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Toward less subjective metrics for quantifying the shape and organization of clouds

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Here we compute the parameters β, D_i, D_c, and D_{box} for varying dataset sizes. We consider reflectance thresholds $R = 0.1$, $R = 0.2$, and $R = 0.3$. Without replacement, a varying number of images are randomly selected from the ensemble of 72 images and each parameter is calculated for the subset as described in the text. All thresholds and methodological considerations are identical to those used for the full dataset in the main text. As can be seen in Fig. S1, when the parameters are computed using only one or two images, their values can differ by as much as 0.3, although the individual fractal dimension shows less dependence. Once the dataset is composed of at least 10 to 15 images, the resulting parameters converge to a value close to that obtained using all 72 images. This suggests that our full dataset of 72 images is large enough that statistical uncertainty arising from the finite sample size is negligible.

As a note, in Appendix C, values for β are only reported if the filtered distribution spans at least two orders of magnitude, as recommended by Stumpf and Porter (2012). In this section we relax this criterion to 1.5 orders of magnitude due to the smaller dataset size. This choice does not affect values for β, only whether they are reported.

References

Stumpf, M. P. H. and Porter, M. A.: Critical Truths About Power Laws, Science, 335, 665–666, https://doi.org/10.1126/science.1216142, 2012.

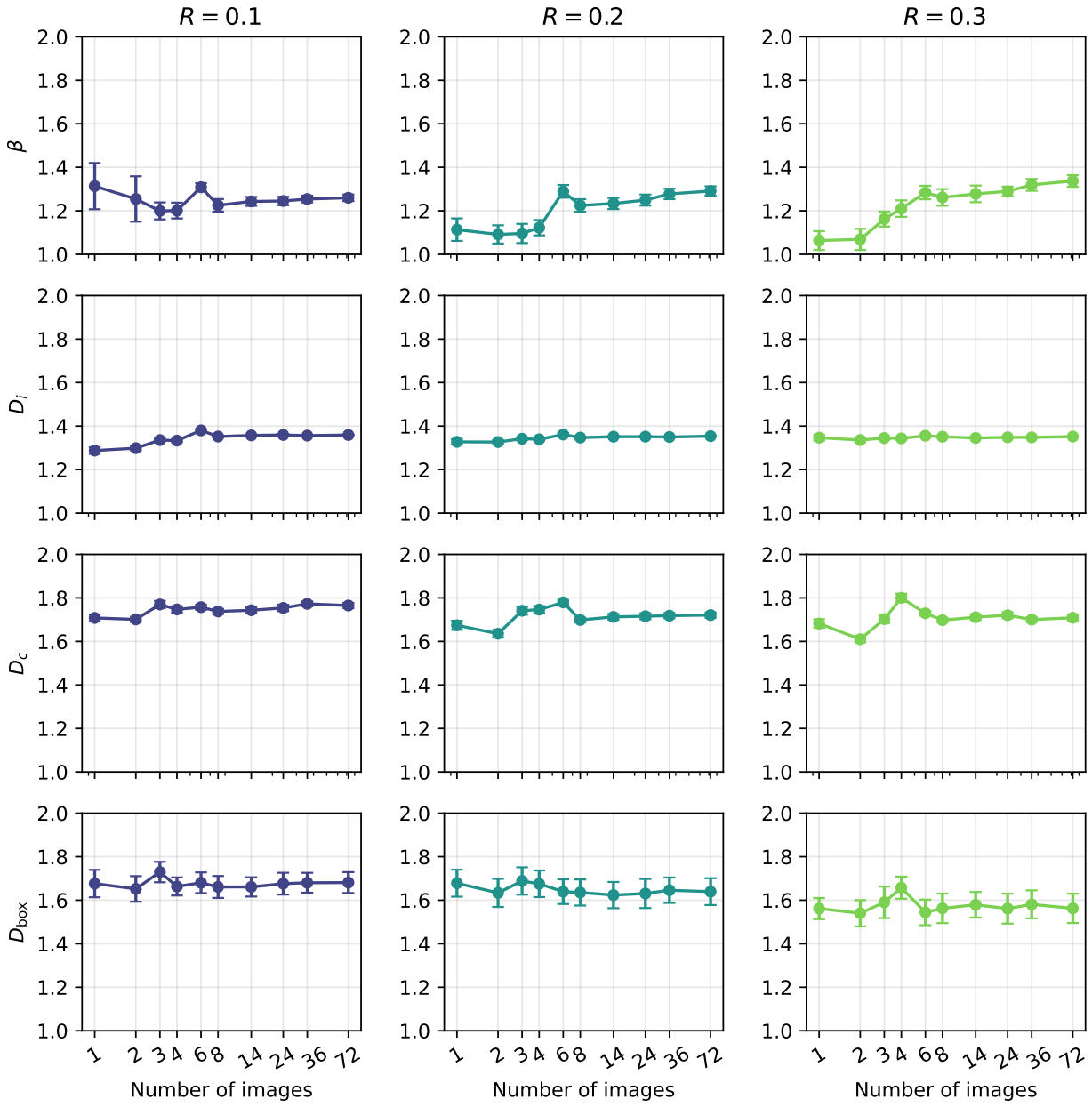

Figure S1: Parameter values computed as in the main text but for randomly selected subsets of the MODIS dataset.