

PyCAMA report generated by tropl2-proc

tropl2-proc

2023-11-19 (09:15)

1 Short Introduction

1.1 The list of parameters

You may want to keep the list given in table 1 at hand when viewing the results.

2 Definitions

The averages shown here are *unweighed* averages:

$$\bar{x} = \frac{1}{N} \sum_{i=1}^N x_i \quad (1)$$

with N the number of observations in the dataset.

The spread of the measurements is indicated with the variance $V(x)$, or rather the standard deviation $\sigma(x) = \sqrt{V(x)}$.

$$V(x) = \frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{x})^2 \quad (2)$$

We also report the more robust statistics median, minimum, maximum, various percentiles and inter quartile range.

The median m is the value of parameter x for which half of the observations of x is smaller than m :

$$P(x \leq m) = P(x \geq m) = \int_{-\infty}^m f(x) dx = \frac{1}{2} \quad (3)$$

with $f(x)$ the probability density function.

The median is a special case of a percentile. Instead of 1/2 in equation 3, other threshold values can be used. We report results for 1 %, 5 %, 10 %, 15.9 %, 25 %, 75 %, 84.1 %, 90 %, 95 % and 99 %. The inter quartile range is the difference between the 75 % and 25 % percentiles. Similarly the minimum and maximum values correspond to the 0 % and 100 % percentiles respectively.

For normally distributed parameters the mean and median are the same, while the $\mu \pm \sigma$ values and the 15.9 % and 84.1 % percentiles coincide.

To get a measure for the relation of one variable $x_{(k)}$ with another $x_{(l)}$, we calculate the covariance matrix C_{kl} .

$$C_{kl} = C(x_{(k)}, x_{(l)}) = \frac{1}{N-1} \sum_{i=1}^N (x_{(k),i} - \bar{x}_{(k)})(x_{(l),i} - \bar{x}_{(l)}) \quad (4)$$

Rather than a dimensionally dependent covariance, it is often easier to interpret a correlation matrix R_{kl} , a matrix of Pearson's r coefficients:

$$R_{kl} = R(x_{(k)}, x_{(l)}) = \frac{C_{kl}}{\sqrt{C_{kk}C_{ll}}} = \frac{C_{kl}}{\sqrt{V(x_k)V(x_l)}} \quad (5)$$

The diagonal elements of the covariance matrix are the variances of the elements, $V(x_{(k)}) = C_{kk}$ and obviously $R_{kk} = 1$.

Table 1: Parameterlist and basic statistics for the analysis

Variable	mean $\pm \sigma$	Count	Mode	IQR	Median	Minimum	Maximum
qa value [1]	0.541 ± 0.413	20548273	5.000×10^{-3}	0.830	0.740	0.0	1.000
cloud fraction [1]	0.555 ± 0.343	20548273	0.995	0.722	0.513	5.326×10^{-4}	1.000
cloud top height [m]	$(0.404 \pm 0.282) \times 10^4$	20548273	1.575×10^3	4.017×10^3	3.417×10^3	0.0	2.000×10^4
cloud optical thickness [1]	21.2 ± 38.7	20548273	10.7	12.1	10.2	1.000	250
cloud fraction crb [1]	0.554 ± 0.343	20548273	0.995	0.721	0.513	5.680×10^{-3}	1.000
cloud height crb [m]	$(0.306 \pm 0.235) \times 10^4$	20548273	75.0	3.193×10^3	2.566×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.655 ± 0.212	20548273	0.995	0.292	0.638	0.0	1.000
surface albedo fitted [1]	0.285 ± 0.349	20548273	1.500×10^{-2}	0.523	7.545×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.266 ± 0.331	20548273	1.500×10^{-2}	0.527	5.634×10^{-2}	0.0	1.000
fitted root mean square [1]	$(7.338 \pm 8.861) \times 10^{-4}$	20548273	5.000×10^{-5}	9.097×10^{-4}	4.813×10^{-4}	9.388×10^{-7}	0.328
fitted root mean square crb [1]	$(6.583 \pm 8.418) \times 10^{-4}$	20548273	5.000×10^{-5}	8.536×10^{-4}	3.825×10^{-4}	9.992×10^{-7}	0.779
wavelength shift [nm]	$(9.958 \pm 7.665) \times 10^{-3}$	20548273	6.300×10^{-3}	1.125×10^{-2}	9.595×10^{-3}	-4.964×10^{-2}	0.210
cloud fraction apriori [1]	0.561 ± 0.349	20548273	0.995	0.764	0.526	0.0	1.000
reflectance blue ocra [1]	0.595 ± 0.235	20548273	0.305	0.414	0.578	0.134	2.08
reflectance green ocra [1]	0.549 ± 0.266	20548273	0.195	0.492	0.538	8.196×10^{-2}	2.12
reflectance continuum aband [1]	0.507 ± 0.292	20548273	0.785	0.507	0.508	1.203×10^{-2}	5.10

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	1.000	1.000	1.000	1.000
cloud fraction [1]	2.591×10^{-2}	6.757×10^{-2}	0.107	0.155	0.239	0.961	1.000	1.000	1.000	1.000
cloud top height [m]	193	674	1.016×10^3	1.330×10^3	1.758×10^3	5.775×10^3	6.909×10^3	7.987×10^3	9.451×10^3	1.212×10^4
cloud optical thickness [1]	1.000	2.40	3.71	4.70	5.76	17.8	26.4	39.8	75.5	250
cloud fraction crb [1]	2.562×10^{-2}	6.710×10^{-2}	0.106	0.154	0.238	0.960	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	245	549	823	1.194×10^3	4.388×10^3	5.477×10^3	6.437×10^3	7.717×10^3	9.855×10^3
cloud albedo crb [1]	5.968×10^{-2}	0.308	0.421	0.470	0.518	0.809	0.902	0.979	1.000	1.000
surface albedo fitted [1]	0.0	9.950×10^{-3}	1.466×10^{-2}	1.923×10^{-2}	2.667×10^{-2}	0.549	0.835	0.908	0.962	1.000
surface albedo fitted crb [1]	2.176×10^{-3}	7.757×10^{-3}	1.114×10^{-2}	1.457×10^{-2}	2.007×10^{-2}	0.547	0.779	0.839	0.896	0.951
fitted root mean square [1]	1.805×10^{-5}	3.860×10^{-5}	6.387×10^{-5}	9.921×10^{-5}	1.654×10^{-4}	1.075×10^{-3}	1.421×10^{-3}	1.743×10^{-3}	2.193×10^{-3}	3.205×10^{-3}
fitted root mean square crb [1]	1.044×10^{-5}	2.660×10^{-5}	4.654×10^{-5}	7.183×10^{-5}	1.212×10^{-4}	9.748×10^{-4}	1.335×10^{-3}	1.669×10^{-3}	2.127×10^{-3}	3.107×10^{-3}
wavelength shift [nm]	-7.052×10^{-3}	-3.781×10^{-4}	6.803×10^{-4}	2.026×10^{-3}	4.136×10^{-3}	1.538×10^{-2}	1.787×10^{-2}	1.993×10^{-2}	2.260×10^{-2}	2.817×10^{-2}
cloud fraction apriori [1]	1.744×10^{-2}	6.213×10^{-2}	9.843×10^{-2}	0.147	0.236	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.234	0.264	0.294	0.329	0.385	0.799	0.858	0.898	0.940	1.11
reflectance green ocra [1]	0.157	0.184	0.207	0.237	0.296	0.788	0.856	0.899	0.945	1.07
reflectance continuum aband [1]	3.366×10^{-2}	6.597×10^{-2}	0.107	0.158	0.252	0.759	0.832	0.881	0.938	1.08

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]	0.603 ± 0.402	8257412	0.800	0.850	0.0	1.000	0.150	0.950
cloud fraction [1]	0.571 ± 0.353	8257412	0.759	0.564	5.326×10^{-4}	1.000	0.225	0.984
cloud top height [m]	$(0.418 \pm 0.271) \times 10^4$	8257412	3.805×10^3	3.589×10^3	0.0	2.000×10^4	1.986×10^3	5.790×10^3
cloud optical thickness [1]	28.3 ± 48.5	8257412	16.6	11.5	1.000	250	6.71	23.3
cloud fraction crb [1]	0.569 ± 0.354	8257412	0.760	0.561	8.465×10^{-3}	1.000	0.223	0.983
cloud height crb [m]	$(0.348 \pm 0.233) \times 10^4$	8257412	3.363×10^3	3.005×10^3	0.0	2.000×10^4	1.548×10^3	4.910×10^3
cloud albedo crb [1]	0.612 ± 0.195	8257412	0.233	0.601	0.0	1.000	0.500	0.733
surface albedo fitted [1]	0.144 ± 0.172	8257412	0.179	6.524×10^{-2}	0.0	1.000	2.689×10^{-2}	0.205
surface albedo fitted crb [1]	0.135 ± 0.173	8257412	0.173	4.913×10^{-2}	0.0	1.000	2.003×10^{-2}	0.193
fitted root mean square [1]	$(4.468 \pm 5.783) \times 10^{-4}$	8257412	4.734×10^{-4}	2.582×10^{-4}	9.388×10^{-7}	0.130	1.077×10^{-4}	5.811×10^{-4}
fitted root mean square crb [1]	$(3.915 \pm 5.112) \times 10^{-4}$	8257412	4.408×10^{-4}	1.899×10^{-4}	9.992×10^{-7}	5.440×10^{-2}	7.121×10^{-5}	5.120×10^{-4}
wavelength shift [nm]	$(7.579 \pm 7.066) \times 10^{-3}$	8257412	9.522×10^{-3}	6.709×10^{-3}	-4.964×10^{-2}	6.962×10^{-2}	2.392×10^{-3}	1.191×10^{-2}
cloud fraction apriori [1]	0.574 ± 0.361	8257412	0.784	0.572	0.0	1.000	0.216	1.000
reflectance blue ocra [1]	0.534 ± 0.204	8257412	0.311	0.505	0.138	2.02	0.365	0.676
reflectance green ocra [1]	0.476 ± 0.231	8257412	0.375	0.444	8.198×10^{-2}	2.04	0.272	0.647
reflectance continuum aband [1]	0.432 ± 0.266	8257412	0.398	0.406	1.203×10^{-2}	4.33	0.218	0.617

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]	0.499 ± 0.415	12290861	0.850	0.560	0.0	1.000	5.000×10^{-2}	0.900
cloud fraction [1]	0.544 ± 0.335	12290861	0.686	0.489	6.359×10^{-3}	1.000	0.247	0.933
cloud top height [m]	$(0.394 \pm 0.290) \times 10^4$	12290861	4.165×10^3	3.266×10^3	0.0	2.000×10^4	1.601×10^3	5.766×10^3
cloud optical thickness [1]	16.3 ± 29.5	12290861	10.1	9.55	1.000	250	5.39	15.5
cloud fraction crb [1]	0.544 ± 0.335	12290861	0.685	0.489	5.680×10^{-3}	1.000	0.247	0.932
cloud height crb [m]	$(0.278 \pm 0.232) \times 10^4$	12290861	3.047×10^3	2.240×10^3	0.0	2.000×10^4	966	4.013×10^3
cloud albedo crb [1]	0.683 ± 0.217	12290861	0.328	0.674	0.0	1.000	0.531	0.859
surface albedo fitted [1]	0.379 ± 0.402	12290861	0.819	8.907×10^{-2}	0.0	1.000	2.652×10^{-2}	0.845
surface albedo fitted crb [1]	0.353 ± 0.379	12290861	0.764	6.584×10^{-2}	0.0	1.000	2.009×10^{-2}	0.784
fitted root mean square [1]	$(9.266 \pm 9.978) \times 10^{-4}$	12290861	1.075×10^{-3}	7.368×10^{-4}	3.056×10^{-6}	0.328	2.736×10^{-4}	1.348×10^{-3}
fitted root mean square crb [1]	$(8.376 \pm 9.639) \times 10^{-4}$	12290861	1.050×10^{-3}	6.072×10^{-4}	1.865×10^{-6}	0.779	2.031×10^{-4}	1.253×10^{-3}
wavelength shift [nm]	$(1.156 \pm 0.764) \times 10^{-2}$	12290861	1.102×10^{-2}	1.185×10^{-2}	-4.655×10^{-2}	0.210	5.957×10^{-3}	1.698×10^{-2}
cloud fraction apriori [1]	0.553 ± 0.340	12290861	0.735	0.504	0.0	1.000	0.249	0.984
reflectance blue ocra [1]	0.636 ± 0.245	12290861	0.440	0.668	0.134	2.08	0.405	0.845
reflectance green ocra [1]	0.599 ± 0.276	12290861	0.519	0.645	8.196×10^{-2}	2.12	0.324	0.843
reflectance continuum aband [1]	0.557 ± 0.297	12290861	0.524	0.614	1.311×10^{-2}	5.10	0.286	0.810

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]	0.692 ± 0.347	12534859	0.550	0.890	0.0	1.000	0.400	0.950
cloud fraction [1]	0.581 ± 0.357	12534859	0.770	0.590	6.359×10^{-3}	1.000	0.226	0.996
cloud top height [m]	$(0.352 \pm 0.278) \times 10^4$	12534859	3.284×10^3	2.606×10^3	0.0	2.000×10^4	1.498×10^3	4.782×10^3
cloud optical thickness [1]	18.9 ± 28.3	12534859	10.5	11.5	1.000	250	7.88	18.4
cloud fraction crb [1]	0.580 ± 0.358	12534859	0.773	0.588	5.680×10^{-3}	1.000	0.224	0.997
cloud height crb [m]	$(0.278 \pm 0.245) \times 10^4$	12534859	2.995×10^3	1.952×10^3	0.0	2.000×10^4	963	3.957×10^3
cloud albedo crb [1]	0.610 ± 0.176	12534859	0.223	0.597	0.0	1.000	0.502	0.725
surface albedo fitted [1]	0.122 ± 0.240	12534859	4.113×10^{-2}	3.231×10^{-2}	0.0	1.000	1.881×10^{-2}	5.994×10^{-2}
surface albedo fitted crb [1]	0.112 ± 0.233	12534859	2.984×10^{-2}	2.413×10^{-2}	0.0	1.000	1.425×10^{-2}	4.409×10^{-2}
fitted root mean square [1]	$(7.051 \pm 9.550) \times 10^{-4}$	12534859	9.441×10^{-4}	3.964×10^{-4}	9.388×10^{-7}	0.246	1.211×10^{-4}	1.065×10^{-3}
fitted root mean square crb [1]	$(6.820 \pm 9.318) \times 10^{-4}$	12534859	9.327×10^{-4}	3.729×10^{-4}	9.992×10^{-7}	0.779	1.101×10^{-4}	1.043×10^{-3}
wavelength shift [nm]	$(9.605 \pm 7.963) \times 10^{-3}$	12534859	1.151×10^{-2}	9.308×10^{-3}	-4.655×10^{-2}	0.210	3.630×10^{-3}	1.514×10^{-2}
cloud fraction apriori [1]	0.585 ± 0.365	12534859	0.783	0.602	0.0	1.000	0.217	1.000
reflectance blue ocrs [1]	0.531 ± 0.205	12534859	0.329	0.493	0.154	2.03	0.357	0.686
reflectance green ocrs [1]	0.473 ± 0.233	12534859	0.400	0.433	8.198×10^{-2}	2.02	0.262	0.662
reflectance continuum aband [1]	0.411 ± 0.272	12534859	0.487	0.382	1.203×10^{-2}	4.33	0.156	0.644

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]	0.286 ± 0.389	6473905	0.730	8.000×10^{-2}	0.0	1.000	0.0	0.730
cloud fraction [1]	0.481 ± 0.301	6473905	0.455	0.412	5.326×10^{-4}	1.000	0.239	0.694
cloud top height [m]	$(0.504 \pm 0.268) \times 10^4$	6473905	3.550×10^3	4.999×10^3	0.0	2.000×10^4	3.087×10^3	6.637×10^3
cloud optical thickness [1]	19.0 ± 42.8	6473905	7.73	6.04	1.000	250	4.40	12.1
cloud fraction crb [1]	0.483 ± 0.300	6473905	0.454	0.414	7.886×10^{-3}	1.000	0.241	0.695
cloud height crb [m]	$(0.357 \pm 0.208) \times 10^4$	6473905	2.766×10^3	3.358×10^3	0.0	2.000×10^4	2.061×10^3	4.826×10^3
cloud albedo crb [1]	0.736 ± 0.246	6473905	0.401	0.775	0.0	1.000	0.573	0.974
surface albedo fitted [1]	0.604 ± 0.336	6473905	0.683	0.762	0.0	1.000	0.240	0.923
surface albedo fitted crb [1]	0.567 ± 0.309	6473905	0.616	0.727	4.344×10^{-3}	1.000	0.232	0.847
fitted root mean square [1]	$(8.336 \pm 7.441) \times 10^{-4}$	6473905	8.563×10^{-4}	6.492×10^{-4}	3.056×10^{-6}	0.130	3.103×10^{-4}	1.167×10^{-3}
fitted root mean square crb [1]	$(6.755 \pm 6.776) \times 10^{-4}$	6473905	7.900×10^{-4}	4.639×10^{-4}	2.228×10^{-6}	4.903×10^{-2}	1.773×10^{-4}	9.673×10^{-4}
wavelength shift [nm]	$(1.116 \pm 0.710) \times 10^{-2}$	6473905	1.089×10^{-2}	1.085×10^{-2}	-3.635×10^{-2}	7.173×10^{-2}	5.586×10^{-3}	1.647×10^{-2}
cloud fraction apriori [1]	0.493 ± 0.306	6473905	0.474	0.428	0.0	1.000	0.245	0.719
reflectance blue ocrs [1]	0.710 ± 0.245	6473905	0.383	0.796	0.134	2.08	0.505	0.888
reflectance green ocrs [1]	0.687 ± 0.273	6473905	0.442	0.791	8.196×10^{-2}	2.12	0.453	0.895
reflectance continuum aband [1]	0.680 ± 0.252	6473905	0.411	0.753	1.665×10^{-2}	5.10	0.464	0.875

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	-8.318×10^{-3}	2.786×10^{-2}	6.200×10^{-2}	7.336×10^{-3}	-3.802×10^{-2}	6.201×10^{-2}	6.682×10^{-2}	3.514×10^{-2}	6.045×10^{-2}
-8.318×10^{-3}	1.000	4.176×10^{-2}	0.103	9.597×10^{-2}	0.160	0.106	3.001×10^{-2}	0.244	0.116
2.786×10^{-2}	4.176×10^{-2}	1.000	7.318×10^{-2}	-2.334×10^{-2}	0.195	6.913×10^{-2}	0.112	-0.227	5.941×10^{-2}
6.200×10^{-2}	0.103	7.318×10^{-2}	1.000	-7.292×10^{-2}	0.252	1.000	-1.816×10^{-2}	0.139	0.983
7.336×10^{-3}	9.597×10^{-2}	-2.334×10^{-2}	-7.292×10^{-2}	1.000	4.018×10^{-2}	-7.144×10^{-2}	0.929	0.137	-8.319×10^{-2}
-3.802×10^{-2}	0.160	0.195	0.252	4.018×10^{-2}	1.000	0.247	0.105	0.327	0.248
6.201×10^{-2}	0.106	6.913×10^{-2}	1.000	-7.144×10^{-2}	0.247	1.000	-1.803×10^{-2}	0.140	0.983
6.682×10^{-2}	3.001×10^{-2}	0.112	-1.816×10^{-2}	0.929	0.105	-1.803×10^{-2}	1.000	-1.546×10^{-3}	-3.333×10^{-2}
3.514×10^{-2}	0.244	-0.227	0.139	0.137	0.327	0.140	-1.546×10^{-3}	1.000	0.157
6.045×10^{-2}	0.116	5.941×10^{-2}	0.983	-8.319×10^{-2}	0.248	0.983	-3.333×10^{-2}	0.157	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
380	-3.13	27.4	0.414	404	-28.7	0.414	3.059×10^3	0.145	0.412
-3.13	372	40.6	0.683	5.230×10^3	120	0.699	1.359×10^3	0.998	0.783
27.4	40.6	2.538×10^3	1.26	-3.319×10^3	381	1.19	1.330×10^4	-2.42	1.04
0.414	0.683	1.26	0.117	-70.5	3.34	0.117	-14.6	1.009×10^{-2}	0.118
404	5.230×10^3	-3.319×10^3	-70.5	7.973×10^6	4.394×10^3	-69.1	6.157×10^6	81.9	-82.0
-28.7	120	381	3.34	4.394×10^3	1.500×10^3	3.28	9.529×10^3	2.68	3.35
0.414	0.699	1.19	0.117	-69.1	3.28	0.117	-14.5	1.017×10^{-2}	0.118
3.059×10^3	1.359×10^3	1.330×10^4	-14.6	6.157×10^6	9.529×10^3	-14.5	5.509×10^6	-0.769	-27.3
0.145	0.998	-2.42	1.009×10^{-2}	81.9	2.68	1.017×10^{-2}	-0.769	4.483×10^{-2}	1.158×10^{-2}
0.412	0.783	1.04	0.118	-82.0	3.35	0.118	-27.3	1.158×10^{-2}	0.122

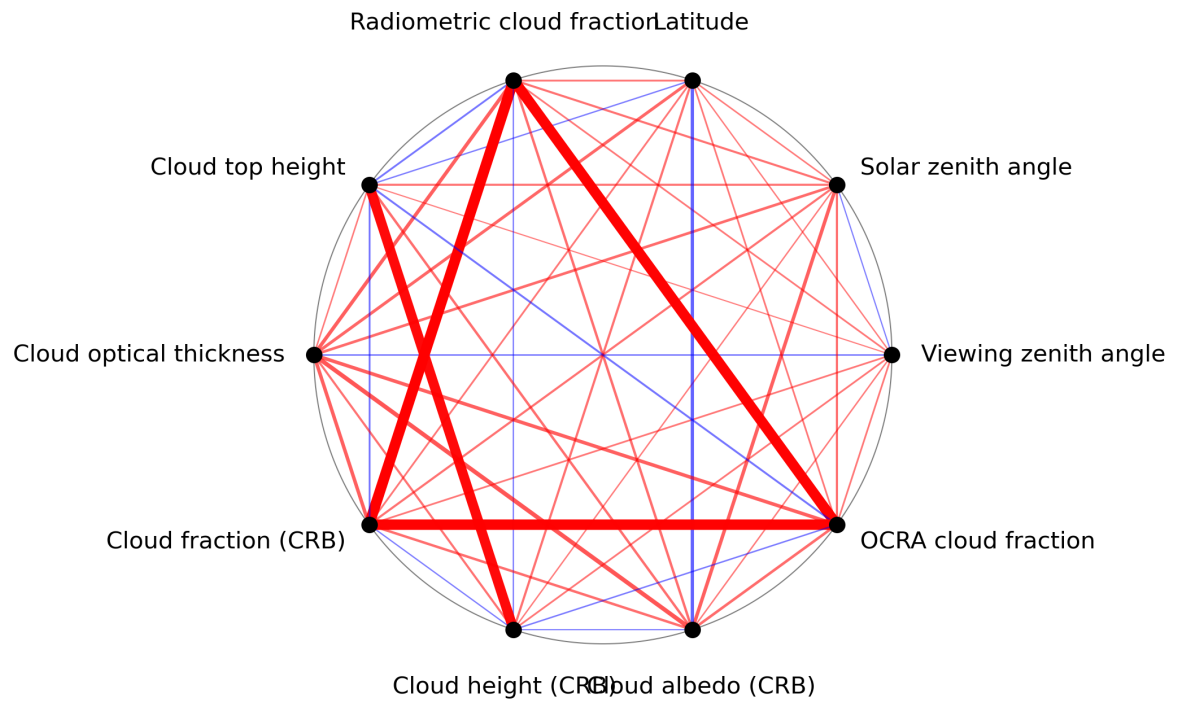


Figure 1: Map of correlation graph for 2023-11-03 to 2023-11-05.

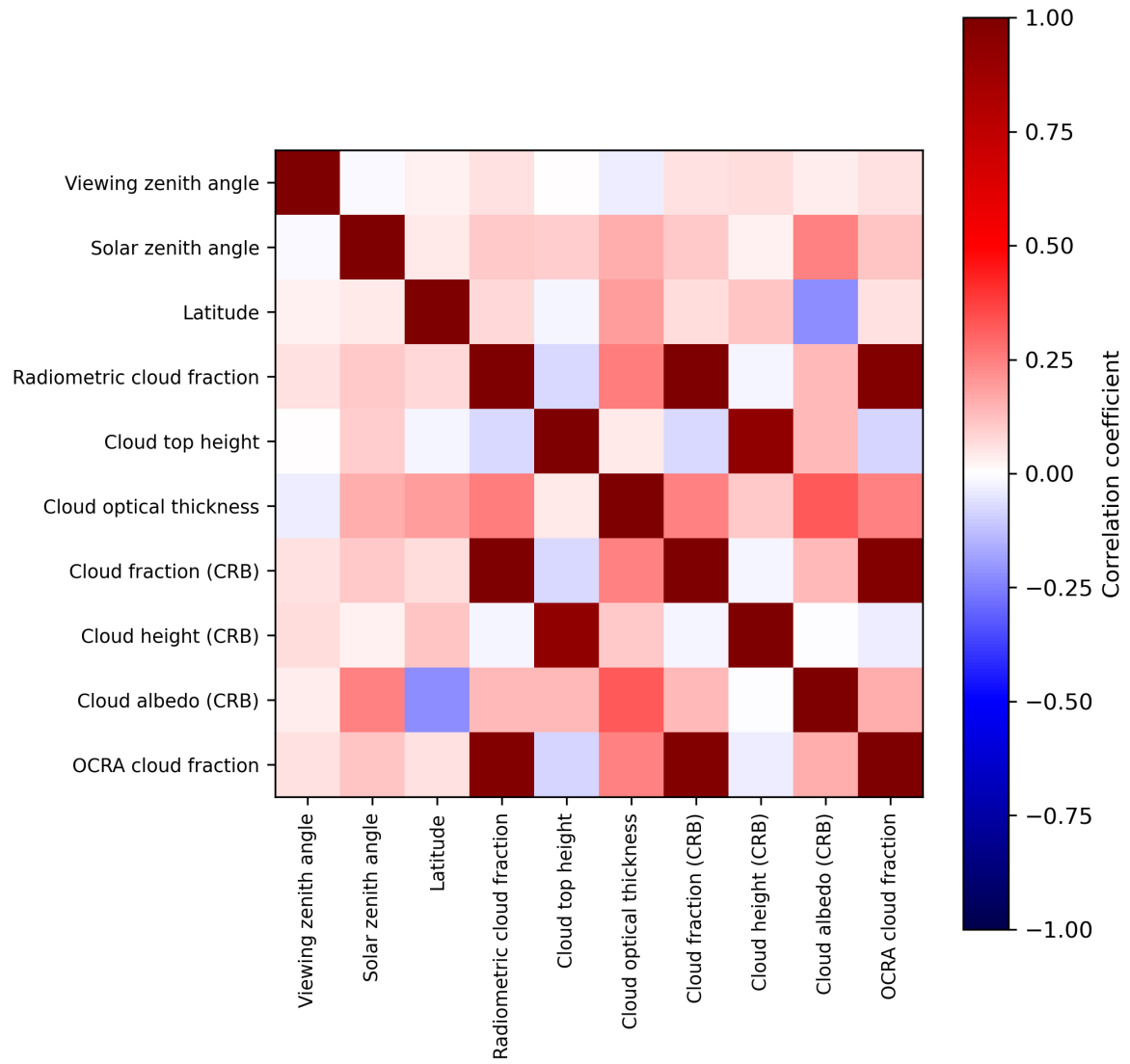


Figure 2: Map of correlation matrix for 2023-11-03 to 2023-11-05.

3 Granule outlines

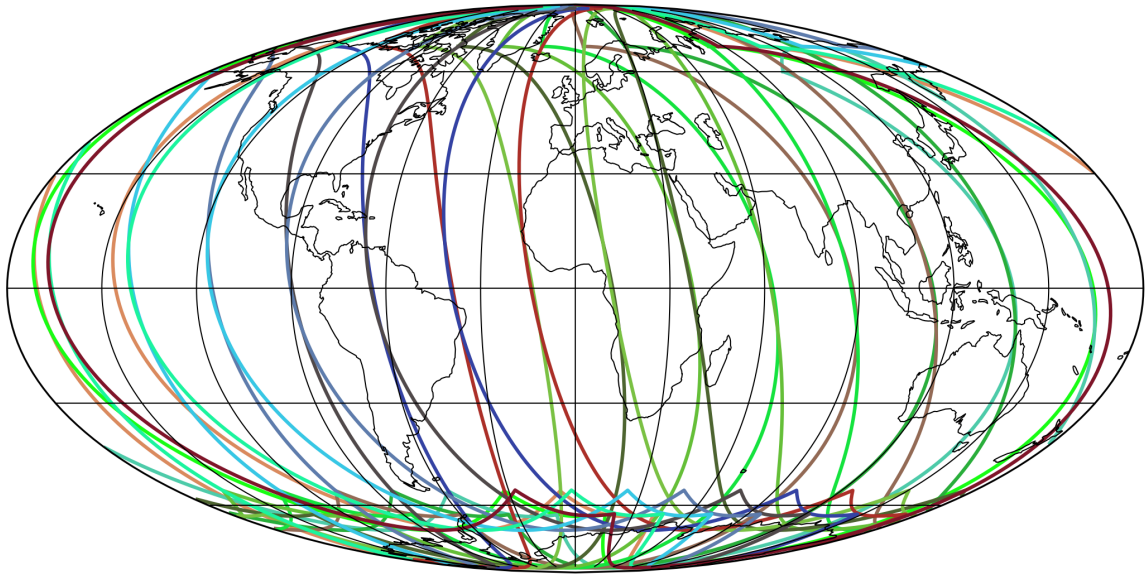


Figure 3: Outline of the granules.

4 Input data monitoring

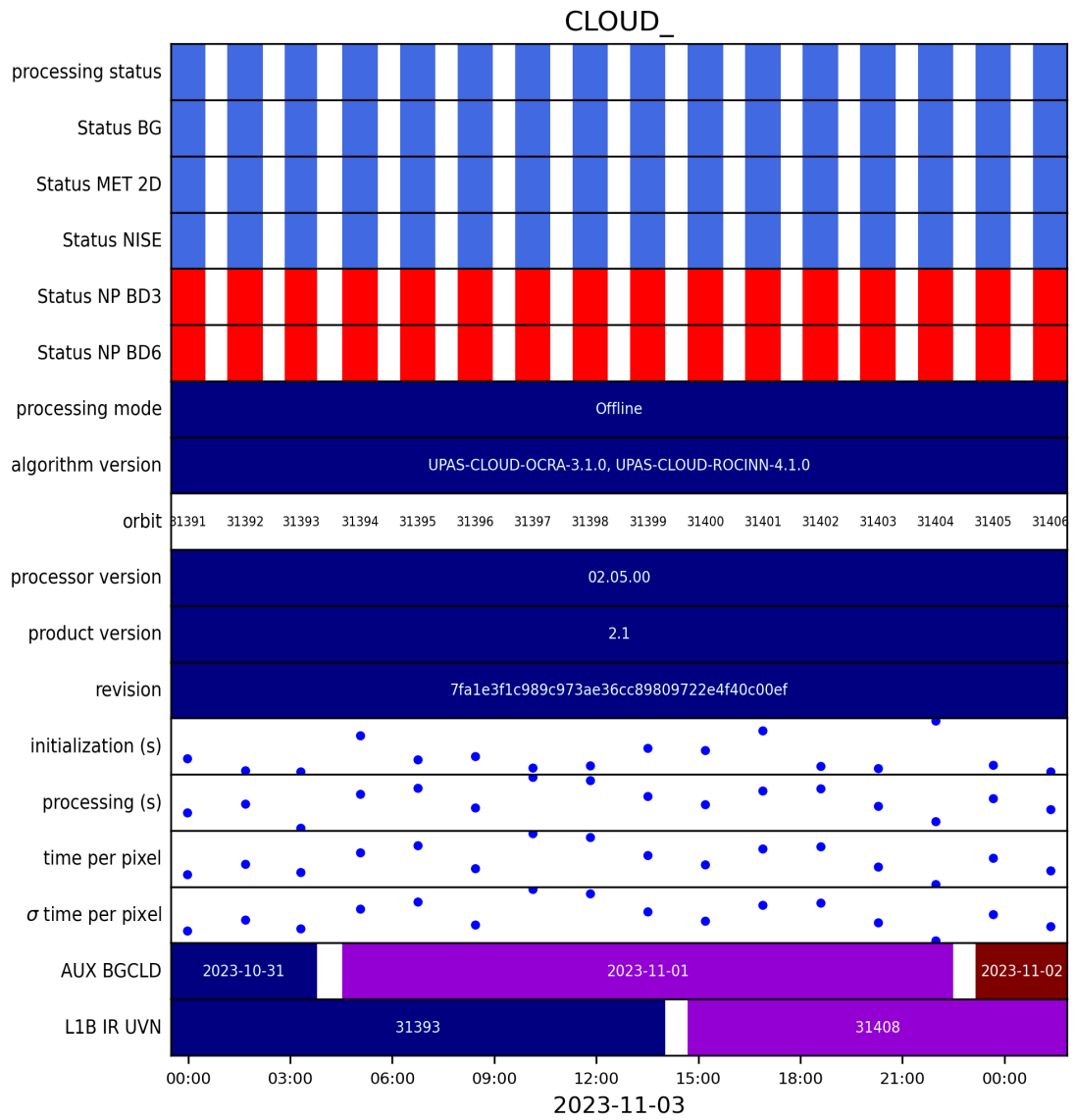


Figure 4: Input data per granule

5 Warnings and errors

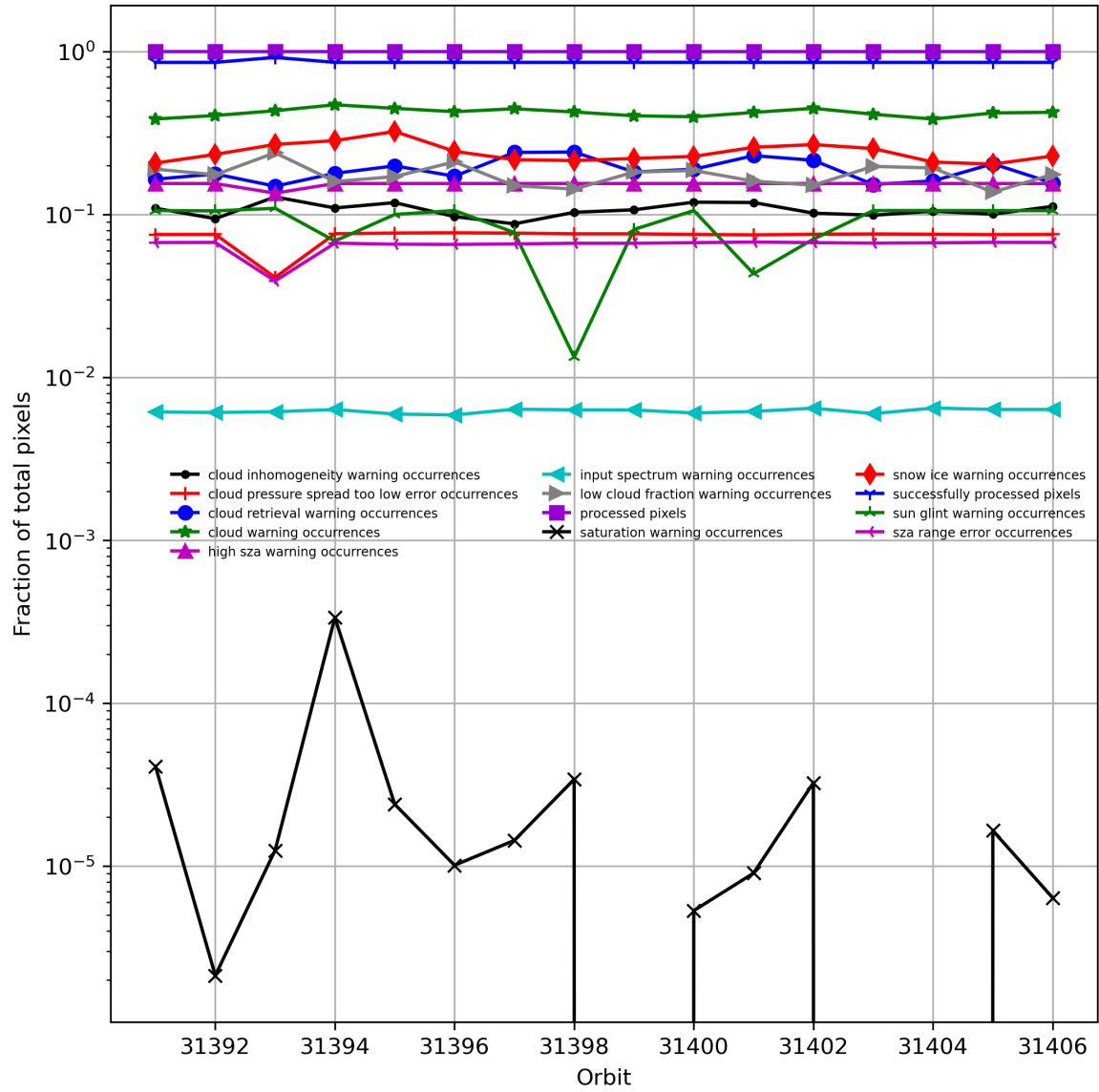


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

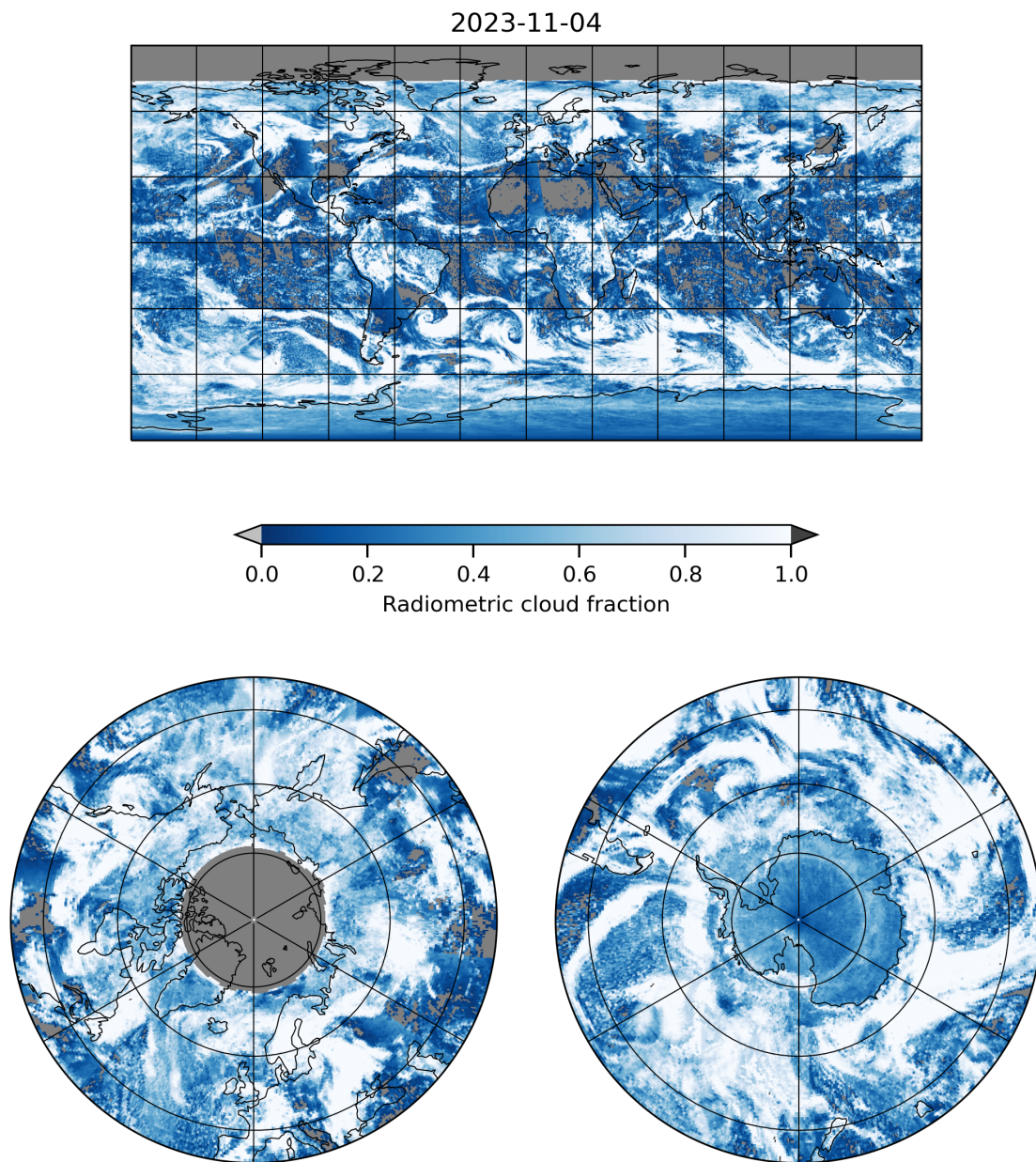


Figure 6: Map of “Radiometric cloud fraction” for 2023-11-03 to 2023-11-05

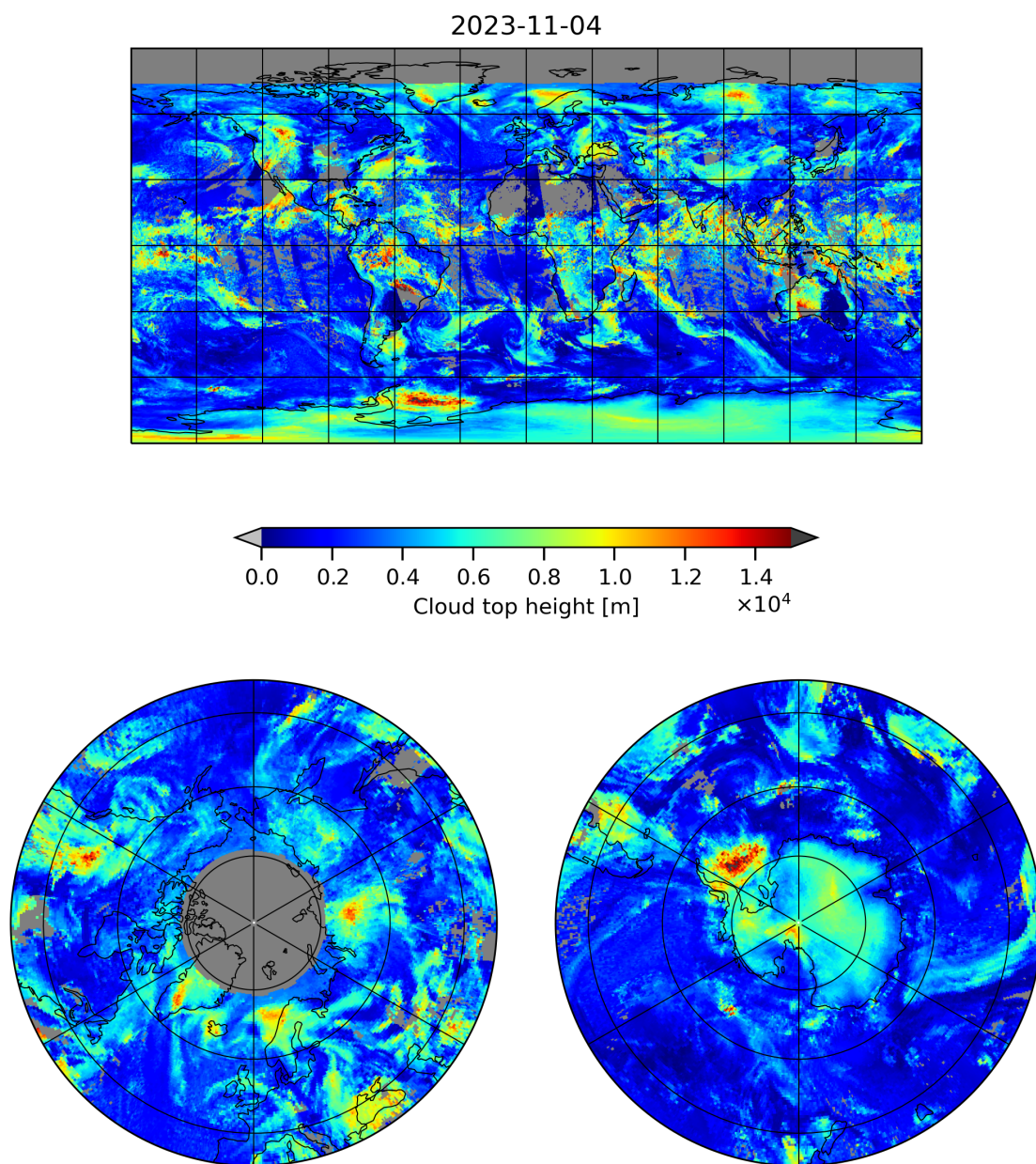


Figure 7: Map of “Cloud top height” for 2023-11-03 to 2023-11-05

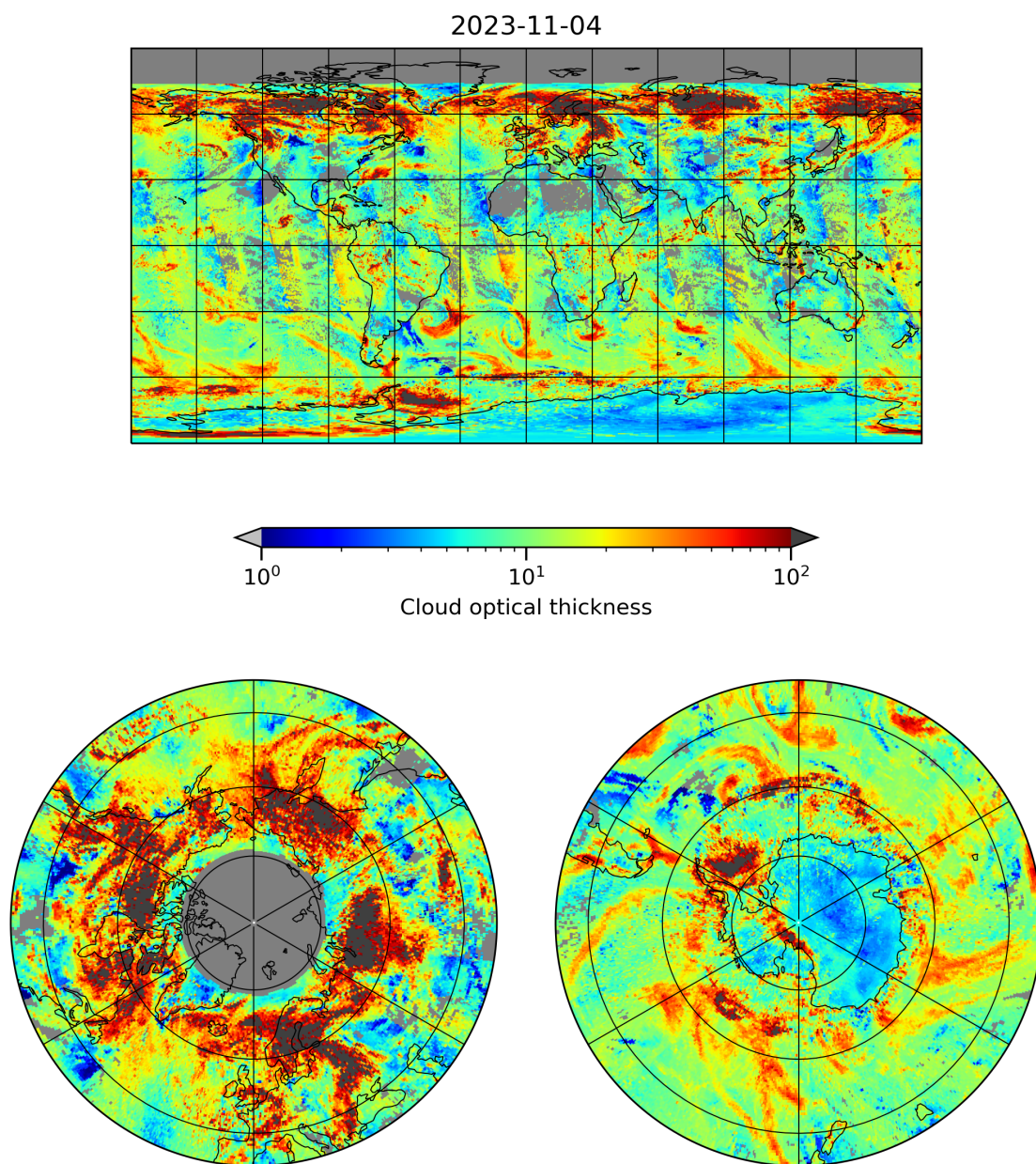


Figure 8: Map of “Cloud optical thickness” for 2023-11-03 to 2023-11-05

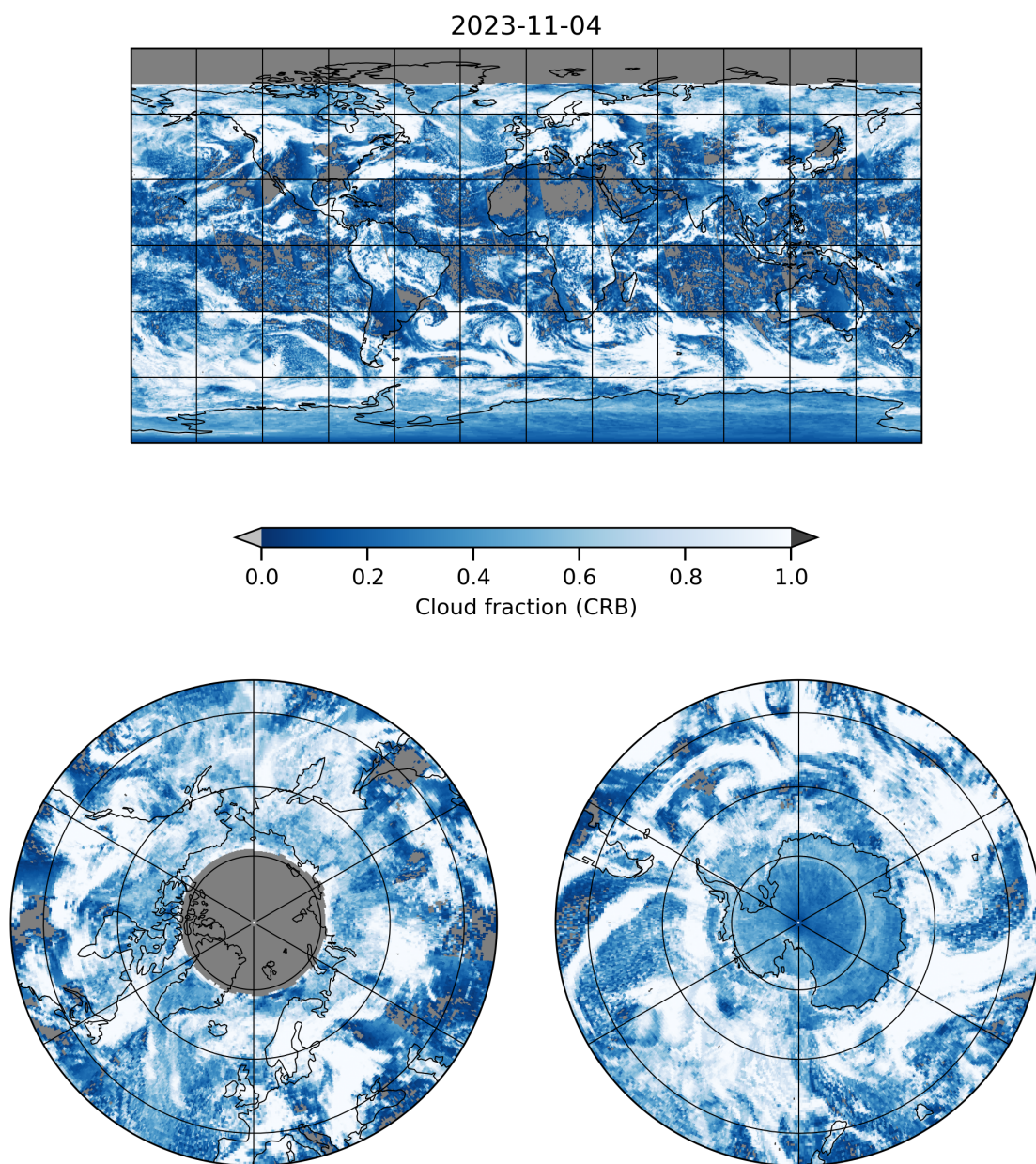


Figure 9: Map of “Cloud fraction (CRB)” for 2023-11-03 to 2023-11-05

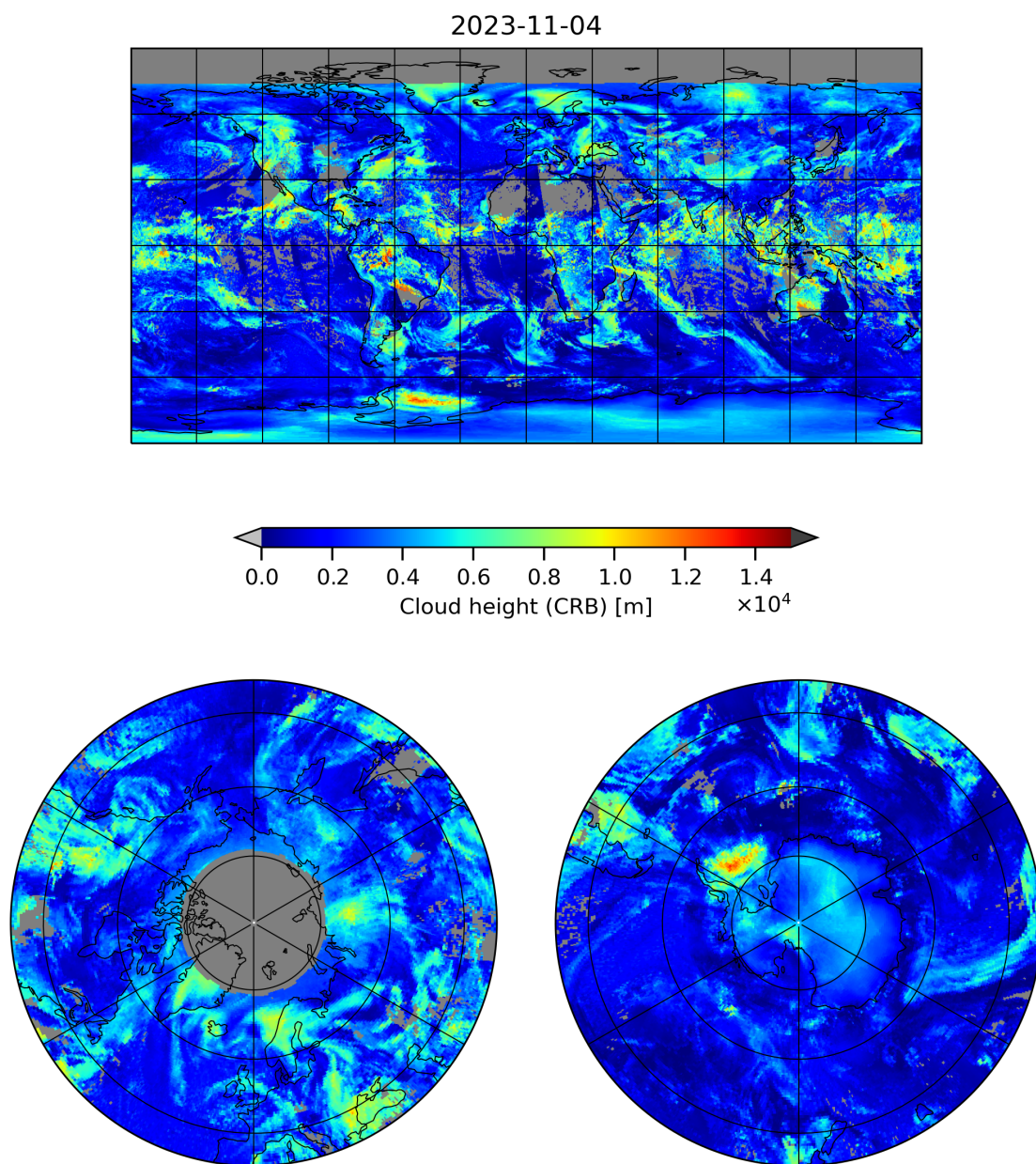


Figure 10: Map of “Cloud height (CRB)” for 2023-11-03 to 2023-11-05

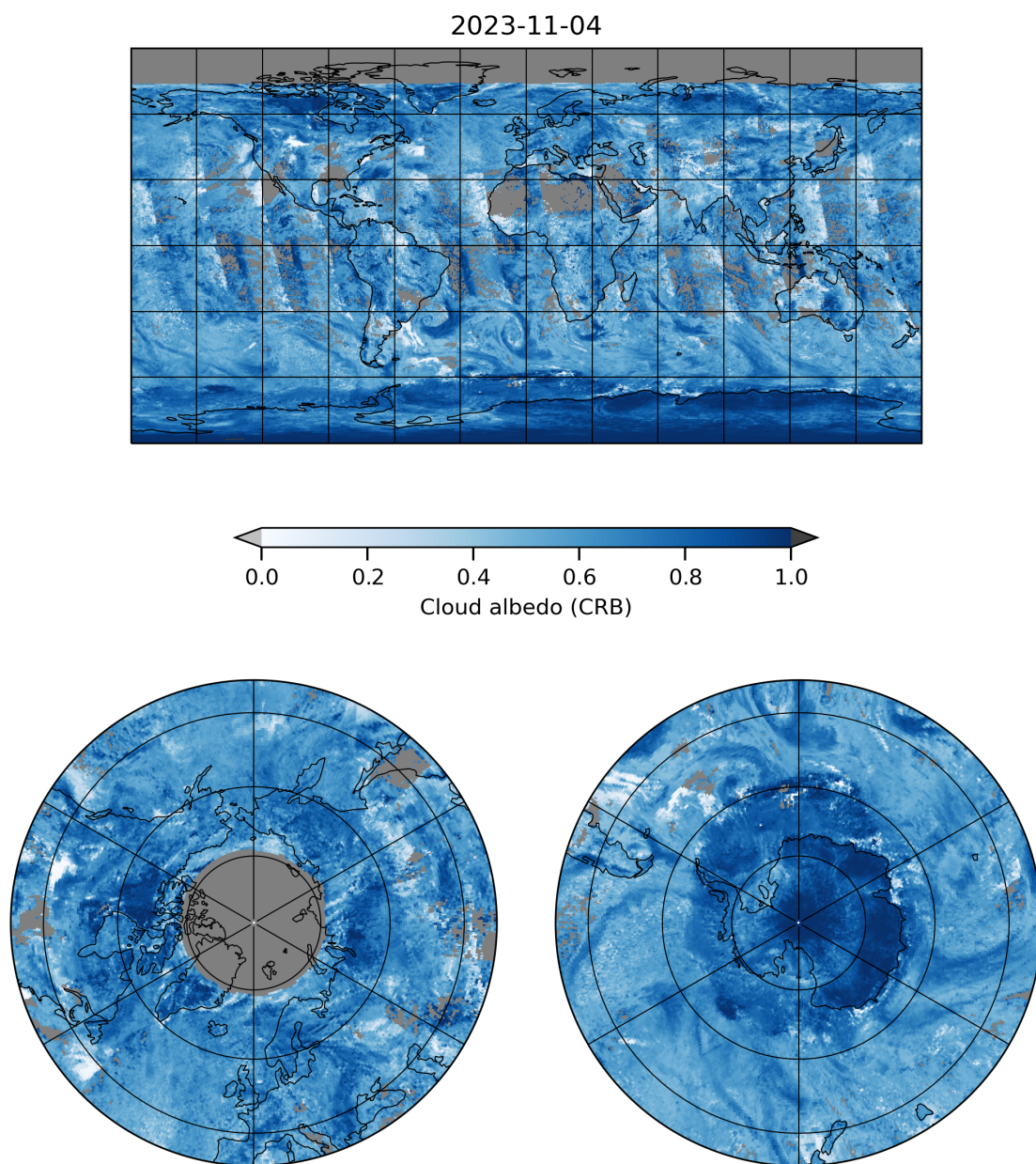


Figure 11: Map of “Cloud albedo (CRB)” for 2023-11-03 to 2023-11-05

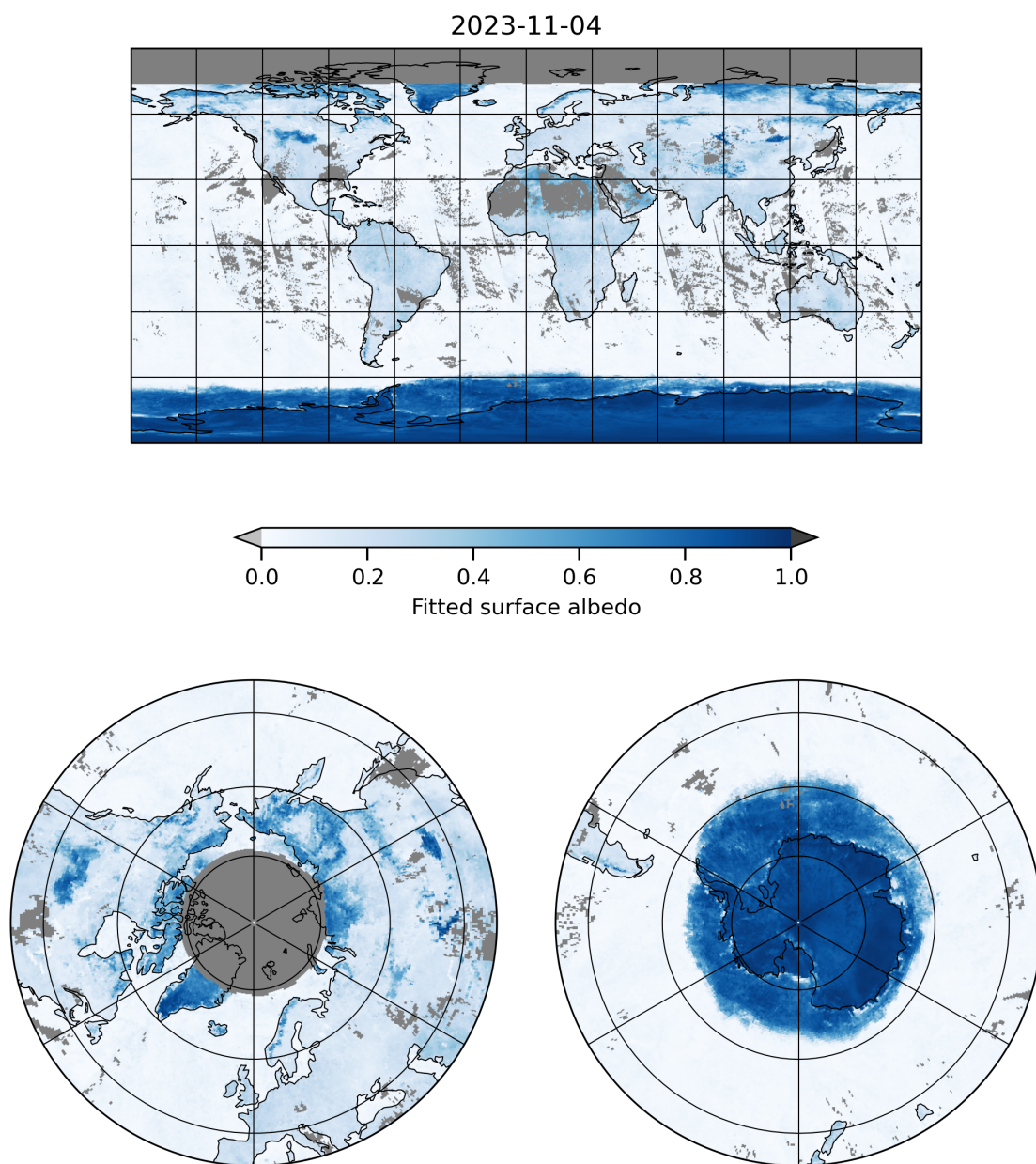


Figure 12: Map of “Fitted surface albedo” for 2023-11-03 to 2023-11-05

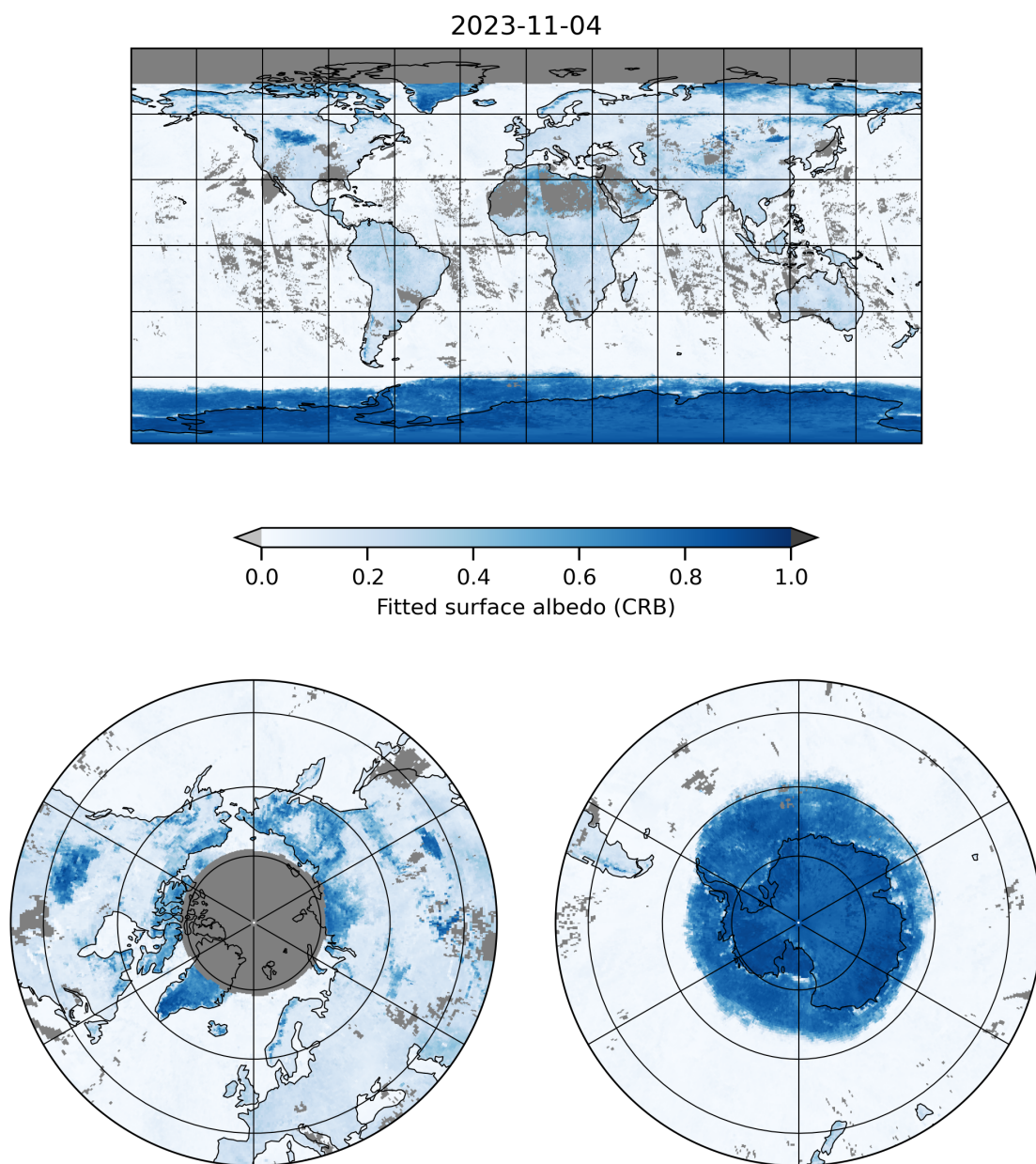


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-11-03 to 2023-11-05

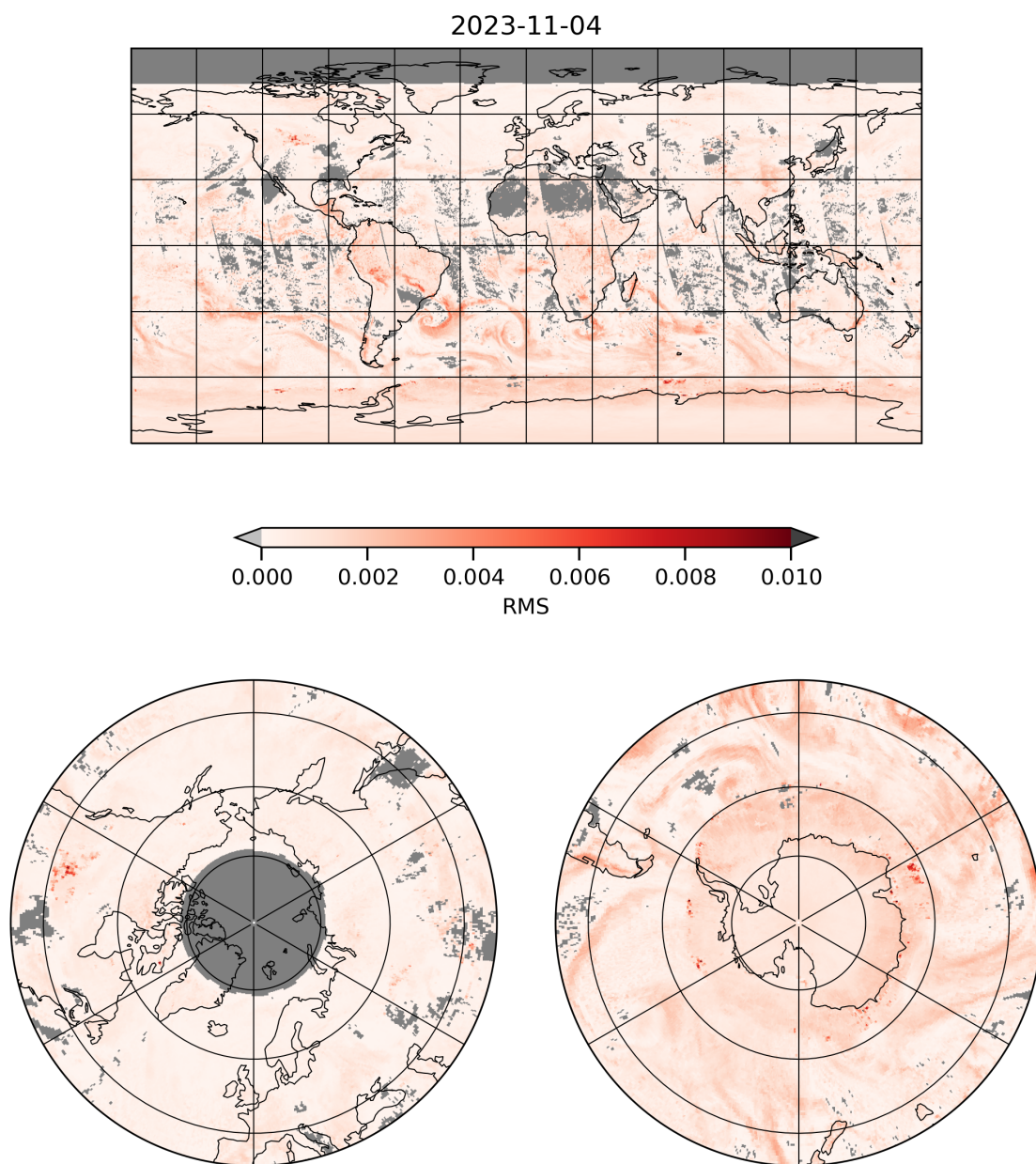


Figure 14: Map of “RMS” for 2023-11-03 to 2023-11-05

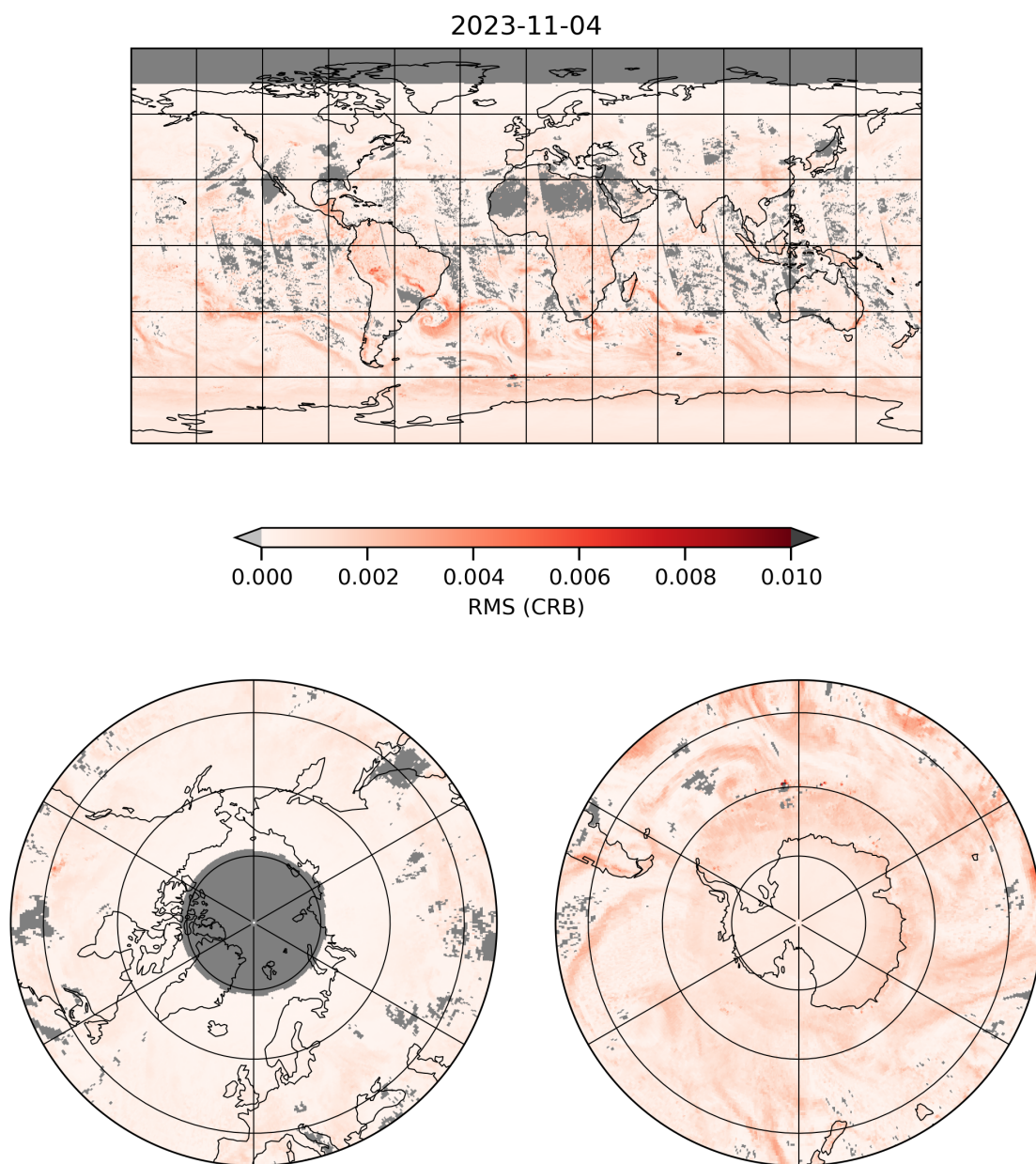


Figure 15: Map of “RMS (CRB)” for 2023-11-03 to 2023-11-05

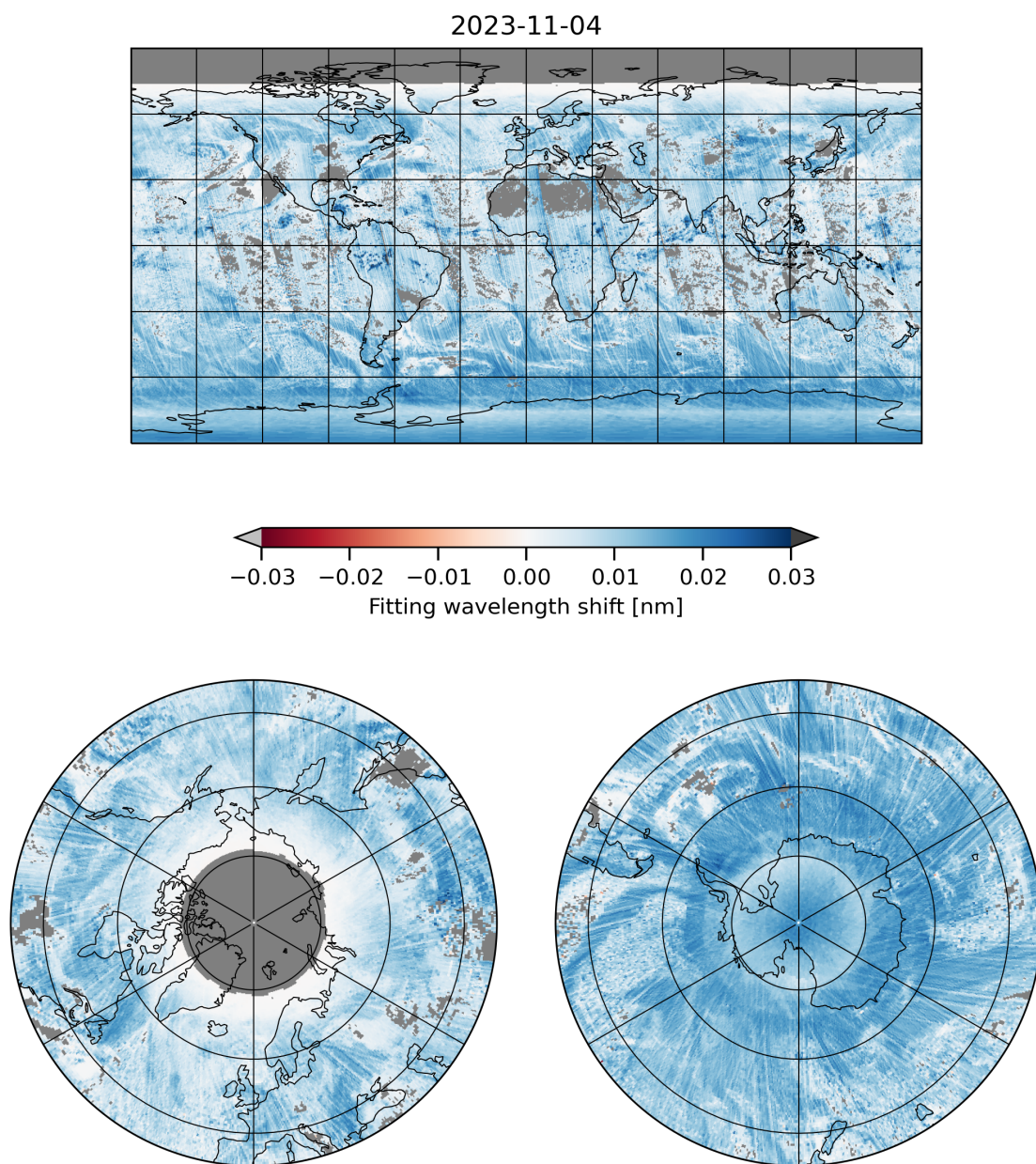


Figure 16: Map of “Fitting wavelength shift” for 2023-11-03 to 2023-11-05

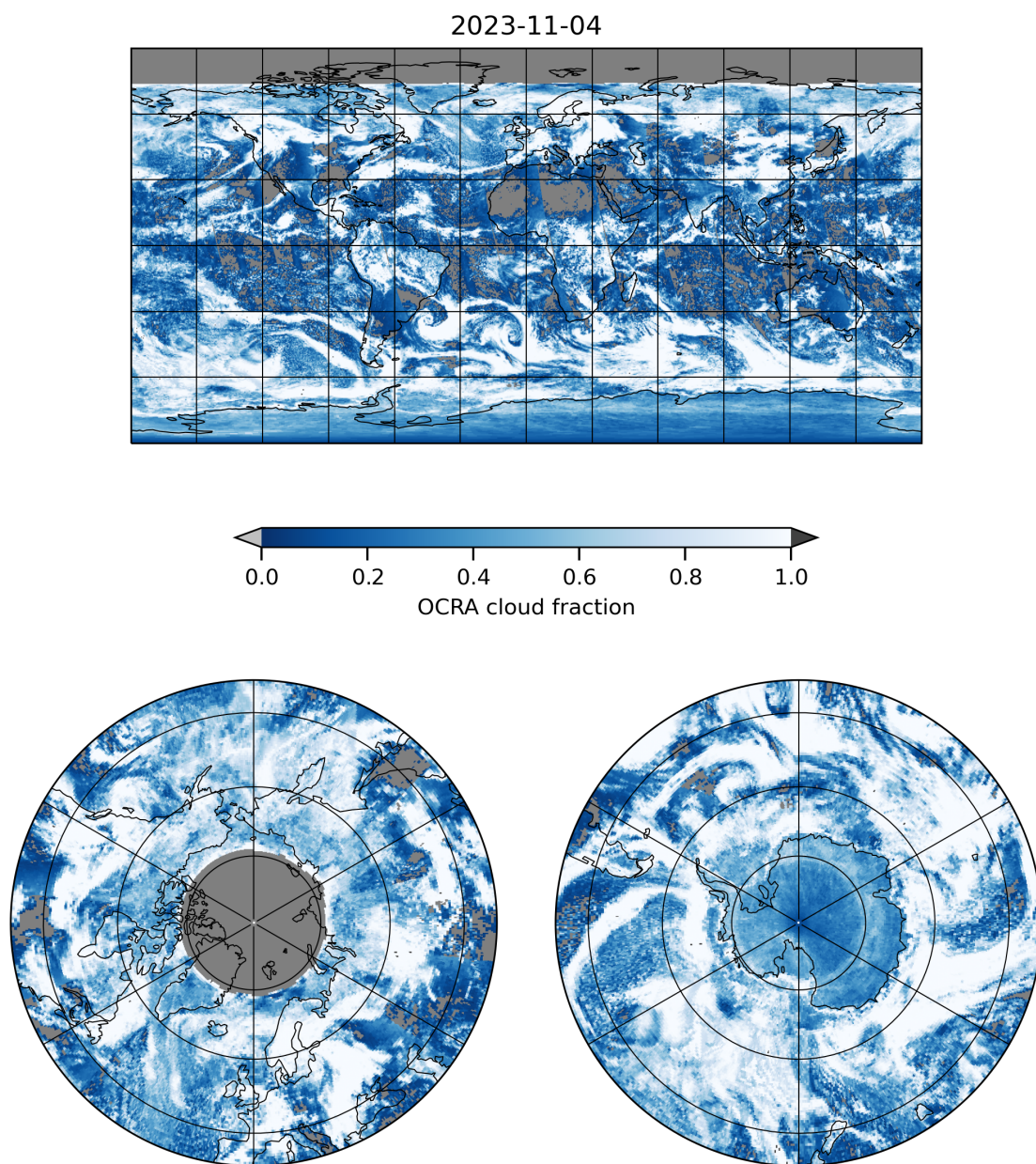


Figure 17: Map of “OCRA cloud fraction” for 2023-11-03 to 2023-11-05

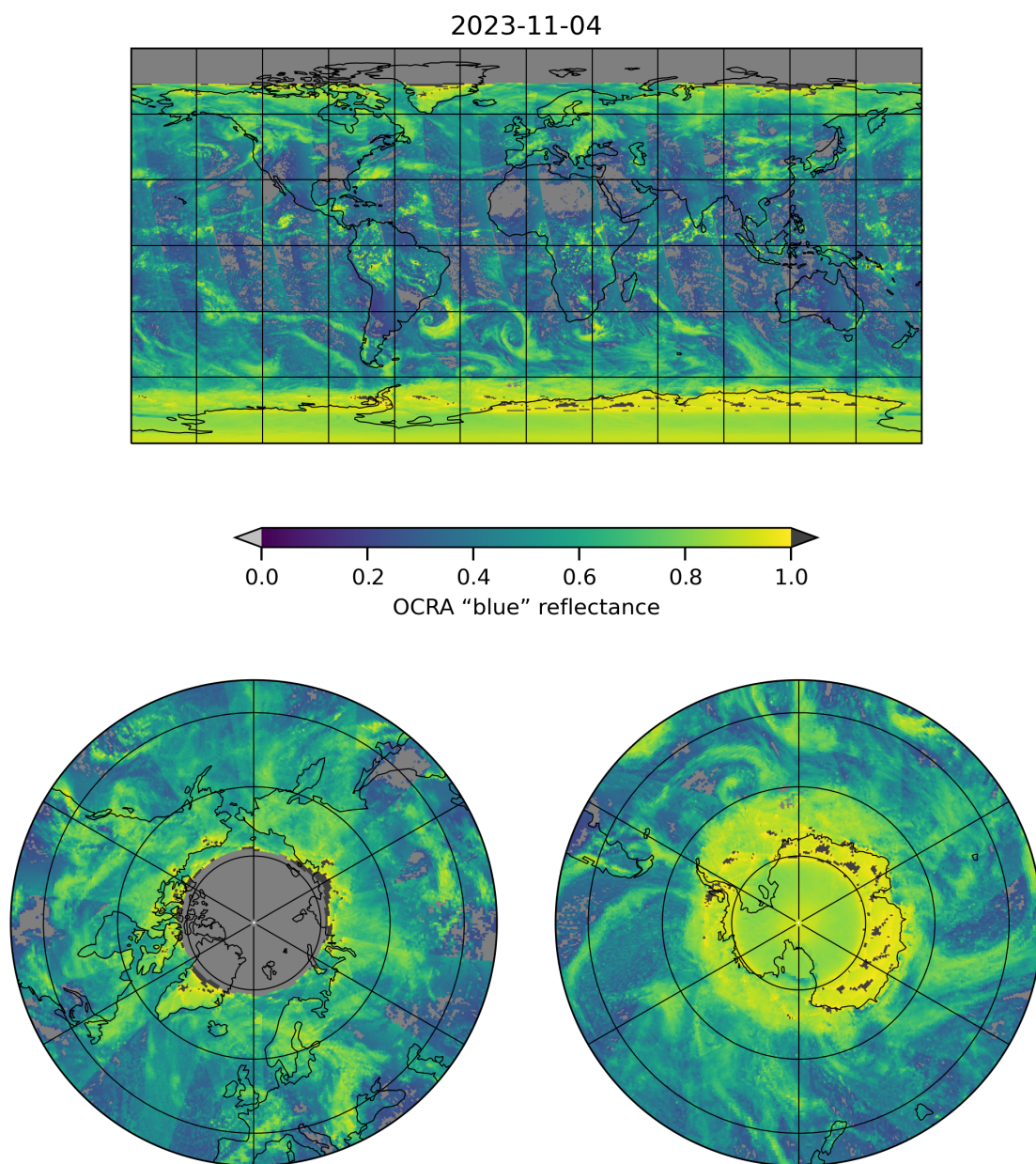


Figure 18: Map of "OCRA "blue" reflectance" for 2023-11-03 to 2023-11-05

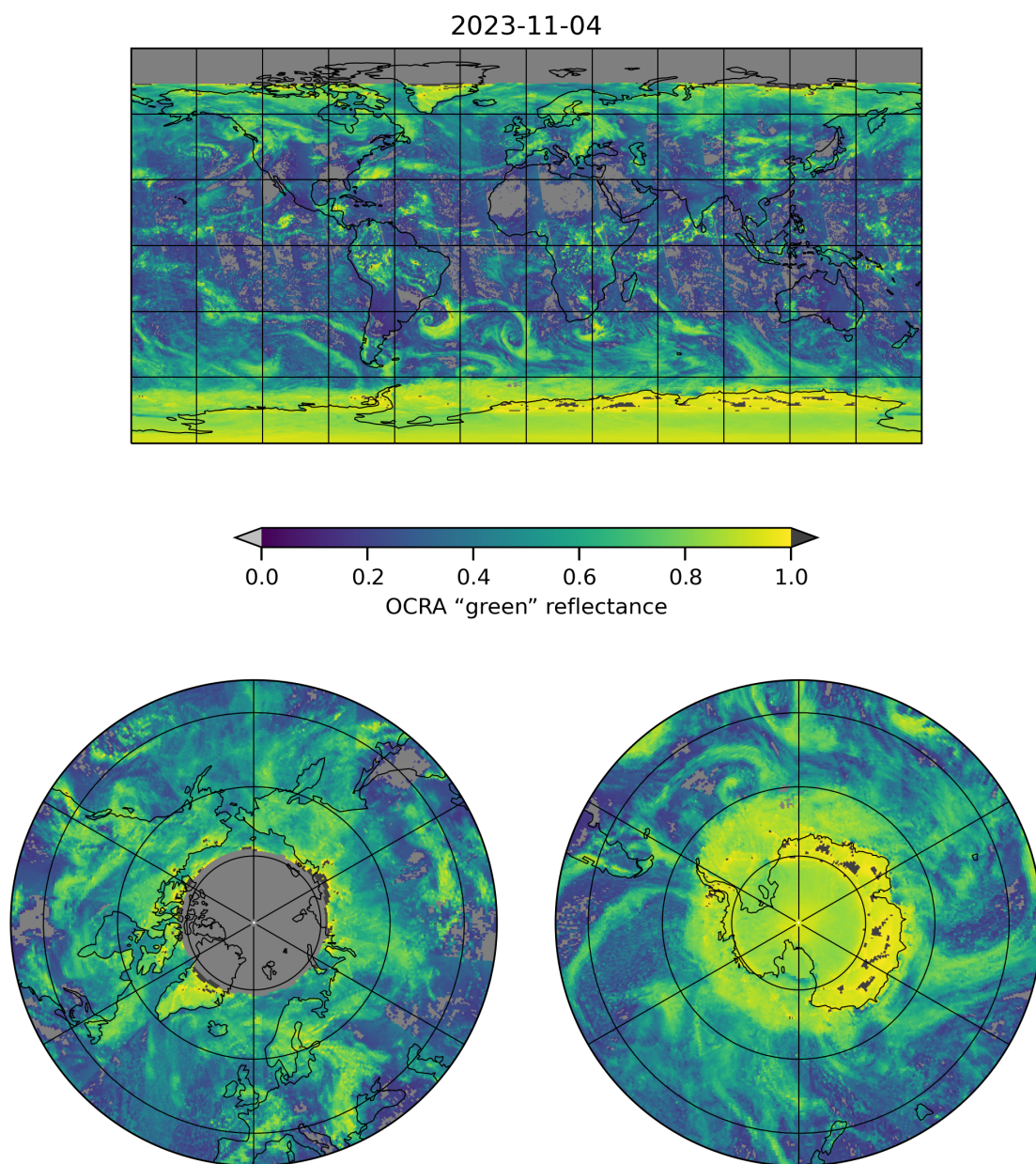


Figure 19: Map of "OCRA "green" reflectance" for 2023-11-03 to 2023-11-05

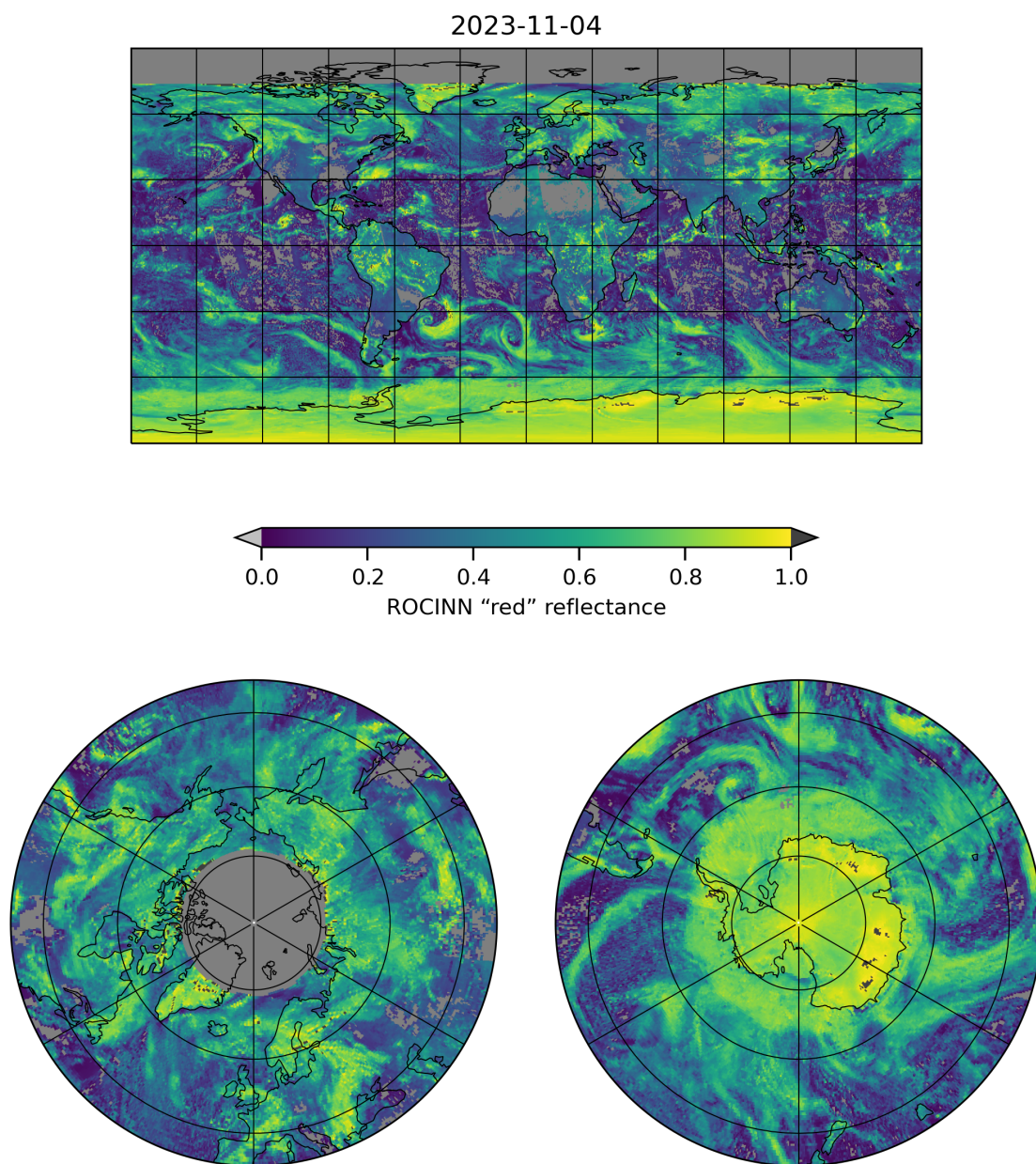


Figure 20: Map of "ROCINN "red" reflectance" for 2023-11-03 to 2023-11-05

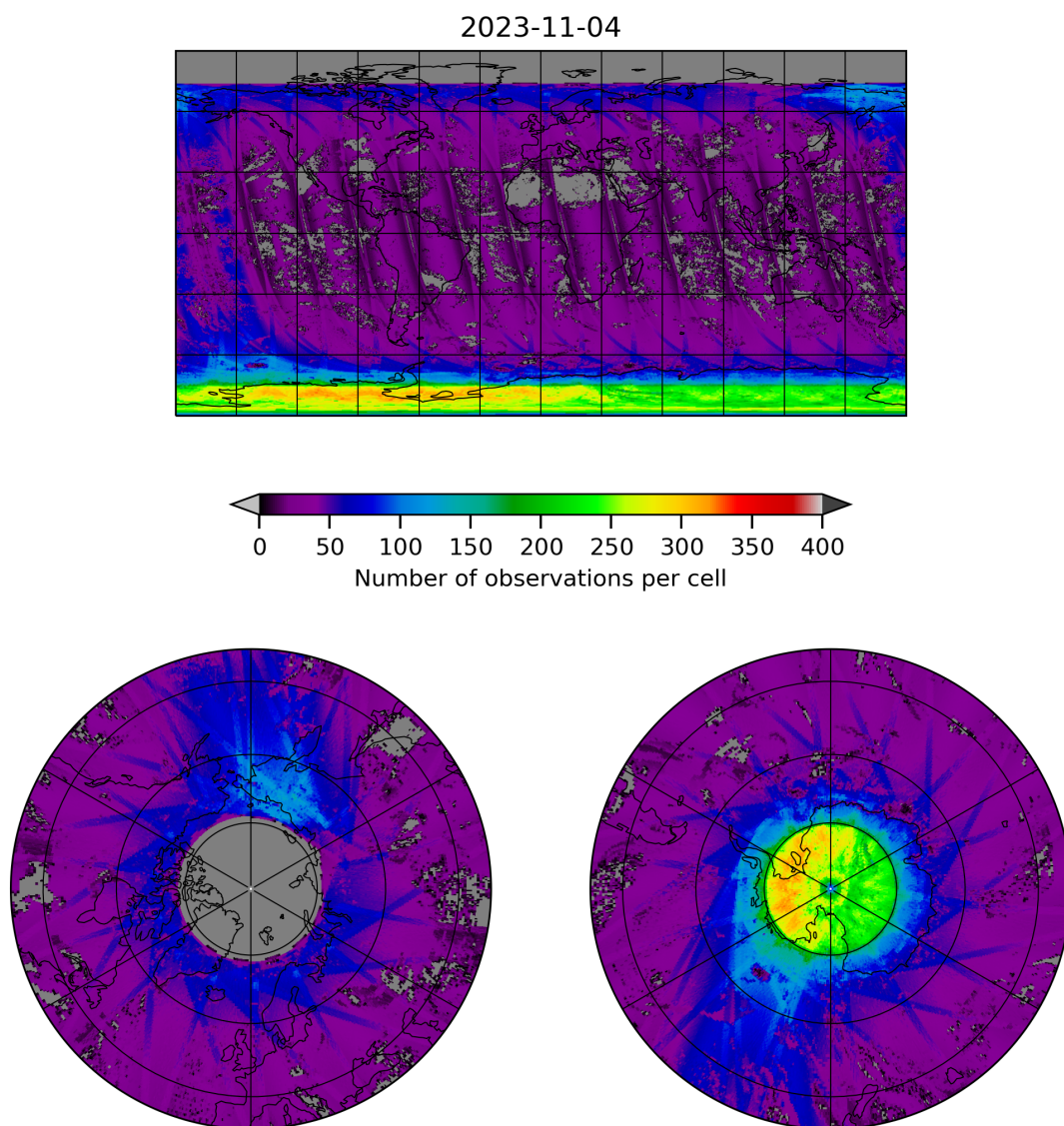


Figure 21: Map of the number of observations for 2023-11-03 to 2023-11-05

7 Zonal average

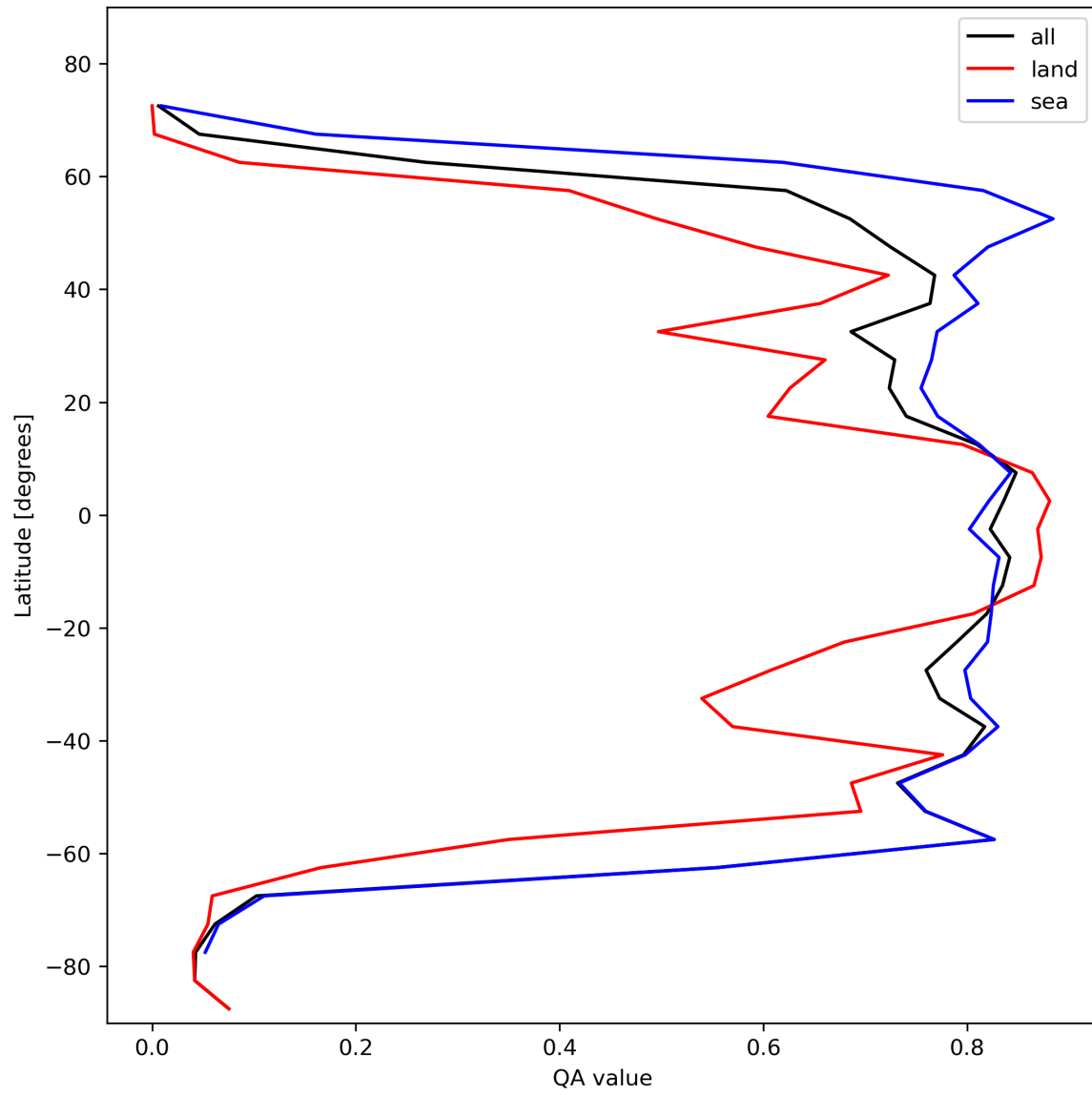


Figure 22: Zonal average of “QA value” for 2023-11-03 to 2023-11-05.

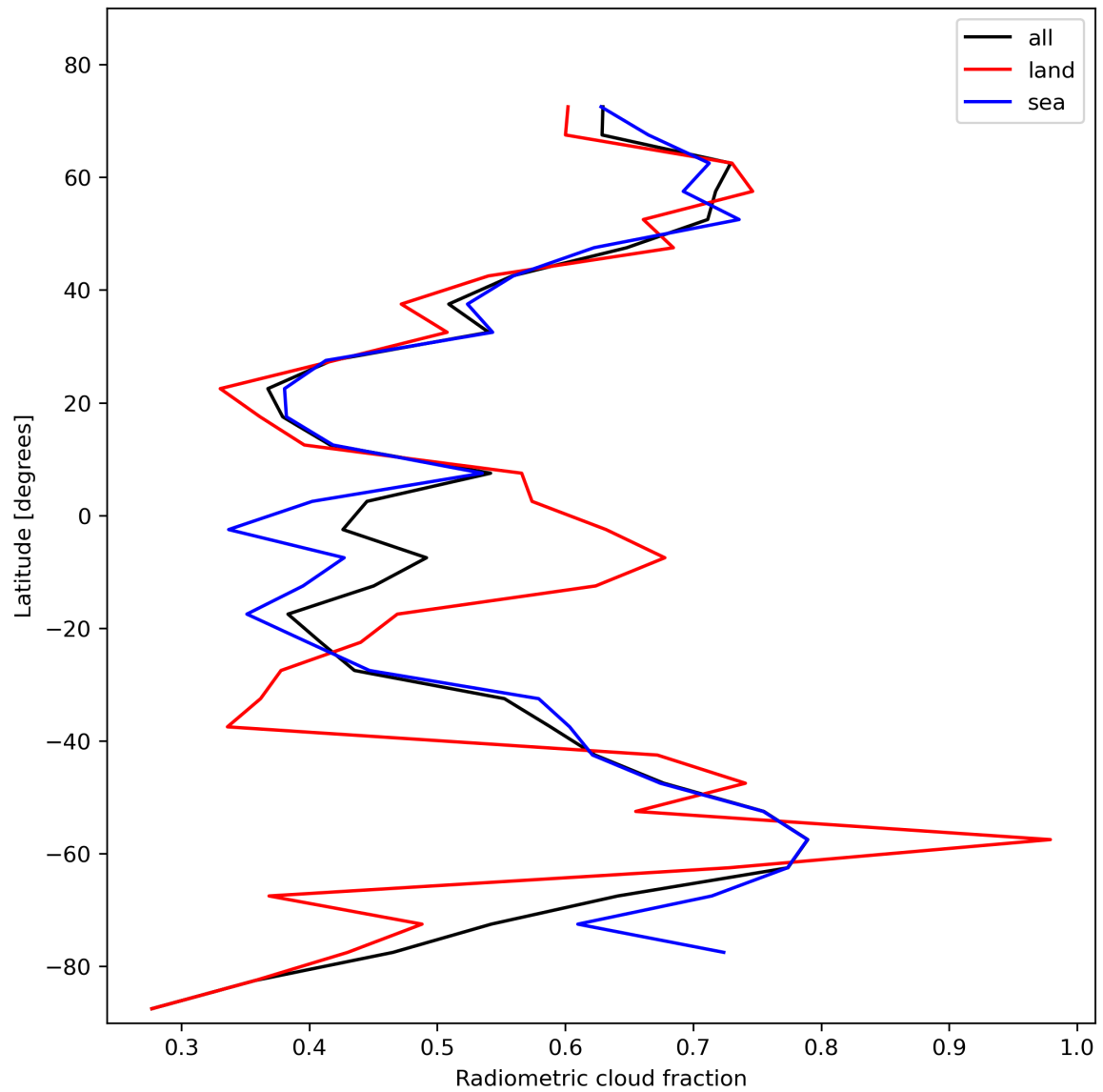


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-11-03 to 2023-11-05.

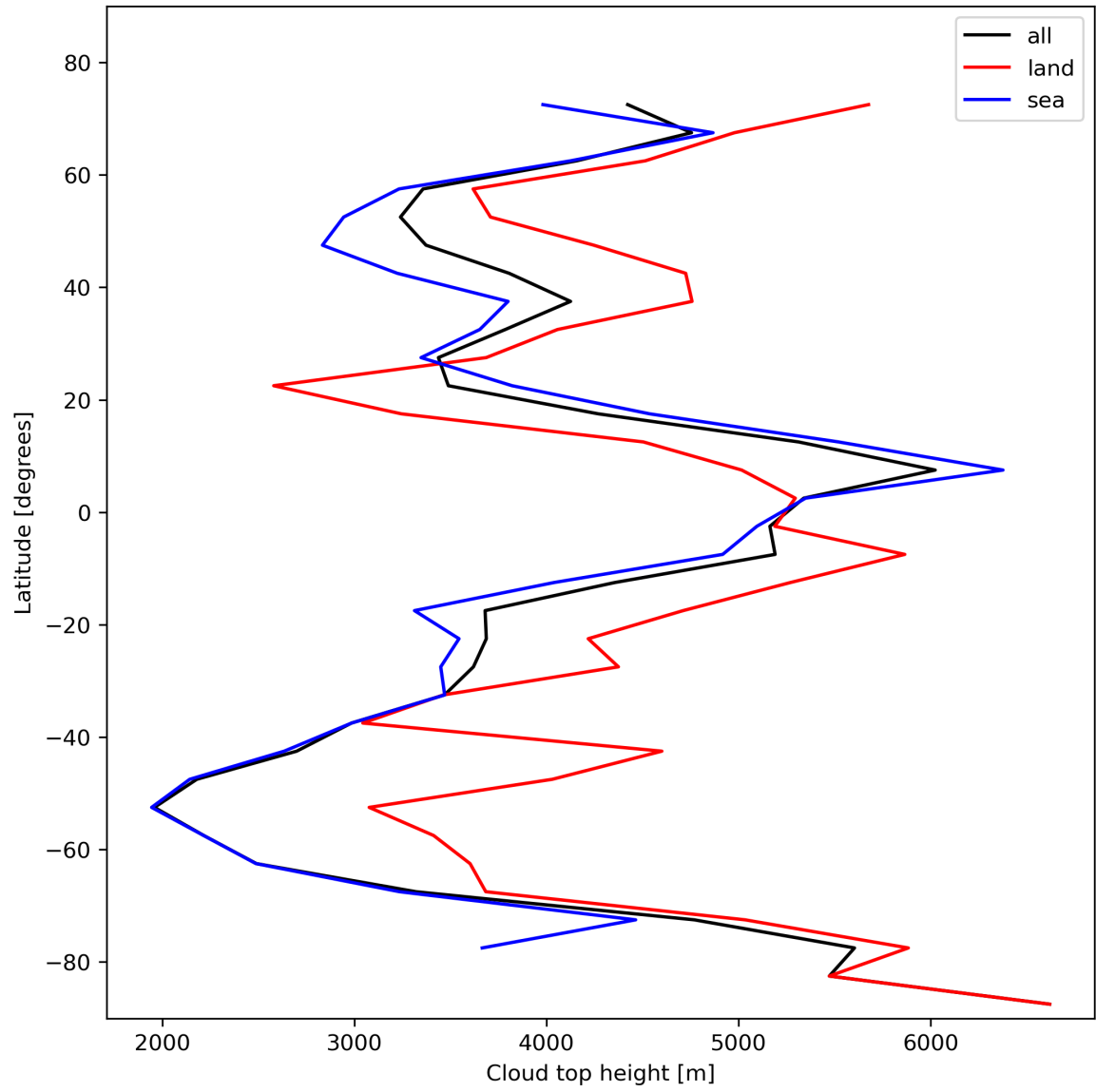


Figure 24: Zonal average of “Cloud top height” for 2023-11-03 to 2023-11-05.

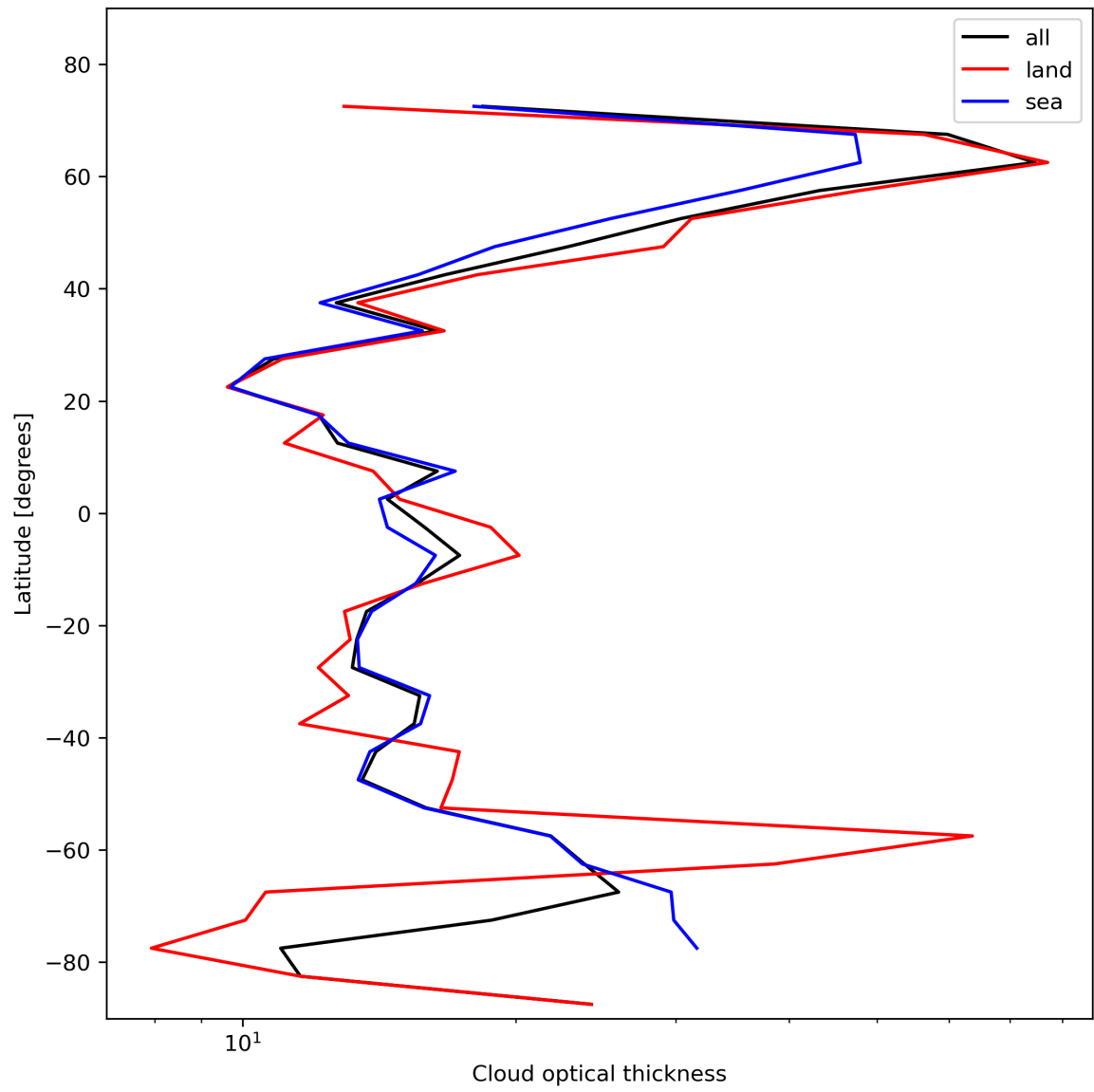


Figure 25: Zonal average of “Cloud optical thickness” for 2023-11-03 to 2023-11-05.

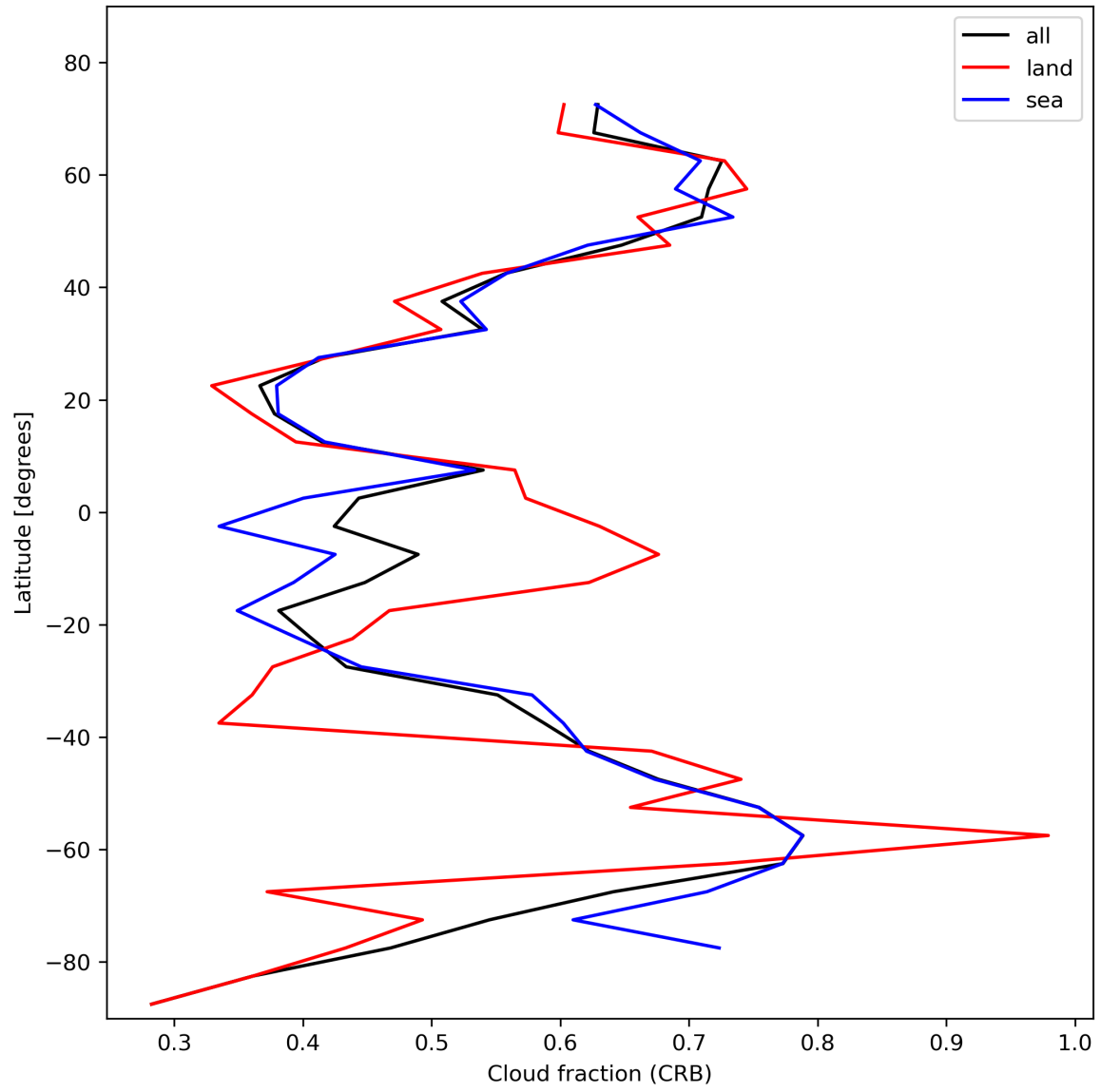


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-11-03 to 2023-11-05.

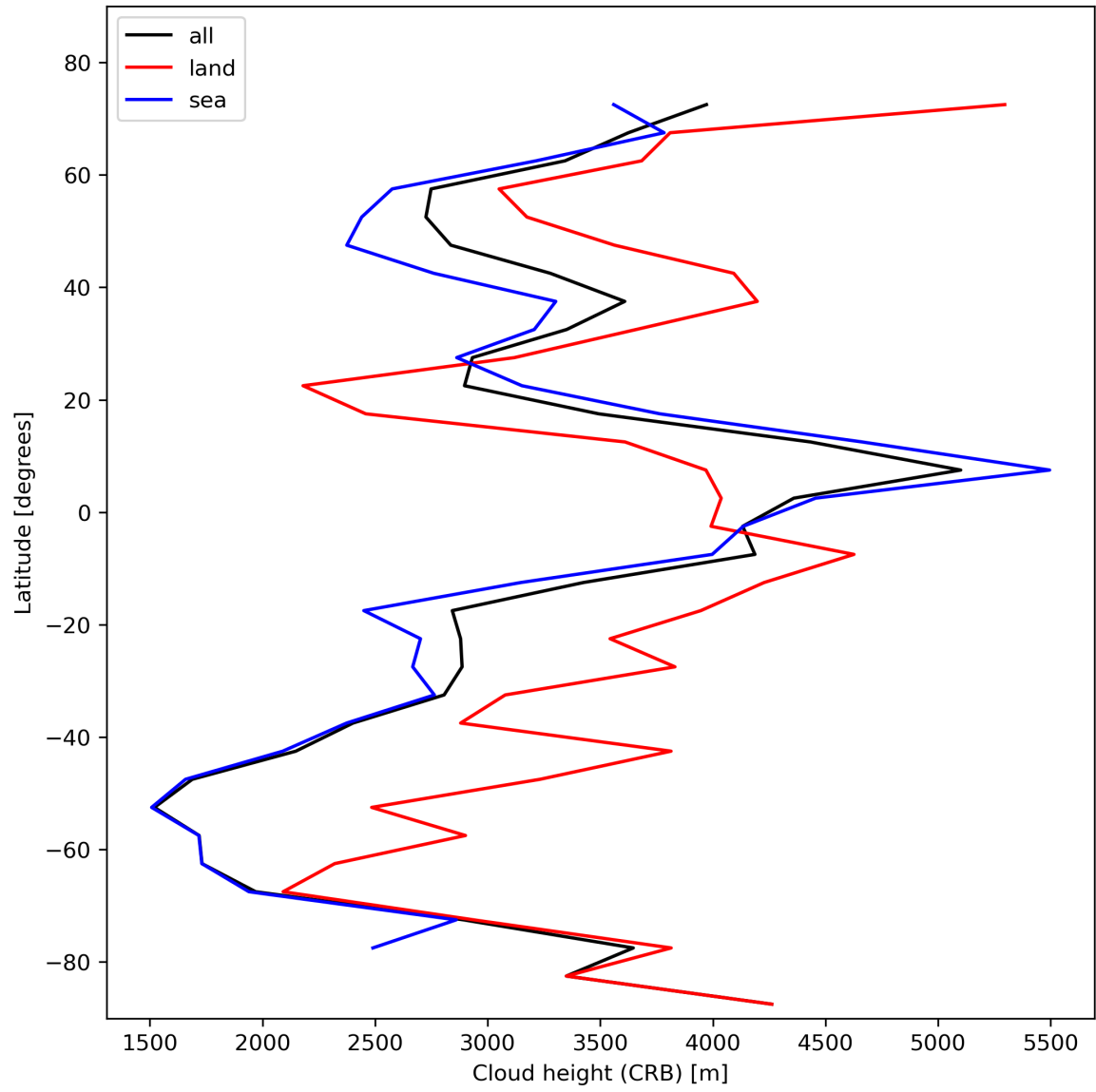


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-11-03 to 2023-11-05.

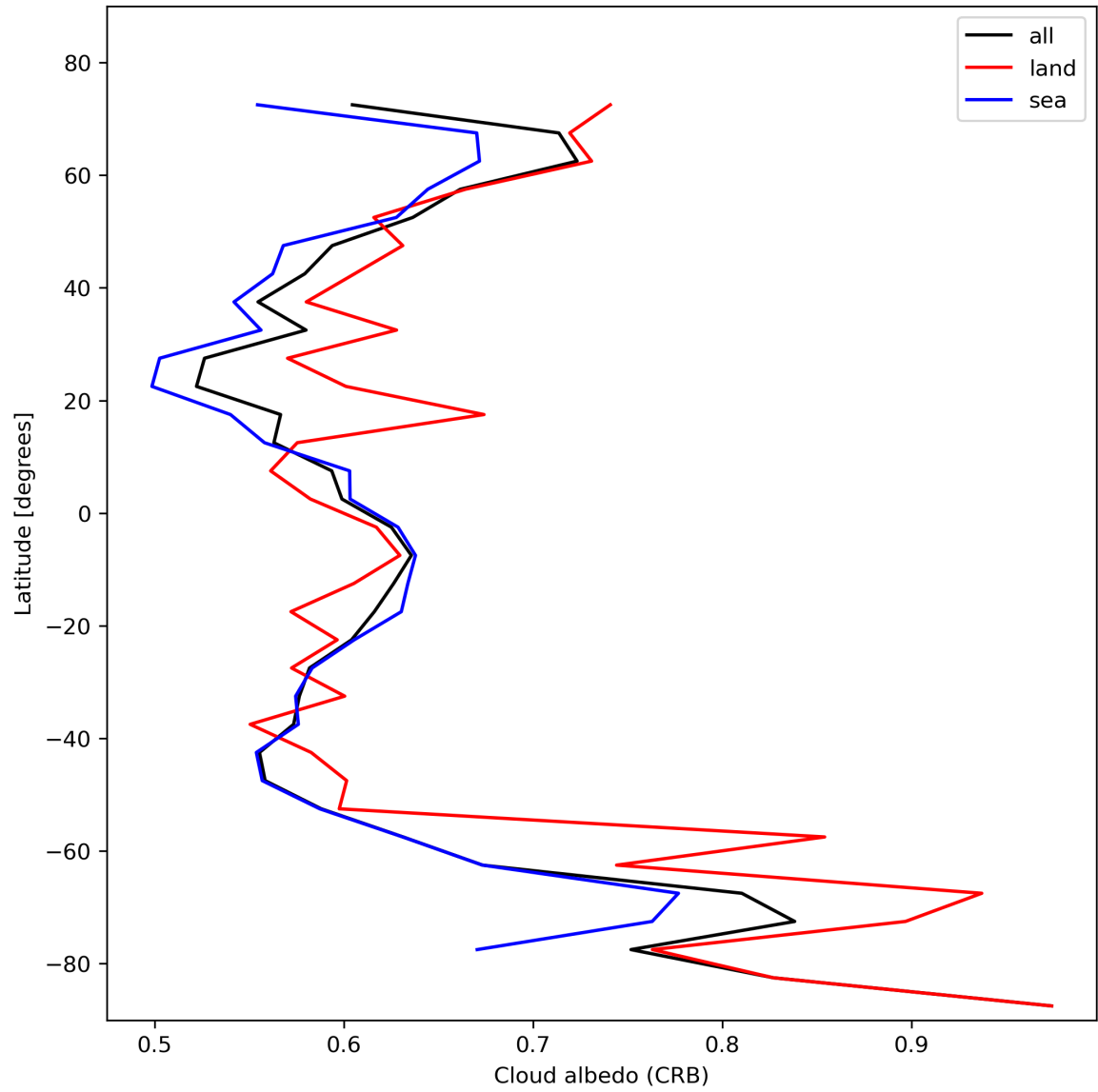


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-11-03 to 2023-11-05.

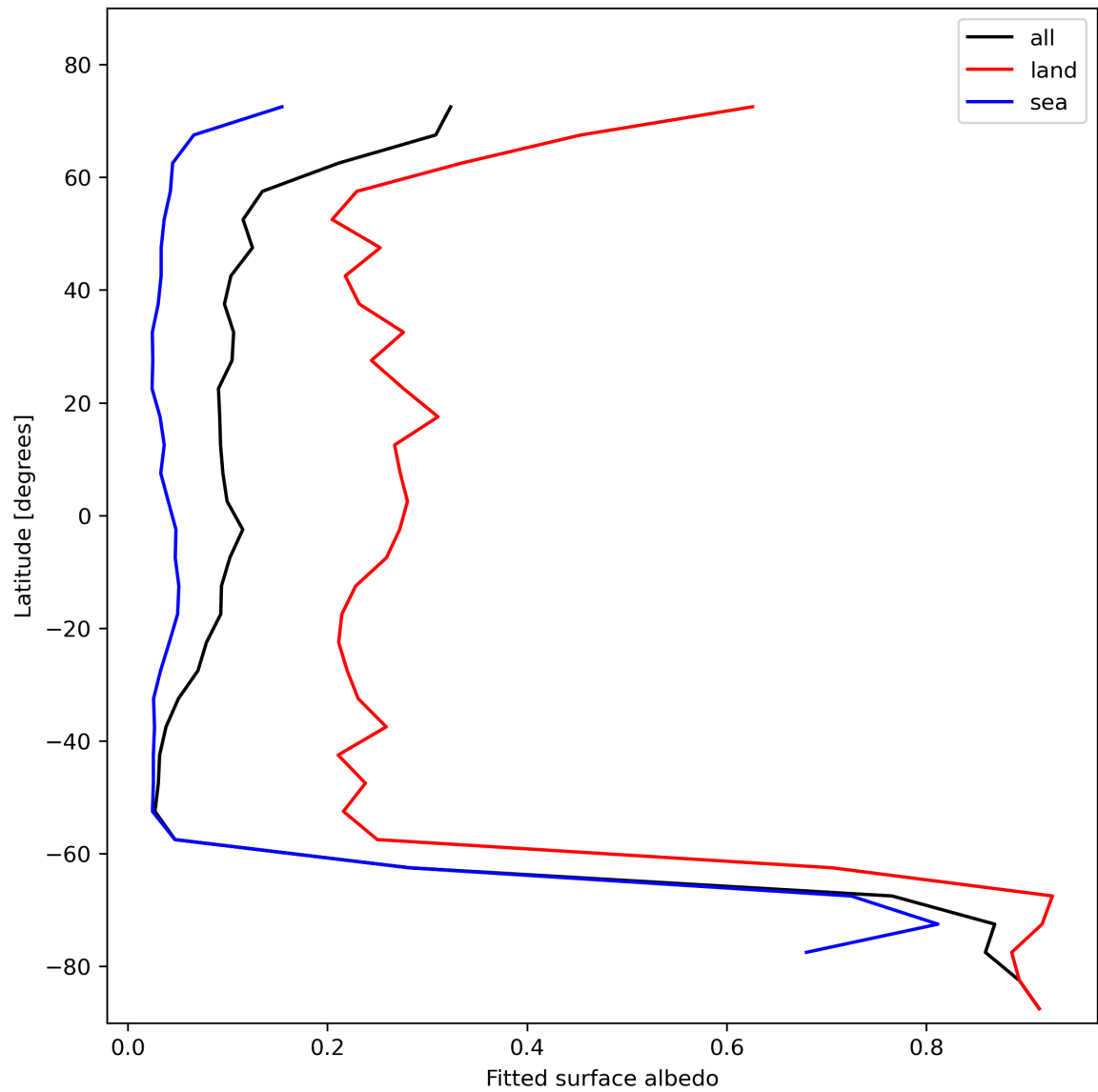


Figure 29: Zonal average of “Fitted surface albedo” for 2023-11-03 to 2023-11-05.

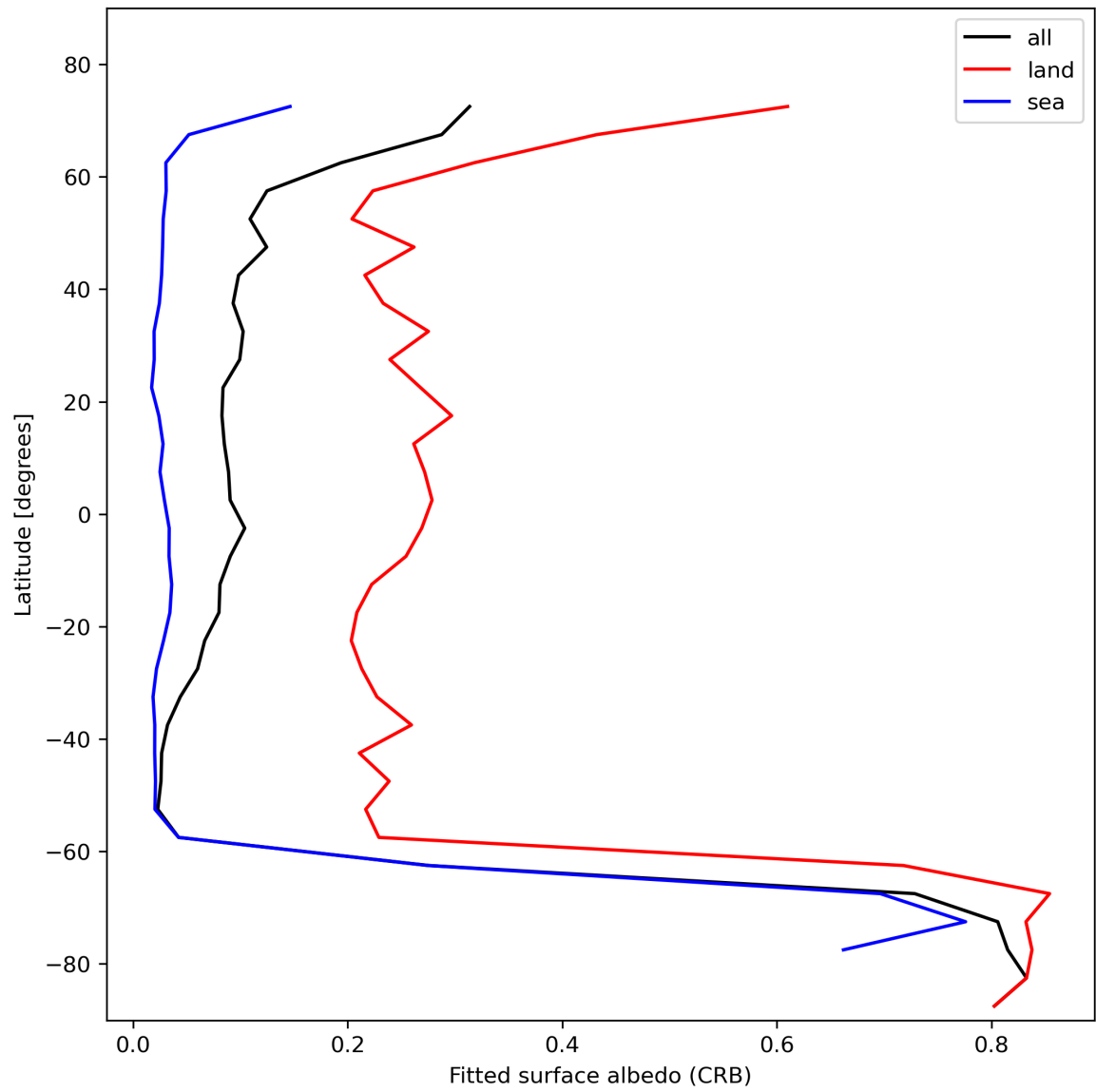


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-11-03 to 2023-11-05.

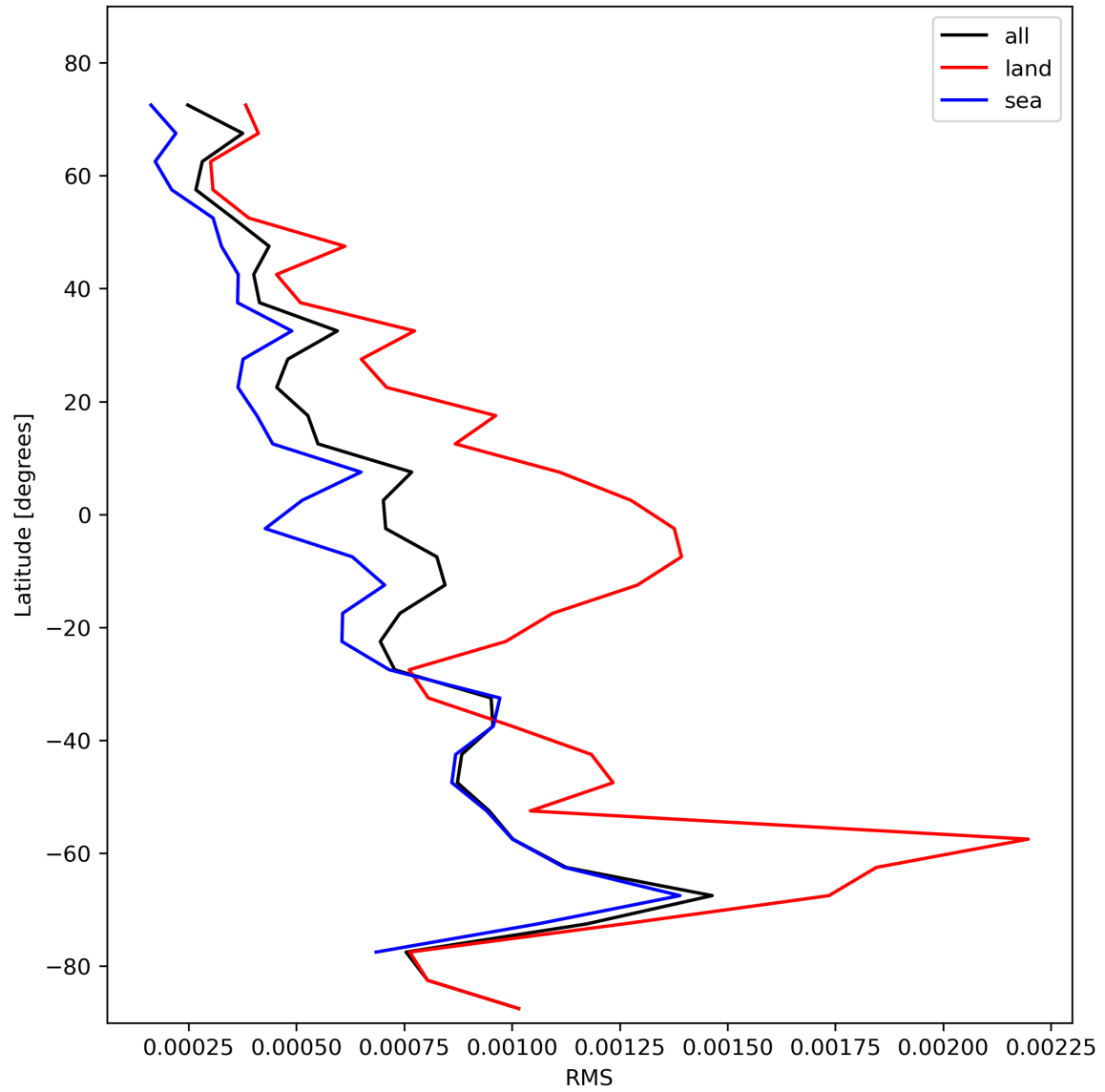


Figure 31: Zonal average of “RMS” for 2023-11-03 to 2023-11-05.

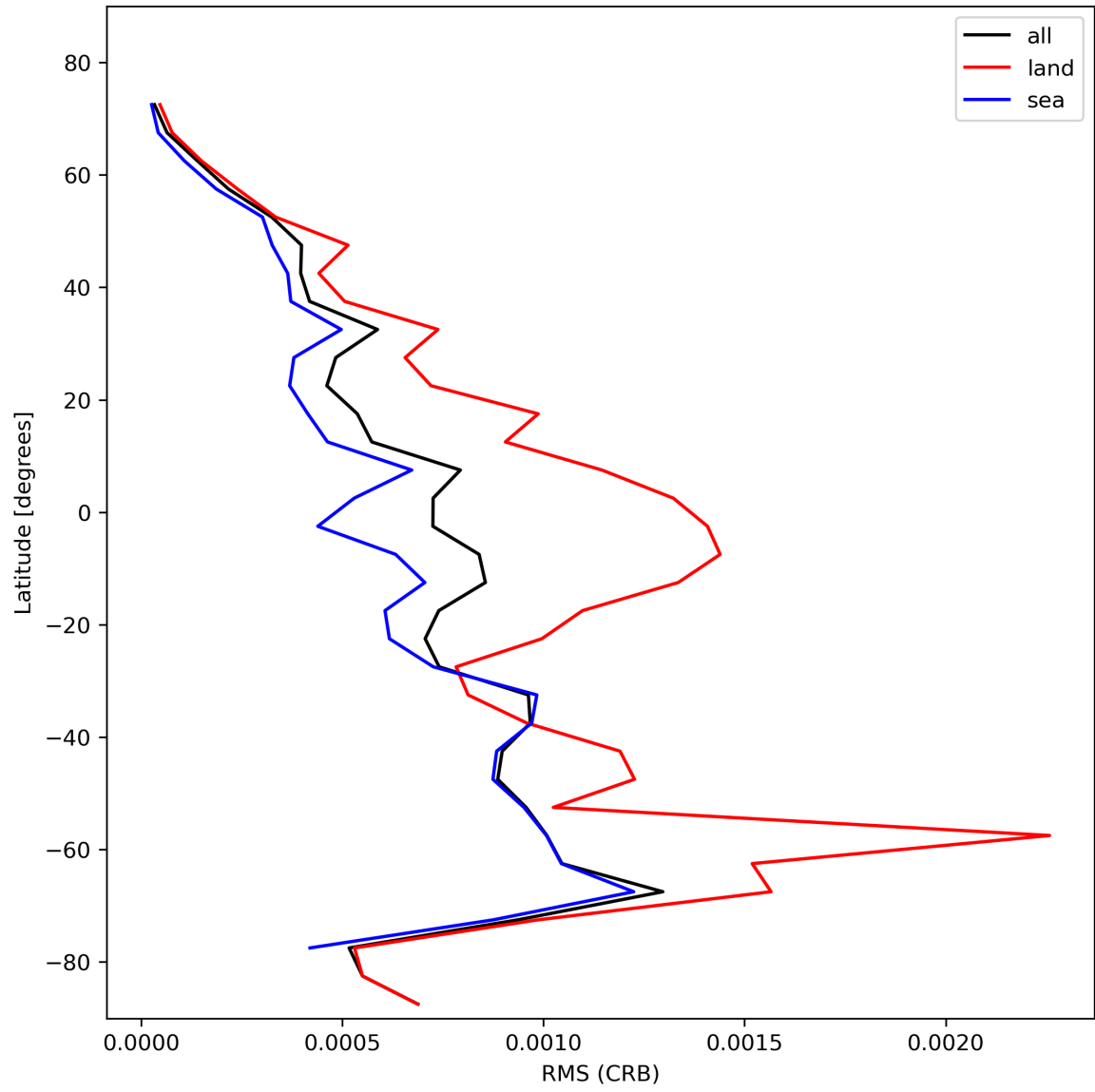


Figure 32: Zonal average of “RMS (CRB)” for 2023-11-03 to 2023-11-05.

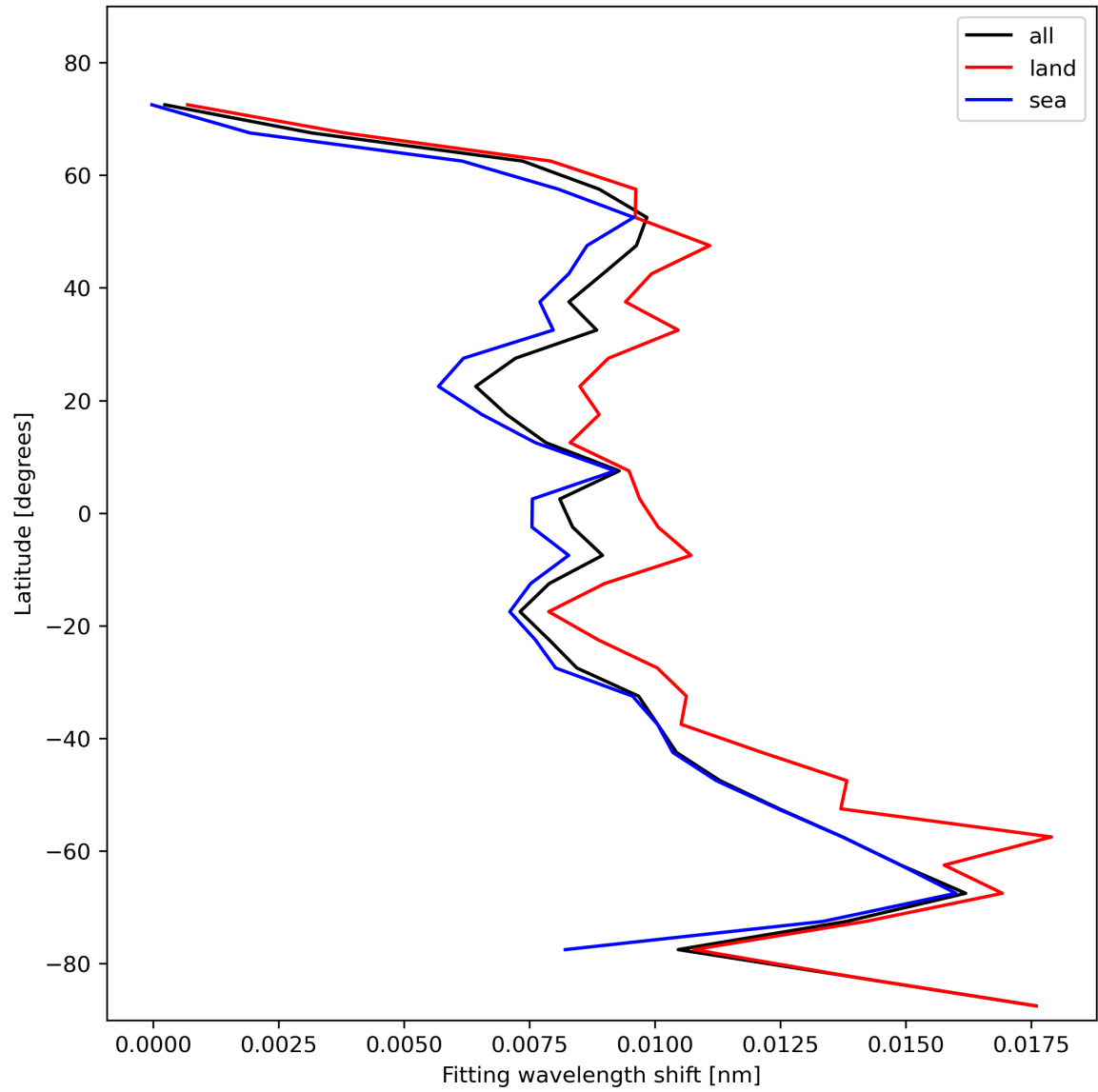


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-11-03 to 2023-11-05.

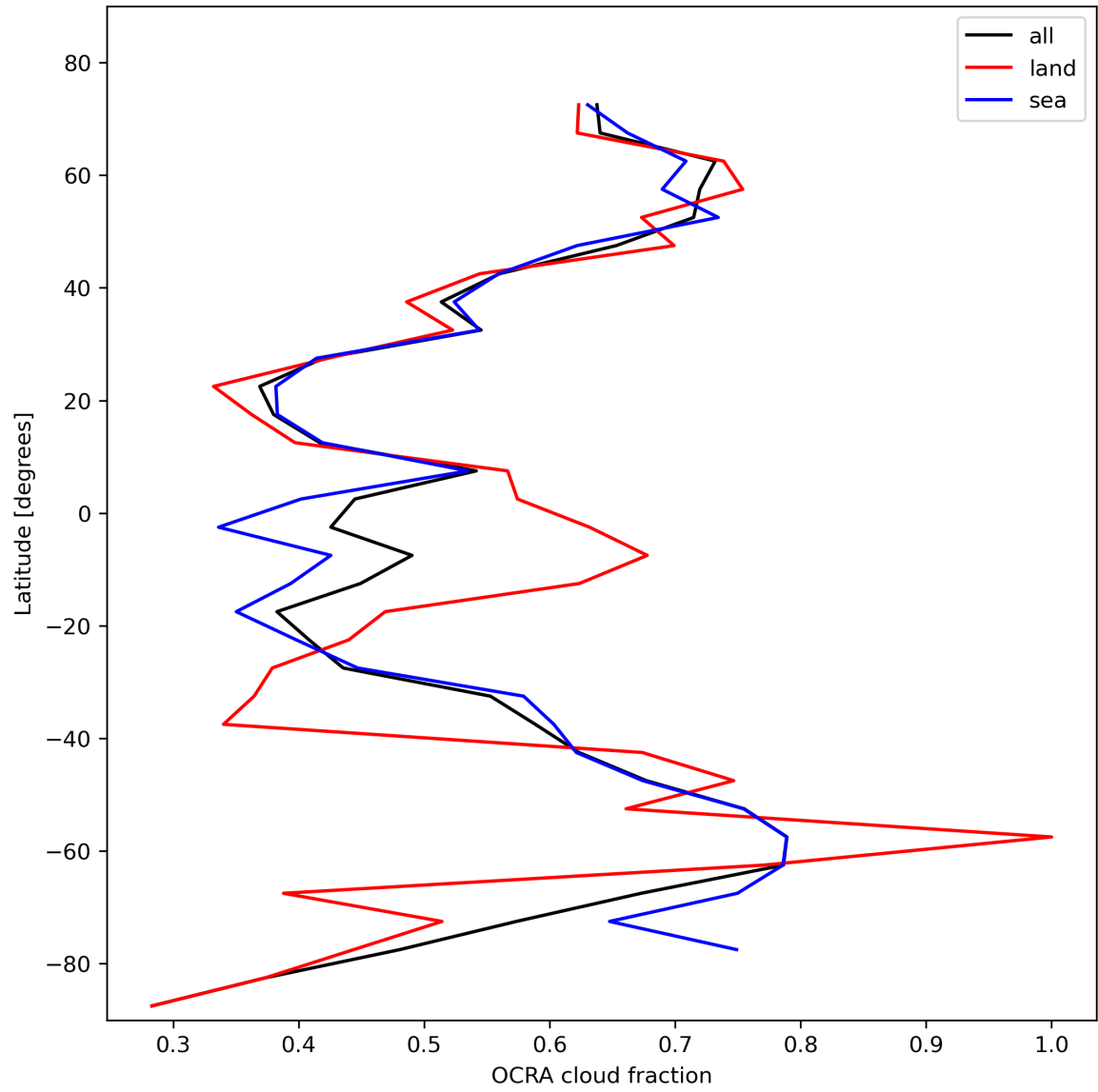


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-11-03 to 2023-11-05.

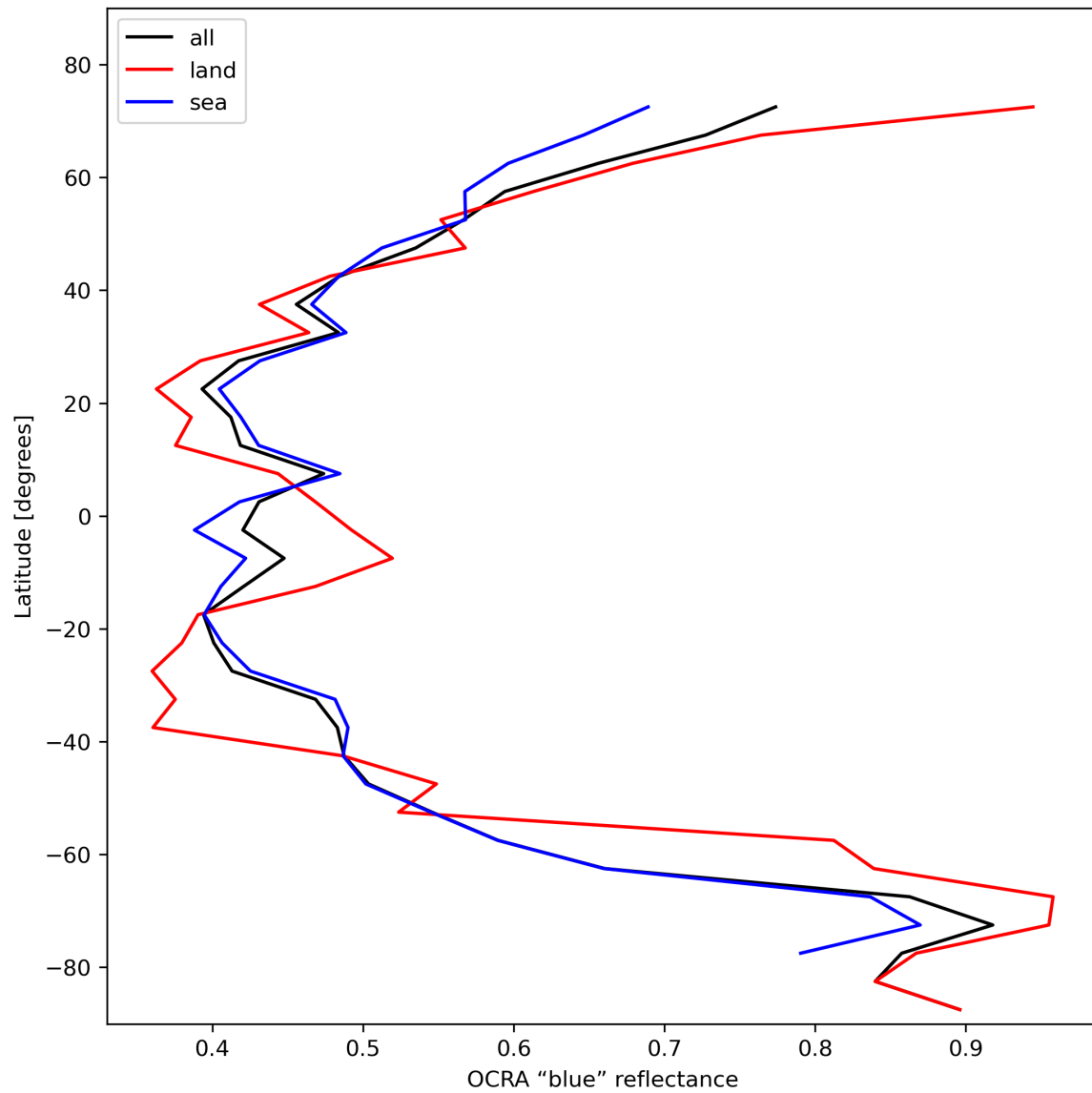


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-11-03 to 2023-11-05.

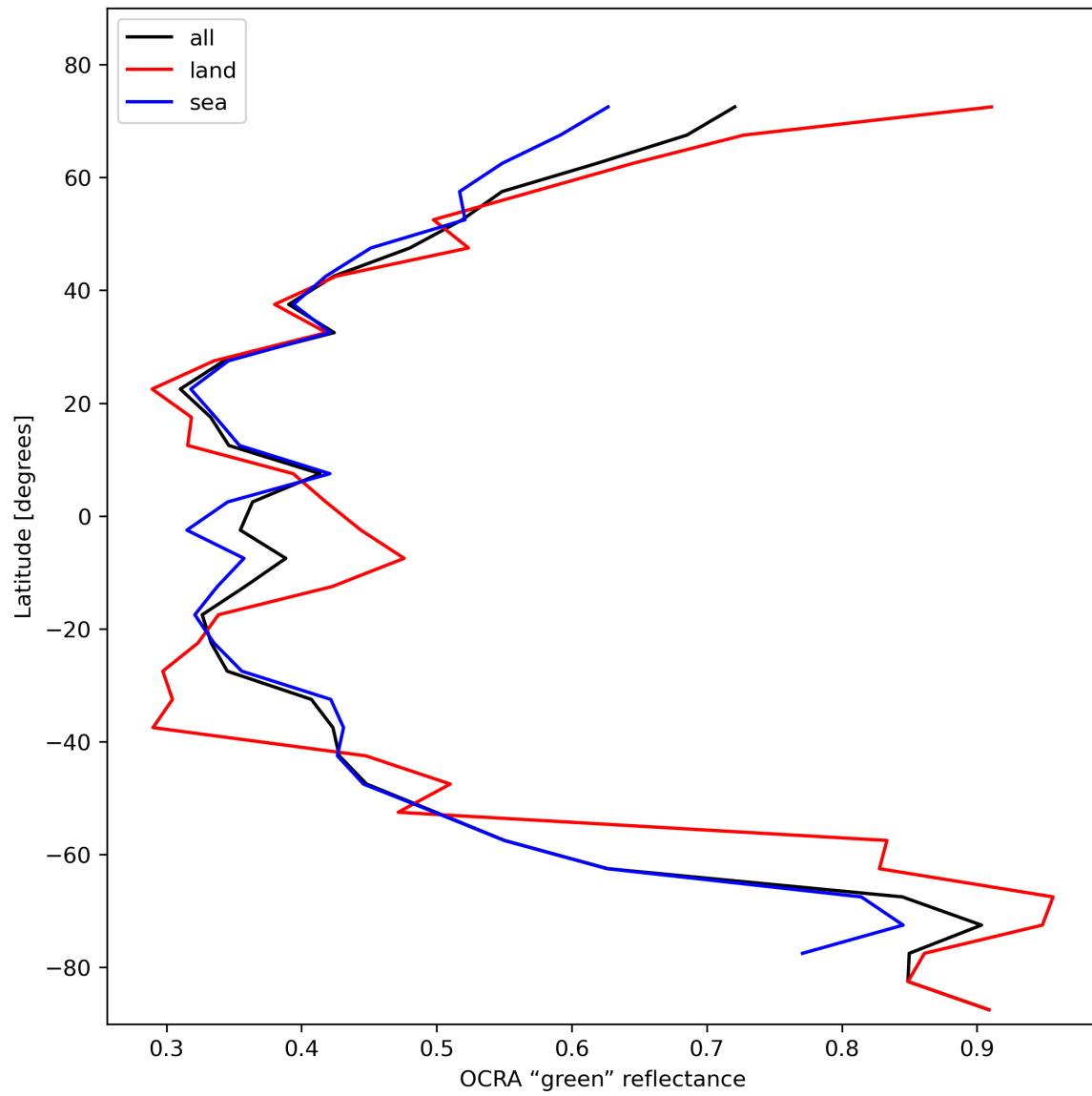


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-11-03 to 2023-11-05.

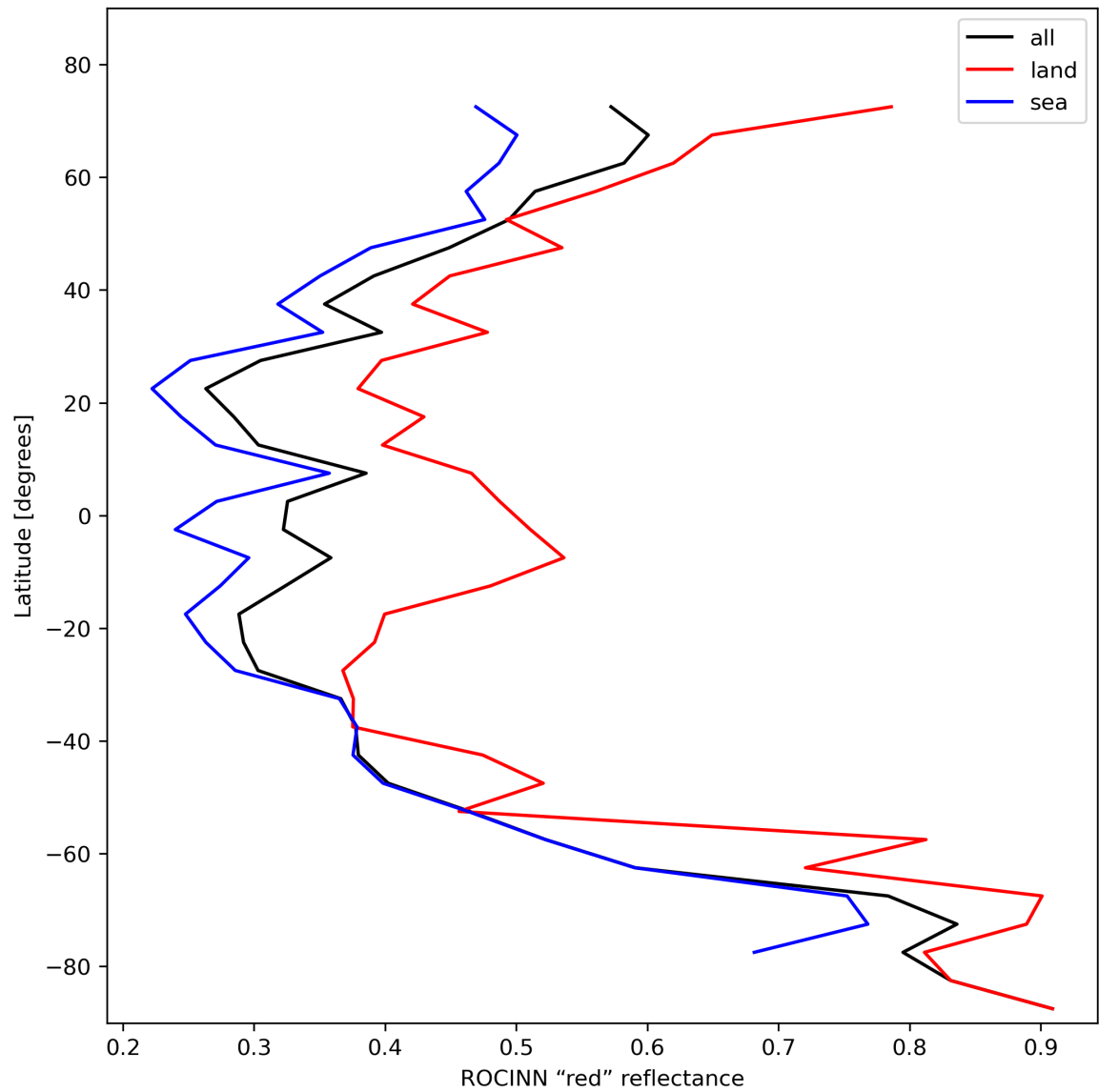


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-11-03 to 2023-11-05.

8 Histograms

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

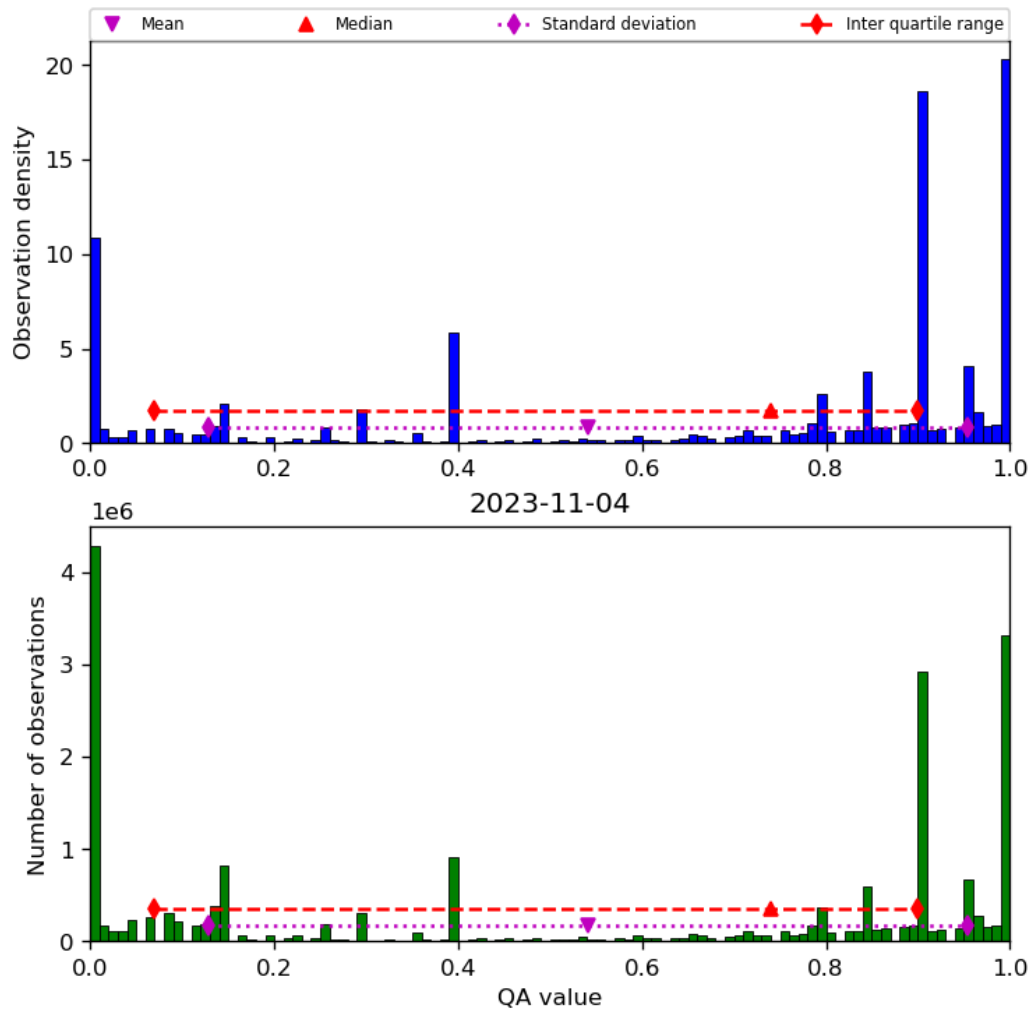


Figure 38: Histogram of “QA value” for 2023-11-03 to 2023-11-05

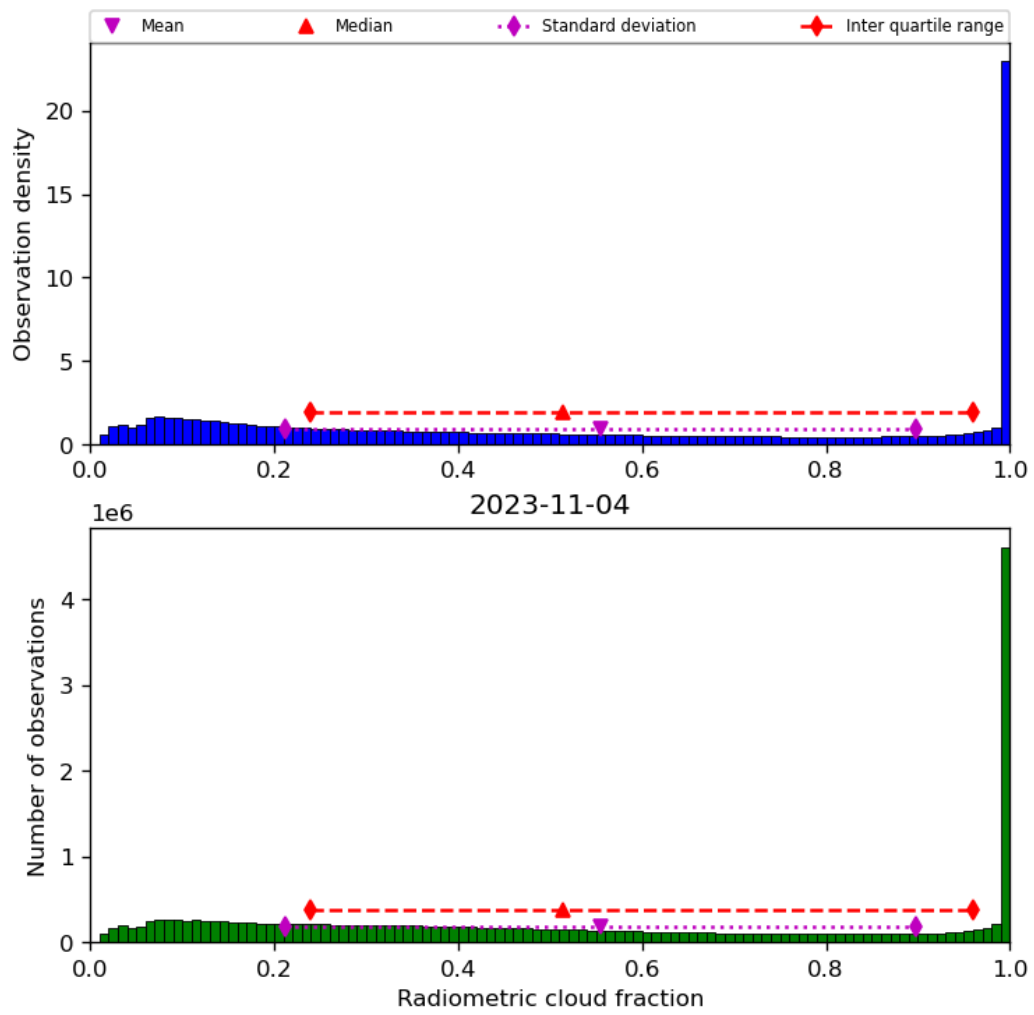


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-11-03 to 2023-11-05

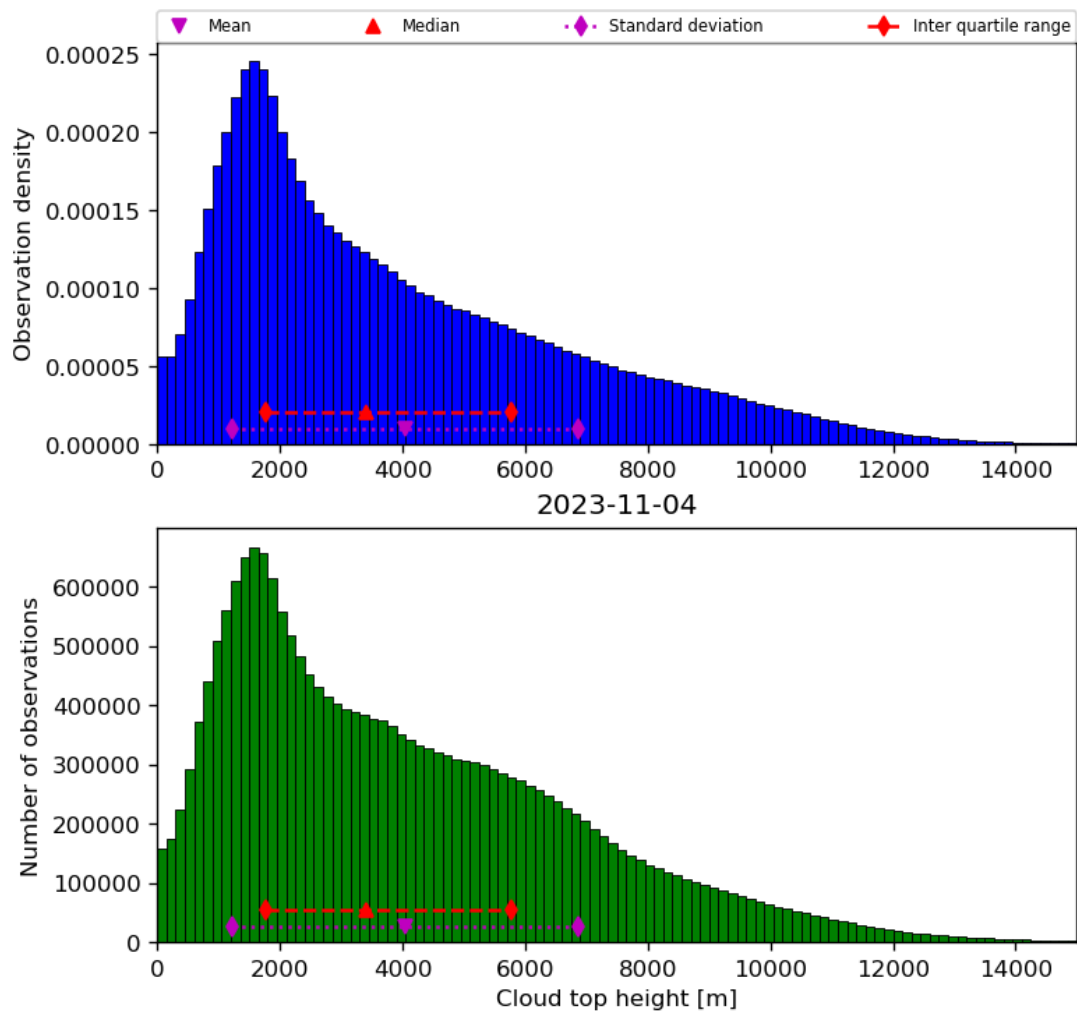


Figure 40: Histogram of “Cloud top height” for 2023-11-03 to 2023-11-05

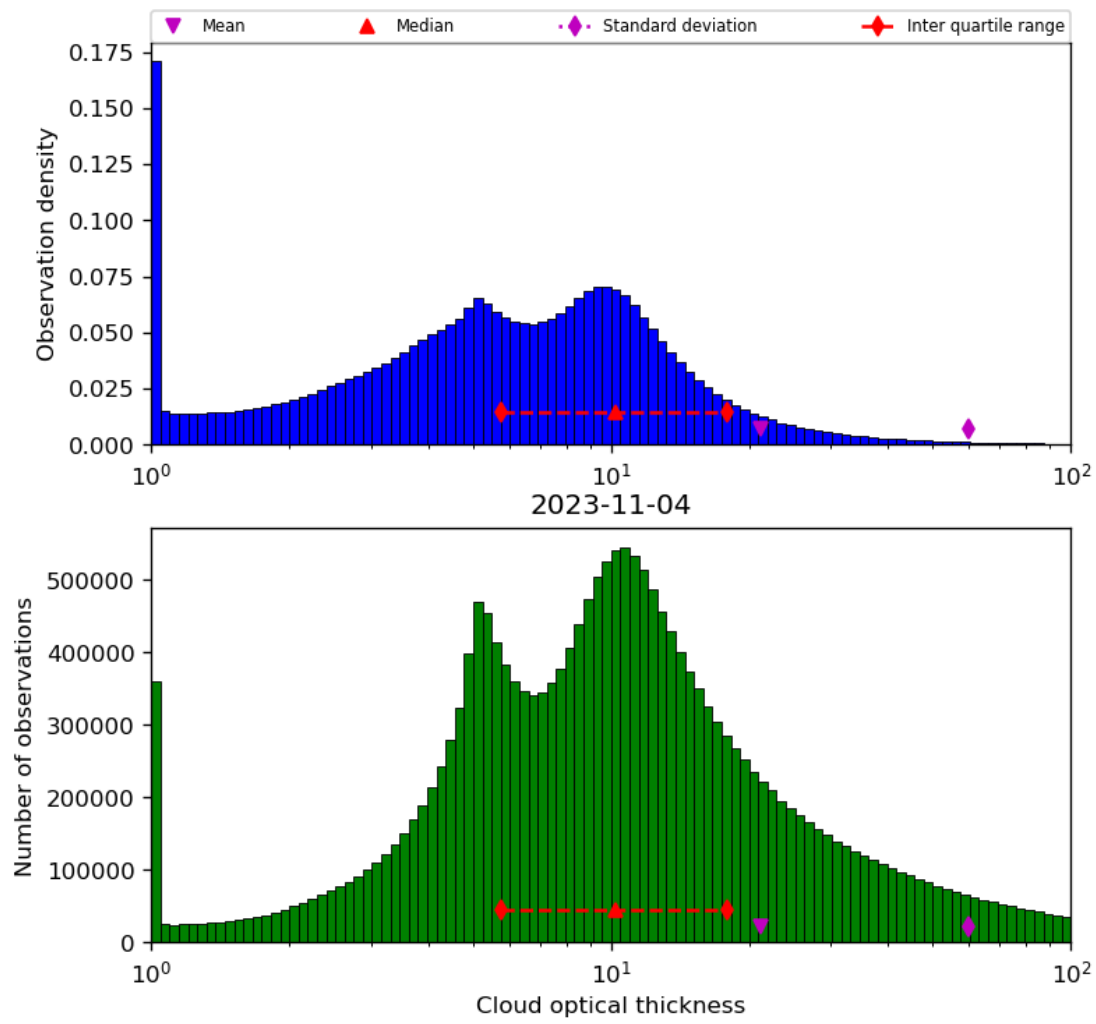


Figure 41: Histogram of “Cloud optical thickness” for 2023-11-03 to 2023-11-05

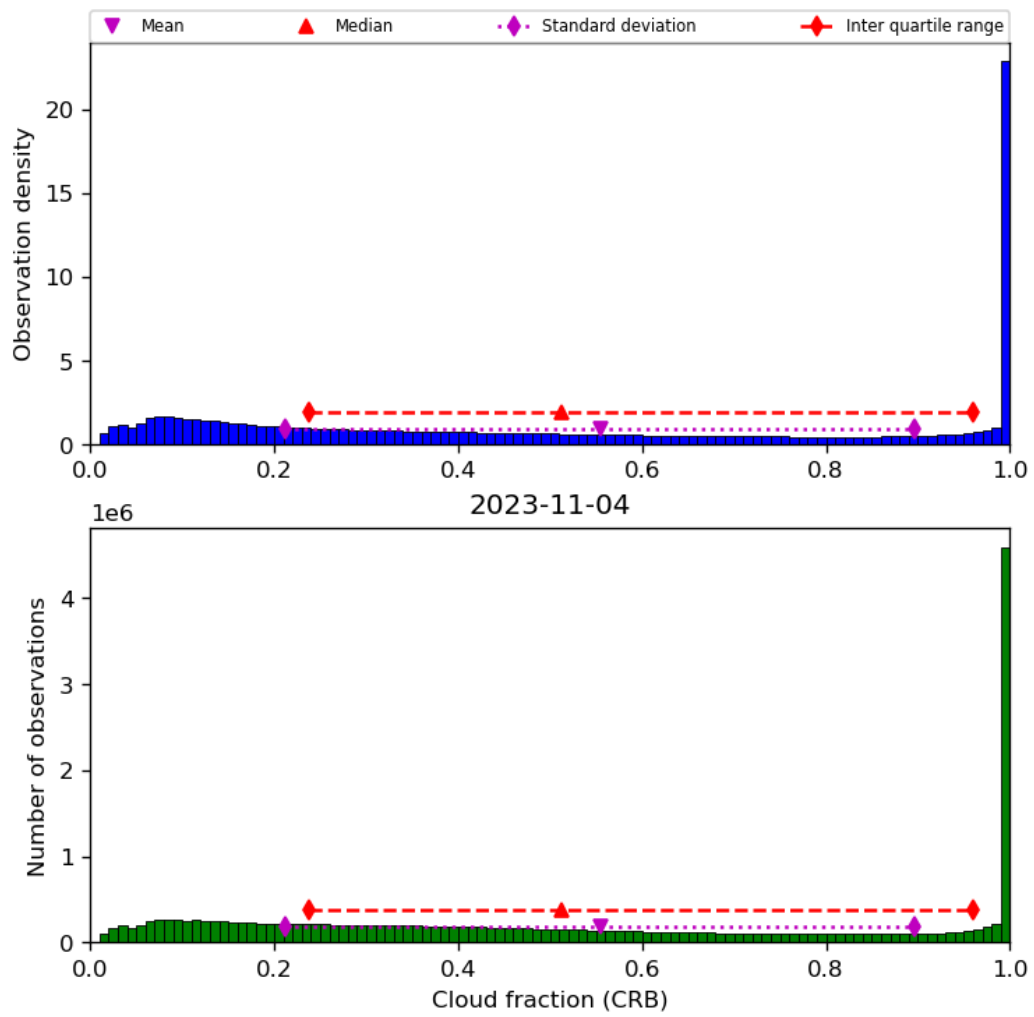


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-11-03 to 2023-11-05

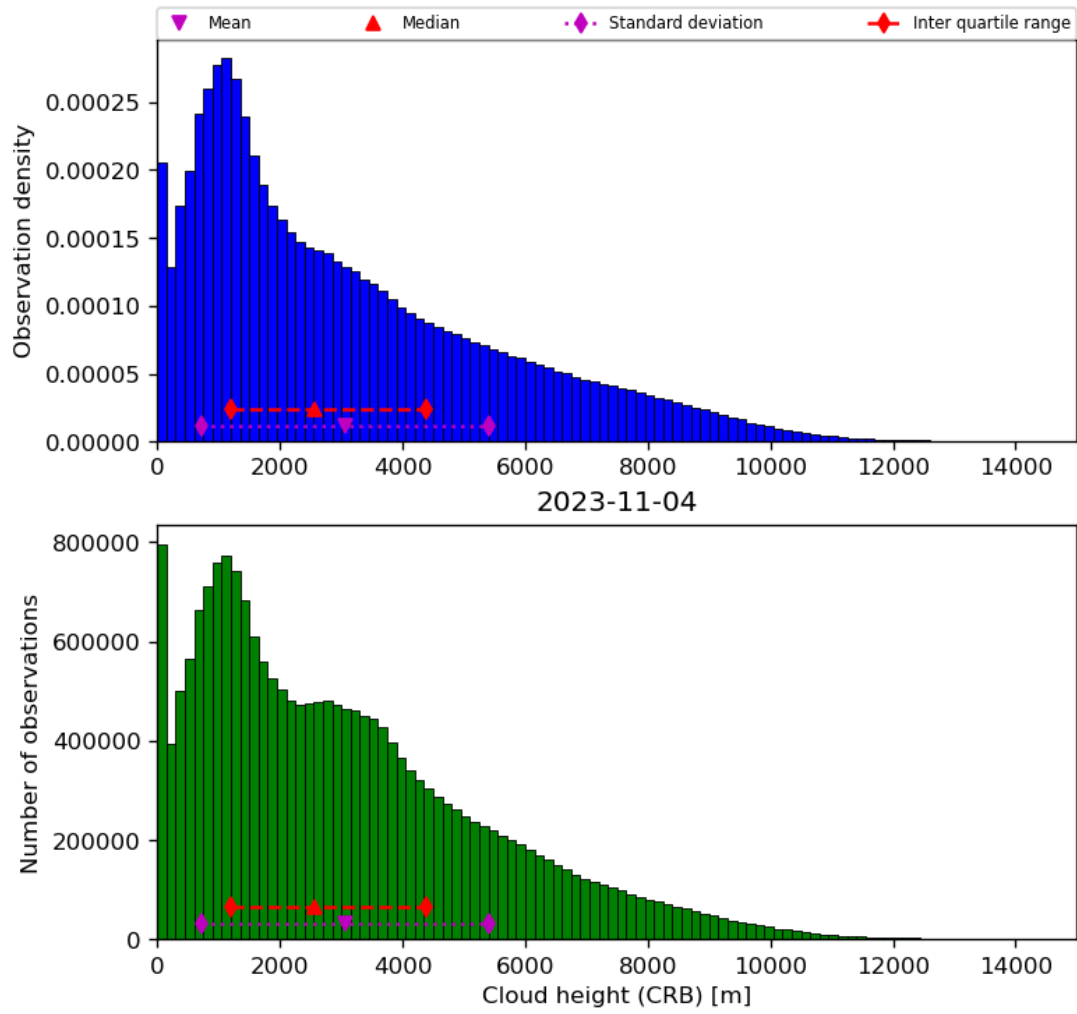


Figure 43: Histogram of “Cloud height (CRB)” for 2023-11-03 to 2023-11-05

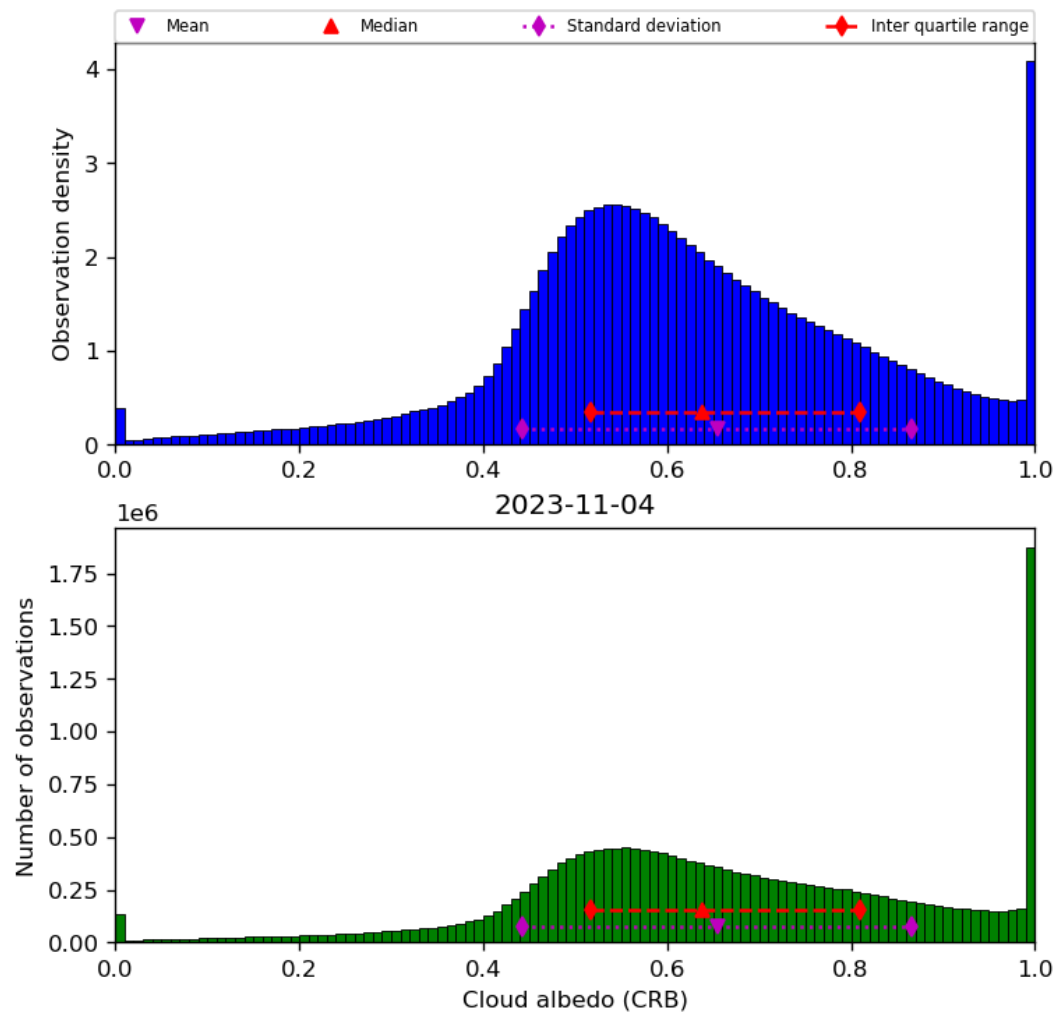


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-11-03 to 2023-11-05

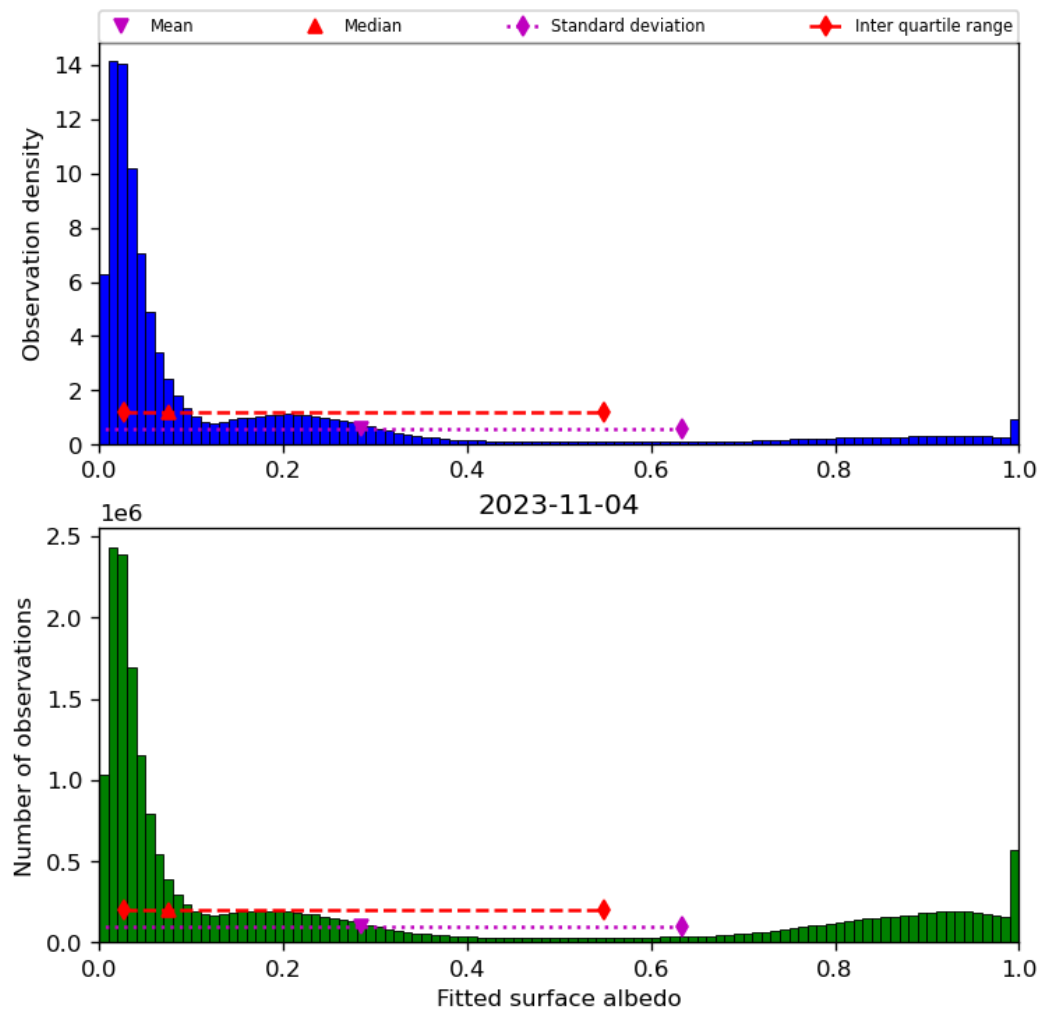


Figure 45: Histogram of “Fitted surface albedo” for 2023-11-03 to 2023-11-05

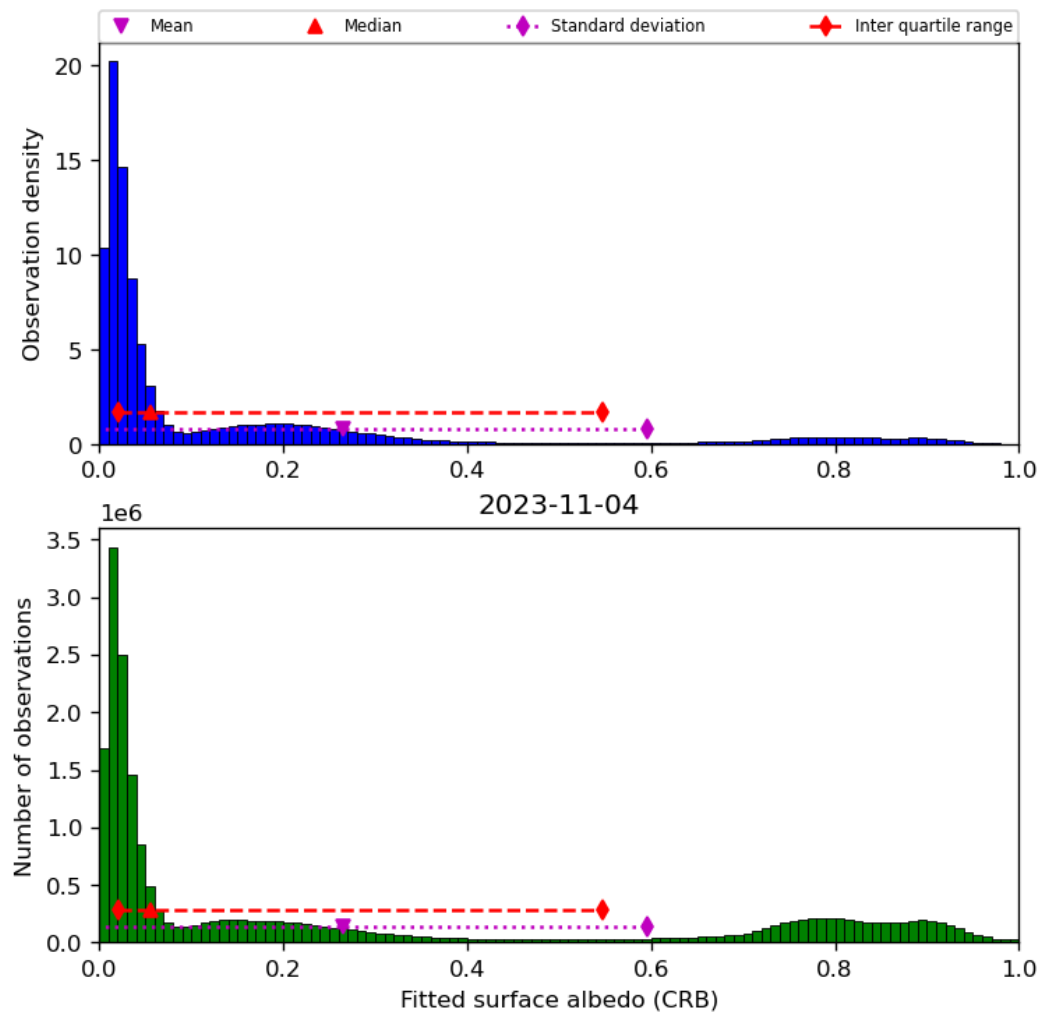


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-11-03 to 2023-11-05

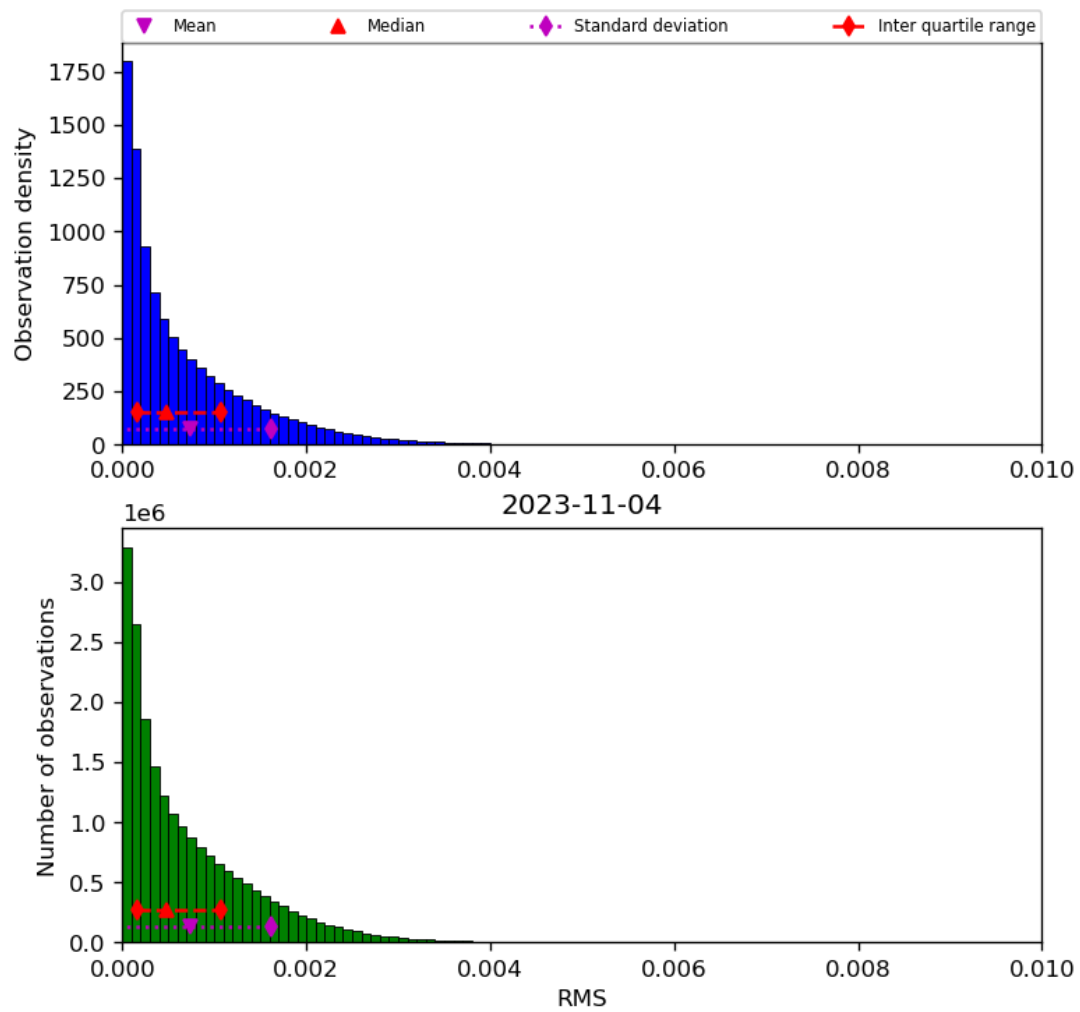


Figure 47: Histogram of “RMS” for 2023-11-03 to 2023-11-05

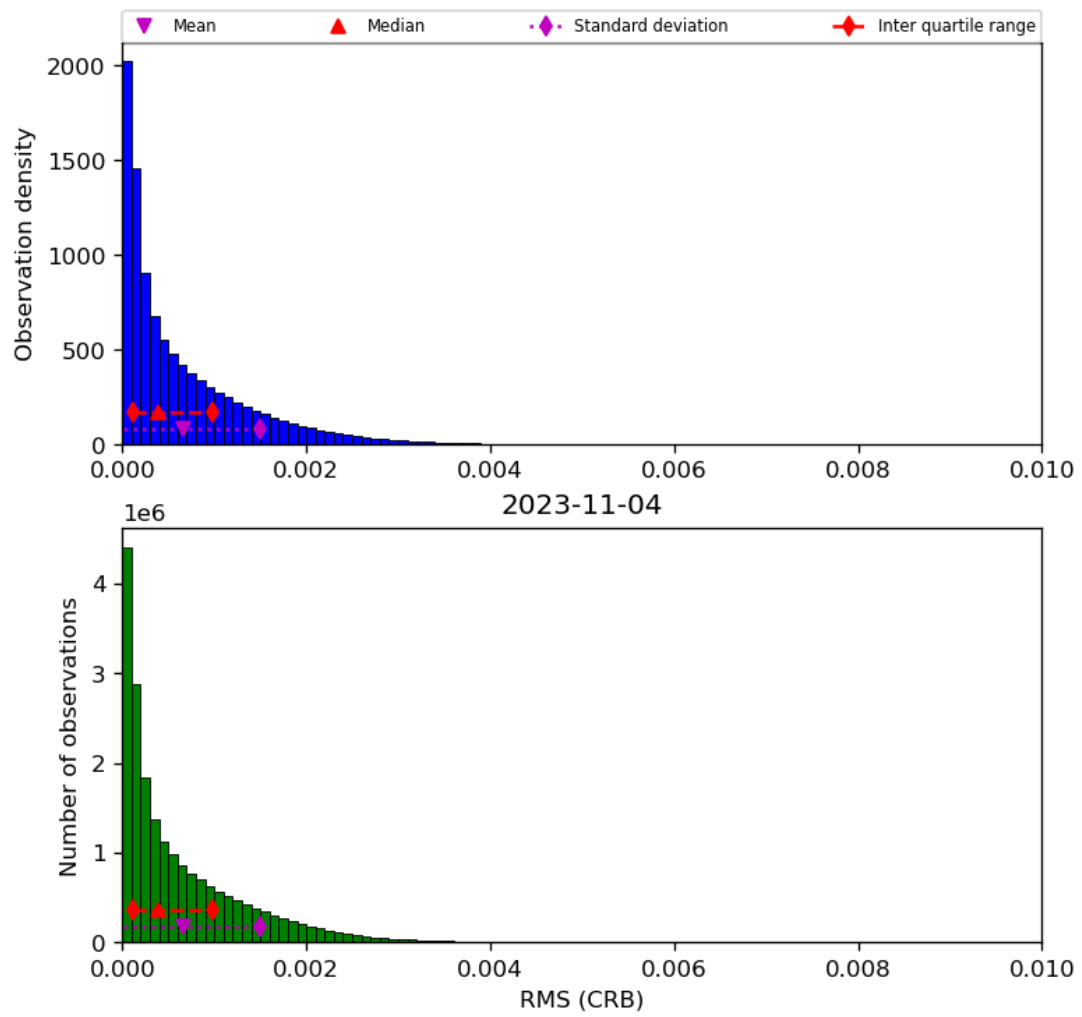


Figure 48: Histogram of “RMS (CRB)” for 2023-11-03 to 2023-11-05

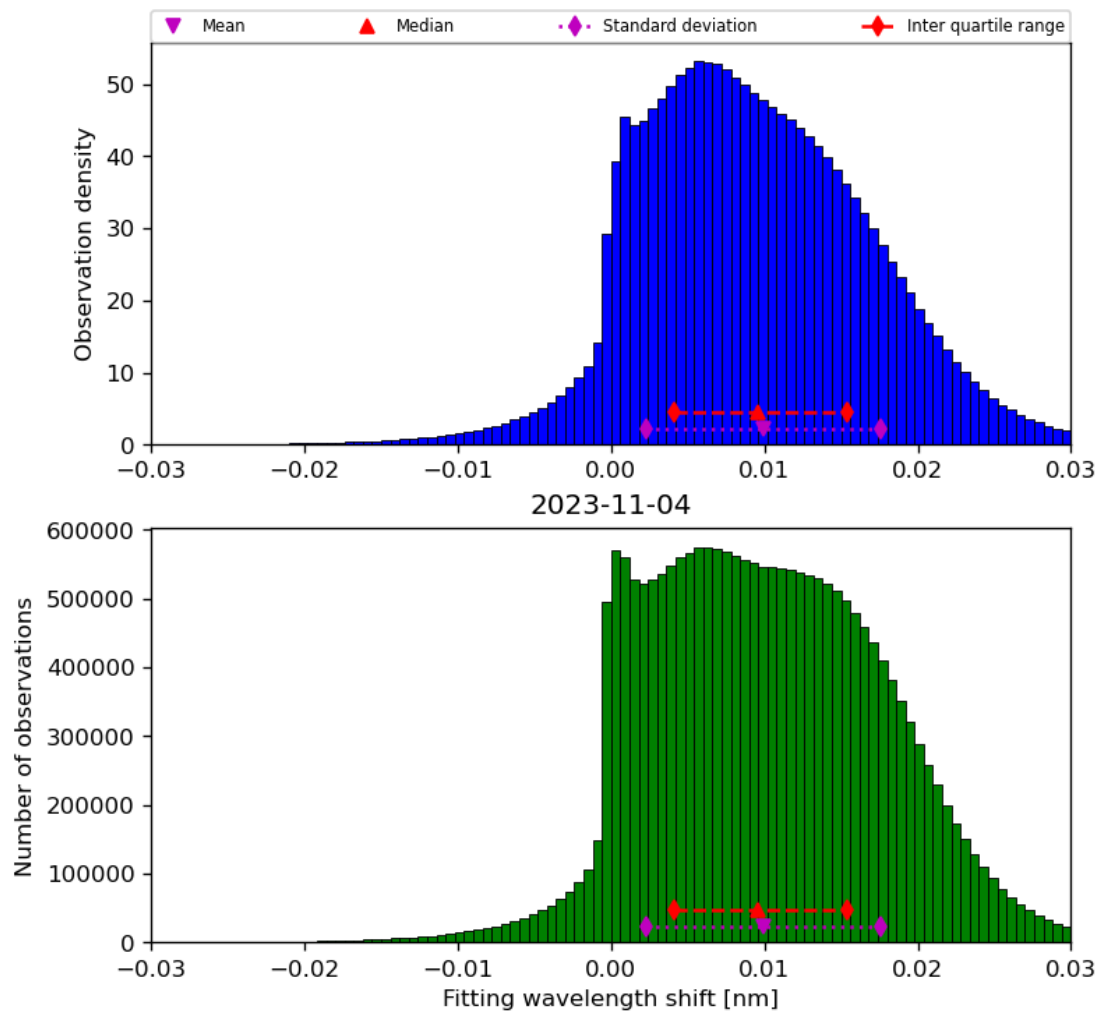


Figure 49: Histogram of “Fitting wavelength shift” for 2023-11-03 to 2023-11-05

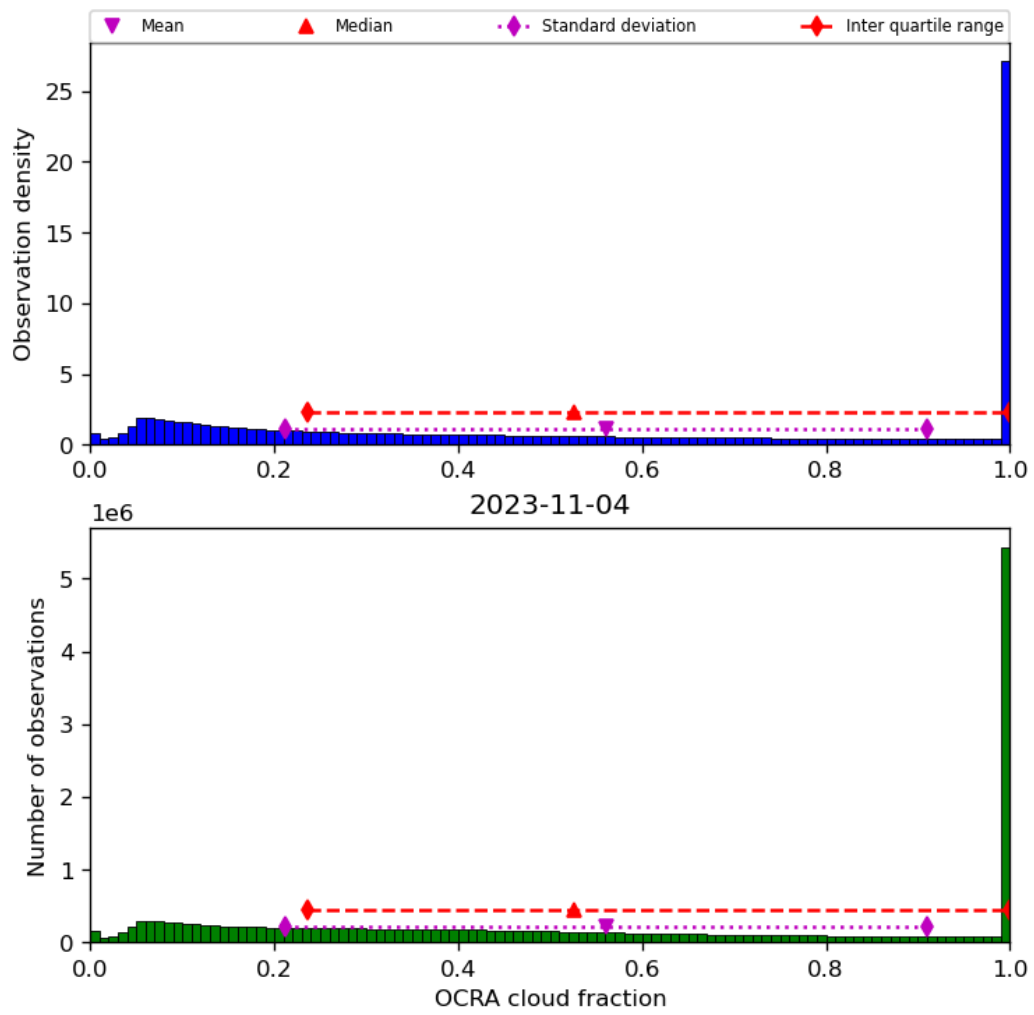


Figure 50: Histogram of “OCRA cloud fraction” for 2023-11-03 to 2023-11-05

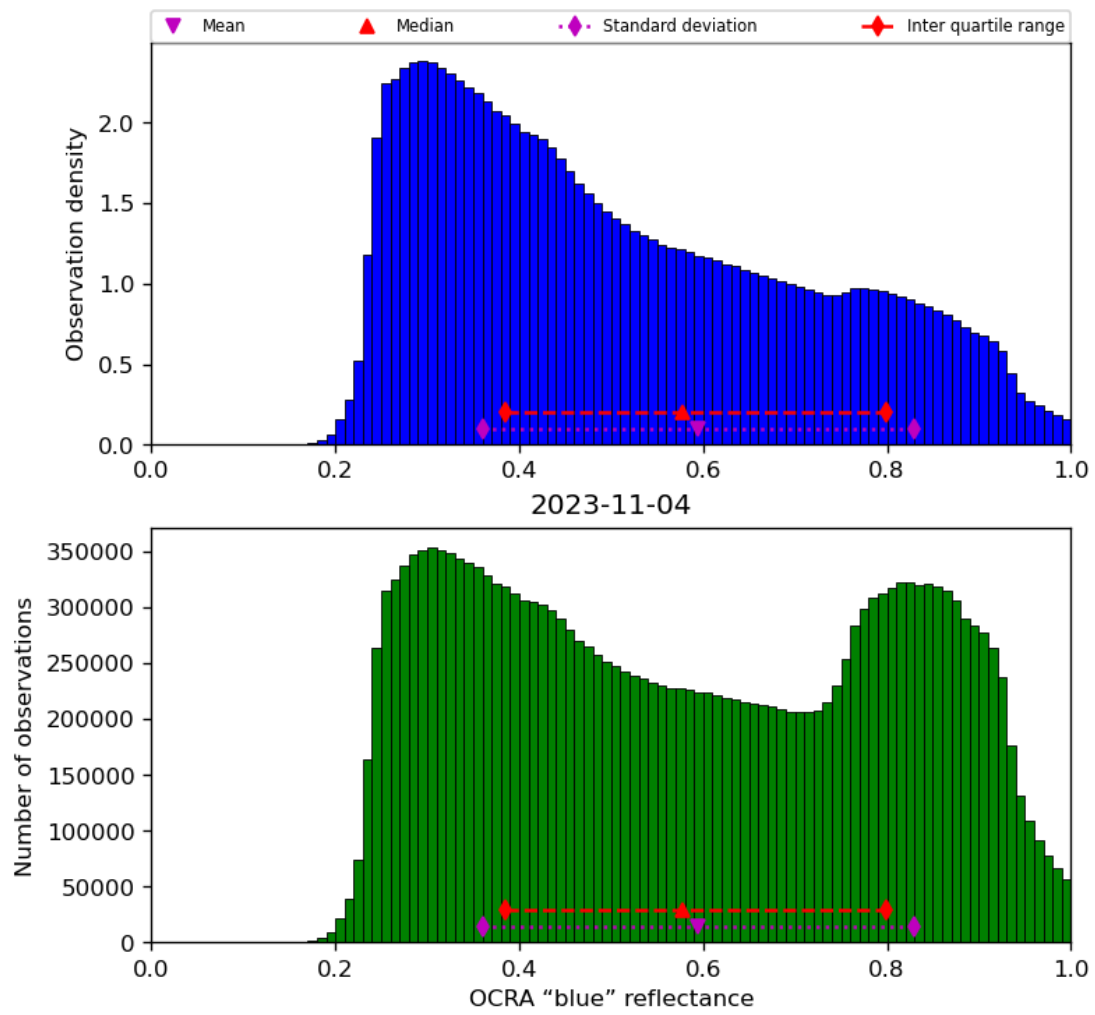


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-11-03 to 2023-11-05

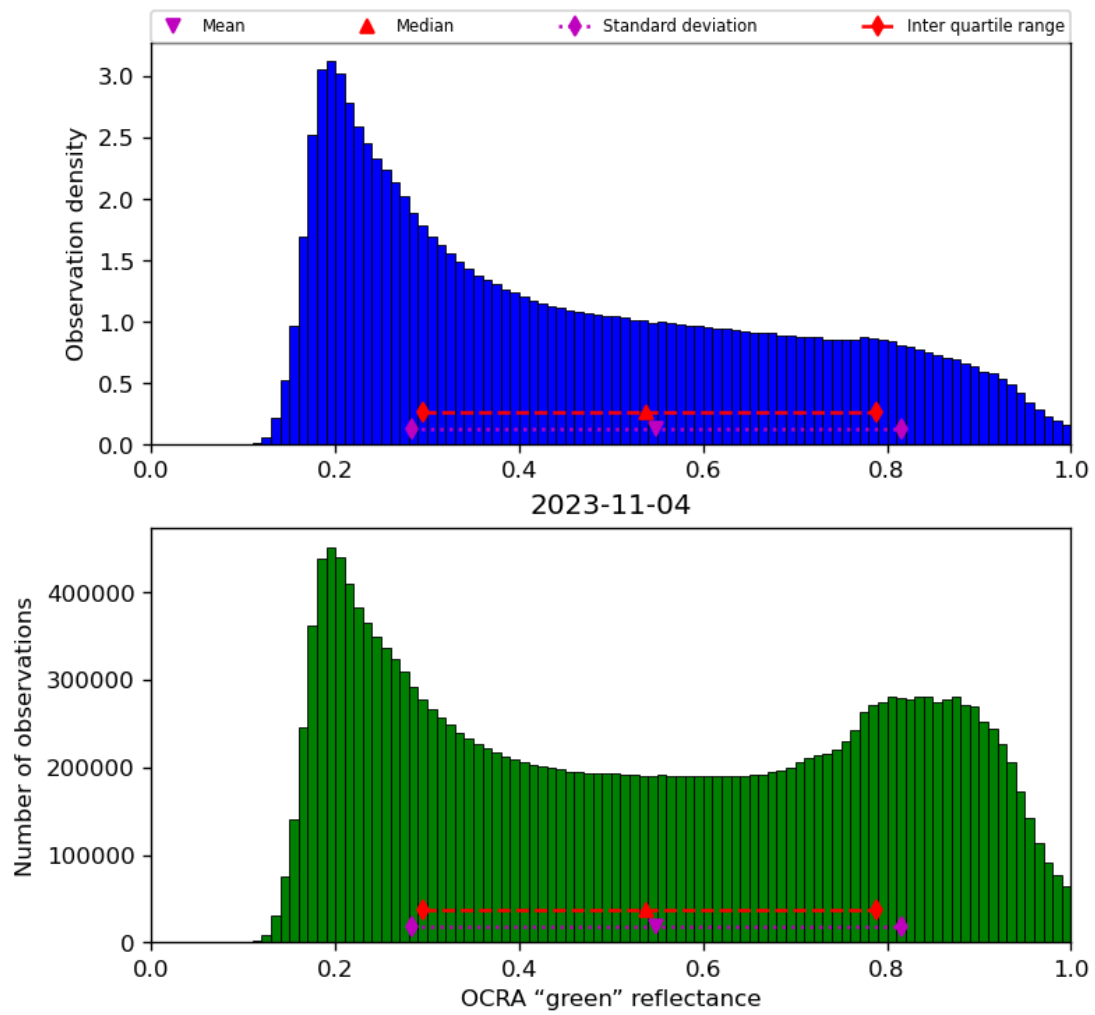


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-11-03 to 2023-11-05

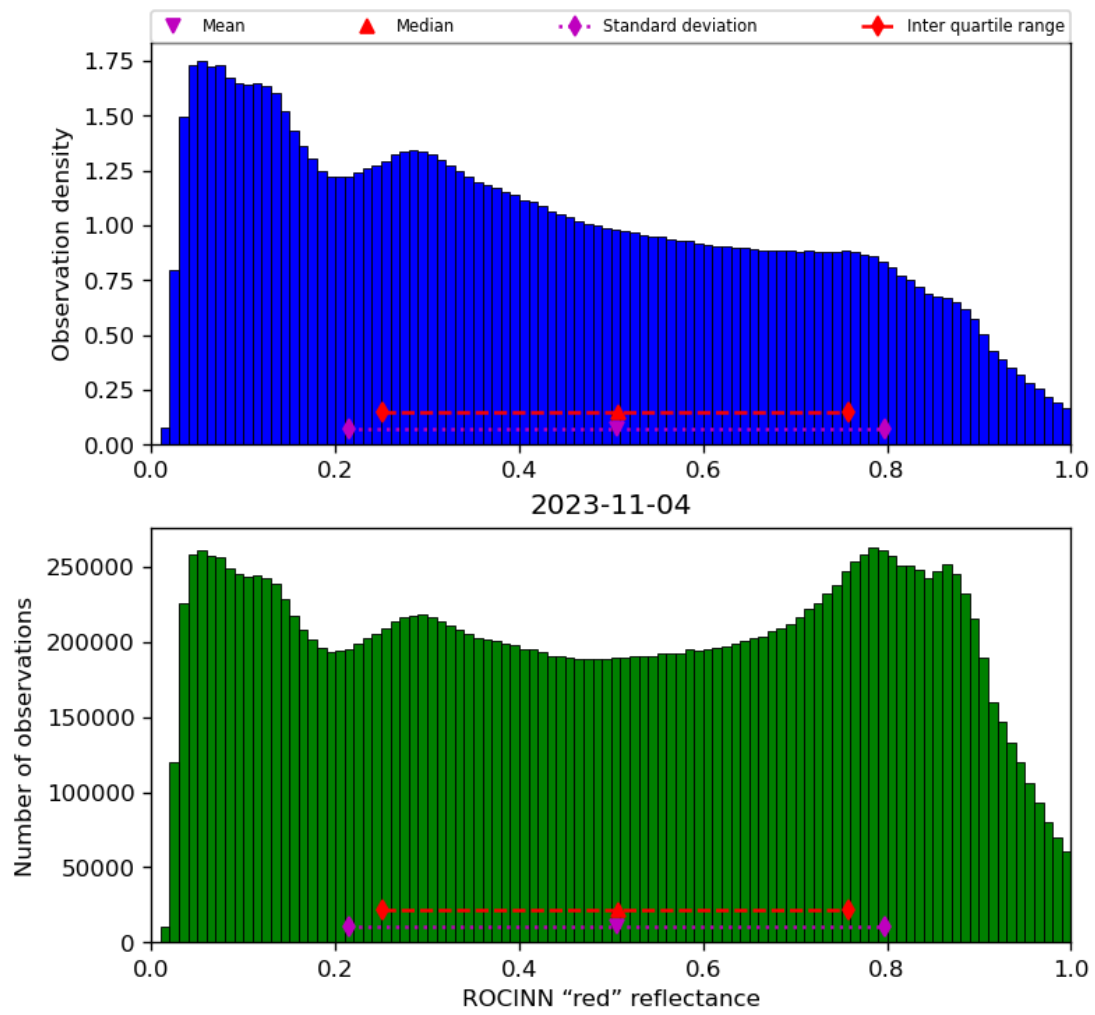


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-11-03 to 2023-11-05

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.

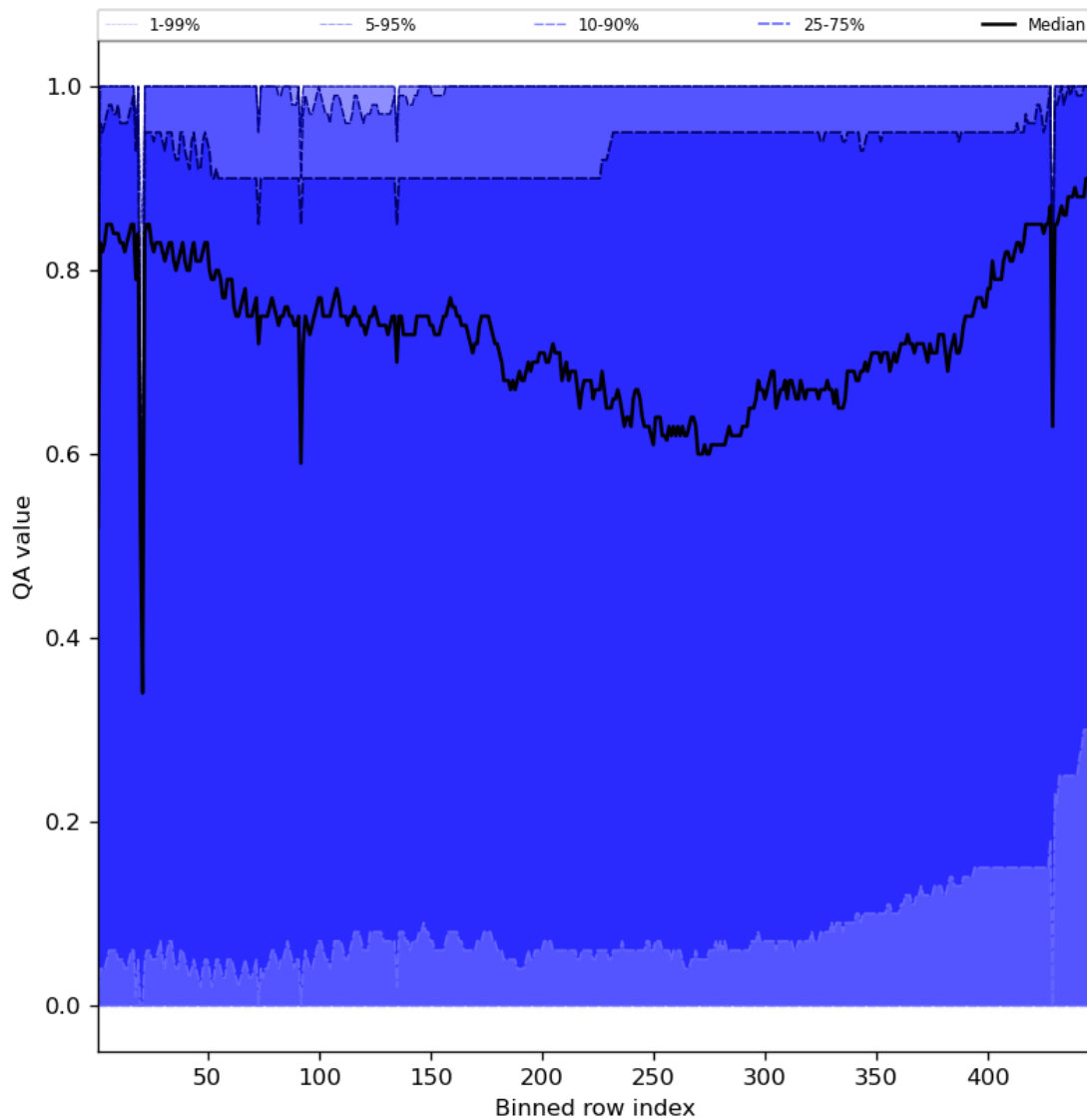


Figure 54: Along track statistics of “QA value” for 2023-11-03 to 2023-11-05

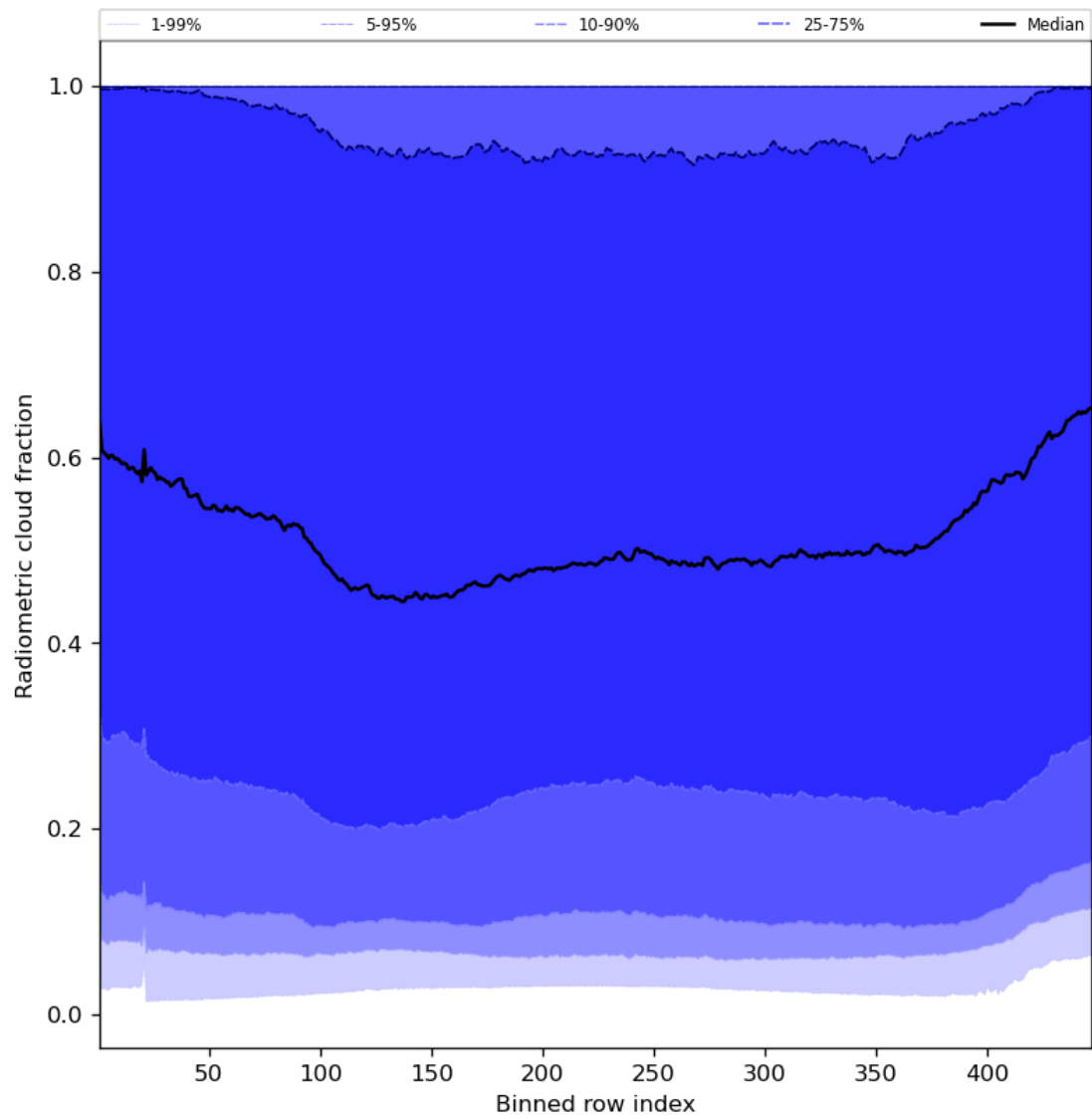


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-11-03 to 2023-11-05

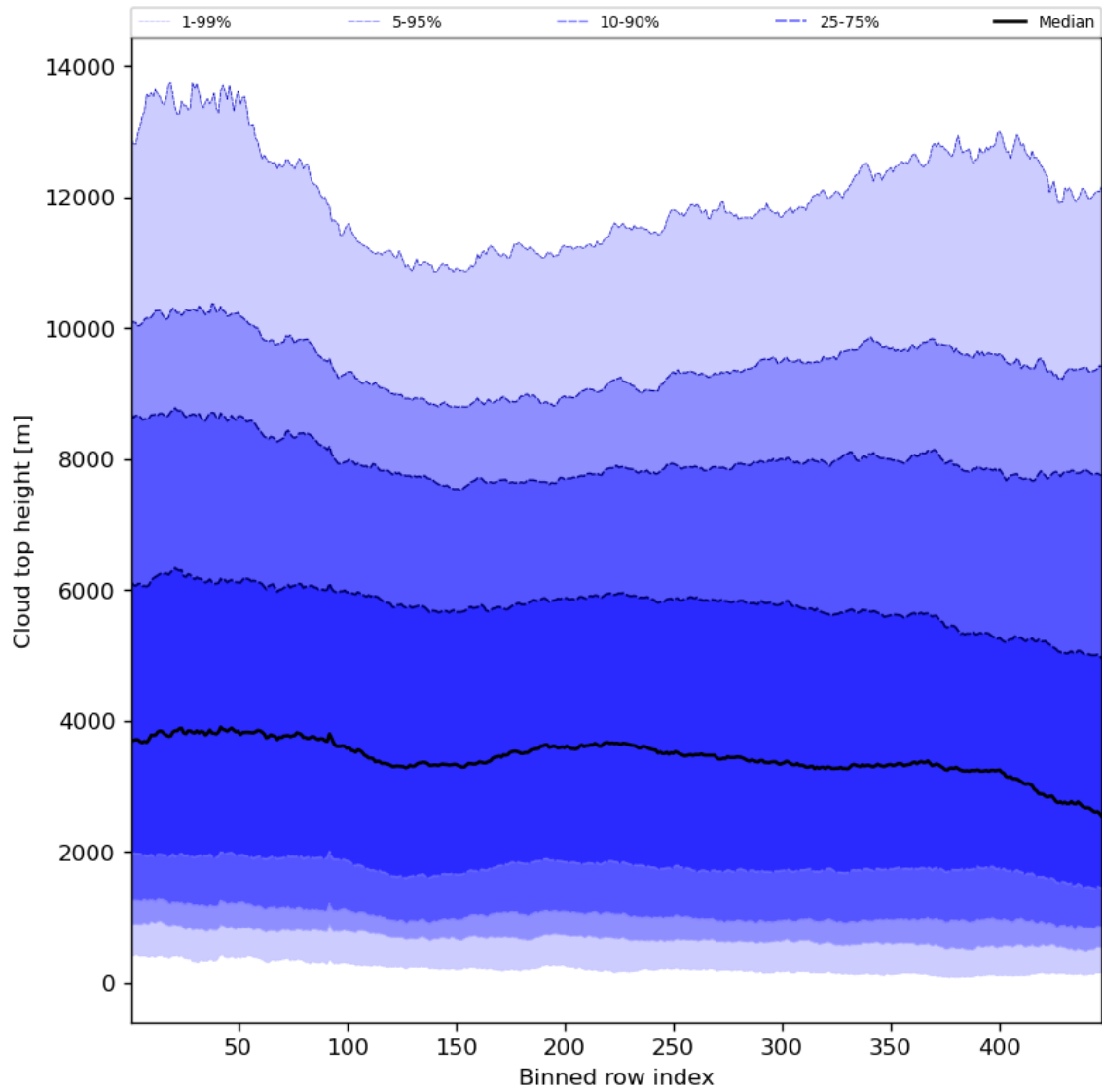


Figure 56: Along track statistics of “Cloud top height” for 2023-11-03 to 2023-11-05

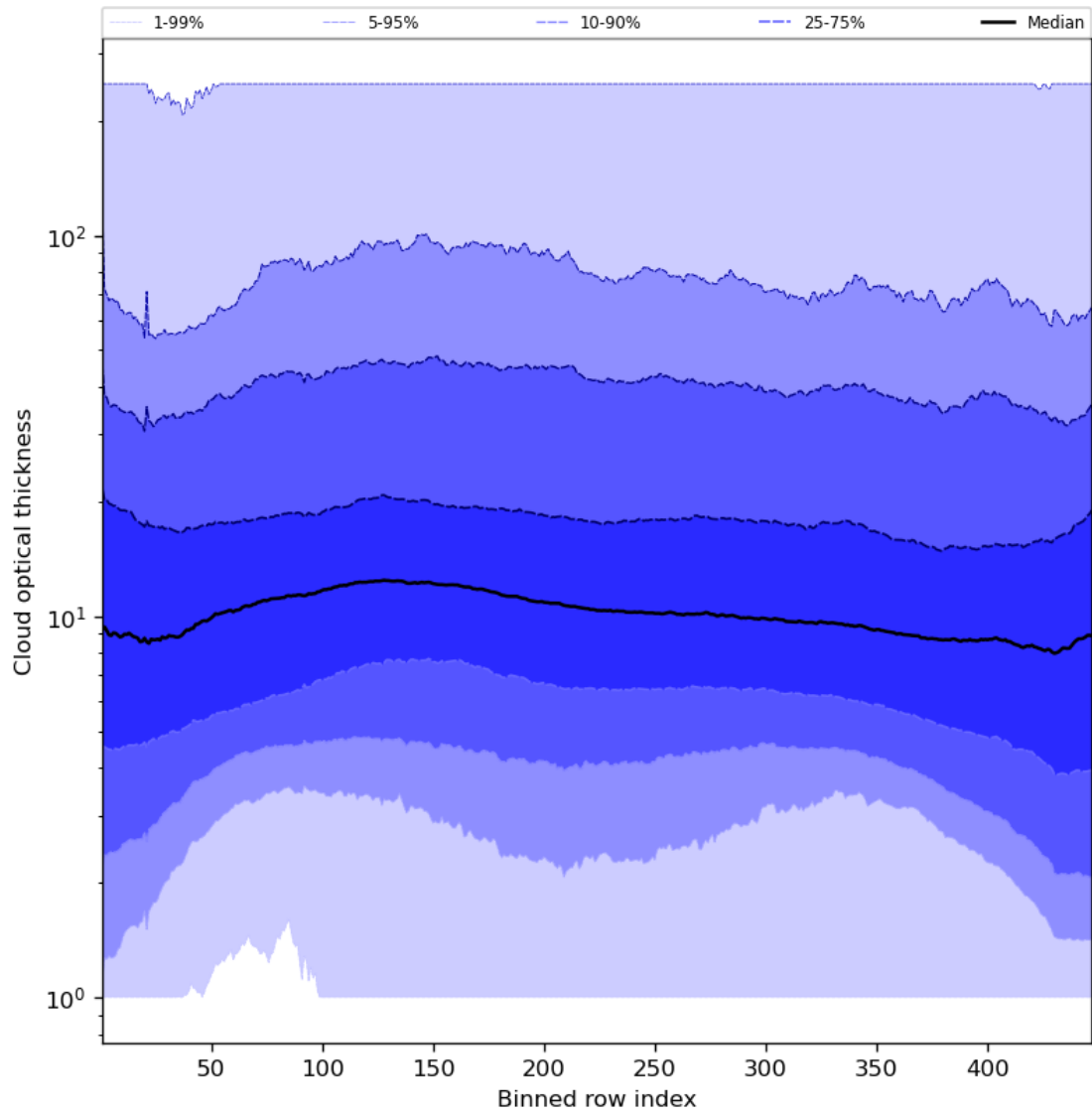


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-11-03 to 2023-11-05

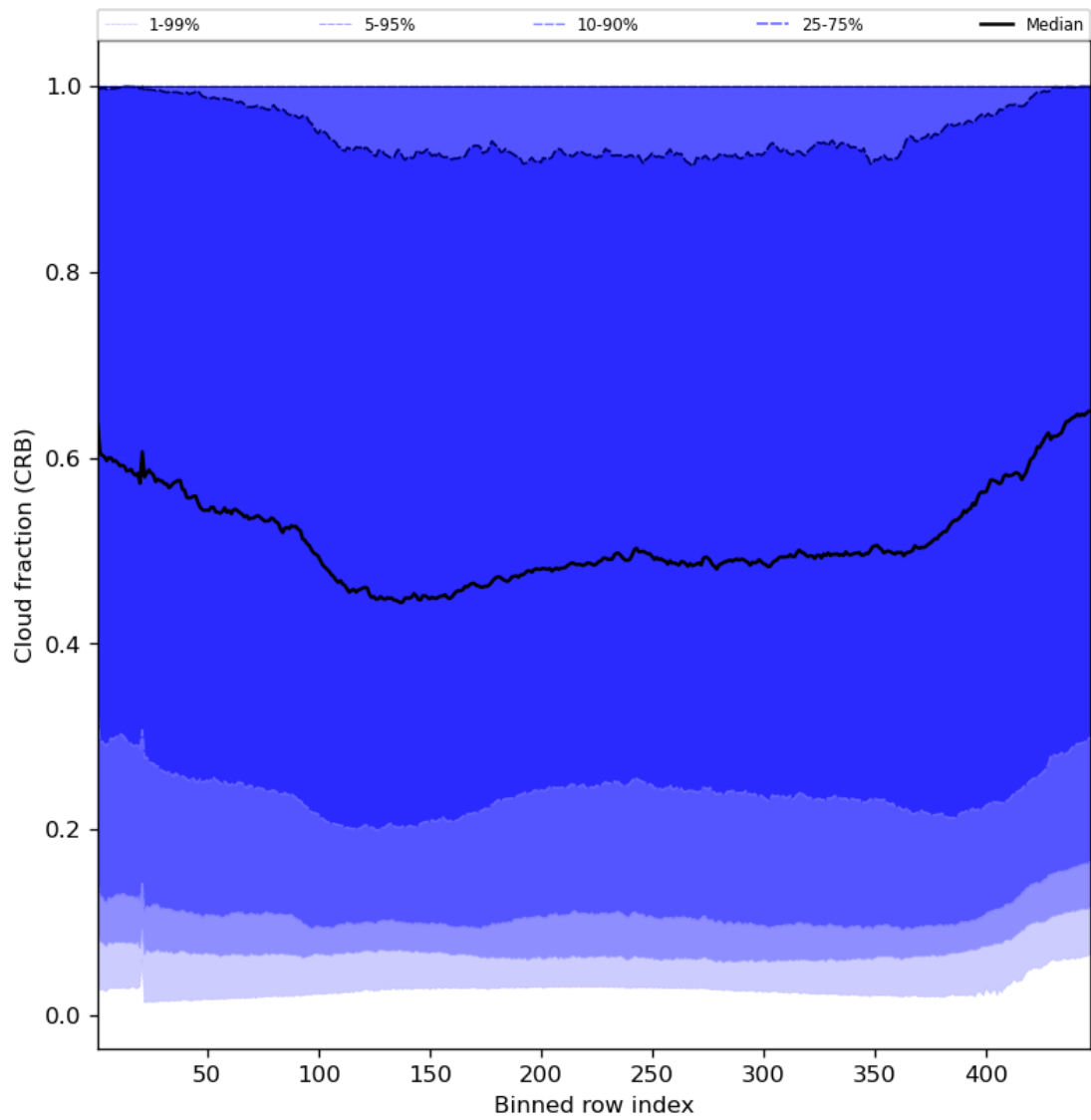


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-11-03 to 2023-11-05

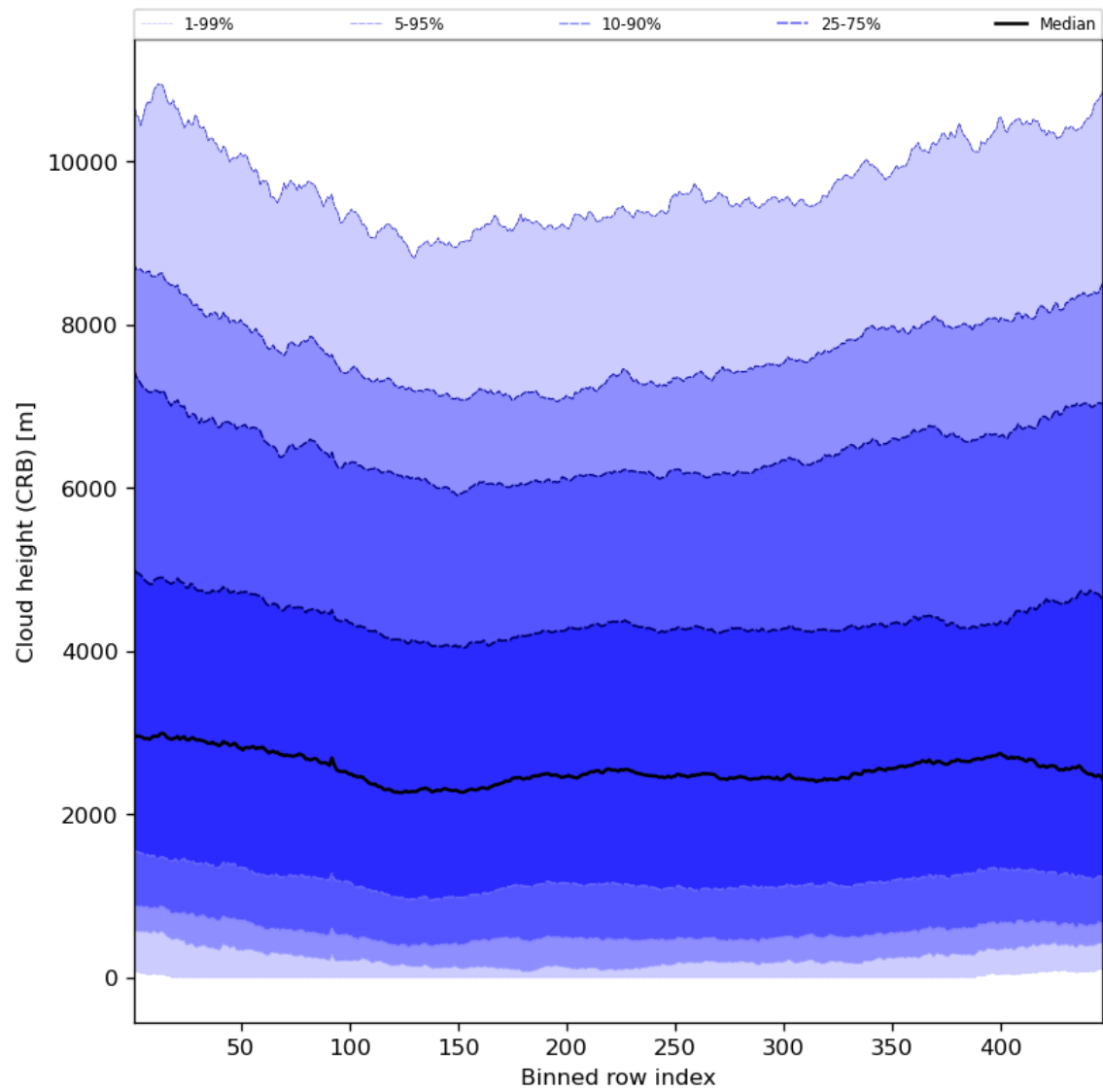


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-11-03 to 2023-11-05

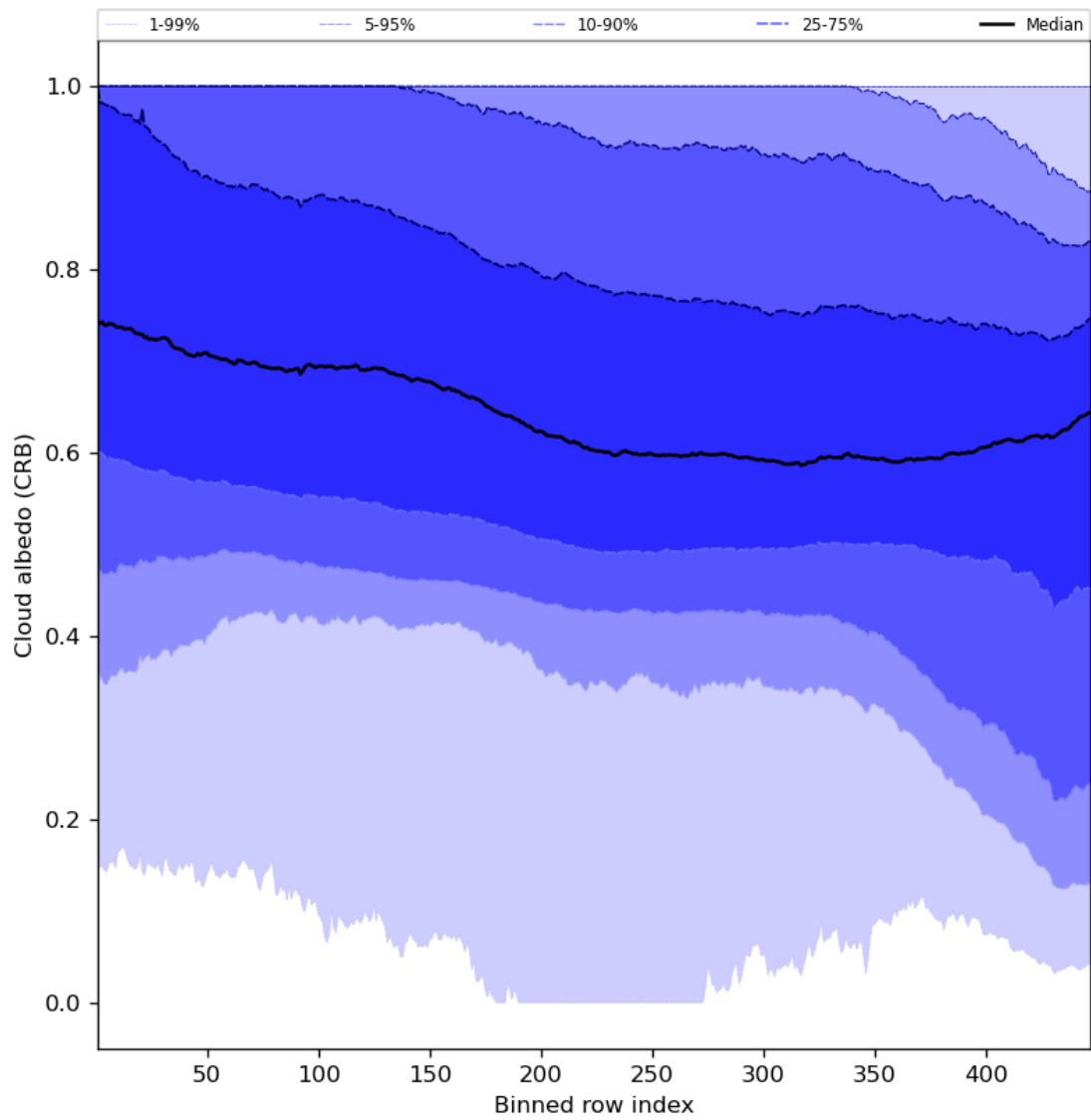


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-11-03 to 2023-11-05

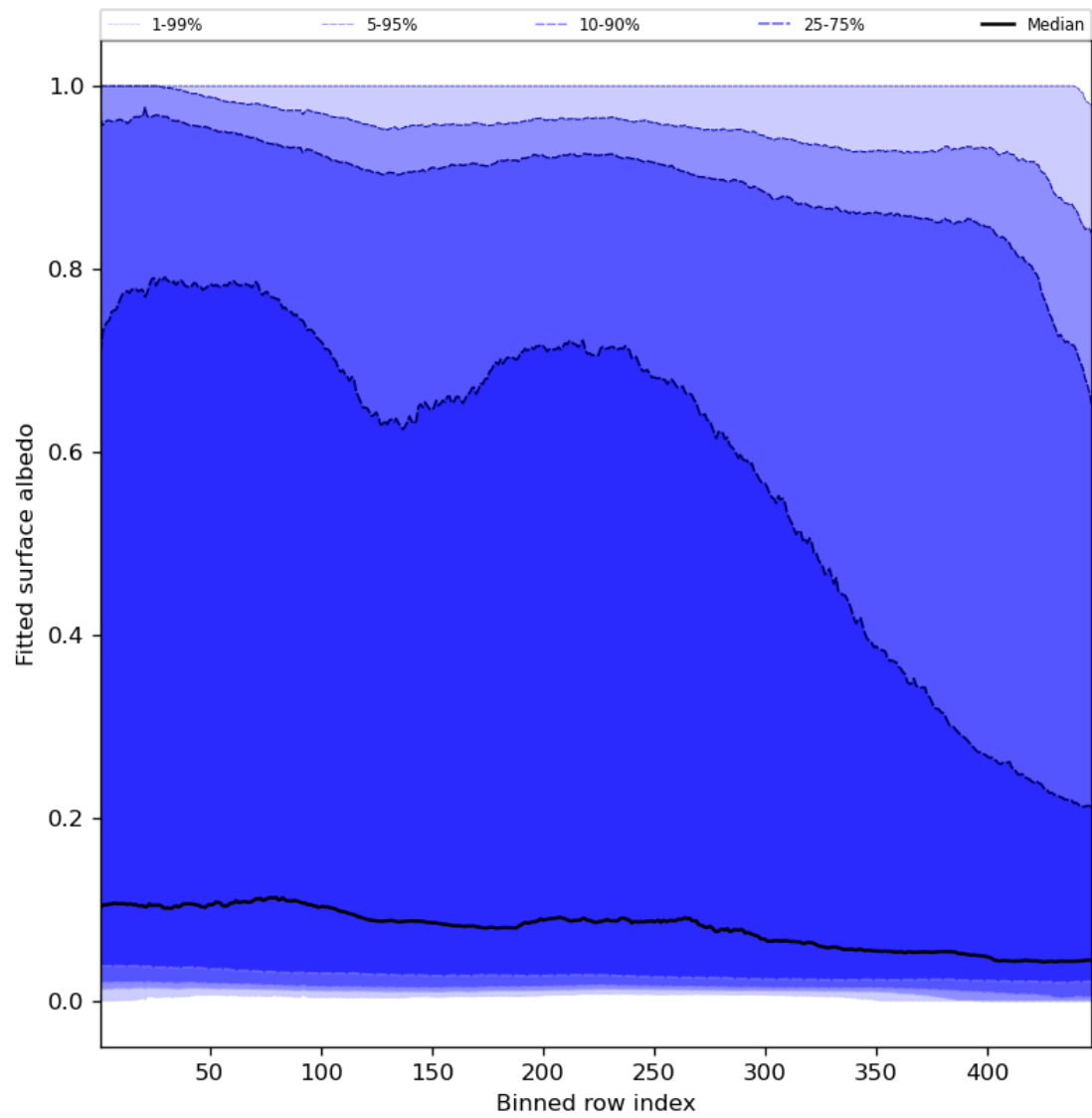


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-11-03 to 2023-11-05

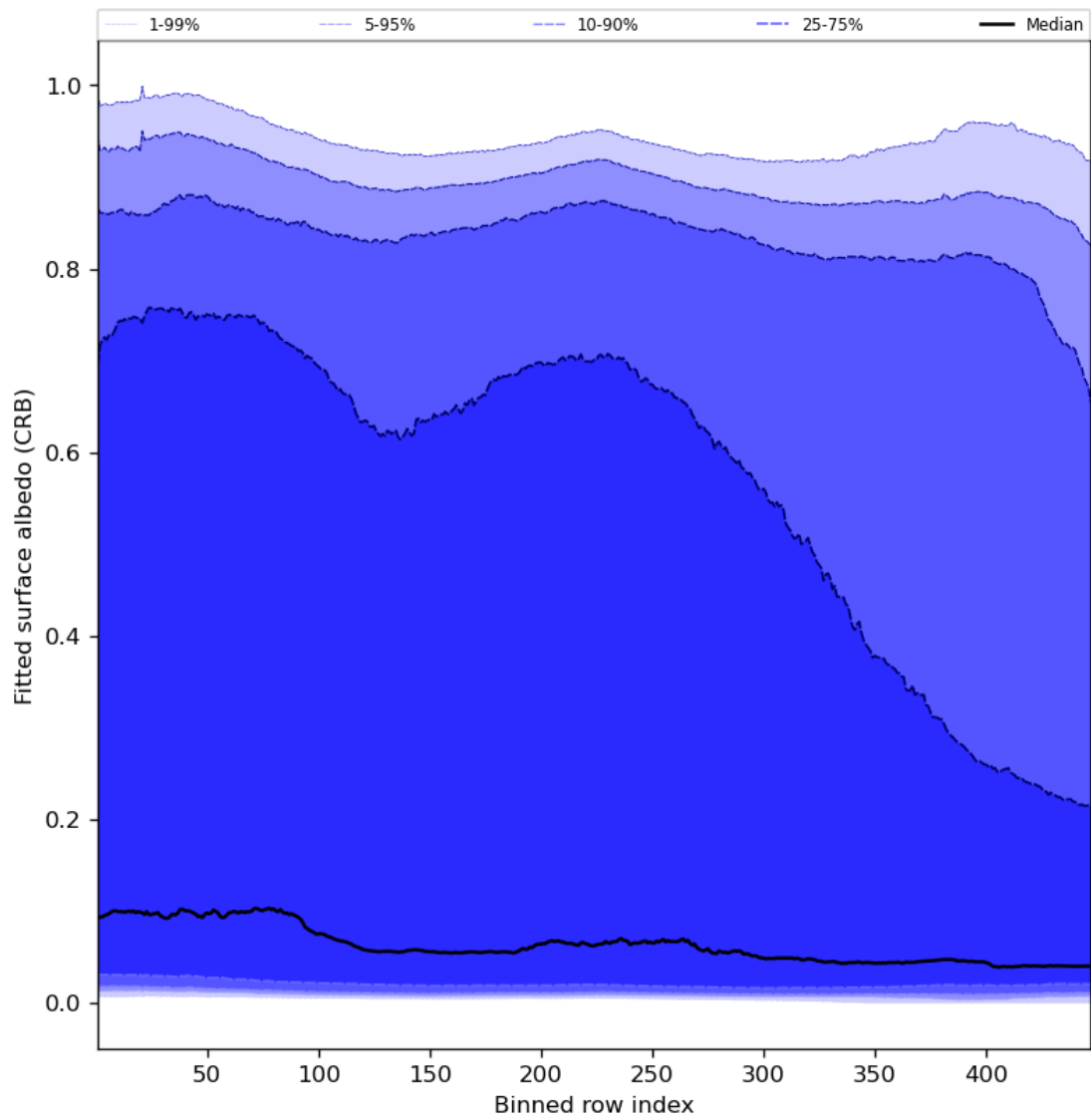


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-11-03 to 2023-11-05

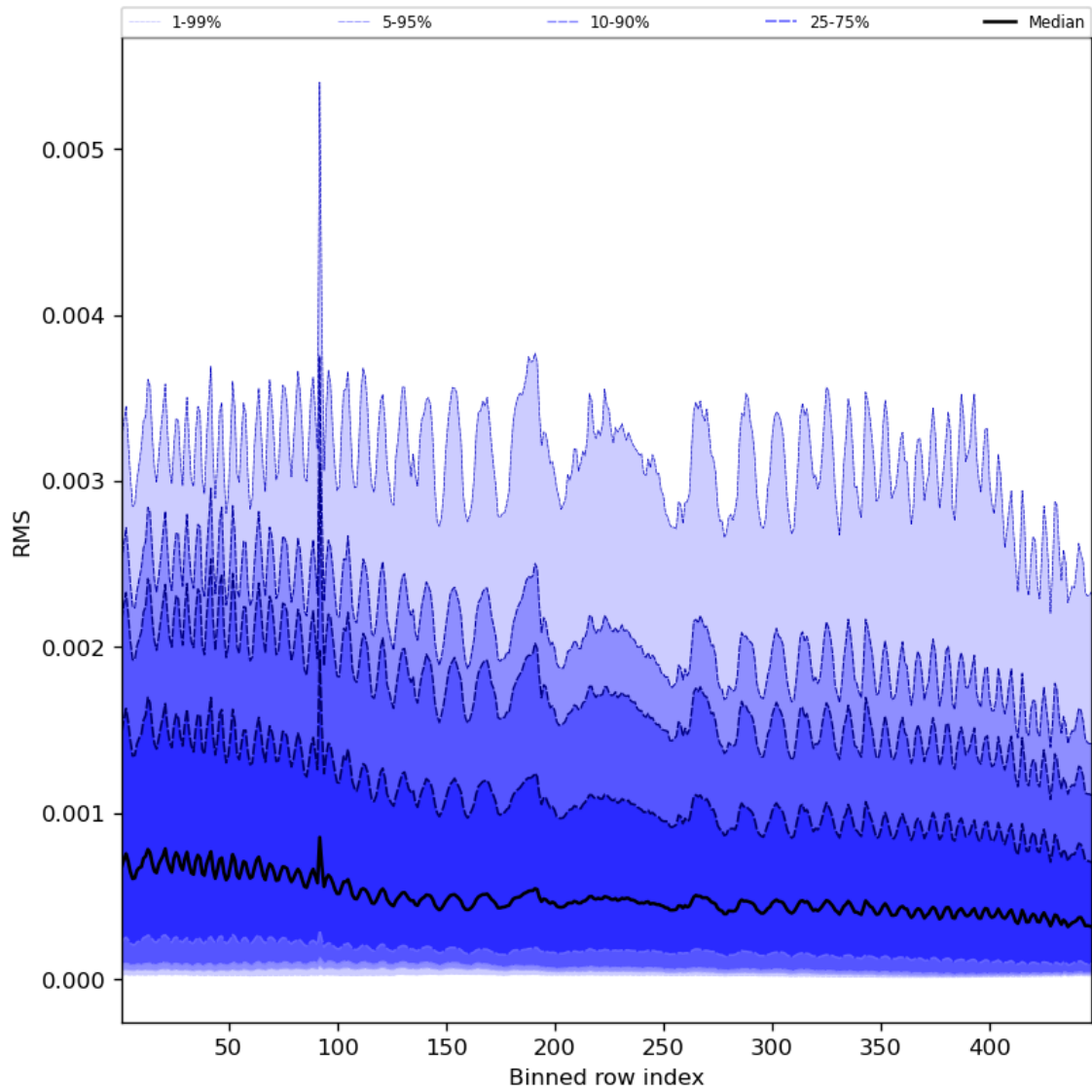


Figure 63: Along track statistics of “RMS” for 2023-11-03 to 2023-11-05

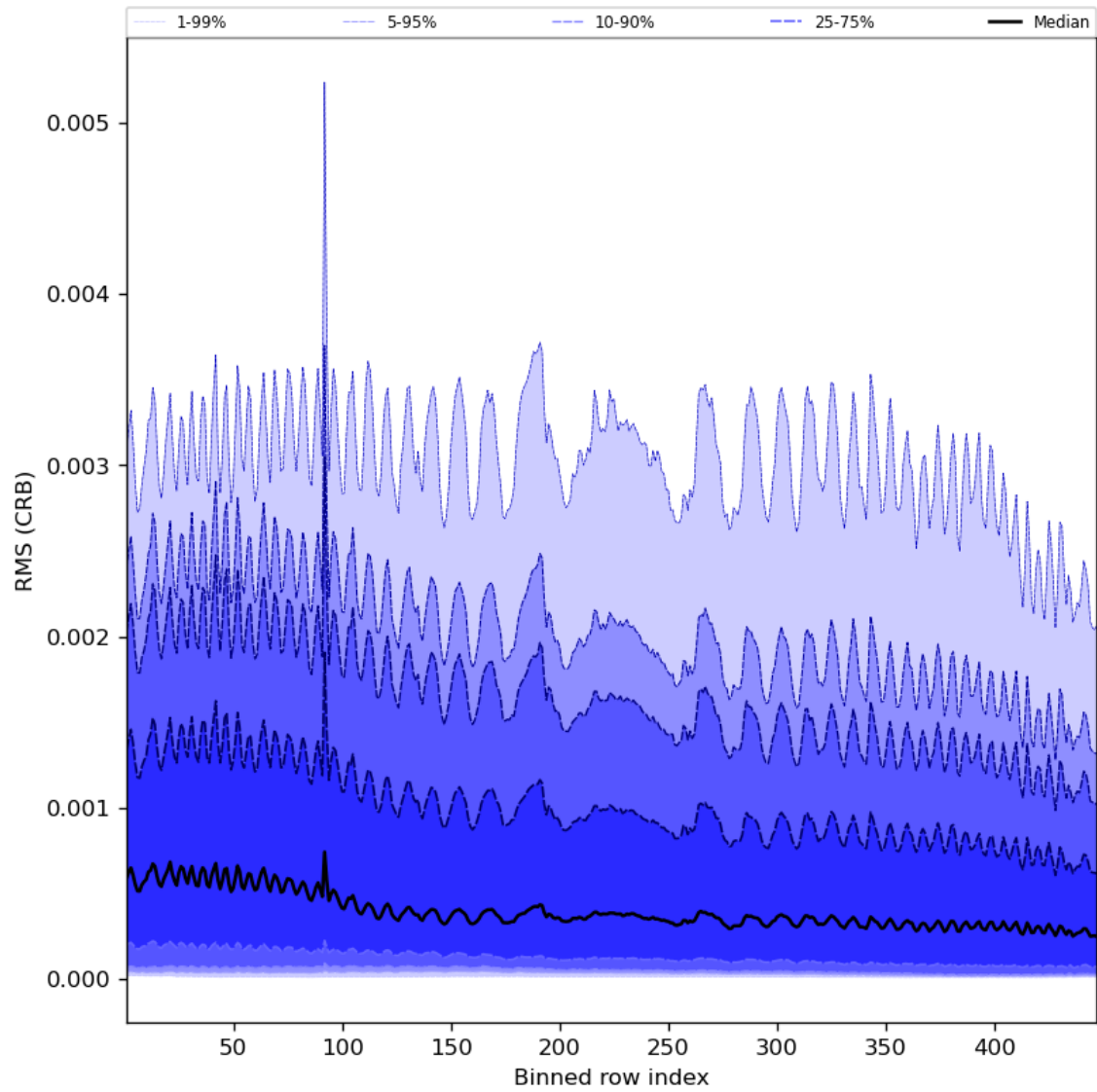


Figure 64: Along track statistics of “RMS (CRB)” for 2023-11-03 to 2023-11-05

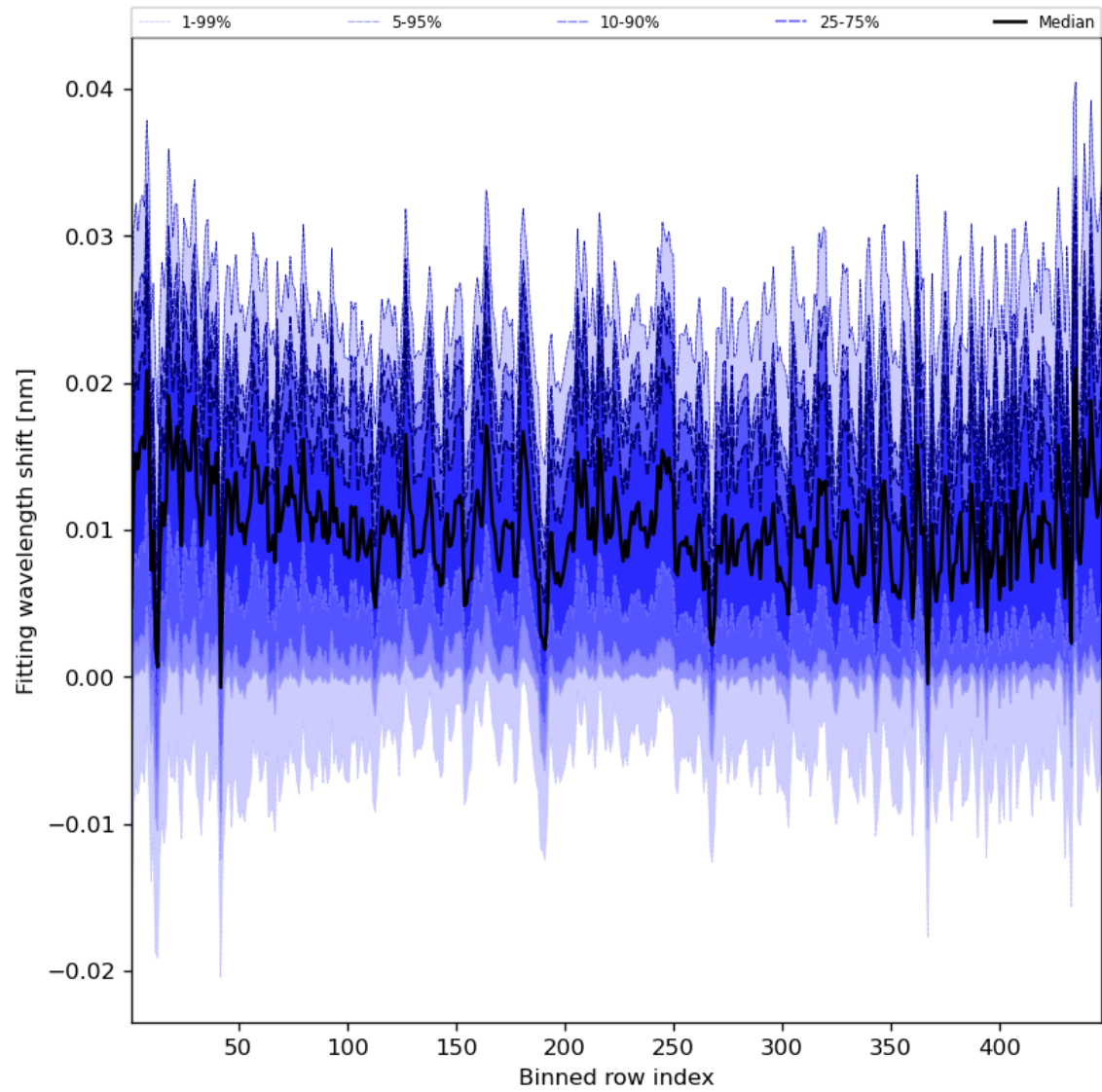


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-11-03 to 2023-11-05

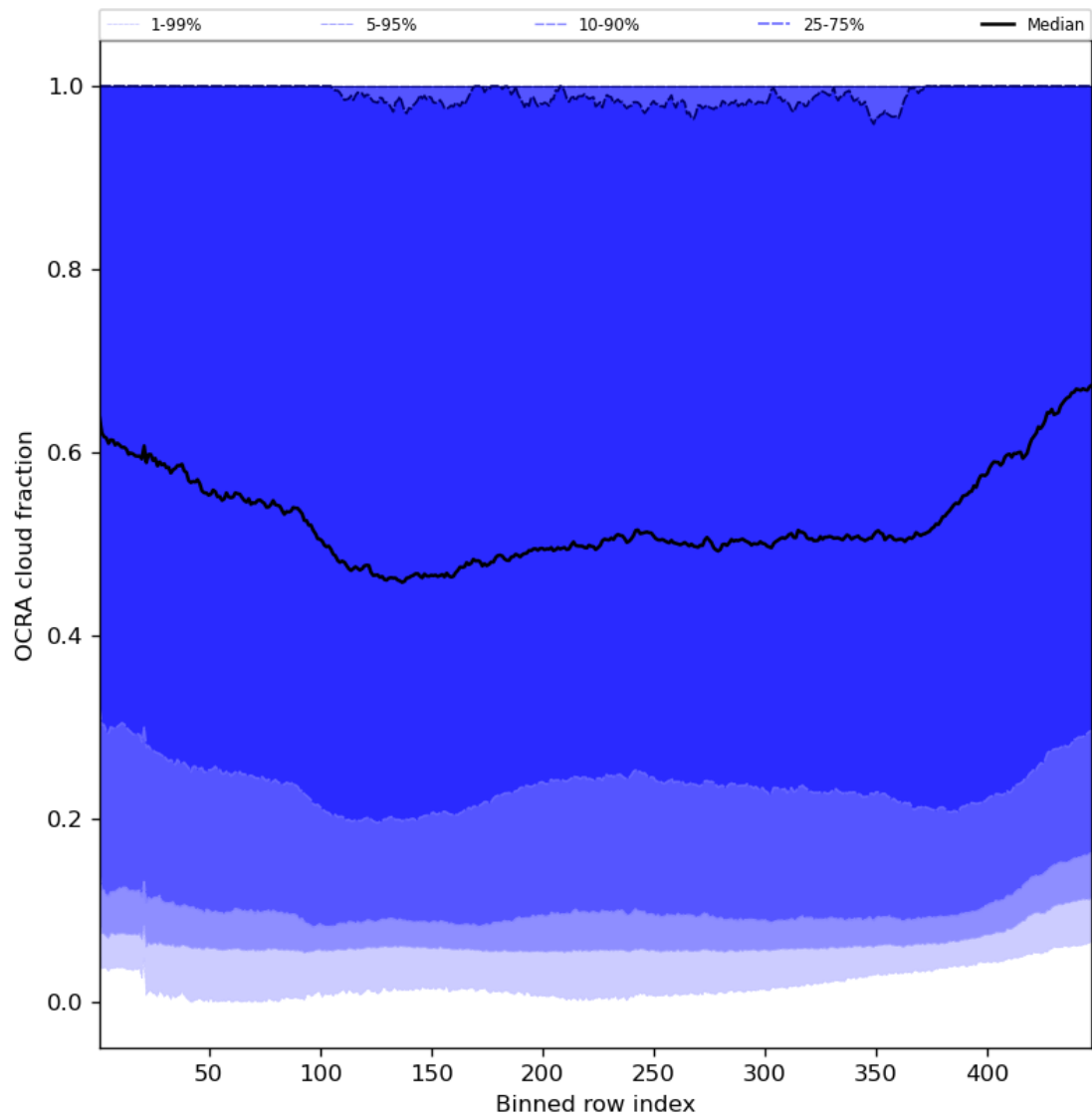


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-11-03 to 2023-11-05

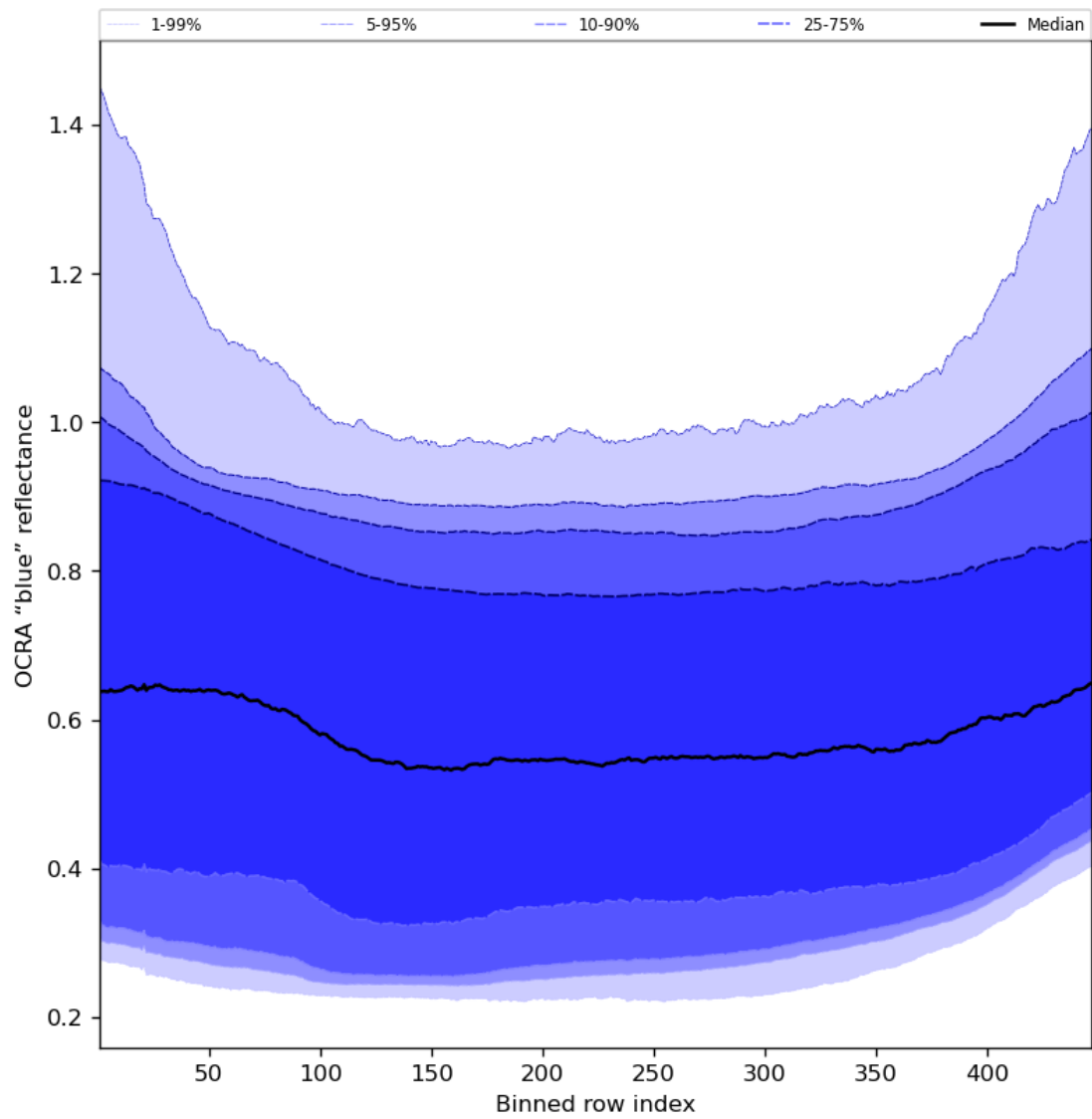


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-11-03 to 2023-11-05

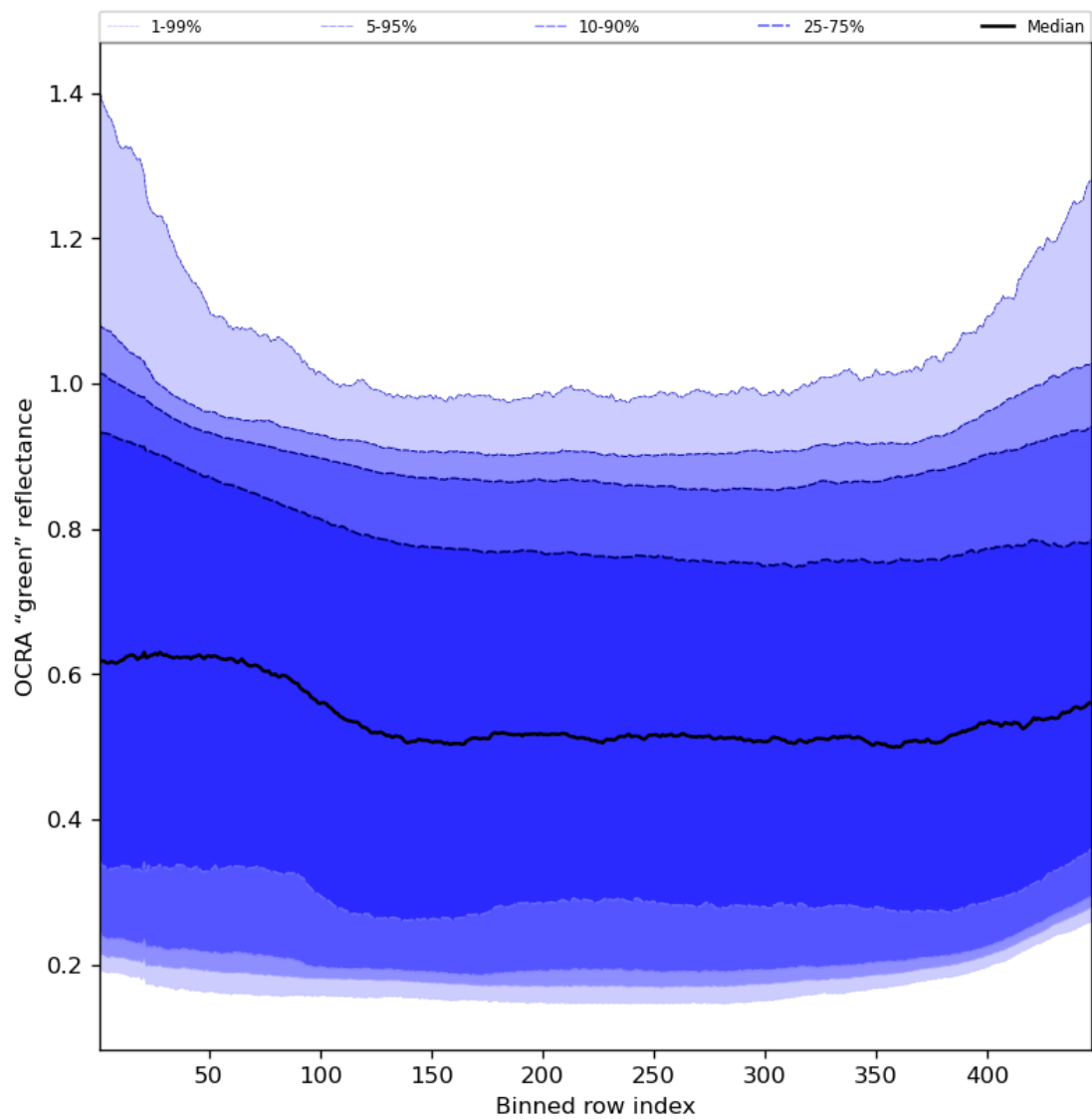


Figure 68: Along track statistics of "OCRA "green" reflectance" for 2023-11-03 to 2023-11-05

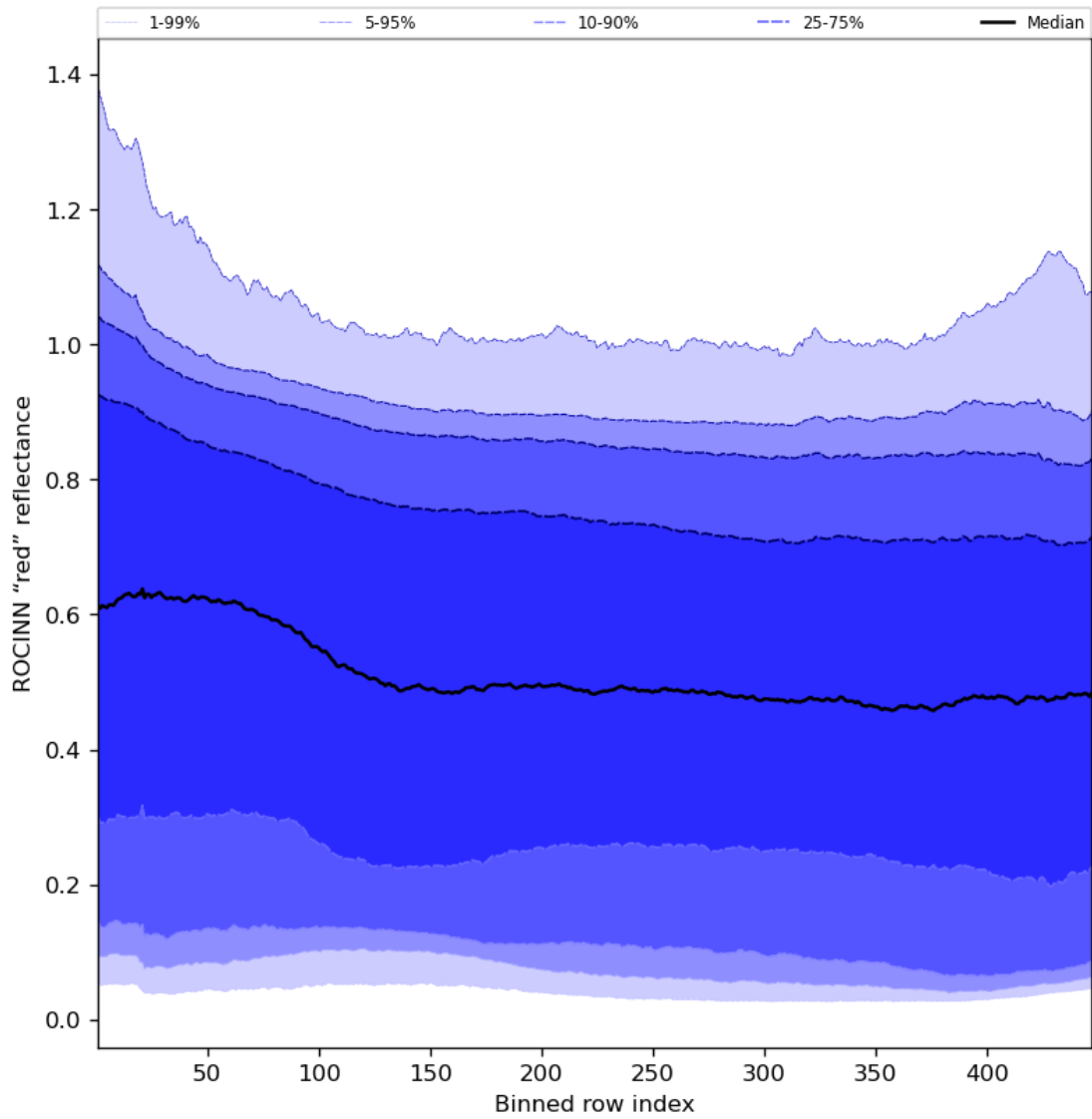


Figure 69: Along track statistics of "ROCINN "red" reflectance" for 2023-11-03 to 2023-11-05

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.

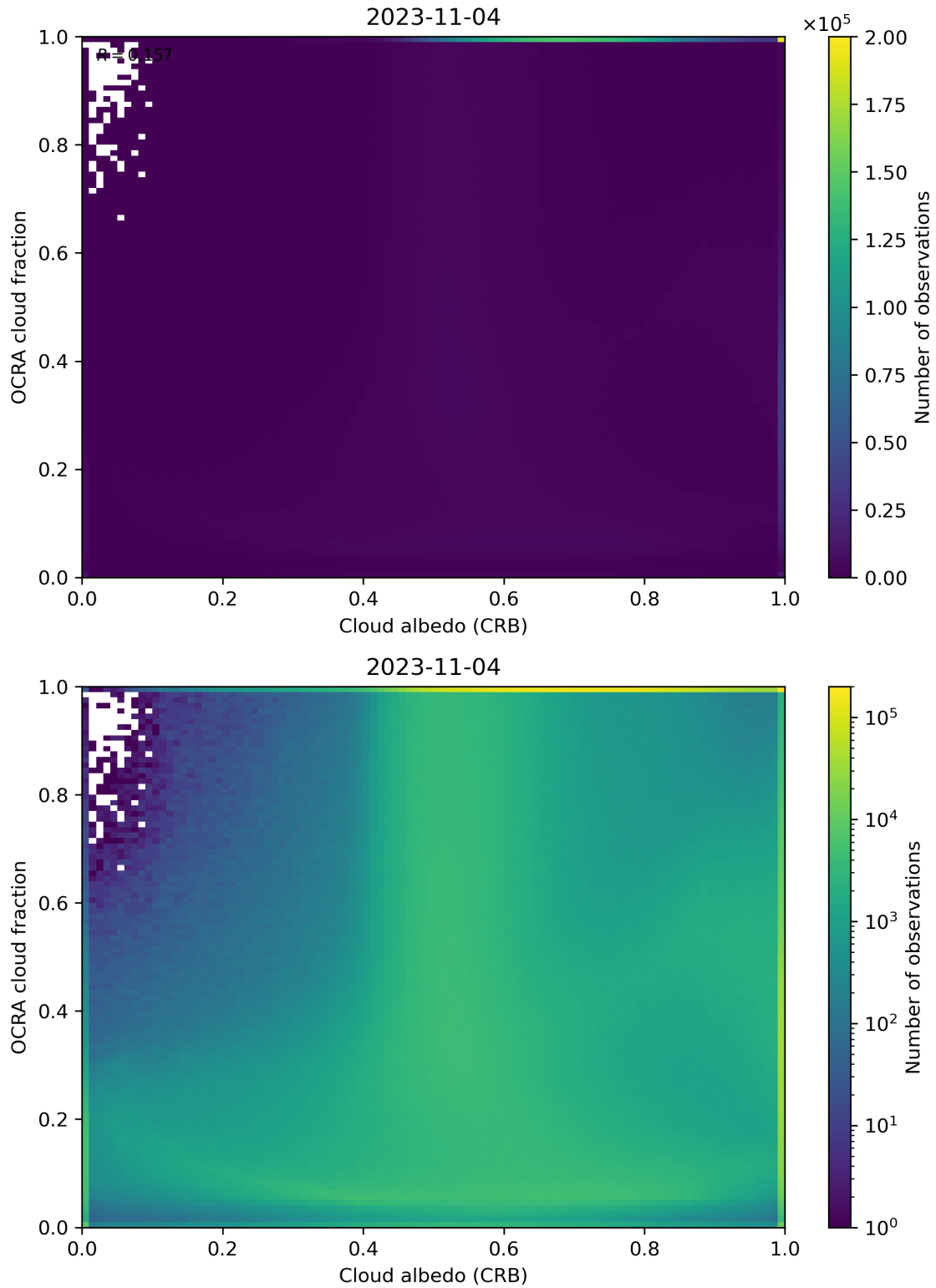


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-11-03 to 2023-11-05.

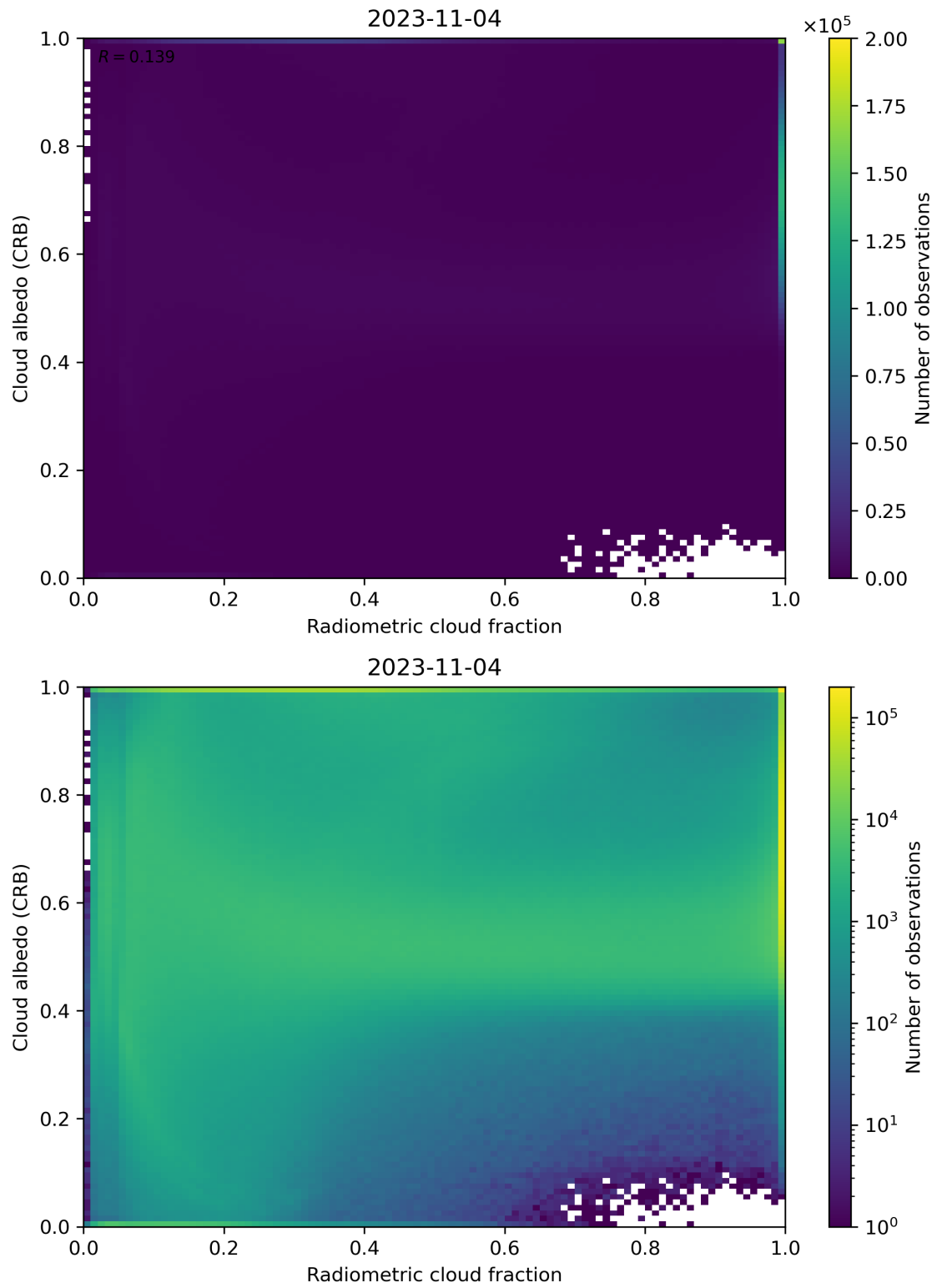


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-11-03 to 2023-11-05.

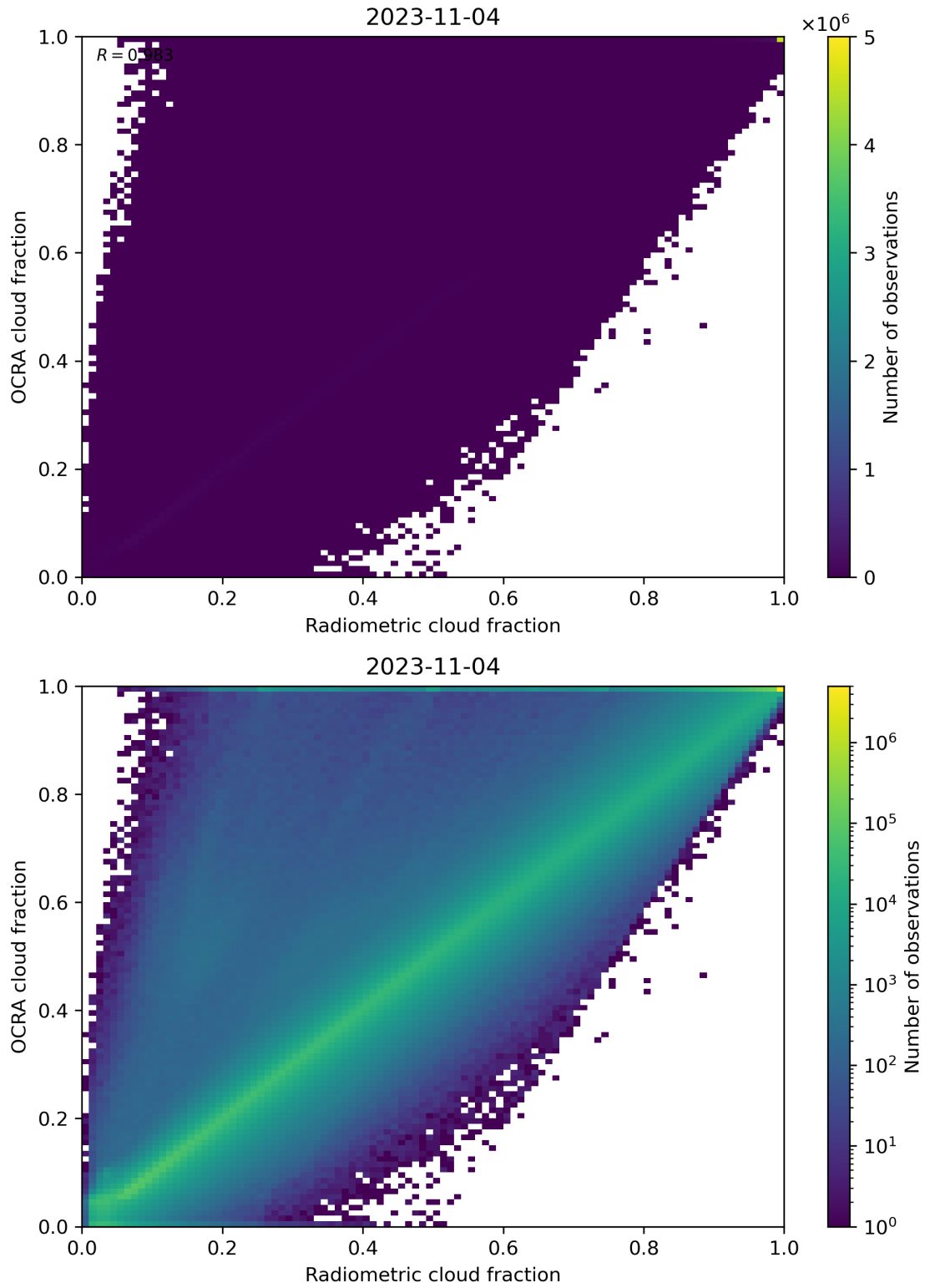


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-11-03 to 2023-11-05.

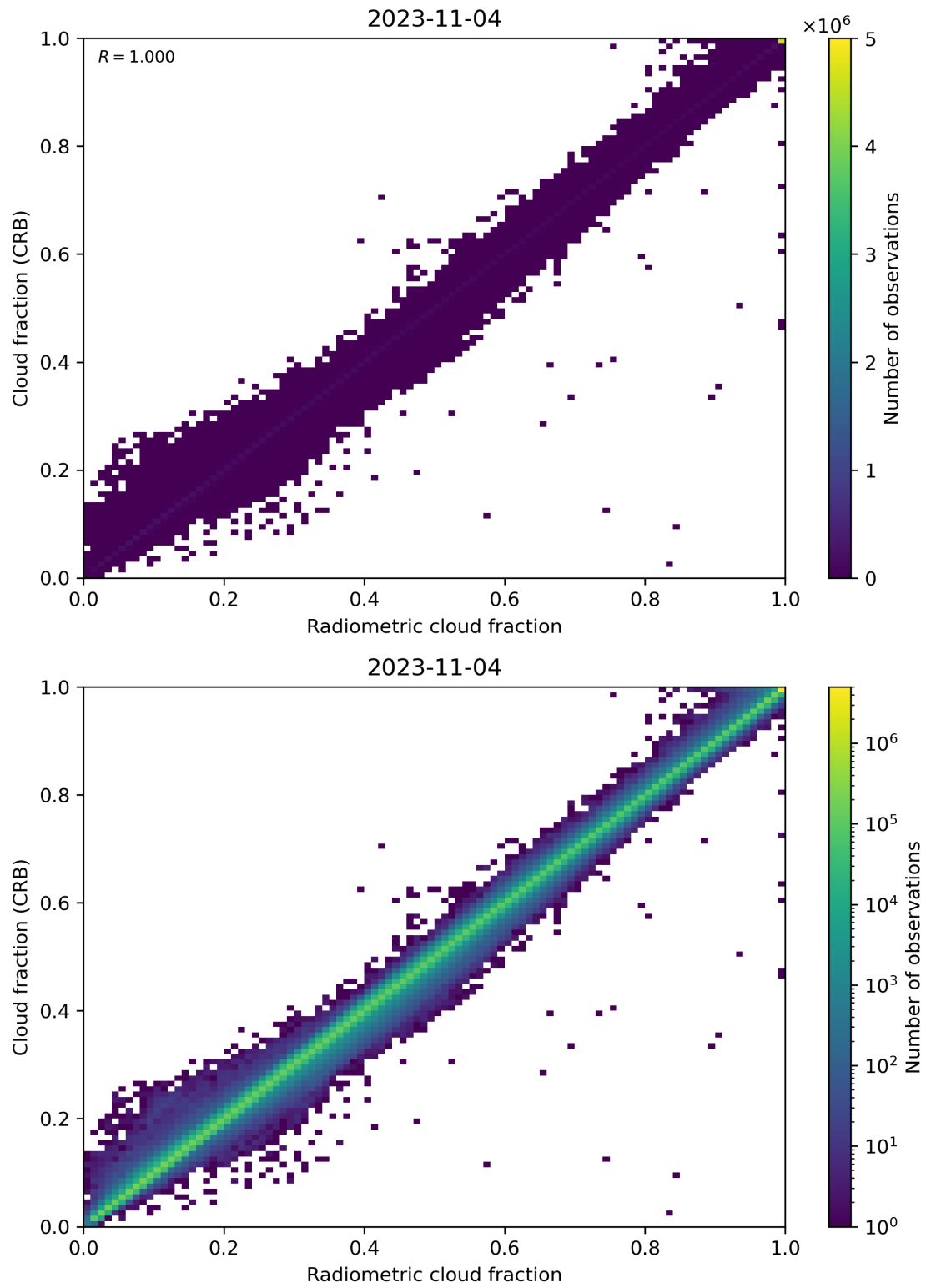


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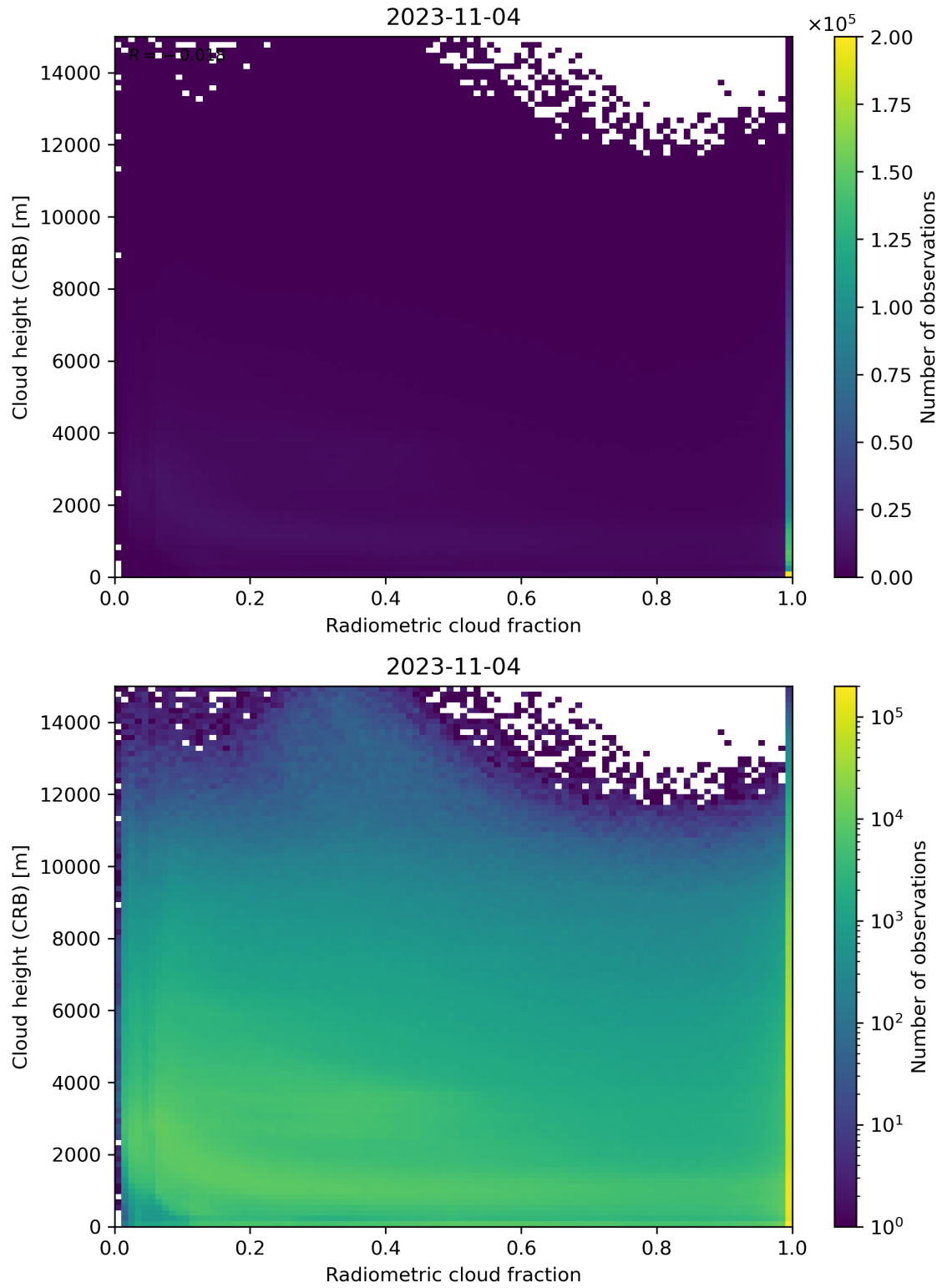


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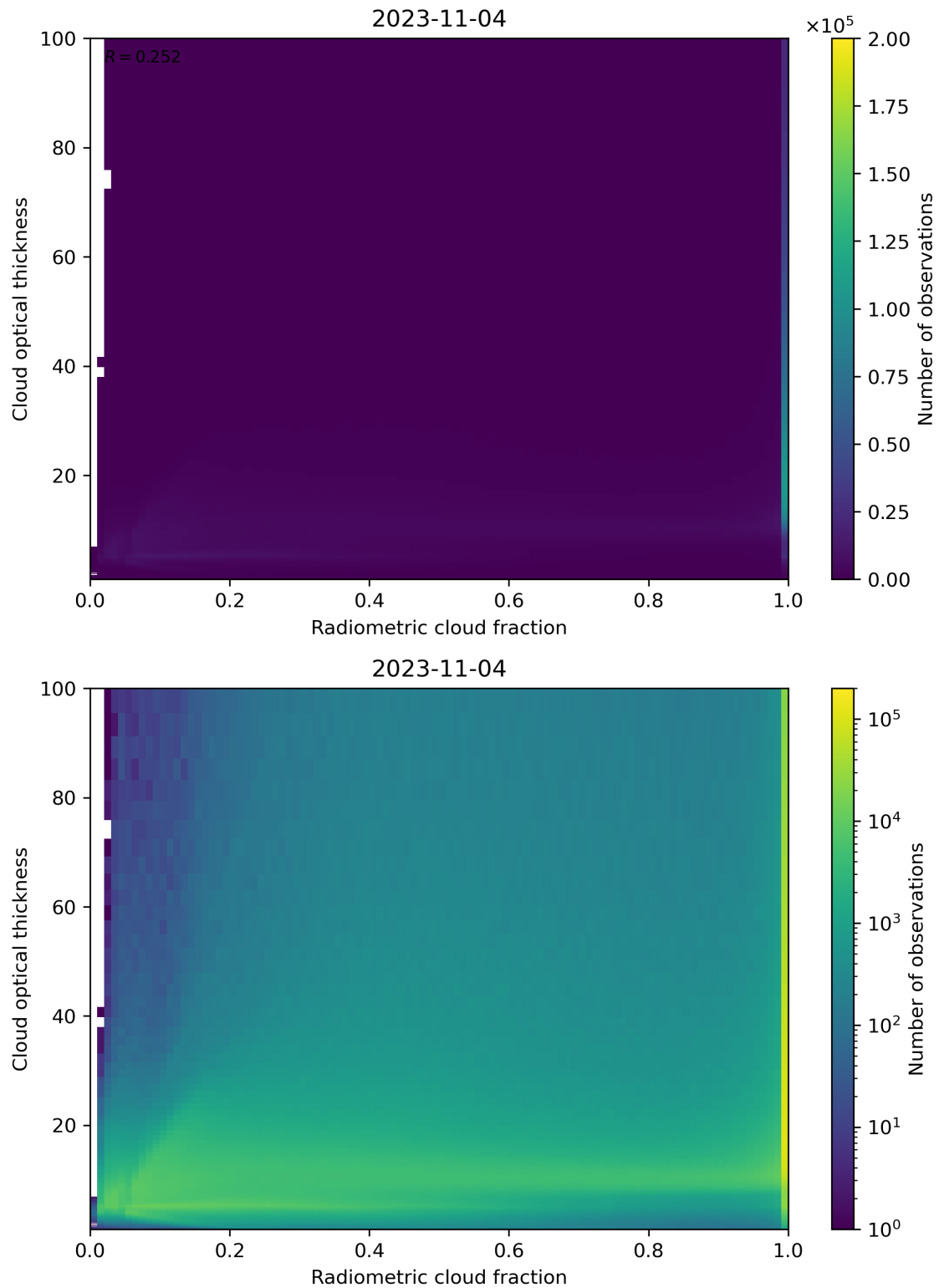


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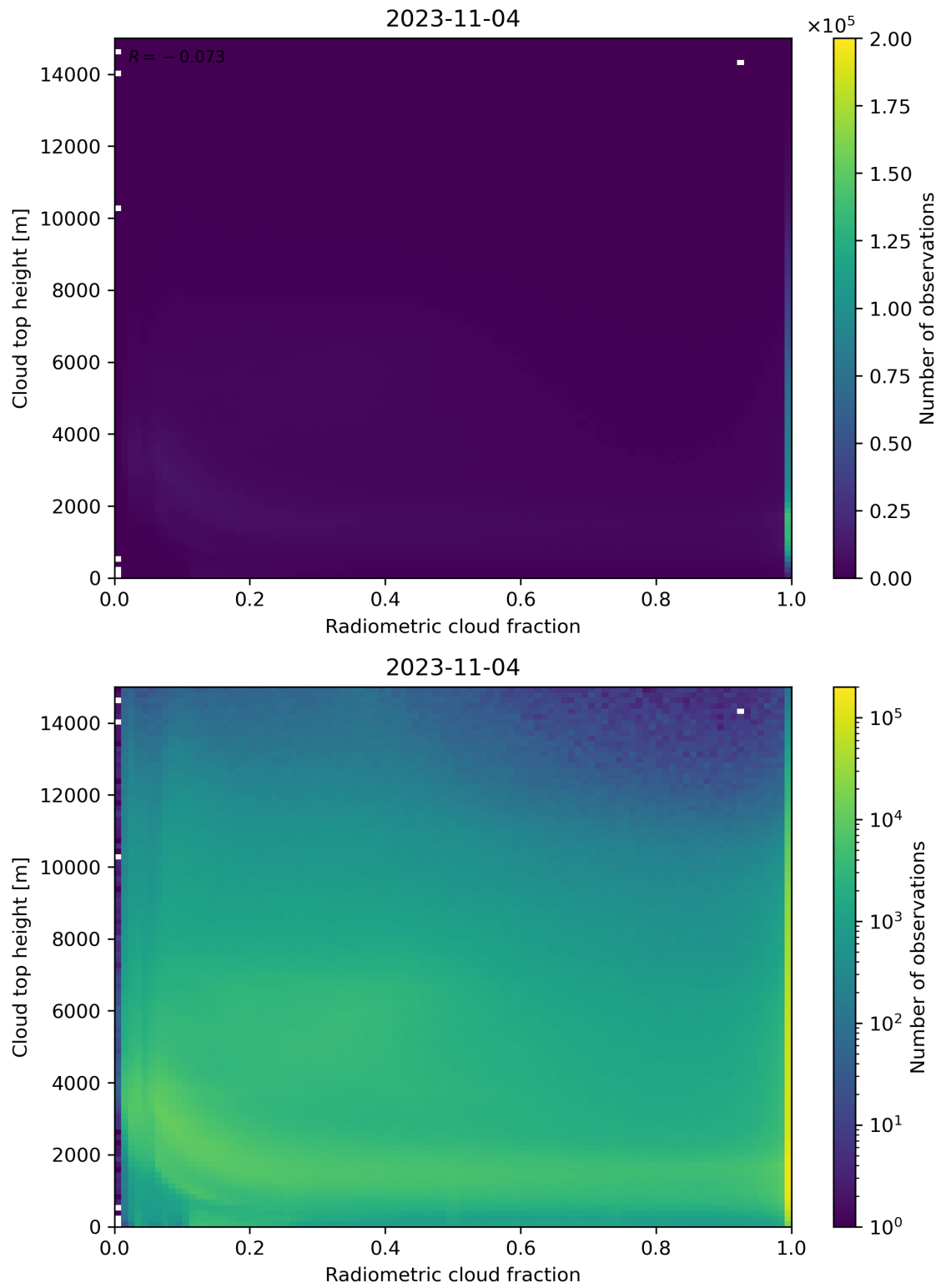


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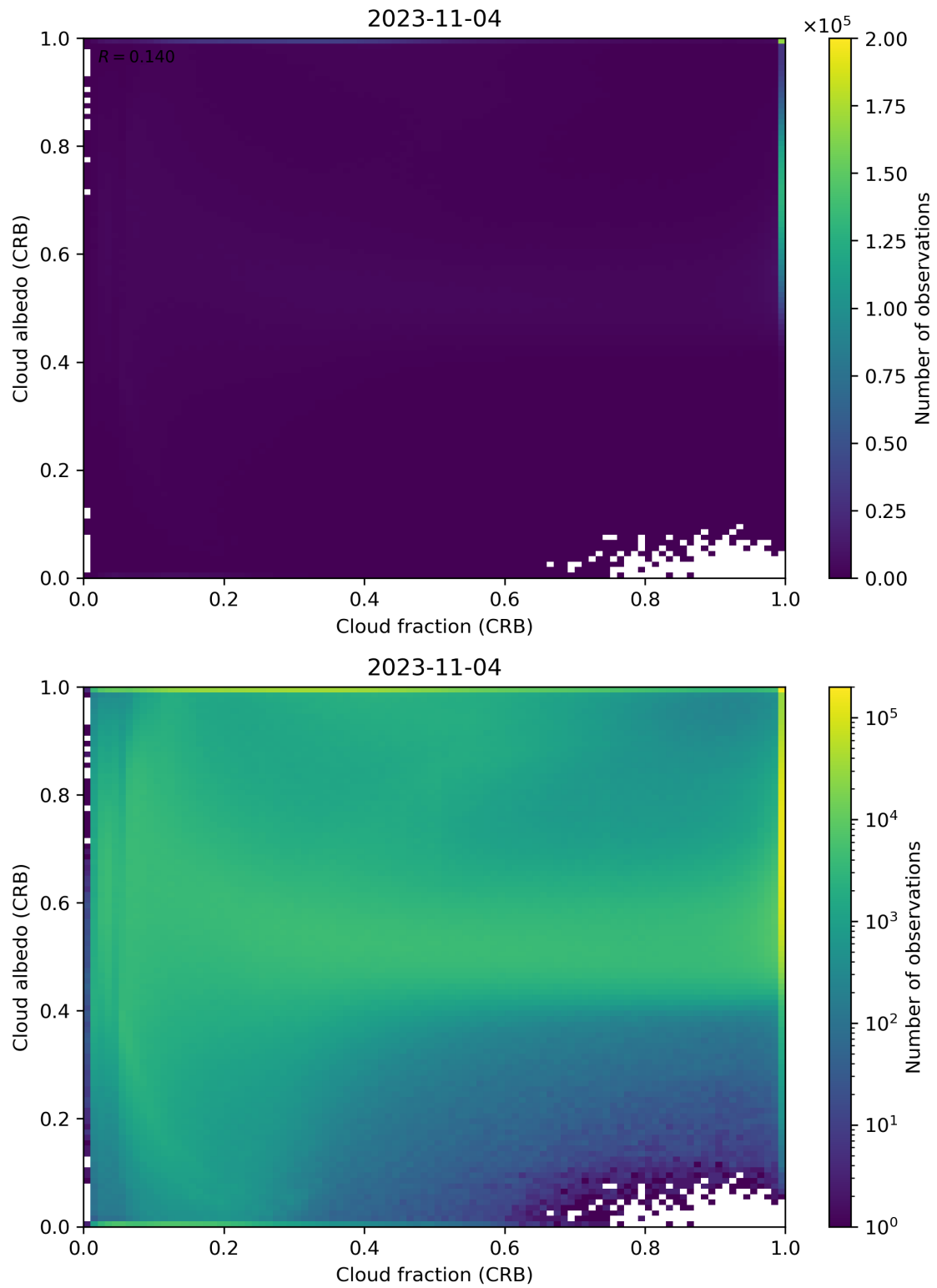


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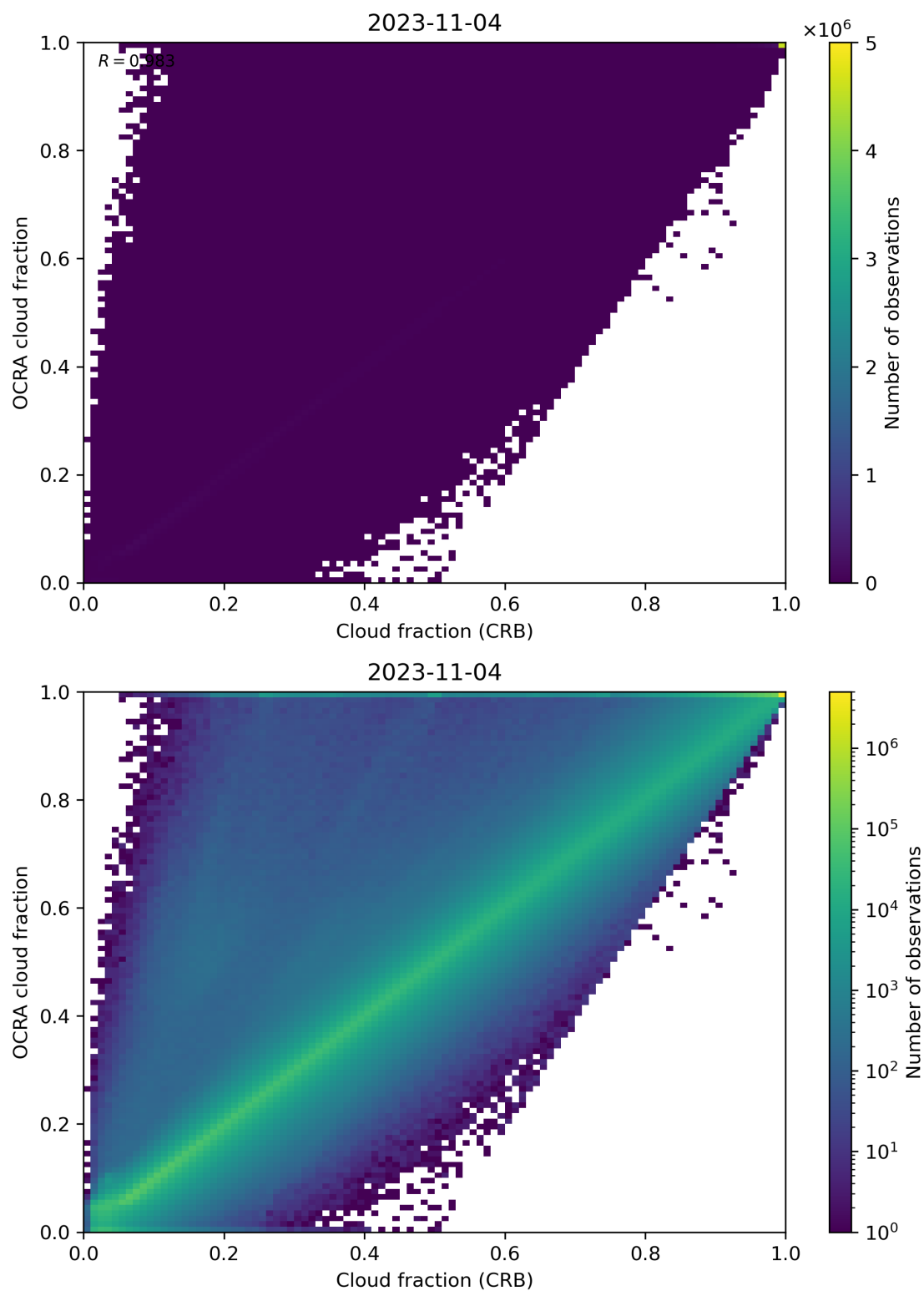


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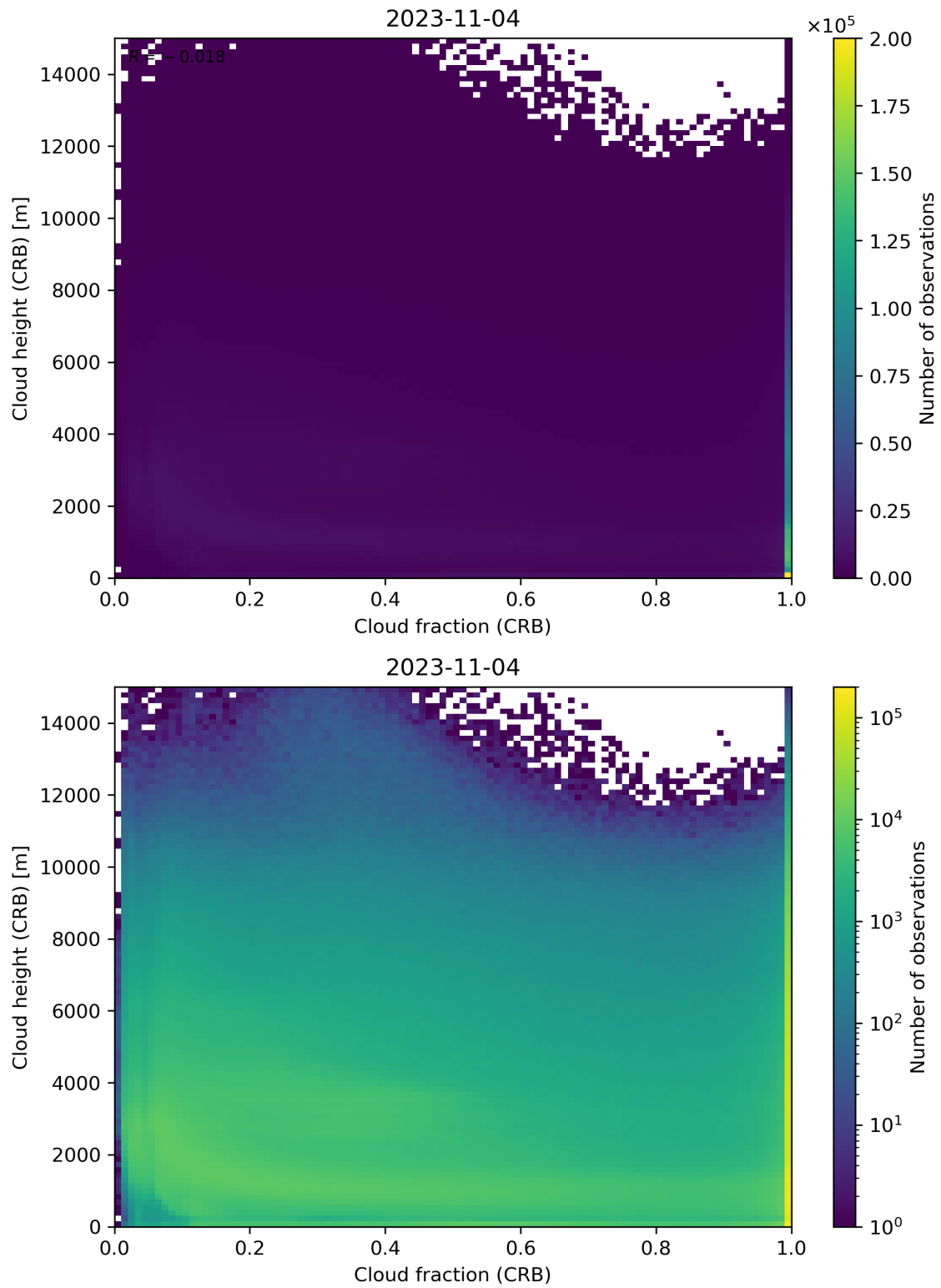


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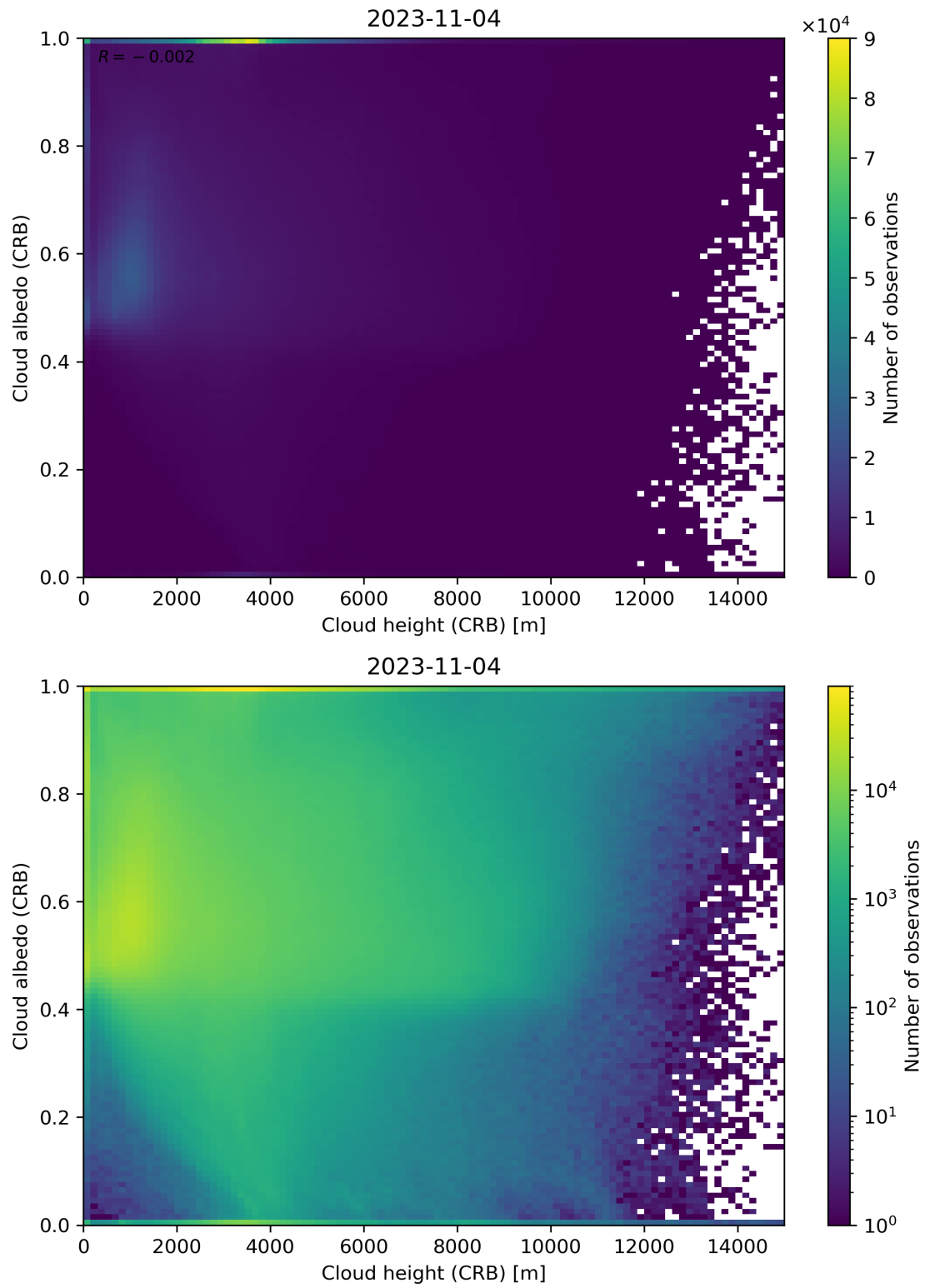


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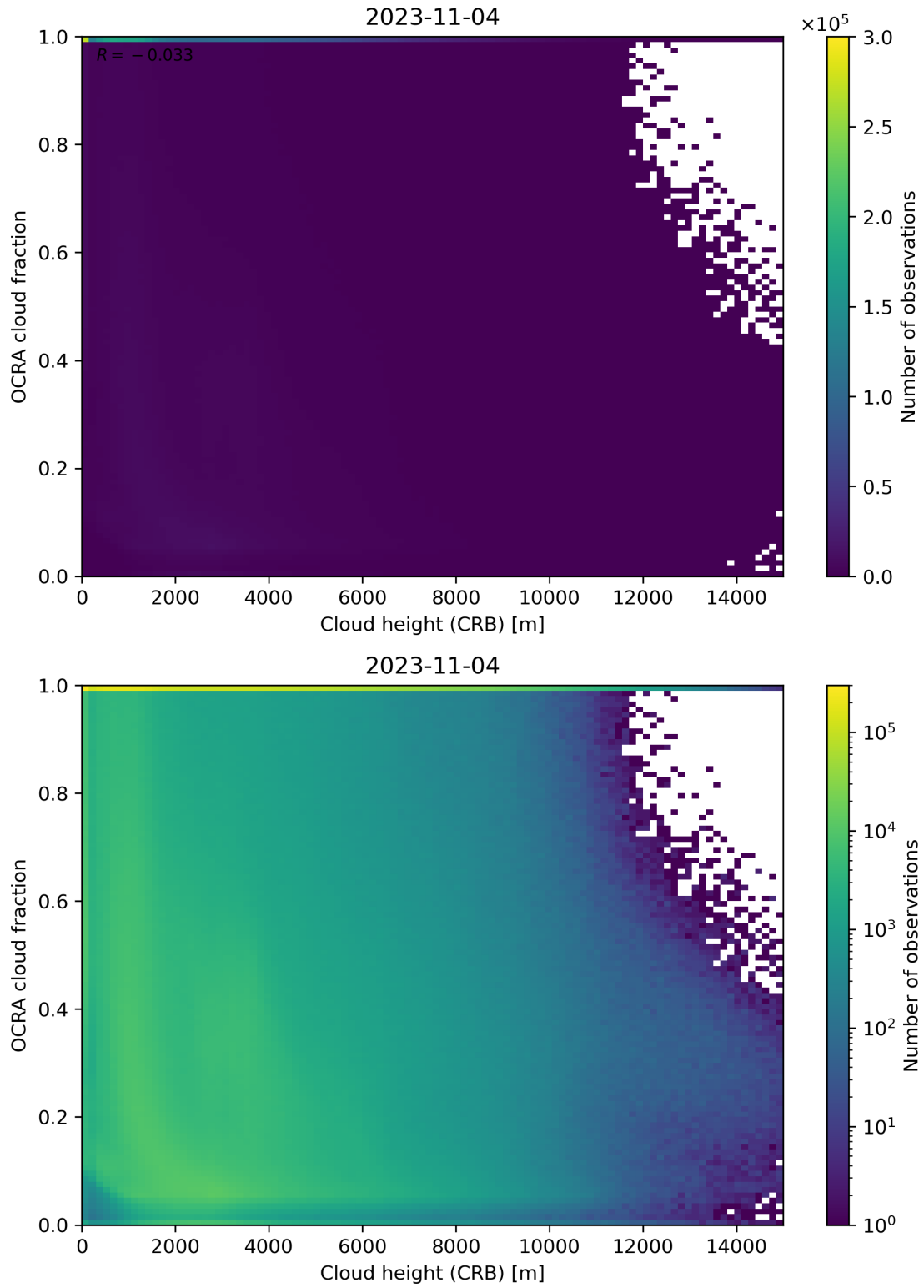


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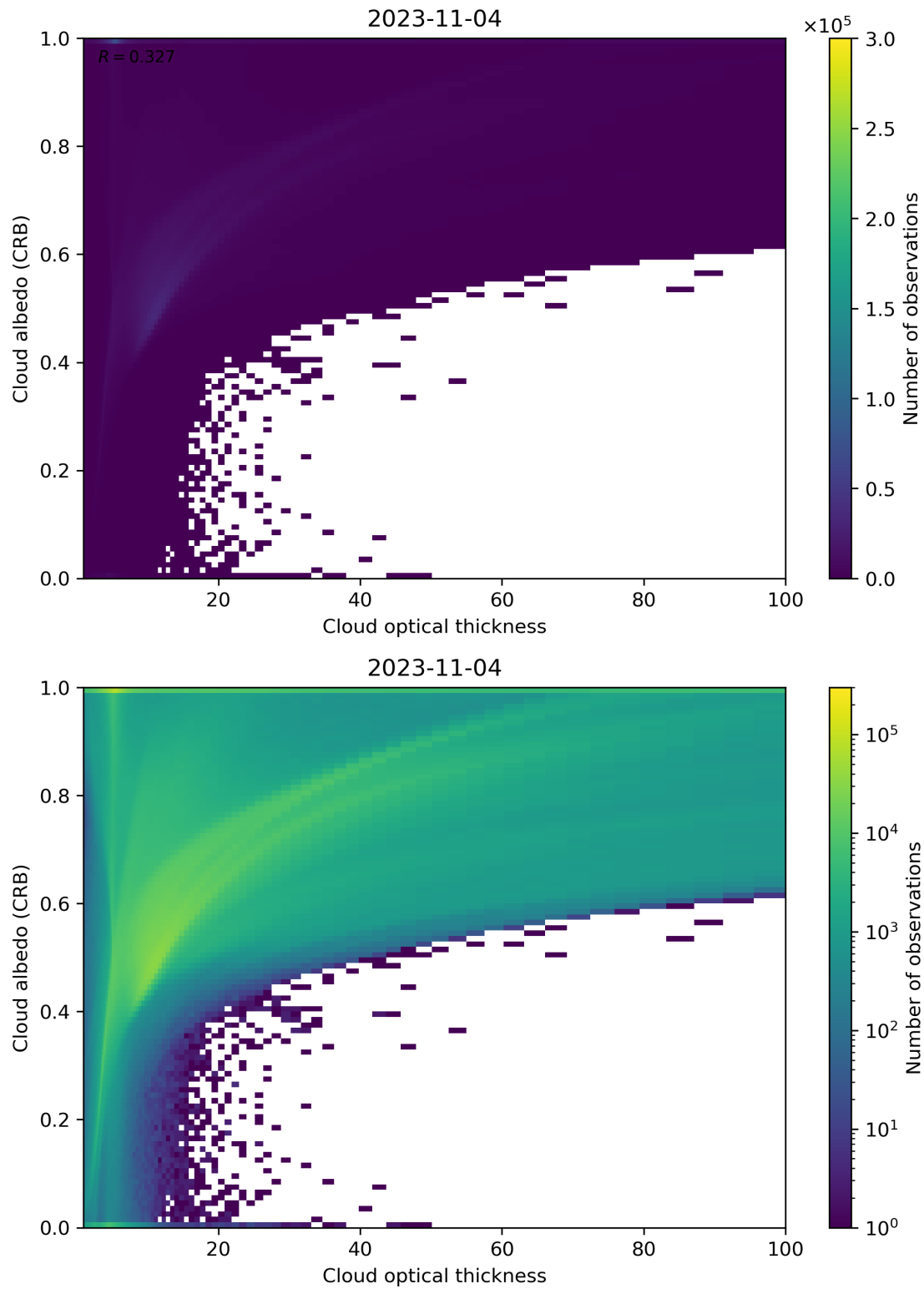


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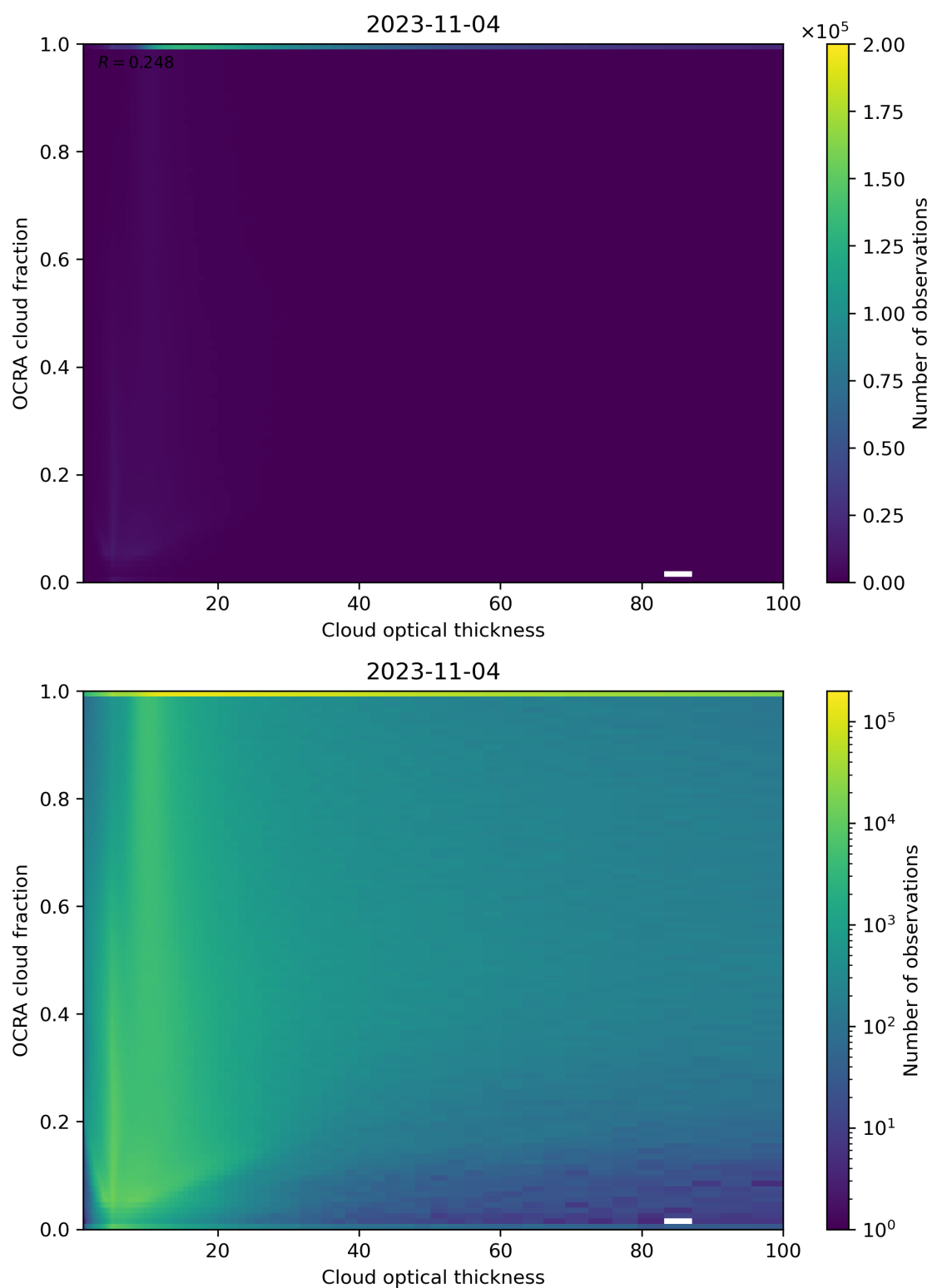


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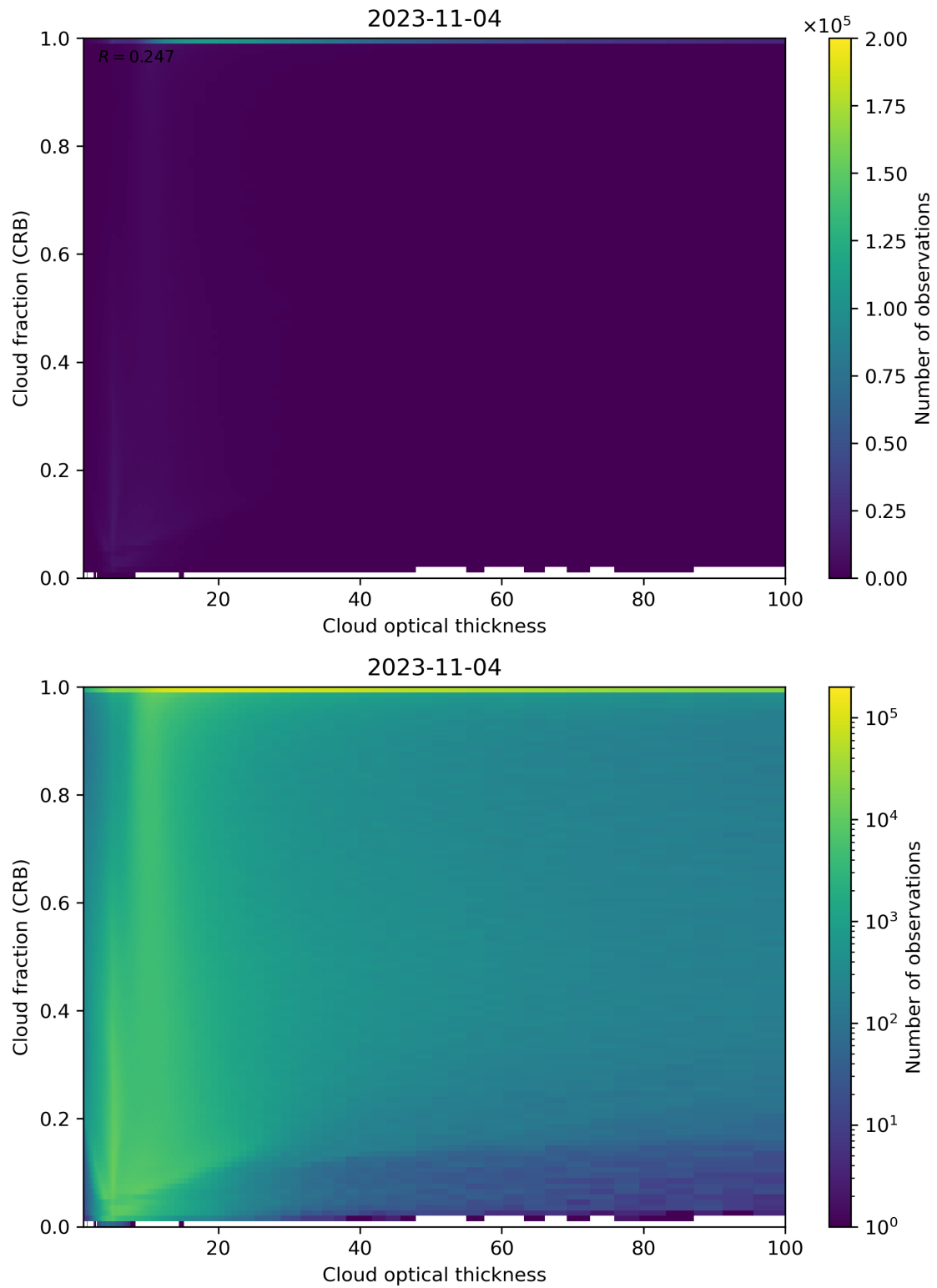


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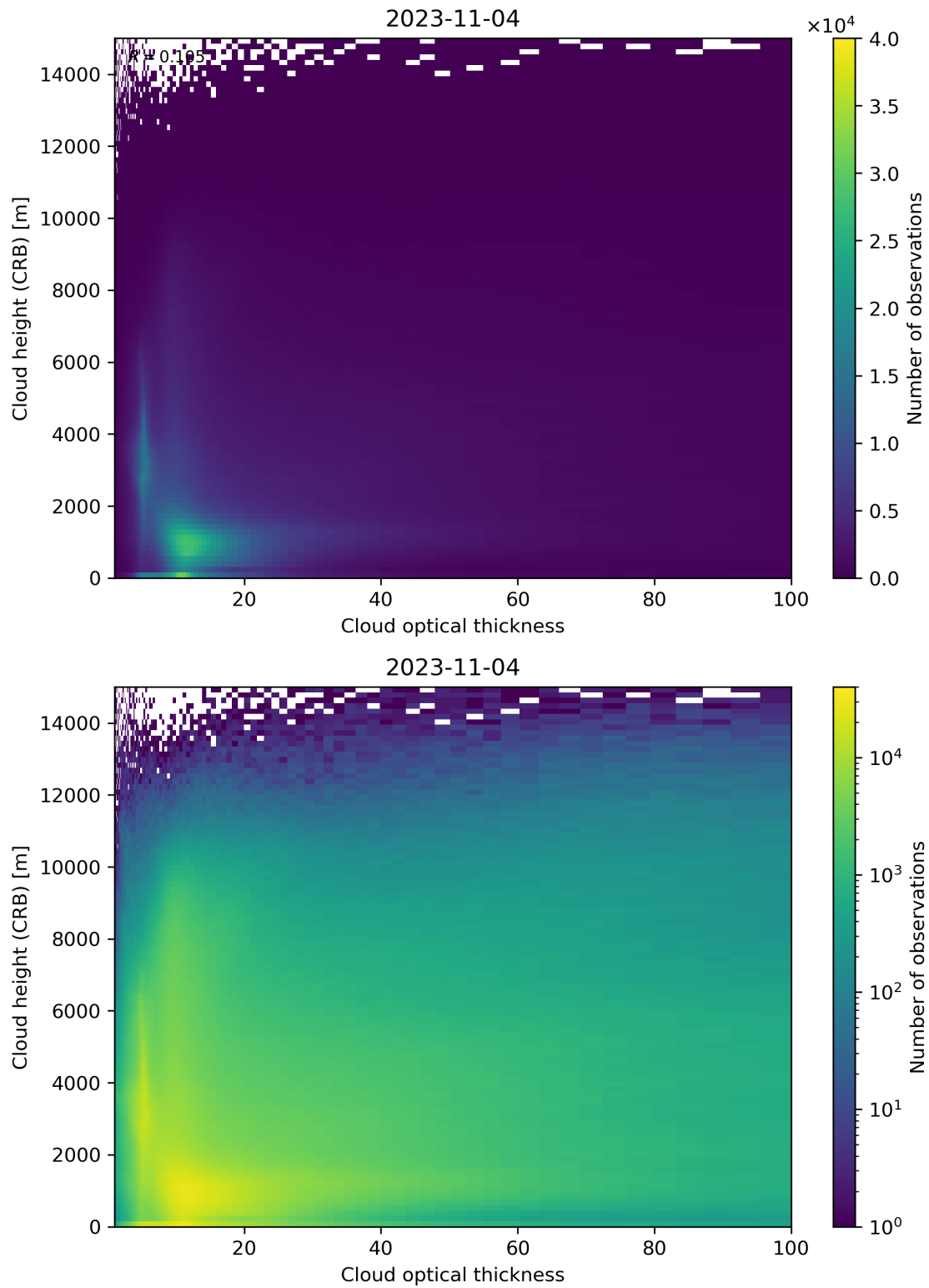


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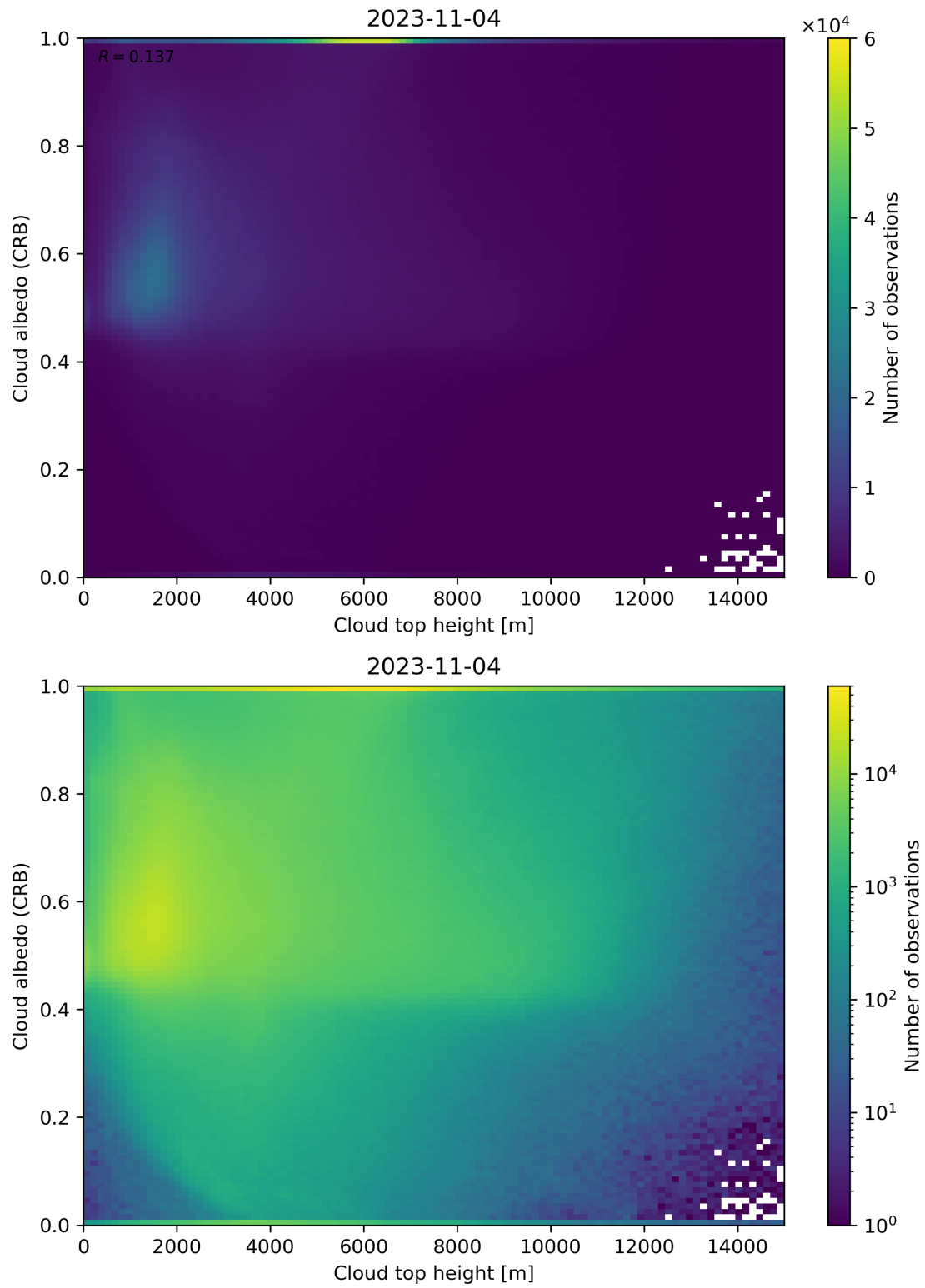


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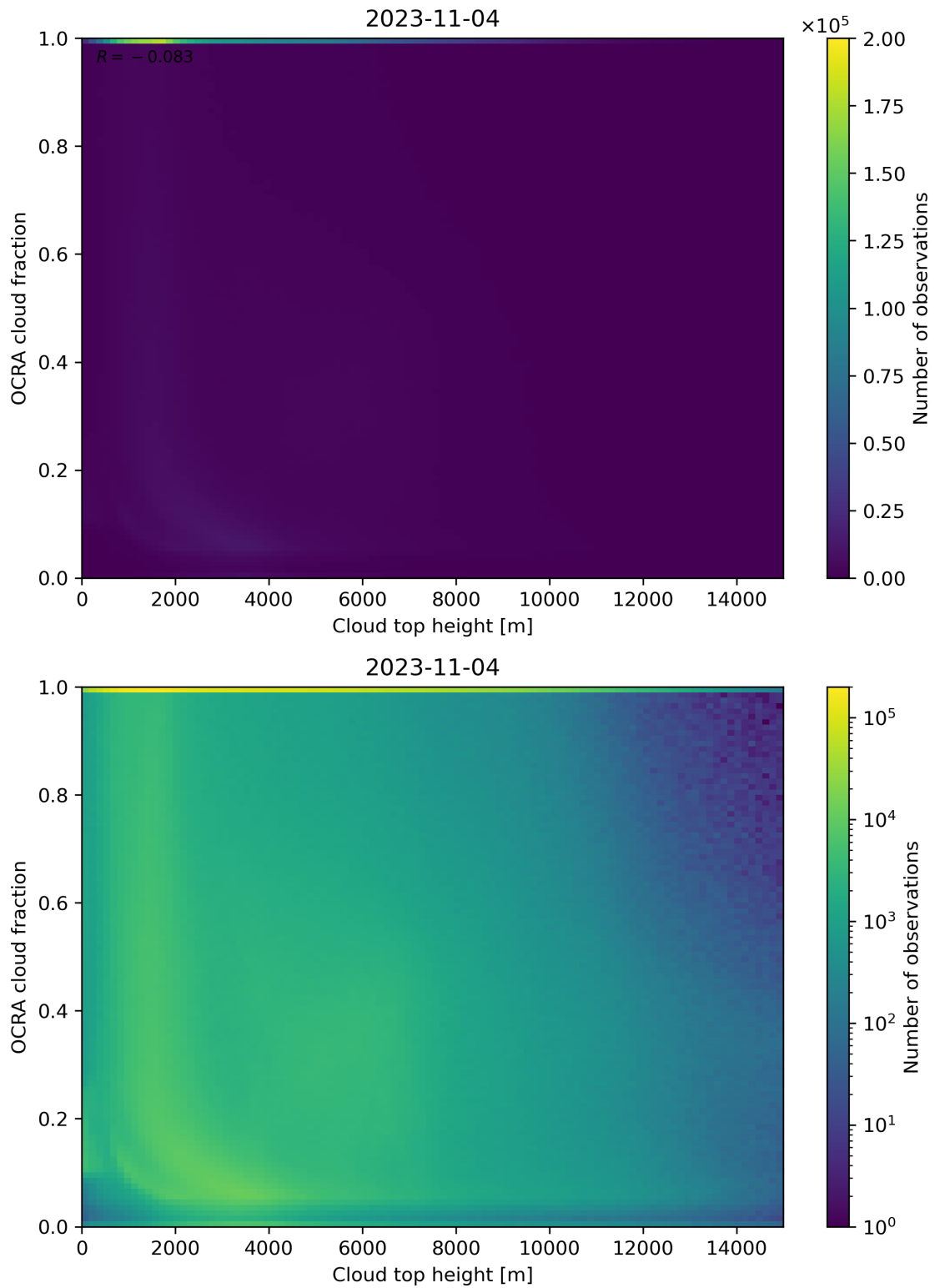


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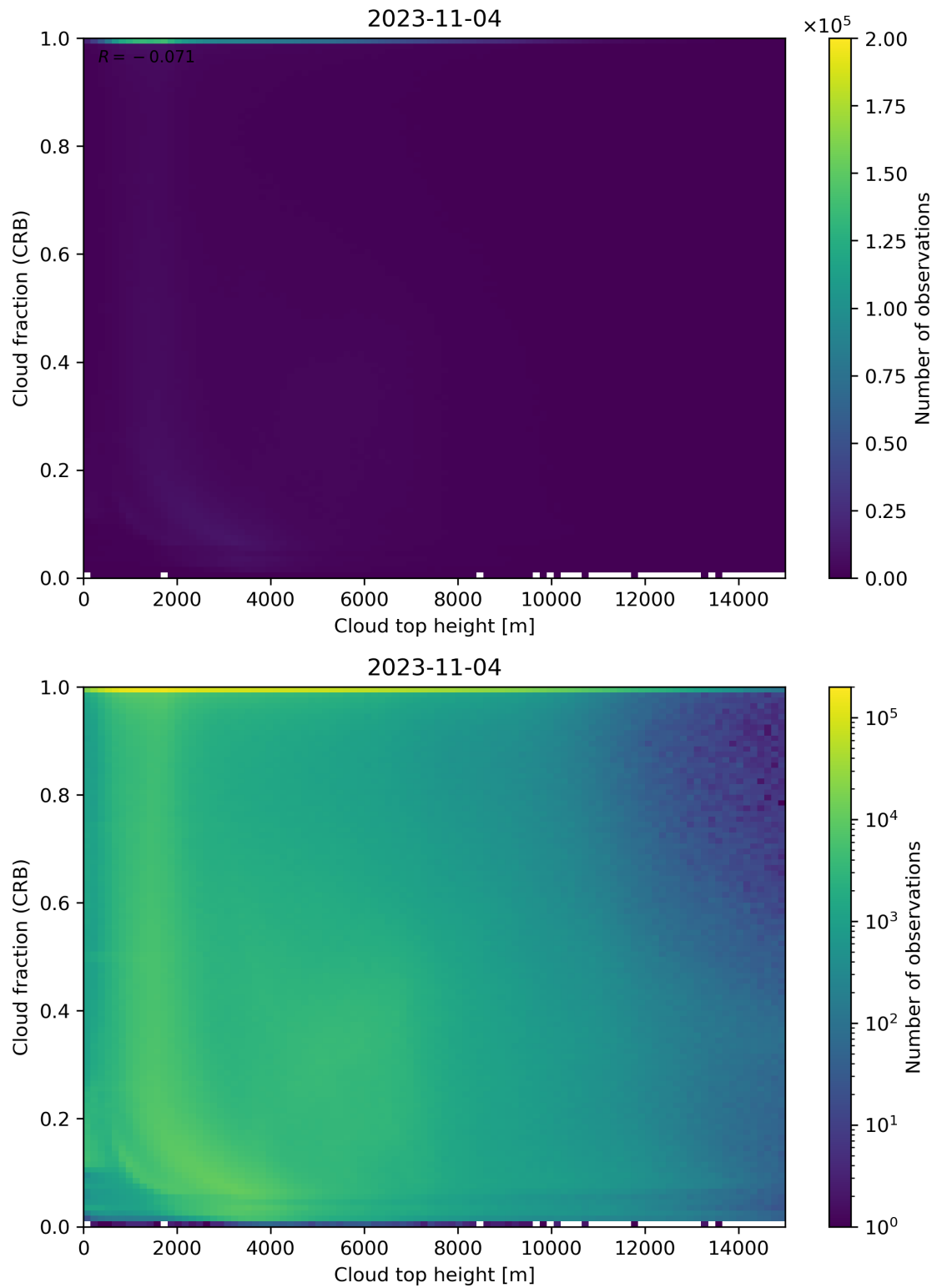


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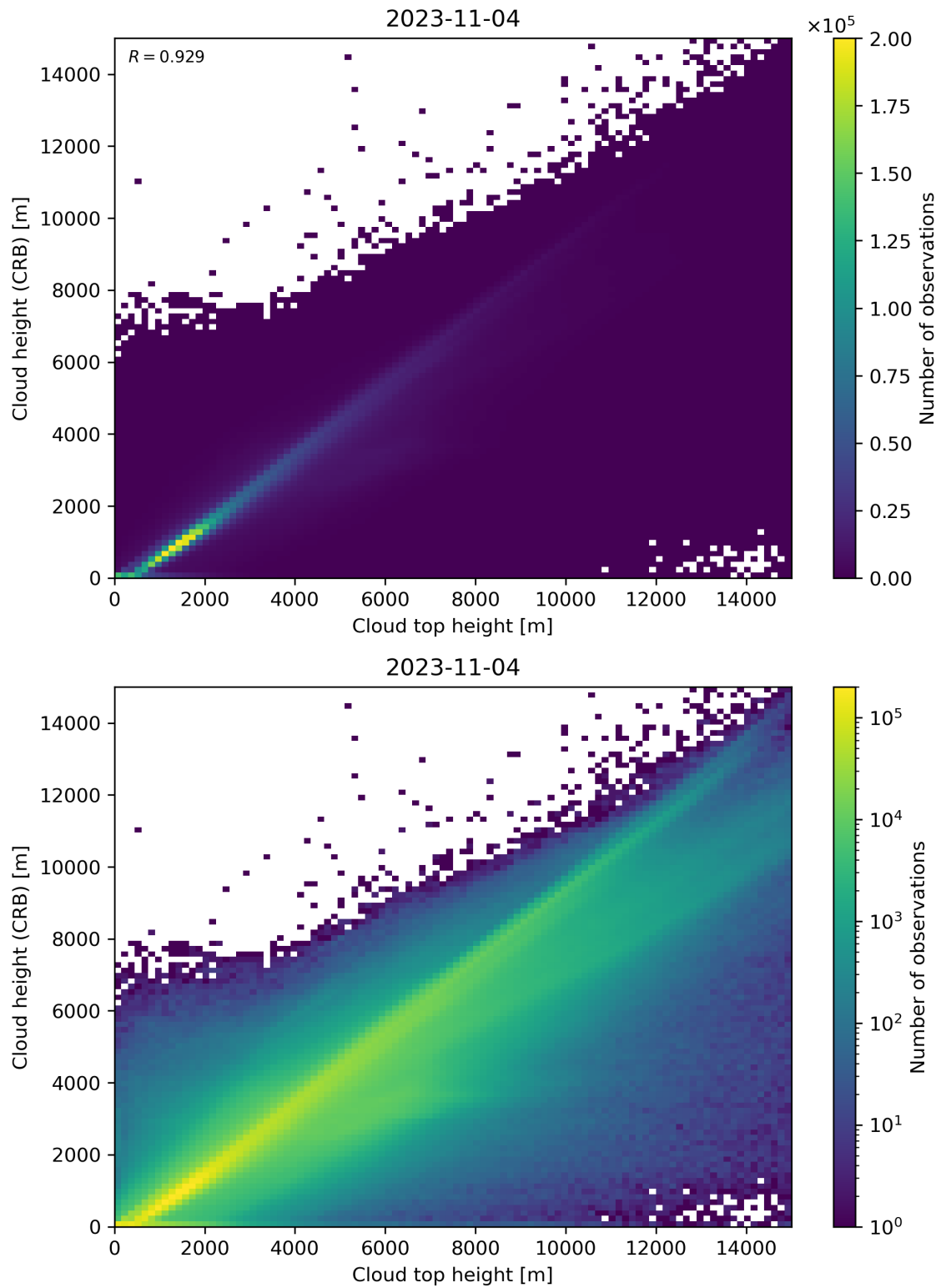


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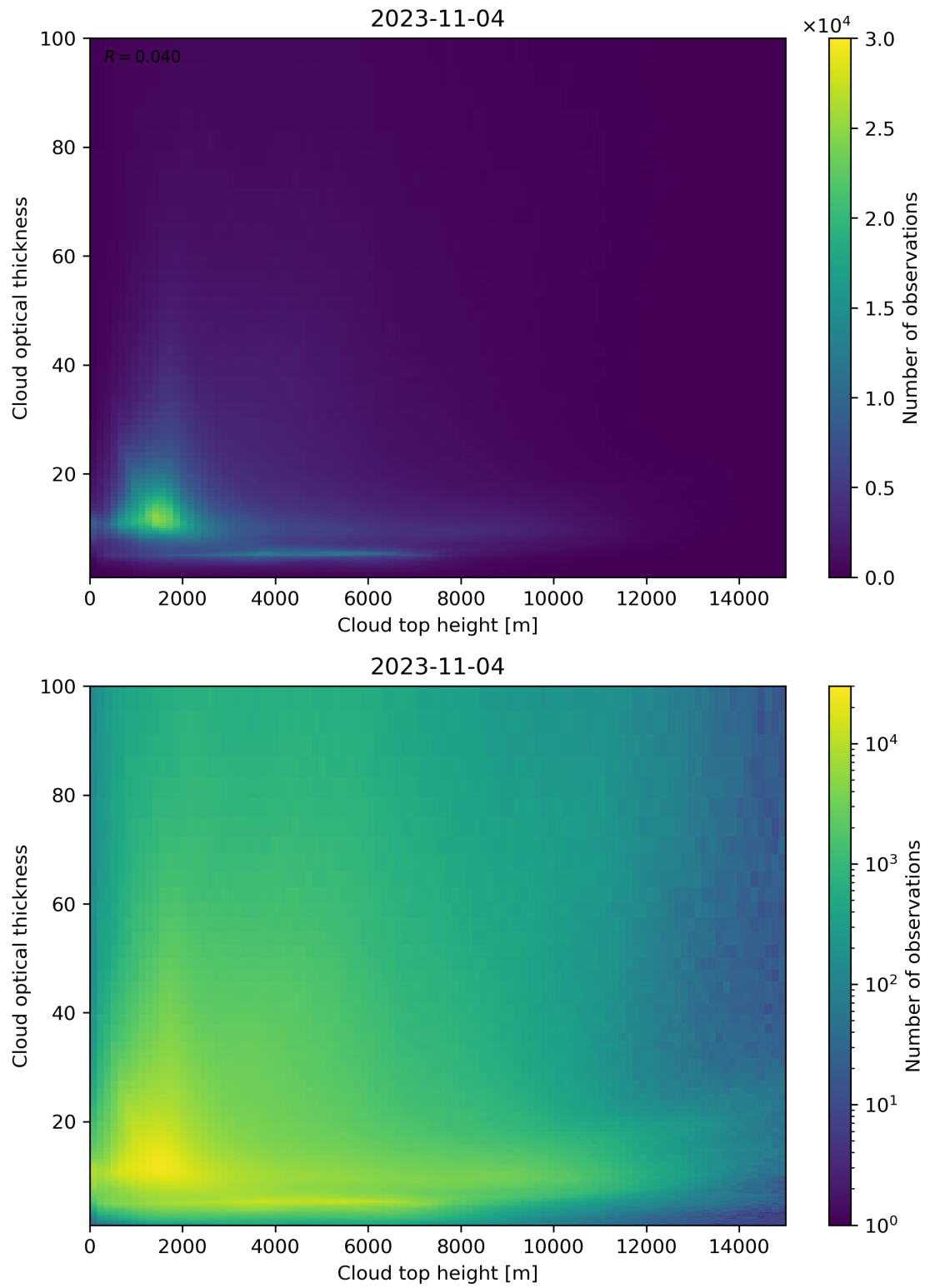


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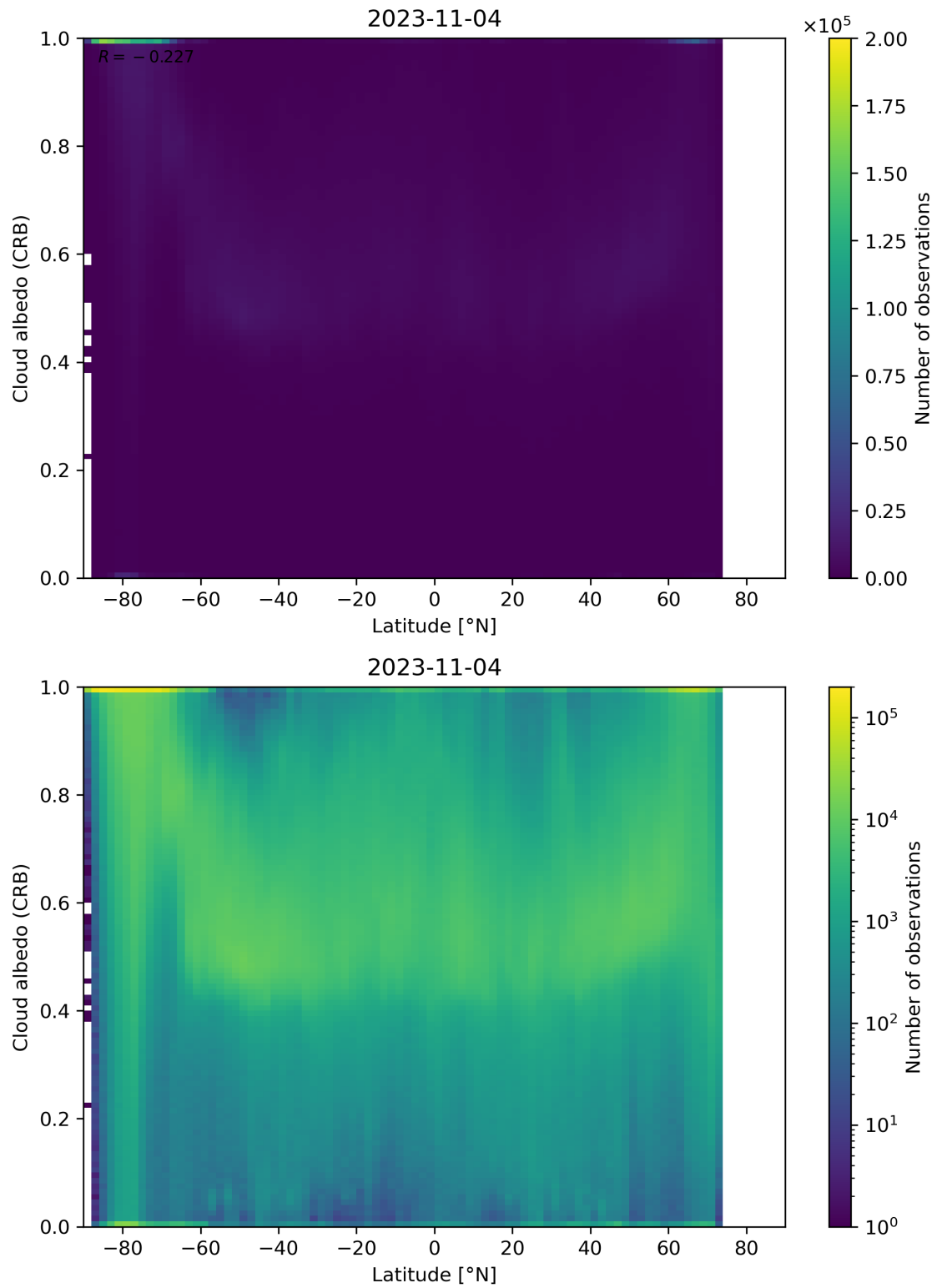


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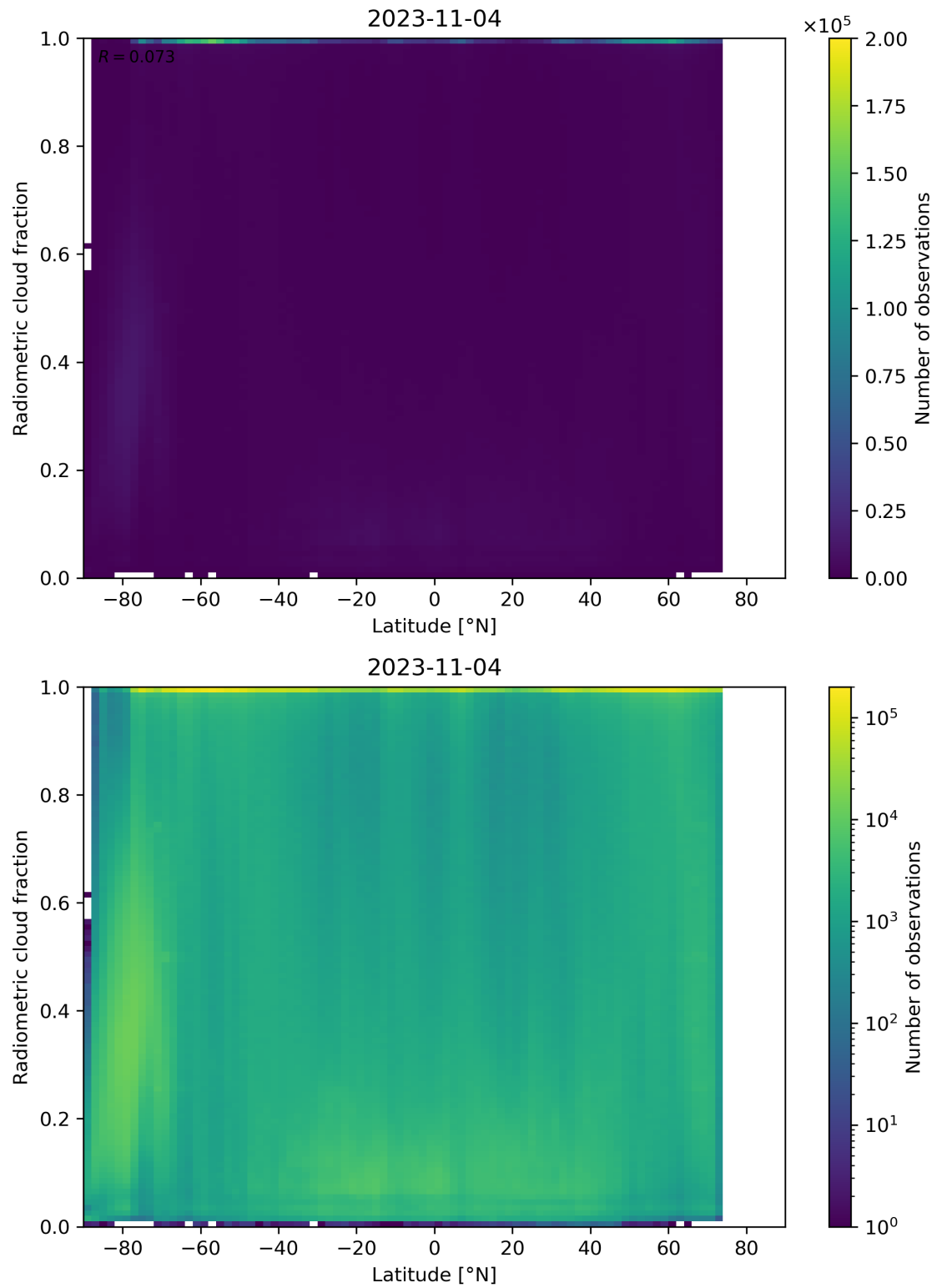


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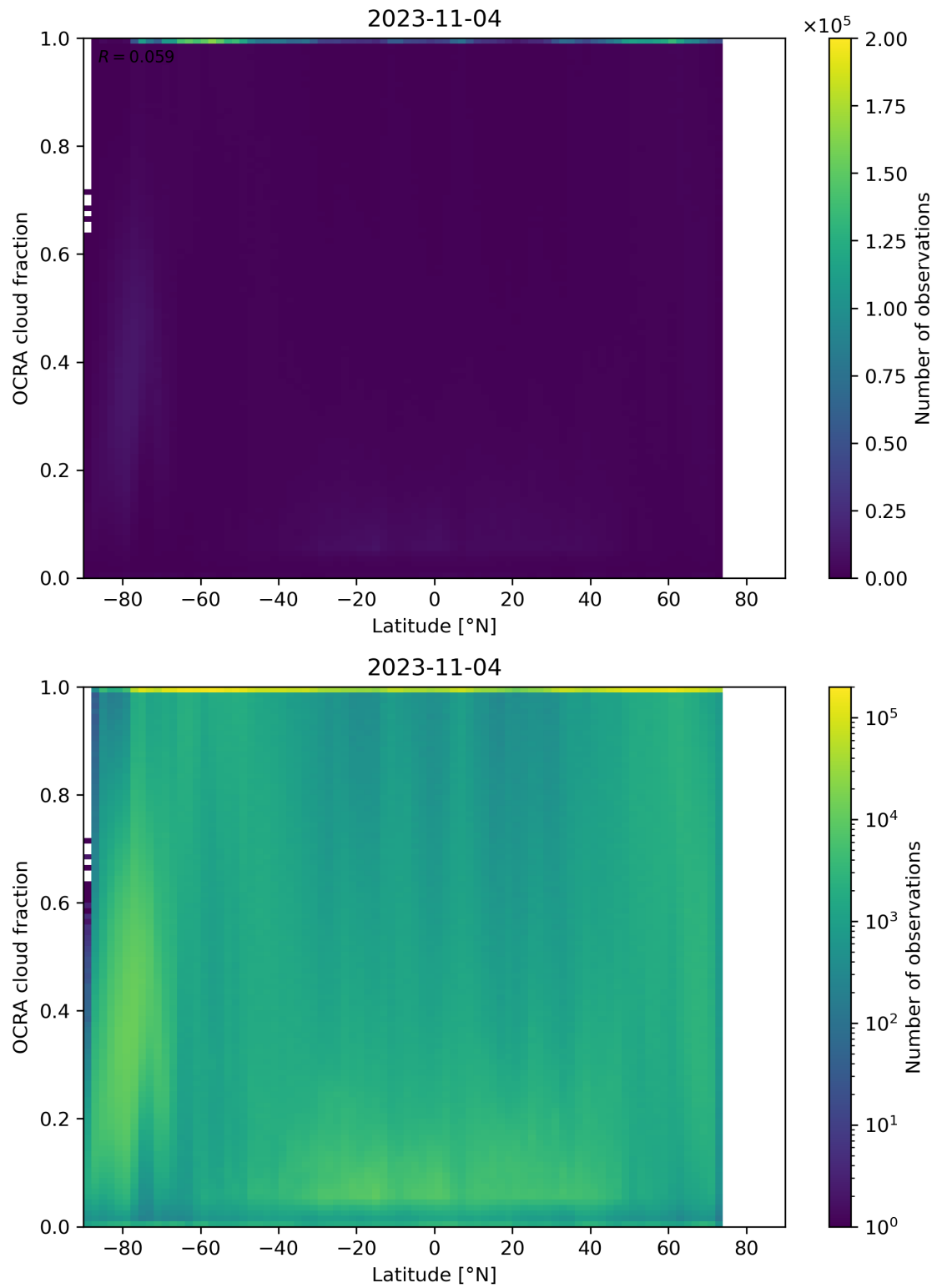


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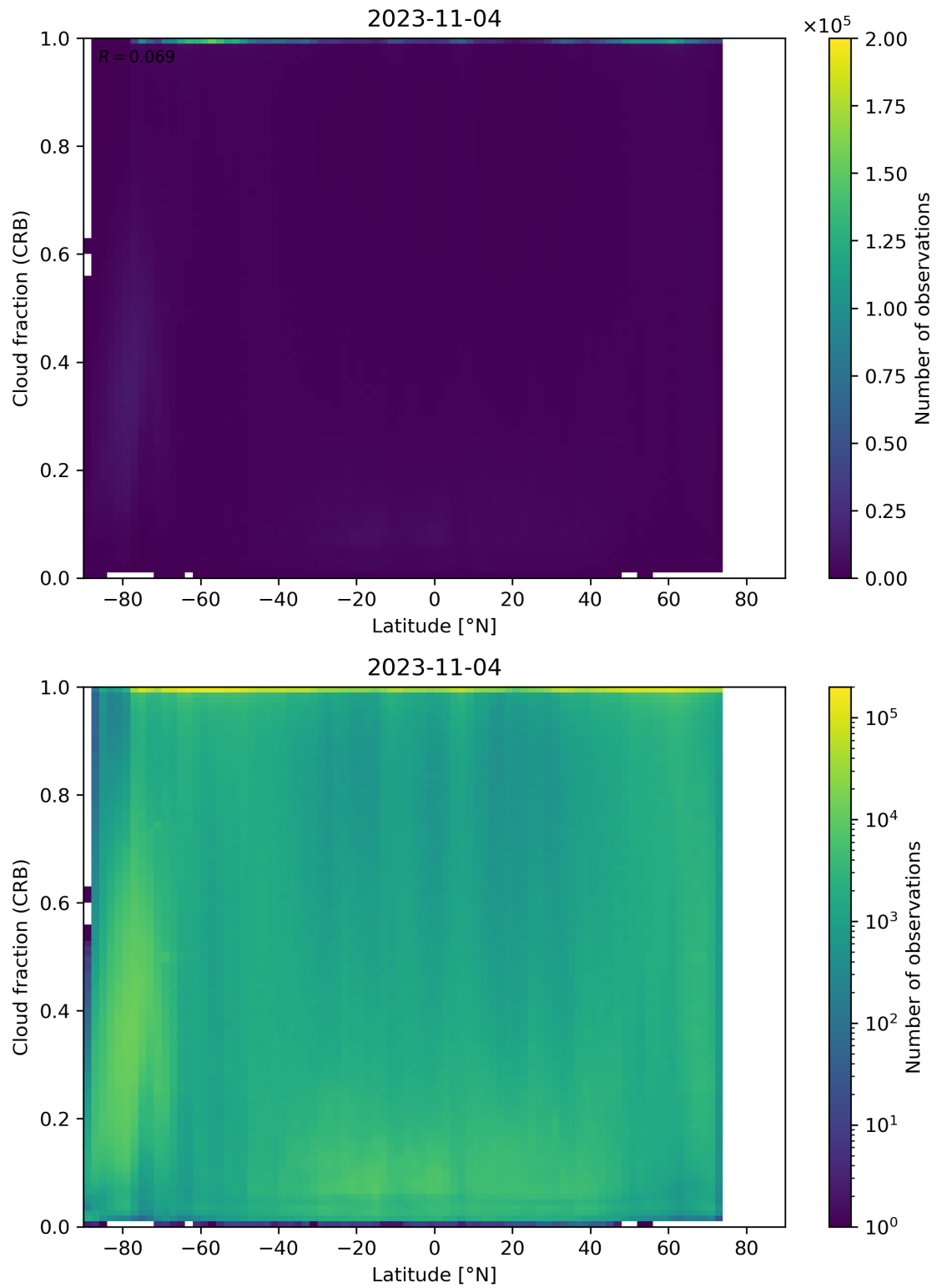


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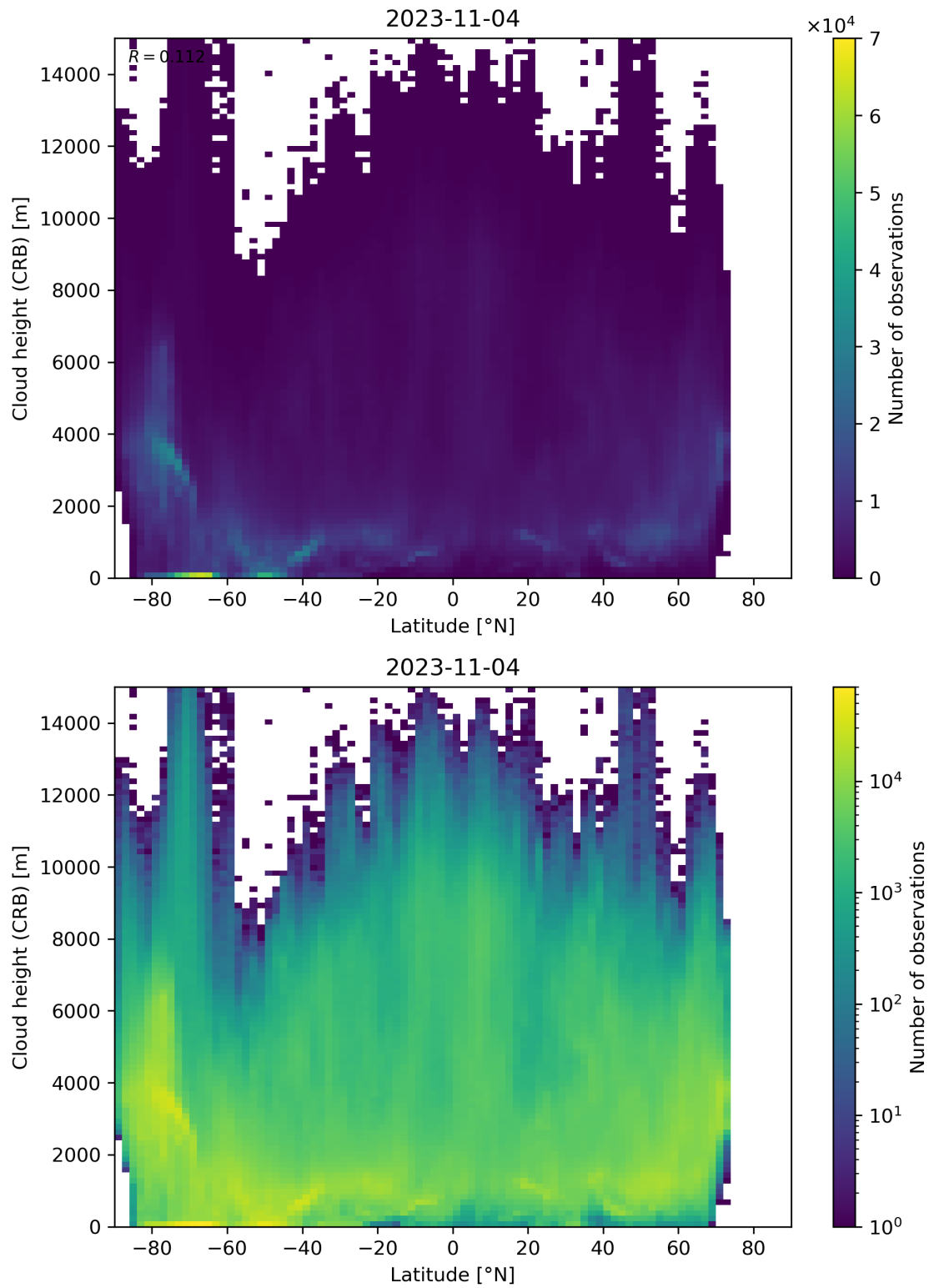


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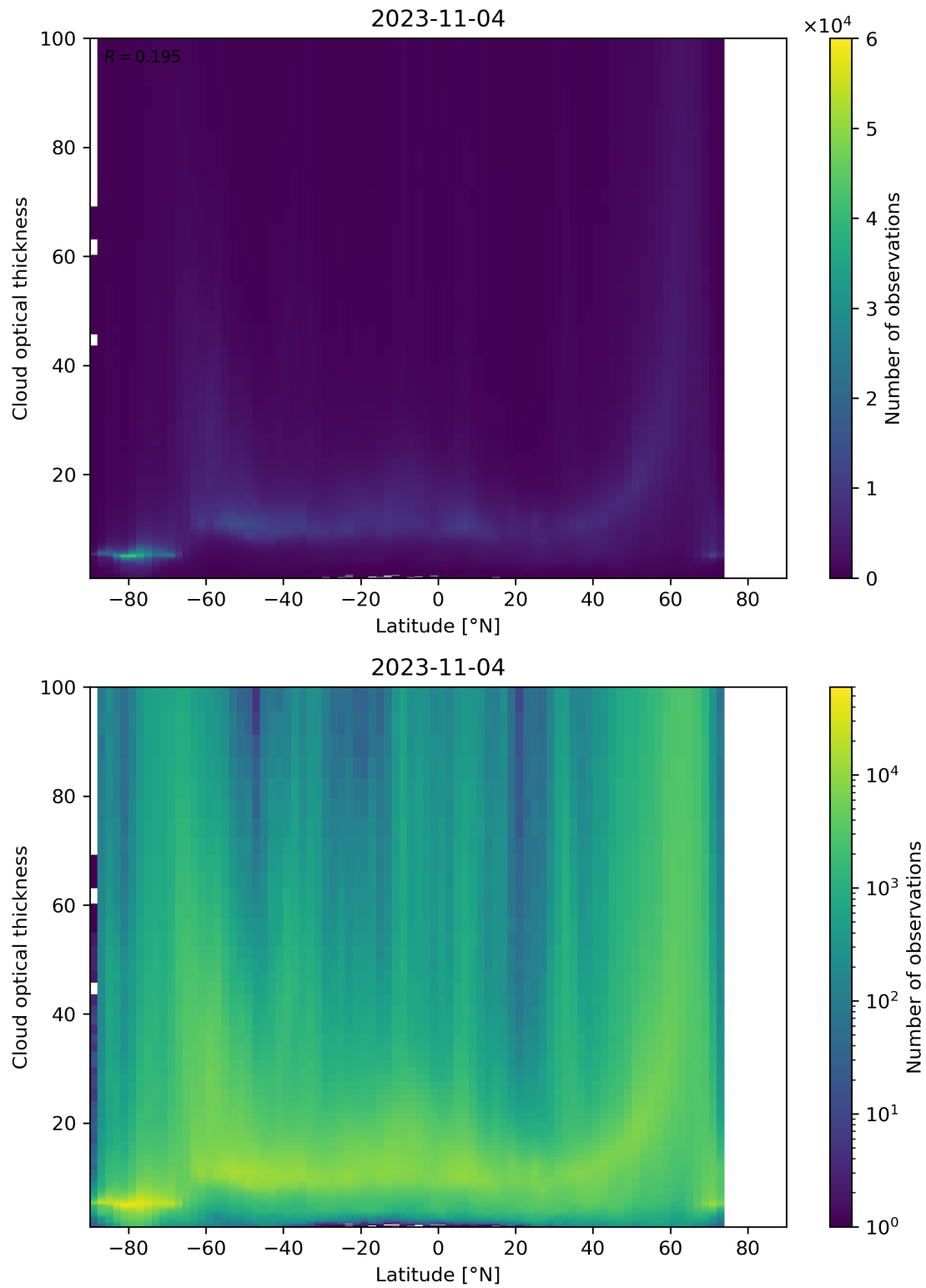


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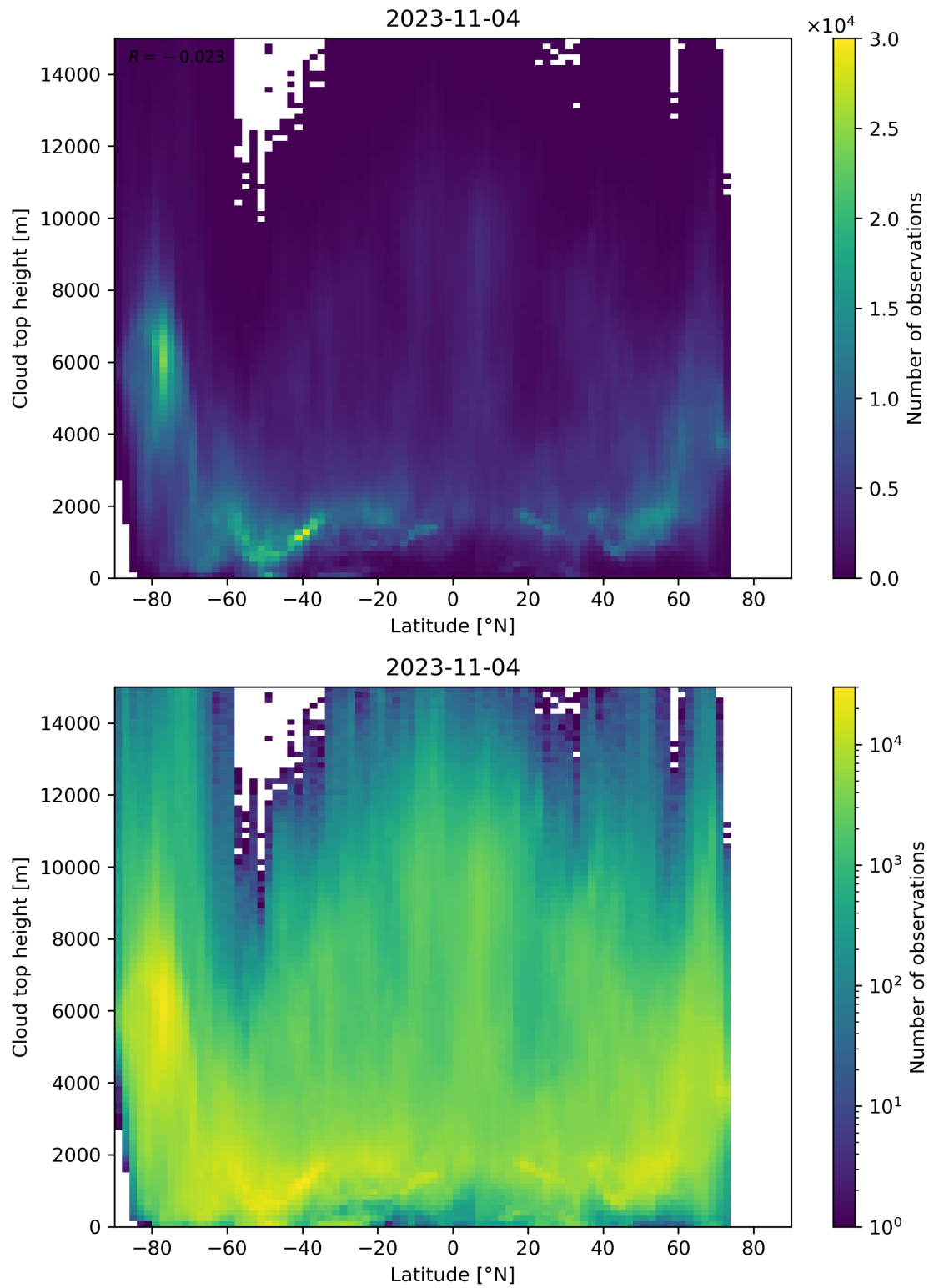


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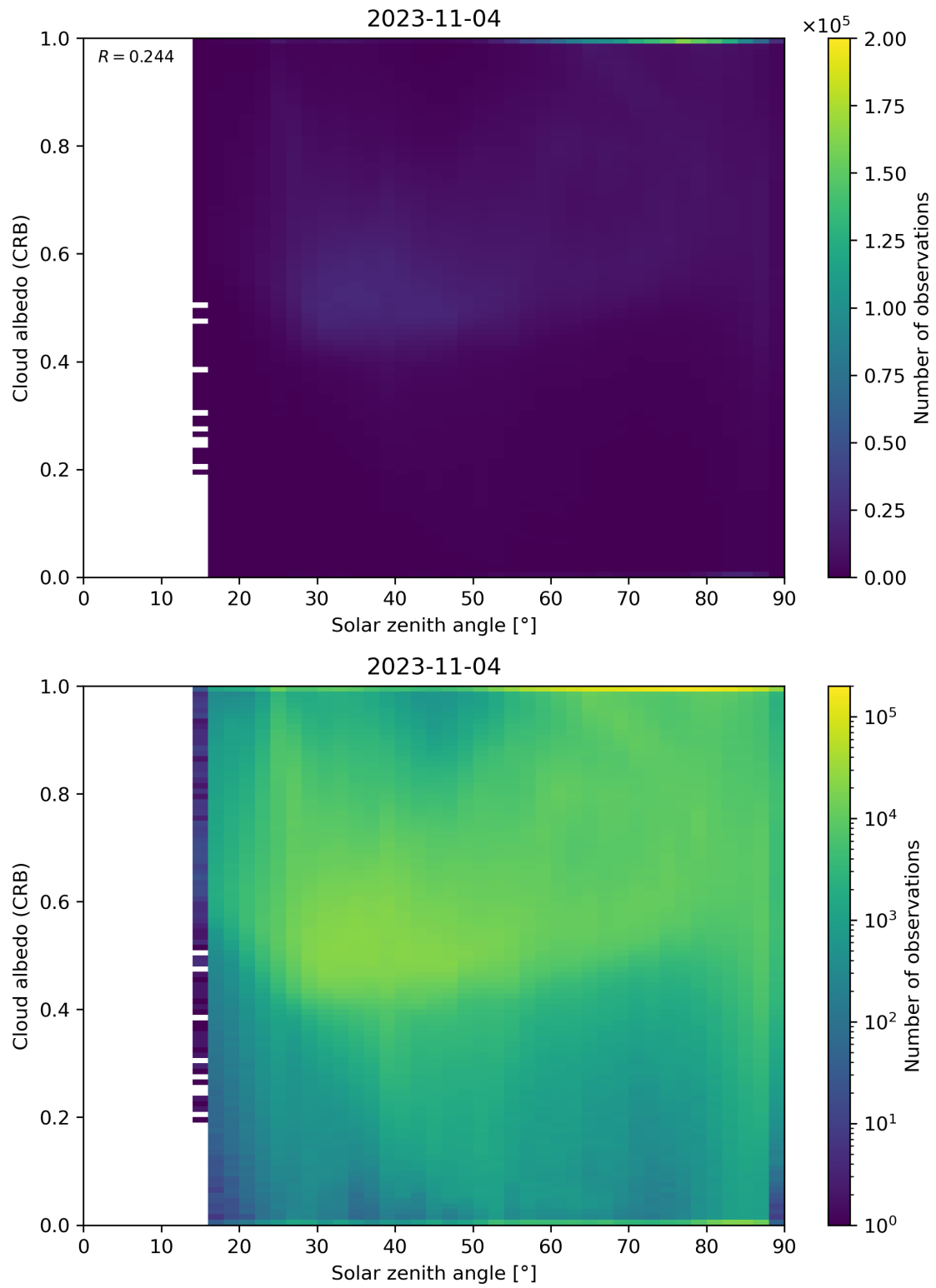


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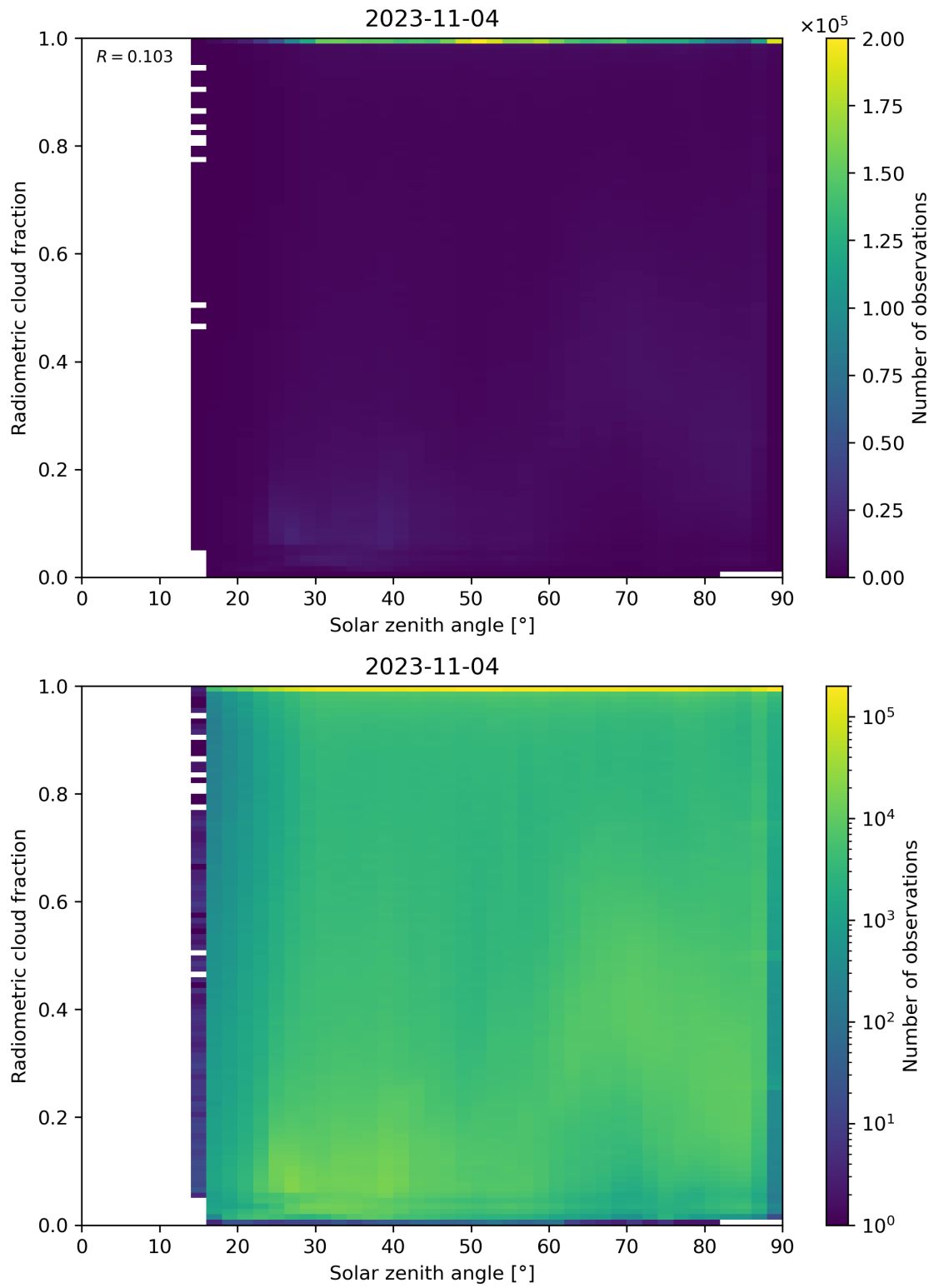


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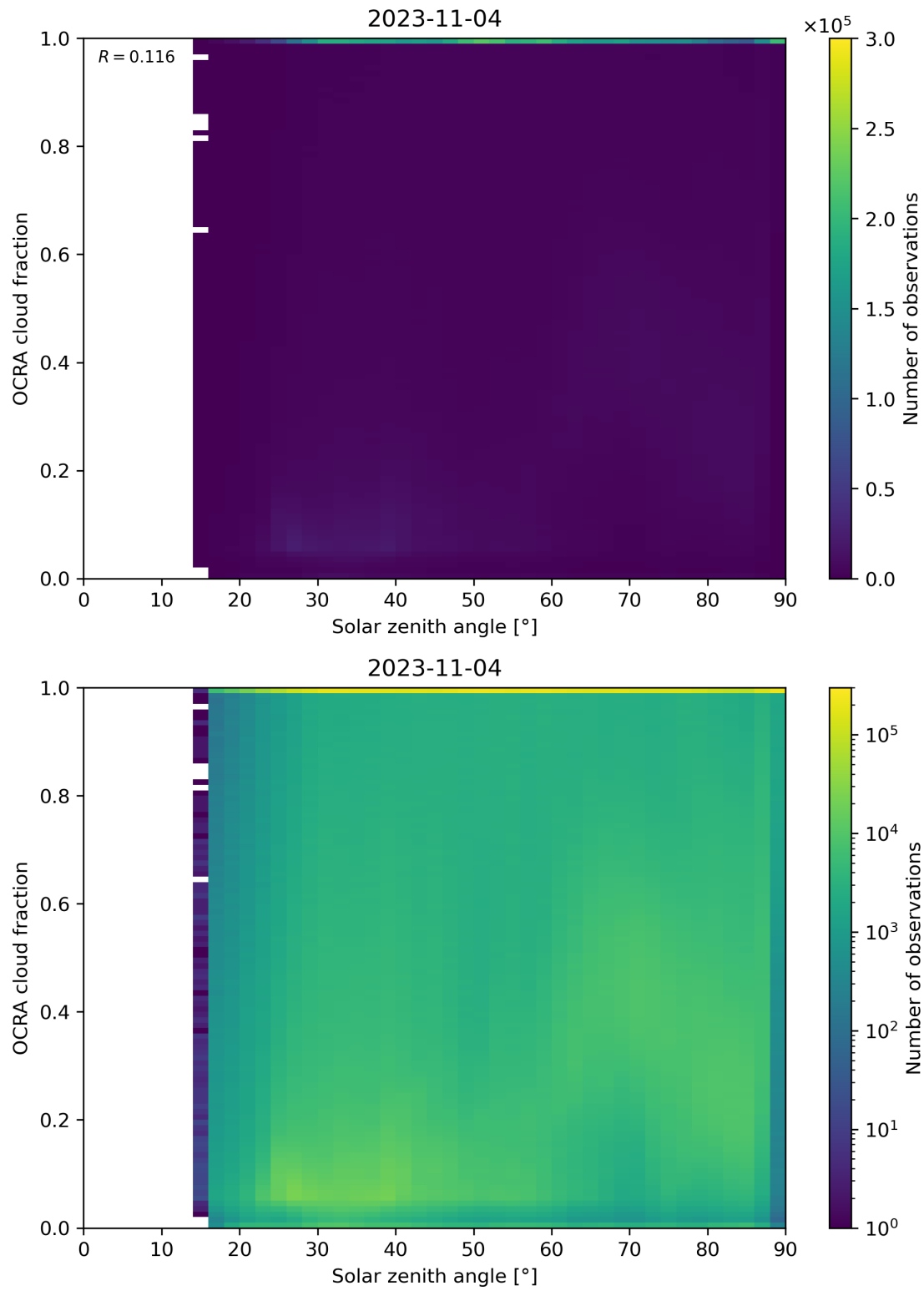


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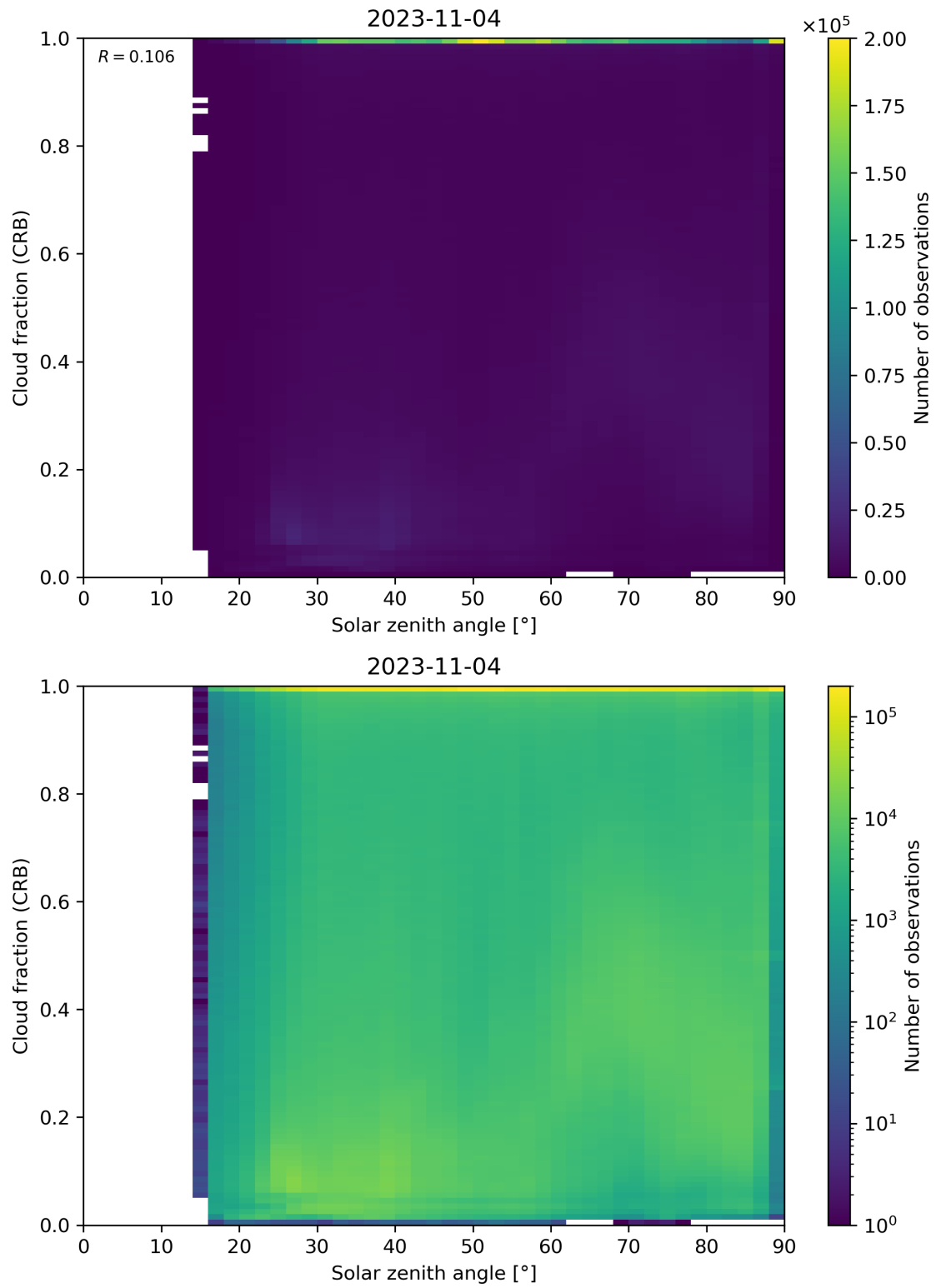


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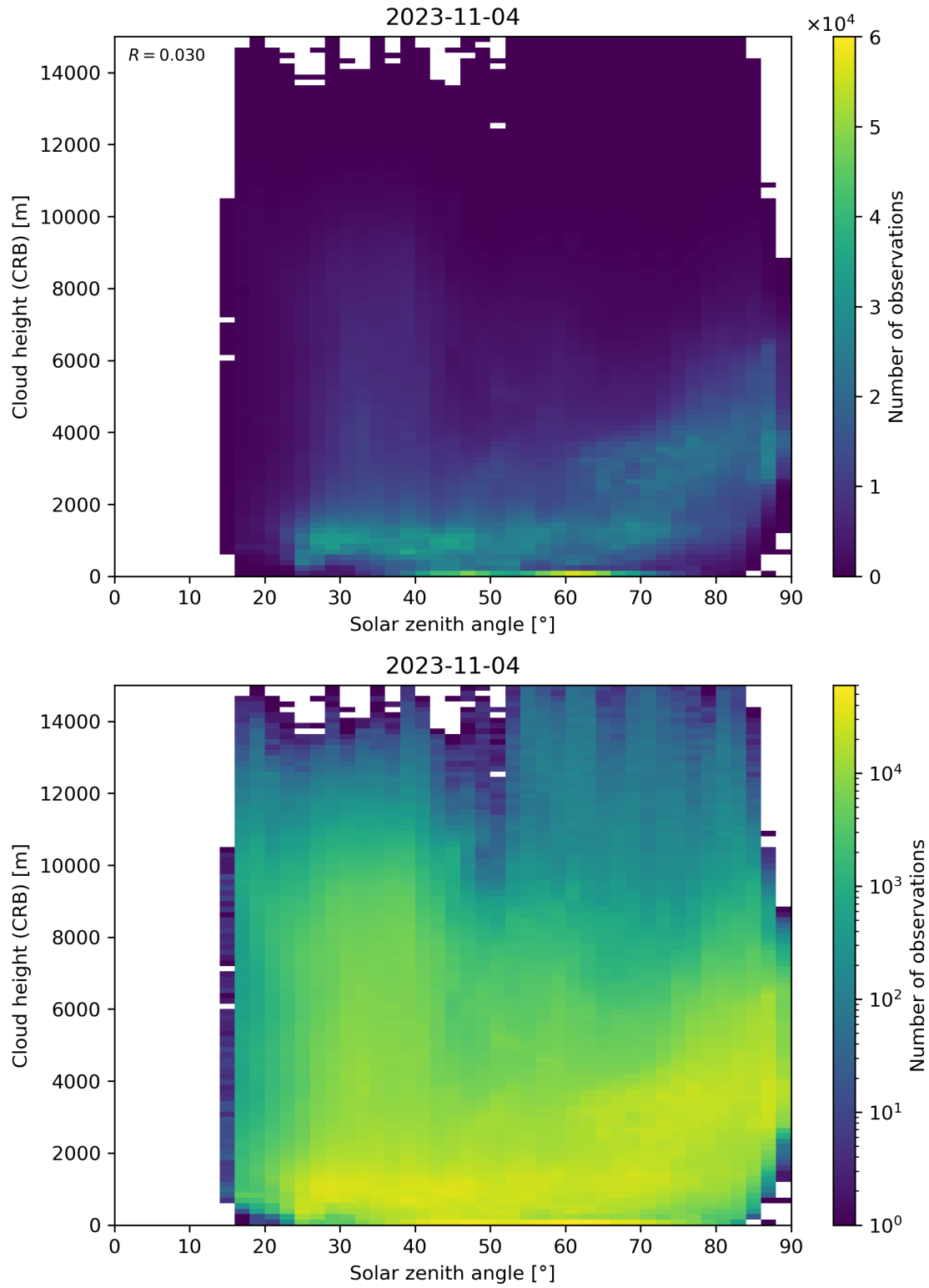


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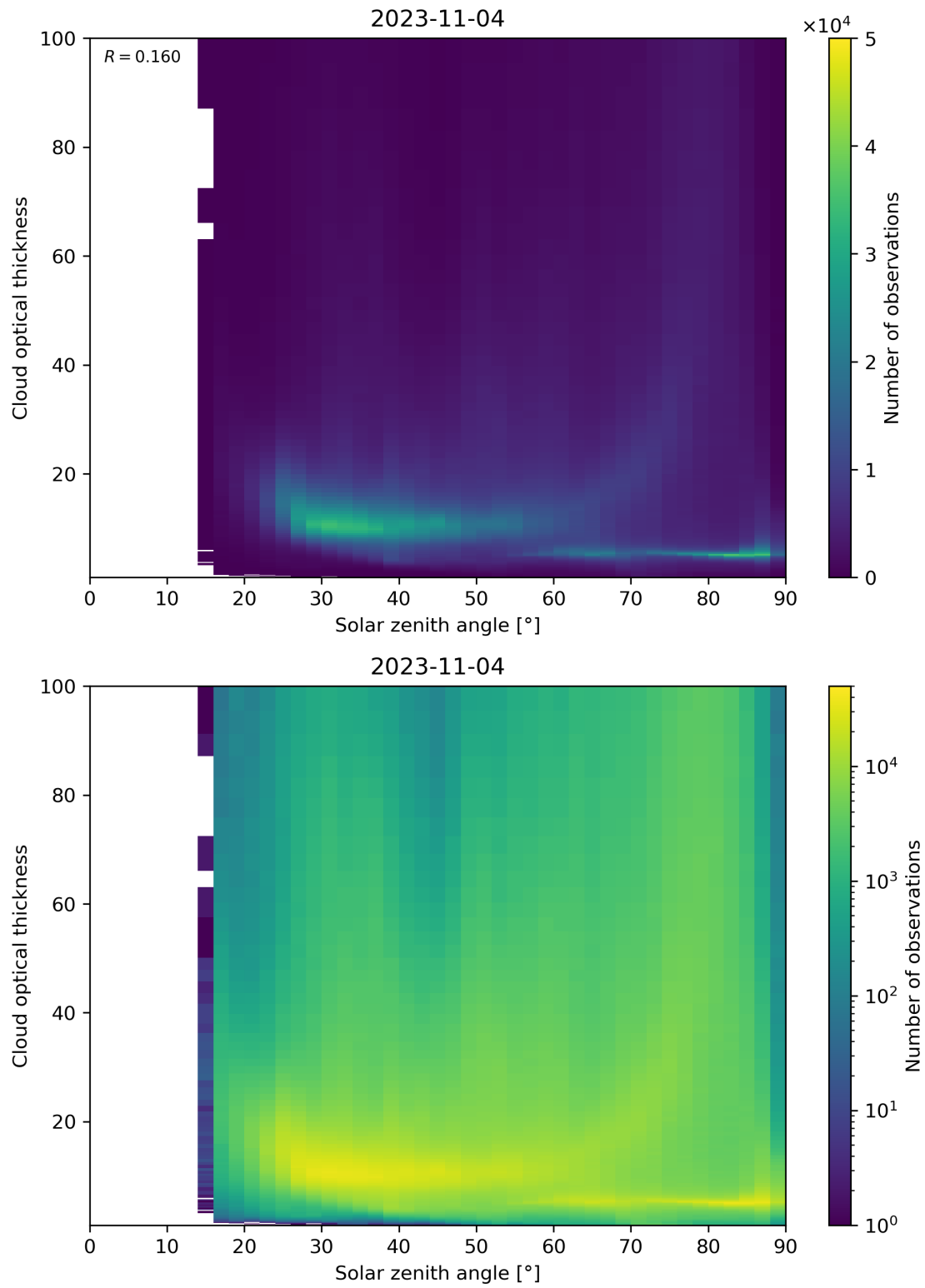


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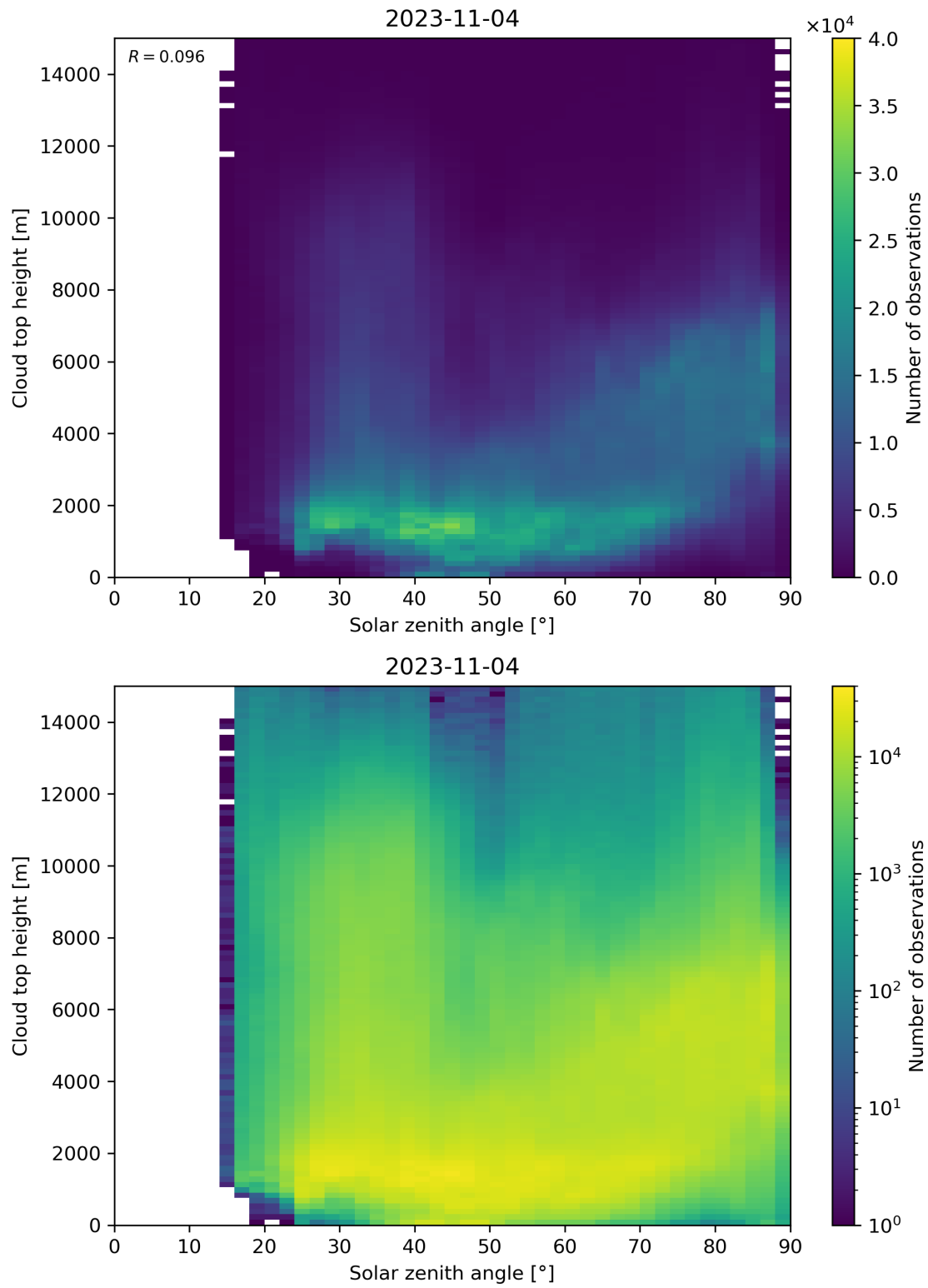


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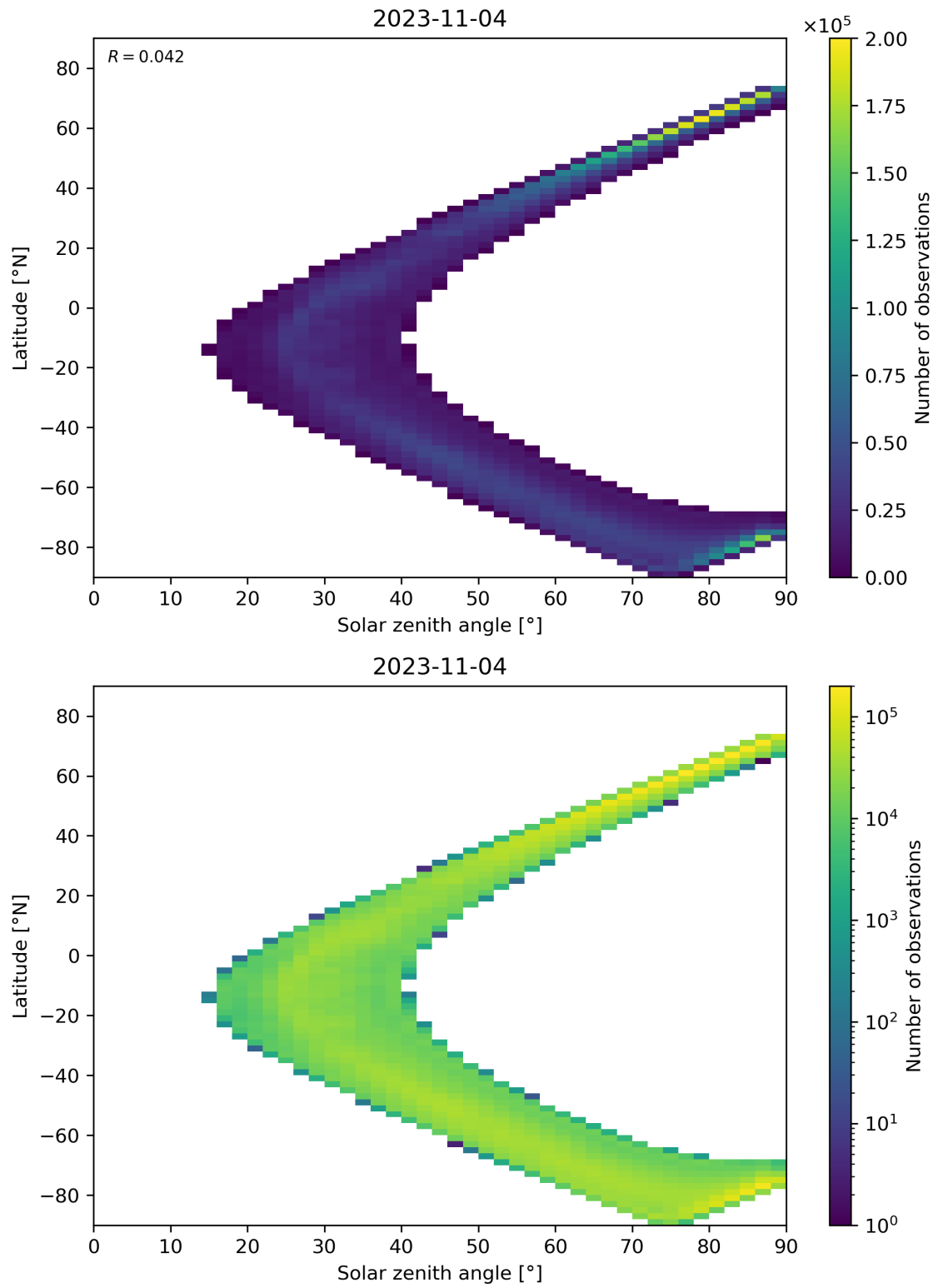


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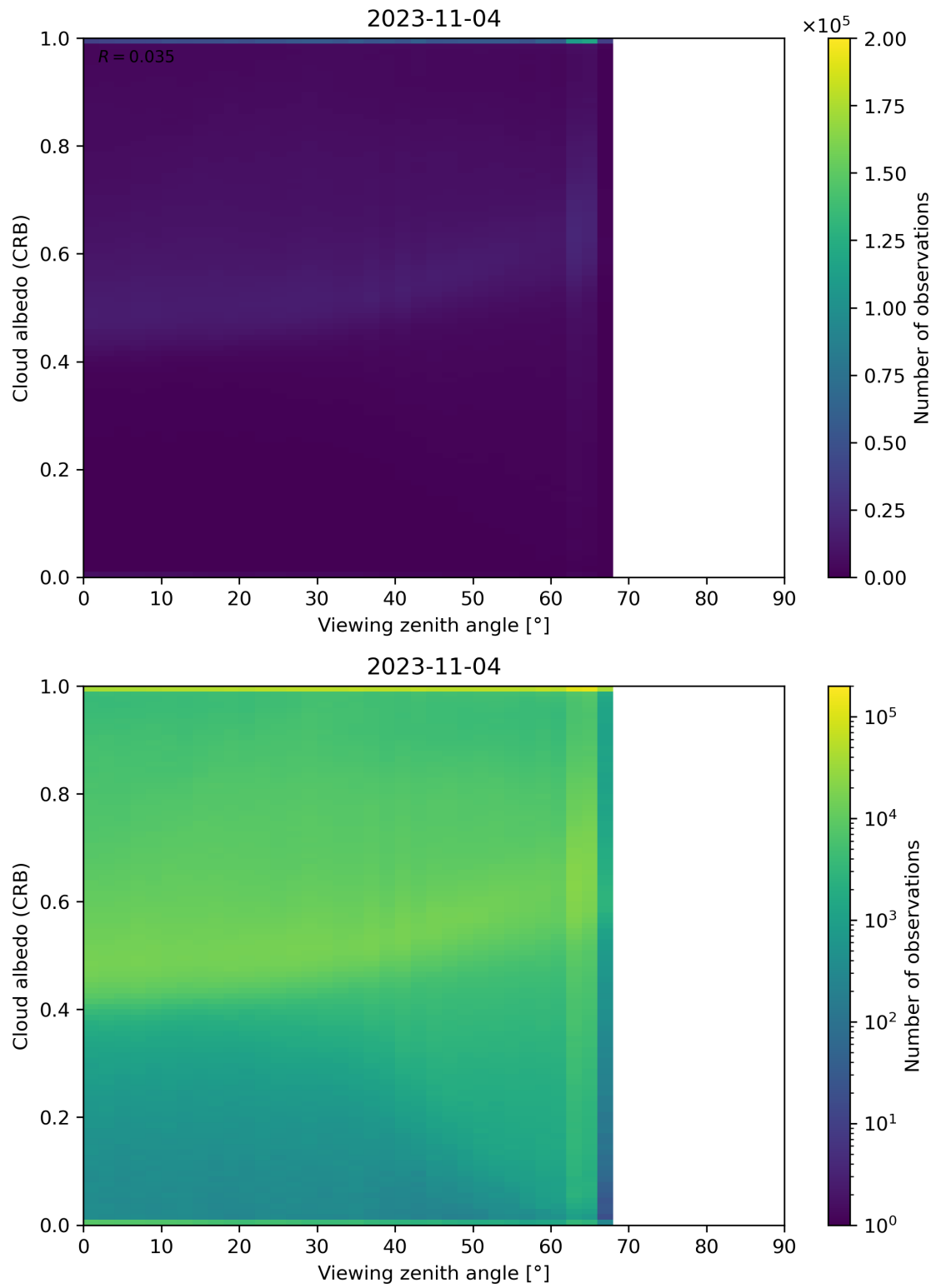


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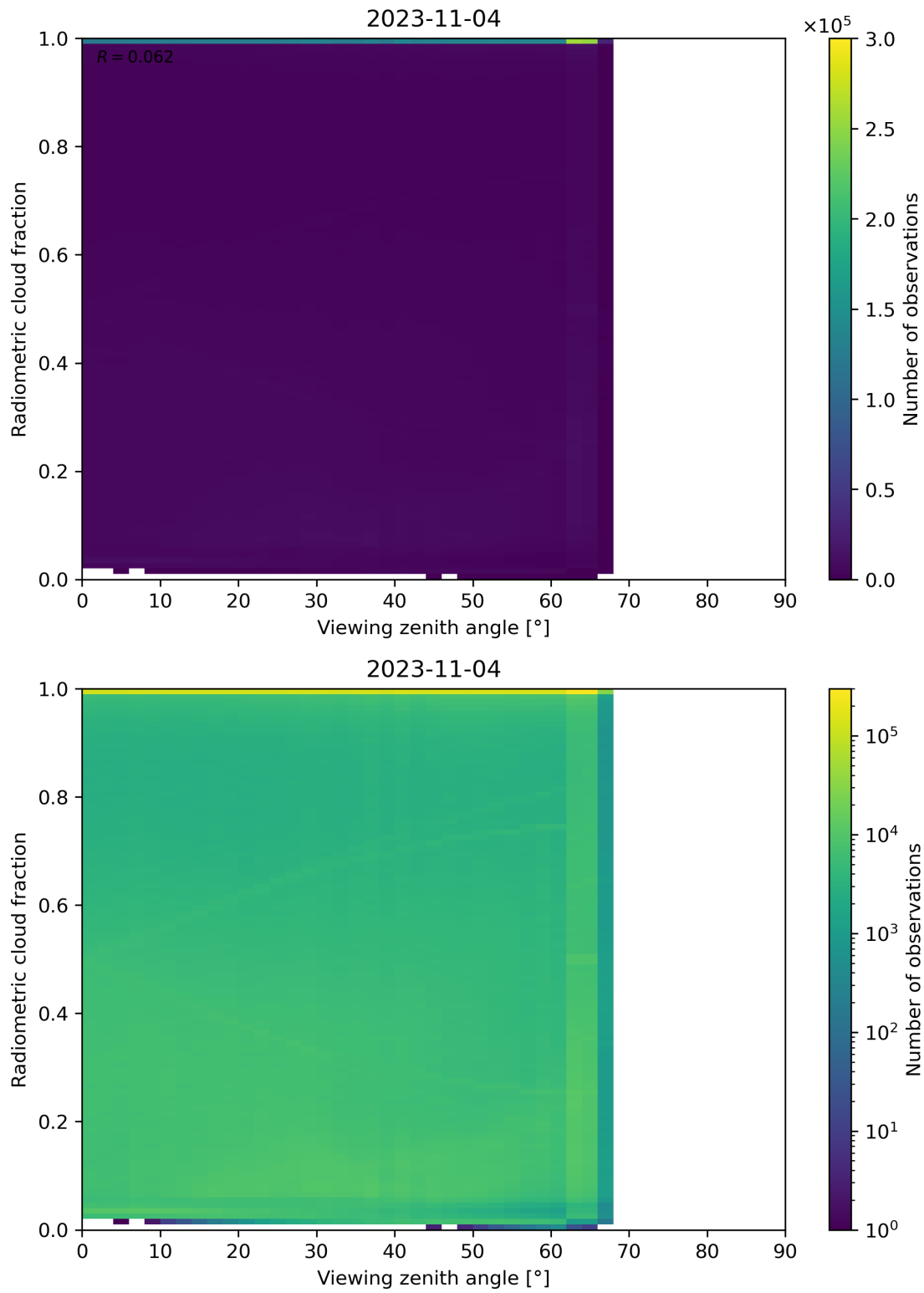


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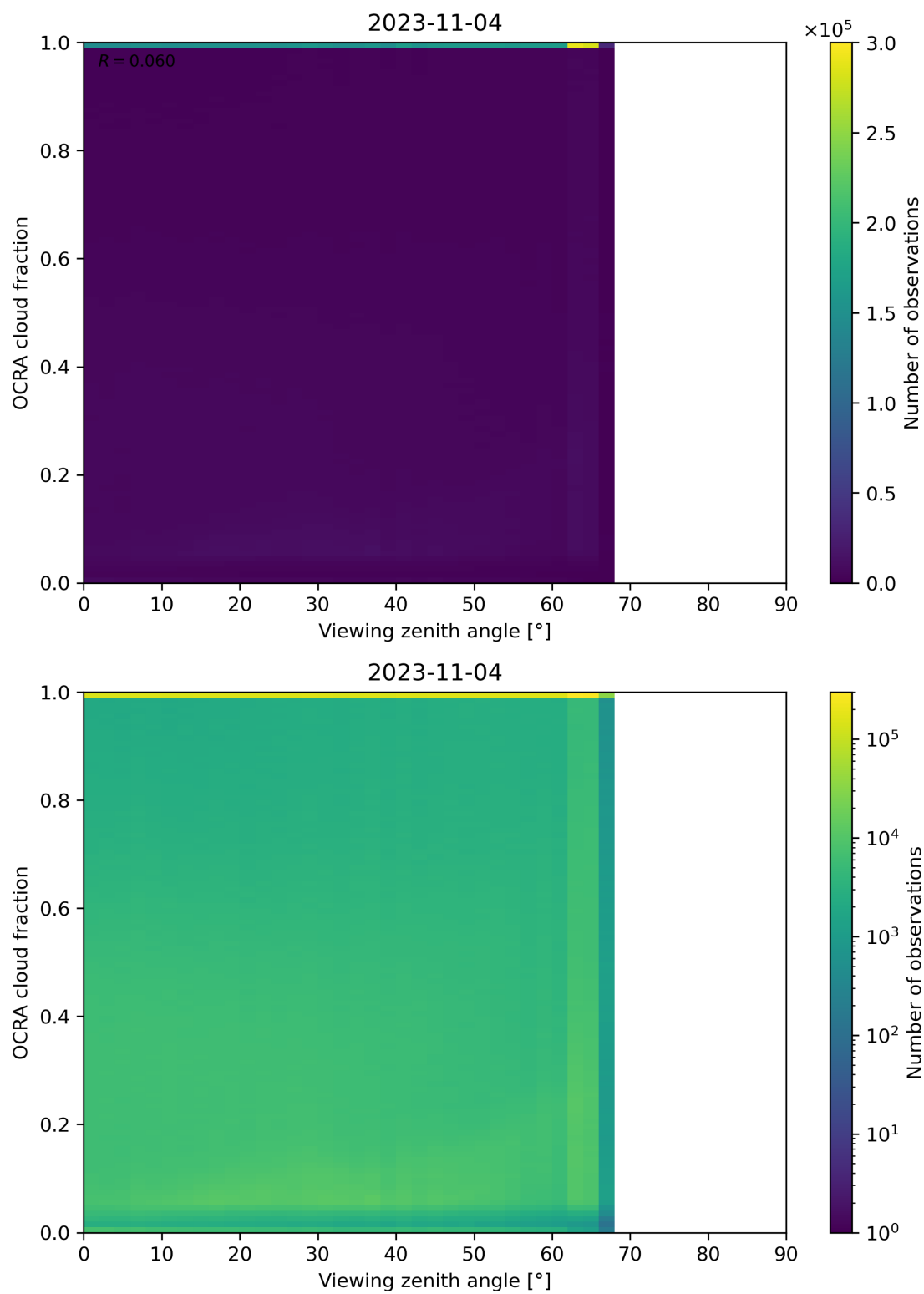


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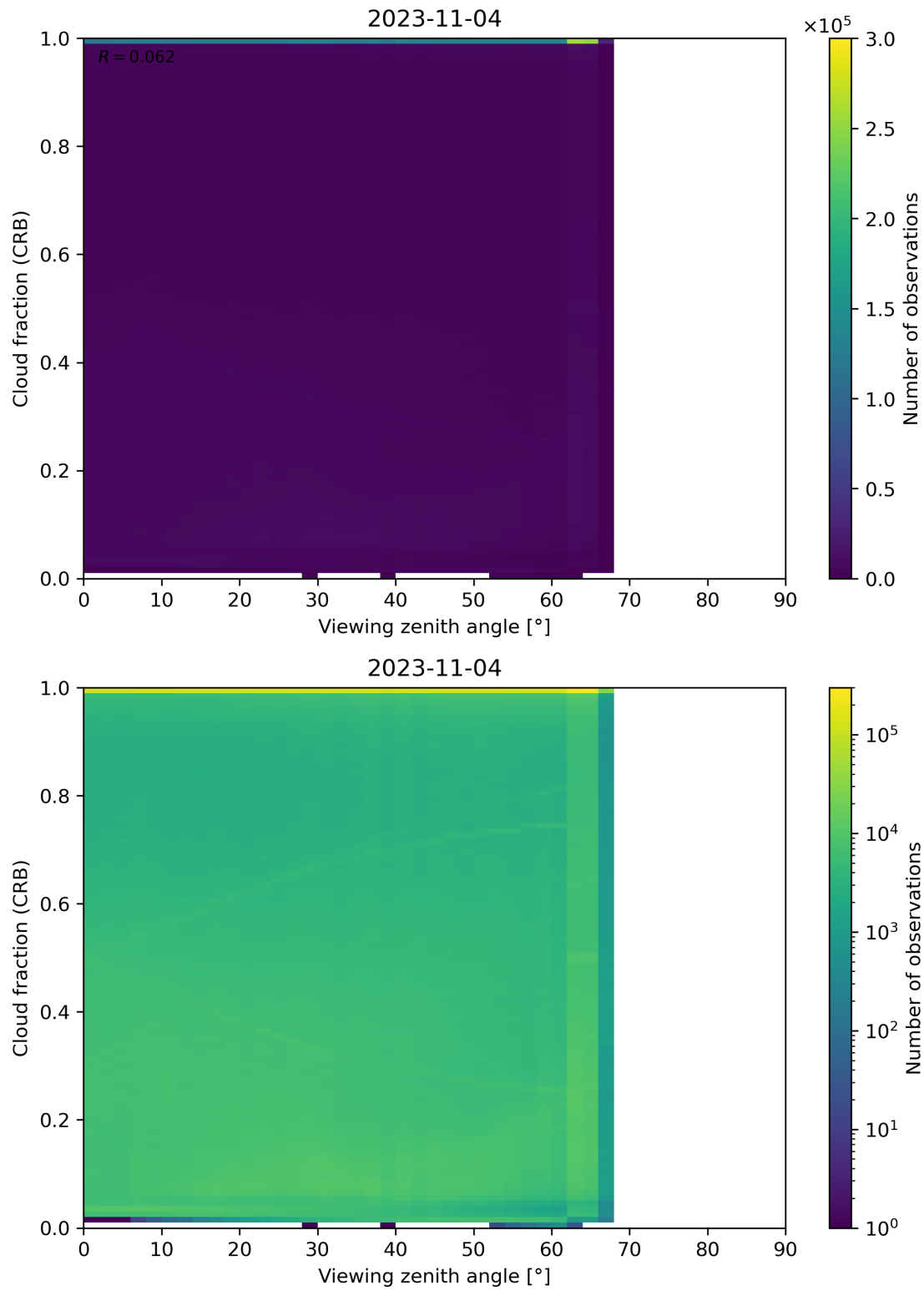


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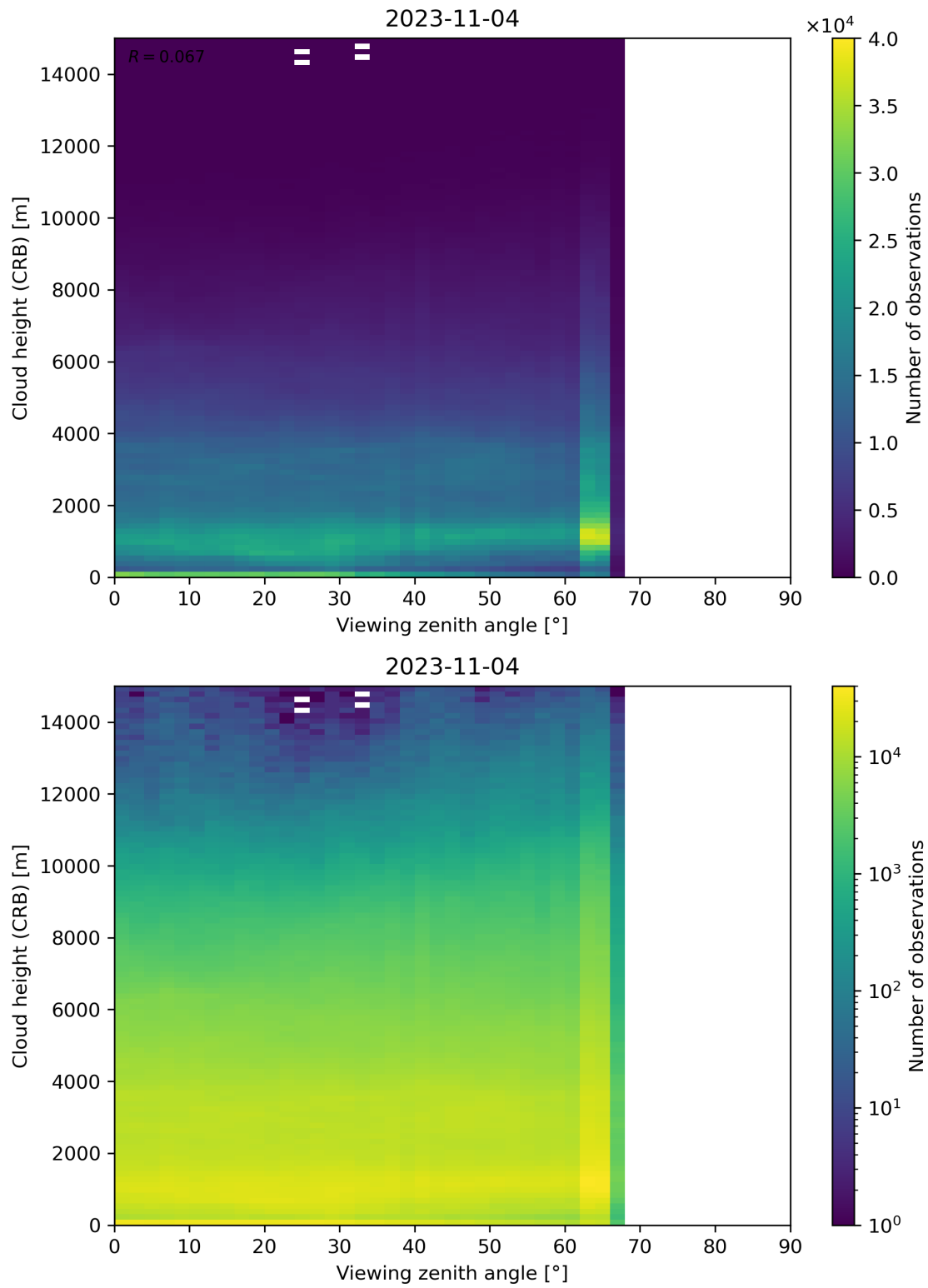


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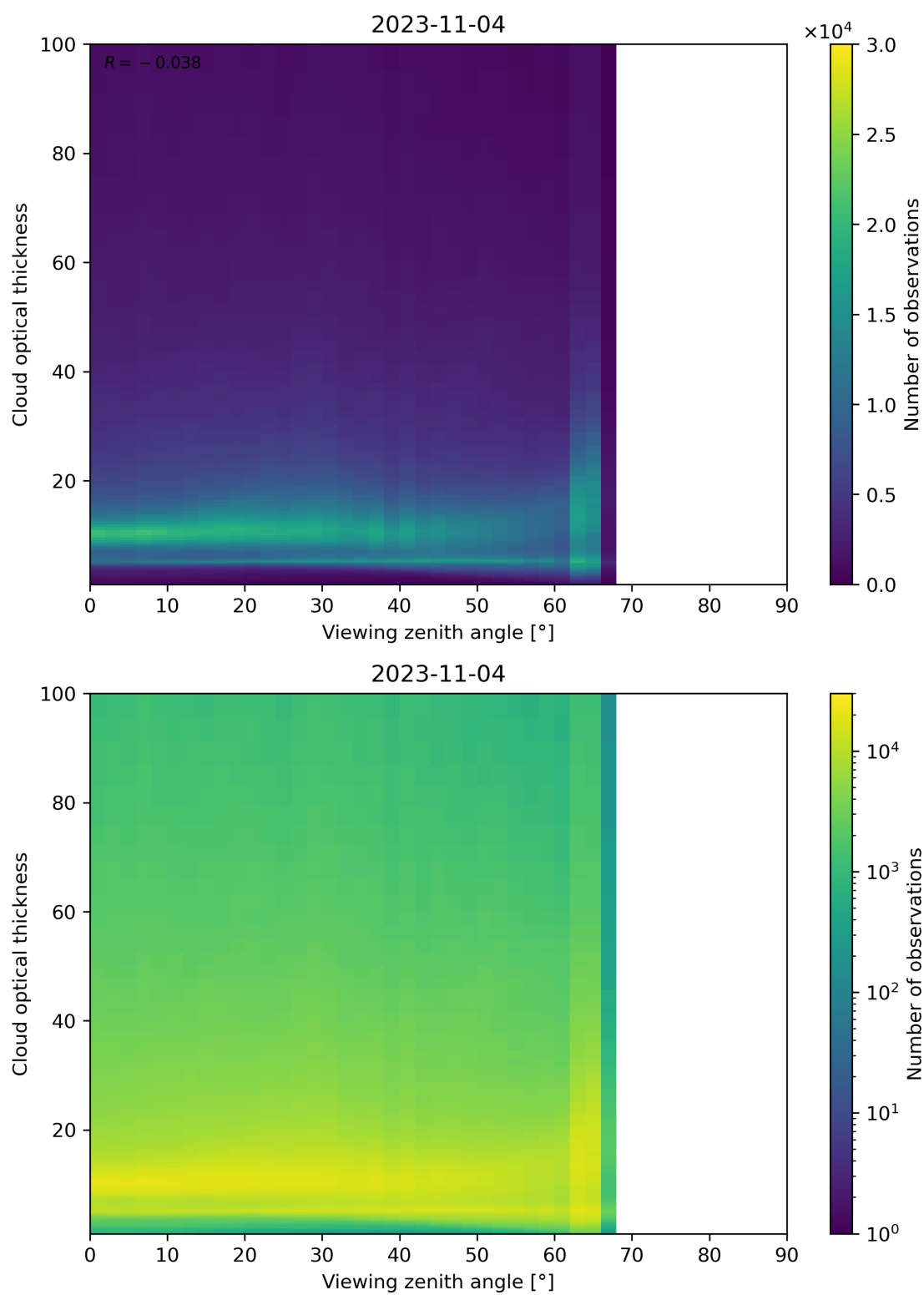


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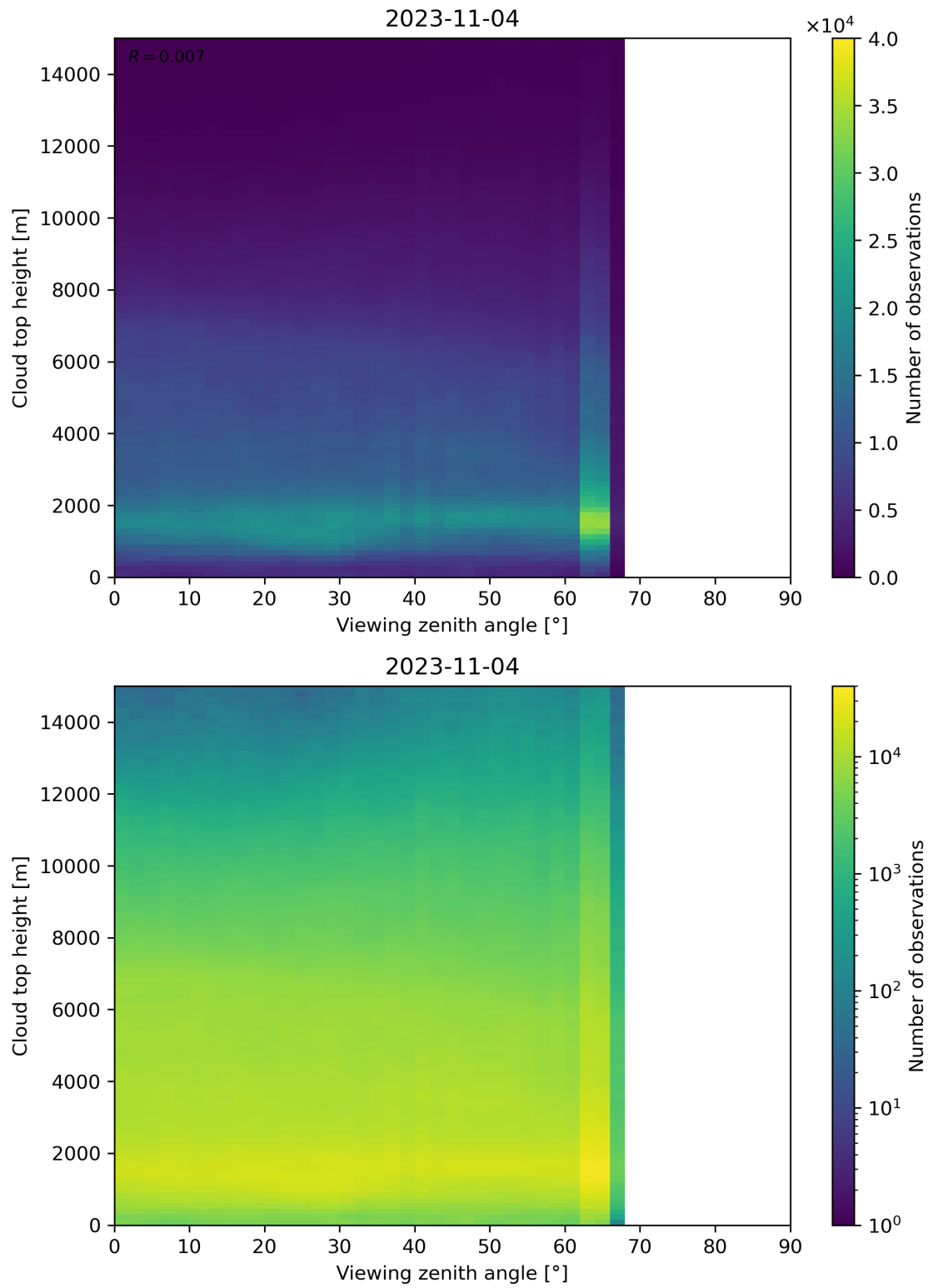


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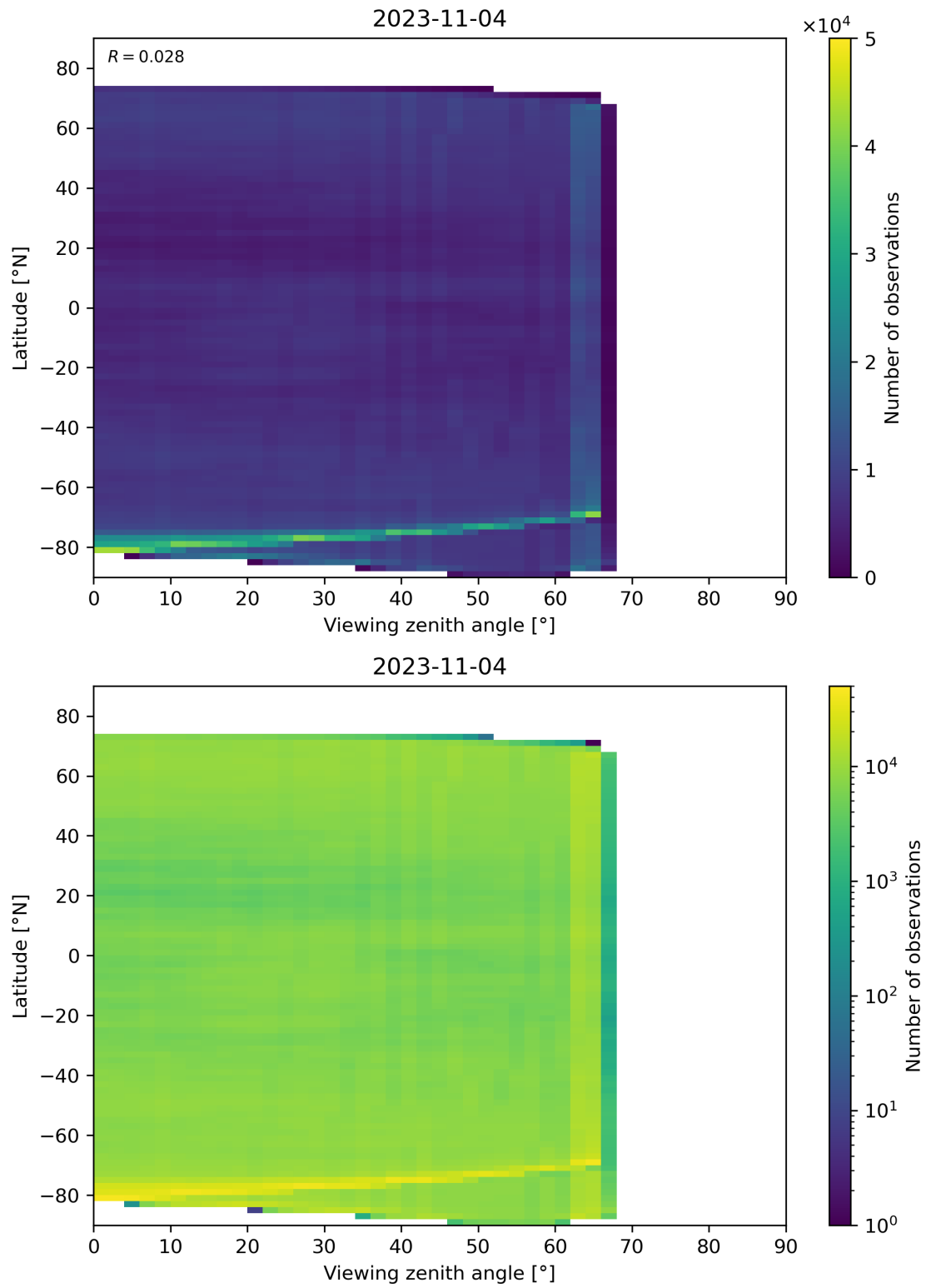


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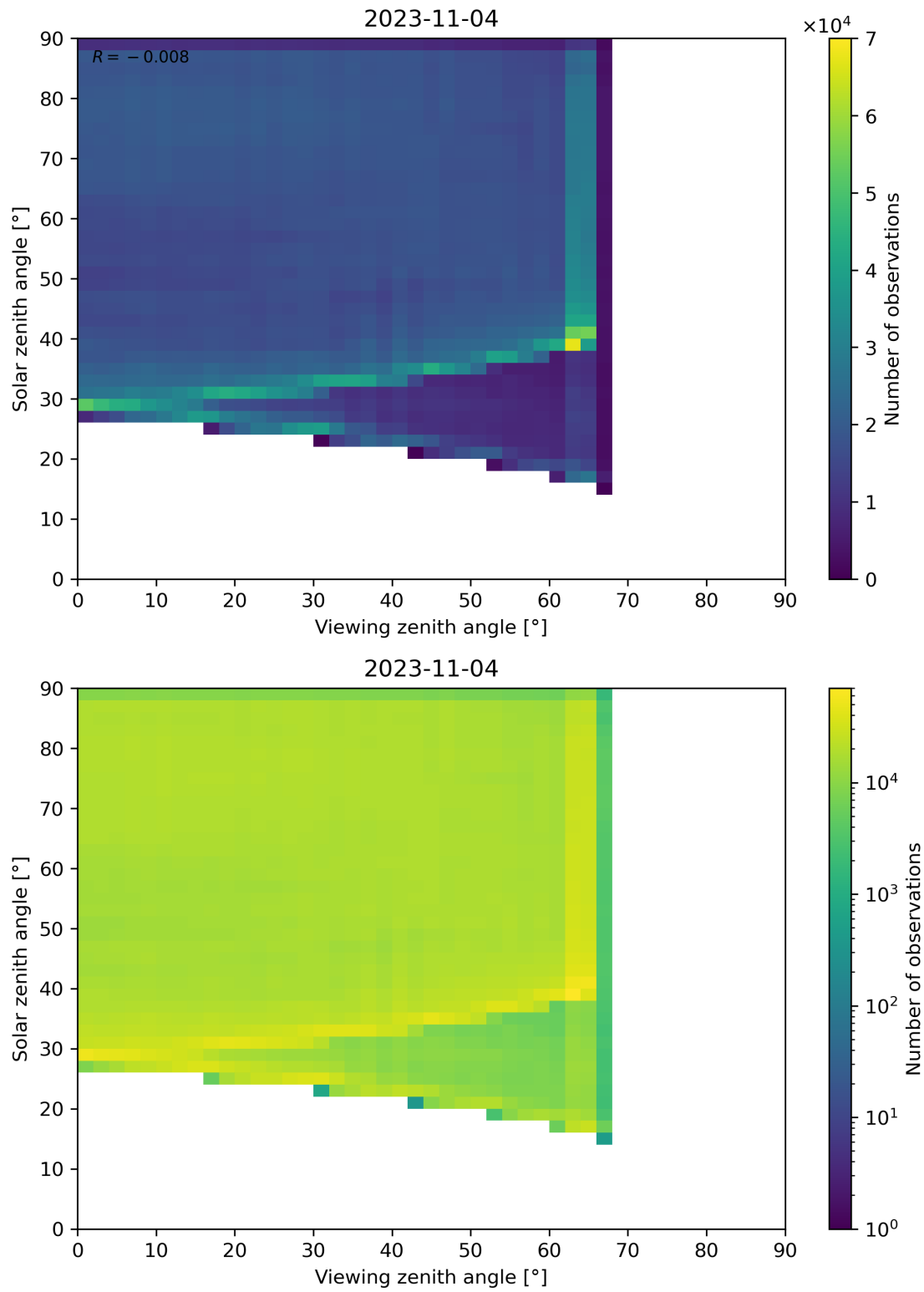


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