S1 Numerical values of plotted data

Tables S1 through S11 list the numerical values plotted in the Figures in the main text as well as additional information about the data in each plot. Note that all values listed here have been rounded in accordance with their uncertainties and might therefore appear slightly different in plots.

Table S1: Numerical values plotted in Fig. 2. The mean for all datasets is $\langle\alpha\rangle = 0.95 \pm 0.08$.

Dataset	α	$a_{\min}$ (km^2)	$a_{\max}$ (km^2)	Total Count in Histogram	Dates Examined
MODIS 250m	0.90 ± 0.02	≤ 3	$\geq 2 \times 10^4$	1×10^5 (96763)	01 January 2021 to 10 January 2021
MODIS 1km	0.943 ± 0.008	$\leq 1 \times 10^1$	$\geq 3 \times 10^4$	3×10^8 (298407040)	01 January 2012 to 01 January 2013
VIIRS	0.98 ± 0.01	$\leq 1 \times 10^1$	$\geq 4 \times 10^4$	6×10^8 (551060352)	01 January 2021 to 01 January 2022
POLDER	0.90 ± 0.02	$\leq 8 \times 10^1$	$\geq 5 \times 10^3$	3×10^5 (305733)	01 January 2012 to 01 January 2013
METEOSAT 9	0.94 ± 0.01	$\leq 1 \times 10^2$	$\geq 3 \times 10^5$	3×10^6 (3244516)	01 January 2021 to 01 January 2022
METEOSAT 11	0.96 ± 0.02	$\leq 1 \times 10^2$	$\geq 2 \times 10^5$	4×10^6 (3784562)	01 January 2021 to 01 January 2022
Himawari	0.99 ± 0.02	$\leq 4 \times 10^1$	$\geq 2 \times 10^5$	8×10^6 (7564319)	01 January 2021 to 01 January 2022
EPIC	0.91 ± 0.02	$\leq 9 \times 10^3$	$\geq 4 \times 10^5$	6×10^5 (627068)	01 January 2017 to 01 January 2018
GOES West	0.99 ± 0.02	$\leq 4 \times 10^1$	$\geq 4 \times 10^5$	8×10^6 (8462897)	01 January 2021 to 01 January 2022
GOES East	1.01 ± 0.02	$\leq 4 \times 10^1$	$\geq 3 \times 10^5$	8×10^6 (8045113)	01 January 2021 to 01 January 2022

Table S2: Numerical values plotted in Fig. 3. The mean for all satellite datasets (excluding SAM) is $\langle \beta = 1.26 \rangle \pm 0.06$.

Dataset	β	$p_{\min}$ (km)	$p_{\max}$ (km)	Total Count in Histogram	Dates Examined
MODIS 250m	1.22 ± 0.02	≤ 3	$\geq 3 \times 10^4$	5×10^5 (524171)	01 January 2021 to 10 January 2021
MODIS 1km	1.22 ± 0.02	$\leq 1 \times 10^1$	$\geq 1 \times 10^4$	5×10^8 (517218432)	01 January 2012 to 01 January 2013
VIIRS	1.26 ± 0.03	$\leq 1 \times 10^1$	$\geq 2 \times 10^4$	1×10^9 (1173681920)	01 January 2021 to 01 January 2022
POLDER	1.25 ± 0.03	$\leq 8 \times 10^1$	$\geq 8 \times 10^2$	1×10^5 (134915)	01 January 2012 to 01 January 2013
METEOSAT 9	1.25 ± 0.01	$\leq 3 \times 10^1$	$\geq 3 \times 10^4$	6×10^6 (5775306)	01 January 2021 to 01 January 2022
METEOSAT 11	1.27 ± 0.01	$\leq 3 \times 10^1$	$\geq 2 \times 10^4$	6×10^6 (6466694)	01 January 2021 to 01 January 2022
Himawari	1.30 ± 0.02	$\leq 2 \times 10^1$	$\geq 5 \times 10^4$	1×10^7 (9946716)	01 January 2021 to 01 January 2022
GOES West	1.267 ± 0.005	$\leq 2 \times 10^1$	$\geq 5 \times 10^4$	1×10^7 (11779489)	01 January 2021 to 01 January 2022
GOES East	1.316 ± 0.008	$\leq 2 \times 10^1$	$\geq 3 \times 10^4$	1×10^7 (12494704)	01 January 2021 to 01 January 2022
EPIC	1.25 ± 0.01	$\leq 3 \times 10^2$	$\geq 1 \times 10^4$	2×10^6 (1869522)	01 January 2017 to 01 January 2018
SAM	0.98 ± 0.03	≤ 1	$\geq 1 \times 10^3$	4×10^6 (4143644)	Timesteps: 0000021600 to 0000045000

Table S3: Numerical values for VIIRS plotted in Fig. 4 for the northern midlatitude region (30°N to 60°N).

Dataset	Month	β	Total Count in Histogram	Dates Examined (Start/End)
VIIRS	Jan	1.28 ± 0.03	1×10^7 (11832716)	01 January 2021 to 01 February 2021
VIIRS	Feb	1.26 ± 0.03	1×10^7 (11235651)	01 February 2021 to 01 March 2021
VIIRS	Mar	1.28 ± 0.03	1×10^7 (11913838)	01 March 2021 to 01 April 2021
VIIRS	Apr	1.27 ± 0.03	1×10^7 (11172378)	01 April 2021 to 01 May 2021
VIIRS	May	1.27 ± 0.02	1×10^7 (12420857)	01 May 2021 to 01 June 2021
VIIRS	Jun	1.28 ± 0.03	1×10^7 (13869403)	01 June 2021 to 01 July 2021
VIIRS	Jul	1.28 ± 0.02	2×10^7 (16819652)	01 July 2021 to 01 August 2021
VIIRS	Aug	1.27 ± 0.02	2×10^7 (15563438)	01 August 2021 to 01 September 2021
VIIRS	Sept	1.26 ± 0.02	2×10^7 (15274810)	01 September 2021 to 01 October 2021
VIIRS	Oct	1.27 ± 0.03	1×10^7 (14316861)	01 October 2021 to 01 November 2021
VIIRS	Nov	1.29 ± 0.03	1×10^7 (11612482)	01 November 2021 to 01 December 2021
VIIRS	Dec	1.27 ± 0.03	1×10^7 (12388309)	01 December 2021 to 01 January 2022

Table S4: Numerical values for VIIRS plotted in Fig. 4 for the southern midlatitude region (60°S to 30°S).

Dataset	Month	β	Total Count in Histogram	Dates Examined (Start/End)
VIIRS	Jan	1.27 ± 0.03	1×10^7 (12760062)	01 January 2021 to 01 February 2021
VIIRS	Feb	1.28 ± 0.02	1×10^7 (11883713)	01 February 2021 to 01 March 2021
VIIRS	Mar	1.28 ± 0.03	1×10^7 (12439279)	01 March 2021 to 01 April 2021
VIIRS	Apr	1.28 ± 0.03	1×10^7 (12010962)	01 April 2021 to 01 May 2021
VIIRS	May	1.29 ± 0.03	1×10^7 (12073330)	01 May 2021 to 01 June 2021
VIIRS	Jun	1.31 ± 0.02	1×10^7 (11264441)	01 June 2021 to 01 July 2021
VIIRS	Jul	1.31 ± 0.02	1×10^7 (11542211)	01 July 2021 to 01 August 2021
VIIRS	Aug	1.29 ± 0.03	1×10^7 (10933924)	01 August 2021 to 01 September 2021
VIIRS	Sept	1.28 ± 0.03	1×10^7 (10506677)	01 September 2021 to 01 October 2021
VIIRS	Oct	1.27 ± 0.03	1×10^7 (11049687)	01 October 2021 to 01 November 2021
VIIRS	Nov	1.28 ± 0.02	1×10^7 (10384776)	01 November 2021 to 01 December 2021
VIIRS	Dec	1.27 ± 0.03	1×10^7 (11532109)	01 December 2021 to 01 January 2022

Table S5: Numerical values for MODIS 1km plotted in Fig. 4 for the northern midlatitude region (30°N to 60°N).

Dataset	Month	β	Total Count in Histogram	Dates Examined (Start/End)
MODIS 1km	Jan	1.22 ± 0.03	8×10^6 (7735275)	01 January 2012 to 01 February 2012
MODIS 1km	Feb	1.22 ± 0.03	7×10^6 (6994921)	01 February 2012 to 01 March 2012
MODIS 1km	Mar	1.21 ± 0.03	8×10^6 (7816003)	01 March 2012 to 01 April 2012
MODIS 1km	Apr	1.22 ± 0.03	7×10^6 (7441439)	01 April 2012 to 01 May 2012
MODIS 1km	May	1.21 ± 0.03	8×10^6 (7993072)	01 May 2012 to 01 June 2012
MODIS 1km	Jun	1.21 ± 0.03	8×10^6 (8015104)	01 June 2012 to 01 July 2012
MODIS 1km	Jul	1.22 ± 0.03	9×10^6 (8890881)	01 July 2012 to 01 August 2012
MODIS 1km	Aug	1.24 ± 0.02	9×10^6 (9147759)	01 August 2012 to 01 September 2012
MODIS 1km	Sept	1.24 ± 0.03	9×10^6 (8680551)	01 September 2012 to 01 October 2012
MODIS 1km	Oct	1.24 ± 0.03	8×10^6 (8231236)	01 October 2012 to 01 November 2012
MODIS 1km	Nov	1.24 ± 0.03	7×10^6 (7390606)	01 November 2012 to 01 December 2012
MODIS 1km	Dec	1.23 ± 0.03	7×10^6 (7330371)	01 December 2012 to 01 January 2013

Table S6: Numerical values for MODIS 1km plotted in Fig. 4 for the southern midlatitude region (60°S to 30°S).

Dataset	Month	β	Total Count in Histogram	Dates Examined (Start/End)
MODIS 1km	Jan	1.27 ± 0.02	5×10^6 (4843321)	01 January 2012 to 01 February 2012
MODIS 1km	Feb	1.27 ± 0.02	5×10^6 (4782315)	01 February 2012 to 01 March 2012
MODIS 1km	Mar	1.27 ± 0.02	4×10^6 (4497355)	01 March 2012 to 01 April 2012
MODIS 1km	Apr	1.28 ± 0.02	4×10^6 (4174592)	01 April 2012 to 01 May 2012
MODIS 1km	May	1.29 ± 0.02	4×10^6 (4461957)	01 May 2012 to 01 June 2012
MODIS 1km	Jun	1.32 ± 0.02	4×10^6 (4331315)	01 June 2012 to 01 July 2012
MODIS 1km	Jul	1.32 ± 0.02	4×10^6 (4261934)	01 July 2012 to 01 August 2012
MODIS 1km	Aug	1.28 ± 0.02	4×10^6 (4339969)	01 August 2012 to 01 September 2012
MODIS 1km	Sept	1.28 ± 0.02	4×10^6 (3975094)	01 September 2012 to 01 October 2012
MODIS 1km	Oct	1.27 ± 0.02	4×10^6 (4143936)	01 October 2012 to 01 November 2012
MODIS 1km	Nov	1.27 ± 0.02	4×10^6 (4260828)	01 November 2012 to 01 December 2012
MODIS 1km	Dec	1.26 ± 0.02	5×10^6 (4592295)	01 December 2012 to 01 January 2013

Table S7: Numerical values plotted in Fig. 5. The mean value for land is $\langle\beta\rangle = 1.25 \pm 0.05$, and the mean value for ocean is $\langle\beta\rangle = 1.28 \pm 0.04$.

Dataset	Surface Type	β	Total Count in Histogram	Dates Examined
GOES West	Land	1.24 ± 0.02	1×10^6 (1026350)	01 January 2021 to 01 January 2022
GOES West	Ocean	1.29 ± 0.02	1×10^7 (10782705)	01 January 2021 to 01 January 2022
GOES East	Land	1.267 ± 0.009	5×10^6 (5111640)	01 January 2021 to 01 January 2022
GOES East	Ocean	1.29 ± 0.01	8×10^6 (7515289)	01 January 2021 to 01 January 2022
METEOSAT 9	Land	1.22 ± 0.02	3×10^6 (2585362)	01 January 2021 to 01 January 2022
METEOSAT 9	Ocean	1.27 ± 0.02	3×10^6 (3238042)	01 January 2021 to 01 January 2022
METEOSAT 11	Land	1.25 ± 0.02	3×10^6 (2723026)	01 January 2021 to 01 January 2022
METEOSAT 11	Ocean	1.24 ± 0.02	4×10^6 (3816643)	01 January 2021 to 01 January 2022
VIIRS	Land	1.28 ± 0.04	3×10^8 (271358784)	01 January 2021 to 01 January 2022
VIIRS	Ocean	1.29 ± 0.03	9×10^8 (907178752)	01 January 2021 to 01 January 2022
MODIS 1km	Land	1.21 ± 0.03	2×10^8 (196269600)	01 January 2012 to 01 January 2013
MODIS 1km	Ocean	1.28 ± 0.02	3×10^8 (327173184)	01 January 2012 to 01 January 2013

Table S8: Numerical values plotted in Fig. 6.

Dataset	Latitude Band	β	Total Count in Histogram	Dates Examined
VIIRS	30° N to 60° N	1.28 ± 0.03	2×10^8 (158417344)	01 January 2021 to 01 January 2022
VIIRS	30° S to 30° N	1.28 ± 0.02	7×10^8 (660934016)	01 January 2021 to 01 January 2022
VIIRS	60° S to 30° S	1.28 ± 0.03	1×10^8 (138382944)	01 January 2021 to 01 January 2022
MODIS 1km	30° N to 60° N	1.22 ± 0.03	1×10^8 (95675152)	01 January 2012 to 01 January 2013
MODIS 1km	30° S to 30° N	1.25 ± 0.02	2×10^8 (247458704)	01 January 2012 to 01 January 2013
MODIS 1km	60° S to 30° S	1.28 ± 0.02	5×10^7 (52665044)	01 January 2012 to 01 January 2013

Table S9: Numerical values plotted in Fig. 8 for MODIS 250m. Cloudy pixels were defined as having optical reflectance R larger than the threshold (Section **??**).

Threshold	β	Cloud Fraction	Total Count in Histogram	Dates Examined
$R = 0.10$	1.25 ± 0.03	0.533	6×10^5 (584446)	01 January 2021 to 11 January 2021
$R = 0.20$	1.19 ± 0.02	0.368	5×10^5 (489397)	01 January 2021 to 11 January 2021
$R = 0.30$	1.11 ± 0.02	0.235	4×10^5 (381510)	01 January 2021 to 11 January 2021
$R = 0.50$	1.23 ± 0.05	0.064	2×10^5 (152857)	01 January 2021 to 11 January 2021
$R = 0.70$	1.19 ± 0.05	0.011	2×10^4 (22156)	01 January 2021 to 11 January 2021

Table S10: Numerical values plotted in Fig. 8 for SAM "compressed". Cloudy pixels were defined as having vertically-summed optical depth τ larger than the threshold.

Threshold	β	Cloud Fraction	Total Count in Histogram	Dates Examined
$\tau = 0.1$	1.44 ± 0.05	0.814	4×10^4 (43503)	Timesteps: 0000021600 to 0000045000
$\tau = 0.3$	1.27 ± 0.06	0.589	8×10^4 (80621)	Timesteps: 0000021600 to 0000045000
$\tau = 1$	1.19 ± 0.05	0.350	8×10^4 (79375)	Timesteps: 0000021600 to 0000045000
$\tau = 3$	1.13 ± 0.05	0.245	5×10^4 (50676)	Timesteps: 0000021600 to 0000045000
$\tau = 10$	1.01 ± 0.05	0.164	3×10^4 (28389)	Timesteps: 0000021600 to 0000045000
$\tau = 30$	0.93 ± 0.04	0.101	2×10^4 (16088)	Timesteps: 0000021600 to 0000045000
$\tau = 100$	0.99 ± 0.05	0.042	8×10^3 (8071)	Timesteps: 0000021600 to 0000045000
$\tau = 300$	0.94 ± 0.08	0.011	3×10^3 (2996)	Timesteps: 0000021600 to 0000045000

Table S11: Numerical values plotted in Fig. 8 for SAM "layers". Cloudy pixels were defined as those where all non-precipitating cloud condensate q_n, normalized by the saturation mixing ratio $q^\star$, was greater than a threshold.

Threshold	β	Cloud Fraction	Total Count in Histogram	Dates Examined
$q_n/q^\star = 0.003$	0.98 ± 0.03	0.151	5×10^6 (4526027)	Timesteps: 0000021600 to 0000045000
$q_n/q^\star = 0.01$	0.98 ± 0.03	0.133	4×10^6 (4143644)	Timesteps: 0000021600 to 0000045000
$q_n/q^\star = 0.03$	0.96 ± 0.03	0.092	3×10^6 (3345006)	Timesteps: 0000021600 to 0000045000
$q_n/q^\star = 0.1$	0.97 ± 0.03	0.024	1×10^6 (1365900)	Timesteps: 0000021600 to 0000045000

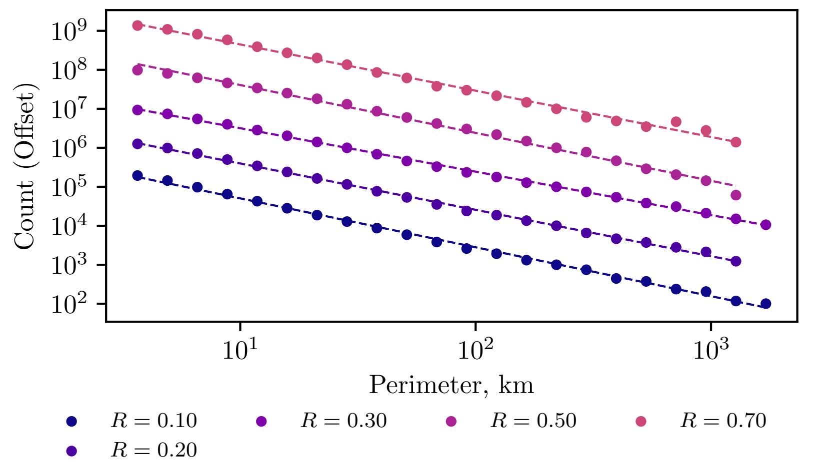

Figure S1: Cloud perimeter histograms from which values of β are calculated for MODIS 250m in Fig. 8. Values for β are calculated using a linear regression (dashed lines) as described in Sect. 4.3.

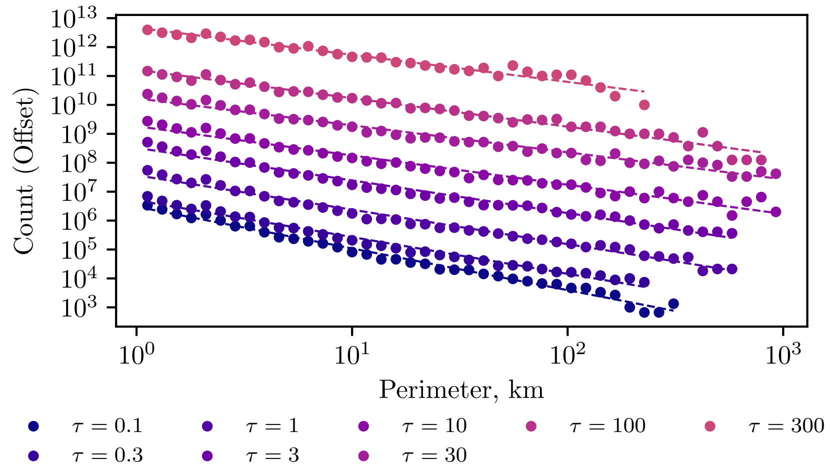

Figure S2: Cloud perimeter histograms from which values of β are calculated for SAM Compressed in Fig. 8. Values for β are calculated using a linear regression (dashed lines) as described in Sect. 4.3.

S2 Histograms for Fig. 8

Figures S1, S2, and S3 display the cloud perimeter histograms from which values of β are calculated in Fig. 8 for the MODIS optical reflectance, SAM compressed, and SAM layers cases, respectively.

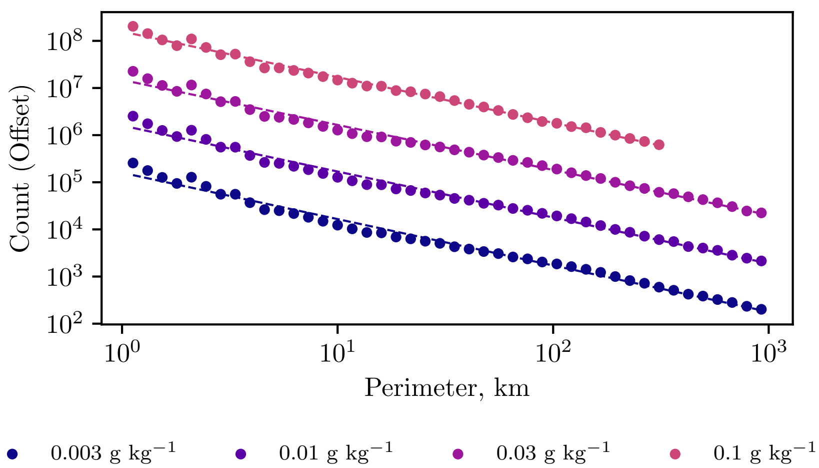

Figure S3: Cloud perimeter histograms from which values of β are calculated for SAM Layers in Fig. 8. Values for β are calculated using a linear regression (dashed lines) as described in Sect. 4.3.