

PyCAMA report generated by tropl2-proc

tropl2-proc

2023-12-25 (01:30)

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]	0.516 ± 0.410	21624029	5.000×10^{-3}	0.830	0.570	0.0	1.000
cloud fraction [1]	0.591 ± 0.341	21624029	0.995	0.716	0.598	0.0	1.000
cloud top height [m]	$(0.406 \pm 0.268) \times 10^4$	21624029	1.575×10^3	3.815×10^3	3.544×10^3	0.0	2.000×10^4
cloud optical thickness [1]	18.9 ± 34.4	21624029	9.34	10.8	9.14	1.000	250
cloud fraction crb [1]	0.590 ± 0.342	21624029	0.995	0.716	0.597	0.0	1.000
cloud height crb [m]	$(0.302 \pm 0.230) \times 10^4$	21624029	75.0	3.085×10^3	2.546×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.626 ± 0.215	21624029	0.995	0.314	0.612	0.0	1.000
surface albedo fitted [1]	0.296 ± 0.362	21624029	1.500×10^{-2}	0.585	5.659×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.282 ± 0.348	21624029	1.500×10^{-2}	0.602	4.387×10^{-2}	0.0	1.000
fitted root mean square [1]	$(8.226 \pm 9.739) \times 10^{-4}$	21624029	5.000×10^{-5}	1.091×10^{-3}	4.871×10^{-4}	1.093×10^{-6}	0.332
fitted root mean square crb [1]	$(7.460 \pm 8.618) \times 10^{-4}$	21624029	5.000×10^{-5}	1.050×10^{-3}	3.968×10^{-4}	7.130×10^{-7}	0.294
wavelength shift [nm]	$(9.350 \pm 7.452) \times 10^{-3}$	21624029	9.000×10^{-4}	1.122×10^{-2}	9.064×10^{-3}	-5.831×10^{-2}	0.129
cloud fraction apriori [1]	0.596 ± 0.345	21624029	0.995	0.730	0.610	0.0	1.000
reflectance blue ocra [1]	0.599 ± 0.236	21624029	0.905	0.427	0.591	0.132	2.00
reflectance green ocra [1]	0.553 ± 0.268	21624029	0.185	0.505	0.553	7.510×10^{-2}	2.02
reflectance continuum aband [1]	0.506 ± 0.296	21624029	4.500×10^{-2}	0.525	0.519	1.102×10^{-2}	5.26

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	0.0	7.000×10^{-2}	0.900	0.990	1.000	1.000	1.000
cloud fraction [1]	2.330×10^{-2}	7.216×10^{-2}	0.113	0.166	0.271	0.987	1.000	1.000	1.000	1.000
cloud top height [m]	283	798	1.160×10^3	1.450×10^3	1.861×10^3	5.676×10^3	6.828×10^3	7.906×10^3	9.195×10^3	1.149×10^4
cloud optical thickness [1]	1.000	2.52	3.68	4.61	5.55	16.3	24.9	36.8	64.7	250
cloud fraction crb [1]	2.296×10^{-2}	7.135×10^{-2}	0.112	0.165	0.270	0.987	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	214	562	831	1.185×10^3	4.270×10^3	5.404×10^3	6.441×10^3	7.675×10^3	9.591×10^3
cloud albedo crb [1]	5.859×10^{-2}	0.273	0.379	0.431	0.479	0.792	0.871	0.925	0.986	1.000
surface albedo fitted [1]	0.0	7.266×10^{-3}	1.231×10^{-2}	1.673×10^{-2}	2.319×10^{-2}	0.608	0.864	0.938	0.979	1.000
surface albedo fitted crb [1]	0.0	5.920×10^{-3}	9.249×10^{-3}	1.249×10^{-2}	1.746×10^{-2}	0.619	0.824	0.880	0.915	0.956
fitted root mean square [1]	1.488×10^{-5}	2.965×10^{-5}	5.000×10^{-5}	8.245×10^{-5}	1.459×10^{-4}	1.236×10^{-3}	1.690×10^{-3}	2.091×10^{-3}	2.600×10^{-3}	3.642×10^{-3}
fitted root mean square crb [1]	8.854×10^{-6}	2.064×10^{-5}	3.591×10^{-5}	5.789×10^{-5}	1.042×10^{-4}	1.154×10^{-3}	1.597×10^{-3}	1.984×10^{-3}	2.484×10^{-3}	3.491×10^{-3}
wavelength shift [nm]	-7.020×10^{-3}	-4.293×10^{-4}	4.742×10^{-4}	1.508×10^{-3}	3.451×10^{-3}	1.468×10^{-2}	1.704×10^{-2}	1.904×10^{-2}	2.158×10^{-2}	2.697×10^{-2}
cloud fraction apriori [1]	3.427×10^{-2}	6.917×10^{-2}	0.108	0.161	0.270	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.235	0.260	0.288	0.322	0.382	0.809	0.872	0.908	0.940	1.06
reflectance green ocra [1]	0.153	0.176	0.197	0.228	0.292	0.797	0.868	0.910	0.941	1.03
reflectance continuum aband [1]	3.060×10^{-2}	5.700×10^{-2}	9.294×10^{-2}	0.140	0.242	0.767	0.840	0.885	0.925	1.04

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]	0.581 ± 0.407	7579306	0.830	0.800	0.0	1.000	0.120	0.950
cloud fraction [1]	0.546 ± 0.346	7579306	0.719	0.522	0.0	1.000	0.212	0.931
cloud top height [m]	$(0.435 \pm 0.281) \times 10^4$	7579306	4.208×10^3	3.705×10^3	0.0	2.000×10^4	1.997×10^3	6.205×10^3
cloud optical thickness [1]	26.9 ± 45.8	7579306	16.3	10.6	1.000	250	6.56	22.9
cloud fraction crb [1]	0.544 ± 0.346	7579306	0.718	0.519	0.0	1.000	0.211	0.928
cloud height crb [m]	$(0.363 \pm 0.242) \times 10^4$	7579306	3.741×10^3	3.169×10^3	0.0	2.000×10^4	1.538×10^3	5.279×10^3
cloud albedo crb [1]	0.591 ± 0.196	7579306	0.244	0.576	0.0	1.000	0.470	0.714
surface albedo fitted [1]	0.137 ± 0.169	7579306	0.194	4.564×10^{-2}	0.0	1.000	2.382×10^{-2}	0.218
surface albedo fitted crb [1]	0.128 ± 0.168	7579306	0.189	3.422×10^{-2}	0.0	1.000	1.722×10^{-2}	0.207
fitted root mean square [1]	$(3.887 \pm 5.042) \times 10^{-4}$	7579306	4.074×10^{-4}	2.168×10^{-4}	1.093×10^{-6}	5.577×10^{-2}	8.444×10^{-5}	4.918×10^{-4}
fitted root mean square crb [1]	$(3.434 \pm 4.763) \times 10^{-4}$	7579306	3.753×10^{-4}	1.561×10^{-4}	7.130×10^{-7}	2.797×10^{-2}	5.410×10^{-5}	4.294×10^{-4}
wavelength shift [nm]	$(6.620 \pm 6.643) \times 10^{-3}$	7579306	9.074×10^{-3}	5.606×10^{-3}	-4.373×10^{-2}	6.295×10^{-2}	1.626×10^{-3}	1.070×10^{-2}
cloud fraction apriori [1]	0.547 ± 0.351	7579306	0.749	0.520	0.0	1.000	0.205	0.954
reflectance blue ocr [1]	0.525 ± 0.200	7579306	0.304	0.495	0.138	1.99	0.360	0.664
reflectance green ocr [1]	0.464 ± 0.225	7579306	0.363	0.433	8.557×10^{-2}	2.02	0.267	0.630
reflectance continuum aband [1]	0.413 ± 0.260	7579306	0.397	0.390	1.102×10^{-2}	4.05	0.199	0.596

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]	0.481 ± 0.408	14044723	0.840	0.400	0.0	1.000	6.000×10^{-2}	0.900
cloud fraction [1]	0.615 ± 0.336	14044723	0.688	0.635	0.0	1.000	0.311	0.999
cloud top height [m]	$(0.391 \pm 0.259) \times 10^4$	14044723	3.655×10^3	3.463×10^3	0.0	2.000×10^4	1.788×10^3	5.443×10^3
cloud optical thickness [1]	14.7 ± 25.4	14044723	8.67	8.54	1.000	250	5.22	13.9
cloud fraction crb [1]	0.615 ± 0.336	14044723	0.688	0.636	0.0	1.000	0.311	0.999
cloud height crb [m]	$(0.270 \pm 0.217) \times 10^4$	14044723	2.728×10^3	2.286×10^3	0.0	2.000×10^4	1.008×10^3	3.736×10^3
cloud albedo crb [1]	0.645 ± 0.222	14044723	0.345	0.644	0.0	1.000	0.484	0.829
surface albedo fitted [1]	0.382 ± 0.406	14044723	0.833	7.756×10^{-2}	0.0	1.000	2.280×10^{-2}	0.855
surface albedo fitted crb [1]	0.365 ± 0.389	14044723	0.800	6.095×10^{-2}	0.0	1.000	1.763×10^{-2}	0.818
fitted root mean square [1]	$(1.057 \pm 1.080) \times 10^{-3}$	14044723	1.354×10^{-3}	8.001×10^{-4}	1.337×10^{-6}	0.332	2.500×10^{-4}	1.604×10^{-3}
fitted root mean square crb [1]	$(9.632 \pm 9.415) \times 10^{-4}$	14044723	1.326×10^{-3}	7.015×10^{-4}	1.304×10^{-6}	0.294	1.793×10^{-4}	1.506×10^{-3}
wavelength shift [nm]	$(1.082 \pm 0.745) \times 10^{-2}$	14044723	1.085×10^{-2}	1.121×10^{-2}	-5.831×10^{-2}	0.129	5.220×10^{-3}	1.607×10^{-2}
cloud fraction apriori [1]	0.623 ± 0.339	14044723	0.684	0.653	0.0	1.000	0.316	1.000
reflectance blue ocra [1]	0.639 ± 0.245	14044723	0.453	0.683	0.132	2.00	0.403	0.856
reflectance green ocra [1]	0.601 ± 0.277	14044723	0.530	0.660	7.510×10^{-2}	2.01	0.321	0.851
reflectance continuum aband [1]	0.557 ± 0.302	14044723	0.533	0.621	1.182×10^{-2}	5.26	0.284	0.817

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]	0.657 ± 0.363	13845825	0.550	0.850	0.0	1.000	0.400	0.950
cloud fraction [1]	0.615 ± 0.361	13845825	0.755	0.680	0.0	1.000	0.245	1.000
cloud top height [m]	$(0.365 \pm 0.263) \times 10^4$	13845825	3.509×10^3	2.828×10^3	0.0	2.000×10^4	1.619×10^3	5.128×10^3
cloud optical thickness [1]	18.1 ± 28.7	13845825	10.5	10.1	1.000	250	6.89	17.4
cloud fraction crb [1]	0.614 ± 0.361	13845825	0.757	0.678	0.0	1.000	0.243	1.000
cloud height crb [m]	$(0.288 \pm 0.237) \times 10^4$	13845825	3.141×10^3	2.156×10^3	0.0	2.000×10^4	1.039×10^3	4.180×10^3
cloud albedo crb [1]	0.569 ± 0.179	13845825	0.235	0.552	0.0	1.000	0.458	0.693
surface albedo fitted [1]	0.116 ± 0.224	13845825	3.484×10^{-2}	2.894×10^{-2}	0.0	1.000	1.692×10^{-2}	5.176×10^{-2}
surface albedo fitted crb [1]	0.111 ± 0.227	13845825	2.732×10^{-2}	2.193×10^{-2}	0.0	1.000	1.262×10^{-2}	3.994×10^{-2}
fitted root mean square [1]	$(7.455 \pm 10.034) \times 10^{-4}$	13845825	1.058×10^{-3}	3.399×10^{-4}	1.093×10^{-6}	0.332	9.756×10^{-5}	1.156×10^{-3}
fitted root mean square crb [1]	$(7.127 \pm 8.788) \times 10^{-4}$	13845825	1.049×10^{-3}	3.040×10^{-4}	7.639×10^{-7}	0.294	8.042×10^{-5}	1.129×10^{-3}
wavelength shift [nm]	$(8.558 \pm 7.654) \times 10^{-3}$	13845825	1.127×10^{-2}	7.818×10^{-3}	-5.022×10^{-2}	0.129	2.624×10^{-3}	1.390×10^{-2}
cloud fraction apriori [1]	0.615 ± 0.367	13845825	0.767	0.682	0.0	1.000	0.233	1.000
reflectance blue oca [1]	0.527 ± 0.208	13845825	0.343	0.496	0.169	2.00	0.346	0.689
reflectance green oca [1]	0.470 ± 0.237	13845825	0.416	0.439	9.121×10^{-2}	2.01	0.249	0.665
reflectance continuum aband [1]	0.406 ± 0.275	13845825	0.493	0.386	1.107×10^{-2}	4.76	0.143	0.637

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]	0.252 ± 0.359	6627622	0.250	9.000×10^{-2}	0.0	1.000	0.0	0.250
cloud fraction [1]	0.532 ± 0.289	6627622	0.462	0.509	0.0	1.000	0.300	0.762
cloud top height [m]	$(0.484 \pm 0.256) \times 10^4$	6627622	3.066×10^3	4.677×10^3	0.0	2.000×10^4	3.067×10^3	6.133×10^3
cloud optical thickness [1]	15.8 ± 34.6	6627622	6.68	6.10	1.000	250	4.54	11.2
cloud fraction crb [1]	0.533 ± 0.290	6627622	0.464	0.511	0.0	1.000	0.300	0.765
cloud height crb [m]	$(0.320 \pm 0.209) \times 10^4$	6627622	2.433×10^3	2.993×10^3	0.0	2.000×10^4	1.737×10^3	4.169×10^3
cloud albedo crb [1]	0.739 ± 0.234	6627622	0.329	0.805	0.0	1.000	0.596	0.925
surface albedo fitted [1]	0.670 ± 0.328	6627622	0.659	0.861	0.0	1.000	0.298	0.957
surface albedo fitted crb [1]	0.637 ± 0.306	6627622	0.603	0.815	0.0	1.000	0.292	0.895
fitted root mean square [1]	$(1.026 \pm 0.902) \times 10^{-3}$	6627622	1.111×10^{-3}	7.583×10^{-4}	1.337×10^{-6}	8.227×10^{-2}	3.585×10^{-4}	1.470×10^{-3}
fitted root mean square crb [1]	$(8.671 \pm 8.199) \times 10^{-4}$	6627622	1.045×10^{-3}	6.169×10^{-4}	1.600×10^{-6}	6.083×10^{-2}	2.341×10^{-4}	1.279×10^{-3}
wavelength shift [nm]	$(1.141 \pm 0.667) \times 10^{-2}$	6627622	9.718×10^{-3}	1.176×10^{-2}	-4.118×10^{-2}	7.182×10^{-2}	6.450×10^{-3}	1.617×10^{-2}
cloud fraction apriori [1]	0.549 ± 0.292	6627622	0.474	0.533	0.0	1.000	0.315	0.789
reflectance blue ocrs [1]	0.740 ± 0.228	6627622	0.321	0.832	0.132	1.98	0.584	0.905
reflectance green ocrs [1]	0.720 ± 0.254	6627622	0.368	0.829	7.510×10^{-2}	2.01	0.543	0.911
reflectance continuum aband [1]	0.706 ± 0.235	6627622	0.358	0.793	1.508×10^{-2}	5.26	0.527	0.885

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	-1.818×10^{-2}	2.554×10^{-2}	-2.669×10^{-2}	3.279×10^{-2}	-1.388×10^{-2}	-2.741×10^{-2}	0.108	2.912×10^{-2}	-3.240×10^{-2}
-1.818×10^{-2}	1.000	8.316×10^{-2}	9.268×10^{-2}	8.514×10^{-2}	0.164	9.398×10^{-2}	1.452×10^{-2}	0.264	0.108
2.554×10^{-2}	8.316×10^{-2}	1.000	-0.110	6.938×10^{-2}	0.203	-0.114	0.233	-0.226	-0.128
-2.669×10^{-2}	9.268×10^{-2}	-0.110	1.000	-6.935×10^{-2}	0.286	1.000	-6.180×10^{-2}	0.313	0.981
3.279×10^{-2}	8.514×10^{-2}	6.938×10^{-2}	-6.935×10^{-2}	1.000	3.458×10^{-2}	-6.825×10^{-2}	0.916	7.852×10^{-2}	-7.351×10^{-2}
-1.388×10^{-2}	0.164	0.203	0.286	3.458×10^{-2}	1.000	0.283	0.114	0.330	0.287
-2.741×10^{-2}	9.398×10^{-2}	-0.114	1.000	-6.825×10^{-2}	0.283	1.000	-6.215×10^{-2}	0.314	0.981
0.108	1.452×10^{-2}	0.233	-6.180×10^{-2}	0.916	0.114	-6.215×10^{-2}	1.000	-6.256×10^{-2}	-7.210×10^{-2}
2.912×10^{-2}	0.264	-0.226	0.313	7.852×10^{-2}	0.330	0.314	-6.256×10^{-2}	1.000	0.338
-3.240×10^{-2}	0.108	-0.128	0.981	-7.351×10^{-2}	0.287	0.981	-7.210×10^{-2}	0.338	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
381	-7.08	23.6	-0.178	1.715×10^3	-9.32	-0.183	4.847×10^3	0.122	-0.218
-7.08	399	78.8	0.631	4.559×10^3	113	0.641	667	1.13	0.745
23.6	78.8	2.252×10^3	-1.79	8.830×10^3	333	-1.85	2.550×10^4	-2.30	-2.09
-0.178	0.631	-1.79	0.116	-63.5	3.36	0.117	-48.6	2.293×10^{-2}	0.116
1.715×10^3	4.559×10^3	8.830×10^3	-63.5	7.192×10^6	3.194×10^3	-62.5	5.655×10^6	45.2	-68.1
-9.32	113	333	3.36	3.194×10^3	1.186×10^3	3.32	9.075×10^3	2.44	3.41
-0.183	0.641	-1.85	0.117	-62.5	3.32	0.117	-48.9	2.299×10^{-2}	0.116
4.847×10^3	667	2.550×10^4	-48.6	5.655×10^6	9.075×10^3	-48.9	5.301×10^6	-30.9	-57.3
0.122	1.13	-2.30	2.293×10^{-2}	45.2	2.44	2.299×10^{-2}	-30.9	4.610×10^{-2}	2.507×10^{-2}
-0.218	0.745	-2.09	0.116	-68.1	3.41	0.116	-57.3	2.507×10^{-2}	0.119

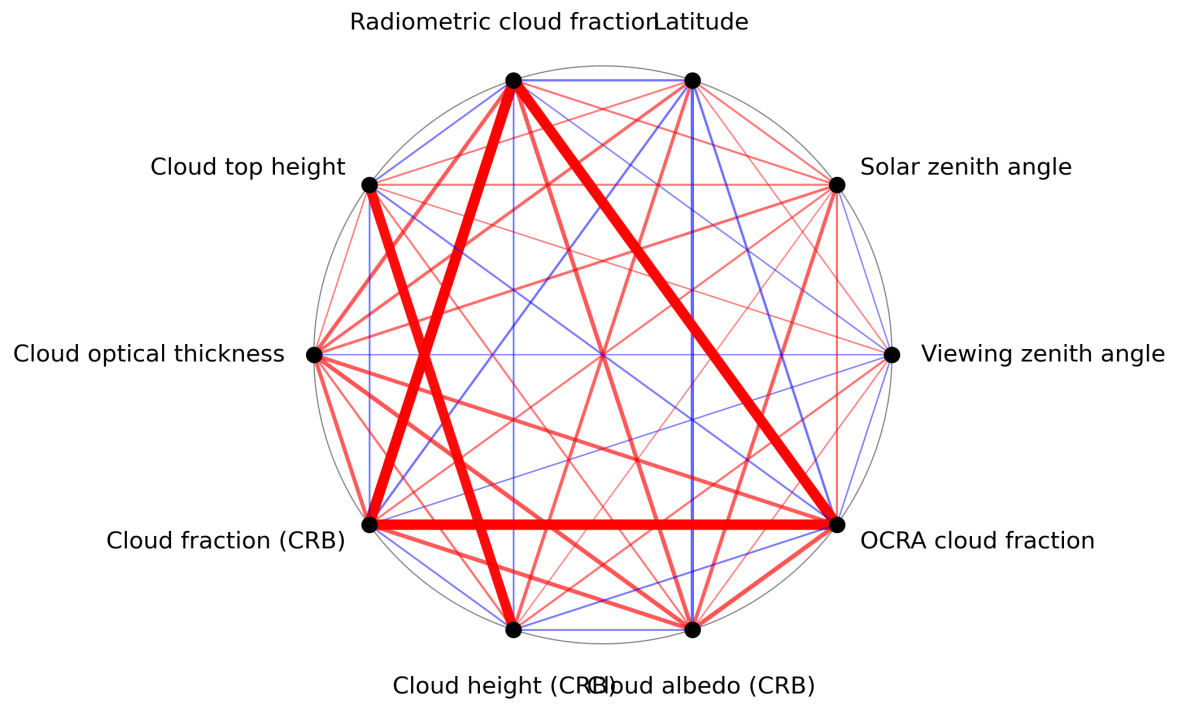


Figure 1: Map of correlation graph for 2023-12-09 to 2023-12-11.

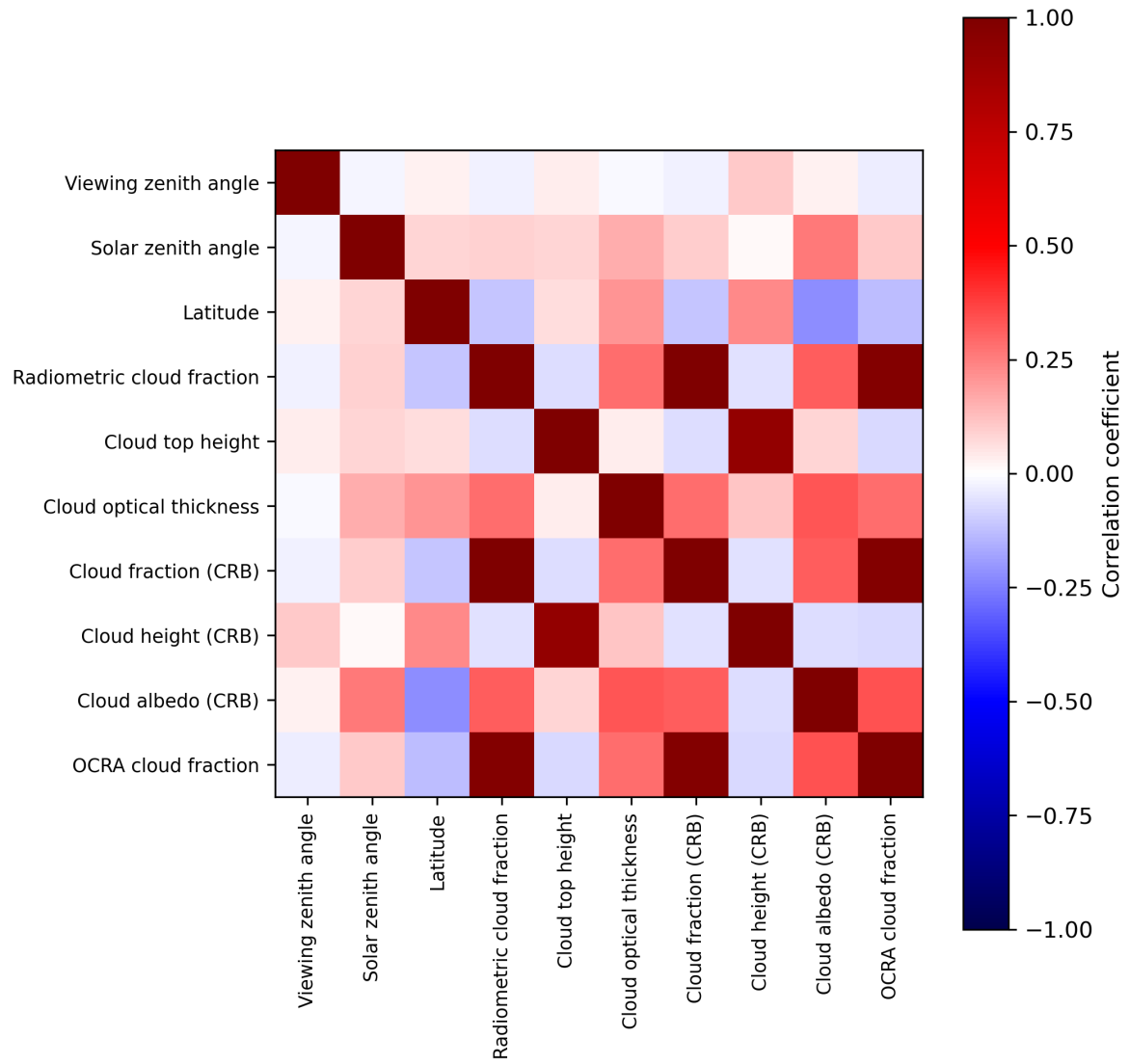


Figure 2: Map of correlation matrix for 2023-12-09 to 2023-12-11.

3 Granule outlines

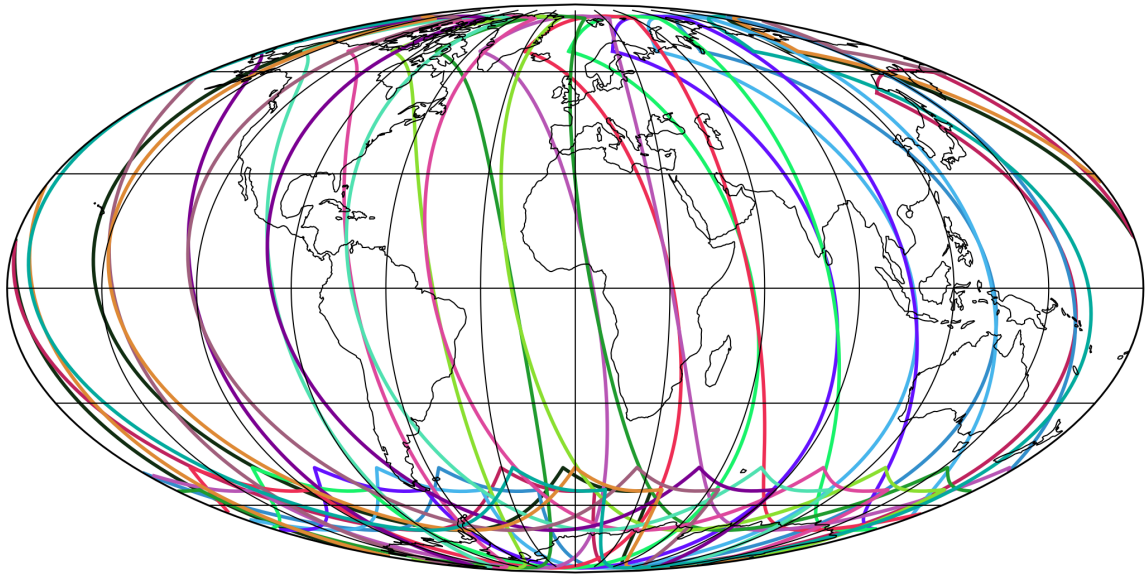


Figure 3: Outline of the granules.

4 Input data monitoring

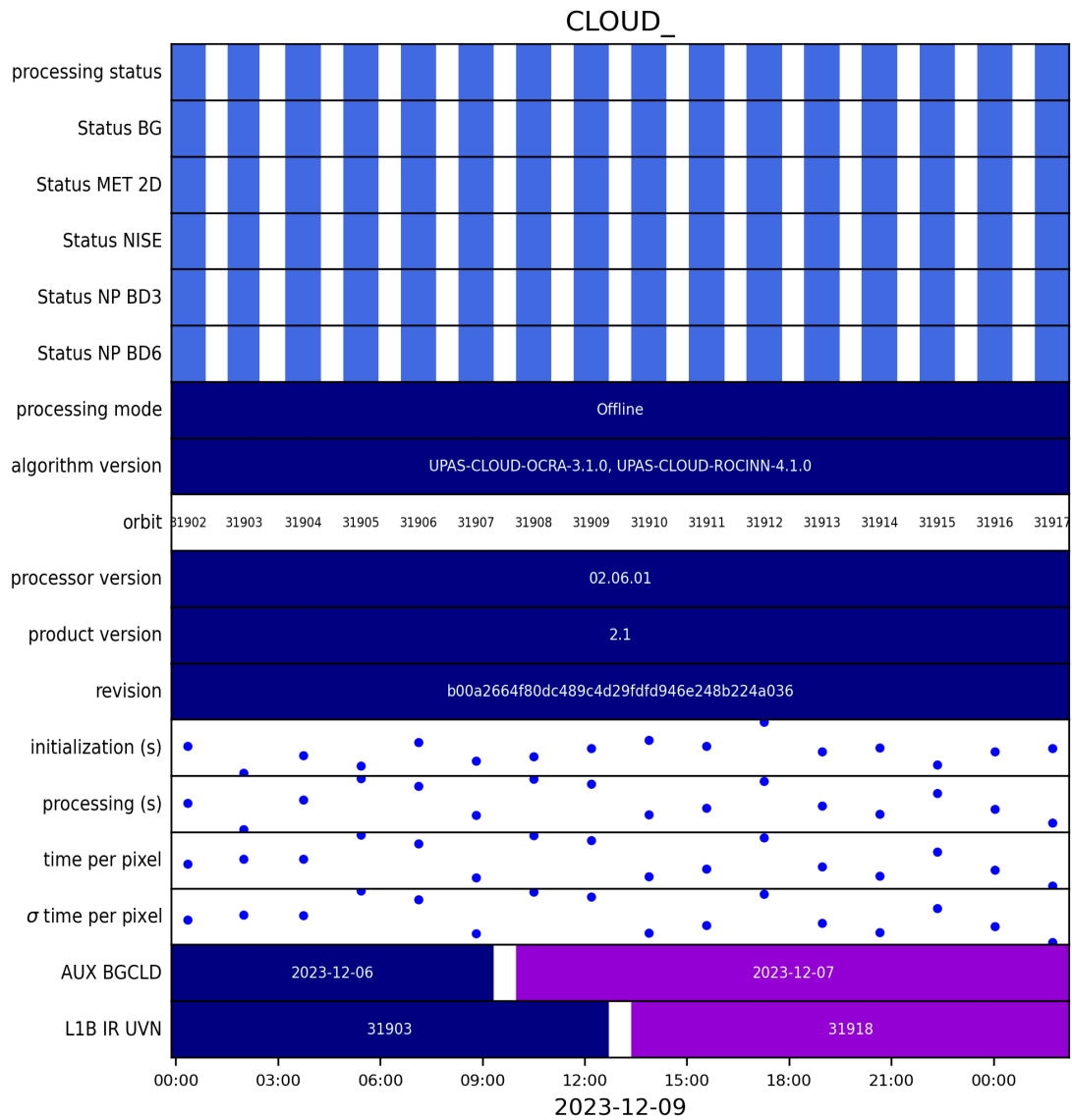


Figure 4: Input data per granule

5 Warnings and errors

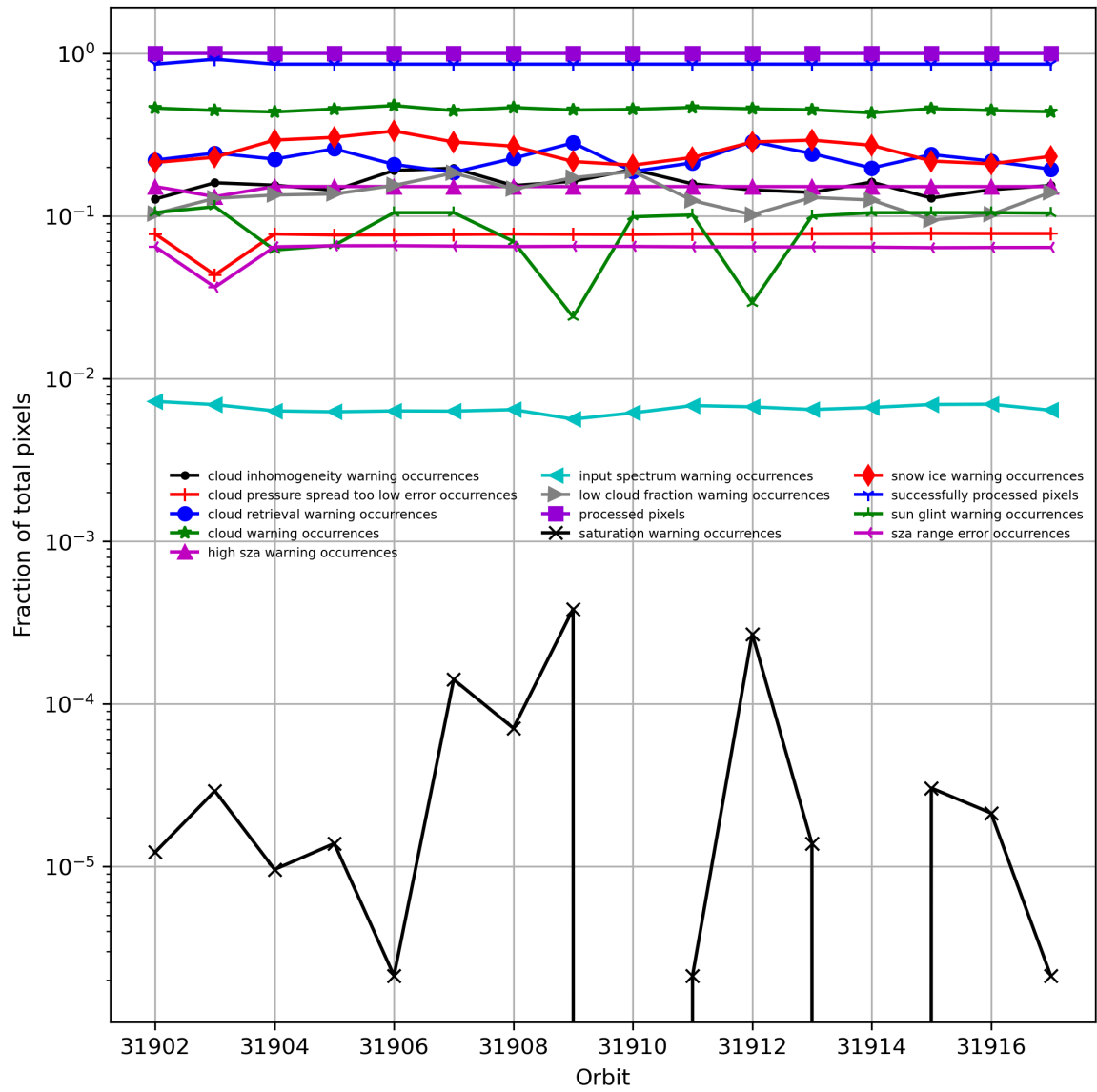


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

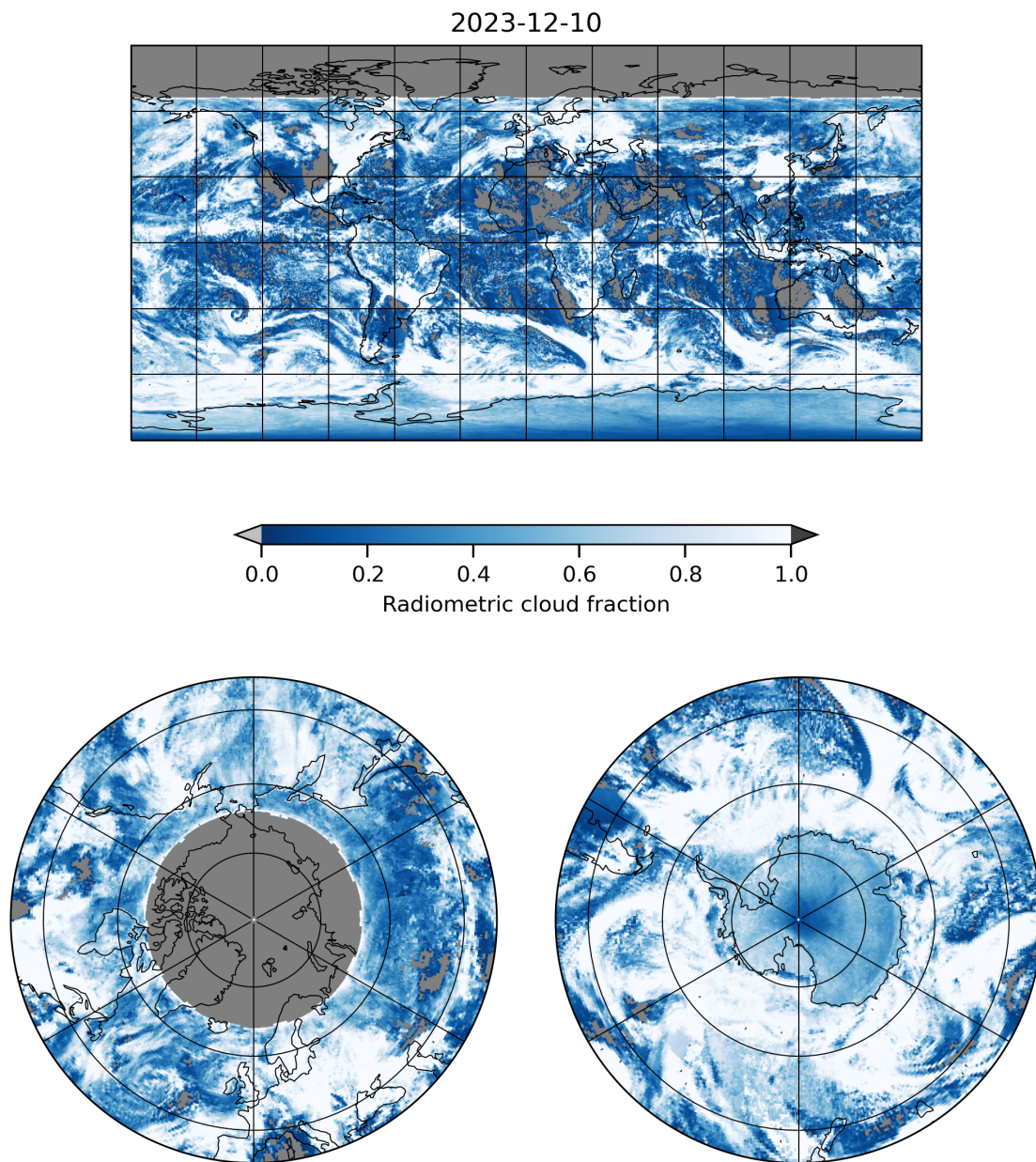


Figure 6: Map of “Radiometric cloud fraction” for 2023-12-09 to 2023-12-11

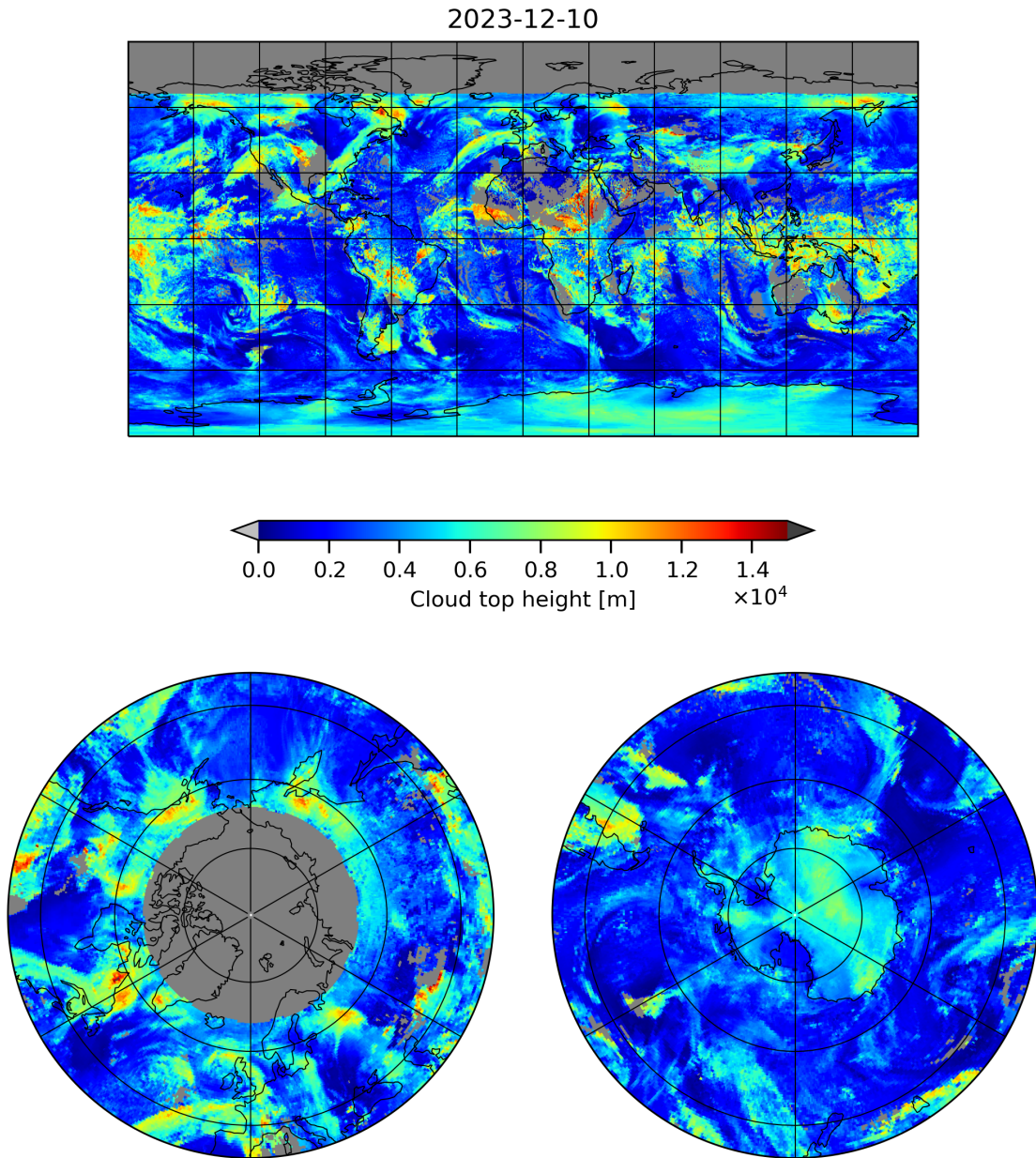


Figure 7: Map of “Cloud top height” for 2023-12-09 to 2023-12-11

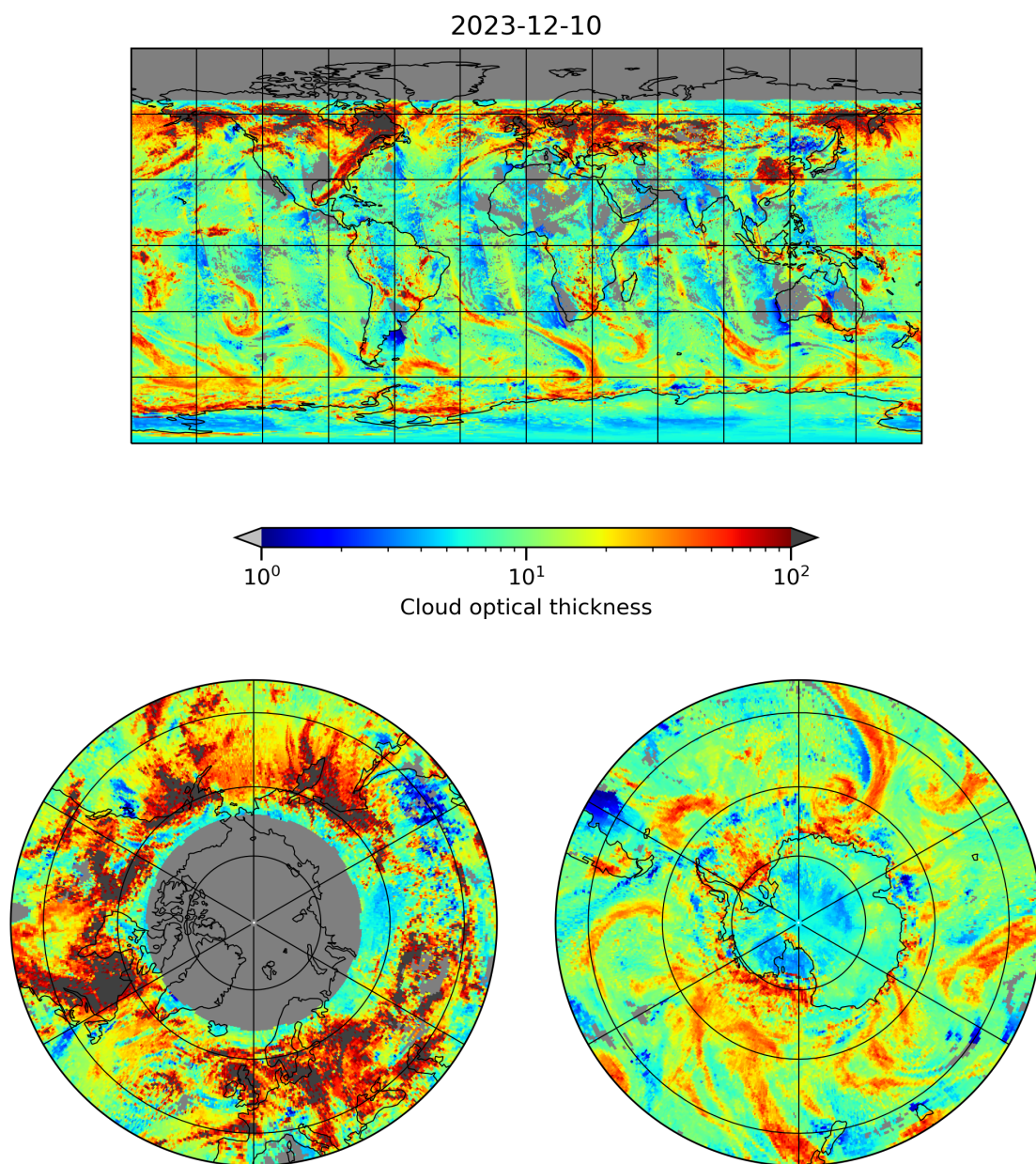


Figure 8: Map of “Cloud optical thickness” for 2023-12-09 to 2023-12-11

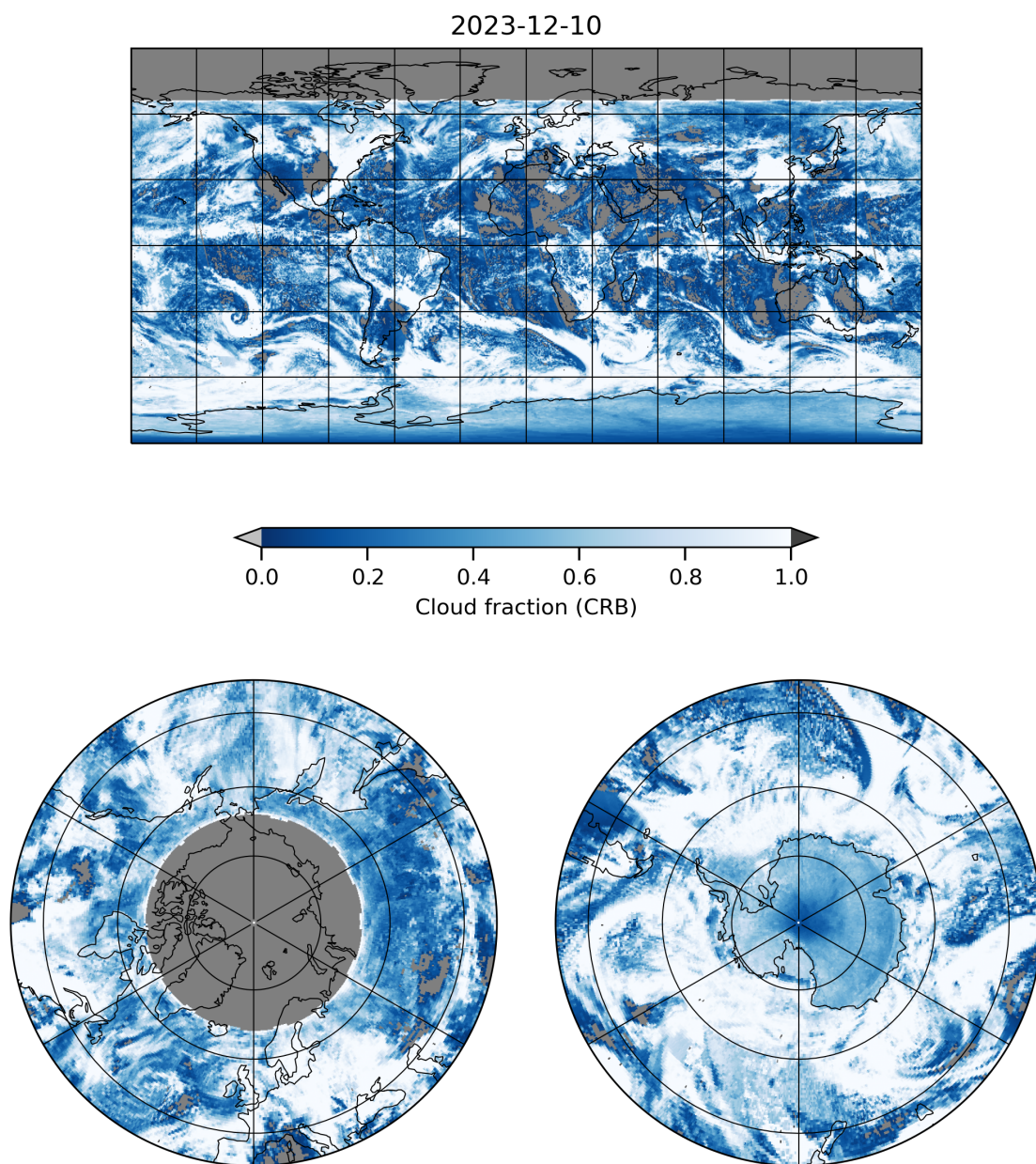


Figure 9: Map of “Cloud fraction (CRB)” for 2023-12-09 to 2023-12-11

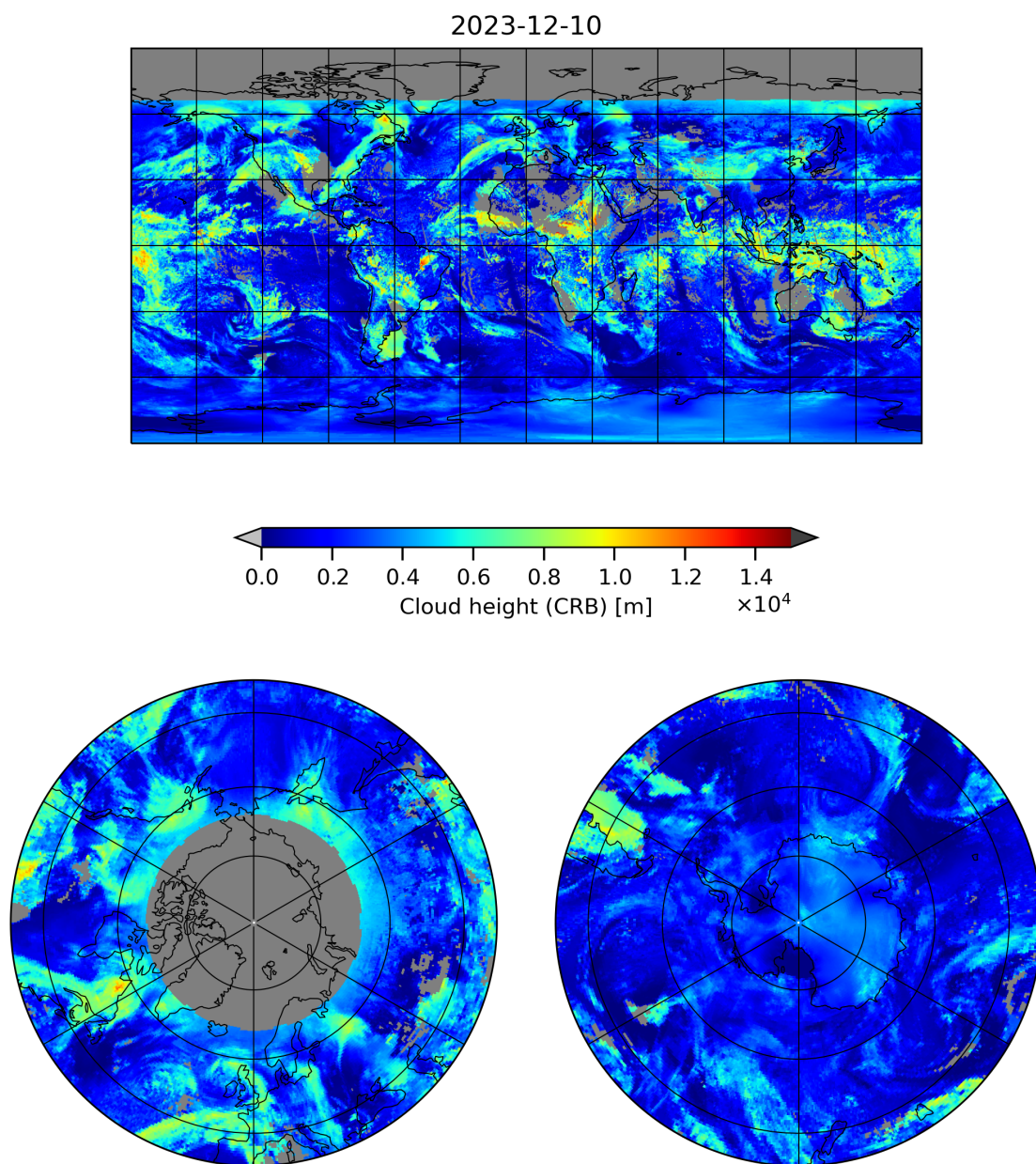


Figure 10: Map of “Cloud height (CRB)” for 2023-12-09 to 2023-12-11

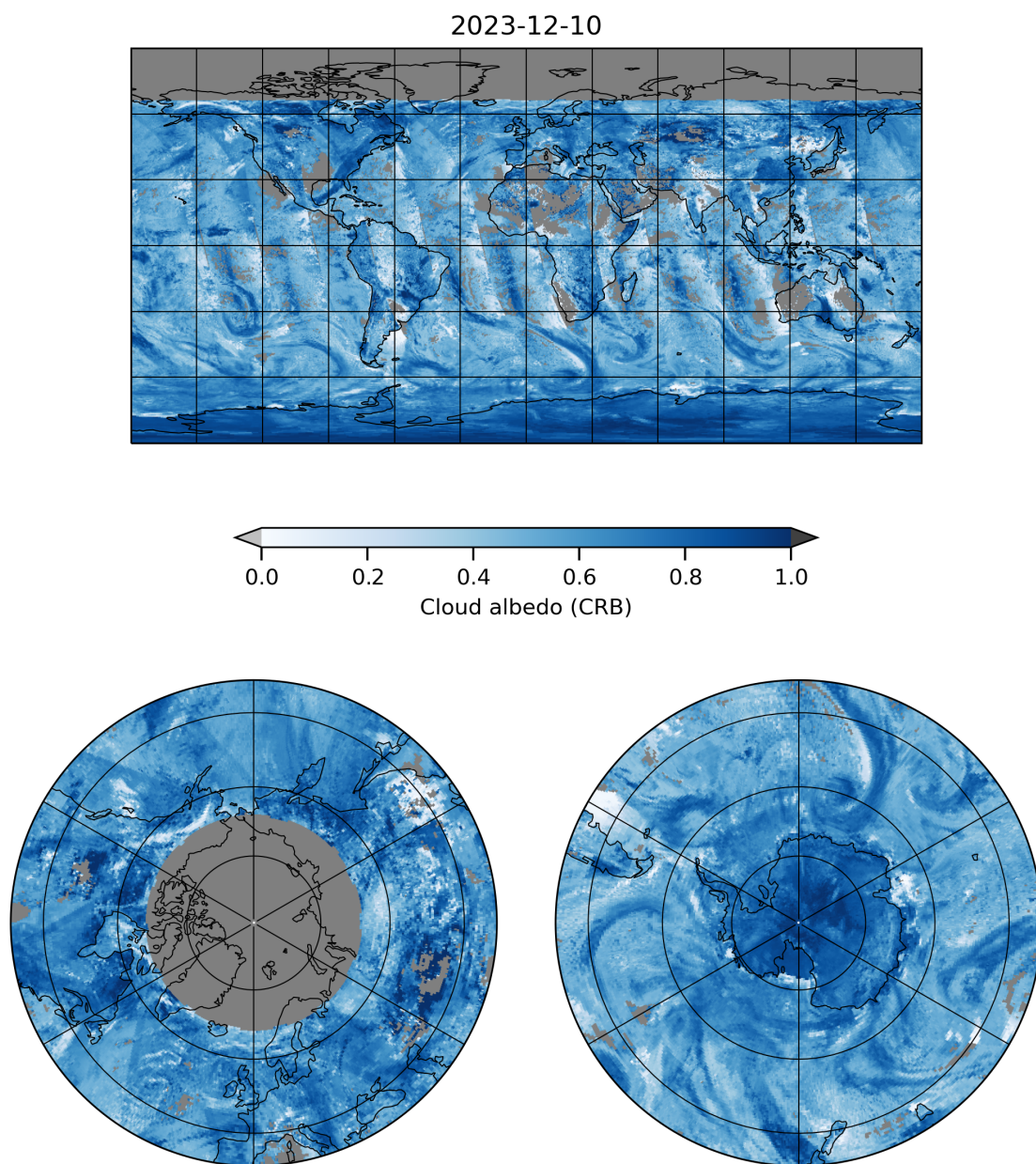


Figure 11: Map of “Cloud albedo (CRB)” for 2023-12-09 to 2023-12-11

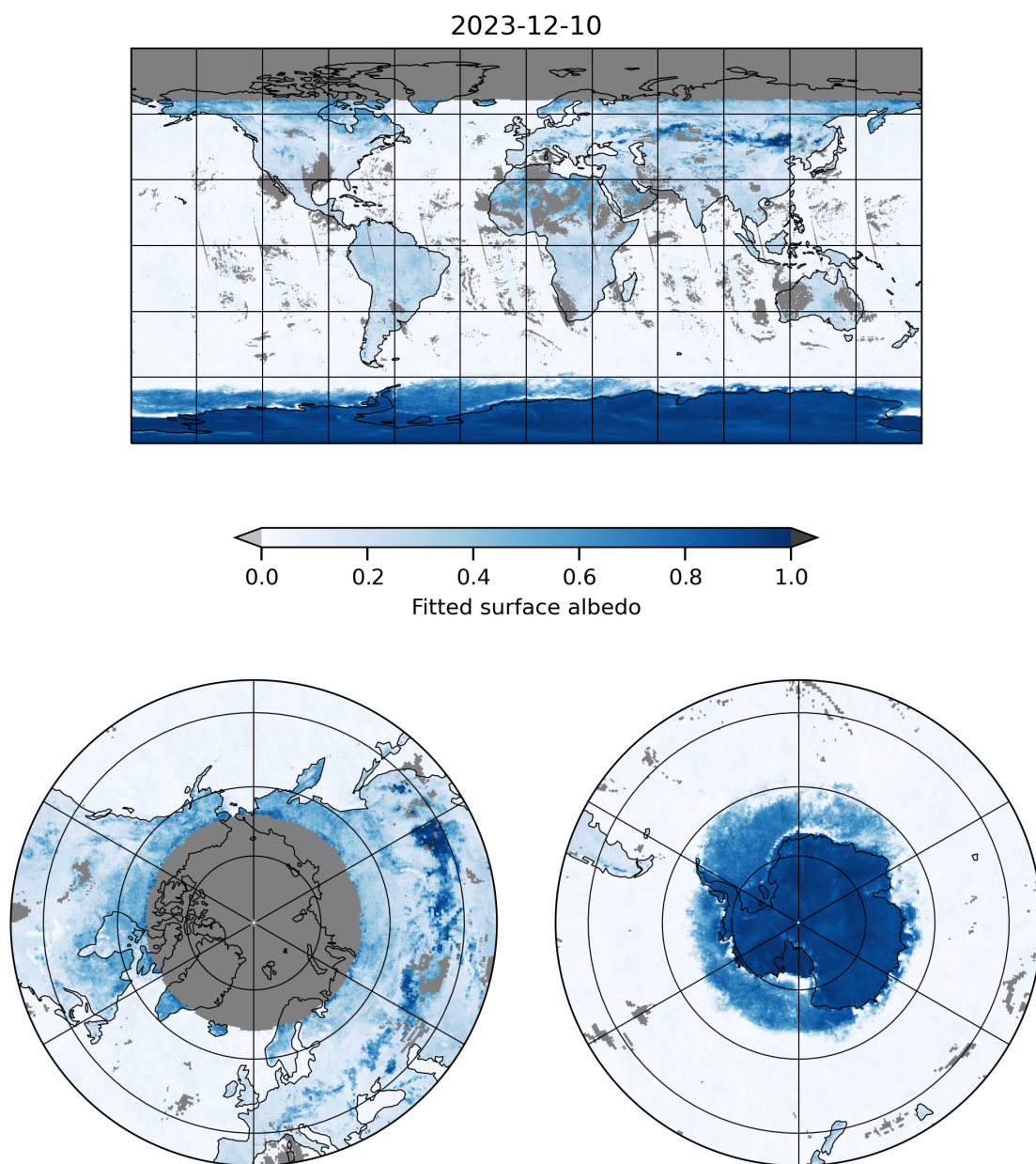


Figure 12: Map of “Fitted surface albedo” for 2023-12-09 to 2023-12-11

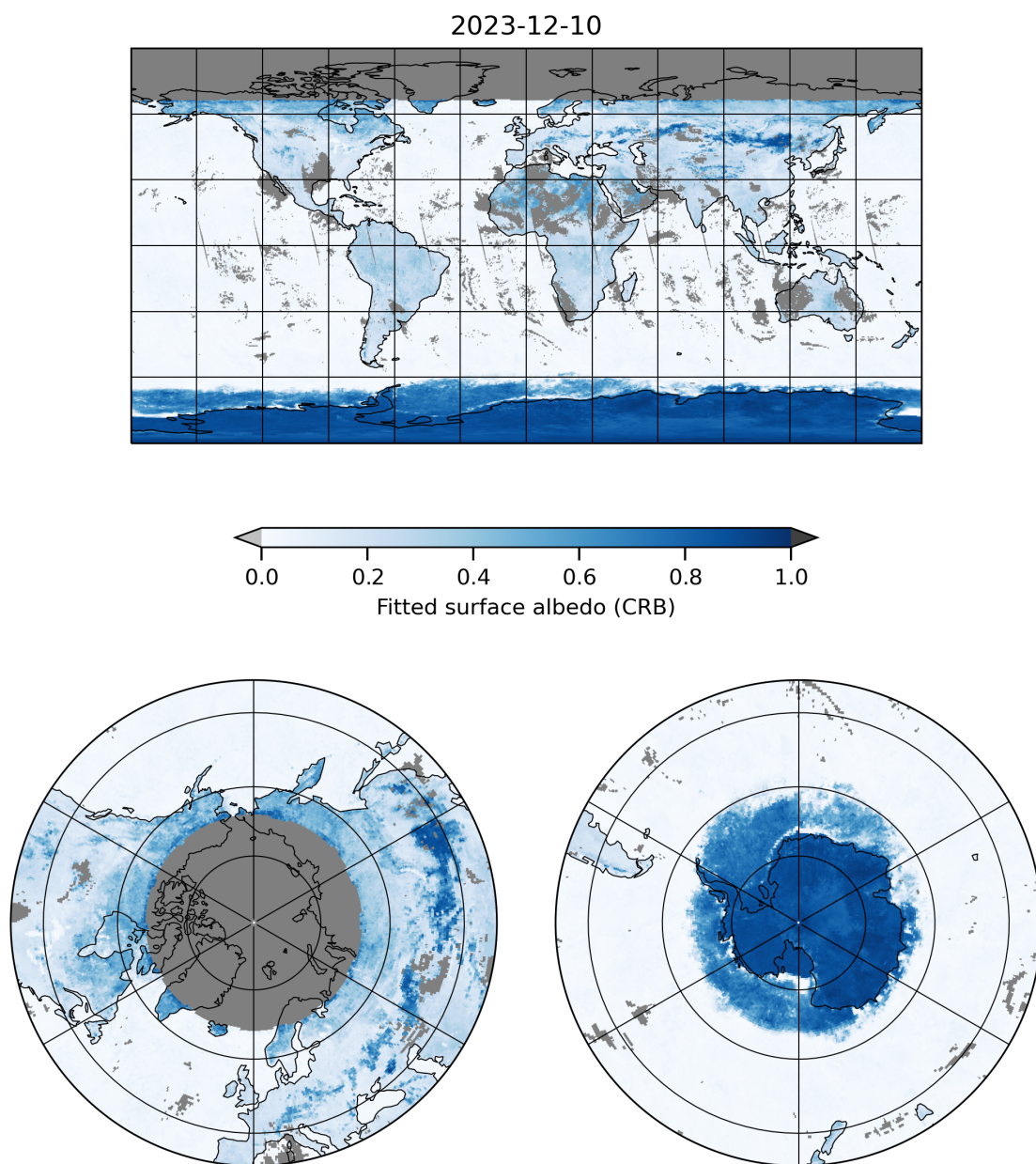


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-12-09 to 2023-12-11

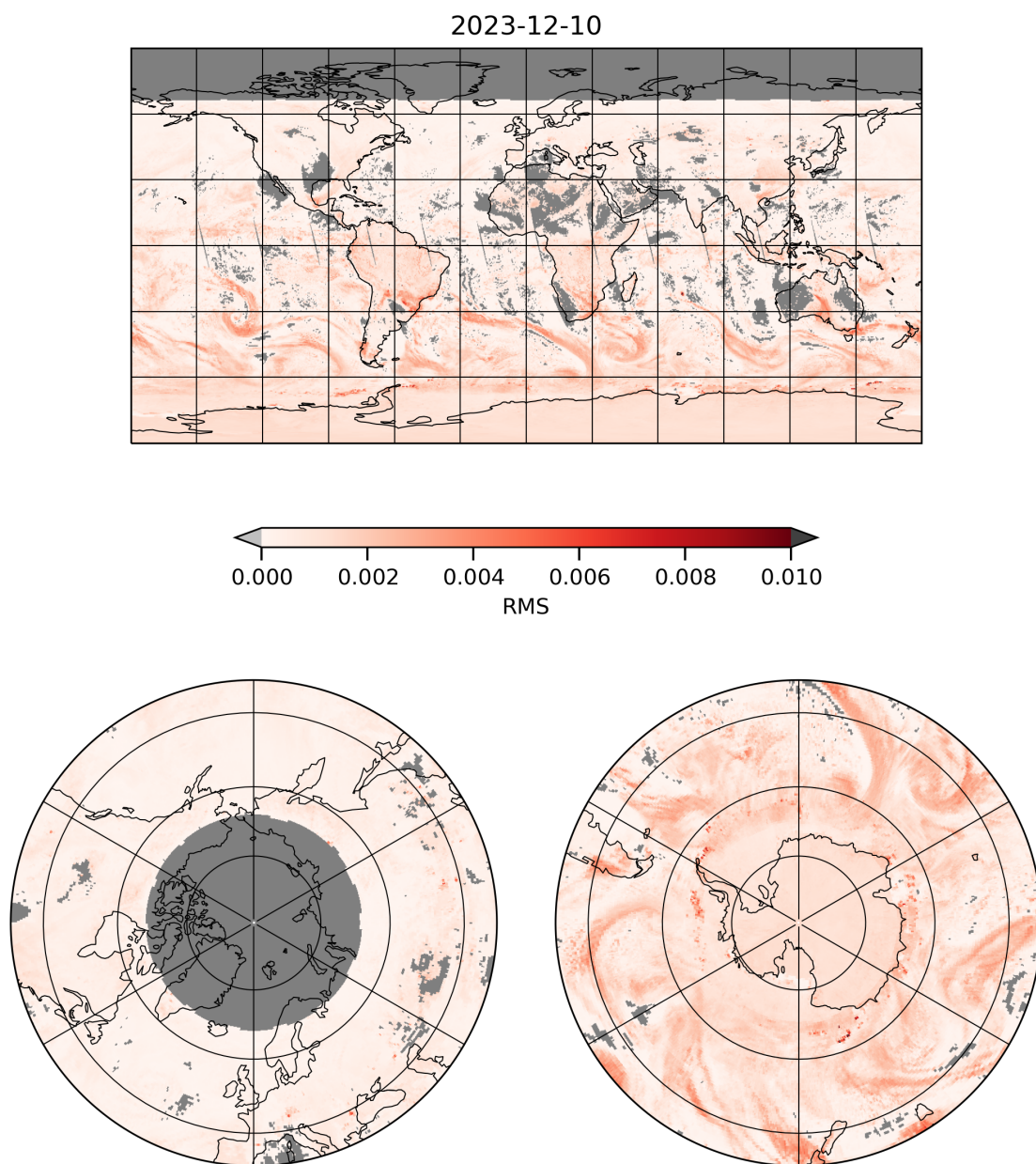


Figure 14: Map of “RMS” for 2023-12-09 to 2023-12-11

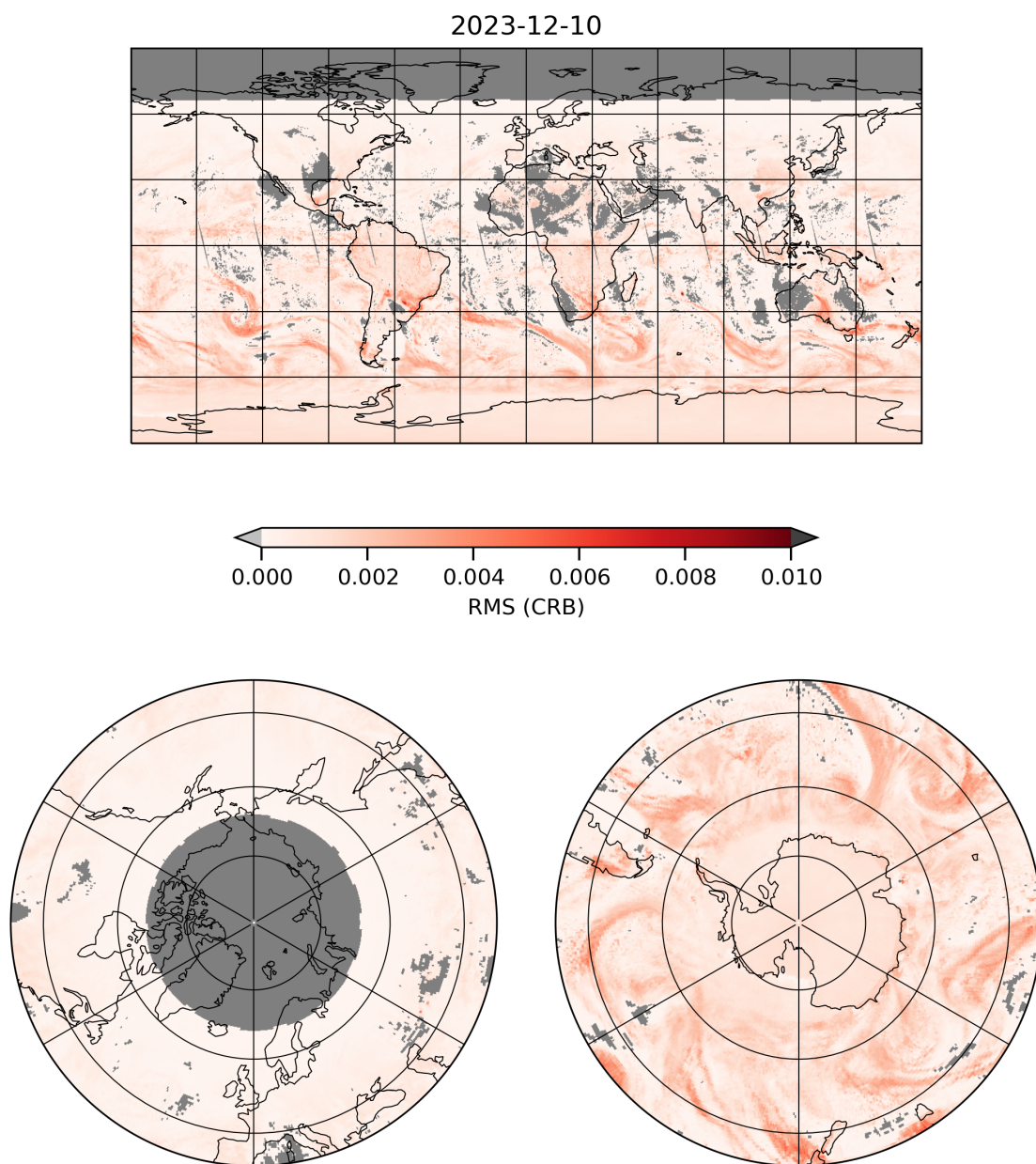


Figure 15: Map of “RMS (CRB)” for 2023-12-09 to 2023-12-11

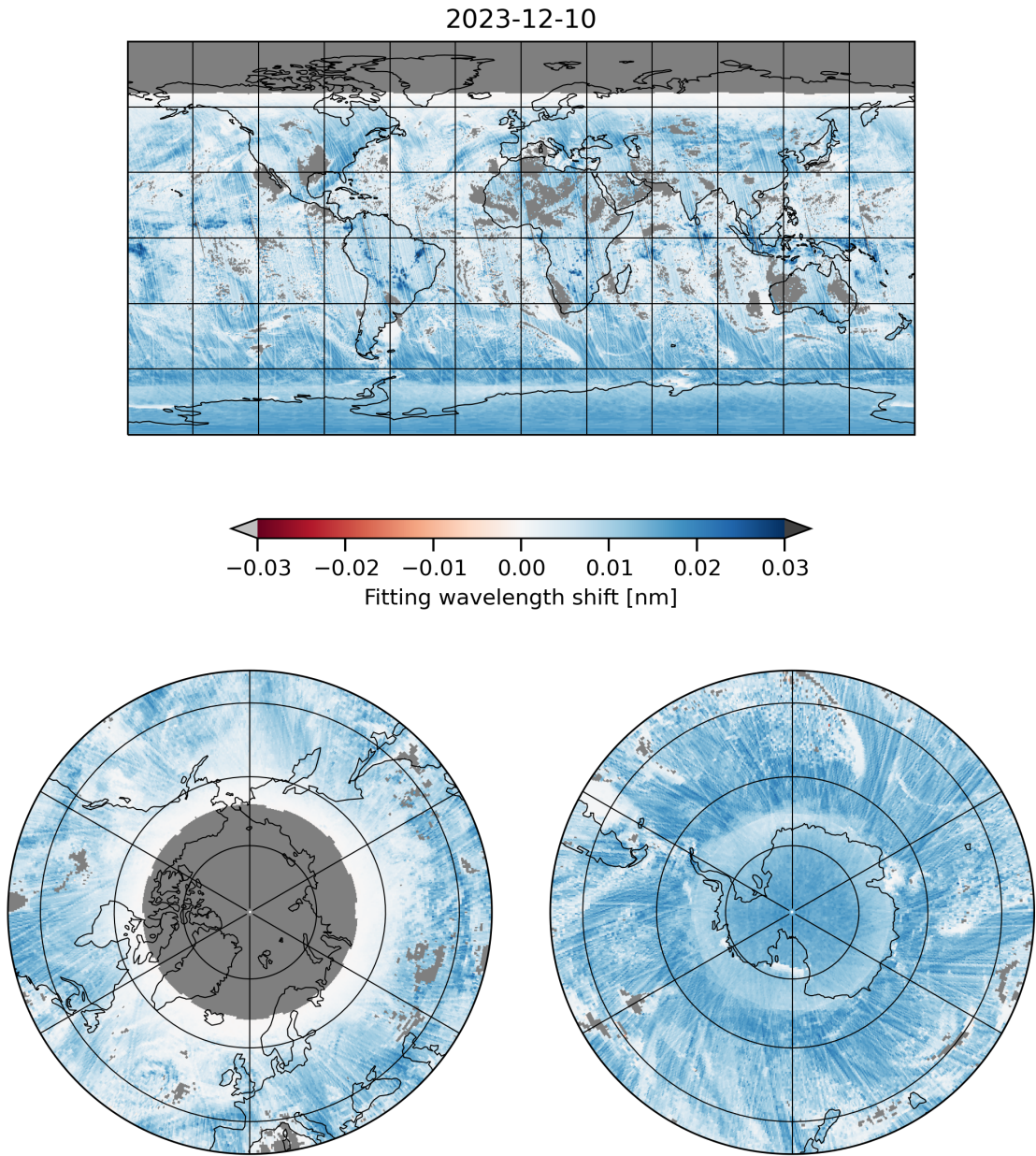


Figure 16: Map of “Fitting wavelength shift” for 2023-12-09 to 2023-12-11

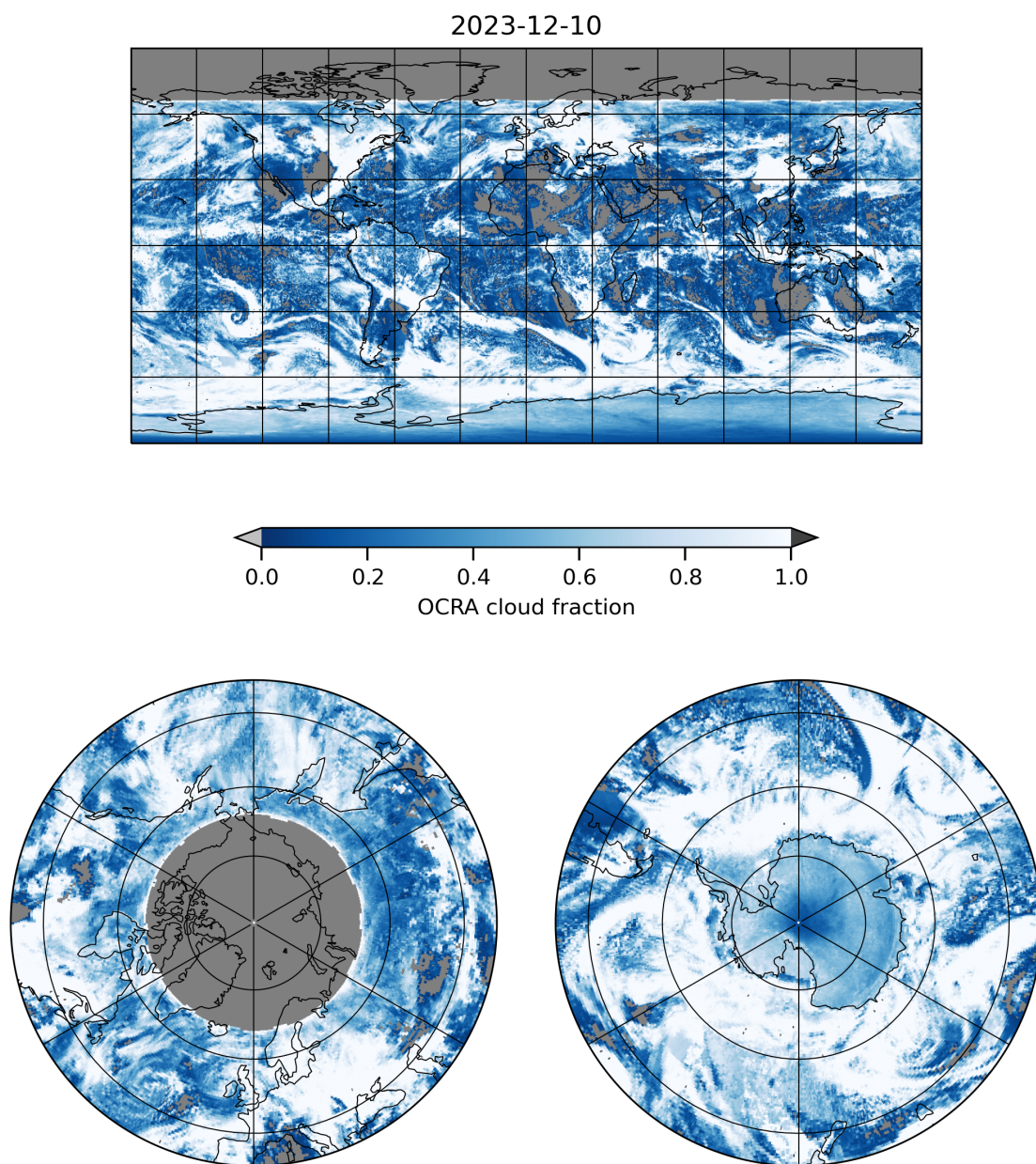


Figure 17: Map of “OCRA cloud fraction” for 2023-12-09 to 2023-12-11

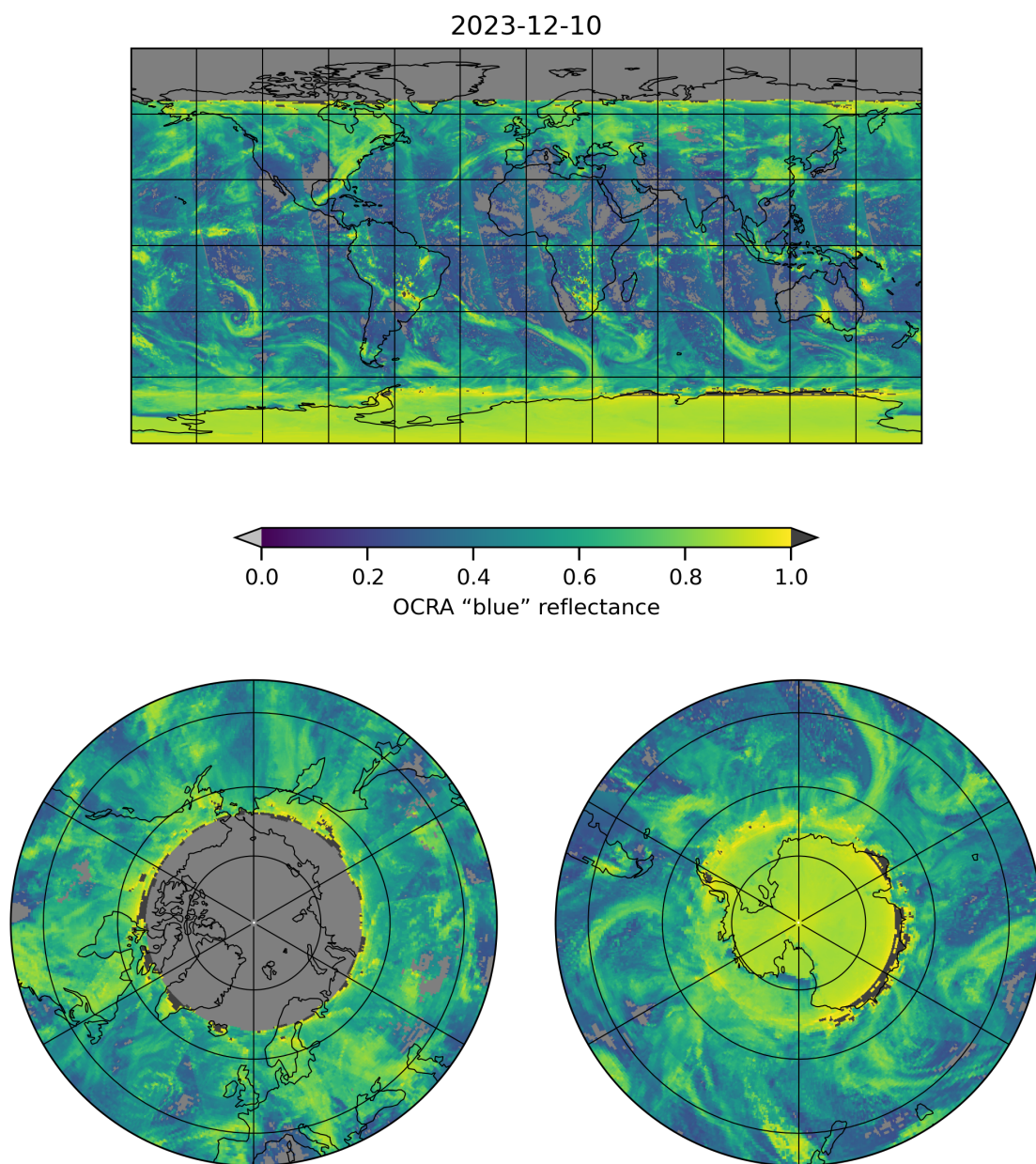


Figure 18: Map of "OCRA "blue" reflectance" for 2023-12-09 to 2023-12-11

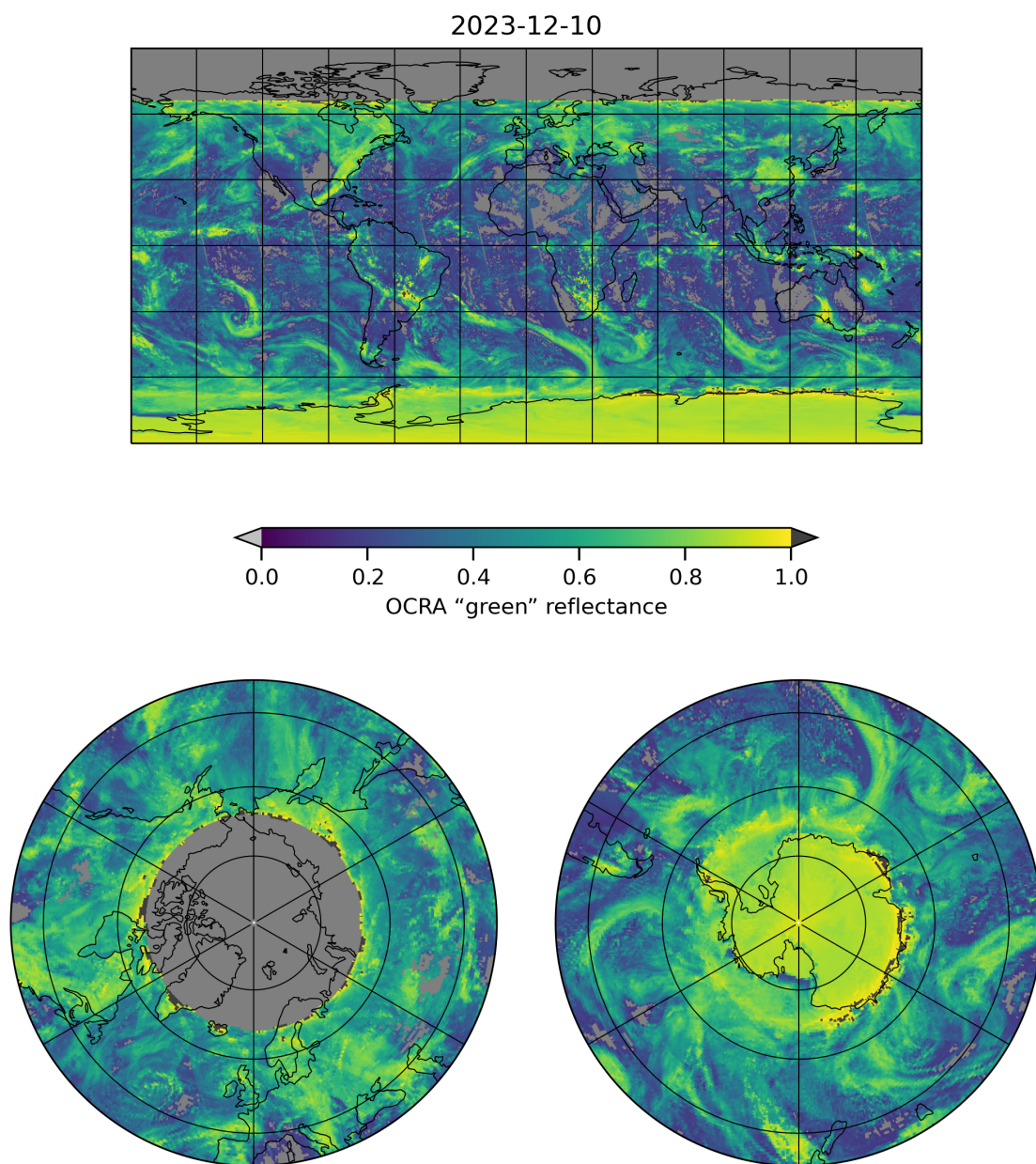


Figure 19: Map of "OCRA "green" reflectance" for 2023-12-09 to 2023-12-11

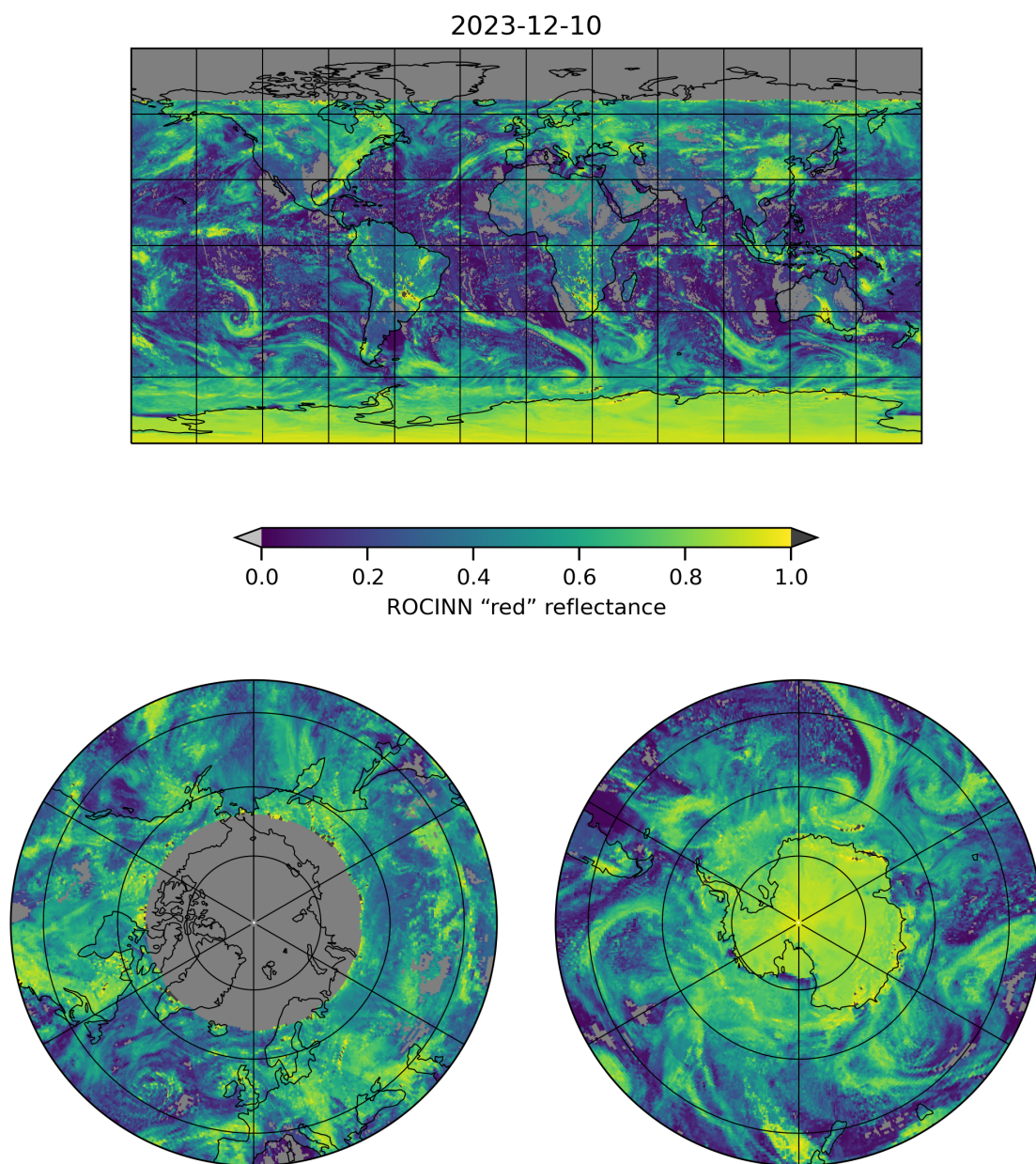


Figure 20: Map of "ROCINN "red" reflectance" for 2023-12-09 to 2023-12-11

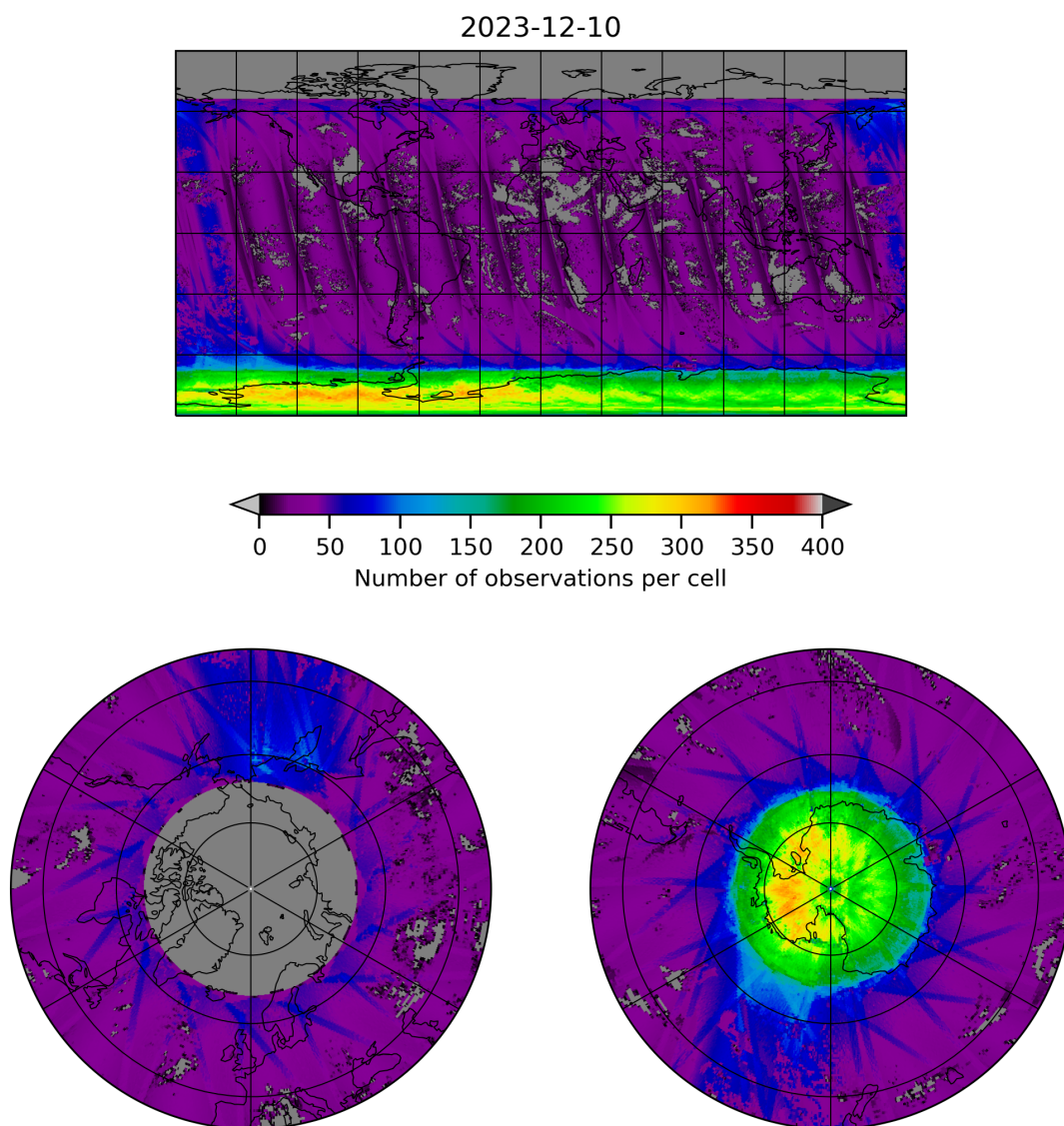


Figure 21: Map of the number of observations for 2023-12-09 to 2023-12-11

7 Zonal average

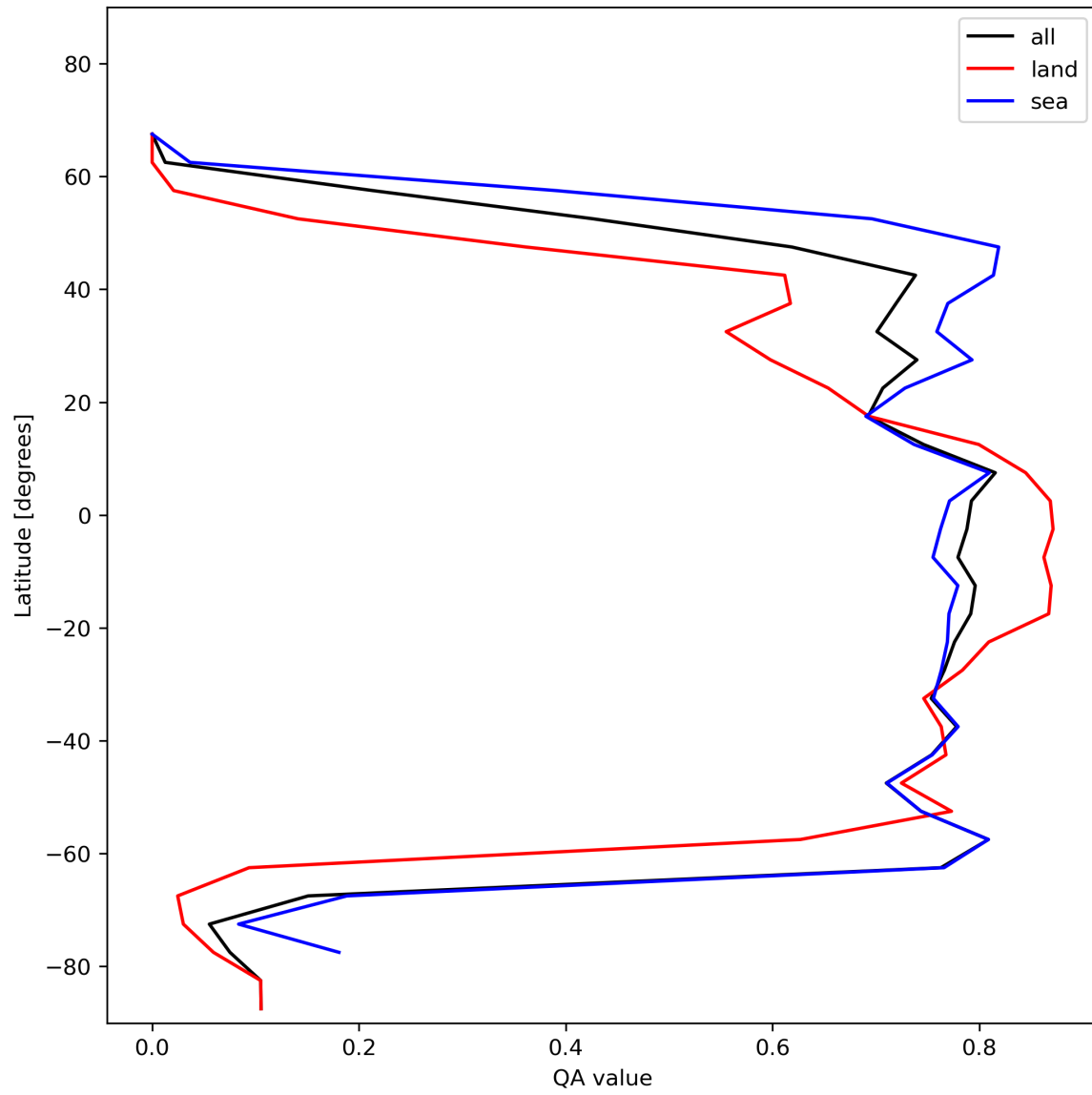


Figure 22: Zonal average of “QA value” for 2023-12-09 to 2023-12-11.

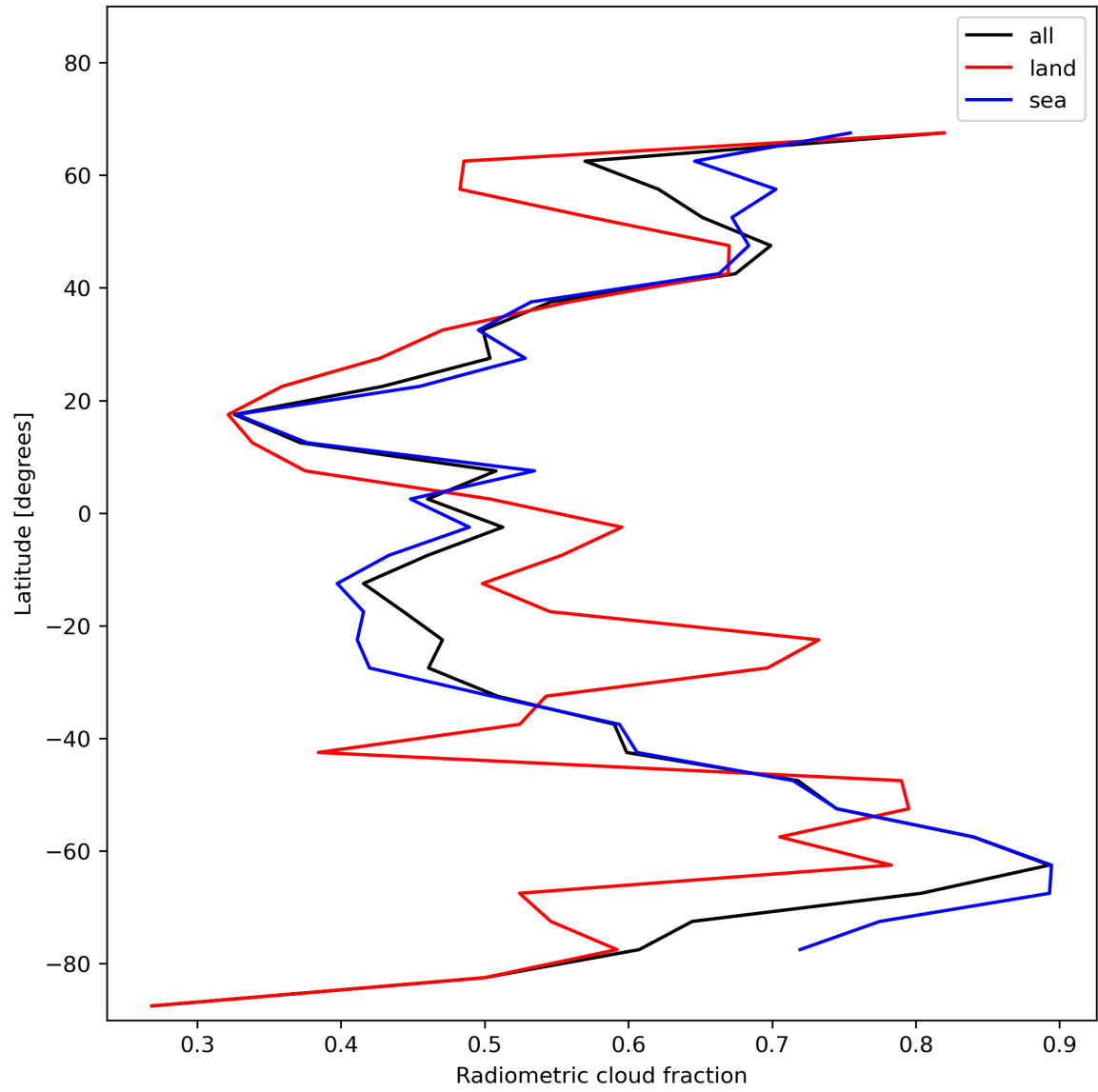


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-12-09 to 2023-12-11.

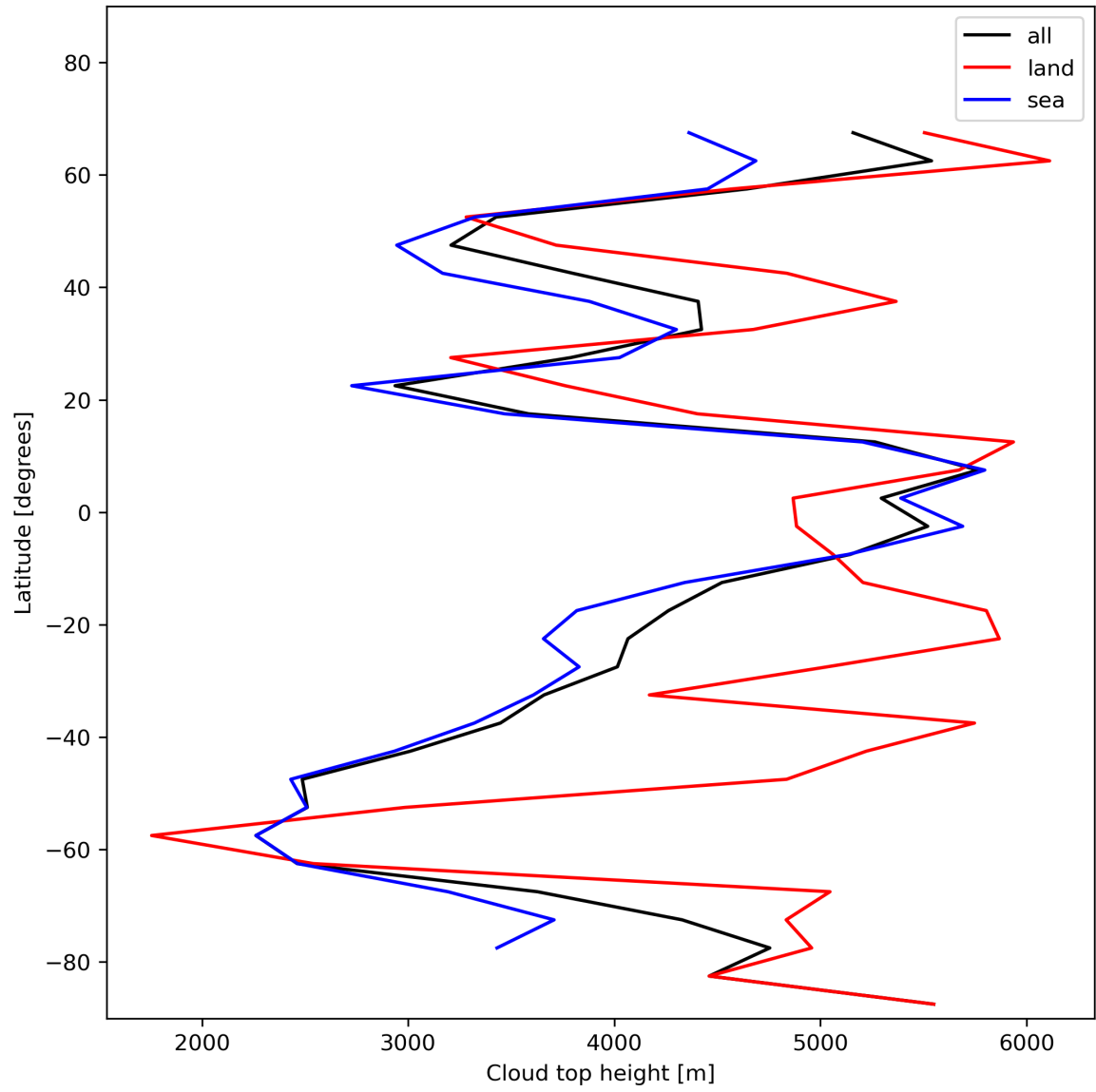


Figure 24: Zonal average of “Cloud top height” for 2023-12-09 to 2023-12-11.

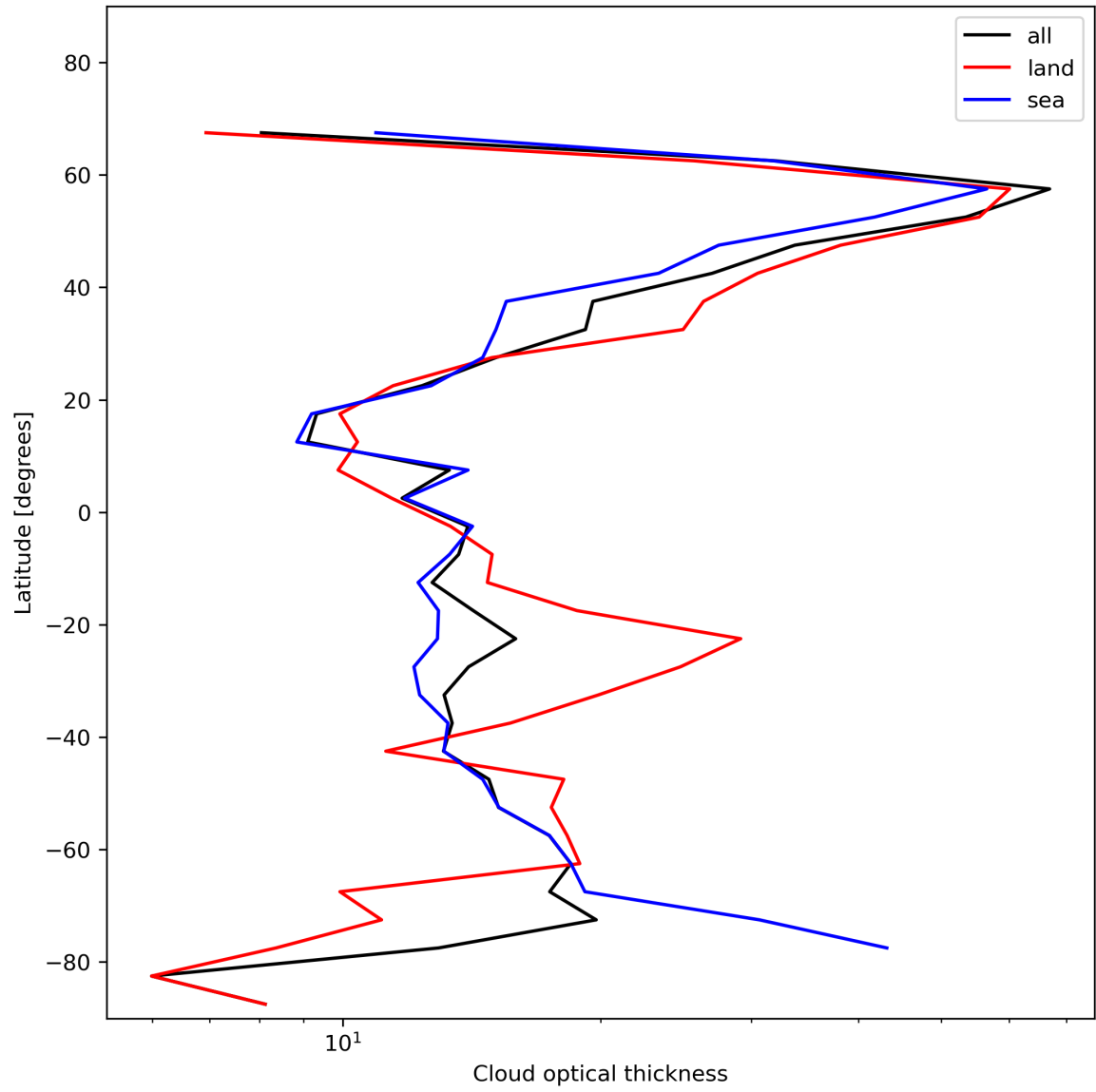


Figure 25: Zonal average of “Cloud optical thickness” for 2023-12-09 to 2023-12-11.

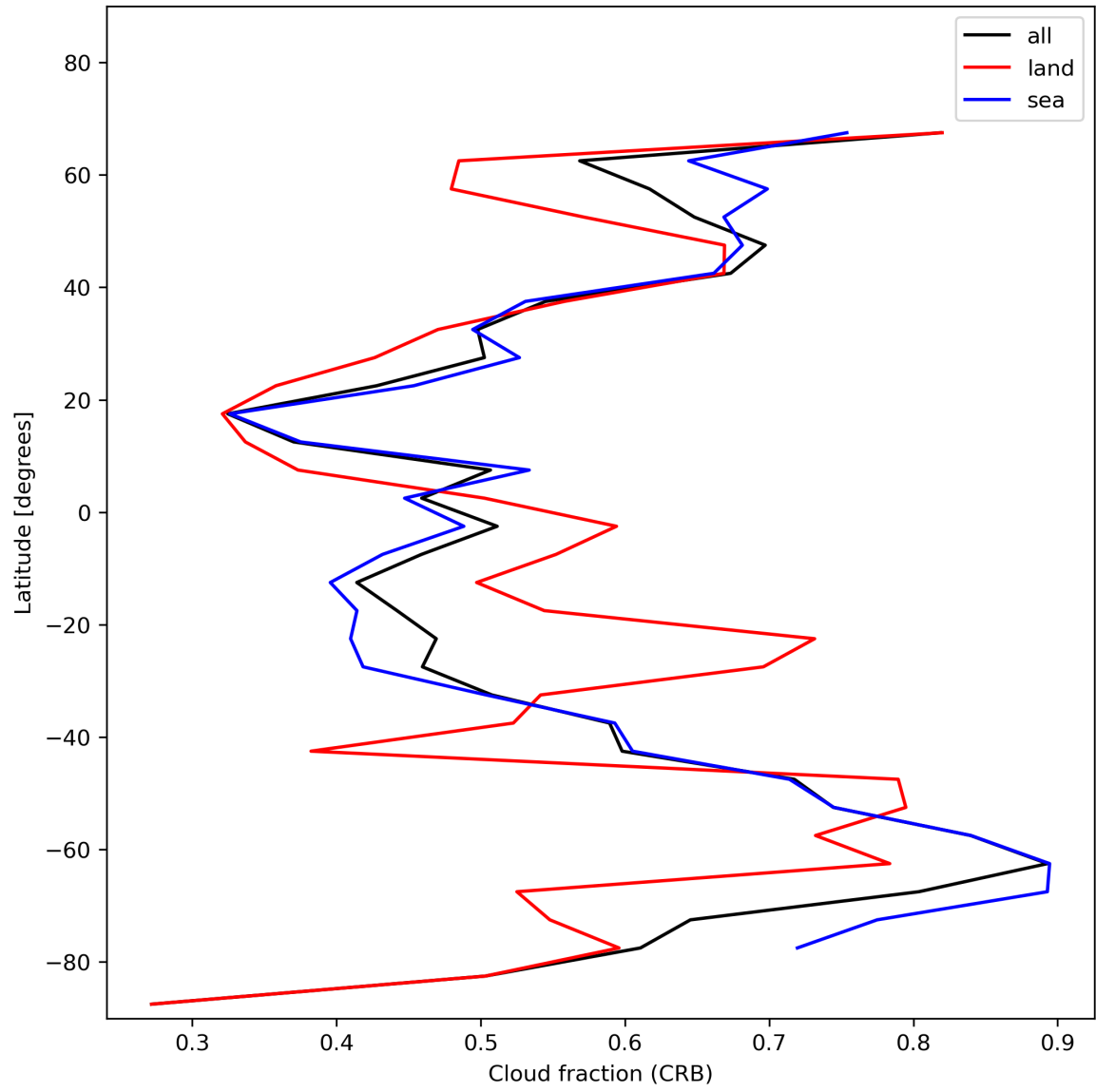


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-12-09 to 2023-12-11.

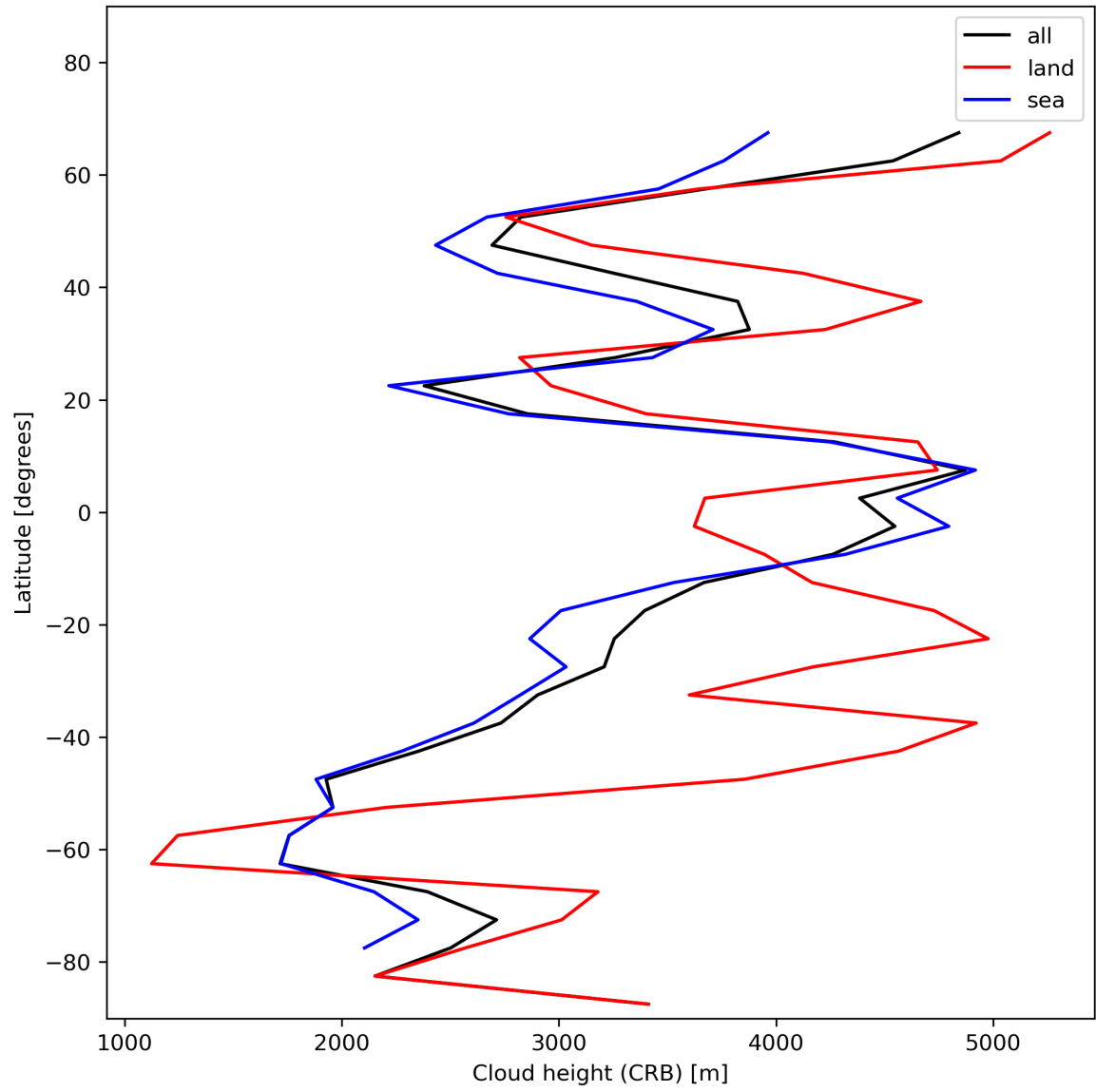


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-12-09 to 2023-12-11.

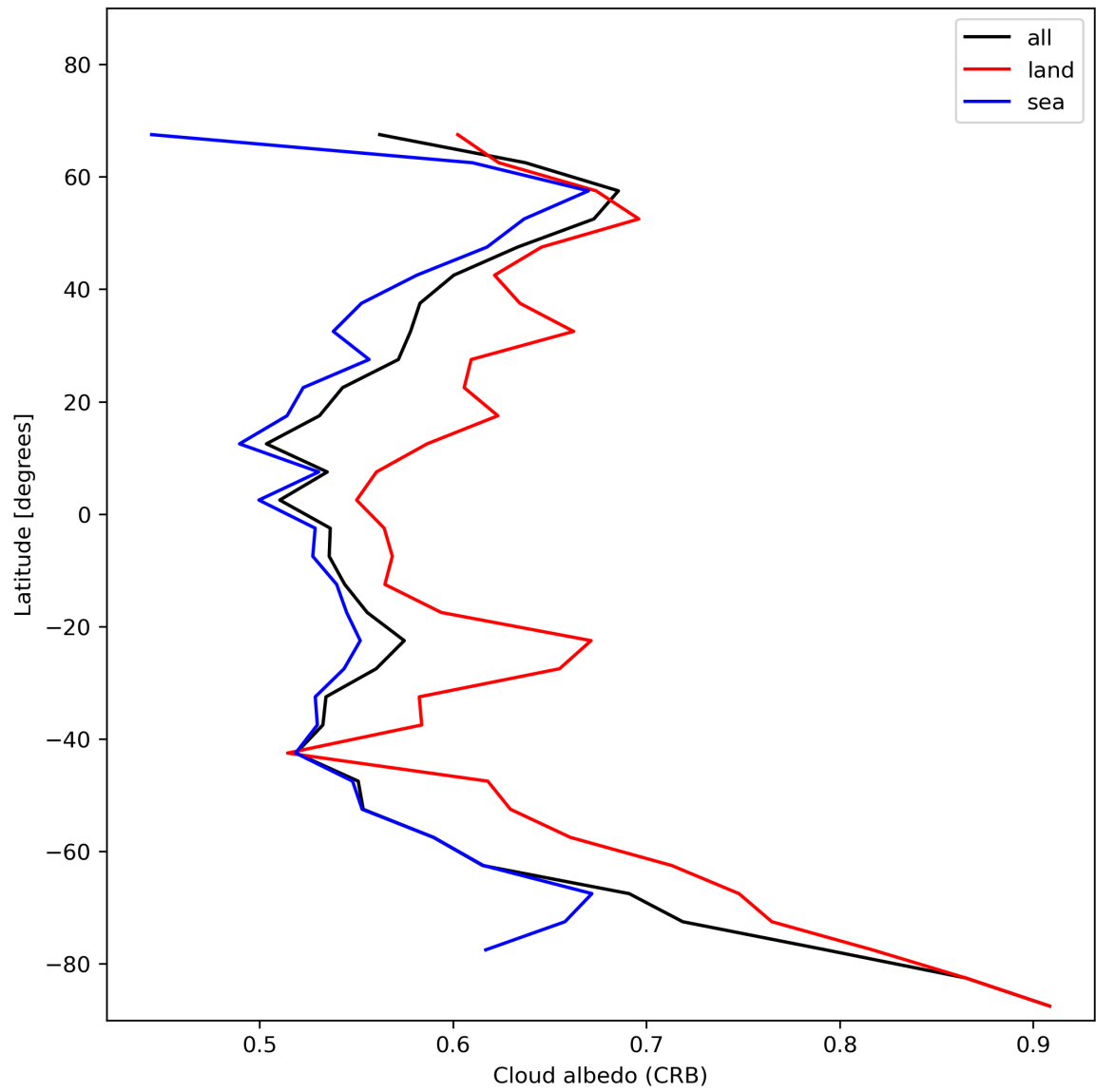


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-12-09 to 2023-12-11.

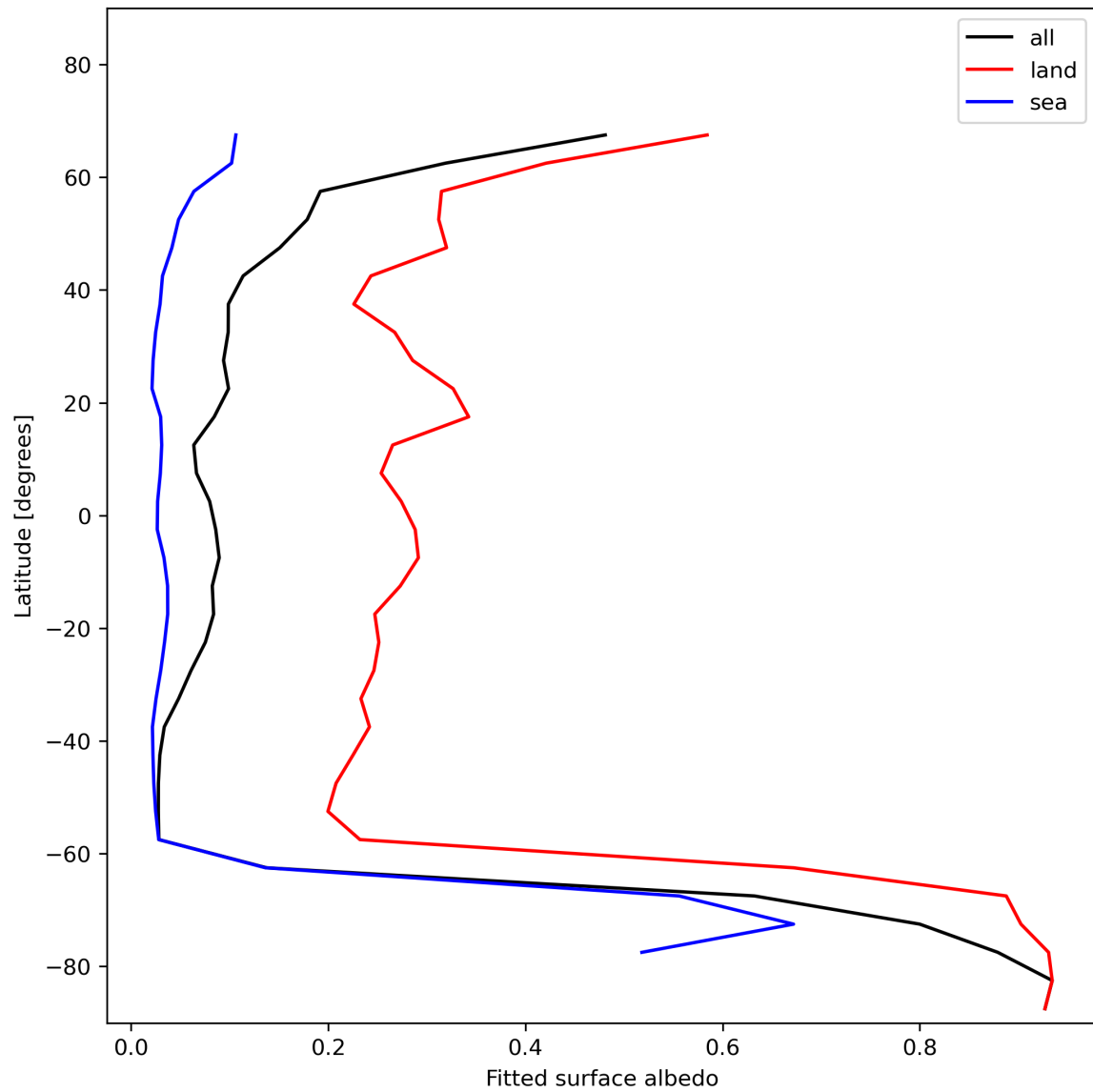


Figure 29: Zonal average of “Fitted surface albedo” for 2023-12-09 to 2023-12-11.

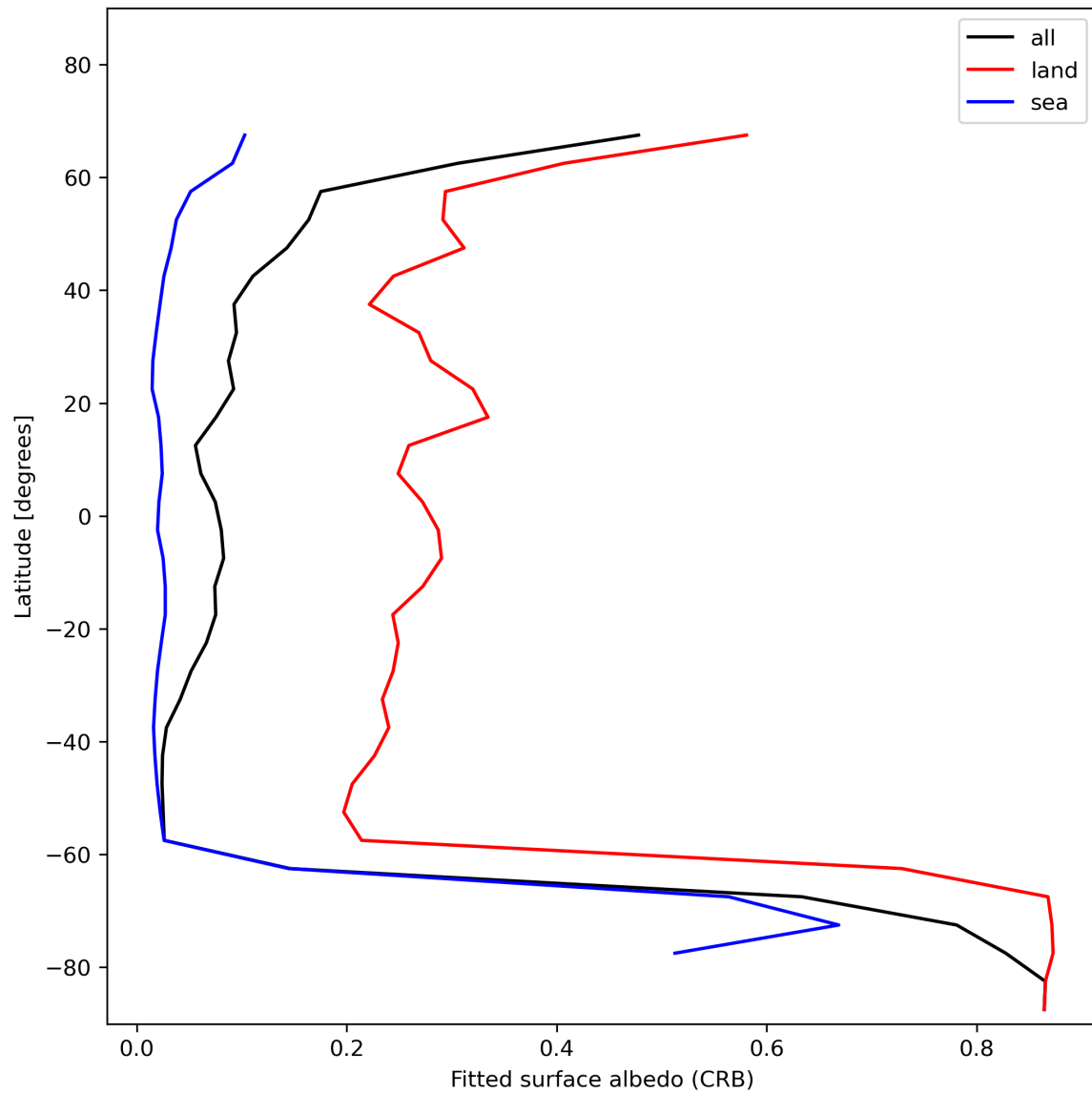


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-12-09 to 2023-12-11.

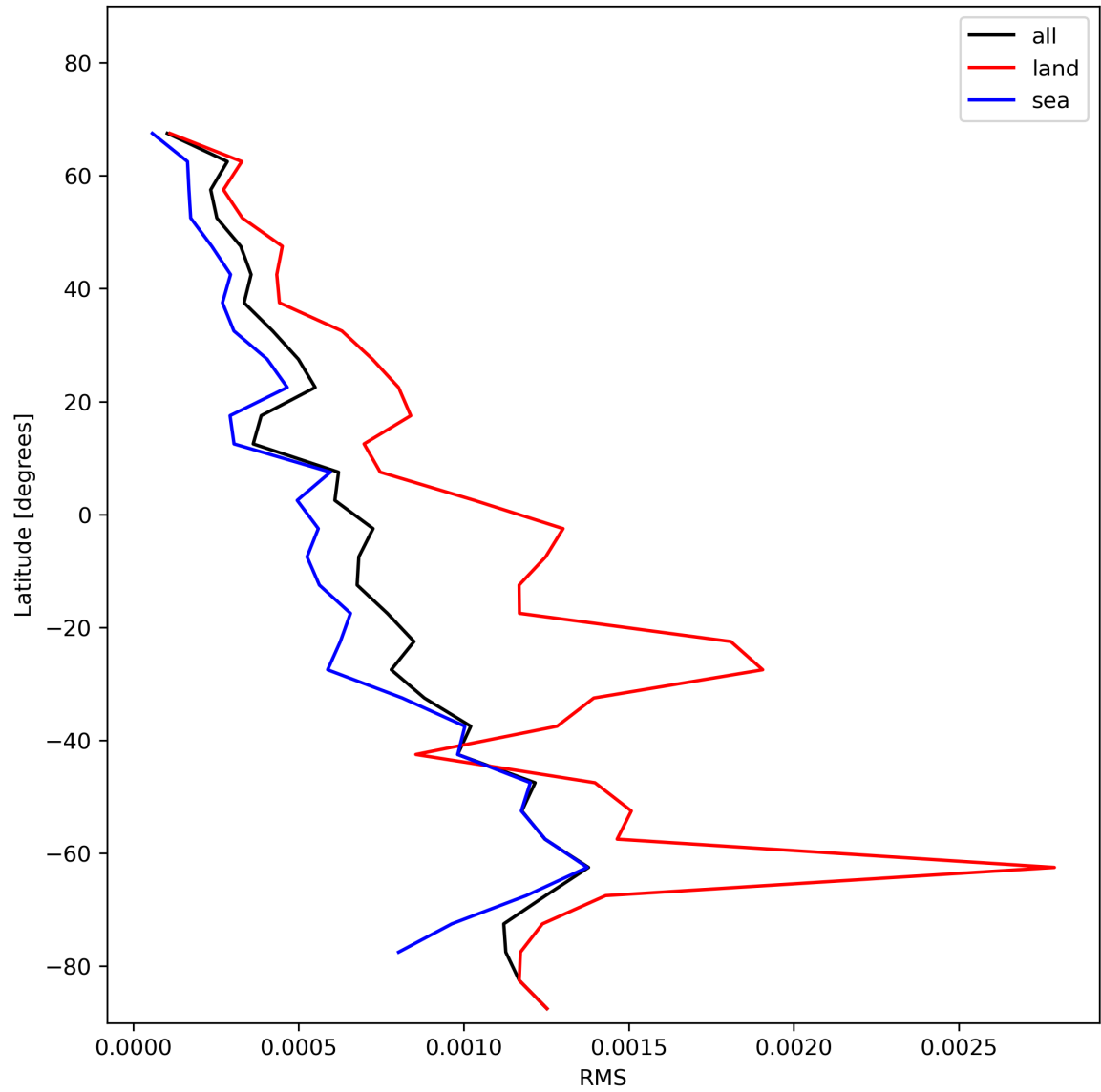


Figure 31: Zonal average of “RMS” for 2023-12-09 to 2023-12-11.

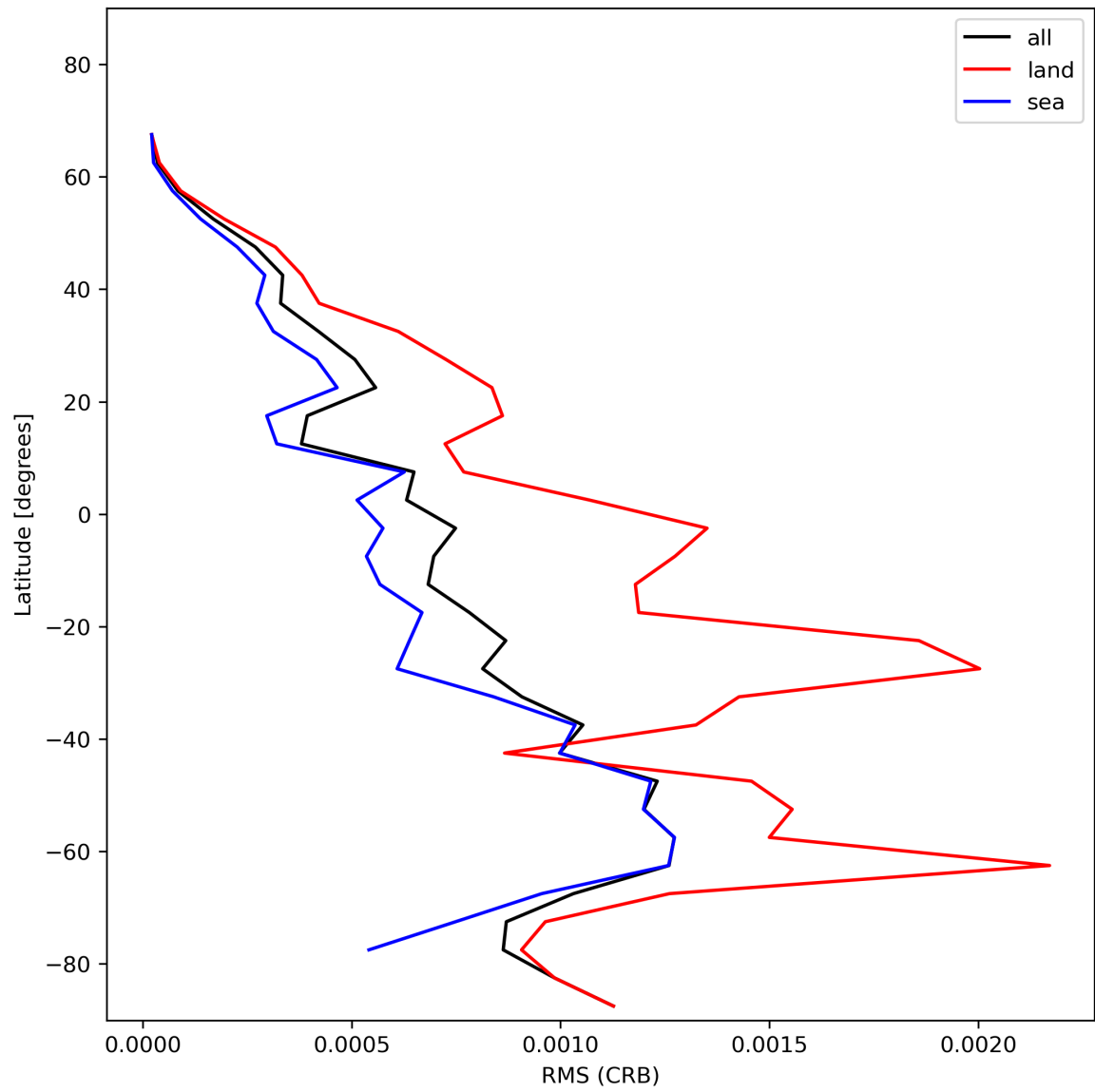


Figure 32: Zonal average of “RMS (CRB)” for 2023-12-09 to 2023-12-11.

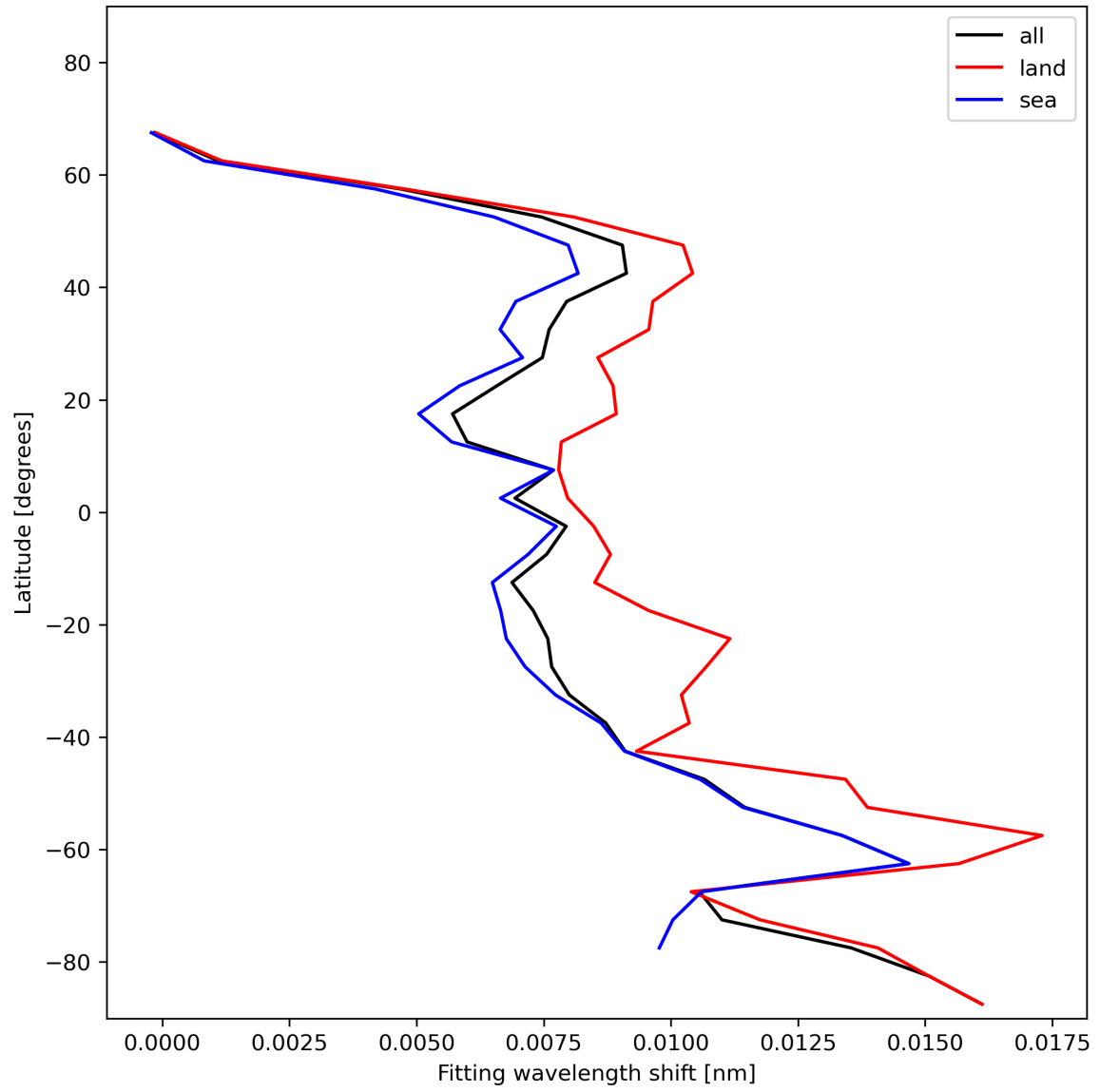


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-12-09 to 2023-12-11.

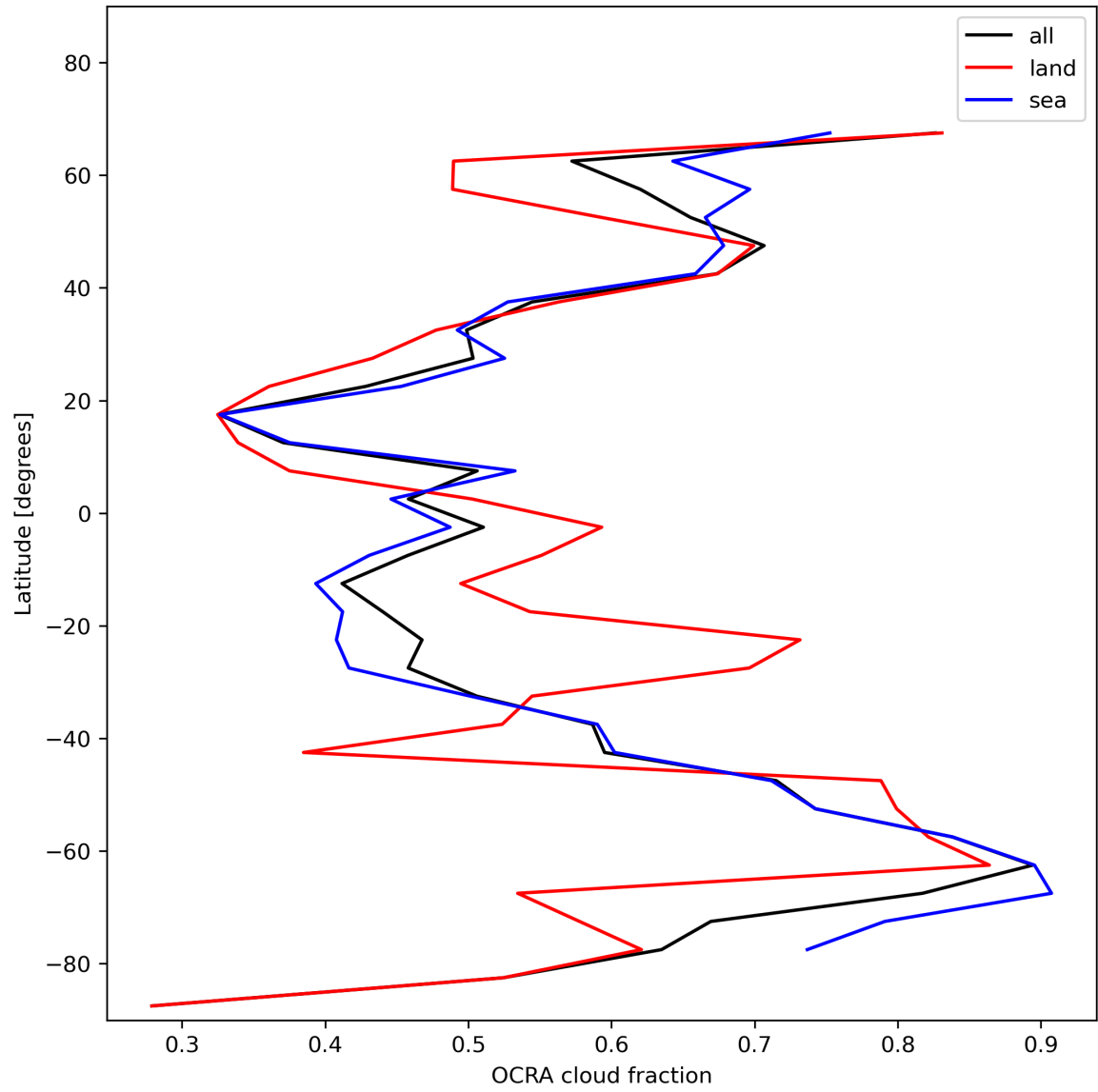


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-12-09 to 2023-12-11.

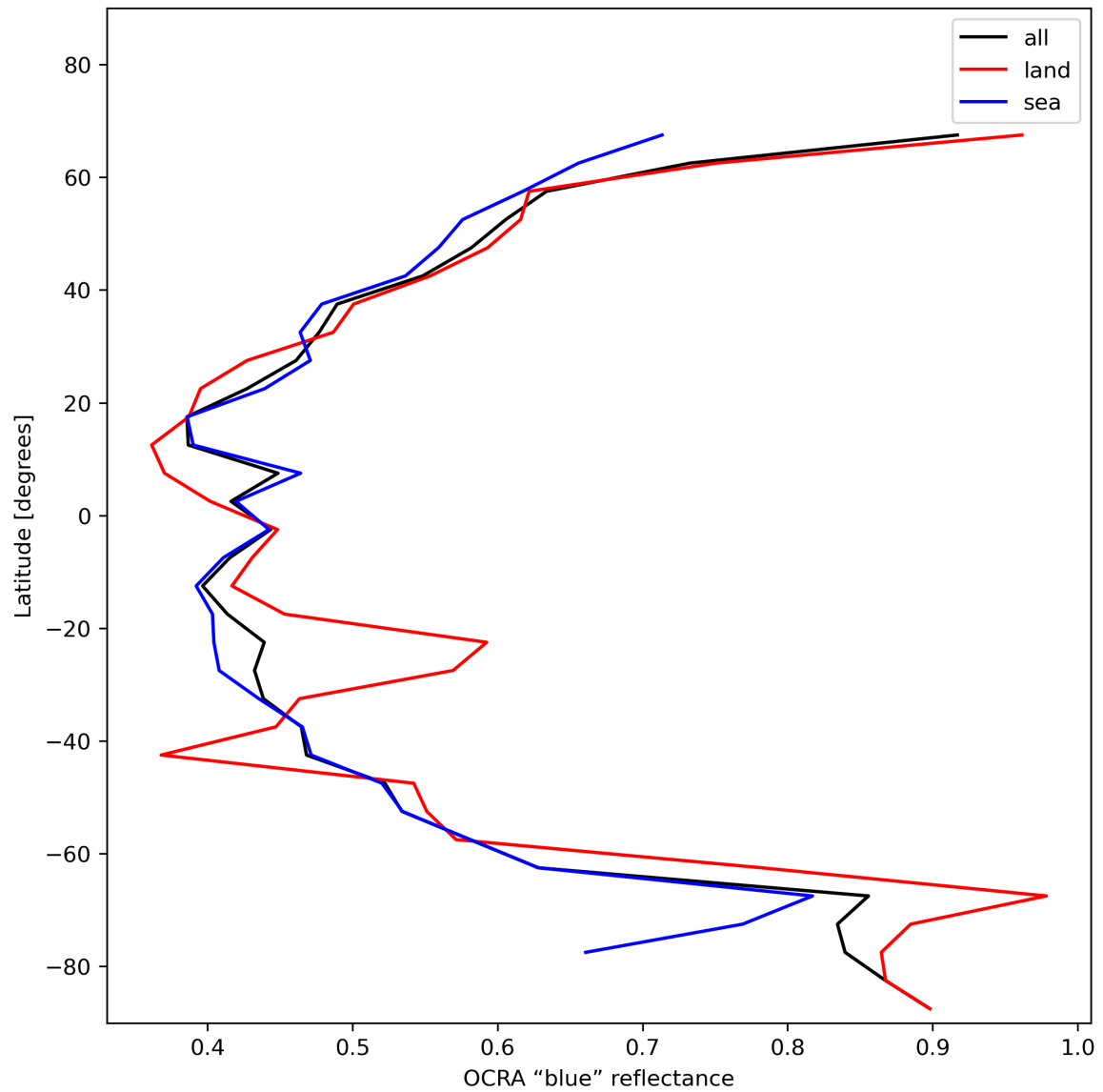


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-12-09 to 2023-12-11.

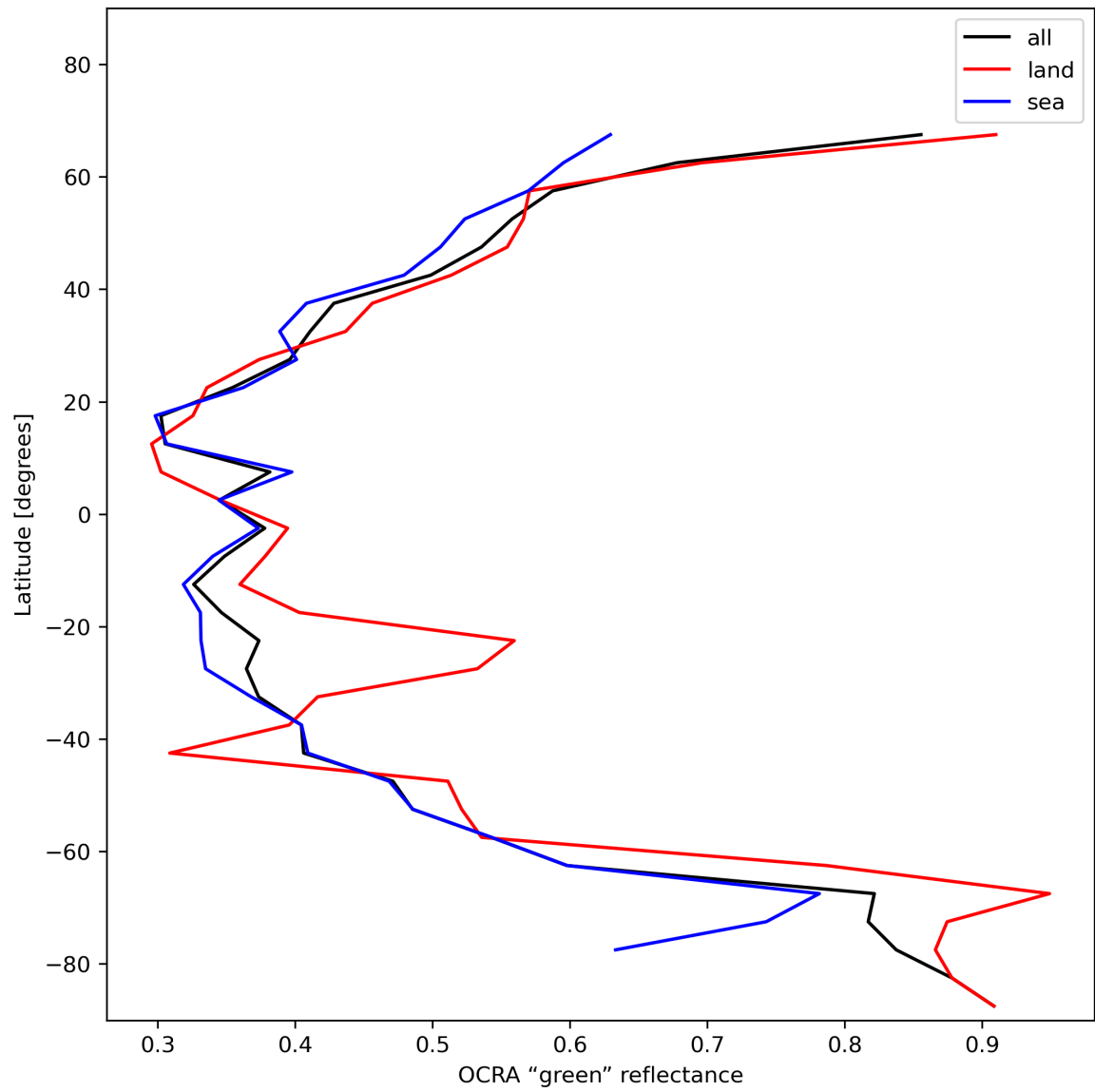


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-12-09 to 2023-12-11.

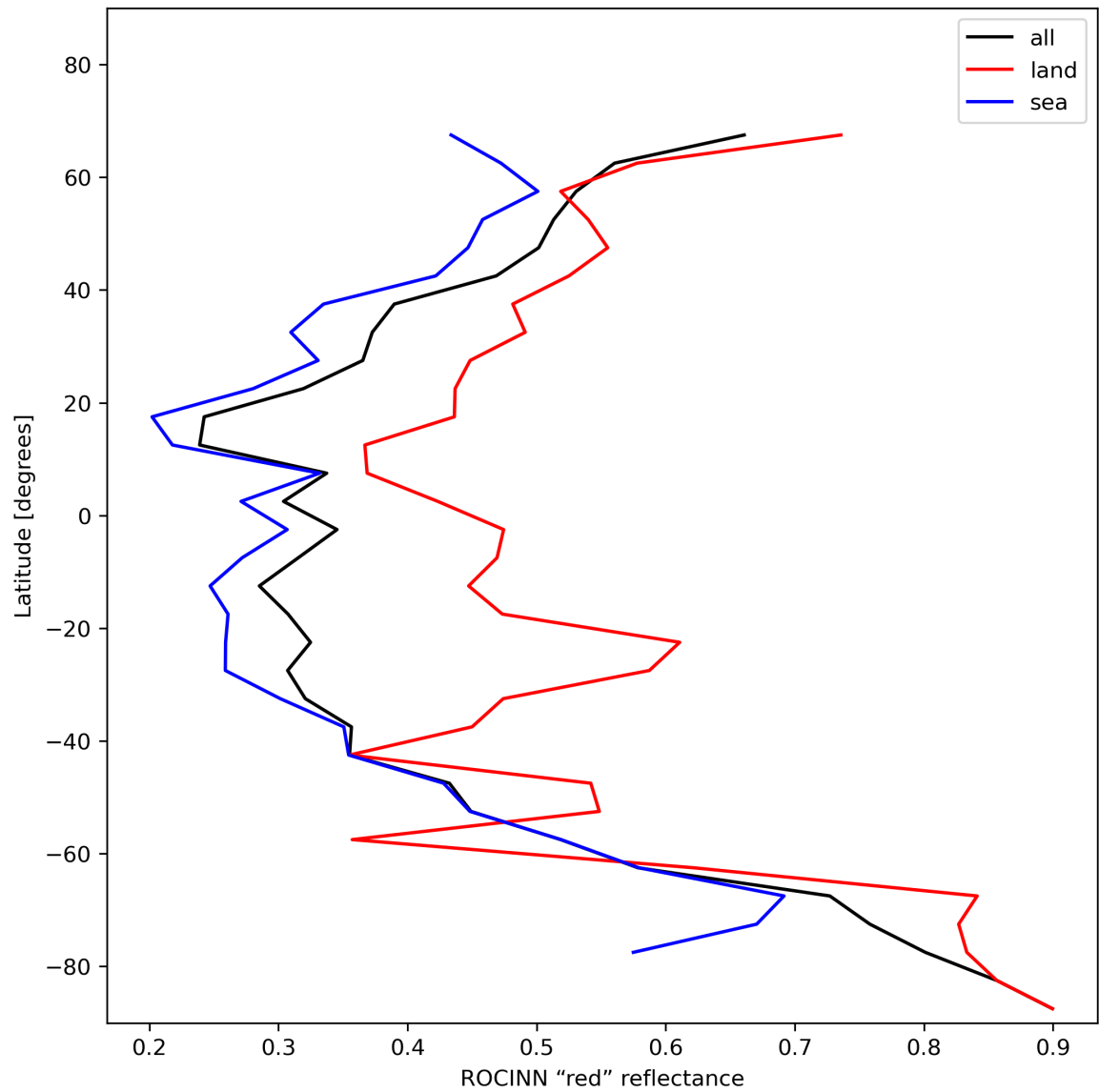


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-12-09 to 2023-12-11.

8 Histograms

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

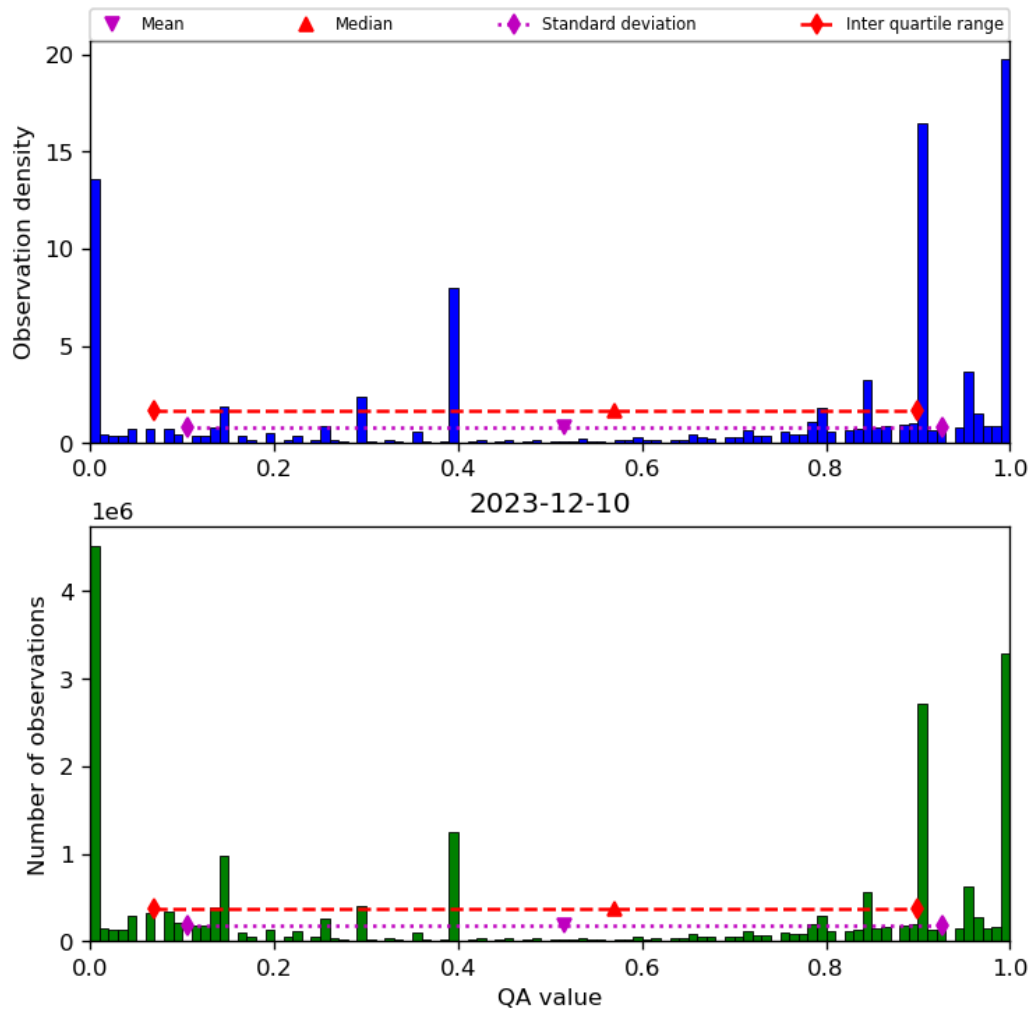


Figure 38: Histogram of “QA value” for 2023-12-09 to 2023-12-11

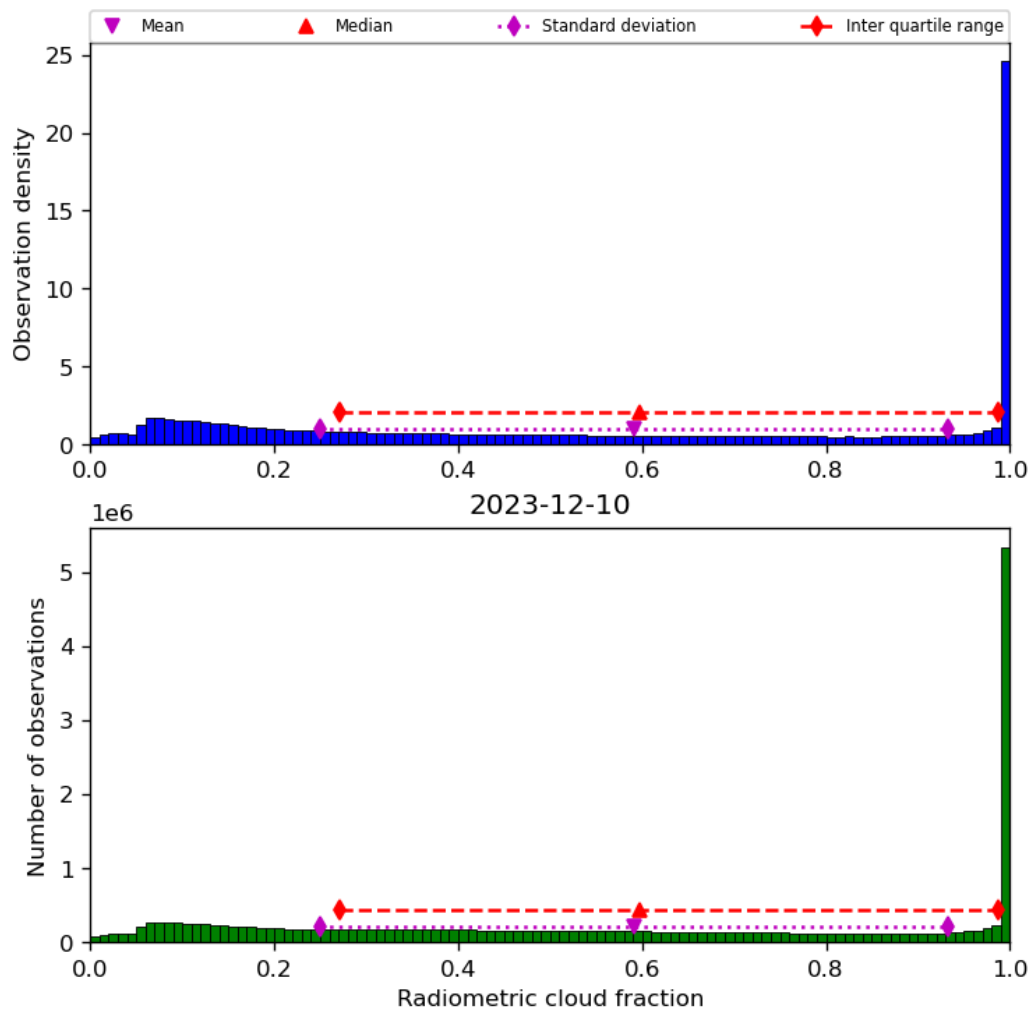


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-12-09 to 2023-12-11

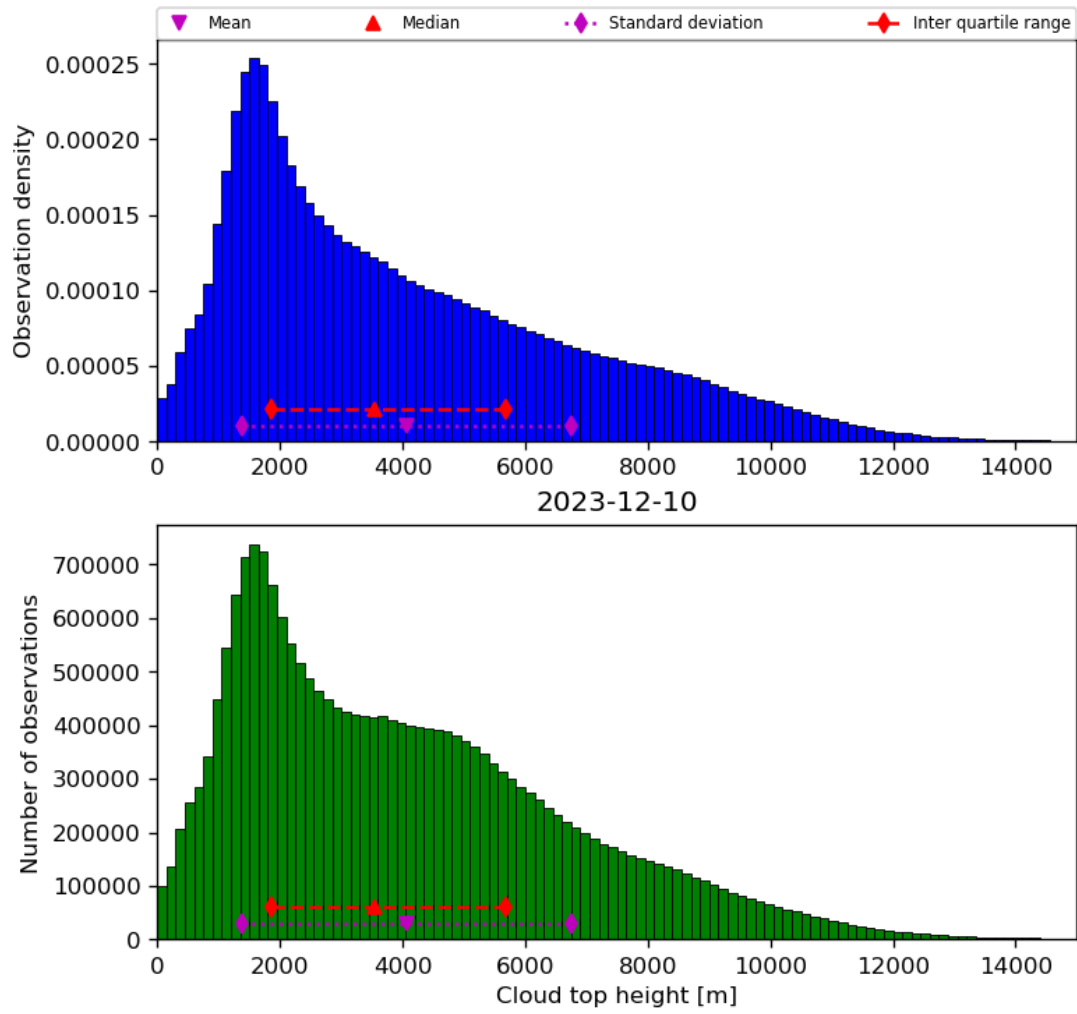


Figure 40: Histogram of “Cloud top height” for 2023-12-09 to 2023-12-11

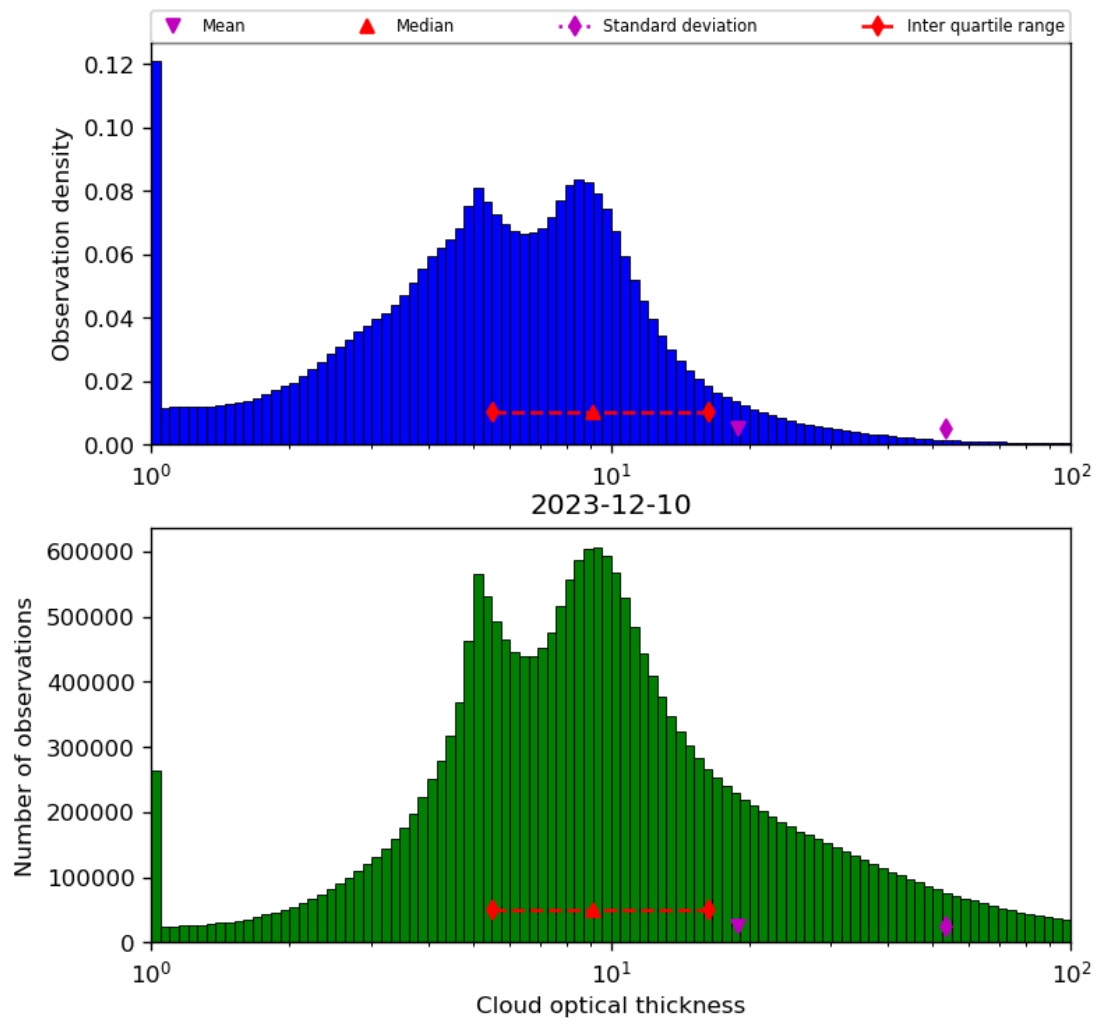


Figure 41: Histogram of “Cloud optical thickness” for 2023-12-09 to 2023-12-11

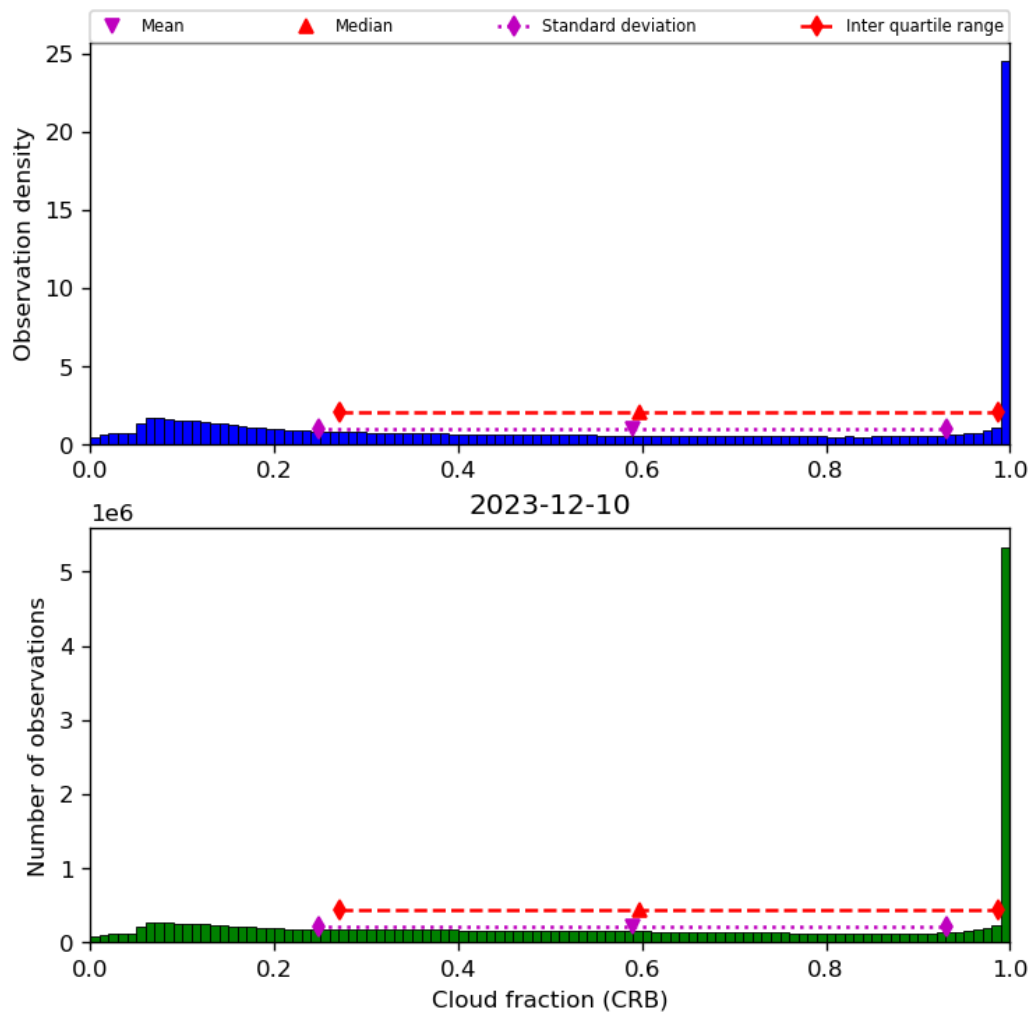


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-12-09 to 2023-12-11

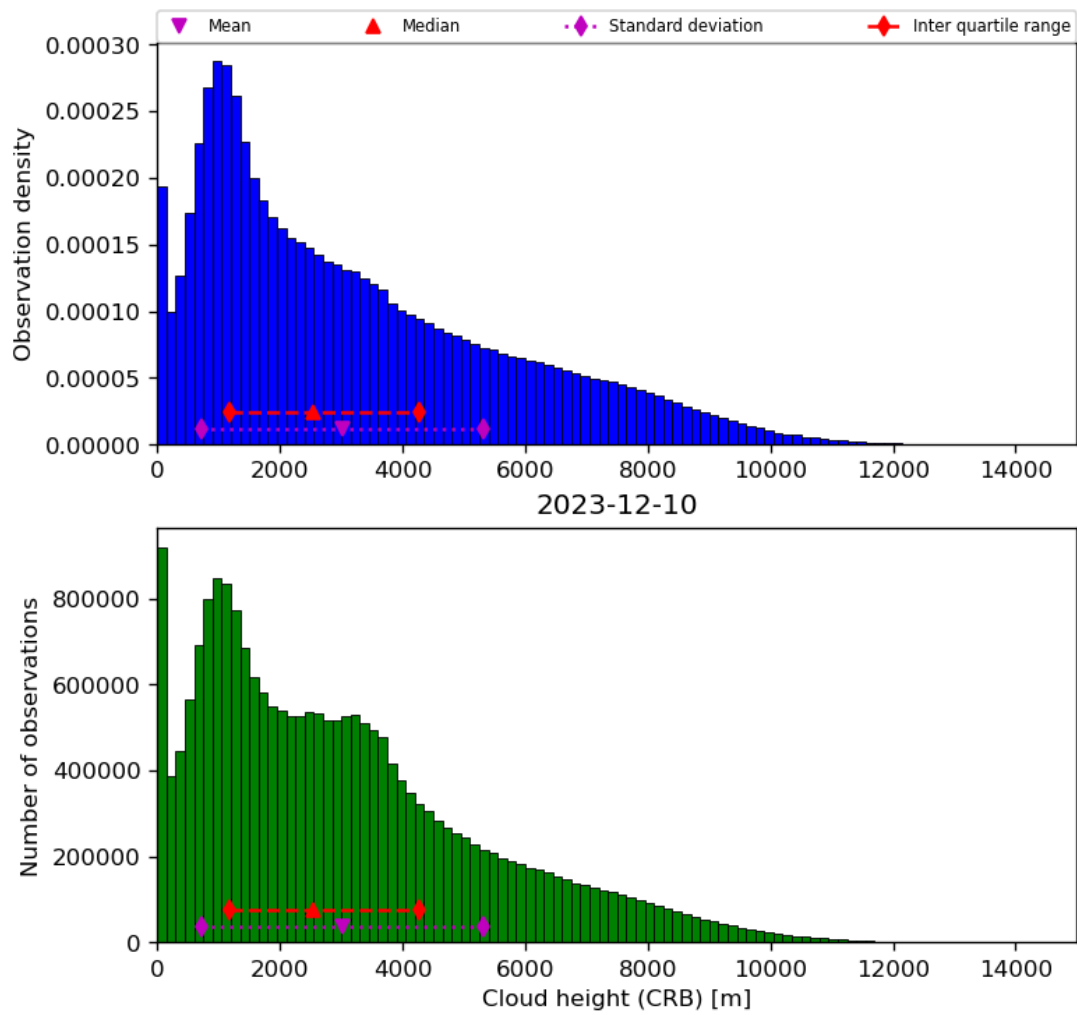


Figure 43: Histogram of “Cloud height (CRB)” for 2023-12-09 to 2023-12-11

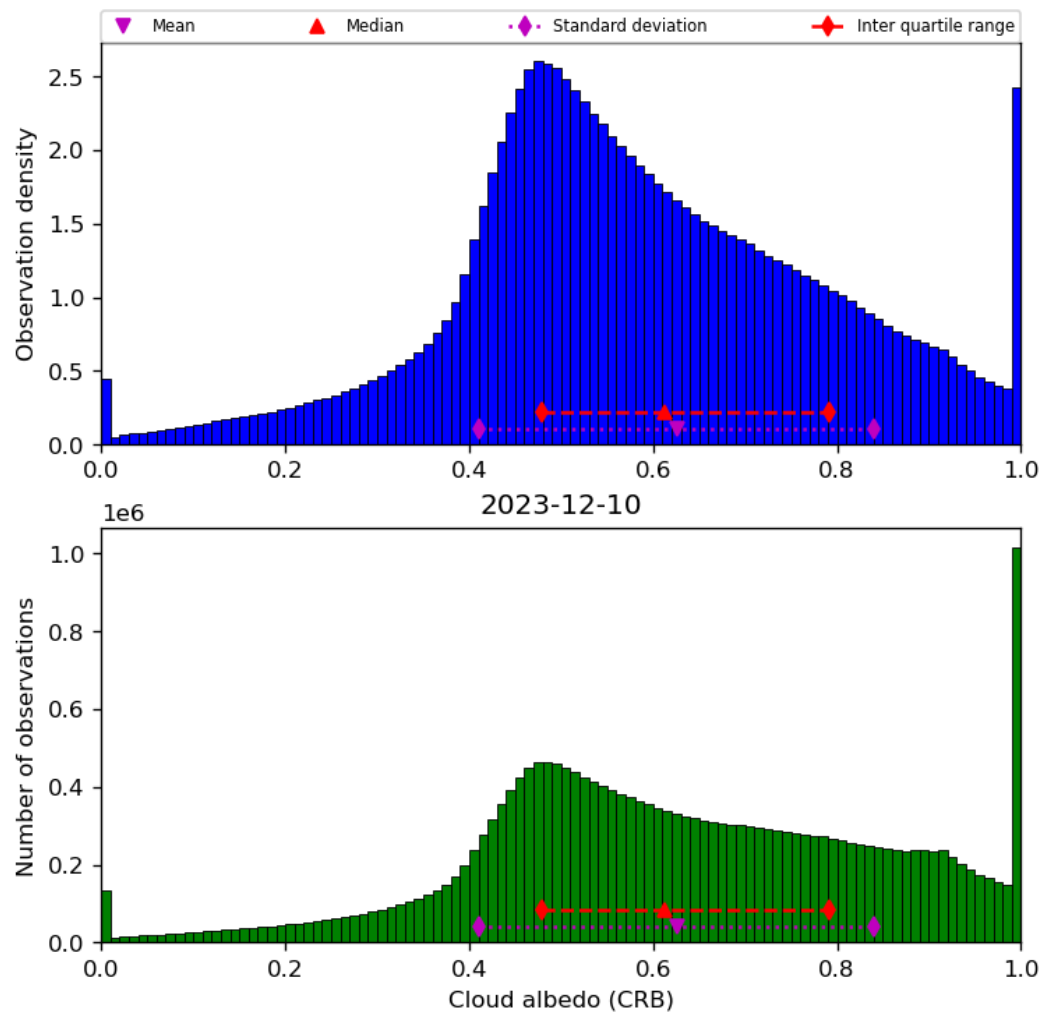


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-12-09 to 2023-12-11

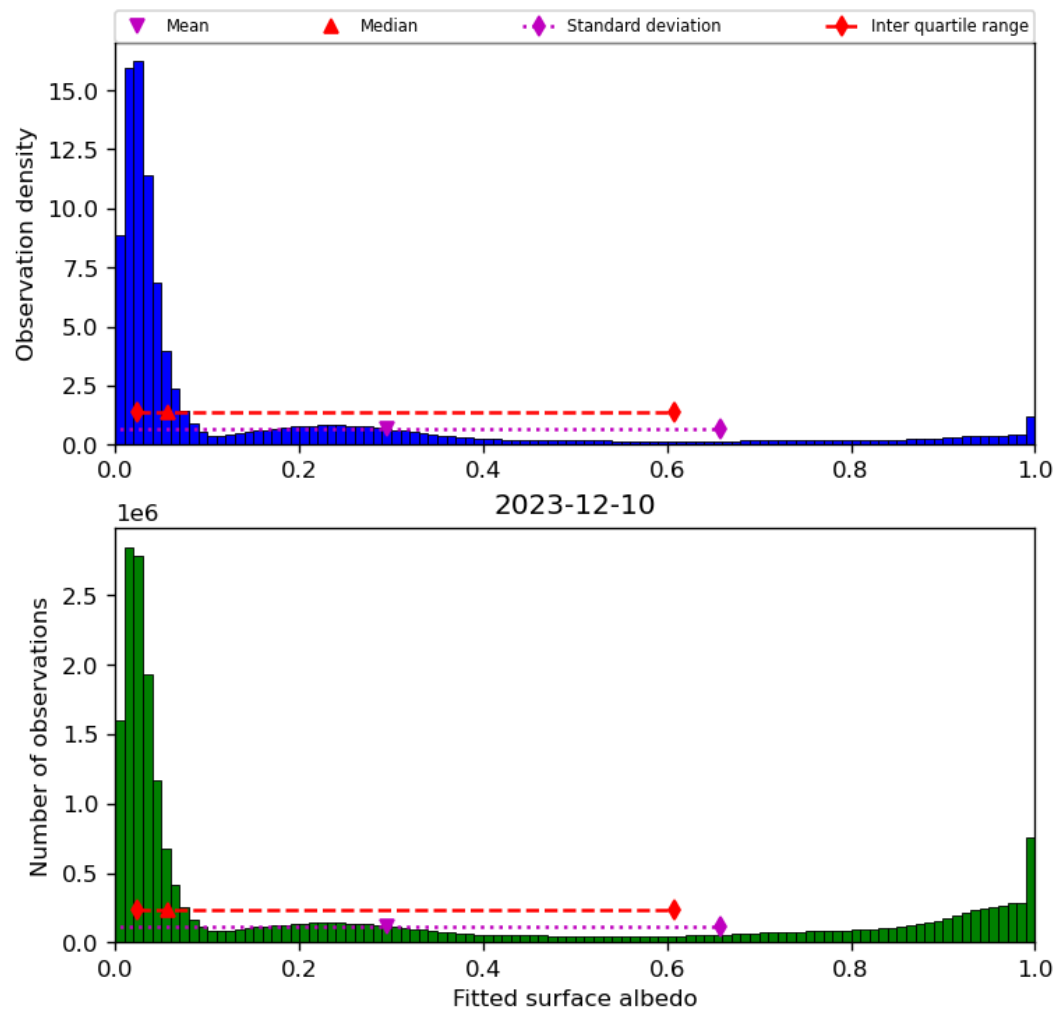


Figure 45: Histogram of “Fitted surface albedo” for 2023-12-09 to 2023-12-11

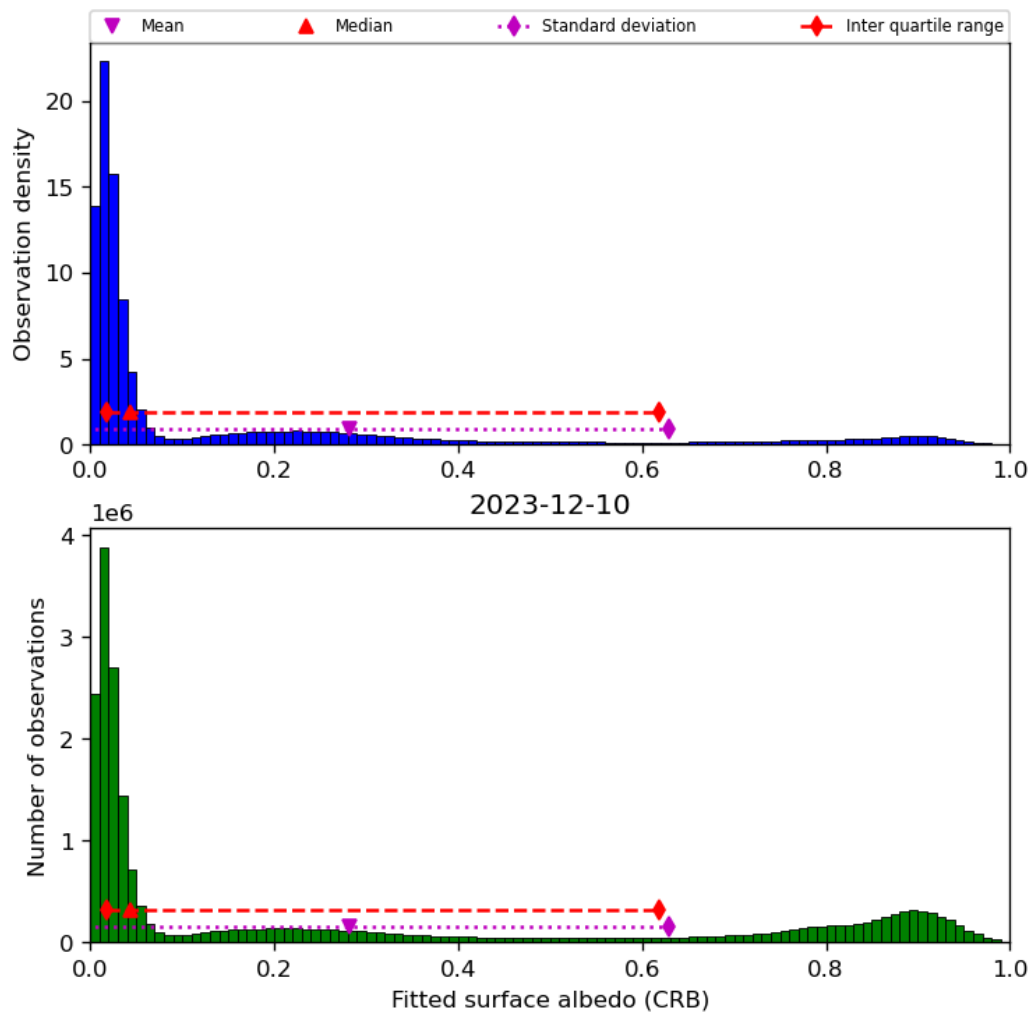


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-12-09 to 2023-12-11

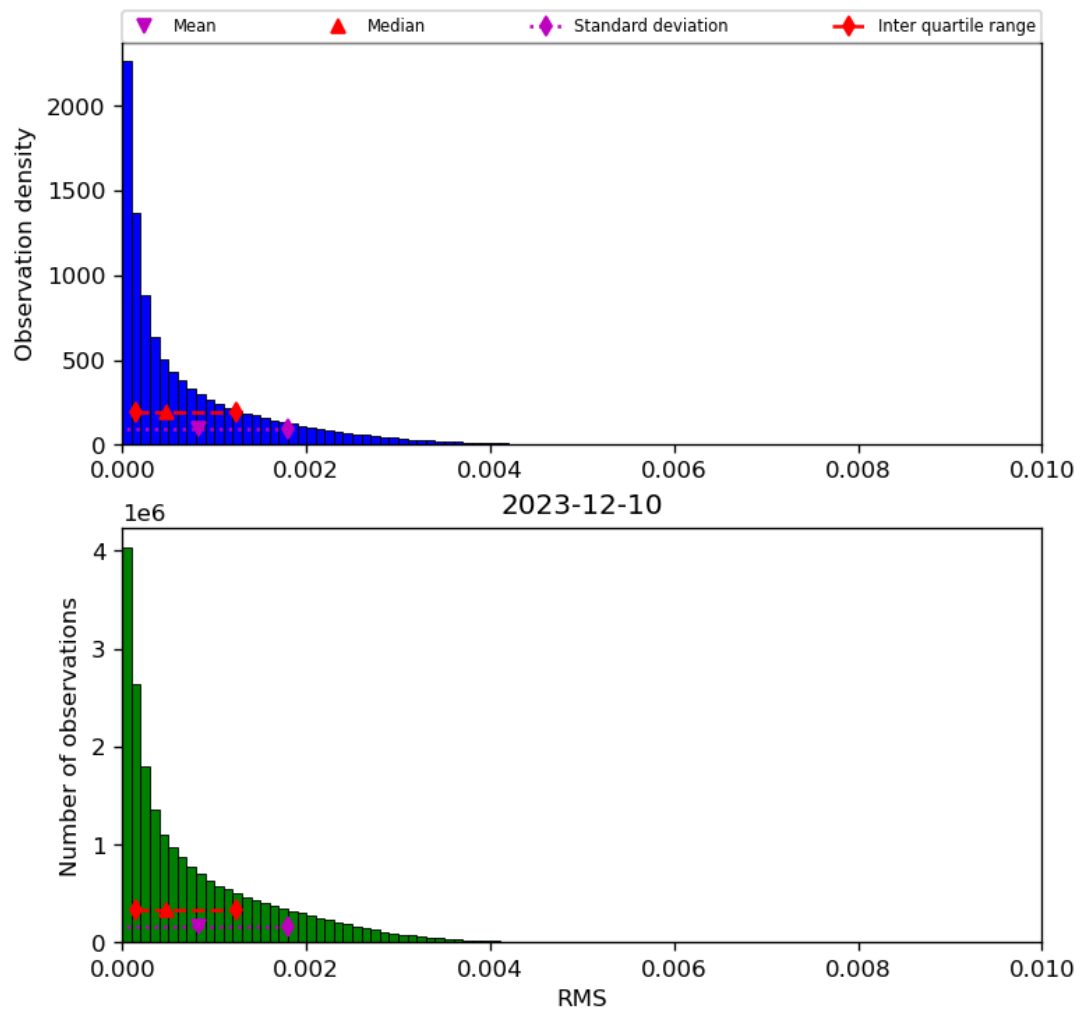


Figure 47: Histogram of “RMS” for 2023-12-09 to 2023-12-11

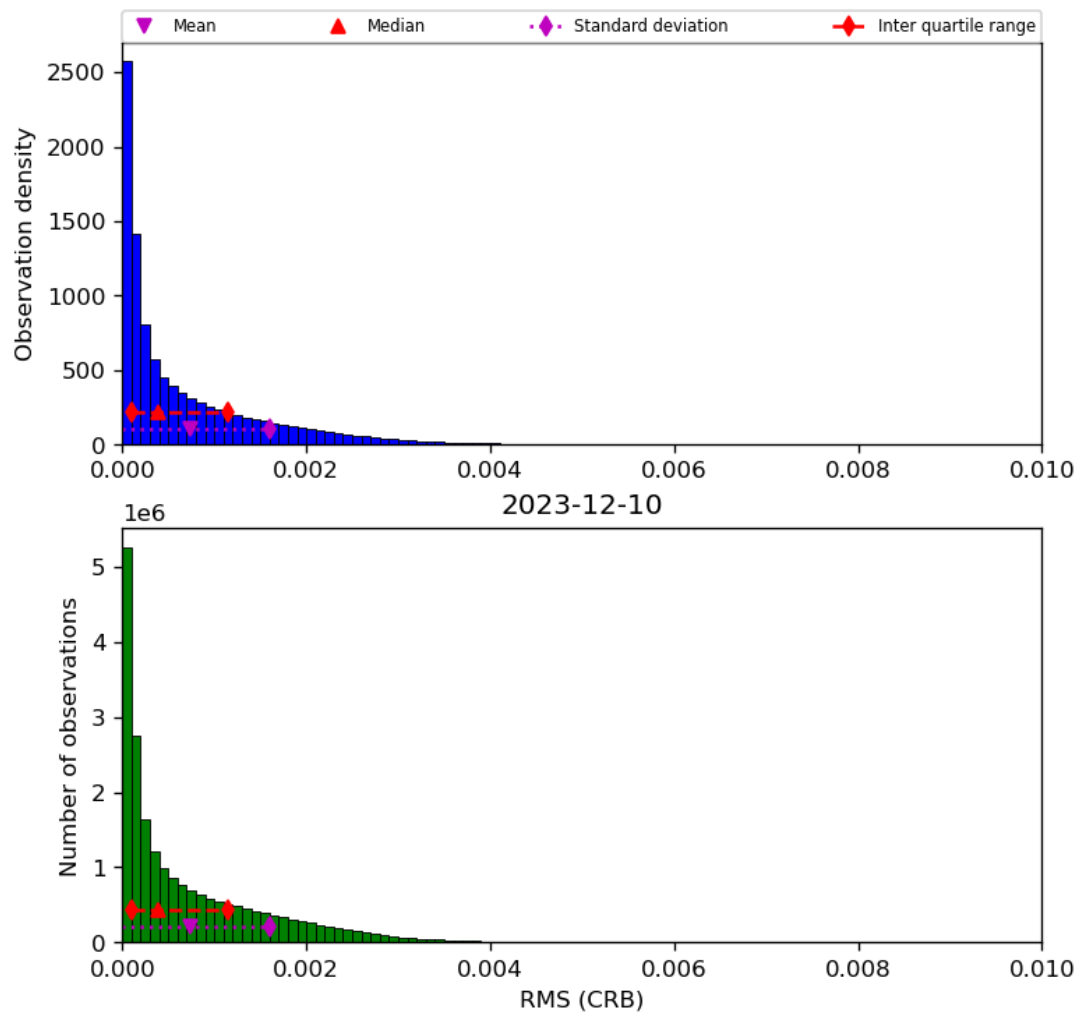


Figure 48: Histogram of “RMS (CRB)” for 2023-12-09 to 2023-12-11

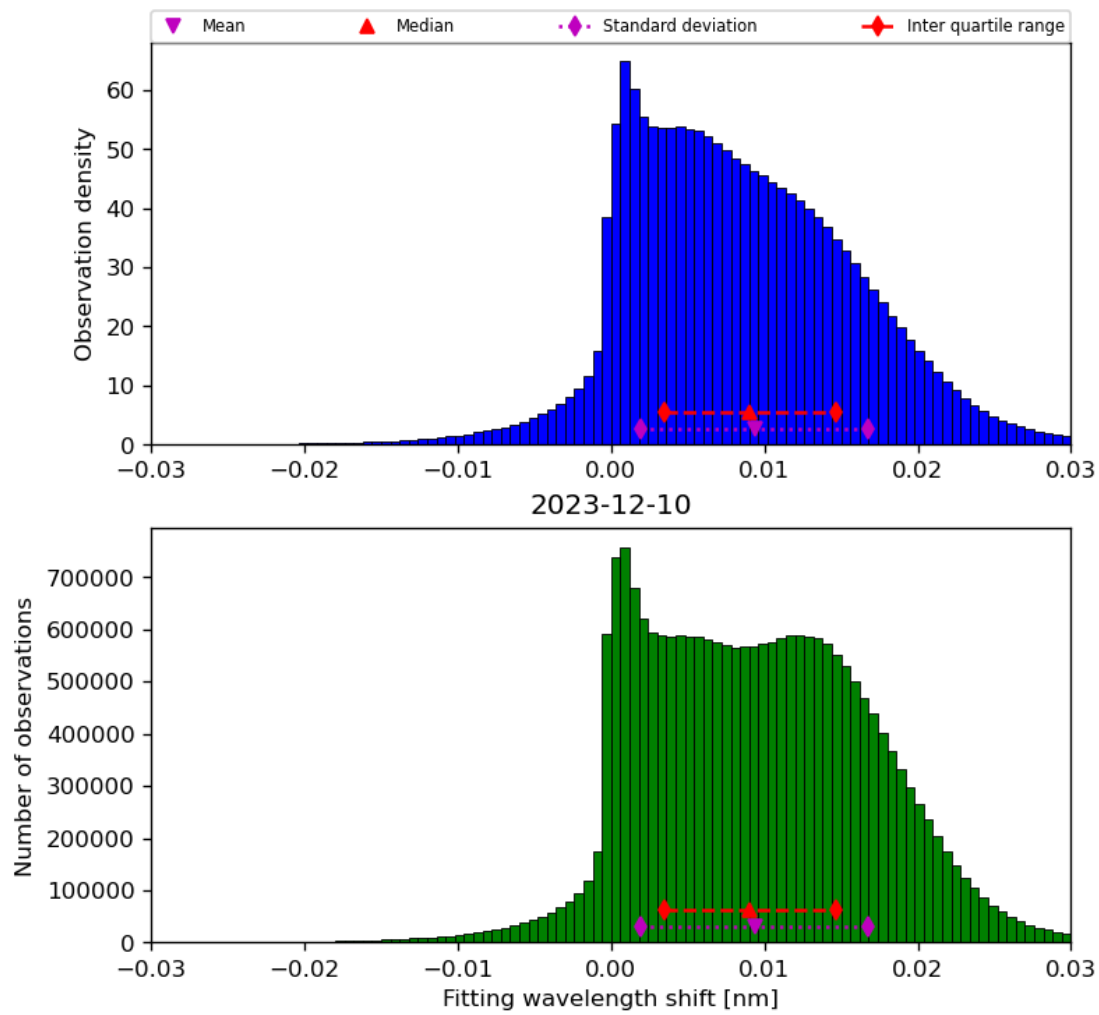


Figure 49: Histogram of “Fitting wavelength shift” for 2023-12-09 to 2023-12-11

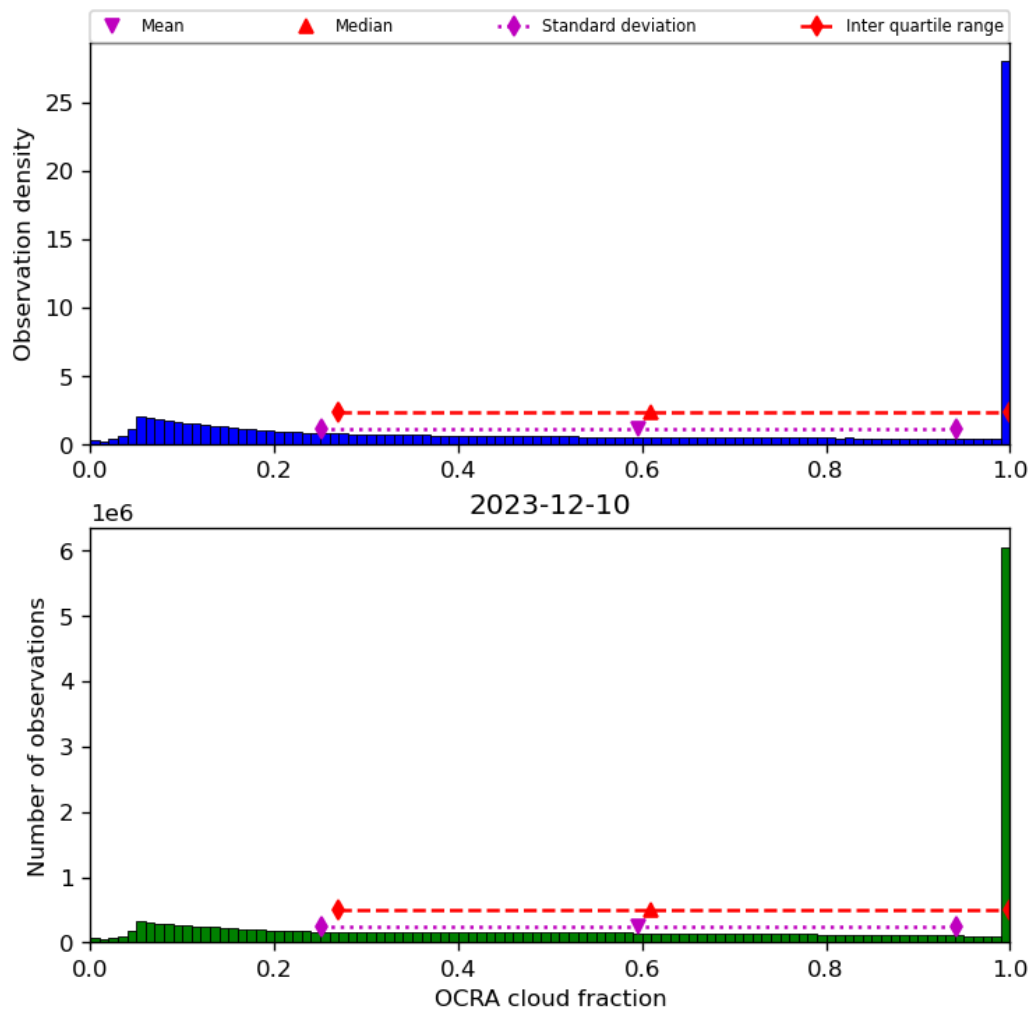


Figure 50: Histogram of “OCRA cloud fraction” for 2023-12-09 to 2023-12-11

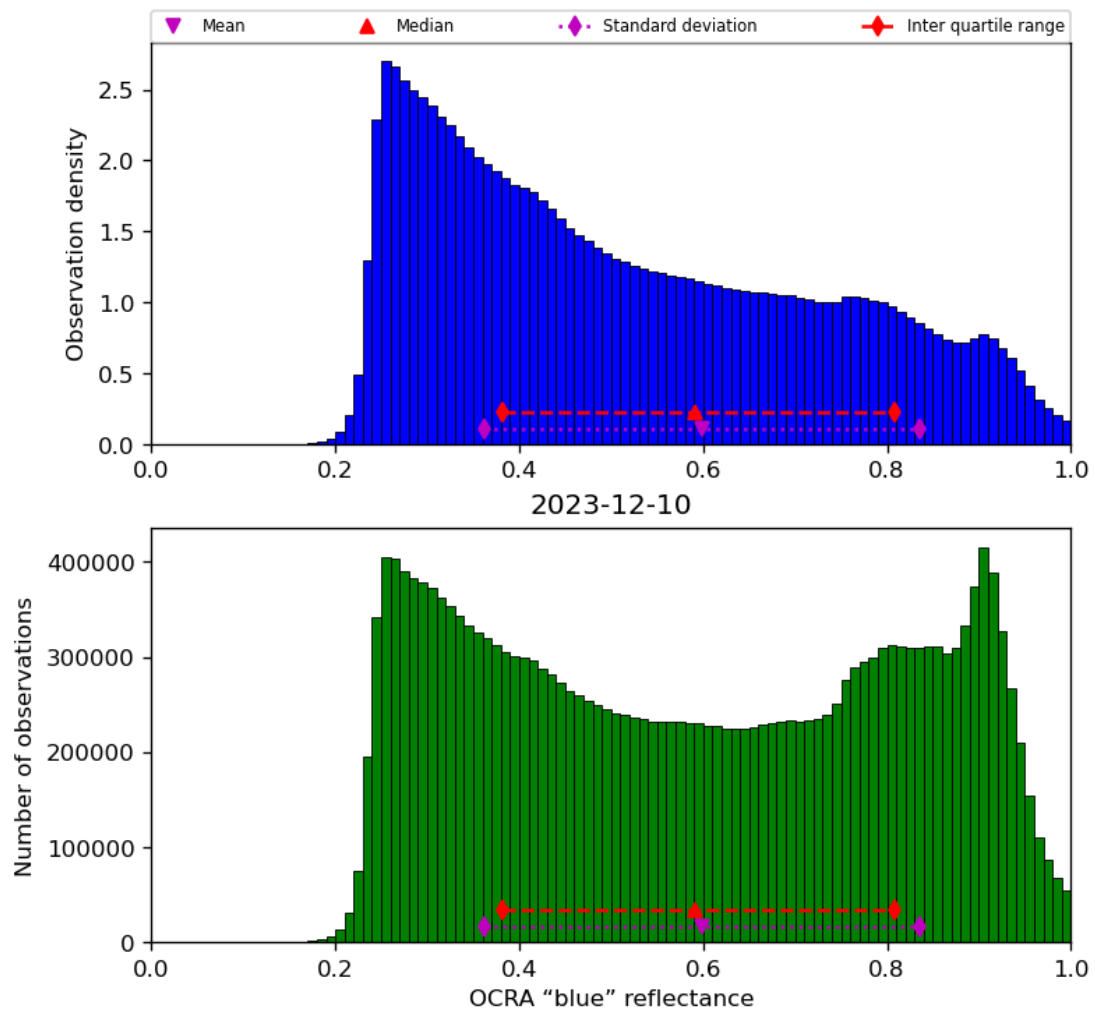


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-12-09 to 2023-12-11

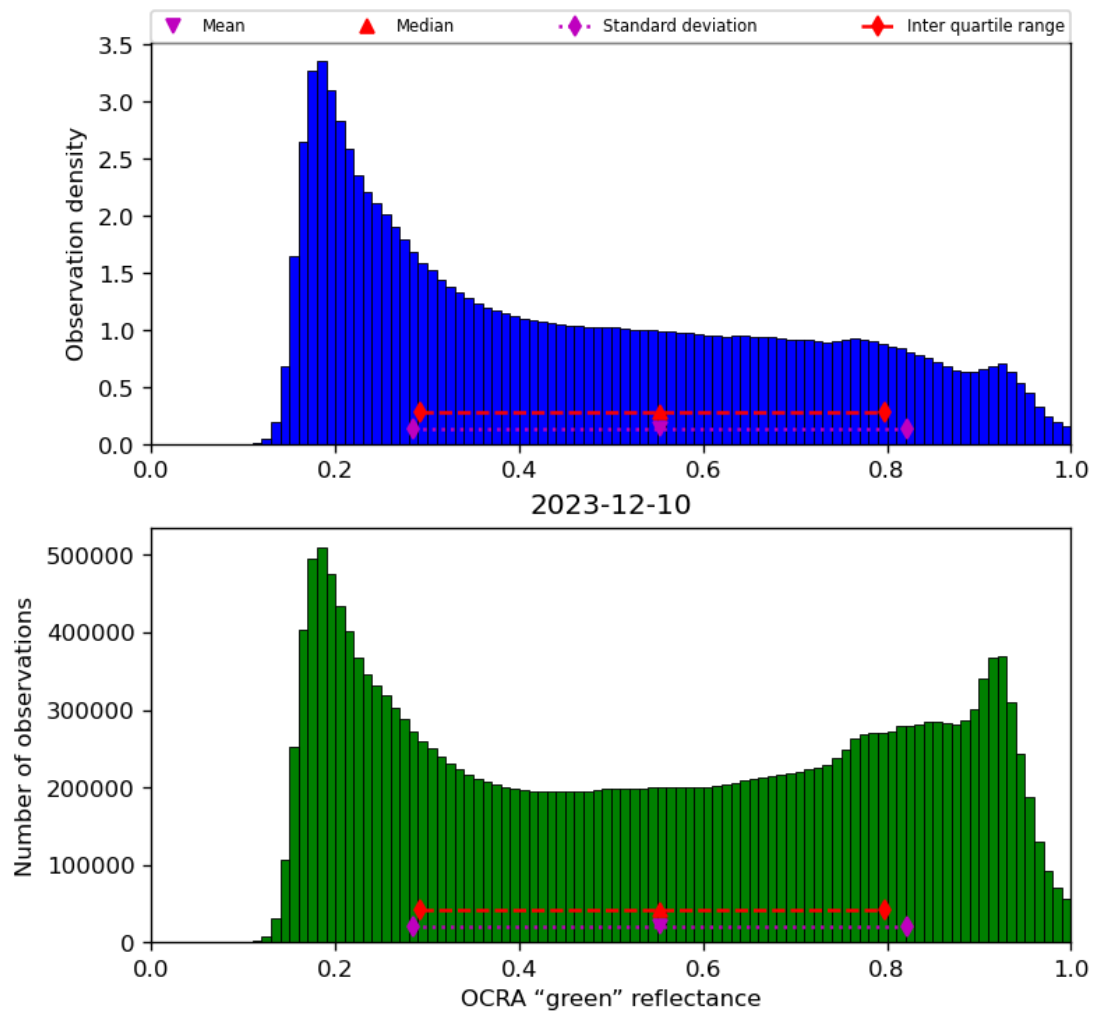


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-12-09 to 2023-12-11

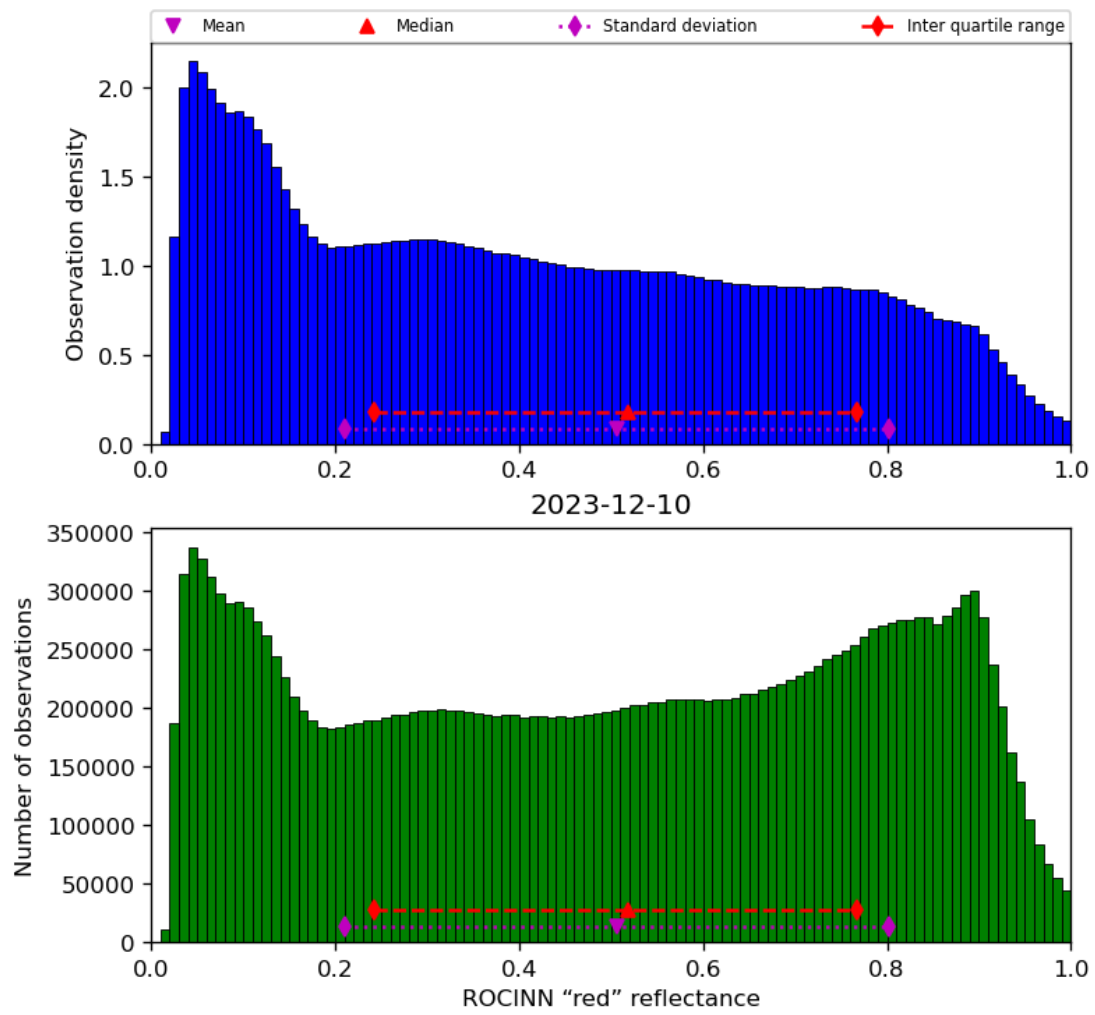


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-12-09 to 2023-12-11

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.

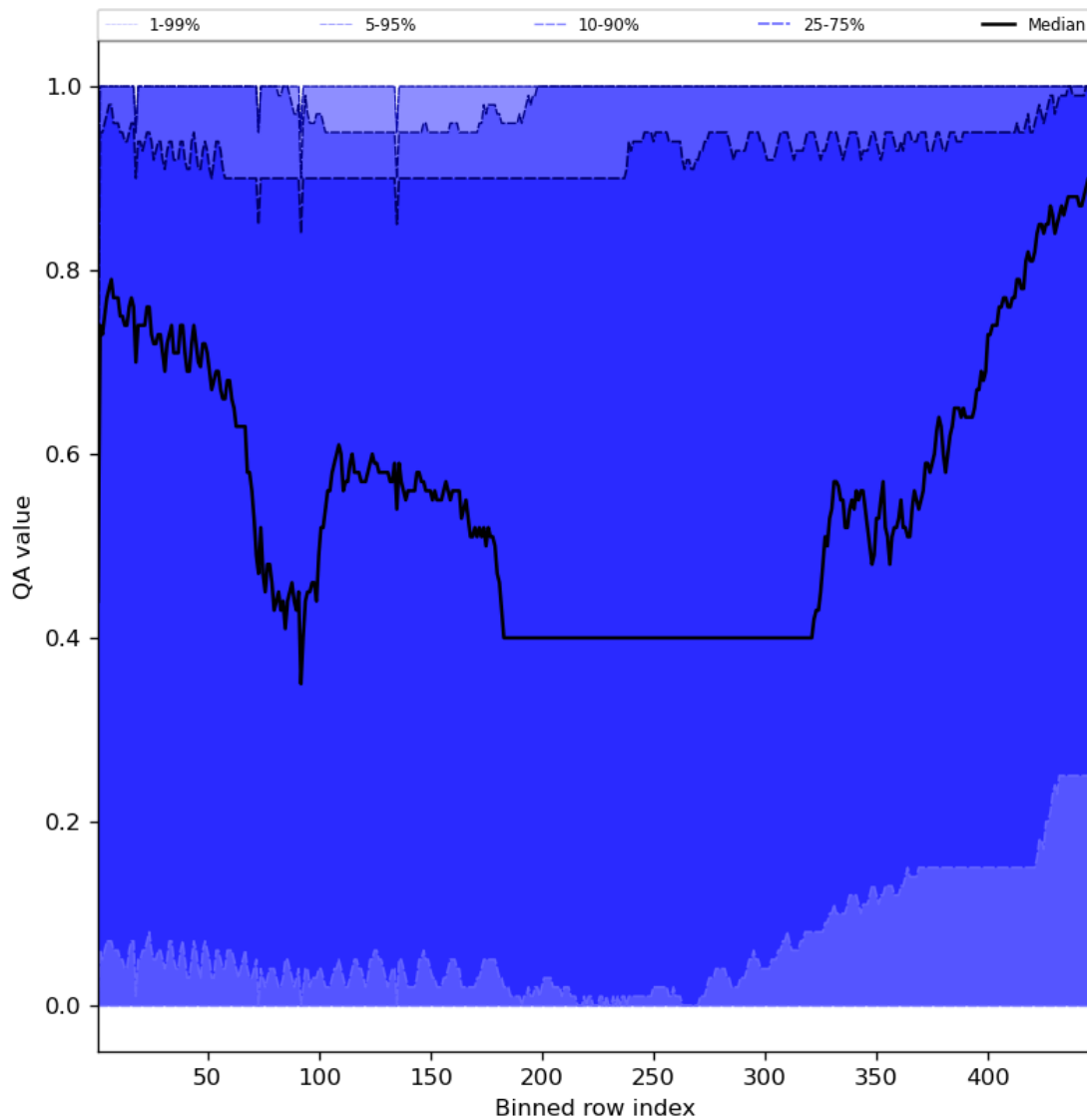


Figure 54: Along track statistics of “QA value” for 2023-12-09 to 2023-12-11

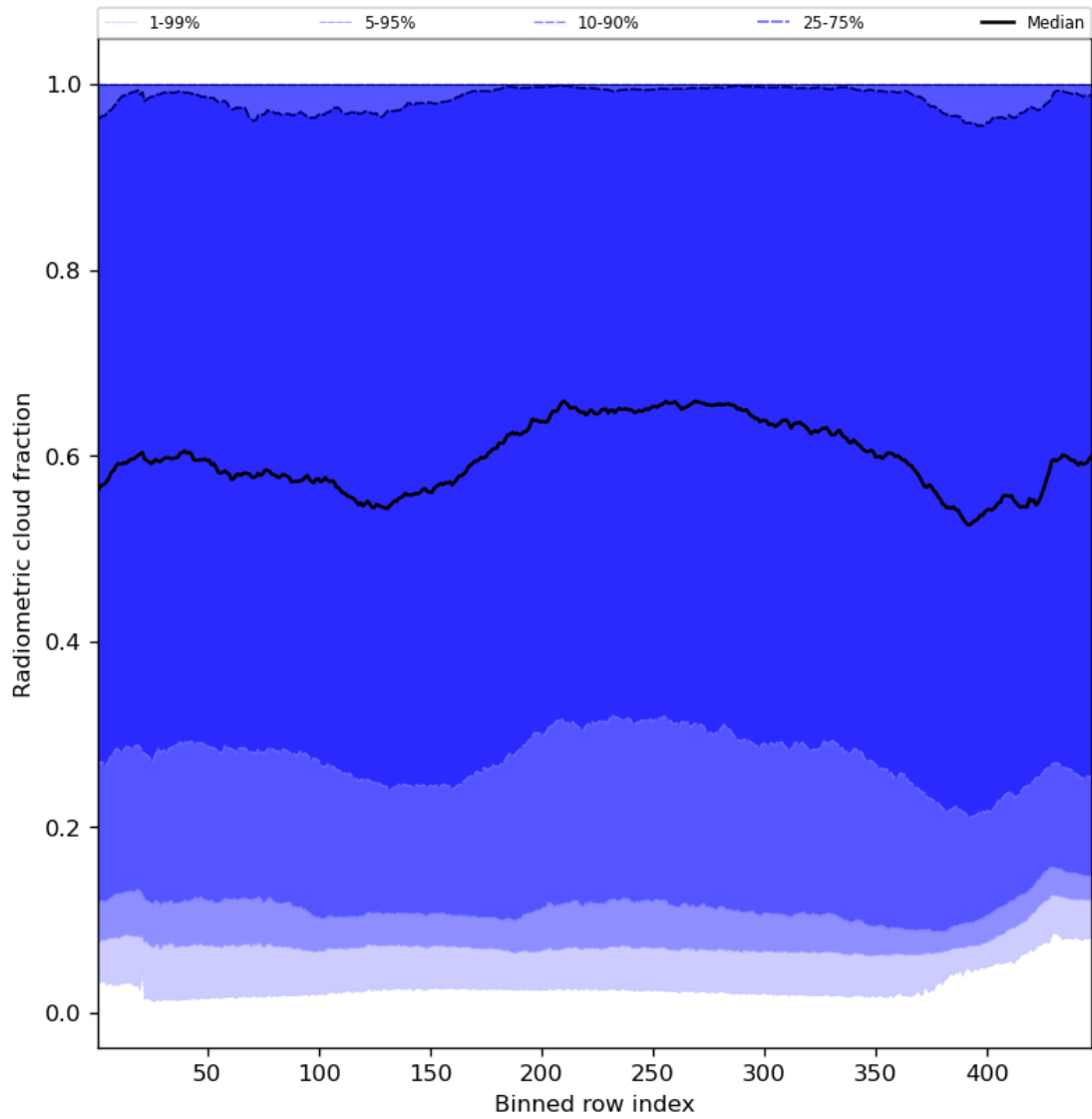


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-12-09 to 2023-12-11

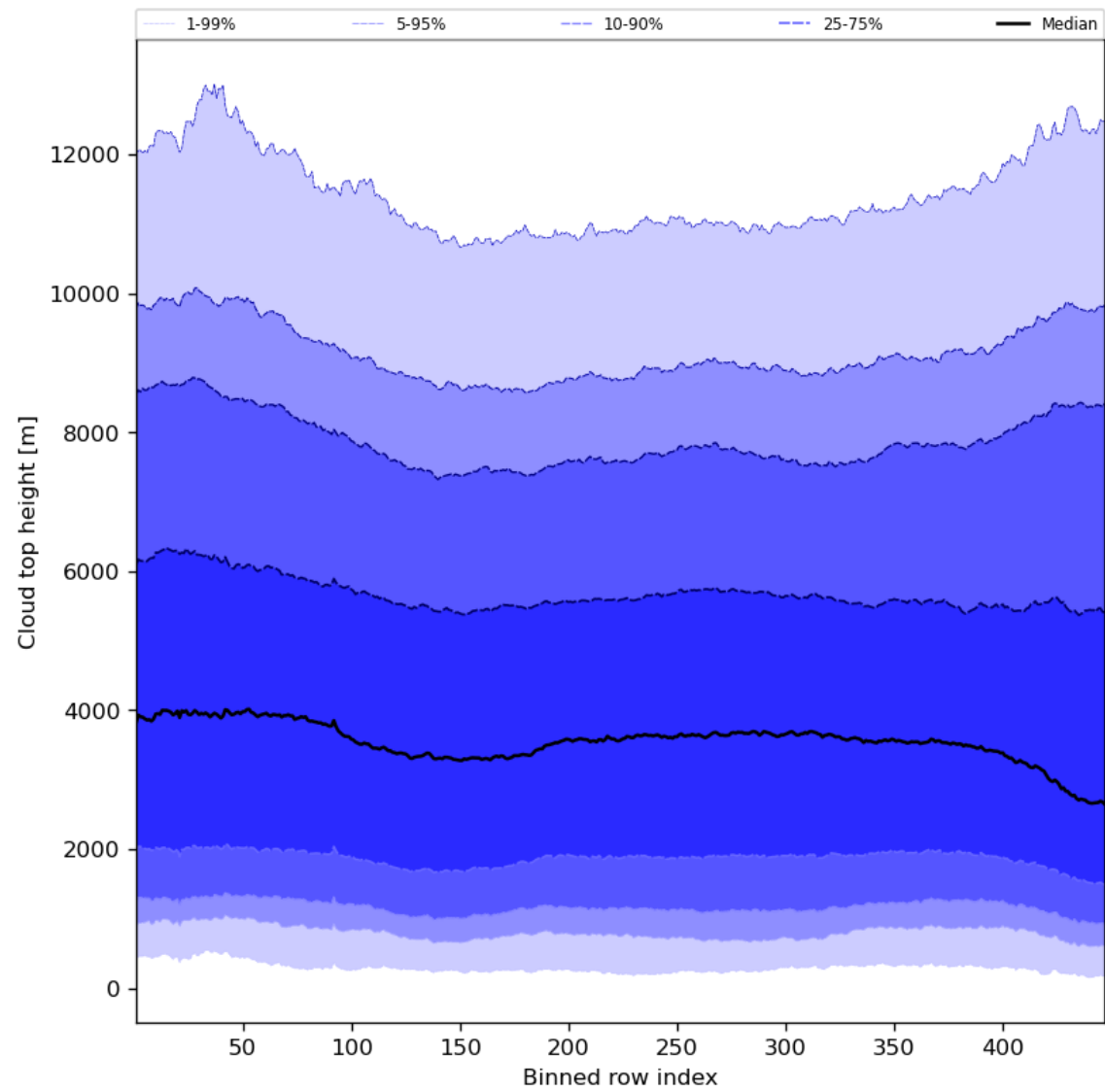


Figure 56: Along track statistics of “Cloud top height” for 2023-12-09 to 2023-12-11

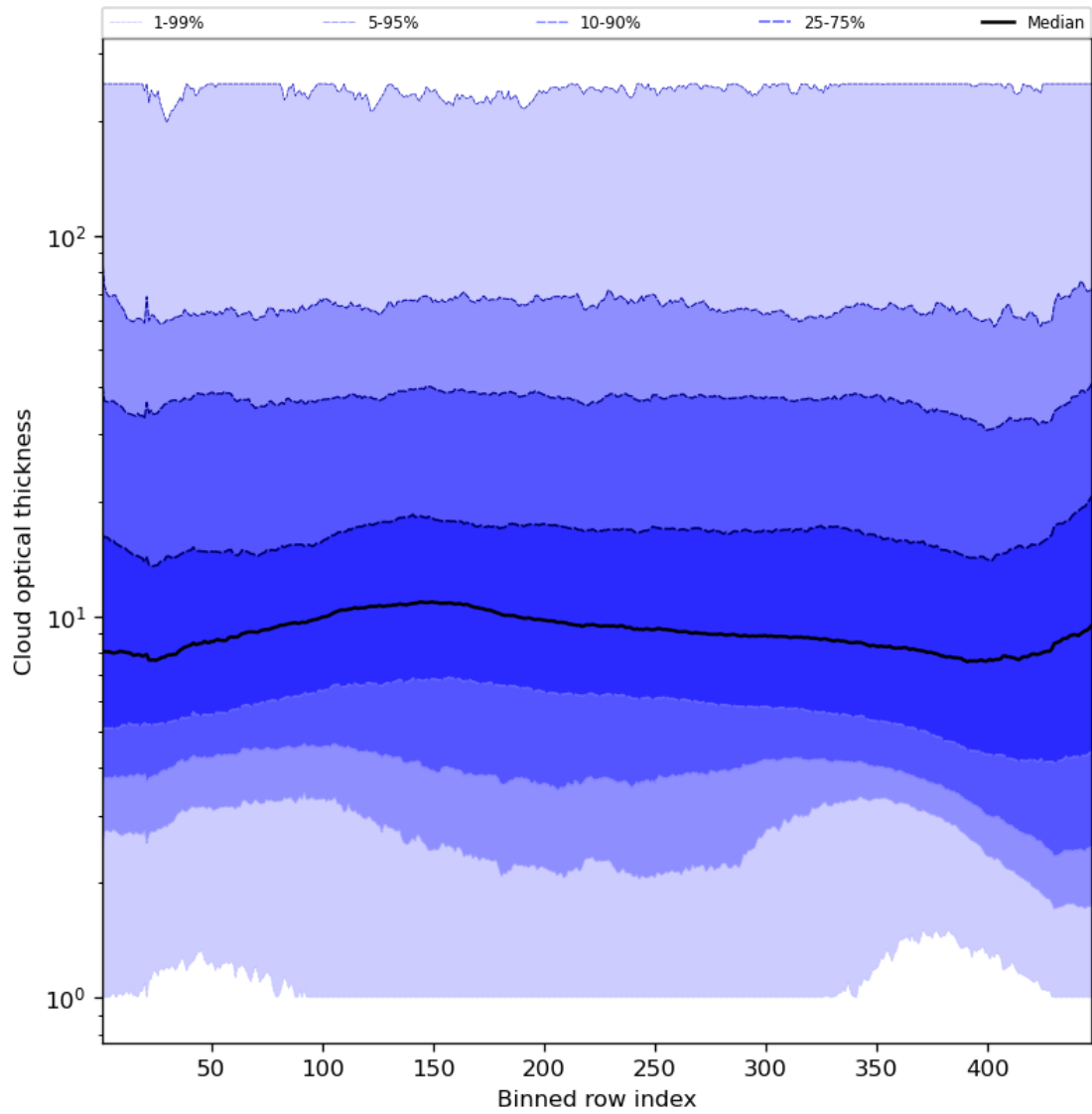


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-12-09 to 2023-12-11

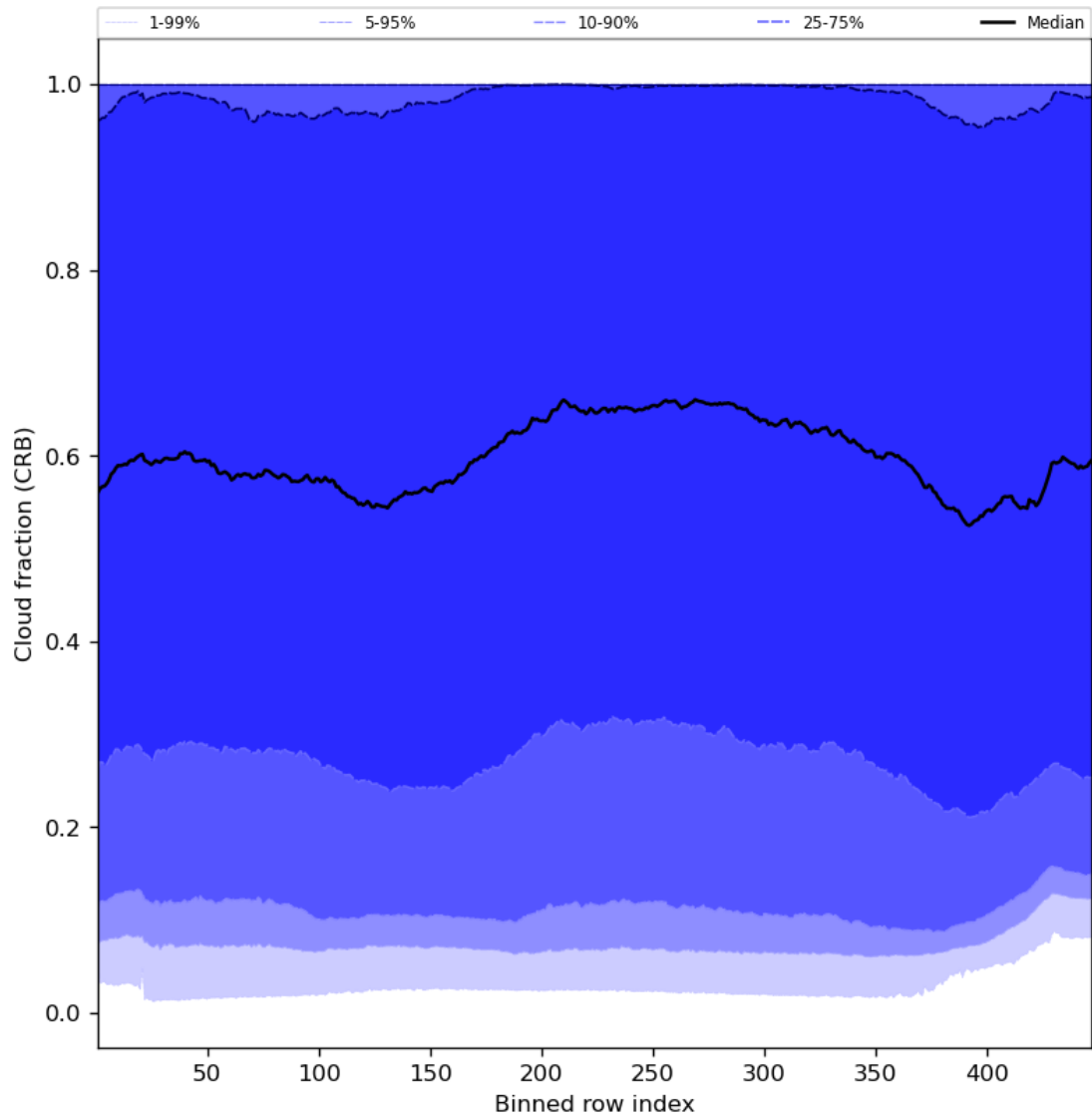


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-12-09 to 2023-12-11

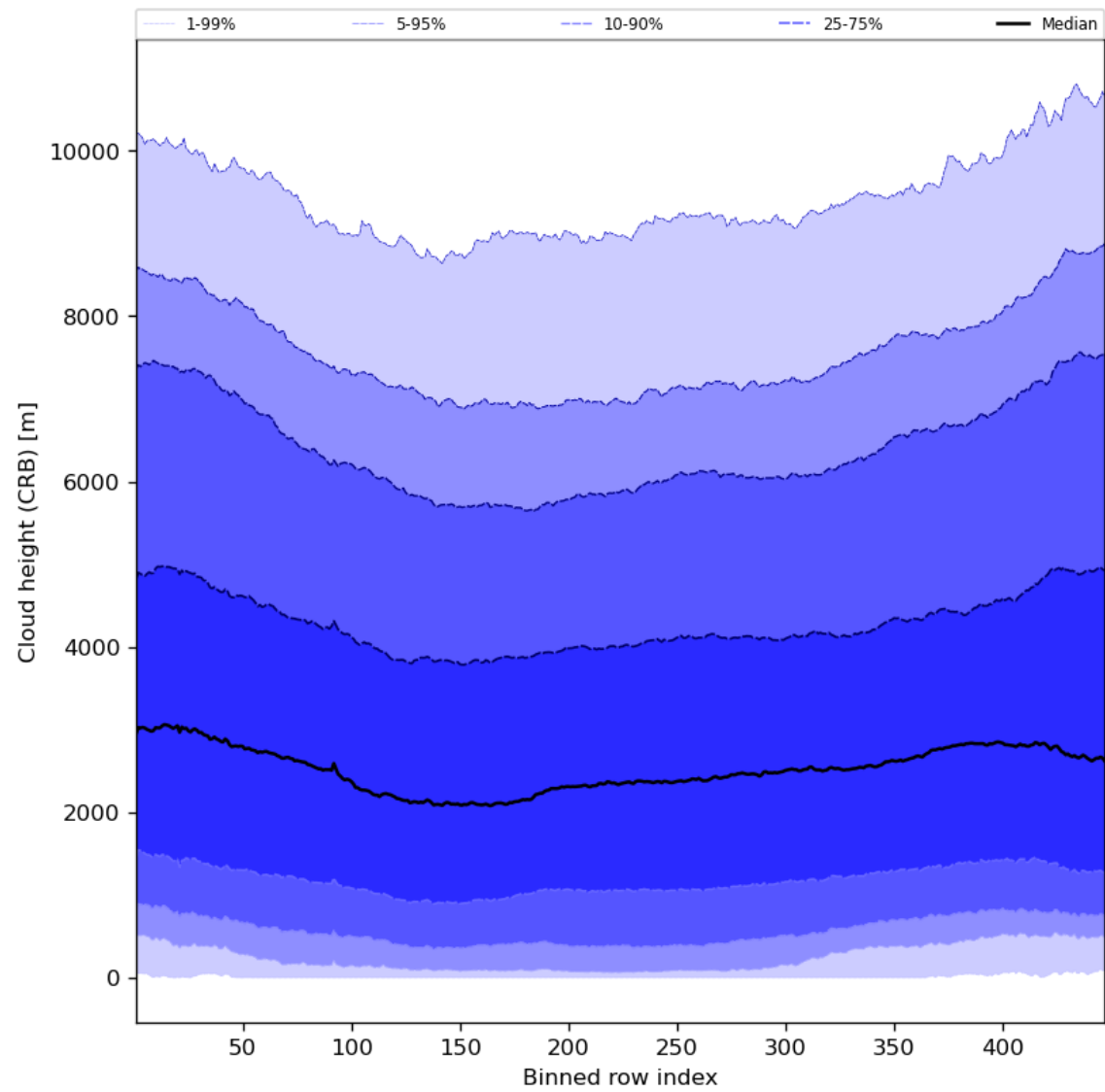


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-12-09 to 2023-12-11

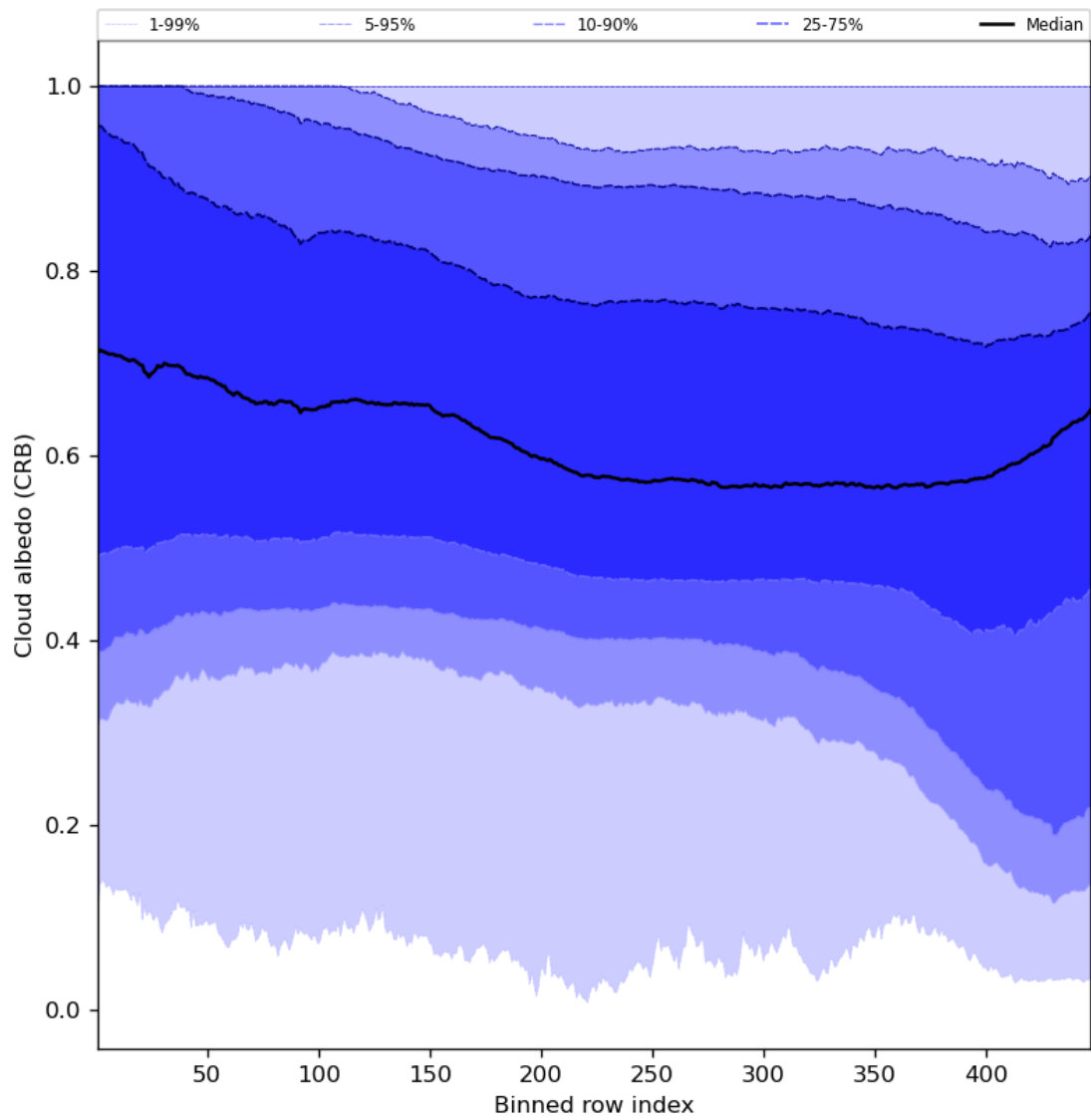


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-12-09 to 2023-12-11

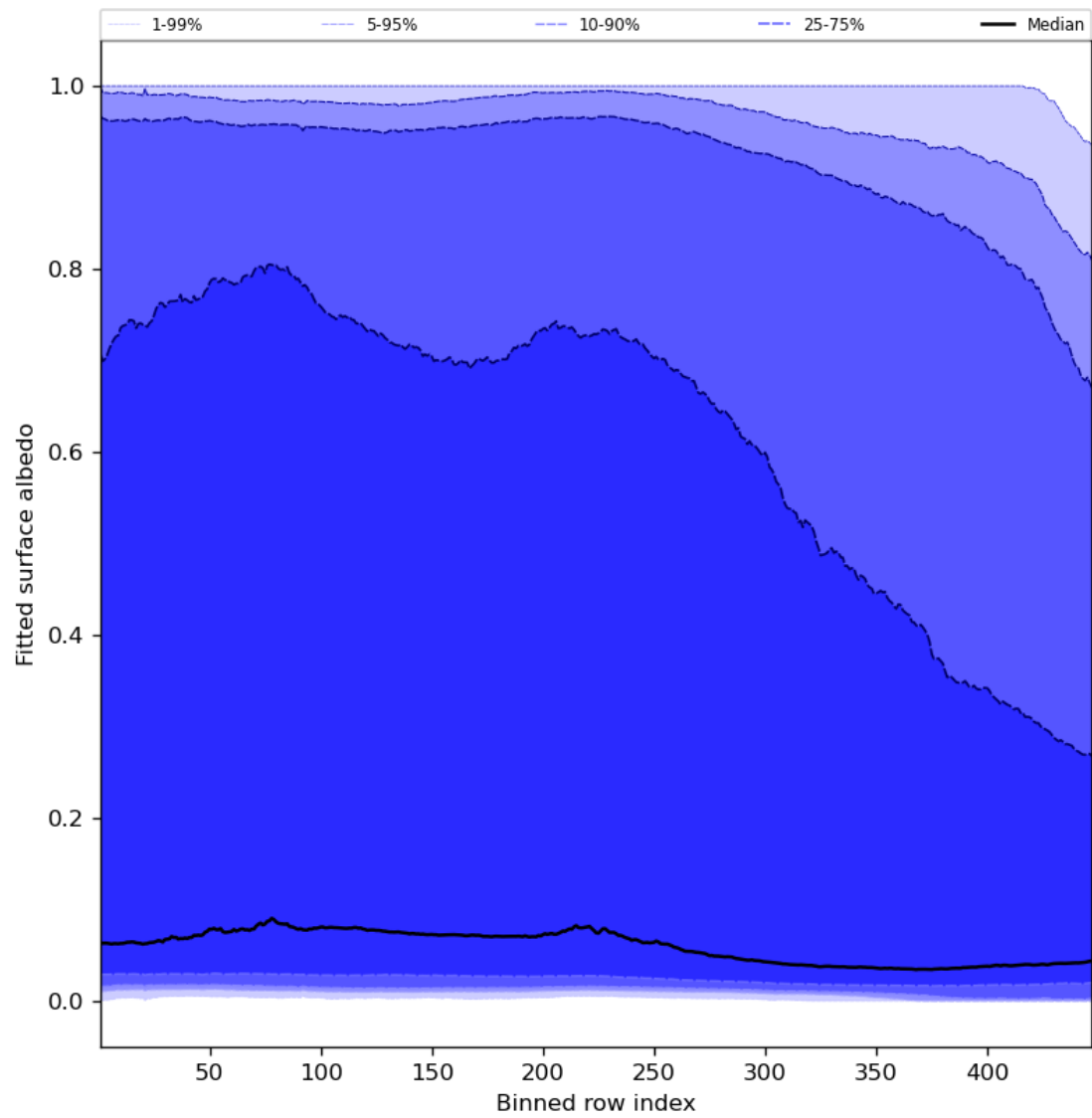


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-12-09 to 2023-12-11

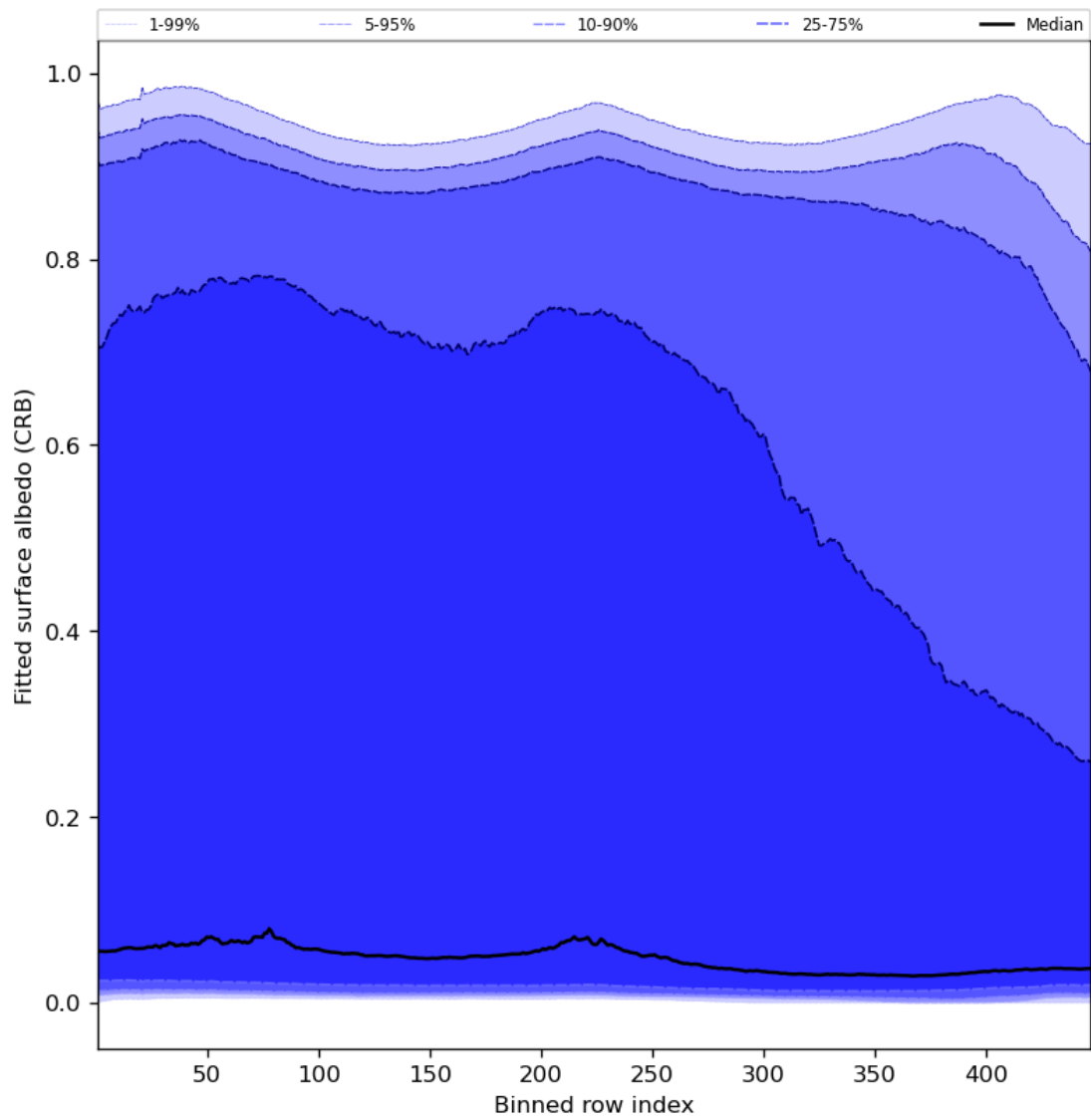


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-12-09 to 2023-12-11

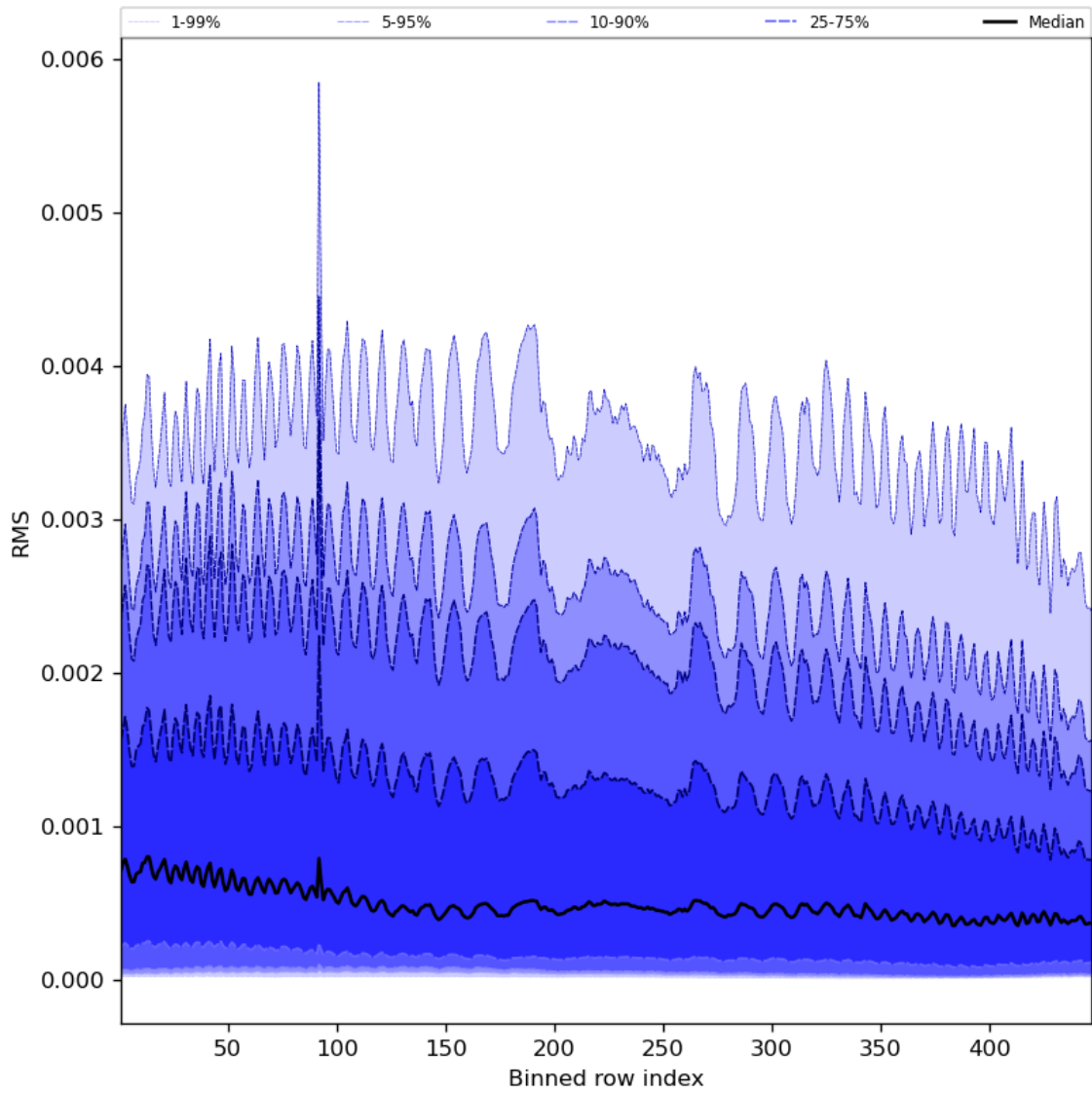


Figure 63: Along track statistics of “RMS” for 2023-12-09 to 2023-12-11

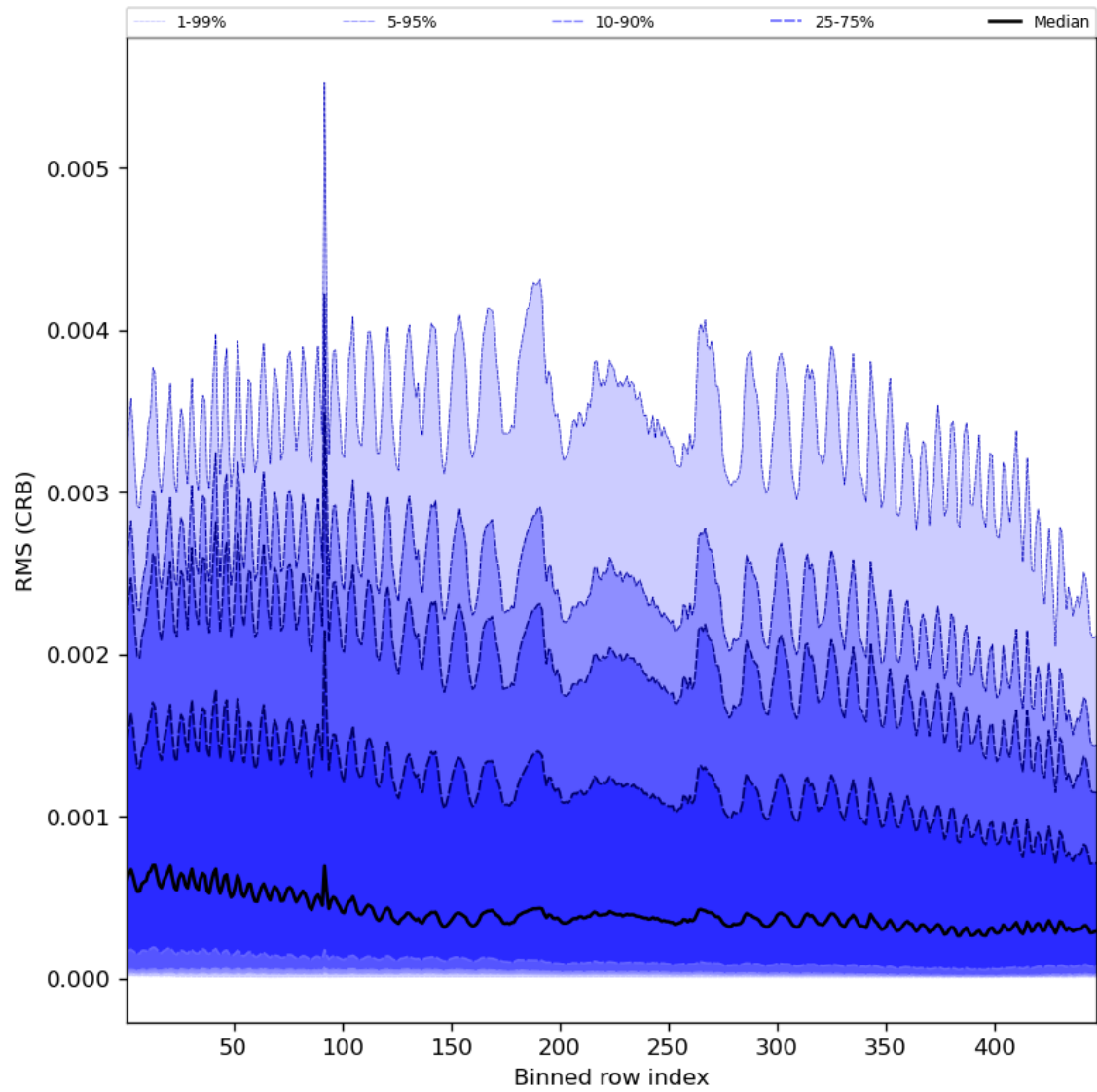


Figure 64: Along track statistics of “RMS (CRB)” for 2023-12-09 to 2023-12-11

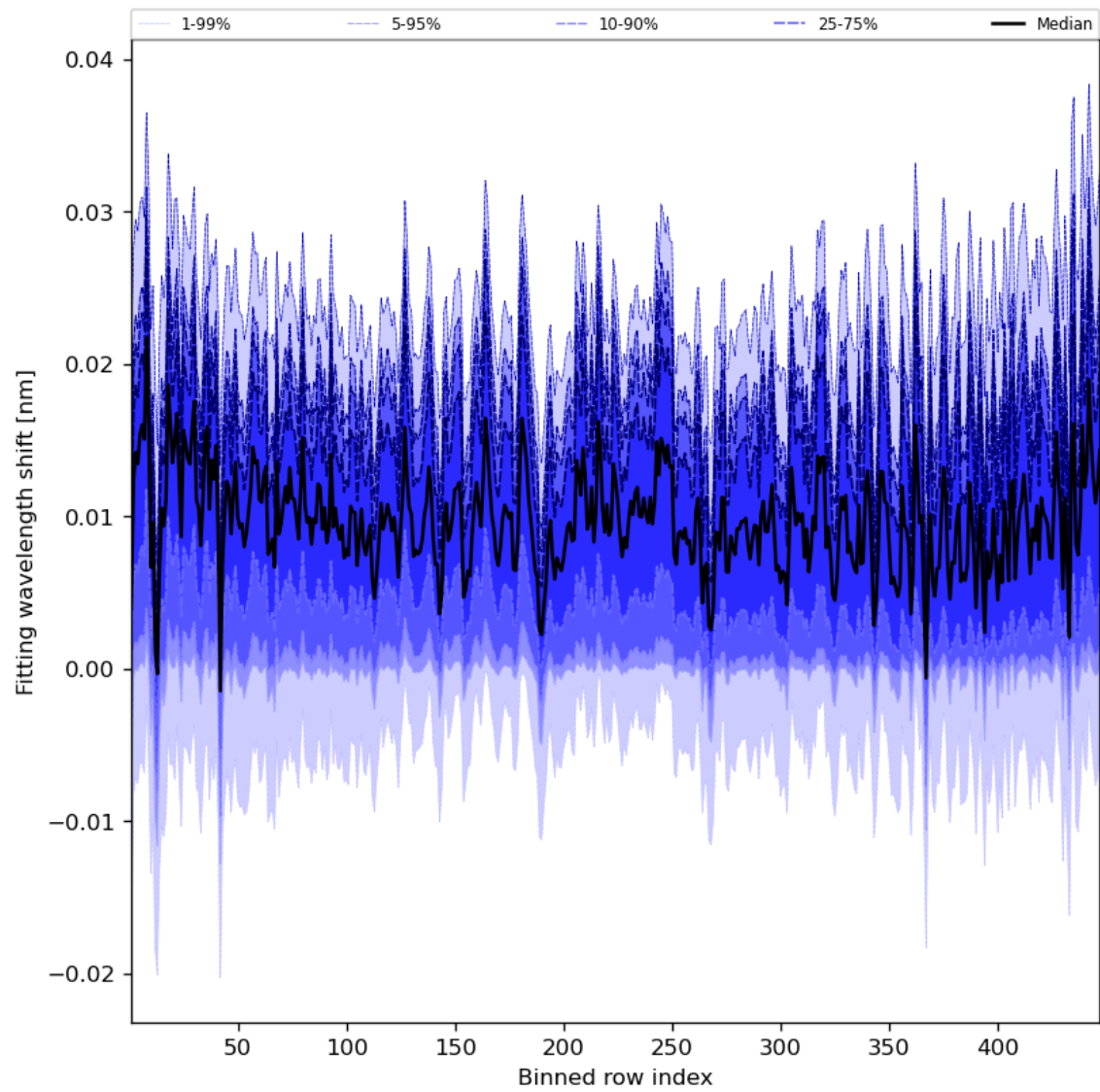


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-12-09 to 2023-12-11

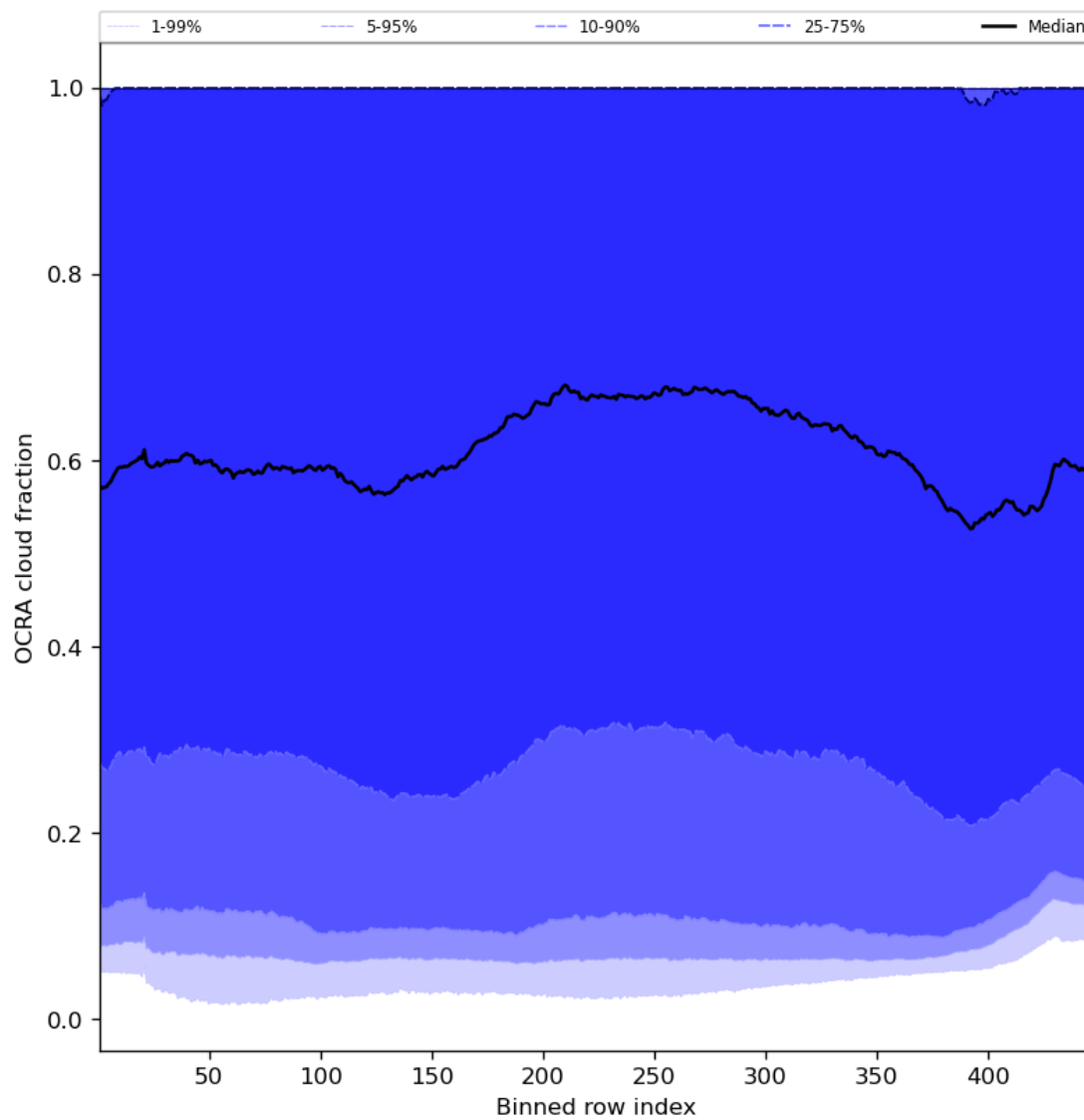


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-12-09 to 2023-12-11

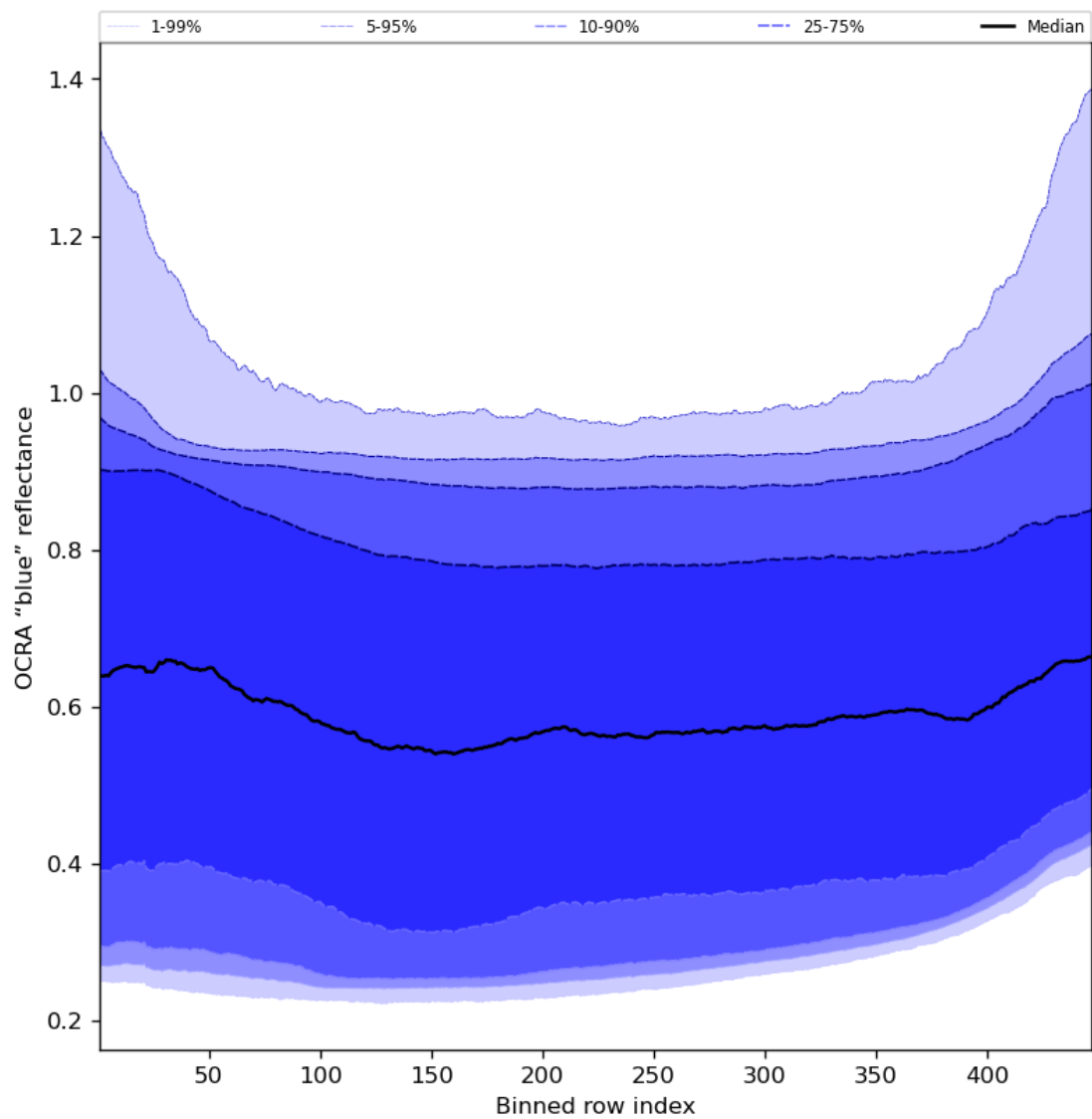


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-12-09 to 2023-12-11

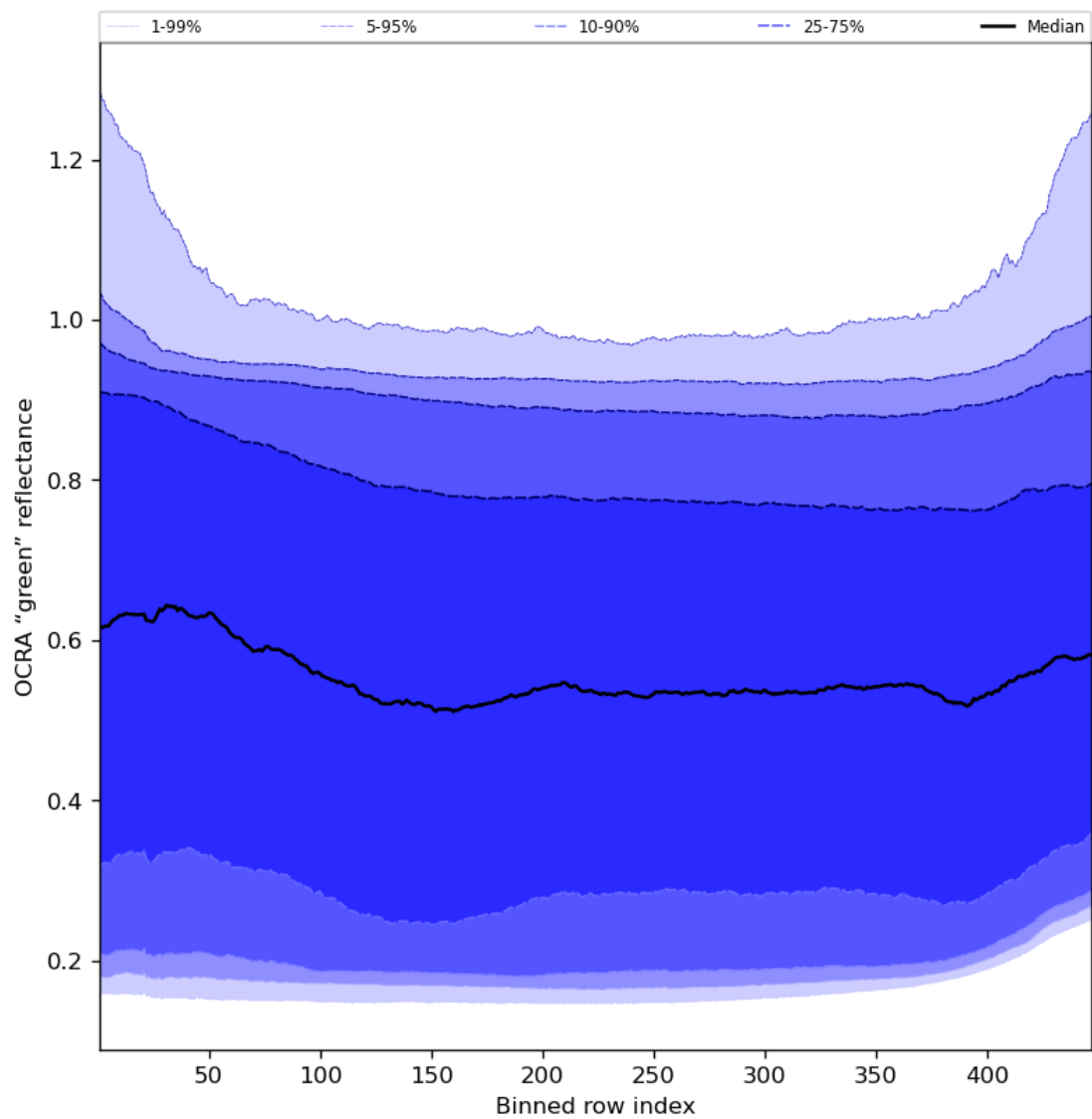


Figure 68: Along track statistics of “OCRA “green” reflectance” for 2023-12-09 to 2023-12-11

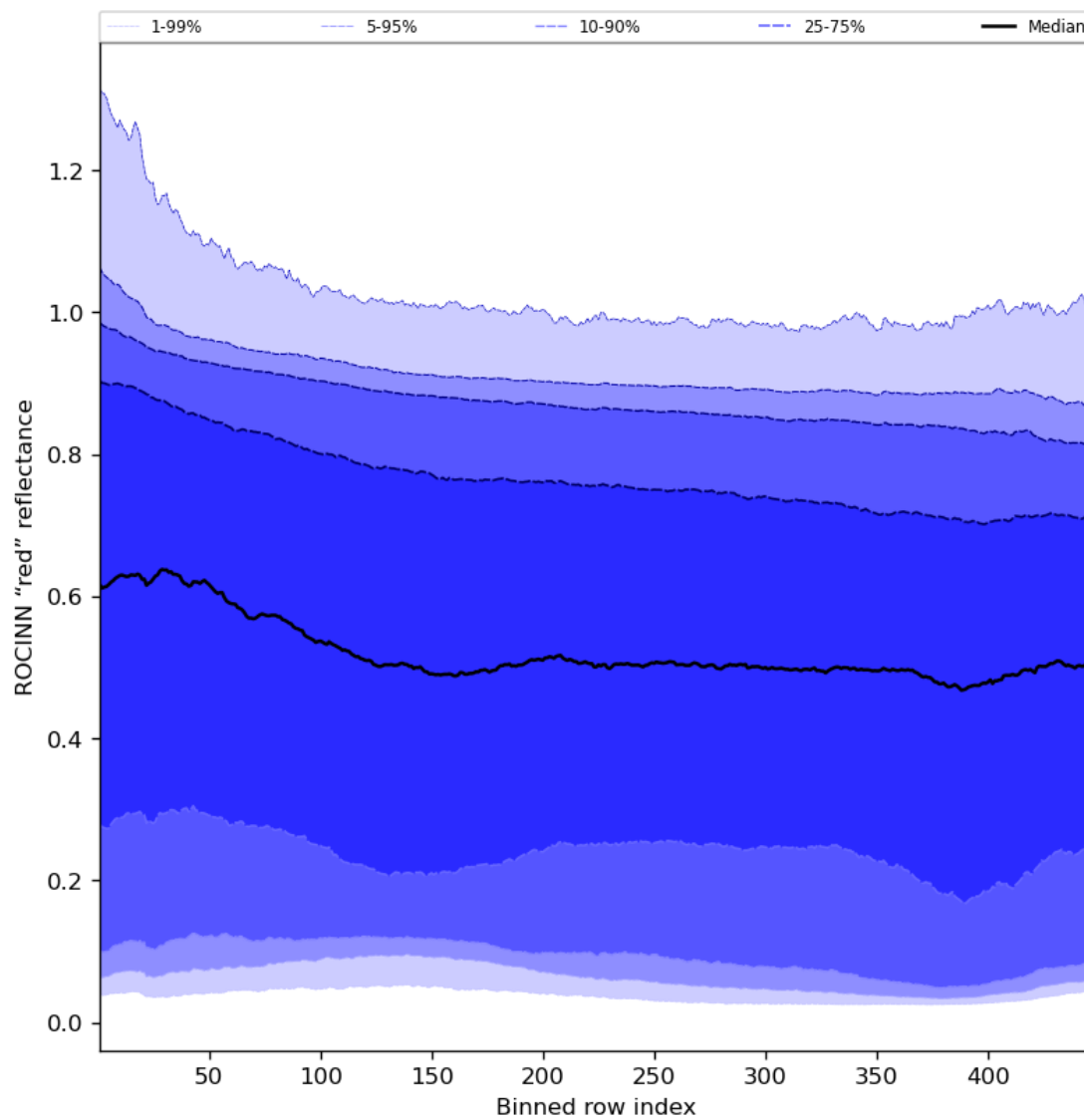


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2023-12-09 to 2023-12-11

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.

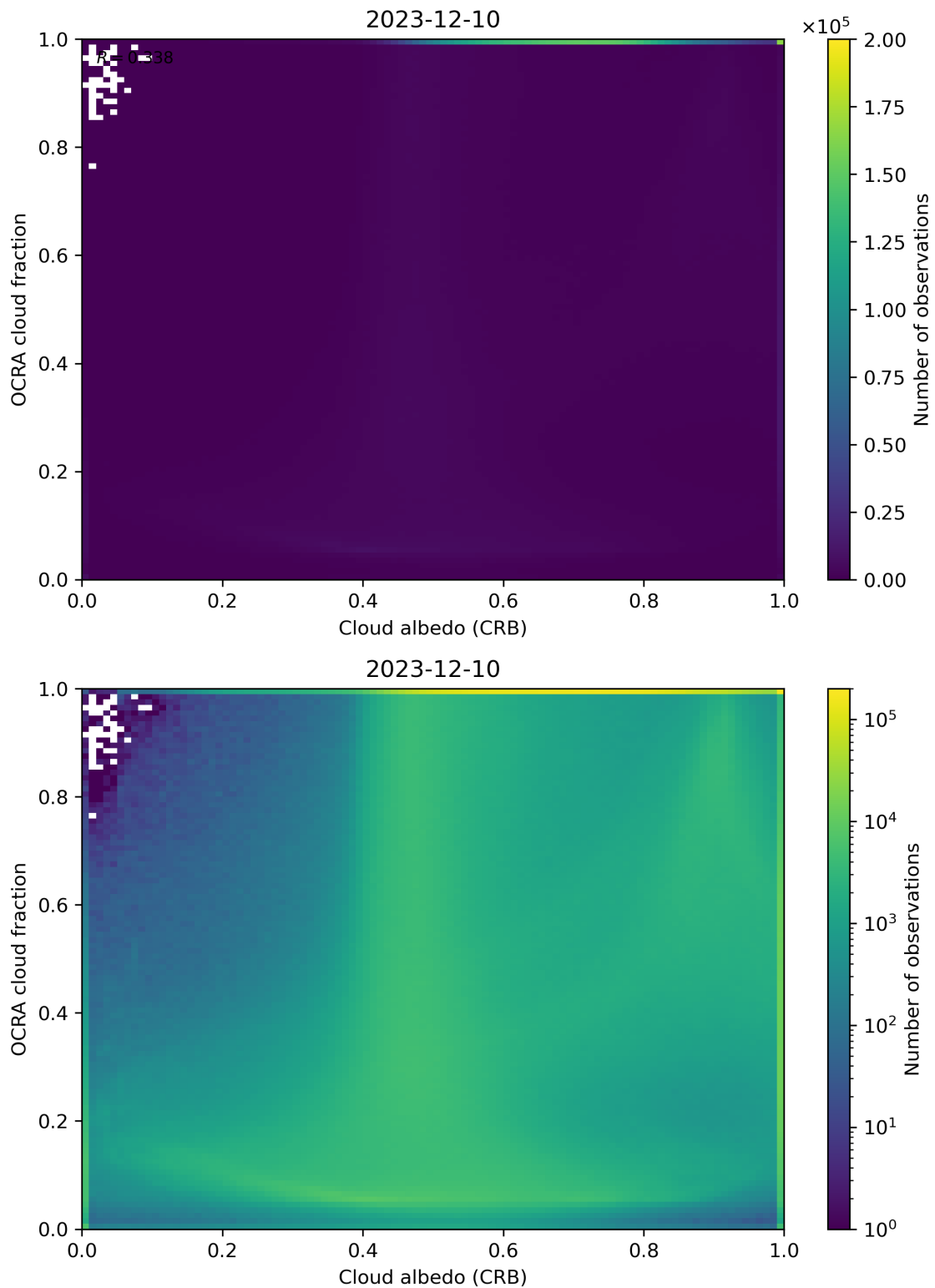


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-12-09 to 2023-12-11.

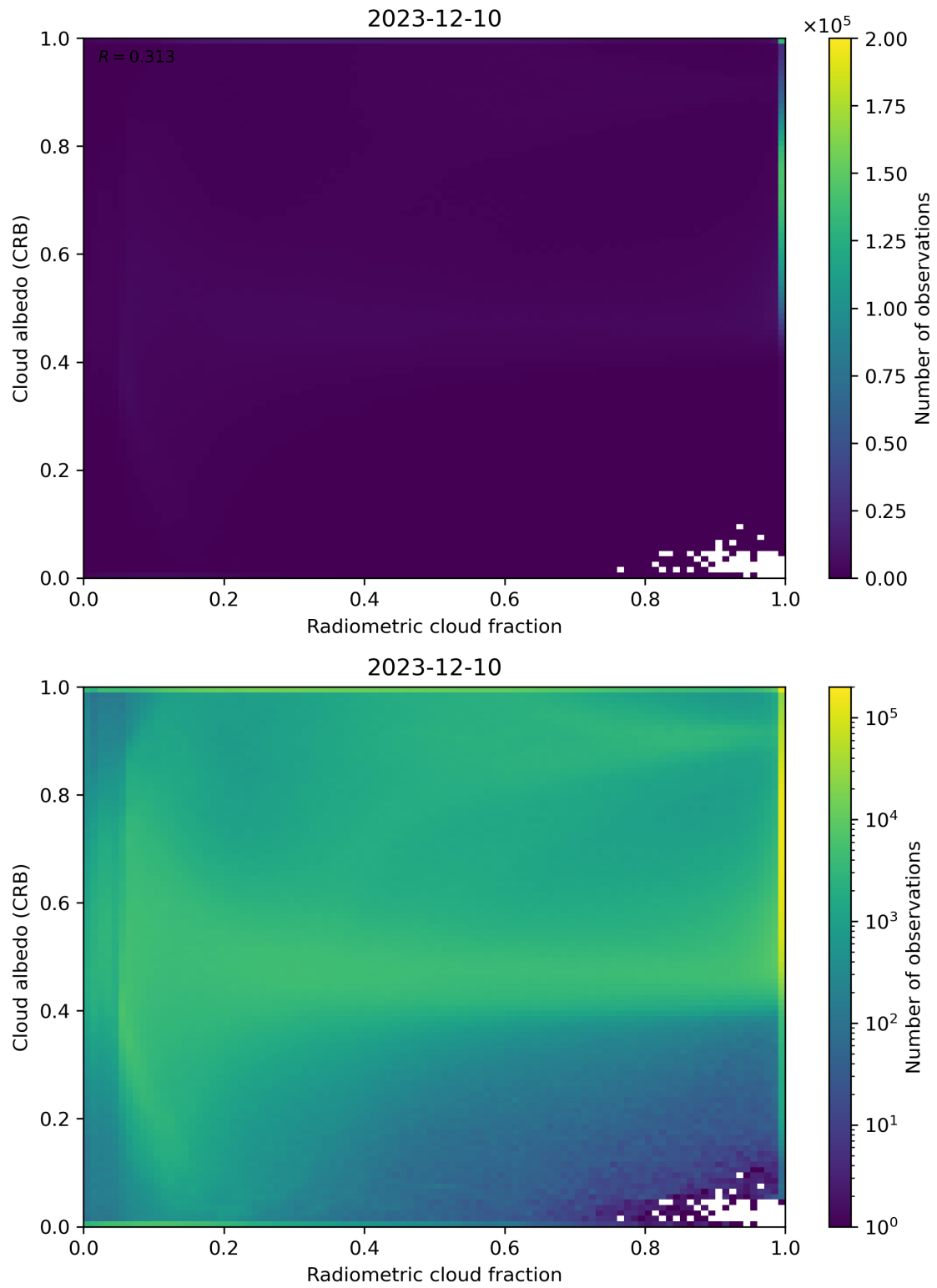


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-12-09 to 2023-12-11.

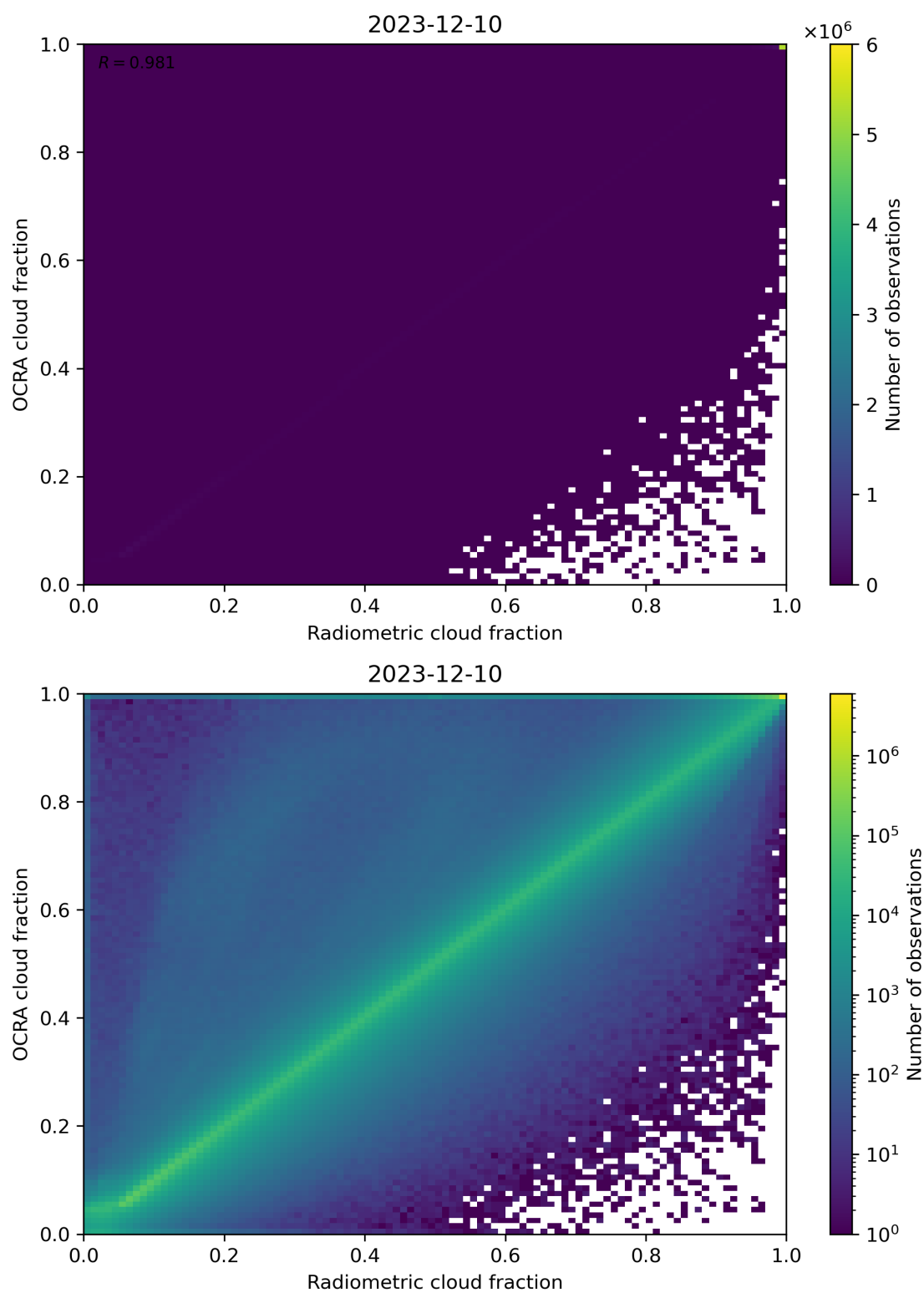


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-12-09 to 2023-12-11.

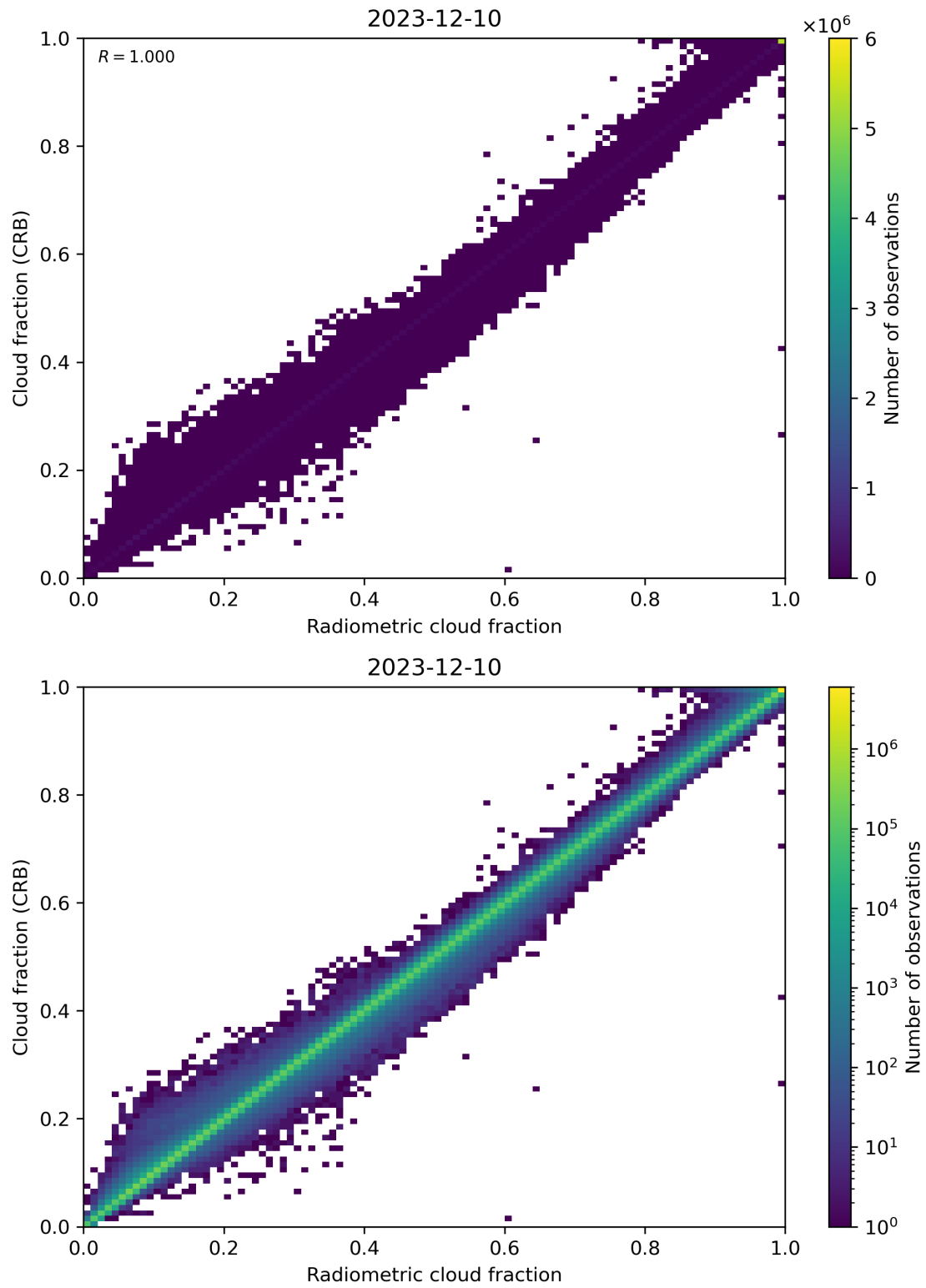


Figure 73: Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2023-12-09 to 2023-12-11.

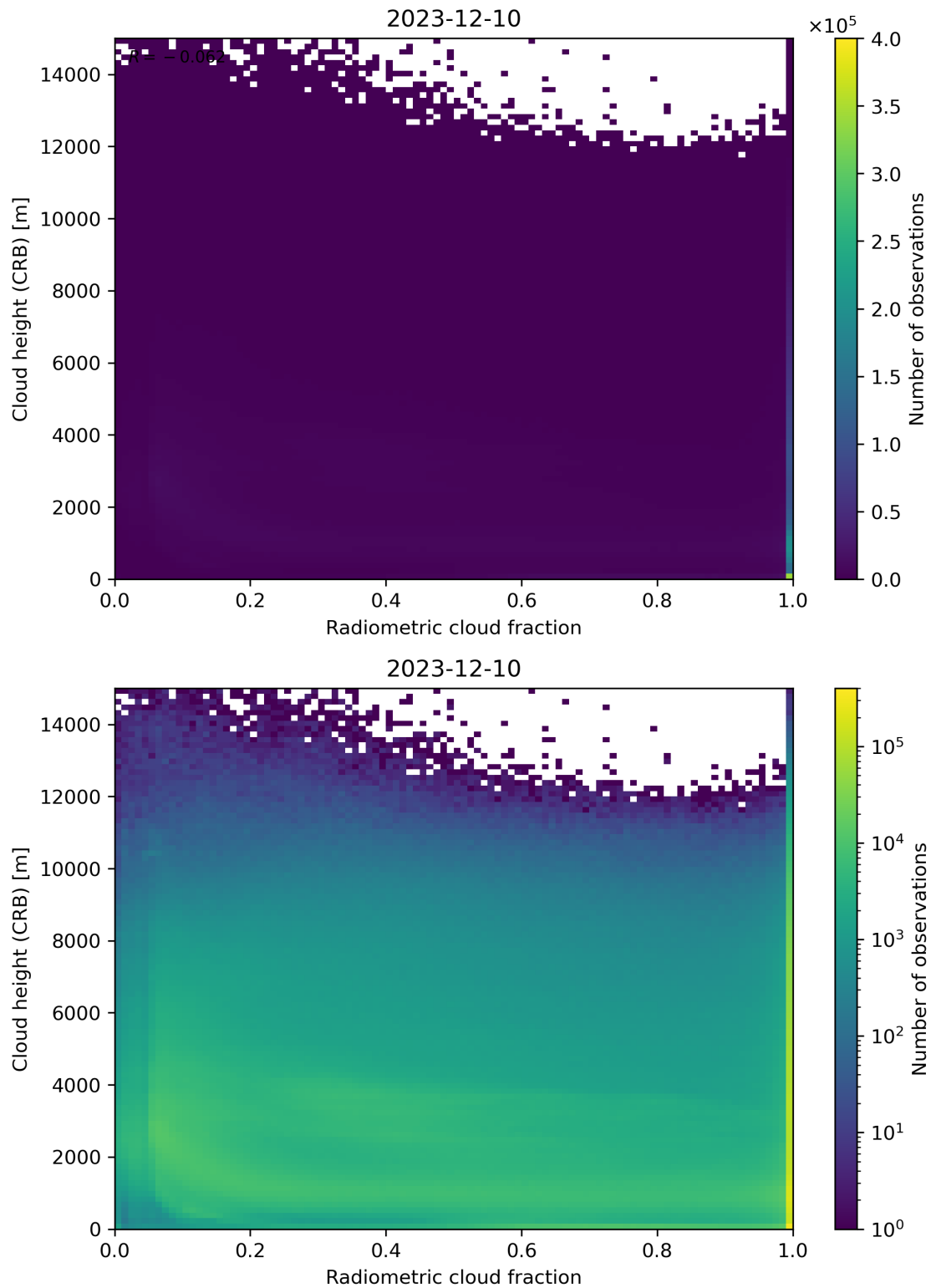


Figure 74: Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2023-12-09 to 2023-12-11.

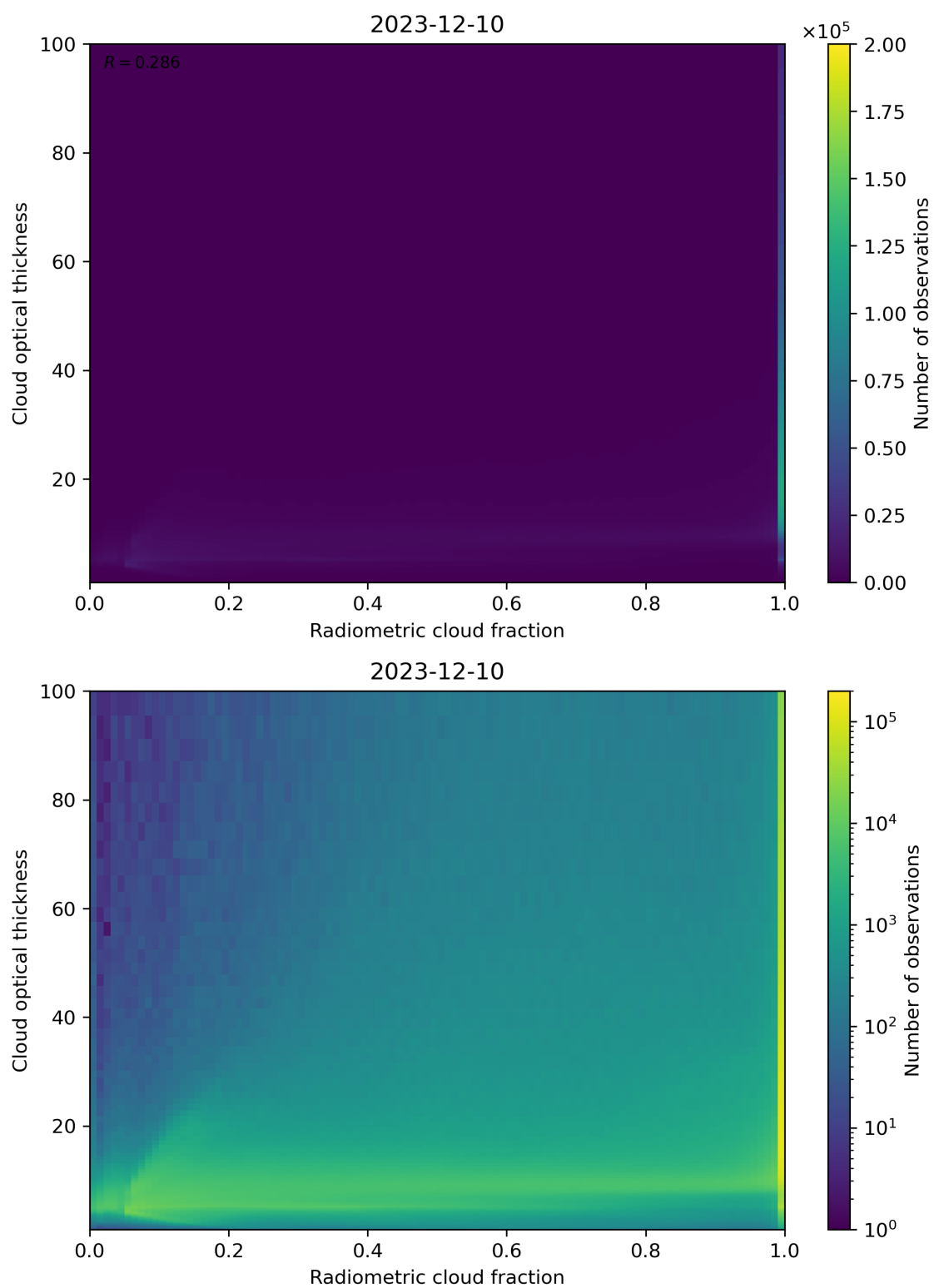


Figure 75: Scatter density plot of “Radiometric cloud fraction” against “Cloud optical thickness” for 2023-12-09 to 2023-12-11.

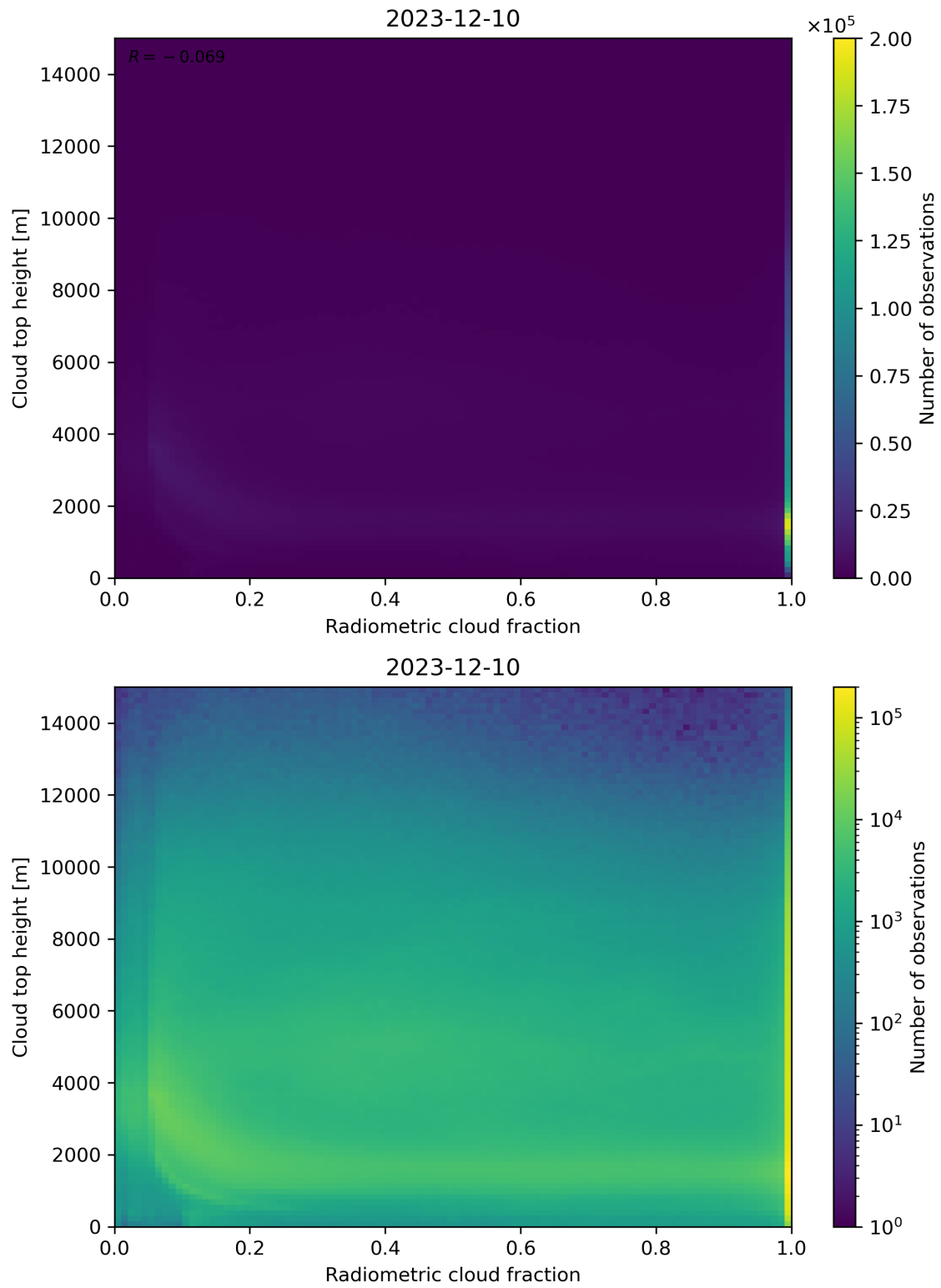


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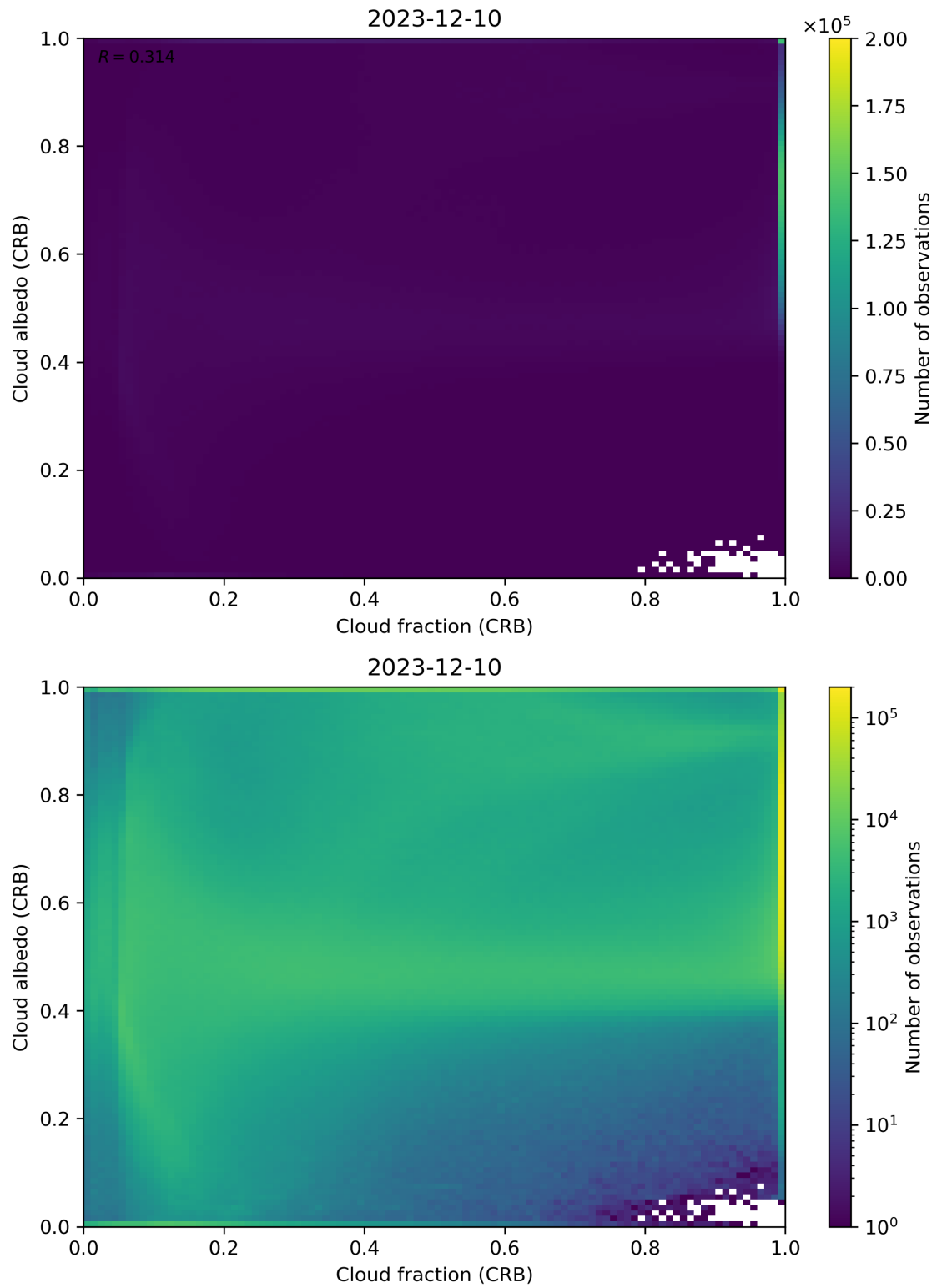


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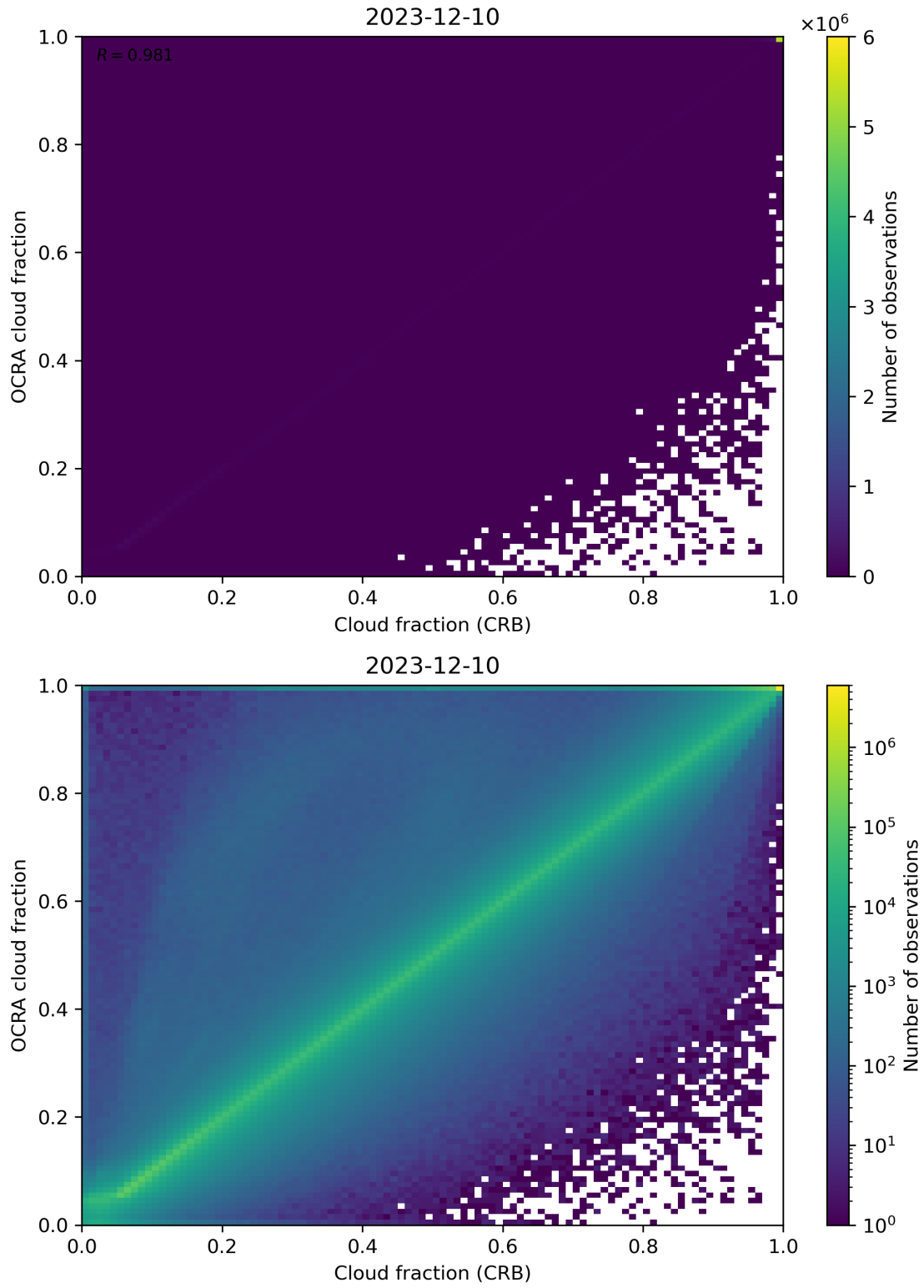


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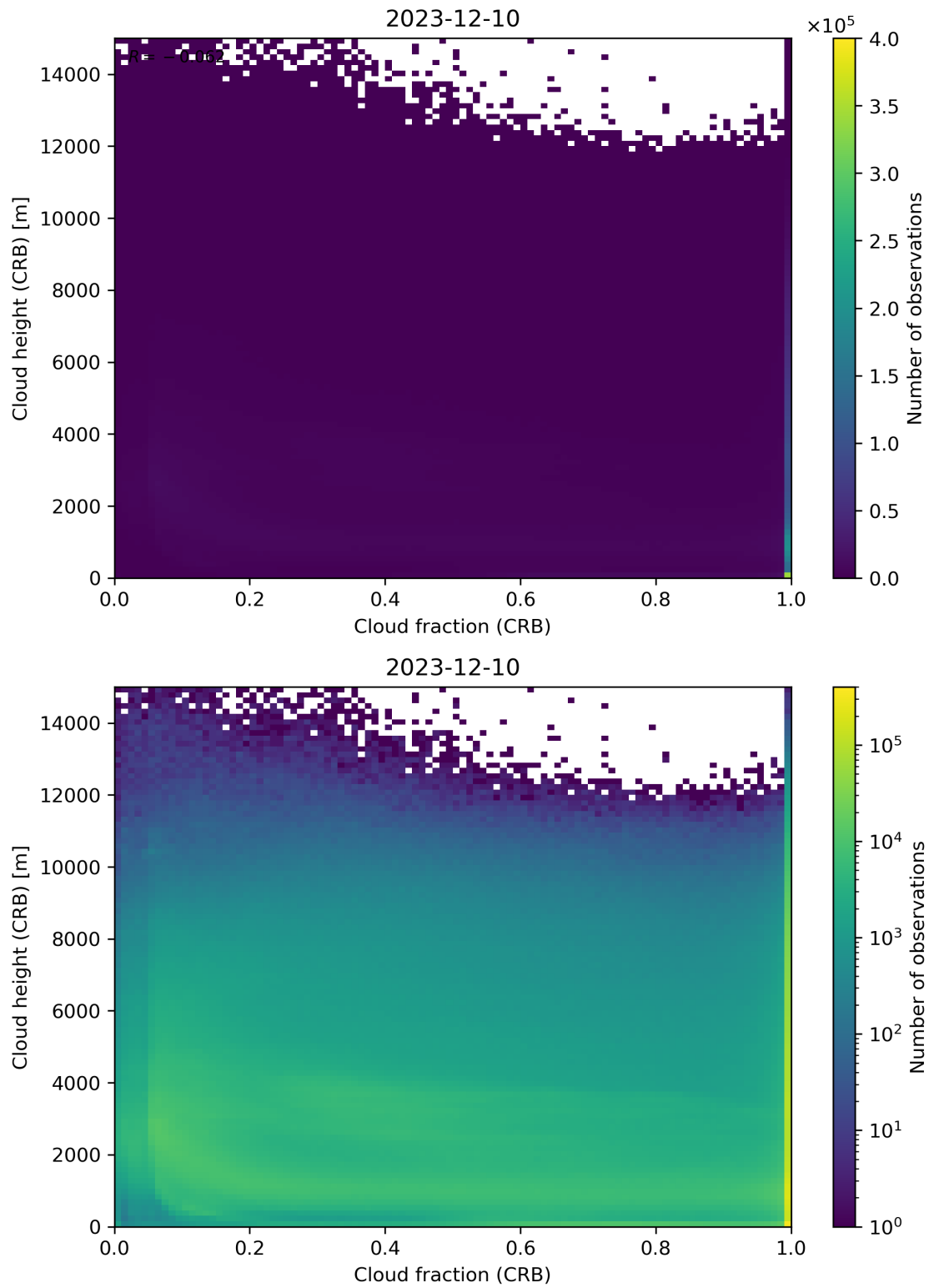


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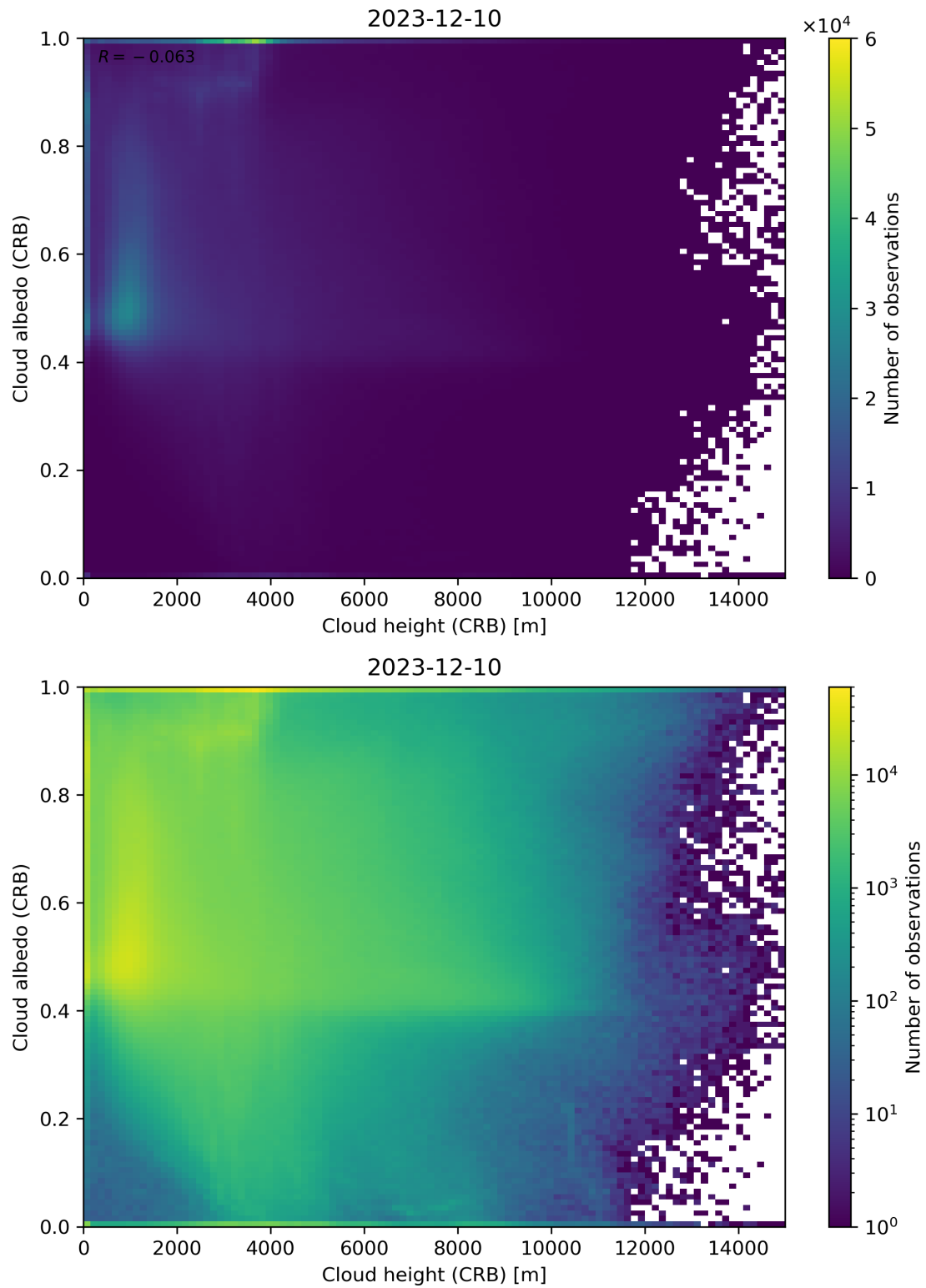


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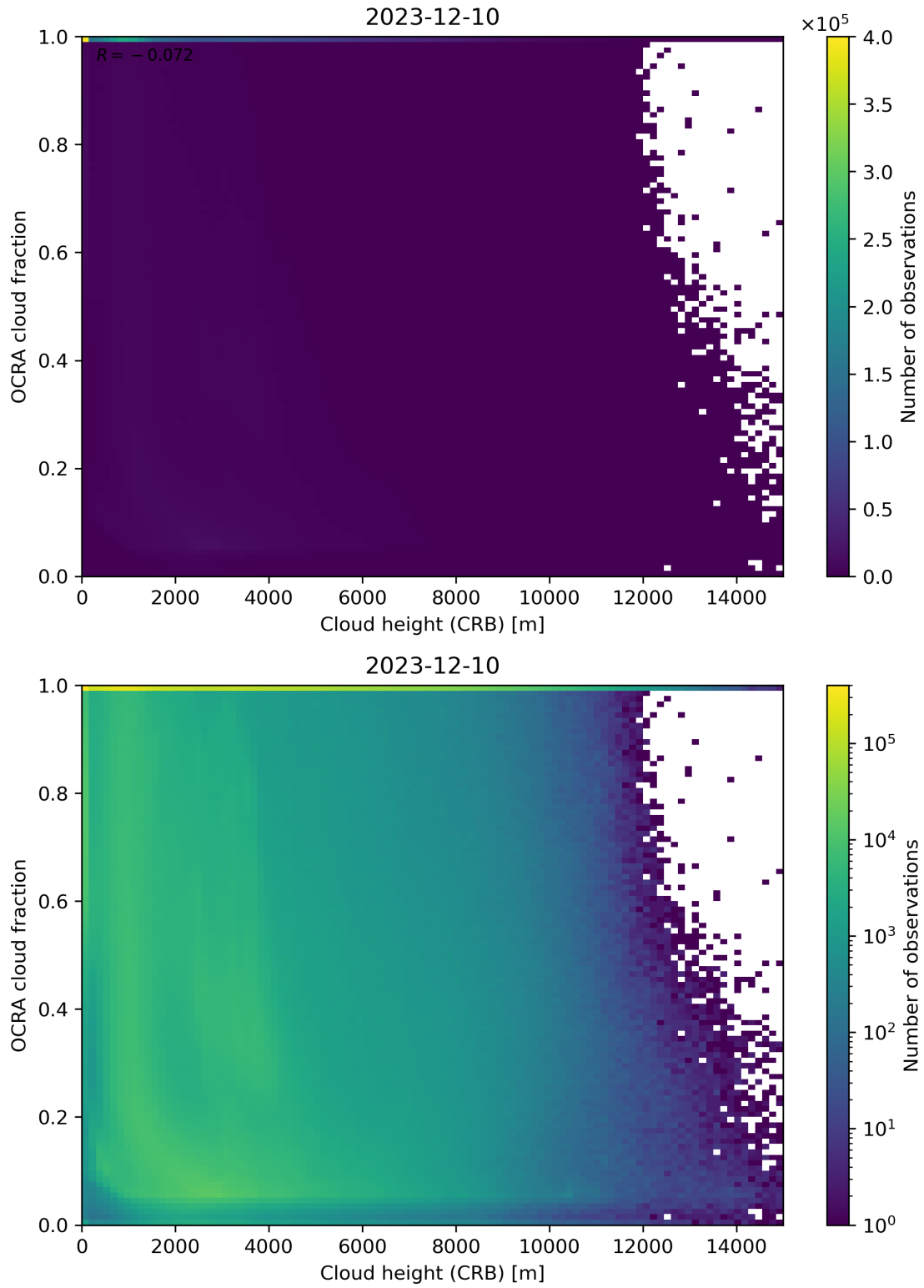


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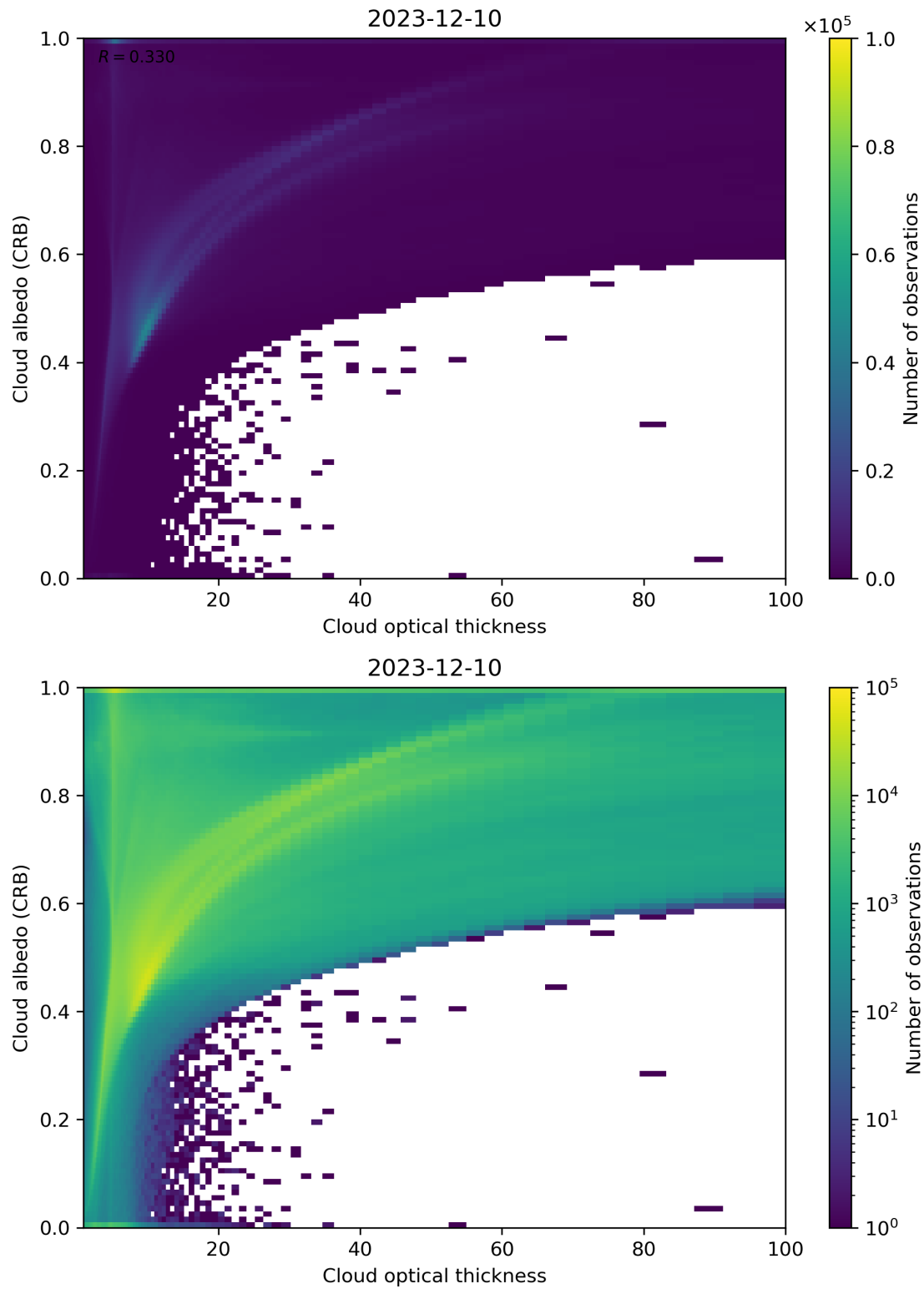


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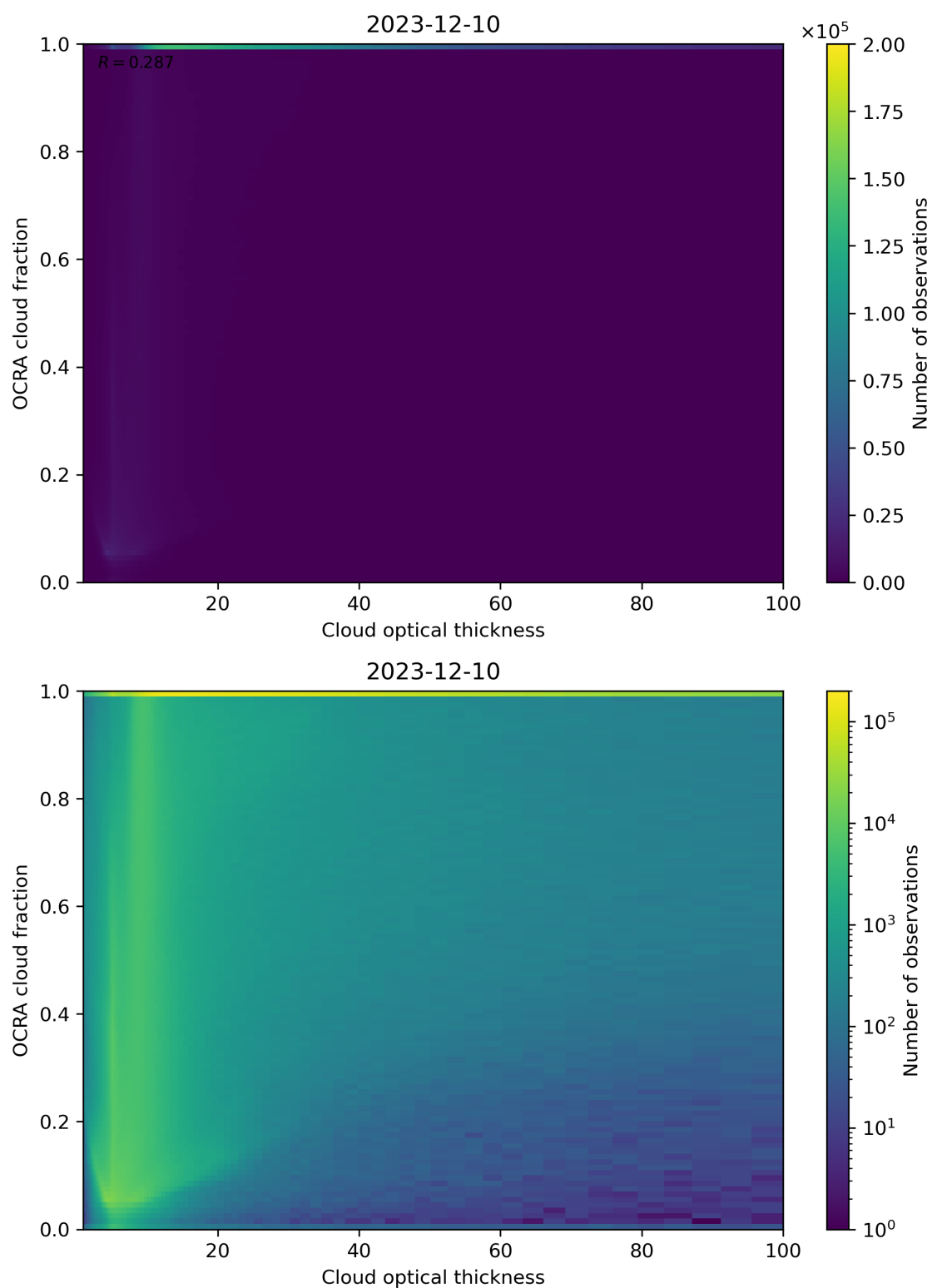


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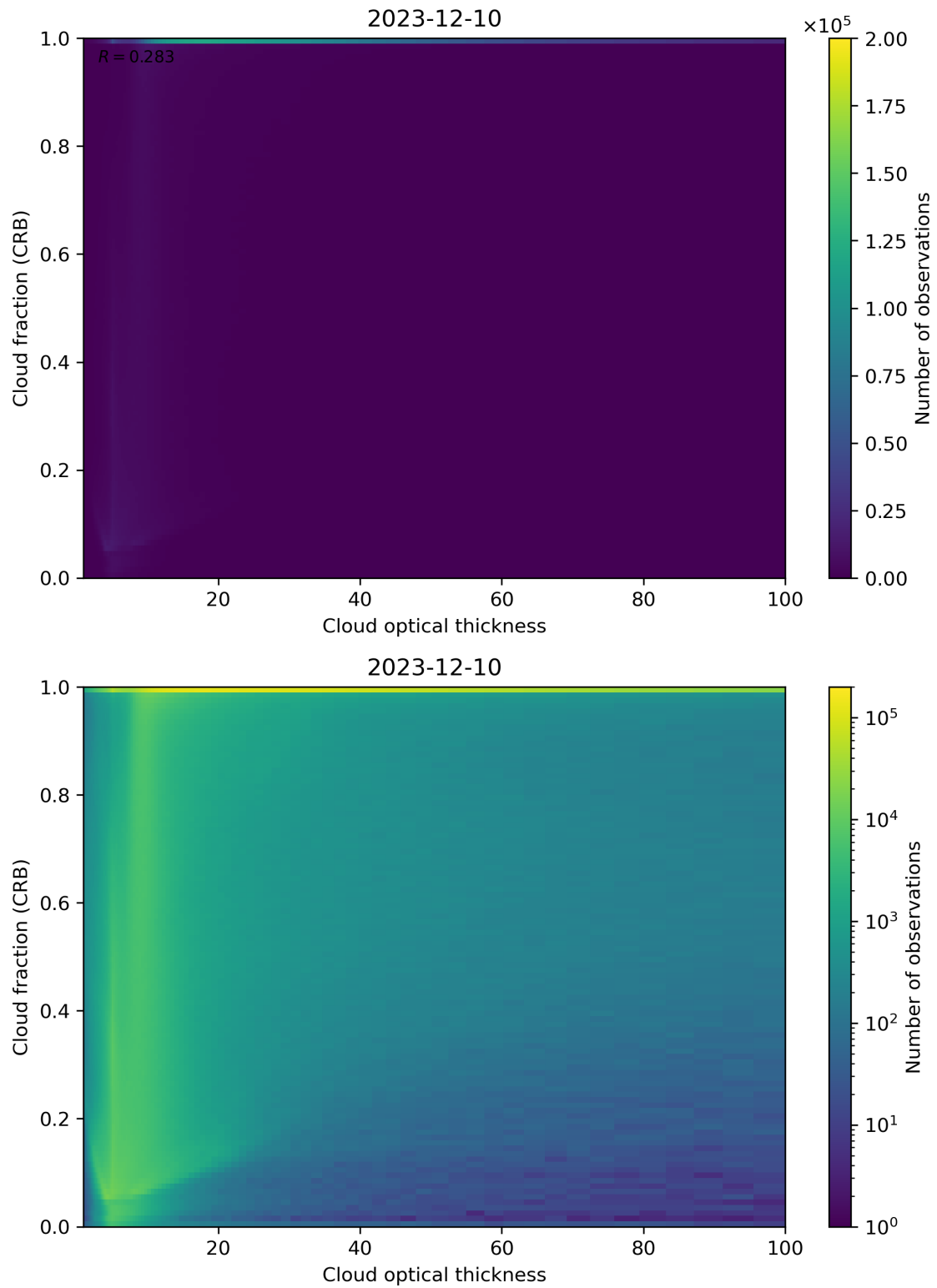


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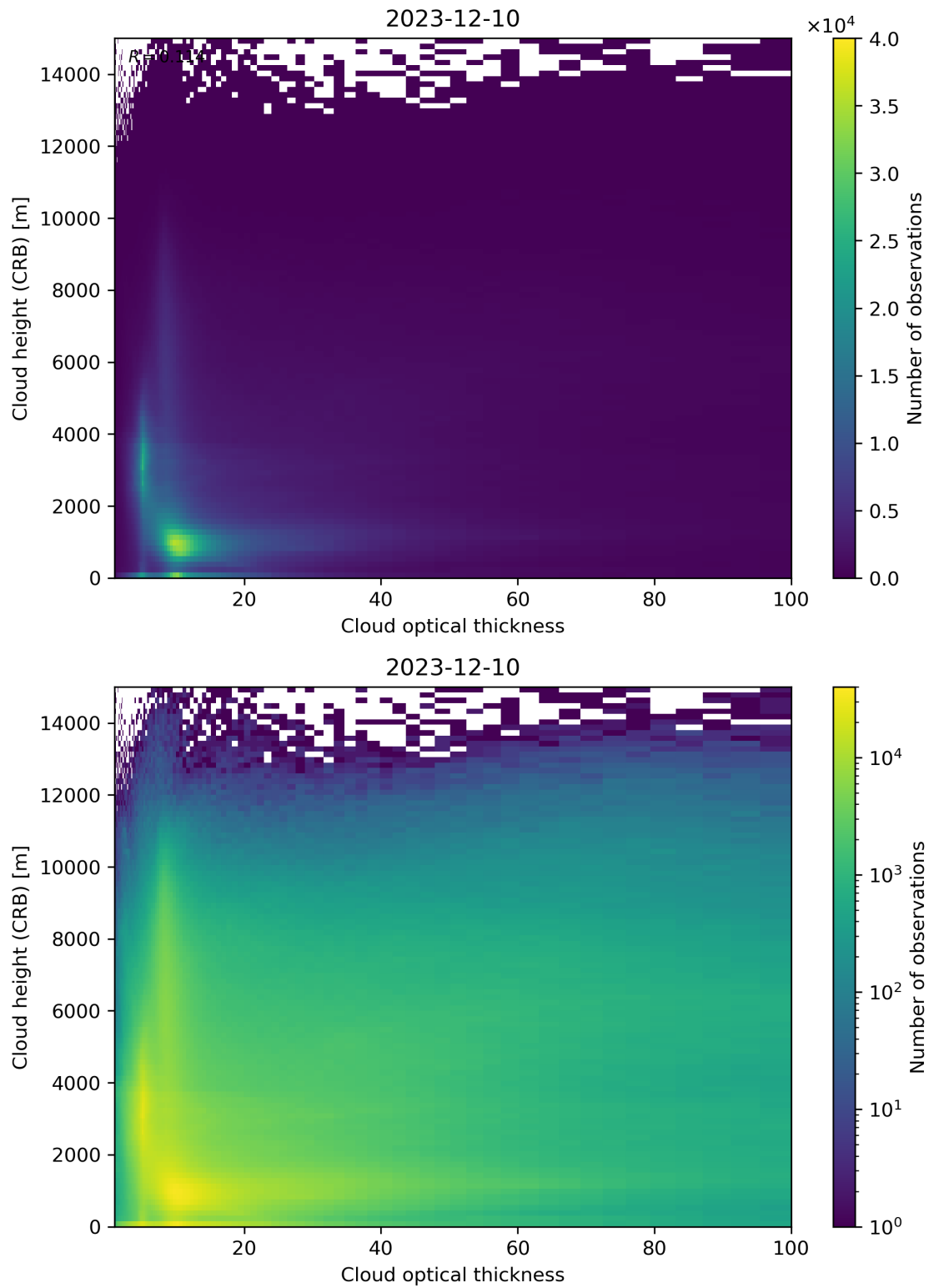


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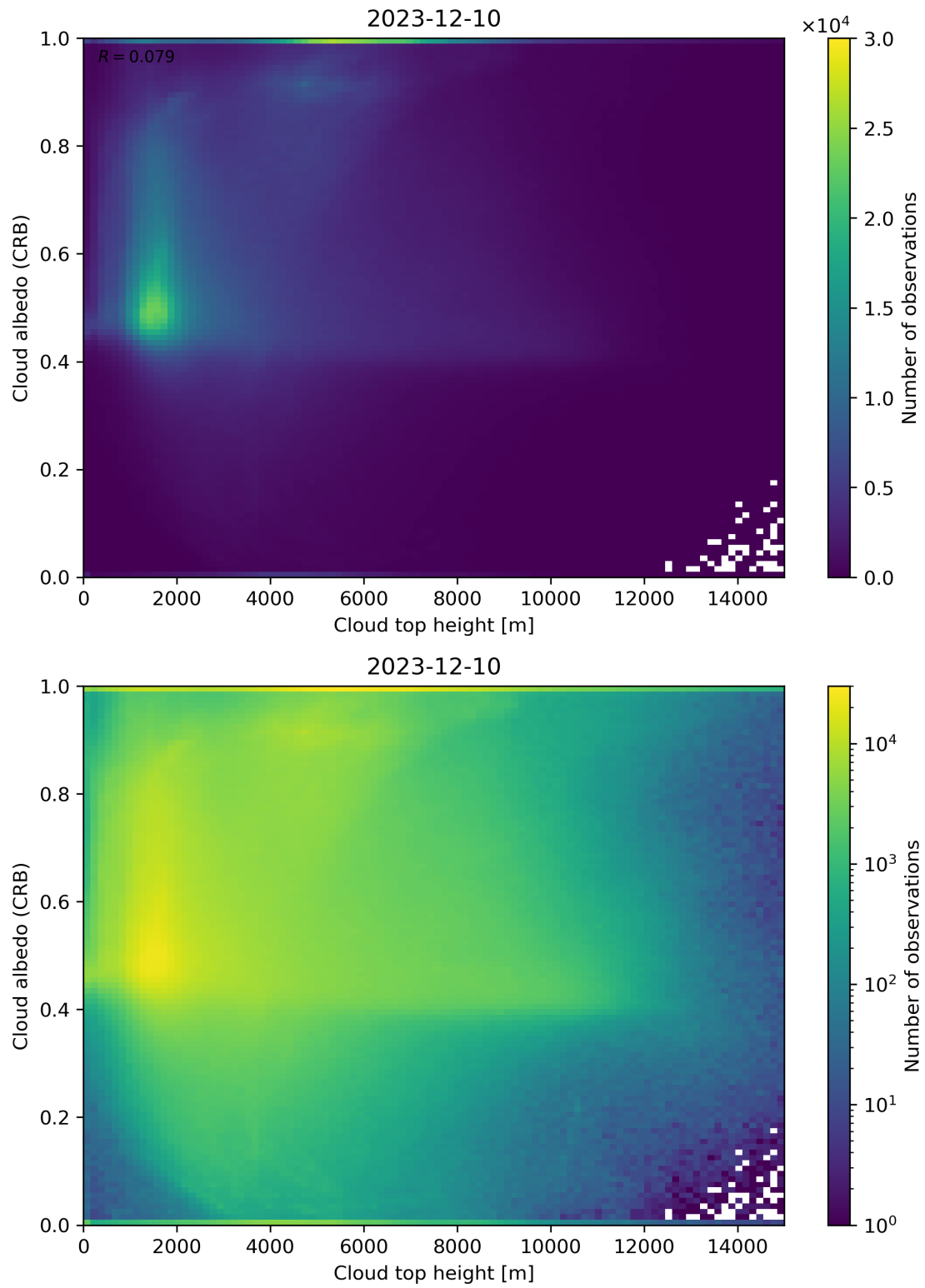


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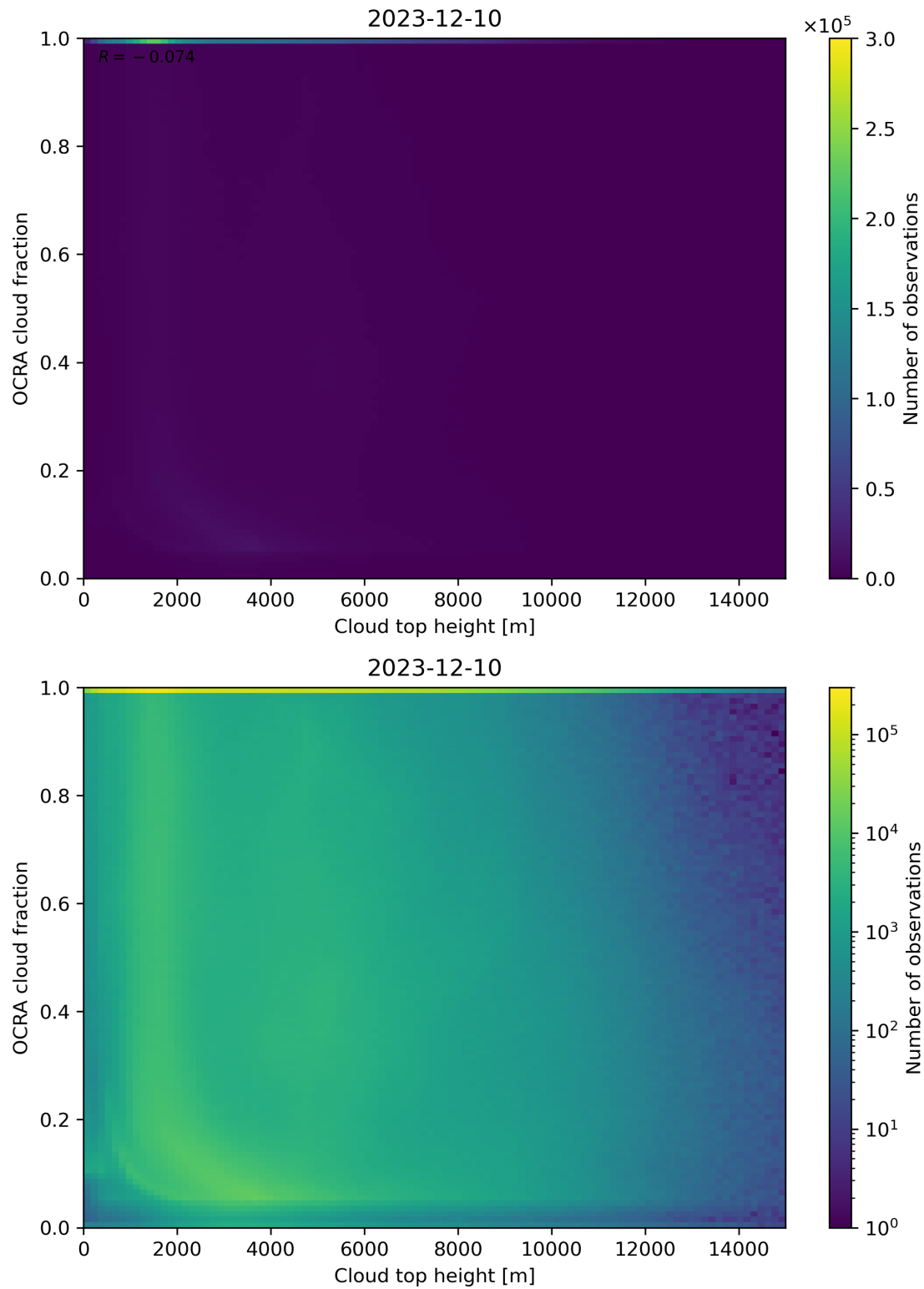


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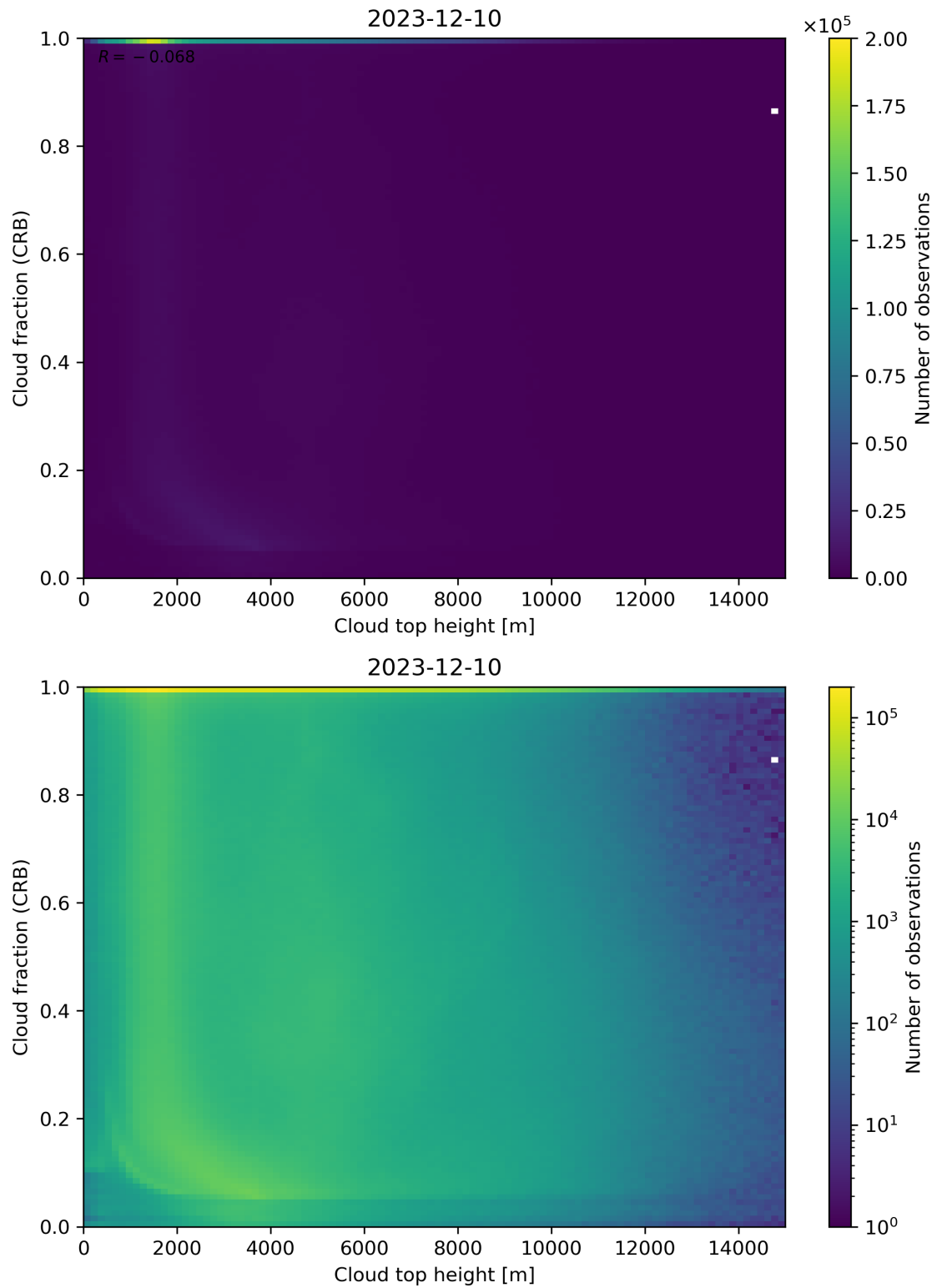


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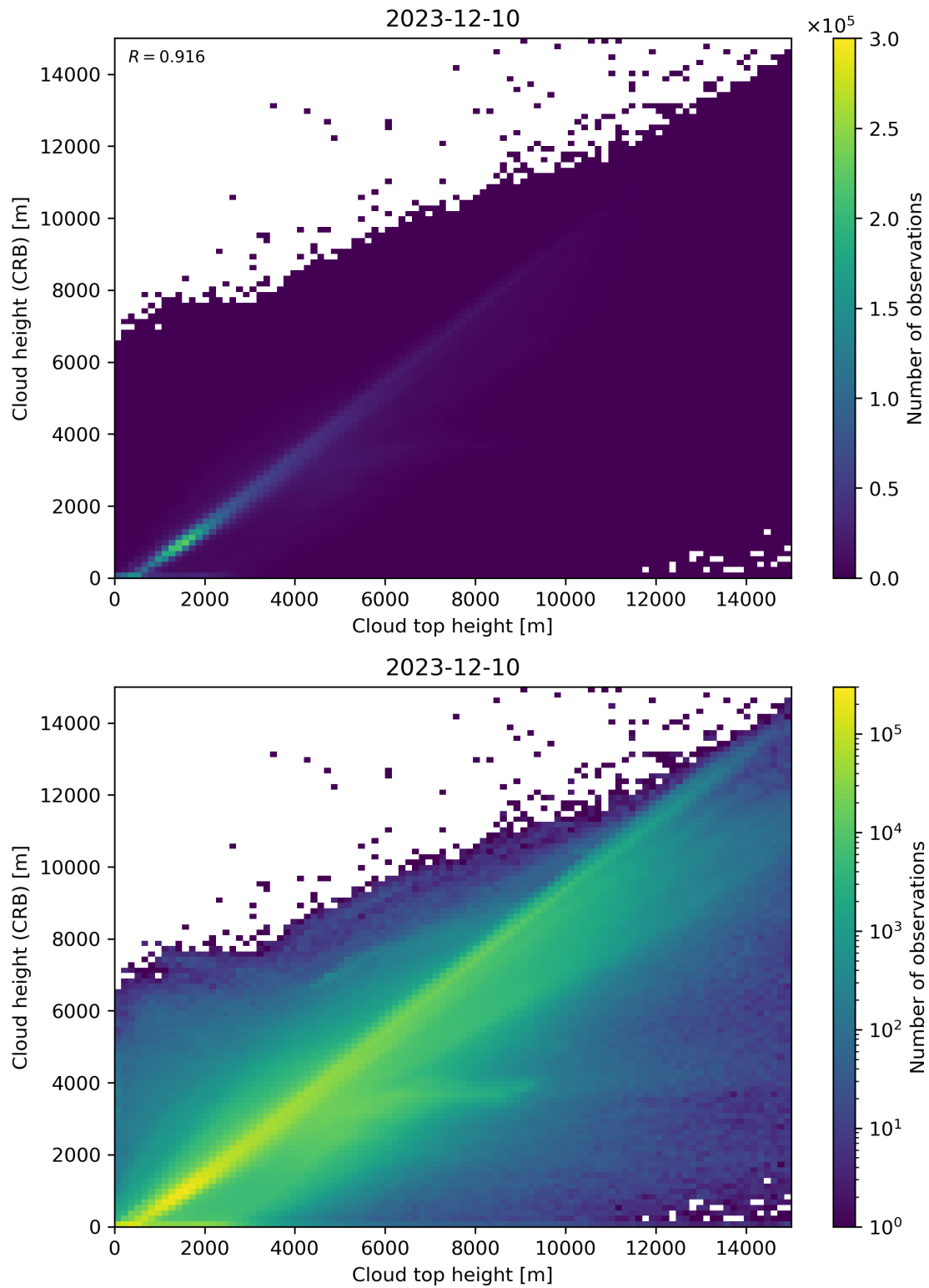


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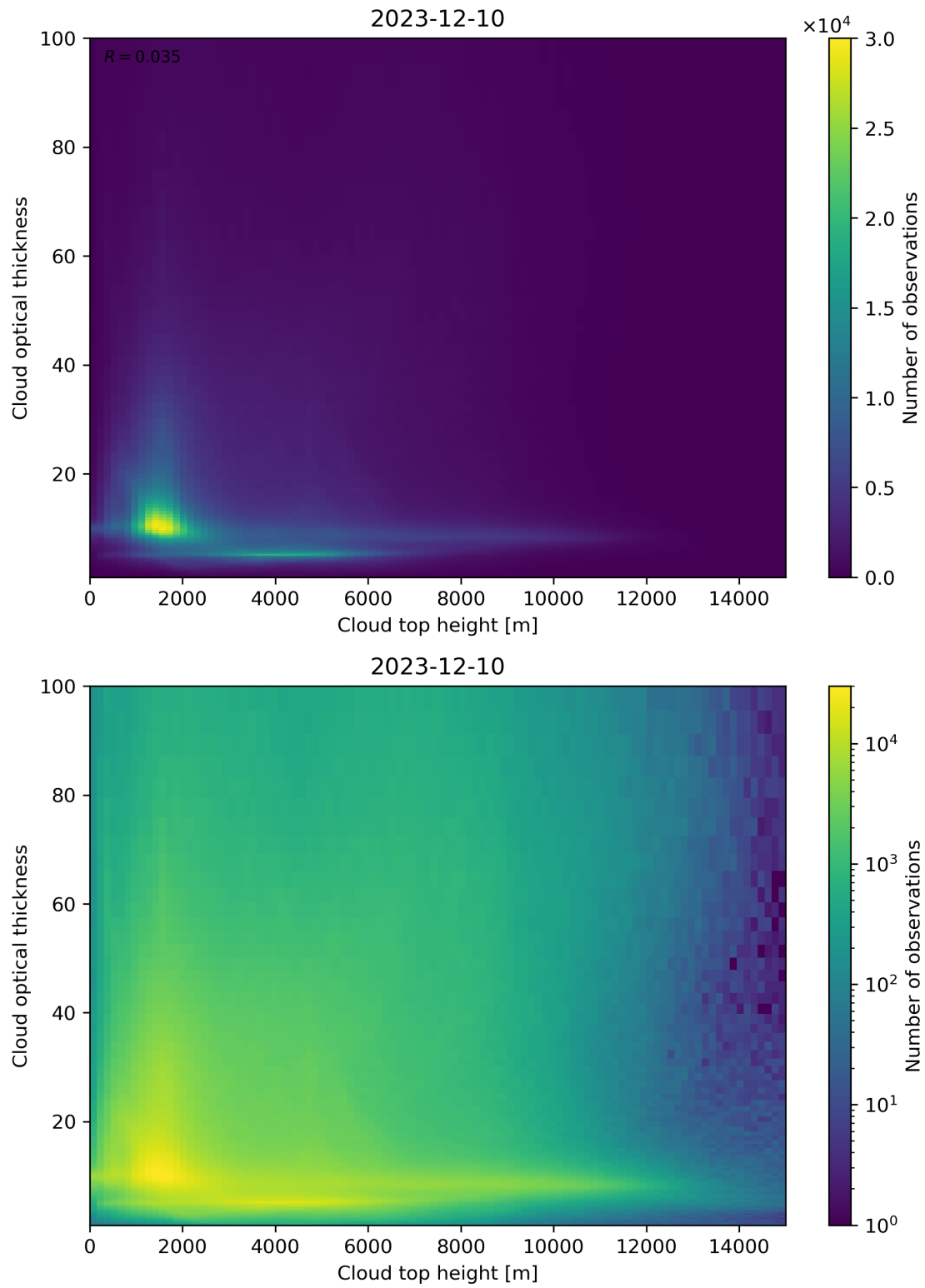


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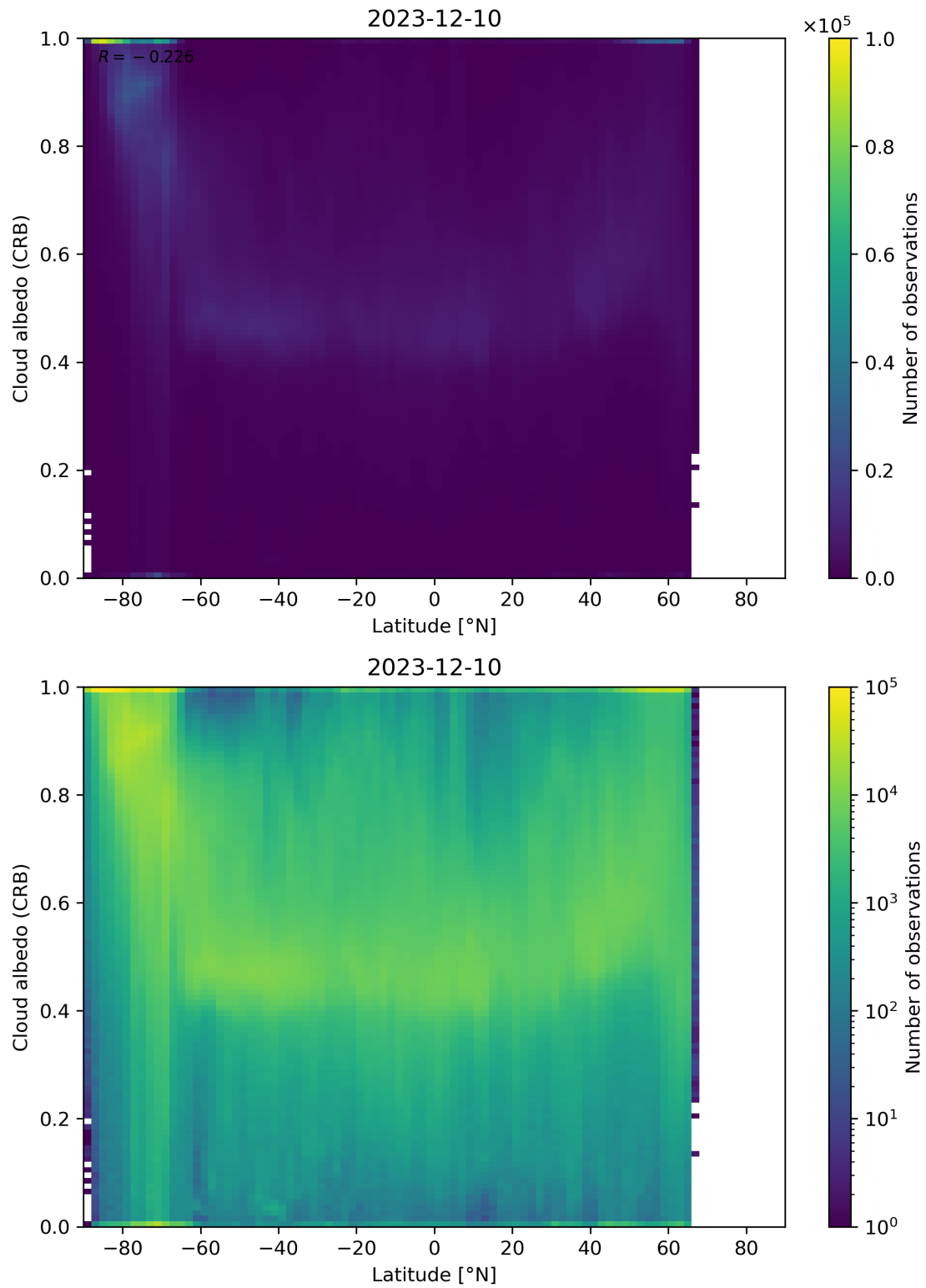


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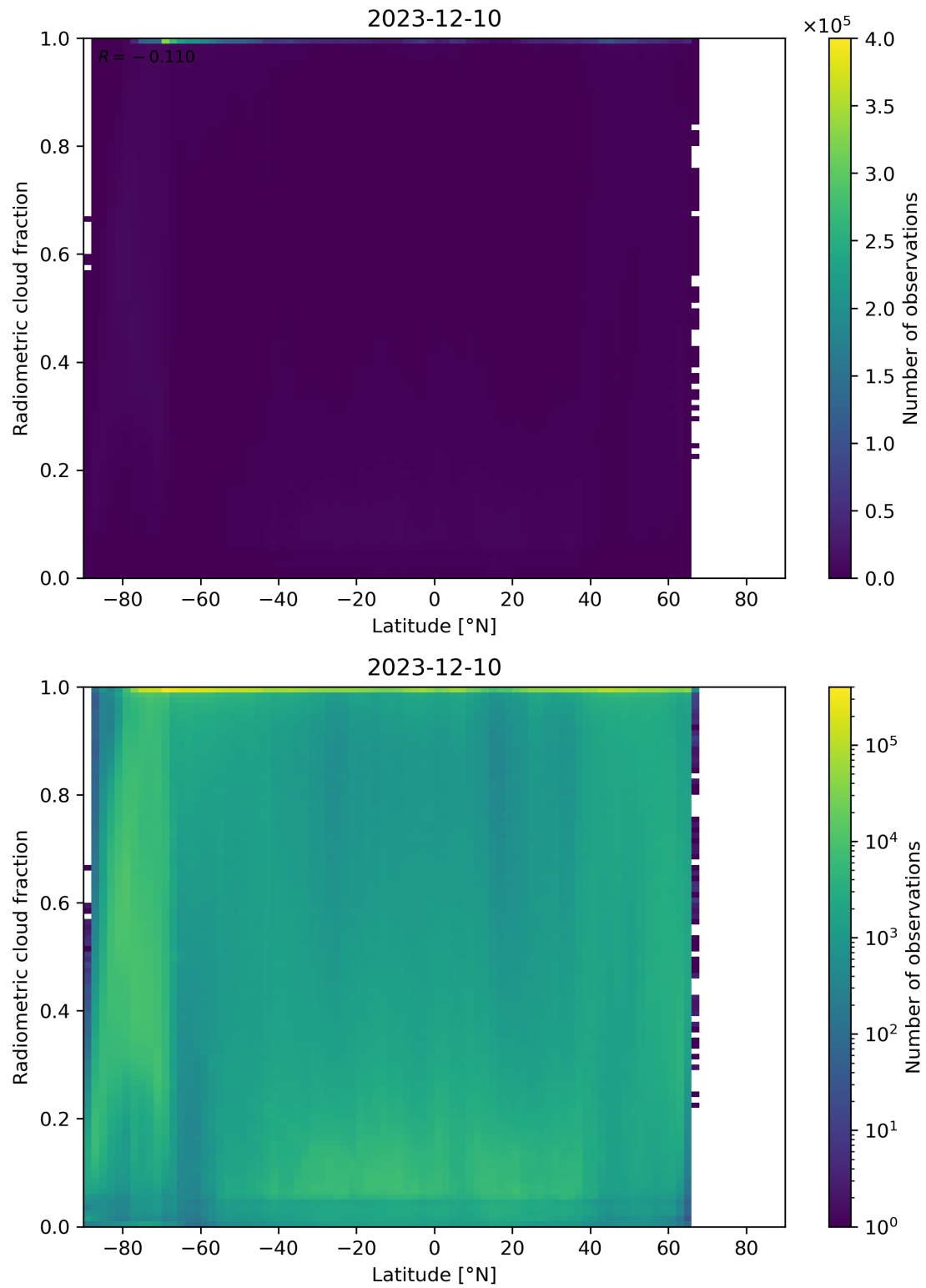


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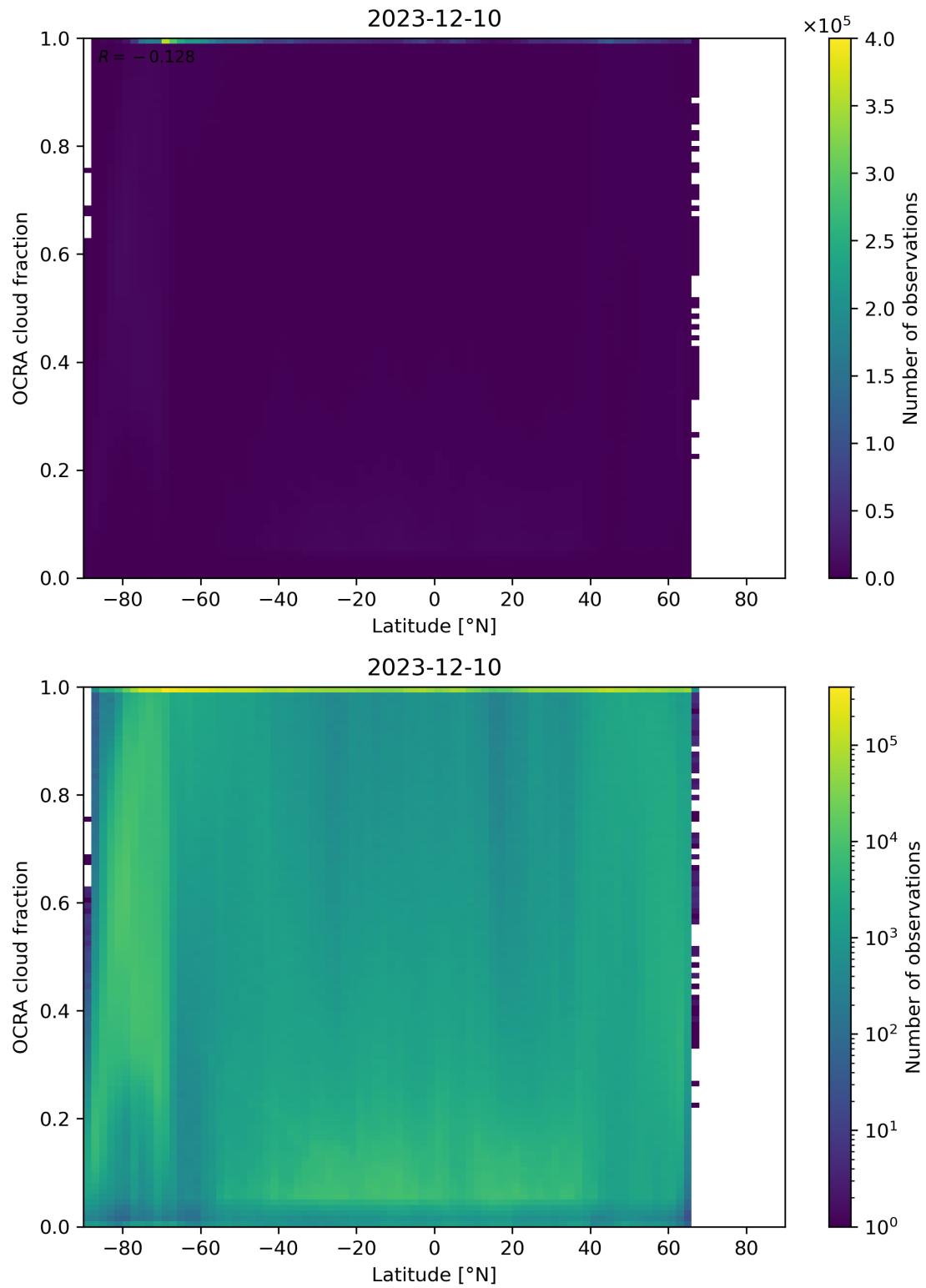


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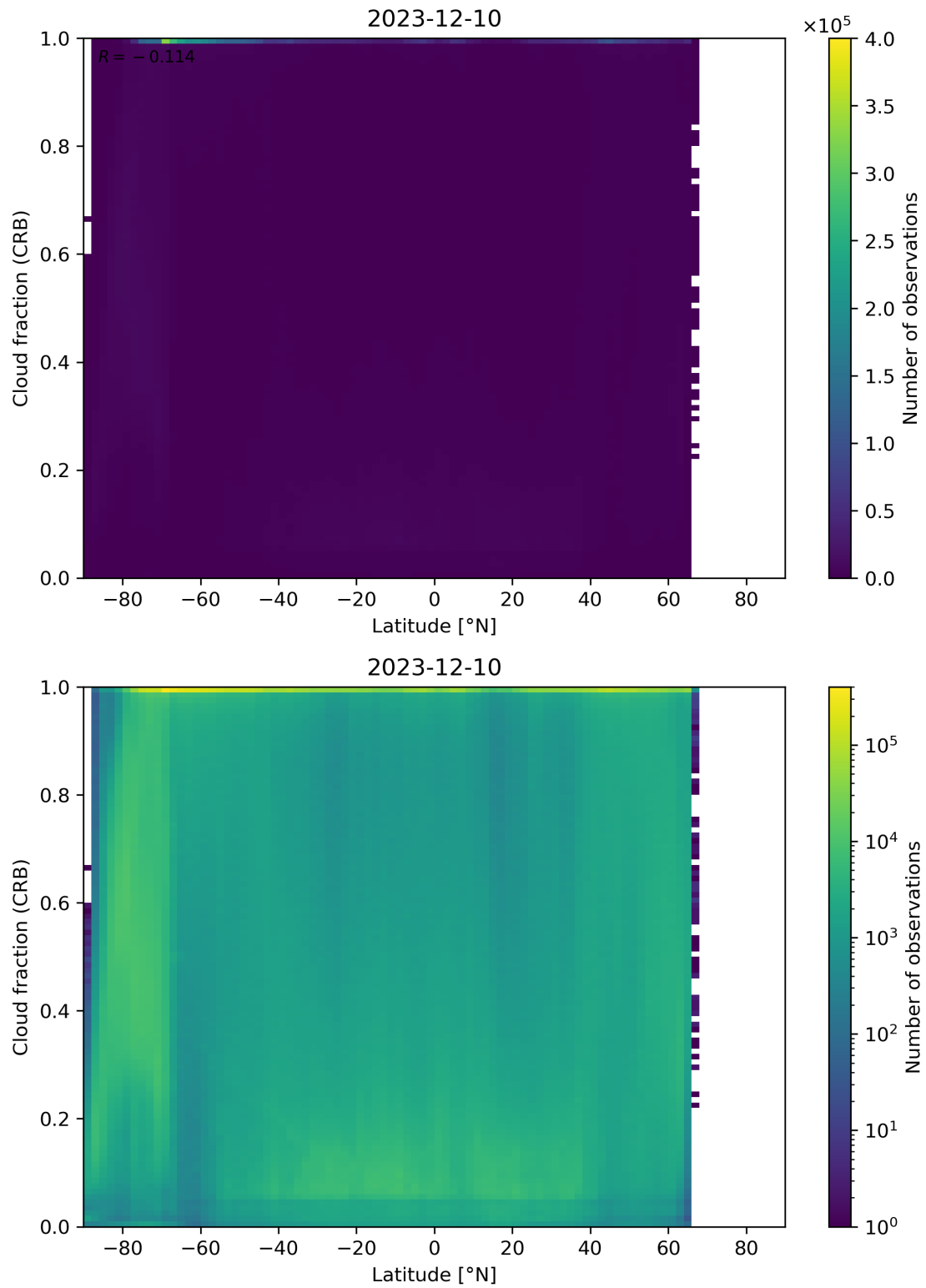


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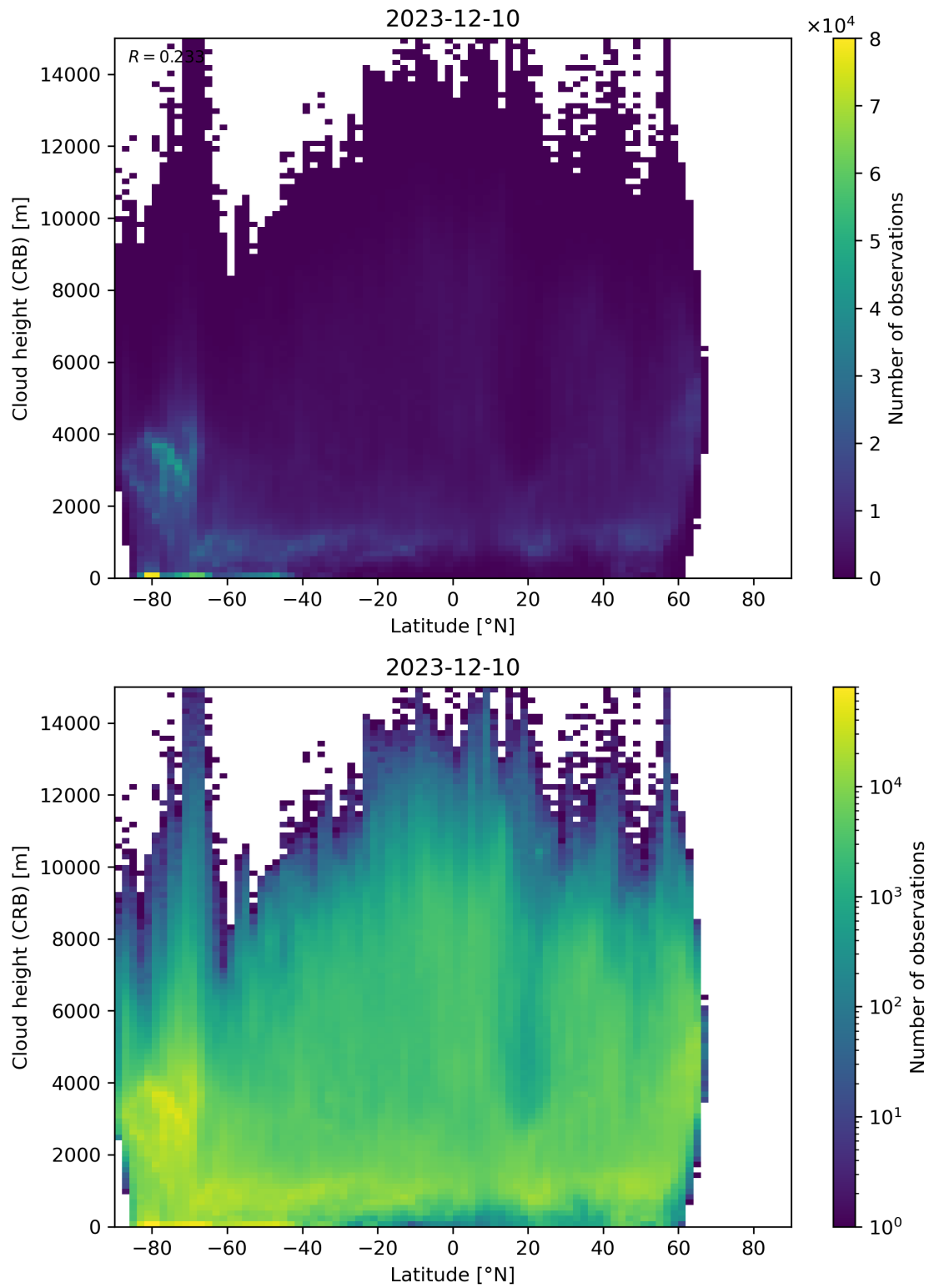


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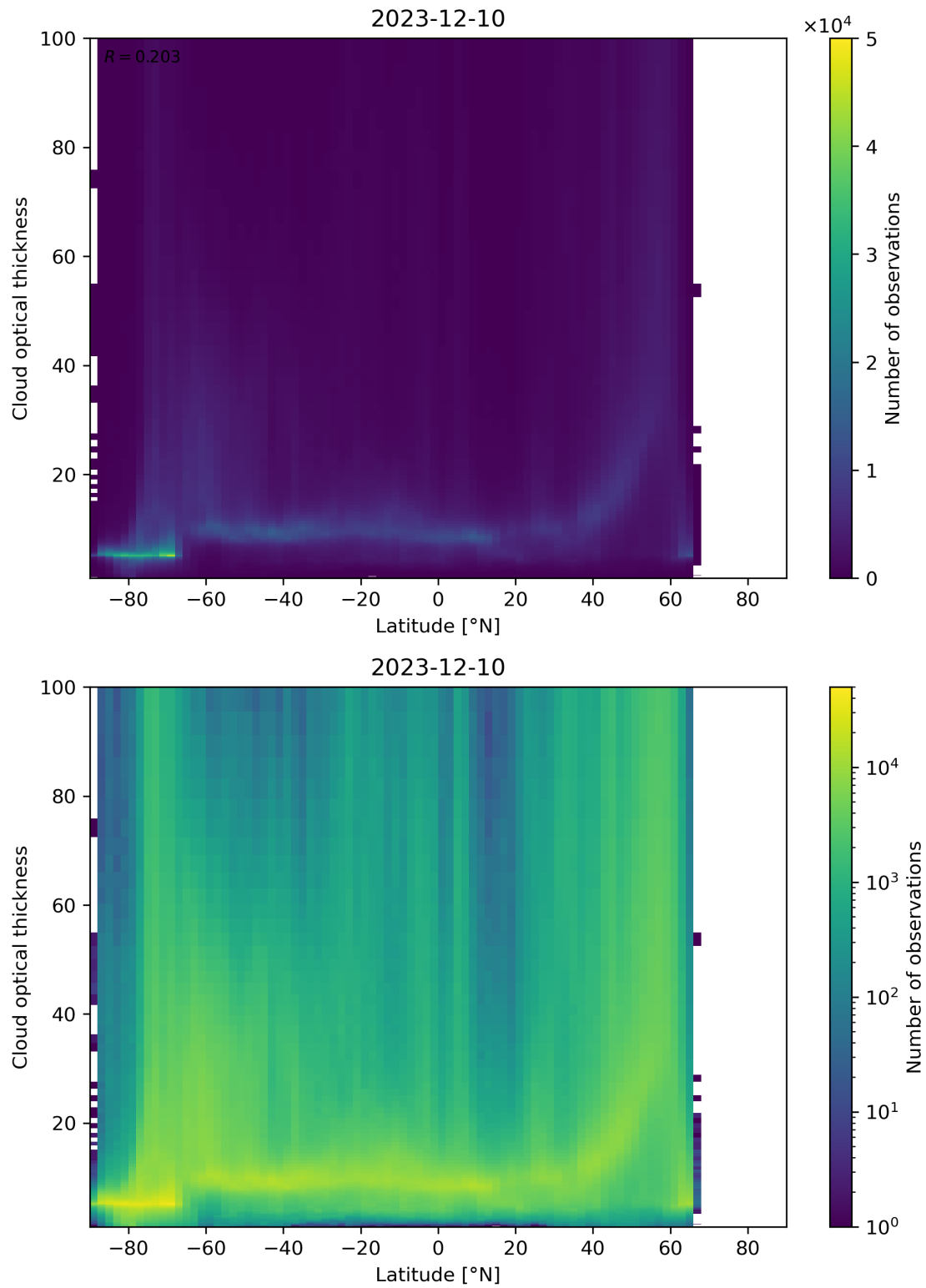


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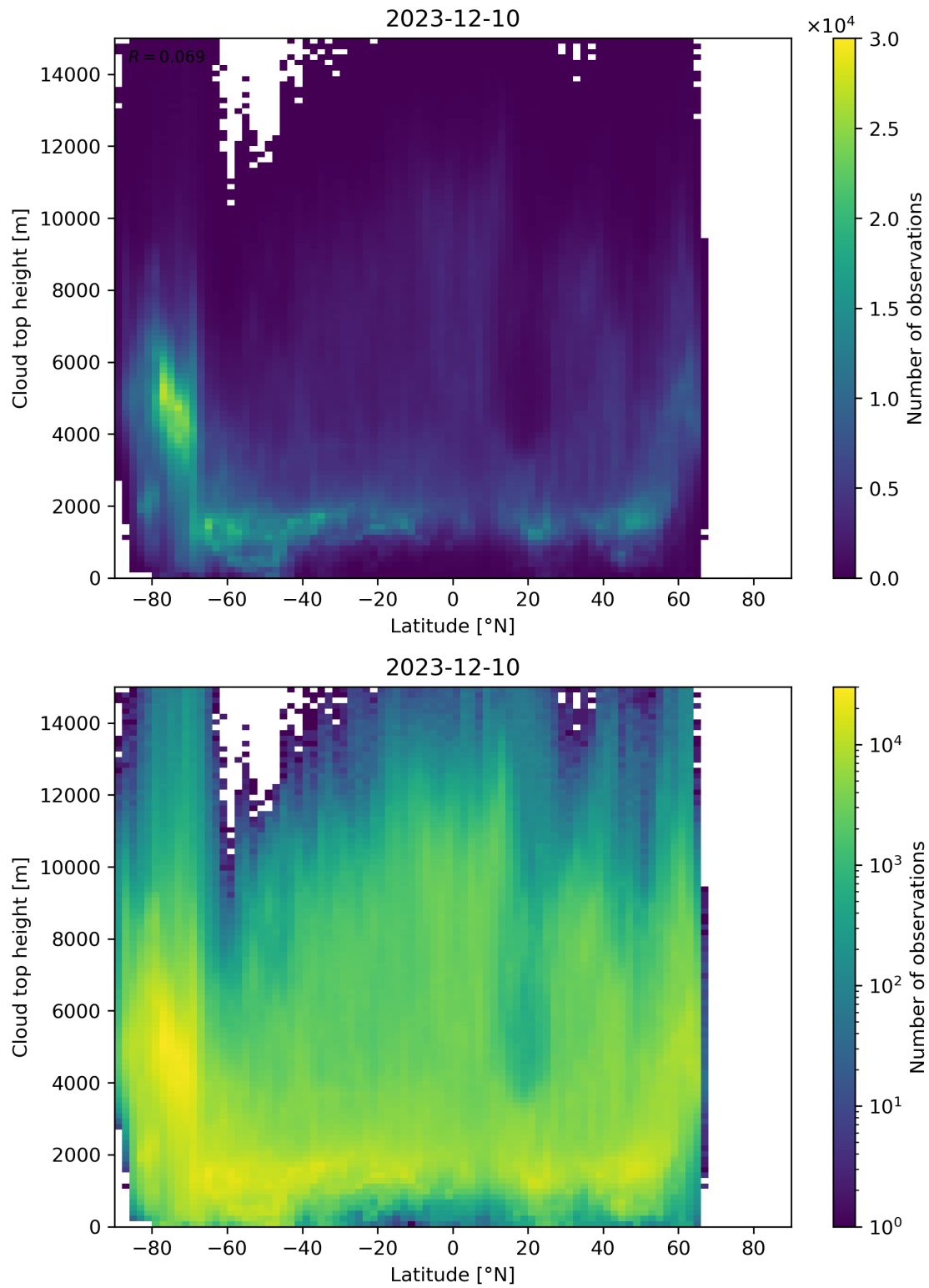


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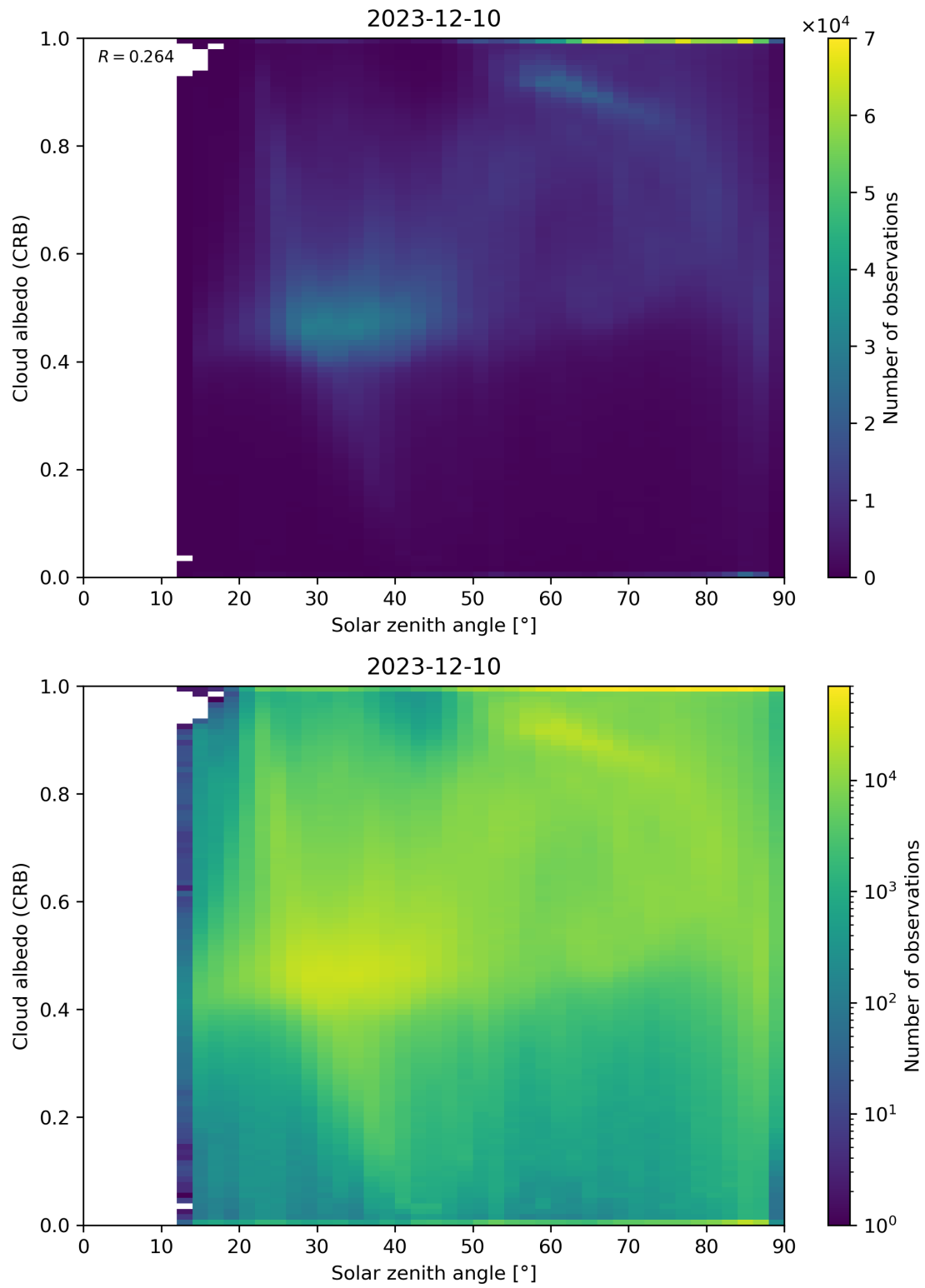


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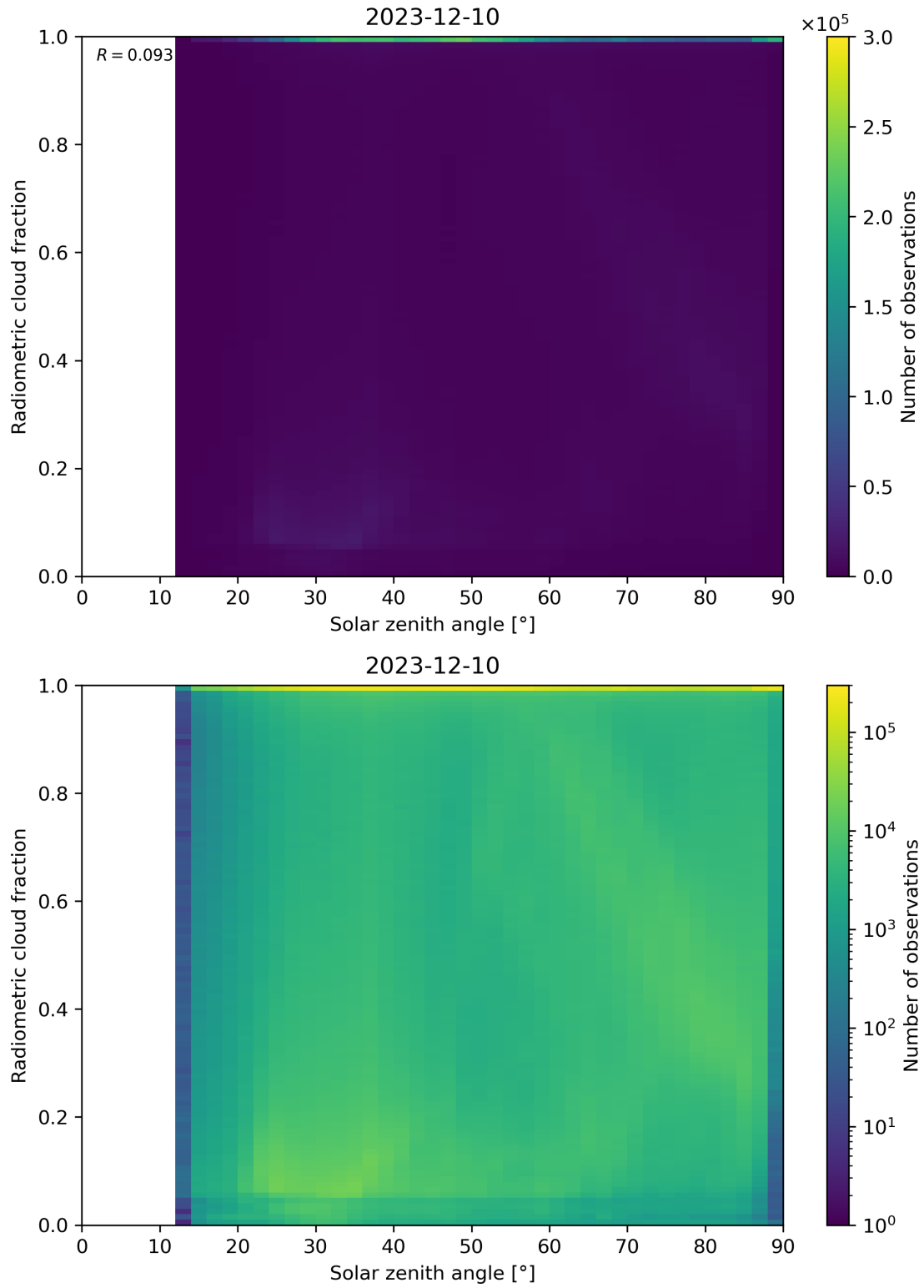


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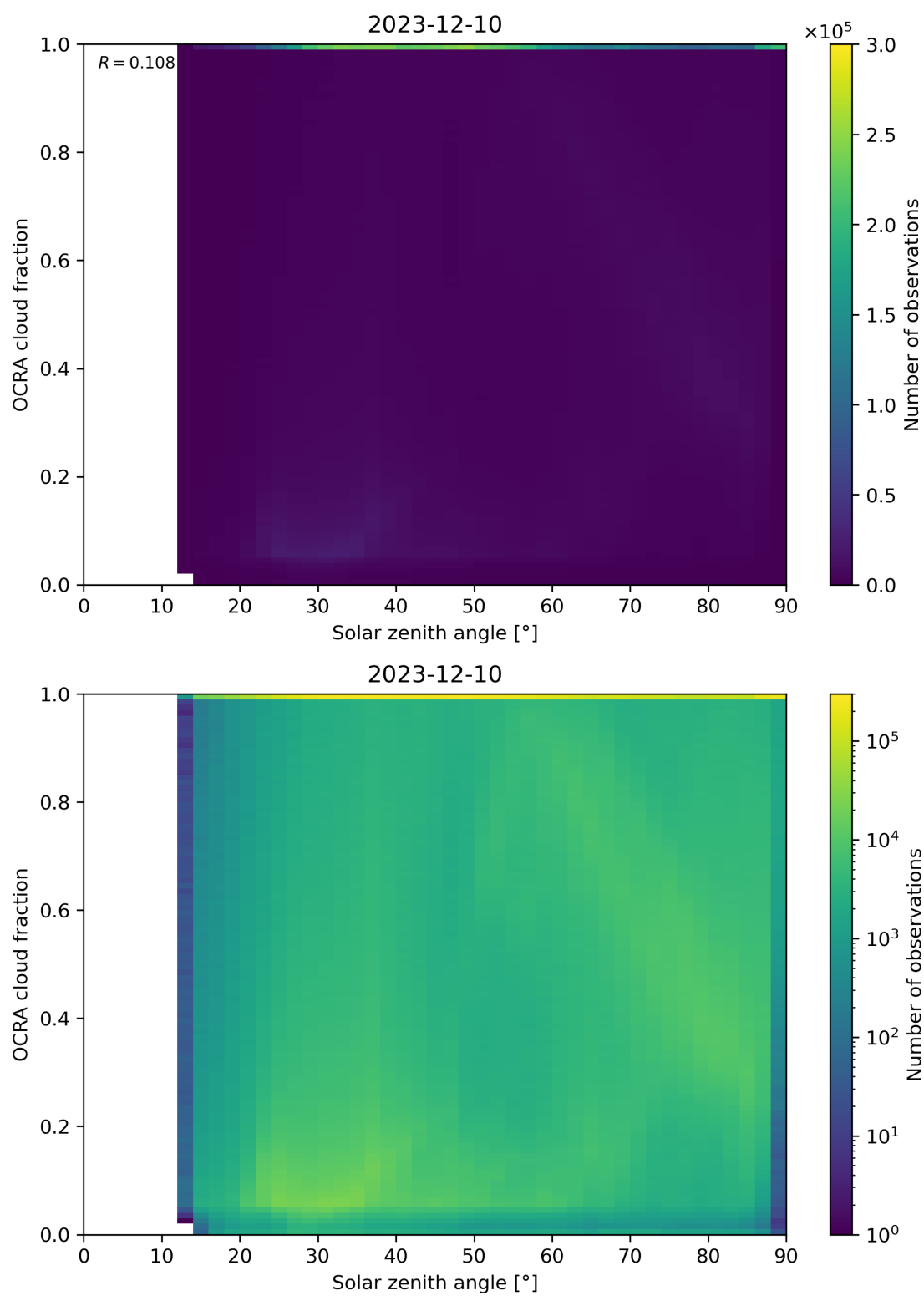


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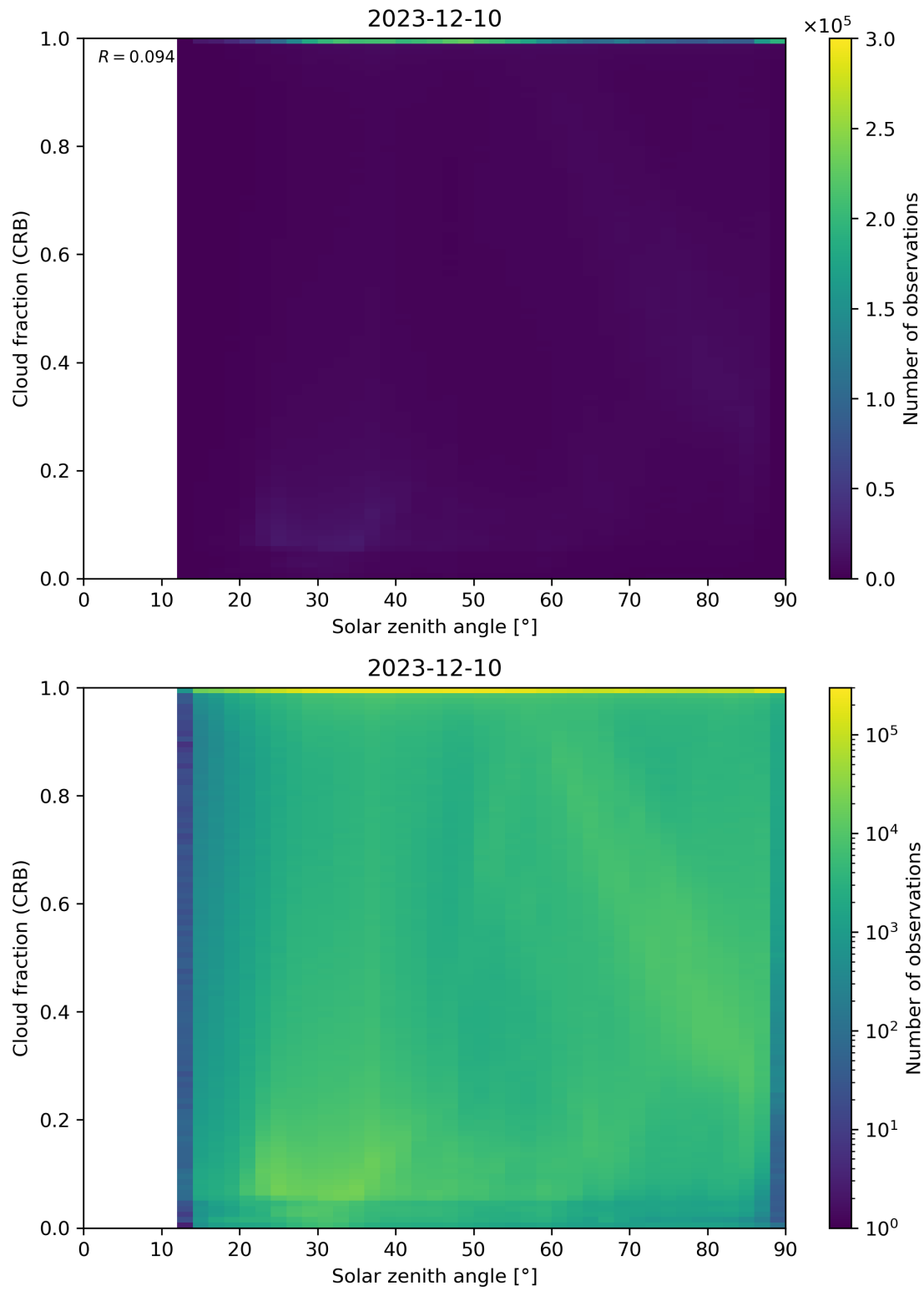


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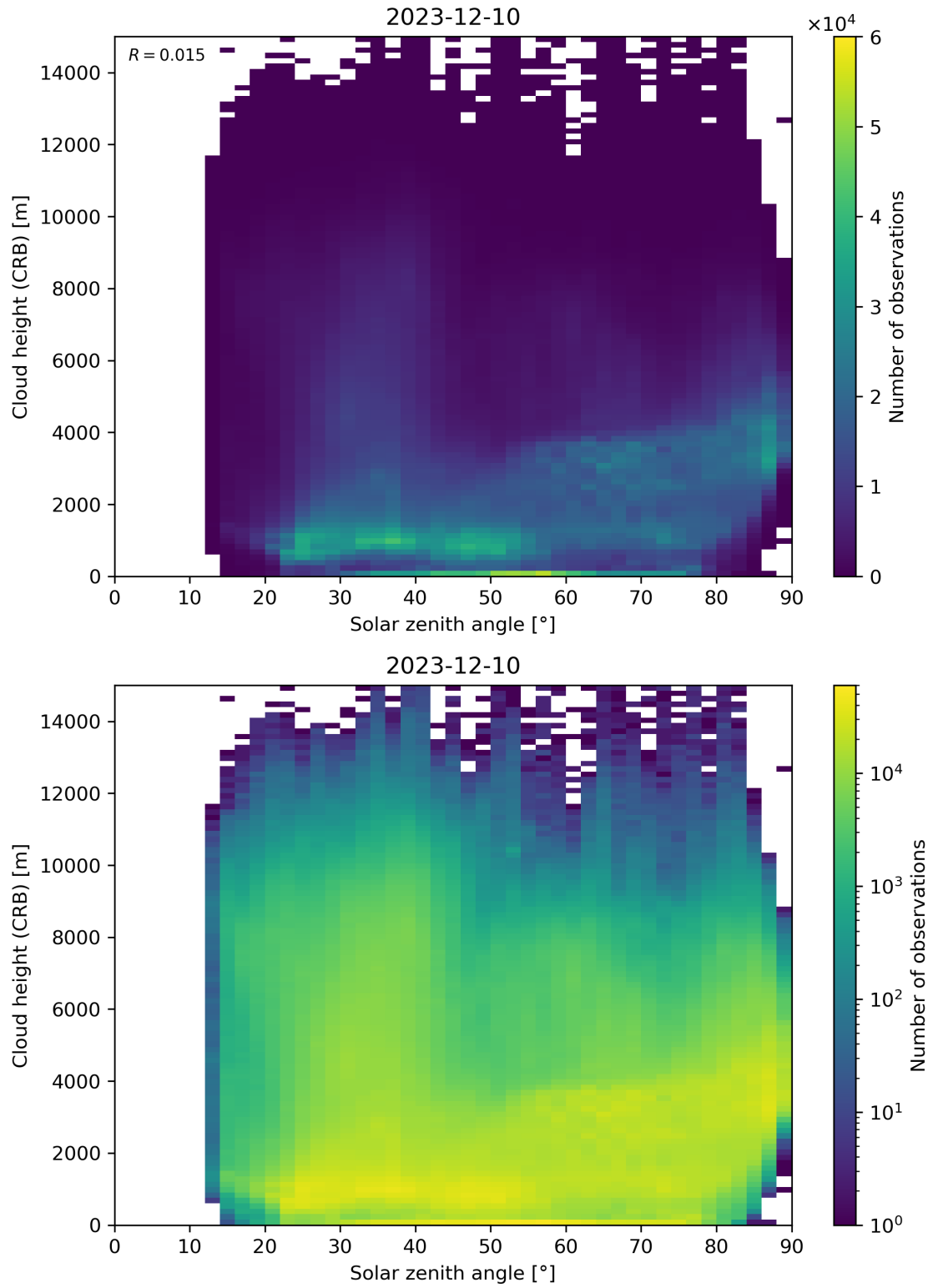


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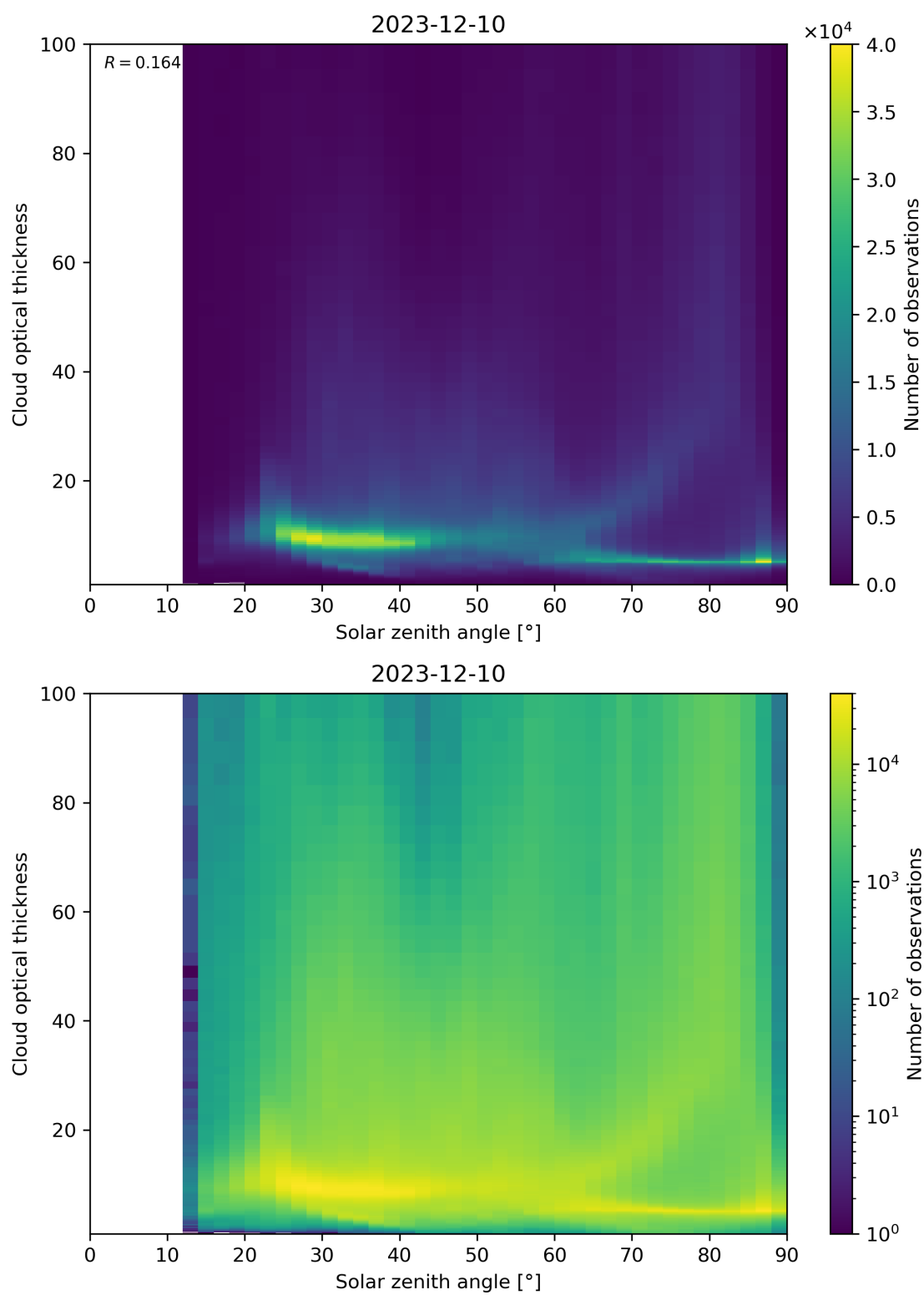


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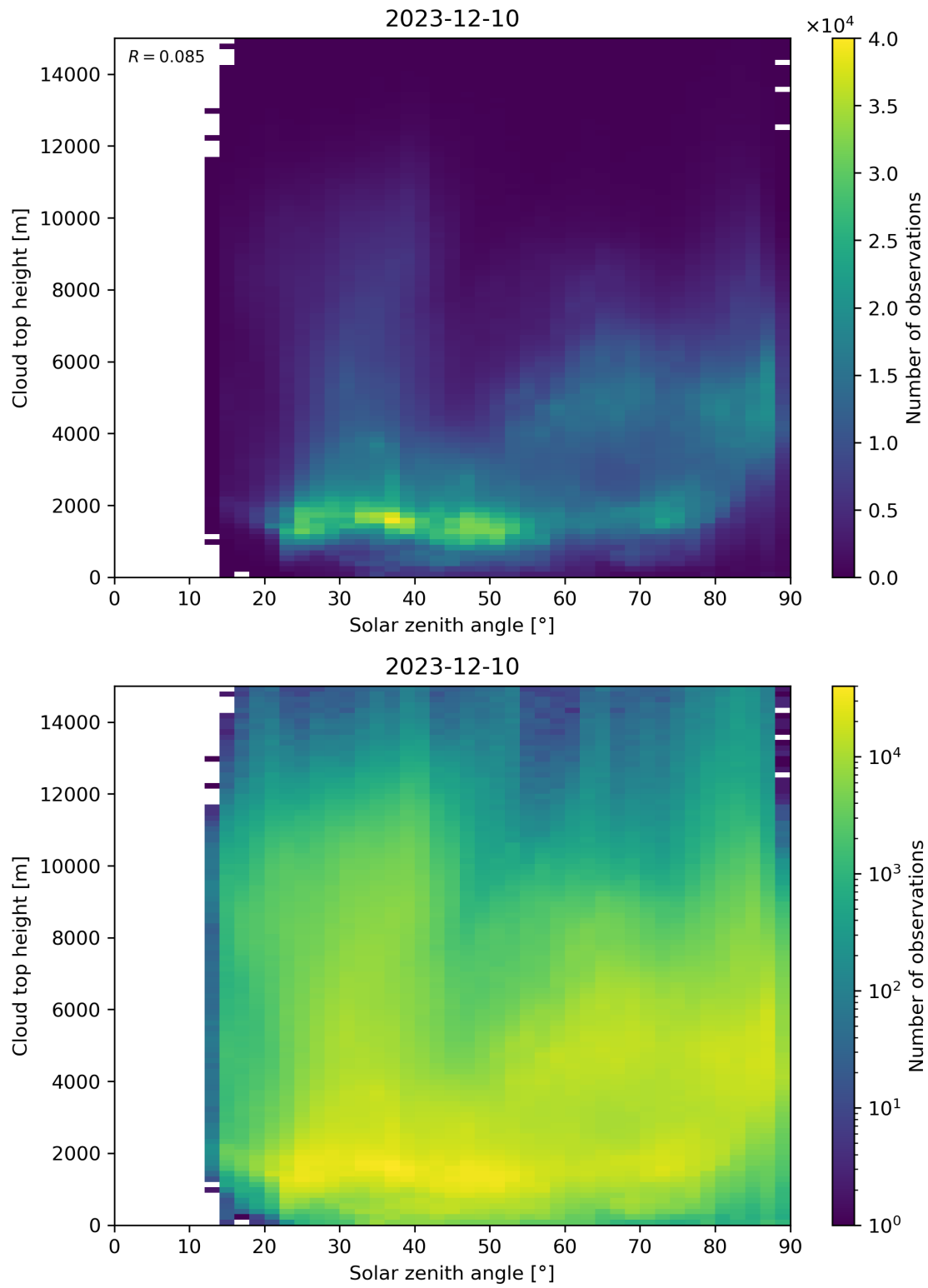


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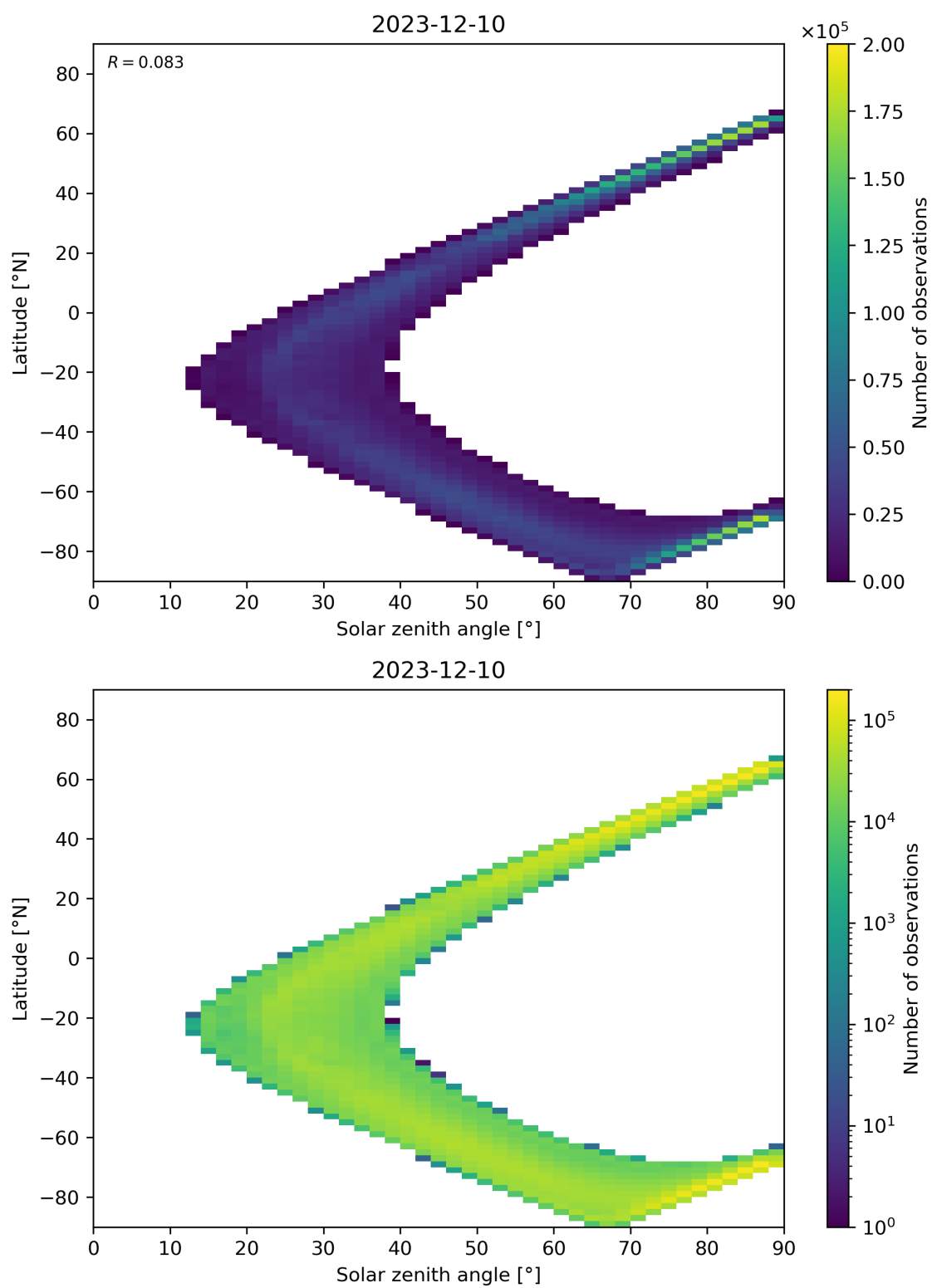


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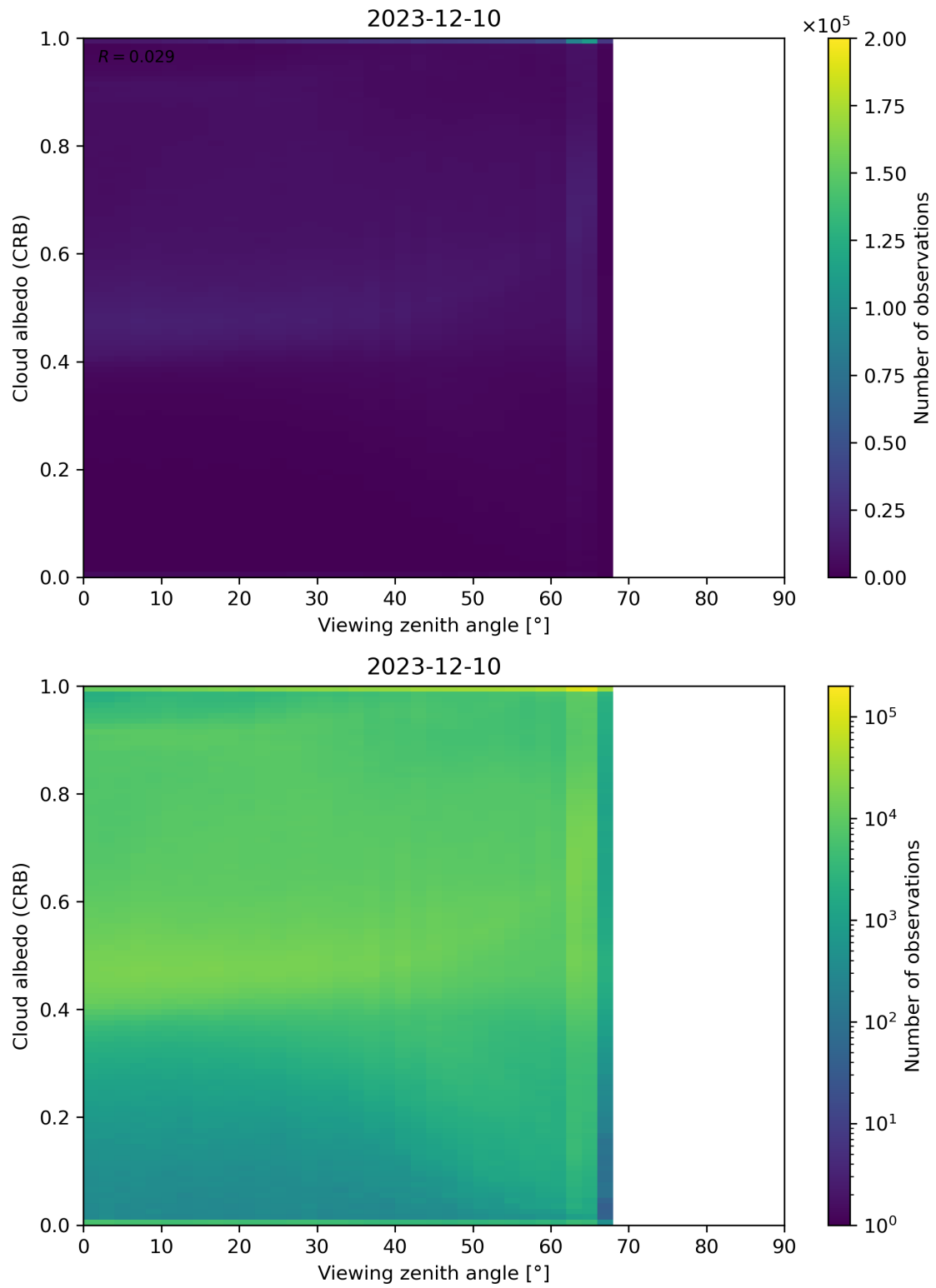


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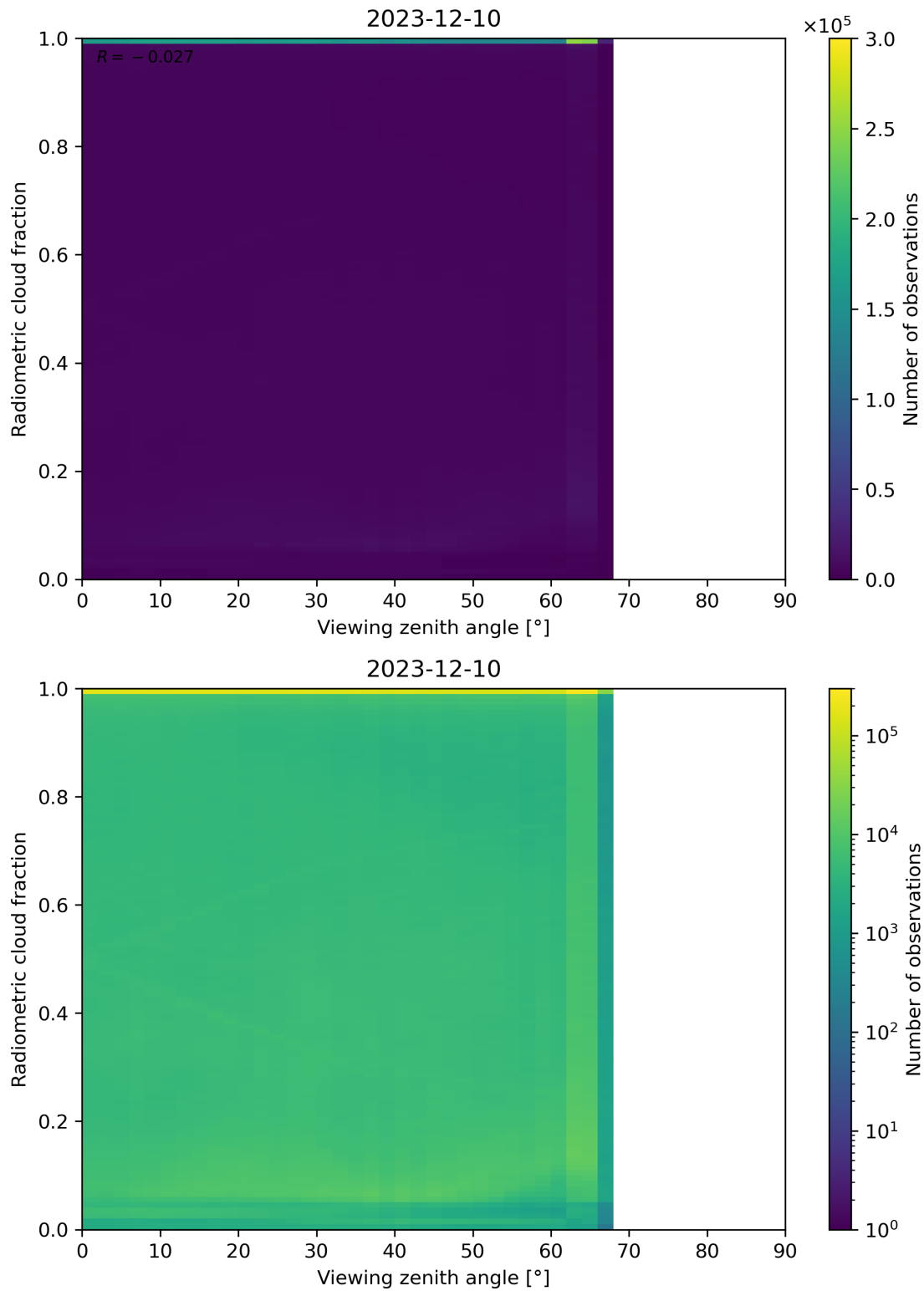


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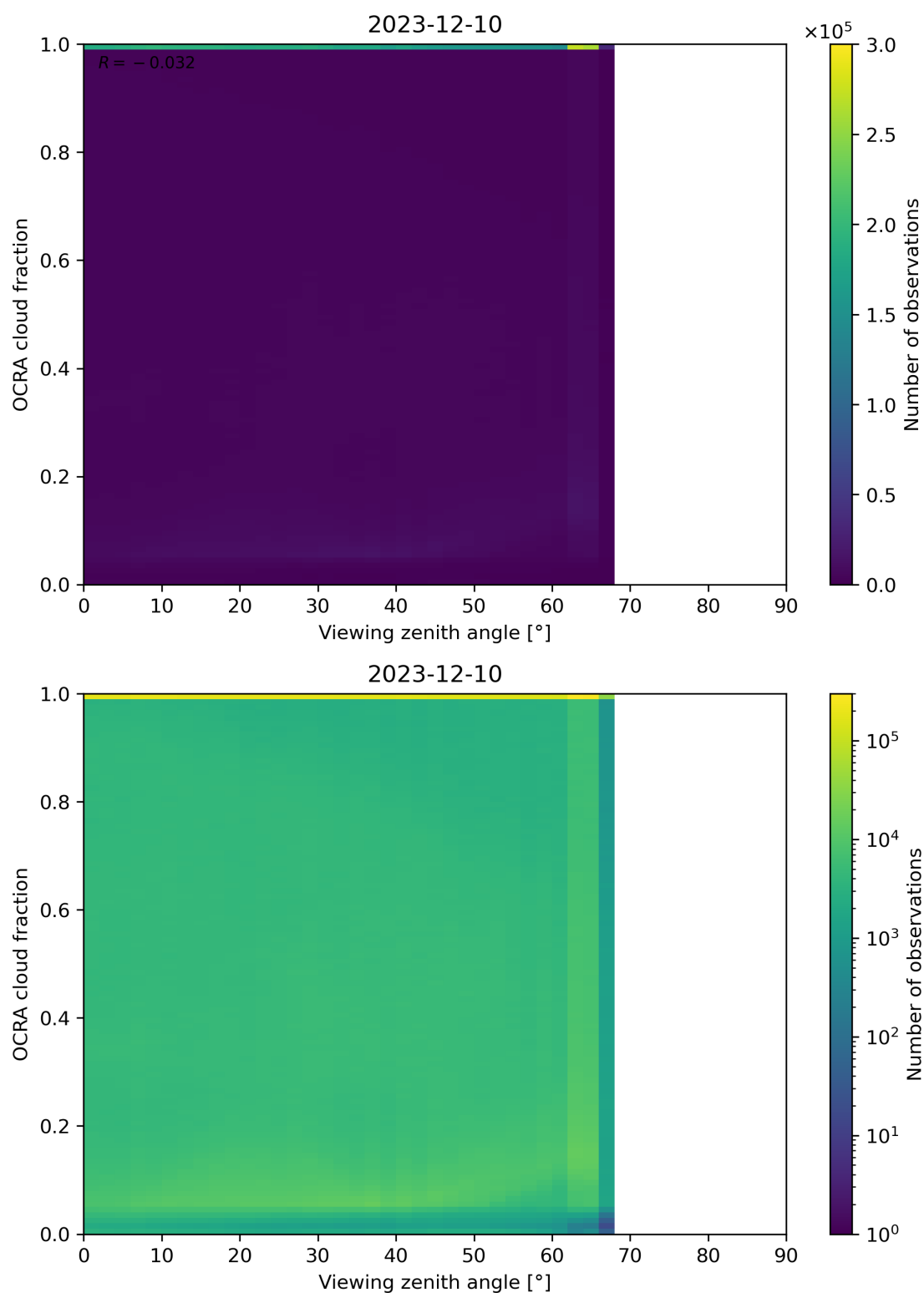


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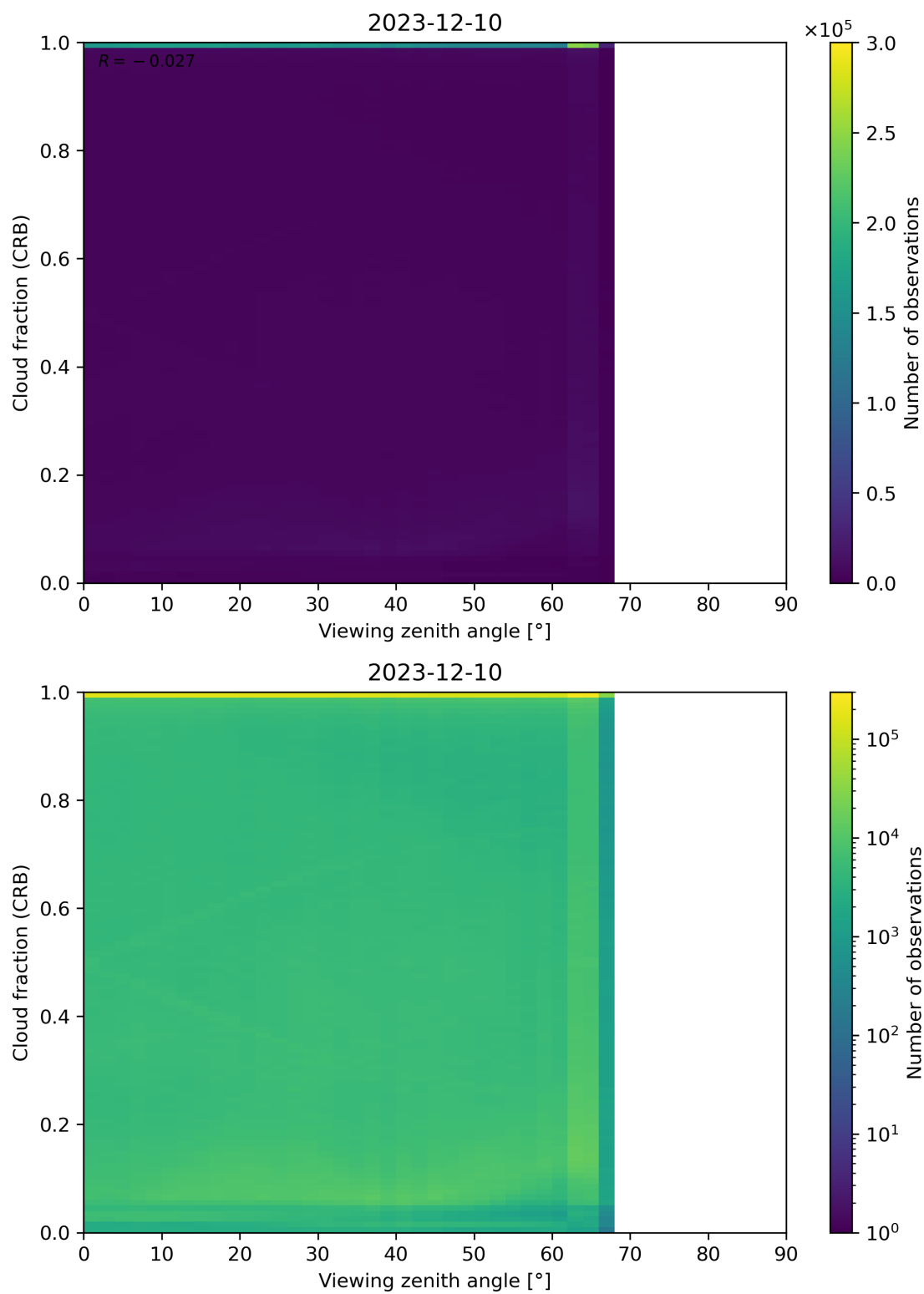


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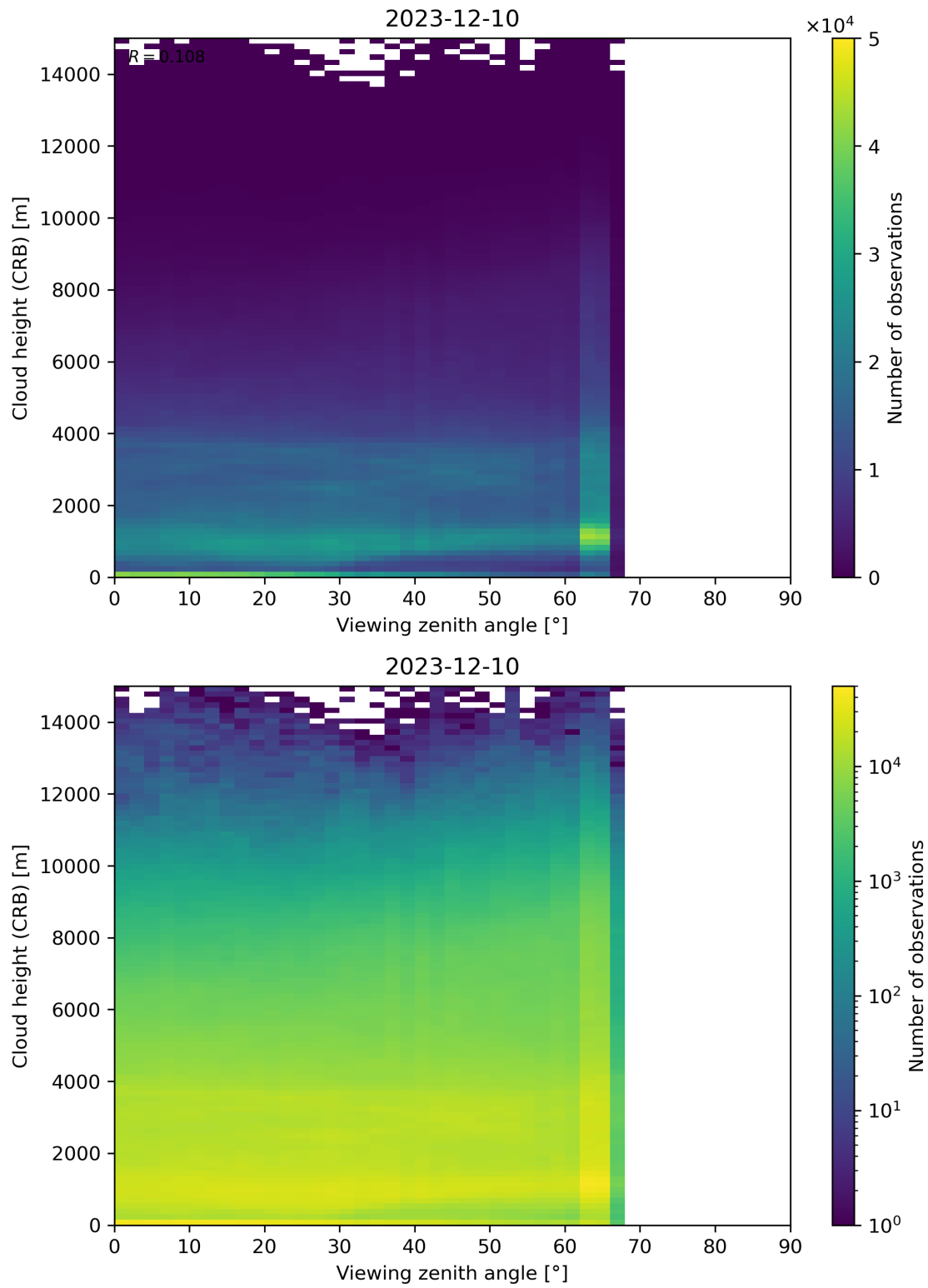


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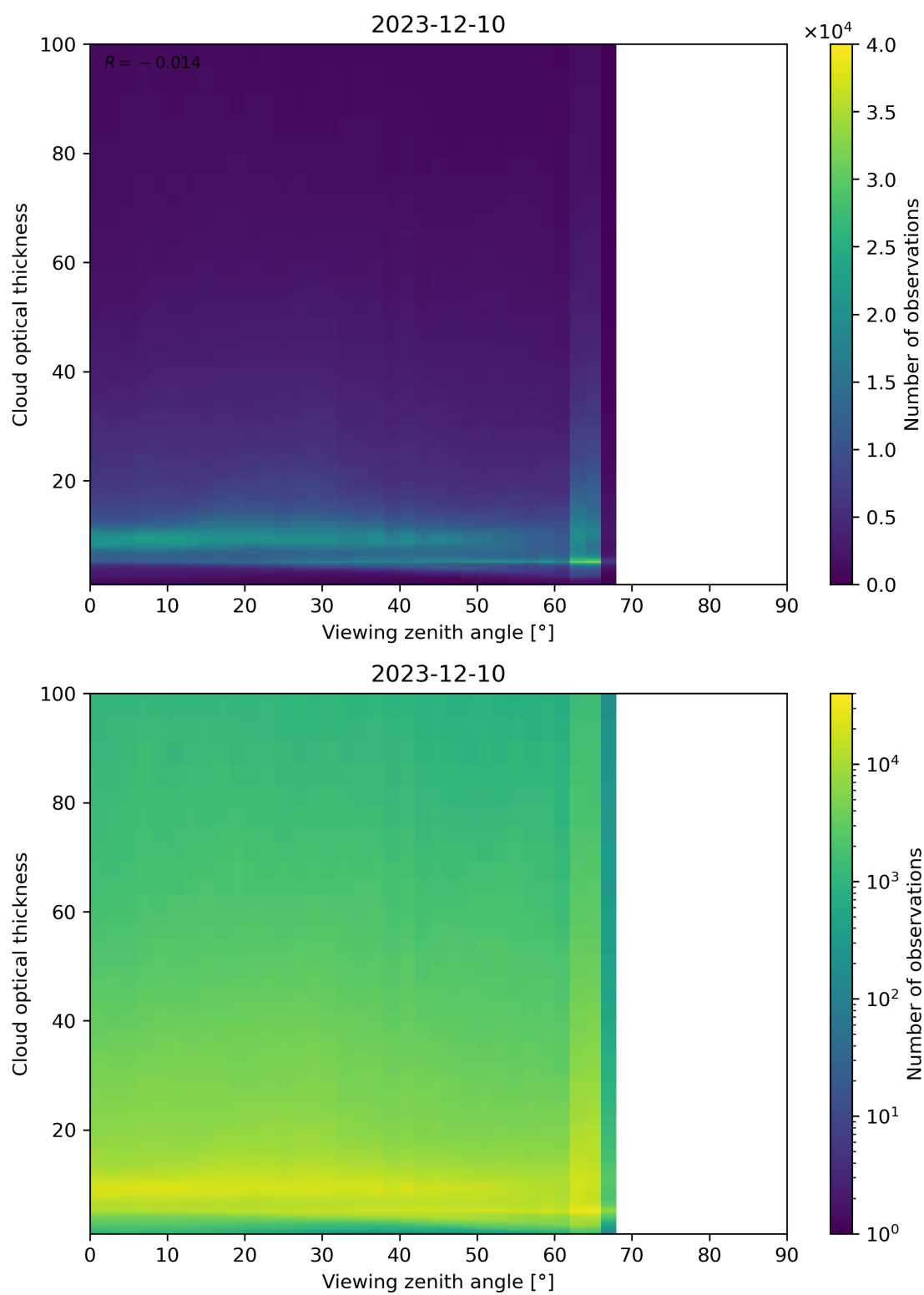


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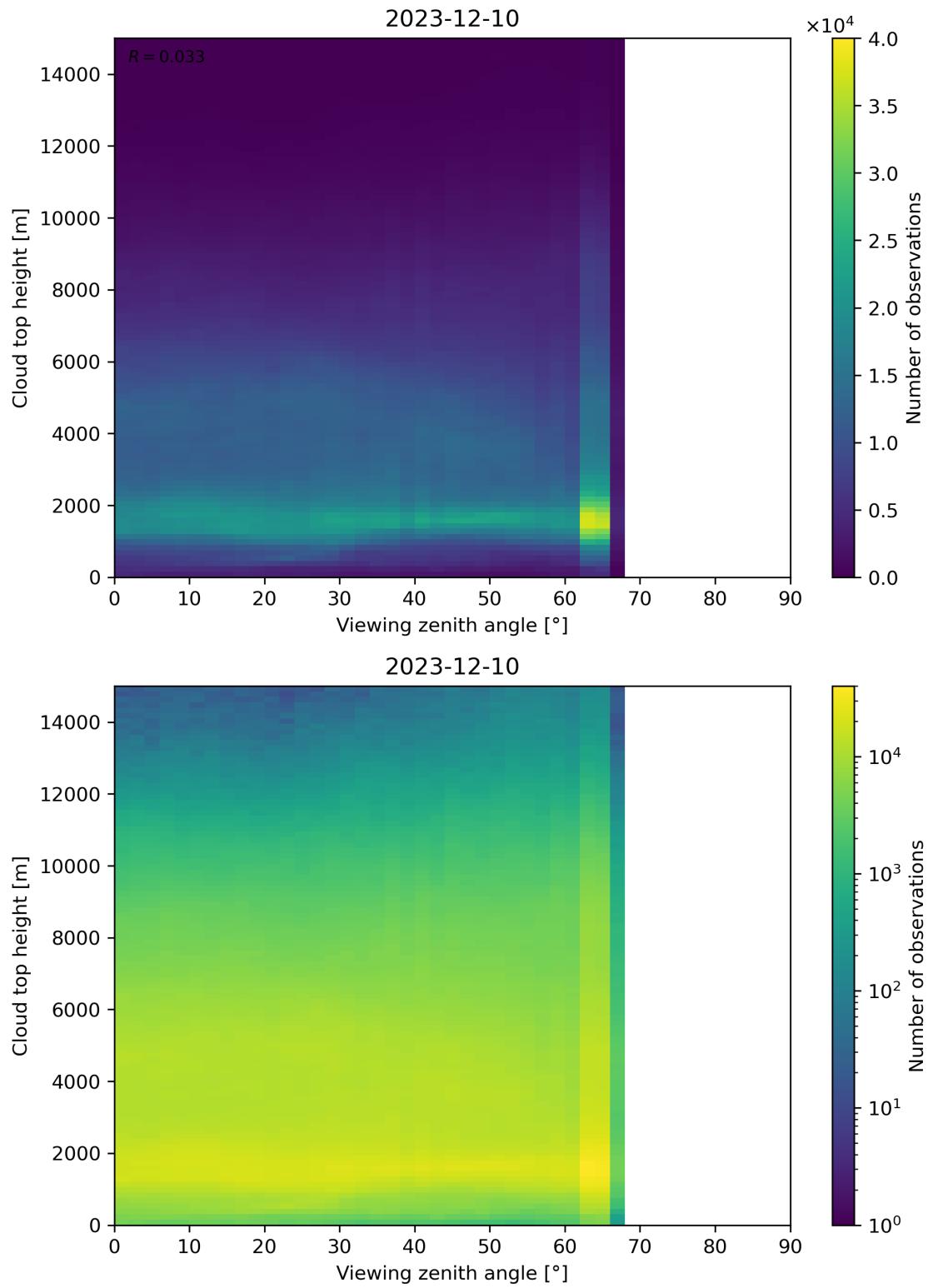


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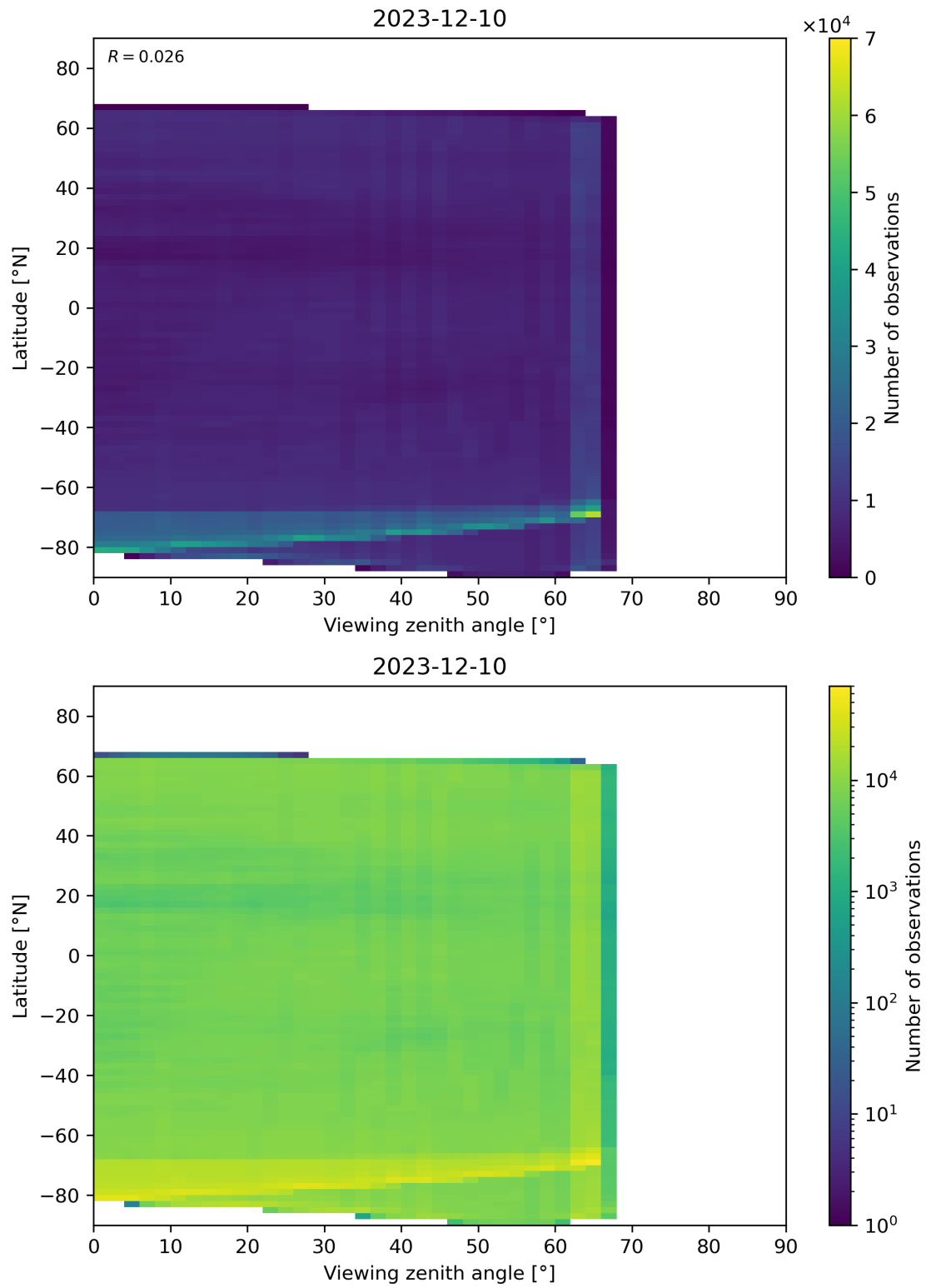


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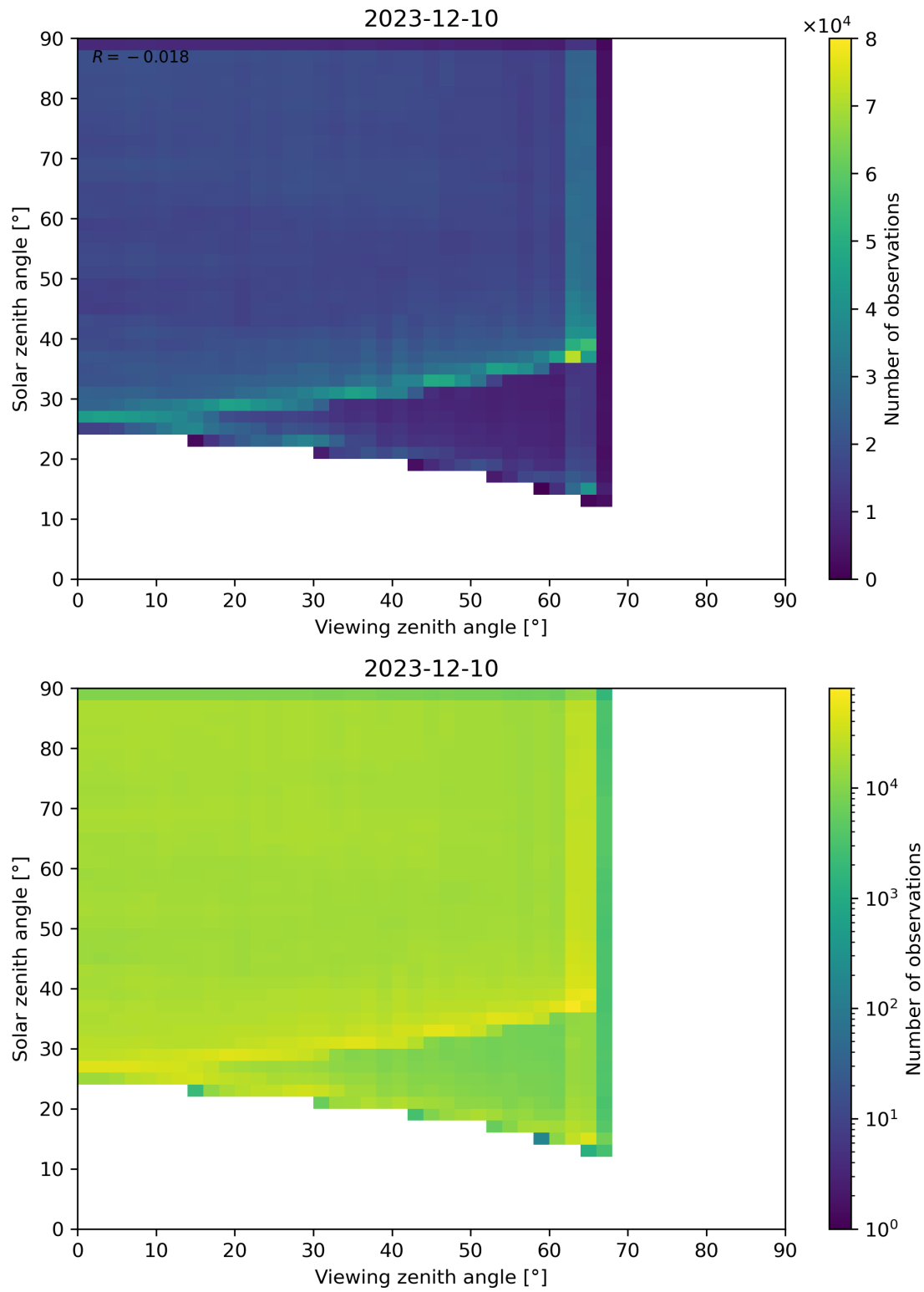


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