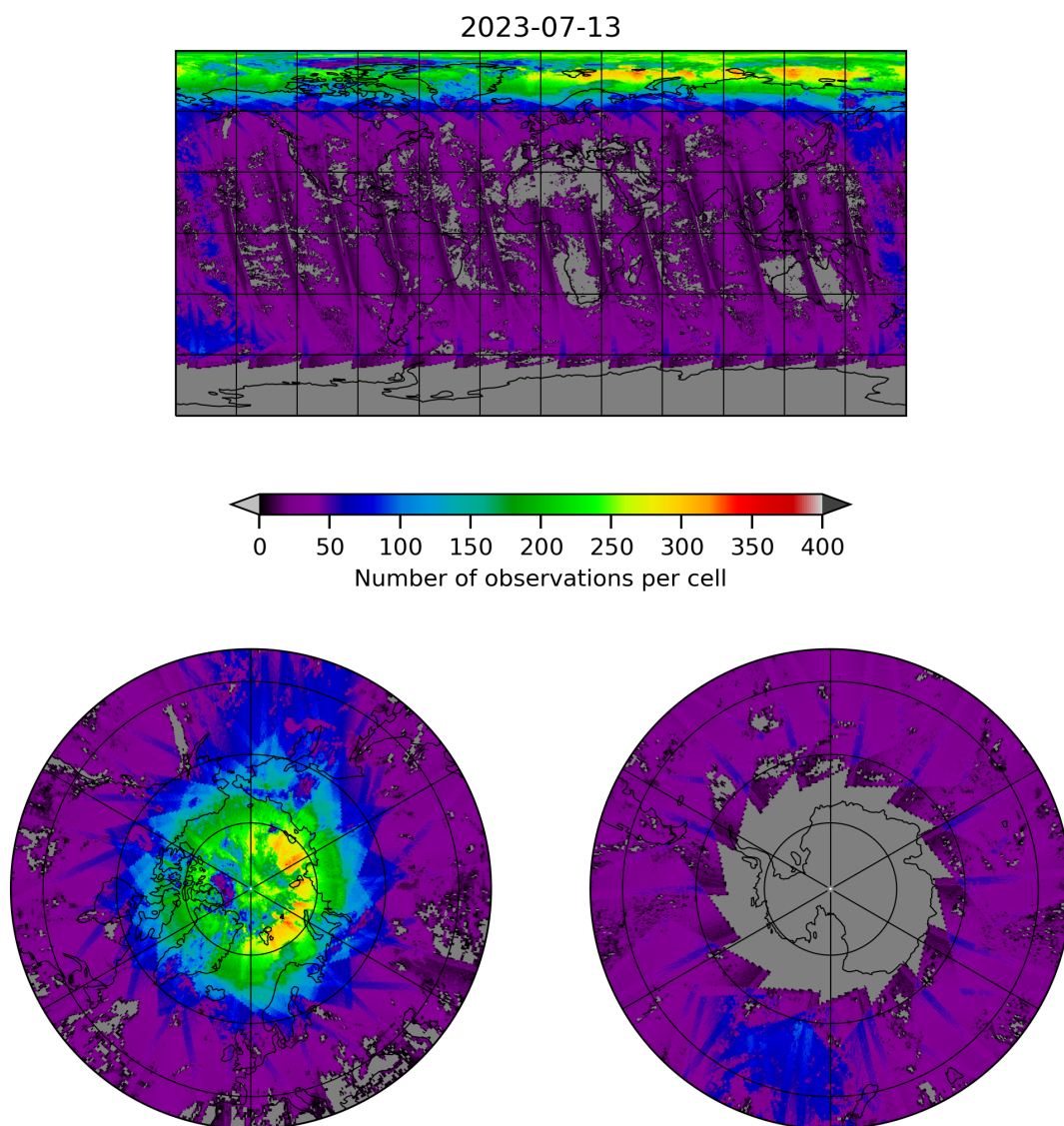


Figure 21: Map of the number of observations for 2023-07-13 to 2023-07-14

7 Zonal average

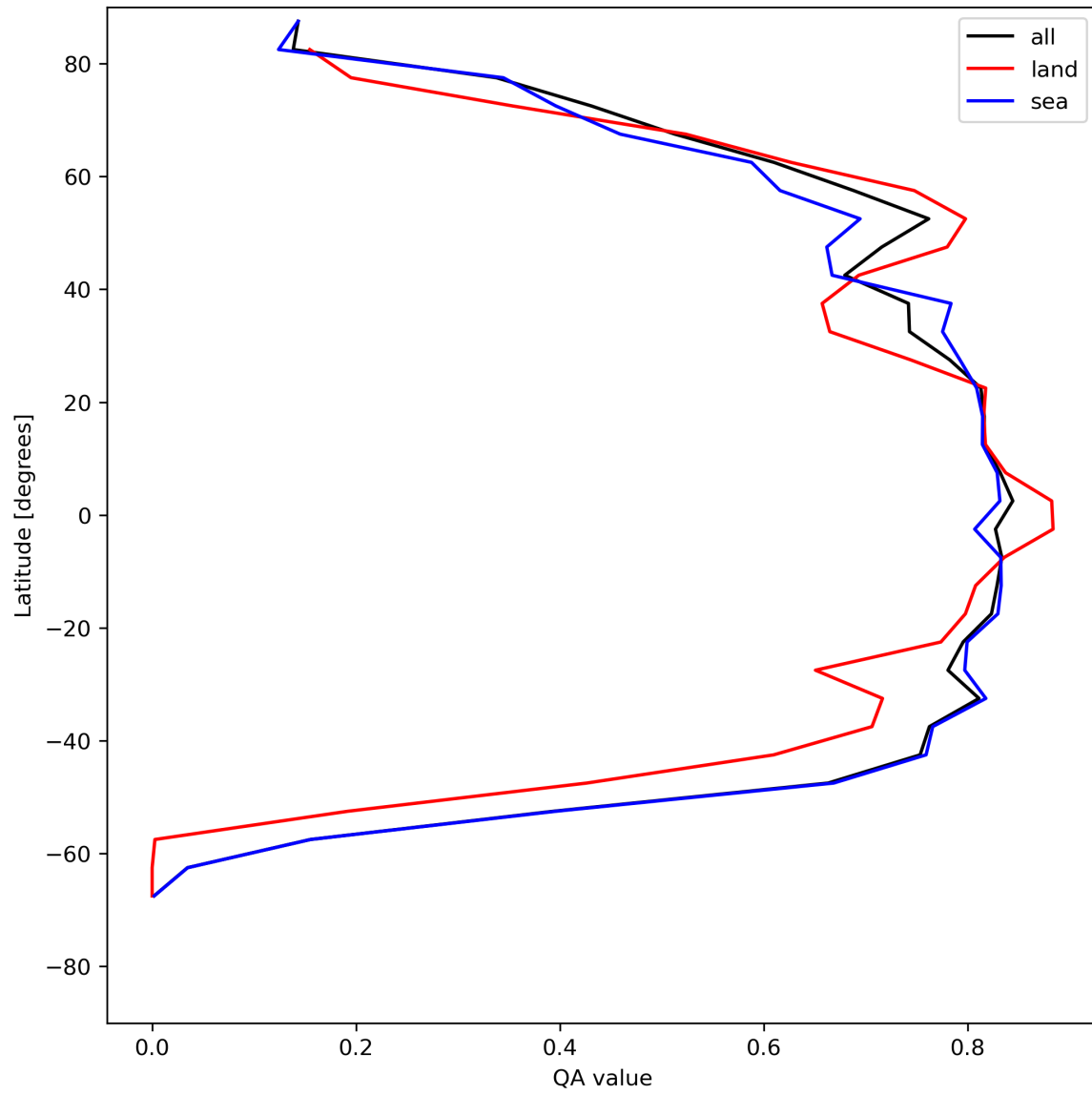


Figure 22: Zonal average of “QA value” for 2023-07-13 to 2023-07-14.

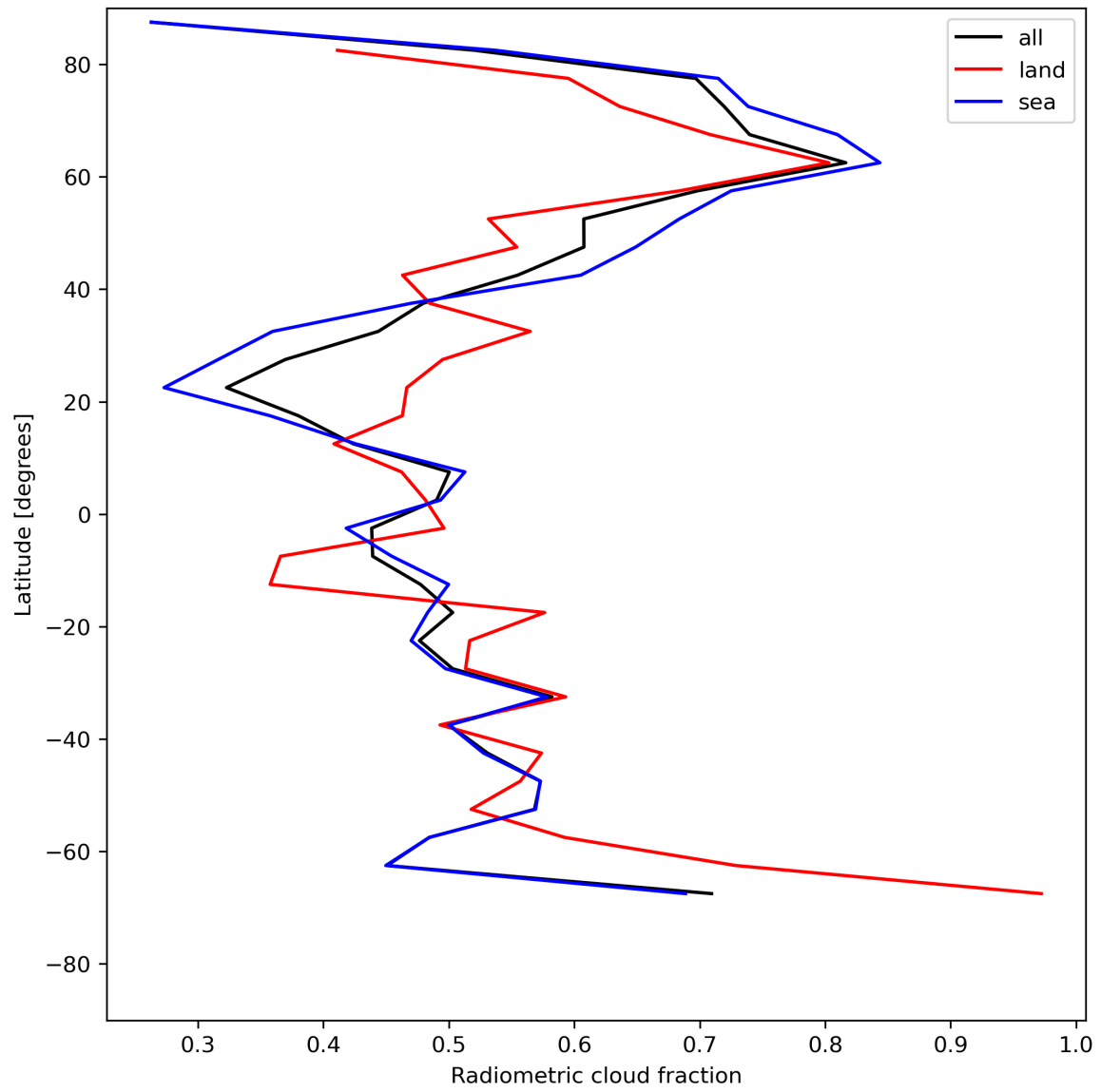


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14.

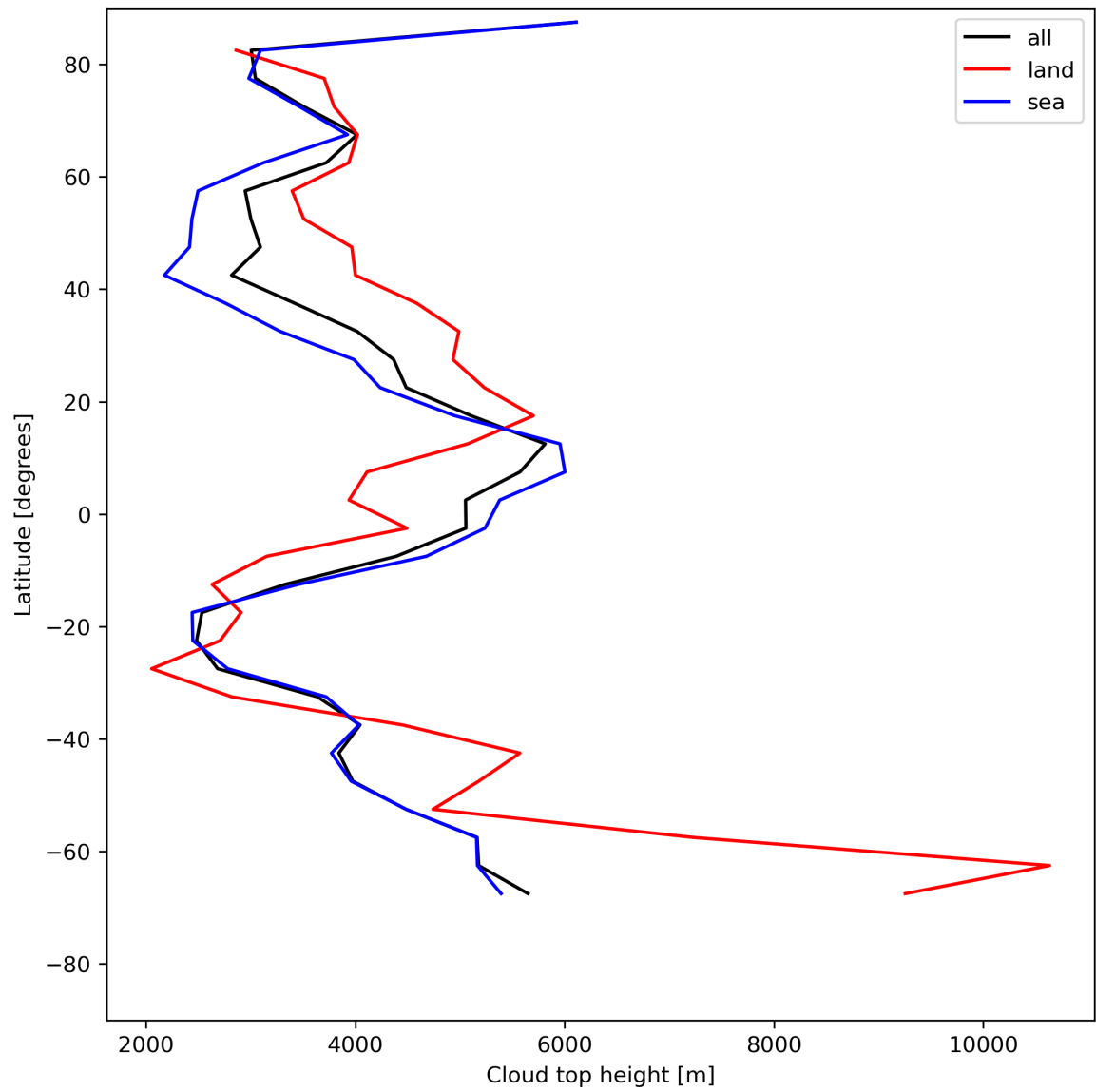


Figure 24: Zonal average of “Cloud top height” for 2023-07-13 to 2023-07-14.

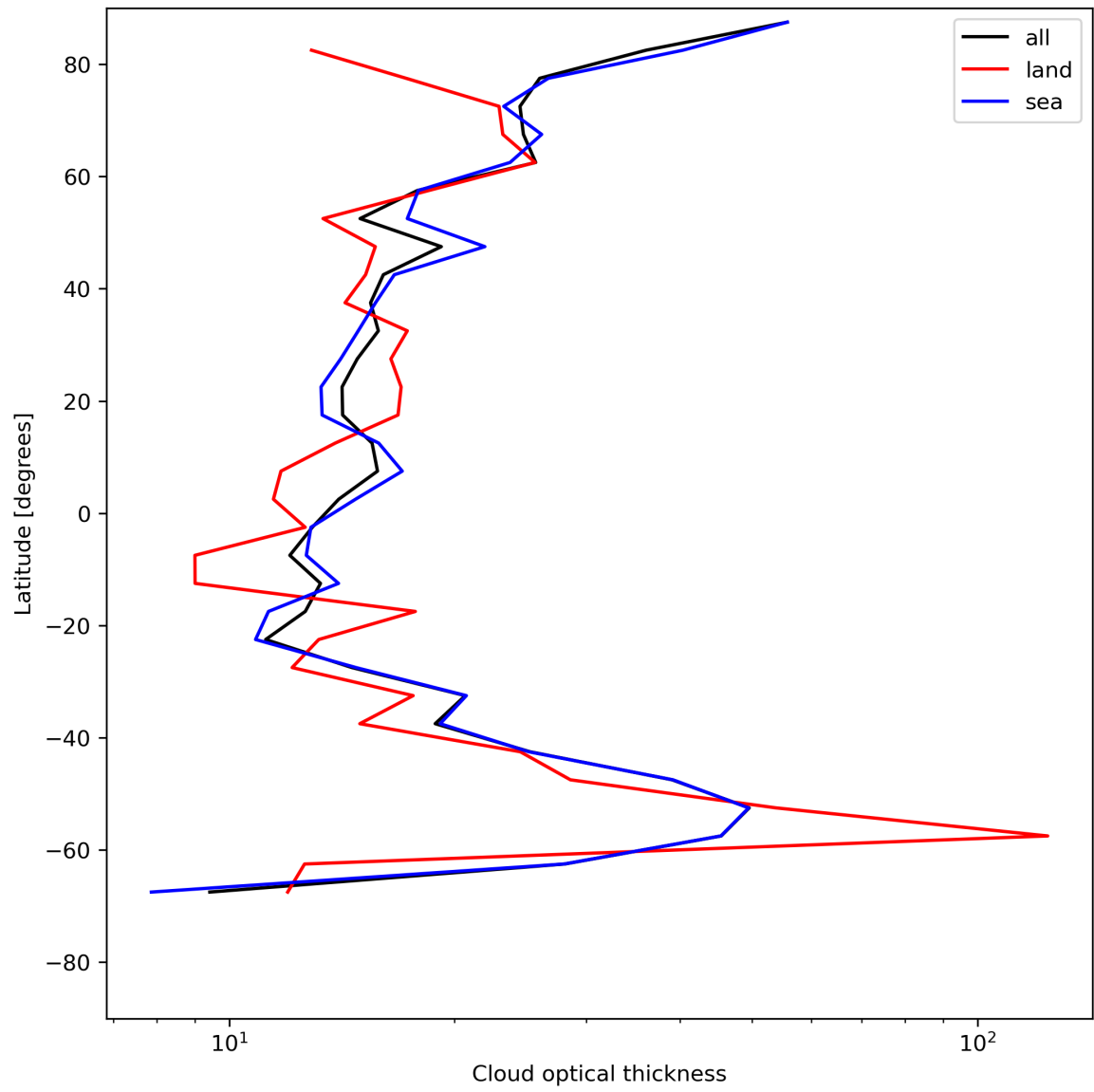


Figure 25: Zonal average of “Cloud optical thickness” for 2023-07-13 to 2023-07-14.

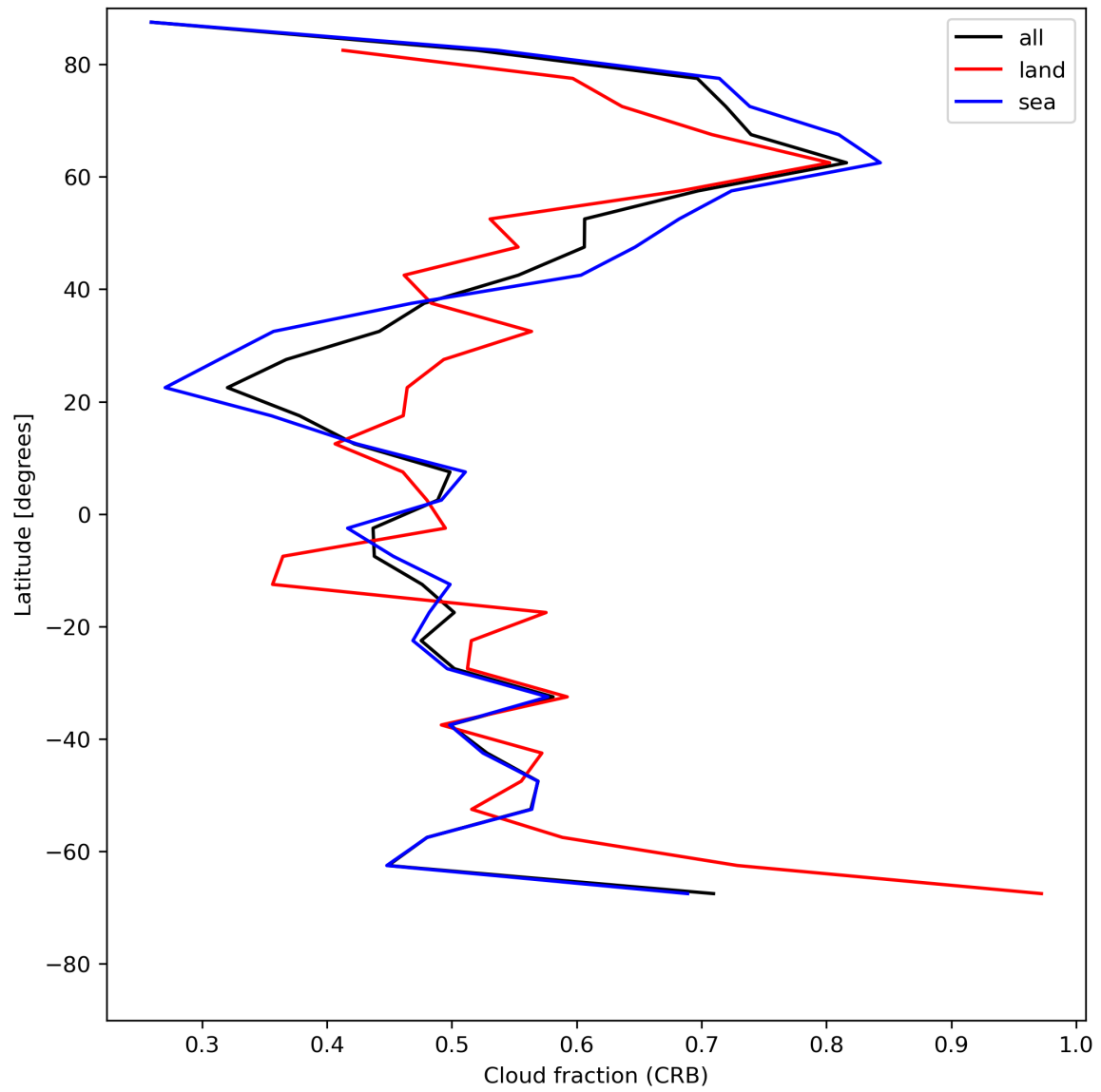


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.

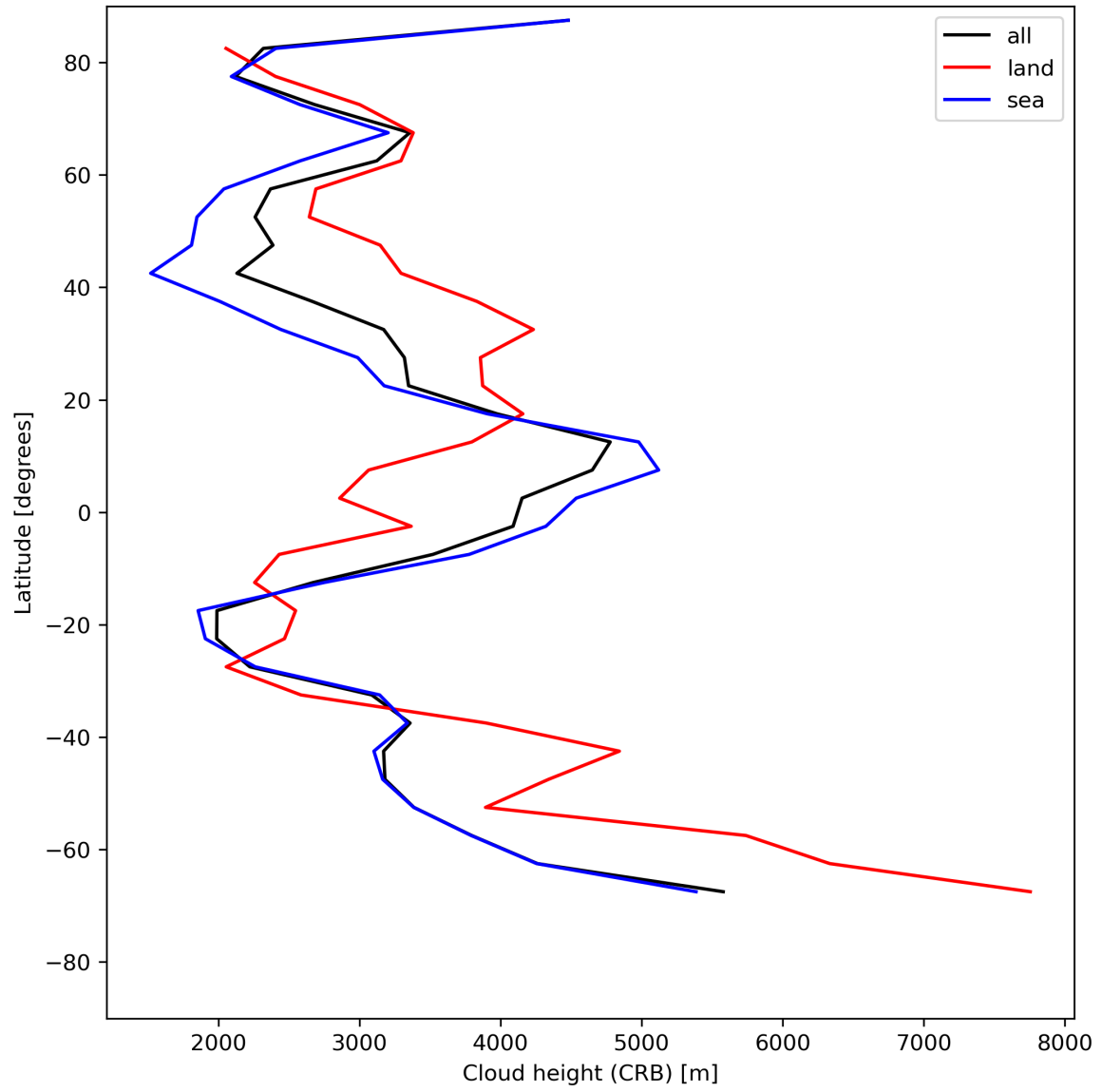


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.

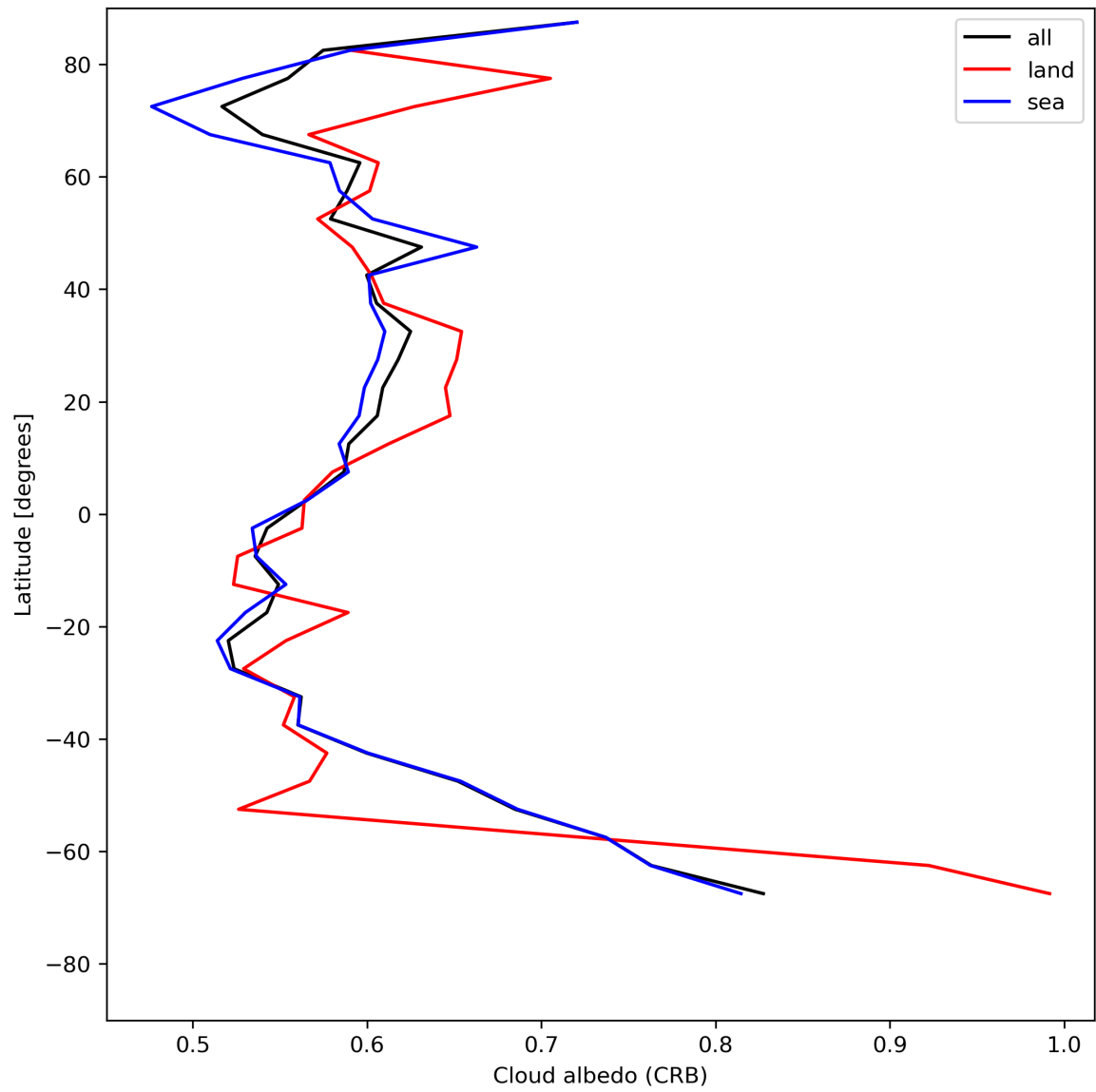


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

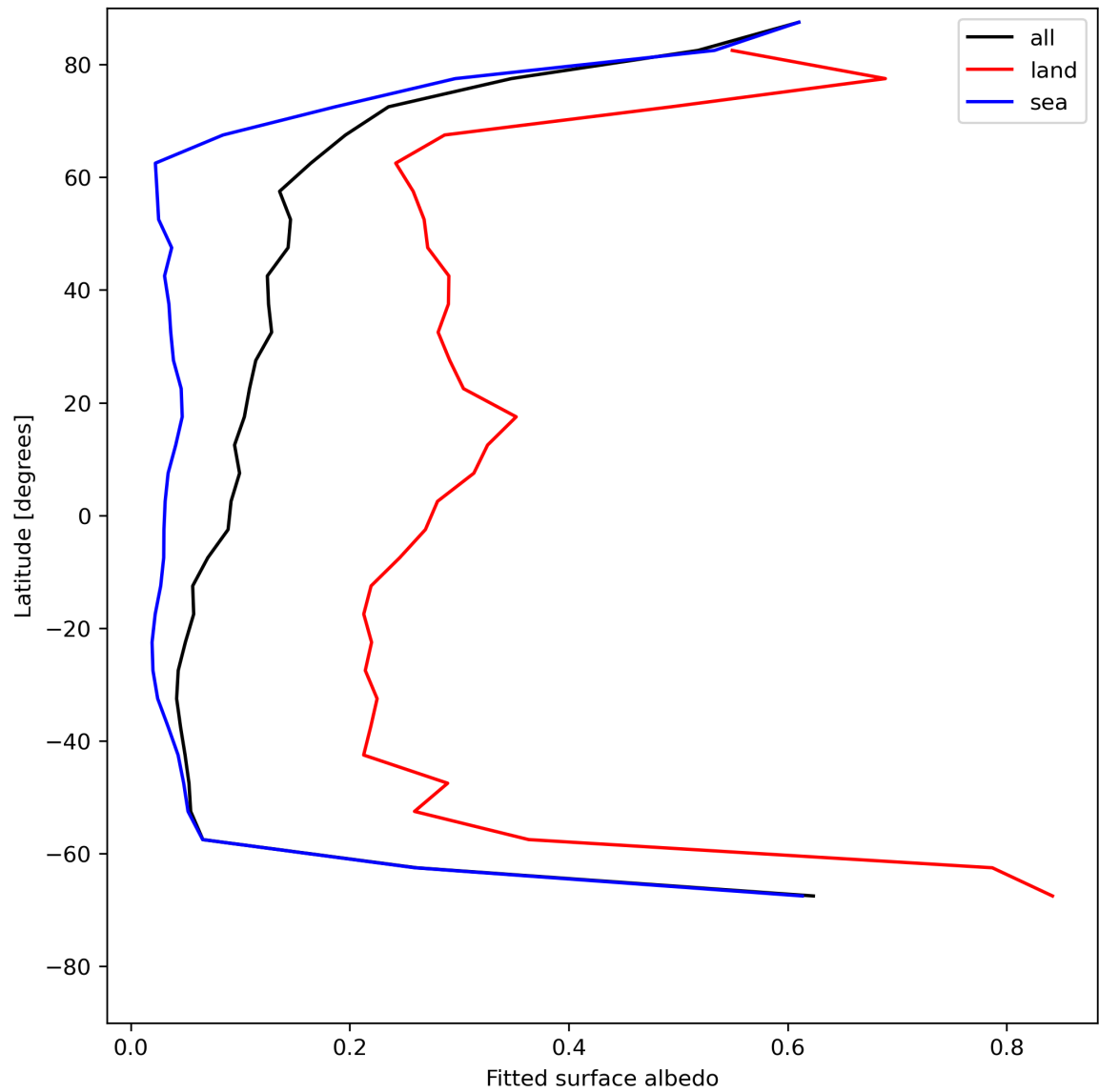


Figure 29: Zonal average of “Fitted surface albedo” for 2023-07-13 to 2023-07-14.

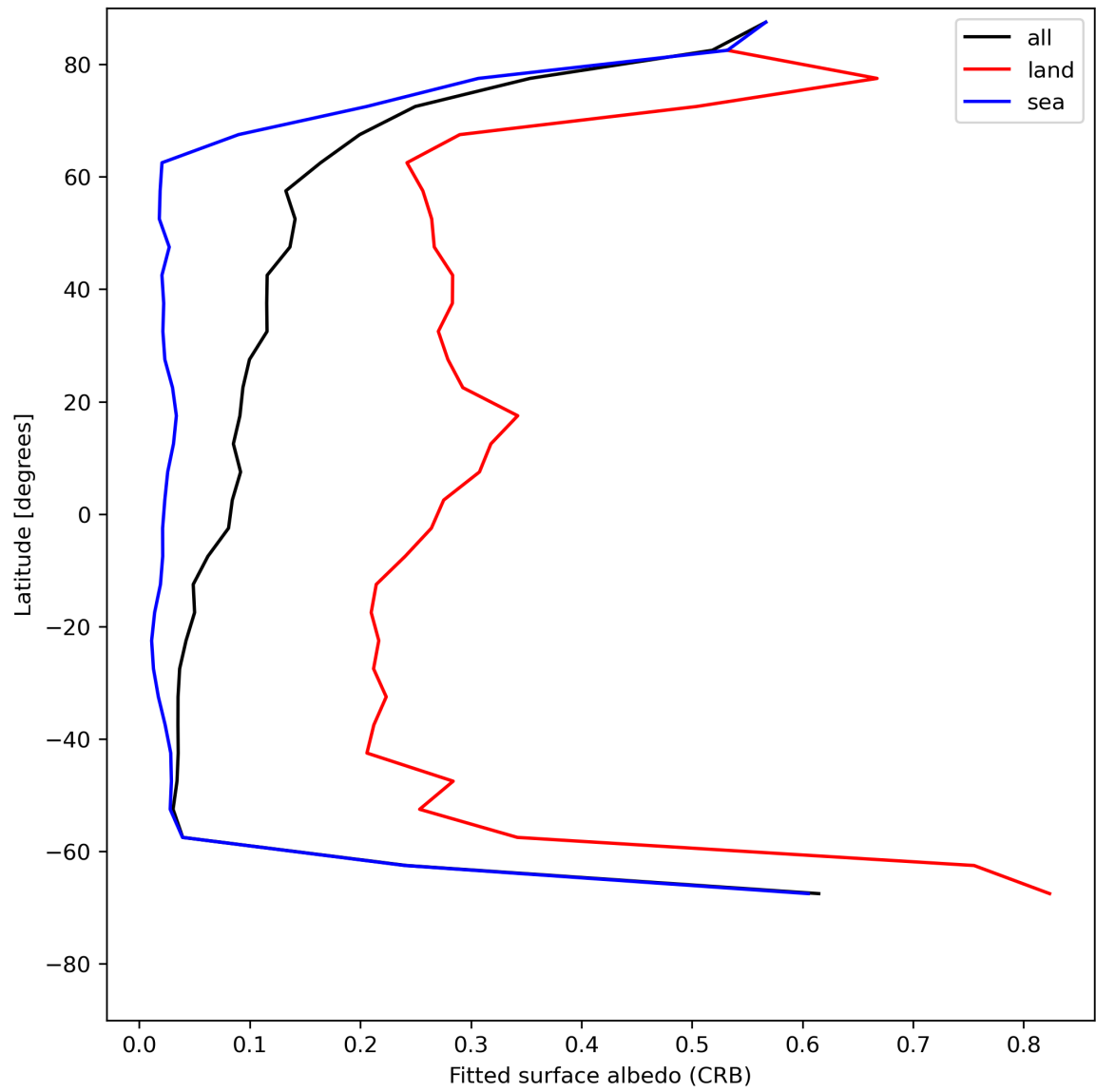


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-07-13 to 2023-07-14.

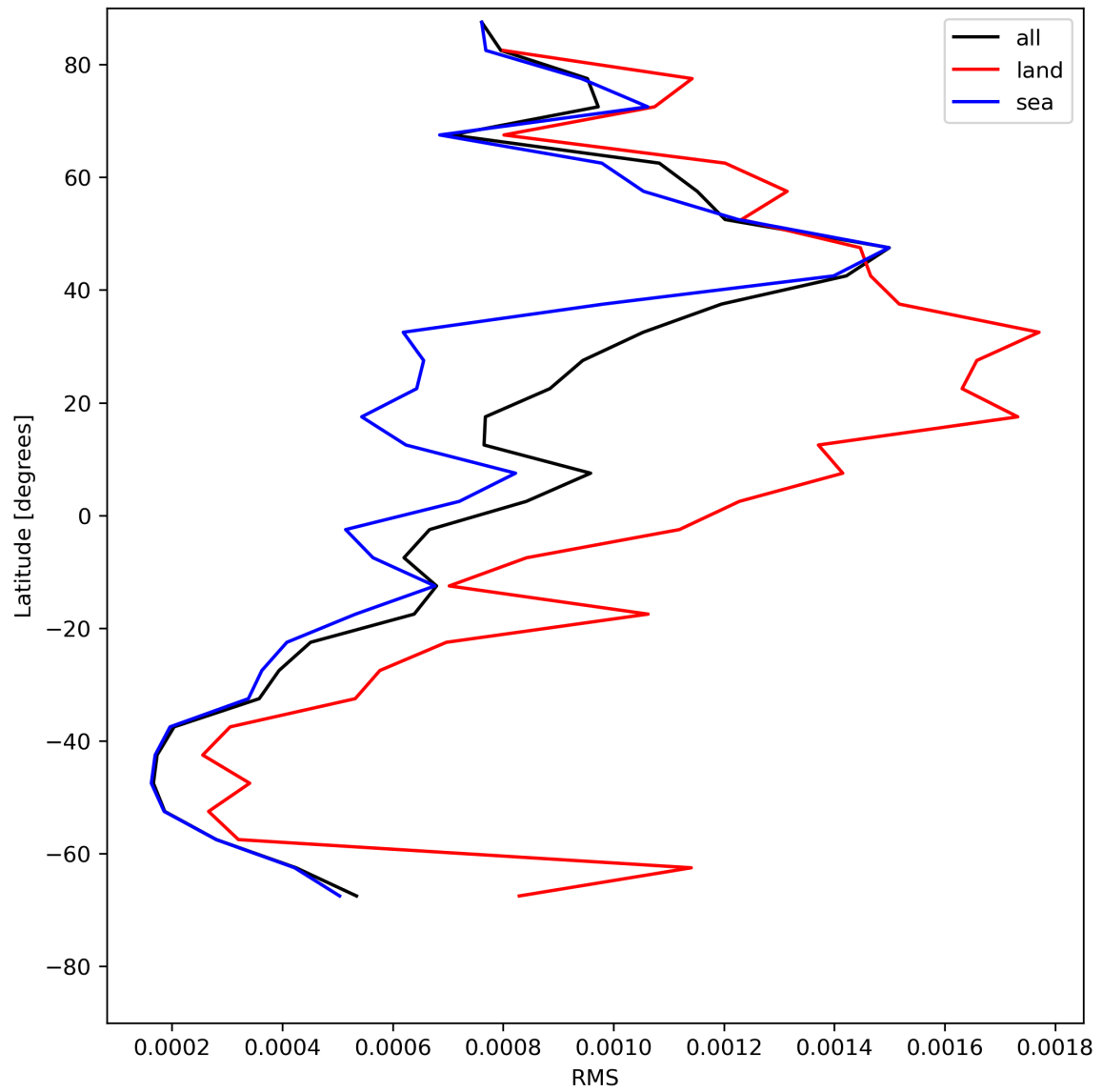


Figure 31: Zonal average of “RMS” for 2023-07-13 to 2023-07-14.

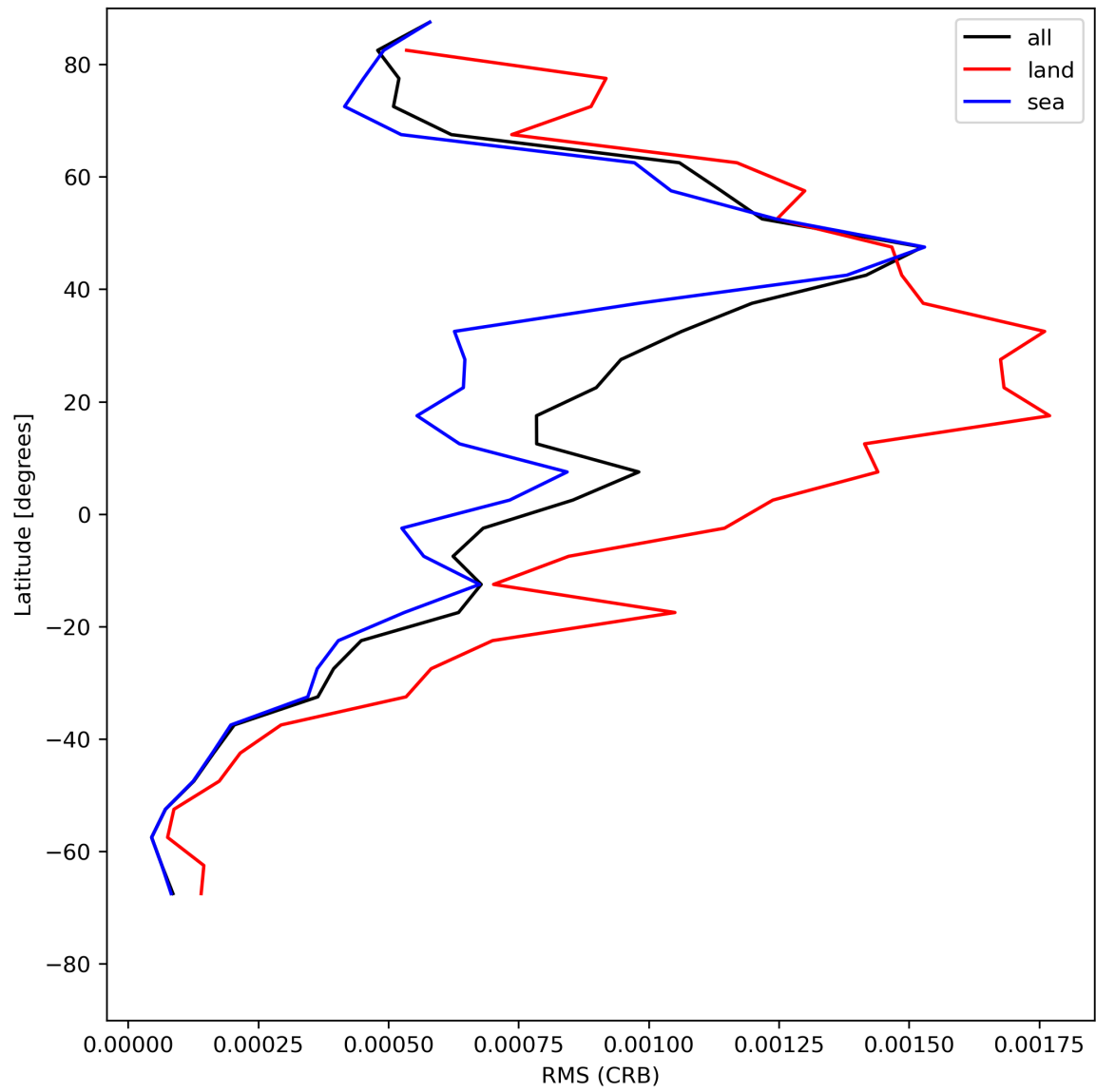


Figure 32: Zonal average of “RMS (CRB)” for 2023-07-13 to 2023-07-14.

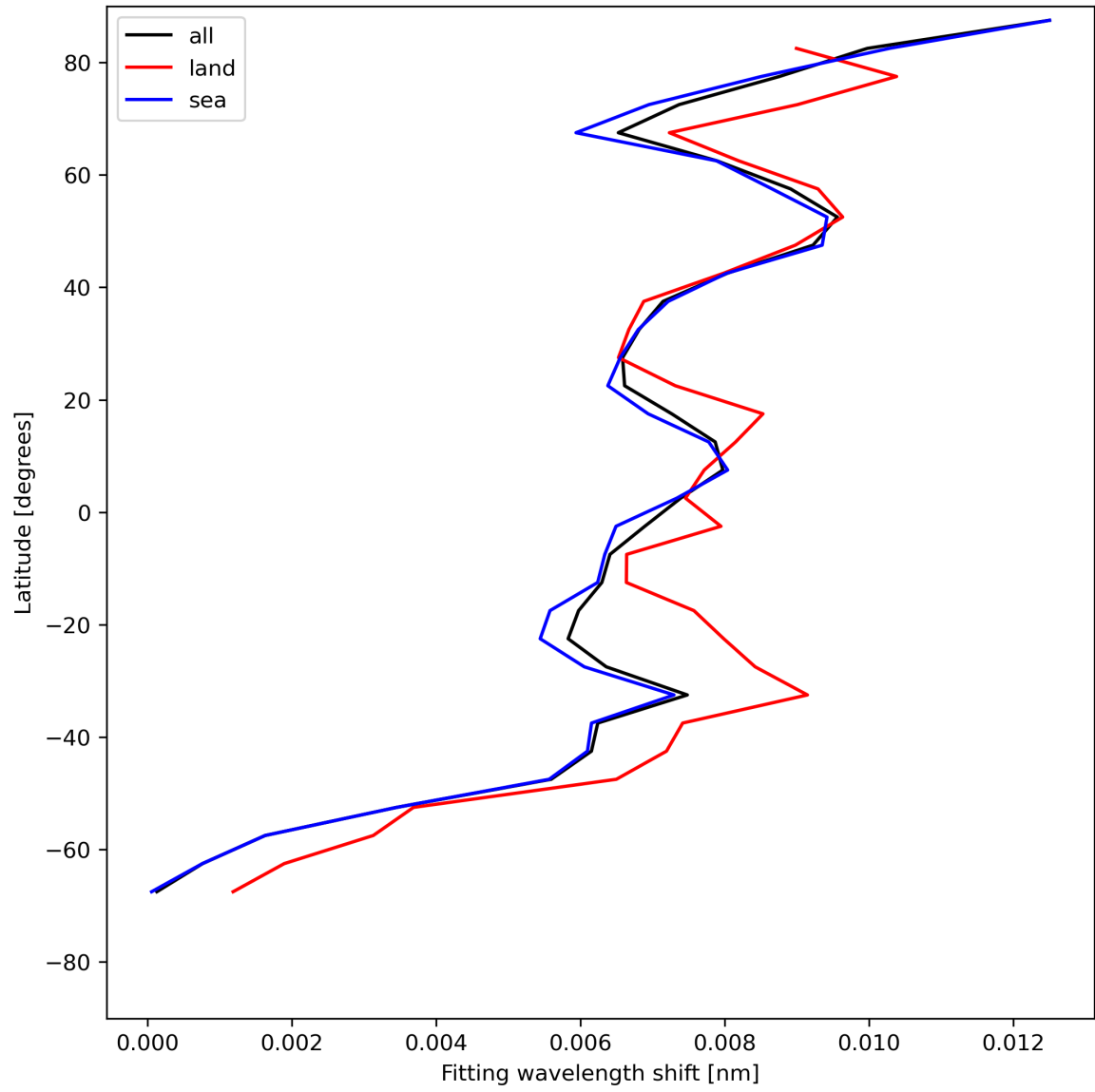


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-07-13 to 2023-07-14.

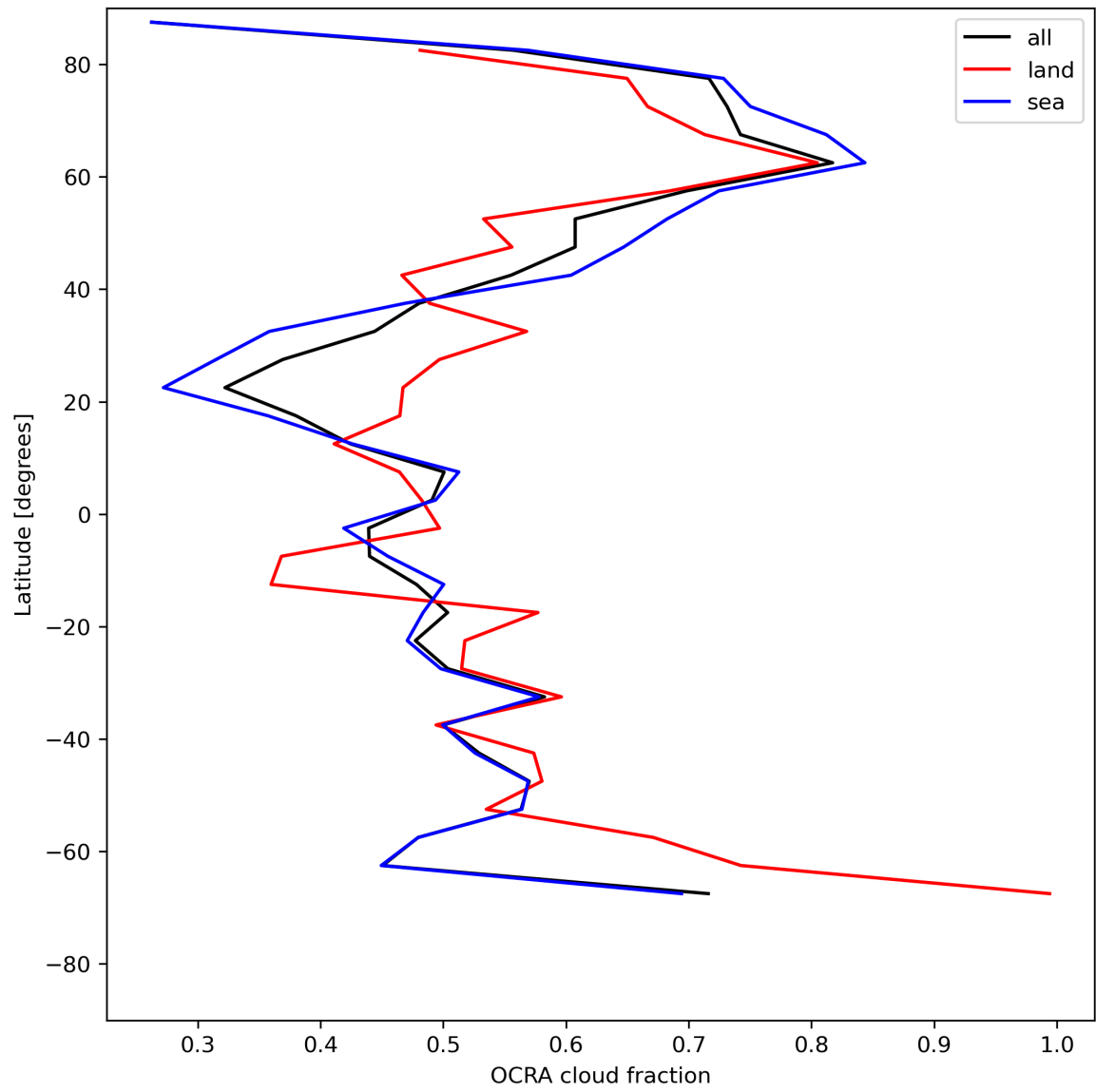


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

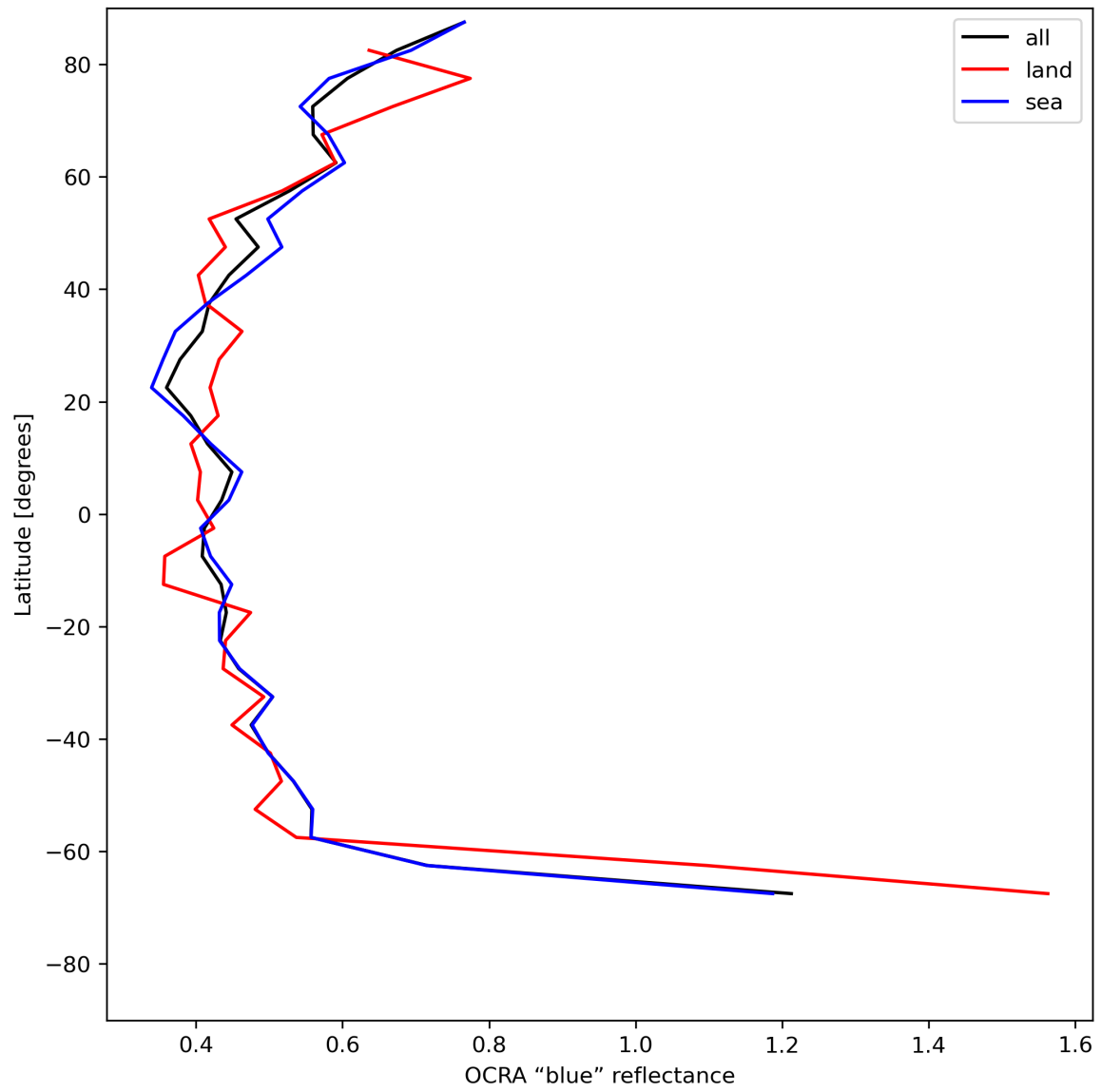


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-07-13 to 2023-07-14.

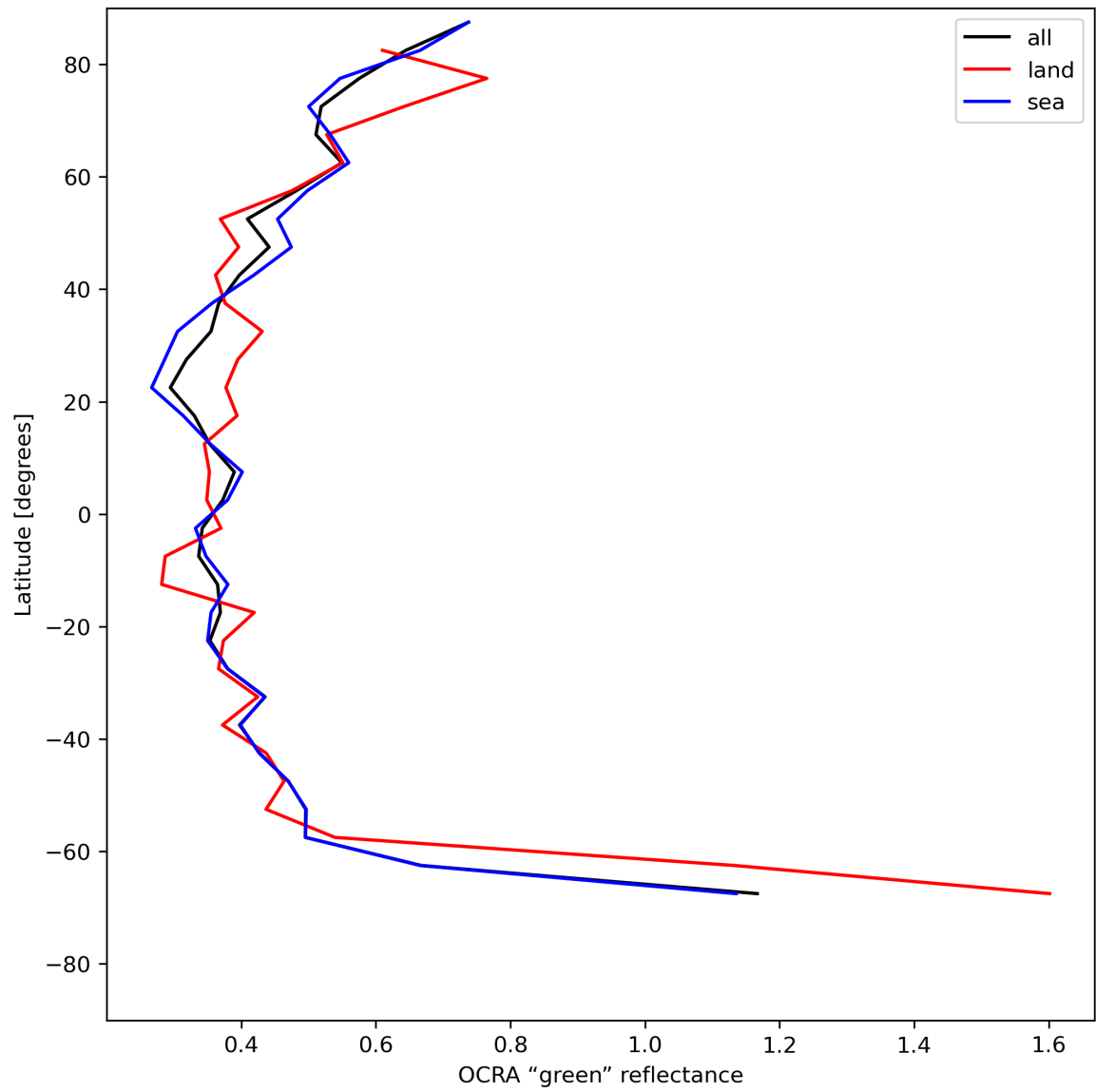


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-07-13 to 2023-07-14.

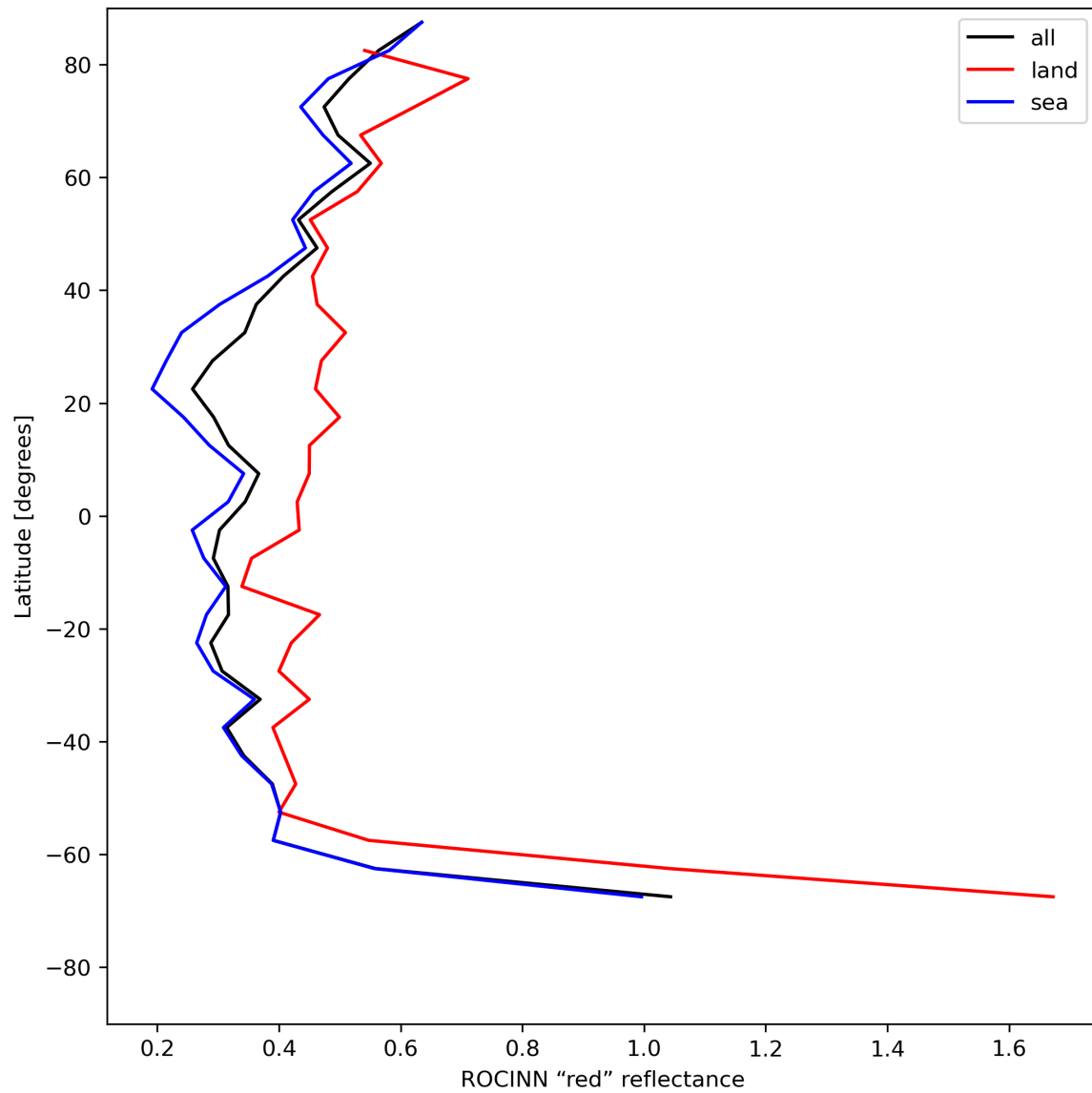


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-07-13 to 2023-07-14.

8 Histograms

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

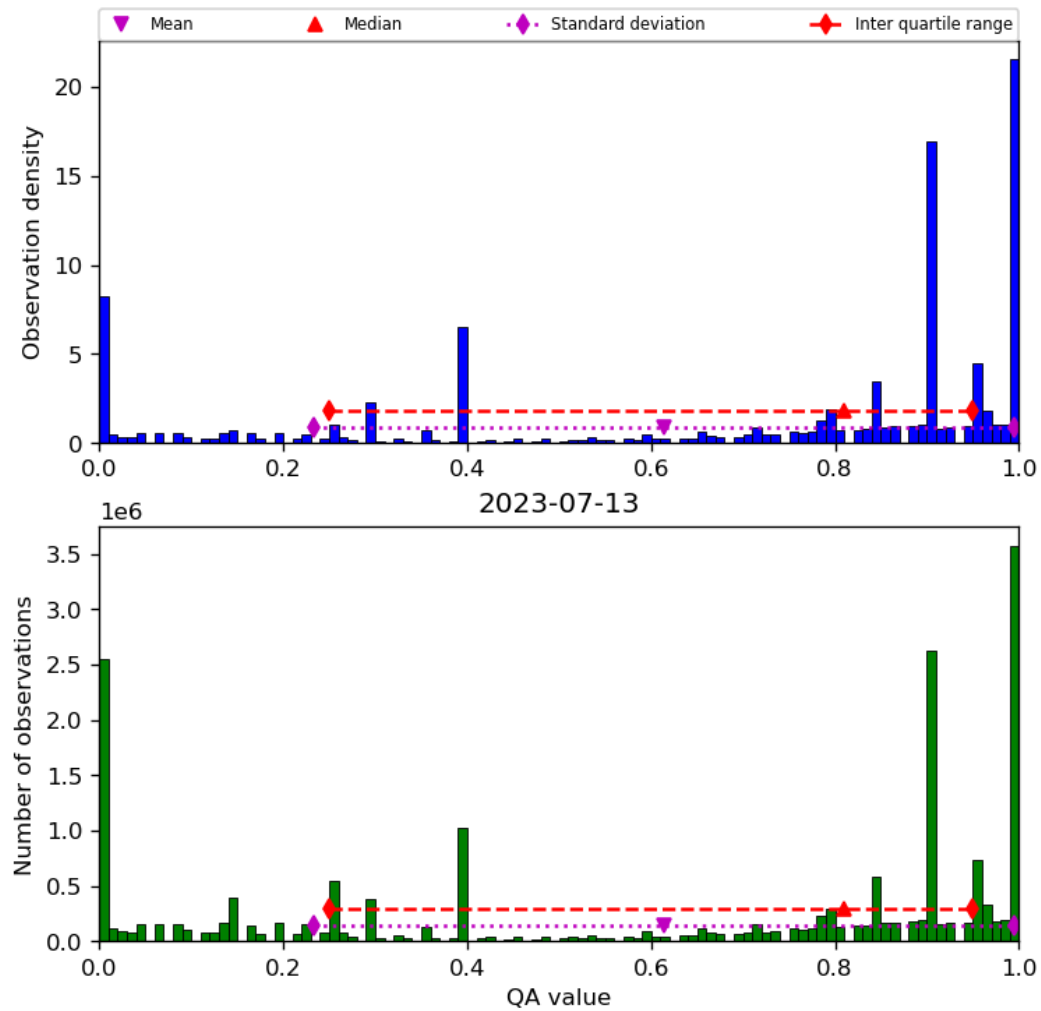


Figure 38: Histogram of “QA value” for 2023-07-13 to 2023-07-14

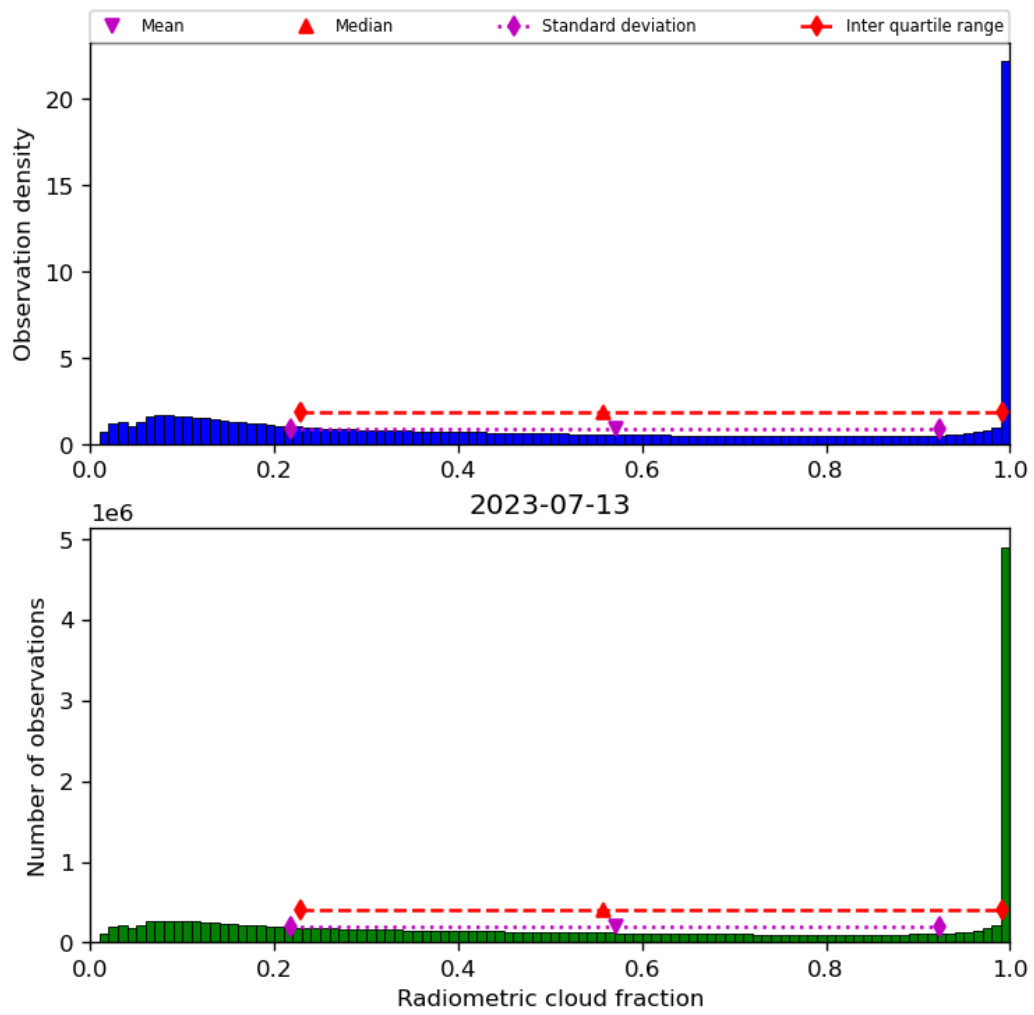


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14

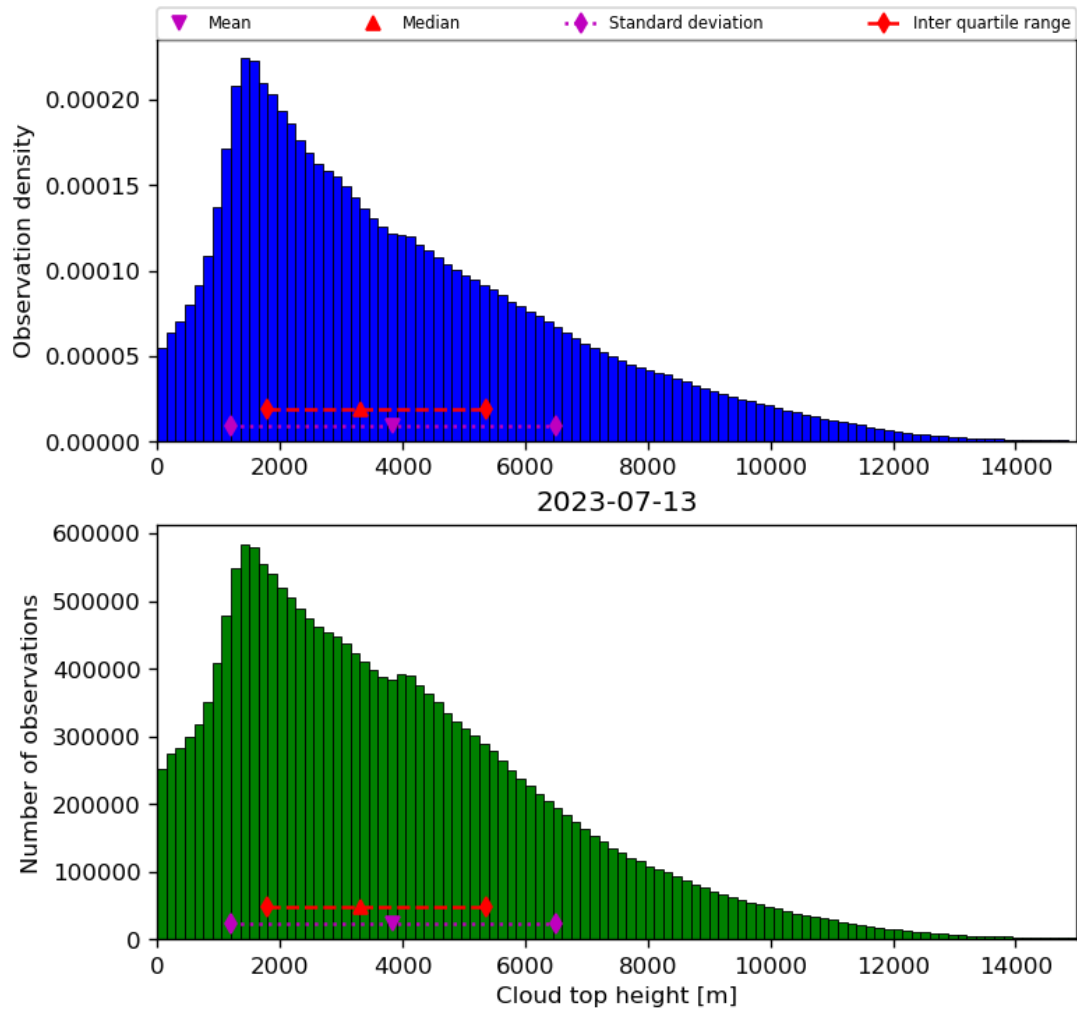


Figure 40: Histogram of “Cloud top height” for 2023-07-13 to 2023-07-14

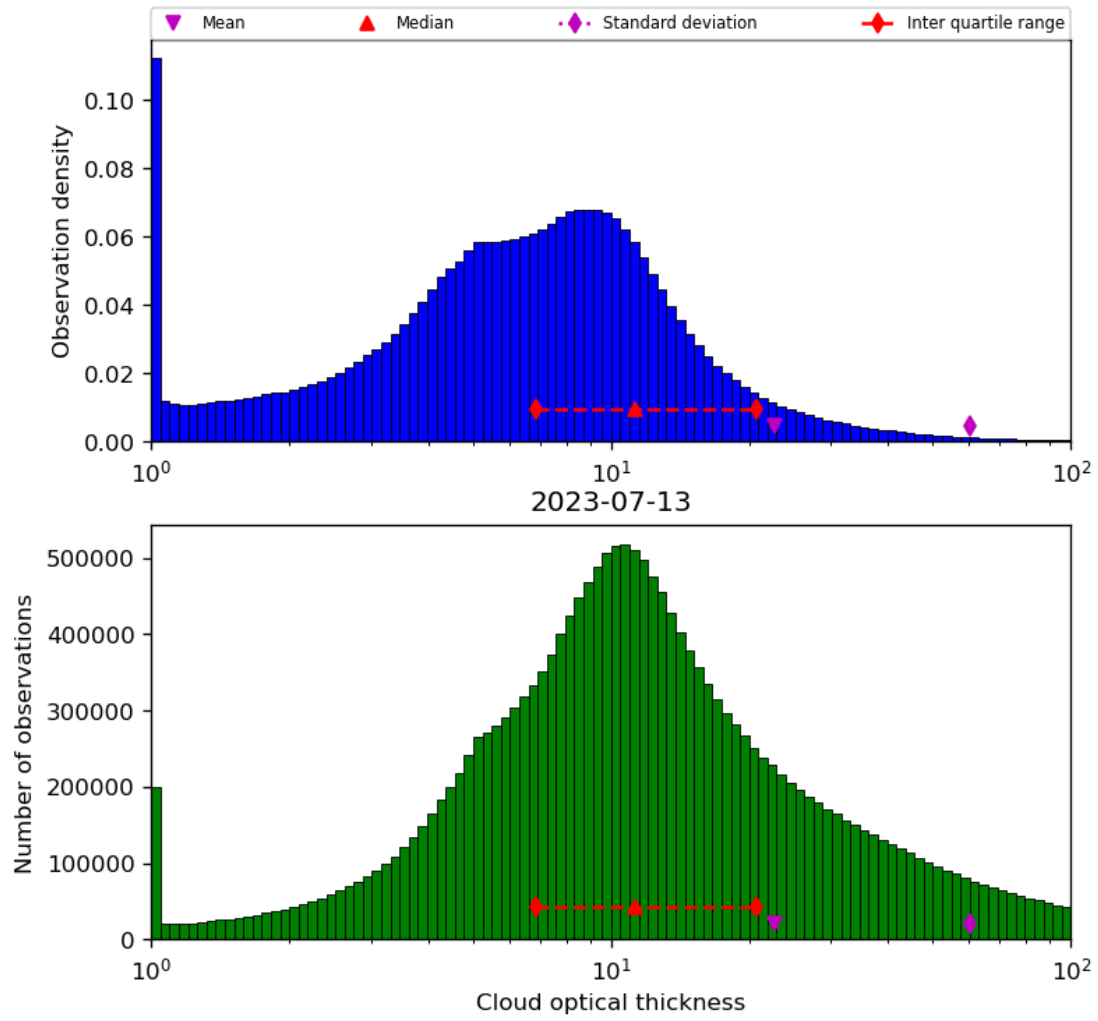


Figure 41: Histogram of “Cloud optical thickness” for 2023-07-13 to 2023-07-14

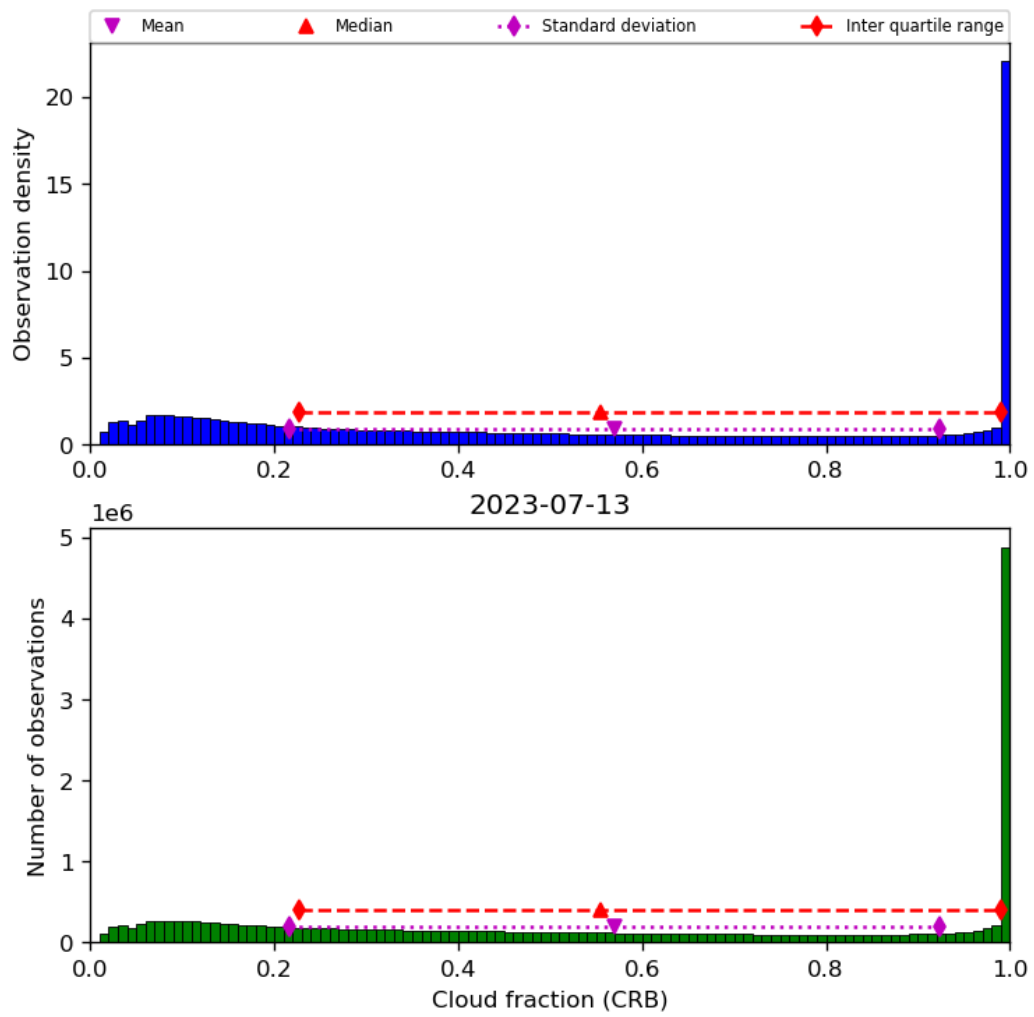


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14

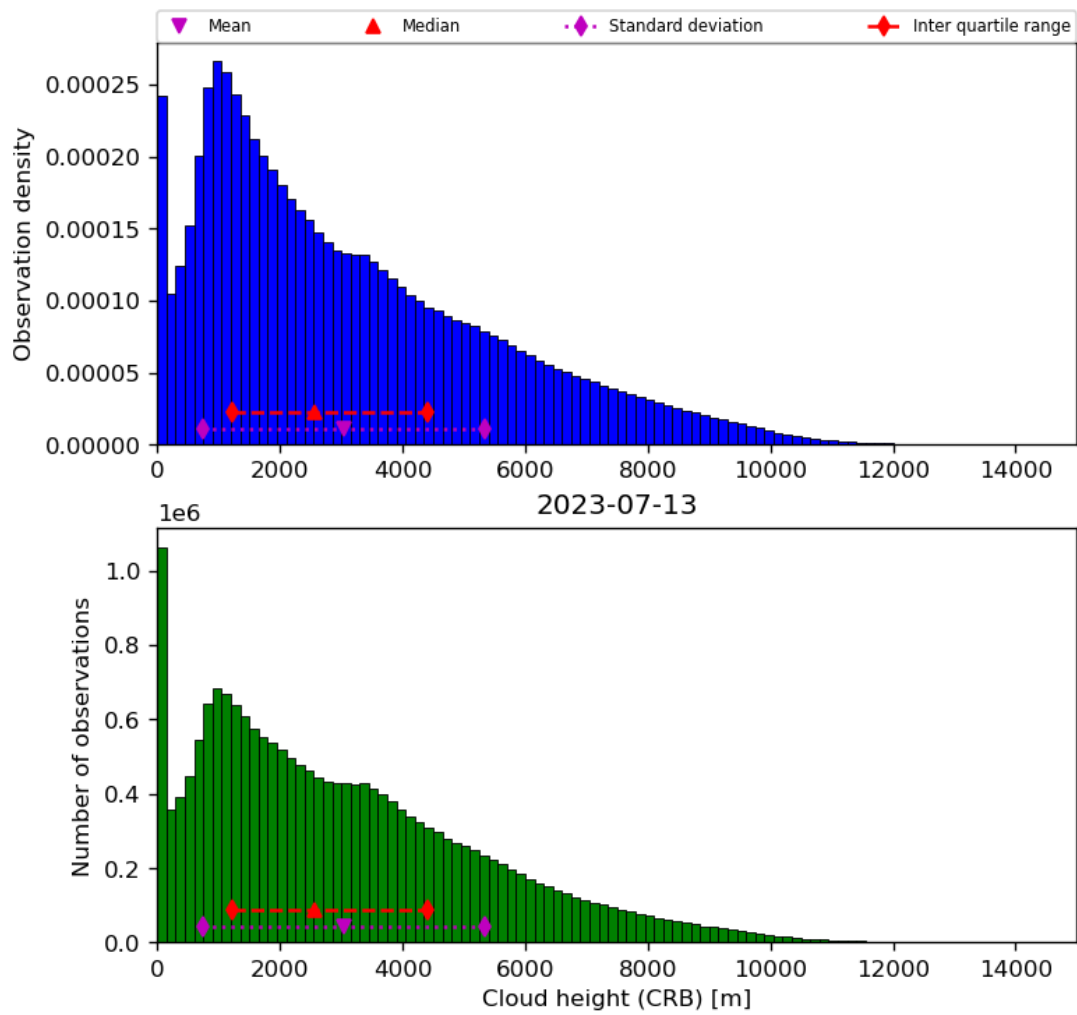


Figure 43: Histogram of “Cloud height (CRB)” for 2023-07-13 to 2023-07-14

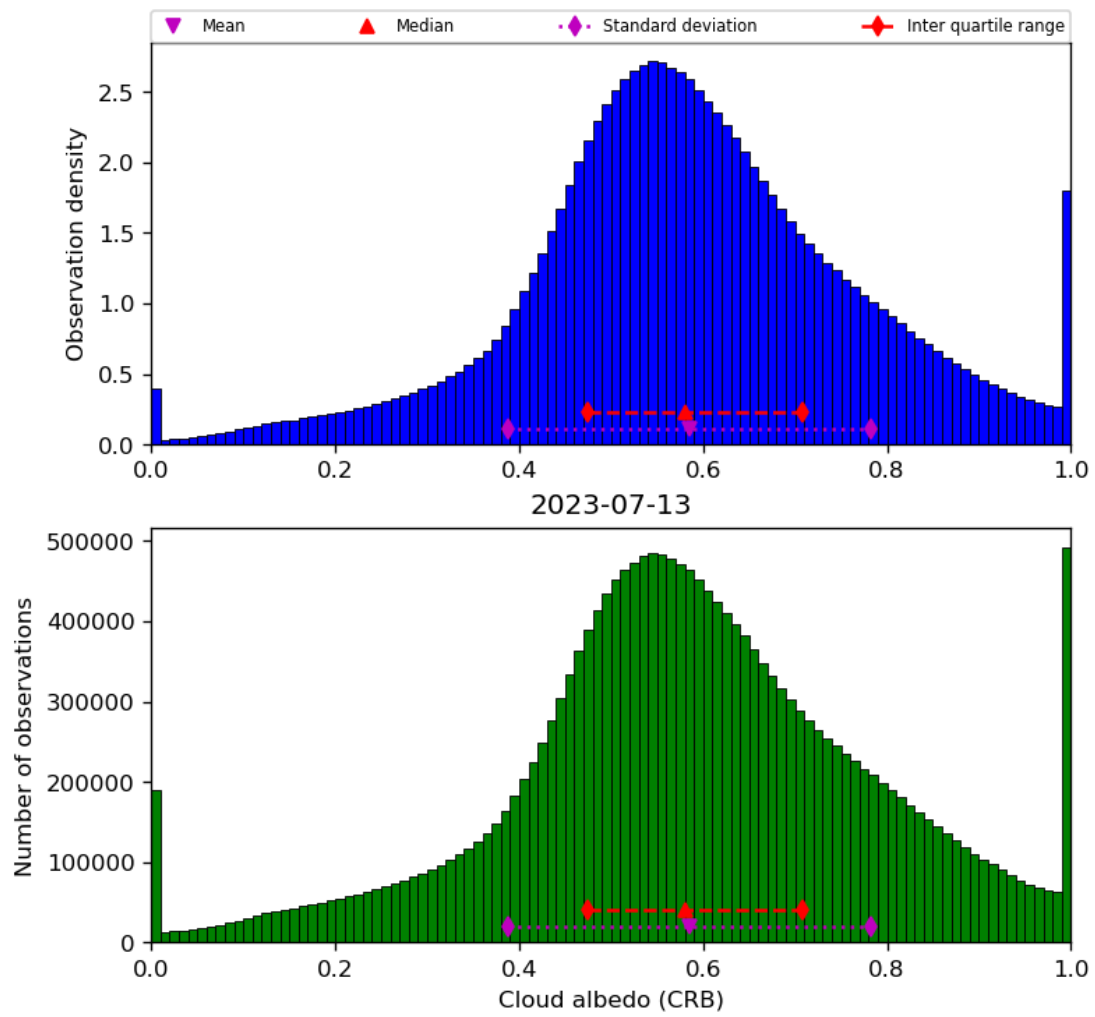


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14

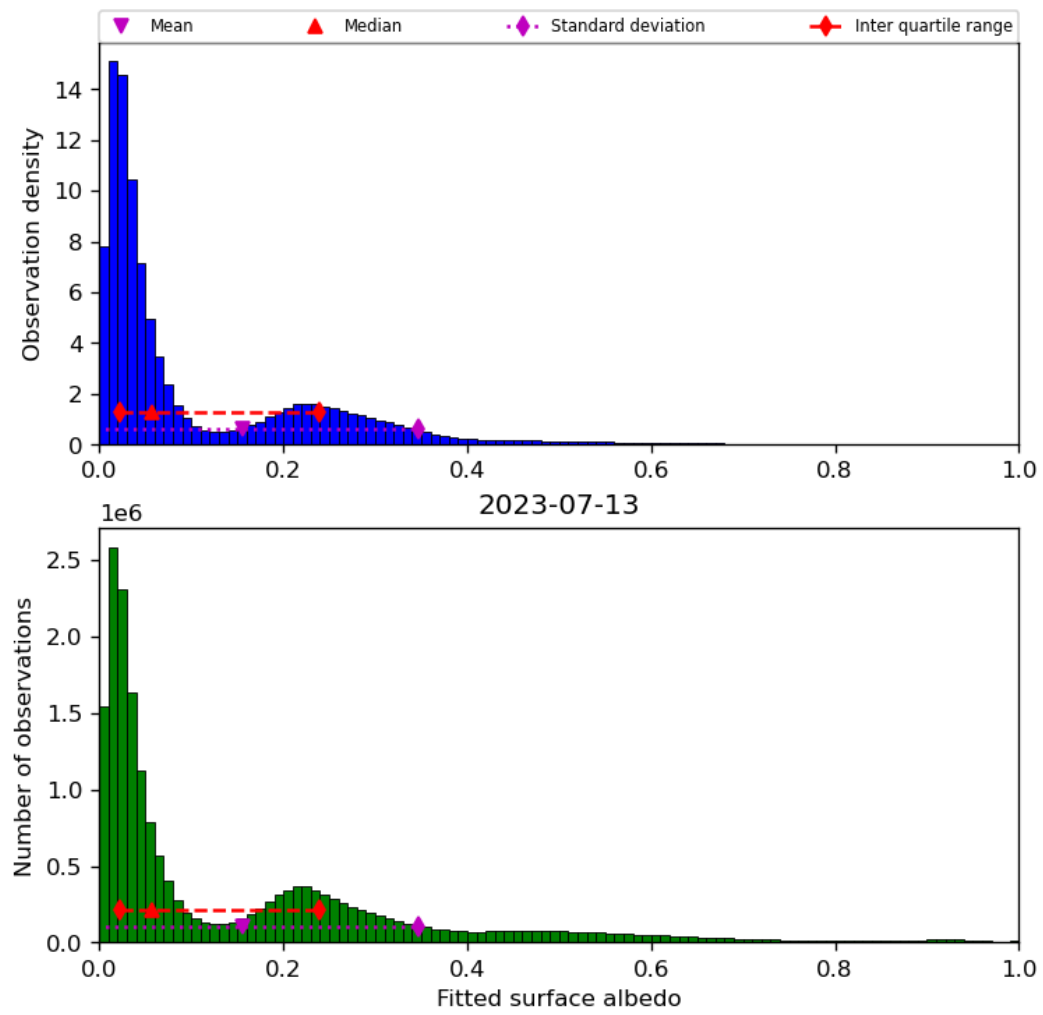


Figure 45: Histogram of “Fitted surface albedo” for 2023-07-13 to 2023-07-14

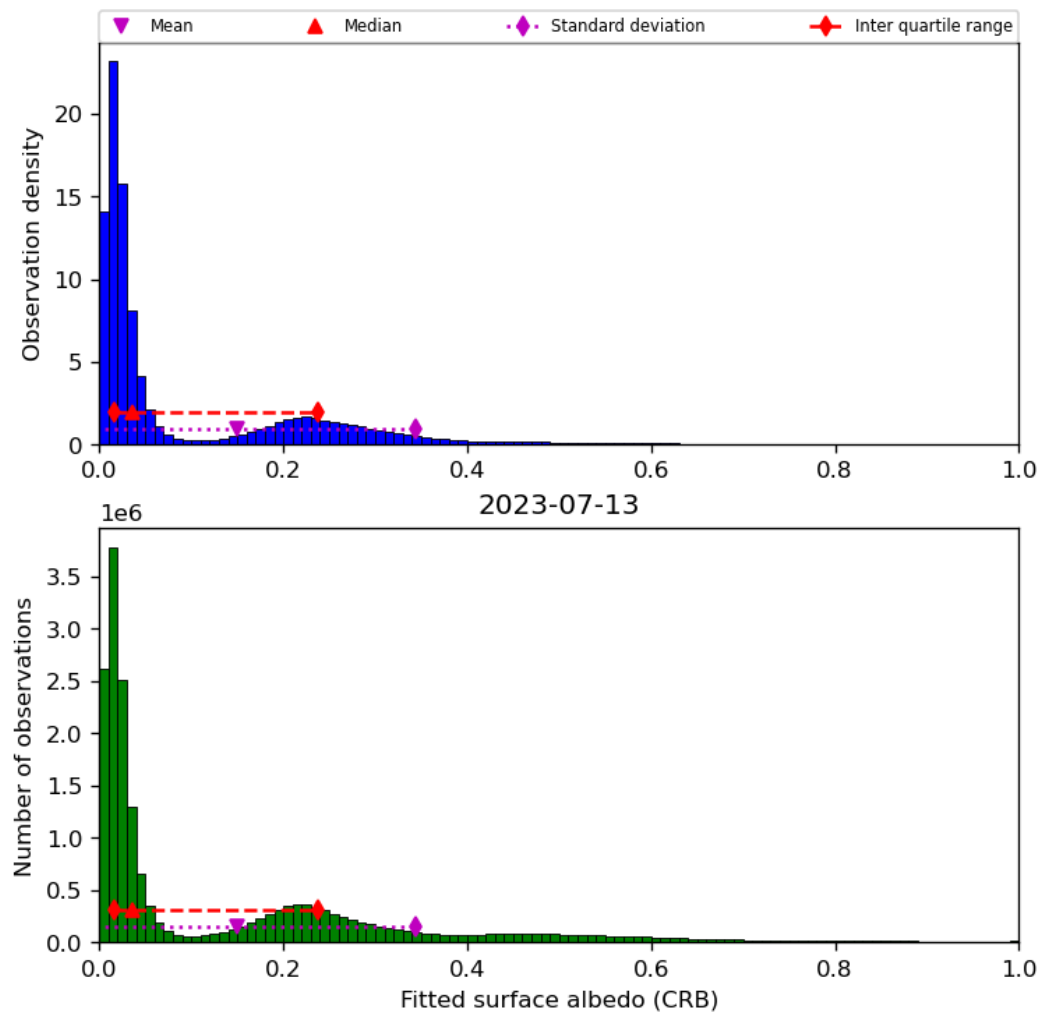


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-07-13 to 2023-07-14

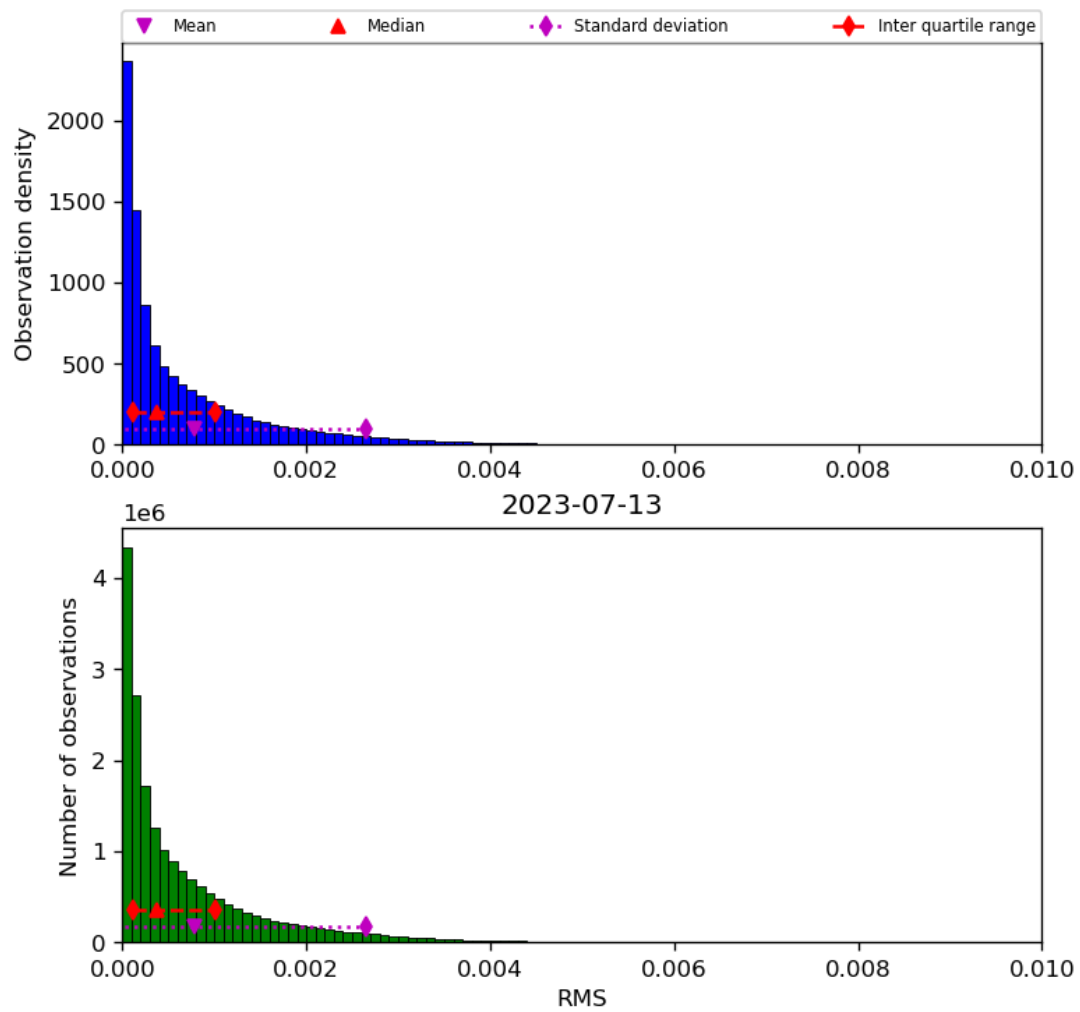


Figure 47: Histogram of “RMS” for 2023-07-13 to 2023-07-14

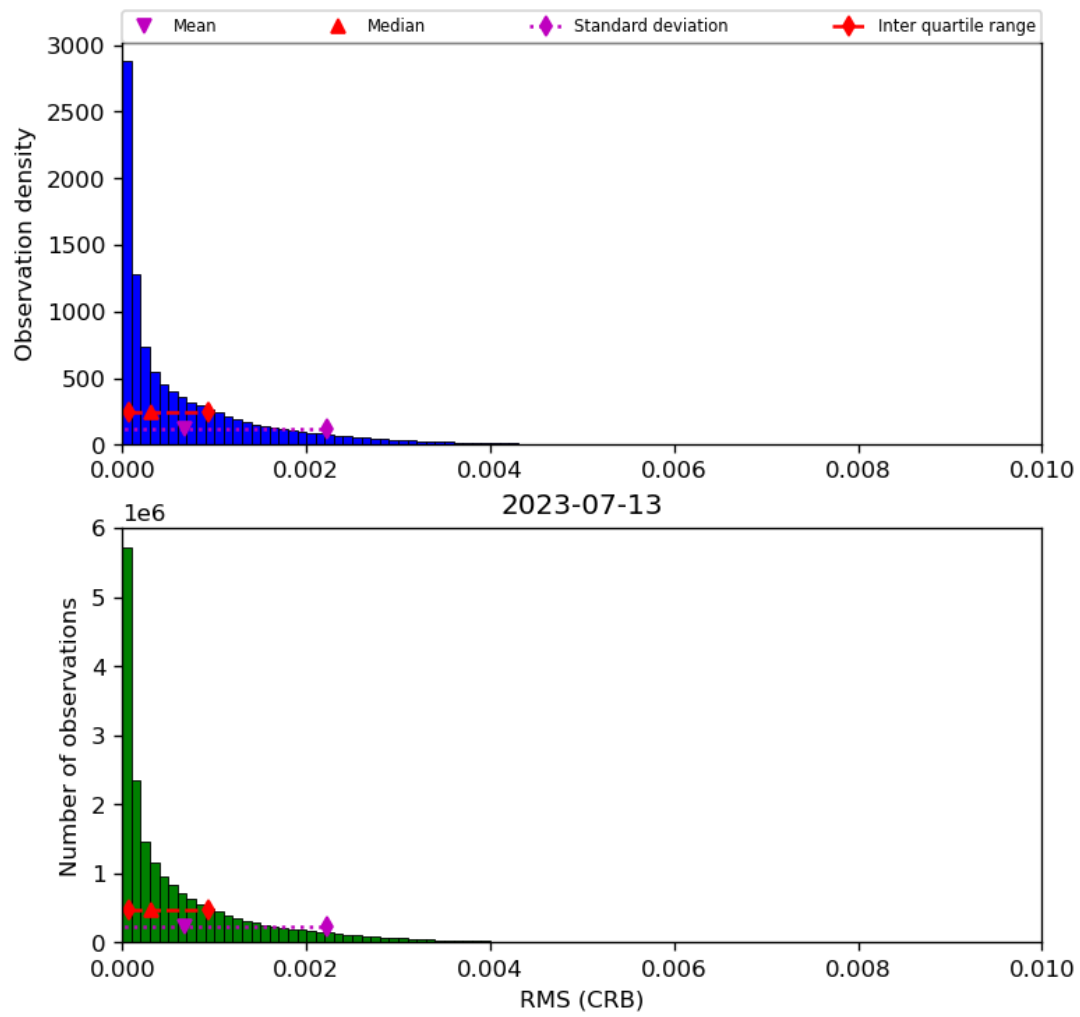


Figure 48: Histogram of “RMS (CRB)” for 2023-07-13 to 2023-07-14

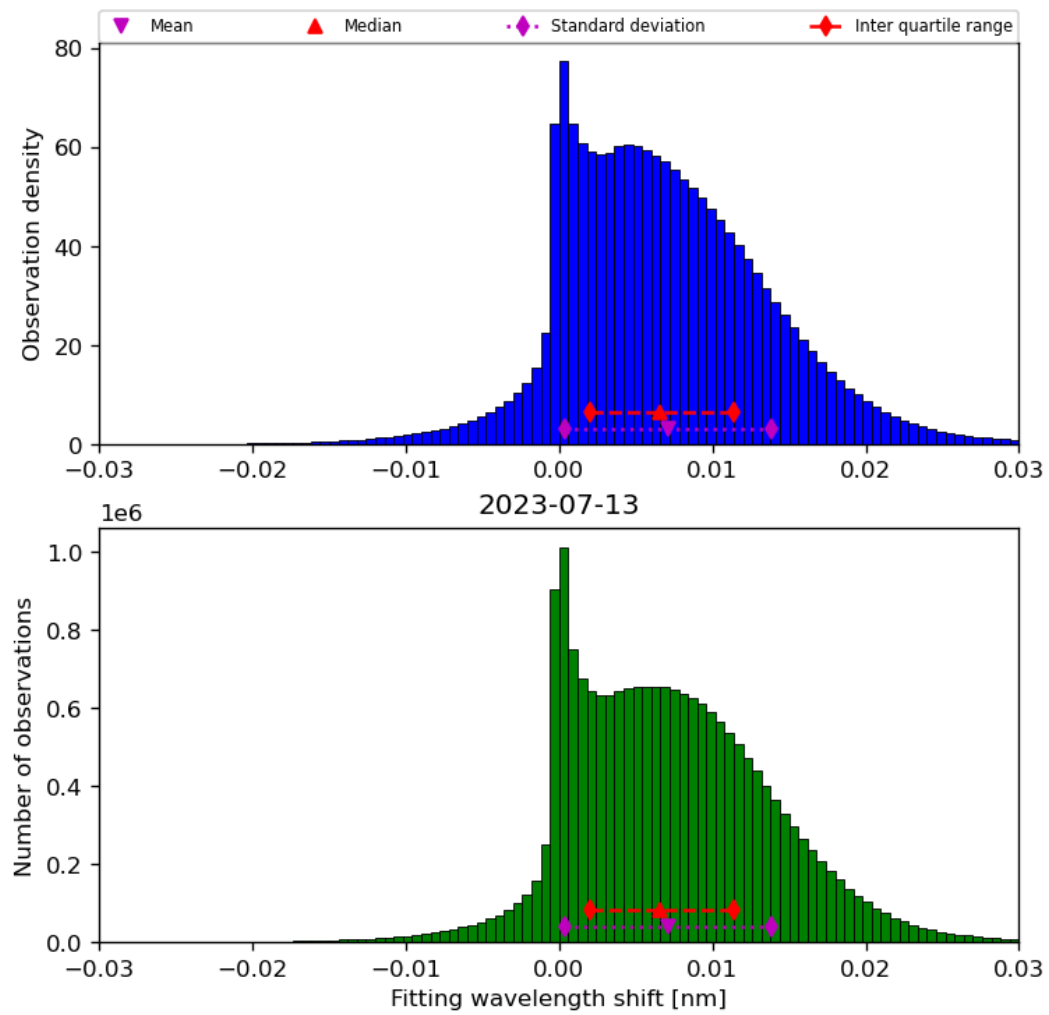


Figure 49: Histogram of “Fitting wavelength shift” for 2023-07-13 to 2023-07-14

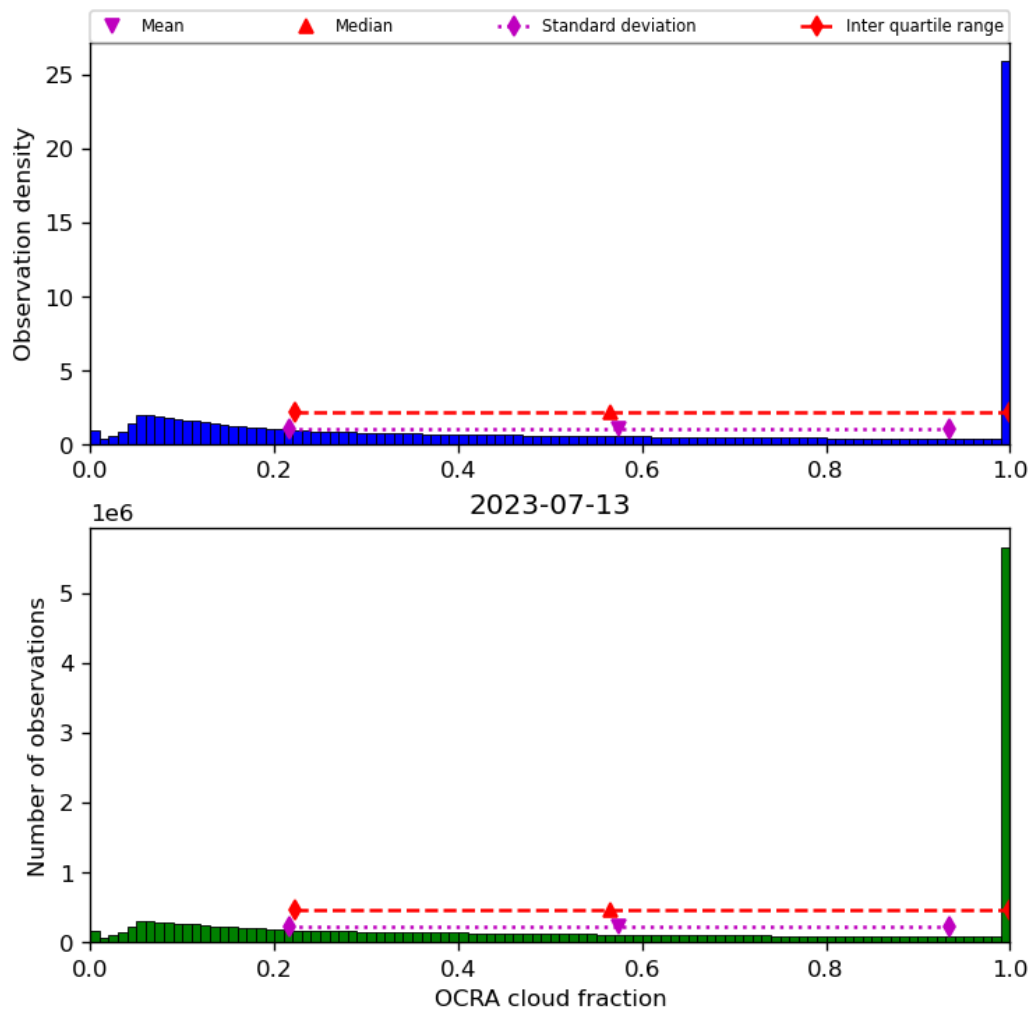


Figure 50: Histogram of “OCRA cloud fraction” for 2023-07-13 to 2023-07-14

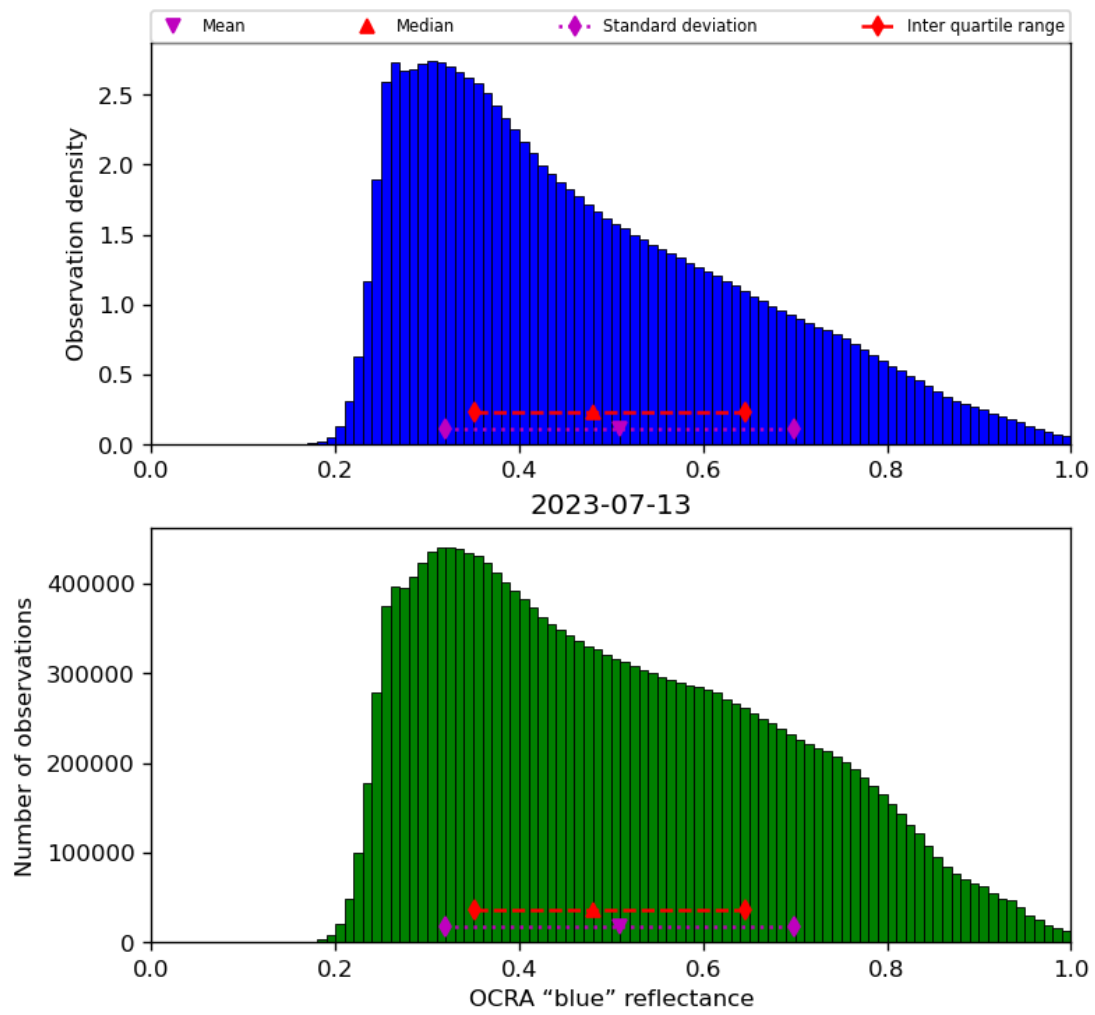


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-07-13 to 2023-07-14

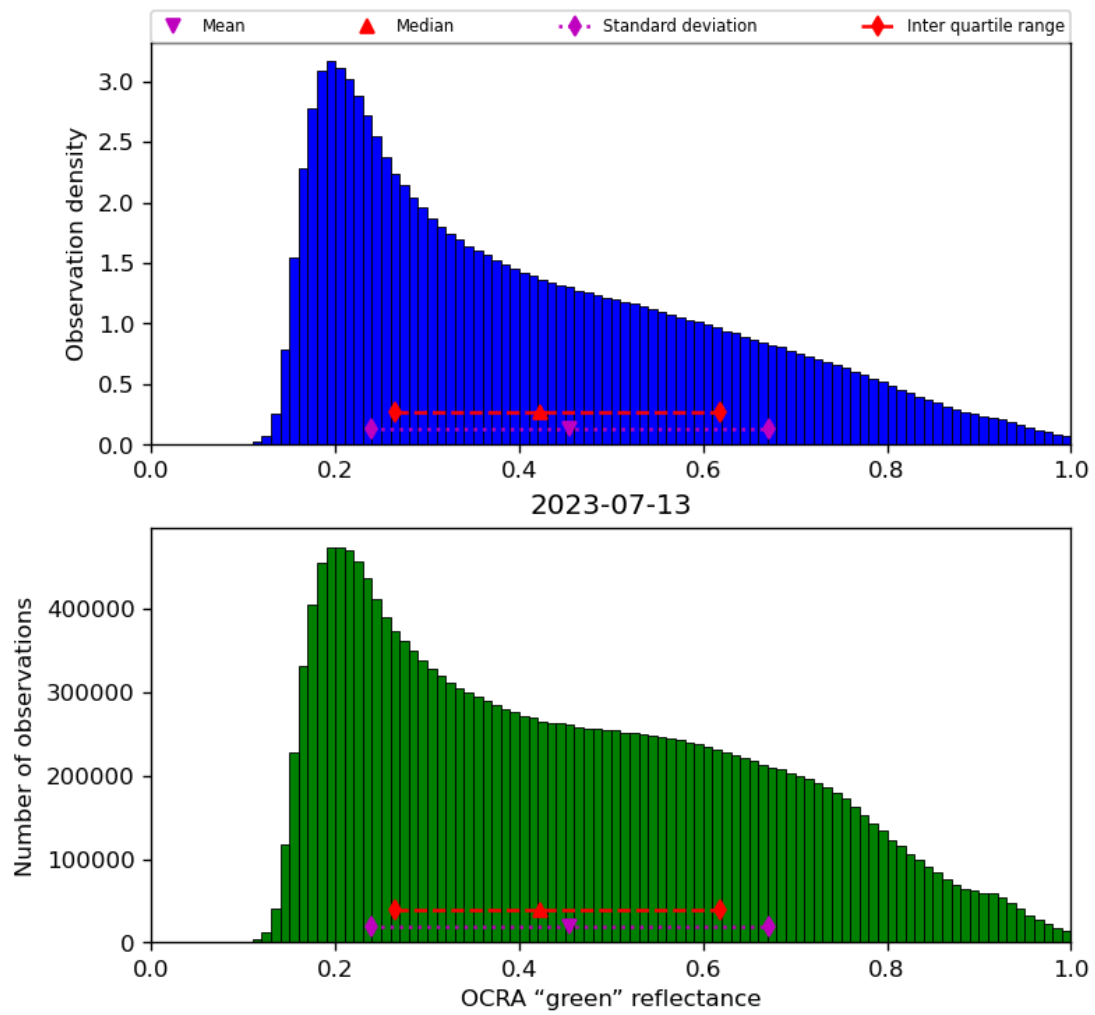


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-07-13 to 2023-07-14

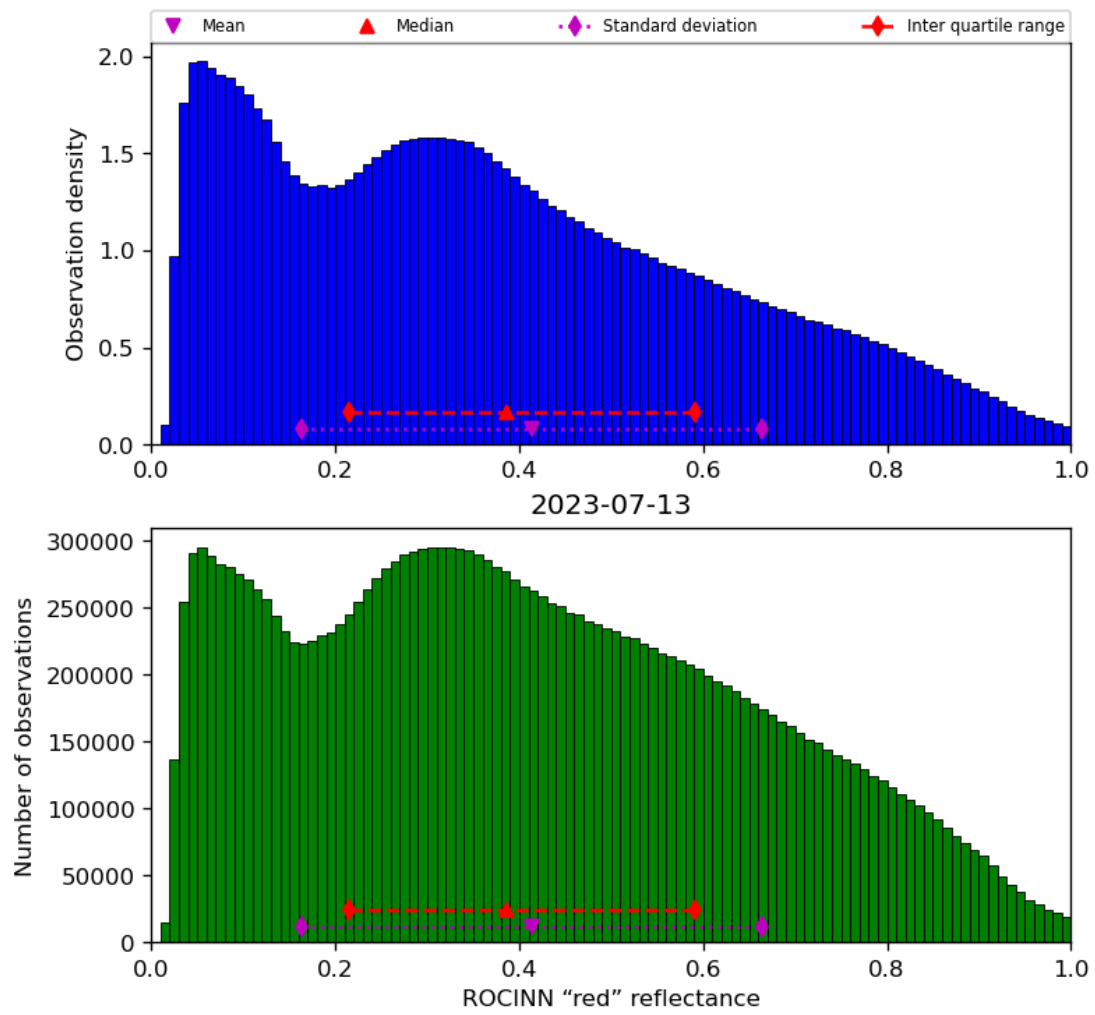


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-07-13 to 2023-07-14

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.

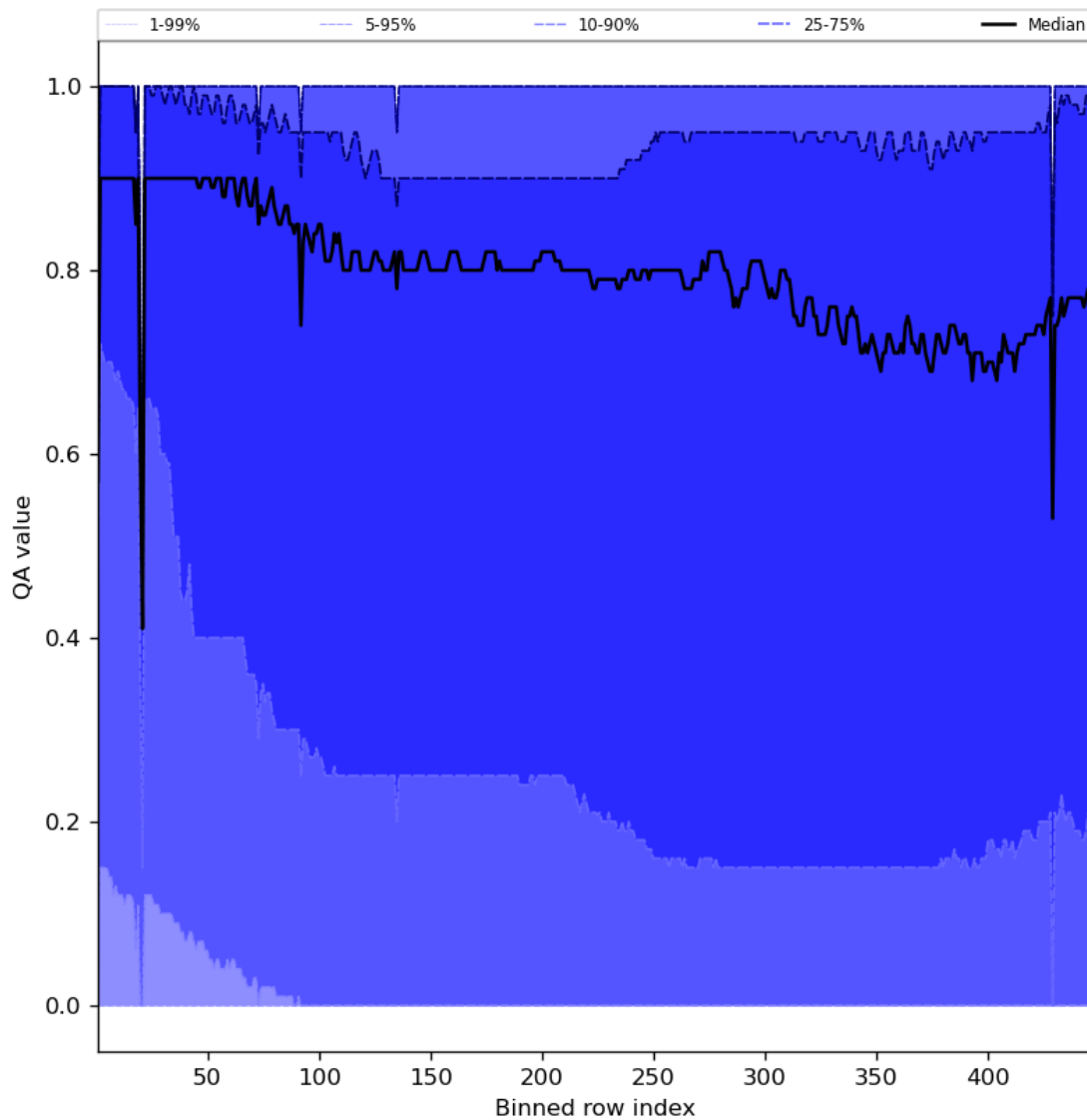


Figure 54: Along track statistics of “QA value” for 2023-07-13 to 2023-07-14

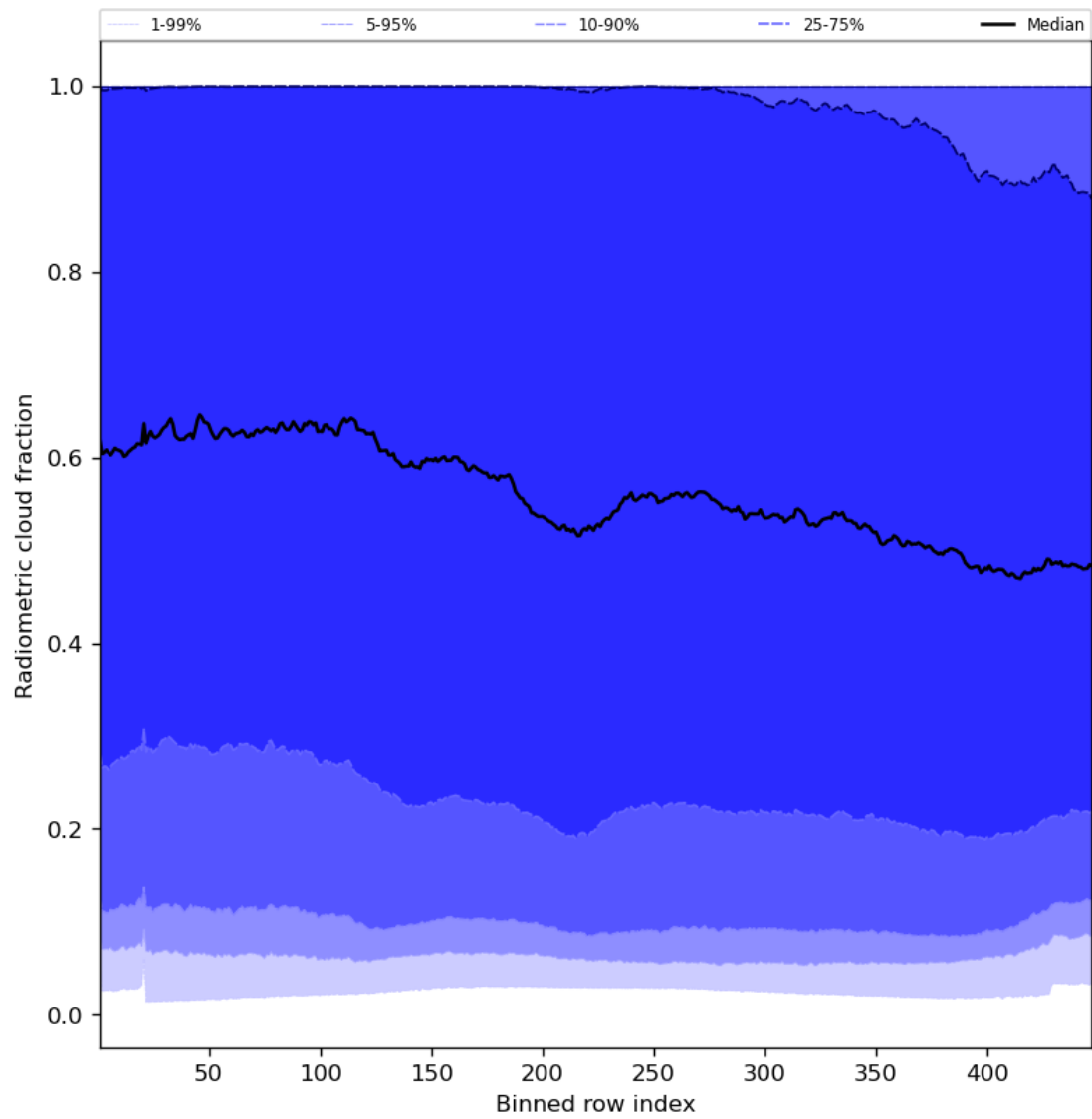


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14

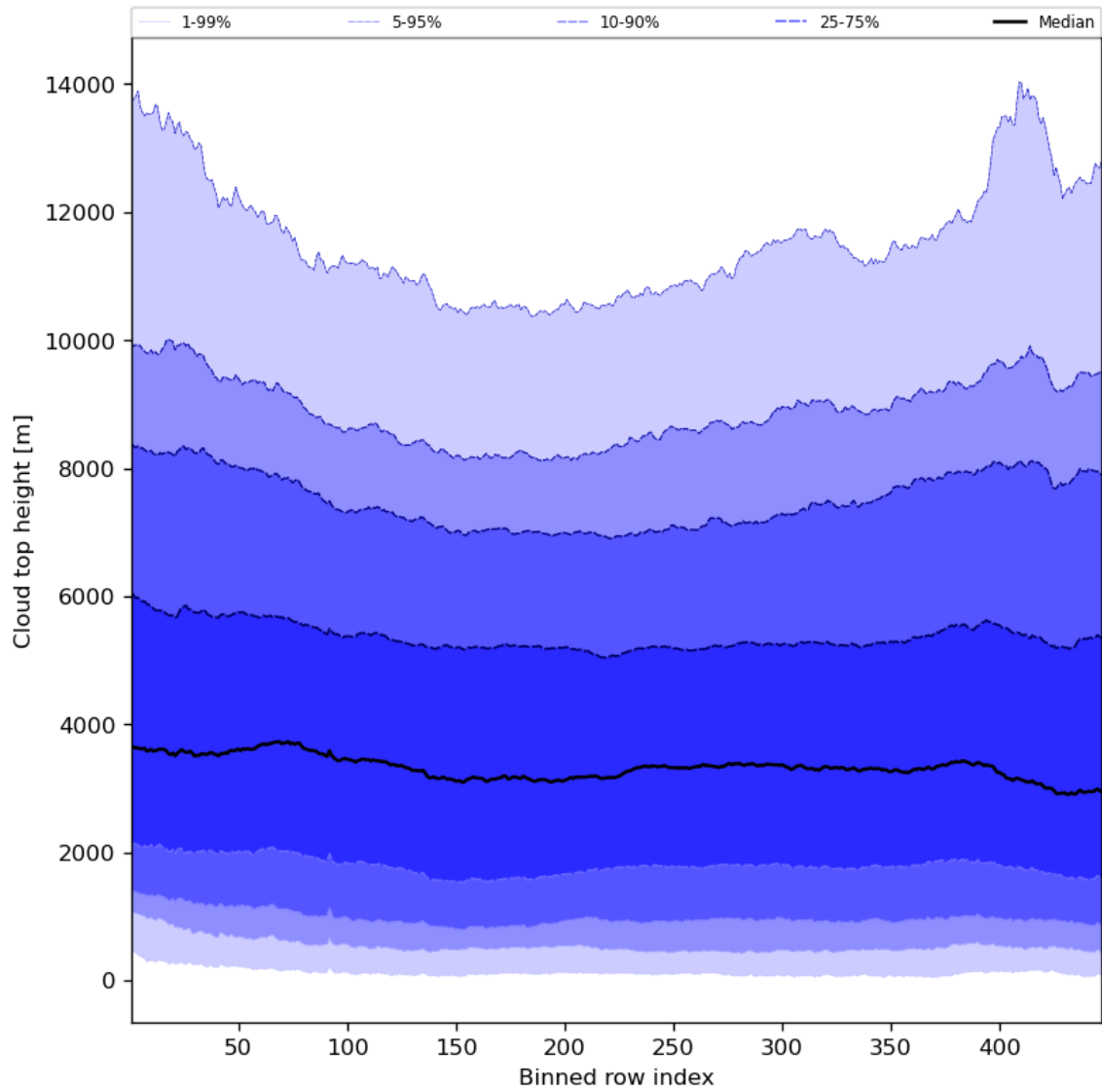


Figure 56: Along track statistics of “Cloud top height” for 2023-07-13 to 2023-07-14

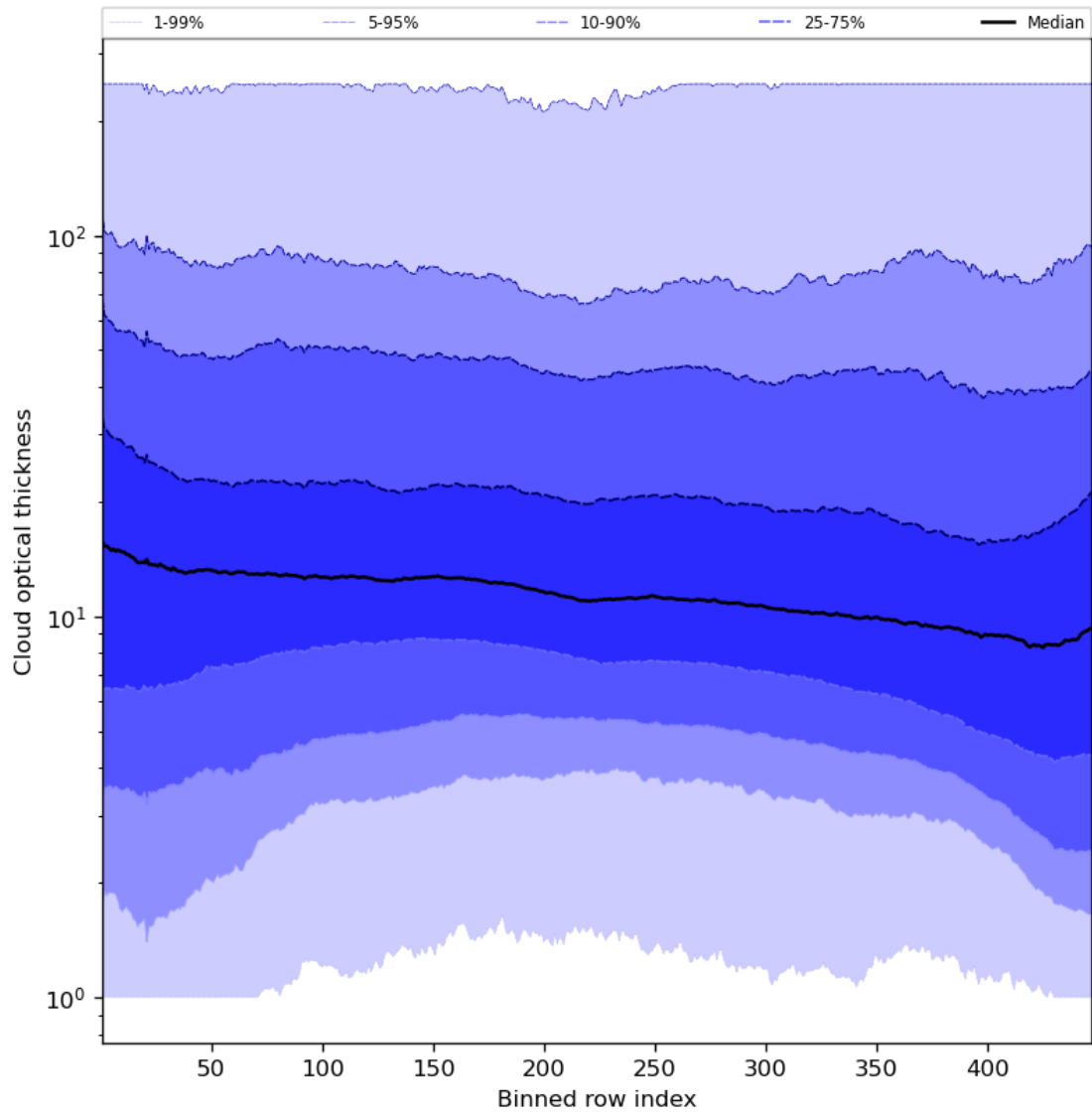


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-07-13 to 2023-07-14

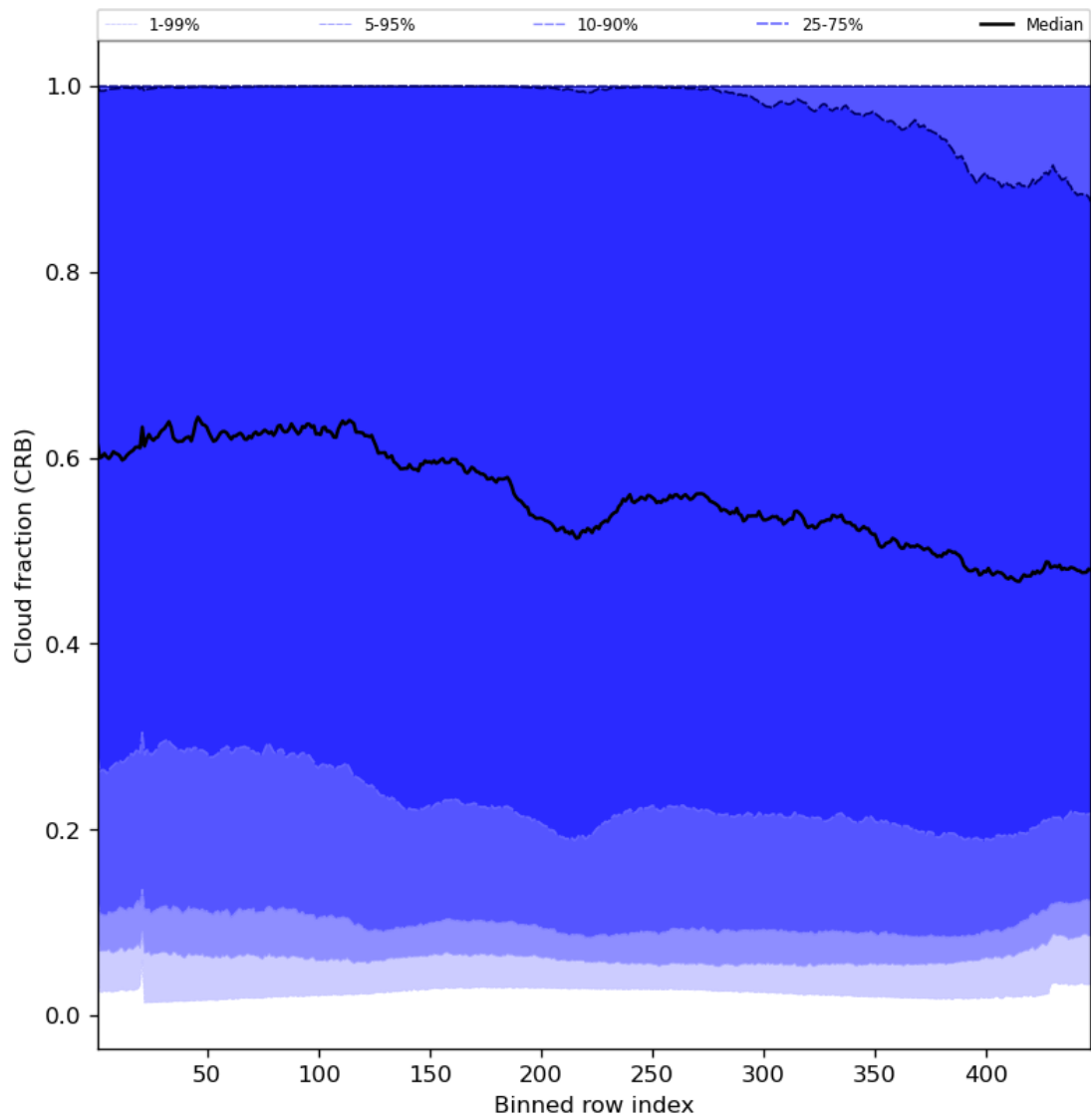


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14

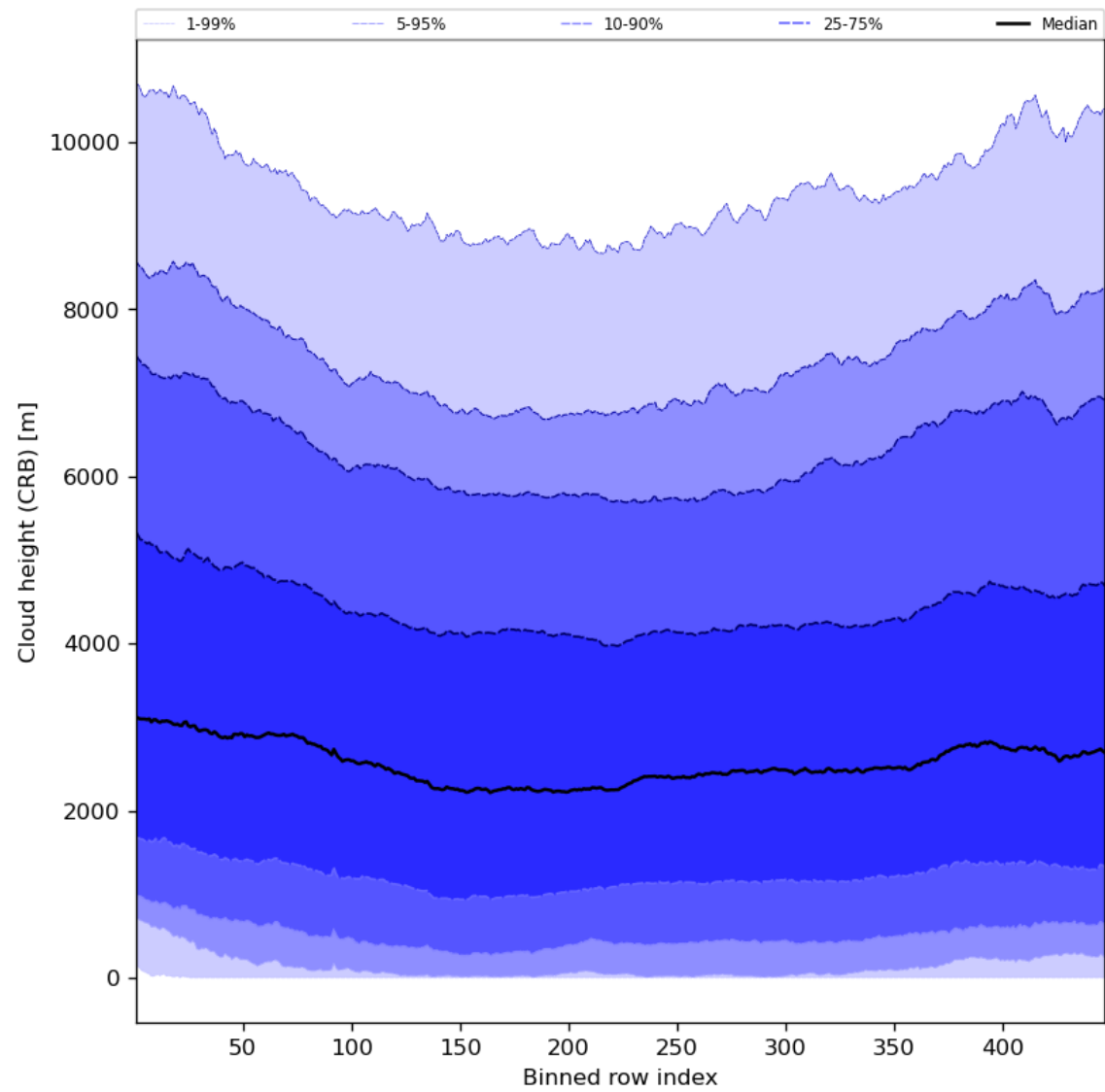


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-07-13 to 2023-07-14

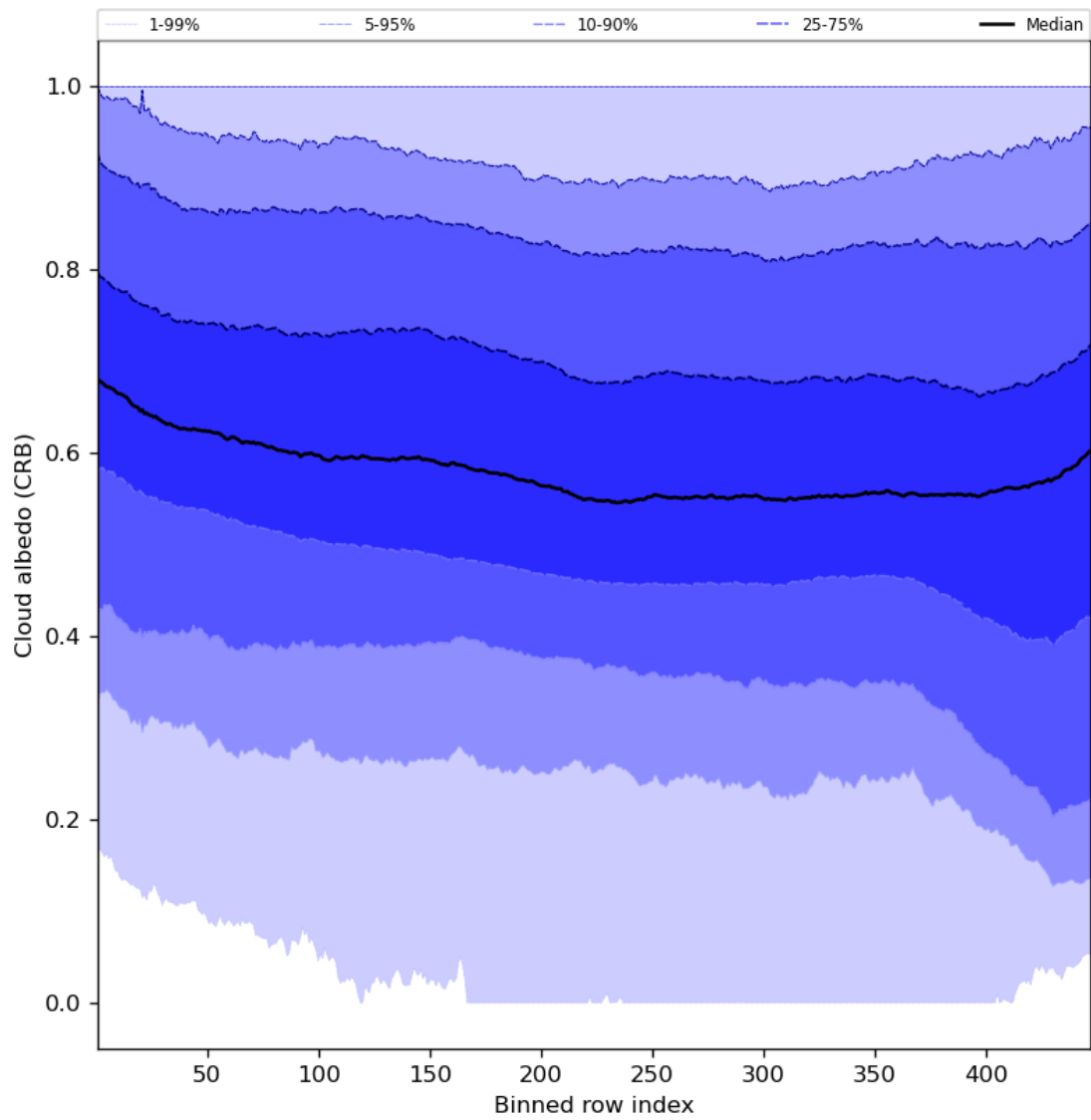


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14

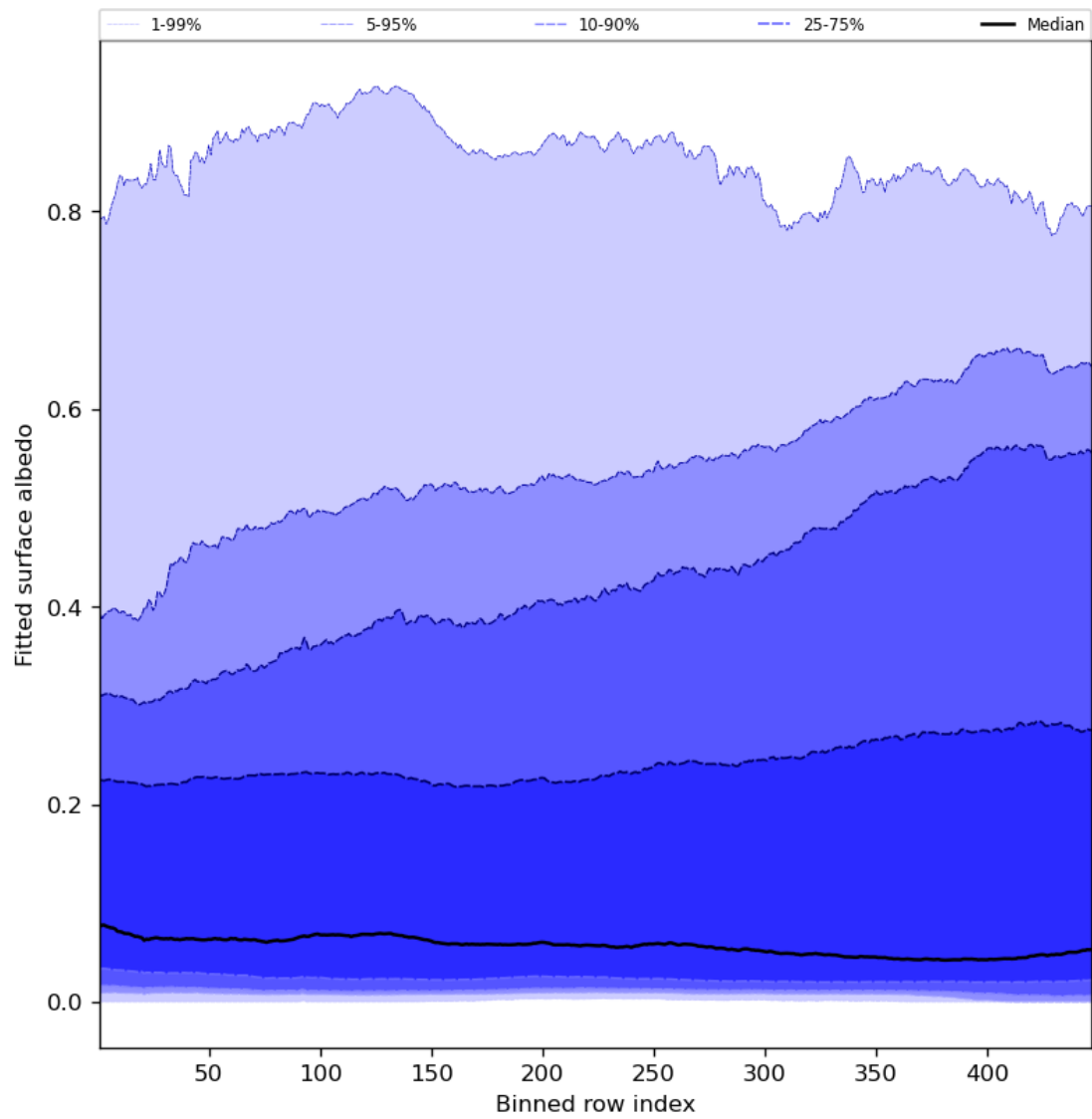


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-07-13 to 2023-07-14

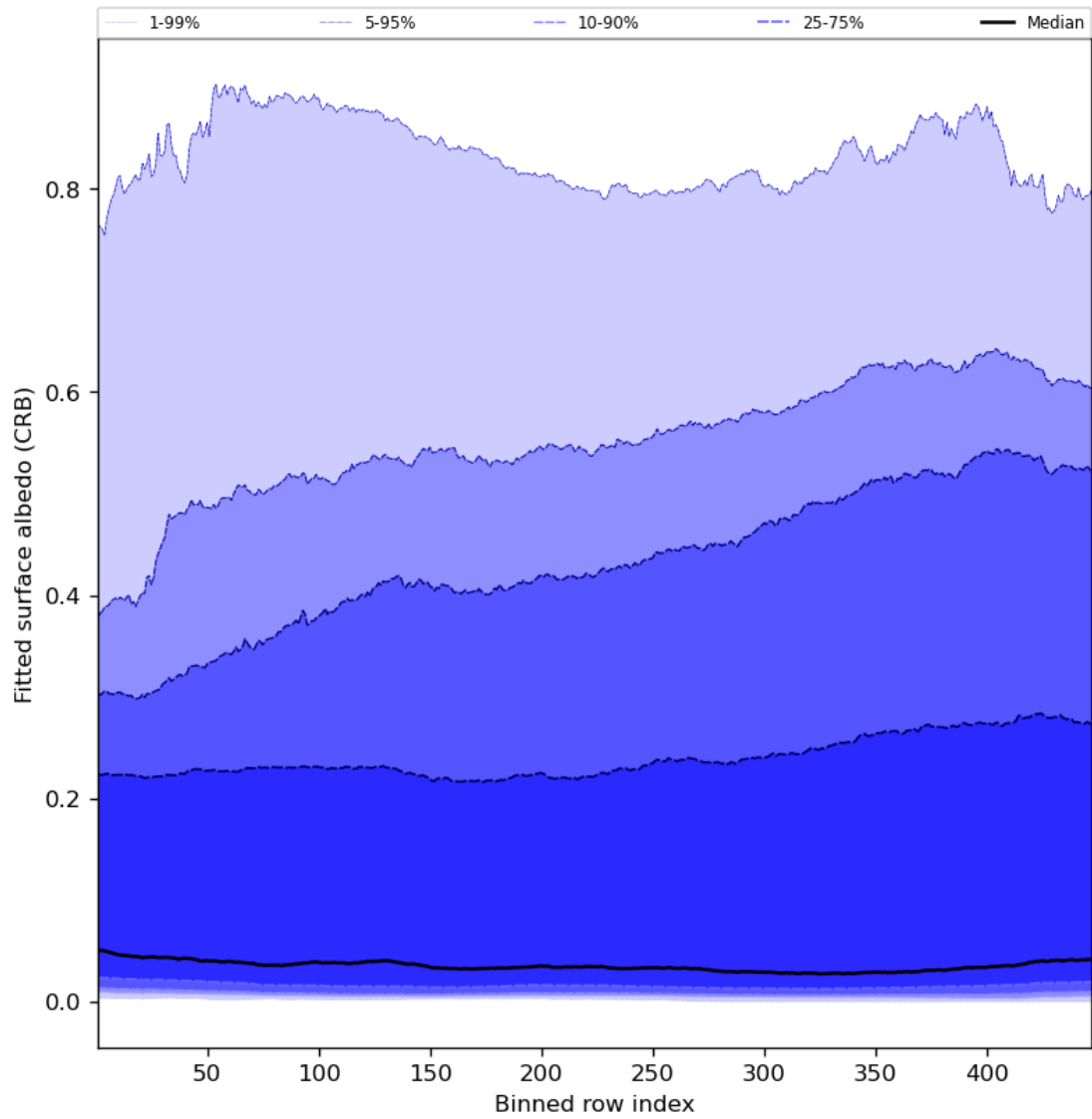


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-07-13 to 2023-07-14

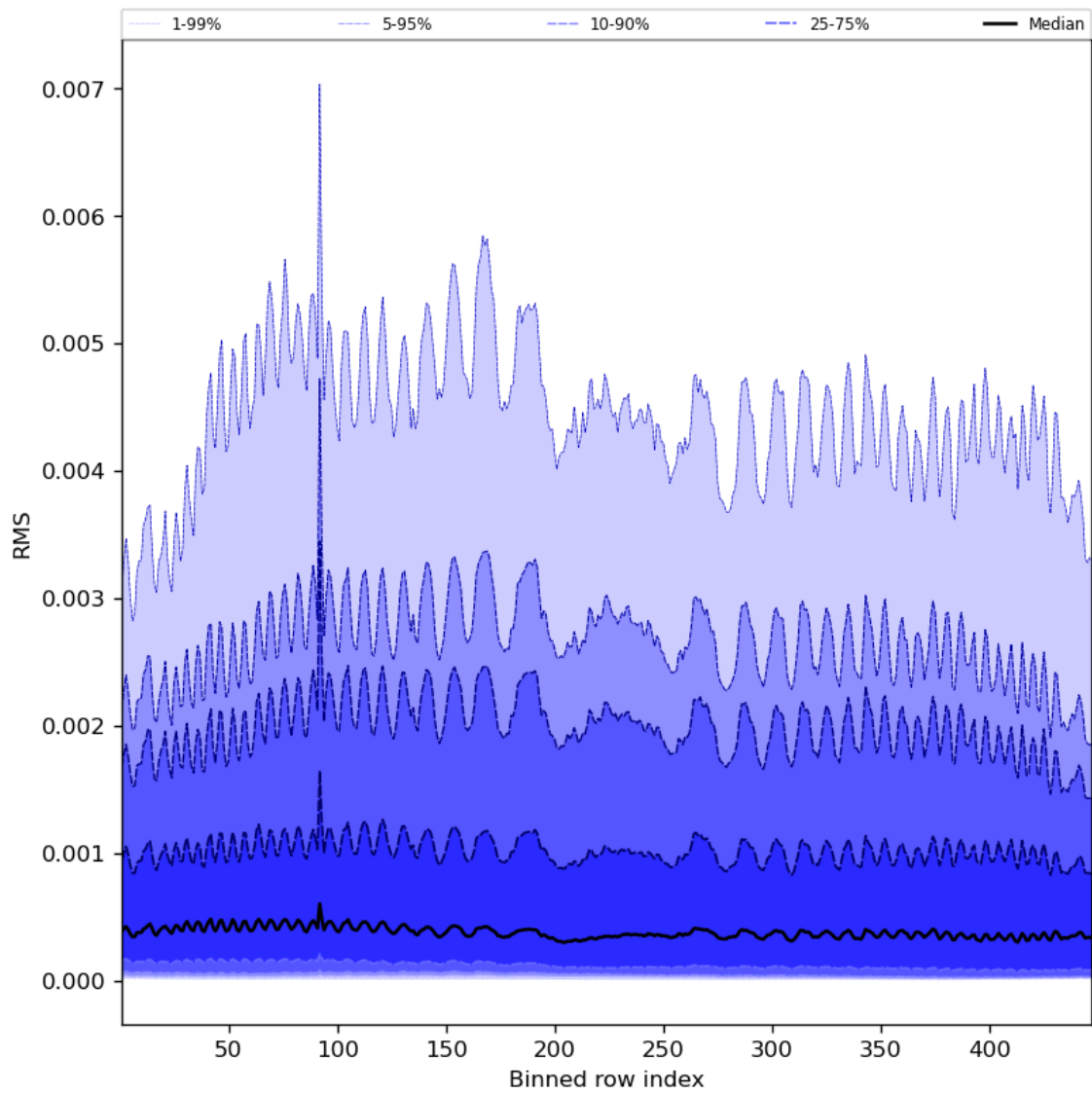


Figure 63: Along track statistics of “RMS” for 2023-07-13 to 2023-07-14

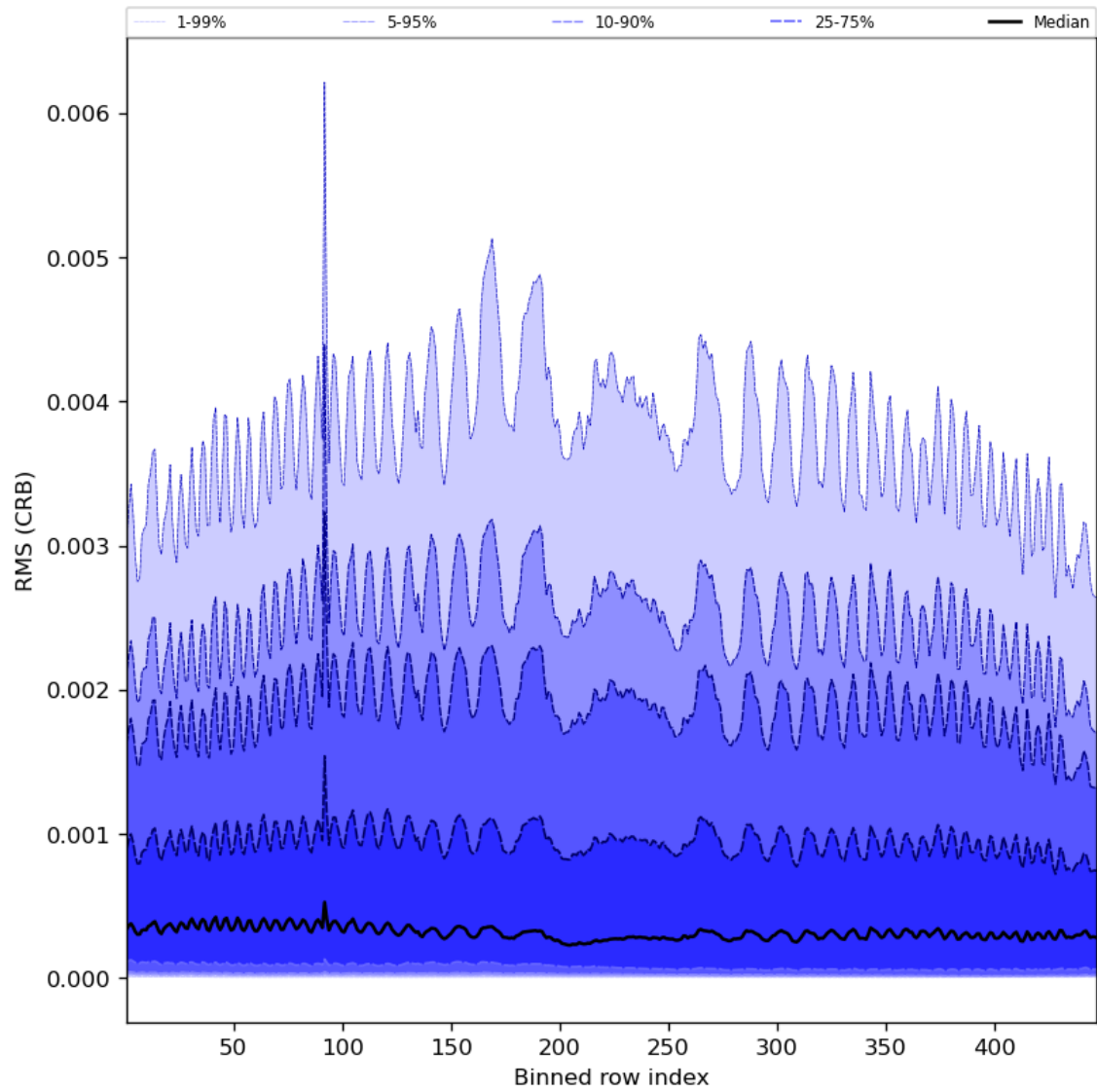


Figure 64: Along track statistics of “RMS (CRB)” for 2023-07-13 to 2023-07-14

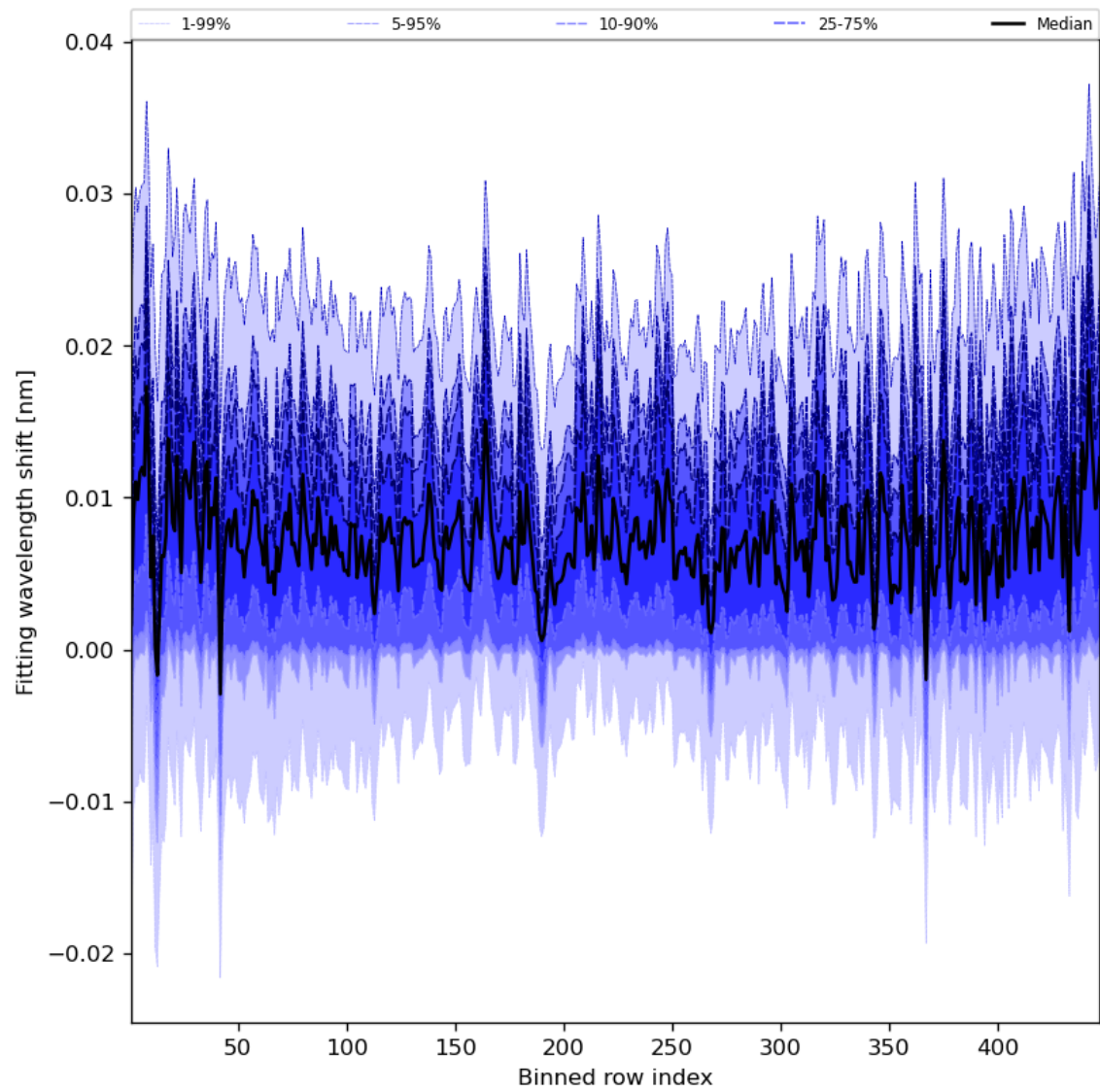


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-07-13 to 2023-07-14

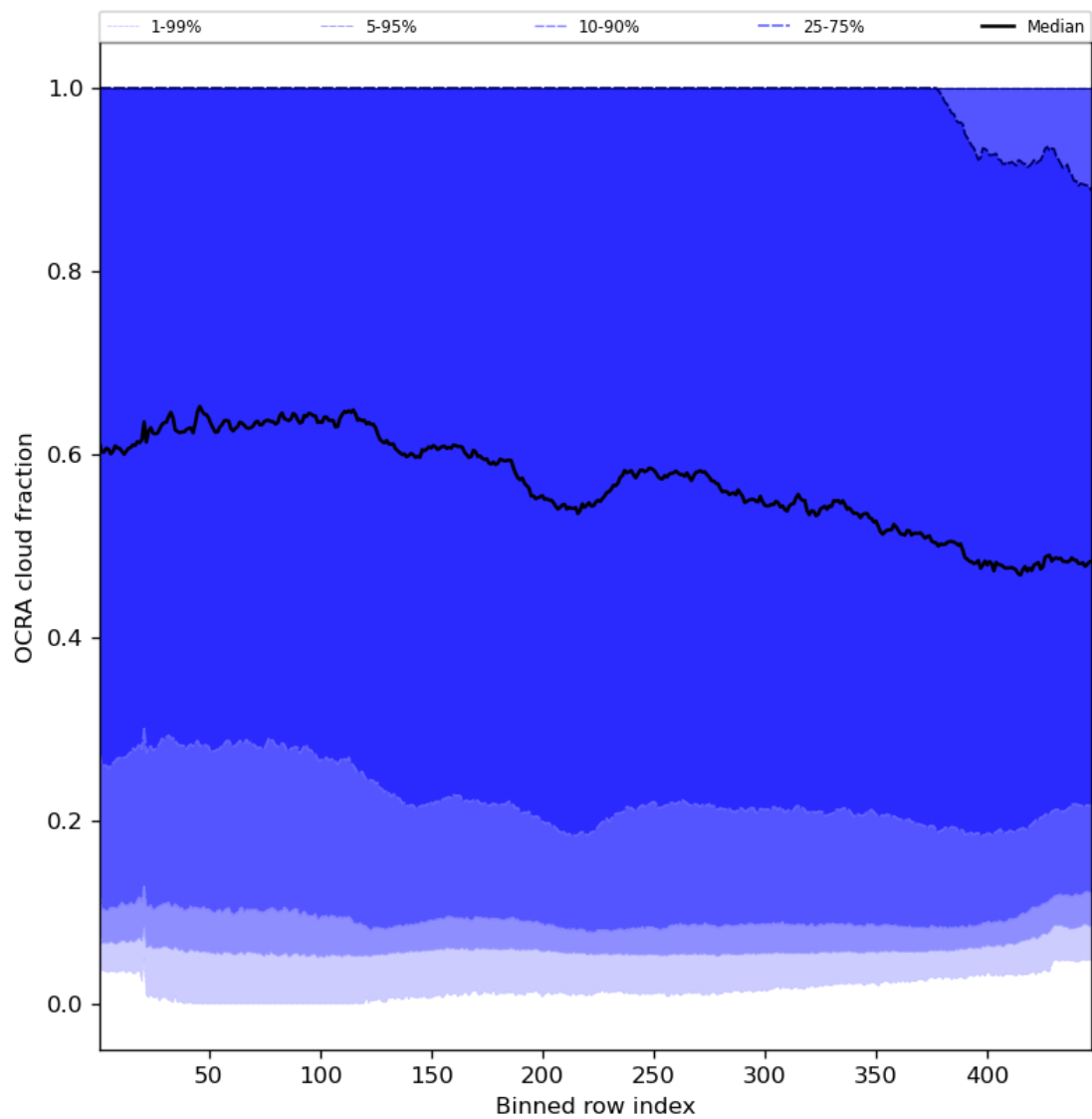


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-07-13 to 2023-07-14

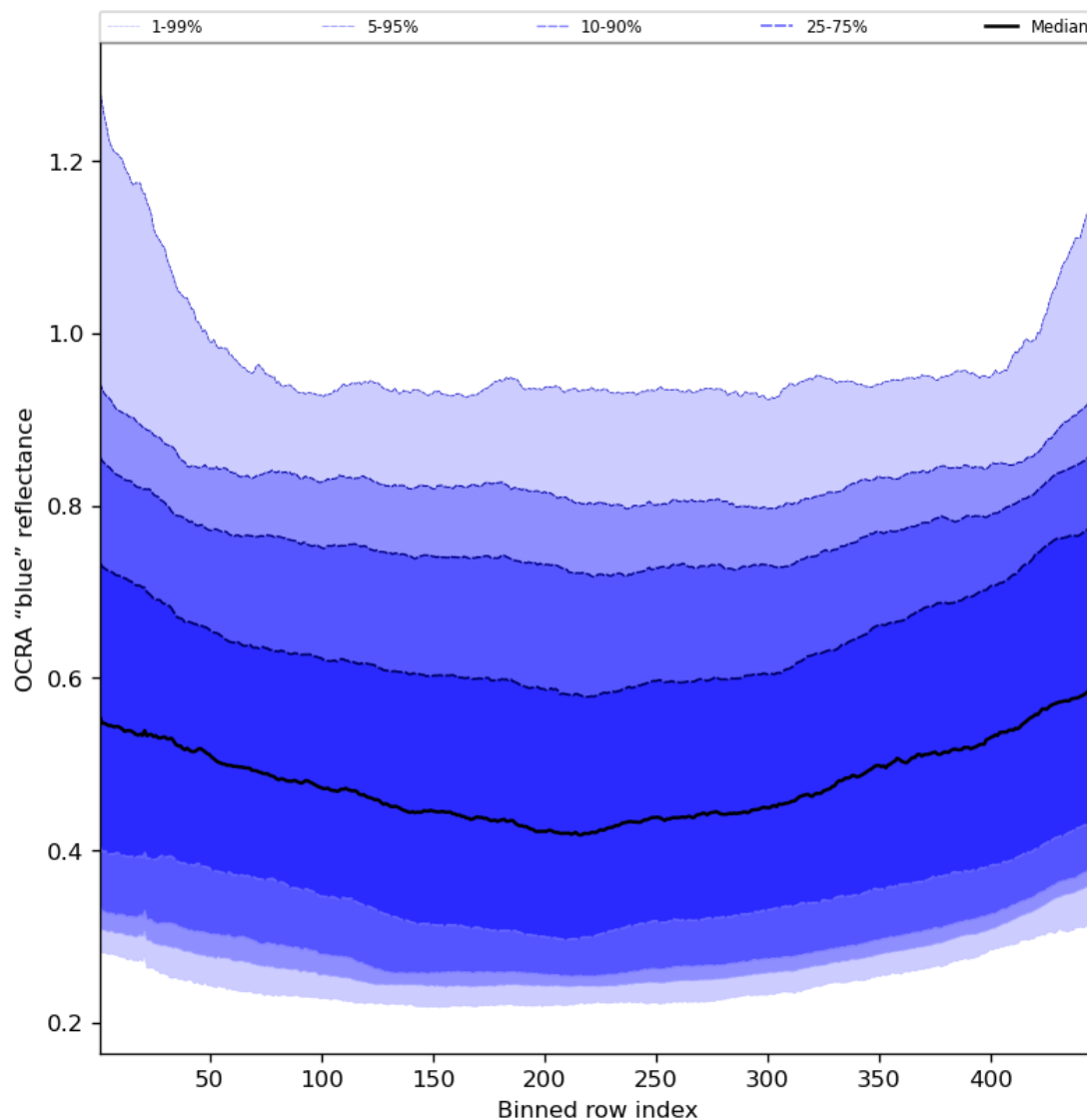


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-07-13 to 2023-07-14

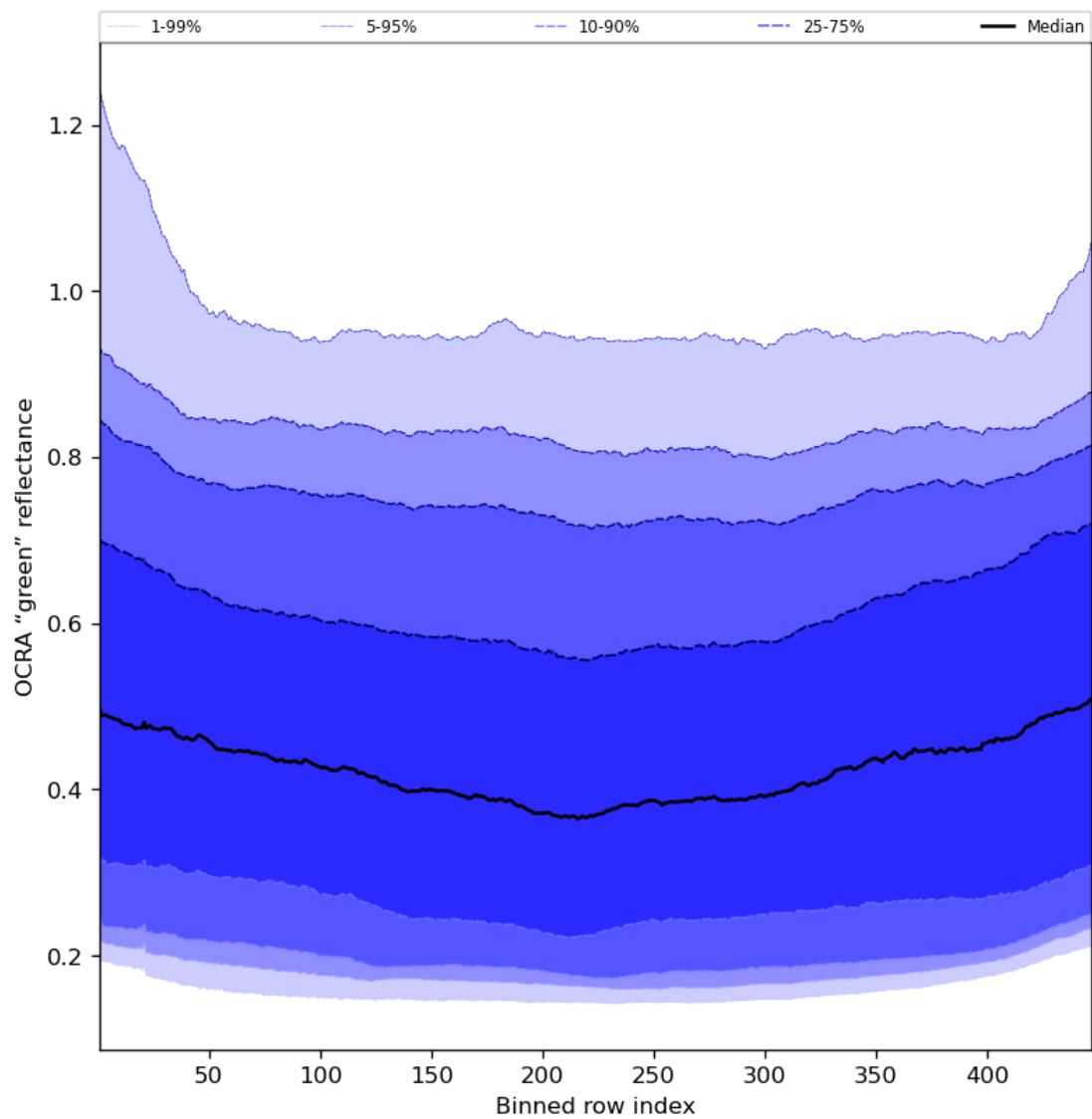


Figure 68: Along track statistics of “OCRA “green” reflectance” for 2023-07-13 to 2023-07-14

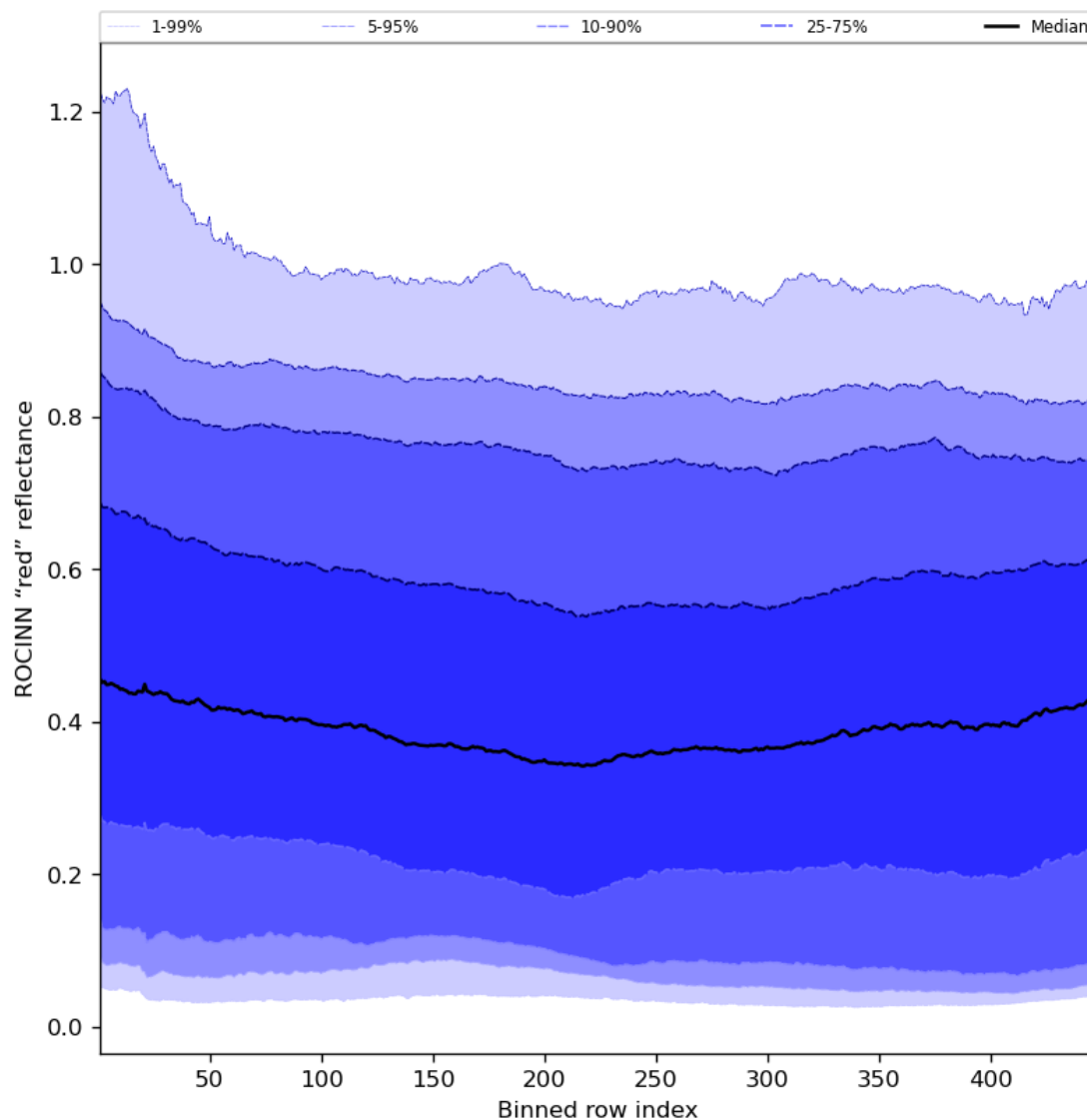


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2023-07-13 to 2023-07-14

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.

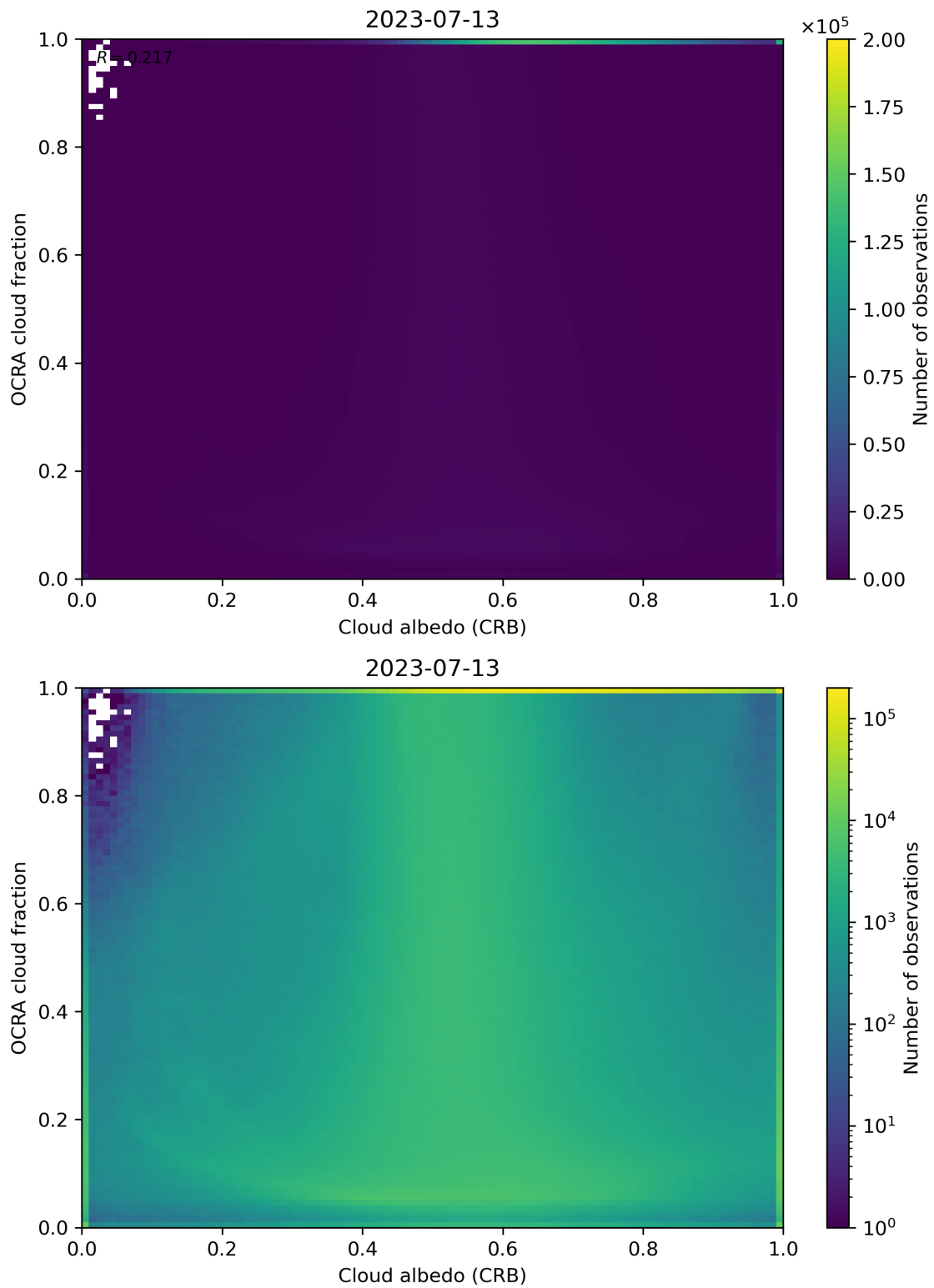


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

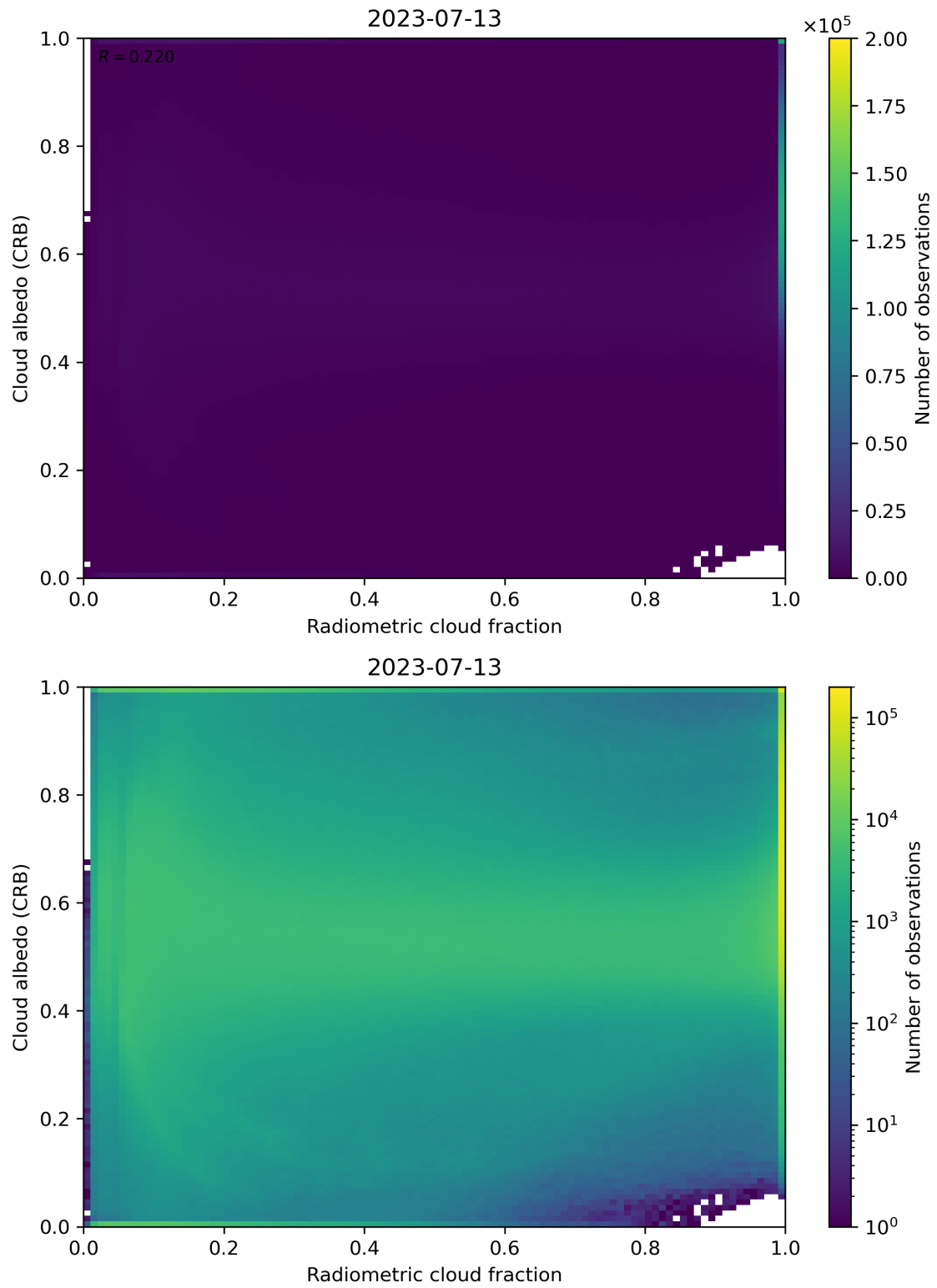


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

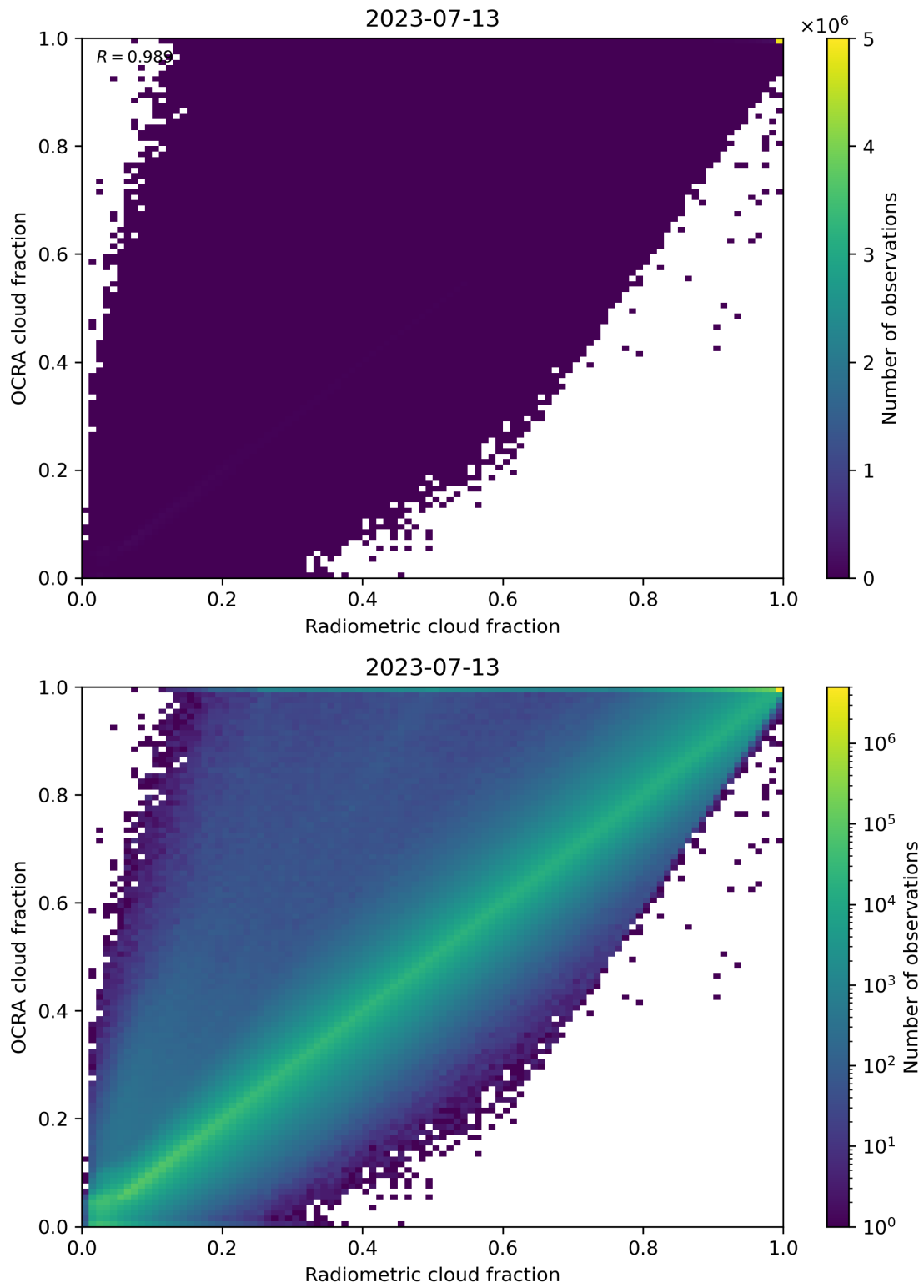


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

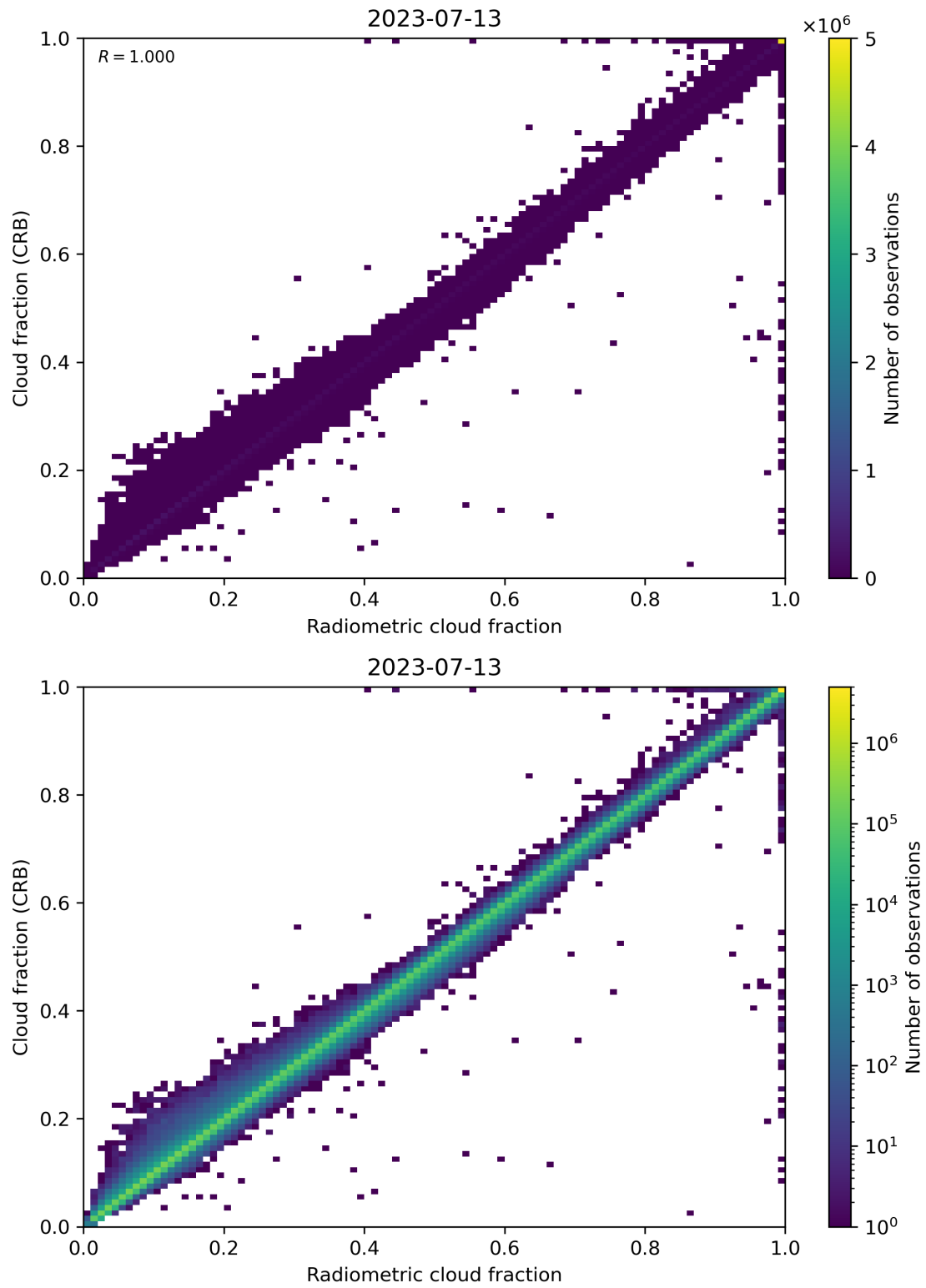


Figure 73: Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.

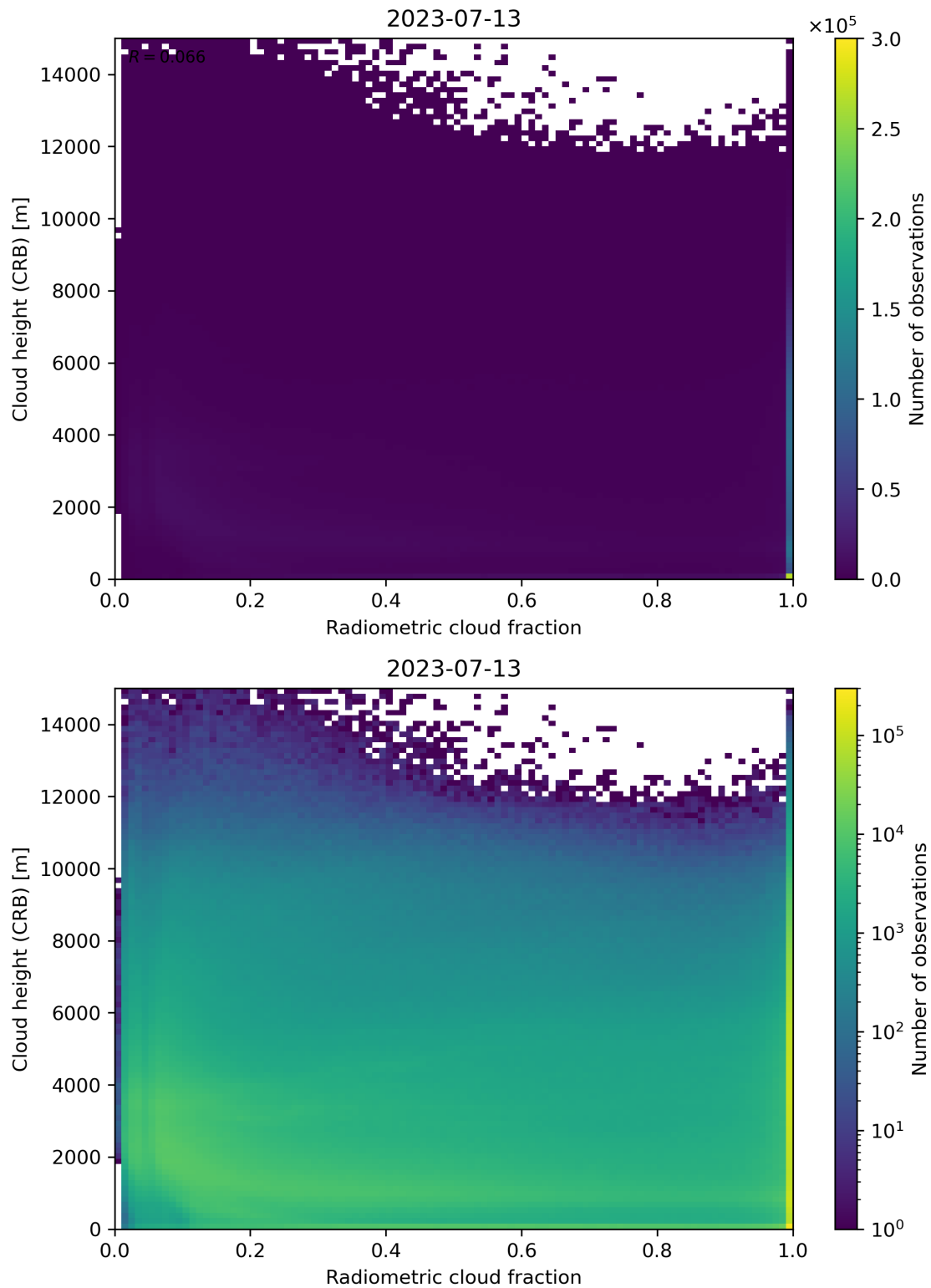


Figure 74: Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.

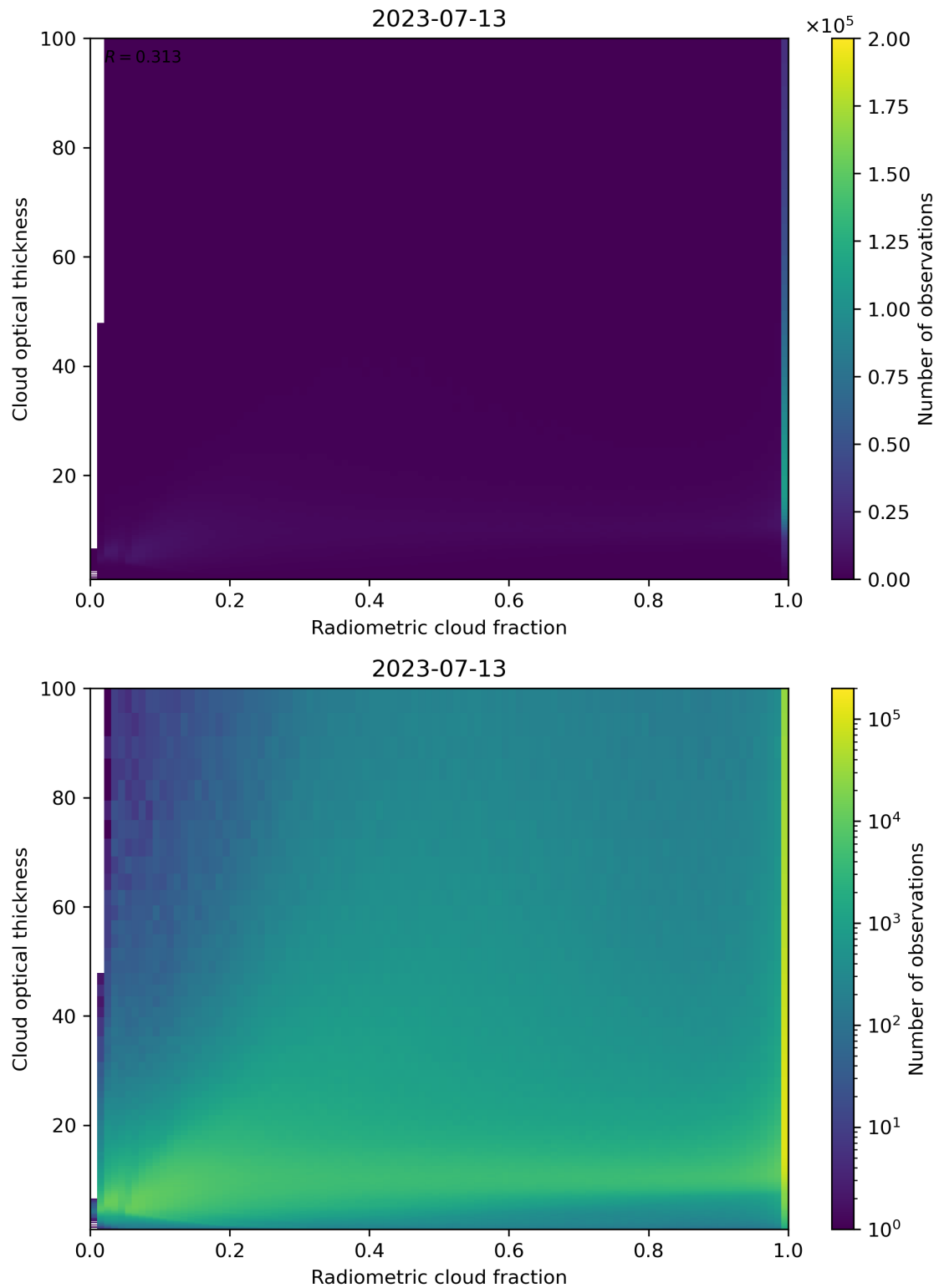


Figure 75: Scatter density plot of “Radiometric cloud fraction” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.

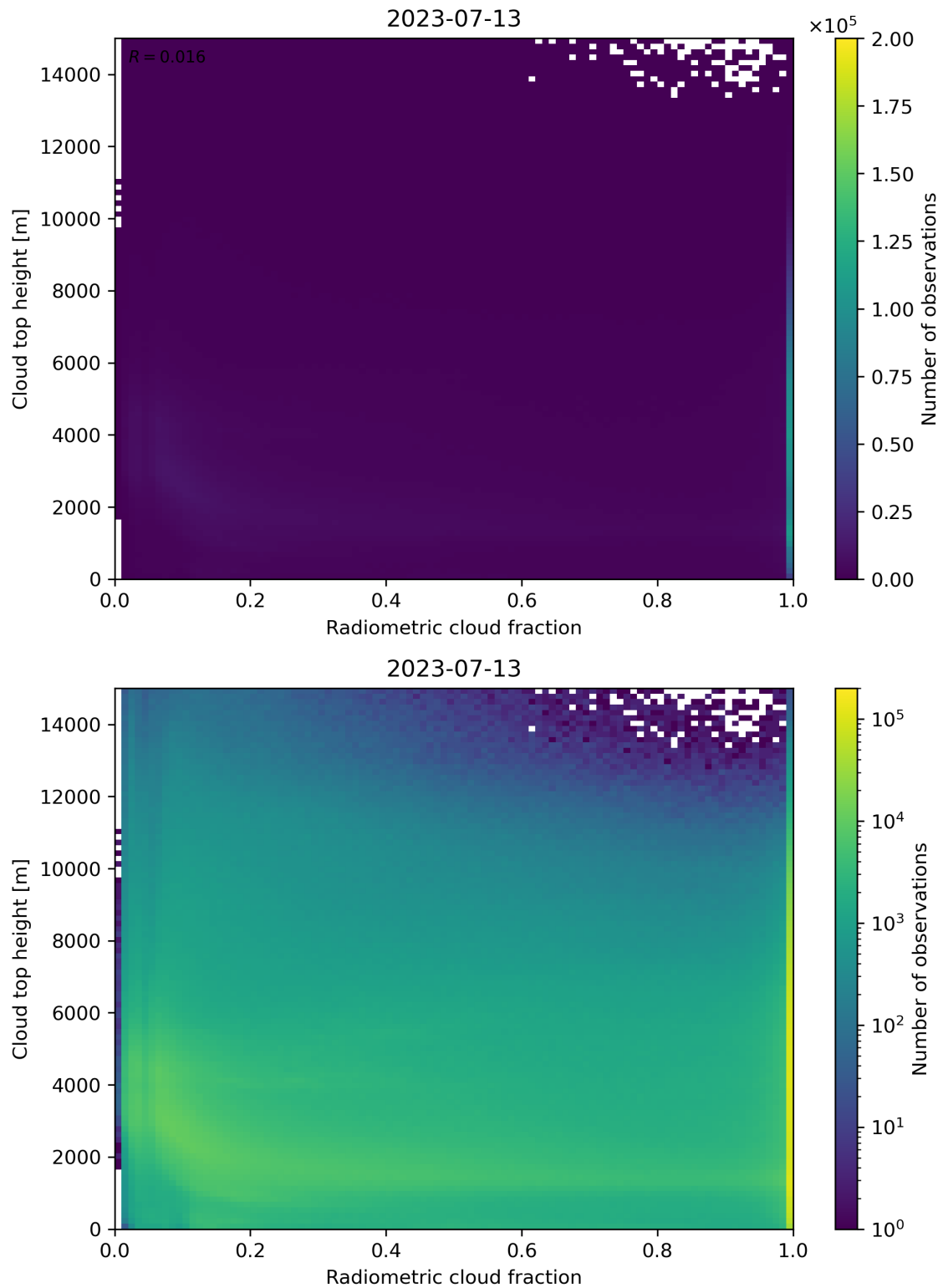


Figure 76: Scatter density plot of “Radiometric cloud fraction” against “Cloud top height” for 2023-07-13 to 2023-07-14.

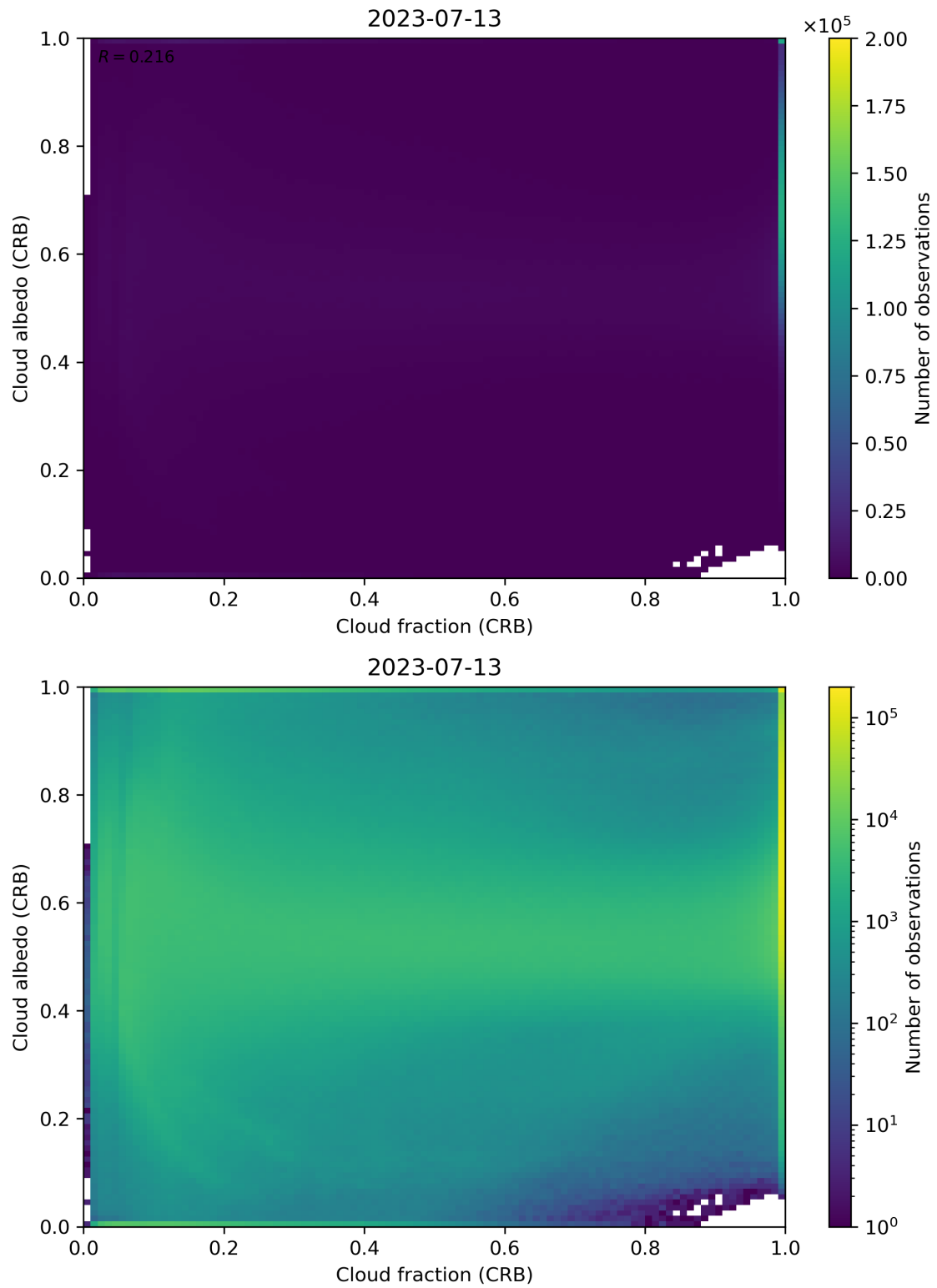


Figure 77: Scatter density plot of “Cloud fraction (CRB)” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

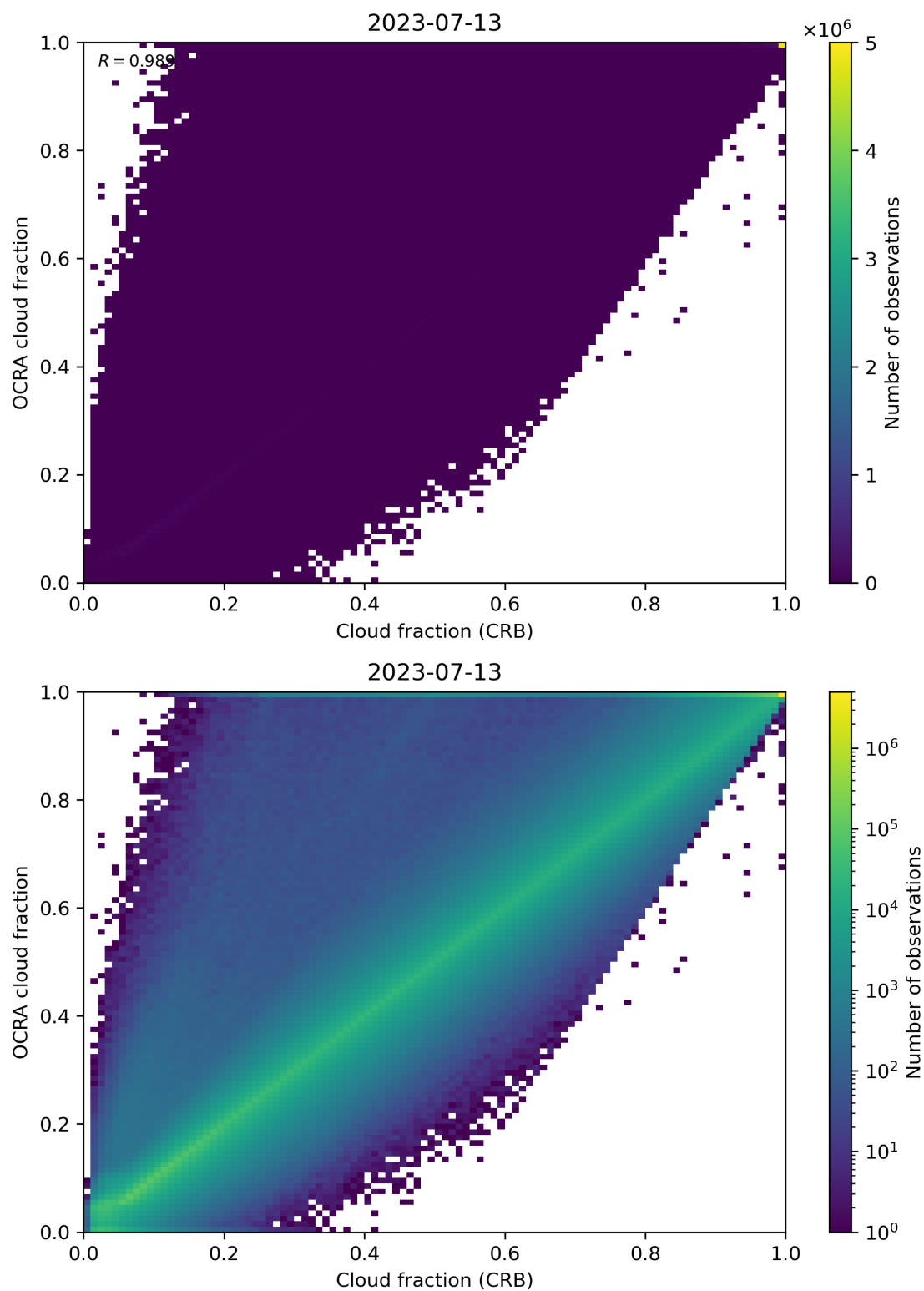


Figure 78: Scatter density plot of “Cloud fraction (CRB)” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

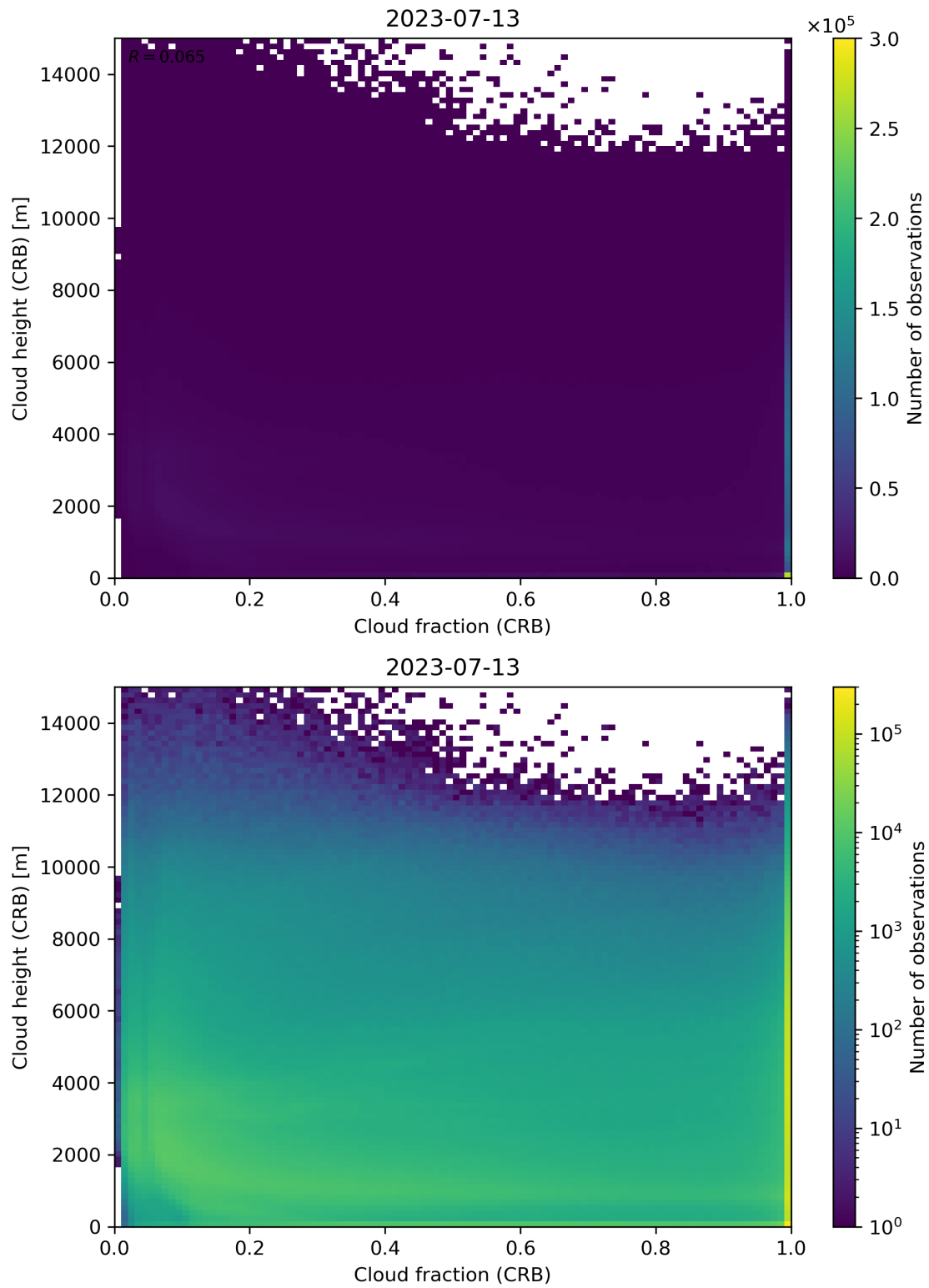


Figure 79: Scatter density plot of “Cloud fraction (CRB)” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.

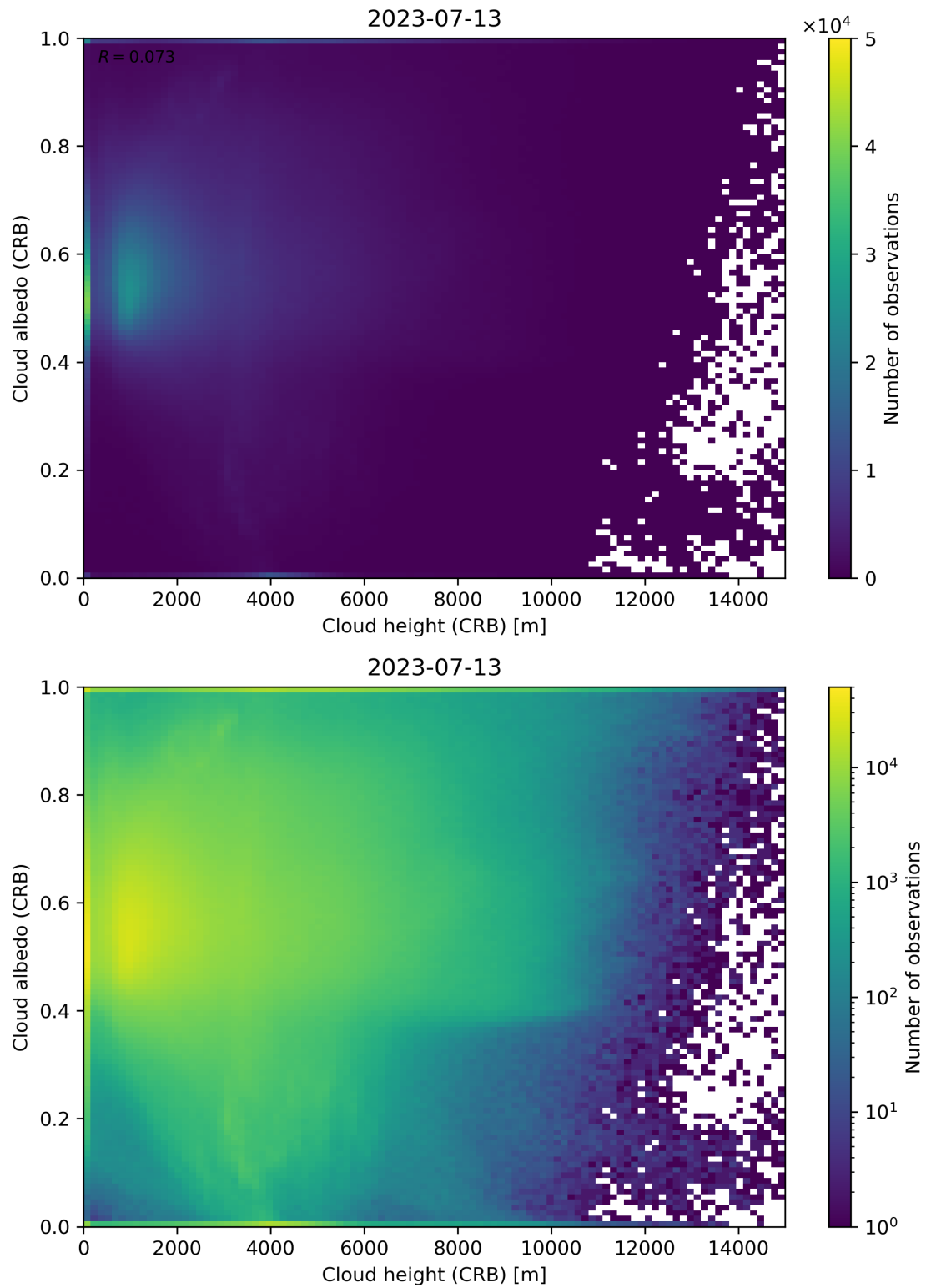


Figure 80: Scatter density plot of “Cloud height (CRB)” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

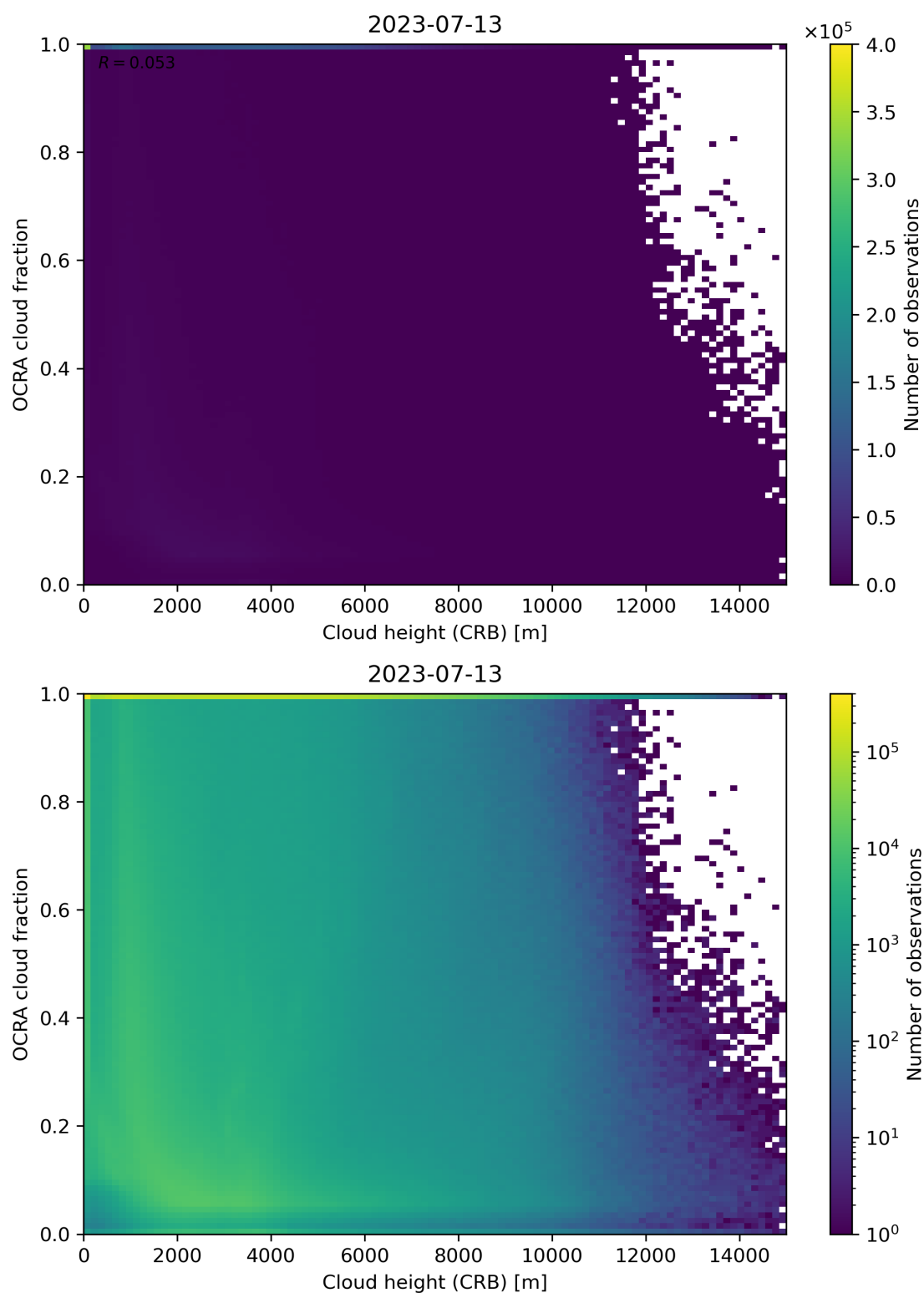


Figure 81: Scatter density plot of “Cloud height (CRB)” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

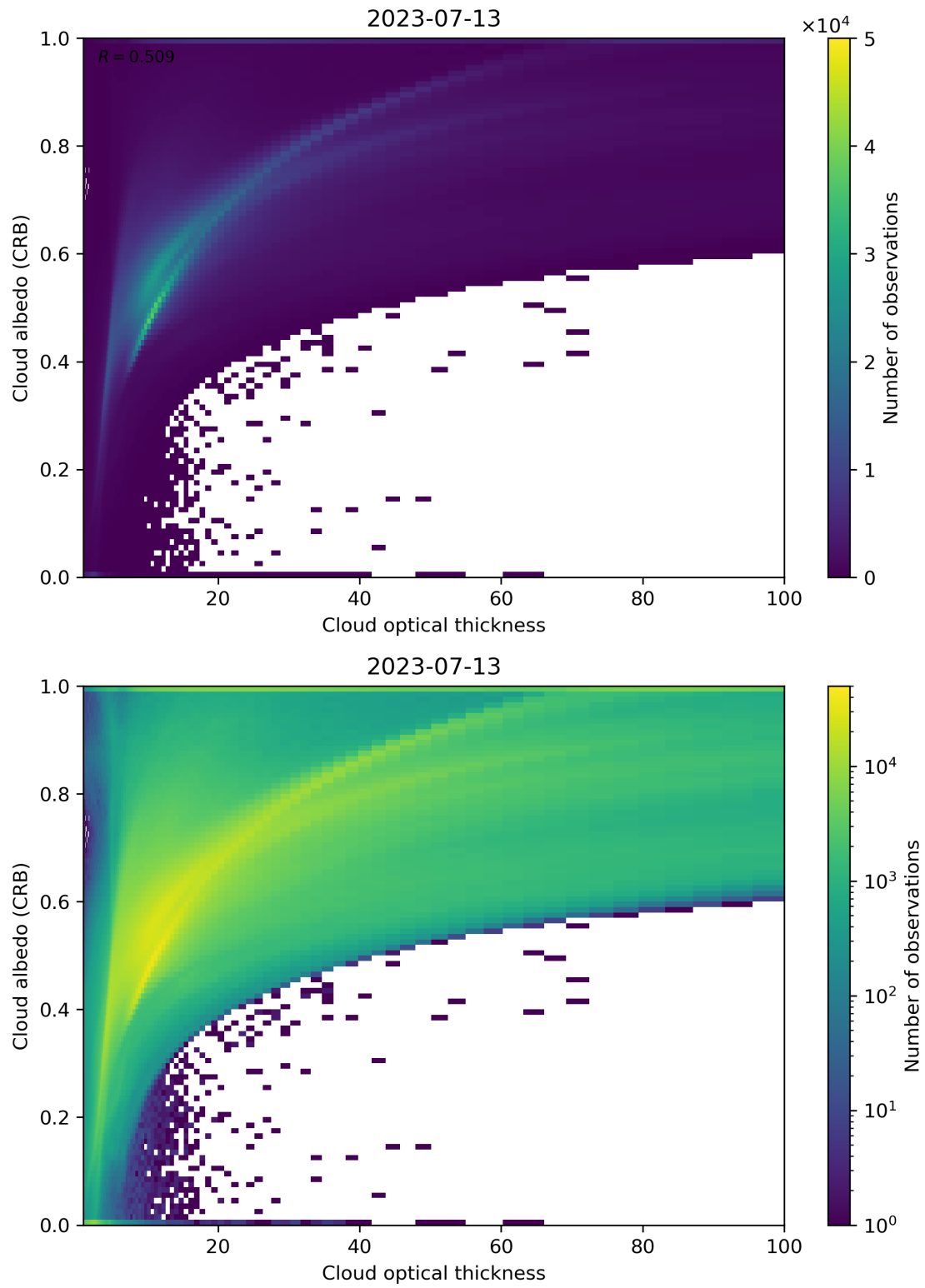


Figure 82: Scatter density plot of “Cloud optical thickness” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

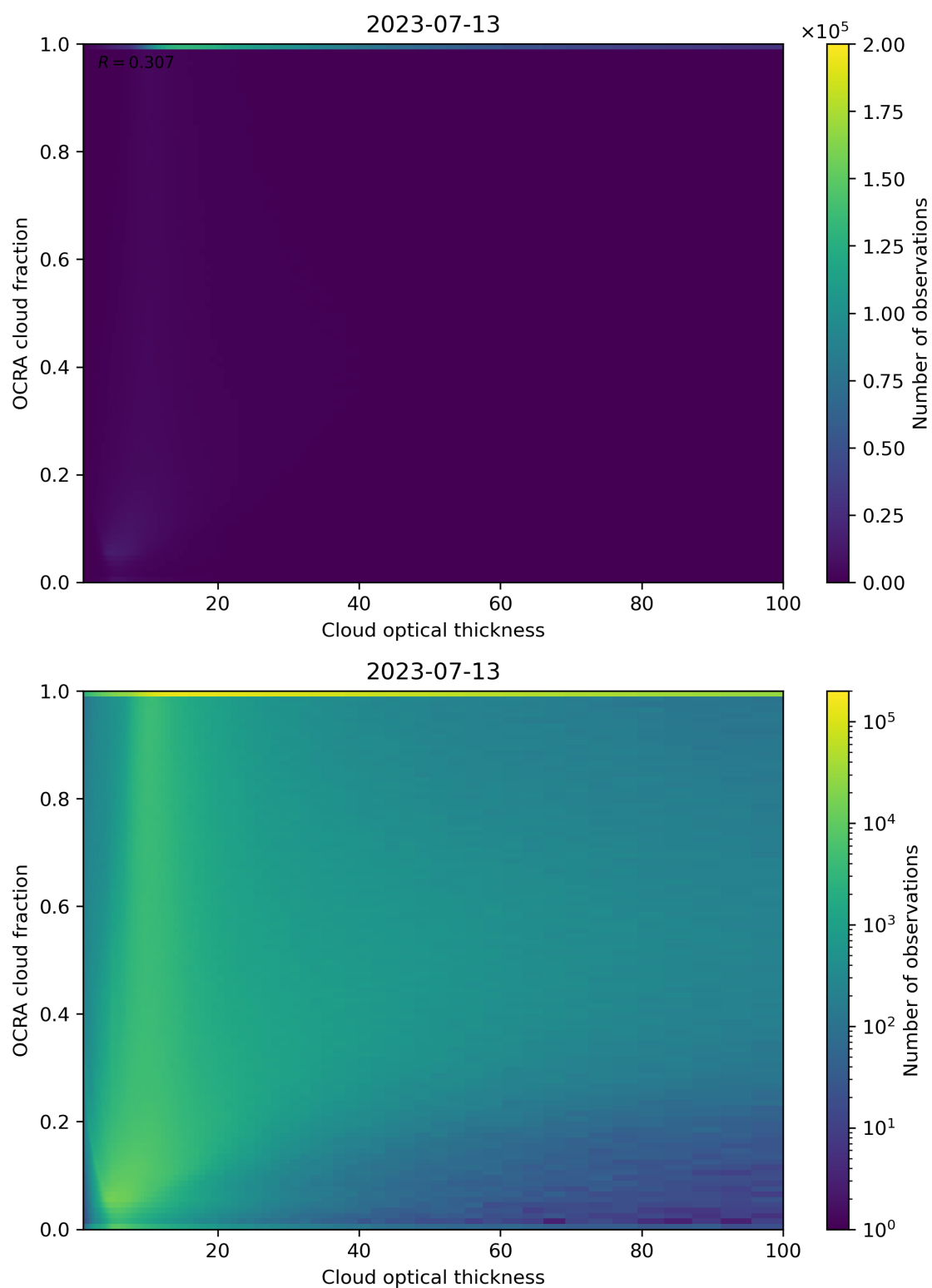


Figure 83: Scatter density plot of “Cloud optical thickness” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

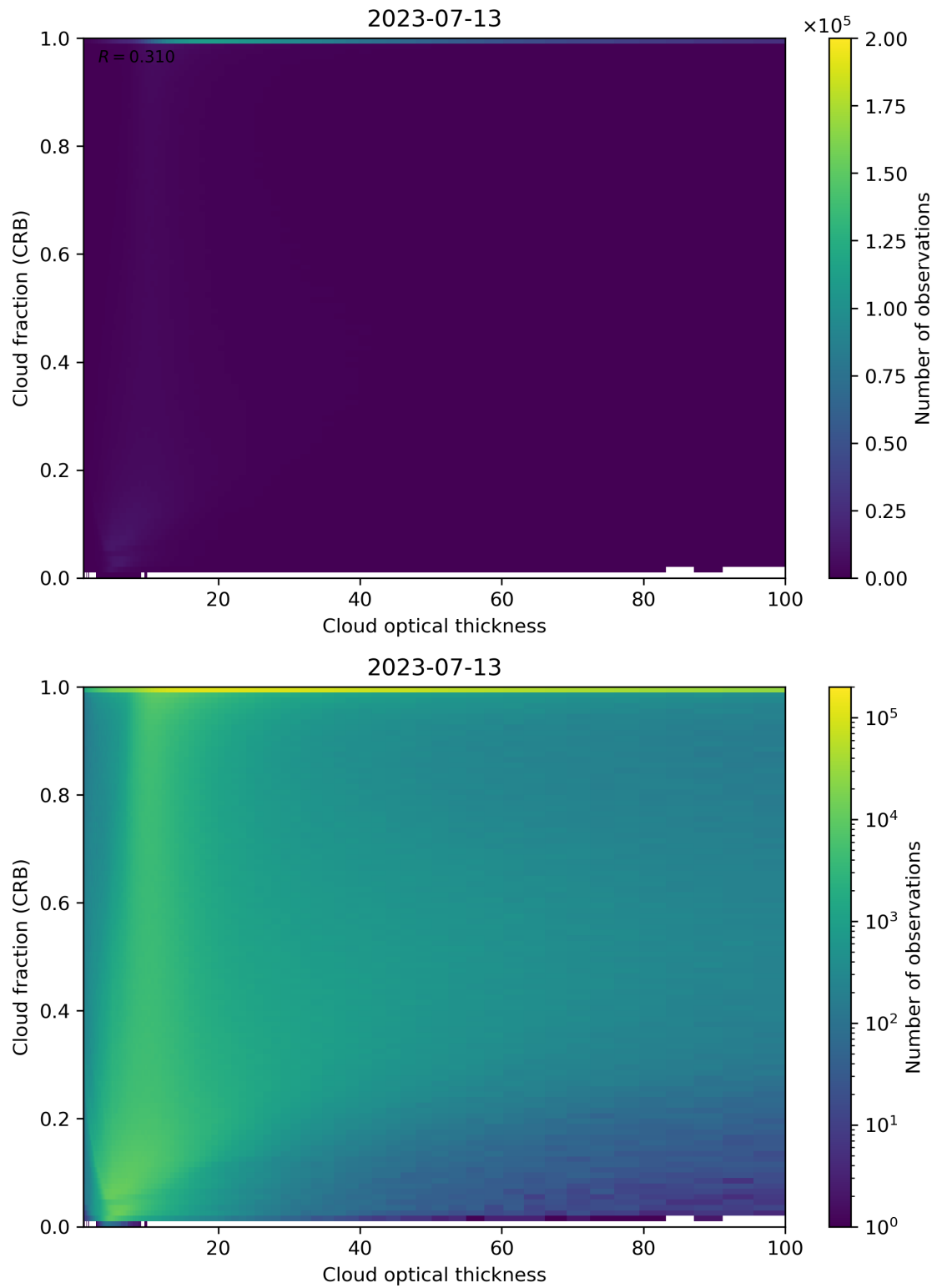


Figure 84: Scatter density plot of “Cloud optical thickness” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.

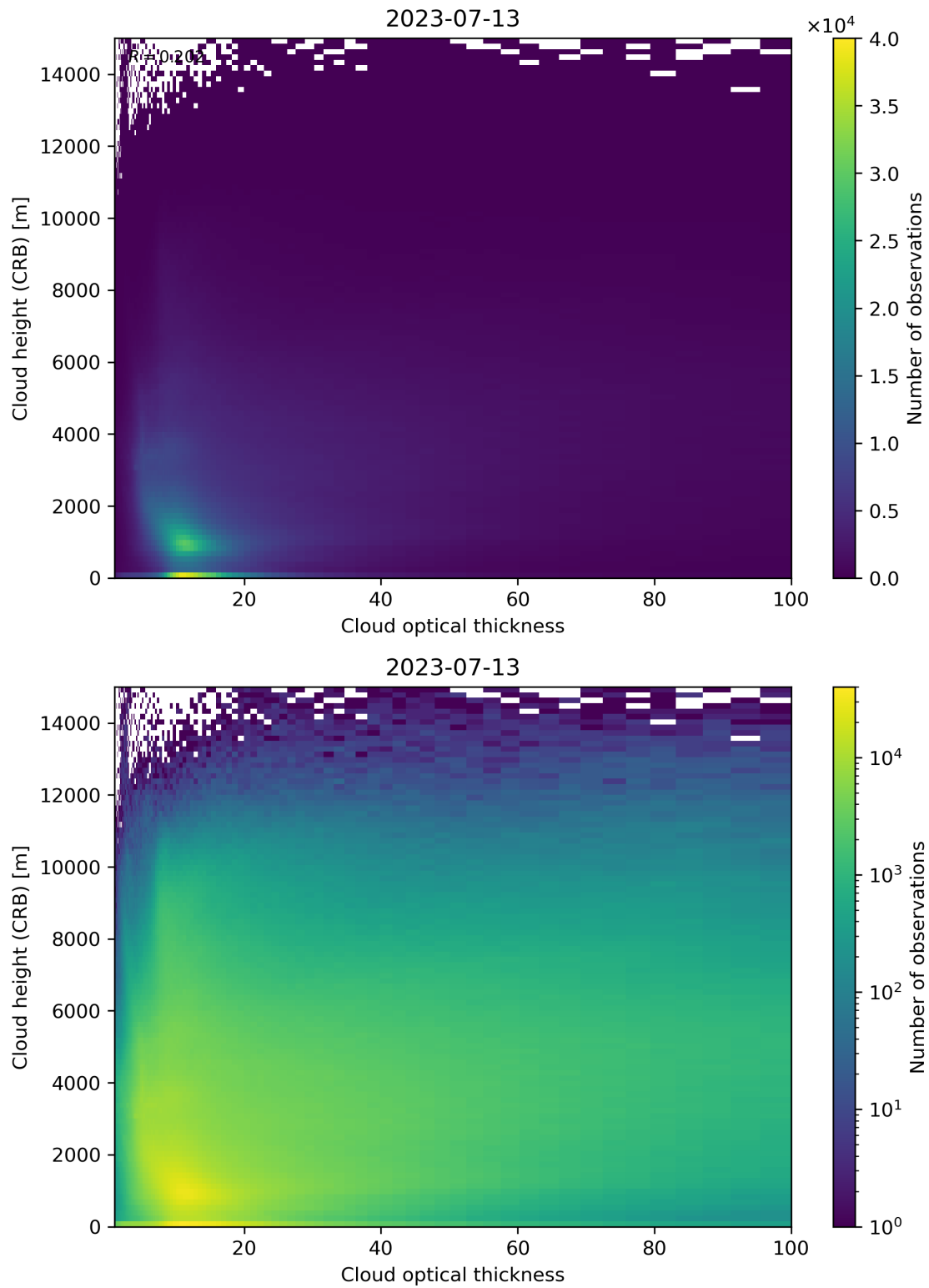


Figure 85: Scatter density plot of “Cloud optical thickness” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.

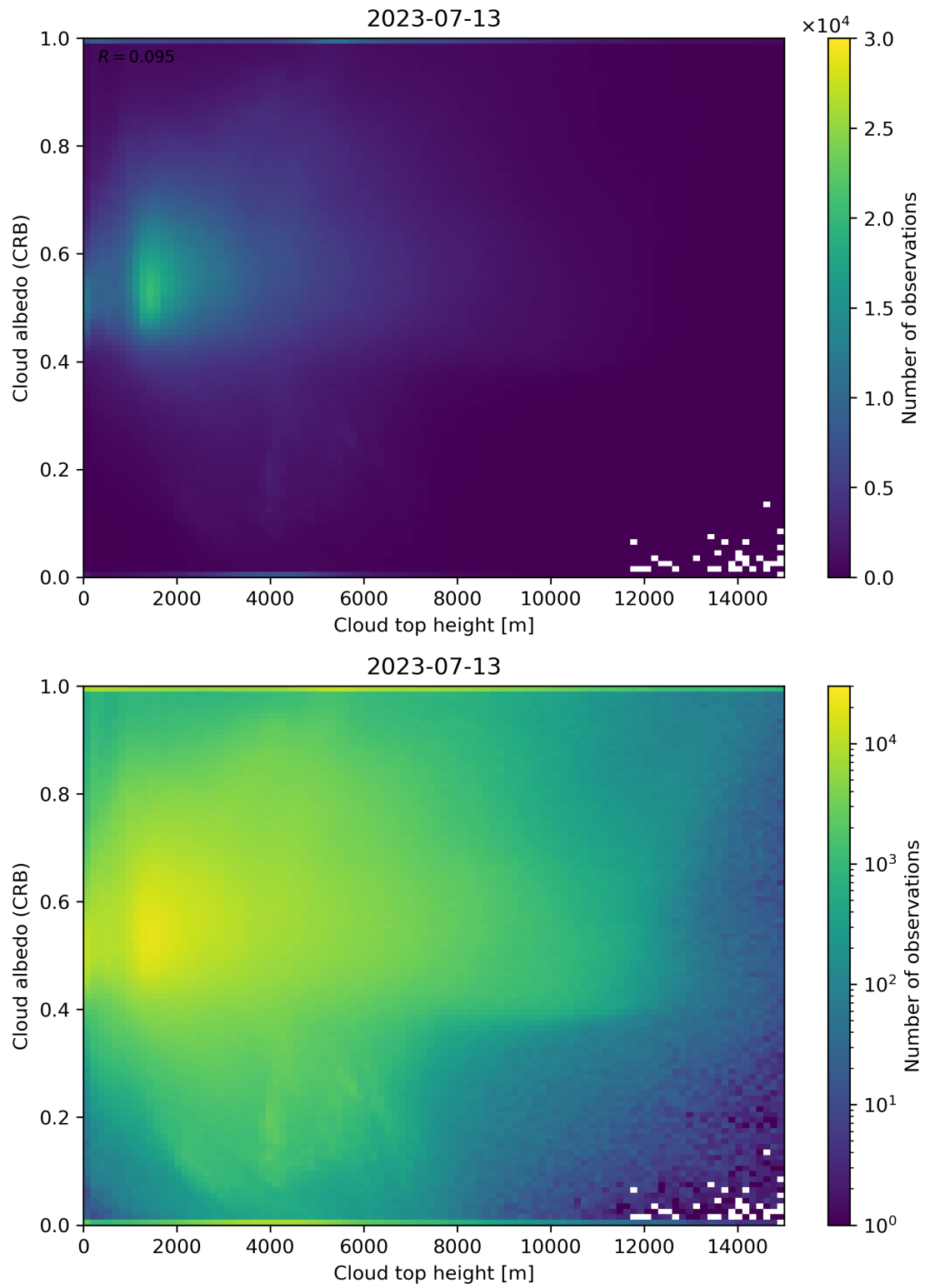


Figure 86: Scatter density plot of “Cloud top height” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

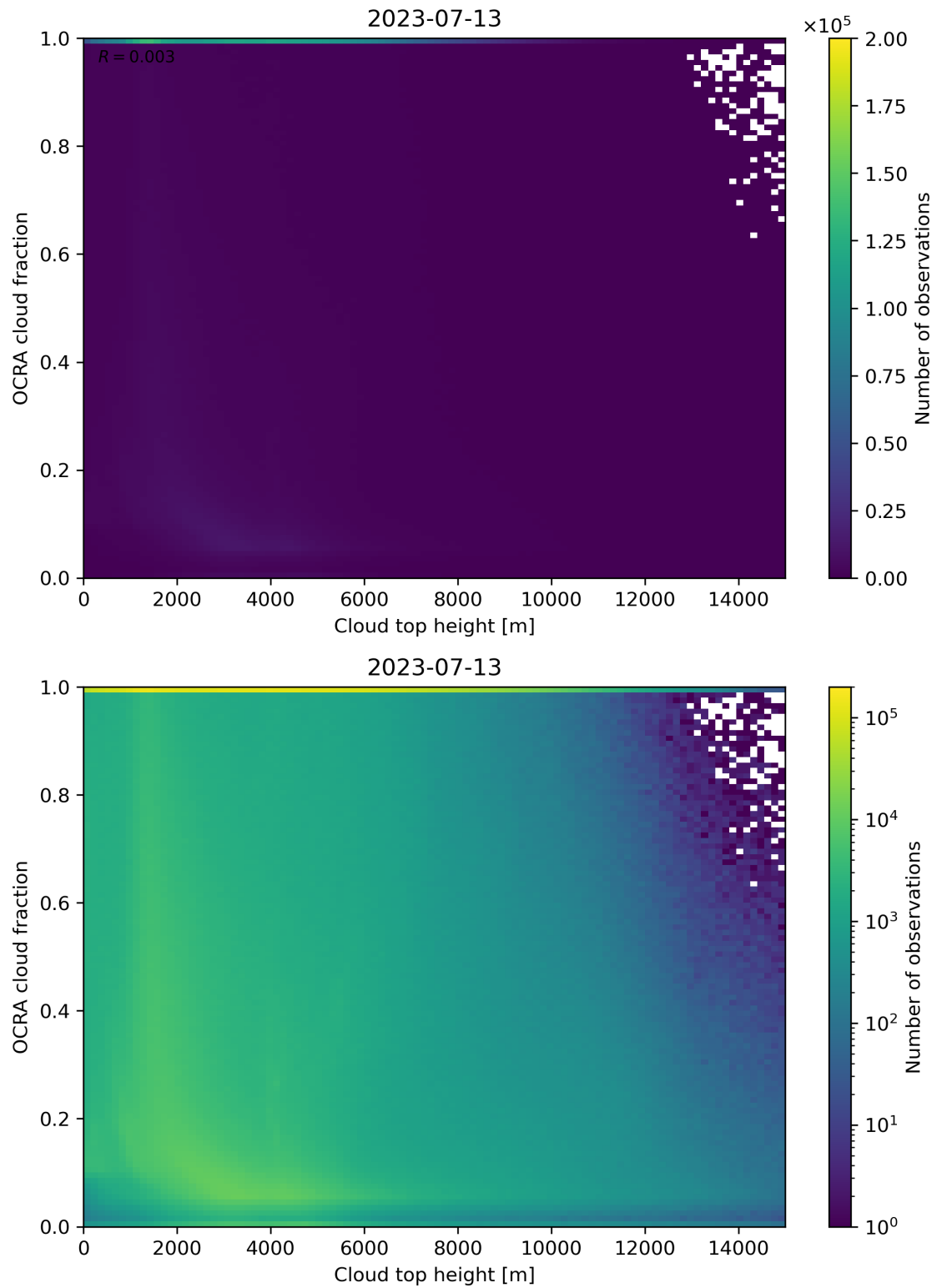


Figure 87: Scatter density plot of “Cloud top height” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

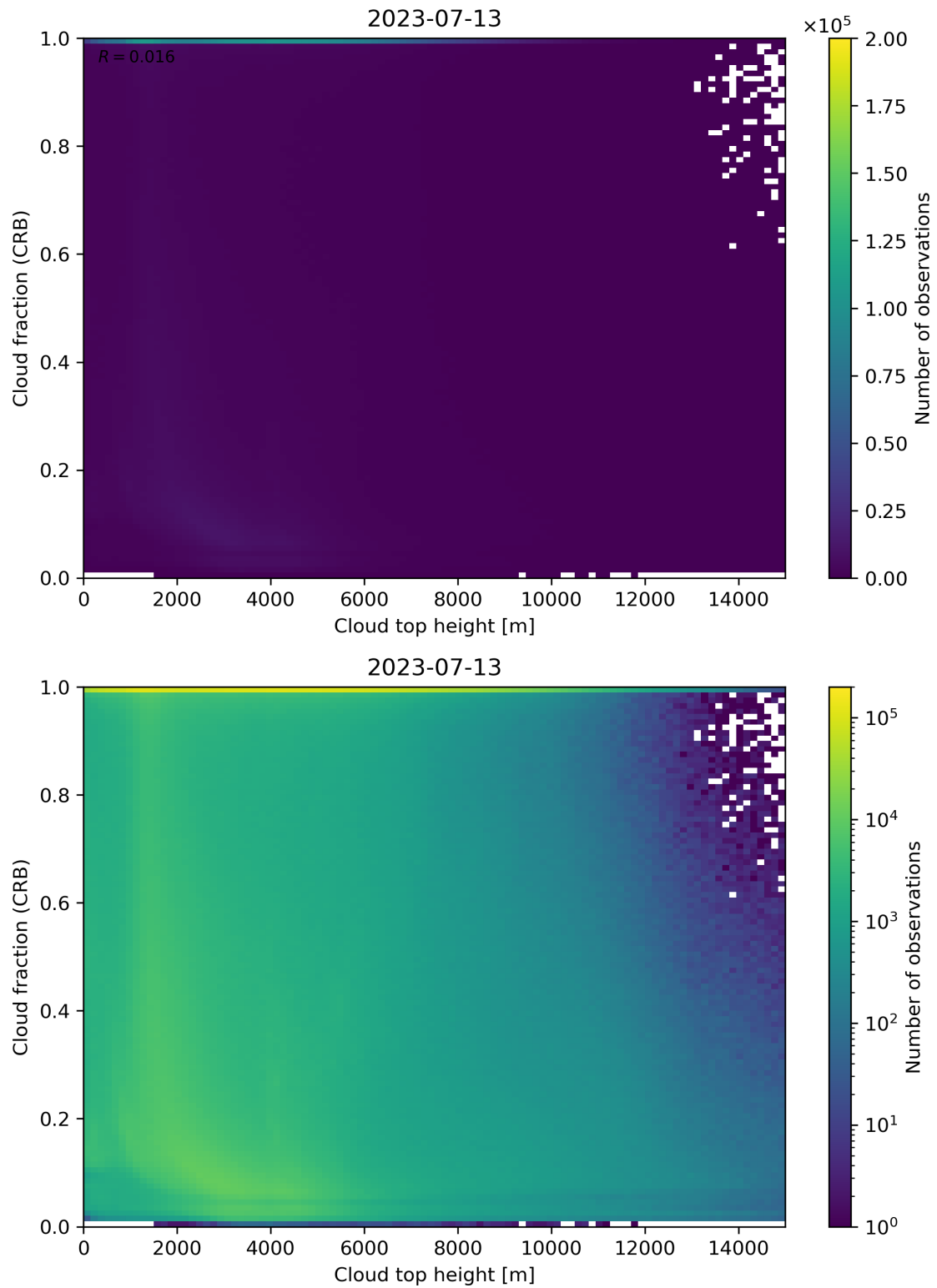


Figure 88: Scatter density plot of “Cloud top height” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.

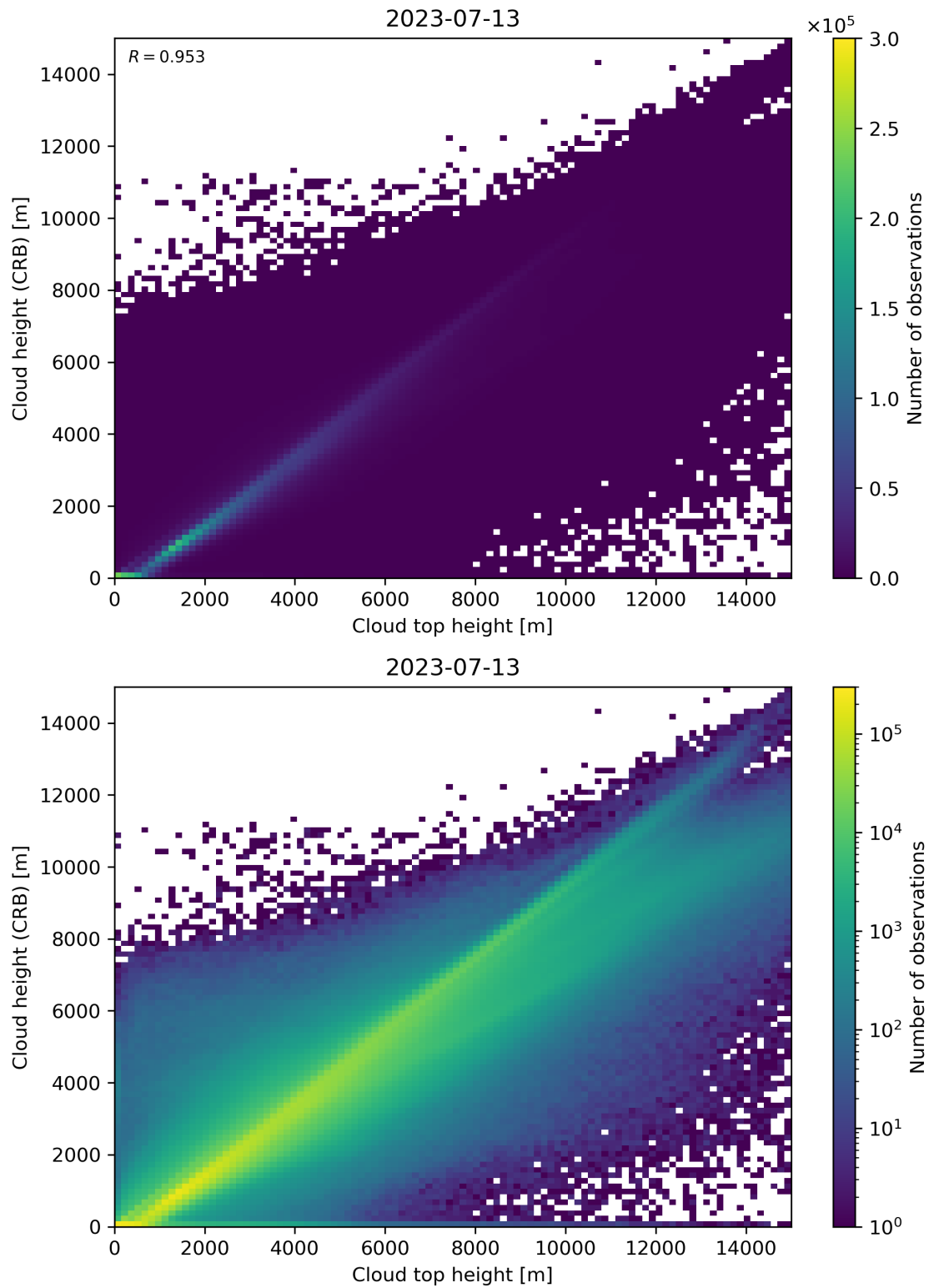


Figure 89: Scatter density plot of “Cloud top height” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.

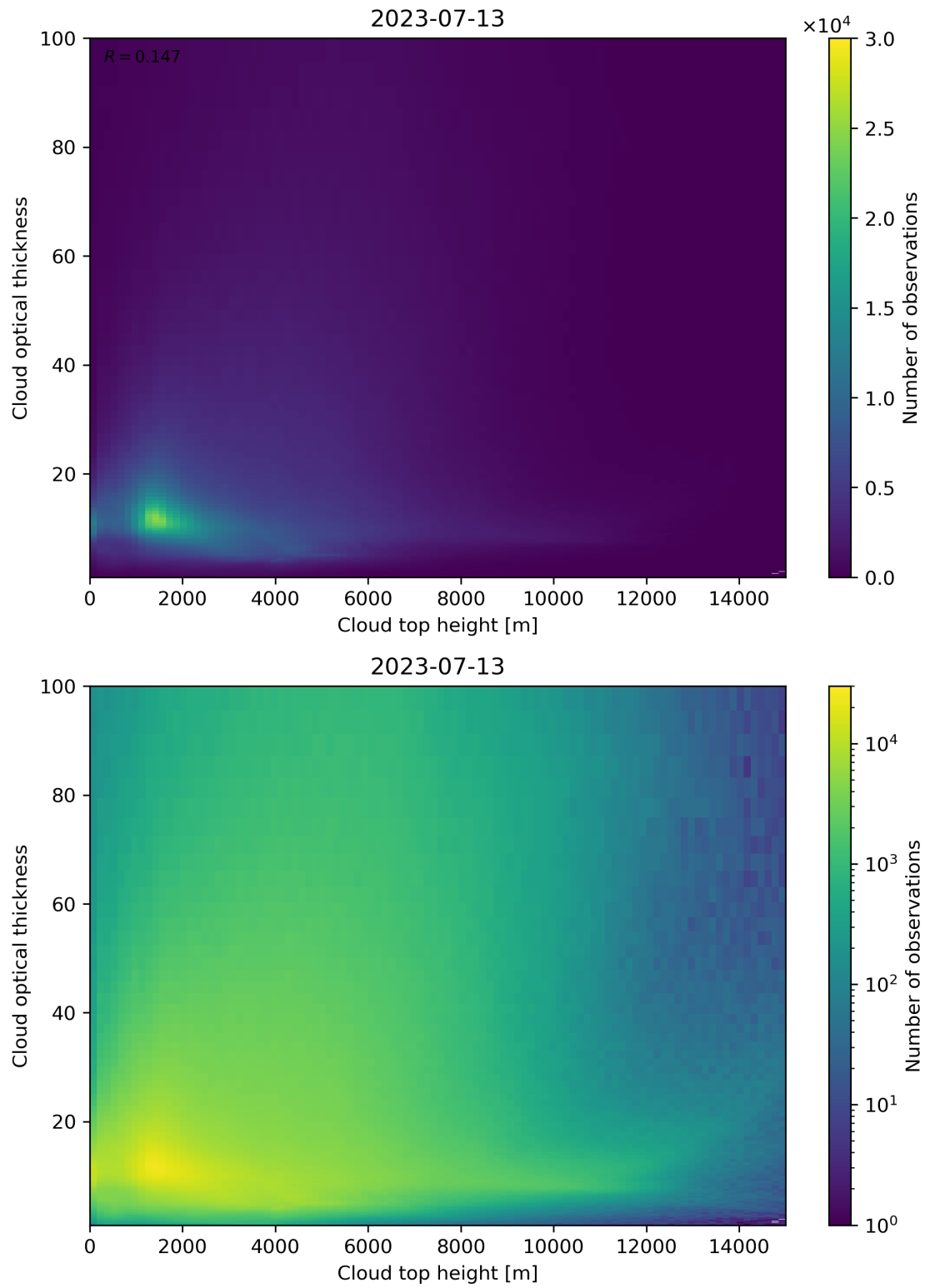


Figure 90: Scatter density plot of “Cloud top height” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.

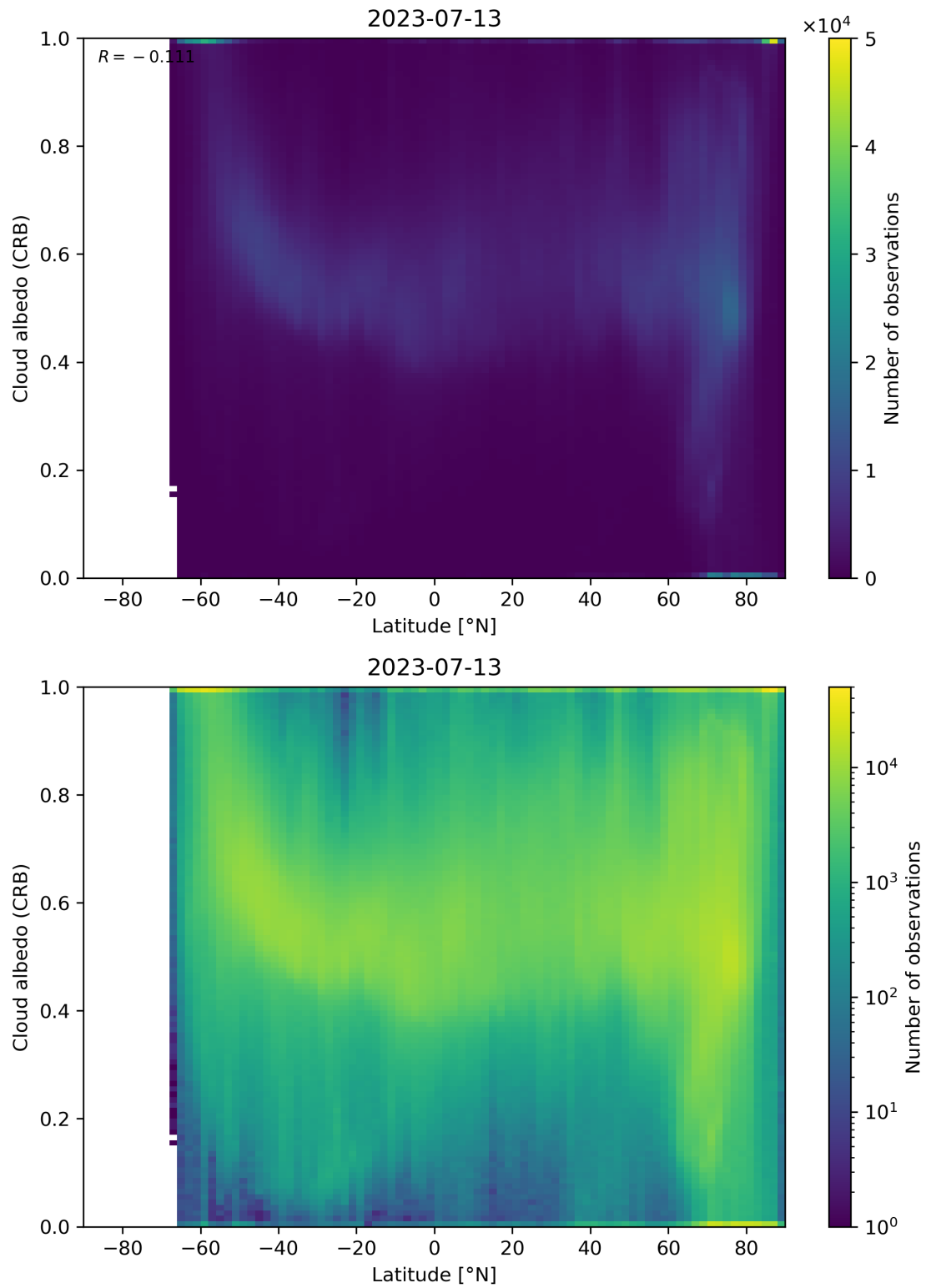


Figure 91: Scatter density plot of “Latitude” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

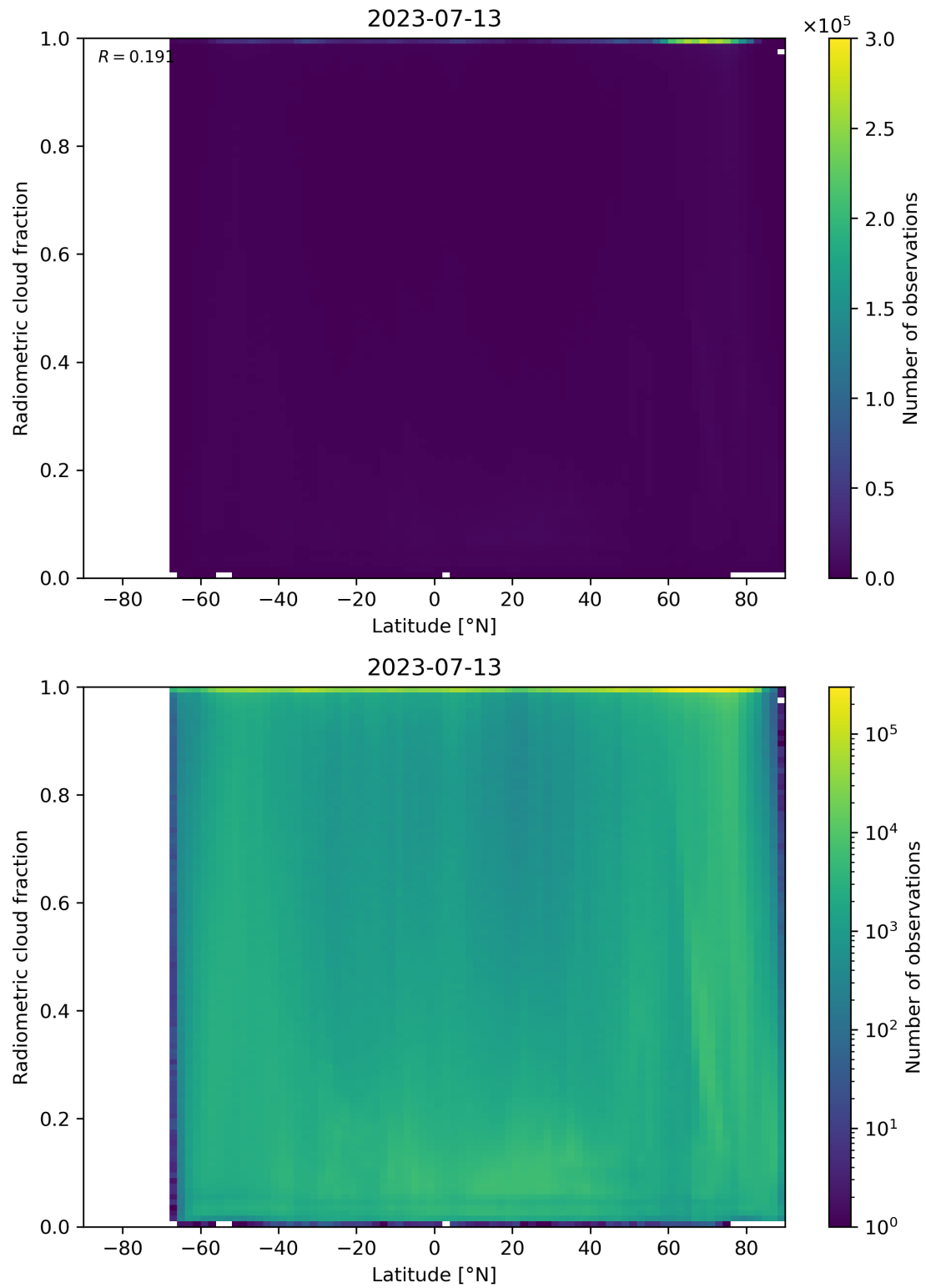


Figure 92: Scatter density plot of “Latitude” against “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14.

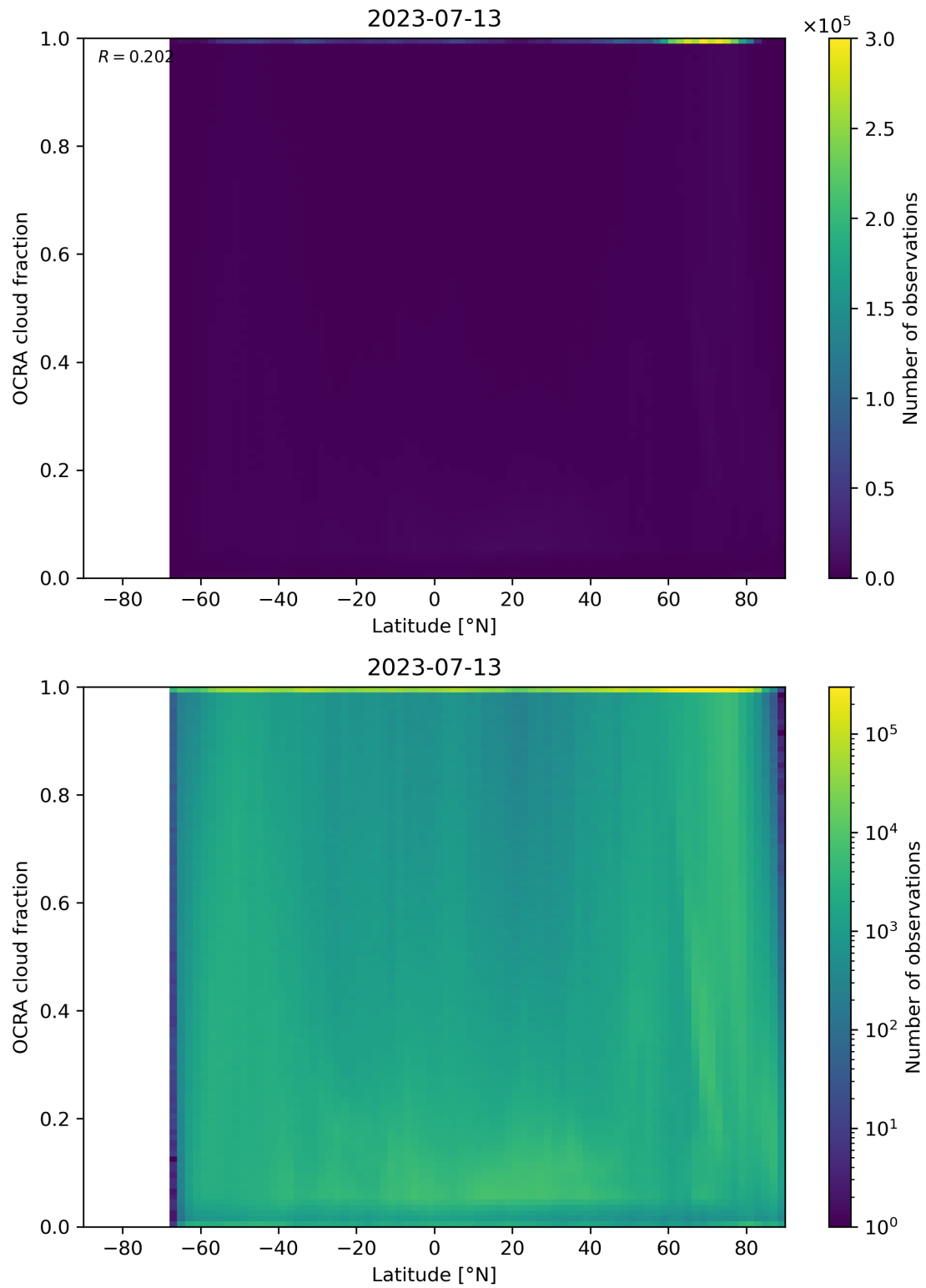


Figure 93: Scatter density plot of “Latitude” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

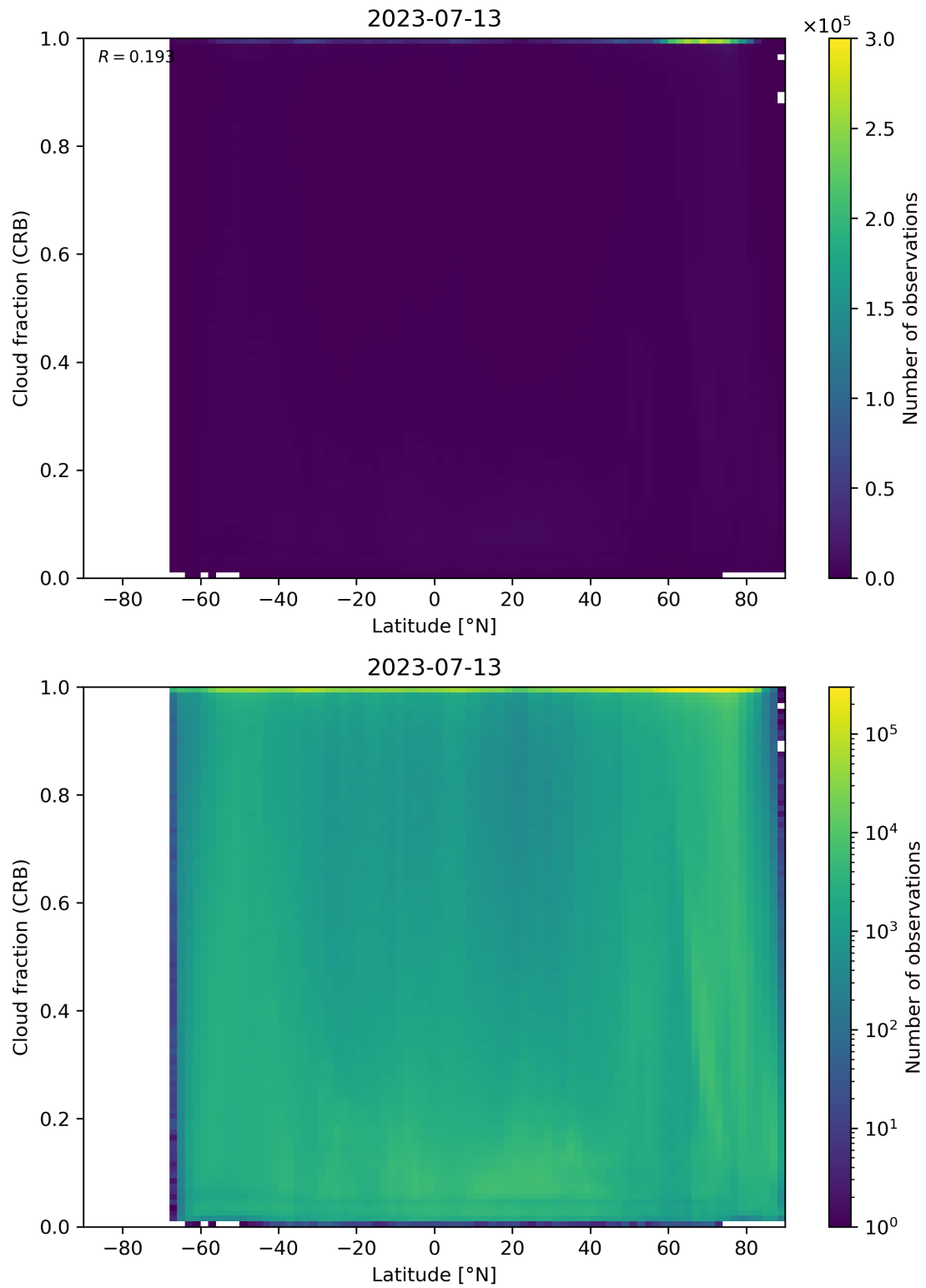


Figure 94: Scatter density plot of “Latitude” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.

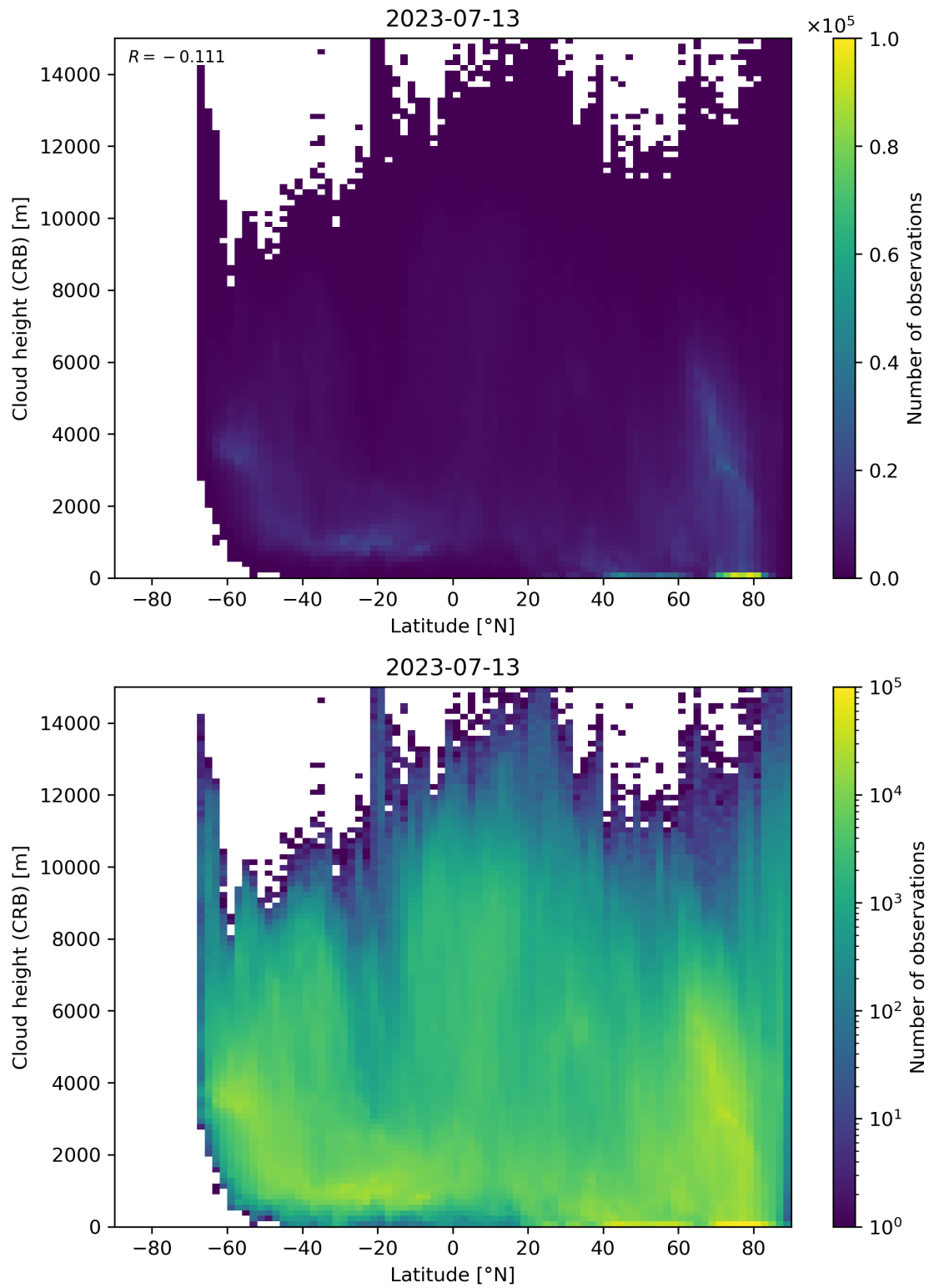


Figure 95: Scatter density plot of “Latitude” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.

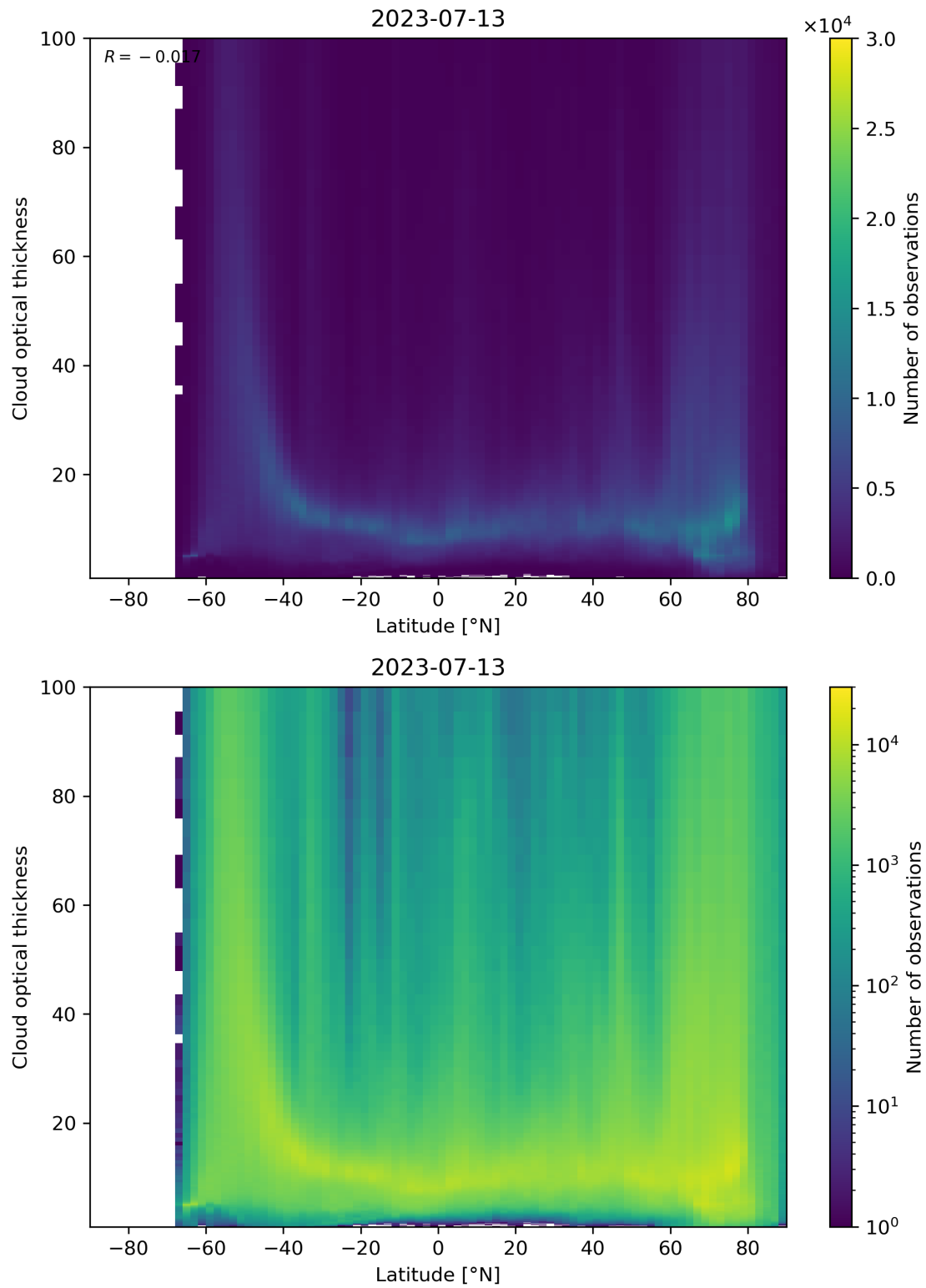


Figure 96: Scatter density plot of “Latitude” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.

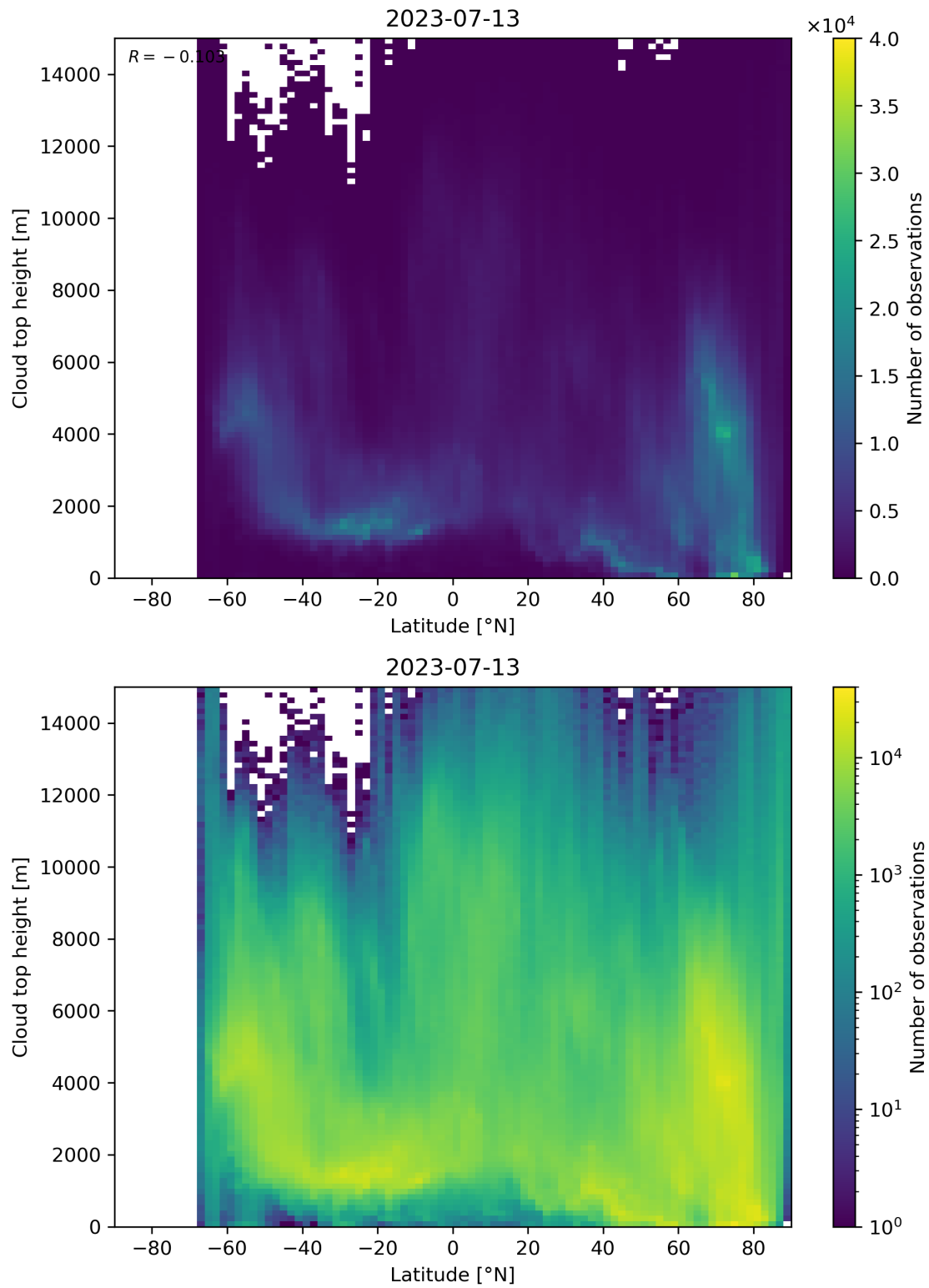


Figure 97: Scatter density plot of “Latitude” against “Cloud top height” for 2023-07-13 to 2023-07-14.

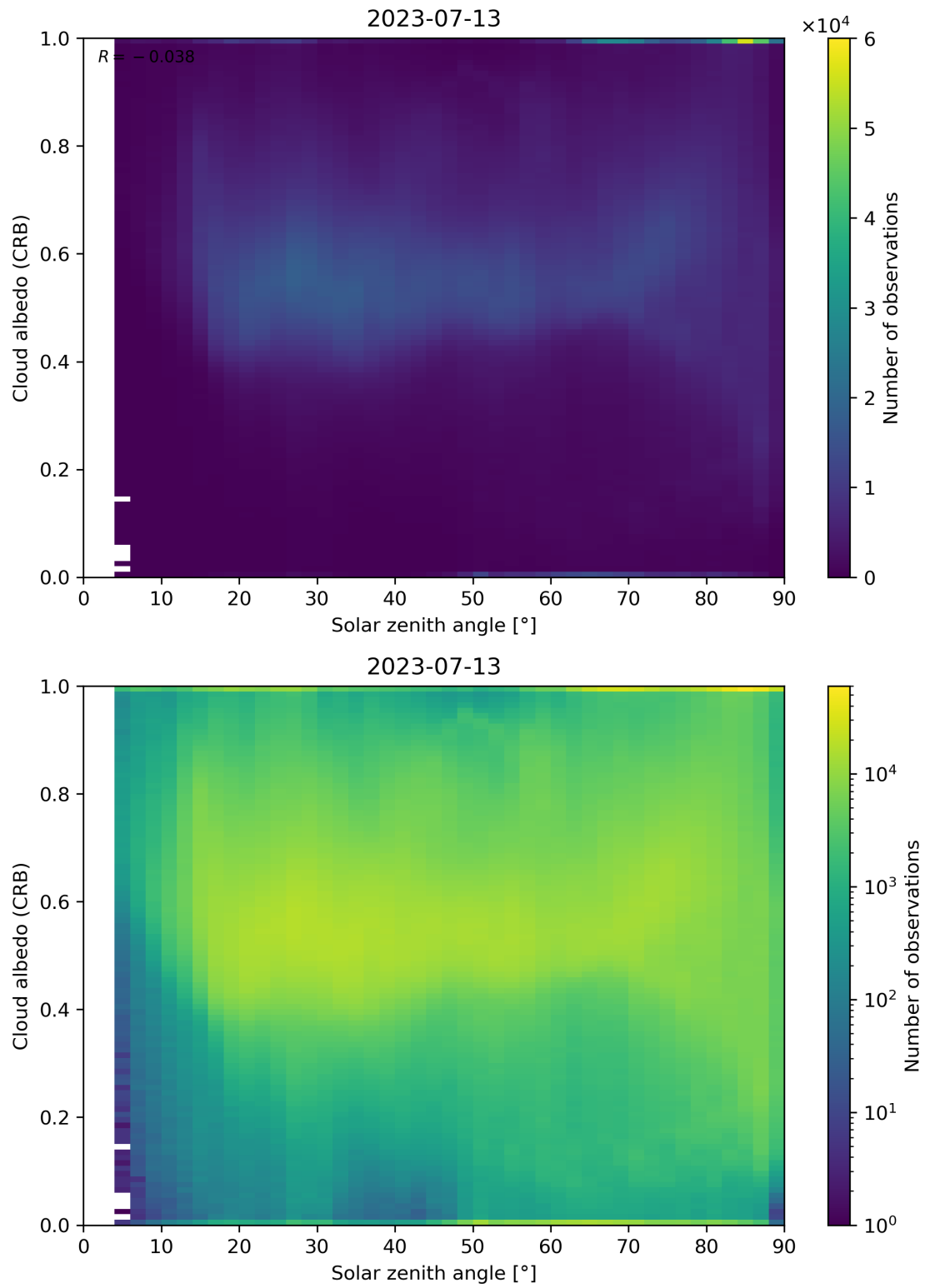


Figure 98: Scatter density plot of “Solar zenith angle” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

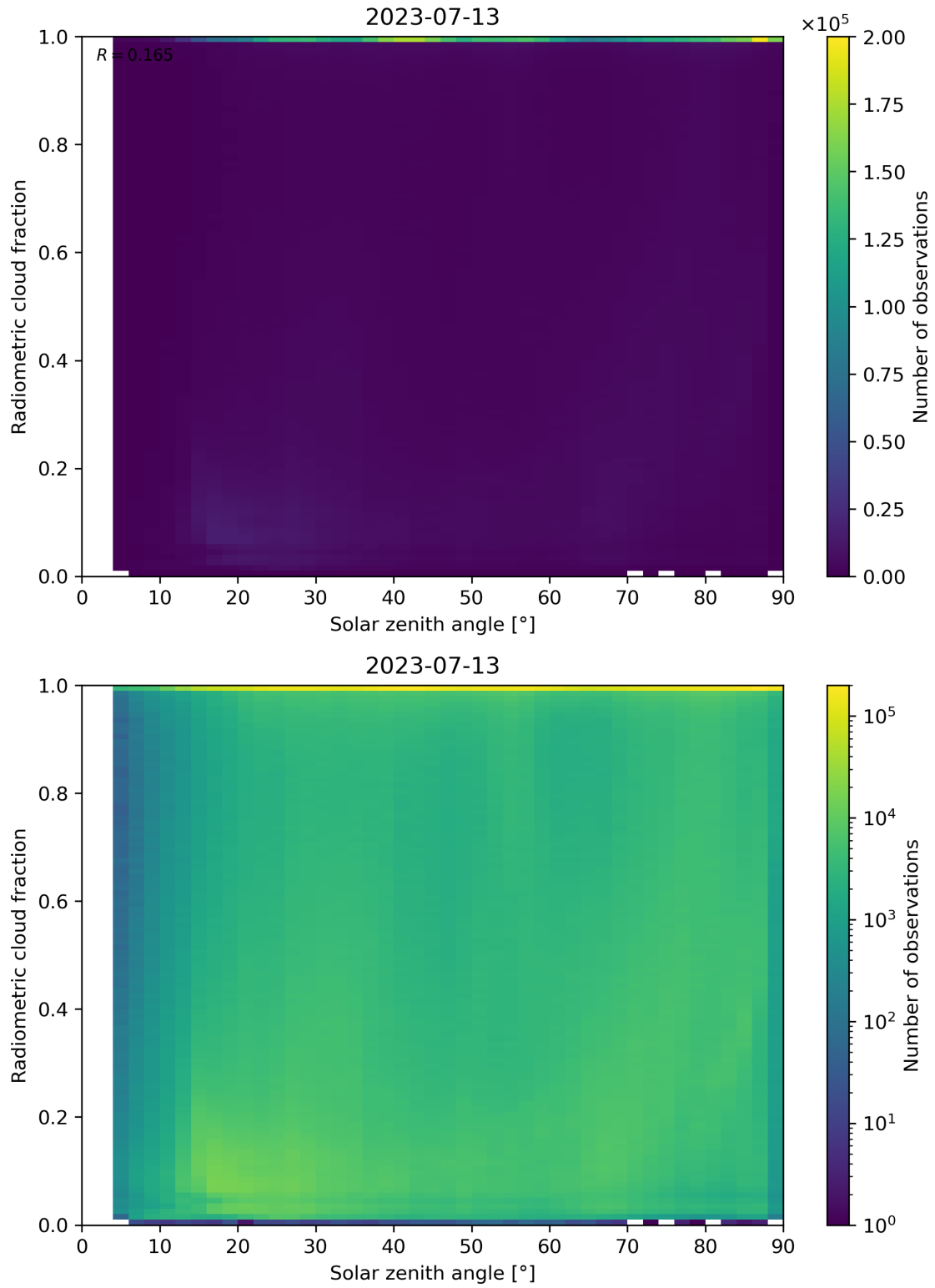


Figure 99: Scatter density plot of “Solar zenith angle” against “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14.

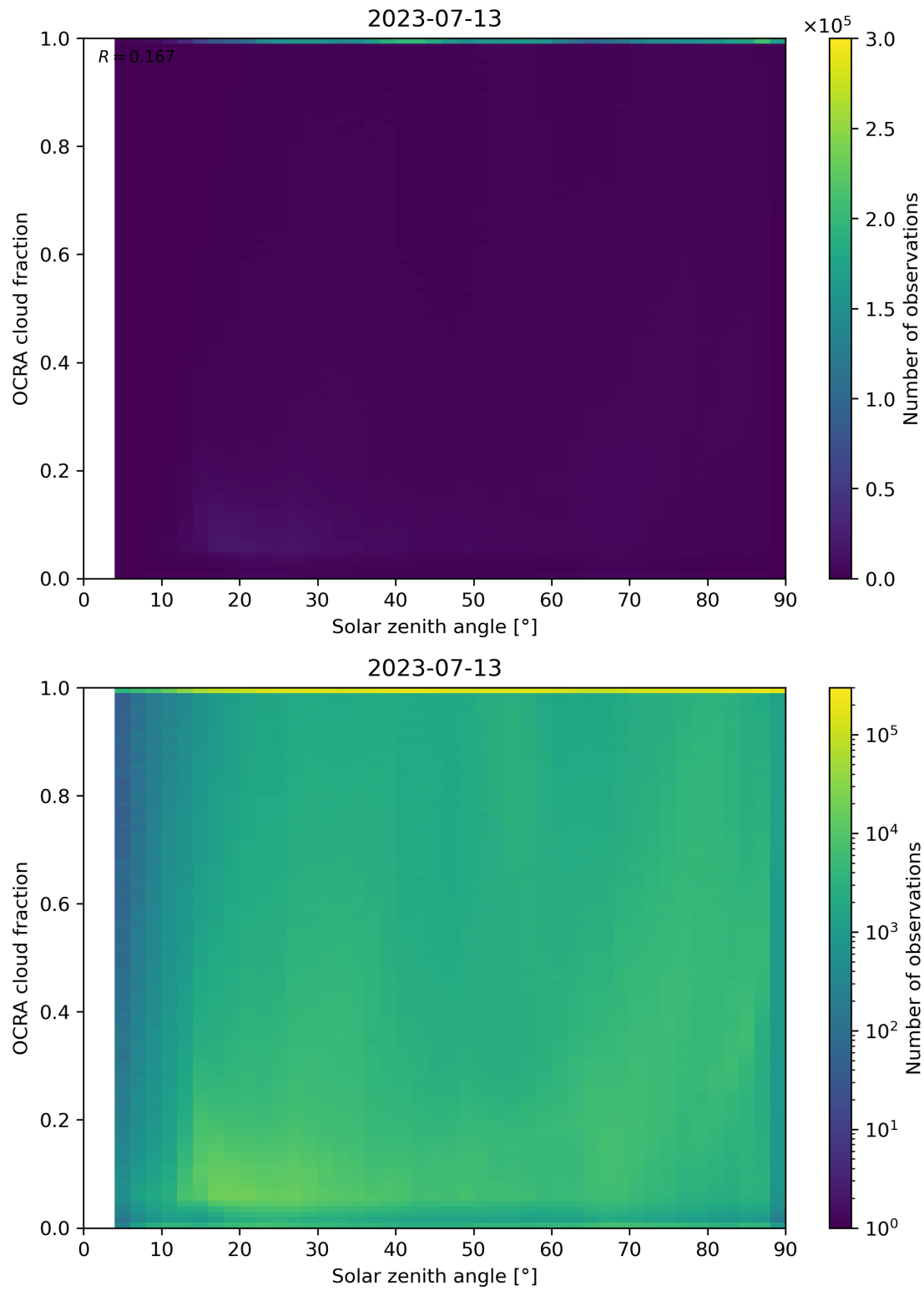


Figure 100: Scatter density plot of “Solar zenith angle” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

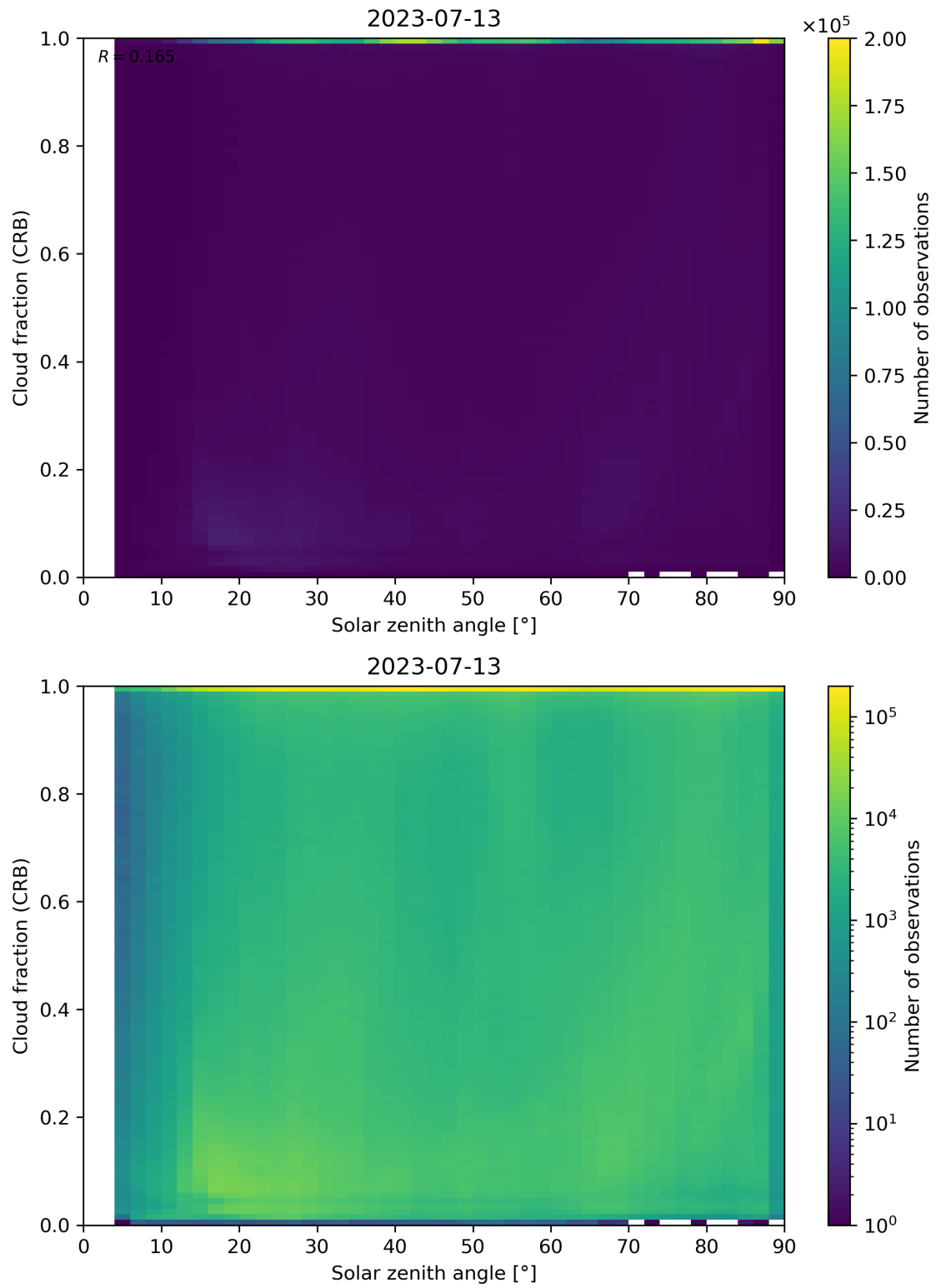


Figure 101: Scatter density plot of “Solar zenith angle” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.

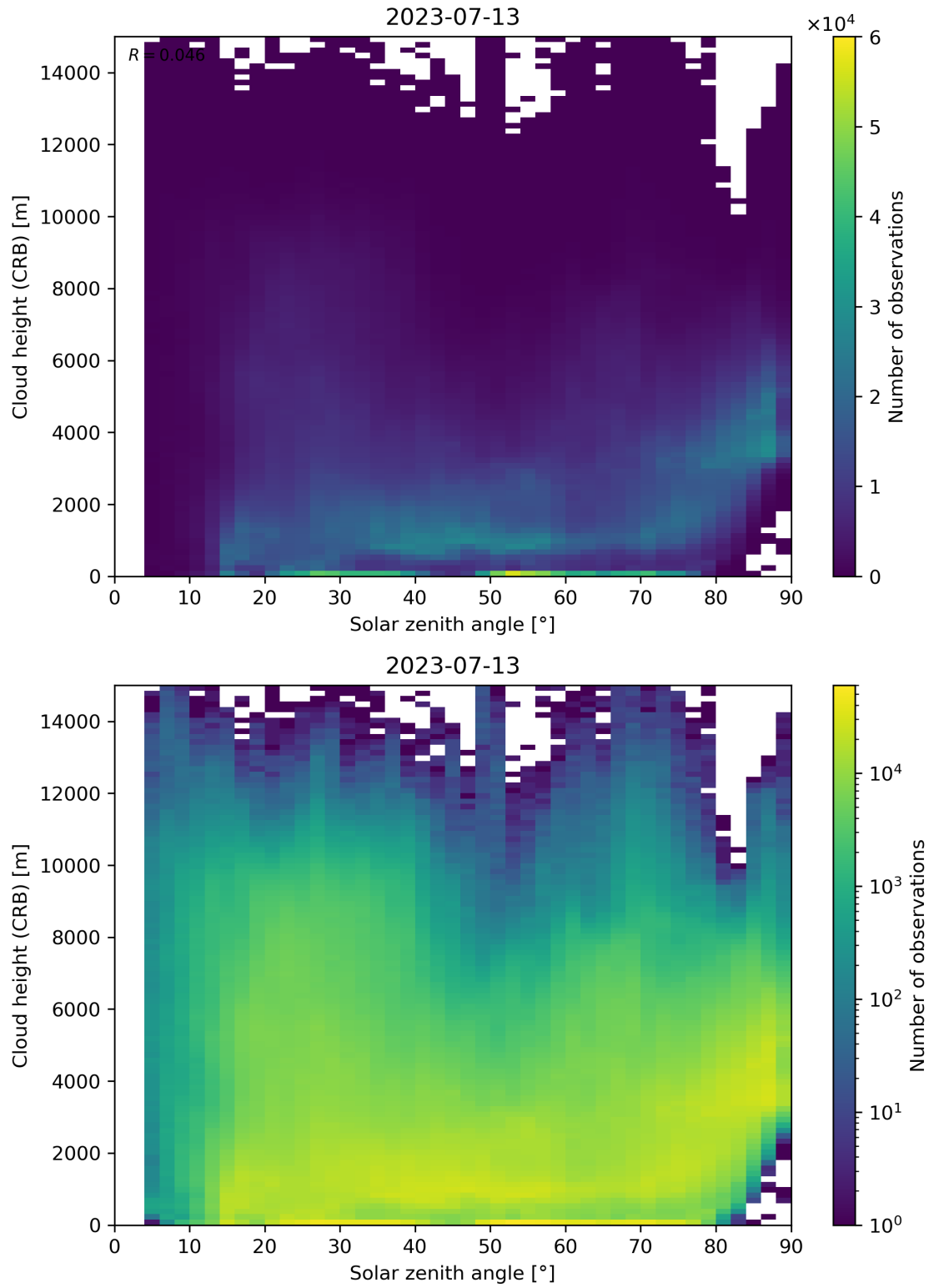


Figure 102: Scatter density plot of “Solar zenith angle” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.

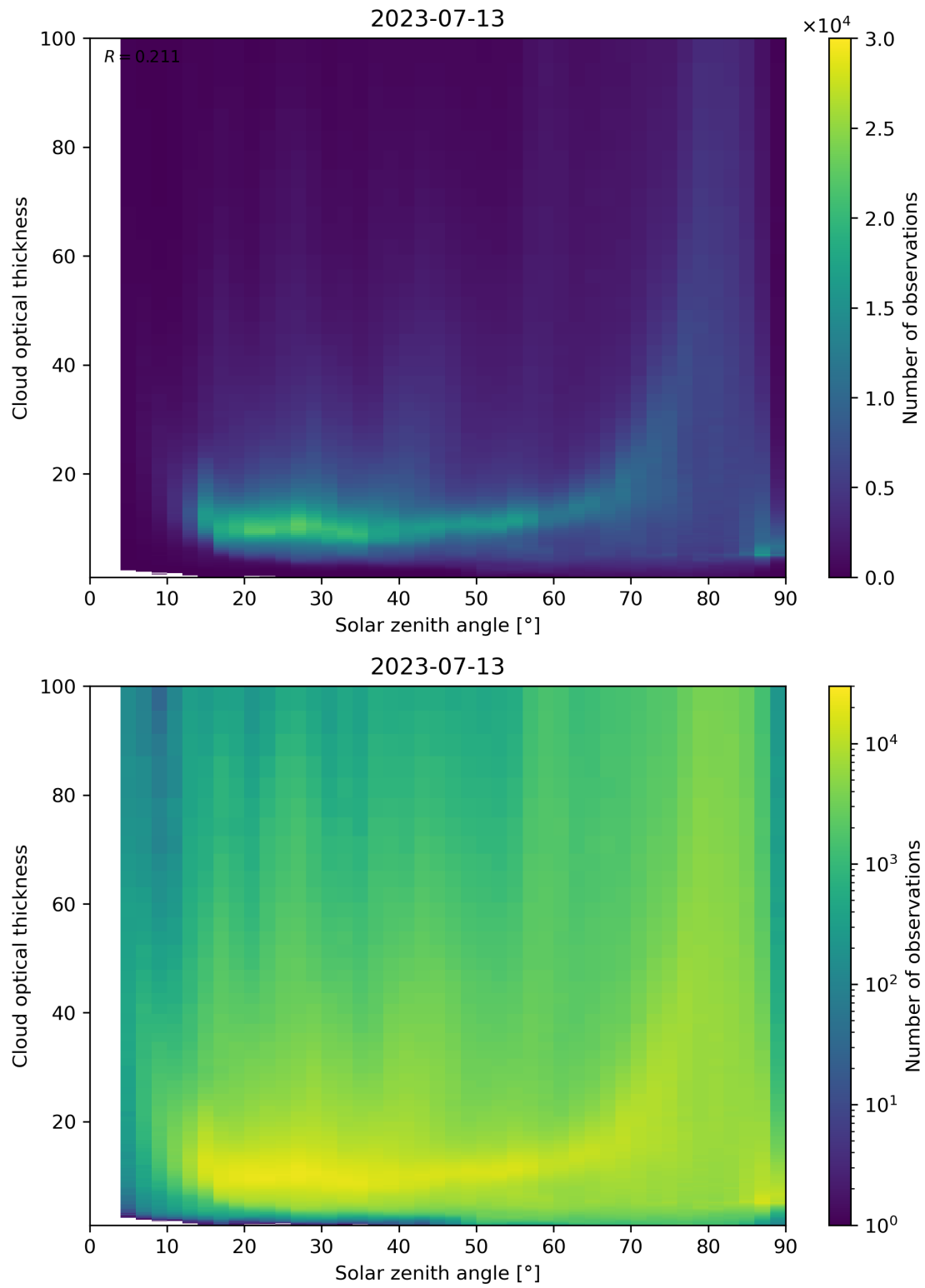


Figure 103: Scatter density plot of “Solar zenith angle” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.

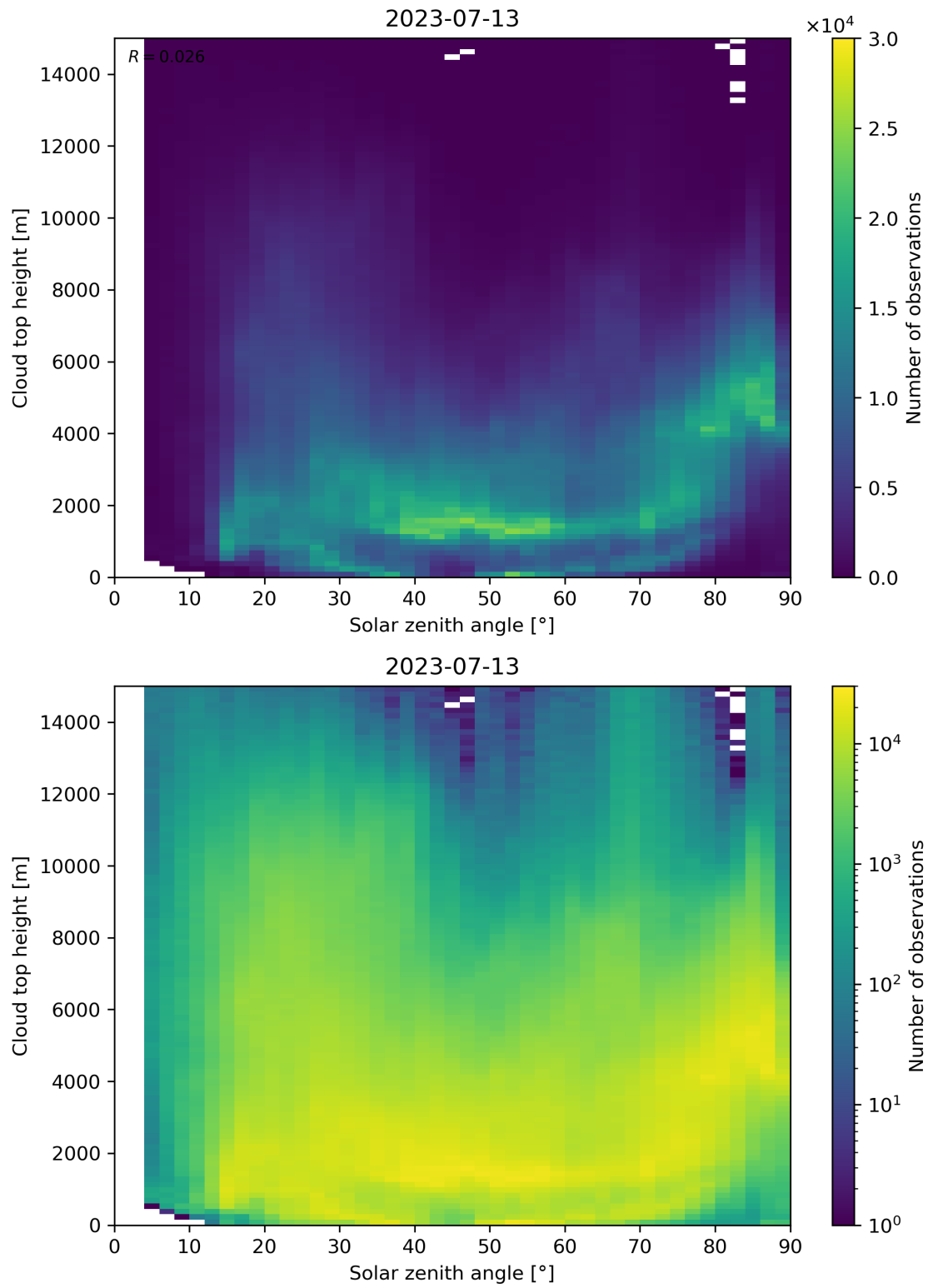


Figure 104: Scatter density plot of “Solar zenith angle” against “Cloud top height” for 2023-07-13 to 2023-07-14.

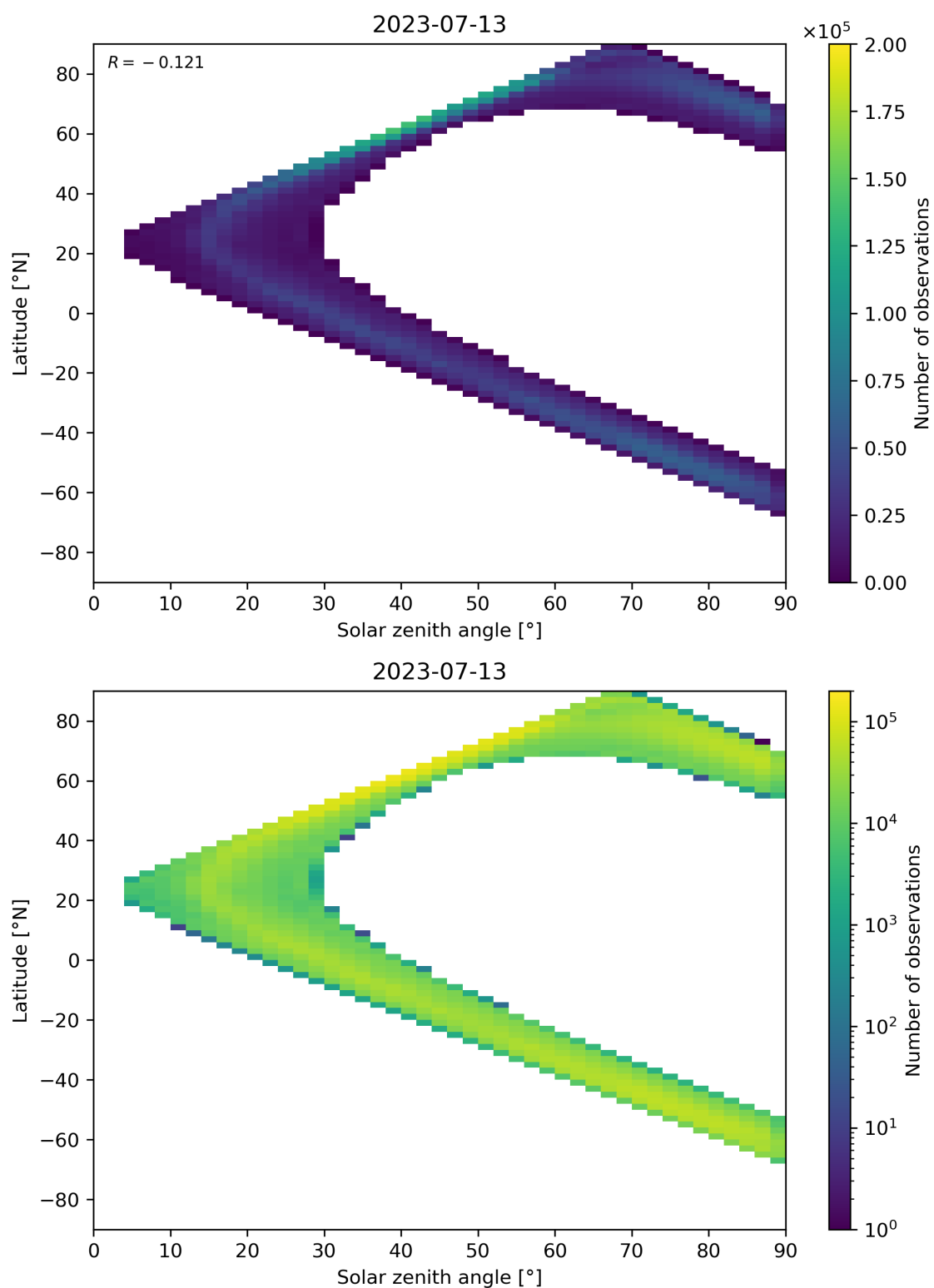


Figure 105: Scatter density plot of “Solar zenith angle” against “Latitude” for 2023-07-13 to 2023-07-14.

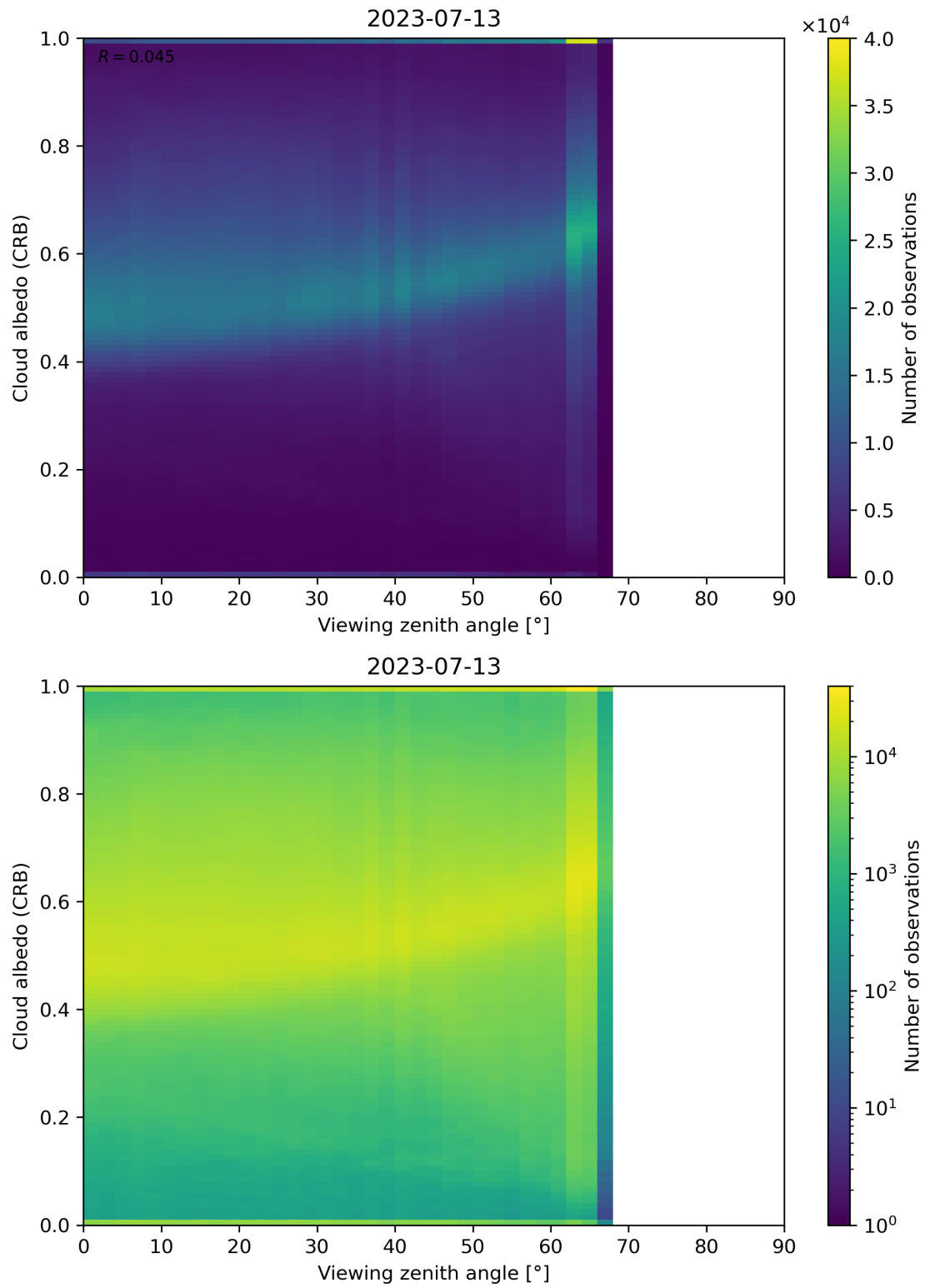


Figure 106: Scatter density plot of “Viewing zenith angle” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.

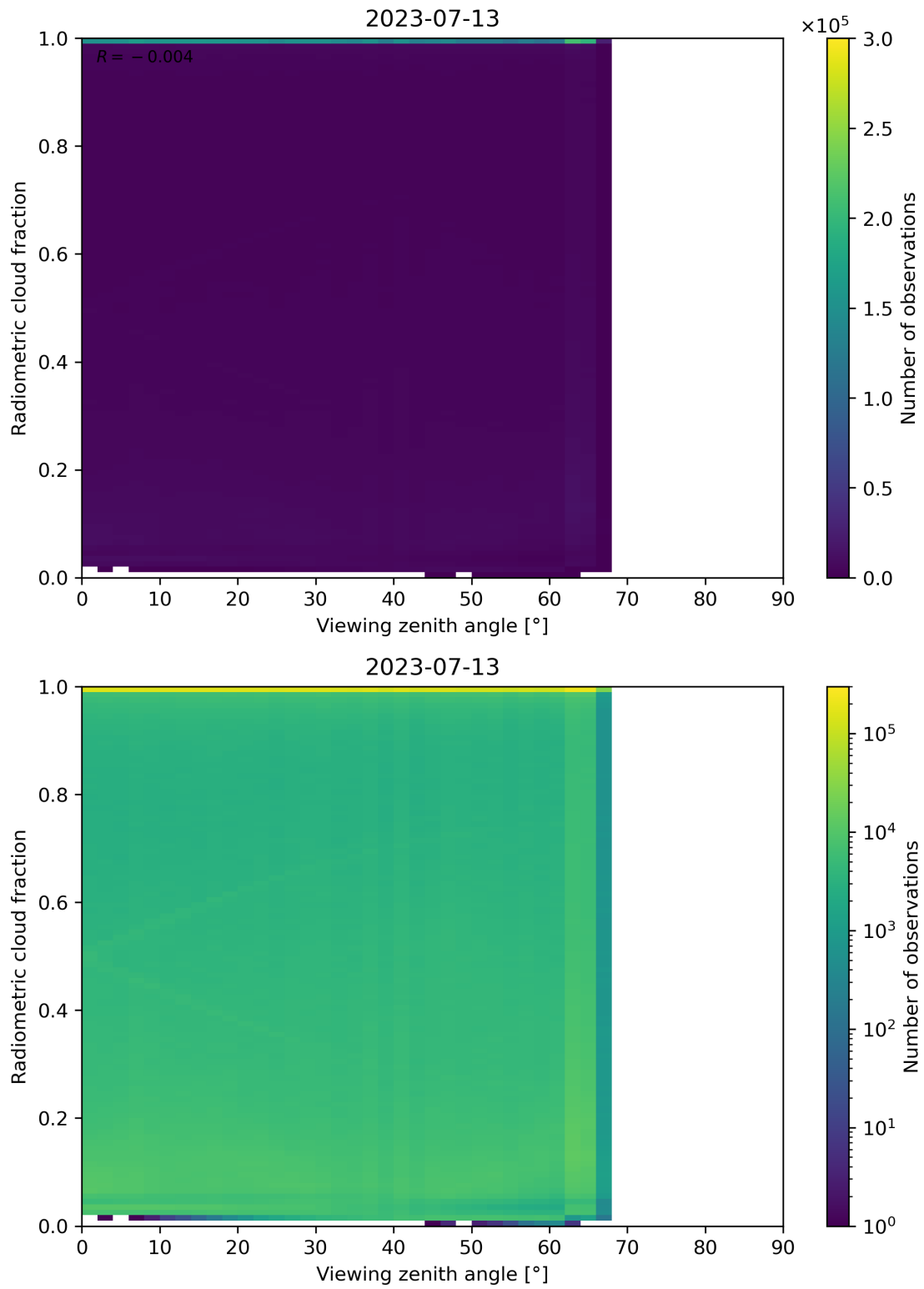


Figure 107: Scatter density plot of “Viewing zenith angle” against “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14.

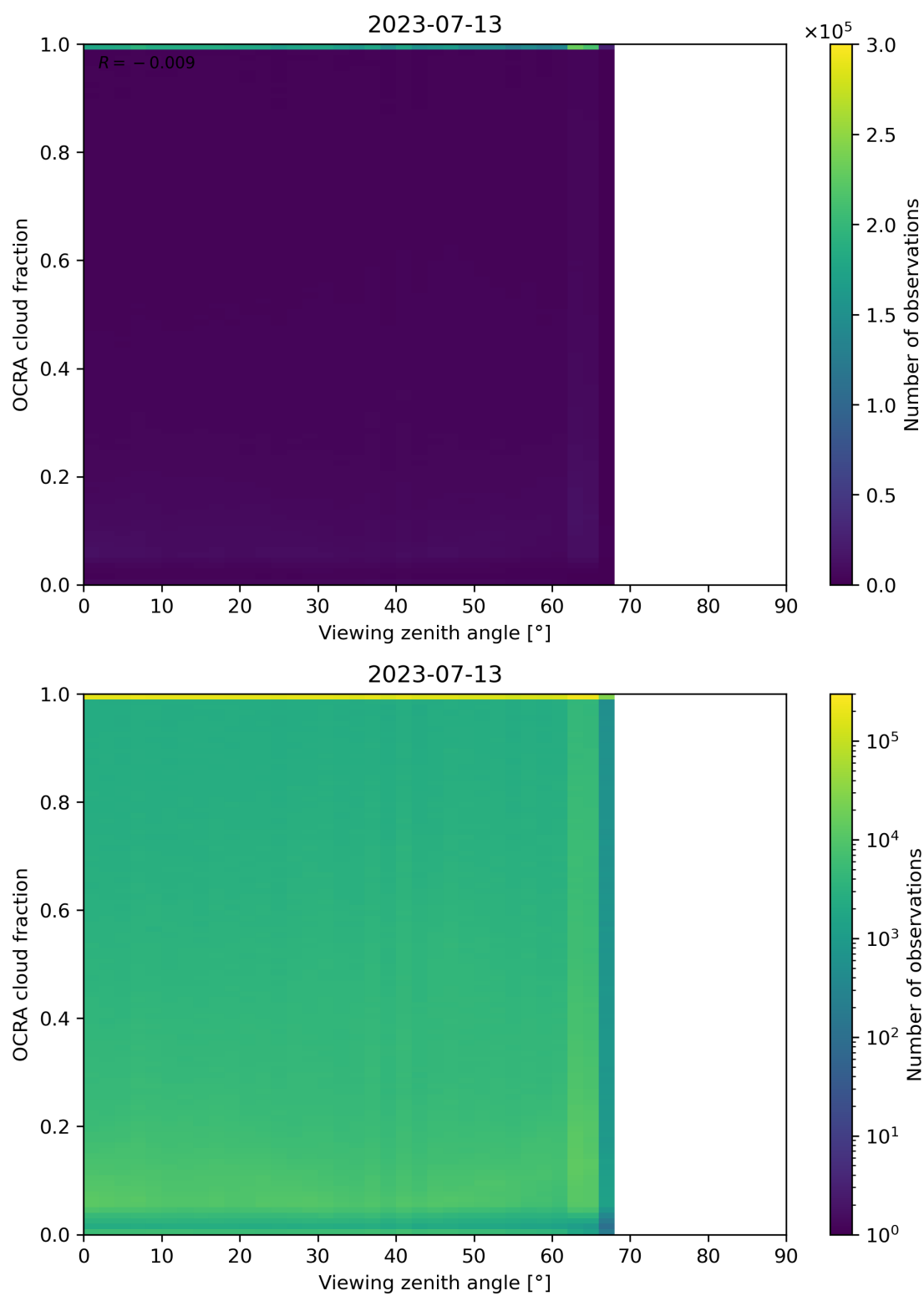


Figure 108: Scatter density plot of “Viewing zenith angle” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.

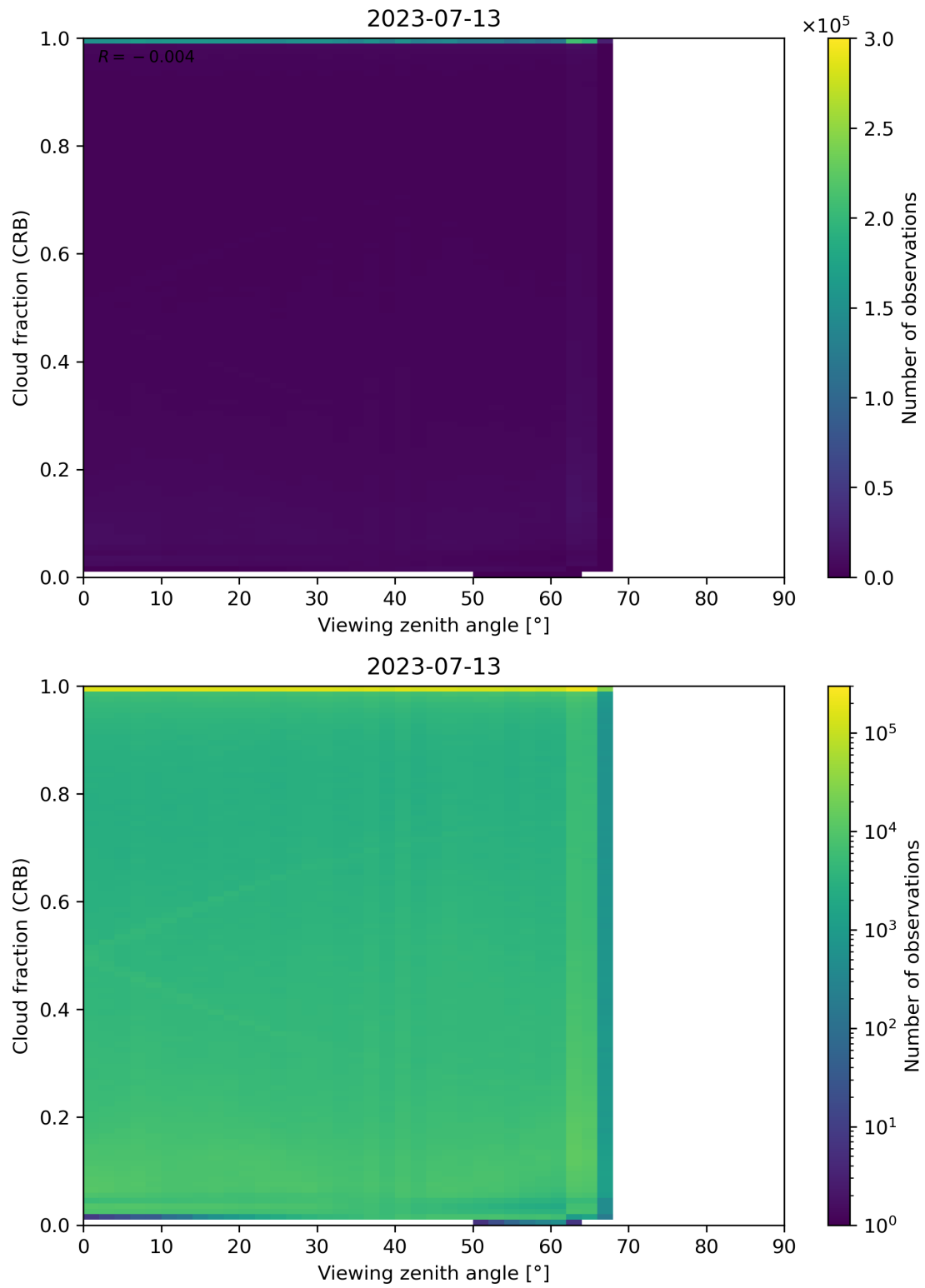


Figure 109: Scatter density plot of “Viewing zenith angle” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.

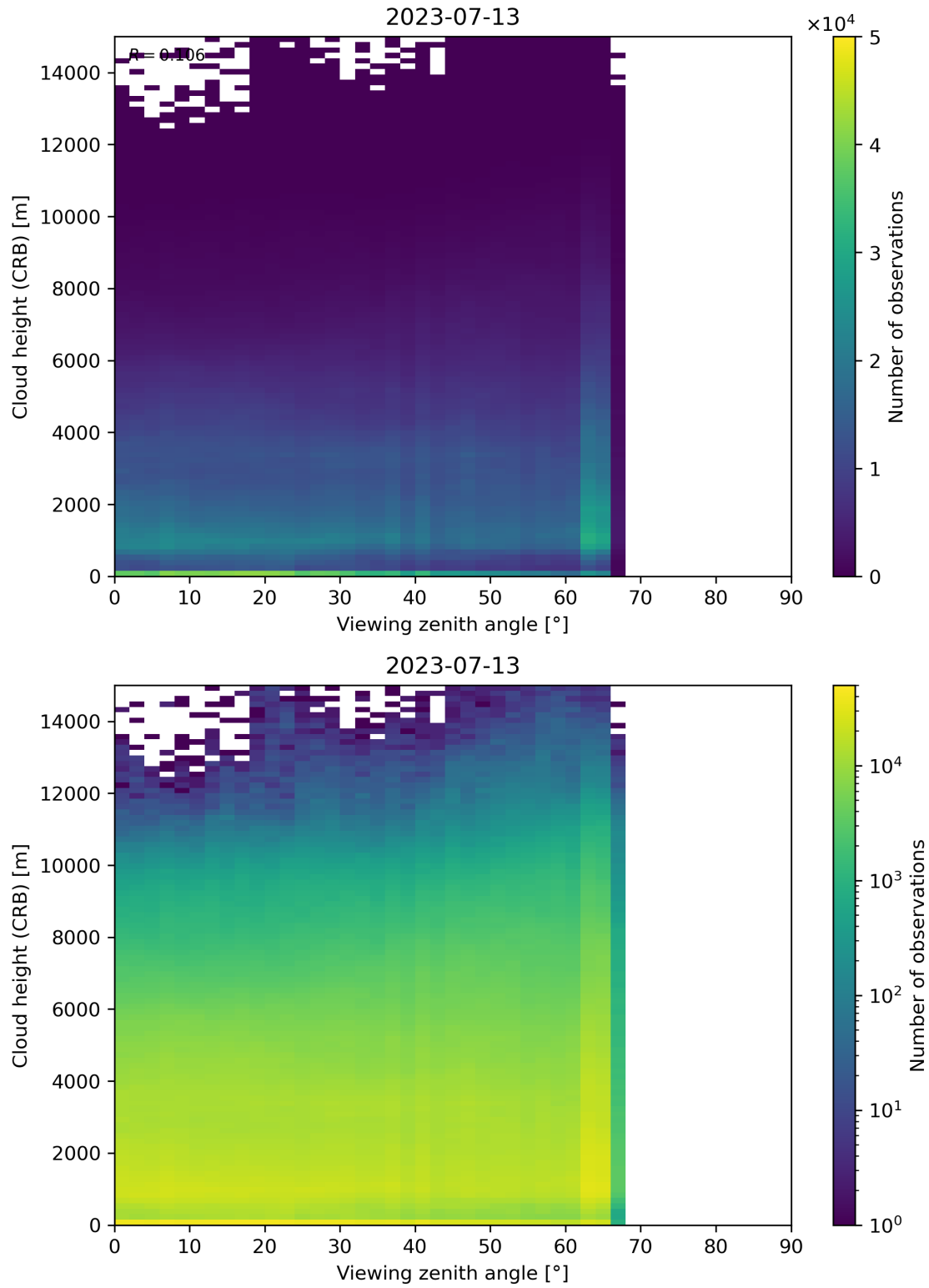


Figure 110: Scatter density plot of “Viewing zenith angle” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.

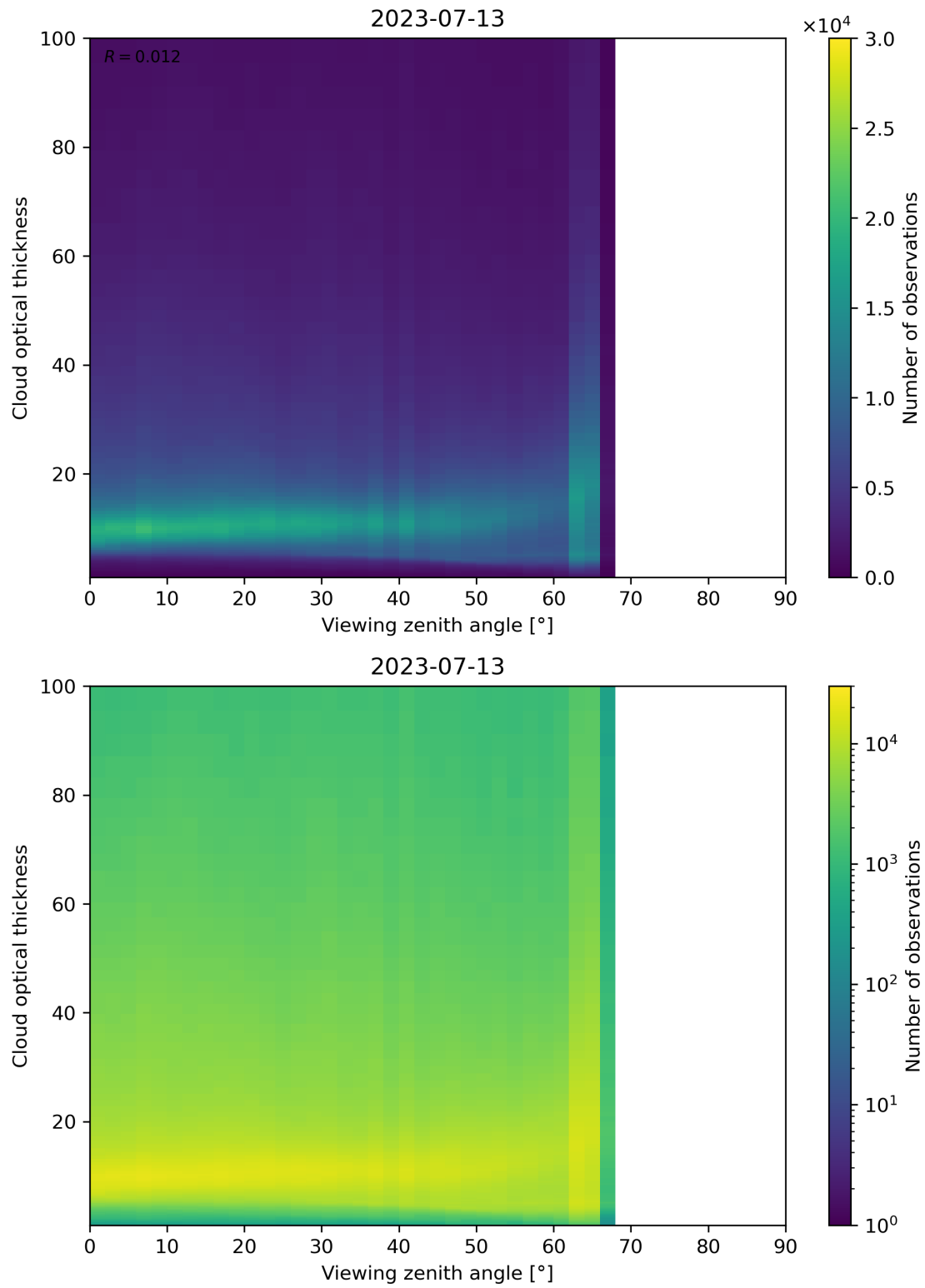


Figure 111: Scatter density plot of “Viewing zenith angle” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.

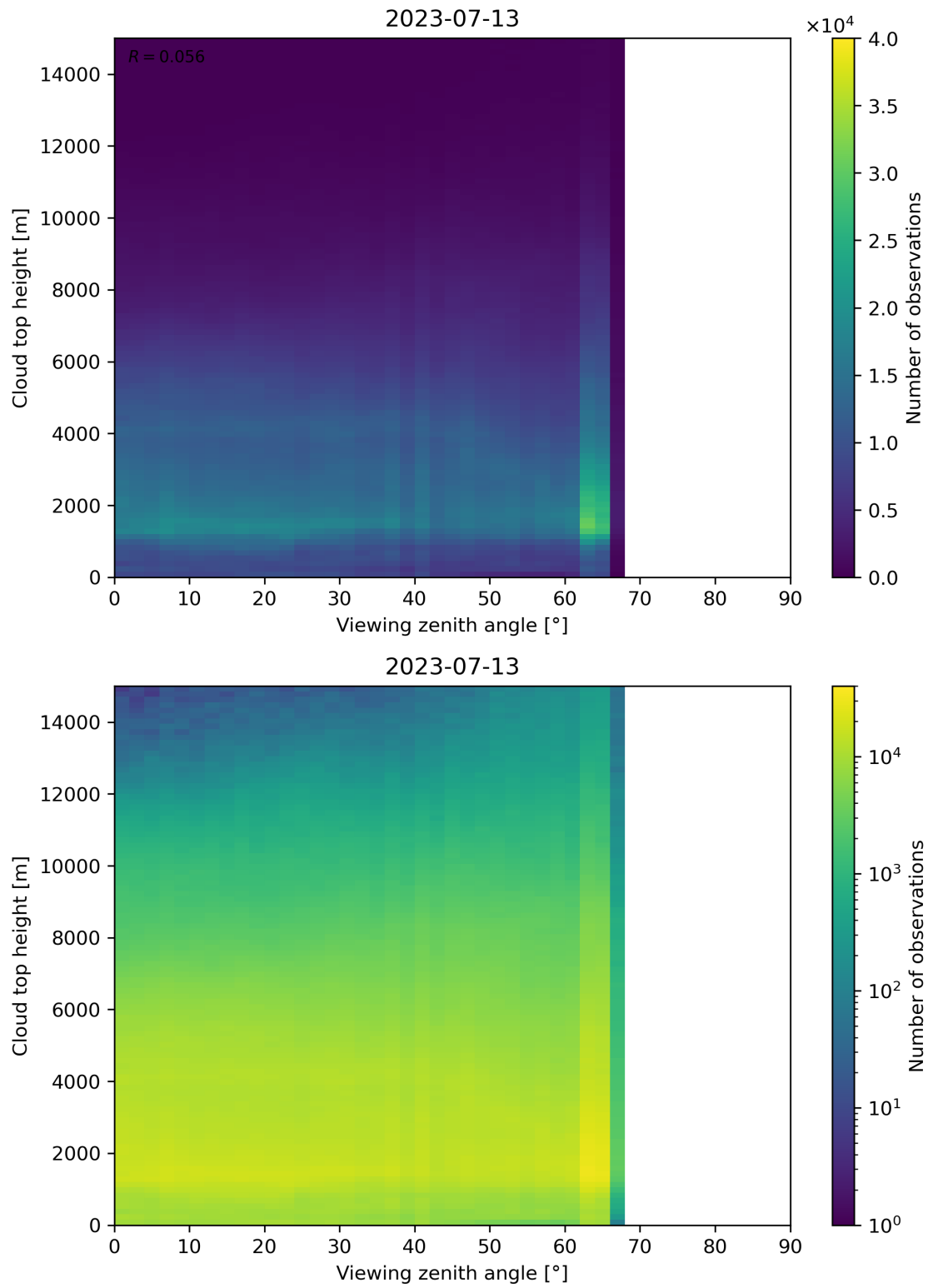


Figure 112: Scatter density plot of “Viewing zenith angle” against “Cloud top height” for 2023-07-13 to 2023-07-14.

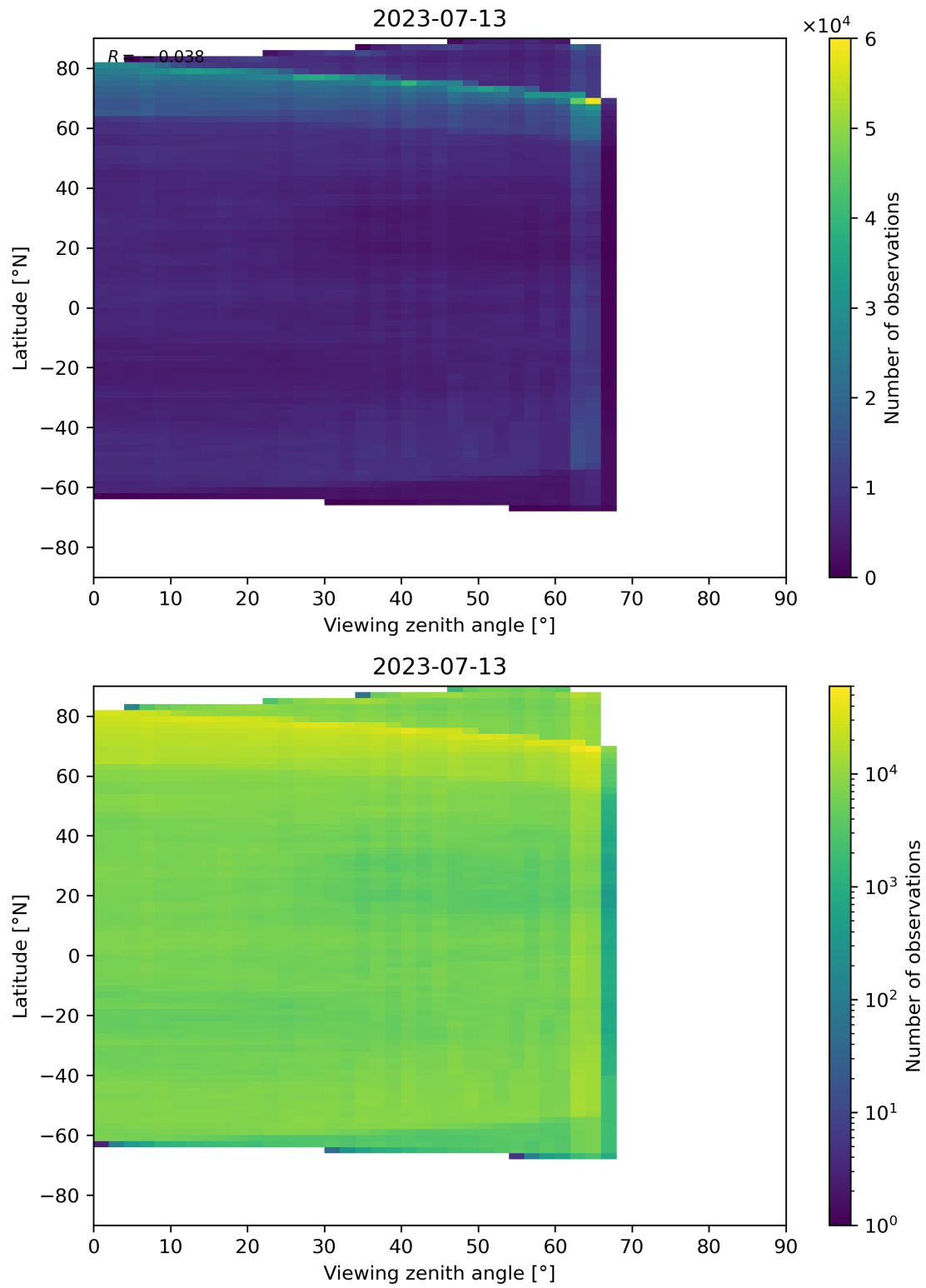


Figure 113: Scatter density plot of “Viewing zenith angle” against “Latitude” for 2023-07-13 to 2023-07-14.

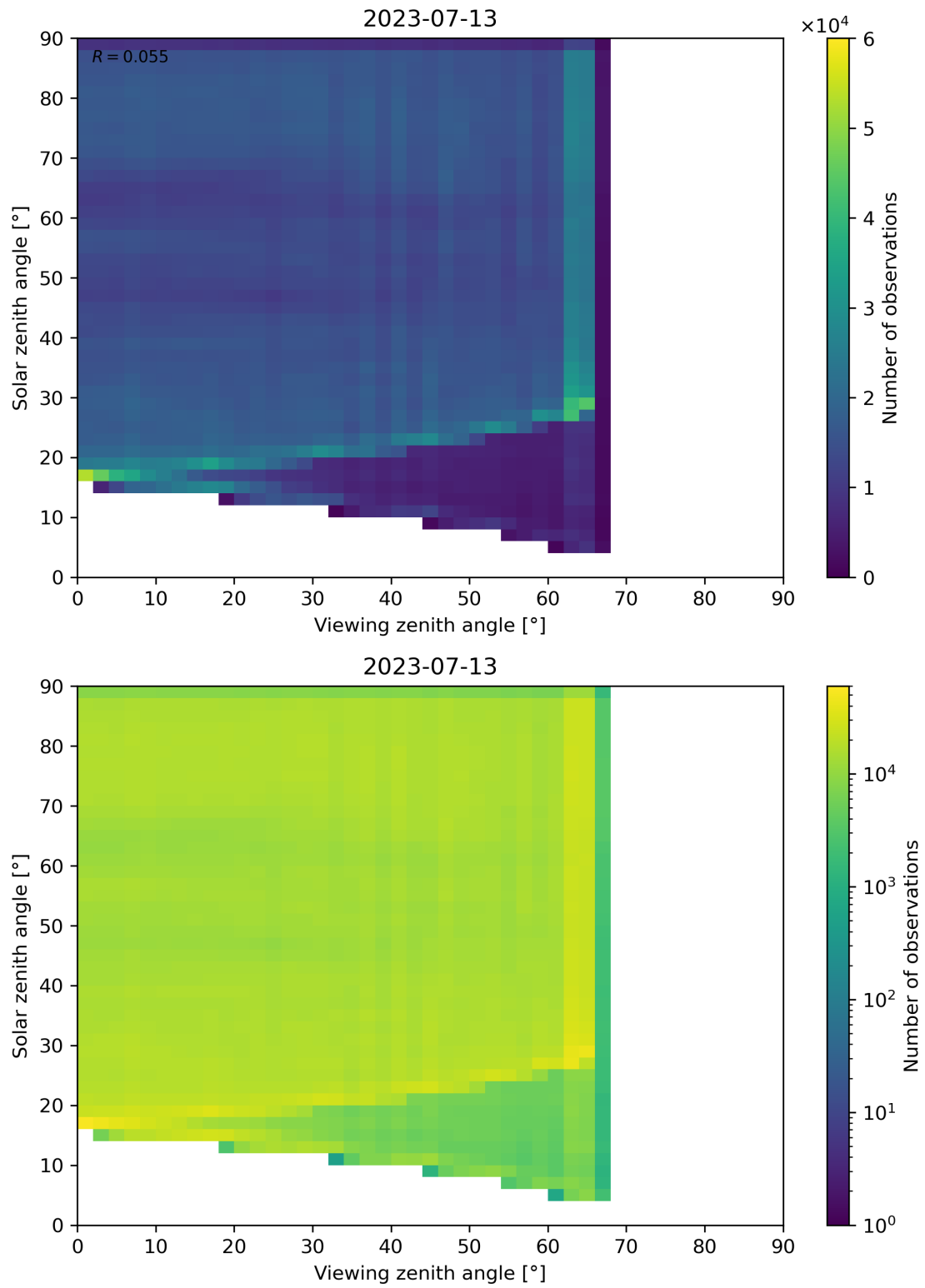


Figure 114: Scatter density plot of “Viewing zenith angle” against “Solar zenith angle” for 2023-07-13 to 2023-07-14.

Contents

1	Short Introduction	1
1.1	The list of parameters	1
2	Definitions	1
3	Granule outlines	12
4	Input data monitoring	13
5	Warnings and errors	14
6	World maps	15
7	Zonal average	31
8	Histograms	47
9	Along track statistics	63
10	Coincidence density	79
11	Copyright information of ‘PyCAMA’	124

List of Figures

1	Map of correlation graph for 2023-07-13 to 2023-07-14.	10
2	Map of correlation matrix for 2023-07-13 to 2023-07-14.	11
3	Outline of the granules.	12
4	Input data per granule	13
5	Fraction of pixels with specific warnings and errors during processing	14
6	Map of “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14	15
7	Map of “Cloud top height” for 2023-07-13 to 2023-07-14	16
8	Map of “Cloud optical thickness” for 2023-07-13 to 2023-07-14	17
9	Map of “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14	18
10	Map of “Cloud height (CRB)” for 2023-07-13 to 2023-07-14	19
11	Map of “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14	20
12	Map of “Fitted surface albedo” for 2023-07-13 to 2023-07-14	21
13	Map of “Fitted surface albedo (CRB)” for 2023-07-13 to 2023-07-14	22
14	Map of “RMS” for 2023-07-13 to 2023-07-14	23
15	Map of “RMS (CRB)” for 2023-07-13 to 2023-07-14	24
16	Map of “Fitting wavelength shift” for 2023-07-13 to 2023-07-14	25
17	Map of “OCRA cloud fraction” for 2023-07-13 to 2023-07-14	26
18	Map of “OCRA [Pleaseinsertintopreamble]blue[Pleaseinsertintopreamble] reflectance” for 2023-07-13 to 2023-07-14	27
19	Map of “OCRA “green” reflectance” for 2023-07-13 to 2023-07-14	28
20	Map of “ROCINN “red” reflectance” for 2023-07-13 to 2023-07-14	29
21	Map of the number of observations for 2023-07-13 to 2023-07-14	30
22	Zonal average of “QA value” for 2023-07-13 to 2023-07-14.	31
23	Zonal average of “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14.	32
24	Zonal average of “Cloud top height” for 2023-07-13 to 2023-07-14.	33
25	Zonal average of “Cloud optical thickness” for 2023-07-13 to 2023-07-14.	34
26	Zonal average of “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.	35
27	Zonal average of “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.	36
28	Zonal average of “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	37
29	Zonal average of “Fitted surface albedo” for 2023-07-13 to 2023-07-14.	38
30	Zonal average of “Fitted surface albedo (CRB)” for 2023-07-13 to 2023-07-14.	39
31	Zonal average of “RMS” for 2023-07-13 to 2023-07-14.	40
32	Zonal average of “RMS (CRB)” for 2023-07-13 to 2023-07-14.	41
33	Zonal average of “Fitting wavelength shift” for 2023-07-13 to 2023-07-14.	42
34	Zonal average of “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	43
35	Zonal average of “OCRA “blue” reflectance” for 2023-07-13 to 2023-07-14.	44

36	Zonal average of “OCRA “green” reflectance” for 2023-07-13 to 2023-07-14.	45
37	Zonal average of “ROCINN “red” reflectance” for 2023-07-13 to 2023-07-14.	46
38	Histogram of “QA value” for 2023-07-13 to 2023-07-14	47
39	Histogram of “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14	48
40	Histogram of “Cloud top height” for 2023-07-13 to 2023-07-14	49
41	Histogram of “Cloud optical thickness” for 2023-07-13 to 2023-07-14	50
42	Histogram of “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14	51
43	Histogram of “Cloud height (CRB)” for 2023-07-13 to 2023-07-14	52
44	Histogram of “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14	53
45	Histogram of “Fitted surface albedo” for 2023-07-13 to 2023-07-14	54
46	Histogram of “Fitted surface albedo (CRB)” for 2023-07-13 to 2023-07-14	55
47	Histogram of “RMS” for 2023-07-13 to 2023-07-14	56
48	Histogram of “RMS (CRB)” for 2023-07-13 to 2023-07-14	57
49	Histogram of “Fitting wavelength shift” for 2023-07-13 to 2023-07-14	58
50	Histogram of “OCRA cloud fraction” for 2023-07-13 to 2023-07-14	59
51	Histogram of “OCRA “blue” reflectance” for 2023-07-13 to 2023-07-14	60
52	Histogram of “OCRA “green” reflectance” for 2023-07-13 to 2023-07-14	61
53	Histogram of “ROCINN “red” reflectance” for 2023-07-13 to 2023-07-14	62
54	Along track statistics of “QA value” for 2023-07-13 to 2023-07-14	63
55	Along track statistics of “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14	64
56	Along track statistics of “Cloud top height” for 2023-07-13 to 2023-07-14	65
57	Along track statistics of “Cloud optical thickness” for 2023-07-13 to 2023-07-14	66
58	Along track statistics of “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14	67
59	Along track statistics of “Cloud height (CRB)” for 2023-07-13 to 2023-07-14	68
60	Along track statistics of “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14	69
61	Along track statistics of “Fitted surface albedo” for 2023-07-13 to 2023-07-14	70
62	Along track statistics of “Fitted surface albedo (CRB)” for 2023-07-13 to 2023-07-14	71
63	Along track statistics of “RMS” for 2023-07-13 to 2023-07-14	72
64	Along track statistics of “RMS (CRB)” for 2023-07-13 to 2023-07-14	73
65	Along track statistics of “Fitting wavelength shift” for 2023-07-13 to 2023-07-14	74
66	Along track statistics of “OCRA cloud fraction” for 2023-07-13 to 2023-07-14	75
67	Along track statistics of “OCRA “blue” reflectance” for 2023-07-13 to 2023-07-14	76
68	Along track statistics of “OCRA “green” reflectance” for 2023-07-13 to 2023-07-14	77
69	Along track statistics of “ROCINN “red” reflectance” for 2023-07-13 to 2023-07-14	78
70	Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	79
71	Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	80
72	Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	81
73	Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.	82
74	Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.	83
75	Scatter density plot of “Radiometric cloud fraction” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.	84
76	Scatter density plot of “Radiometric cloud fraction” against “Cloud top height” for 2023-07-13 to 2023-07-14.	85
77	Scatter density plot of “Cloud fraction (CRB)” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	86
78	Scatter density plot of “Cloud fraction (CRB)” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	87
79	Scatter density plot of “Cloud fraction (CRB)” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.	88
80	Scatter density plot of “Cloud height (CRB)” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	89
81	Scatter density plot of “Cloud height (CRB)” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	90
82	Scatter density plot of “Cloud optical thickness” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	91
83	Scatter density plot of “Cloud optical thickness” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	92
84	Scatter density plot of “Cloud optical thickness” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.	93
85	Scatter density plot of “Cloud optical thickness” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.	94
86	Scatter density plot of “Cloud top height” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	95
87	Scatter density plot of “Cloud top height” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	96
88	Scatter density plot of “Cloud top height” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.	97
89	Scatter density plot of “Cloud top height” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.	98
90	Scatter density plot of “Cloud top height” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.	99
91	Scatter density plot of “Latitude” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	100
92	Scatter density plot of “Latitude” against “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14.	101

93	Scatter density plot of “Latitude” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	102
94	Scatter density plot of “Latitude” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.	103
95	Scatter density plot of “Latitude” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.	104
96	Scatter density plot of “Latitude” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.	105
97	Scatter density plot of “Latitude” against “Cloud top height” for 2023-07-13 to 2023-07-14.	106
98	Scatter density plot of “Solar zenith angle” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	107
99	Scatter density plot of “Solar zenith angle” against “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14.	108
100	Scatter density plot of “Solar zenith angle” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	109
101	Scatter density plot of “Solar zenith angle” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.	110
102	Scatter density plot of “Solar zenith angle” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.	111
103	Scatter density plot of “Solar zenith angle” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.	112
104	Scatter density plot of “Solar zenith angle” against “Cloud top height” for 2023-07-13 to 2023-07-14.	113
105	Scatter density plot of “Solar zenith angle” against “Latitude” for 2023-07-13 to 2023-07-14.	114
106	Scatter density plot of “Viewing zenith angle” against “Cloud albedo (CRB)” for 2023-07-13 to 2023-07-14.	115
107	Scatter density plot of “Viewing zenith angle” against “Radiometric cloud fraction” for 2023-07-13 to 2023-07-14.	116
108	Scatter density plot of “Viewing zenith angle” against “OCRA cloud fraction” for 2023-07-13 to 2023-07-14.	117
109	Scatter density plot of “Viewing zenith angle” against “Cloud fraction (CRB)” for 2023-07-13 to 2023-07-14.	118
110	Scatter density plot of “Viewing zenith angle” against “Cloud height (CRB)” for 2023-07-13 to 2023-07-14.	119
111	Scatter density plot of “Viewing zenith angle” against “Cloud optical thickness” for 2023-07-13 to 2023-07-14.	120
112	Scatter density plot of “Viewing zenith angle” against “Cloud top height” for 2023-07-13 to 2023-07-14.	121
113	Scatter density plot of “Viewing zenith angle” against “Latitude” for 2023-07-13 to 2023-07-14.	122
114	Scatter density plot of “Viewing zenith angle” against “Solar zenith angle” for 2023-07-13 to 2023-07-14.	123

List of Tables

1	Parameterlist and basic statistics for the analysis	2
2	Percentile ranges	3
3	Parameterlist and basic statistics for the analysis for observations in the northern hemisphere	4
4	Parameterlist and basic statistics for the analysis for observations in the southern hemisphere	5
5	Parameterlist and basic statistics for the analysis for observations over water	6
6	Parameterlist and basic statistics for the analysis for observations over land	7
7	Correlation matrix	8
8	Covariance matrix	9

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