PyCAMA report generated by tropl2-proc

tropl2-proc

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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:

$$\overline{x} = \frac{1}{N}\sum_{i=1}^{N} x_i \tag{1}$$

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 $\sigma(x) = \sqrt{V(x)}$.

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

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:

$$P(x \leq m) = P(x \geq m) = \int_{-\infty}^{m} f(x)\,\mathrm{d}x = \frac{1}{2} \tag{3}$$

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

The median is a special case of a percentile. Instead of ½ 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}.

$$C_{kl} = C(x_{(k)}, x_{(l)}) = \frac{1}{N-1}\sum_{i=1}^{N}(x_{(k),i} - \overline{x_{(k)}})(x_{(l),i} - \overline{x_{(l)}}) \tag{4}$$

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

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

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]	0.633 ± 0.373	20287192	0.995	0.630	0.800	0.0	1.000
cloud fraction [1]	0.558 ± 0.348	20287192	0.995	0.740	0.529	0.0	1.000
cloud top height [m]	$(0.381 \pm 0.275) \times 10^4$	20287192	1.425×10^3	3.625×10^3	3.148×10^3	0.0	2.000×10^4
cloud optical thickness [1]	19.9 ± 34.3	20287192	9.34	11.3	9.82	1.000	250
cloud fraction crb [1]	0.558 ± 0.348	20287192	0.995	0.739	0.528	0.0	1.000
cloud height crb [m]	$(0.299 \pm 0.243) \times 10^4$	20287192	75.0	3.182×10^3	2.382×10^3	0.0	2.000×10^4
cloud albedo crb [1]	0.599 ± 0.205	20287192	0.995	0.262	0.576	0.0	1.000
surface albedo fitted [1]	0.227 ± 0.307	20287192	1.500×10^{-2}	0.320	3.885×10^{-2}	0.0	1.000
surface albedo fitted crb [1]	0.215 ± 0.294	20287192	1.500×10^{-2}	0.332	2.867×10^{-2}	0.0	1.000
fitted root mean square [1]	$(6.893 \pm 12.150) \times 10^{-4}$	20287192	5.000×10^{-5}	8.100×10^{-4}	4.087×10^{-4}	1.445×10^{-6}	0.979
fitted root mean square crb [1]	$(6.223 \pm 12.078) \times 10^{-4}$	20287192	5.000×10^{-5}	7.476×10^{-4}	3.188×10^{-4}	1.216×10^{-6}	0.889
wavelength shift [nm]	$(7.629 \pm 6.838) \times 10^{-3}$	20287192	9.000×10^{-4}	9.271×10^{-3}	7.138×10^{-3}	-5.312×10^{-2}	0.470
cloud fraction apriori [1]	0.563 ± 0.351	20287192	0.995	0.771	0.535	0.0	1.000
reflectance blue ocra [1]	0.560 ± 0.226	20287192	0.265	0.386	0.540	0.134	1.98
reflectance green ocra [1]	0.510 ± 0.253	20287192	0.175	0.457	0.496	7.937×10^{-2}	1.92
reflectance continuum aband [1]	0.466 ± 0.278	20287192	4.500×10^{-2}	0.476	0.468	1.210×10^{-2}	4.30

Table 2: Percentile ranges

Variable	1 %	5 %	10 %	15.9 %	25 %	75 %	84.1 %	90 %	95 %	99 %
qa value [1]	0.0	0.0	0.0	0.0	0.320	0.950	1.000	1.000	1.000	1.000
cloud fraction [1]	1.928×10^{-2}	6.531×10^{-2}	9.938×10^{-2}	0.144	0.229	0.969	1.000	1.000	1.000	1.000
cloud top height [m]	124	602	997	1.296×10^{3}	1.678×10^{3}	5.304×10^{3}	6.559×10^{3}	7.734×10^{3}	9.250×10^{3}	1.195×10^{4}
cloud optical thickness [1]	1.21	3.05	4.17	4.98	6.11	17.4	26.7	40.0	68.5	250
cloud fraction crb [1]	1.900×10^{-2}	6.430×10^{-2}	9.864×10^{-2}	0.143	0.229	0.968	1.000	1.000	1.000	1.000
cloud height crb [m]	0.0	143	501	770	1.100×10^{3}	4.282×10^{3}	5.435×10^{3}	6.450×10^{3}	7.755×10^{3}	1.029×10^{4}
cloud albedo crb [1]	3.213×10^{-2}	0.268	0.375	0.427	0.472	0.734	0.821	0.896	0.982	1.000
surface albedo fitted [1]	0.0	7.582×10^{-3}	1.157×10^{-2}	1.490×10^{-2}	1.966×10^{-2}	0.340	0.679	0.787	0.883	0.986
surface albedo fitted crb [1]	0.0	5.390×10^{-3}	8.158×10^{-3}	1.067×10^{-2}	1.426×10^{-2}	0.346	0.653	0.738	0.834	0.927
fitted root mean square [1]	1.659×10^{-5}	3.190×10^{-5}	5.045×10^{-5}	7.864×10^{-5}	1.339×10^{-4}	9.439×10^{-4}	1.290×10^{-3}	1.659×10^{-3}	2.244×10^{-3}	3.696×10^{-3}
fitted root mean square crb [1]	1.019×10^{-5}	2.409×10^{-5}	4.017×10^{-5}	6.100×10^{-5}	1.025×10^{-4}	8.501×10^{-4}	1.219×10^{-3}	1.603×10^{-3}	2.191×10^{-3}	3.566×10^{-3}
wavelength shift [nm]	-8.621×10^{-3}	-1.392×10^{-3}	1.171×10^{-4}	1.151×10^{-3}	2.732×10^{-3}	1.200×10^{-2}	1.431×10^{-2}	1.636×10^{-2}	1.915×10^{-2}	2.540×10^{-2}
cloud fraction apriori [1]	2.972×10^{-2}	6.455×10^{-2}	9.698×10^{-2}	0.141	0.229	1.000	1.000	1.000	1.000	1.000
reflectance blue ocra [1]	0.234	0.257	0.279	0.308	0.359	0.745	0.805	0.854	0.917	1.11
reflectance green ocra [1]	0.153	0.172	0.191	0.217	0.269	0.726	0.794	0.844	0.905	1.06
reflectance continuum aband [1]	2.994×10^{-2}	5.337×10^{-2}	8.469×10^{-2}	0.126	0.220	0.696	0.772	0.828	0.893	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]	0.580 ± 0.371	10237857	0.670	0.700	0.0	1.000	0.230	0.900
cloud fraction [1]	0.521 ± 0.347	10237857	0.728	0.453	0.0	1.000	0.201	0.929
cloud top height [m]	$(0.360 \pm 0.262) \times 10^4$	10237857	3.357×10^3	3.031×10^3	0.0	2.000×10^4	1.614×10^3	4.971×10^3
cloud optical thickness [1]	18.3 ± 33.9	10237857	9.35	9.02	1.000	250	5.73	15.1
cloud fraction crb [1]	0.520 ± 0.347	10237857	0.727	0.454	0.0	1.000	0.201	0.929
cloud height crb [m]	$(0.267 \pm 0.220) \times 10^4$	10237857	2.890×10^3	2.173×10^3	0.0	2.000×10^4	964	3.854×10^3
cloud albedo crb [1]	0.623 ± 0.226	10237857	0.320	0.607	0.0	1.000	0.476	0.797
surface albedo fitted [1]	0.312 ± 0.330	10237857	0.612	0.169	0.0	1.000	2.825×10^{-2}	0.640
surface albedo fitted crb [1]	0.297 ± 0.312	10237857	0.603	0.166	0.0	1.000	2.154×10^{-2}	0.625
fitted root mean square [1]	$(8.704 \pm 15.785) \times 10^{-4}$	10237857	1.000×10^{-3}	5.920×10^{-4}	1.445×10^{-6}	0.979	1.862×10^{-4}	1.186×10^{-3}
fitted root mean square crb [1]	$(7.768 \pm 15.833) \times 10^{-4}$	10237857	9.460×10^{-4}	4.451×10^{-4}	1.216×10^{-6}	0.889	1.370×10^{-4}	1.083×10^{-3}
wavelength shift [nm]	$(8.618 \pm 6.916) \times 10^{-3}$	10237857	9.445×10^{-3}	8.395×10^{-3}	-5.312×10^{-2}	0.470	3.716×10^{-3}	1.316×10^{-2}
cloud fraction apriori [1]	0.531 ± 0.349	10237857	0.767	0.471	0.0	1.000	0.207	0.974
reflectance blue ocra [1]	0.573 ± 0.234	10237857	0.418	0.568	0.134	1.98	0.351	0.770
reflectance green ocra [1]	0.529 ± 0.261	10237857	0.491	0.537	8.817×10^{-2}	1.89	0.267	0.758
reflectance continuum aband [1]	0.497 ± 0.283	10237857	0.495	0.522	1.326×10^{-2}	4.30	0.242	0.737

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]	0.688 ± 0.367	10049335	0.600	0.900	0.0	1.000	0.400	1.000
cloud fraction [1]	0.597 ± 0.345	10049335	0.720	0.621	0.0	1.000	0.267	0.987
cloud top height [m]	$(0.403 \pm 0.286) \times 10^4$	10049335	3.968×10^3	3.281×10^3	0.0	2.000×10^4	1.736×10^3	5.704×10^3
cloud optical thickness [1]	21.5 ± 34.7	10049335	13.3	10.8	1.000	250	6.68	19.9
cloud fraction crb [1]	0.596 ± 0.345	10049335	0.719	0.619	0.0	1.000	0.266	0.986
cloud height crb [m]	$(0.331 \pm 0.260) \times 10^4$	10049335	3.577×10^3	2.624×10^3	0.0	2.000×10^4	1.219×10^3	4.796×10^3
cloud albedo crb [1]	0.574 ± 0.178	10049335	0.206	0.556	0.0	1.000	0.469	0.675
surface albedo fitted [1]	0.140 ± 0.254	10049335	4.707×10^{-2}	2.614×10^{-2}	0.0	1.000	1.572×10^{-2}	6.279×10^{-2}
surface albedo fitted crb [1]	0.132 ± 0.249	10049335	3.474×10^{-2}	1.875×10^{-2}	0.0	1.000	1.097×10^{-2}	4.571×10^{-2}
fitted root mean square [1]	$(5.049 \pm 6.120) \times 10^{-4}$	10049335	5.776×10^{-4}	2.865×10^{-4}	1.501×10^{-6}	6.527×10^{-2}	1.053×10^{-4}	6.828×10^{-4}
fitted root mean square crb [1]	$(4.648 \pm 5.849) \times 10^{-4}$	10049335	5.513×10^{-4}	2.318×10^{-4}	1.566×10^{-6}	1.319×10^{-2}	7.983×10^{-5}	6.312×10^{-4}
wavelength shift [nm]	$(6.622 \pm 6.606) \times 10^{-3}$	10049335	8.662×10^{-3}	5.949×10^{-3}	-4.428×10^{-2}	6.160×10^{-2}	1.964×10^{-3}	1.063×10^{-2}
cloud fraction apriori [1]	0.595 ± 0.350	10049335	0.743	0.616	0.0	1.000	0.257	1.000
reflectance blue ocra [1]	0.548 ± 0.216	10049335	0.335	0.521	0.154	1.96	0.366	0.702
reflectance green ocra [1]	0.491 ± 0.243	10049335	0.402	0.469	7.937×10^{-2}	1.92	0.271	0.674
reflectance continuum aband [1]	0.434 ± 0.269	10049335	0.442	0.427	1.210×10^{-2}	3.99	0.199	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]	0.669 ± 0.362	14764904	0.570	0.870	0.0	1.000	0.400	0.970
cloud fraction [1]	0.567 ± 0.354	14764904	0.761	0.558	0.0	1.000	0.221	0.982
cloud top height [m]	$(0.349 \pm 0.248) \times 10^4$	14764904	3.278×10^3	2.849×10^3	0.0	2.000×10^4	1.573×10^3	4.851×10^3
cloud optical thickness [1]	20.3 ± 32.9	14764904	11.3	10.5	1.000	250	7.06	18.3
cloud fraction crb [1]	0.567 ± 0.354	14764904	0.760	0.556	0.0	1.000	0.221	0.981
cloud height crb [m]	$(0.275 \pm 0.222) \times 10^4$	14764904	2.939×10^3	2.167×10^3	0.0	2.000×10^4	1.022×10^3	3.961×10^3
cloud albedo crb [1]	0.577 ± 0.184	14764904	0.220	0.554	0.0	1.000	0.466	0.685
surface albedo fitted [1]	0.128 ± 0.248	14764904	3.175×10^{-2}	2.638×10^{-2}	0.0	1.000	1.617×10^{-2}	4.792×10^{-2}
surface albedo fitted crb [1]	0.117 ± 0.235	14764904	2.374×10^{-2}	1.932×10^{-2}	0.0	1.000	1.161×10^{-2}	3.535×10^{-2}
fitted root mean square [1]	$(5.645 \pm 12.593) \times 10^{-4}$	14764904	6.441×10^{-4}	2.794×10^{-4}	1.445×10^{-6}	0.979	9.926×10^{-5}	7.434×10^{-4}
fitted root mean square crb [1]	$(5.147 \pm 12.921) \times 10^{-4}$	14764904	5.663×10^{-4}	2.258×10^{-4}	1.216×10^{-6}	0.889	8.223×10^{-5}	6.486×10^{-4}
wavelength shift [nm]	$(7.075 \pm 6.796) \times 10^{-3}$	14764904	8.911×10^{-3}	6.458×10^{-3}	-4.697×10^{-2}	0.470	2.373×10^{-3}	1.128×10^{-2}
cloud fraction apriori [1]	0.568 ± 0.358	14764904	0.785	0.556	0.0	1.000	0.215	1.000
reflectance blue ocra [1]	0.531 ± 0.208	14764904	0.348	0.506	0.156	1.98	0.349	0.696
reflectance green ocra [1]	0.474 ± 0.235	14764904	0.419	0.453	7.937×10^{-2}	1.82	0.251	0.670
reflectance continuum aband [1]	0.410 ± 0.270	14764904	0.484	0.401	1.210×10^{-2}	4.19	0.149	0.633

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]	0.531 ± 0.396	4103391	0.900	0.680	0.0	1.000	0.0	0.900
cloud fraction [1]	0.527 ± 0.331	4103391	0.645	0.467	0.0	1.000	0.243	0.888
cloud top height [m]	$(0.503 \pm 0.321) \times 10^4$	4103391	4.327×10^3	4.471×10^3	0.0	2.000×10^4	2.532×10^3	6.859×10^3
cloud optical thickness [1]	16.4 ± 32.9	4103391	8.42	7.03	1.000	250	4.66	13.1
cloud fraction crb [1]	0.528 ± 0.330	4103391	0.644	0.467	0.0	1.000	0.243	0.887
cloud height crb [m]	$(0.393 \pm 0.287) \times 10^4$	4103391	3.696×10^3	3.276×10^3	0.0	2.000×10^4	1.725×10^3	5.421×10^3
cloud albedo crb [1]	0.651 ± 0.239	4103391	0.332	0.660	0.0	1.000	0.505	0.837
surface albedo fitted [1]	0.496 ± 0.286	4103391	0.539	0.365	0.0	1.000	0.244	0.783
surface albedo fitted crb [1]	0.483 ± 0.271	4103391	0.513	0.375	3.522×10^{-3}	1.000	0.241	0.754
fitted root mean square [1]	$(1.008 \pm 0.999) \times 10^{-3}$	4103391	9.142×10^{-4}	7.721×10^{-4}	4.102×10^{-6}	0.201	4.034×10^{-4}	1.318×10^{-3}
fitted root mean square crb [1]	$(8.991 \pm 8.817) \times 10^{-4}$	4103391	9.893×10^{-4}	6.625×10^{-4}	2.853×10^{-6}	4.895×10^{-2}	2.591×10^{-4}	1.248×10^{-3}
wavelength shift [nm]	$(8.651 \pm 6.600) \times 10^{-3}$	4103391	9.398×10^{-3}	8.396×10^{-3}	-4.784×10^{-2}	5.434×10^{-2}	3.656×10^{-3}	1.306×10^{-2}
cloud fraction apriori [1]	0.540 ± 0.333	4103391	0.681	0.483	0.0	1.000	0.250	0.931
reflectance blue ocra [1]	0.635 ± 0.260	4103391	0.443	0.672	0.134	1.97	0.389	0.832
reflectance green ocra [1]	0.604 ± 0.278	4103391	0.495	0.658	8.642×10^{-2}	1.92	0.331	0.826
reflectance continuum aband [1]	0.613 ± 0.241	4103391	0.403	0.638	1.608×10^{-2}	4.16	0.397	0.801

Table 7: Correlation matrix

Viewing zenith angle	Solar zenith angle	Latitude	Radiometric cloud fraction	Cloud top height	Cloud optical thickness	Cloud fraction (CRB)	Cloud height (CRB)	Cloud albedo (CRB)	OCRA cloud fraction
1.000	-1.572×10^{-2}	1.797×10^{-3}	-9.243×10^{-3}	7.903×10^{-2}	-4.049×10^{-2}	-9.523×10^{-3}	0.119	3.319×10^{-3}	-1.343×10^{-2}
-1.572×10^{-2}	1.000	-6.812×10^{-2}	0.140	-7.352×10^{-2}	0.175	0.142	-9.187×10^{-2}	0.299	0.153
1.797×10^{-3}	-6.812×10^{-2}	1.000	-0.126	-9.534×10^{-2}	-6.112×10^{-2}	-0.123	-0.155	0.134	-0.102
-9.243×10^{-3}	0.140	-0.126	1.000	-8.575×10^{-2}	0.302	1.000	-4.612×10^{-2}	0.269	0.983
7.903×10^{-2}	-7.352×10^{-2}	-9.534×10^{-2}	-8.575×10^{-2}	1.000	6.948×10^{-3}	-8.549×10^{-2}	0.943	2.570×10^{-2}	-9.856×10^{-2}
-4.049×10^{-2}	0.175	-6.112×10^{-2}	0.302	6.948×10^{-3}	1.000	0.300	4.062×10^{-2}	0.412	0.307
-9.523×10^{-3}	0.142	-0.123	1.000	-8.549×10^{-2}	0.300	1.000	-4.635×10^{-2}	0.270	0.983
0.119	-9.187×10^{-2}	-0.155	-4.612×10^{-2}	0.943	4.062×10^{-2}	-4.635×10^{-2}	1.000	-6.273×10^{-2}	-5.930×10^{-2}
3.319×10^{-3}	0.299	0.134	0.269	2.570×10^{-2}	0.412	0.270	-6.273×10^{-2}	1.000	0.293
-1.343×10^{-2}	0.153	-0.102	0.983	-9.856×10^{-2}	0.307	0.983	-5.930×10^{-2}	0.293	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
385	−6.60	1.80	-6.313×10^{-2}	4.261×10^{3}	−27.3	-6.503×10^{-2}	5.665×10^{3}	1.336×10^{-2}	-9.251×10^{-2}
−6.60	458	−74.2	1.04	-4.321×10^{3}	128	1.06	-4.770×10^{3}	1.31	1.15
1.80	−74.2	2.596×10^{3}	−2.23	-1.335×10^{4}	−107	−2.19	-1.920×10^{4}	1.40	−1.83
-6.313×10^{-2}	1.04	−2.23	0.121	−82.0	3.61	0.121	−39.0	1.924×10^{-2}	0.120
4.261×10^{3}	-4.321×10^{3}	-1.335×10^{4}	−82.0	7.549×10^{6}	655	−81.7	6.290×10^{6}	14.5	−95.1
−27.3	128	−107	3.61	655	1.177×10^{3}	3.58	3.383×10^{3}	2.90	3.69
-6.503×10^{-2}	1.06	−2.19	0.121	−81.7	3.58	0.121	−39.1	1.927×10^{-2}	0.120
5.665×10^{3}	-4.770×10^{3}	-1.920×10^{4}	−39.0	6.290×10^{6}	3.383×10^{3}	−39.1	5.890×10^{6}	−31.2	−50.5
1.336×10^{-2}	1.31	1.40	1.924×10^{-2}	14.5	2.90	1.927×10^{-2}	−31.2	4.207×10^{-2}	2.111×10^{-2}
-9.251×10^{-2}	1.15	−1.83	0.120	−95.1	3.69	0.120	−50.5	2.111×10^{-2}	0.123

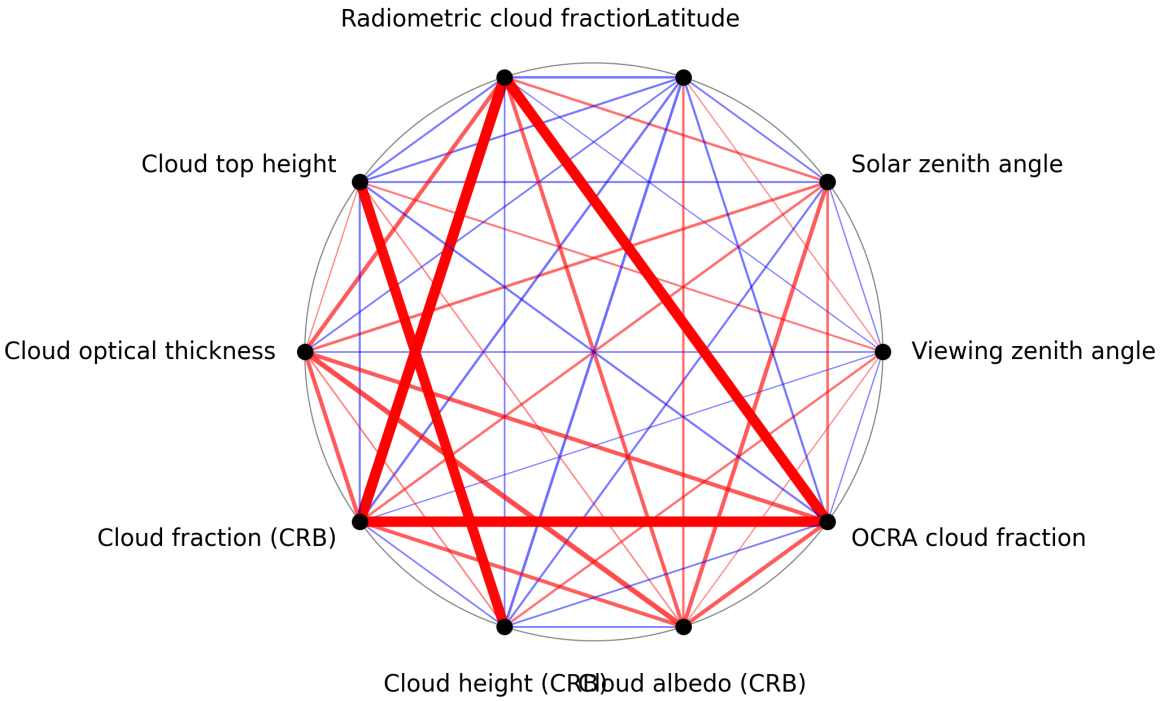


Figure 1: Map of correlation graph for 2025-03-28 to 2025-03-30.

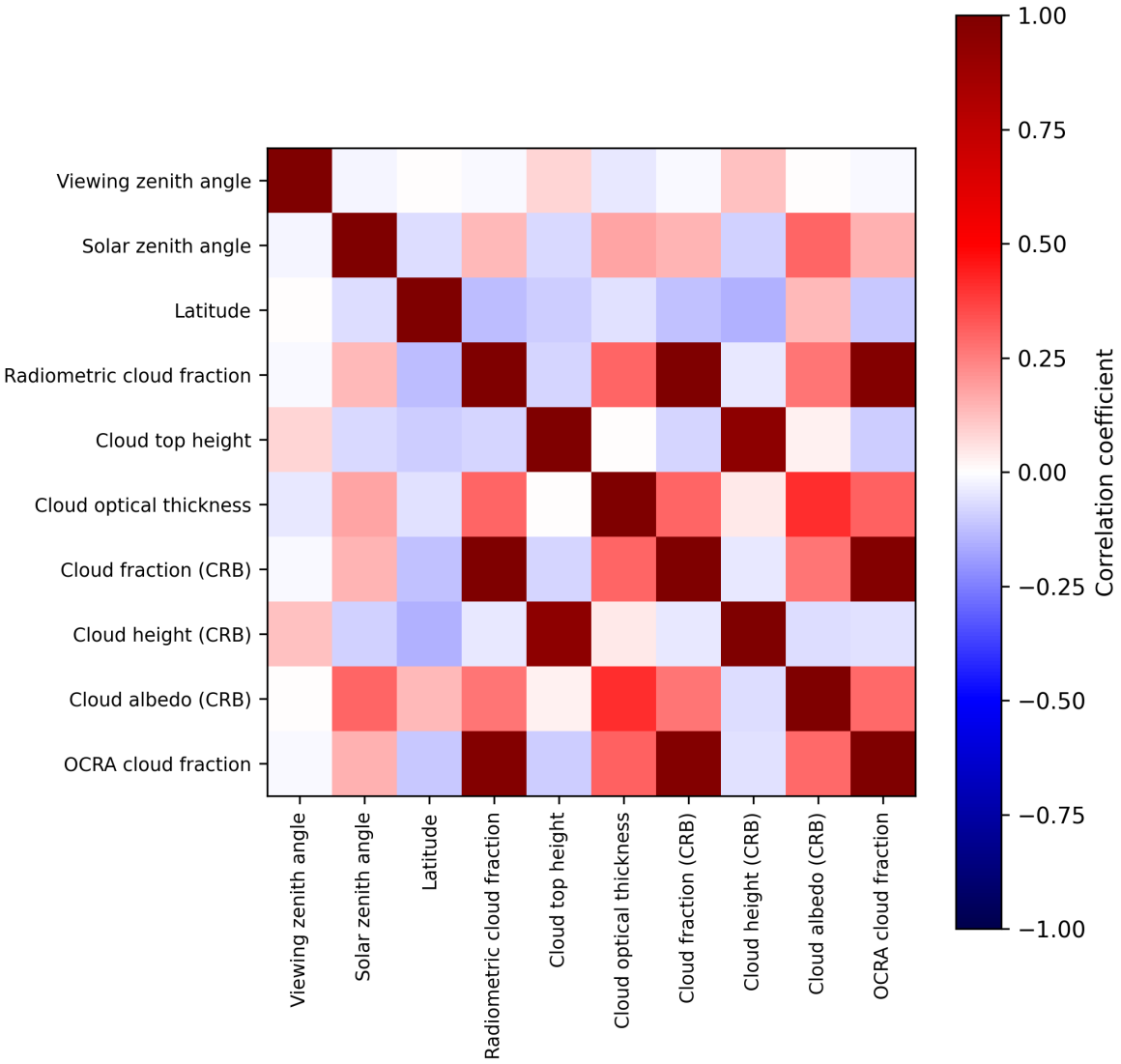


Figure 2: Map of correlation matrix for 2025-03-28 to 2025-03-30.

3 Granule outlines

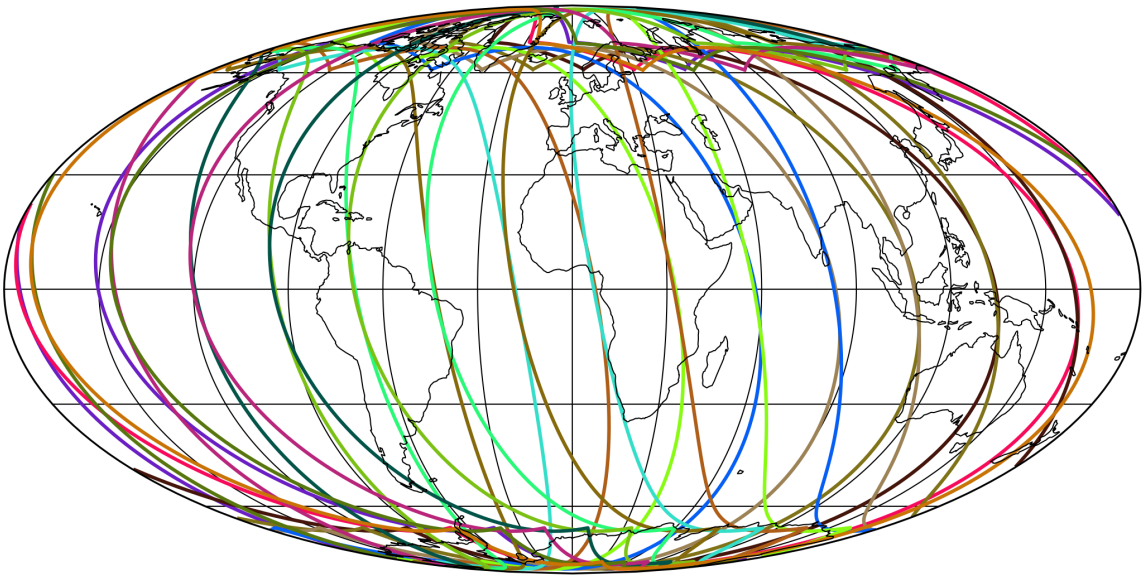


Figure 3: Outline of the granules.

4 Input data monitoring

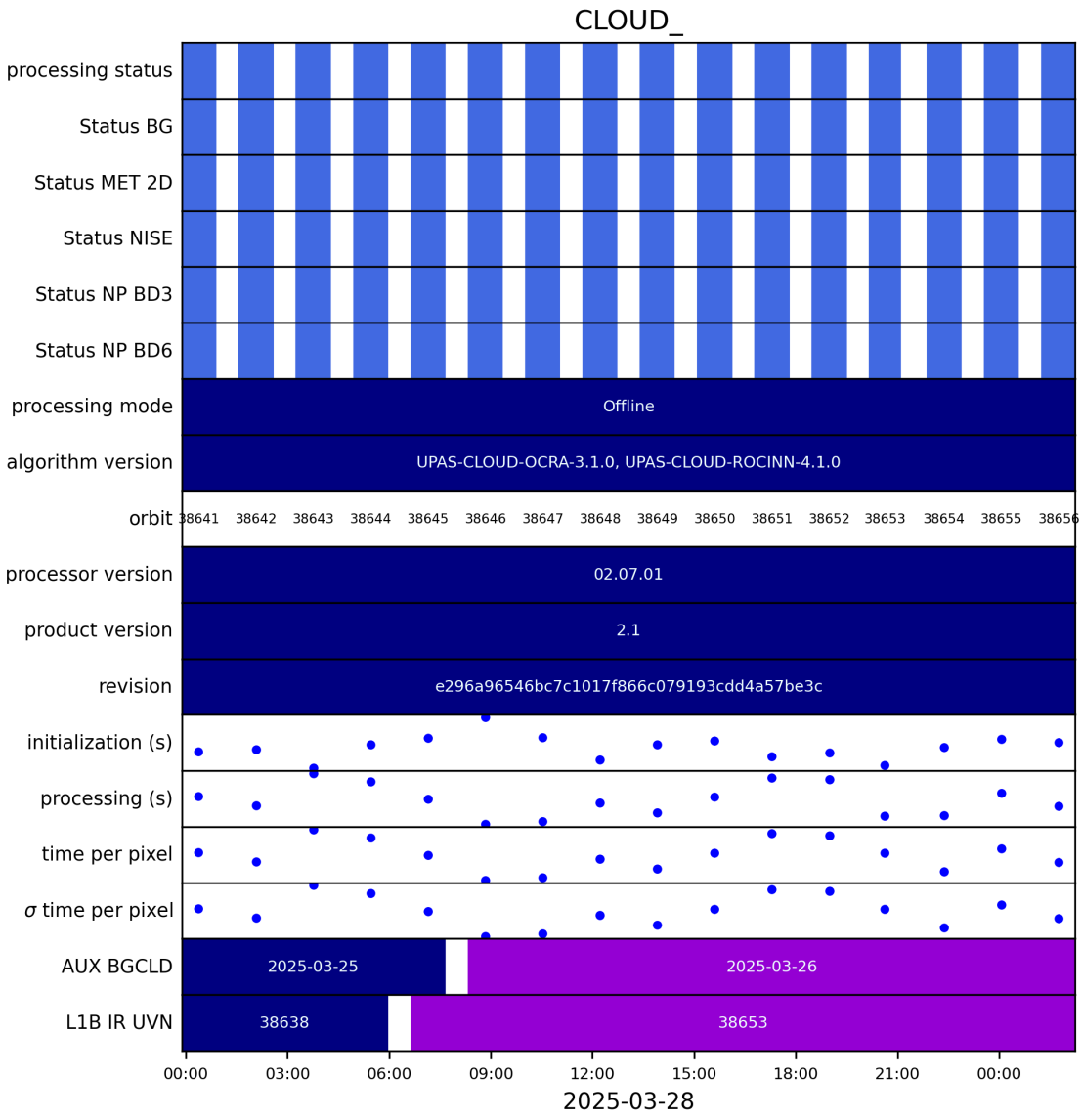


Figure 4: Input data per granule

5 Warnings and errors

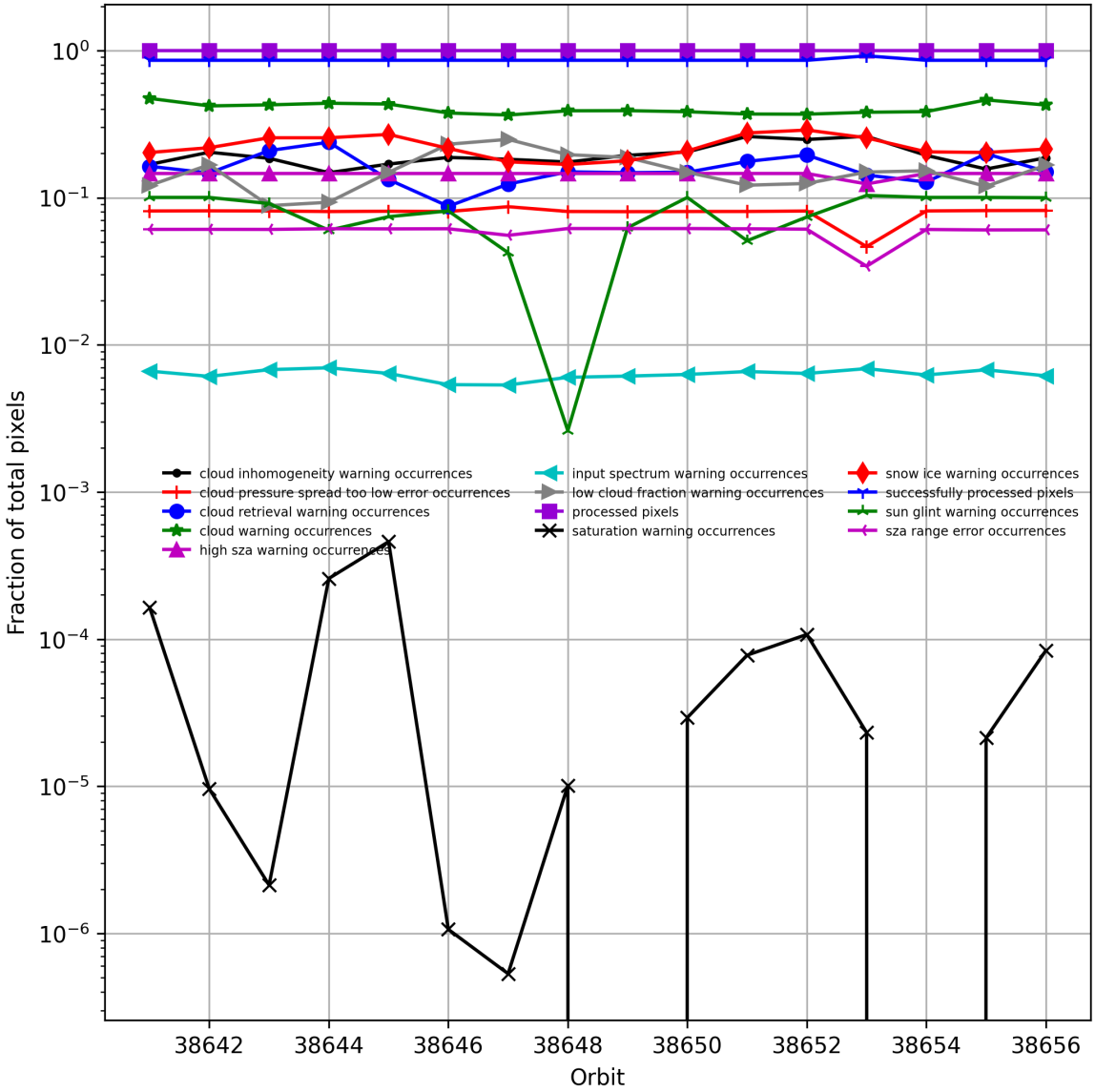


Figure 5: Fraction of pixels with specific warnings and errors during processing

6 World maps

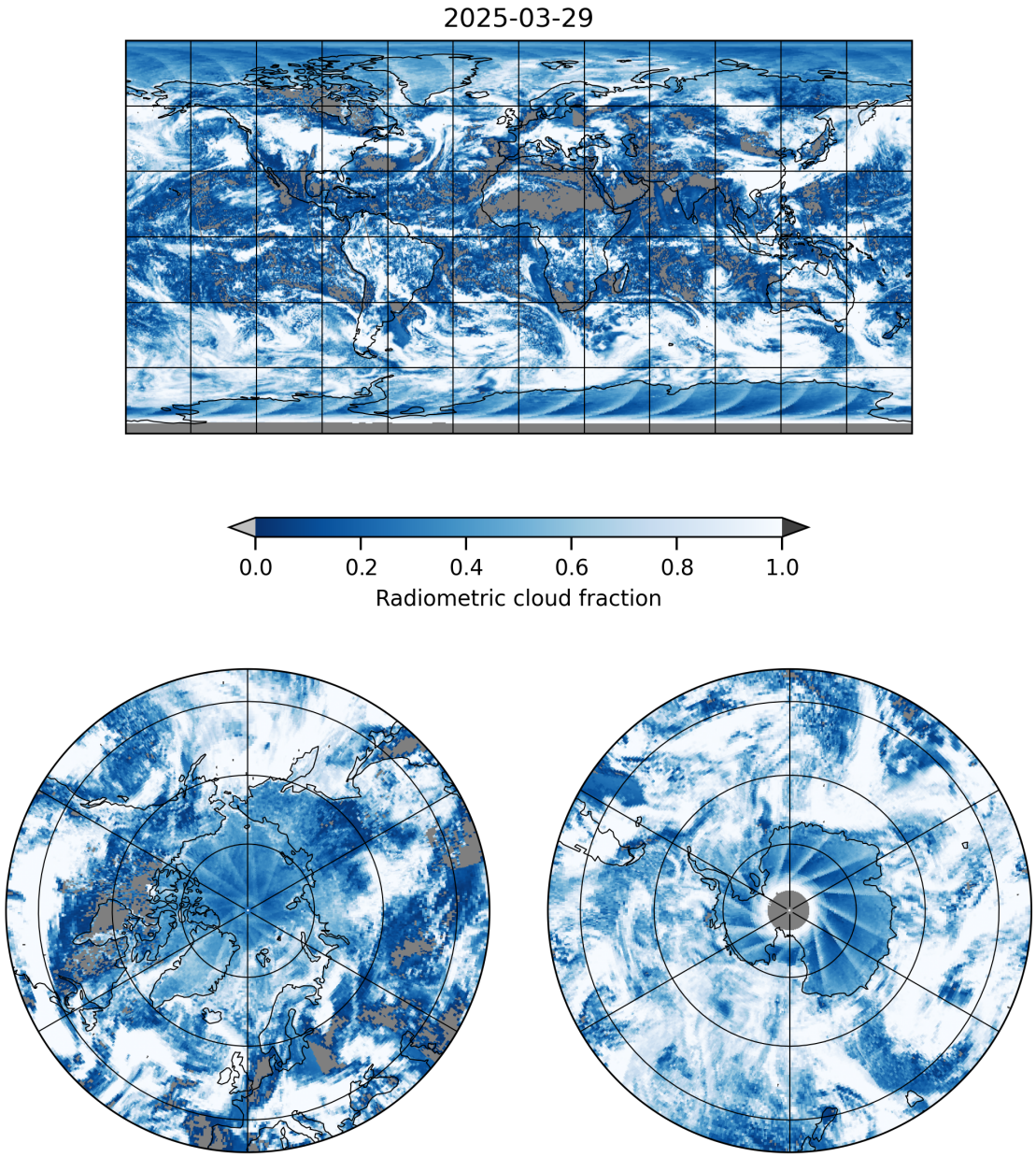


Figure 6: Map of “Radiometric cloud fraction” for 2025-03-28 to 2025-03-30

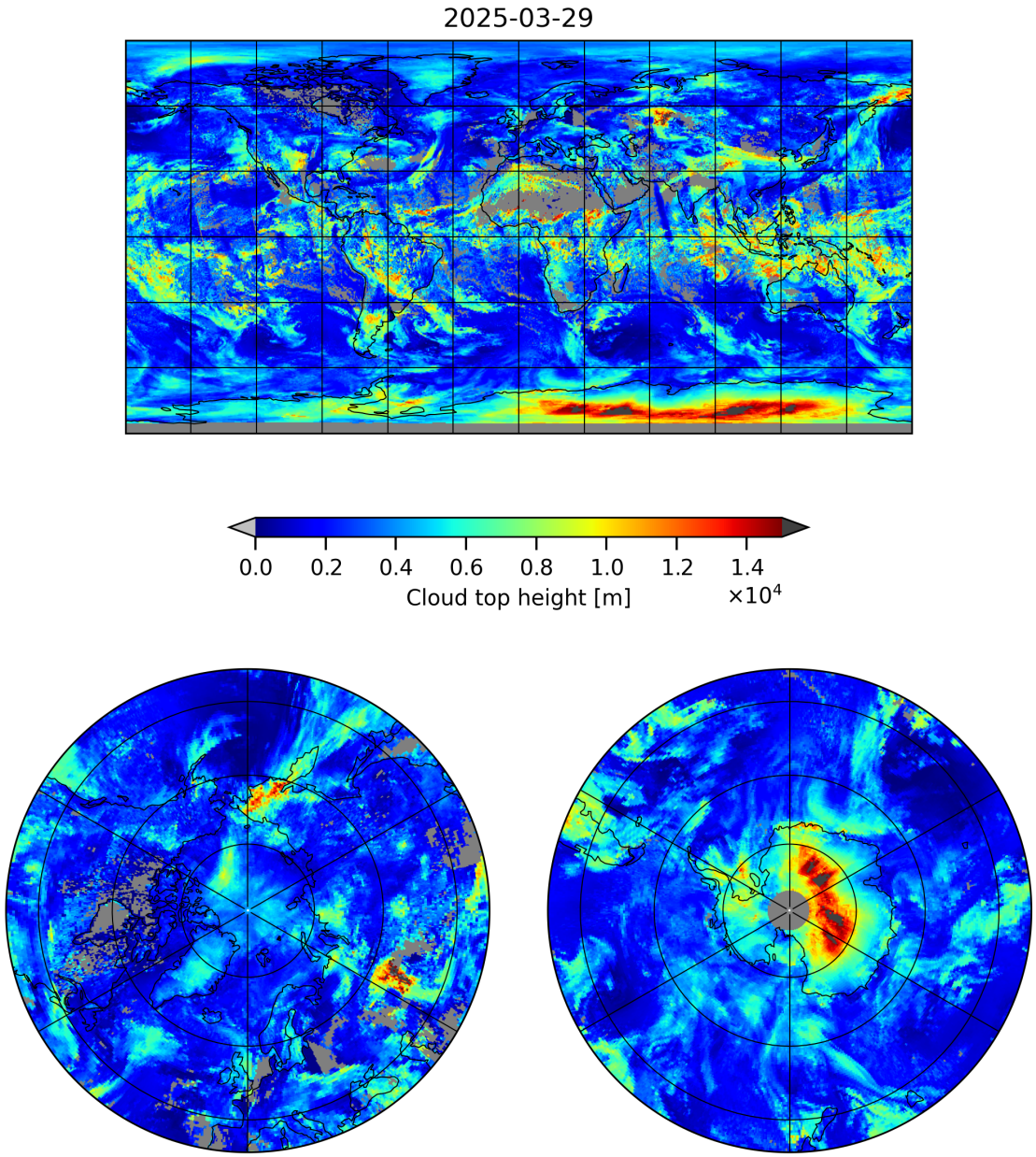


Figure 7: Map of “Cloud top height” for 2025-03-28 to 2025-03-30

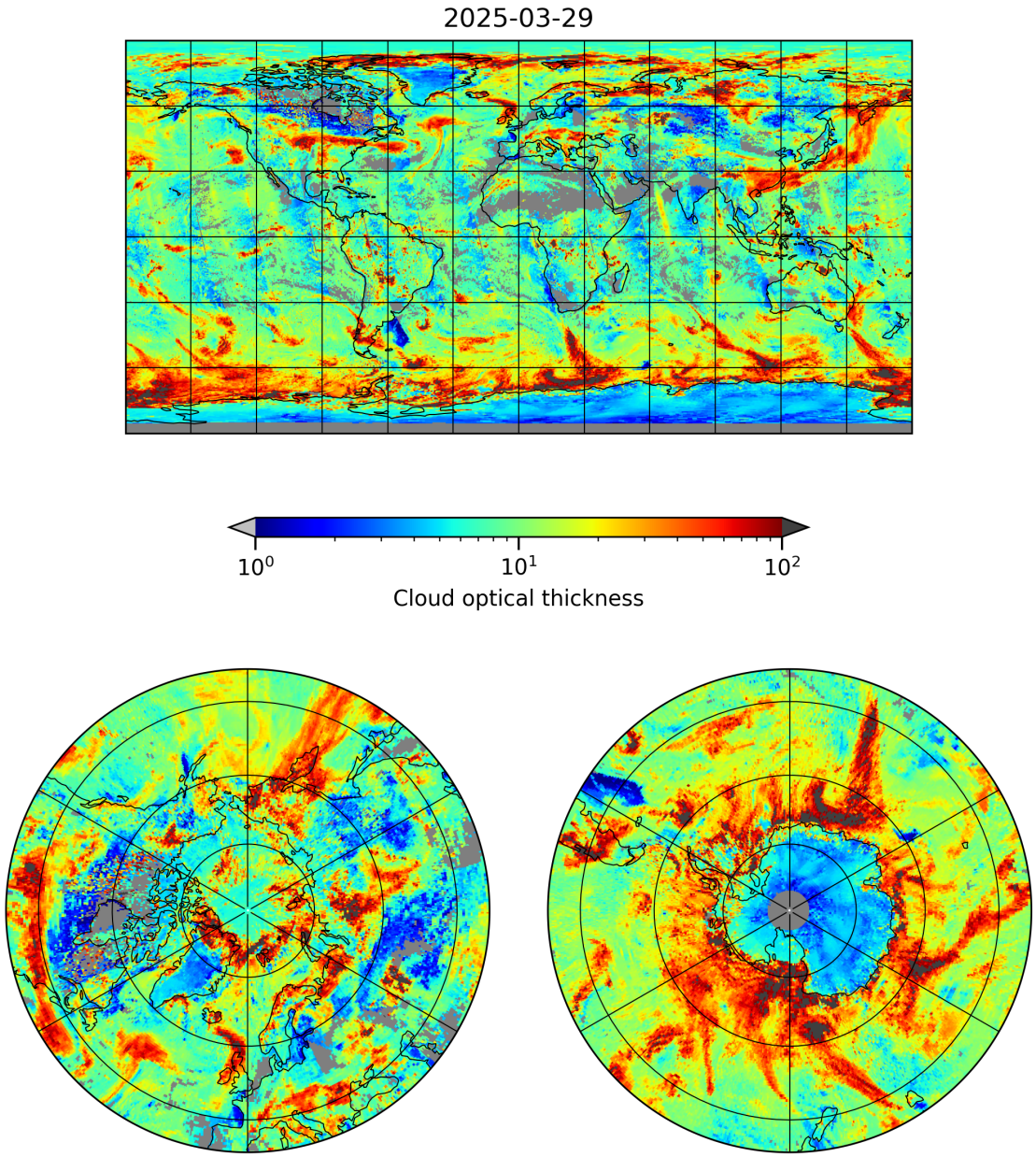


Figure 8: Map of “Cloud optical thickness” for 2025-03-28 to 2025-03-30

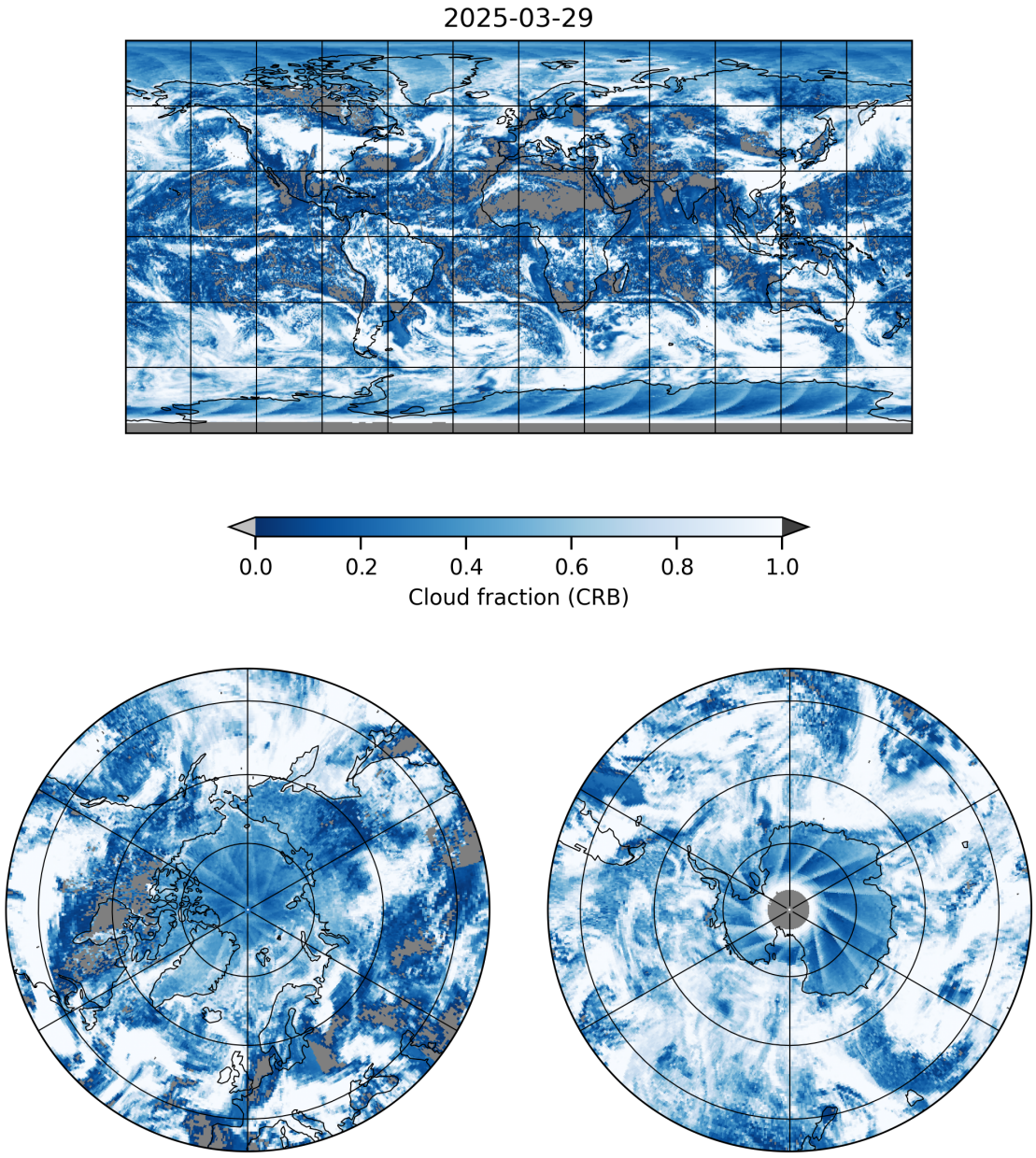


Figure 9: Map of “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30

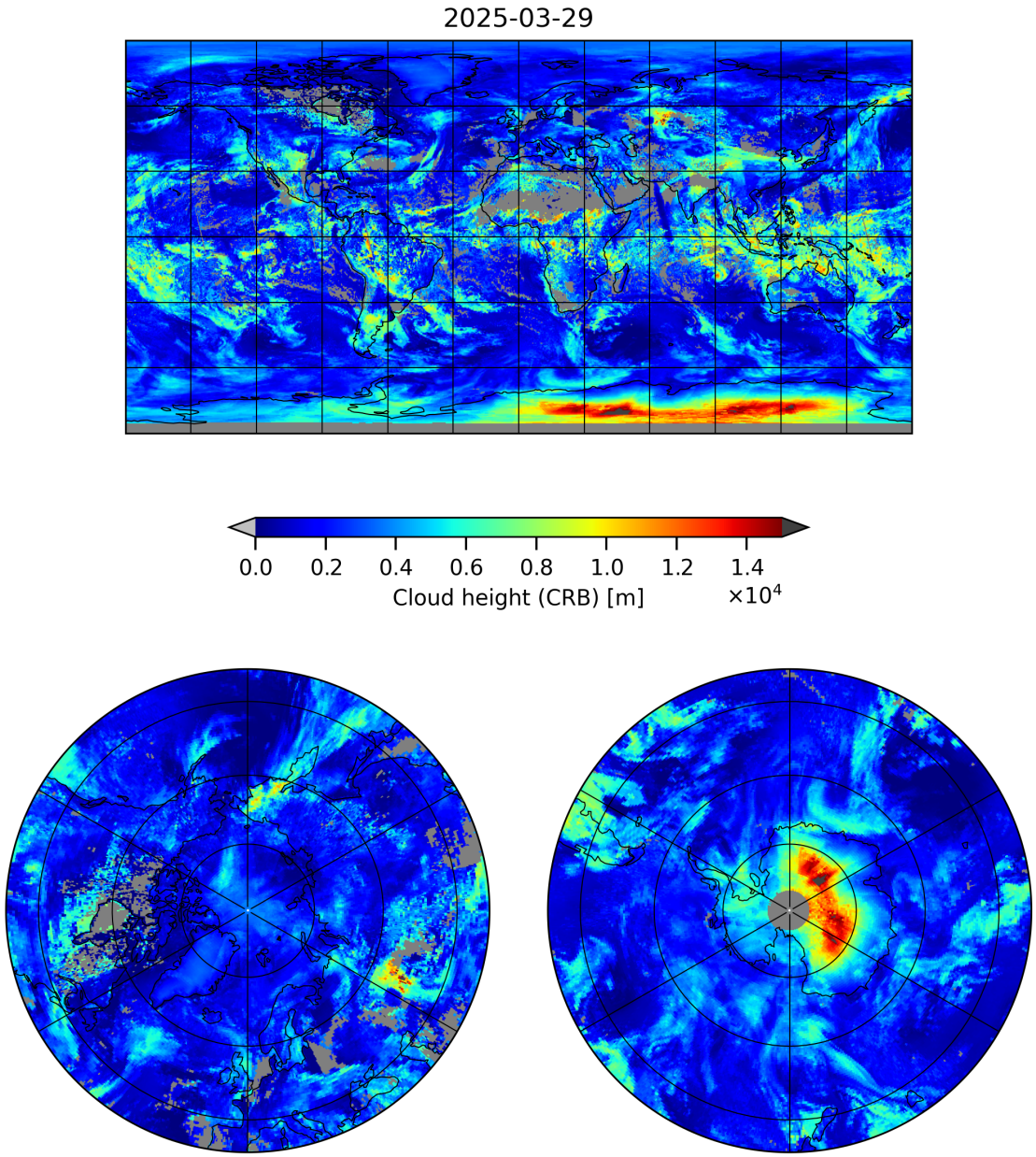


Figure 10: Map of “Cloud height (CRB)” for 2025-03-28 to 2025-03-30

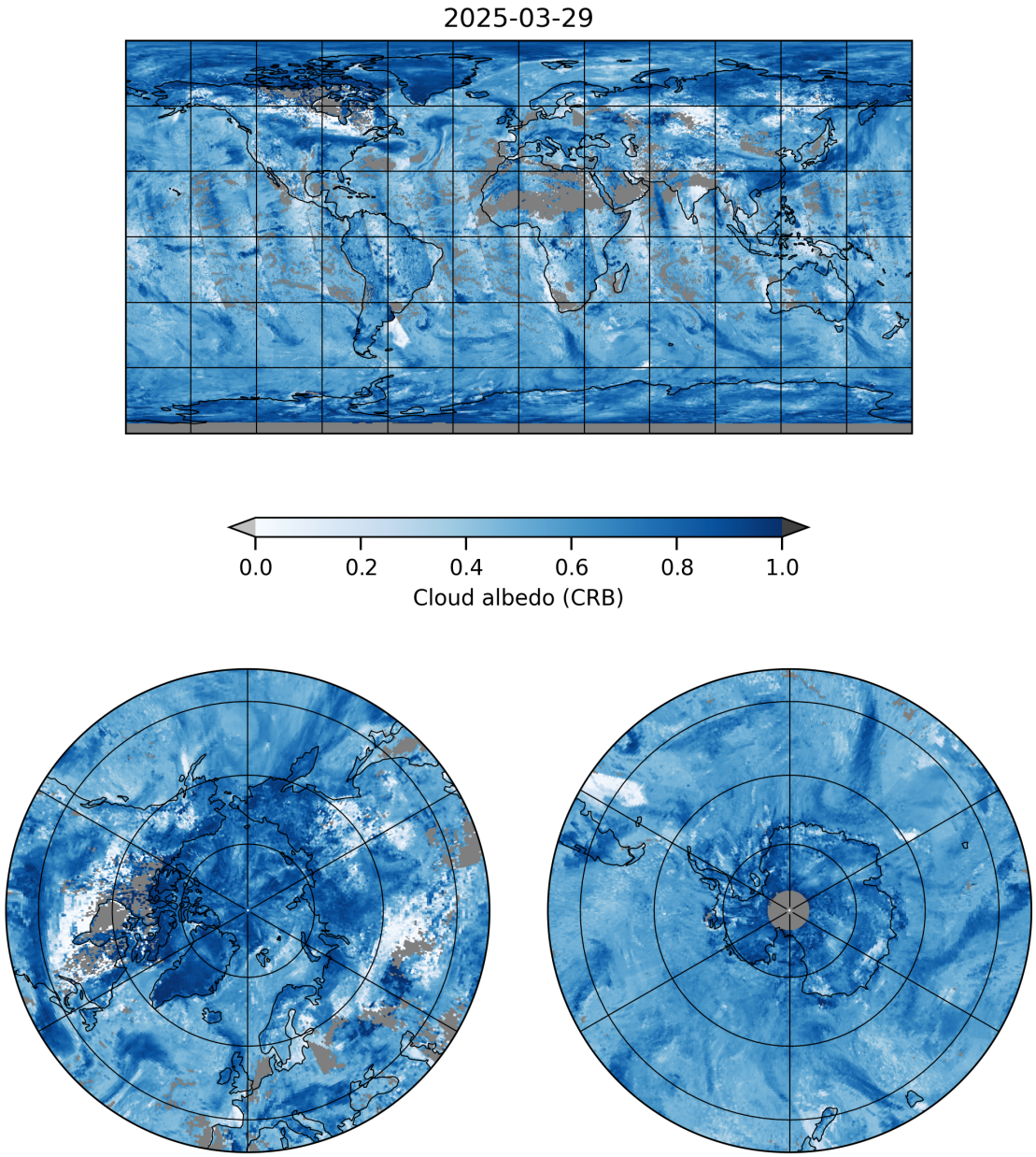


Figure 11: Map of “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30

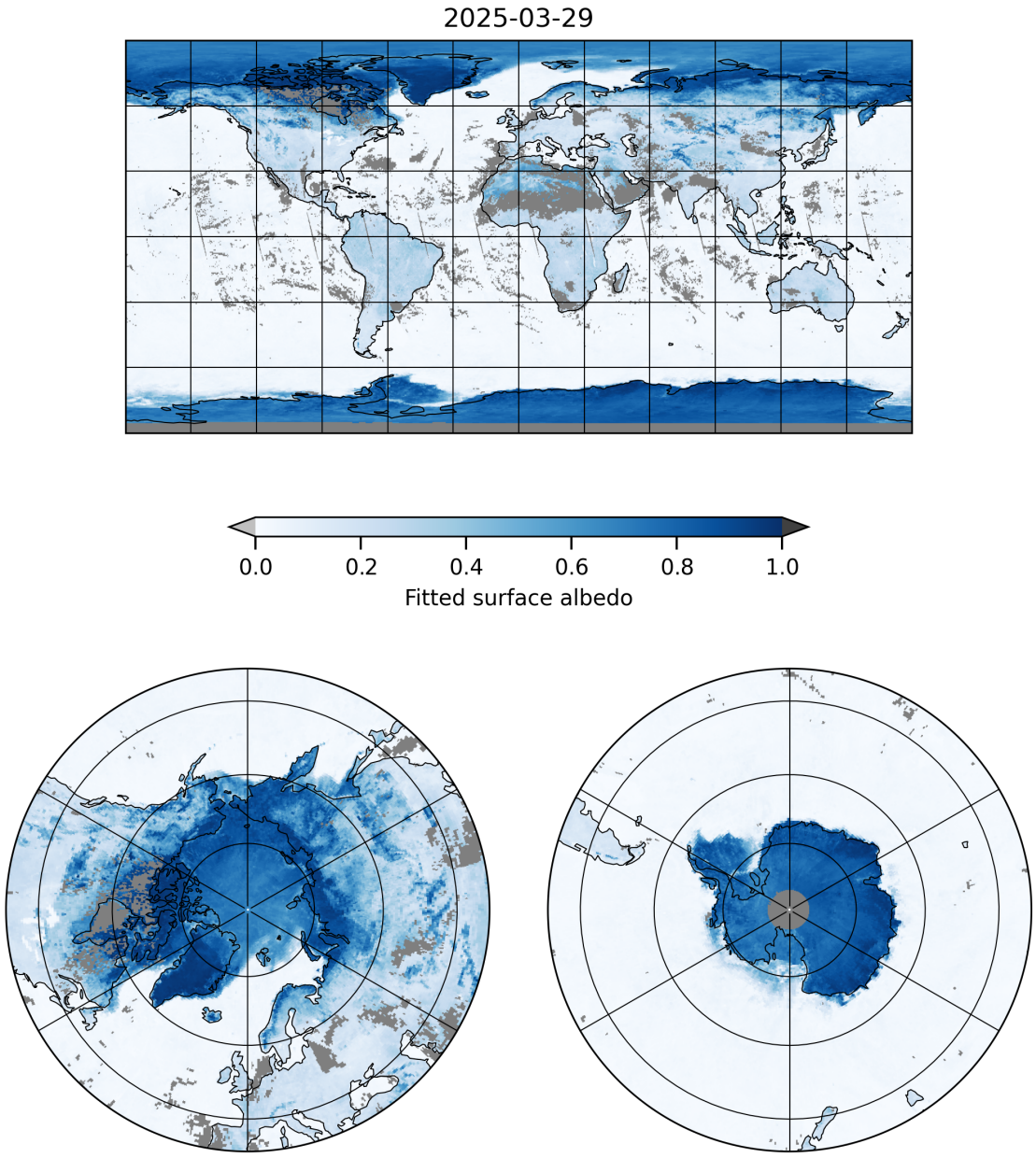


Figure 12: Map of “Fitted surface albedo” for 2025-03-28 to 2025-03-30

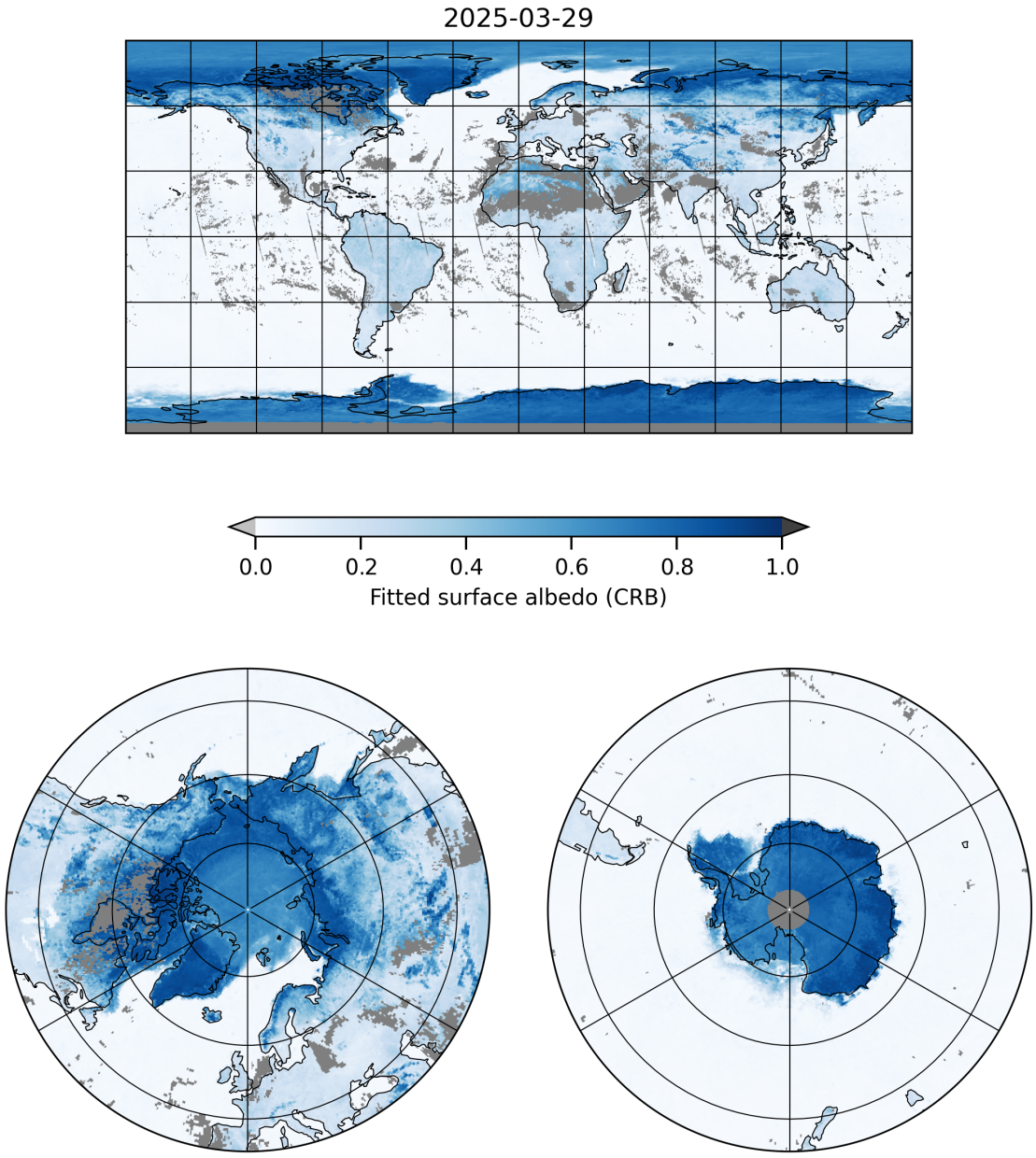


Figure 13: Map of “Fitted surface albedo (CRB)” for 2025-03-28 to 2025-03-30

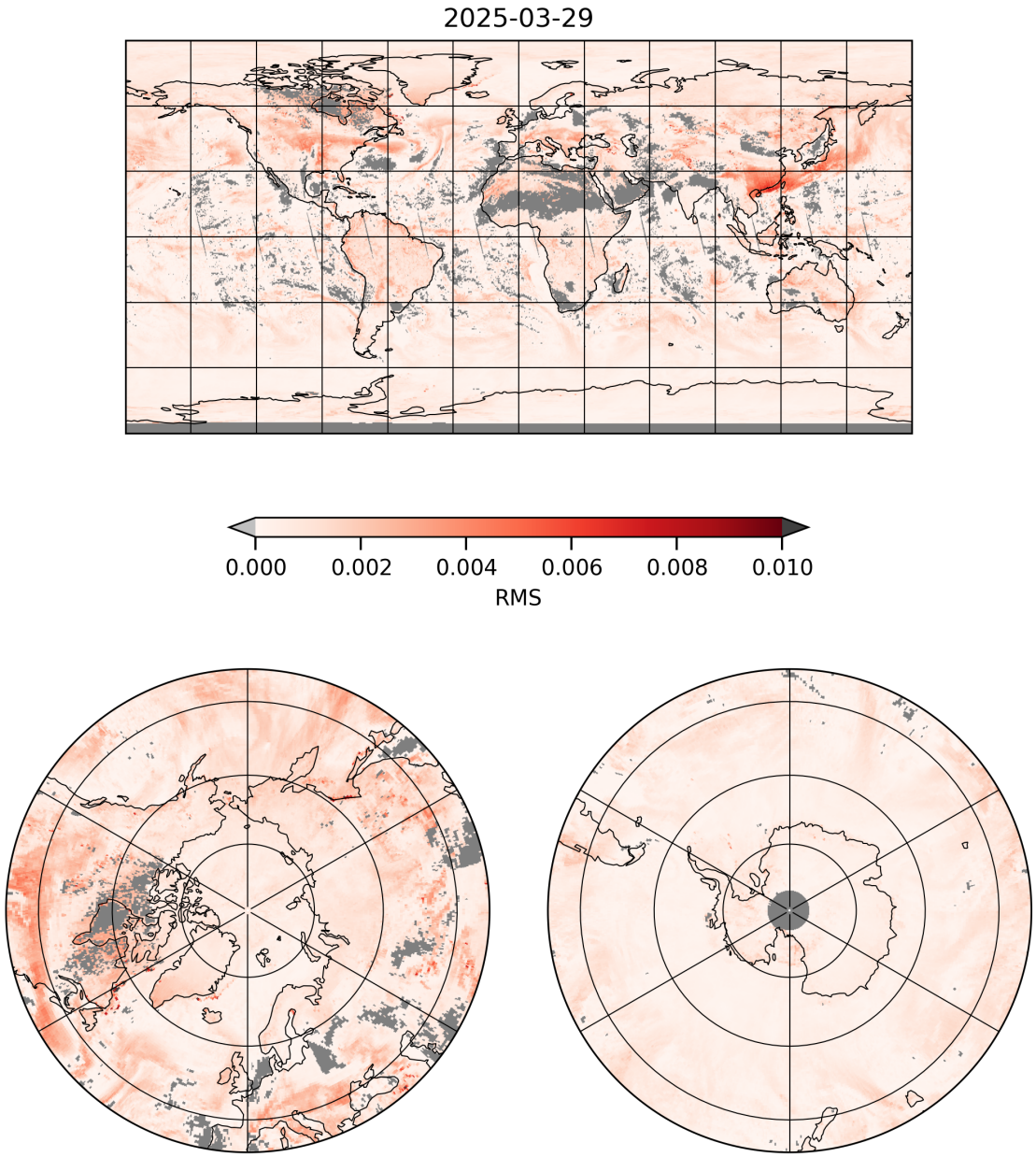


Figure 14: Map of “RMS” for 2025-03-28 to 2025-03-30

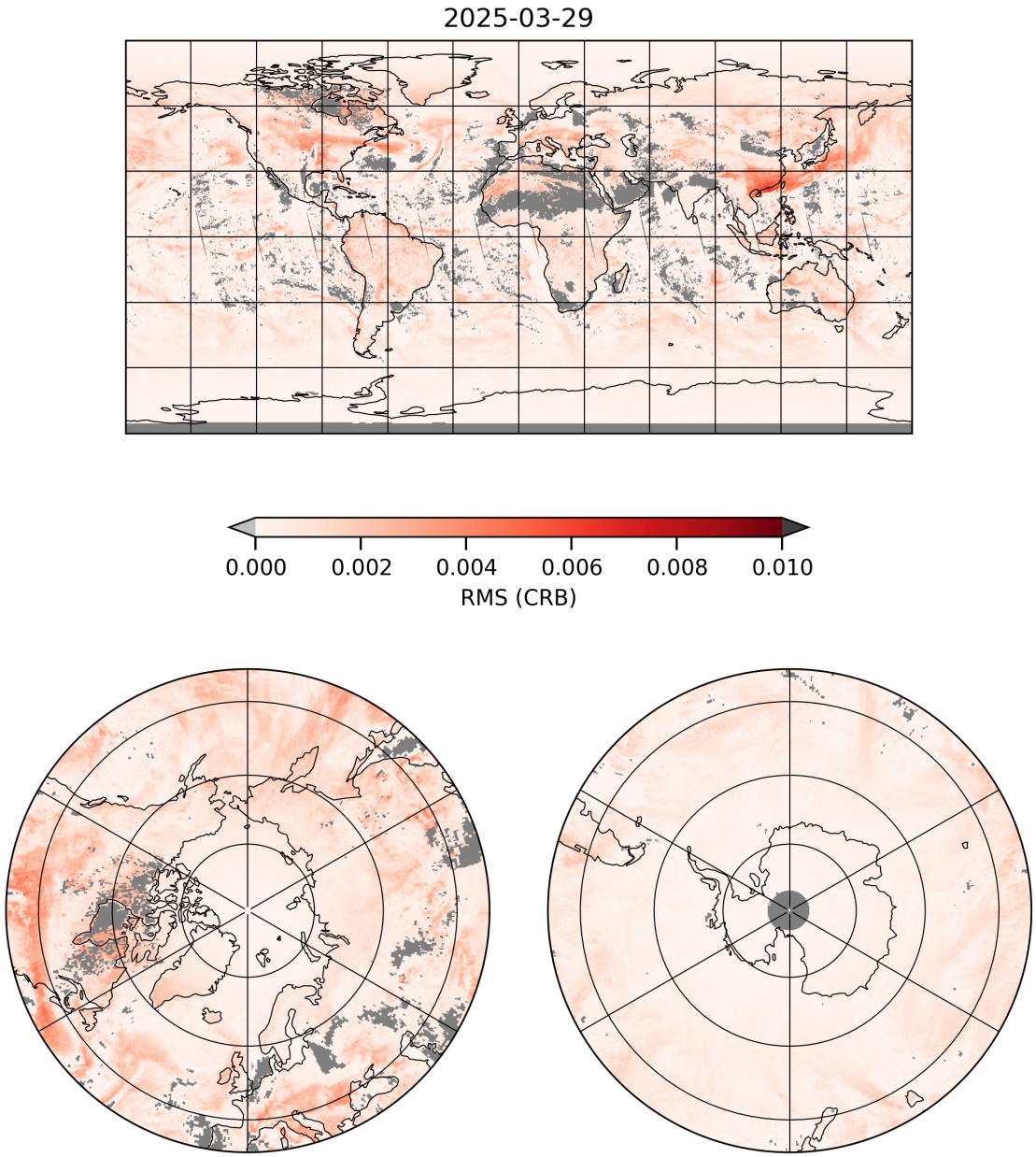


Figure 15: Map of “RMS (CRB)” for 2025-03-28 to 2025-03-30

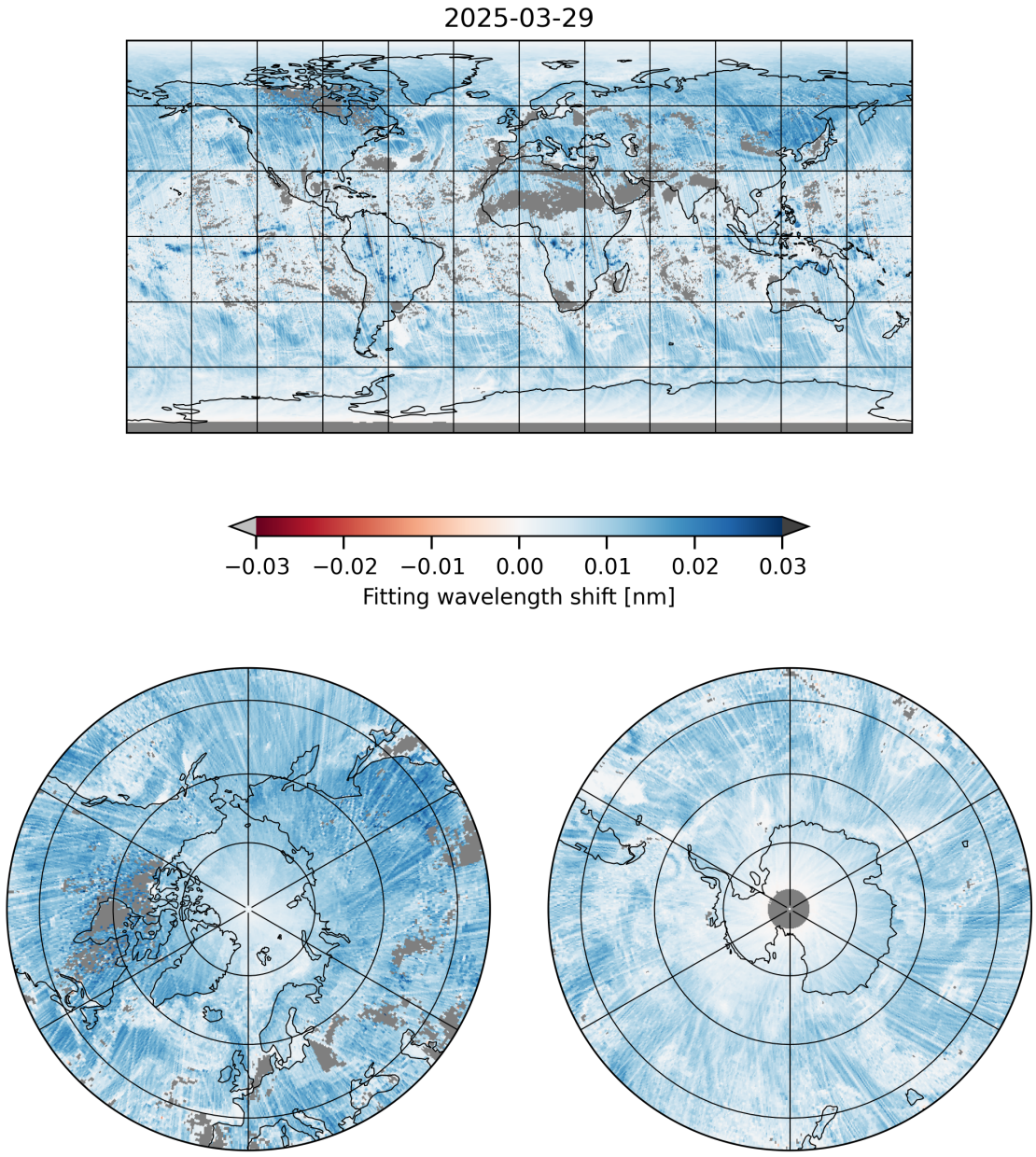


Figure 16: Map of “Fitting wavelength shift” for 2025-03-28 to 2025-03-30

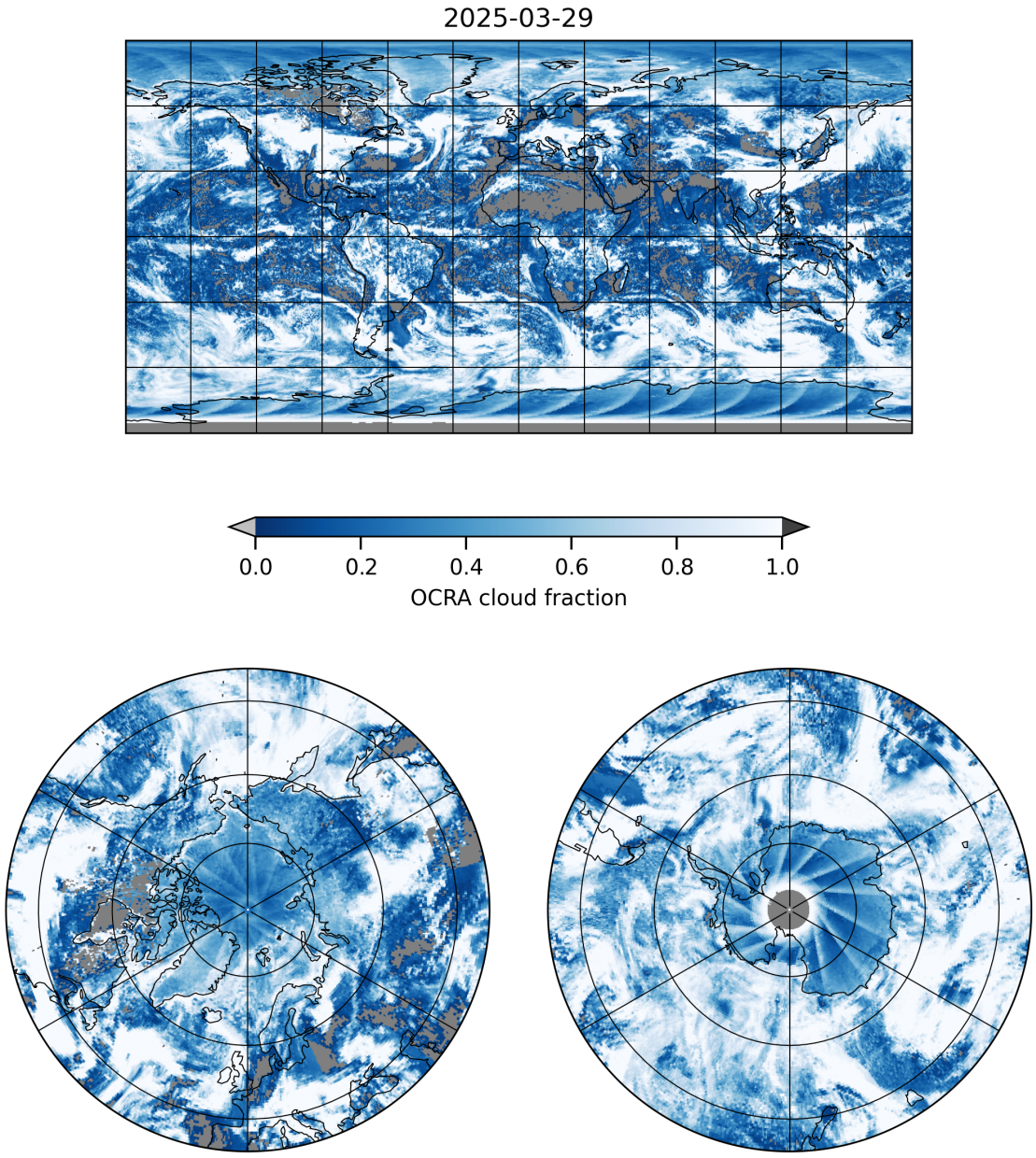


Figure 17: Map of “OCRA cloud fraction” for 2025-03-28 to 2025-03-30

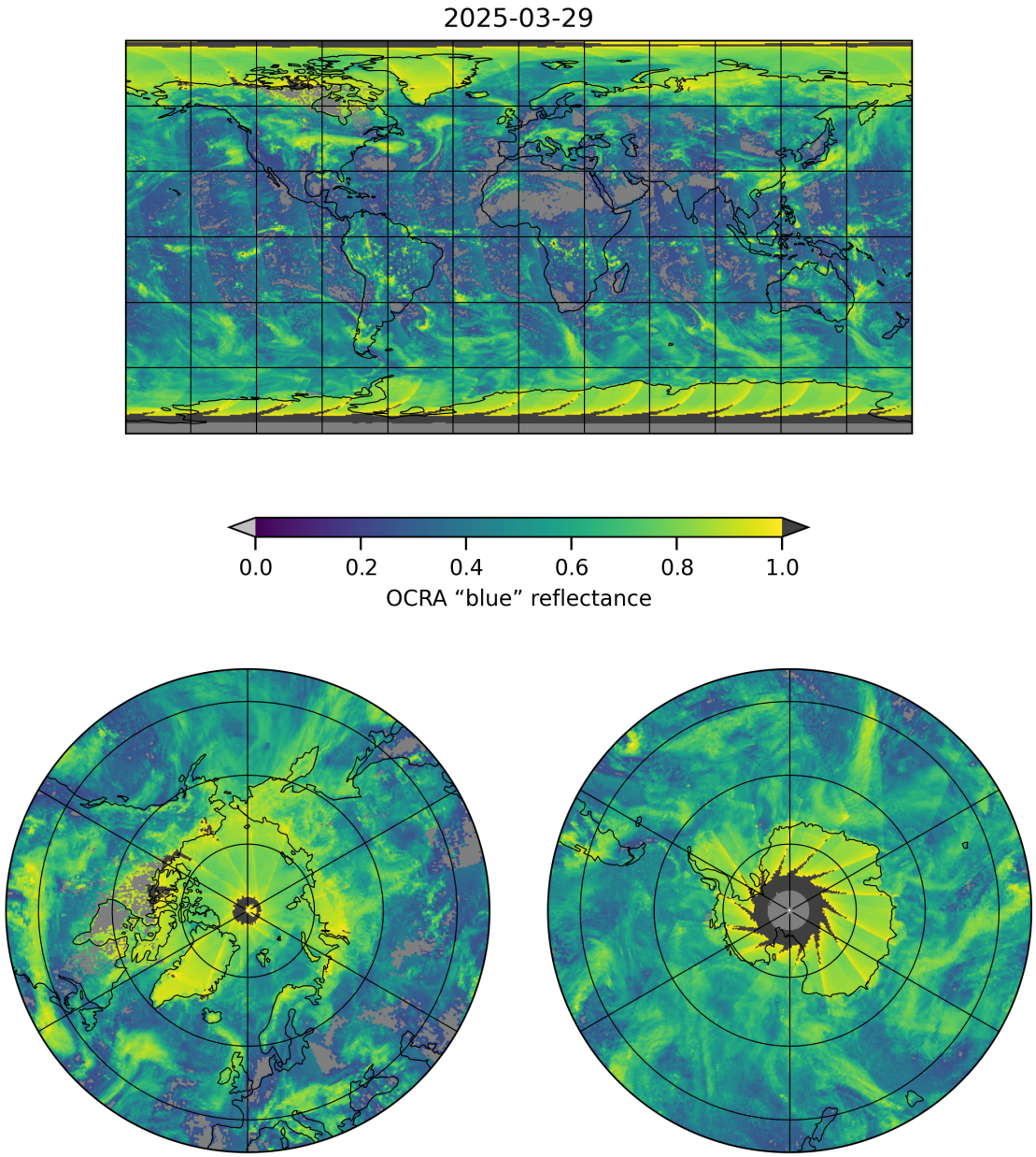


Figure 18: Map of “OCRA “blue” reflectance” for 2025-03-28 to 2025-03-30

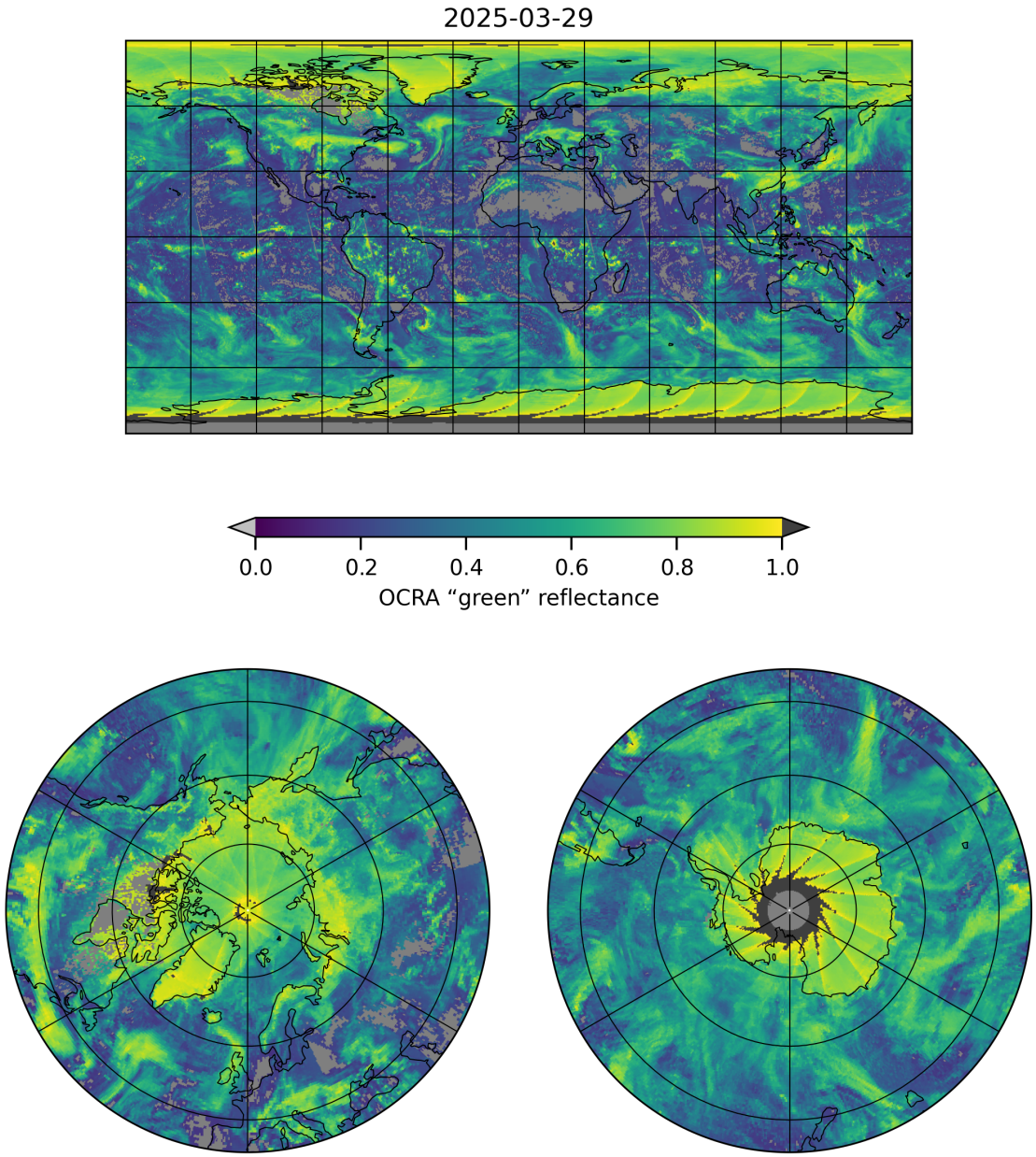


Figure 19: Map of “OCRA “green” reflectance” for 2025-03-28 to 2025-03-30

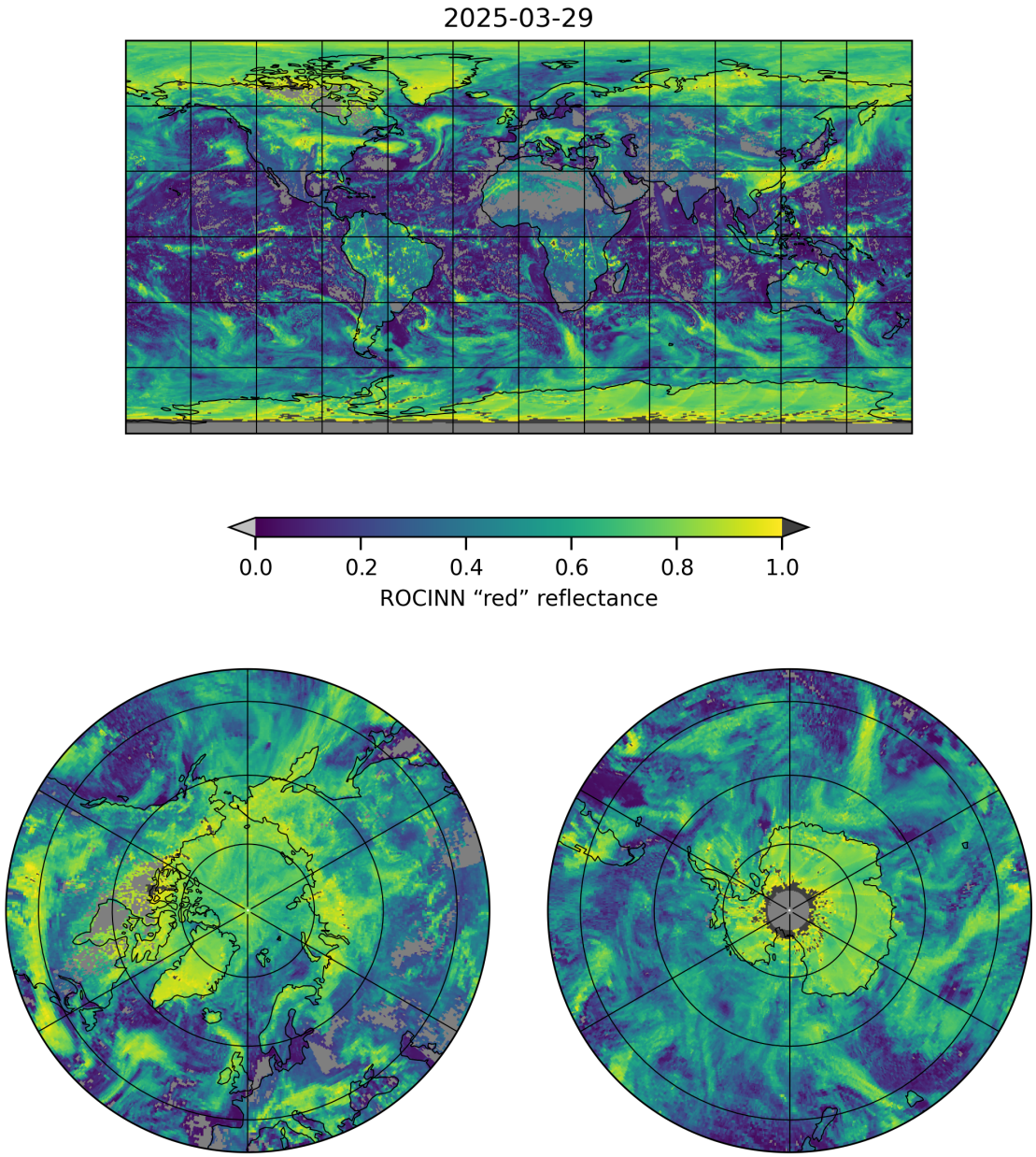


Figure 20: Map of “ROCINN “red” reflectance” for 2025-03-28 to 2025-03-30

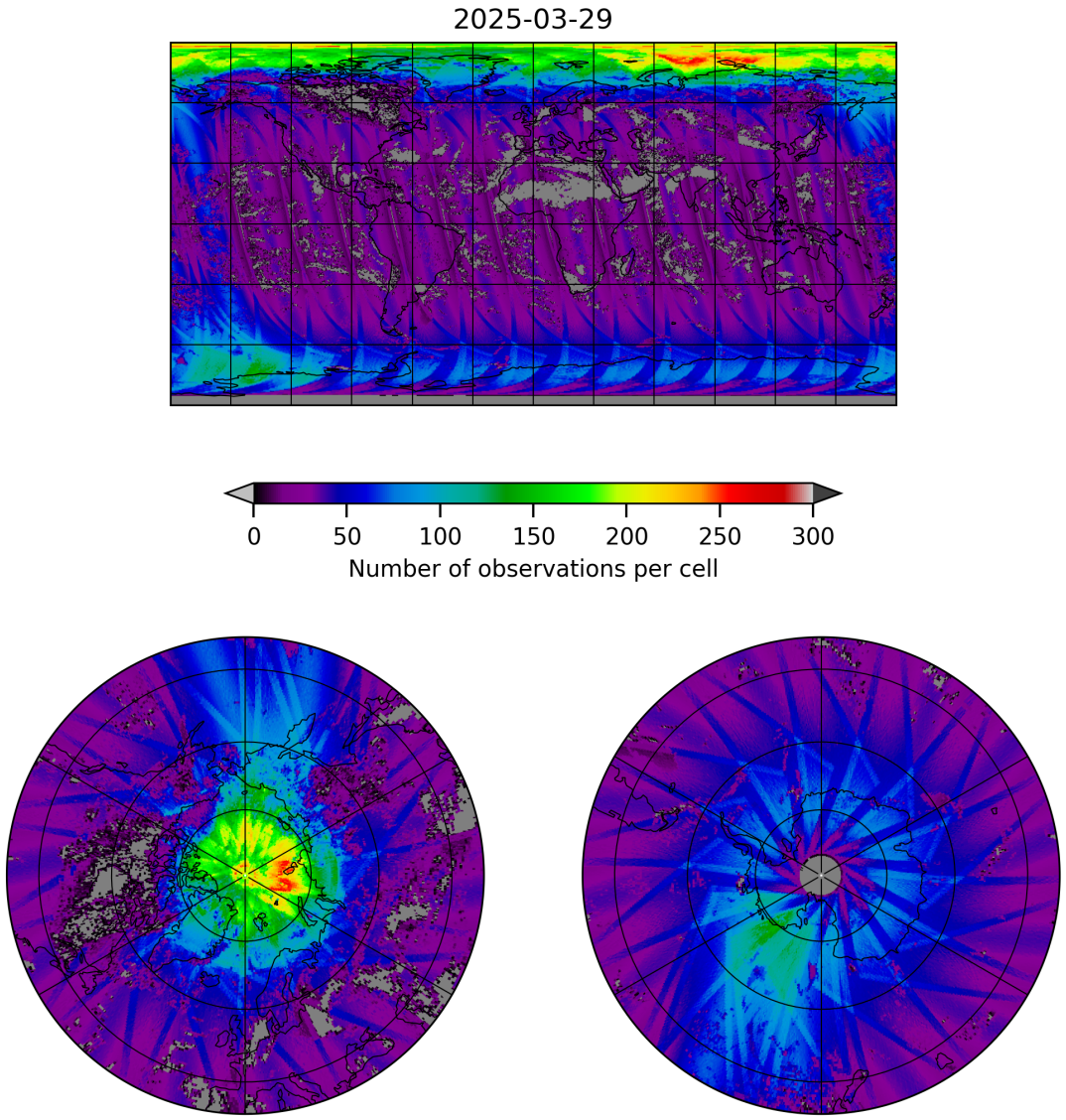


Figure 21: Map of the number of observations for 2025-03-28 to 2025-03-30

7 Zonal average

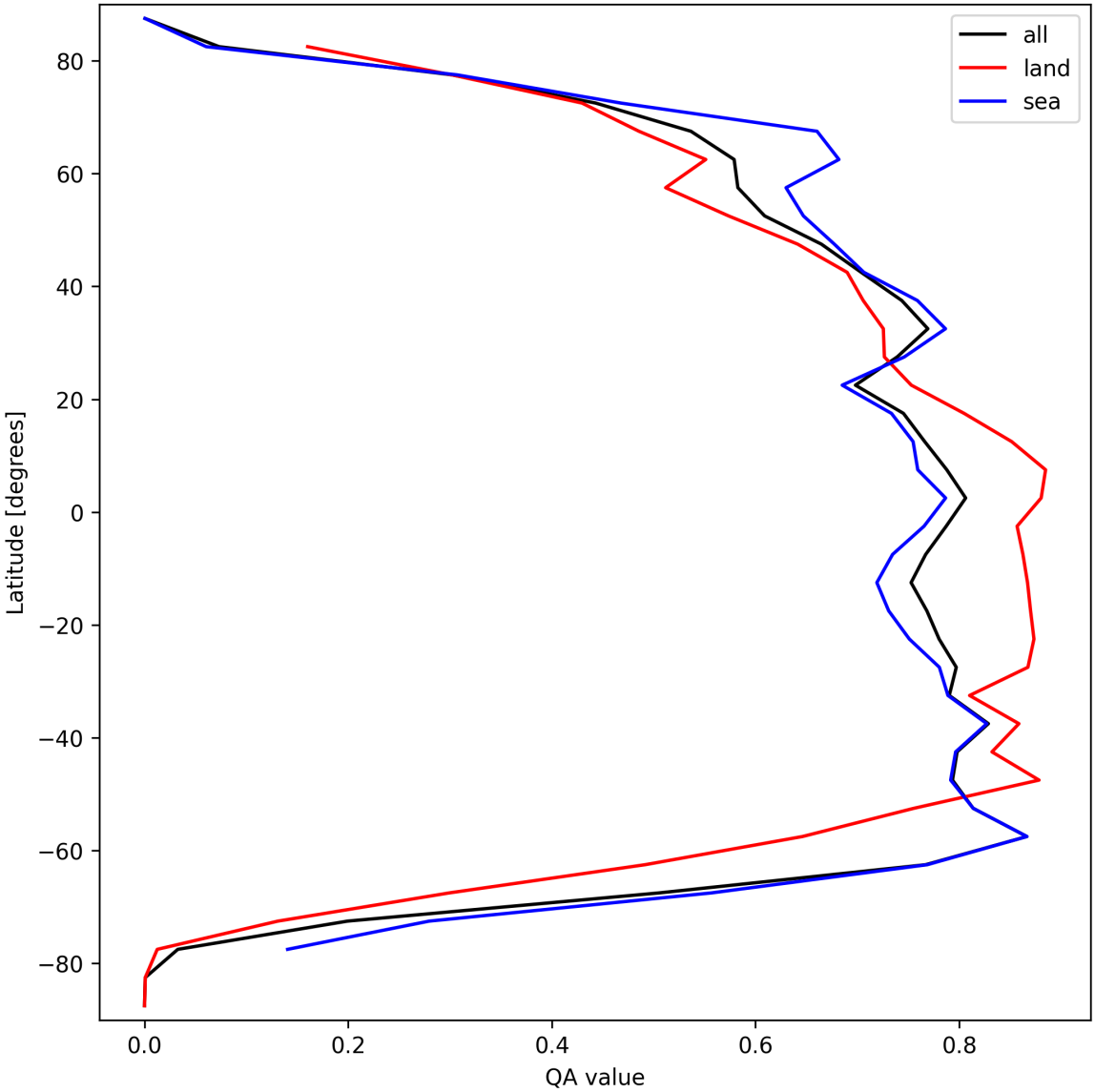


Figure 22: Zonal average of “QA value” for 2025-03-28 to 2025-03-30.

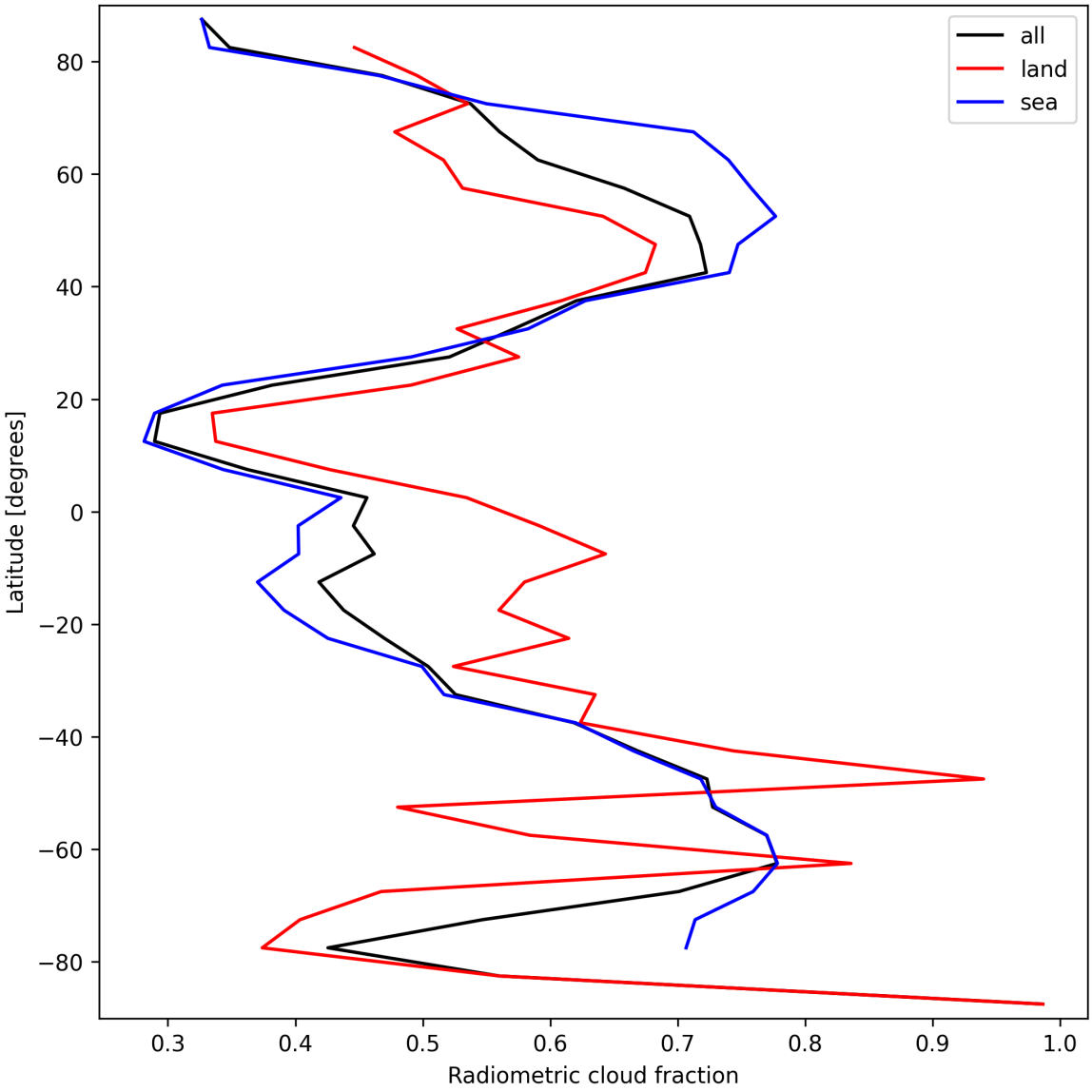


Figure 23: Zonal average of “Radiometric cloud fraction” for 2025-03-28 to 2025-03-30.

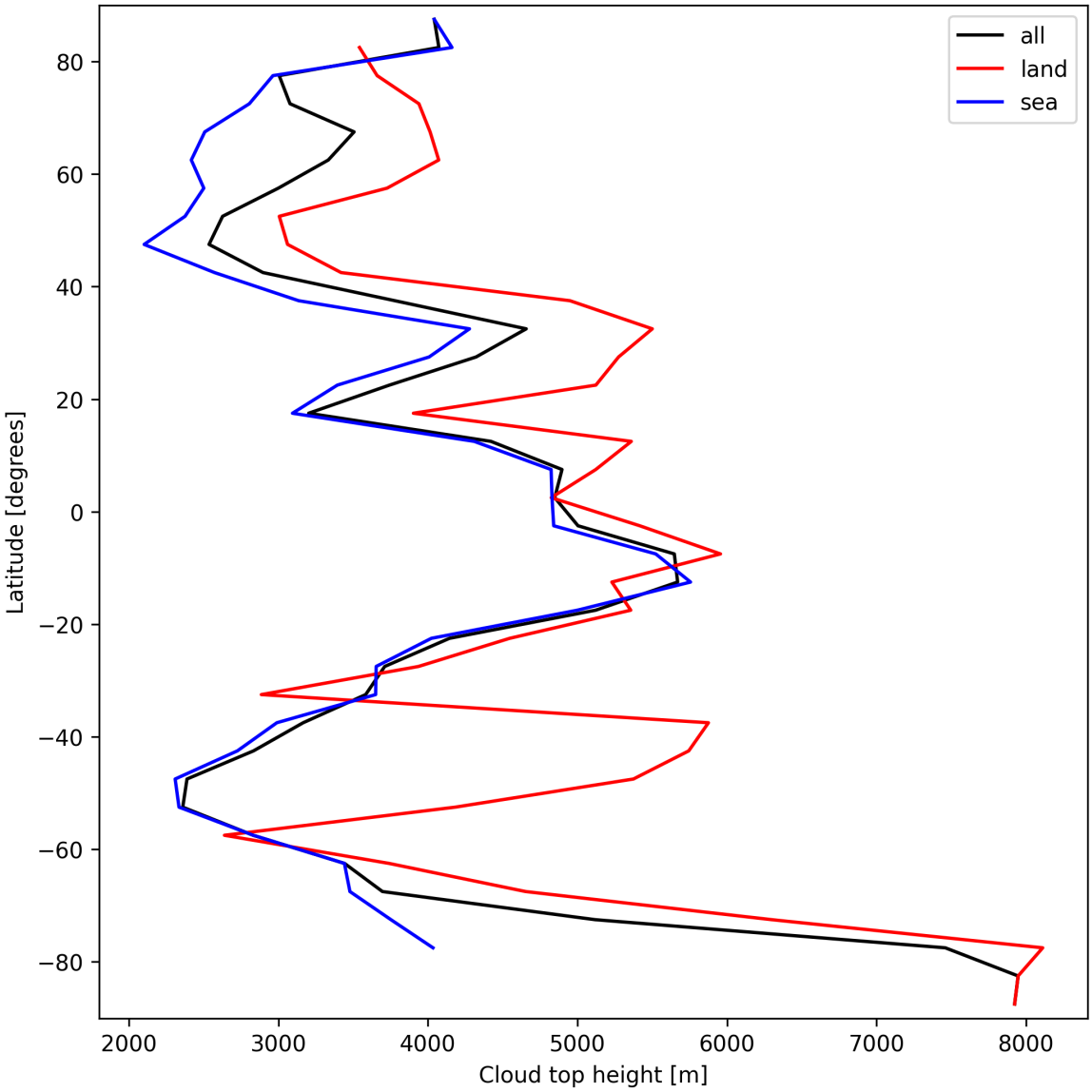


Figure 24: Zonal average of “Cloud top height” for 2025-03-28 to 2025-03-30.

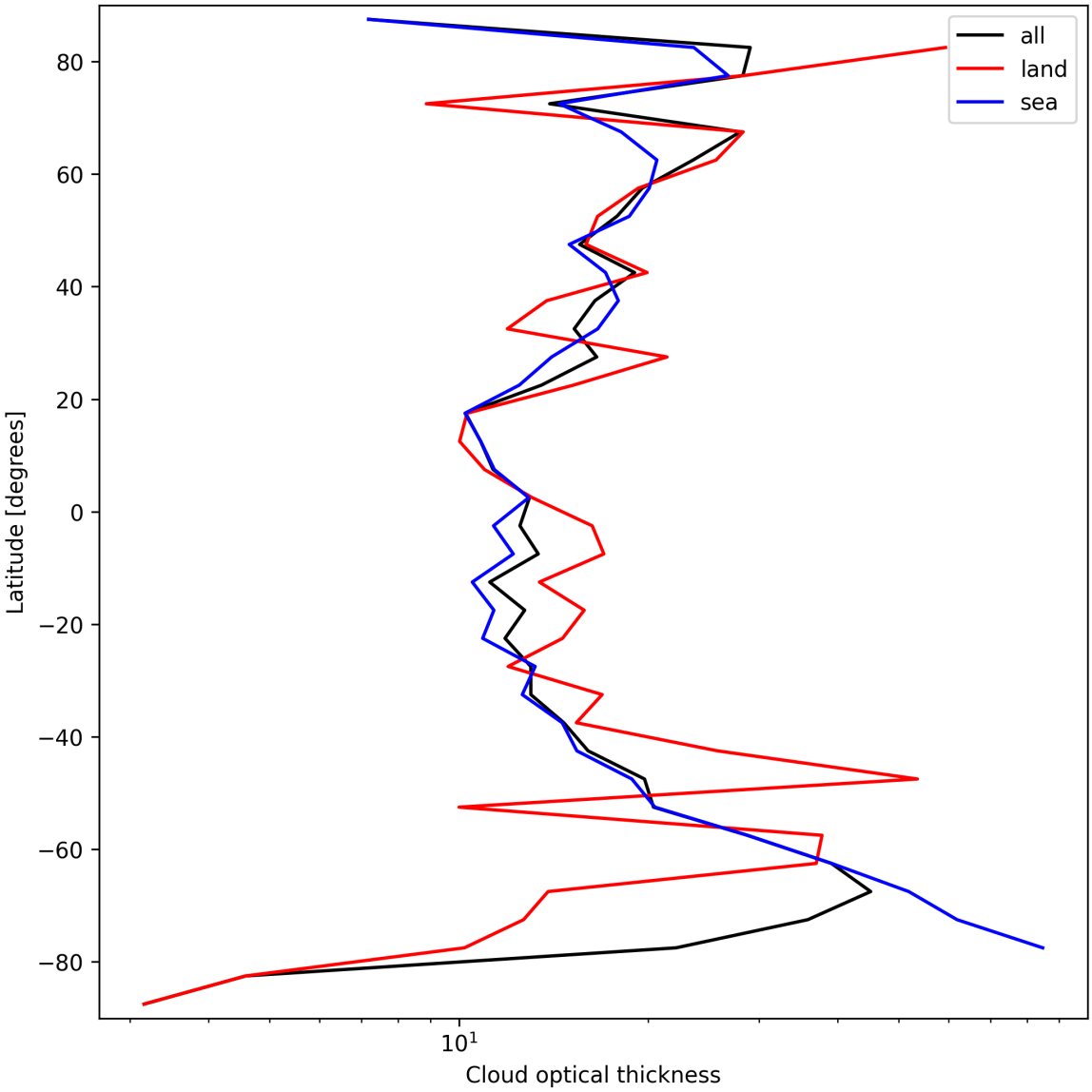


Figure 25: Zonal average of “Cloud optical thickness” for 2025-03-28 to 2025-03-30.

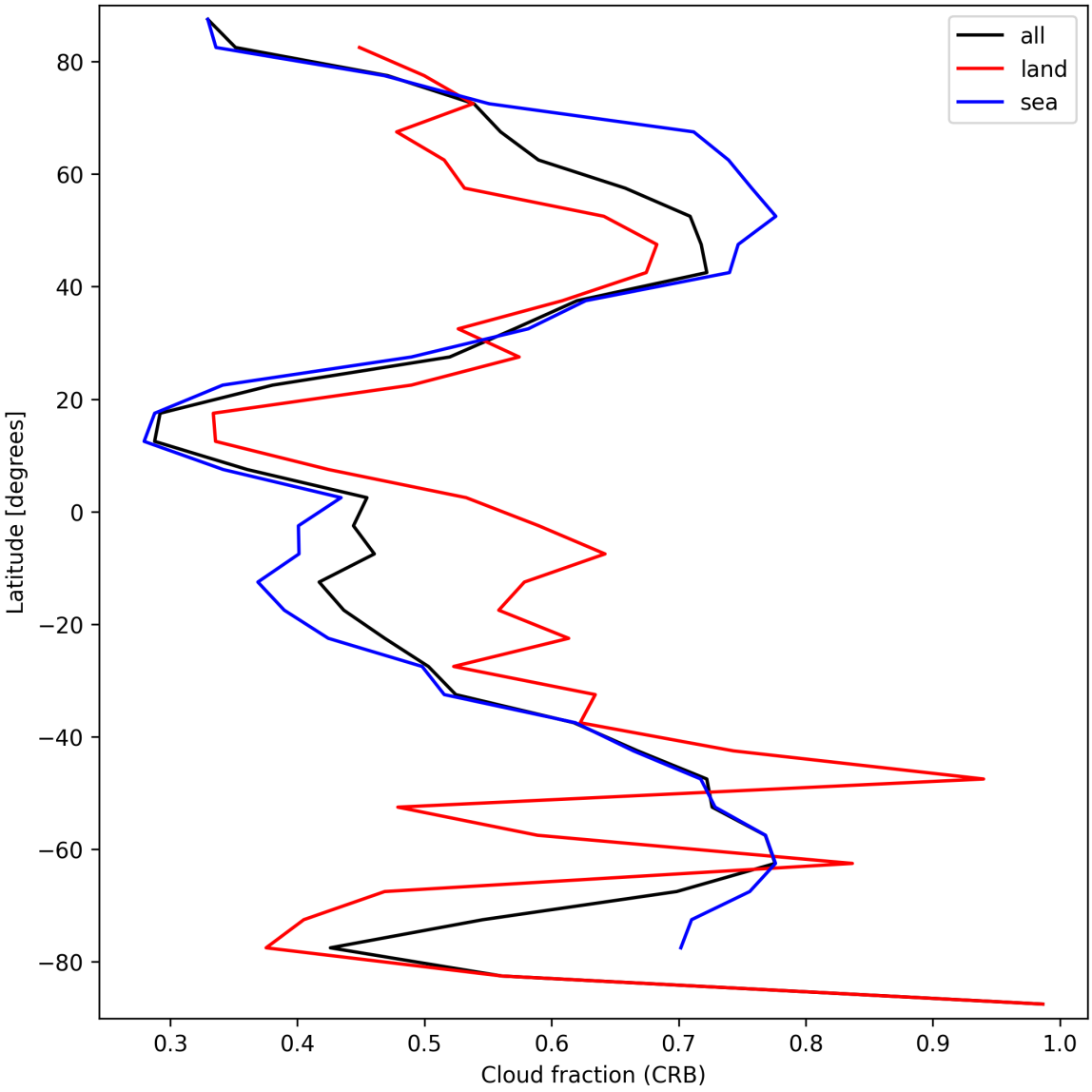


Figure 26: Zonal average of “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30.

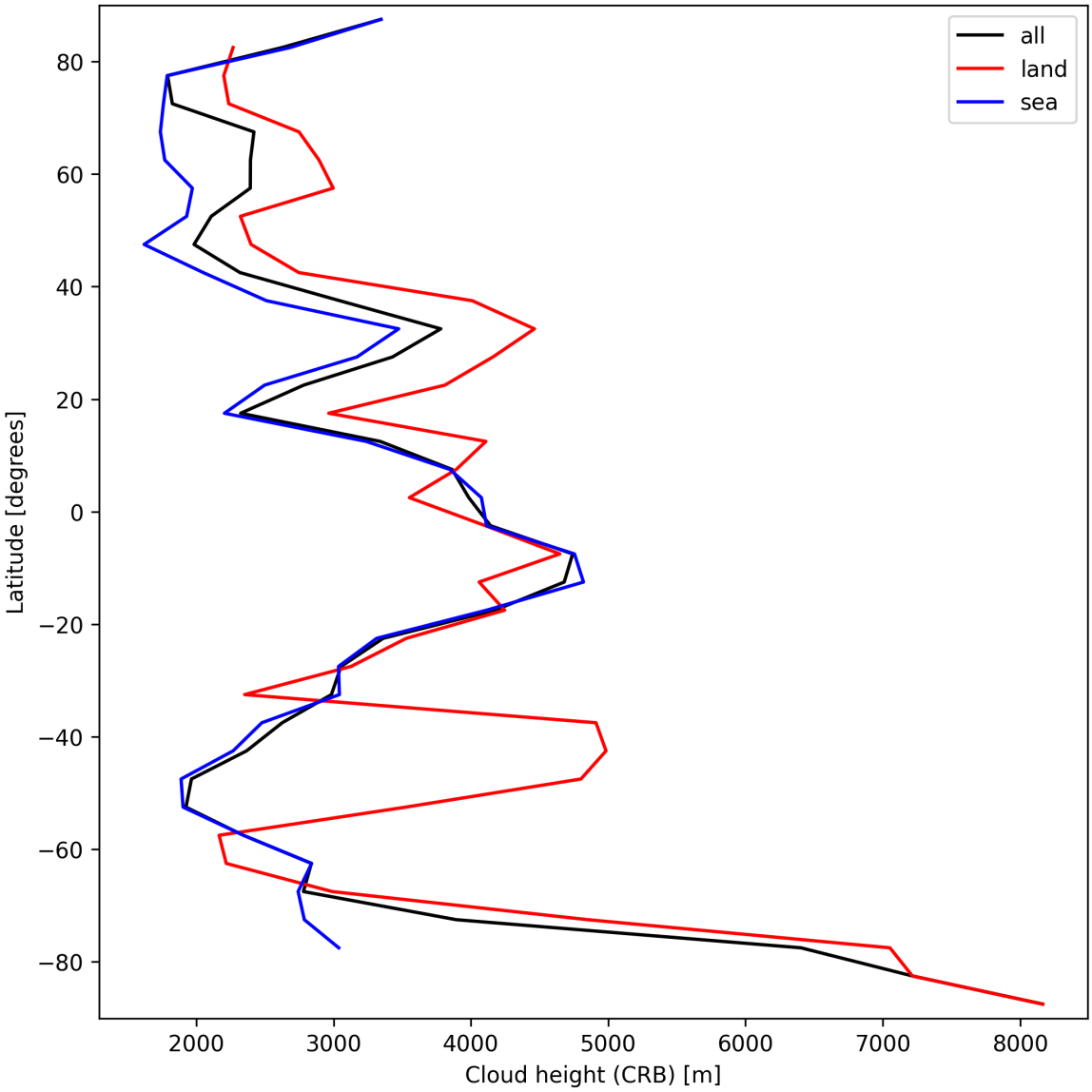


Figure 27: Zonal average of “Cloud height (CRB)” for 2025-03-28 to 2025-03-30.

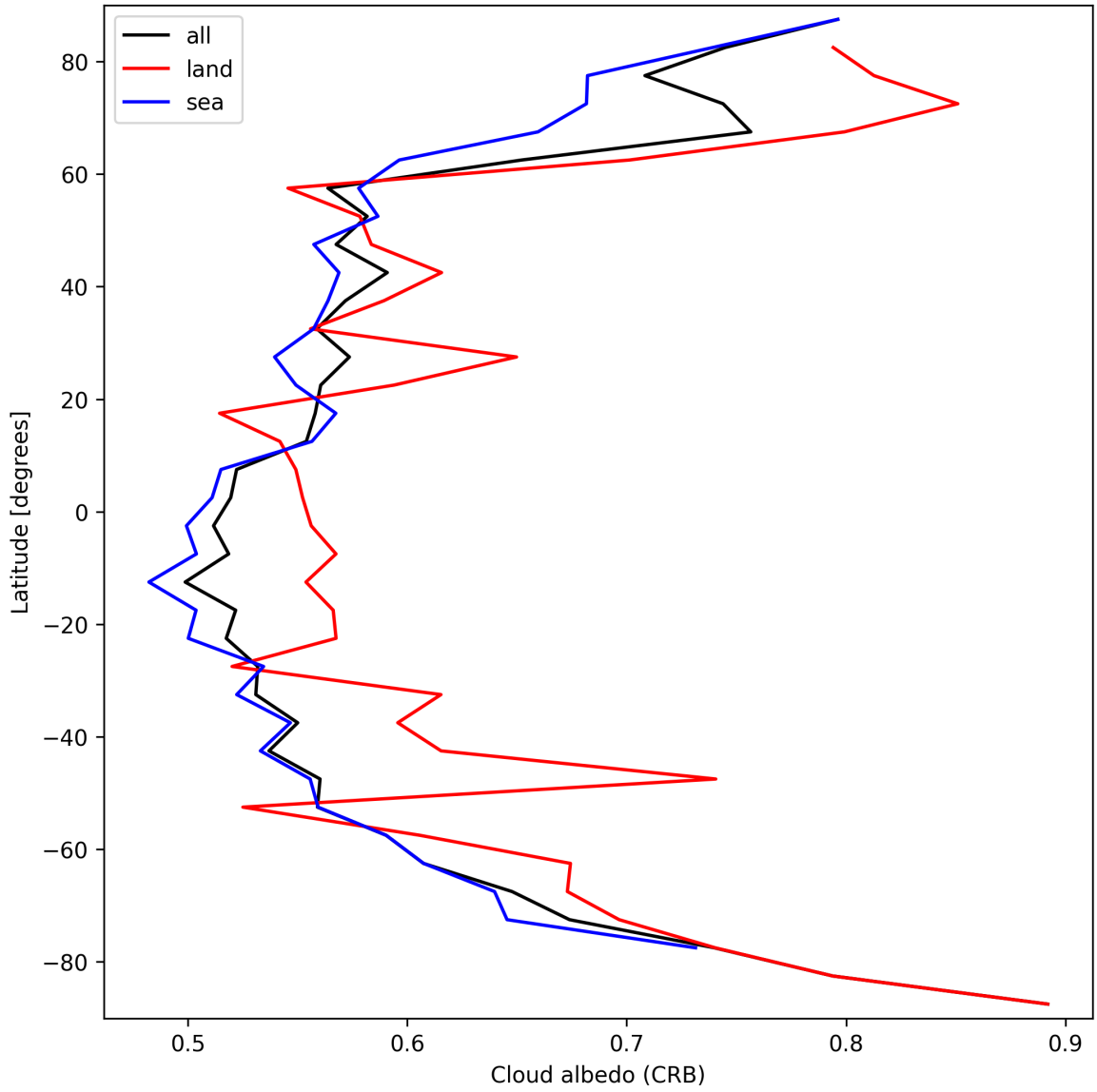


Figure 28: Zonal average of “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

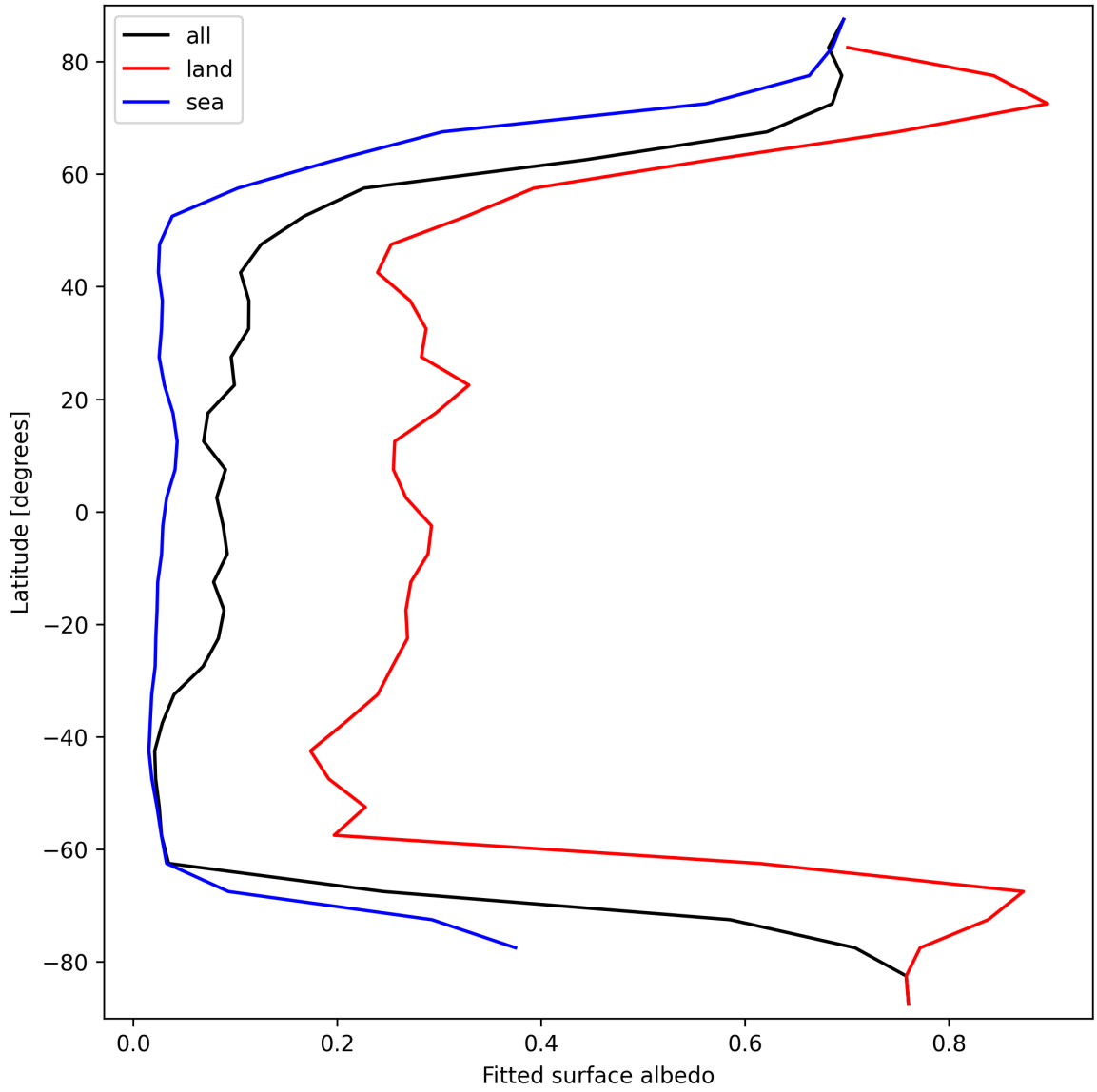


Figure 29: Zonal average of “Fitted surface albedo” for 2025-03-28 to 2025-03-30.

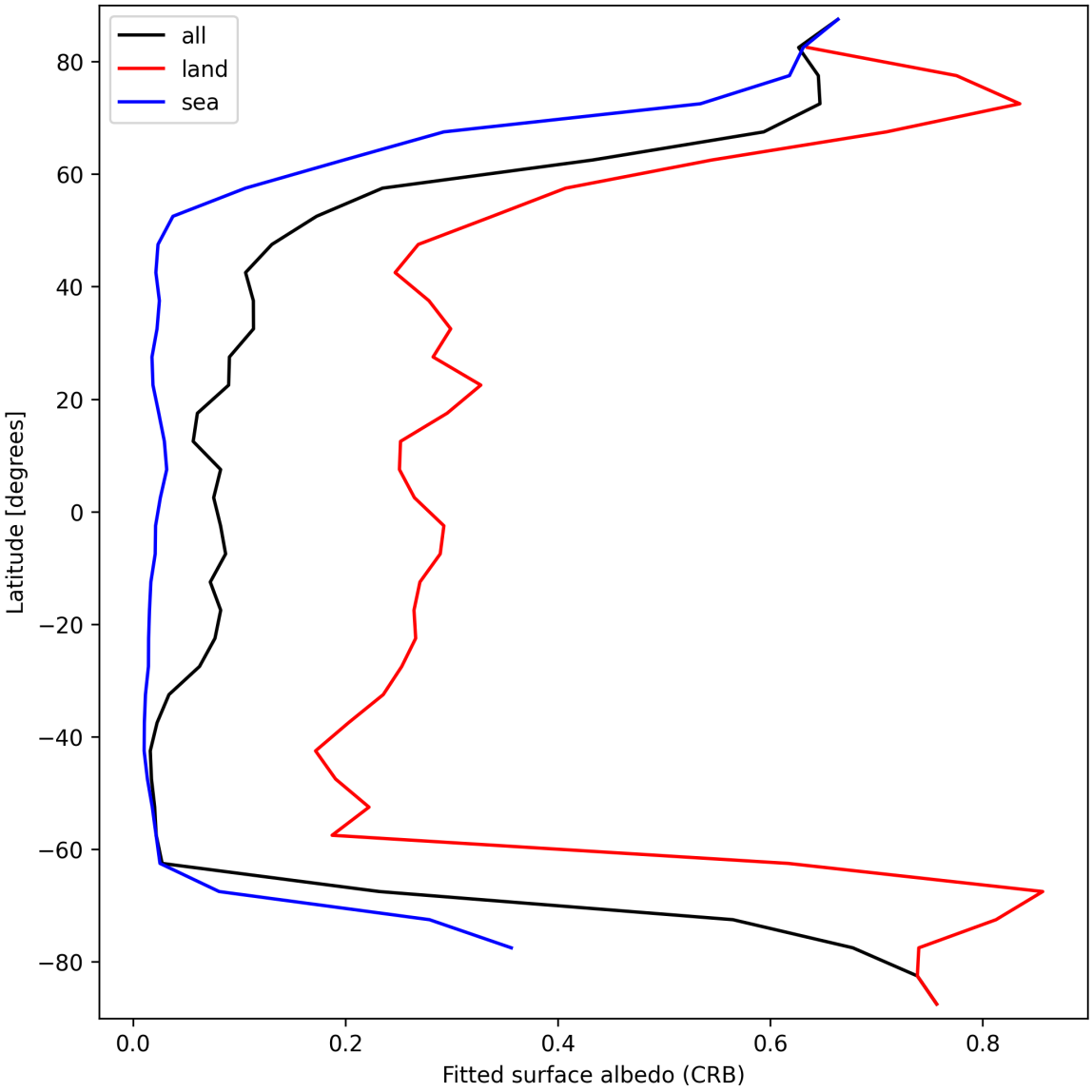


Figure 30: Zonal average of “Fitted surface albedo (CRB)” for 2025-03-28 to 2025-03-30.

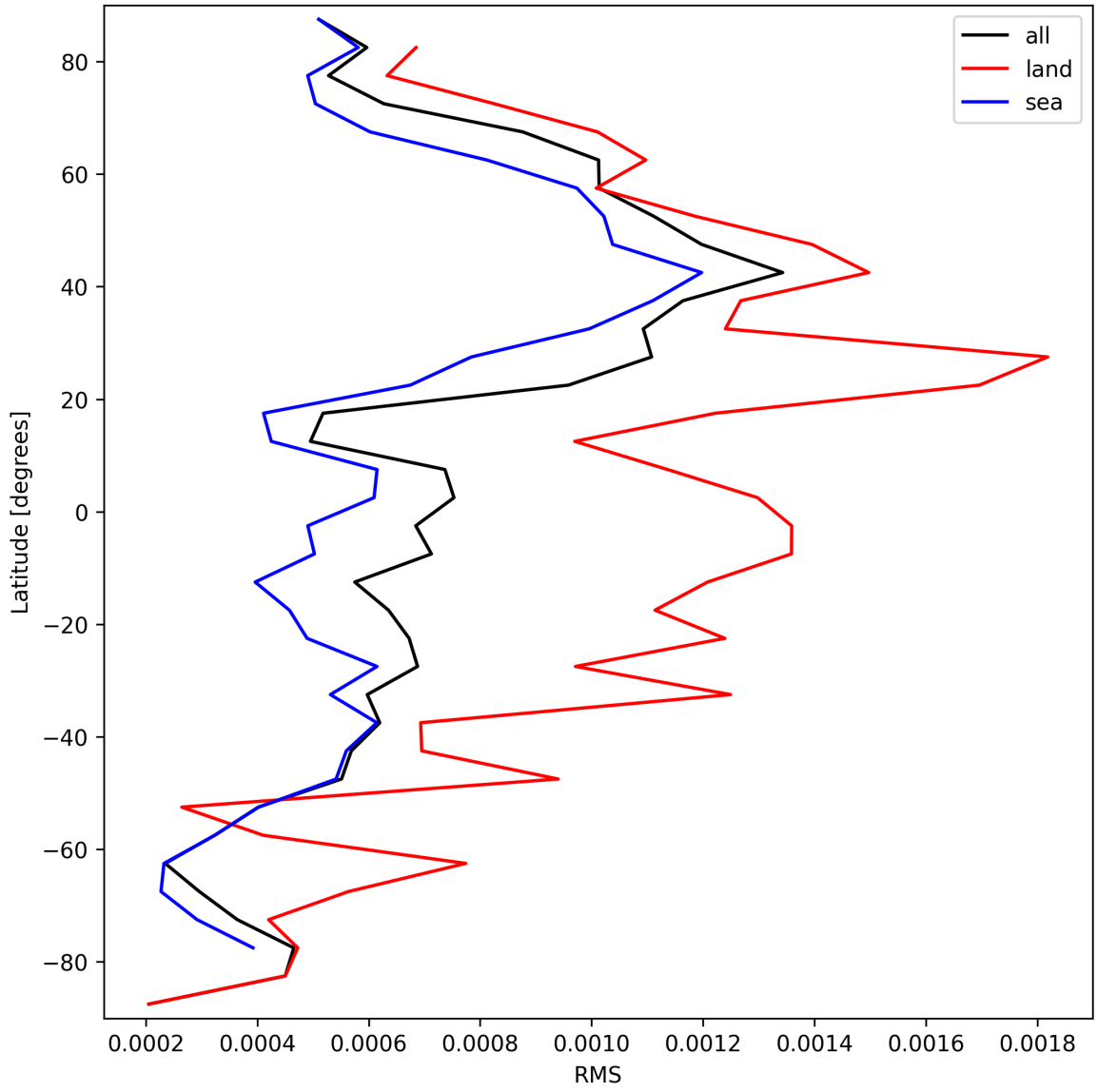


Figure 31: Zonal average of “RMS” for 2025-03-28 to 2025-03-30.

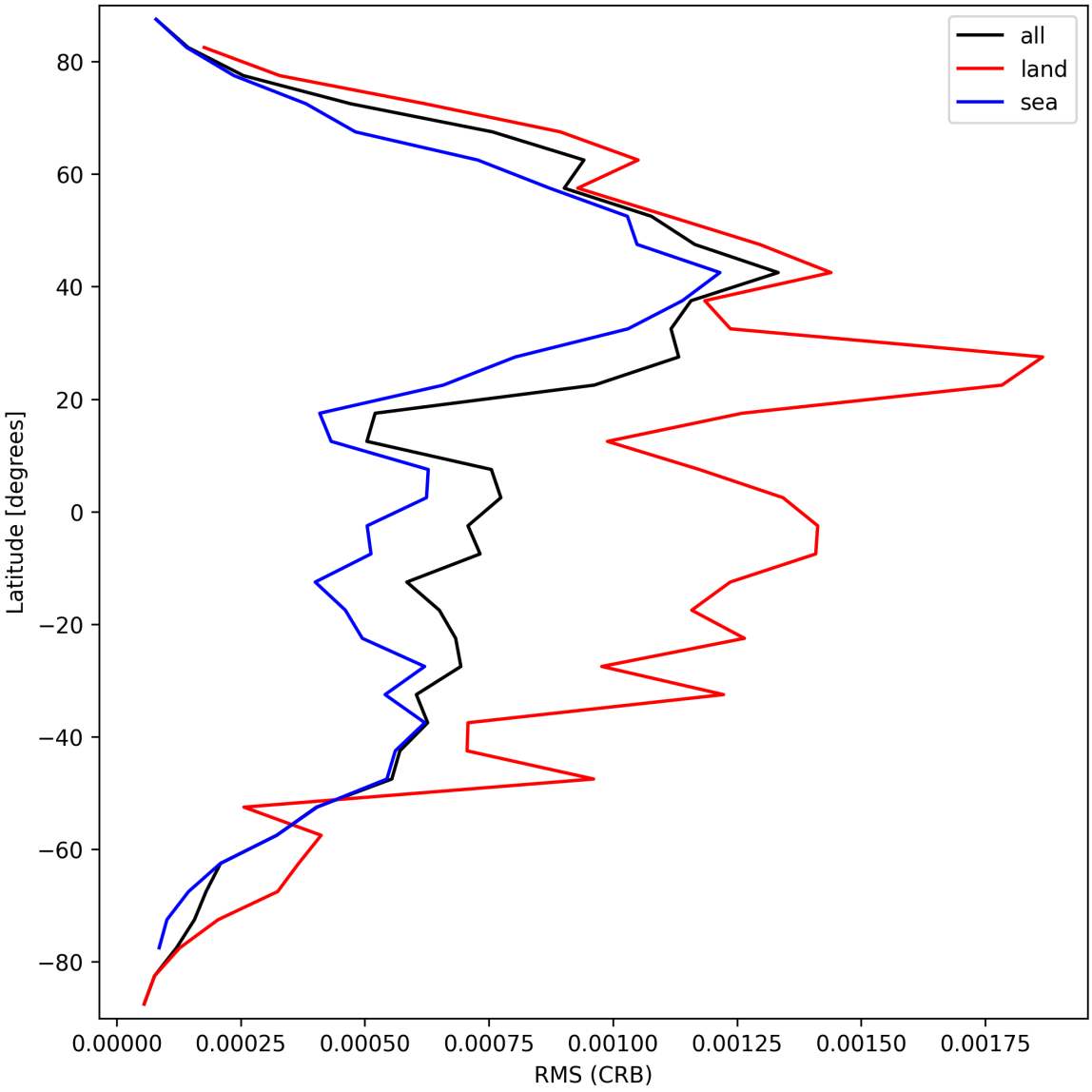


Figure 32: Zonal average of “RMS (CRB)” for 2025-03-28 to 2025-03-30.

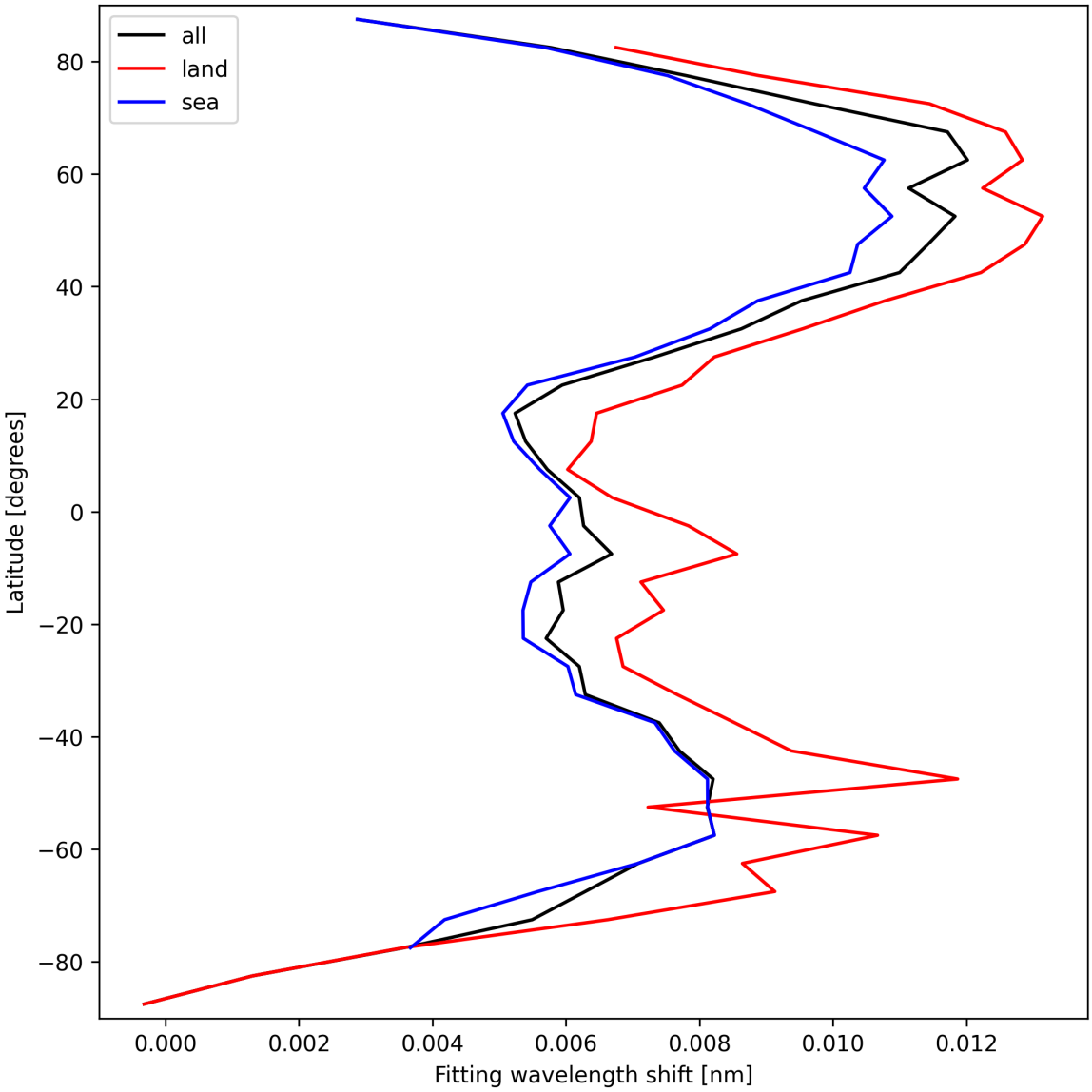


Figure 33: Zonal average of “Fitting wavelength shift” for 2025-03-28 to 2025-03-30.

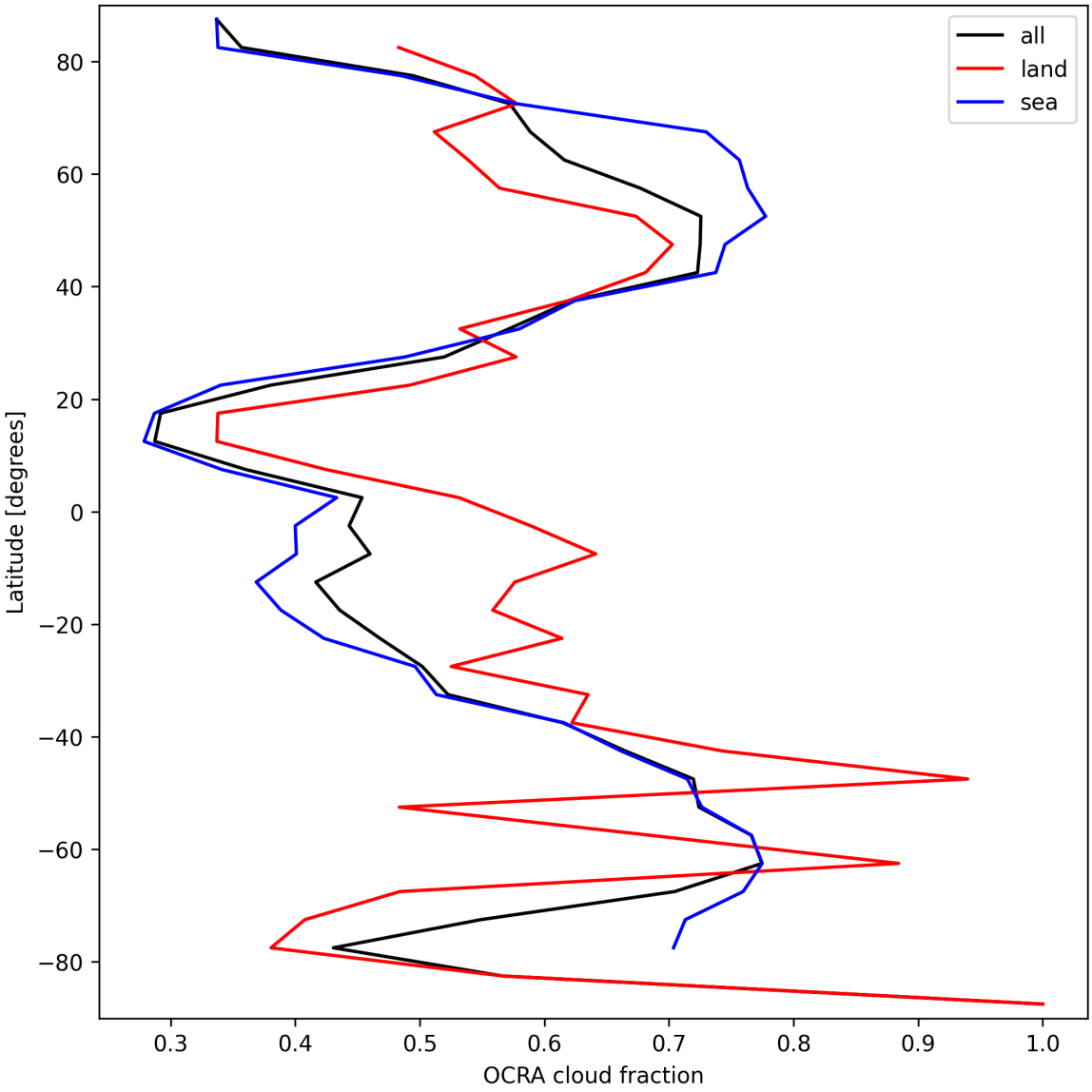


Figure 34: Zonal average of “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

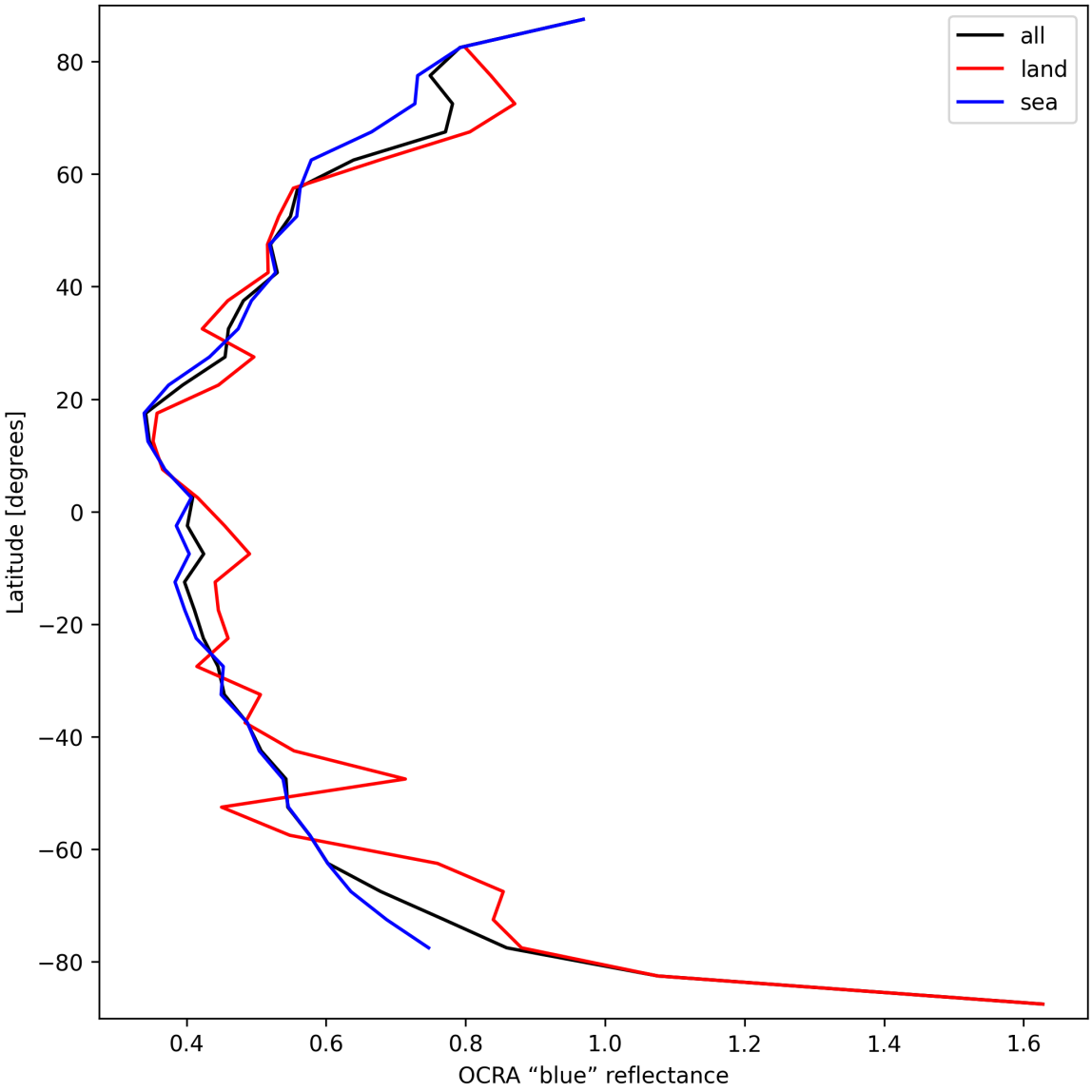


Figure 35: Zonal average of “OCRA “blue” reflectance” for 2025-03-28 to 2025-03-30.

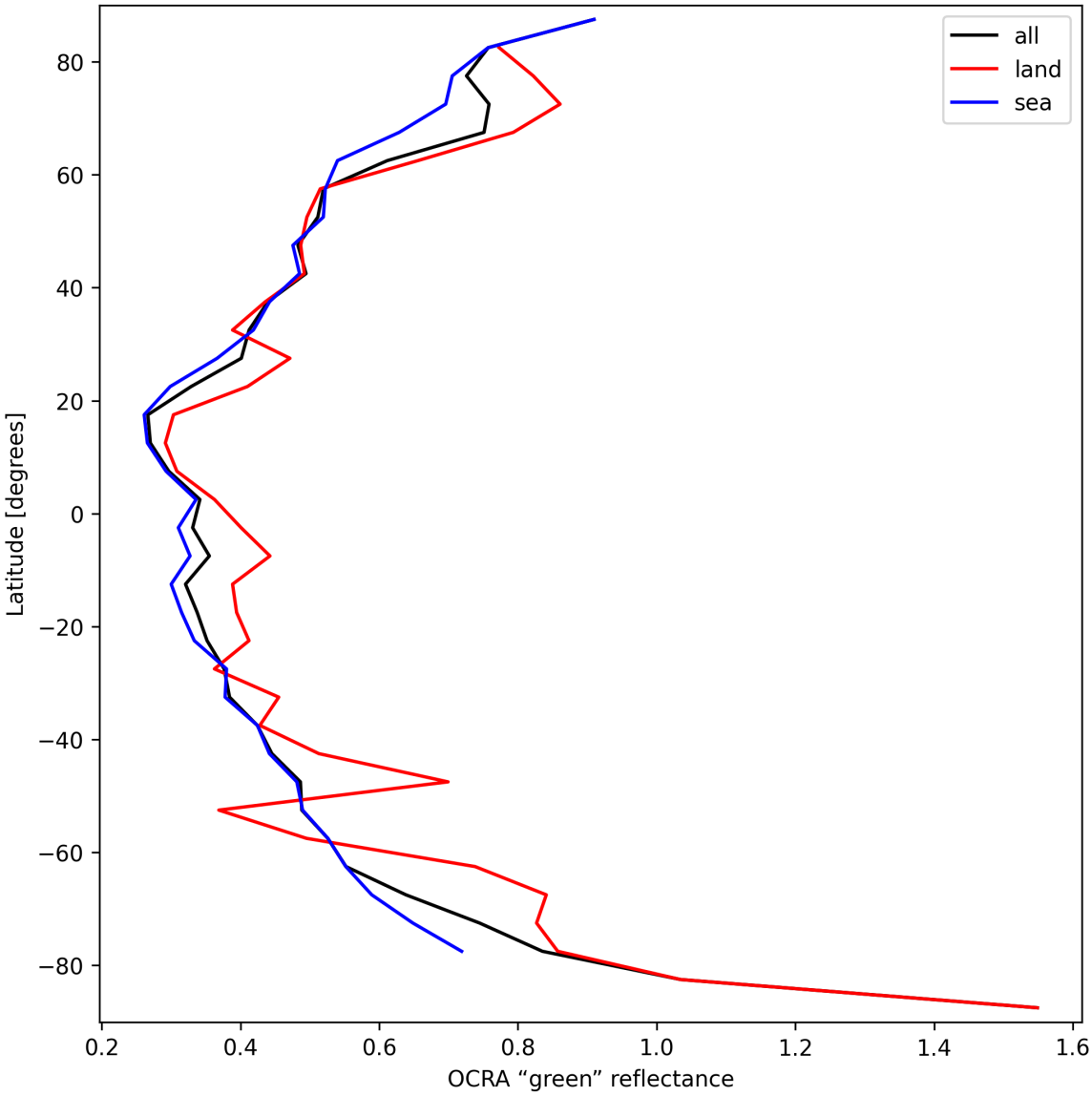


Figure 36: Zonal average of “OCRA “green” reflectance” for 2025-03-28 to 2025-03-30.

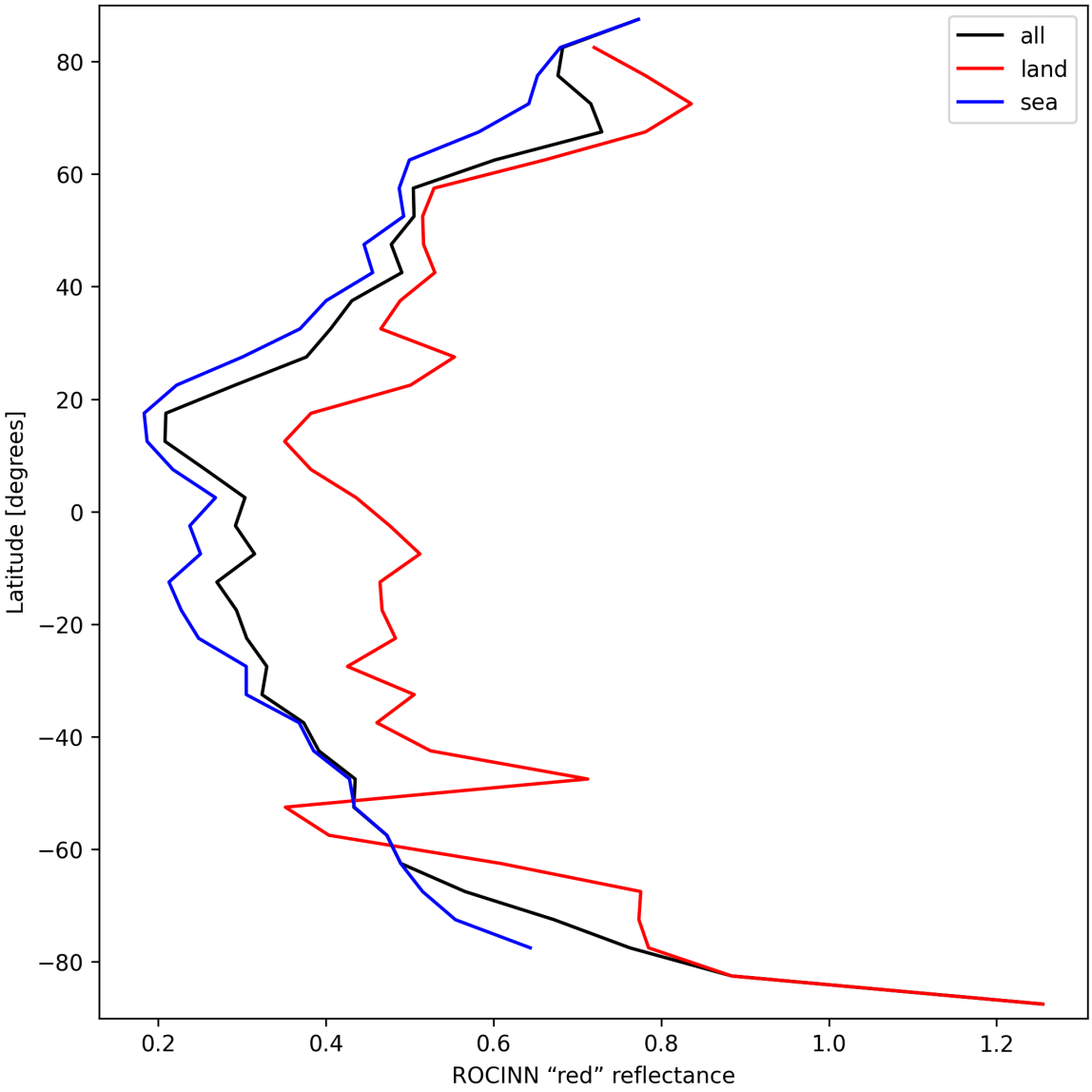


Figure 37: Zonal average of “ROCINN “red” reflectance” for 2025-03-28 to 2025-03-30.

8 Histograms

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

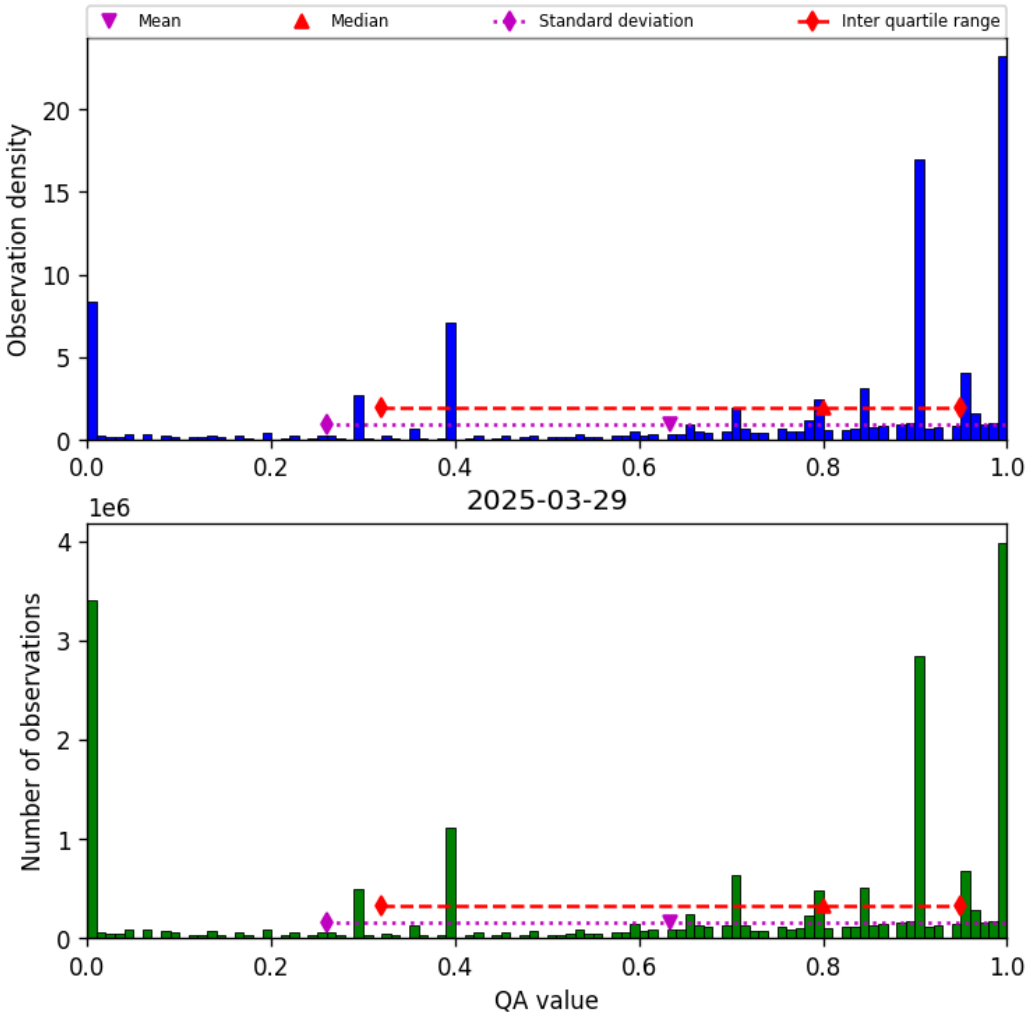


Figure 38: Histogram of “QA value” for 2025-03-28 to 2025-03-30

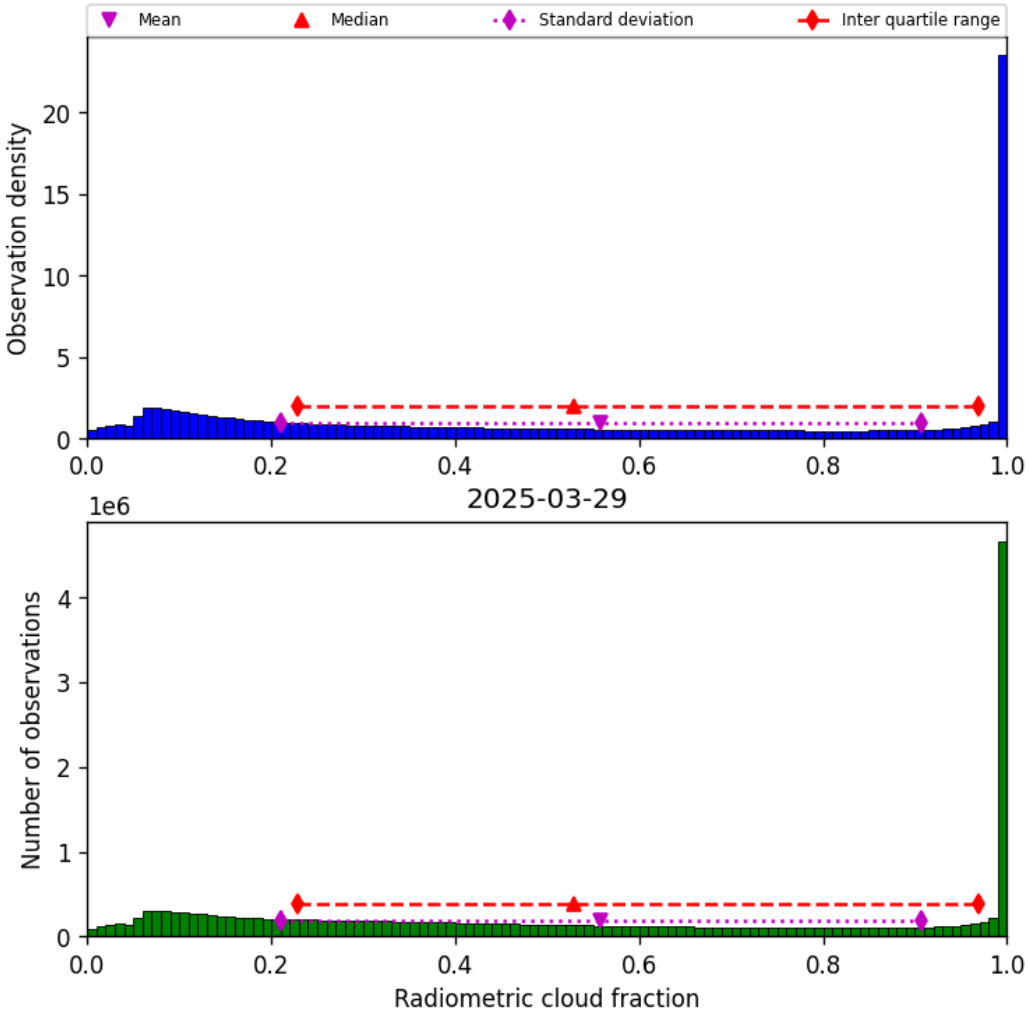


Figure 39: Histogram of “Radiometric cloud fraction” for 2025-03-28 to 2025-03-30

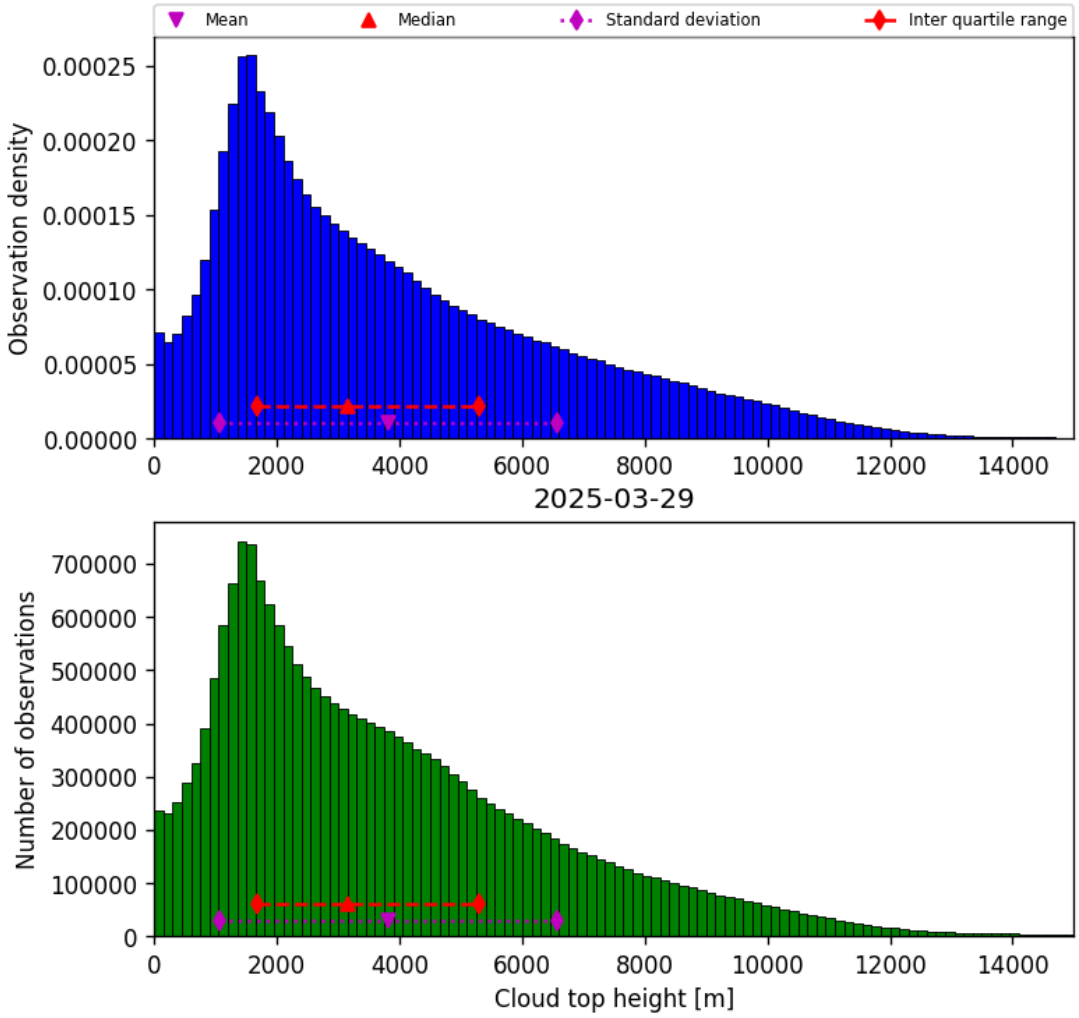


Figure 40: Histogram of “Cloud top height” for 2025-03-28 to 2025-03-30

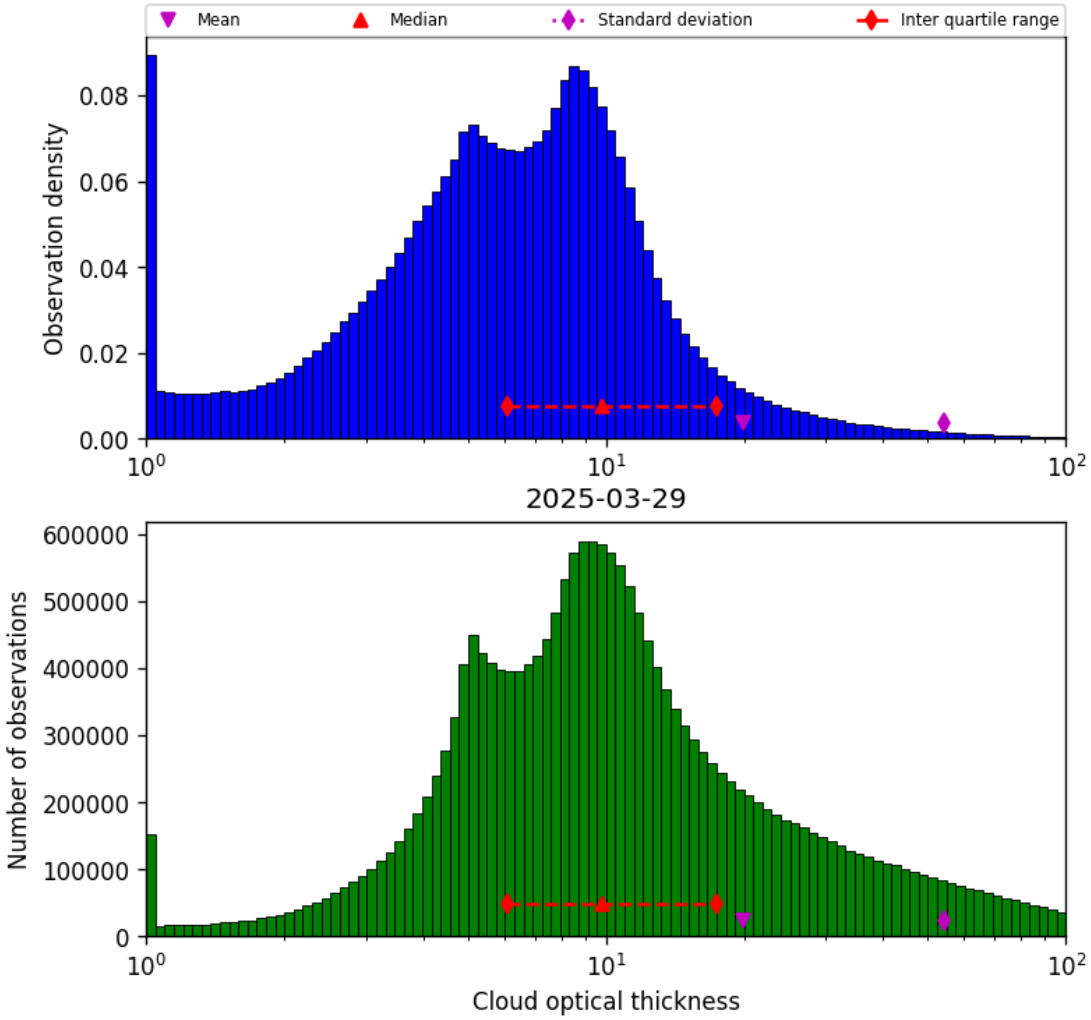


Figure 41: Histogram of “Cloud optical thickness” for 2025-03-28 to 2025-03-30

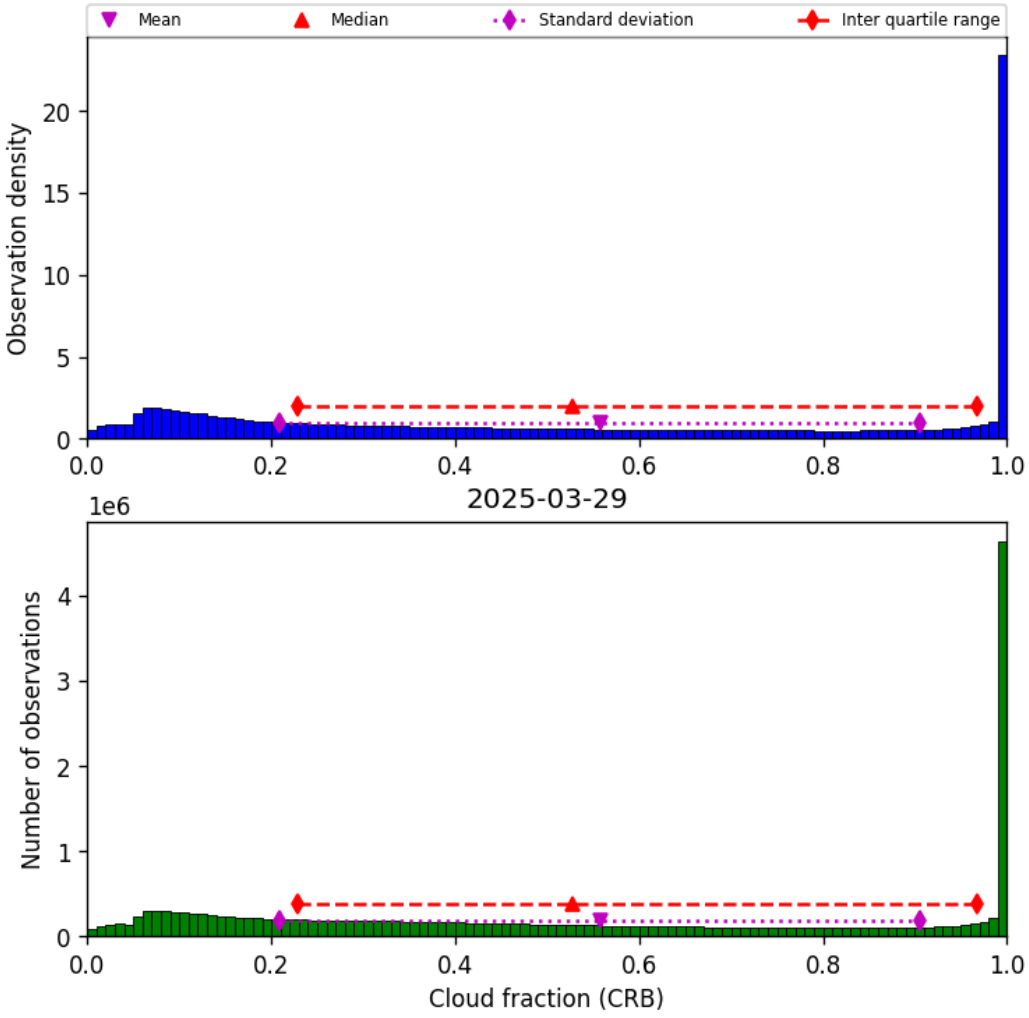


Figure 42: Histogram of “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30

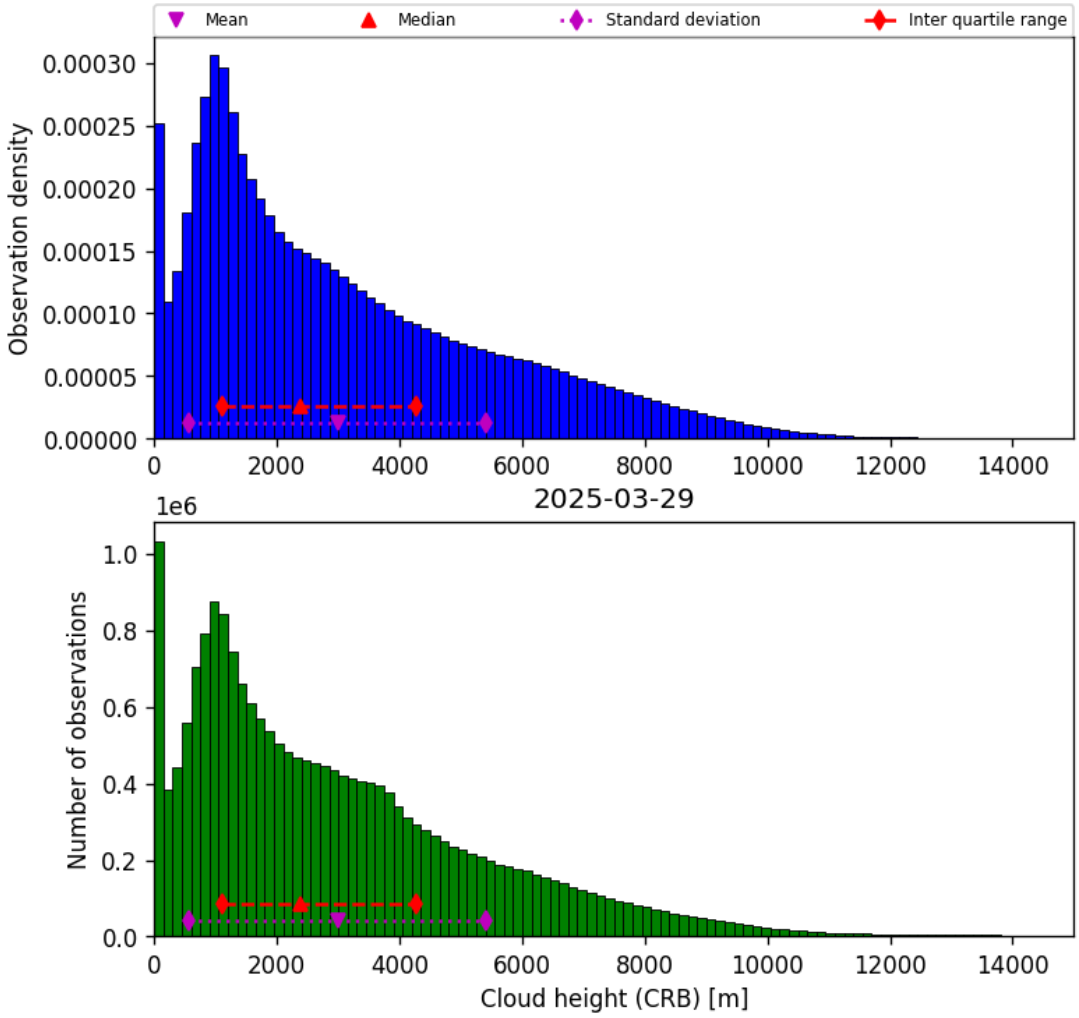


Figure 43: Histogram of “Cloud height (CRB)” for 2025-03-28 to 2025-03-30

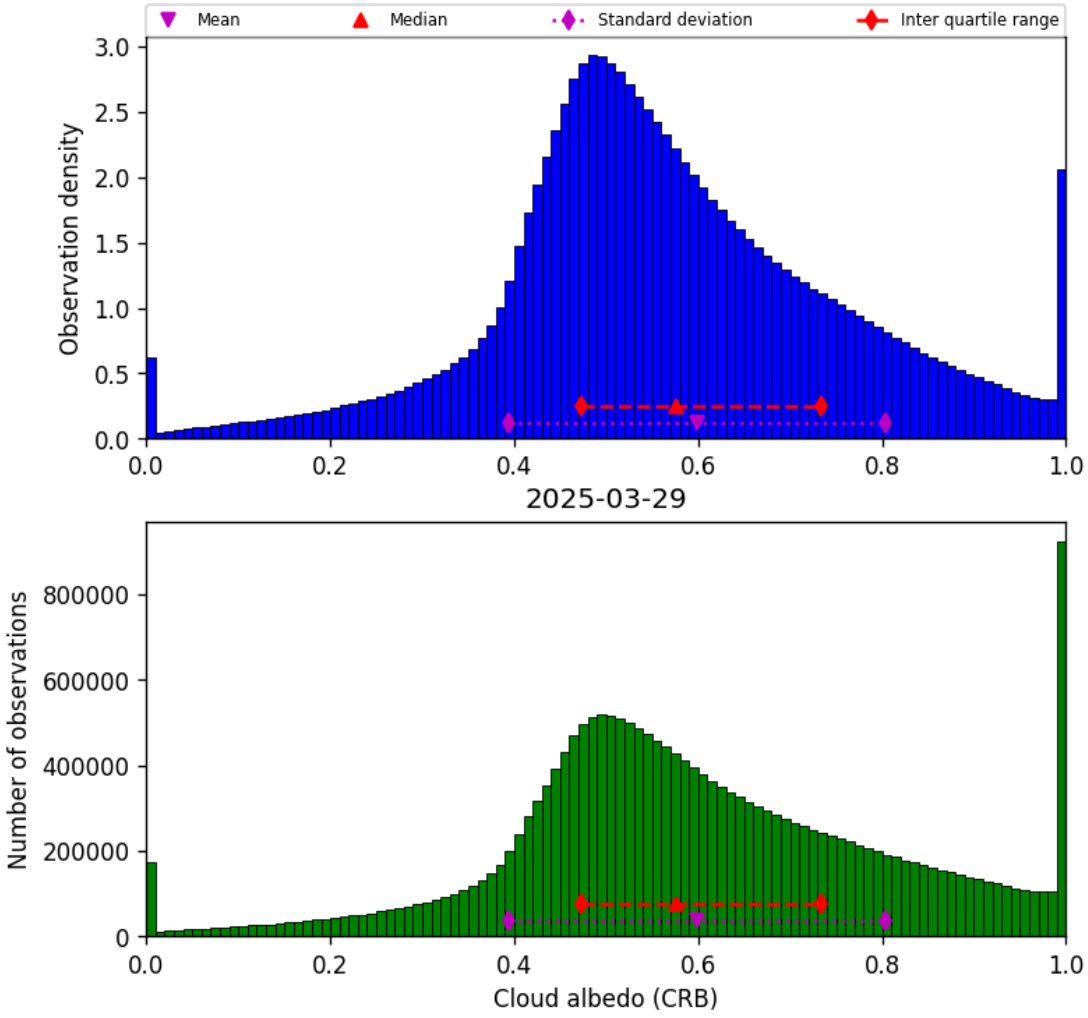


Figure 44: Histogram of “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30

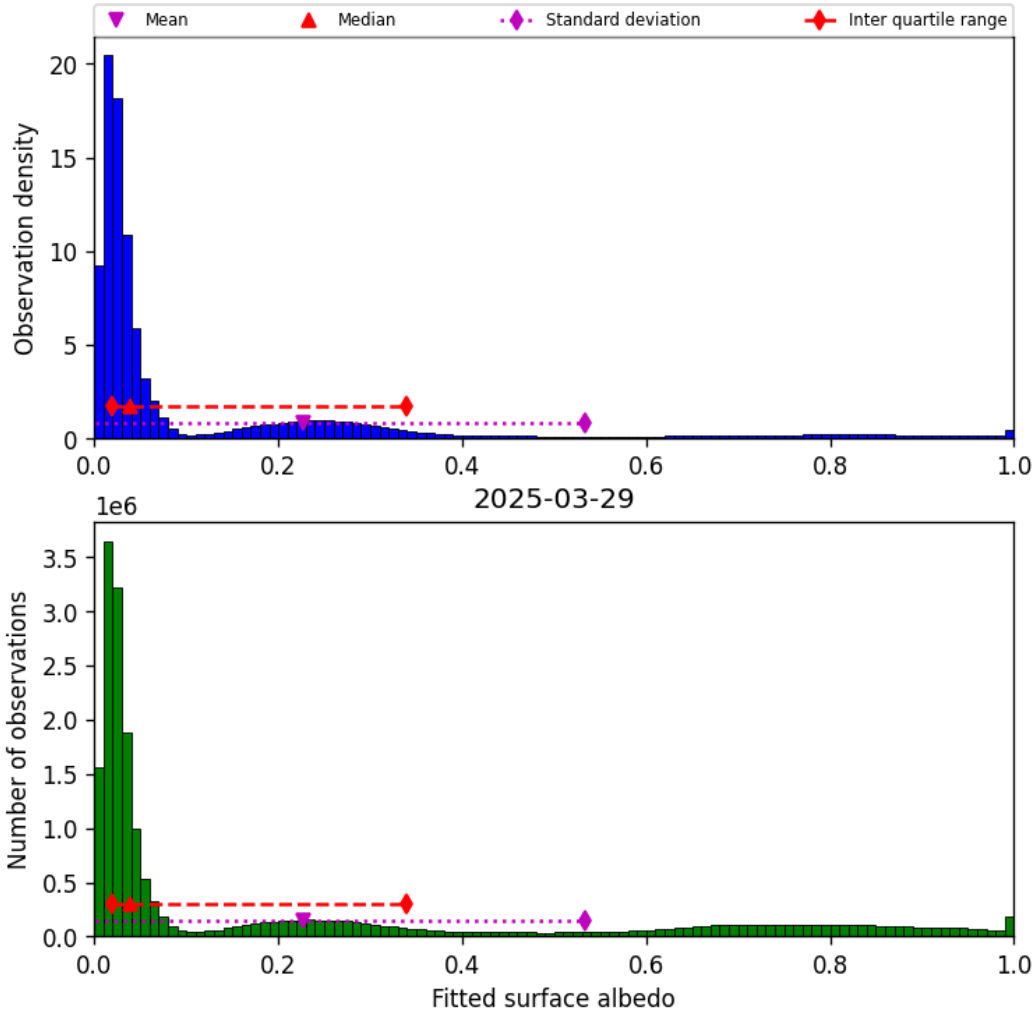


Figure 45: Histogram of “Fitted surface albedo” for 2025-03-28 to 2025-03-30

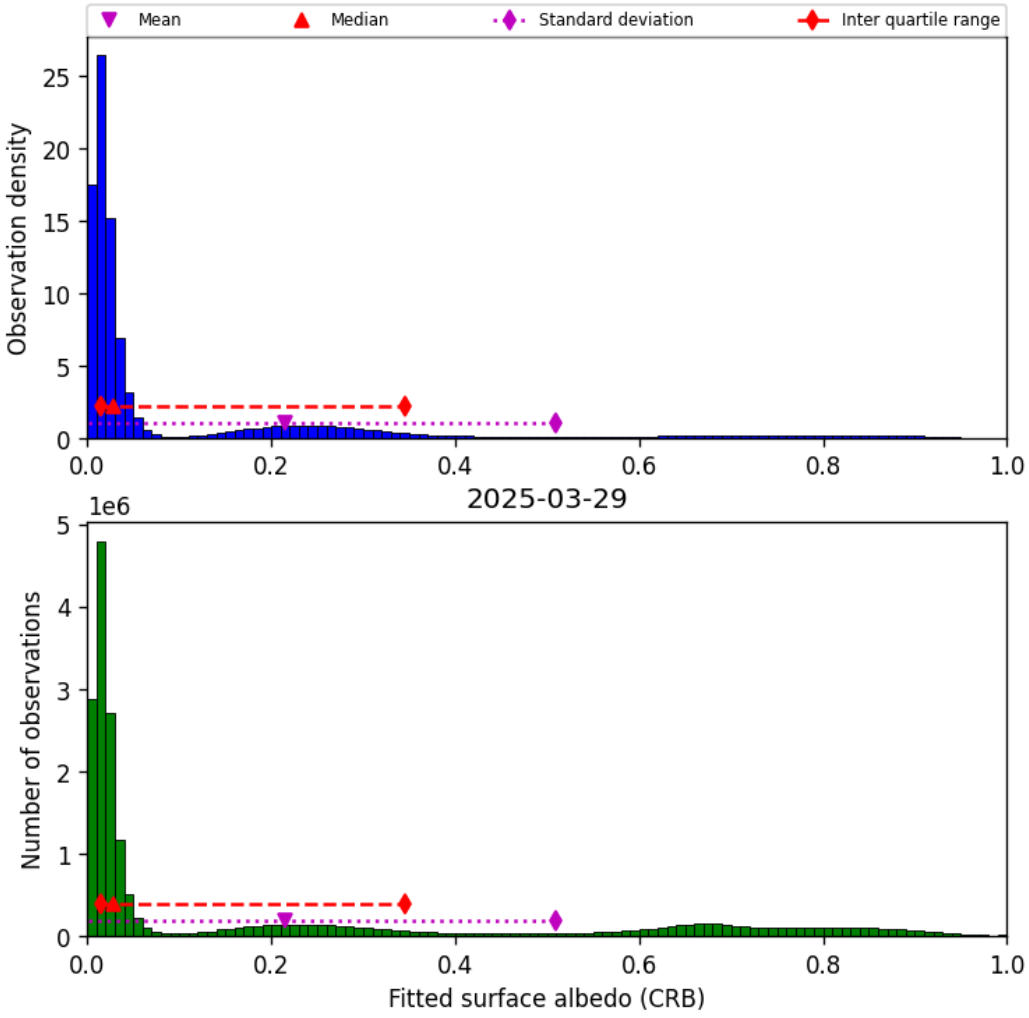


Figure 46: Histogram of “Fitted surface albedo (CRB)” for 2025-03-28 to 2025-03-30

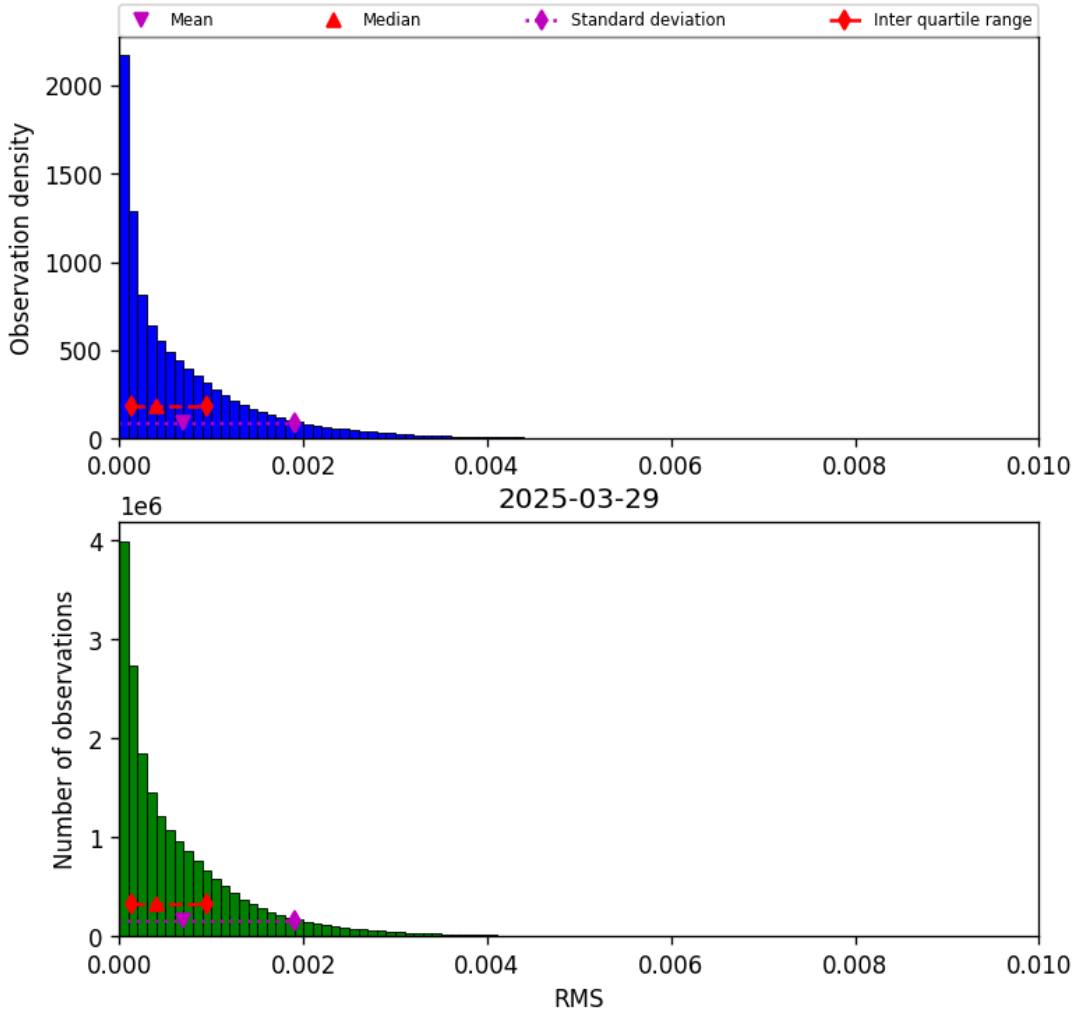


Figure 47: Histogram of “RMS” for 2025-03-28 to 2025-03-30

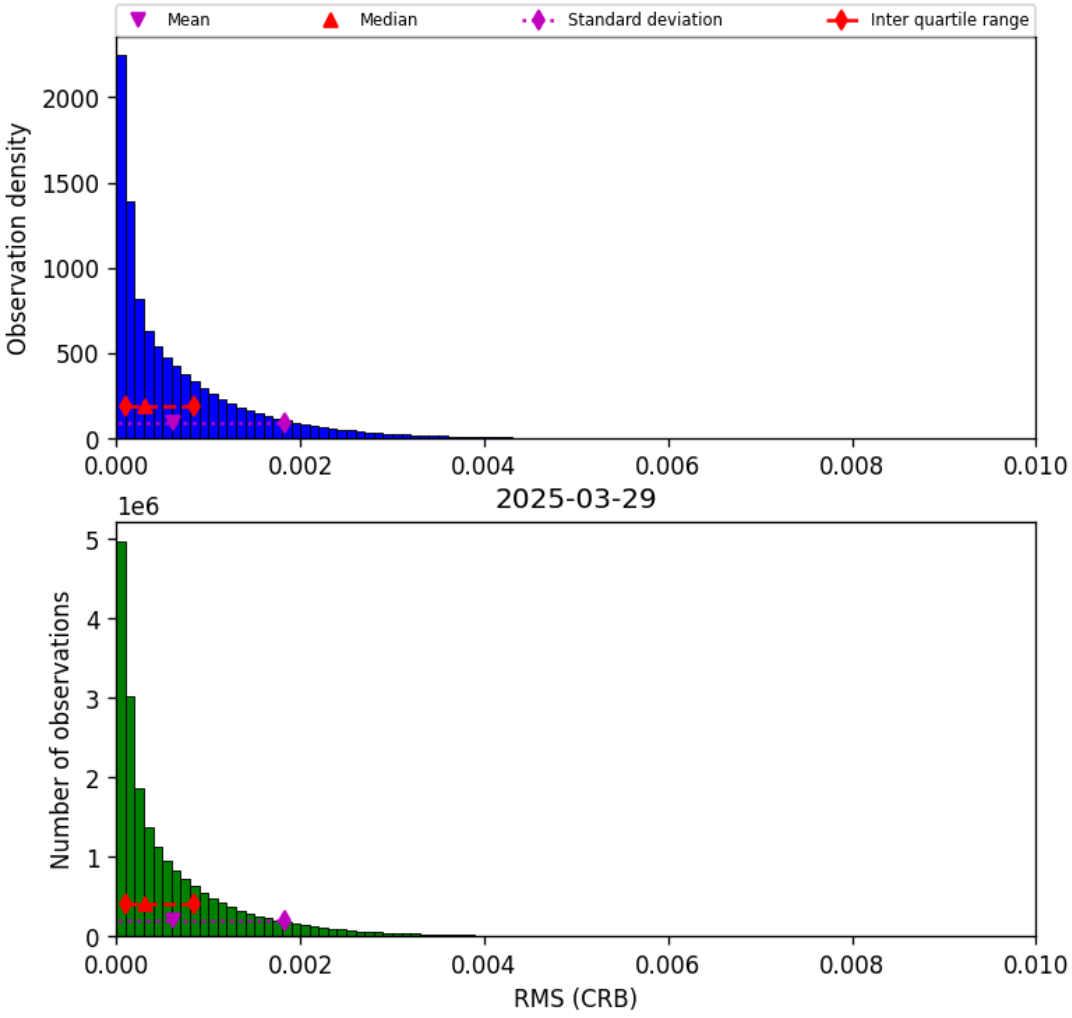


Figure 48: Histogram of “RMS (CRB)” for 2025-03-28 to 2025-03-30

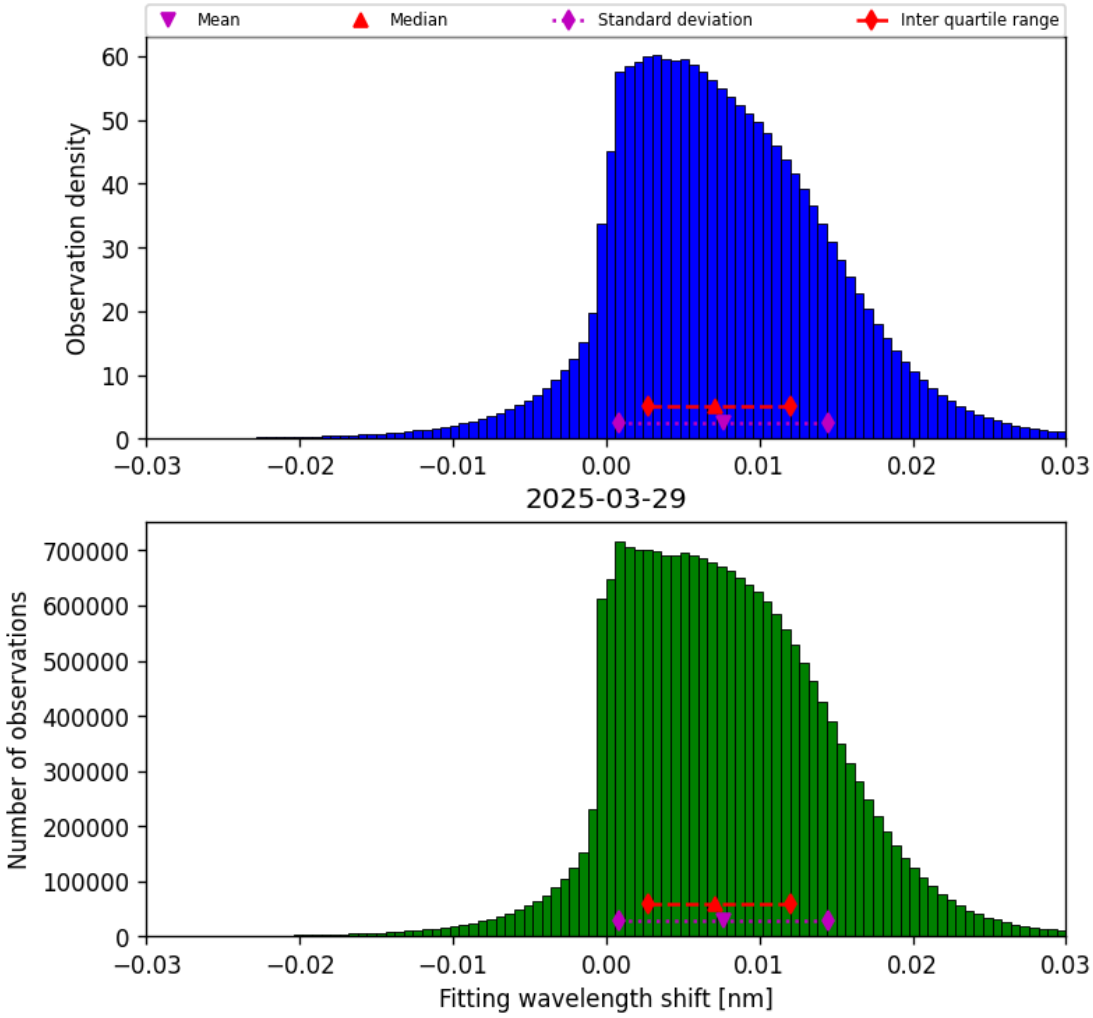


Figure 49: Histogram of “Fitting wavelength shift” for 2025-03-28 to 2025-03-30

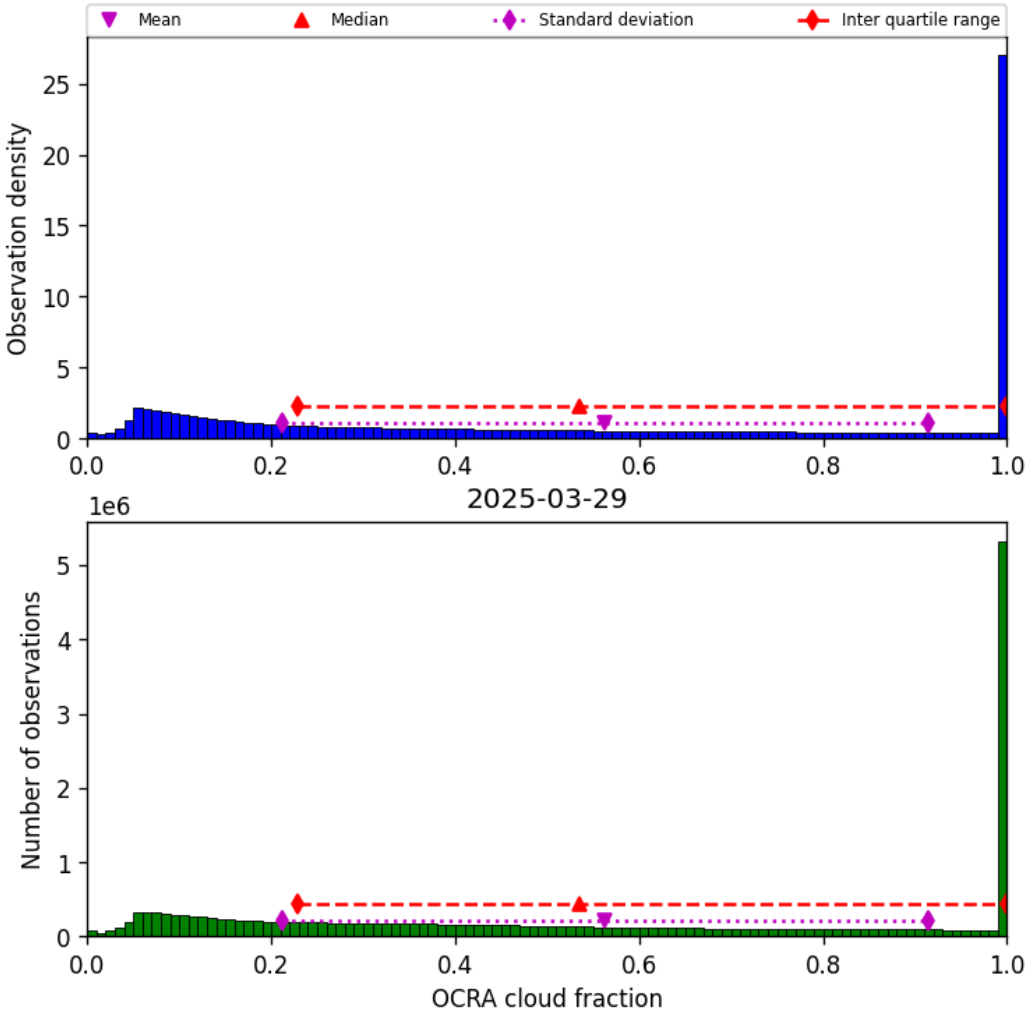


Figure 50: Histogram of “OCRA cloud fraction” for 2025-03-28 to 2025-03-30

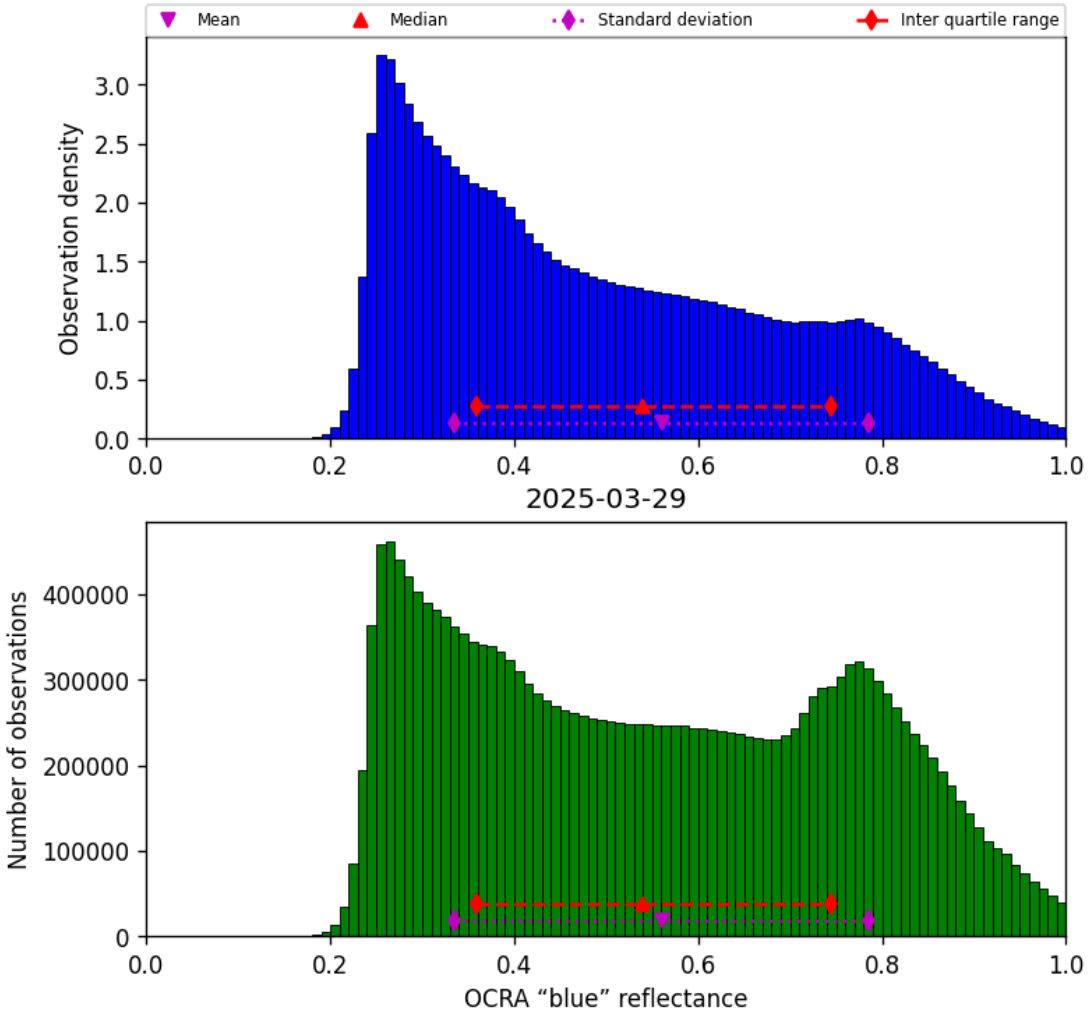


Figure 51: Histogram of “OCRA “blue” reflectance” for 2025-03-28 to 2025-03-30

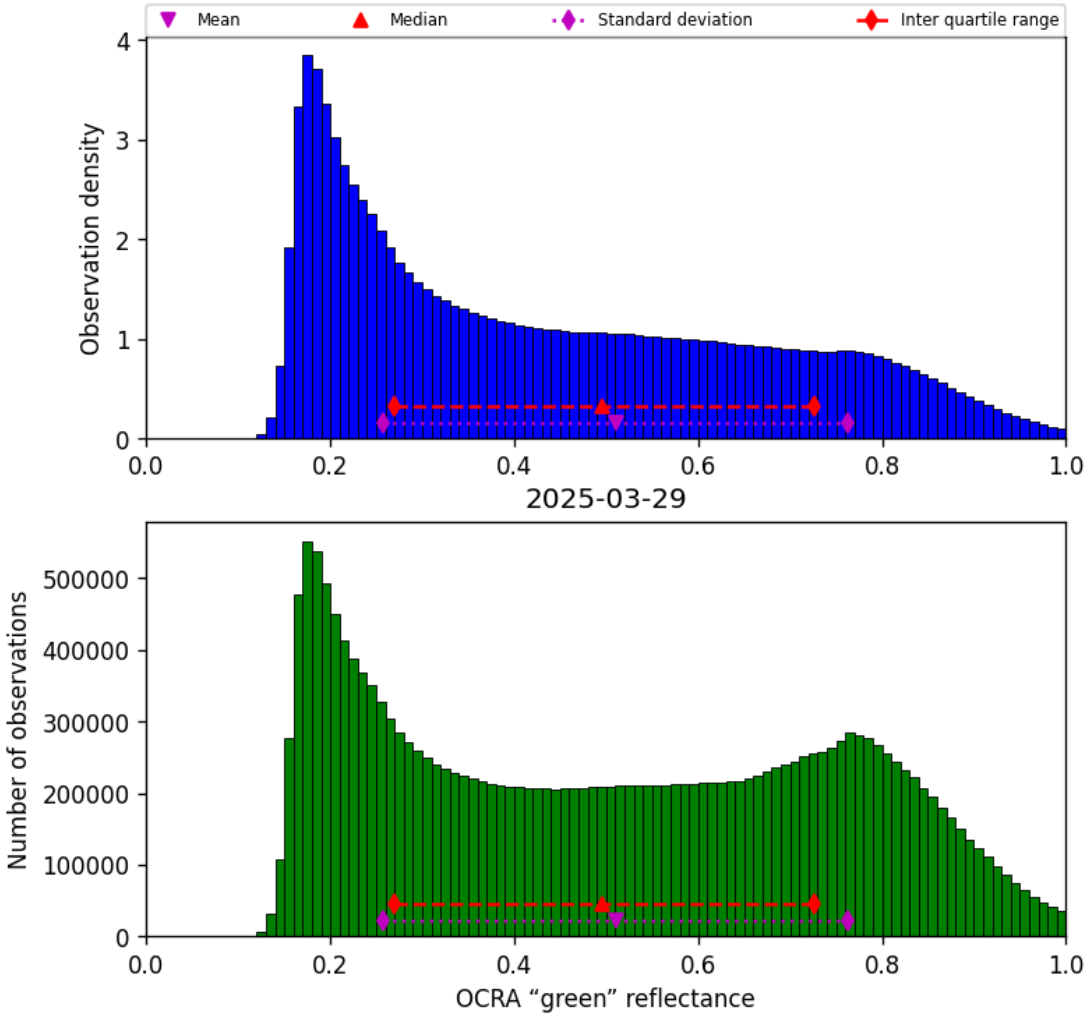


Figure 52: Histogram of “OCRA “green” reflectance” for 2025-03-28 to 2025-03-30

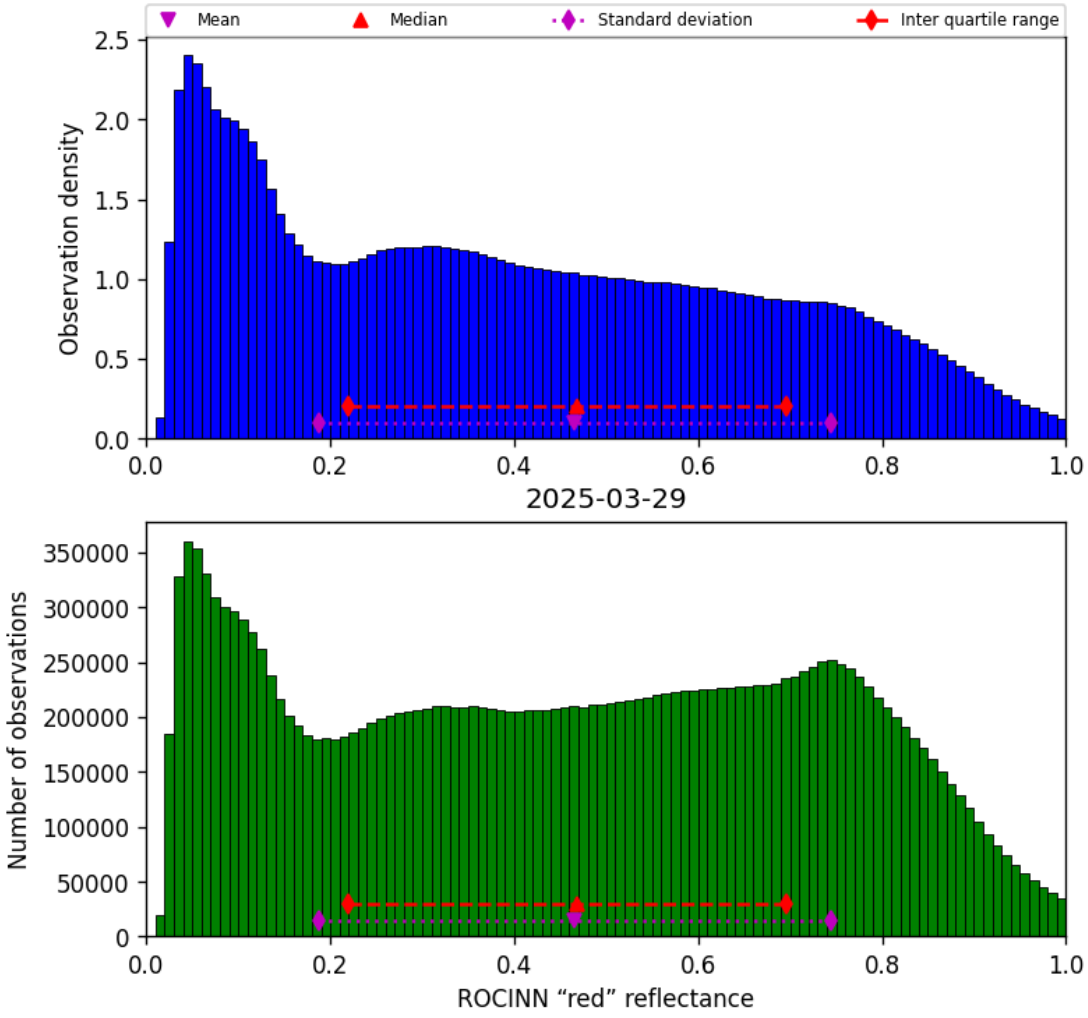


Figure 53: Histogram of “ROCINN “red” reflectance” for 2025-03-28 to 2025-03-30

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.

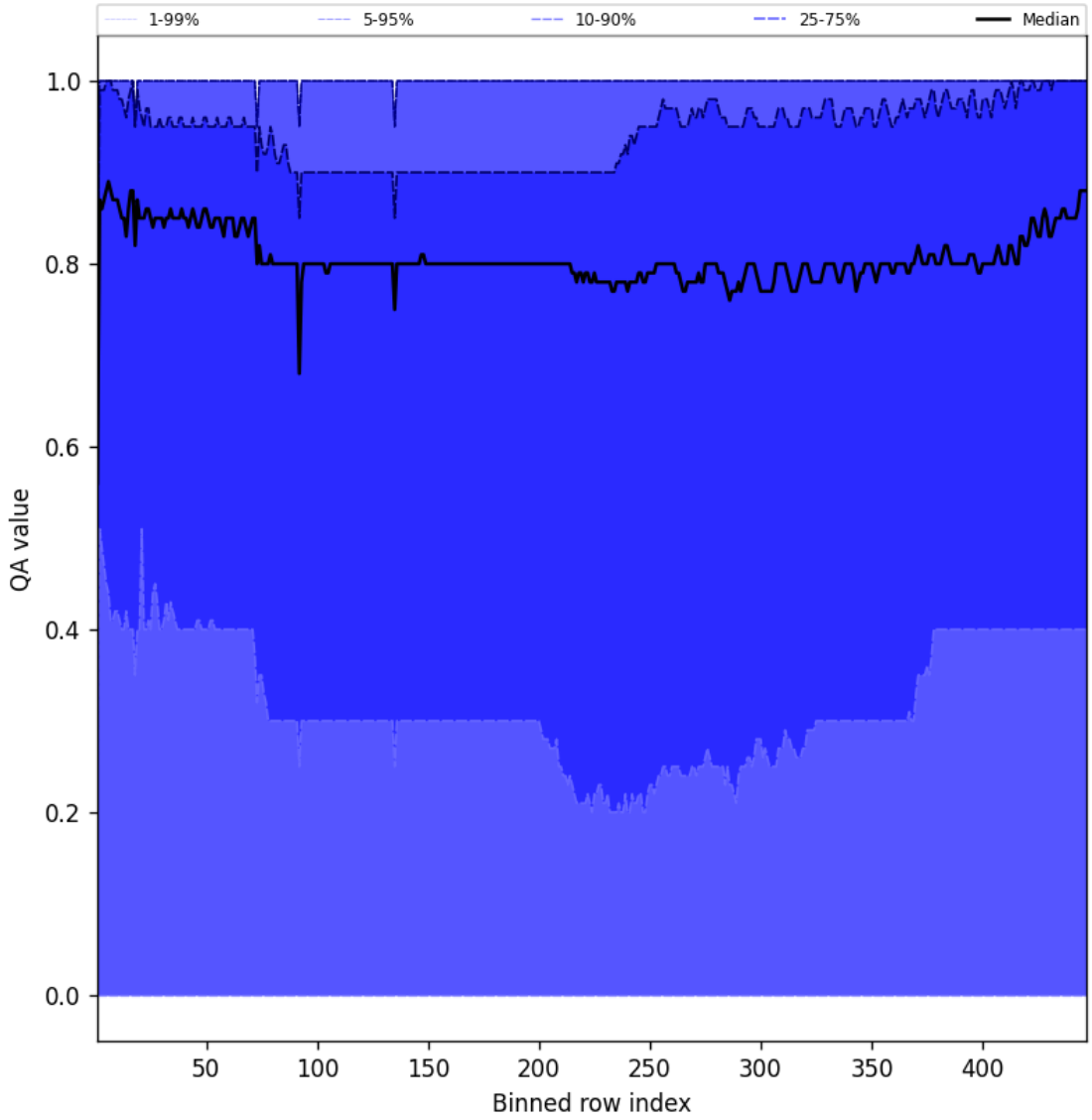


Figure 54: Along track statistics of “QA value” for 2025-03-28 to 2025-03-30

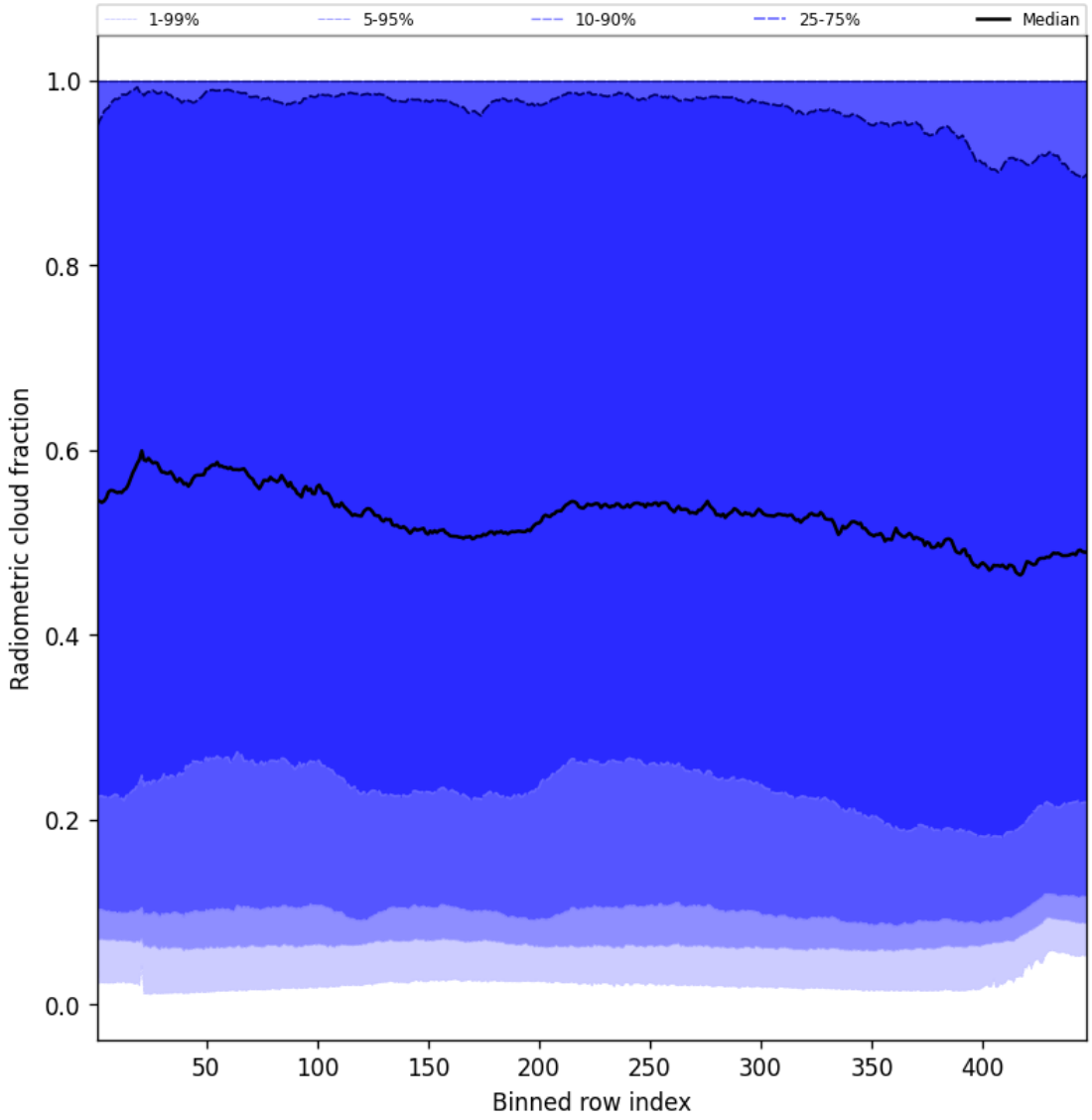


Figure 55: Along track statistics of “Radiometric cloud fraction” for 2025-03-28 to 2025-03-30

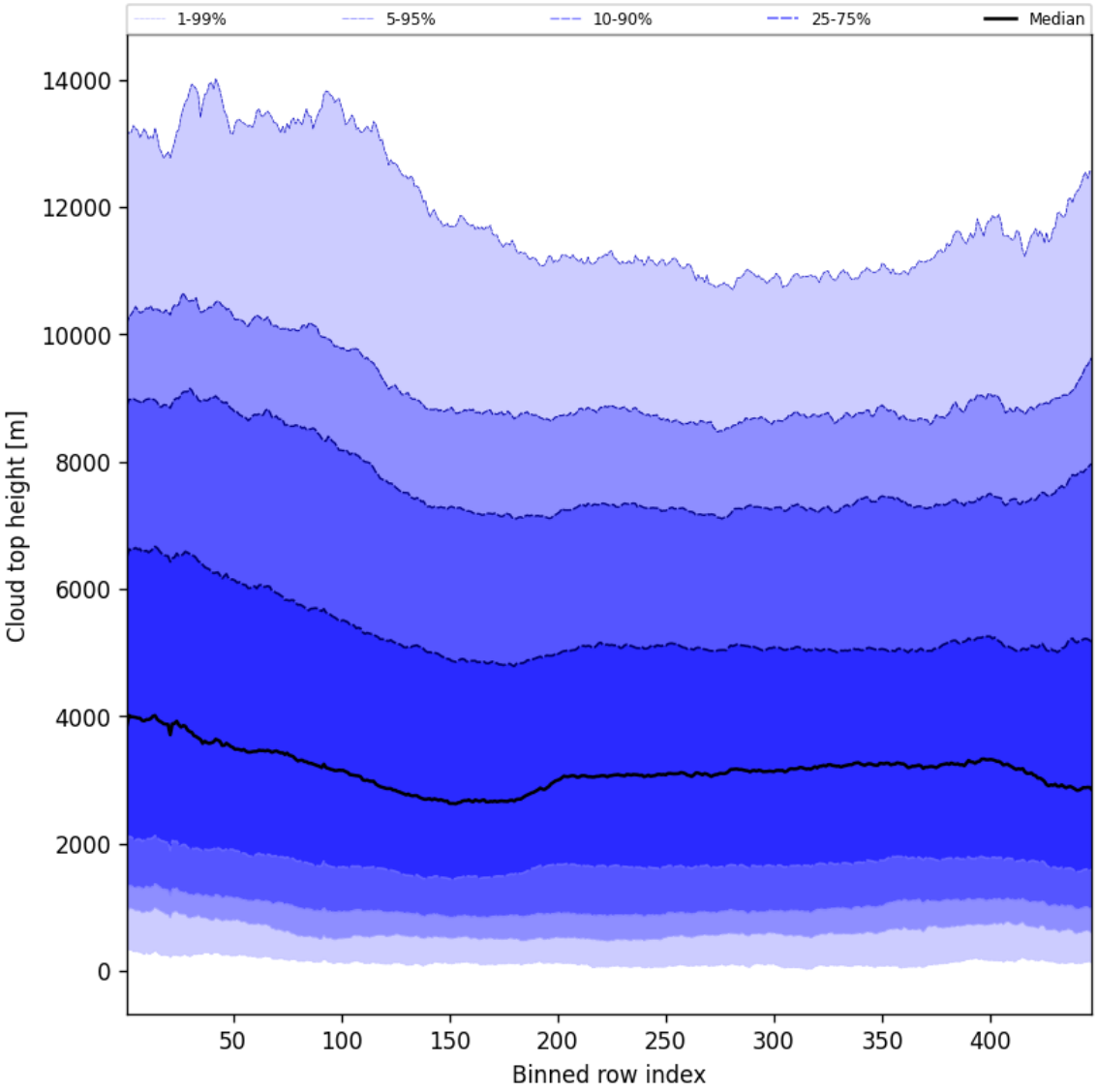


Figure 56: Along track statistics of “Cloud top height” for 2025-03-28 to 2025-03-30

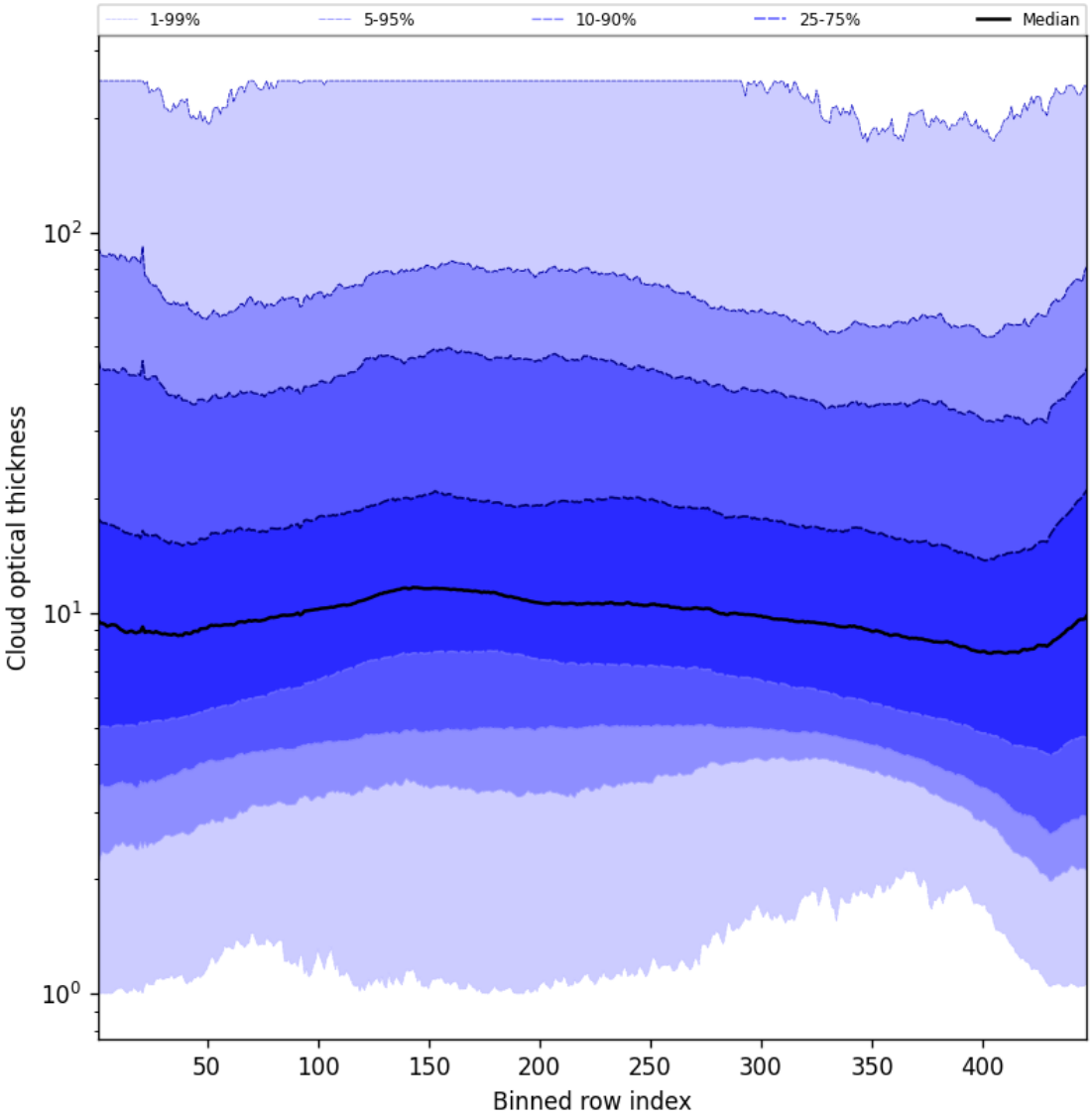


Figure 57: Along track statistics of “Cloud optical thickness” for 2025-03-28 to 2025-03-30

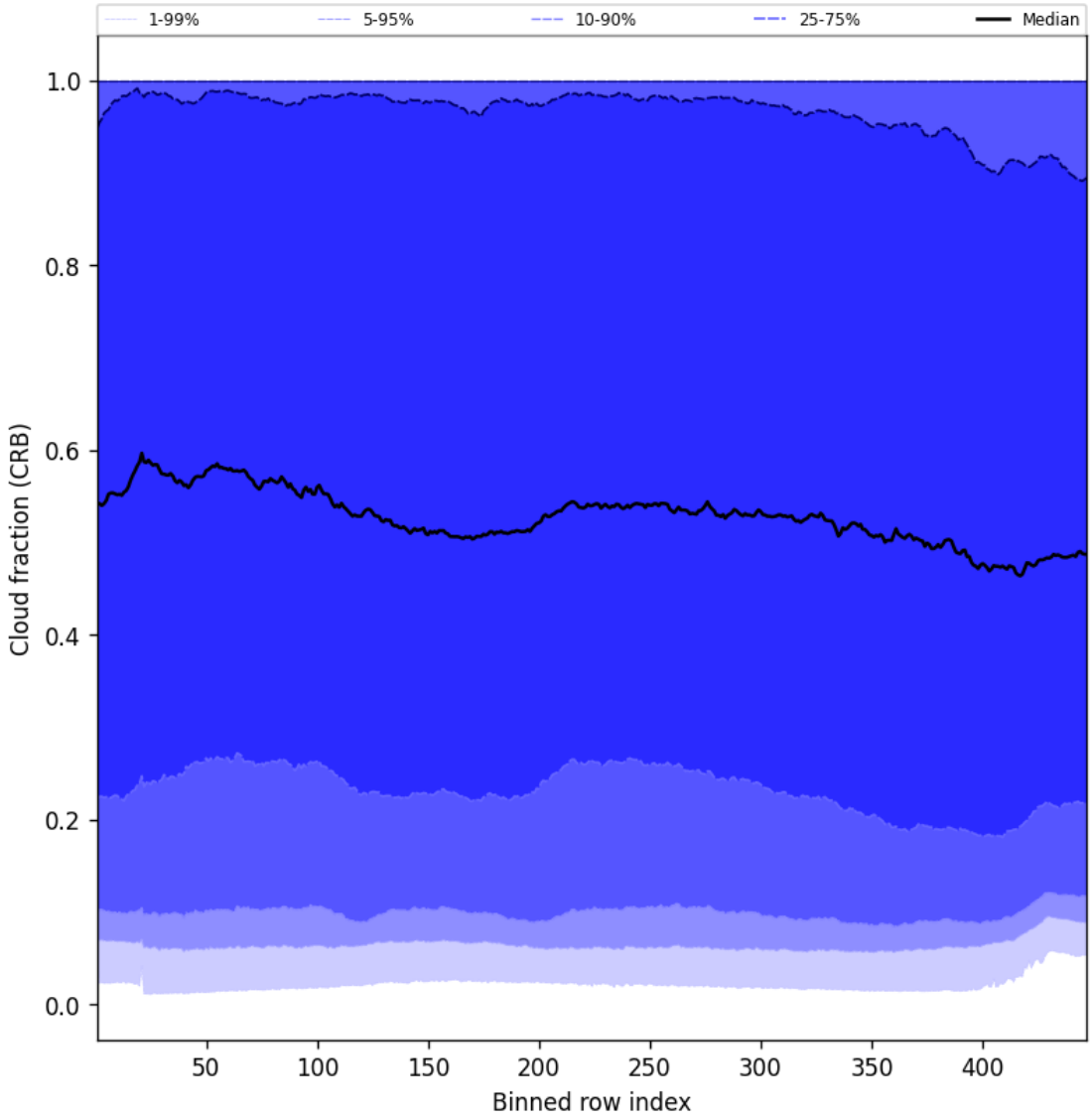


Figure 58: Along track statistics of “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30

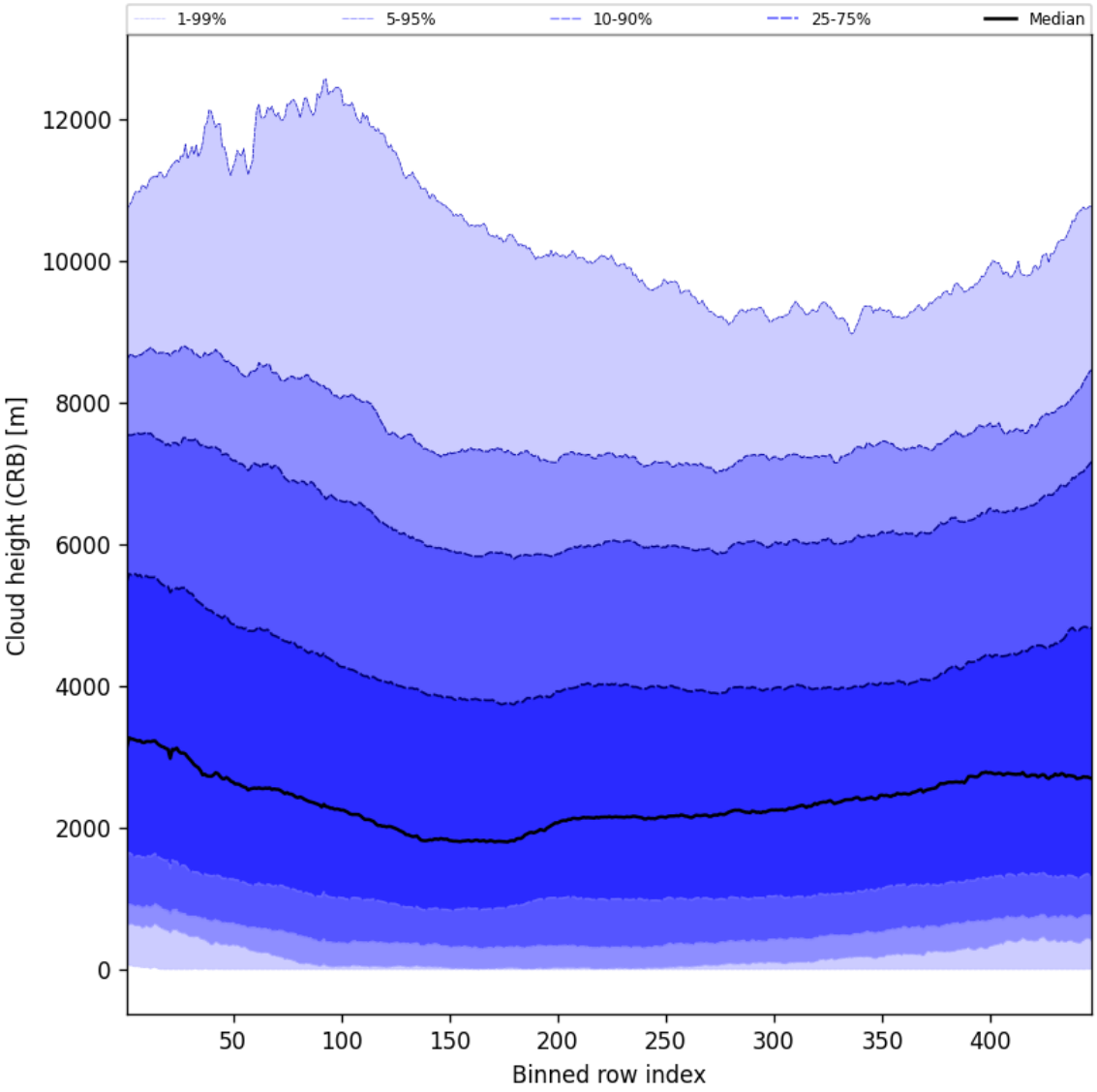


Figure 59: Along track statistics of “Cloud height (CRB)” for 2025-03-28 to 2025-03-30

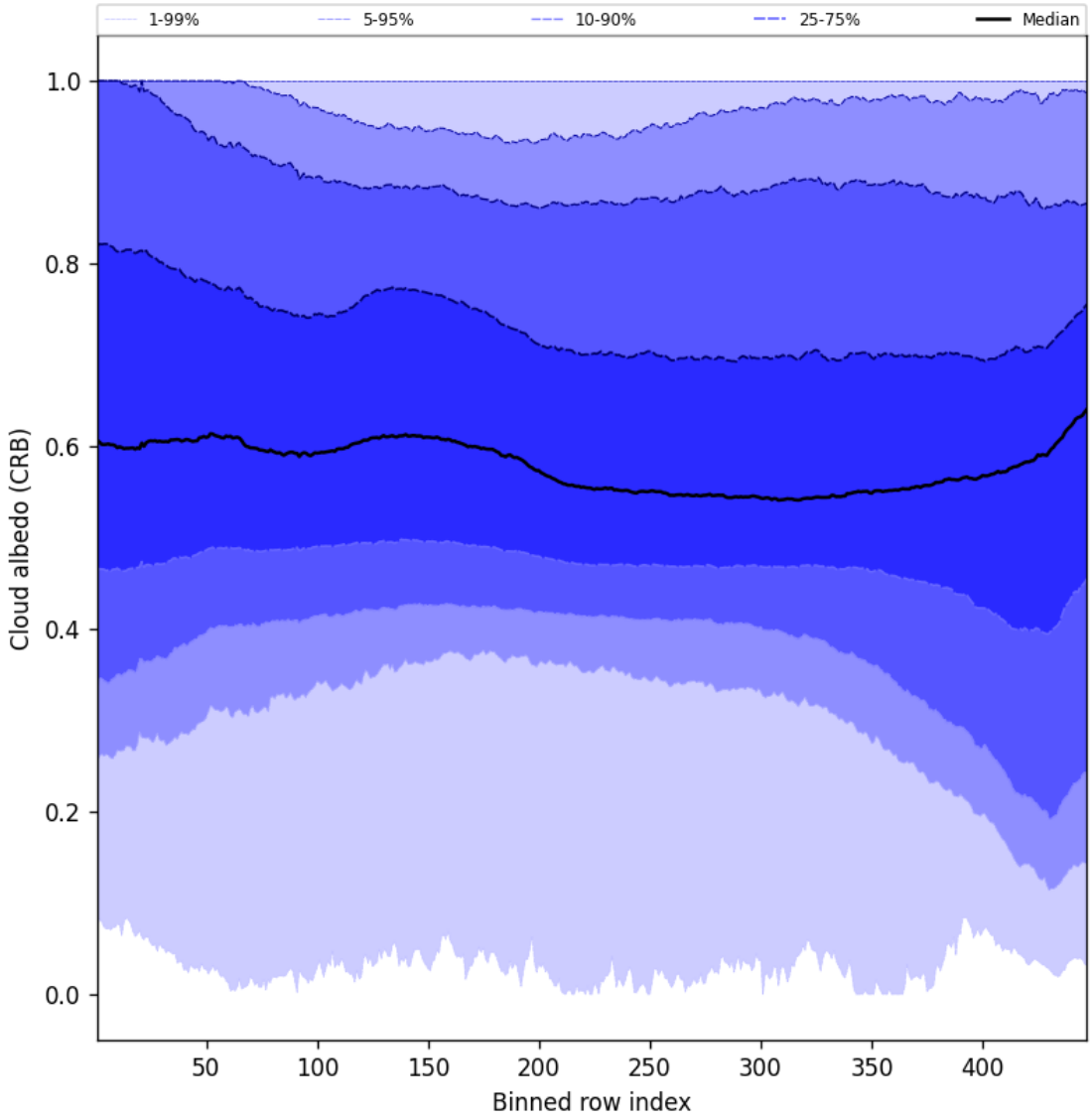


Figure 60: Along track statistics of “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30

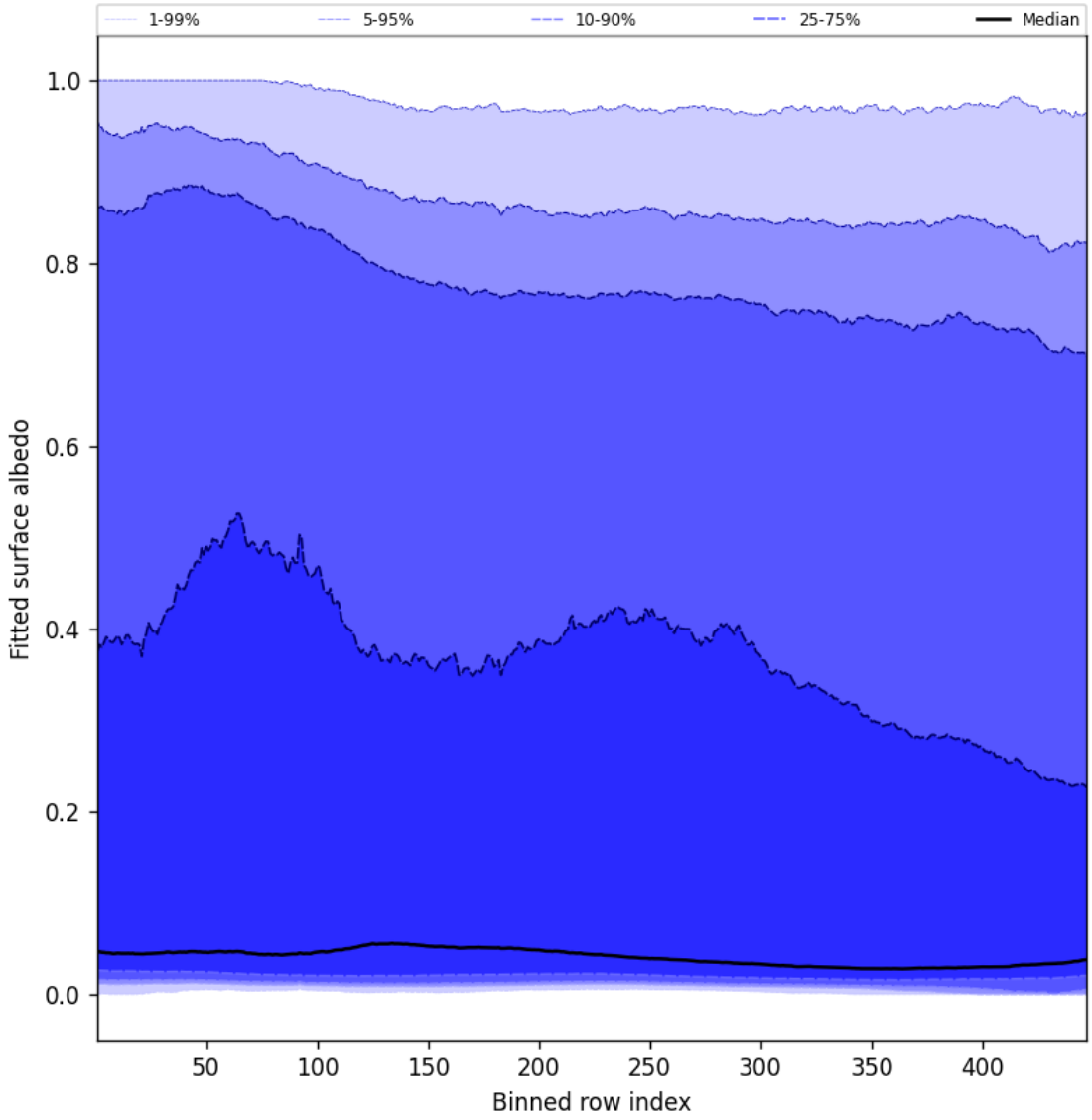


Figure 61: Along track statistics of “Fitted surface albedo” for 2025-03-28 to 2025-03-30

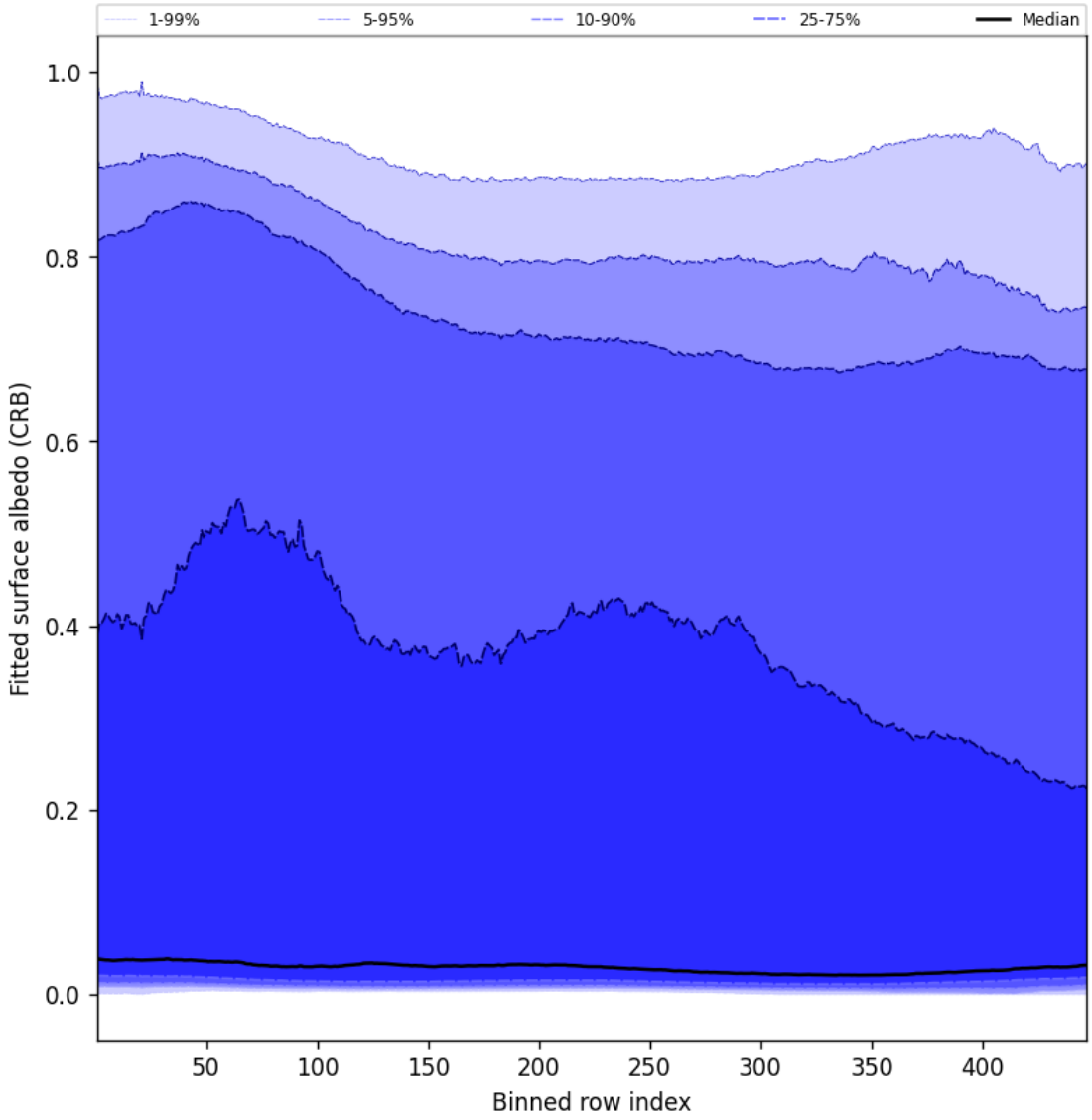


Figure 62: Along track statistics of “Fitted surface albedo (CRB)” for 2025-03-28 to 2025-03-30

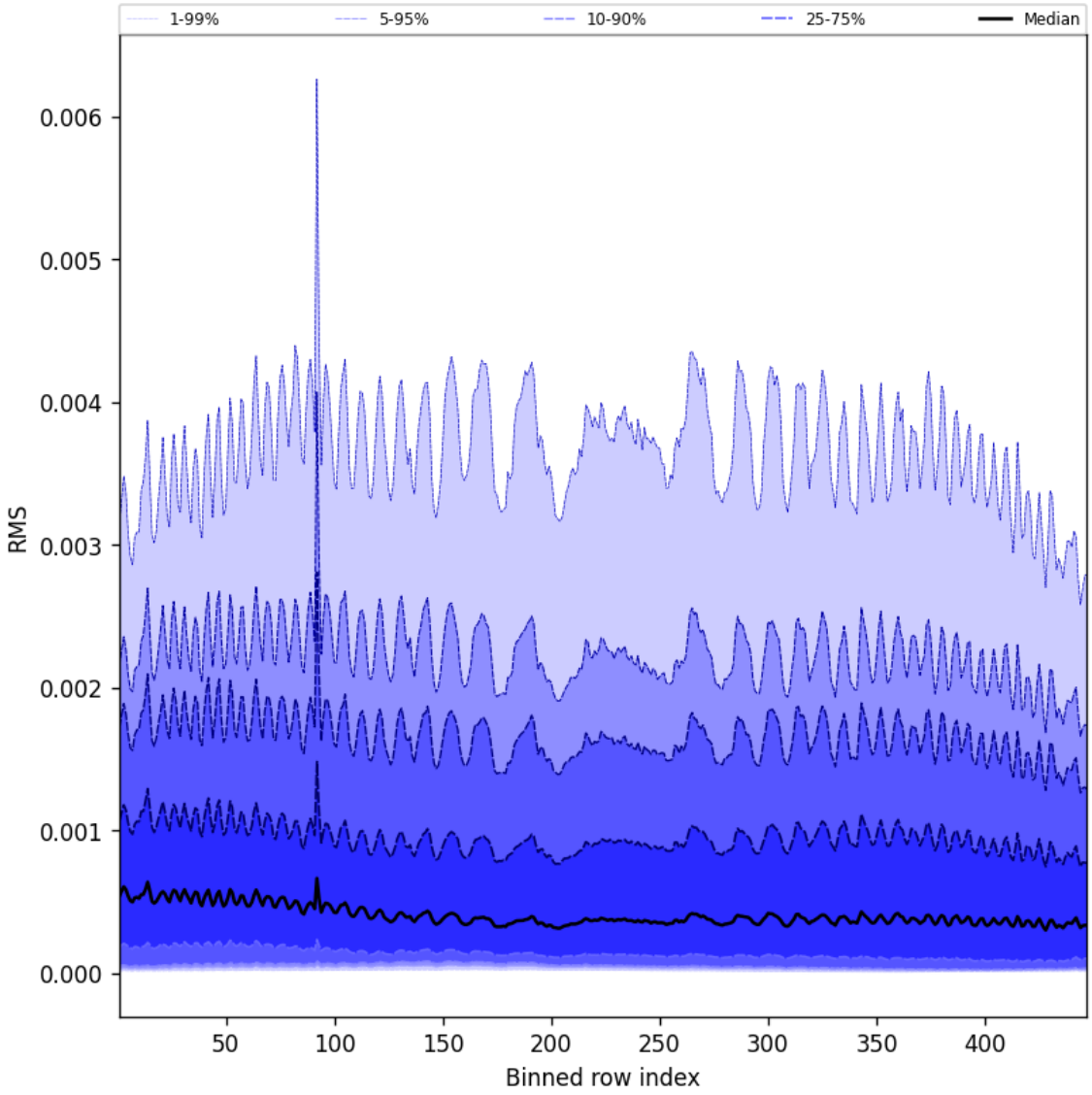


Figure 63: Along track statistics of “RMS” for 2025-03-28 to 2025-03-30

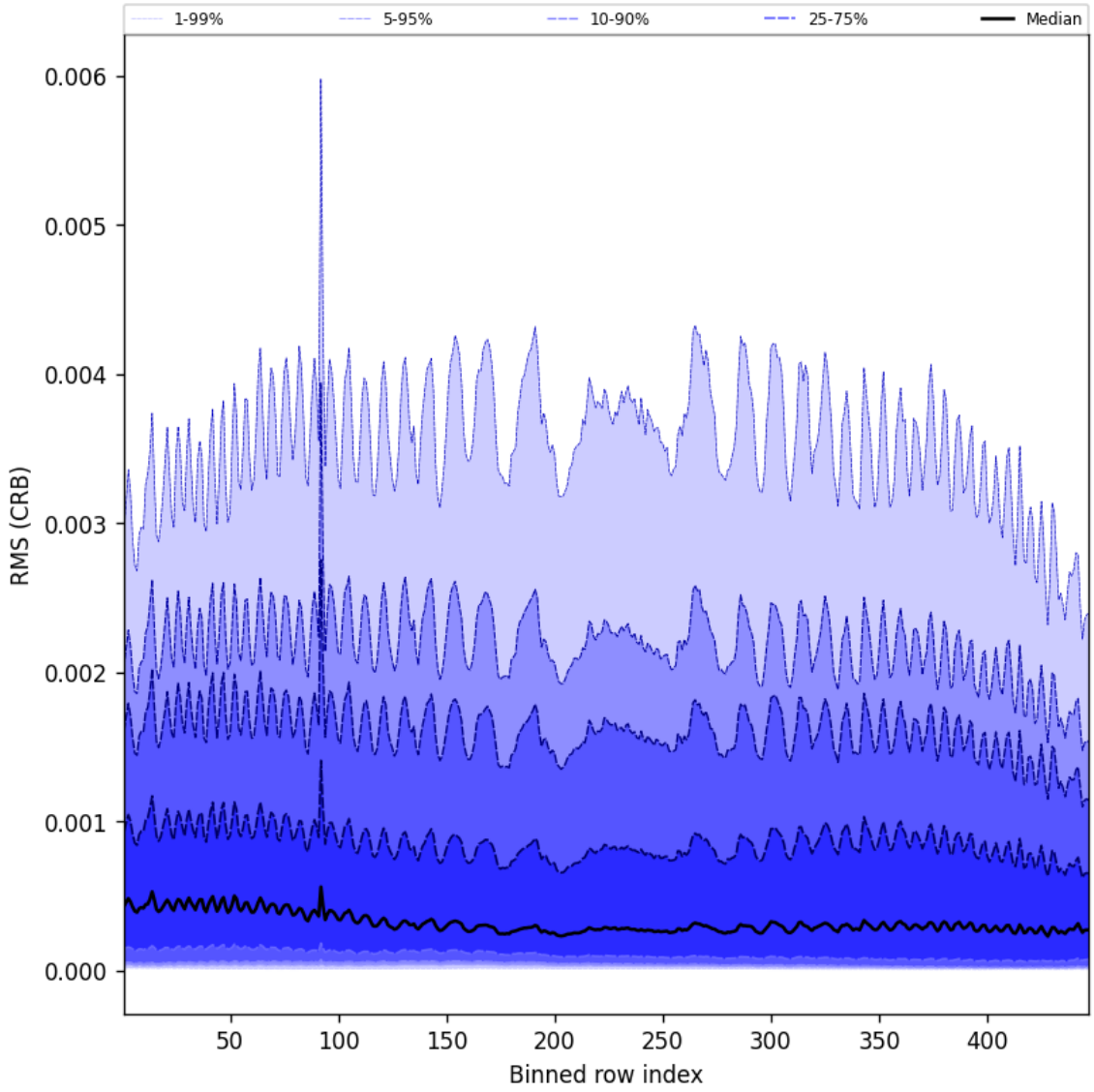


Figure 64: Along track statistics of “RMS (CRB)” for 2025-03-28 to 2025-03-30

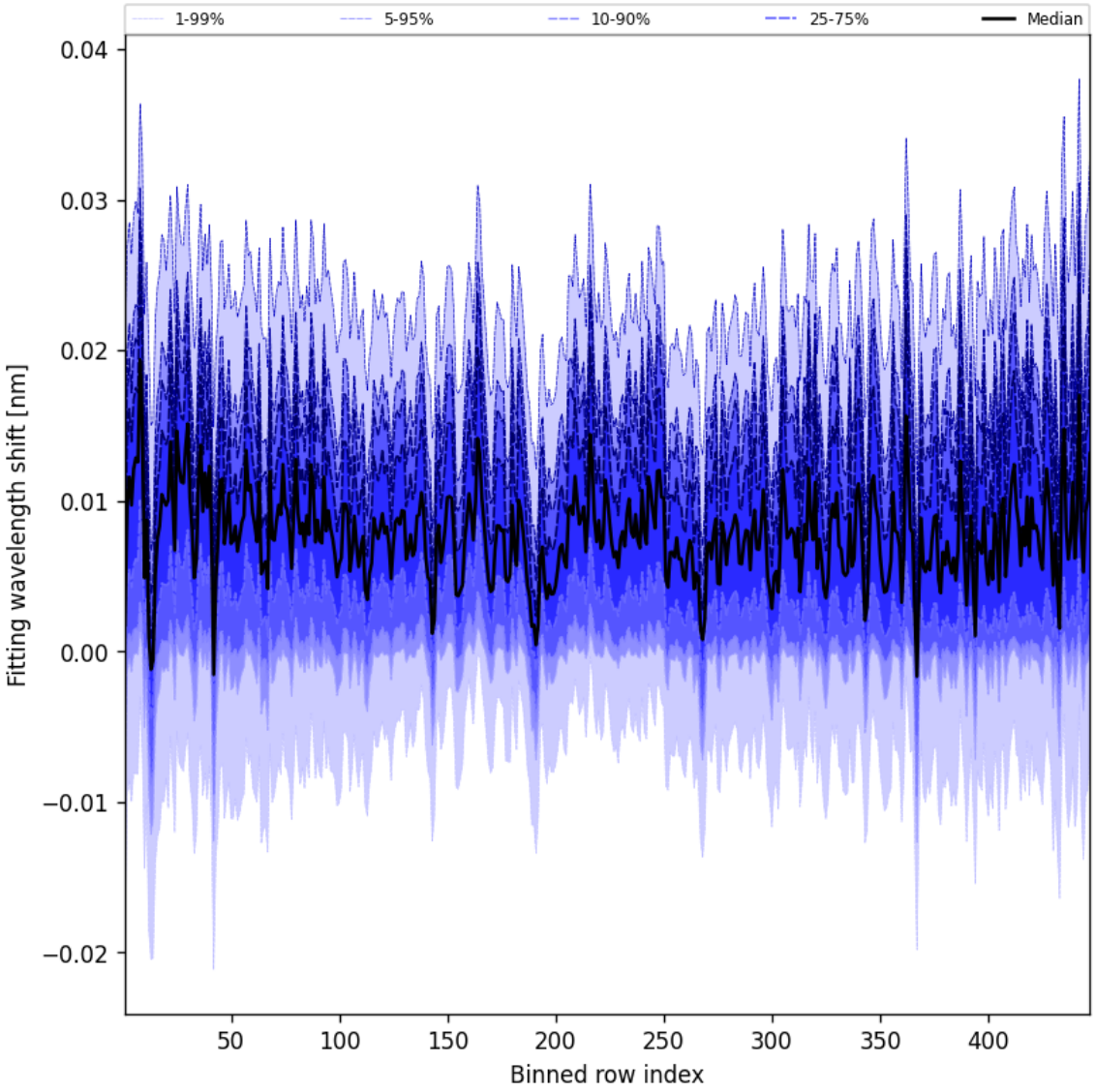


Figure 65: Along track statistics of “Fitting wavelength shift” for 2025-03-28 to 2025-03-30

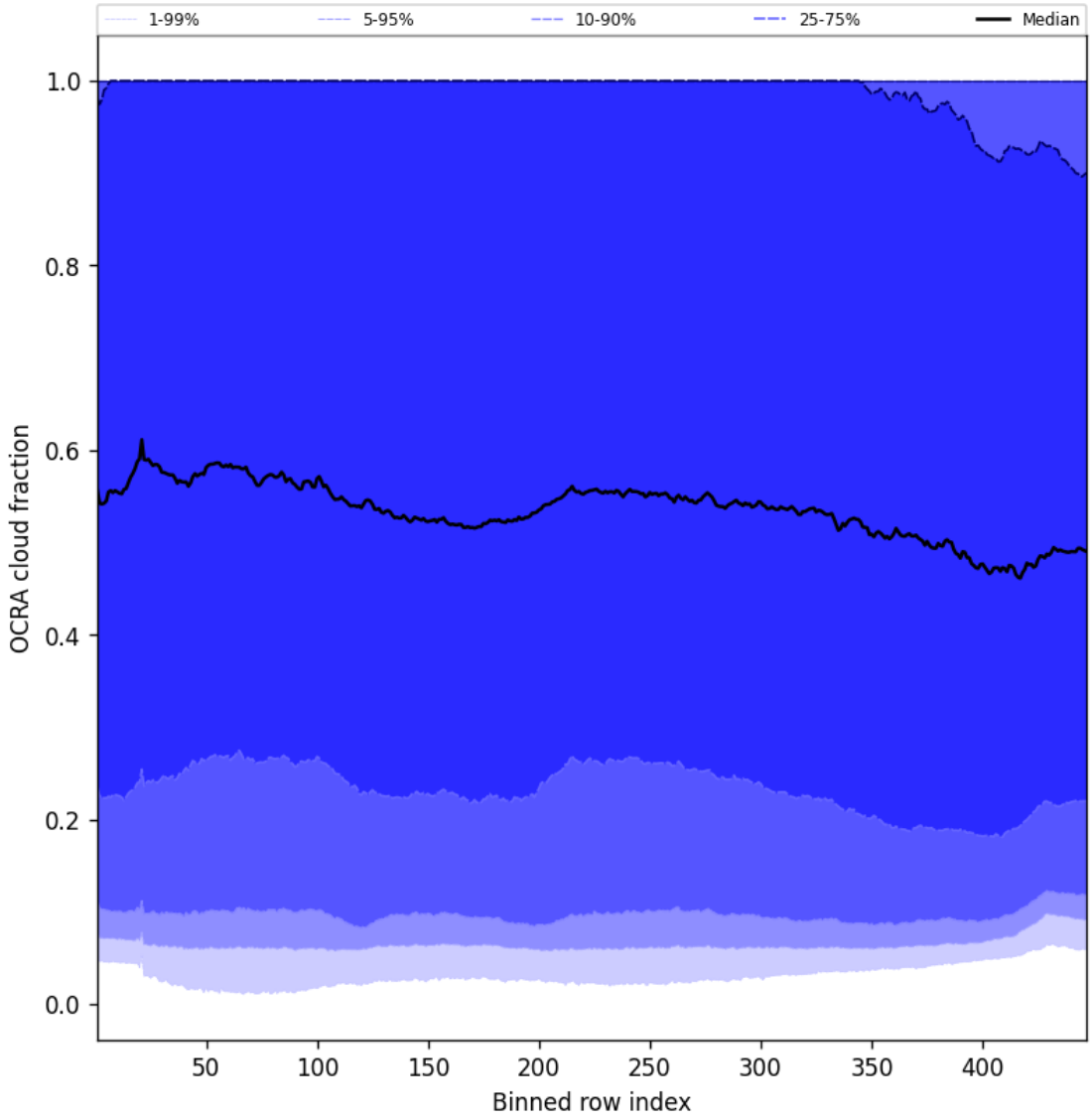


Figure 66: Along track statistics of “OCRA cloud fraction” for 2025-03-28 to 2025-03-30

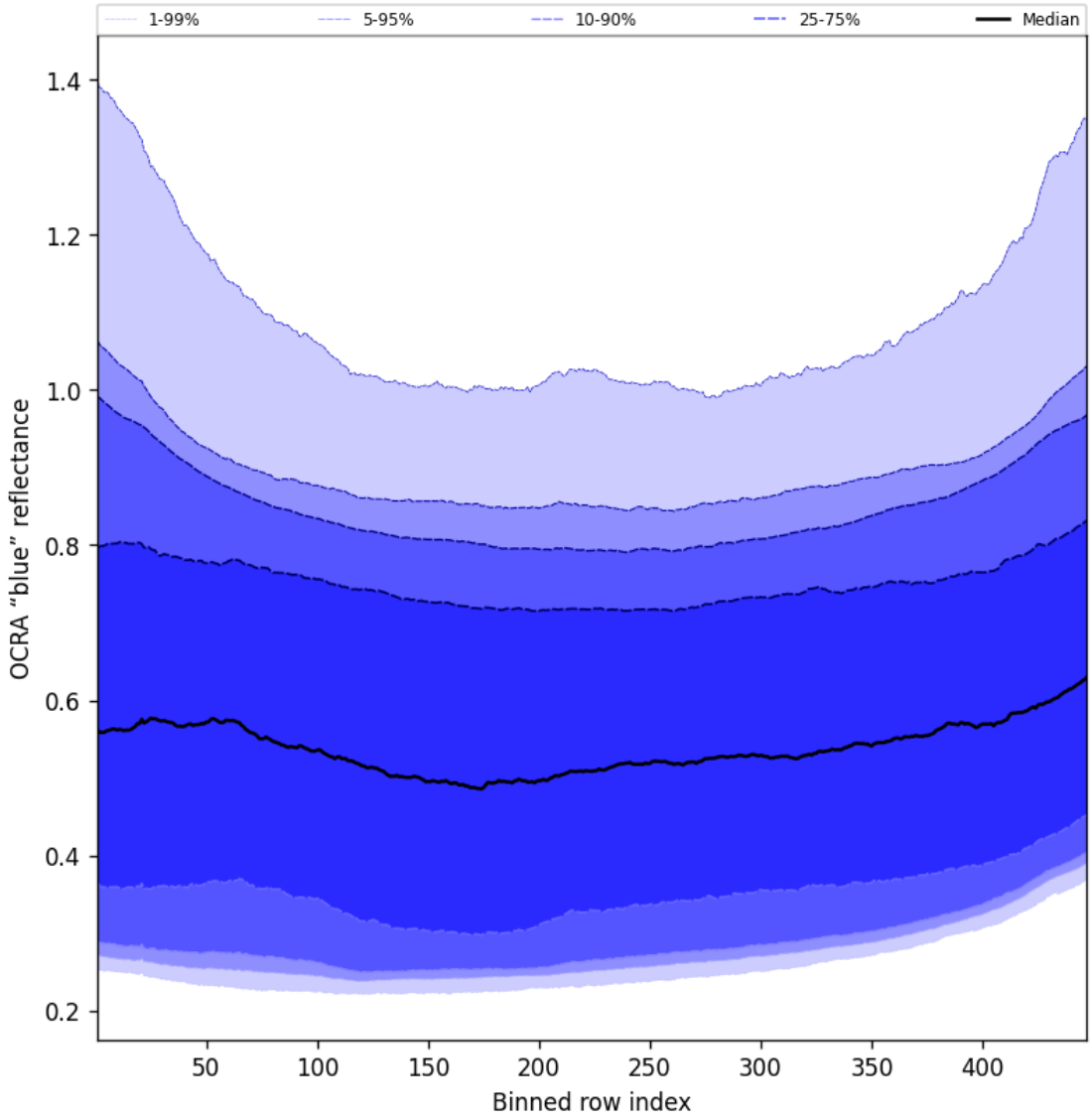


Figure 67: Along track statistics of “OCRA “blue” reflectance” for 2025-03-28 to 2025-03-30

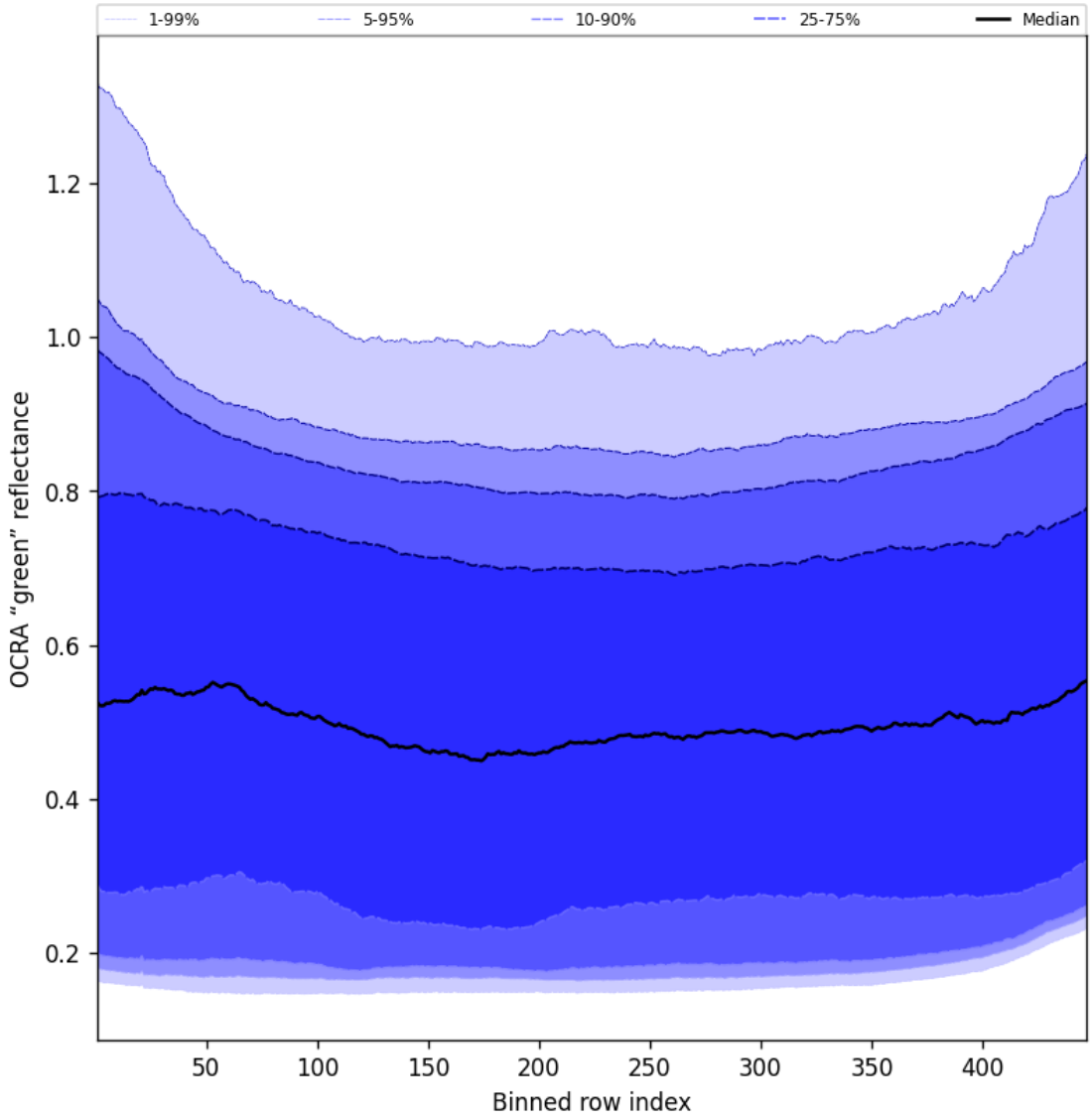


Figure 68: Along track statistics of "OCRA "green" reflectance" for 2025-03-28 to 2025-03-30

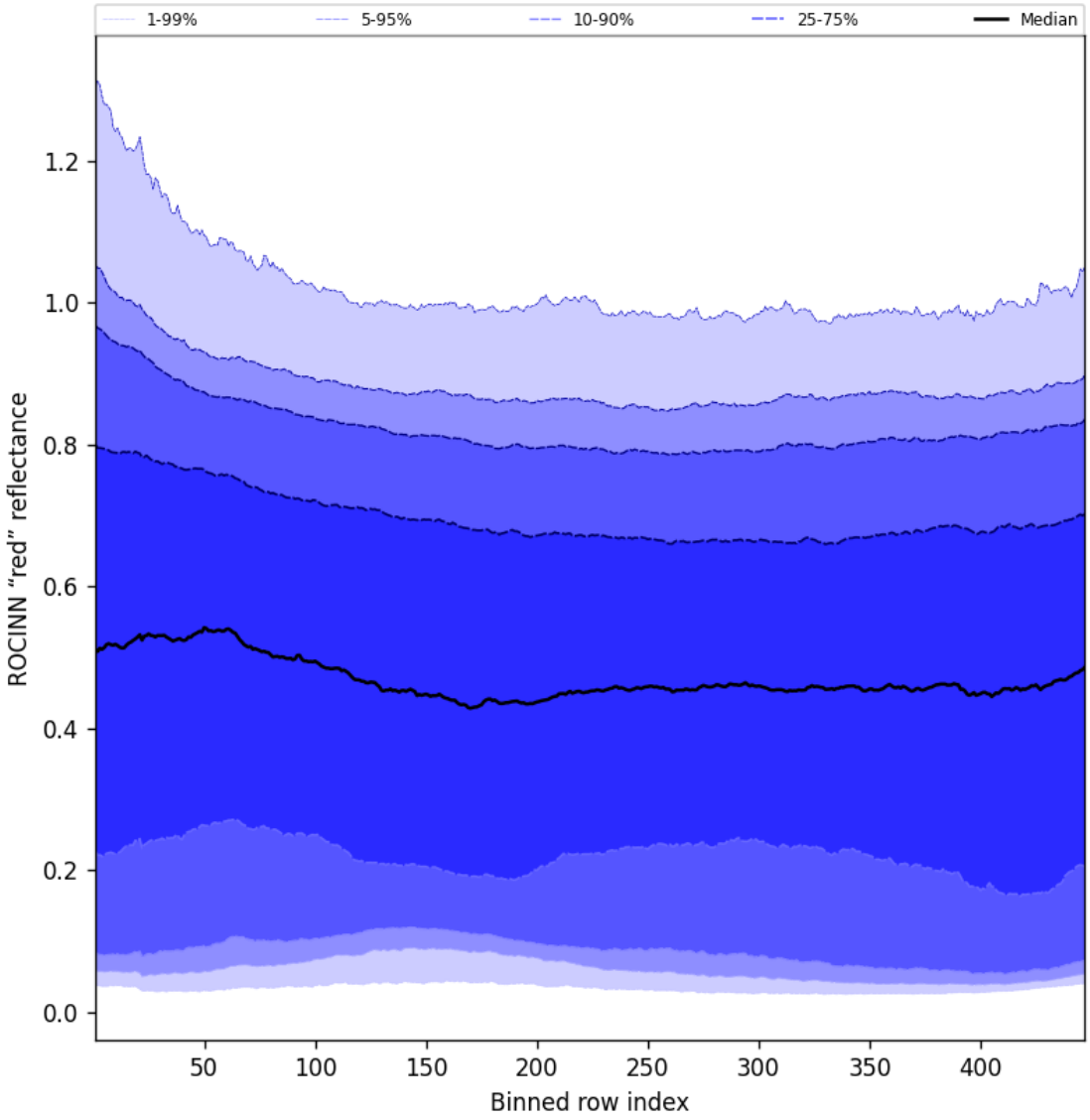


Figure 69: Along track statistics of “ROCINN “red” reflectance” for 2025-03-28 to 2025-03-30

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.

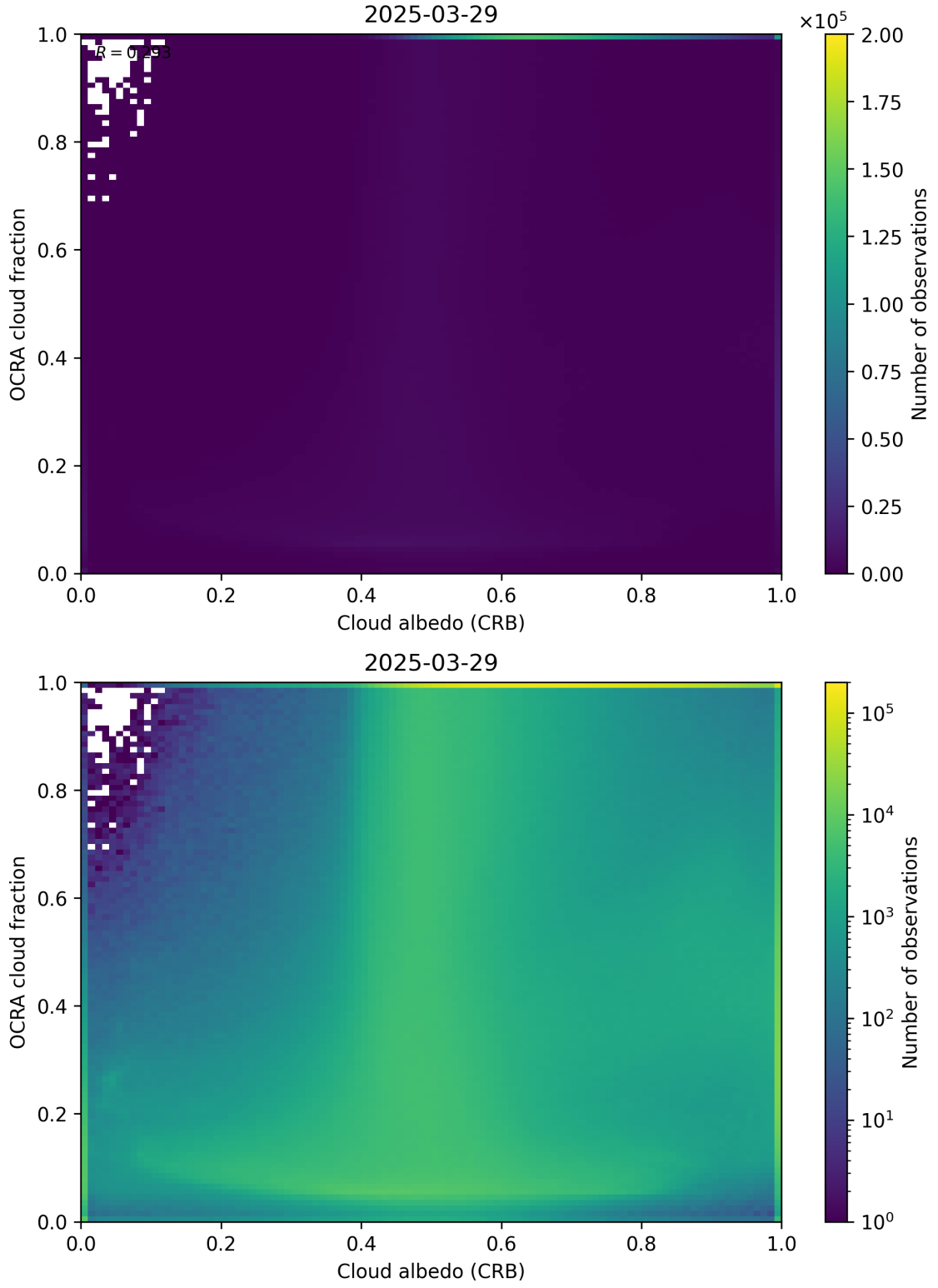


Figure 70: Scatter density plot of “Cloud albedo (CRB)” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

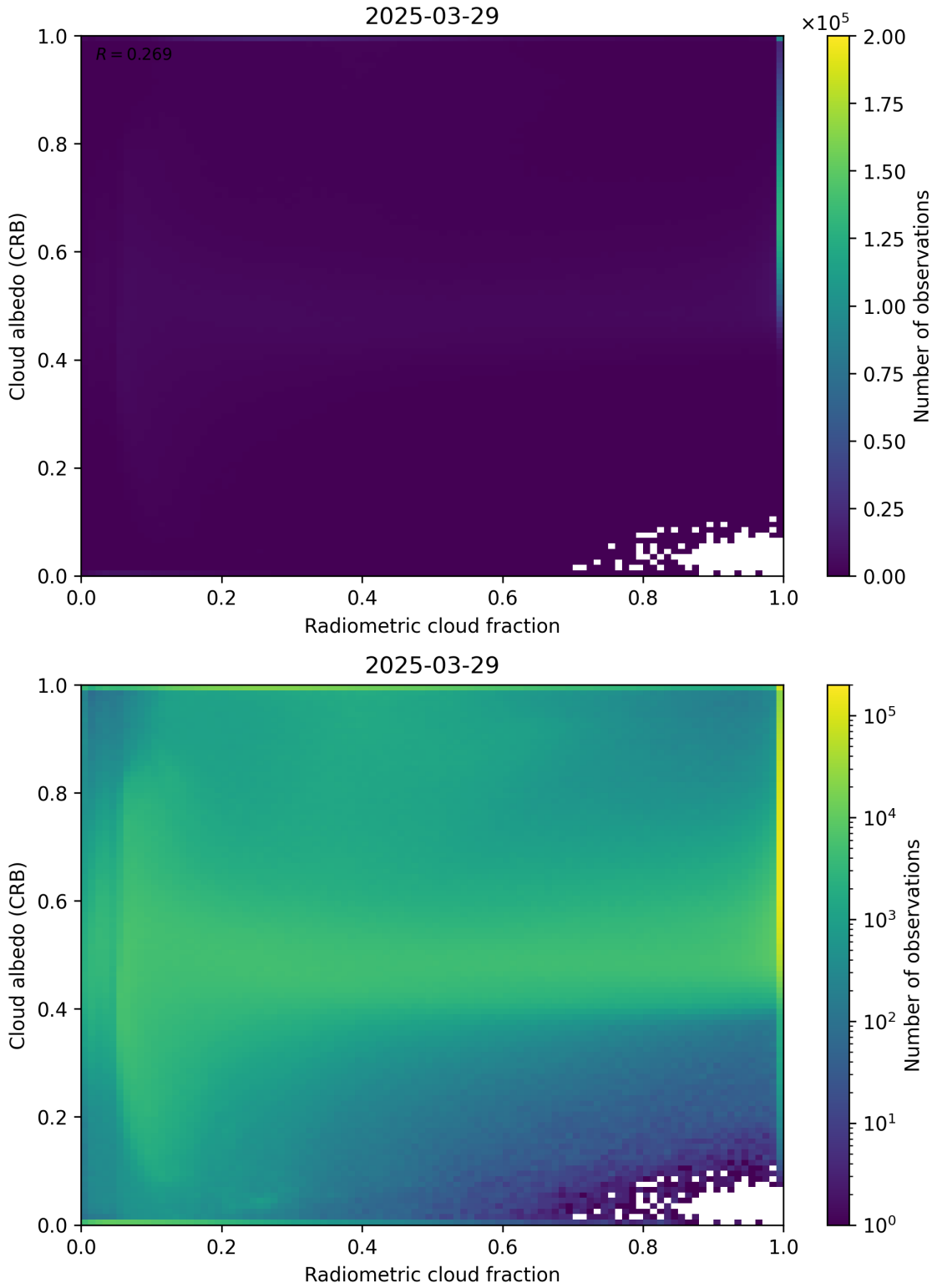


Figure 71: Scatter density plot of “Radiometric cloud fraction” against “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

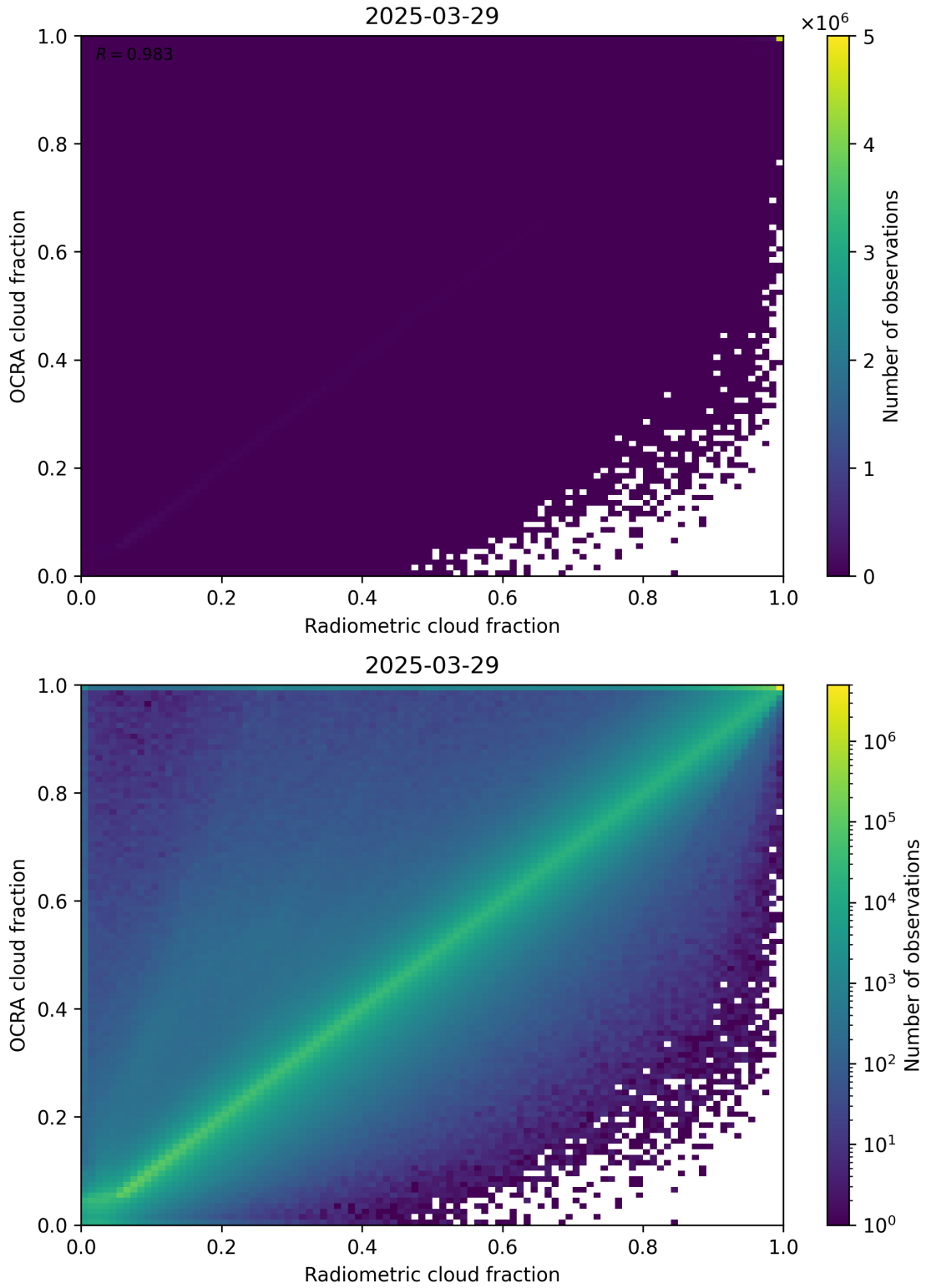


Figure 72: Scatter density plot of “Radiometric cloud fraction” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

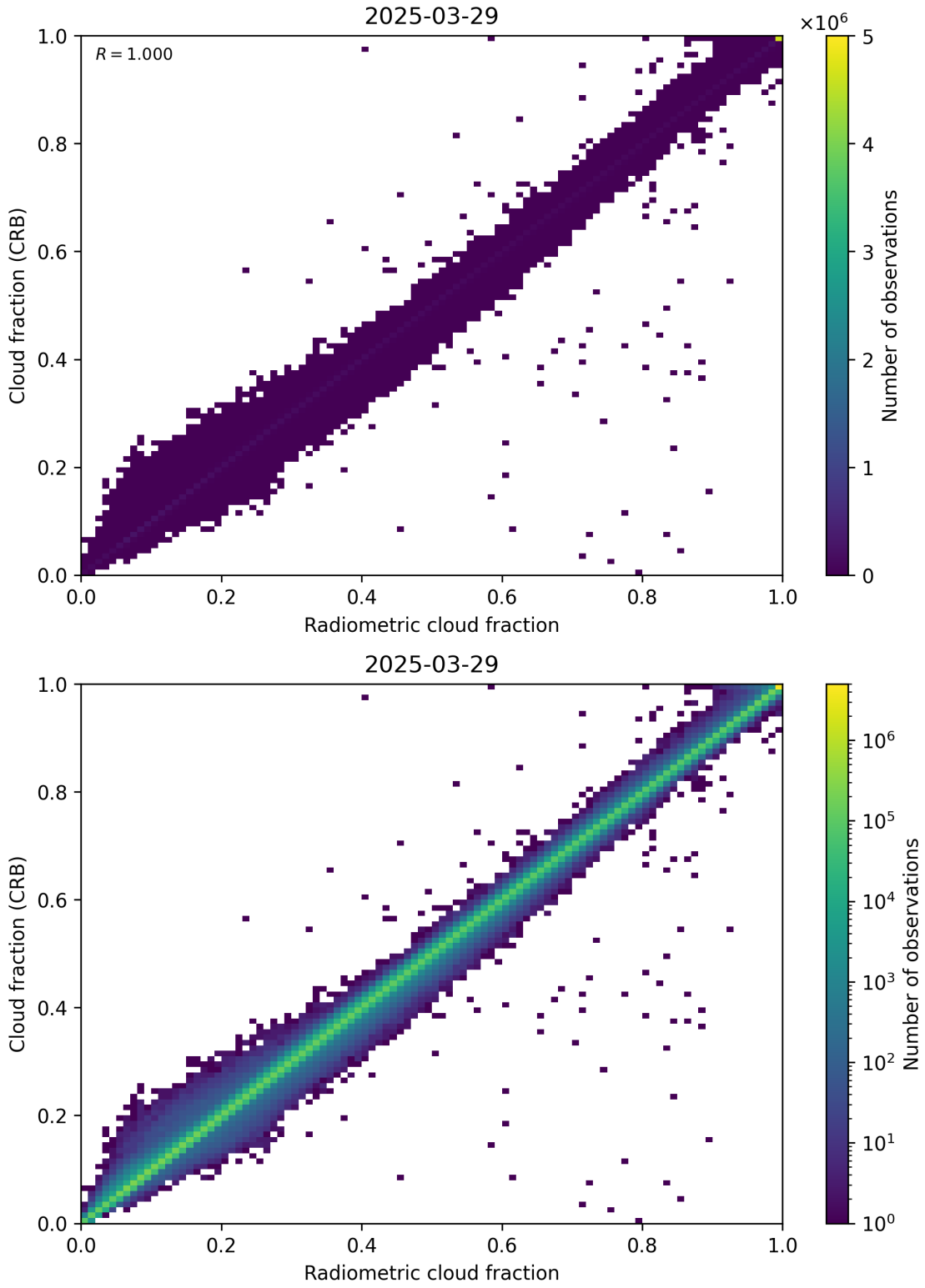


Figure 73: Scatter density plot of “Radiometric cloud fraction” against “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30.

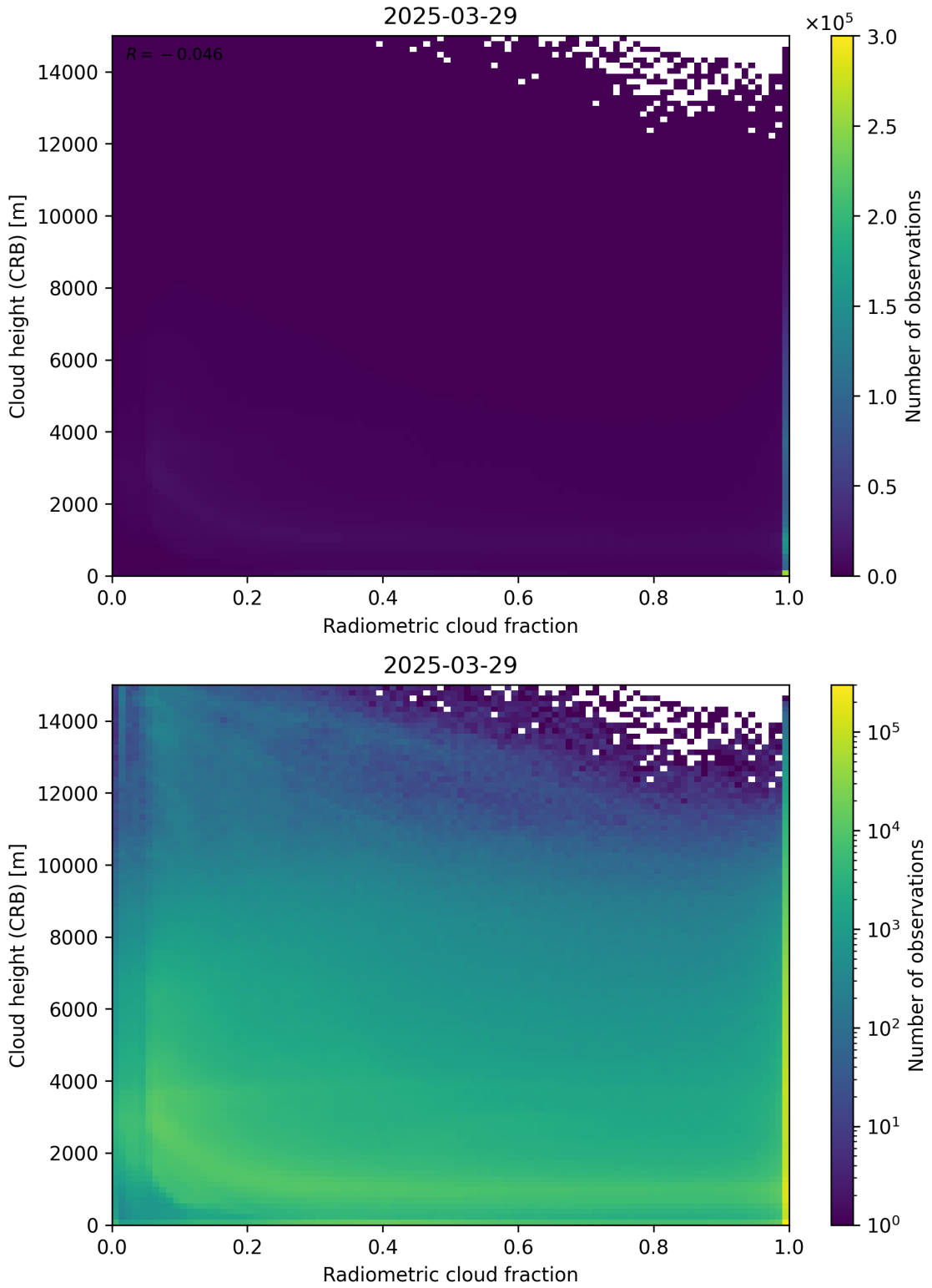


Figure 74: Scatter density plot of “Radiometric cloud fraction” against “Cloud height (CRB)” for 2025-03-28 to 2025-03-30.

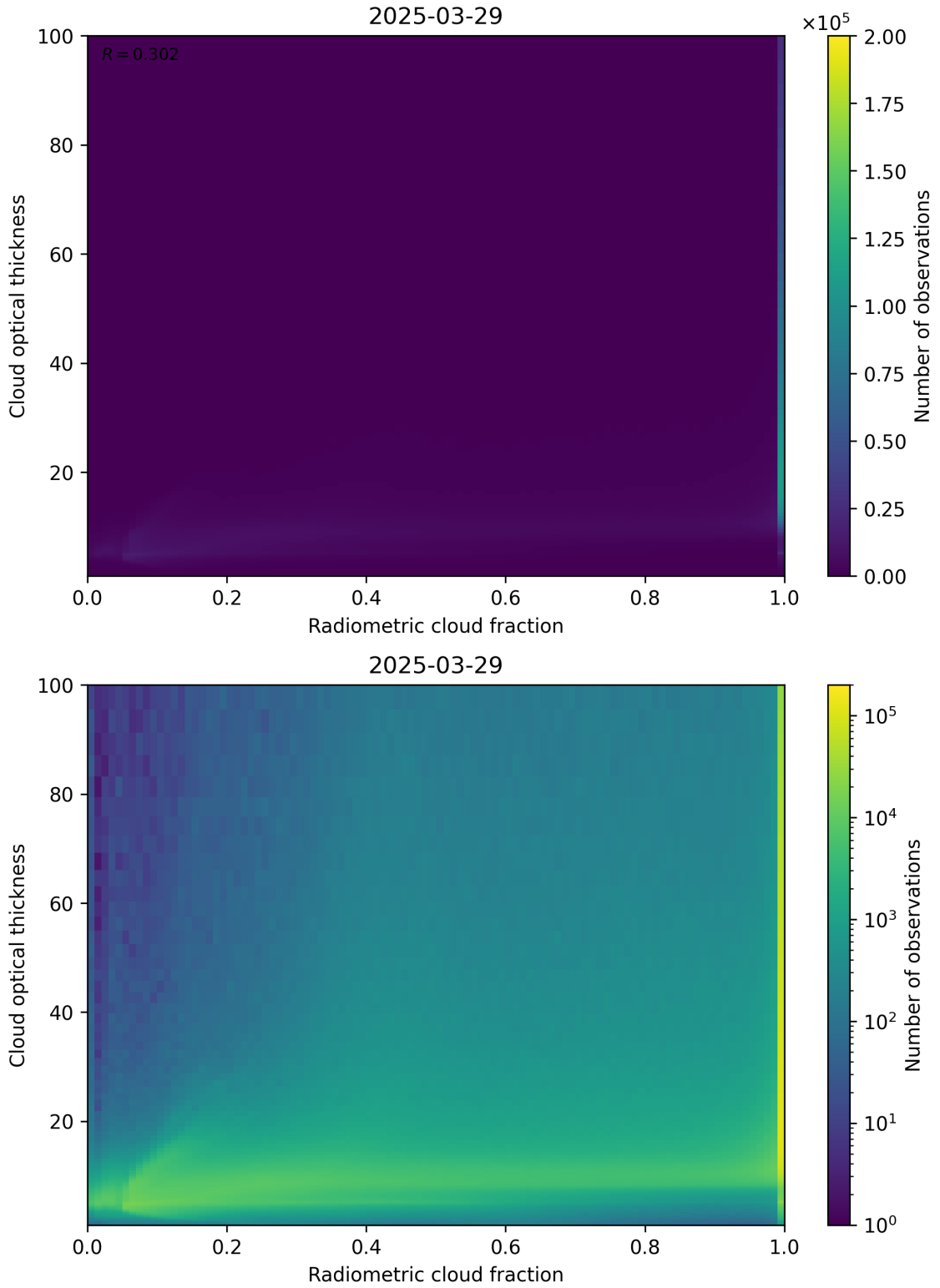


Figure 75: Scatter density plot of “Radiometric cloud fraction” against “Cloud optical thickness” for 2025-03-28 to 2025-03-30.

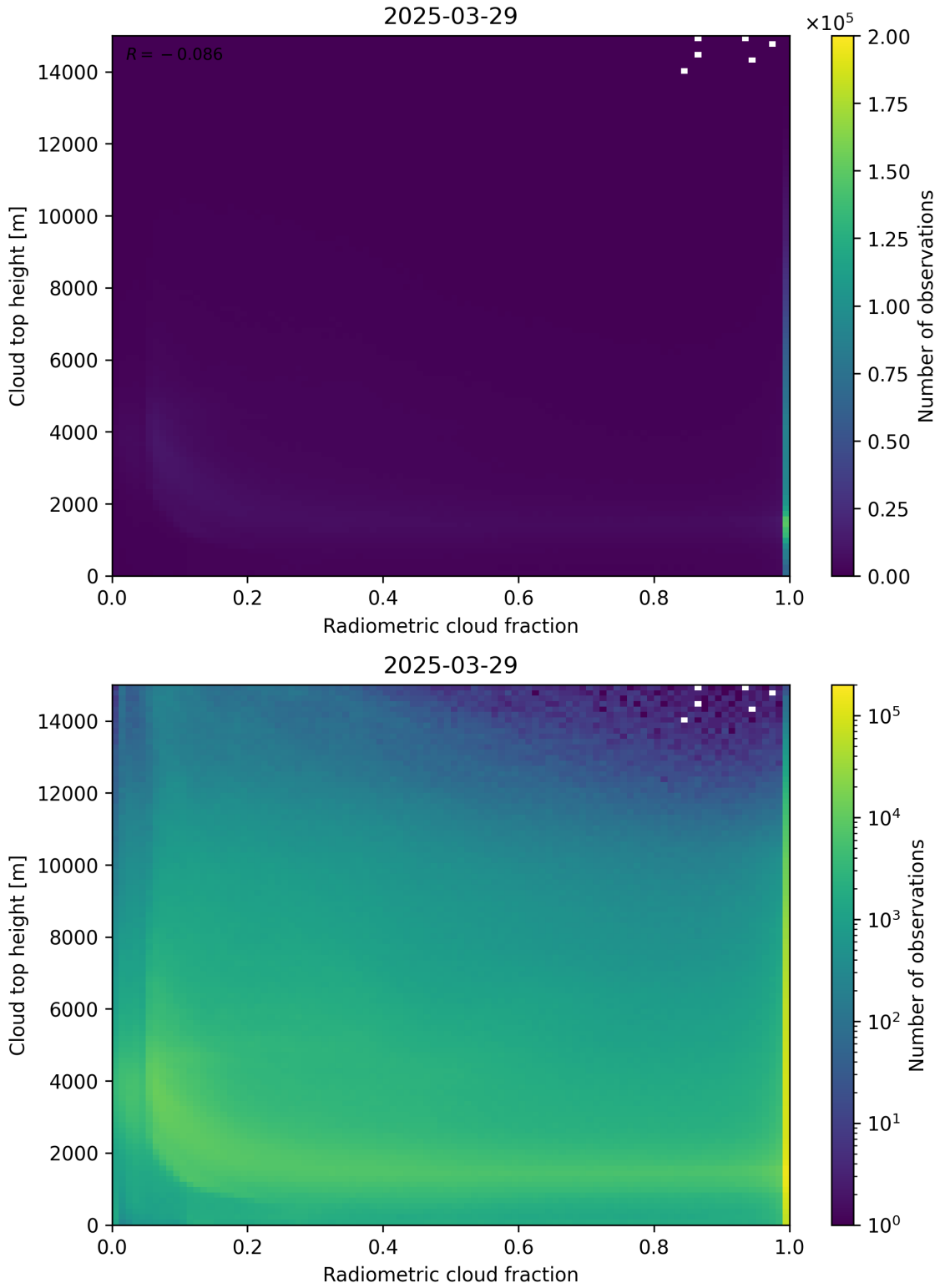


Figure 76: Scatter density plot of “Radiometric cloud fraction” against “Cloud top height” for 2025-03-28 to 2025-03-30.

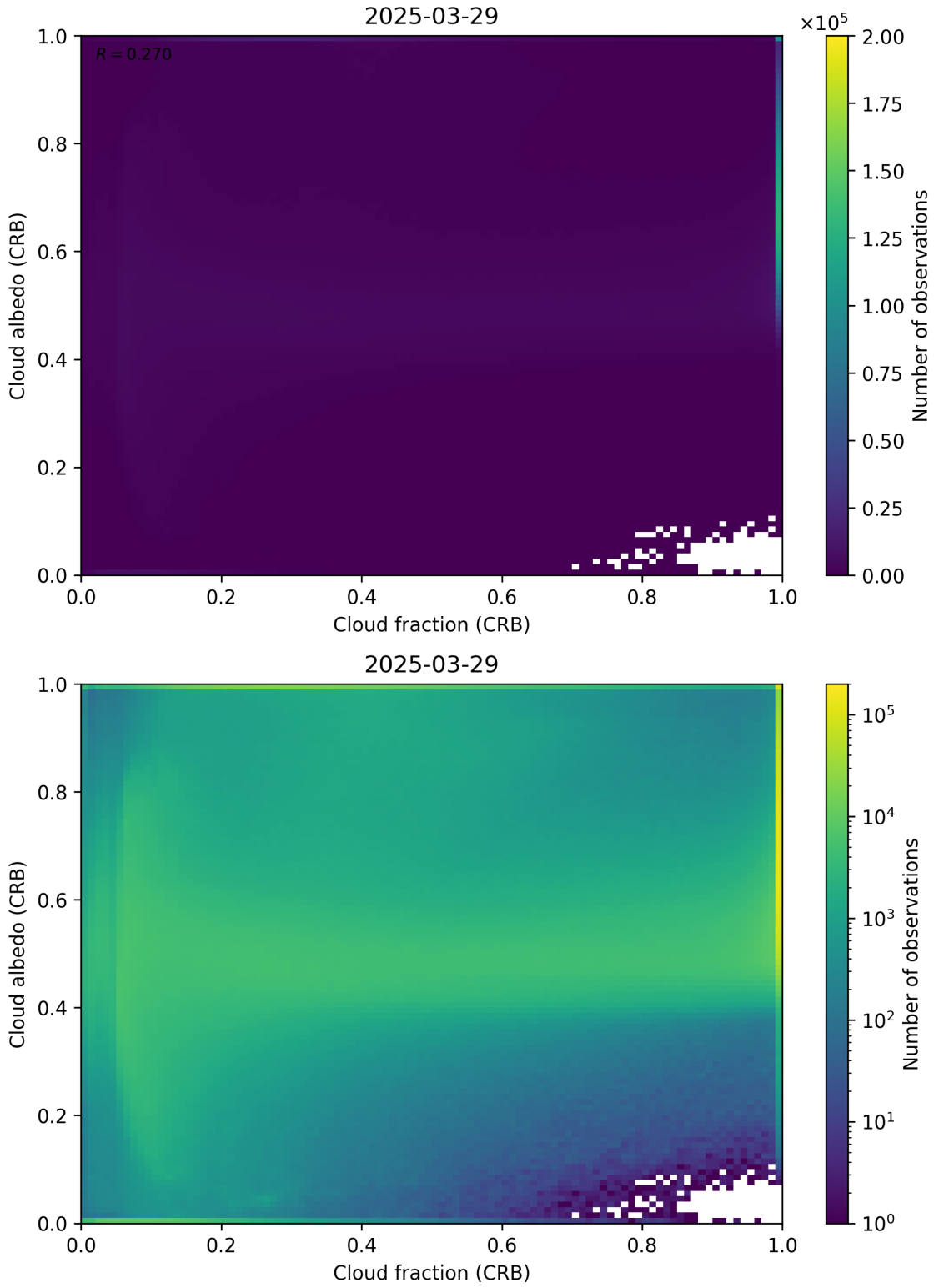


Figure 77: Scatter density plot of “Cloud fraction (CRB)” against “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

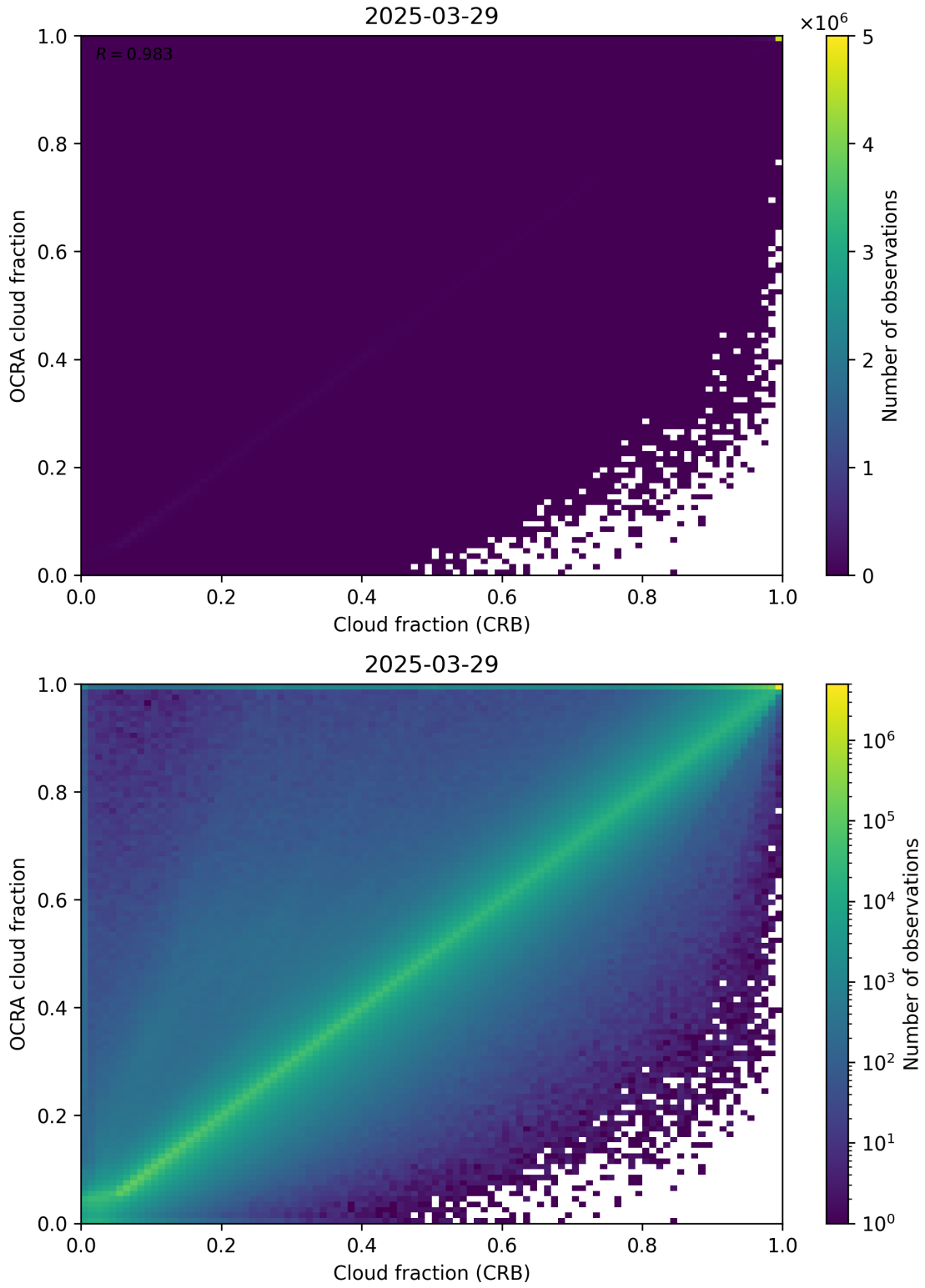


Figure 78: Scatter density plot of “Cloud fraction (CRB)” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

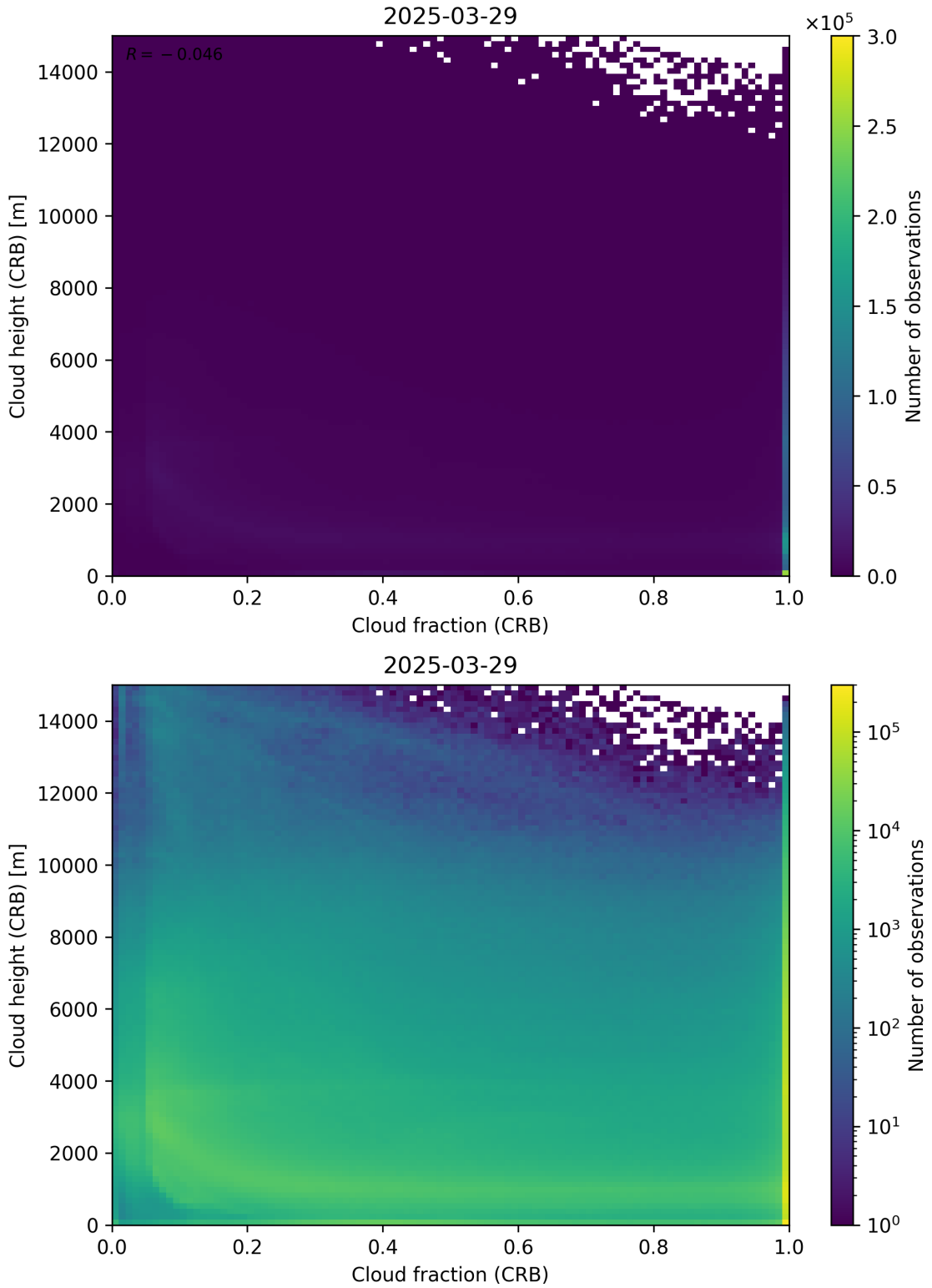


Figure 79: Scatter density plot of “Cloud fraction (CRB)” against “Cloud height (CRB)” for 2025-03-28 to 2025-03-30.

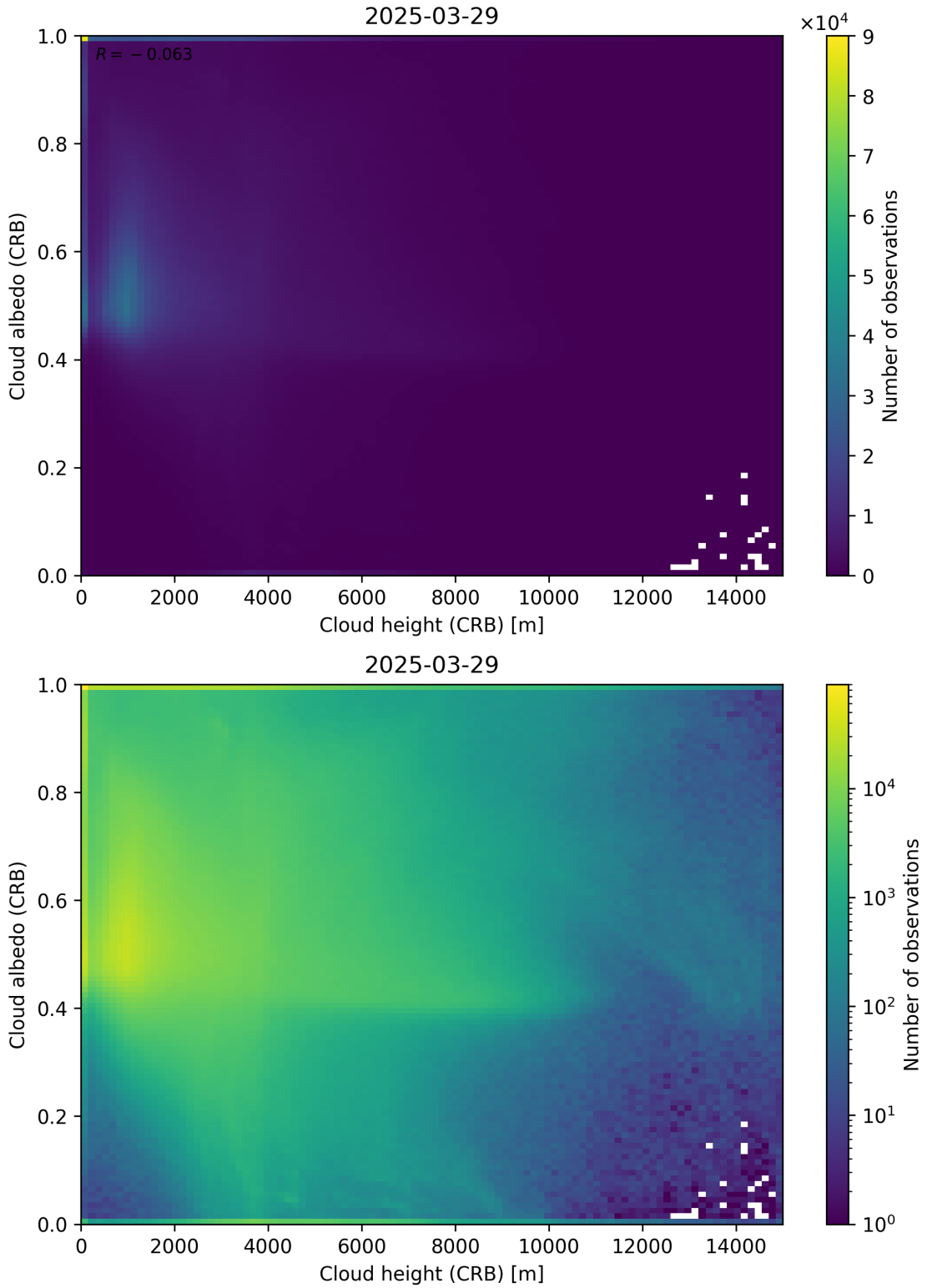


Figure 80: Scatter density plot of “Cloud height (CRB)” against “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

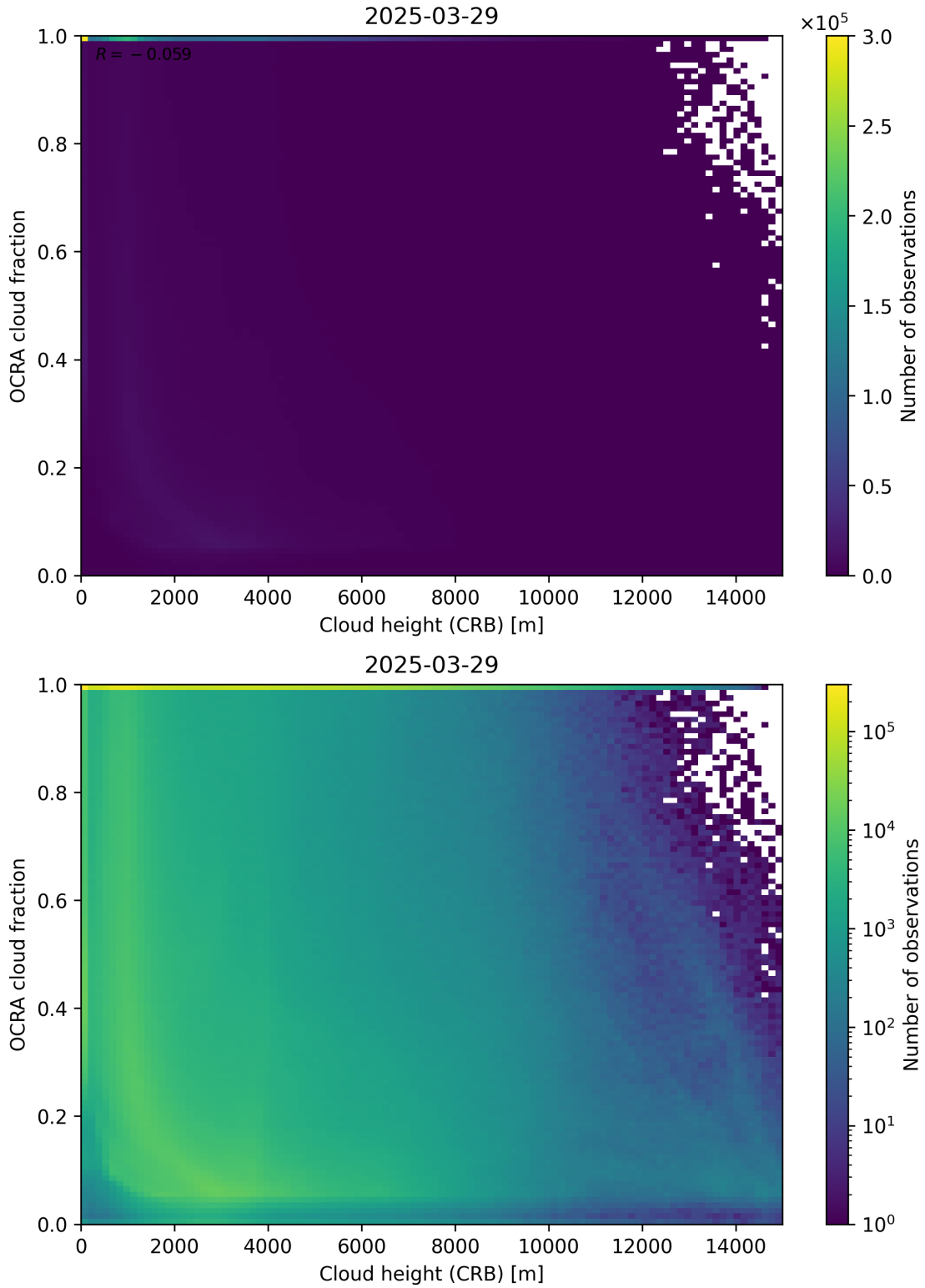


Figure 81: Scatter density plot of “Cloud height (CRB)” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

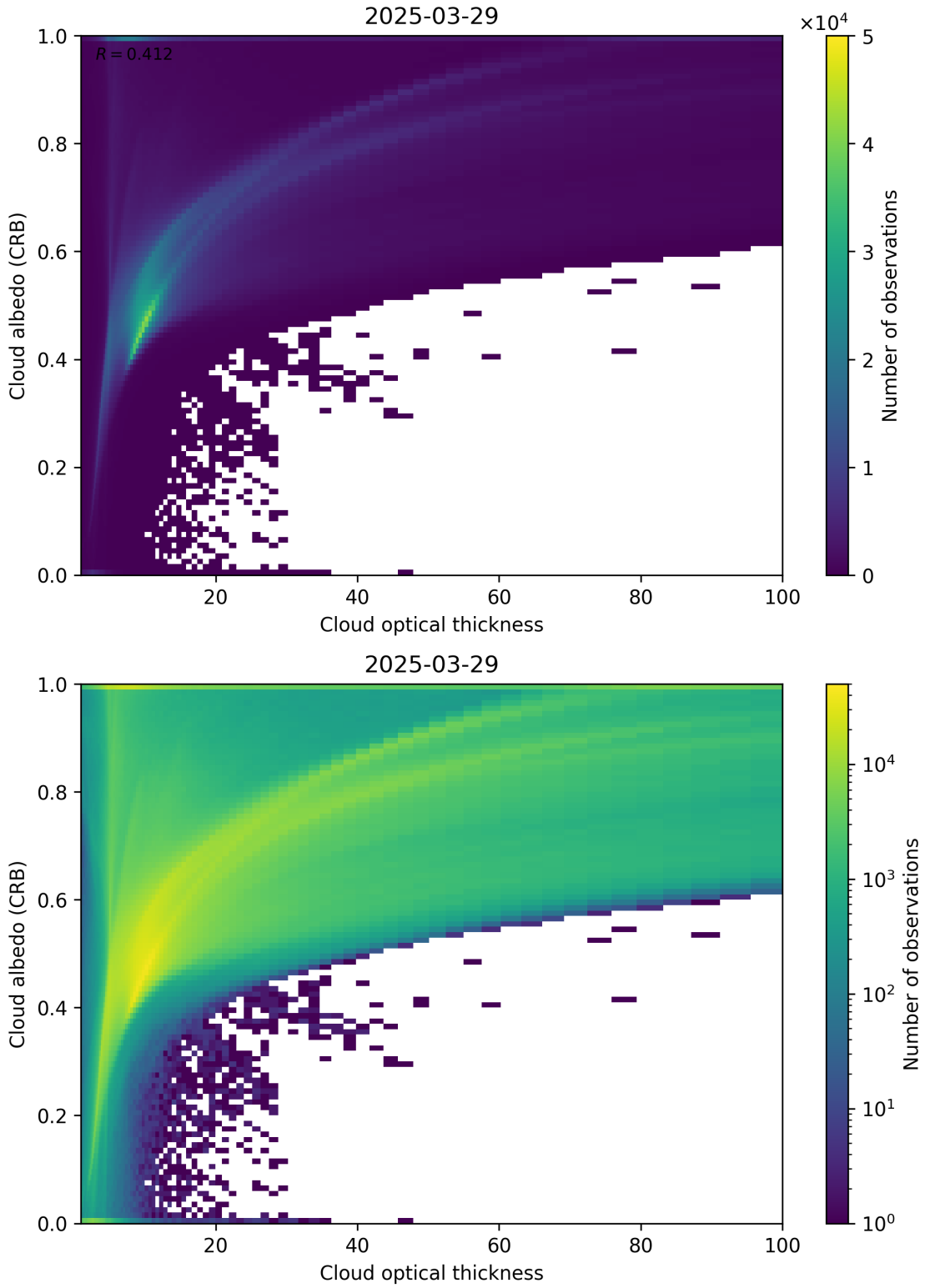


Figure 82: Scatter density plot of “Cloud optical thickness” against “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

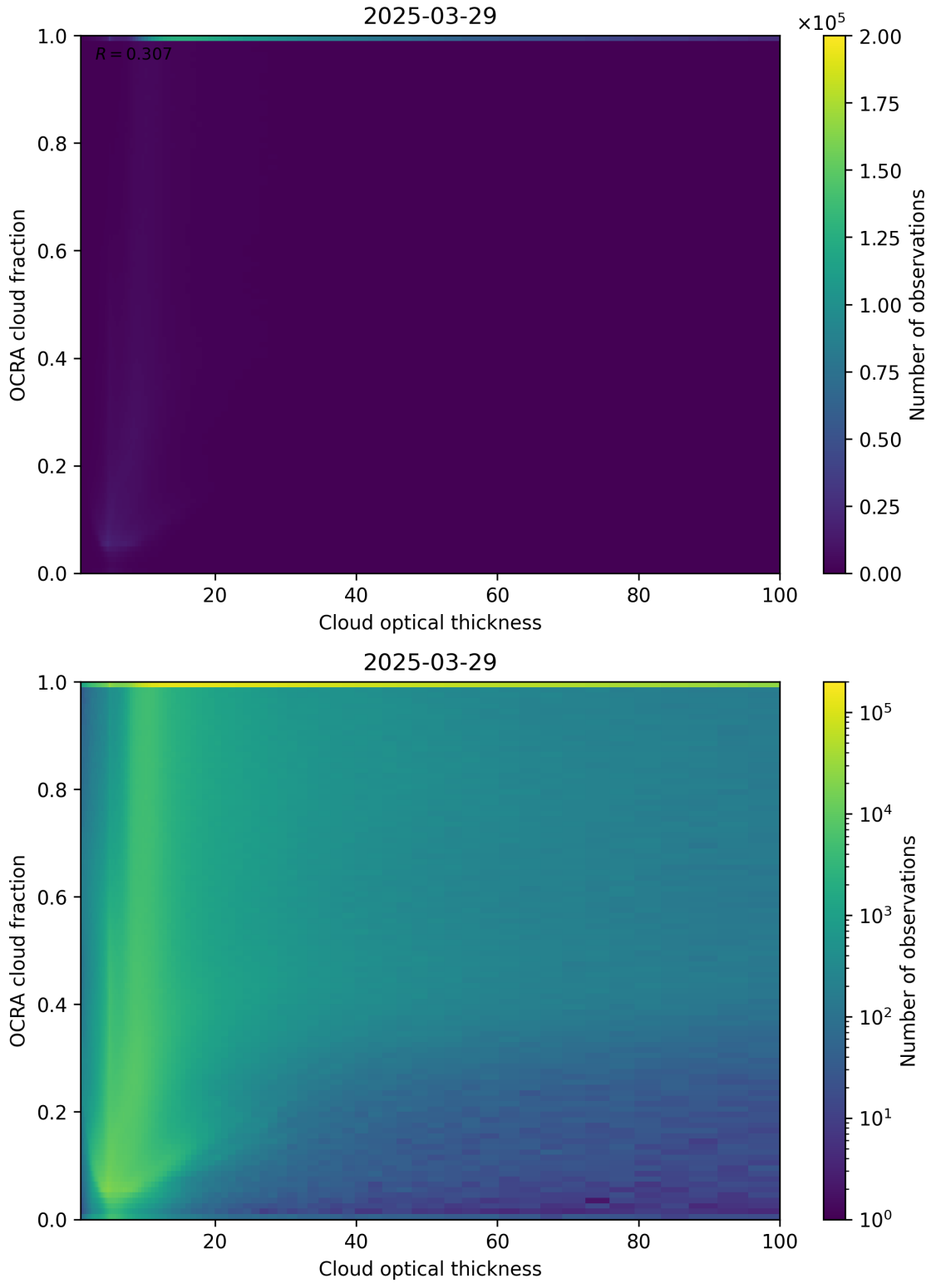


Figure 83: Scatter density plot of “Cloud optical thickness” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

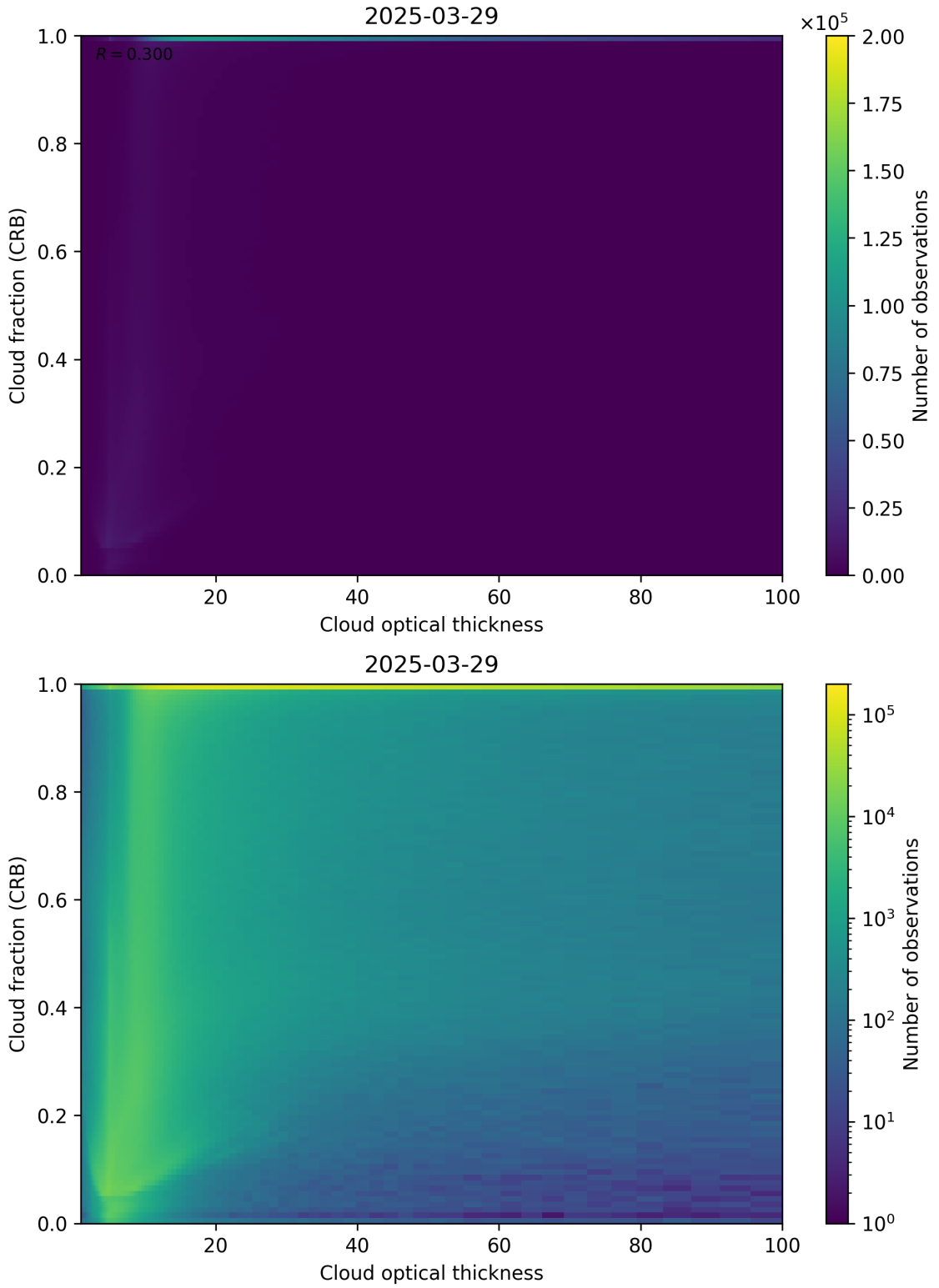


Figure 84: Scatter density plot of “Cloud optical thickness” against “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30.

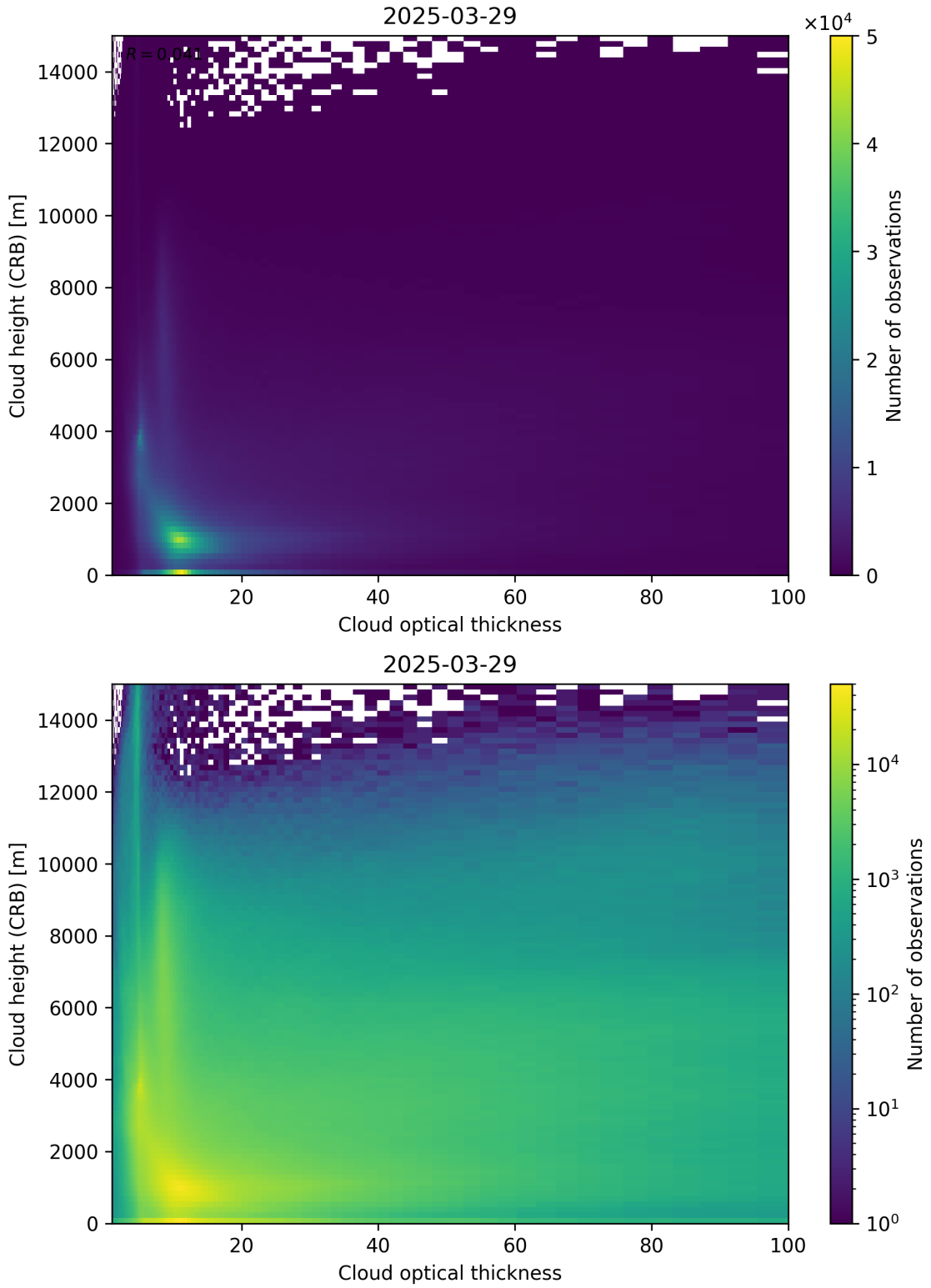


Figure 85: Scatter density plot of “Cloud optical thickness” against “Cloud height (CRB)” for 2025-03-28 to 2025-03-30.

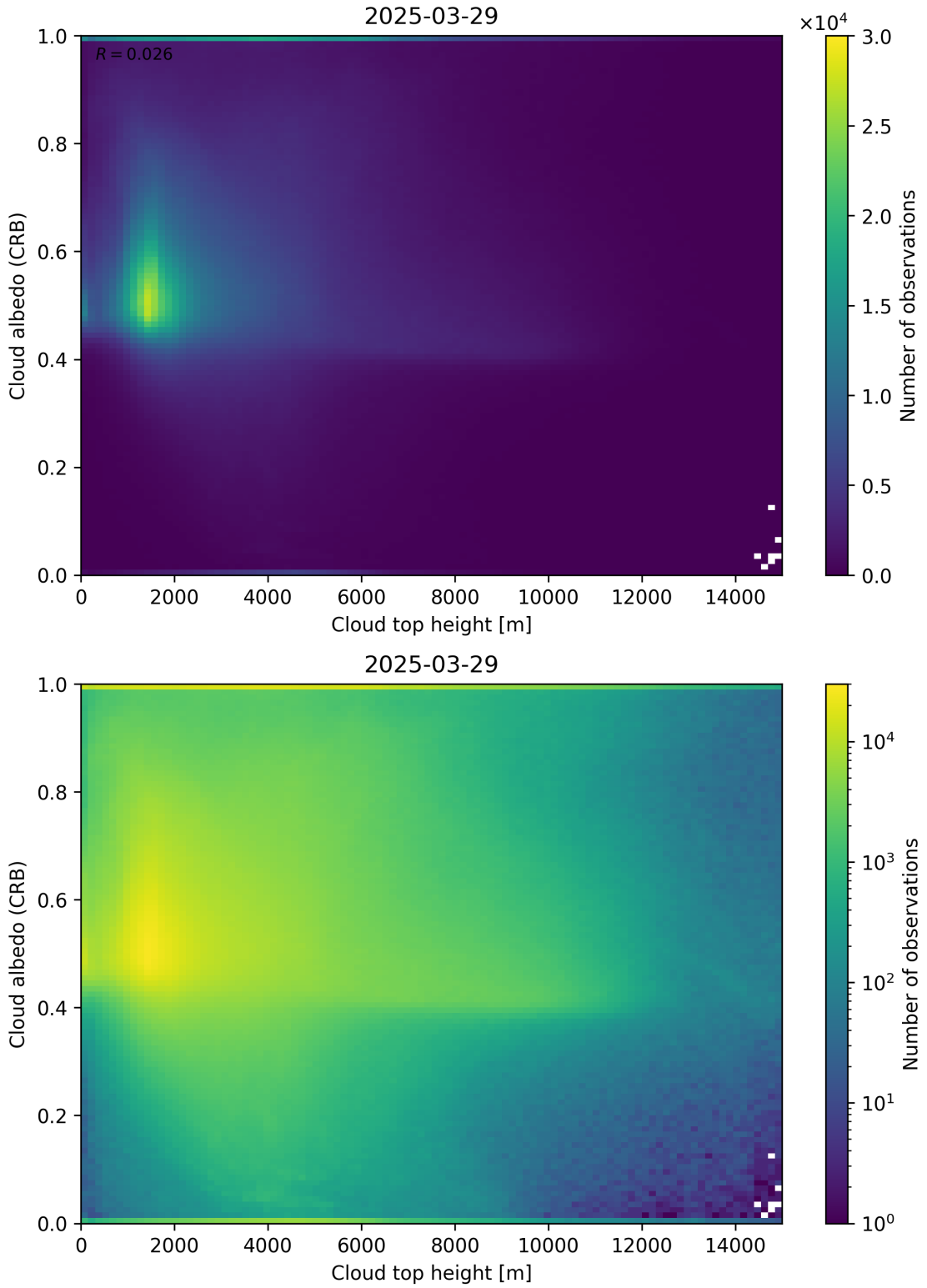


Figure 86: Scatter density plot of “Cloud top height” against “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

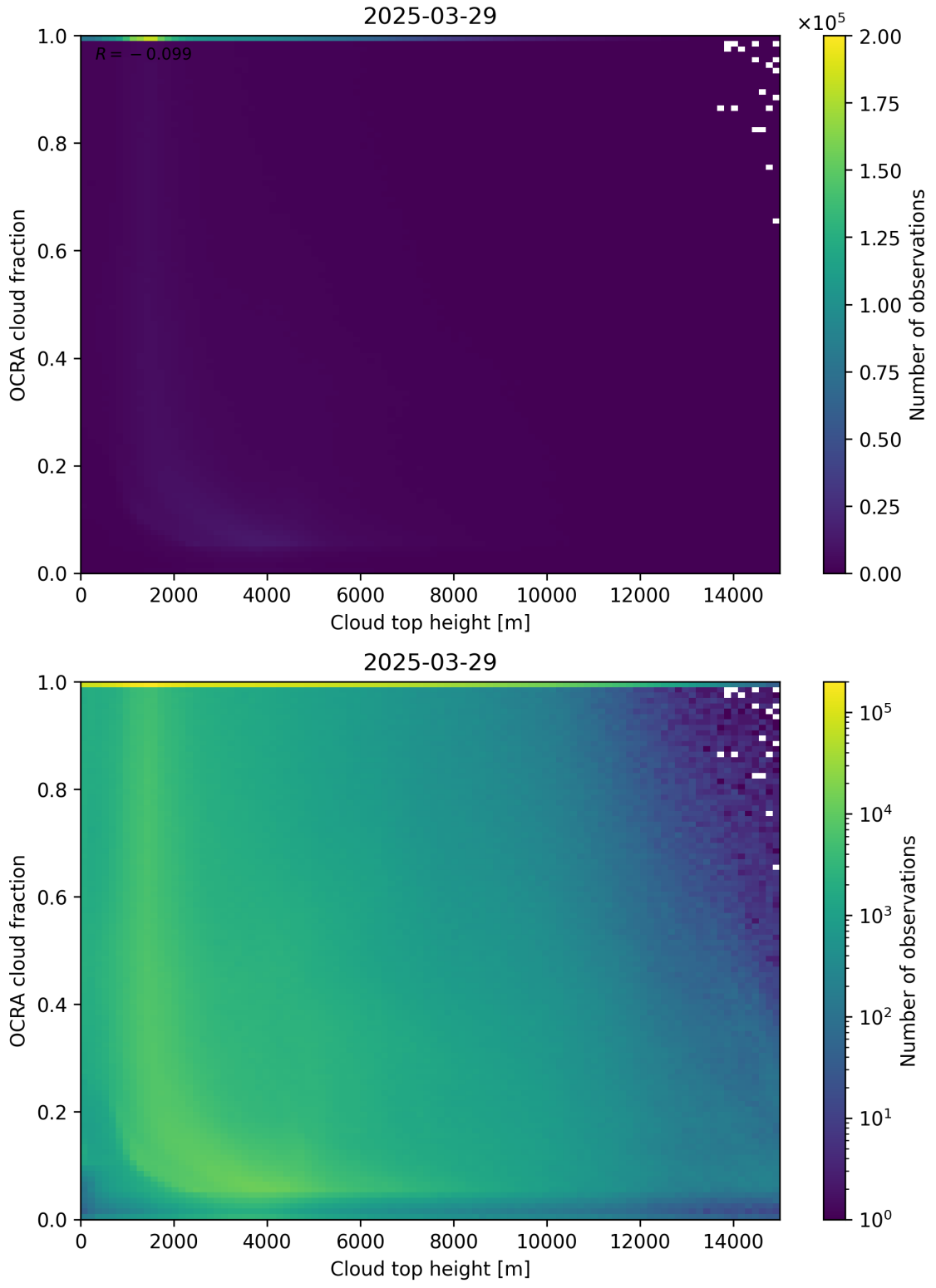


Figure 87: Scatter density plot of “Cloud top height” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

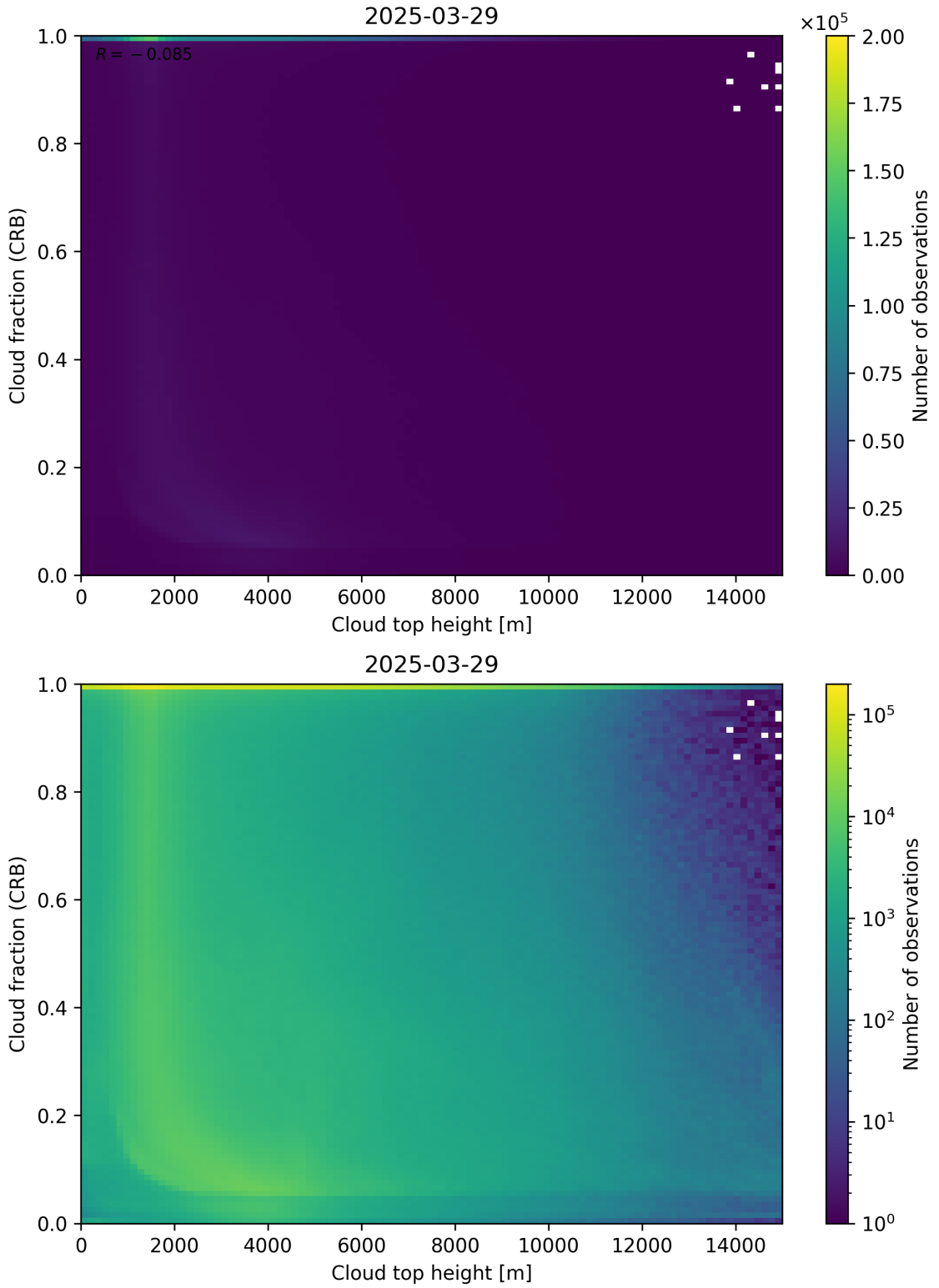


Figure 88: Scatter density plot of “Cloud top height” against “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30.

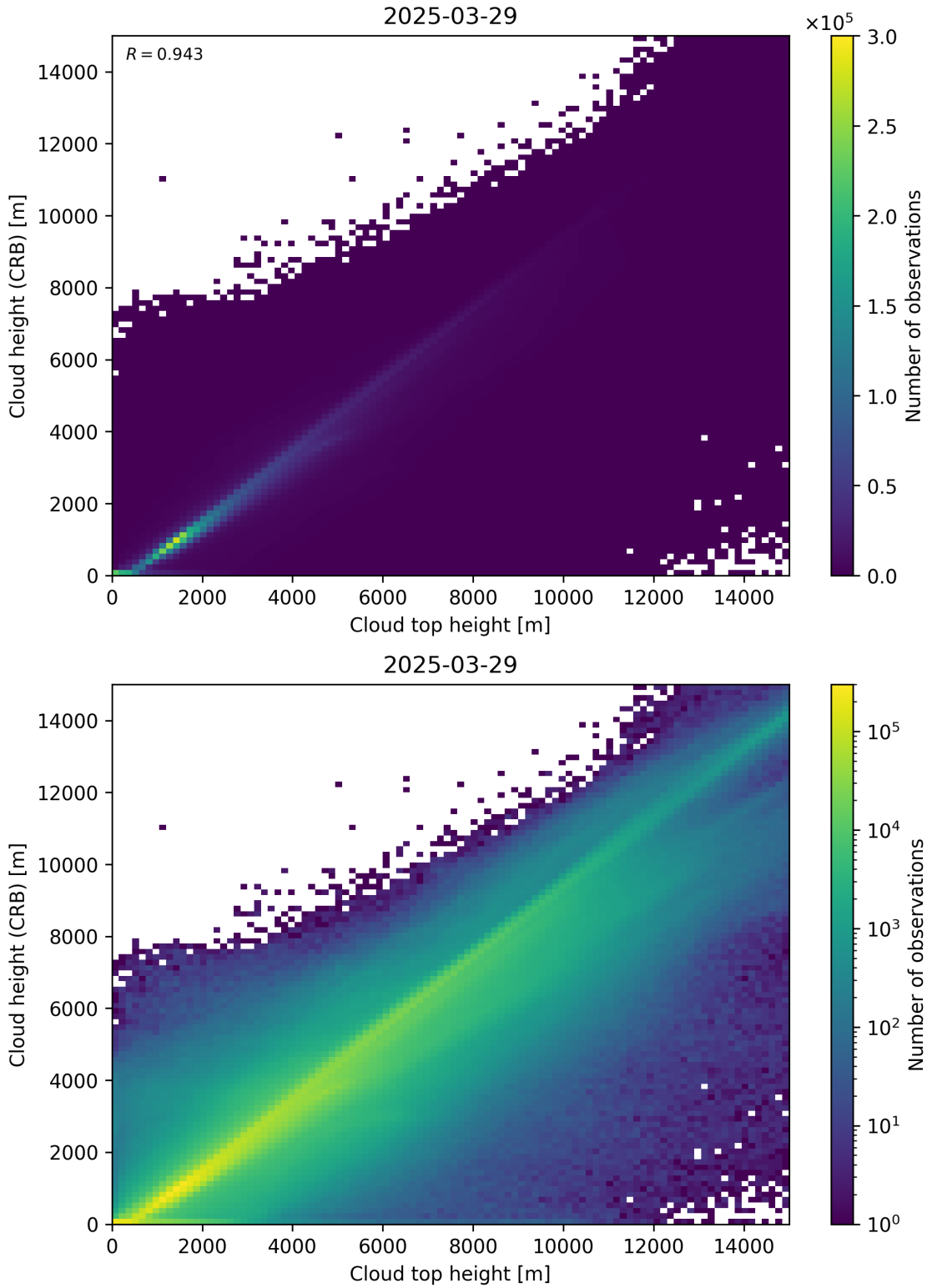


Figure 89: Scatter density plot of “Cloud top height” against “Cloud height (CRB)” for 2025-03-28 to 2025-03-30.

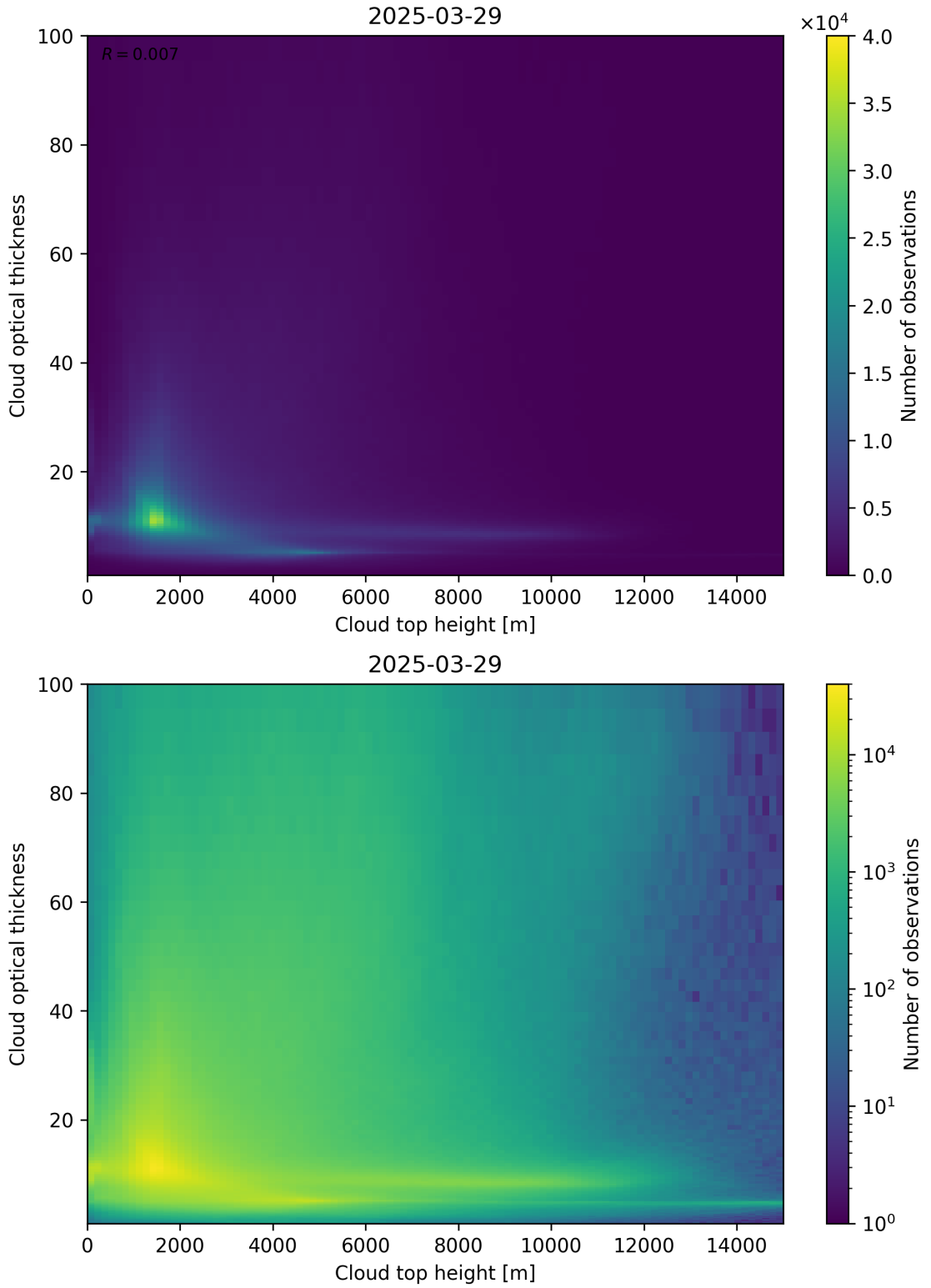


Figure 90: Scatter density plot of “Cloud top height” against “Cloud optical thickness” for 2025-03-28 to 2025-03-30.

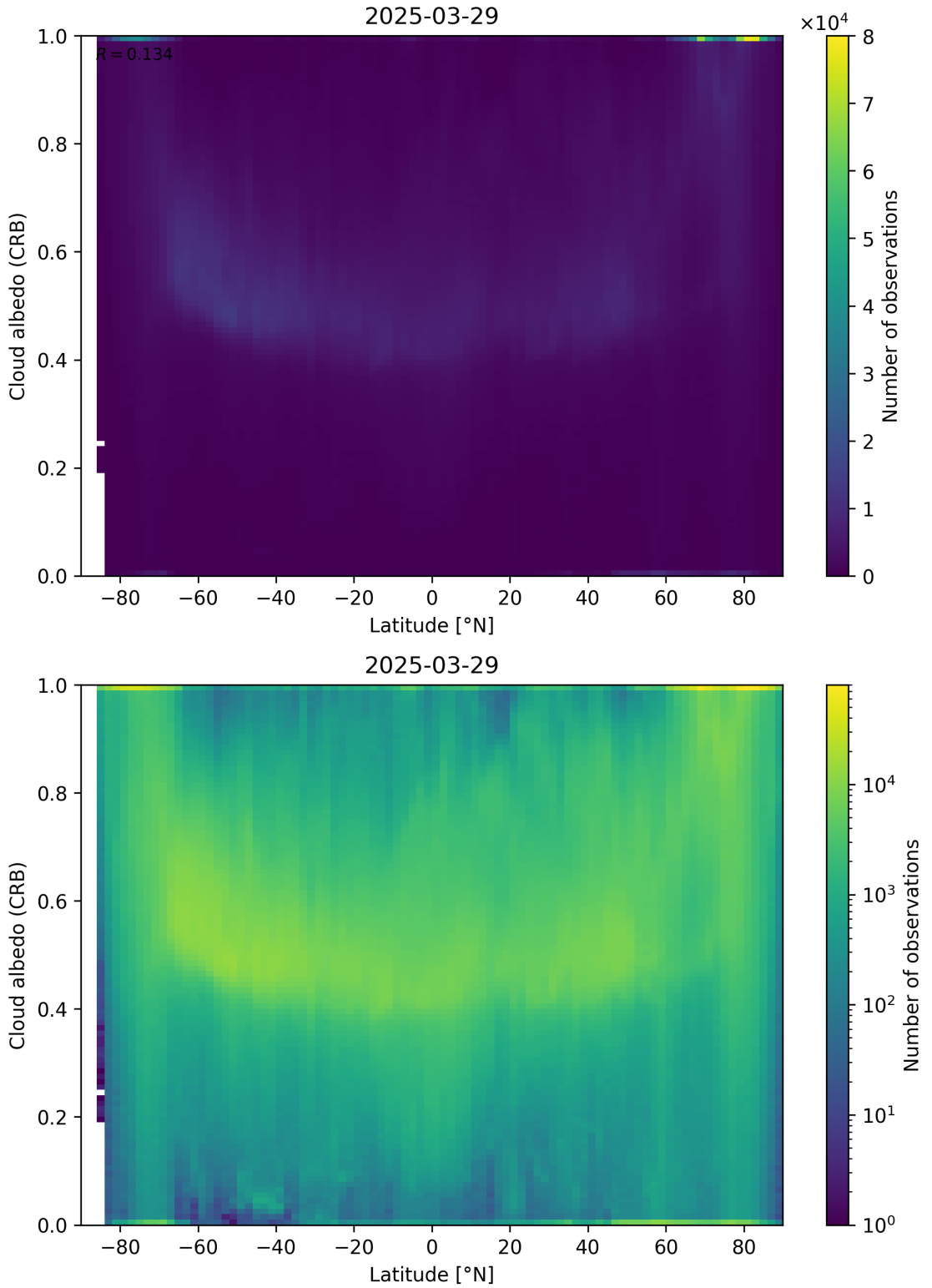


Figure 91: Scatter density plot of “Latitude” against “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

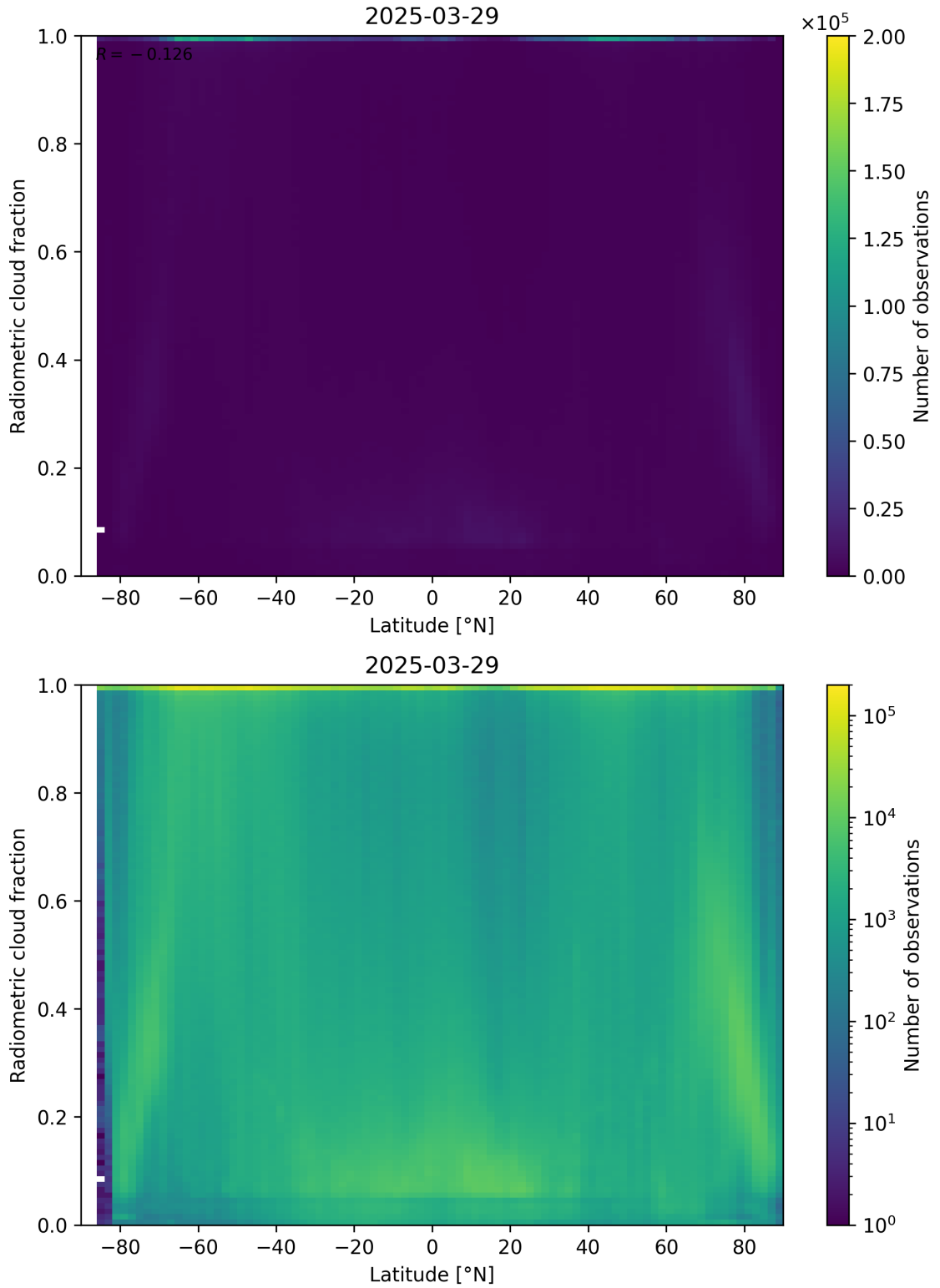


Figure 92: Scatter density plot of “Latitude” against “Radiometric cloud fraction” for 2025-03-28 to 2025-03-30.

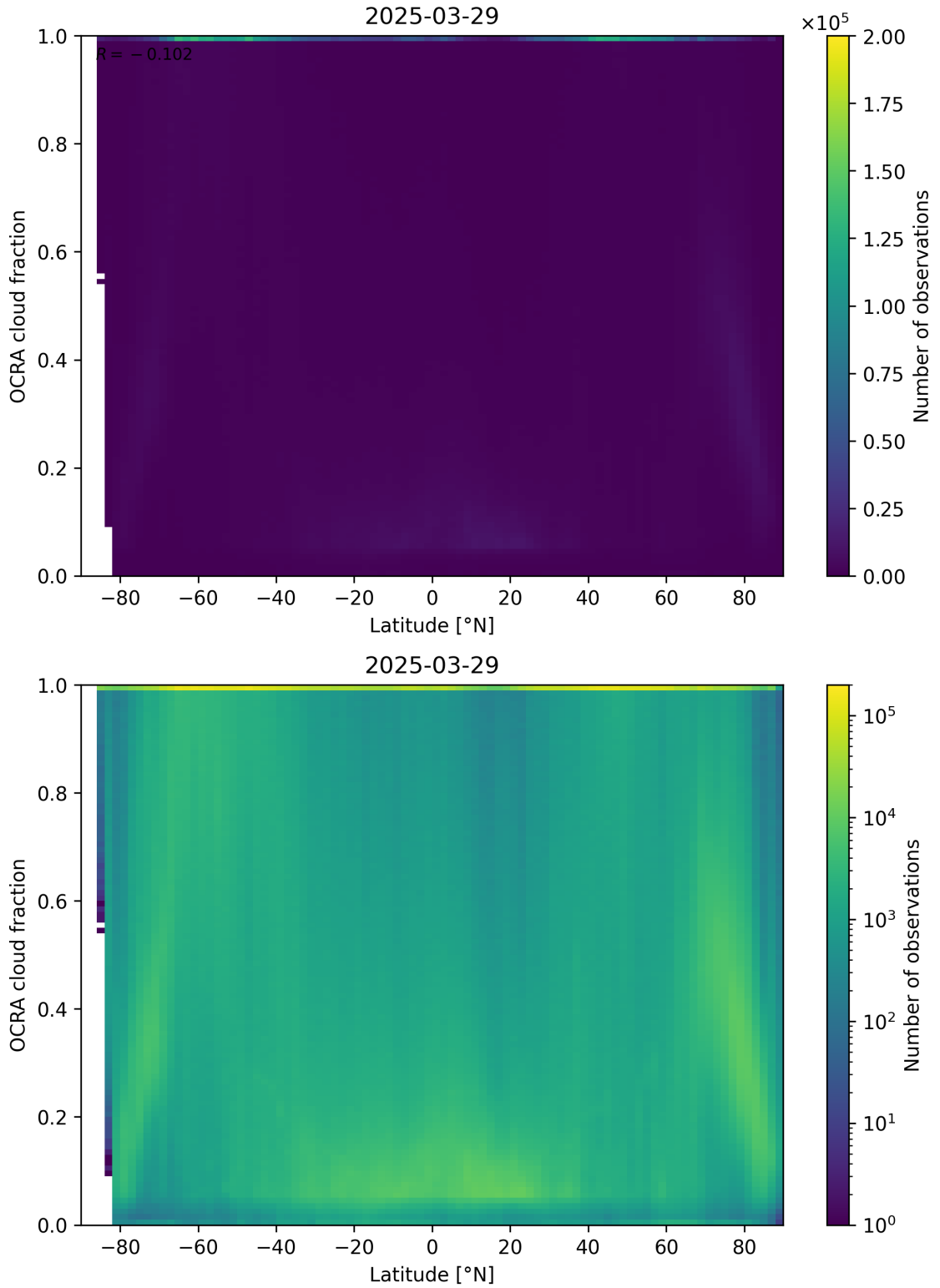


Figure 93: Scatter density plot of “Latitude” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

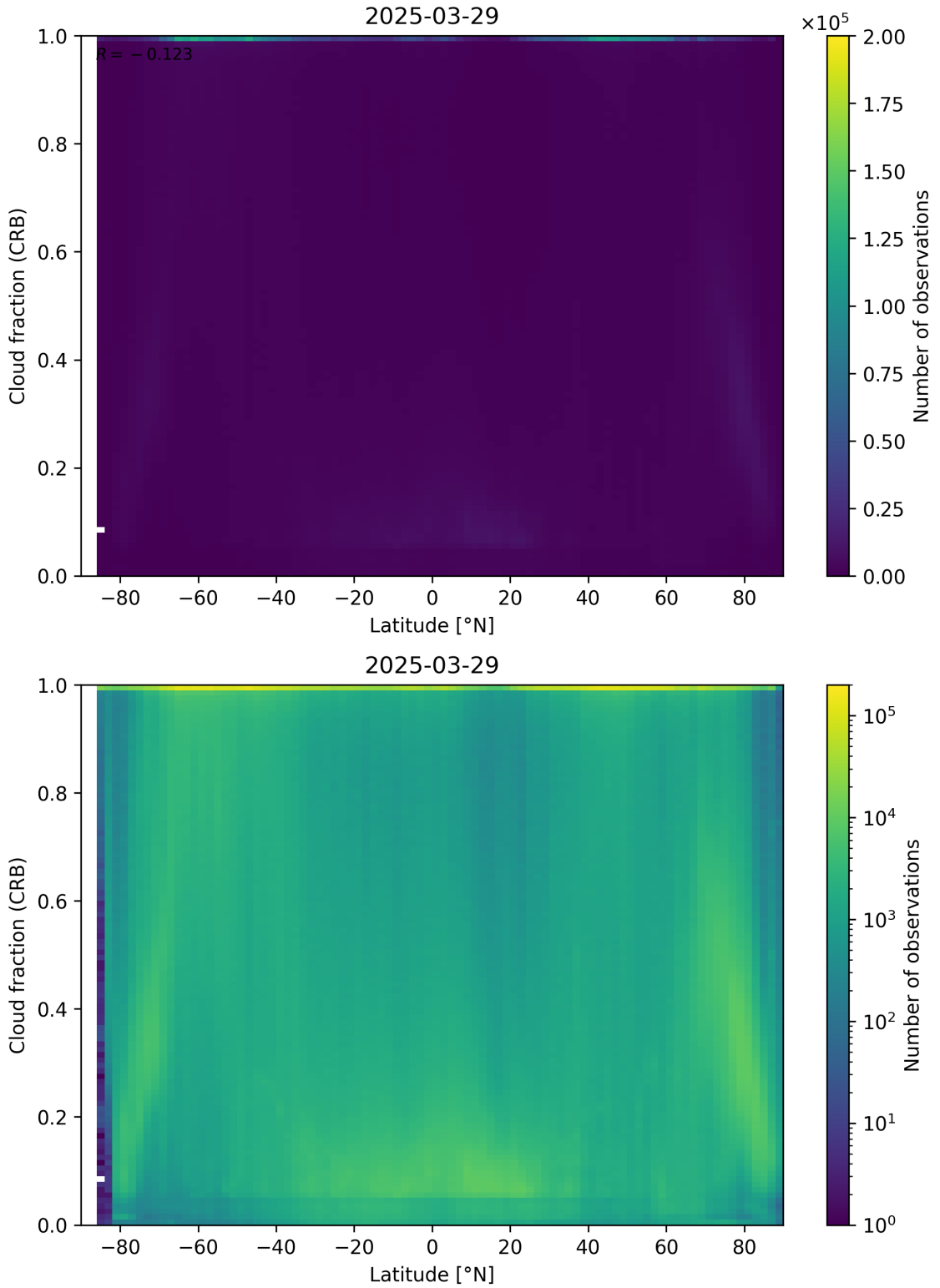


Figure 94: Scatter density plot of “Latitude” against “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30.

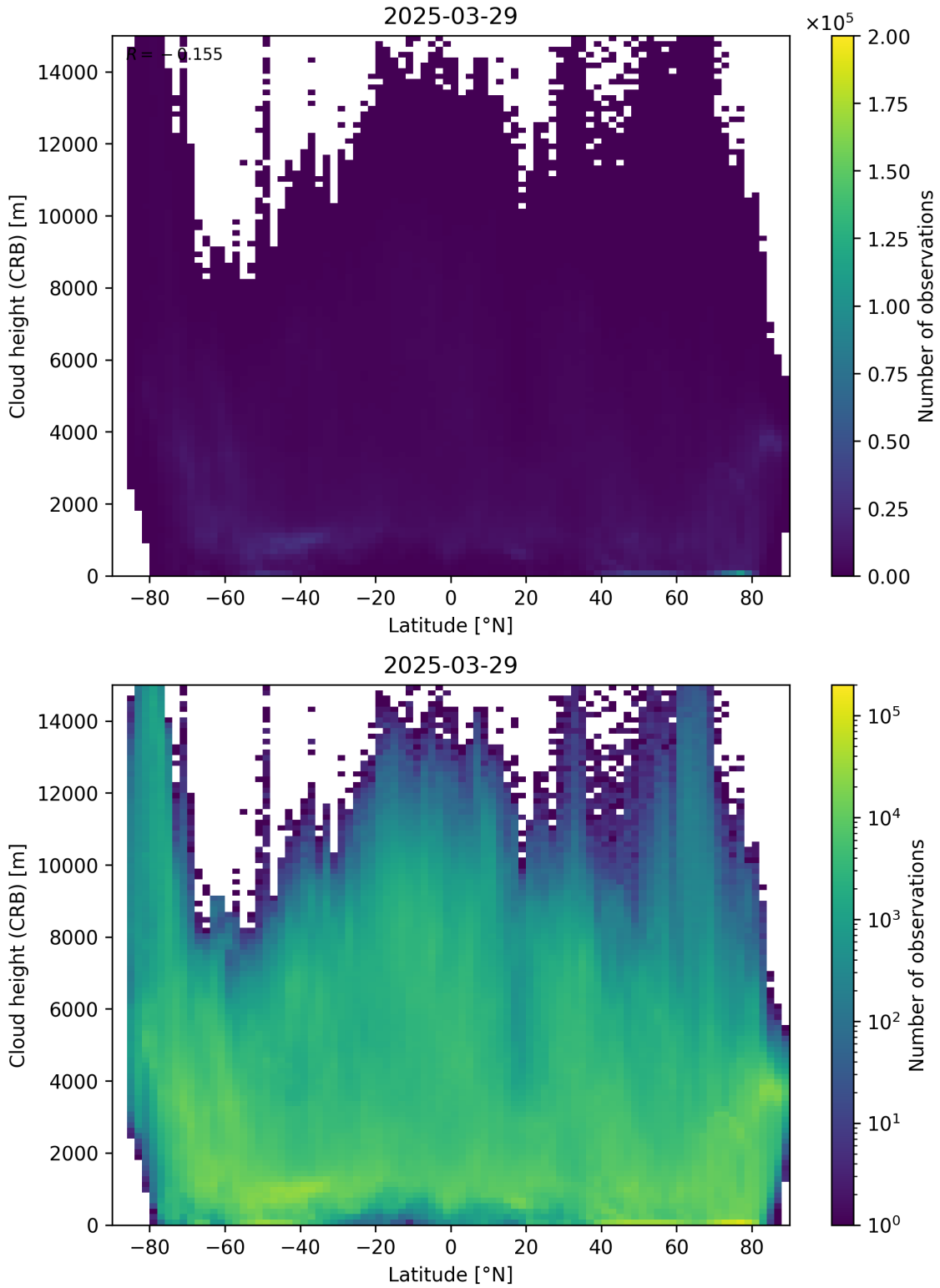


Figure 95: Scatter density plot of “Latitude” against “Cloud height (CRB)” for 2025-03-28 to 2025-03-30.

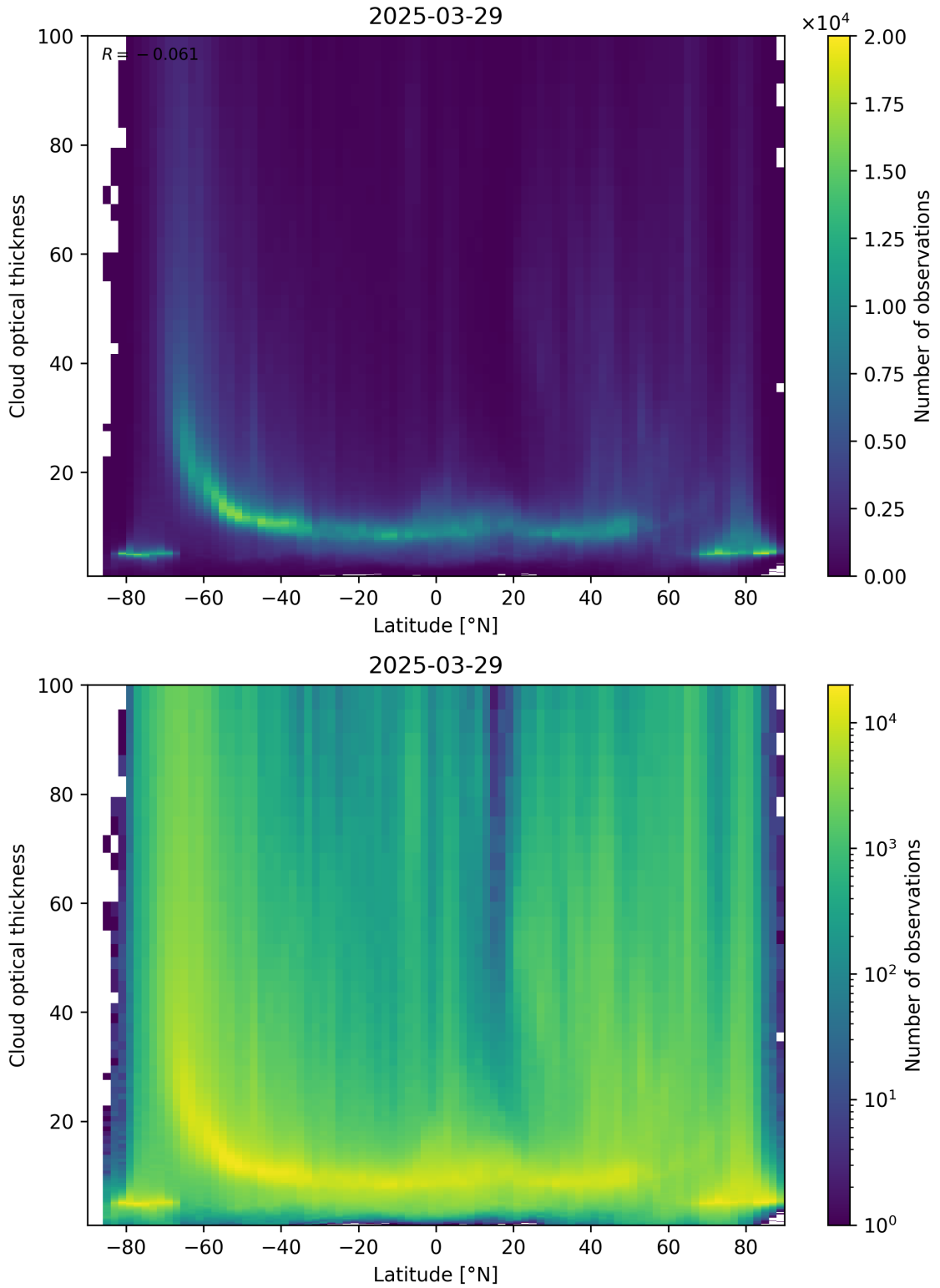


Figure 96: Scatter density plot of “Latitude” against “Cloud optical thickness” for 2025-03-28 to 2025-03-30.

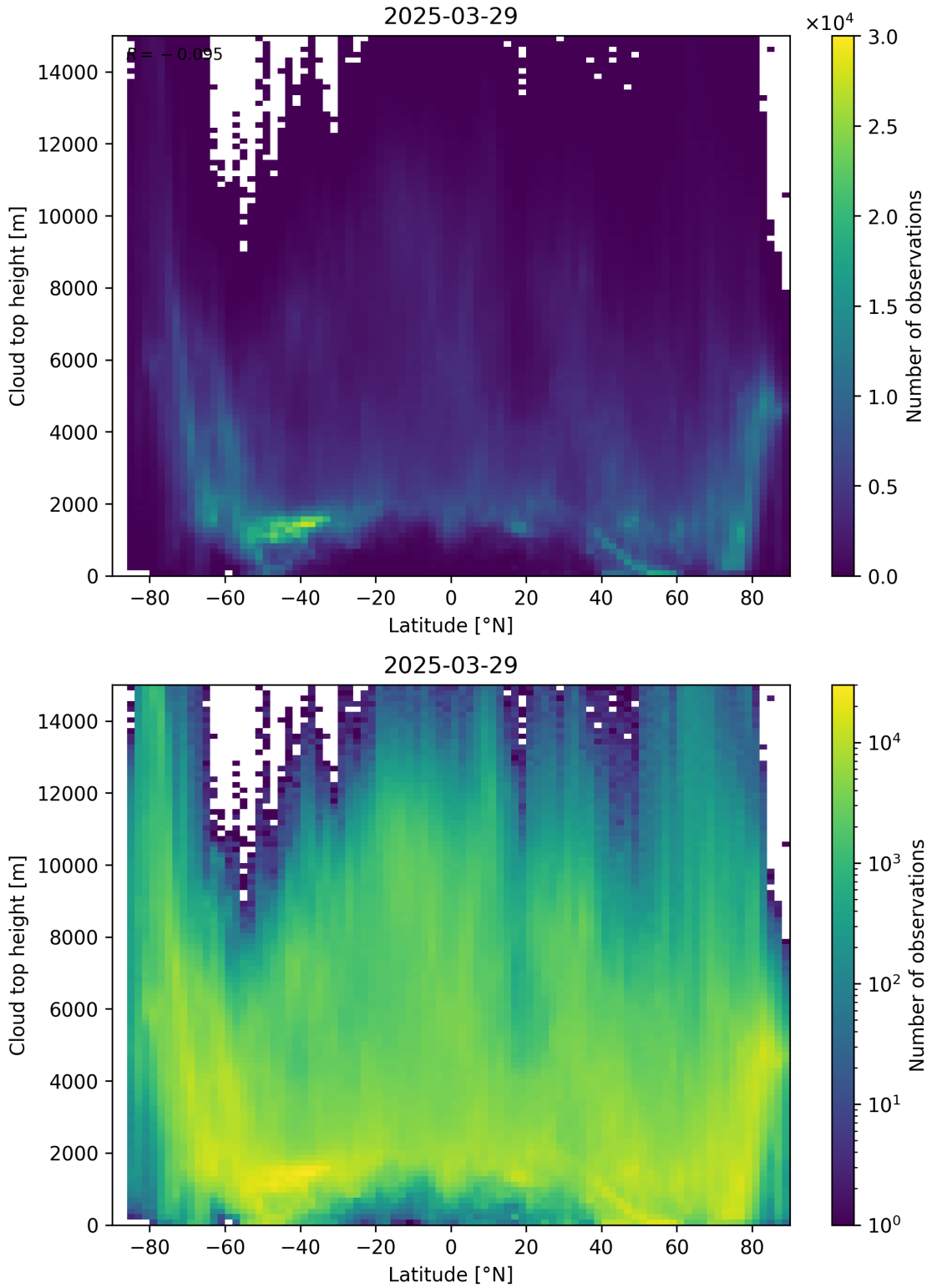


Figure 97: Scatter density plot of “Latitude” against “Cloud top height” for 2025-03-28 to 2025-03-30.

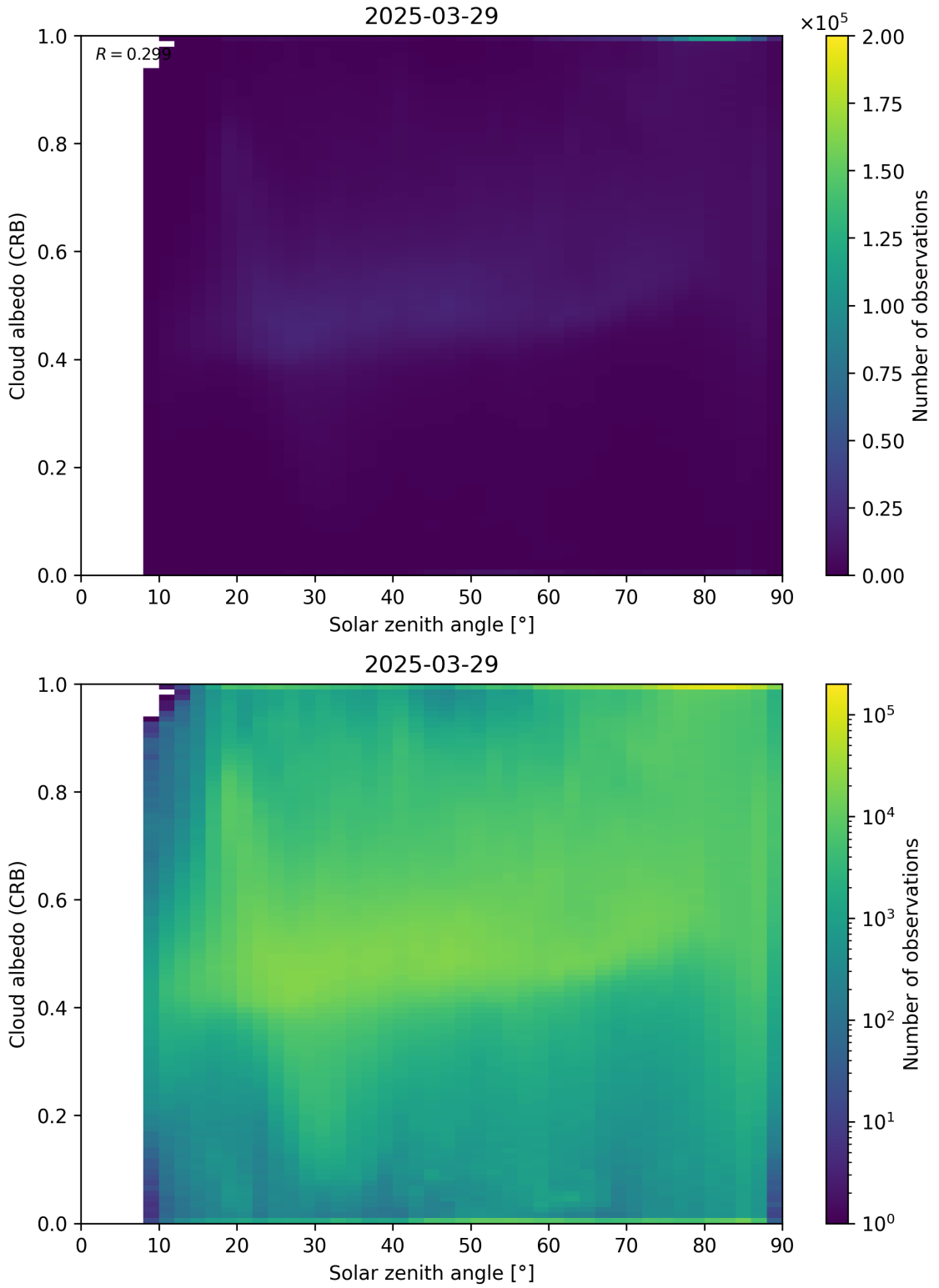


Figure 98: Scatter density plot of “Solar zenith angle” against “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

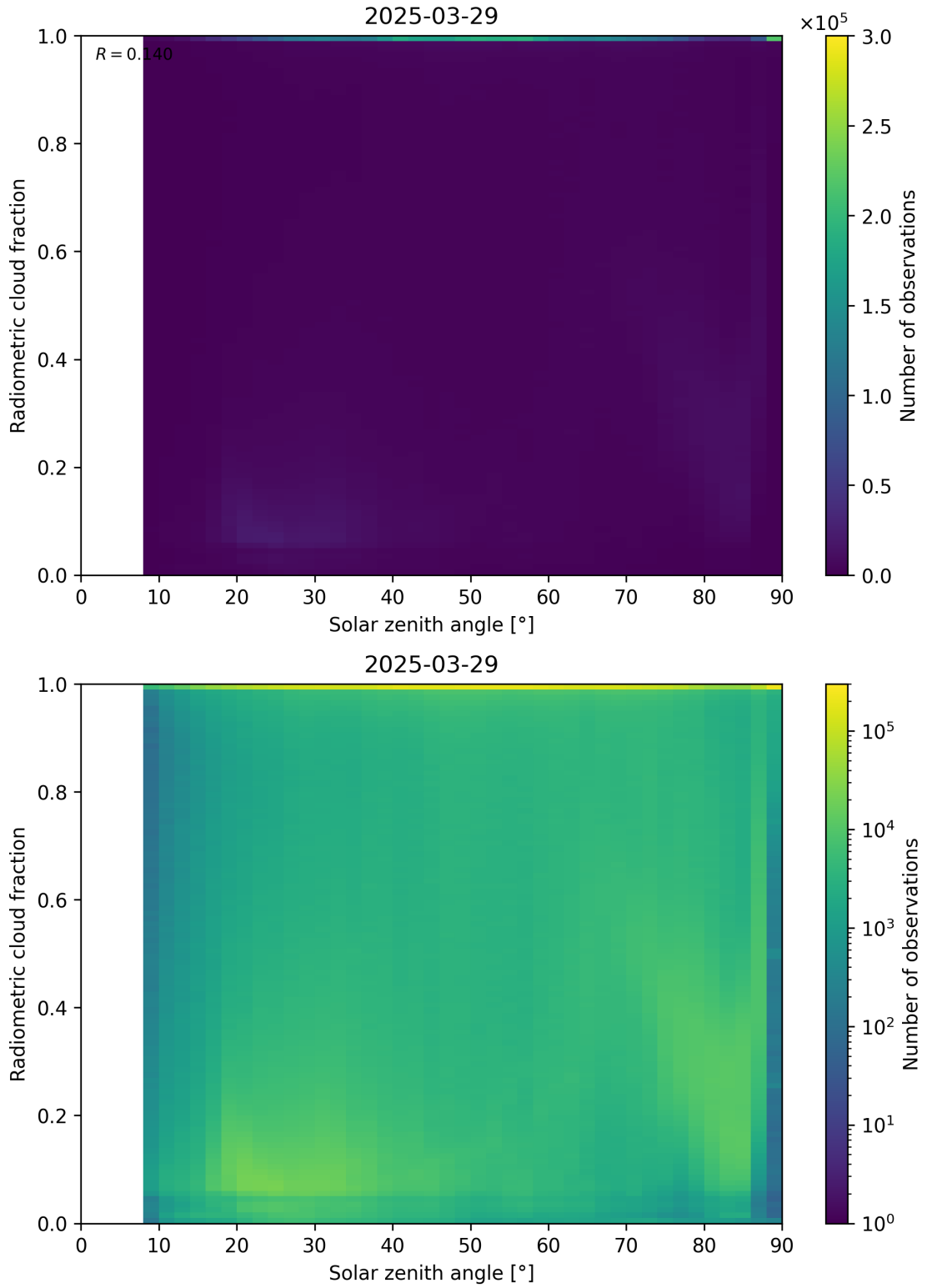


Figure 99: Scatter density plot of “Solar zenith angle” against “Radiometric cloud fraction” for 2025-03-28 to 2025-03-30.

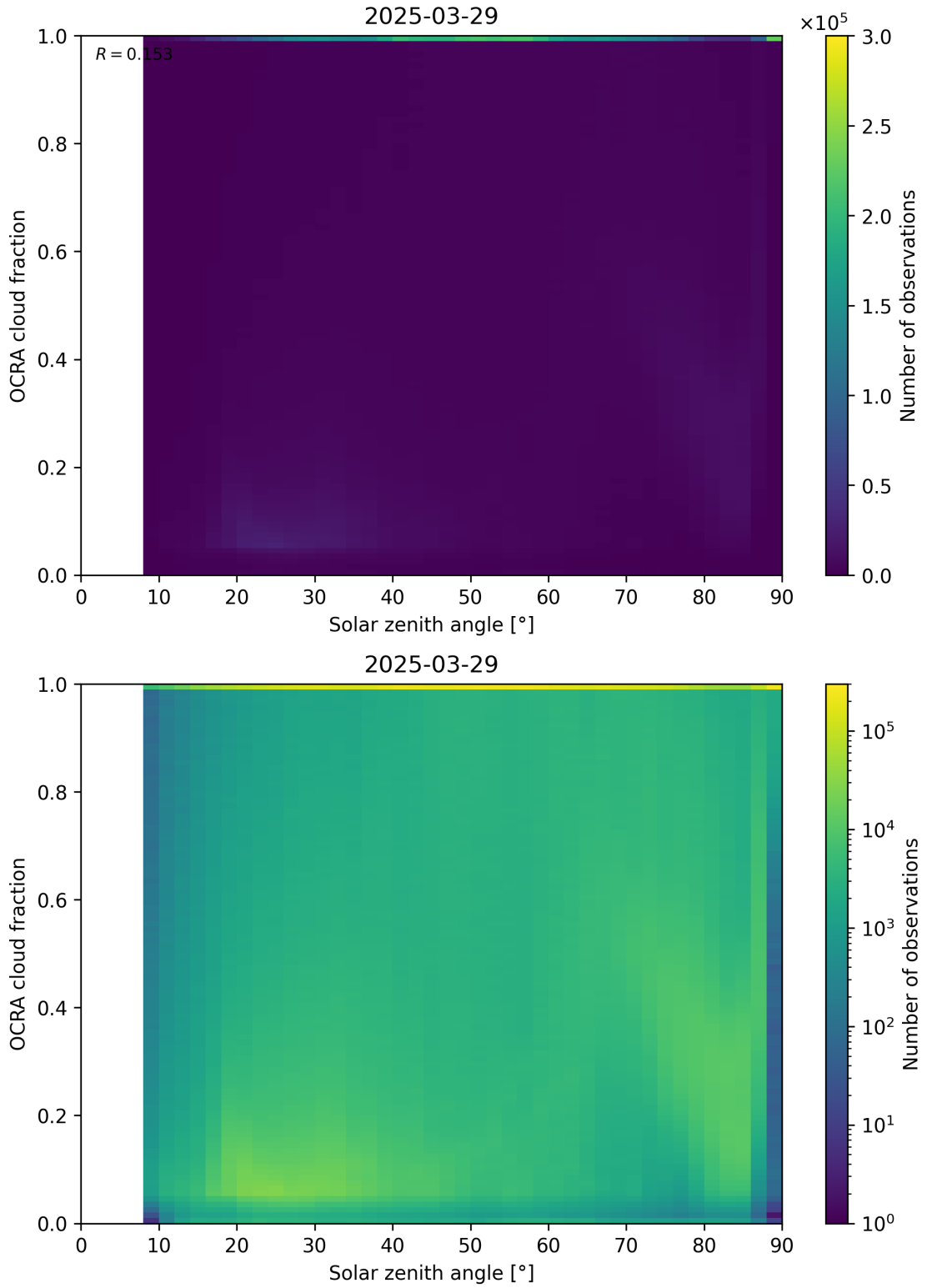


Figure 100: Scatter density plot of “Solar zenith angle” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

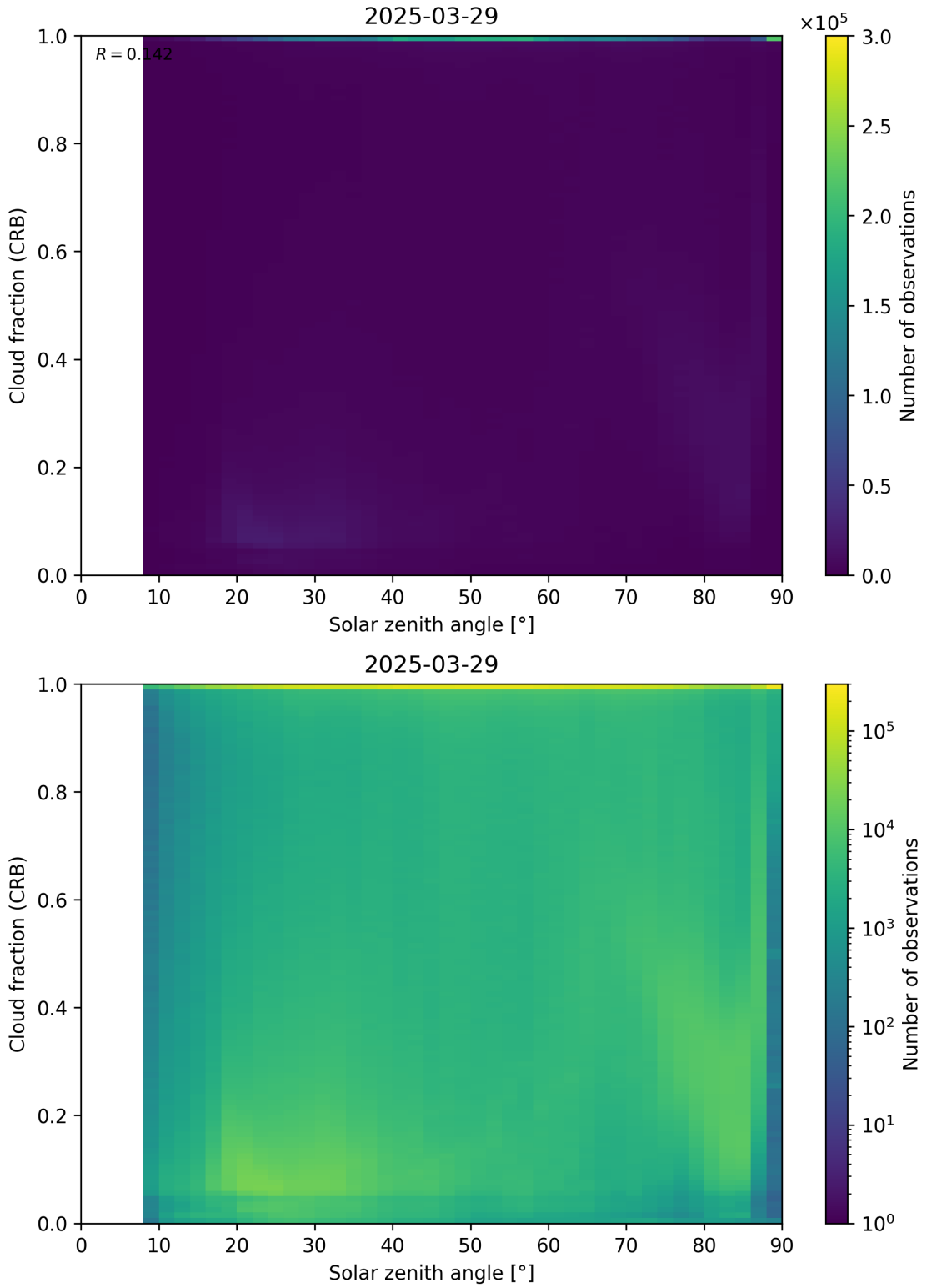


Figure 101: Scatter density plot of “Solar zenith angle” against “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30.

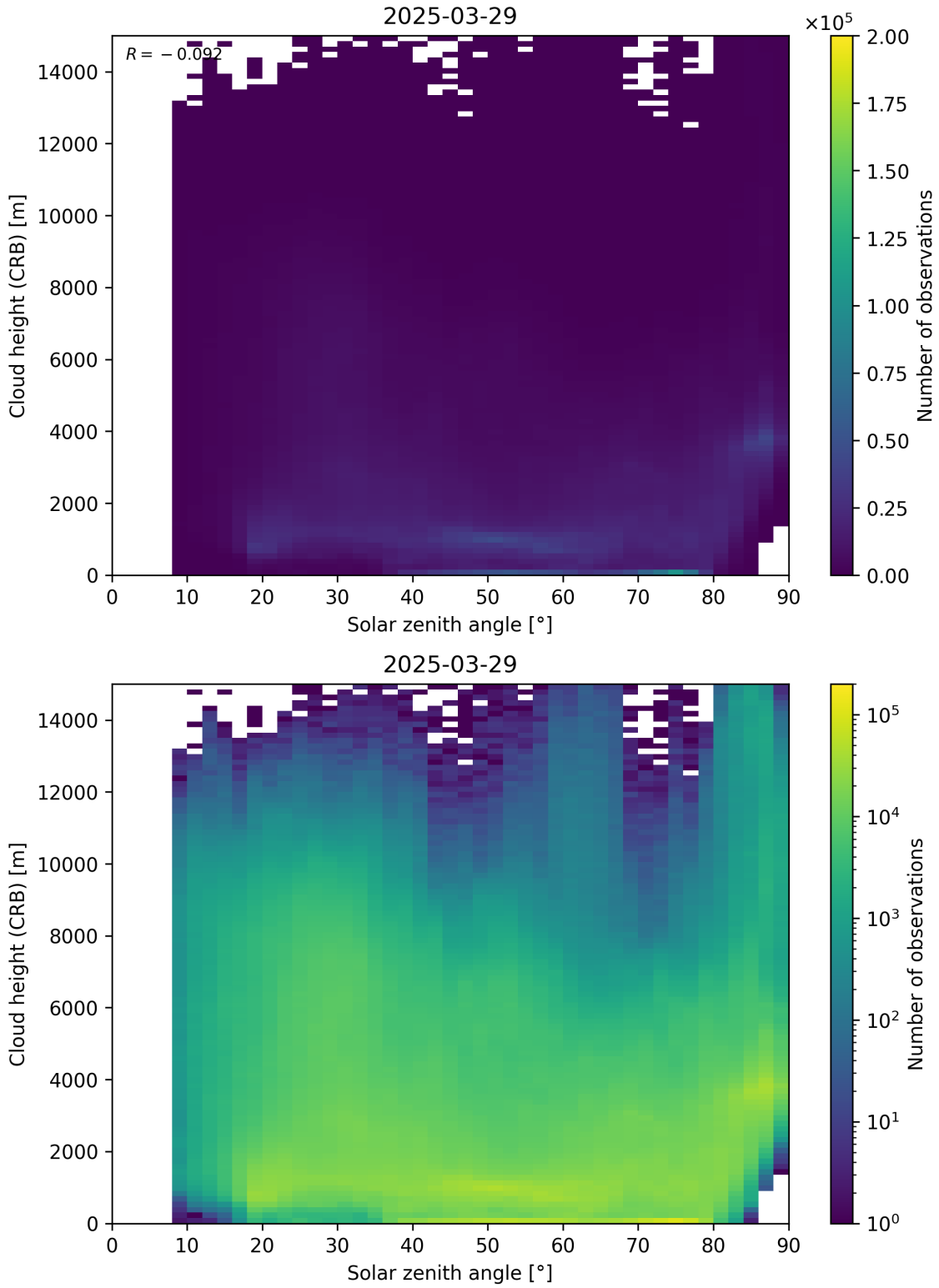


Figure 102: Scatter density plot of “Solar zenith angle” against “Cloud height (CRB)” for 2025-03-28 to 2025-03-30.

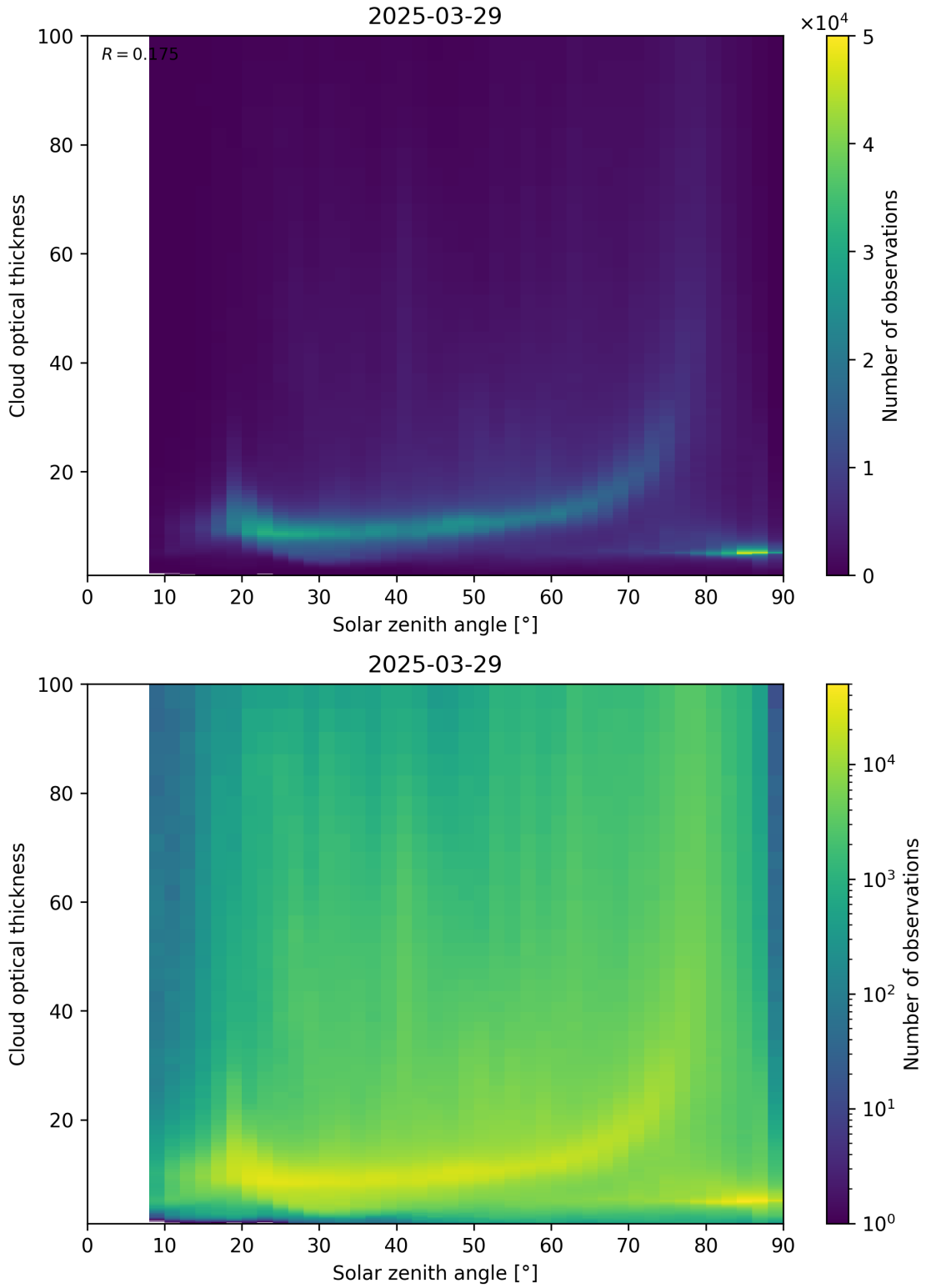


Figure 103: Scatter density plot of “Solar zenith angle” against “Cloud optical thickness” for 2025-03-28 to 2025-03-30.

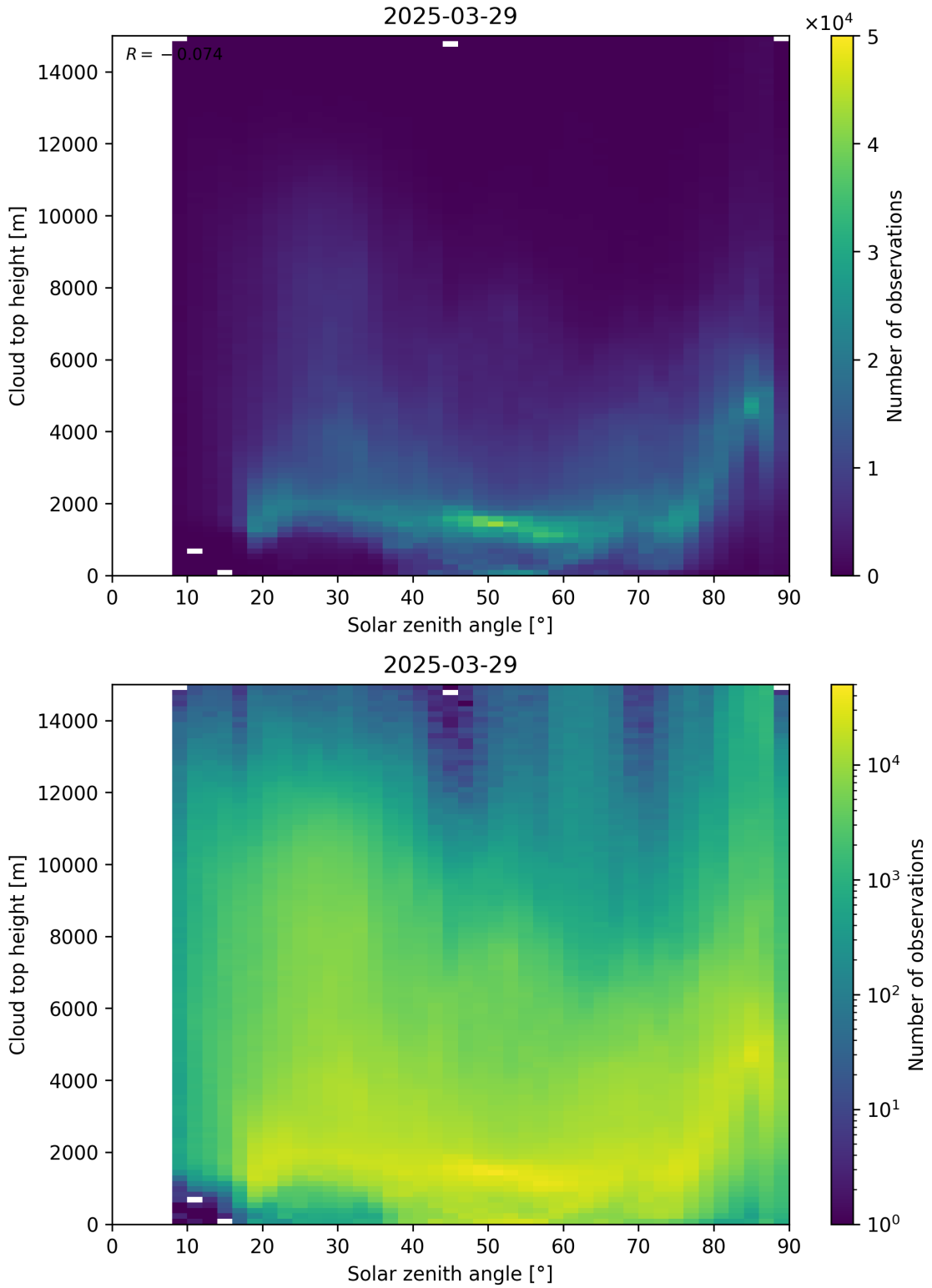


Figure 104: Scatter density plot of “Solar zenith angle” against “Cloud top height” for 2025-03-28 to 2025-03-30.

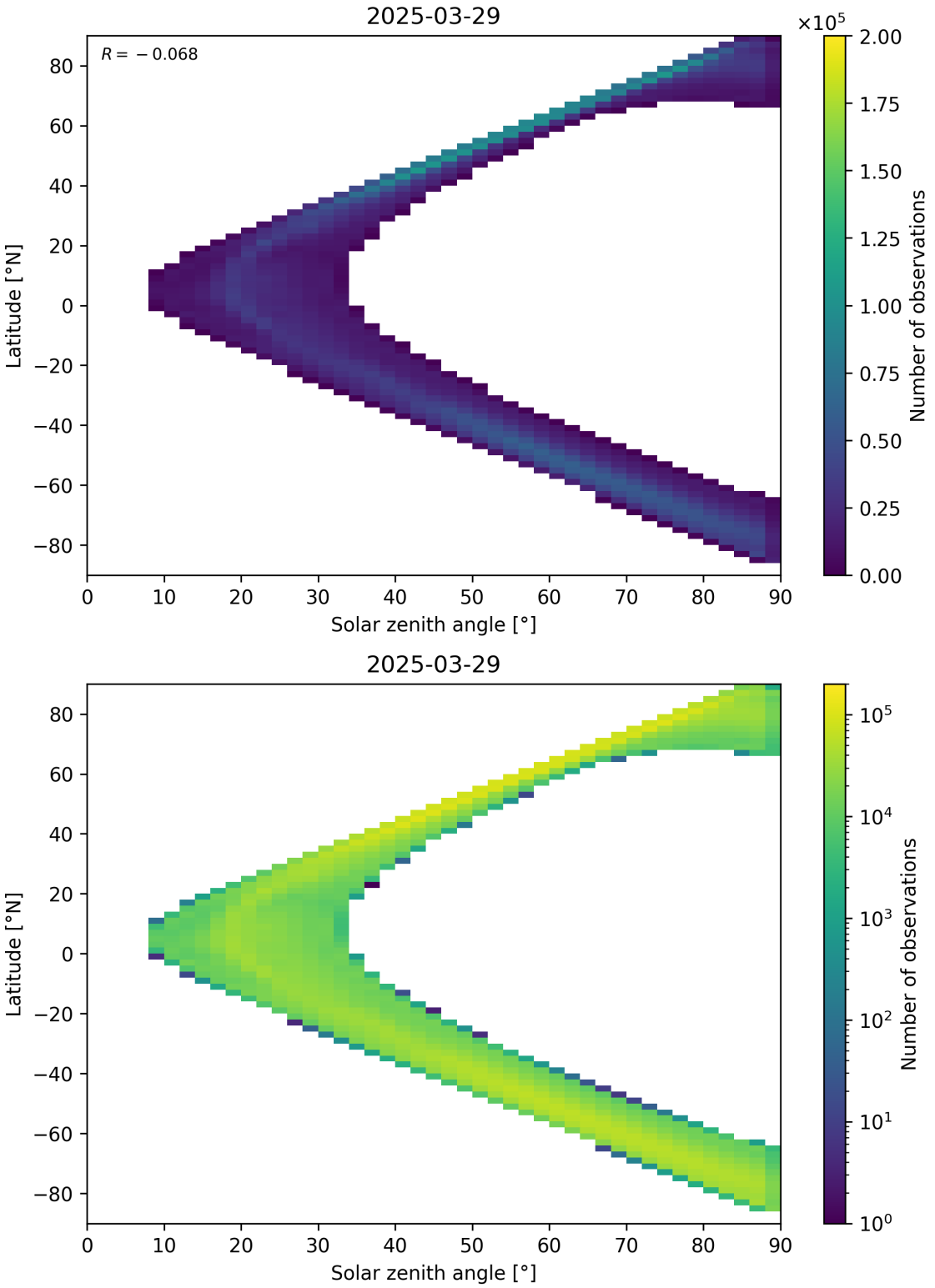


Figure 105: Scatter density plot of “Solar zenith angle” against “Latitude” for 2025-03-28 to 2025-03-30.

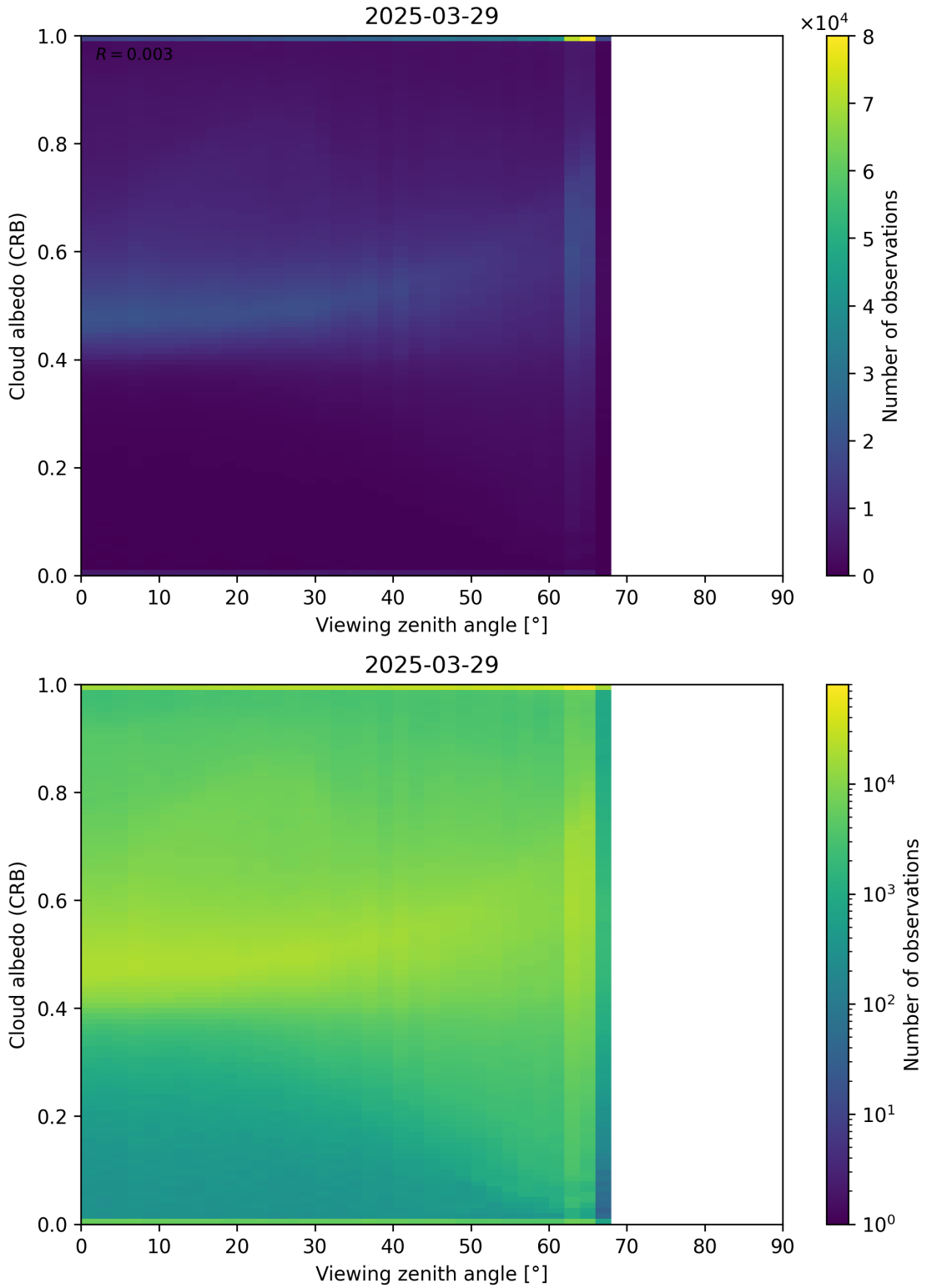


Figure 106: Scatter density plot of “Viewing zenith angle” against “Cloud albedo (CRB)” for 2025-03-28 to 2025-03-30.

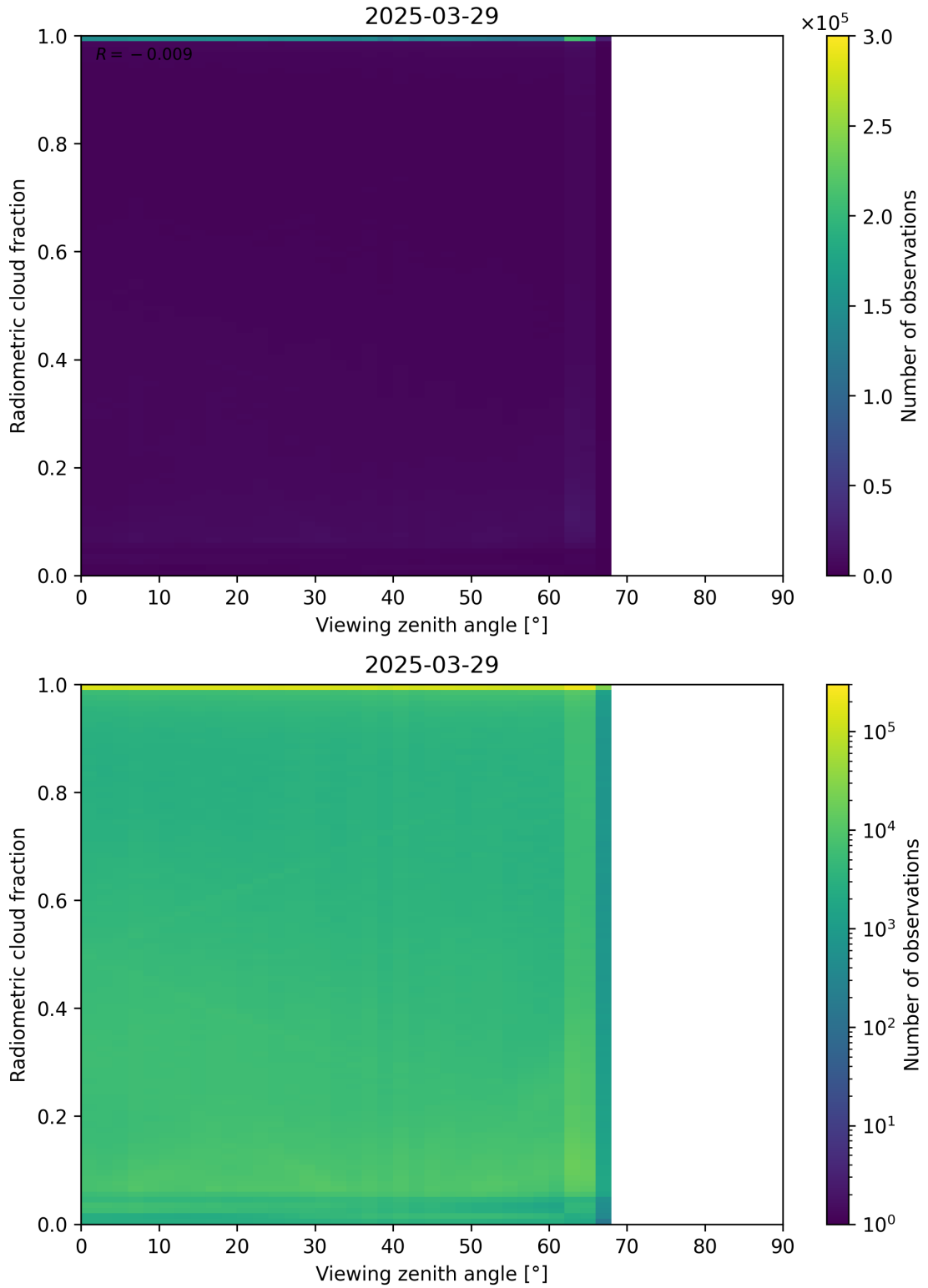


Figure 107: Scatter density plot of “Viewing zenith angle” against “Radiometric cloud fraction” for 2025-03-28 to 2025-03-30.

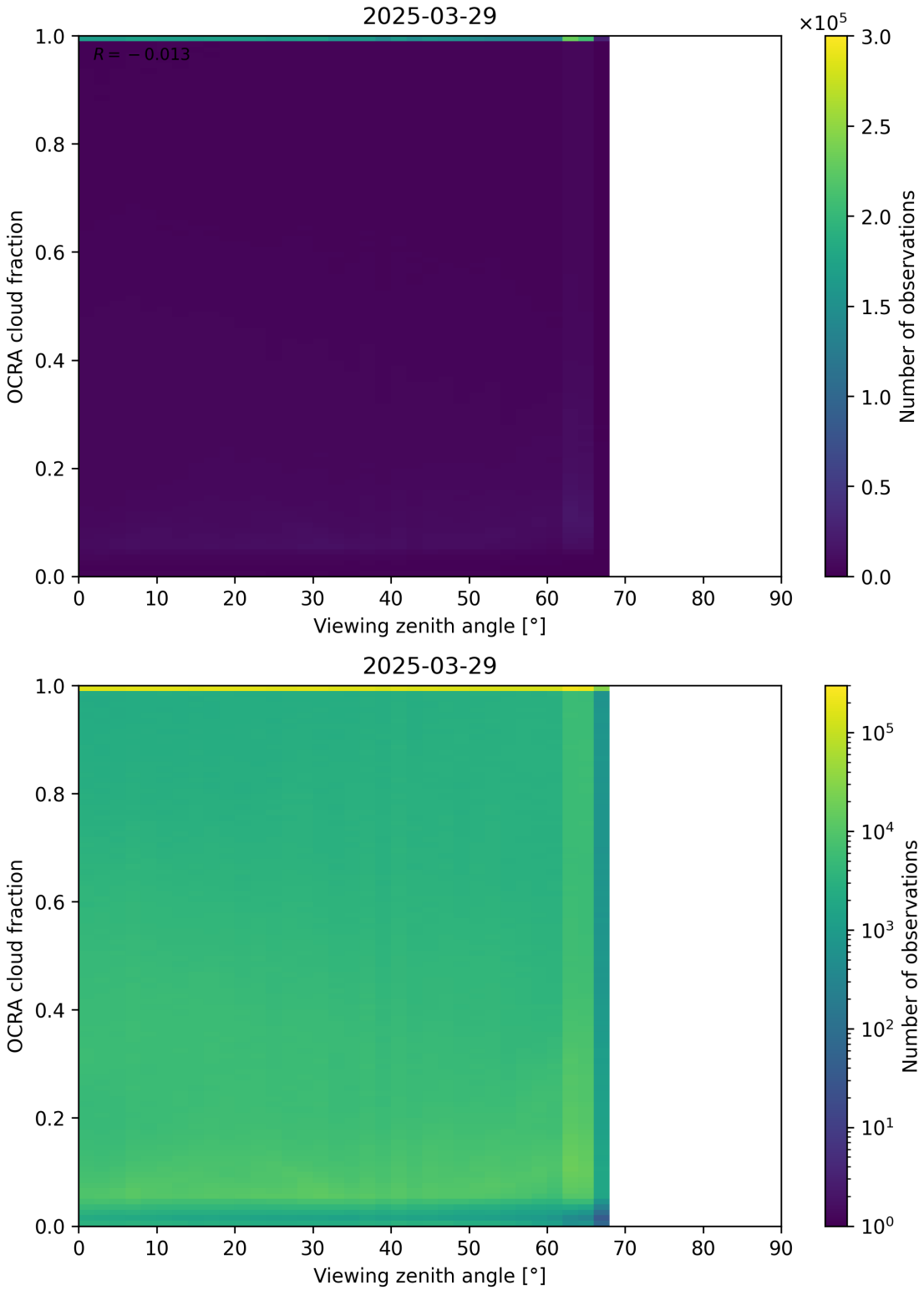


Figure 108: Scatter density plot of “Viewing zenith angle” against “OCRA cloud fraction” for 2025-03-28 to 2025-03-30.

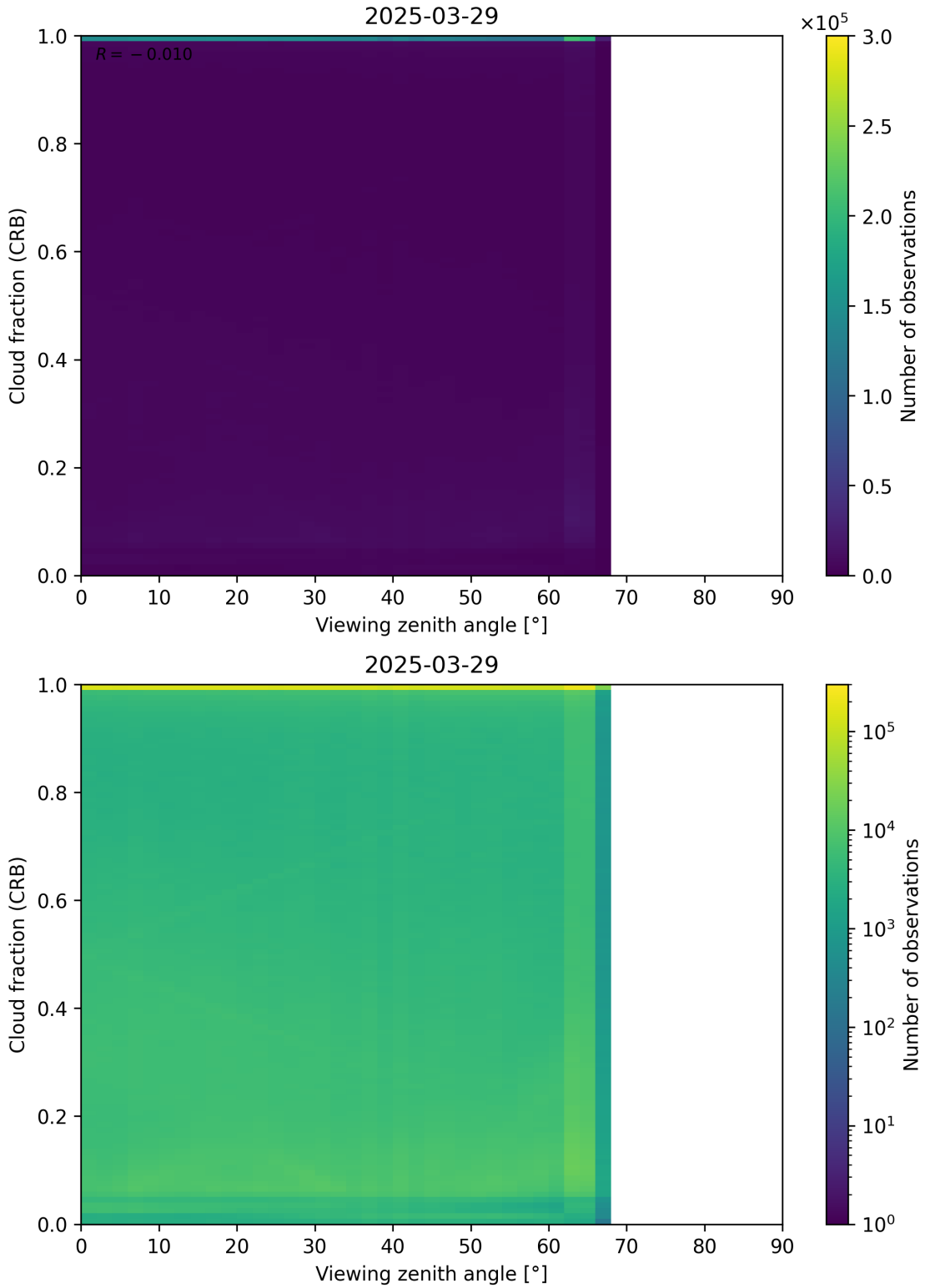


Figure 109: Scatter density plot of “Viewing zenith angle” against “Cloud fraction (CRB)” for 2025-03-28 to 2025-03-30.

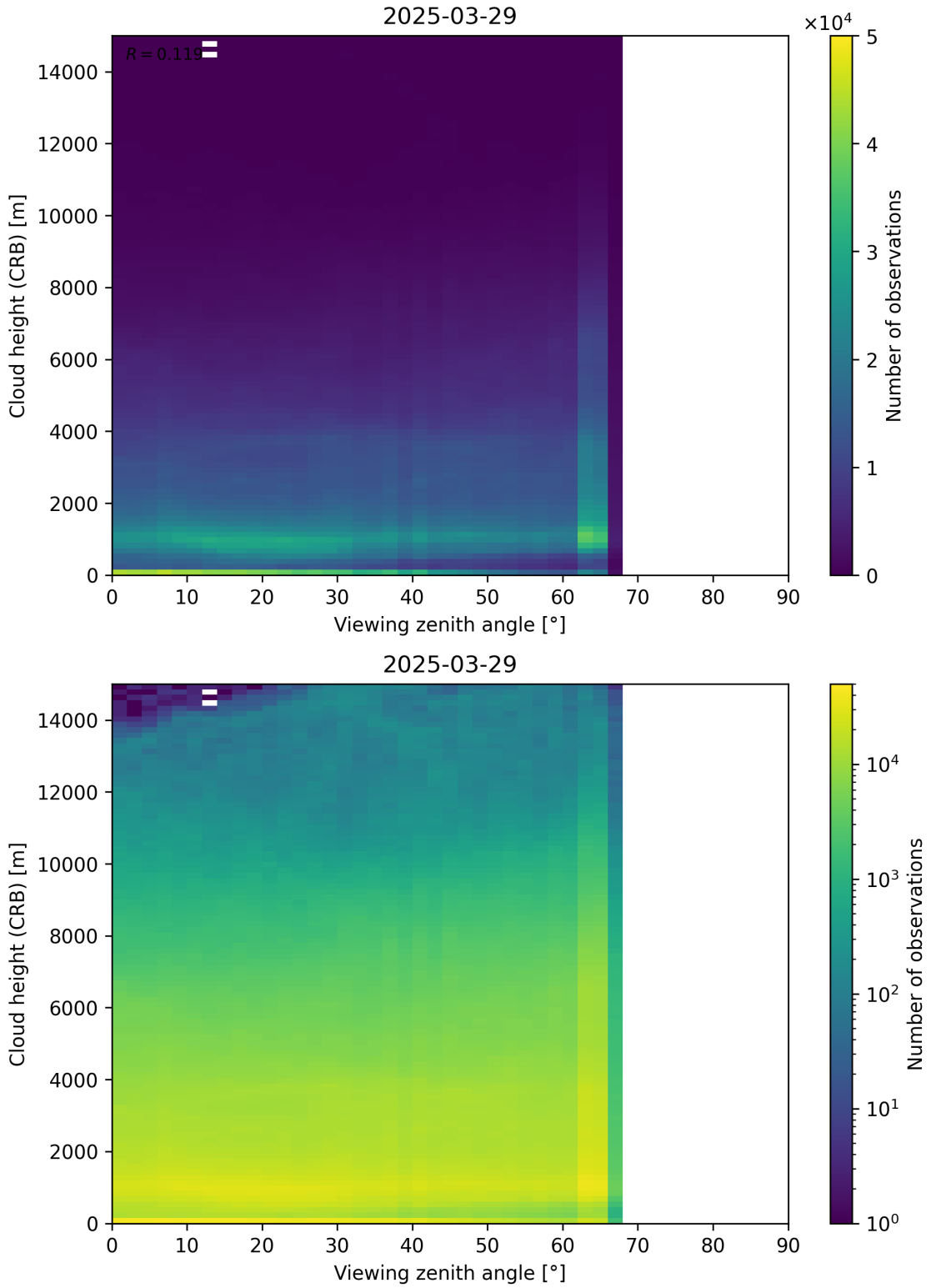


Figure 110: Scatter density plot of “Viewing zenith angle” against “Cloud height (CRB)” for 2025-03-28 to 2025-03-30.

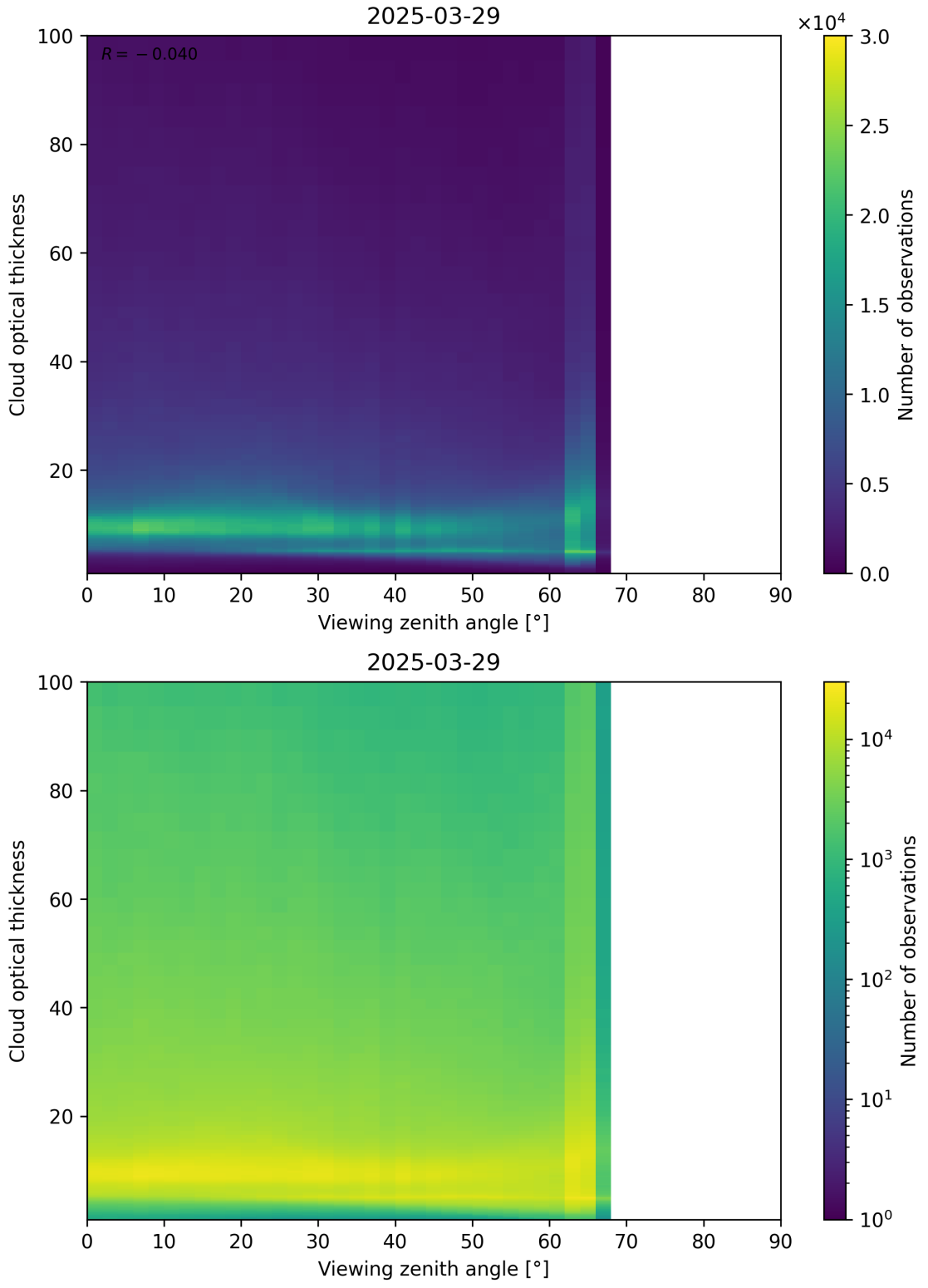


Figure 111: Scatter density plot of “Viewing zenith angle” against “Cloud optical thickness” for 2025-03-28 to 2025-03-30.

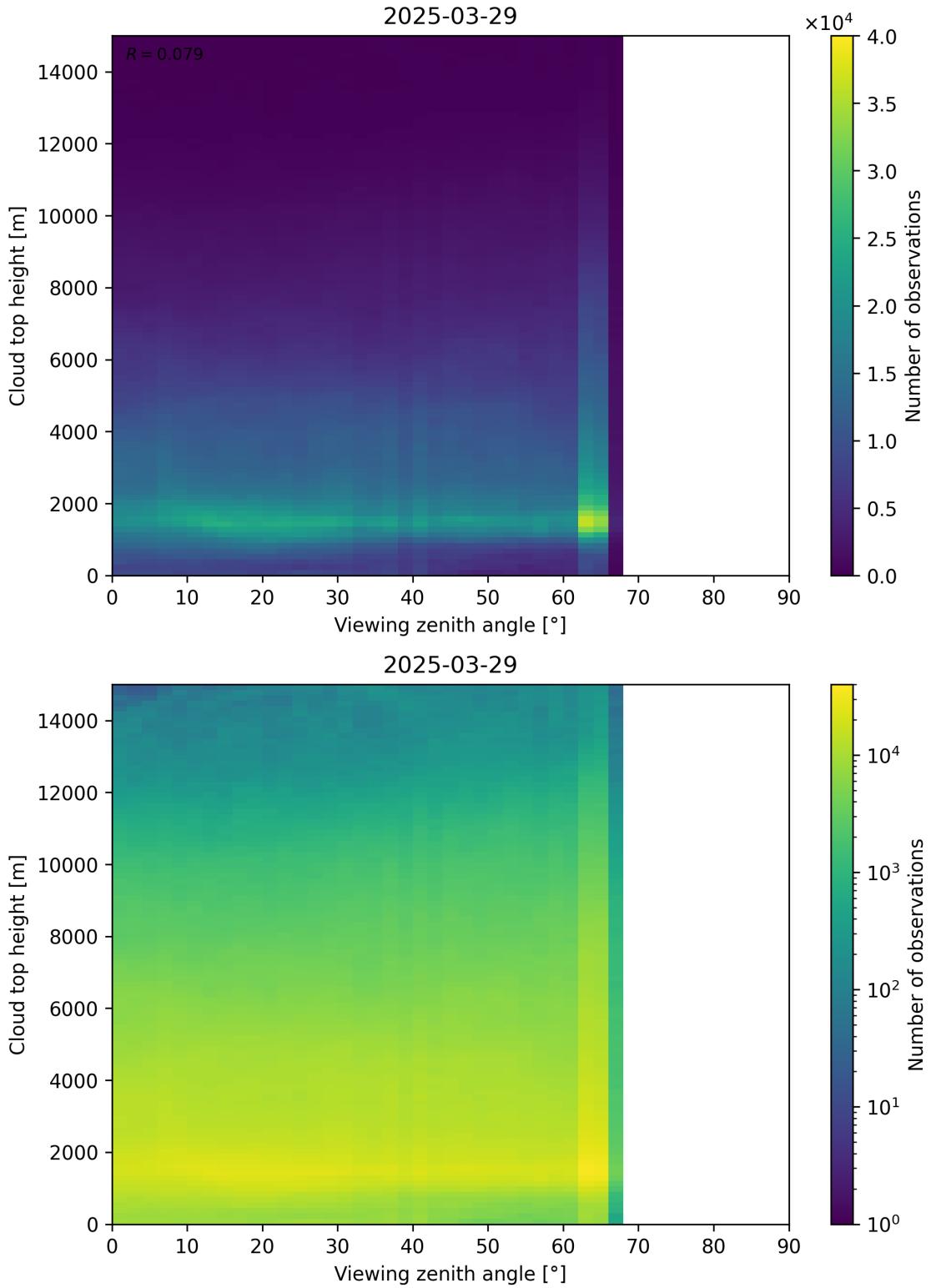


Figure 112: Scatter density plot of “Viewing zenith angle” against “Cloud top height” for 2025-03-28 to 2025-03-30.

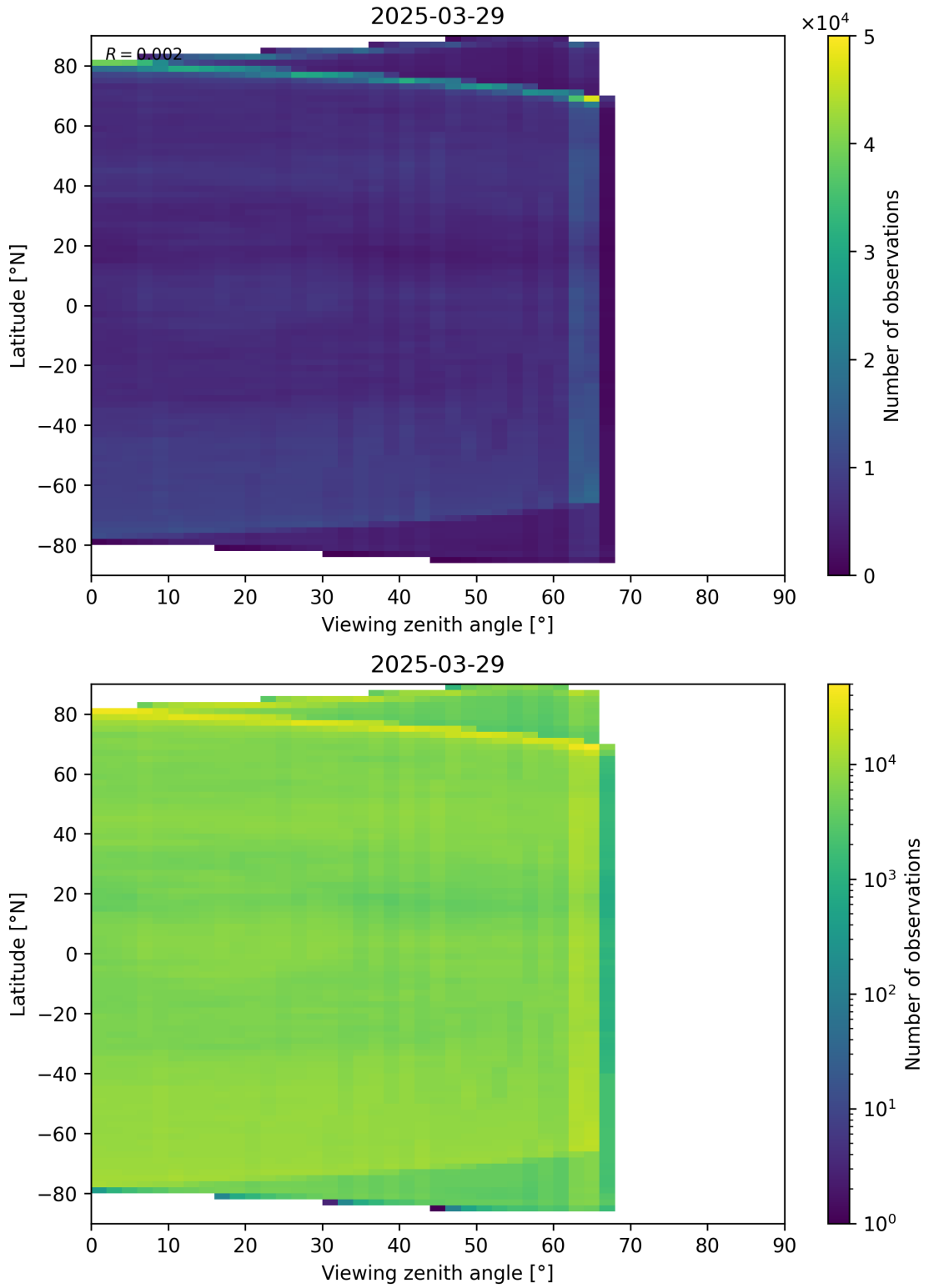
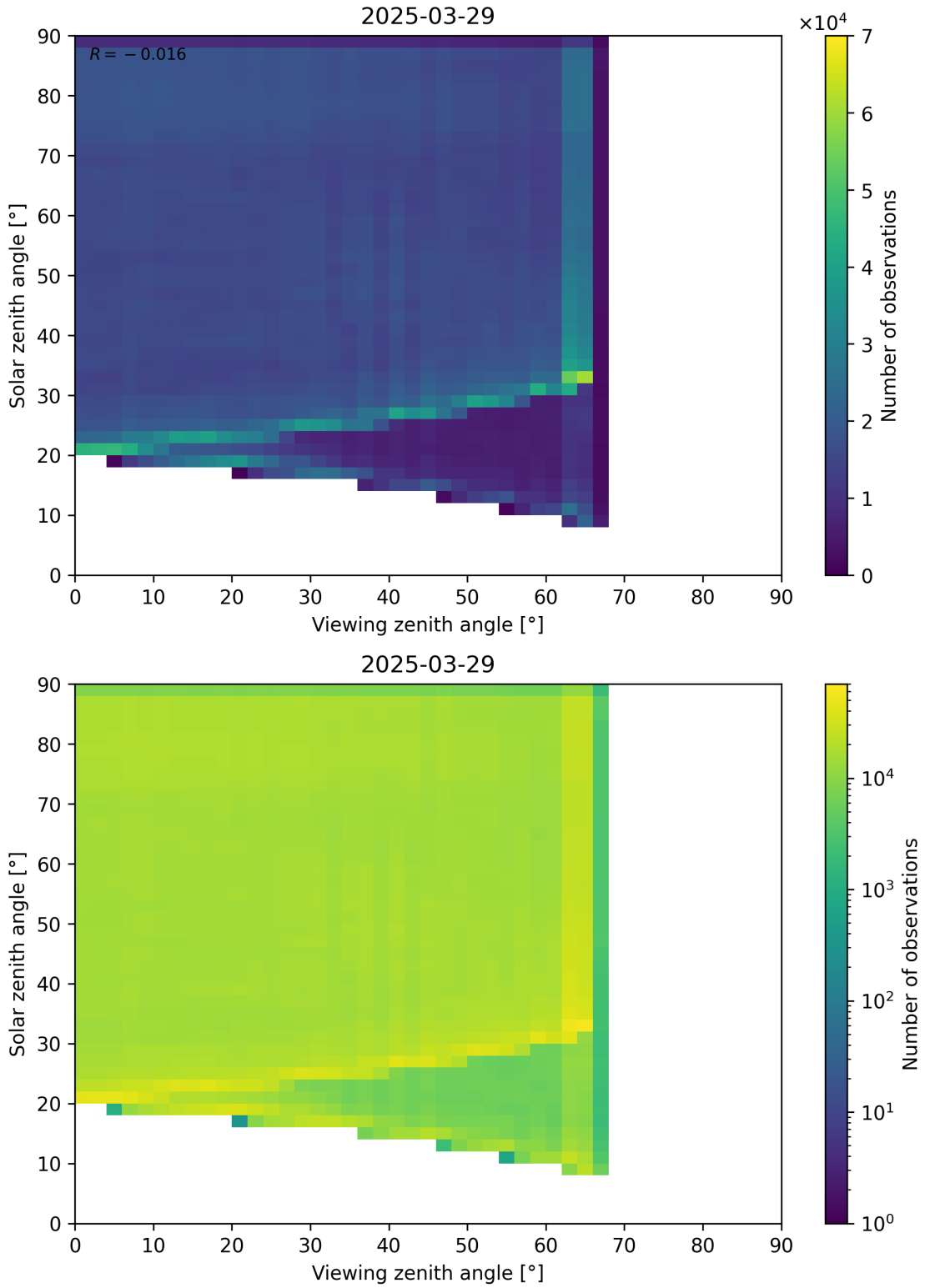


Figure 113: Scatter density plot of “Viewing zenith angle” against “Latitude” for 2025-03-28 to 2025-03-30.



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