

PyCAMA report generated by tropl2-proc

tropl2-proc

2024-01-04 (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]	0.514 ± 0.410	20167668	5.000×10^{-3}	0.830	0.540	0.0	1.000
cloud fraction [1]	0.575 ± 0.339	20167668	0.995	0.704	0.568	0.0	1.000
cloud top height [m]	$(0.405 \pm 0.265) \times 10^4$	20167668	1.575×10^3	3.744×10^3	3.607×10^3	0.0	2.000×10^4
cloud optical thickness [1]	18.4 ± 33.8	20167668	9.34	10.3	9.05	1.000	250
cloud fraction crb [1]	0.575 ± 0.339	20167668	0.995	0.704	0.567	0.0	1.000
cloud height crb [m]	$(0.302 \pm 0.226) \times 10^4$	20167668	975	3.006×10^3	2.592×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.615 ± 0.218	20167668	0.995	0.310	0.597	0.0	1.000
surface albedo fitted [1]	0.290 ± 0.359	20167668	2.500×10^{-2}	0.544	5.345×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.278 ± 0.347	20167668	1.500×10^{-2}	0.566	4.000×10^{-2}	0.0	1.000
fitted root mean square [1]	$(8.125 \pm 10.347) \times 10^{-4}$	20167668	5.000×10^{-5}	1.043×10^{-3}	4.596×10^{-4}	9.996×10^{-7}	0.135
fitted root mean square crb [1]	$(7.163 \pm 8.482) \times 10^{-4}$	20167668	5.000×10^{-5}	9.785×10^{-4}	3.680×10^{-4}	8.429×10^{-7}	0.123
wavelength shift [nm]	$(8.972 \pm 7.374) \times 10^{-3}$	20167668	9.000×10^{-4}	1.103×10^{-2}	8.609×10^{-3}	-4.612×10^{-2}	7.362×10^{-2}
cloud fraction apriori [1]	0.580 ± 0.343	20167668	0.995	0.742	0.576	0.0	1.000
reflectance blue ocra [1]	0.588 ± 0.234	20167668	0.265	0.421	0.572	0.140	2.02
reflectance green ocra [1]	0.541 ± 0.265	20167668	0.185	0.496	0.531	7.773×10^{-2}	2.10
reflectance continuum aband [1]	0.491 ± 0.294	20167668	4.500×10^{-2}	0.522	0.494	9.670×10^{-3}	4.21

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]	2.259×10^{-2}	7.049×10^{-2}	0.109	0.161	0.260	0.964	1.000	1.000	1.000	1.000
cloud top height [m]	306	788	1.128×10^3	1.450×10^3	1.901×10^3	5.645×10^3	6.691×10^3	7.679×10^3	9.017×10^3	1.155×10^4
cloud optical thickness [1]	1.000	2.54	3.66	4.53	5.48	15.7	23.7	35.3	61.7	249
cloud fraction crb [1]	2.224×10^{-2}	6.970×10^{-2}	0.109	0.160	0.259	0.964	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	261	563	845	1.216×10^3	4.223×10^3	5.299×10^3	6.269×10^3	7.498×10^3	9.594×10^3
cloud albedo crb [1]	2.439×10^{-2}	0.252	0.363	0.422	0.470	0.780	0.864	0.920	0.982	1.000
surface albedo fitted [1]	0.0	7.197×10^{-3}	1.227×10^{-2}	1.659×10^{-2}	2.274×10^{-2}	0.567	0.859	0.937	0.974	1.000
surface albedo fitted crb [1]	0.0	5.561×10^{-3}	9.035×10^{-3}	1.223×10^{-2}	1.694×10^{-2}	0.583	0.826	0.884	0.918	0.956
fitted root mean square [1]	1.518×10^{-5}	2.955×10^{-5}	4.854×10^{-5}	7.820×10^{-5}	1.383×10^{-4}	1.182×10^{-3}	1.659×10^{-3}	2.086×10^{-3}	2.620×10^{-3}	3.799×10^{-3}
fitted root mean square crb [1]	8.480×10^{-6}	2.007×10^{-5}	3.451×10^{-5}	5.441×10^{-5}	9.732×10^{-5}	1.076×10^{-3}	1.529×10^{-3}	1.939×10^{-3}	2.463×10^{-3}	3.499×10^{-3}
wavelength shift [nm]	-7.329×10^{-3}	-5.593×10^{-4}	3.562×10^{-4}	1.334×10^{-3}	3.147×10^{-3}	1.418×10^{-2}	1.659×10^{-2}	1.861×10^{-2}	2.116×10^{-2}	2.662×10^{-2}
cloud fraction apriori [1]	3.273×10^{-2}	6.795×10^{-2}	0.105	0.156	0.258	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.235	0.260	0.287	0.320	0.375	0.796	0.867	0.907	0.939	1.04
reflectance green ocra [1]	0.153	0.176	0.197	0.226	0.284	0.780	0.859	0.906	0.940	1.02
reflectance continuum aband [1]	3.025×10^{-2}	5.481×10^{-2}	8.828×10^{-2}	0.132	0.225	0.748	0.832	0.881	0.922	1.03

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]	0.565 ± 0.408	7126728	0.870	0.750	0.0	1.000	8.000×10^{-2}	0.950
cloud fraction [1]	0.531 ± 0.345	7126728	0.701	0.494	0.0	1.000	0.202	0.903
cloud top height [m]	$(0.432 \pm 0.273) \times 10^4$	7126728	4.156×10^3	3.860×10^3	0.0	2.000×10^4	2.010×10^3	6.166×10^3
cloud optical thickness [1]	27.2 ± 46.7	7126728	16.9	10.7	1.000	250	6.45	23.4
cloud fraction crb [1]	0.529 ± 0.345	7126728	0.700	0.490	0.0	1.000	0.201	0.900
cloud height crb [m]	$(0.361 \pm 0.237) \times 10^4$	7126728	3.692×10^3	3.247×10^3	0.0	1.994×10^4	1.567×10^3	5.258×10^3
cloud albedo crb [1]	0.594 ± 0.201	7126728	0.254	0.582	0.0	1.000	0.470	0.724
surface albedo fitted [1]	0.140 ± 0.180	7126728	0.194	4.516×10^{-2}	0.0	1.000	2.398×10^{-2}	0.218
surface albedo fitted crb [1]	0.132 ± 0.179	7126728	0.190	3.288×10^{-2}	0.0	1.000	1.724×10^{-2}	0.207
fitted root mean square [1]	$(4.147 \pm 5.563) \times 10^{-4}$	7126728	4.382×10^{-4}	2.258×10^{-4}	9.996×10^{-7}	7.142×10^{-2}	8.781×10^{-5}	5.260×10^{-4}
fitted root mean square crb [1]	$(3.559 \pm 5.018) \times 10^{-4}$	7126728	3.905×10^{-4}	1.547×10^{-4}	8.429×10^{-7}	2.073×10^{-2}	5.422×10^{-5}	4.447×10^{-4}
wavelength shift [nm]	$(6.487 \pm 6.660) \times 10^{-3}$	7126728	8.975×10^{-3}	5.388×10^{-3}	-4.269×10^{-2}	6.349×10^{-2}	1.559×10^{-3}	1.053×10^{-2}
cloud fraction apriori [1]	0.532 ± 0.350	7126728	0.728	0.492	0.0	1.000	0.196	0.923
reflectance blue ocra [1]	0.522 ± 0.199	7126728	0.305	0.494	0.140	2.02	0.356	0.661
reflectance green ocra [1]	0.463 ± 0.225	7126728	0.365	0.431	7.773×10^{-2}	2.10	0.264	0.629
reflectance continuum aband [1]	0.413 ± 0.264	7126728	0.407	0.385	9.670×10^{-3}	4.21	0.193	0.601

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]	0.486 ± 0.408	13040940	0.840	0.400	0.0	1.000	6.000×10^{-2}	0.900
cloud fraction [1]	0.600 ± 0.333	13040940	0.684	0.603	0.0	1.000	0.303	0.986
cloud top height [m]	$(0.391 \pm 0.259) \times 10^4$	13040940	3.533×10^3	3.486×10^3	0.0	2.000×10^4	1.849×10^3	5.382×10^3
cloud optical thickness [1]	13.6 ± 22.6	13040940	7.98	8.42	1.000	250	5.17	13.2
cloud fraction crb [1]	0.600 ± 0.334	13040940	0.684	0.604	0.0	1.000	0.303	0.987
cloud height crb [m]	$(0.270 \pm 0.213) \times 10^4$	13040940	2.638×10^3	2.320×10^3	0.0	2.000×10^4	1.060×10^3	3.699×10^3
cloud albedo crb [1]	0.626 ± 0.225	13040940	0.342	0.610	0.0	1.000	0.470	0.812
surface albedo fitted [1]	0.372 ± 0.403	13040940	0.826	7.142×10^{-2}	0.0	1.000	2.198×10^{-2}	0.848
surface albedo fitted crb [1]	0.359 ± 0.388	13040940	0.802	5.403×10^{-2}	0.0	1.000	1.673×10^{-2}	0.819
fitted root mean square [1]	$(1.030 \pm 1.163) \times 10^{-3}$	13040940	1.340×10^{-3}	7.268×10^{-4}	1.676×10^{-6}	0.135	2.093×10^{-4}	1.549×10^{-3}
fitted root mean square crb [1]	$(9.132 \pm 9.302) \times 10^{-4}$	13040940	1.254×10^{-3}	6.247×10^{-4}	1.009×10^{-6}	0.123	1.607×10^{-4}	1.415×10^{-3}
wavelength shift [nm]	$(1.033 \pm 0.739) \times 10^{-2}$	13040940	1.075×10^{-2}	1.059×10^{-2}	-4.612×10^{-2}	7.362×10^{-2}	4.769×10^{-3}	1.552×10^{-2}
cloud fraction apriori [1]	0.606 ± 0.337	13040940	0.695	0.616	0.0	1.000	0.305	1.000
reflectance blue oca [1]	0.625 ± 0.243	13040940	0.457	0.646	0.142	2.01	0.391	0.848
reflectance green oca [1]	0.583 ± 0.276	13040940	0.535	0.619	7.958×10^{-2}	1.81	0.305	0.839
reflectance continuum aband [1]	0.534 ± 0.300	13040940	0.548	0.575	1.276×10^{-2}	3.73	0.257	0.804

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 ± 0.363	13056604	0.550	0.850	0.0	1.000	0.400	0.950
cloud fraction [1]	0.594 ± 0.360	13056604	0.773	0.623	0.0	1.000	0.227	1.000
cloud top height [m]	$(0.363 \pm 0.254) \times 10^4$	13056604	3.449×10^3	2.929×10^3	0.0	2.000×10^4	1.649×10^3	5.098×10^3
cloud optical thickness [1]	17.2 ± 26.7	13056604	9.84	9.86	1.000	250	6.57	16.4
cloud fraction crb [1]	0.593 ± 0.361	13056604	0.774	0.621	0.0	1.000	0.226	1.000
cloud height crb [m]	$(0.286 \pm 0.228) \times 10^4$	13056604	3.061×10^3	2.232×10^3	0.0	2.000×10^4	1.069×10^3	4.130×10^3
cloud albedo crb [1]	0.558 ± 0.178	13056604	0.224	0.541	0.0	1.000	0.451	0.675
surface albedo fitted [1]	0.105 ± 0.204	13056604	3.352×10^{-2}	2.835×10^{-2}	0.0	1.000	1.688×10^{-2}	5.040×10^{-2}
surface albedo fitted crb [1]	0.101 ± 0.211	13056604	2.531×10^{-2}	2.127×10^{-2}	0.0	1.000	1.244×10^{-2}	3.776×10^{-2}
fitted root mean square [1]	$(7.124 \pm 10.701) \times 10^{-4}$	13056604	9.377×10^{-4}	3.047×10^{-4}	9.996×10^{-7}	0.135	9.167×10^{-5}	1.029×10^{-3}
fitted root mean square crb [1]	$(6.549 \pm 8.357) \times 10^{-4}$	13056604	9.008×10^{-4}	2.722×10^{-4}	8.429×10^{-7}	0.123	7.415×10^{-5}	9.750×10^{-4}
wavelength shift [nm]	$(8.147 \pm 7.556) \times 10^{-3}$	13056604	1.099×10^{-2}	7.326×10^{-3}	-4.612×10^{-2}	7.362×10^{-2}	2.351×10^{-3}	1.334×10^{-2}
cloud fraction apriori [1]	0.594 ± 0.366	13056604	0.783	0.622	0.0	1.000	0.217	1.000
reflectance blue oca [1]	0.513 ± 0.201	13056604	0.324	0.477	0.161	2.01	0.341	0.665
reflectance green oca [1]	0.453 ± 0.228	13056604	0.394	0.415	8.612×10^{-2}	1.87	0.243	0.638
reflectance continuum aband [1]	0.386 ± 0.265	13056604	0.466	0.358	1.156×10^{-2}	3.30	0.137	0.603

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]	0.237 ± 0.345	6123613	0.220	9.000×10^{-2}	0.0	1.000	0.0	0.220
cloud fraction [1]	0.535 ± 0.287	6123613	0.454	0.512	0.0	1.000	0.310	0.764
cloud top height [m]	$(0.488 \pm 0.265) \times 10^4$	6123613	3.082×10^3	4.725×10^3	0.0	2.000×10^4	3.092×10^3	6.175×10^3
cloud optical thickness [1]	17.4 ± 38.6	6123613	7.55	6.29	1.000	250	4.58	12.1
cloud fraction crb [1]	0.536 ± 0.287	6123613	0.455	0.514	0.0	1.000	0.310	0.765
cloud height crb [m]	$(0.324 \pm 0.215) \times 10^4$	6123613	2.440×10^3	3.021×10^3	0.0	2.000×10^4	1.726×10^3	4.166×10^3
cloud albedo crb [1]	0.731 ± 0.242	6123613	0.332	0.800	0.0	1.000	0.588	0.920
surface albedo fitted [1]	0.681 ± 0.318	6123613	0.635	0.864	0.0	1.000	0.320	0.956
surface albedo fitted crb [1]	0.652 ± 0.298	6123613	0.582	0.826	0.0	1.000	0.318	0.900
fitted root mean square [1]	$(1.060 \pm 0.933) \times 10^{-3}$	6123613	1.147×10^{-3}	7.761×10^{-4}	1.912×10^{-6}	7.142×10^{-2}	3.724×10^{-4}	1.520×10^{-3}
fitted root mean square crb [1]	$(8.903 \pm 8.514) \times 10^{-4}$	6123613	1.086×10^{-3}	6.288×10^{-4}	2.256×10^{-6}	7.611×10^{-2}	2.320×10^{-4}	1.318×10^{-3}
wavelength shift [nm]	$(1.115 \pm 0.658) \times 10^{-2}$	6123613	9.480×10^{-3}	1.142×10^{-2}	-3.728×10^{-2}	6.343×10^{-2}	6.317×10^{-3}	1.580×10^{-2}
cloud fraction apriori [1]	0.550 ± 0.289	6123613	0.463	0.531	0.0	1.000	0.323	0.787
reflectance blue ocr [1]	0.744 ± 0.225	6123613	0.307	0.832	0.140	2.01	0.600	0.908
reflectance green ocr [1]	0.723 ± 0.250	6123613	0.349	0.827	7.773×10^{-2}	2.04	0.562	0.911
reflectance continuum aband [1]	0.707 ± 0.234	6123613	0.349	0.791	1.704×10^{-2}	4.21	0.534	0.883

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	-8.033×10^{-3}	1.780×10^{-2}	-3.651×10^{-2}	2.109×10^{-2}	-5.440×10^{-3}	-3.709×10^{-2}	9.066×10^{-2}	2.828×10^{-2}	-4.092×10^{-2}
-8.033×10^{-3}	1.000	8.893×10^{-2}	8.243×10^{-2}	9.383×10^{-2}	0.166	8.328×10^{-2}	3.060×10^{-2}	0.245	9.668×10^{-2}
1.780×10^{-2}	8.893×10^{-2}	1.000	-0.120	8.258×10^{-2}	0.228	-0.124	0.252	-0.168	-0.133
-3.651×10^{-2}	8.243×10^{-2}	-0.120	1.000	-6.992×10^{-2}	0.265	1.000	-6.471×10^{-2}	0.309	0.982
2.109×10^{-2}	9.383×10^{-2}	8.258×10^{-2}	-6.992×10^{-2}	1.000	6.087×10^{-2}	-6.929×10^{-2}	0.916	0.109	-7.698×10^{-2}
-5.440×10^{-3}	0.166	0.228	0.265	6.087×10^{-2}	1.000	0.261	0.134	0.352	0.266
-3.709×10^{-2}	8.328×10^{-2}	-0.124	1.000	-6.929×10^{-2}	0.261	1.000	-6.542×10^{-2}	0.309	0.982
9.066×10^{-2}	3.060×10^{-2}	0.252	-6.471×10^{-2}	0.916	0.134	-6.542×10^{-2}	1.000	-3.069×10^{-2}	-7.544×10^{-2}
2.828×10^{-2}	0.245	-0.168	0.309	0.109	0.352	0.309	-3.069×10^{-2}	1.000	0.328
-4.092×10^{-2}	9.668×10^{-2}	-0.133	0.982	-7.698×10^{-2}	0.266	0.982	-7.544×10^{-2}	0.328	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
383	-3.18	16.5	-0.242	1.092×10^3	-3.60	-0.246	4.004×10^3	0.120	-0.275
-3.18	410	85.6	0.566	5.027×10^3	113	0.572	1.399×10^3	1.08	0.672
16.5	85.6	2.258×10^3	-1.94	1.038×10^4	366	-2.01	2.701×10^4	-1.73	-2.17
-0.242	0.566	-1.94	0.115	-62.7	3.04	0.115	-49.5	2.281×10^{-2}	0.114
1.092×10^3	5.027×10^3	1.038×10^4	-62.7	7.004×10^6	5.443×10^3	-62.2	5.471×10^6	62.9	-69.9
-3.60	113	366	3.04	5.443×10^3	1.142×10^3	2.99	1.022×10^4	2.59	3.08
-0.246	0.572	-2.01	0.115	-62.2	2.99	0.115	-50.1	2.281×10^{-2}	0.114
4.004×10^3	1.399×10^3	2.701×10^4	-49.5	5.471×10^6	1.022×10^4	-50.1	5.098×10^6	-15.1	-58.5
0.120	1.08	-1.73	2.281×10^{-2}	62.9	2.59	2.281×10^{-2}	-15.1	4.742×10^{-2}	2.451×10^{-2}
-0.275	0.672	-2.17	0.114	-69.9	3.08	0.114	-58.5	2.451×10^{-2}	0.118

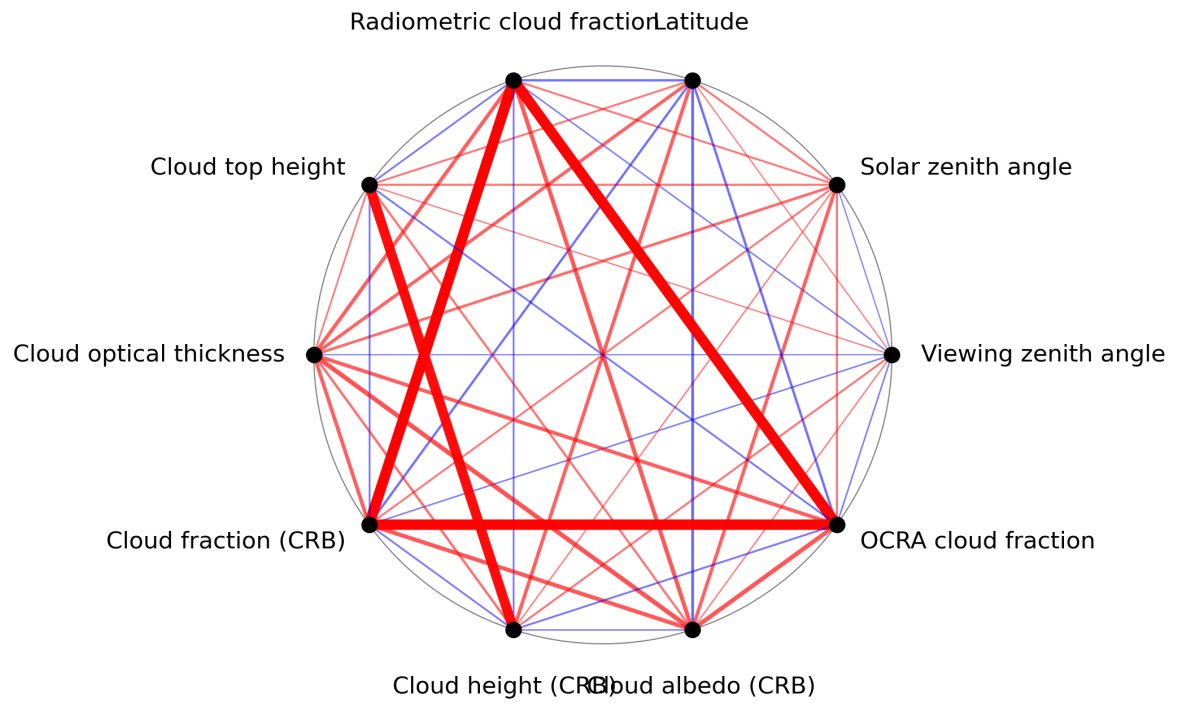


Figure 1: Map of correlation graph for 2023-12-20 to 2023-12-21.

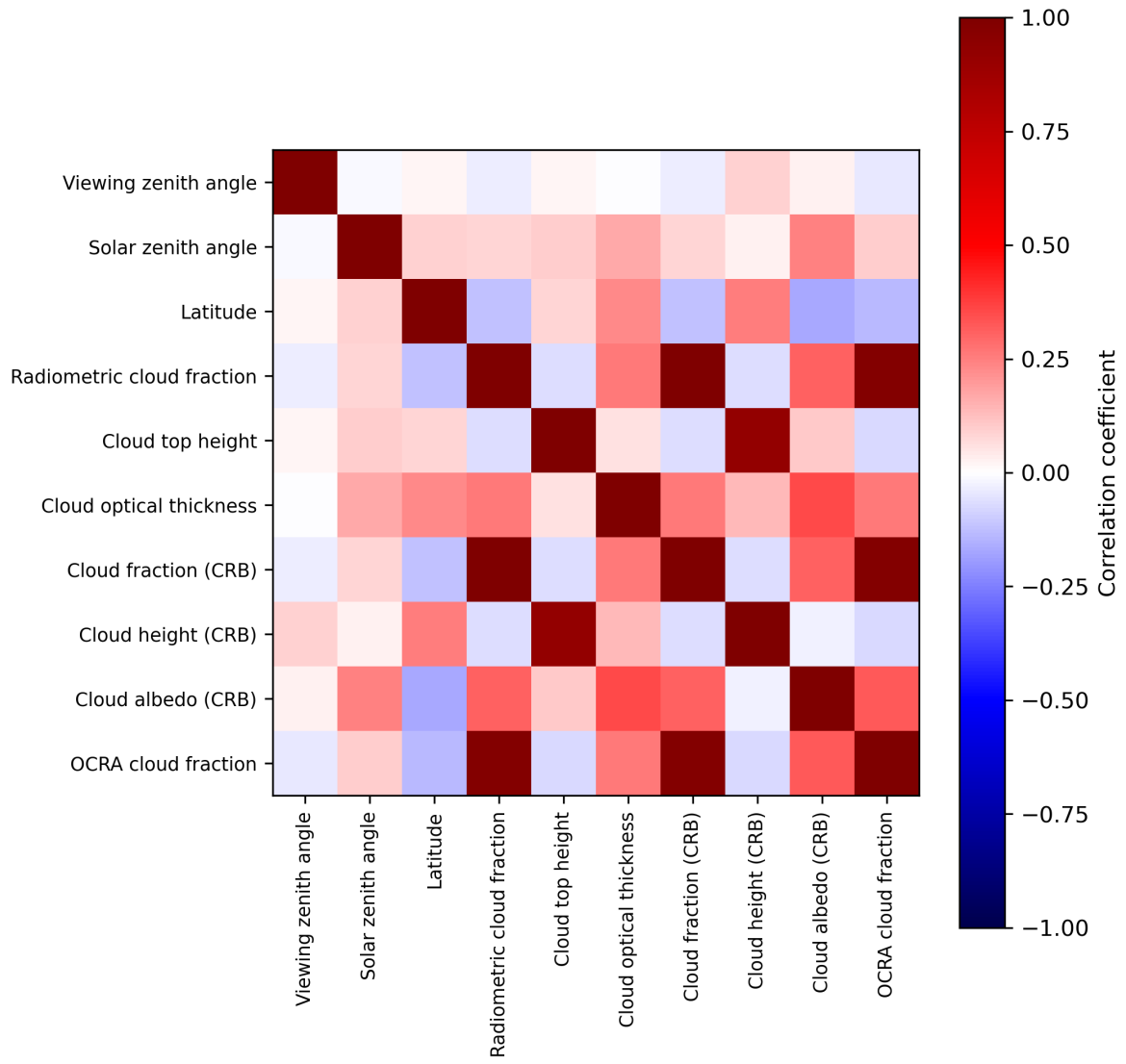


Figure 2: Map of correlation matrix for 2023-12-20 to 2023-12-21.

3 Granule outlines

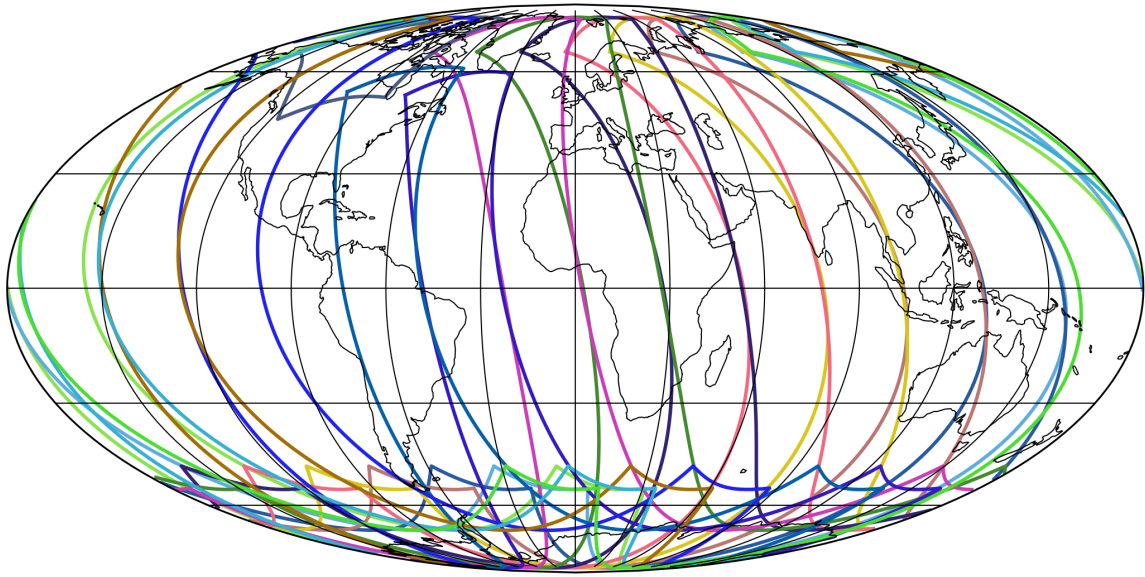


Figure 3: Outline of the granules.

4 Input data monitoring

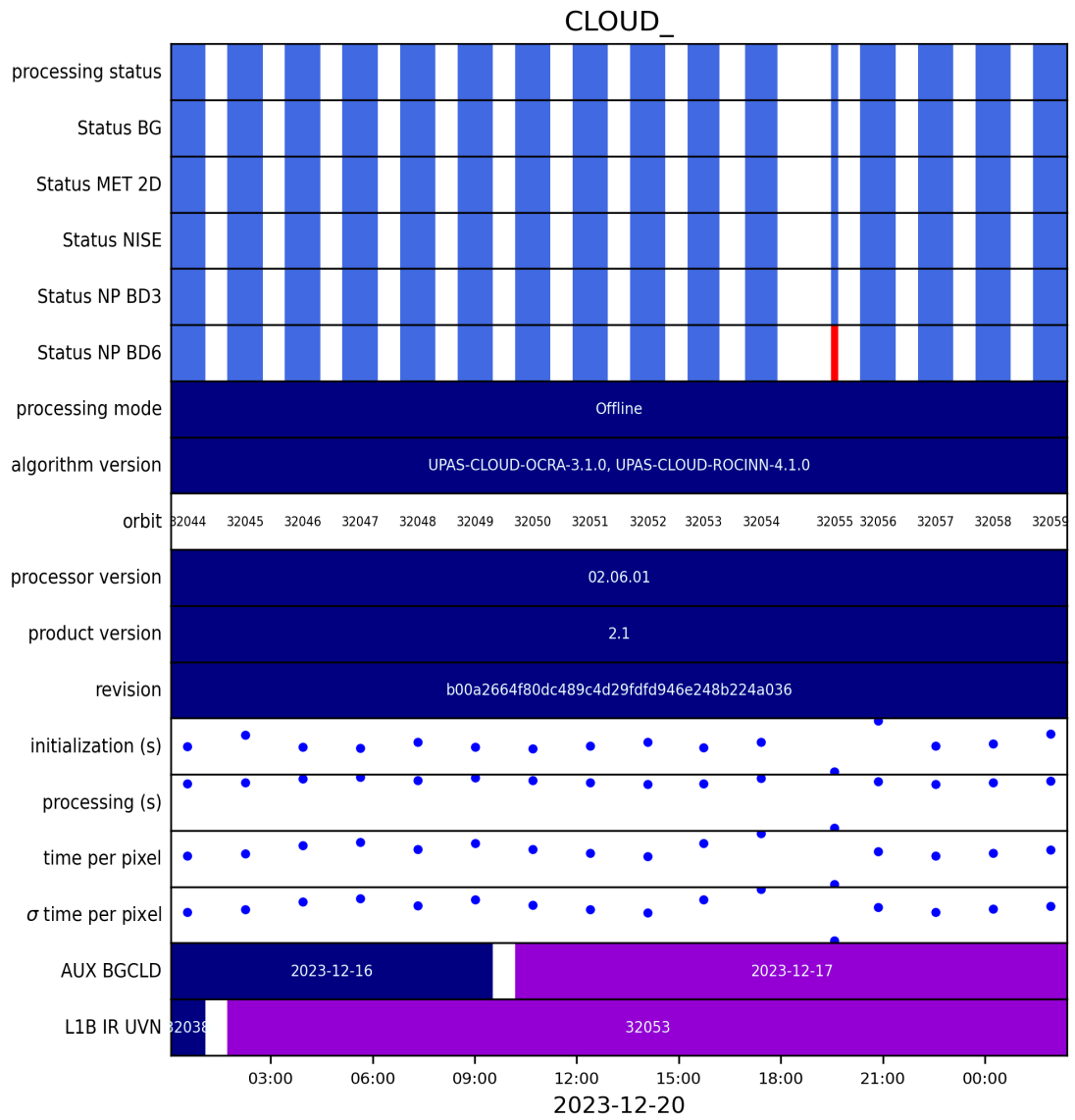


Figure 4: Input data per granule

5 Warnings and errors

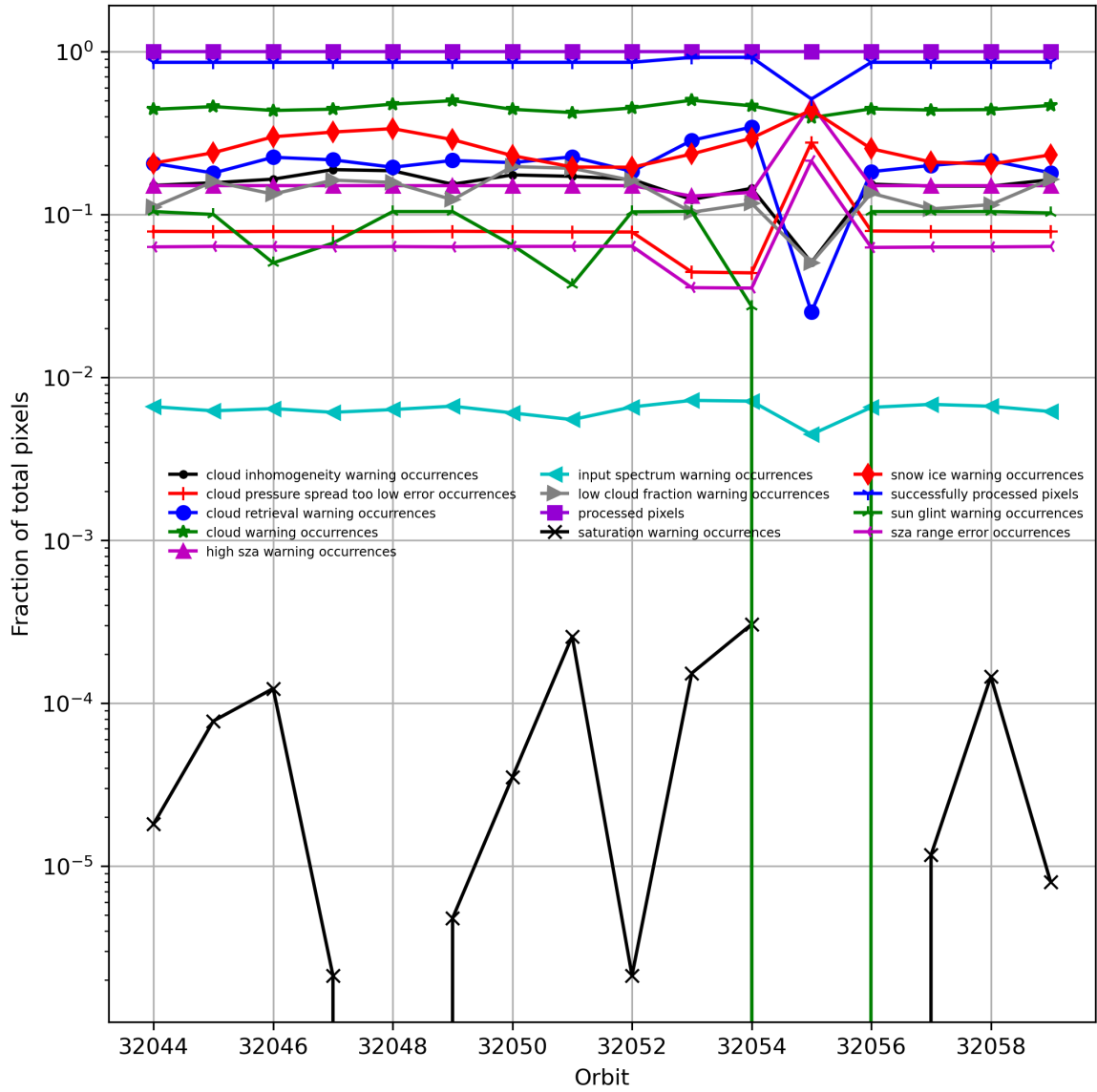


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

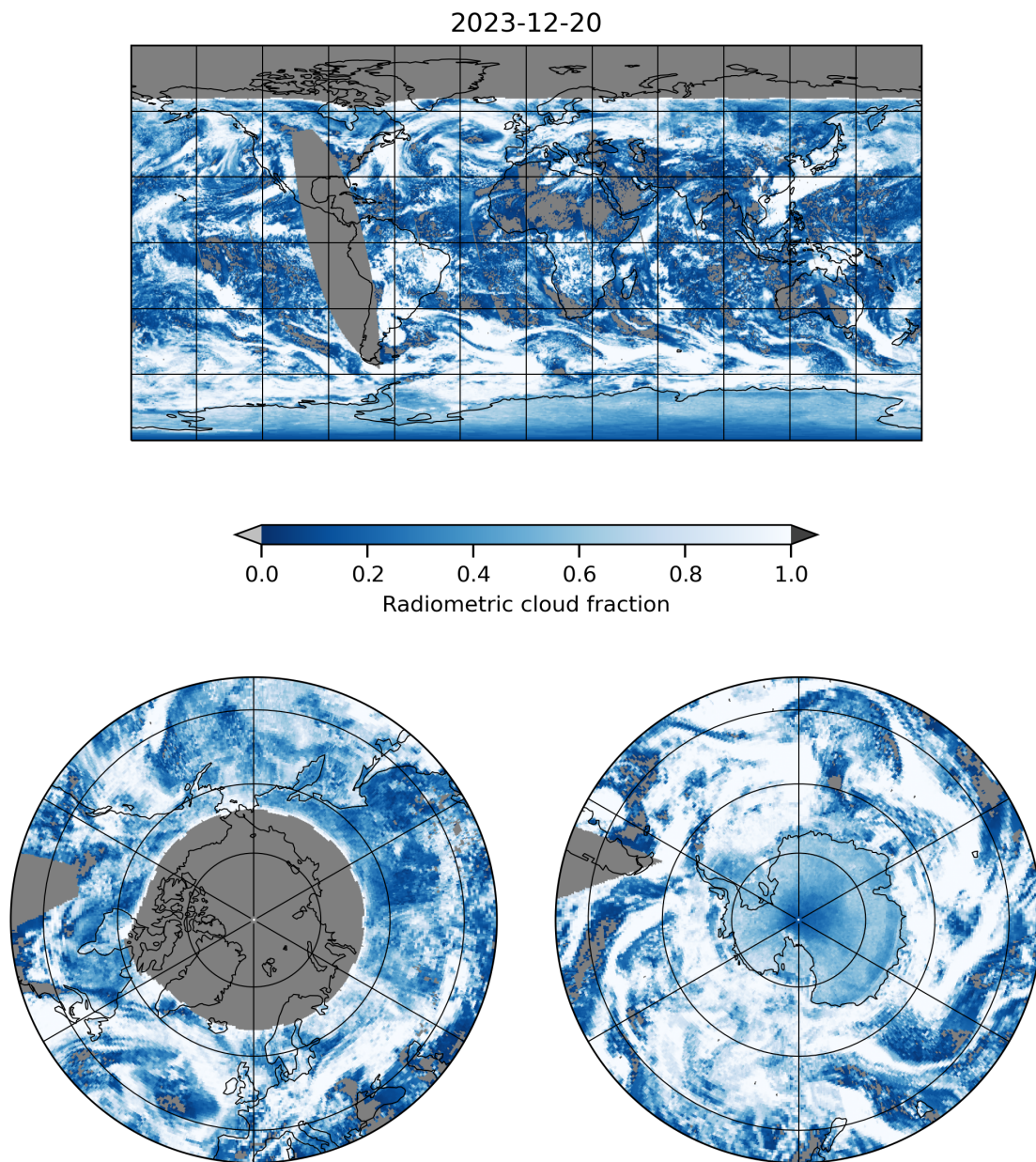


Figure 6: Map of “Radiometric cloud fraction” for 2023-12-20 to 2023-12-21

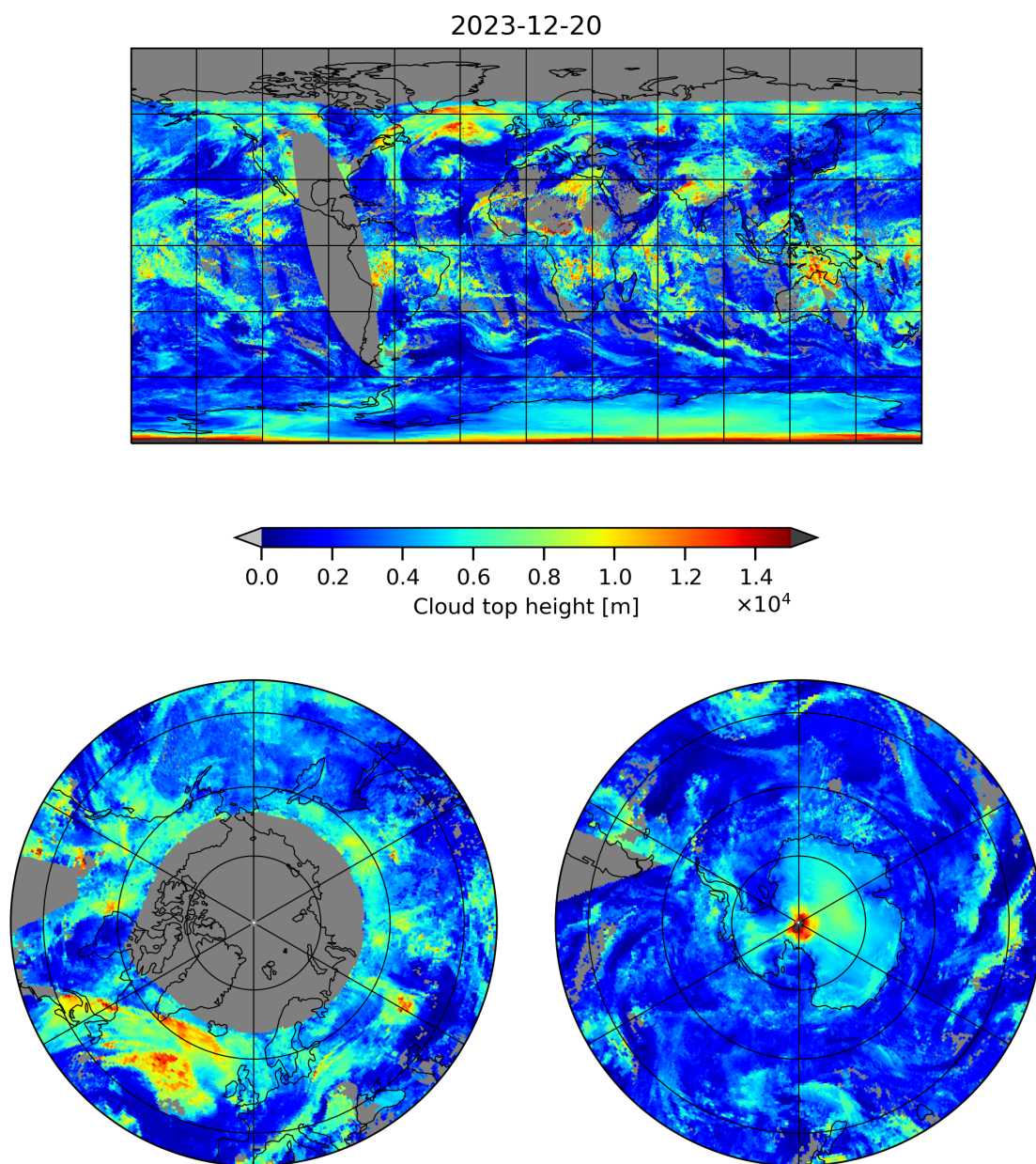


Figure 7: Map of “Cloud top height” for 2023-12-20 to 2023-12-21

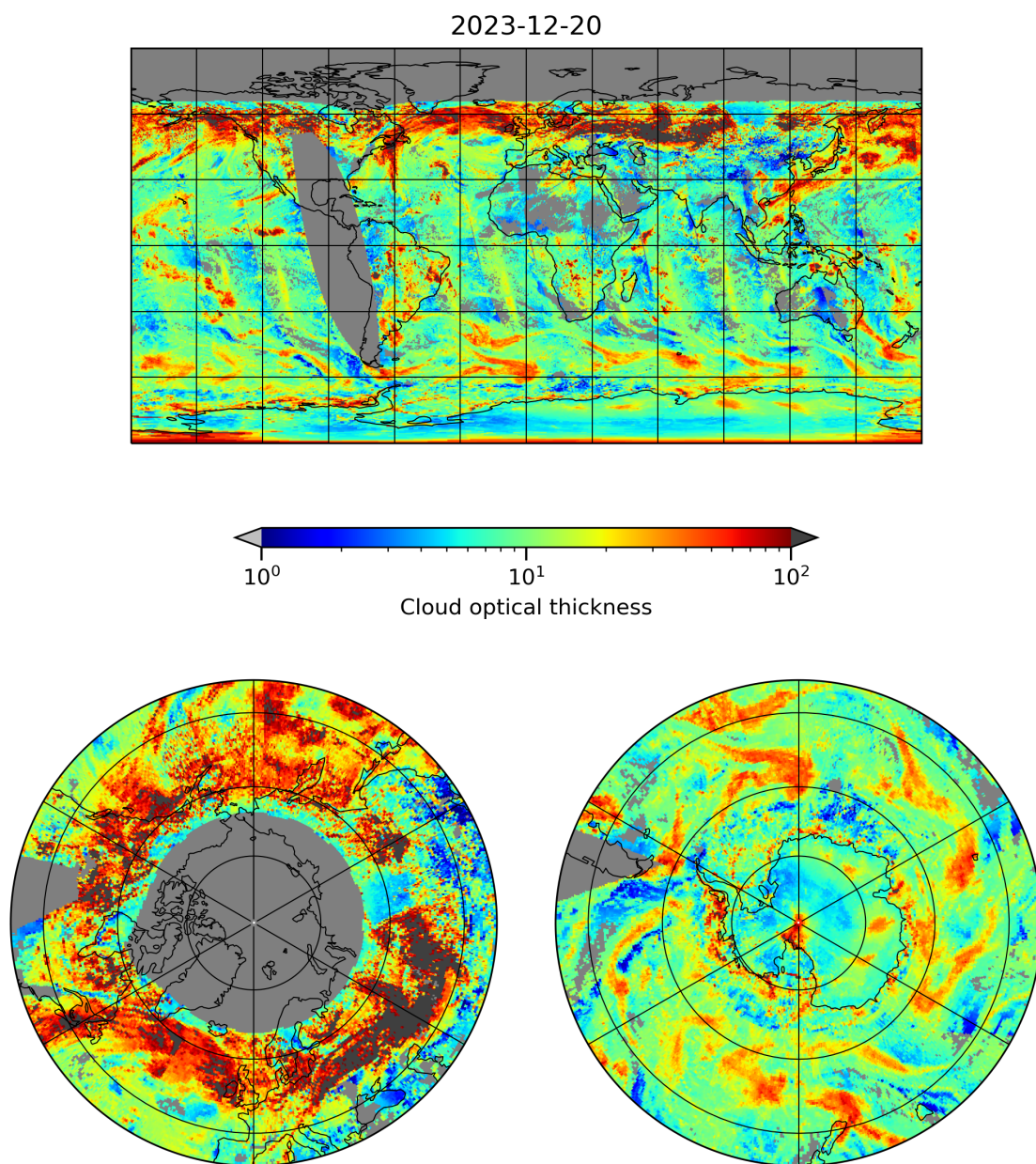


Figure 8: Map of “Cloud optical thickness” for 2023-12-20 to 2023-12-21

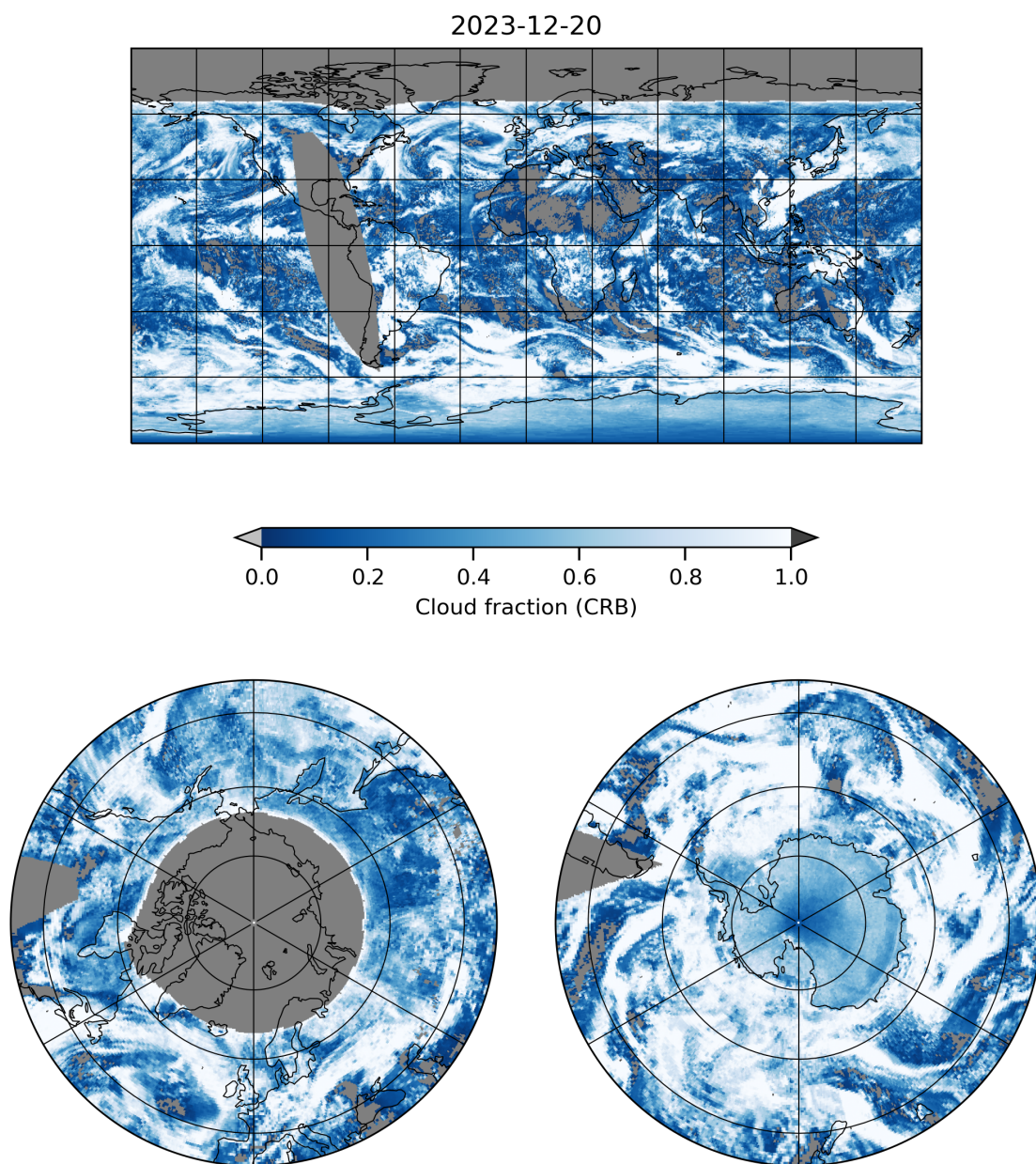


Figure 9: Map of “Cloud fraction (CRB)” for 2023-12-20 to 2023-12-21

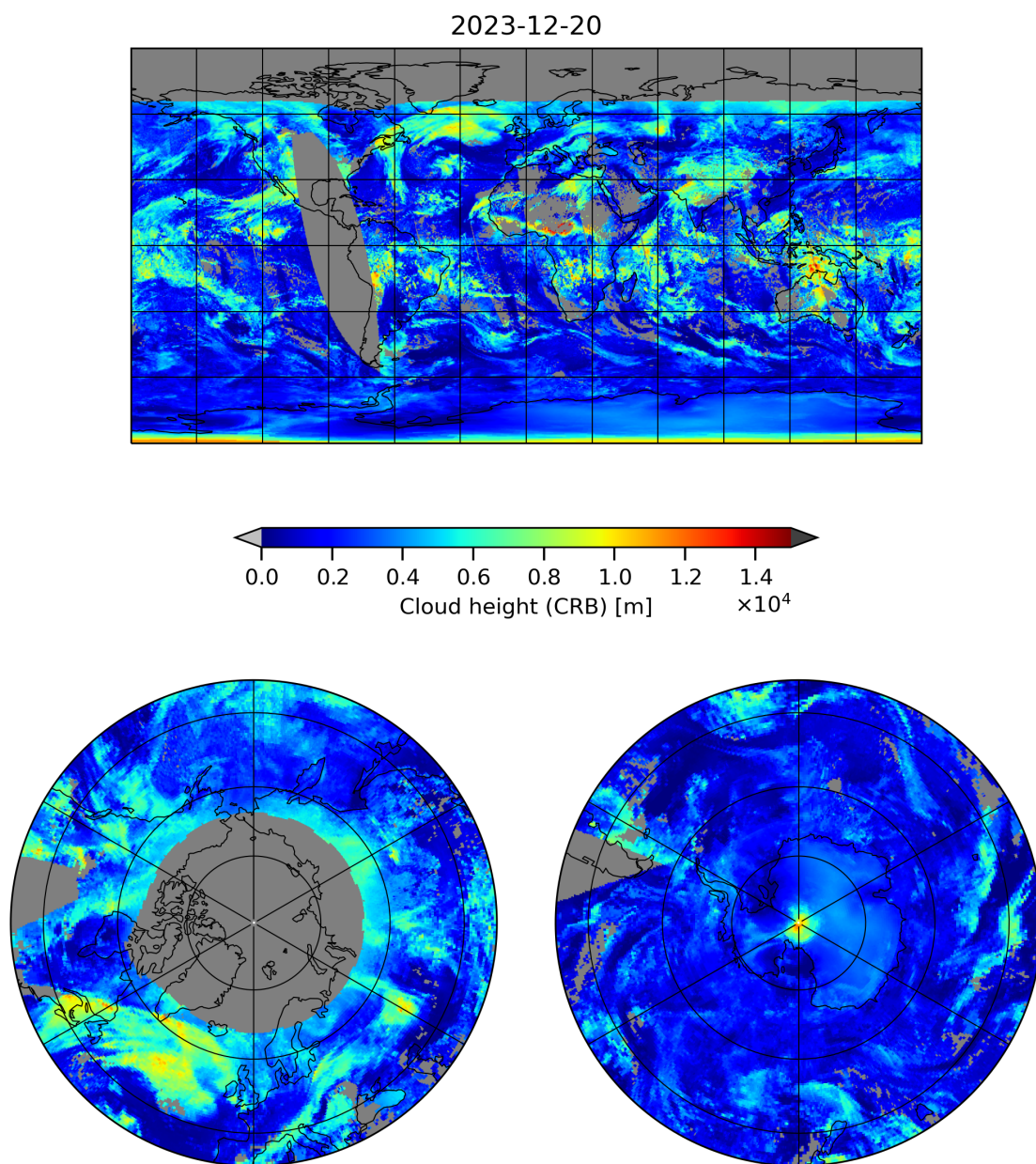


Figure 10: Map of “Cloud height (CRB)” for 2023-12-20 to 2023-12-21

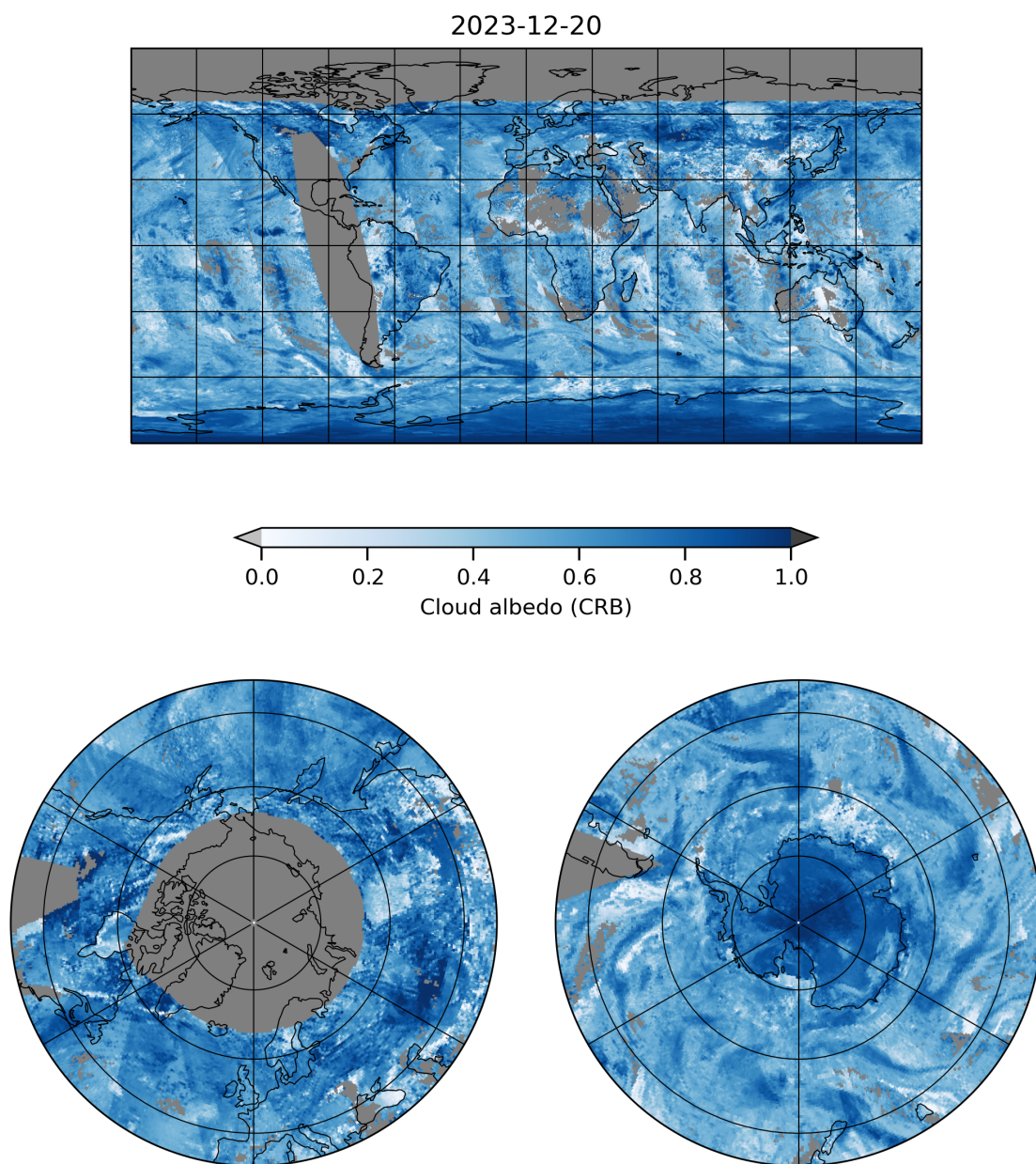


Figure 11: Map of “Cloud albedo (CRB)” for 2023-12-20 to 2023-12-21

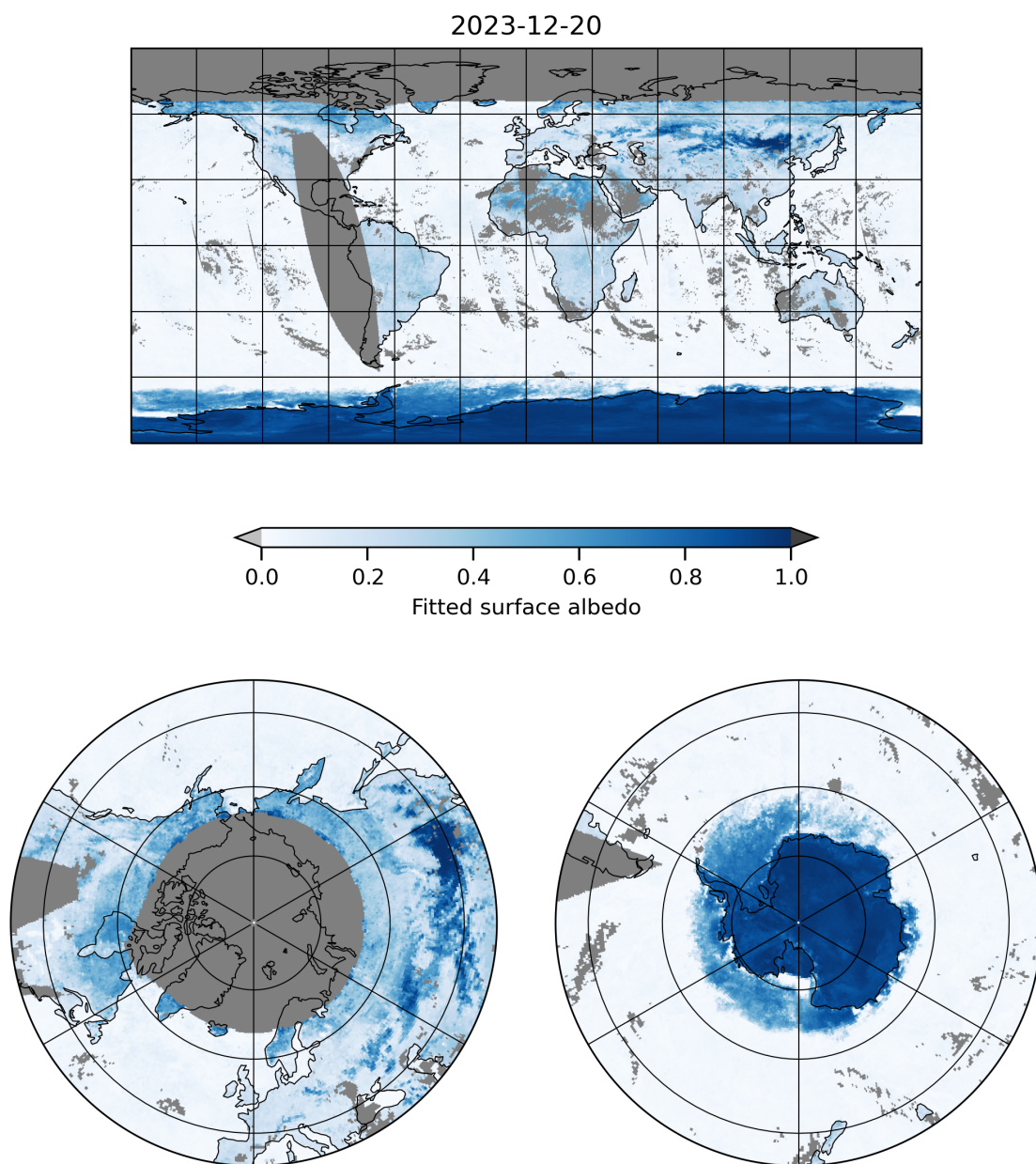


Figure 12: Map of “Fitted surface albedo” for 2023-12-20 to 2023-12-21

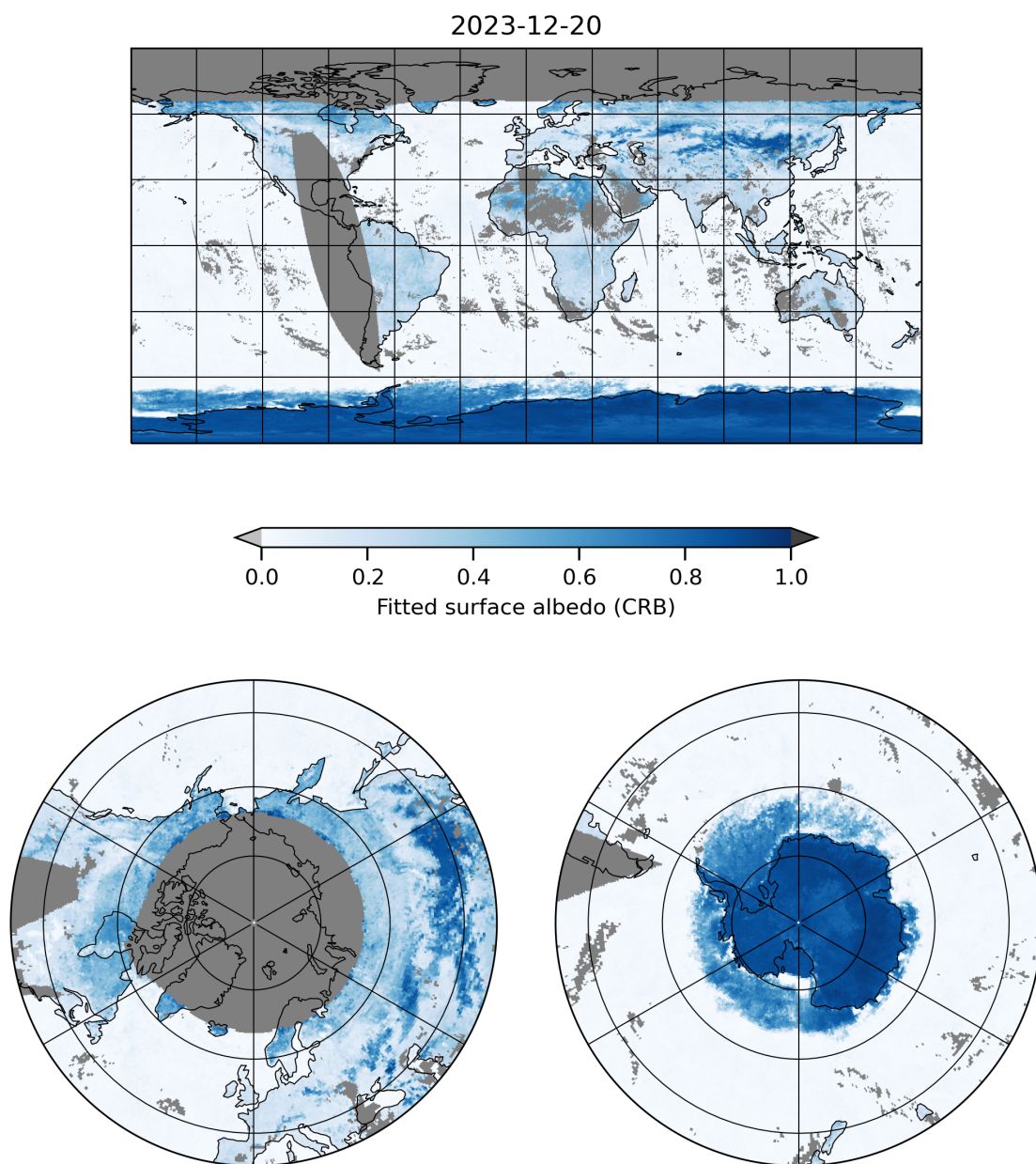


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-12-20 to 2023-12-21

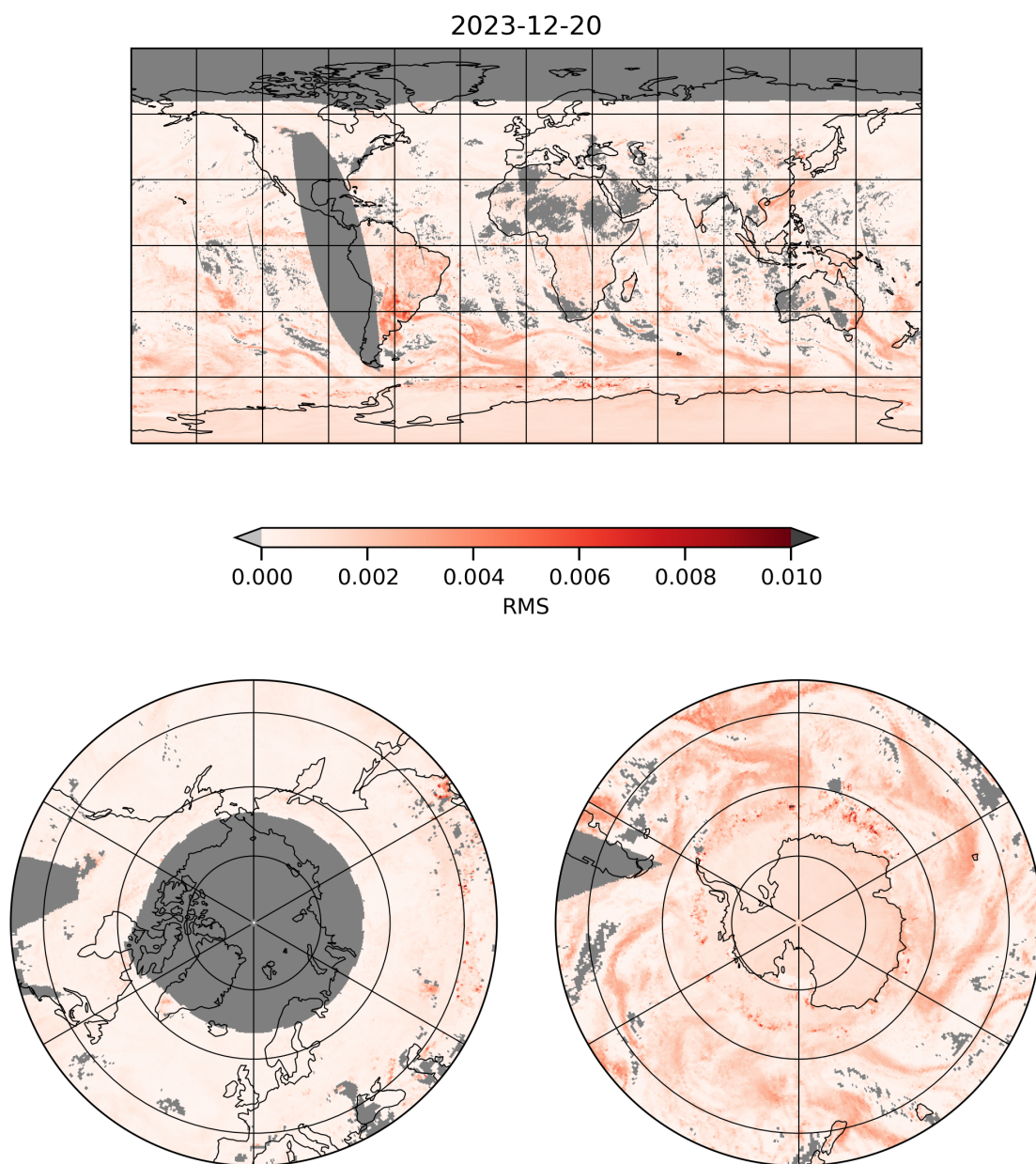


Figure 14: Map of “RMS” for 2023-12-20 to 2023-12-21

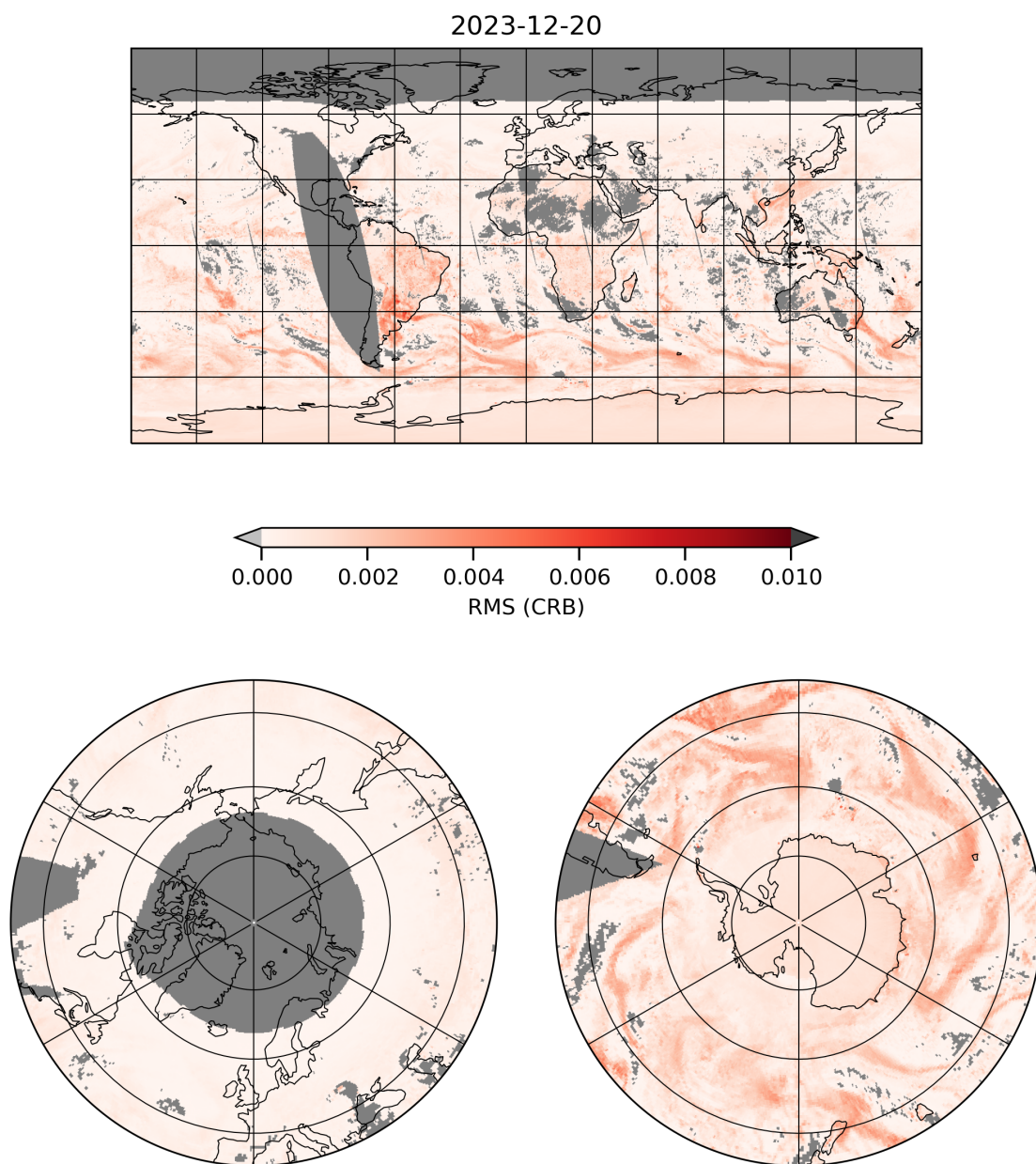


Figure 15: Map of “RMS (CRB)” for 2023-12-20 to 2023-12-21

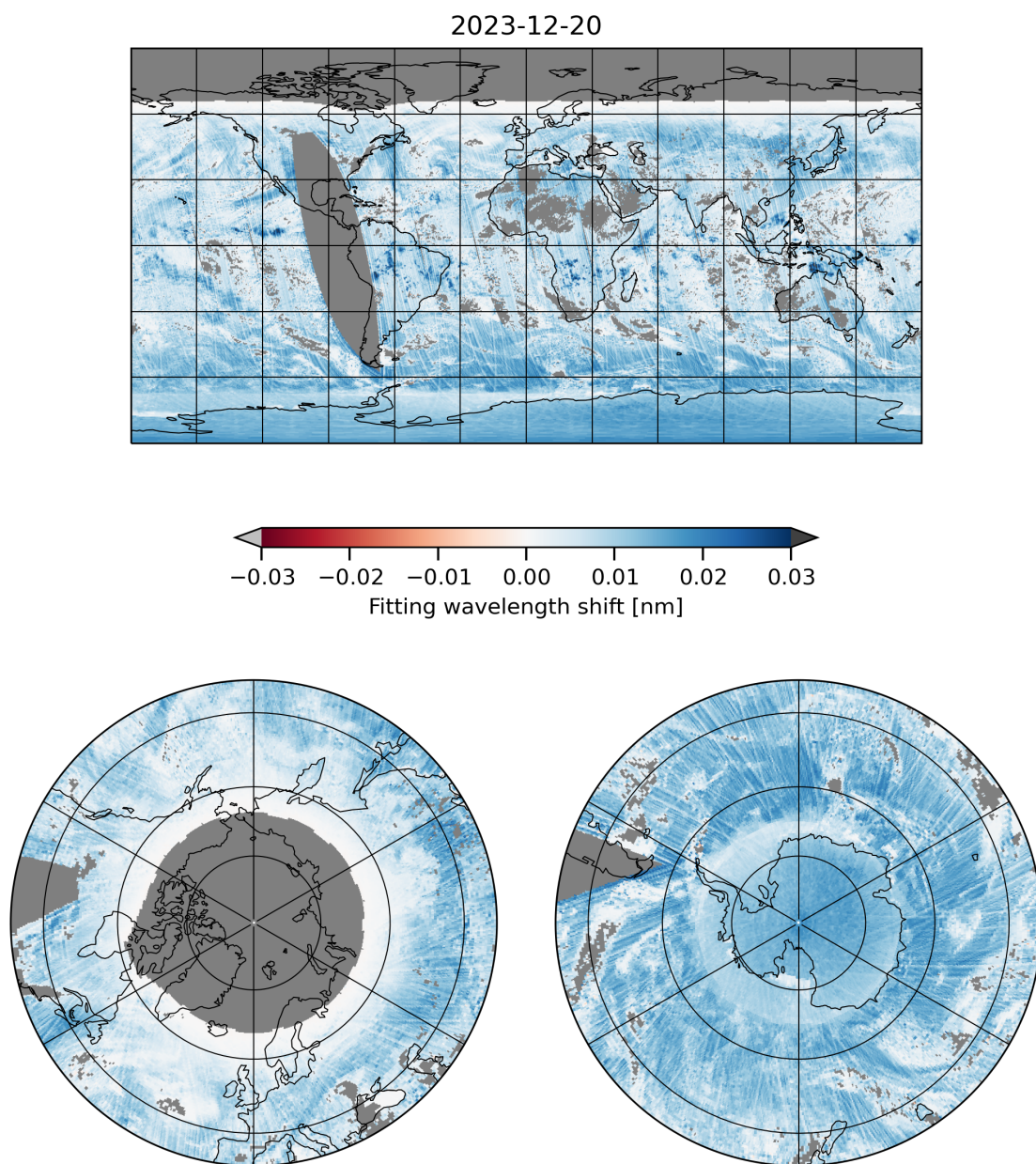


Figure 16: Map of "Fitting wavelength shift" for 2023-12-20 to 2023-12-21

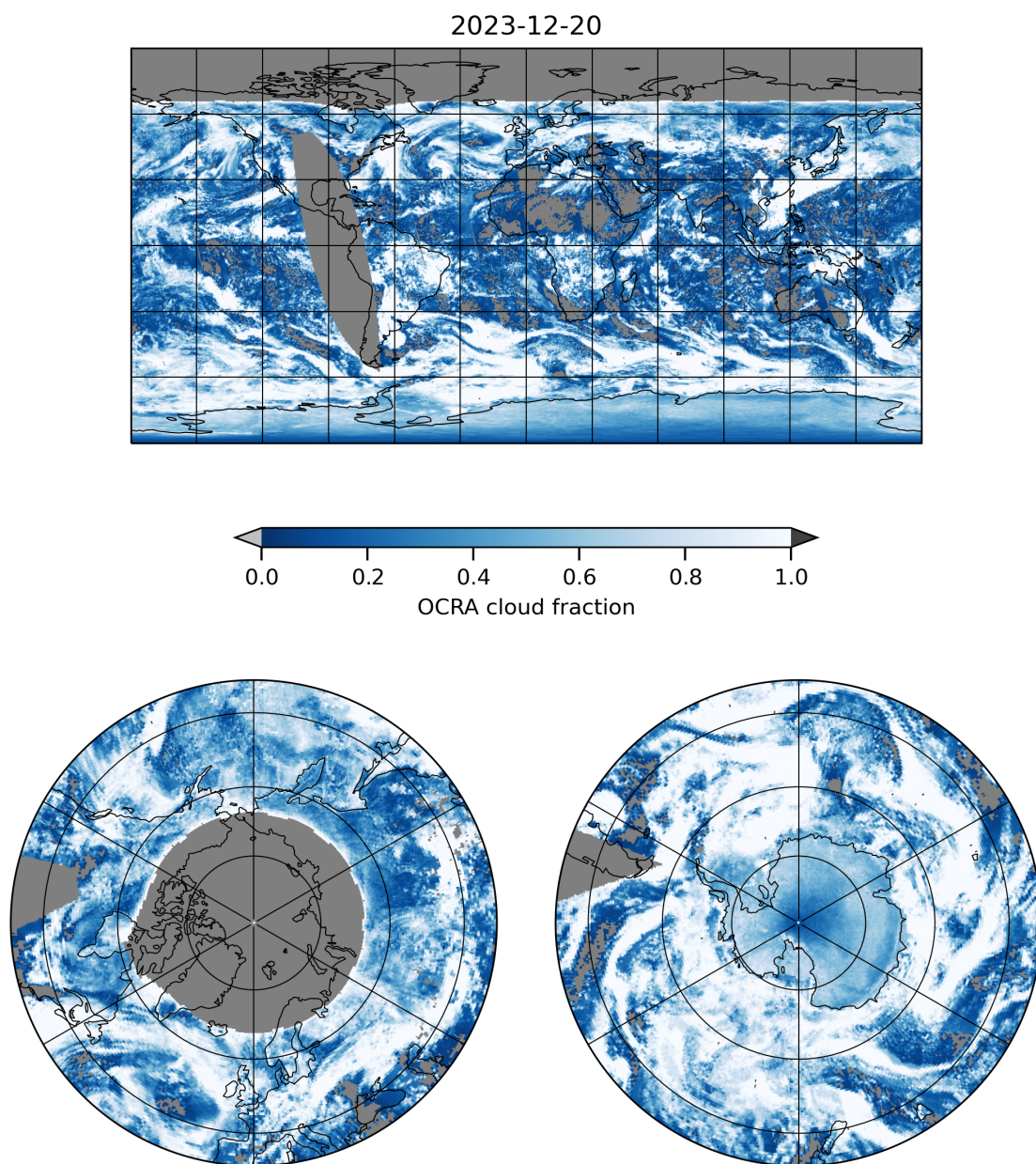


Figure 17: Map of “OCRA cloud fraction” for 2023-12-20 to 2023-12-21

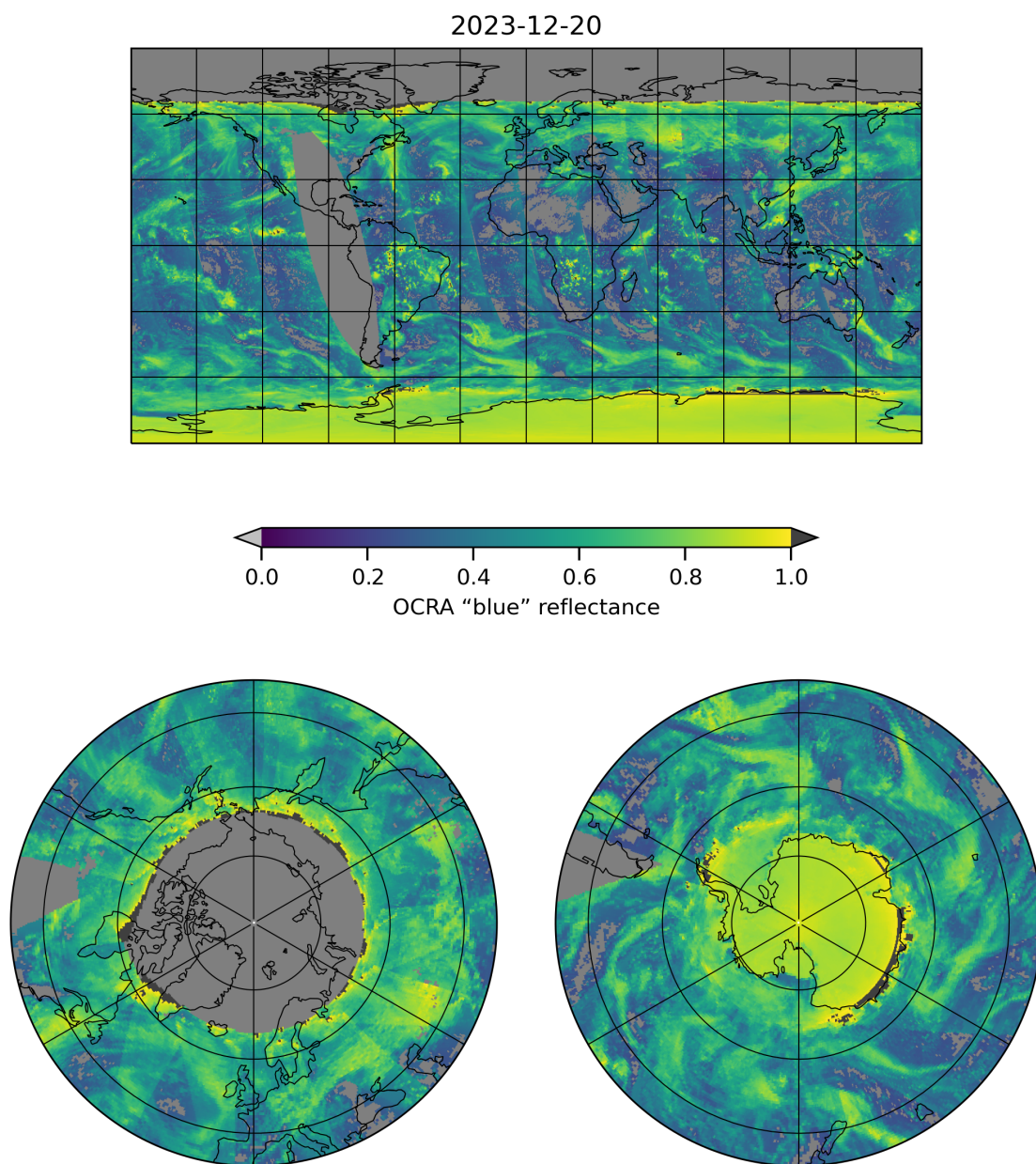


Figure 18: Map of "OCRA "blue" reflectance" for 2023-12-20 to 2023-12-21

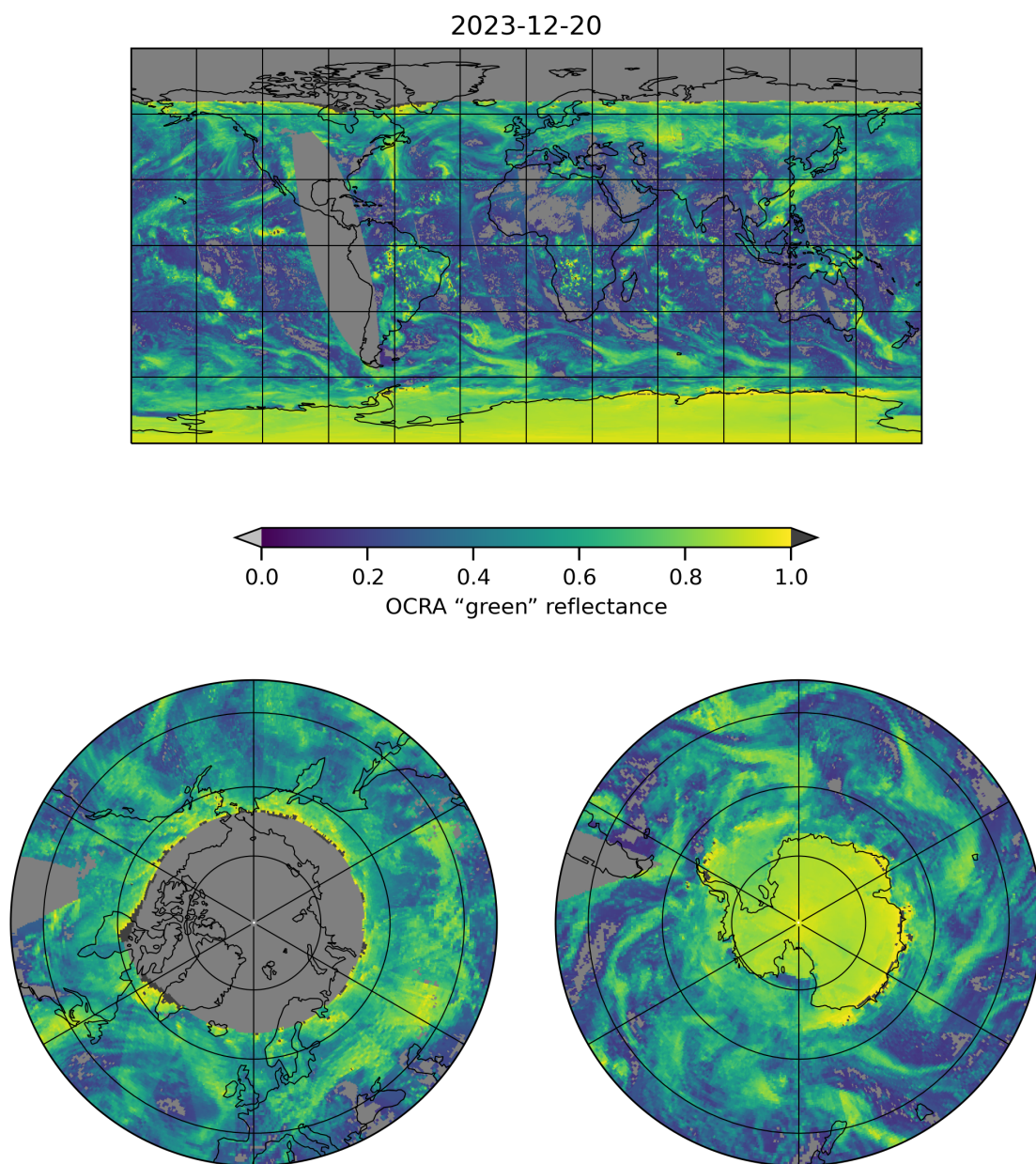


Figure 19: Map of "OCRA "green" reflectance" for 2023-12-20 to 2023-12-21

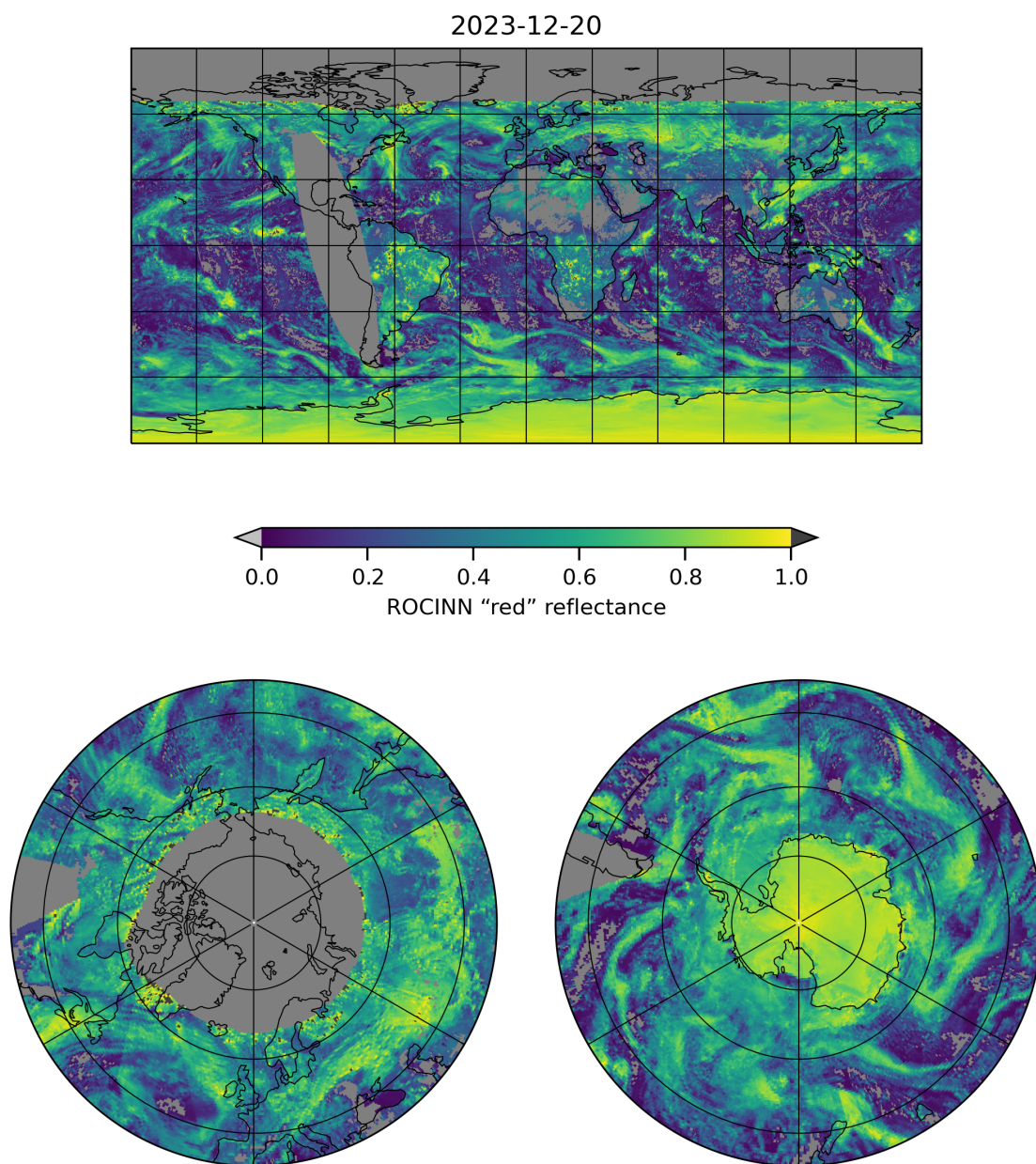


Figure 20: Map of "ROCINN "red" reflectance" for 2023-12-20 to 2023-12-21

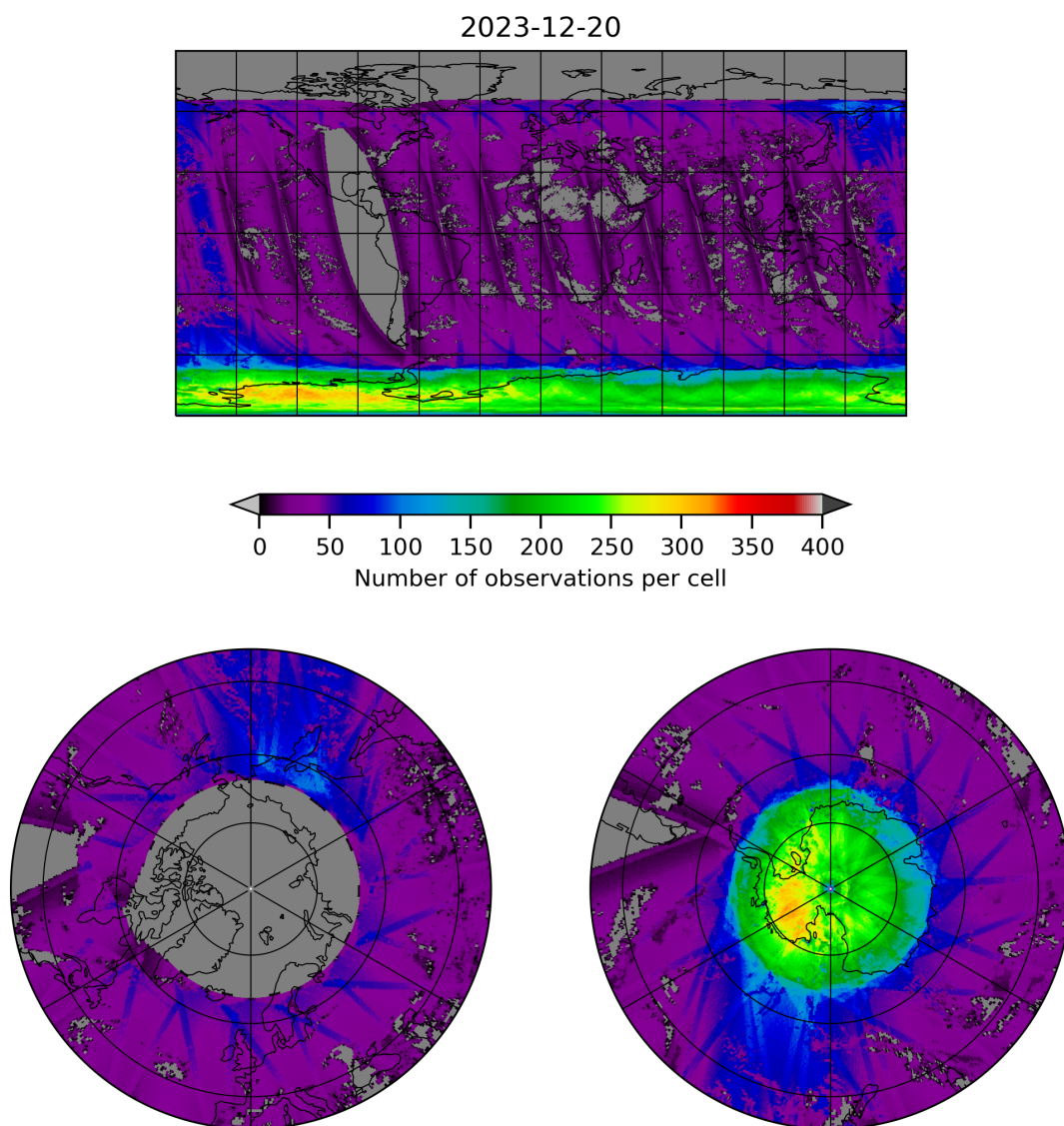


Figure 21: Map of the number of observations for 2023-12-20 to 2023-12-21

7 Zonal average

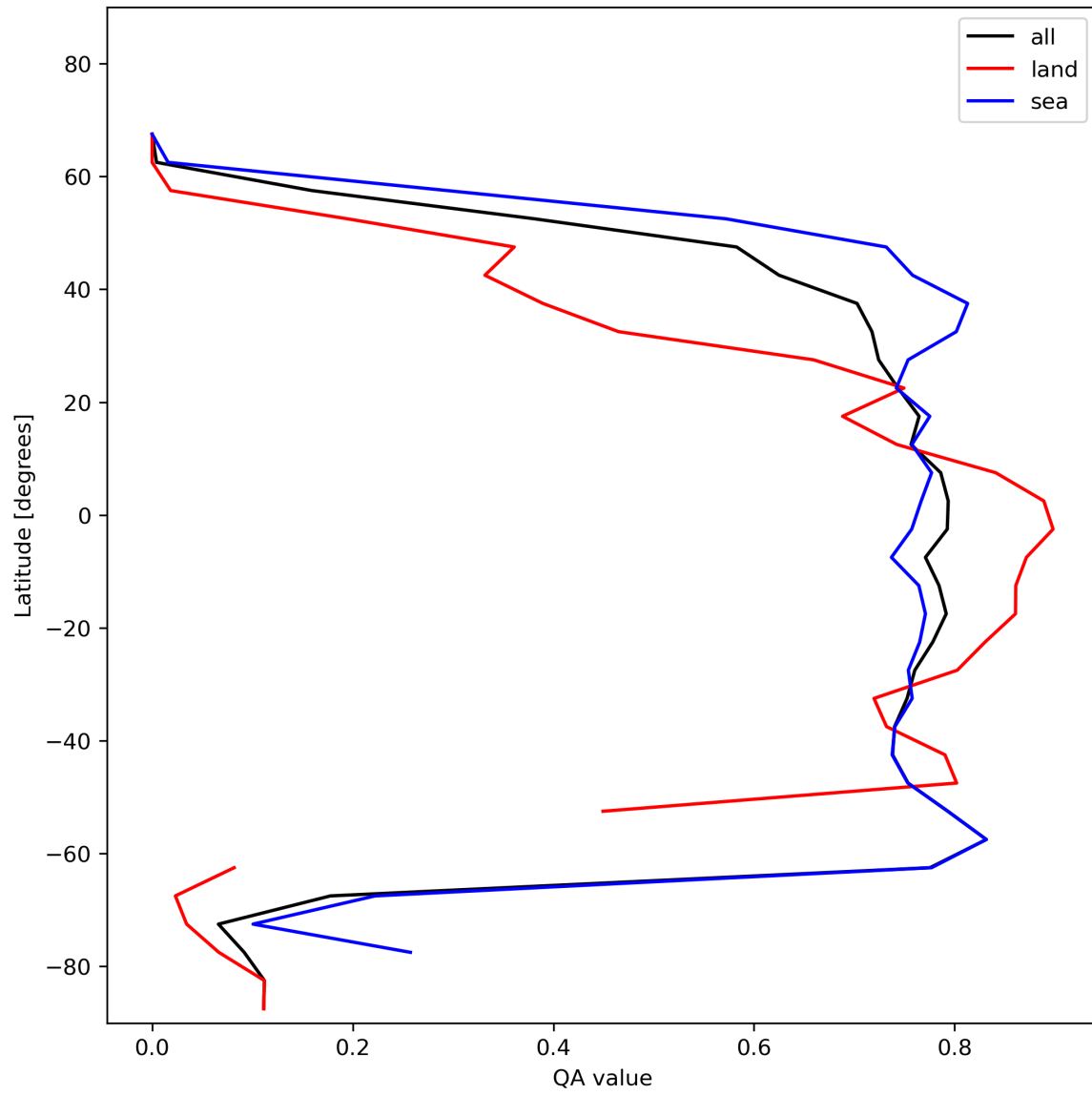


Figure 22: Zonal average of “QA value” for 2023-12-20 to 2023-12-21.

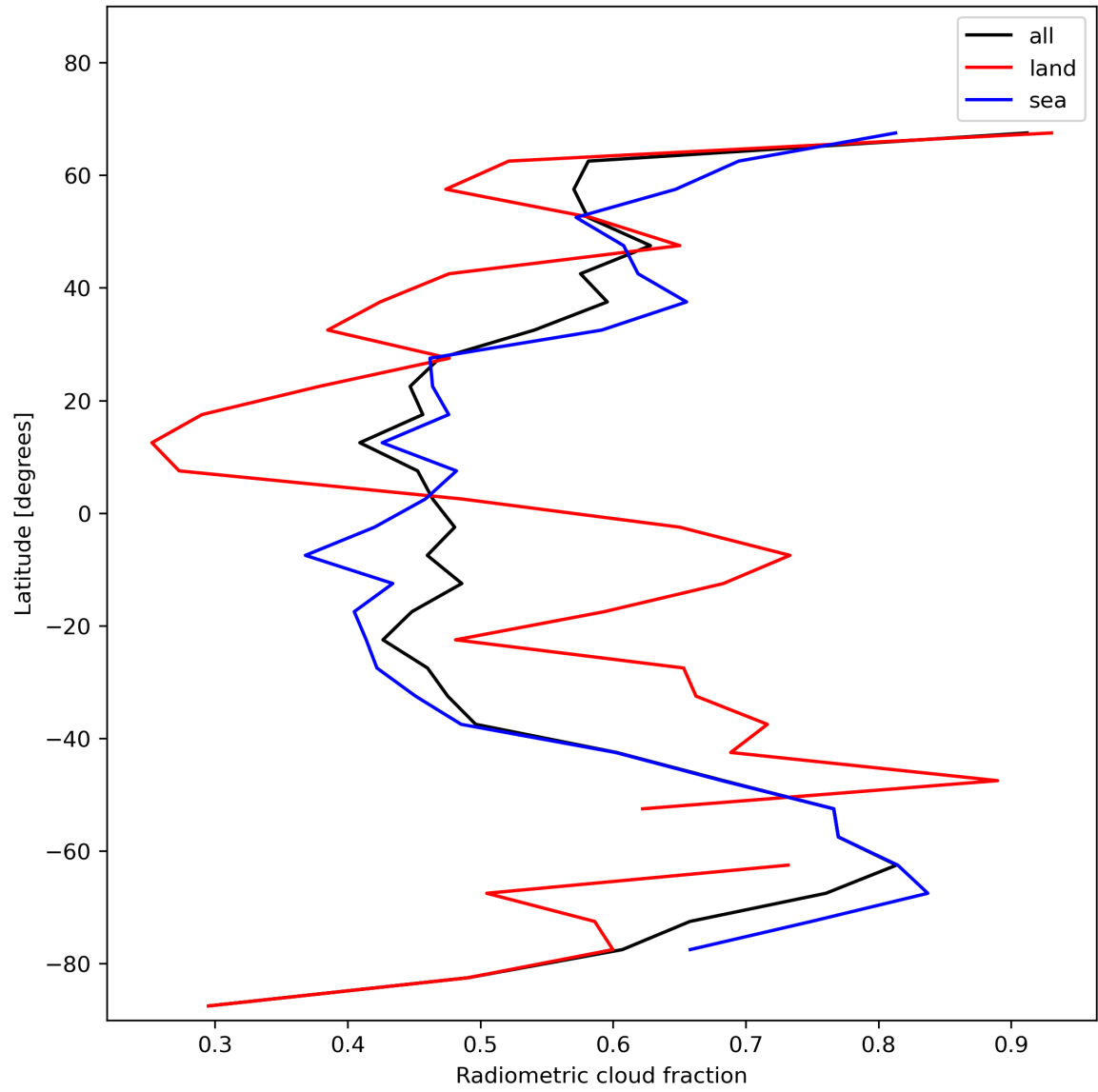


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-12-20 to 2023-12-21.

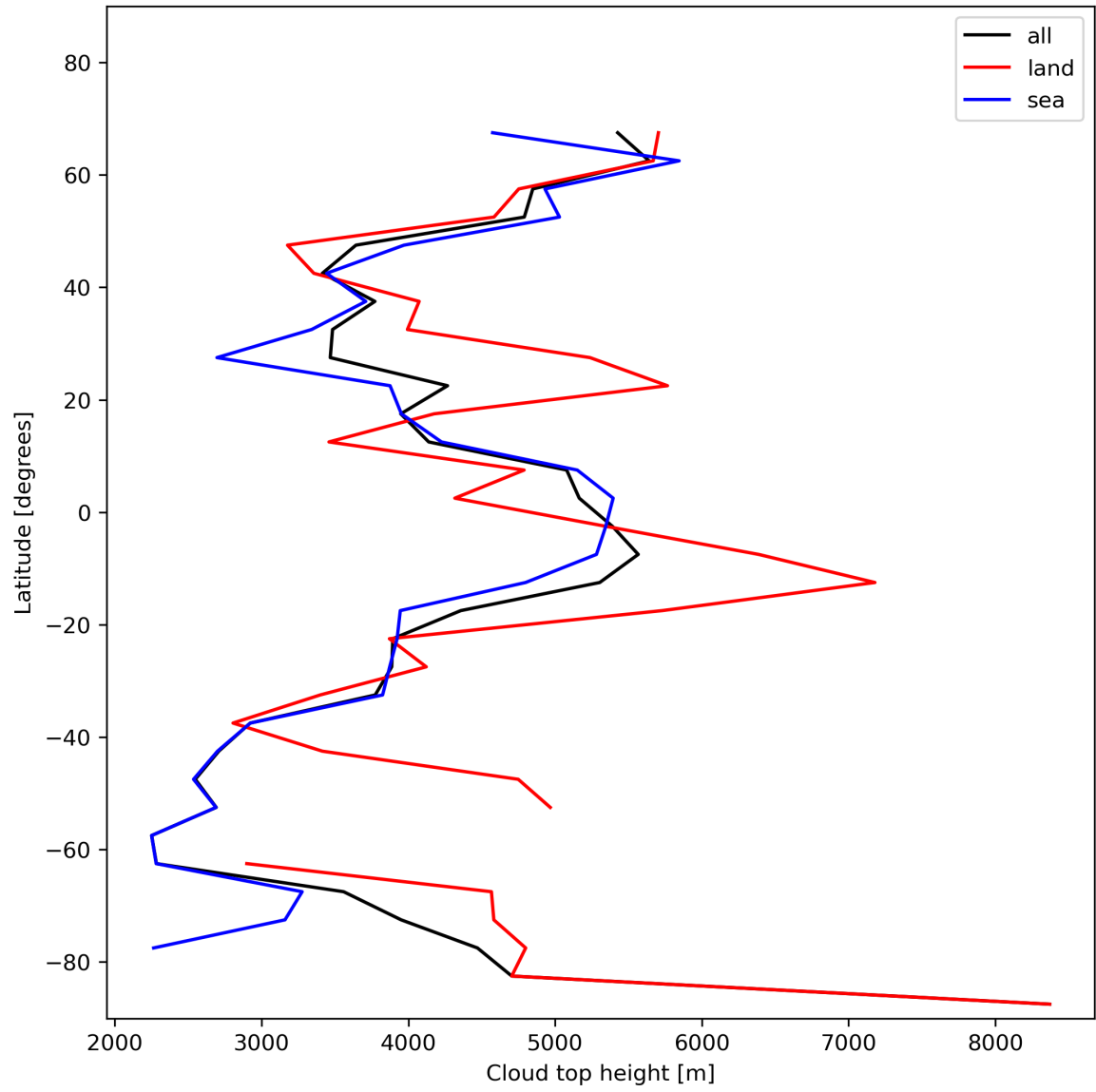


Figure 24: Zonal average of “Cloud top height” for 2023-12-20 to 2023-12-21.

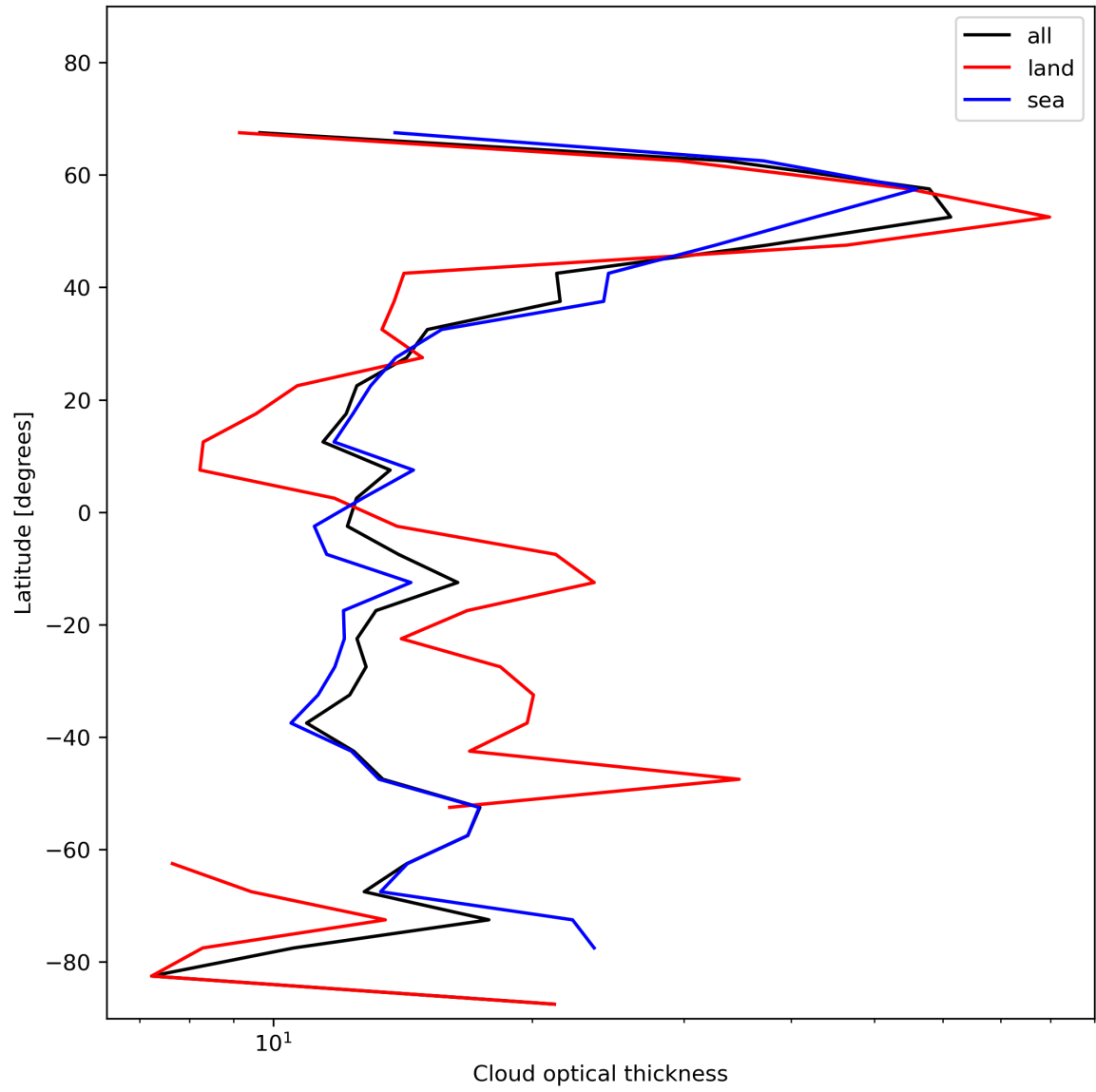


Figure 25: Zonal average of “Cloud optical thickness” for 2023-12-20 to 2023-12-21.

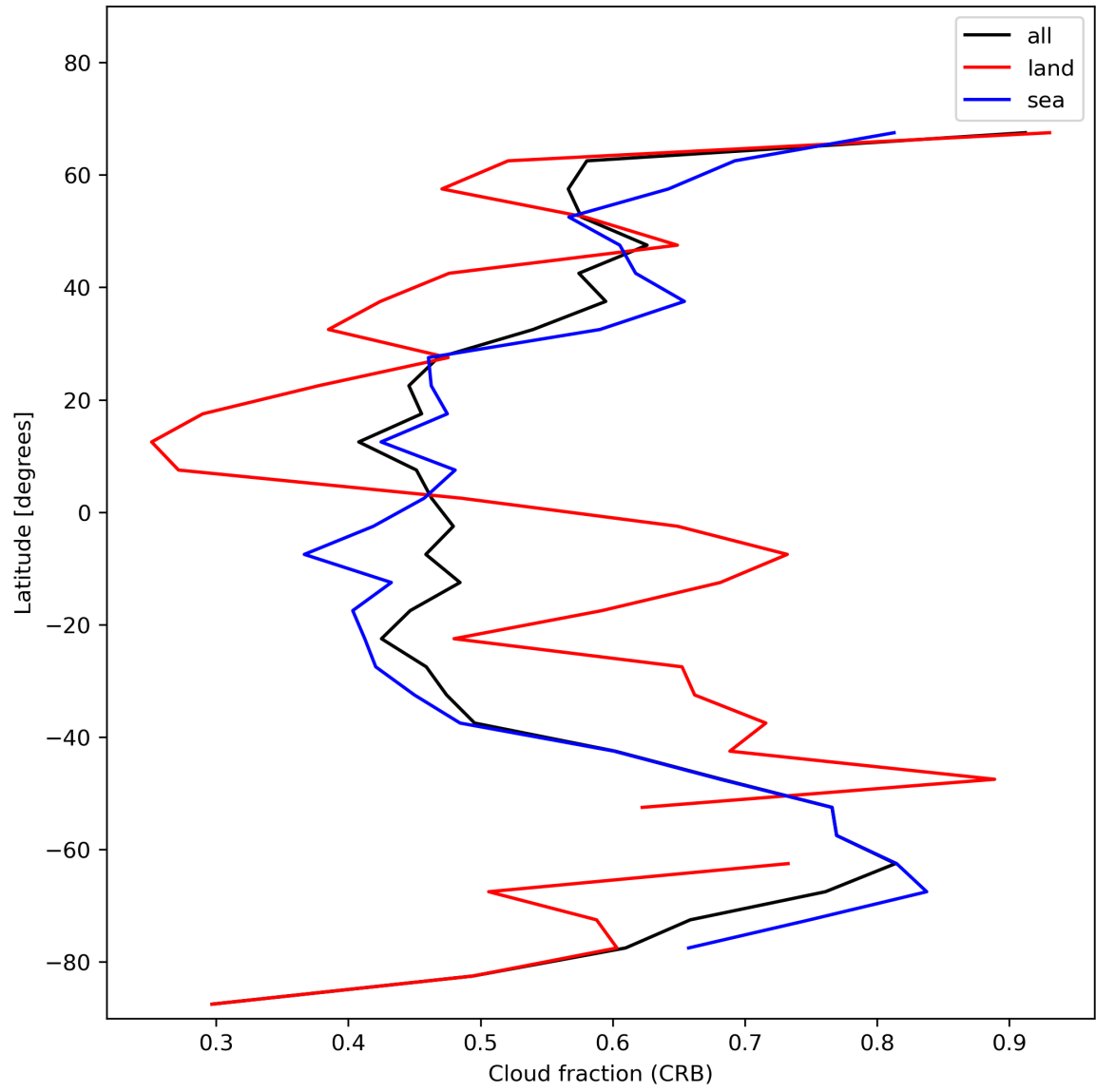


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-12-20 to 2023-12-21.

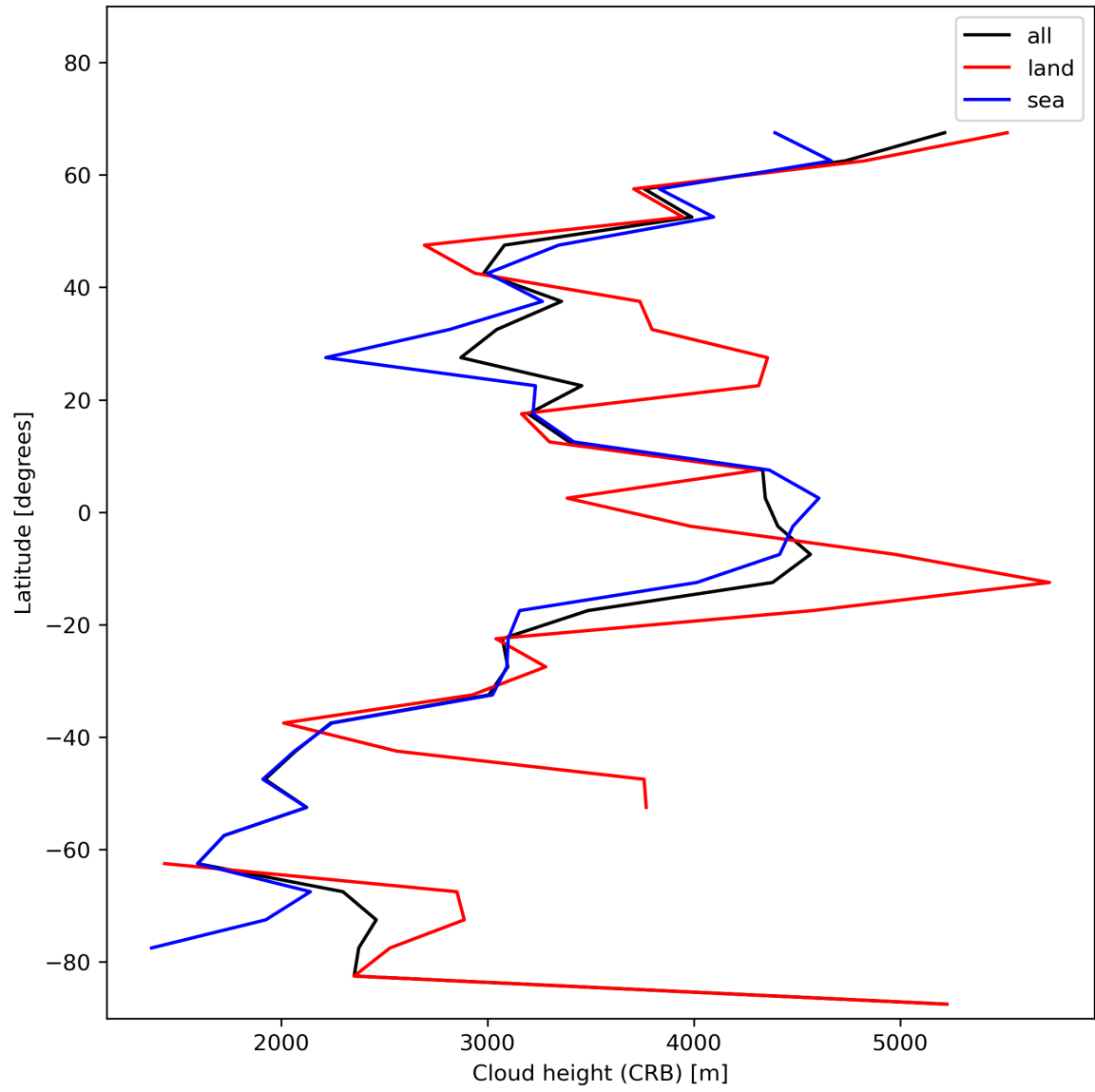


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-12-20 to 2023-12-21.

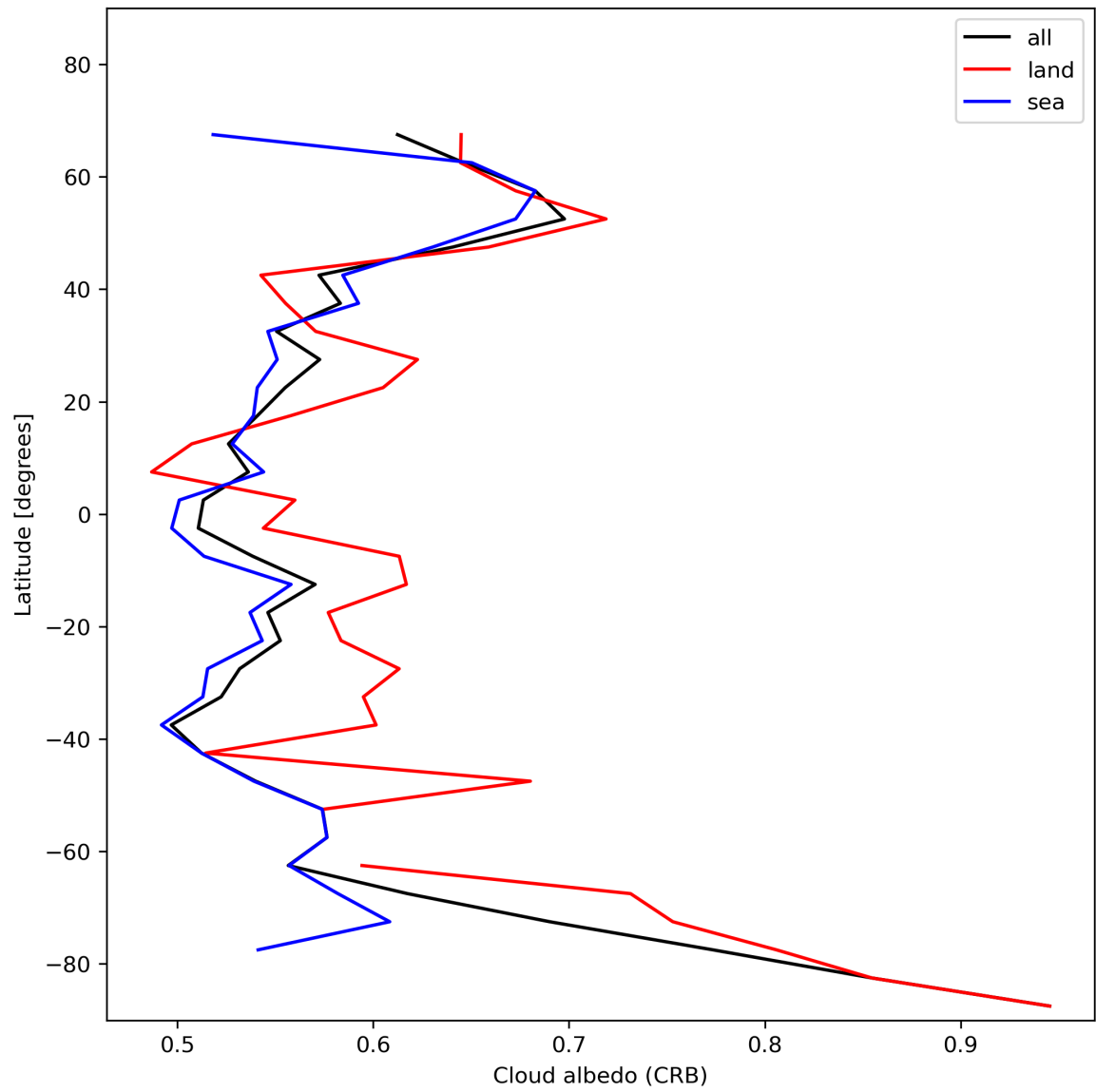


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-12-20 to 2023-12-21.

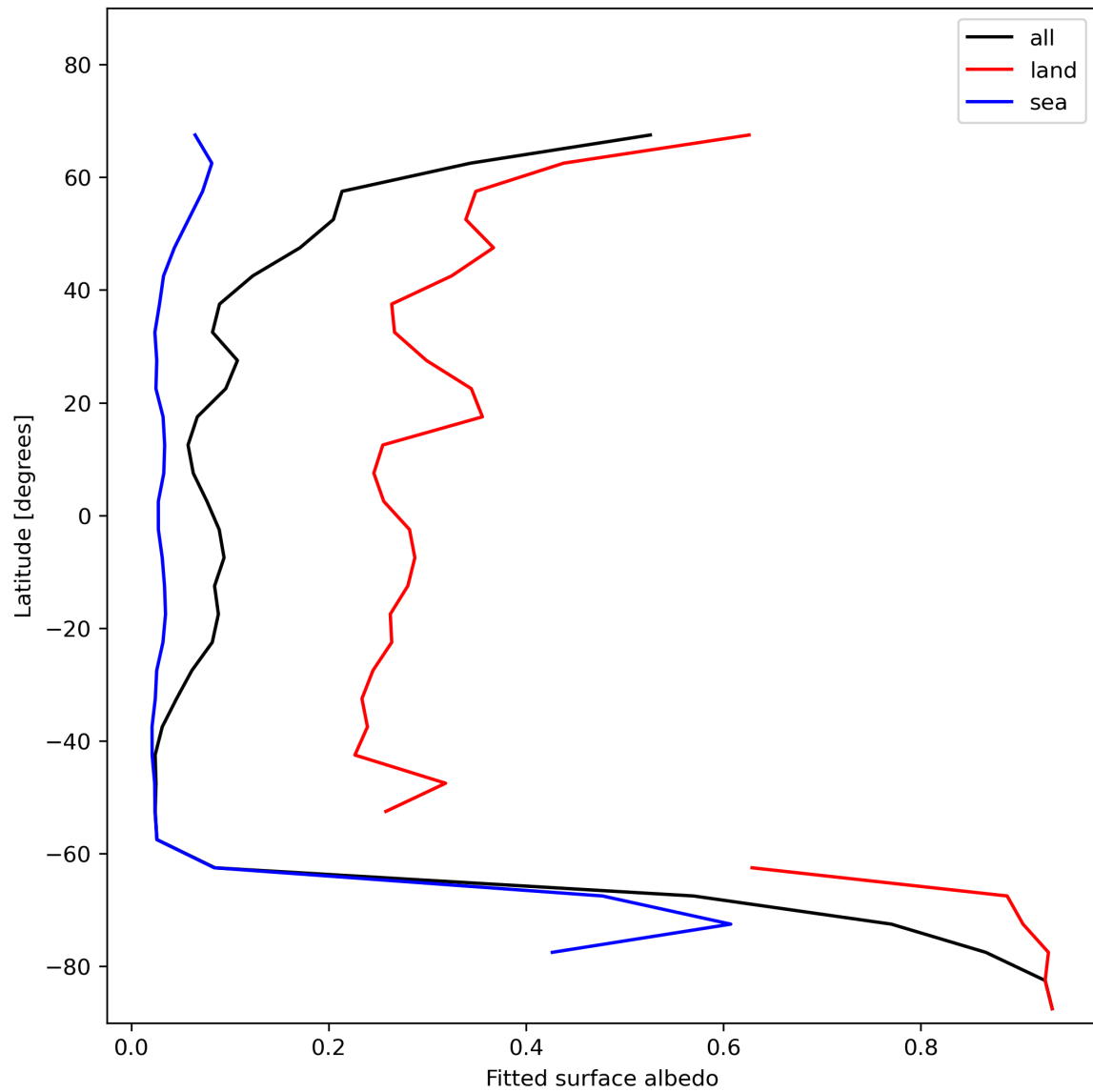


Figure 29: Zonal average of “Fitted surface albedo” for 2023-12-20 to 2023-12-21.

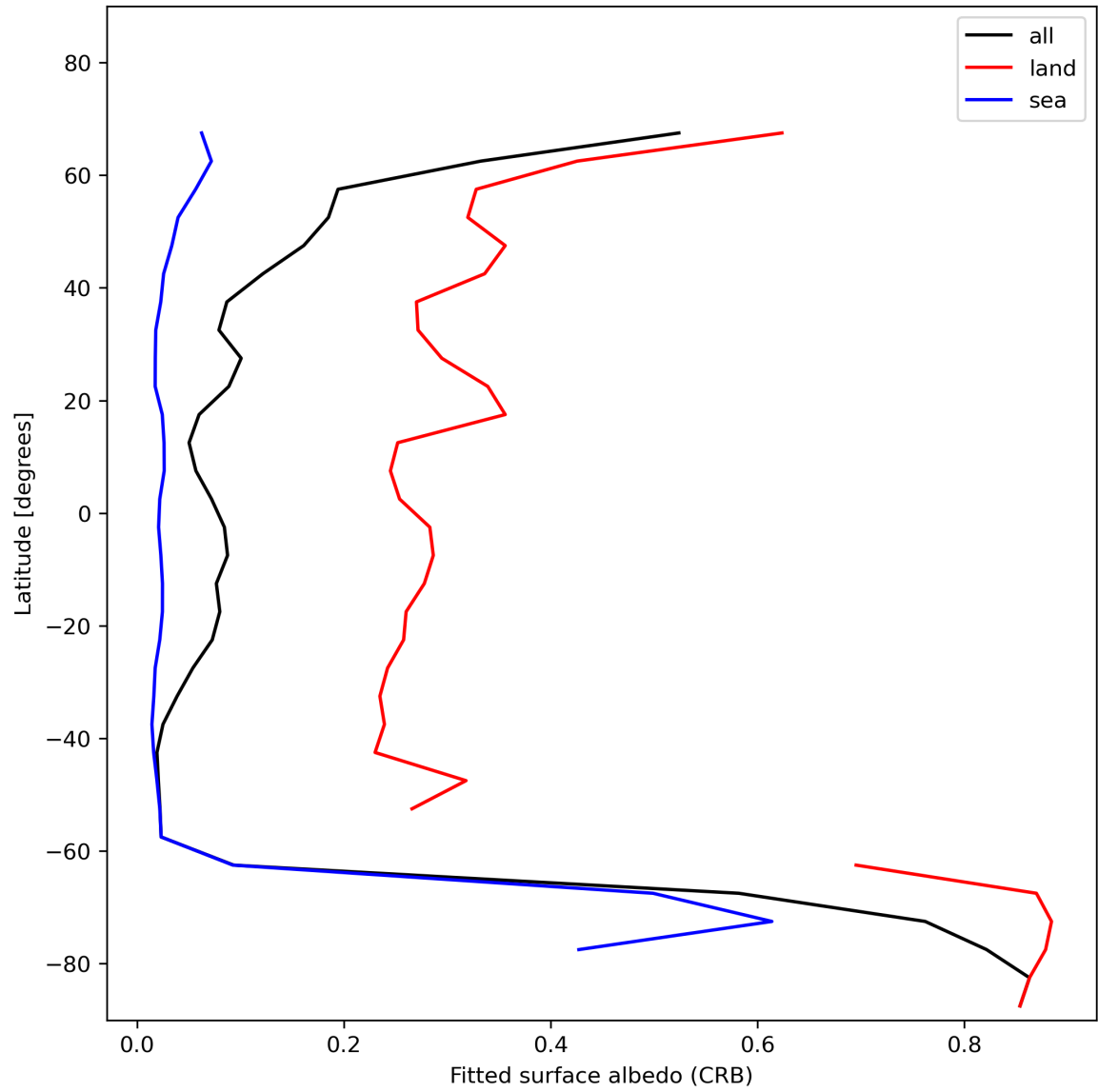


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-12-20 to 2023-12-21.

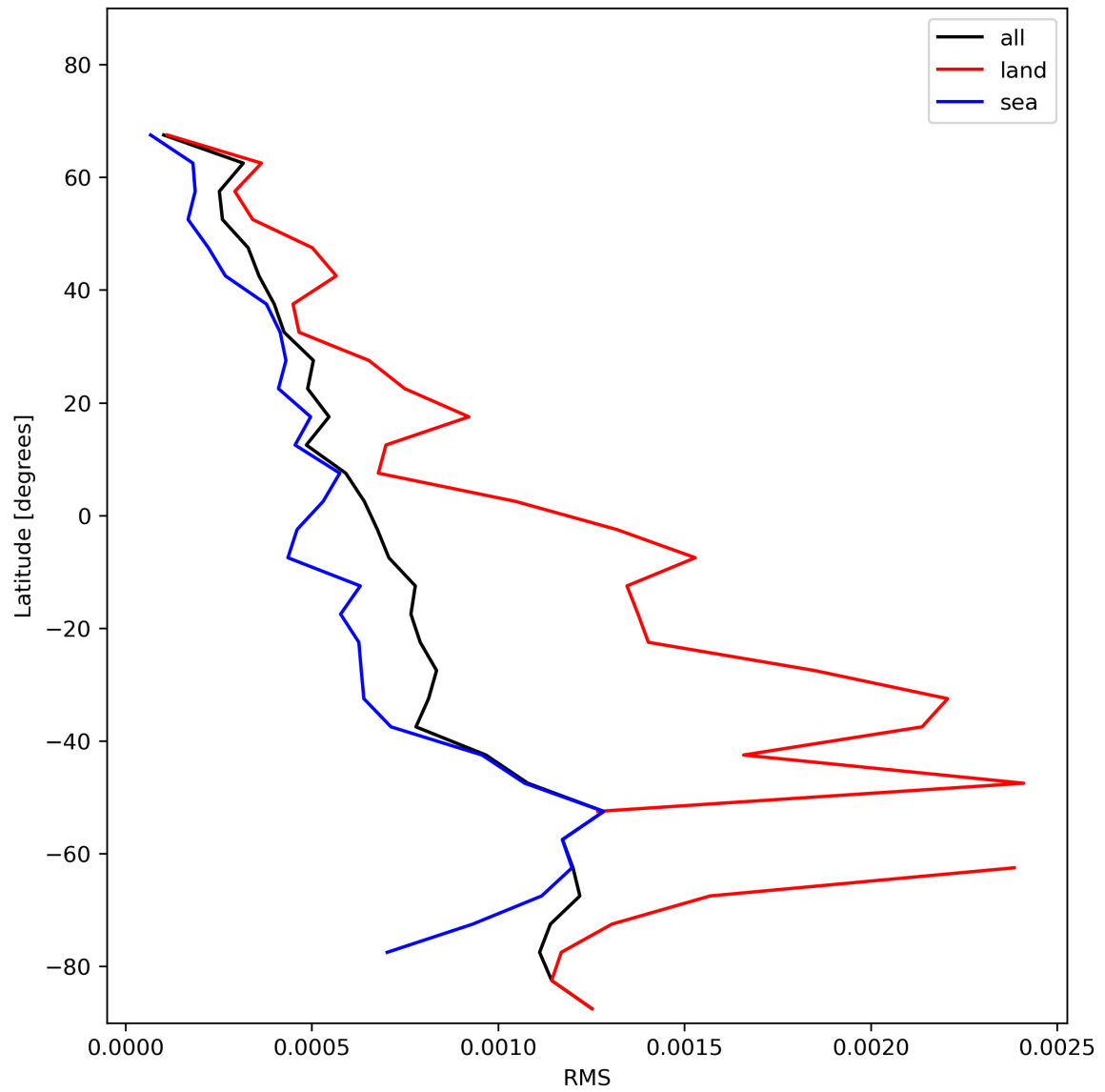


Figure 31: Zonal average of “RMS” for 2023-12-20 to 2023-12-21.

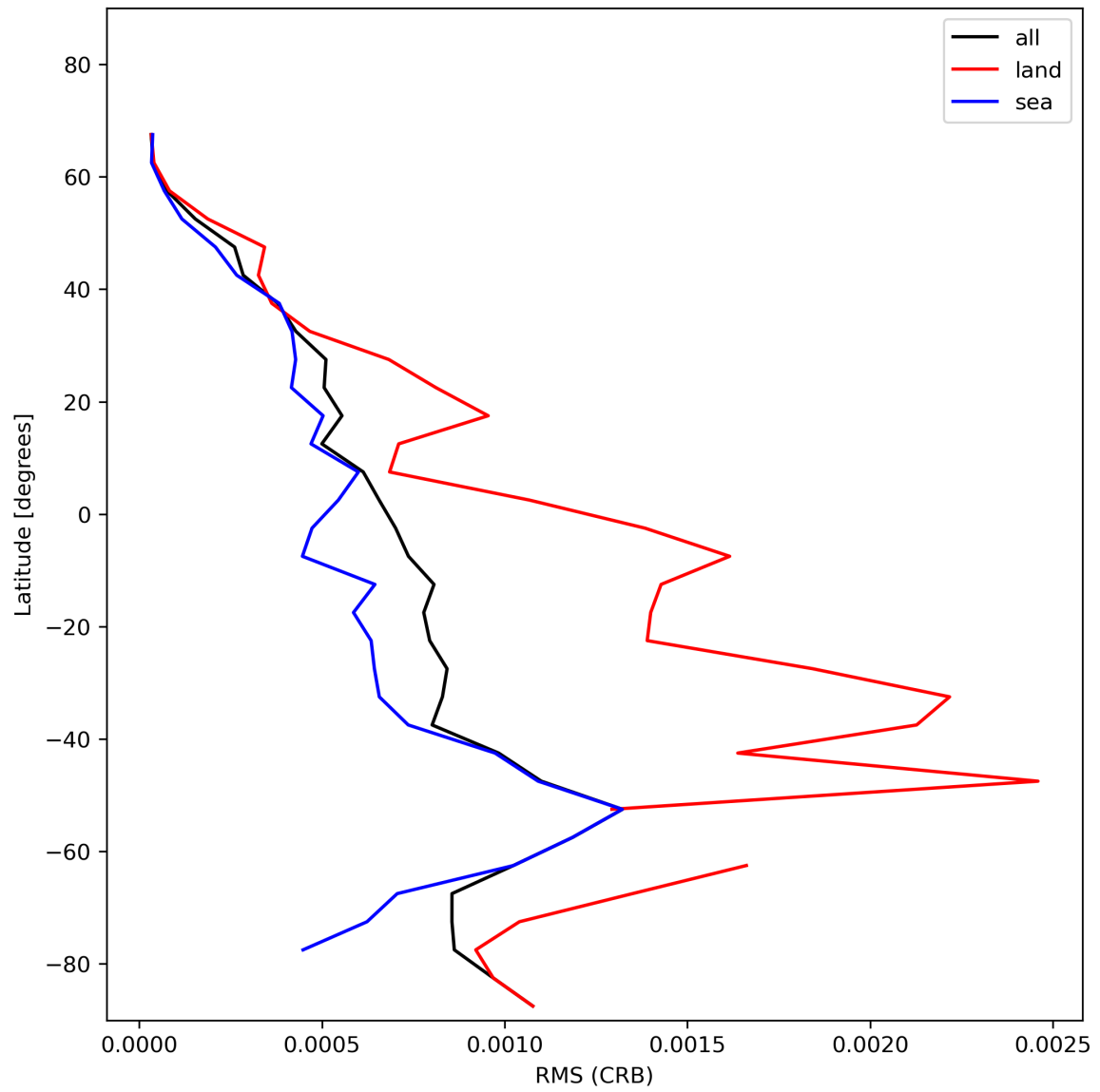


Figure 32: Zonal average of “RMS (CRB)” for 2023-12-20 to 2023-12-21.

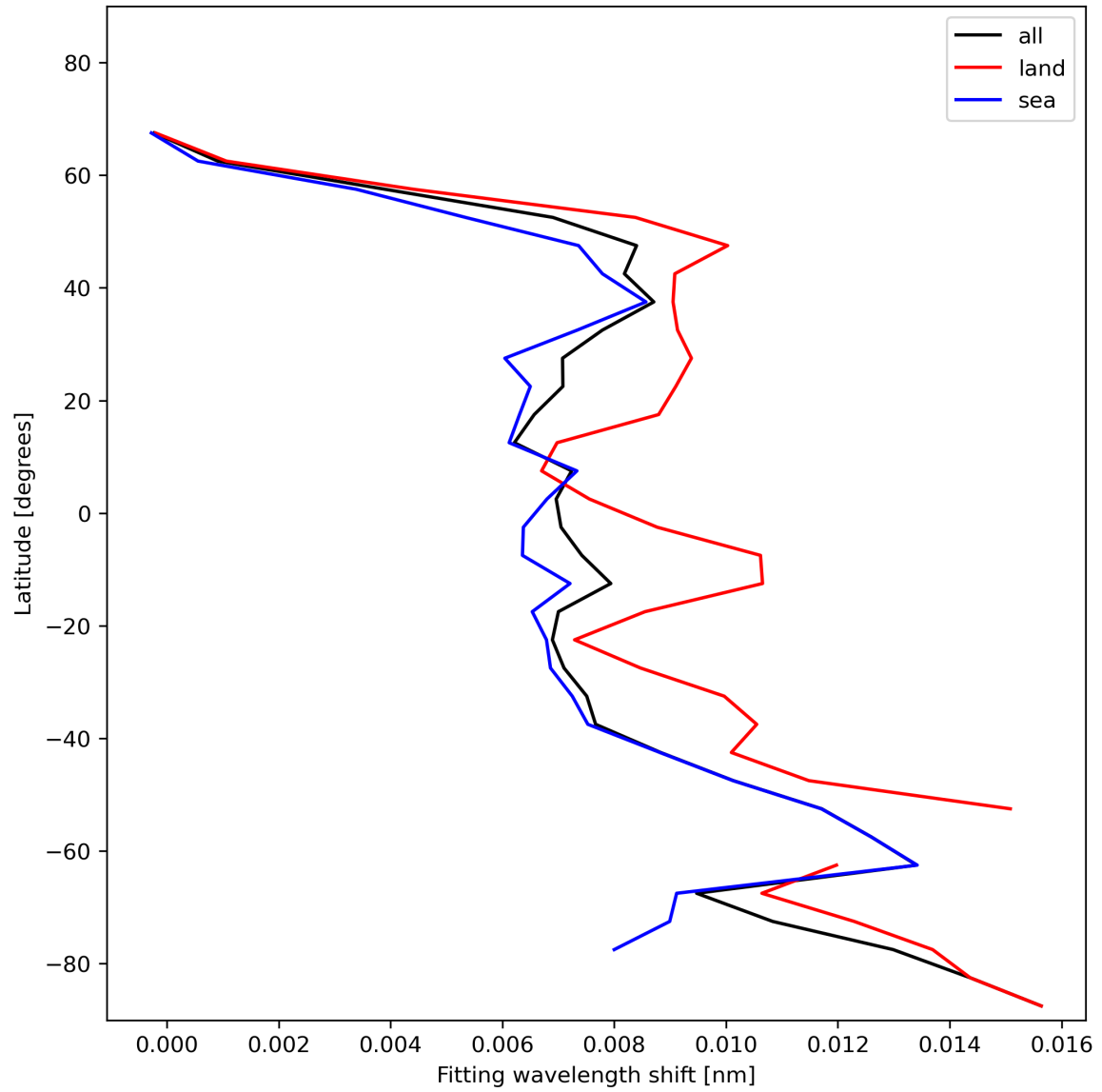


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-12-20 to 2023-12-21.

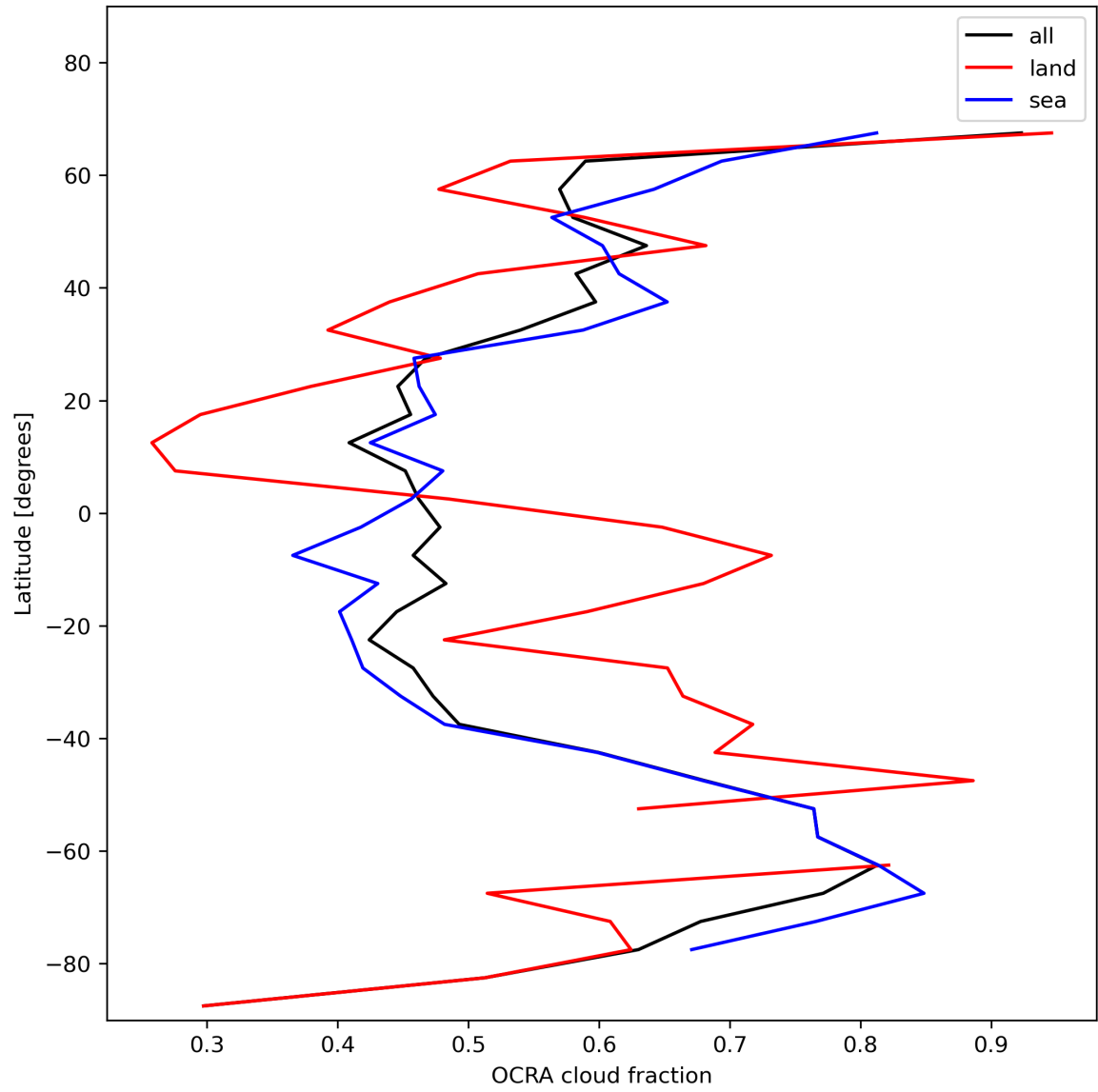


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-12-20 to 2023-12-21.

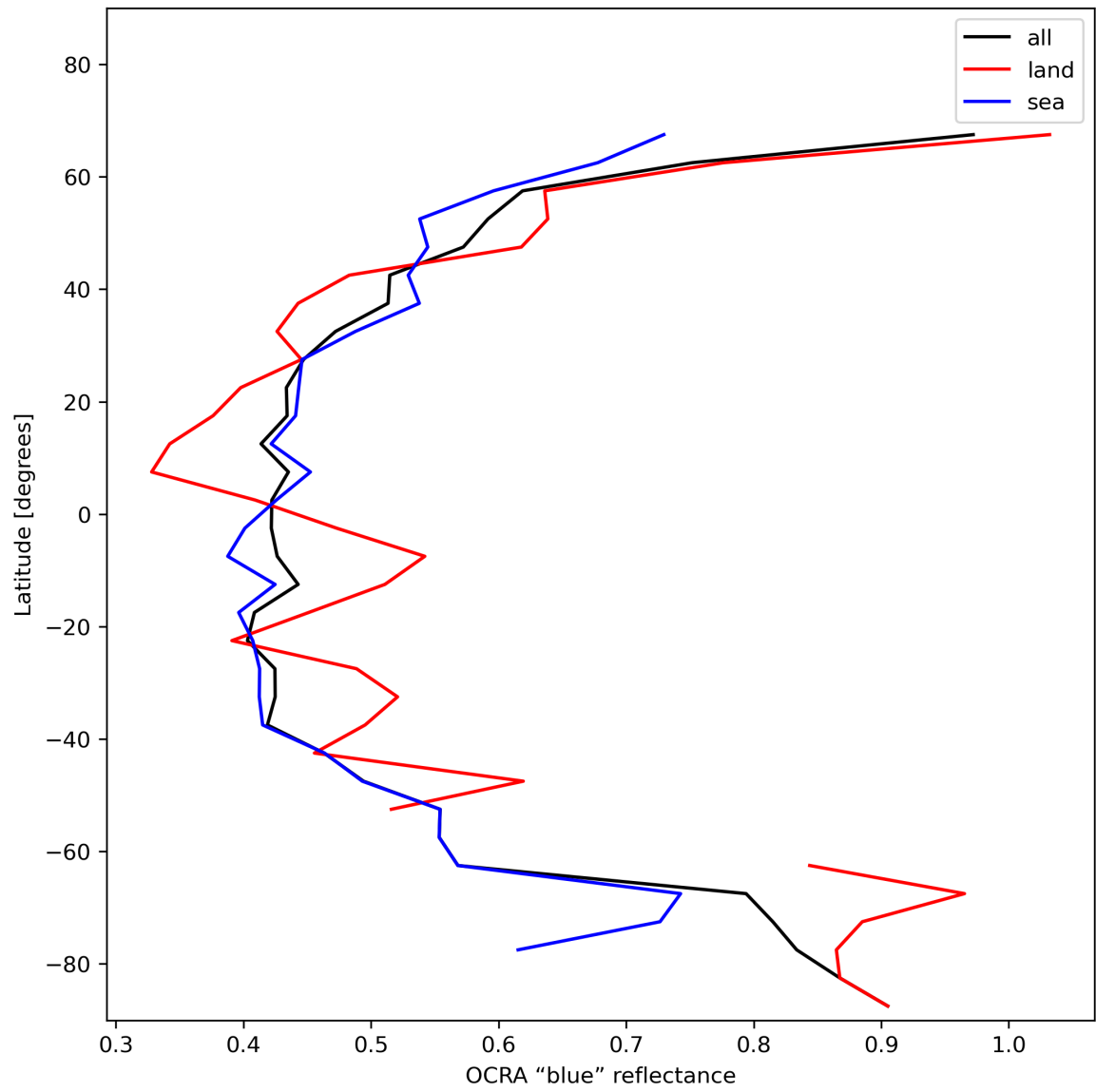


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-12-20 to 2023-12-21.

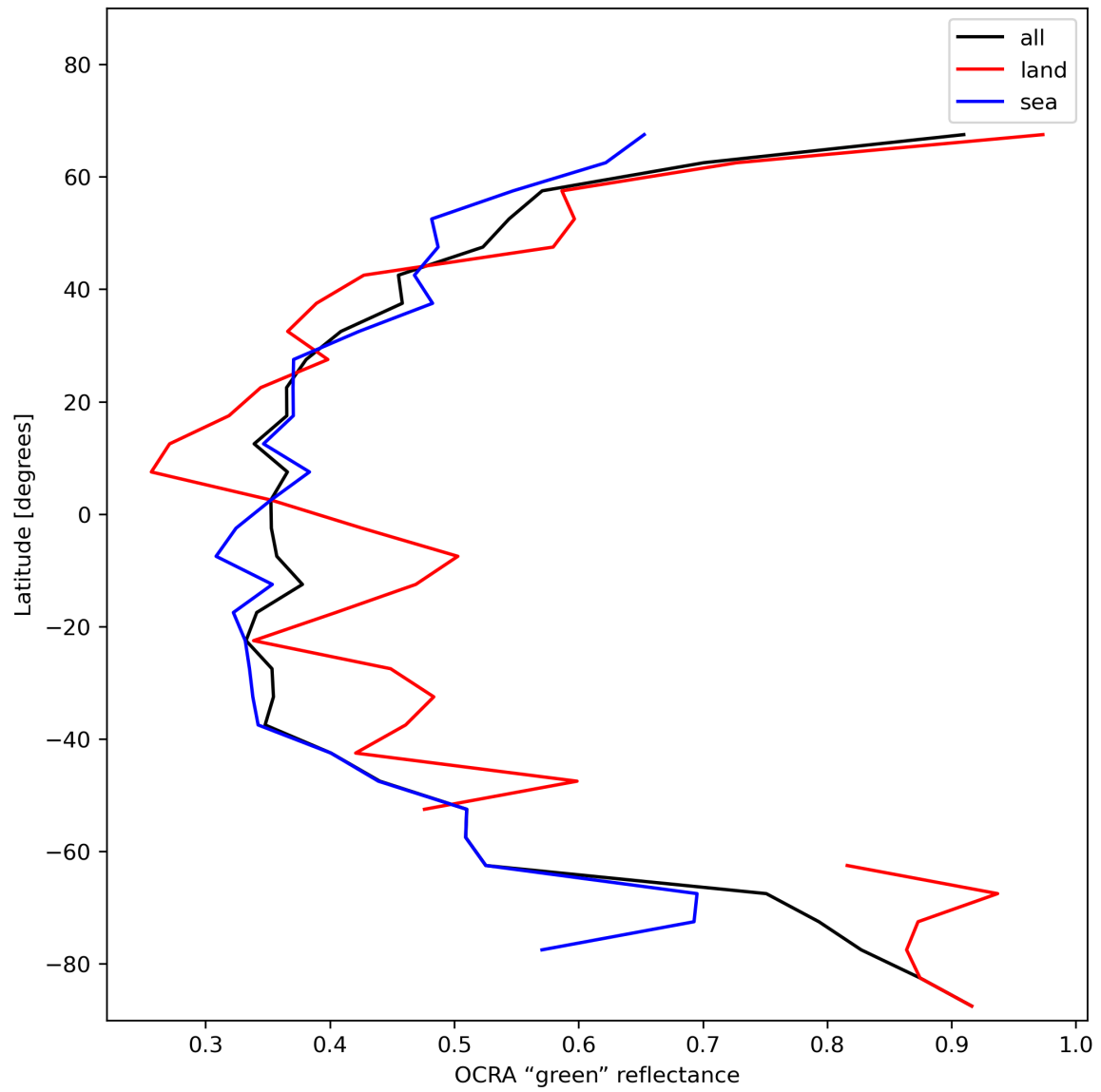


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-12-20 to 2023-12-21.

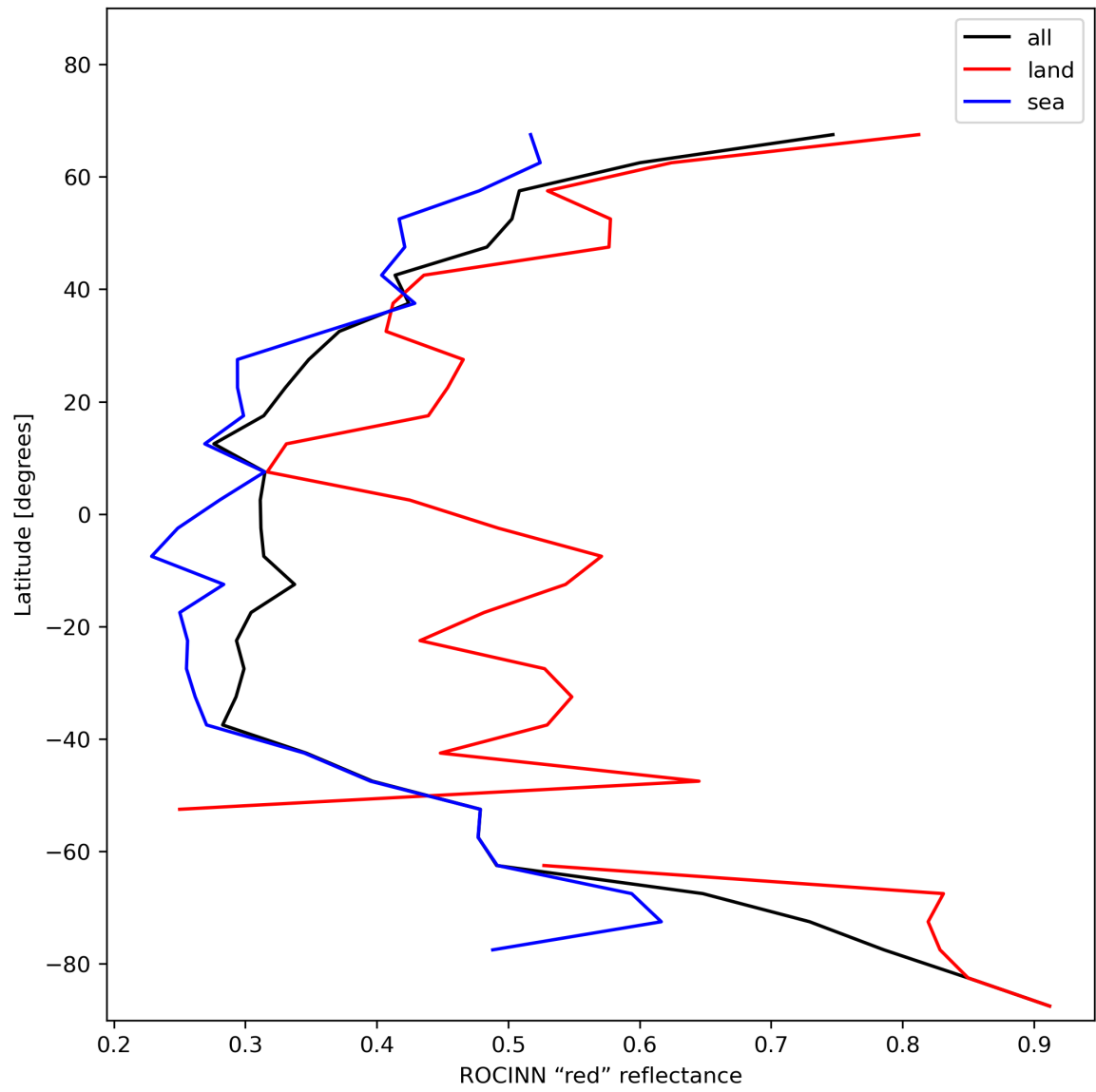


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-12-20 to 2023-12-21.

8 Histograms

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

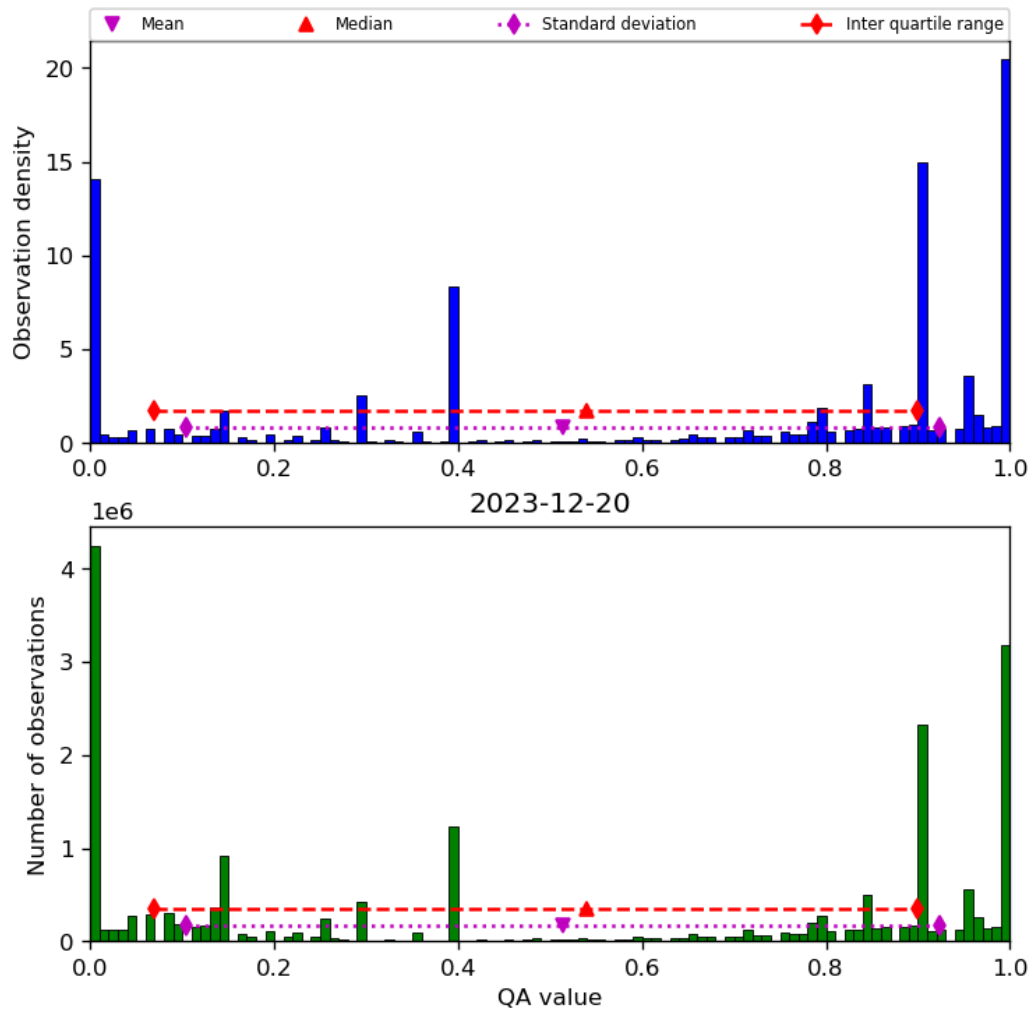


Figure 38: Histogram of “QA value” for 2023-12-20 to 2023-12-21

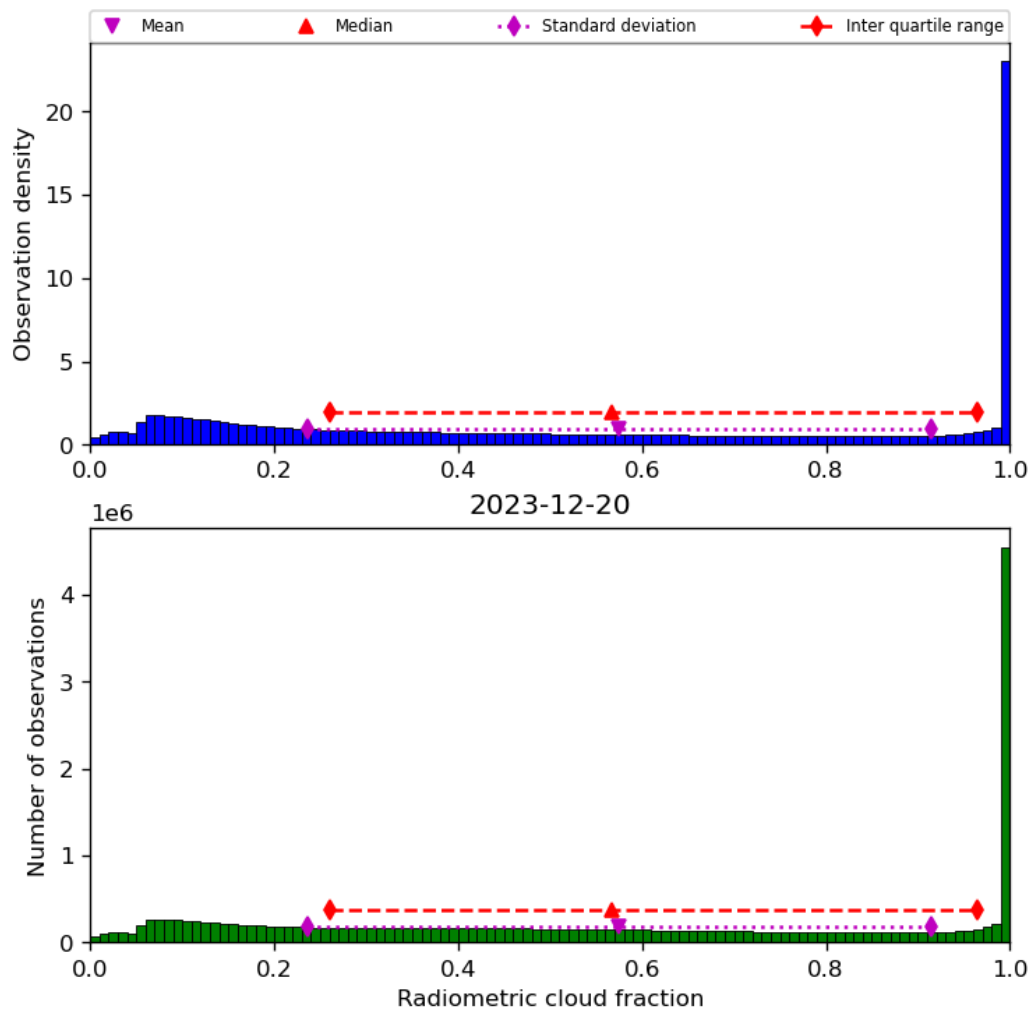


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-12-20 to 2023-12-21

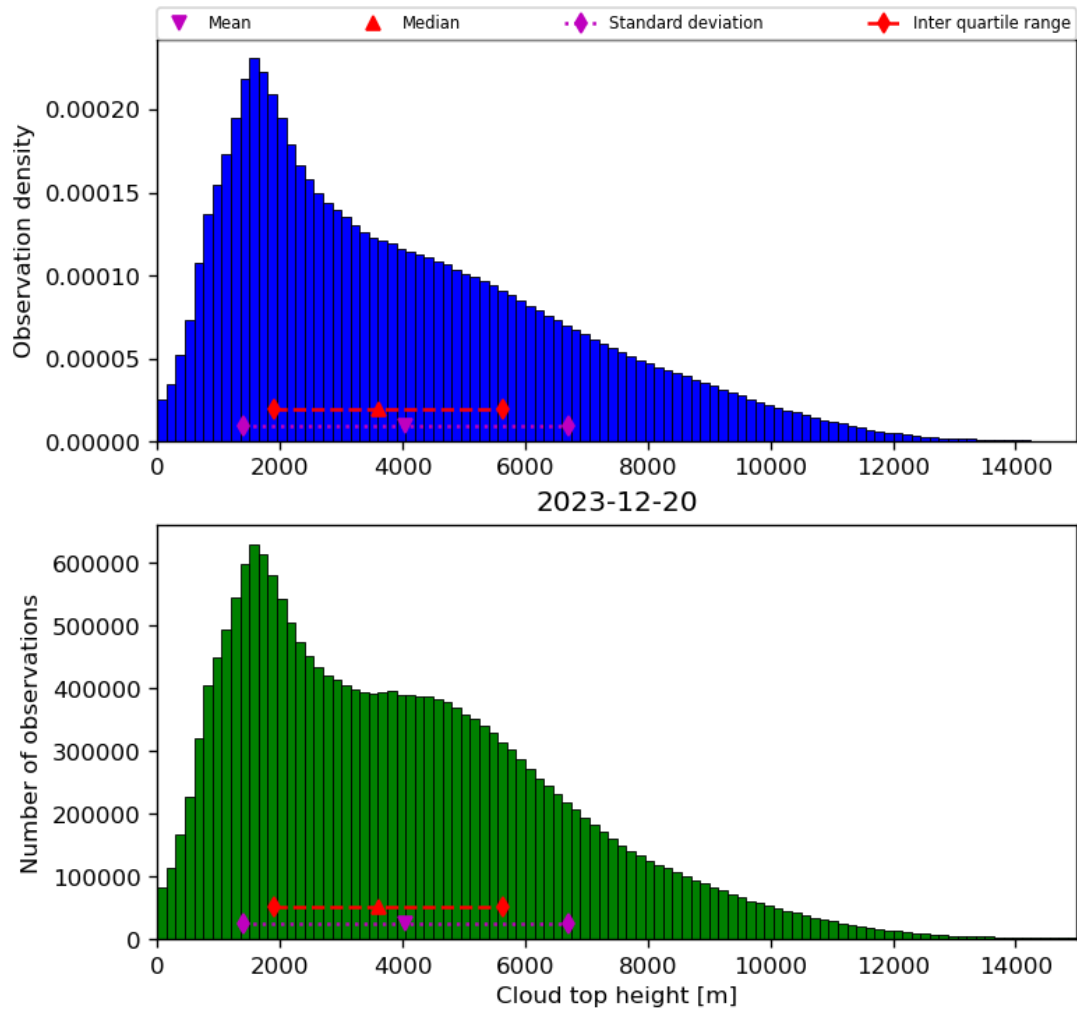


Figure 40: Histogram of “Cloud top height” for 2023-12-20 to 2023-12-21

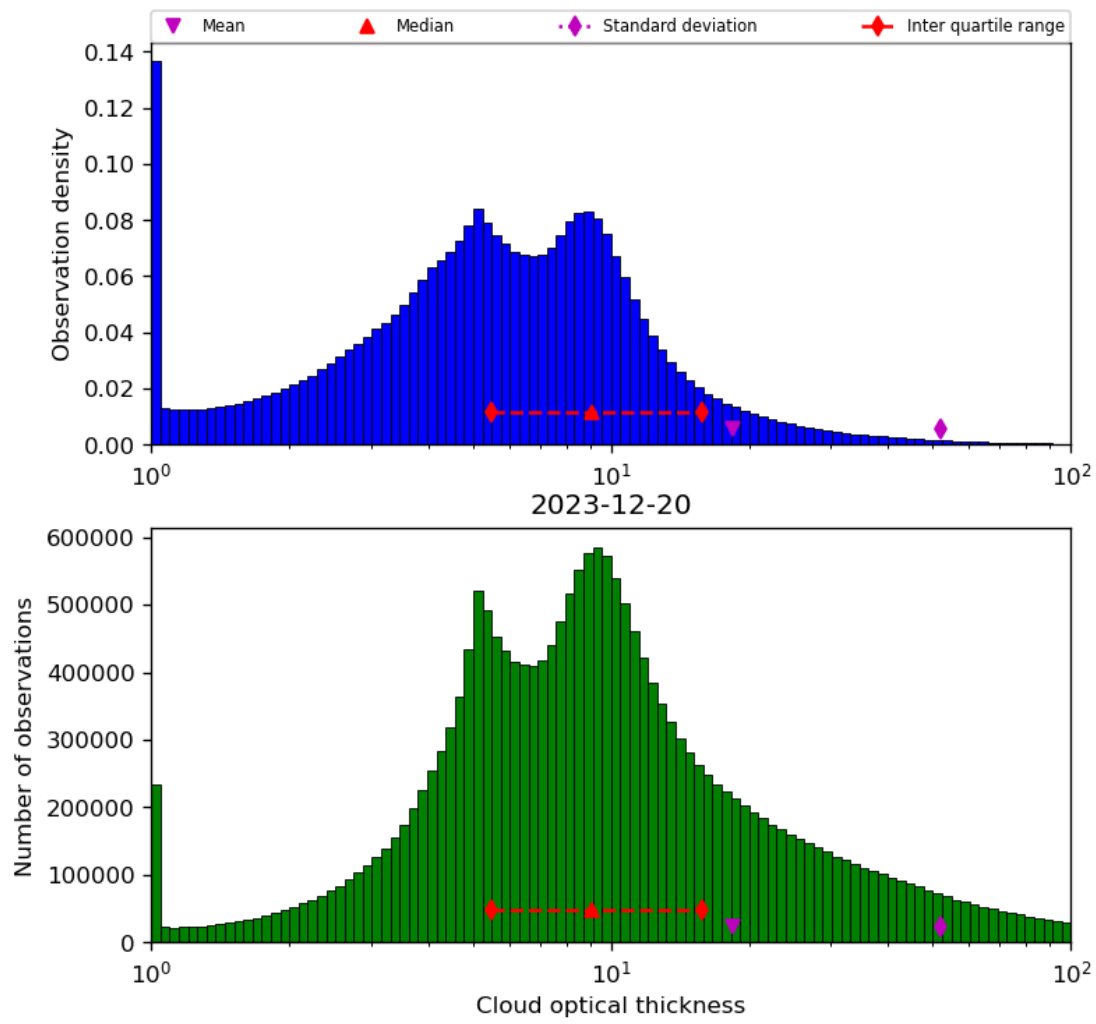


Figure 41: Histogram of “Cloud optical thickness” for 2023-12-20 to 2023-12-21

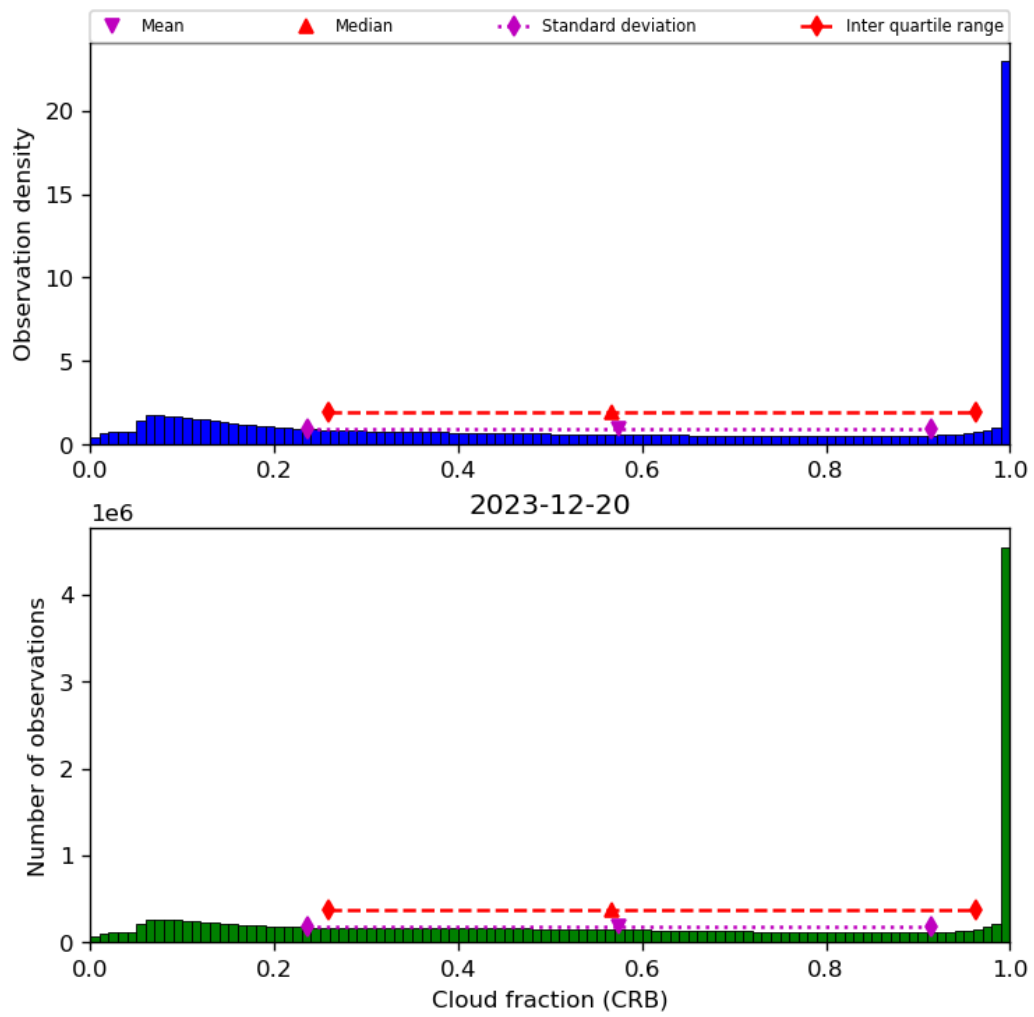


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-12-20 to 2023-12-21

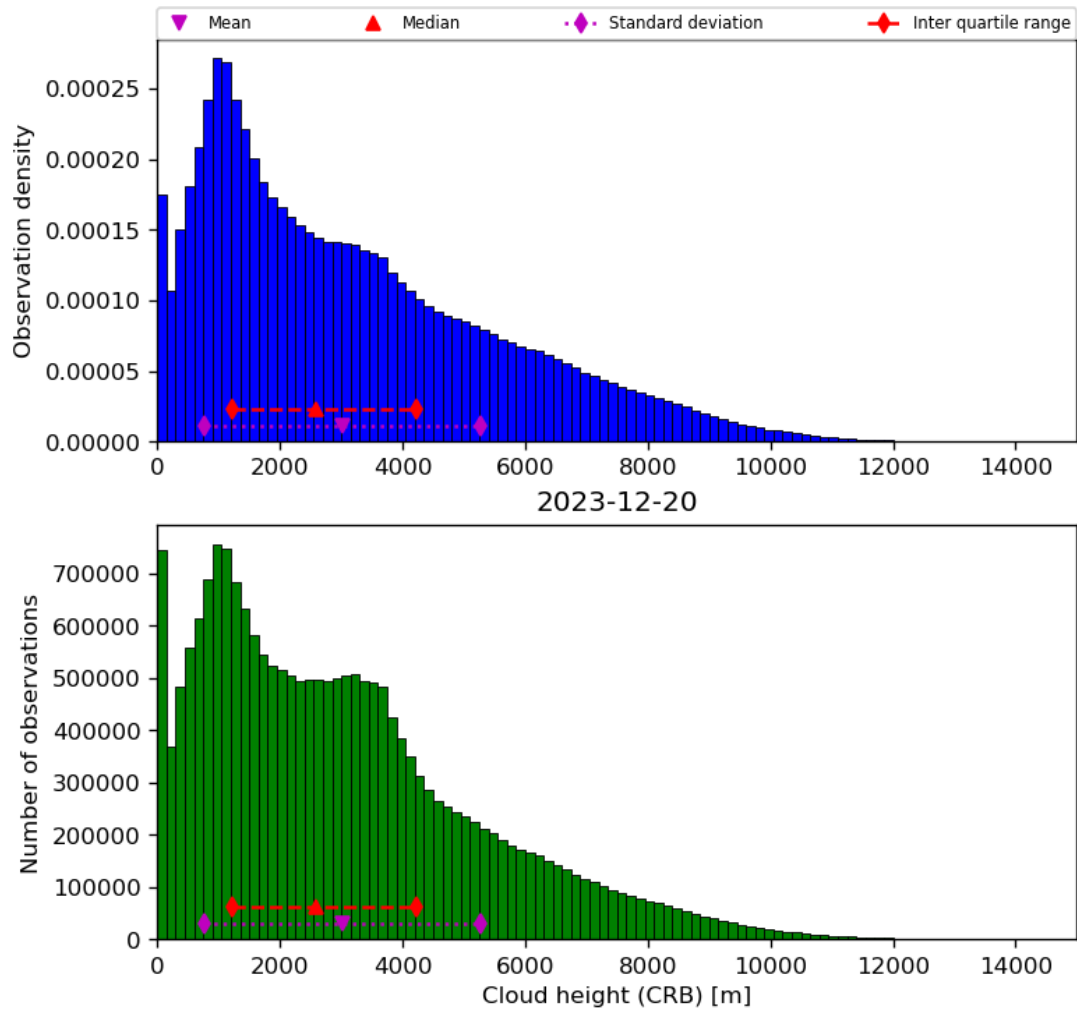


Figure 43: Histogram of “Cloud height (CRB)” for 2023-12-20 to 2023-12-21

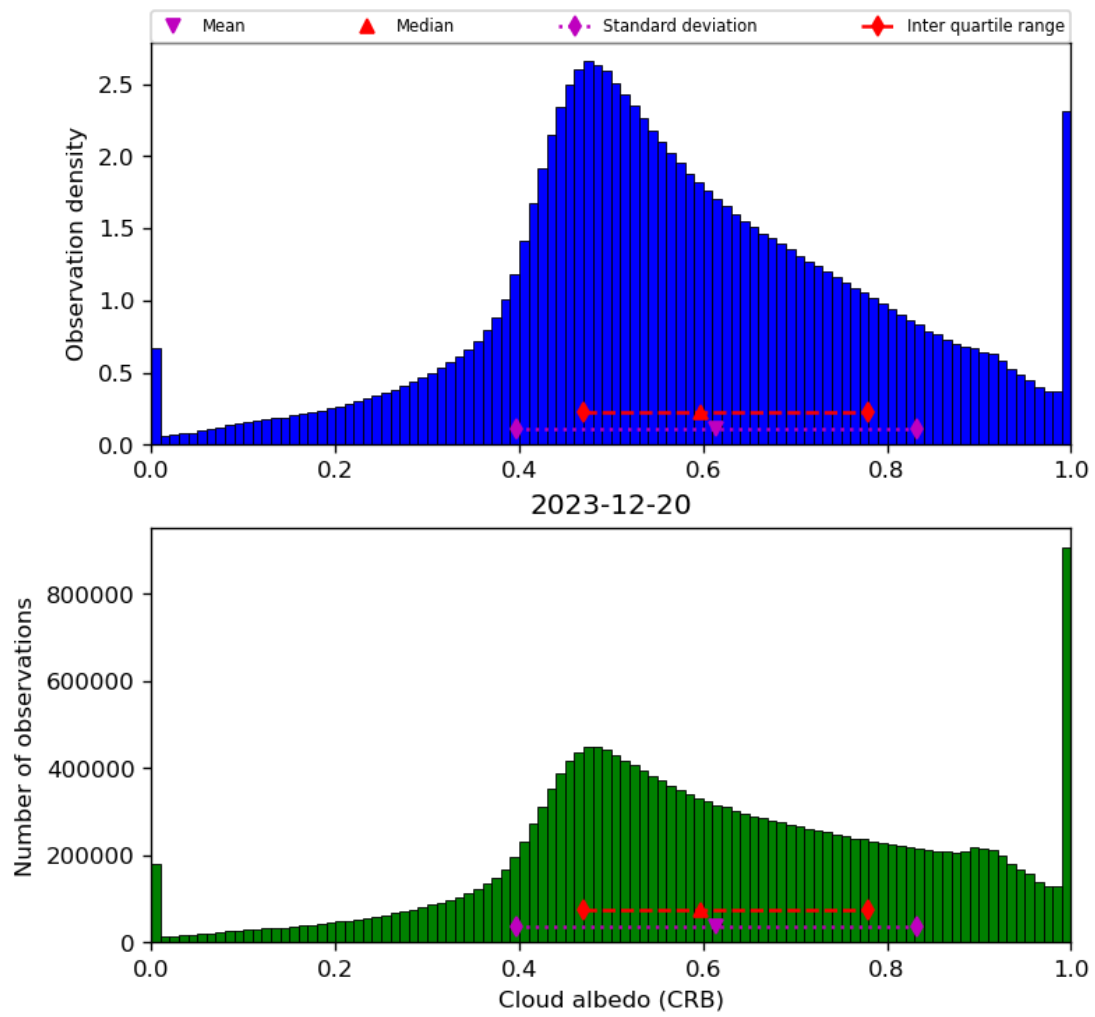


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-12-20 to 2023-12-21

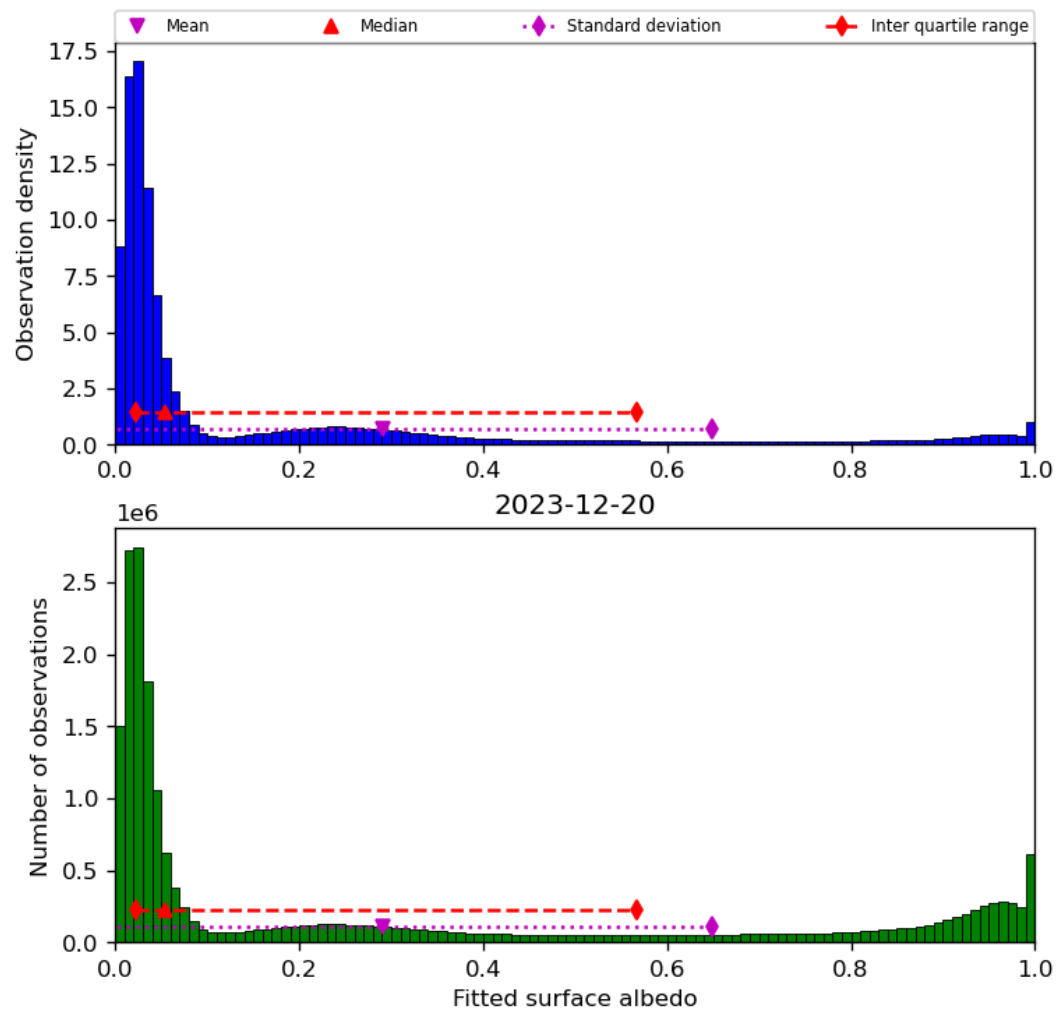


Figure 45: Histogram of “Fitted surface albedo” for 2023-12-20 to 2023-12-21

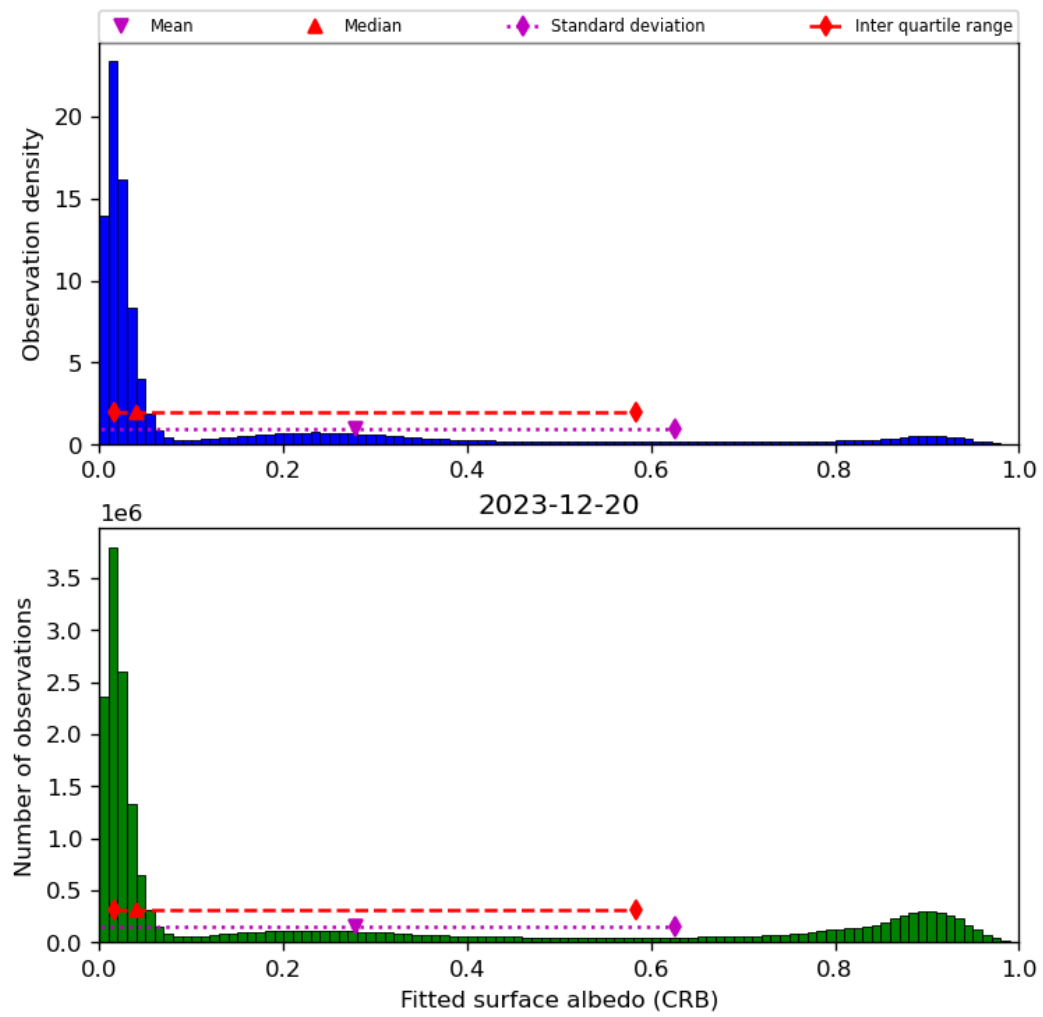


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-12-20 to 2023-12-21

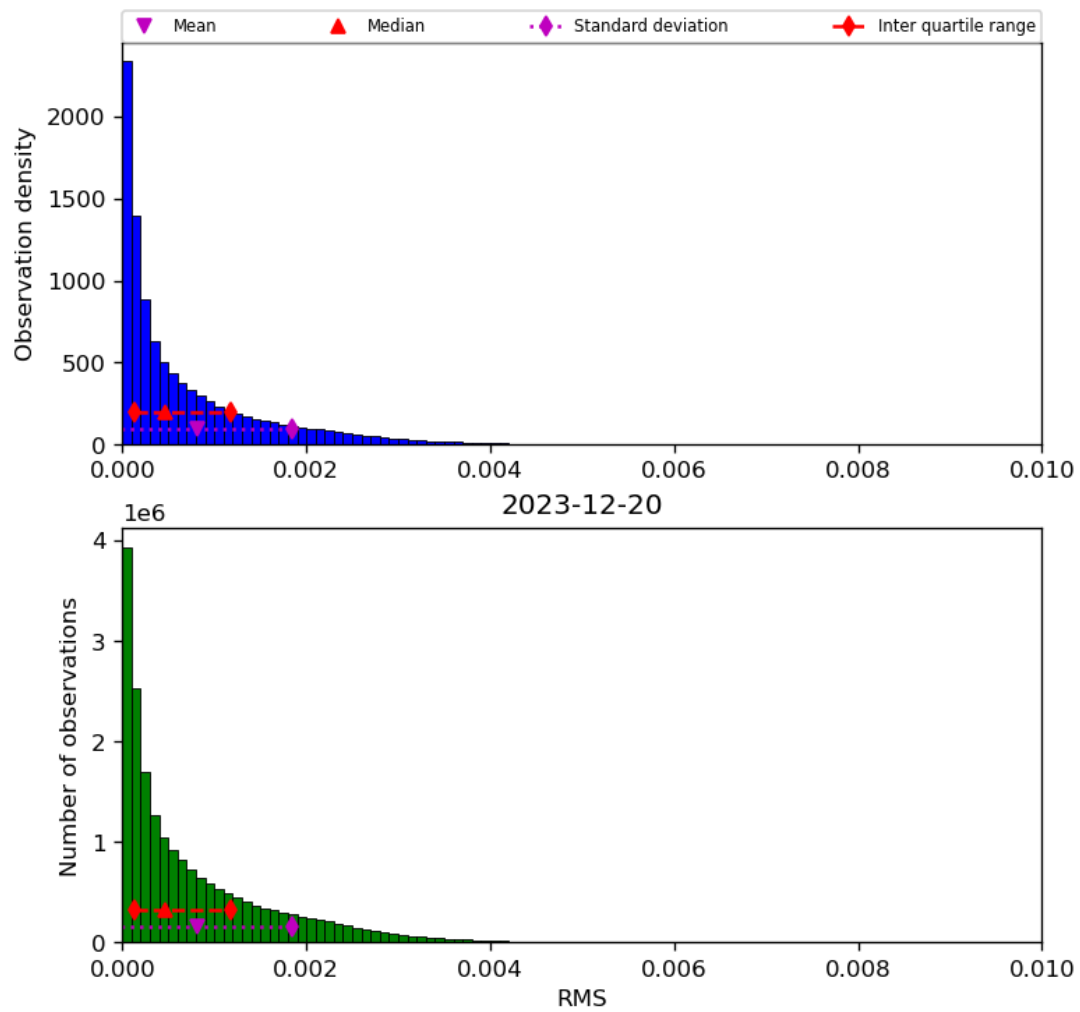


Figure 47: Histogram of “RMS” for 2023-12-20 to 2023-12-21

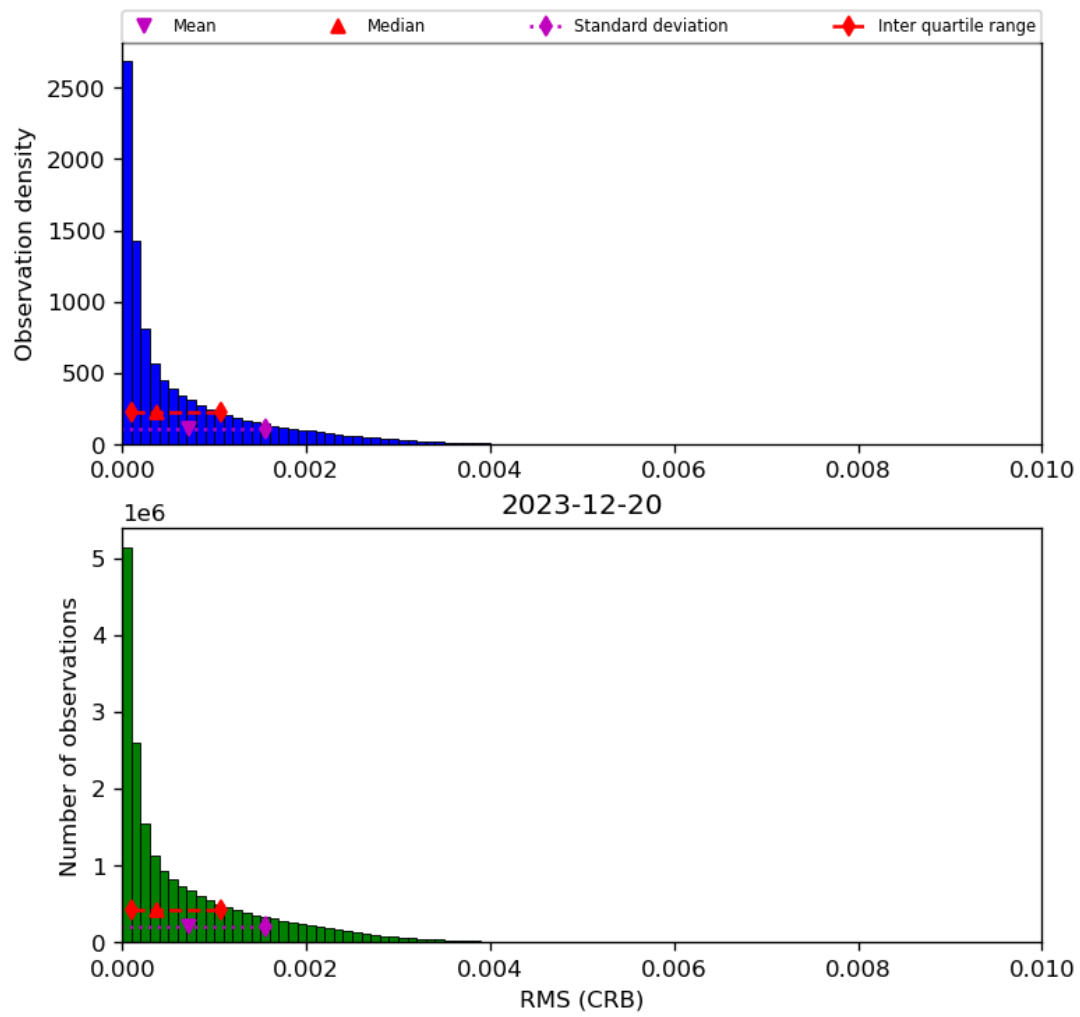


Figure 48: Histogram of “RMS (CRB)” for 2023-12-20 to 2023-12-21

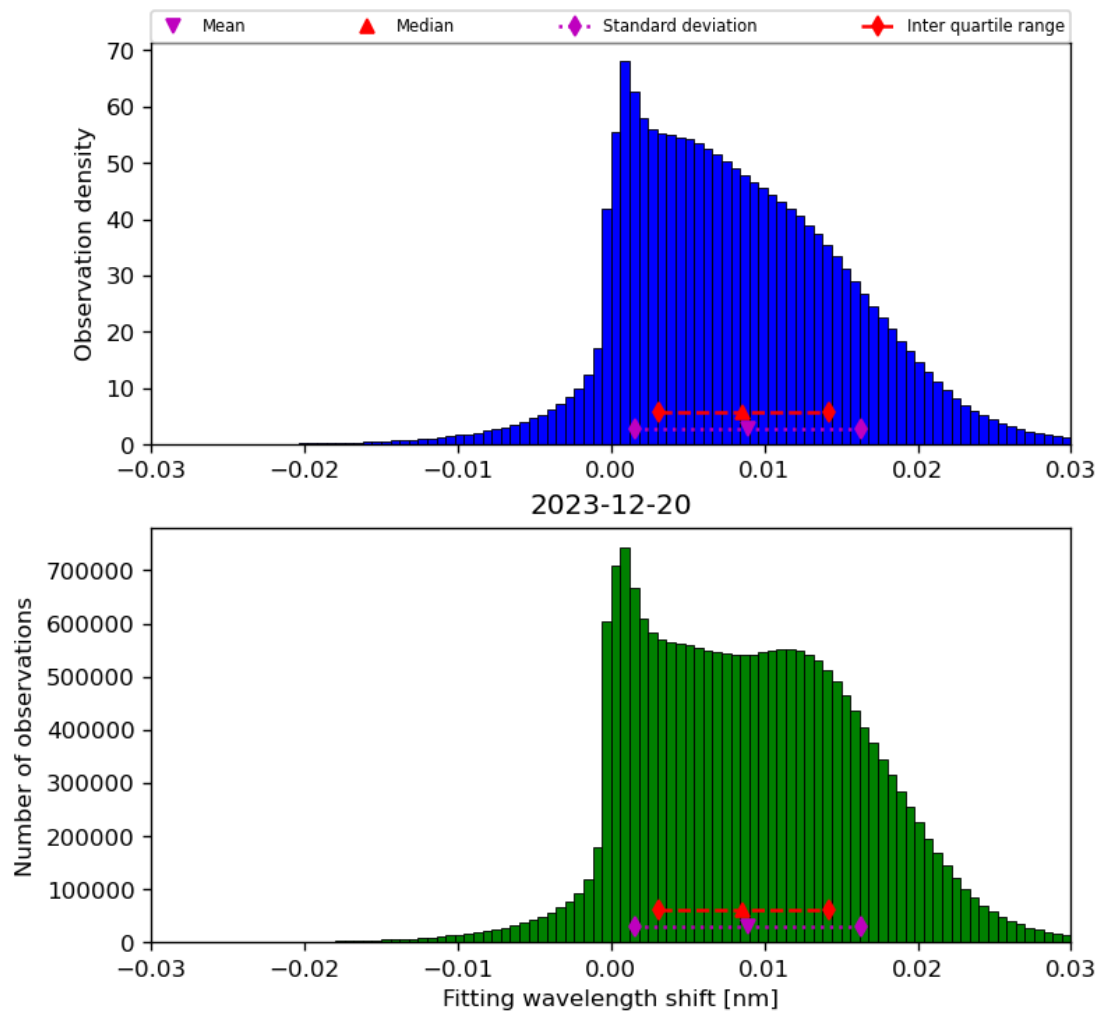


Figure 49: Histogram of “Fitting wavelength shift” for 2023-12-20 to 2023-12-21

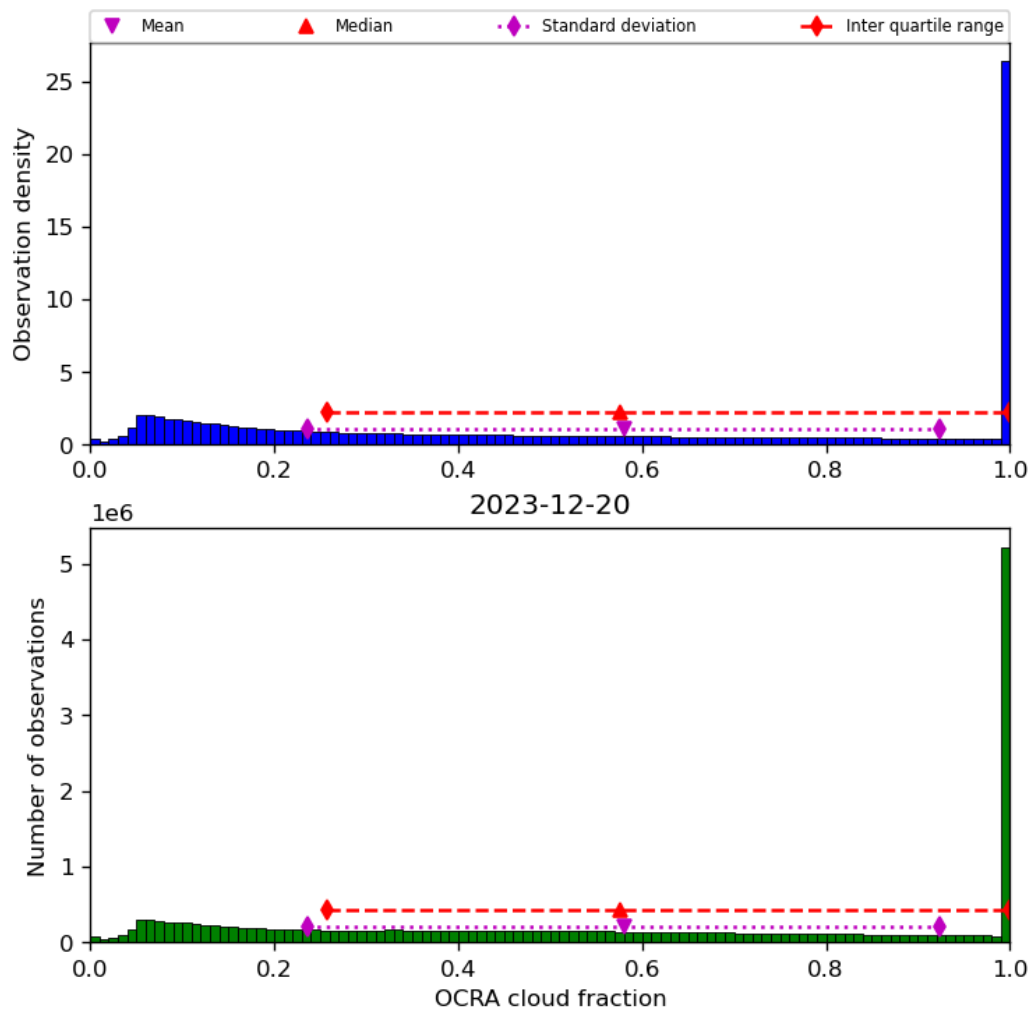


Figure 50: Histogram of “OCRA cloud fraction” for 2023-12-20 to 2023-12-21

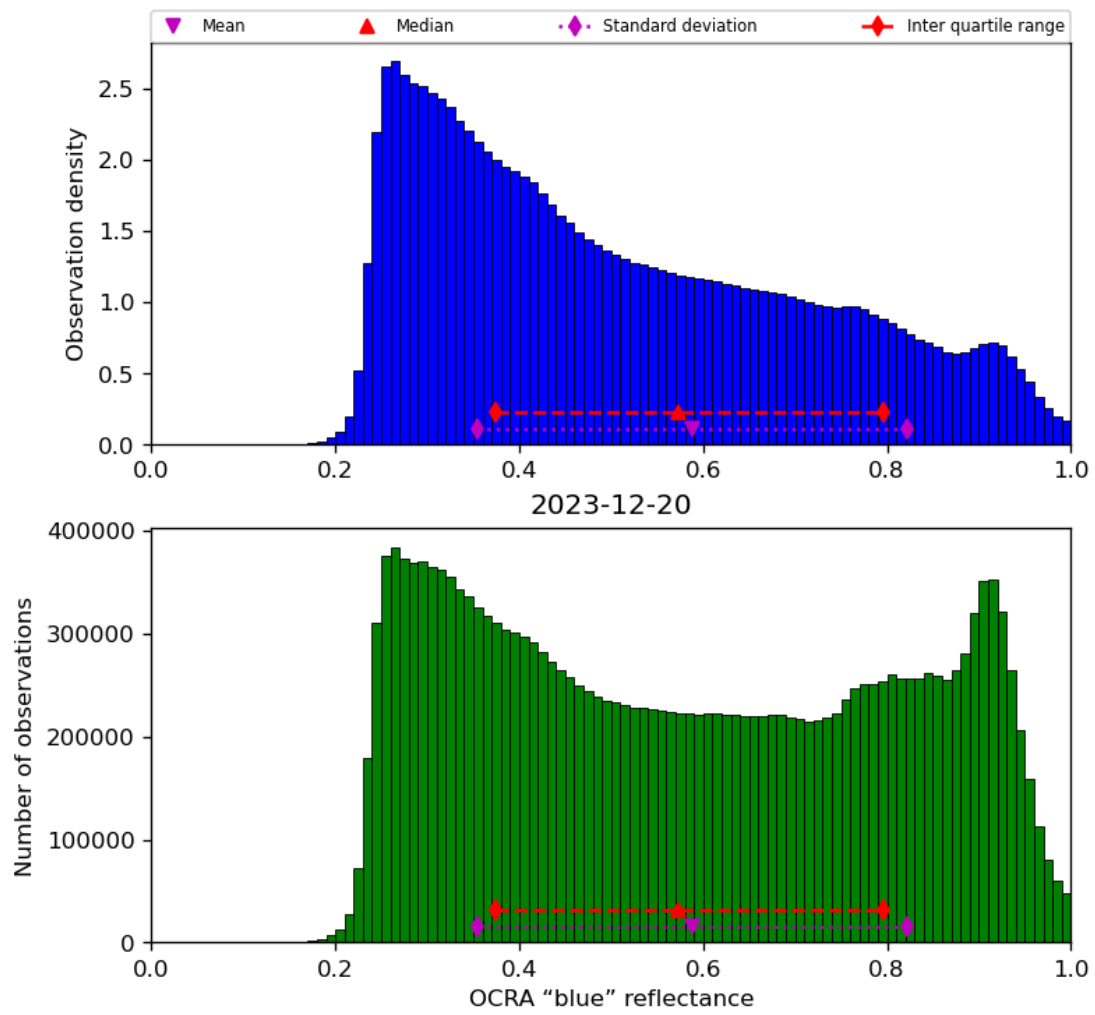


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-12-20 to 2023-12-21

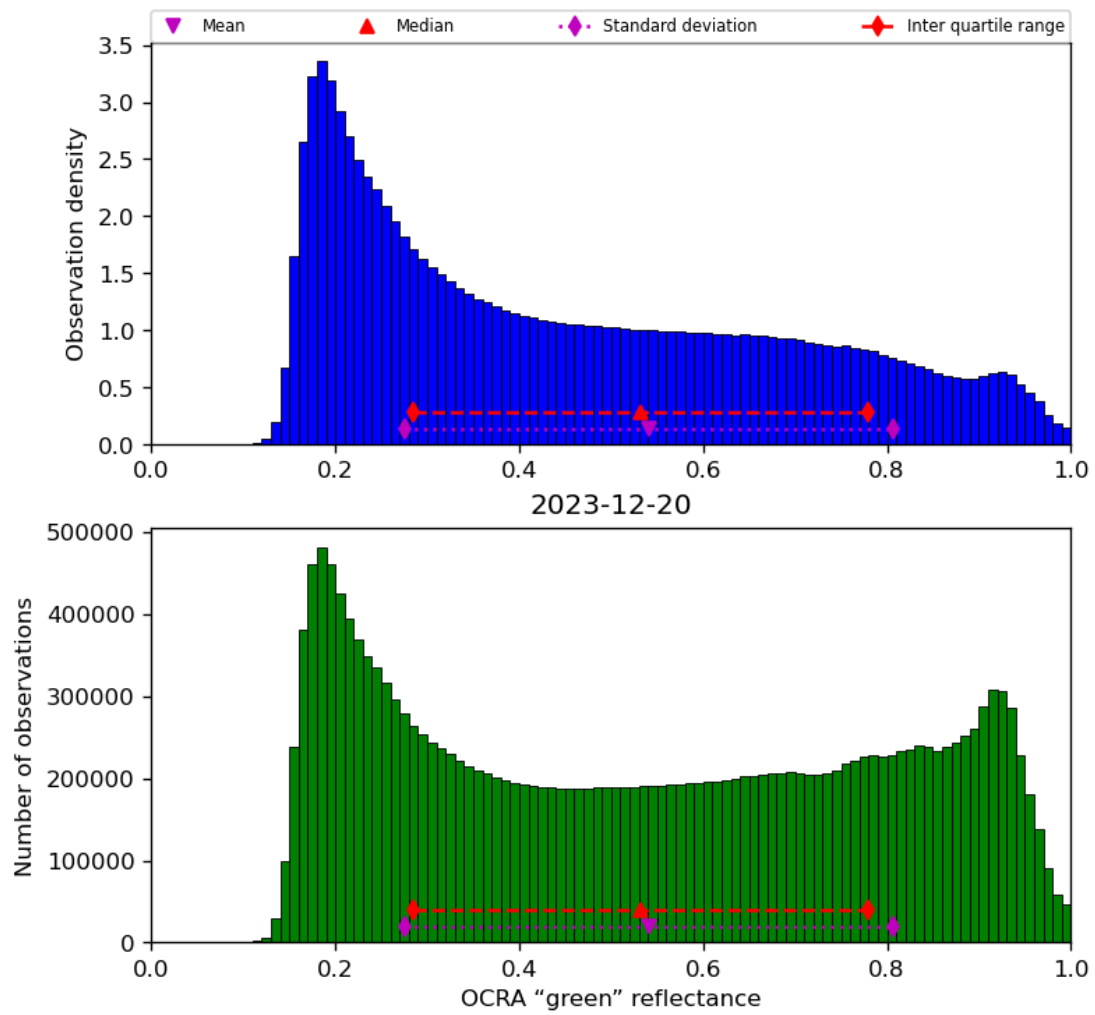


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-12-20 to 2023-12-21

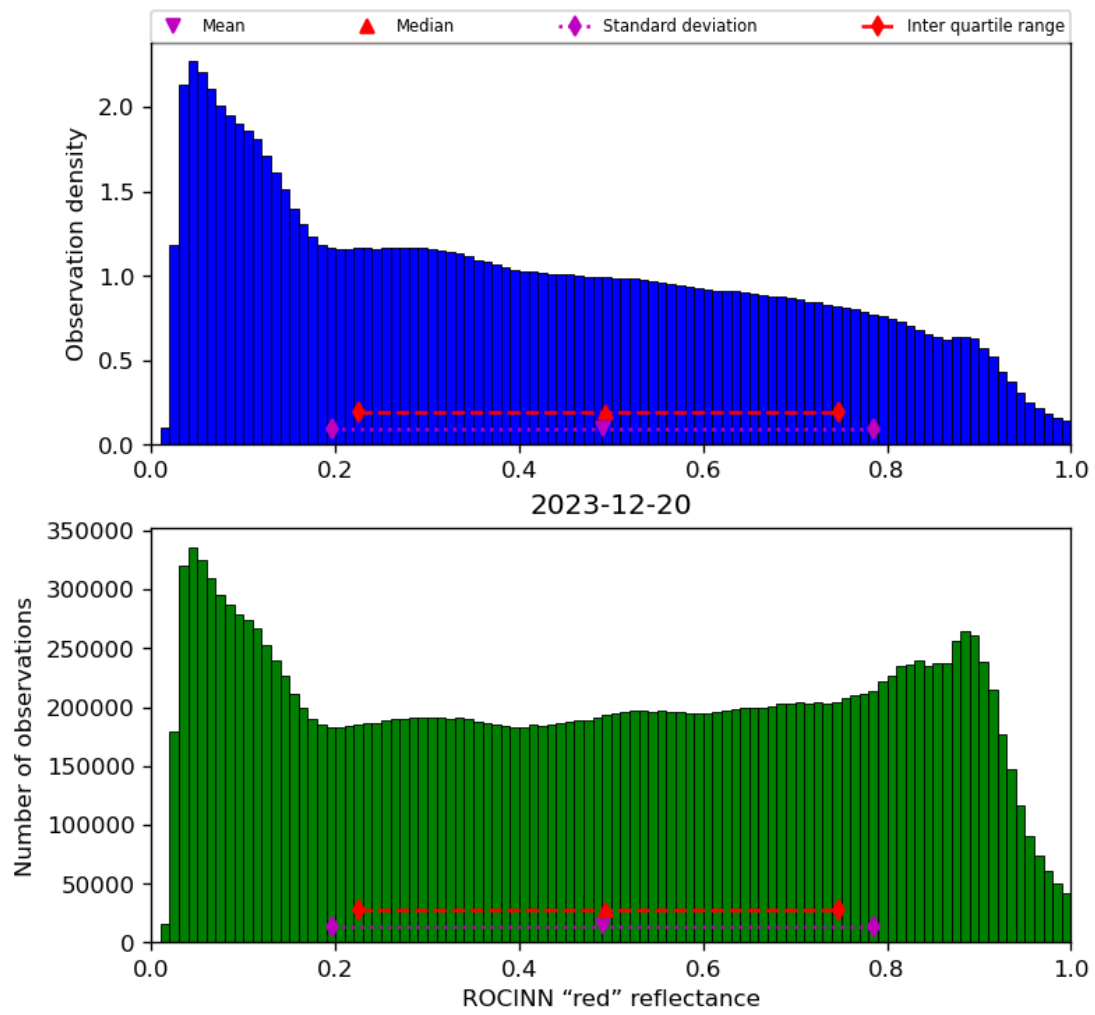


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-12-20 to 2023-12-21

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.

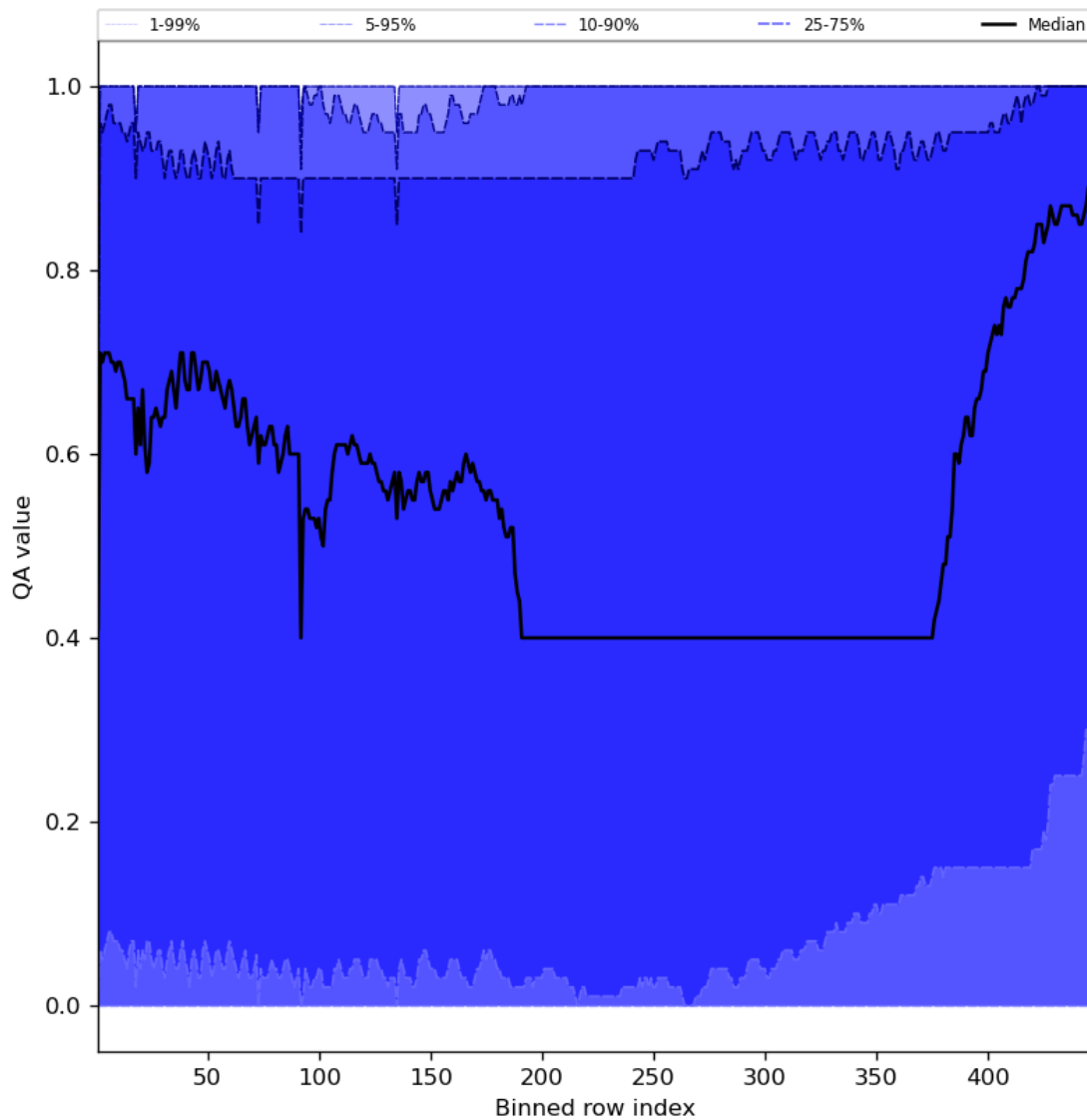


Figure 54: Along track statistics of “QA value” for 2023-12-20 to 2023-12-21

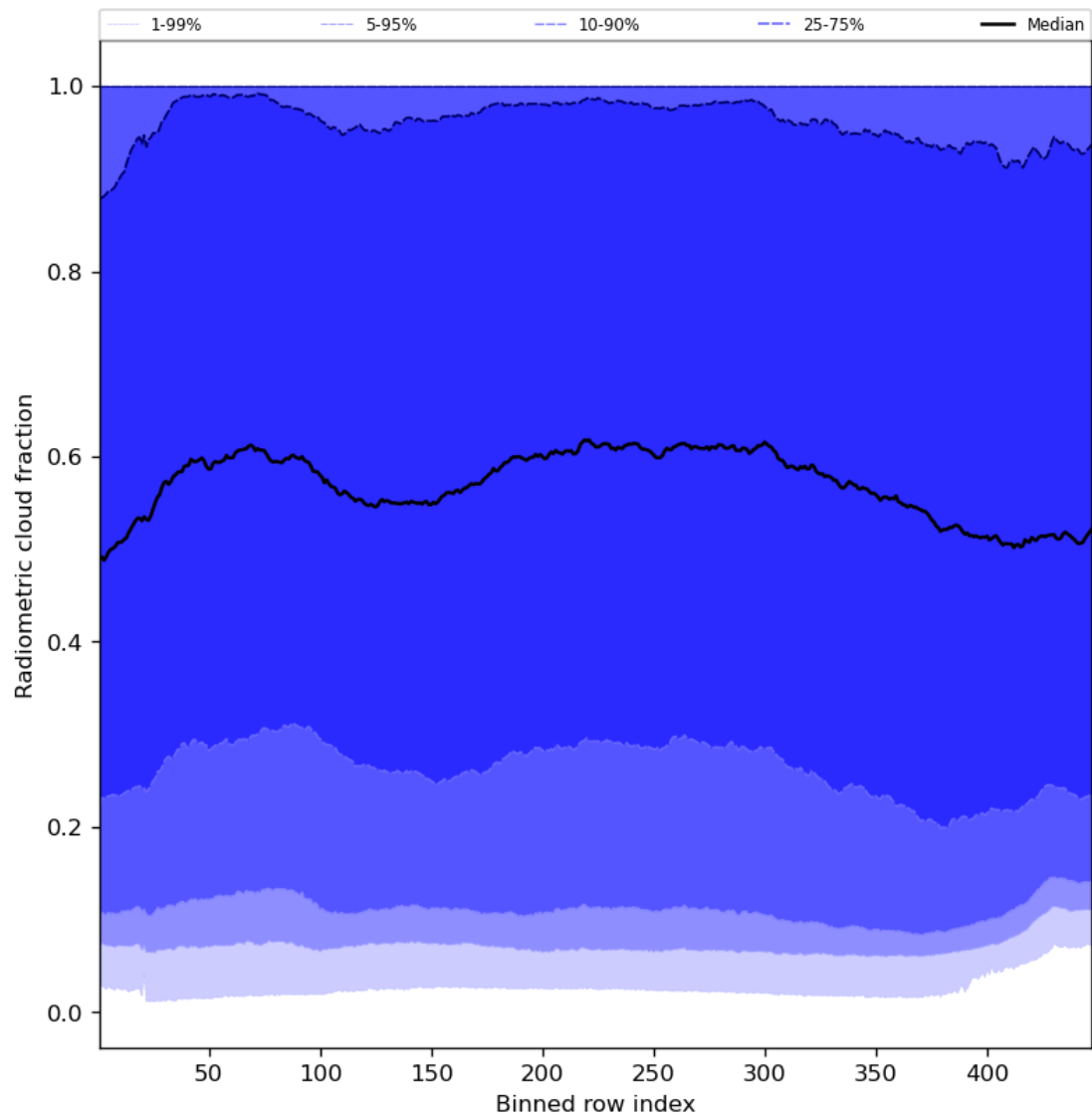


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-12-20 to 2023-12-21

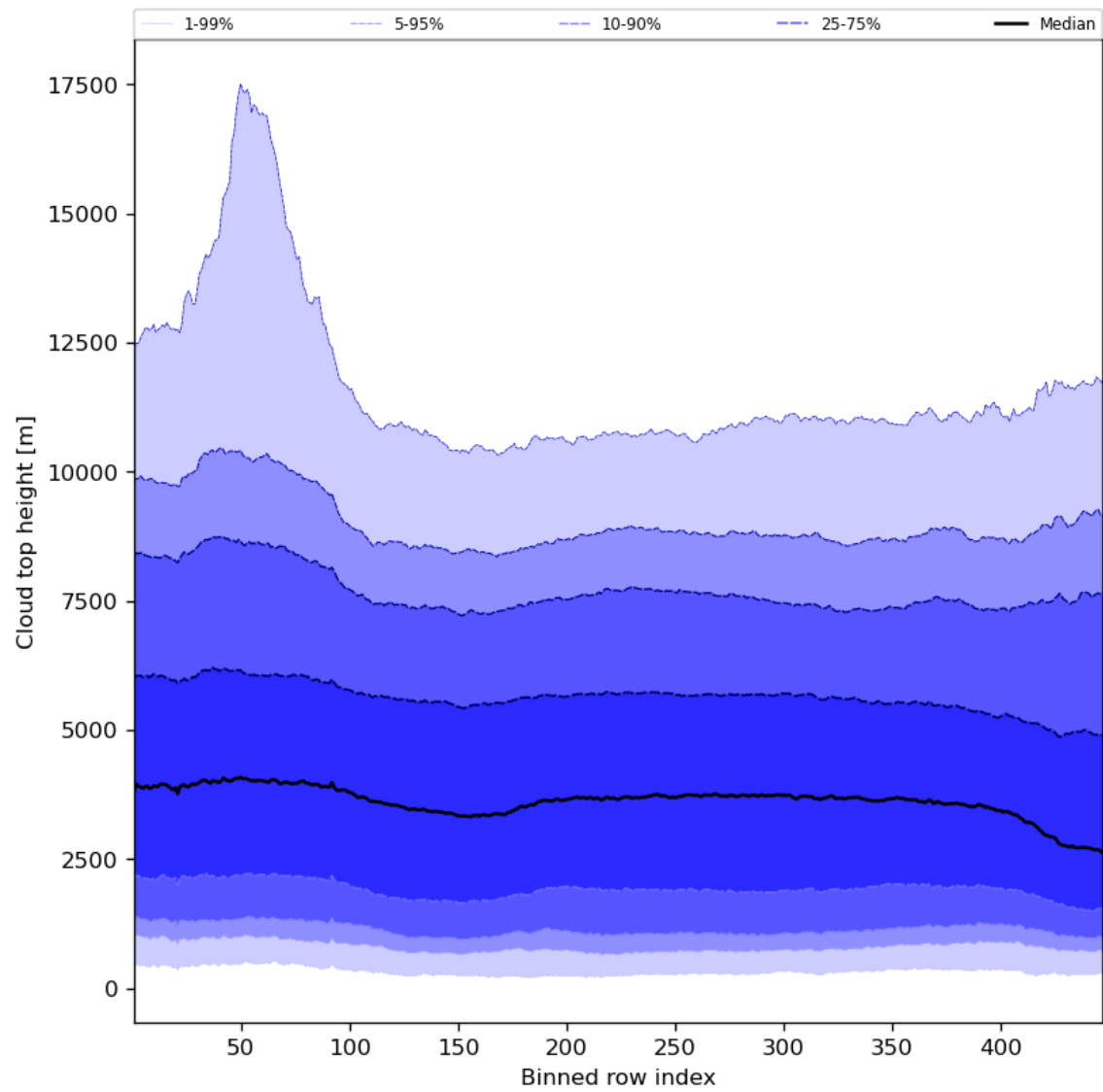


Figure 56: Along track statistics of “Cloud top height” for 2023-12-20 to 2023-12-21

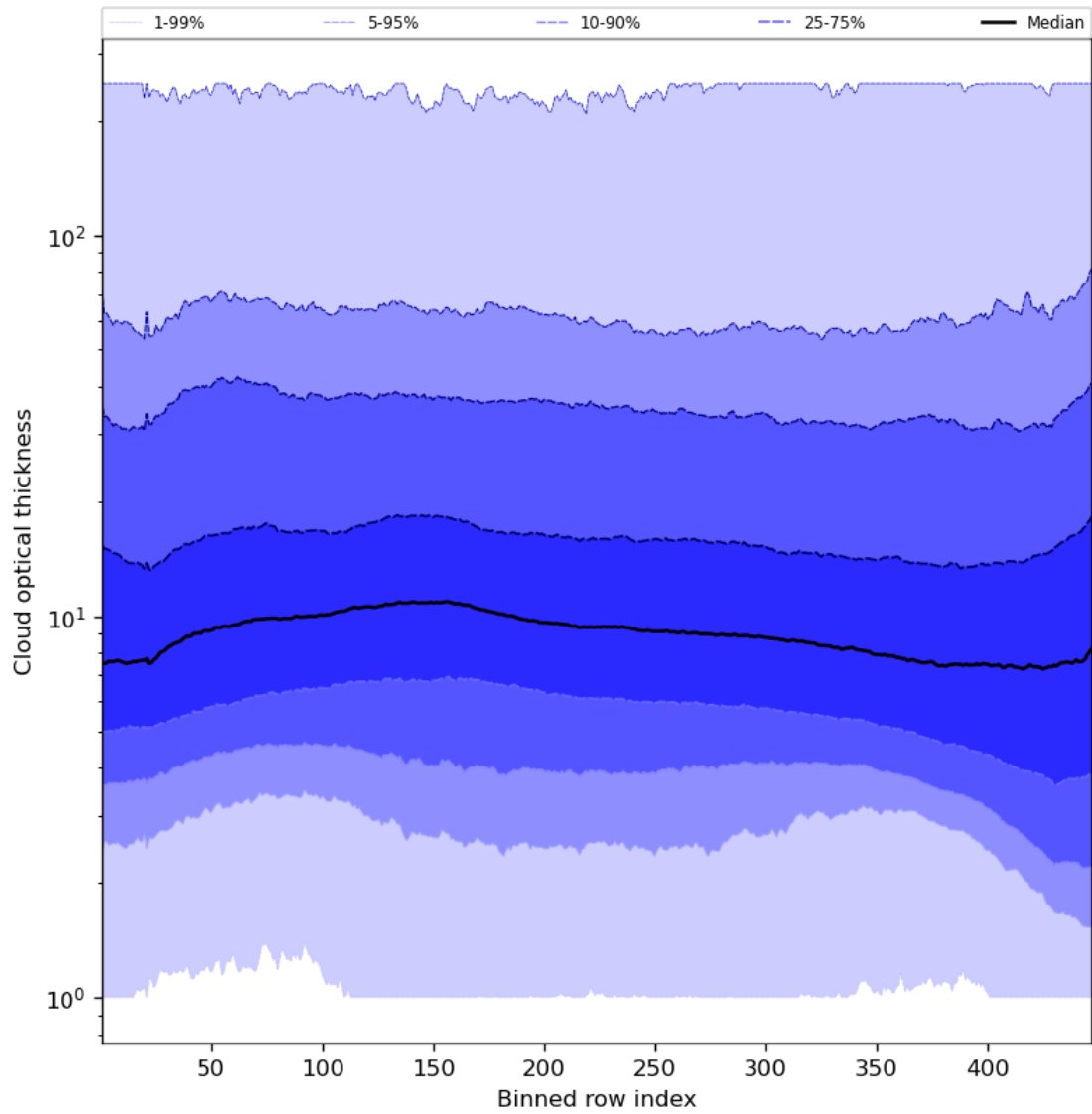


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-12-20 to 2023-12-21

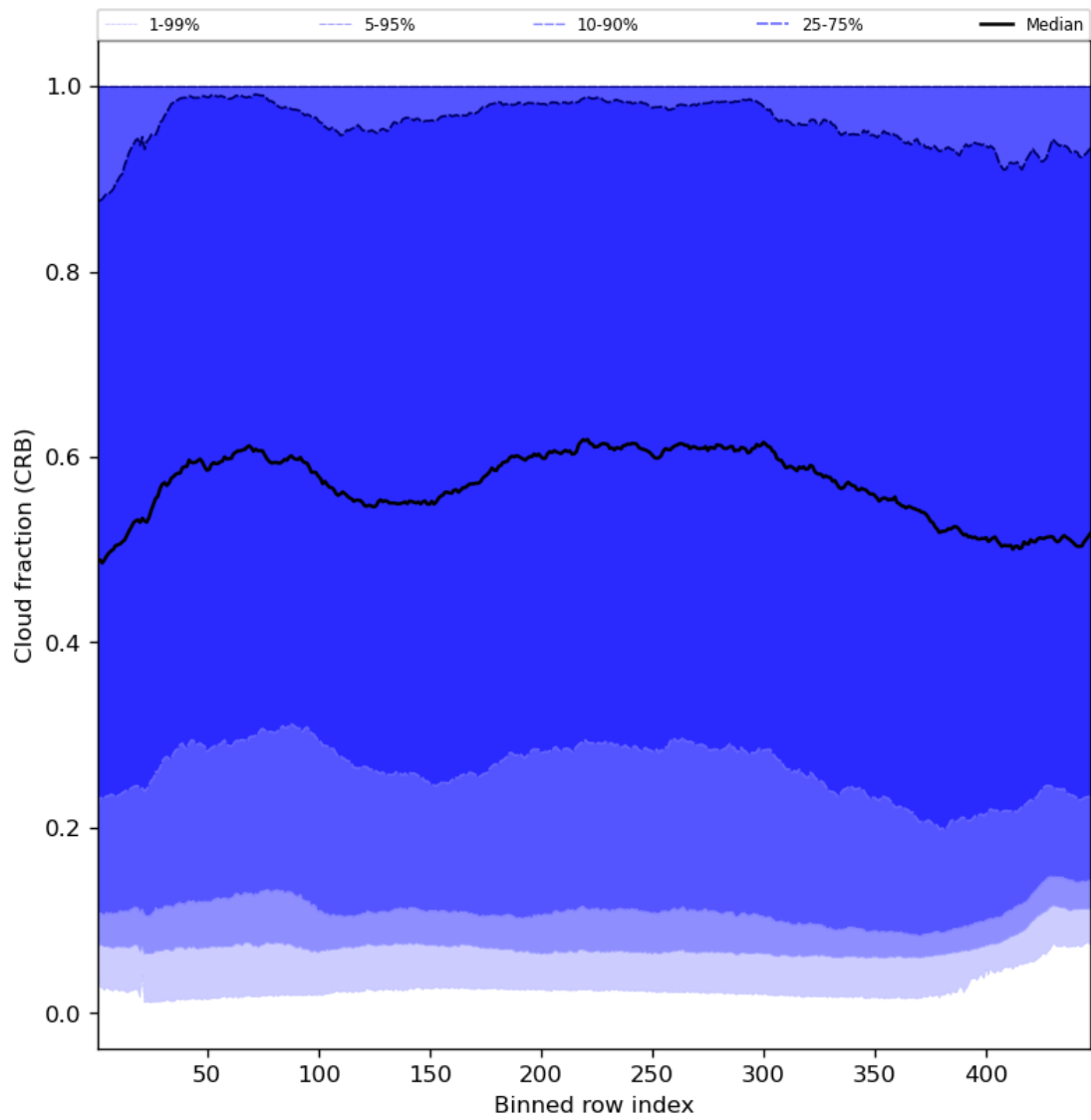


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-12-20 to 2023-12-21

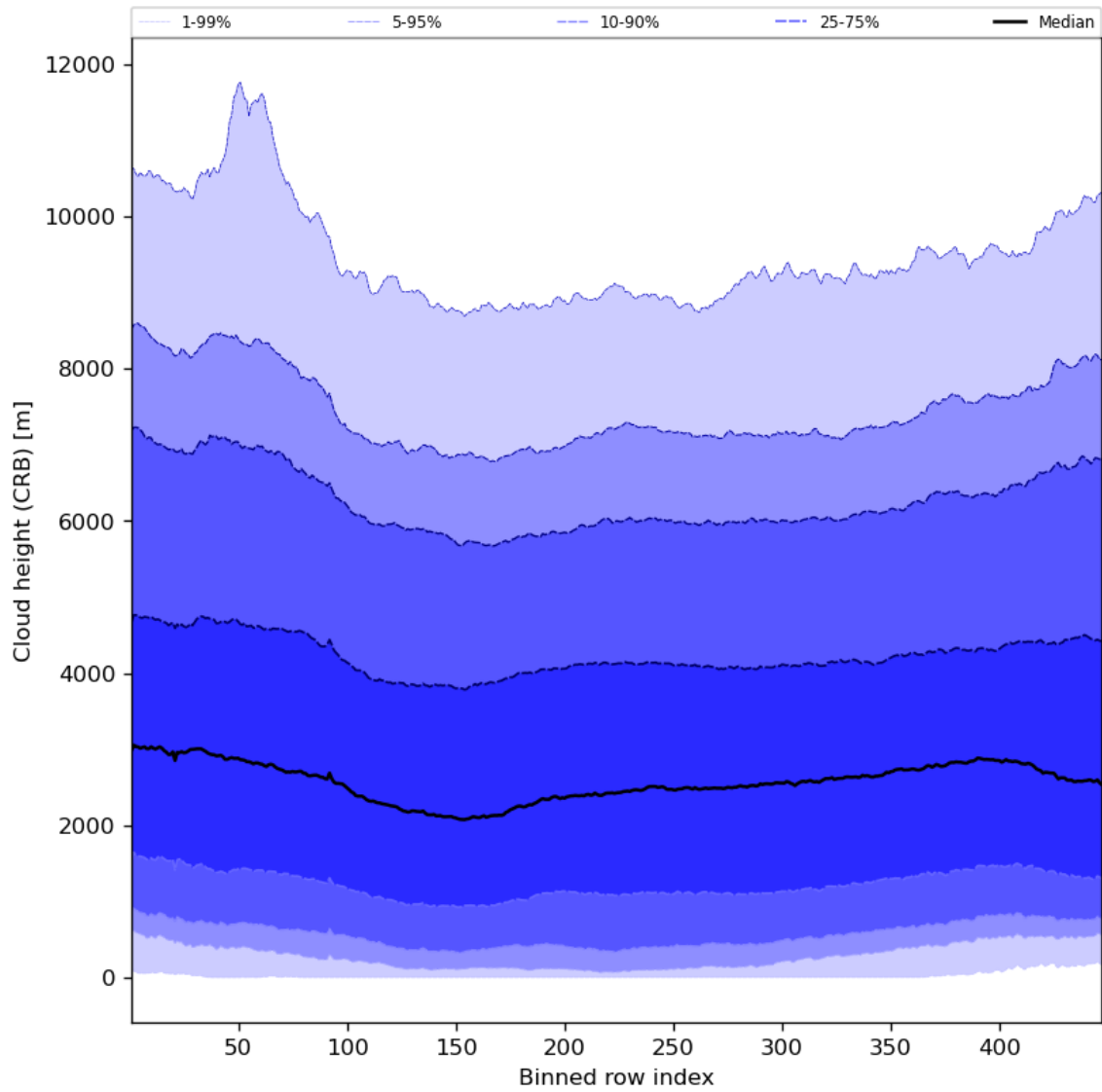


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-12-20 to 2023-12-21

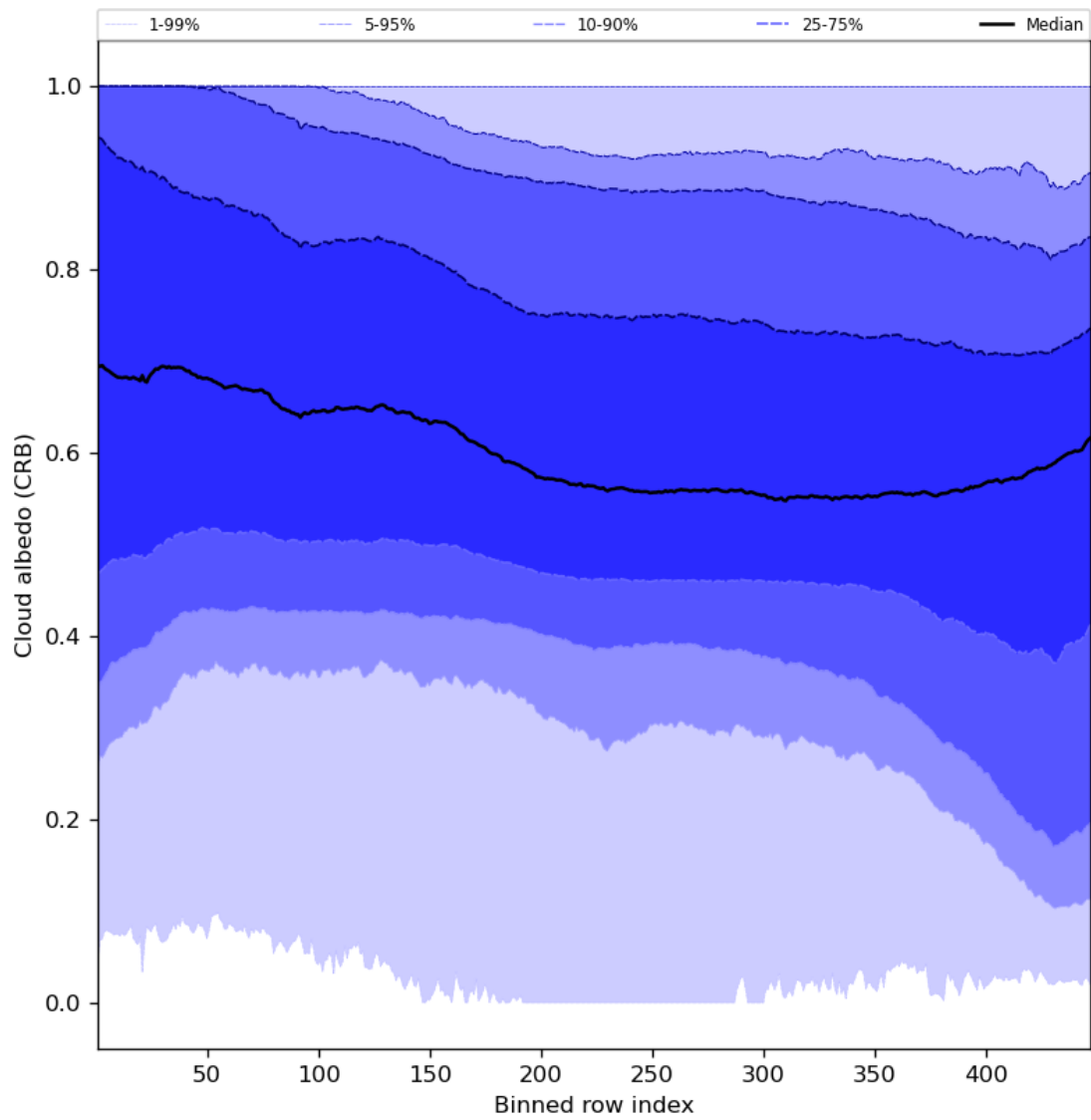


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-12-20 to 2023-12-21

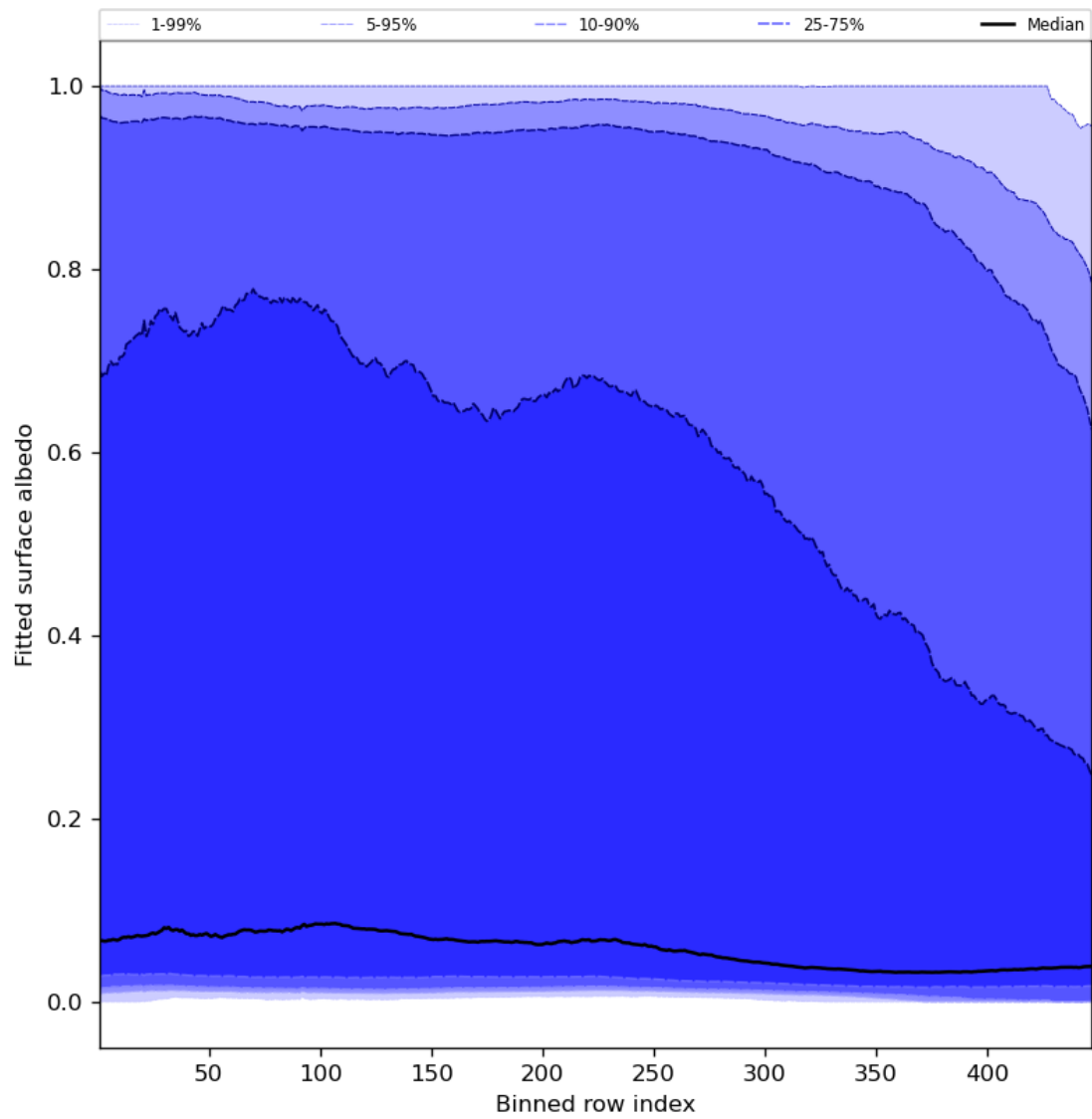


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-12-20 to 2023-12-21

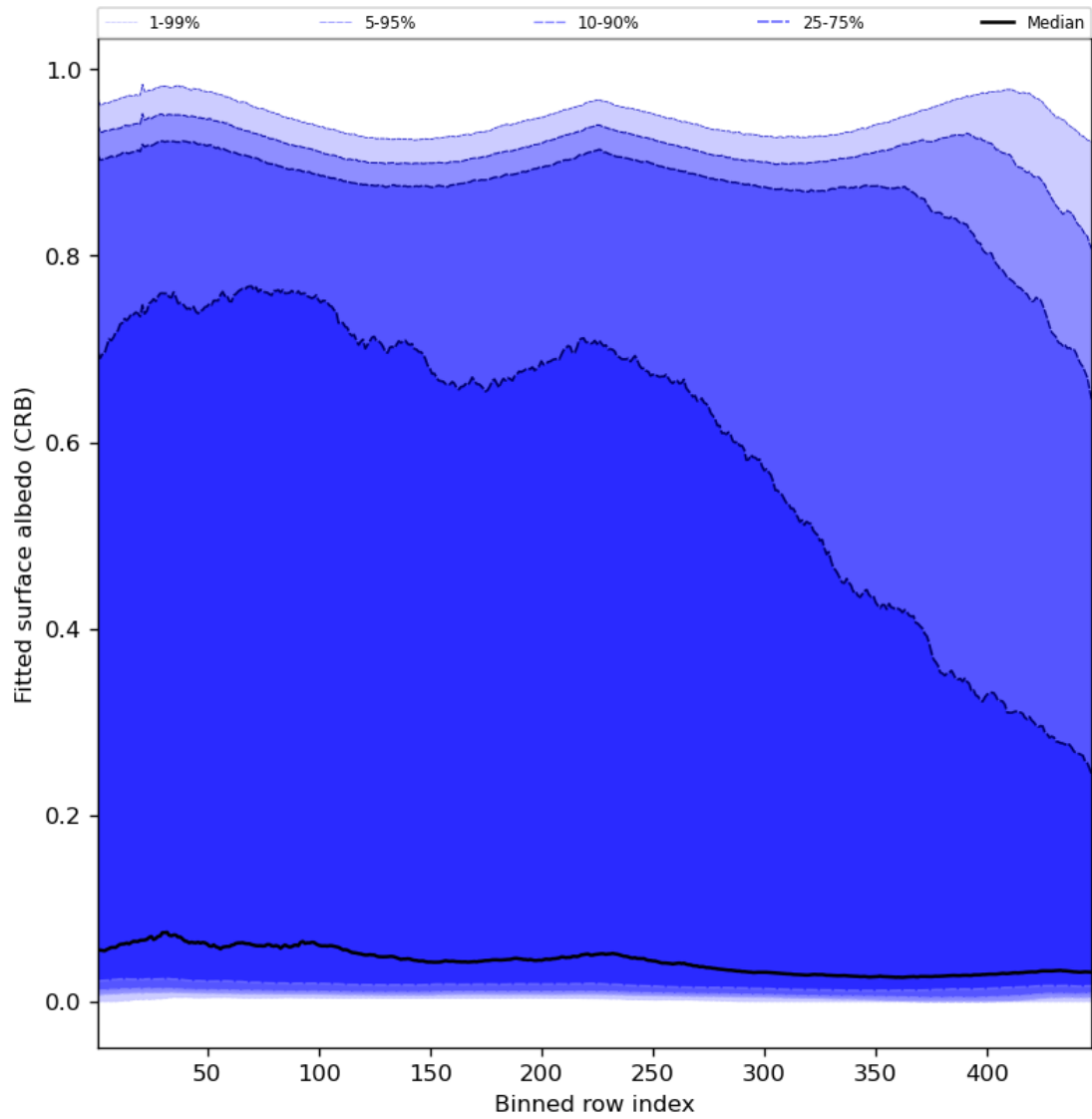


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-12-20 to 2023-12-21

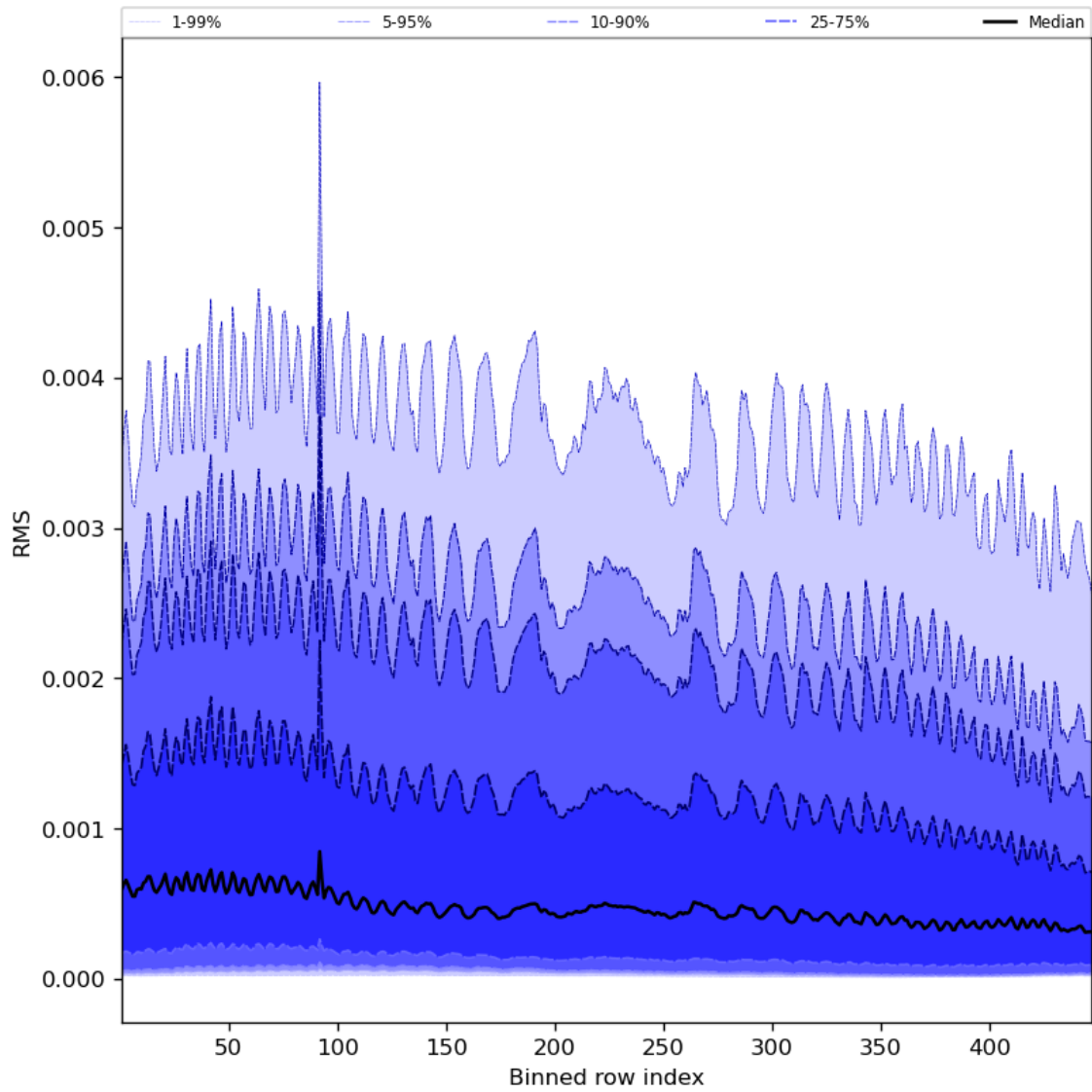


Figure 63: Along track statistics of “RMS” for 2023-12-20 to 2023-12-21

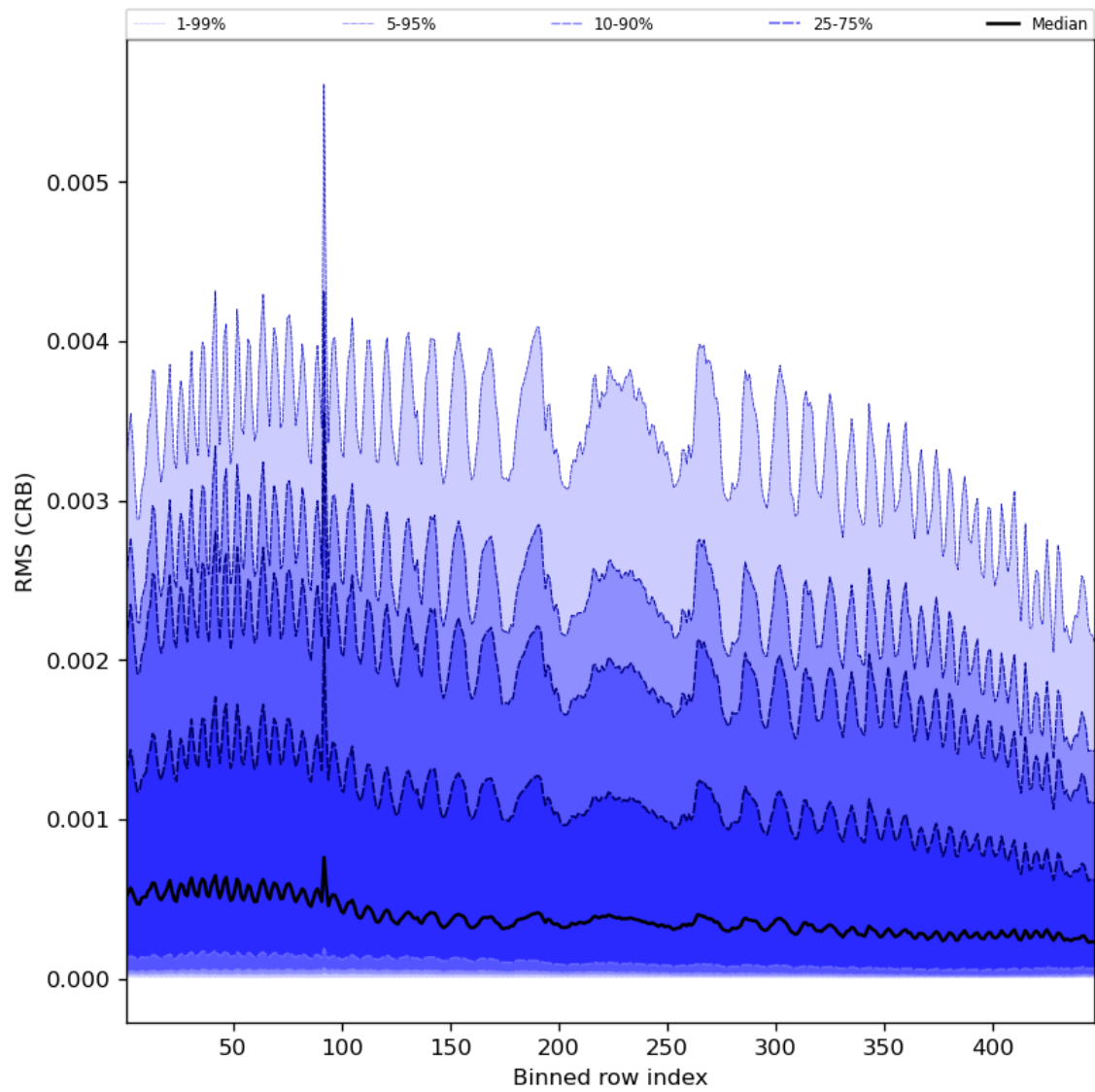


Figure 64: Along track statistics of “RMS (CRB)” for 2023-12-20 to 2023-12-21

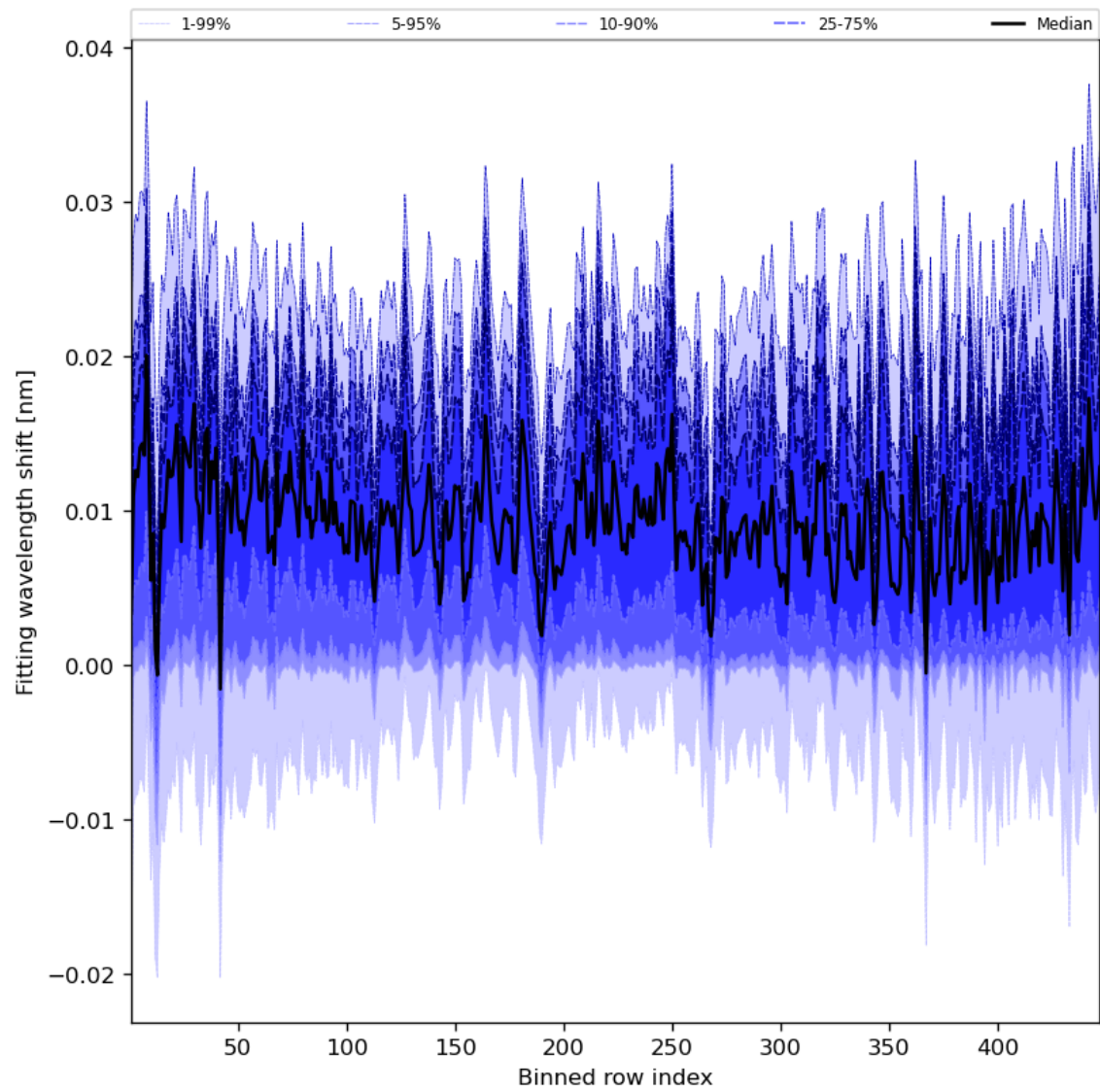


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-12-20 to 2023-12-21

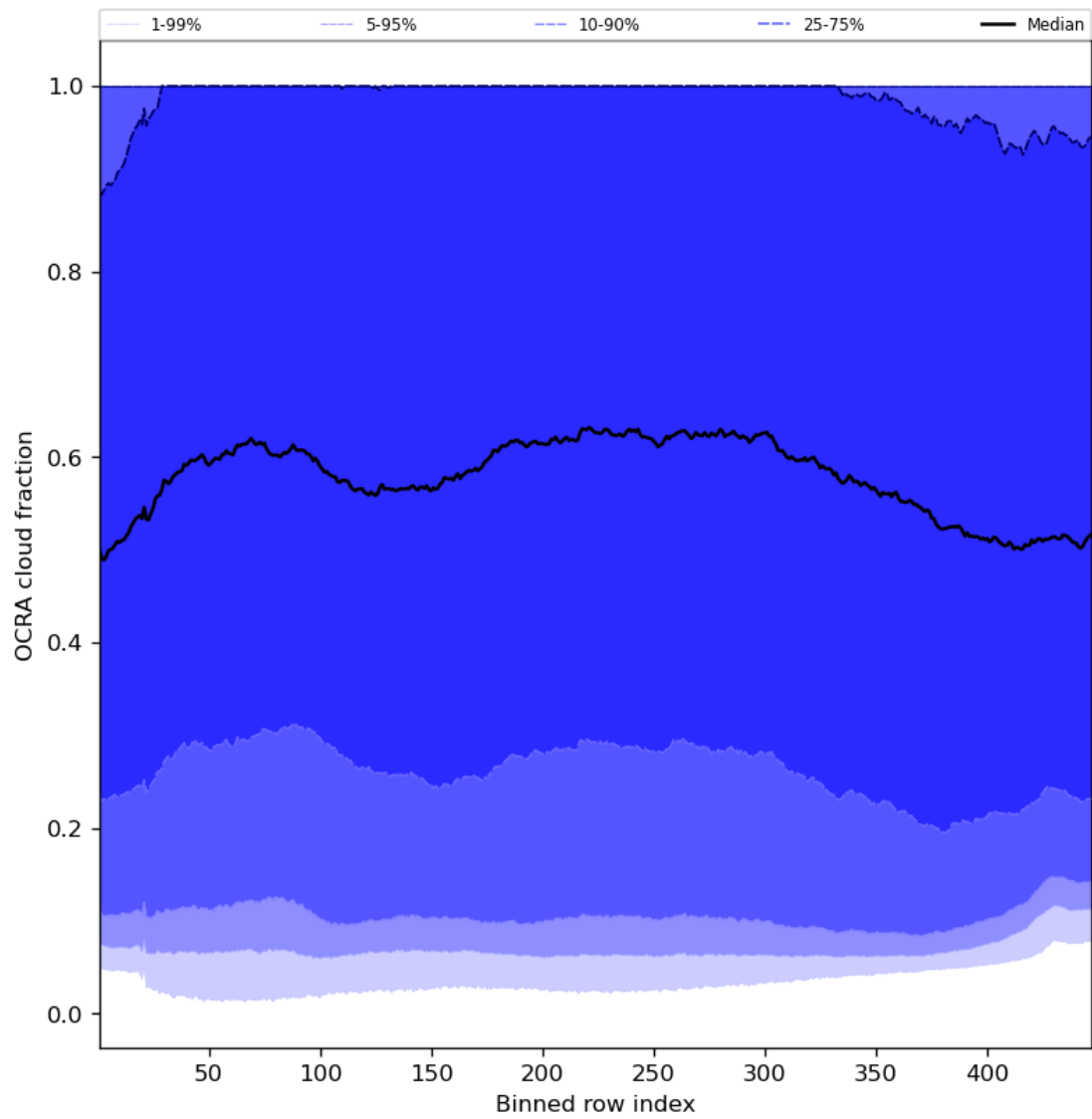


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-12-20 to 2023-12-21

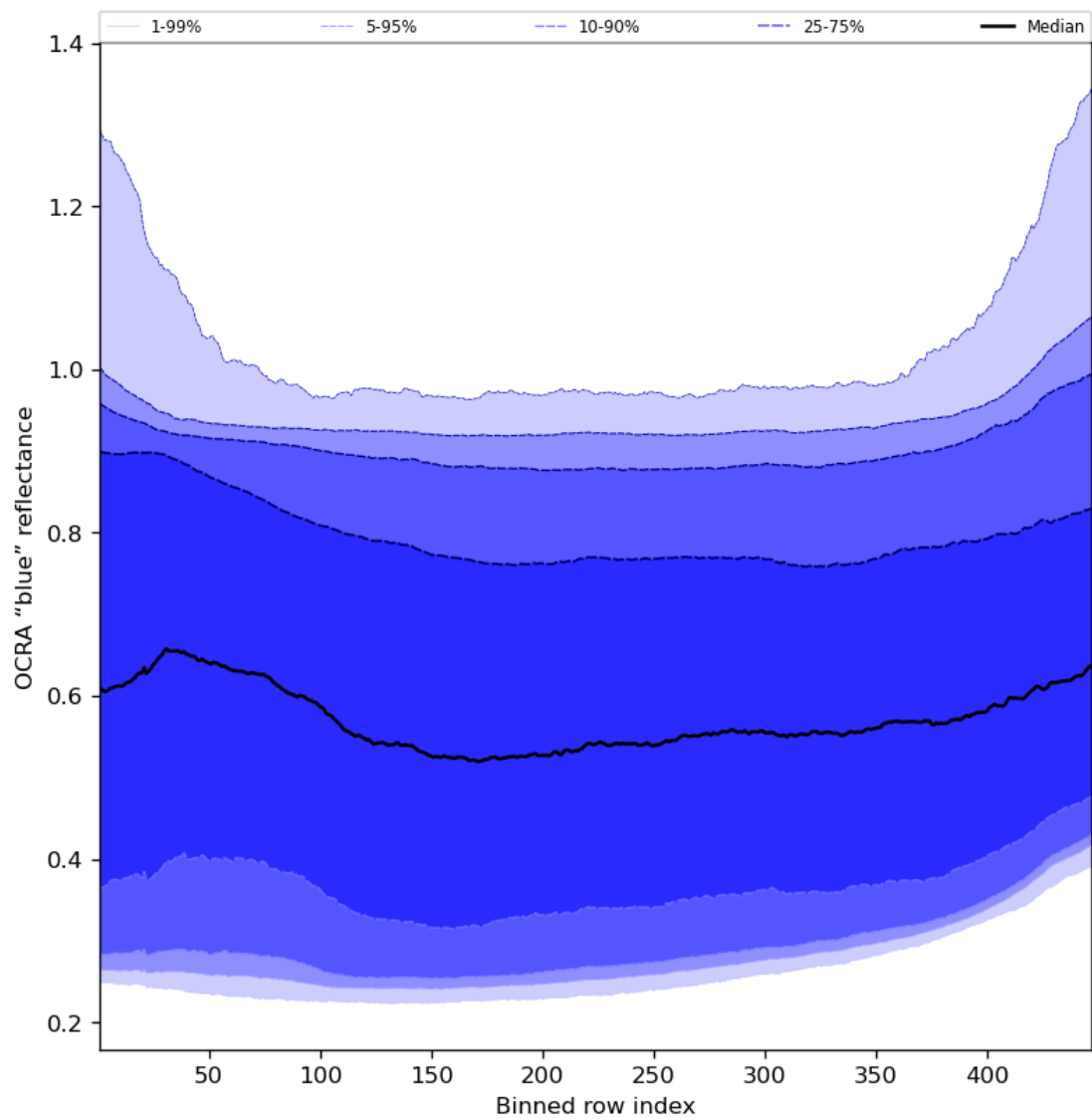


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-12-20 to 2023-12-21

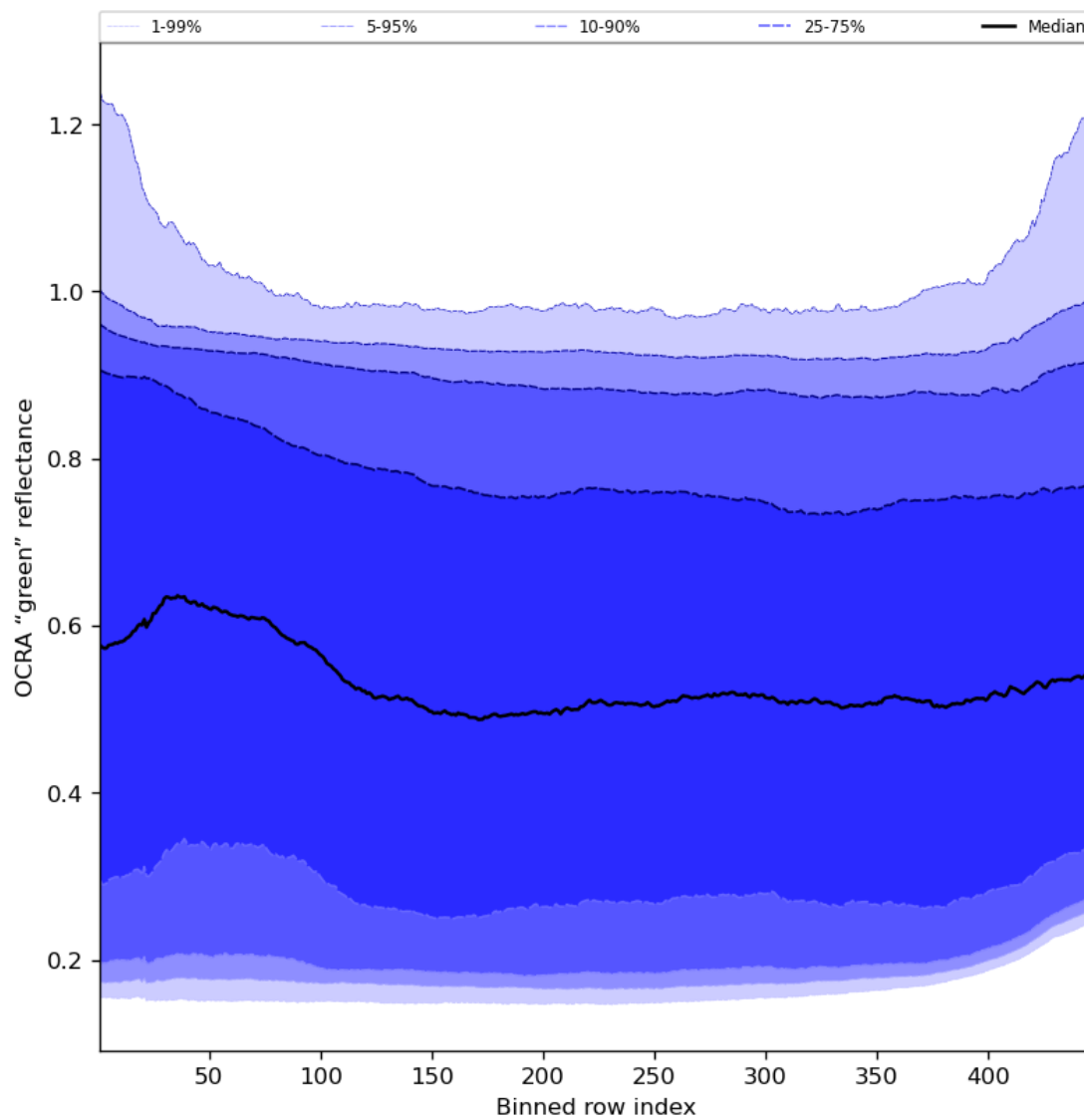


Figure 68: Along track statistics of "OCRA "green" reflectance" for 2023-12-20 to 2023-12-21

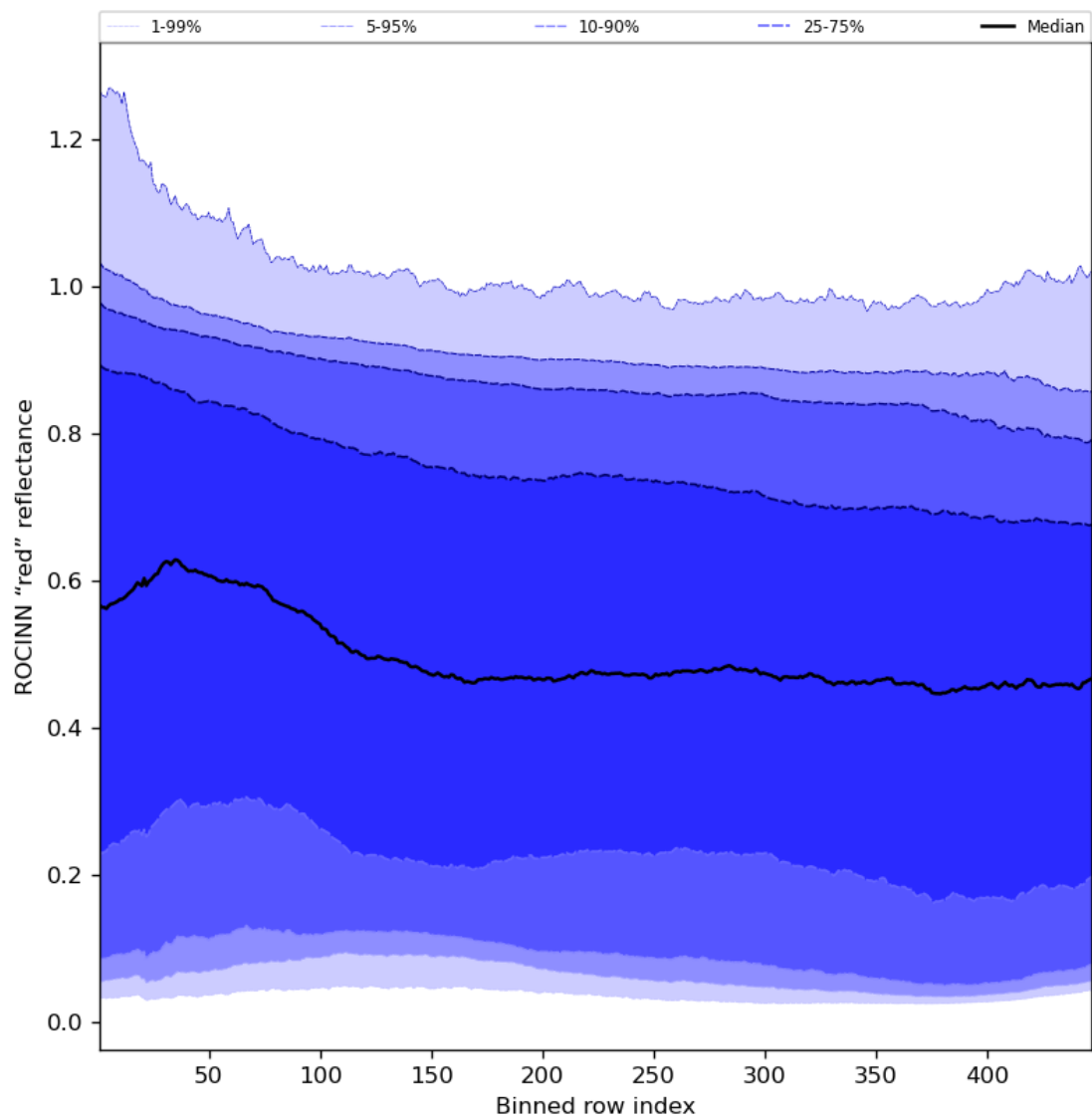


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2023-12-20 to 2023-12-21

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.

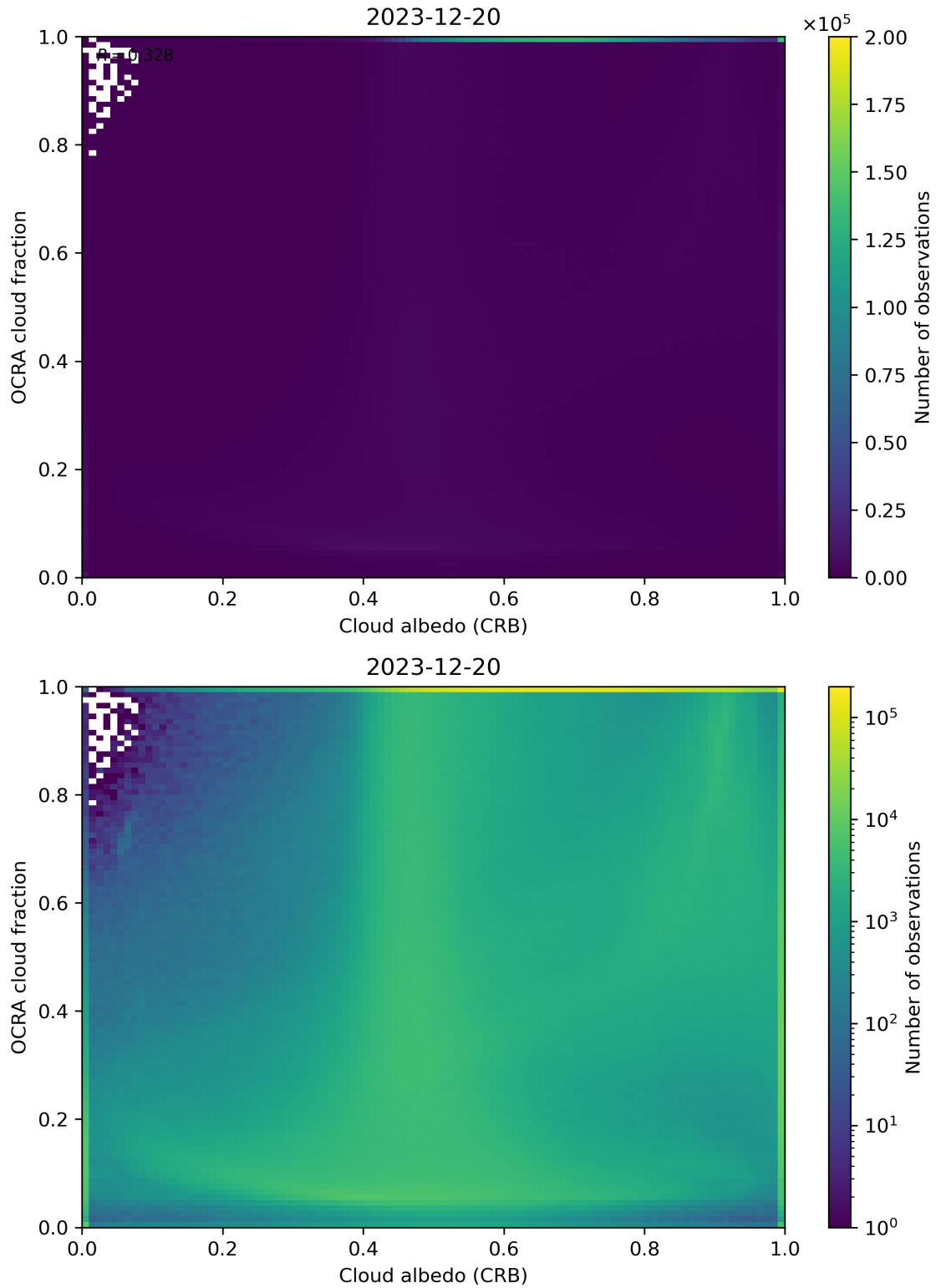


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-12-20 to 2023-12-21.

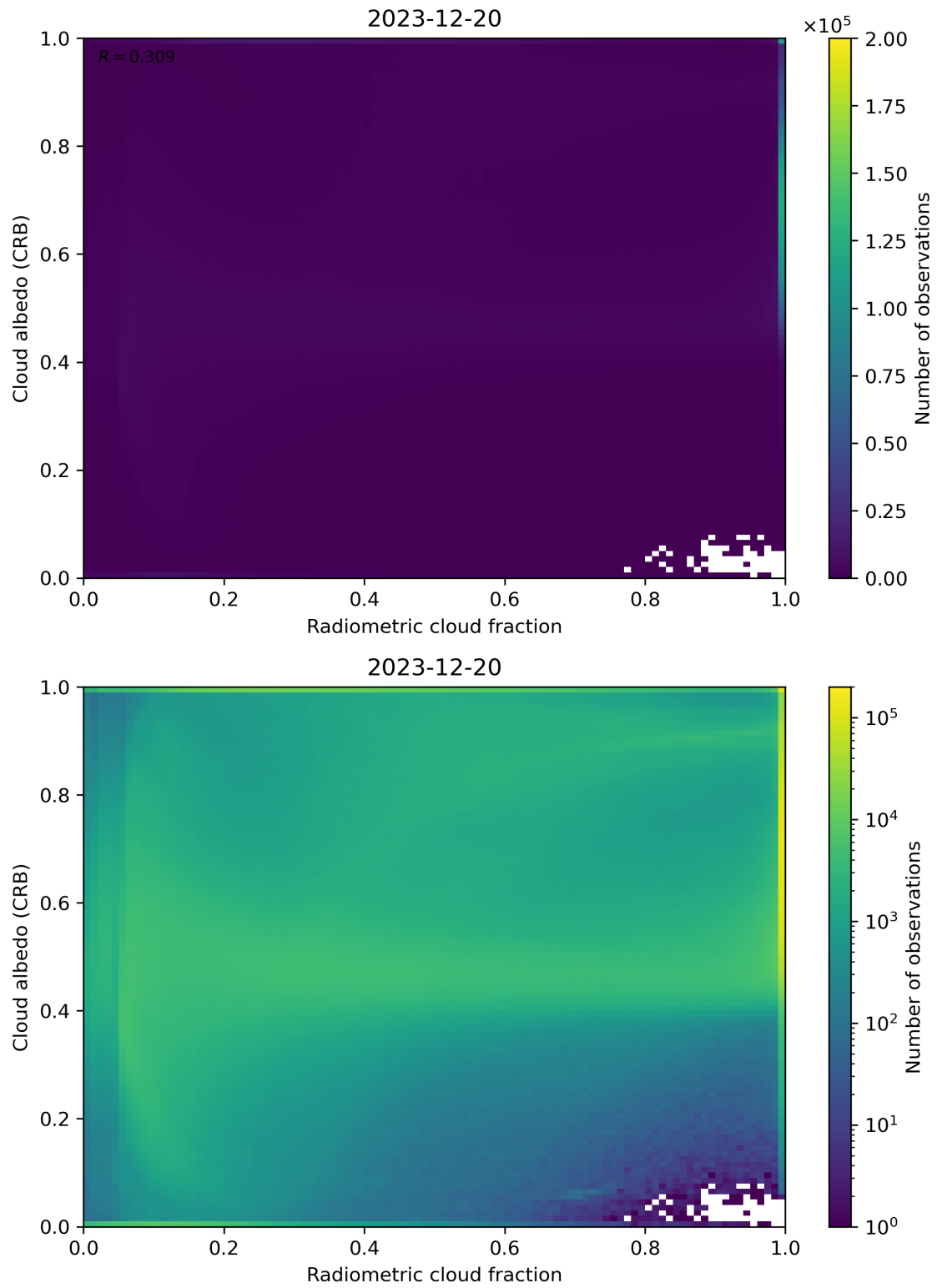


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-12-20 to 2023-12-21.

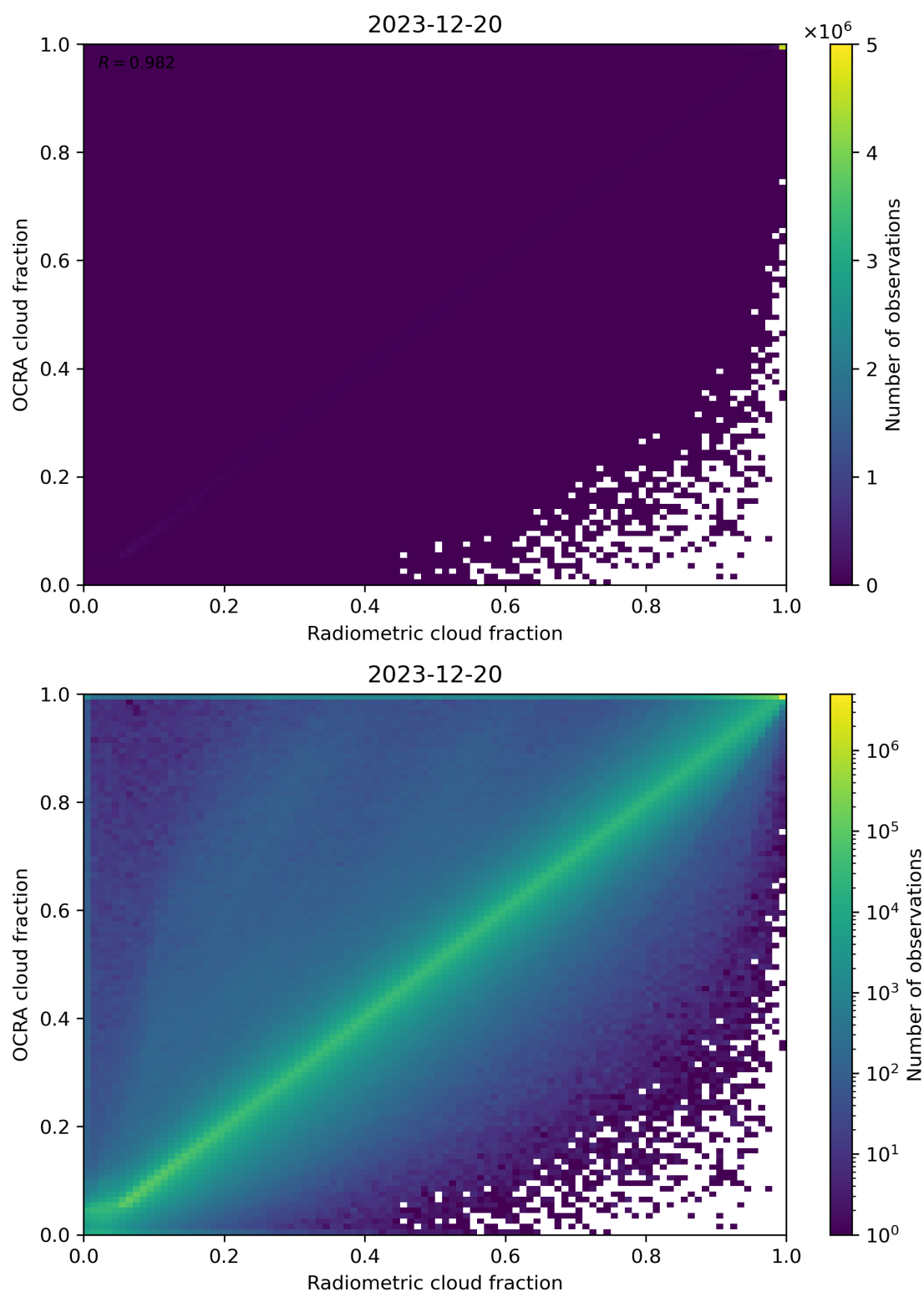


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-12-20 to 2023-12-21.

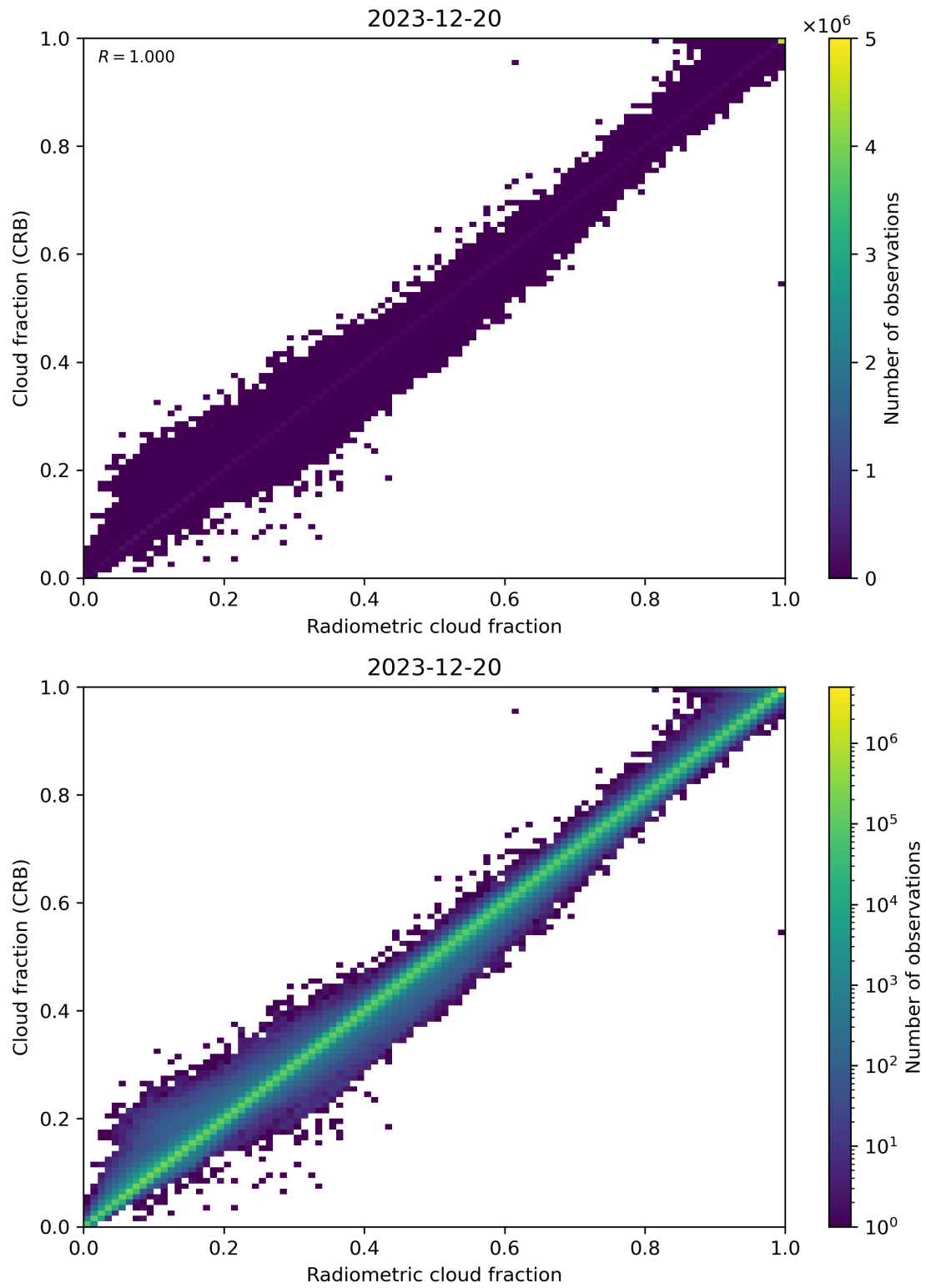


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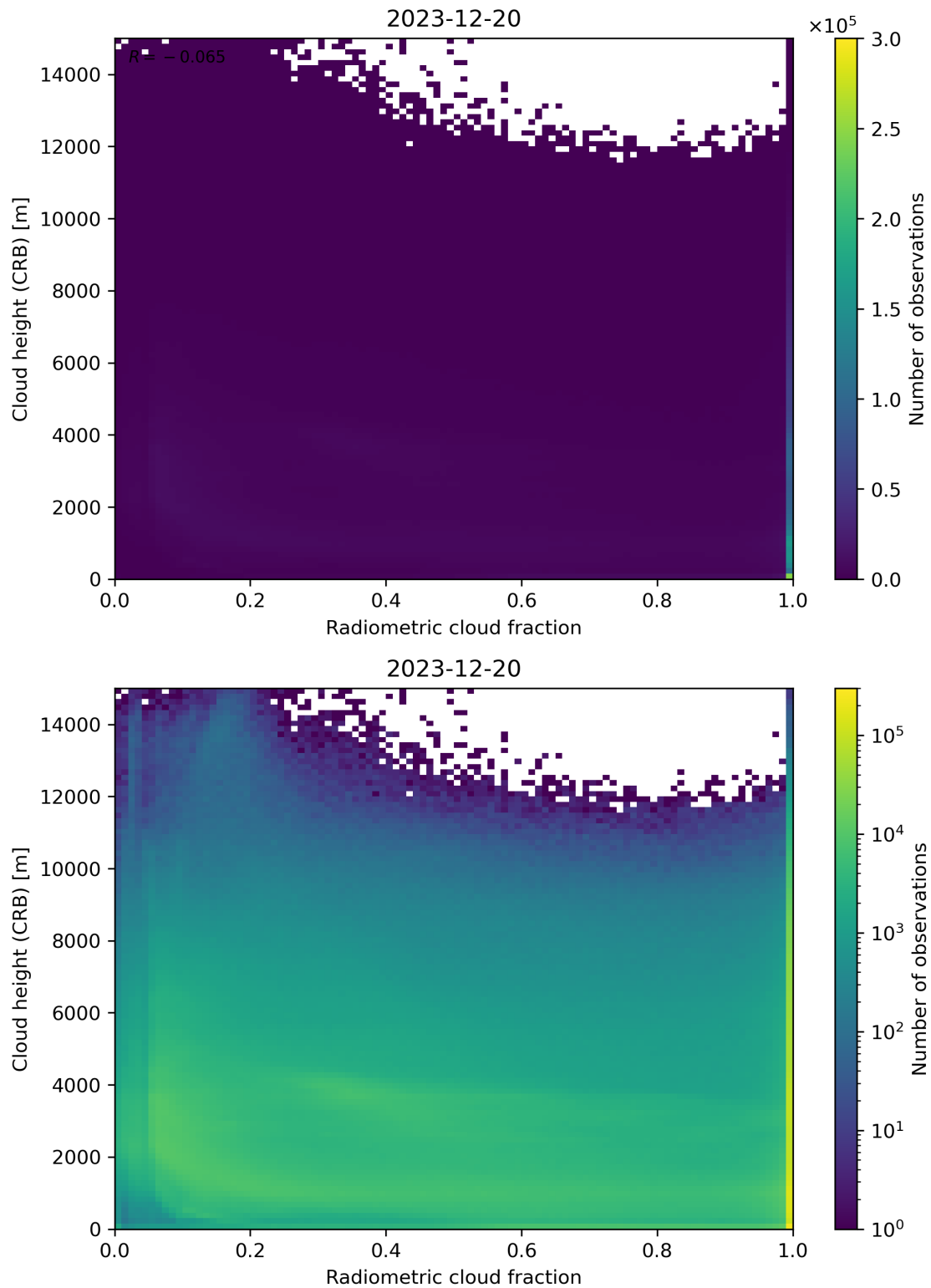


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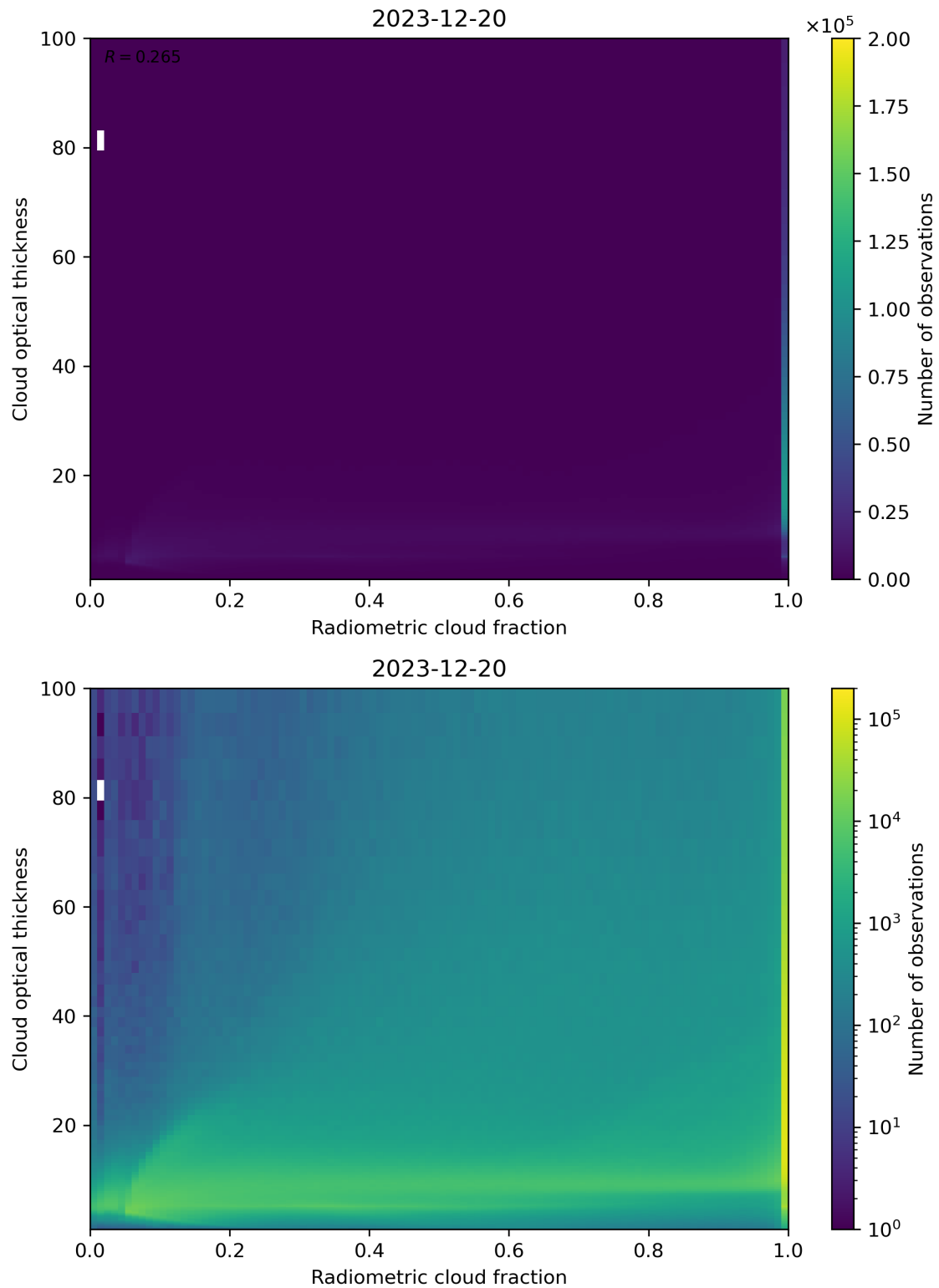


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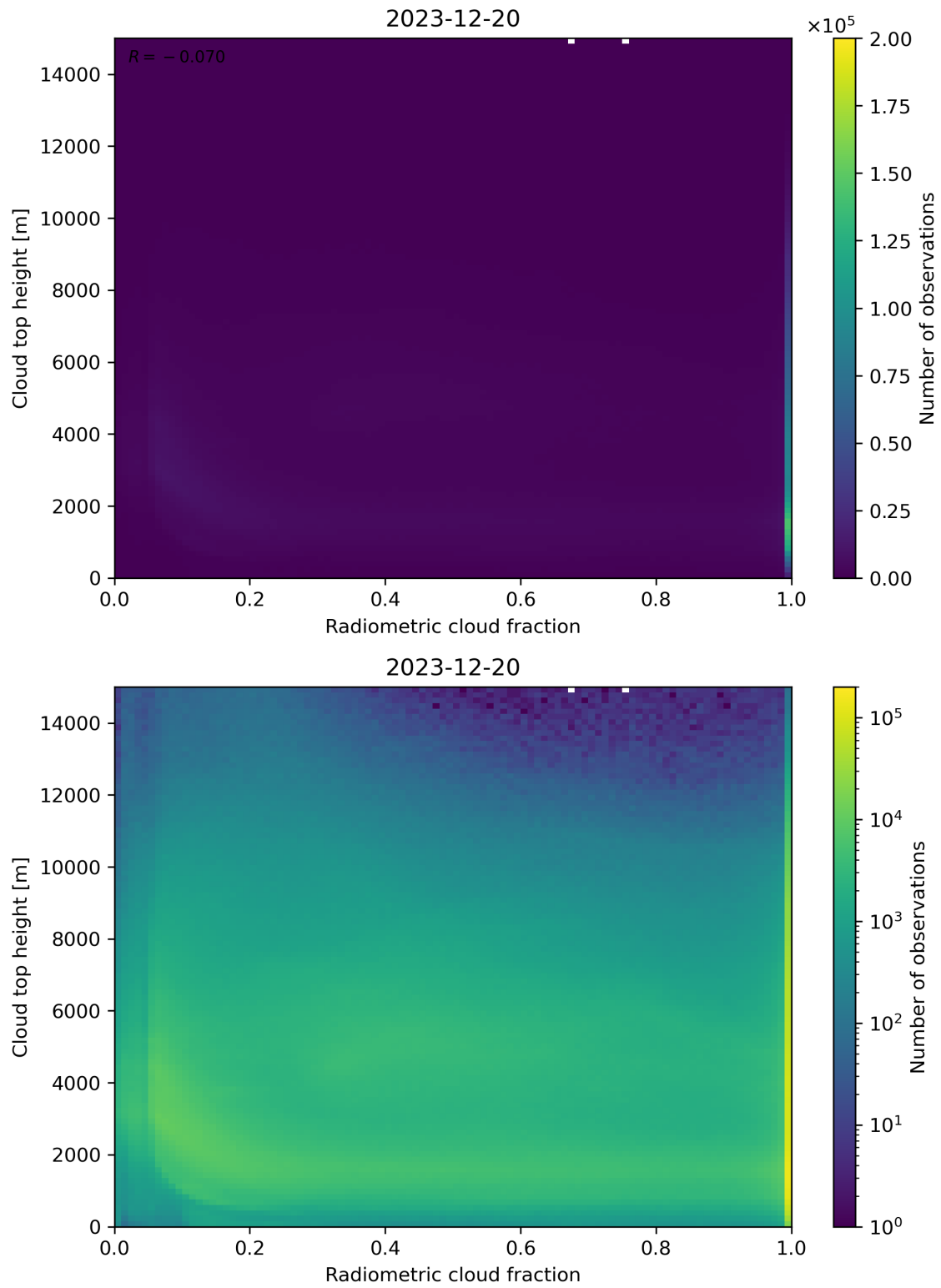


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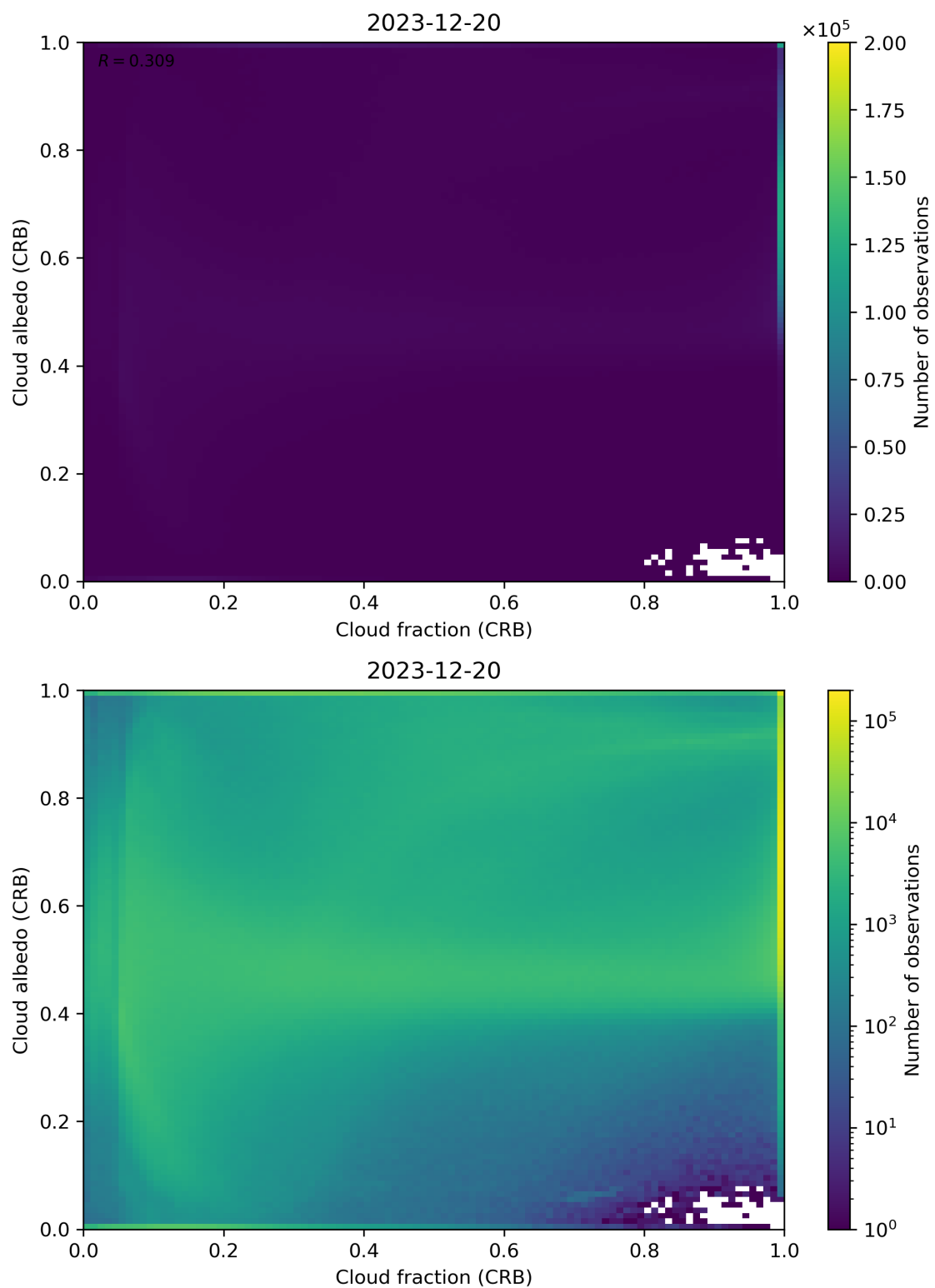


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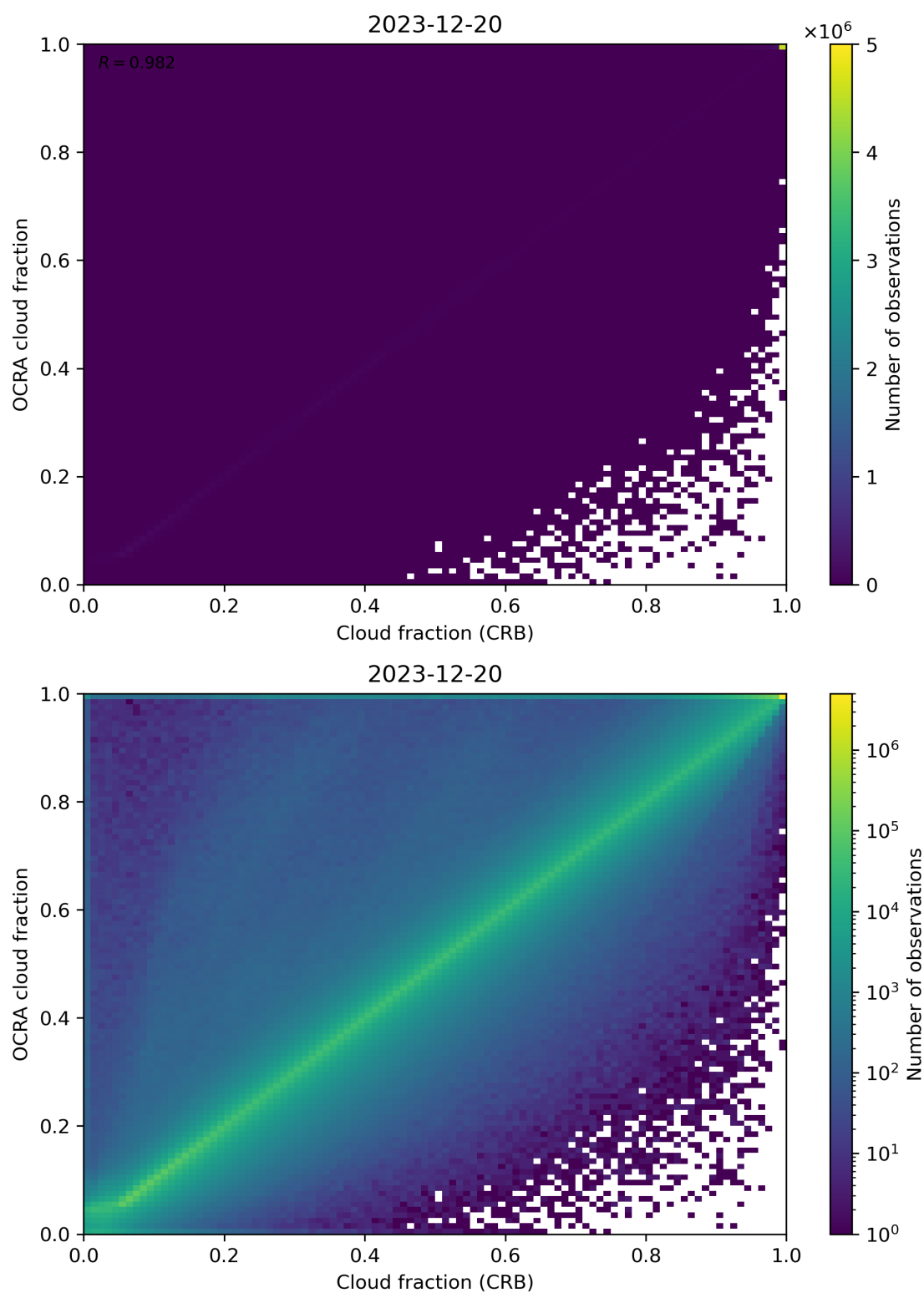


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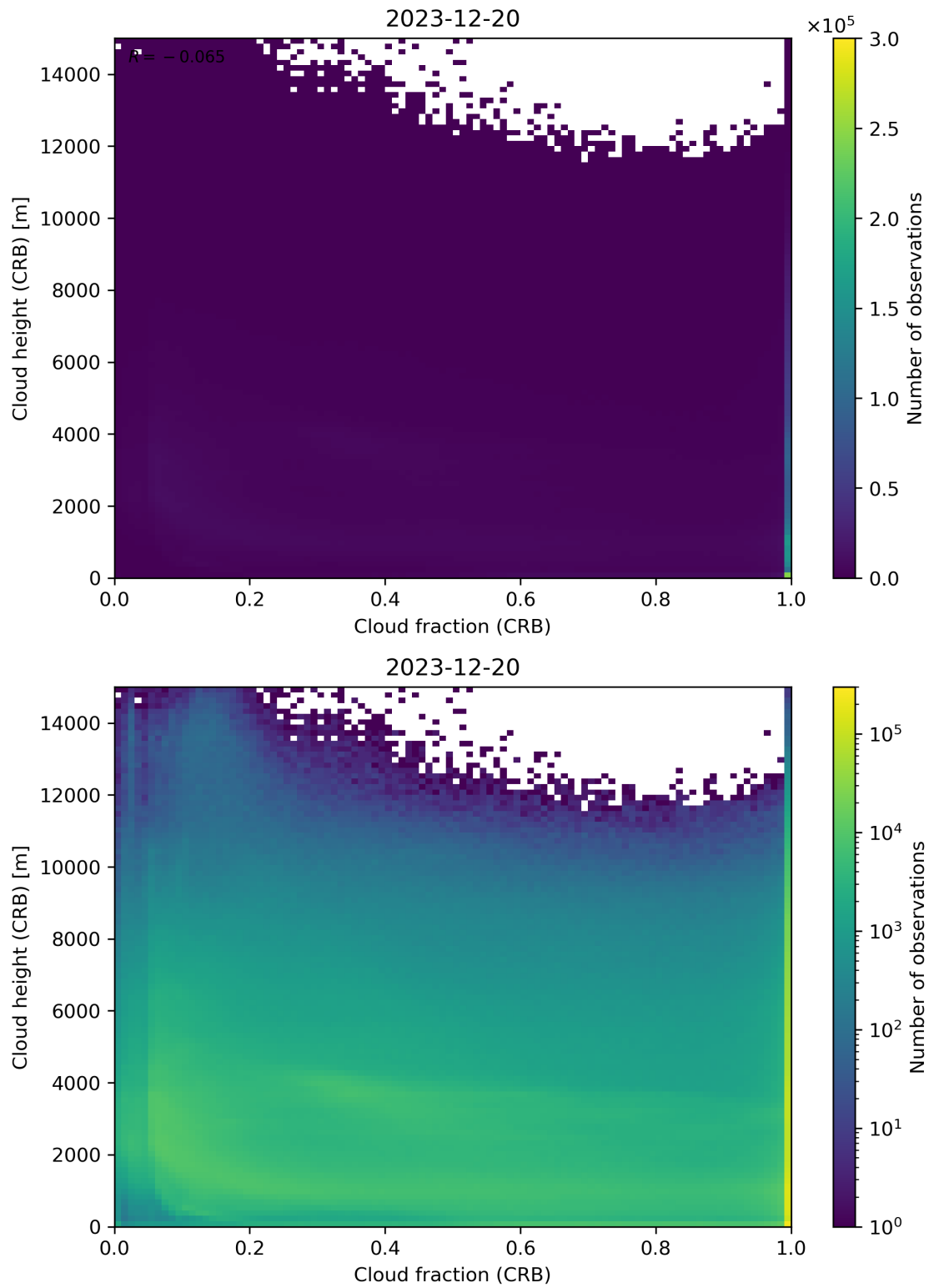


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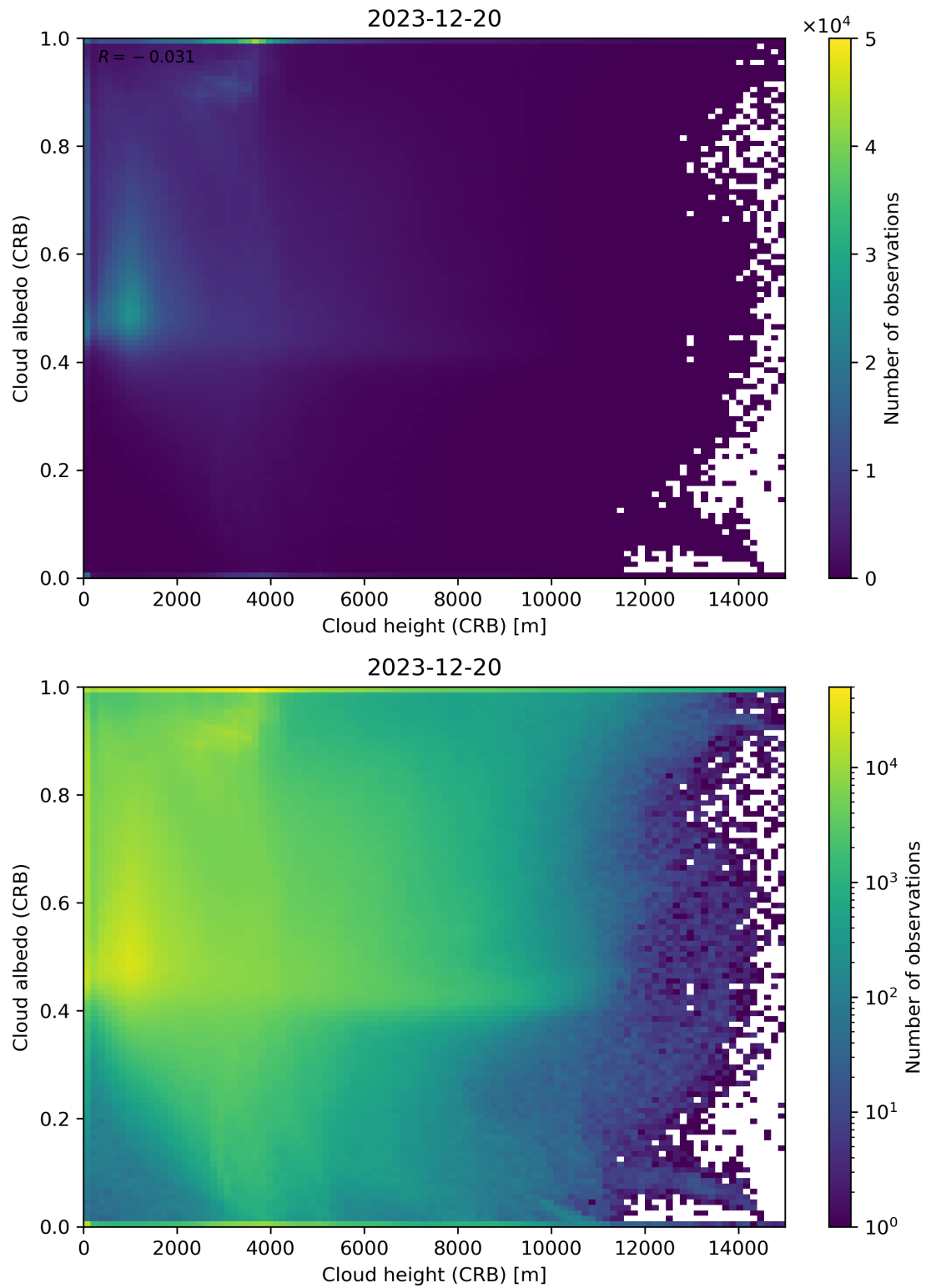


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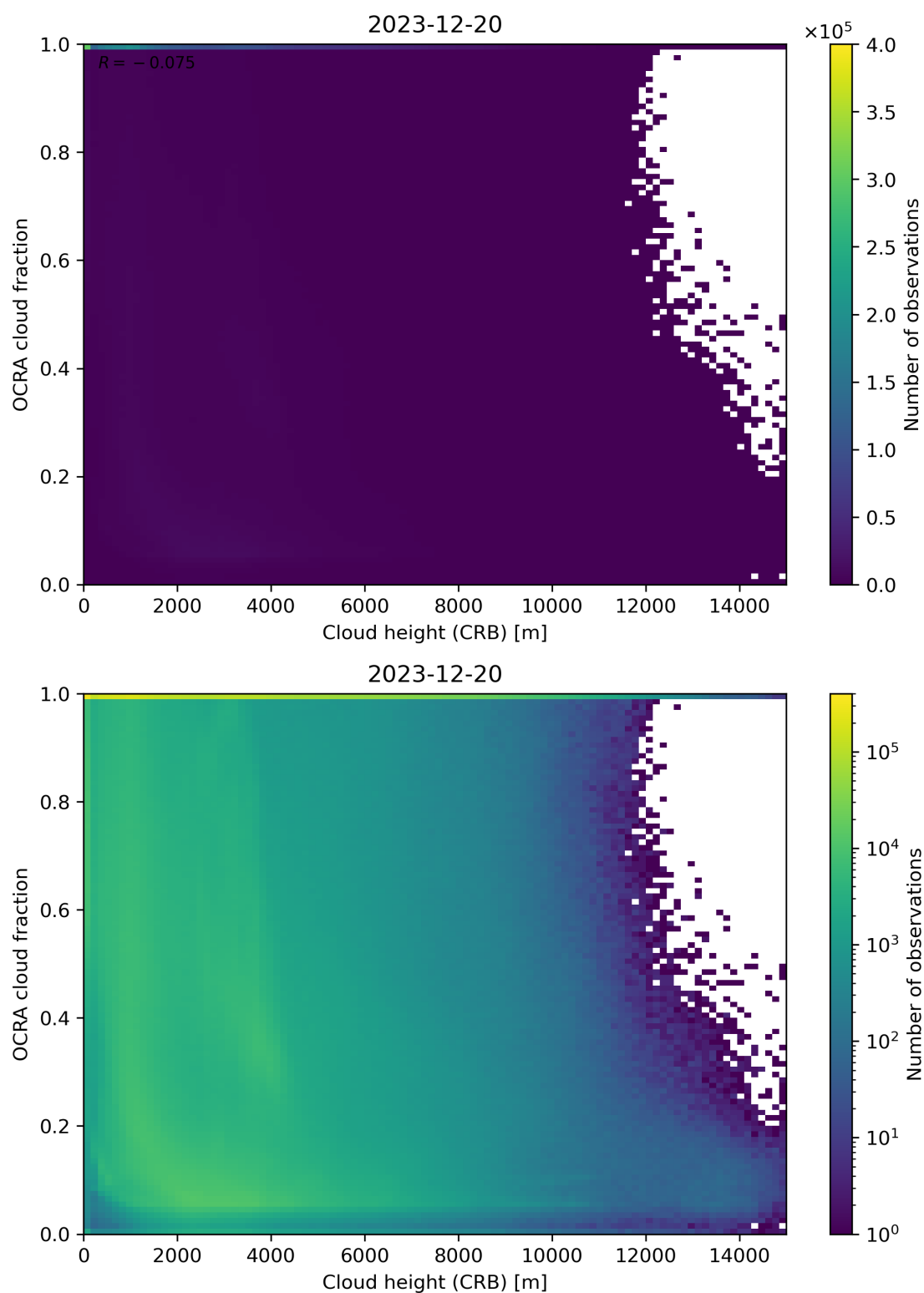


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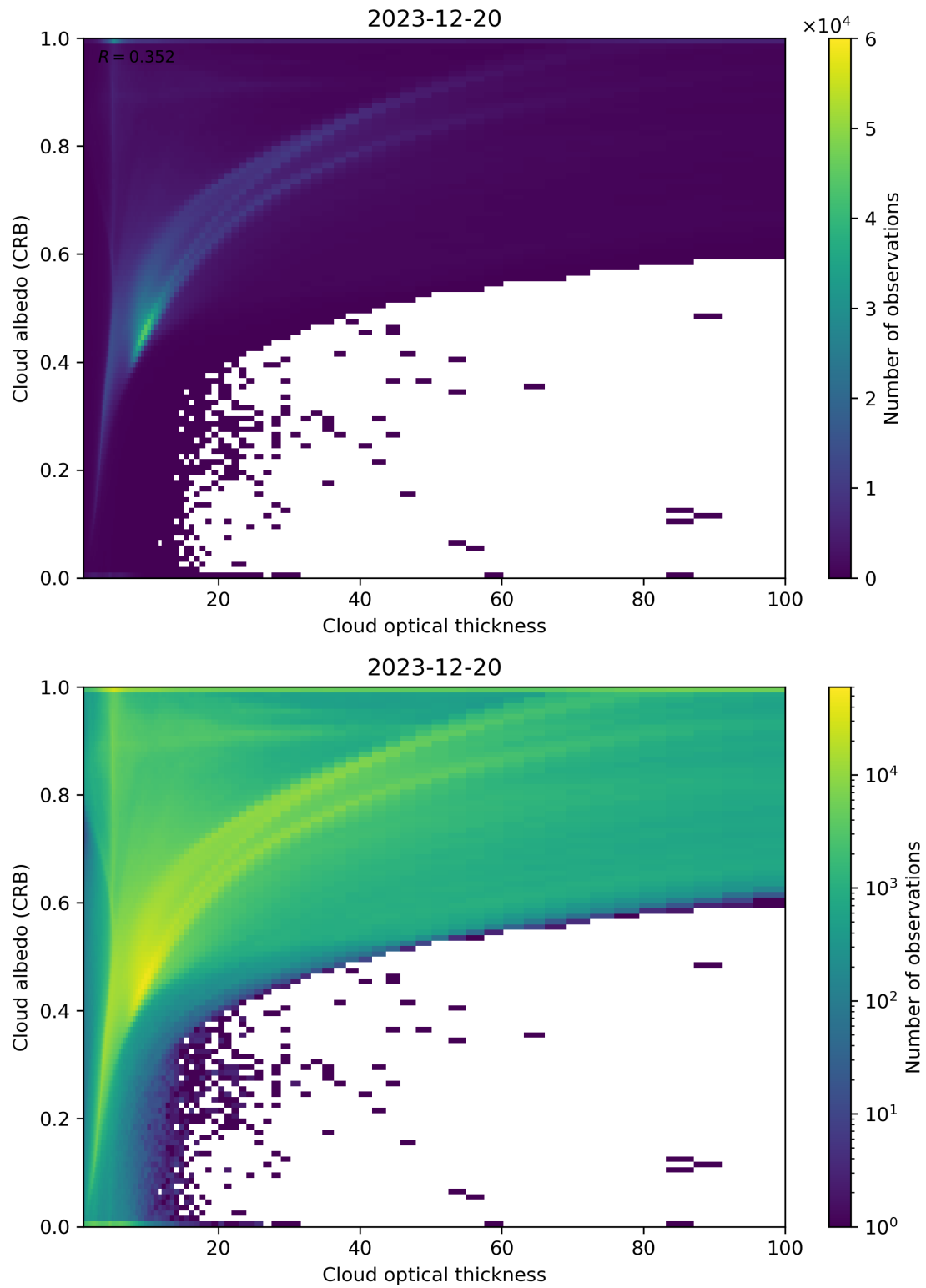


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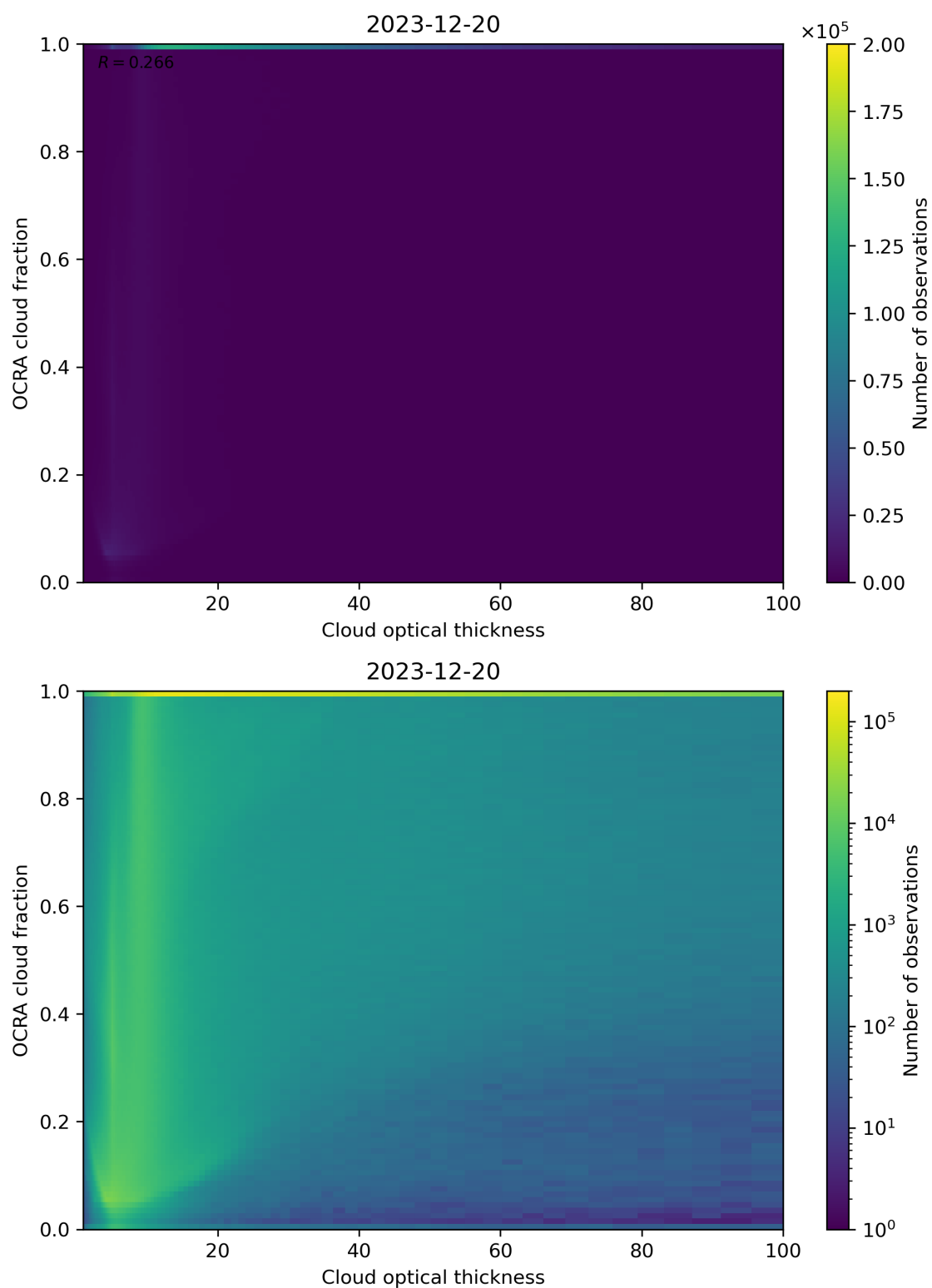


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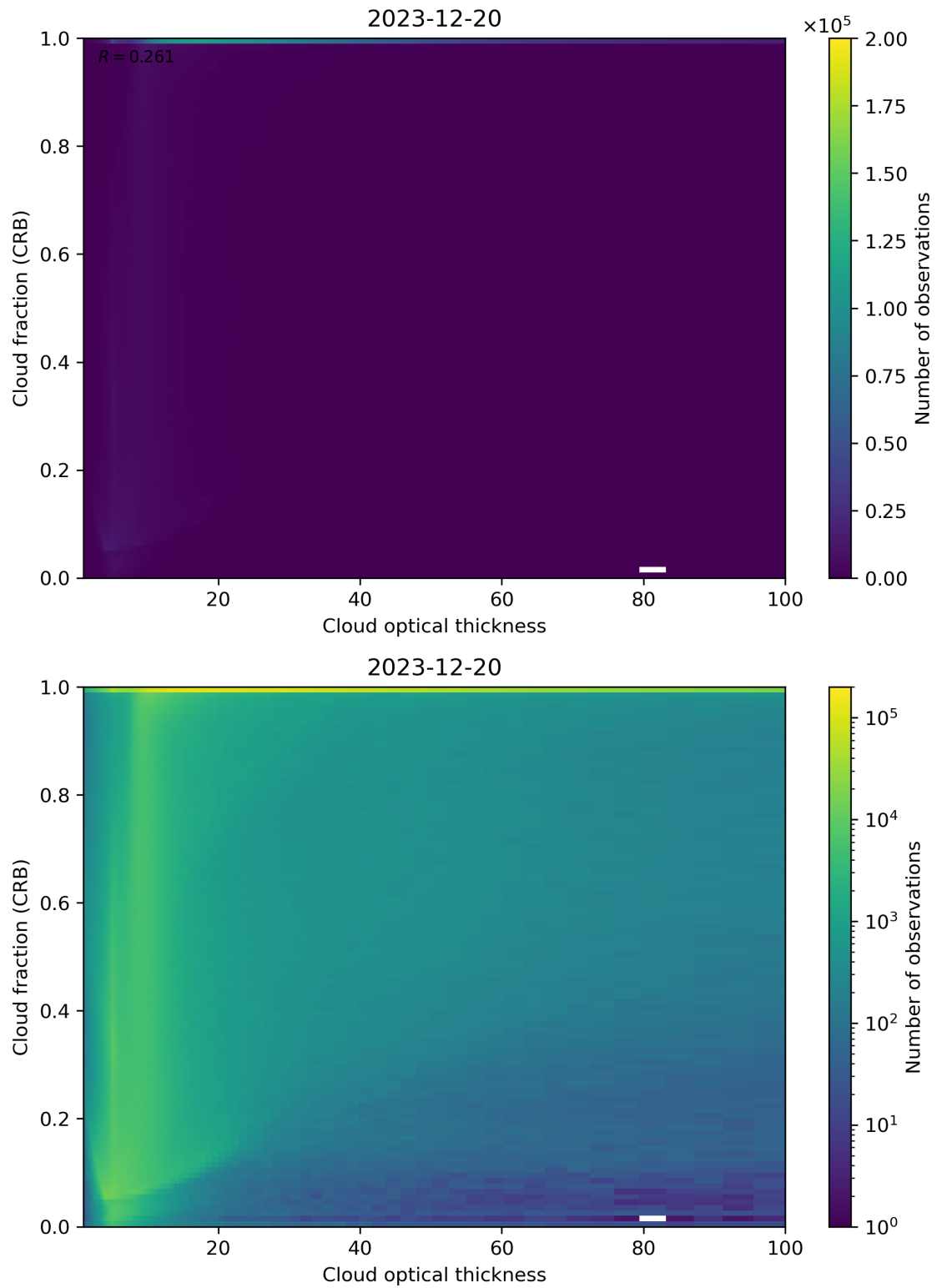


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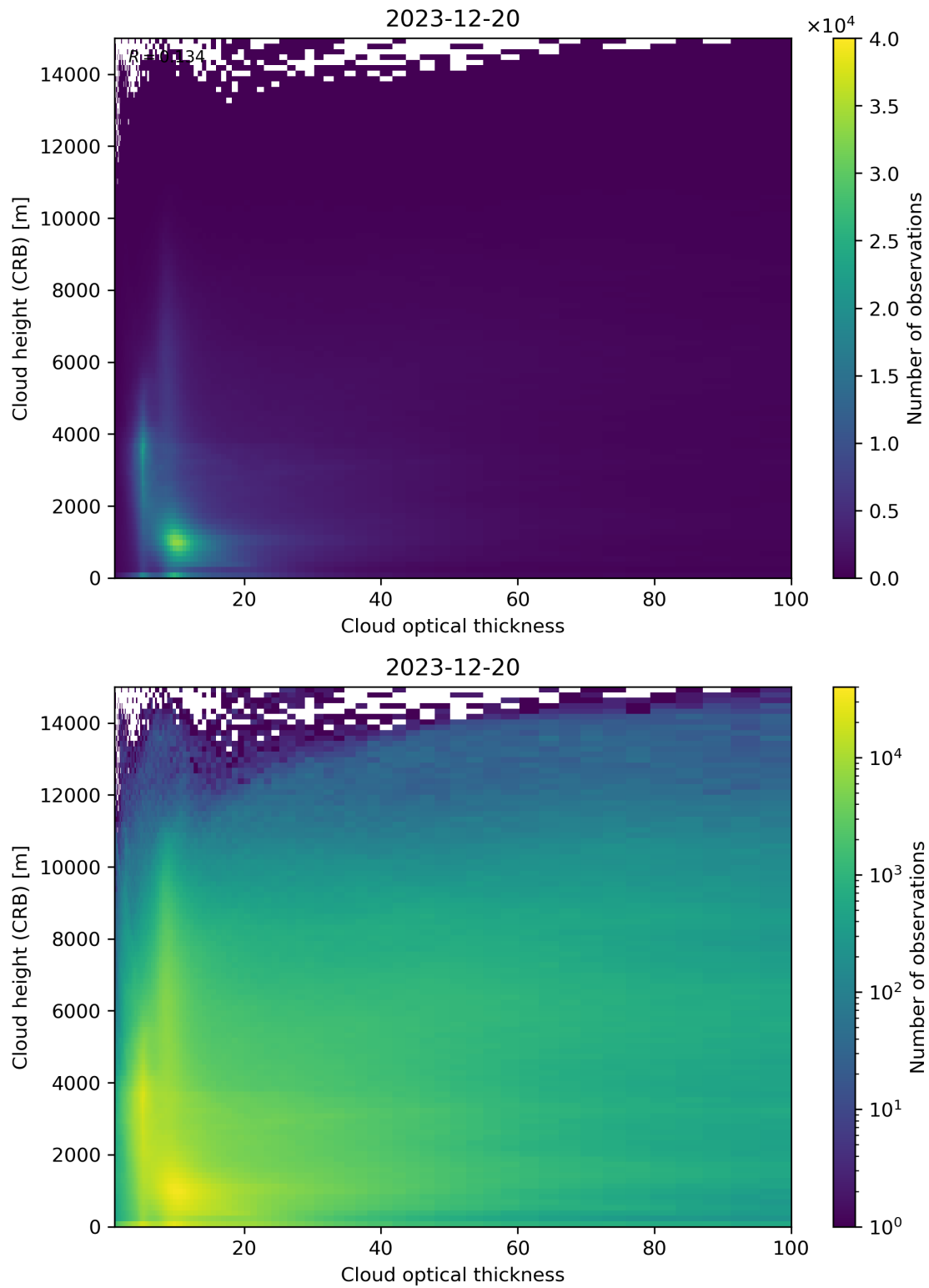


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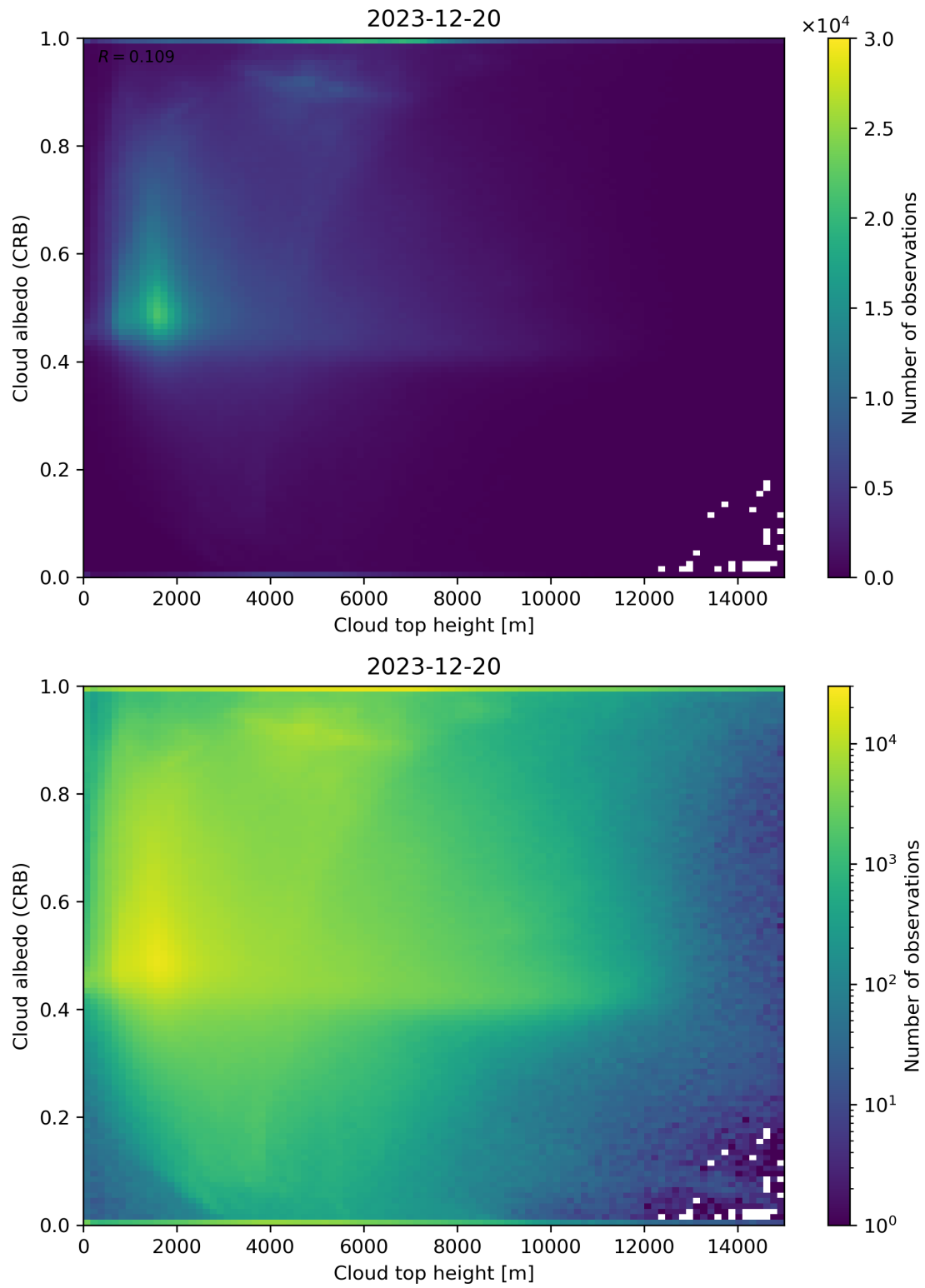


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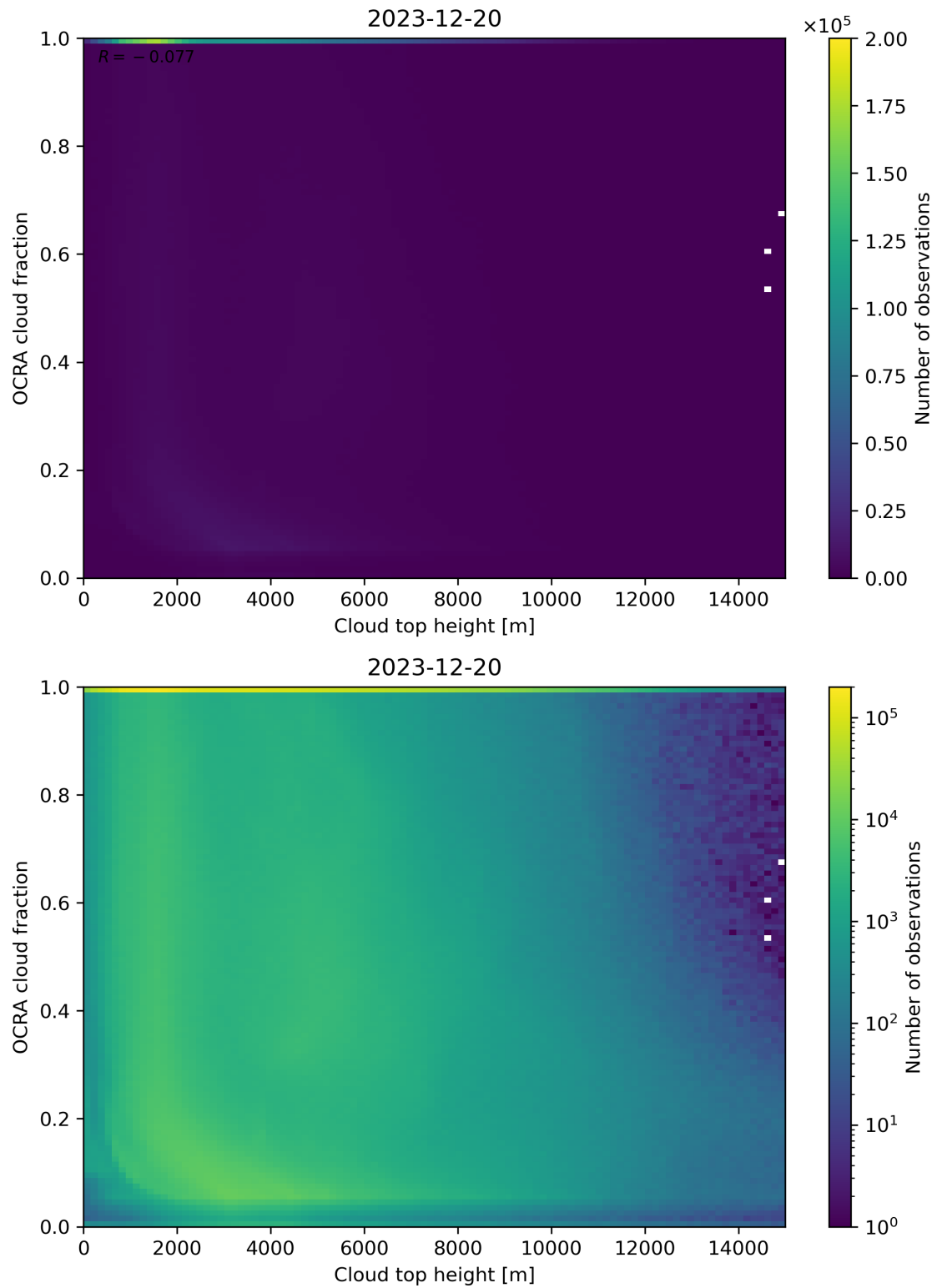


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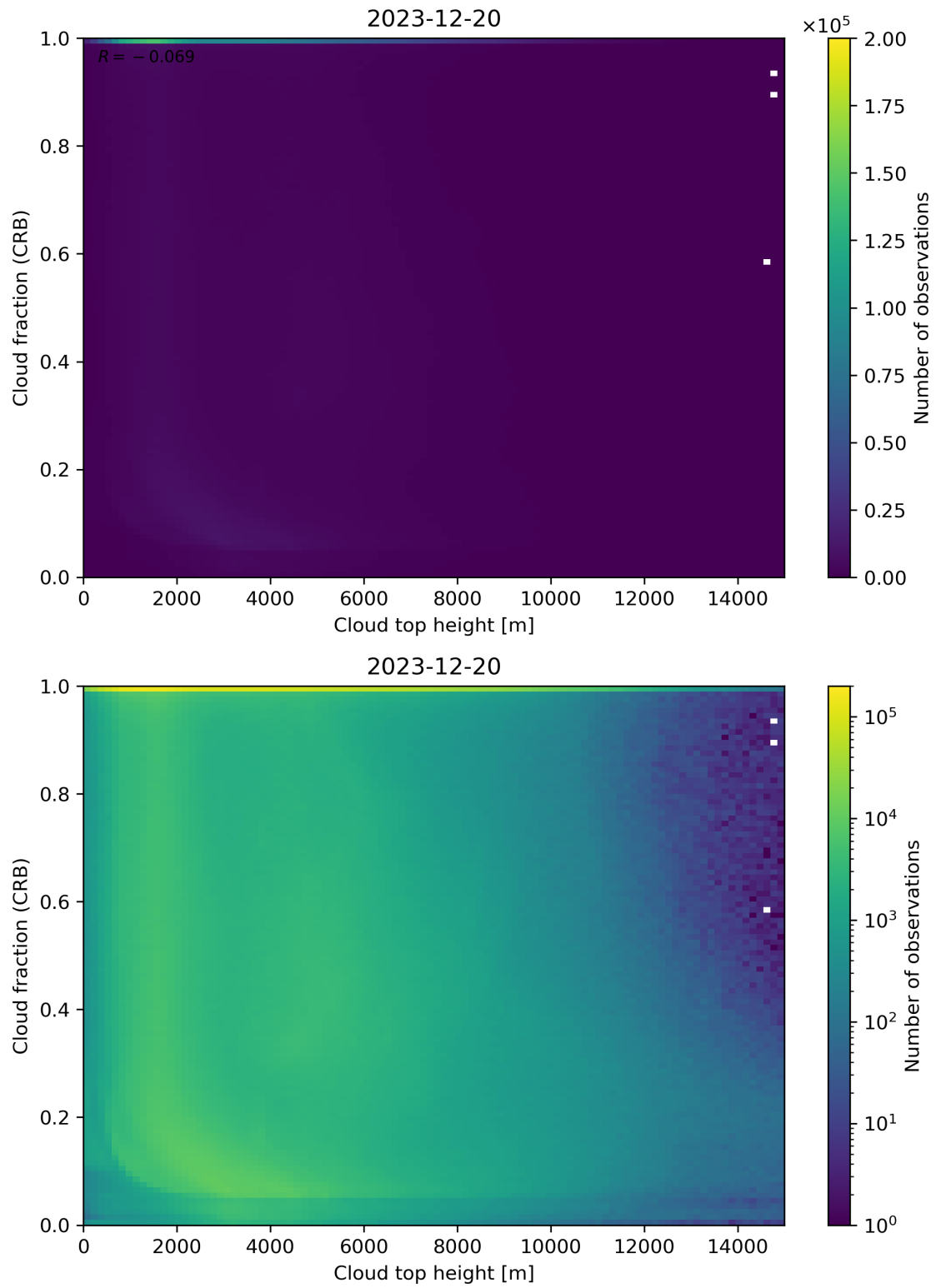


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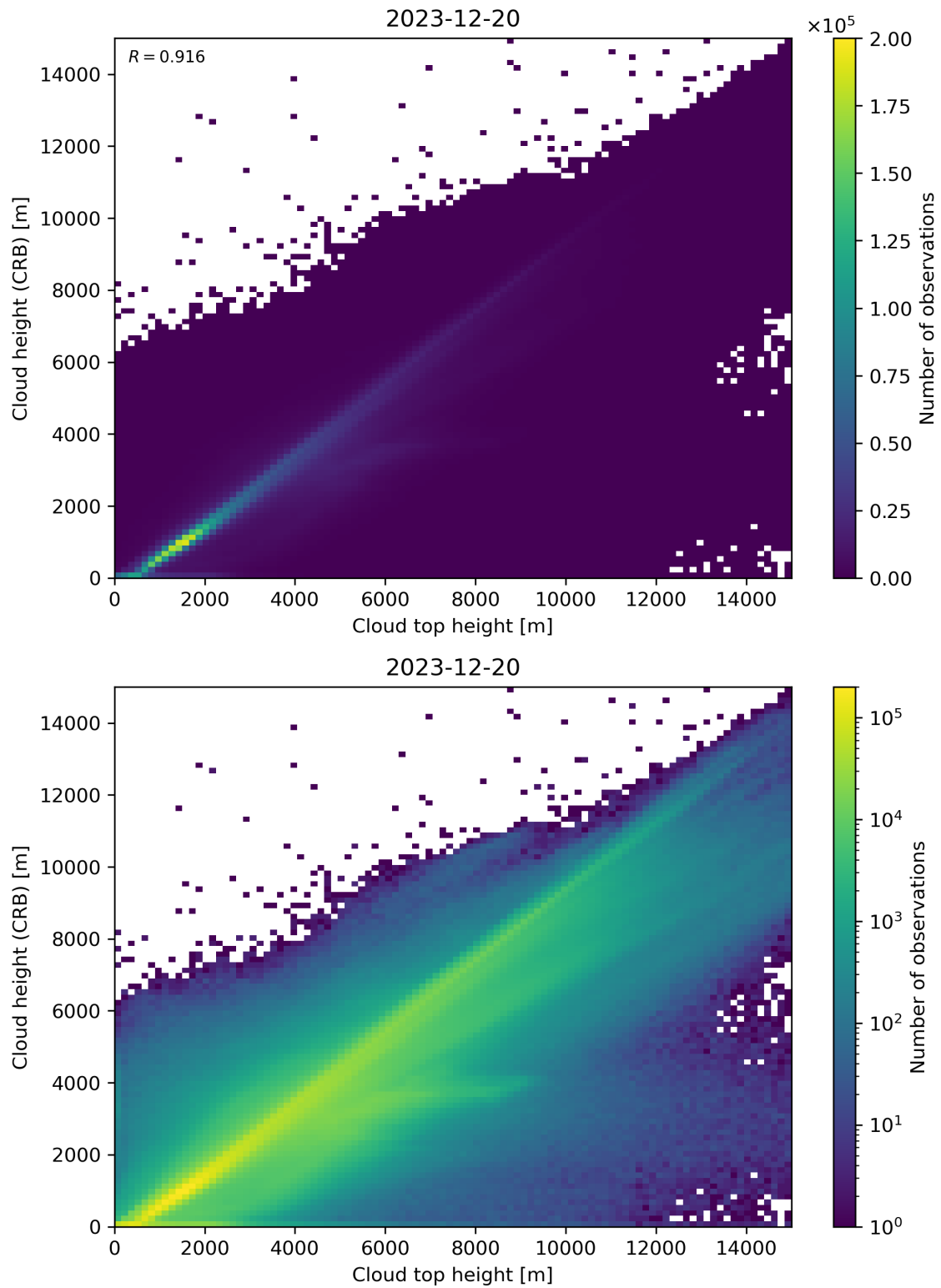


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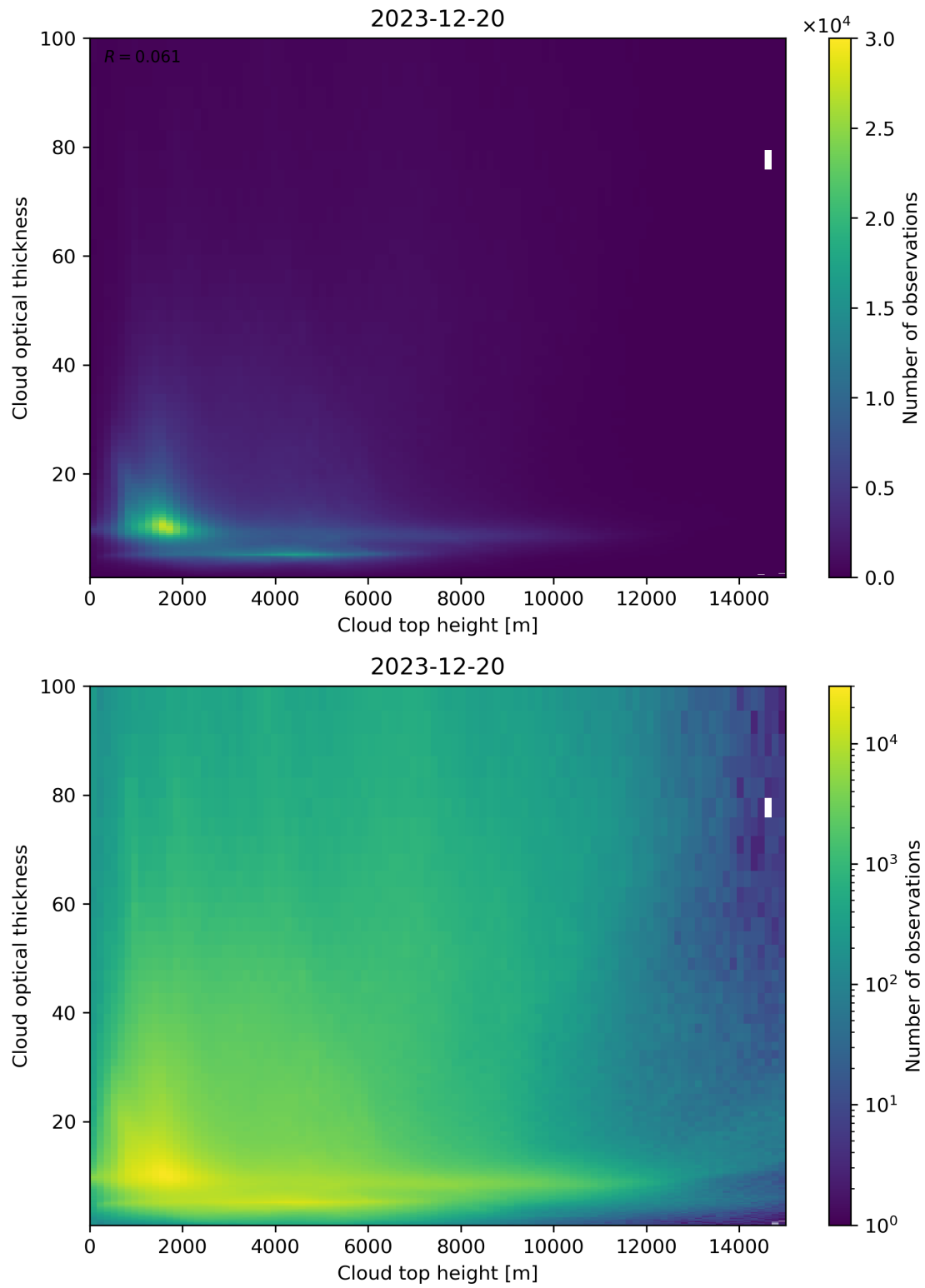


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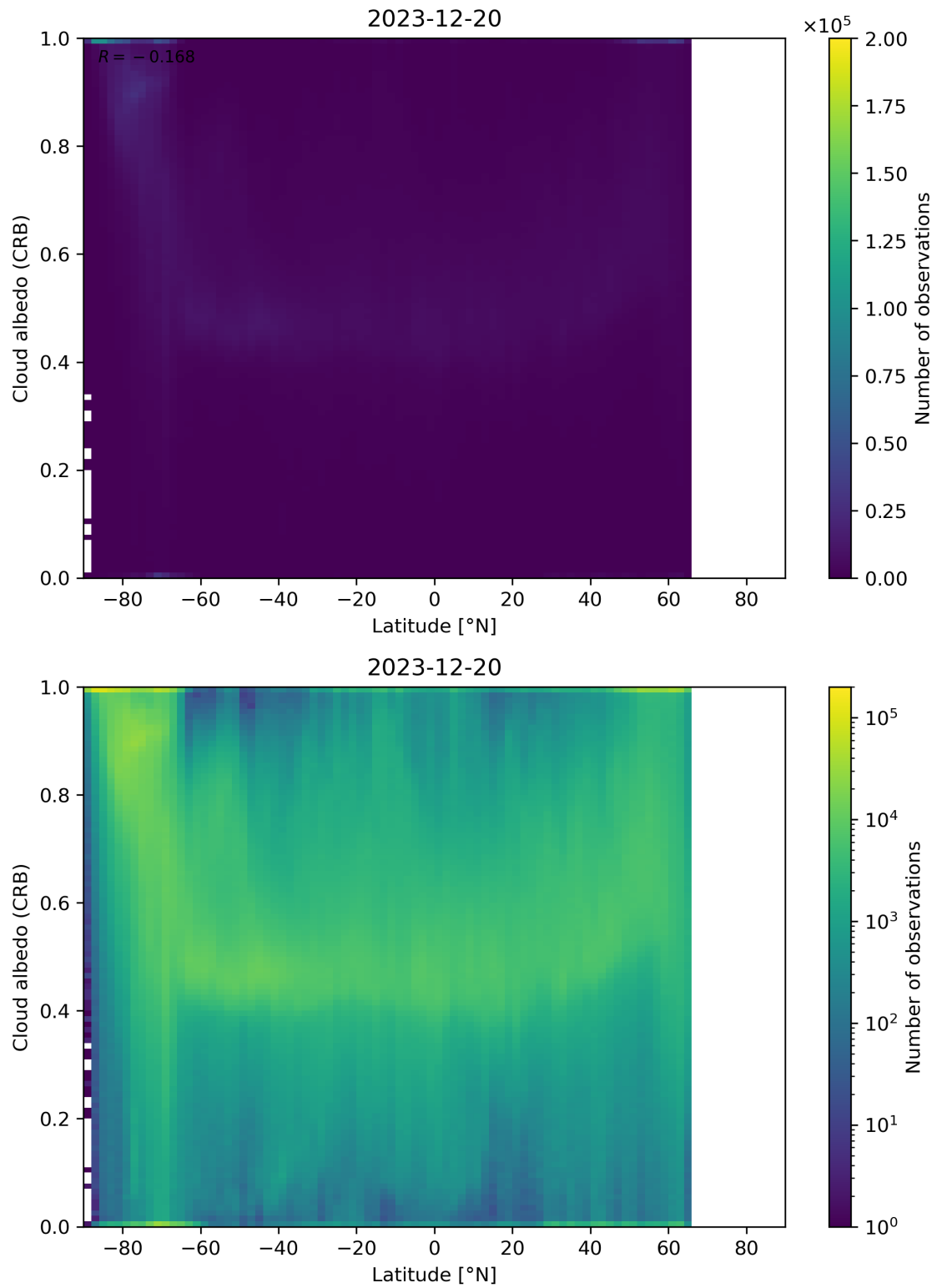


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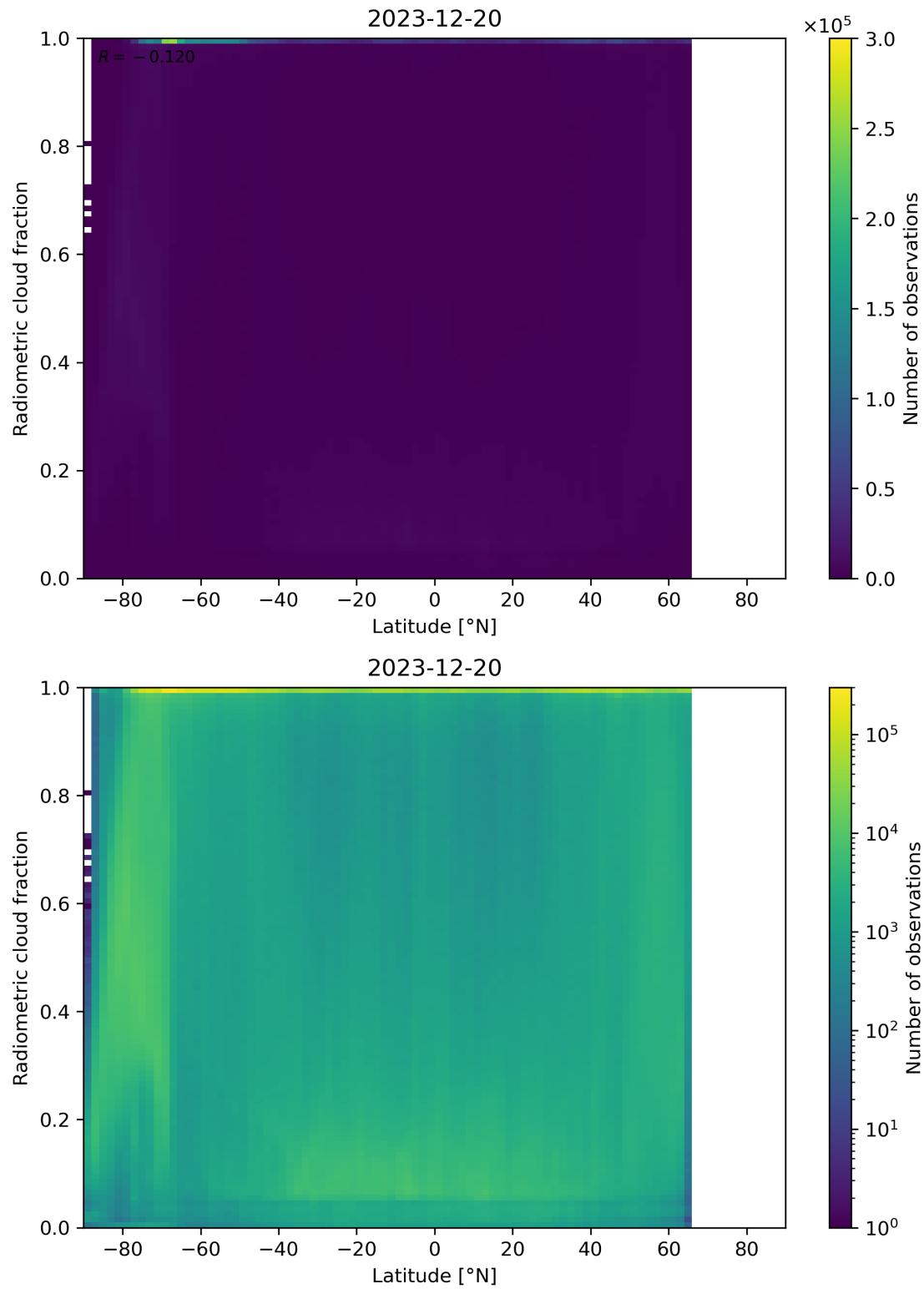


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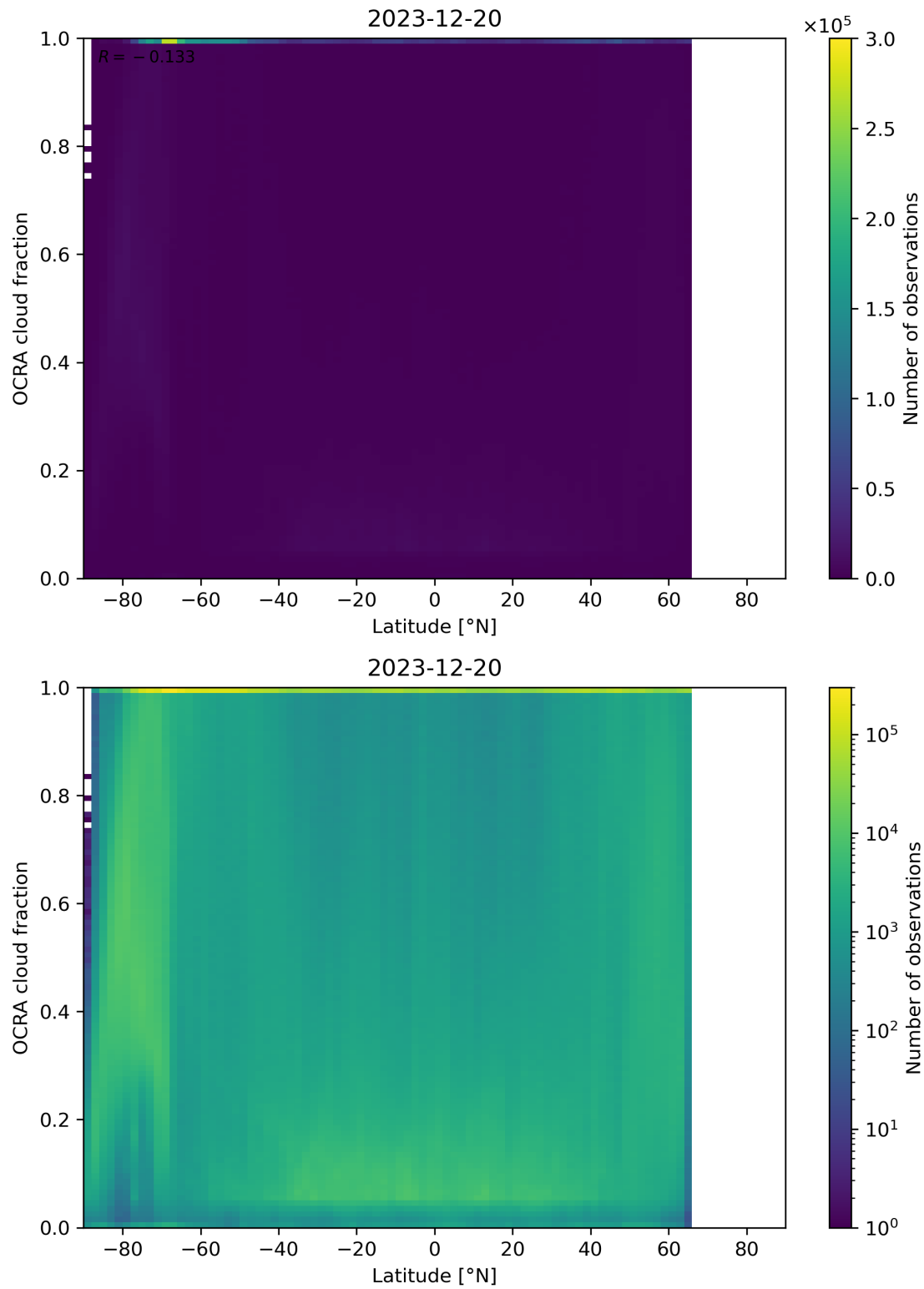


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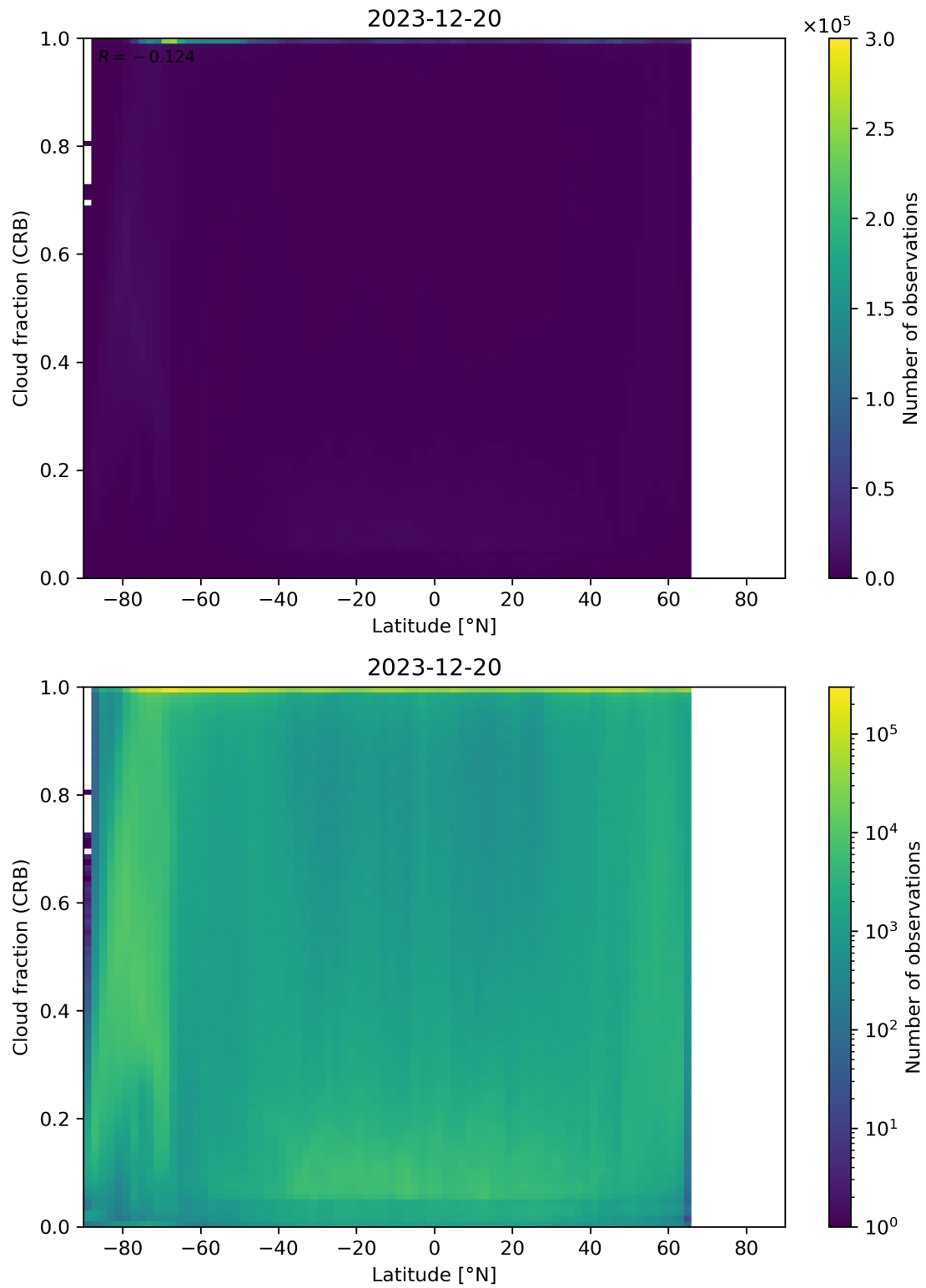


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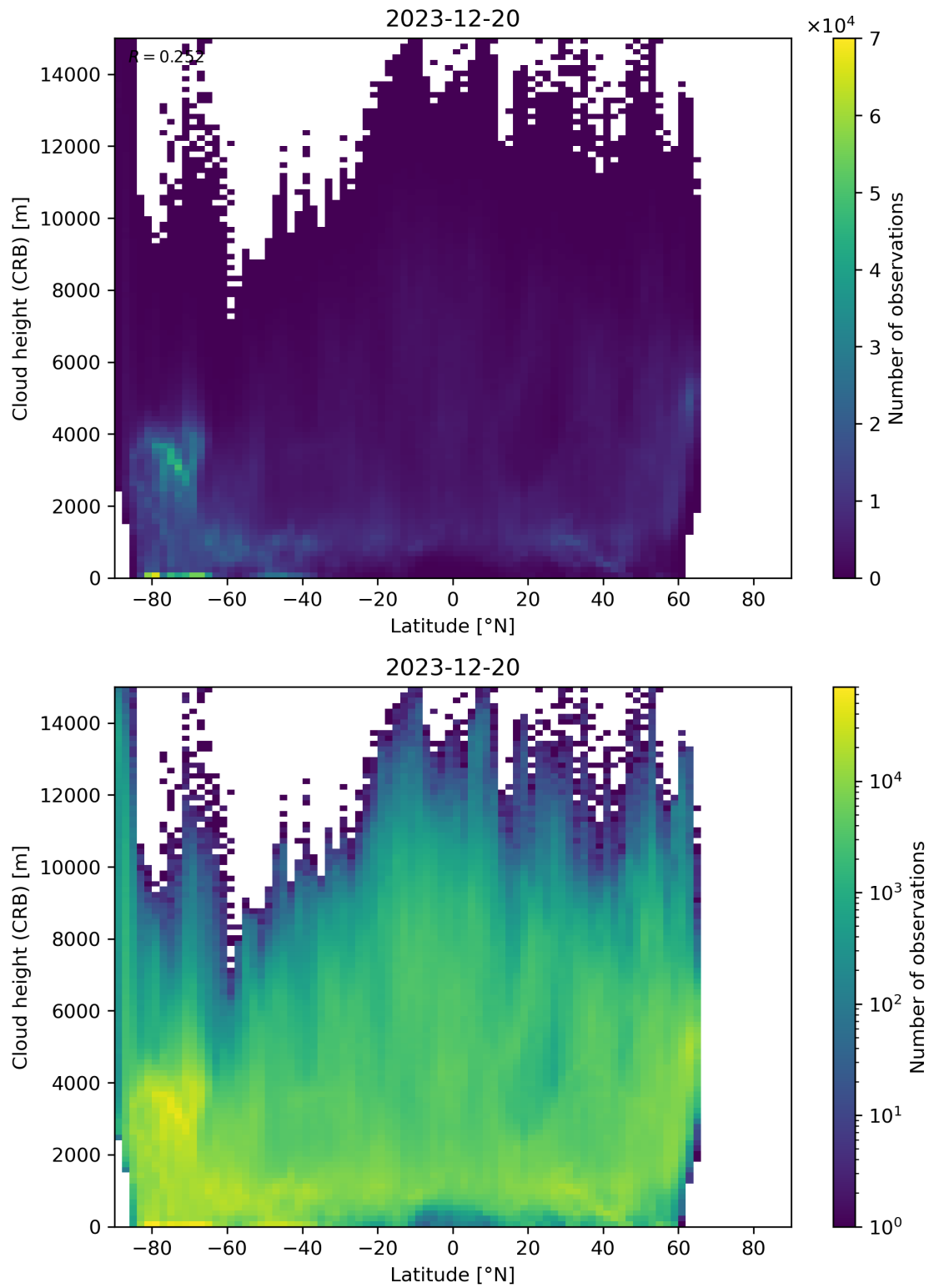


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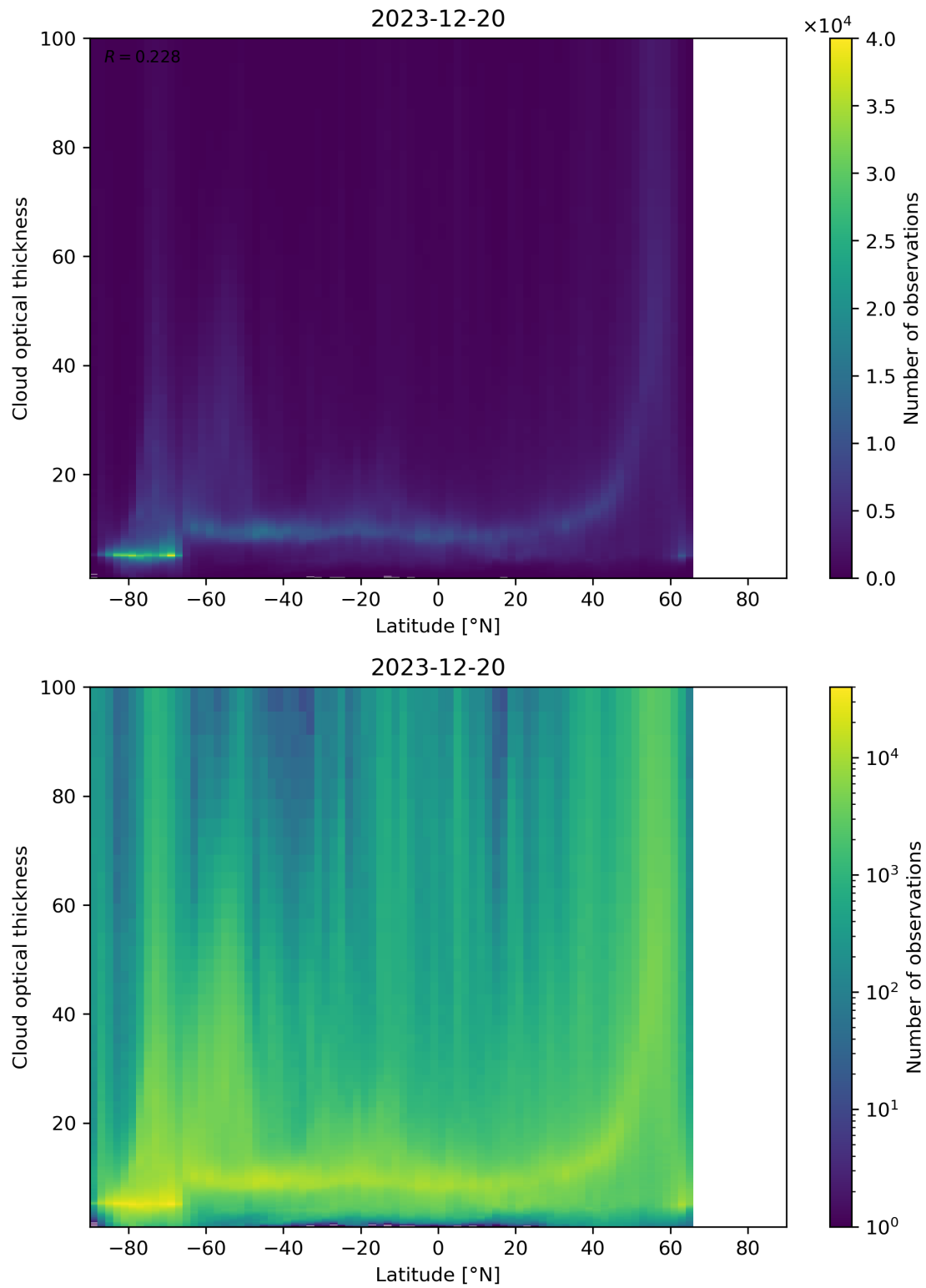


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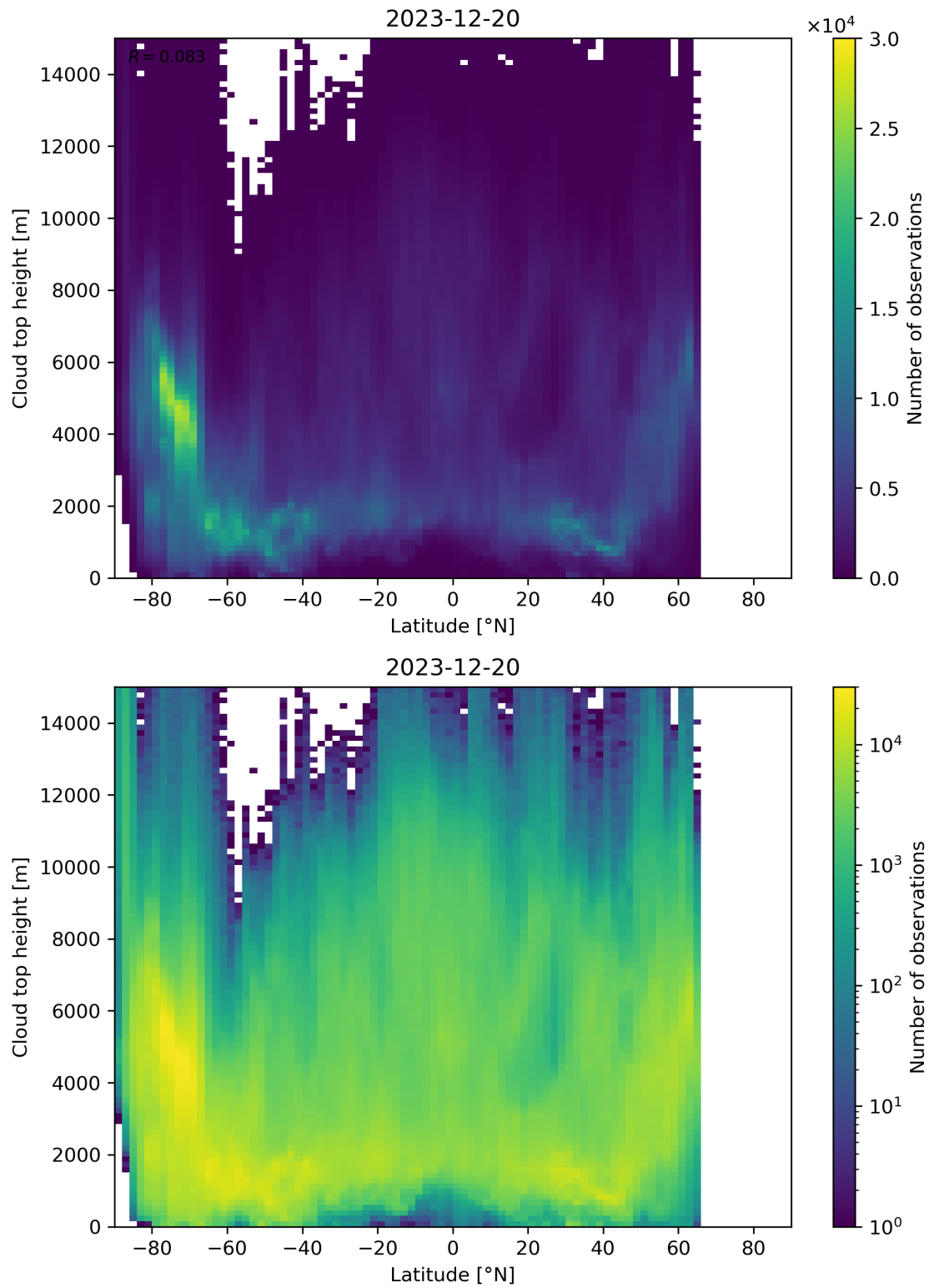


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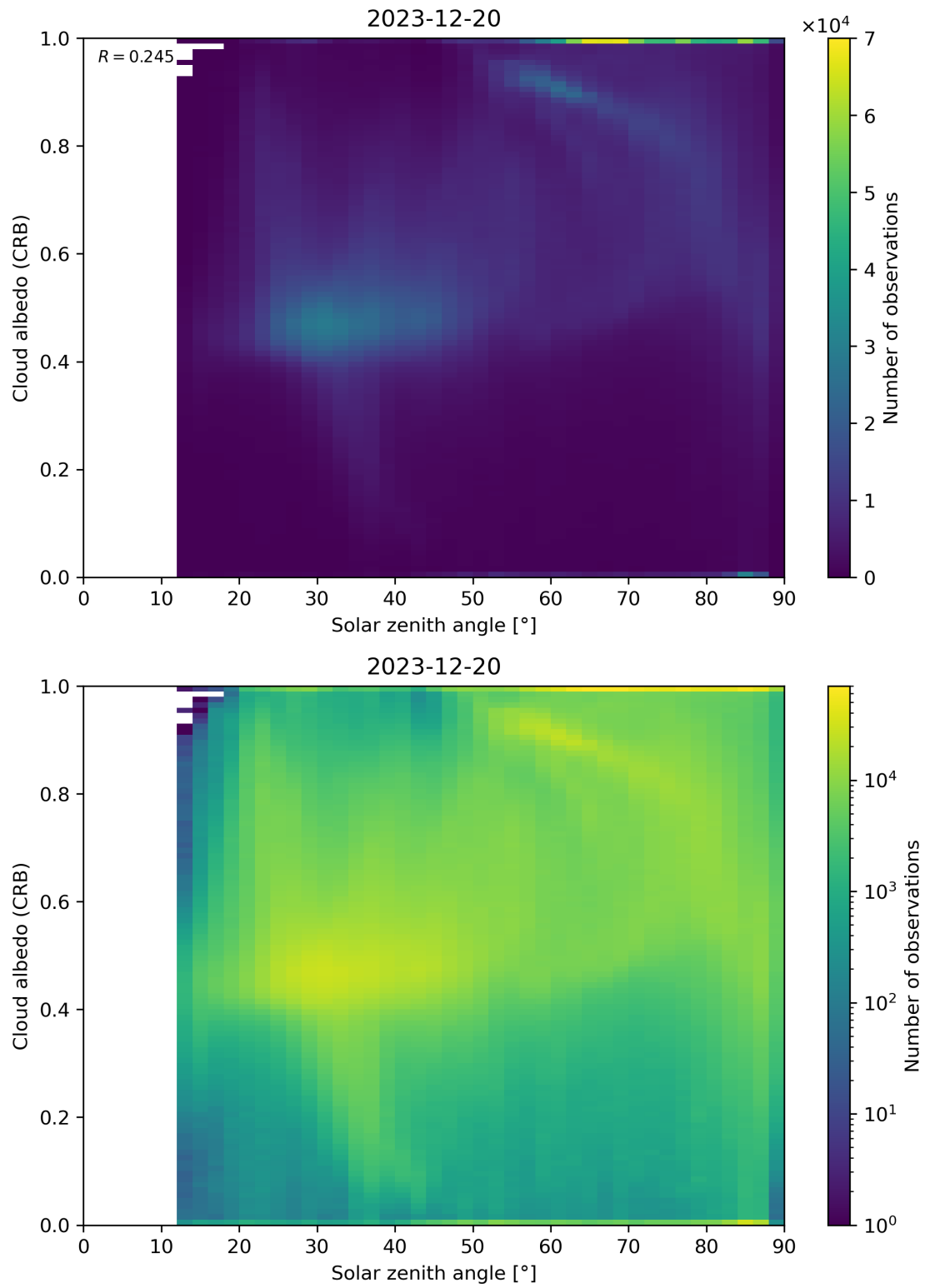


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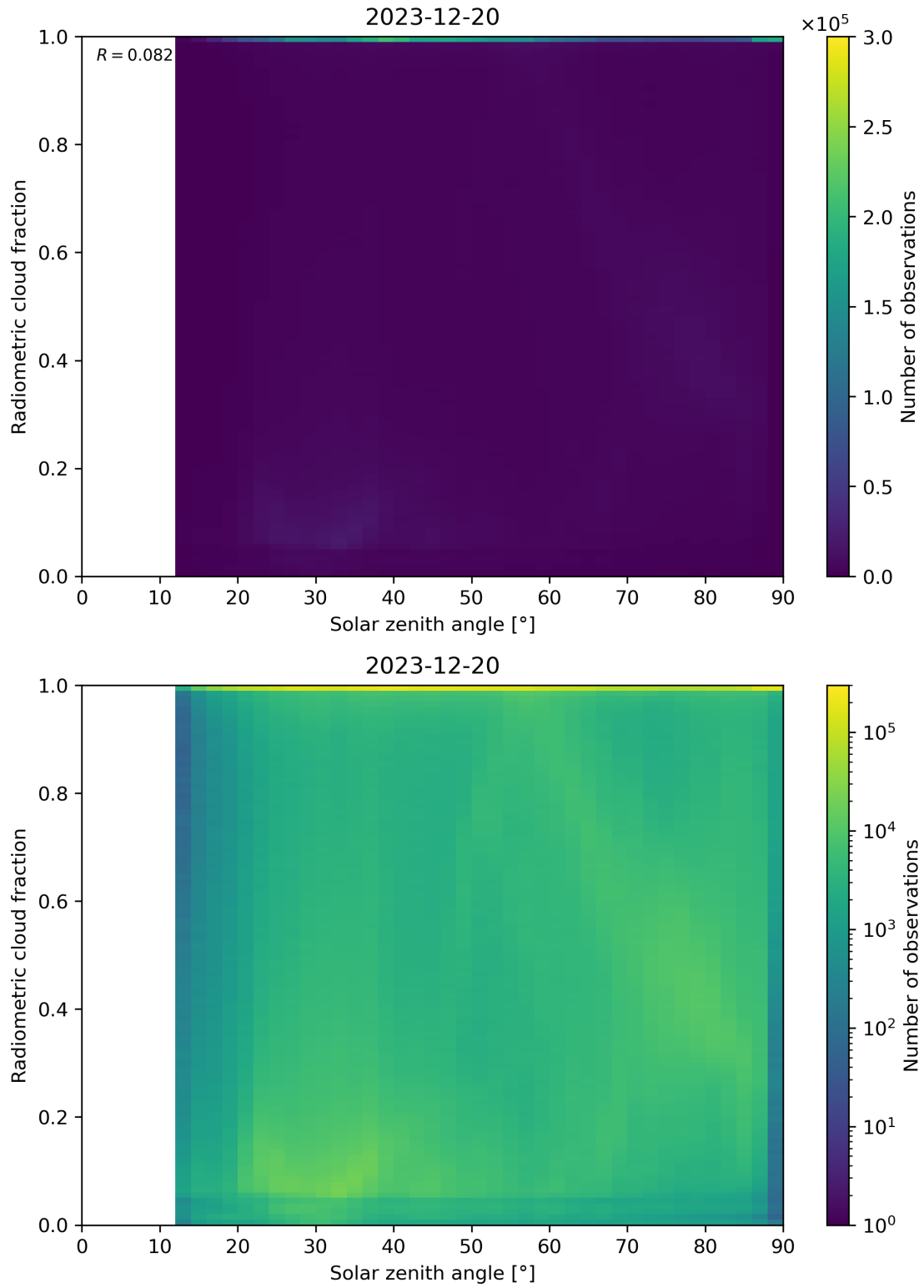


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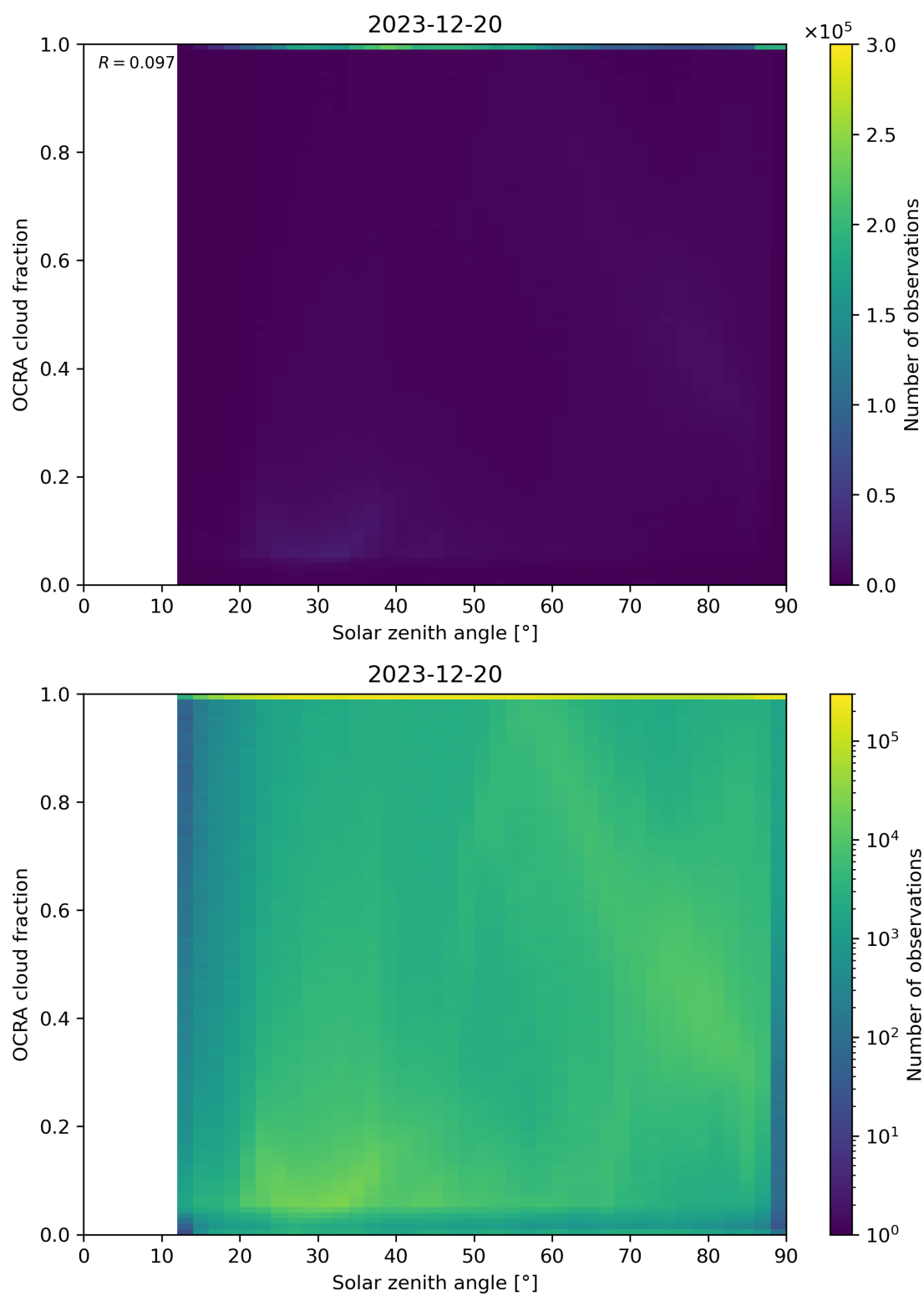


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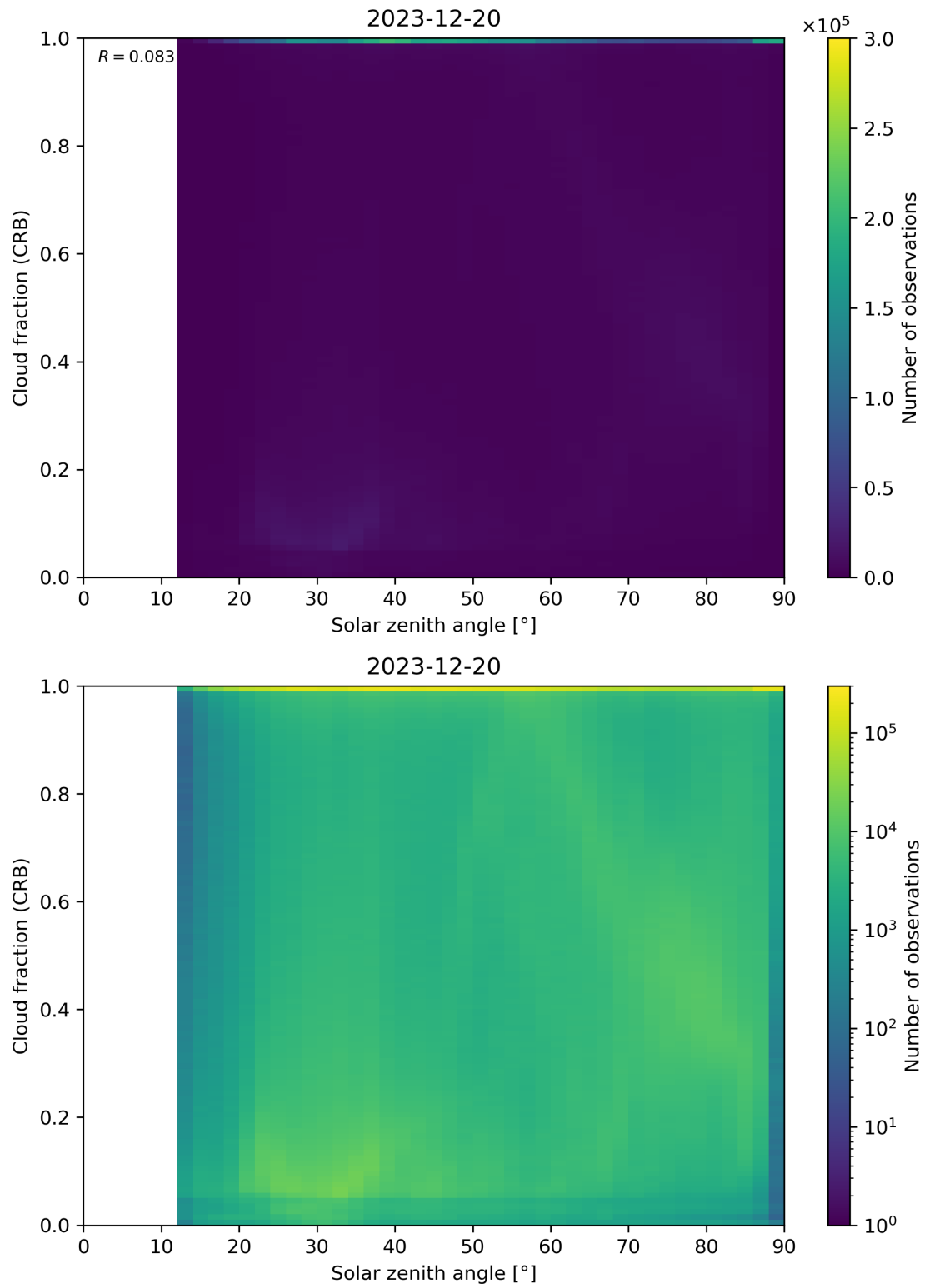


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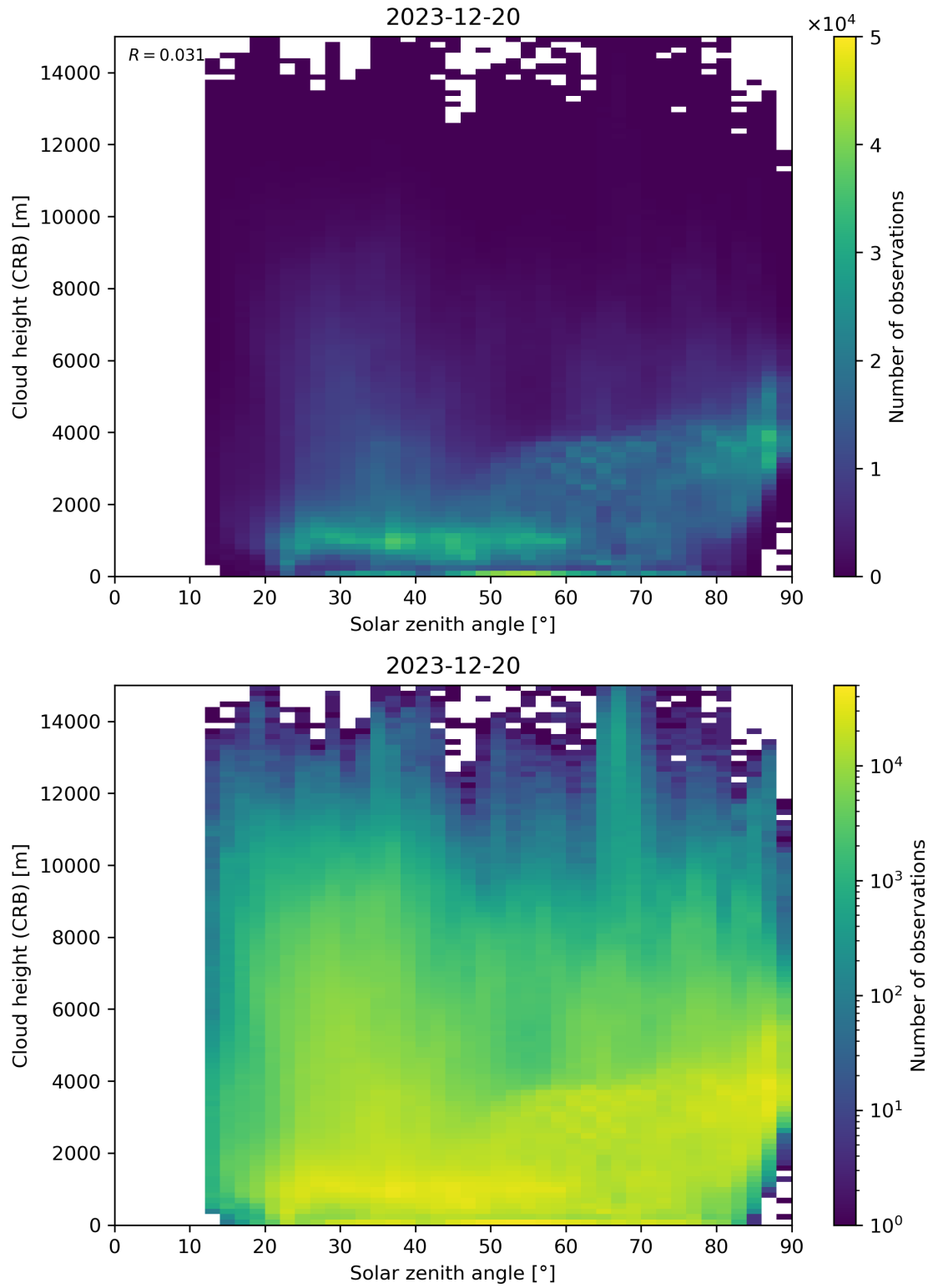


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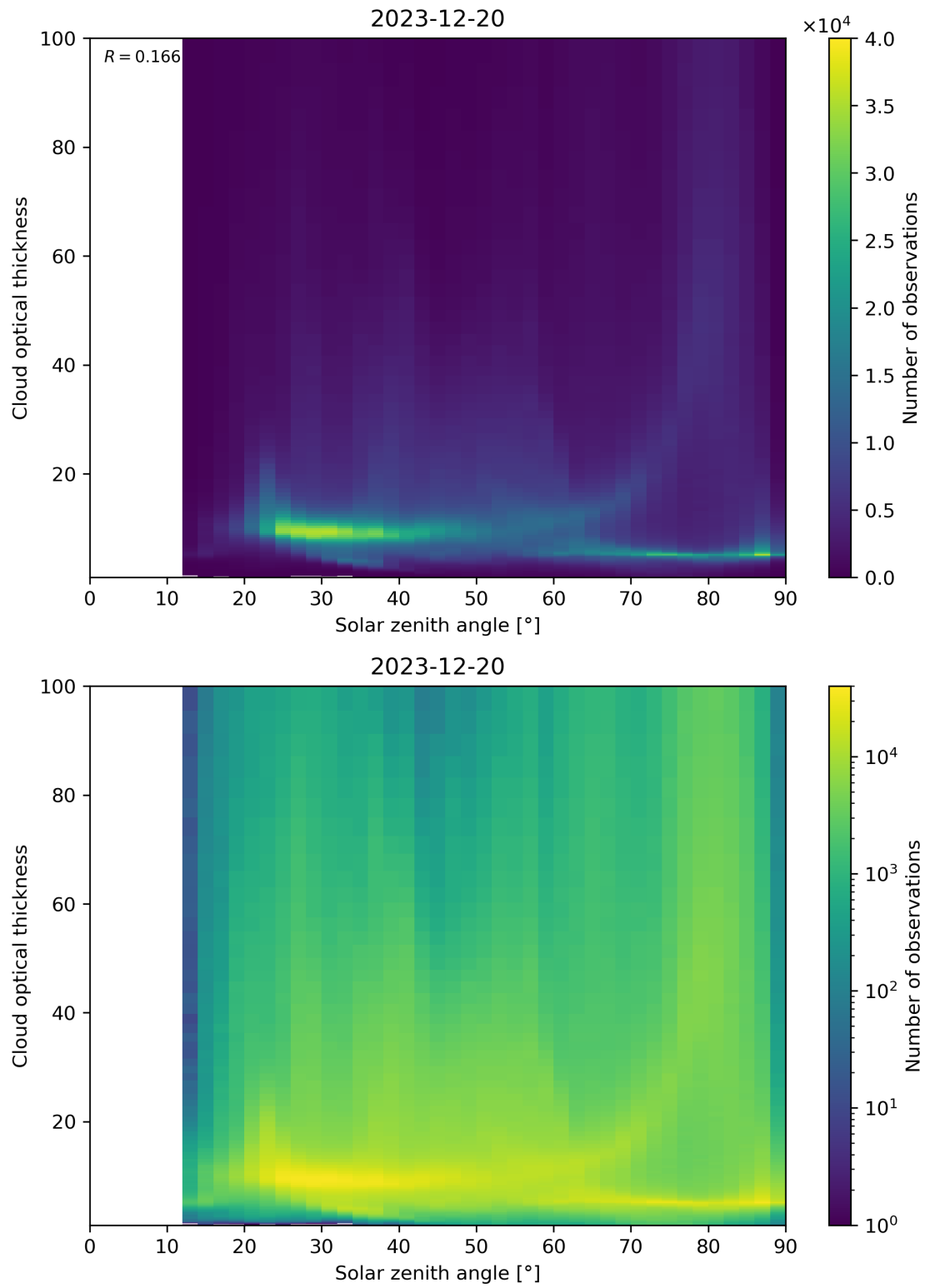


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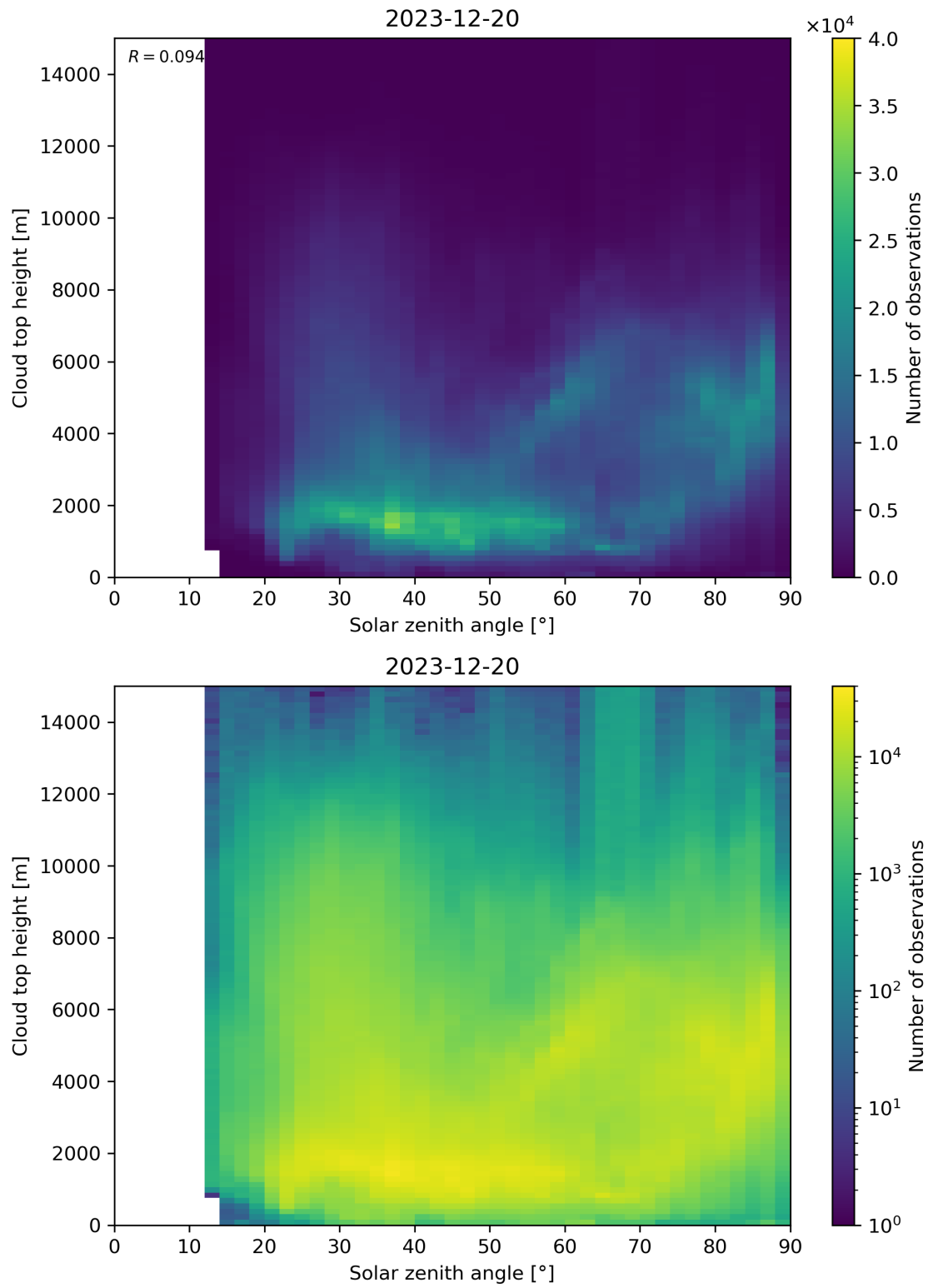


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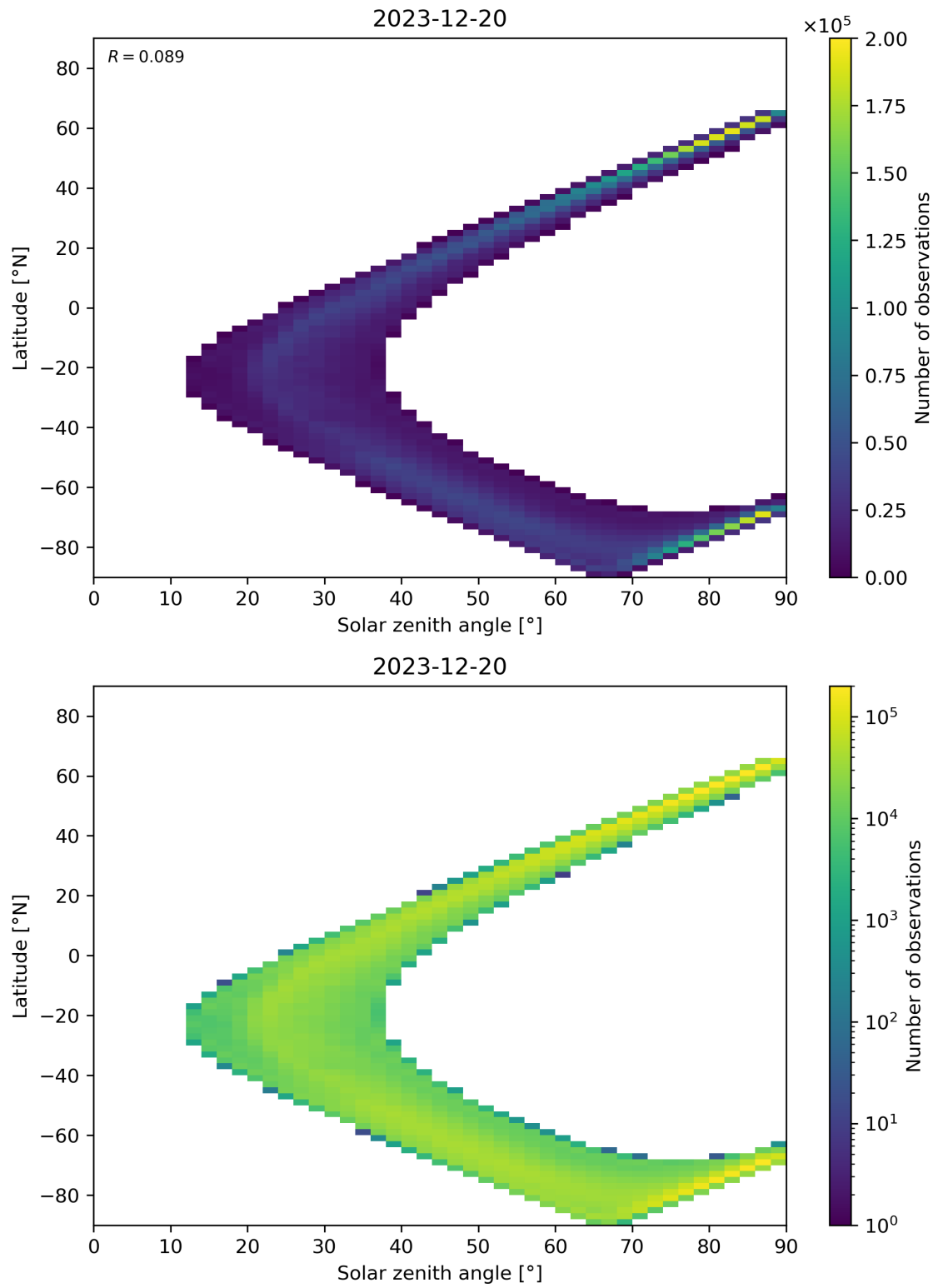


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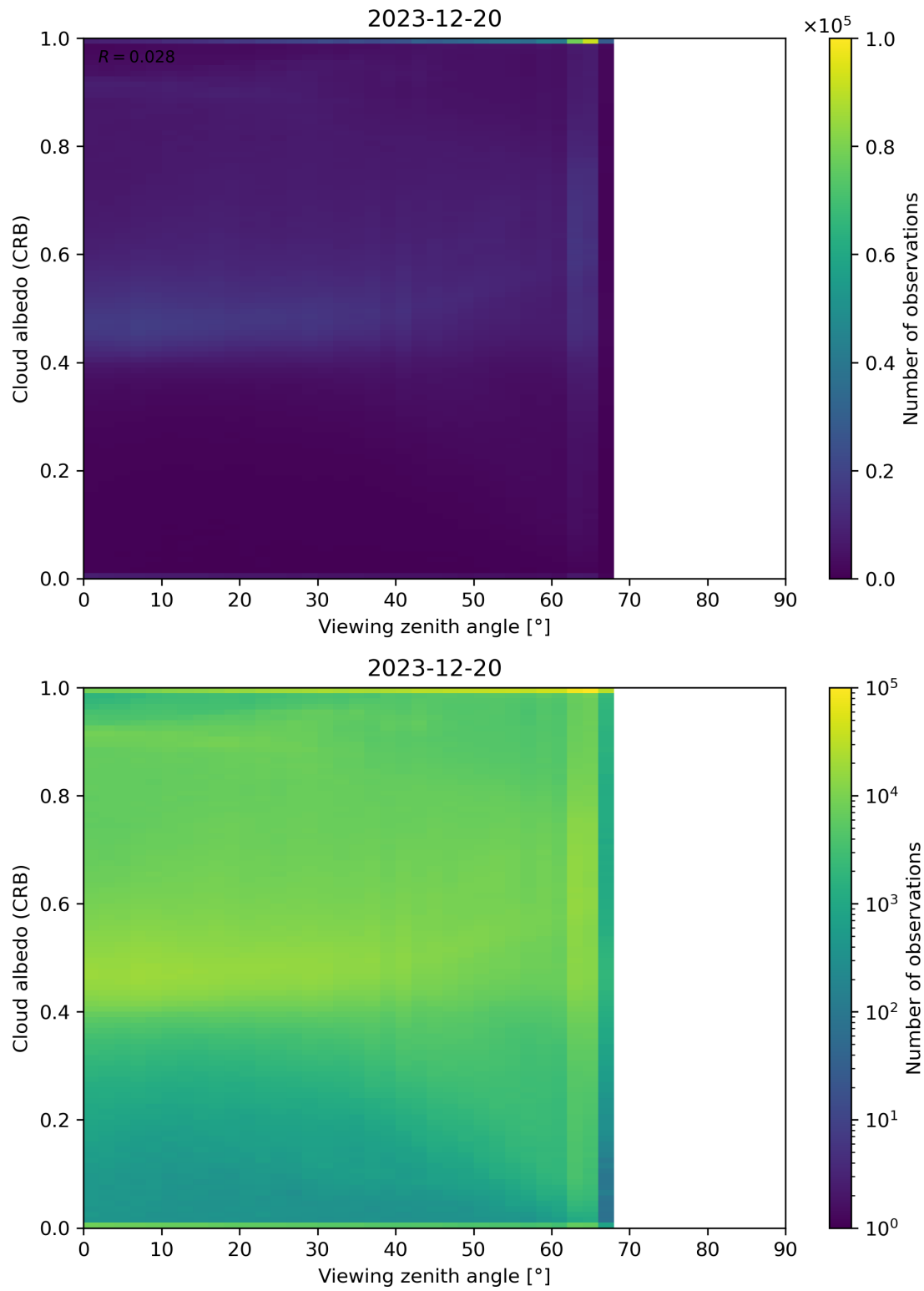


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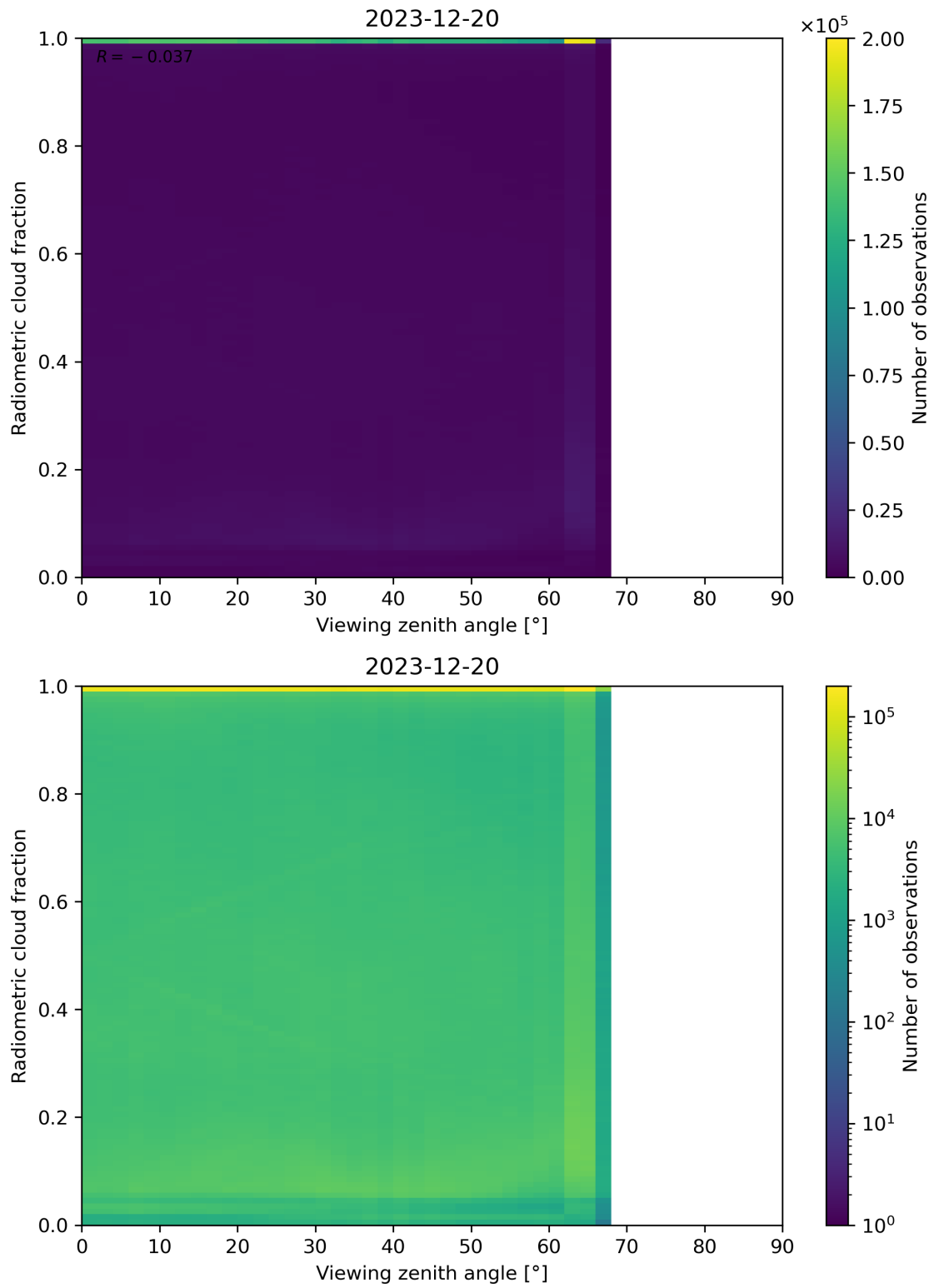


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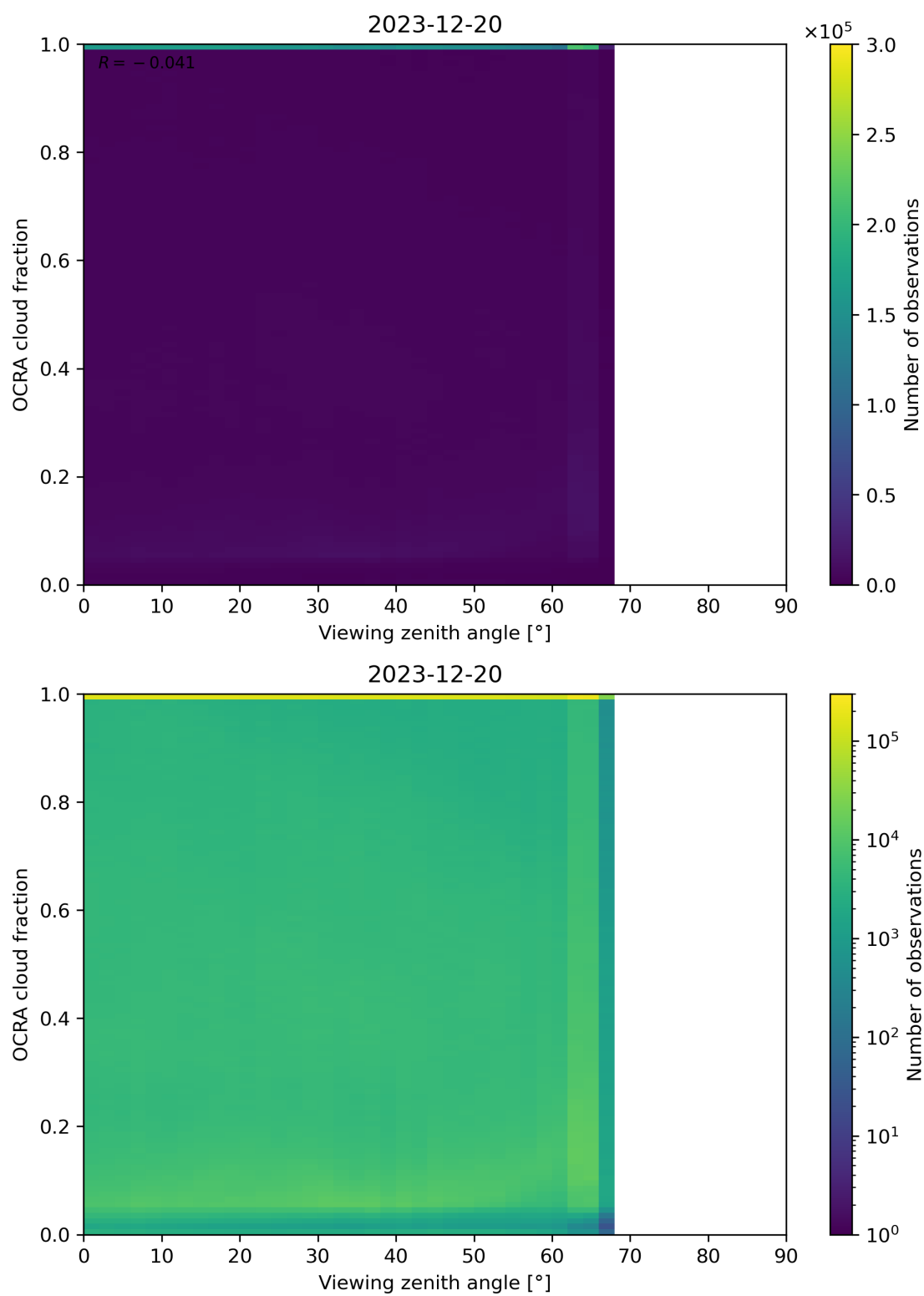


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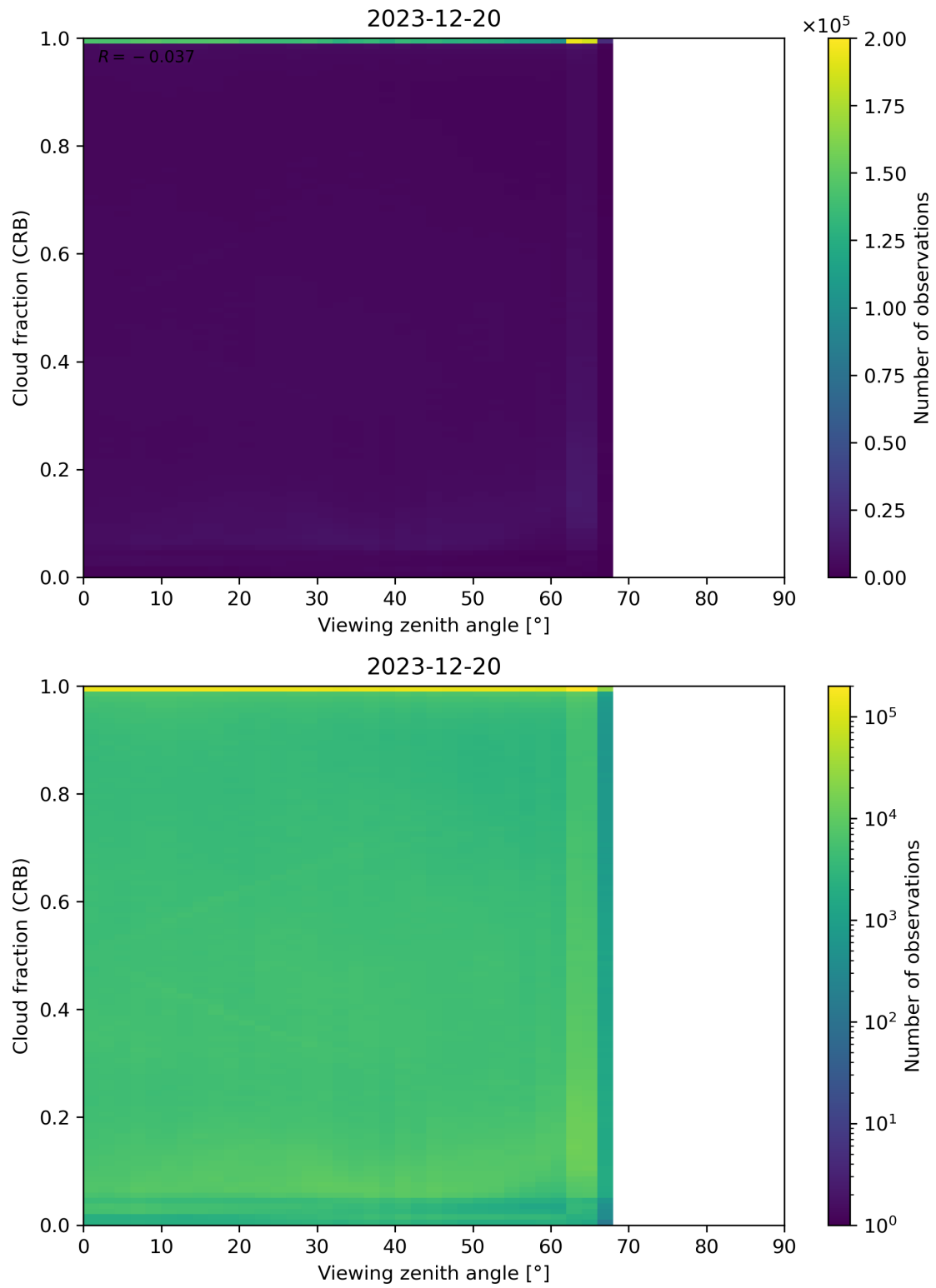


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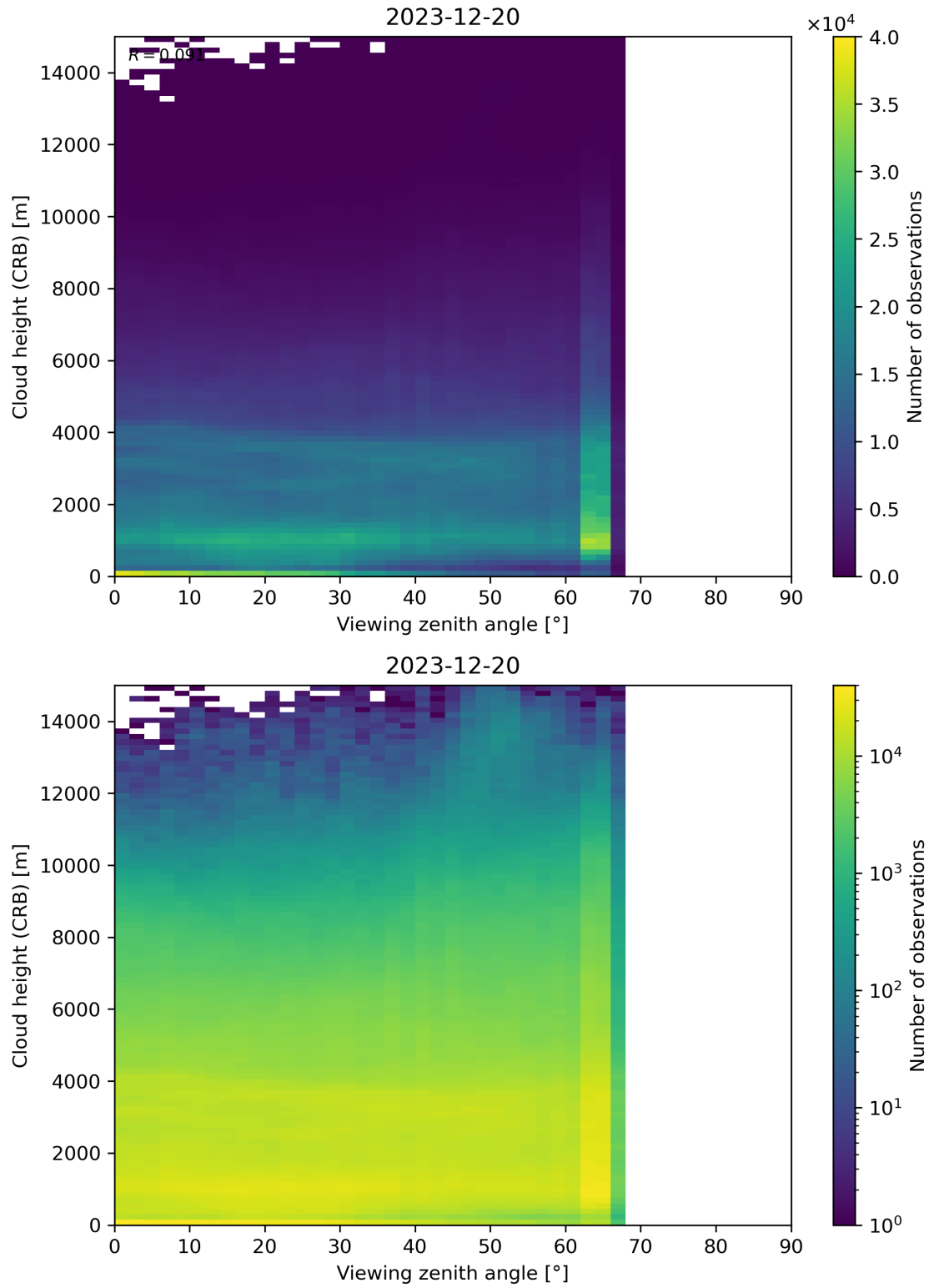


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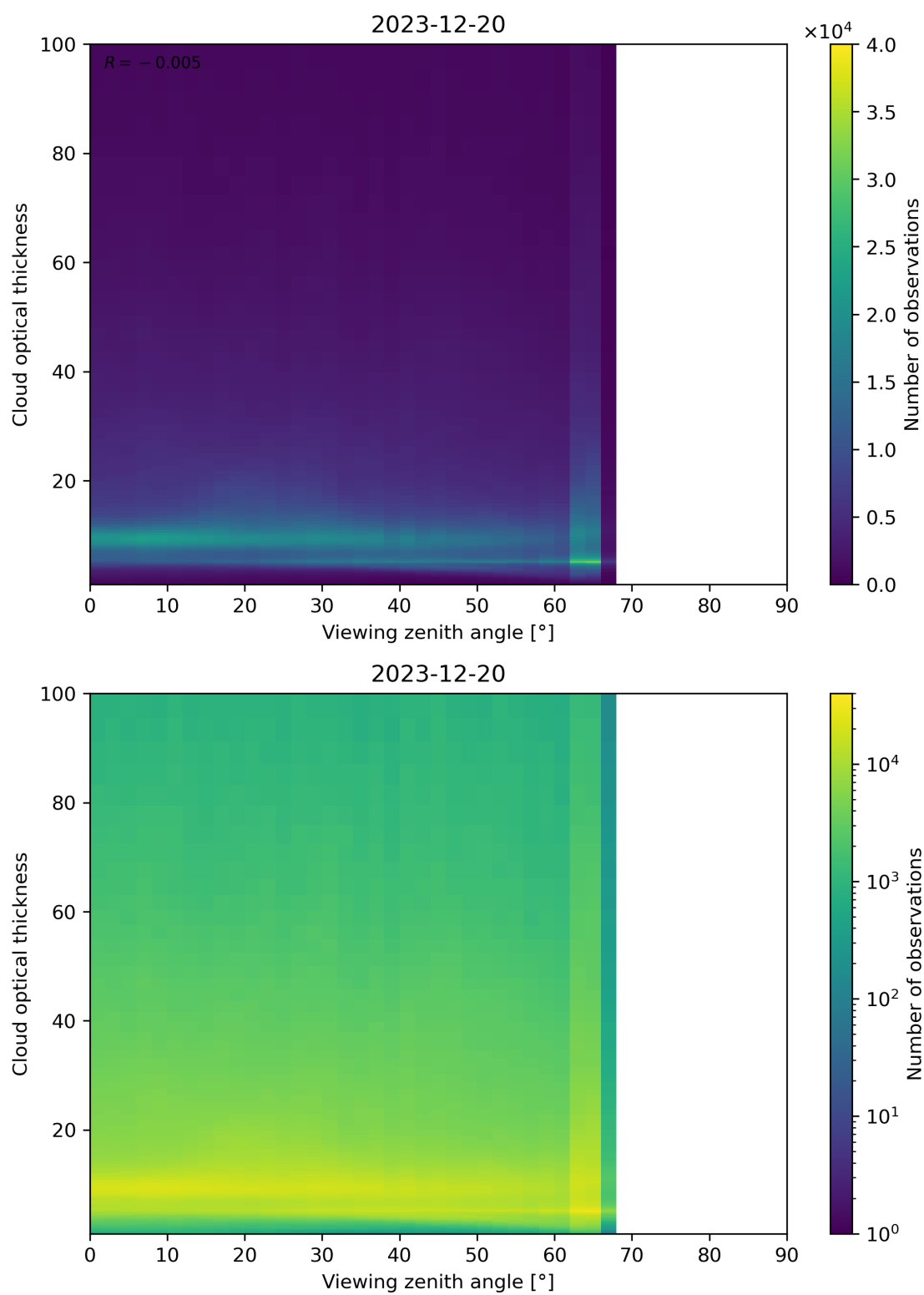


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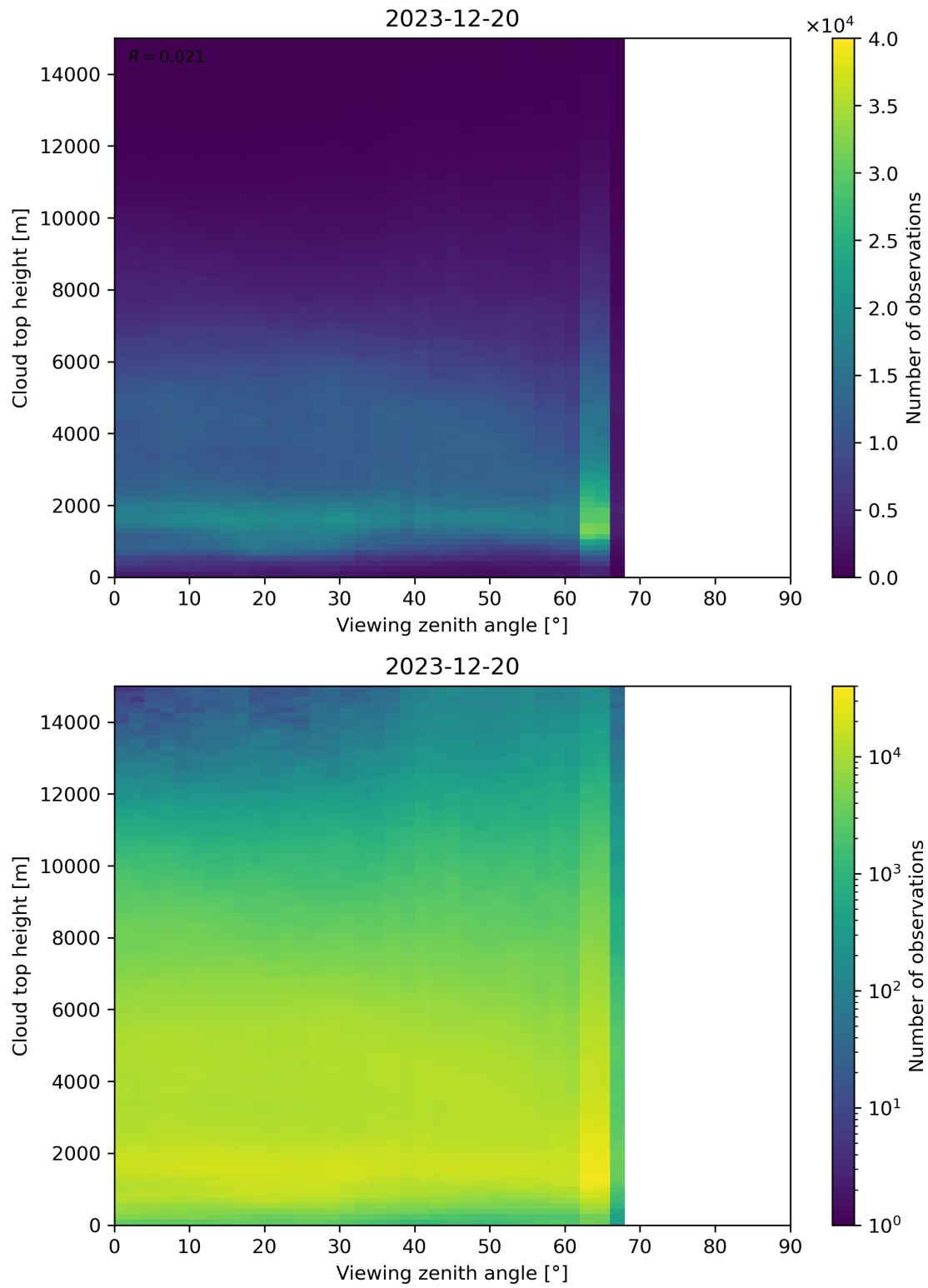


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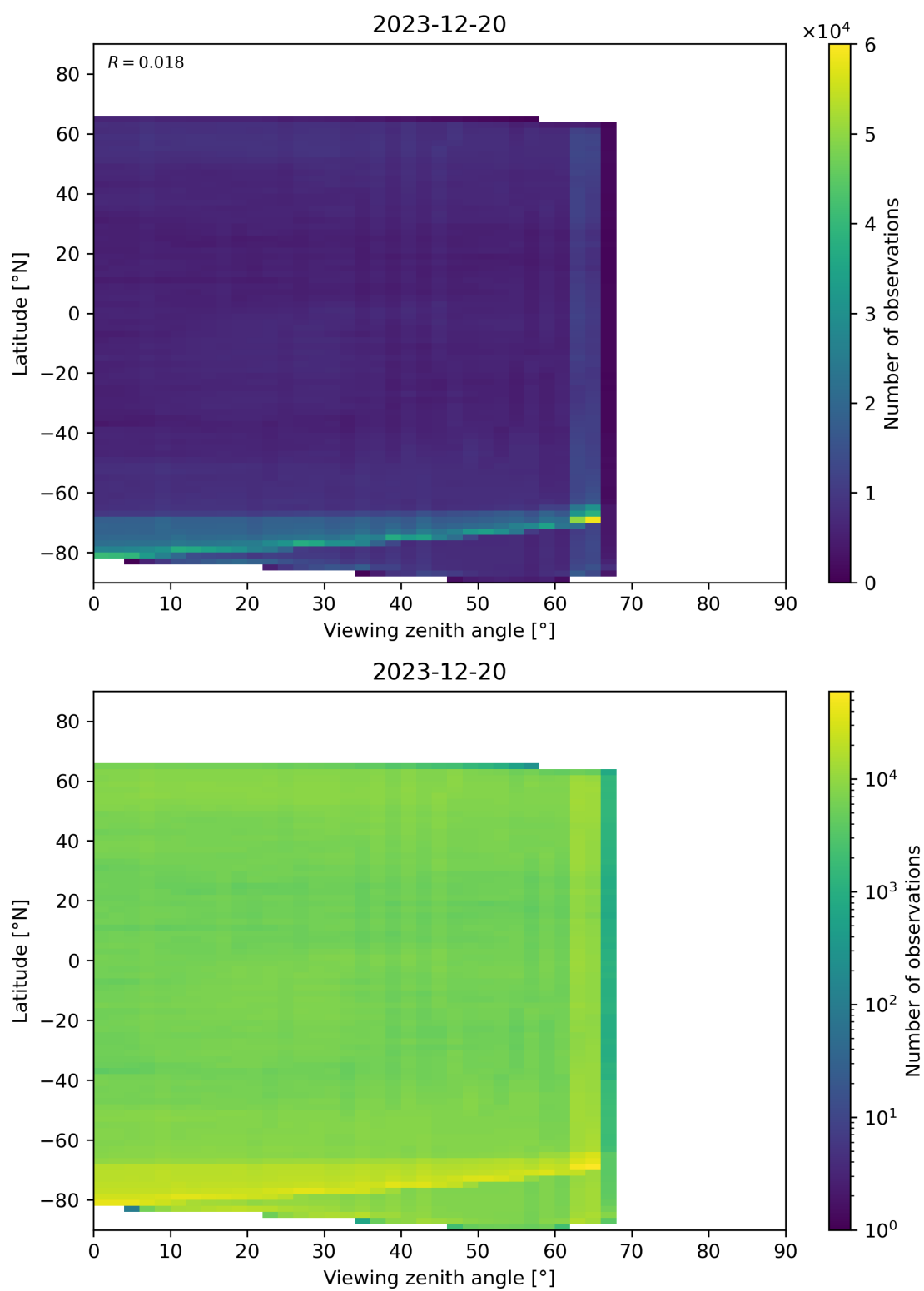


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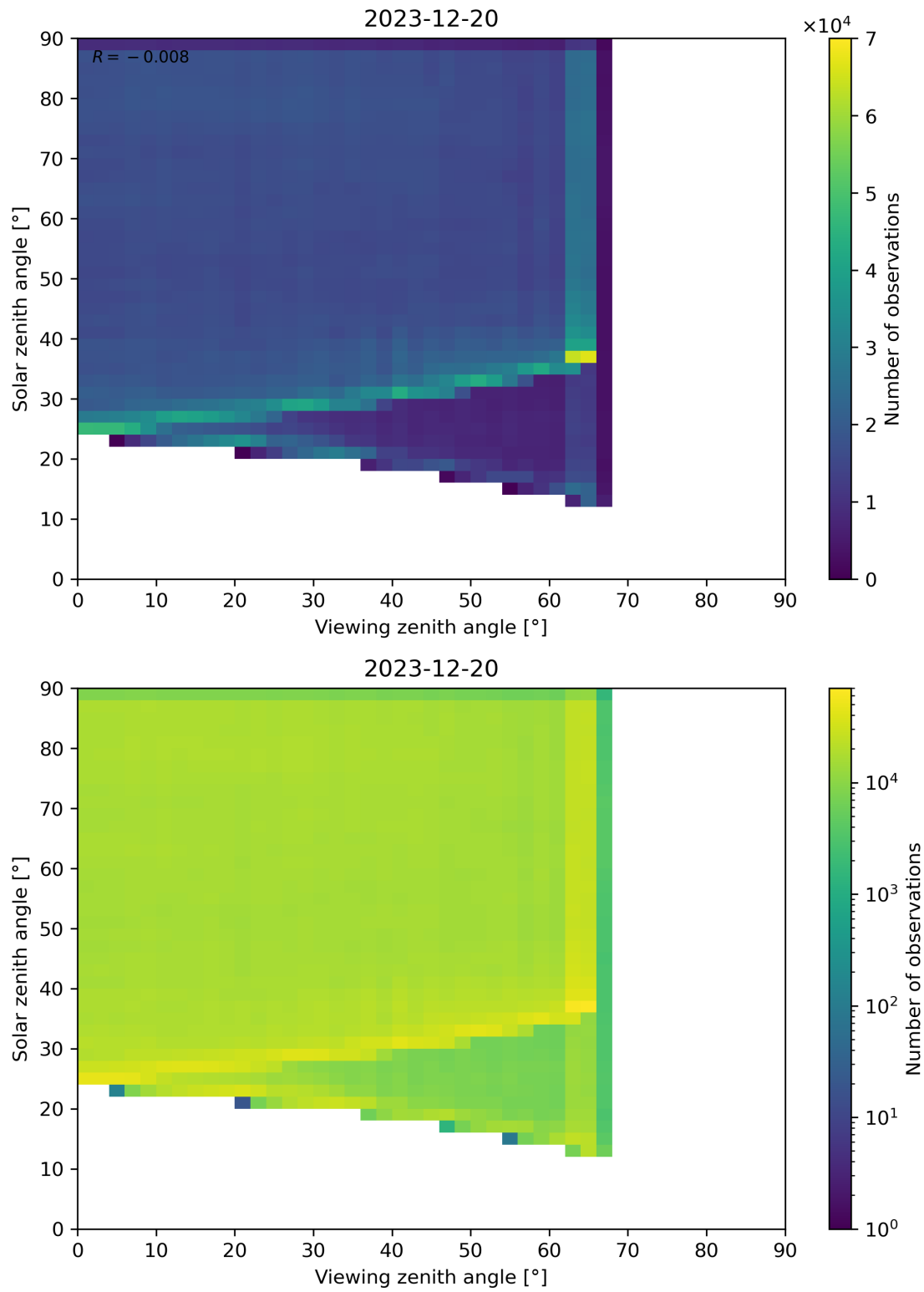


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