Supplement of Atmos. Chem. Phys., 25, 8785–8804, 2025
https://doi.org/10.5194/acp-25-8785-2025-supplement

Atmospheric Chemistry and Physics
Open Access

Supplement of

Light scattering and microphysical properties of atmospheric bullet rosette ice crystals

Shawn W. Wagner et al.

Correspondence to: Shawn W. Wagner (shawn.wagner@und.edu) and Emma Järvinen (jaervinen@uni-wuppertal.de)

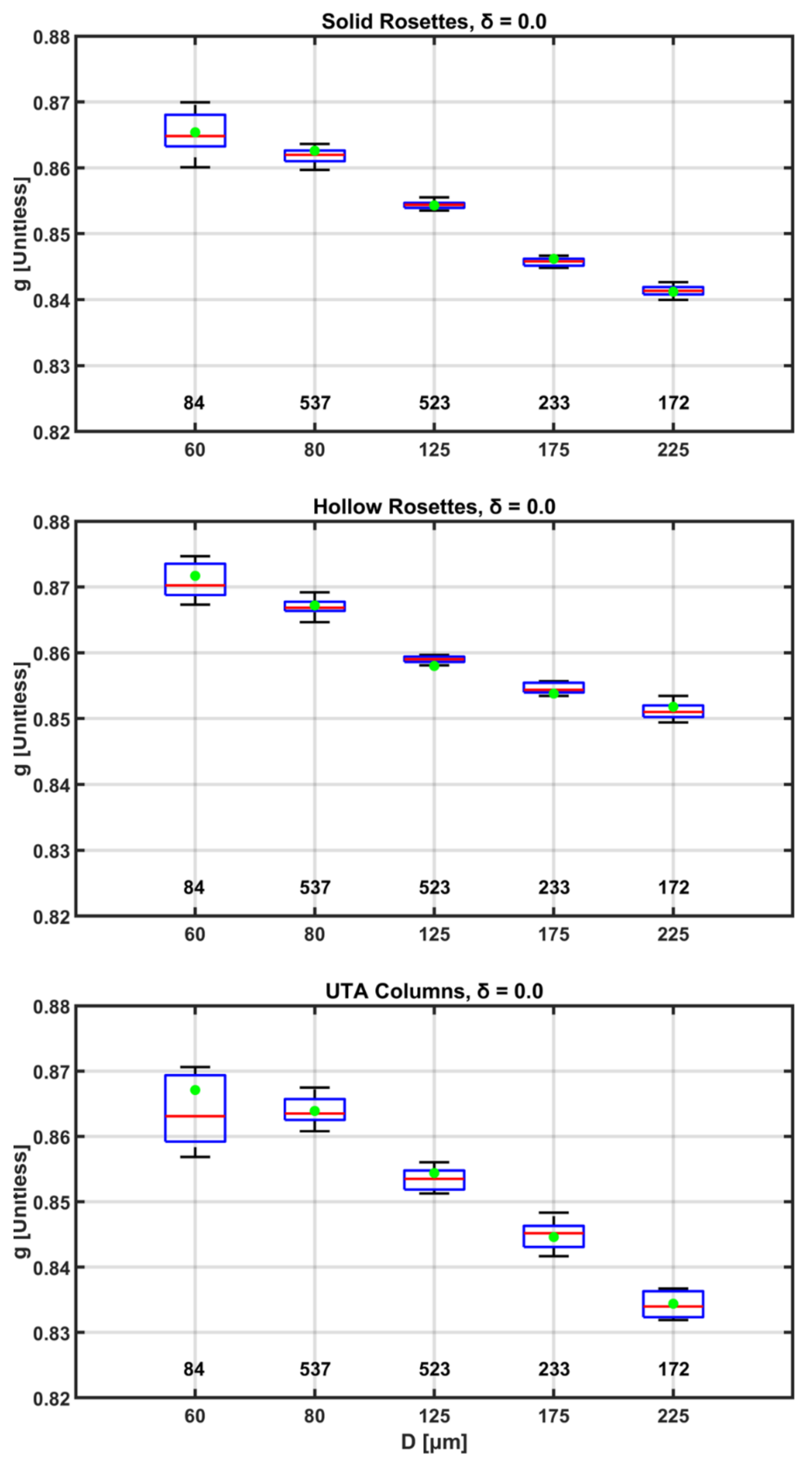

Figure S1: Statistical analysis of the asymmetry parameter (g) versus the area equivalent diameter (D) of modeled rosettes and columns using the uniform tilted angle (UTA) method, with the distortion parameter (δ) as 0.0. Boxes indicate the 75th percentile, 25th percentile, and median of ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. Green dots indicate the g values from the singular runs with 10,000 orientations. The values below the boxplots indicate the number of orientations applied to the ten model runs.

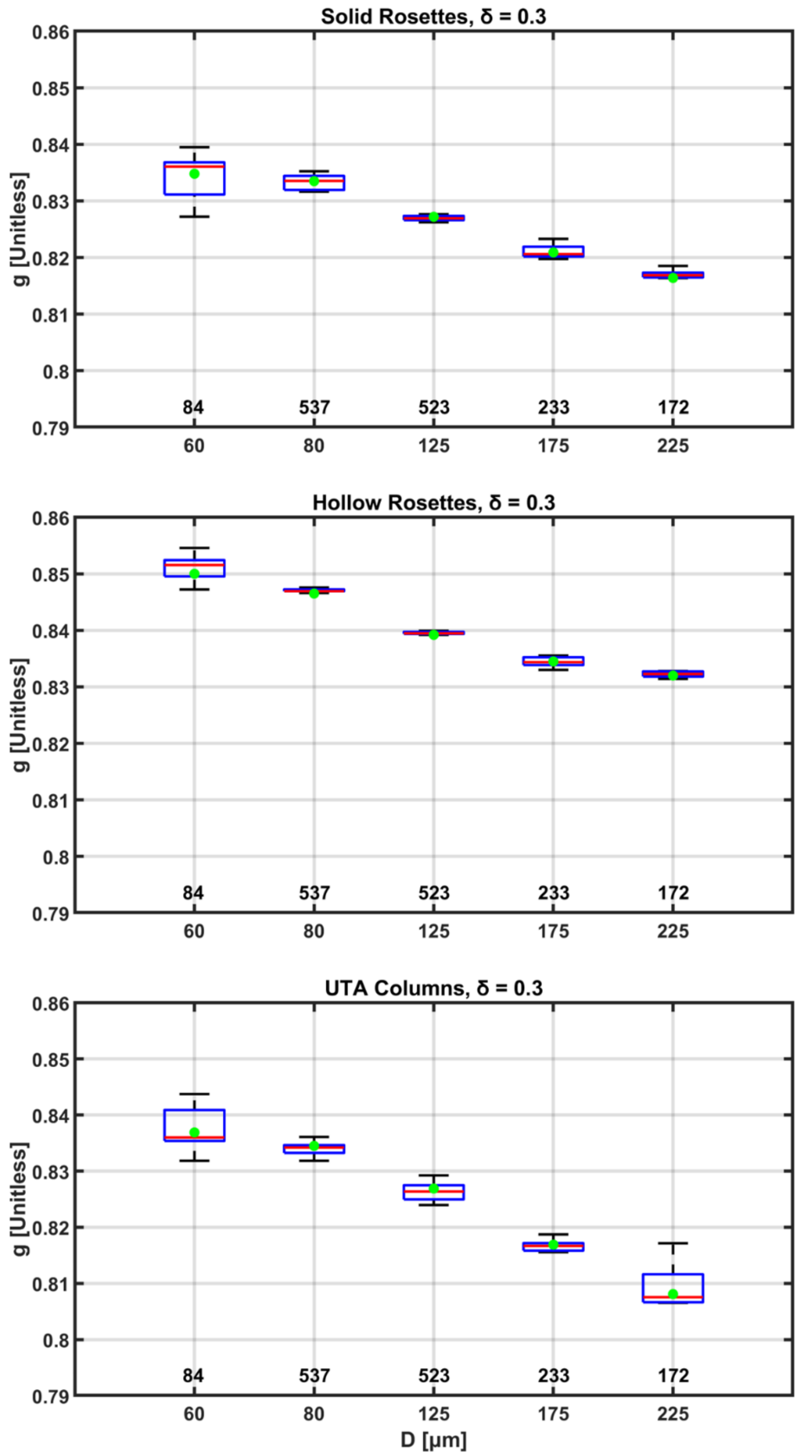

Figure S2: Statistical analysis of the asymmetry parameter (g) versus the area equivalent diameter (D) of modeled rosettes and columns using the uniform tilted angle (UTA) method, with the distortion parameter (δ) as 0.3. Boxes indicate the 75th percentile, 25th percentile, and median of ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. Green dots indicate the g values from the singular runs with 10,000 orientations. The values below the boxplots indicate the number of orientations applied to the ten model runs.

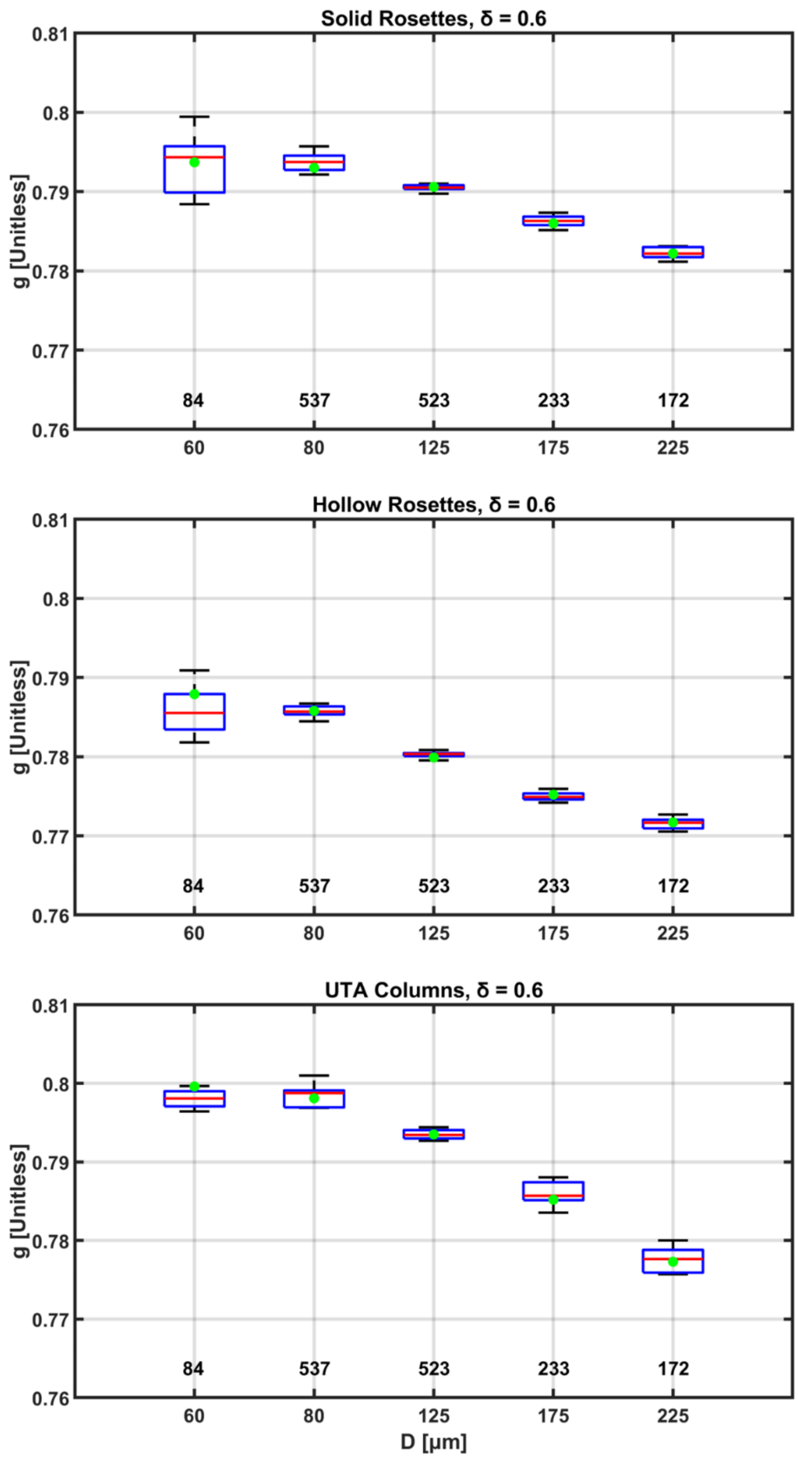

Figure S3: Statistical analysis of the asymmetry parameter (g) versus the area equivalent diameter (D) of modeled rosettes and columns using the uniform tilted angle (UTA) method, with the distortion parameter (δ) as 0.6. Boxes indicate the 75th percentile, 25th percentile, and median of ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. Green dots indicate the g values from the singular runs with 10,000 orientations. The values below the boxplots indicate the number of orientations applied to the ten model runs.

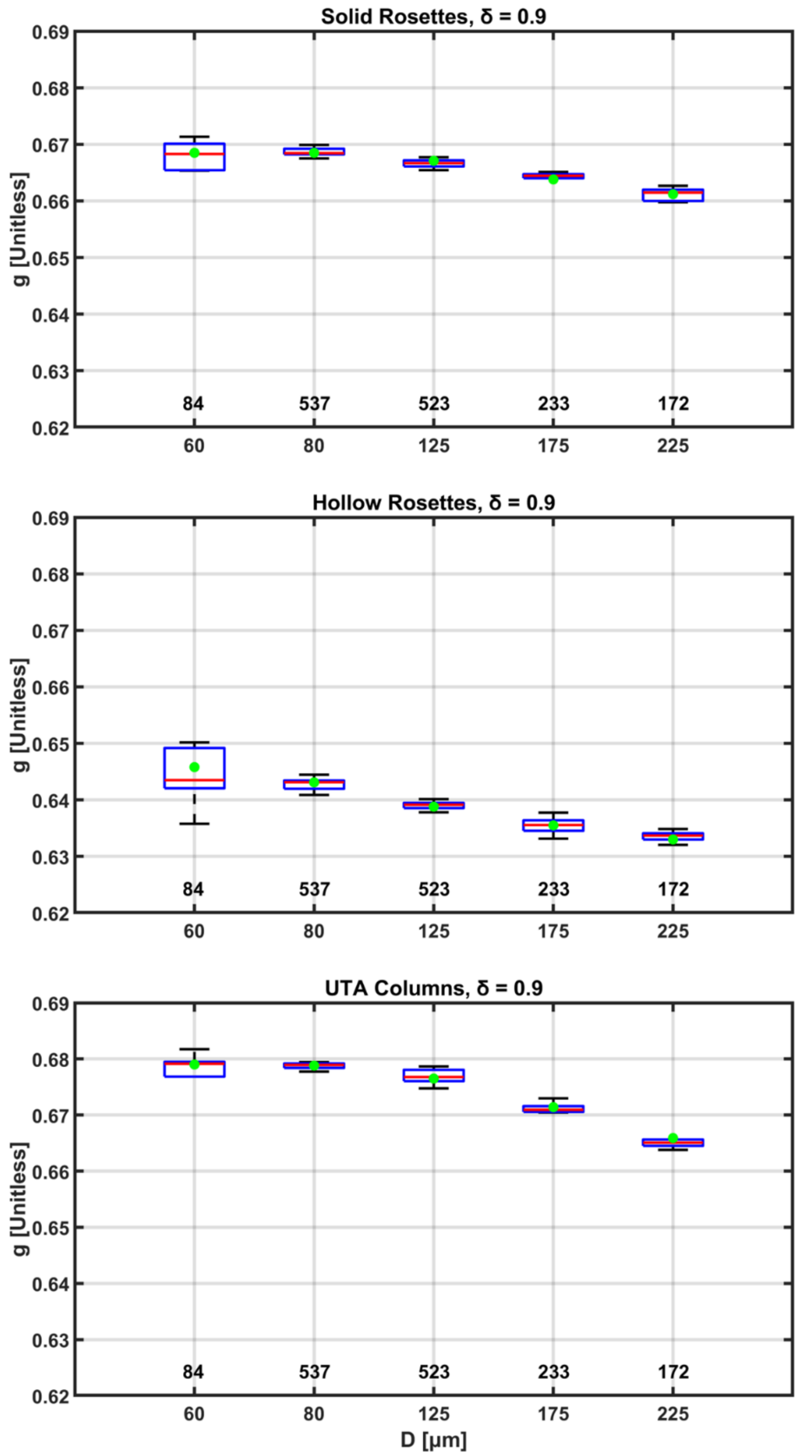

Figure S4: Statistical analysis of the asymmetry parameter (g) versus the area equivalent diameter (D) of modeled rosettes and columns using the uniform tilted angle (UTA) method, with the distortion parameter (δ) as 0.9. Boxes indicate the 75th percentile, 25th percentile, and median of ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. Green dots indicate the g values from the singular runs with 10,000 orientations. The values below the boxplots indicate the number of orientations applied to the ten model runs.

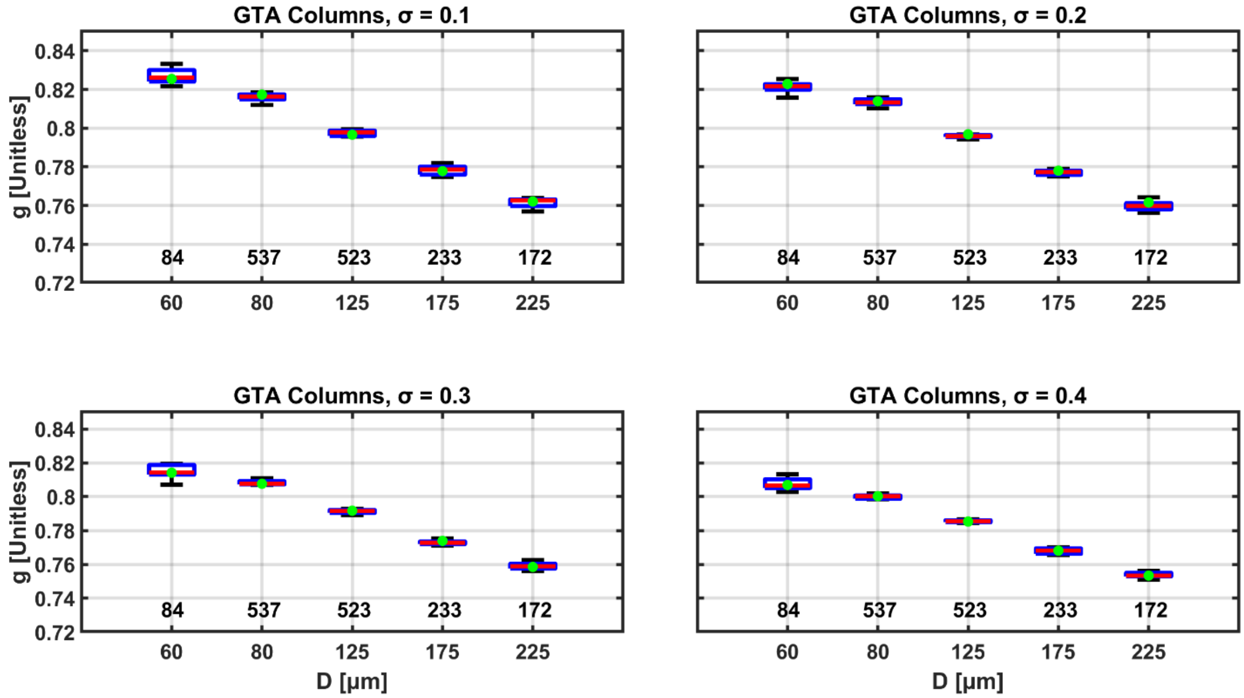

Figure S5: Statistical analysis of the asymmetry parameter (g) versus the area equivalent diameter (D) of modeled columns using the Gaussian tilted angle (GTA) method, with the complexity parameter (σ) ranging from 0.1 to 0.4. Boxes indicate the 75th percentile, 25th percentile, and median of ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. Green dots indicate the g values from the singular runs with 10,000 orientations. The values below the boxplots indicate the number of orientations applied to the ten model runs.

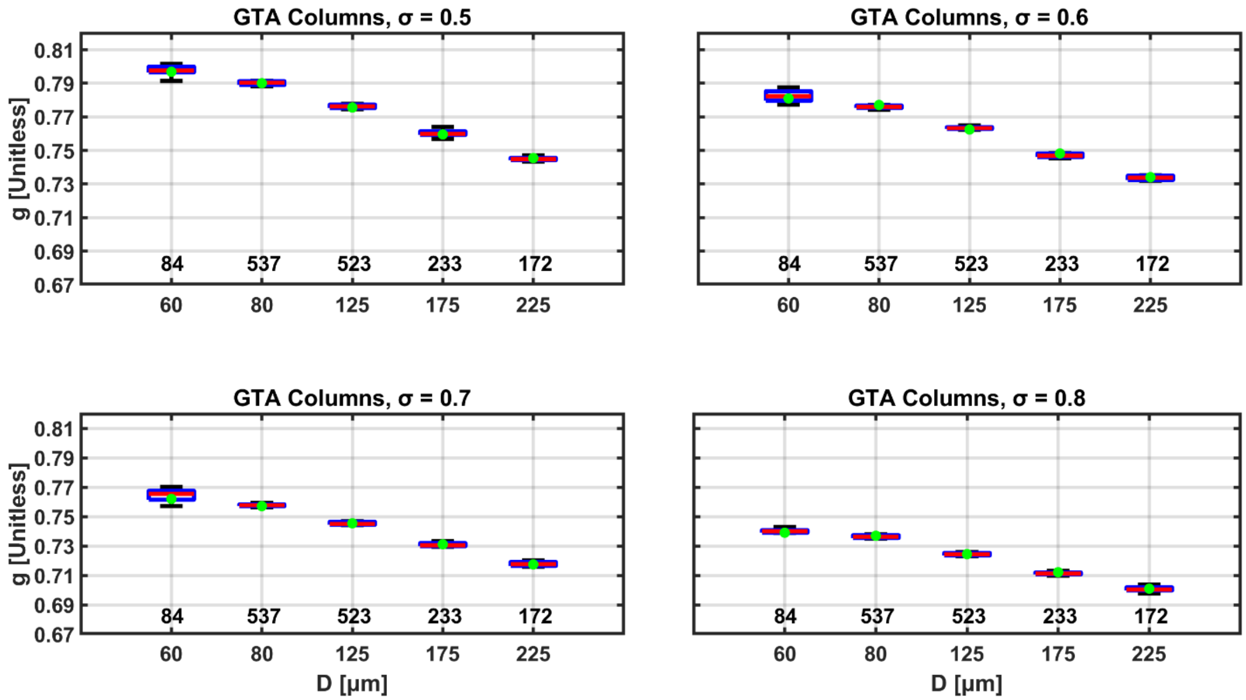

Figure S6: Statistical analysis of the asymmetry parameter (g) versus the area equivalent diameter (D) of modeled columns using the Gaussian tilted angle (GTA) method, with the complexity parameter (σ) ranging from 0.5 to 0.8. Boxes indicate the 75th percentile, 25th percentile, and median of ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. Green dots indicate the g values from the singular runs with 10,000 orientations. The values below the boxplots indicate the number of orientations applied to the ten model runs.

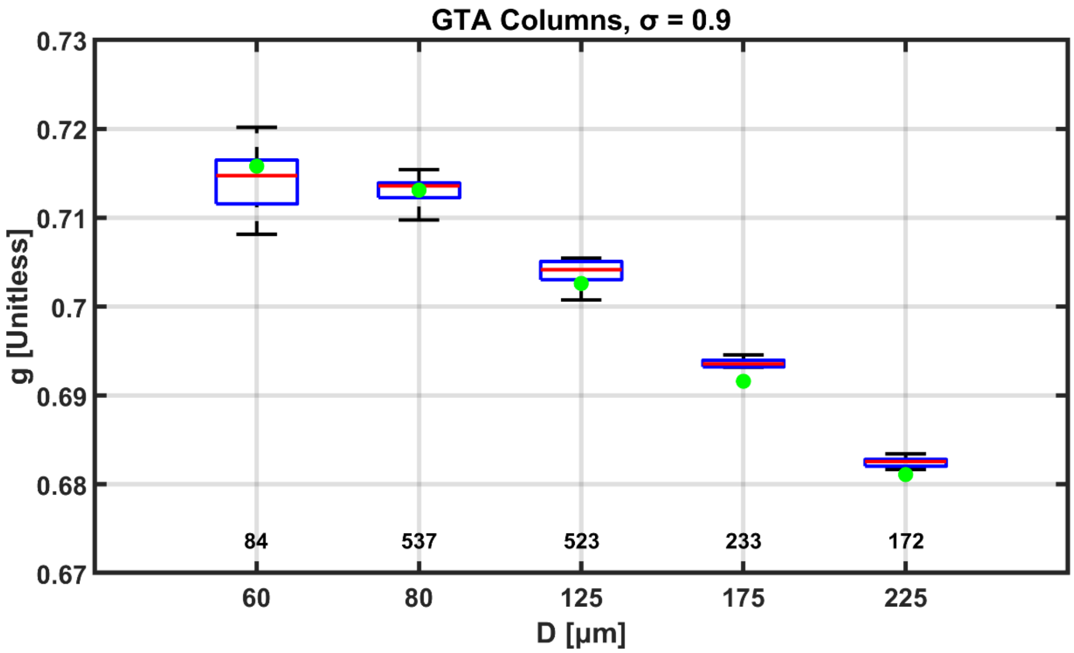

Figure S7: Statistical analysis of the asymmetry parameter (g) versus the area equivalent diameter (D) of modeled columns using the Gaussian tilted angle (GTA) method, with the complexity parameter (σ) as from 0.9. Boxes indicate the 75th percentile, 25th percentile, and median of ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. Green dots indicate the g values from the singular runs with 10,000 orientations. The values below the boxplots indicate the number of orientations applied to the ten model runs.

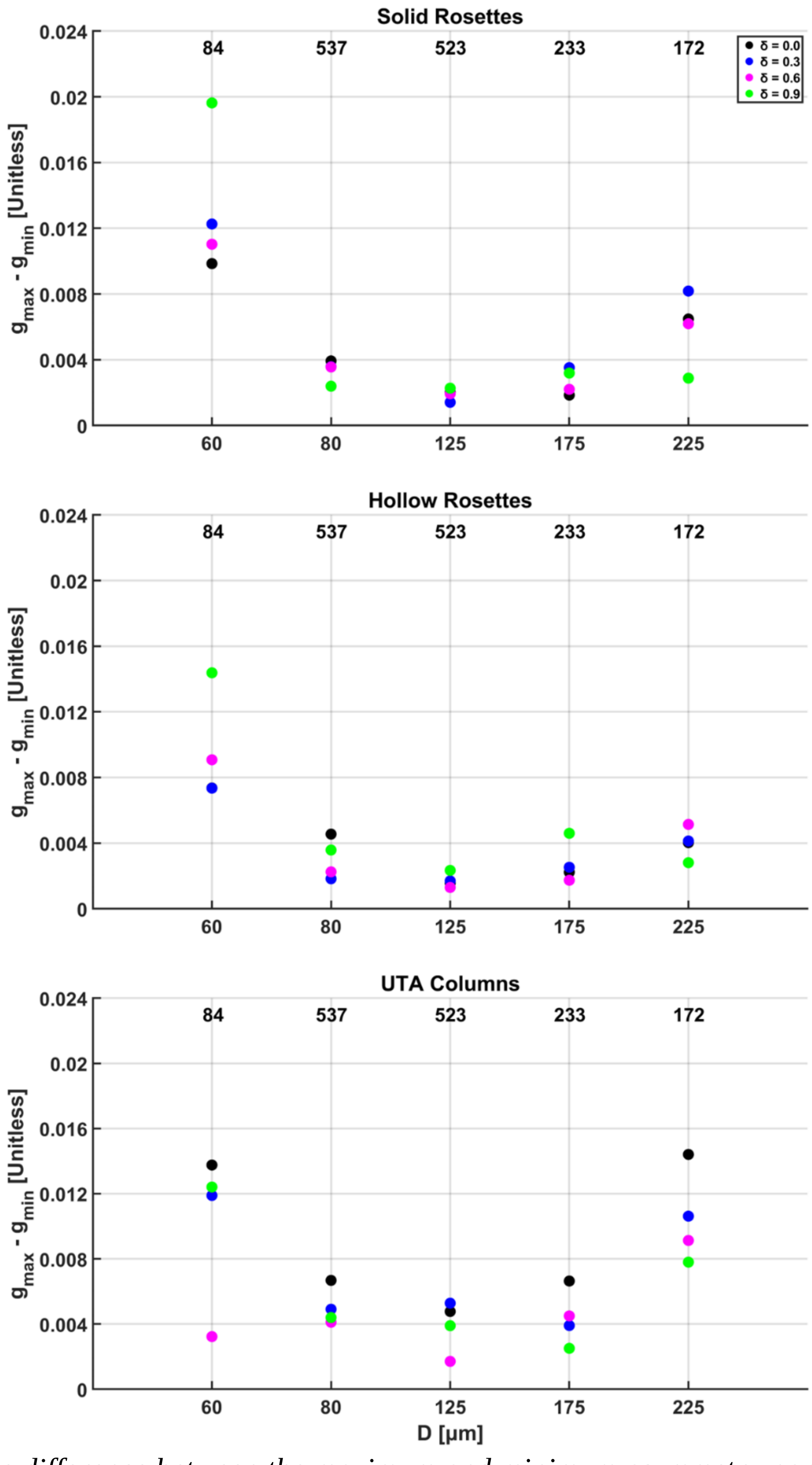

Figure S8: The difference between the maximum and minimum asymmetry parameters (g) by run versus the area equivalent diameter (D) of modeled rosettes and columns using the uniform tilted angle (UTA) method, with the distortion parameters (δ) as 0.0, 0.3, 0.6 and 0.9. The maximum and minimum are from ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. The values at the top of the plots indicate the number of orientations applied to the ten model runs.

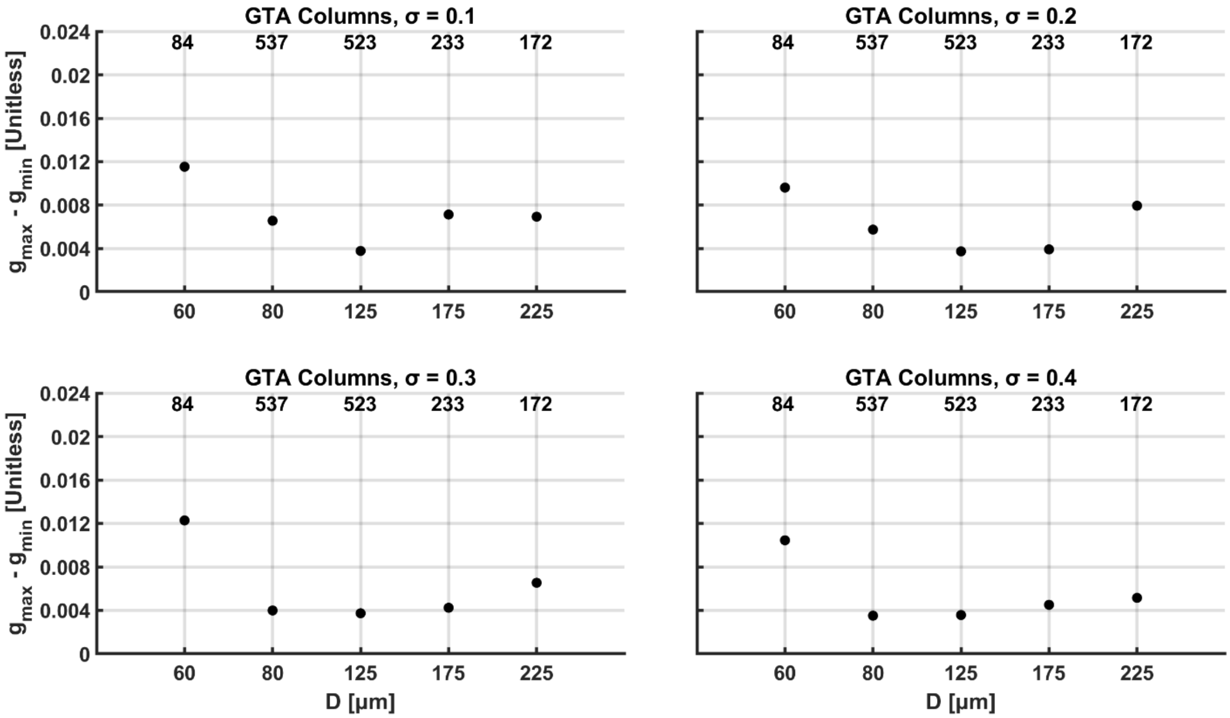

Figure S9: The difference between the maximum and minimum asymmetry parameters (g) by run versus the area equivalent diameter (D) of modeled rosettes and columns using the Gaussian tilted angle (GTA) method, with the complexity parameter (σ) ranging from 0.1 to 0.4. The maximum and minimum are from ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. The values above the black dots indicate the number of orientations applied to the ten model runs.

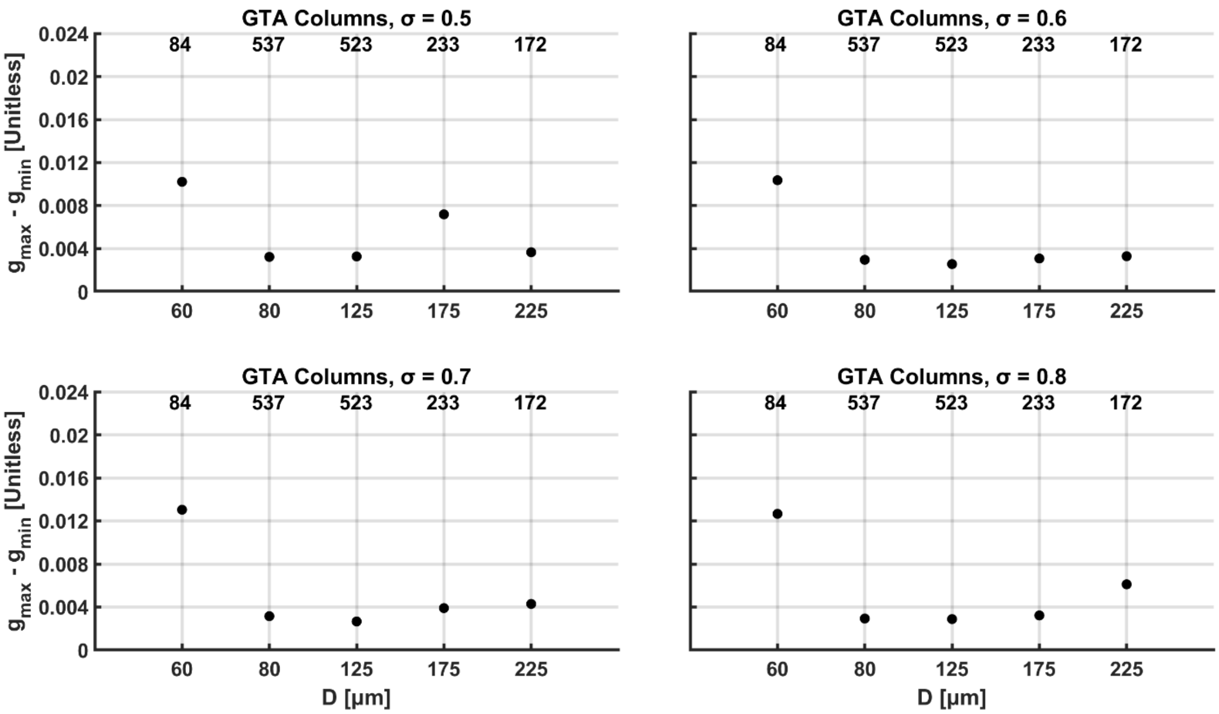

Figure S10: The difference between the maximum and minimum asymmetry parameters (g) by run versus the area equivalent diameter (D) of modeled rosettes and columns using the Gaussian tilted angle (GTA) method, with the complexity parameter (σ) ranging from 0.5 to 0.8. The maximum and minimum are from ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. The values above the black dots indicate the number of orientations applied to the ten model runs.

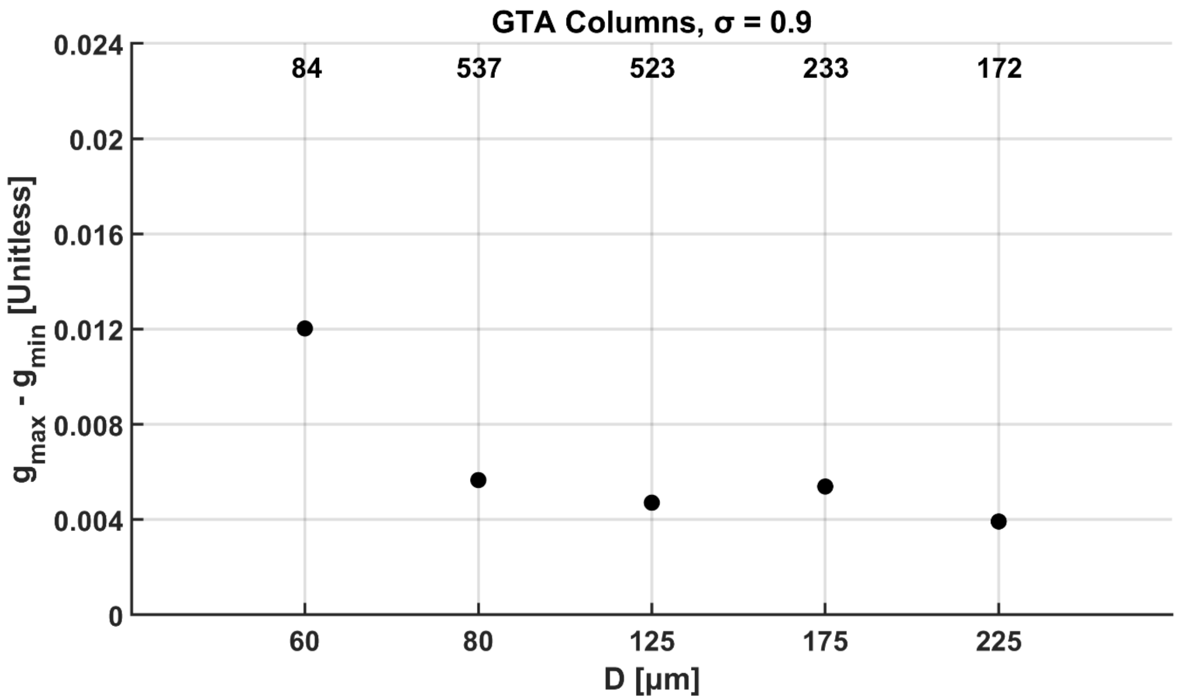

Figure S11: The difference between the maximum and minimum asymmetry parameters (g) by run versus the area equivalent diameter (D) of modeled rosettes and columns using the Gaussian tilted angle (GTA) method, with the complexity parameter (σ) as 0.9. The maximum and minimum are from ten model simulations, where the number of crystal orientations were bound by the number of crystals in the observational data set. The values above the black dots indicate the number of orientations applied to the ten model runs.

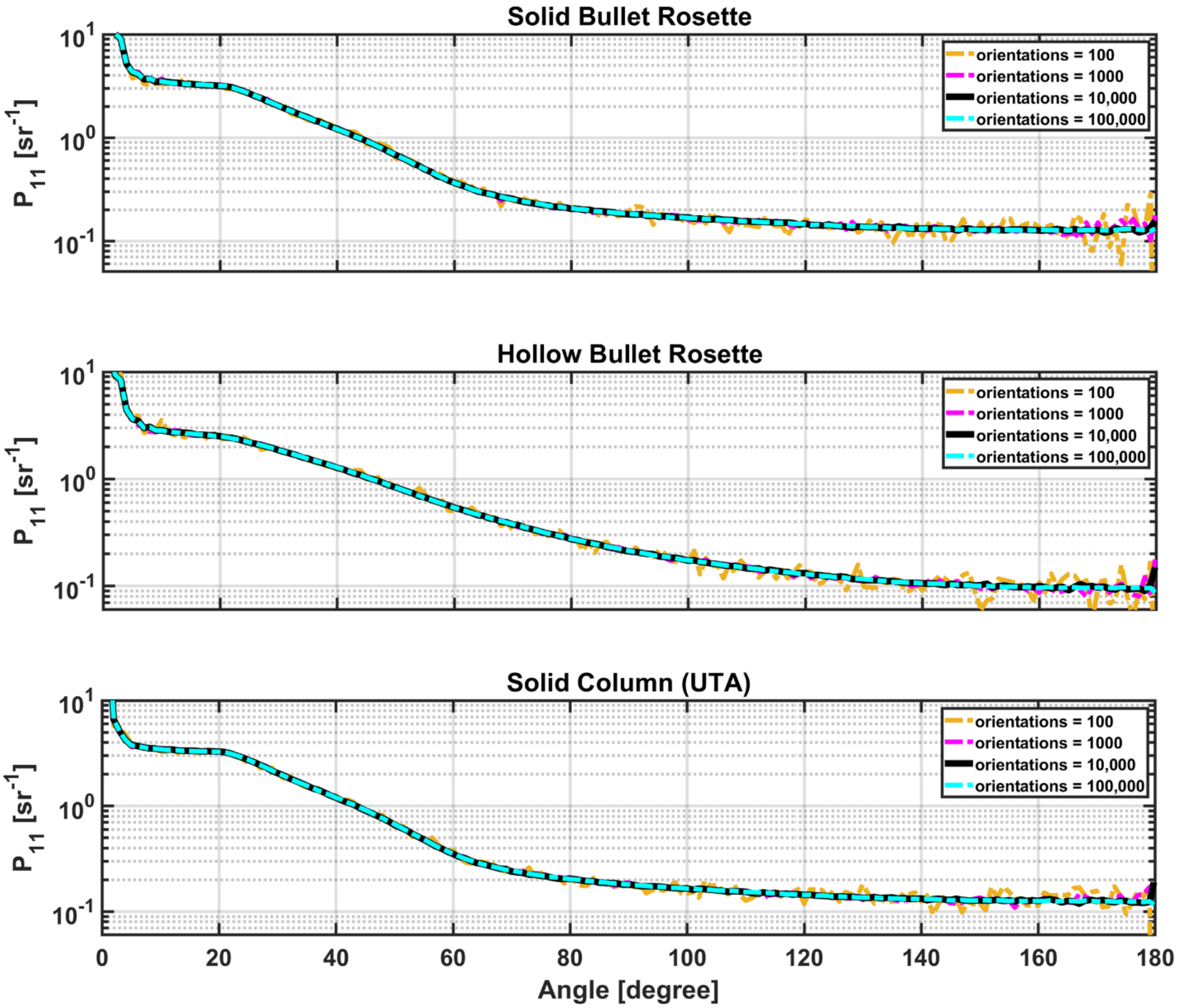

Figure S12: The theoretical phase functions for the modeled solid rosette, hollow rosette, and solid column, where D = 125 µm and δ = 0.6 with a range of orientations from 100 to 100,000. Calculations were performed using the uniform tilted angle (UTA) method.