

PyCAMA report generated by trop12-proc

trop12-proc

2023-09-19 (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]	0.649 ± 0.384	19671881	0.995	0.670	0.880	0.0	1.000
cloud fraction [1]	0.558 ± 0.353	19671881	0.995	0.755	0.541	7.661×10^{-3}	1.000
cloud top height [m]	$(0.384 \pm 0.281) \times 10^4$	19671881	1.425×10^3	3.607×10^3	3.106×10^3	0.0	2.000×10^4
cloud optical thickness [1]	24.2 ± 41.8	19671881	10.7	13.3	11.8	1.000	250
cloud fraction crb [1]	0.557 ± 0.353	19671881	0.995	0.755	0.538	8.258×10^{-3}	1.000
cloud height crb [m]	$(0.304 \pm 0.236) \times 10^4$	19671881	975	3.176×10^3	2.430×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.614 ± 0.186	19671881	0.995	0.216	0.594	0.0	1.000
surface albedo fitted [1]	0.168 ± 0.220	19671881	1.500×10^{-2}	0.207	4.975×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.154 ± 0.207	19671881	1.500×10^{-2}	0.209	3.452×10^{-2}	0.0	1.000
fitted root mean square [1]	$(6.084 \pm 7.408) \times 10^{-4}$	19671881	5.000×10^{-5}	6.935×10^{-4}	3.503×10^{-4}	1.757×10^{-6}	0.219
fitted root mean square crb [1]	$(5.412 \pm 7.173) \times 10^{-4}$	19671881	5.000×10^{-5}	6.059×10^{-4}	2.753×10^{-4}	1.270×10^{-6}	0.361
wavelength shift [nm]	$(8.238 \pm 6.877) \times 10^{-3}$	19671881	7.500×10^{-3}	9.289×10^{-3}	7.781×10^{-3}	-5.656×10^{-2}	0.144
cloud fraction apriori [1]	0.560 ± 0.360	19671881	0.995	0.795	0.544	0.0	1.000
reflectance blue ocra [1]	0.528 ± 0.207	19671881	0.285	0.328	0.502	0.124	1.92
reflectance green ocra [1]	0.476 ± 0.233	19671881	0.195	0.393	0.451	7.074×10^{-2}	1.92
reflectance continuum aband [1]	0.435 ± 0.257	19671881	4.500×10^{-2}	0.403	0.421	9.696×10^{-3}	4.95

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	0.0	0.0	0.0	2.000×10^{-2}	0.300	0.970	1.000	1.000	1.000	1.000
cloud fraction [1]	2.366×10^{-2}	6.018×10^{-2}	9.402×10^{-2}	0.135	0.214	0.969	1.000	1.000	1.000	1.000
cloud top height [m]	159	617	982	1.288×10^3	1.702×10^3	5.309×10^3	6.665×10^3	7.887×10^3	9.398×10^3	1.235×10^4
cloud optical thickness [1]	1.76	3.73	4.82	5.79	7.46	20.8	30.4	45.8	85.9	250
cloud fraction crb [1]	2.337×10^{-2}	5.924×10^{-2}	9.327×10^{-2}	0.134	0.212	0.968	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	294	582	832	1.183×10^3	4.360×10^3	5.517×10^3	6.554×10^3	7.816×10^3	9.821×10^3
cloud albedo crb [1]	0.130	0.323	0.411	0.459	0.503	0.719	0.801	0.881	0.998	1.000
surface albedo fitted [1]	0.0	9.035×10^{-3}	1.333×10^{-2}	1.718×10^{-2}	2.292×10^{-2}	0.230	0.345	0.564	0.684	0.878
surface albedo fitted crb [1]	6.087×10^{-4}	6.808×10^{-3}	9.751×10^{-3}	1.241×10^{-2}	1.633×10^{-2}	0.225	0.339	0.530	0.629	0.810
fitted root mean square [1]	1.643×10^{-5}	3.328×10^{-5}	5.470×10^{-5}	8.334×10^{-5}	1.347×10^{-4}	8.282×10^{-4}	1.164×10^{-3}	1.509×10^{-3}	2.025×10^{-3}	3.224×10^{-3}
fitted root mean square crb [1]	9.857×10^{-6}	2.428×10^{-5}	4.123×10^{-5}	6.277×10^{-5}	1.024×10^{-4}	7.083×10^{-4}	1.054×10^{-3}	1.424×10^{-3}	1.965×10^{-3}	3.141×10^{-3}
wavelength shift [nm]	-7.682×10^{-3}	-7.380×10^{-4}	3.958×10^{-4}	1.526×10^{-3}	3.321×10^{-3}	1.261×10^{-2}	1.497×10^{-2}	1.707×10^{-2}	1.992×10^{-2}	2.612×10^{-2}
cloud fraction apriori [1]	1.569×10^{-2}	5.726×10^{-2}	8.690×10^{-2}	0.126	0.205	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.228	0.256	0.280	0.307	0.352	0.679	0.753	0.808	0.881	1.05
reflectance green ocra [1]	0.150	0.173	0.194	0.218	0.263	0.656	0.737	0.797	0.872	1.02
reflectance continuum aband [1]	3.128×10^{-2}	5.791×10^{-2}	9.315×10^{-2}	0.140	0.223	0.626	0.712	0.781	0.863	1.01

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]	0.650 ± 0.378	10963792	0.650	0.860	0.0	1.000	0.300	0.950
cloud fraction [1]	0.584 ± 0.357	10963792	0.772	0.599	7.661×10^{-3}	1.000	0.225	0.997
cloud top height [m]	$(0.392 \pm 0.276) \times 10^4$	10963792	3.717×10^3	3.333×10^3	0.0	2.000×10^4	1.780×10^3	5.498×10^3
cloud optical thickness [1]	21.7 ± 35.0	10963792	12.9	11.7	1.000	250	7.48	20.4
cloud fraction crb [1]	0.582 ± 0.358	10963792	0.773	0.597	8.258×10^{-3}	1.000	0.223	0.996
cloud height crb [m]	$(0.314 \pm 0.235) \times 10^4$	10963792	3.213×10^3	2.656×10^3	0.0	2.000×10^4	1.270×10^3	4.483×10^3
cloud albedo crb [1]	0.605 ± 0.179	10963792	0.215	0.593	0.0	1.000	0.499	0.714
surface albedo fitted [1]	0.168 ± 0.197	10963792	0.214	7.784×10^{-2}	0.0	1.000	2.567×10^{-2}	0.240
surface albedo fitted crb [1]	0.159 ± 0.191	10963792	0.216	5.856×10^{-2}	0.0	1.000	1.829×10^{-2}	0.234
fitted root mean square [1]	$(6.632 \pm 8.115) \times 10^{-4}$	10963792	7.627×10^{-4}	3.825×10^{-4}	1.757×10^{-6}	0.219	1.470×10^{-4}	9.096×10^{-4}
fitted root mean square crb [1]	$(6.302 \pm 8.095) \times 10^{-4}$	10963792	7.582×10^{-4}	3.330×10^{-4}	1.270×10^{-6}	0.361	1.171×10^{-4}	8.753×10^{-4}
wavelength shift [nm]	$(8.321 \pm 6.691) \times 10^{-3}$	10963792	8.906×10^{-3}	7.929×10^{-3}	-5.656×10^{-2}	0.144	3.645×10^{-3}	1.255×10^{-2}
cloud fraction apriori [1]	0.586 ± 0.363	10963792	0.783	0.605	0.0	1.000	0.217	1.000
reflectance blue ocra [1]	0.514 ± 0.198	10963792	0.313	0.493	0.124	1.92	0.344	0.657
reflectance green ocra [1]	0.465 ± 0.223	10963792	0.376	0.445	7.074×10^{-2}	1.92	0.259	0.634
reflectance continuum aband [1]	0.439 ± 0.246	10963792	0.371	0.423	9.696×10^{-3}	4.95	0.245	0.616

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]	0.648 ± 0.390	8708089	0.690	0.900	0.0	1.000	0.300	0.990
cloud fraction [1]	0.527 ± 0.345	8708089	0.700	0.478	7.692×10^{-3}	1.000	0.202	0.902
cloud top height [m]	$(0.373 \pm 0.287) \times 10^4$	8708089	3.406×10^3	2.827×10^3	0.0	2.000×10^4	1.639×10^3	5.045×10^3
cloud optical thickness [1]	27.4 ± 48.8	8708089	13.9	11.9	1.000	250	7.43	21.3
cloud fraction crb [1]	0.525 ± 0.345	8708089	0.699	0.475	8.497×10^{-3}	1.000	0.201	0.900
cloud height crb [m]	$(0.292 \pm 0.236) \times 10^4$	8708089	3.064×10^3	2.139×10^3	0.0	2.000×10^4	1.114×10^3	4.178×10^3
cloud albedo crb [1]	0.625 ± 0.193	8708089	0.218	0.595	0.0	1.000	0.509	0.727
surface albedo fitted [1]	0.167 ± 0.246	8708089	0.175	3.703×10^{-2}	0.0	1.000	2.086×10^{-2}	0.196
surface albedo fitted crb [1]	0.149 ± 0.226	8708089	0.175	2.559×10^{-2}	0.0	1.000	1.478×10^{-2}	0.190
fitted root mean square [1]	$(5.395 \pm 6.341) \times 10^{-4}$	8708089	6.163×10^{-4}	3.156×10^{-4}	1.903×10^{-6}	4.863×10^{-2}	1.200×10^{-4}	7.362×10^{-4}
fitted root mean square crb [1]	$(4.291 \pm 5.611) \times 10^{-4}$	8708089	4.447×10^{-4}	2.272×10^{-4}	2.173×10^{-6}	2.955×10^{-2}	8.889×10^{-5}	5.336×10^{-4}
wavelength shift [nm]	$(8.134 \pm 7.103) \times 10^{-3}$	8708089	9.755×10^{-3}	7.569×10^{-3}	-5.035×10^{-2}	6.246×10^{-2}	2.935×10^{-3}	1.269×10^{-2}
cloud fraction apriori [1]	0.527 ± 0.352	8708089	0.733	0.477	0.0	1.000	0.193	0.926
reflectance blue ocra [1]	0.546 ± 0.216	8708089	0.350	0.513	0.150	1.91	0.362	0.712
reflectance green ocra [1]	0.490 ± 0.244	8708089	0.418	0.460	8.960×10^{-2}	1.85	0.268	0.686
reflectance continuum aband [1]	0.430 ± 0.270	8708089	0.445	0.418	1.266×10^{-2}	4.64	0.194	0.639

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]	0.658 ± 0.375	14127105	0.610	0.880	0.0	1.000	0.350	0.960
cloud fraction [1]	0.557 ± 0.351	14127105	0.743	0.541	7.692×10^{-3}	1.000	0.216	0.959
cloud top height [m]	$(0.368 \pm 0.268) \times 10^4$	14127105	3.411×10^3	2.957×10^3	0.0	2.000×10^4	1.645×10^3	5.056×10^3
cloud optical thickness [1]	25.7 ± 43.2	14127105	13.5	12.6	1.000	250	8.30	21.8
cloud fraction crb [1]	0.555 ± 0.351	14127105	0.743	0.538	8.506×10^{-3}	1.000	0.214	0.957
cloud height crb [m]	$(0.291 \pm 0.230) \times 10^4$	14127105	3.060×10^3	2.277×10^3	0.0	2.000×10^4	1.106×10^3	4.166×10^3
cloud albedo crb [1]	0.603 ± 0.178	14127105	0.200	0.586	0.0	1.000	0.499	0.699
surface albedo fitted [1]	0.113 ± 0.196	14127105	4.296×10^{-2}	3.150×10^{-2}	0.0	1.000	1.855×10^{-2}	6.150×10^{-2}
surface albedo fitted crb [1]	$(9.925 \pm 18.331) \times 10^{-2}$	14127105	2.962×10^{-2}	2.200×10^{-2}	0.0	1.000	1.333×10^{-2}	4.295×10^{-2}
fitted root mean square [1]	$(5.081 \pm 6.801) \times 10^{-4}$	14127105	5.654×10^{-4}	2.590×10^{-4}	1.757×10^{-6}	0.219	1.020×10^{-4}	6.675×10^{-4}
fitted root mean square crb [1]	$(4.486 \pm 6.494) \times 10^{-4}$	14127105	4.554×10^{-4}	2.032×10^{-4}	1.270×10^{-6}	0.223	8.137×10^{-5}	5.367×10^{-4}
wavelength shift [nm]	$(7.897 \pm 7.045) \times 10^{-3}$	14127105	9.414×10^{-3}	7.256×10^{-3}	-5.656×10^{-2}	0.144	2.893×10^{-3}	1.231×10^{-2}
cloud fraction apriori [1]	0.557 ± 0.358	14127105	0.791	0.543	0.0	1.000	0.206	0.997
reflectance blue ocr [1]	0.522 ± 0.193	14127105	0.307	0.500	0.160	1.92	0.358	0.664
reflectance green ocr [1]	0.465 ± 0.219	14127105	0.371	0.446	8.457×10^{-2}	1.85	0.265	0.636
reflectance continuum aband [1]	0.399 ± 0.254	14127105	0.429	0.390	9.696×10^{-3}	4.95	0.165	0.594

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]	0.580 ± 0.421	3760310	0.930	0.830	0.0	1.000	2.000×10^{-2}	0.950
cloud fraction [1]	0.519 ± 0.355	3760310	0.763	0.450	7.875×10^{-3}	1.000	0.180	0.943
cloud top height [m]	$(0.461 \pm 0.328) \times 10^4$	3760310	4.363×10^3	3.905×10^3	0.0	2.000×10^4	2.085×10^3	6.448×10^3
cloud optical thickness [1]	19.7 ± 38.6	3760310	10.2	8.96	1.000	250	5.52	15.7
cloud fraction crb [1]	0.519 ± 0.355	3760310	0.762	0.449	8.258×10^{-3}	1.000	0.179	0.942
cloud height crb [m]	$(0.366 \pm 0.260) \times 10^4$	3760310	3.711×10^3	3.020×10^3	0.0	2.000×10^4	1.587×10^3	5.297×10^3
cloud albedo crb [1]	0.658 ± 0.210	3760310	0.285	0.639	0.0	1.000	0.525	0.810
surface albedo fitted [1]	0.361 ± 0.233	3760310	0.201	0.261	6.561×10^{-3}	1.000	0.205	0.406
surface albedo fitted crb [1]	0.344 ± 0.211	3760310	0.198	0.255	5.189×10^{-3}	1.000	0.200	0.397
fitted root mean square [1]	$(9.527 \pm 8.504) \times 10^{-4}$	3760310	8.694×10^{-4}	7.122×10^{-4}	2.699×10^{-6}	0.135	3.857×10^{-4}	1.255×10^{-3}
fitted root mean square crb [1]	$(8.362 \pm 8.669) \times 10^{-4}$	3760310	8.304×10^{-4}	5.923×10^{-4}	2.073×10^{-6}	0.361	2.804×10^{-4}	1.111×10^{-3}
wavelength shift [nm]	$(8.963 \pm 6.259) \times 10^{-3}$	3760310	8.524×10^{-3}	8.771×10^{-3}	-4.889×10^{-2}	4.722×10^{-2}	4.521×10^{-3}	1.304×10^{-2}
cloud fraction apriori [1]	0.525 ± 0.362	3760310	0.826	0.457	0.0	1.000	0.174	1.000
reflectance blue ocra [1]	0.555 ± 0.258	3760310	0.447	0.508	0.124	1.91	0.322	0.769
reflectance green ocra [1]	0.514 ± 0.281	3760310	0.514	0.471	7.074×10^{-2}	1.92	0.247	0.761
reflectance continuum aband [1]	0.543 ± 0.245	3760310	0.408	0.508	1.651×10^{-2}	3.42	0.330	0.738

Table 7: Correlation matrix

Viewing zenith angle	Solar zenith angle	Latitude	Radiometric cloud fraction	Cloud top height	Cloud optical thickness	Cloud fraction (CRB)	Cloud height (CRB)	Cloud albedo (CRB)	OCRA cloud fraction
1.000	2.290×10^{-2}	-1.119×10^{-2}	2.612×10^{-2}	7.673×10^{-2}	-1.205×10^{-2}	2.557×10^{-2}	0.117	8.247×10^{-2}	2.415×10^{-2}
2.290×10^{-2}	1.000	-4.118×10^{-2}	0.213	7.226×10^{-3}	0.244	0.214	-1.122×10^{-2}	0.169	0.214
-1.119×10^{-2}	-4.118×10^{-2}	1.000	0.109	-6.554×10^{-2}	-7.895×10^{-2}	0.109	-5.598×10^{-2}	-0.132	0.111
2.612×10^{-2}	0.213	0.109	1.000	-7.945×10^{-2}	0.241	1.000	-9.601×10^{-3}	0.160	0.991
7.673×10^{-2}	7.226×10^{-3}	-6.554×10^{-2}	-7.945×10^{-2}	1.000	0.102	-7.897×10^{-2}	0.954	0.222	-8.398×10^{-2}
-1.205×10^{-2}	0.244	-7.895×10^{-2}	0.241	0.102	1.000	0.236	0.127	0.484	0.240
2.557×10^{-2}	0.214	0.109	1.000	-7.897×10^{-2}	0.236	1.000	-9.297×10^{-3}	0.159	0.992
0.117	-1.122×10^{-2}	-5.598×10^{-2}	-9.601×10^{-3}	0.954	0.127	-9.297×10^{-3}	1.000	0.164	-1.403×10^{-2}
8.247×10^{-2}	0.169	-0.132	0.160	0.222	0.484	0.159	0.164	1.000	0.168
2.415×10^{-2}	0.214	0.111	0.991	-8.398×10^{-2}	0.240	0.992	-1.403×10^{-2}	0.168	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
386	9.40	-11.3	0.181	4.231×10^3	-9.89	0.177	5.418×10^3	0.301	0.171
9.40	436	-44.0	1.57	424	213	1.58	-553	0.656	1.60
-11.3	-44.0	2.622×10^3	1.97	-9.420×10^3	-169	1.97	-6.761×10^3	-1.25	2.04
0.181	1.57	1.97	0.125	-78.7	3.56	0.125	-7.99	1.050×10^{-2}	0.126
4.231×10^3	424	-9.420×10^3	-78.7	7.880×10^6	1.202×10^4	-78.3	6.318×10^6	116	-84.8
-9.89	213	-169	3.56	1.202×10^4	1.746×10^3	3.49	1.254×10^4	3.75	3.61
0.177	1.58	1.97	0.125	-78.3	3.49	0.125	-7.75	1.041×10^{-2}	0.126
5.418×10^3	-553	-6.761×10^3	-7.99	6.318×10^6	1.254×10^4	-7.75	5.564×10^6	72.0	-11.9
0.301	0.656	-1.25	1.050×10^{-2}	116	3.75	1.041×10^{-2}	72.0	3.442×10^{-2}	1.119×10^{-2}
0.171	1.60	2.04	0.126	-84.8	3.61	0.126	-11.9	1.119×10^{-2}	0.129

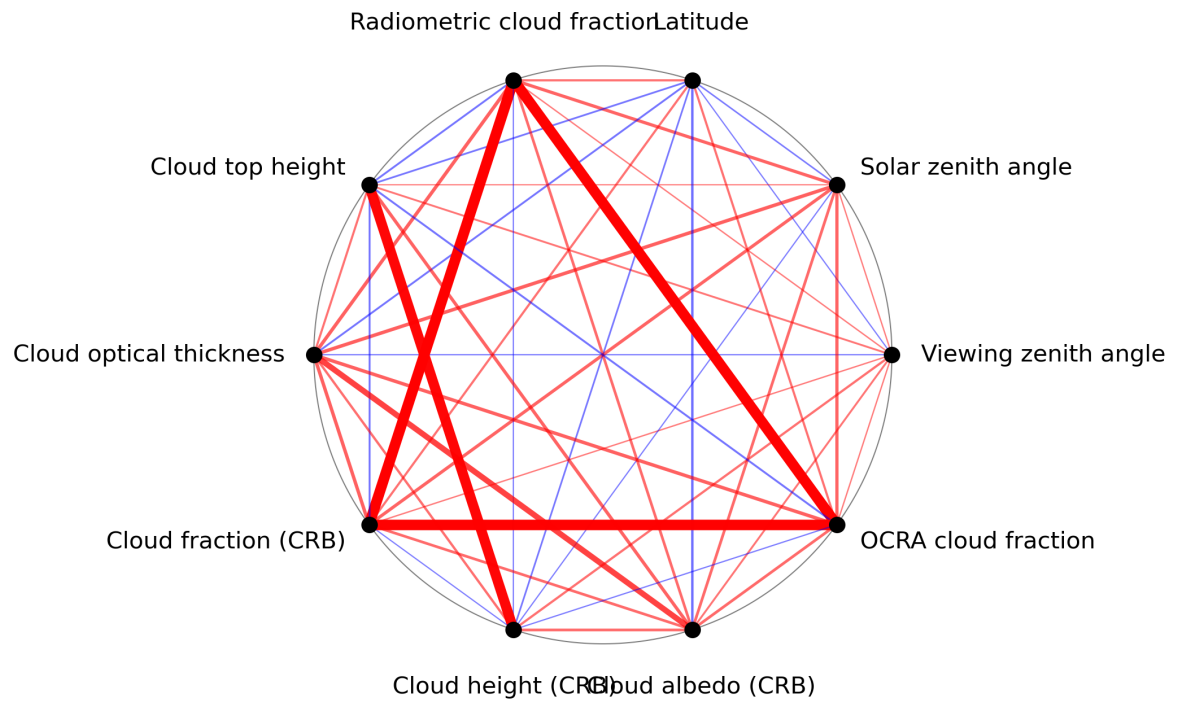


Figure 1: Map of correlation graph for 2023-09-04 to 2023-09-05.

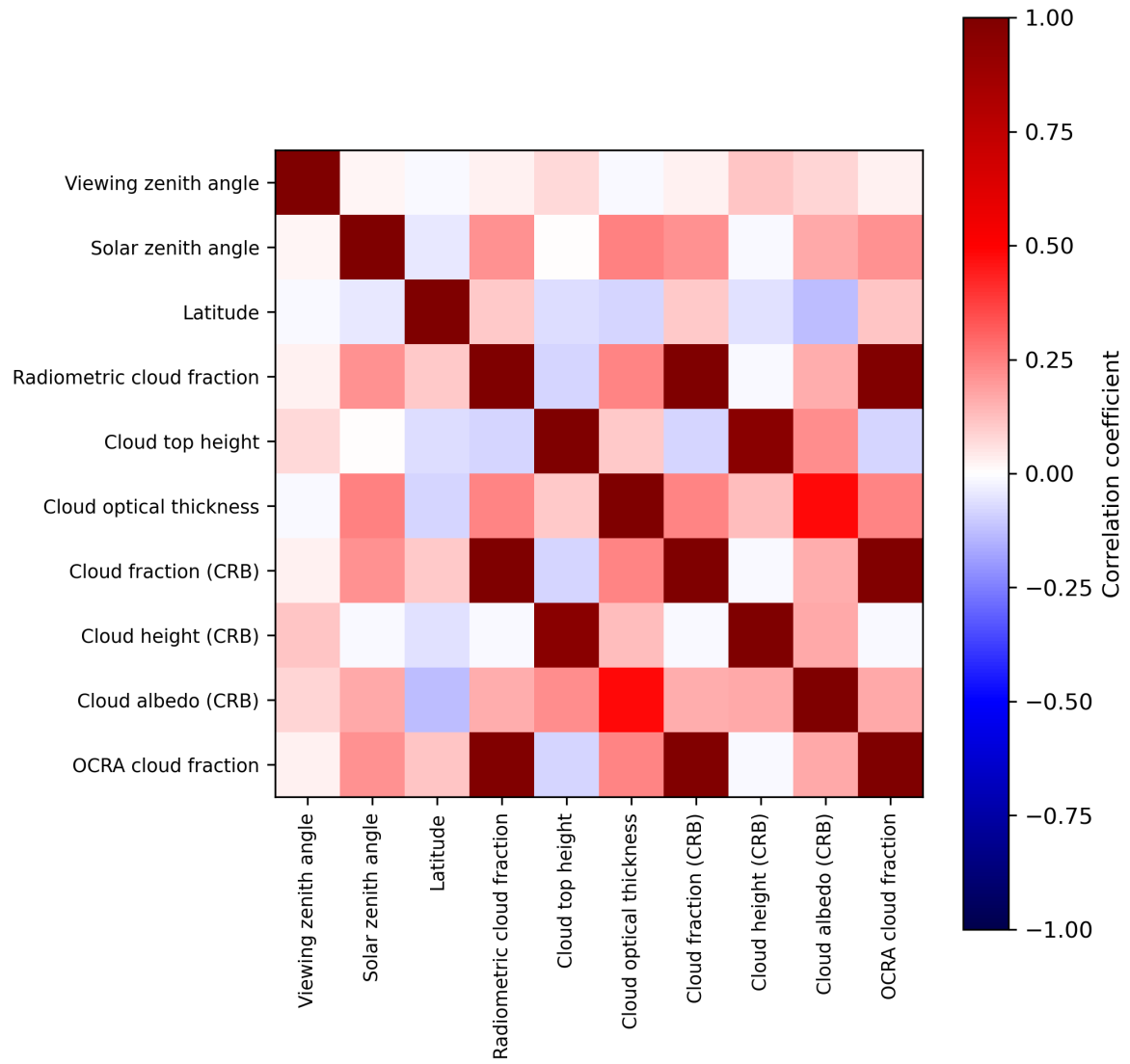


Figure 2: Map of correlation matrix for 2023-09-04 to 2023-09-05.

3 Granule outlines

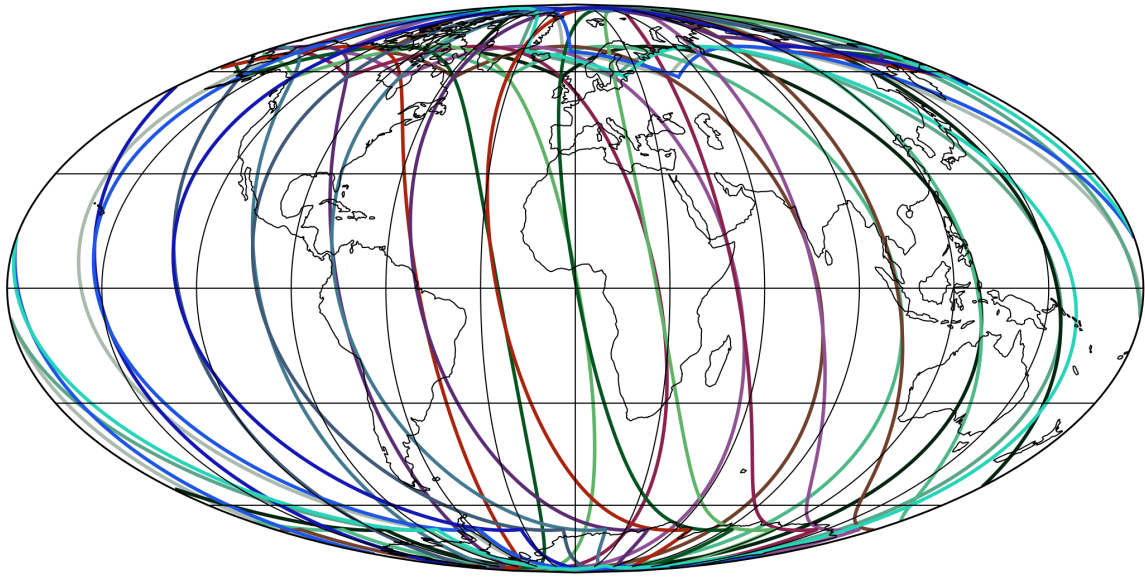


Figure 3: Outline of the granules.

4 Input data monitoring

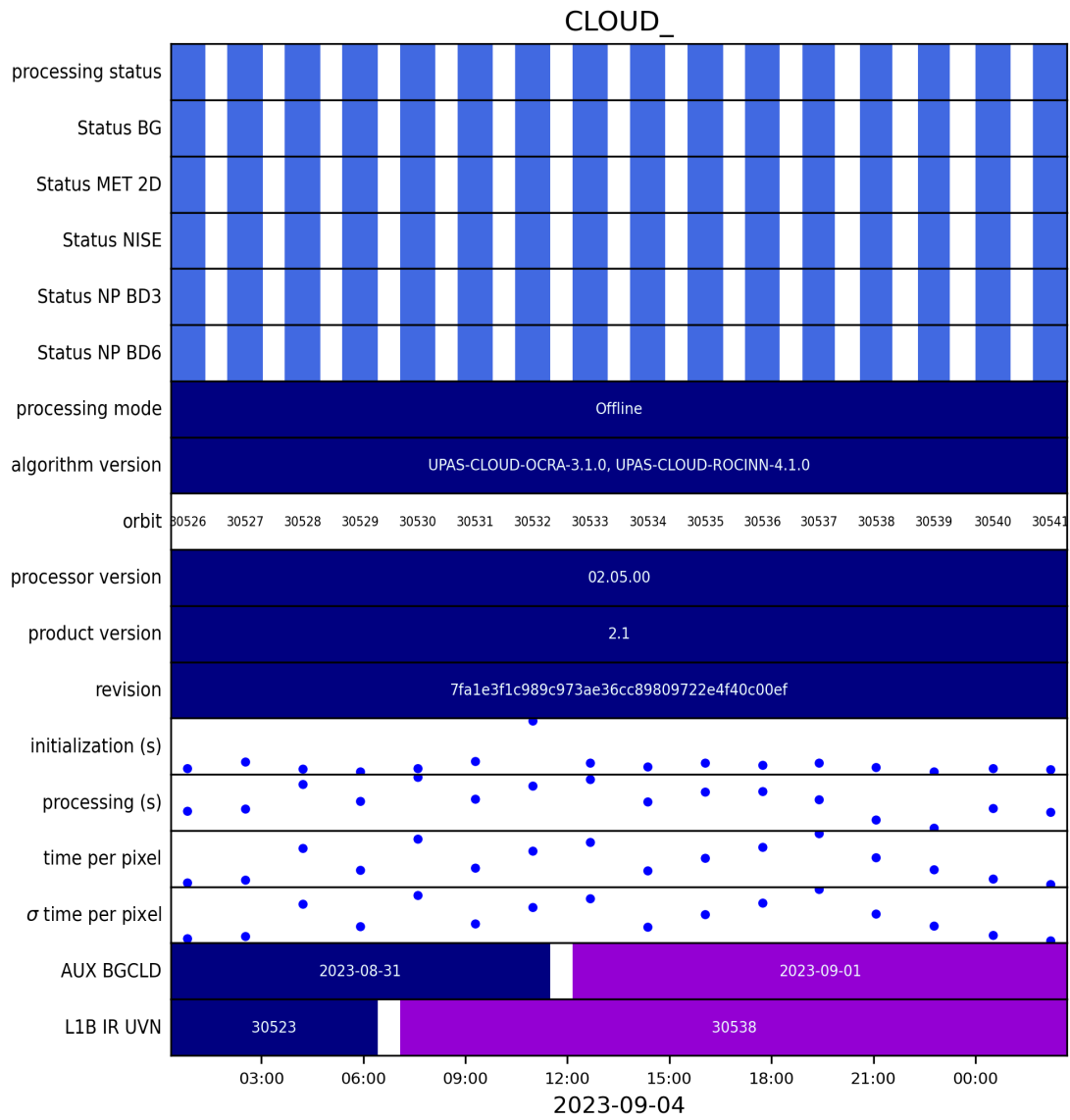


Figure 4: Input data per granule

5 Warnings and errors

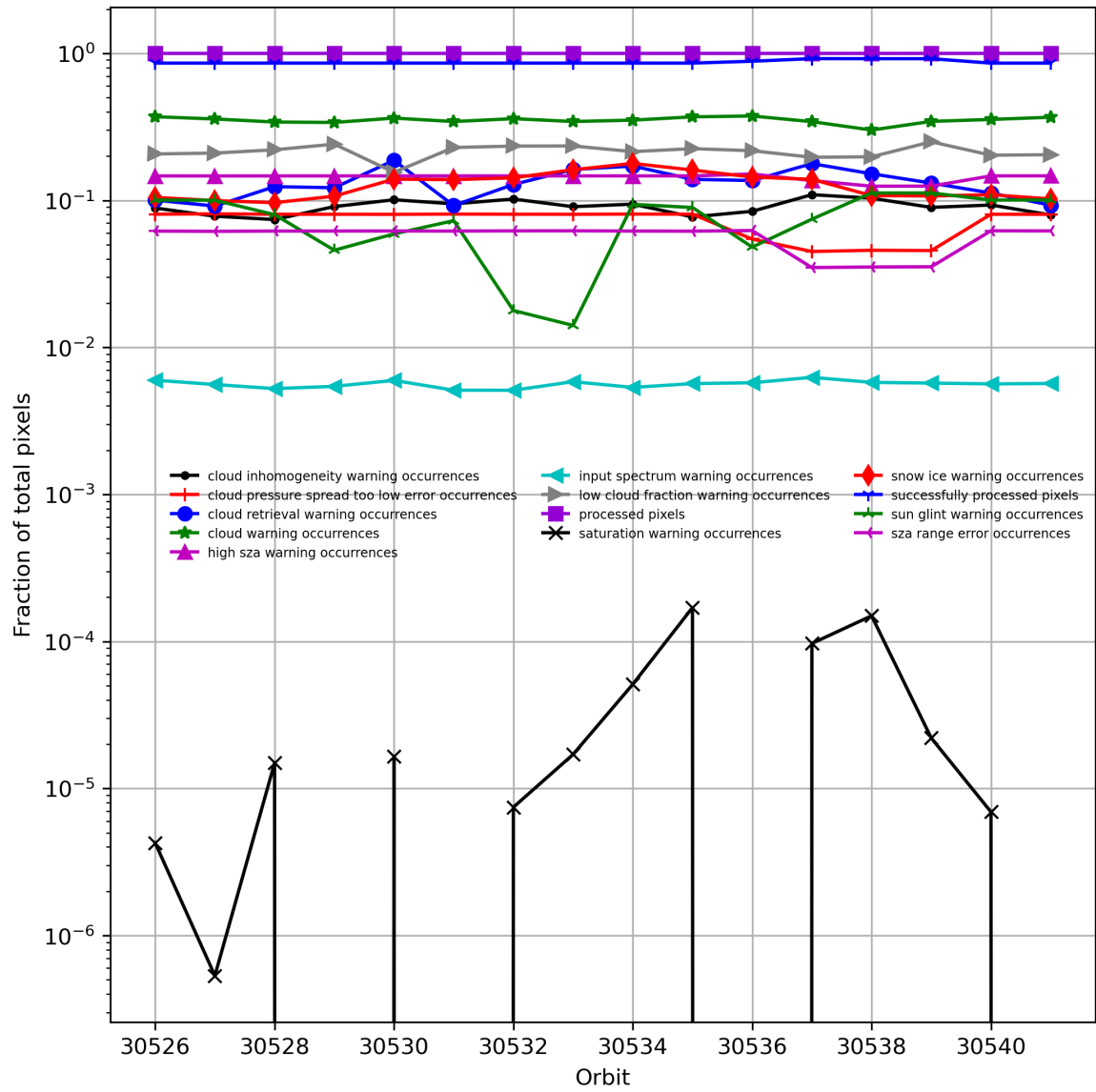


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

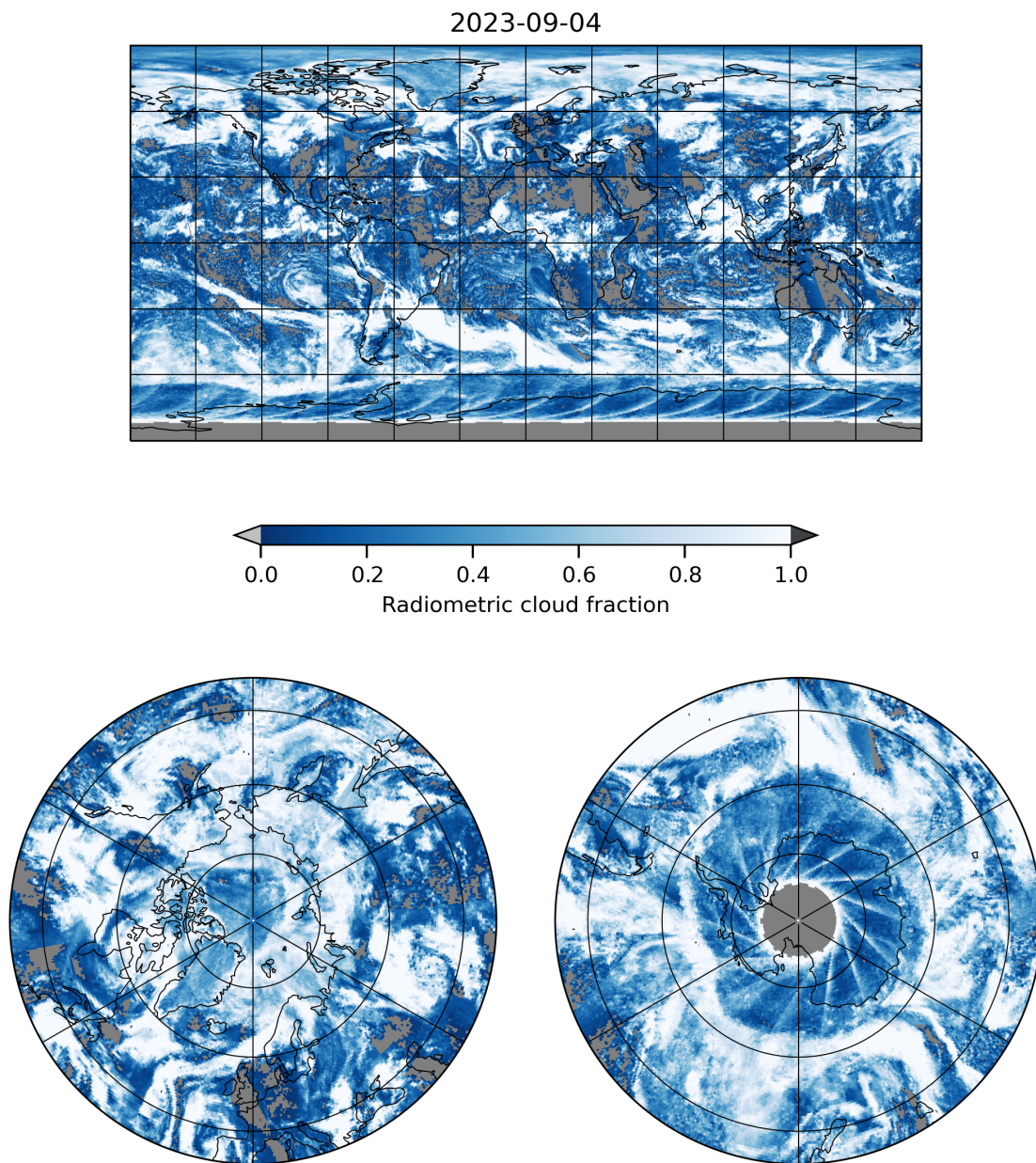


Figure 6: Map of “Radiometric cloud fraction” for 2023-09-04 to 2023-09-05

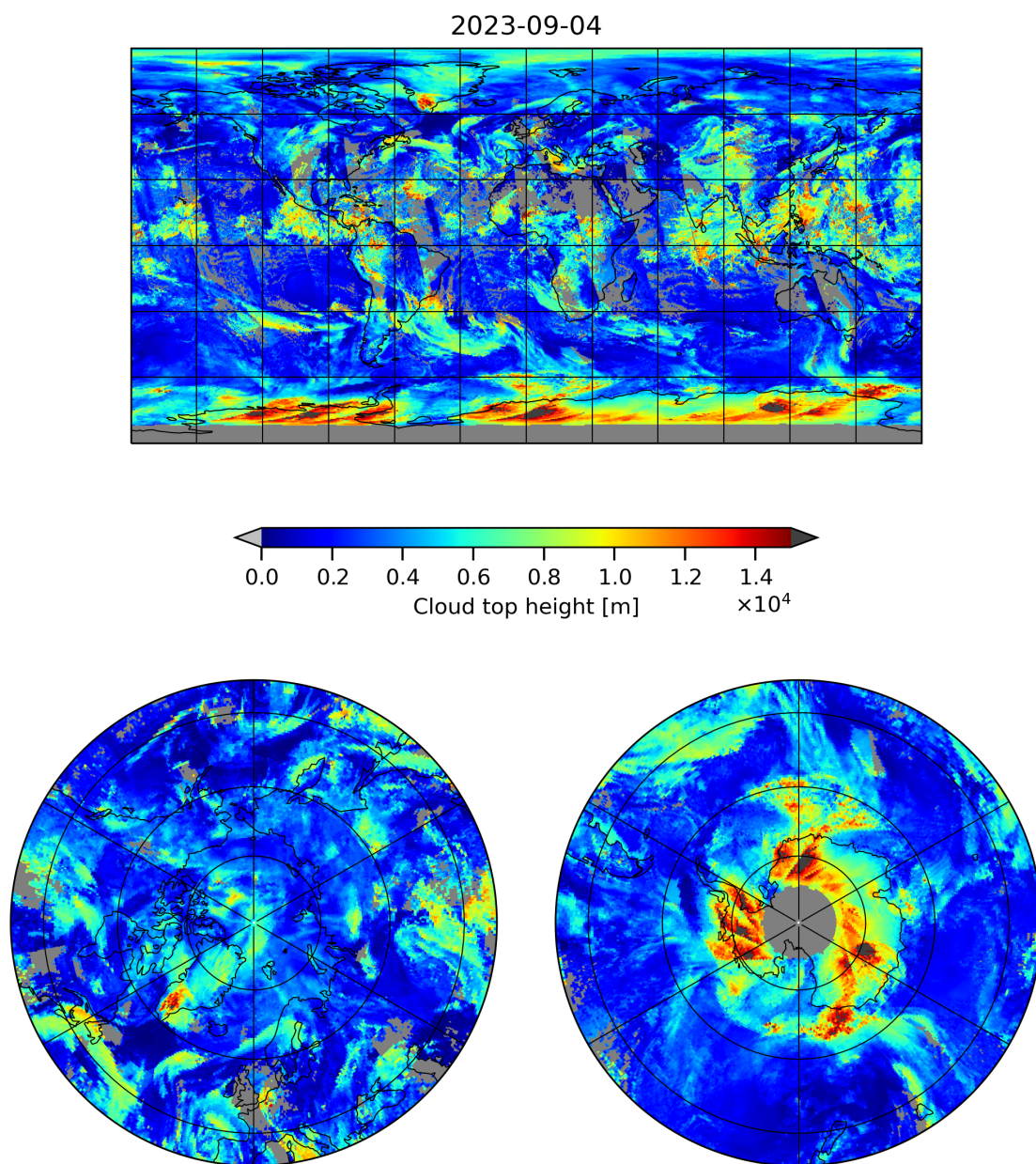


Figure 7: Map of “Cloud top height” for 2023-09-04 to 2023-09-05

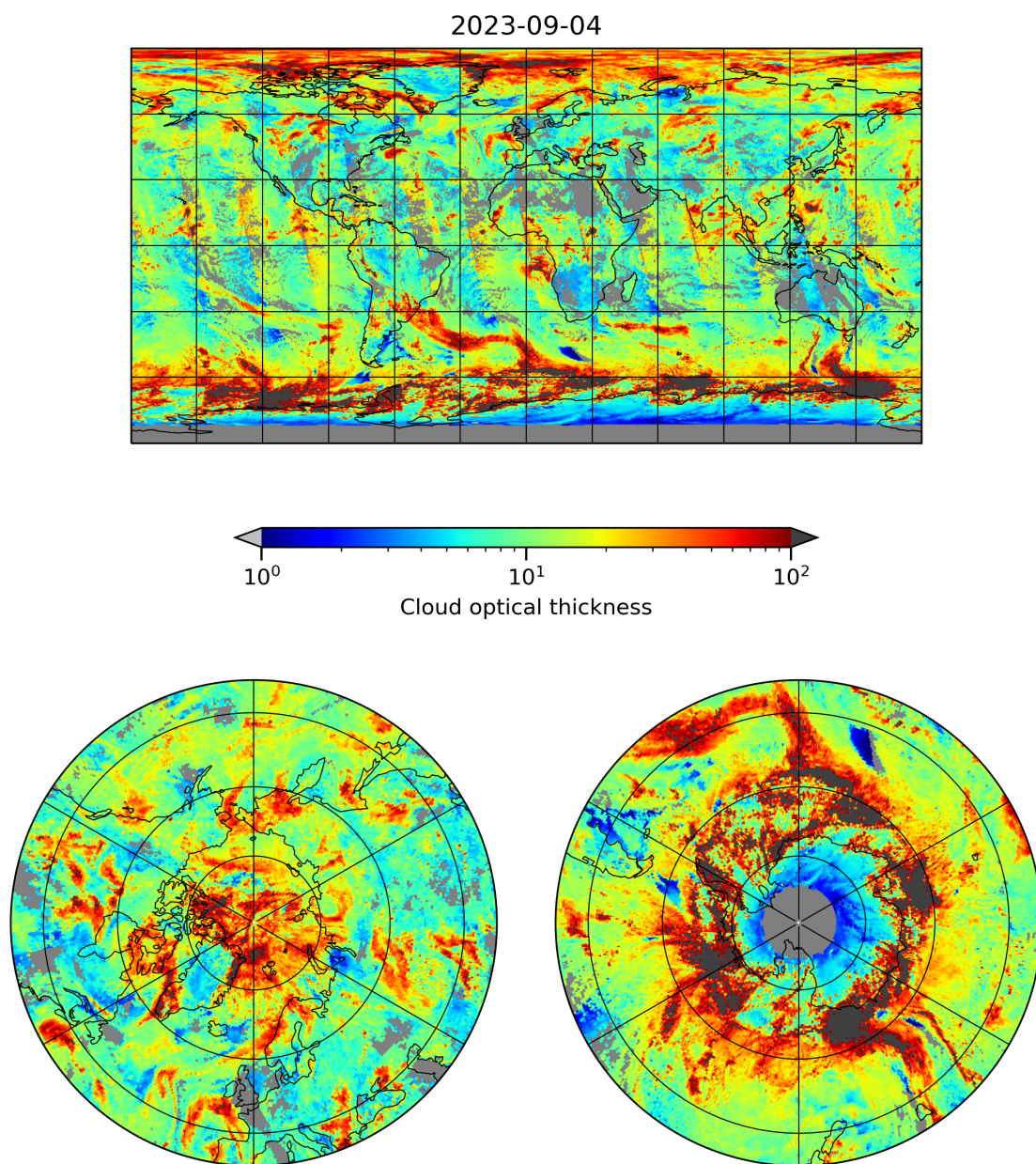


Figure 8: Map of “Cloud optical thickness” for 2023-09-04 to 2023-09-05

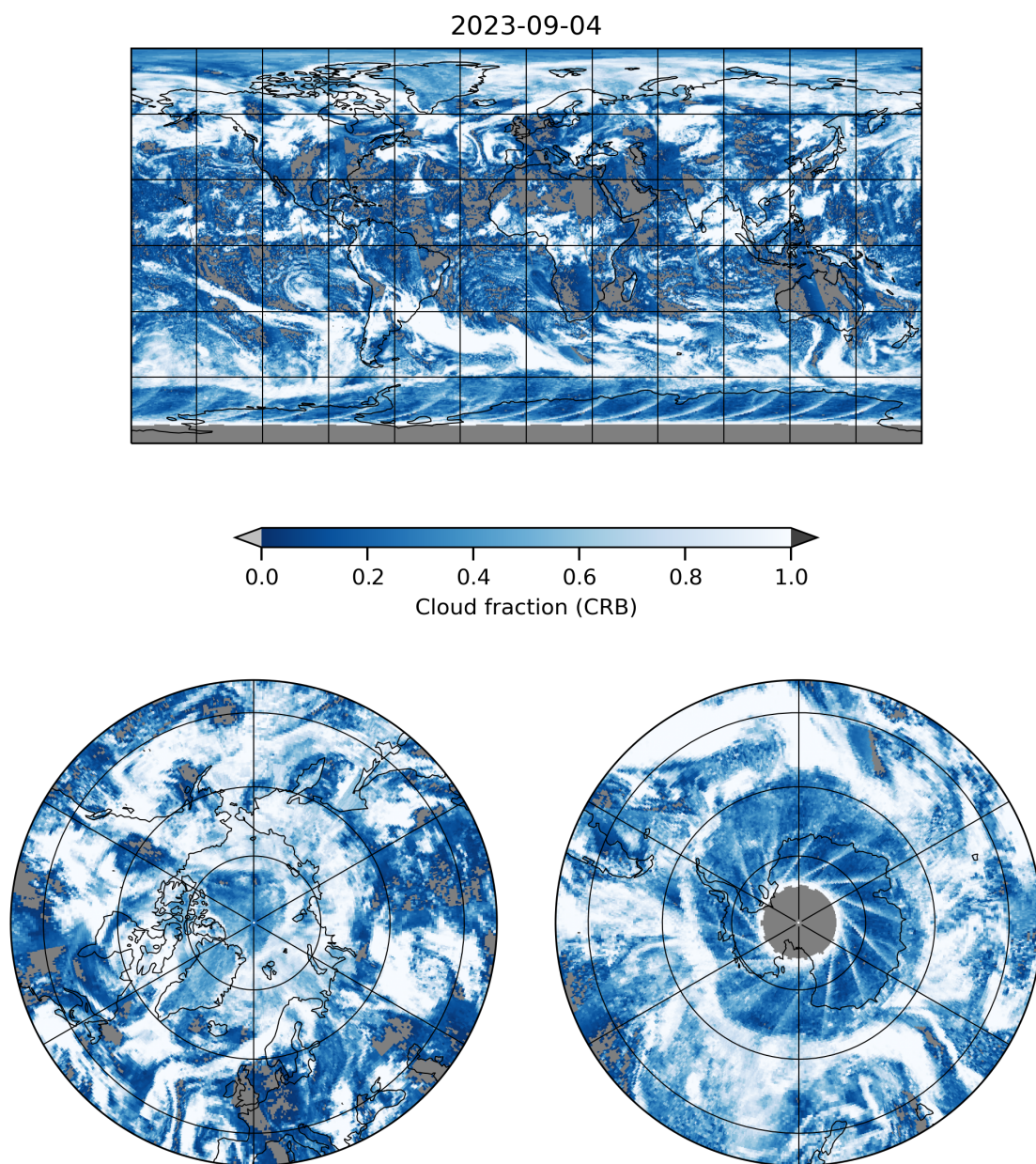


Figure 9: Map of “Cloud fraction (CRB)” for 2023-09-04 to 2023-09-05

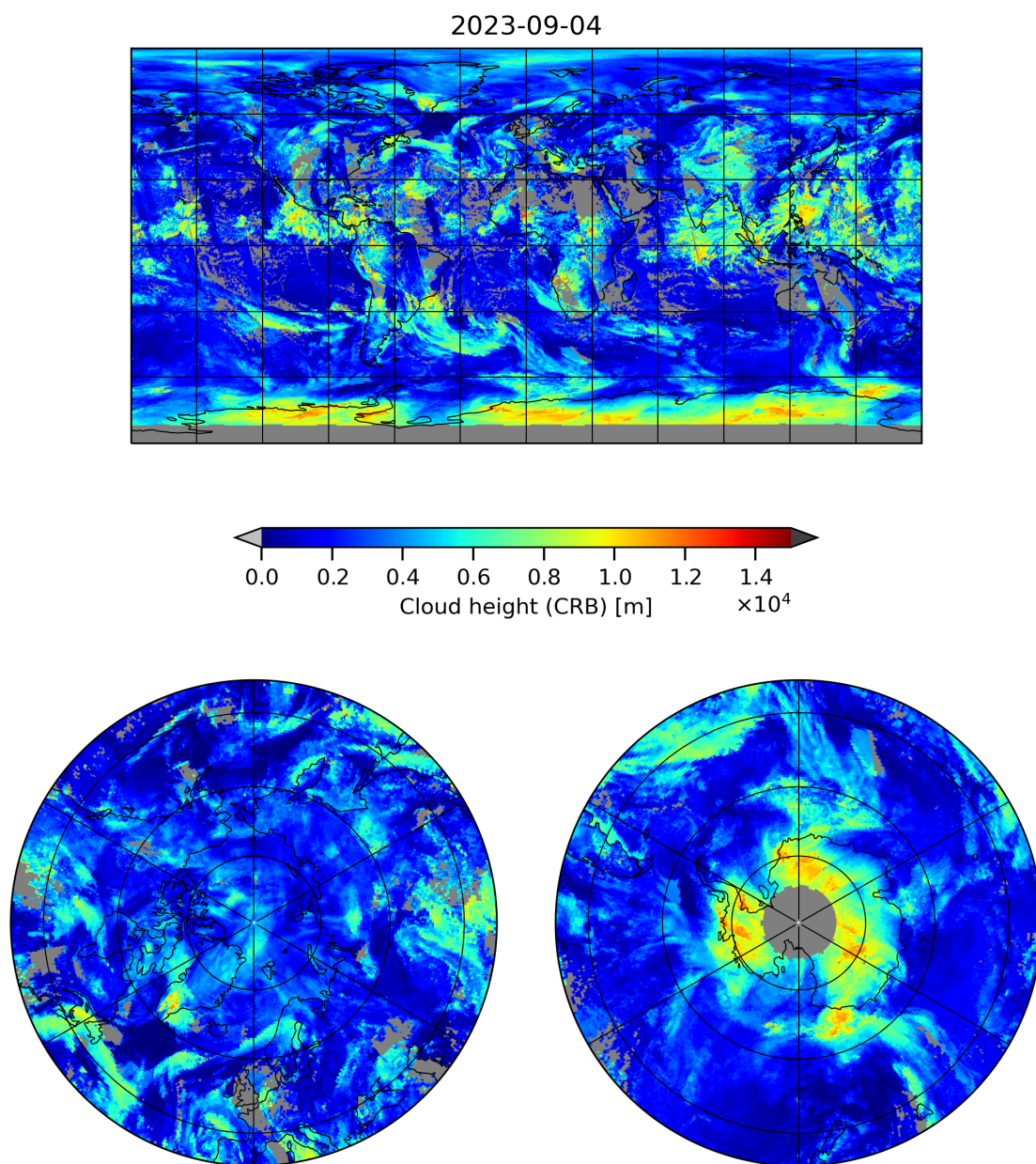


Figure 10: Map of “Cloud height (CRB)” for 2023-09-04 to 2023-09-05

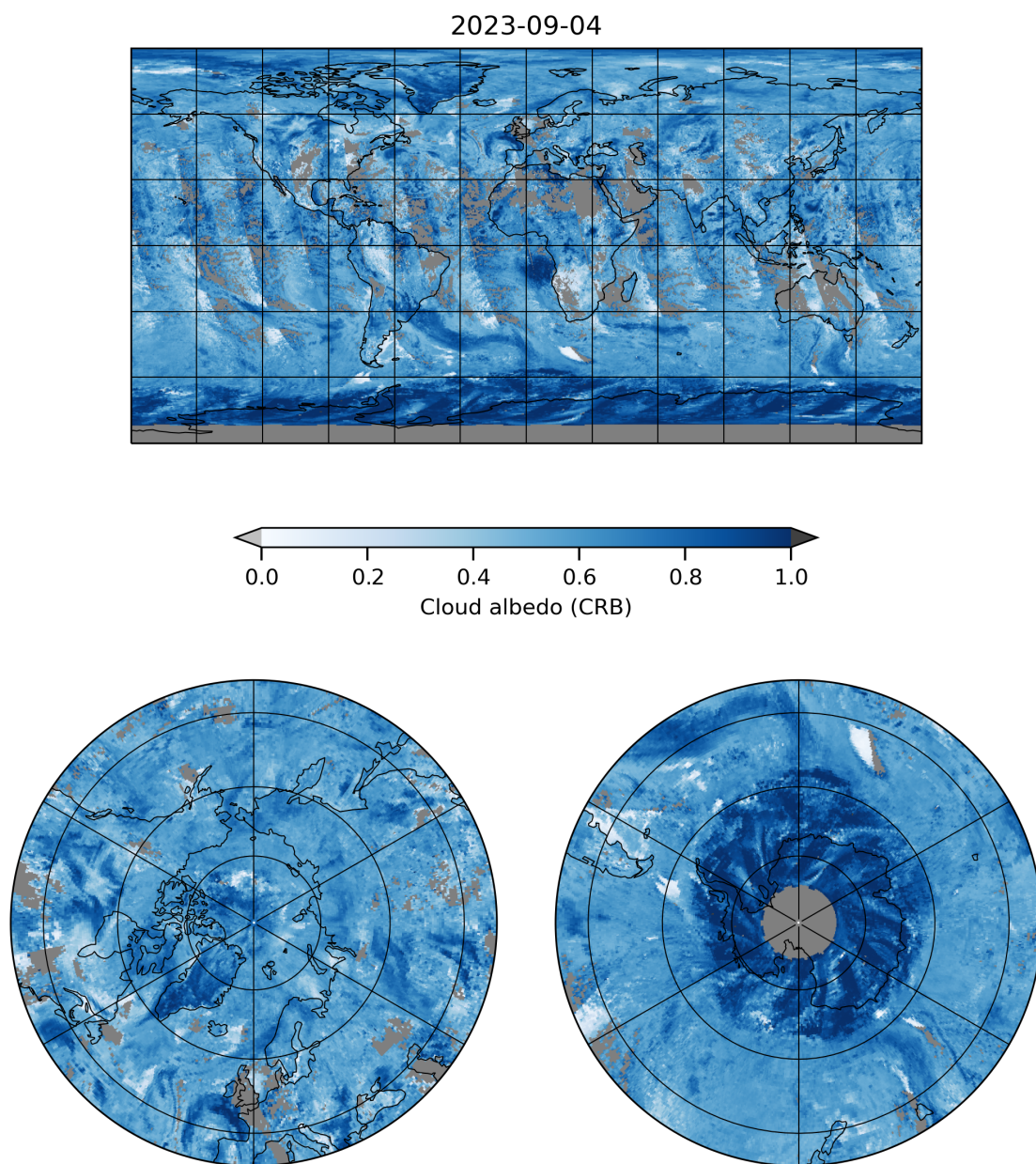


Figure 11: Map of “Cloud albedo (CRB)” for 2023-09-04 to 2023-09-05

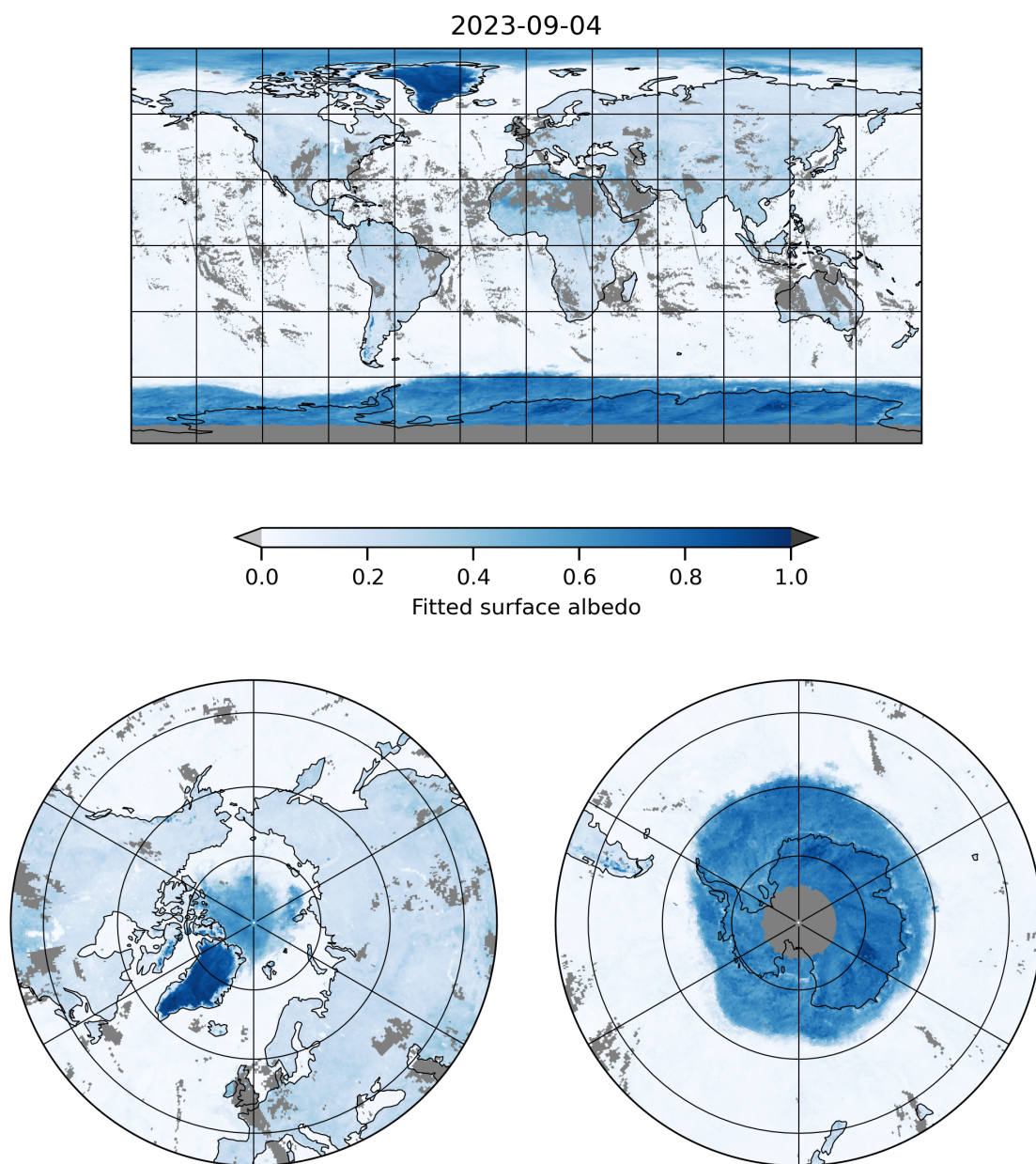


Figure 12: Map of “Fitted surface albedo” for 2023-09-04 to 2023-09-05

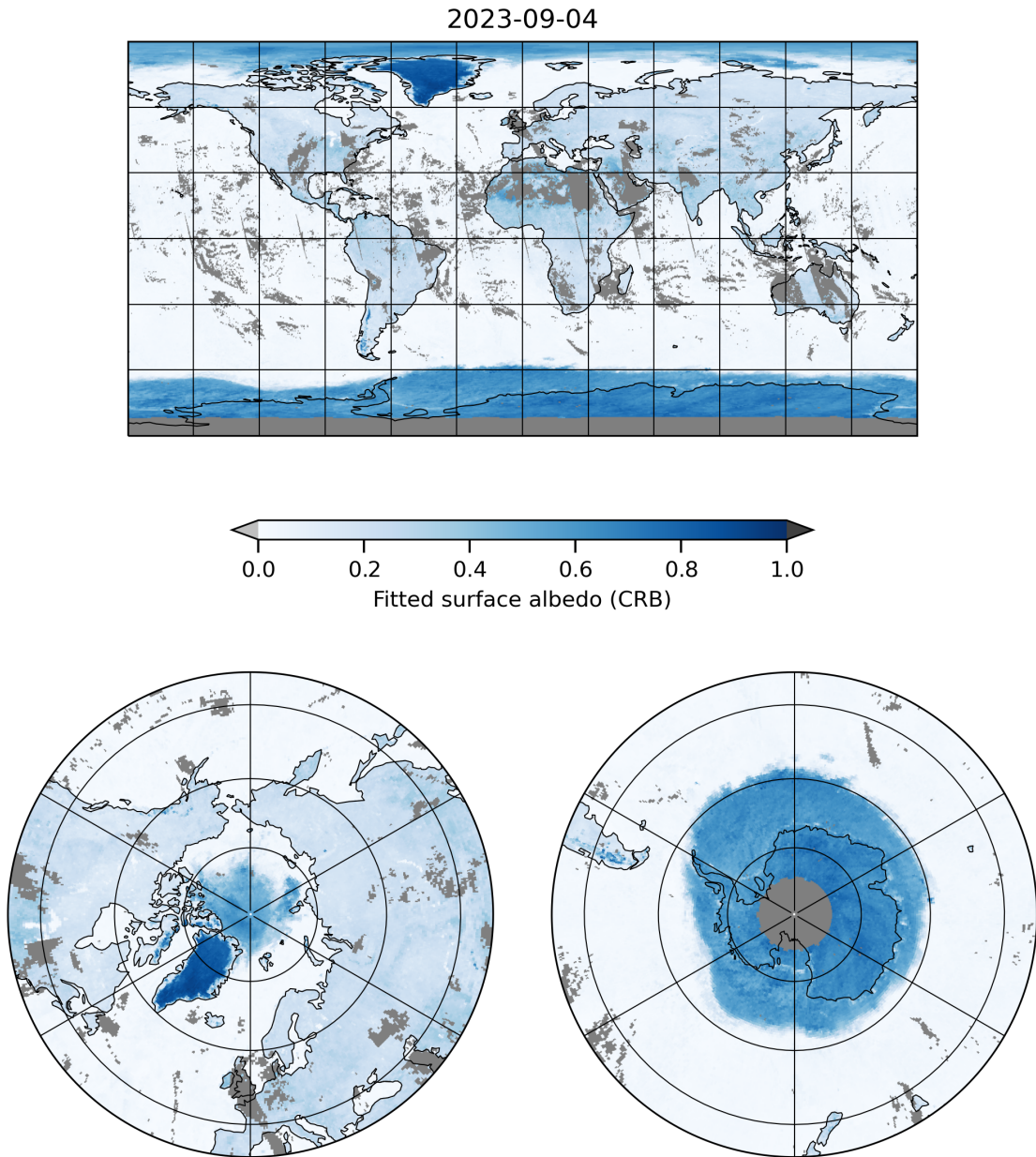


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-09-04 to 2023-09-05

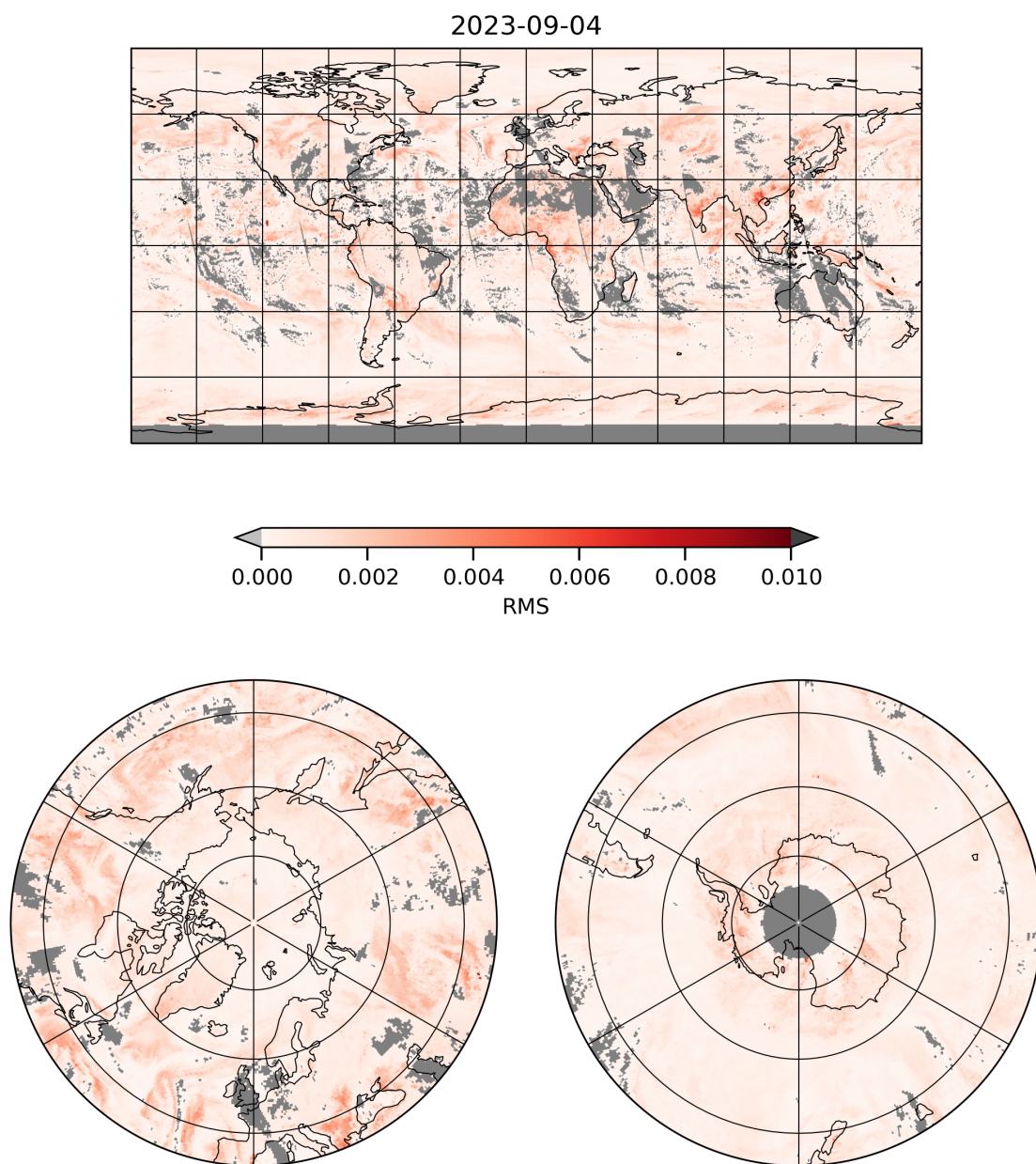


Figure 14: Map of “RMS” for 2023-09-04 to 2023-09-05

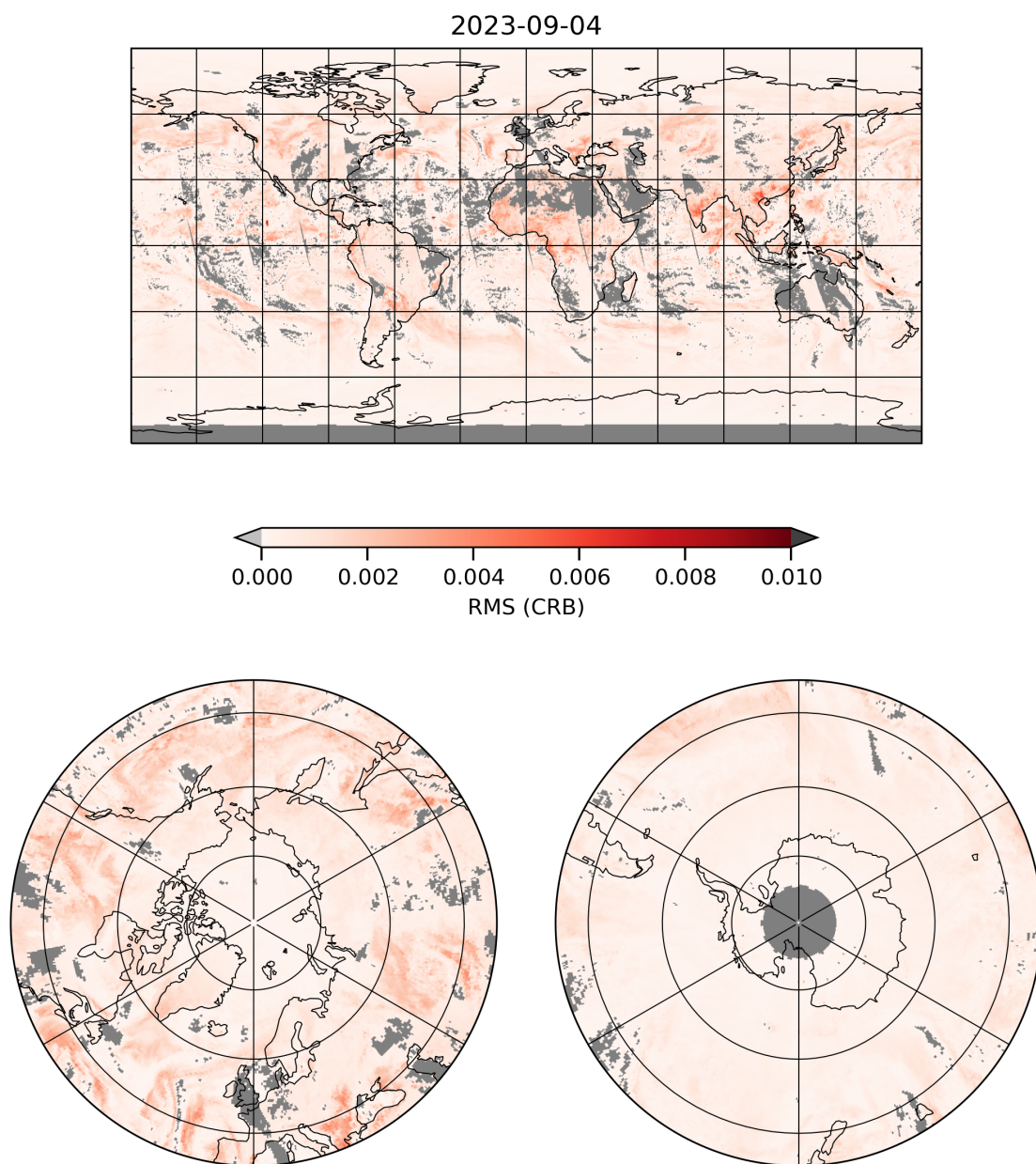


Figure 15: Map of “RMS (CRB)” for 2023-09-04 to 2023-09-05

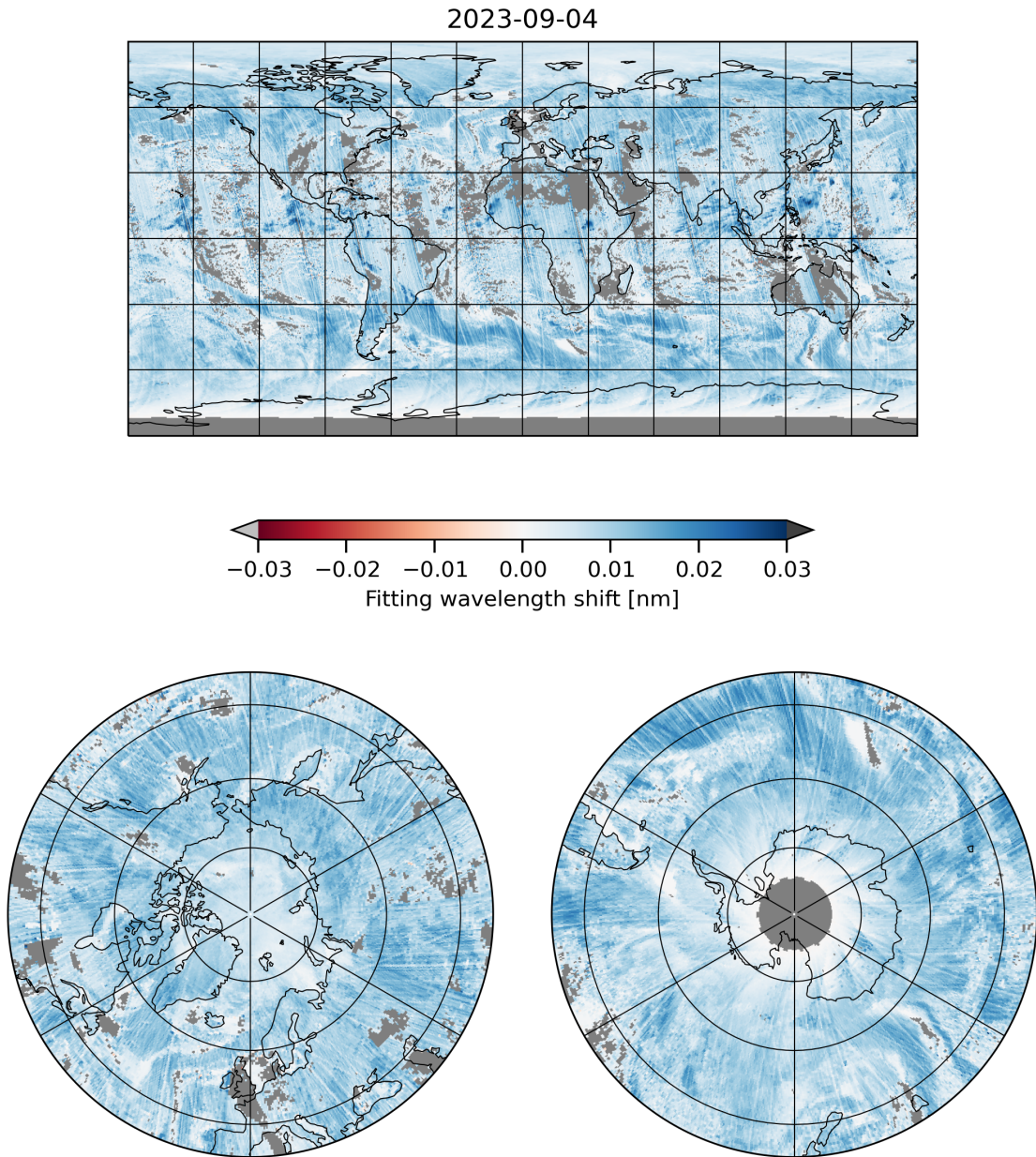


Figure 16: Map of “Fitting wavelength shift” for 2023-09-04 to 2023-09-05

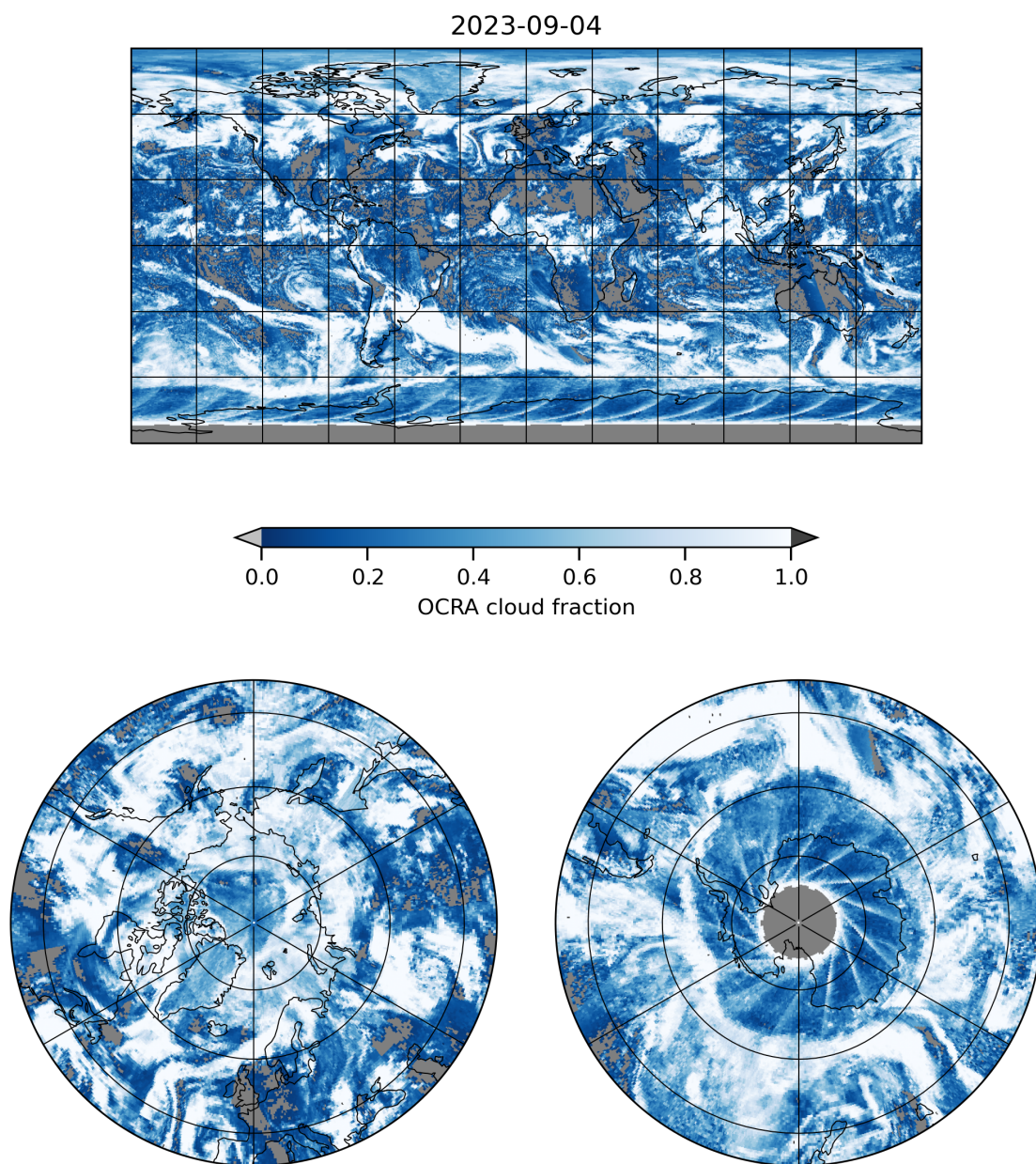


Figure 17: Map of “OCRA cloud fraction” for 2023-09-04 to 2023-09-05

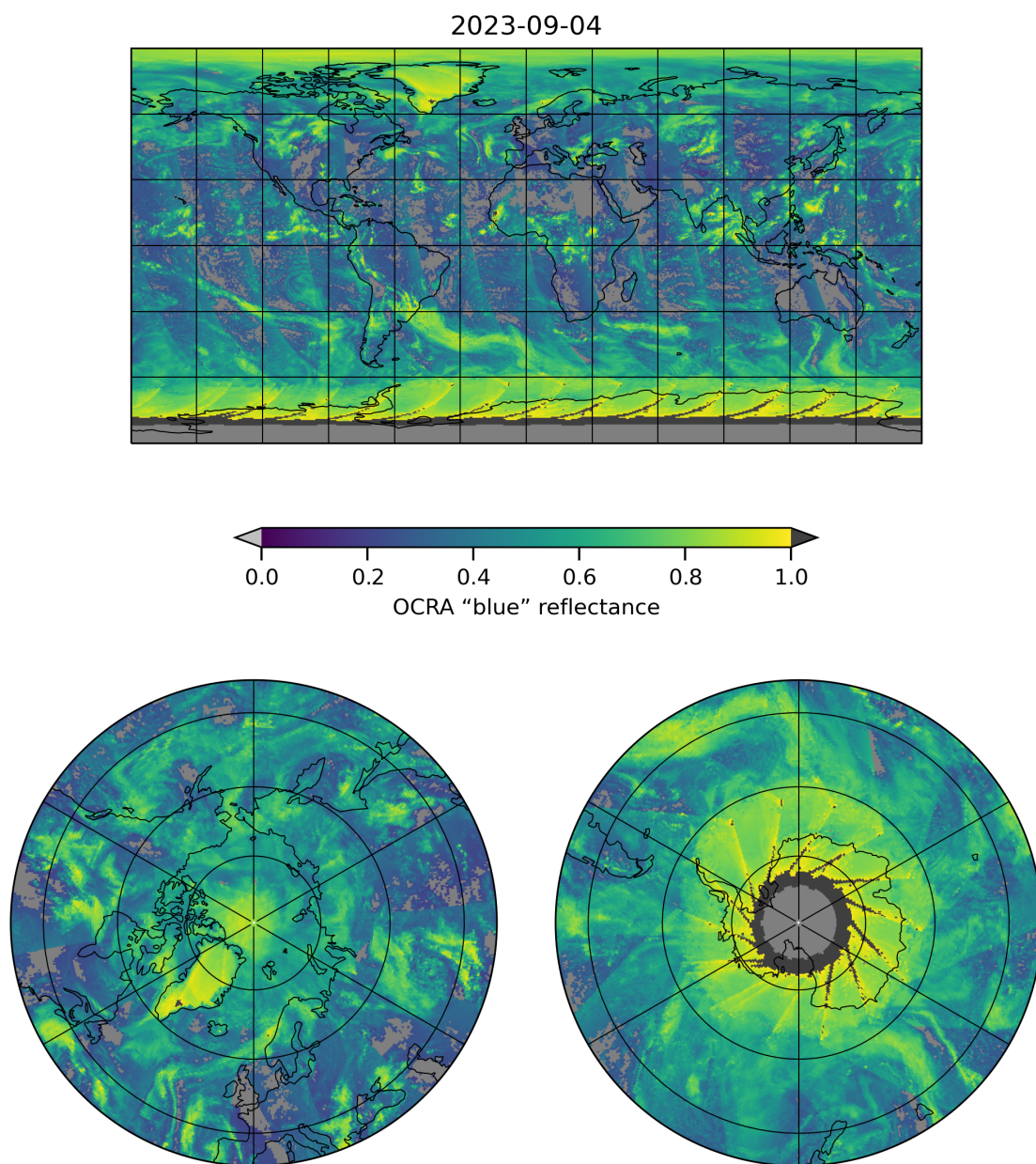


Figure 18: Map of "OCRA "blue" reflectance" for 2023-09-04 to 2023-09-05

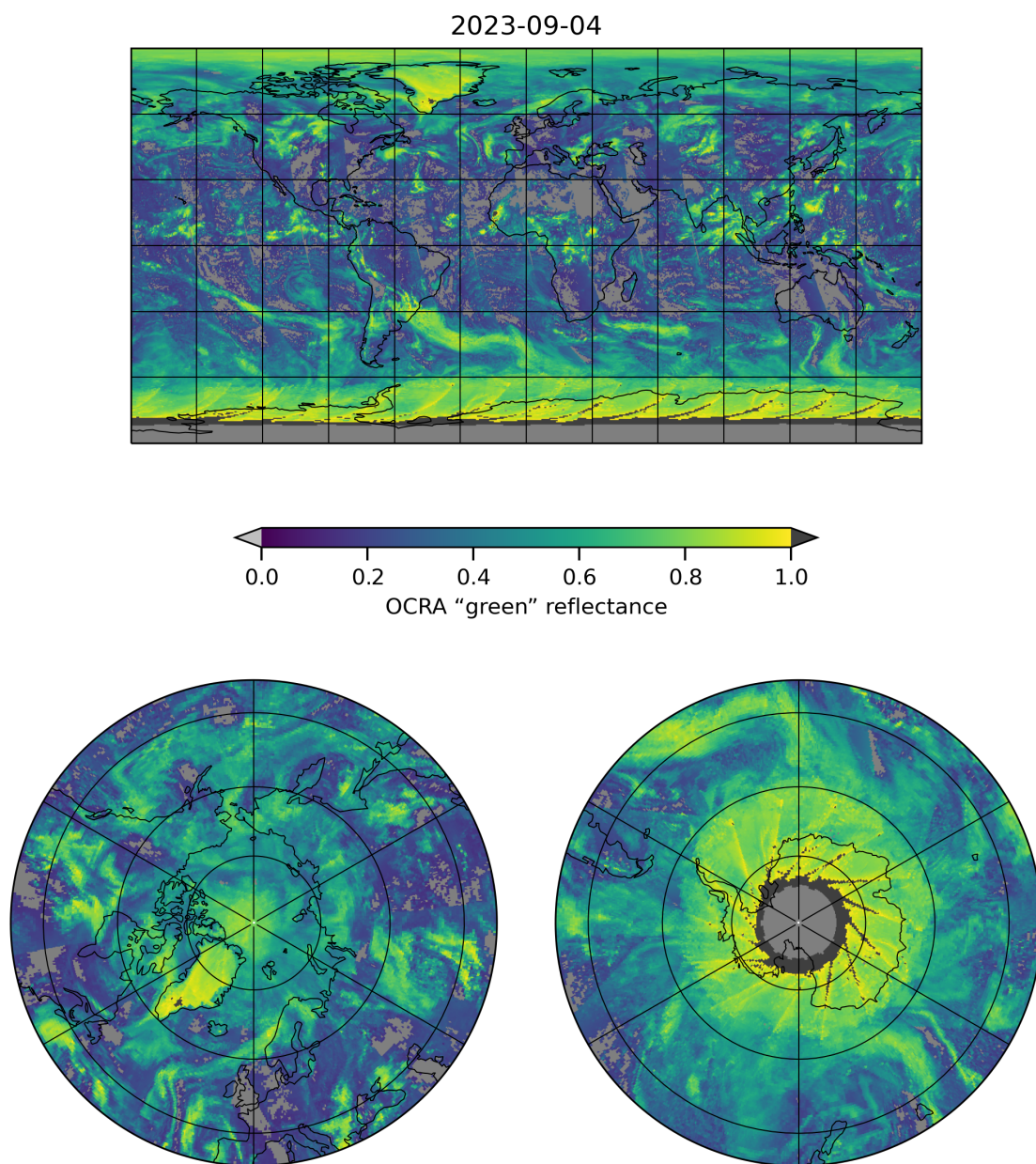


Figure 19: Map of "OCRA "green" reflectance" for 2023-09-04 to 2023-09-05

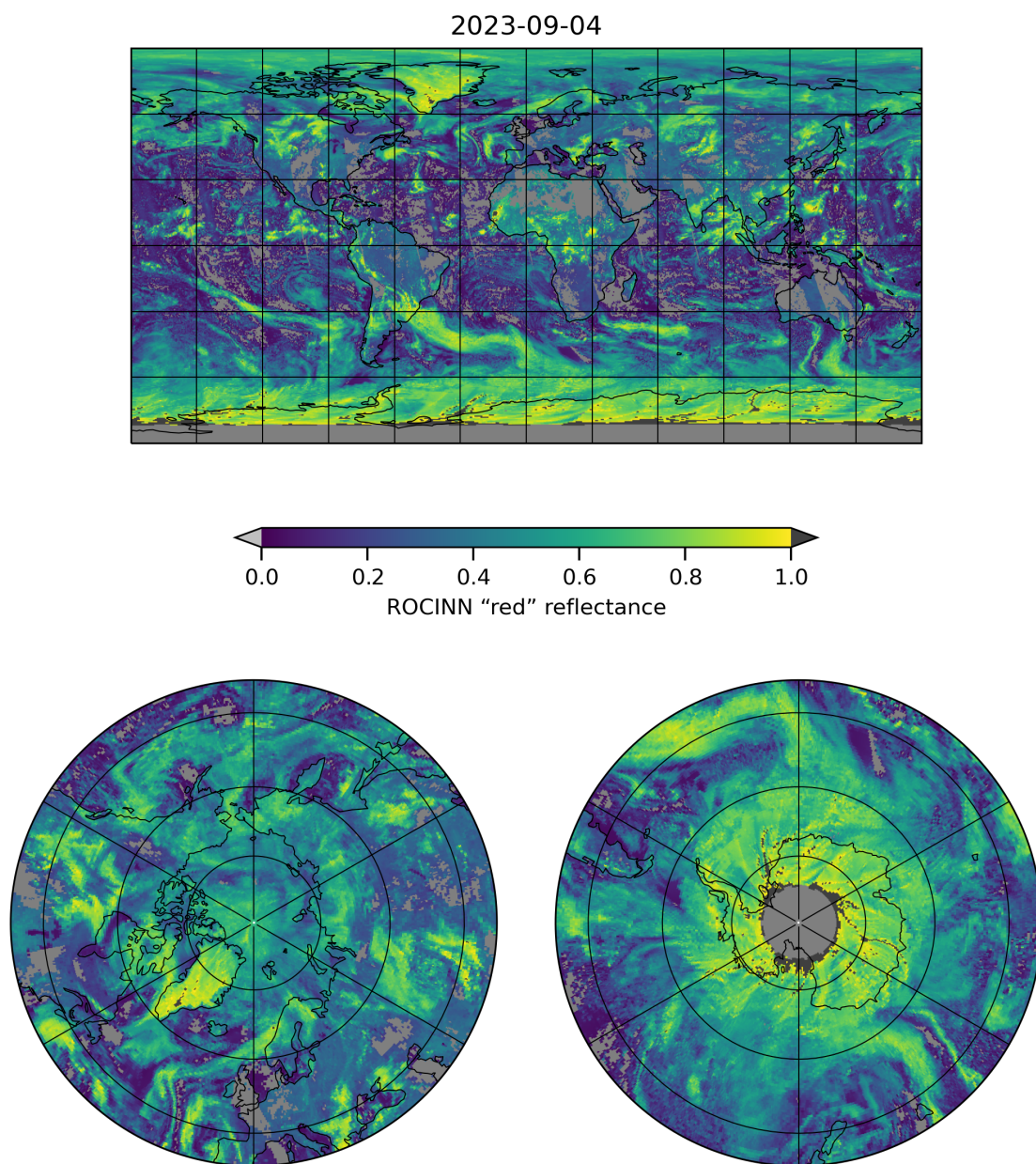


Figure 20: Map of "ROCINN "red" reflectance" for 2023-09-04 to 2023-09-05

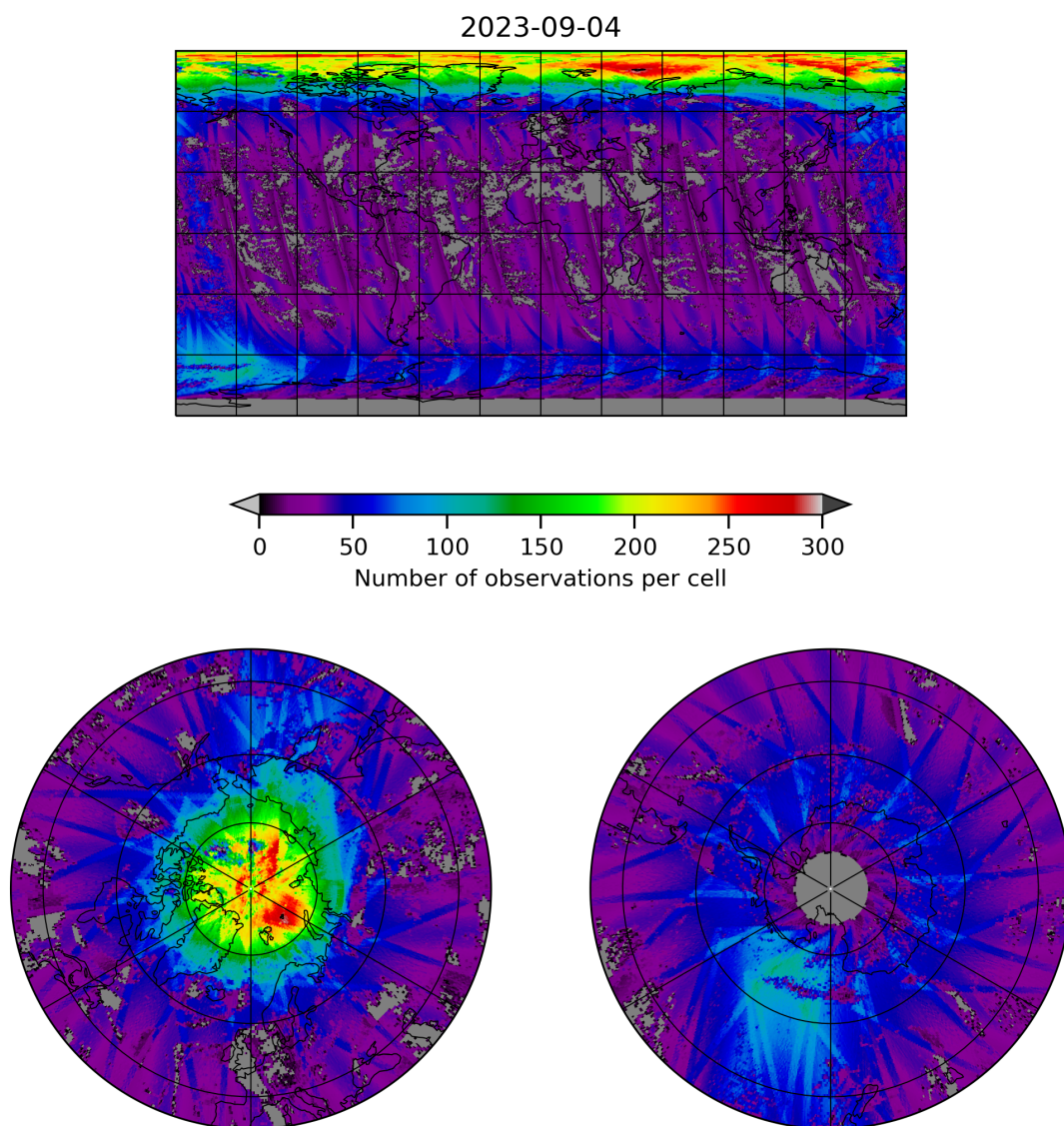


Figure 21: Map of the number of observations for 2023-09-04 to 2023-09-05

7 Zonal average

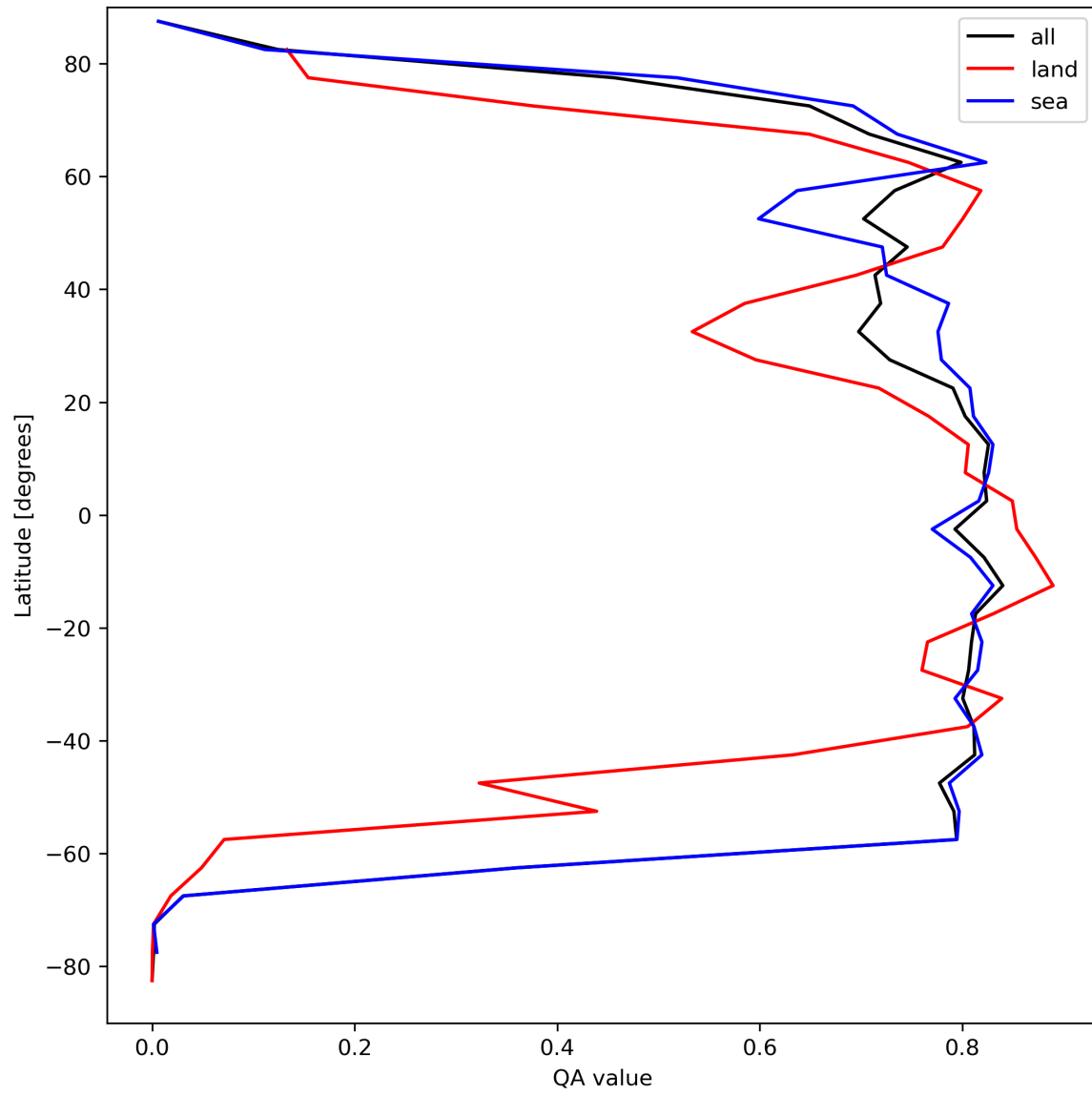


Figure 22: Zonal average of “QA value” for 2023-09-04 to 2023-09-05.

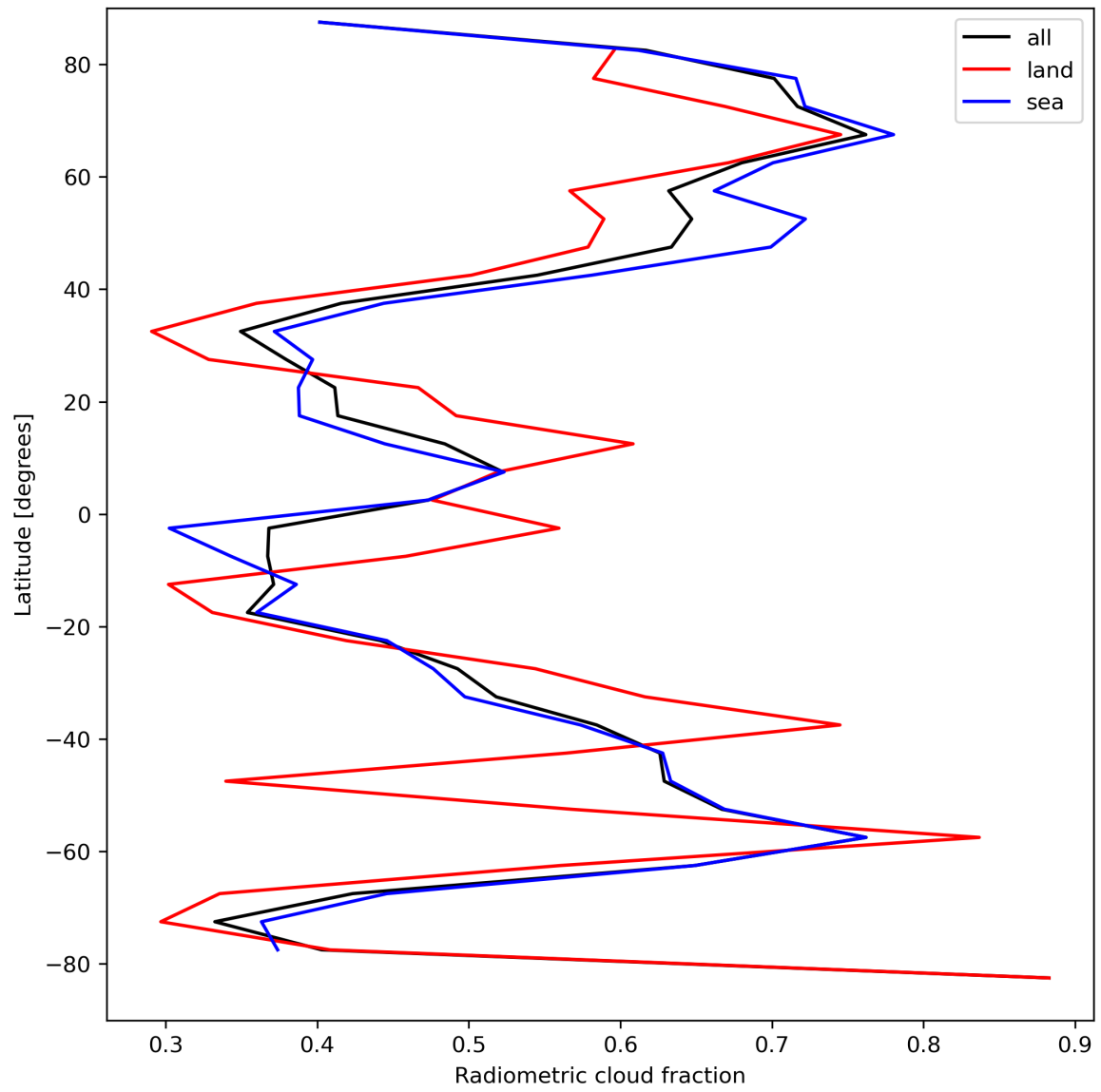


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-09-04 to 2023-09-05.

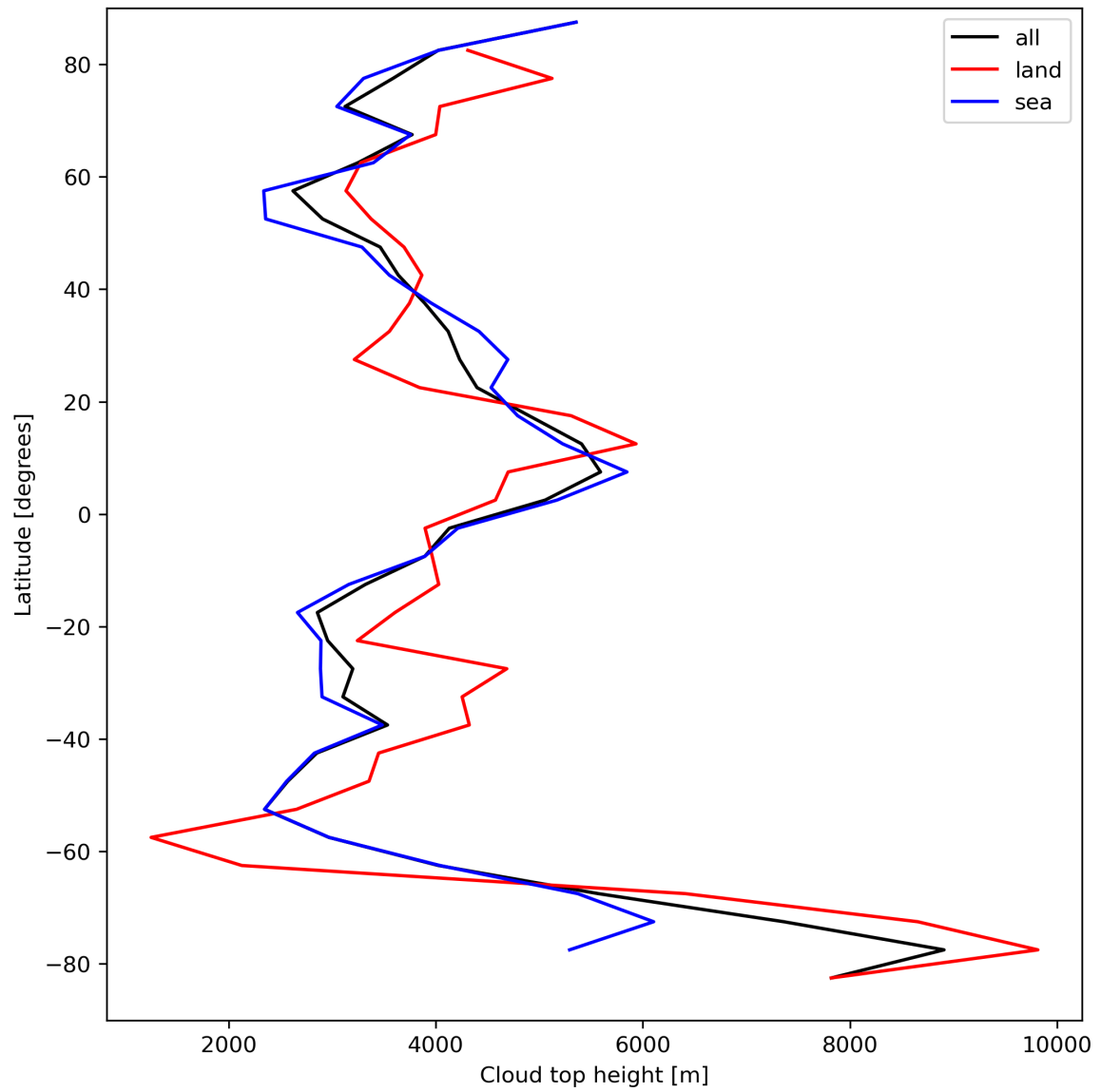


Figure 24: Zonal average of “Cloud top height” for 2023-09-04 to 2023-09-05.

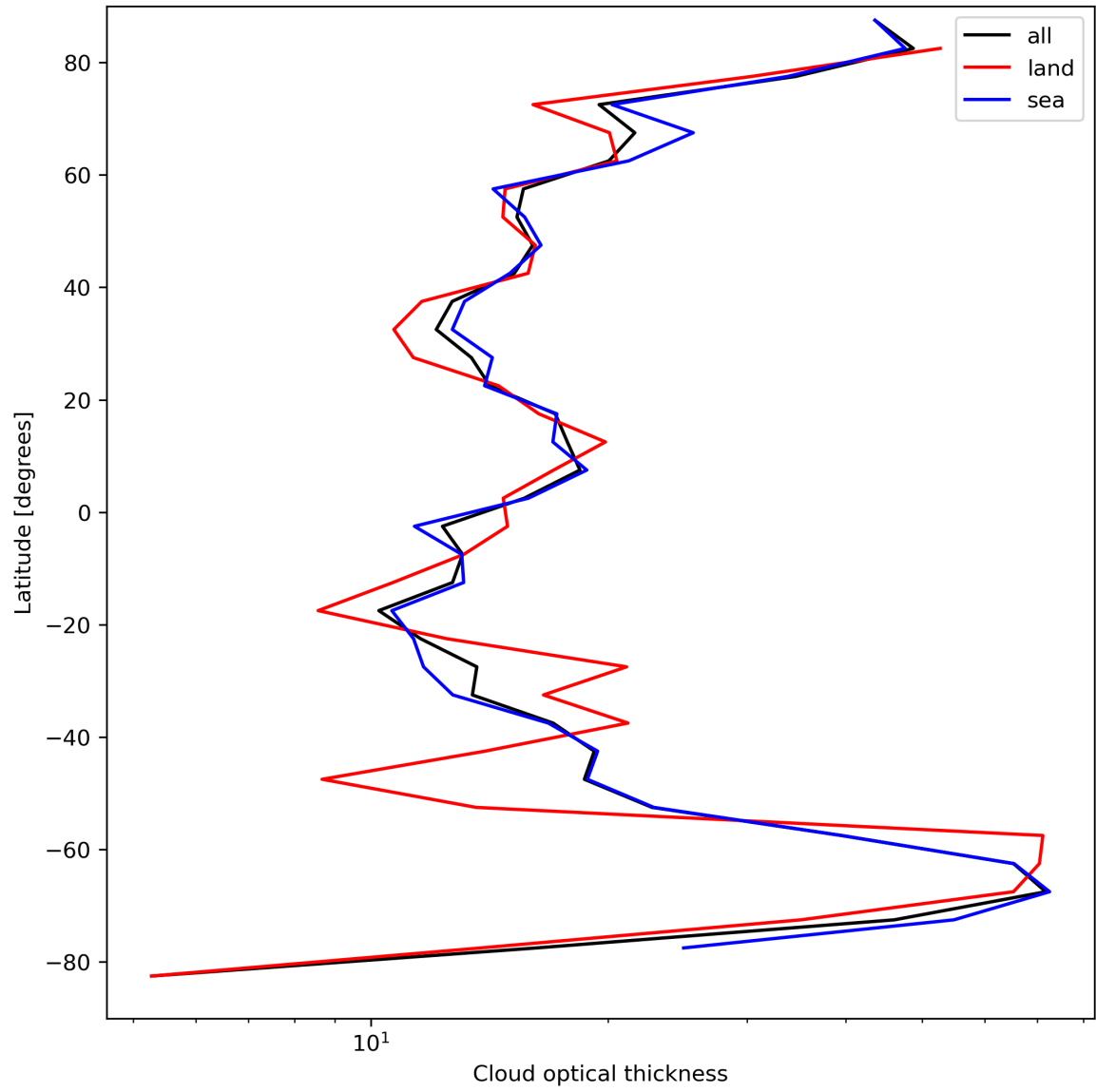


Figure 25: Zonal average of “Cloud optical thickness” for 2023-09-04 to 2023-09-05.

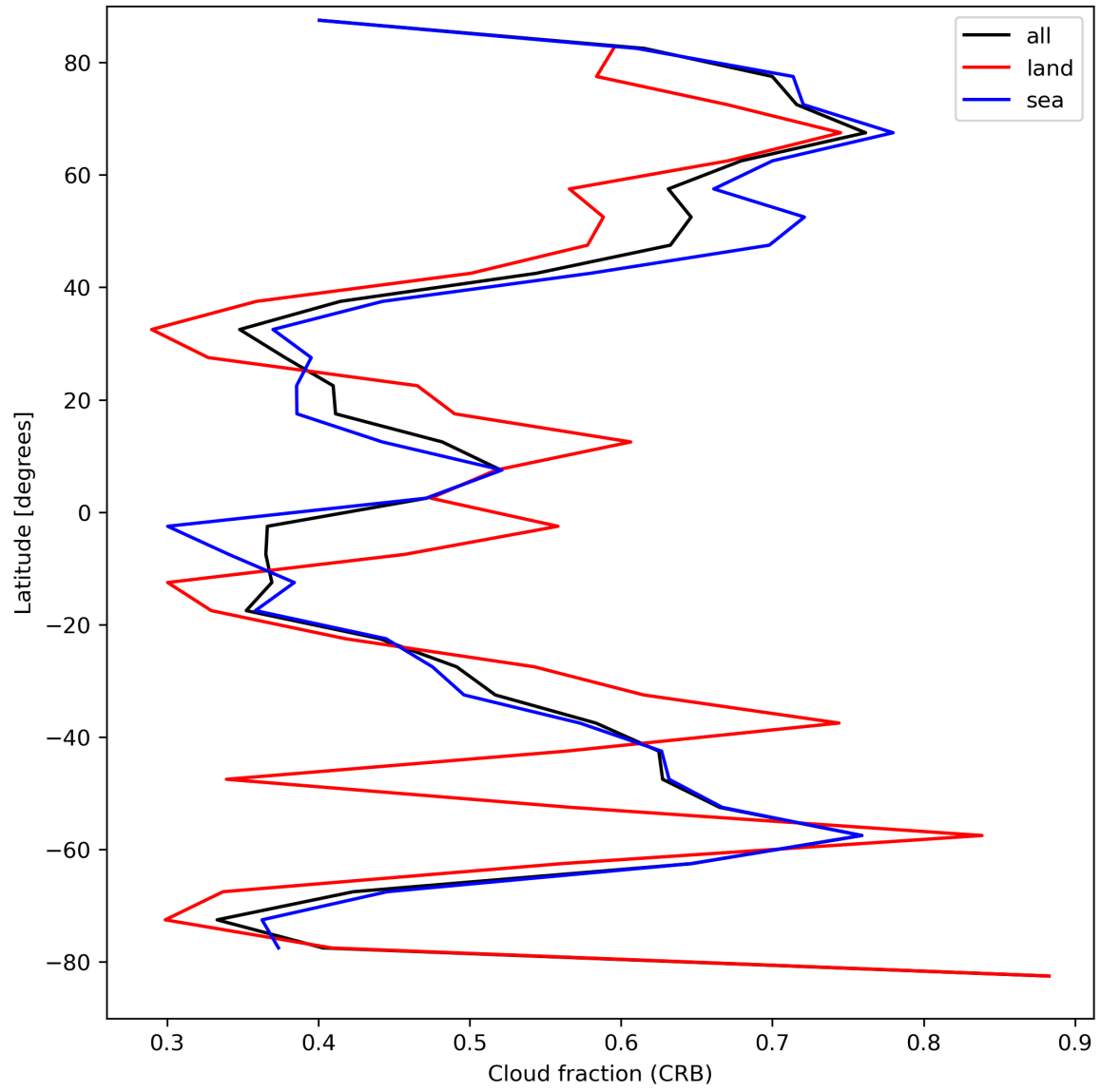


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-09-04 to 2023-09-05.

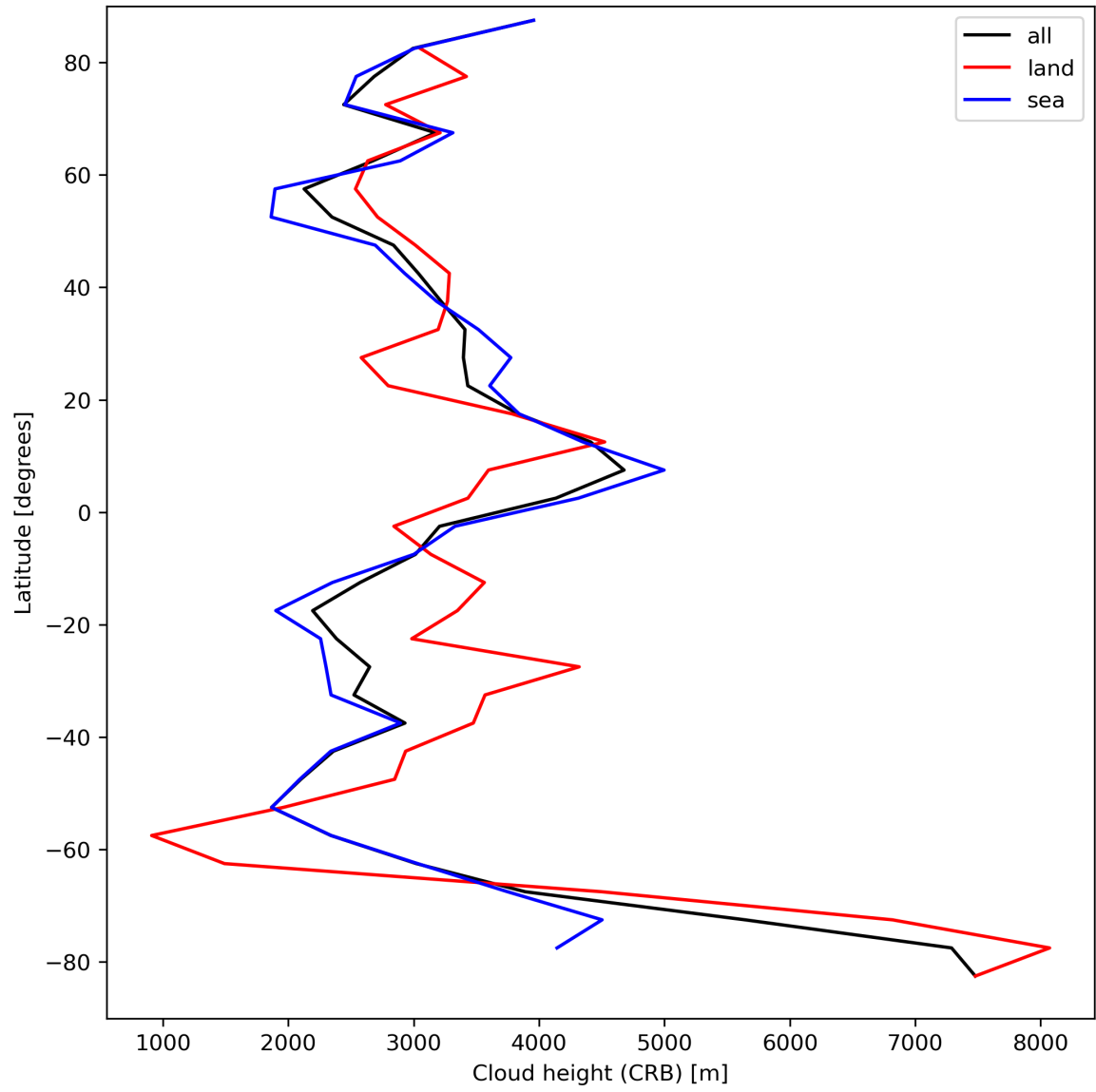


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-09-04 to 2023-09-05.

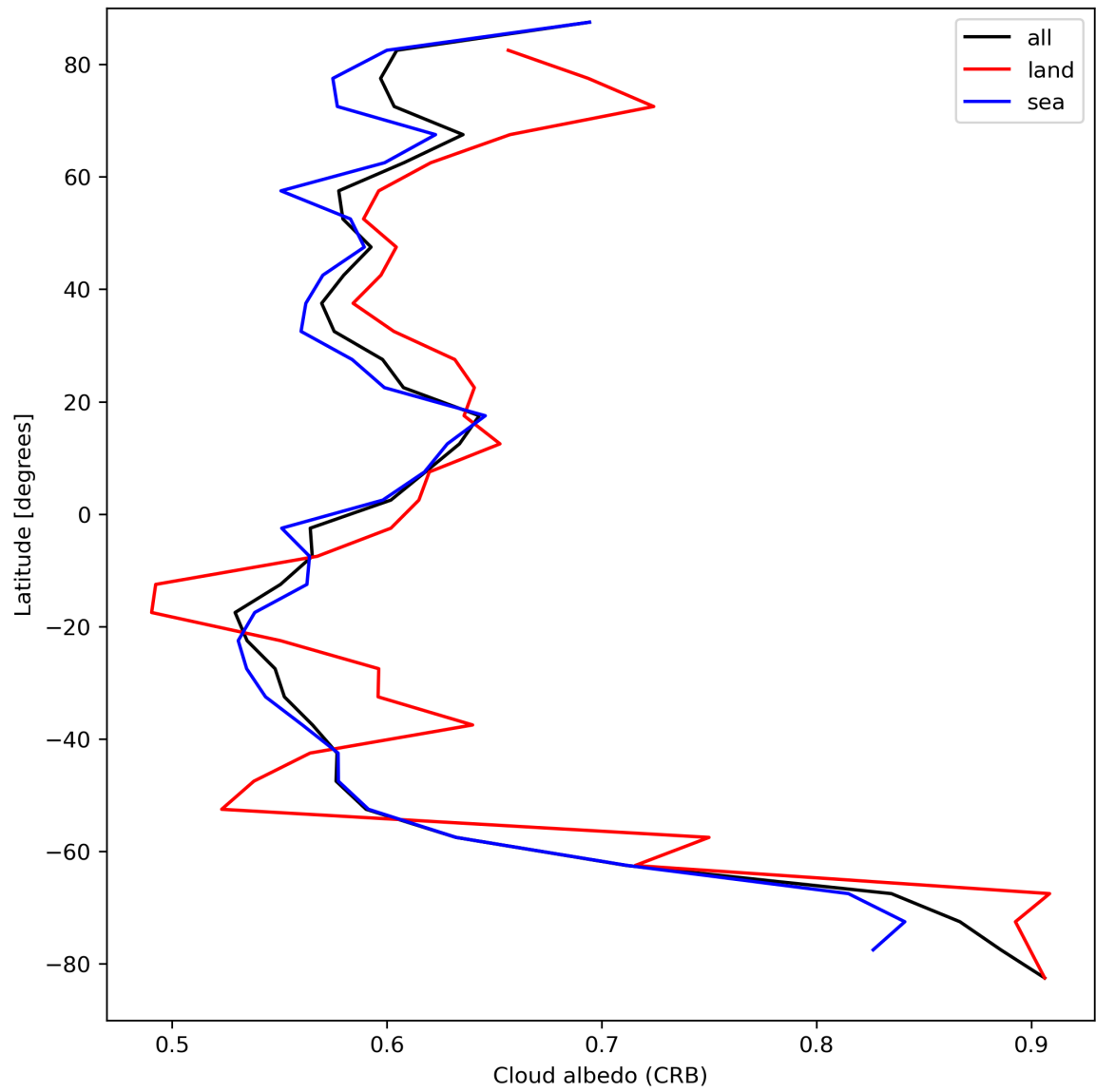


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-09-04 to 2023-09-05.

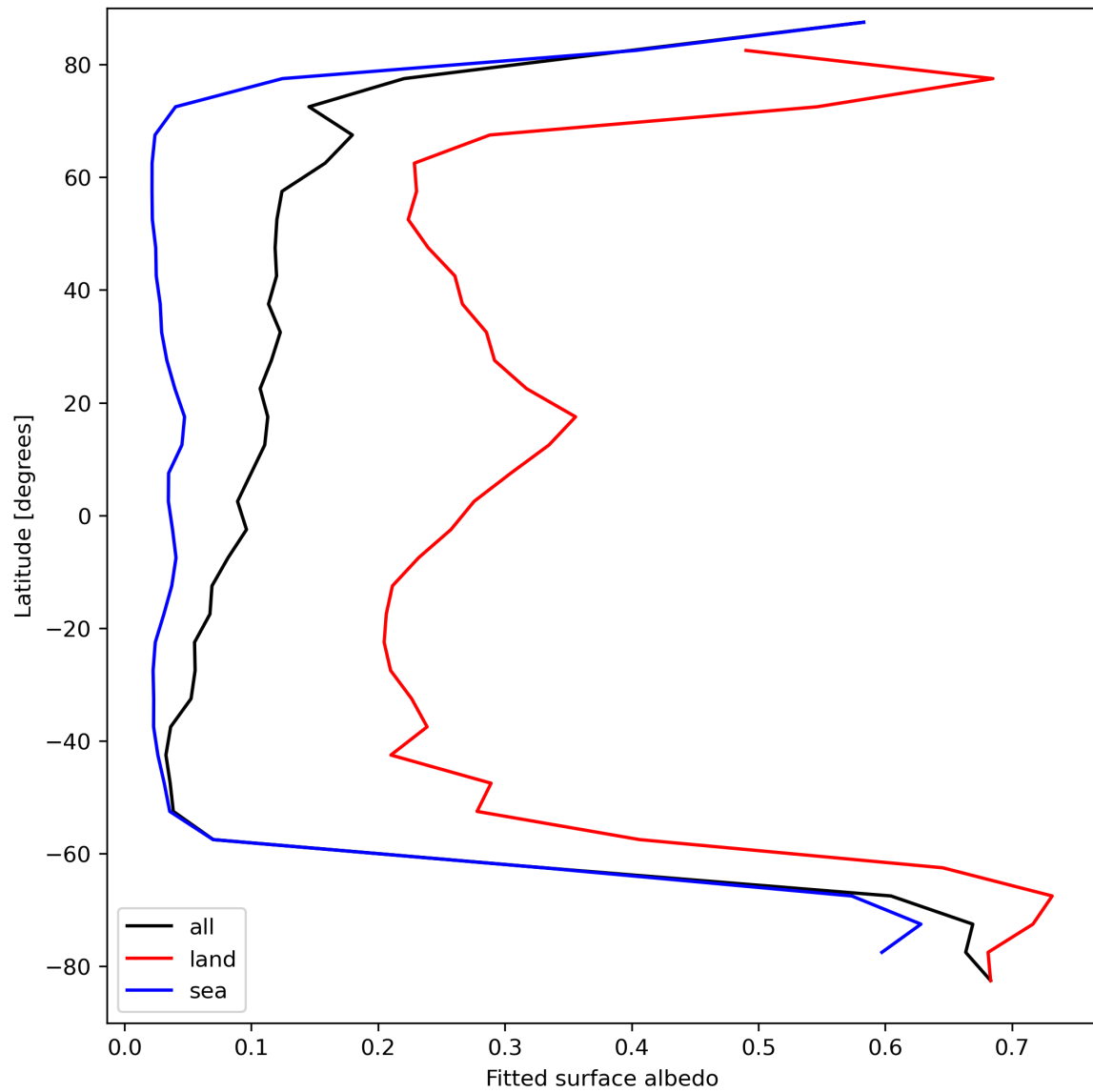


Figure 29: Zonal average of “Fitted surface albedo” for 2023-09-04 to 2023-09-05.

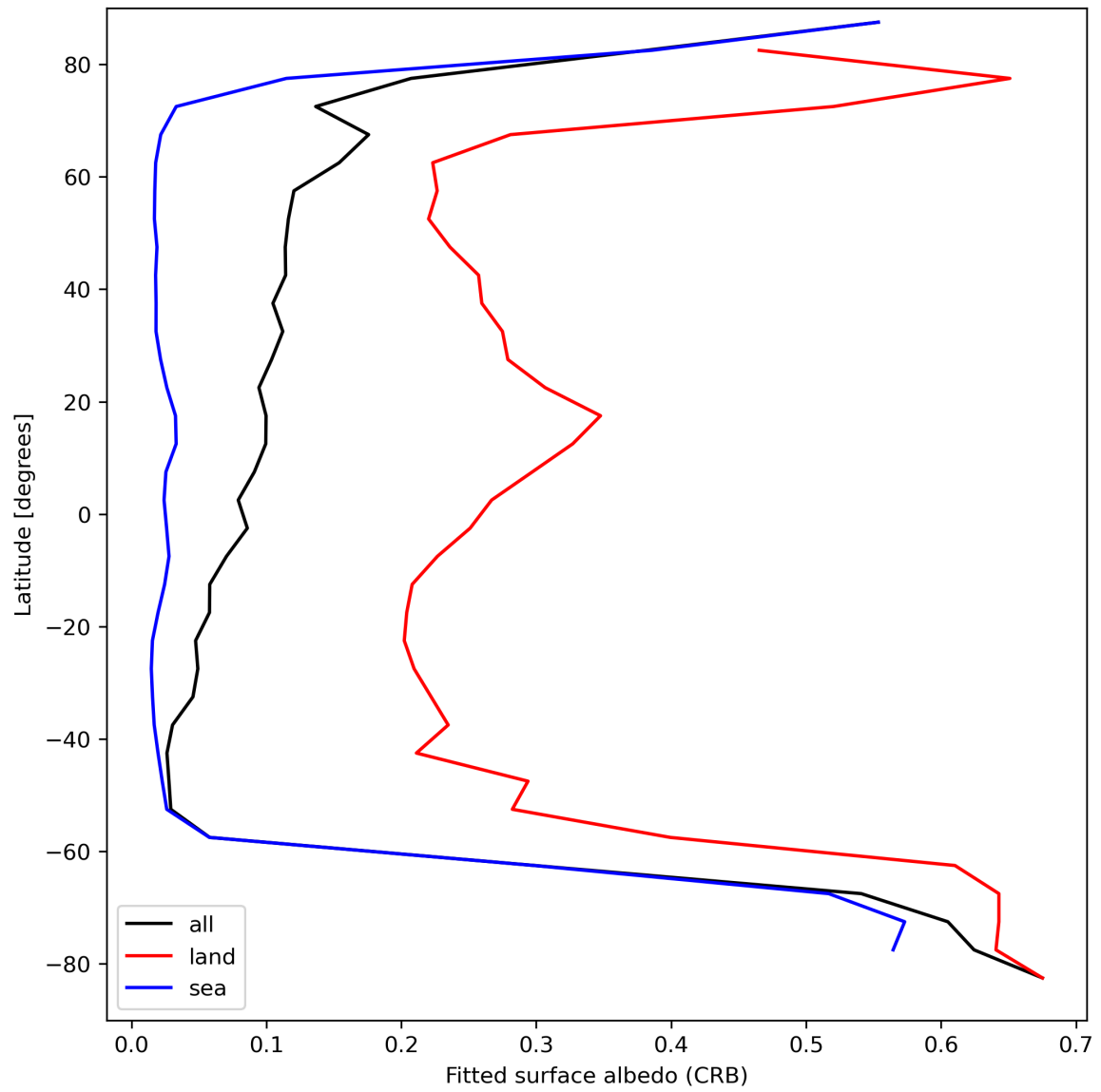


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-09-04 to 2023-09-05.

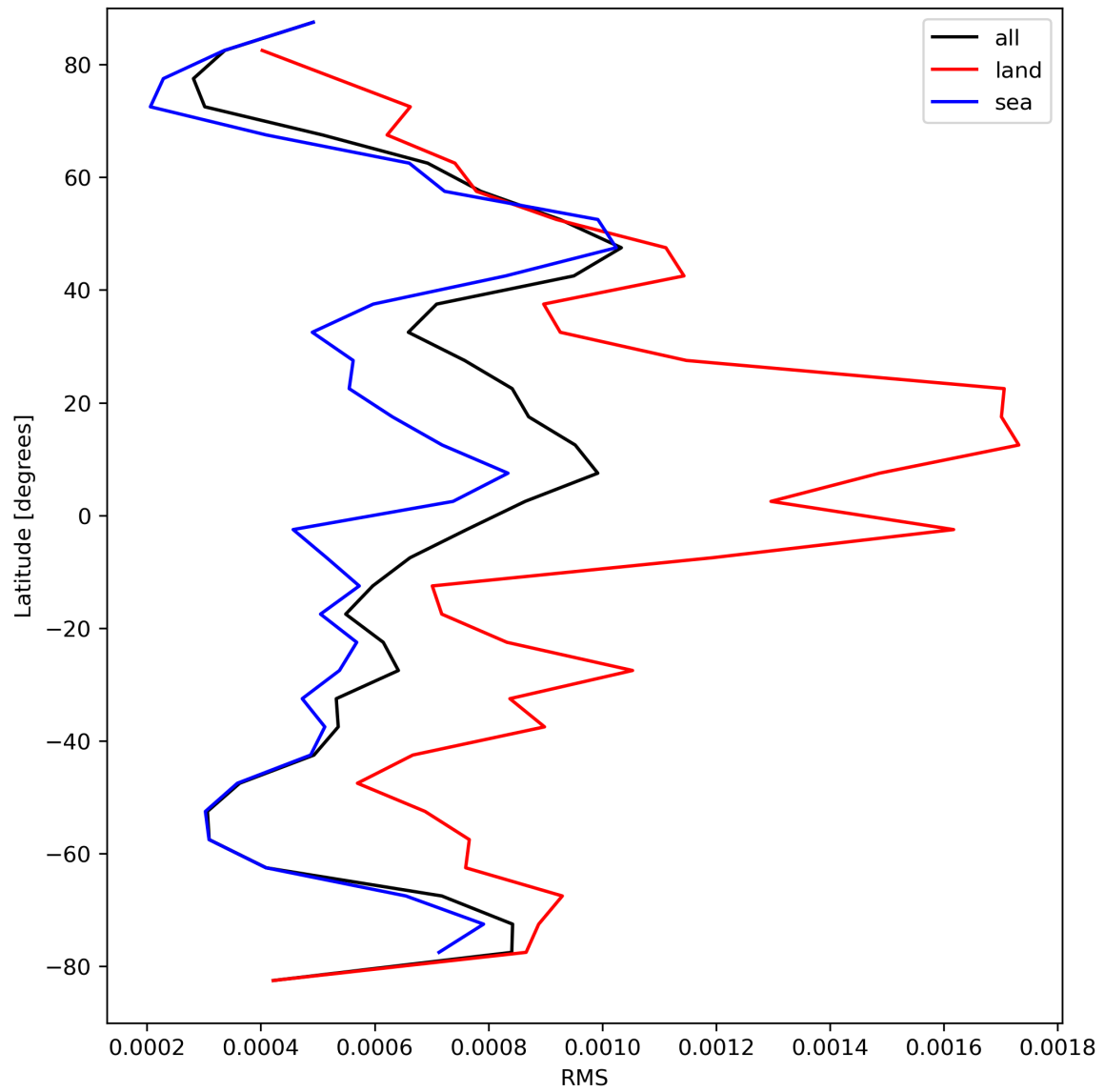


Figure 31: Zonal average of “RMS” for 2023-09-04 to 2023-09-05.

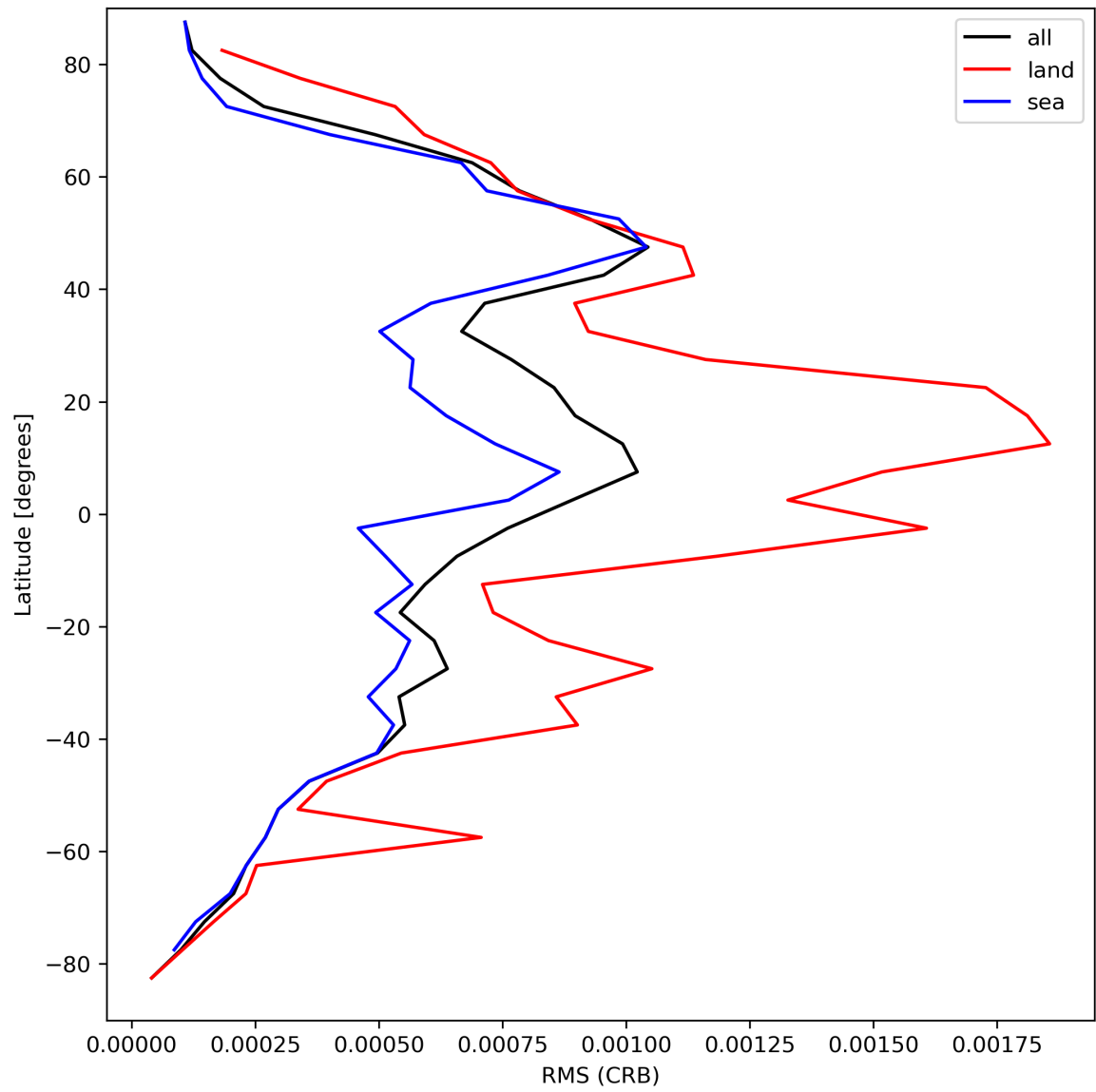


Figure 32: Zonal average of “RMS (CRB)” for 2023-09-04 to 2023-09-05.

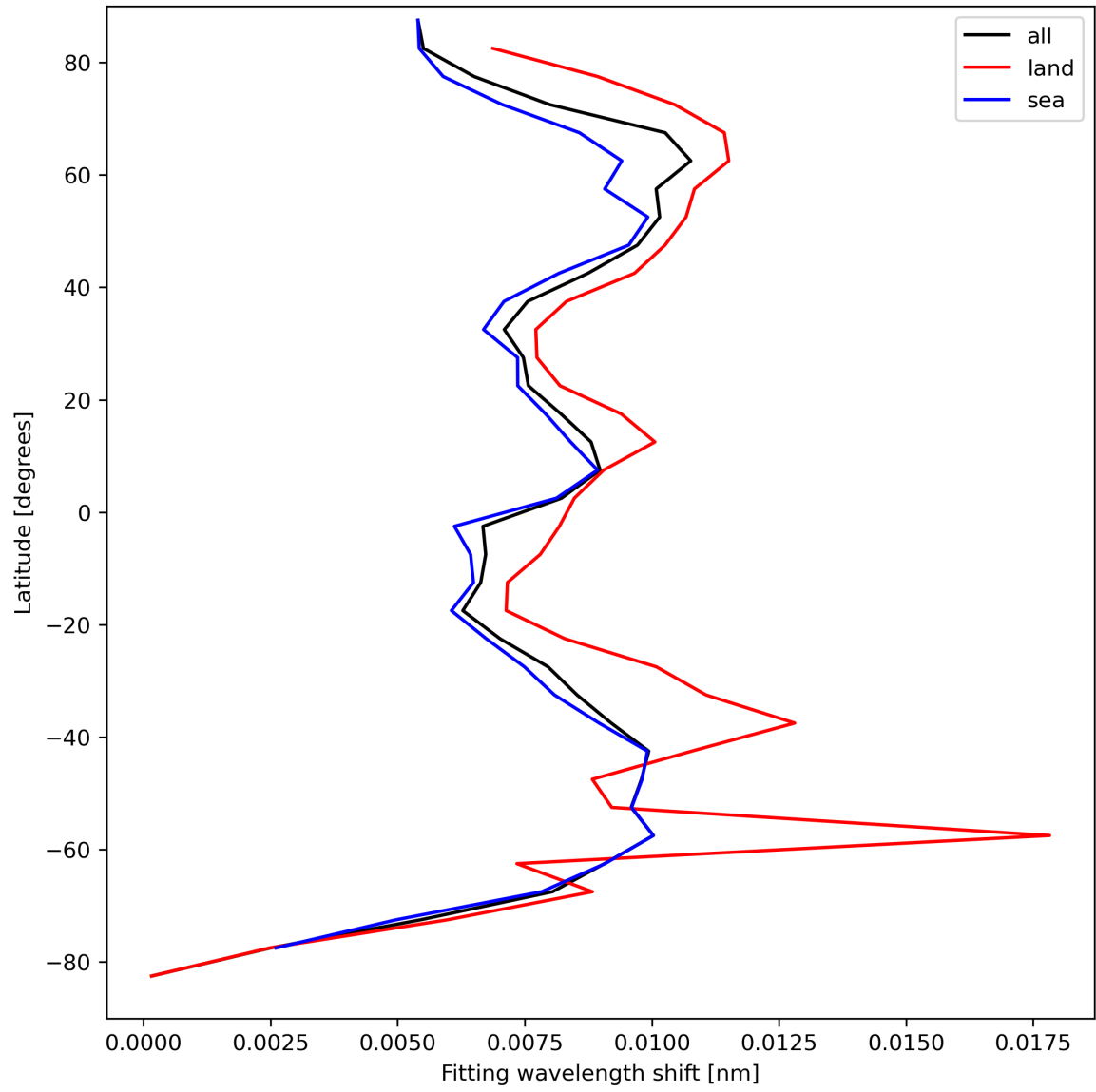


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-09-04 to 2023-09-05.

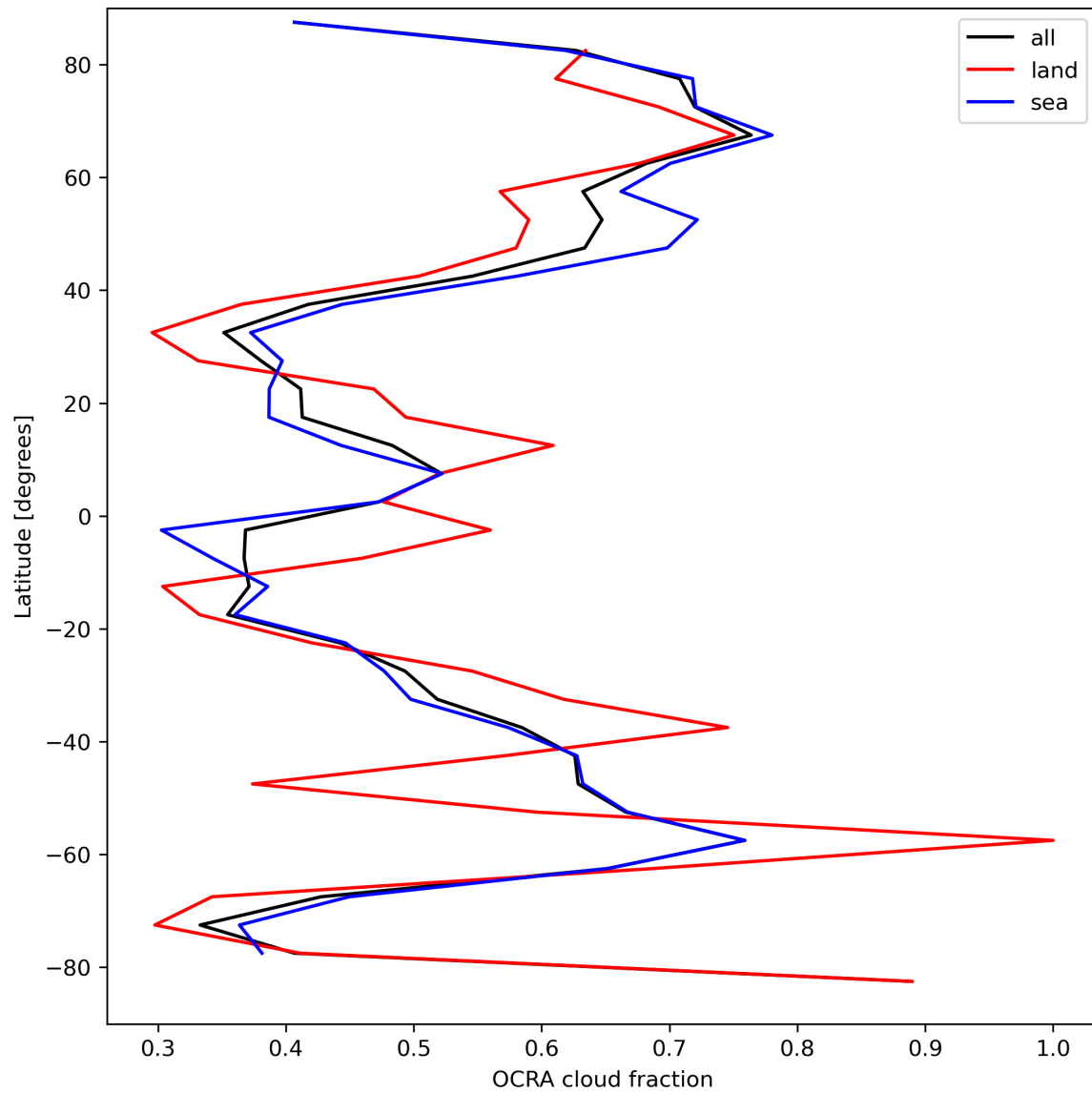


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-09-04 to 2023-09-05.

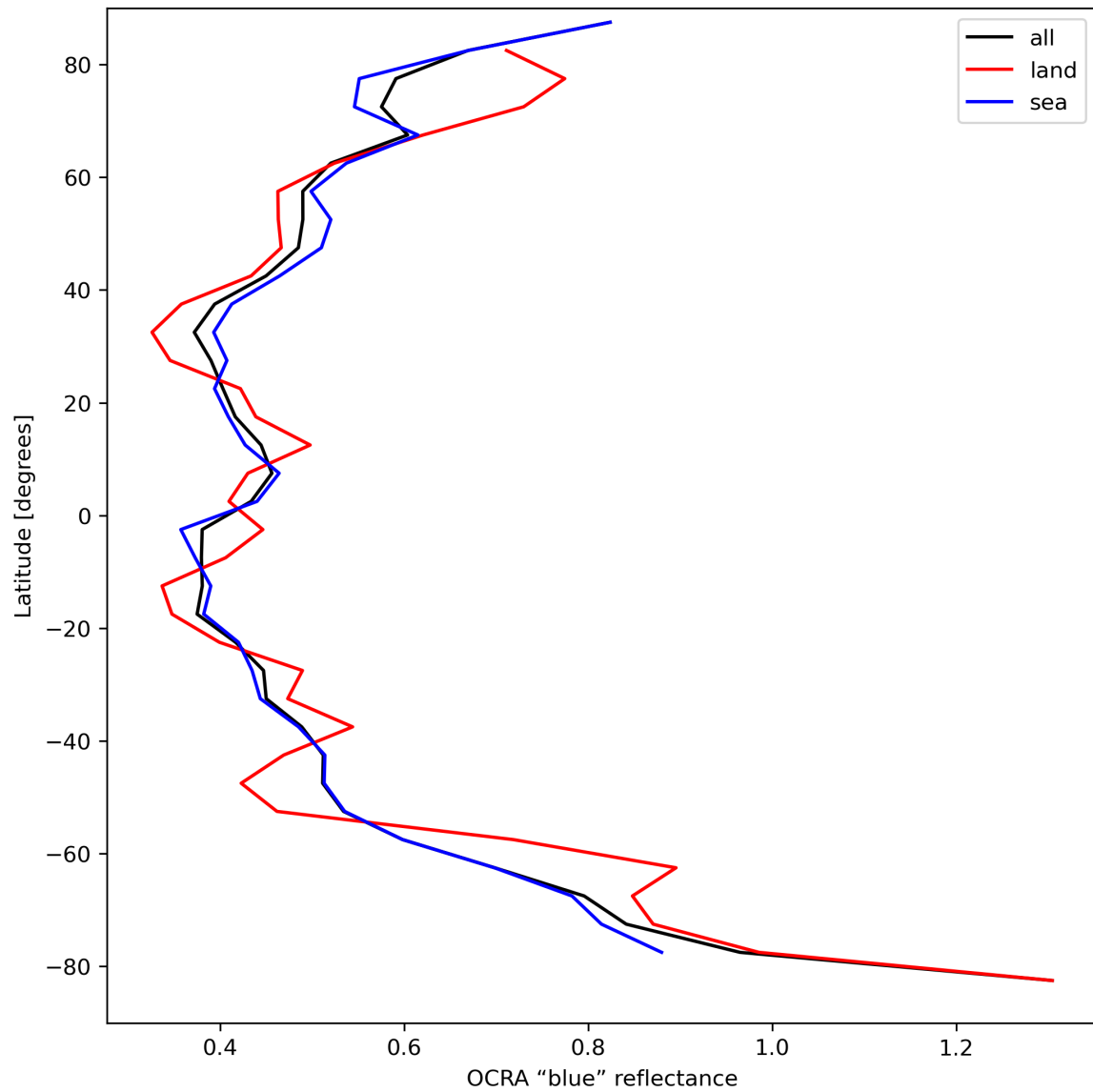


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-09-04 to 2023-09-05.

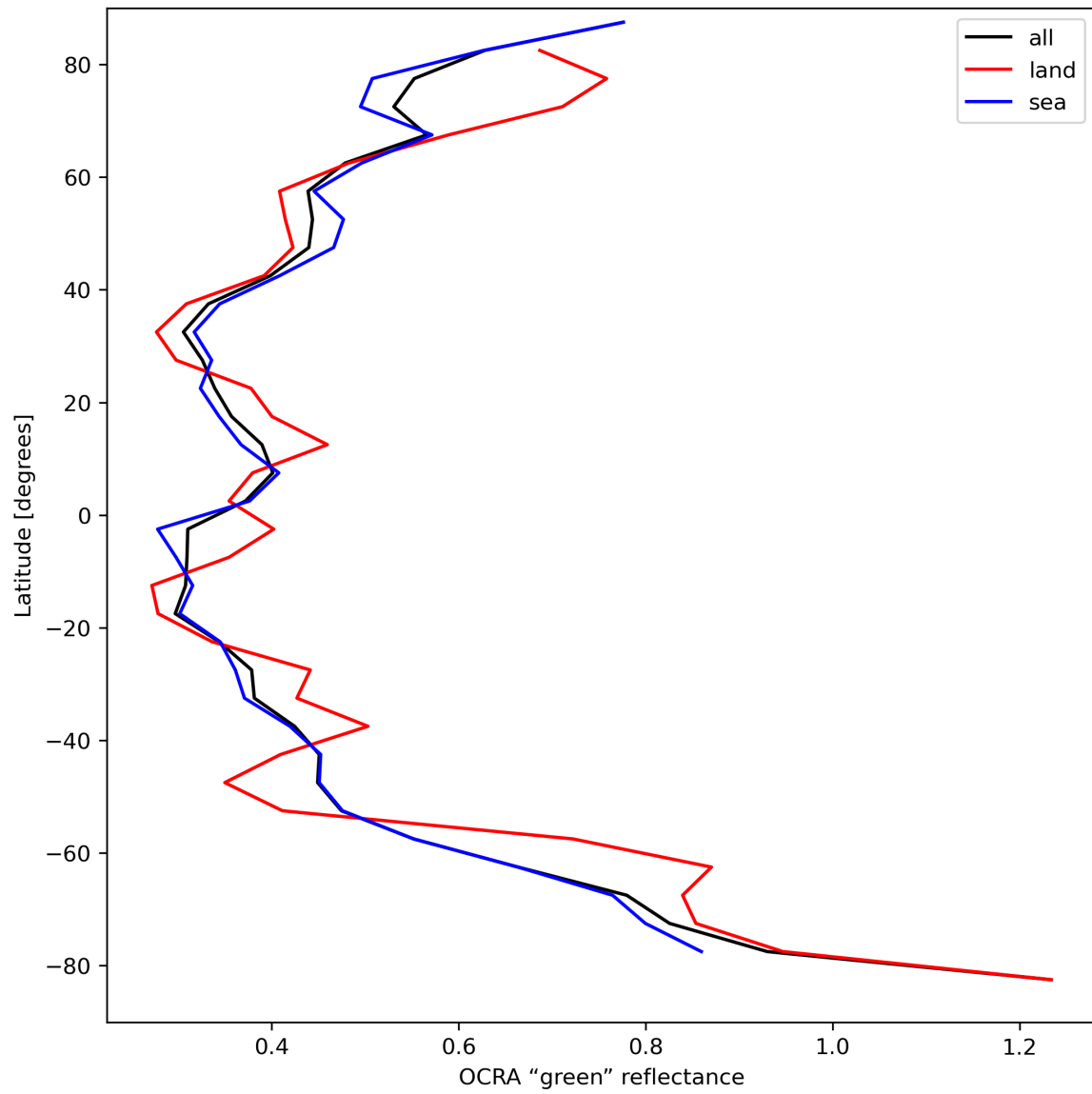


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-09-04 to 2023-09-05.

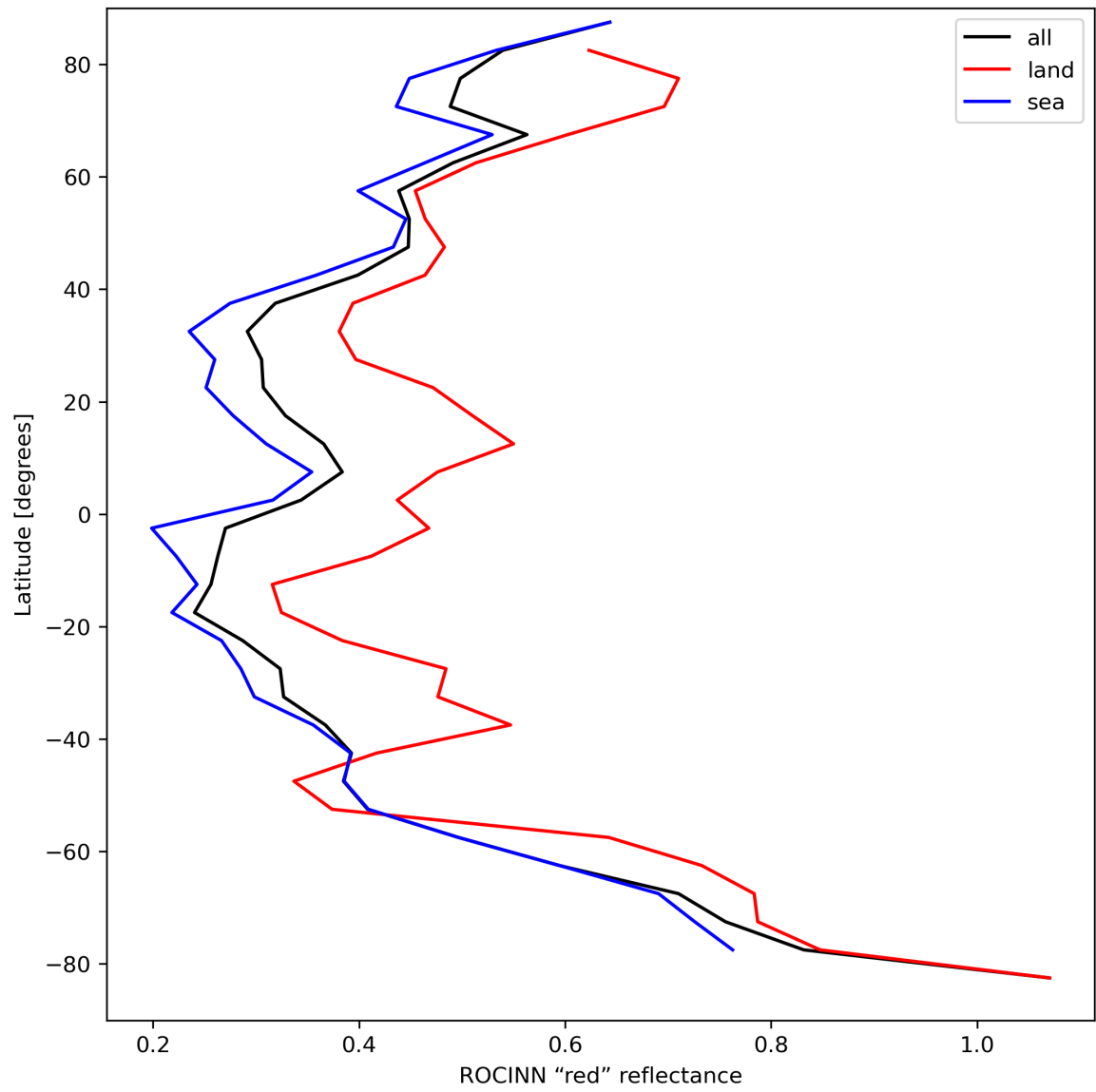


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-09-04 to 2023-09-05.

8 Histograms

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

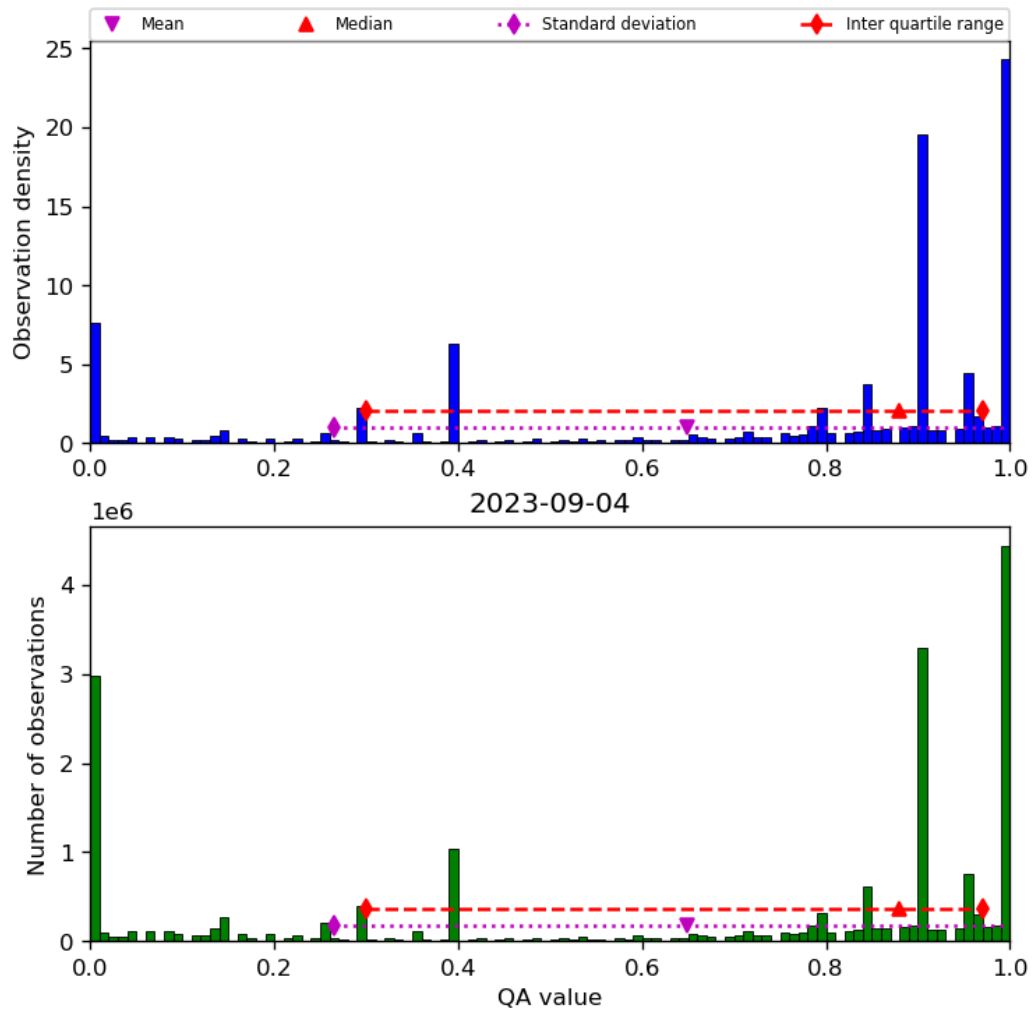


Figure 38: Histogram of “QA value” for 2023-09-04 to 2023-09-05

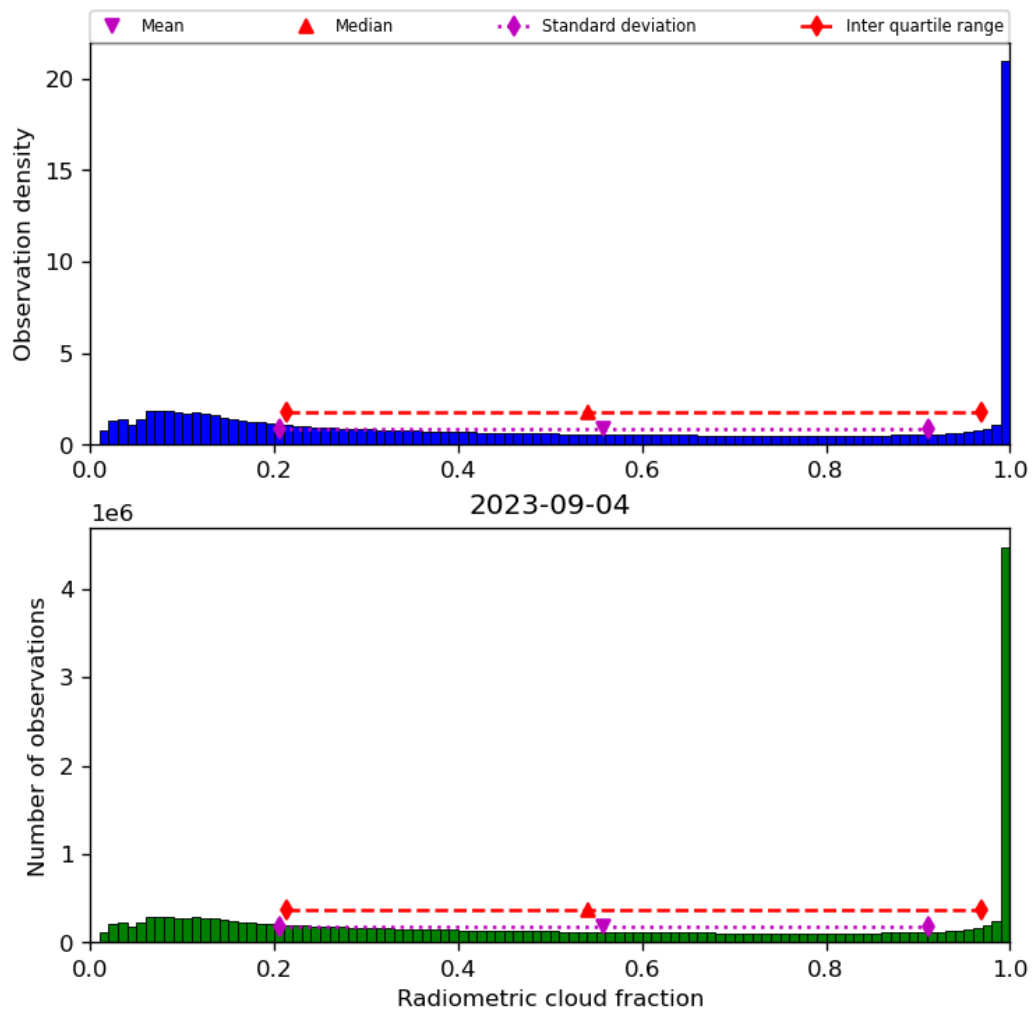


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-09-04 to 2023-09-05

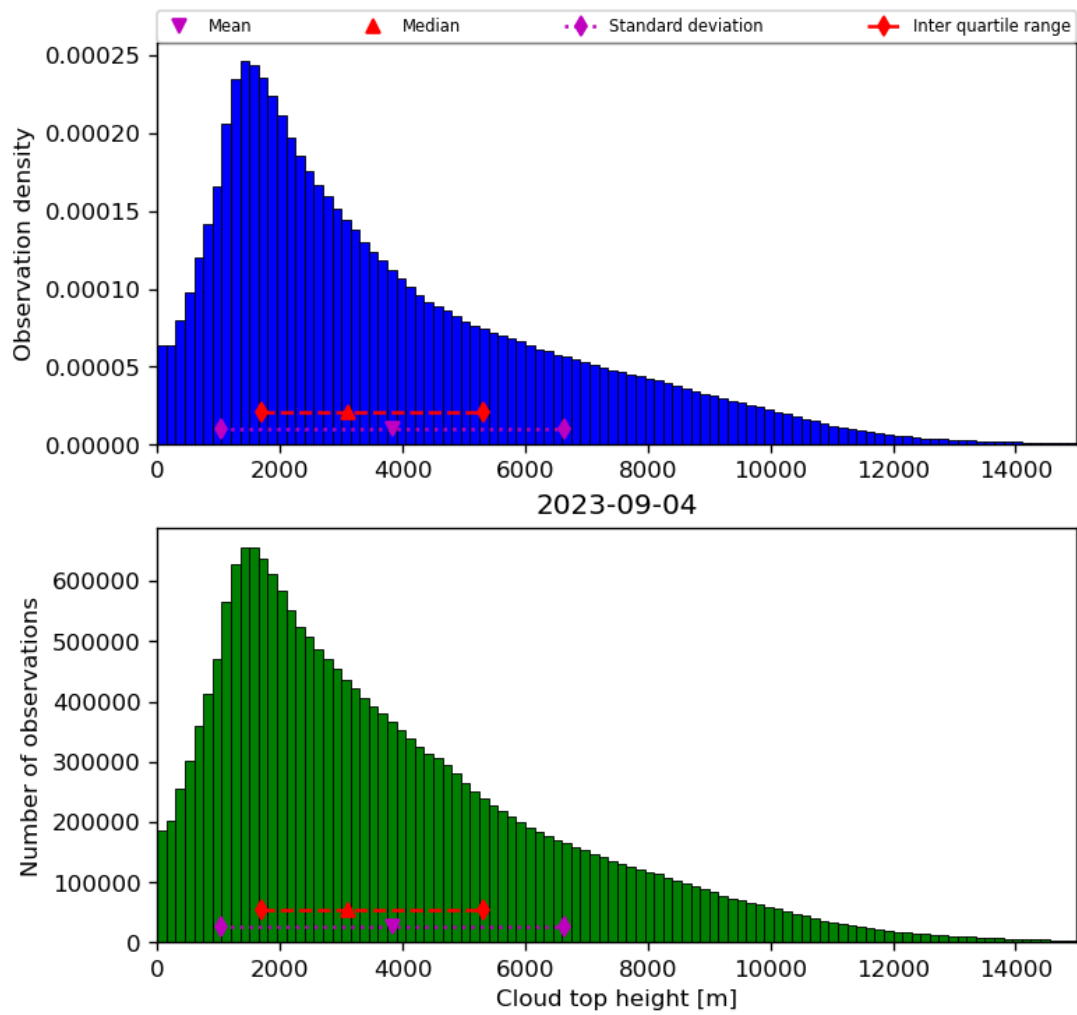


Figure 40: Histogram of “Cloud top height” for 2023-09-04 to 2023-09-05

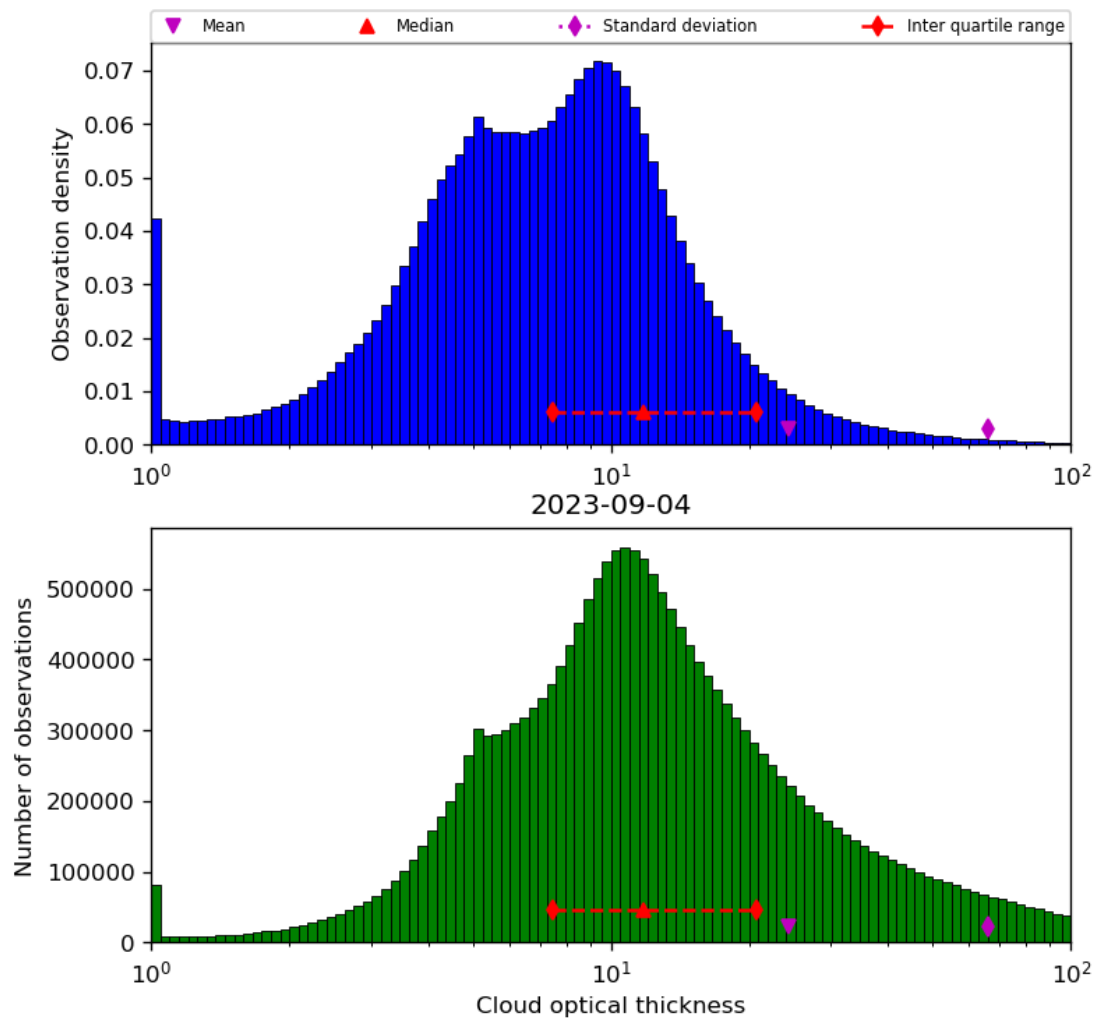


Figure 41: Histogram of “Cloud optical thickness” for 2023-09-04 to 2023-09-05

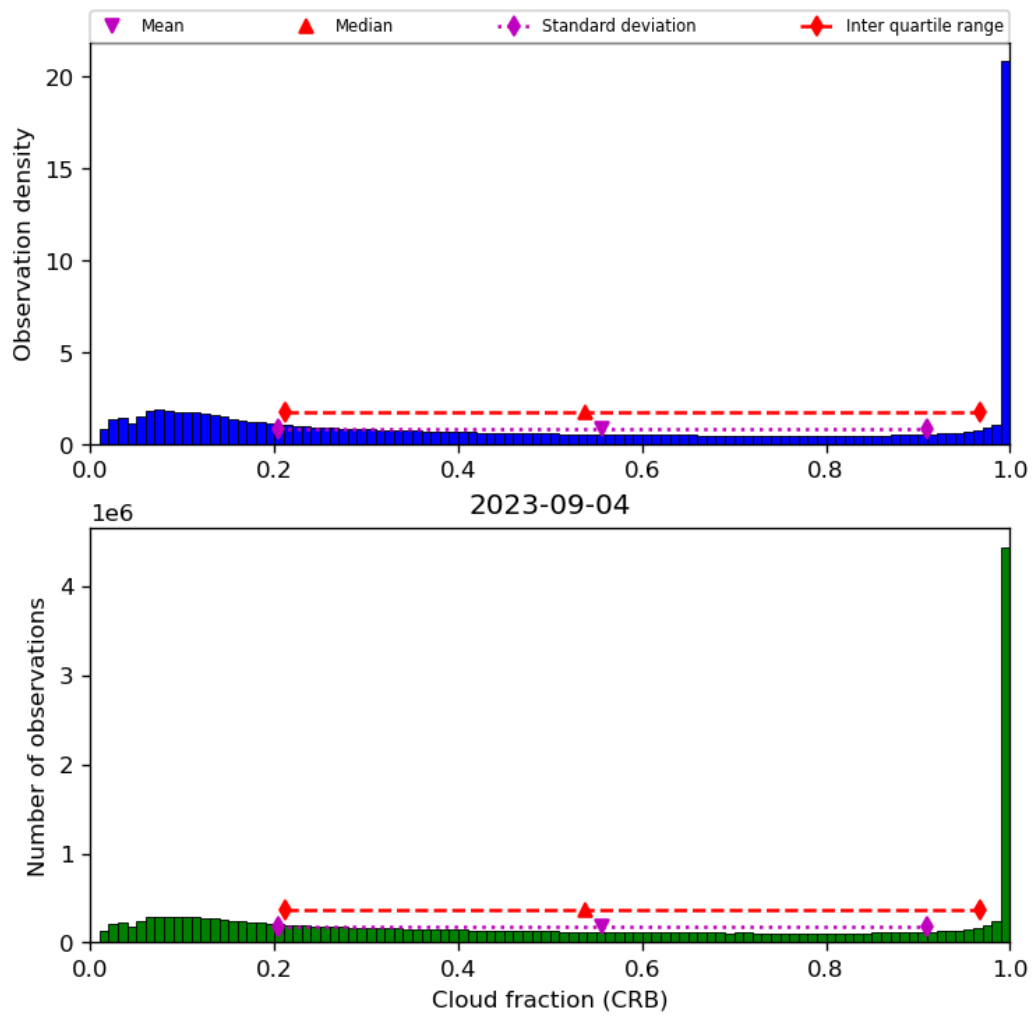


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-09-04 to 2023-09-05

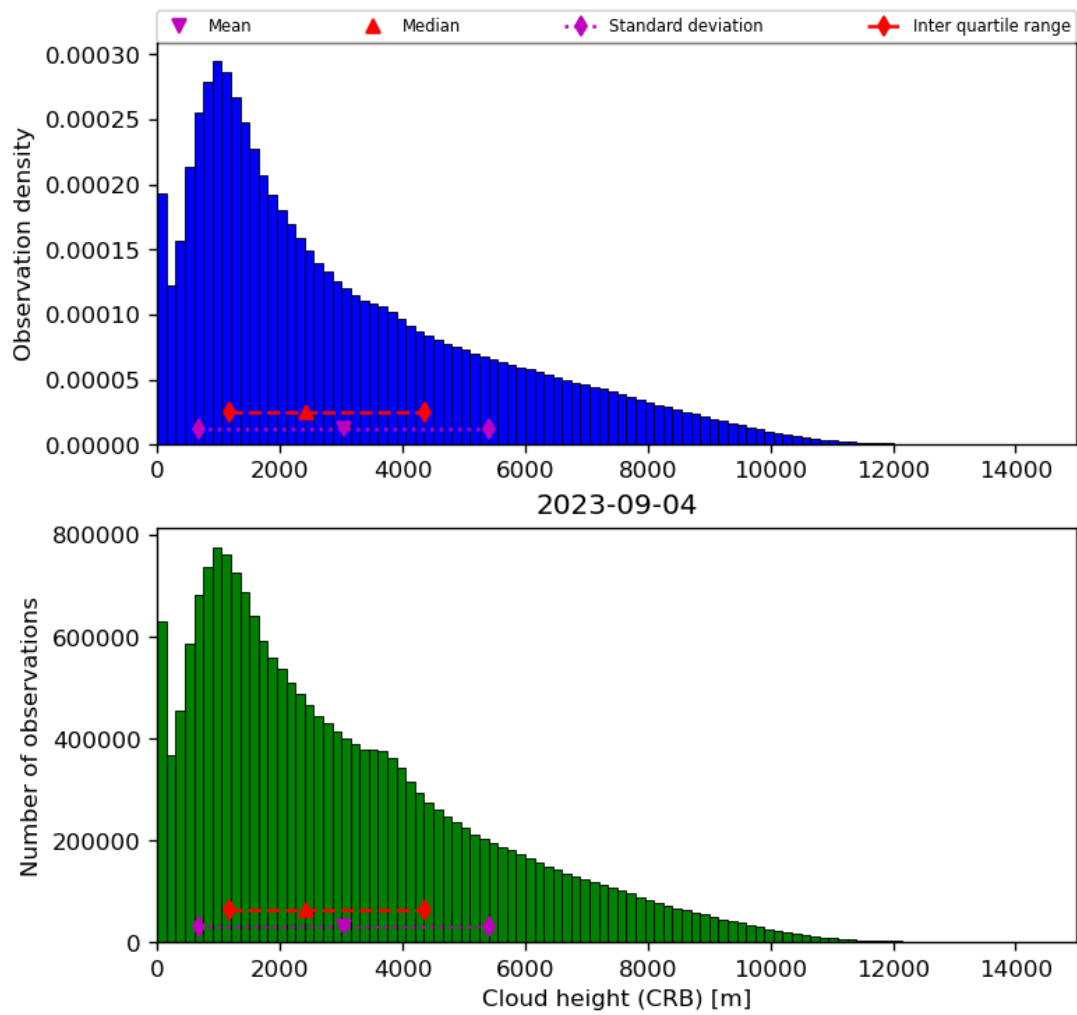


Figure 43: Histogram of “Cloud height (CRB)” for 2023-09-04 to 2023-09-05

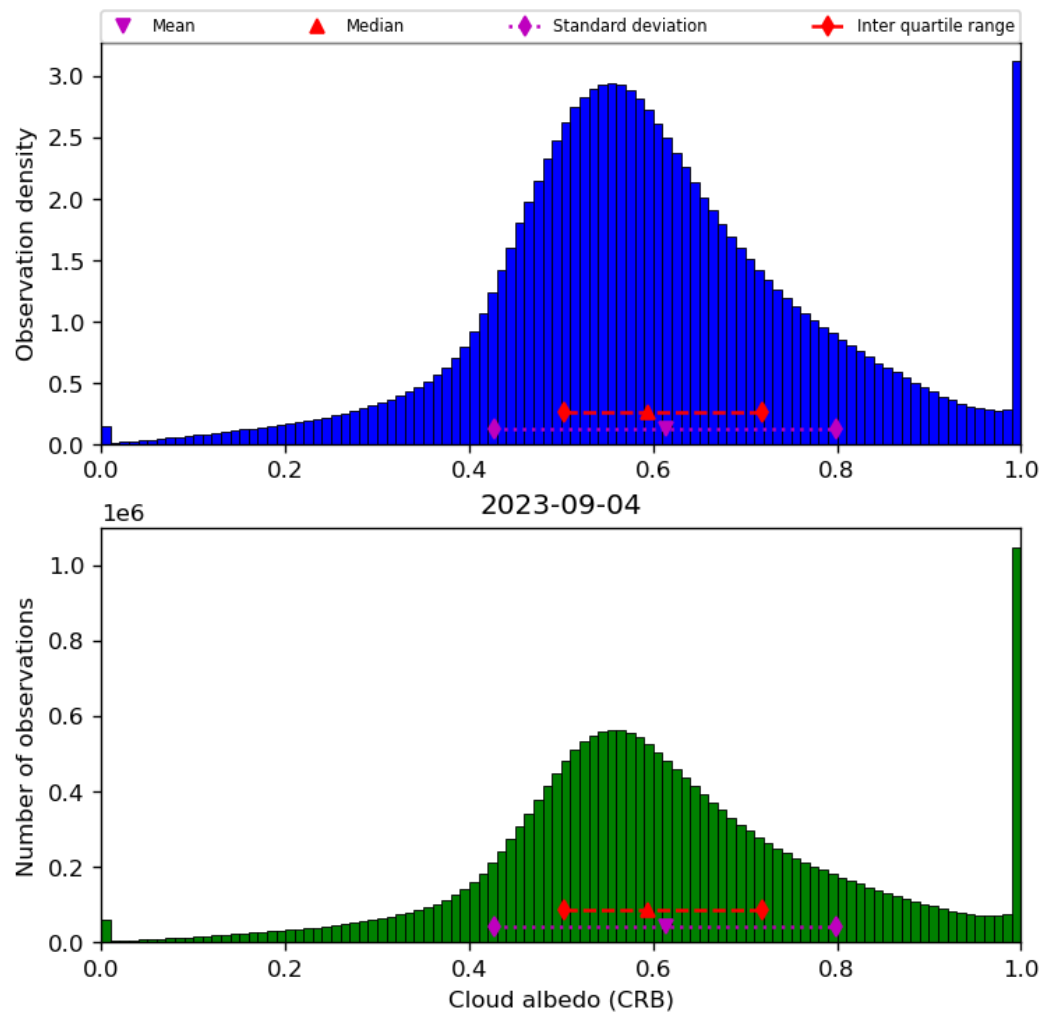


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-09-04 to 2023-09-05

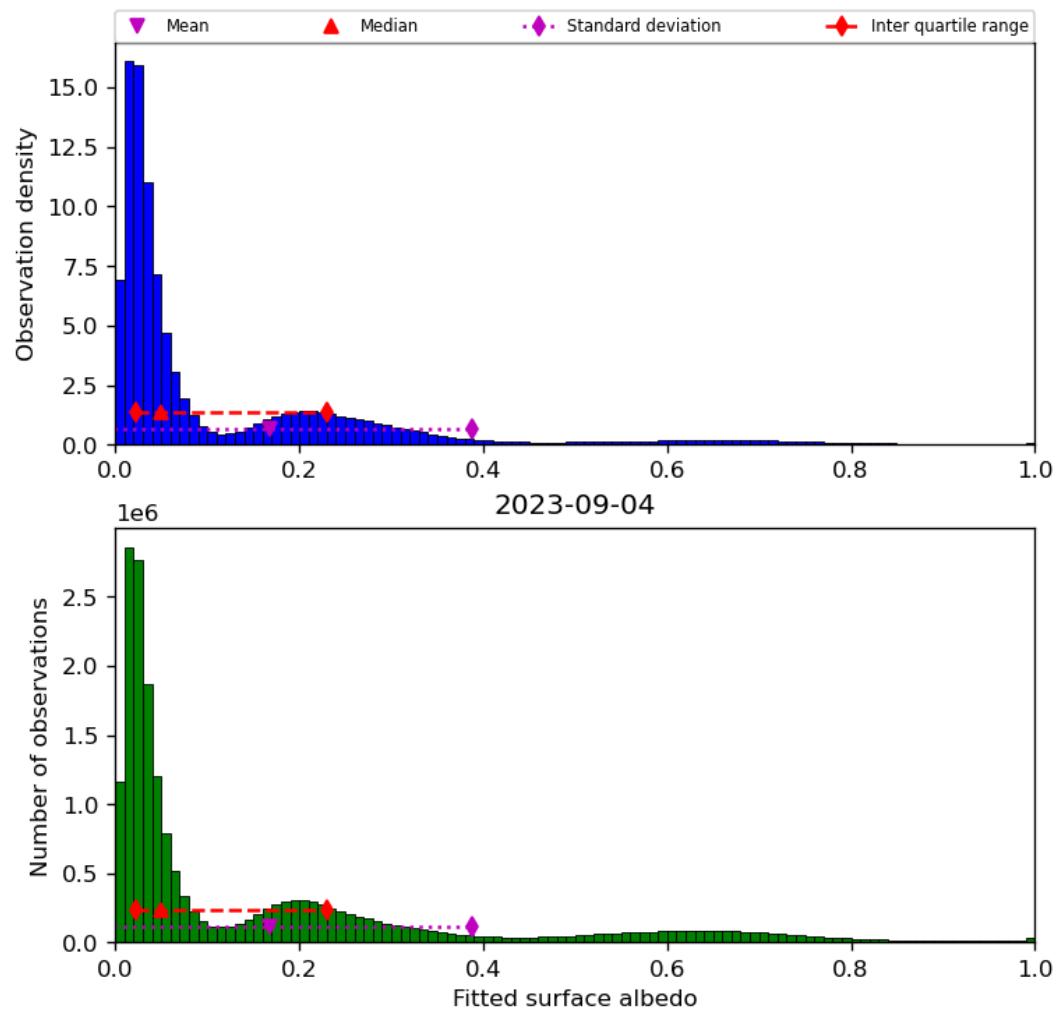


Figure 45: Histogram of “Fitted surface albedo” for 2023-09-04 to 2023-09-05

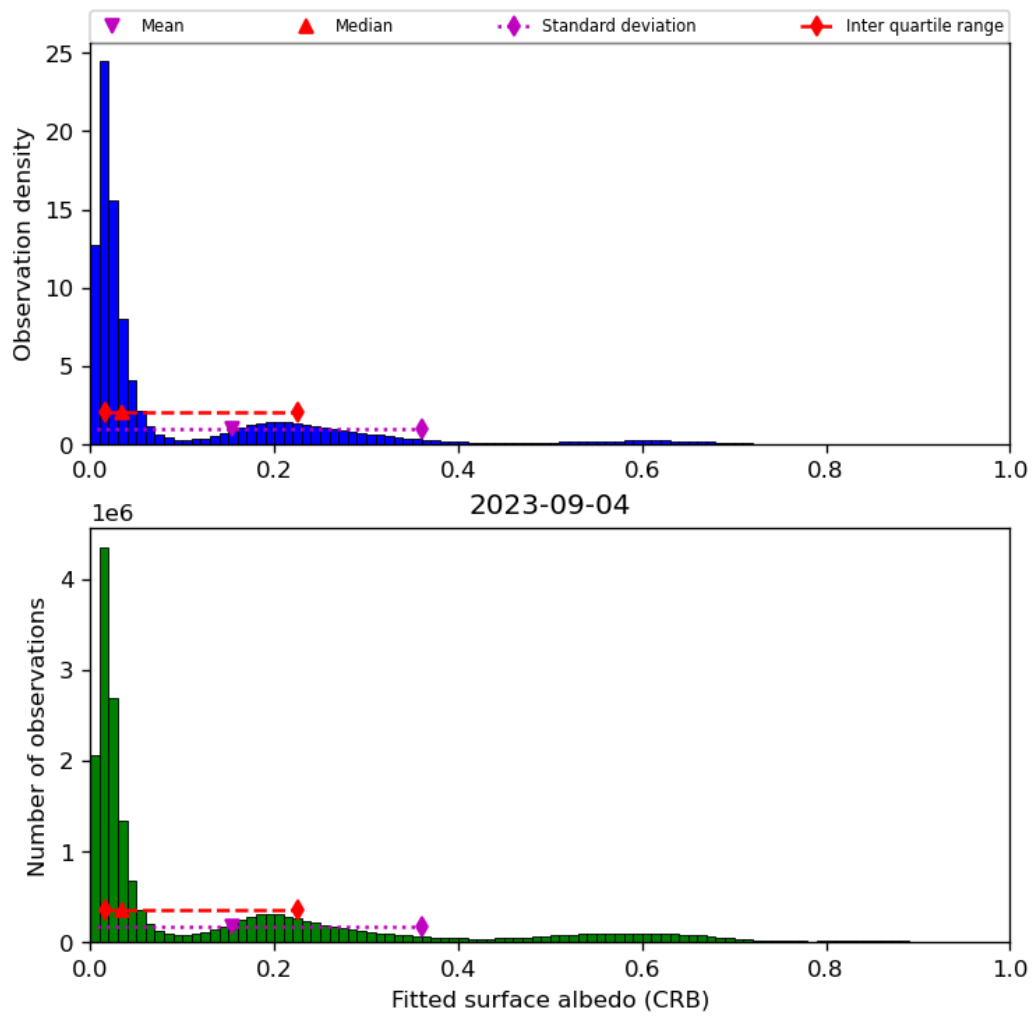


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-09-04 to 2023-09-05

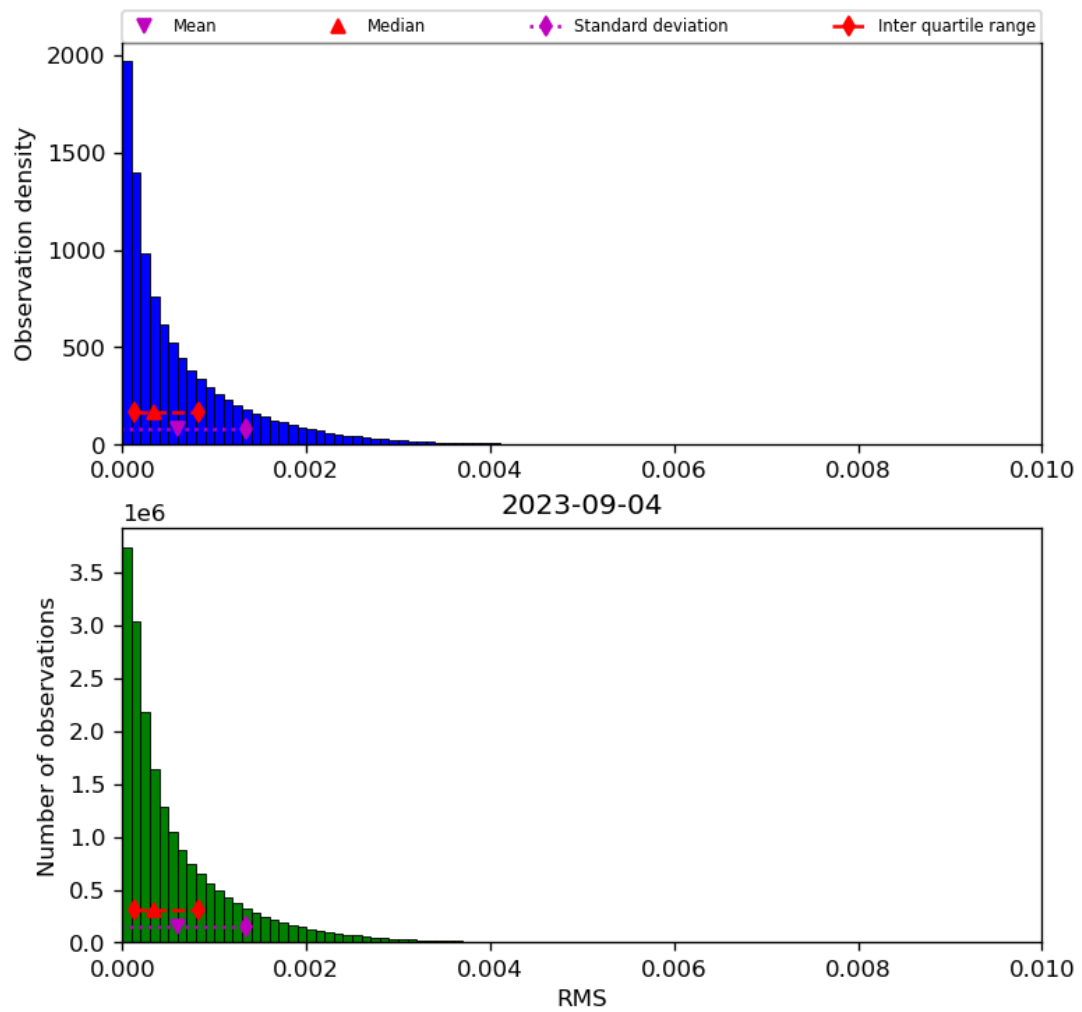


Figure 47: Histogram of “RMS” for 2023-09-04 to 2023-09-05

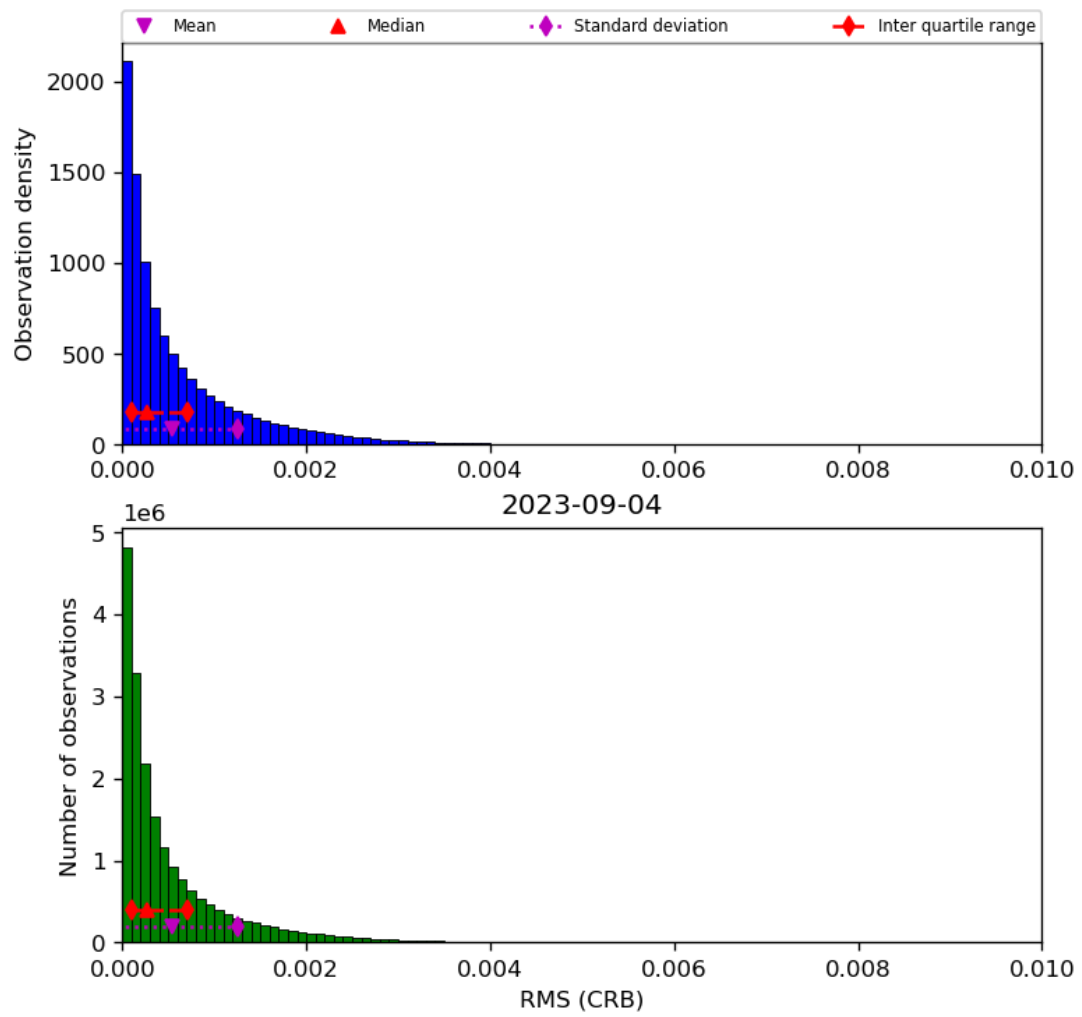


Figure 48: Histogram of “RMS (CRB)” for 2023-09-04 to 2023-09-05

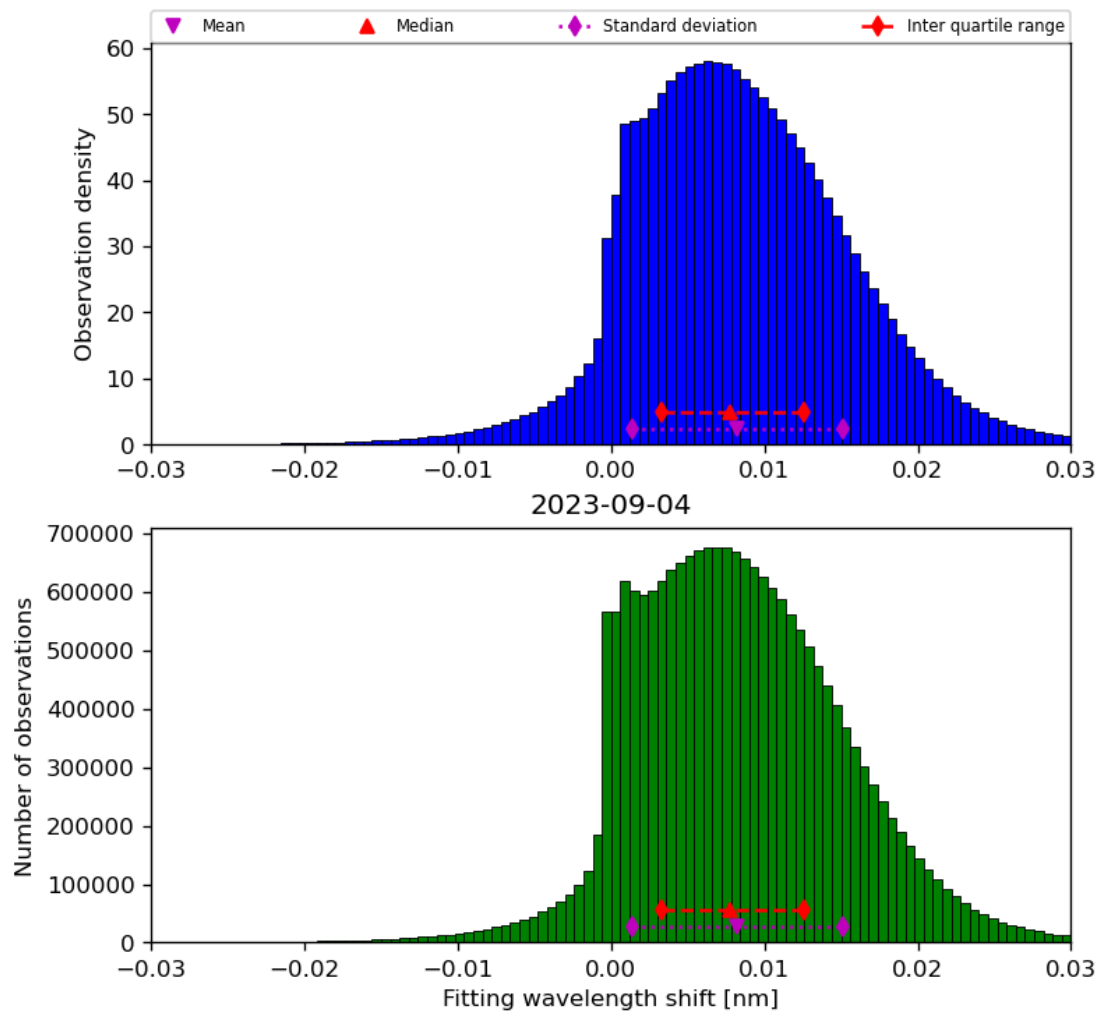


Figure 49: Histogram of “Fitting wavelength shift” for 2023-09-04 to 2023-09-05

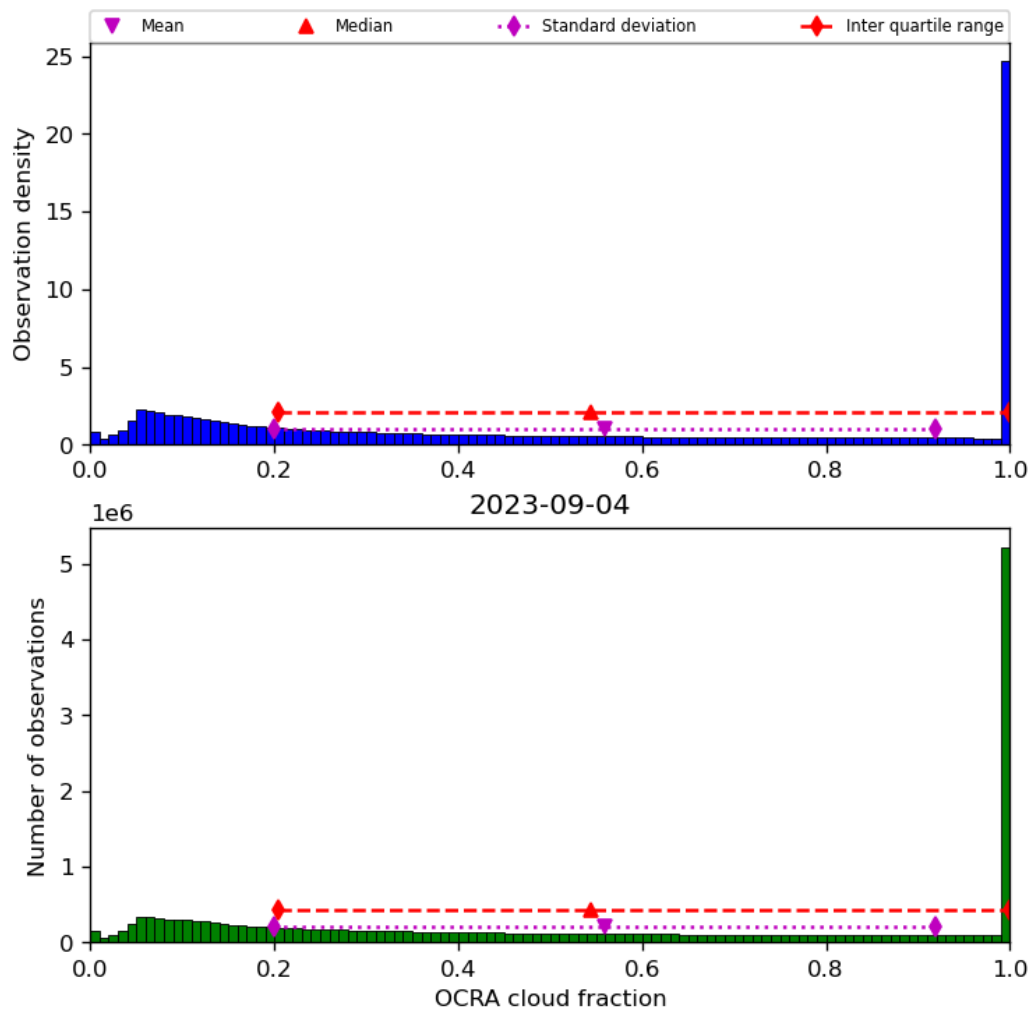


Figure 50: Histogram of “OCRA cloud fraction” for 2023-09-04 to 2023-09-05

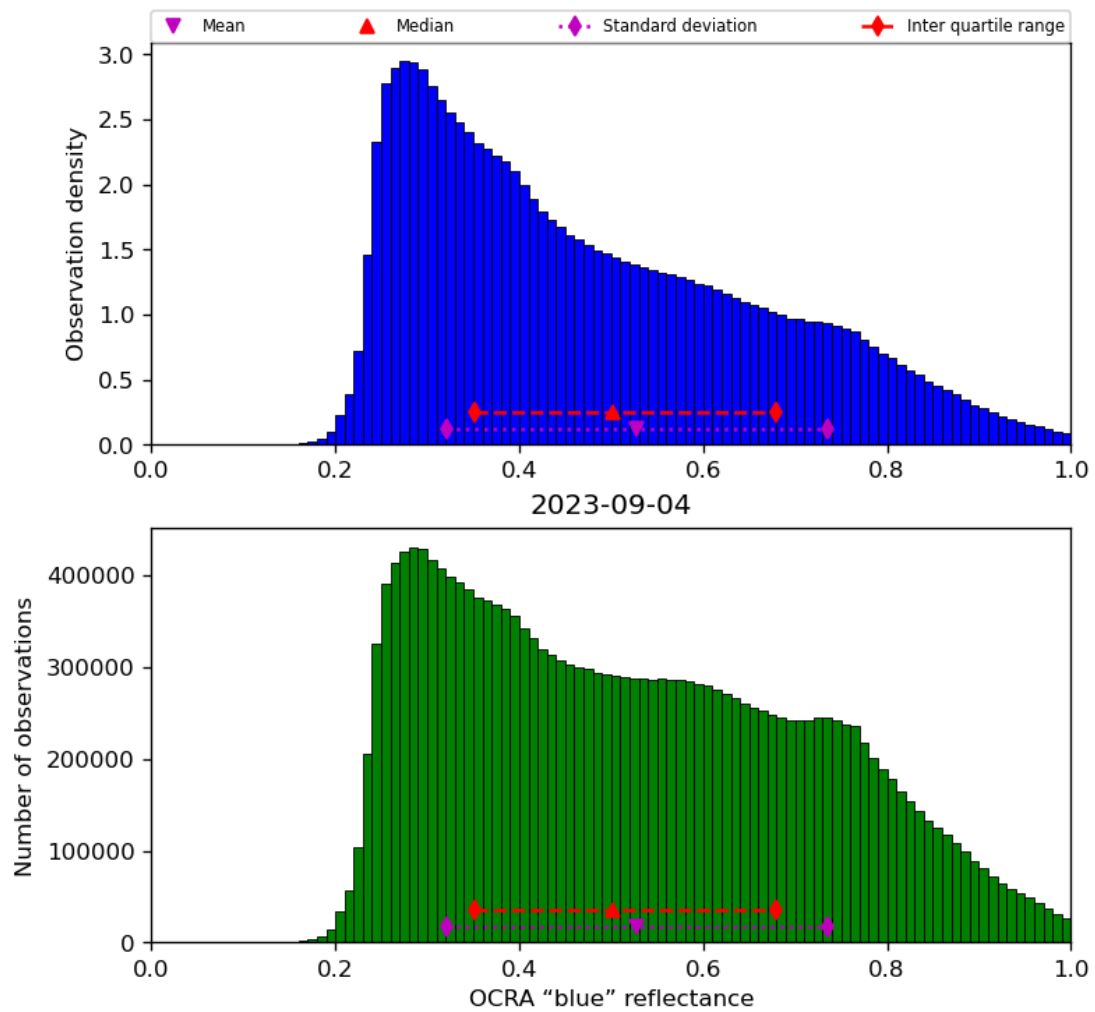


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-09-04 to 2023-09-05

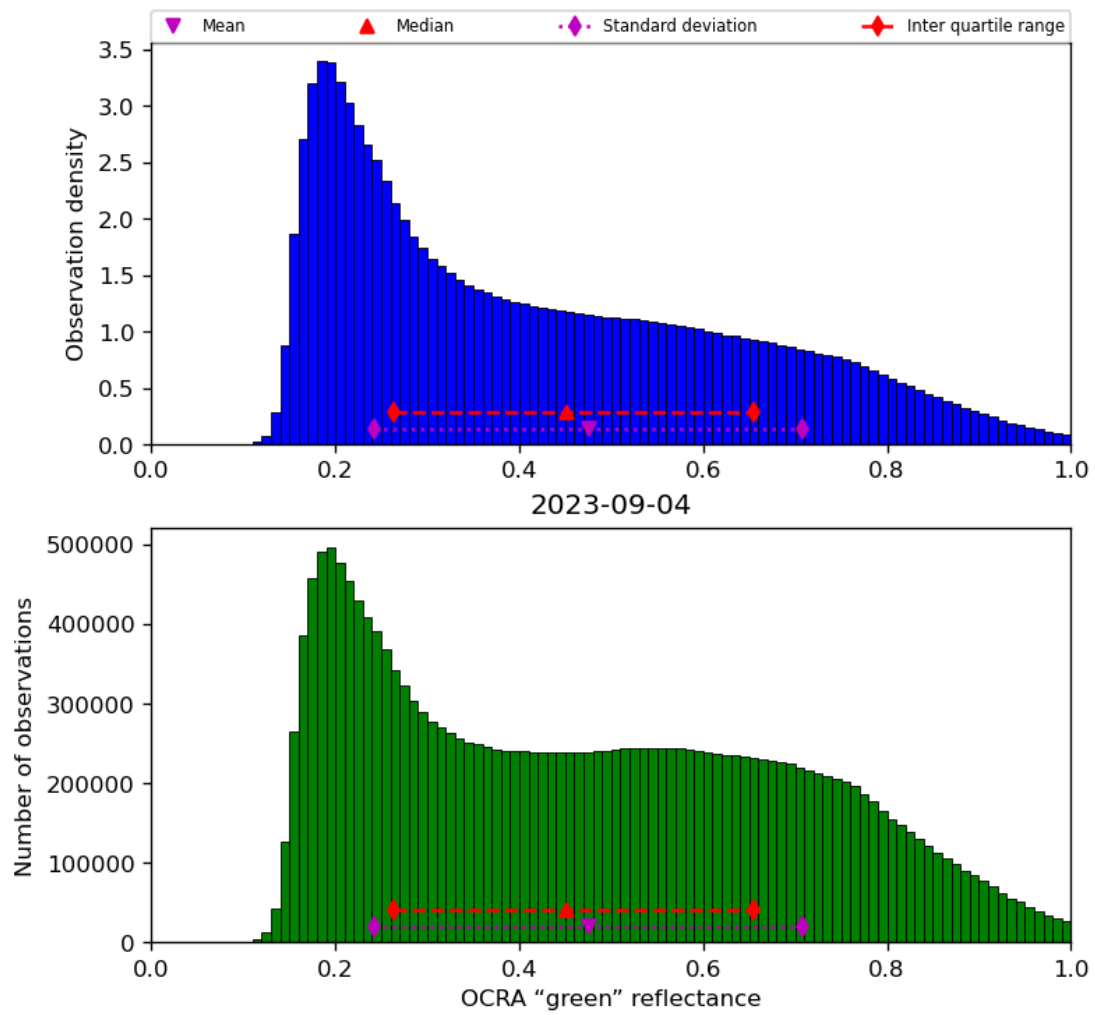


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-09-04 to 2023-09-05

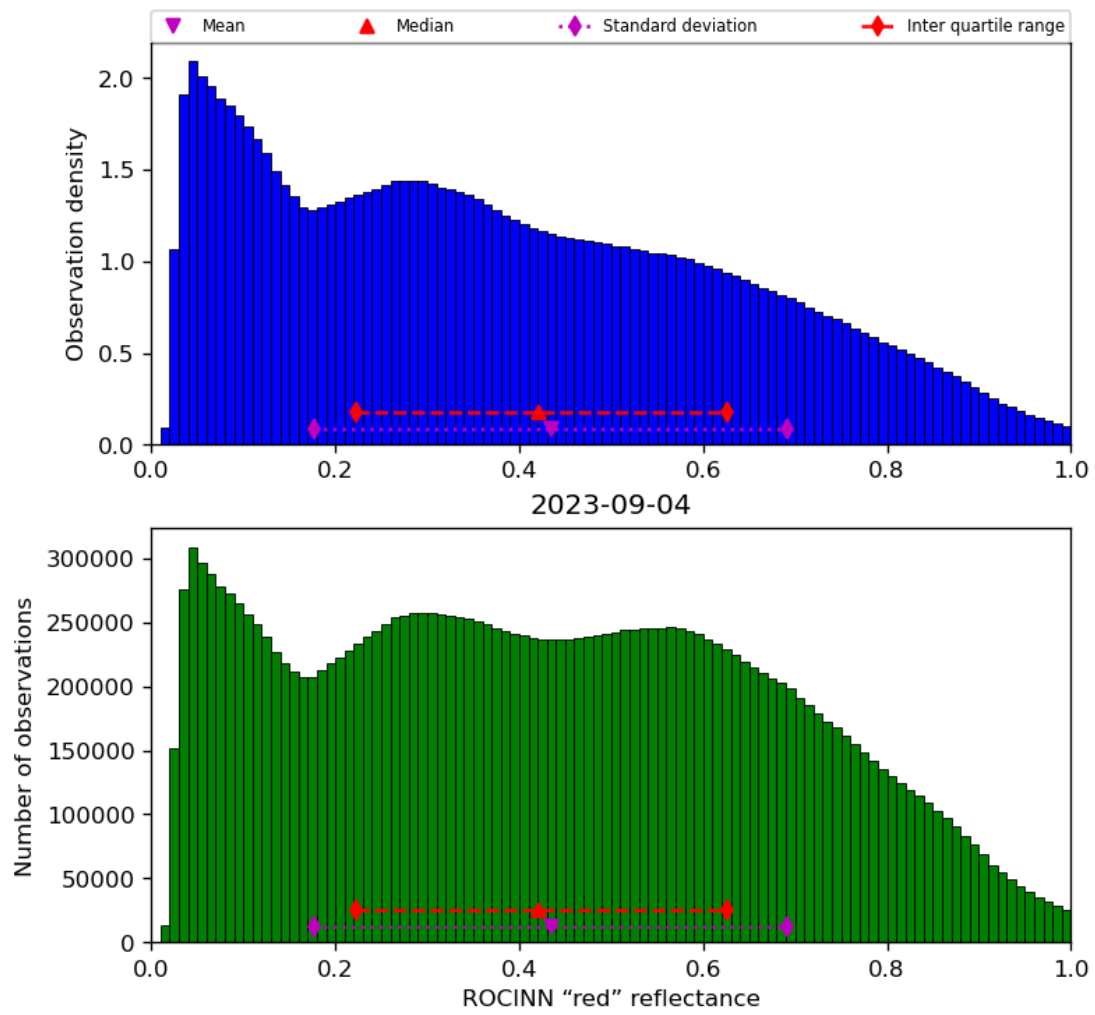


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-09-04 to 2023-09-05

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.

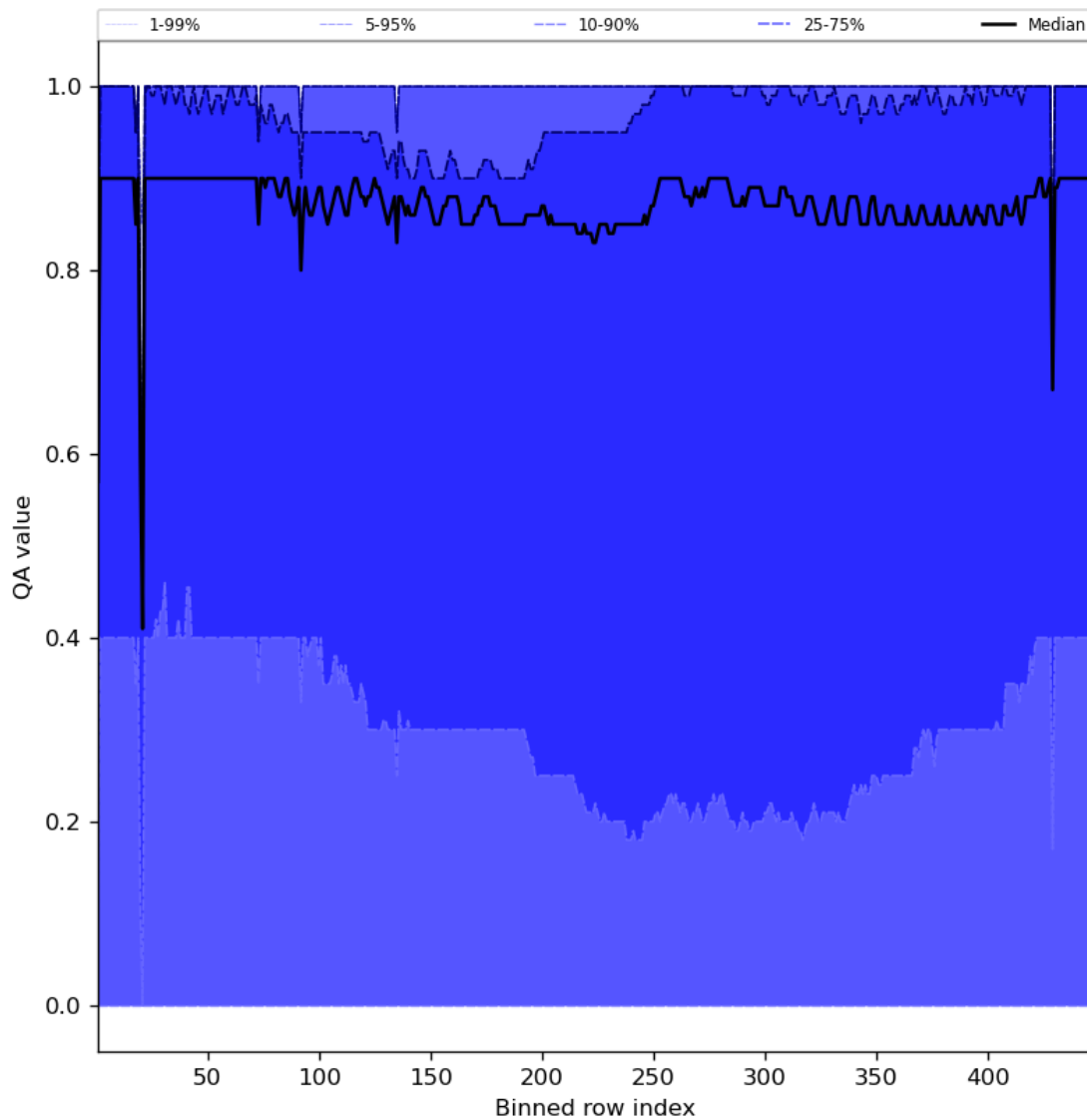


Figure 54: Along track statistics of “QA value” for 2023-09-04 to 2023-09-05

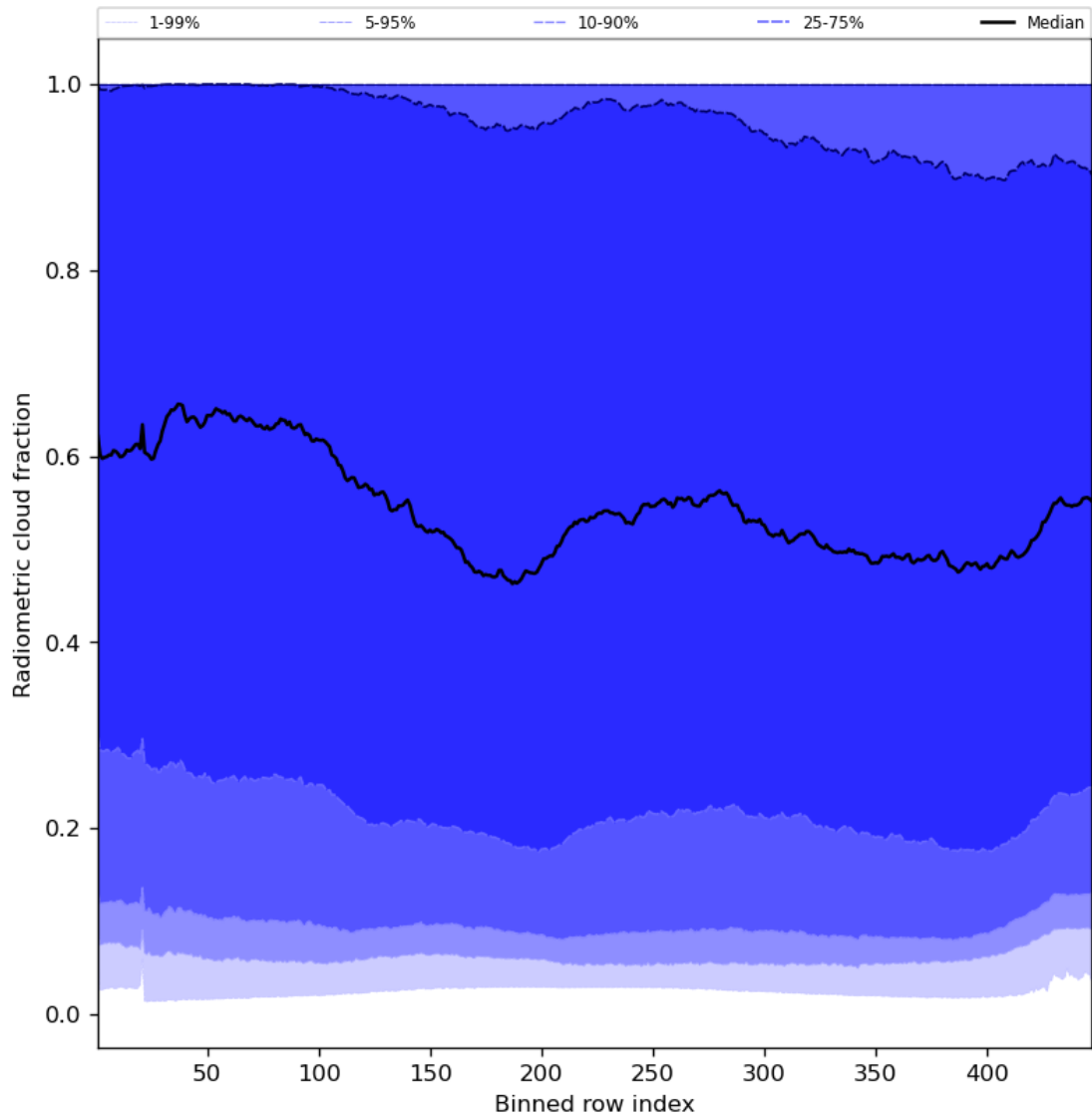


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-09-04 to 2023-09-05

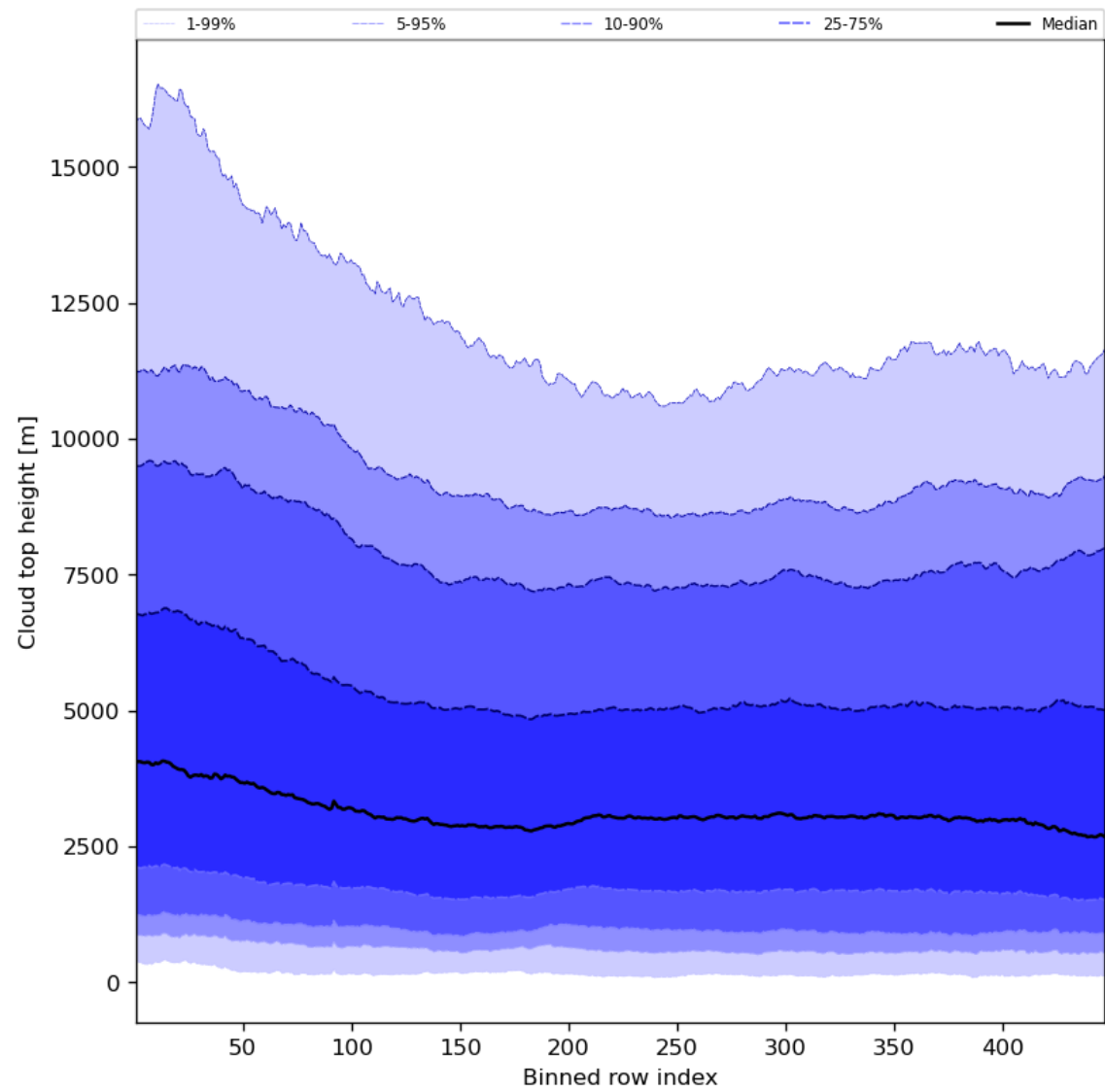


Figure 56: Along track statistics of “Cloud top height” for 2023-09-04 to 2023-09-05

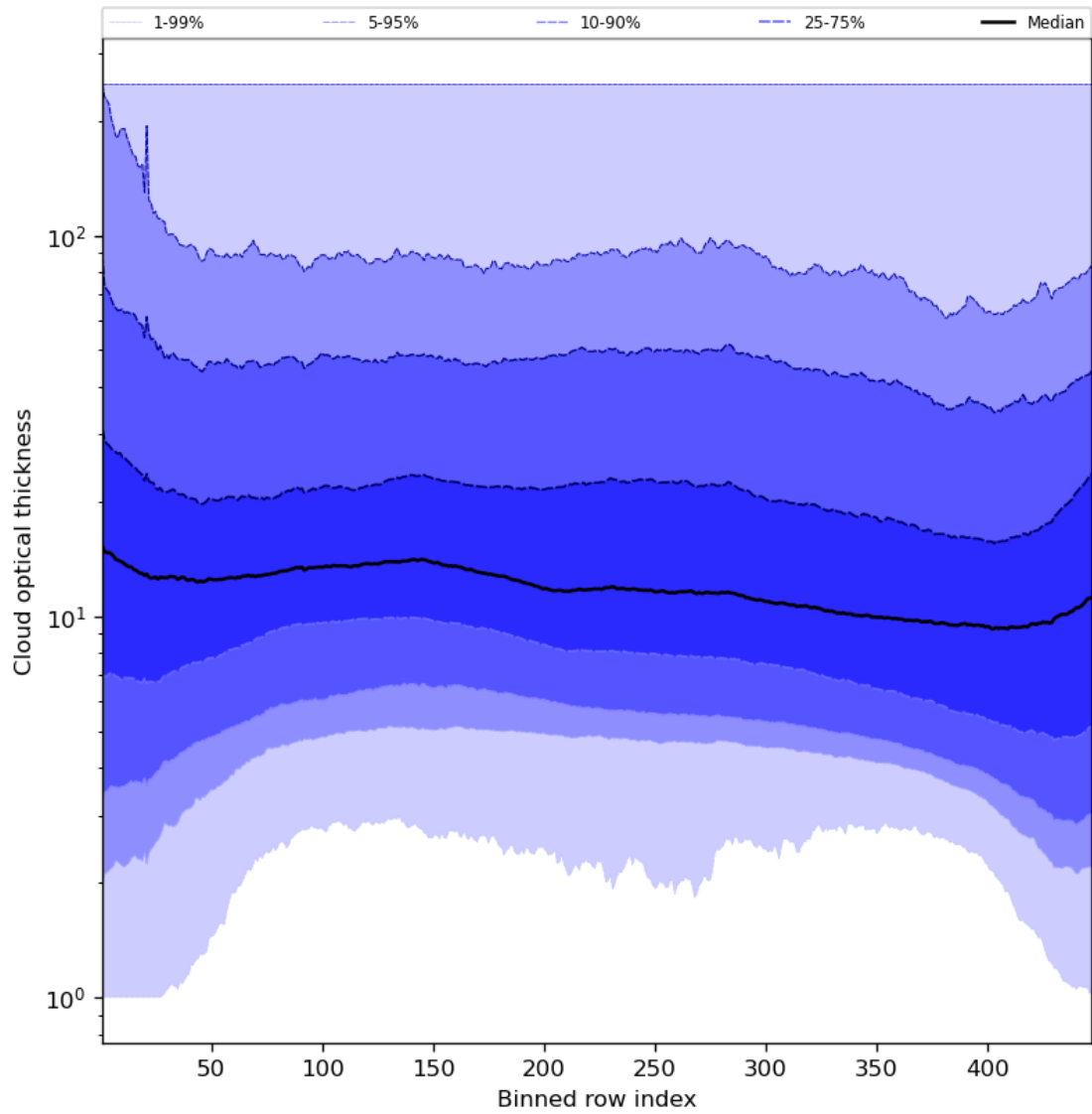


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-09-04 to 2023-09-05

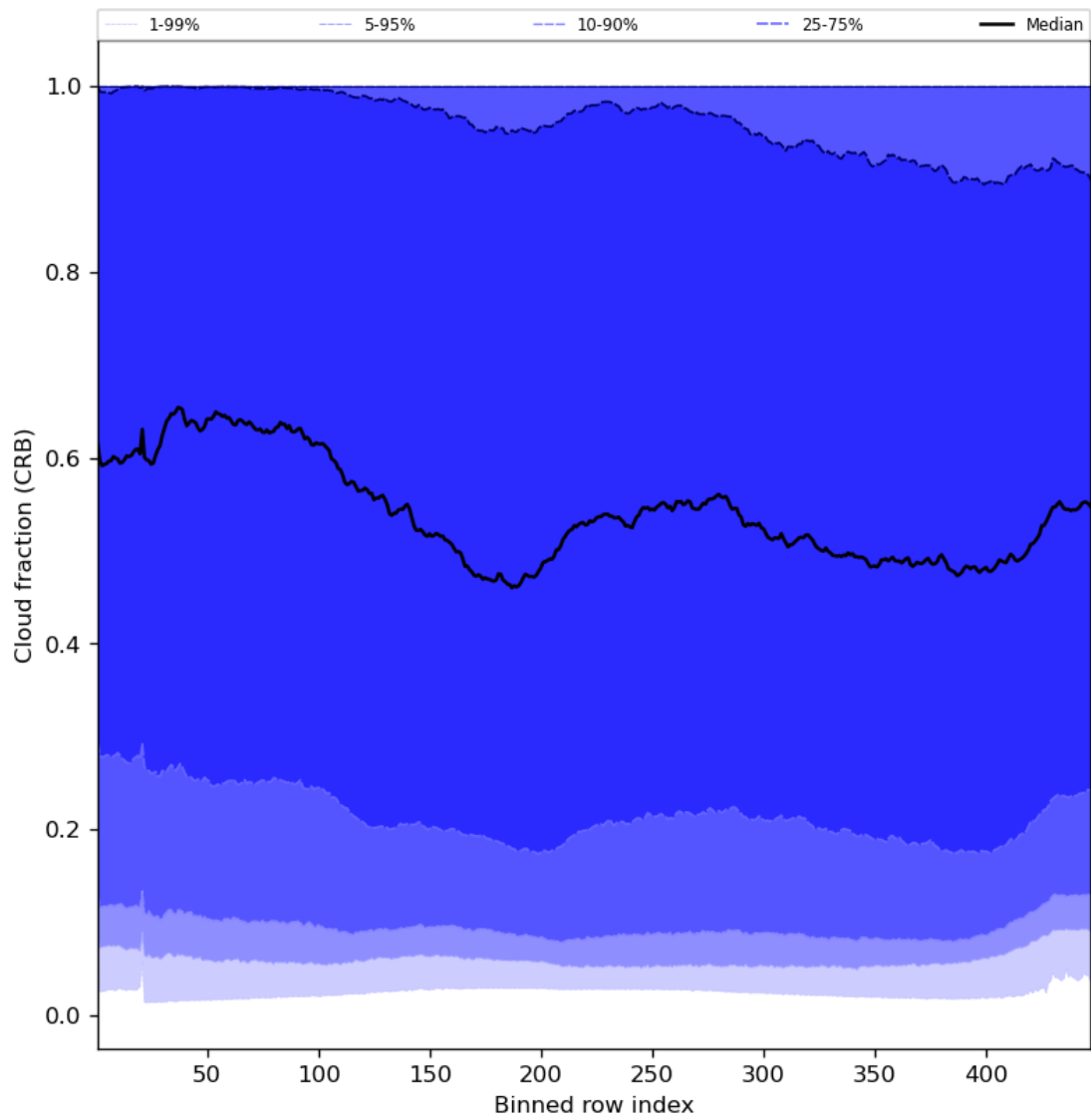


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-09-04 to 2023-09-05

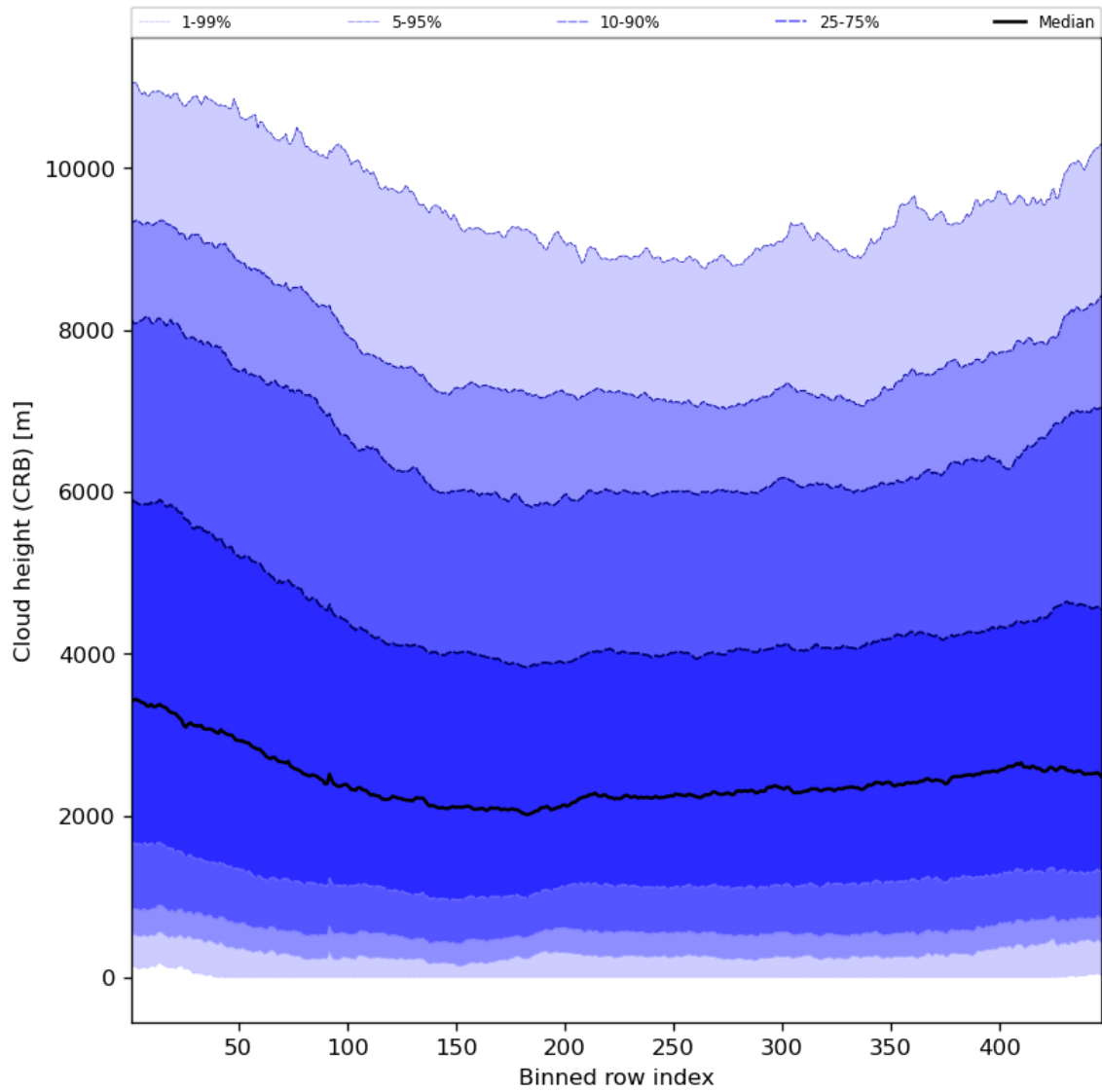


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-09-04 to 2023-09-05

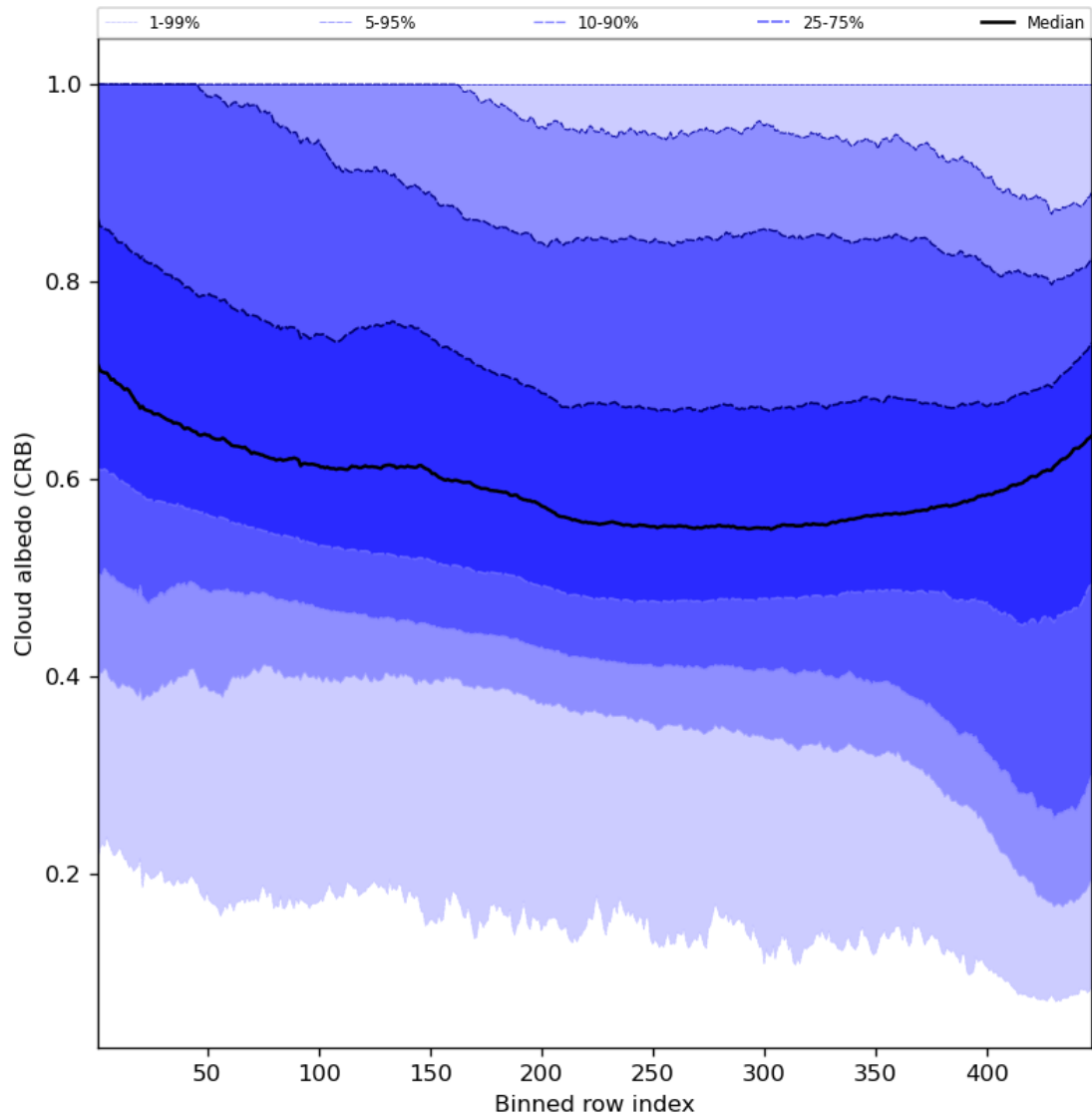


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-09-04 to 2023-09-05

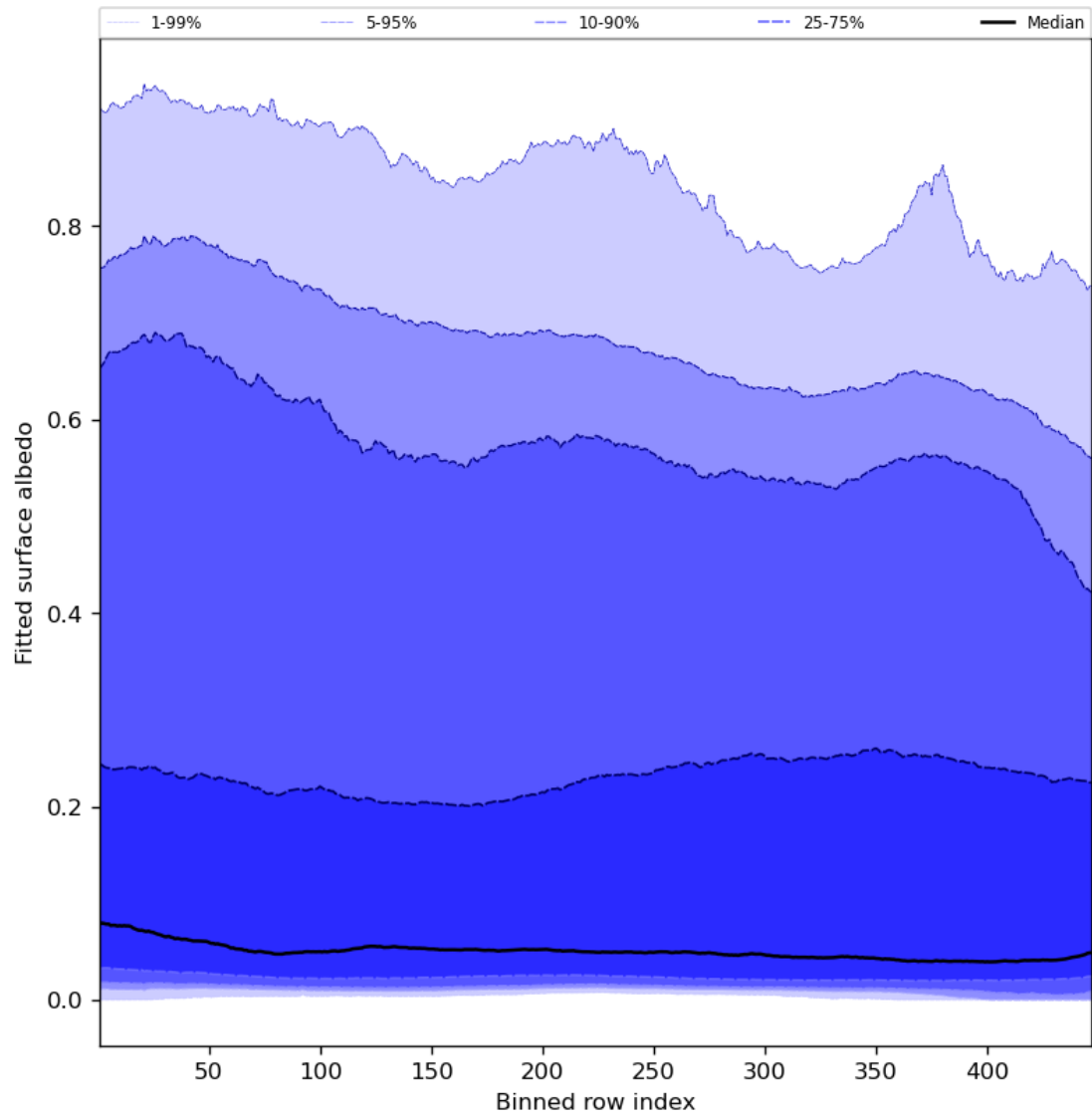


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-09-04 to 2023-09-05

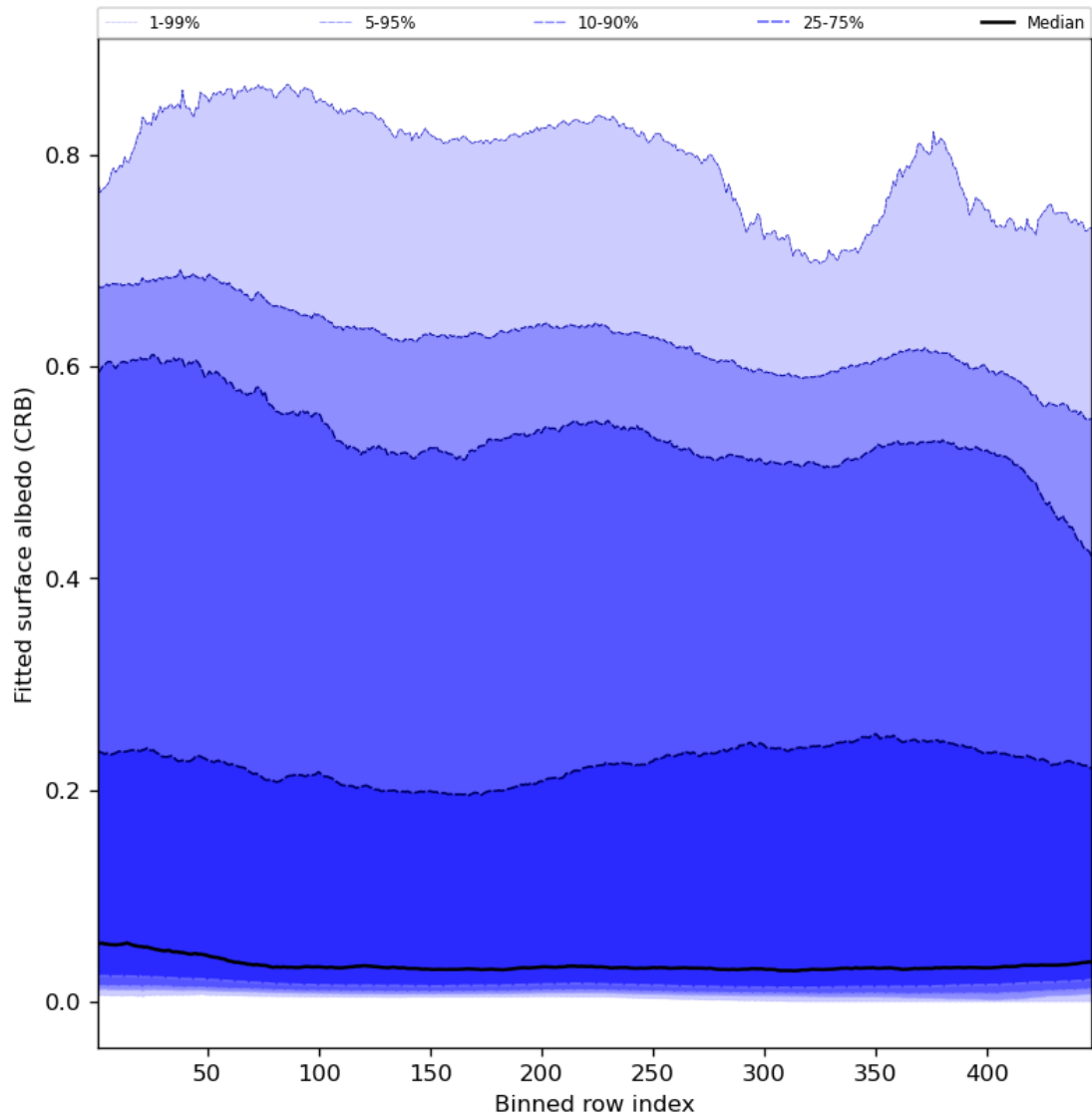


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-09-04 to 2023-09-05

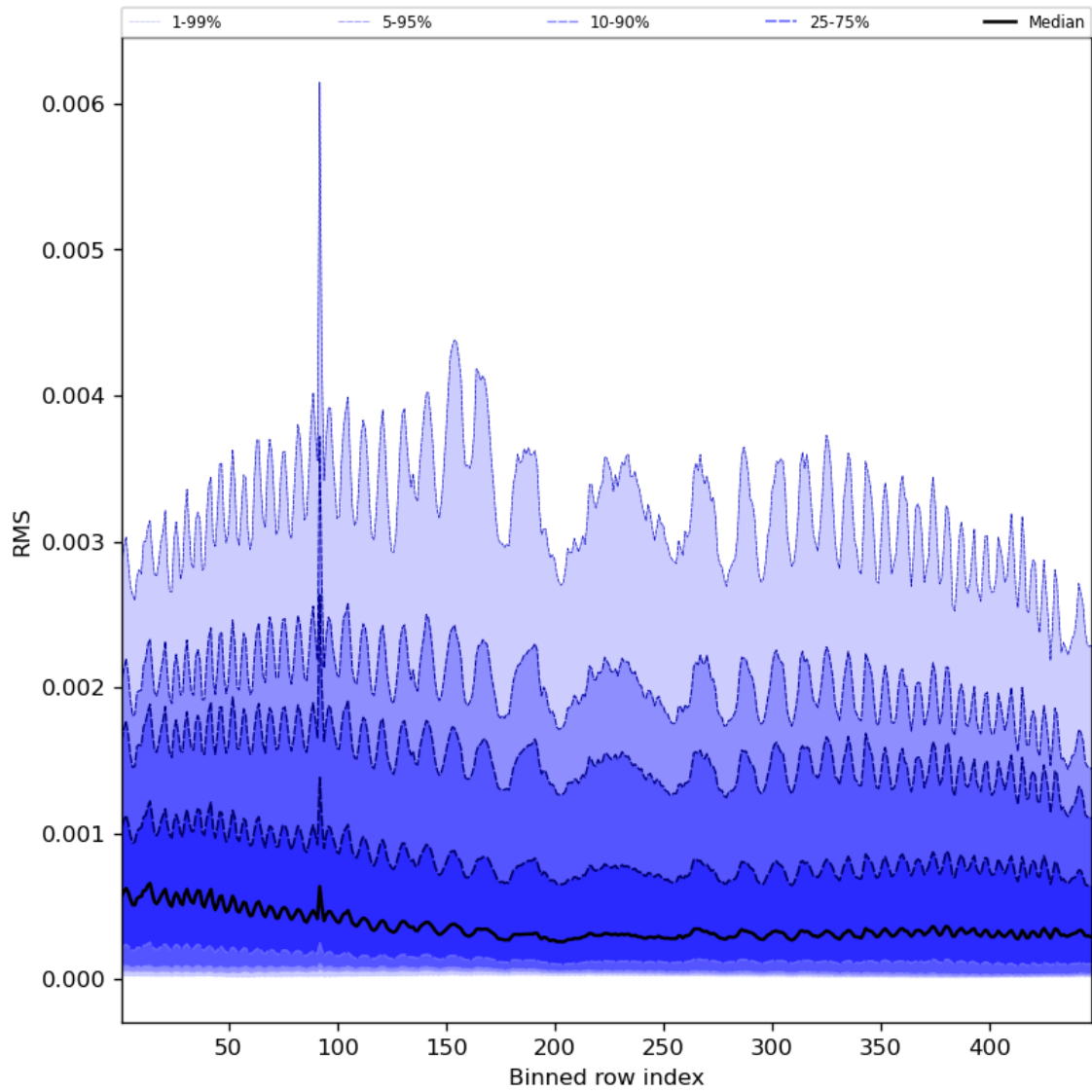


Figure 63: Along track statistics of “RMS” for 2023-09-04 to 2023-09-05

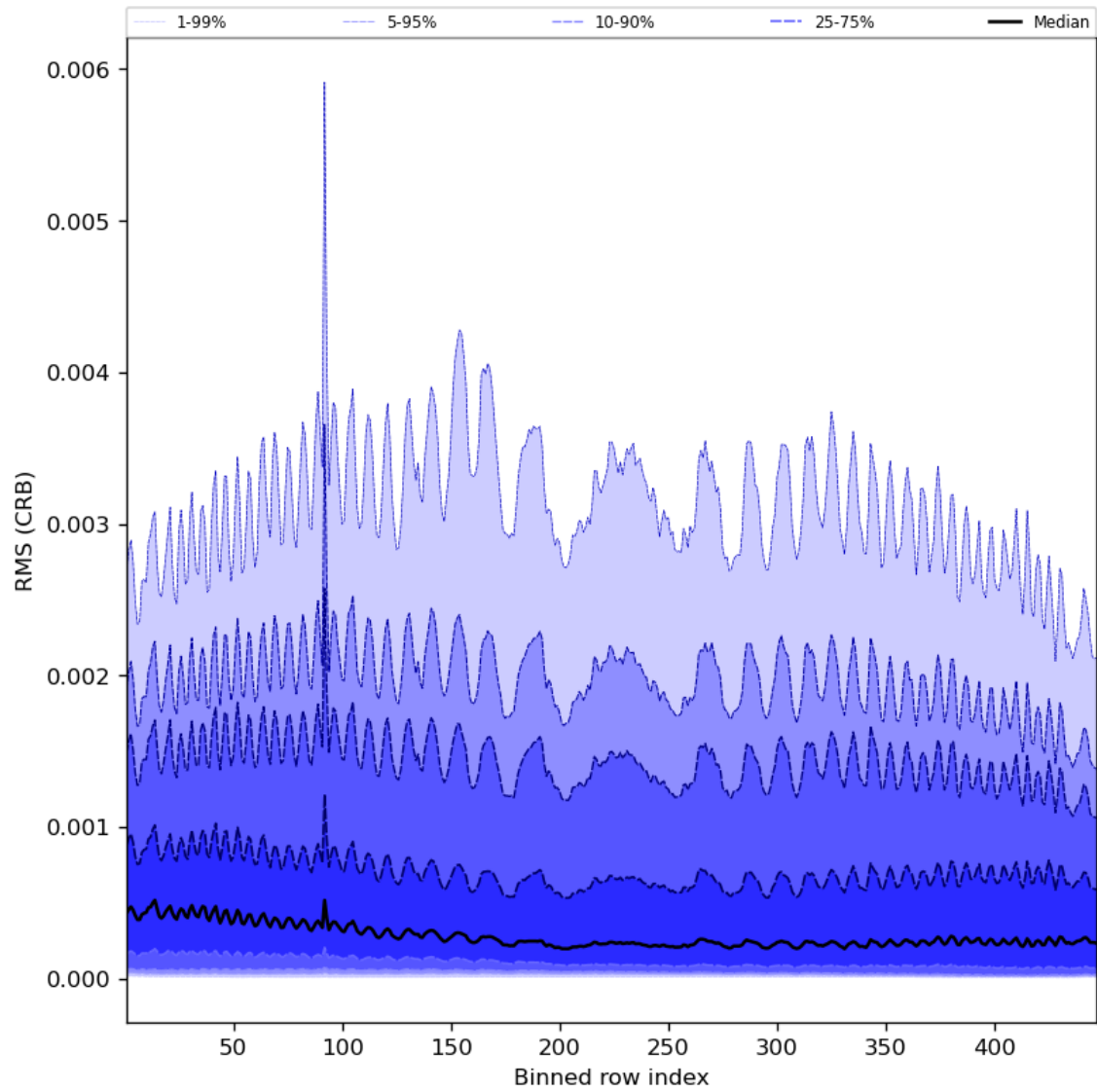


Figure 64: Along track statistics of “RMS (CRB)” for 2023-09-04 to 2023-09-05

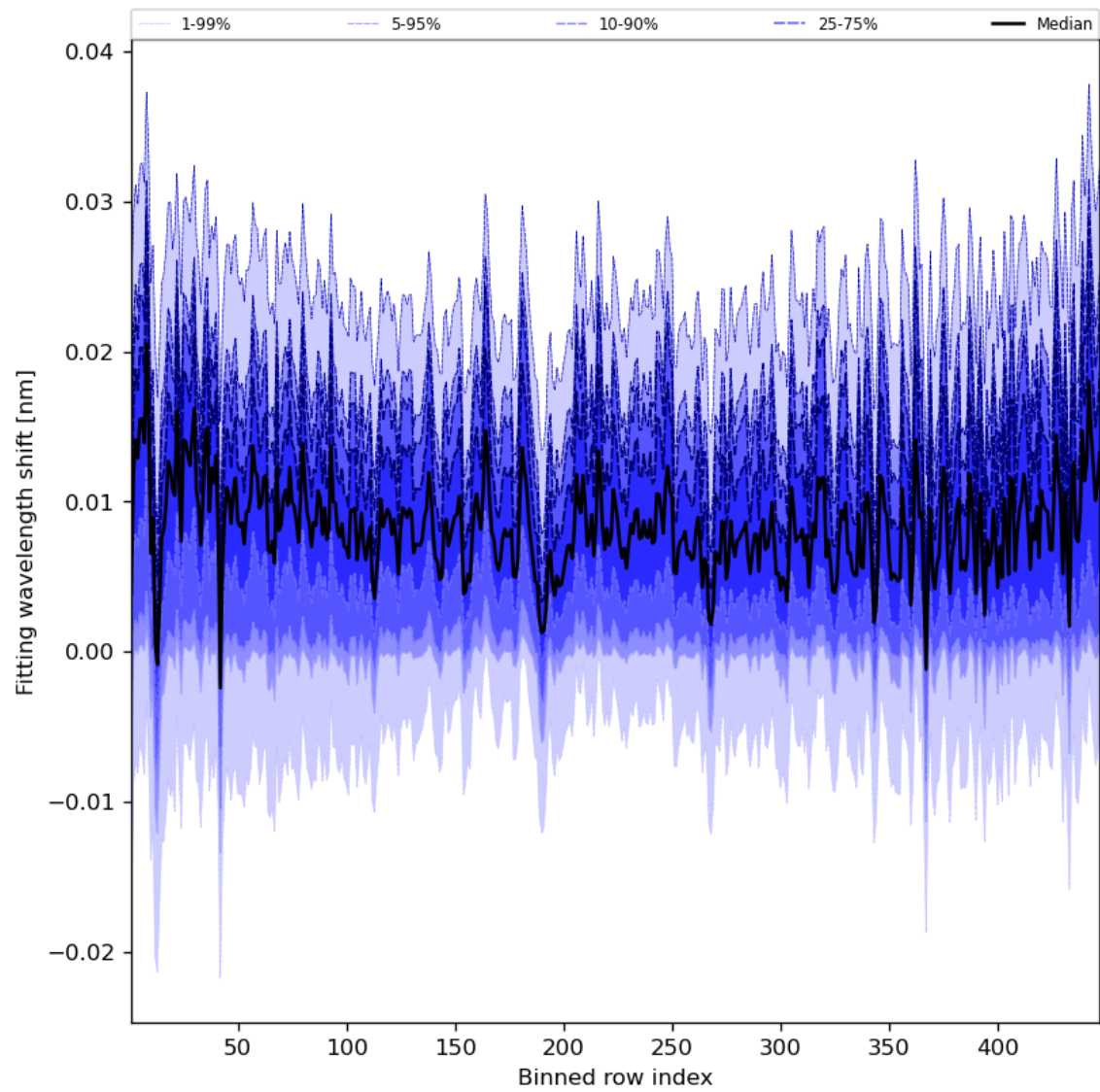


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-09-04 to 2023-09-05

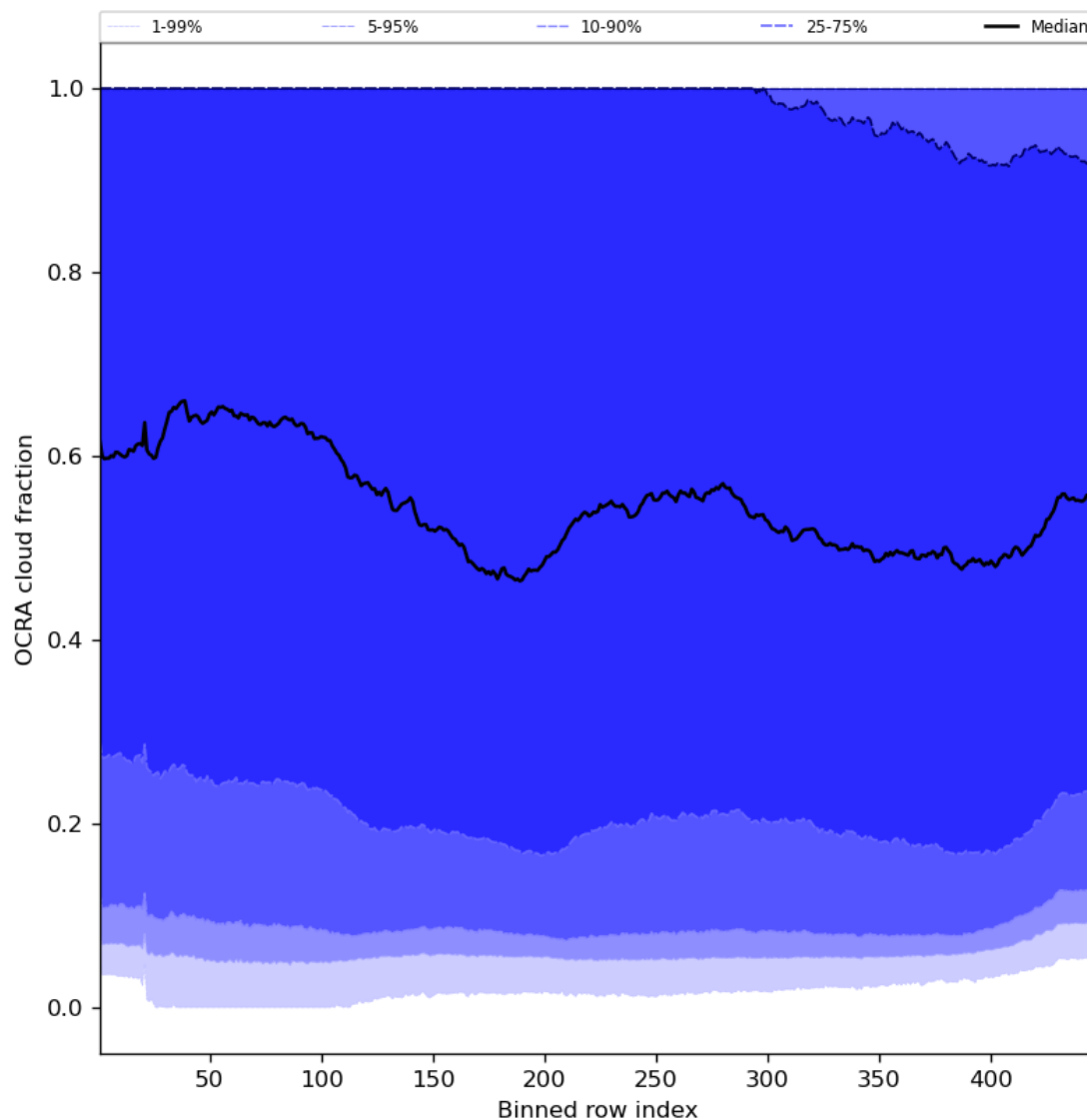


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-09-04 to 2023-09-05

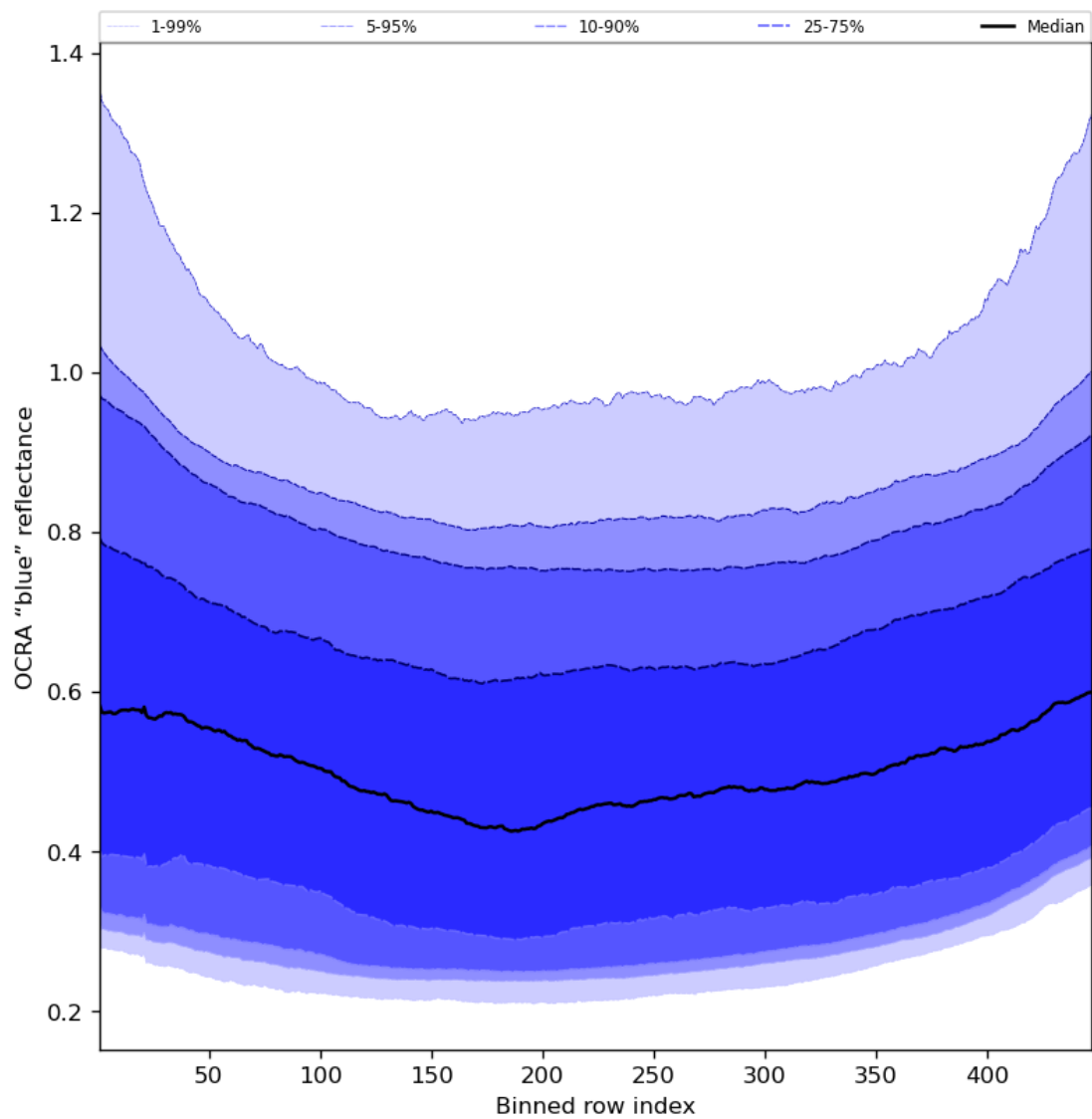


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-09-04 to 2023-09-05

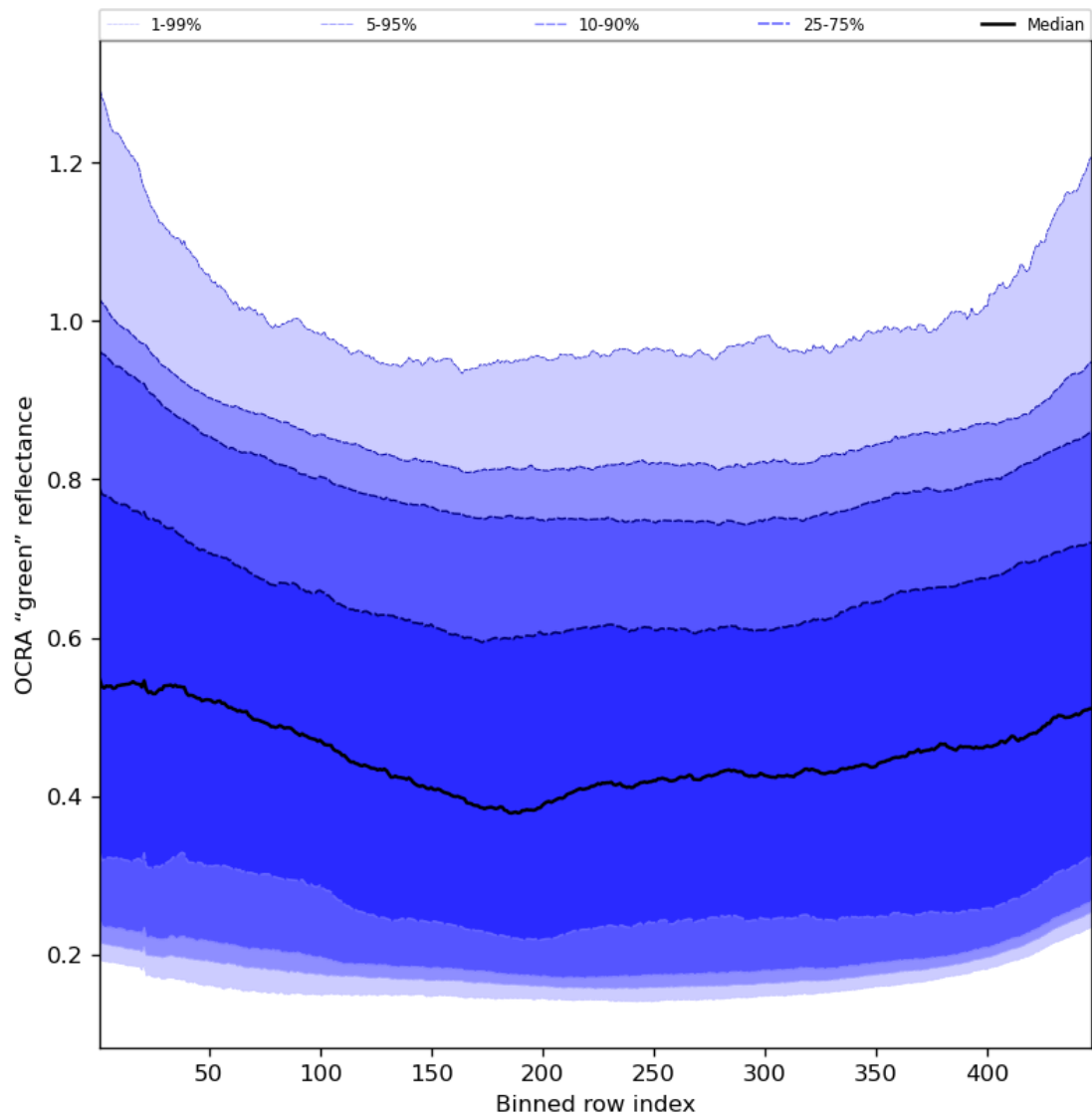


Figure 68: Along track statistics of “OCRA “green” reflectance” for 2023-09-04 to 2023-09-05

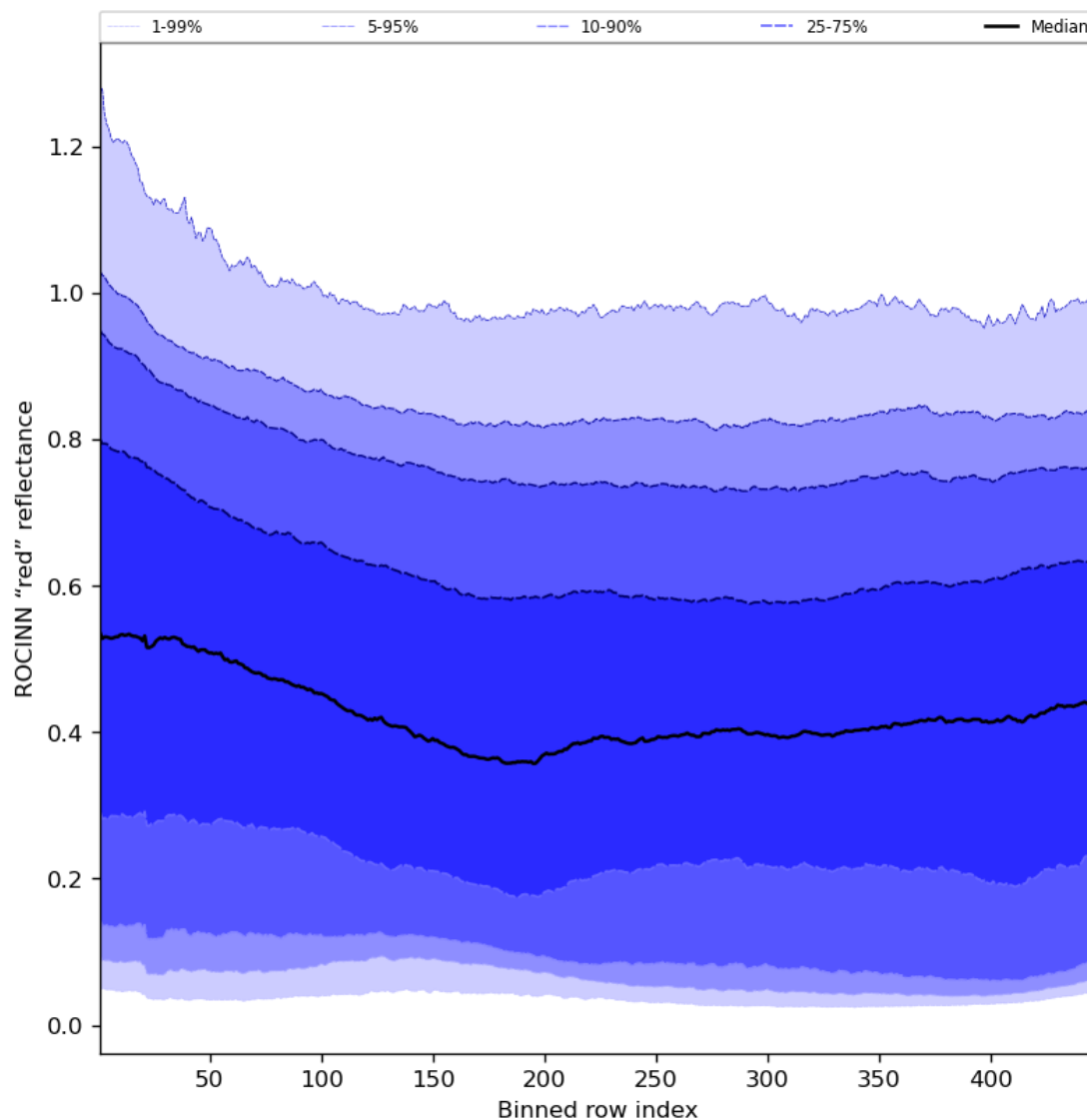


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2023-09-04 to 2023-09-05

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.

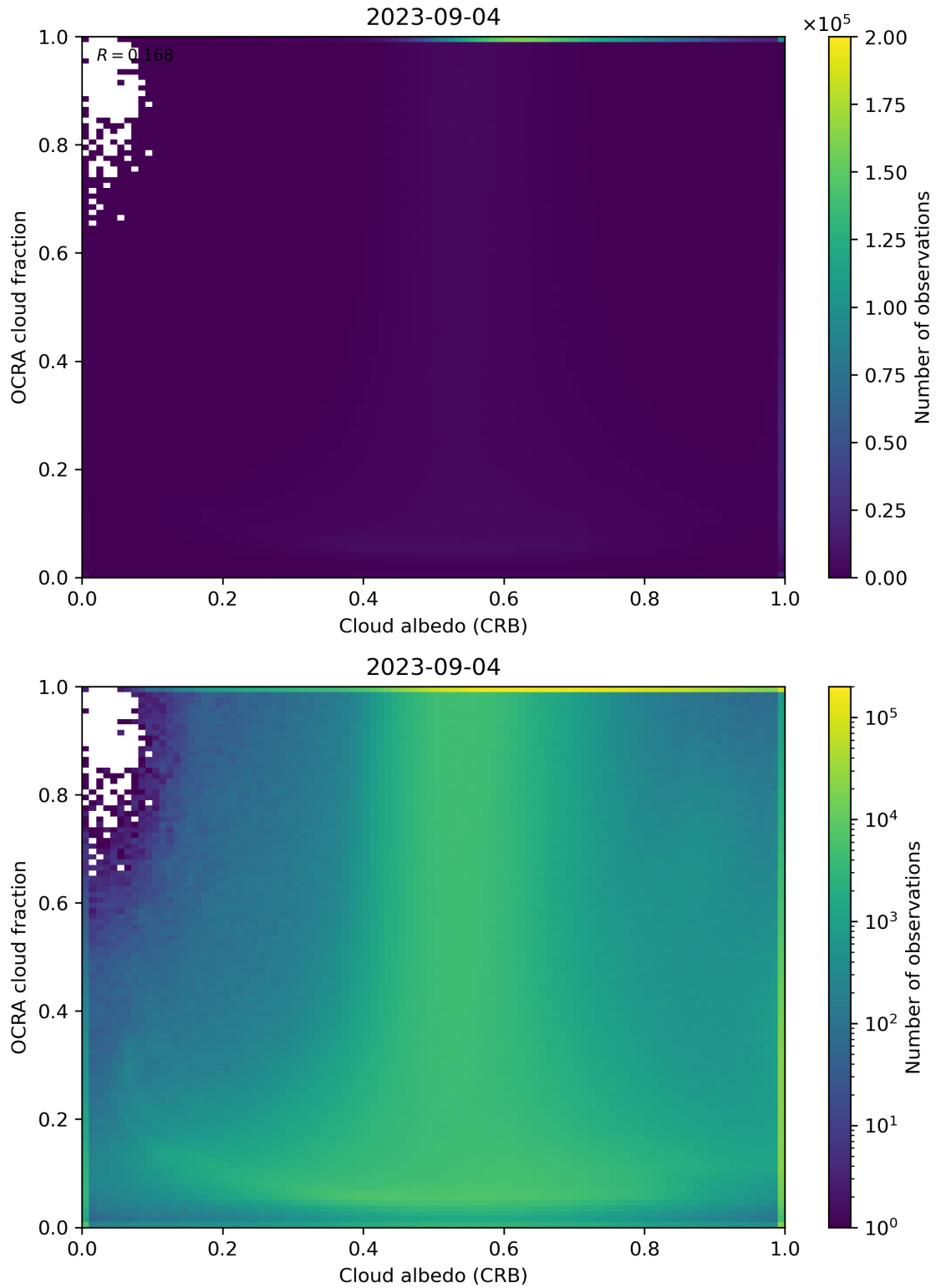


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-09-04 to 2023-09-05.

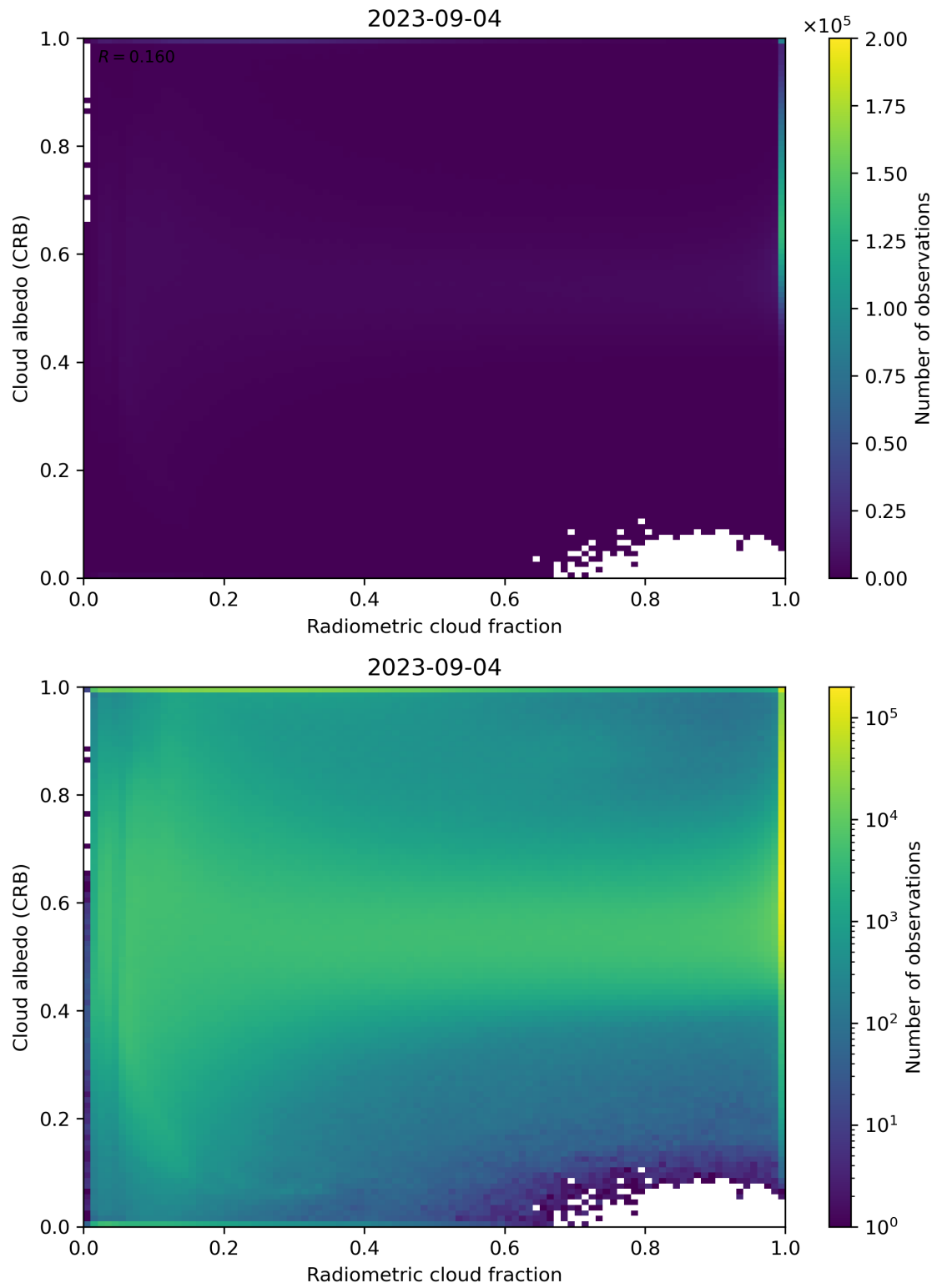


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-09-04 to 2023-09-05.

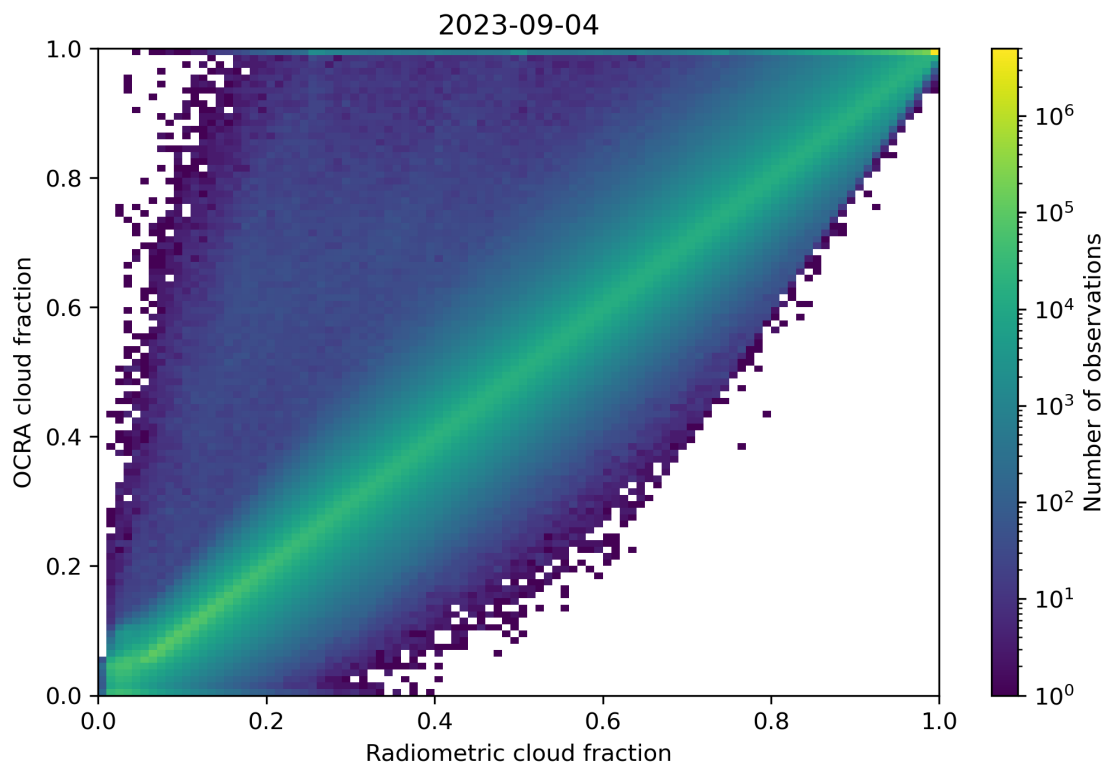
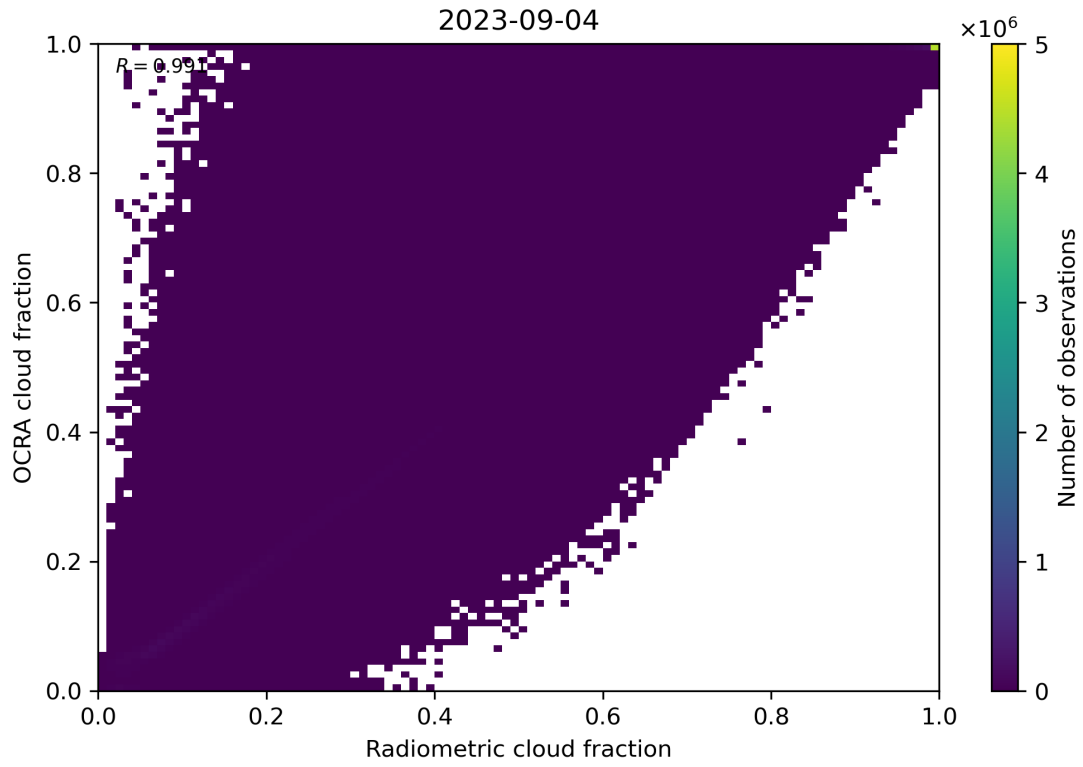


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-09-04 to 2023-09-05.

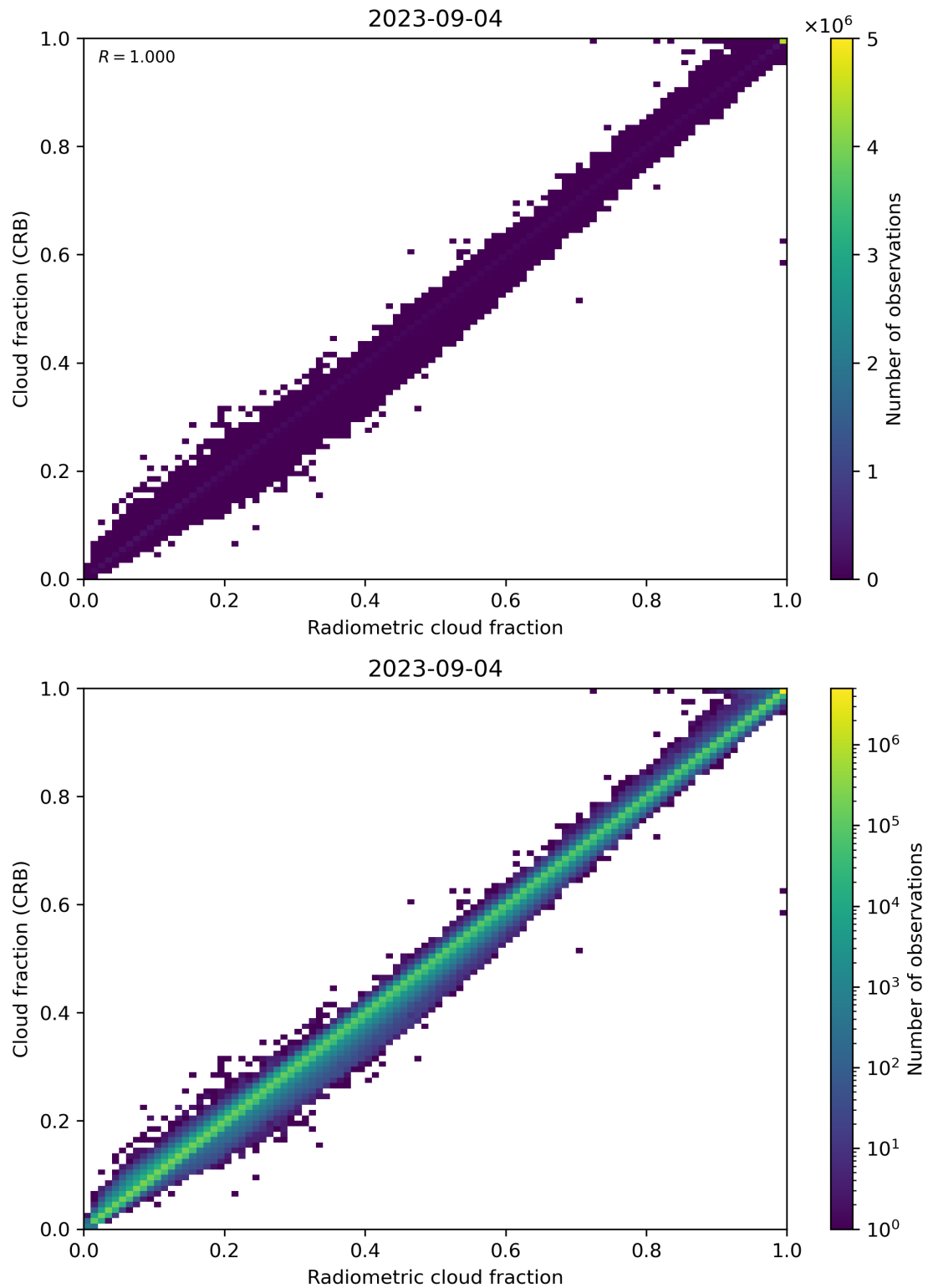


Figure 73: Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2023-09-04 to 2023-09-05.

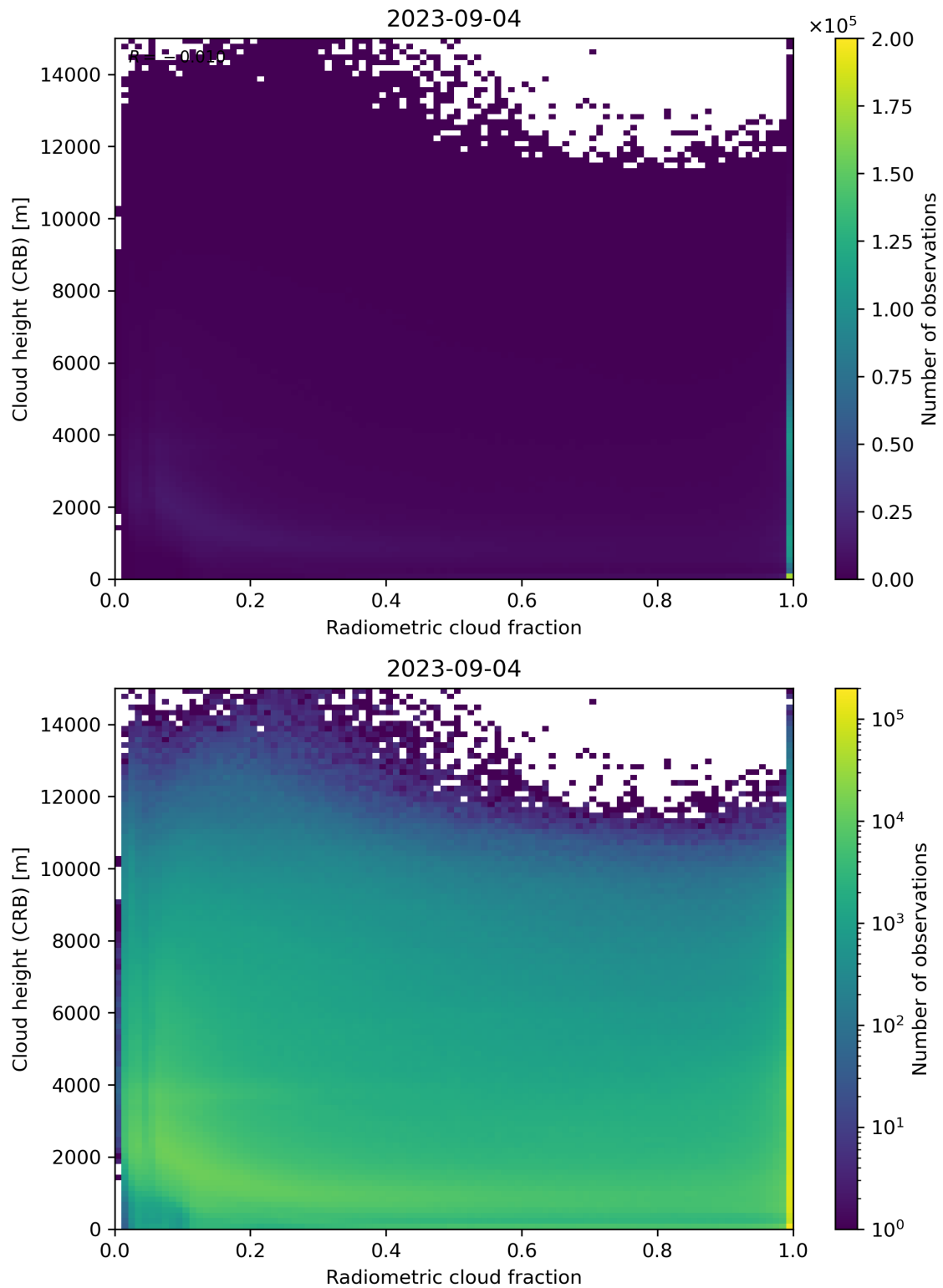


Figure 74: Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2023-09-04 to 2023-09-05.

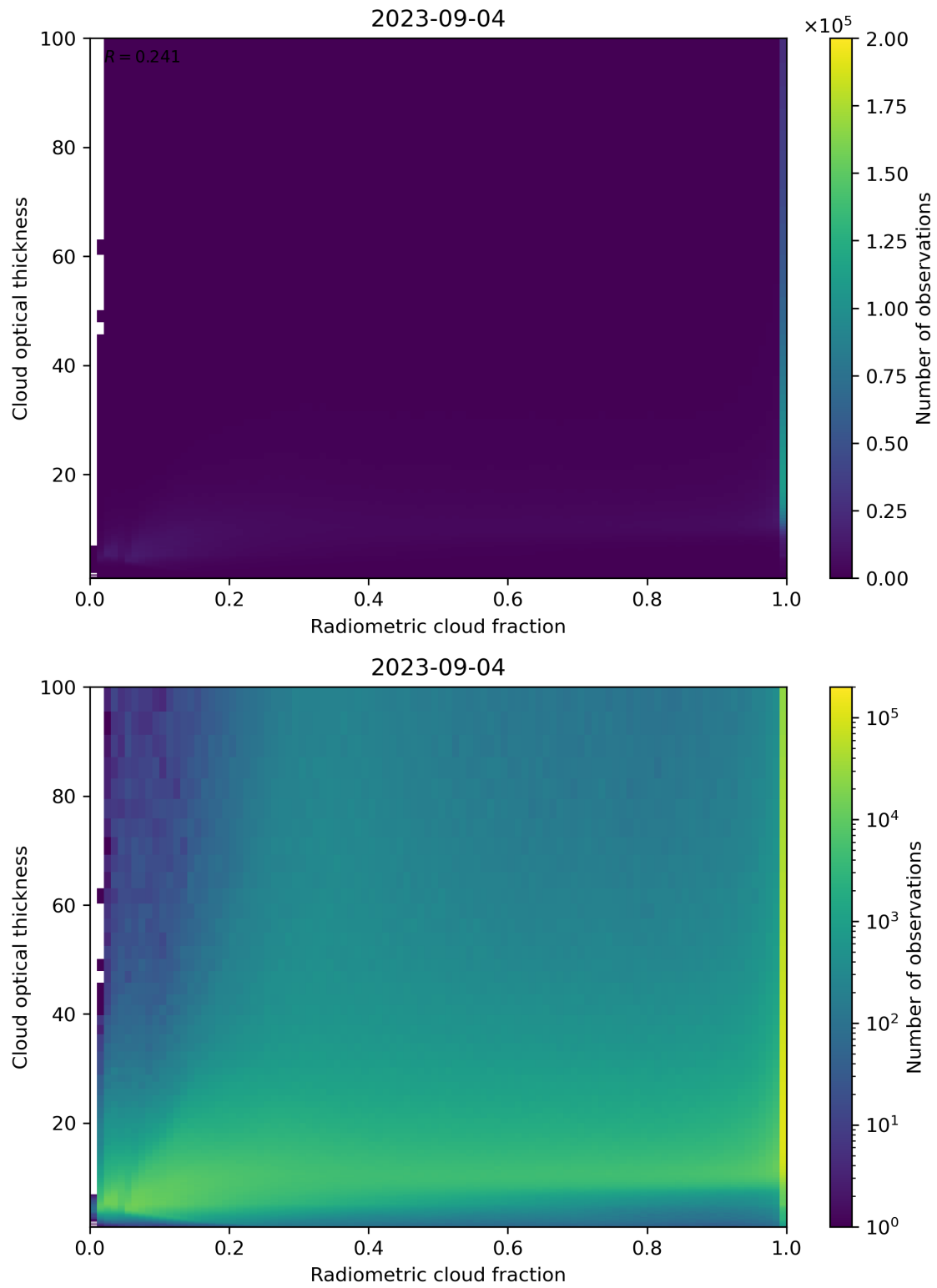


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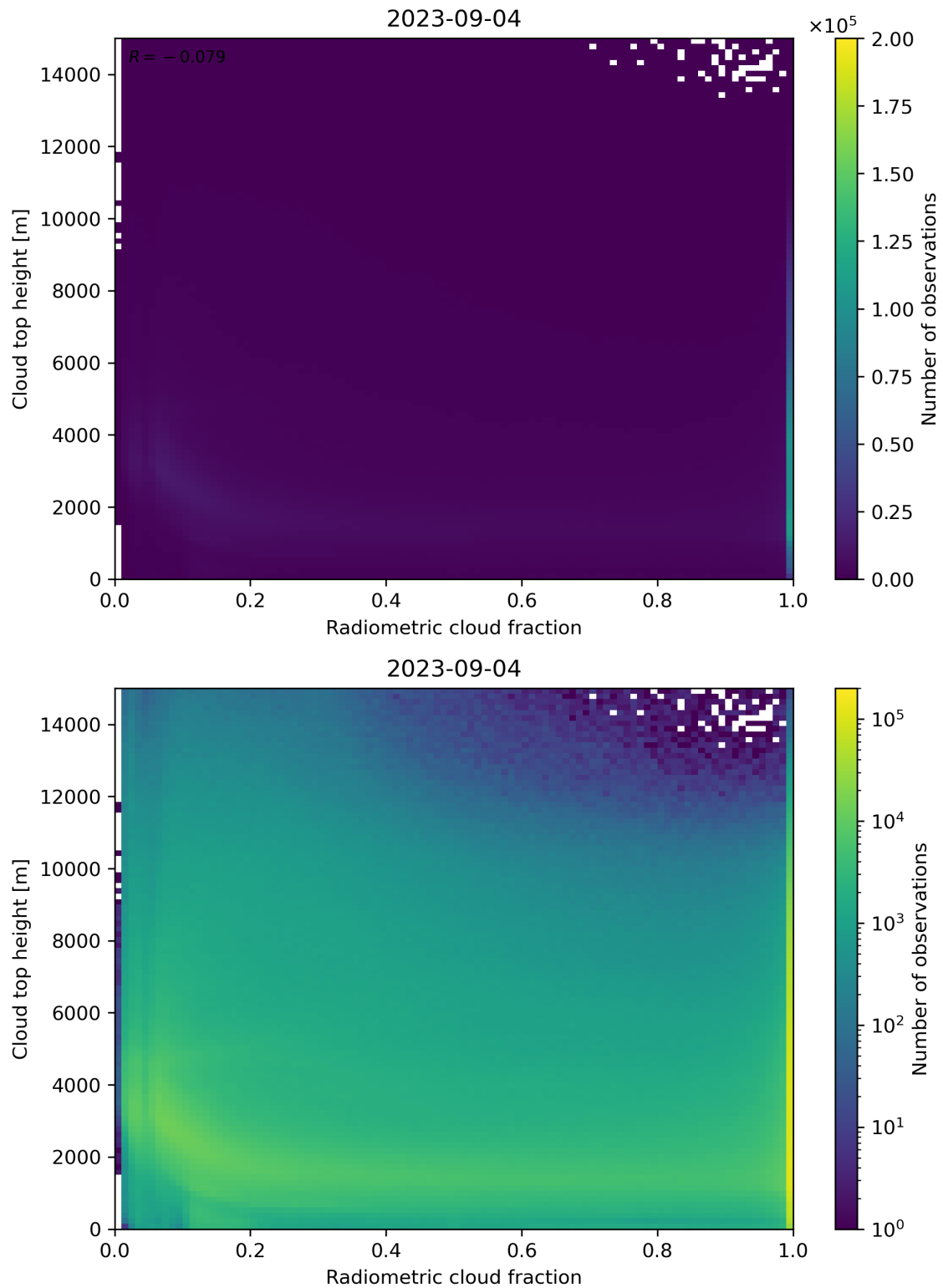


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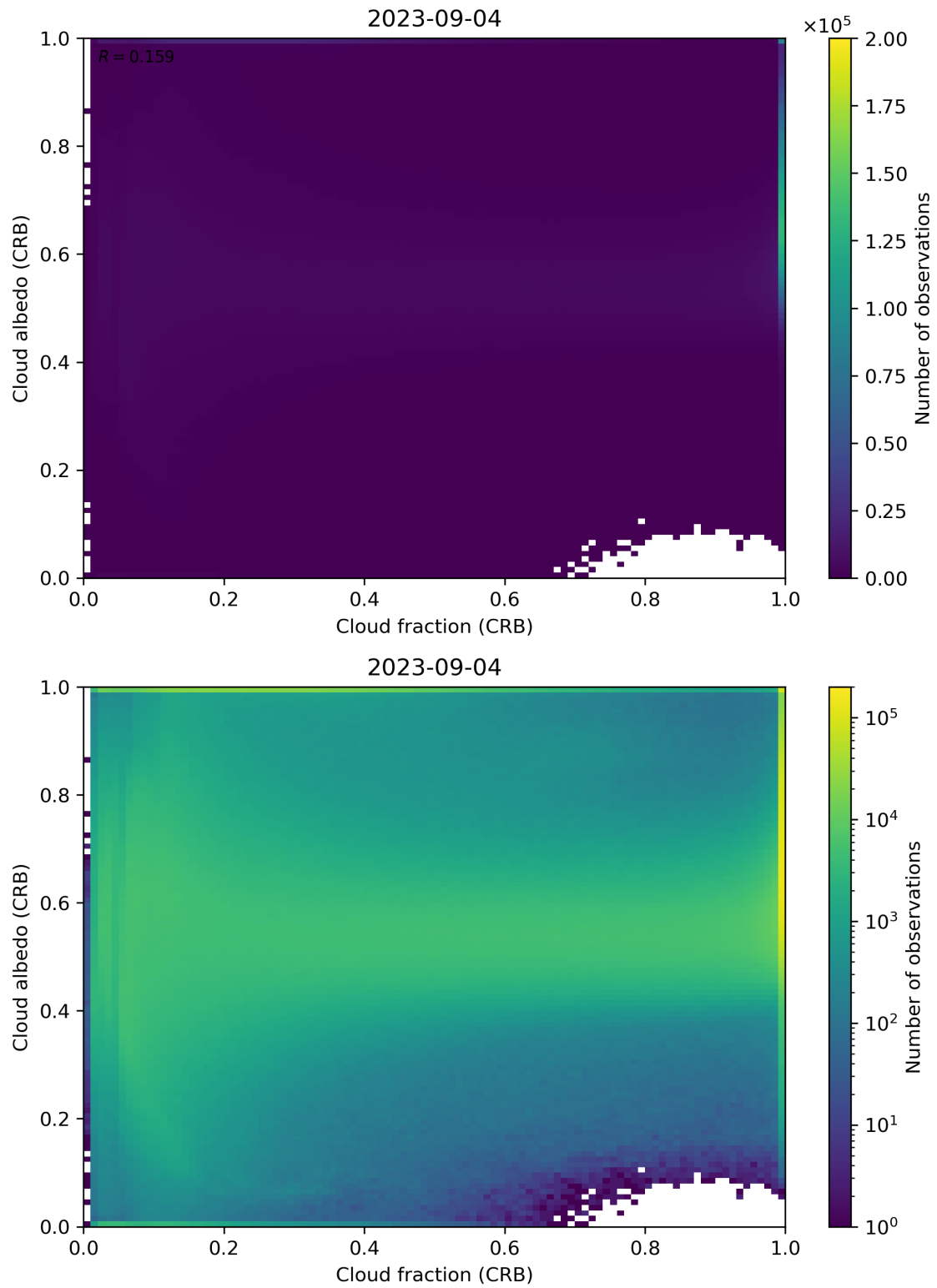


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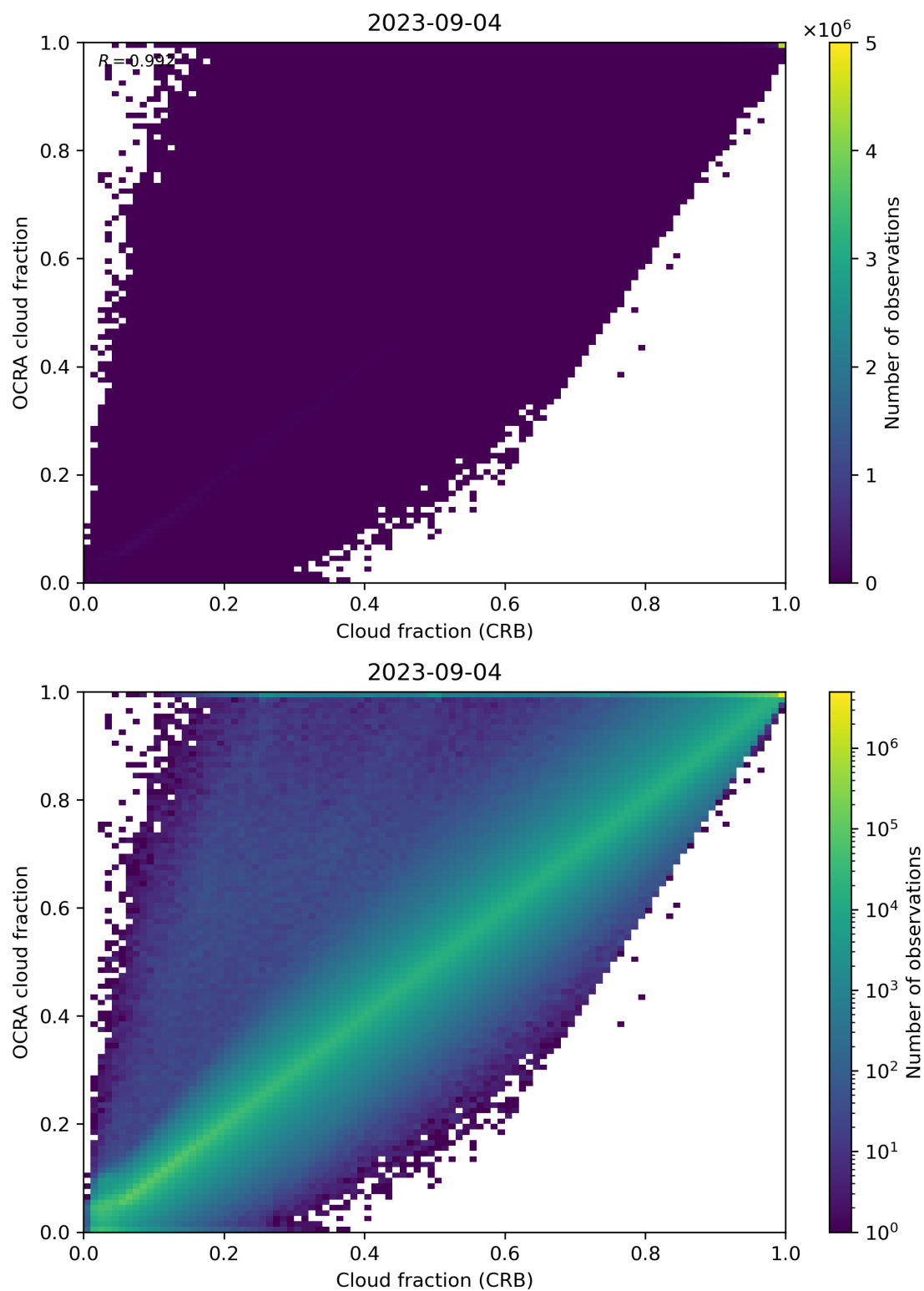


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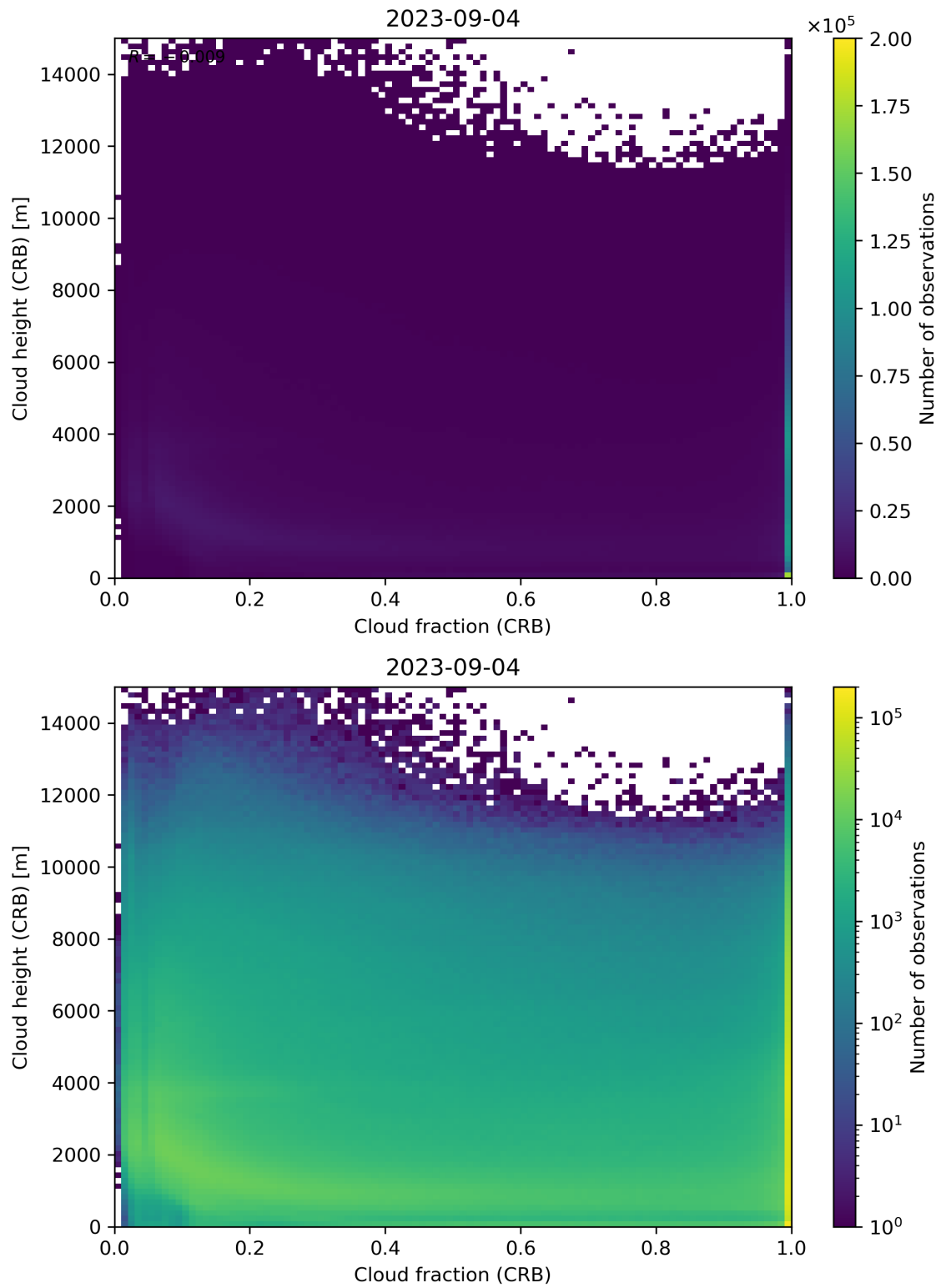


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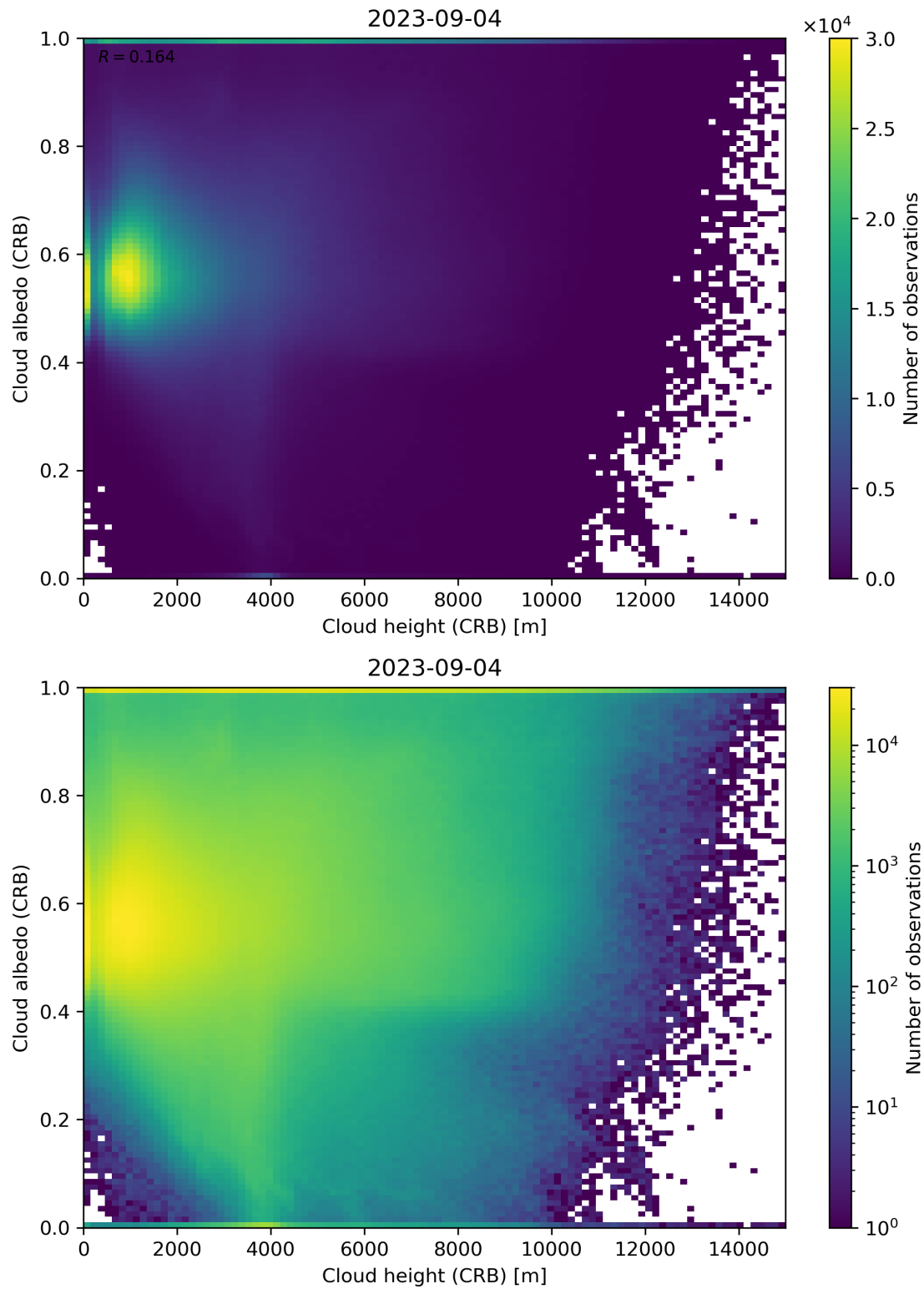


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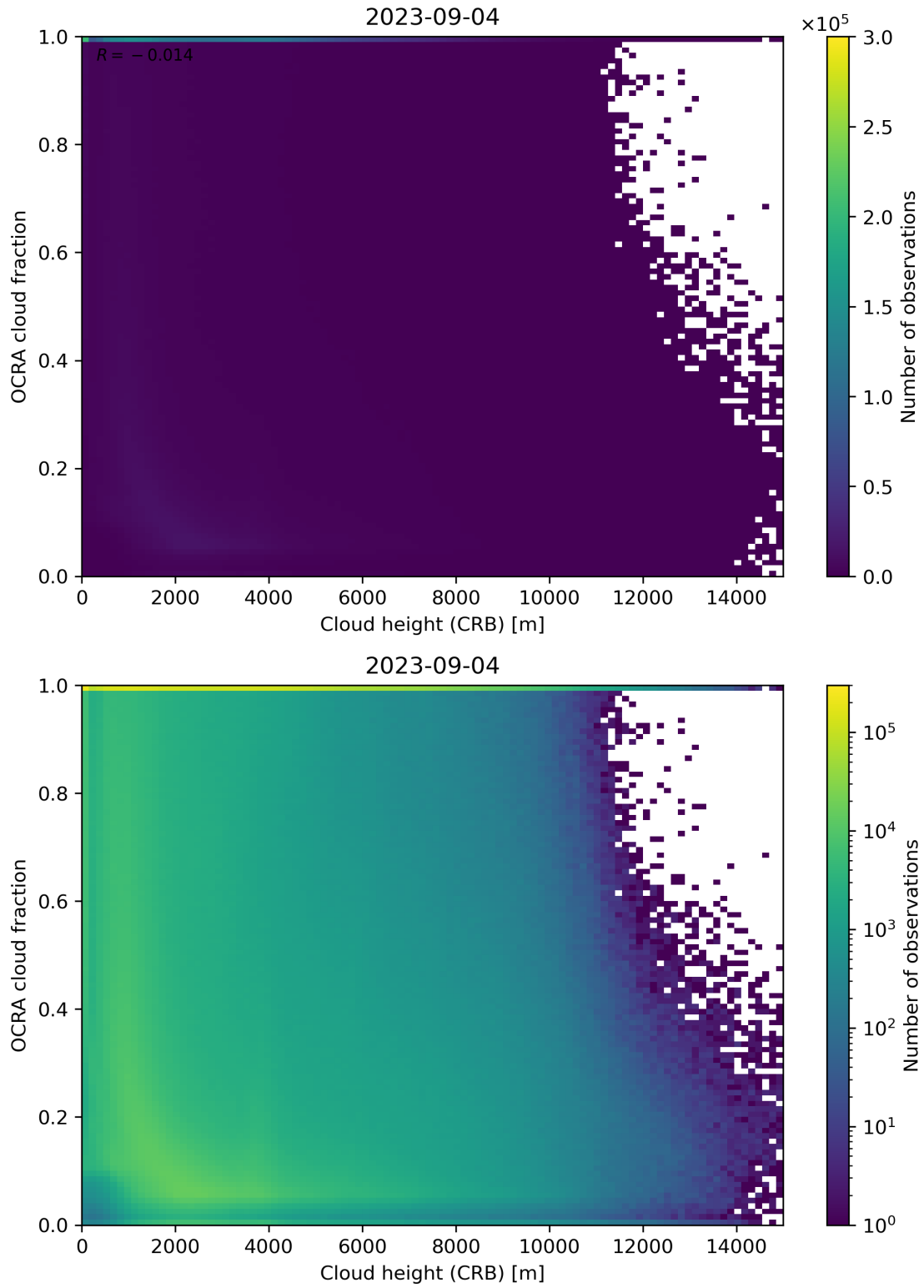


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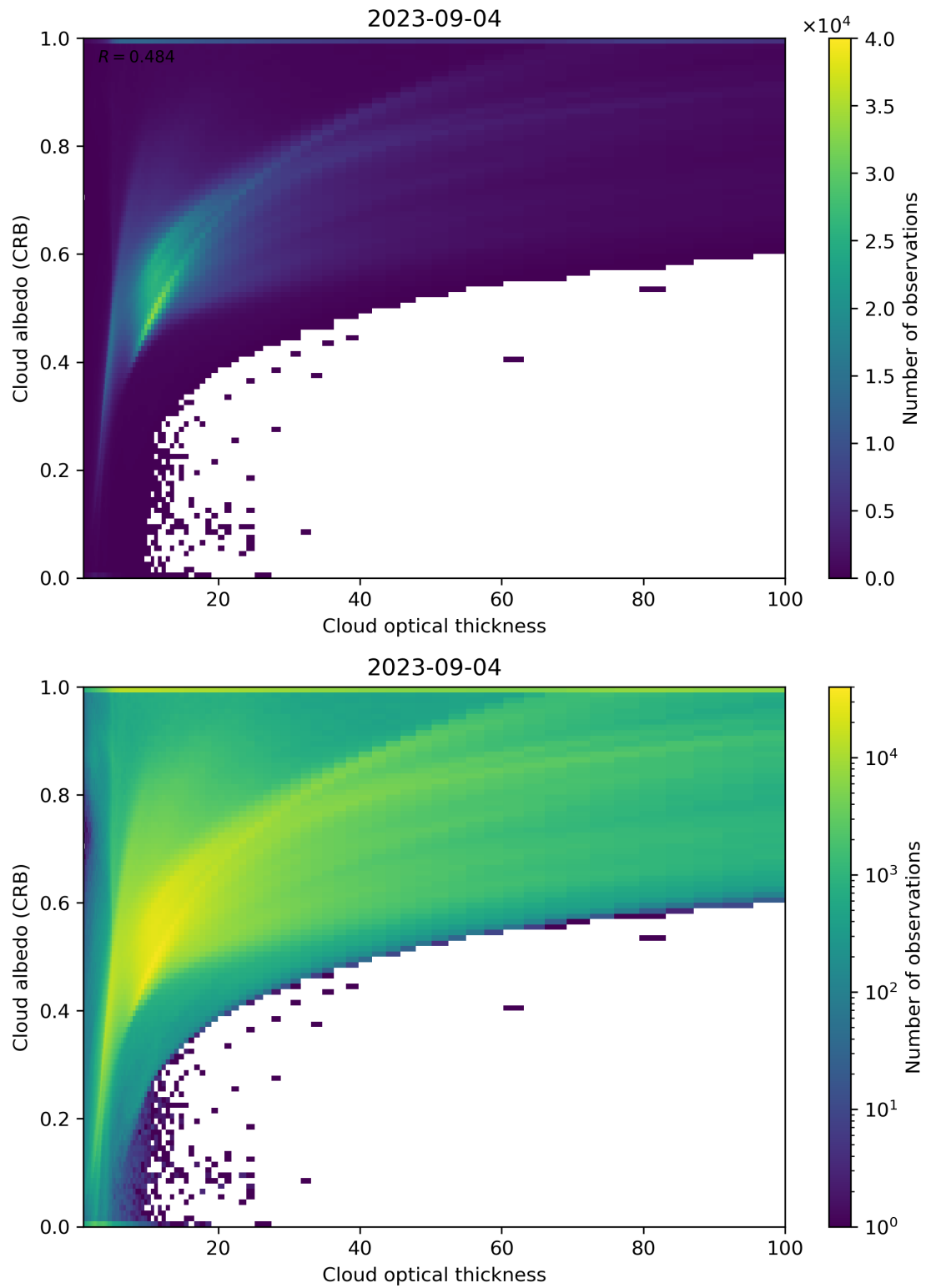


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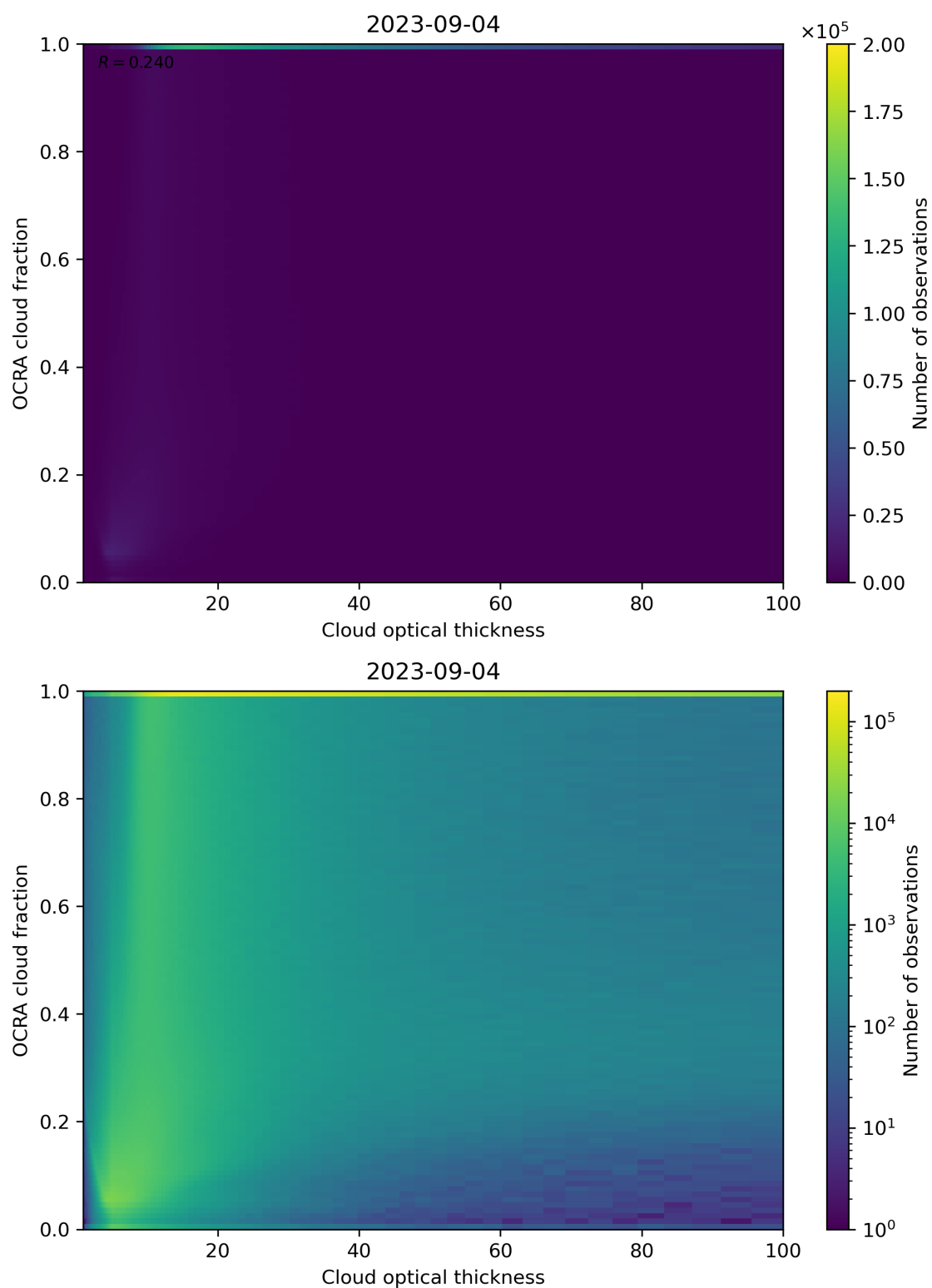


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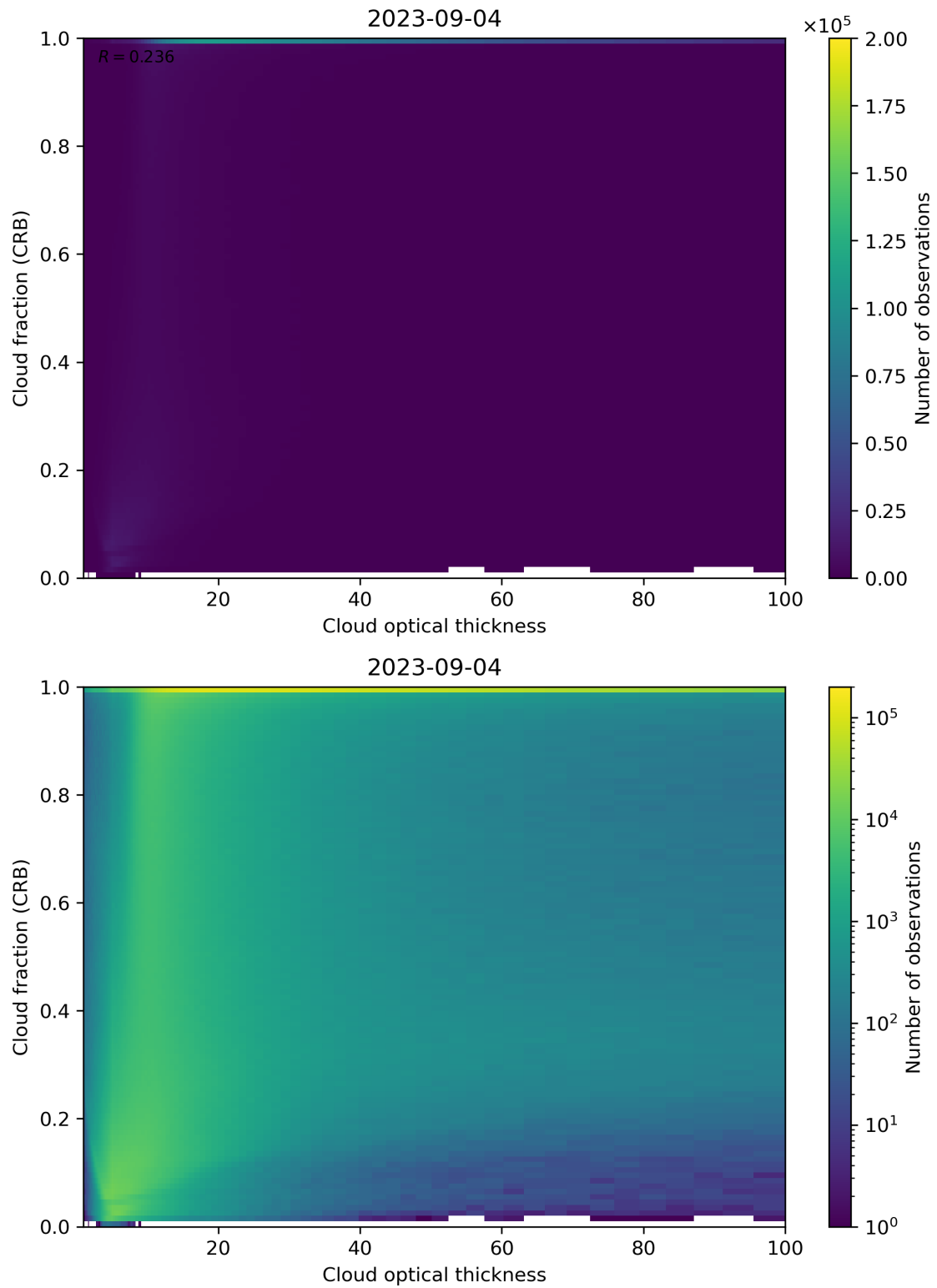


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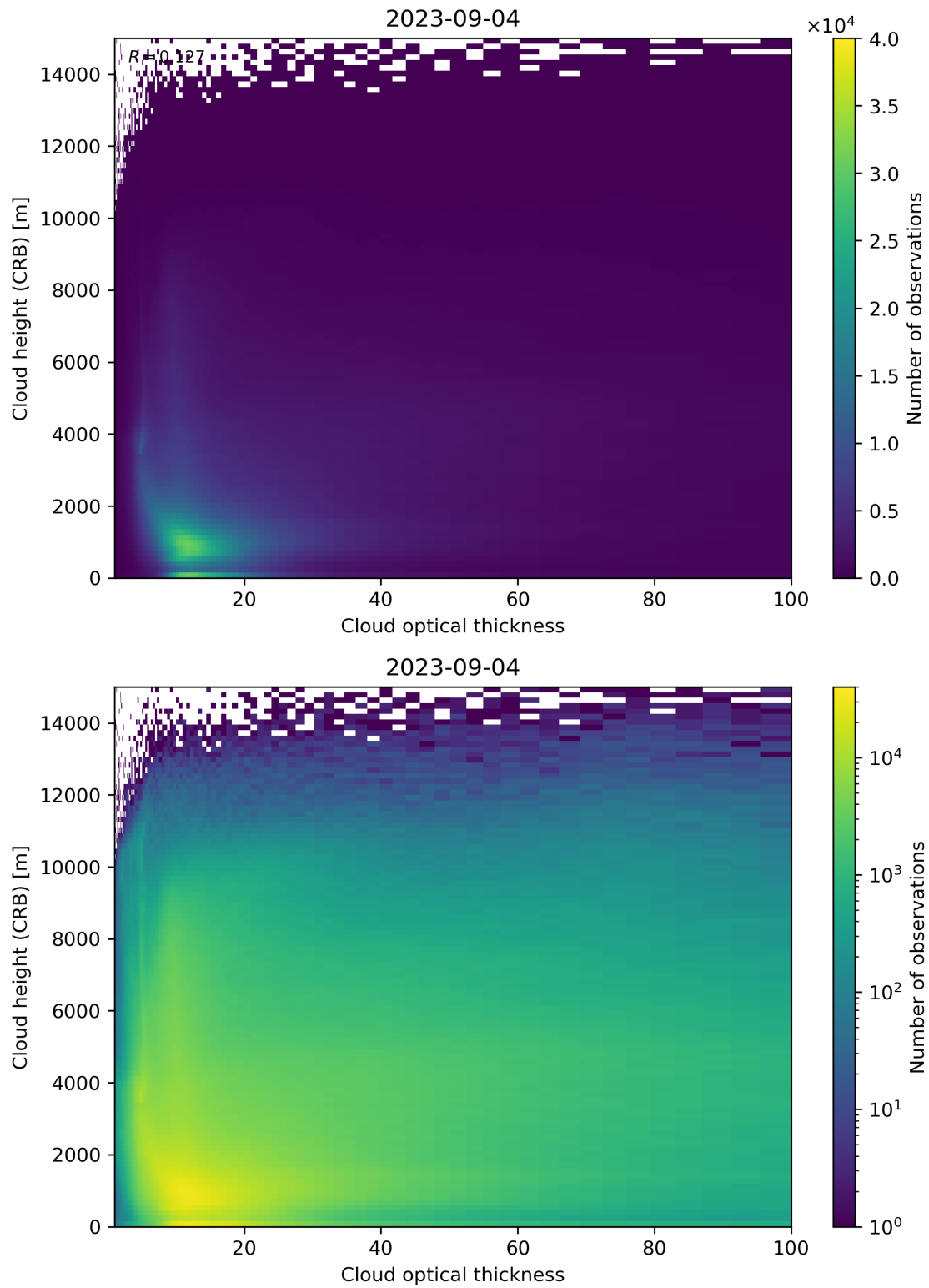


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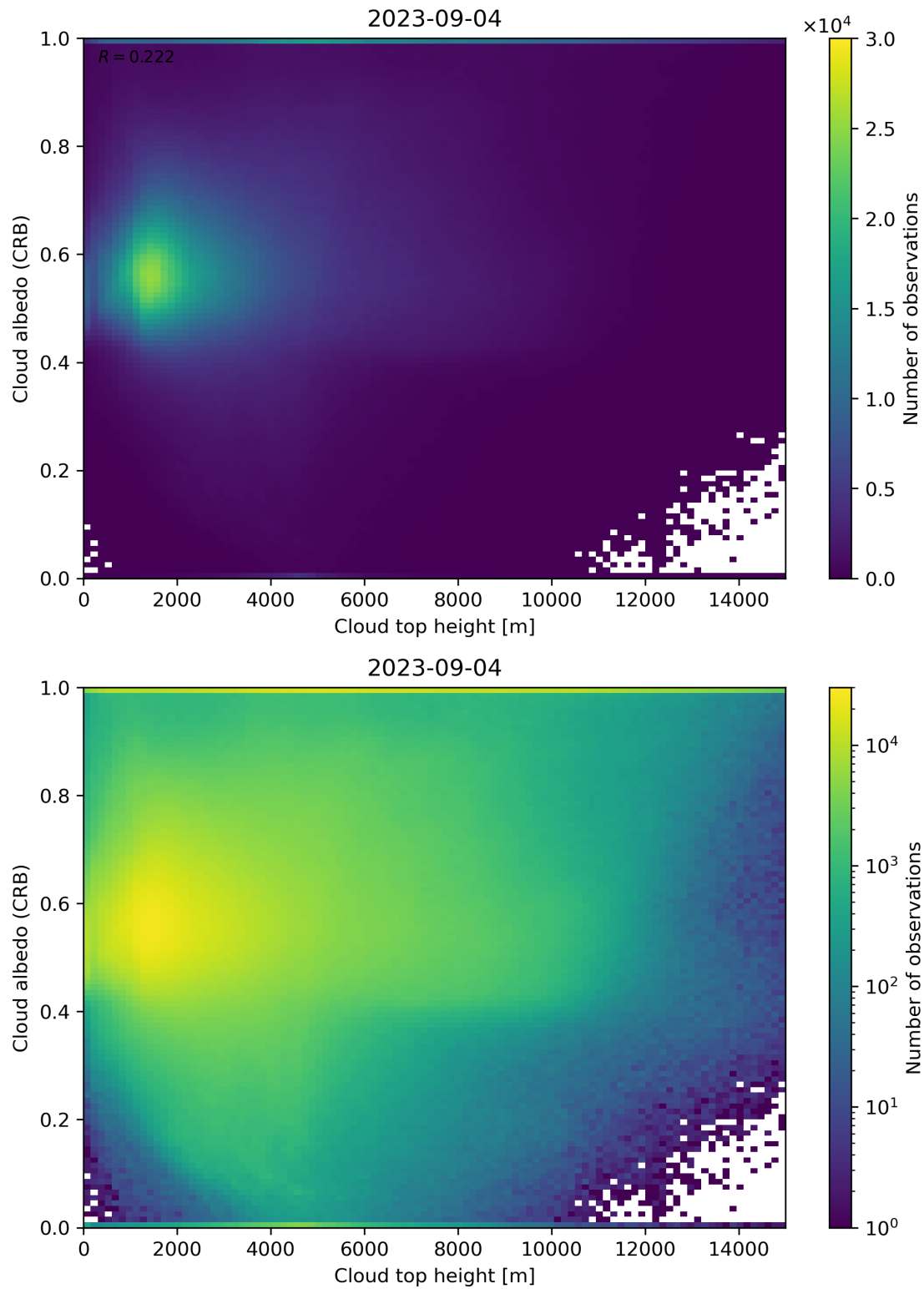


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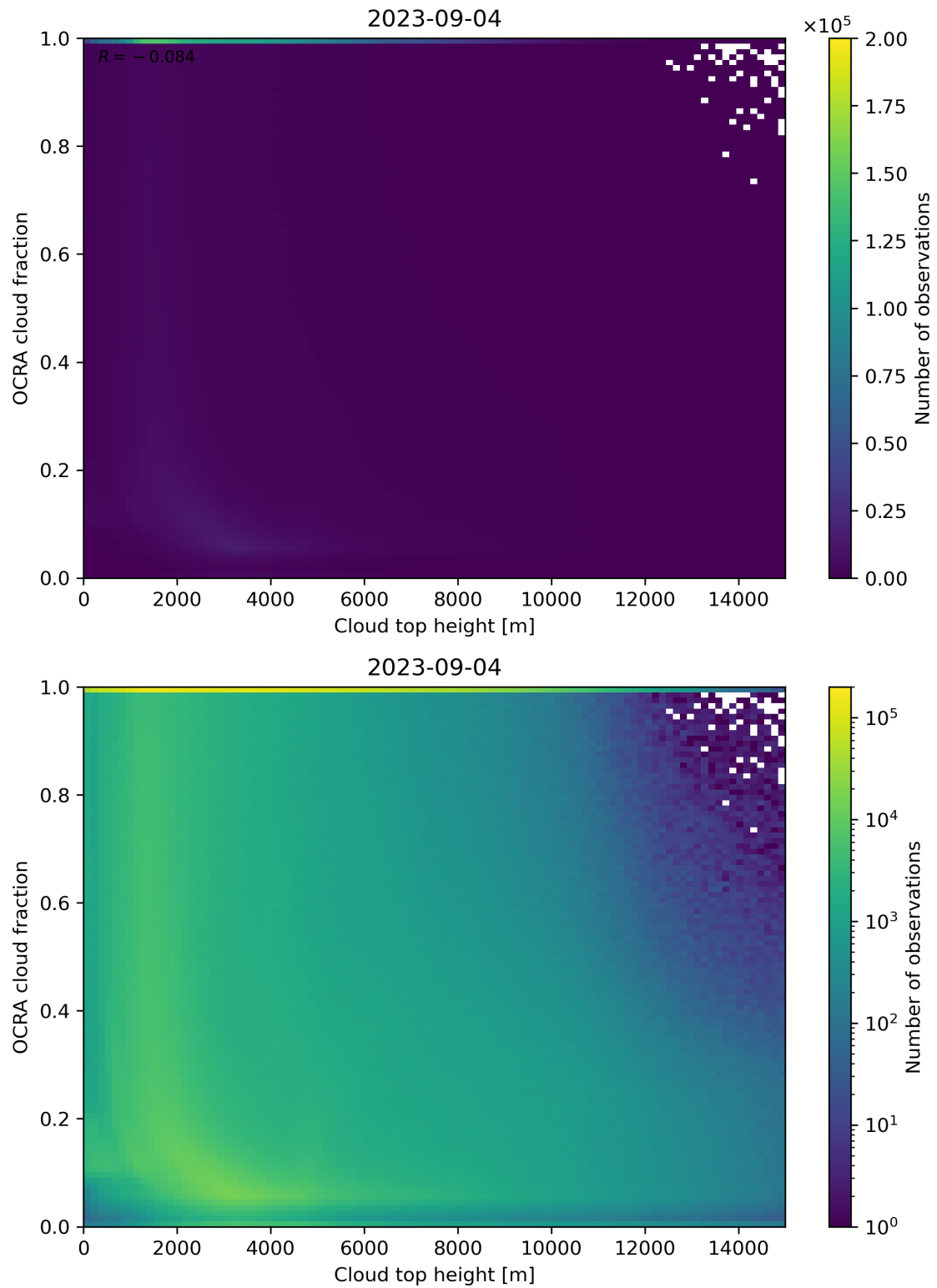


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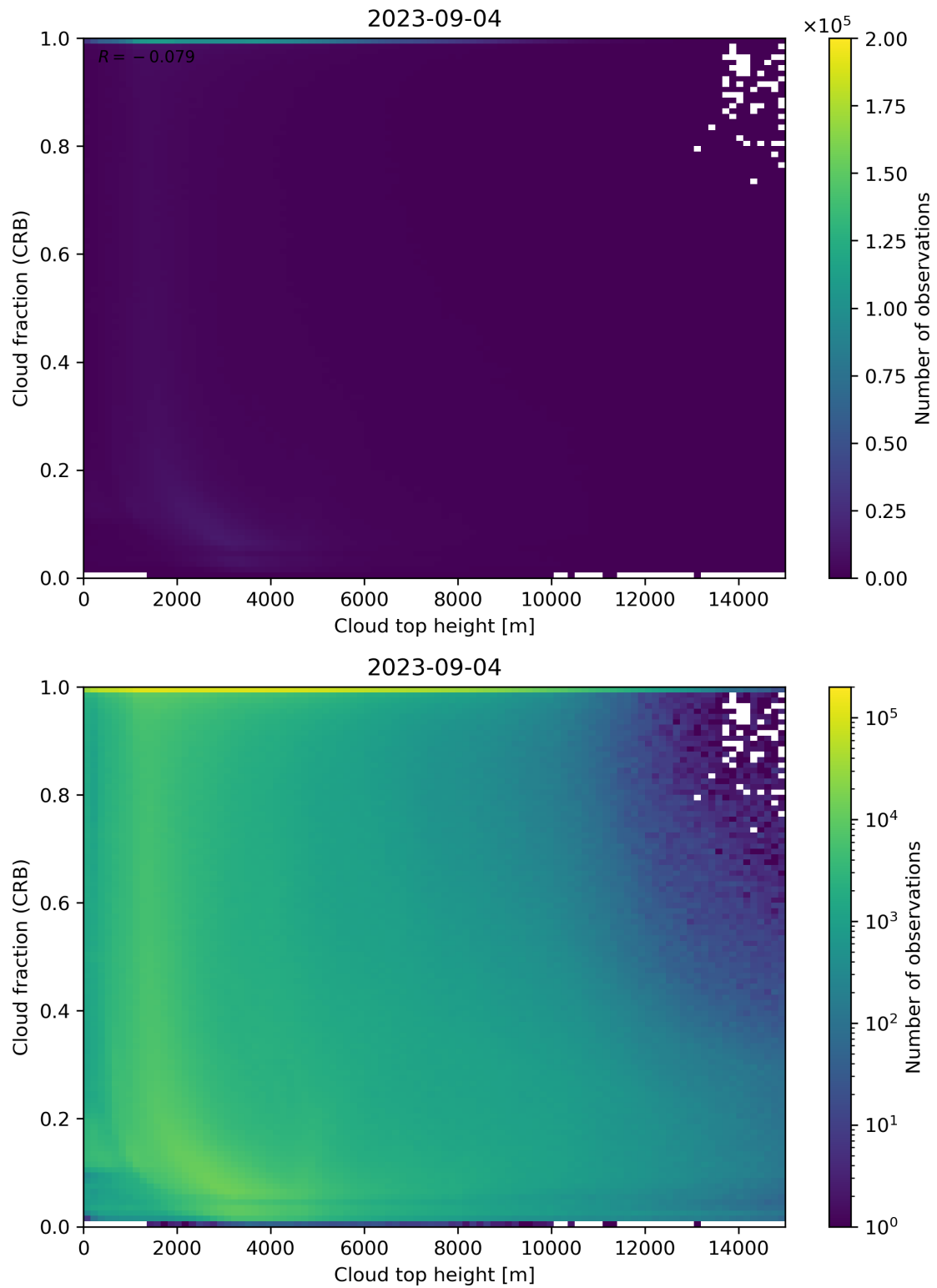


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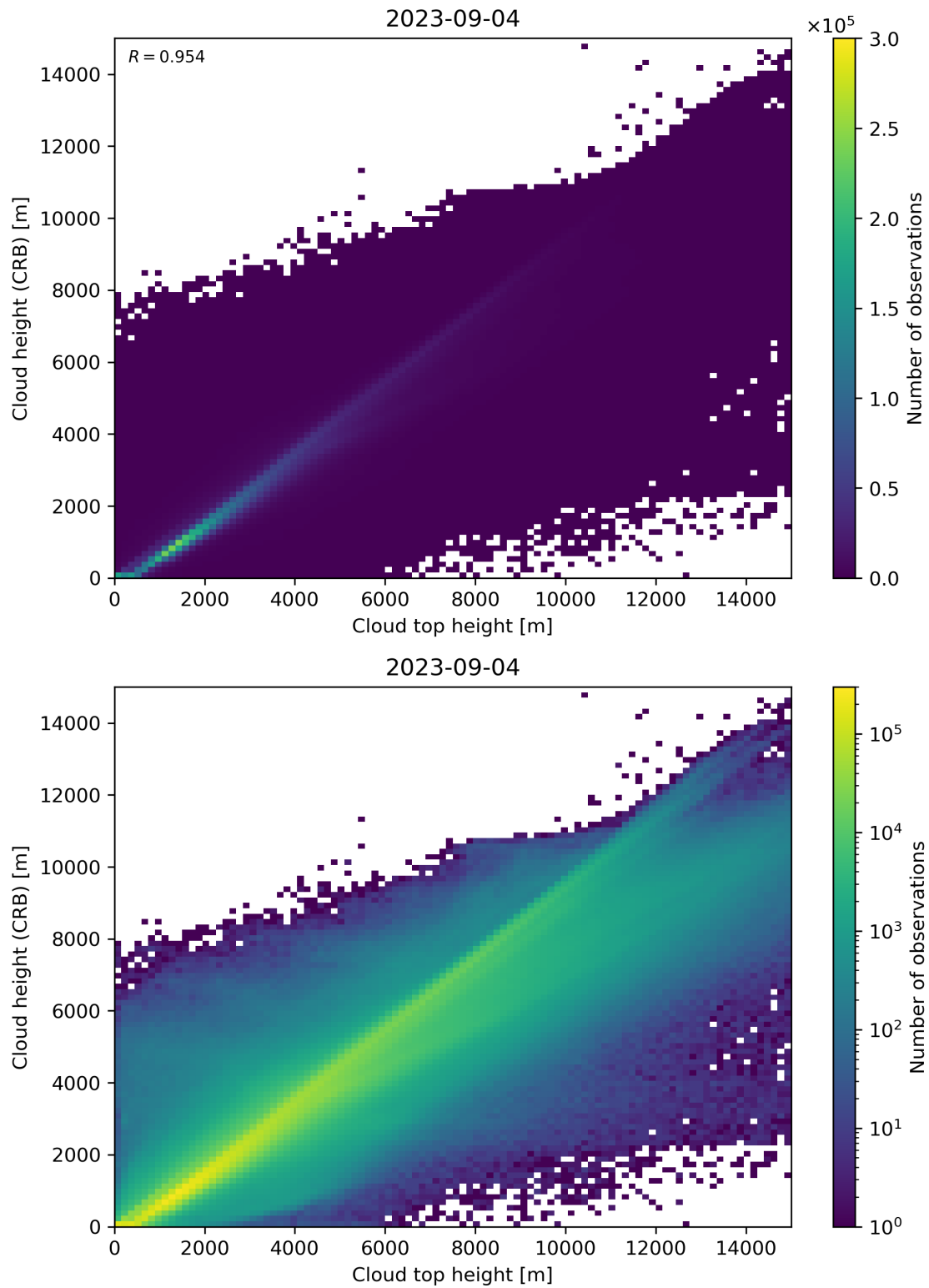


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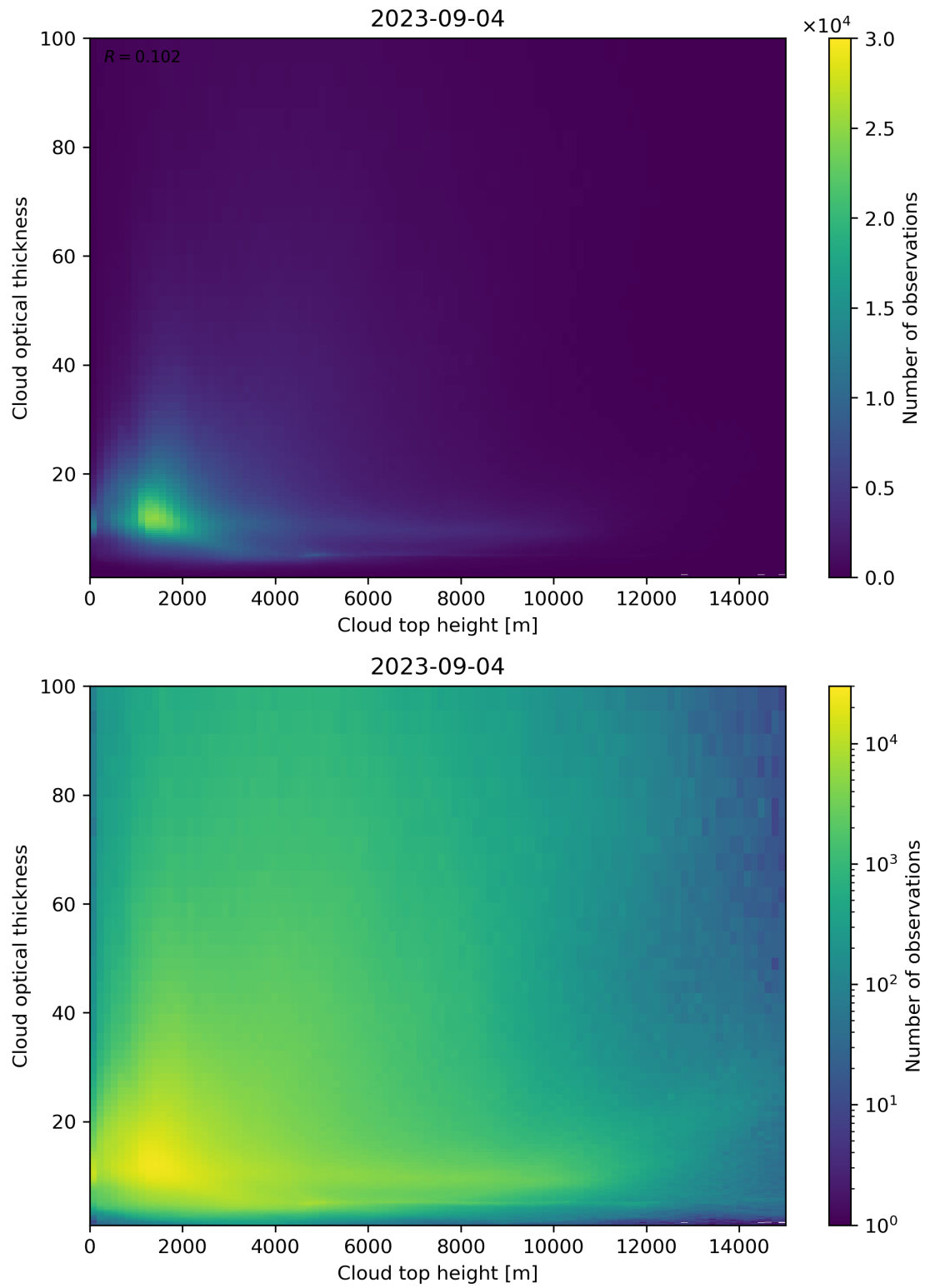


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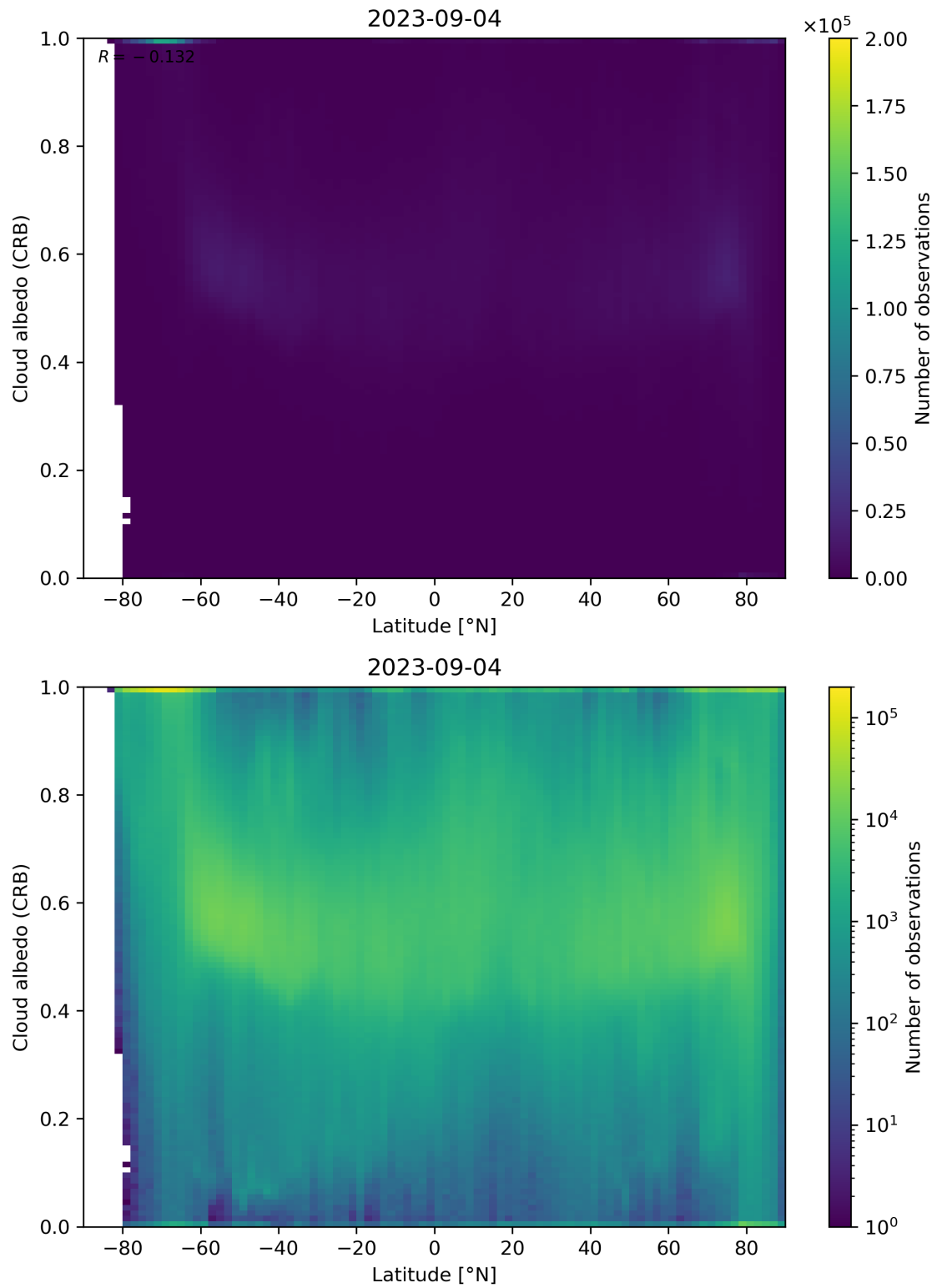


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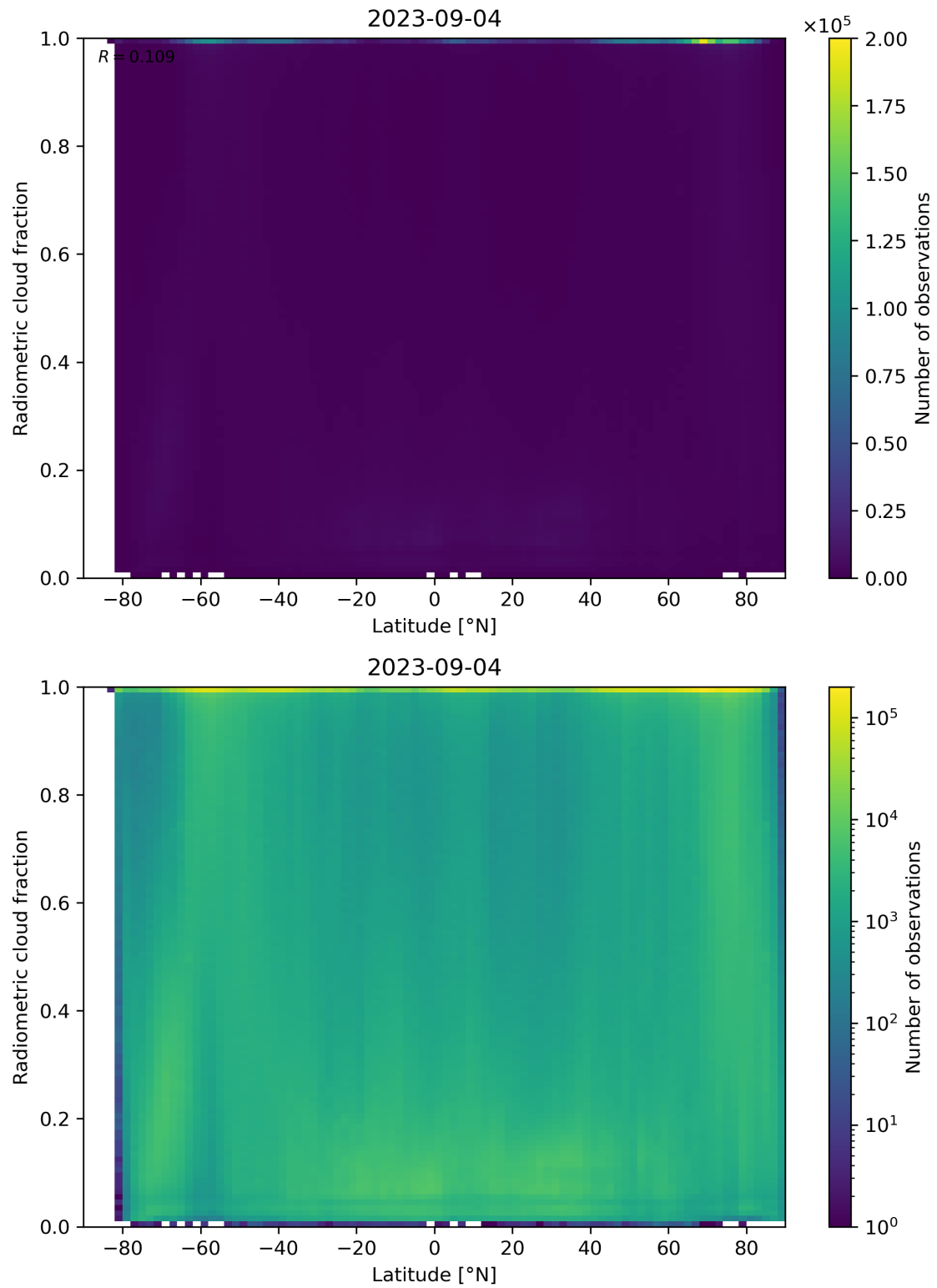


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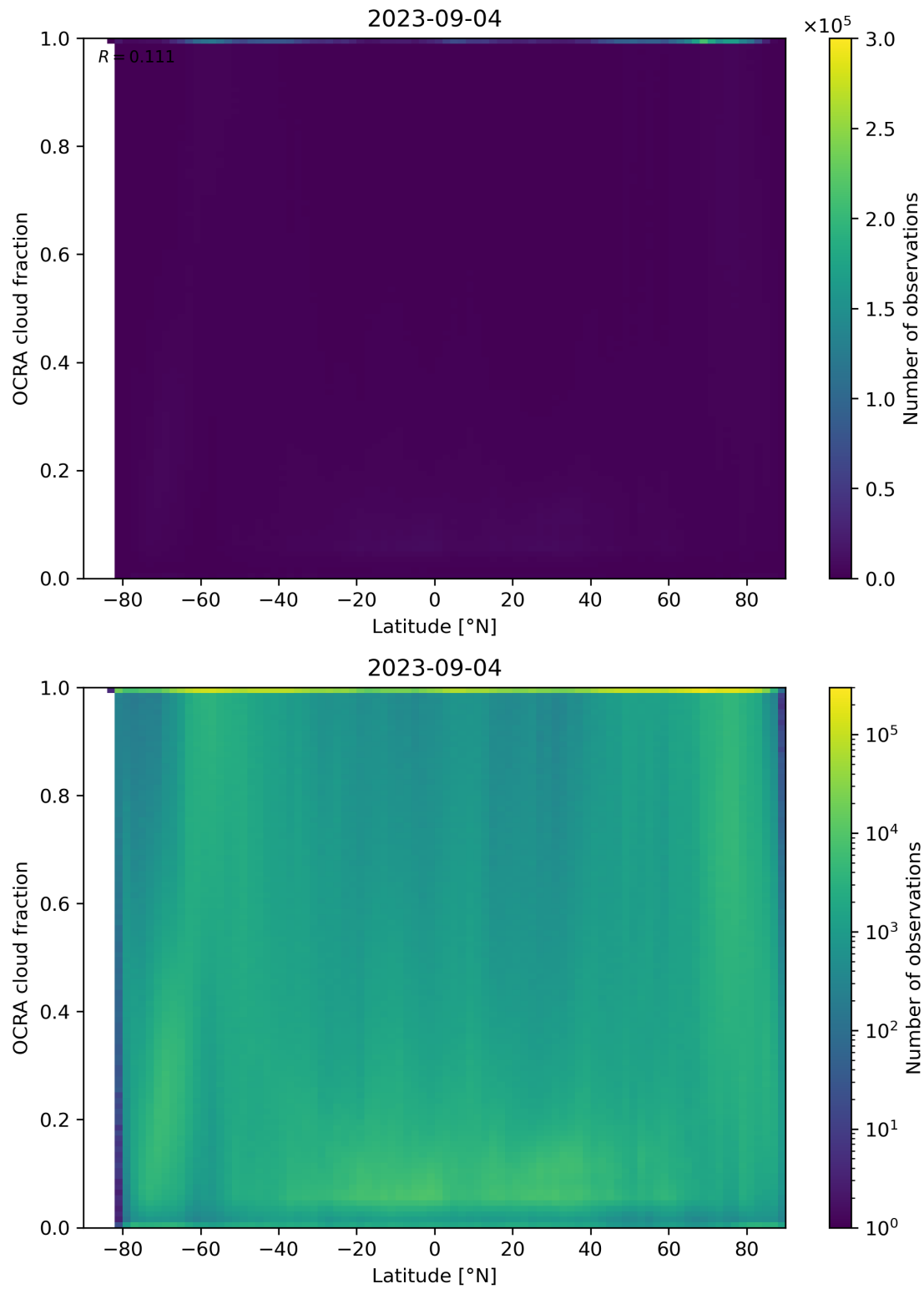


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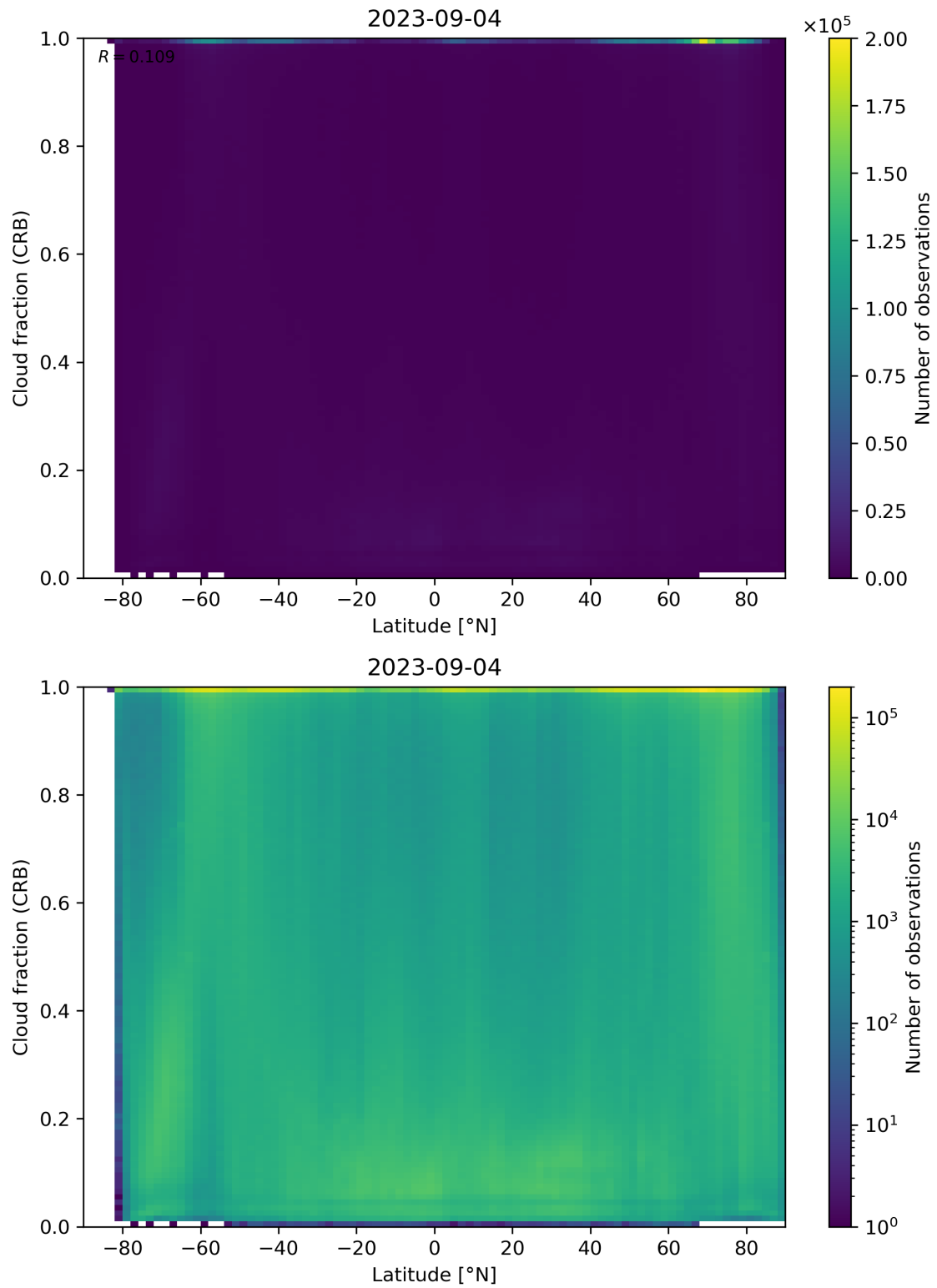


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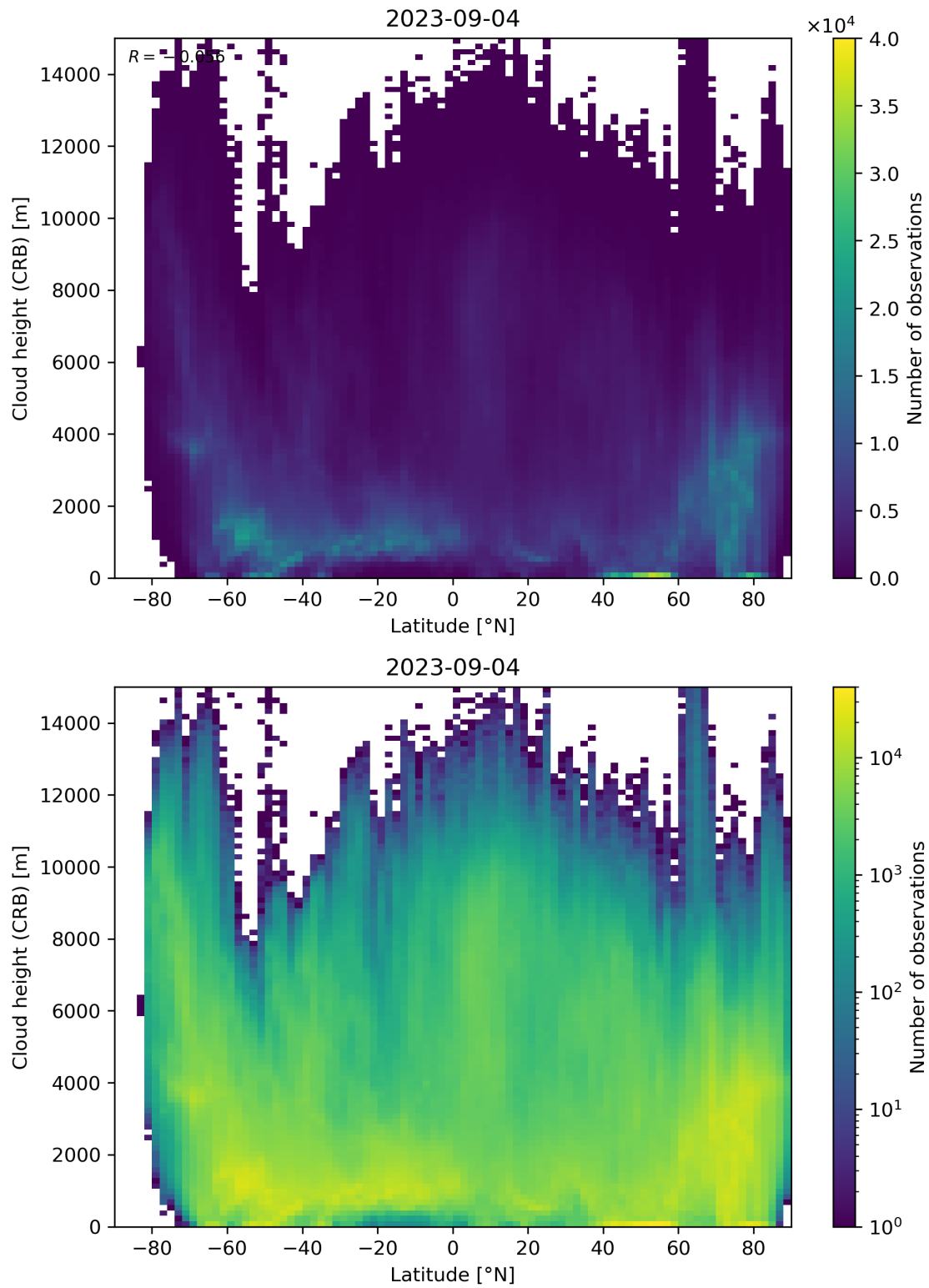


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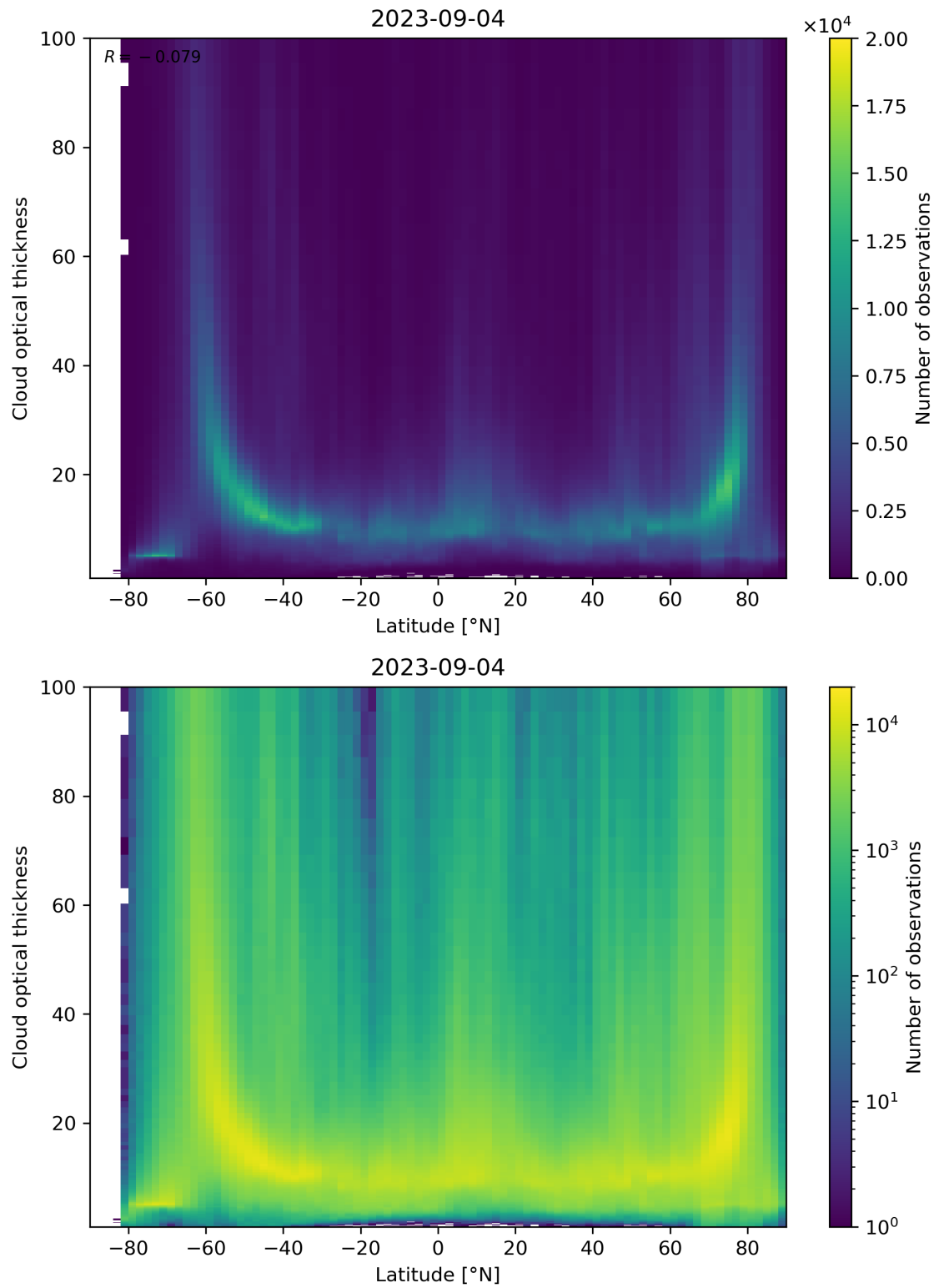


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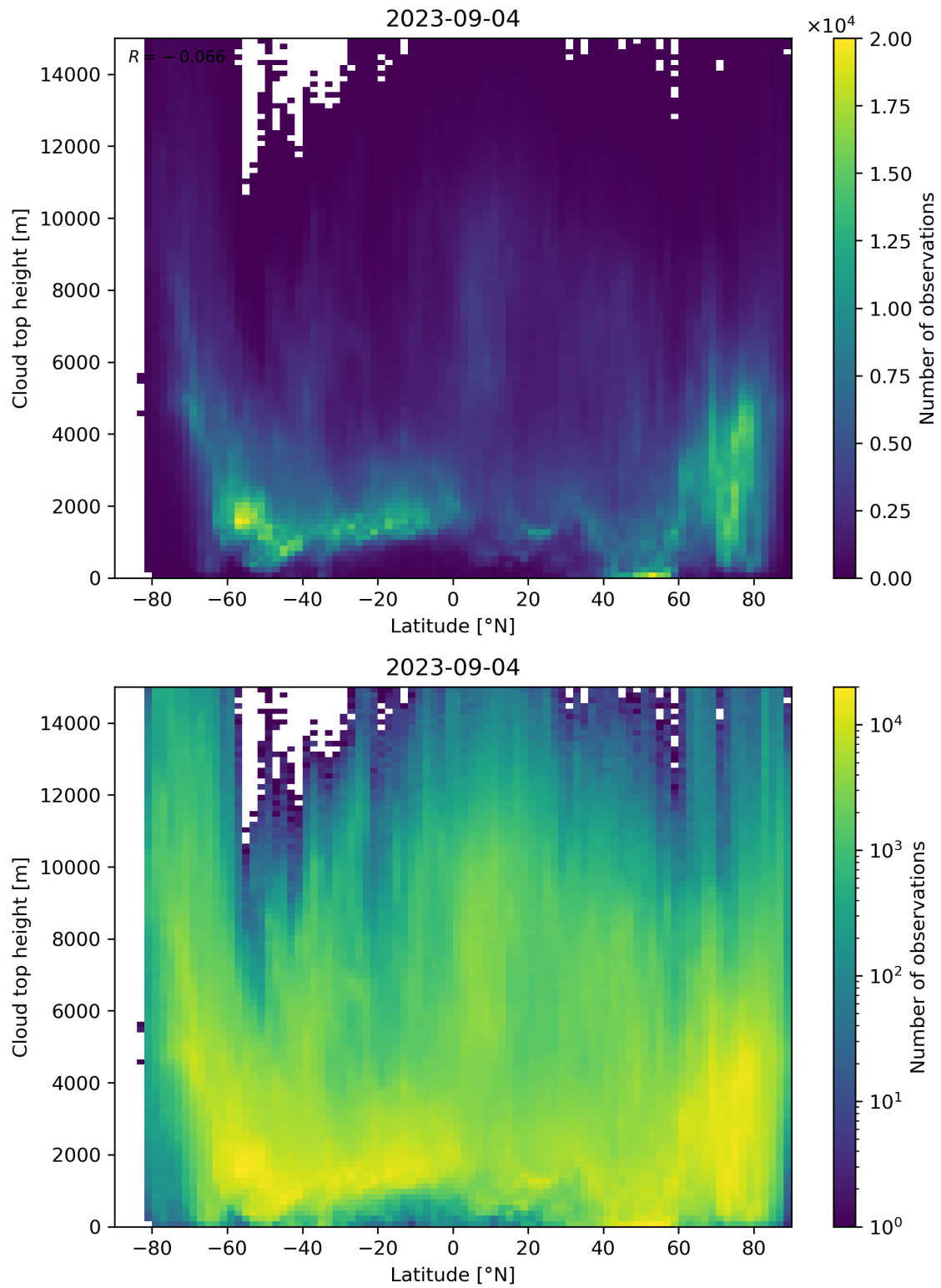


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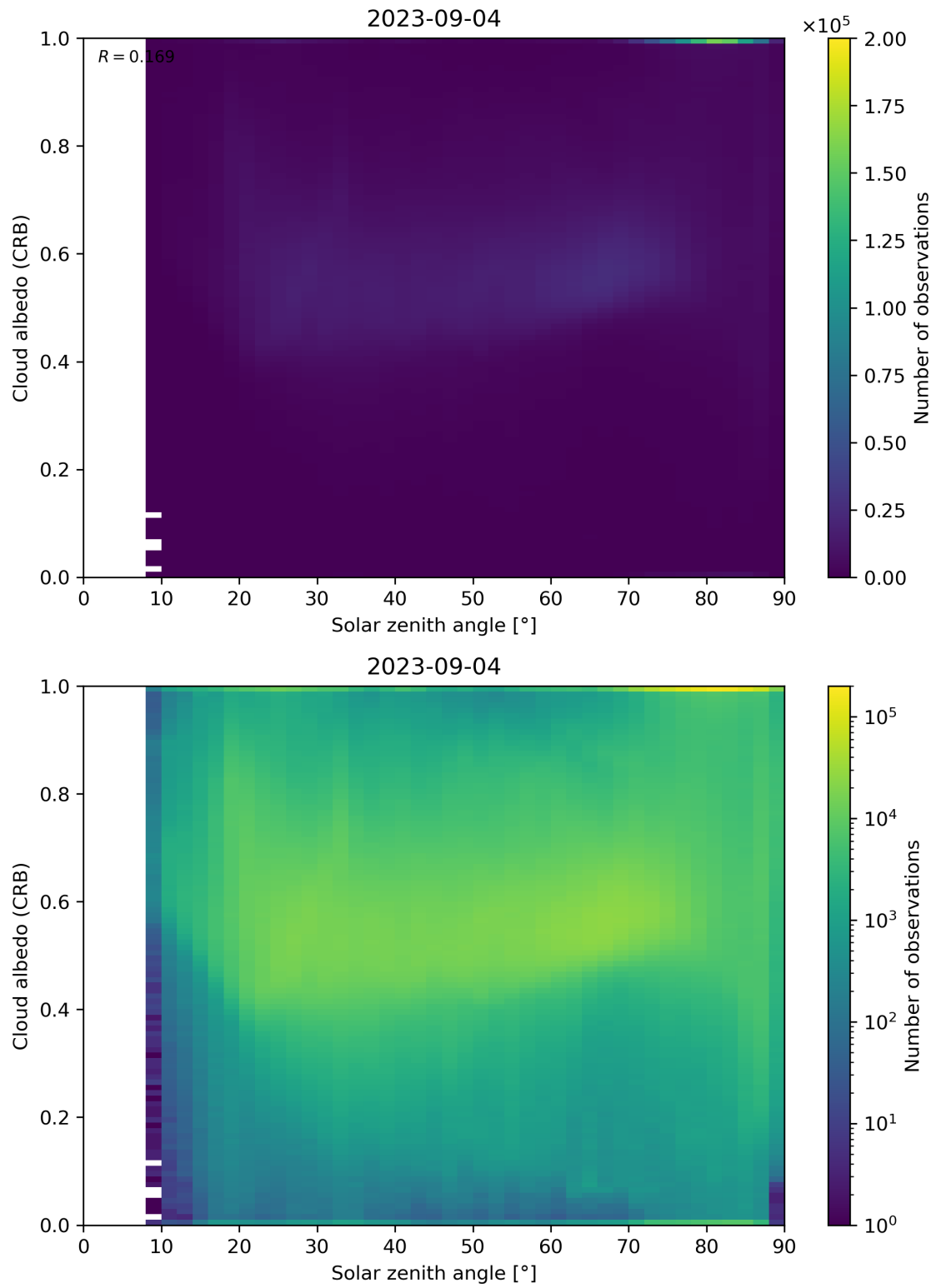


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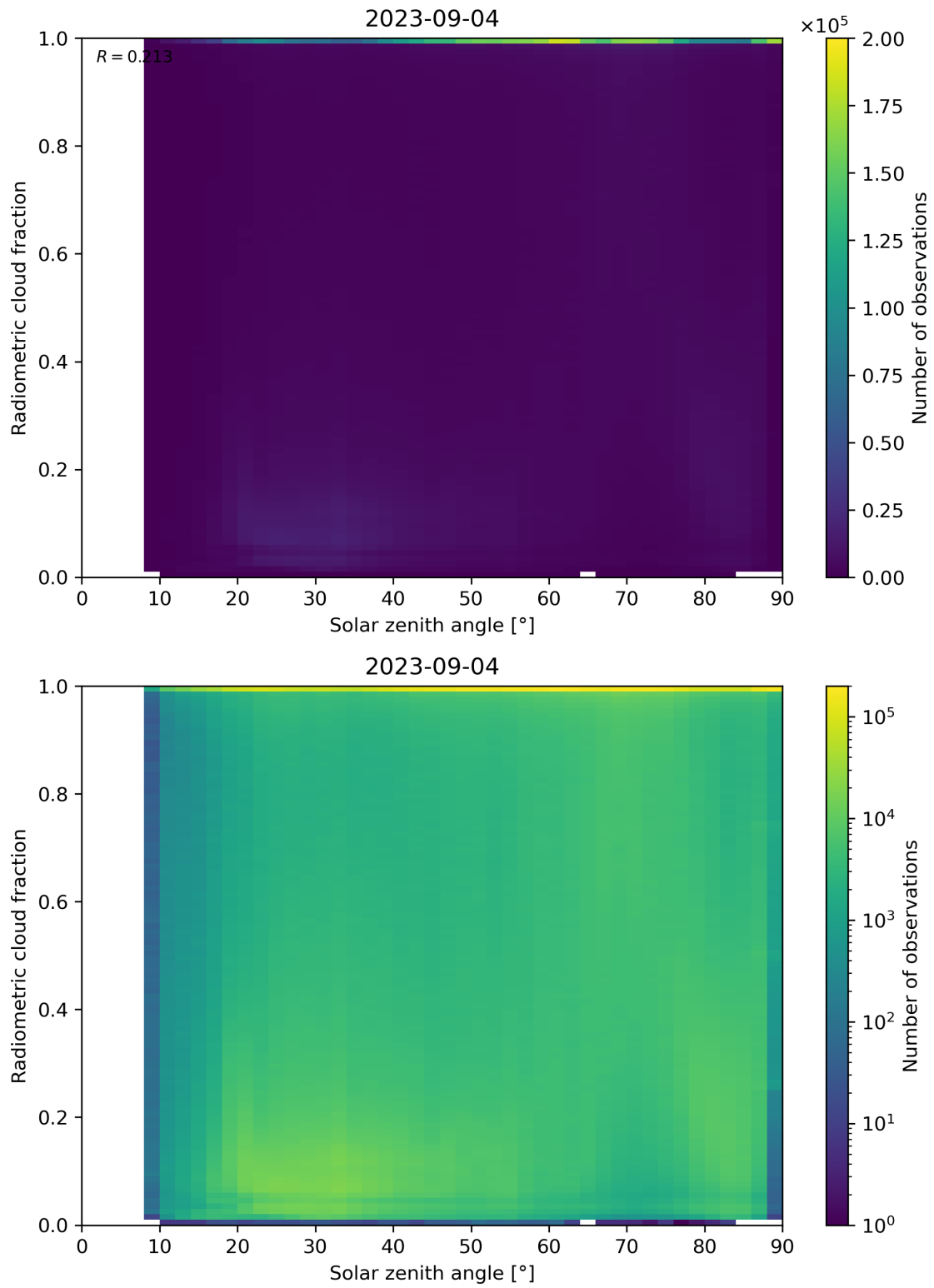


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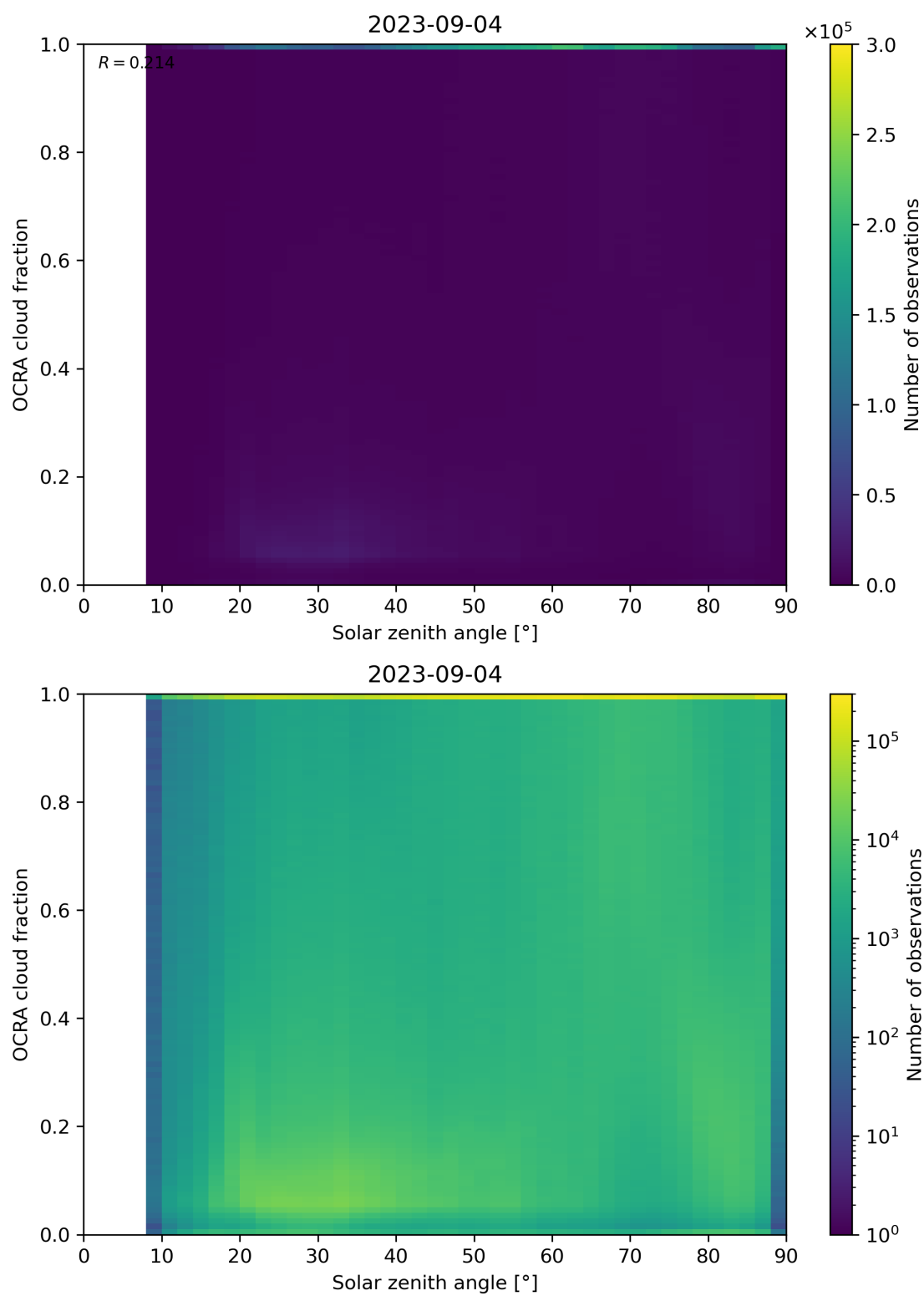


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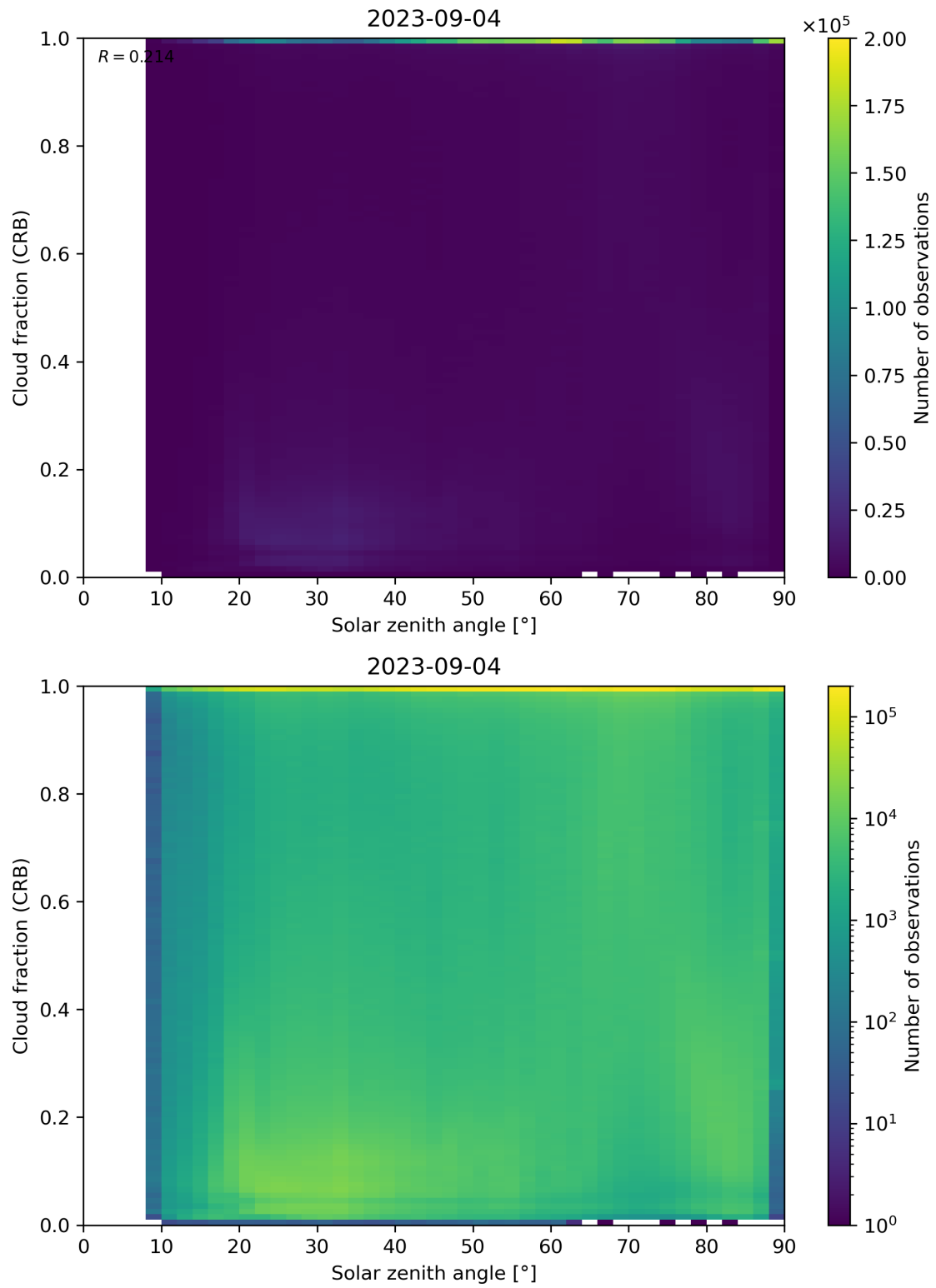


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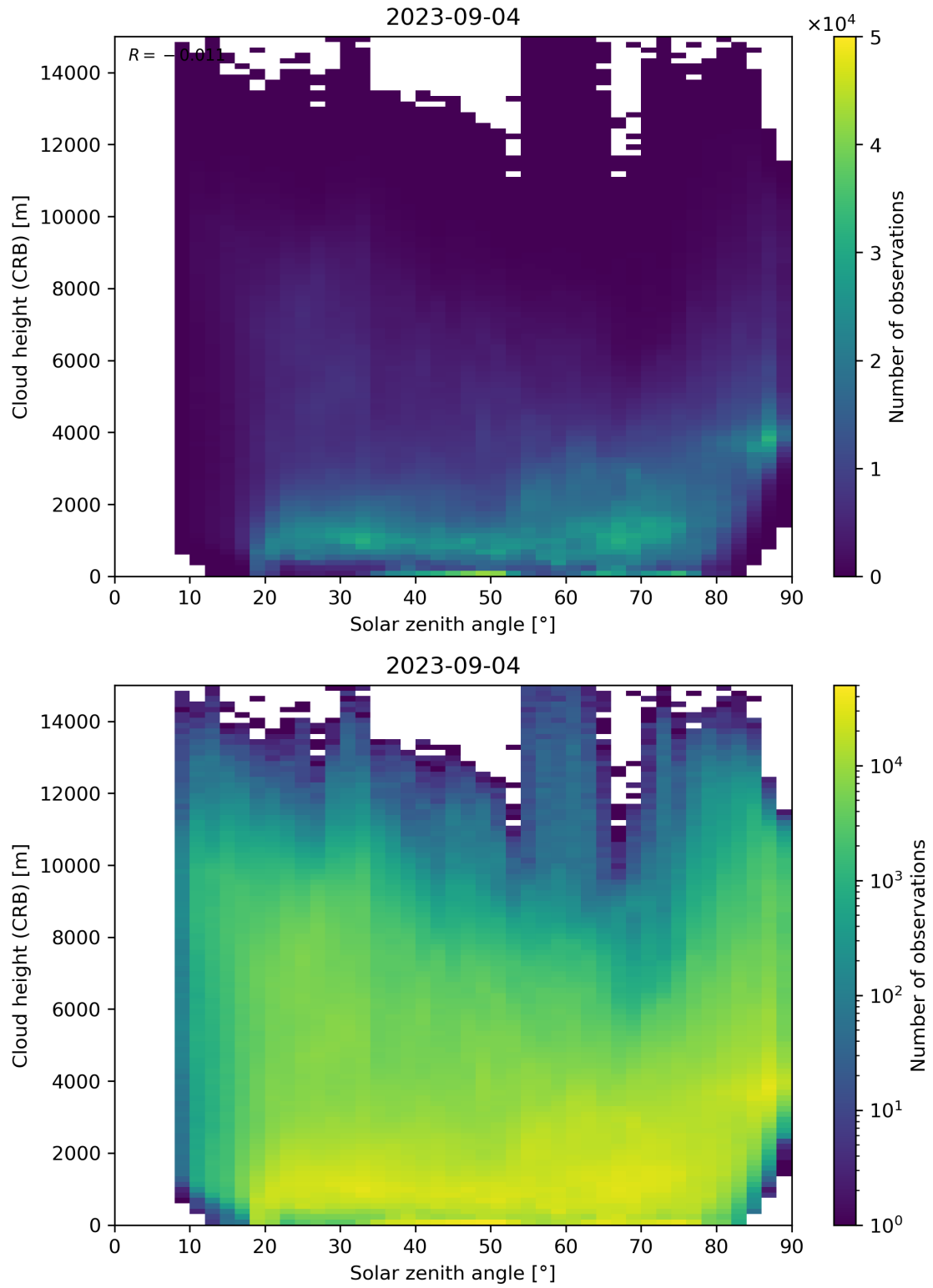


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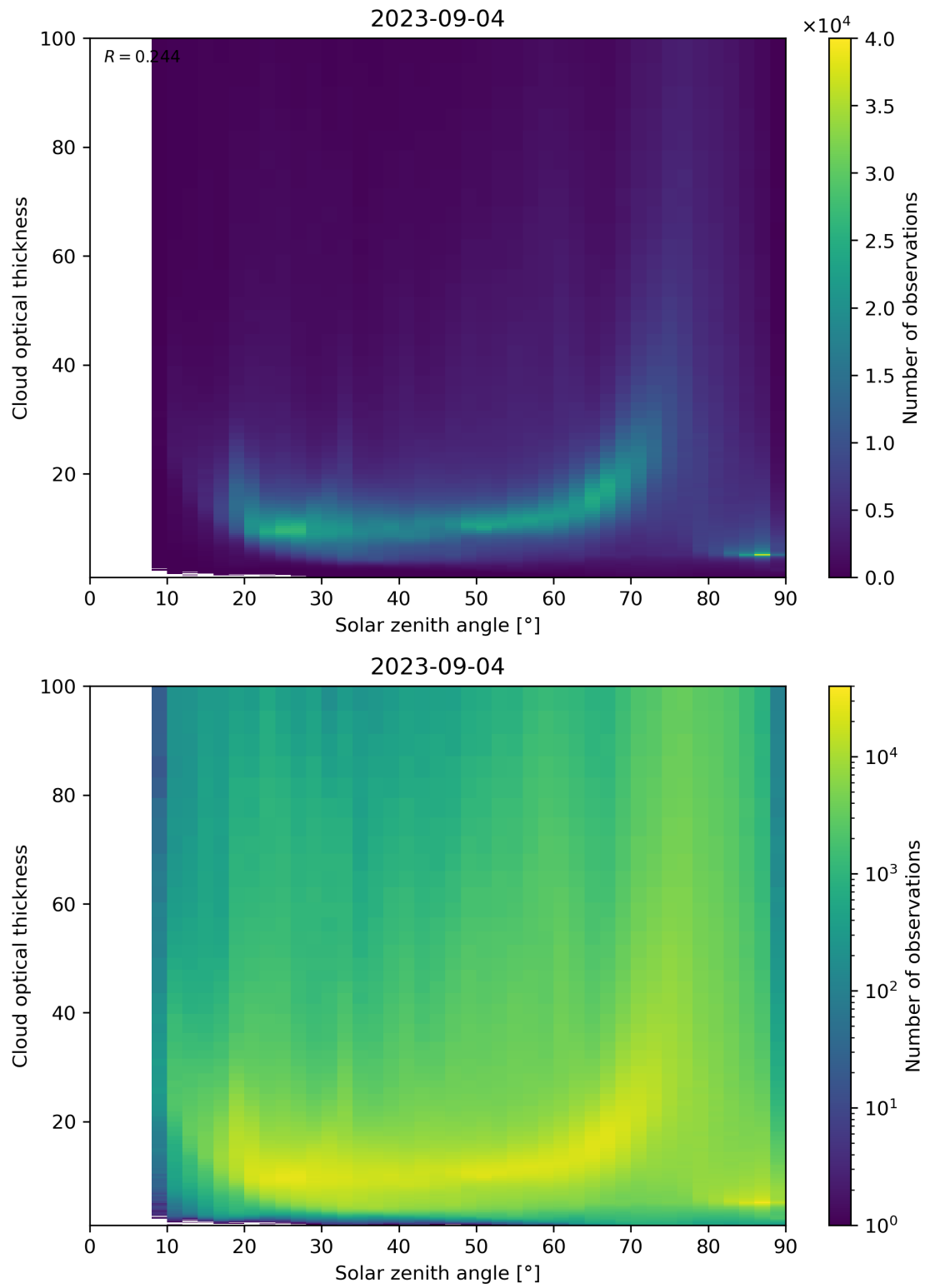


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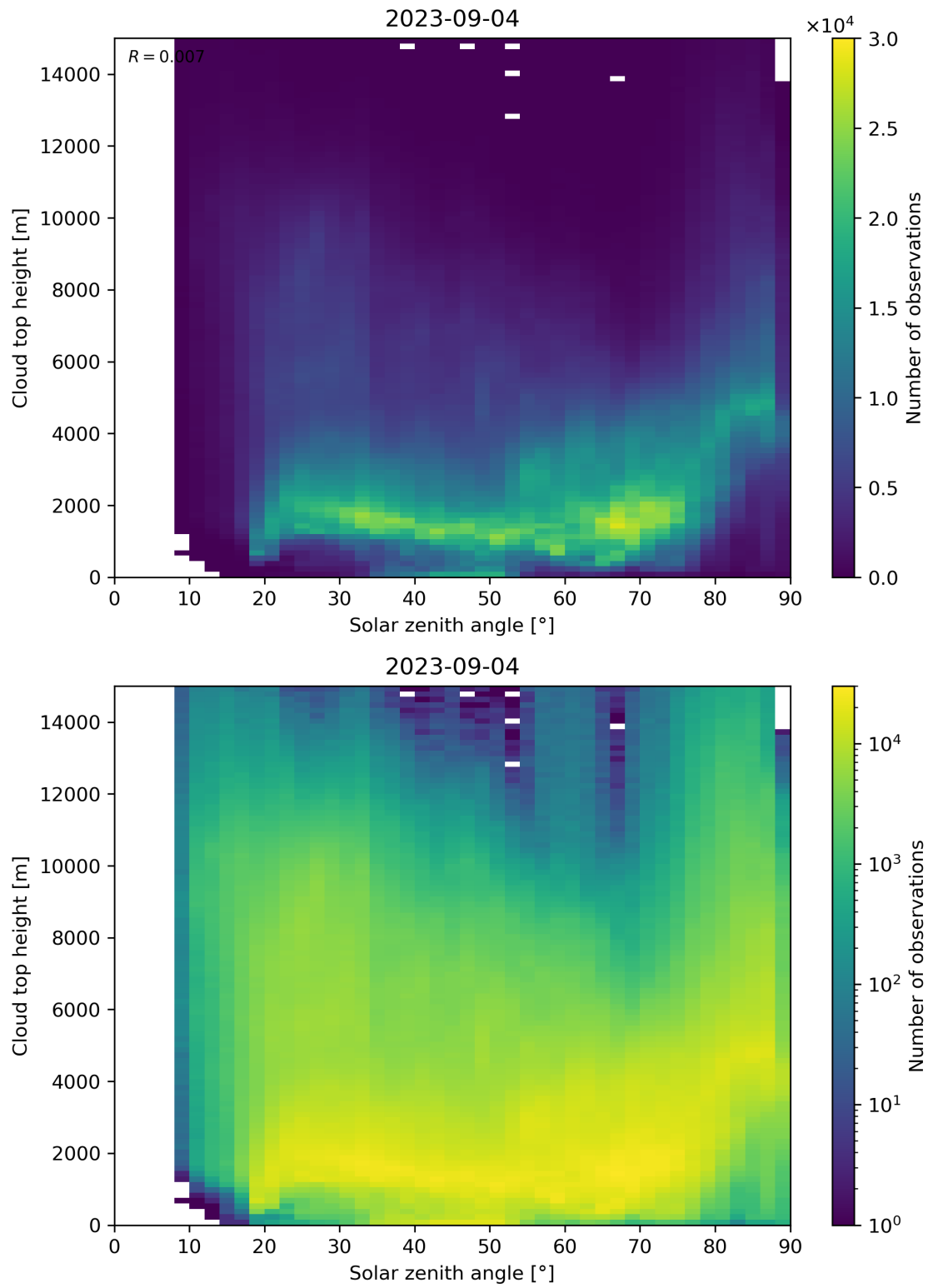


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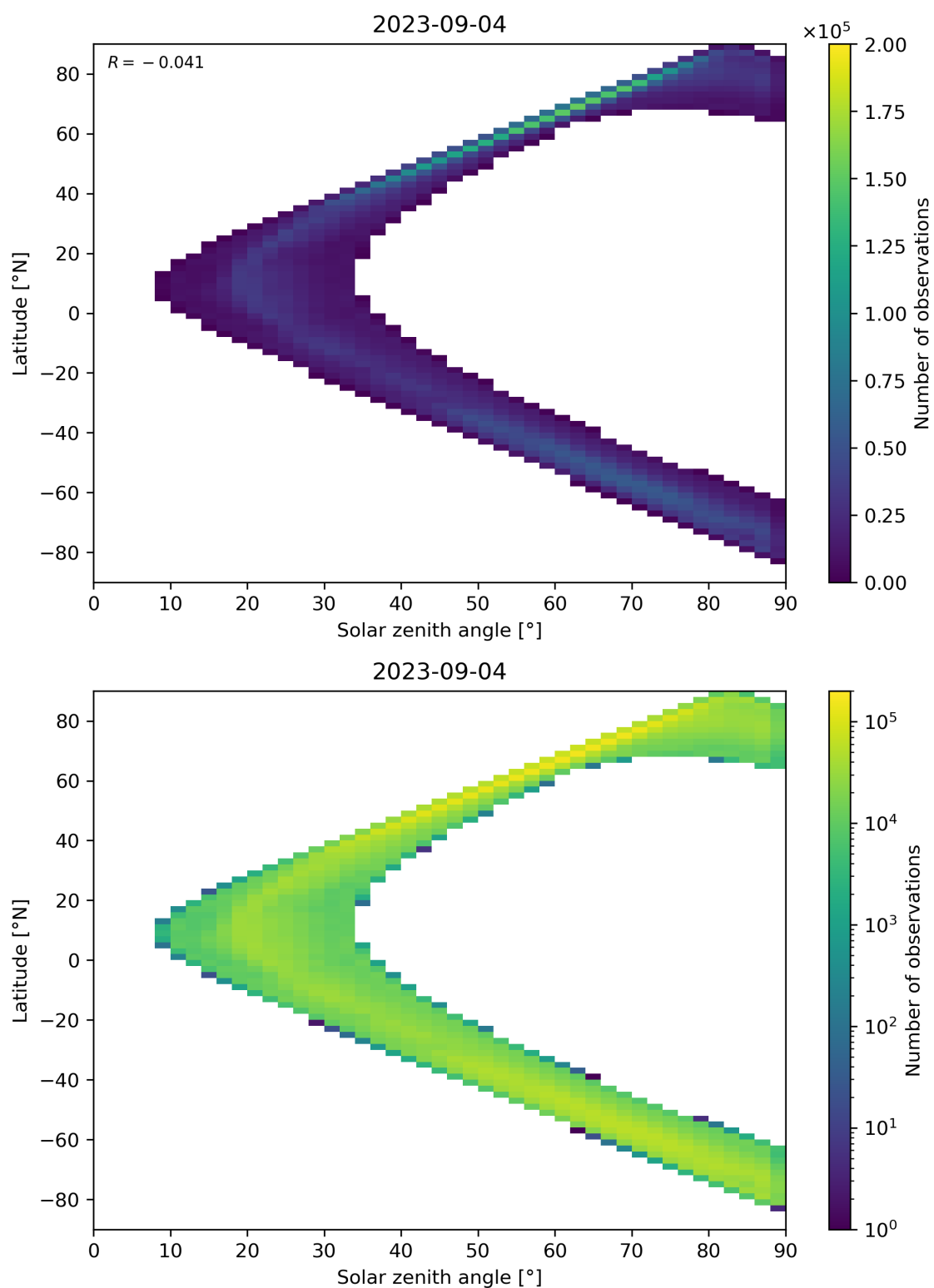


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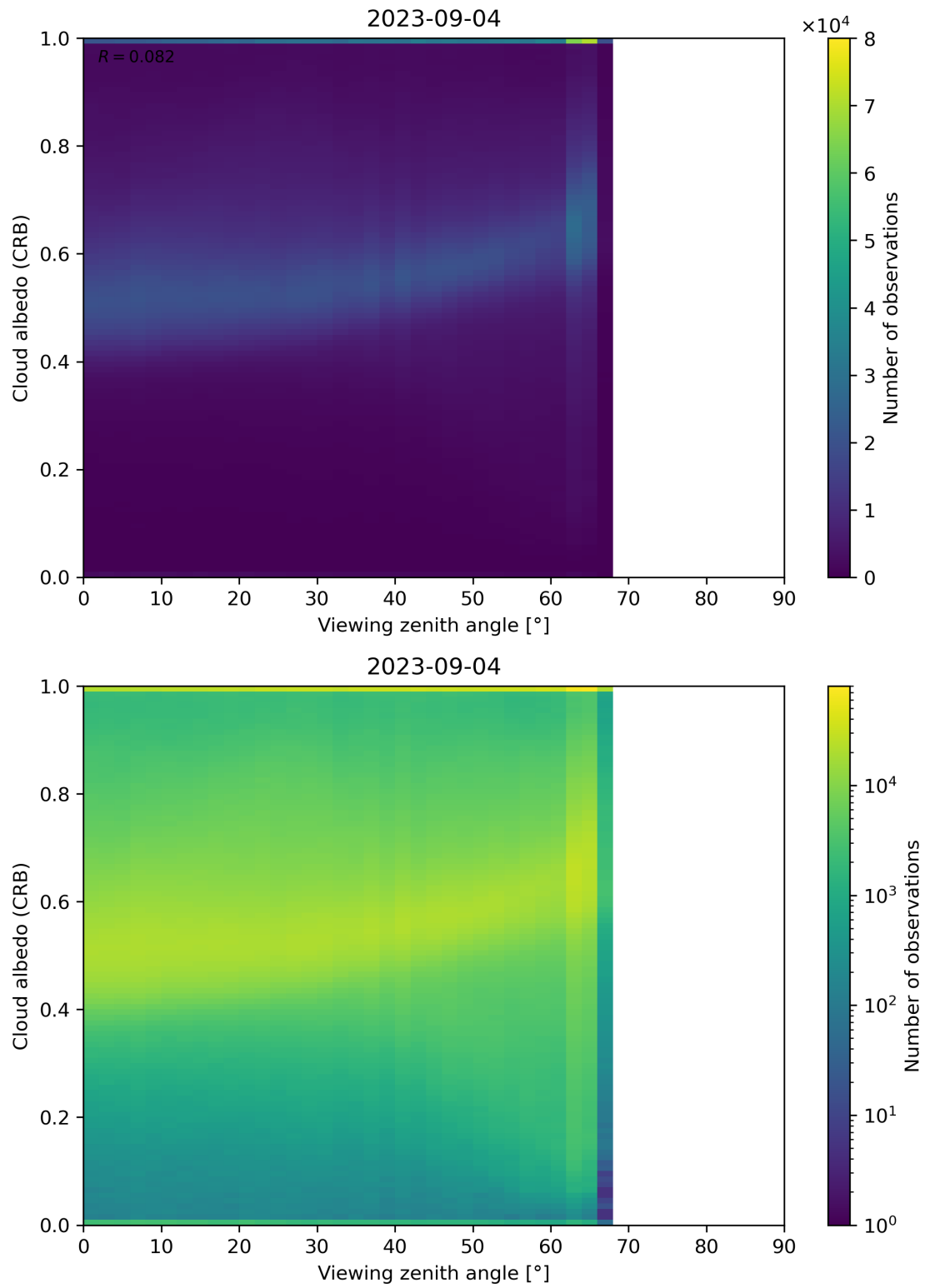


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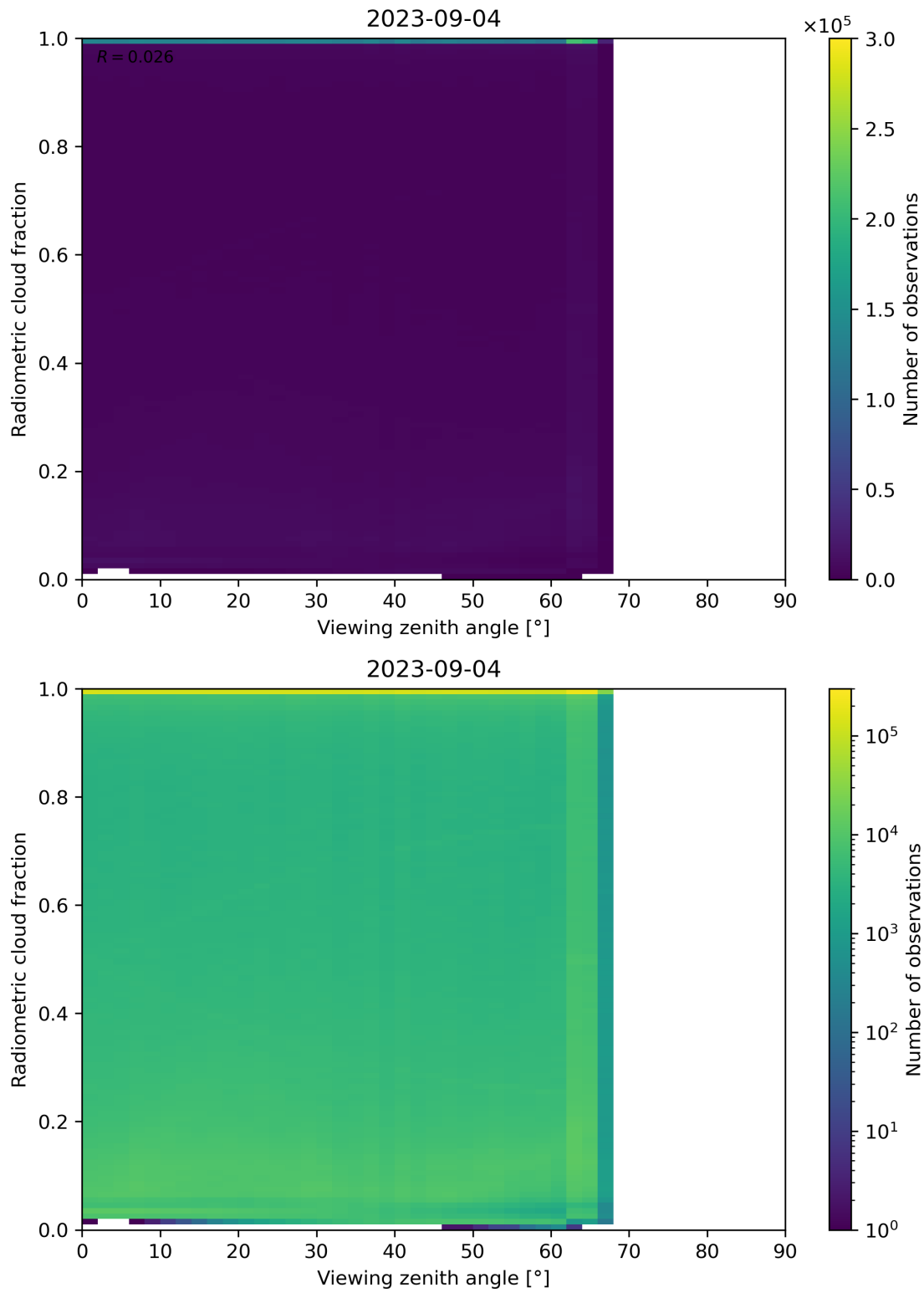


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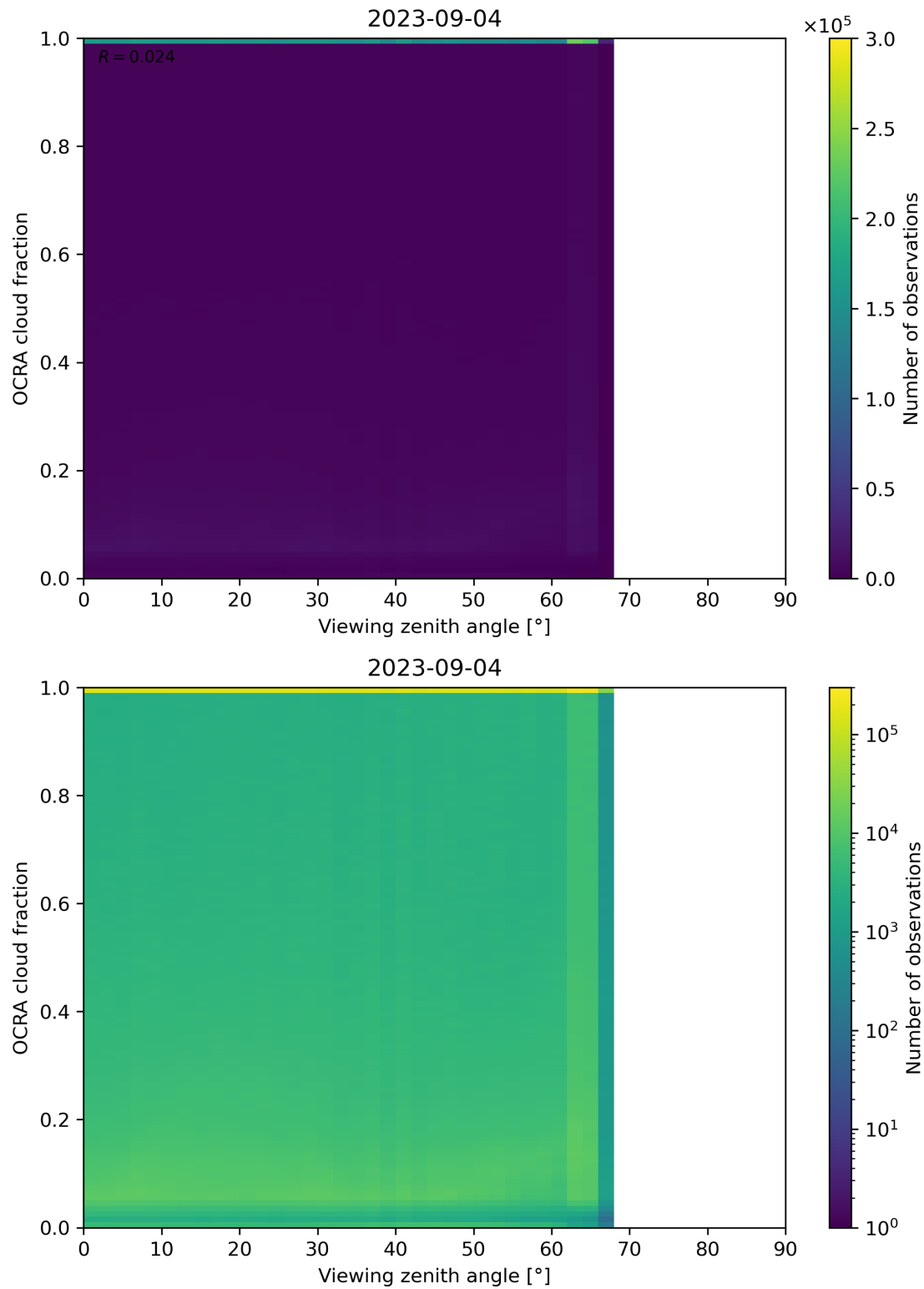


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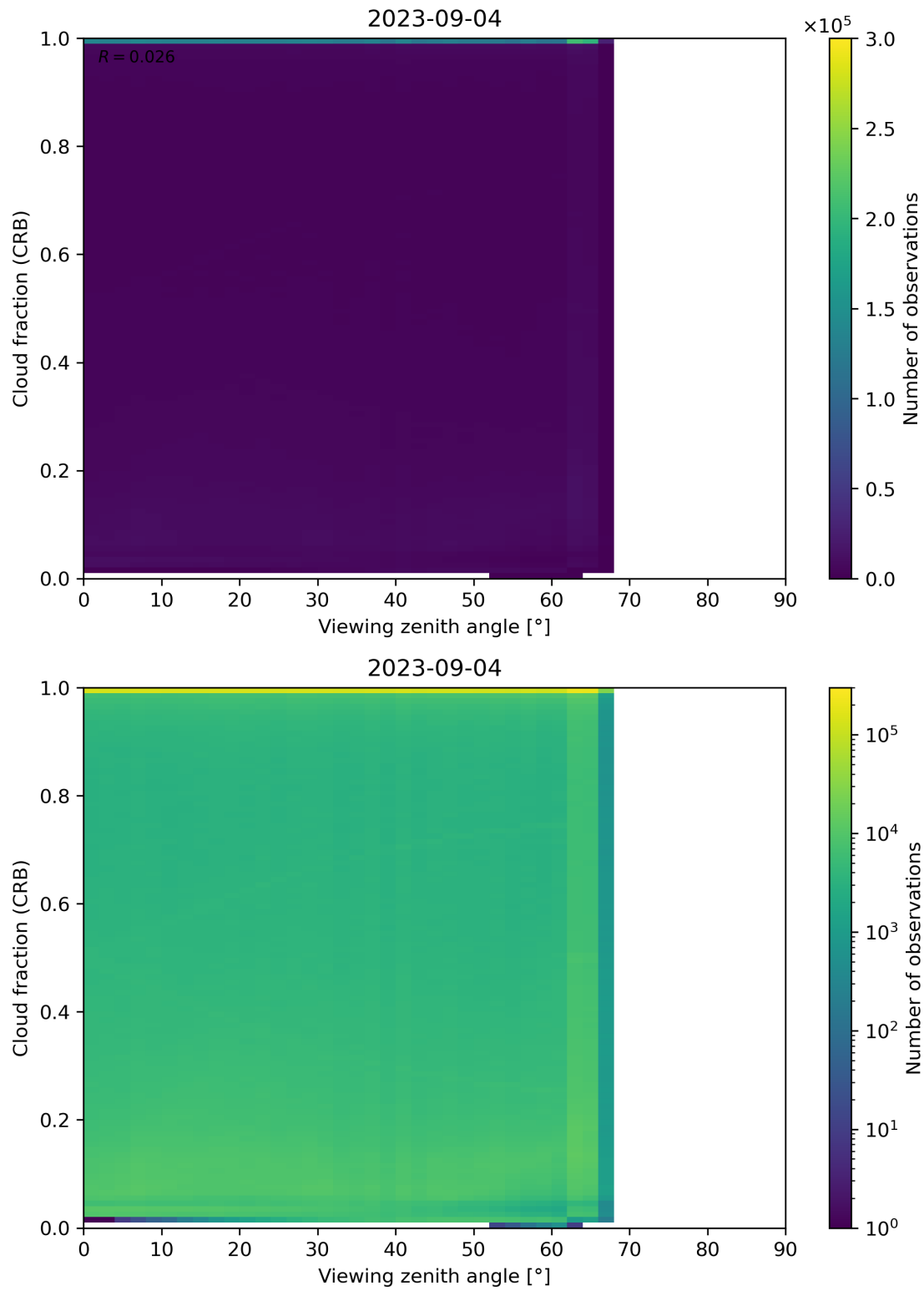


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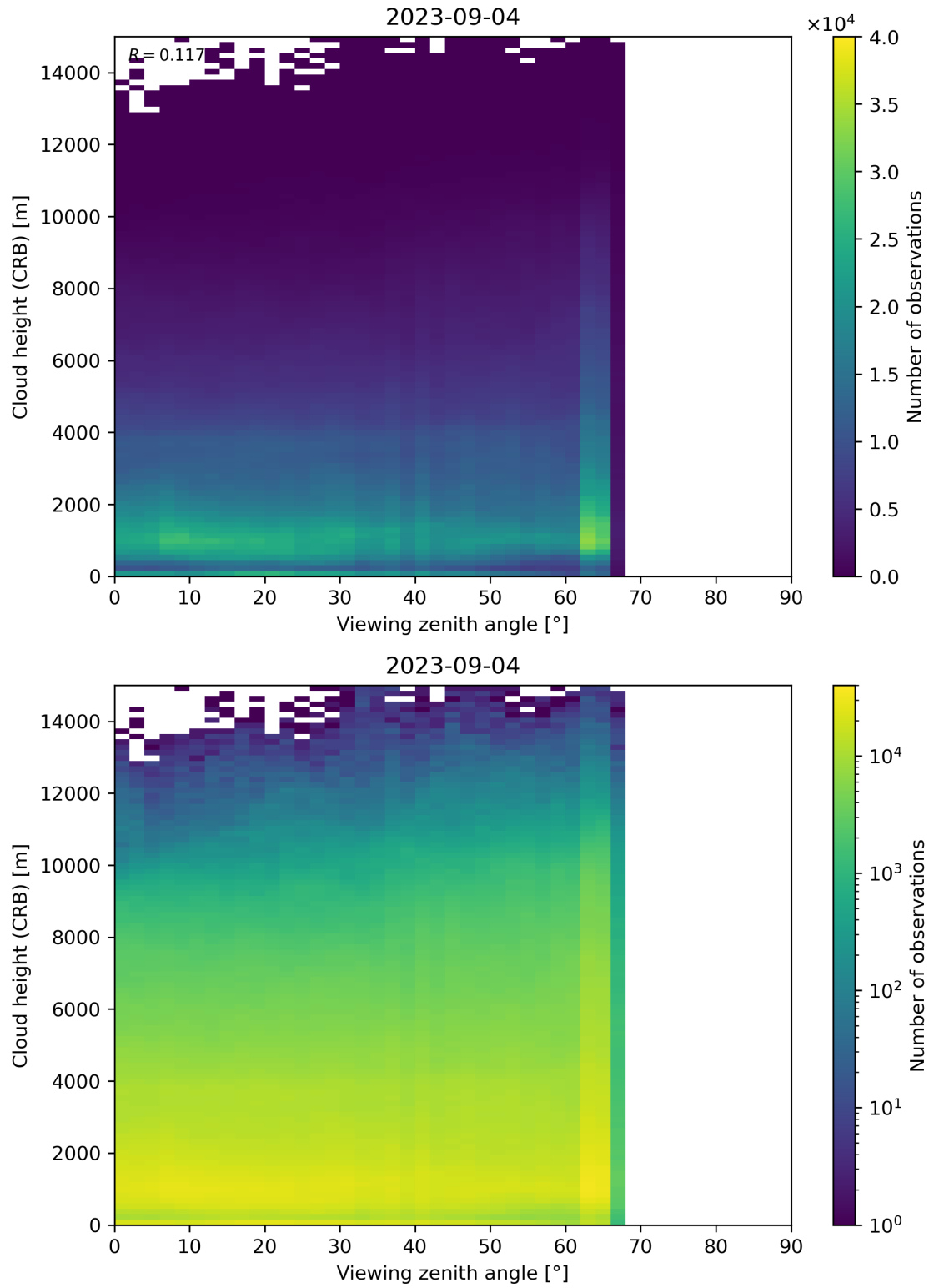


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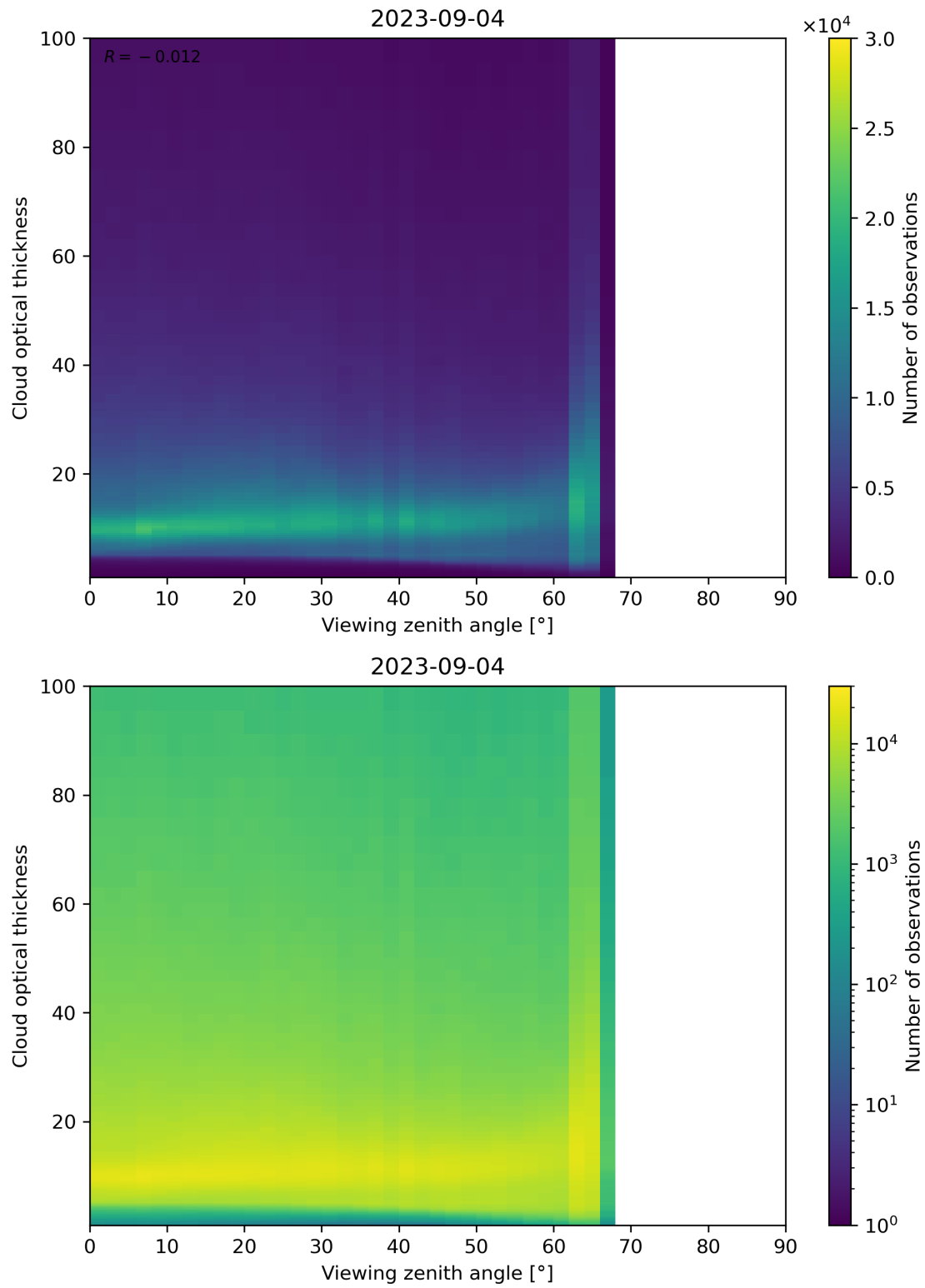


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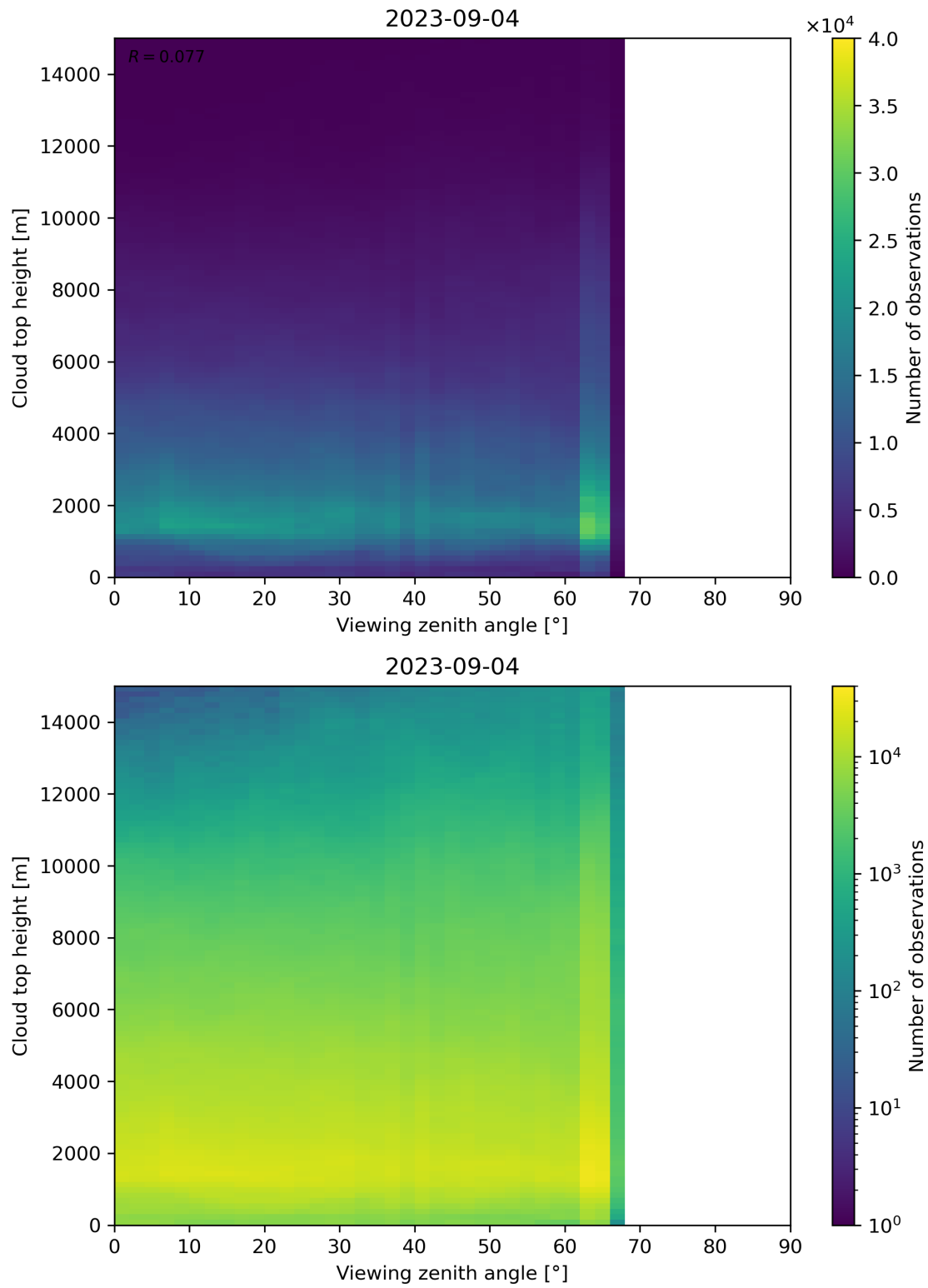


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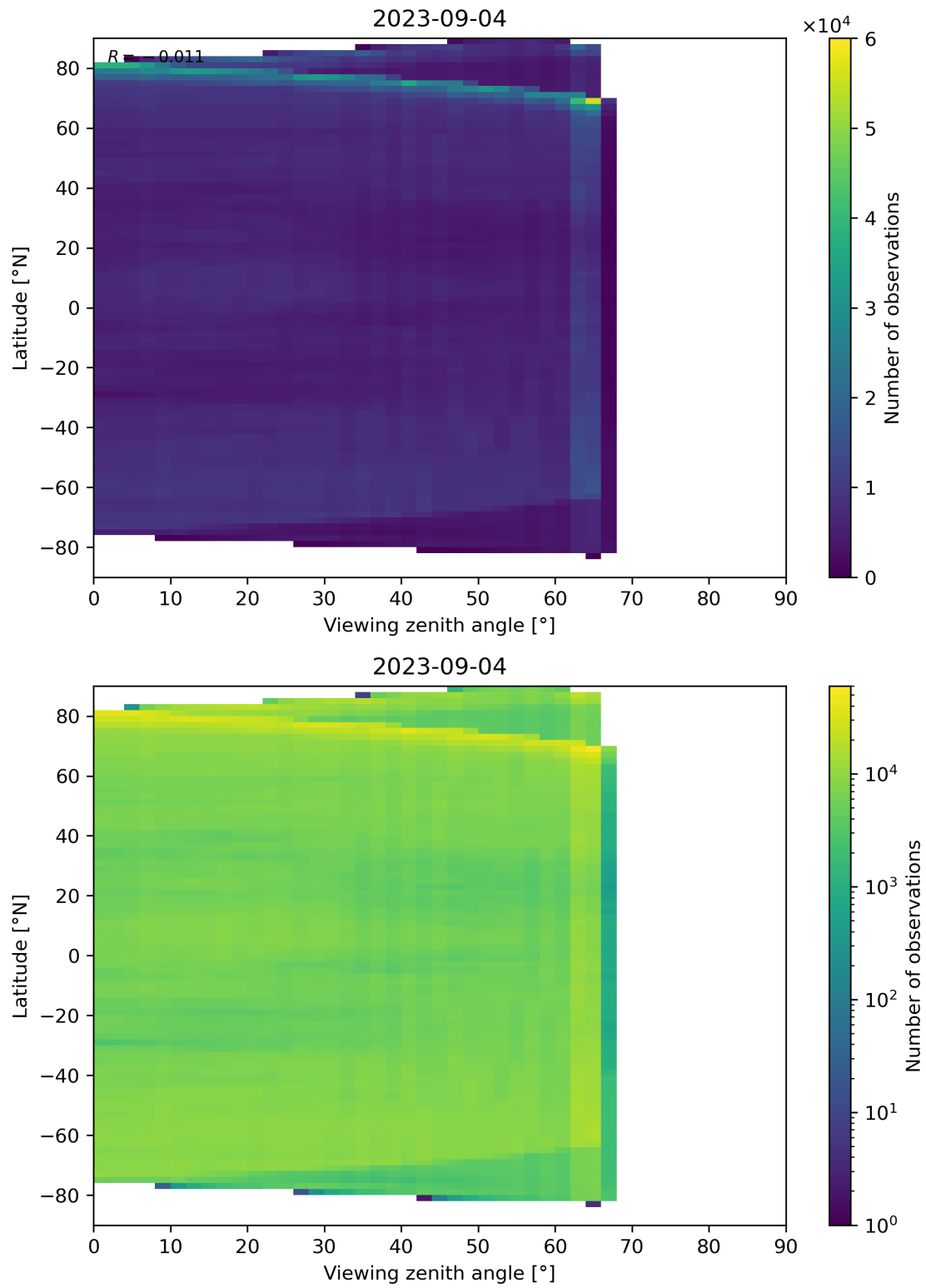


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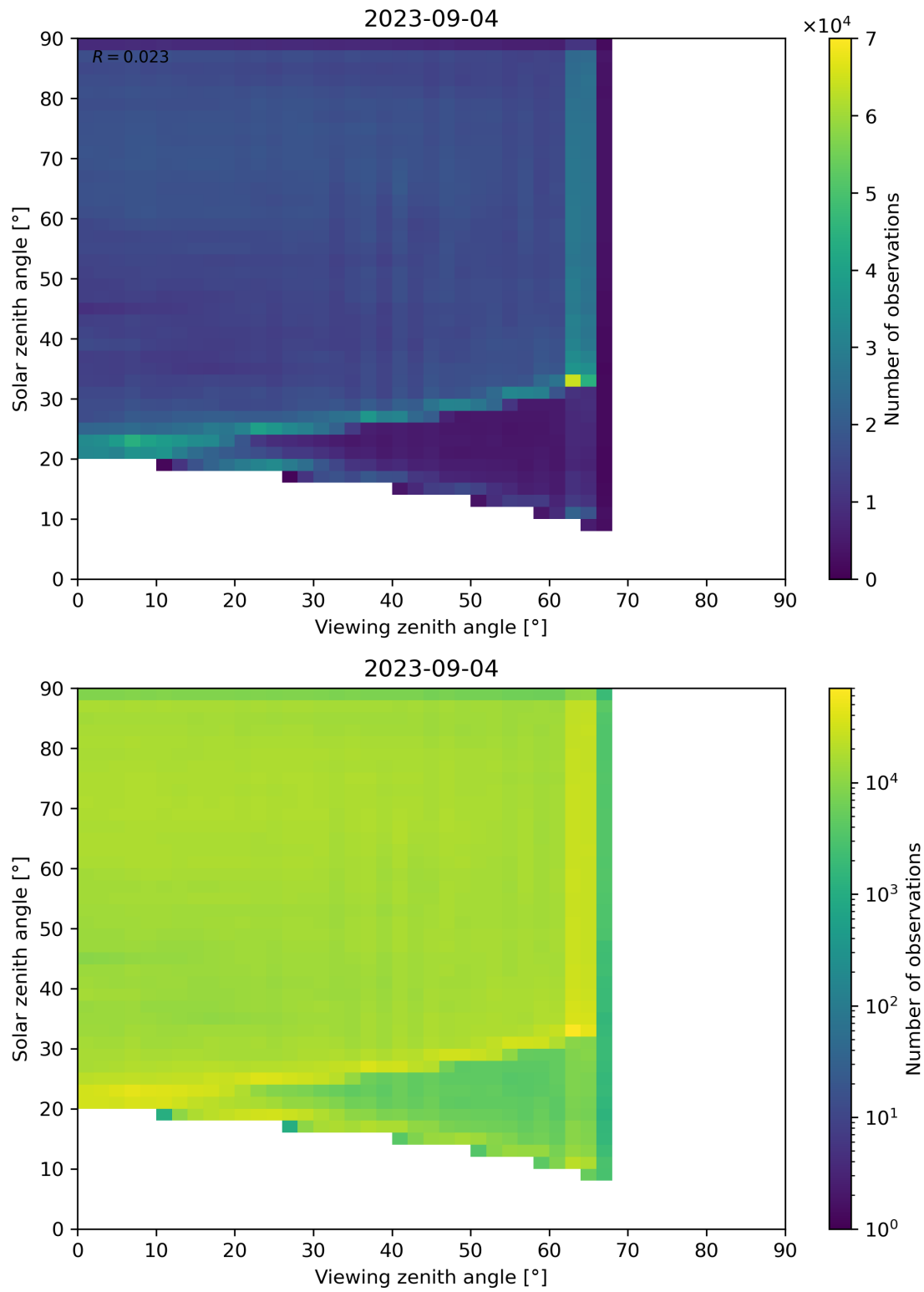


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