

PyCAMA report generated by tropl2-proc

tropl2-proc

2023-09-20 (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]	0.648 ± 0.384	19835206	0.995	0.670	0.880	0.0	1.000
cloud fraction [1]	0.559 ± 0.351	19835206	0.995	0.749	0.541	7.985×10^{-3}	1.000
cloud top height [m]	$(0.382 \pm 0.280) \times 10^4$	19835206	1.425×10^3	3.613×10^3	3.104×10^3	0.0	2.000×10^4
cloud optical thickness [1]	24.5 ± 42.6	19835206	10.7	13.2	11.8	1.000	250
cloud fraction crb [1]	0.558 ± 0.352	19835206	0.995	0.749	0.538	8.424×10^{-3}	1.000
cloud height crb [m]	$(0.302 \pm 0.233) \times 10^4$	19835206	975	3.195×10^3	2.433×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.615 ± 0.186	19835206	0.995	0.219	0.595	0.0	1.000
surface albedo fitted [1]	0.169 ± 0.221	19835206	1.500×10^{-2}	0.207	4.997×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.155 ± 0.208	19835206	1.500×10^{-2}	0.208	3.519×10^{-2}	0.0	1.000
fitted root mean square [1]	$(6.123 \pm 8.337) \times 10^{-4}$	19835206	5.000×10^{-5}	7.043×10^{-4}	3.589×10^{-4}	1.361×10^{-6}	0.706
fitted root mean square crb [1]	$(5.423 \pm 8.155) \times 10^{-4}$	19835206	5.000×10^{-5}	6.125×10^{-4}	2.780×10^{-4}	1.112×10^{-6}	0.823
wavelength shift [nm]	$(8.248 \pm 6.929) \times 10^{-3}$	19835206	6.900×10^{-3}	9.371×10^{-3}	7.779×10^{-3}	-5.023×10^{-2}	0.352
cloud fraction apriori [1]	0.561 ± 0.358	19835206	0.995	0.790	0.543	0.0	1.000
reflectance blue ocra [1]	0.529 ± 0.206	19835206	0.295	0.326	0.503	0.132	1.94
reflectance green ocra [1]	0.477 ± 0.232	19835206	0.195	0.391	0.452	7.700×10^{-2}	1.85
reflectance continuum aband [1]	0.436 ± 0.257	19835206	4.500×10^{-2}	0.403	0.423	1.177×10^{-2}	4.95

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	0.0	0.0	0.0	2.000×10^{-2}	0.300	0.970	1.000	1.000	1.000	1.000
cloud fraction [1]	2.375×10^{-2}	6.059×10^{-2}	9.557×10^{-2}	0.139	0.219	0.968	1.000	1.000	1.000	1.000
cloud top height [m]	205	647	979	1.275×10^3	1.677×10^3	5.290×10^3	6.605×10^3	7.800×10^3	9.353×10^3	1.250×10^4
cloud optical thickness [1]	1.81	3.77	4.86	5.84	7.49	20.7	30.4	45.7	87.5	250
cloud fraction crb [1]	2.347×10^{-2}	5.967×10^{-2}	9.481×10^{-2}	0.138	0.218	0.966	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	304	576	814	1.157×10^3	4.352×10^3	5.454×10^3	6.453×10^3	7.698×10^3	9.757×10^3
cloud albedo crb [1]	0.134	0.325	0.412	0.458	0.503	0.722	0.803	0.884	1.000	1.000
surface albedo fitted [1]	0.0	9.188×10^{-3}	1.352×10^{-2}	1.735×10^{-2}	2.315×10^{-2}	0.230	0.353	0.570	0.689	0.867
surface albedo fitted crb [1]	8.919×10^{-4}	6.877×10^{-3}	9.842×10^{-3}	1.257×10^{-2}	1.663×10^{-2}	0.225	0.345	0.534	0.631	0.806
fitted root mean square [1]	1.613×10^{-5}	3.342×10^{-5}	5.520×10^{-5}	8.431×10^{-5}	1.365×10^{-4}	8.408×10^{-4}	1.175×10^{-3}	1.509×10^{-3}	2.011×10^{-3}	3.175×10^{-3}
fitted root mean square crb [1]	8.746×10^{-6}	2.338×10^{-5}	4.115×10^{-5}	6.282×10^{-5}	1.028×10^{-4}	7.153×10^{-4}	1.064×10^{-3}	1.431×10^{-3}	1.953×10^{-3}	3.089×10^{-3}
wavelength shift [nm]	-7.722×10^{-3}	-7.767×10^{-4}	3.123×10^{-4}	1.466×10^{-3}	3.290×10^{-3}	1.266×10^{-2}	1.504×10^{-2}	1.716×10^{-2}	2.000×10^{-2}	2.624×10^{-2}
cloud fraction apriori [1]	1.501×10^{-2}	5.751×10^{-2}	8.816×10^{-2}	0.129	0.210	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.228	0.256	0.281	0.309	0.355	0.681	0.753	0.807	0.878	1.05
reflectance green ocra [1]	0.150	0.173	0.194	0.220	0.266	0.657	0.737	0.796	0.867	1.02
reflectance continuum aband [1]	3.185×10^{-2}	5.861×10^{-2}	9.422×10^{-2}	0.142	0.226	0.629	0.714	0.780	0.858	1.02

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]	0.651 ± 0.378	11114223	0.650	0.860	0.0	1.000	0.300	0.950
cloud fraction [1]	0.584 ± 0.355	11114223	0.764	0.595	7.995×10^{-3}	1.000	0.232	0.996
cloud top height [m]	$(0.394 \pm 0.270) \times 10^4$	11114223	3.735×10^3	3.406×10^3	0.0	2.000×10^4	1.792×10^3	5.526×10^3
cloud optical thickness [1]	22.2 ± 36.4	11114223	12.9	11.7	1.000	250	7.55	20.4
cloud fraction crb [1]	0.583 ± 0.356	11114223	0.765	0.593	8.424×10^{-3}	1.000	0.230	0.995
cloud height crb [m]	$(0.314 \pm 0.228) \times 10^4$	11114223	3.224×10^3	2.733×10^3	0.0	2.000×10^4	1.278×10^3	4.502×10^3
cloud albedo crb [1]	0.606 ± 0.179	11114223	0.217	0.595	0.0	1.000	0.499	0.716
surface albedo fitted [1]	0.169 ± 0.196	11114223	0.213	7.855×10^{-2}	0.0	1.000	2.586×10^{-2}	0.239
surface albedo fitted crb [1]	0.159 ± 0.191	11114223	0.215	5.962×10^{-2}	0.0	1.000	1.875×10^{-2}	0.233
fitted root mean square [1]	$(6.628 \pm 9.624) \times 10^{-4}$	11114223	7.636×10^{-4}	3.826×10^{-4}	1.361×10^{-6}	0.706	1.464×10^{-4}	9.099×10^{-4}
fitted root mean square crb [1]	$(6.253 \pm 9.654) \times 10^{-4}$	11114223	7.556×10^{-4}	3.252×10^{-4}	1.112×10^{-6}	0.823	1.146×10^{-4}	8.701×10^{-4}
wavelength shift [nm]	$(8.280 \pm 6.762) \times 10^{-3}$	11114223	9.024×10^{-3}	7.871×10^{-3}	-5.023×10^{-2}	0.352	3.532×10^{-3}	1.256×10^{-2}
cloud fraction apriori [1]	0.586 ± 0.361	11114223	0.777	0.599	0.0	1.000	0.223	1.000
reflectance blue ocra [1]	0.515 ± 0.198	11114223	0.313	0.494	0.132	1.88	0.347	0.660
reflectance green ocra [1]	0.465 ± 0.222	11114223	0.376	0.444	7.700×10^{-2}	1.81	0.261	0.637
reflectance continuum aband [1]	0.440 ± 0.246	11114223	0.373	0.424	1.177×10^{-2}	4.95	0.246	0.619

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]	0.644 ± 0.392	8720983	0.690	0.900	0.0	1.000	0.300	0.990
cloud fraction [1]	0.528 ± 0.344	8720983	0.696	0.482	7.985×10^{-3}	1.000	0.206	0.902
cloud top height [m]	$(0.368 \pm 0.292) \times 10^4$	8720983	3.342×10^3	2.741×10^3	0.0	2.000×10^4	1.587×10^3	4.930×10^3
cloud optical thickness [1]	27.3 ± 49.3	8720983	13.7	11.9	1.000	250	7.41	21.1
cloud fraction crb [1]	0.527 ± 0.343	8720983	0.695	0.479	8.498×10^{-3}	1.000	0.205	0.900
cloud height crb [m]	$(0.287 \pm 0.239) \times 10^4$	8720983	3.031×10^3	2.061×10^3	0.0	2.000×10^4	1.063×10^3	4.094×10^3
cloud albedo crb [1]	0.627 ± 0.194	8720983	0.224	0.596	0.0	1.000	0.507	0.731
surface albedo fitted [1]	0.169 ± 0.249	8720983	0.177	3.730×10^{-2}	0.0	1.000	2.108×10^{-2}	0.198
surface albedo fitted crb [1]	0.150 ± 0.227	8720983	0.176	2.609×10^{-2}	0.0	1.000	1.498×10^{-2}	0.191
fitted root mean square [1]	$(5.480 \pm 6.268) \times 10^{-4}$	8720983	6.398×10^{-4}	3.323×10^{-4}	1.796×10^{-6}	4.963×10^{-2}	1.241×10^{-4}	7.639×10^{-4}
fitted root mean square crb [1]	$(4.365 \pm 5.520) \times 10^{-4}$	8720983	4.628×10^{-4}	2.367×10^{-4}	2.894×10^{-6}	3.447×10^{-2}	9.138×10^{-5}	5.542×10^{-4}
wavelength shift [nm]	$(8.207 \pm 7.136) \times 10^{-3}$	8720983	9.801×10^{-3}	7.646×10^{-3}	-4.859×10^{-2}	6.415×10^{-2}	3.002×10^{-3}	1.280×10^{-2}
cloud fraction apriori [1]	0.529 ± 0.351	8720983	0.731	0.482	0.0	1.000	0.197	0.927
reflectance blue ocra [1]	0.547 ± 0.215	8720983	0.346	0.516	0.160	1.94	0.365	0.711
reflectance green ocra [1]	0.491 ± 0.243	8720983	0.414	0.463	9.026×10^{-2}	1.85	0.272	0.686
reflectance continuum aband [1]	0.432 ± 0.270	8720983	0.444	0.421	1.279×10^{-2}	4.63	0.197	0.641

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]	0.660 ± 0.373	14310116	0.610	0.880	0.0	1.000	0.350	0.960
cloud fraction [1]	0.564 ± 0.350	14310116	0.744	0.553	7.985×10^{-3}	1.000	0.224	0.968
cloud top height [m]	$(0.369 \pm 0.266) \times 10^4$	14310116	3.452×10^3	2.990×10^3	0.0	2.000×10^4	1.642×10^3	5.094×10^3
cloud optical thickness [1]	26.2 ± 44.3	14310116	13.9	12.7	1.000	250	8.35	22.2
cloud fraction crb [1]	0.562 ± 0.351	14310116	0.744	0.550	8.498×10^{-3}	1.000	0.222	0.966
cloud height crb [m]	$(0.290 \pm 0.226) \times 10^4$	14310116	3.101×10^3	2.308×10^3	0.0	2.000×10^4	1.098×10^3	4.199×10^3
cloud albedo crb [1]	0.606 ± 0.179	14310116	0.206	0.587	0.0	1.000	0.499	0.705
surface albedo fitted [1]	0.114 ± 0.198	14310116	4.384×10^{-2}	3.188×10^{-2}	0.0	1.000	1.879×10^{-2}	6.263×10^{-2}
surface albedo fitted crb [1]	0.100 ± 0.184	14310116	3.092×10^{-2}	2.261×10^{-2}	0.0	1.000	1.355×10^{-2}	4.447×10^{-2}
fitted root mean square [1]	$(5.240 \pm 8.216) \times 10^{-4}$	14310116	5.954×10^{-4}	2.715×10^{-4}	1.361×10^{-6}	0.706	1.051×10^{-4}	7.005×10^{-4}
fitted root mean square crb [1]	$(4.627 \pm 8.218) \times 10^{-4}$	14310116	4.818×10^{-4}	2.096×10^{-4}	1.112×10^{-6}	0.823	8.279×10^{-5}	5.646×10^{-4}
wavelength shift [nm]	$(7.986 \pm 7.109) \times 10^{-3}$	14310116	9.564×10^{-3}	7.359×10^{-3}	-5.023×10^{-2}	0.352	2.916×10^{-3}	1.248×10^{-2}
cloud fraction apriori [1]	0.564 ± 0.357	14310116	0.786	0.554	0.0	1.000	0.214	1.000
reflectance blue ocra [1]	0.525 ± 0.193	14310116	0.307	0.505	0.166	1.94	0.362	0.669
reflectance green ocra [1]	0.469 ± 0.219	14310116	0.372	0.452	9.252×10^{-2}	1.84	0.269	0.641
reflectance continuum aband [1]	0.404 ± 0.257	14310116	0.433	0.396	1.189×10^{-2}	4.95	0.169	0.602

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]	0.571 ± 0.424	3759627	0.940	0.820	0.0	1.000	1.000×10^{-2}	0.950
cloud fraction [1]	0.505 ± 0.348	3759627	0.714	0.427	8.277×10^{-3}	1.000	0.182	0.896
cloud top height [m]	$(0.460 \pm 0.336) \times 10^4$	3759627	4.401×10^3	3.856×10^3	0.0	2.000×10^4	2.023×10^3	6.424×10^3
cloud optical thickness [1]	19.3 ± 38.8	3759627	9.40	8.85	1.000	250	5.55	15.0
cloud fraction crb [1]	0.504 ± 0.348	3759627	0.713	0.426	8.424×10^{-3}	1.000	0.182	0.895
cloud height crb [m]	$(0.364 \pm 0.264) \times 10^4$	3759627	3.763×10^3	3.000×10^3	0.0	2.000×10^4	1.530×10^3	5.293×10^3
cloud albedo crb [1]	0.657 ± 0.208	3759627	0.281	0.638	0.0	1.000	0.524	0.805
surface albedo fitted [1]	0.364 ± 0.231	3759627	0.229	0.262	0.0	1.000	0.205	0.434
surface albedo fitted crb [1]	0.347 ± 0.212	3759627	0.223	0.256	4.907×10^{-3}	1.000	0.200	0.423
fitted root mean square [1]	$(9.218 \pm 8.363) \times 10^{-4}$	3759627	8.403×10^{-4}	6.936×10^{-4}	2.575×10^{-6}	0.155	3.761×10^{-4}	1.216×10^{-3}
fitted root mean square crb [1]	$(8.003 \pm 7.775) \times 10^{-4}$	3759627	8.078×10^{-4}	5.689×10^{-4}	2.890×10^{-6}	2.681×10^{-2}	2.692×10^{-4}	1.077×10^{-3}
wavelength shift [nm]	$(8.806 \pm 6.264) \times 10^{-3}$	3759627	8.518×10^{-3}	8.566×10^{-3}	-3.247×10^{-2}	5.908×10^{-2}	4.343×10^{-3}	1.286×10^{-2}
cloud fraction apriori [1]	0.511 ± 0.355	3759627	0.764	0.431	0.0	1.000	0.176	0.940
reflectance blue ocra [1]	0.549 ± 0.256	3759627	0.439	0.493	0.132	1.89	0.323	0.762
reflectance green ocra [1]	0.507 ± 0.278	3759627	0.506	0.452	7.700×10^{-2}	1.85	0.249	0.755
reflectance continuum aband [1]	0.537 ± 0.242	3759627	0.399	0.498	1.419×10^{-2}	4.29	0.330	0.729

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	2.404×10^{-2}	-1.283×10^{-2}	2.111×10^{-2}	5.738×10^{-2}	-1.882×10^{-2}	2.055×10^{-2}	9.397×10^{-2}	8.420×10^{-2}	1.913×10^{-2}
2.404×10^{-2}	1.000	-2.369×10^{-2}	0.210	2.940×10^{-2}	0.254	0.210	1.093×10^{-2}	0.185	0.209
-1.283×10^{-2}	-2.369×10^{-2}	1.000	0.112	-5.209×10^{-2}	-6.628×10^{-2}	0.112	-4.651×10^{-2}	-0.129	0.112
2.111×10^{-2}	0.210	0.112	1.000	-9.423×10^{-2}	0.230	1.000	-2.222×10^{-2}	0.143	0.991
5.738×10^{-2}	2.940×10^{-2}	-5.209×10^{-2}	-9.423×10^{-2}	1.000	0.106	-9.377×10^{-2}	0.954	0.225	-9.860×10^{-2}
-1.882×10^{-2}	0.254	-6.628×10^{-2}	0.230	0.106	1.000	0.225	0.129	0.487	0.230
2.055×10^{-2}	0.210	0.112	1.000	-9.377×10^{-2}	0.225	1.000	-2.192×10^{-2}	0.142	0.991
9.397×10^{-2}	1.093×10^{-2}	-4.651×10^{-2}	-2.222×10^{-2}	0.954	0.129	-2.192×10^{-2}	1.000	0.168	-2.652×10^{-2}
8.420×10^{-2}	0.185	-0.129	0.143	0.225	0.487	0.142	0.168	1.000	0.151
1.913×10^{-2}	0.209	0.112	0.991	-9.860×10^{-2}	0.230	0.991	-2.652×10^{-2}	0.151	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
387	9.88	-13.0	0.146	3.163×10^3	-15.8	0.142	4.312×10^3	0.308	0.135
9.88	437	-25.4	1.54	1.722×10^3	226	1.54	533	0.720	1.57
-13.0	-25.4	2.635×10^3	2.02	-7.495×10^3	-145	2.02	-5.570×10^3	-1.23	2.06
0.146	1.54	2.02	0.123	-92.8	3.44	0.123	-18.2	9.364×10^{-3}	0.125
3.163×10^3	1.722×10^3	-7.495×10^3	-92.8	7.857×10^6	1.262×10^4	-92.4	6.237×10^6	117	-98.9
-15.8	226	-145	3.44	1.262×10^4	1.818×10^3	3.38	1.284×10^4	3.86	3.51
0.142	1.54	2.02	0.123	-92.4	3.38	0.124	-18.0	9.266×10^{-3}	0.125
4.312×10^3	533	-5.570×10^3	-18.2	6.237×10^6	1.284×10^4	-18.0	5.443×10^6	72.7	-22.2
0.308	0.720	-1.23	9.364×10^{-3}	117	3.86	9.266×10^{-3}	72.7	3.460×10^{-2}	1.009×10^{-2}
0.135	1.57	2.06	0.125	-98.9	3.51	0.125	-22.2	1.009×10^{-2}	0.128

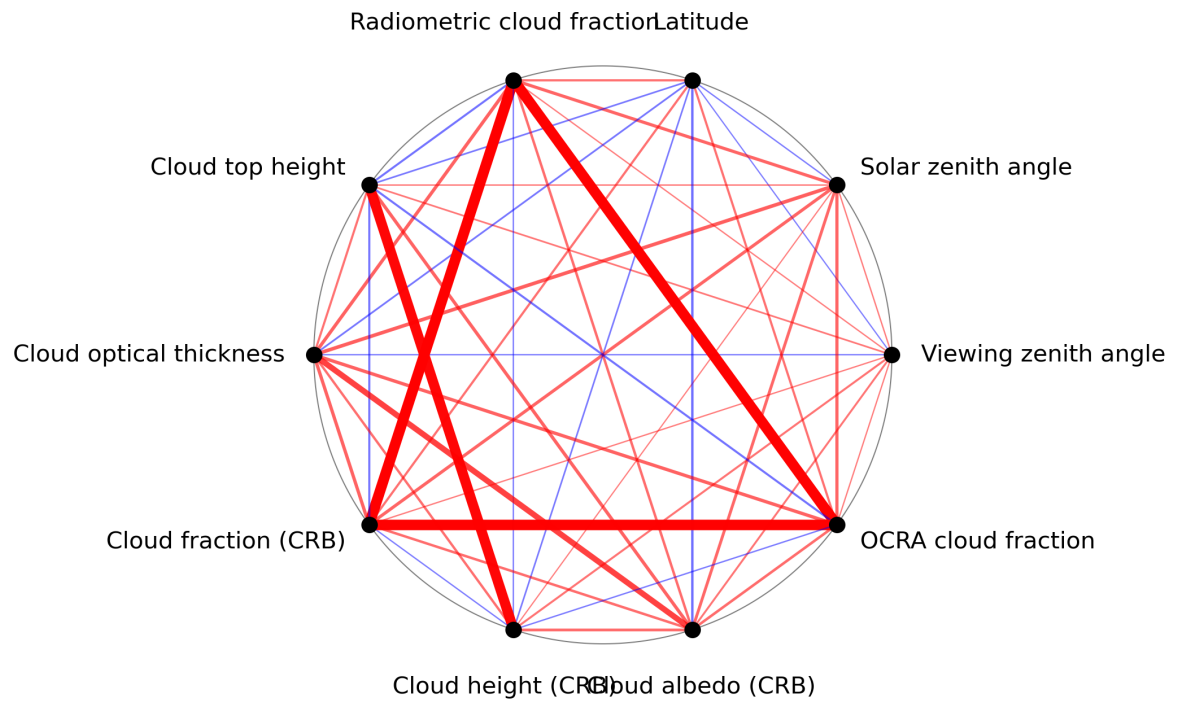


Figure 1: Map of correlation graph for 2023-09-05 to 2023-09-06.

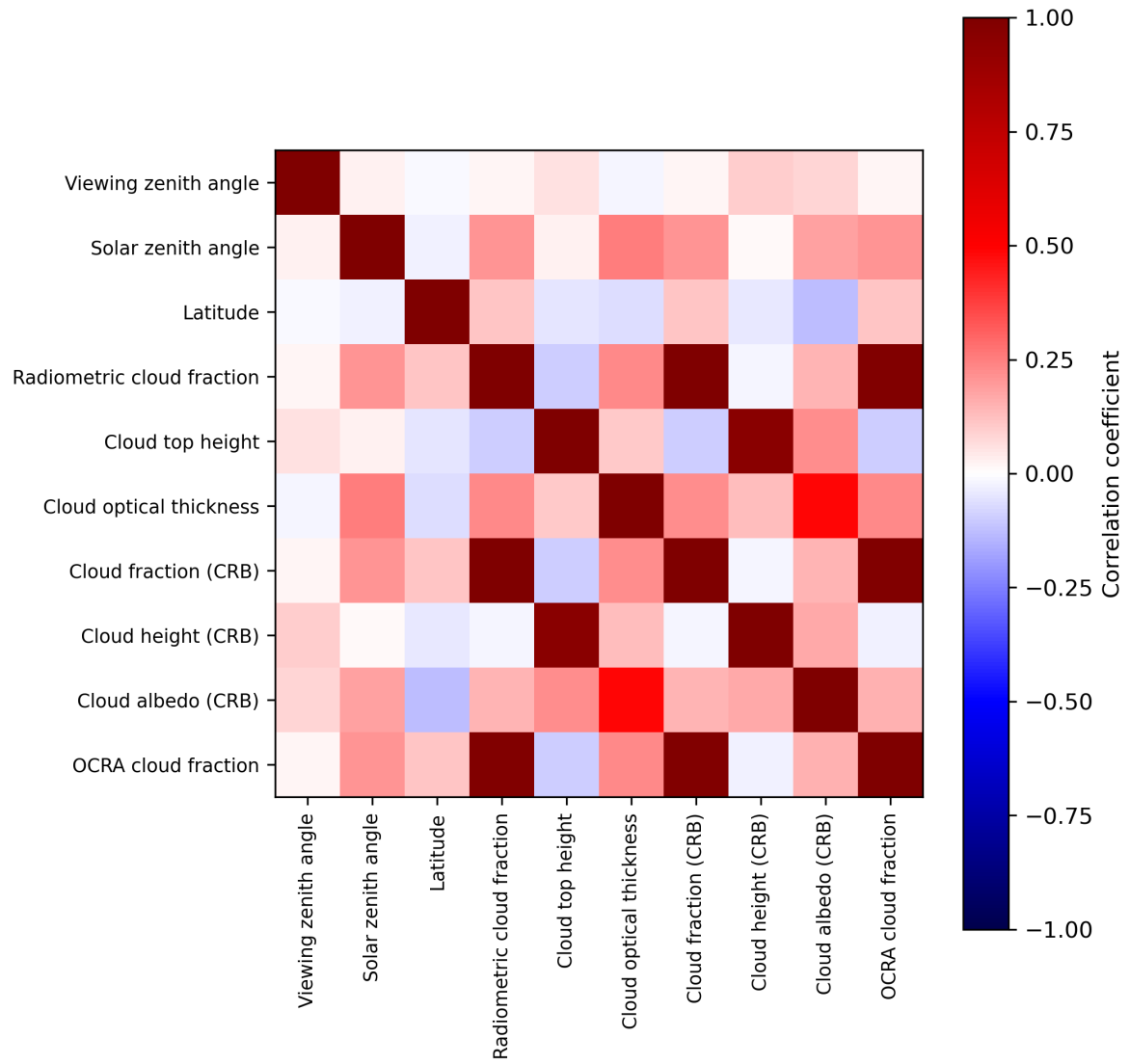


Figure 2: Map of correlation matrix for 2023-09-05 to 2023-09-06.

3 Granule outlines

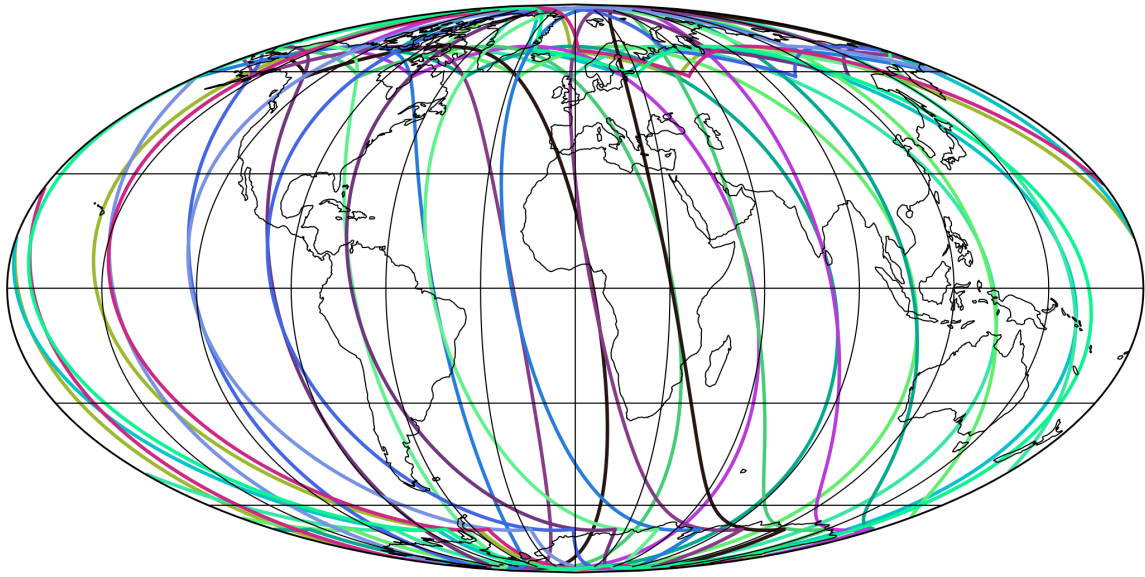


Figure 3: Outline of the granules.

4 Input data monitoring

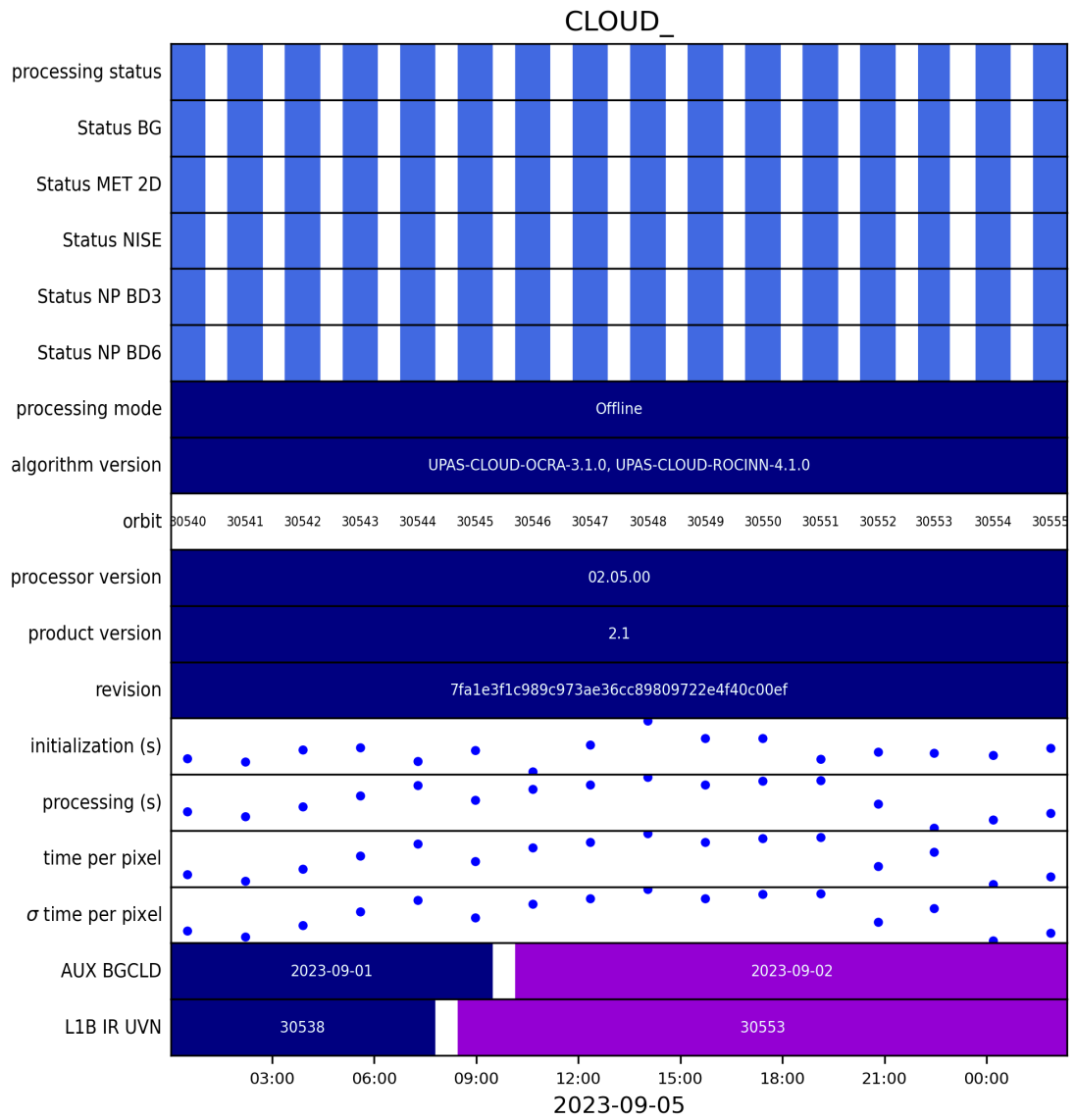


Figure 4: Input data per granule

5 Warnings and errors

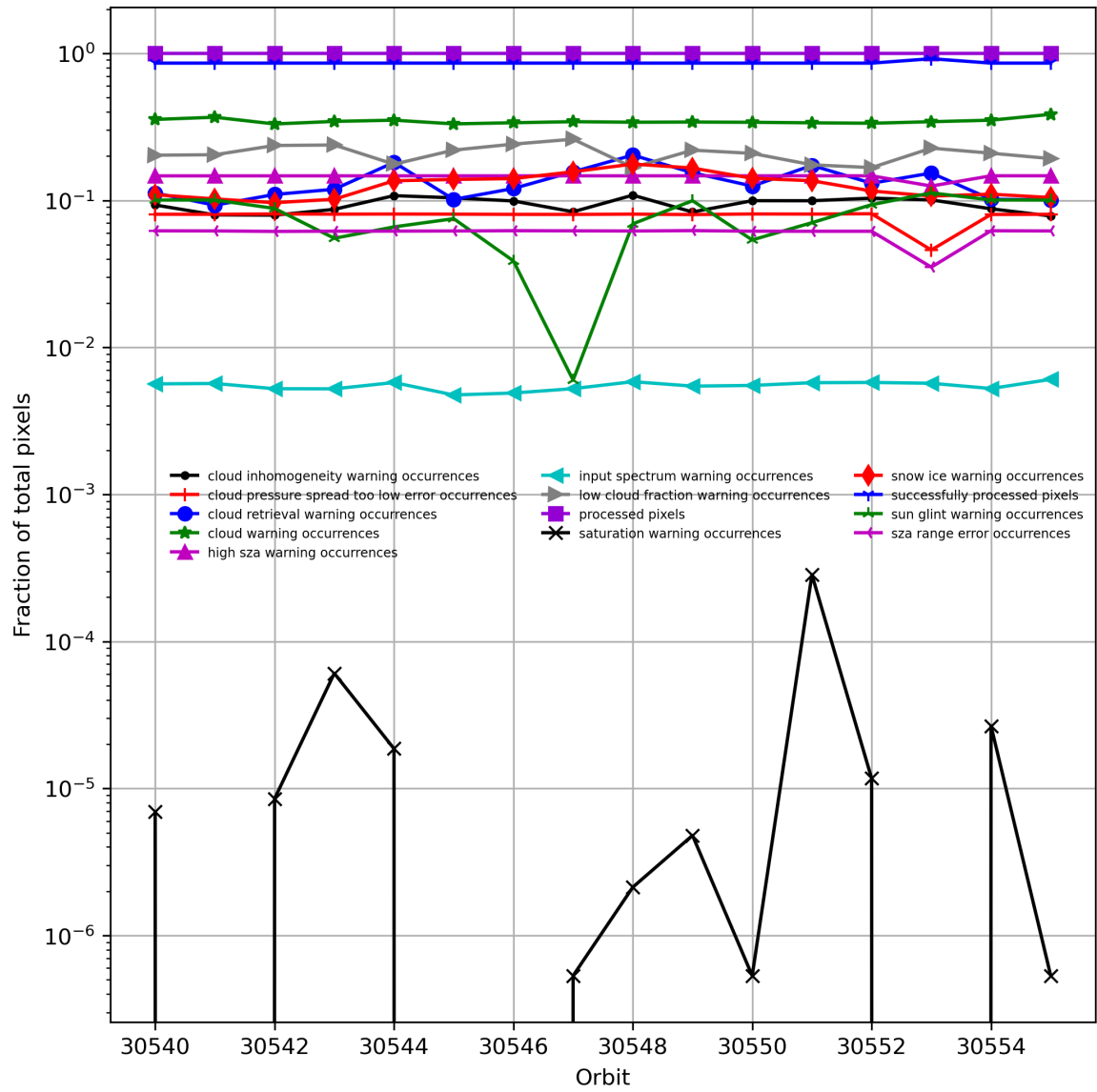


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

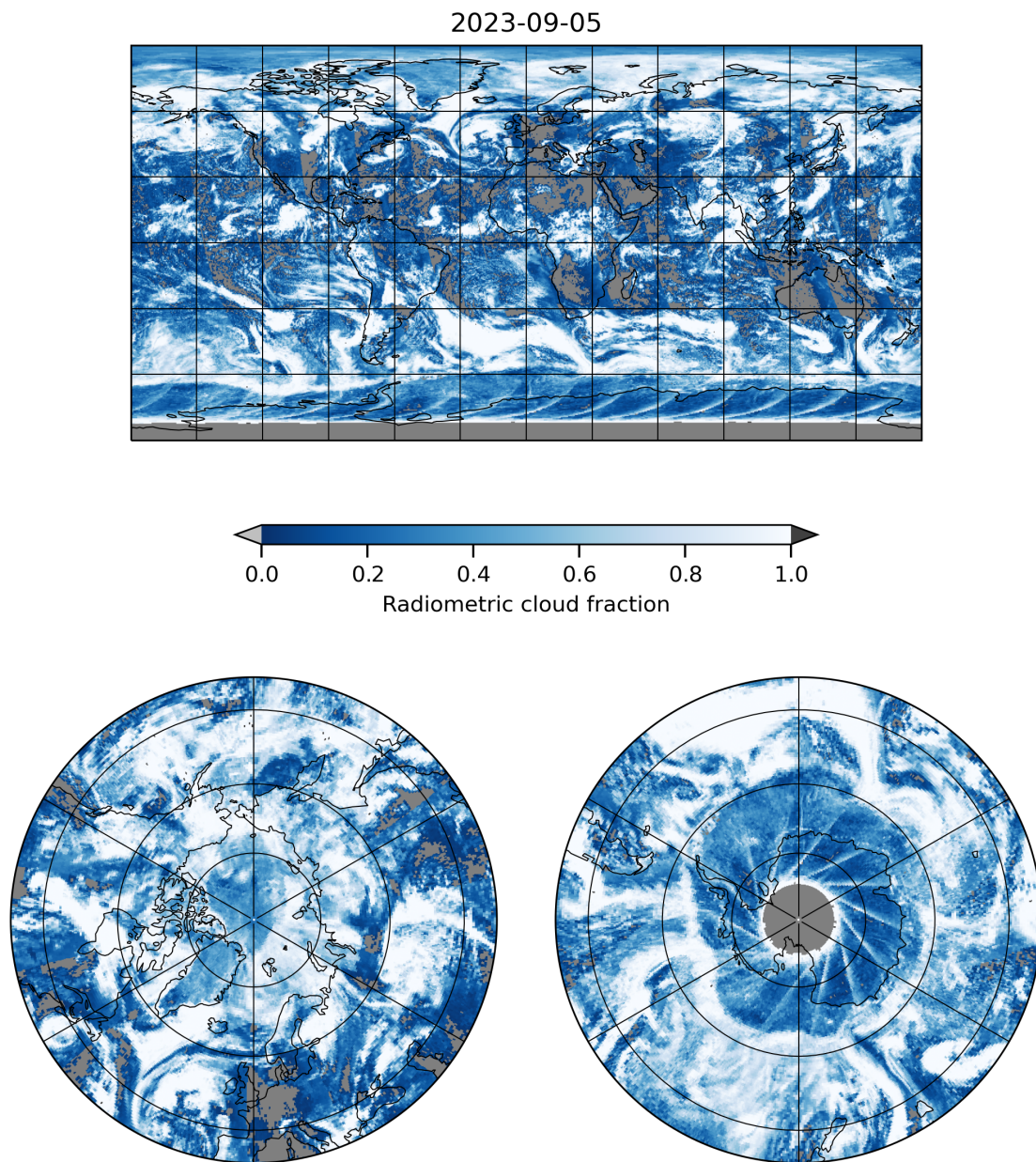


Figure 6: Map of “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06

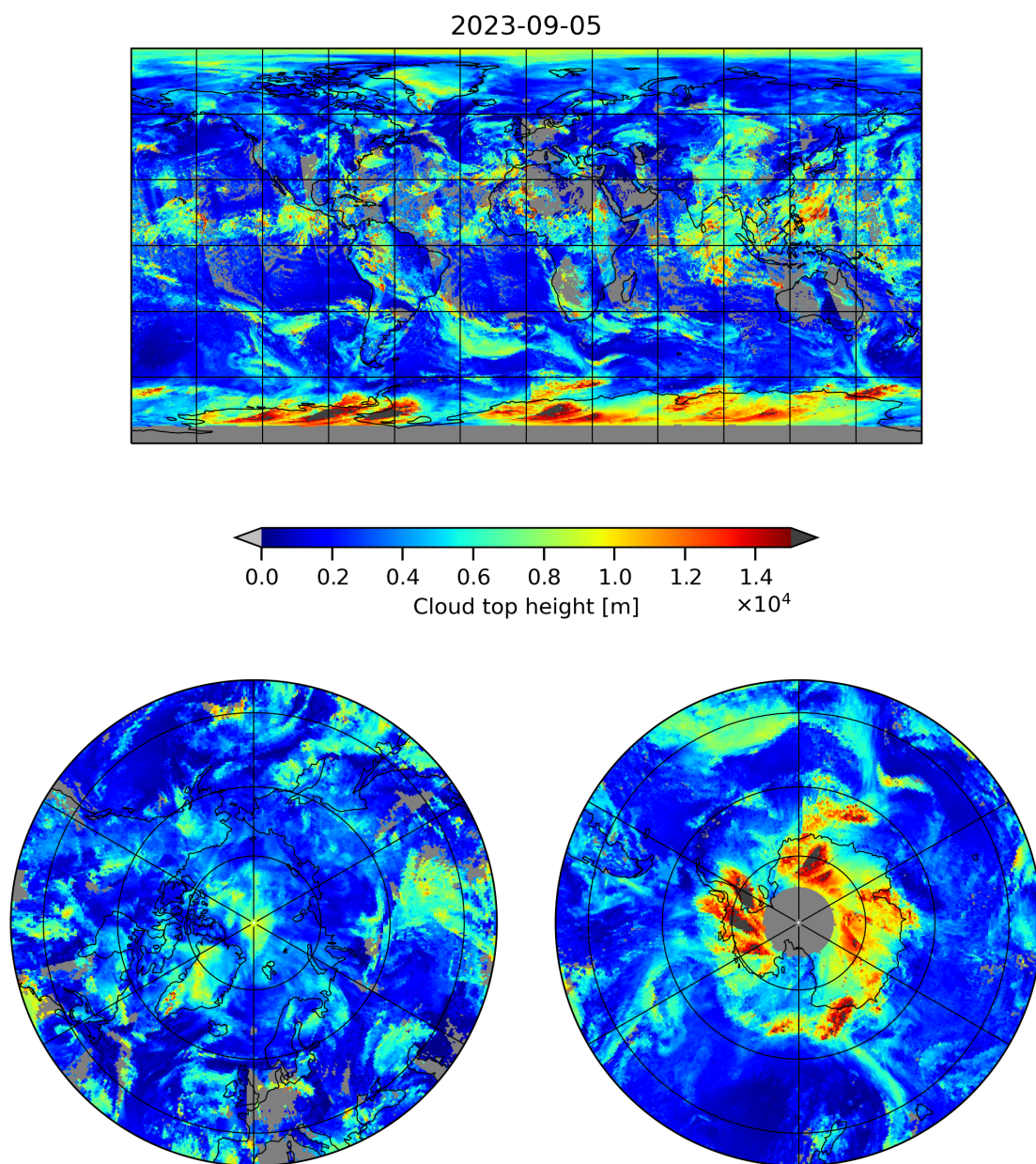


Figure 7: Map of “Cloud top height” for 2023-09-05 to 2023-09-06

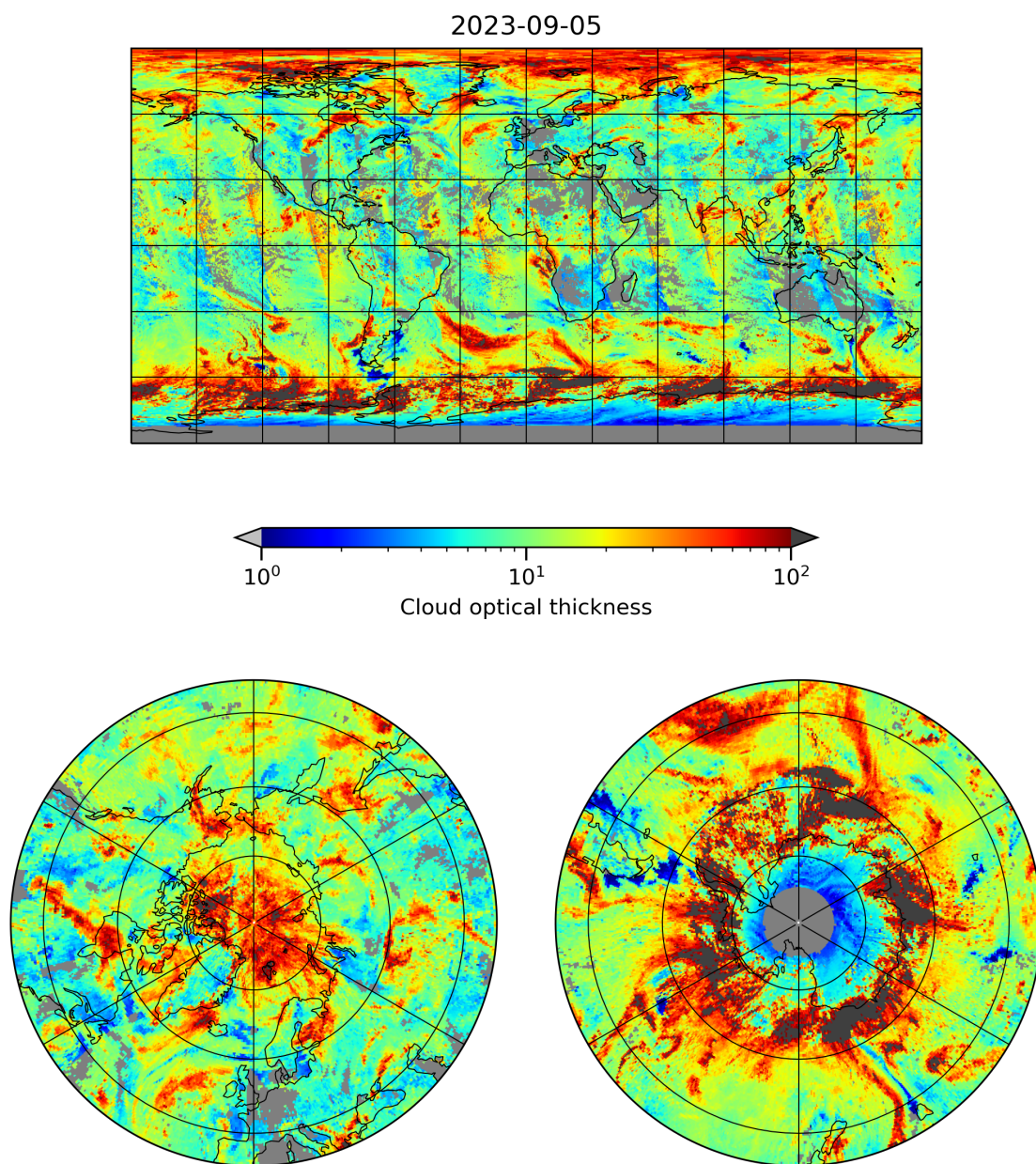


Figure 8: Map of “Cloud optical thickness” for 2023-09-05 to 2023-09-06

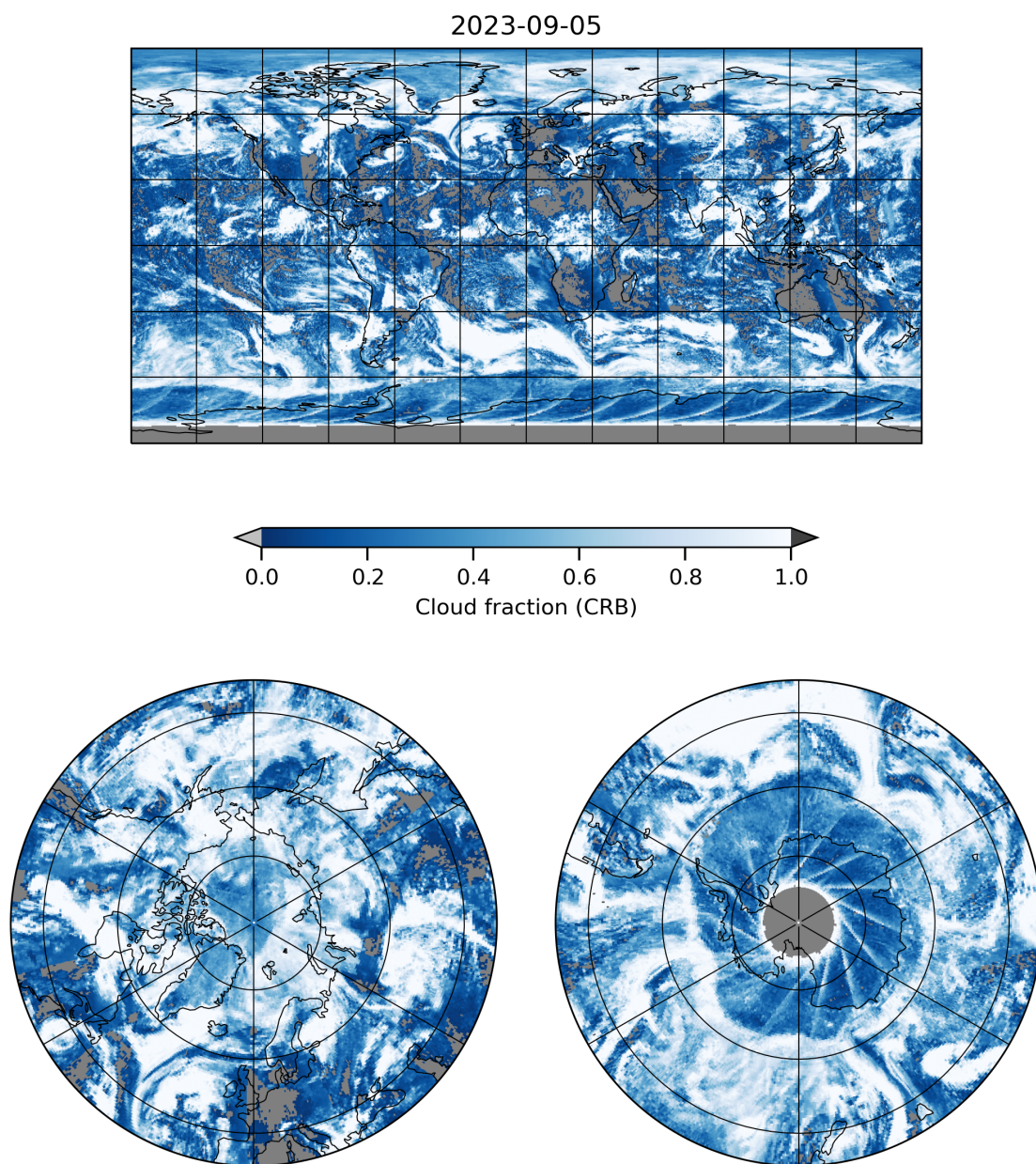


Figure 9: Map of “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06

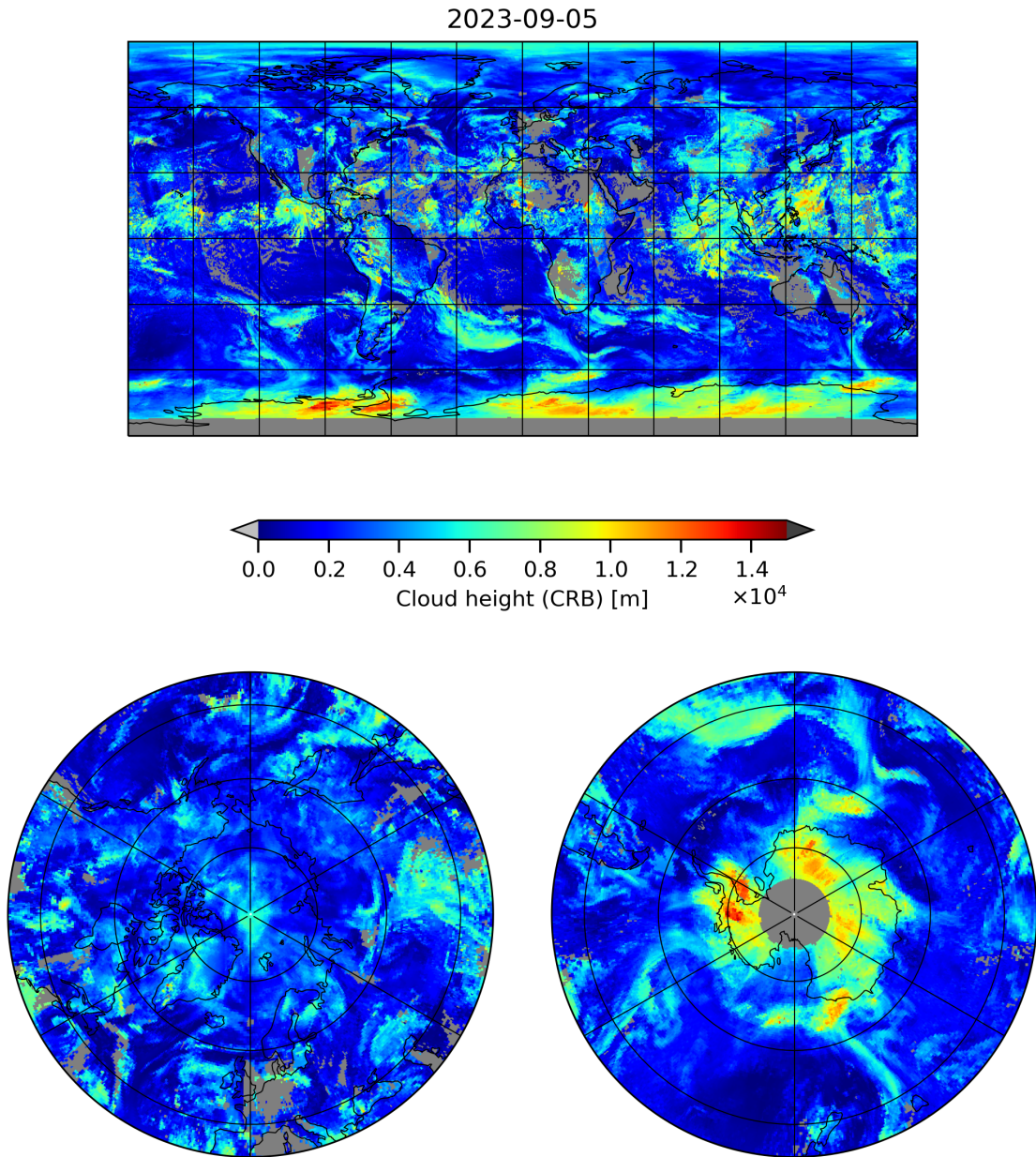


Figure 10: Map of “Cloud height (CRB)” for 2023-09-05 to 2023-09-06

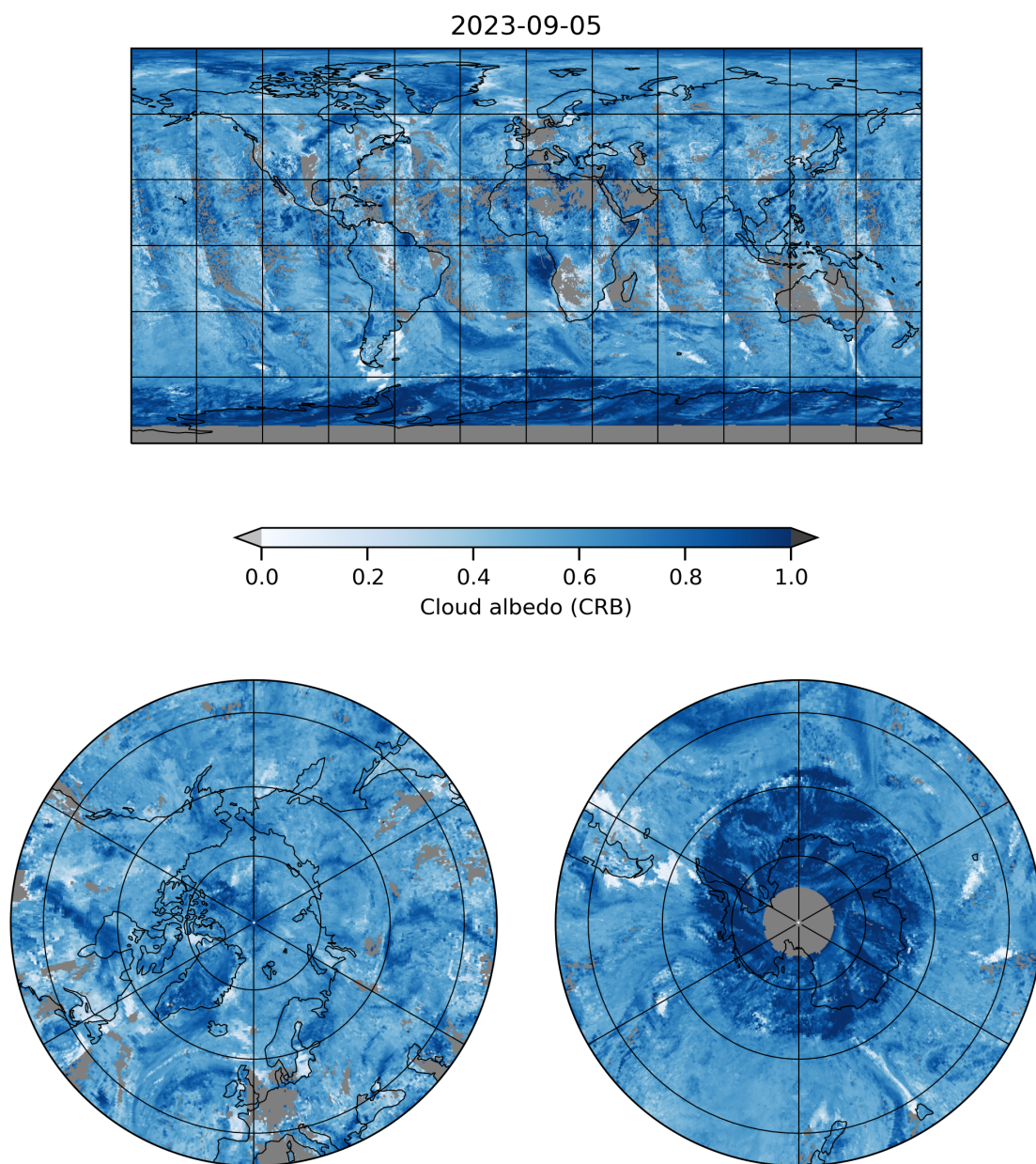


Figure 11: Map of “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06

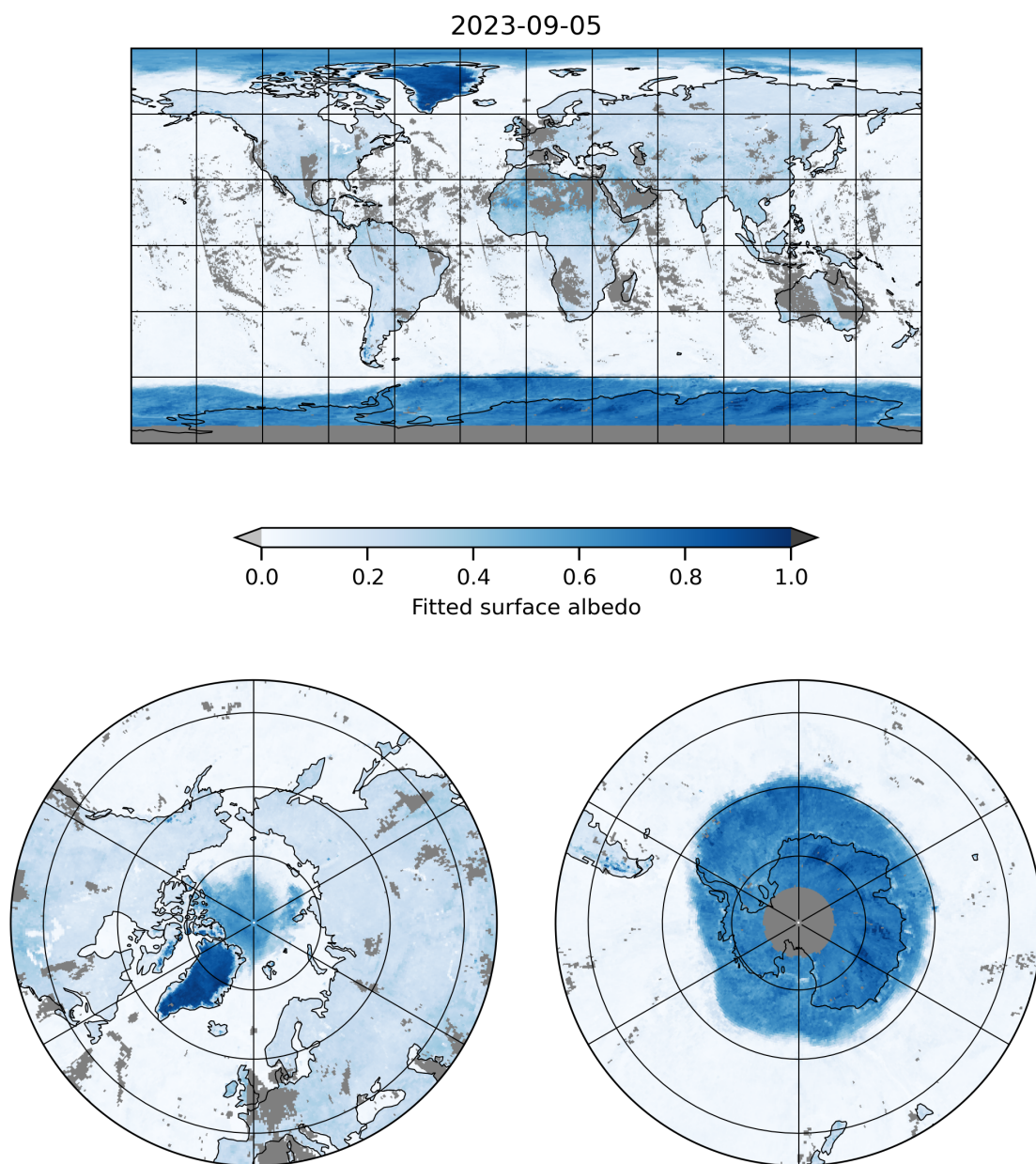


Figure 12: Map of “Fitted surface albedo” for 2023-09-05 to 2023-09-06

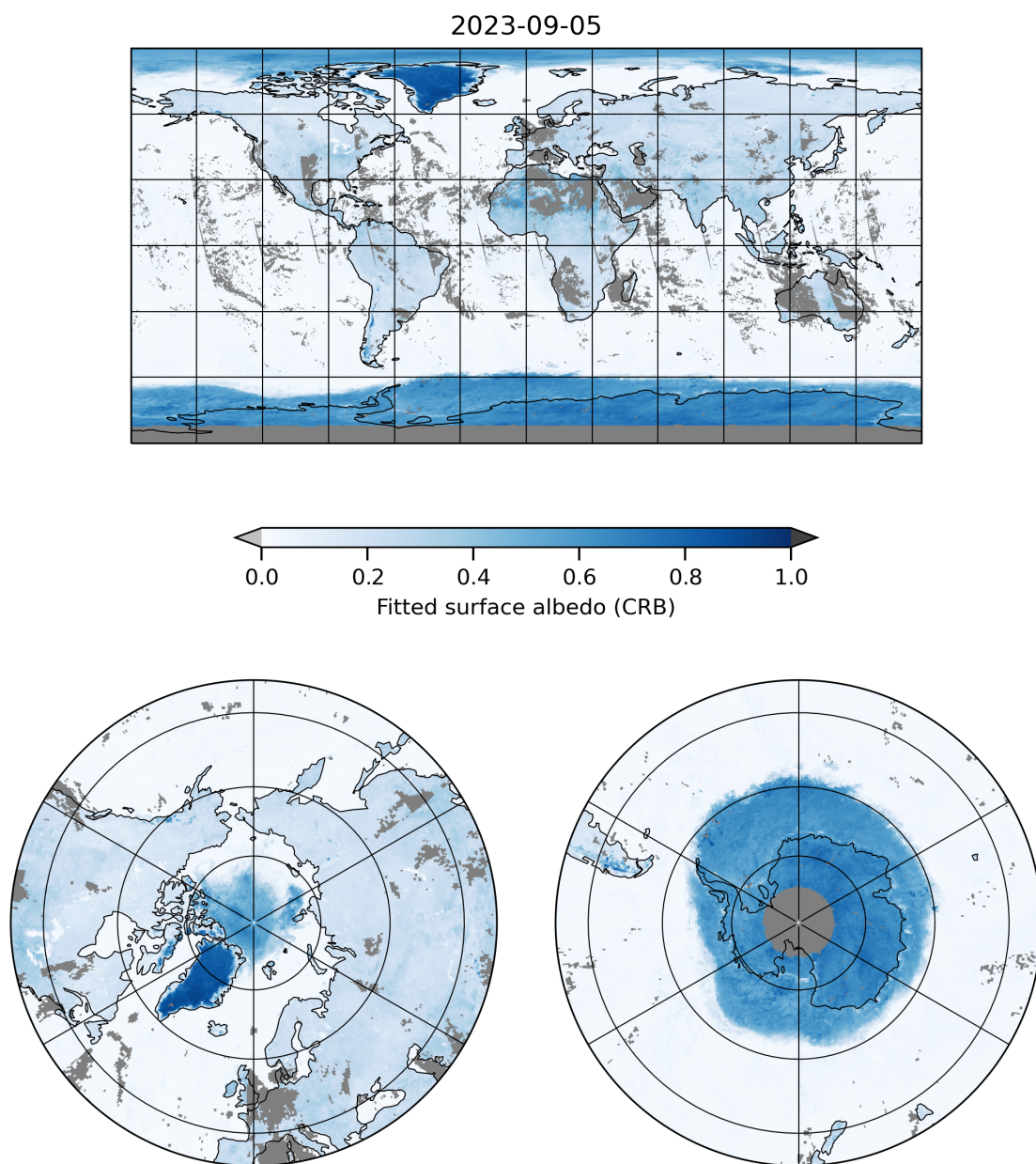


Figure 13: Map of “Fitted surface albedo (CRB)” for 2023-09-05 to 2023-09-06

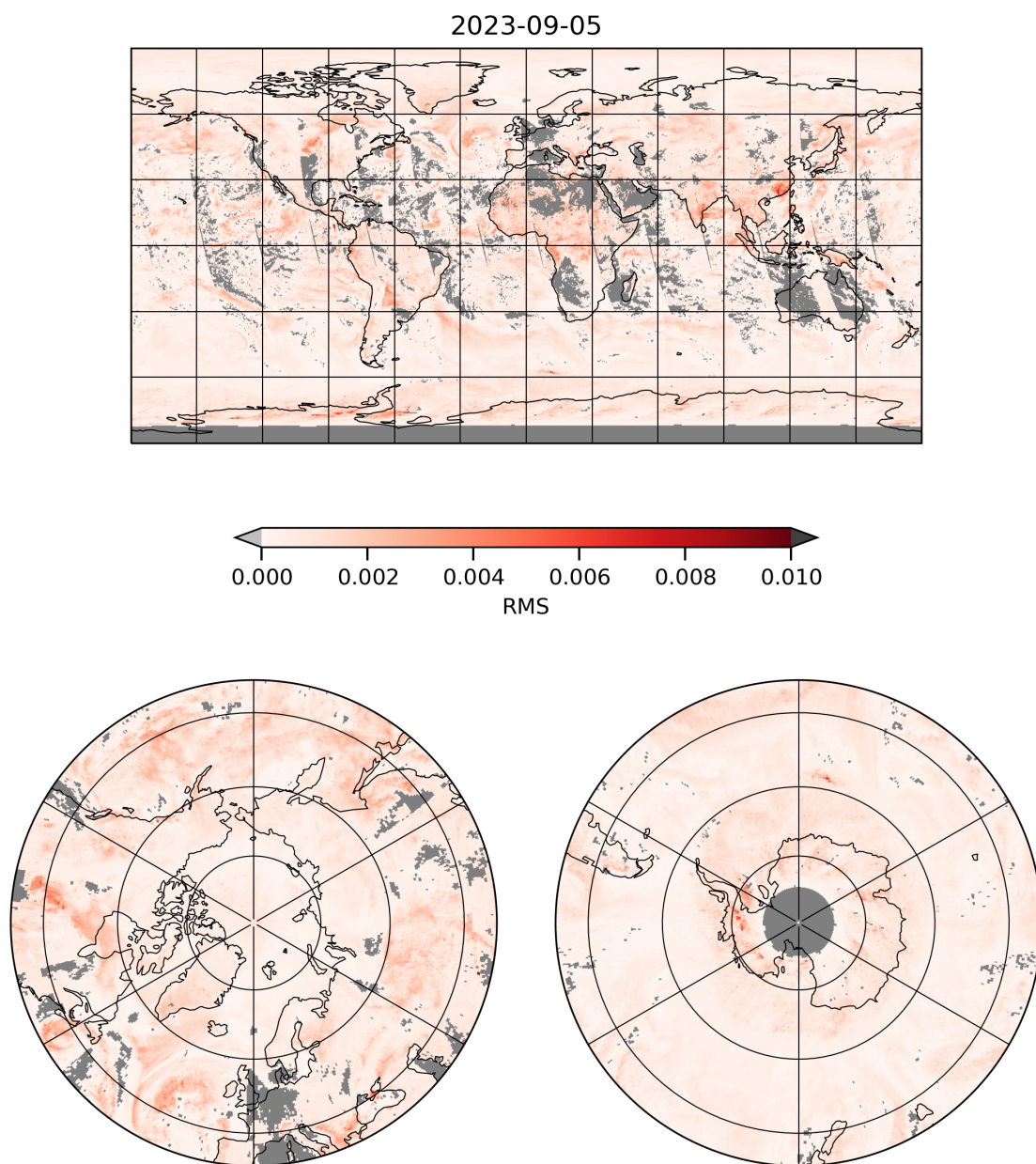


Figure 14: Map of “RMS” for 2023-09-05 to 2023-09-06

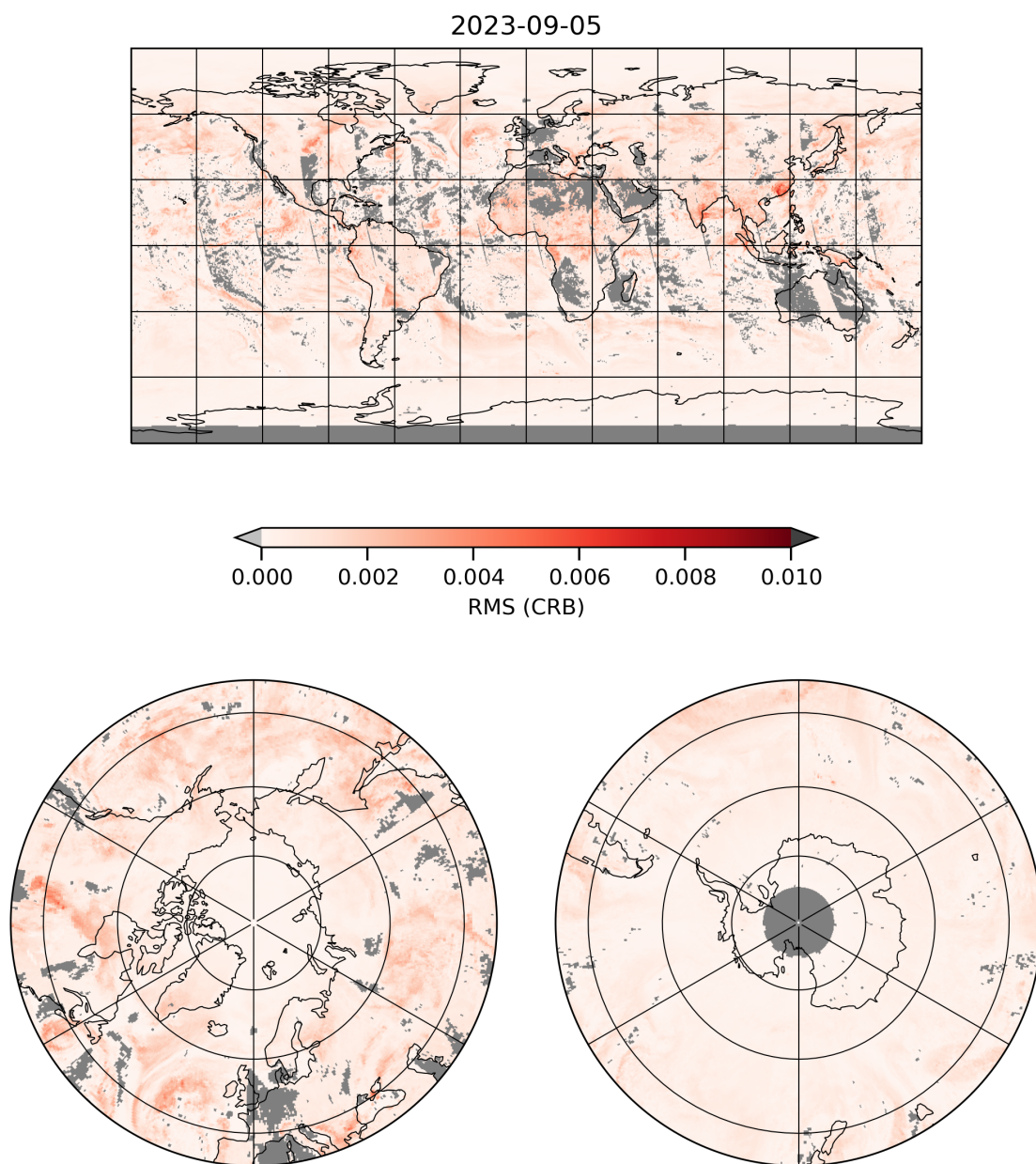


Figure 15: Map of “RMS (CRB)” for 2023-09-05 to 2023-09-06

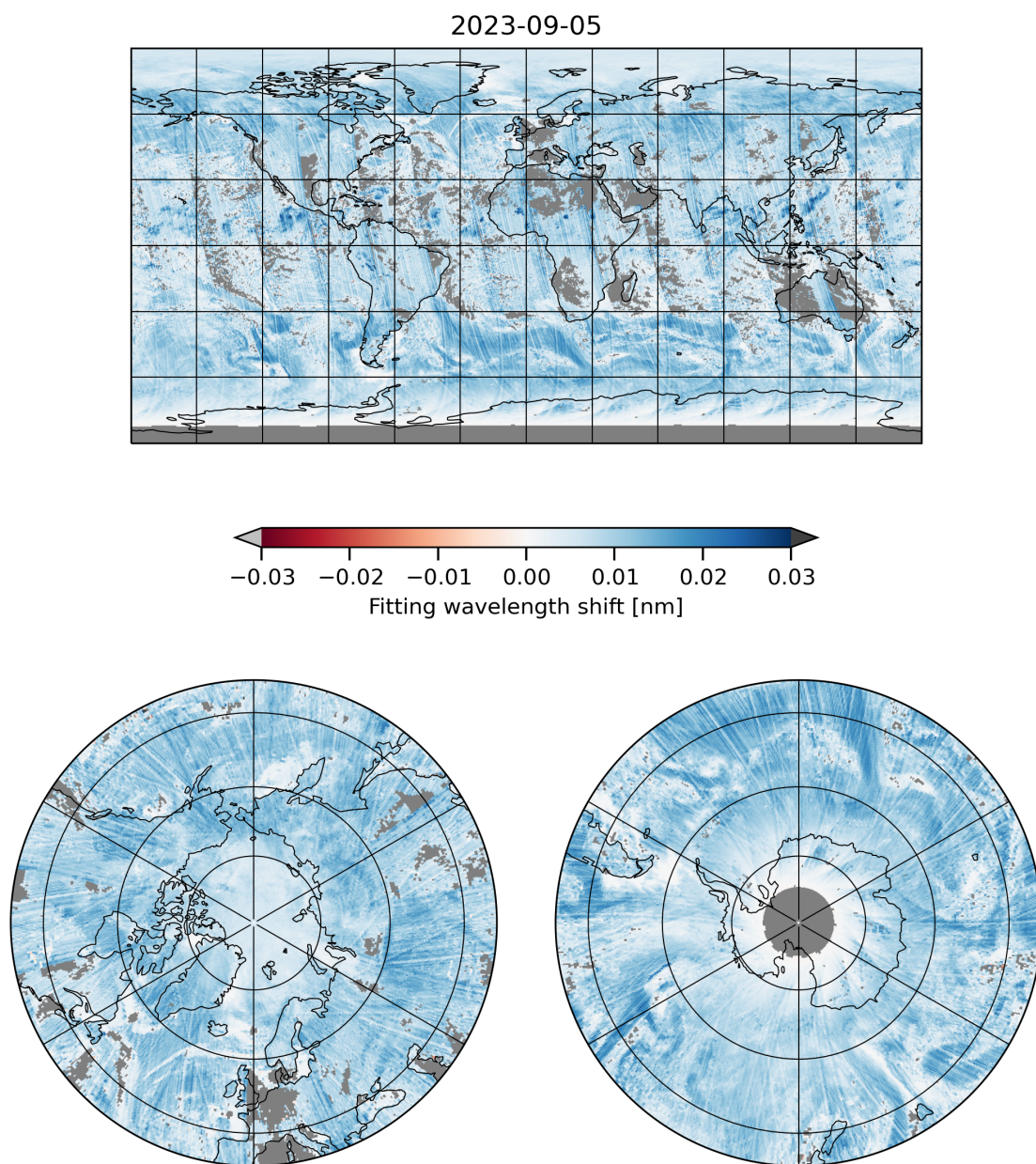


Figure 16: Map of "Fitting wavelength shift" for 2023-09-05 to 2023-09-06

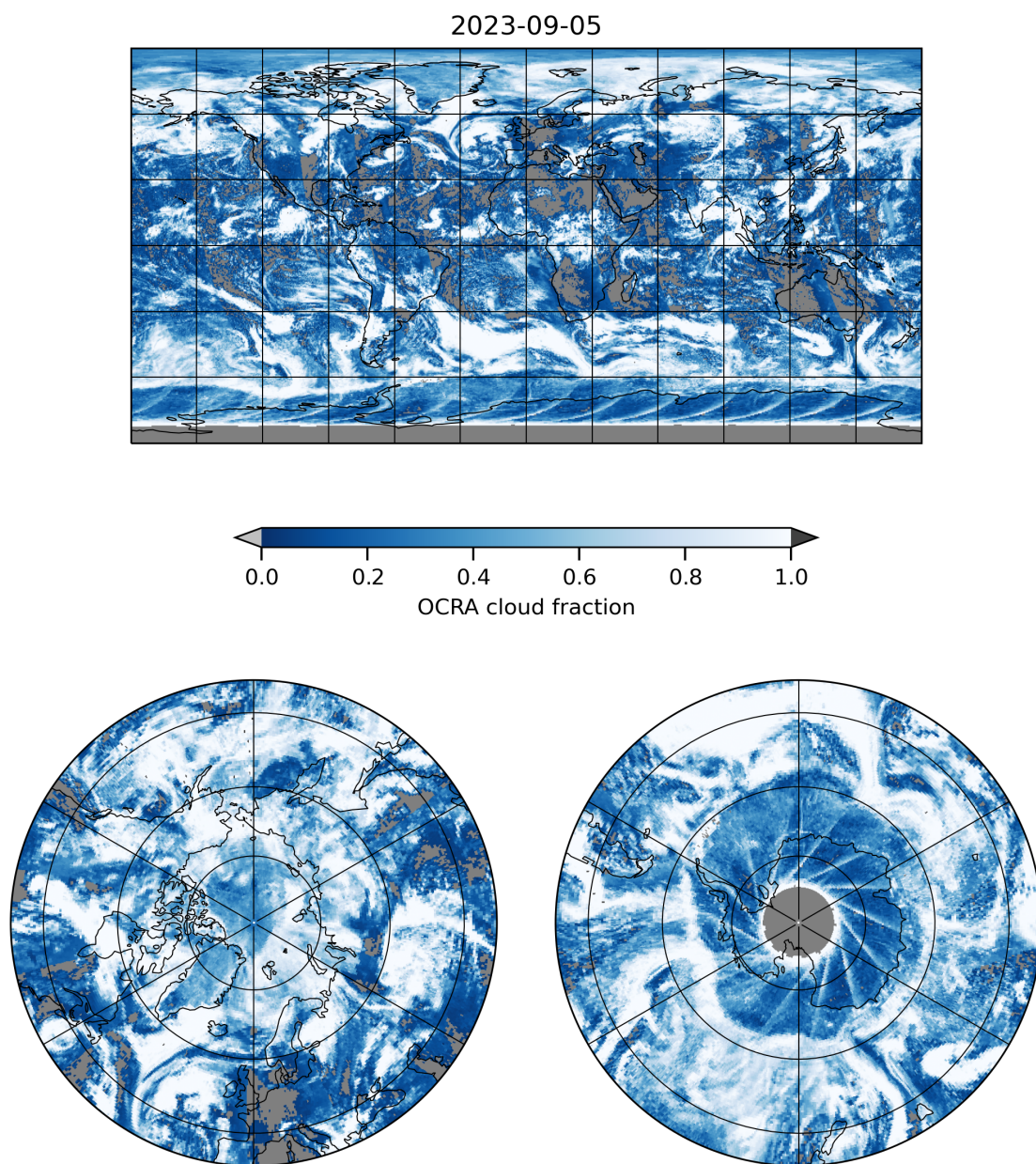


Figure 17: Map of “OCRA cloud fraction” for 2023-09-05 to 2023-09-06

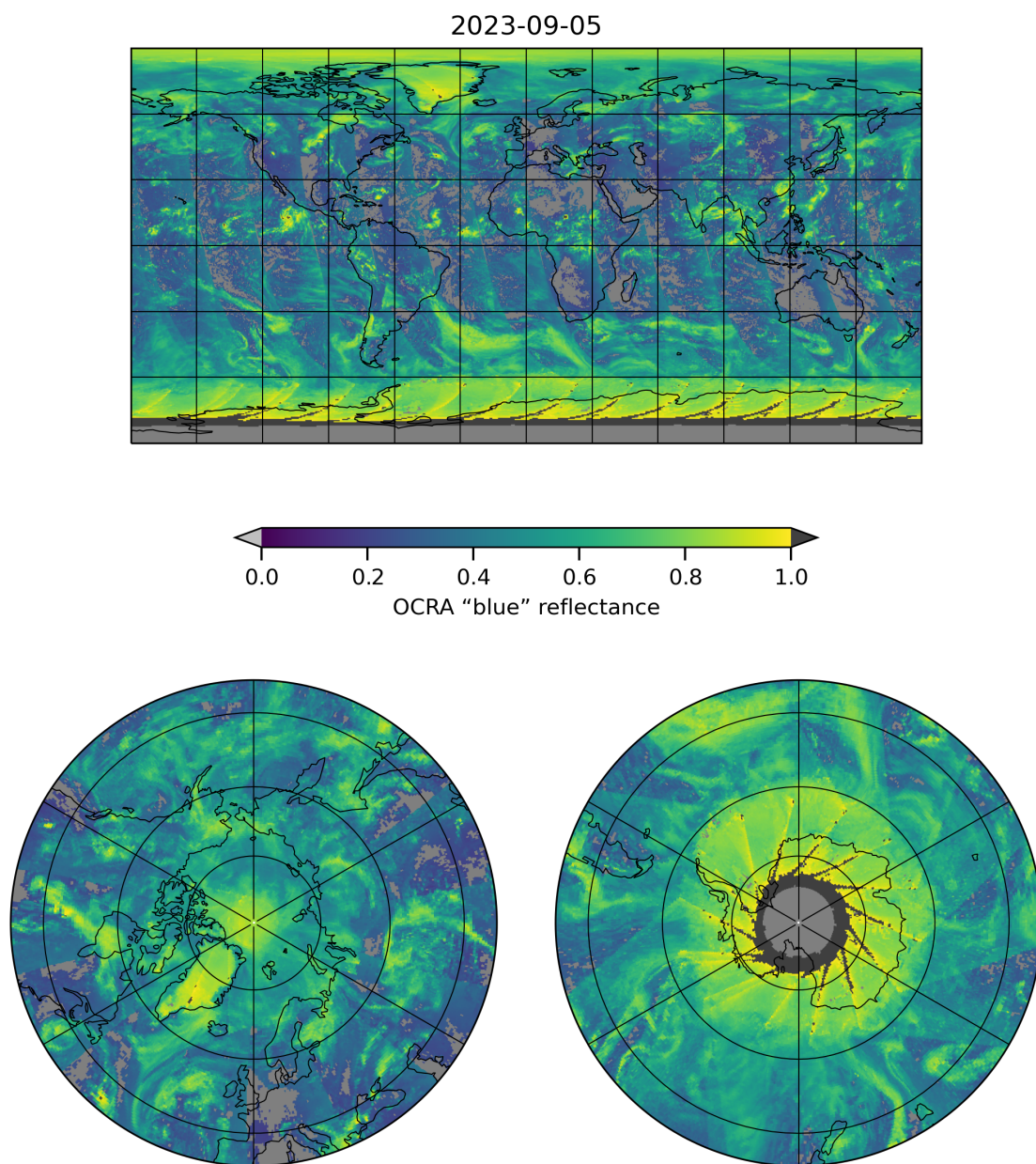


Figure 18: Map of "OCRA "blue" reflectance" for 2023-09-05 to 2023-09-06

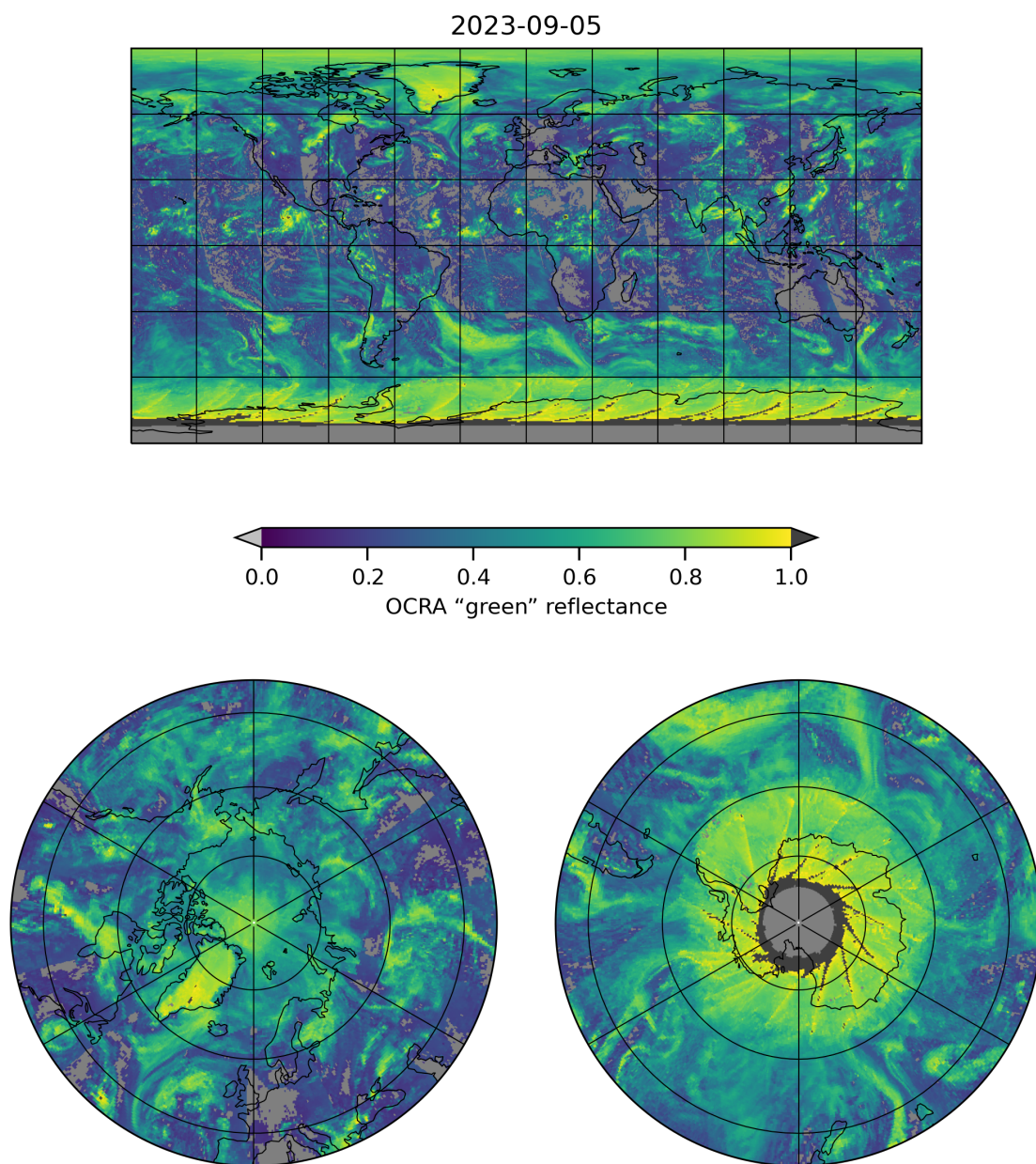


Figure 19: Map of "OCRA "green" reflectance" for 2023-09-05 to 2023-09-06

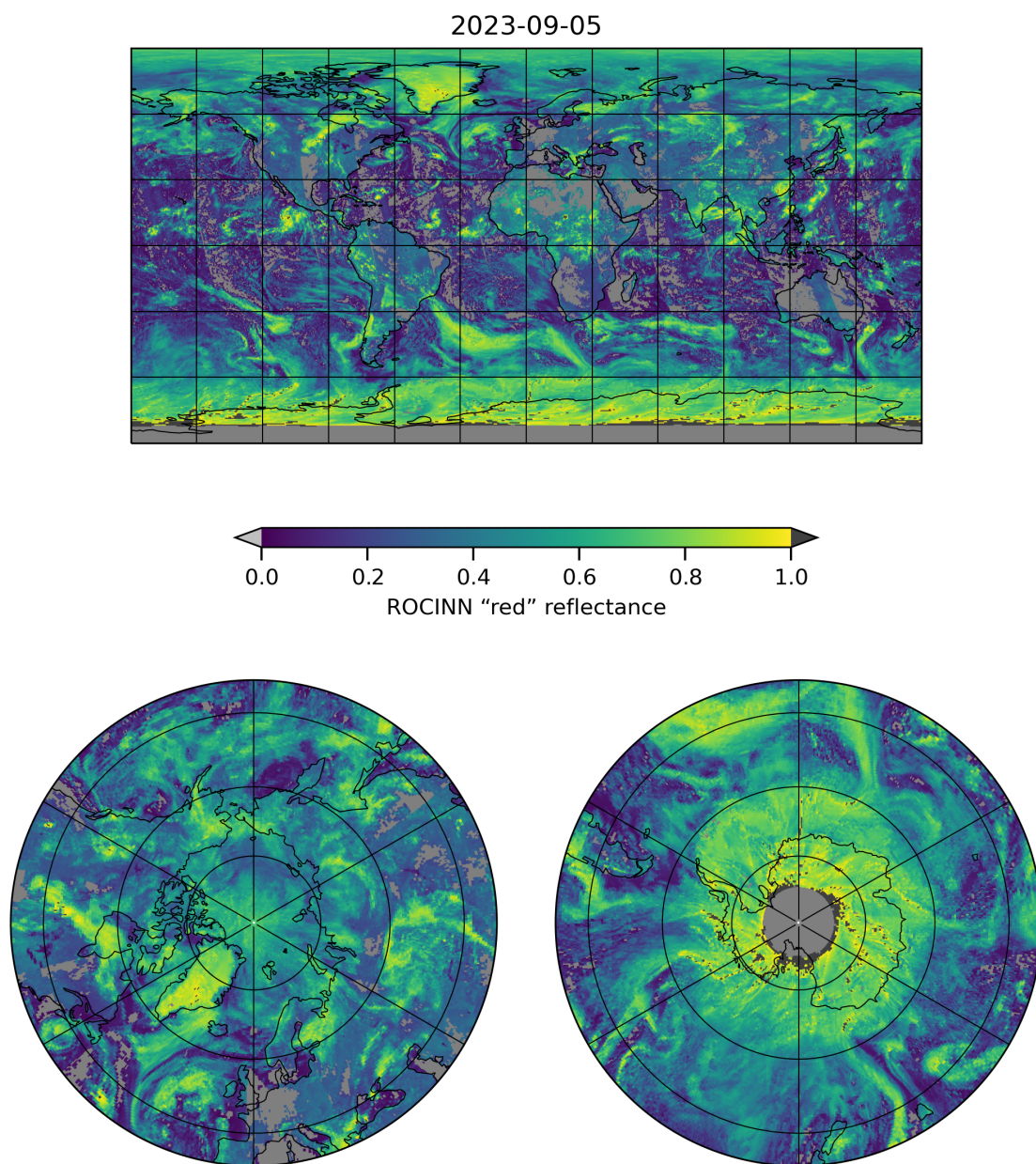


Figure 20: Map of "ROCINN "red" reflectance" for 2023-09-05 to 2023-09-06

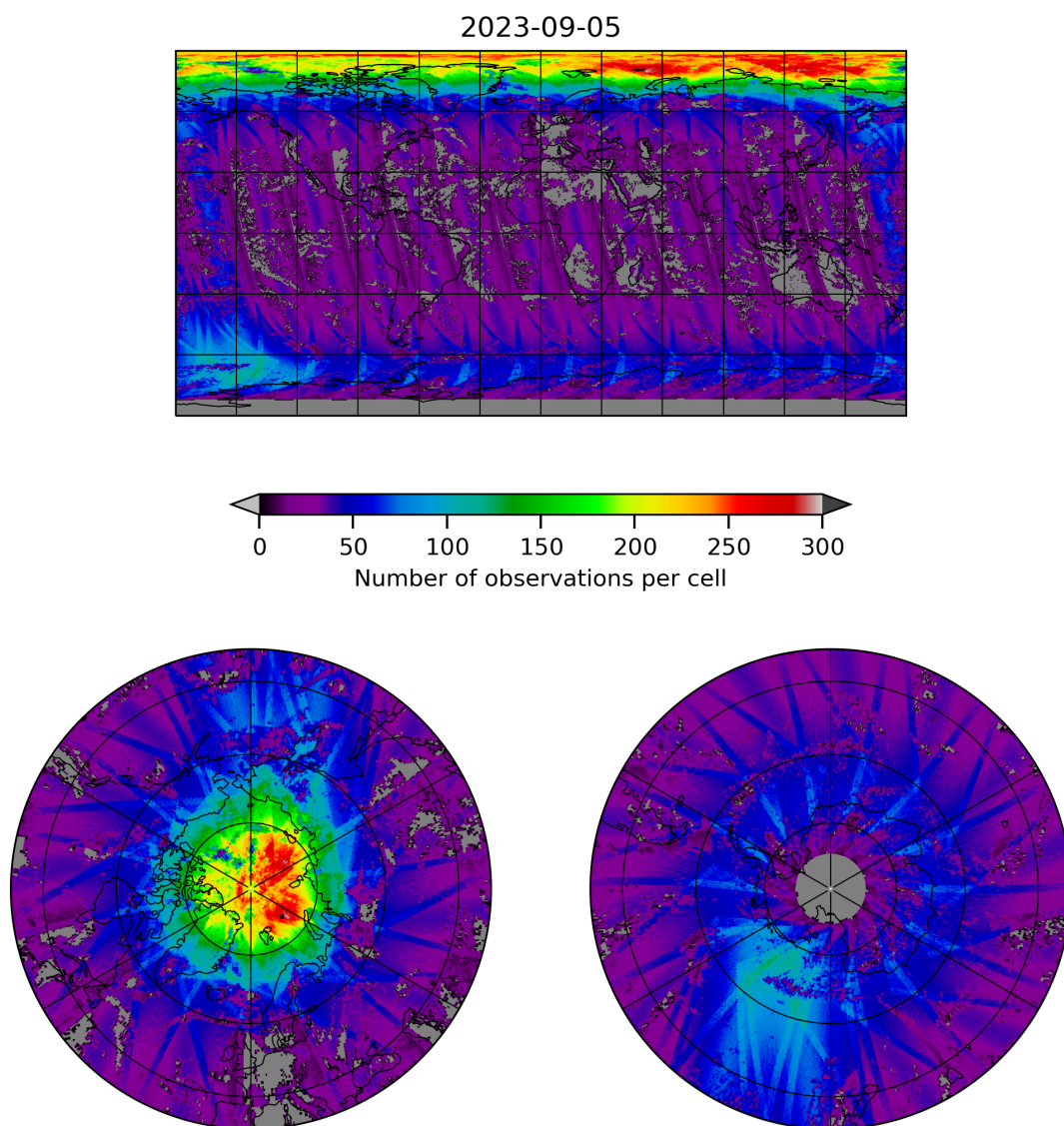


Figure 21: Map of the number of observations for 2023-09-05 to 2023-09-06

7 Zonal average

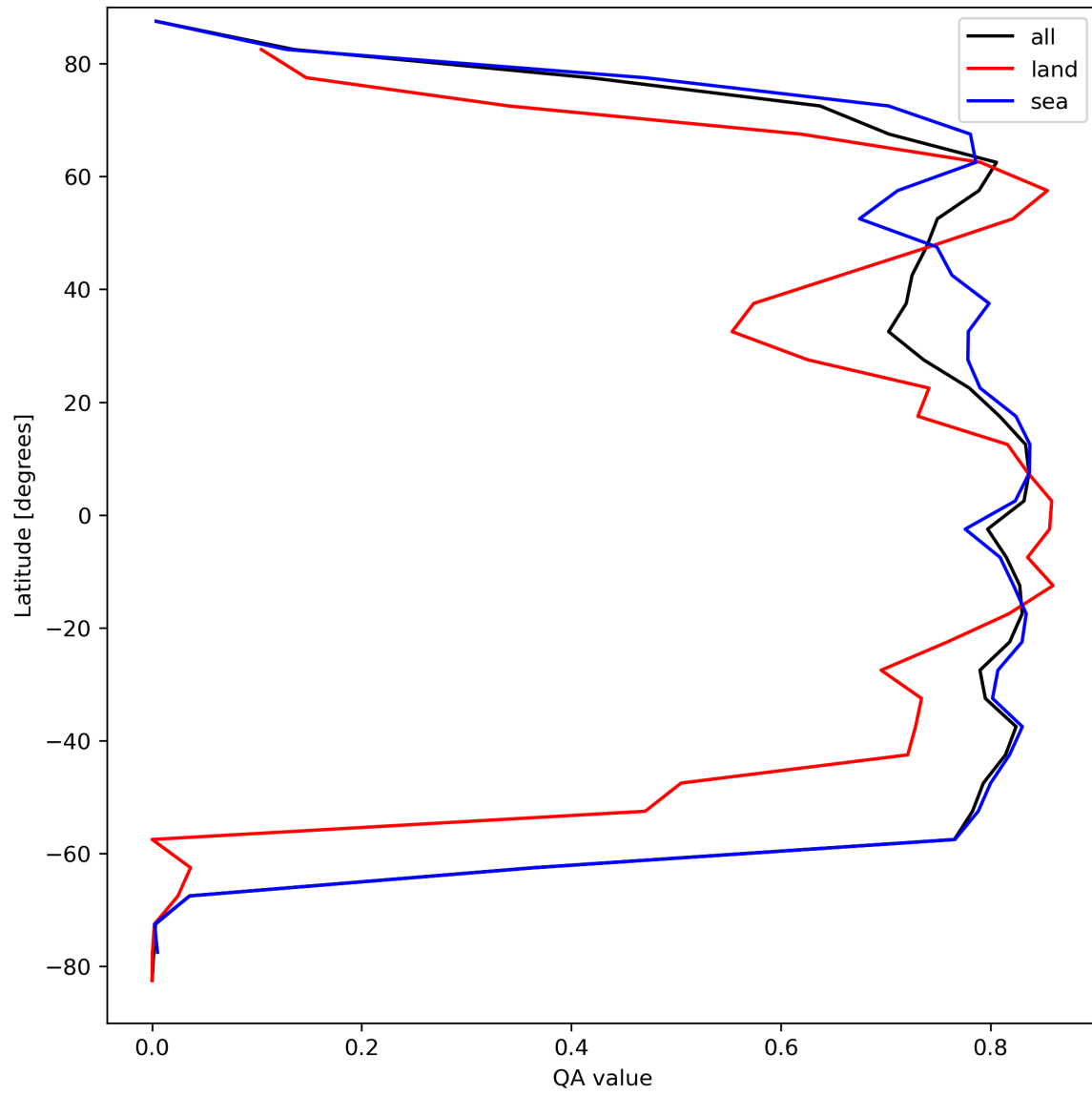


Figure 22: Zonal average of “QA value” for 2023-09-05 to 2023-09-06.

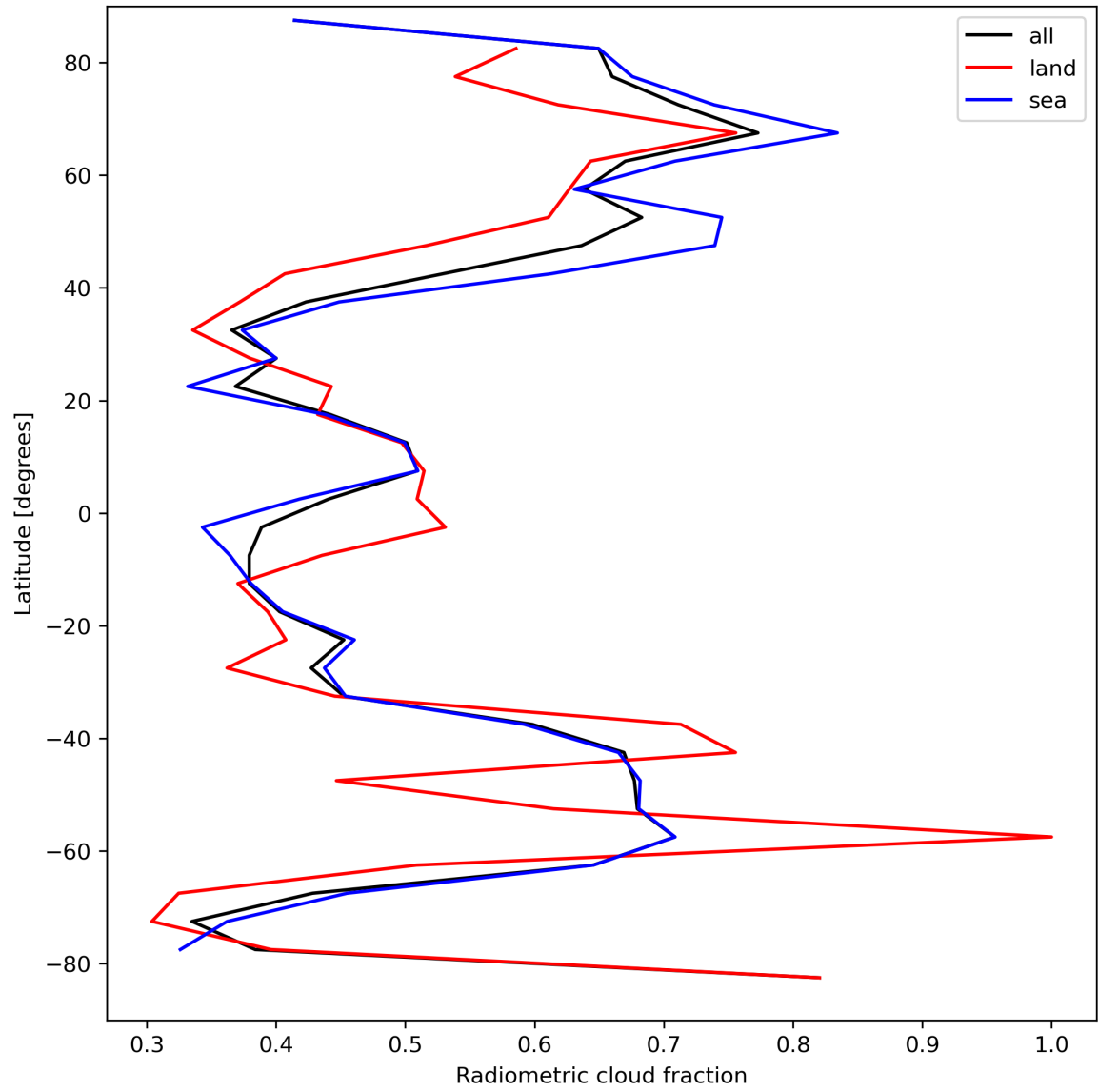


Figure 23: Zonal average of “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06.

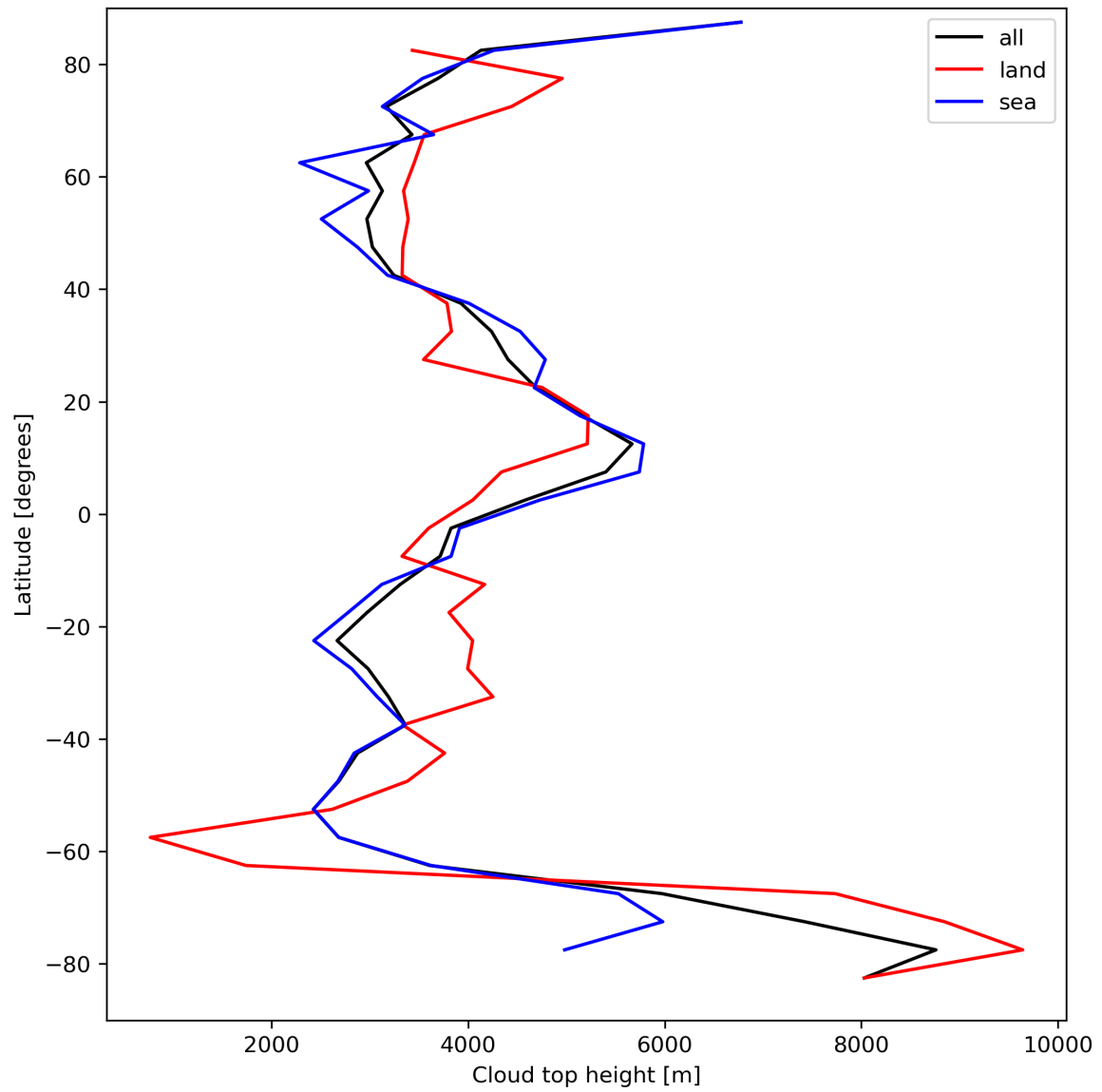


Figure 24: Zonal average of “Cloud top height” for 2023-09-05 to 2023-09-06.

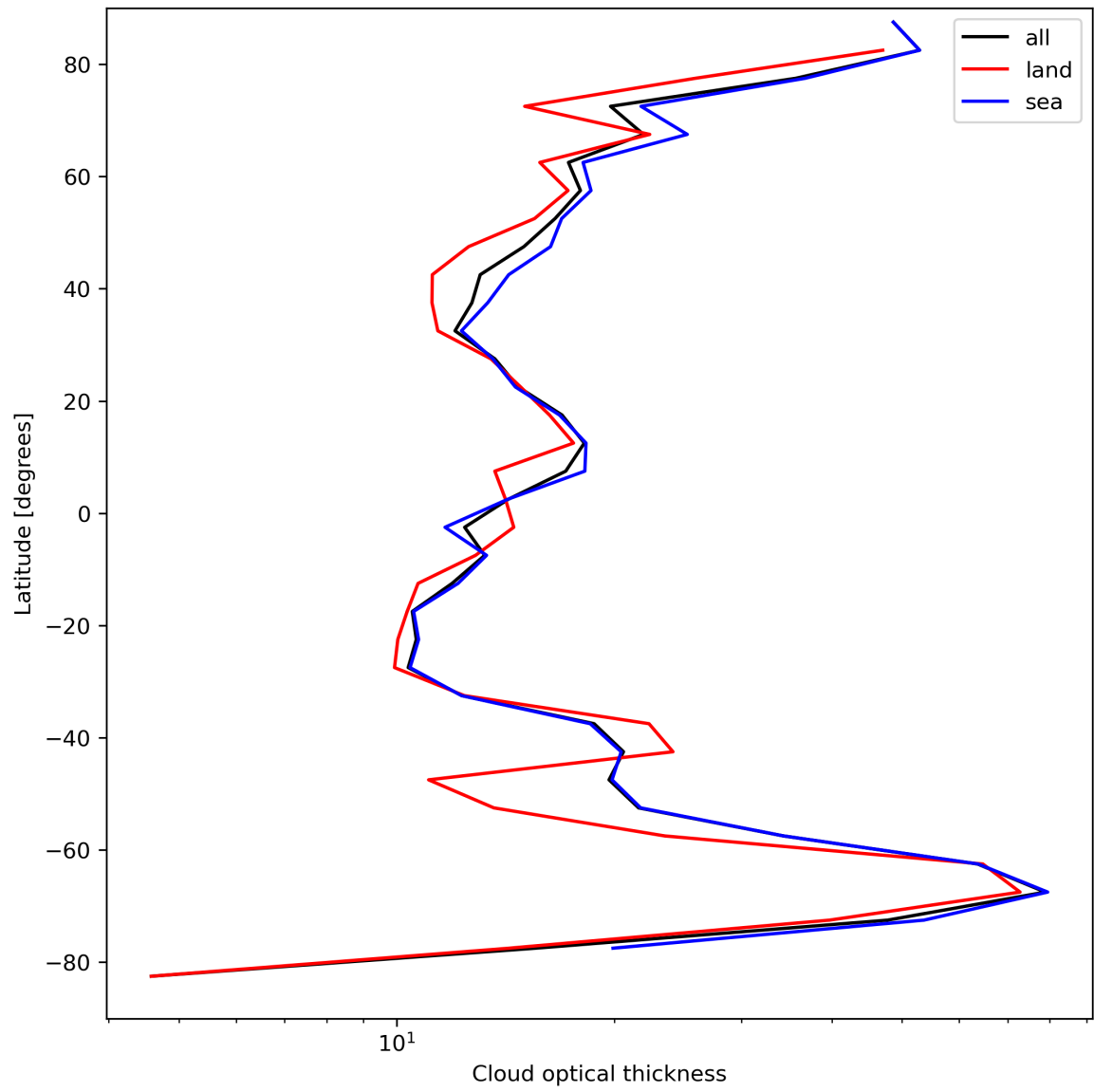


Figure 25: Zonal average of “Cloud optical thickness” for 2023-09-05 to 2023-09-06.

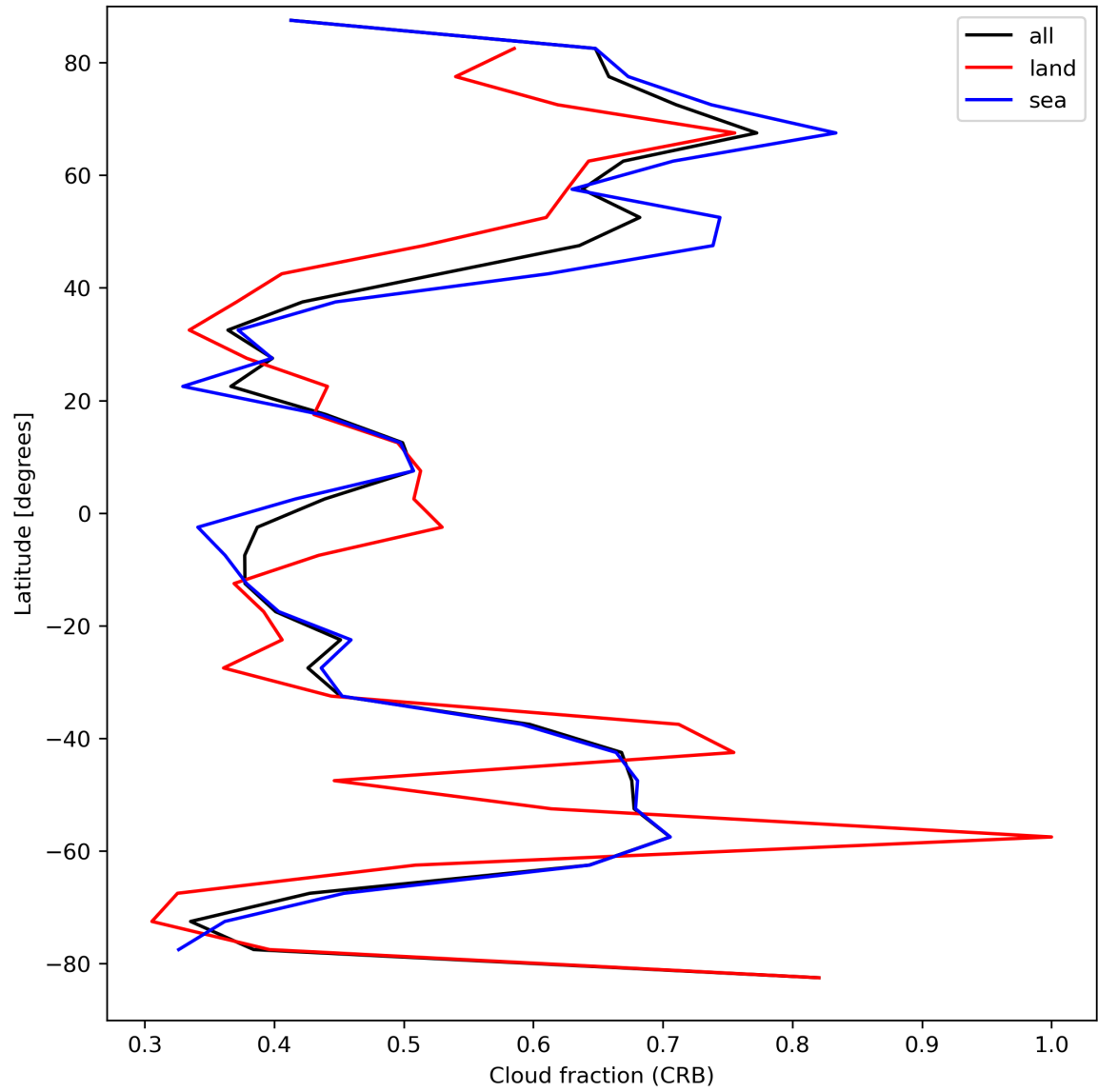


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.

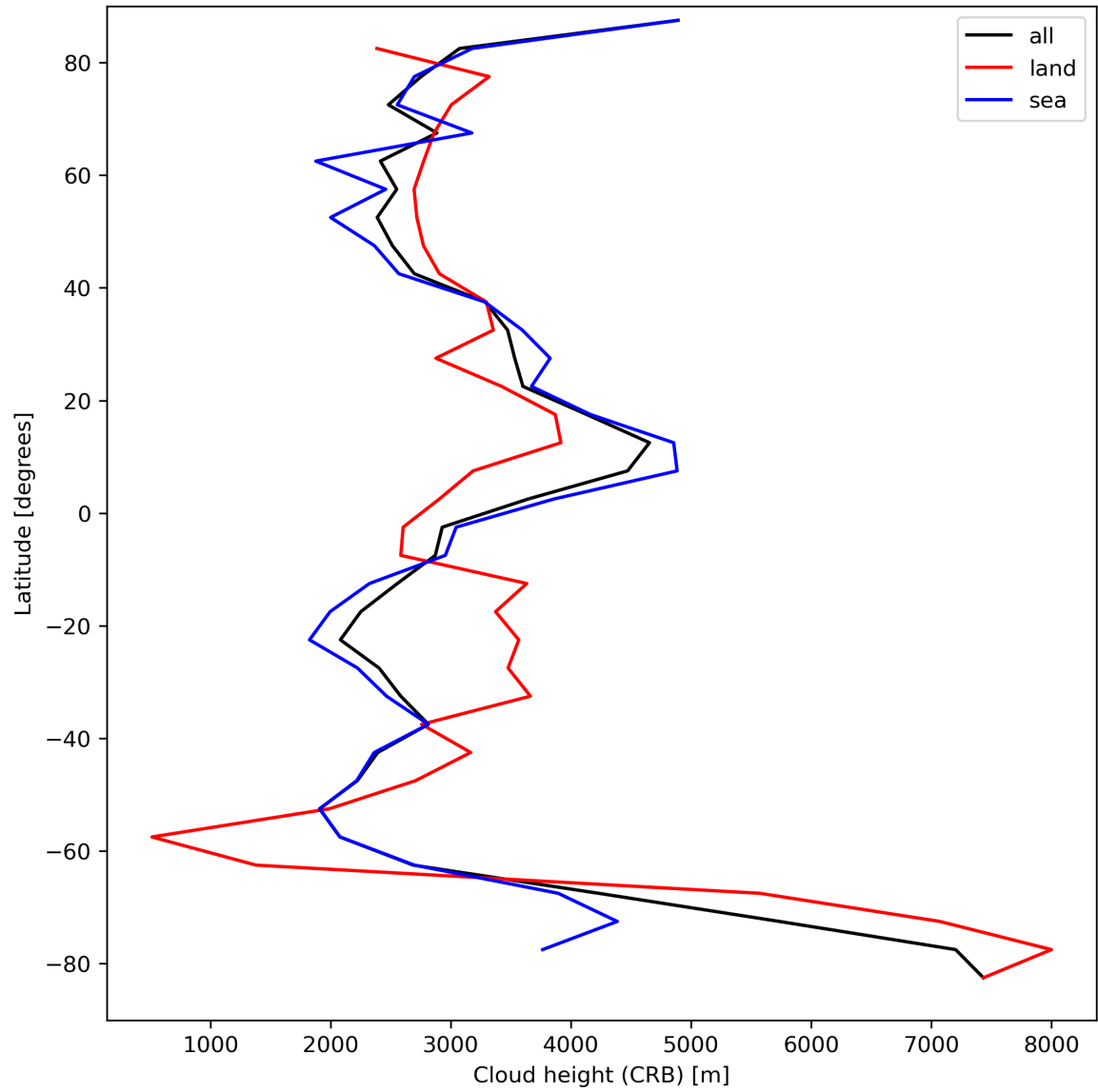


Figure 27: Zonal average of “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.

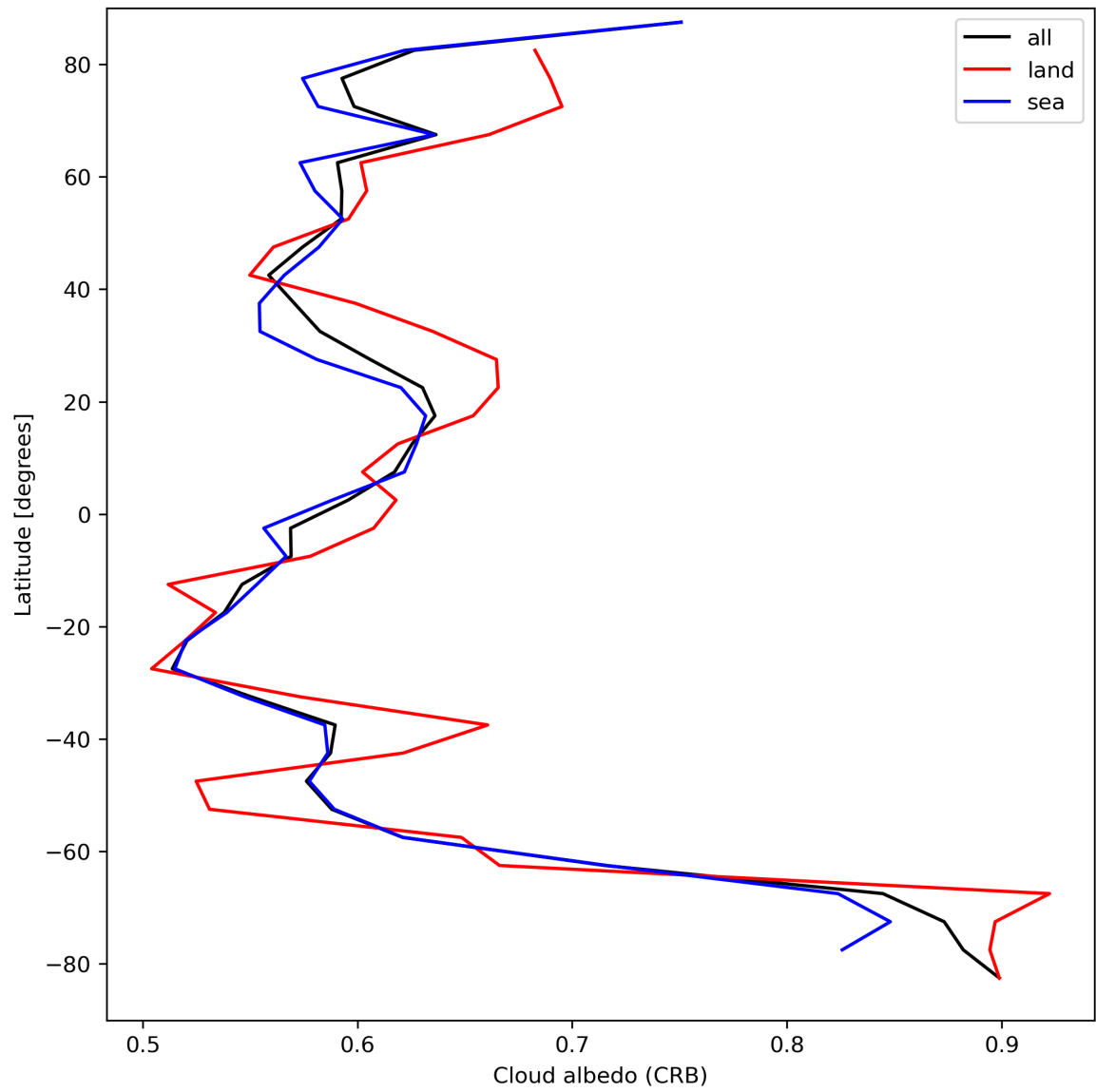


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

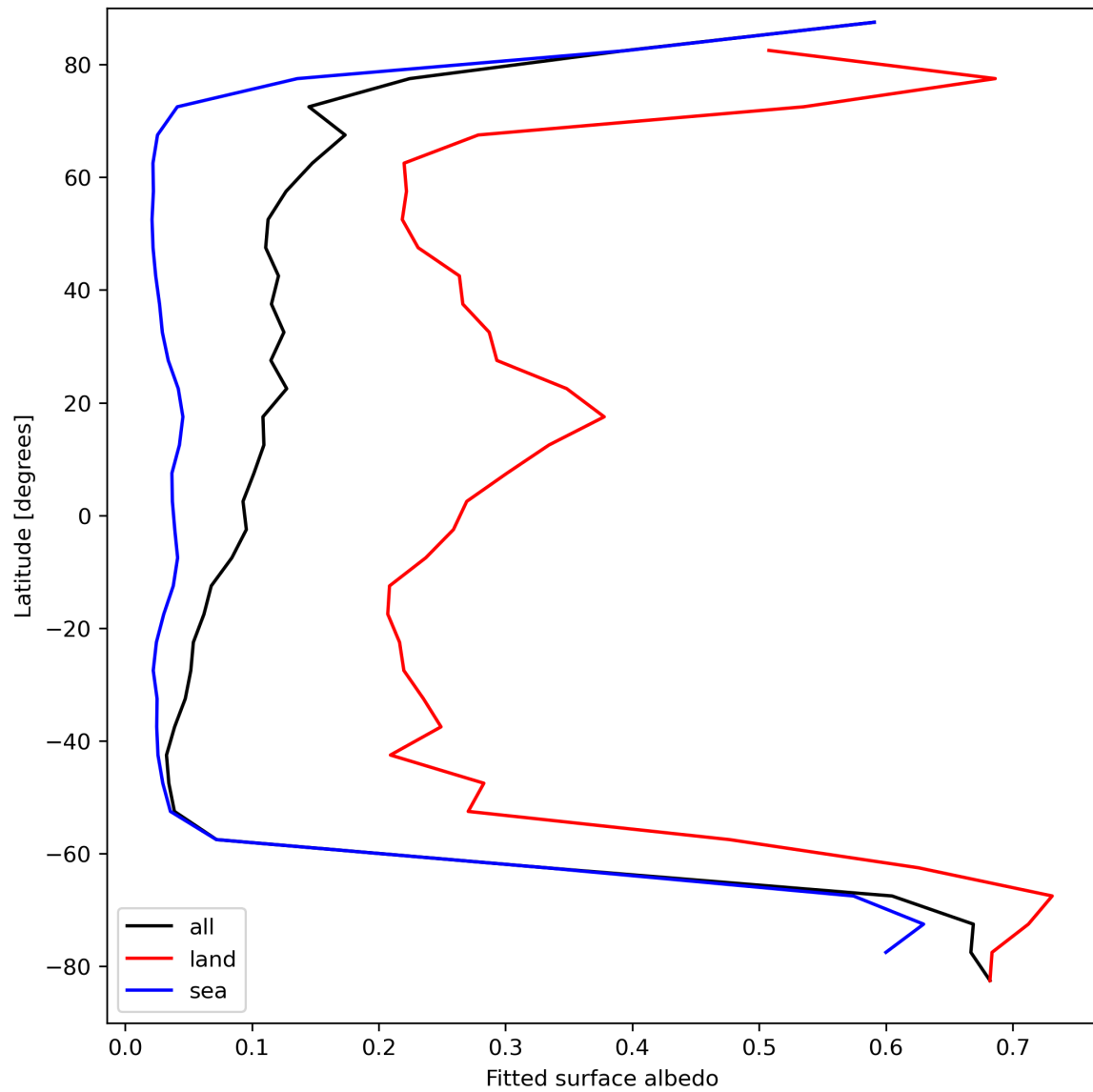


Figure 29: Zonal average of “Fitted surface albedo” for 2023-09-05 to 2023-09-06.

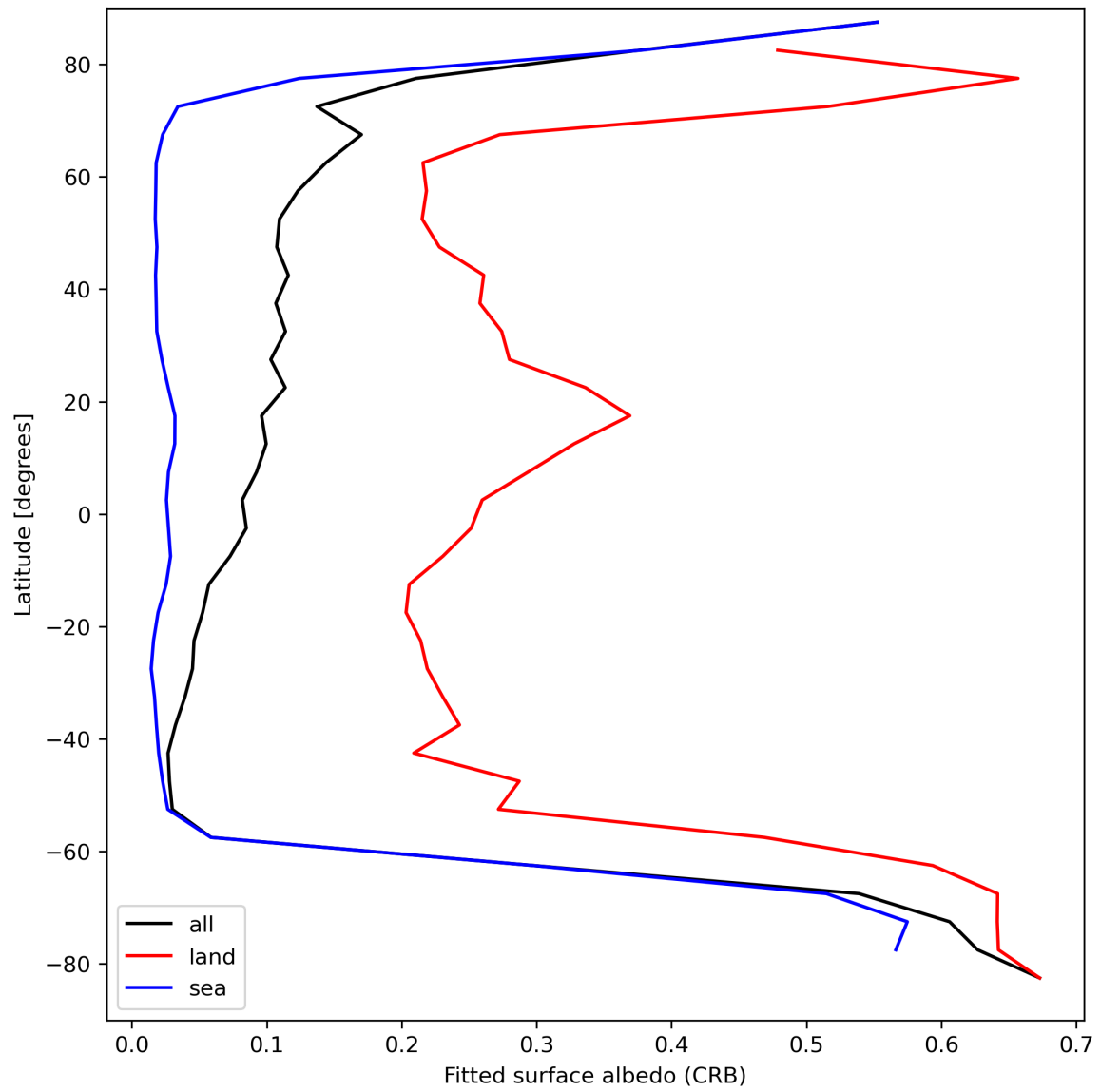


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2023-09-05 to 2023-09-06.

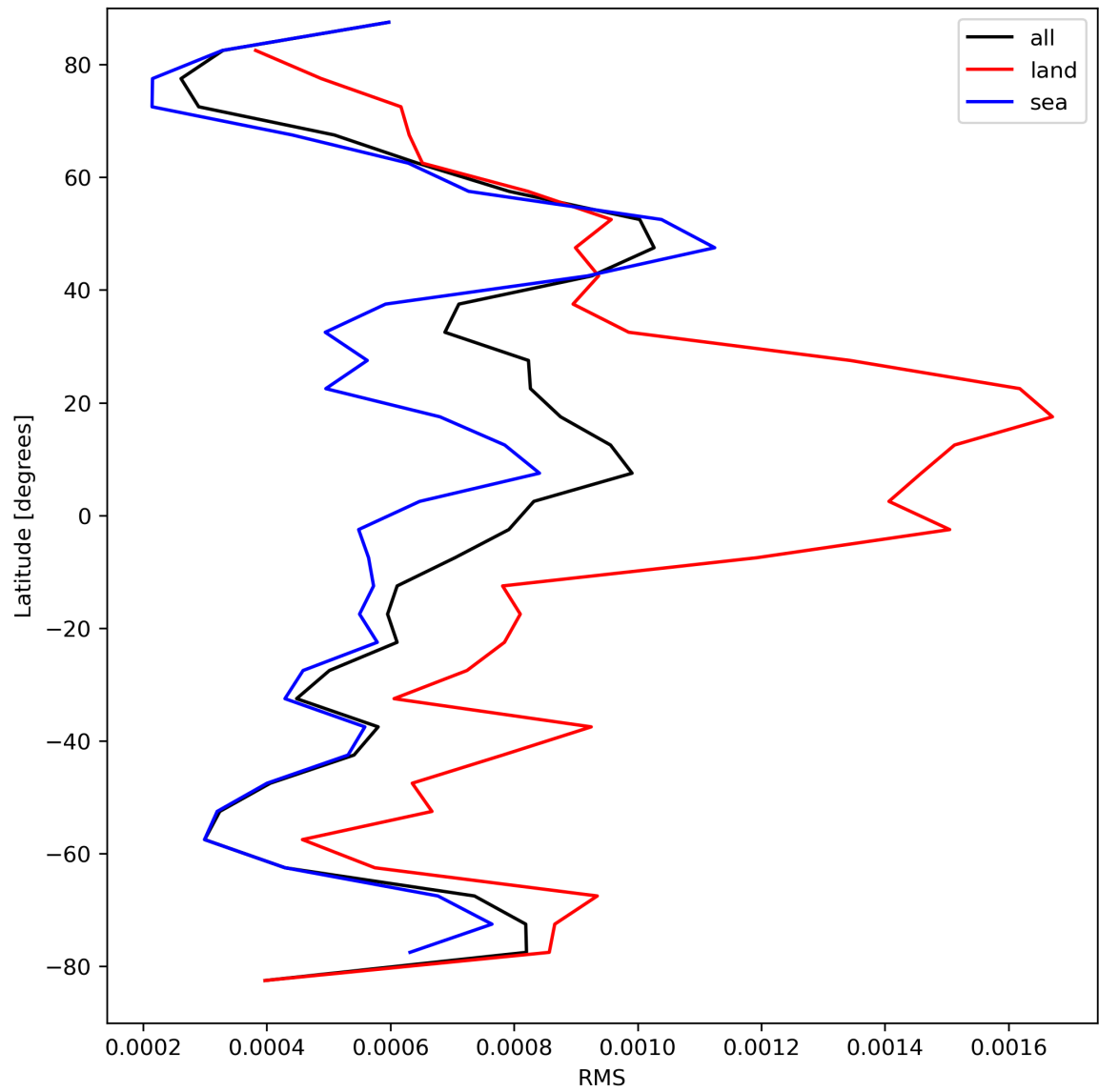


Figure 31: Zonal average of “RMS” for 2023-09-05 to 2023-09-06.

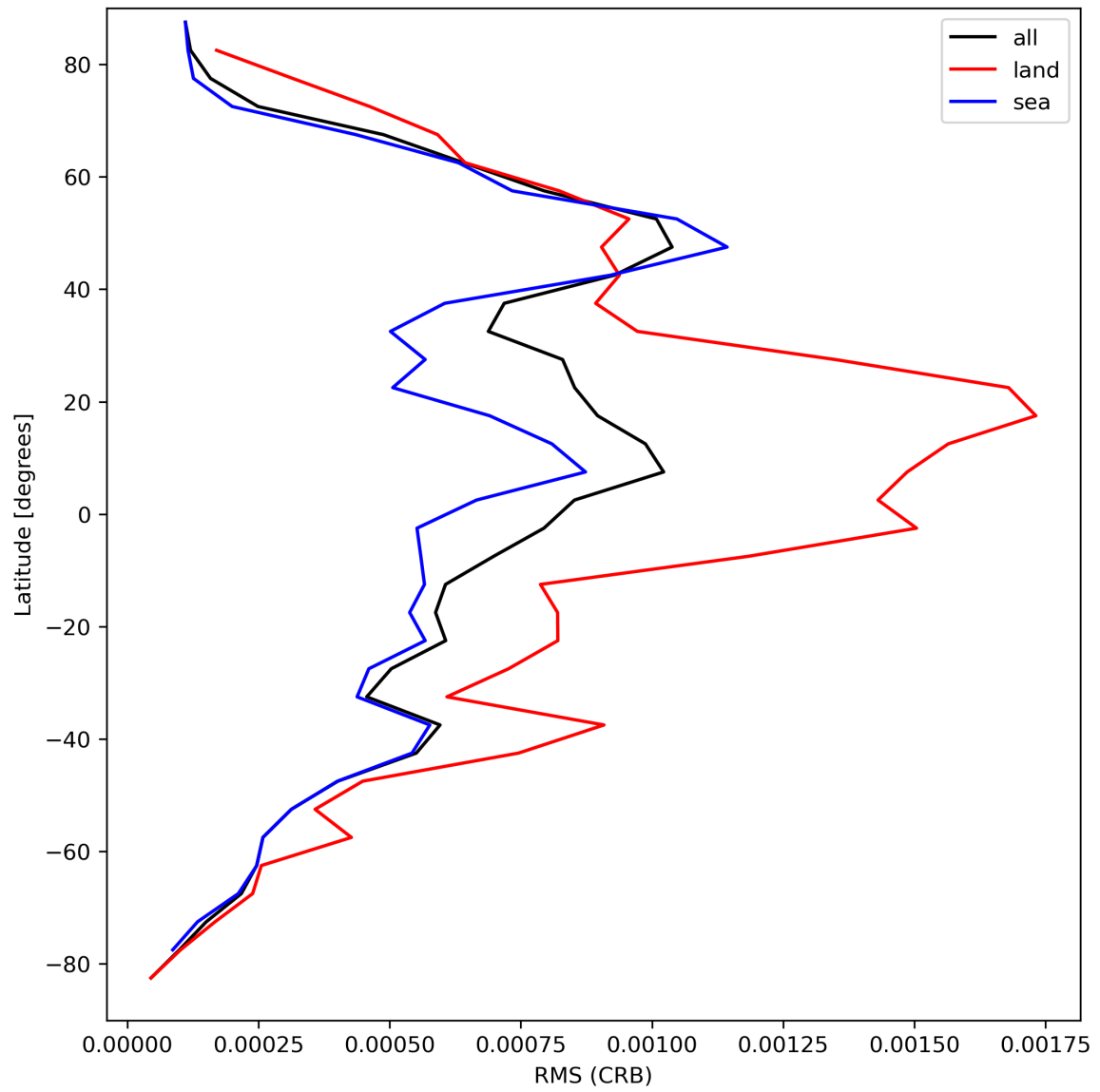


Figure 32: Zonal average of “RMS (CRB)” for 2023-09-05 to 2023-09-06.

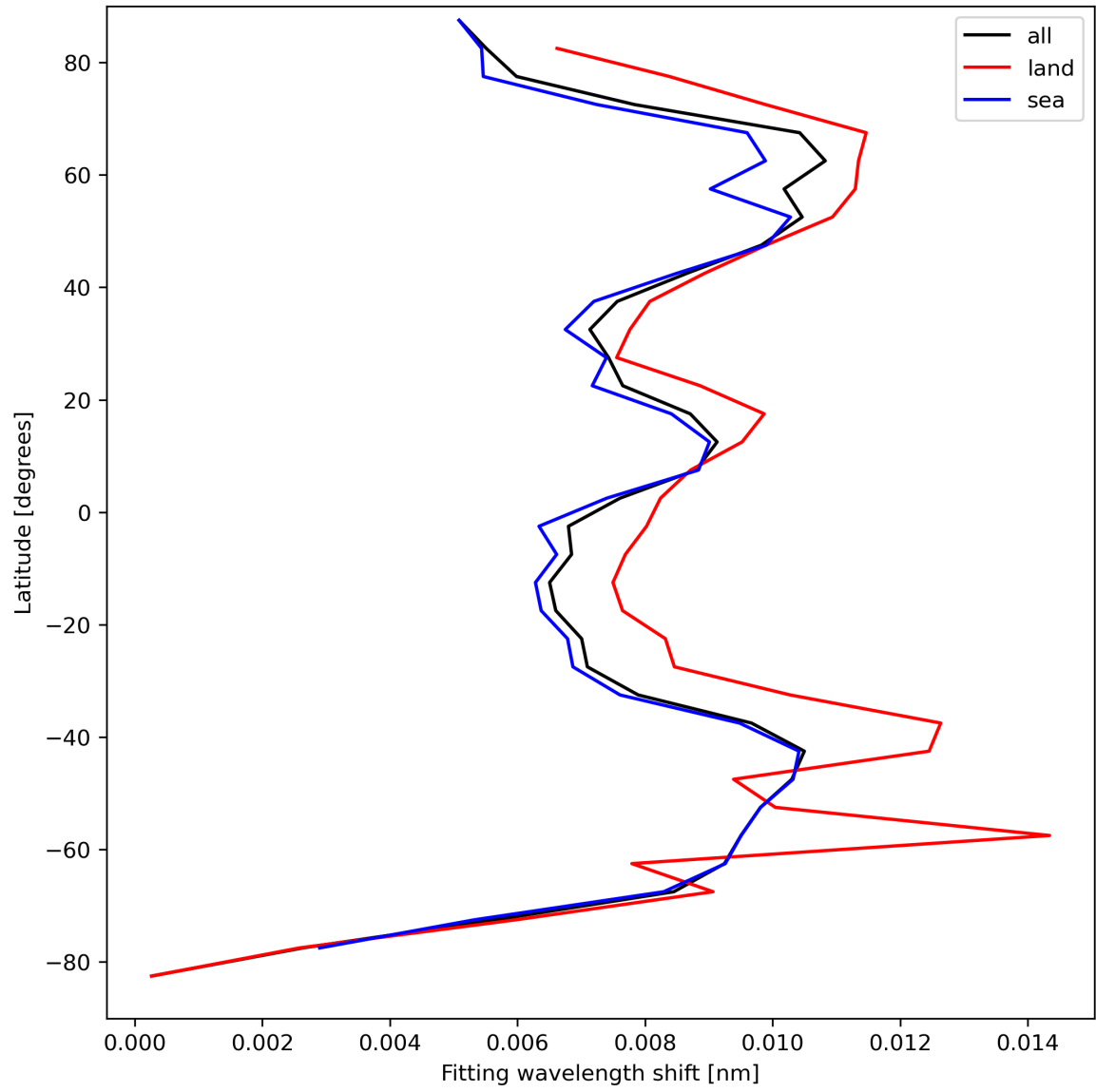


Figure 33: Zonal average of “Fitting wavelength shift” for 2023-09-05 to 2023-09-06.

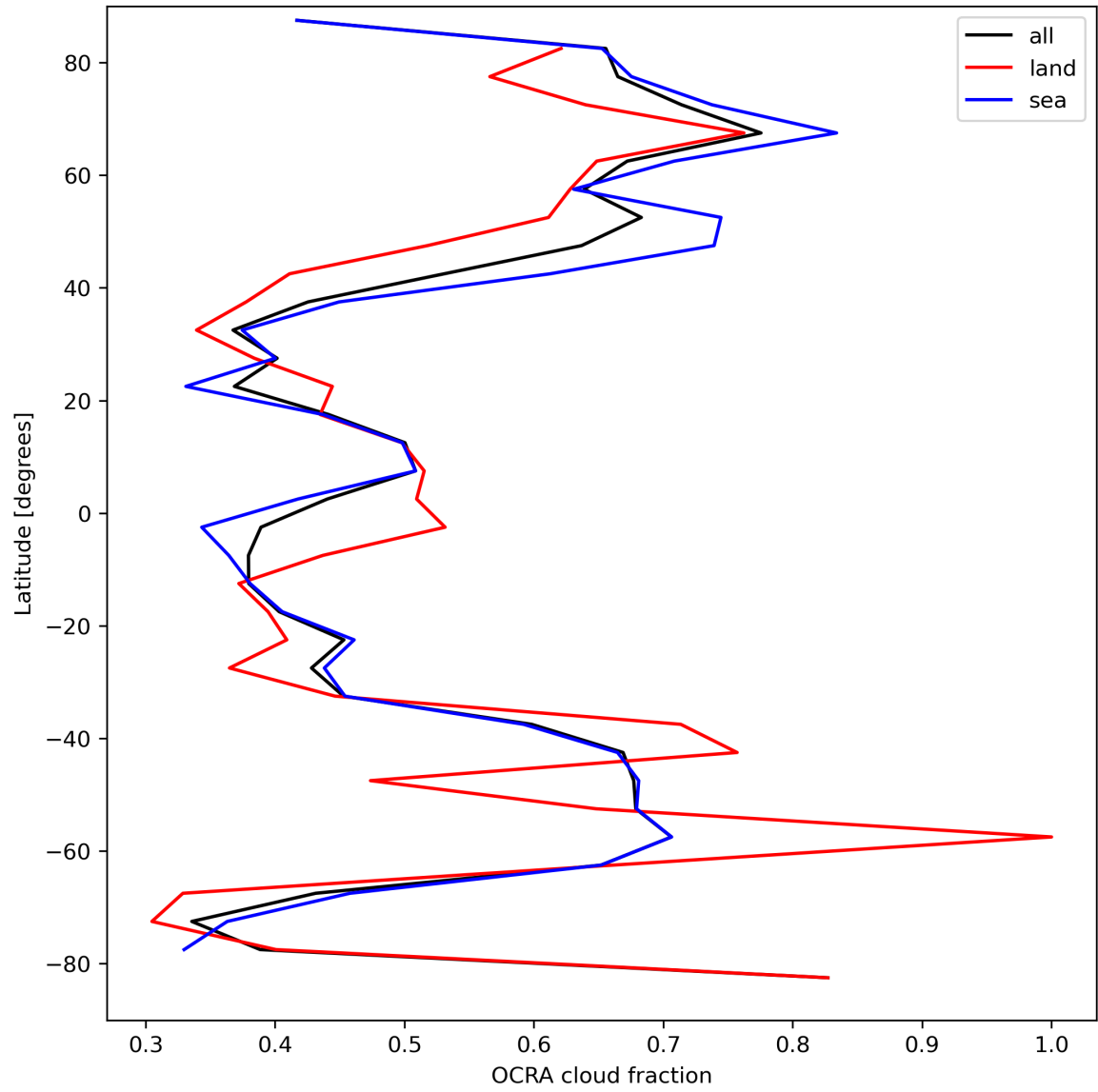


Figure 34: Zonal average of “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

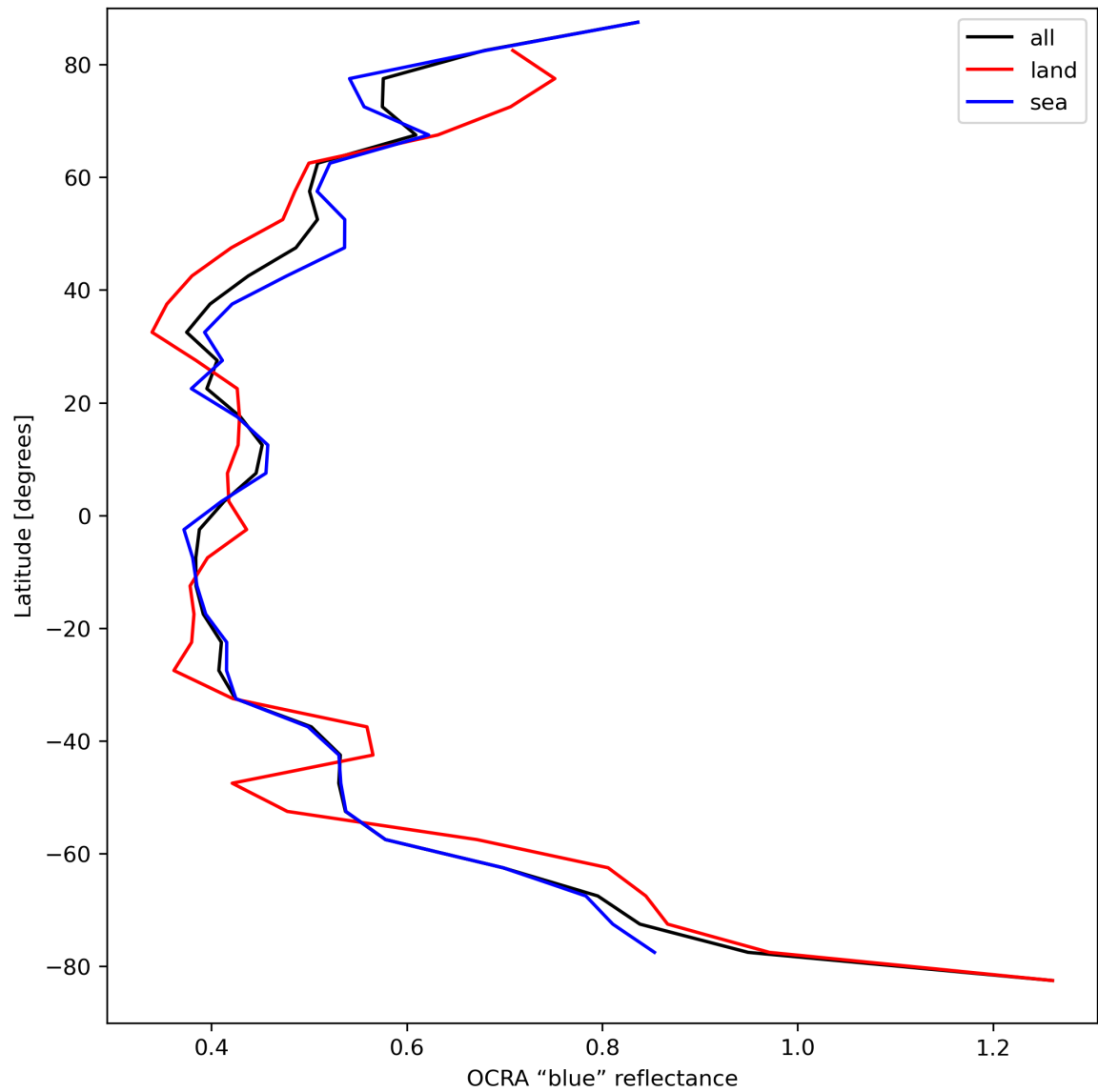


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2023-09-05 to 2023-09-06.

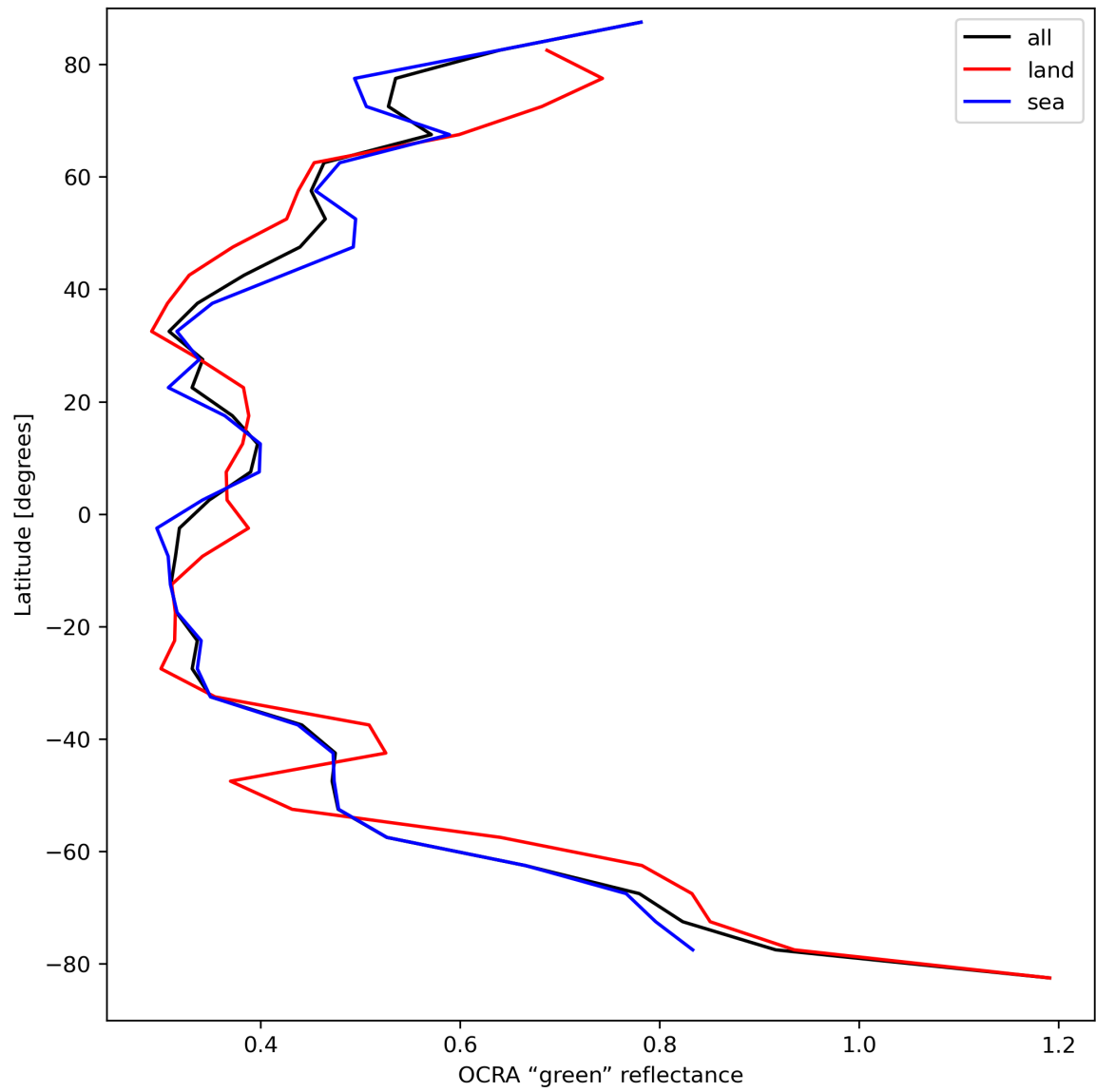


Figure 36: Zonal average of “OCRA “green” reflectance” for 2023-09-05 to 2023-09-06.

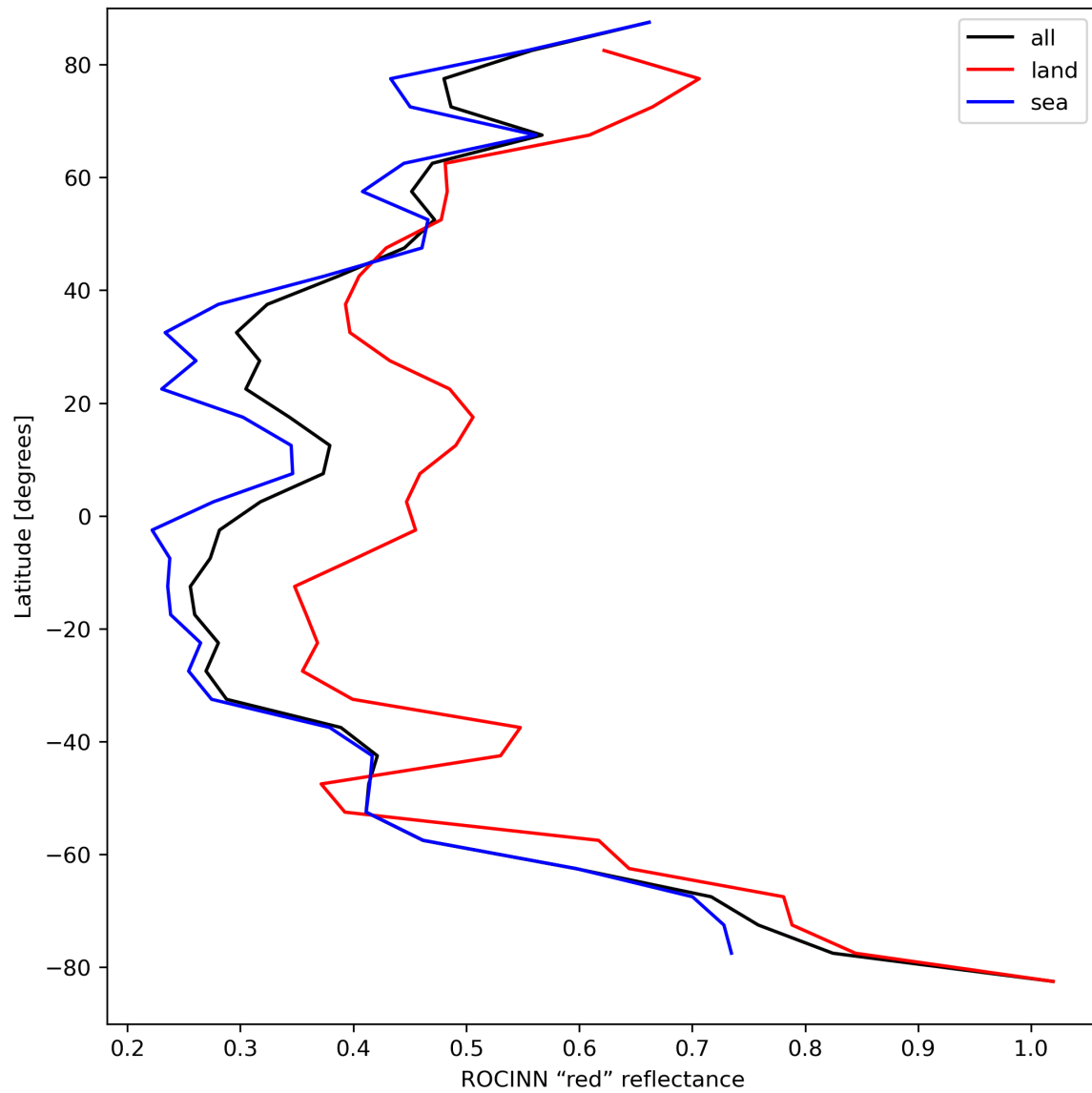


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2023-09-05 to 2023-09-06.

8 Histograms

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

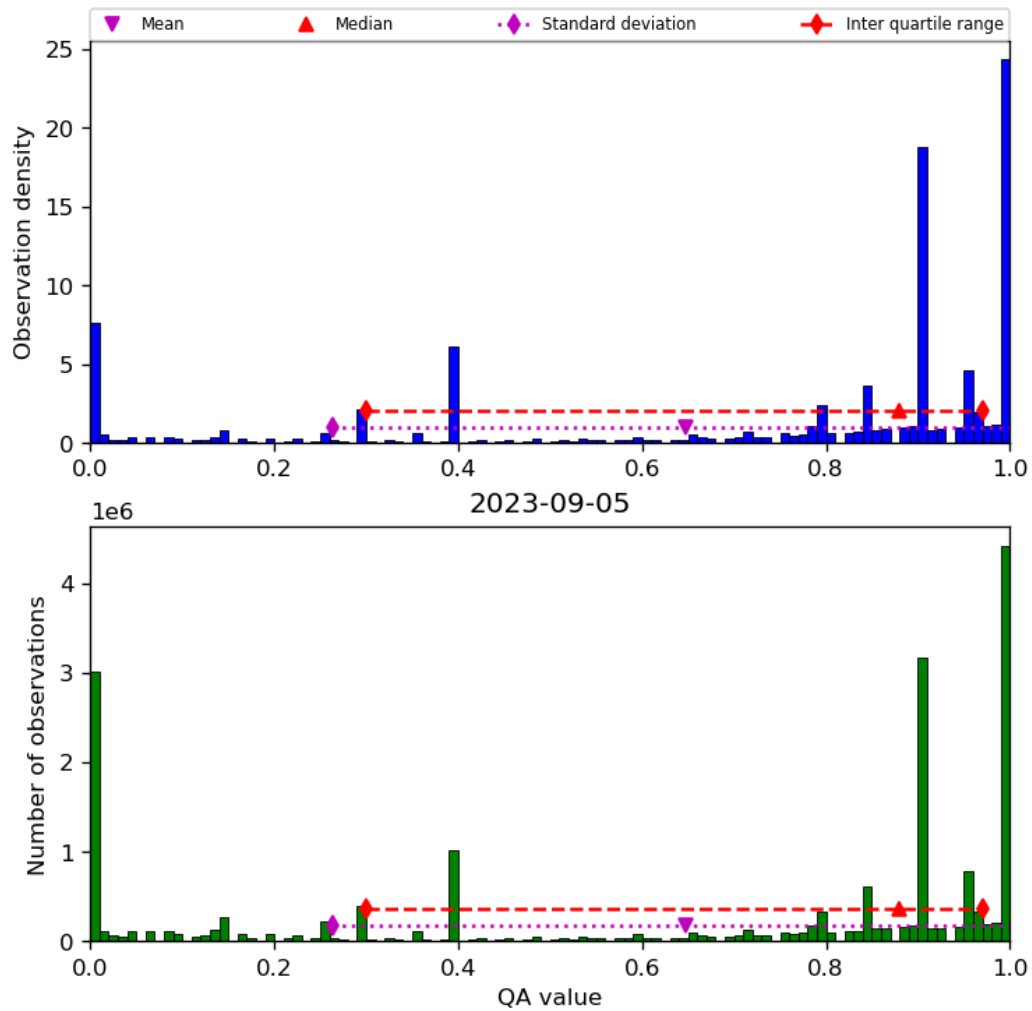


Figure 38: Histogram of “QA value” for 2023-09-05 to 2023-09-06

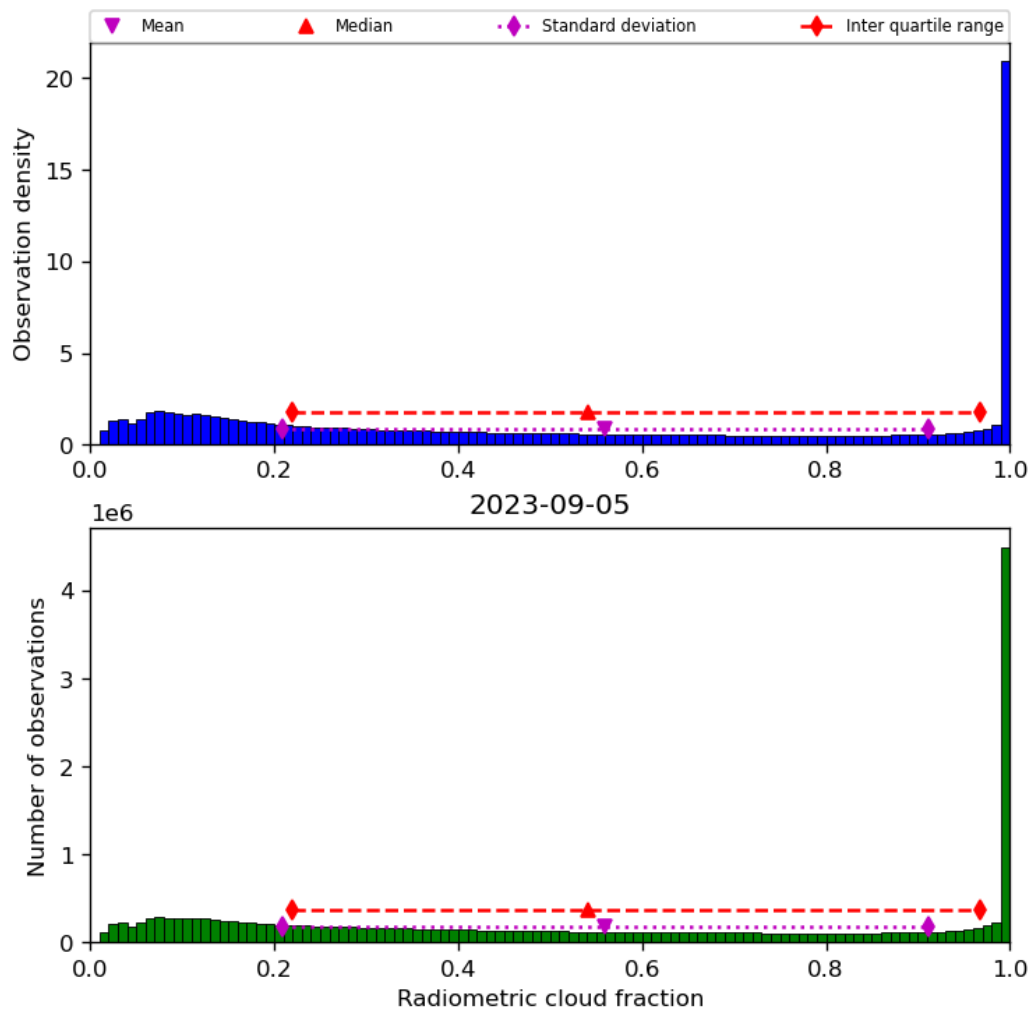


Figure 39: Histogram of “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06

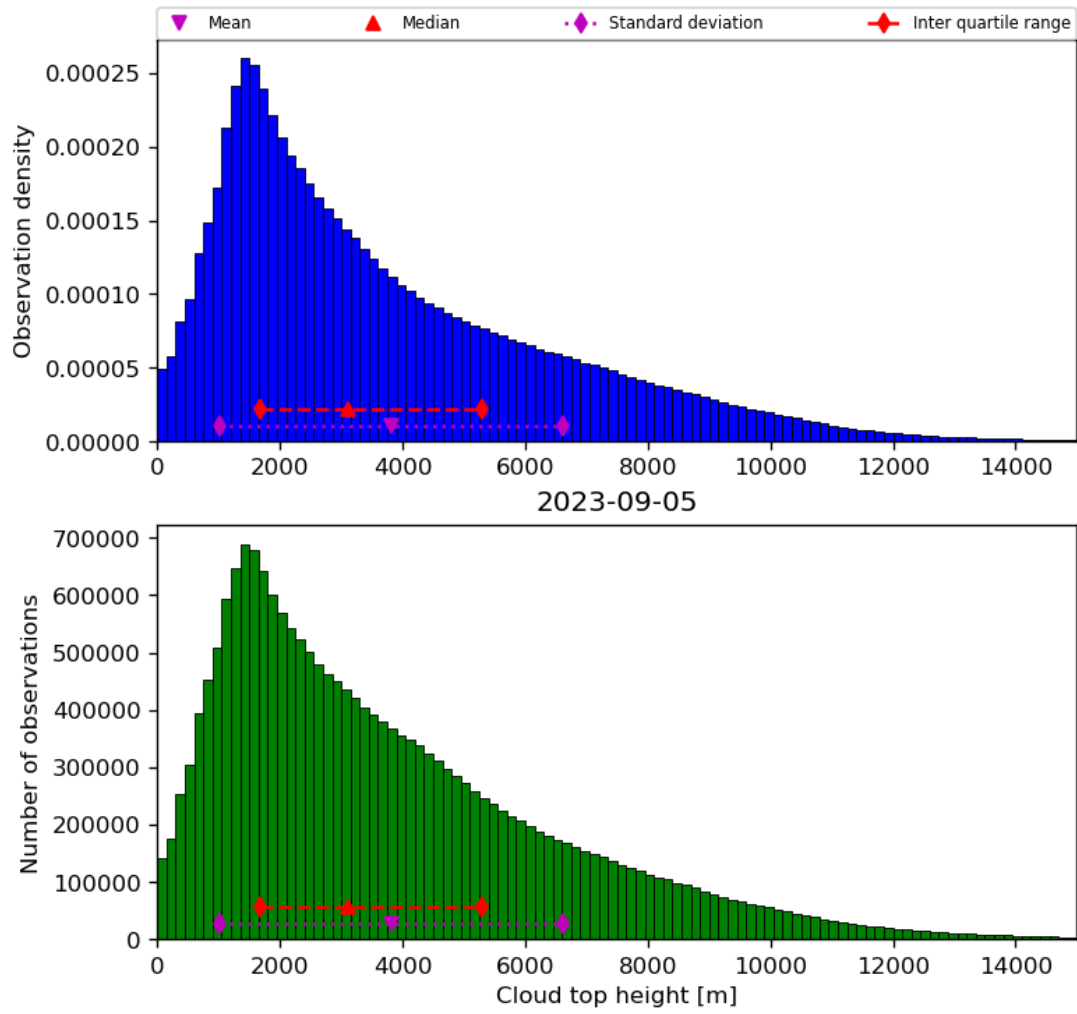


Figure 40: Histogram of “Cloud top height” for 2023-09-05 to 2023-09-06

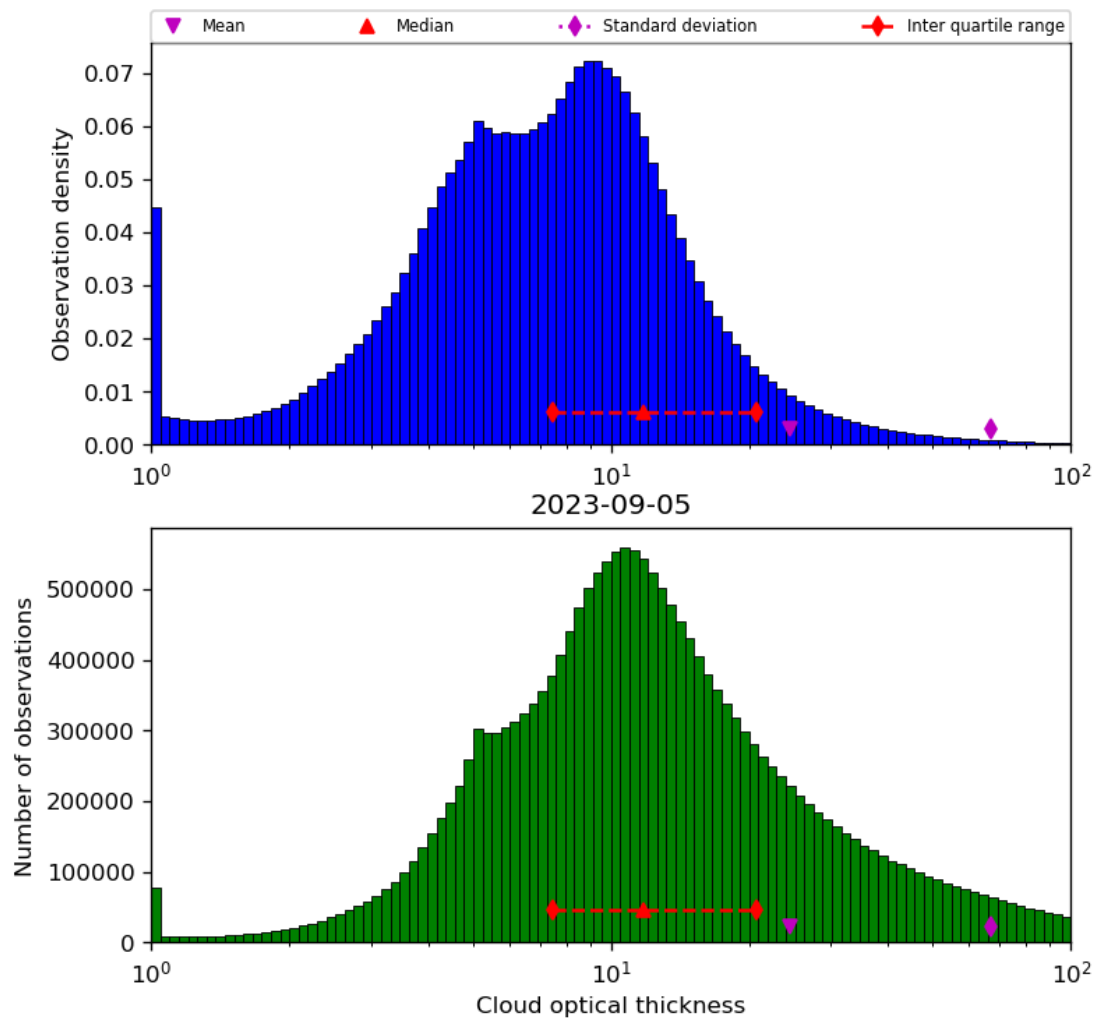


Figure 41: Histogram of “Cloud optical thickness” for 2023-09-05 to 2023-09-06

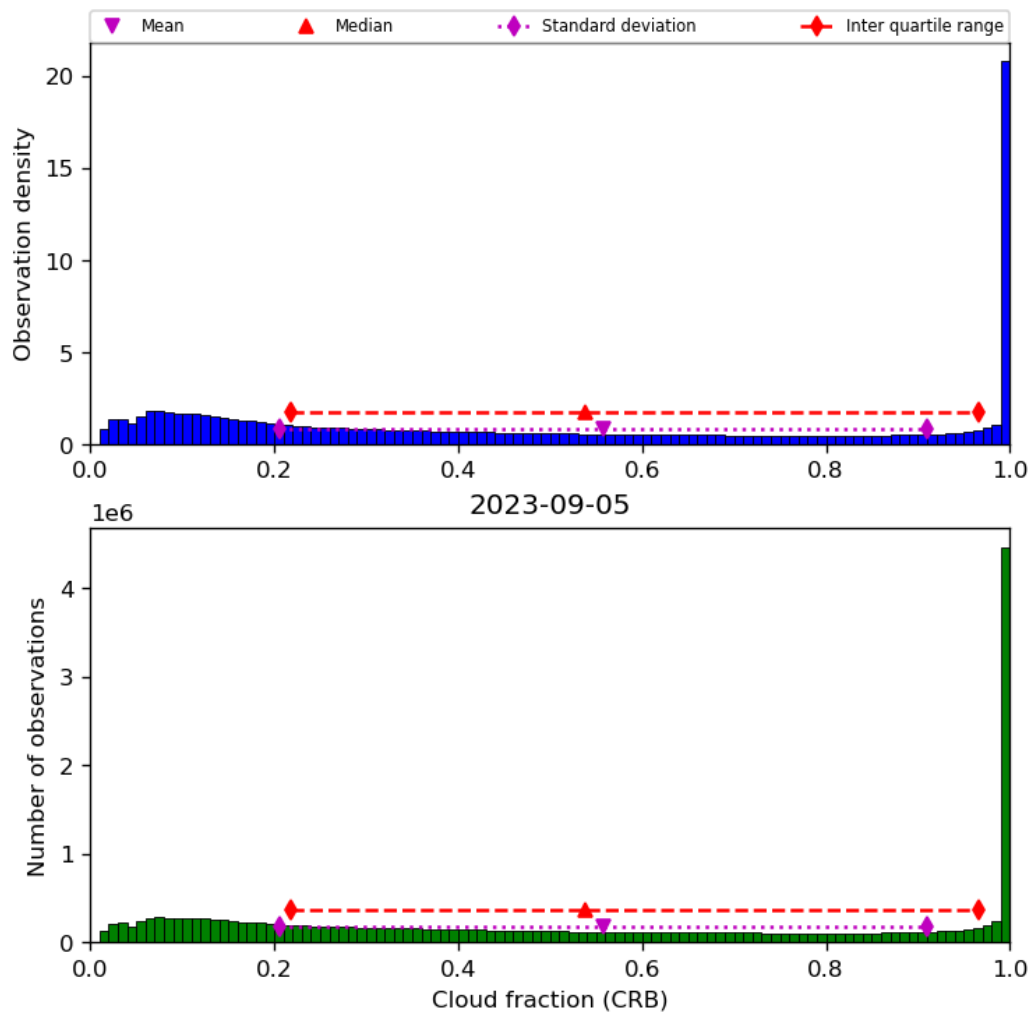


Figure 42: Histogram of “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06

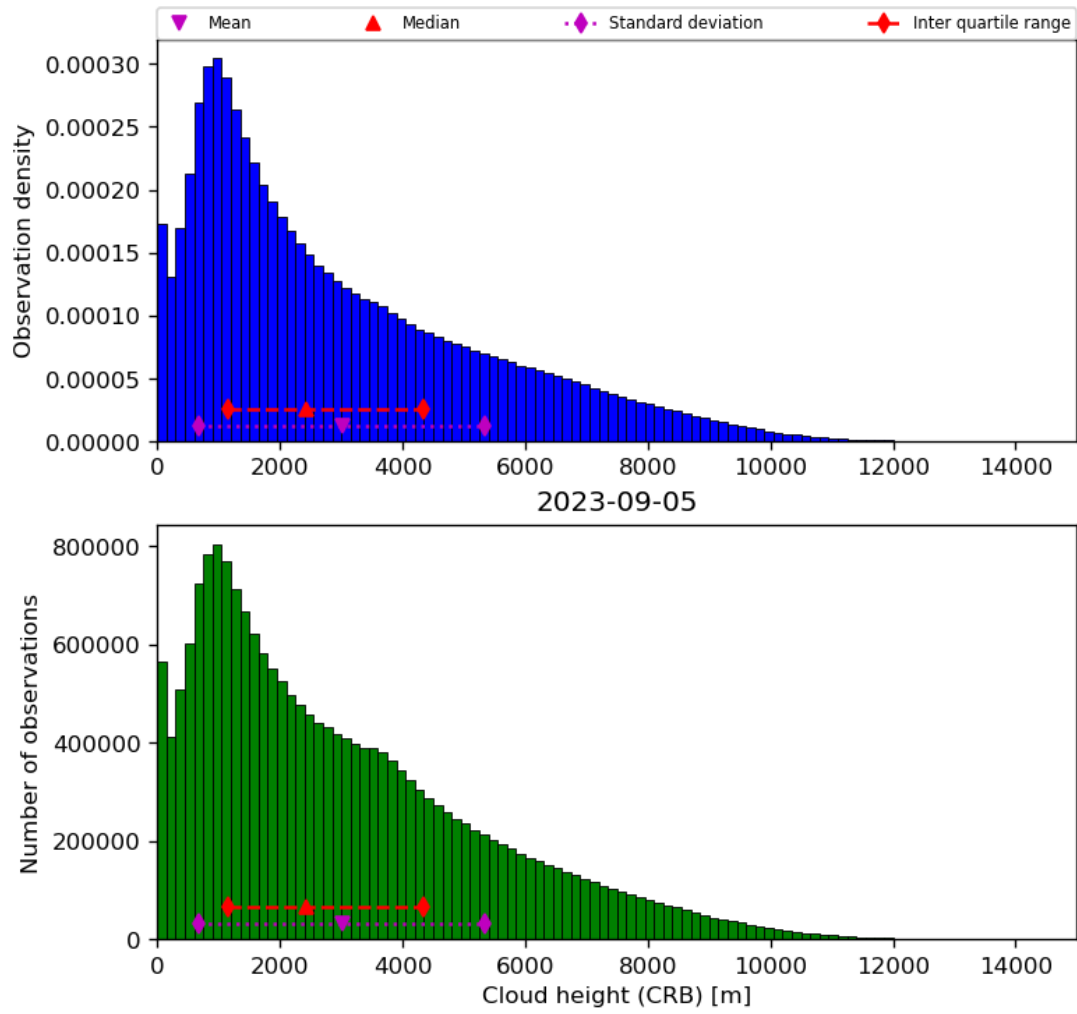


Figure 43: Histogram of “Cloud height (CRB)” for 2023-09-05 to 2023-09-06

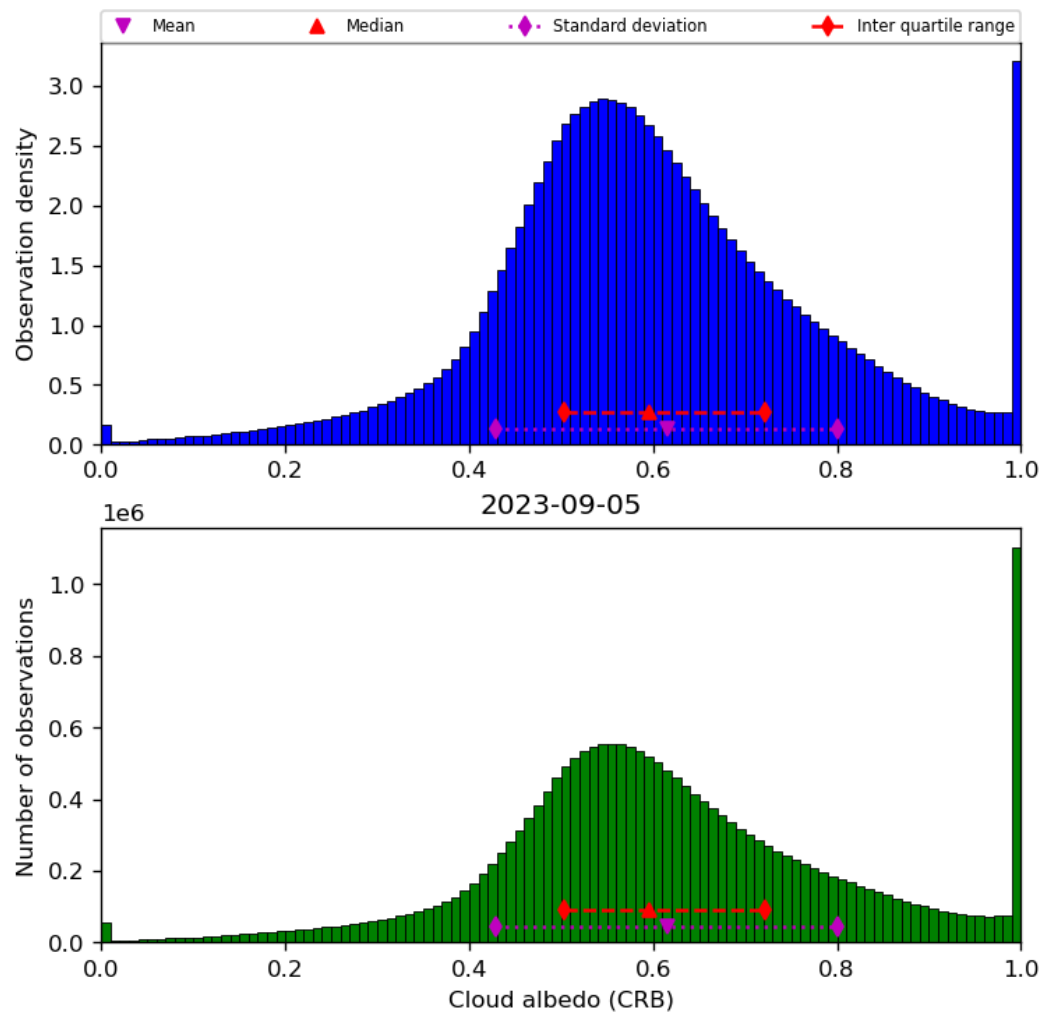


Figure 44: Histogram of “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06

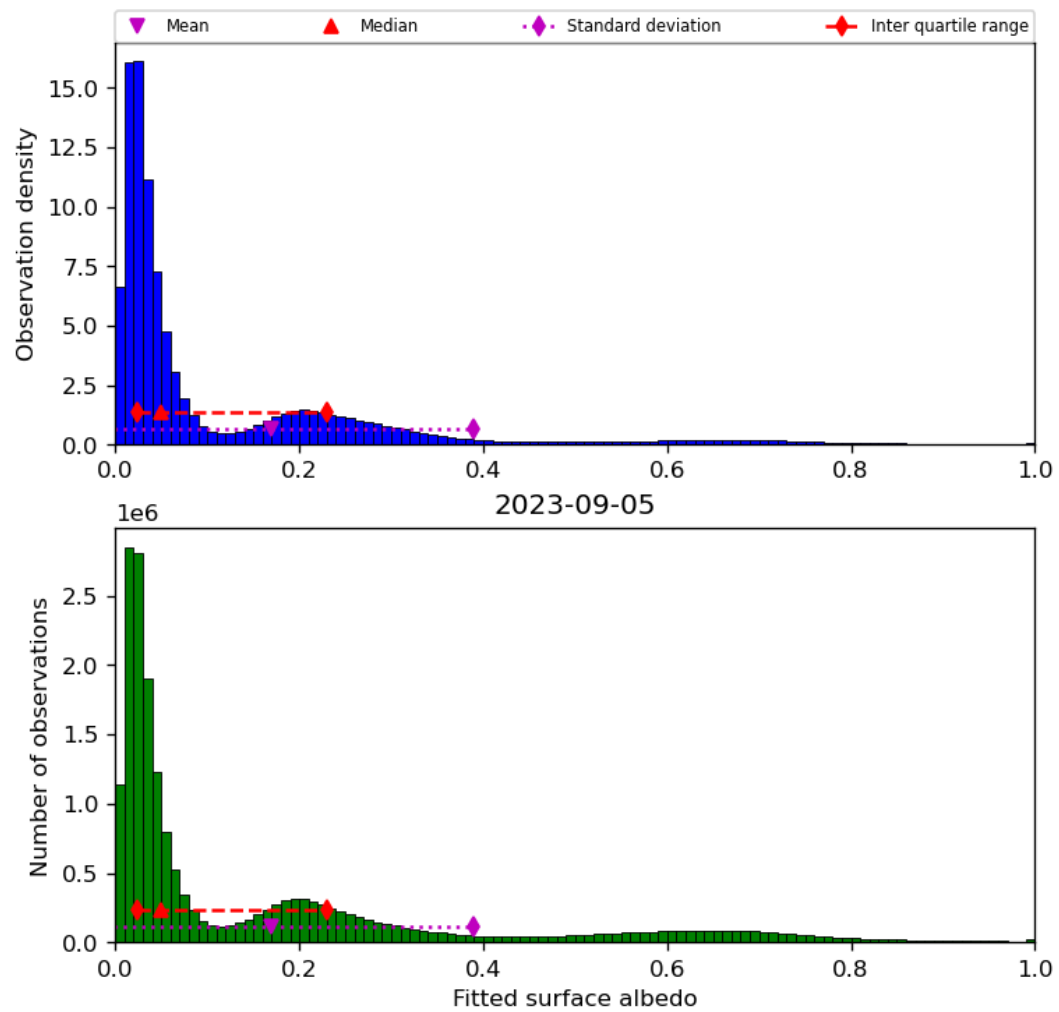


Figure 45: Histogram of “Fitted surface albedo” for 2023-09-05 to 2023-09-06

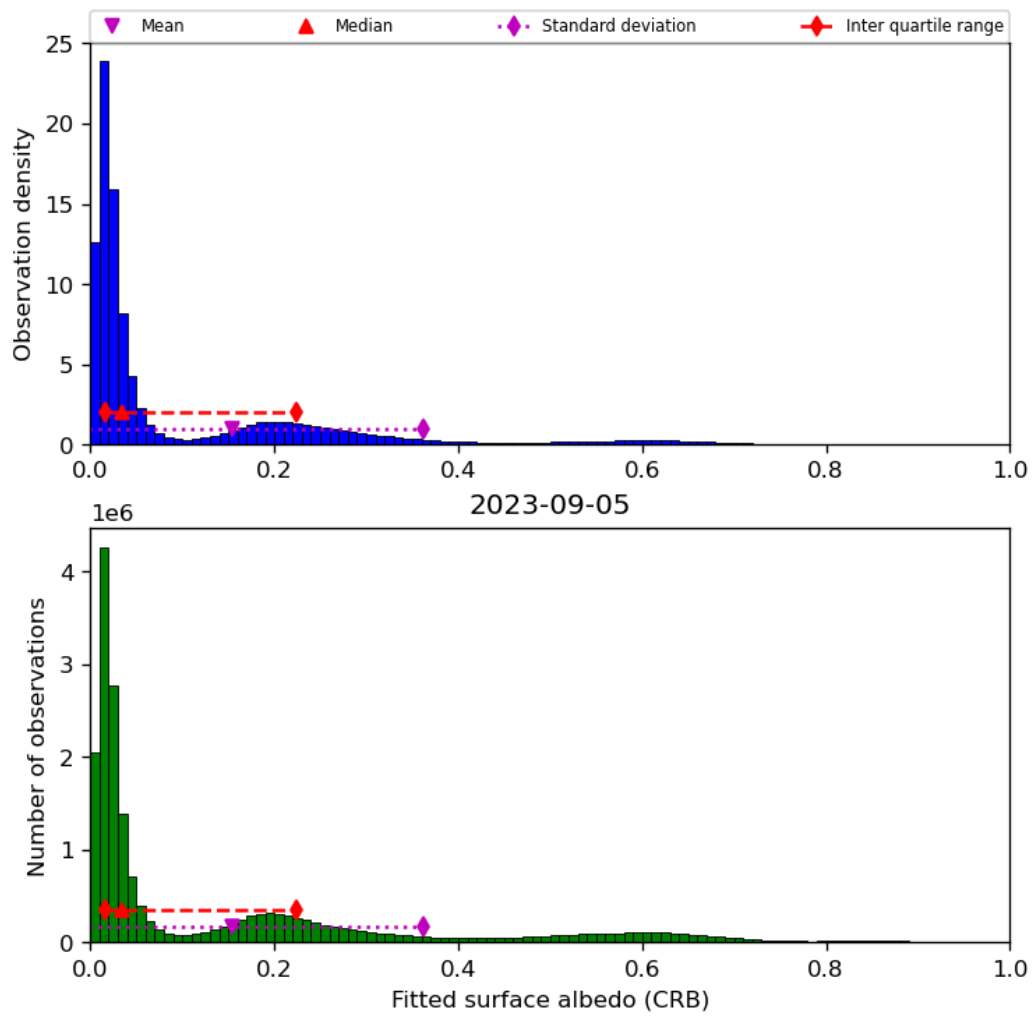


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2023-09-05 to 2023-09-06

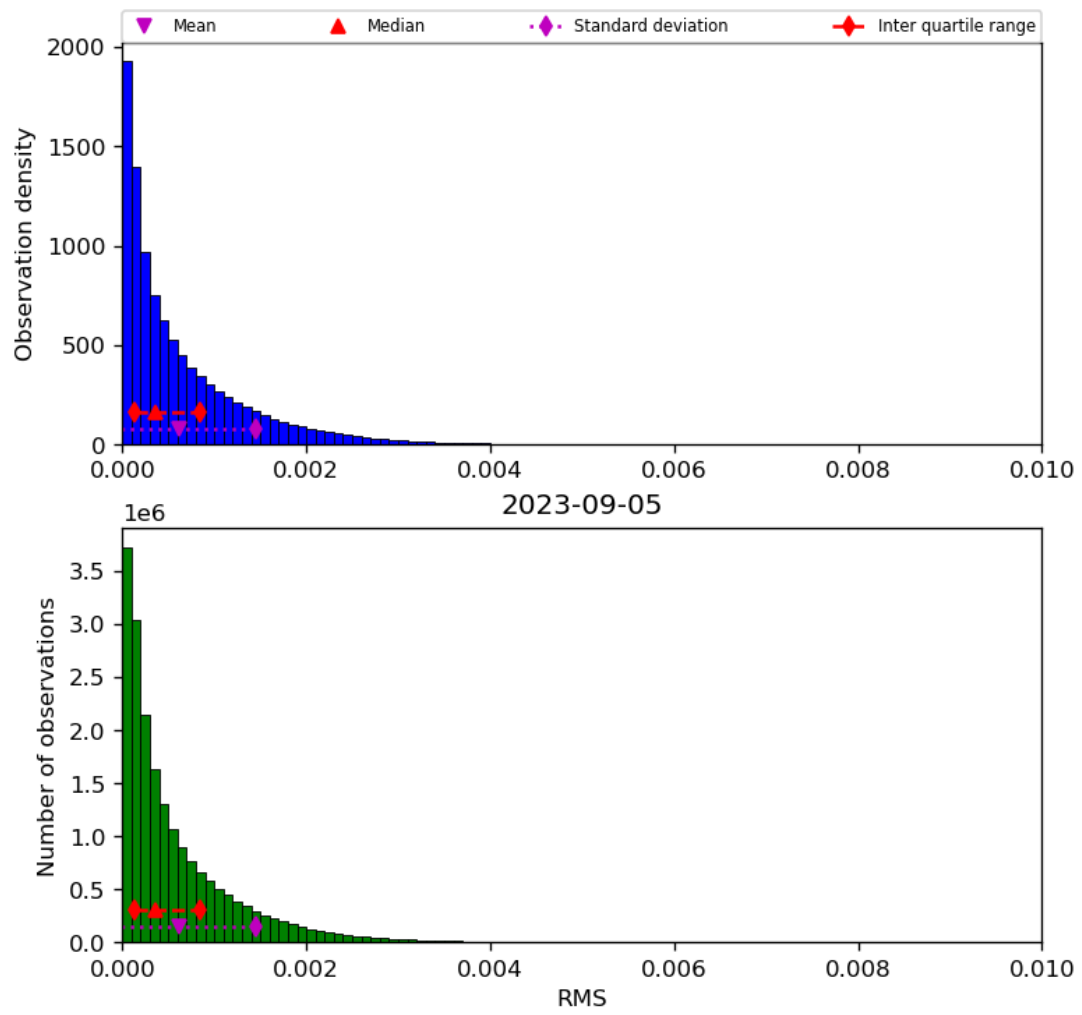


Figure 47: Histogram of “RMS” for 2023-09-05 to 2023-09-06

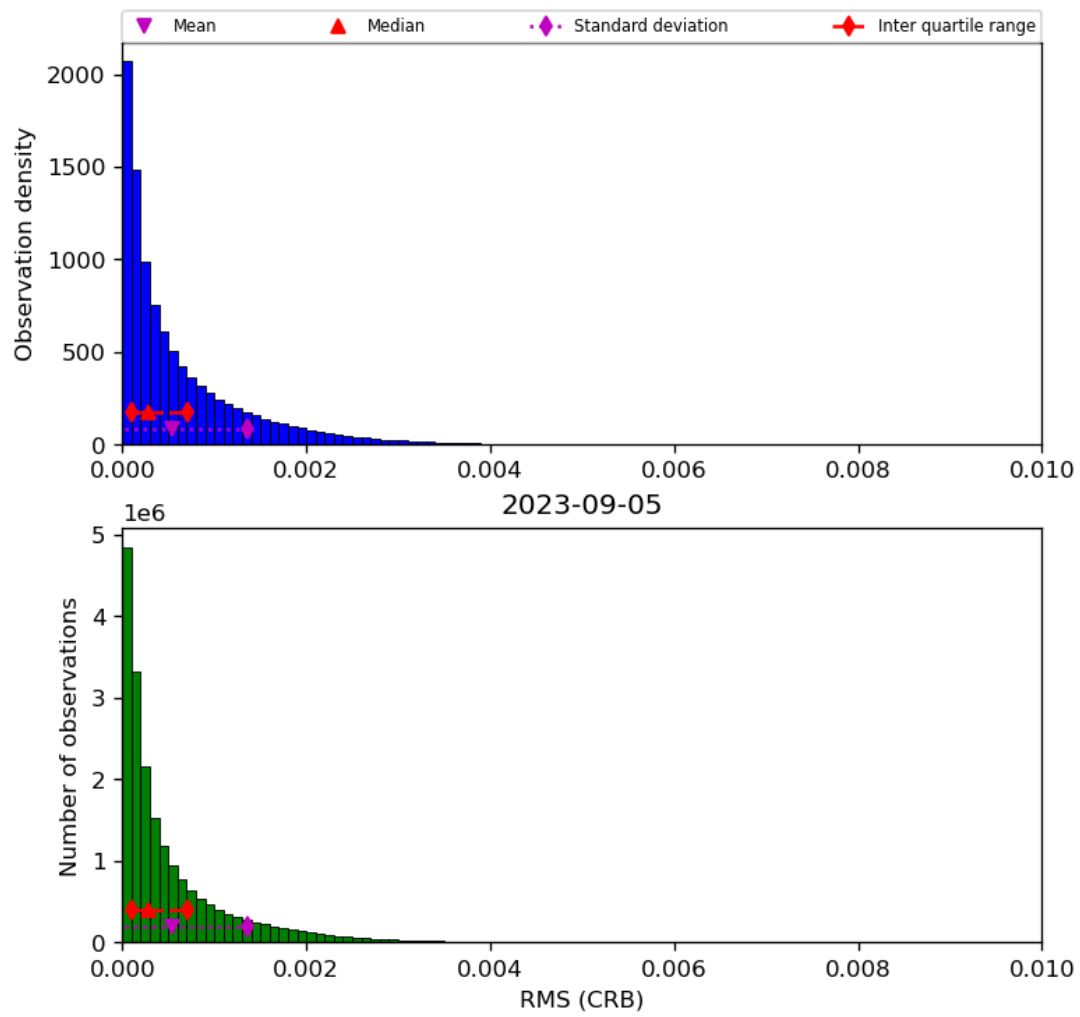


Figure 48: Histogram of "RMS (CRB)" for 2023-09-05 to 2023-09-06

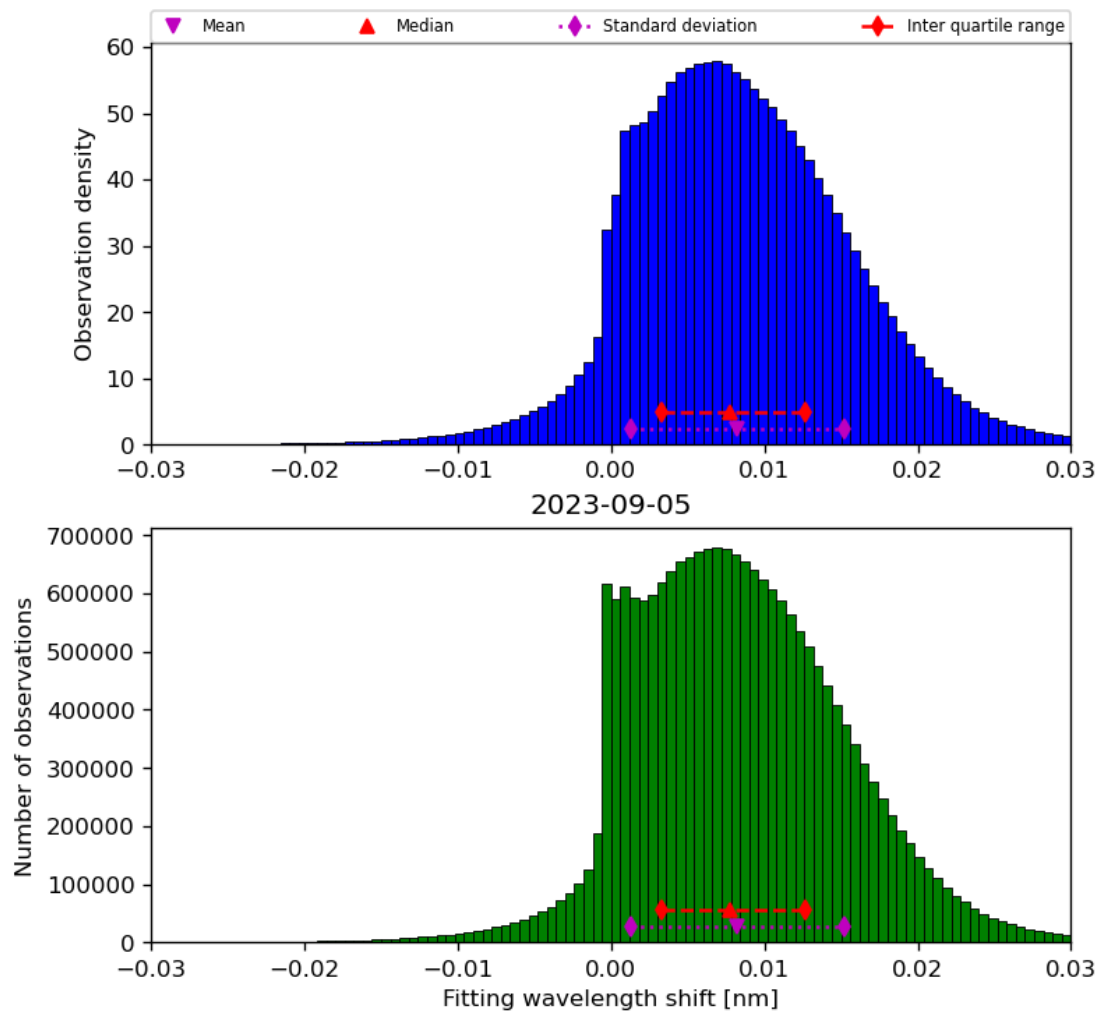


Figure 49: Histogram of “Fitting wavelength shift” for 2023-09-05 to 2023-09-06

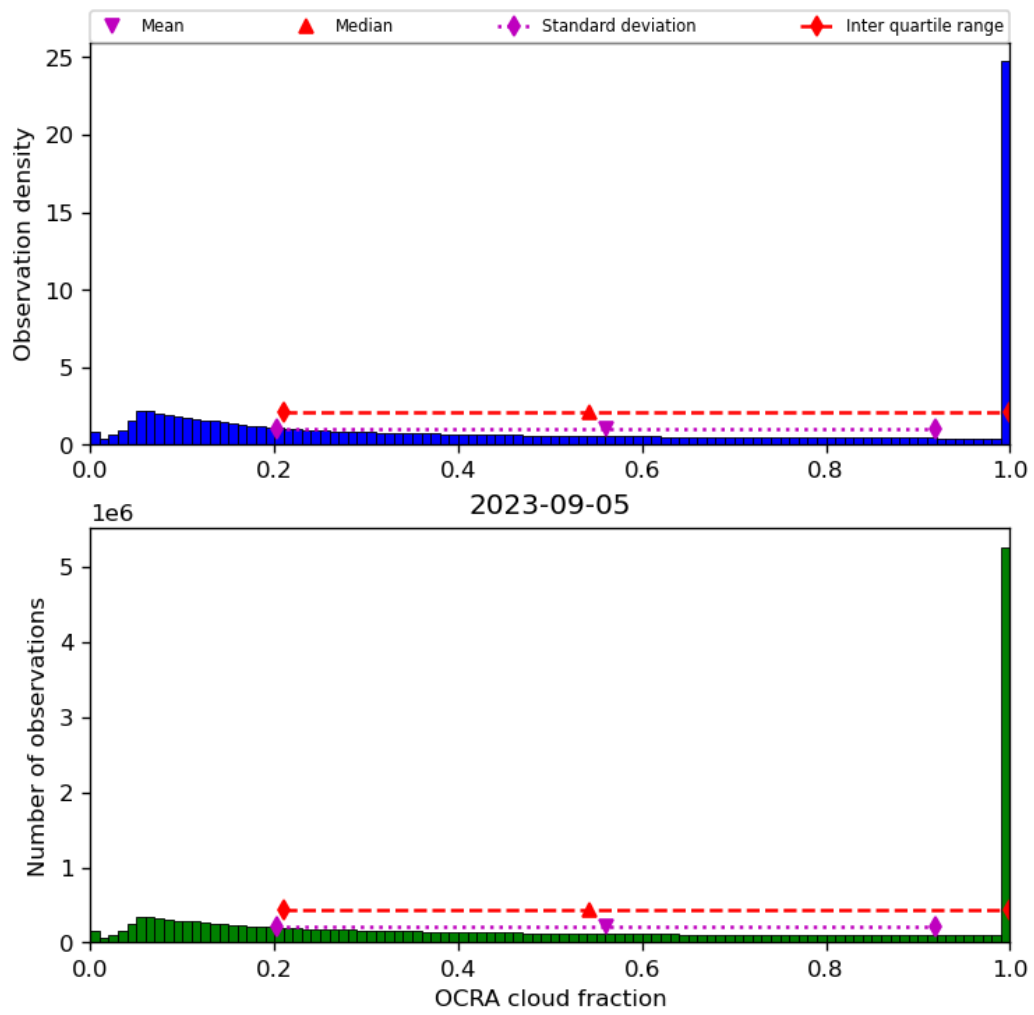


Figure 50: Histogram of “OCRA cloud fraction” for 2023-09-05 to 2023-09-06

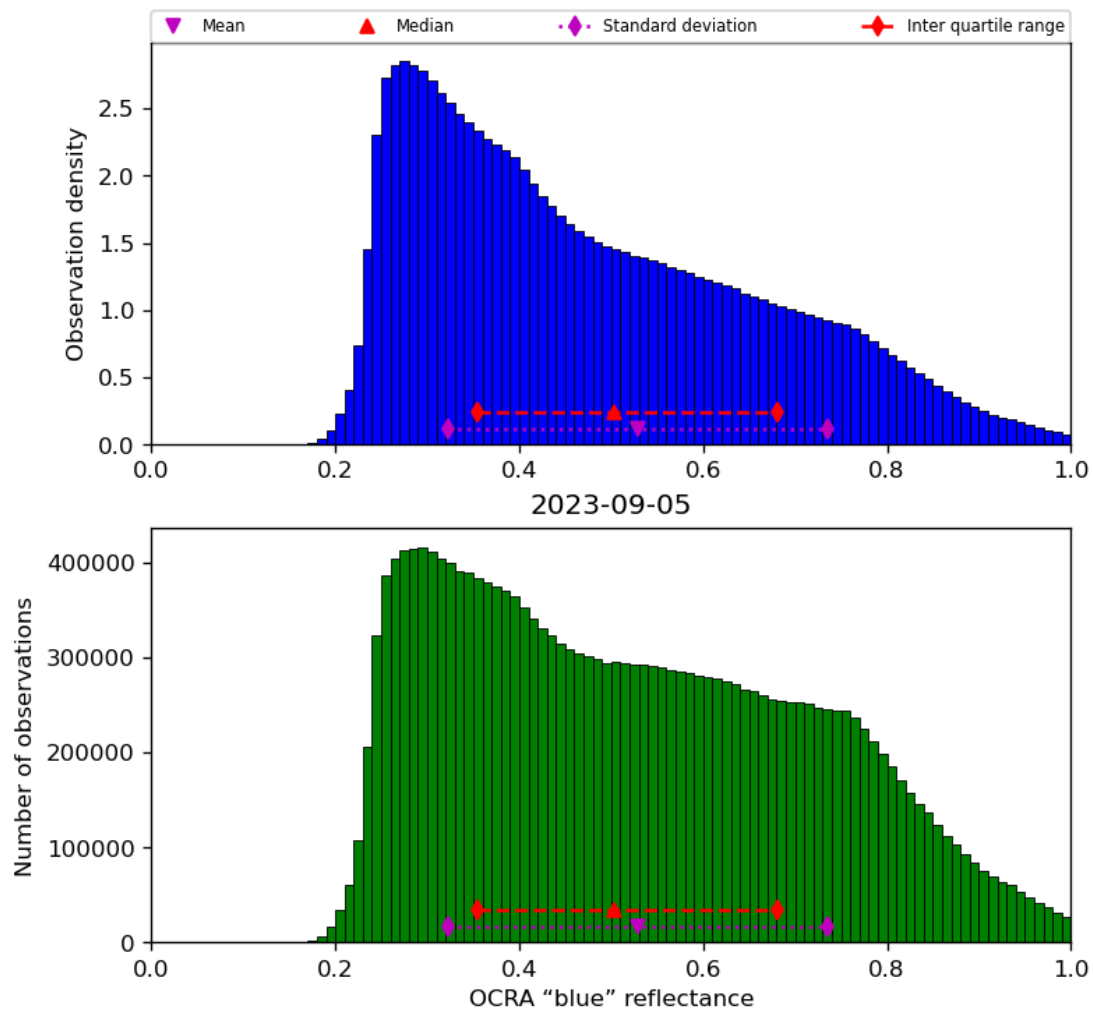


Figure 51: Histogram of “OCRA “blue” reflectance” for 2023-09-05 to 2023-09-06

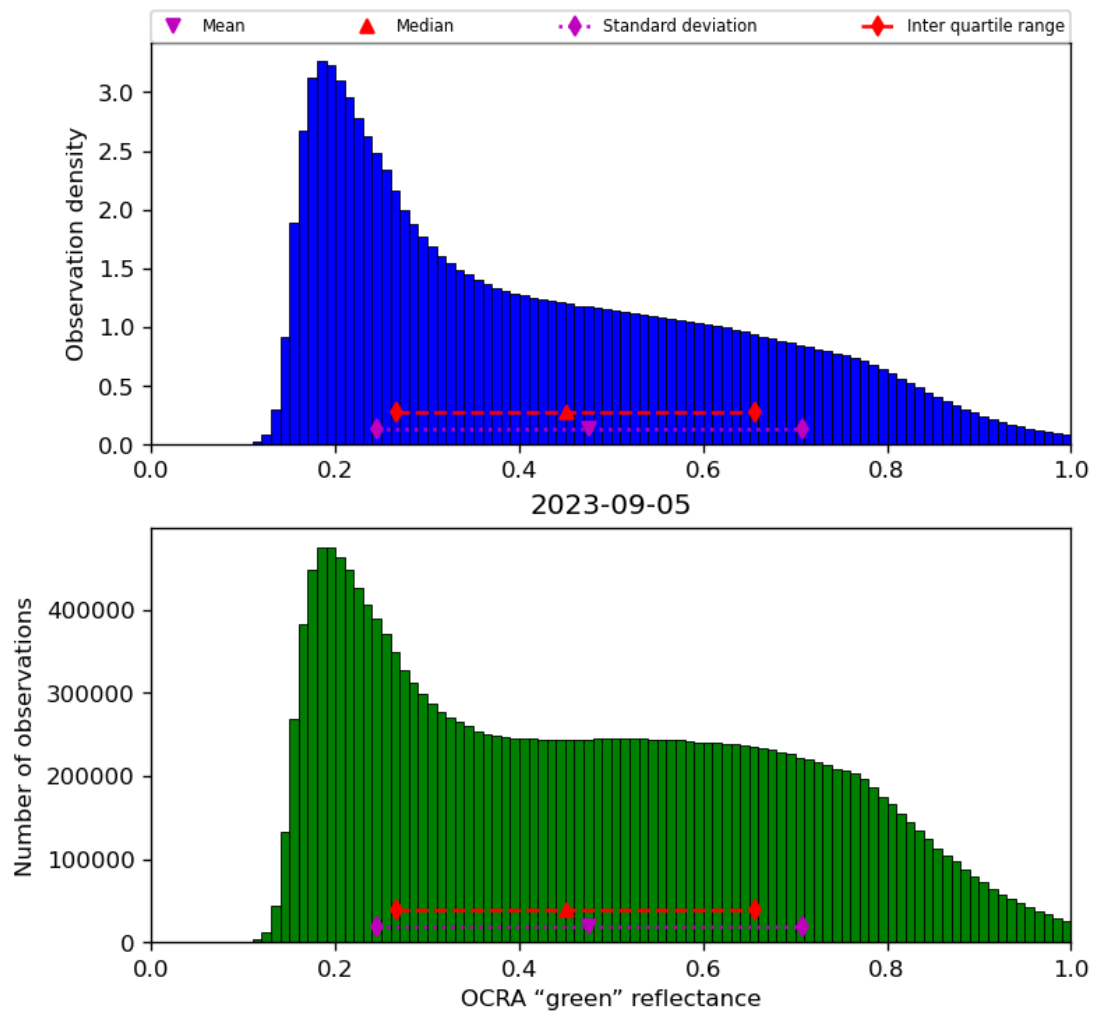


Figure 52: Histogram of “OCRA “green” reflectance” for 2023-09-05 to 2023-09-06

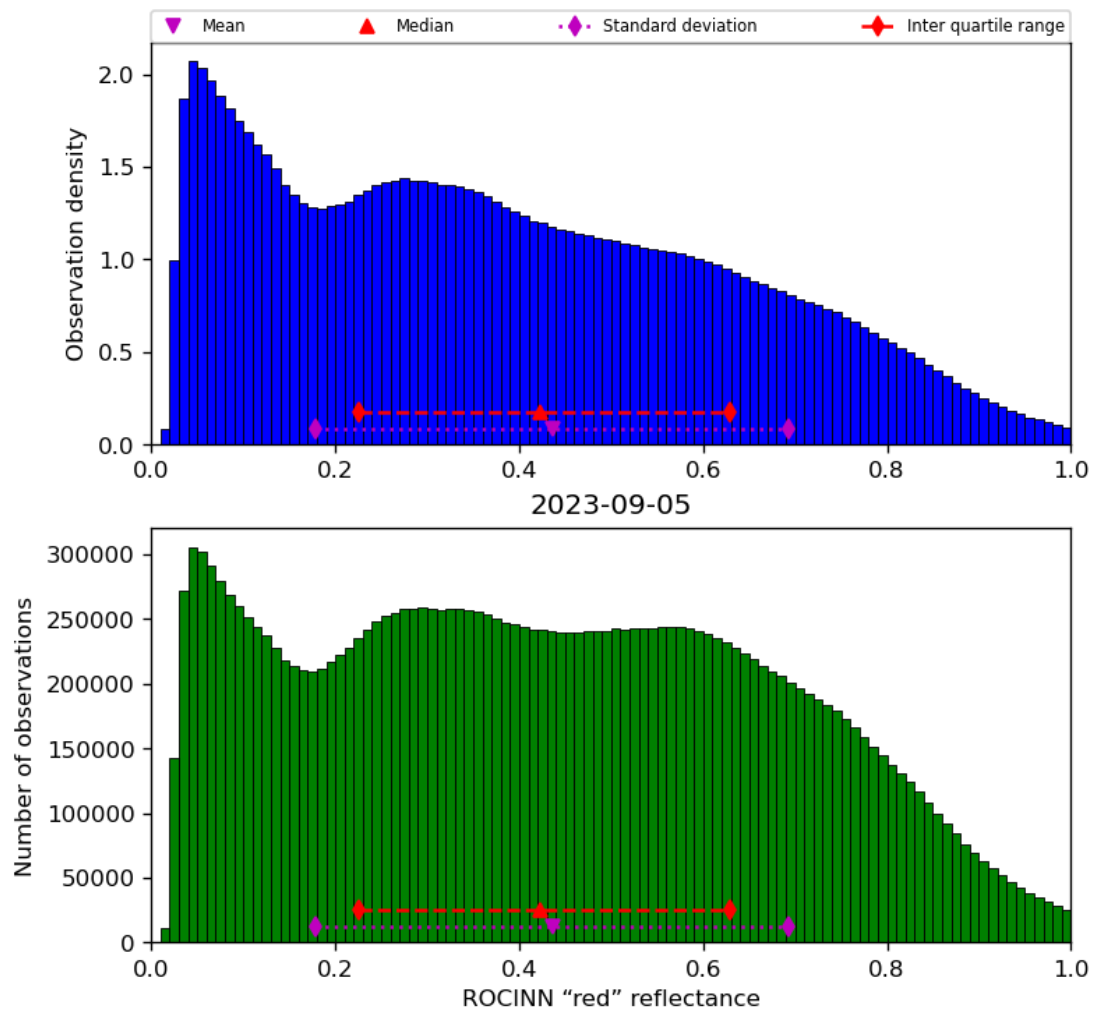


Figure 53: Histogram of “ROCINN “red” reflectance” for 2023-09-05 to 2023-09-06

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.

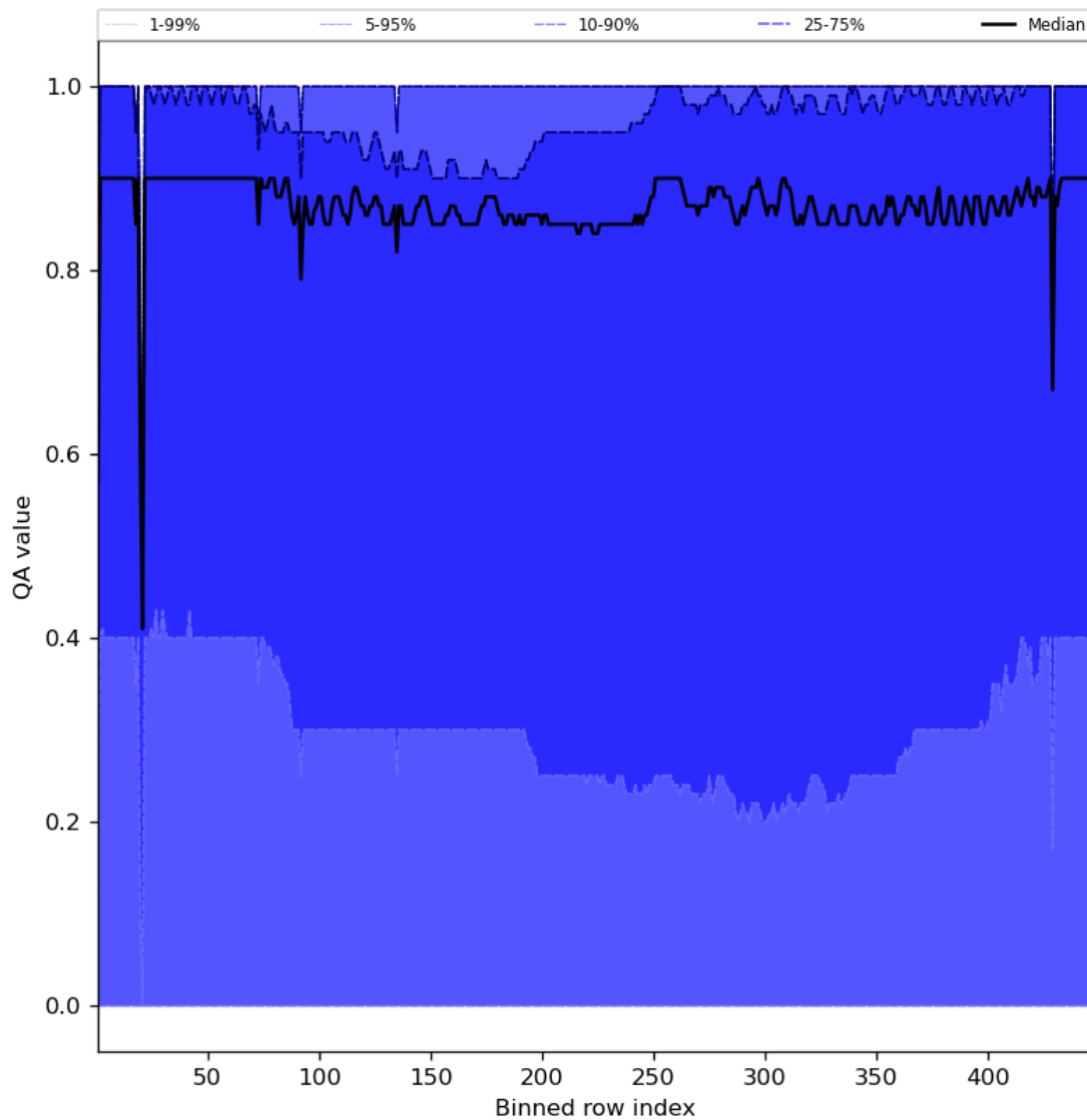


Figure 54: Along track statistics of “QA value” for 2023-09-05 to 2023-09-06

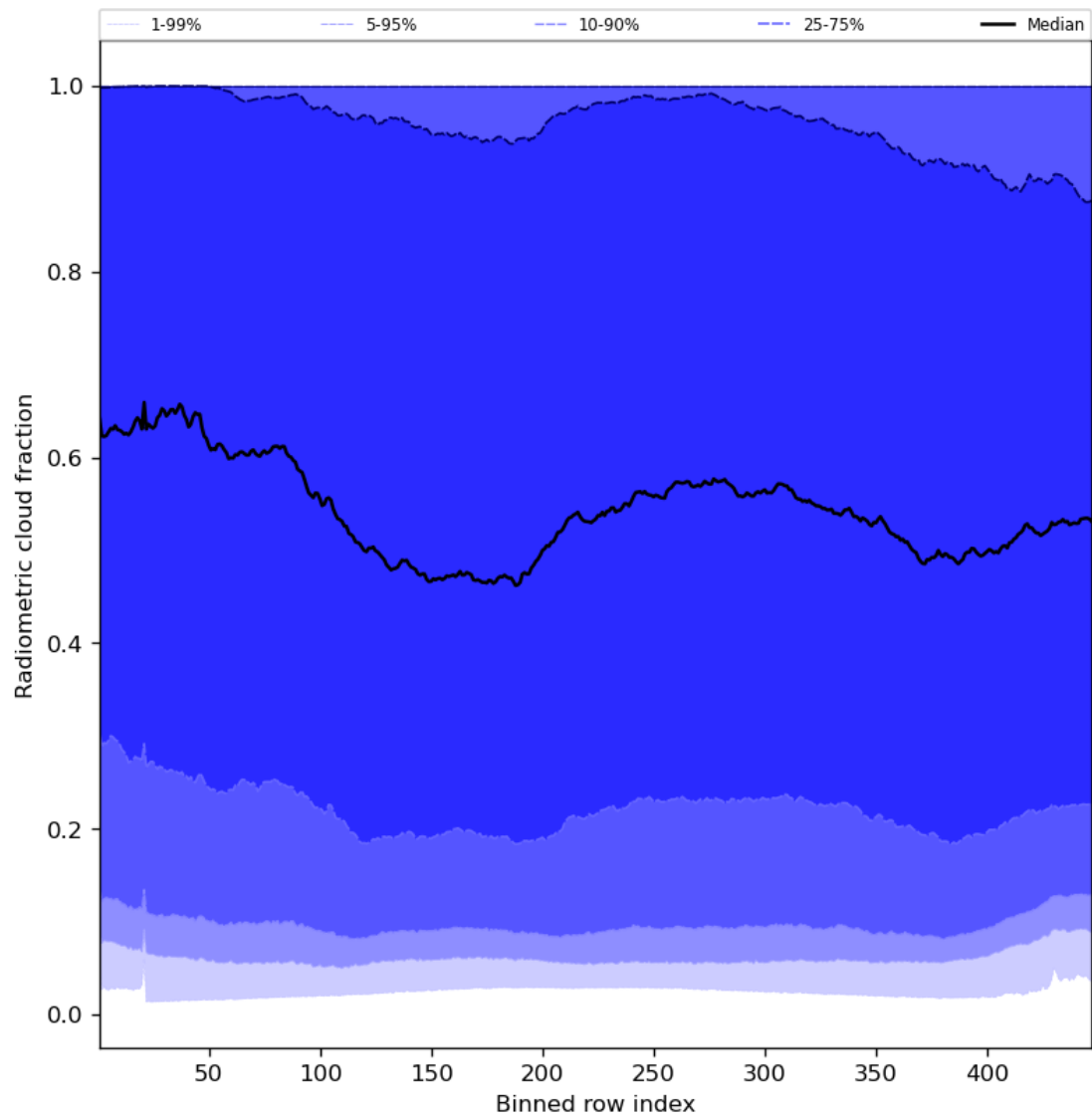


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06

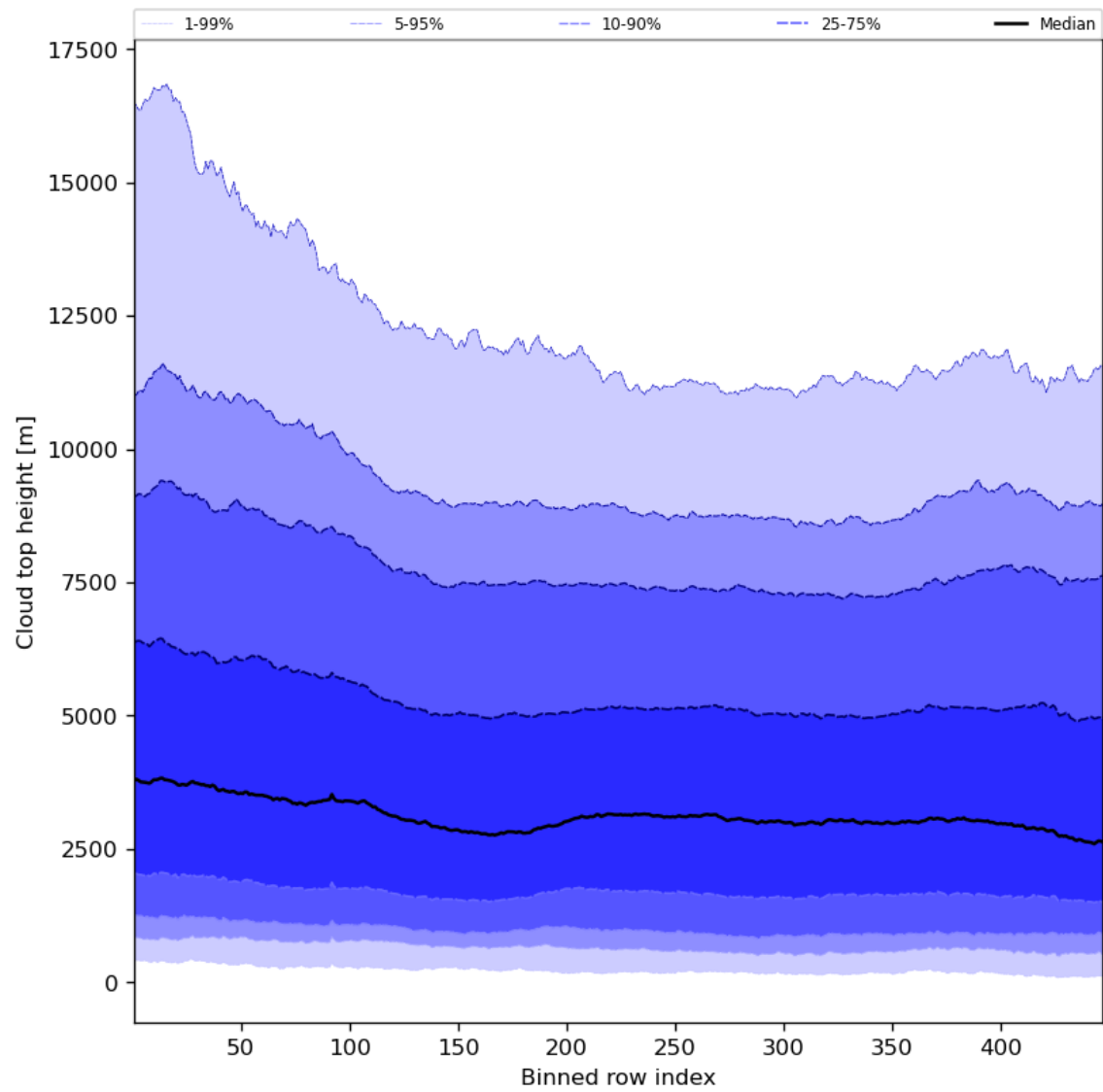


Figure 56: Along track statistics of “Cloud top height” for 2023-09-05 to 2023-09-06

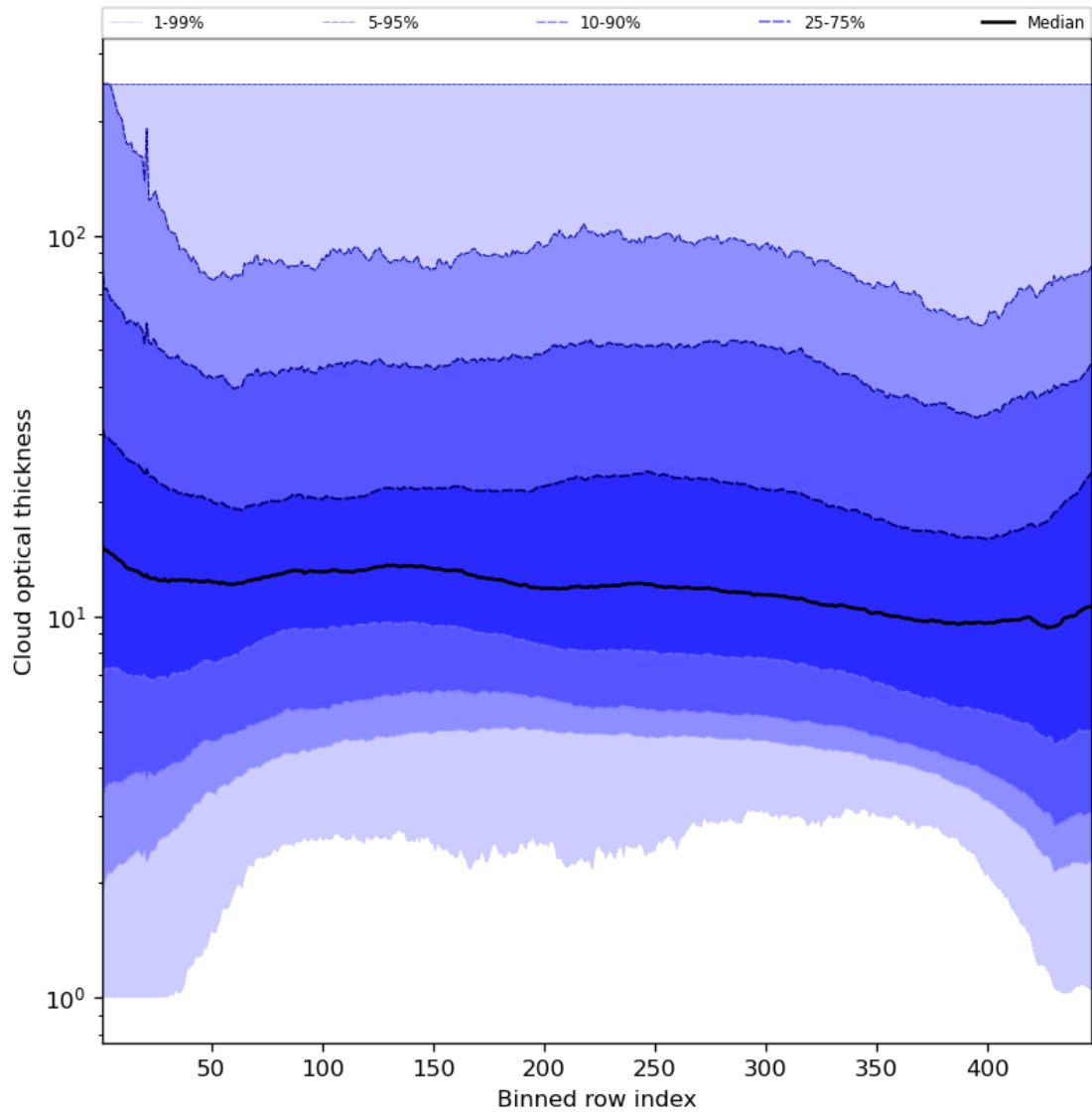


Figure 57: Along track statistics of “Cloud optical thickness” for 2023-09-05 to 2023-09-06

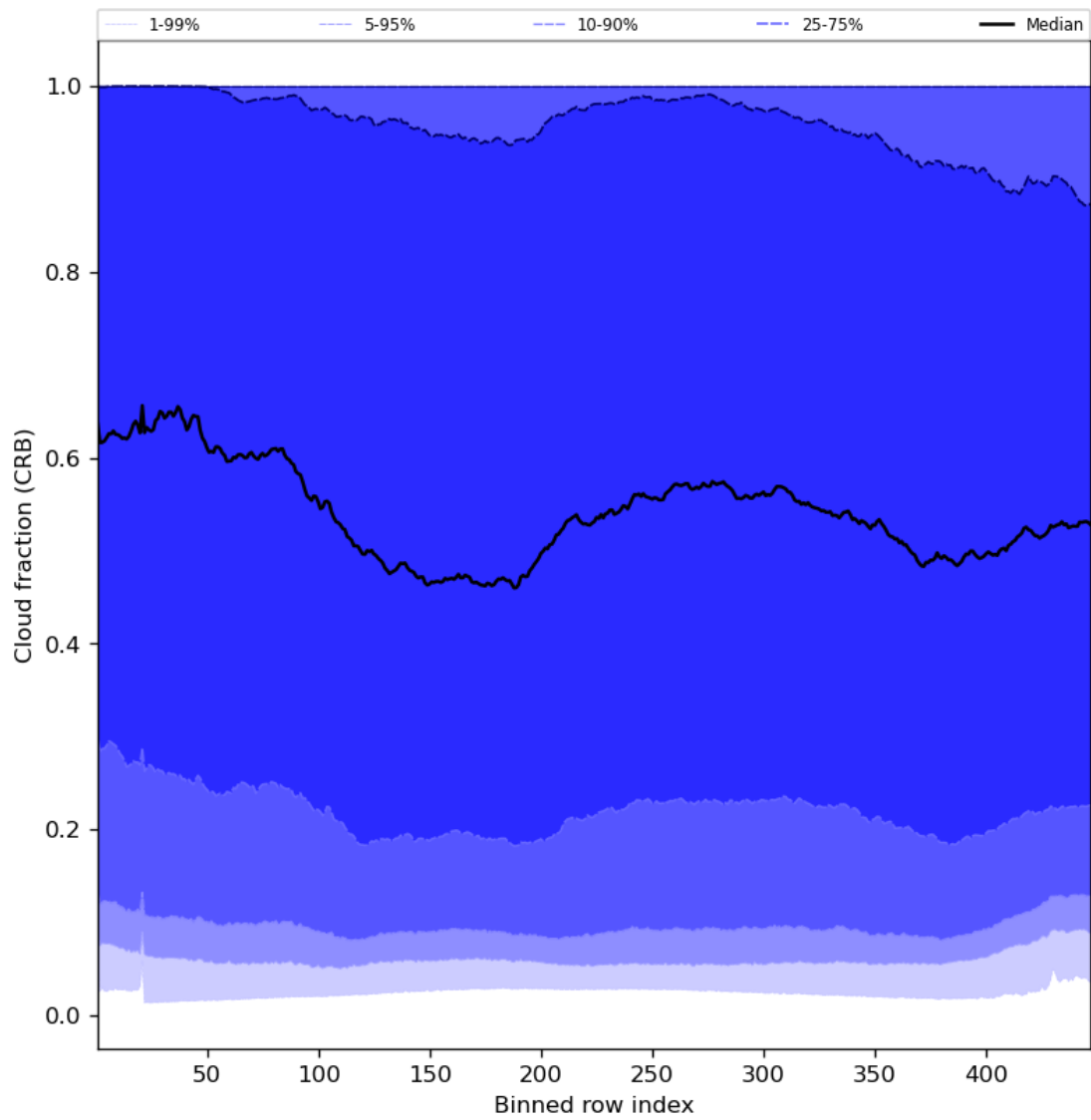


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06

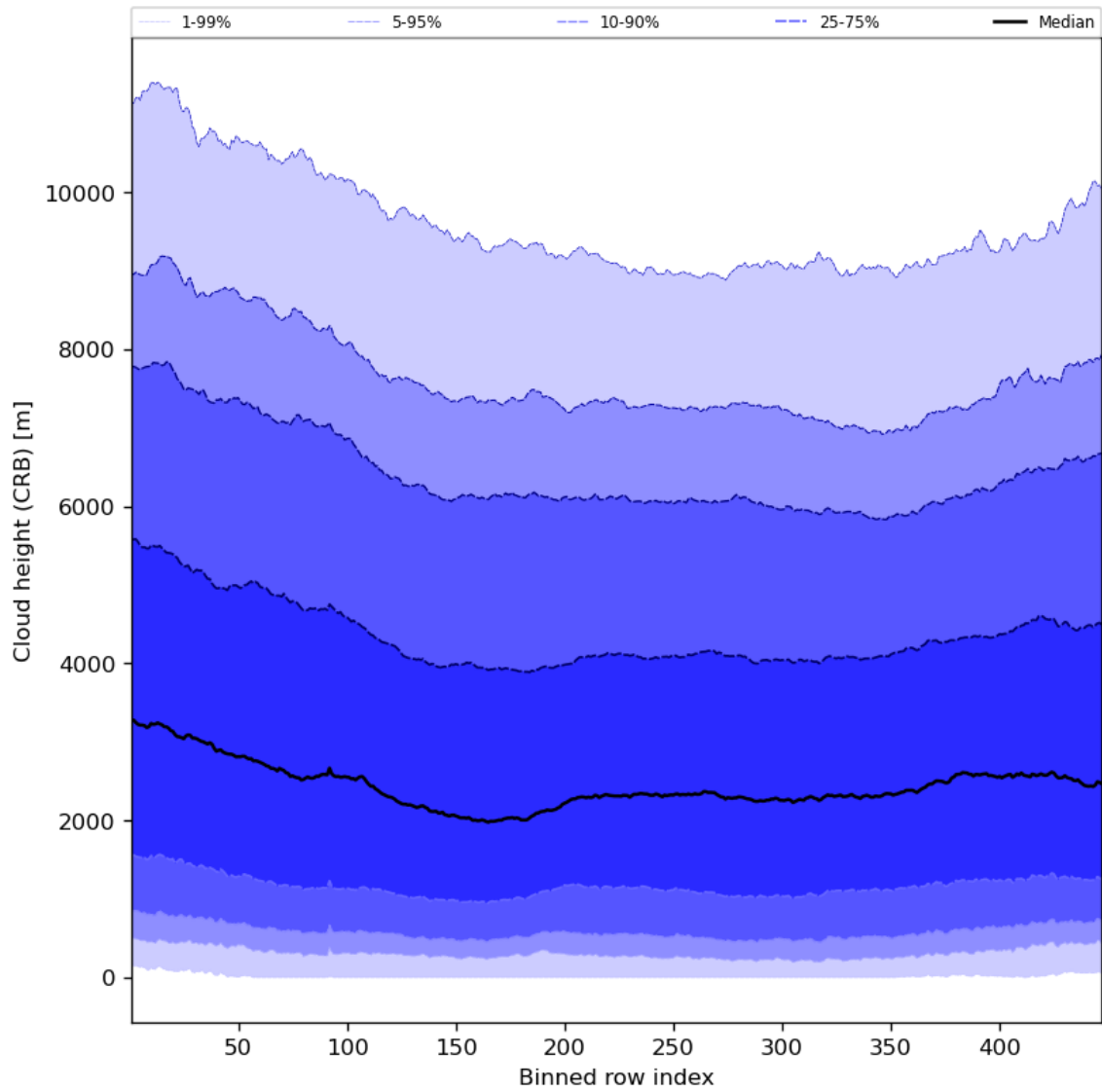


Figure 59: Along track statistics of “Cloud height (CRB)” for 2023-09-05 to 2023-09-06

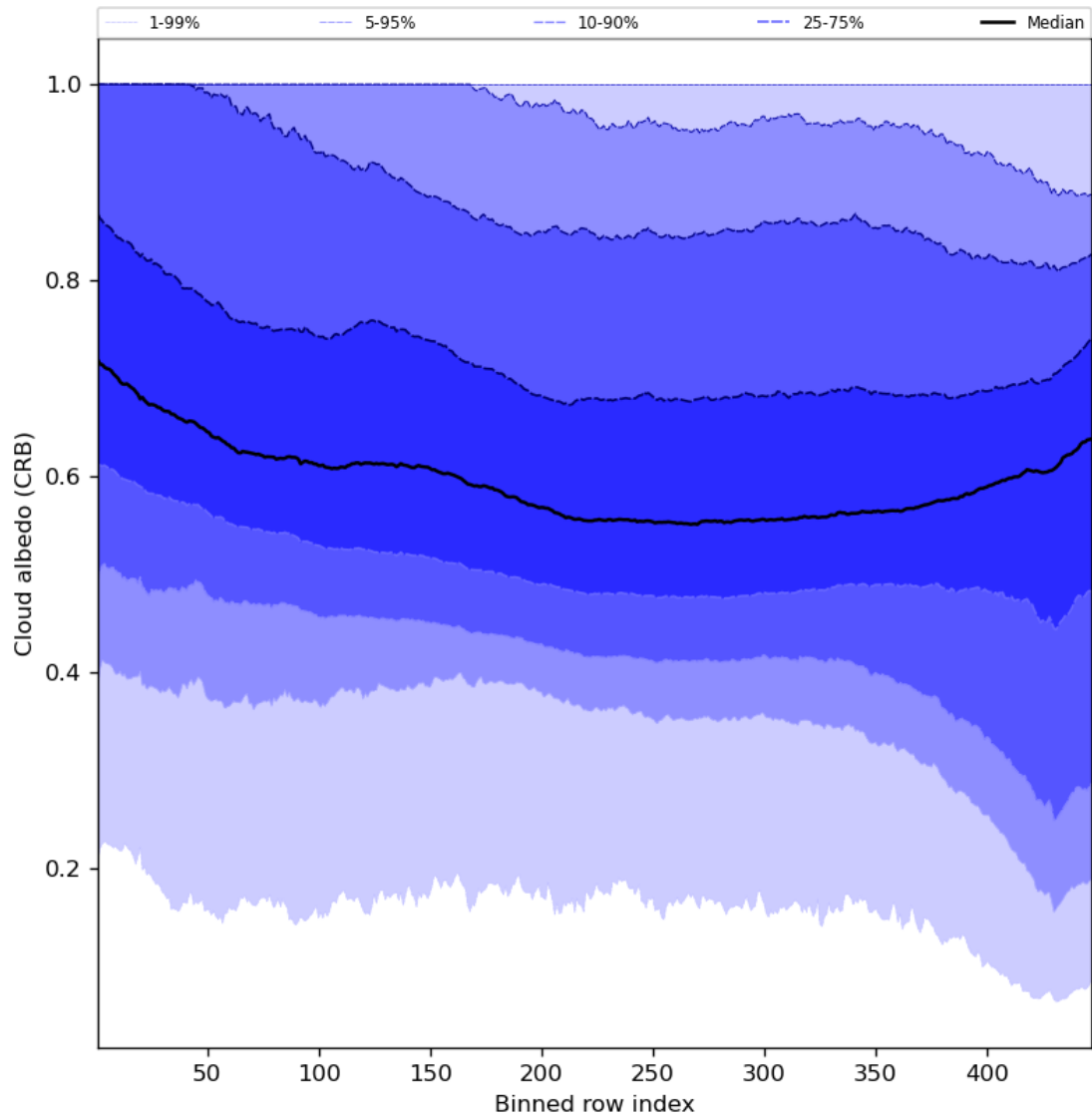


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06

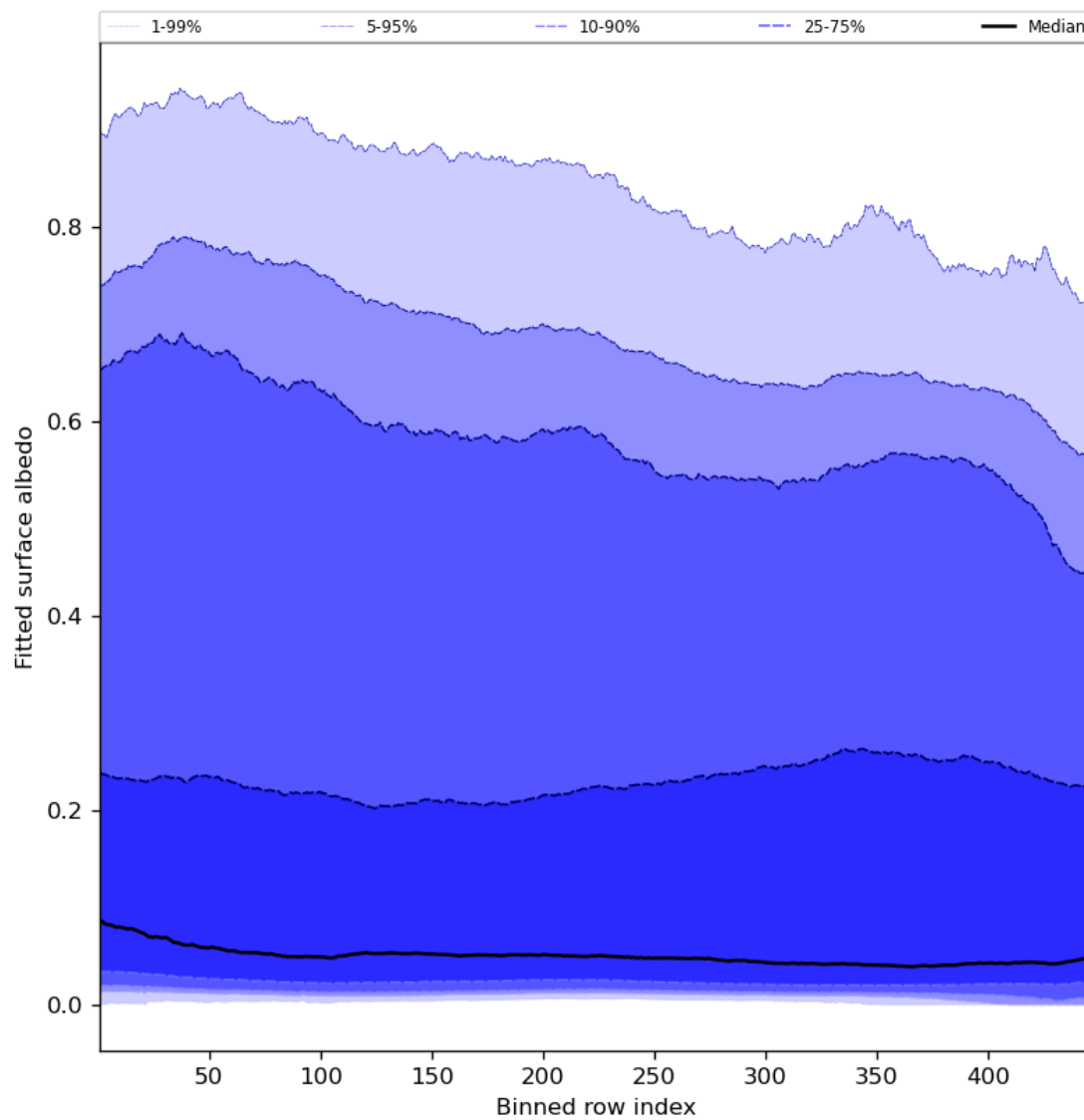


Figure 61: Along track statistics of “Fitted surface albedo” for 2023-09-05 to 2023-09-06

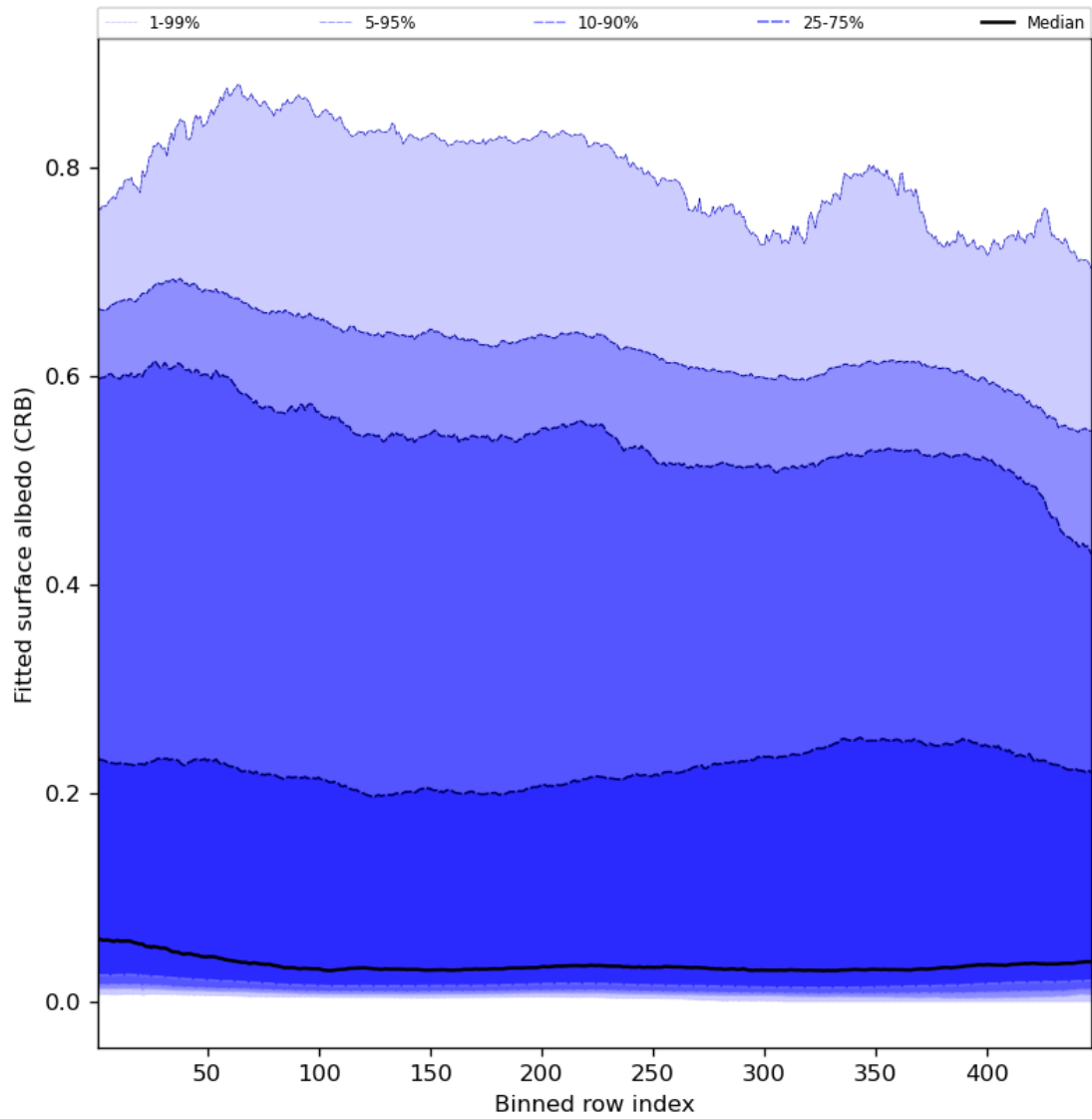


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2023-09-05 to 2023-09-06

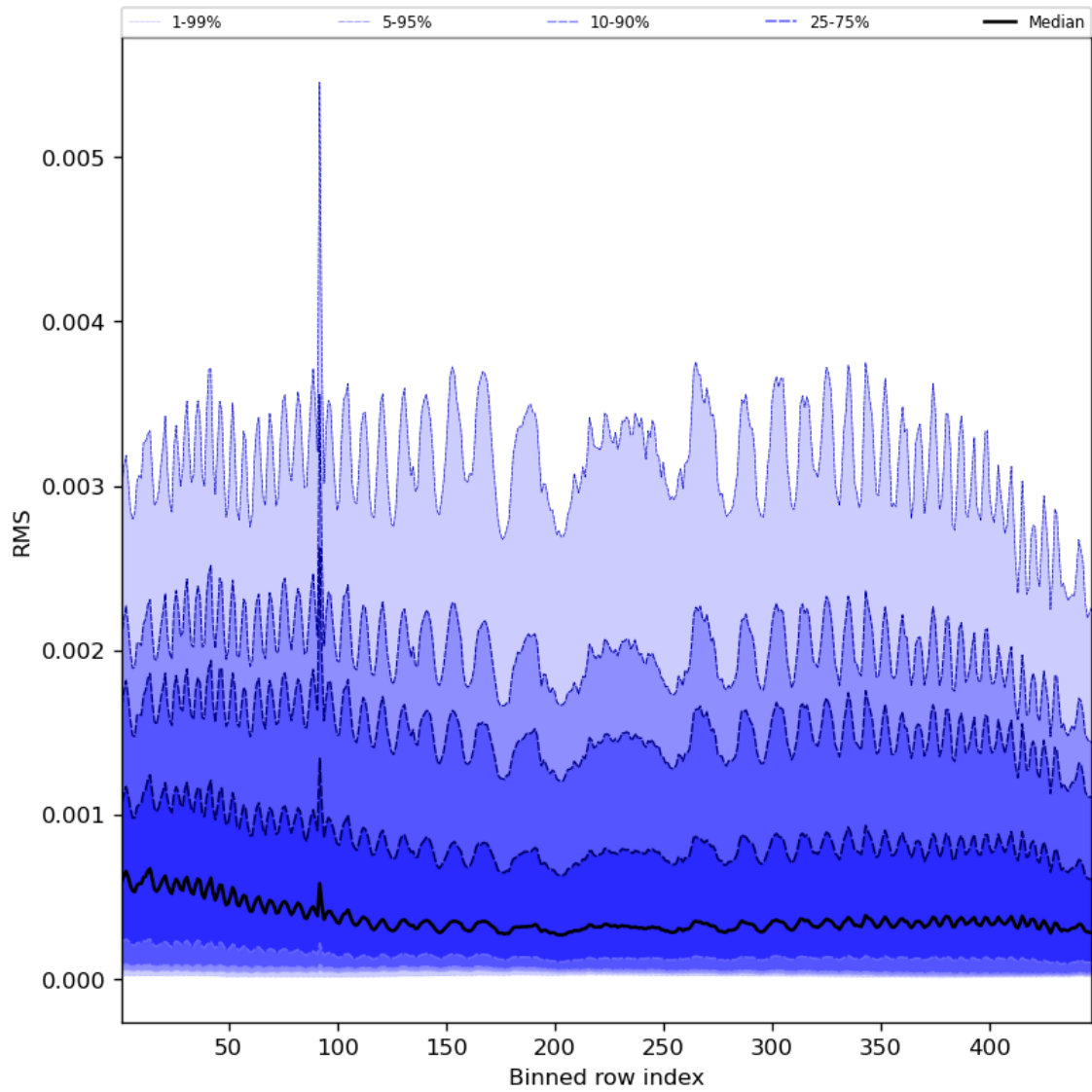


Figure 63: Along track statistics of “RMS” for 2023-09-05 to 2023-09-06

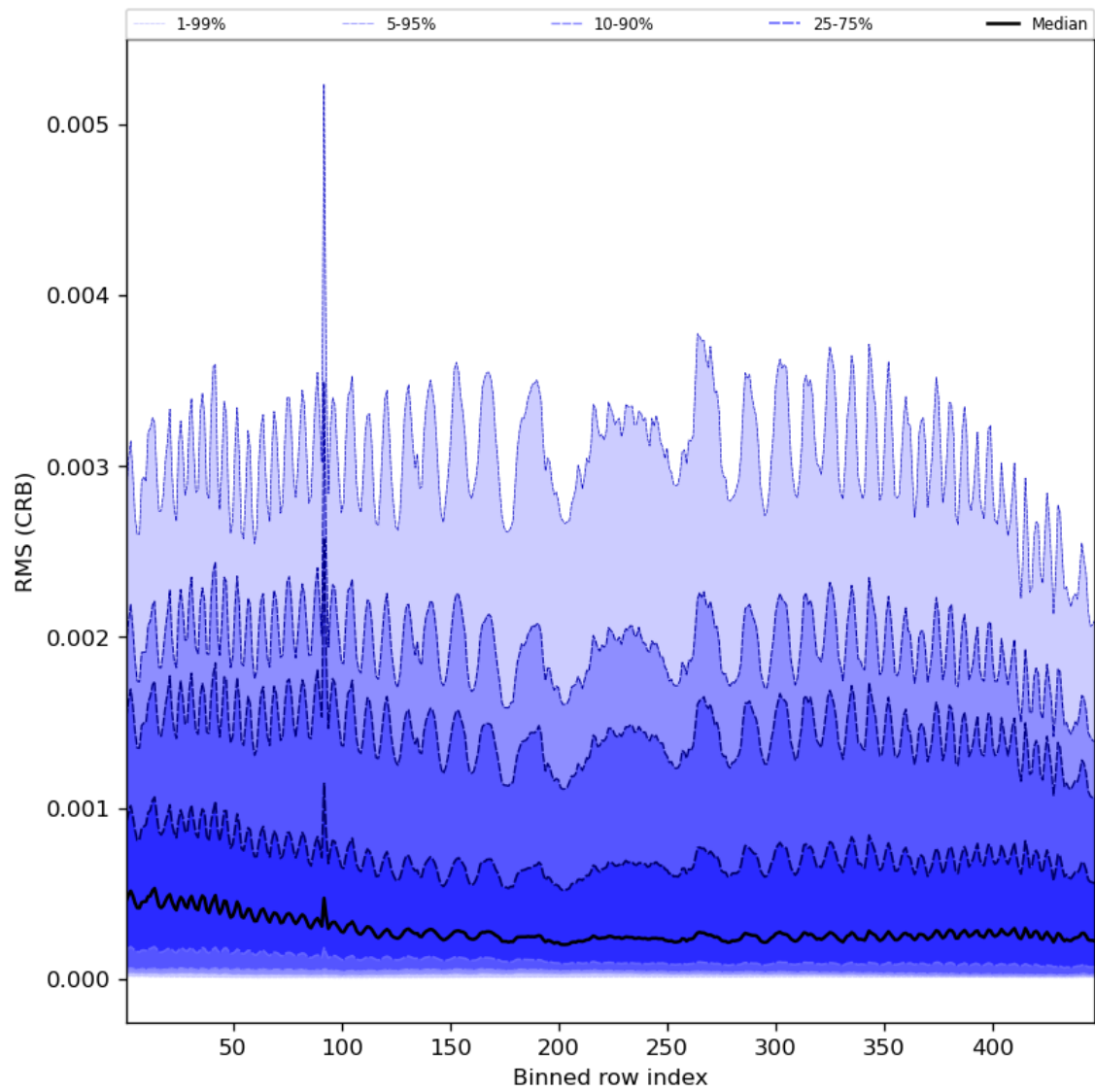


Figure 64: Along track statistics of “RMS (CRB)” for 2023-09-05 to 2023-09-06

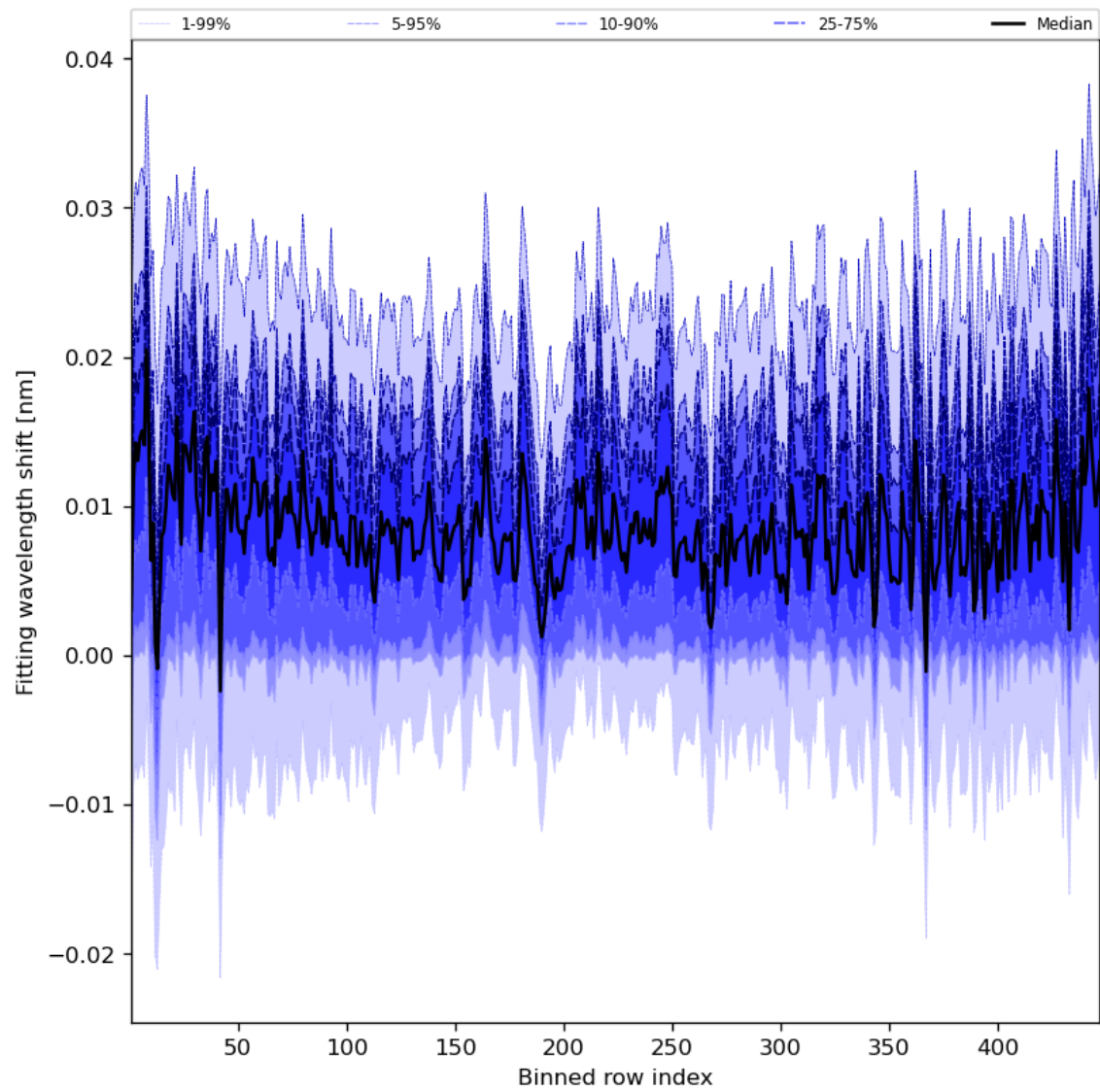


Figure 65: Along track statistics of “Fitting wavelength shift” for 2023-09-05 to 2023-09-06

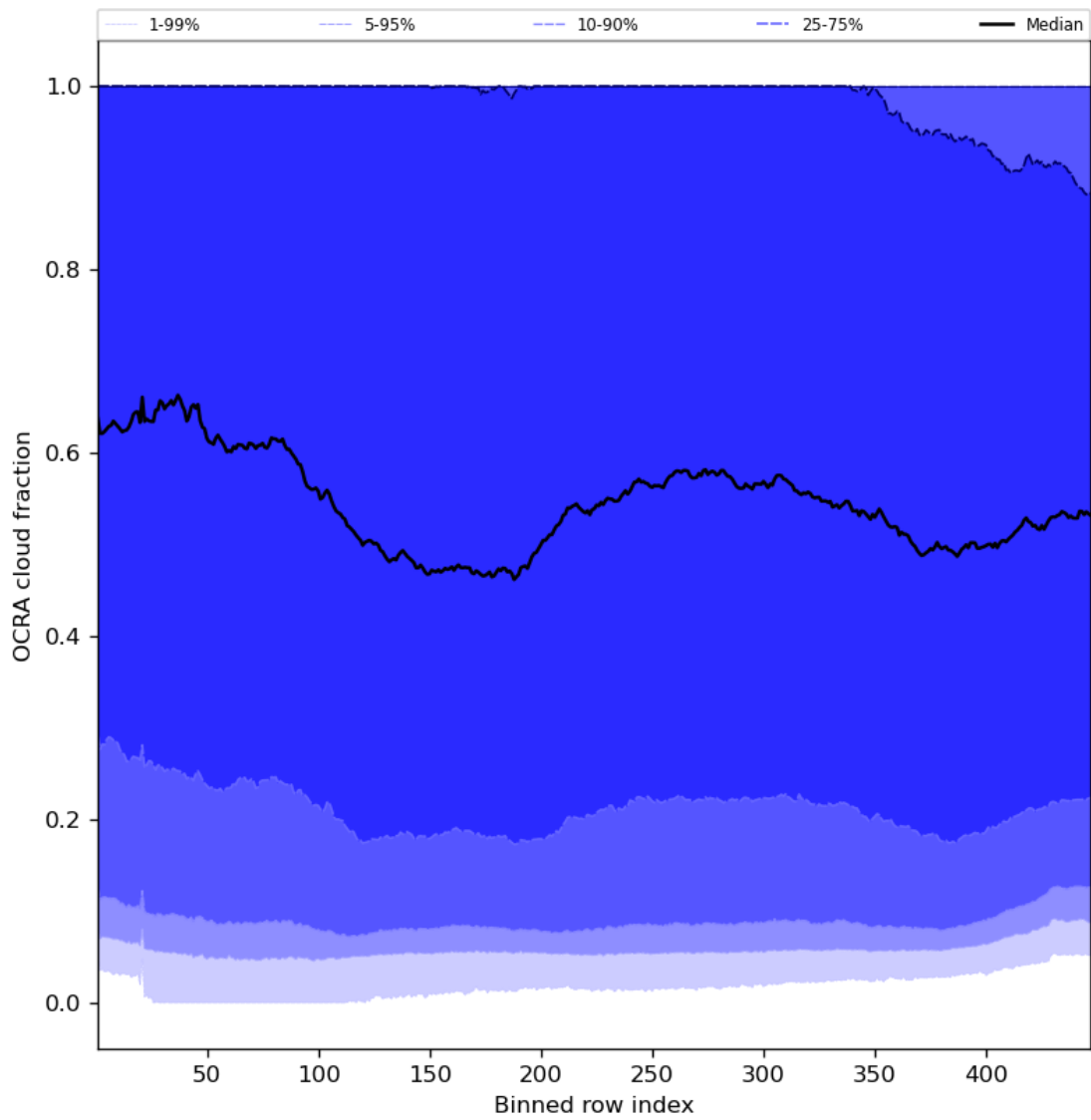


Figure 66: Along track statistics of “OCRA cloud fraction” for 2023-09-05 to 2023-09-06

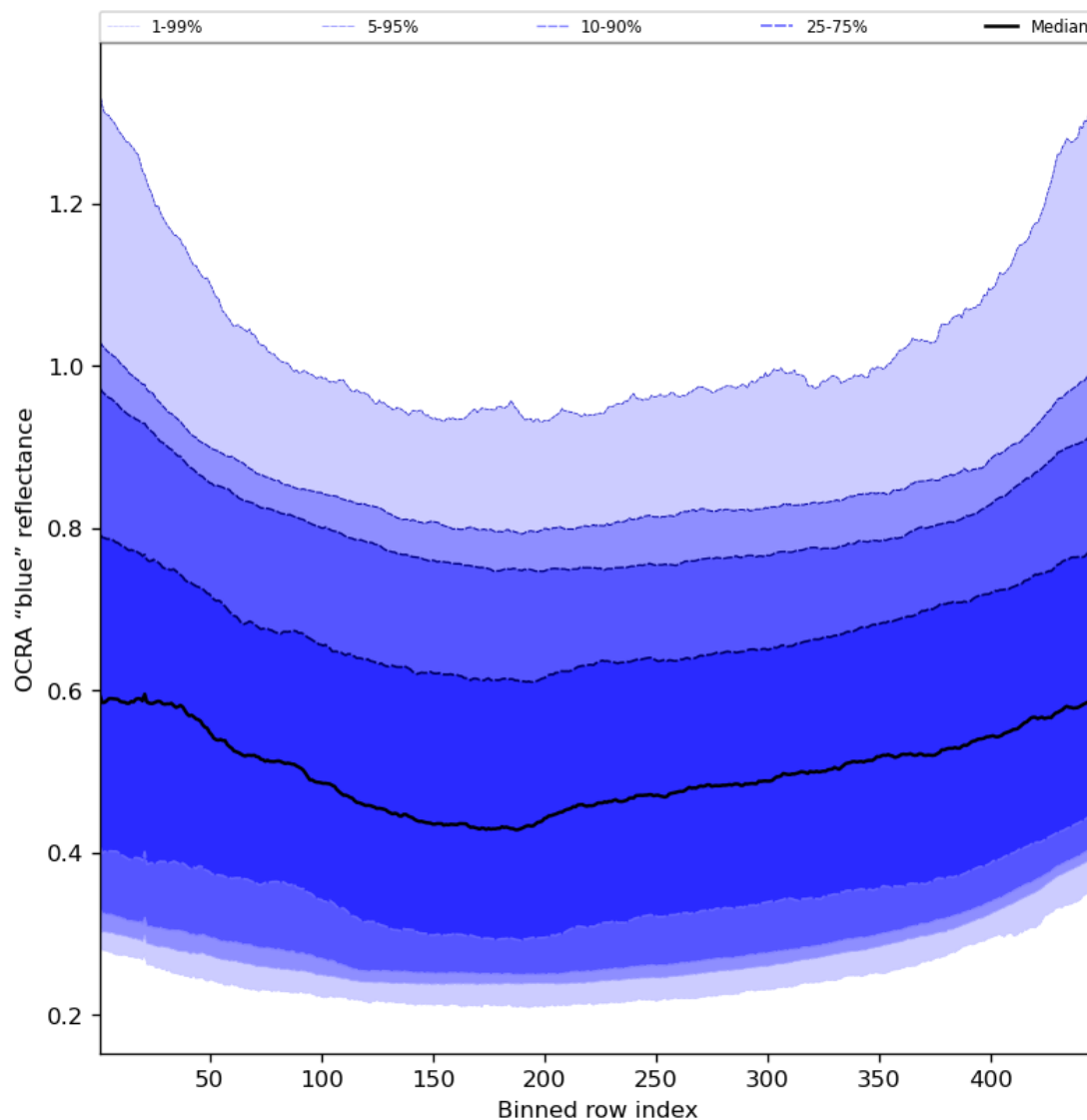


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2023-09-05 to 2023-09-06

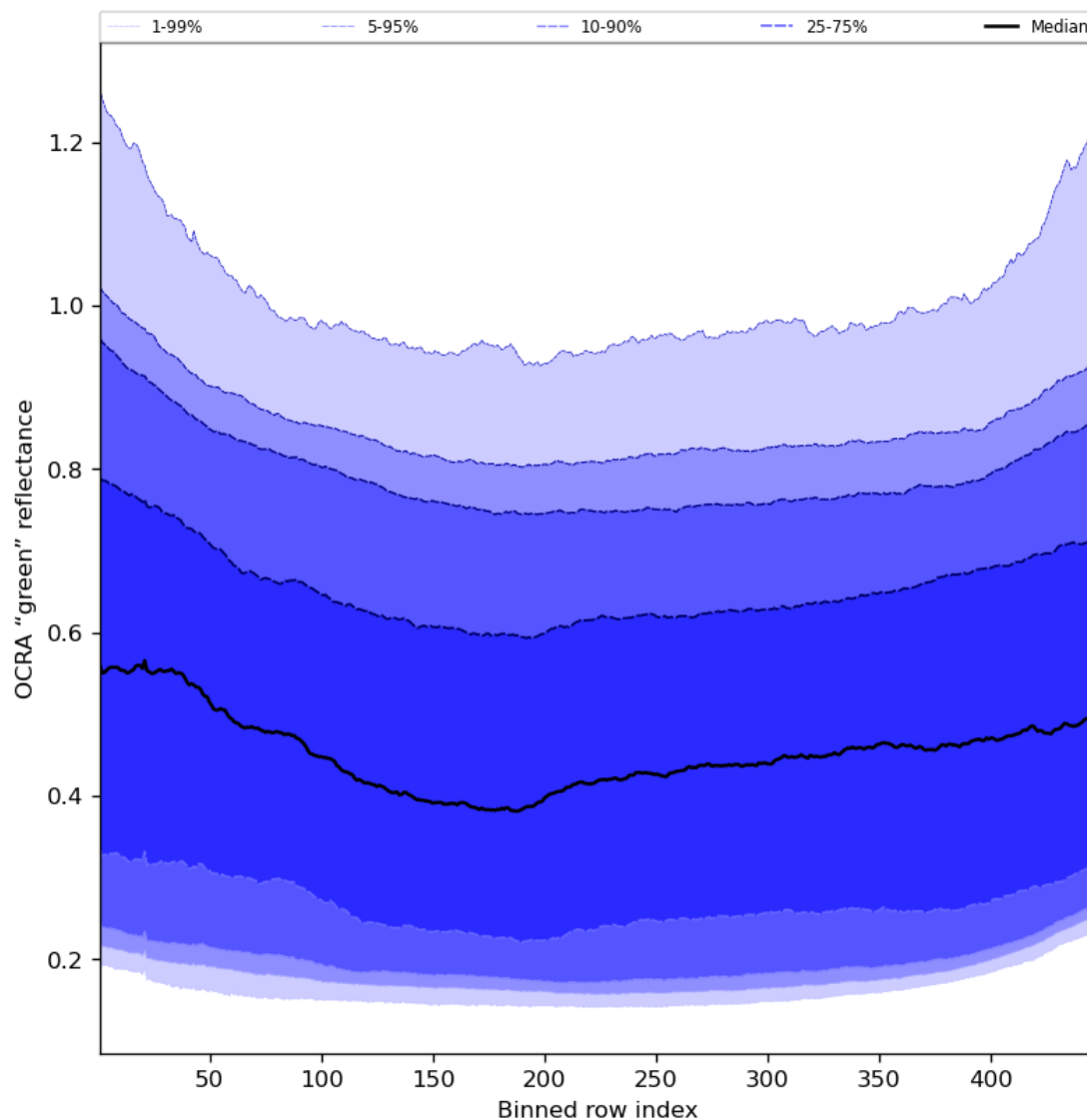


Figure 68: Along track statistics of “OCRA “green” reflectance” for 2023-09-05 to 2023-09-06

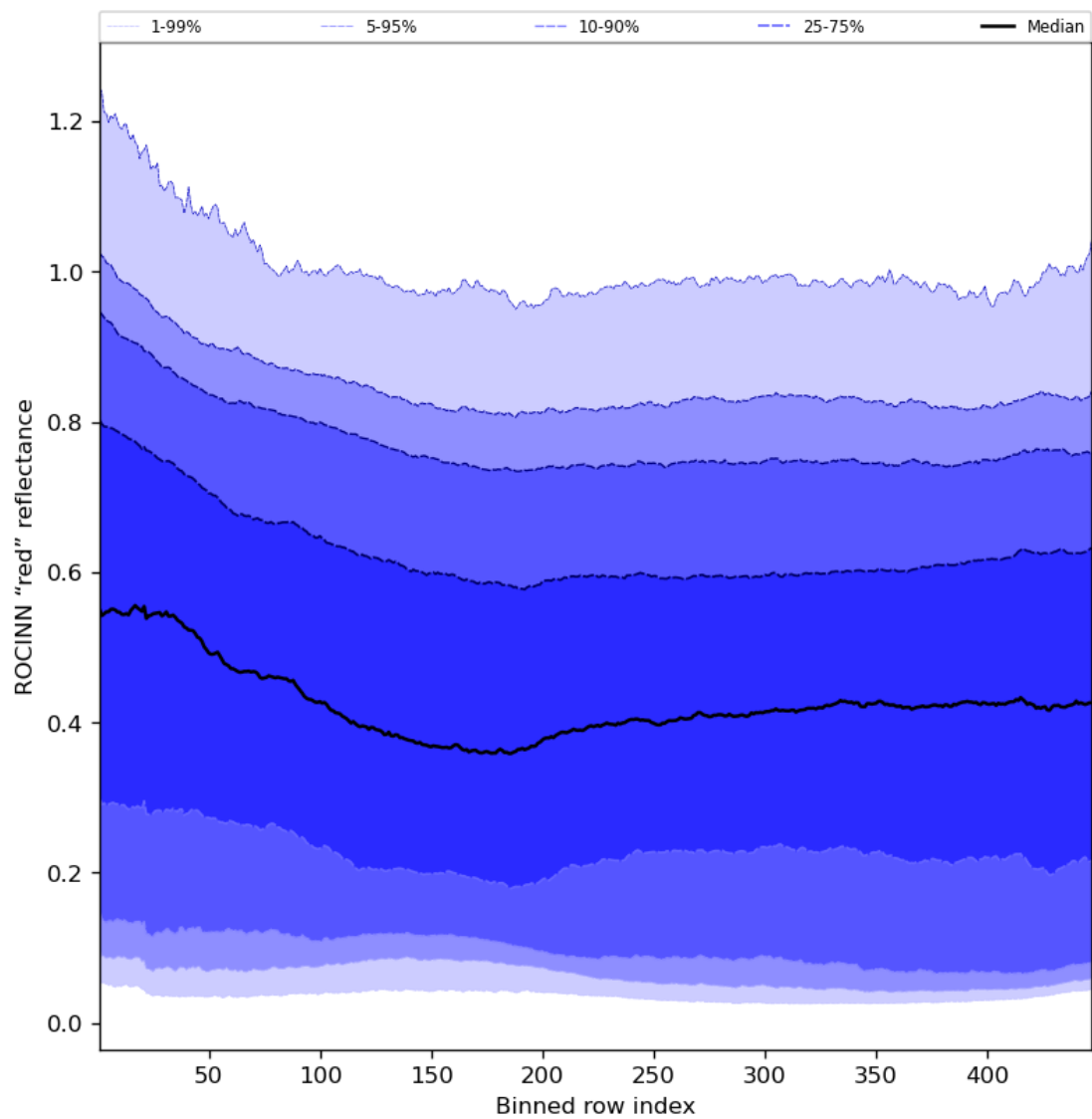


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2023-09-05 to 2023-09-06

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.

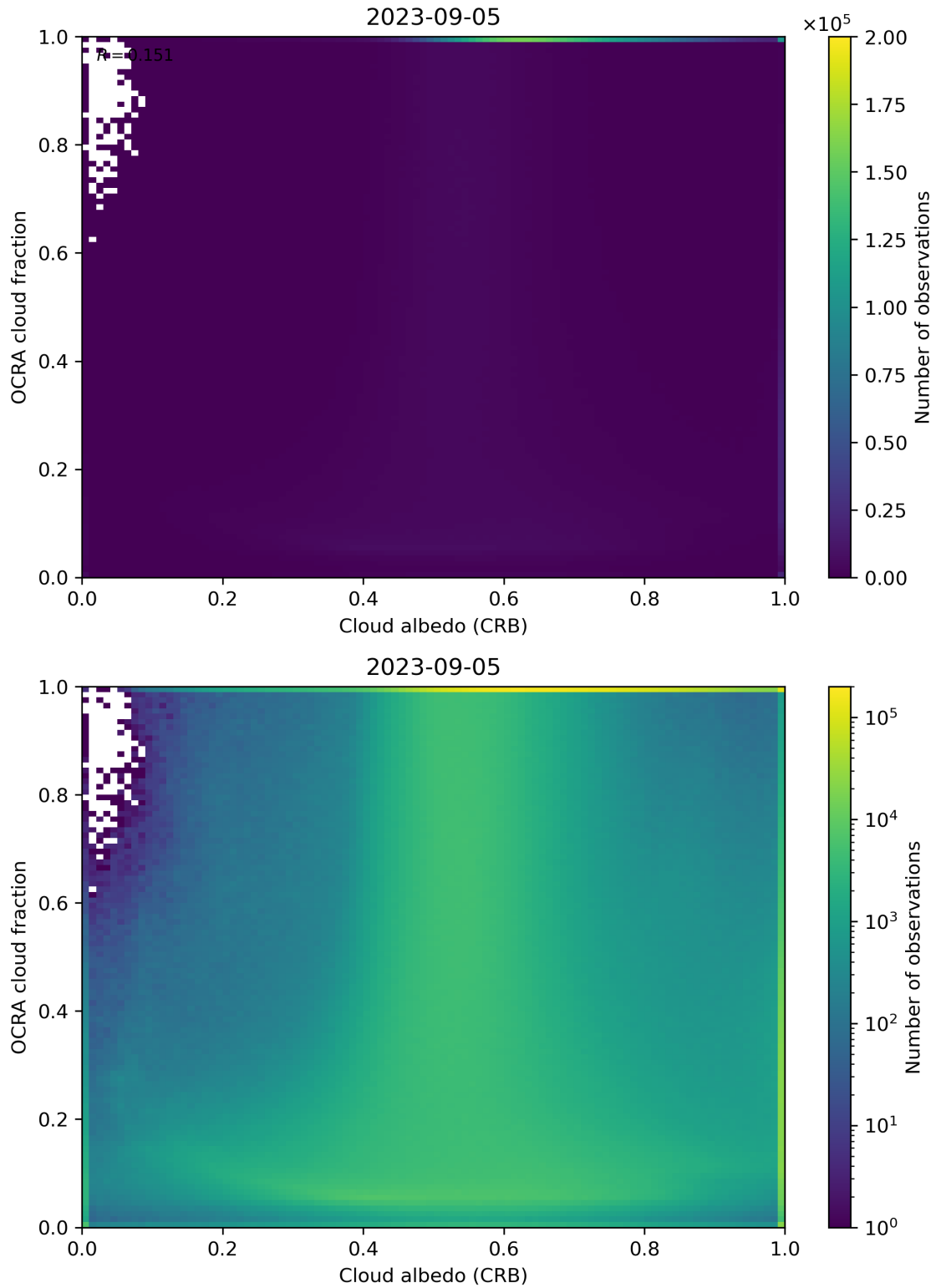


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

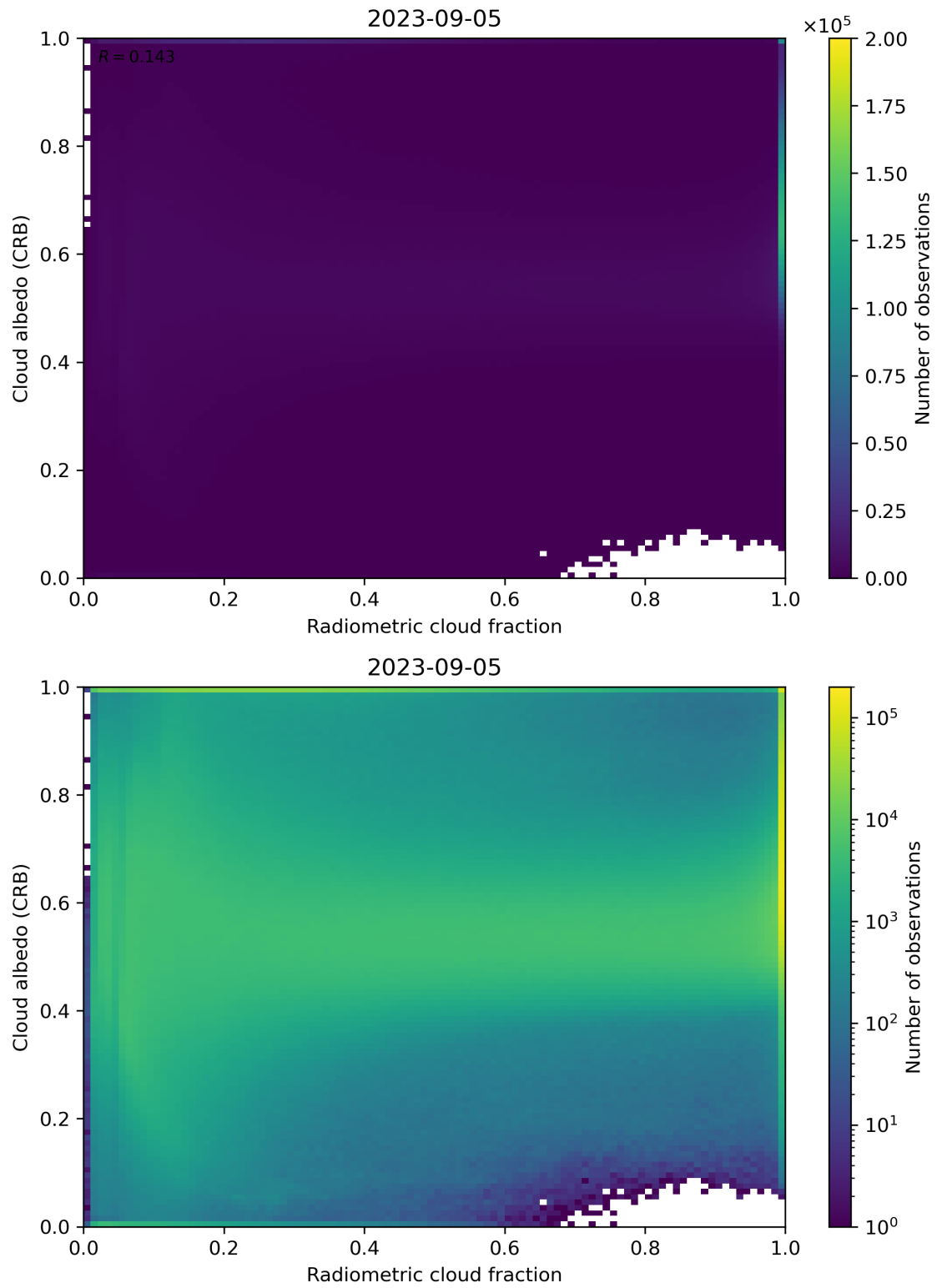


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

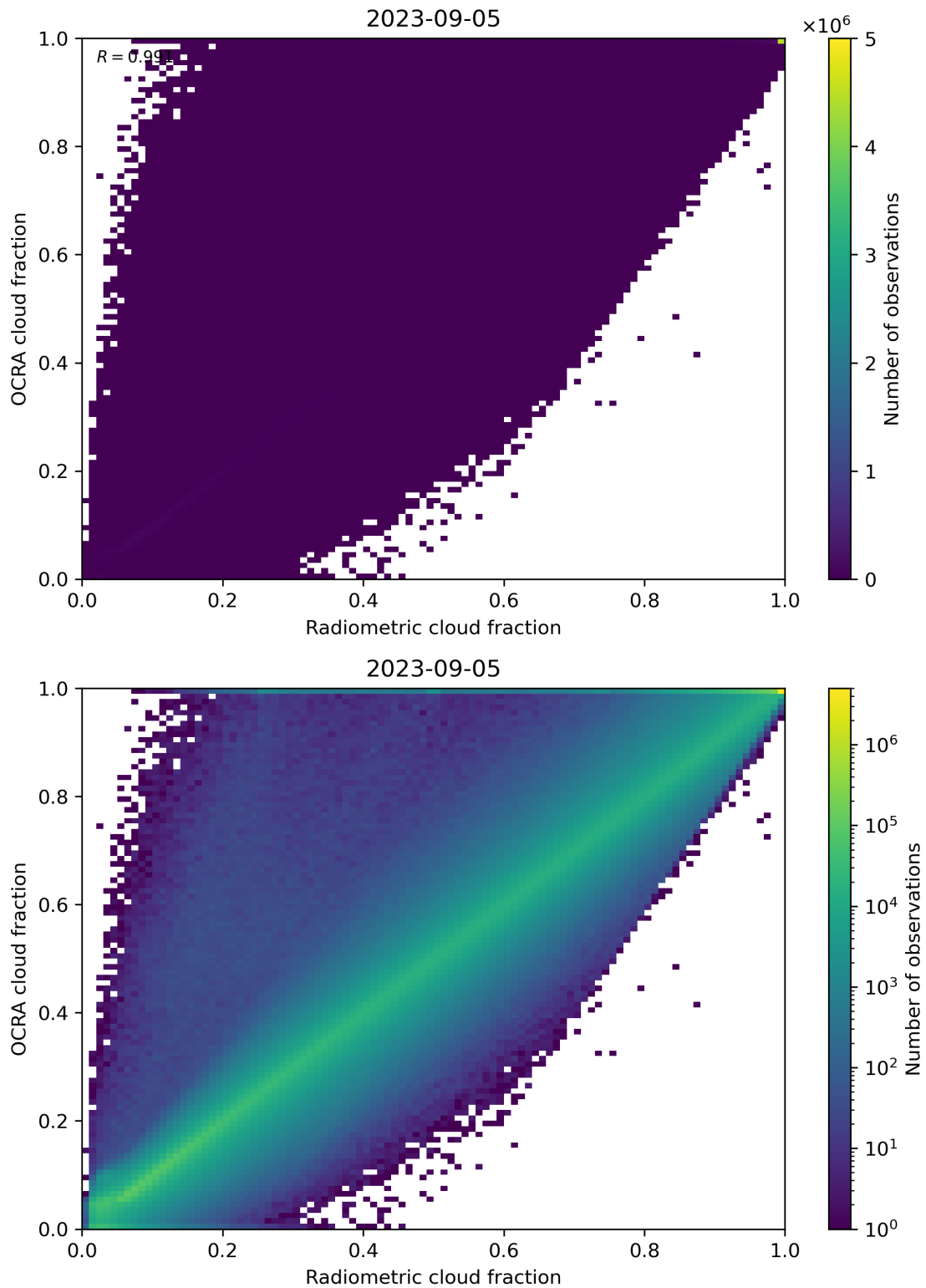


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

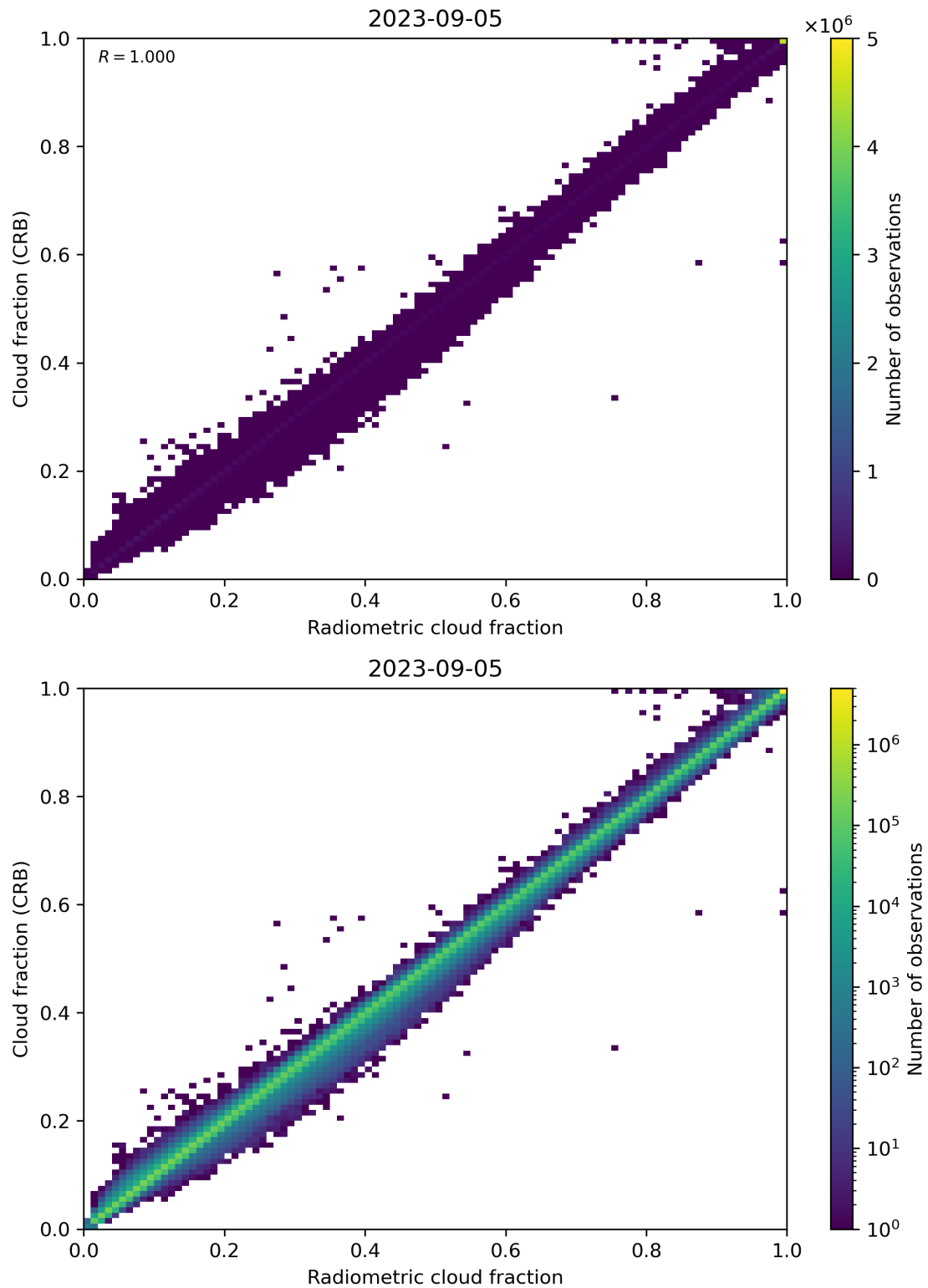


Figure 73: Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.

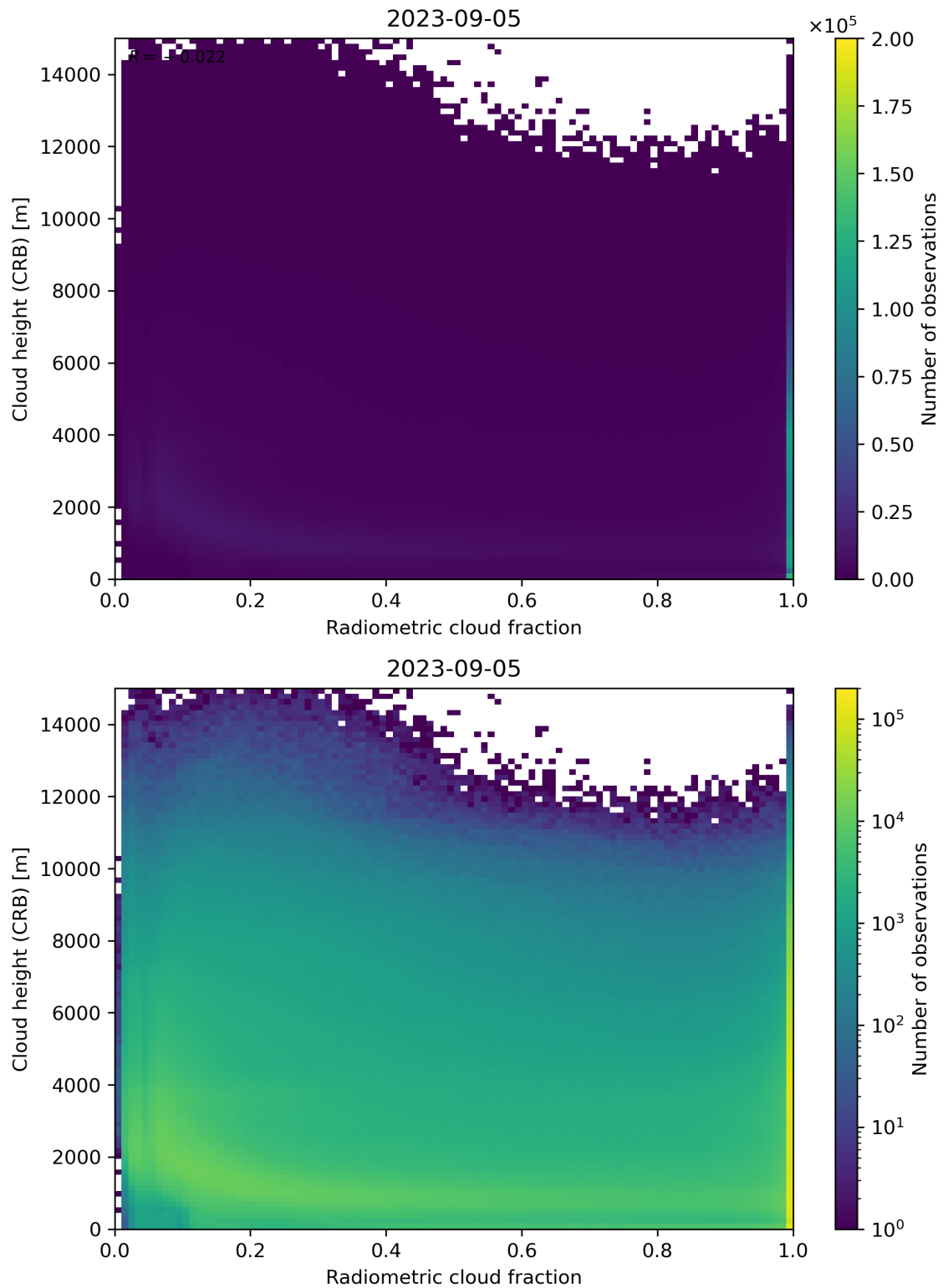


Figure 74: Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.

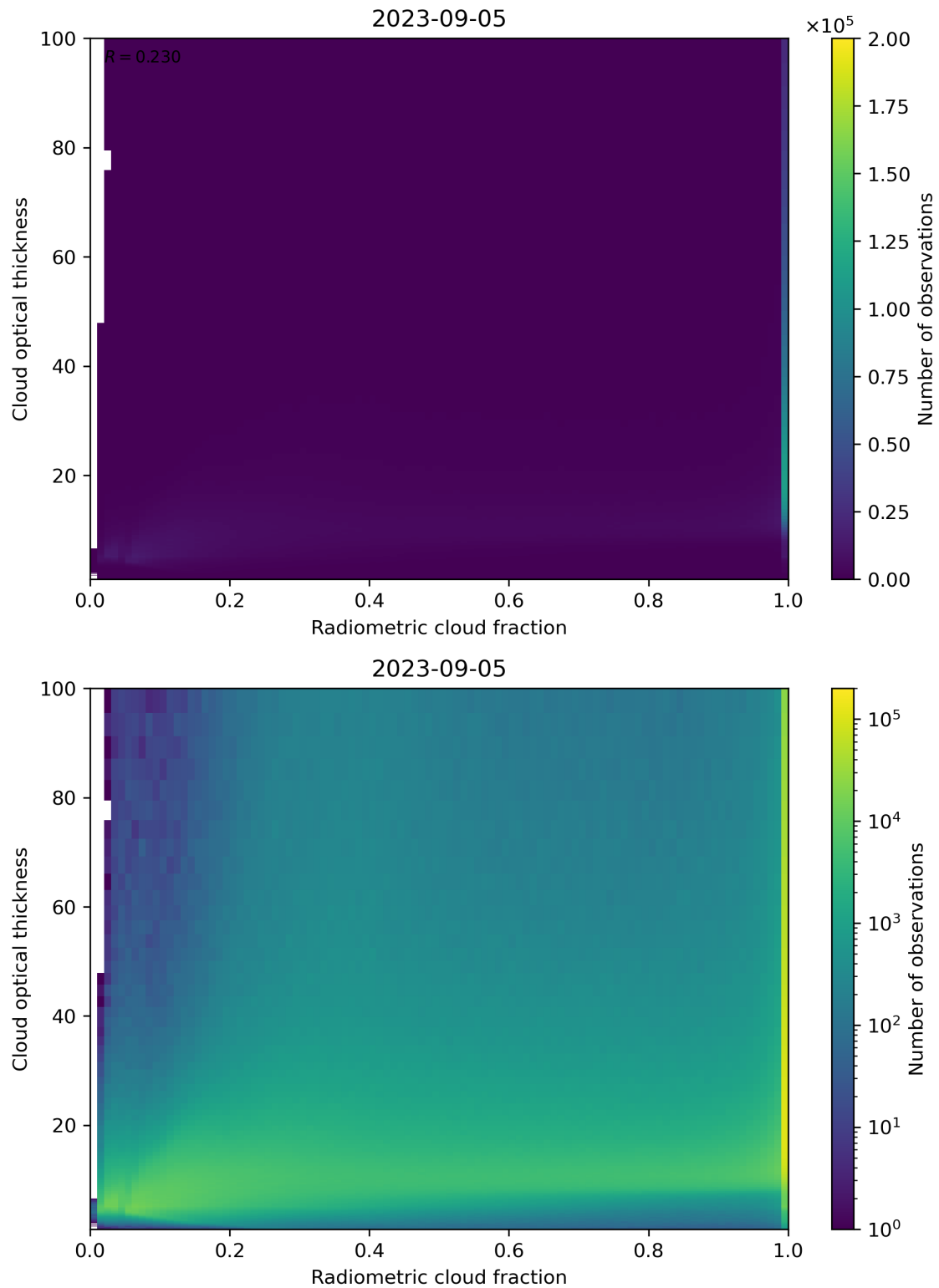


Figure 75: Scatter density plot of “Radiometric cloud fraction” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.

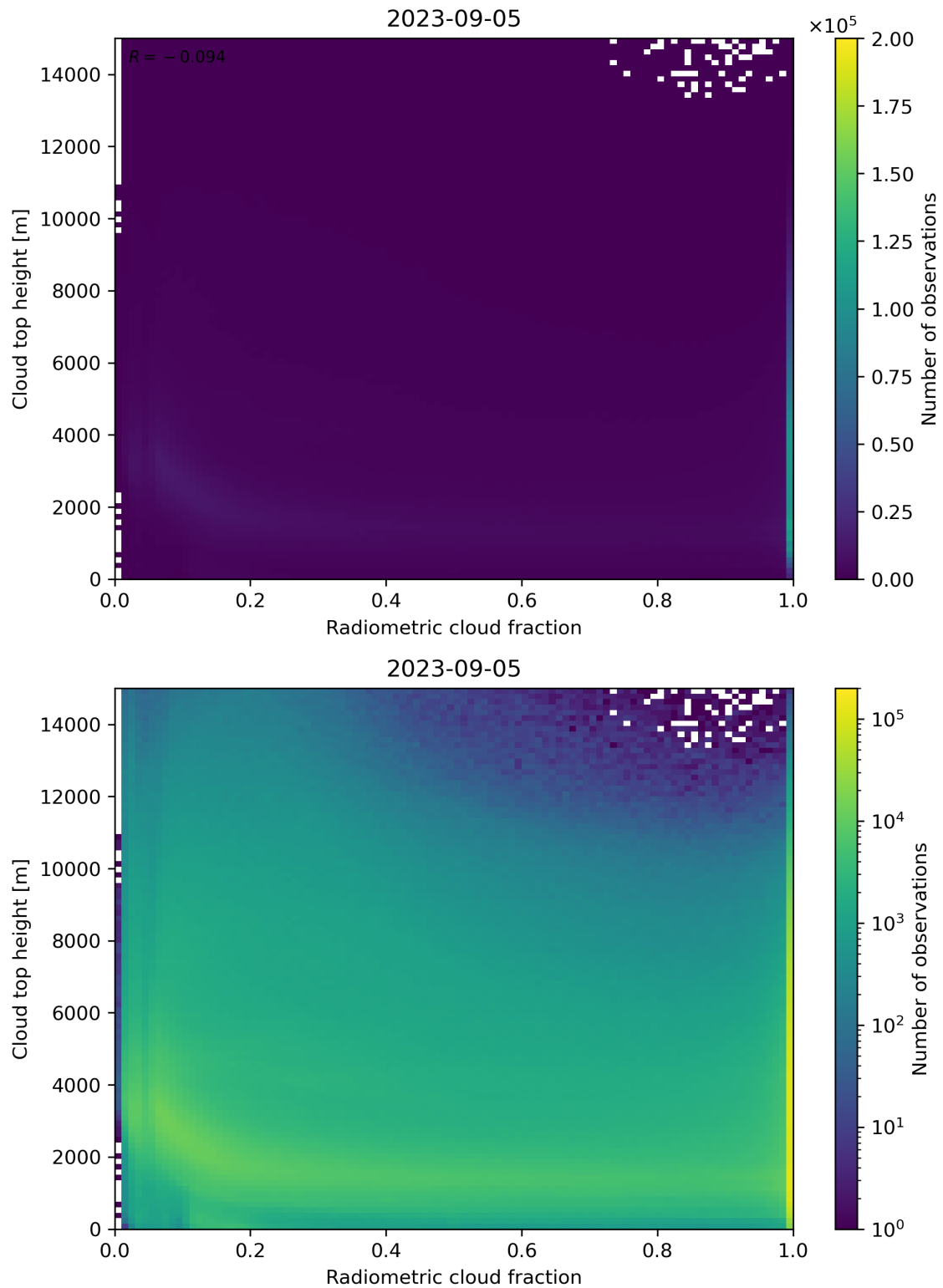


Figure 76: Scatter density plot of “Radiometric cloud fraction” against “Cloud top height” for 2023-09-05 to 2023-09-06.

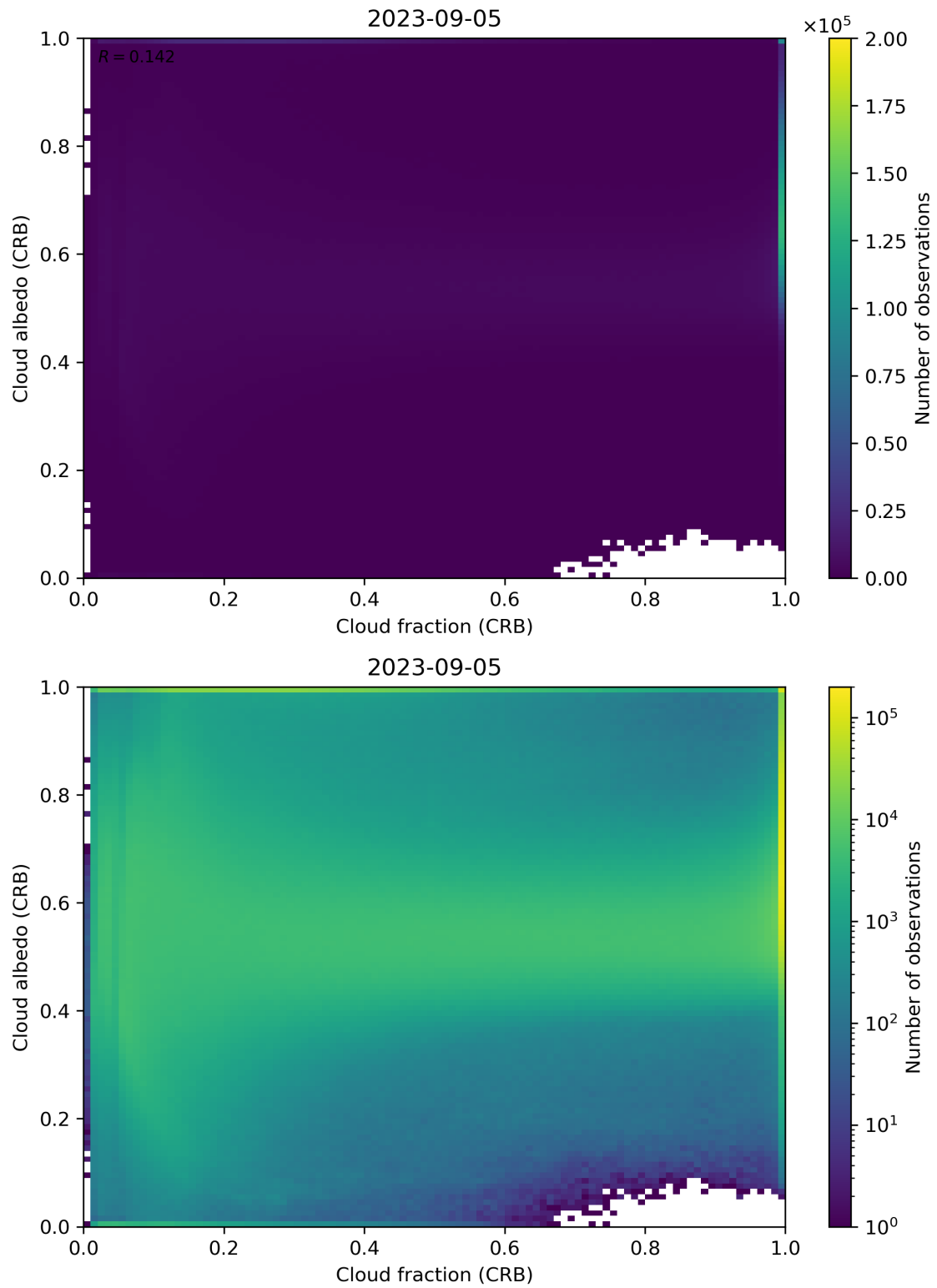


Figure 77: Scatter density plot of “Cloud fraction (CRB)” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

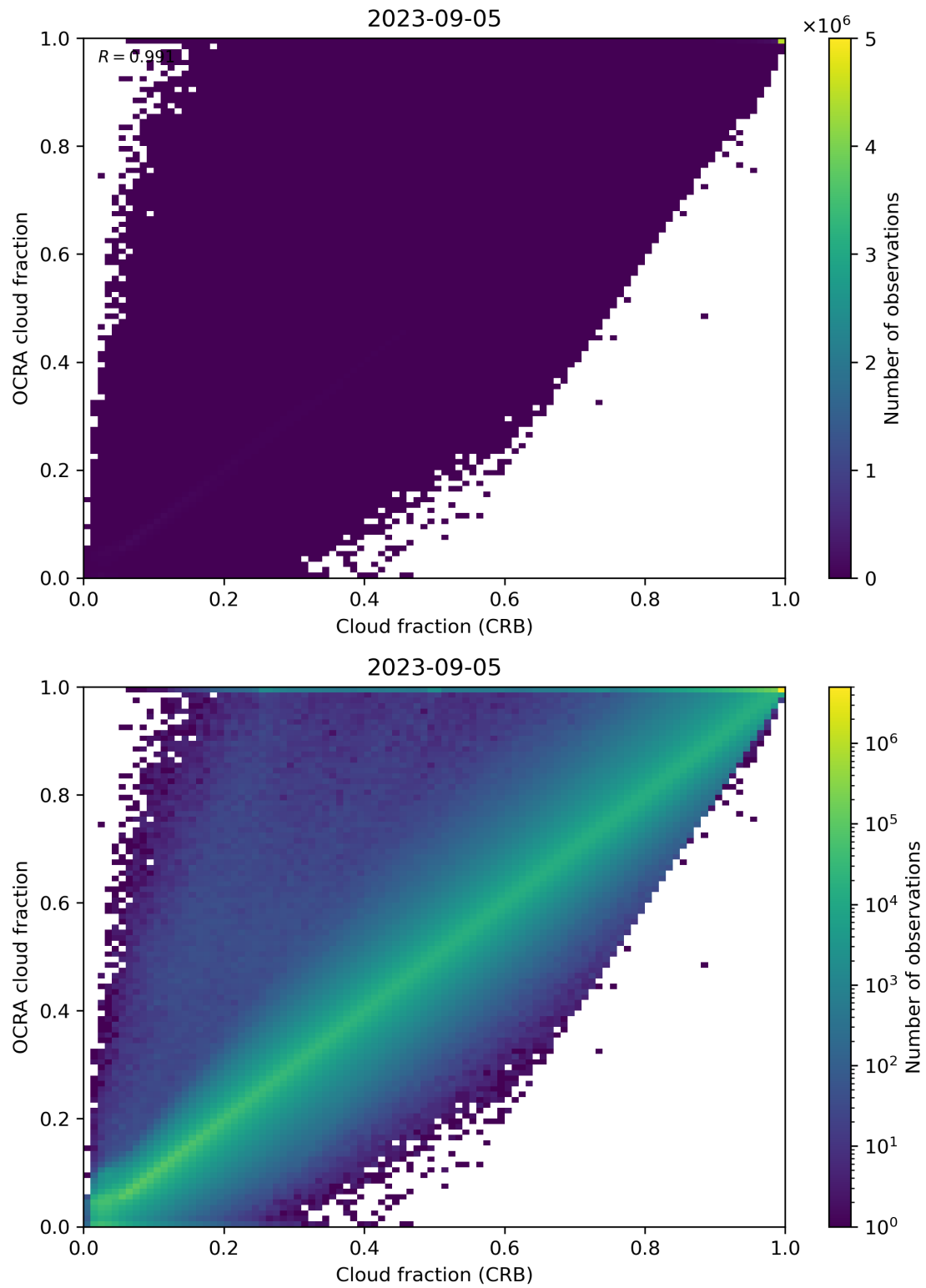


Figure 78: Scatter density plot of “Cloud fraction (CRB)” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

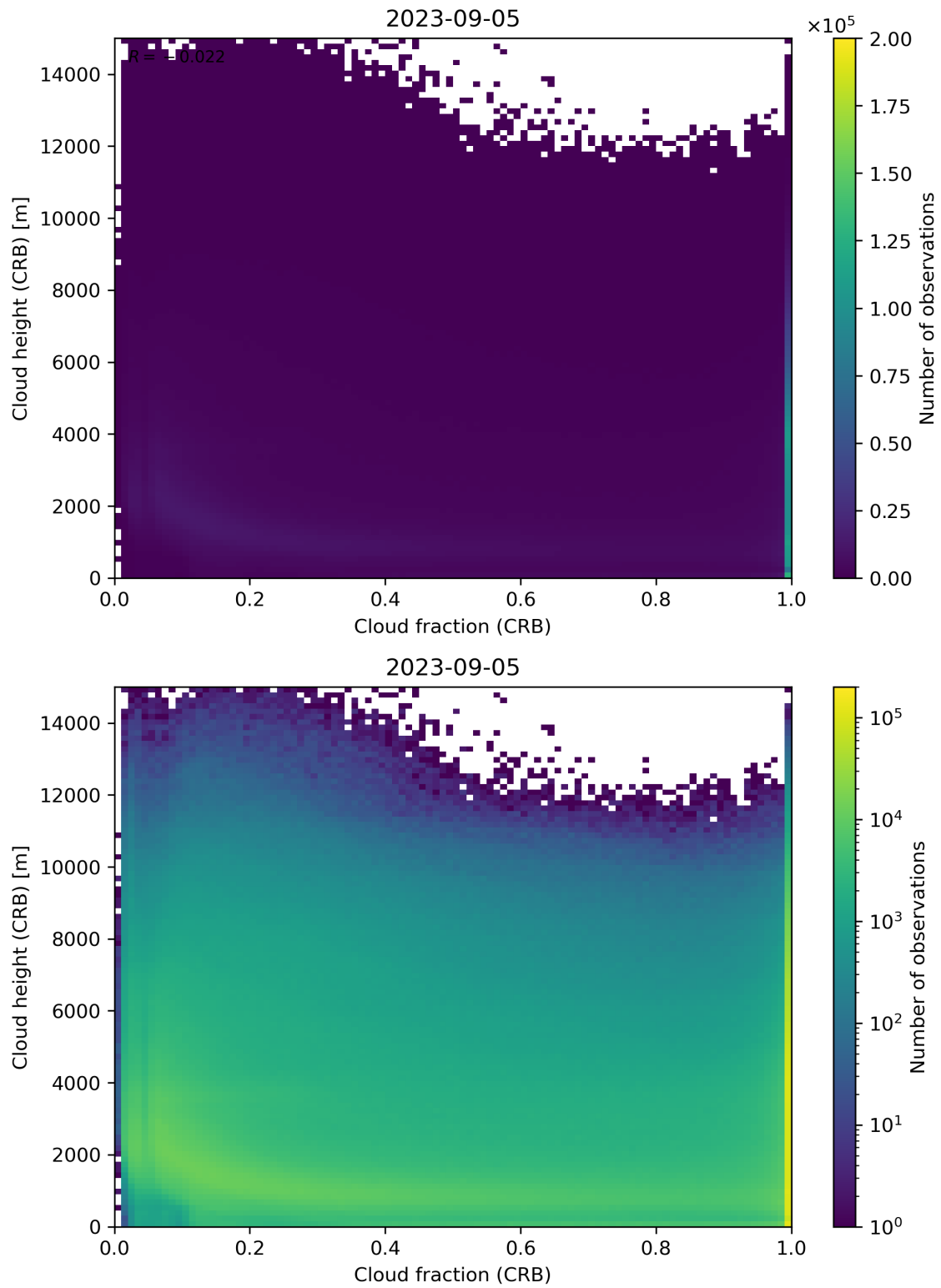


Figure 79: Scatter density plot of “Cloud fraction (CRB)” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.

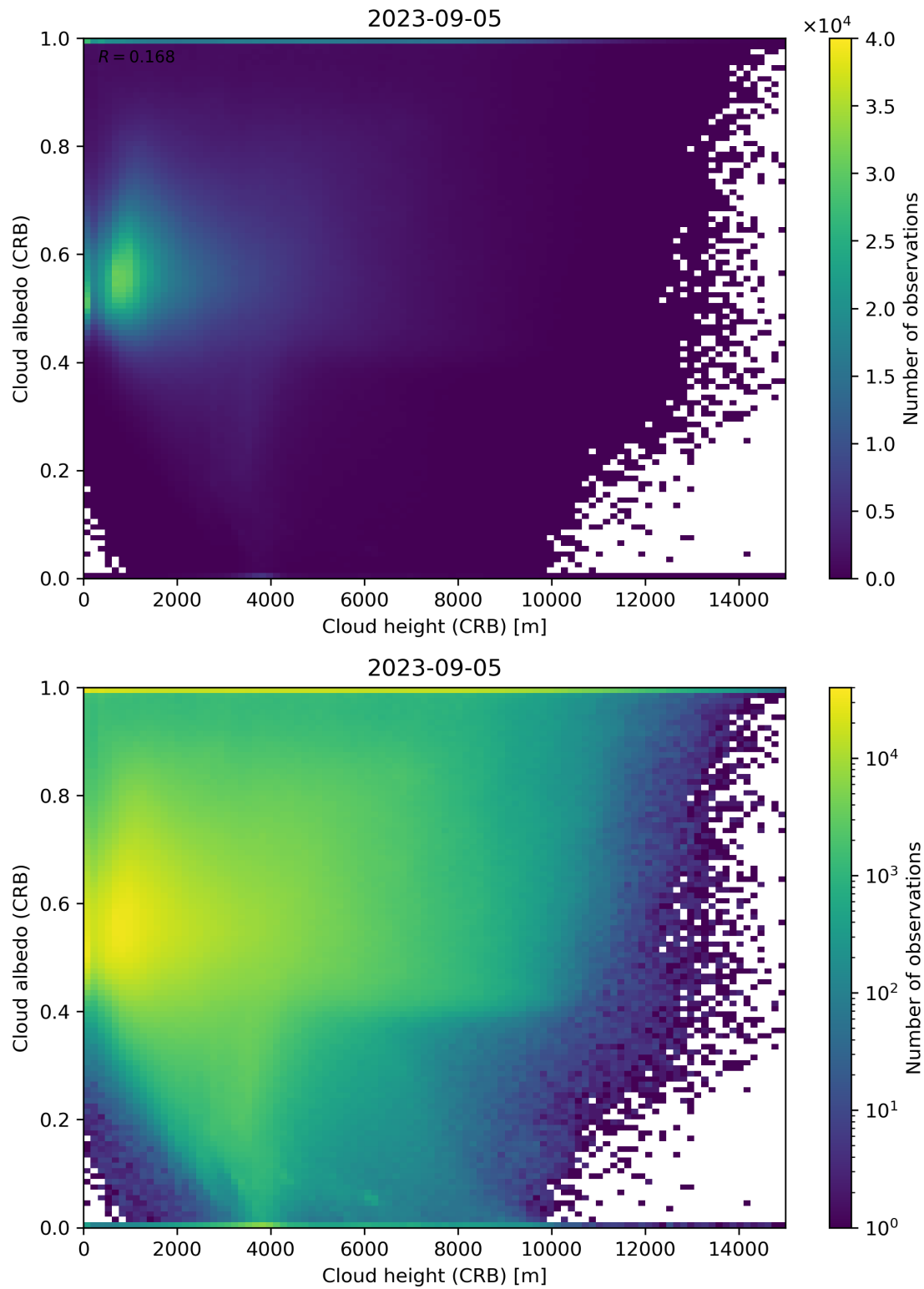


Figure 80: Scatter density plot of “Cloud height (CRB)” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

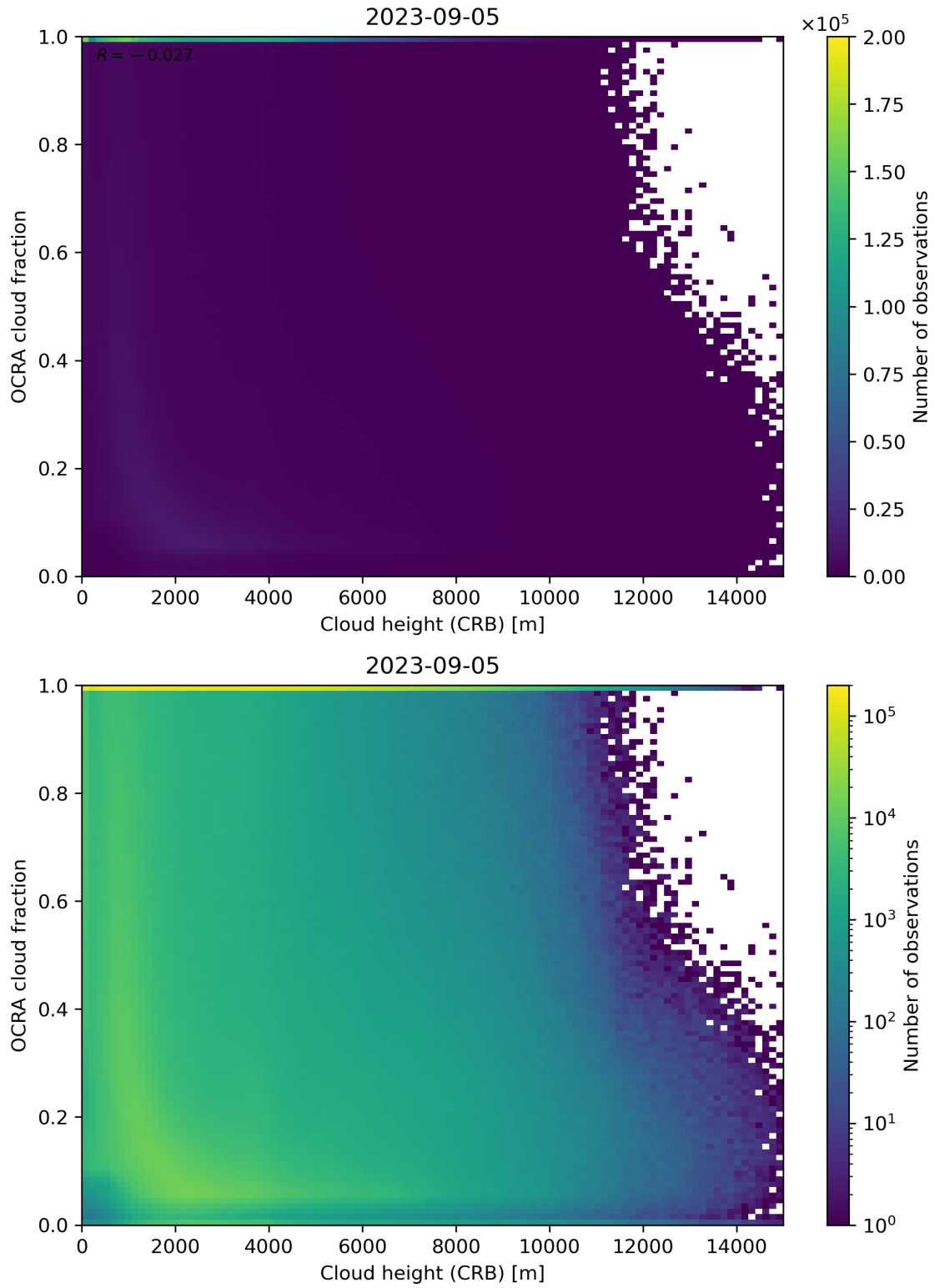


Figure 81: Scatter density plot of “Cloud height (CRB)” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

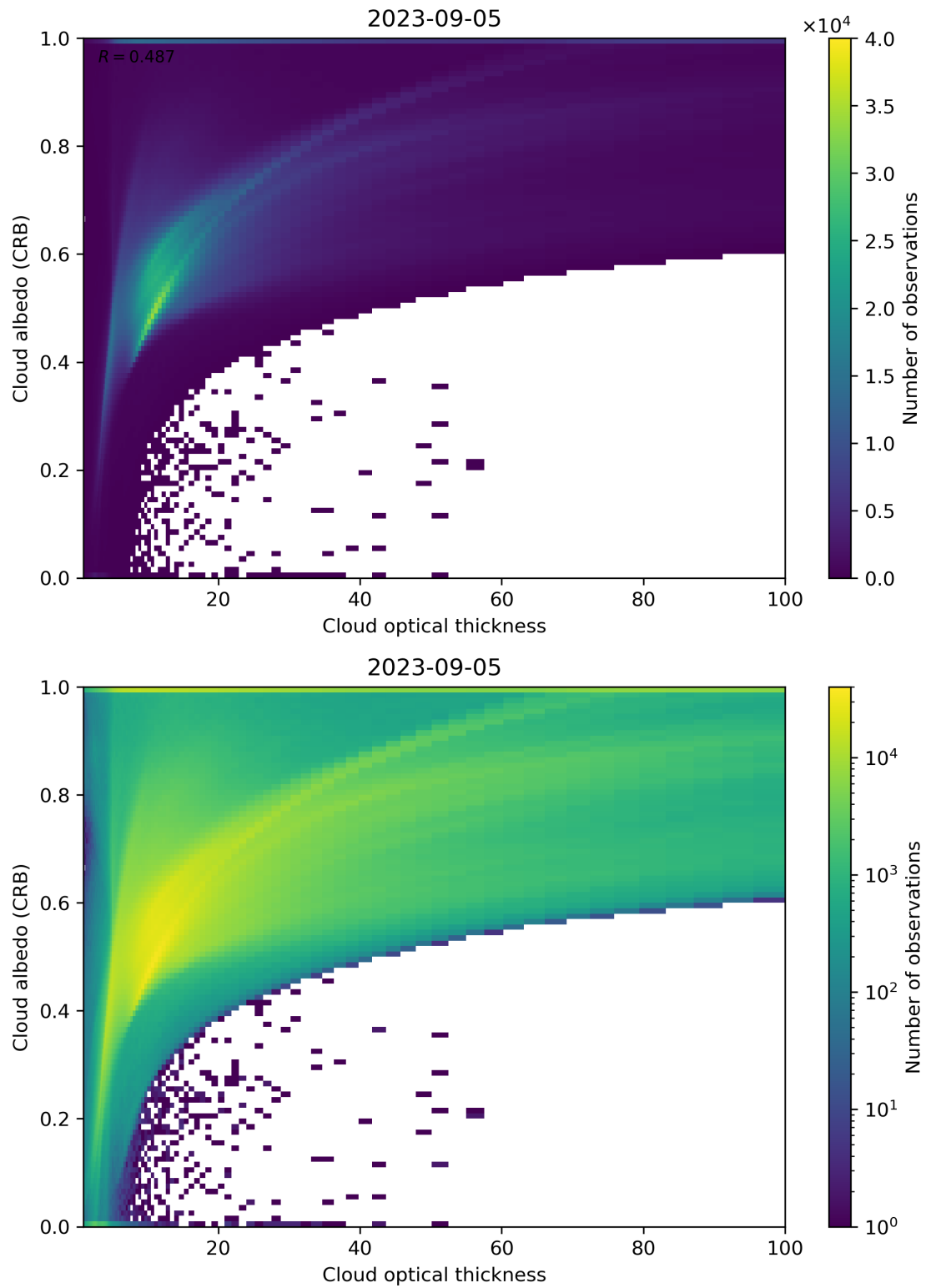


Figure 82: Scatter density plot of “Cloud optical thickness” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

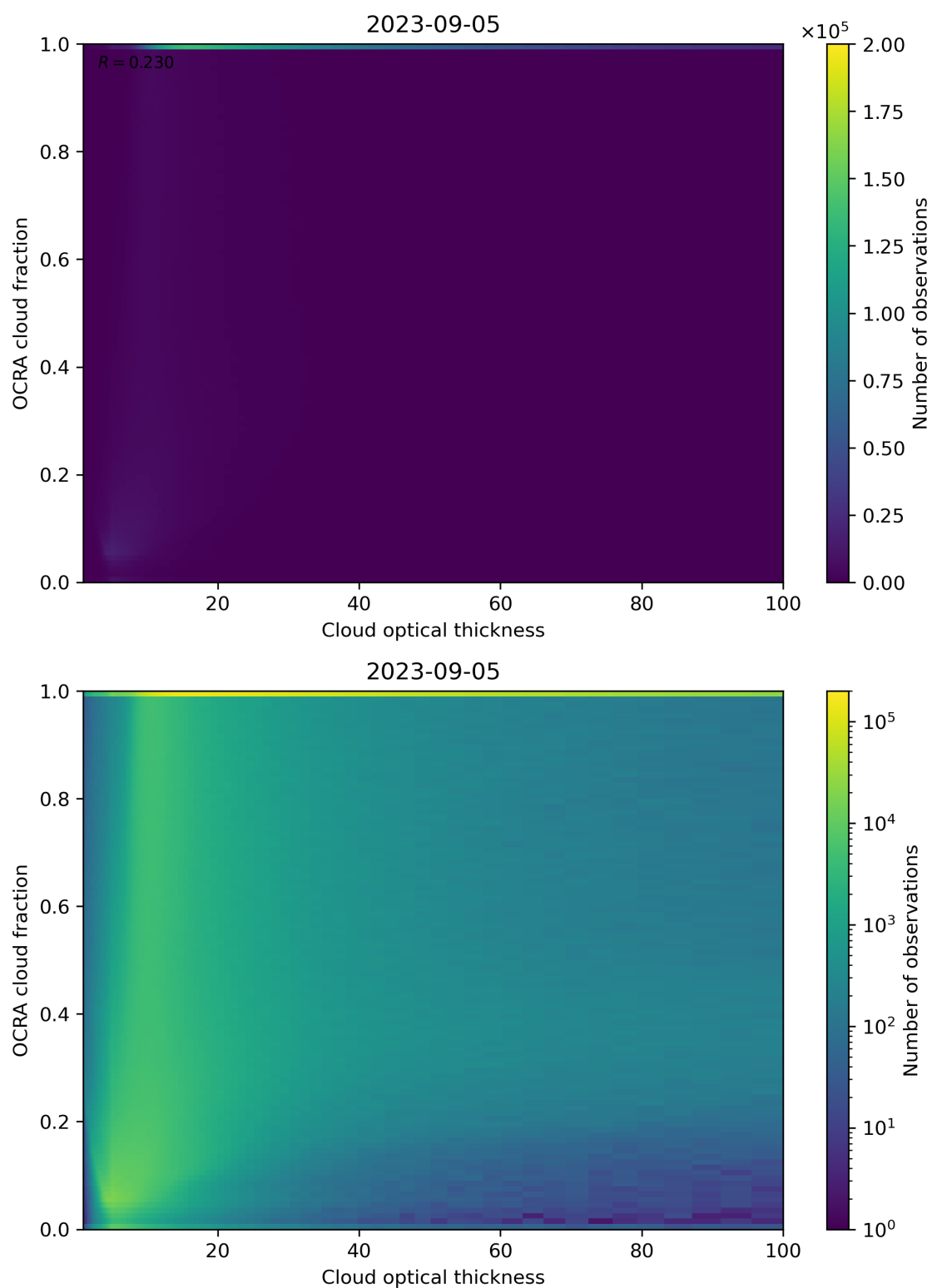


Figure 83: Scatter density plot of “Cloud optical thickness” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

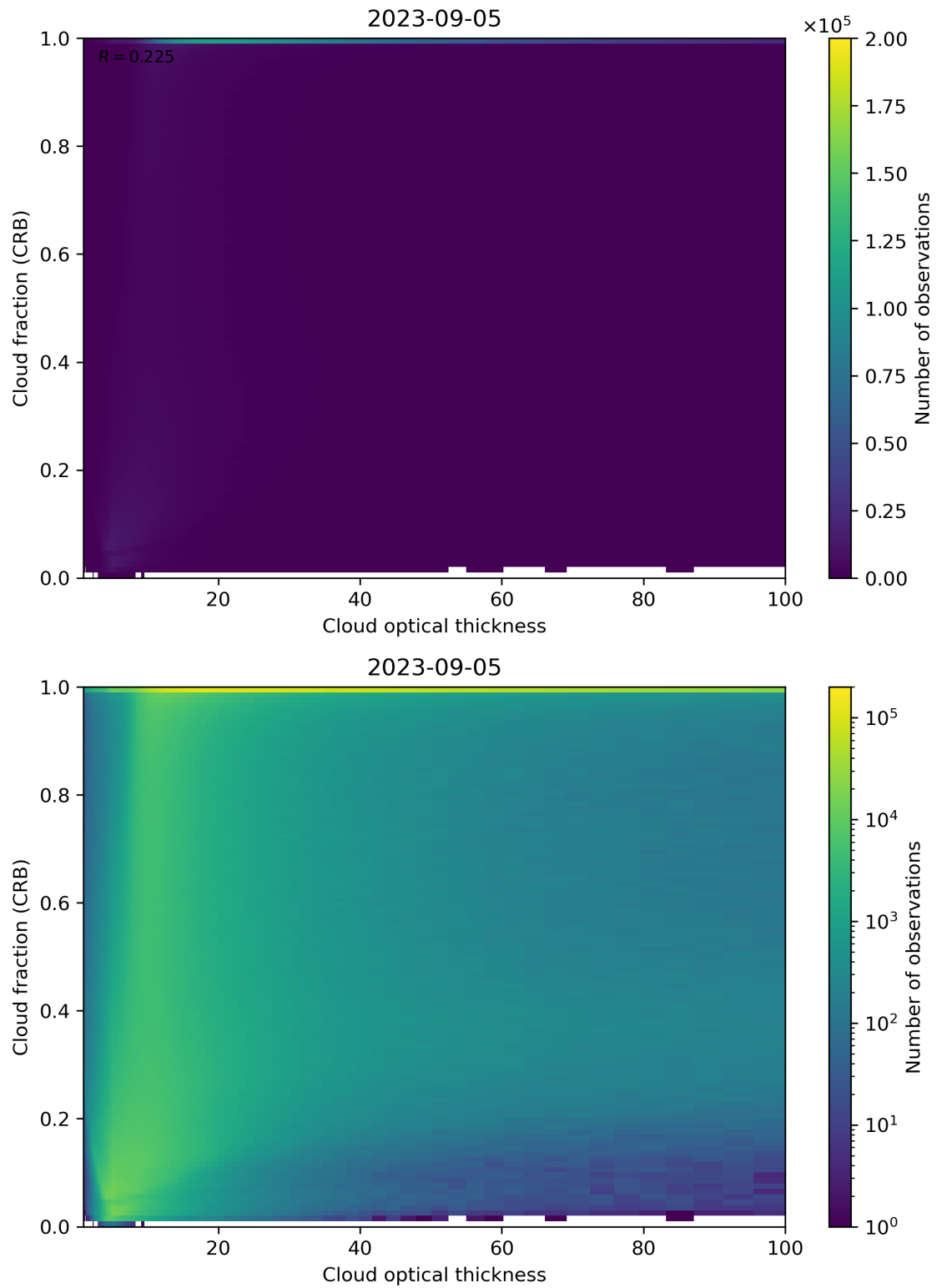


Figure 84: Scatter density plot of “Cloud optical thickness” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.

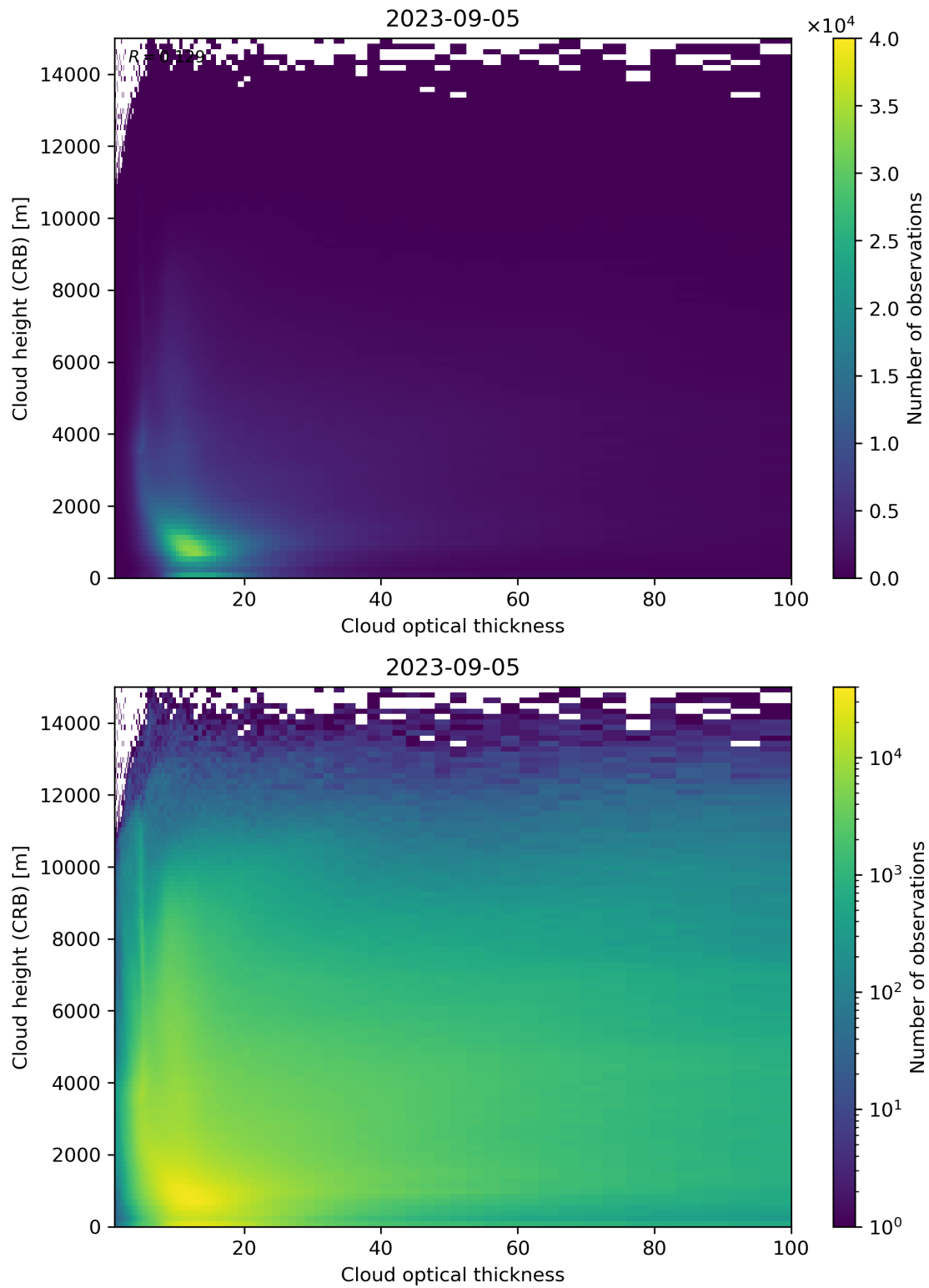


Figure 85: Scatter density plot of “Cloud optical thickness” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.

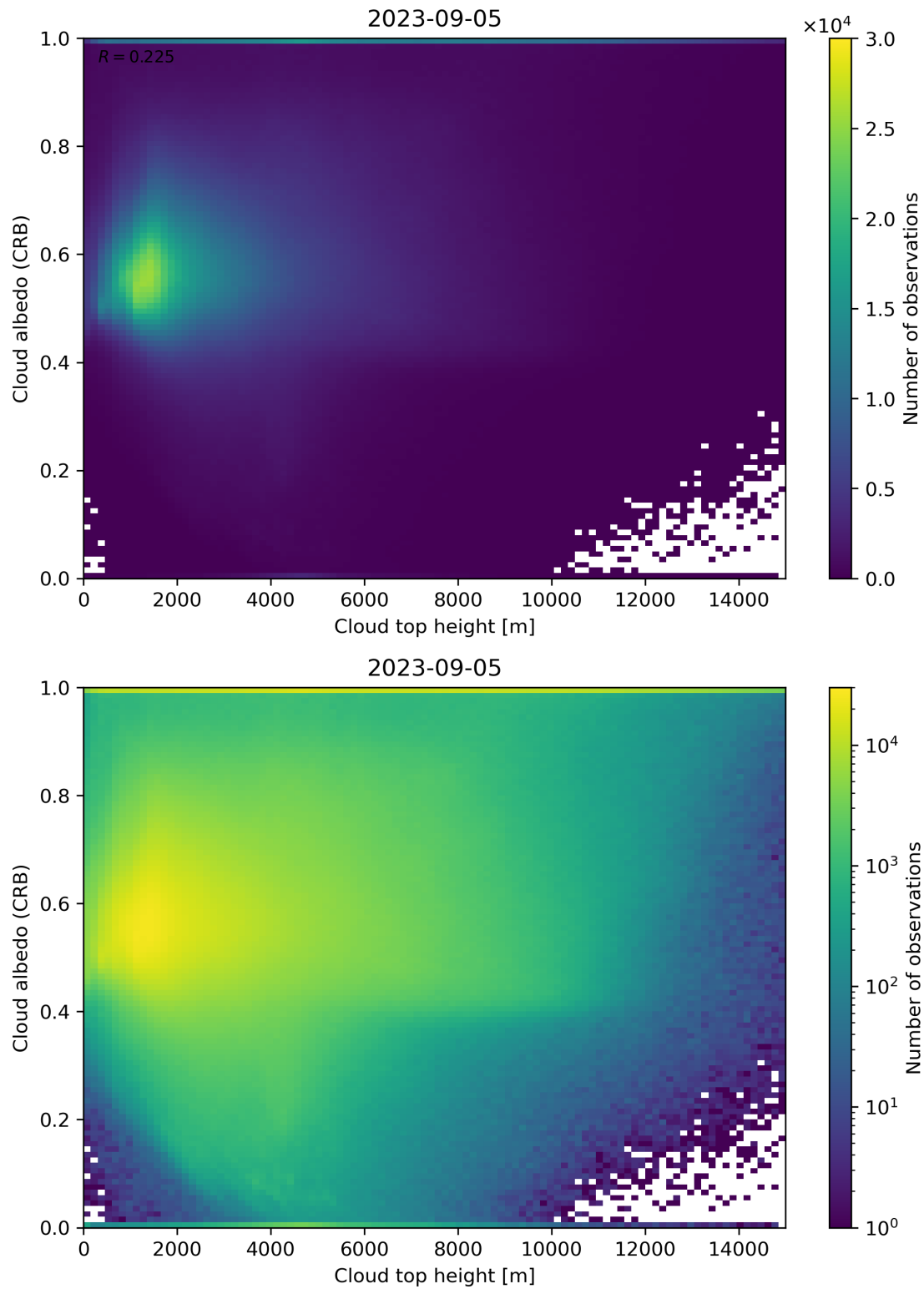


Figure 86: Scatter density plot of “Cloud top height” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

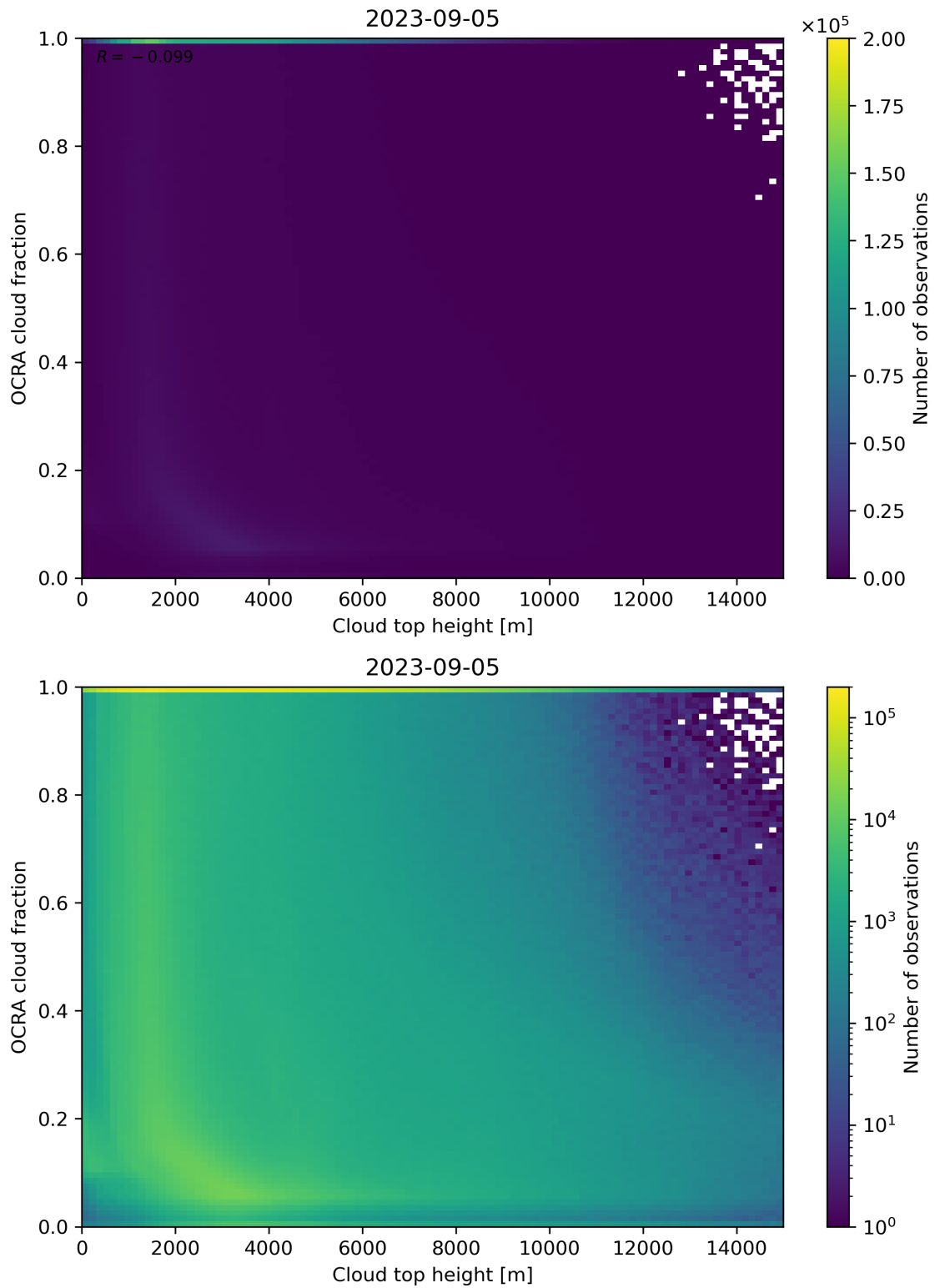


Figure 87: Scatter density plot of “Cloud top height” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

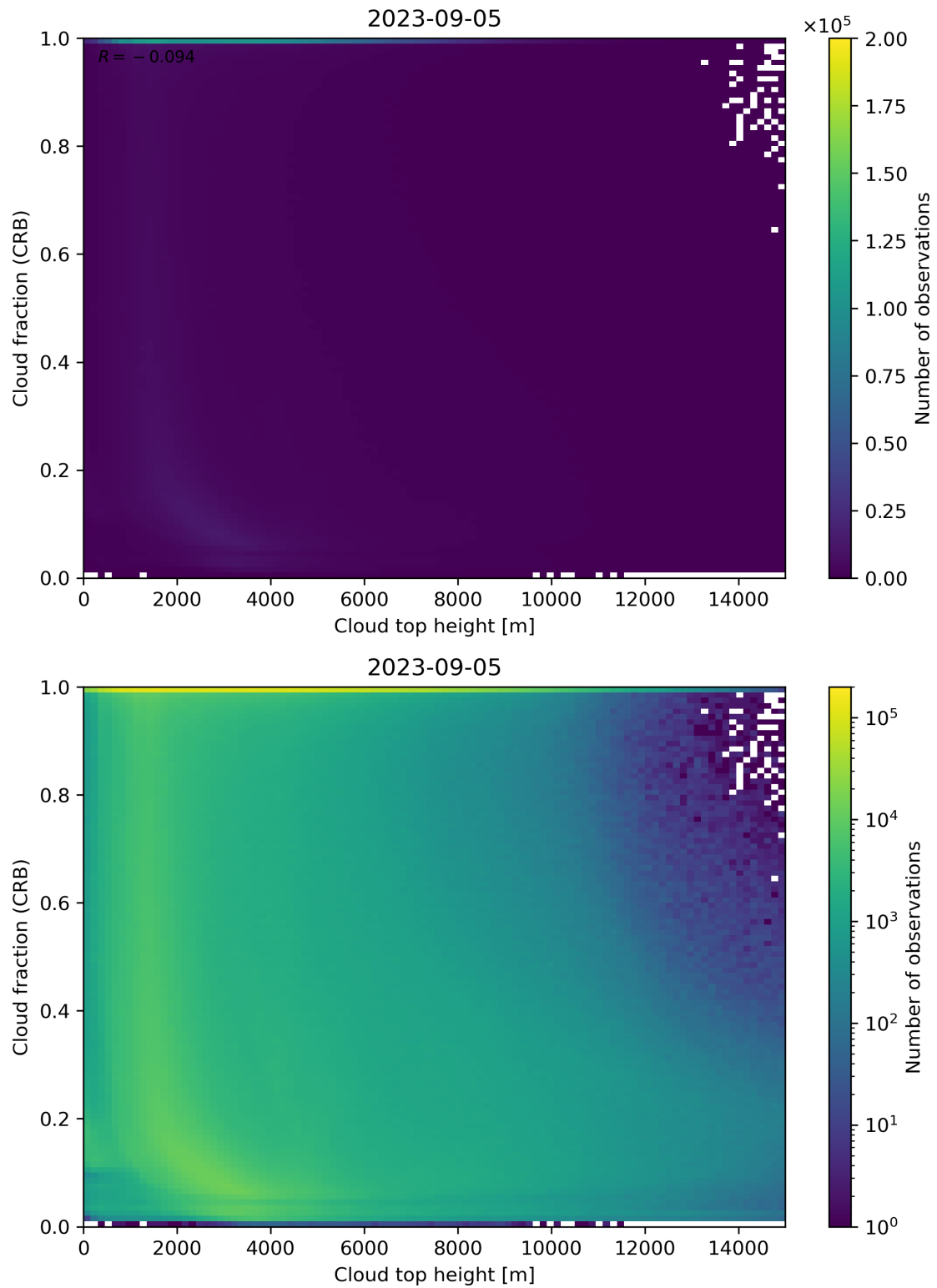


Figure 88: Scatter density plot of “Cloud top height” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.

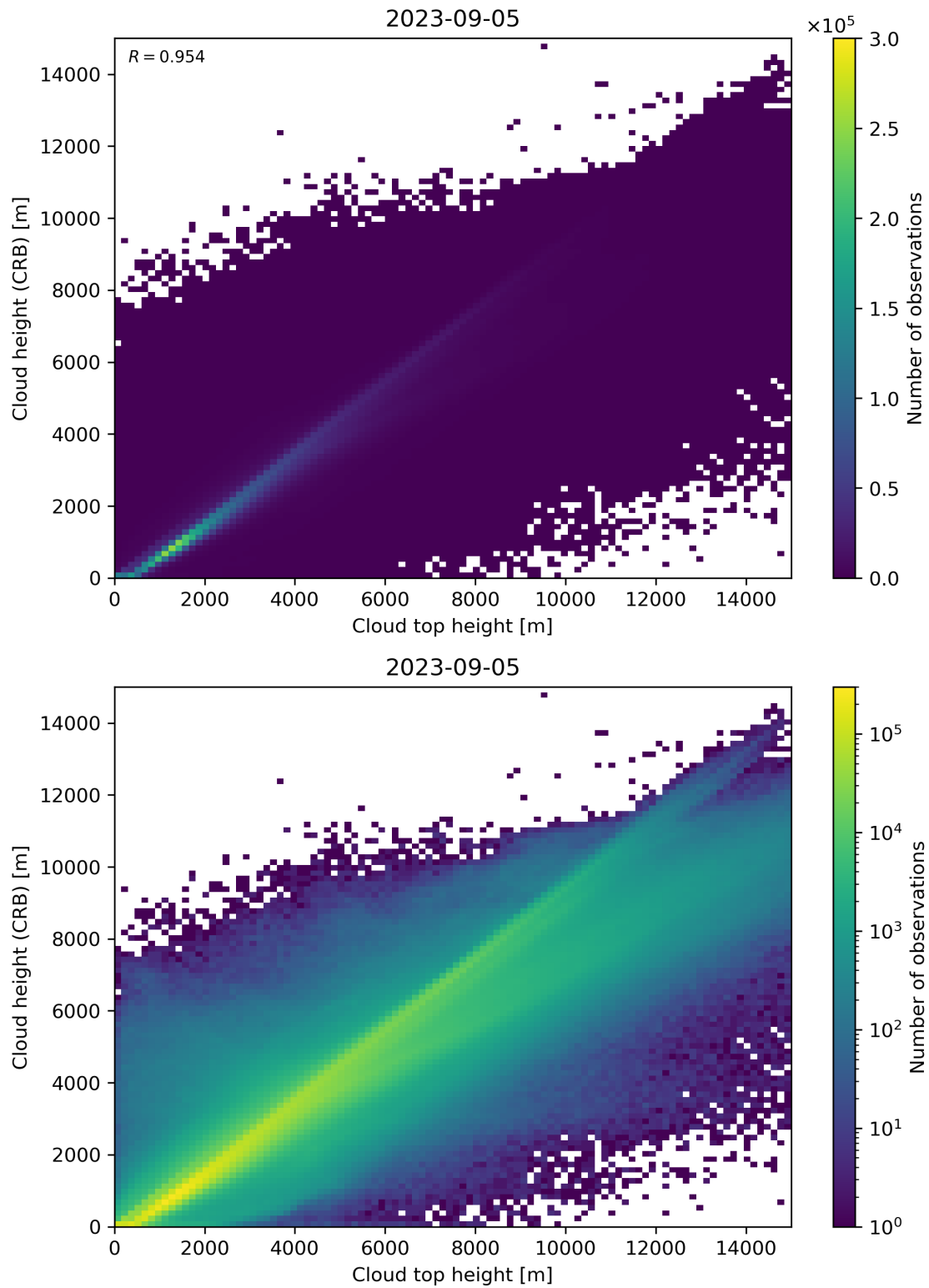


Figure 89: Scatter density plot of “Cloud top height” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.

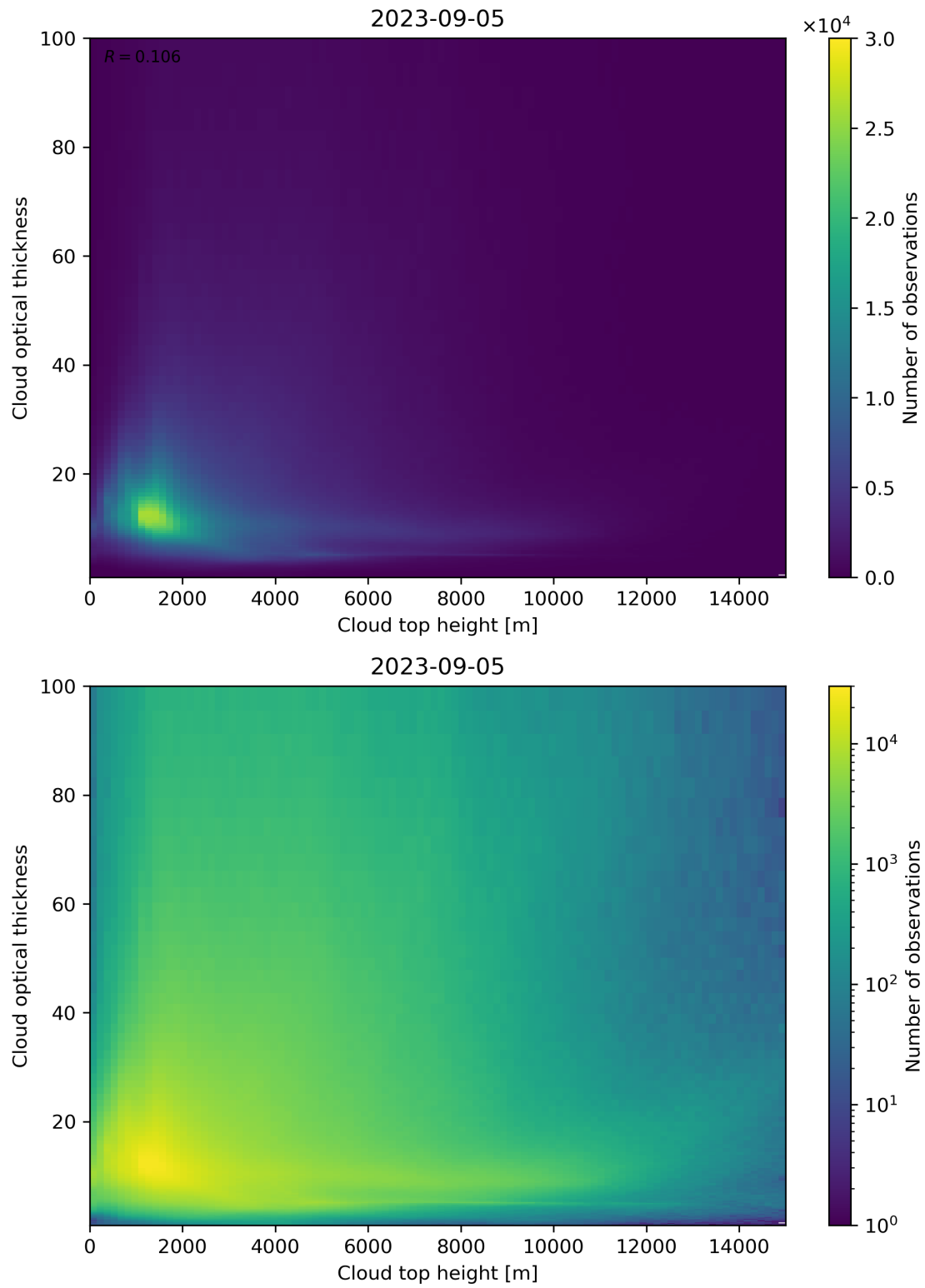


Figure 90: Scatter density plot of “Cloud top height” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.

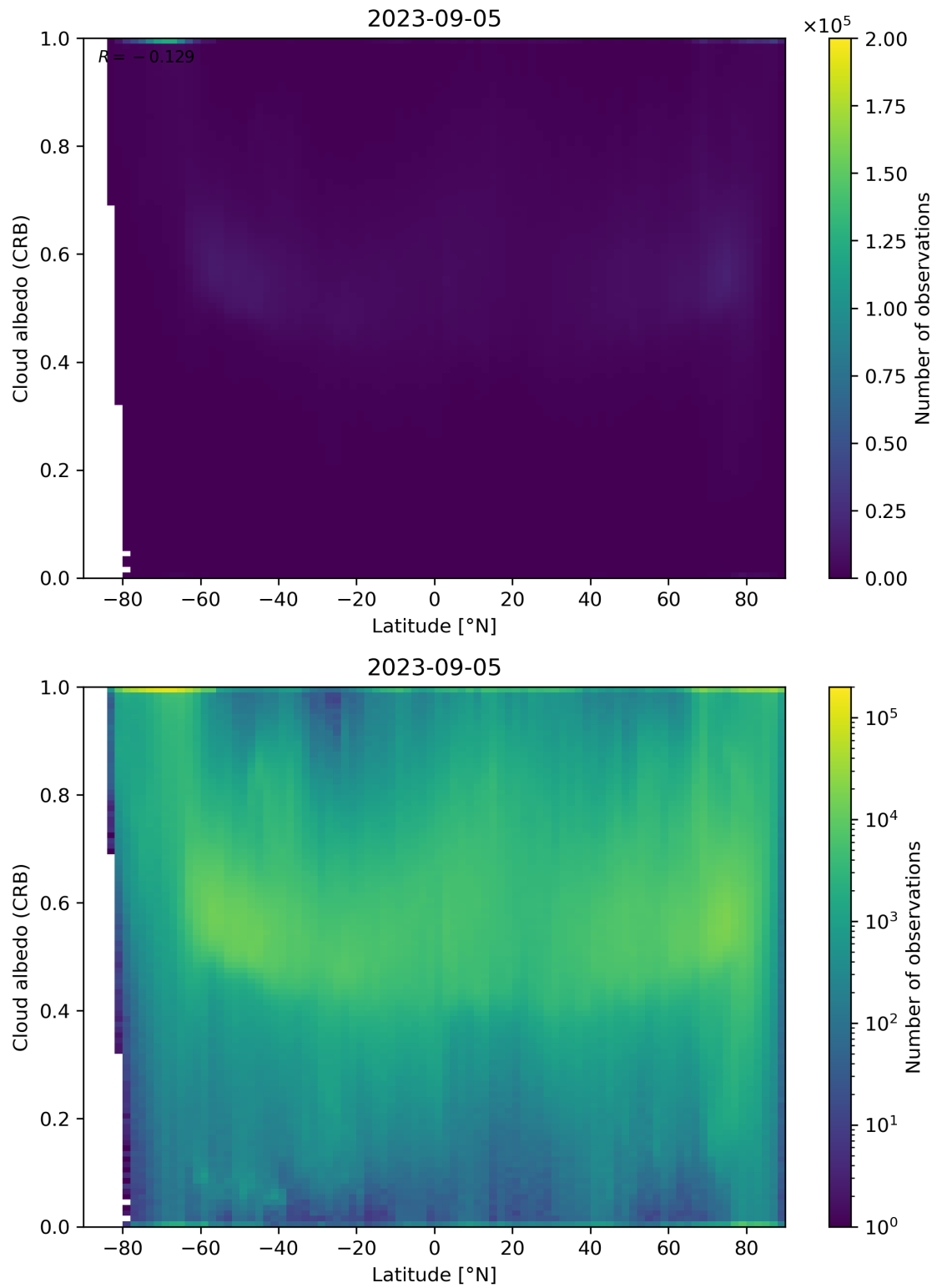


Figure 91: Scatter density plot of “Latitude” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

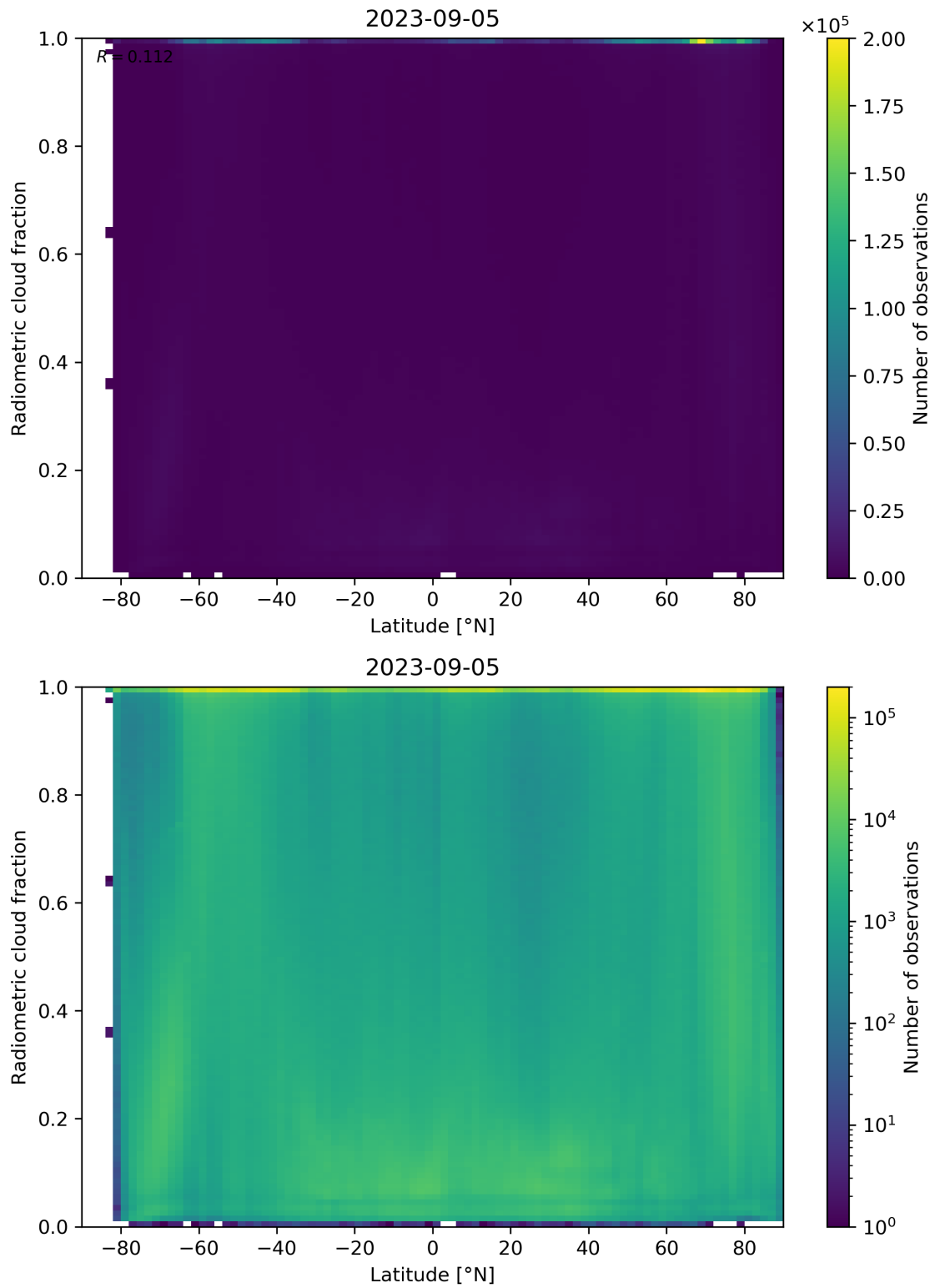


Figure 92: Scatter density plot of “Latitude” against “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06.

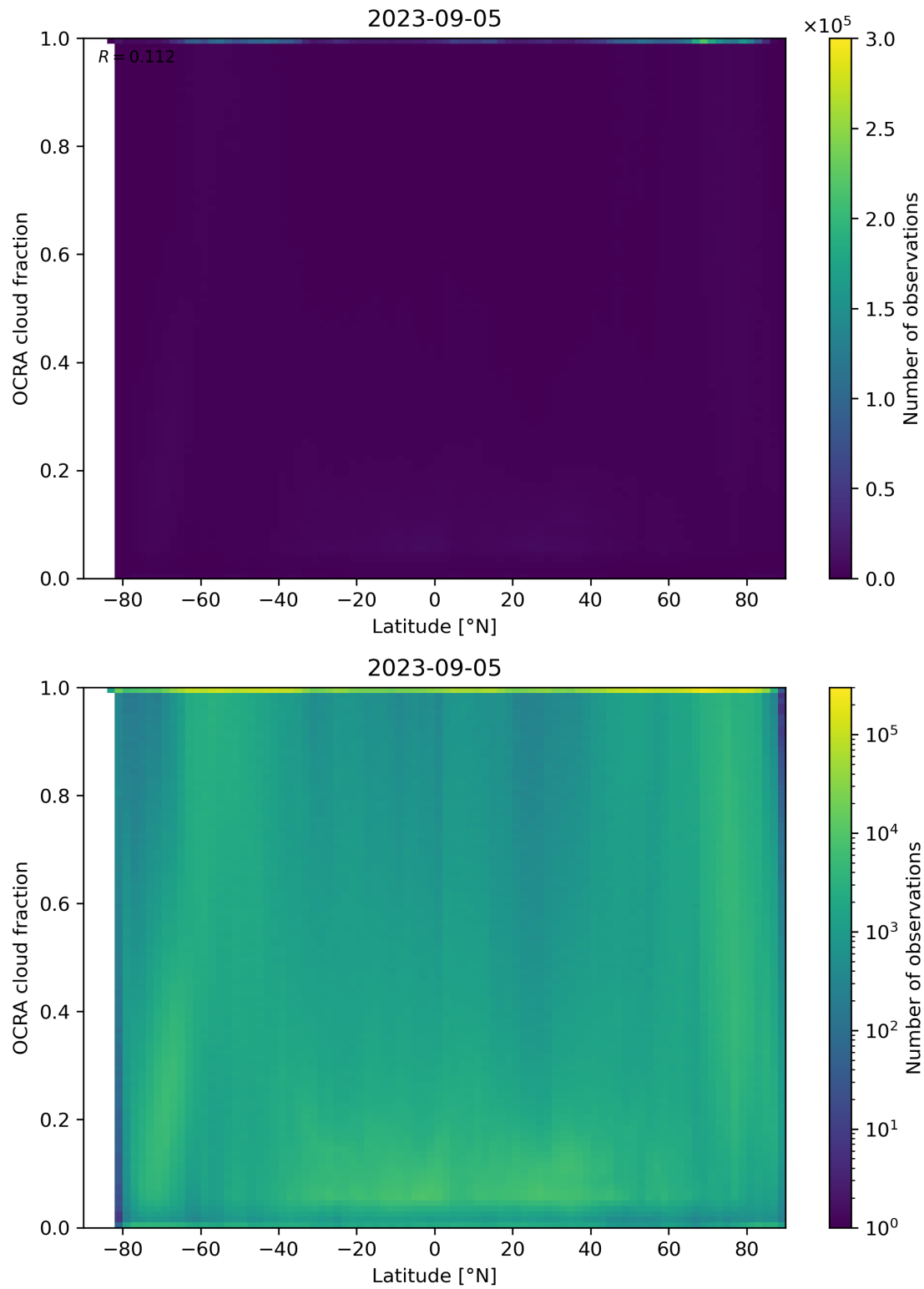


Figure 93: Scatter density plot of “Latitude” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

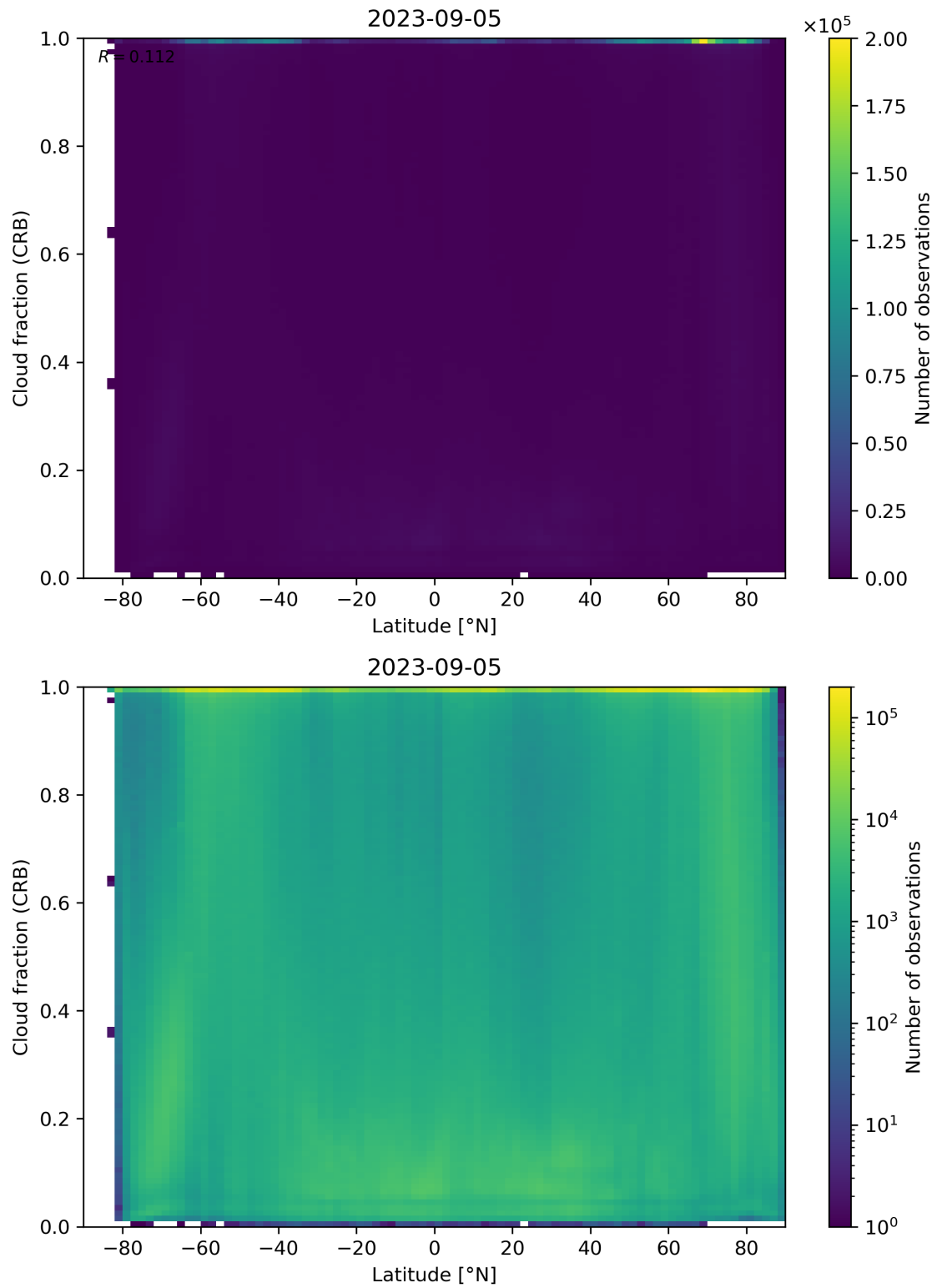


Figure 94: Scatter density plot of “Latitude” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.

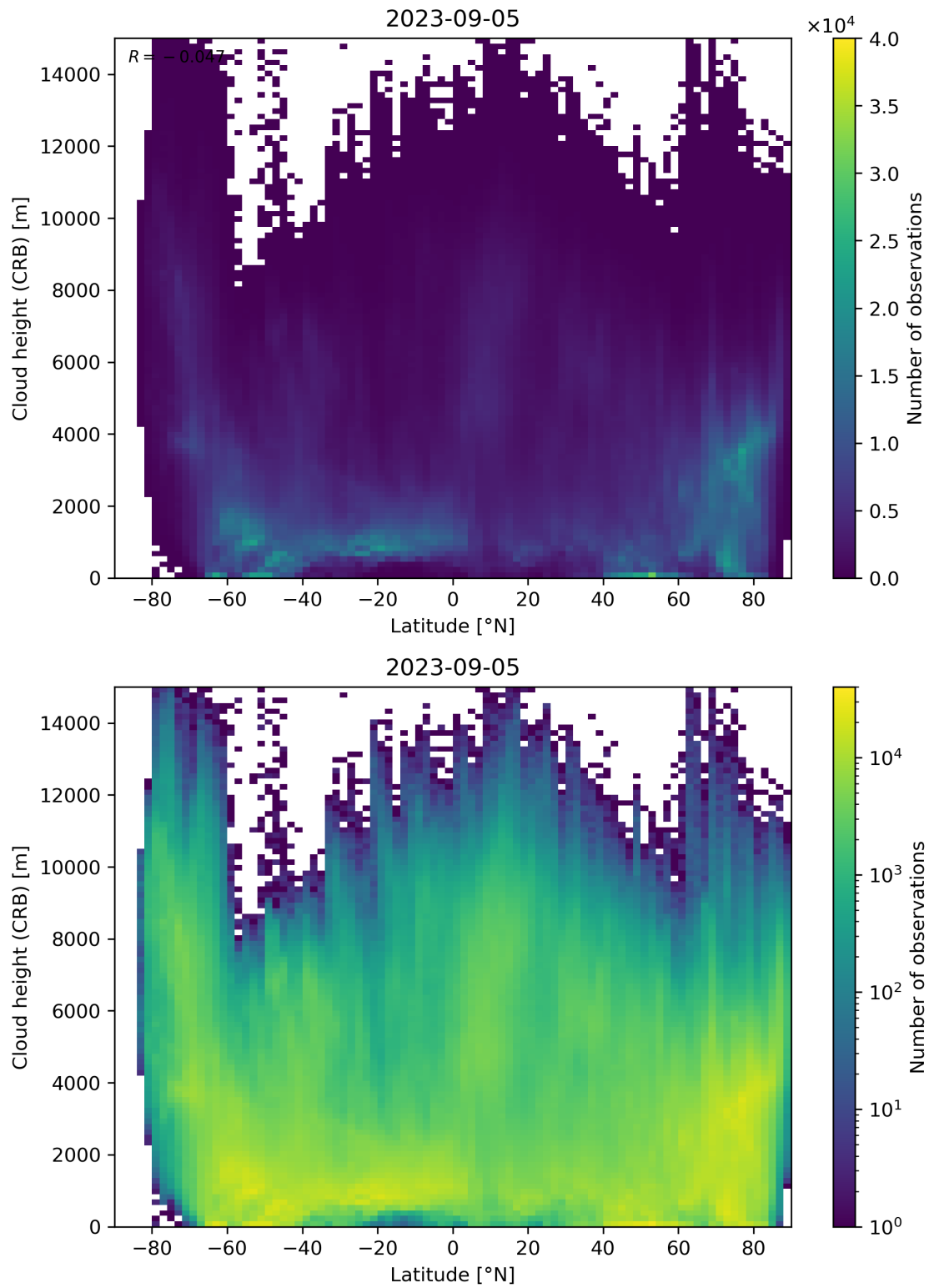


Figure 95: Scatter density plot of “Latitude” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.

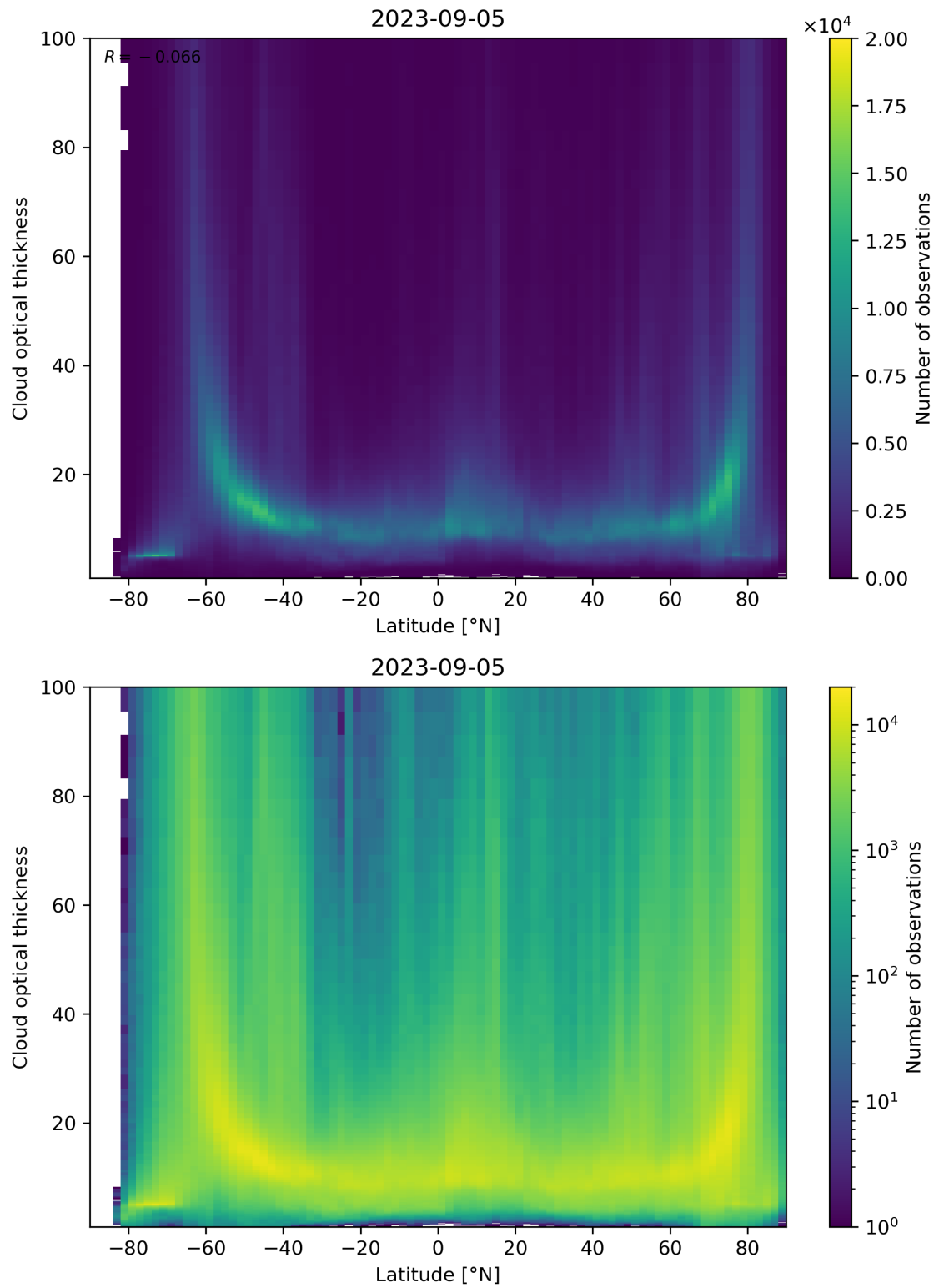


Figure 96: Scatter density plot of “Latitude” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.

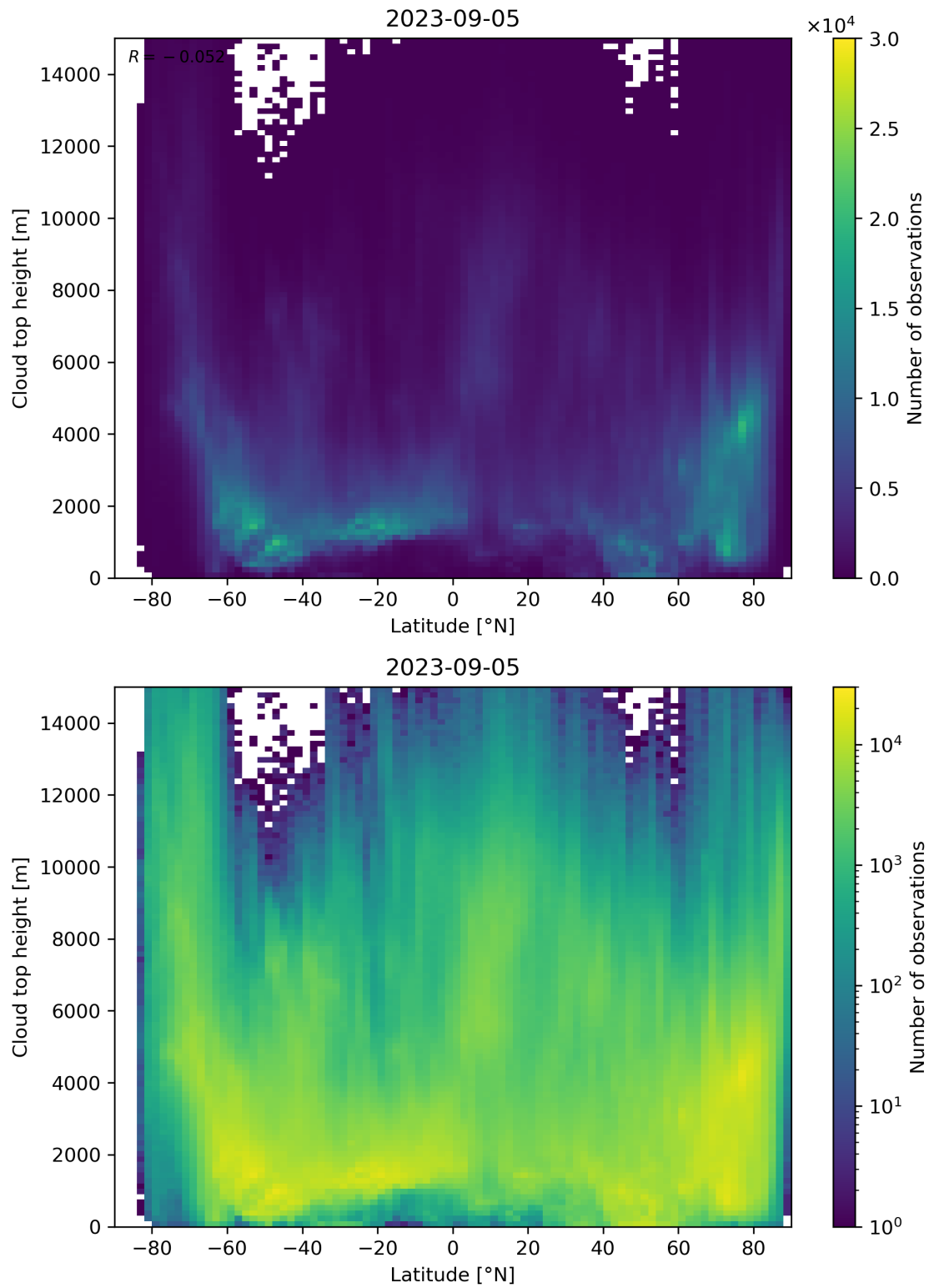


Figure 97: Scatter density plot of “Latitude” against “Cloud top height” for 2023-09-05 to 2023-09-06.

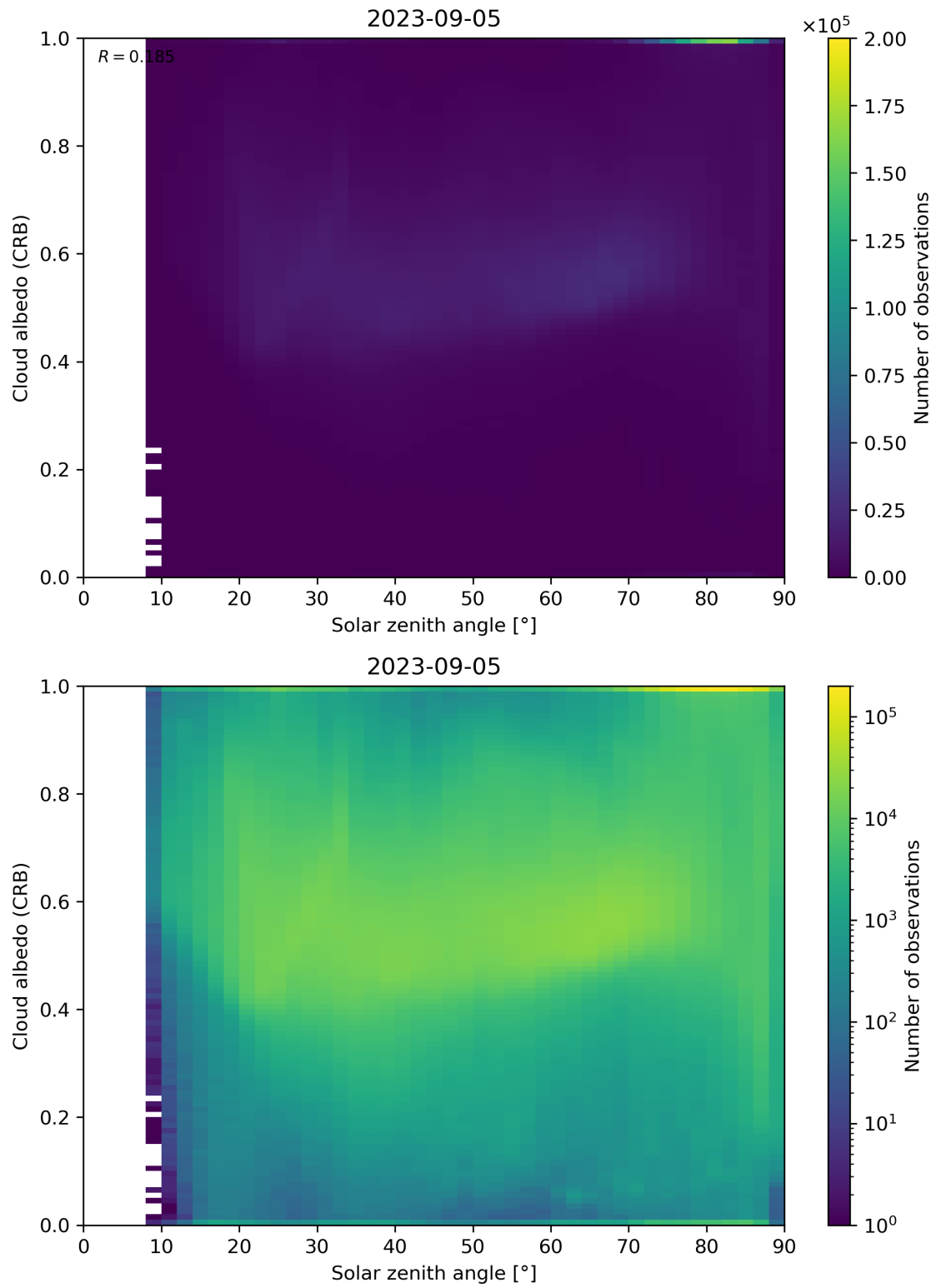


Figure 98: Scatter density plot of “Solar zenith angle” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

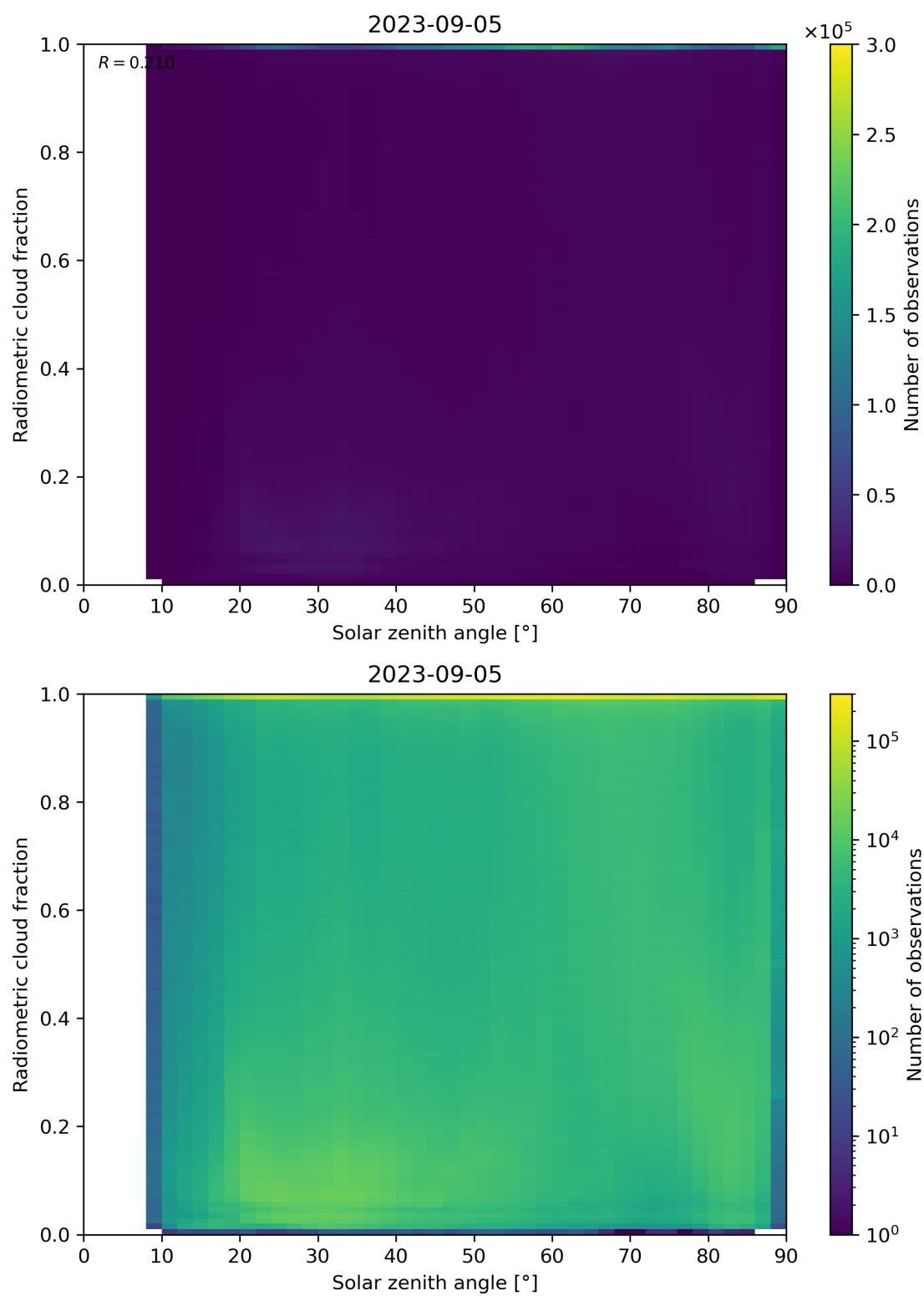


Figure 99: Scatter density plot of “Solar zenith angle” against “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06.

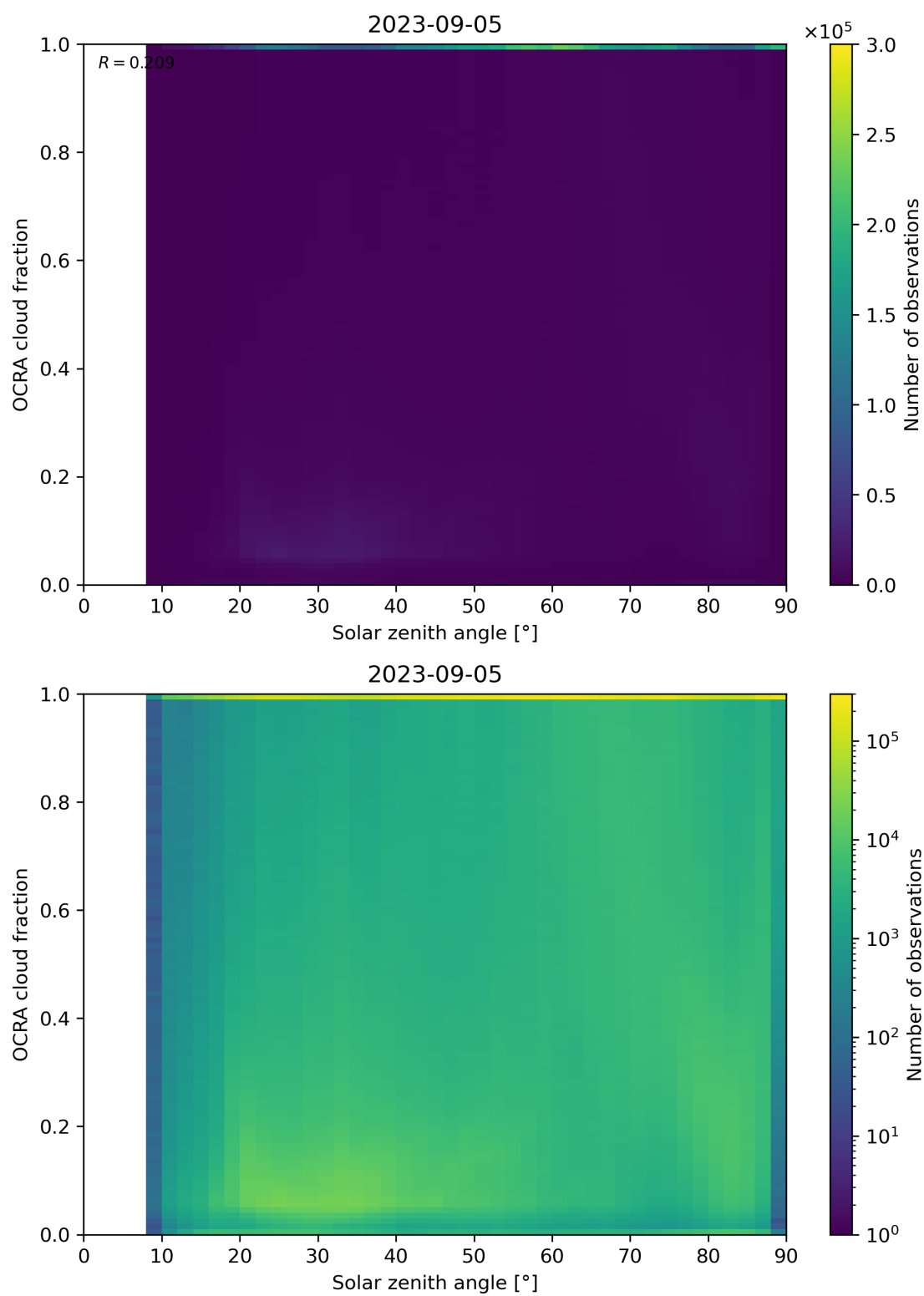


Figure 100: Scatter density plot of “Solar zenith angle” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

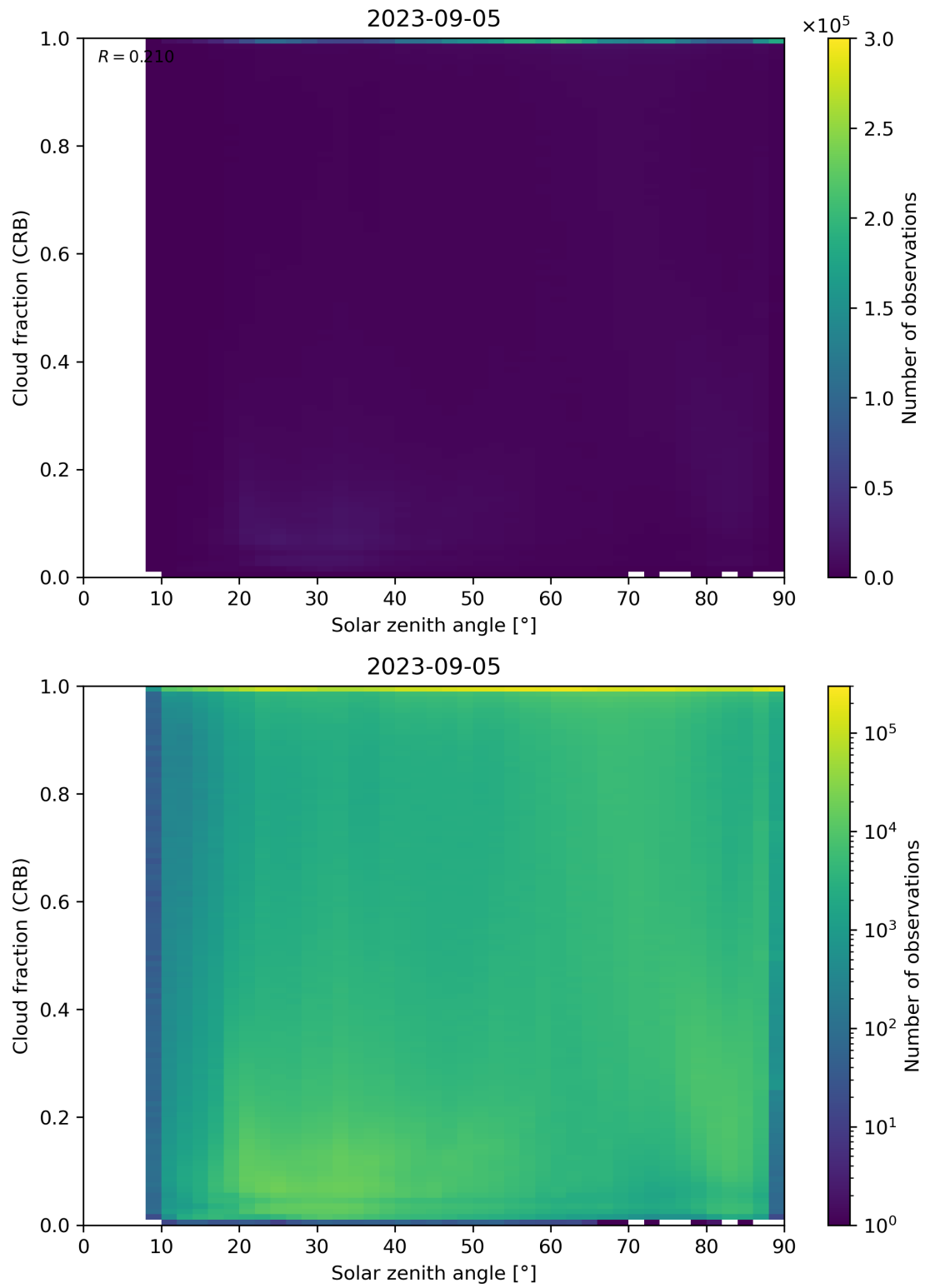


Figure 101: Scatter density plot of “Solar zenith angle” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.

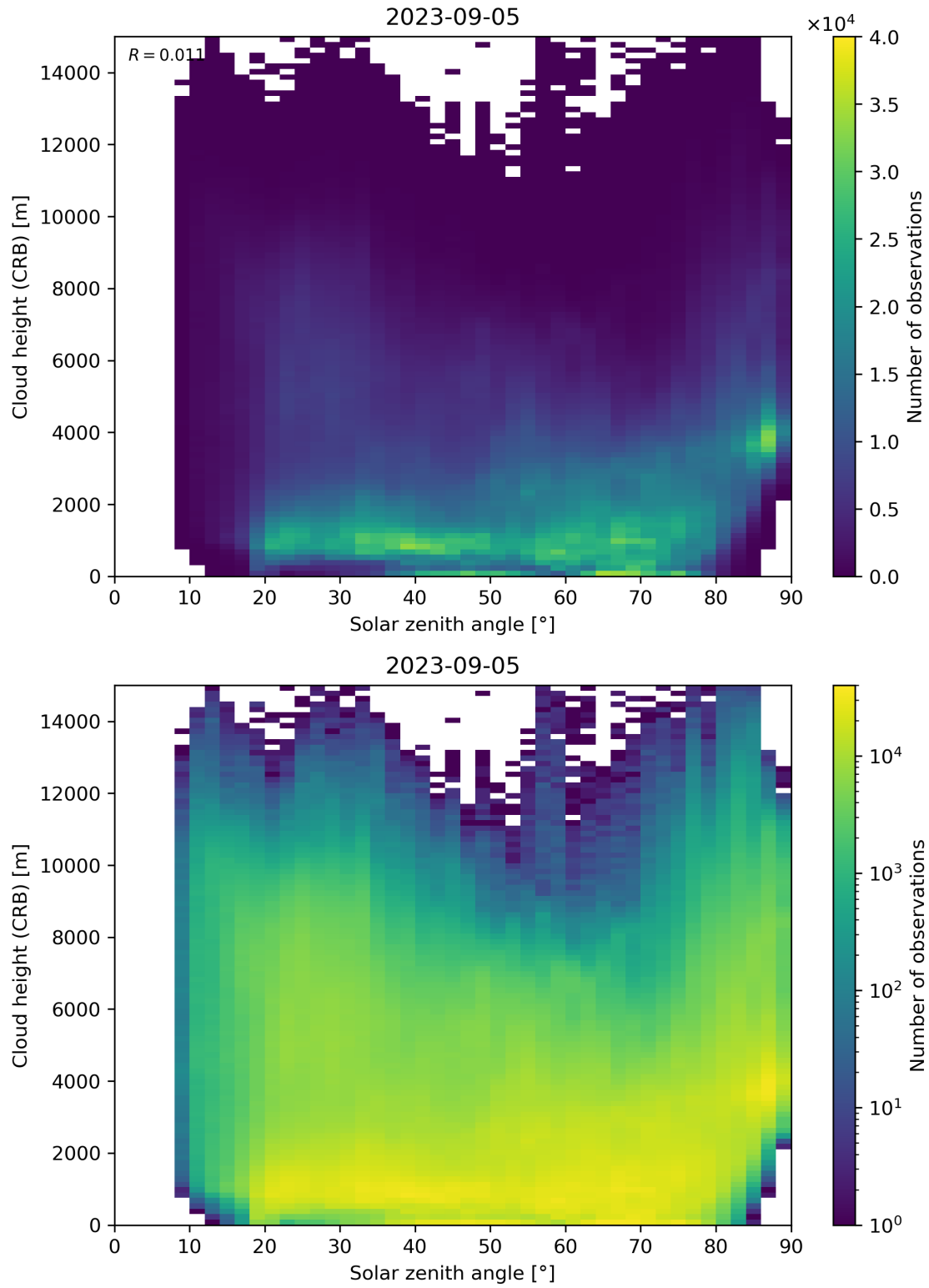


Figure 102: Scatter density plot of “Solar zenith angle” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.

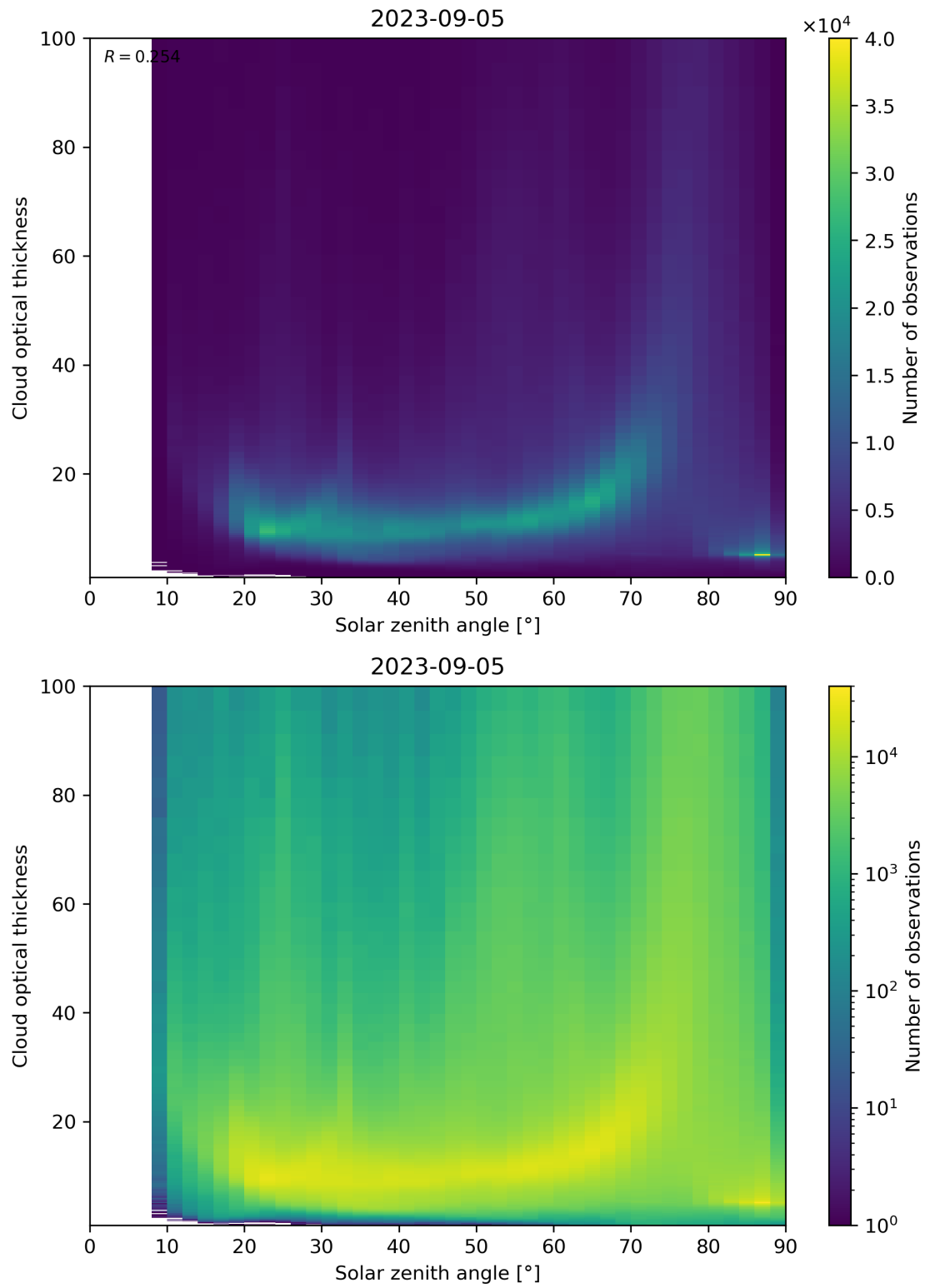


Figure 103: Scatter density plot of “Solar zenith angle” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.

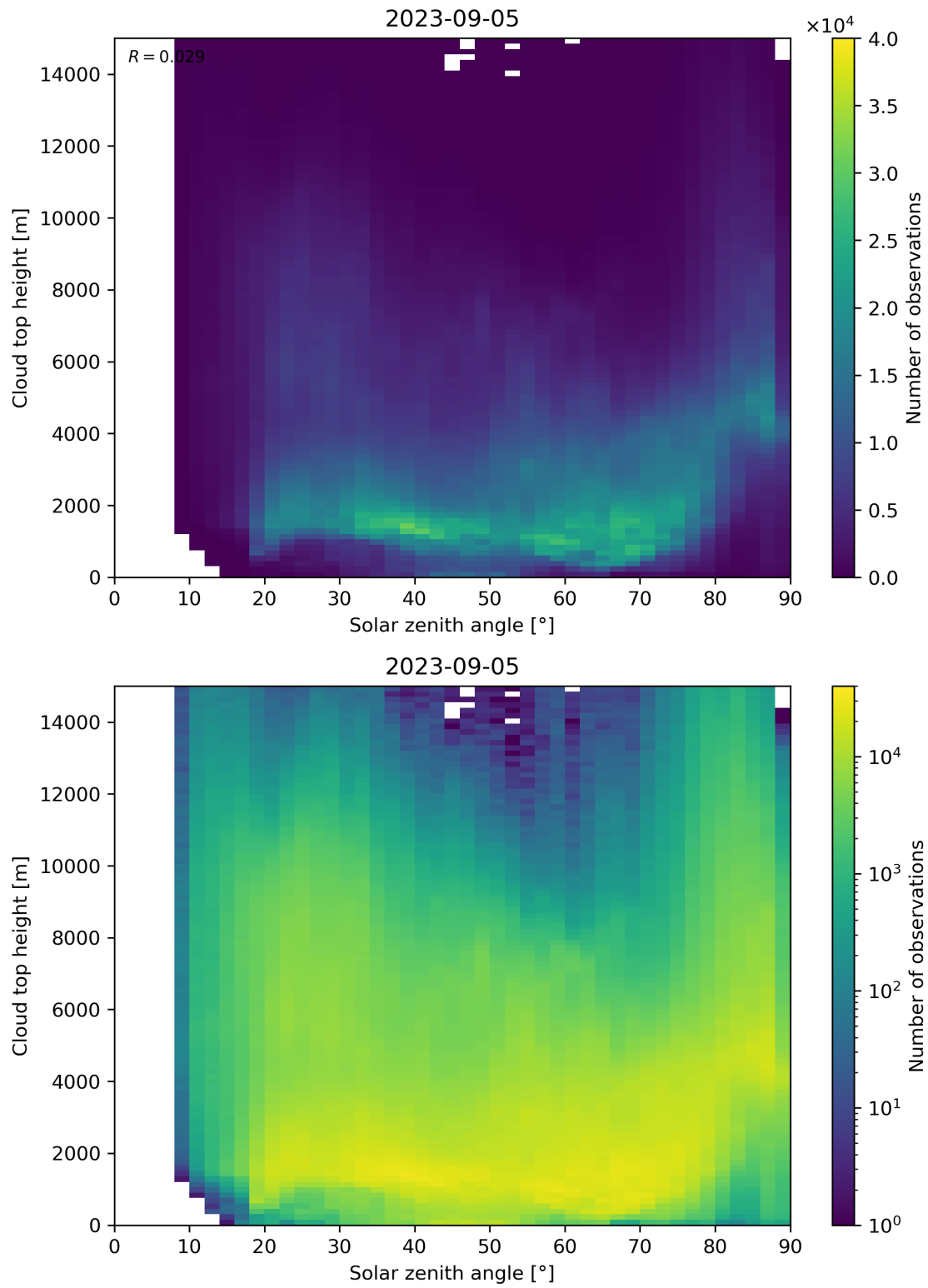


Figure 104: Scatter density plot of “Solar zenith angle” against “Cloud top height” for 2023-09-05 to 2023-09-06.

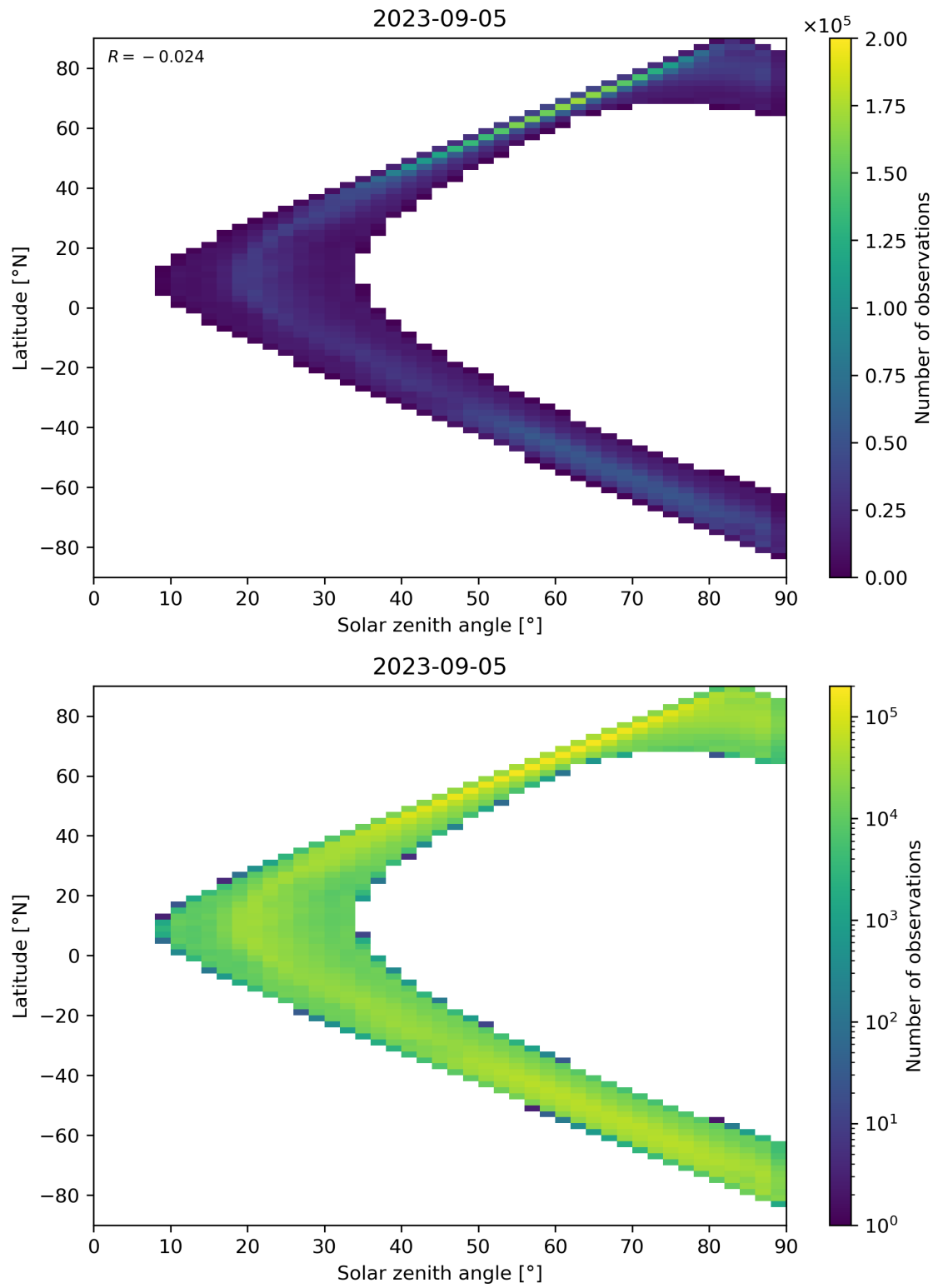


Figure 105: Scatter density plot of “Solar zenith angle” against “Latitude” for 2023-09-05 to 2023-09-06.

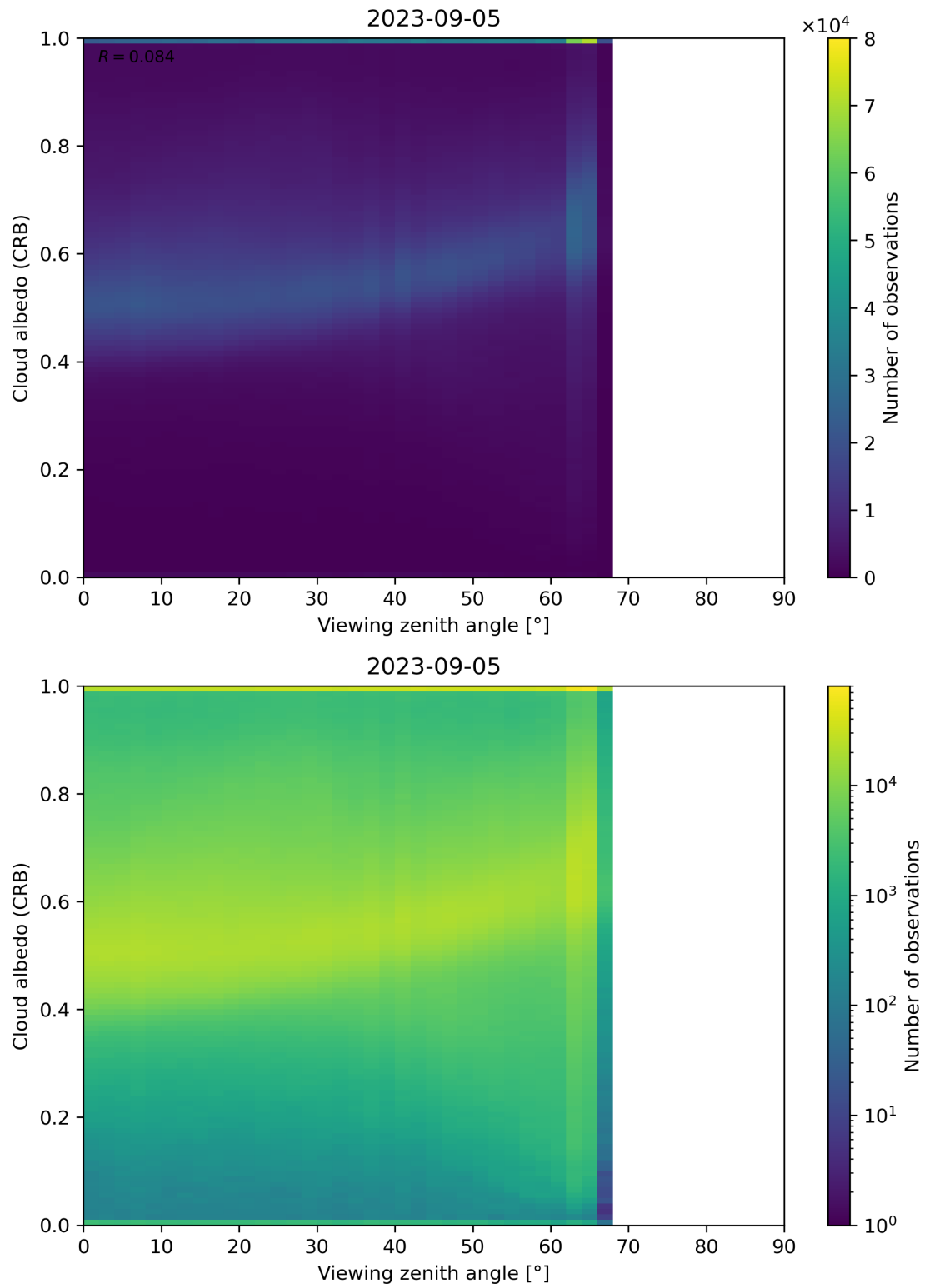


Figure 106: Scatter density plot of “Viewing zenith angle” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.

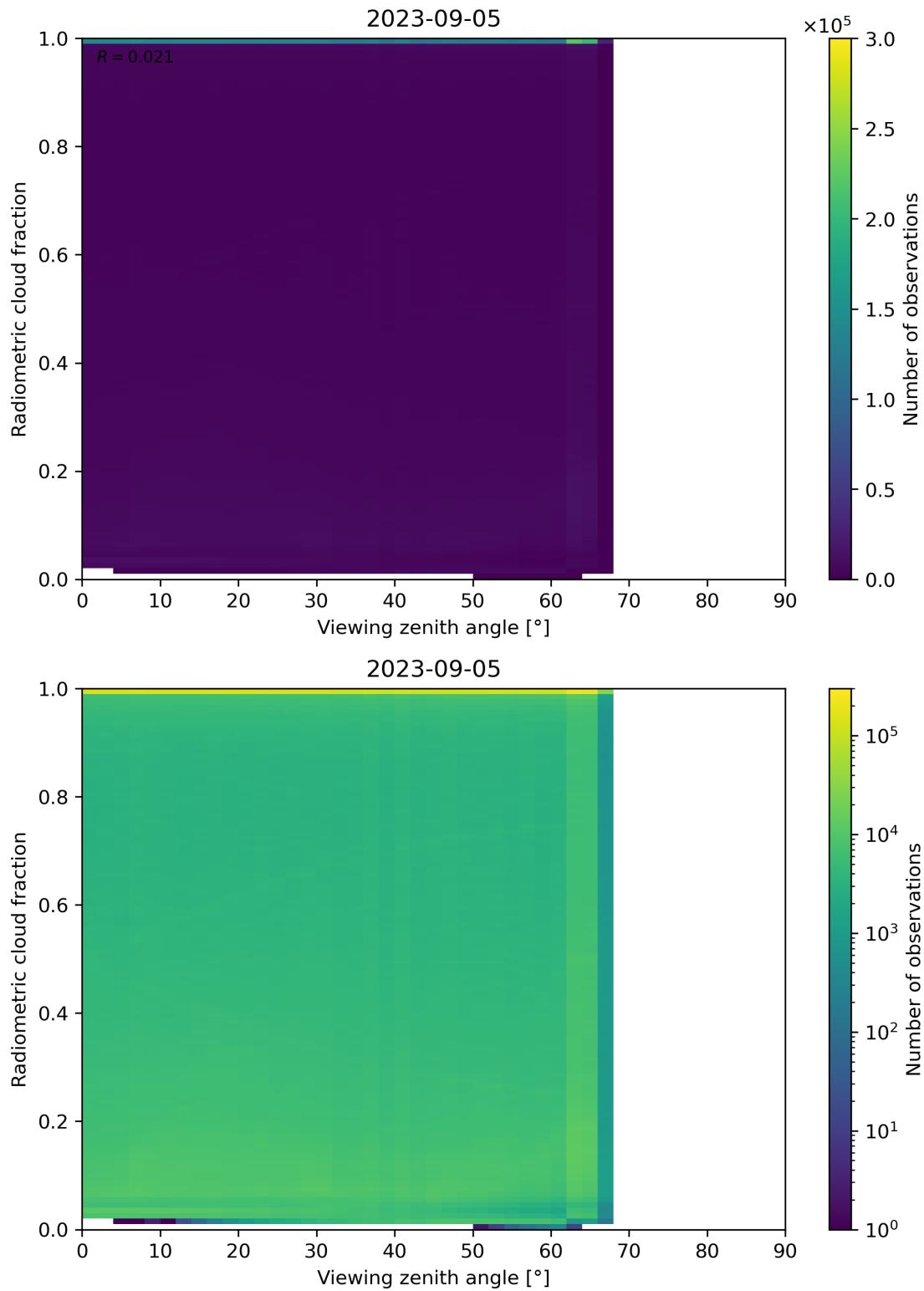


Figure 107: Scatter density plot of “Viewing zenith angle” against “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06.

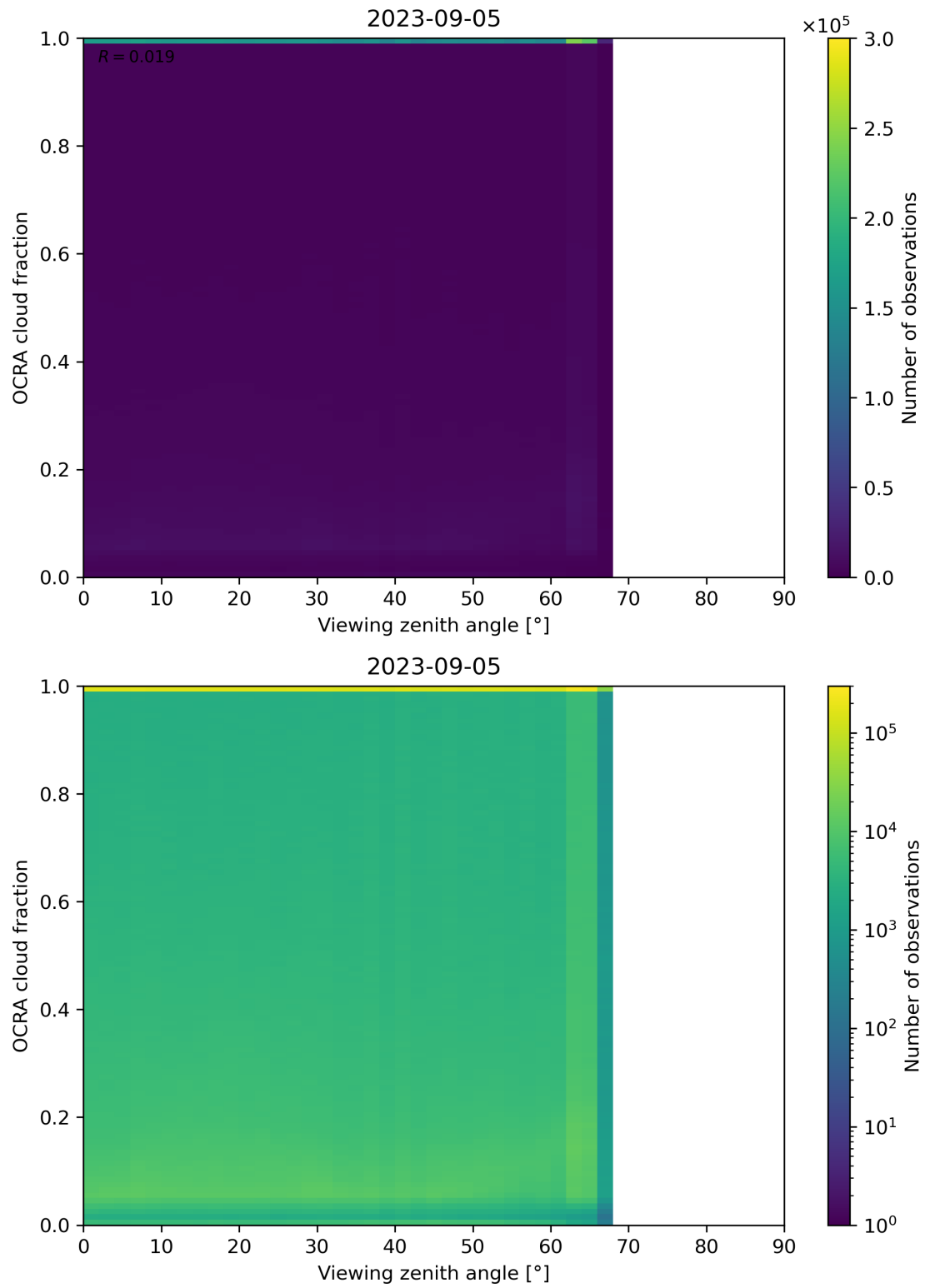


Figure 108: Scatter density plot of “Viewing zenith angle” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.

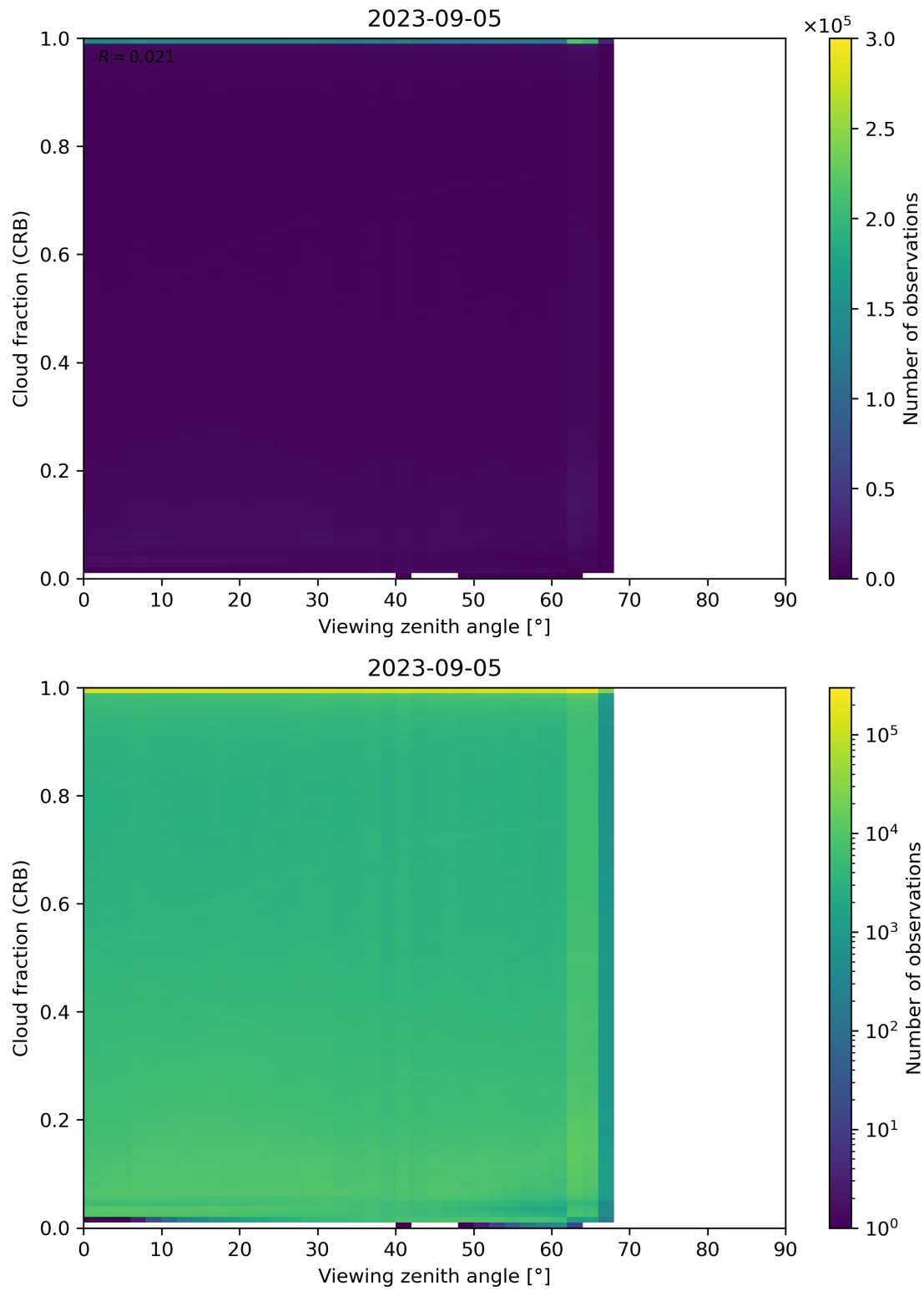


Figure 109: Scatter density plot of “Viewing zenith angle” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.

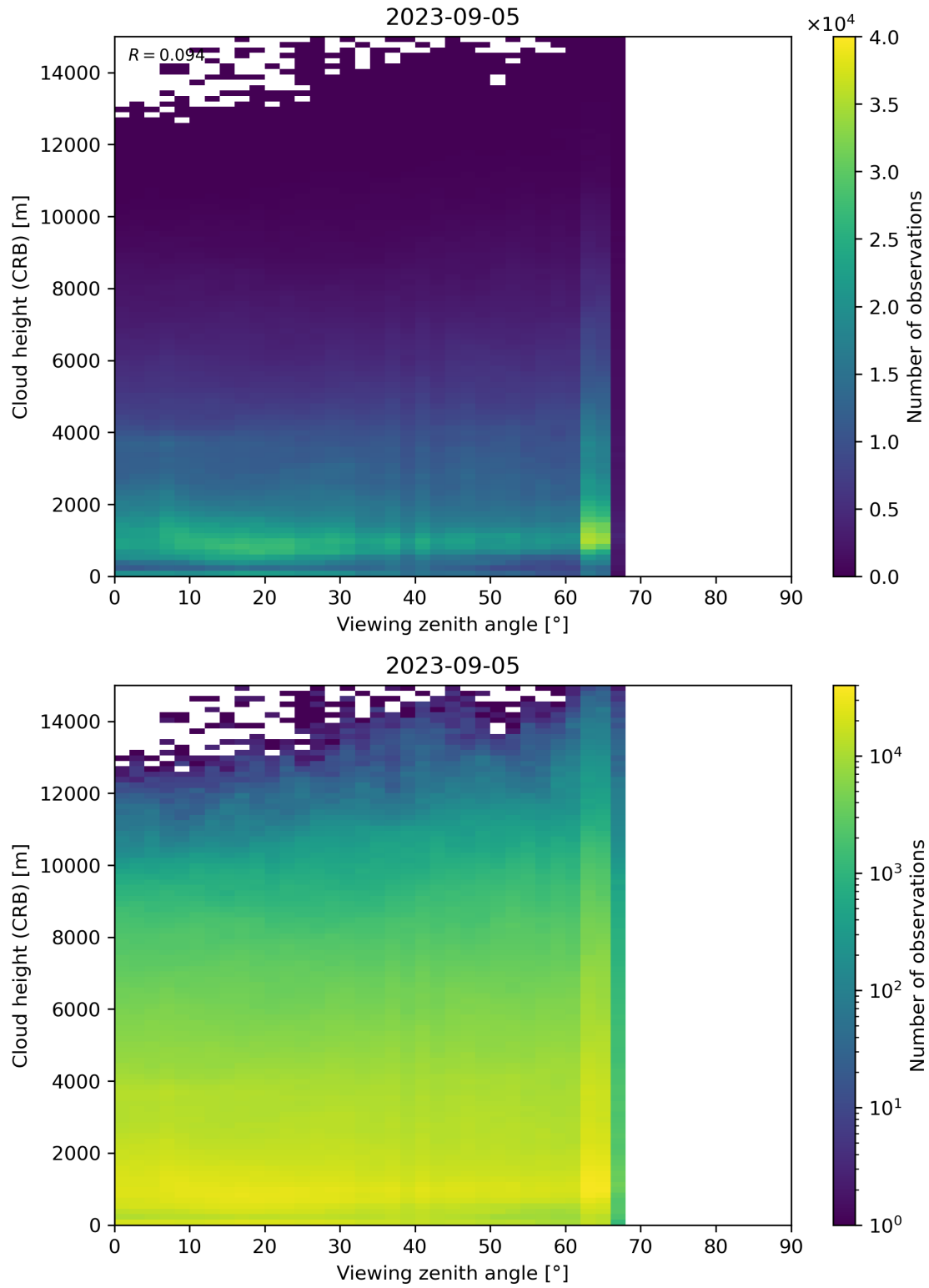


Figure 110: Scatter density plot of “Viewing zenith angle” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.

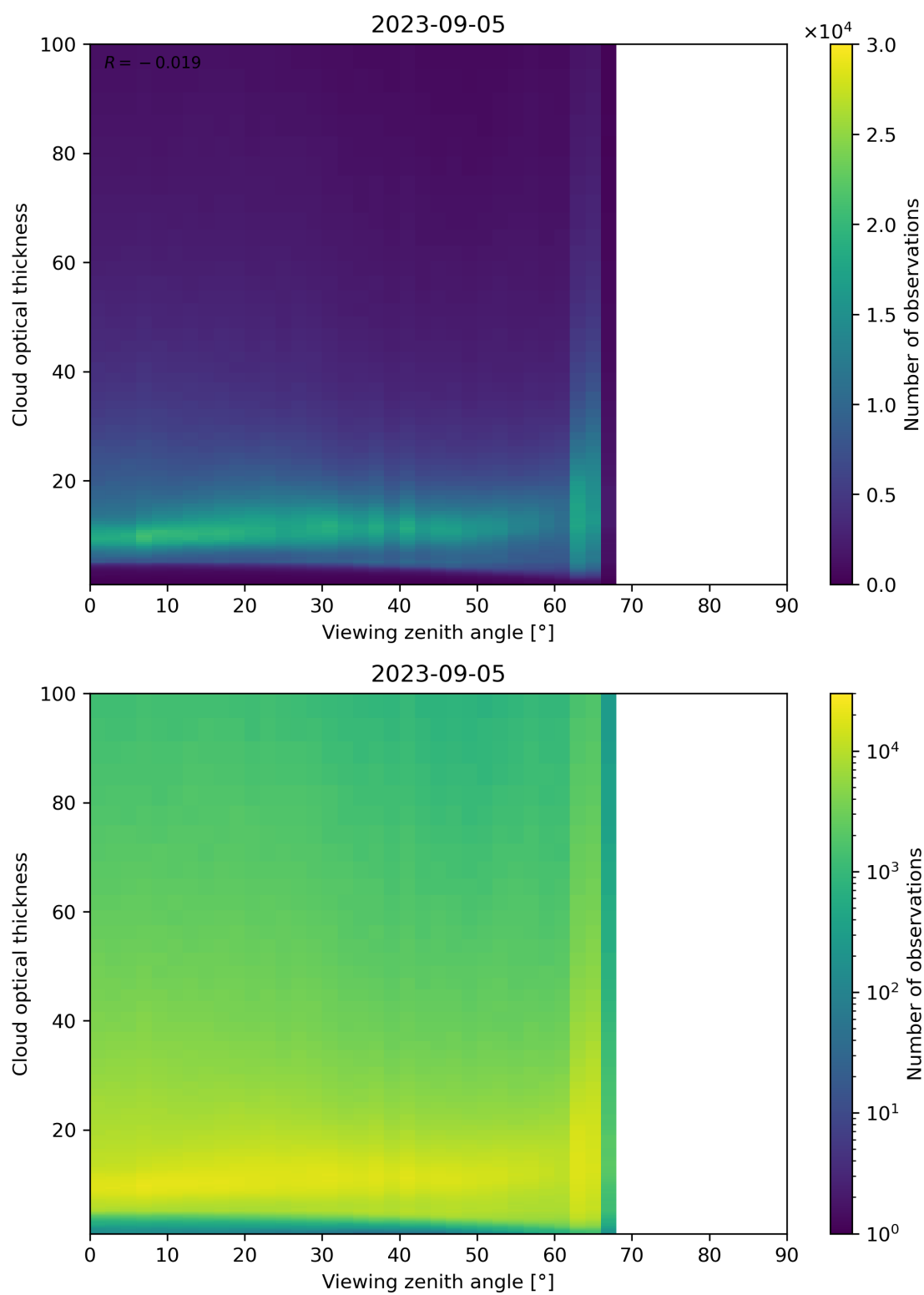


Figure 111: Scatter density plot of “Viewing zenith angle” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.

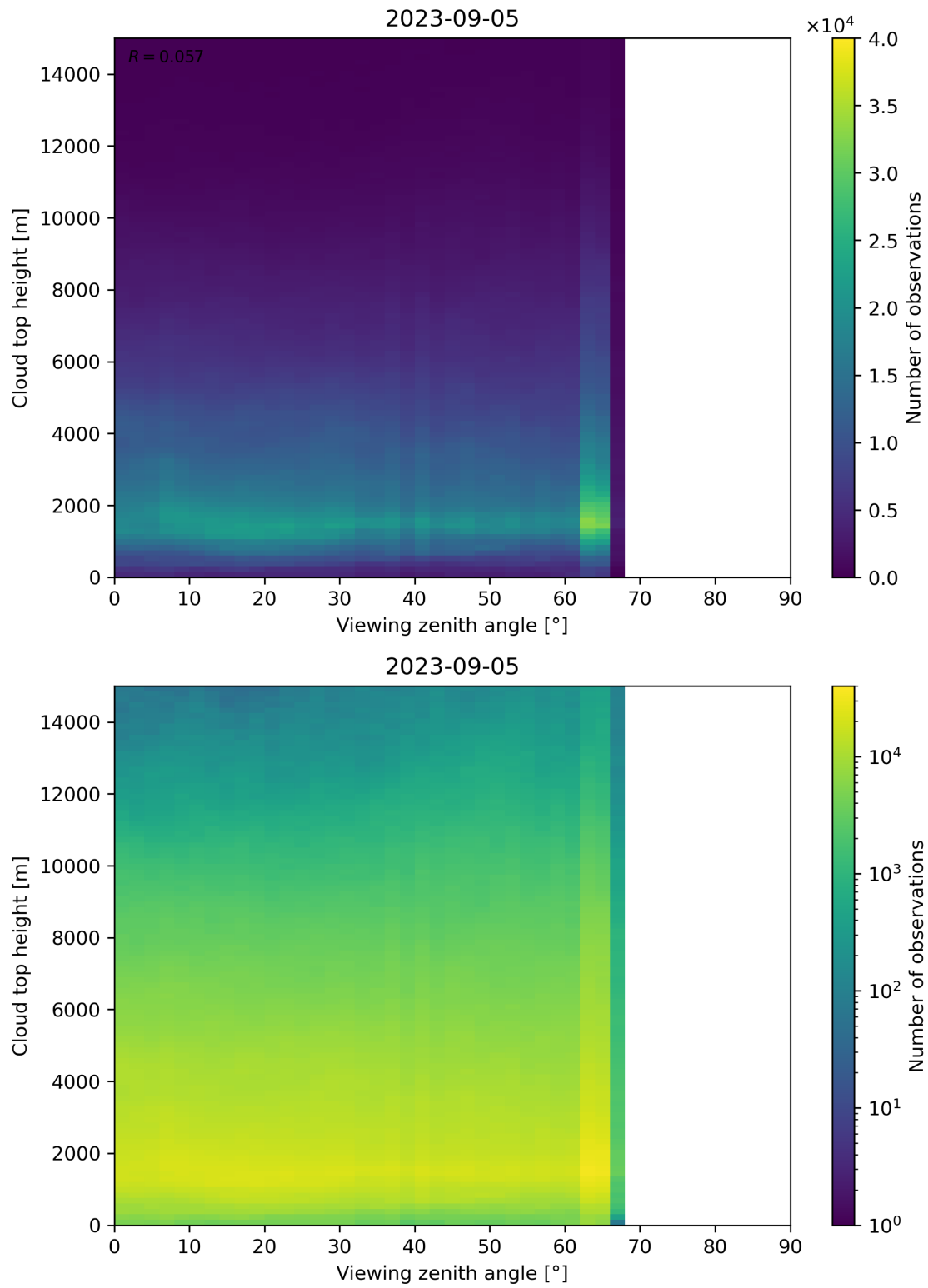


Figure 112: Scatter density plot of “Viewing zenith angle” against “Cloud top height” for 2023-09-05 to 2023-09-06.

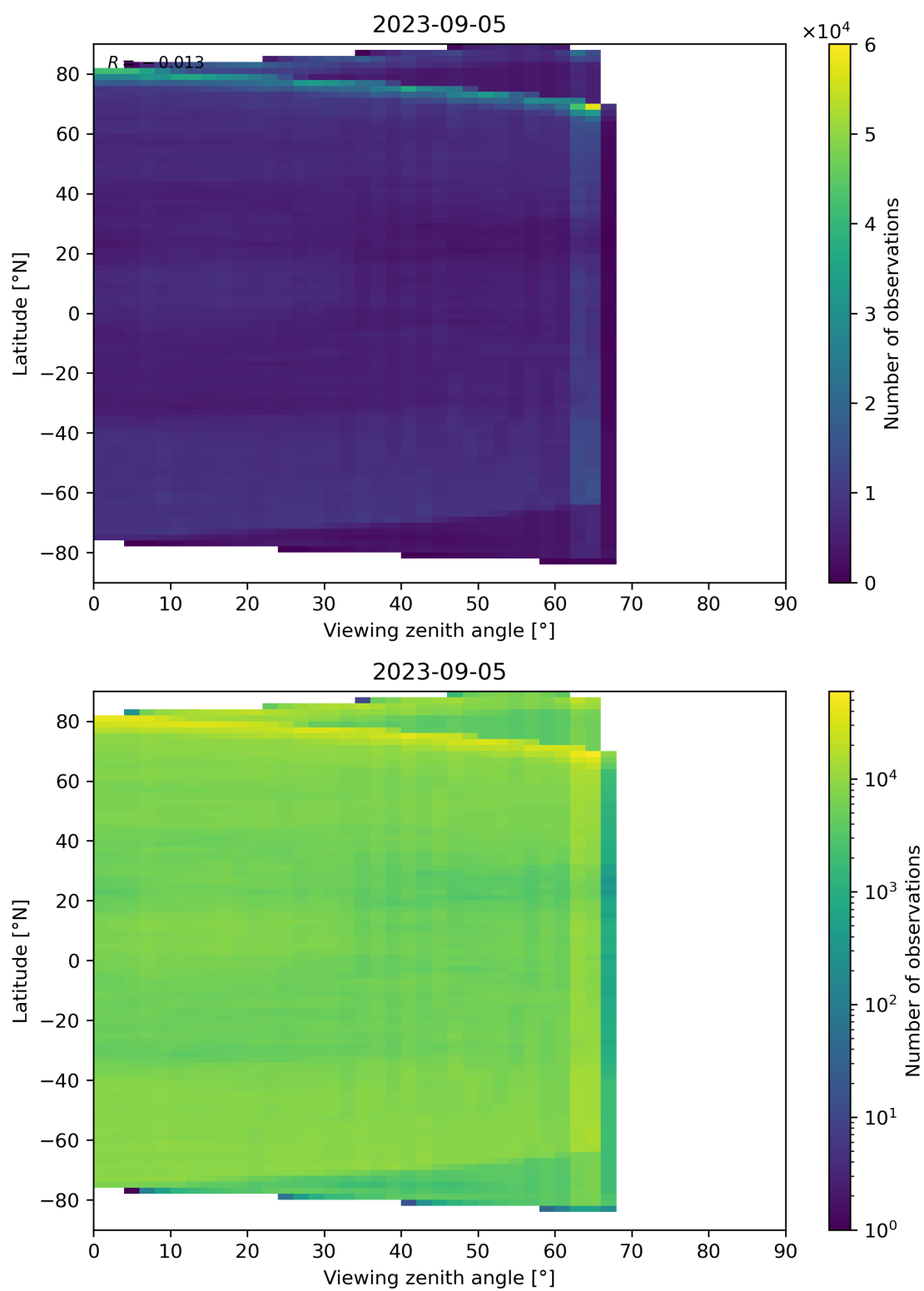


Figure 113: Scatter density plot of “Viewing zenith angle” against “Latitude” for 2023-09-05 to 2023-09-06.

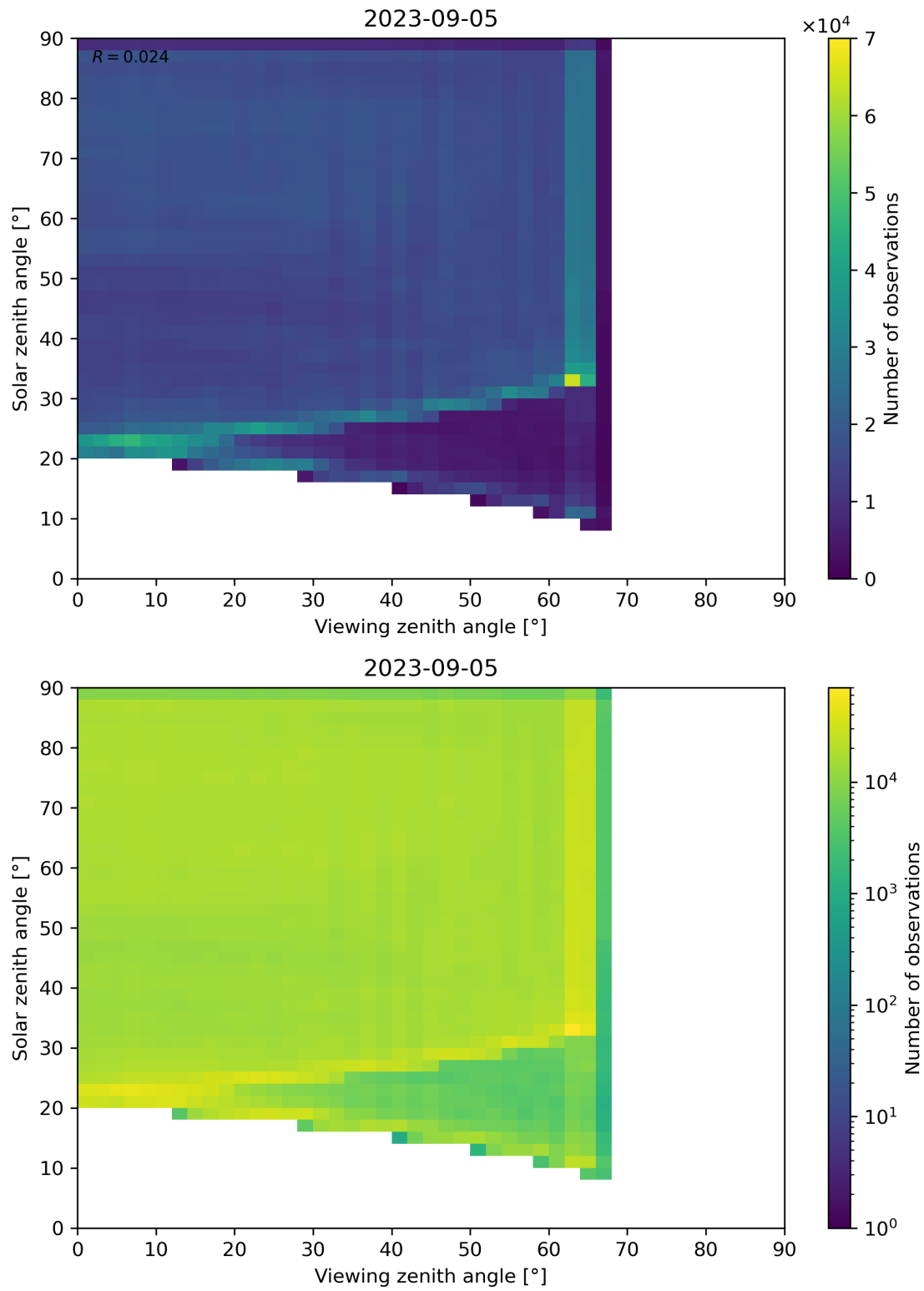


Figure 114: Scatter density plot of “Viewing zenith angle” against “Solar zenith angle” for 2023-09-05 to 2023-09-06.

Contents

1	Short Introduction	1
1.1	The list of parameters	1
2	Definitions	1
3	Granule outlines	12
4	Input data monitoring	13
5	Warnings and errors	14
6	World maps	15
7	Zonal average	31
8	Histograms	47
9	Along track statistics	63
10	Coincidence density	79
11	Copyright information of ‘PyCAMA’	124

List of Figures

1	Map of correlation graph for 2023-09-05 to 2023-09-06.	10
2	Map of correlation matrix for 2023-09-05 to 2023-09-06.	11
3	Outline of the granules.	12
4	Input data per granule	13
5	Fraction of pixels with specific warnings and errors during processing	14
6	Map of “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06	15
7	Map of “Cloud top height” for 2023-09-05 to 2023-09-06	16
8	Map of “Cloud optical thickness” for 2023-09-05 to 2023-09-06	17
9	Map of “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06	18
10	Map of “Cloud height (CRB)” for 2023-09-05 to 2023-09-06	19
11	Map of “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06	20
12	Map of “Fitted surface albedo” for 2023-09-05 to 2023-09-06	21
13	Map of “Fitted surface albedo (CRB)” for 2023-09-05 to 2023-09-06	22
14	Map of “RMS” for 2023-09-05 to 2023-09-06	23
15	Map of “RMS (CRB)” for 2023-09-05 to 2023-09-06	24
16	Map of “Fitting wavelength shift” for 2023-09-05 to 2023-09-06	25
17	Map of “OCRA cloud fraction” for 2023-09-05 to 2023-09-06	26
18	Map of “OCRA [Pleaseinsertintopreamble]blue[Pleaseinsertintopreamble] reflectance” for 2023-09-05 to 2023-09-06	27
19	Map of “OCRA “green” reflectance” for 2023-09-05 to 2023-09-06	28
20	Map of “ROCINN “red” reflectance” for 2023-09-05 to 2023-09-06	29
21	Map of the number of observations for 2023-09-05 to 2023-09-06	30
22	Zonal average of “QA value” for 2023-09-05 to 2023-09-06.	31
23	Zonal average of “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06.	32
24	Zonal average of “Cloud top height” for 2023-09-05 to 2023-09-06.	33
25	Zonal average of “Cloud optical thickness” for 2023-09-05 to 2023-09-06.	34
26	Zonal average of “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.	35
27	Zonal average of “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.	36
28	Zonal average of “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	37
29	Zonal average of “Fitted surface albedo” for 2023-09-05 to 2023-09-06.	38
30	Zonal average of “Fitted surface albedo (CRB)” for 2023-09-05 to 2023-09-06.	39
31	Zonal average of “RMS” for 2023-09-05 to 2023-09-06.	40
32	Zonal average of “RMS (CRB)” for 2023-09-05 to 2023-09-06.	41
33	Zonal average of “Fitting wavelength shift” for 2023-09-05 to 2023-09-06.	42
34	Zonal average of “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	43
35	Zonal average of “OCRA “blue” reflectance” for 2023-09-05 to 2023-09-06.	44

36	Zonal average of “OCRA “green” reflectance” for 2023-09-05 to 2023-09-06.	45
37	Zonal average of “ROCINN “red” reflectance” for 2023-09-05 to 2023-09-06.	46
38	Histogram of “QA value” for 2023-09-05 to 2023-09-06	47
39	Histogram of “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06	48
40	Histogram of “Cloud top height” for 2023-09-05 to 2023-09-06	49
41	Histogram of “Cloud optical thickness” for 2023-09-05 to 2023-09-06	50
42	Histogram of “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06	51
43	Histogram of “Cloud height (CRB)” for 2023-09-05 to 2023-09-06	52
44	Histogram of “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06	53
45	Histogram of “Fitted surface albedo” for 2023-09-05 to 2023-09-06	54
46	Histogram of “Fitted surface albedo (CRB)” for 2023-09-05 to 2023-09-06	55
47	Histogram of “RMS” for 2023-09-05 to 2023-09-06	56
48	Histogram of “RMS (CRB)” for 2023-09-05 to 2023-09-06	57
49	Histogram of “Fitting wavelength shift” for 2023-09-05 to 2023-09-06	58
50	Histogram of “OCRA cloud fraction” for 2023-09-05 to 2023-09-06	59
51	Histogram of “OCRA “blue” reflectance” for 2023-09-05 to 2023-09-06	60
52	Histogram of “OCRA “green” reflectance” for 2023-09-05 to 2023-09-06	61
53	Histogram of “ROCINN “red” reflectance” for 2023-09-05 to 2023-09-06	62
54	Along track statistics of “QA value” for 2023-09-05 to 2023-09-06	63
55	Along track statistics of “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06	64
56	Along track statistics of “Cloud top height” for 2023-09-05 to 2023-09-06	65
57	Along track statistics of “Cloud optical thickness” for 2023-09-05 to 2023-09-06	66
58	Along track statistics of “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06	67
59	Along track statistics of “Cloud height (CRB)” for 2023-09-05 to 2023-09-06	68
60	Along track statistics of “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06	69
61	Along track statistics of “Fitted surface albedo” for 2023-09-05 to 2023-09-06	70
62	Along track statistics of “Fitted surface albedo (CRB)” for 2023-09-05 to 2023-09-06	71
63	Along track statistics of “RMS” for 2023-09-05 to 2023-09-06	72
64	Along track statistics of “RMS (CRB)” for 2023-09-05 to 2023-09-06	73
65	Along track statistics of “Fitting wavelength shift” for 2023-09-05 to 2023-09-06	74
66	Along track statistics of “OCRA cloud fraction” for 2023-09-05 to 2023-09-06	75
67	Along track statistics of “OCRA “blue” reflectance” for 2023-09-05 to 2023-09-06	76
68	Along track statistics of “OCRA “green” reflectance” for 2023-09-05 to 2023-09-06	77
69	Along track statistics of “ROCINN “red” reflectance” for 2023-09-05 to 2023-09-06	78
70	Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	79
71	Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	80
72	Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	81
73	Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.	82
74	Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.	83
75	Scatter density plot of “Radiometric cloud fraction” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.	84
76	Scatter density plot of “Radiometric cloud fraction” against “Cloud top height” for 2023-09-05 to 2023-09-06.	85
77	Scatter density plot of “Cloud fraction (CRB)” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	86
78	Scatter density plot of “Cloud fraction (CRB)” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	87
79	Scatter density plot of “Cloud fraction (CRB)” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.	88
80	Scatter density plot of “Cloud height (CRB)” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	89
81	Scatter density plot of “Cloud height (CRB)” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	90
82	Scatter density plot of “Cloud optical thickness” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	91
83	Scatter density plot of “Cloud optical thickness” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	92
84	Scatter density plot of “Cloud optical thickness” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.	93
85	Scatter density plot of “Cloud optical thickness” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.	94
86	Scatter density plot of “Cloud top height” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	95
87	Scatter density plot of “Cloud top height” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	96
88	Scatter density plot of “Cloud top height” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.	97
89	Scatter density plot of “Cloud top height” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.	98
90	Scatter density plot of “Cloud top height” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.	99
91	Scatter density plot of “Latitude” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	100
92	Scatter density plot of “Latitude” against “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06.	101

93	Scatter density plot of “Latitude” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	102
94	Scatter density plot of “Latitude” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.	103
95	Scatter density plot of “Latitude” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.	104
96	Scatter density plot of “Latitude” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.	105
97	Scatter density plot of “Latitude” against “Cloud top height” for 2023-09-05 to 2023-09-06.	106
98	Scatter density plot of “Solar zenith angle” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	107
99	Scatter density plot of “Solar zenith angle” against “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06.	108
100	Scatter density plot of “Solar zenith angle” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	109
101	Scatter density plot of “Solar zenith angle” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.	110
102	Scatter density plot of “Solar zenith angle” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.	111
103	Scatter density plot of “Solar zenith angle” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.	112
104	Scatter density plot of “Solar zenith angle” against “Cloud top height” for 2023-09-05 to 2023-09-06.	113
105	Scatter density plot of “Solar zenith angle” against “Latitude” for 2023-09-05 to 2023-09-06.	114
106	Scatter density plot of “Viewing zenith angle” against “Cloud albedo (CRB)” for 2023-09-05 to 2023-09-06.	115
107	Scatter density plot of “Viewing zenith angle” against “Radiometric cloud fraction” for 2023-09-05 to 2023-09-06.	116
108	Scatter density plot of “Viewing zenith angle” against “OCRA cloud fraction” for 2023-09-05 to 2023-09-06.	117
109	Scatter density plot of “Viewing zenith angle” against “Cloud fraction (CRB)” for 2023-09-05 to 2023-09-06.	118
110	Scatter density plot of “Viewing zenith angle” against “Cloud height (CRB)” for 2023-09-05 to 2023-09-06.	119
111	Scatter density plot of “Viewing zenith angle” against “Cloud optical thickness” for 2023-09-05 to 2023-09-06.	120
112	Scatter density plot of “Viewing zenith angle” against “Cloud top height” for 2023-09-05 to 2023-09-06.	121
113	Scatter density plot of “Viewing zenith angle” against “Latitude” for 2023-09-05 to 2023-09-06.	122
114	Scatter density plot of “Viewing zenith angle” against “Solar zenith angle” for 2023-09-05 to 2023-09-06.	123

List of Tables

1	Parameterlist and basic statistics for the analysis	2
2	Percentile ranges	3
3	Parameterlist and basic statistics for the analysis for observations in the northern hemisphere	4
4	Parameterlist and basic statistics for the analysis for observations in the southern hemisphere	5
5	Parameterlist and basic statistics for the analysis for observations over water	6
6	Parameterlist and basic statistics for the analysis for observations over land	7
7	Correlation matrix	8
8	Covariance matrix	9

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