

PyCAMA report generated by tropl2-proc

tropl2-proc

2023-10-04 (02:45)

1 Short Introduction

1.1 The list of parameters

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

2 Definitions

The averages shown here are *unweighed* averages:

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

with N the number of observations in the dataset.

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 1: Parameterlist and basic statistics for the analysis

Variable	mean $\pm \sigma$	Count	Mode	IQR	Median	Minimum	Maximum
qa value [1]	0.650 ± 0.387	21164790	0.995	0.680	0.890	0.0	1.000
cloud fraction [1]	0.547 ± 0.350	21164790	0.995	0.745	0.510	6.543×10^{-3}	1.000
cloud top height [m]	$(0.399 \pm 0.290) \times 10^4$	21164790	1.575×10^3	3.715×10^3	3.233×10^3	0.0	2.000×10^4
cloud optical thickness [1]	24.8 ± 43.6	21164790	10.7	13.4	11.6	1.000	250
cloud fraction crb [1]	0.546 ± 0.350	21164790	0.995	0.745	0.507	8.512×10^{-3}	1.000
cloud height crb [m]	$(0.316 \pm 0.242) \times 10^4$	21164790	975	3.252×10^3	2.537×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.627 ± 0.190	21164790	0.995	0.233	0.604	0.0	1.000
surface albedo fitted [1]	0.179 ± 0.240	21164790	2.500×10^{-2}	0.201	5.186×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.163 ± 0.224	21164790	1.500×10^{-2}	0.200	3.569×10^{-2}	0.0	1.000
fitted root mean square [1]	$(6.026 \pm 11.484) \times 10^{-4}$	21164790	5.000×10^{-5}	6.984×10^{-4}	3.723×10^{-4}	1.506×10^{-6}	0.840
fitted root mean square crb [1]	$(5.282 \pm 12.448) \times 10^{-4}$	21164790	5.000×10^{-5}	6.080×10^{-4}	2.901×10^{-4}	1.566×10^{-6}	0.966
wavelength shift [nm]	$(8.651 \pm 7.120) \times 10^{-3}$	21164790	9.000×10^{-4}	9.855×10^{-3}	8.187×10^{-3}	-6.568×10^{-2}	0.321
cloud fraction apriori [1]	0.549 ± 0.356	21164790	0.995	0.794	0.512	0.0	1.000
reflectance blue ocra [1]	0.537 ± 0.213	21164790	0.295	0.345	0.502	0.129	1.96
reflectance green ocra [1]	0.485 ± 0.241	21164790	0.195	0.412	0.451	7.019×10^{-2}	2.08
reflectance continuum aband [1]	0.443 ± 0.266	21164790	4.500×10^{-2}	0.426	0.423	1.033×10^{-2}	3.80

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	1.000×10^{-2}	0.300	0.980	1.000	1.000	1.000	1.000
cloud fraction [1]	2.384×10^{-2}	6.047×10^{-2}	9.512×10^{-2}	0.138	0.214	0.959	1.000	1.000	1.000	1.000
cloud top height [m]	285	784	1.094×10^3	1.368×10^3	1.768×10^3	5.483×10^3	6.828×10^3	8.082×10^3	9.677×10^3	1.317×10^4
cloud optical thickness [1]	1.46	3.58	4.75	5.70	7.33	20.7	31.3	47.7	91.9	250
cloud fraction crb [1]	2.360×10^{-2}	5.968×10^{-2}	9.450×10^{-2}	0.137	0.213	0.957	1.000	1.000	1.000	1.000
cloud height crb [m]	47.6	428	671	903	1.237×10^3	4.489×10^3	5.637×10^3	6.715×10^3	8.079×10^3	1.018×10^4
cloud albedo crb [1]	0.142	0.340	0.421	0.464	0.507	0.740	0.830	0.924	1.000	1.000
surface albedo fitted [1]	0.0	9.406×10^{-3}	1.413×10^{-2}	1.813×10^{-2}	2.401×10^{-2}	0.225	0.401	0.631	0.744	0.914
surface albedo fitted crb [1]	5.044×10^{-5}	7.166×10^{-3}	1.038×10^{-2}	1.330×10^{-2}	1.750×10^{-2}	0.218	0.391	0.588	0.676	0.836
fitted root mean square [1]	1.660×10^{-5}	3.403×10^{-5}	5.668×10^{-5}	8.630×10^{-5}	1.384×10^{-4}	8.368×10^{-4}	1.133×10^{-3}	1.433×10^{-3}	1.900×10^{-3}	2.982×10^{-3}
fitted root mean square crb [1]	9.893×10^{-6}	2.341×10^{-5}	3.995×10^{-5}	6.103×10^{-5}	1.010×10^{-4}	7.090×10^{-4}	1.016×10^{-3}	1.338×10^{-3}	1.828×10^{-3}	2.877×10^{-3}
wavelength shift [nm]	-7.600×10^{-3}	-5.926×10^{-4}	4.980×10^{-4}	1.587×10^{-3}	3.433×10^{-3}	1.329×10^{-2}	1.571×10^{-2}	1.785×10^{-2}	2.071×10^{-2}	2.683×10^{-2}
cloud fraction apriori [1]	1.294×10^{-2}	5.690×10^{-2}	8.750×10^{-2}	0.129	0.206	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.231	0.259	0.283	0.311	0.356	0.701	0.776	0.828	0.895	1.06
reflectance green ocra [1]	0.152	0.175	0.196	0.221	0.267	0.679	0.763	0.821	0.889	1.03
reflectance continuum aband [1]	3.148×10^{-2}	5.750×10^{-2}	9.351×10^{-2}	0.141	0.221	0.647	0.738	0.805	0.881	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]	0.681 ± 0.369	11079657	0.580	0.900	0.0	1.000	0.400	0.980
cloud fraction [1]	0.572 ± 0.356	11079657	0.773	0.564	7.812×10^{-3}	1.000	0.222	0.995
cloud top height [m]	$(0.408 \pm 0.262) \times 10^4$	11079657	3.543×10^3	3.549×10^3	0.0	2.000×10^4	2.027×10^3	5.570×10^3
cloud optical thickness [1]	22.1 ± 32.7	11079657	14.4	11.9	1.000	250	7.47	21.8
cloud fraction crb [1]	0.571 ± 0.356	11079657	0.775	0.562	8.533×10^{-3}	1.000	0.219	0.994
cloud height crb [m]	$(0.330 \pm 0.228) \times 10^4$	11079657	3.093×10^3	2.850×10^3	0.0	2.000×10^4	1.485×10^3	4.578×10^3
cloud albedo crb [1]	0.615 ± 0.174	11079657	0.218	0.603	0.0	1.000	0.506	0.724
surface albedo fitted [1]	0.148 ± 0.180	11079657	0.178	6.998×10^{-2}	0.0	1.000	2.691×10^{-2}	0.205
surface albedo fitted crb [1]	0.138 ± 0.176	11079657	0.180	4.700×10^{-2}	0.0	1.000	1.933×10^{-2}	0.199
fitted root mean square [1]	$(5.812 \pm 14.505) \times 10^{-4}$	11079657	6.564×10^{-4}	3.243×10^{-4}	1.506×10^{-6}	0.840	1.276×10^{-4}	7.840×10^{-4}
fitted root mean square crb [1]	$(5.505 \pm 16.243) \times 10^{-4}$	11079657	6.712×10^{-4}	2.833×10^{-4}	1.566×10^{-6}	0.966	8.930×10^{-5}	7.605×10^{-4}
wavelength shift [nm]	$(8.312 \pm 7.005) \times 10^{-3}$	11079657	9.545×10^{-3}	7.712×10^{-3}	-6.568×10^{-2}	0.321	3.225×10^{-3}	1.277×10^{-2}
cloud fraction apriori [1]	0.574 ± 0.362	11079657	0.787	0.568	0.0	1.000	0.213	1.000
reflectance blue ocrs [1]	0.514 ± 0.200	11079657	0.311	0.480	0.129	1.96	0.347	0.657
reflectance green ocrs [1]	0.461 ± 0.226	11079657	0.374	0.427	7.019×10^{-2}	2.08	0.259	0.633
reflectance continuum aband [1]	0.430 ± 0.252	11079657	0.384	0.406	1.033×10^{-2}	3.77	0.228	0.613

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]	0.617 ± 0.403	10085133	0.830	0.860	0.0	1.000	0.150	0.980
cloud fraction [1]	0.520 ± 0.341	10085133	0.683	0.461	6.543×10^{-3}	1.000	0.207	0.890
cloud top height [m]	$(0.389 \pm 0.318) \times 10^4$	10085133	3.776×10^3	2.844×10^3	0.0	2.000×10^4	1.581×10^3	5.357×10^3
cloud optical thickness [1]	27.8 ± 52.8	10085133	12.3	11.3	1.000	250	7.17	19.5
cloud fraction crb [1]	0.519 ± 0.341	10085133	0.681	0.457	8.512×10^{-3}	1.000	0.207	0.888
cloud height crb [m]	$(0.300 \pm 0.255) \times 10^4$	10085133	3.294×10^3	2.150×10^3	0.0	2.000×10^4	1.057×10^3	4.351×10^3
cloud albedo crb [1]	0.641 ± 0.206	10085133	0.260	0.605	0.0	1.000	0.508	0.768
surface albedo fitted [1]	0.212 ± 0.289	10085133	0.306	4.057×10^{-2}	0.0	1.000	2.200×10^{-2}	0.328
surface albedo fitted crb [1]	0.190 ± 0.264	10085133	0.306	2.901×10^{-2}	0.0	1.000	1.615×10^{-2}	0.322
fitted root mean square [1]	$(6.261 \pm 6.747) \times 10^{-4}$	10085133	7.271×10^{-4}	4.291×10^{-4}	3.154×10^{-6}	0.108	1.565×10^{-4}	8.836×10^{-4}
fitted root mean square crb [1]	$(5.036 \pm 5.935) \times 10^{-4}$	10085133	5.469×10^{-4}	2.961×10^{-4}	2.853×10^{-6}	3.838×10^{-2}	1.147×10^{-4}	6.616×10^{-4}
wavelength shift [nm]	$(9.023 \pm 7.227) \times 10^{-3}$	10085133	1.012×10^{-2}	8.745×10^{-3}	-4.630×10^{-2}	6.446×10^{-2}	3.691×10^{-3}	1.381×10^{-2}
cloud fraction apriori [1]	0.522 ± 0.348	10085133	0.714	0.461	0.0	1.000	0.200	0.914
reflectance blue oca [1]	0.563 ± 0.223	10085133	0.380	0.532	0.132	1.96	0.368	0.748
reflectance green oca [1]	0.511 ± 0.253	10085133	0.450	0.483	7.638×10^{-2}	1.93	0.277	0.727
reflectance continuum aband [1]	0.456 ± 0.280	10085133	0.469	0.449	1.172×10^{-2}	3.80	0.211	0.679

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]	0.681 ± 0.364	14838308	0.580	0.900	0.0	1.000	0.400	0.980
cloud fraction [1]	0.549 ± 0.350	14838308	0.741	0.521	6.543×10^{-3}	1.000	0.214	0.955
cloud top height [m]	$(0.373 \pm 0.270) \times 10^4$	14838308	3.443×10^3	2.976×10^3	0.0	2.000×10^4	1.663×10^3	5.106×10^3
cloud optical thickness [1]	25.1 ± 42.4	14838308	13.1	12.3	1.000	250	8.28	21.3
cloud fraction crb [1]	0.547 ± 0.350	14838308	0.742	0.517	8.671×10^{-3}	1.000	0.211	0.954
cloud height crb [m]	$(0.295 \pm 0.232) \times 10^4$	14838308	3.096×10^3	2.299×10^3	0.0	2.000×10^4	1.121×10^3	4.217×10^3
cloud albedo crb [1]	0.609 ± 0.177	14838308	0.208	0.590	0.0	1.000	0.500	0.708
surface albedo fitted [1]	0.109 ± 0.199	14838308	4.082×10^{-2}	3.189×10^{-2}	0.0	1.000	1.926×10^{-2}	6.008×10^{-2}
surface albedo fitted crb [1]	$(9.520 \pm 18.647) \times 10^{-2}$	14838308	2.671×10^{-2}	2.291×10^{-2}	0.0	1.000	1.410×10^{-2}	4.081×10^{-2}
fitted root mean square [1]	$(5.267 \pm 12.686) \times 10^{-4}$	14838308	6.189×10^{-4}	2.814×10^{-4}	1.506×10^{-6}	0.840	1.054×10^{-4}	7.242×10^{-4}
fitted root mean square crb [1]	$(4.788 \pm 13.870) \times 10^{-4}$	14838308	5.475×10^{-4}	2.286×10^{-4}	1.566×10^{-6}	0.966	8.048×10^{-5}	6.280×10^{-4}
wavelength shift [nm]	$(8.414 \pm 7.407) \times 10^{-3}$	14838308	1.031×10^{-2}	7.769×10^{-3}	-4.636×10^{-2}	0.321	2.955×10^{-3}	1.326×10^{-2}
cloud fraction apriori [1]	0.549 ± 0.356	14838308	0.792	0.522	0.0	1.000	0.204	0.995
reflectance blue oca [1]	0.521 ± 0.197	14838308	0.311	0.487	0.143	1.96	0.356	0.667
reflectance green oca [1]	0.463 ± 0.223	14838308	0.376	0.430	7.638×10^{-2}	1.87	0.263	0.638
reflectance continuum aband [1]	0.395 ± 0.258	14838308	0.437	0.374	1.172×10^{-2}	3.80	0.160	0.597

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]	0.519 ± 0.441	4493157	0.950	0.720	0.0	1.000	0.0	0.950
cloud fraction [1]	0.494 ± 0.340	4493157	0.666	0.403	7.566×10^{-3}	1.000	0.192	0.858
cloud top height [m]	$(0.499 \pm 0.348) \times 10^4$	4493157	4.468×10^3	4.295×10^3	0.0	2.000×10^4	2.356×10^3	6.824×10^3
cloud optical thickness [1]	22.6 ± 47.2	4493157	9.99	8.46	1.000	250	5.37	15.4
cloud fraction crb [1]	0.494 ± 0.340	4493157	0.665	0.402	8.512×10^{-3}	1.000	0.192	0.857
cloud height crb [m]	$(0.392 \pm 0.273) \times 10^4$	4493157	3.775×10^3	3.285×10^3	0.0	2.000×10^4	1.769×10^3	5.545×10^3
cloud albedo crb [1]	0.691 ± 0.220	4493157	0.357	0.663	0.0	1.000	0.534	0.891
surface albedo fitted [1]	0.402 ± 0.260	4493157	0.464	0.274	0.0	1.000	0.198	0.662
surface albedo fitted crb [1]	0.377 ± 0.230	4493157	0.424	0.268	4.859×10^{-3}	1.000	0.193	0.617
fitted root mean square [1]	$(8.475 \pm 7.802) \times 10^{-4}$	4493157	7.717×10^{-4}	6.550×10^{-4}	3.154×10^{-6}	0.148	3.464×10^{-4}	1.118×10^{-3}
fitted root mean square crb [1]	$(6.726 \pm 8.708) \times 10^{-4}$	4493157	6.899×10^{-4}	4.567×10^{-4}	2.767×10^{-6}	0.843	2.096×10^{-4}	8.995×10^{-4}
wavelength shift [nm]	$(9.042 \pm 6.297) \times 10^{-3}$	4493157	8.636×10^{-3}	8.759×10^{-3}	-6.568×10^{-2}	6.850×10^{-2}	4.495×10^{-3}	1.313×10^{-2}
cloud fraction apriori [1]	0.499 ± 0.347	4493157	0.708	0.407	0.0	1.000	0.188	0.896
reflectance blue ocra [1]	0.590 ± 0.260	4493157	0.459	0.573	0.129	1.93	0.347	0.806
reflectance green ocra [1]	0.553 ± 0.286	4493157	0.534	0.545	7.019×10^{-2}	2.08	0.272	0.805
reflectance continuum aband [1]	0.572 ± 0.255	4493157	0.436	0.558	1.647×10^{-2}	3.49	0.344	0.780

Table 7: Correlation matrix

Viewing zenith angle	Solar zenith angle	Latitude	Radiometric cloud fraction	Cloud top height	Cloud optical thickness	Cloud fraction (CRB)	Cloud height (CRB)	Cloud albedo (CRB)	OCRA cloud fraction
1.000	2.275×10^{-2}	-7.779×10^{-3}	3.189×10^{-2}	4.198×10^{-2}	-3.482×10^{-3}	3.122×10^{-2}	8.083×10^{-2}	6.835×10^{-2}	3.051×10^{-2}
2.275×10^{-2}	1.000	-3.682×10^{-3}	0.175	6.580×10^{-2}	0.246	0.175	3.982×10^{-2}	0.265	0.175
-7.779×10^{-3}	-3.682×10^{-3}	1.000	0.112	-9.667×10^{-2}	-9.602×10^{-2}	0.111	-6.757×10^{-2}	-0.146	0.110
3.189×10^{-2}	0.175	0.112	1.000	-8.005×10^{-2}	0.218	1.000	-5.813×10^{-3}	0.137	0.991
4.198×10^{-2}	6.580×10^{-2}	-9.667×10^{-2}	-8.005×10^{-2}	1.000	0.126	-7.975×10^{-2}	0.952	0.262	-8.581×10^{-2}
-3.482×10^{-3}	0.246	-9.602×10^{-2}	0.218	0.126	1.000	0.212	0.150	0.481	0.215
3.122×10^{-2}	0.175	0.111	1.000	-7.975×10^{-2}	0.212	1.000	-5.691×10^{-3}	0.136	0.991
8.083×10^{-2}	3.982×10^{-2}	-6.757×10^{-2}	-5.813×10^{-3}	0.952	0.150	-5.691×10^{-3}	1.000	0.197	-1.163×10^{-2}
6.835×10^{-2}	0.265	-0.146	0.137	0.262	0.481	0.136	0.197	1.000	0.144
3.051×10^{-2}	0.175	0.110	0.991	-8.581×10^{-2}	0.215	0.991	-1.163×10^{-2}	0.144	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	9.02	-7.87	0.218	2.384×10^3	-2.97	0.214	3.826×10^3	0.255	0.213
9.02	411	-3.86	1.24	3.868×10^3	217	1.24	1.952×10^3	1.02	1.27
-7.87	-3.86	2.672×10^3	2.02	-1.450×10^4	-216	2.01	-8.448×10^3	-1.44	2.02
0.218	1.24	2.02	0.122	-81.2	3.32	0.122	-4.92	9.108×10^{-3}	0.124
2.384×10^3	3.868×10^3	-1.450×10^4	-81.2	8.415×10^6	1.596×10^4	-81.0	6.681×10^6	145	-88.7
-2.97	217	-216	3.32	1.596×10^4	1.897×10^3	3.23	1.581×10^4	3.98	3.33
0.214	1.24	2.01	0.122	-81.0	3.23	0.122	-4.82	9.029×10^{-3}	0.124
3.826×10^3	1.952×10^3	-8.448×10^3	-4.92	6.681×10^6	1.581×10^4	-4.82	5.851×10^6	90.9	-10.0
0.255	1.02	-1.44	9.108×10^{-3}	145	3.98	9.029×10^{-3}	90.9	3.624×10^{-2}	9.780×10^{-3}
0.213	1.27	2.02	0.124	-88.7	3.33	0.124	-10.0	9.780×10^{-3}	0.127

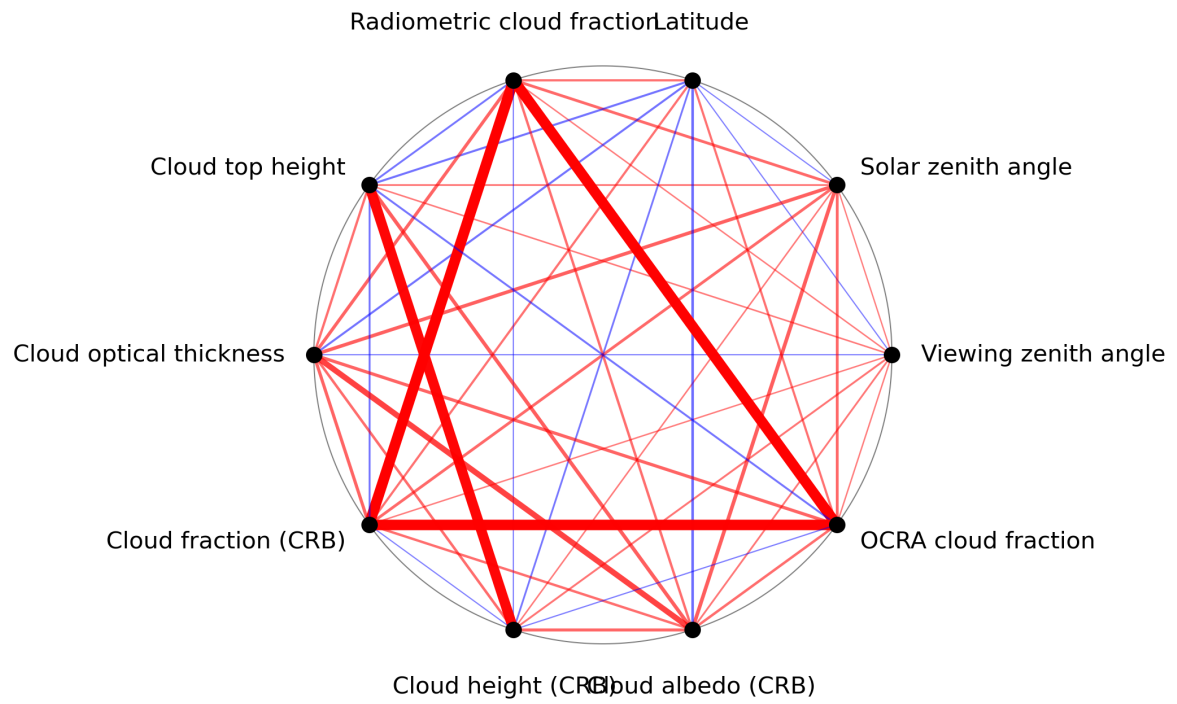


Figure 1: Map of correlation graph for 2023-09-18 to 2023-09-20.

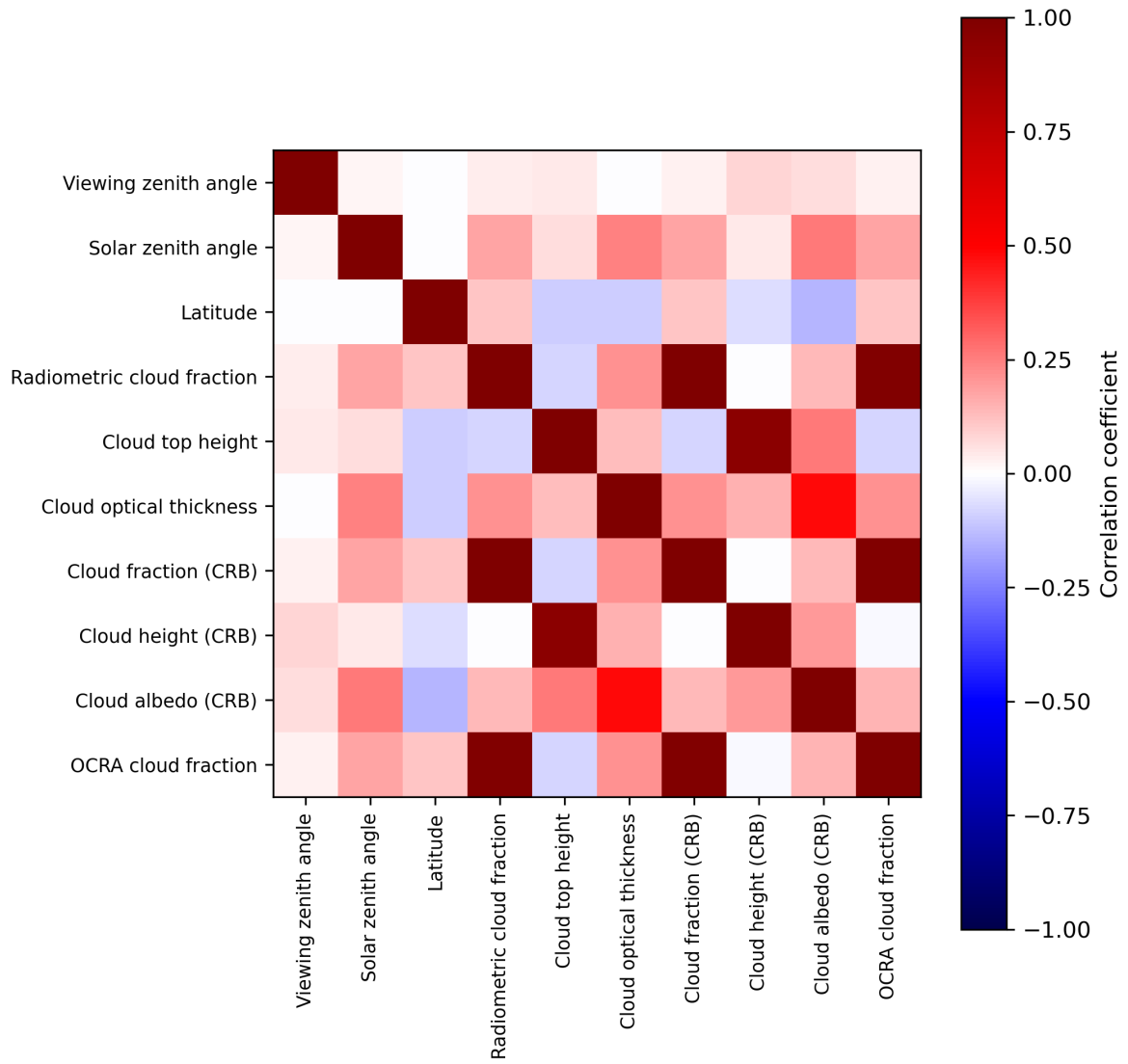


Figure 2: Map of correlation matrix for 2023-09-18 to 2023-09-20.

3 Granule outlines

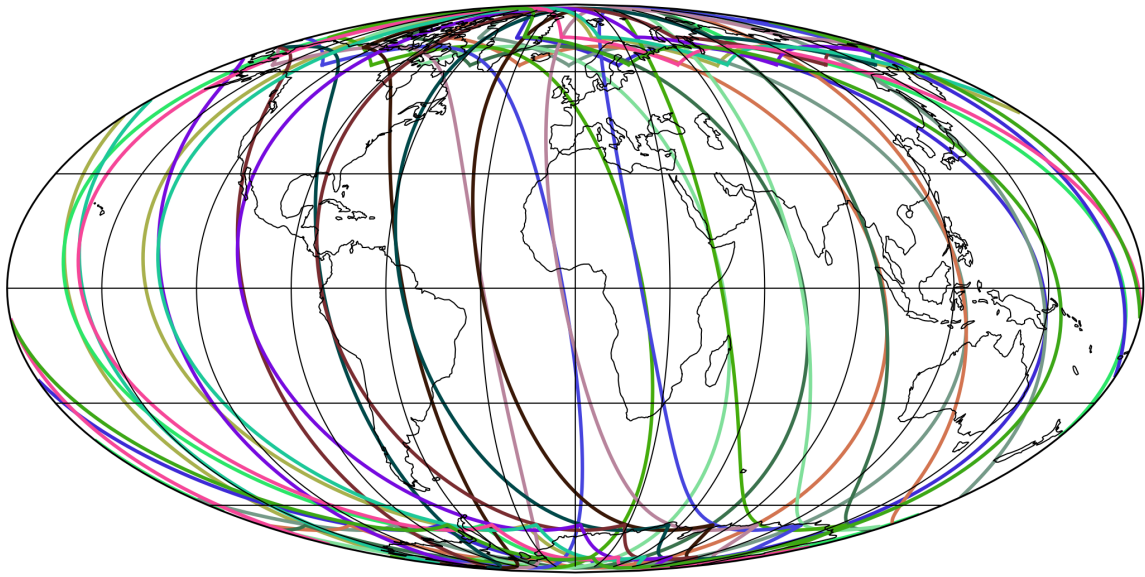


Figure 3: Outline of the granules.

4 Input data monitoring

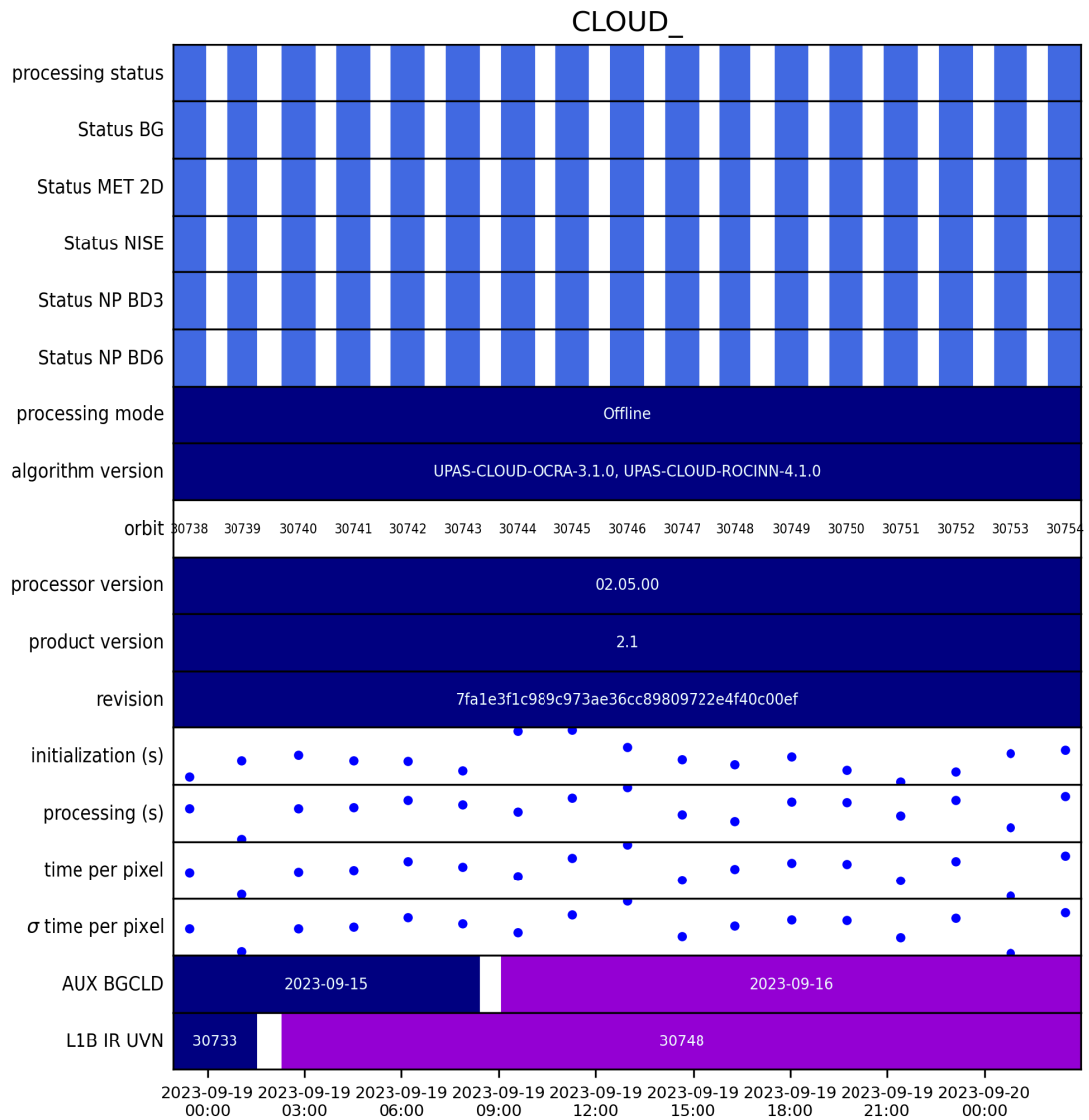


Figure 4: Input data per granule

5 Warnings and errors

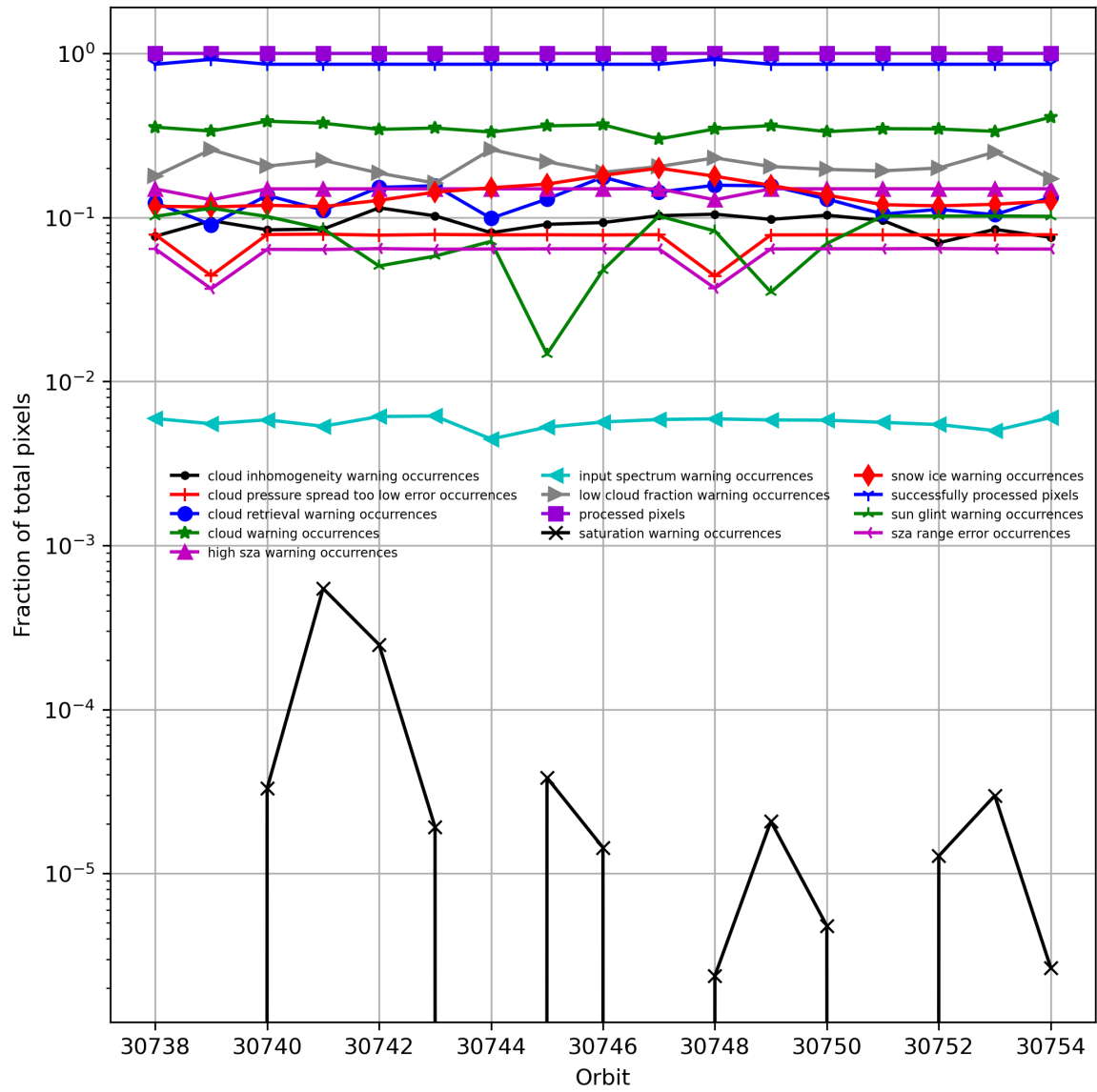


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

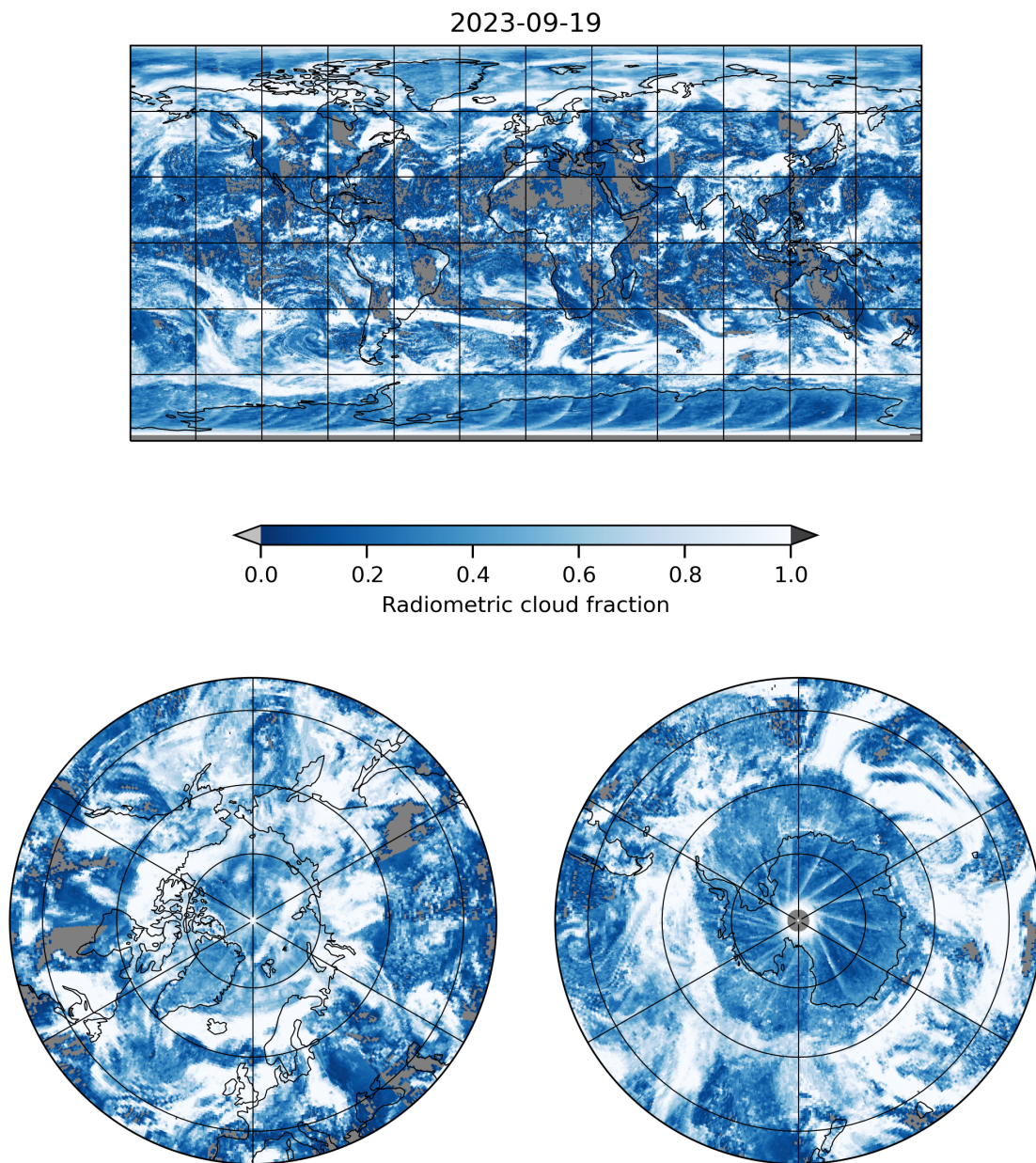


Figure 6: Map of “Radiometric cloud fraction” for 2023-09-18 to 2023-09-20

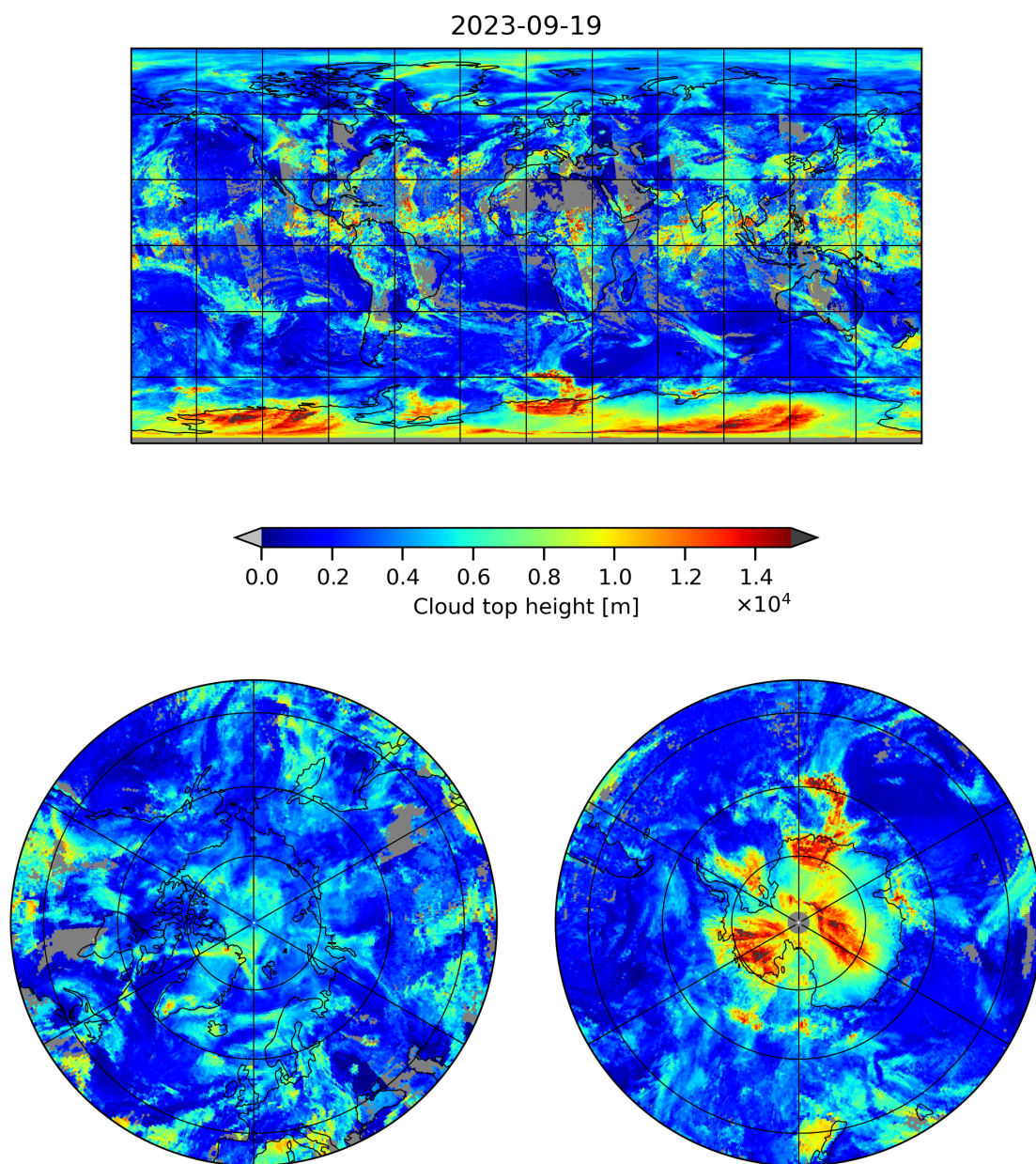


Figure 7: Map of “Cloud top height” for 2023-09-18 to 2023-09-20

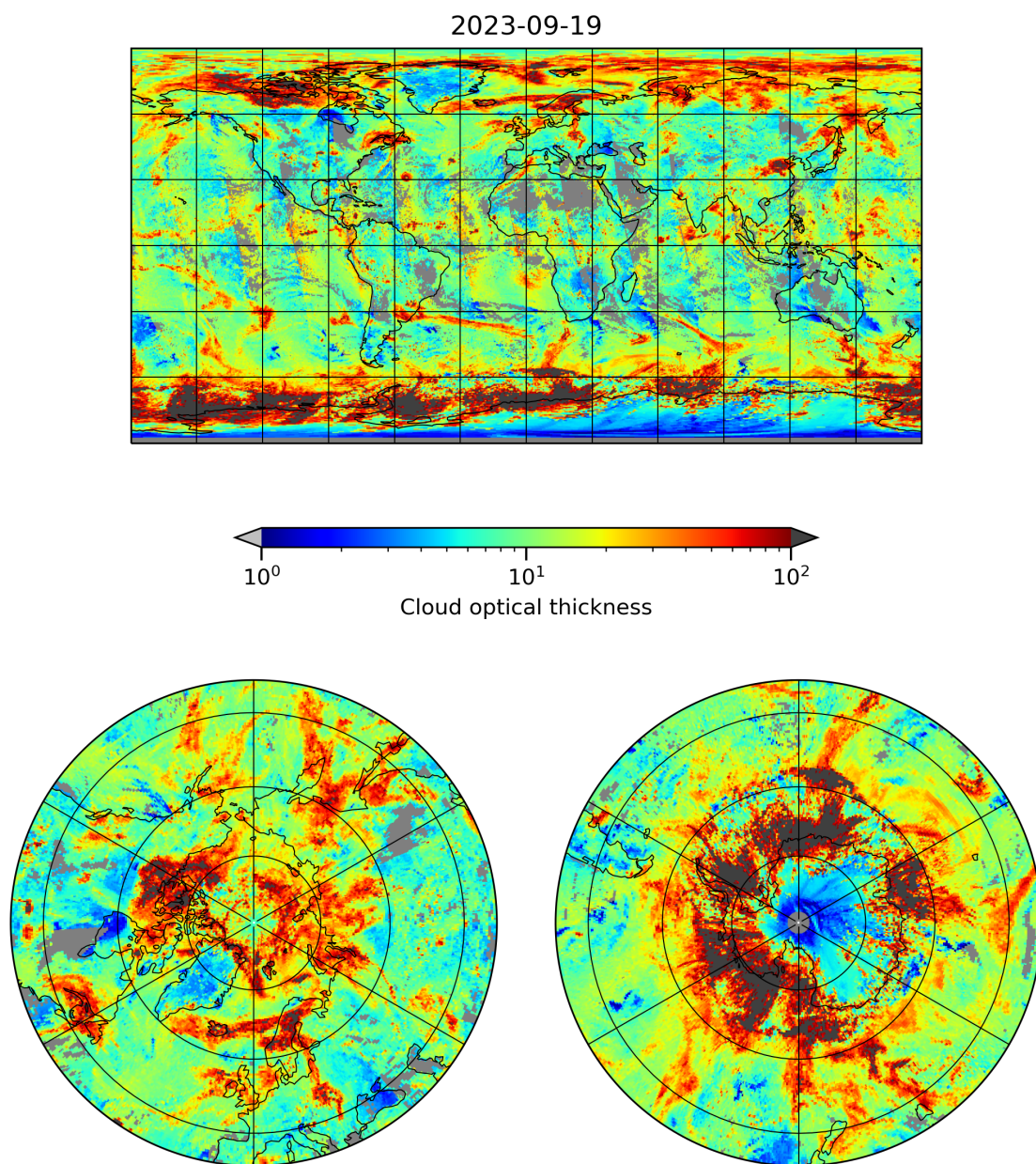


Figure 8: Map of “Cloud optical thickness” for 2023-09-18 to 2023-09-20

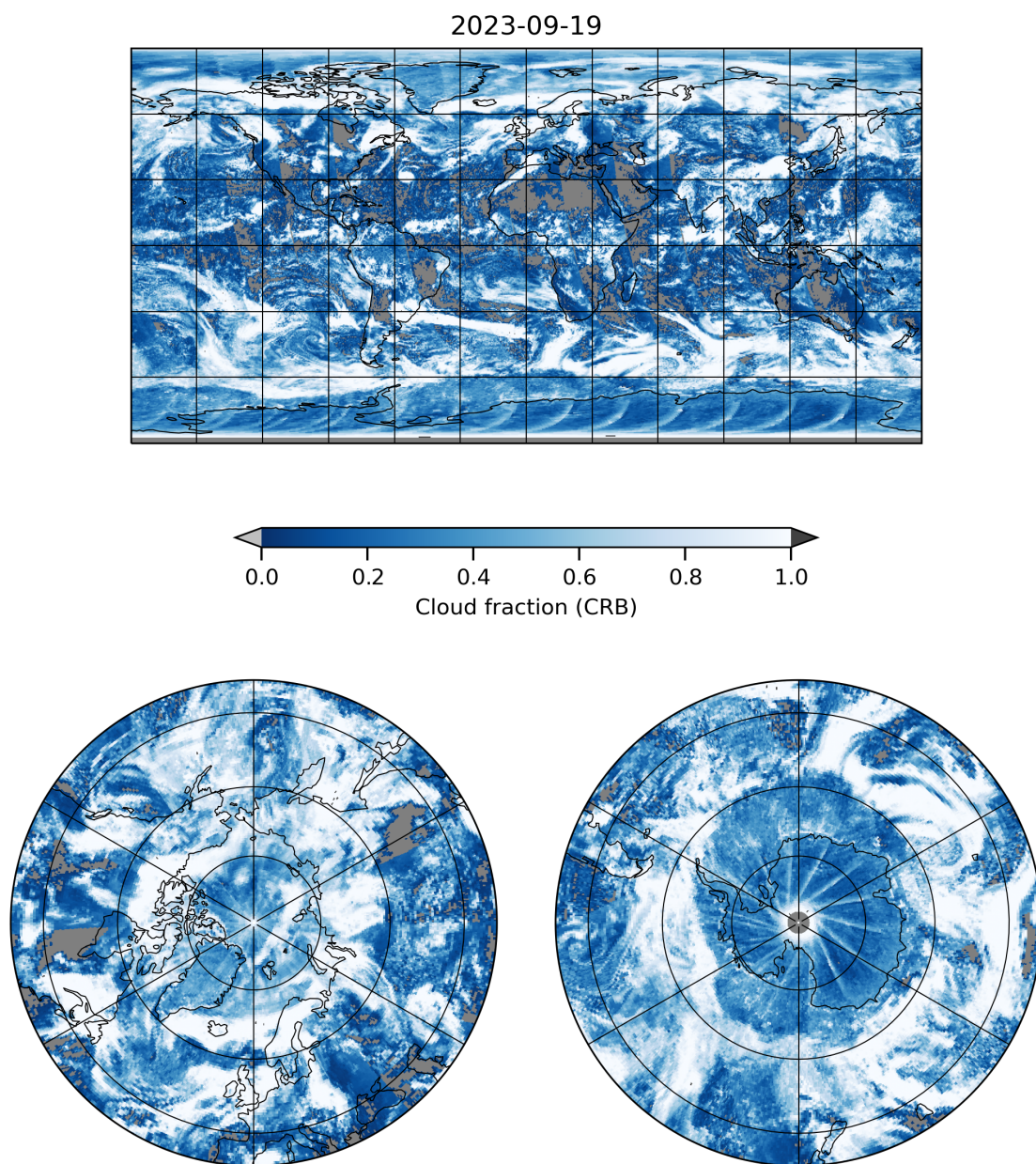


Figure 9: Map of “Cloud fraction (CRB)” for 2023-09-18 to 2023-09-20

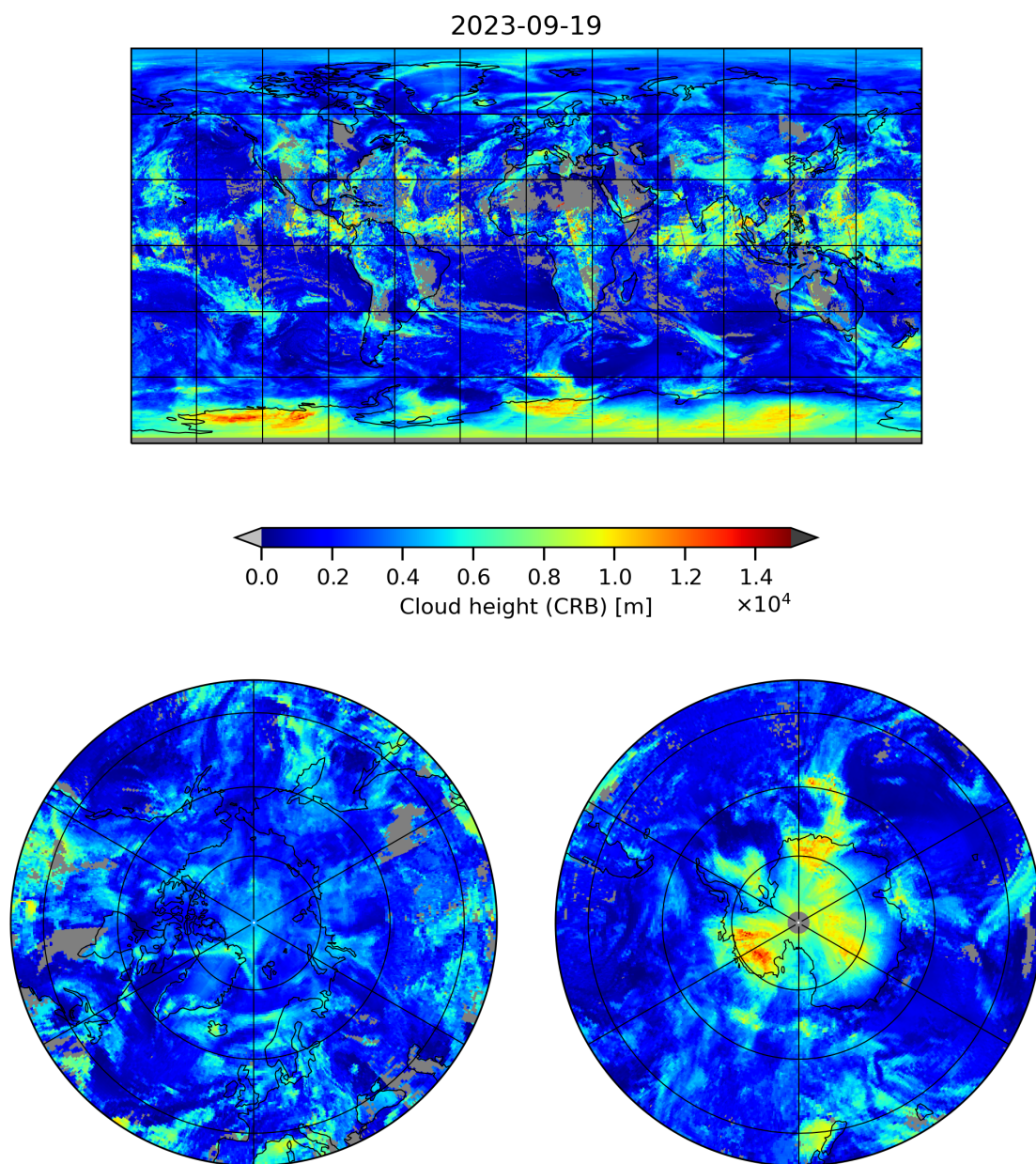


Figure 10: Map of “Cloud height (CRB)” for 2023-09-18 to 2023-09-20

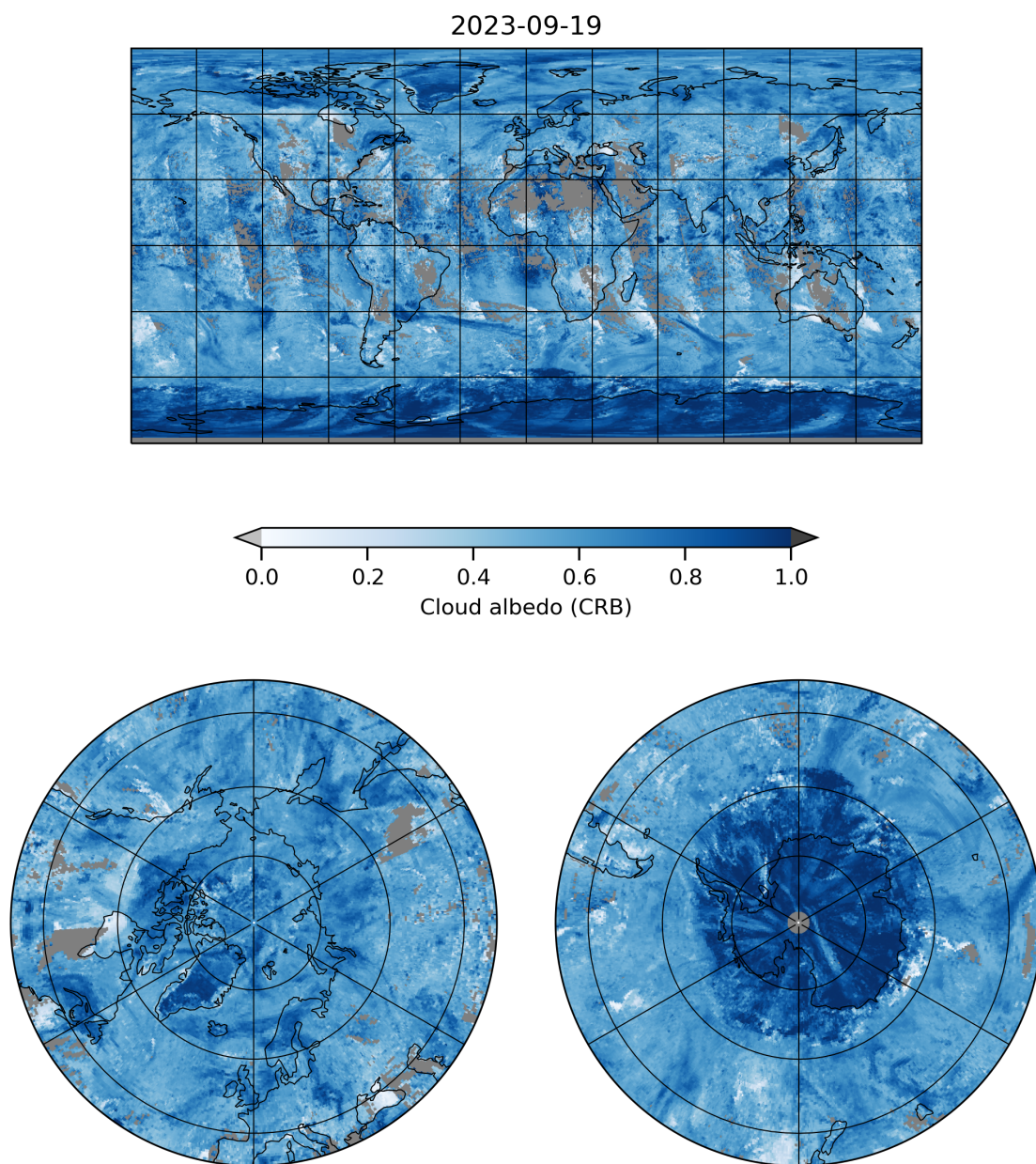


Figure 11: Map of “Cloud albedo (CRB)” for 2023-09-18 to 2023-09-20

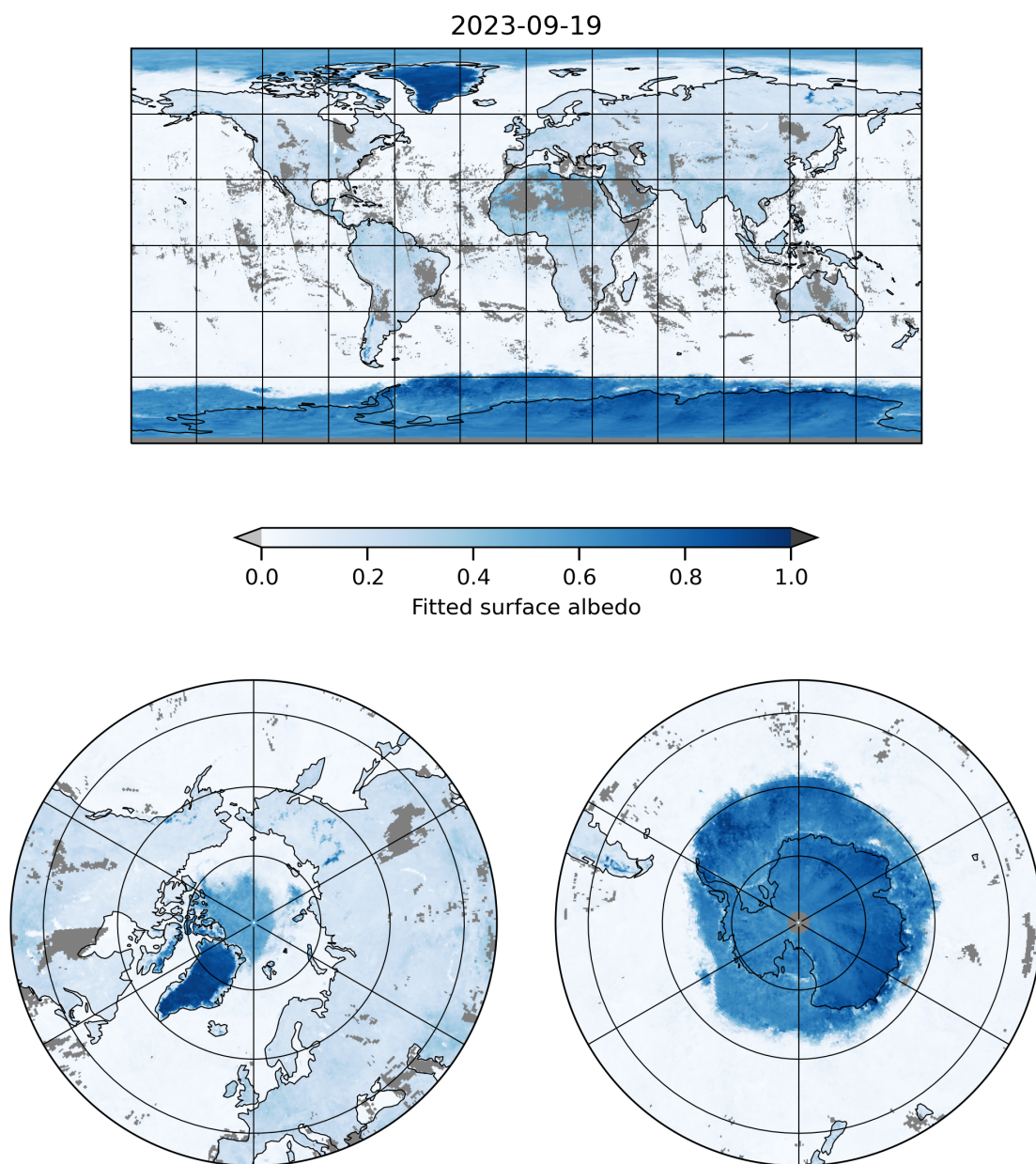


Figure 12: Map of “Fitted surface albedo” for 2023-09-18 to 2023-09-20

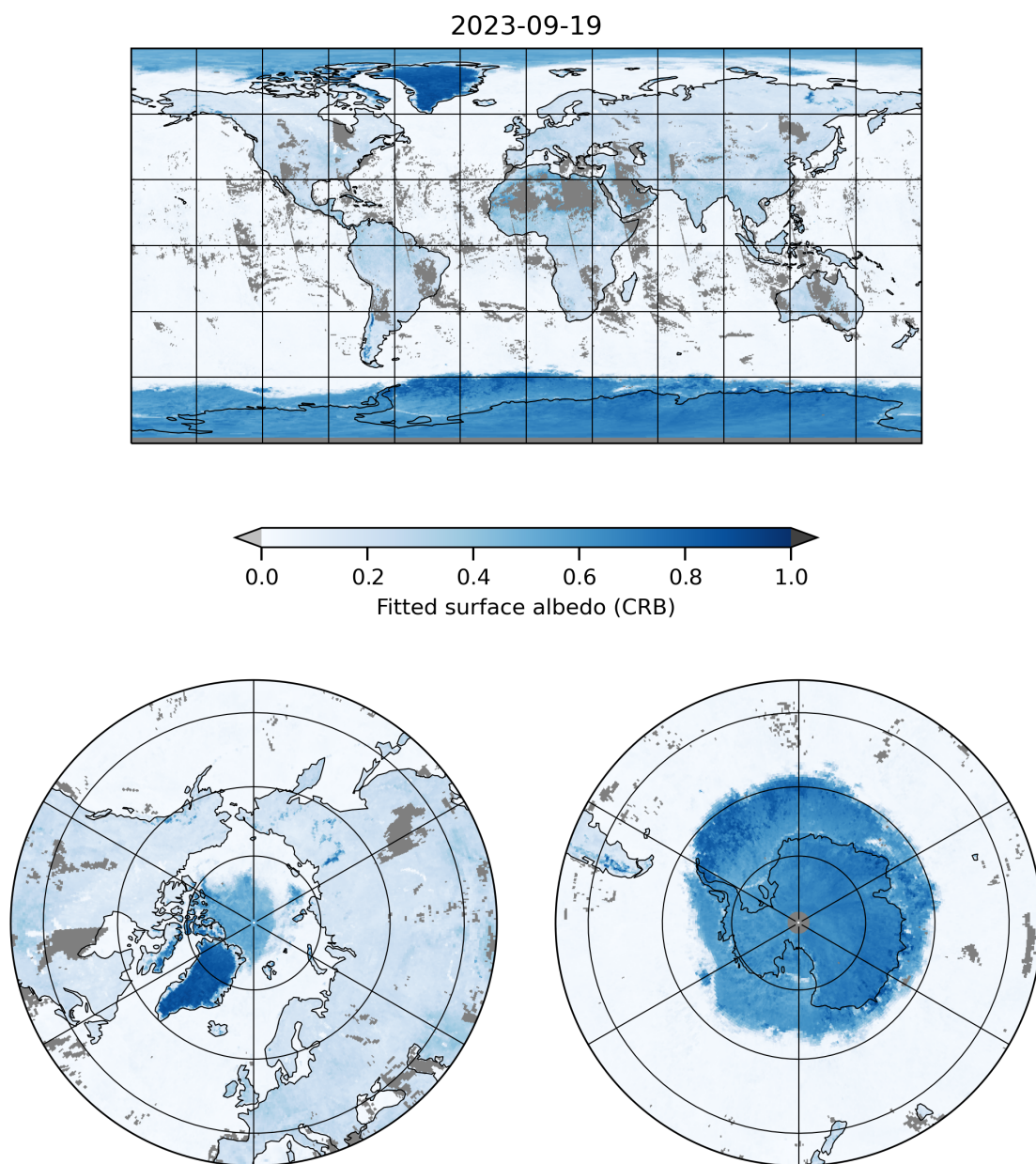


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-09-18 to 2023-09-20

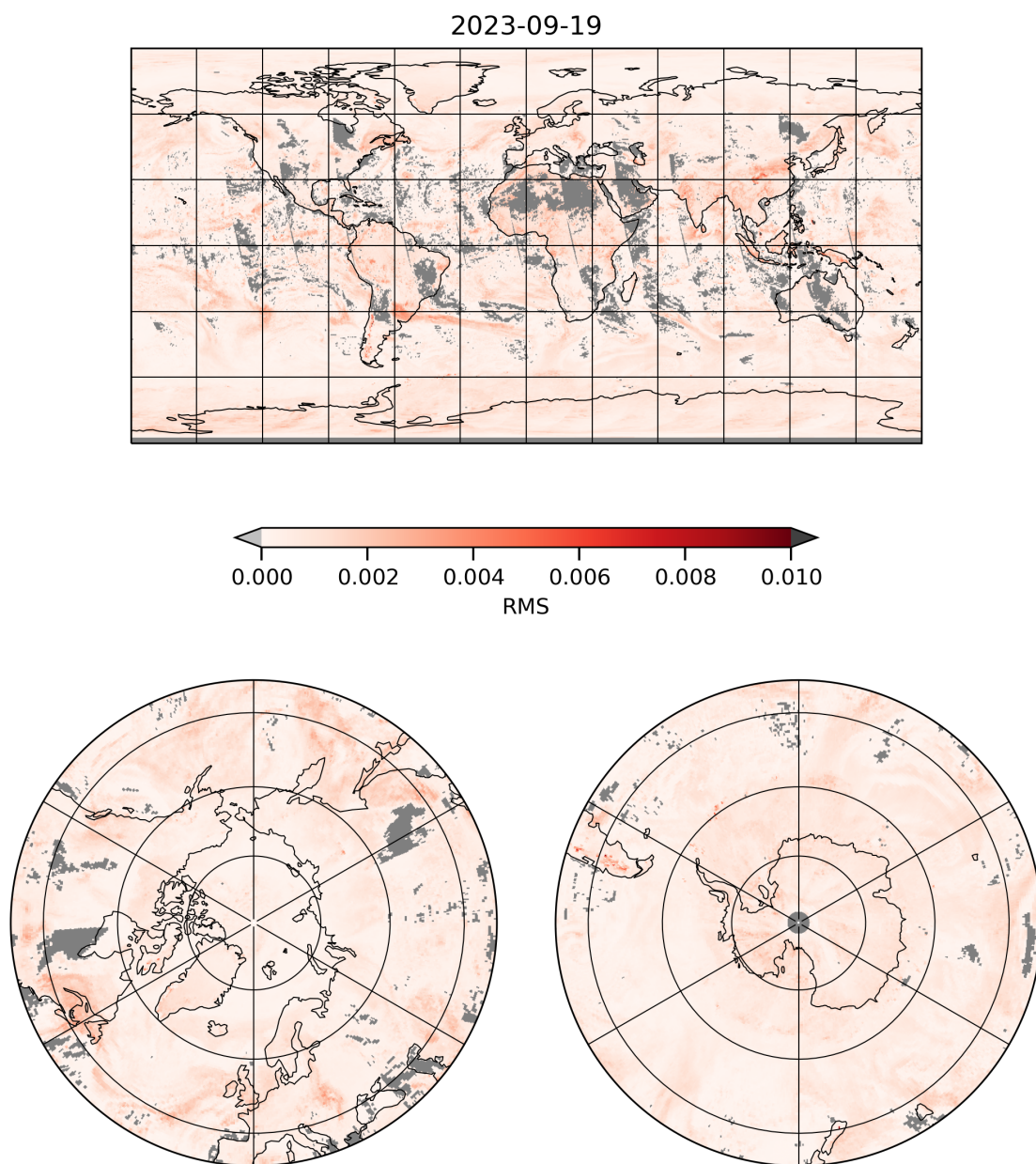


Figure 14: Map of “RMS” for 2023-09-18 to 2023-09-20

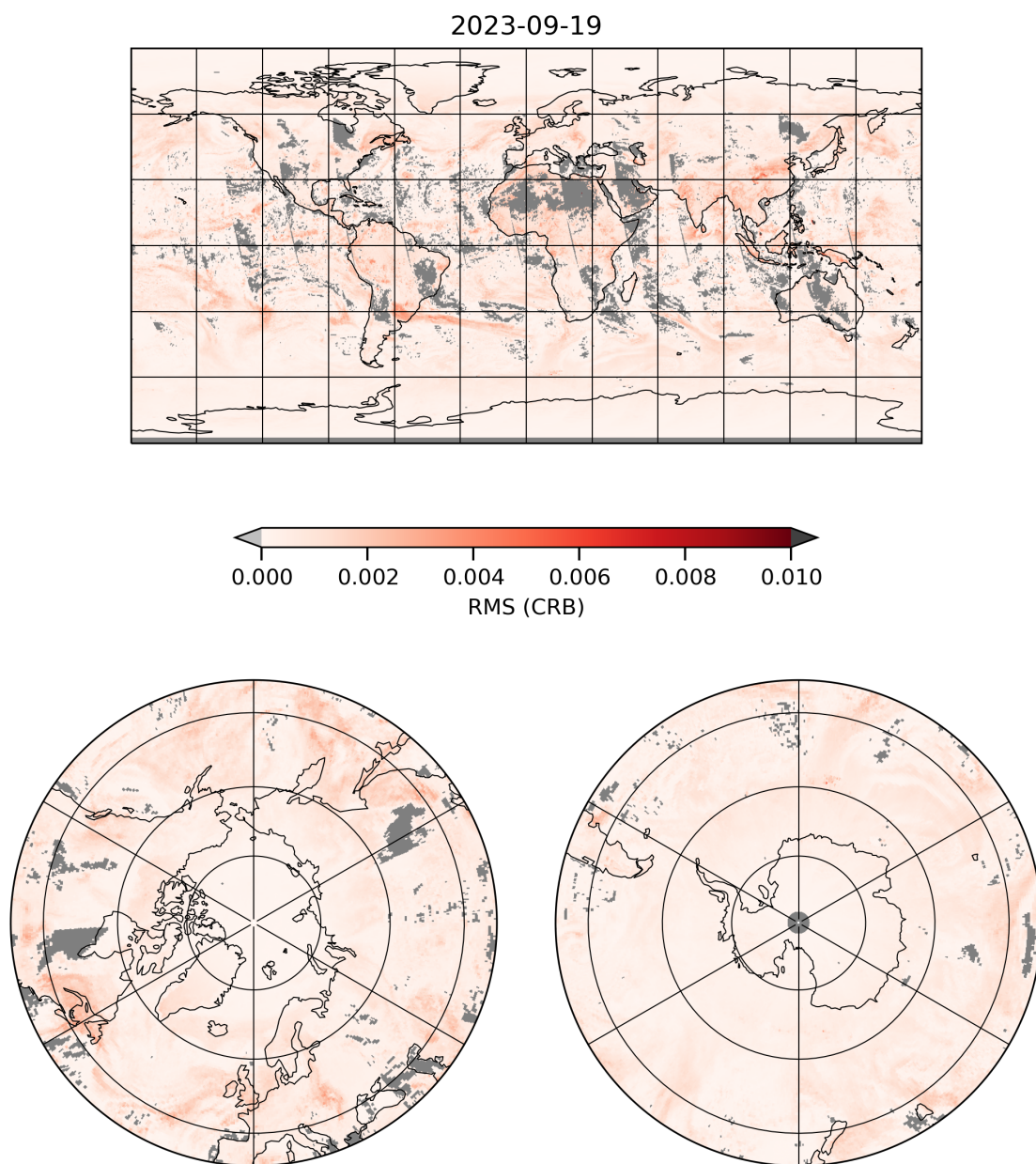


Figure 15: Map of “RMS (CRB)” for 2023-09-18 to 2023-09-20

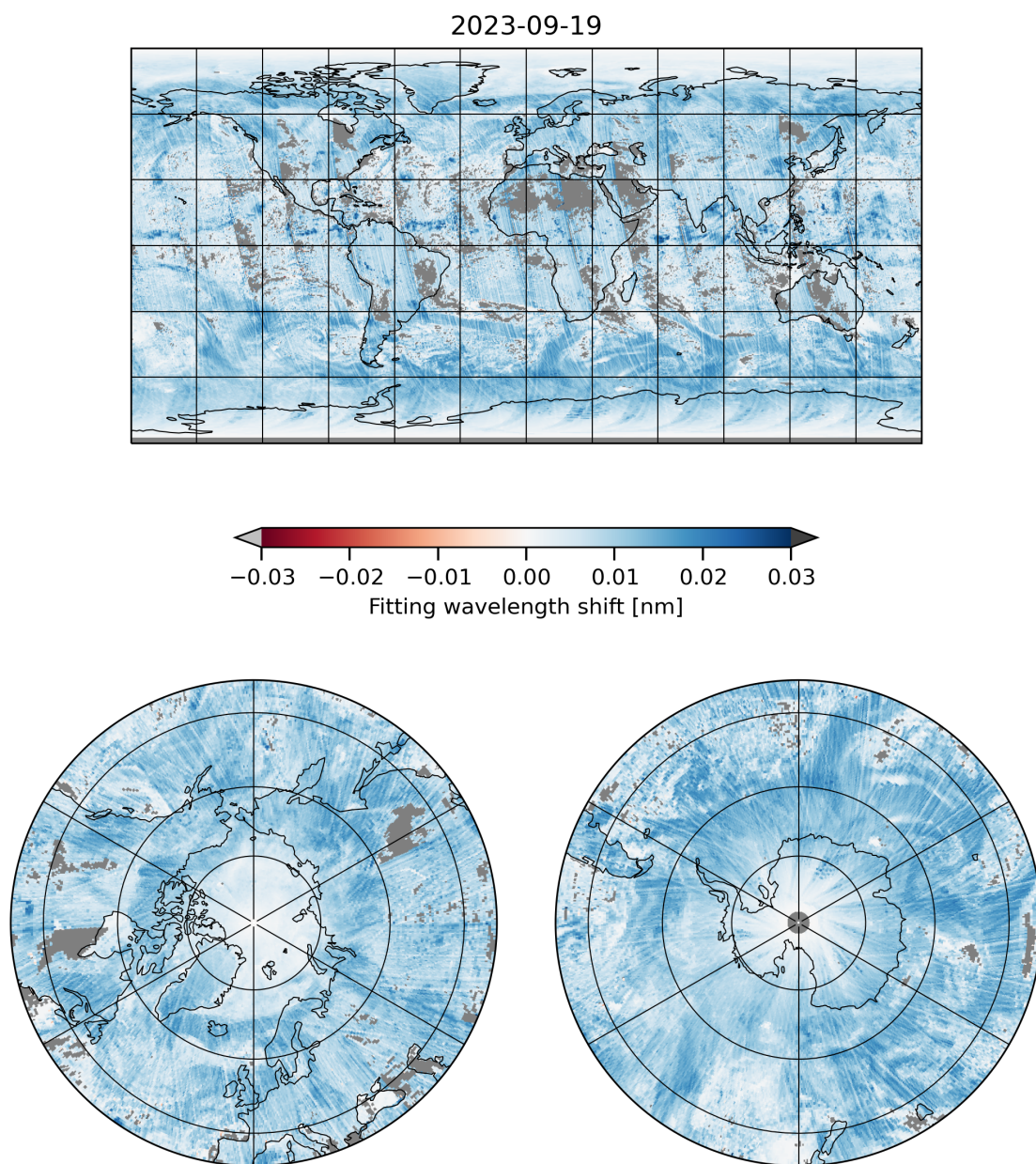


Figure 16: Map of "Fitting wavelength shift" for 2023-09-18 to 2023-09-20

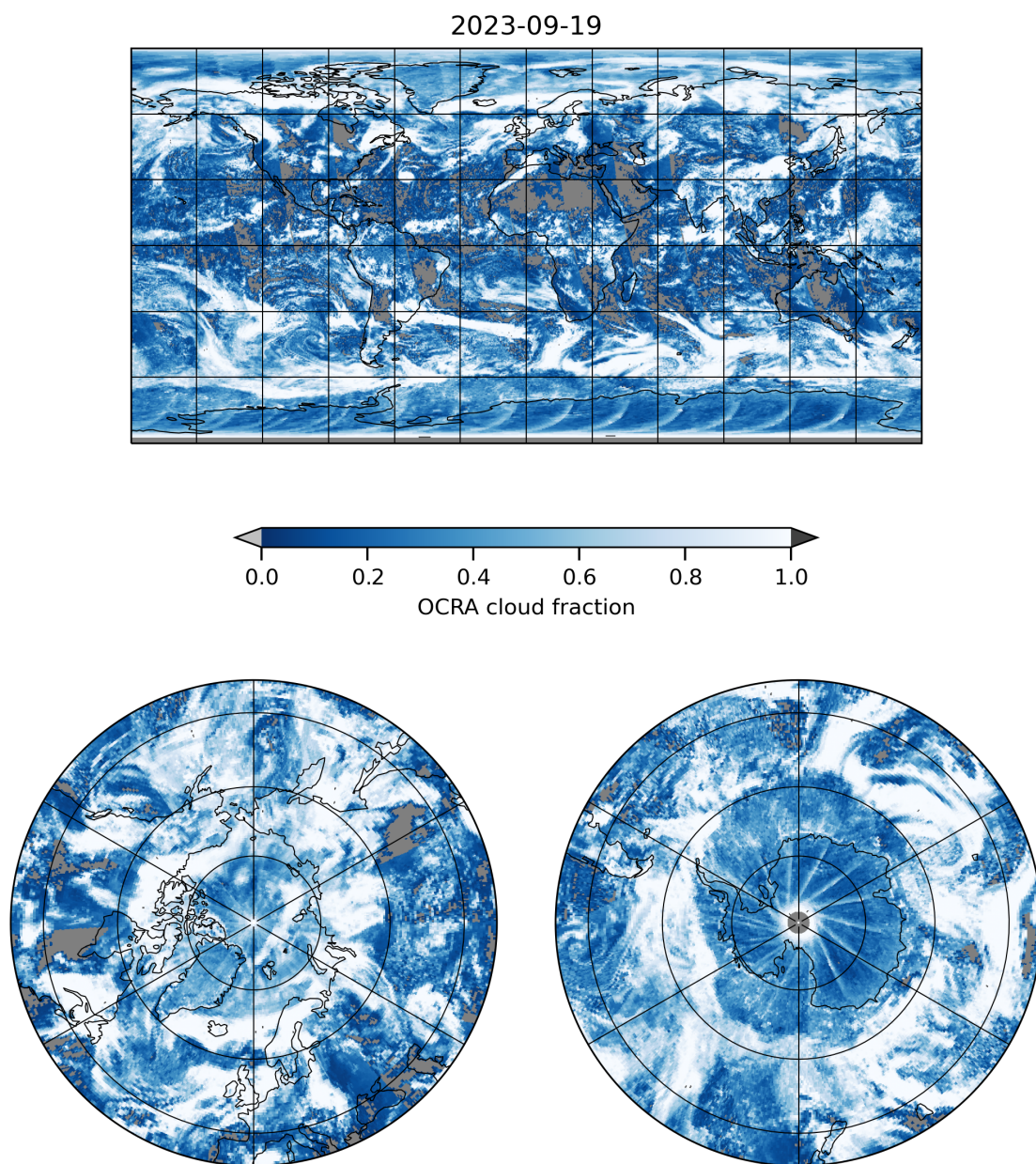


Figure 17: Map of “OCRA cloud fraction” for 2023-09-18 to 2023-09-20

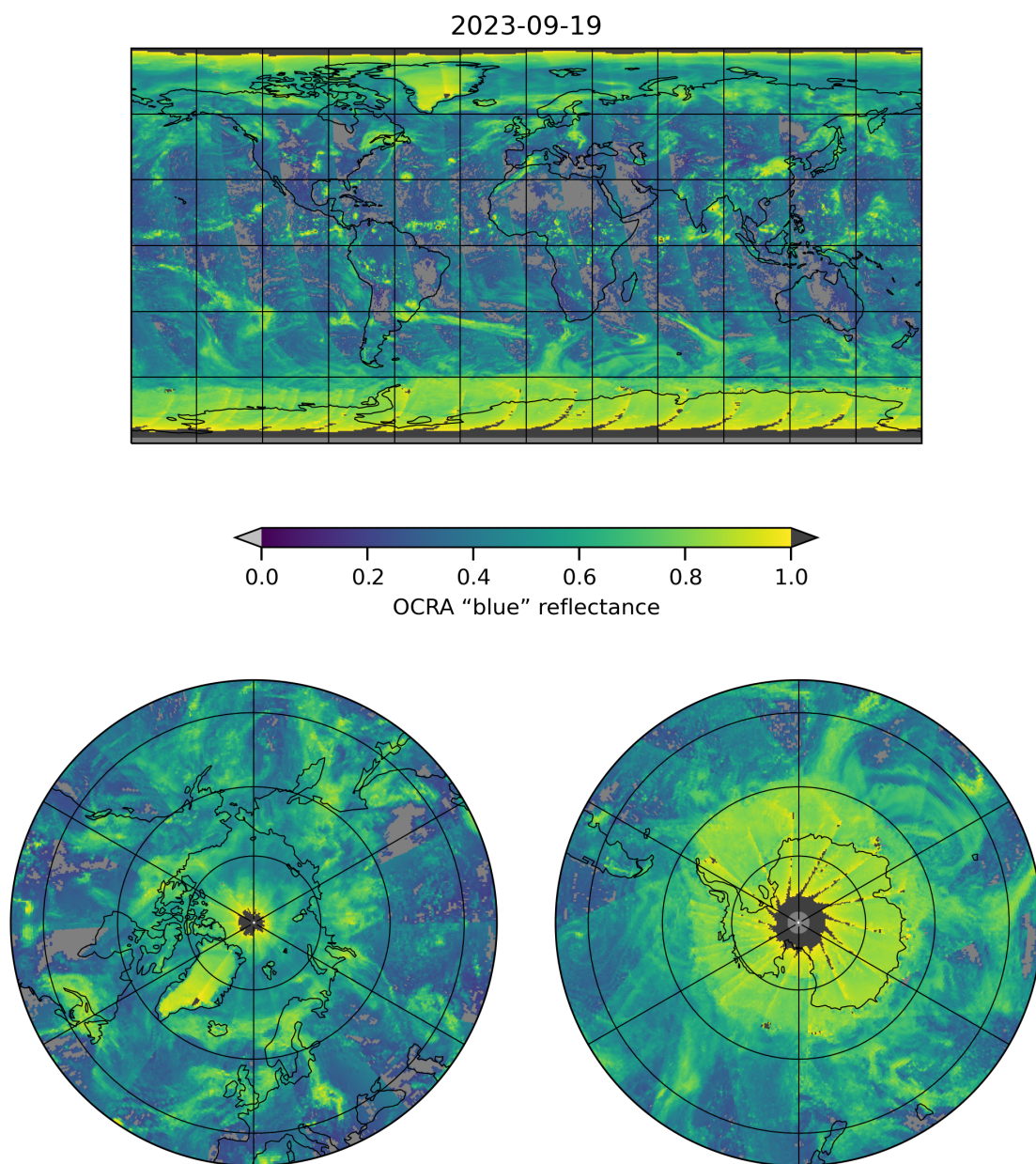


Figure 18: Map of "OCRA "blue" reflectance" for 2023-09-18 to 2023-09-20

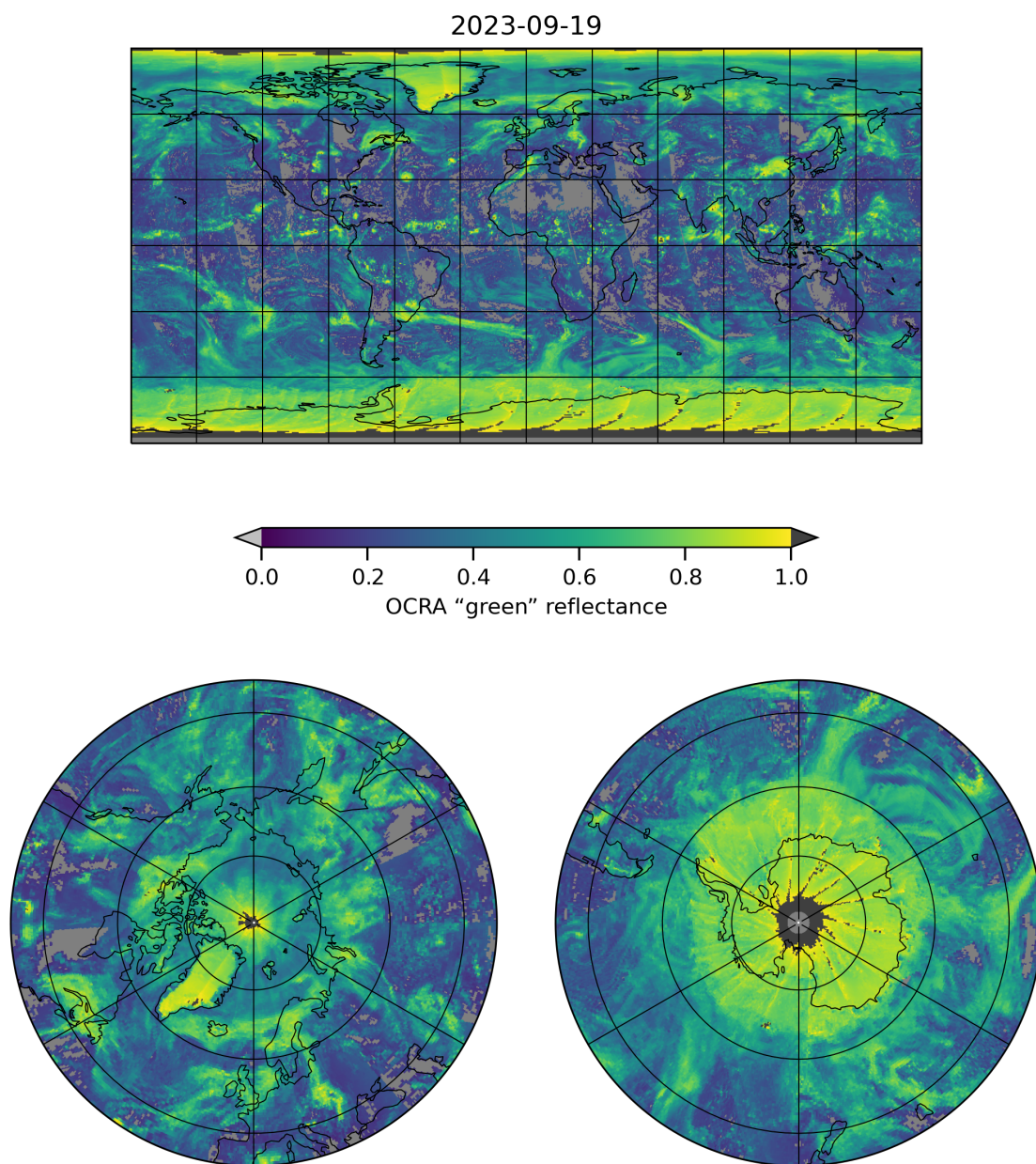


Figure 19: Map of "OCRA "green" reflectance" for 2023-09-18 to 2023-09-20

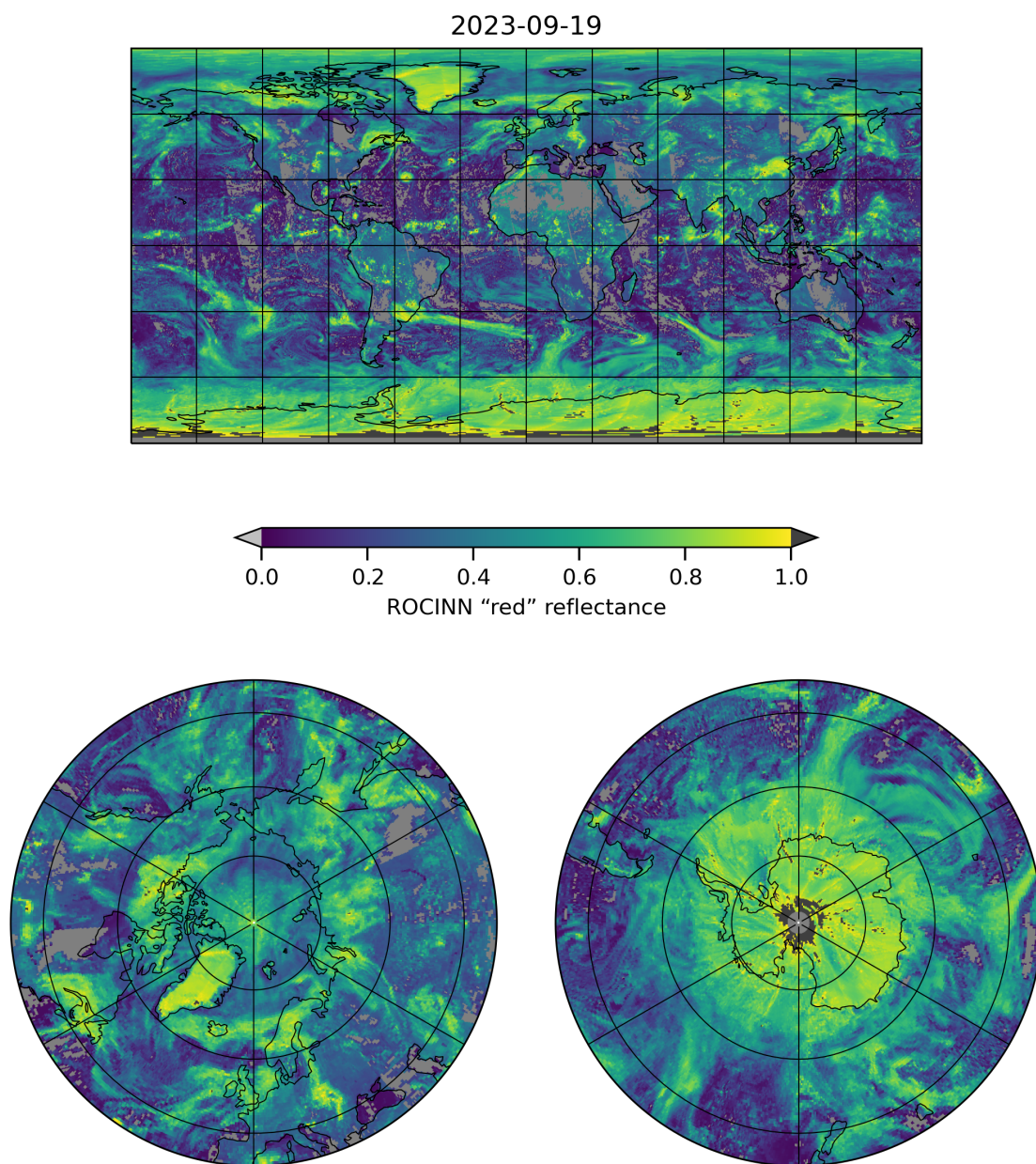


Figure 20: Map of "ROCINN "red" reflectance" for 2023-09-18 to 2023-09-20

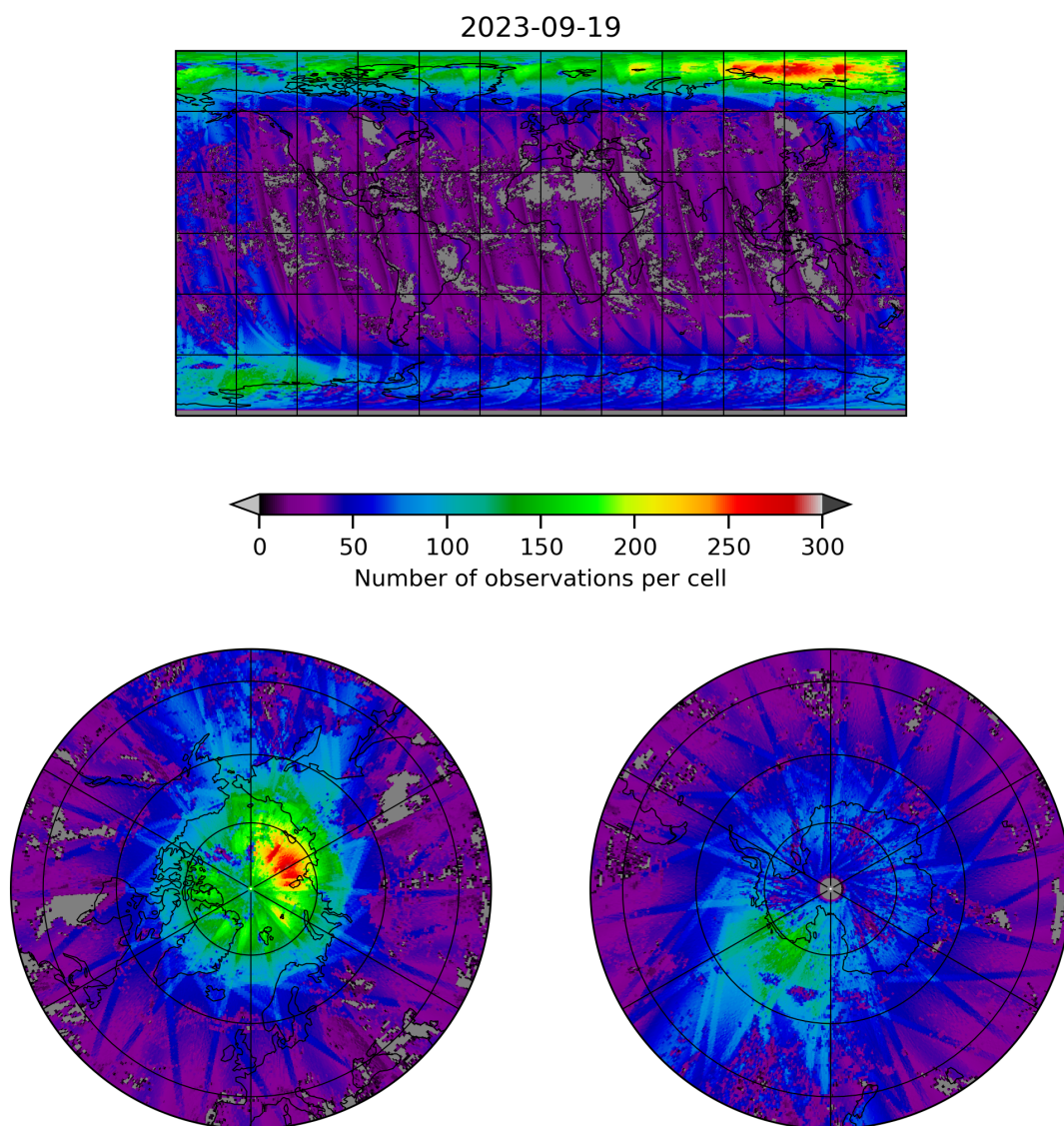


Figure 21: Map of the number of observations for 2023-09-18 to 2023-09-20

7 Zonal average

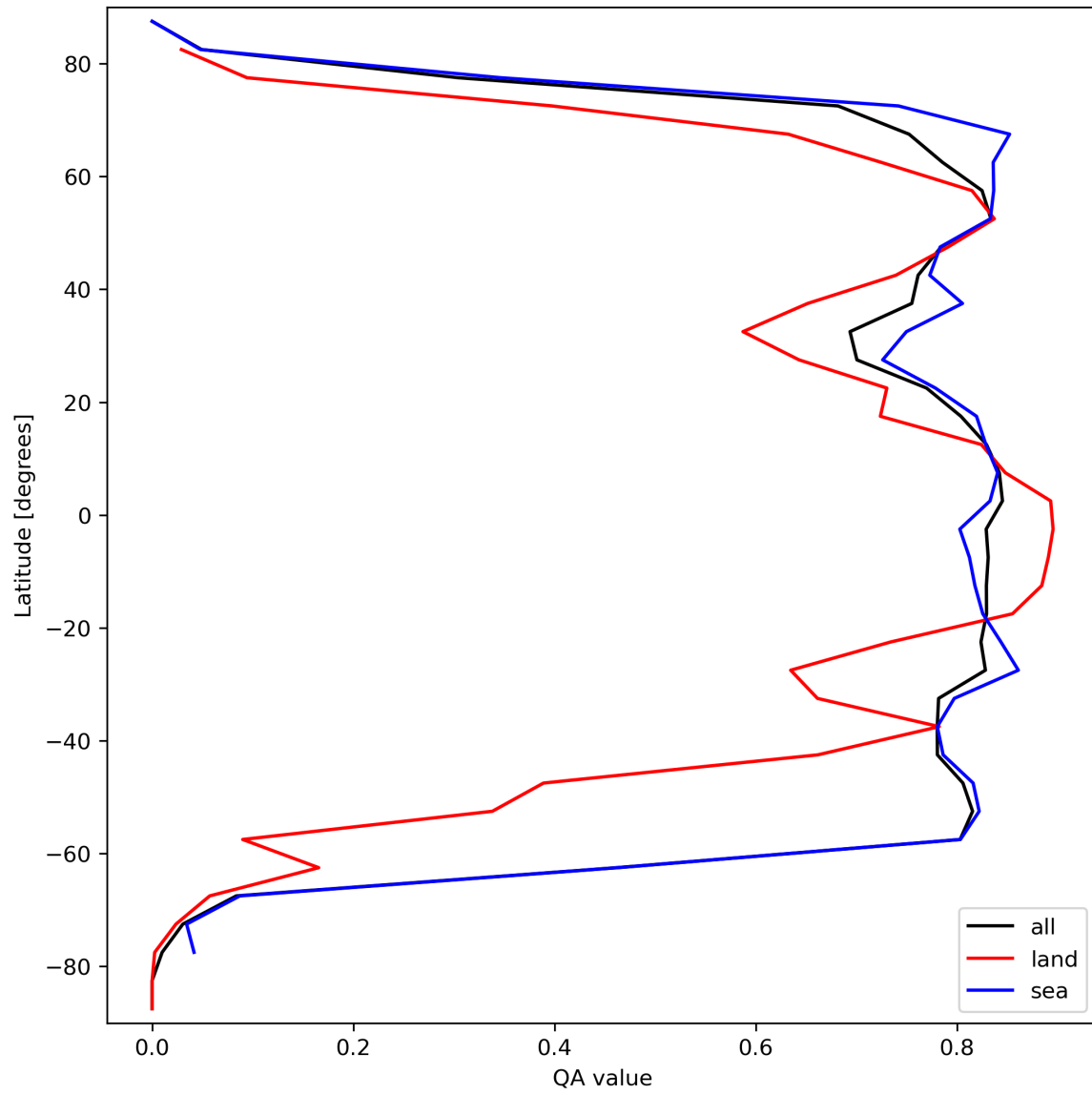


Figure 22: Zonal average of “QA value” for 2023-09-18 to 2023-09-20.

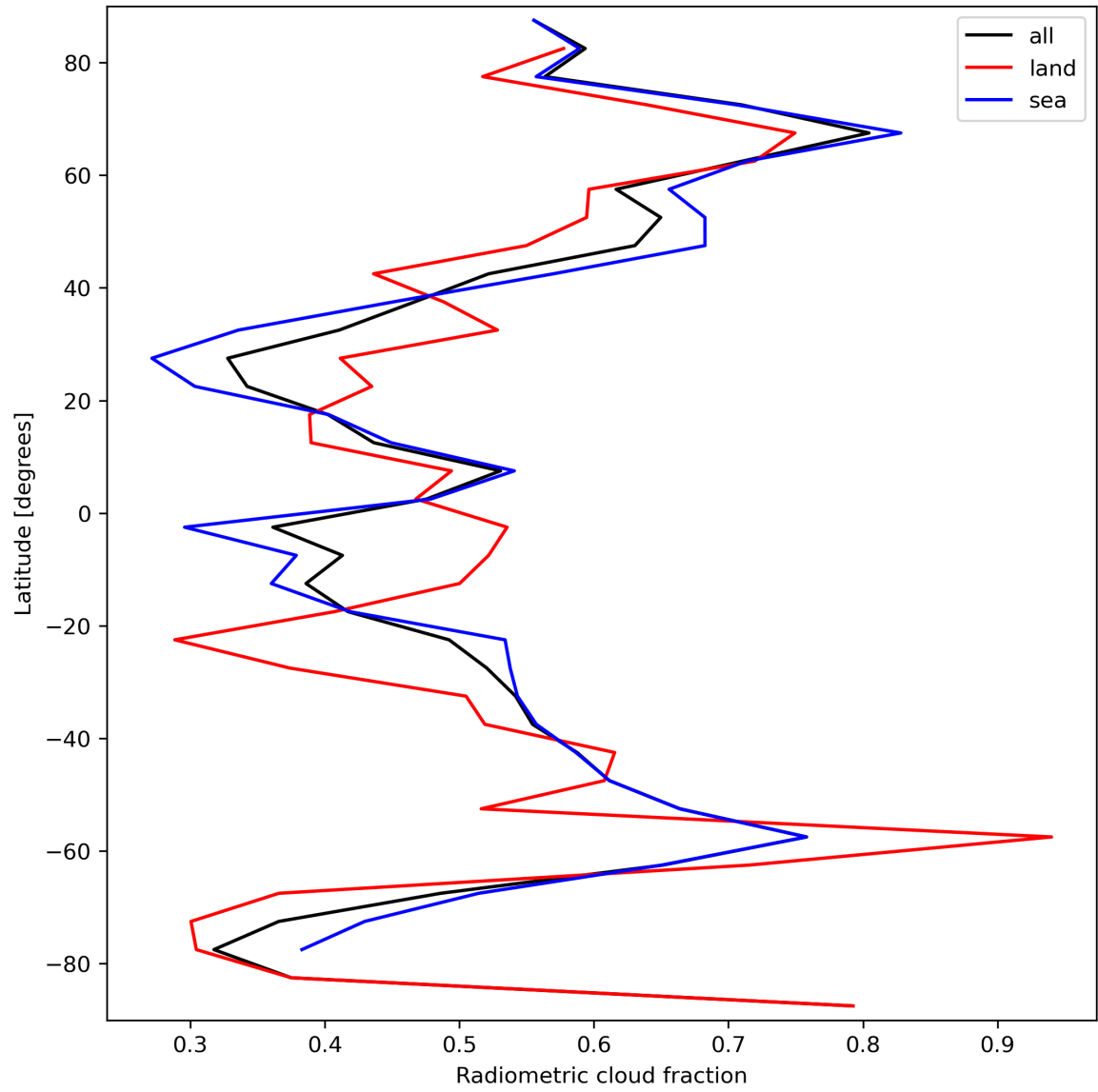


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-09-18 to 2023-09-20.

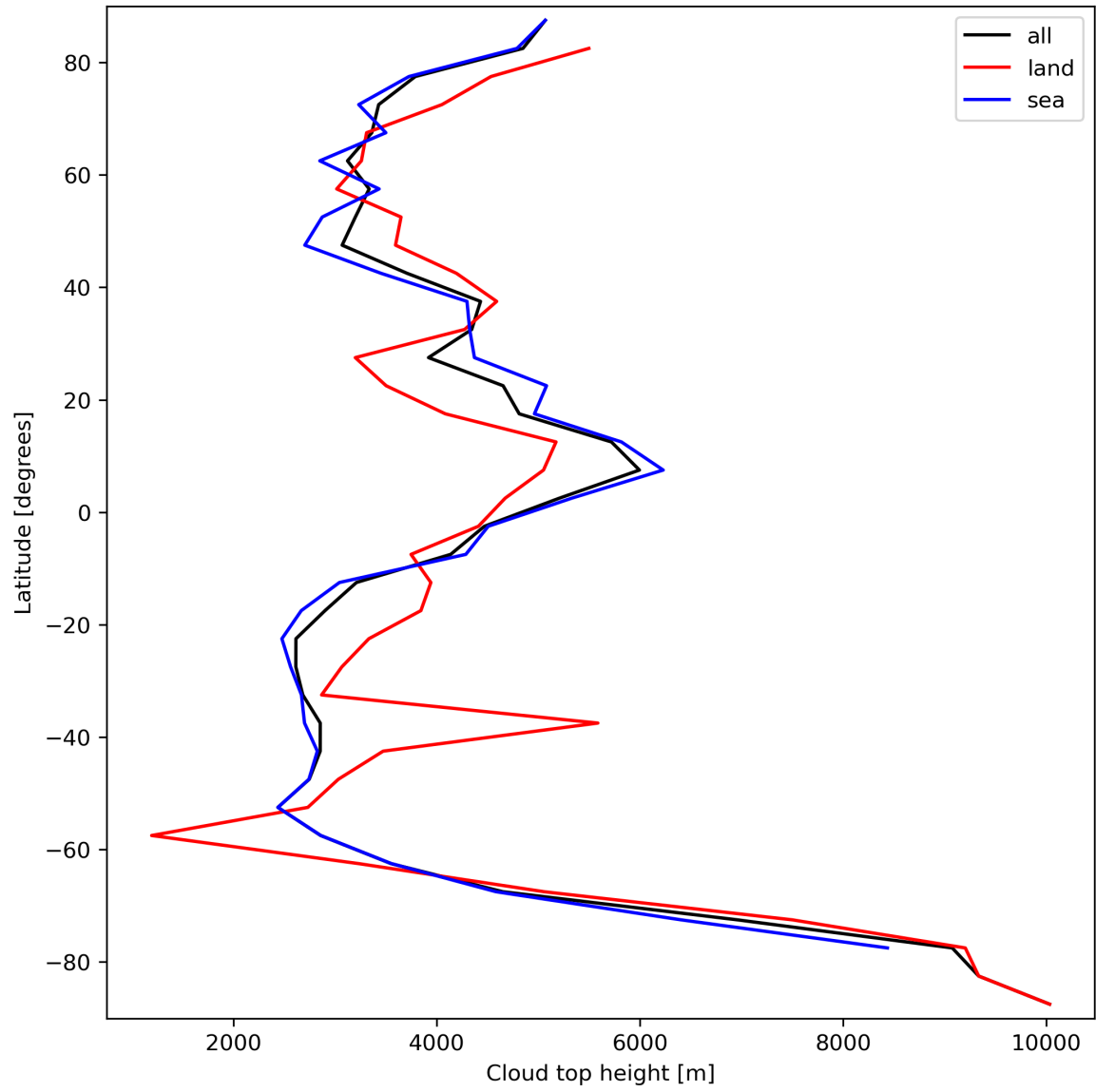


Figure 24: Zonal average of “Cloud top height” for 2023-09-18 to 2023-09-20.

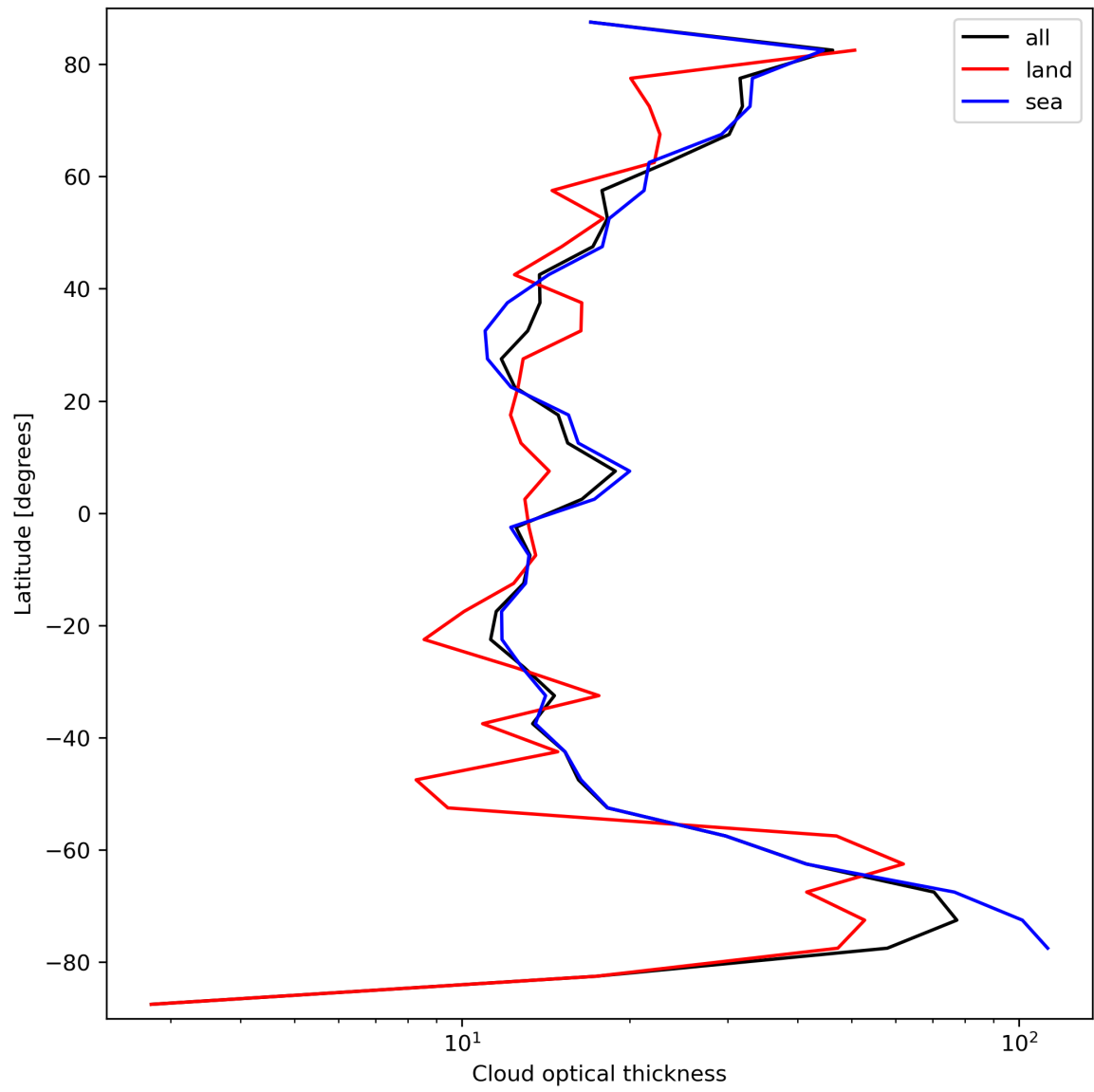


Figure 25: Zonal average of “Cloud optical thickness” for 2023-09-18 to 2023-09-20.

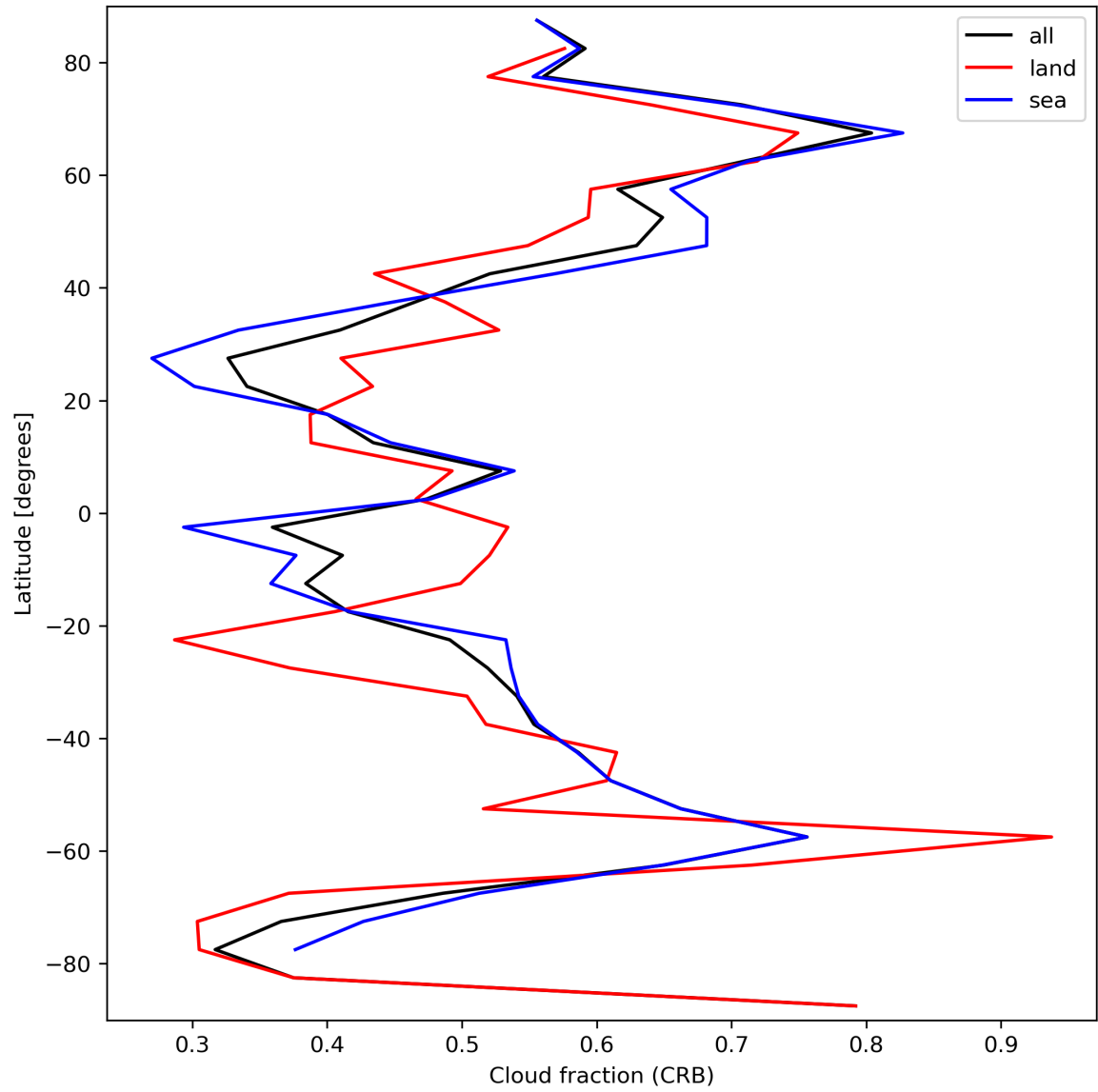


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-09-18 to 2023-09-20.

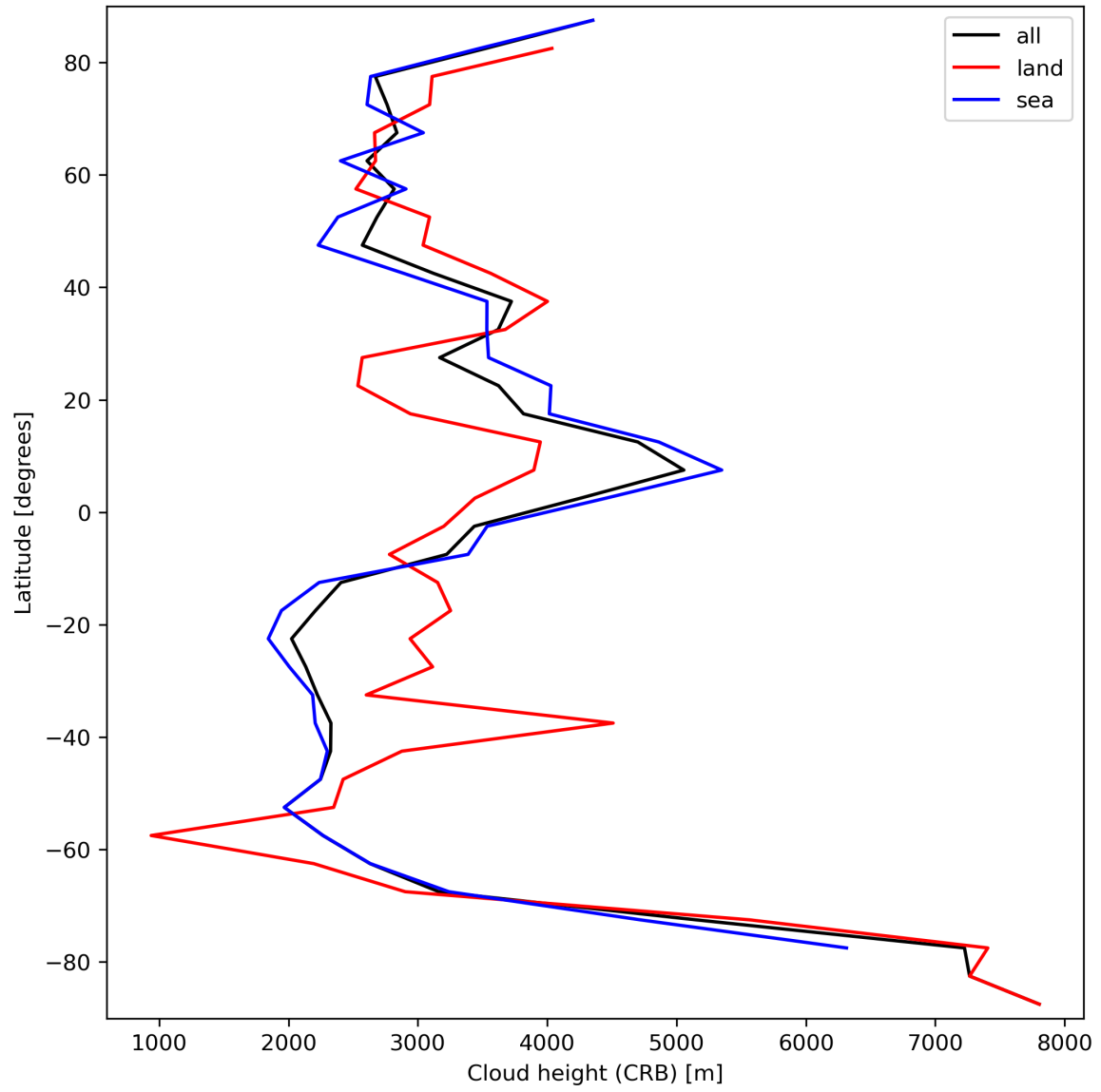


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-09-18 to 2023-09-20.

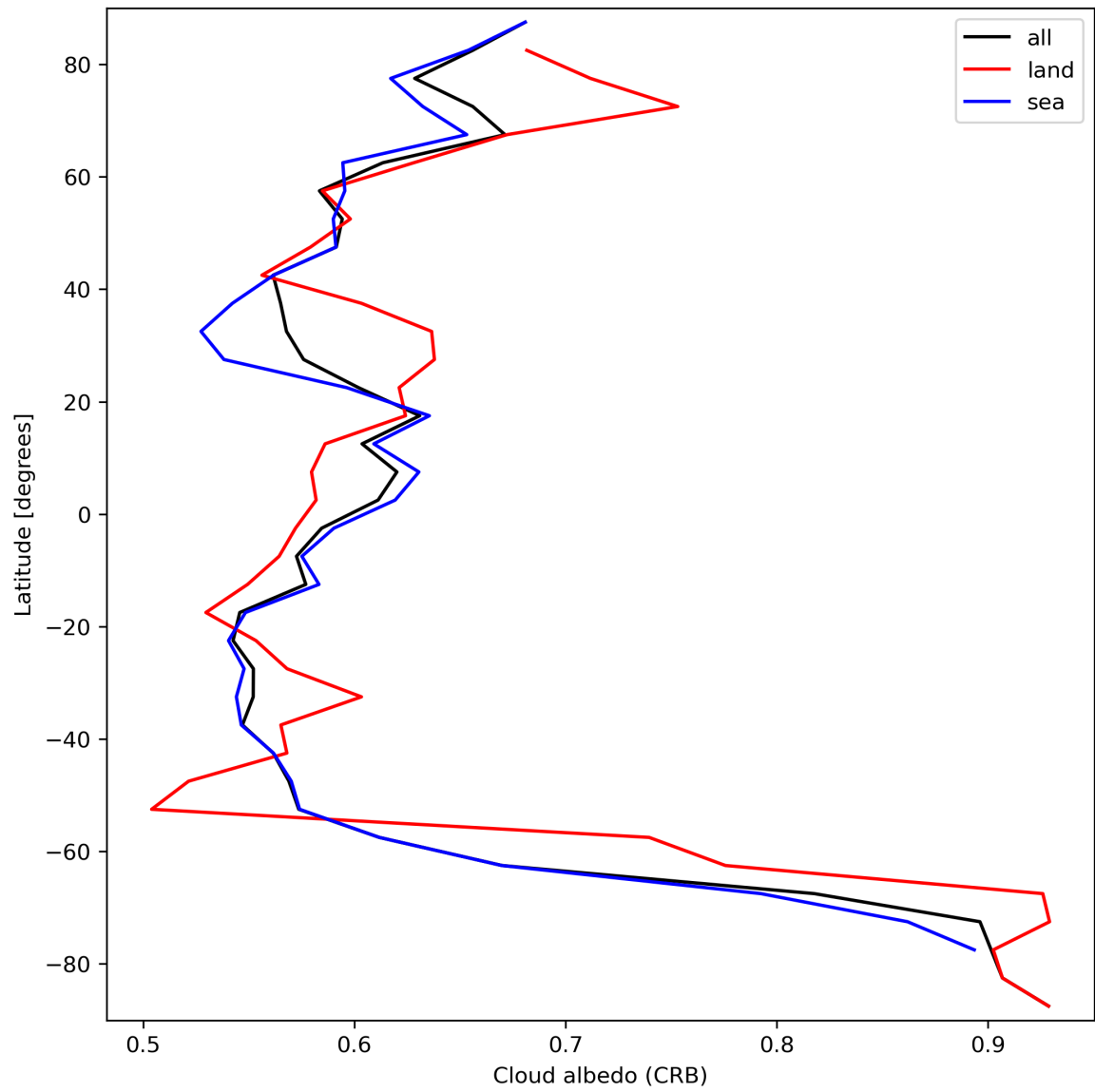


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-09-18 to 2023-09-20.

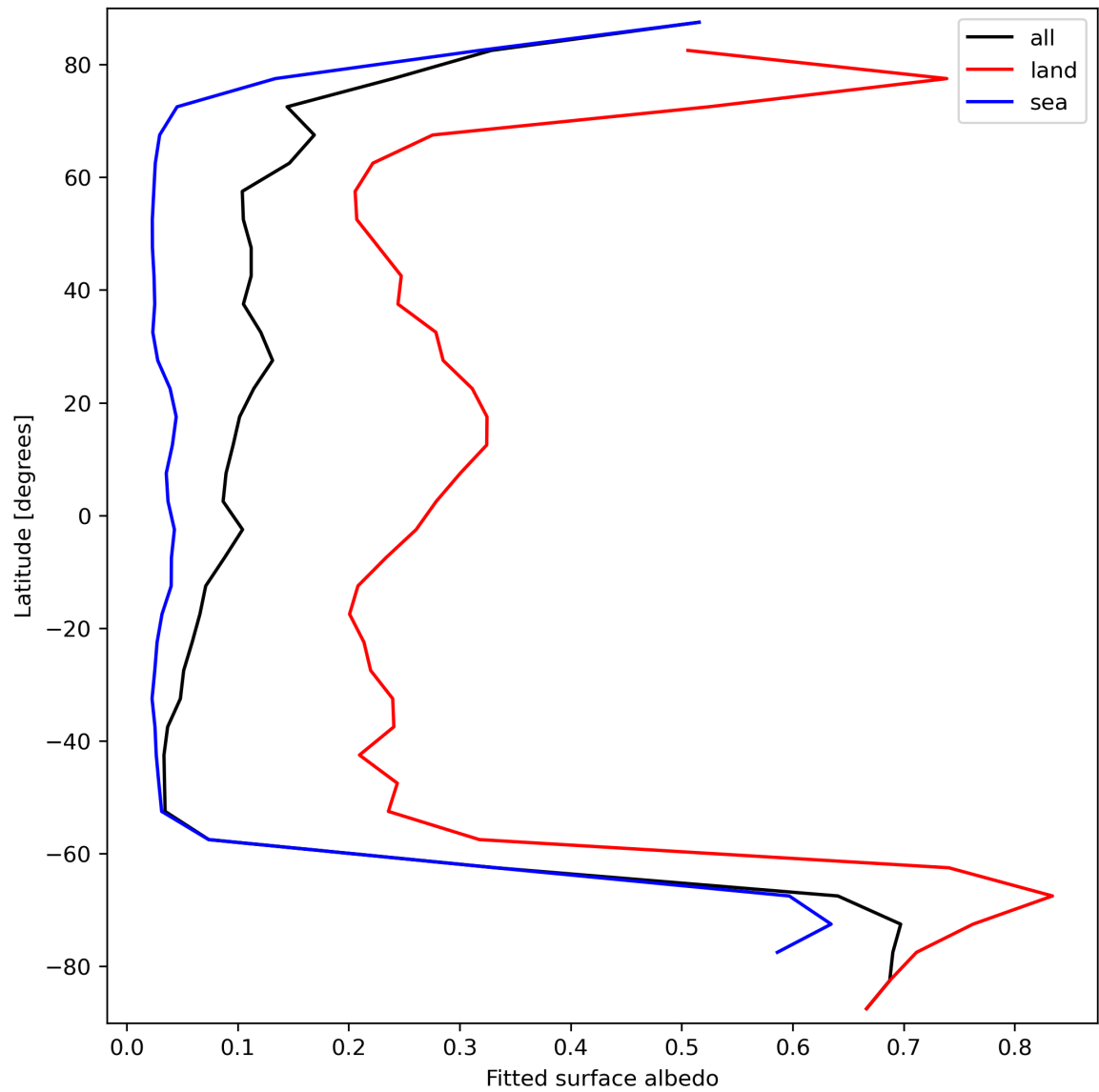


Figure 29: Zonal average of “Fitted surface albedo” for 2023-09-18 to 2023-09-20.

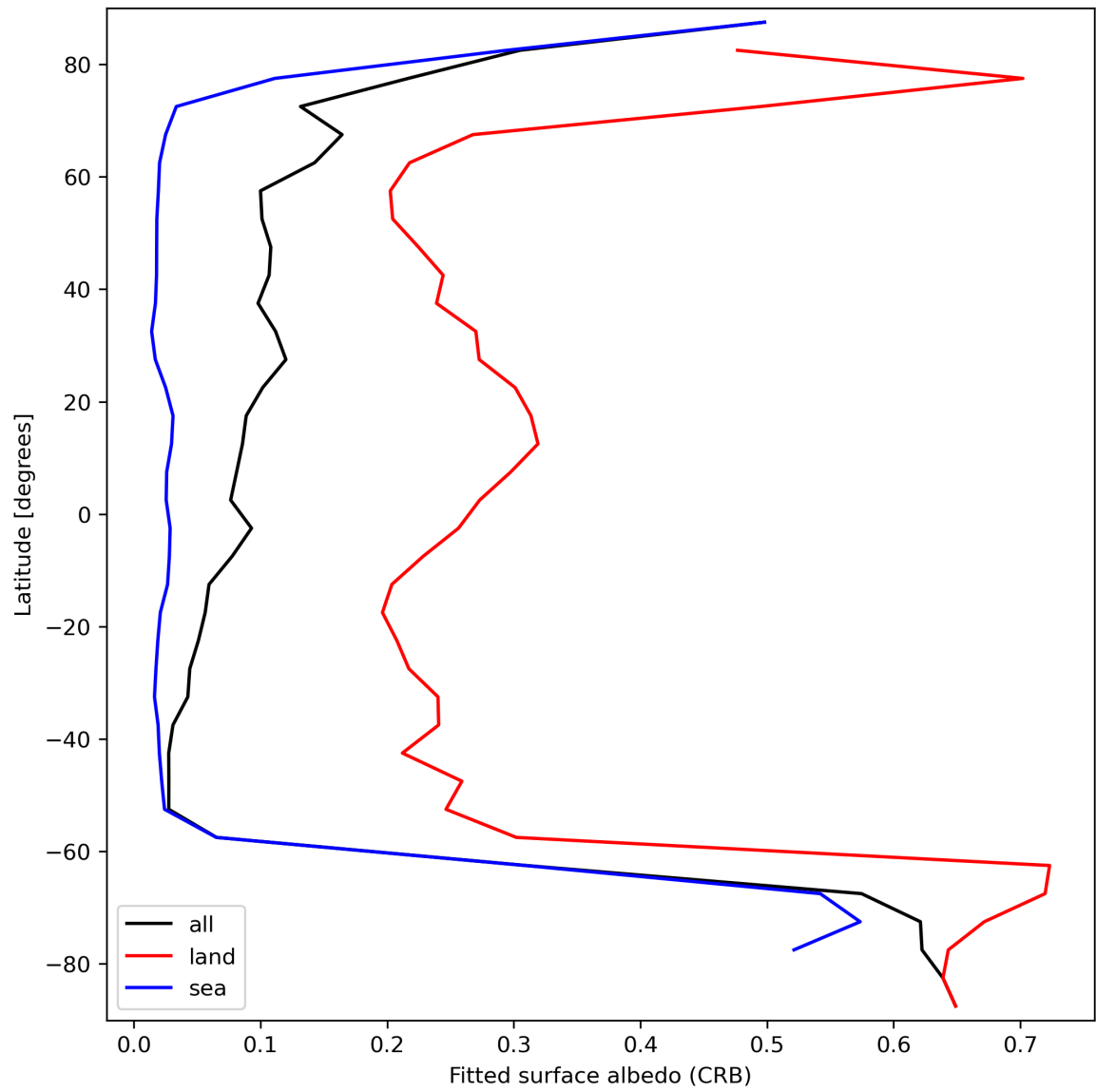


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-09-18 to 2023-09-20.

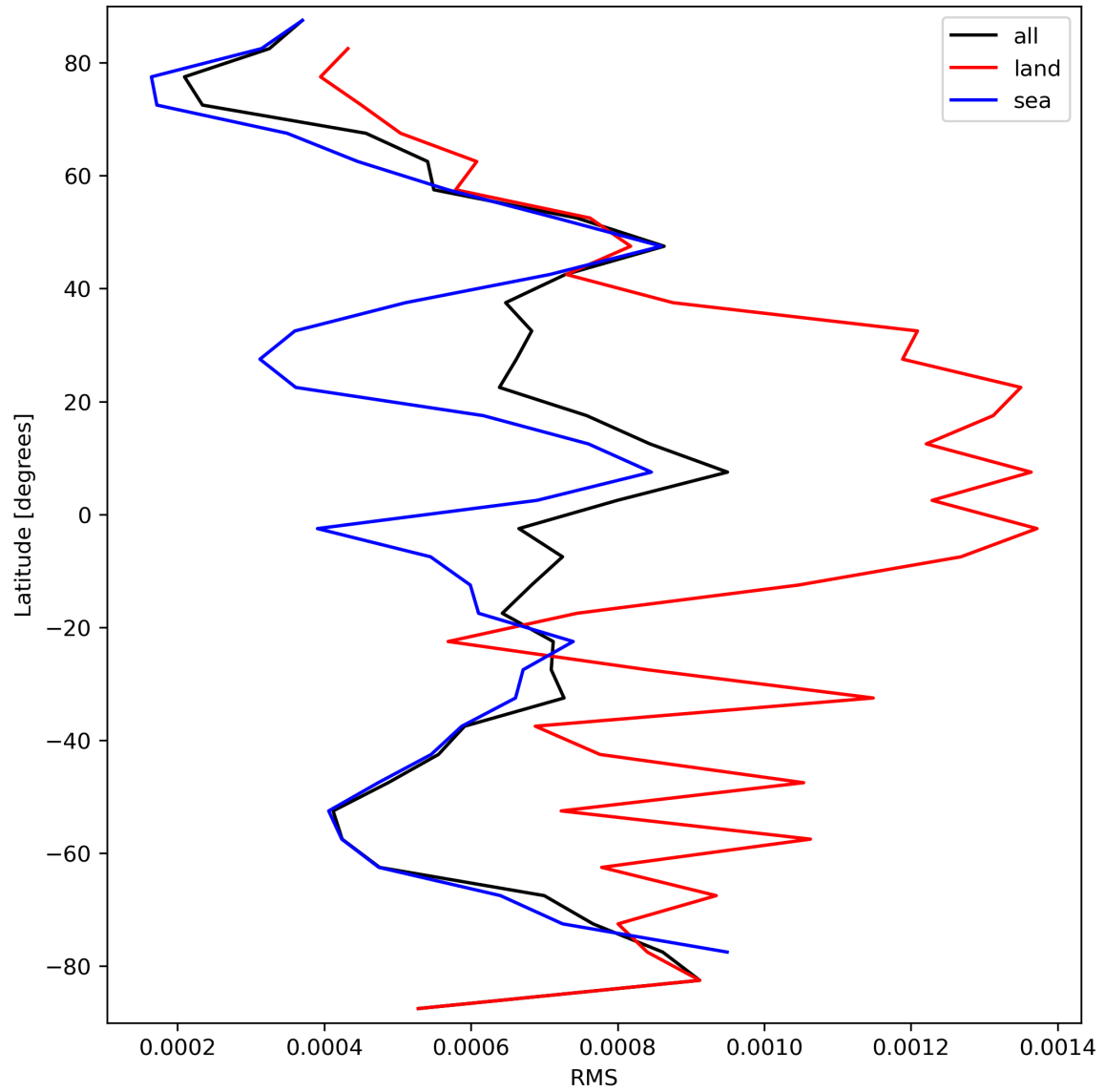


Figure 31: Zonal average of “RMS” for 2023-09-18 to 2023-09-20.

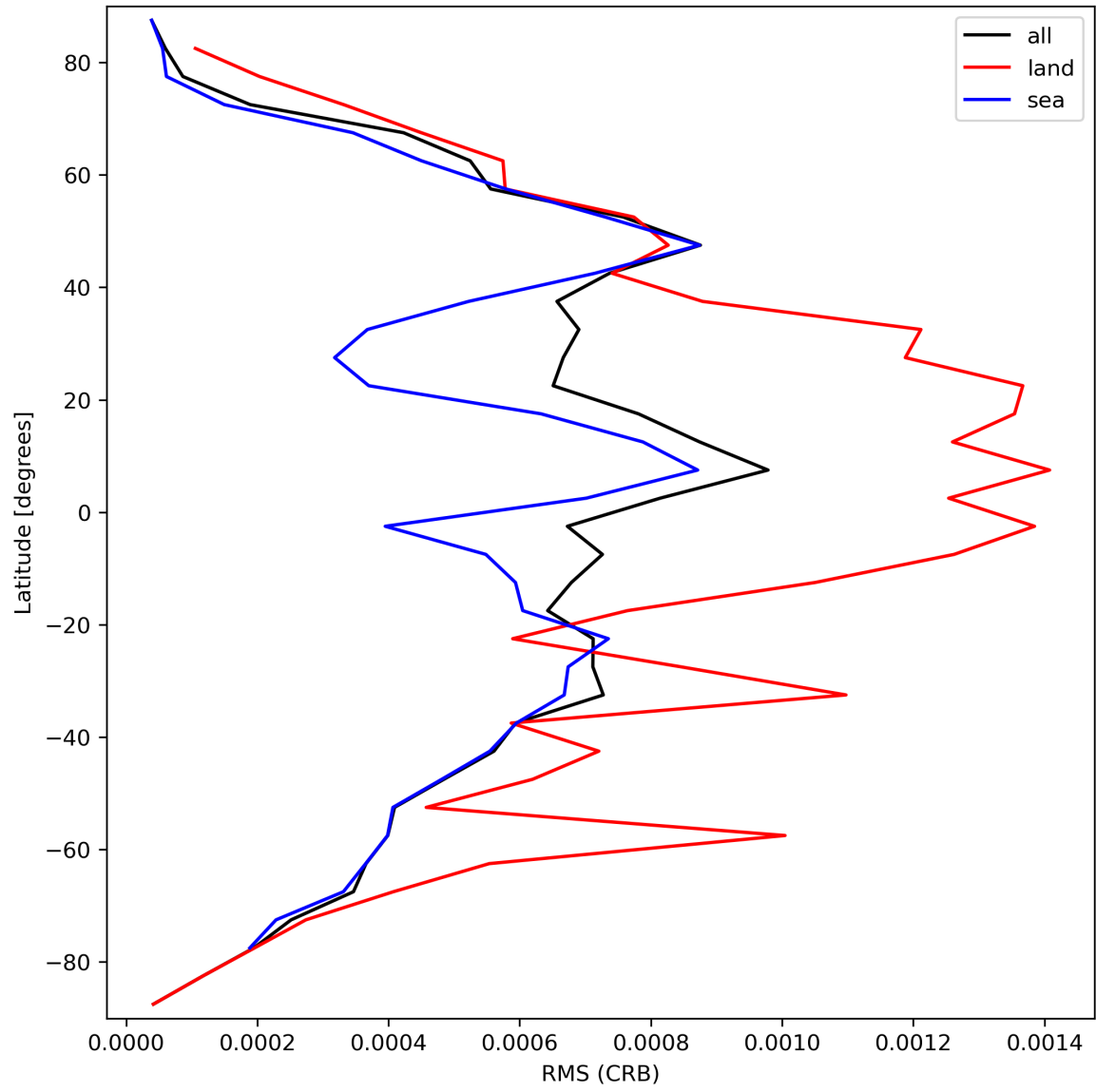


Figure 32: Zonal average of “RMS (CRB)” for 2023-09-18 to 2023-09-20.

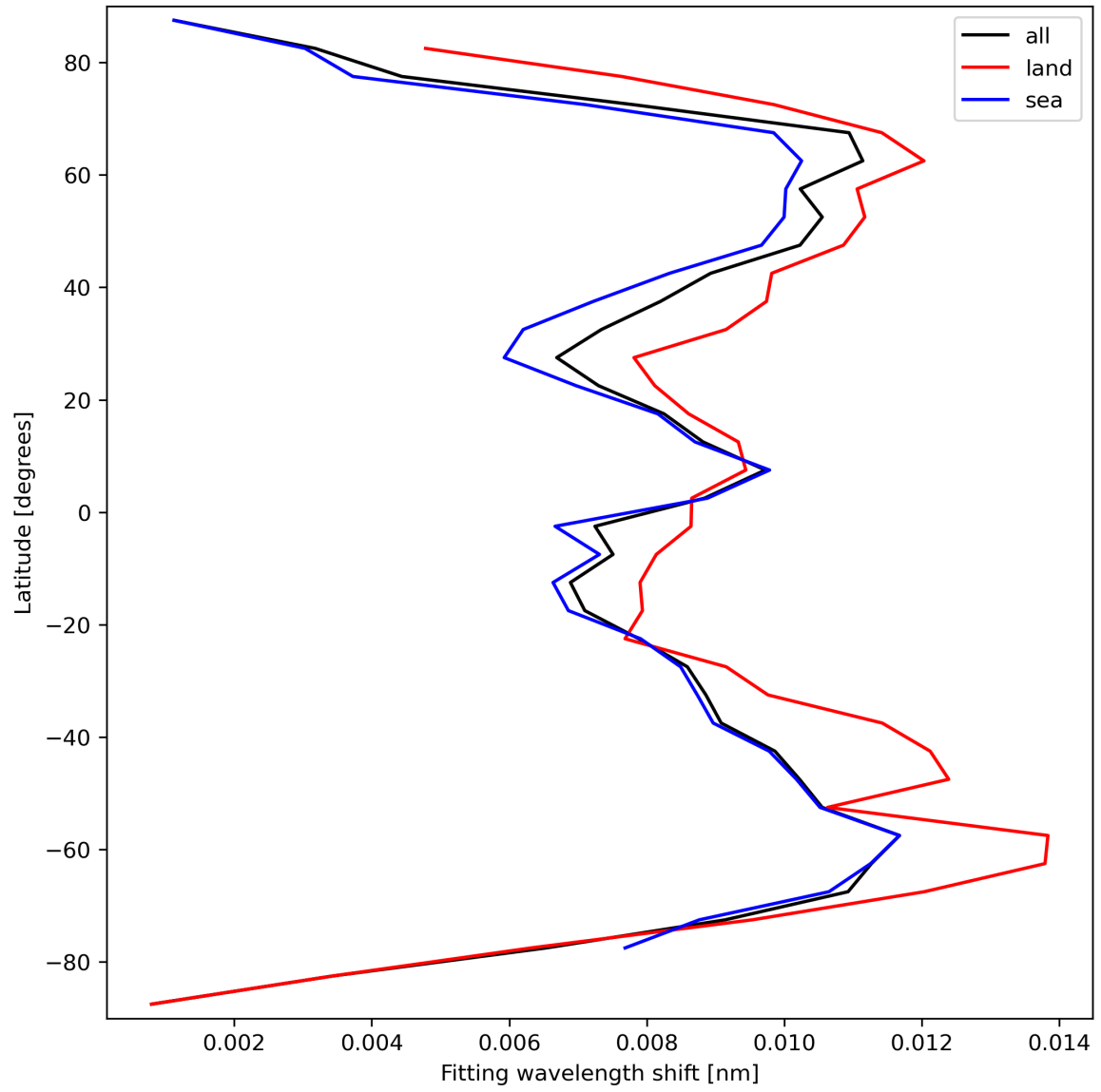


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-09-18 to 2023-09-20.

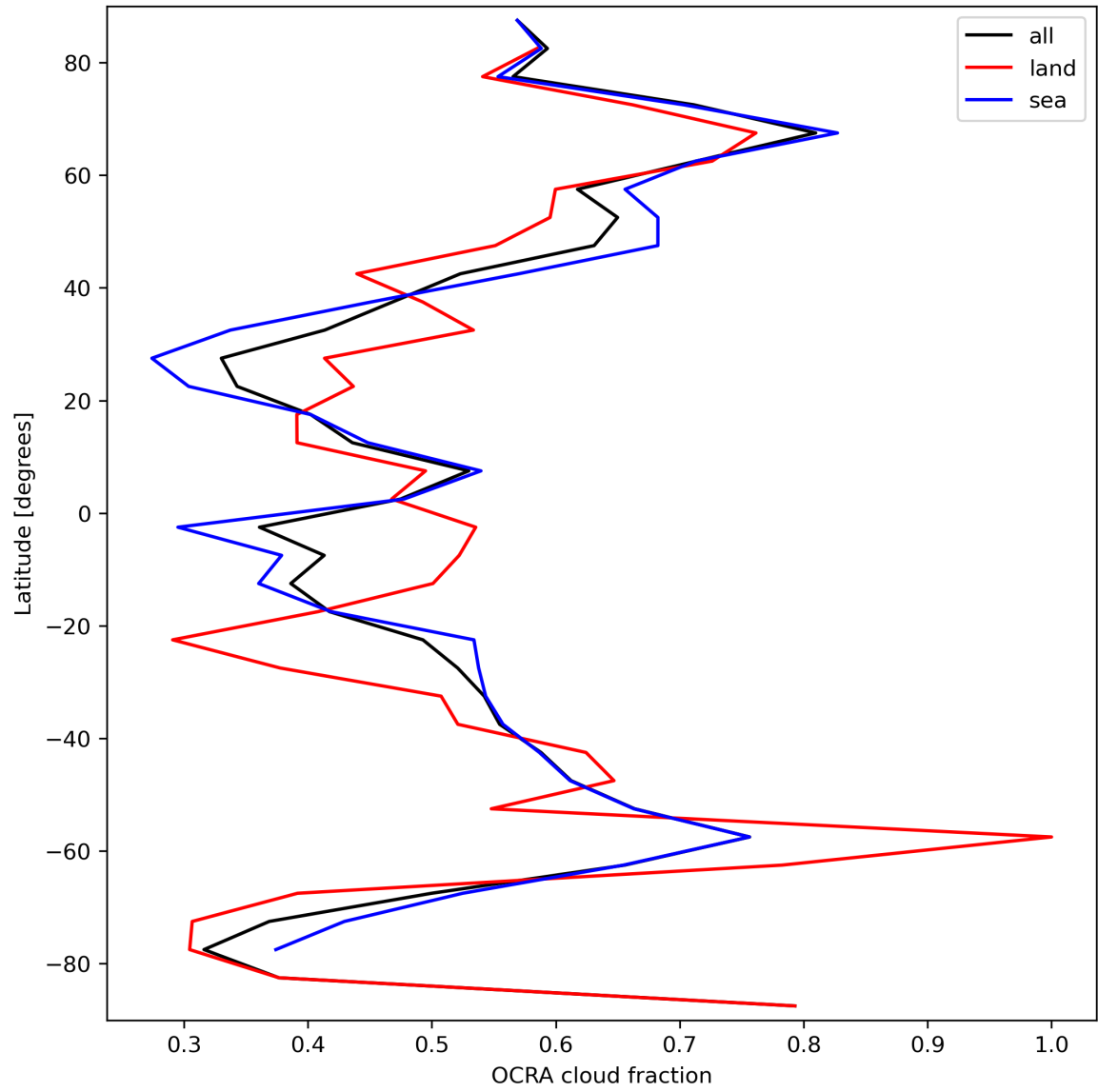


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-09-18 to 2023-09-20.

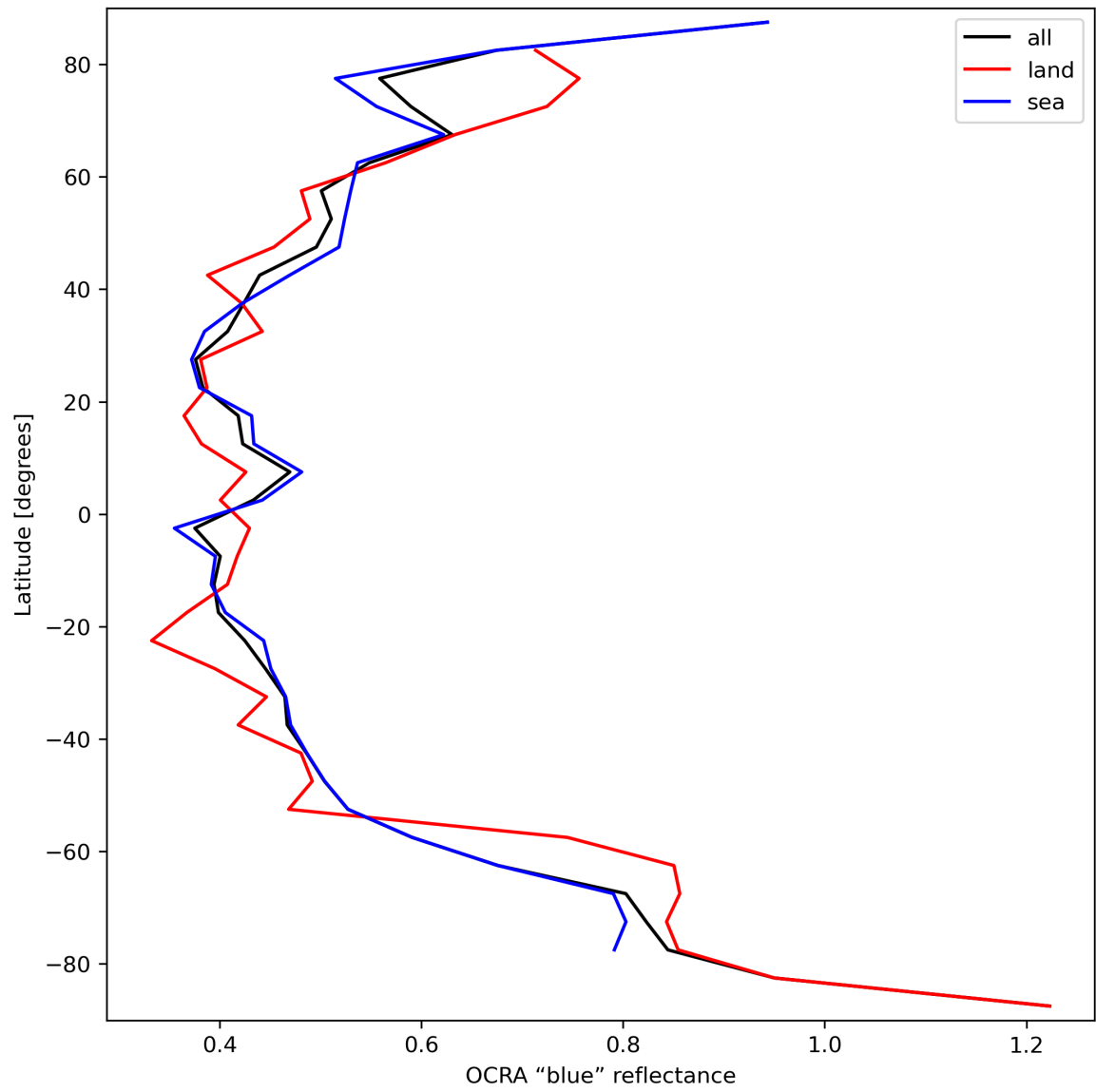


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-09-18 to 2023-09-20.

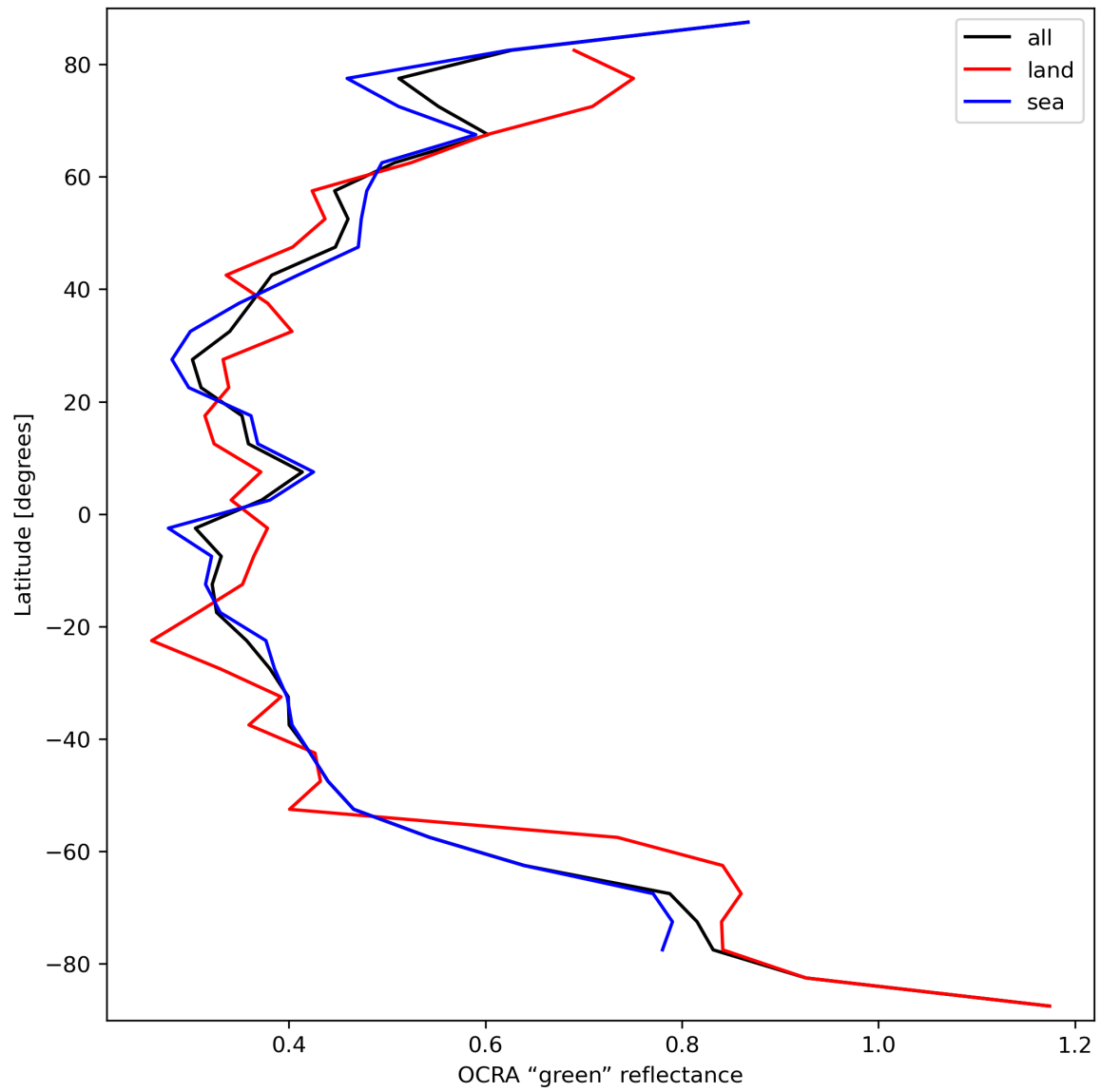


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-09-18 to 2023-09-20.

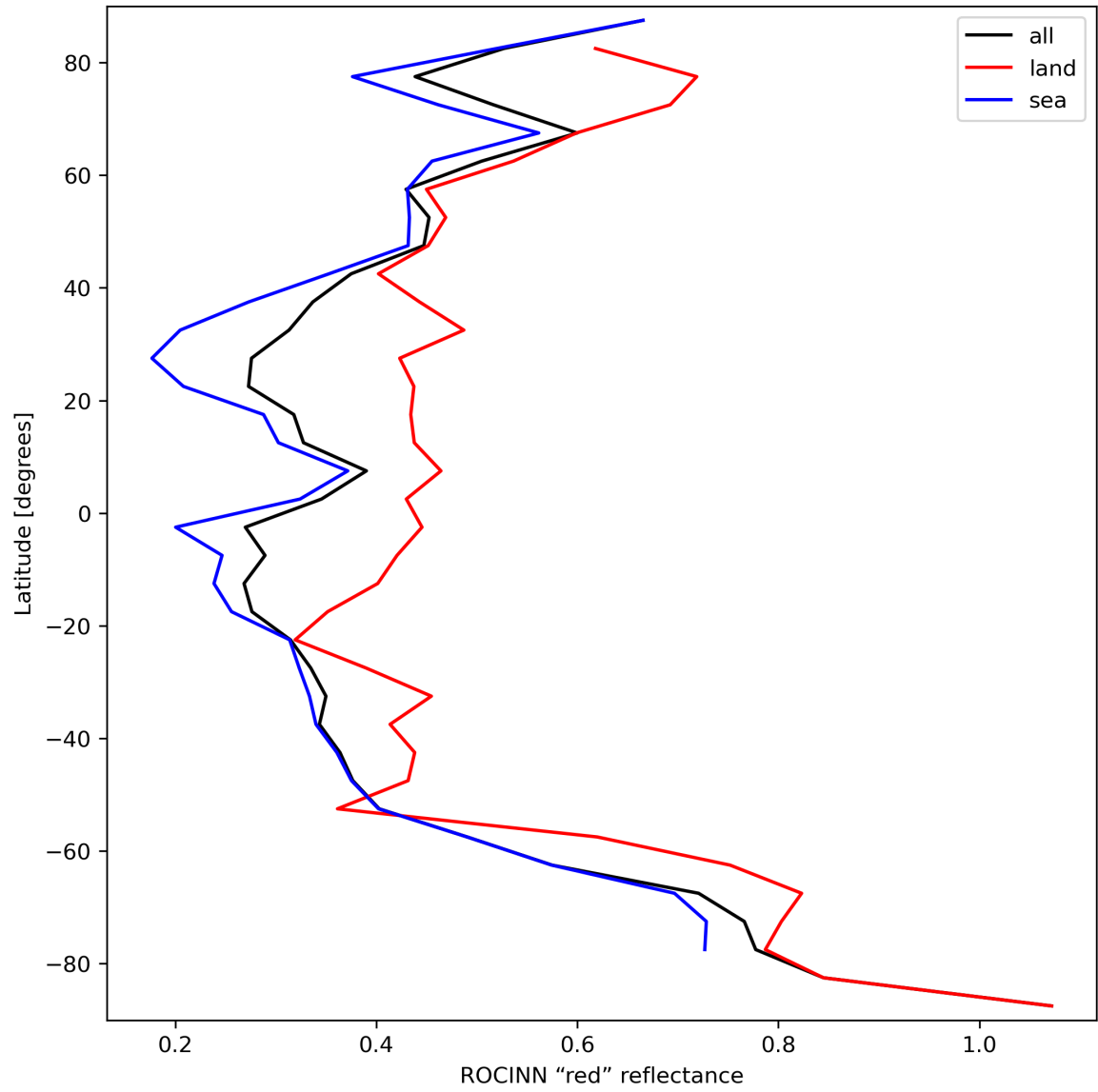


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-09-18 to 2023-09-20.

8 Histograms

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

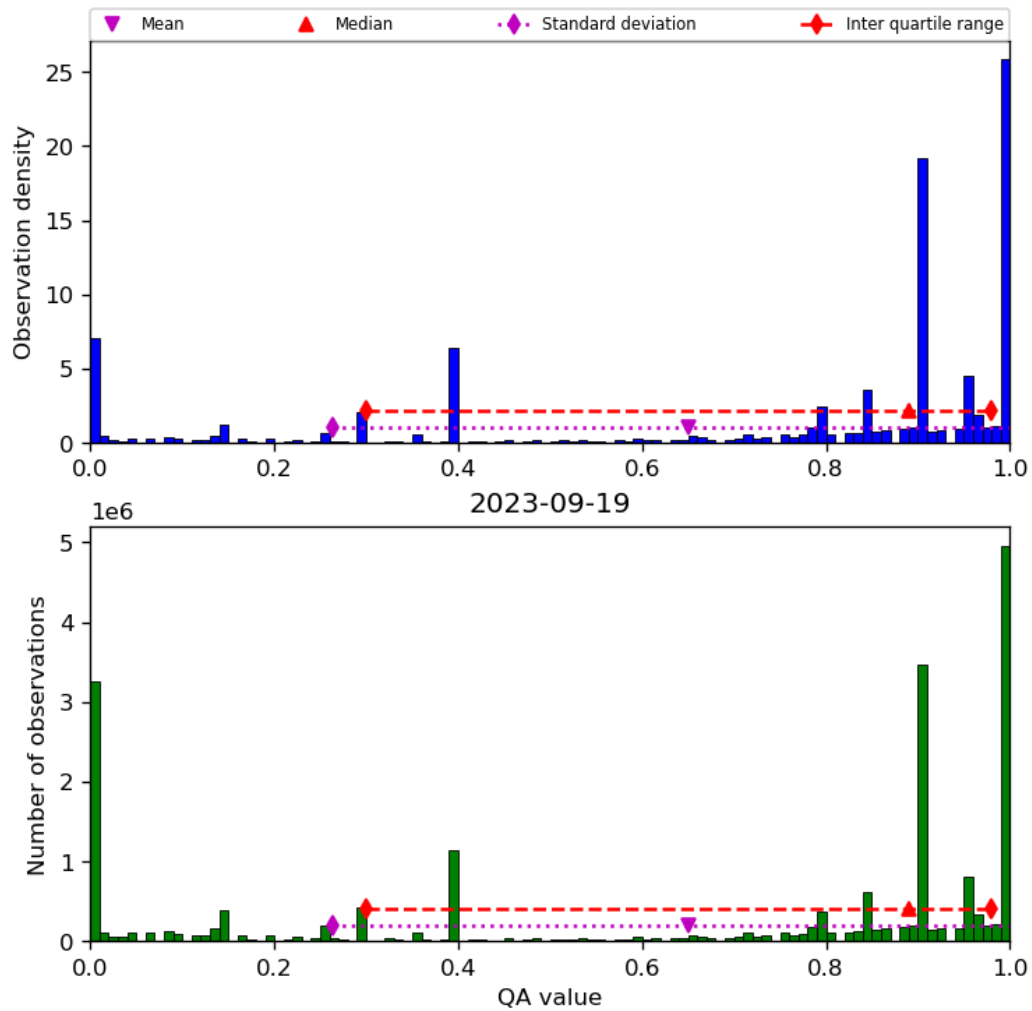


Figure 38: Histogram of “QA value” for 2023-09-18 to 2023-09-20

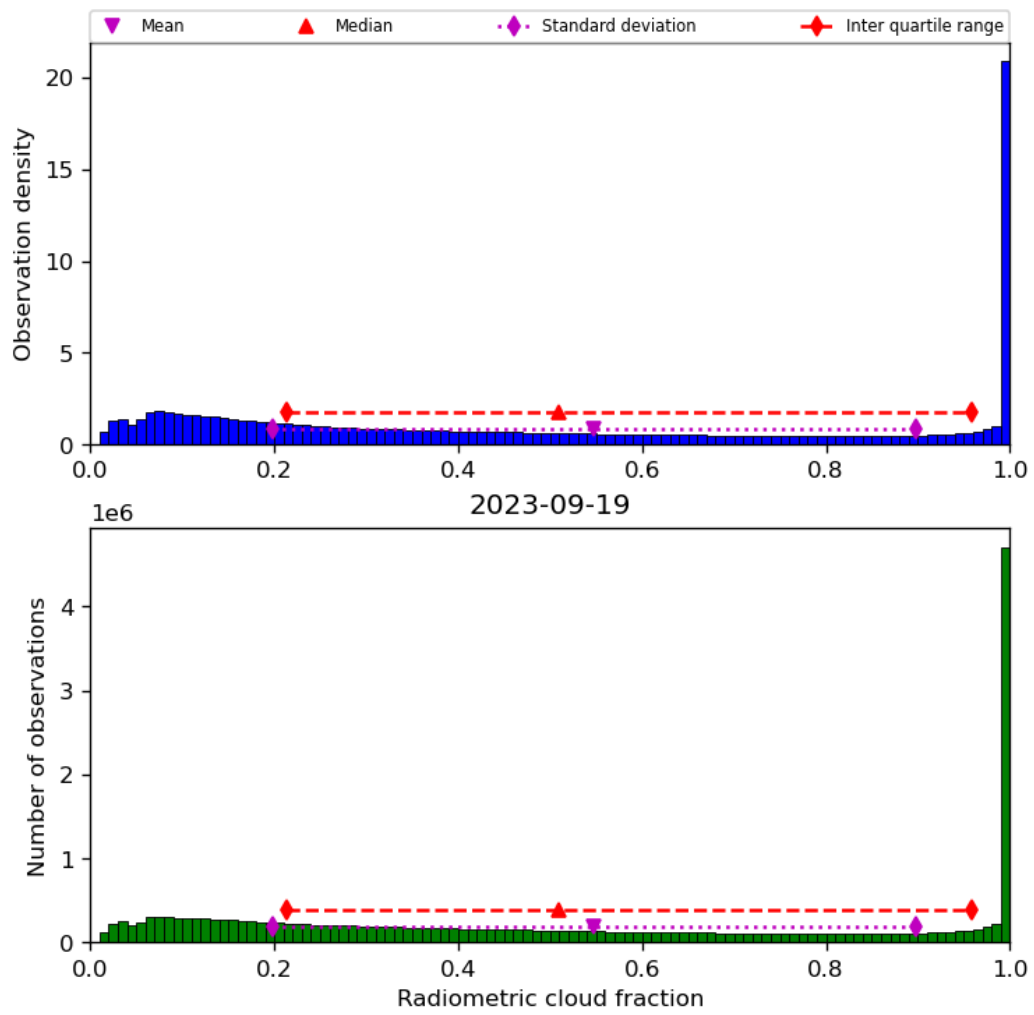


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-09-18 to 2023-09-20

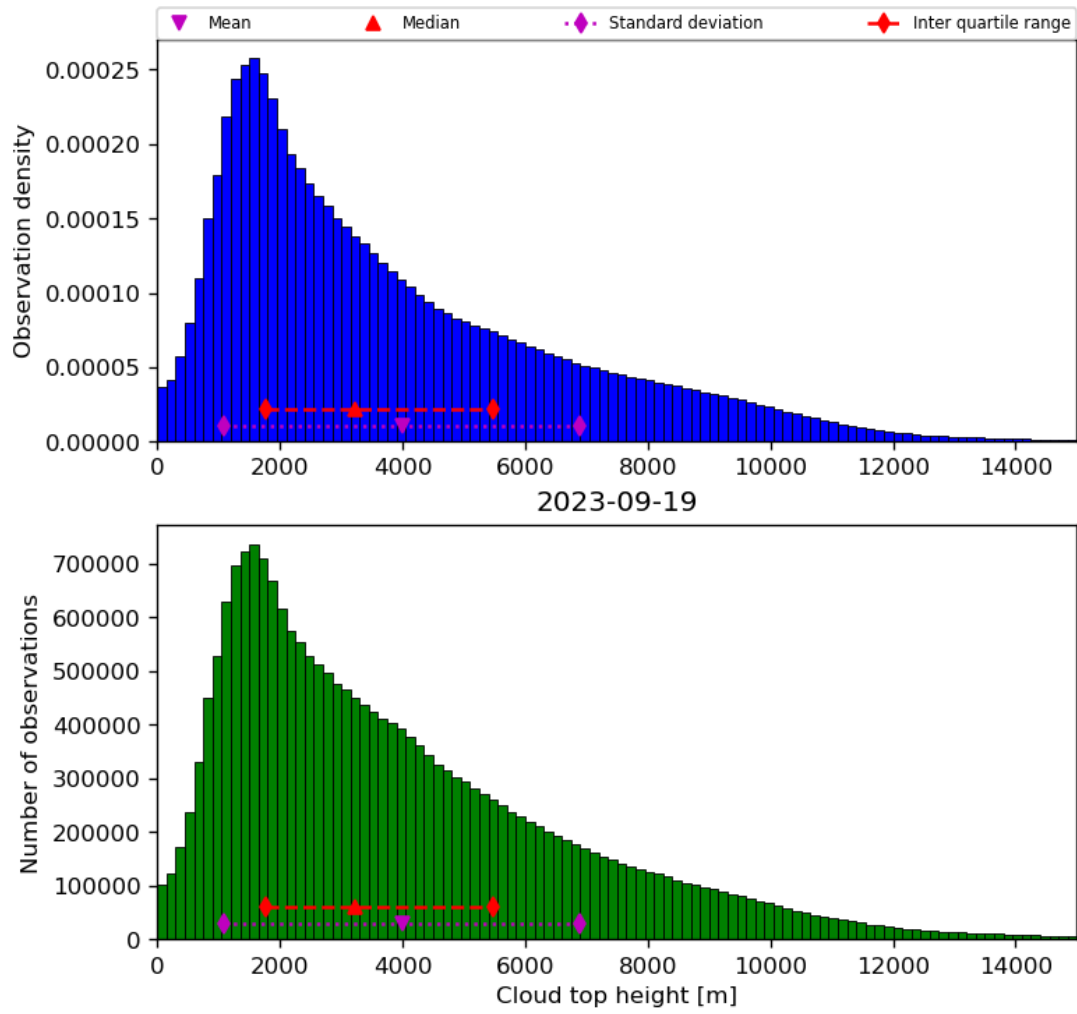


Figure 40: Histogram of “Cloud top height” for 2023-09-18 to 2023-09-20

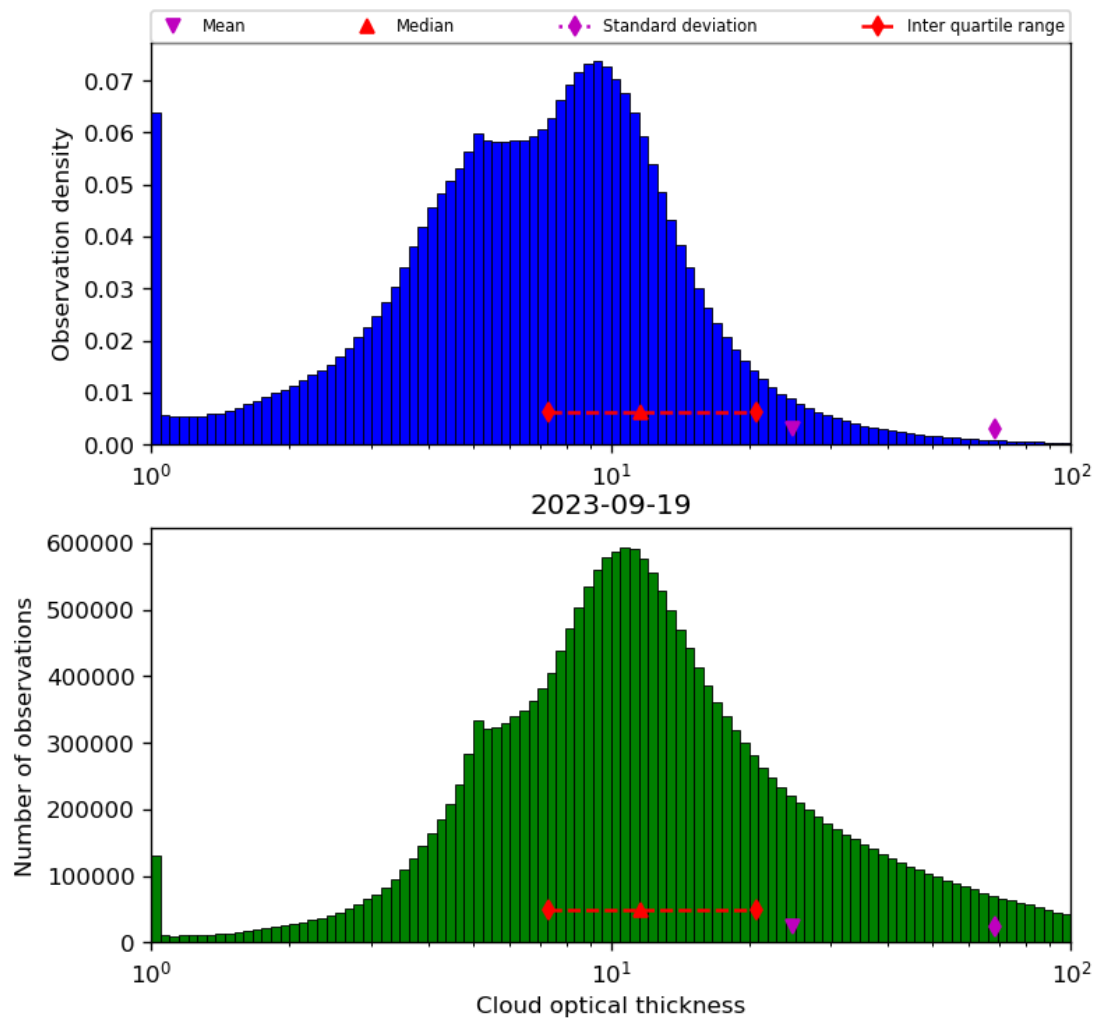


Figure 41: Histogram of “Cloud optical thickness” for 2023-09-18 to 2023-09-20

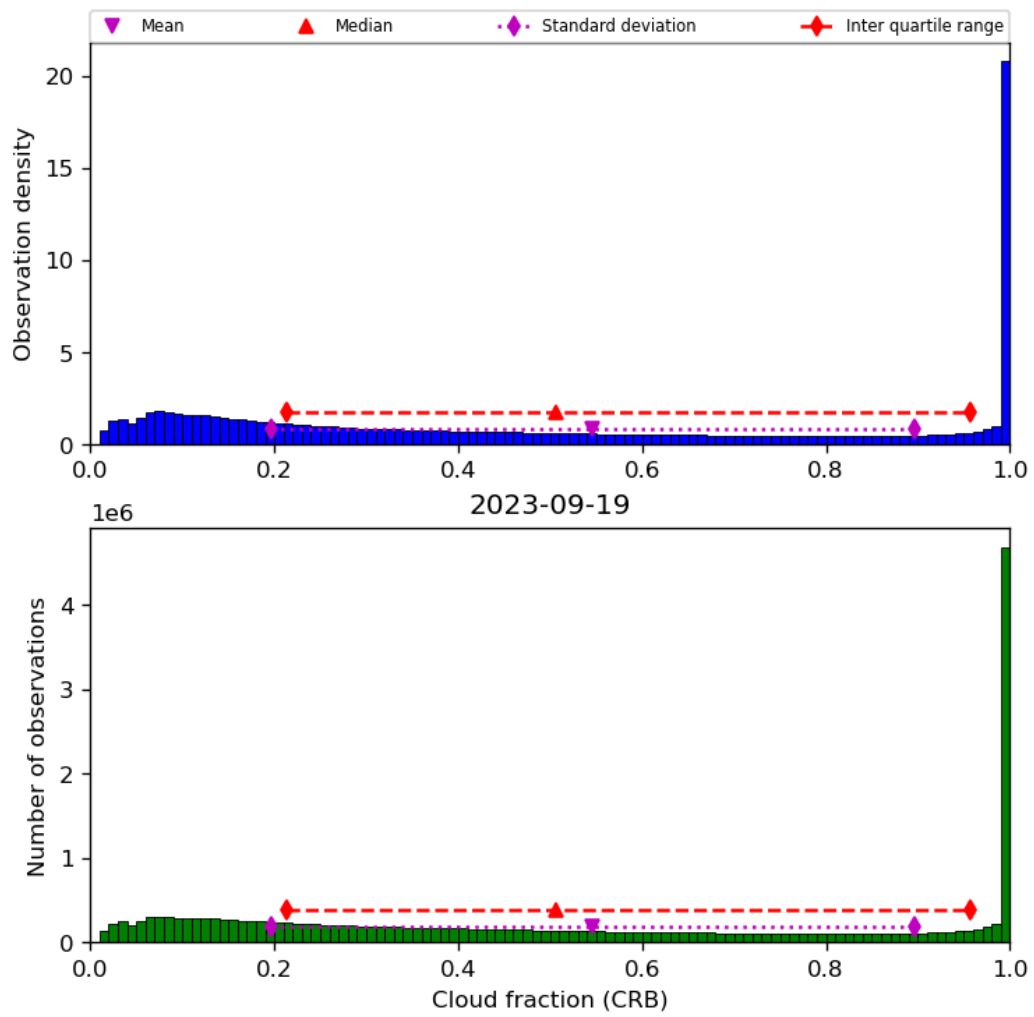


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-09-18 to 2023-09-20

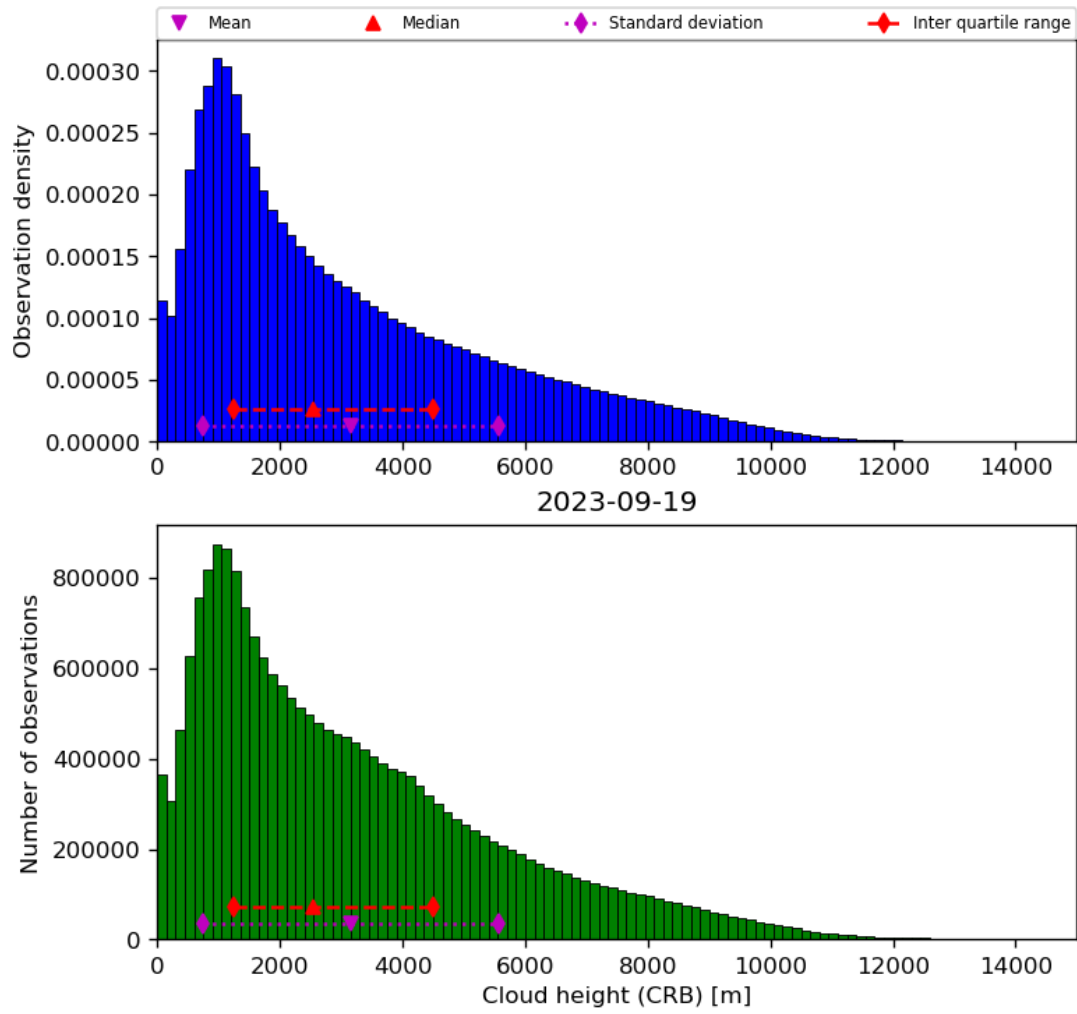


Figure 43: Histogram of “Cloud height (CRB)” for 2023-09-18 to 2023-09-20

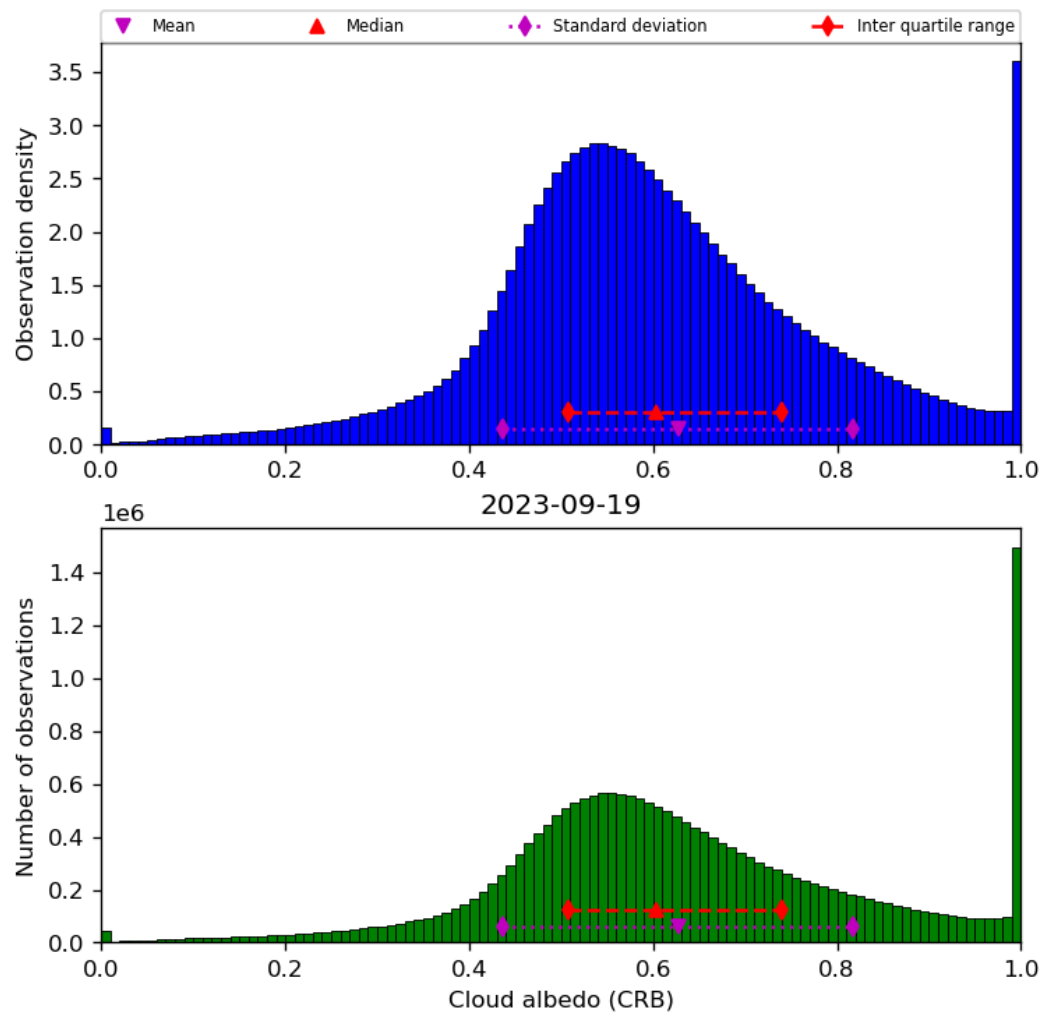


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-09-18 to 2023-09-20

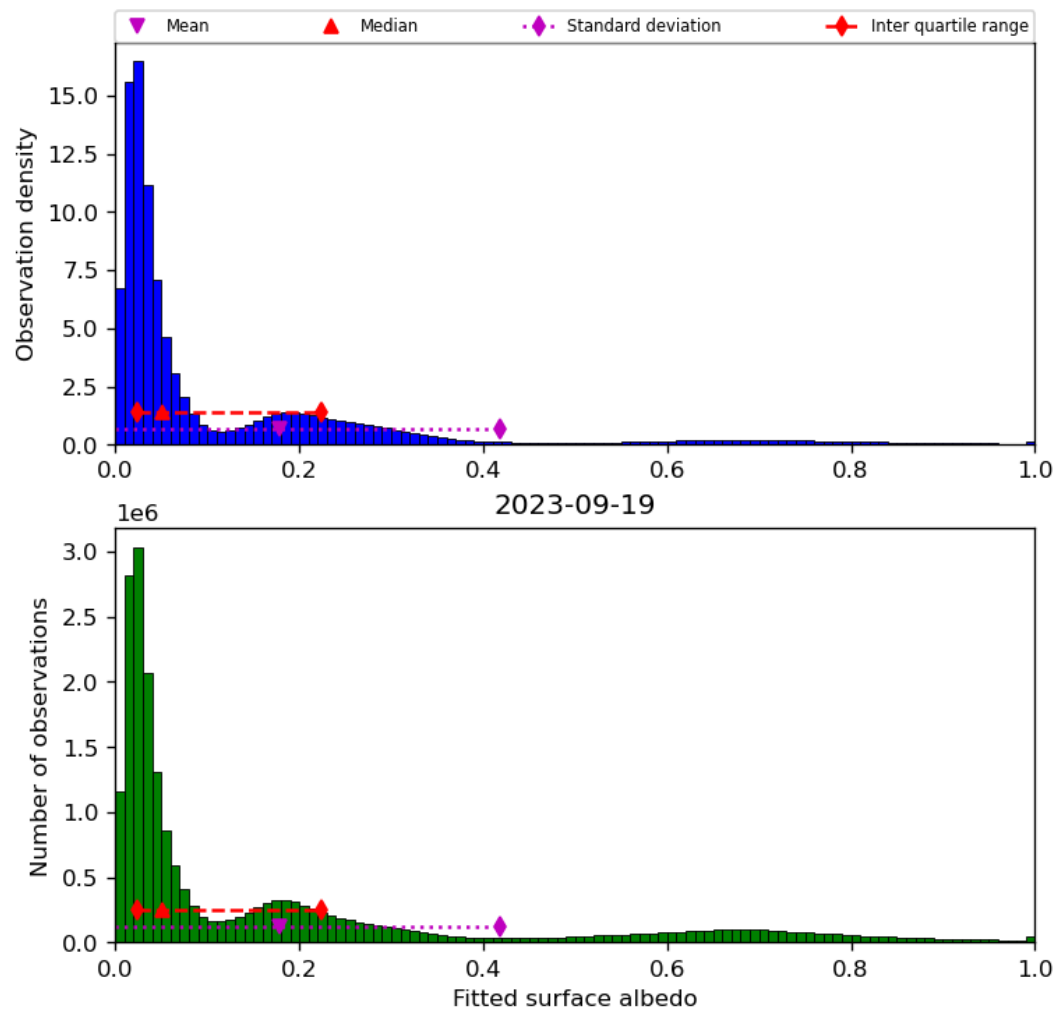


Figure 45: Histogram of “Fitted surface albedo” for 2023-09-18 to 2023-09-20

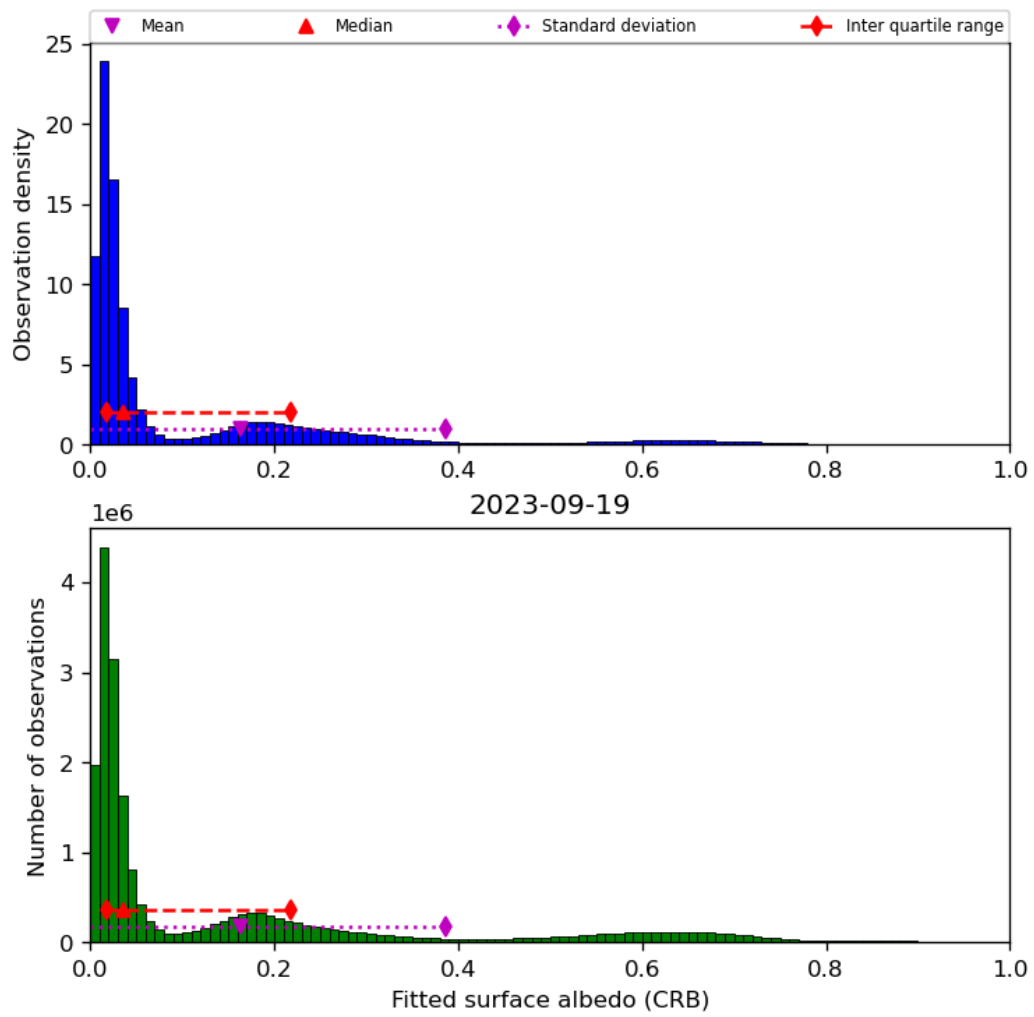


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-09-18 to 2023-09-20

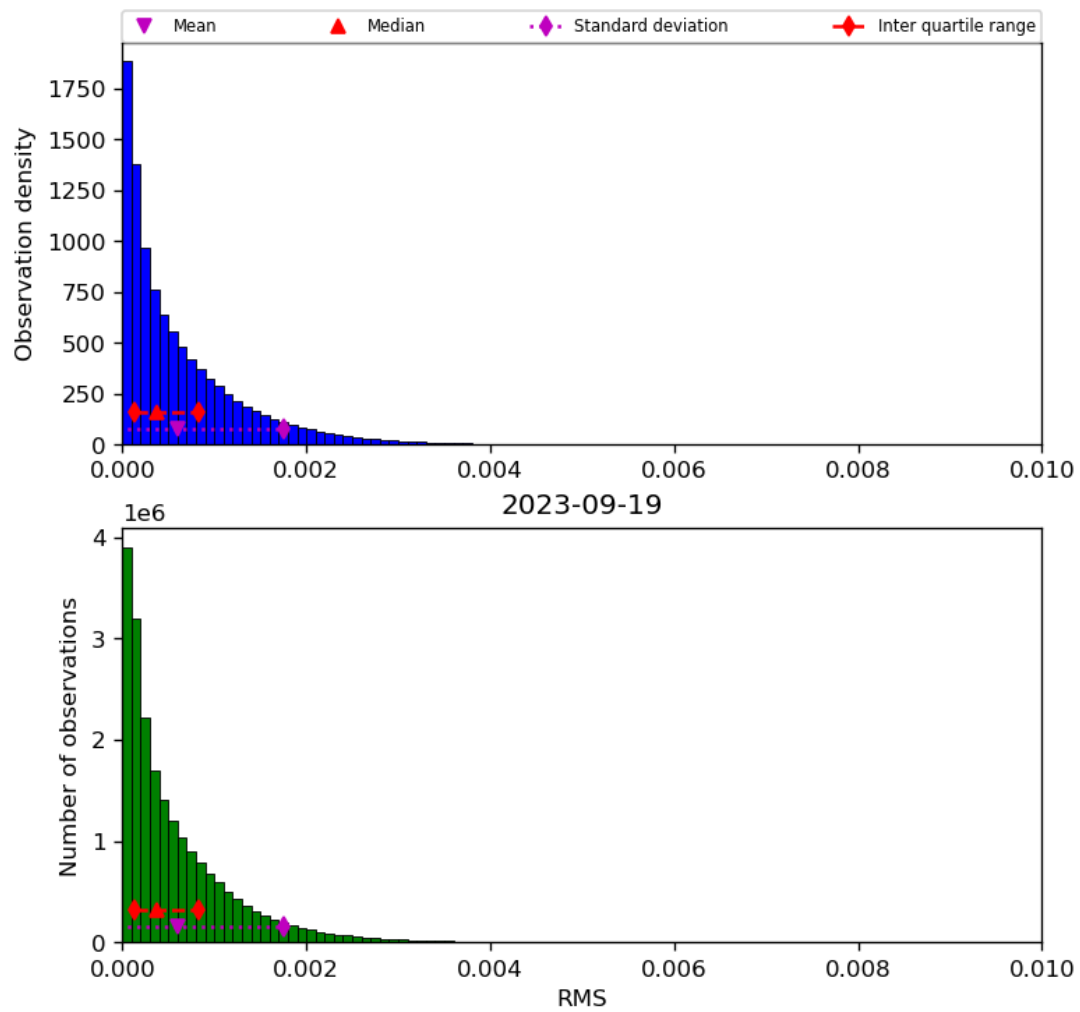


Figure 47: Histogram of “RMS” for 2023-09-18 to 2023-09-20

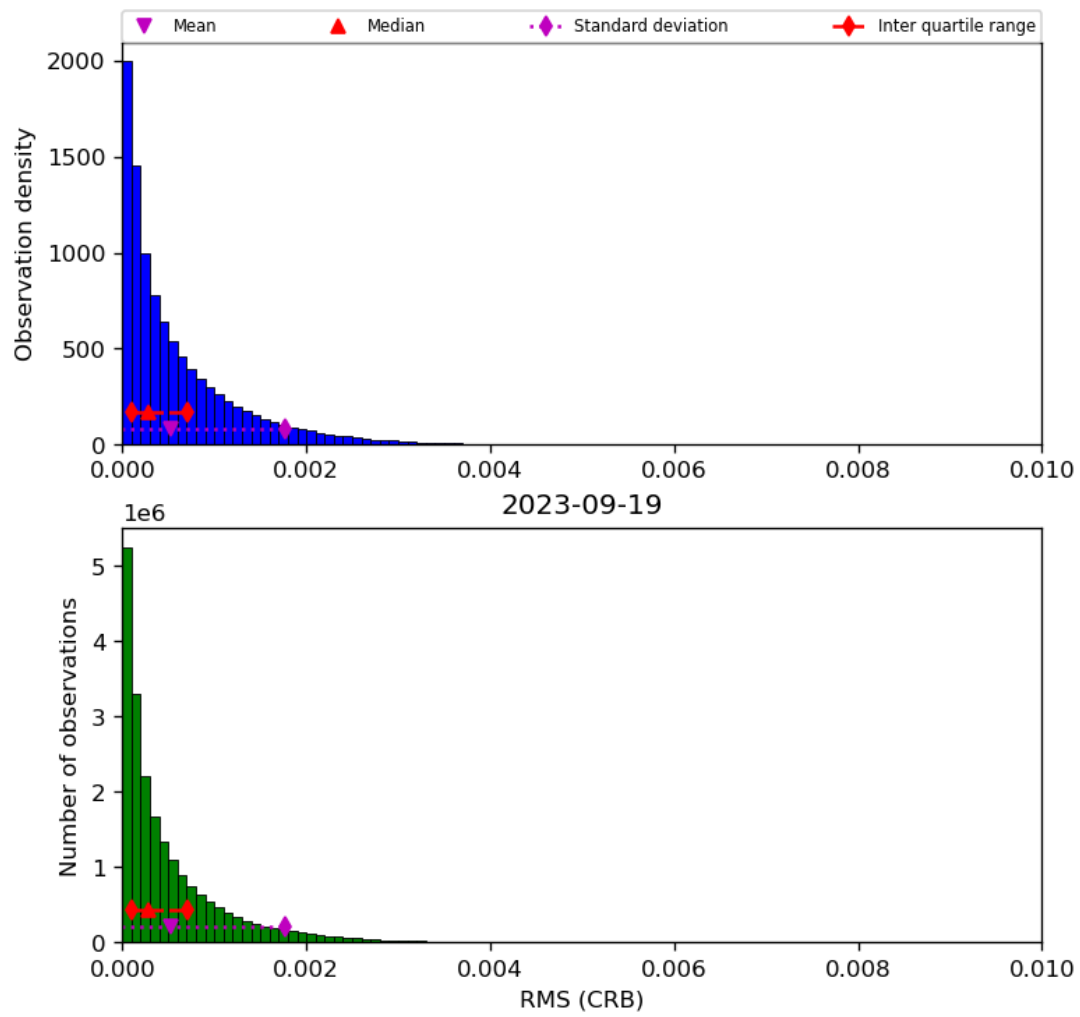


Figure 48: Histogram of “RMS (CRB)” for 2023-09-18 to 2023-09-20

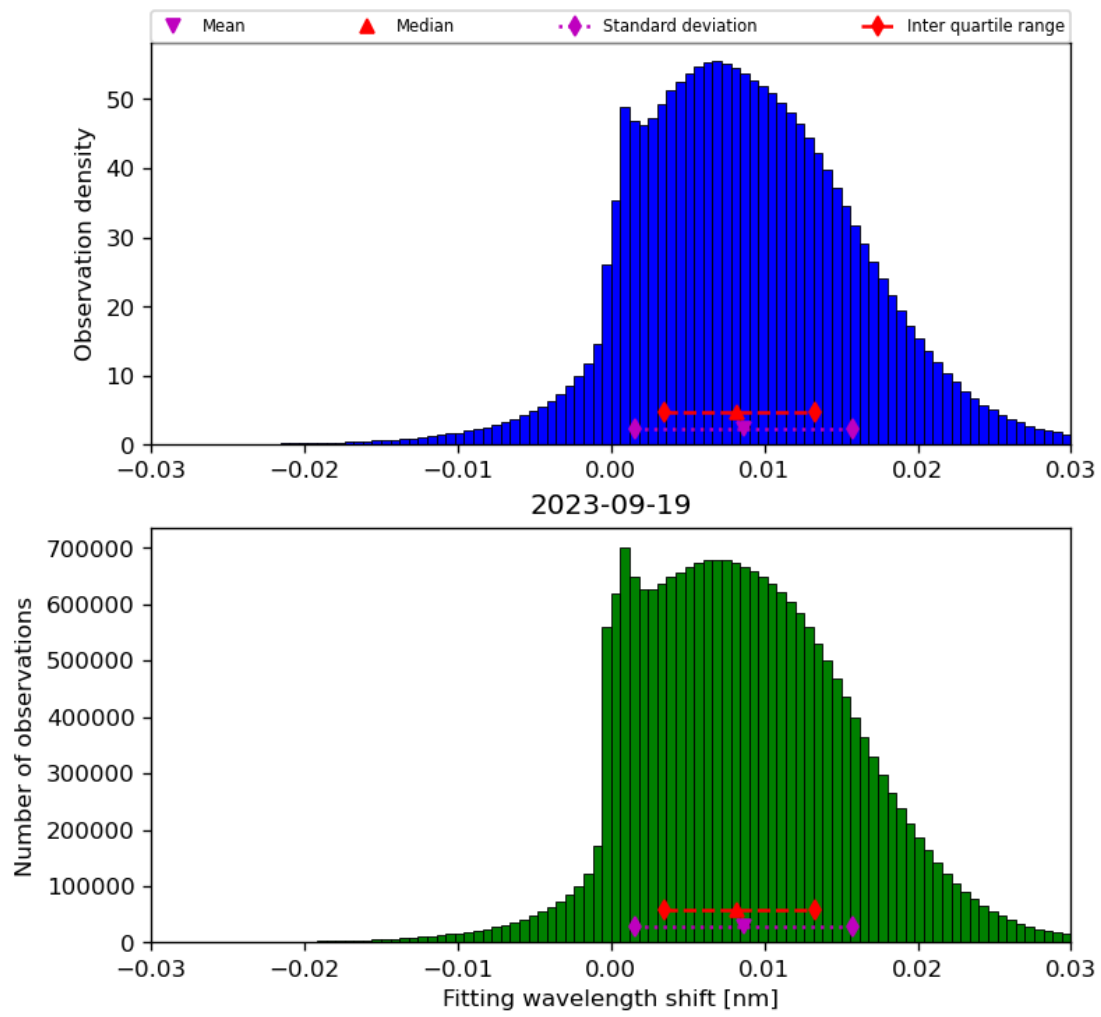


Figure 49: Histogram of “Fitting wavelength shift” for 2023-09-18 to 2023-09-20

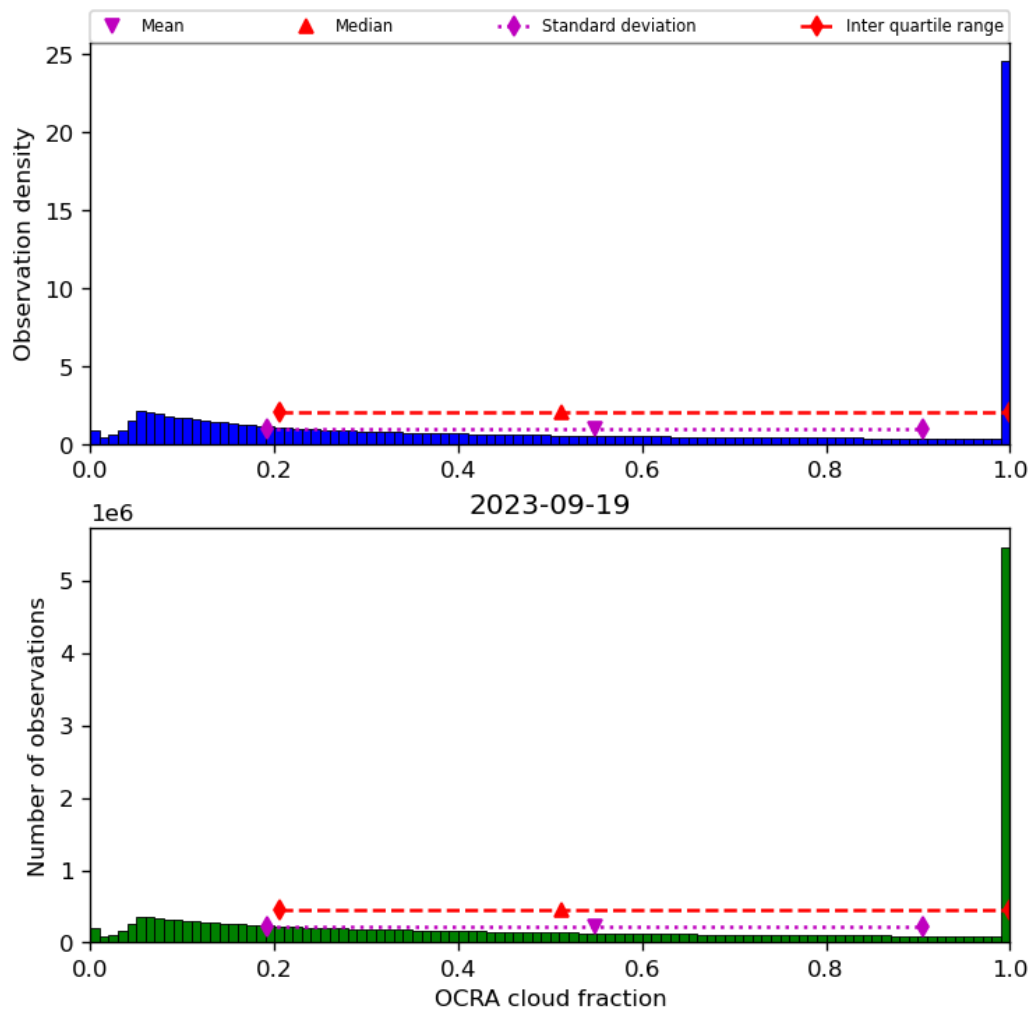


Figure 50: Histogram of “OCRA cloud fraction” for 2023-09-18 to 2023-09-20

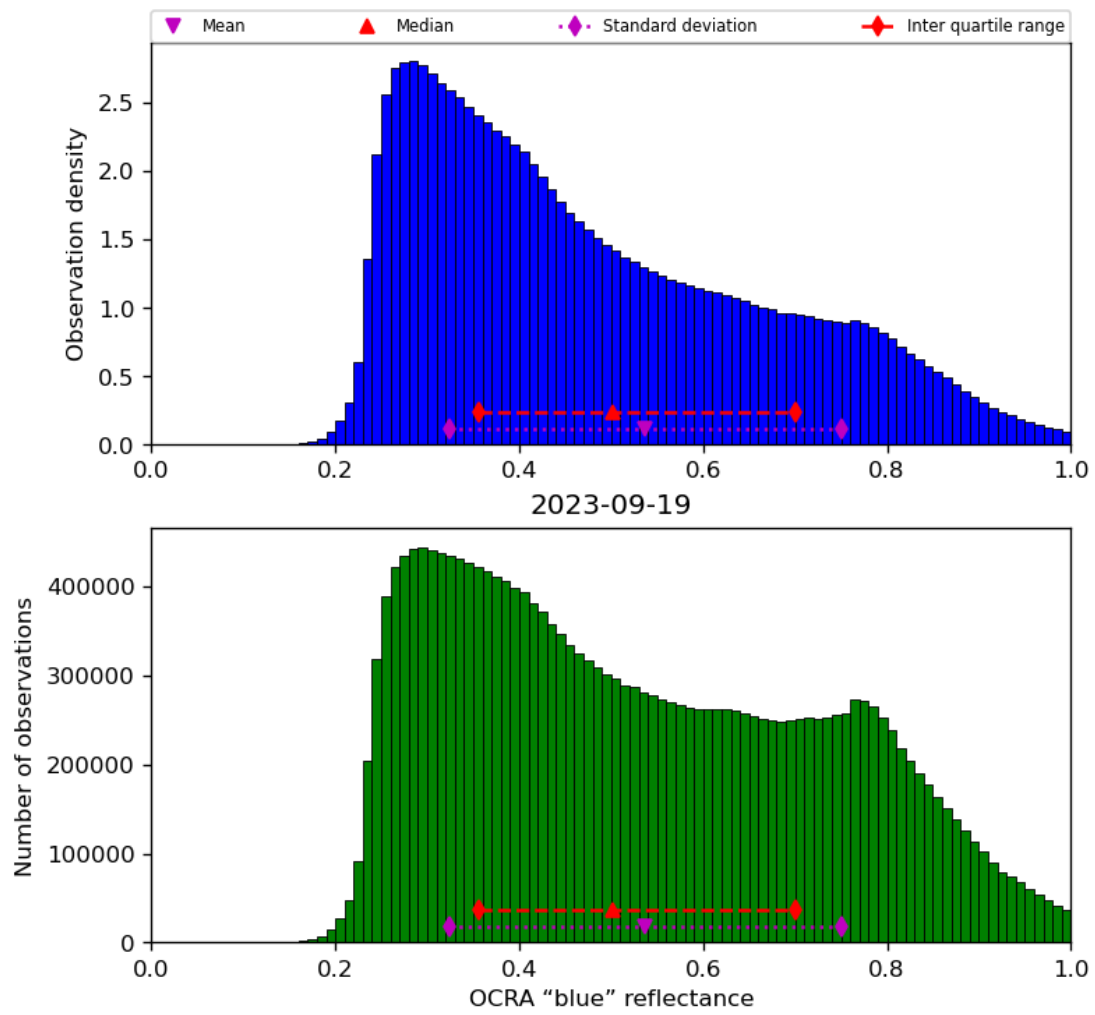


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-09-18 to 2023-09-20

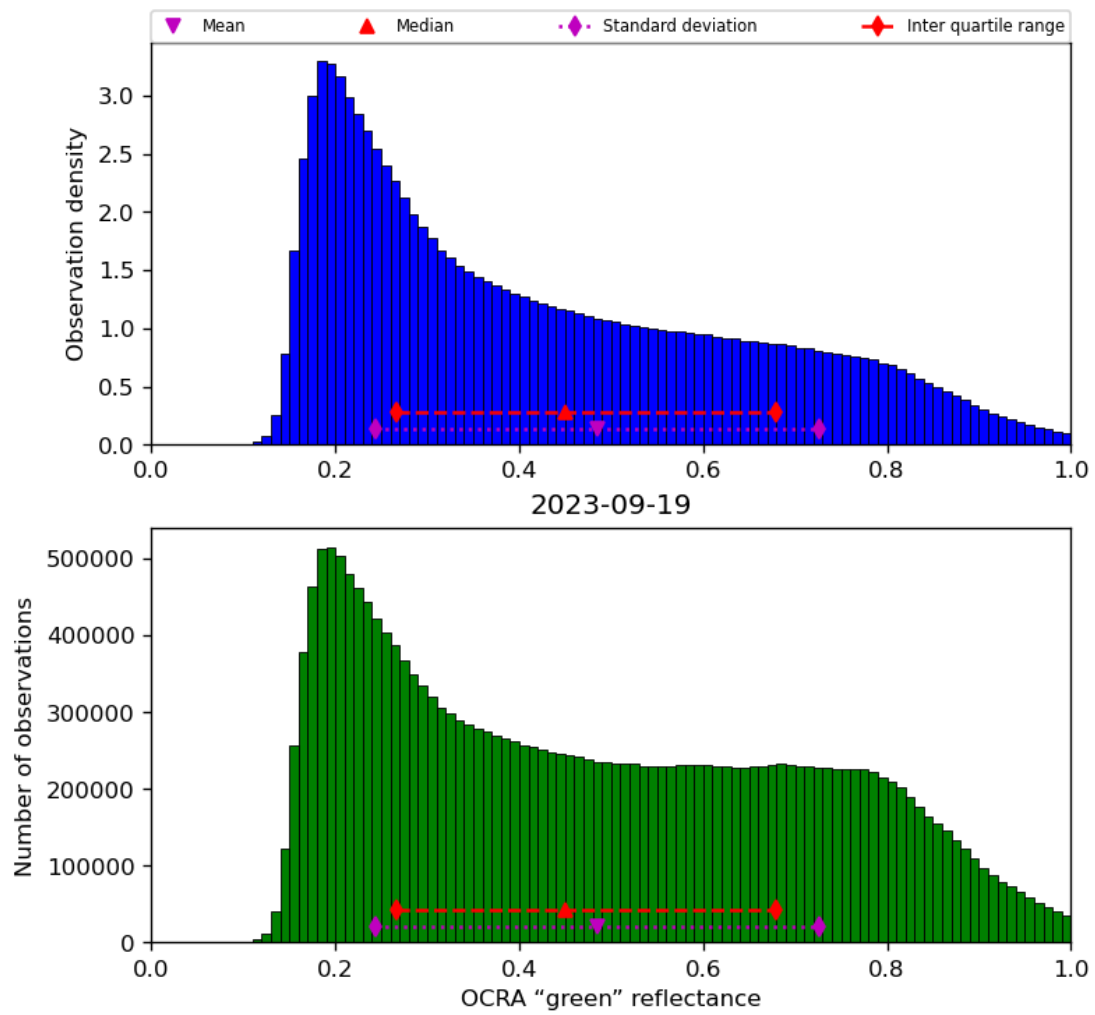


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-09-18 to 2023-09-20

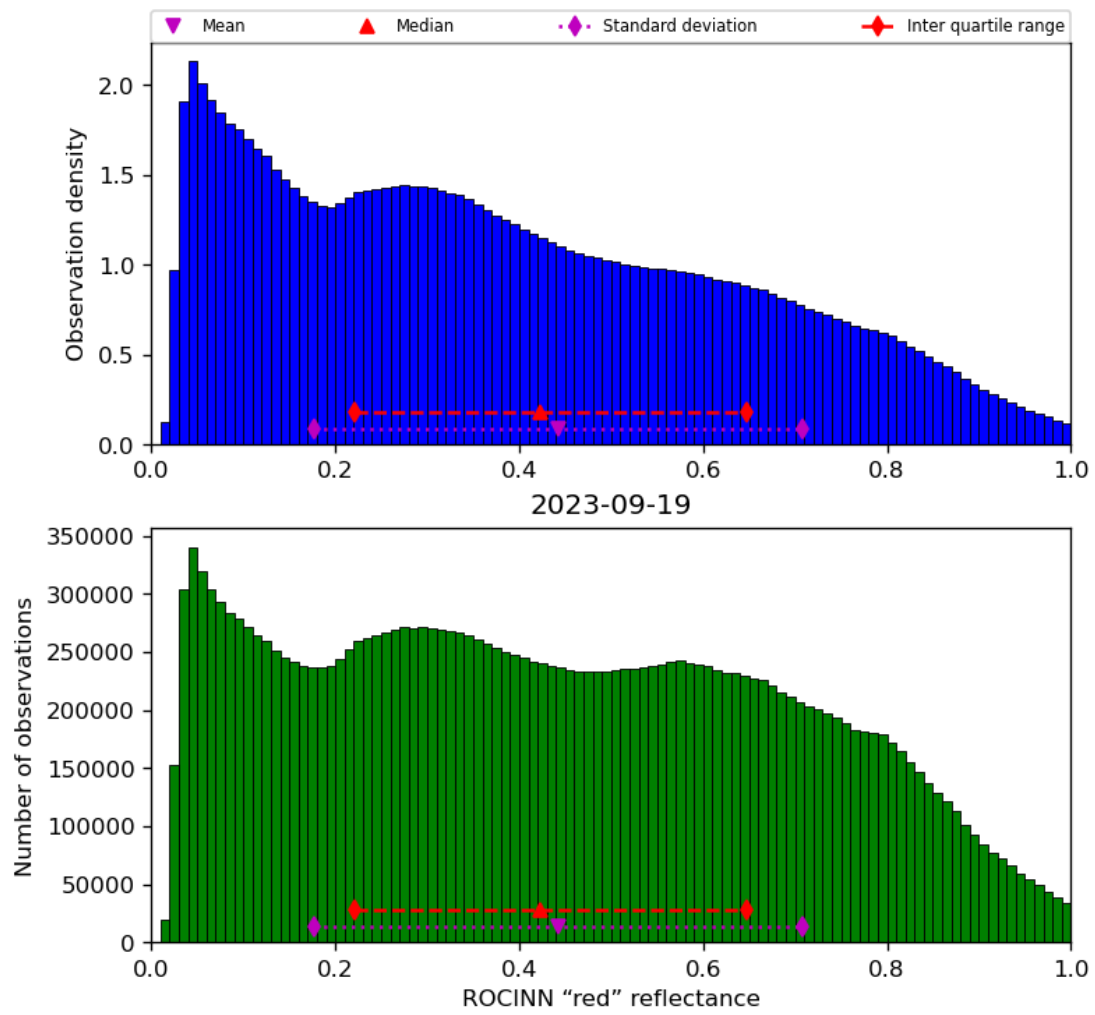


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-09-18 to 2023-09-20

9 Along track statistics

The TROPOMI instrument uses different binned detector rows for different viewing directions. In this section statistics are presented for each of the binned rows in the instrument.

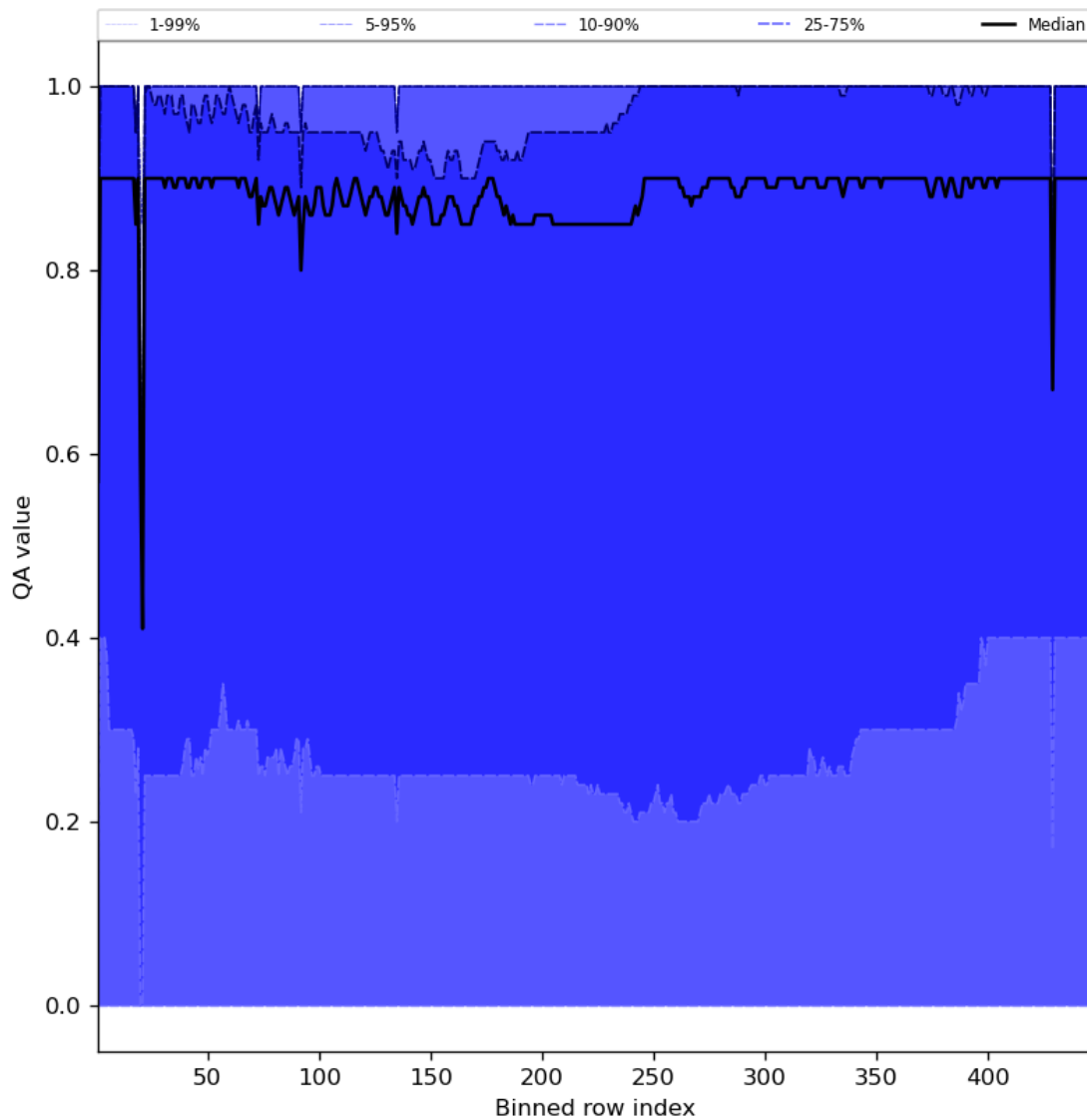


Figure 54: Along track statistics of “QA value” for 2023-09-18 to 2023-09-20

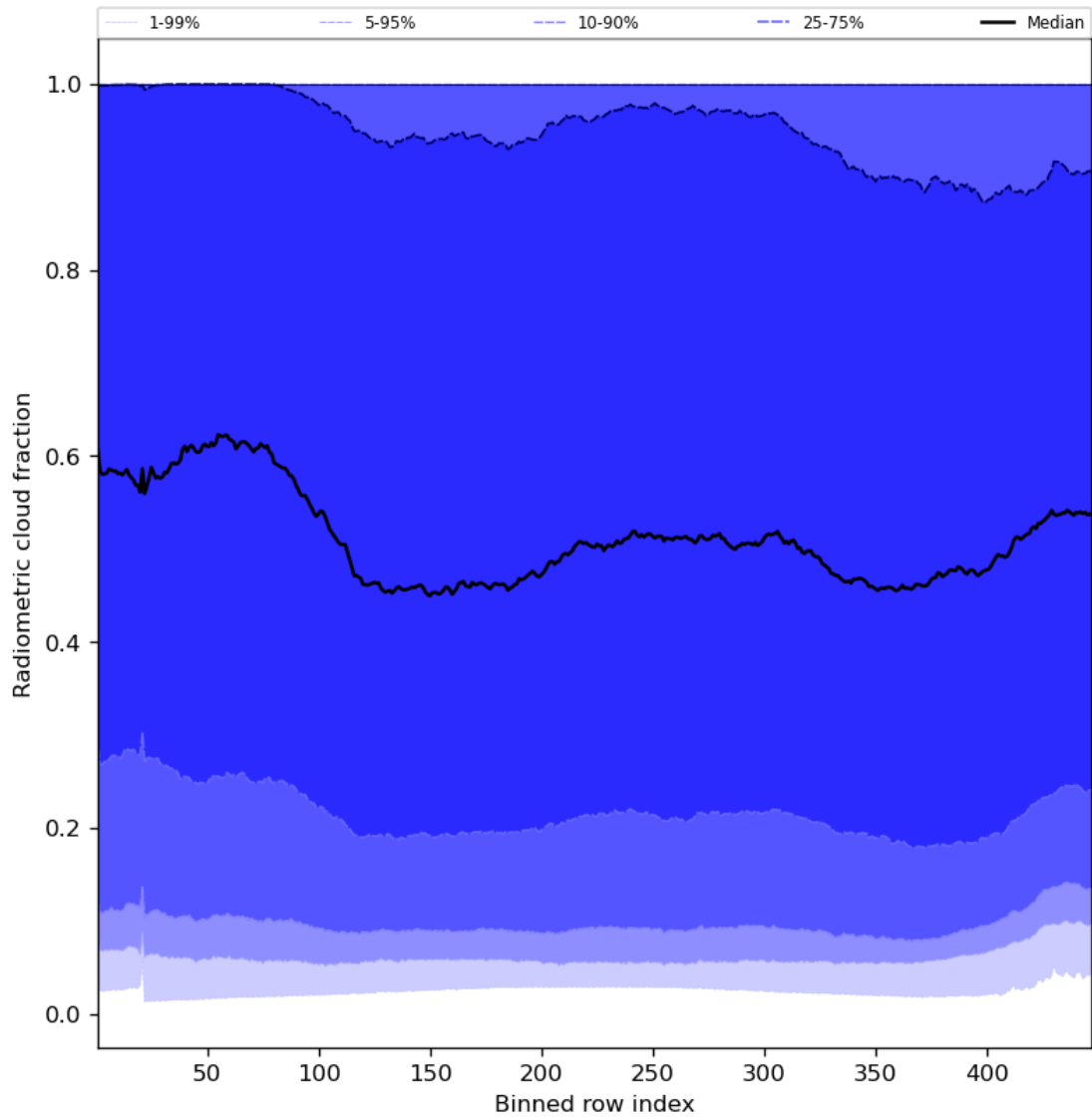


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-09-18 to 2023-09-20

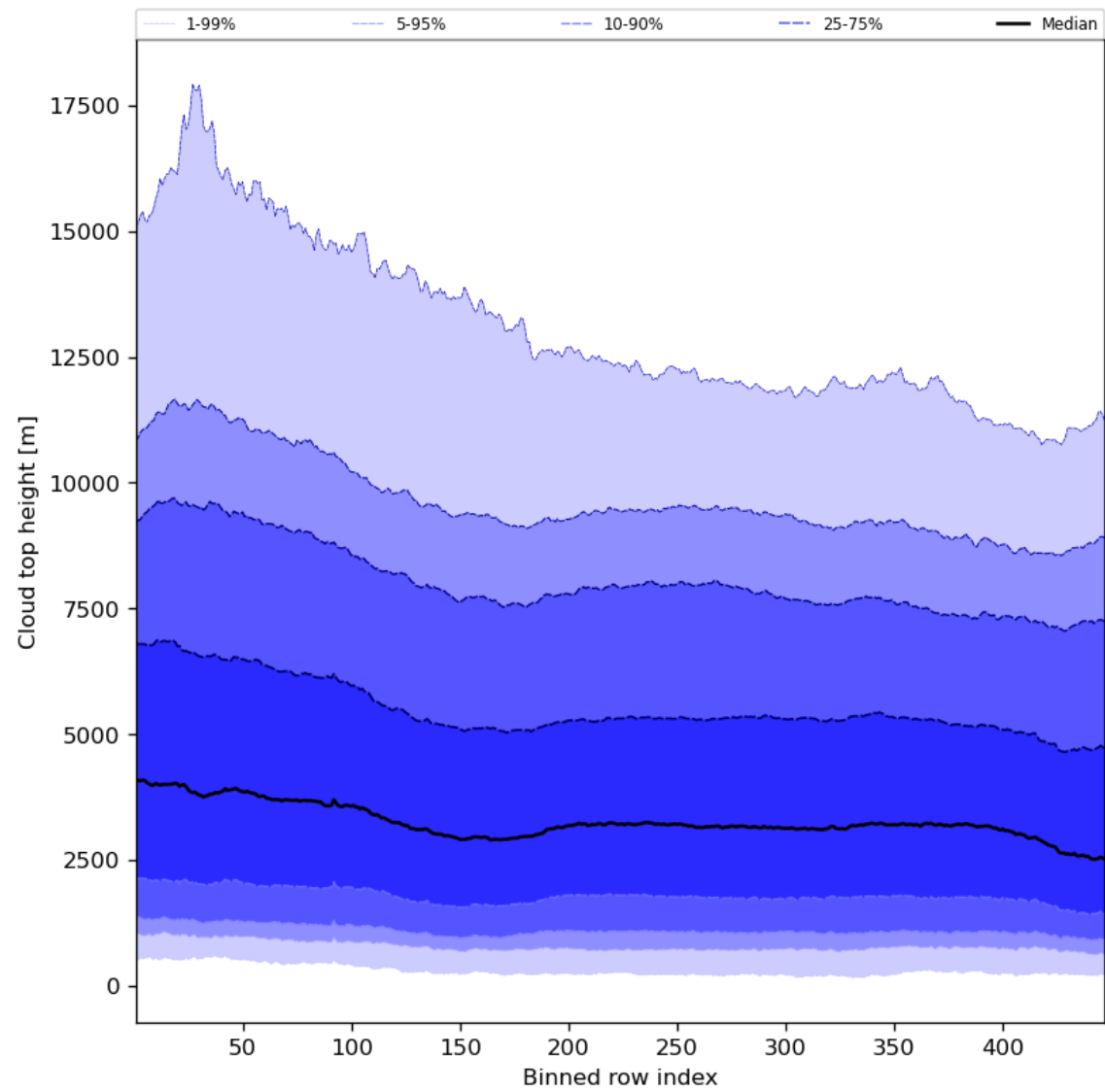


Figure 56: Along track statistics of “Cloud top height” for 2023-09-18 to 2023-09-20

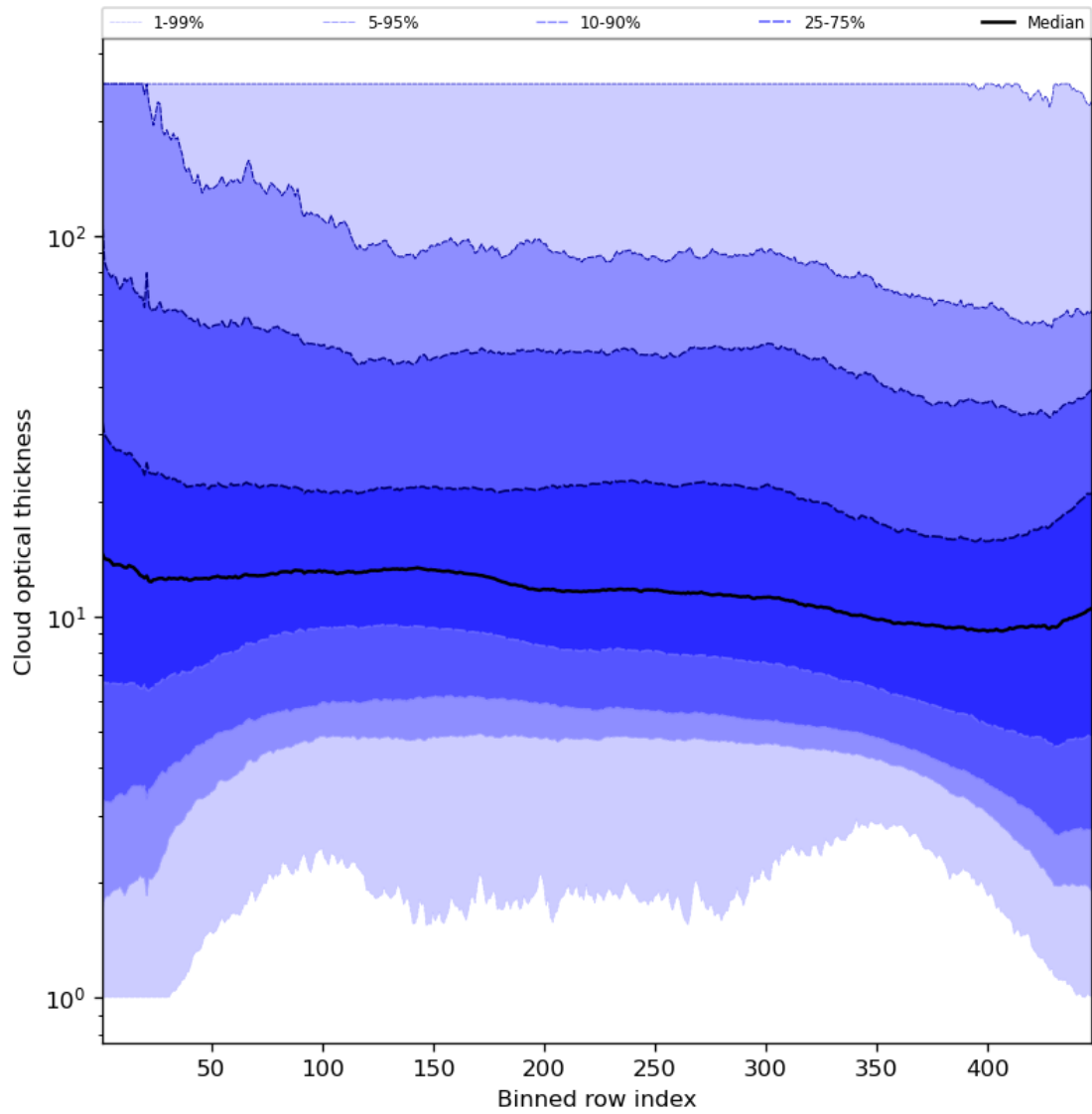


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-09-18 to 2023-09-20

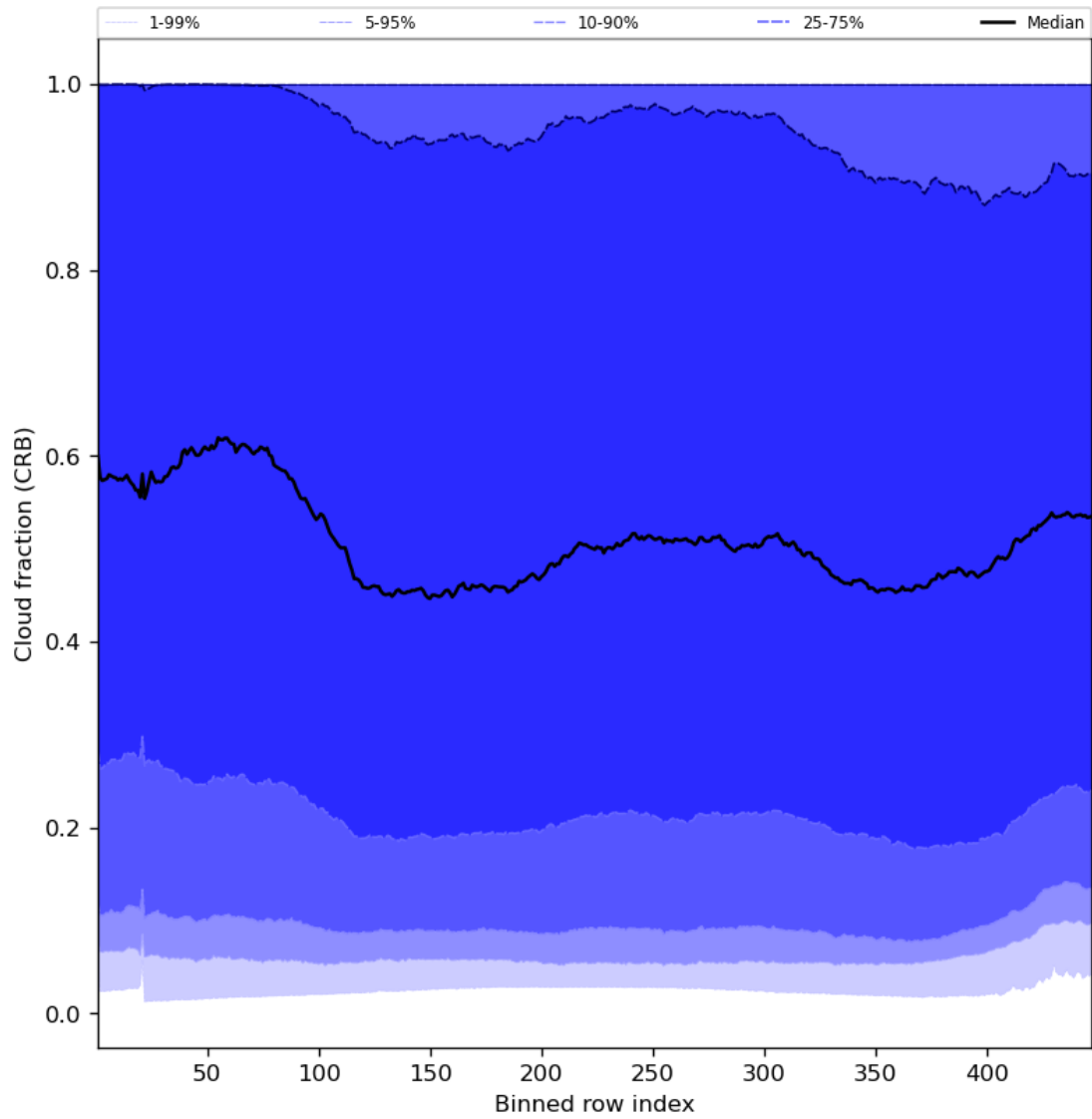


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-09-18 to 2023-09-20

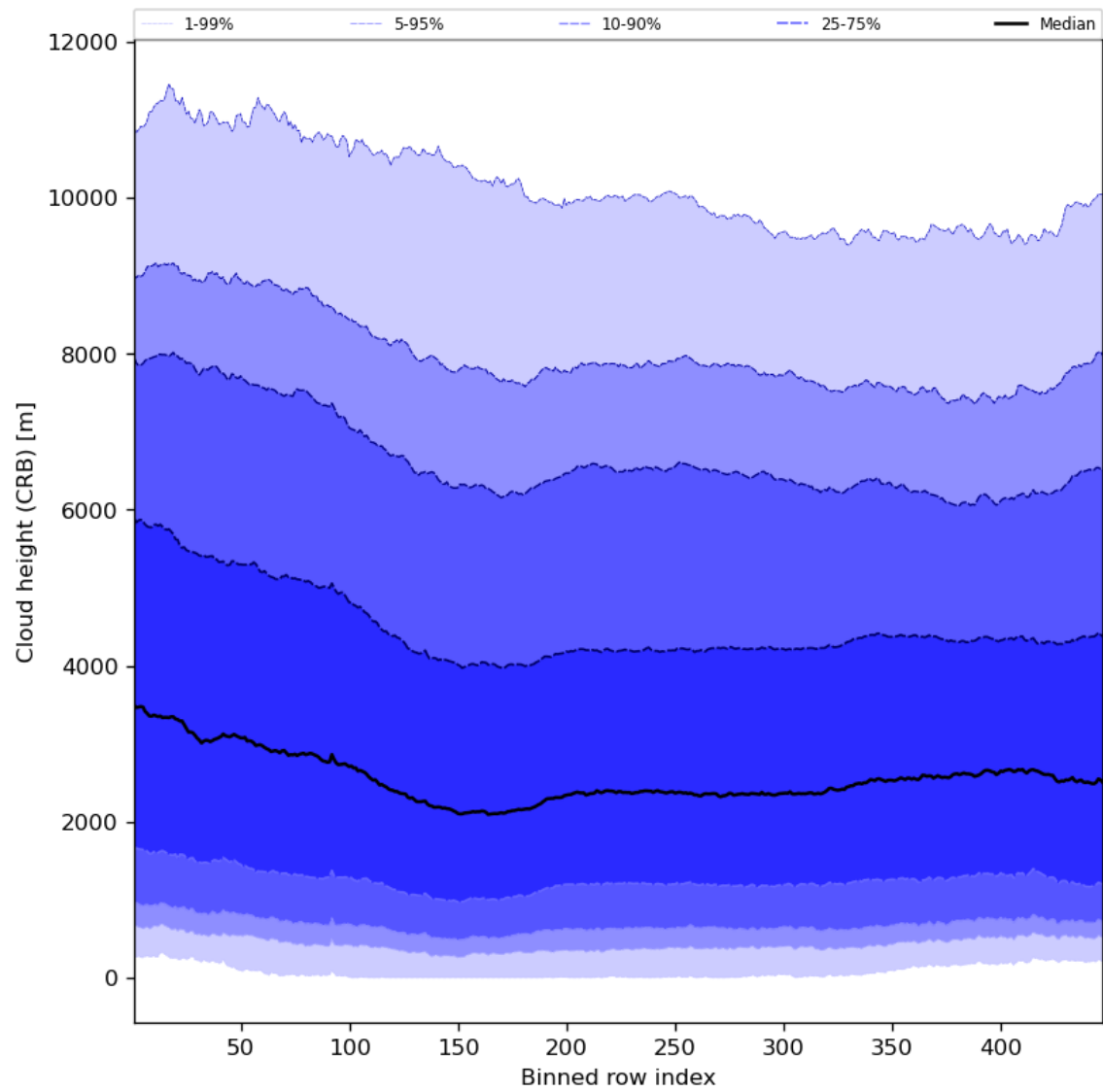


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-09-18 to 2023-09-20

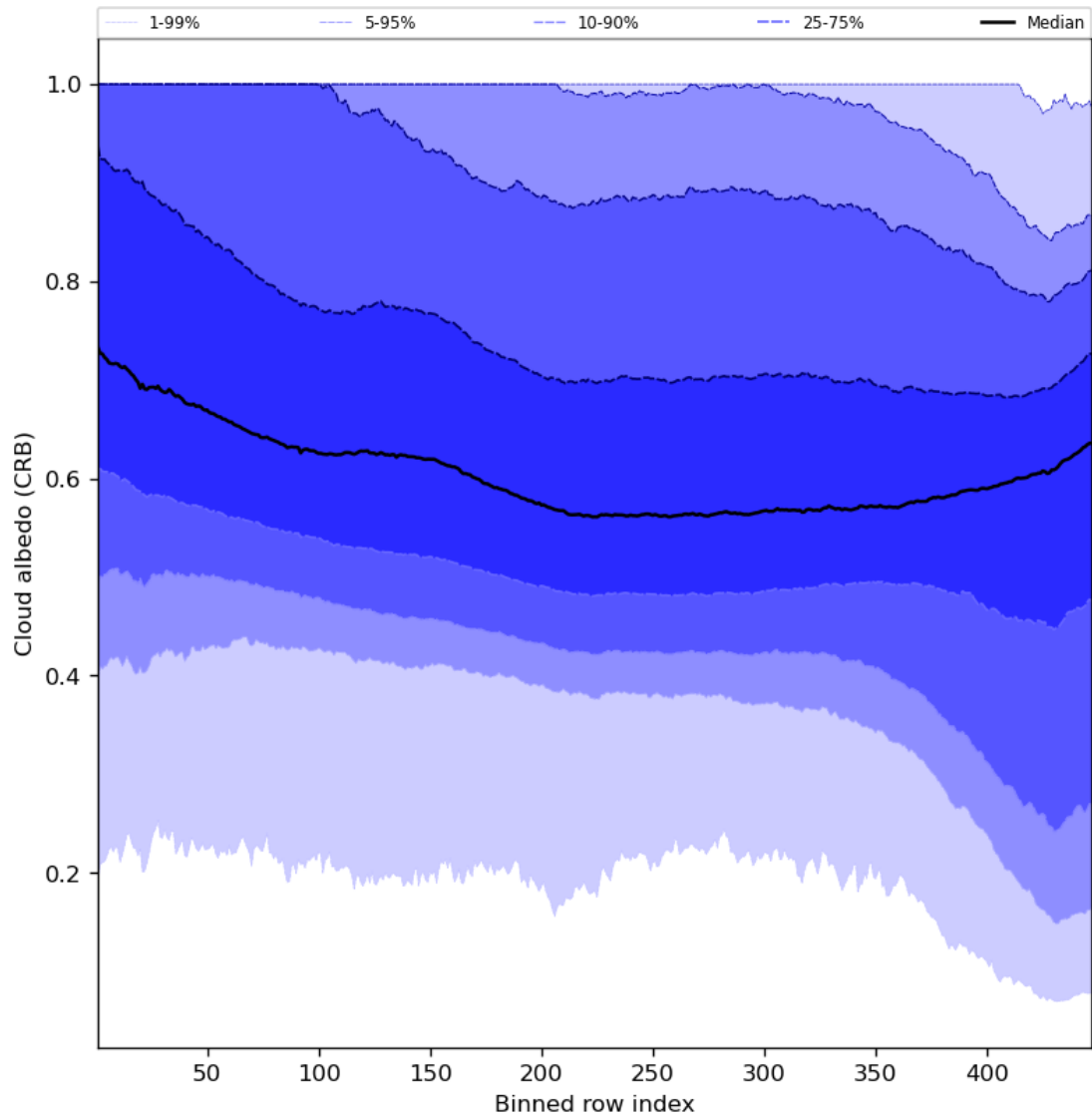


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-09-18 to 2023-09-20

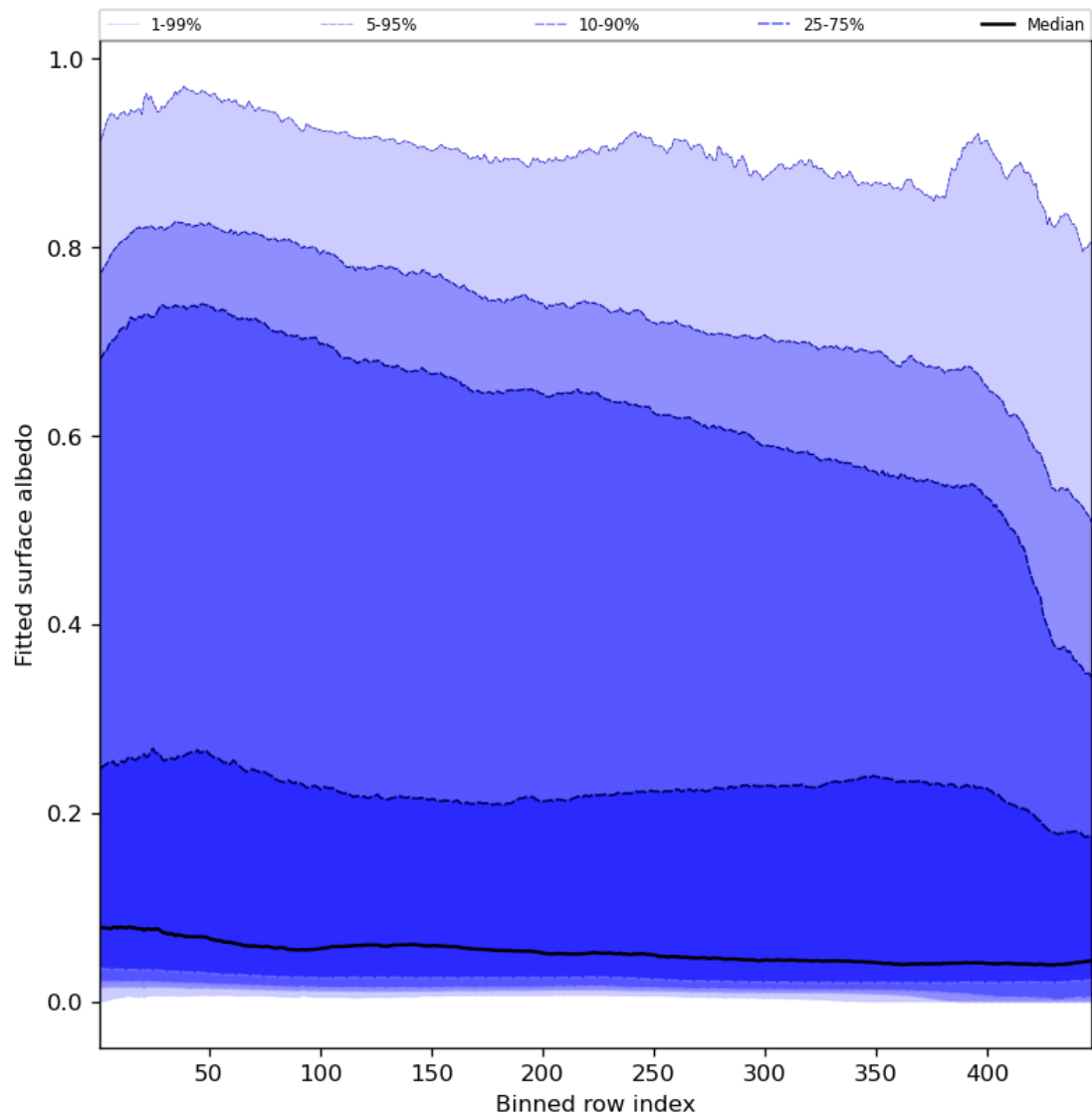


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-09-18 to 2023-09-20

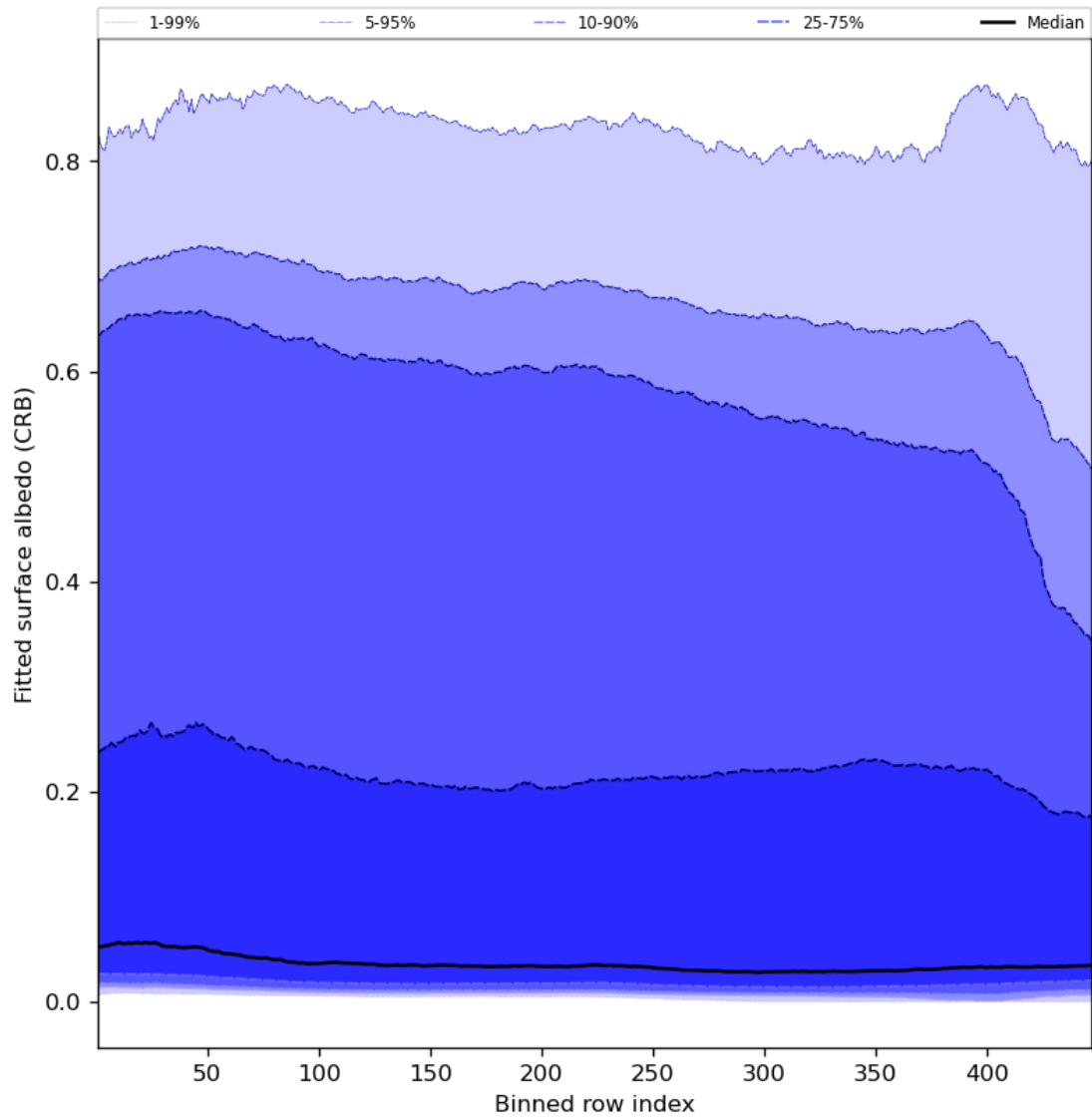


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-09-18 to 2023-09-20

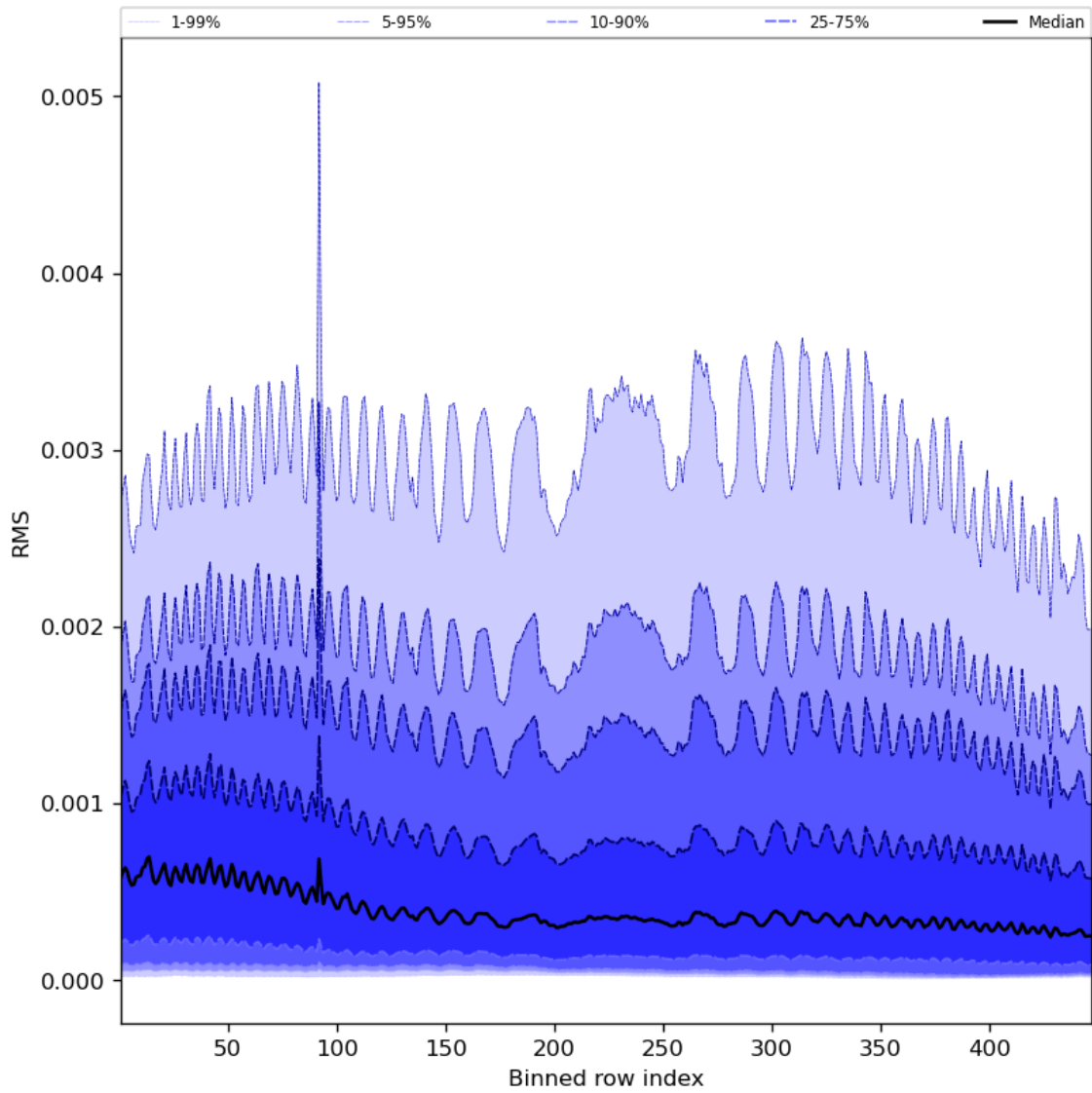


Figure 63: Along track statistics of “RMS” for 2023-09-18 to 2023-09-20

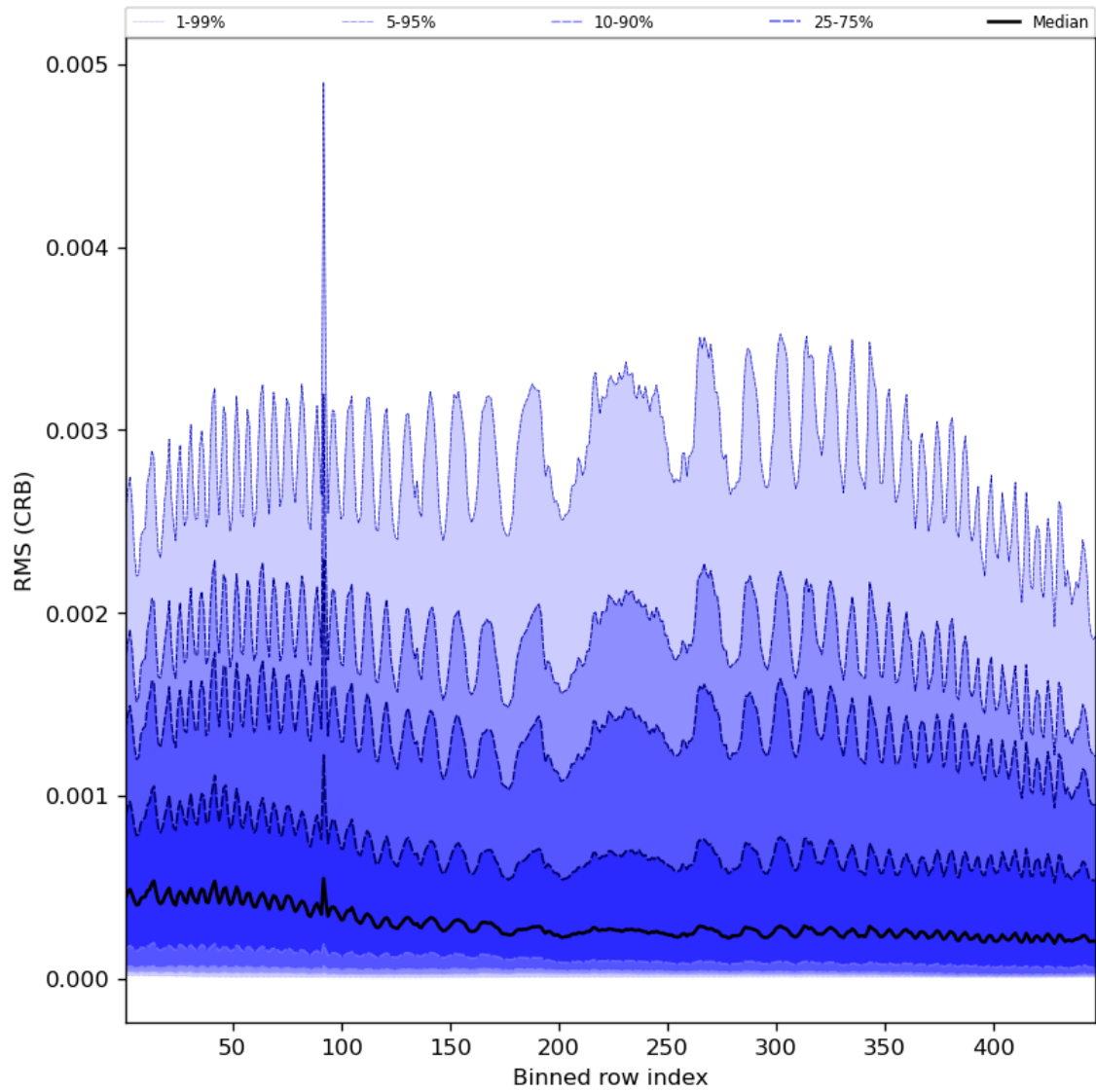


Figure 64: Along track statistics of “RMS (CRB)” for 2023-09-18 to 2023-09-20

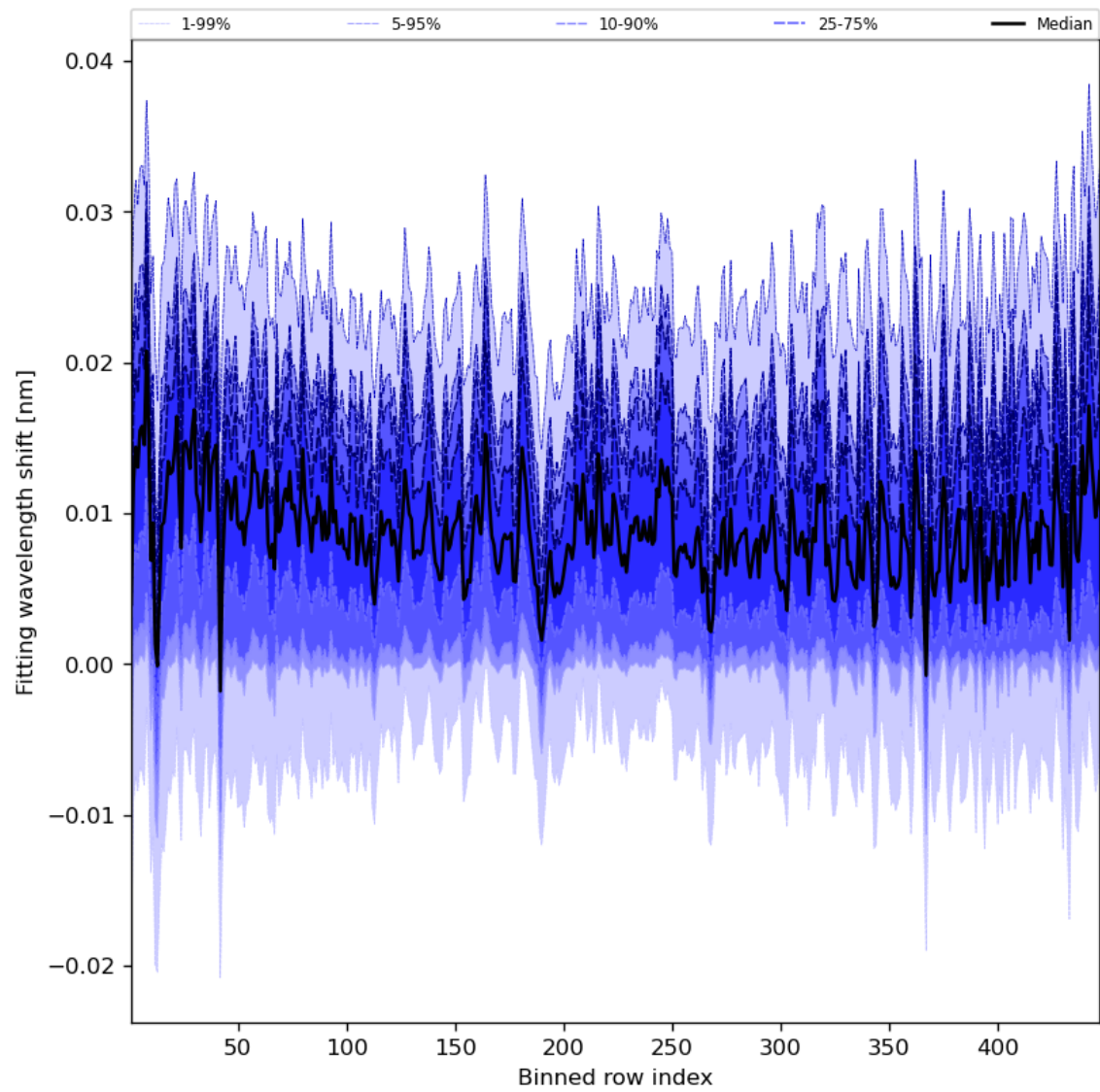


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-09-18 to 2023-09-20

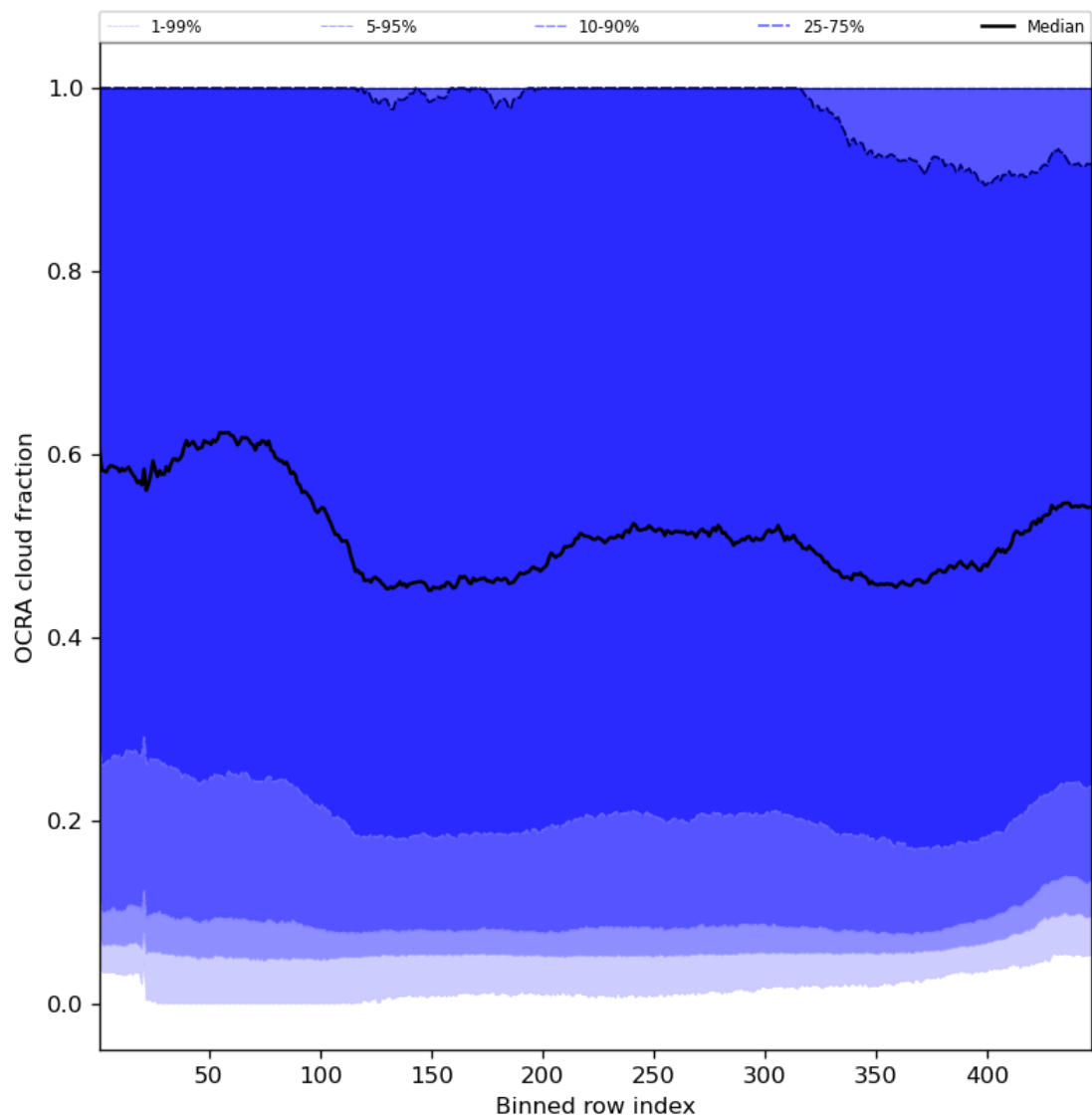


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-09-18 to 2023-09-20

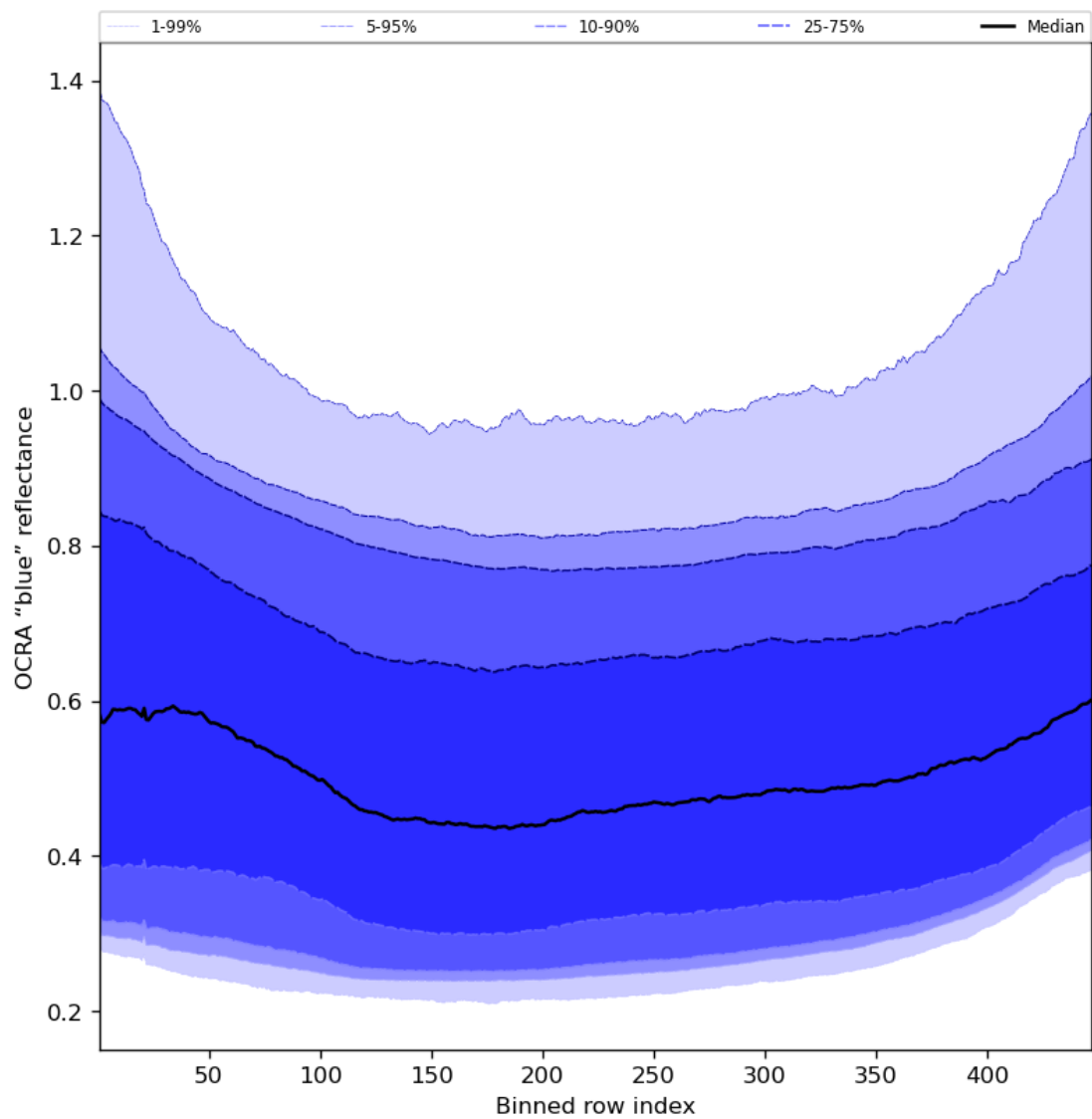


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-09-18 to 2023-09-20

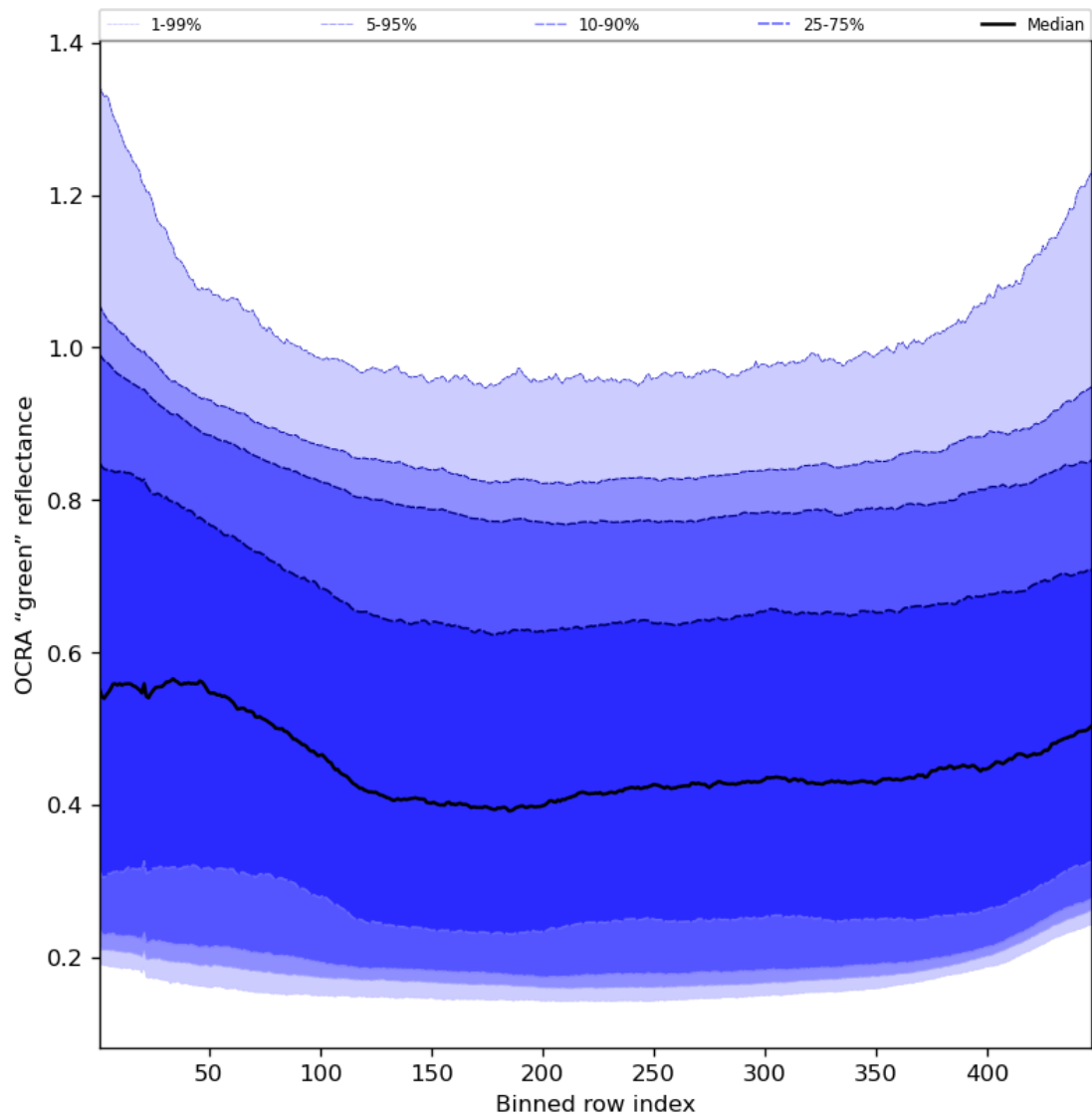


Figure 68: Along track statistics of “OCRA “green” reflectance” for 2023-09-18 to 2023-09-20

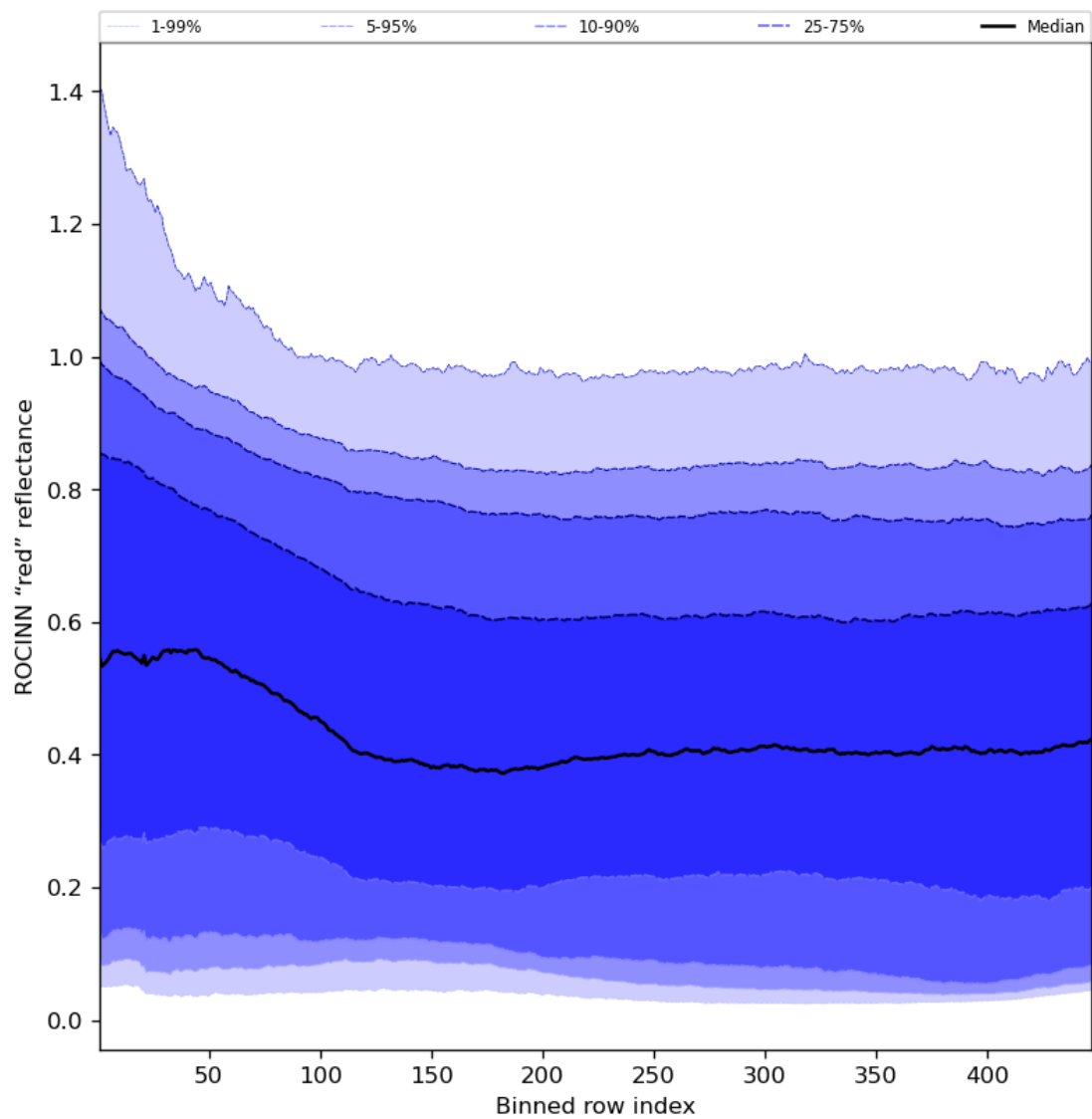


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2023-09-18 to 2023-09-20

10 Coincidence density

To investigate the relation between parameters scatter density plots are produced. These include some ‘hidden’ parameters, latitude and the solar- and viewing geometries, in addition to all configured parameters. All combinations of pairs of parameters are included *once*, in one direction alone.

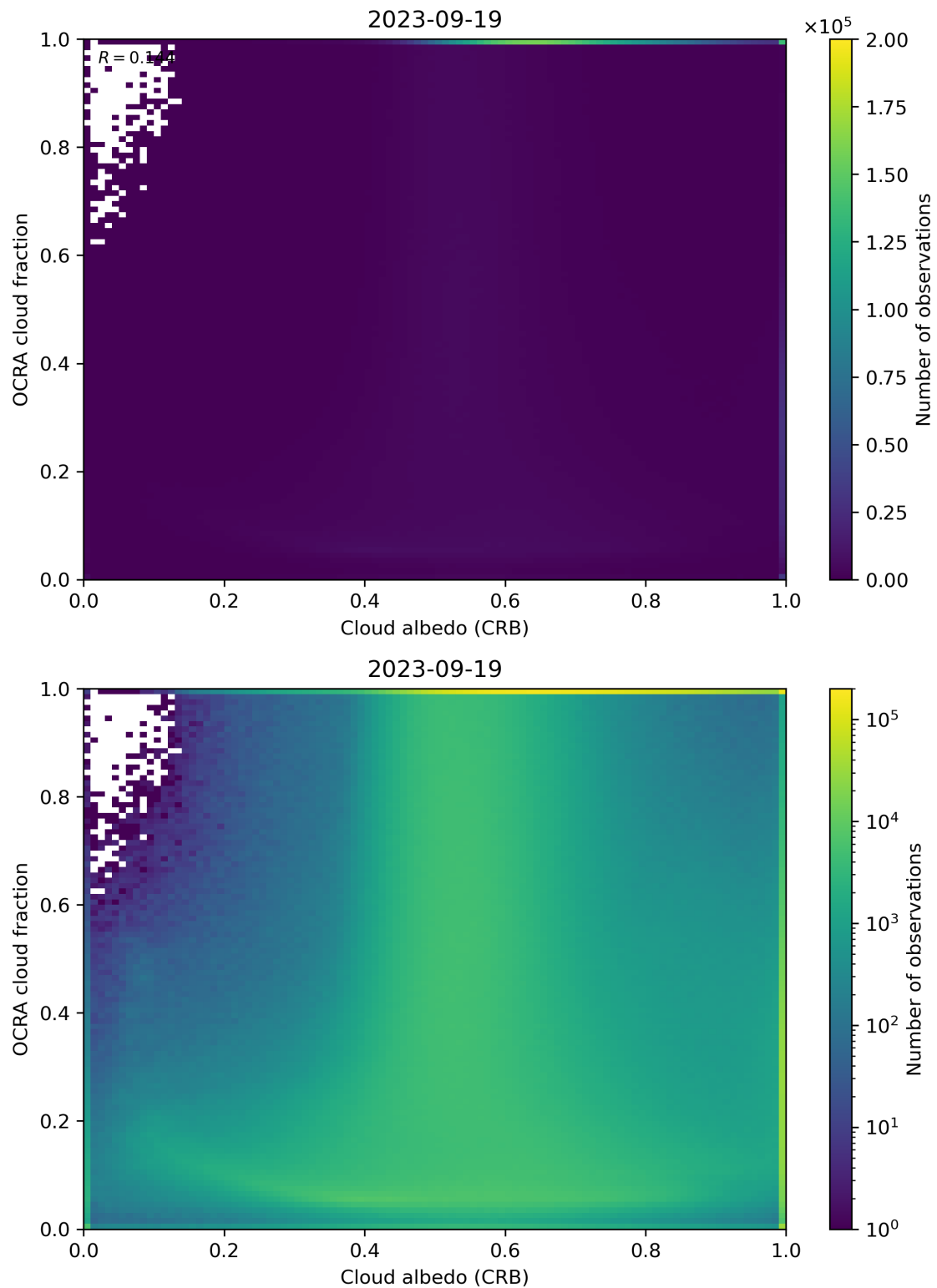


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-09-18 to 2023-09-20.

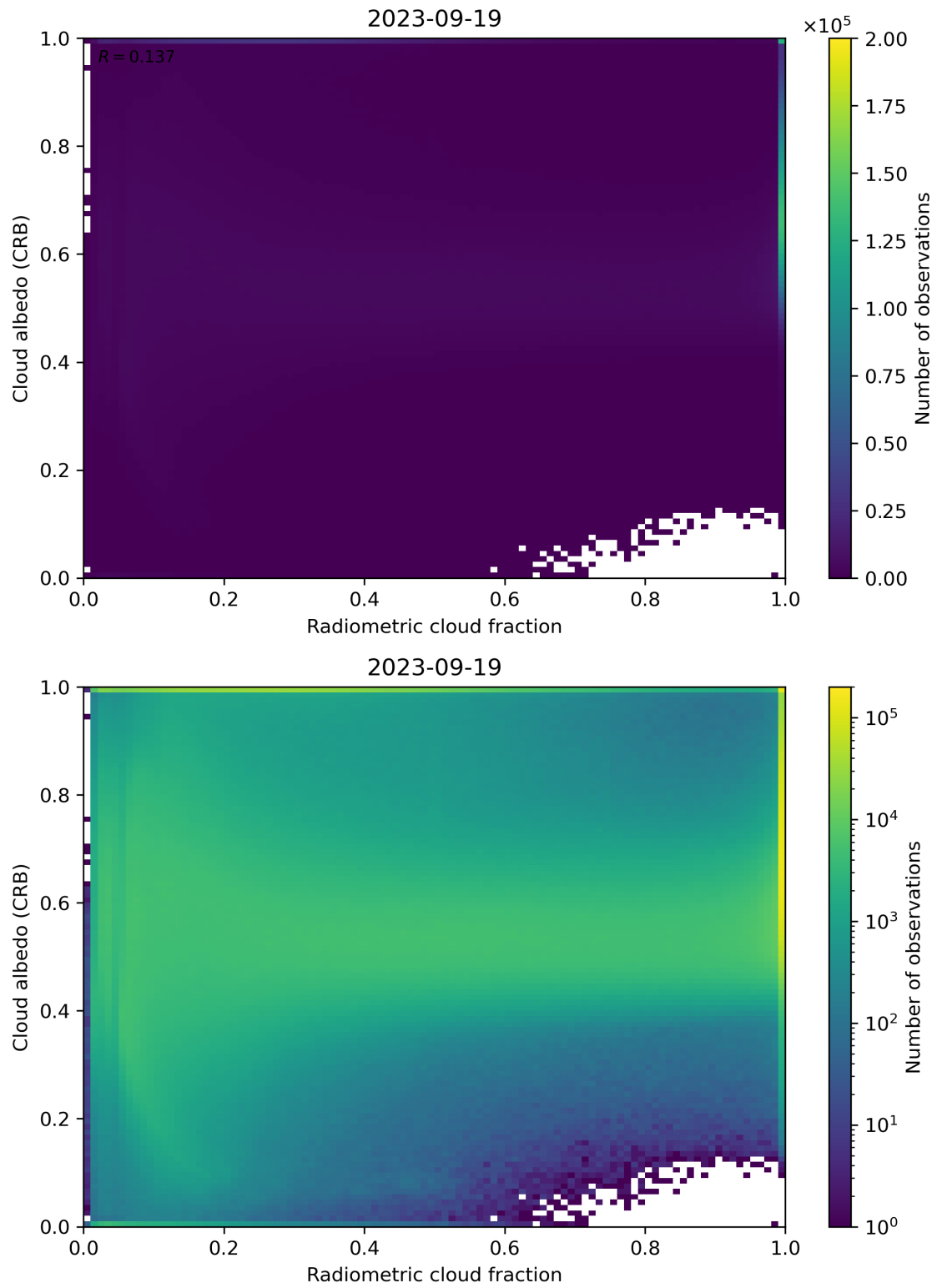


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-09-18 to 2023-09-20.

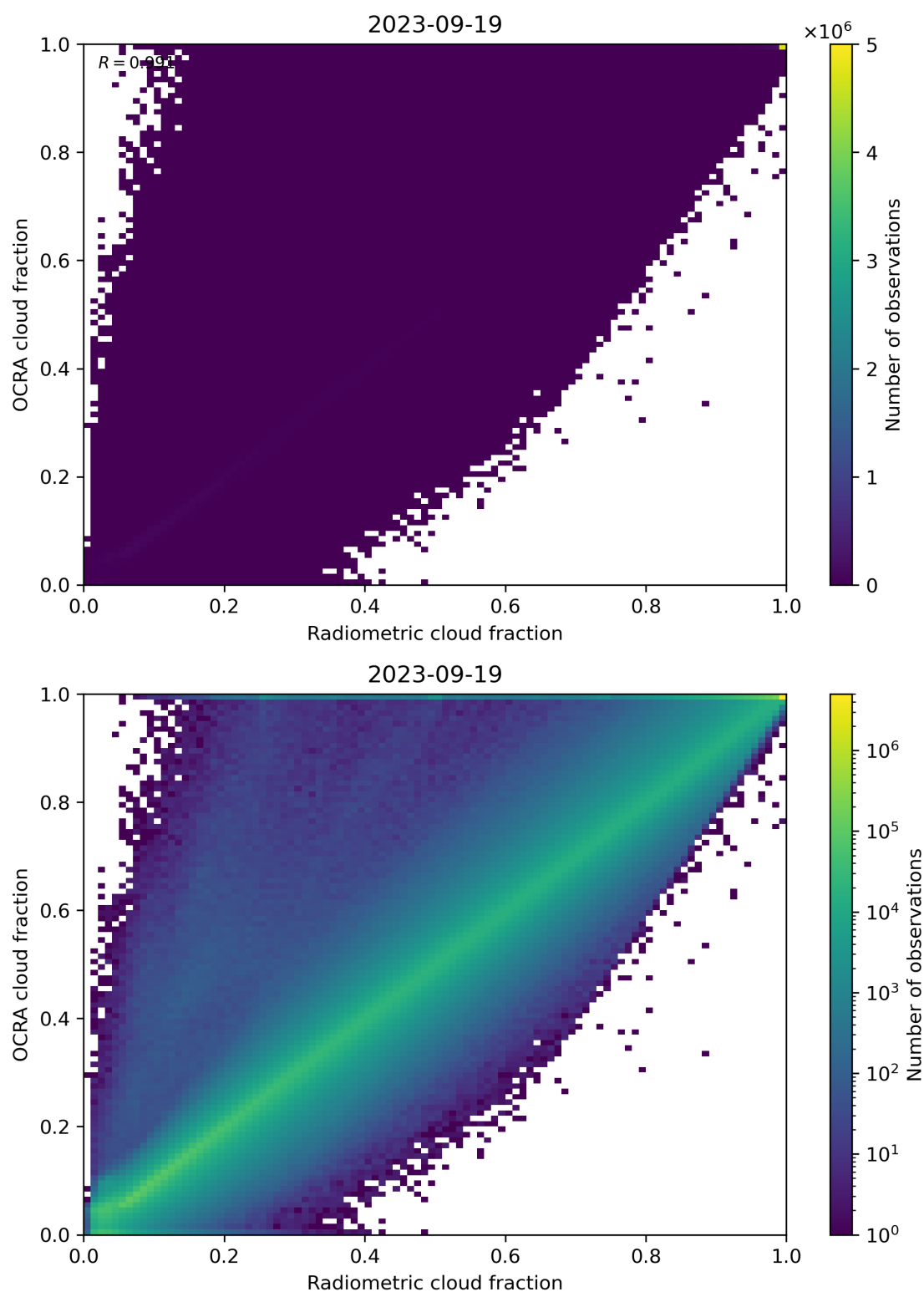


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-09-18 to 2023-09-20.

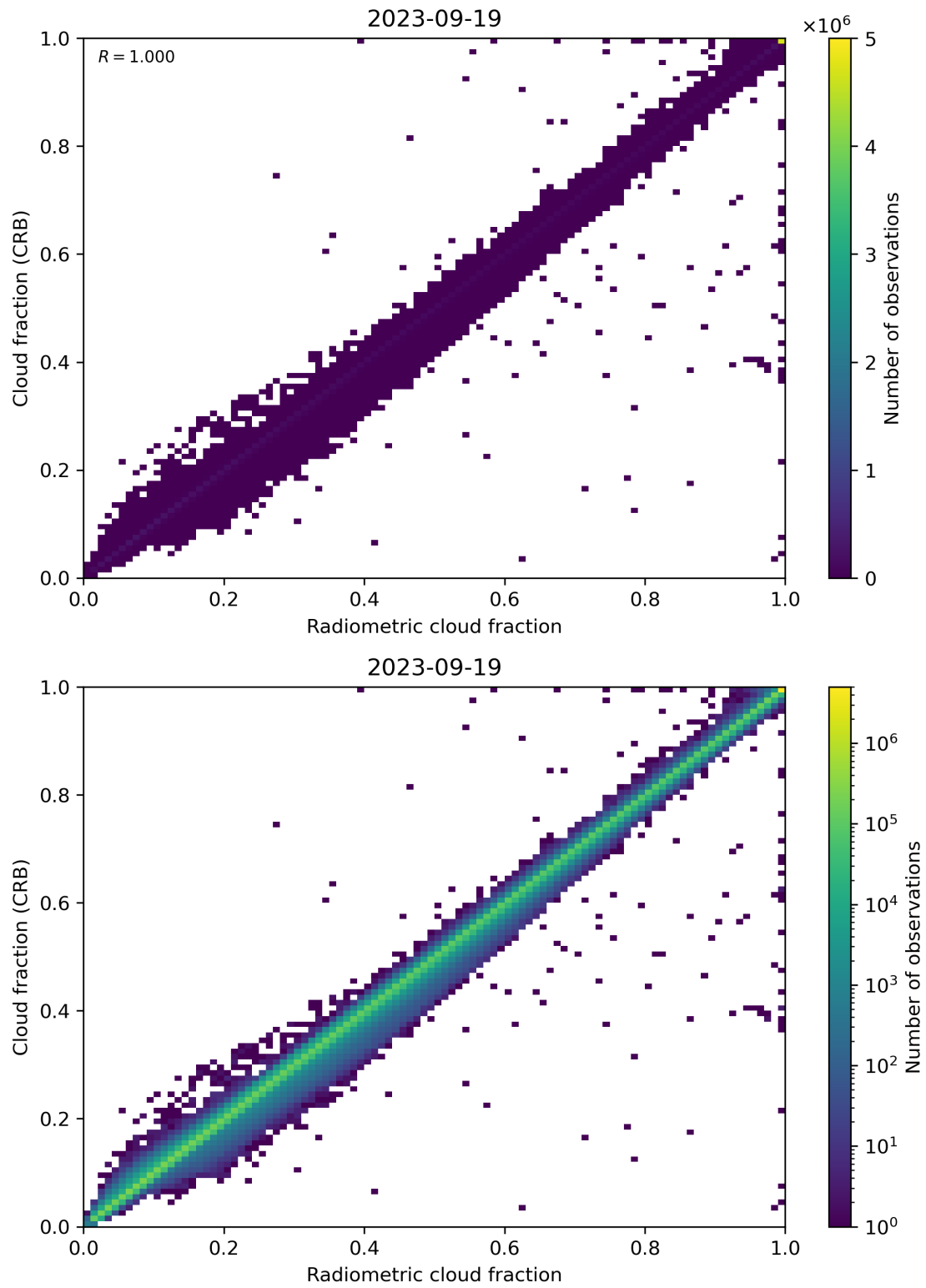


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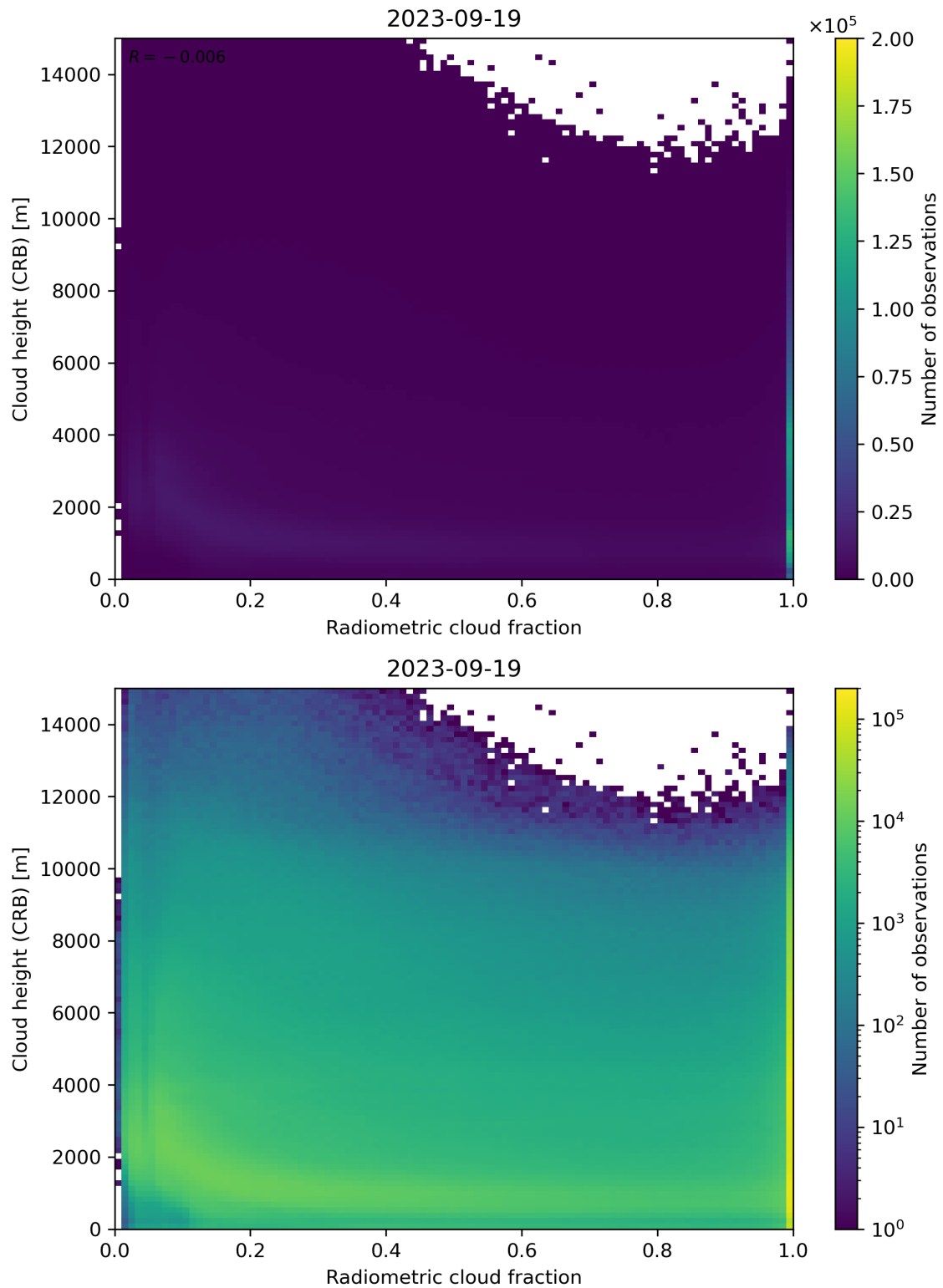


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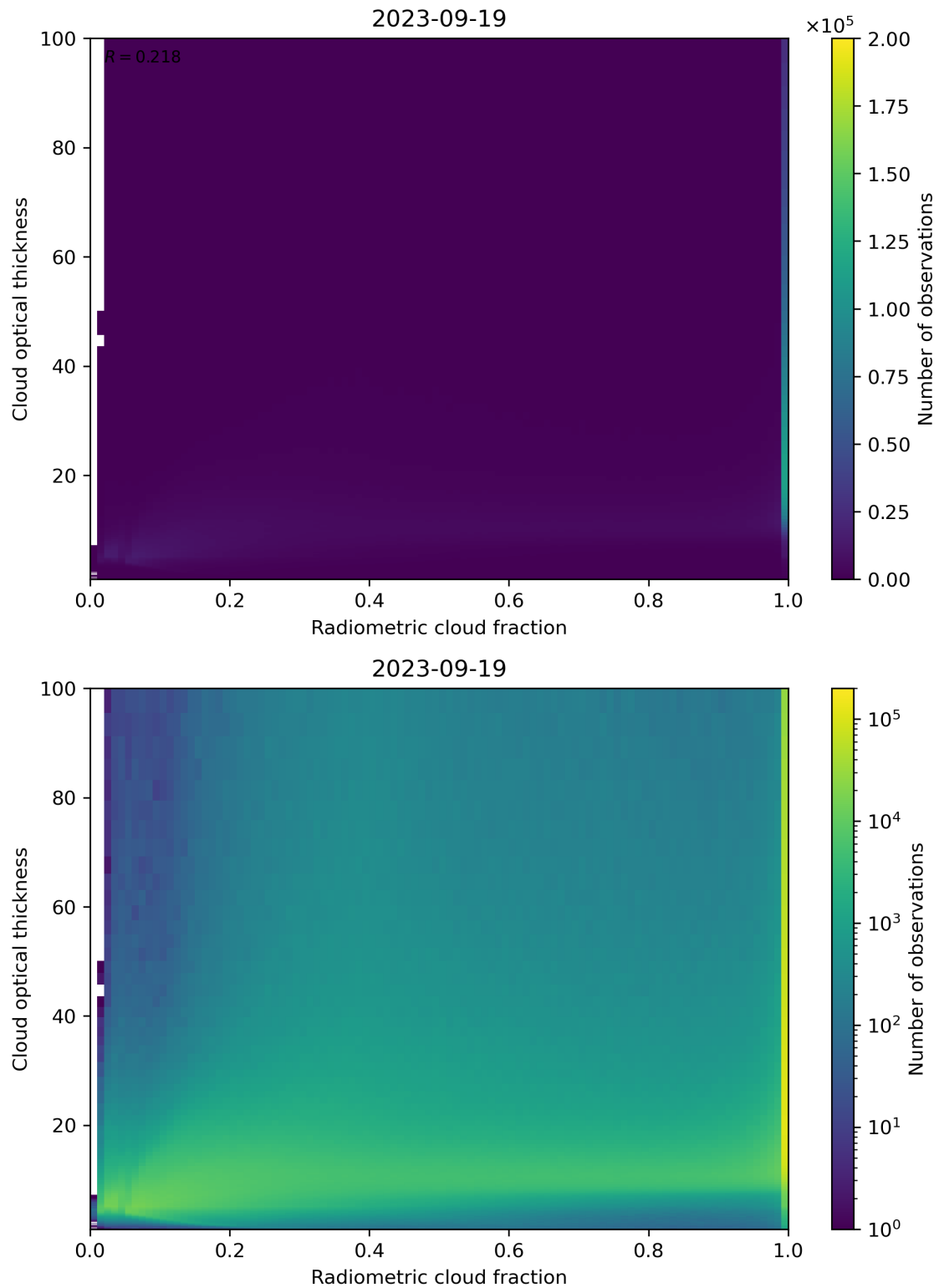


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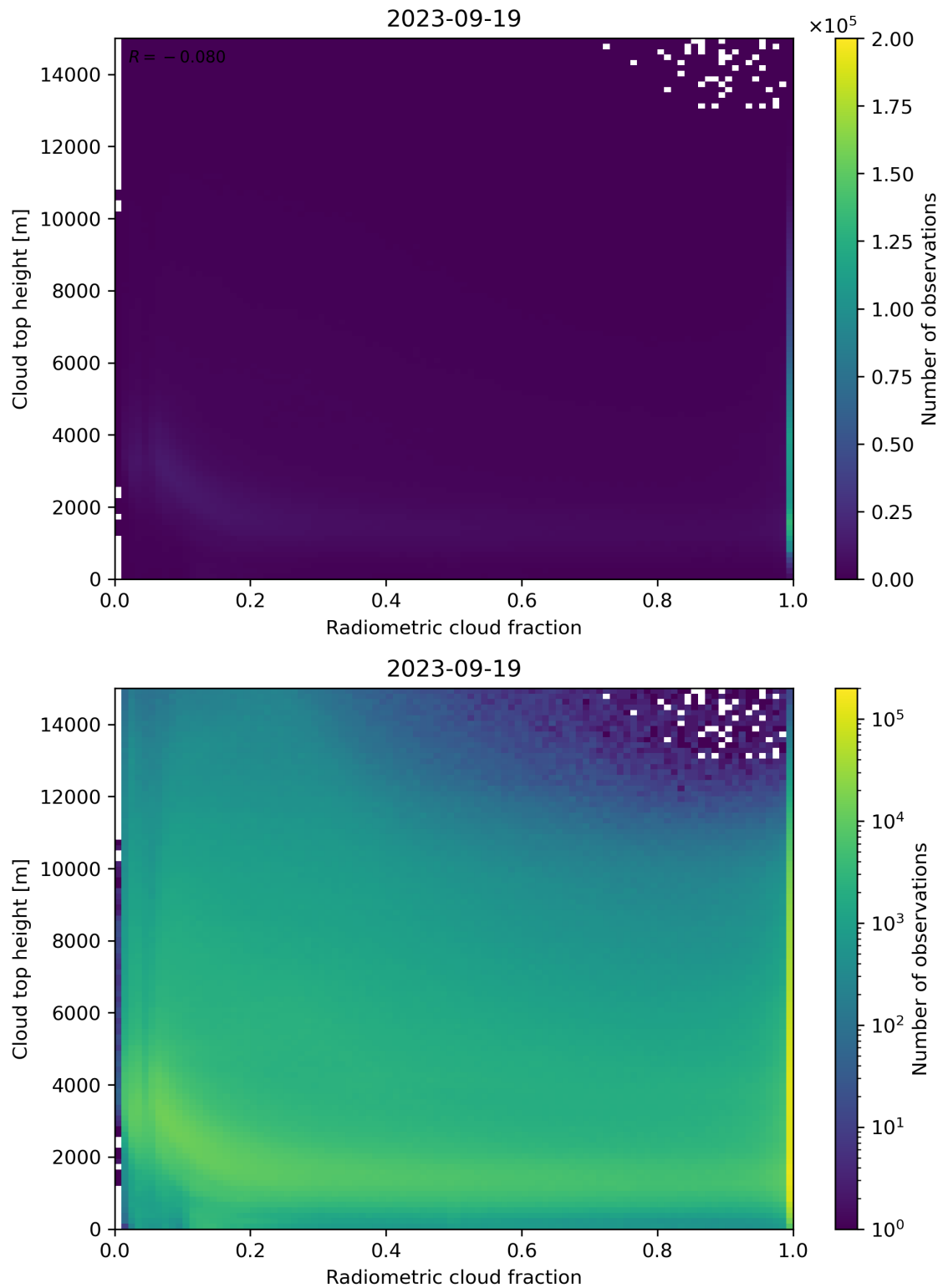


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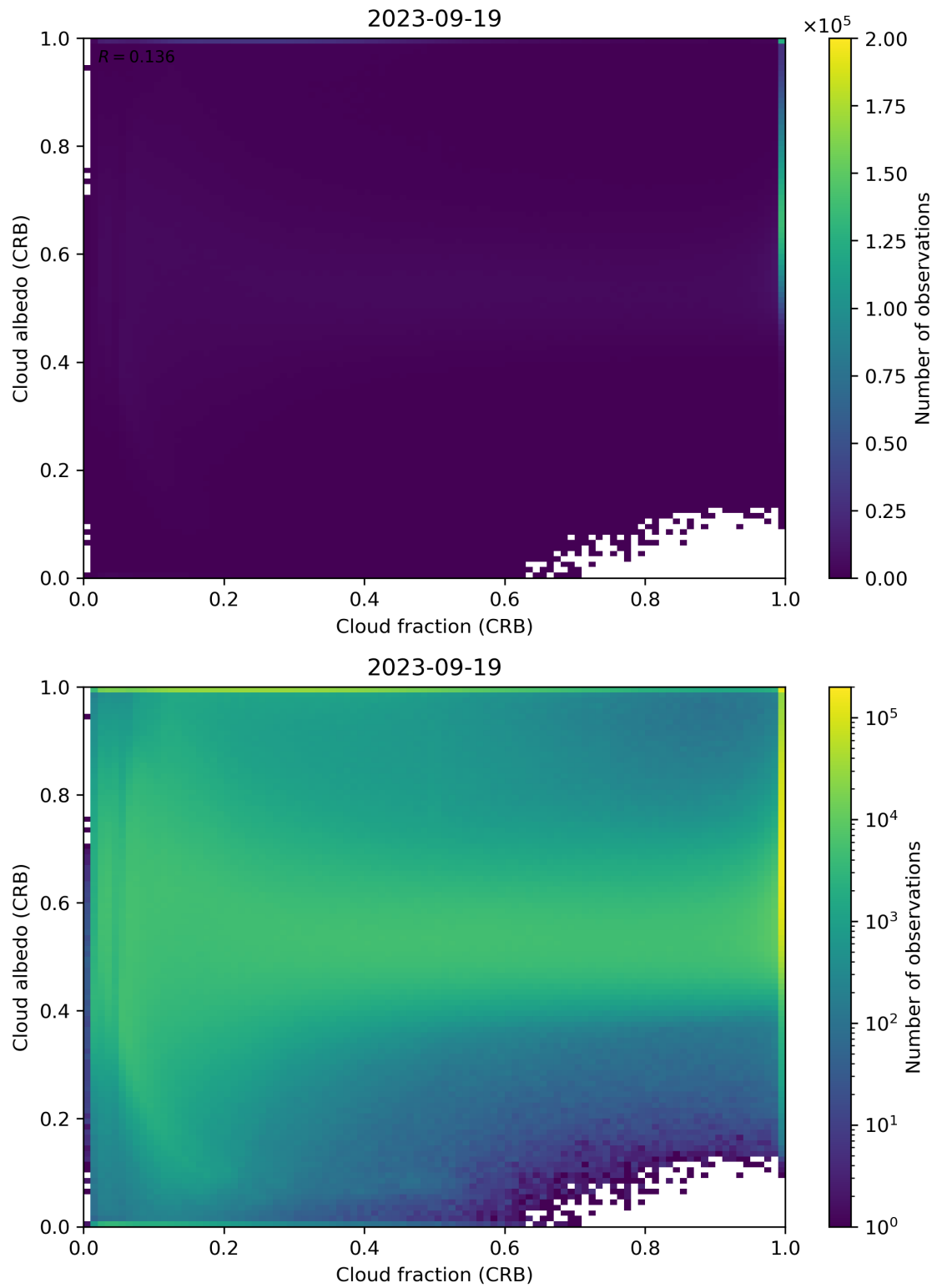


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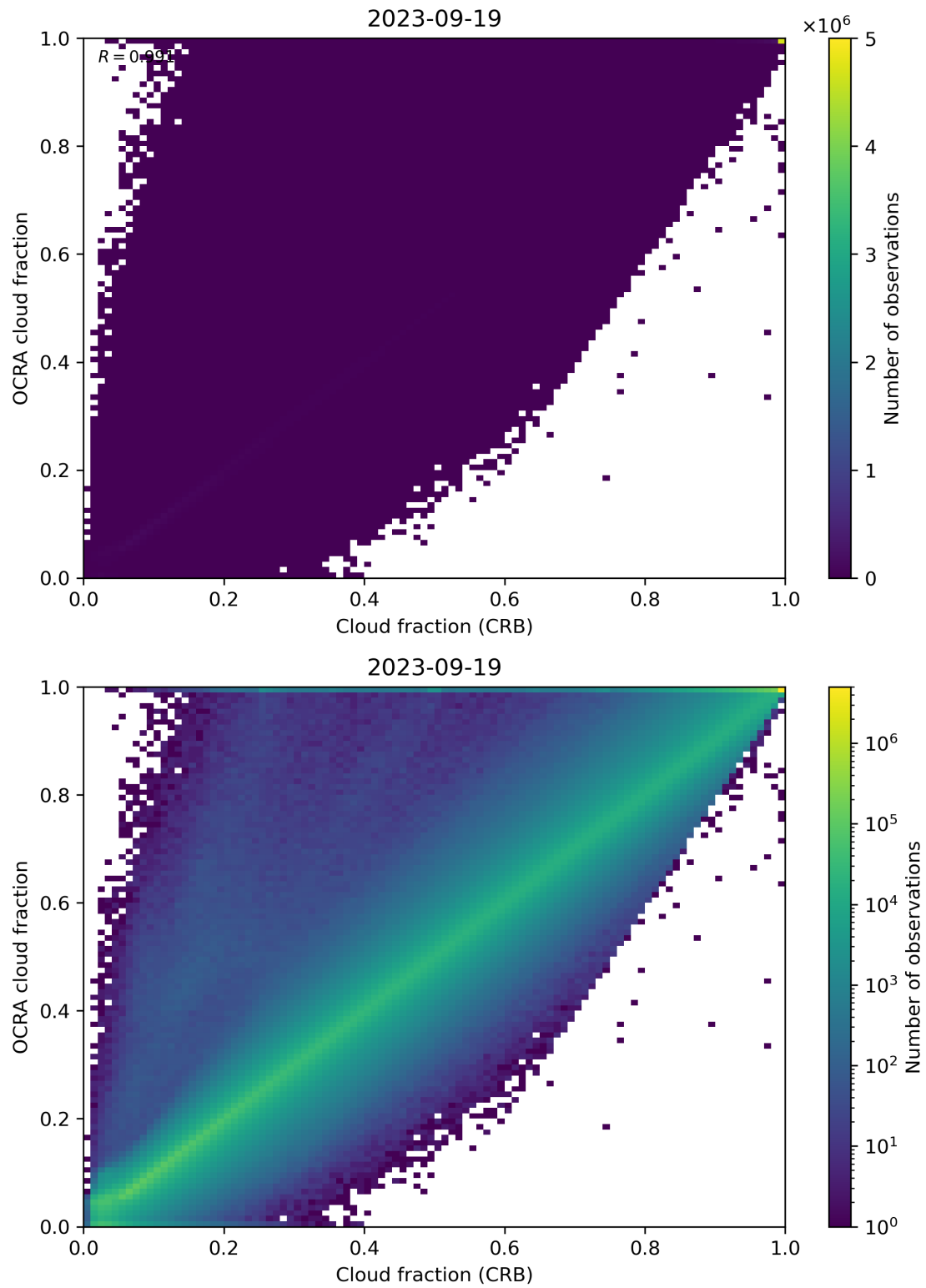


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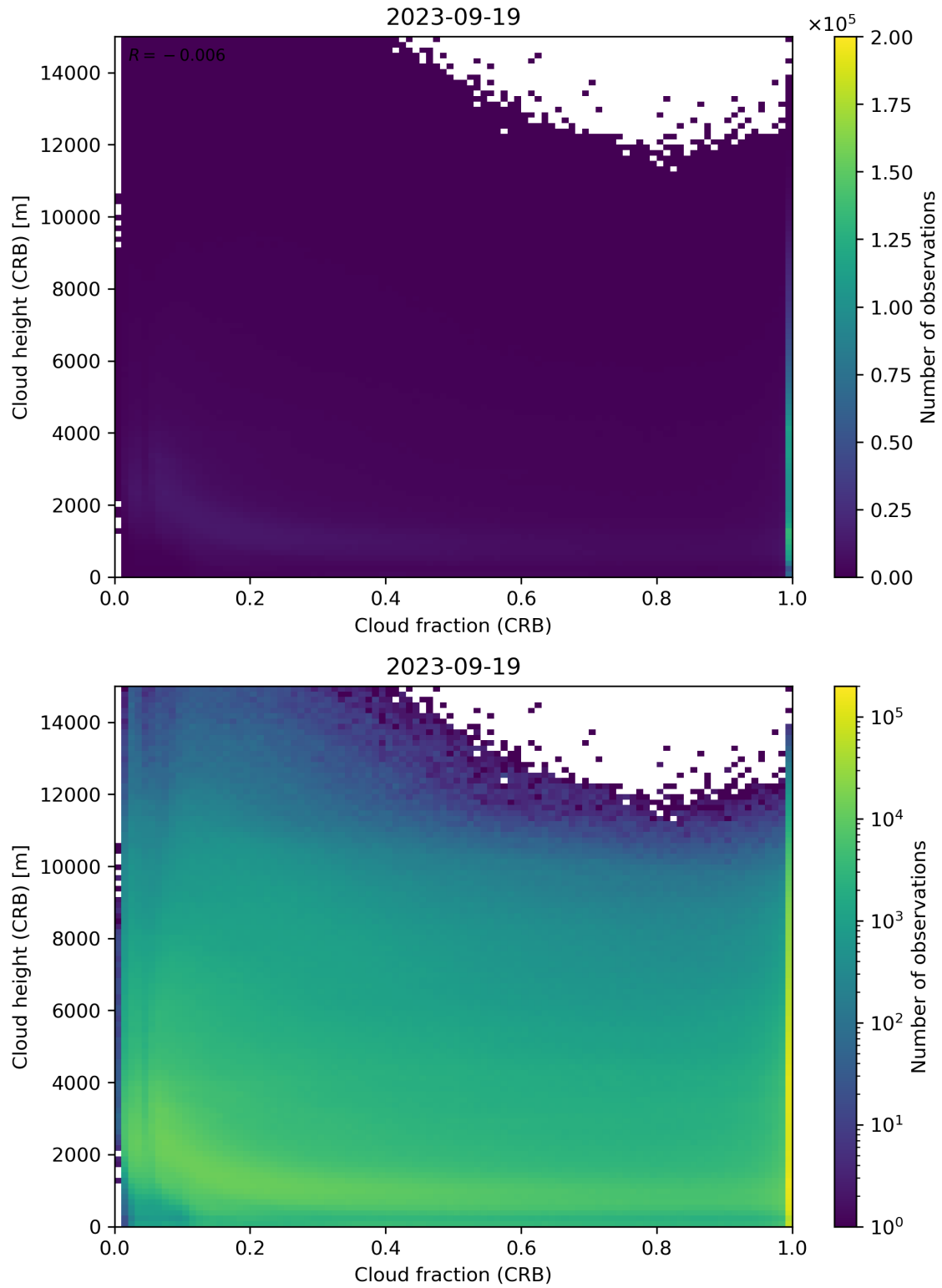


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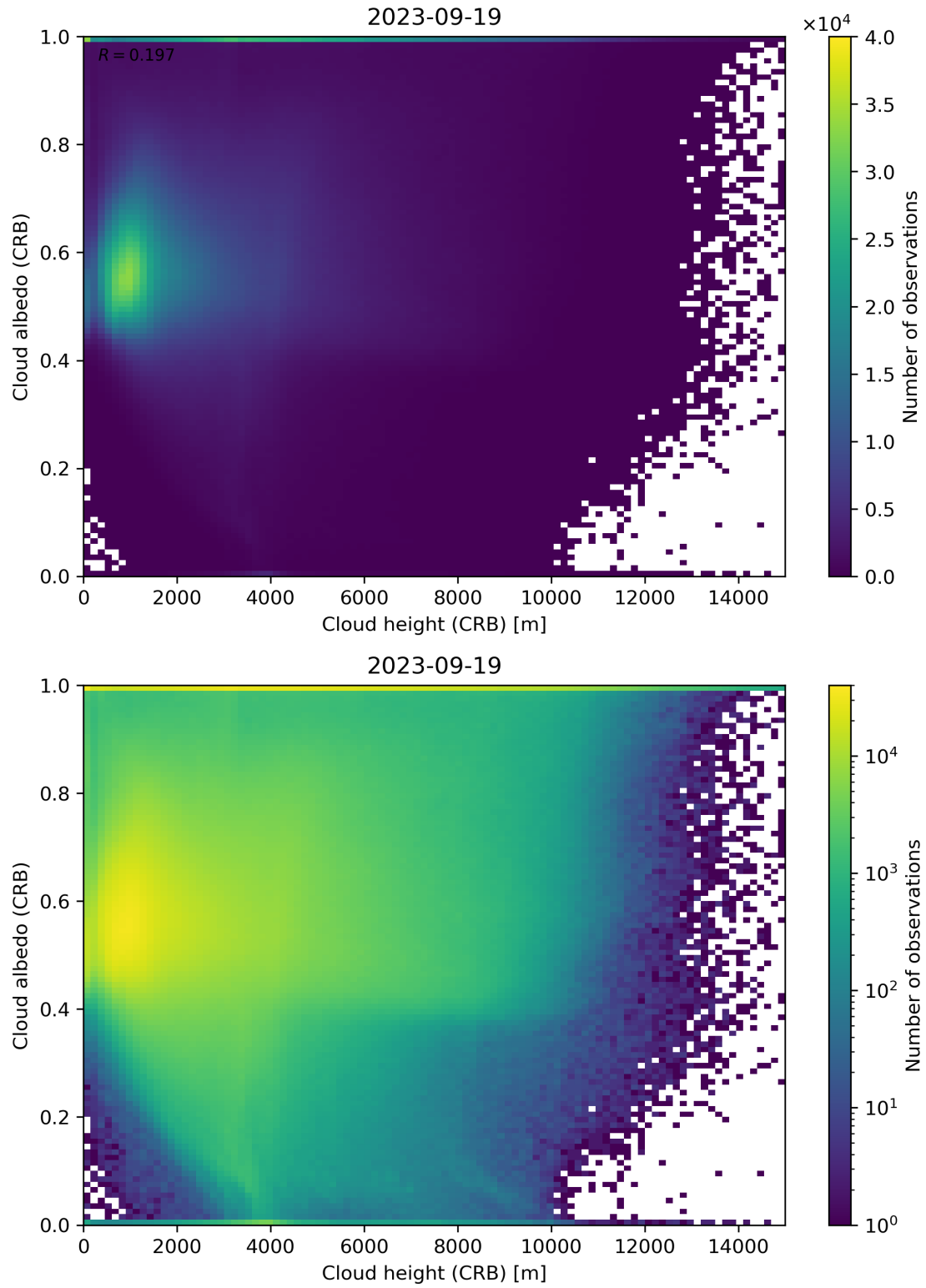


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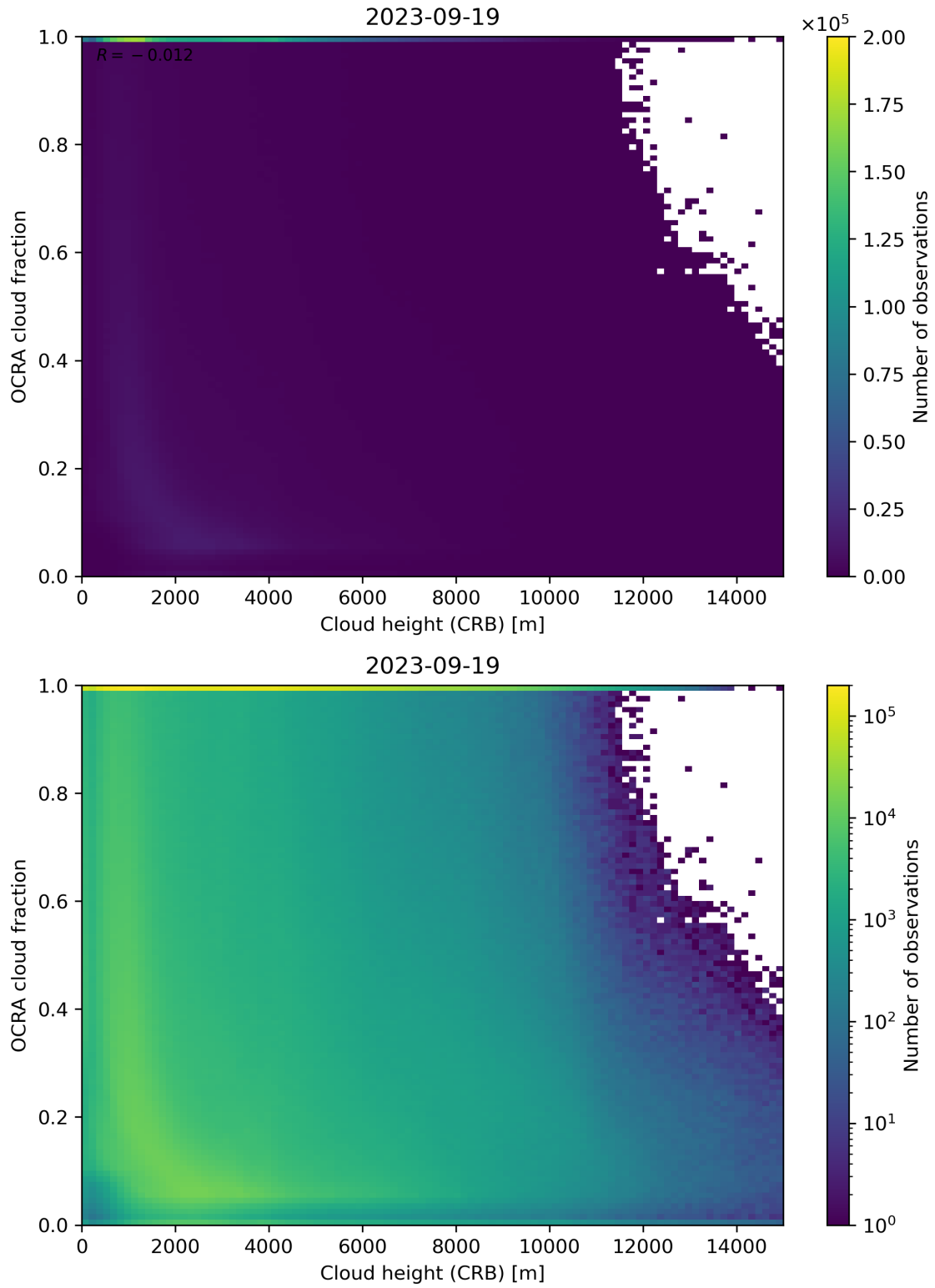


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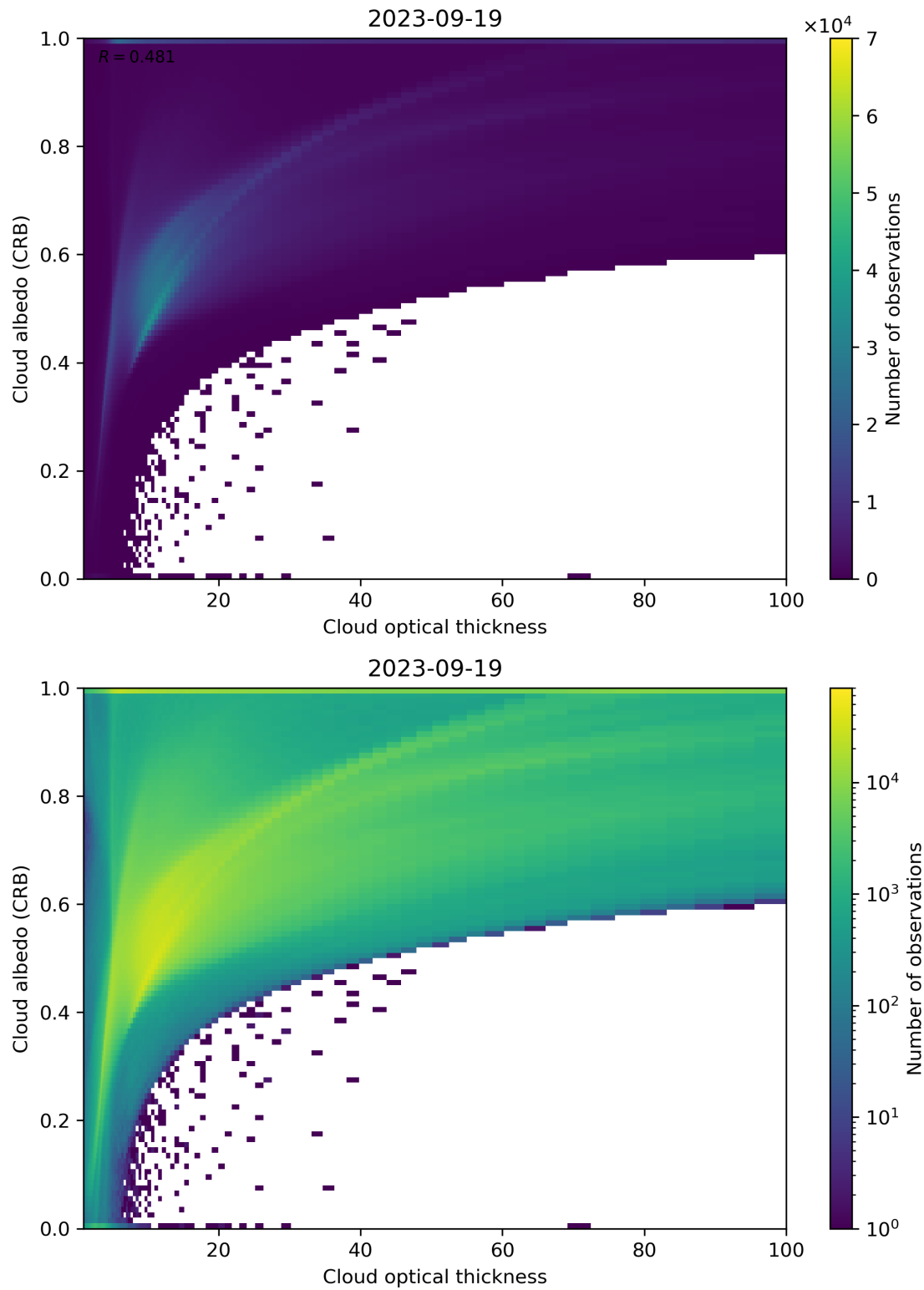


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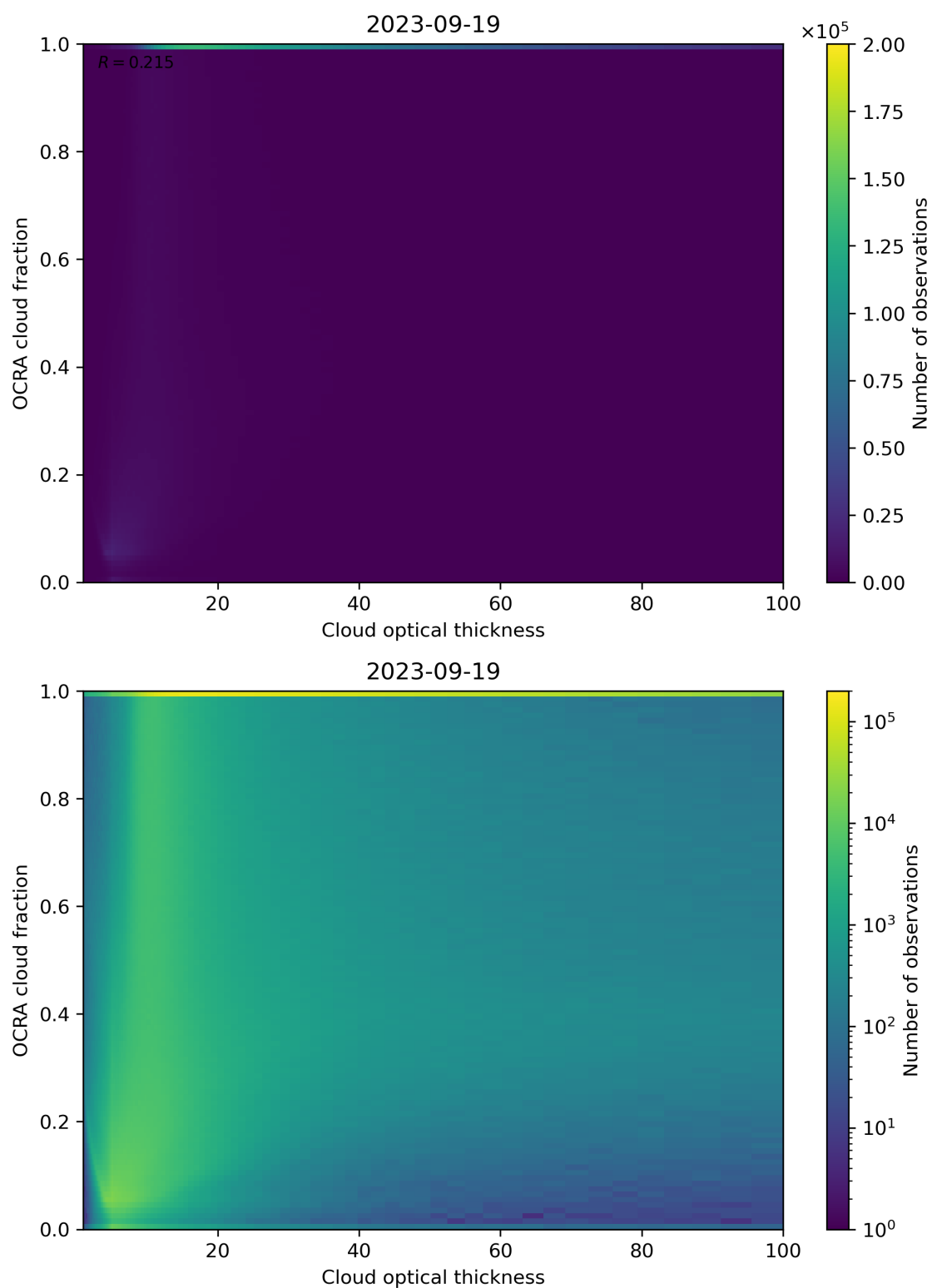


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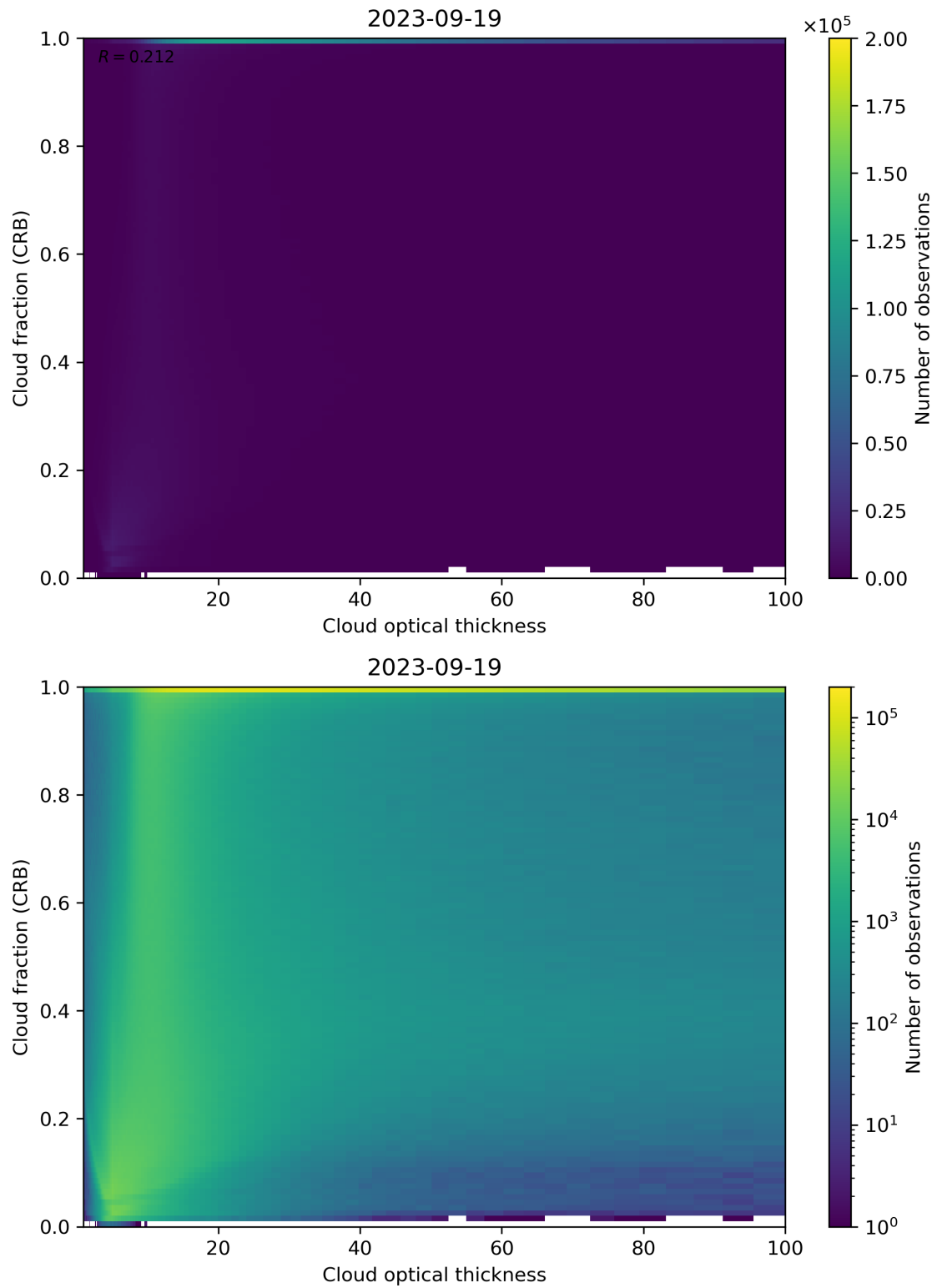


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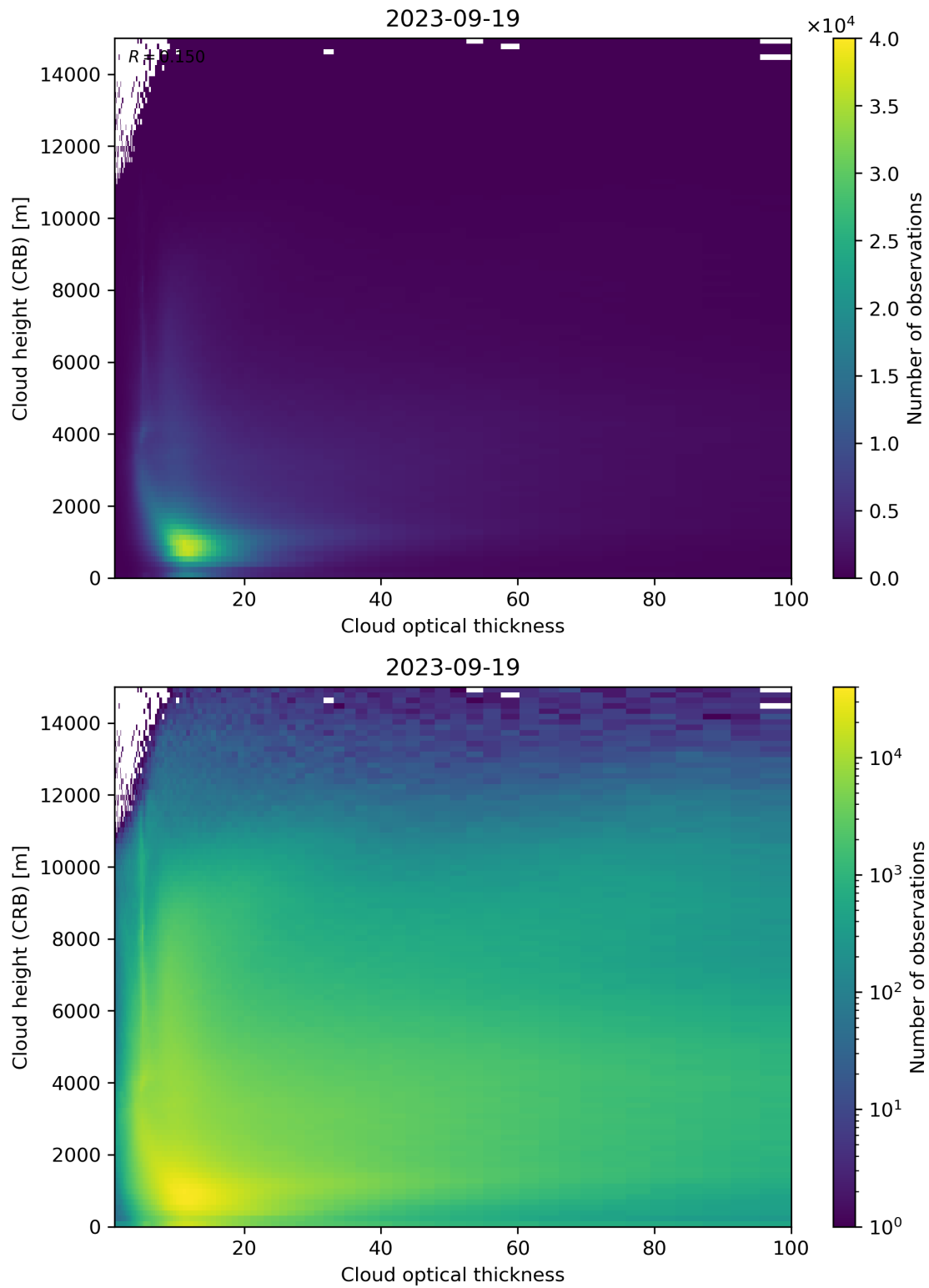


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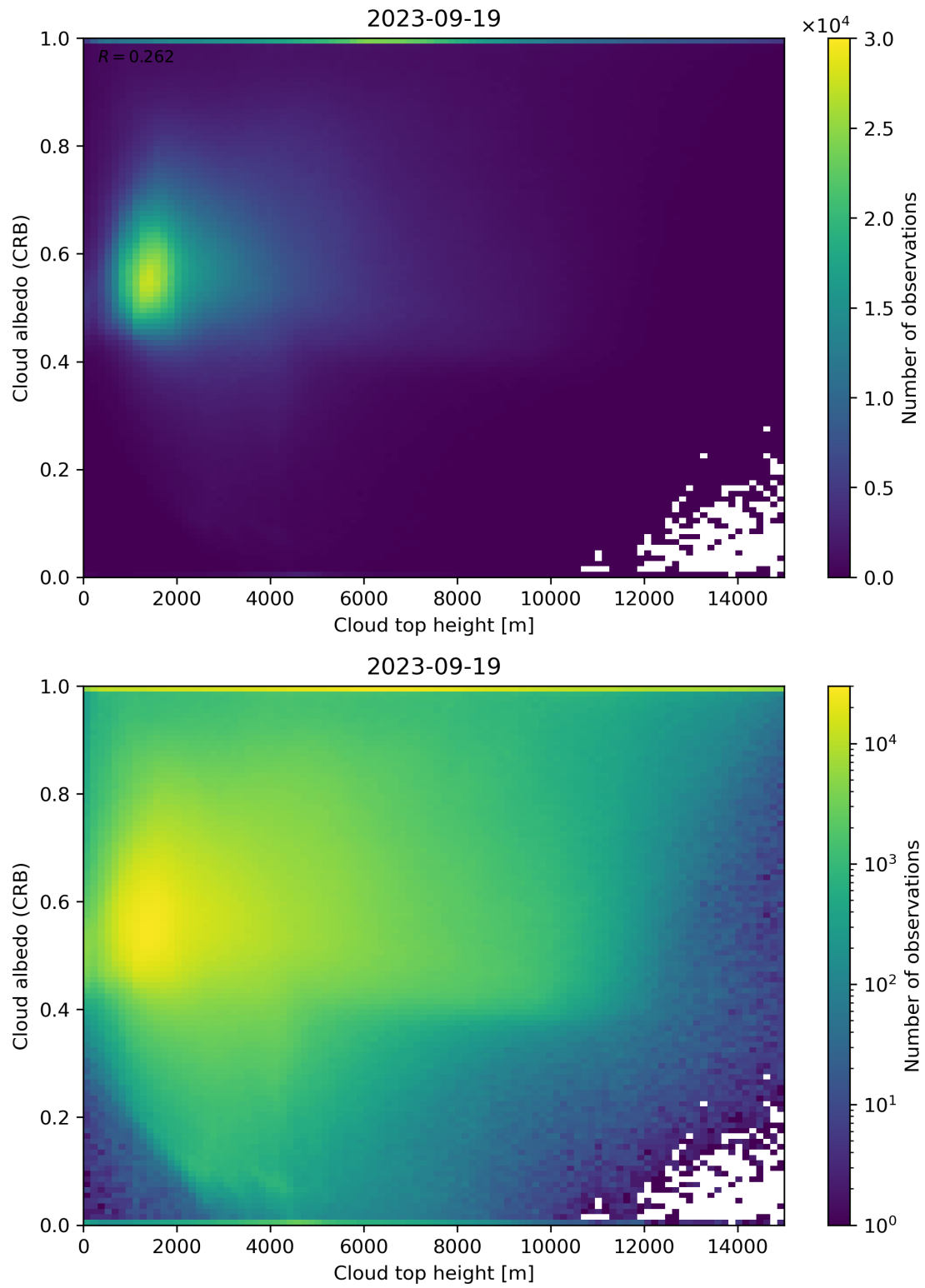


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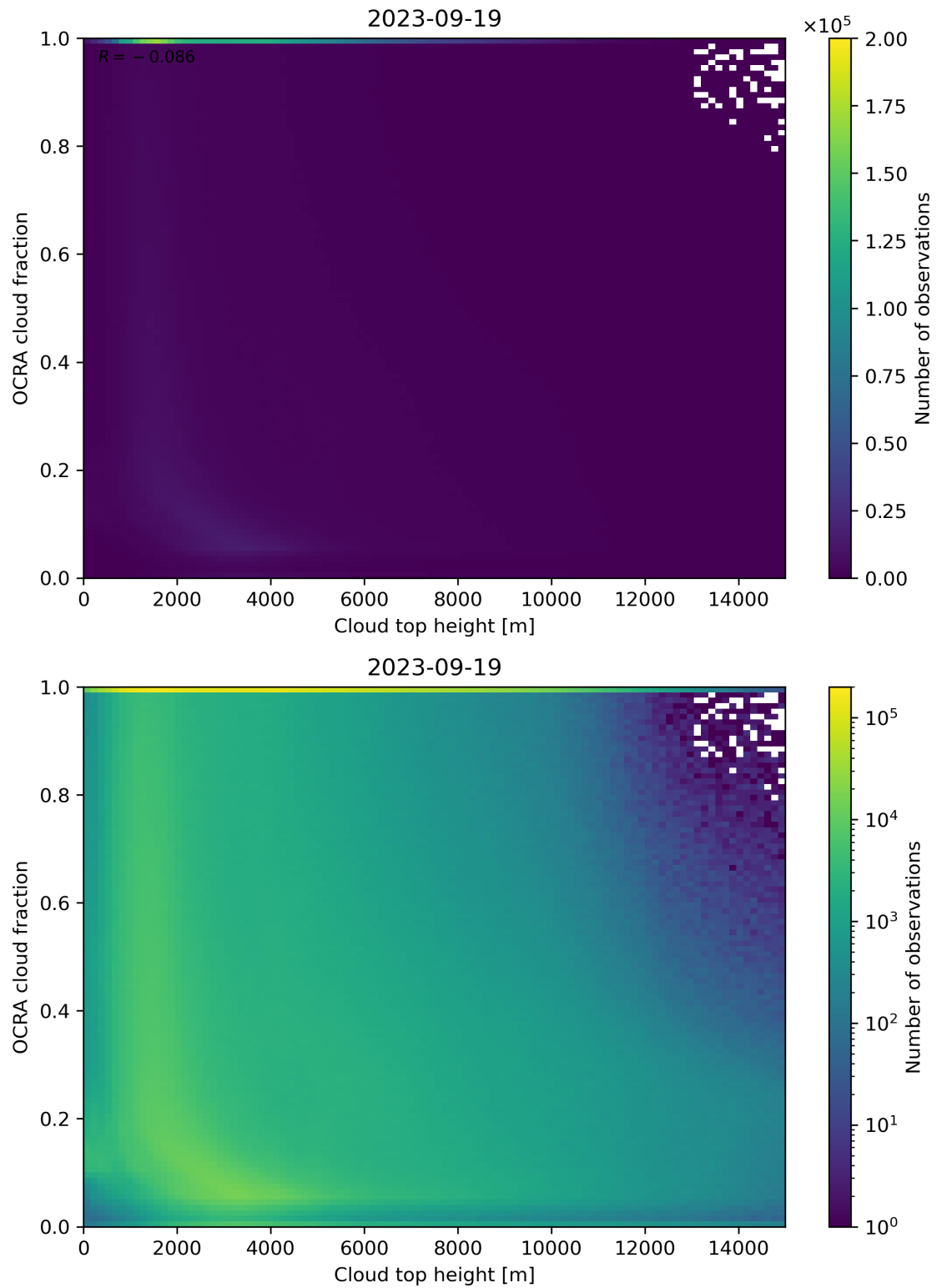


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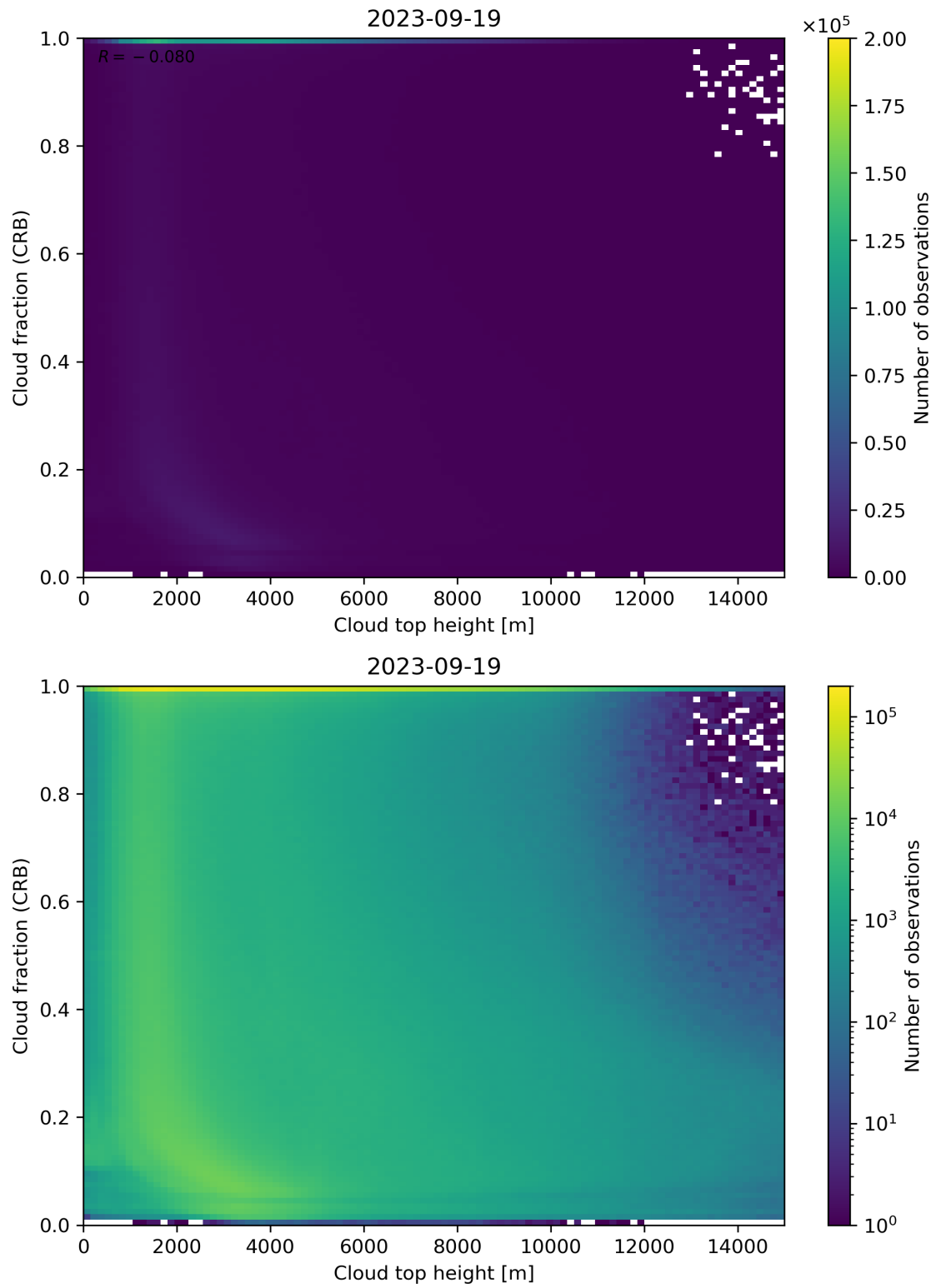


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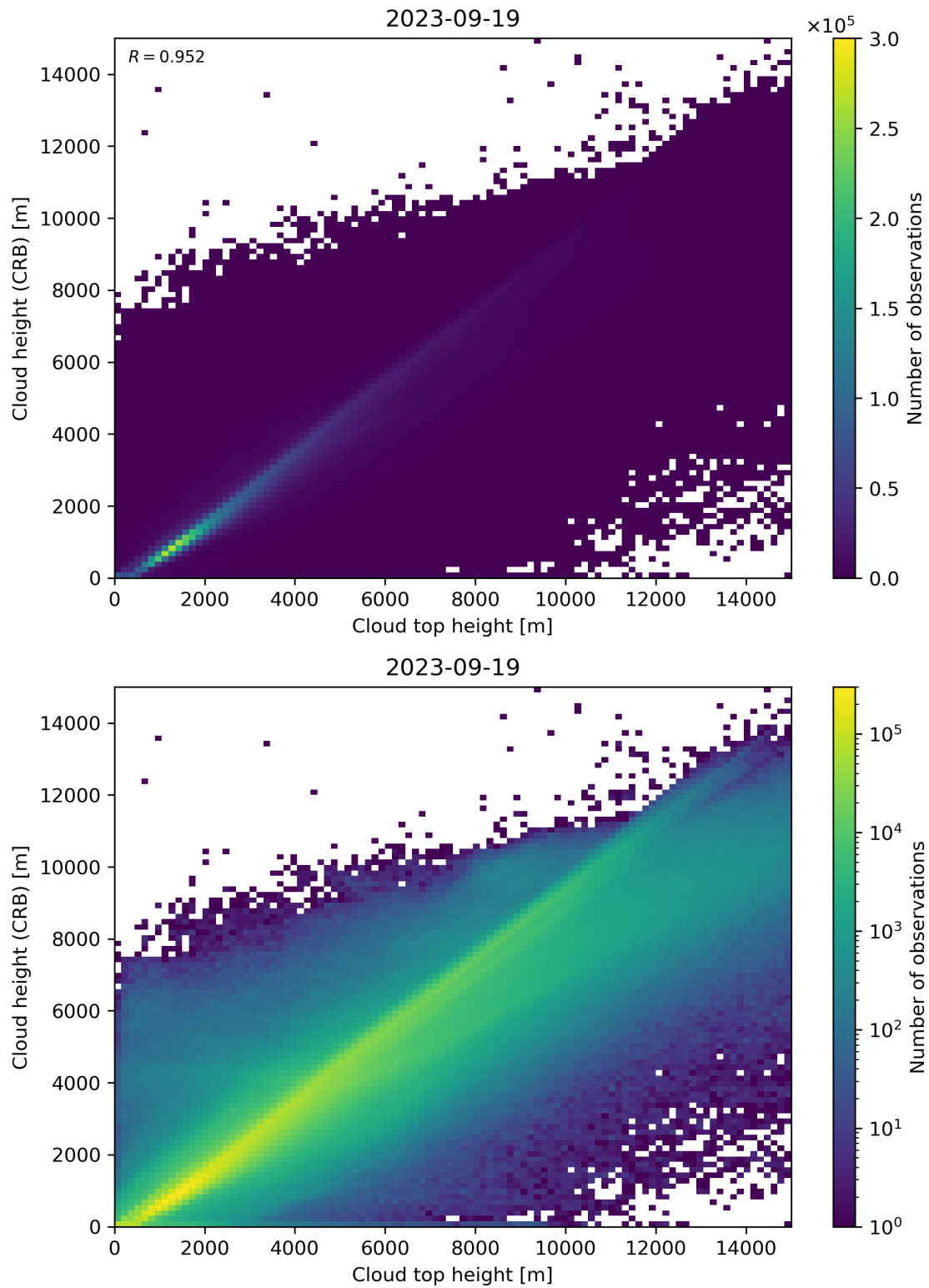


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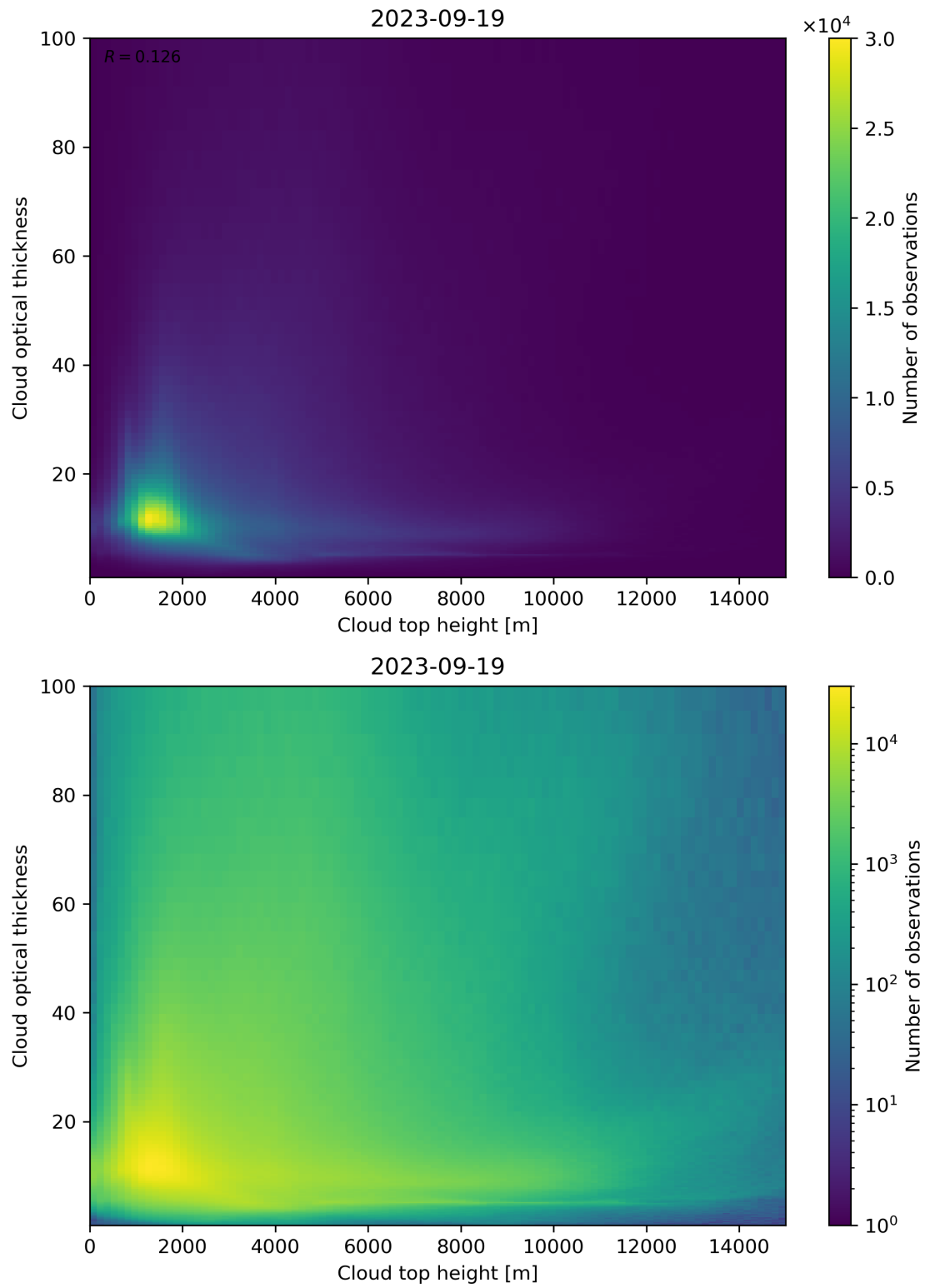


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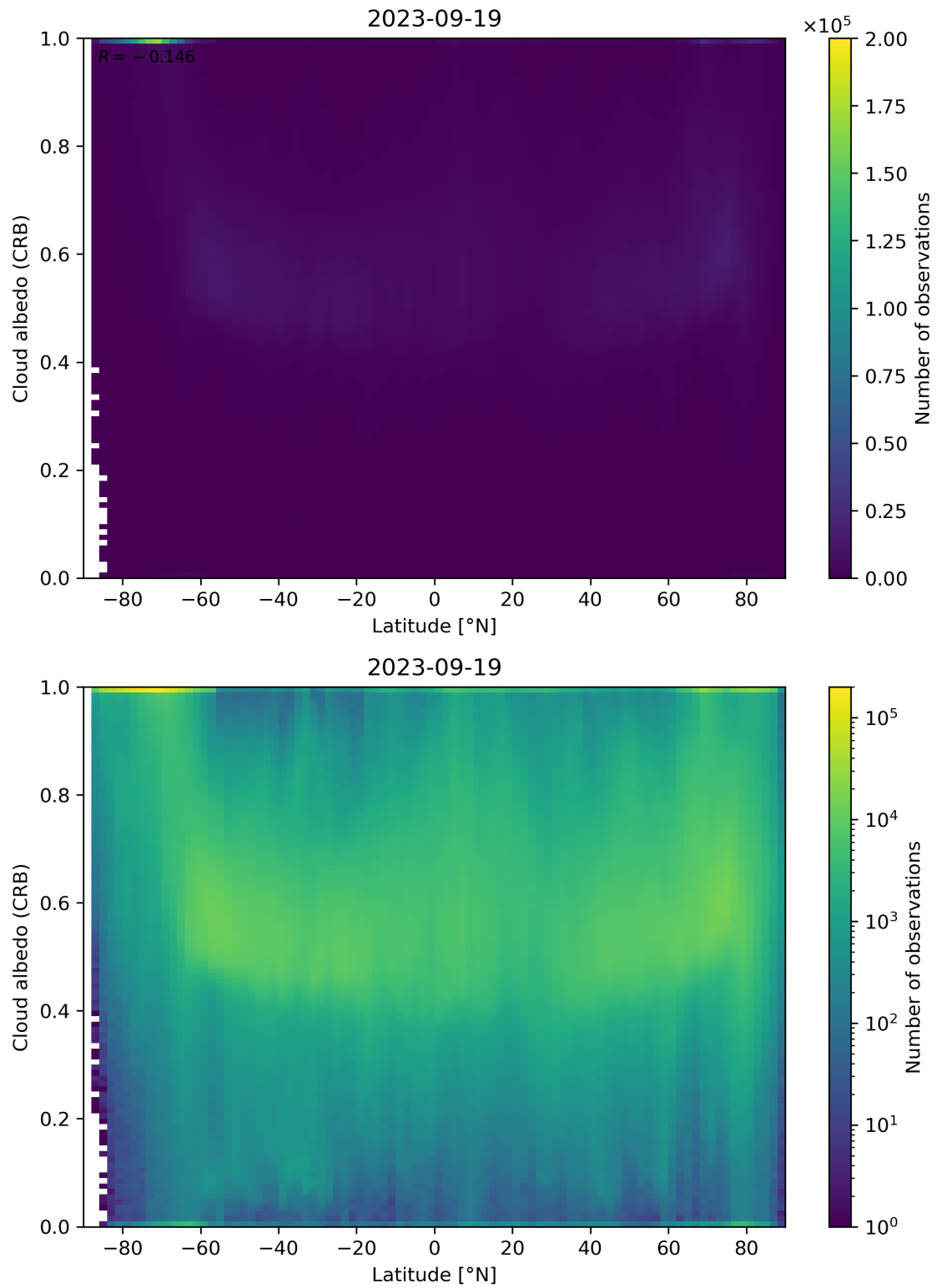


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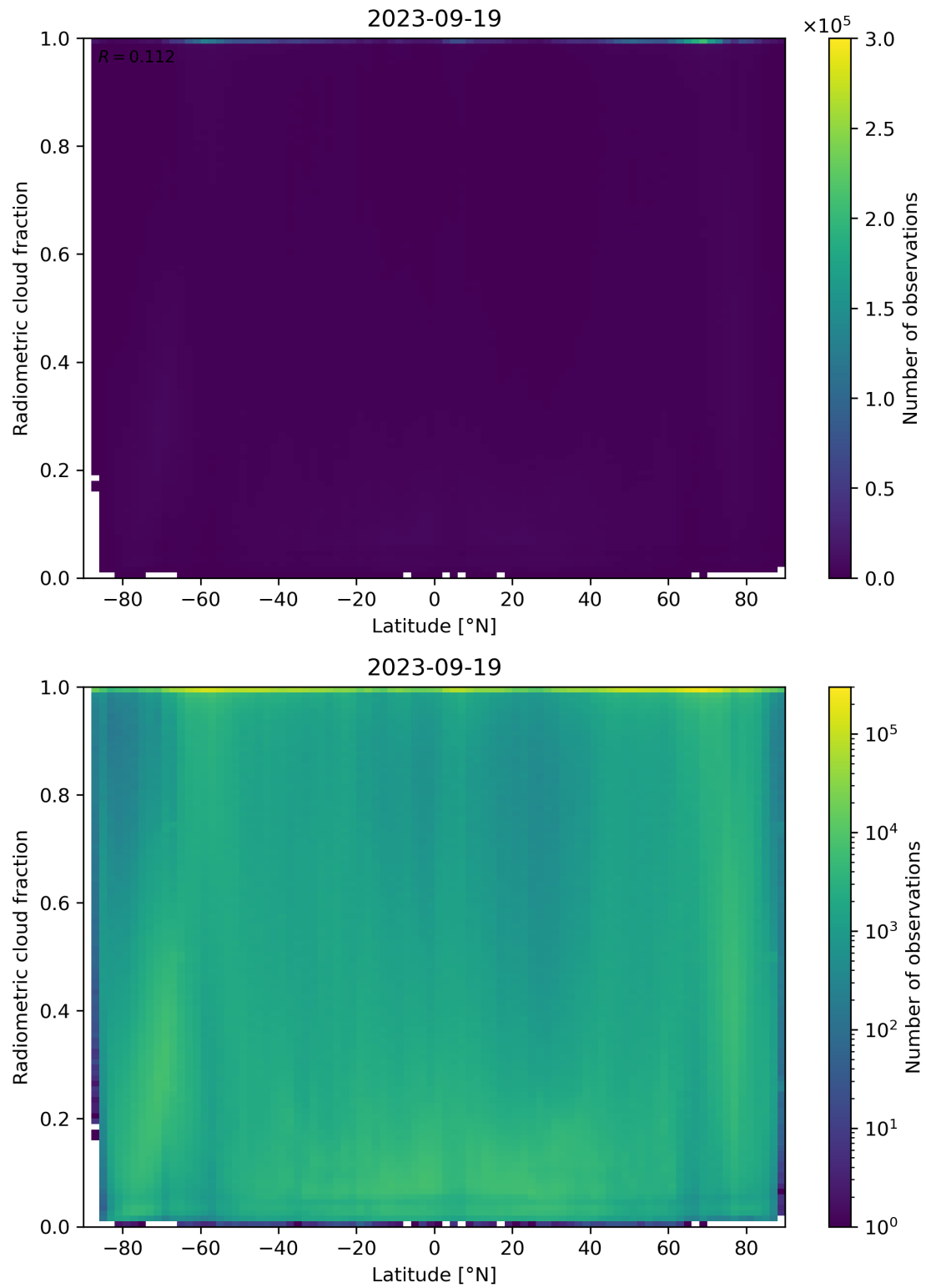


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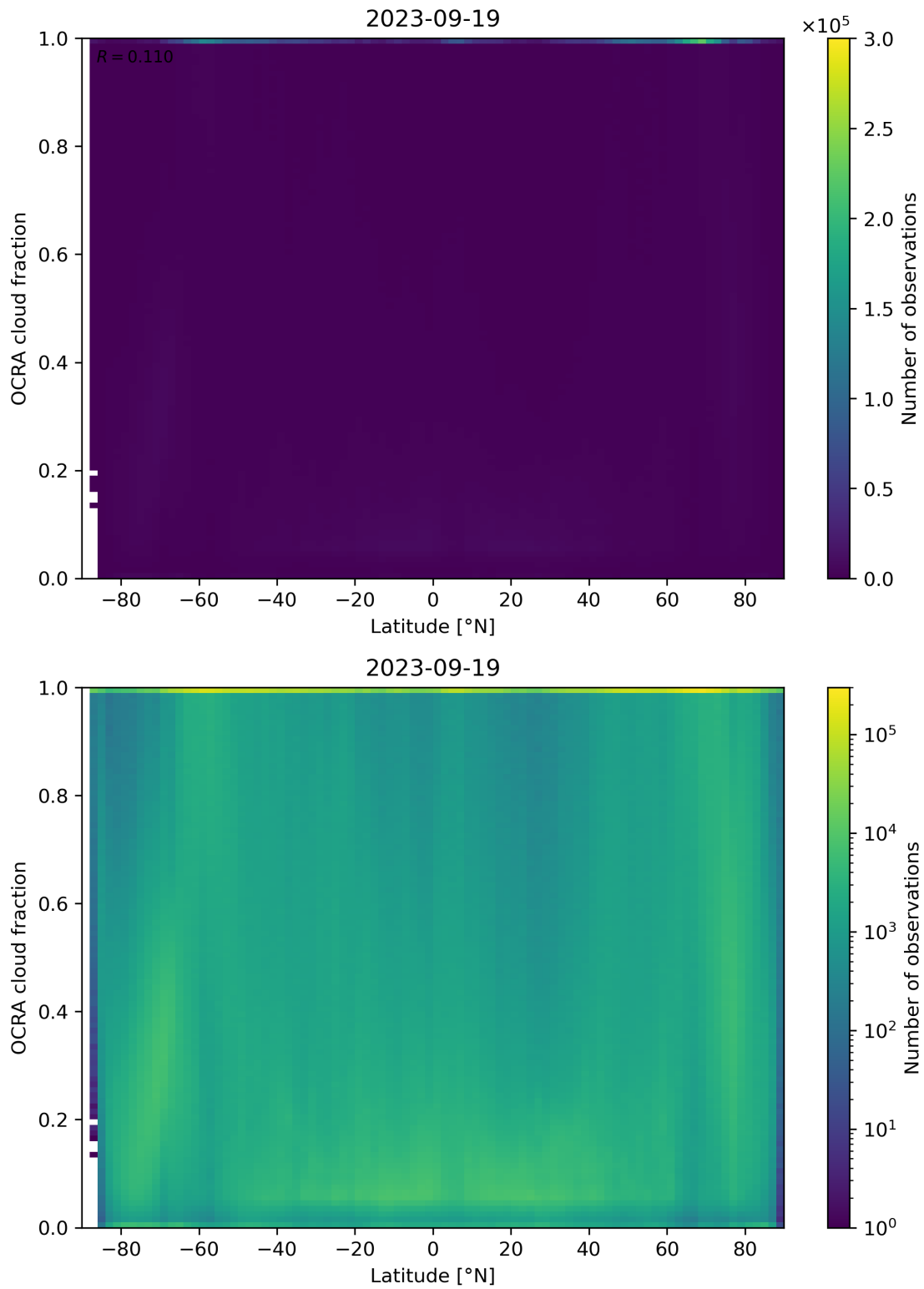


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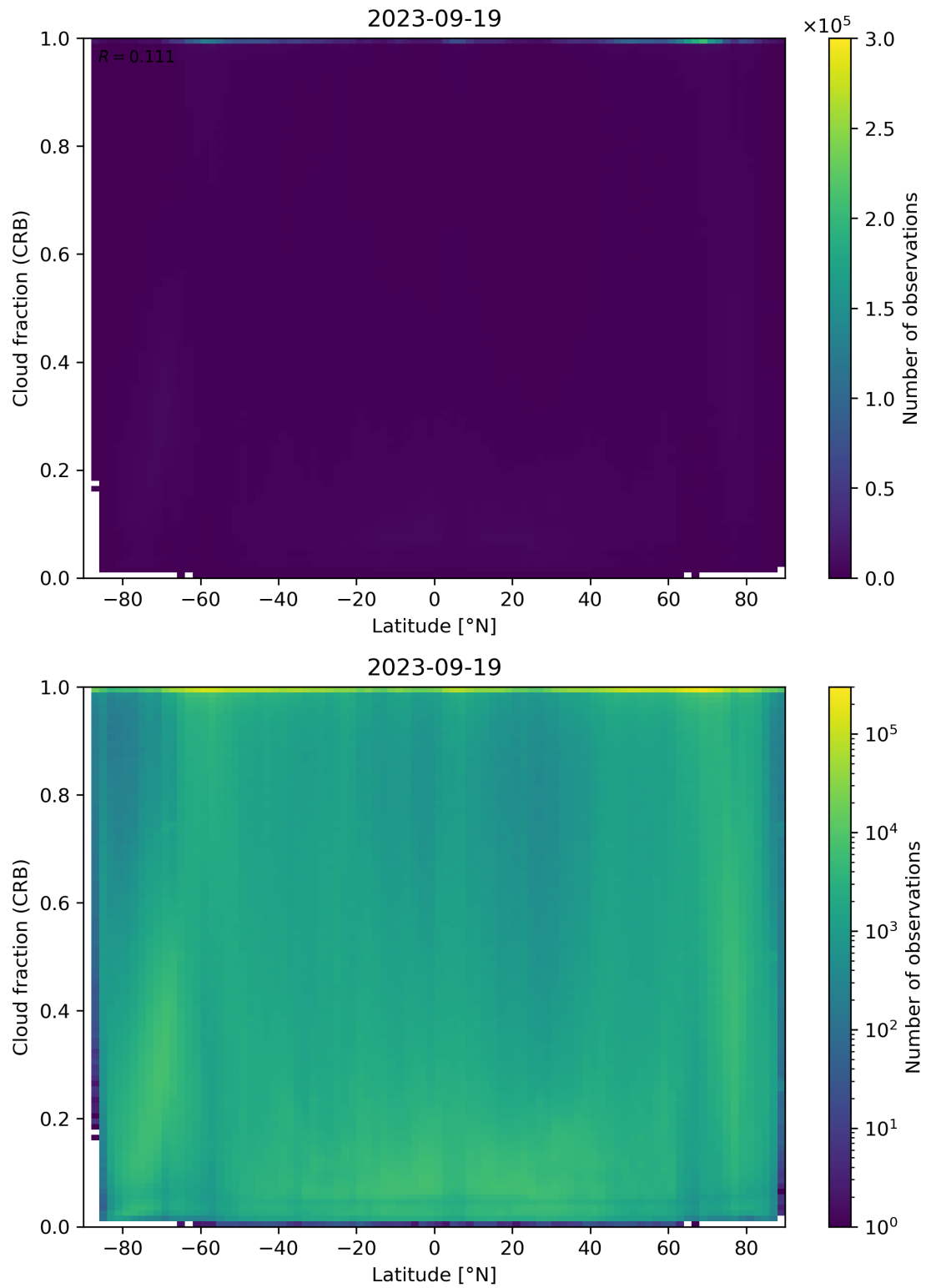


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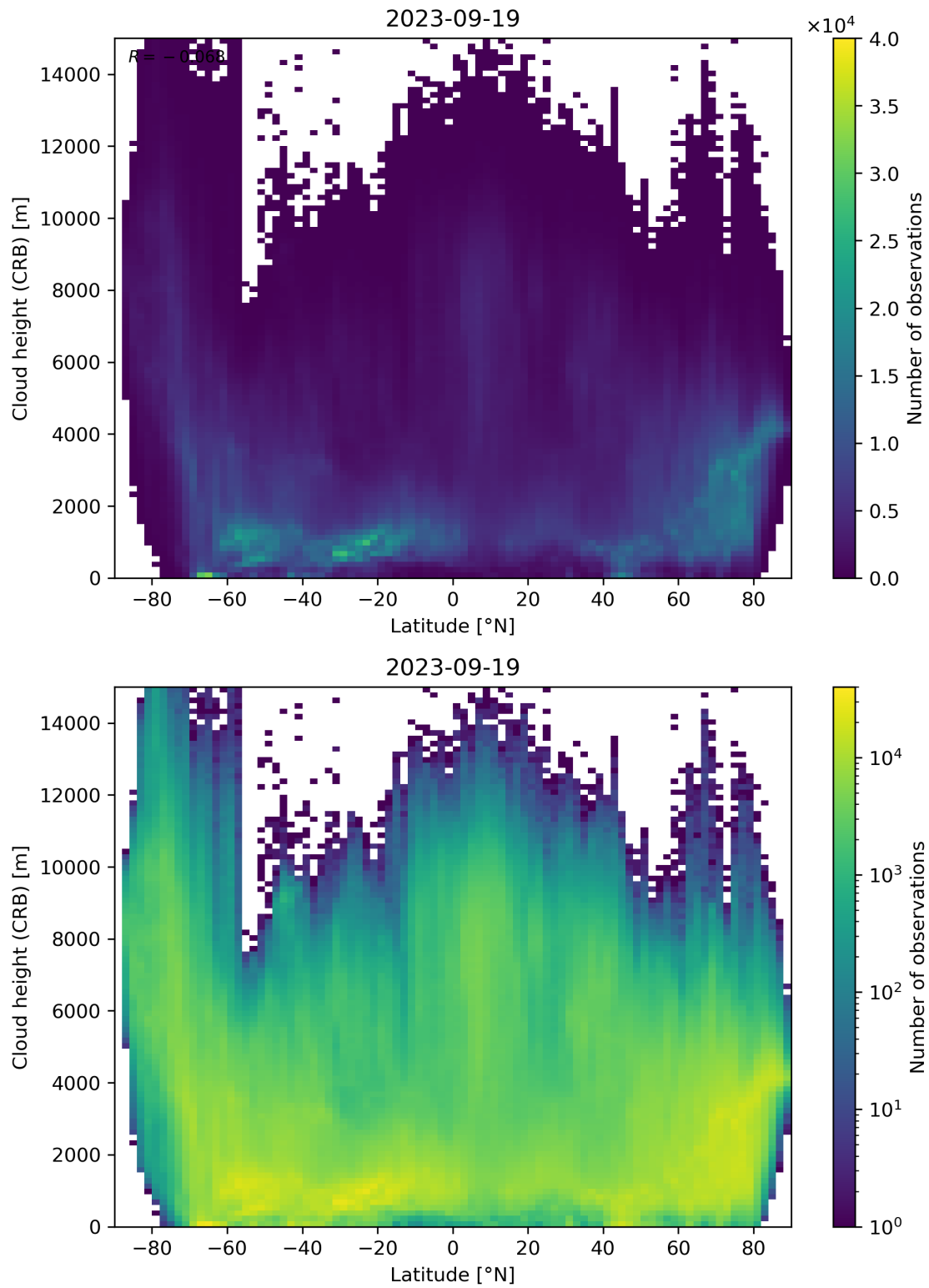


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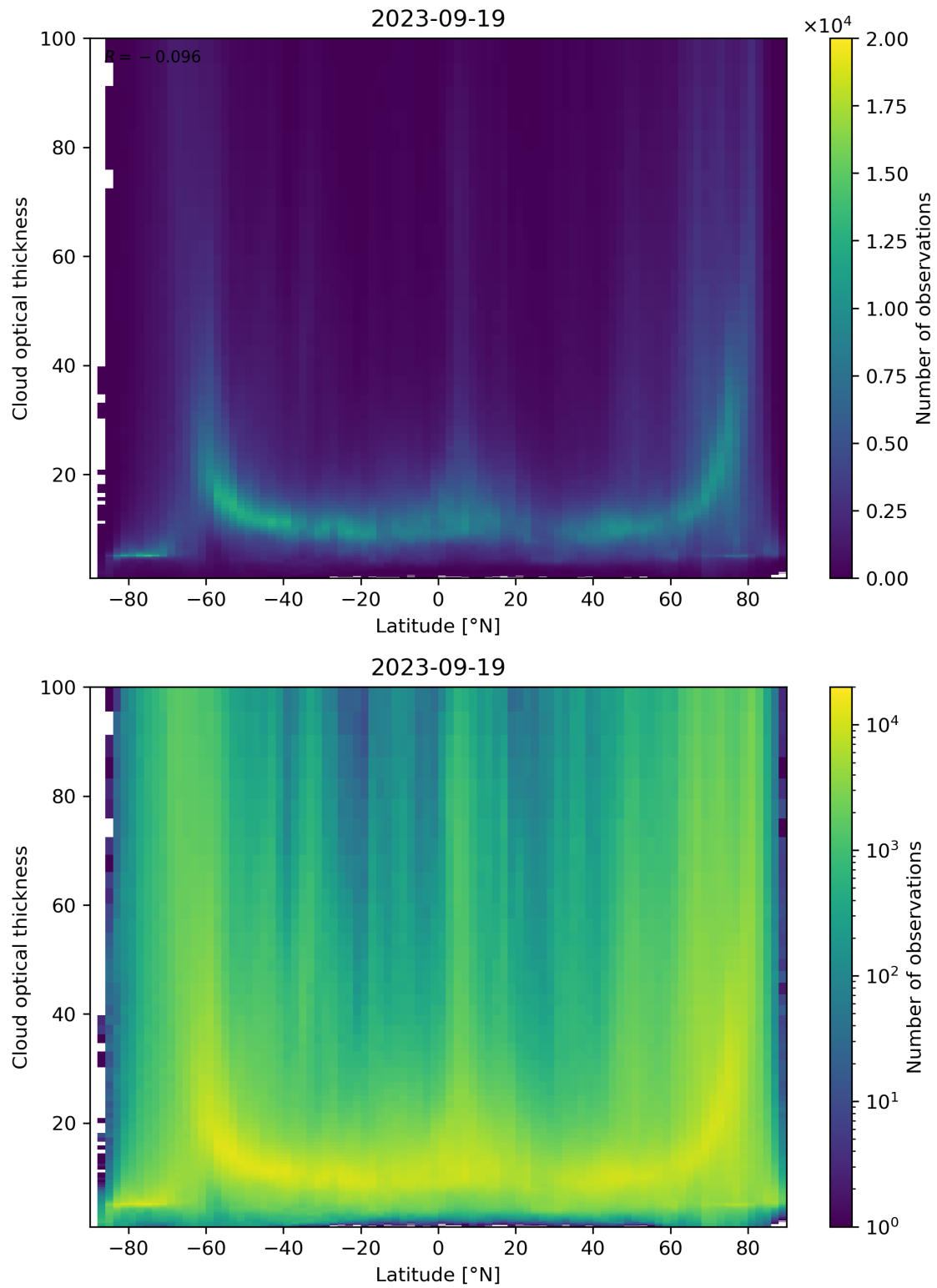


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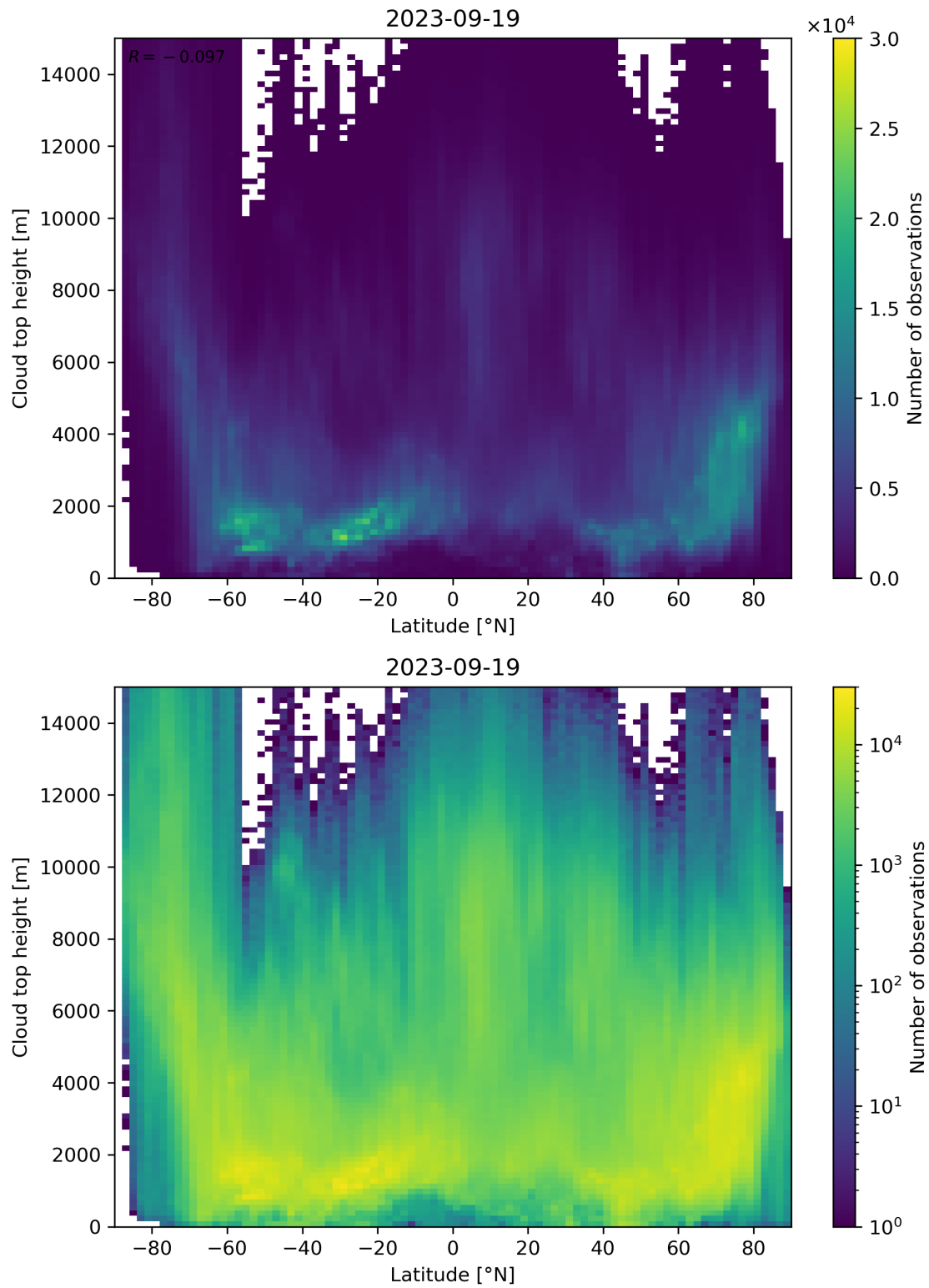


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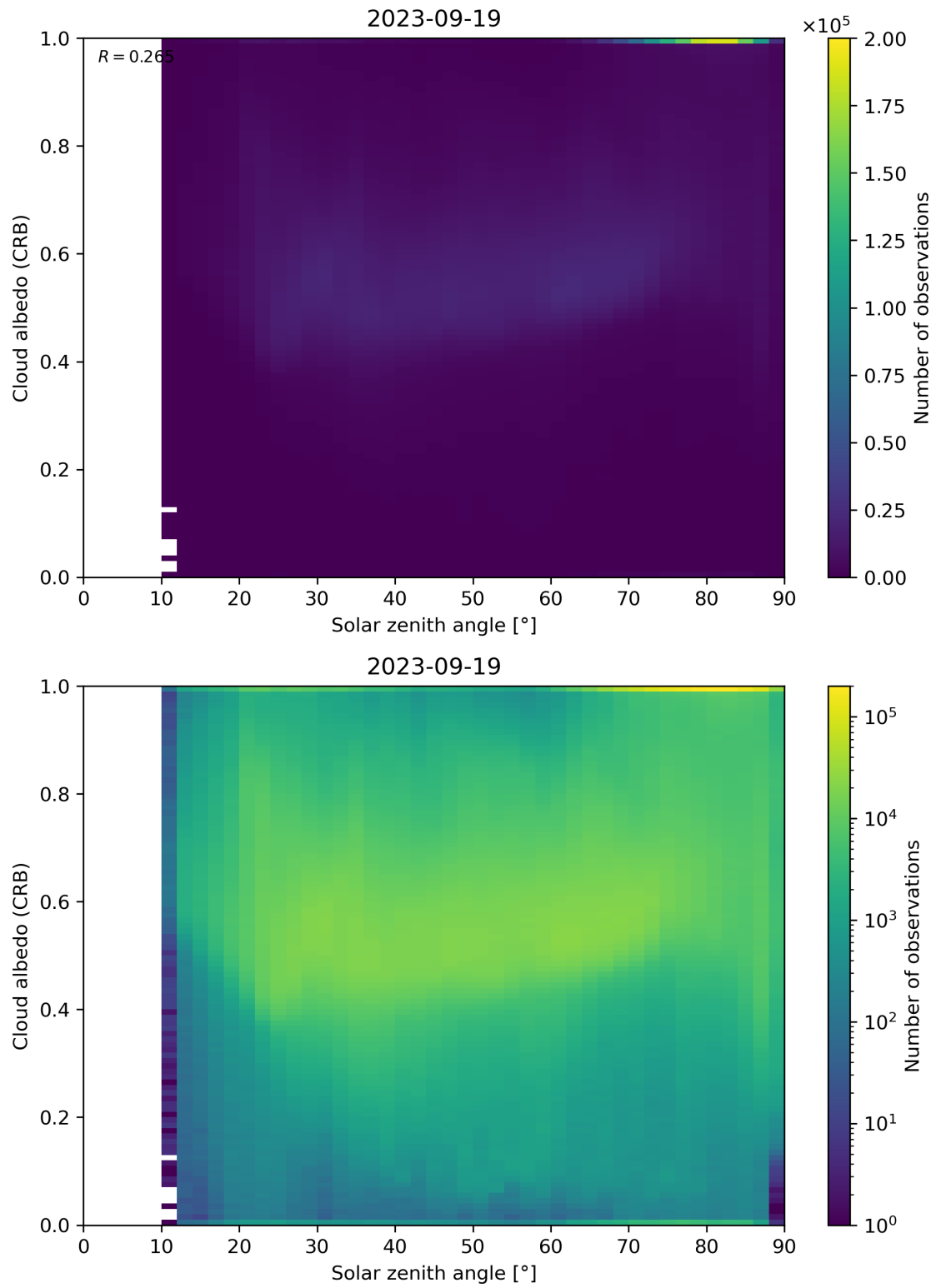


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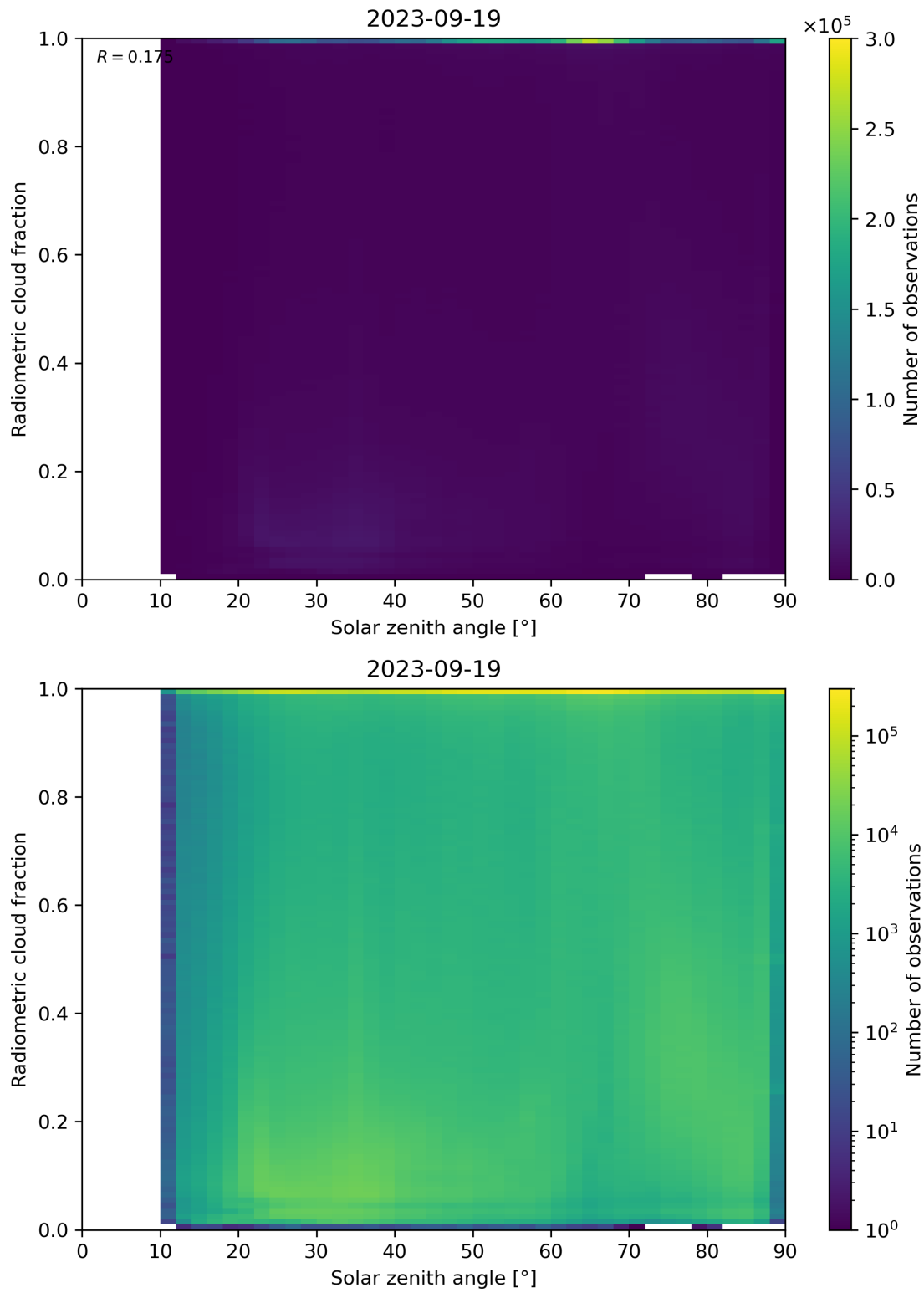


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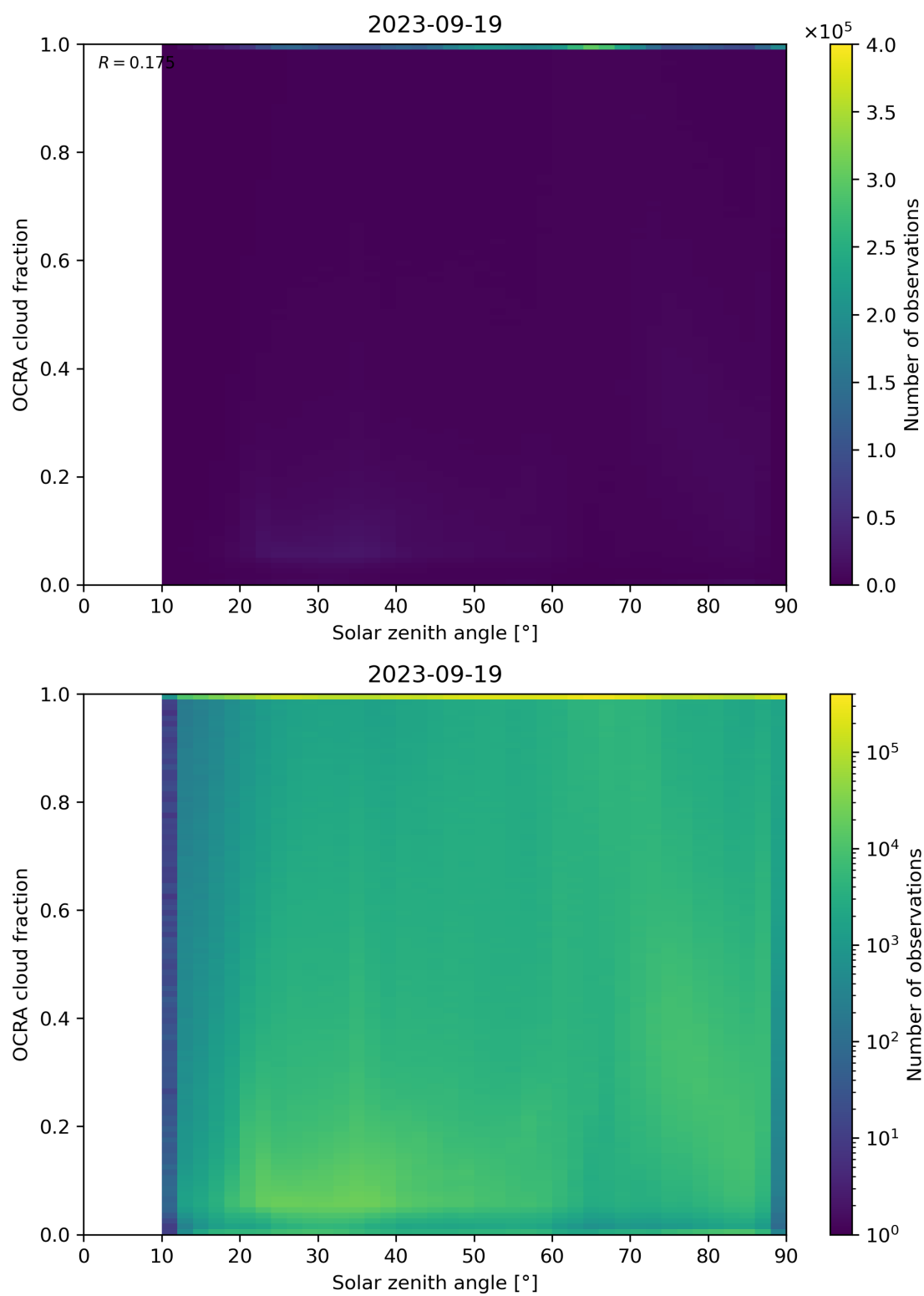


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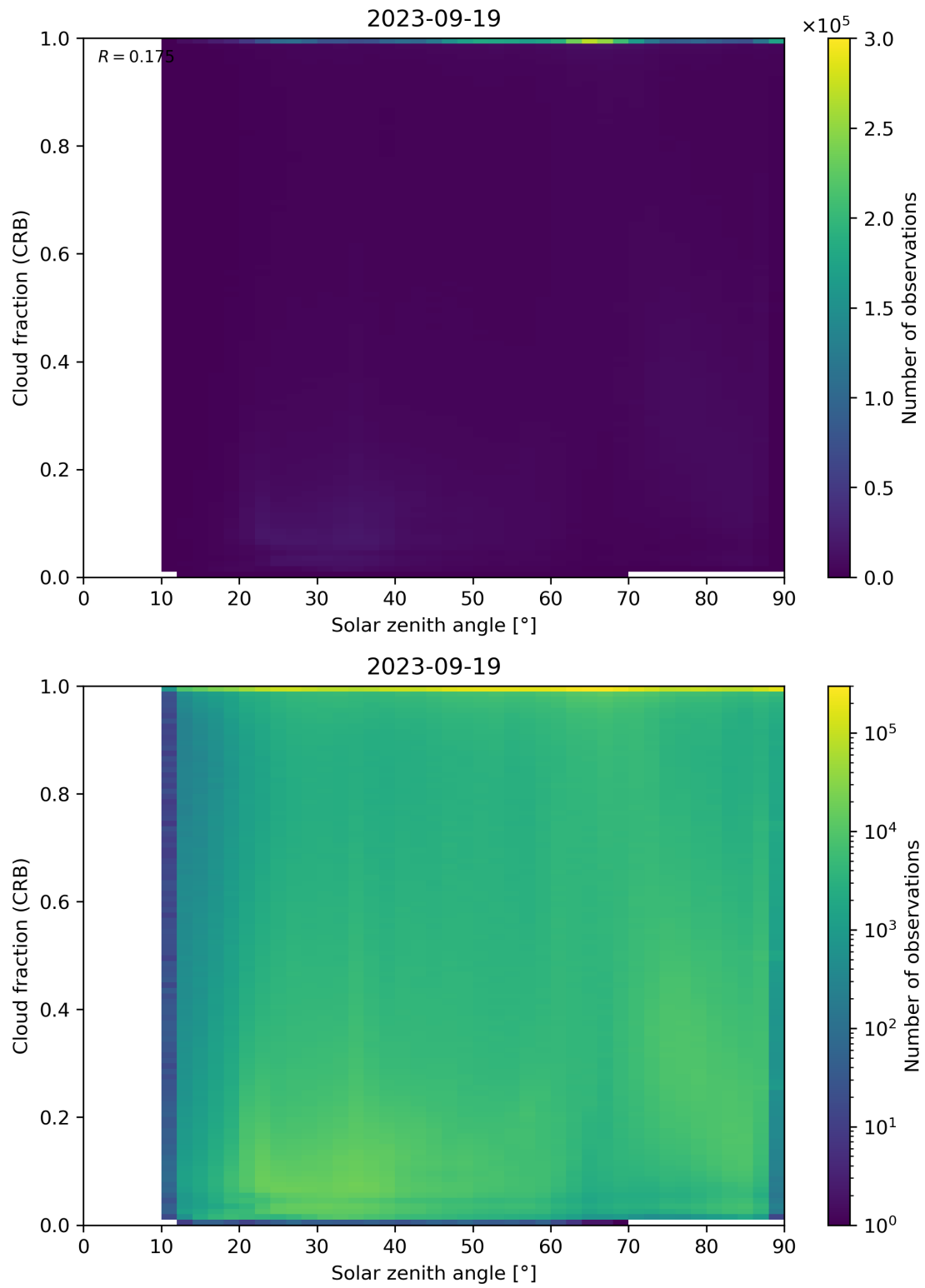


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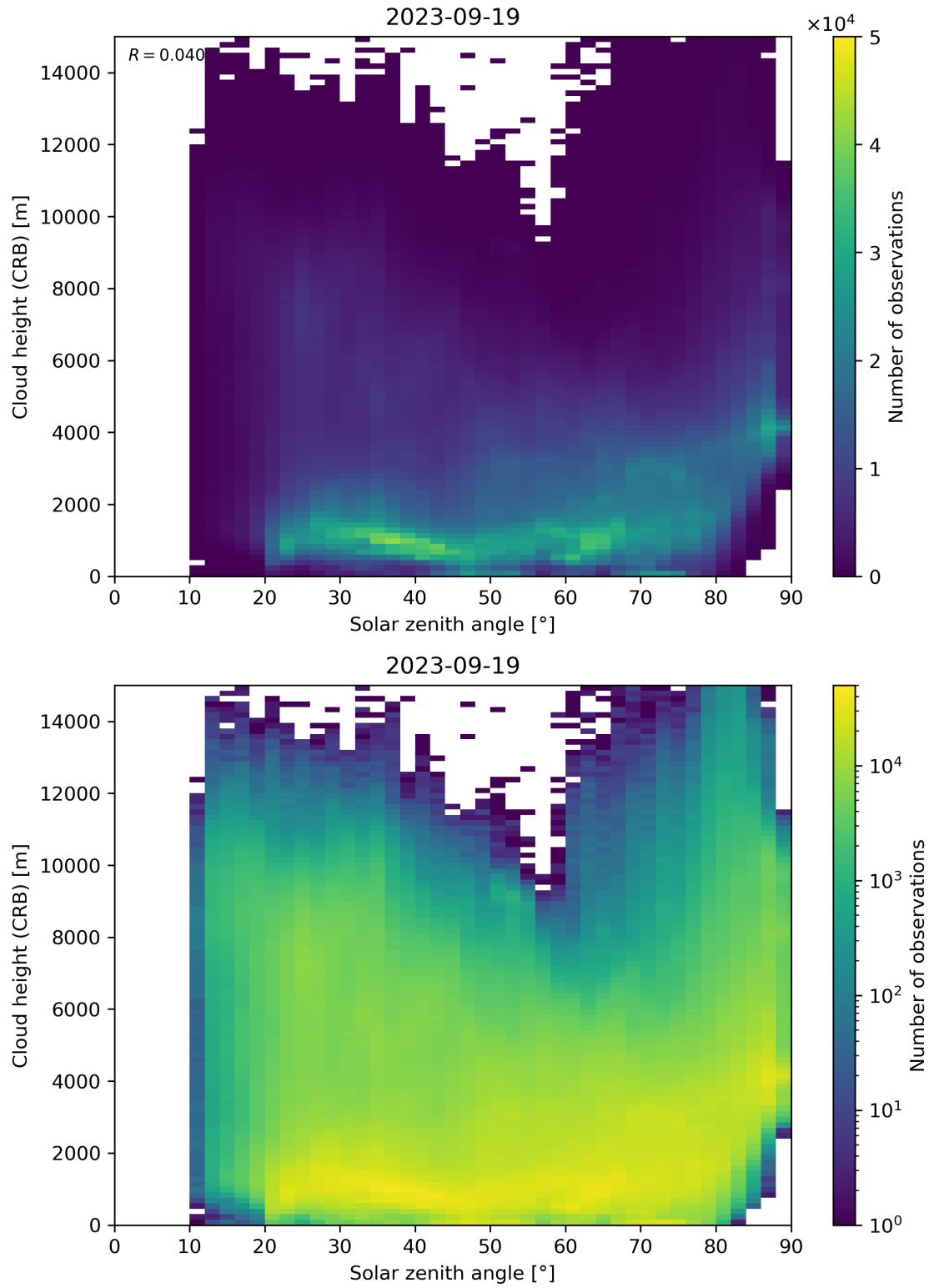


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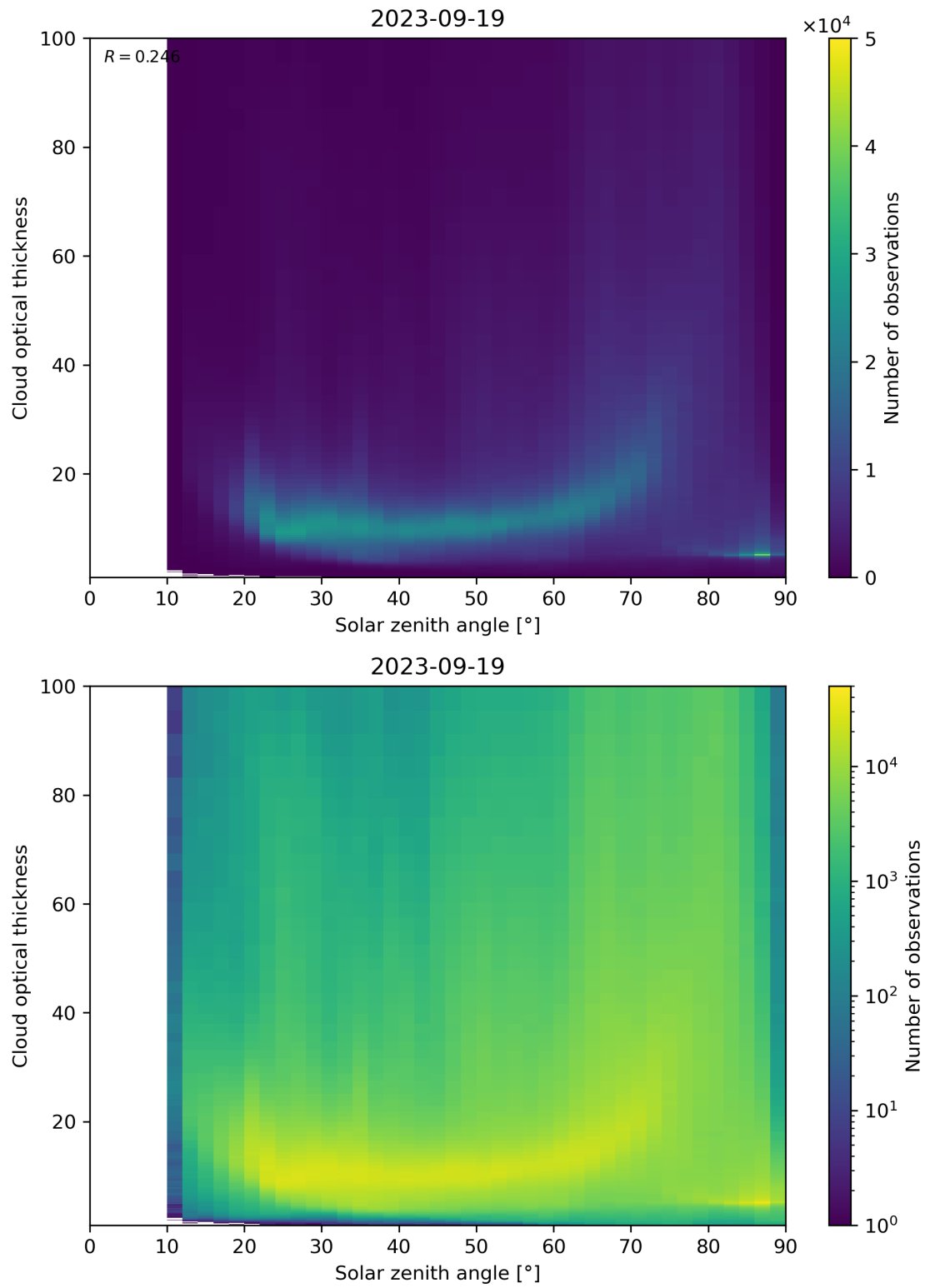


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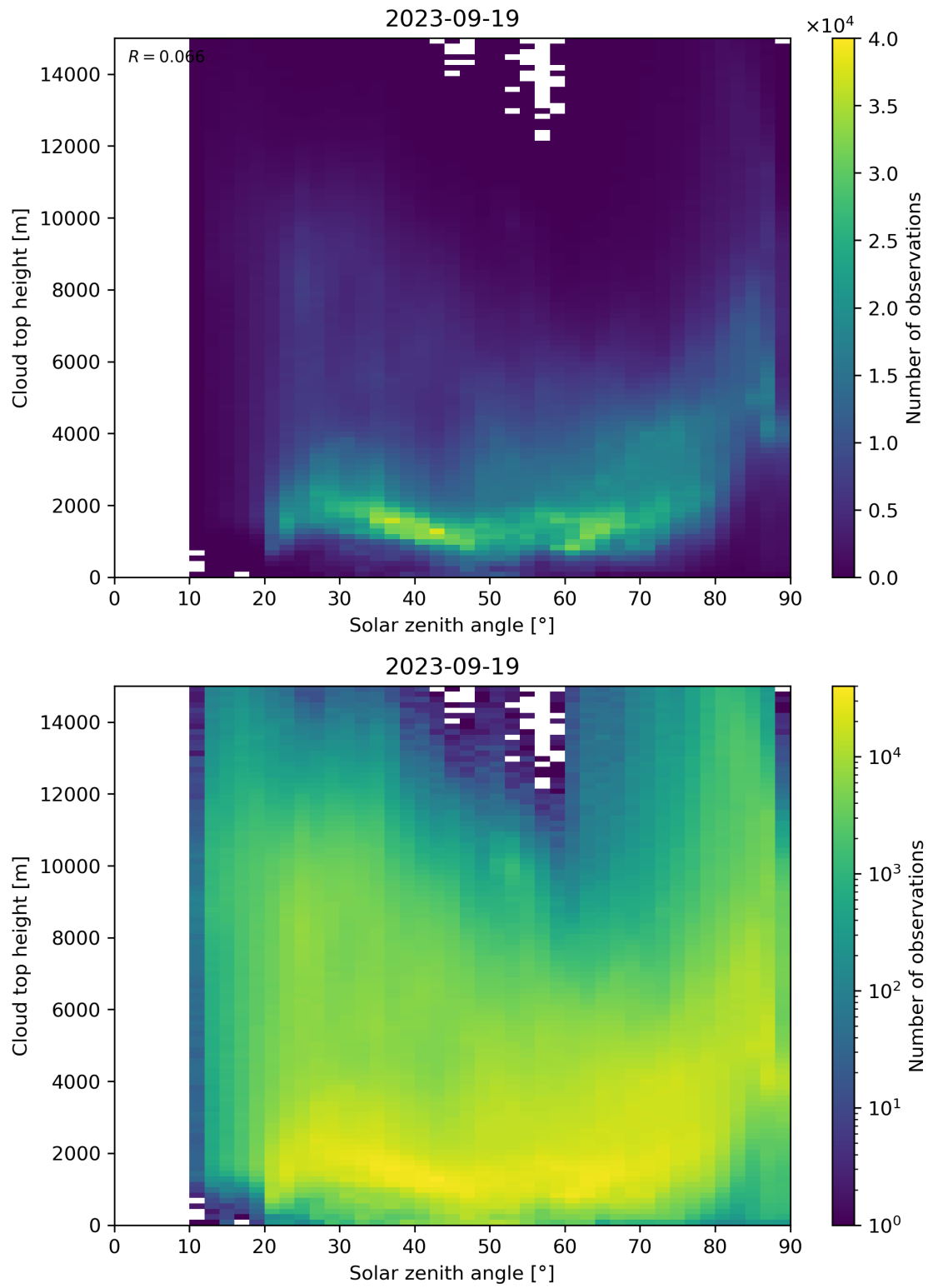


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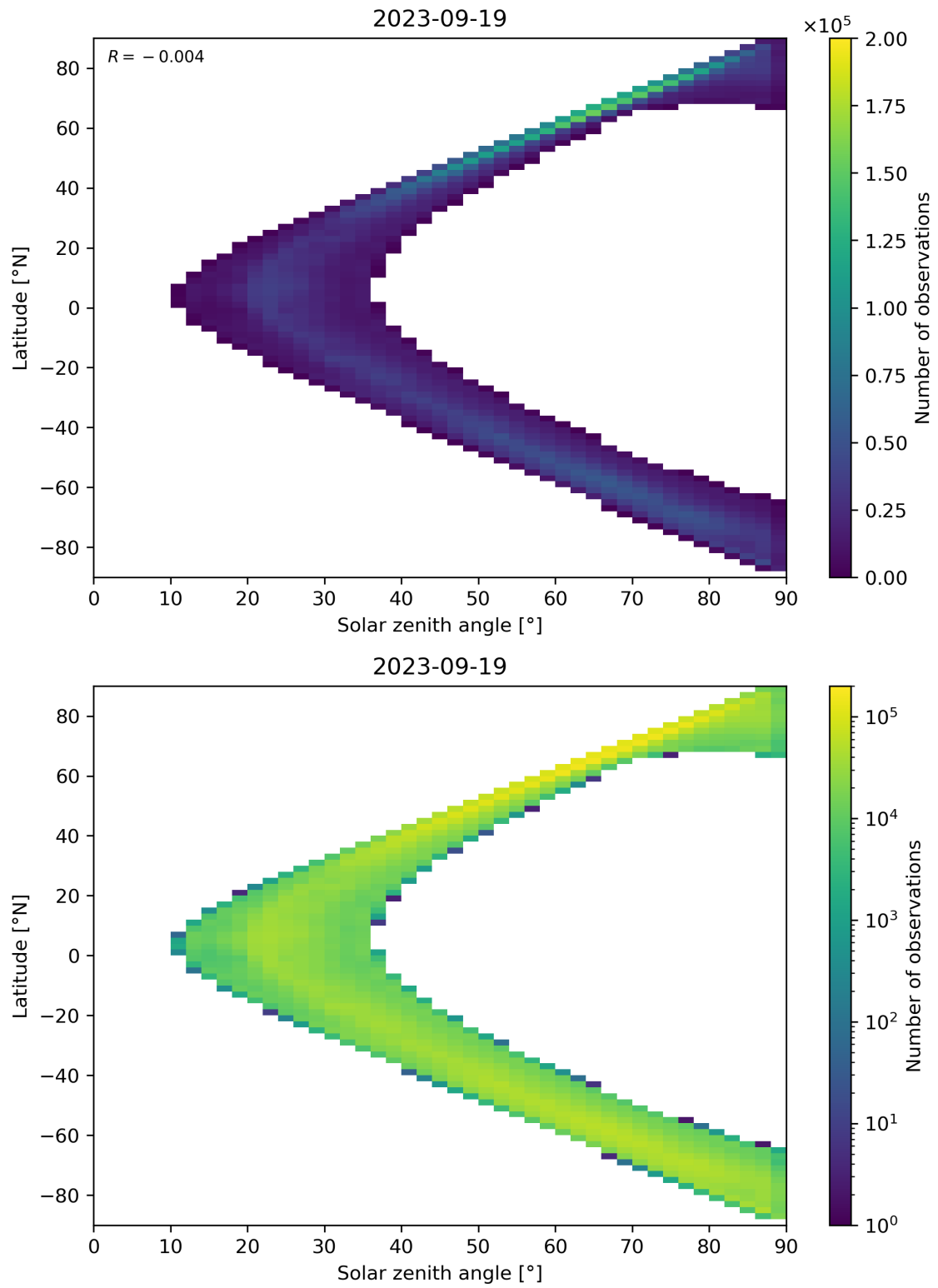


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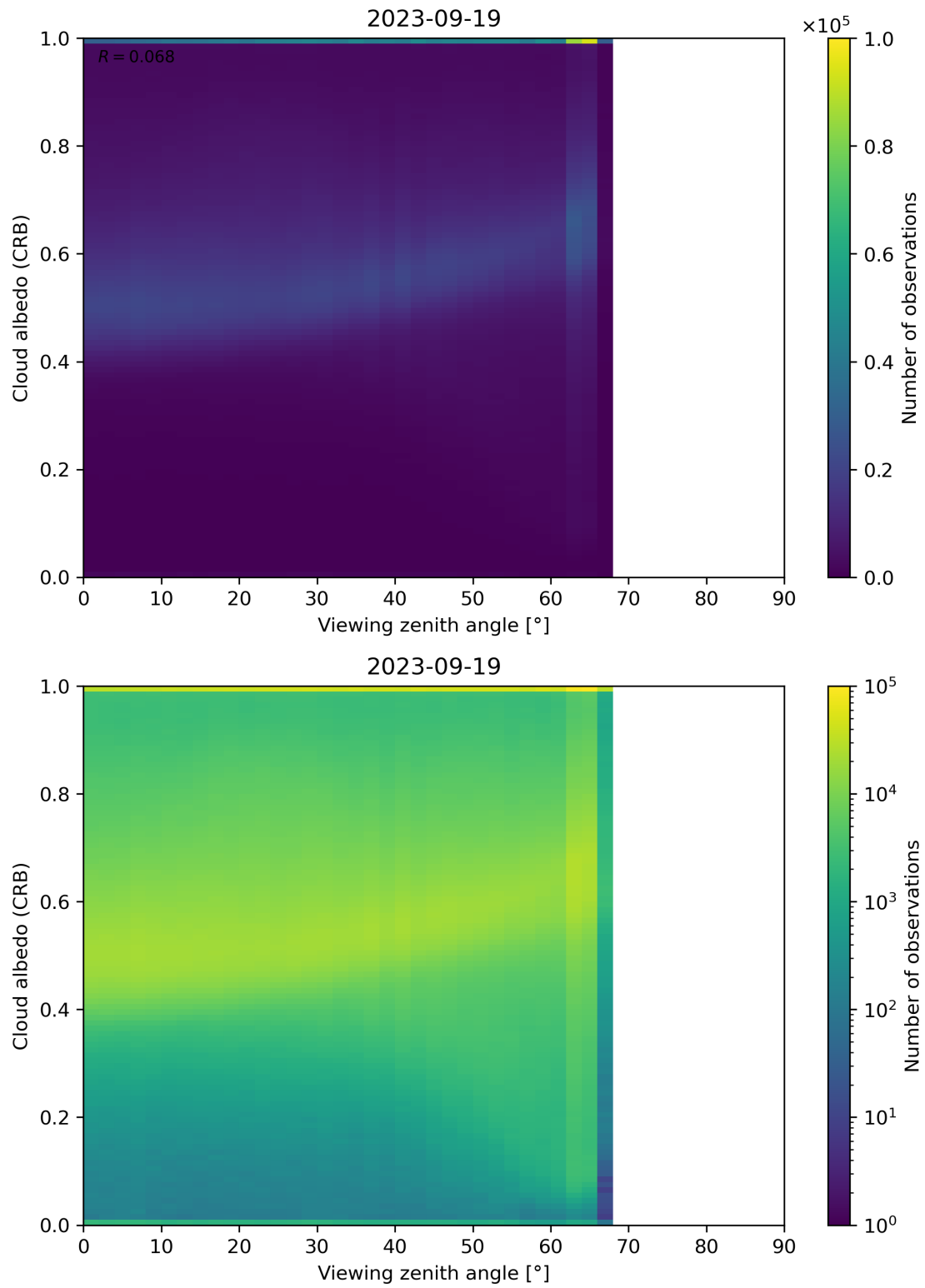


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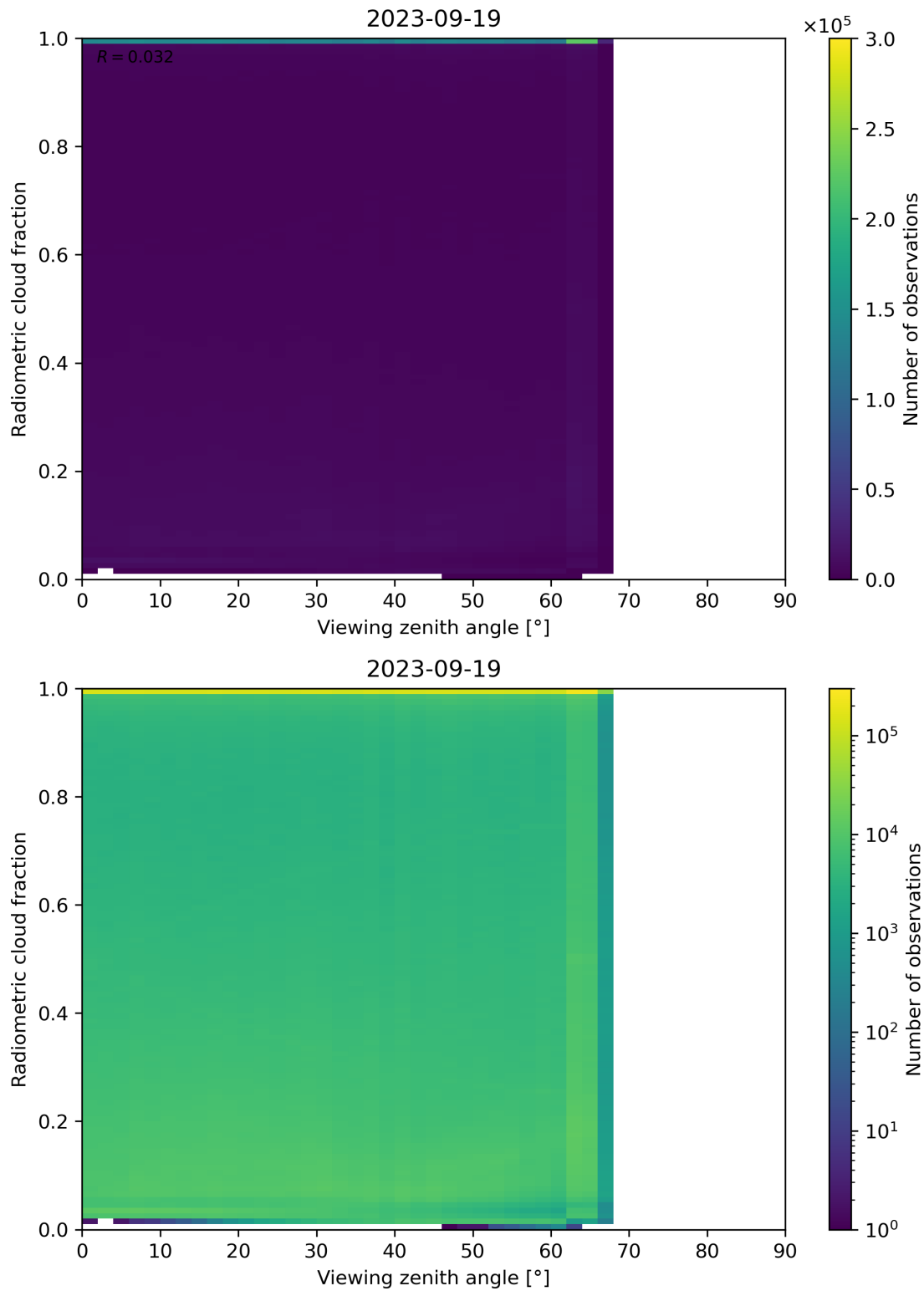


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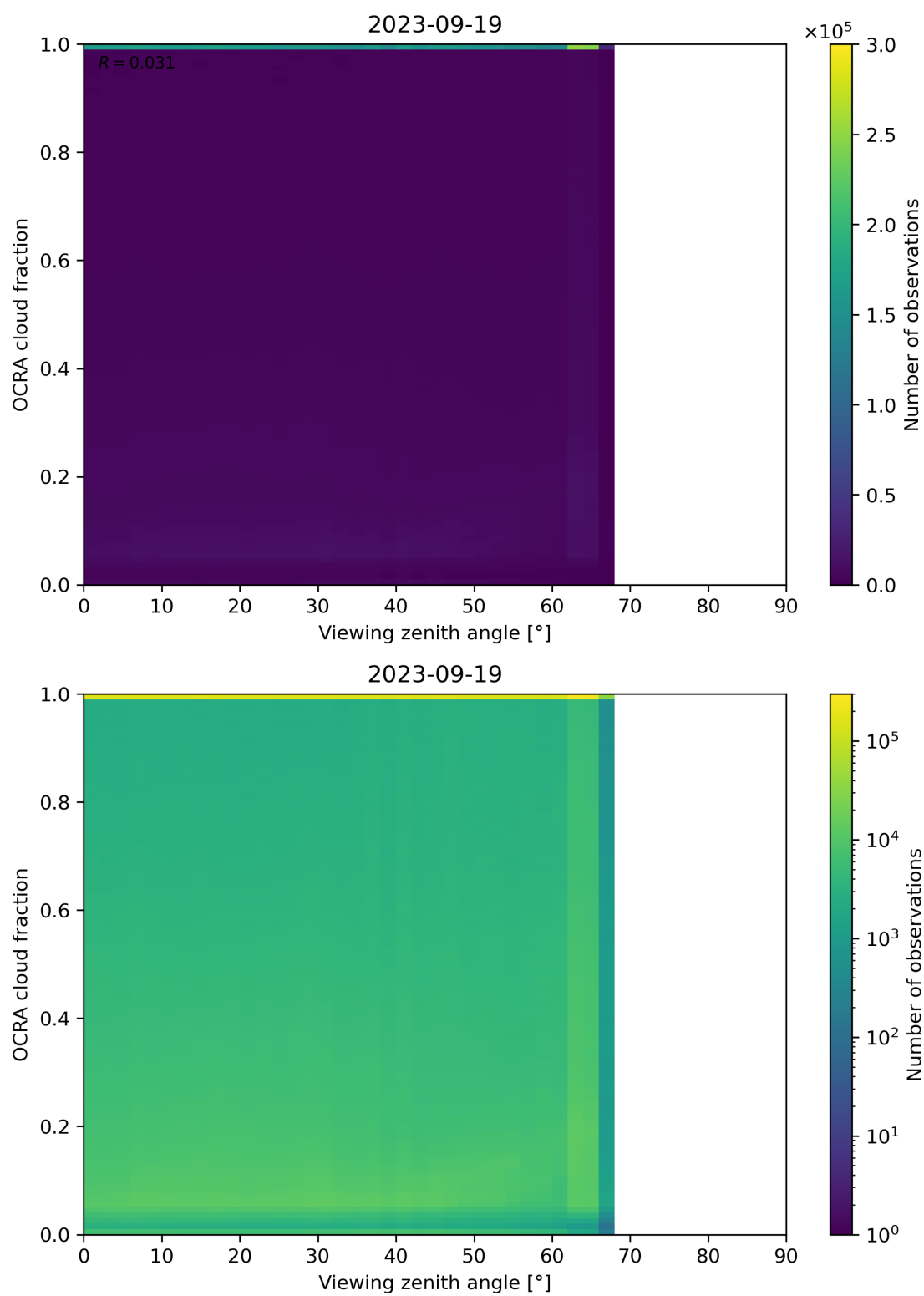


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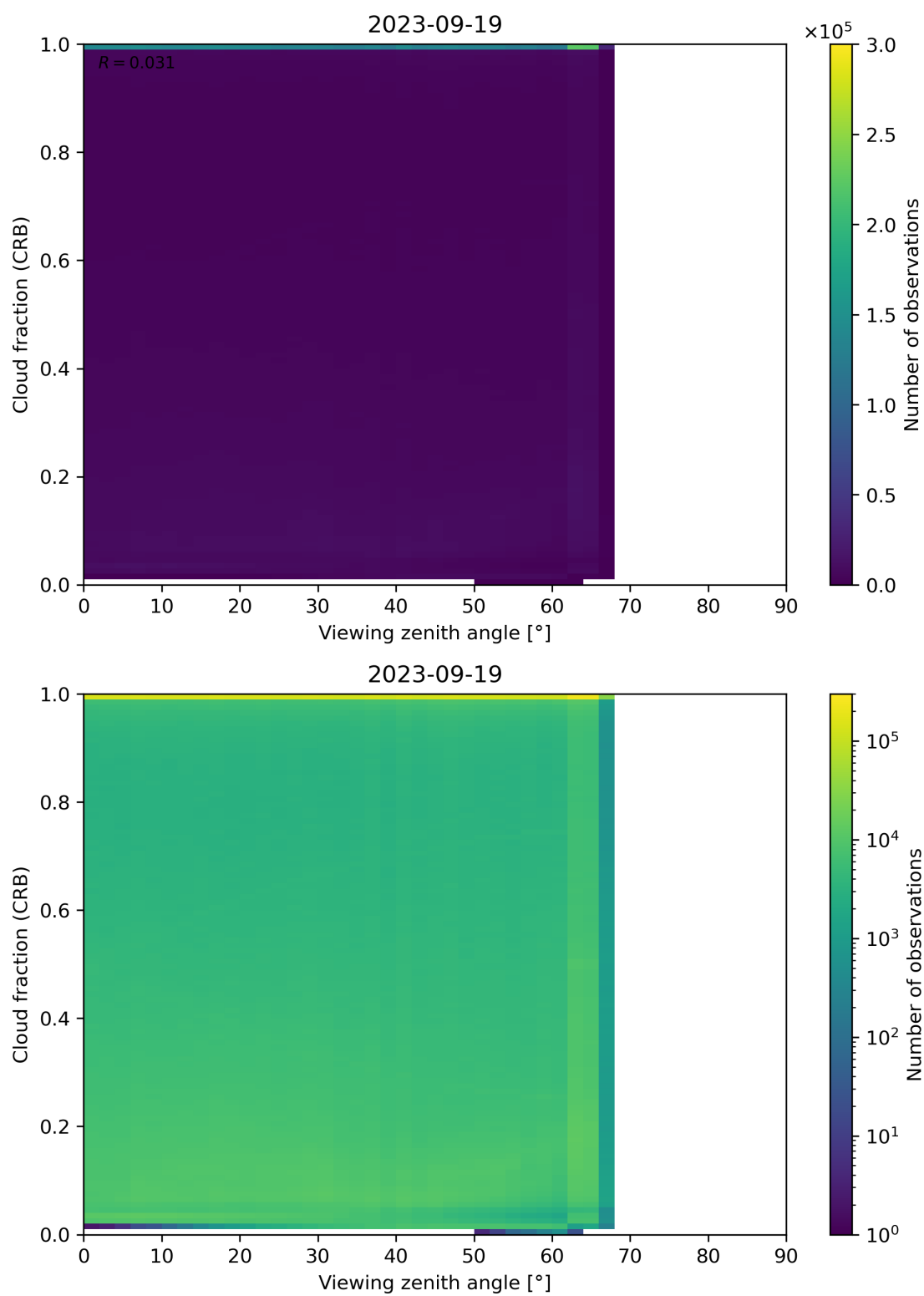


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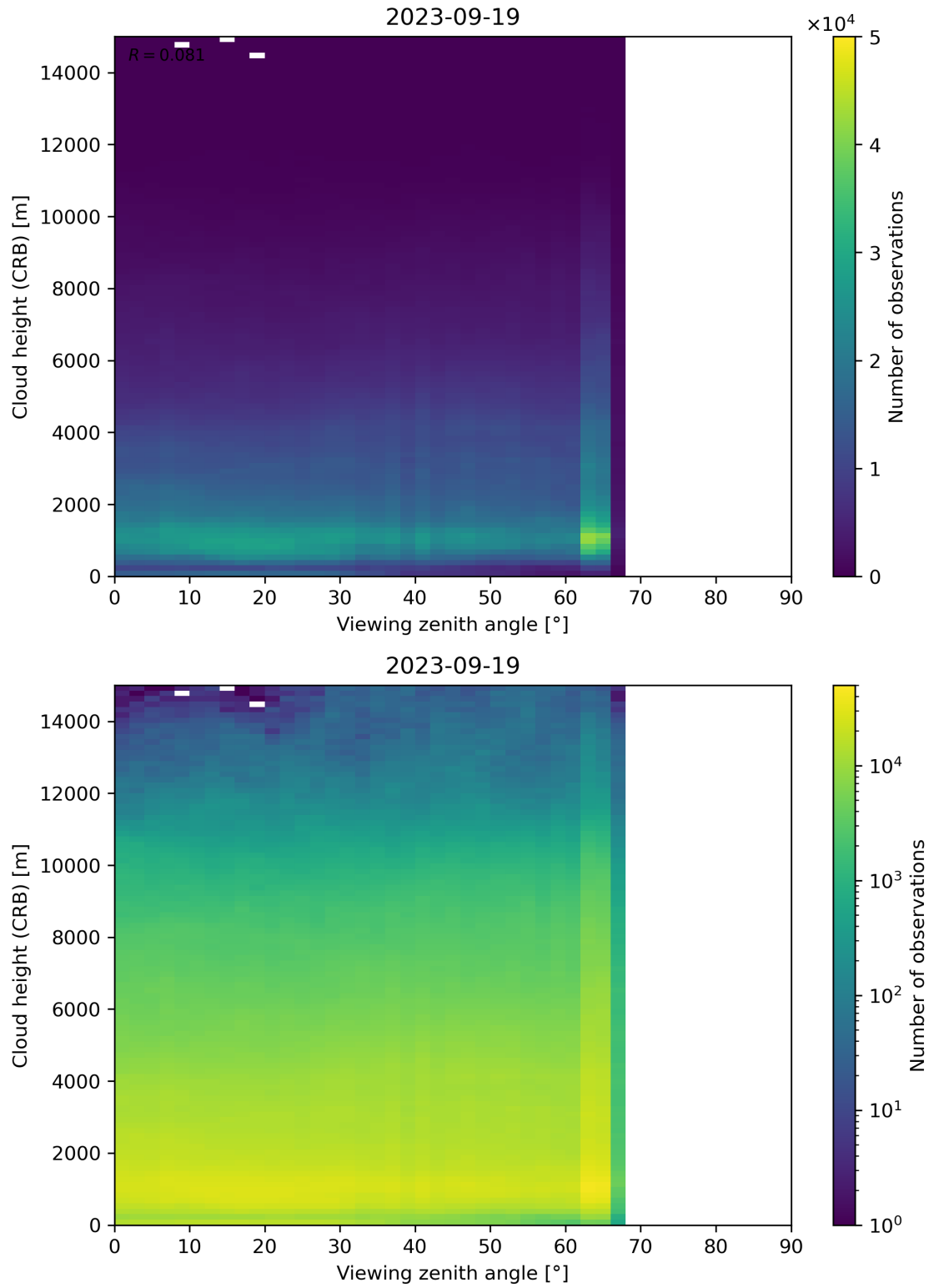


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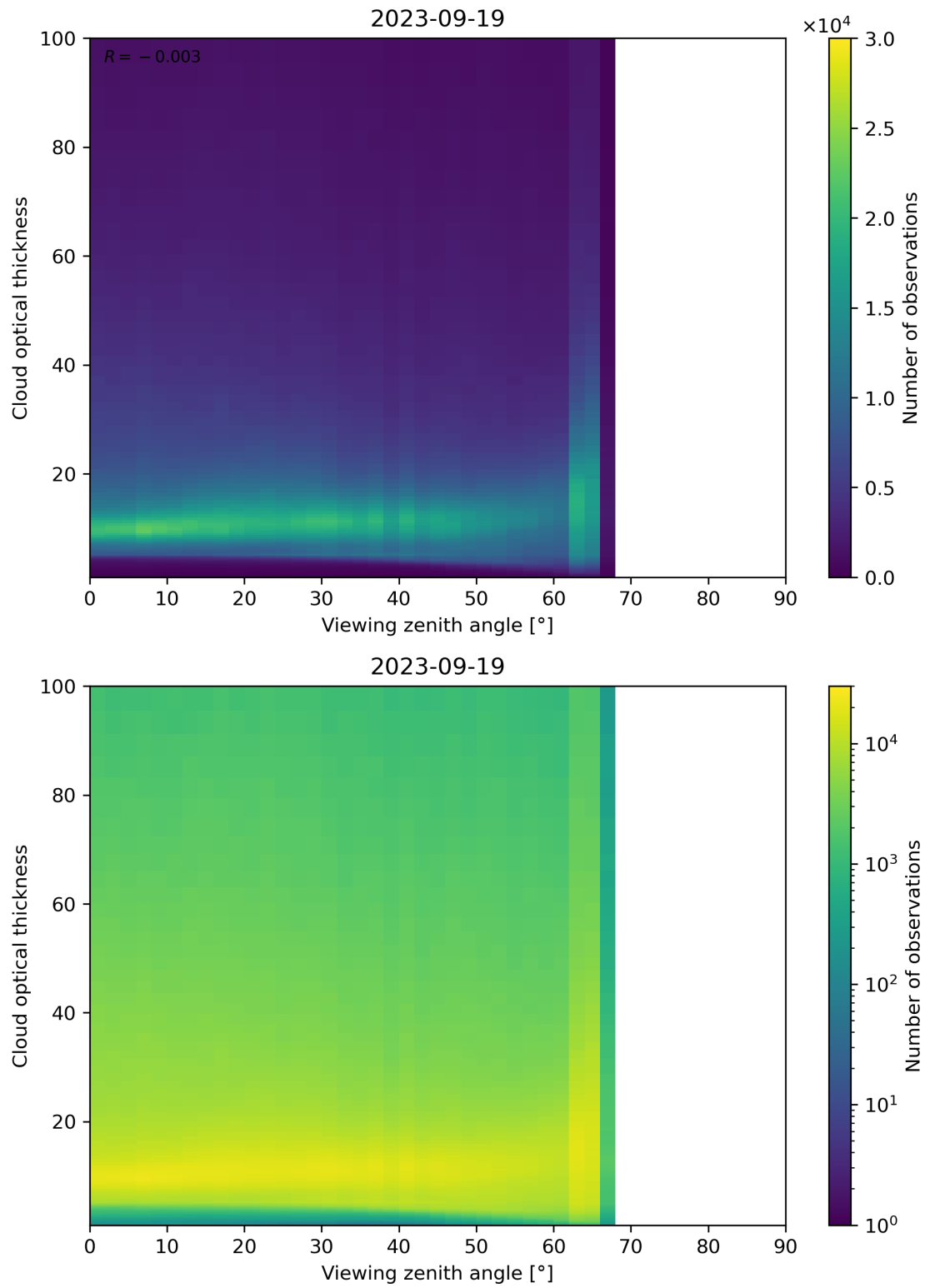


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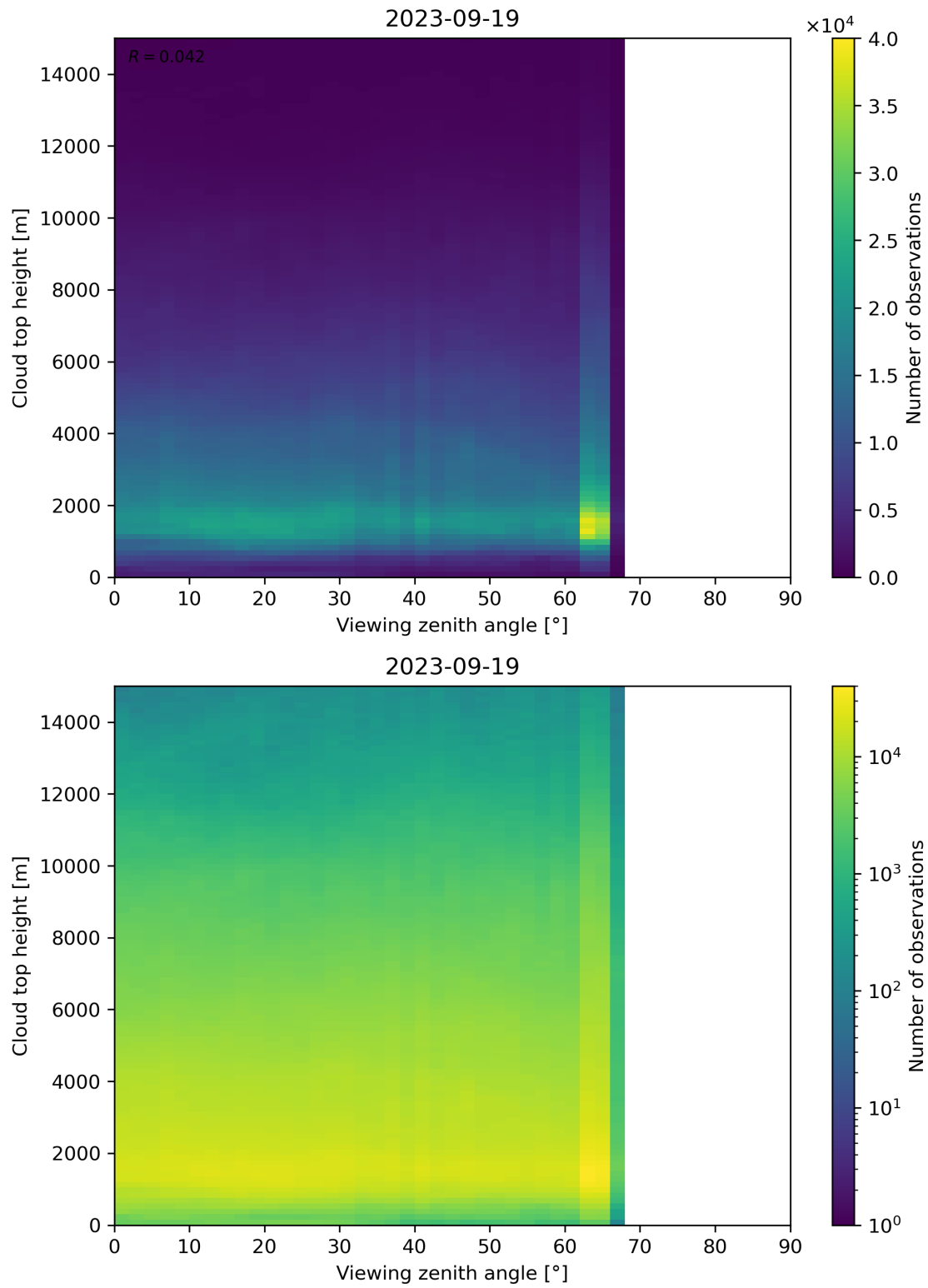


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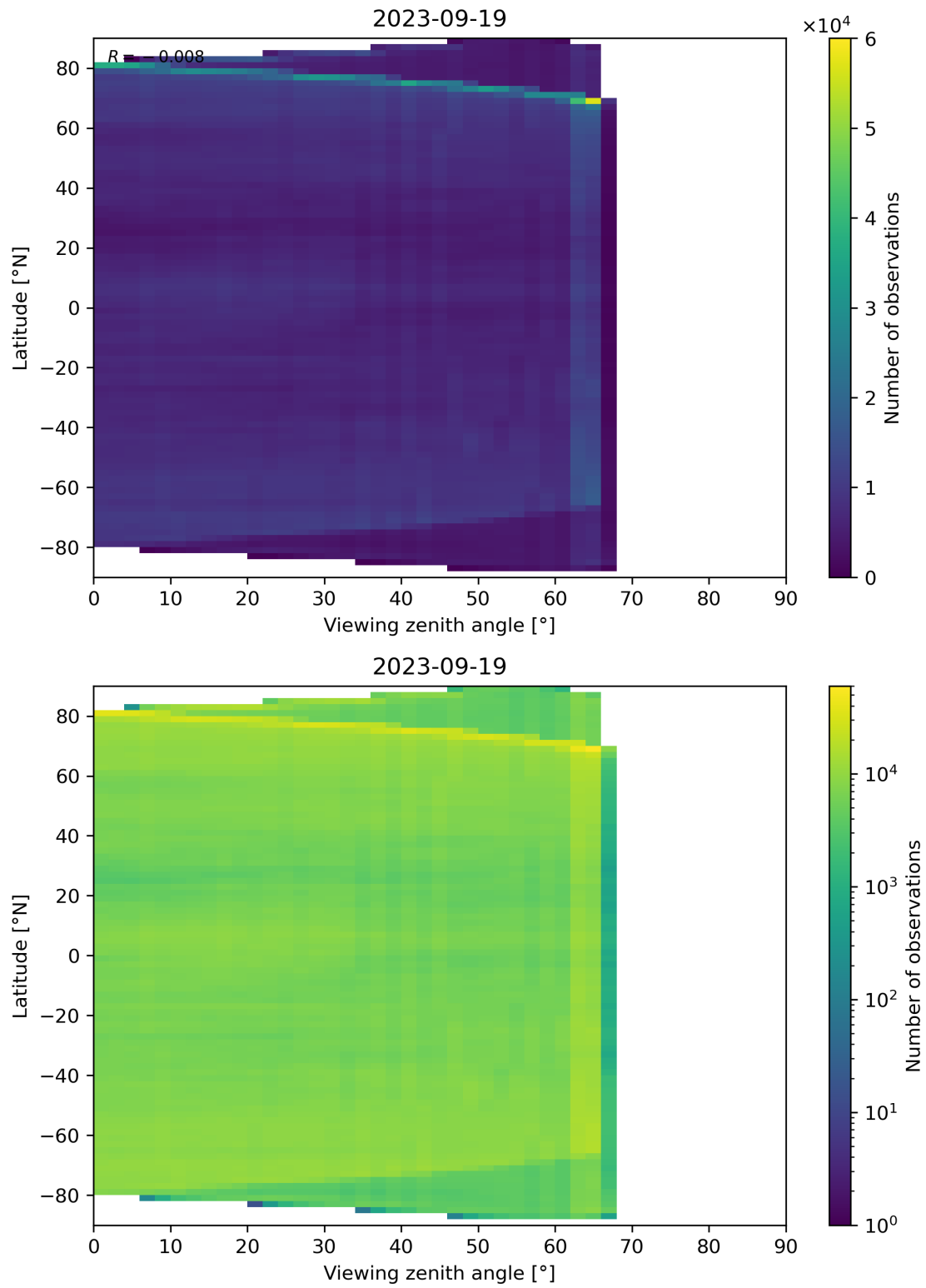


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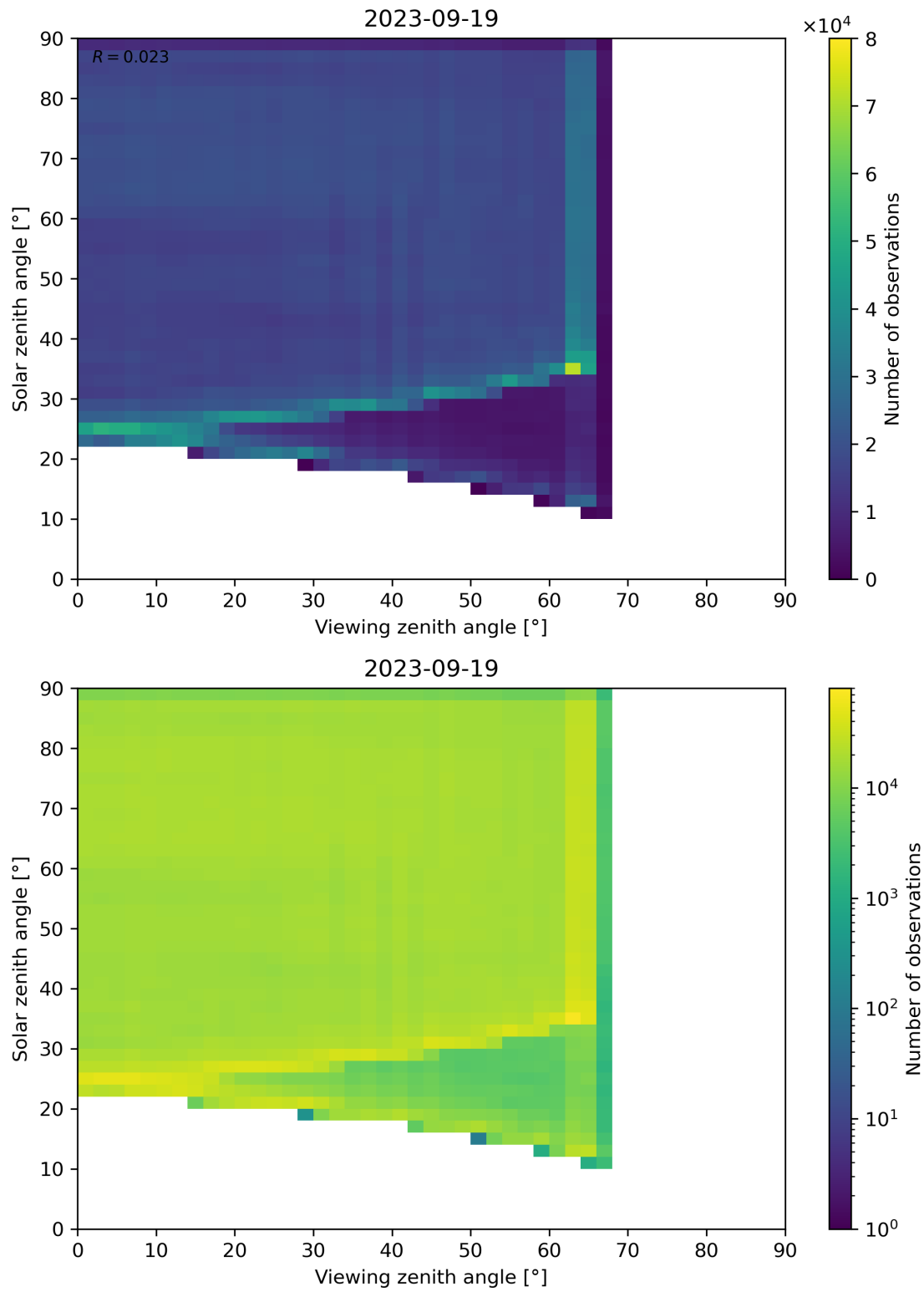


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