

snowScatt-1.0: A consistent model of microphysical and scattering properties of rimed and unrimed snowflakes based on the self-similar Rayleigh-Gans approximation



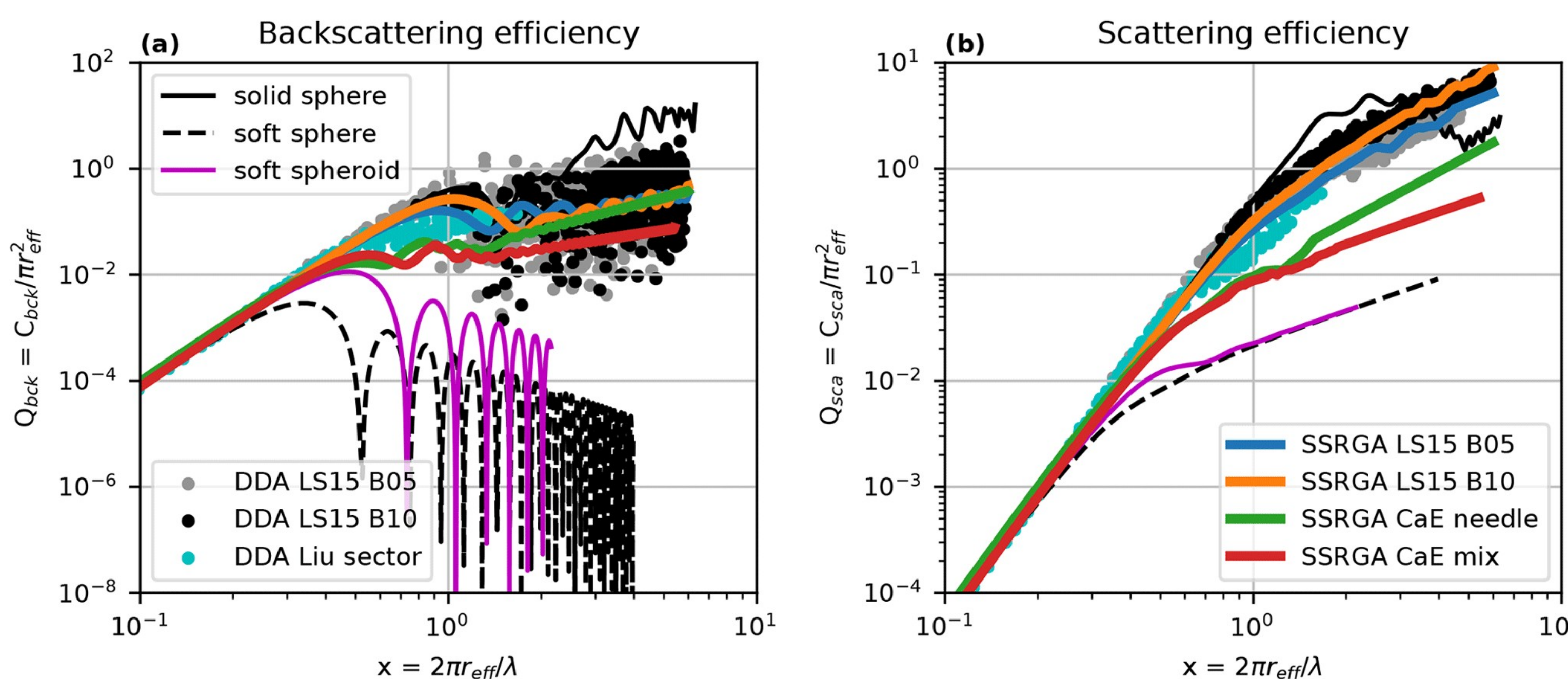
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MOTIVATION

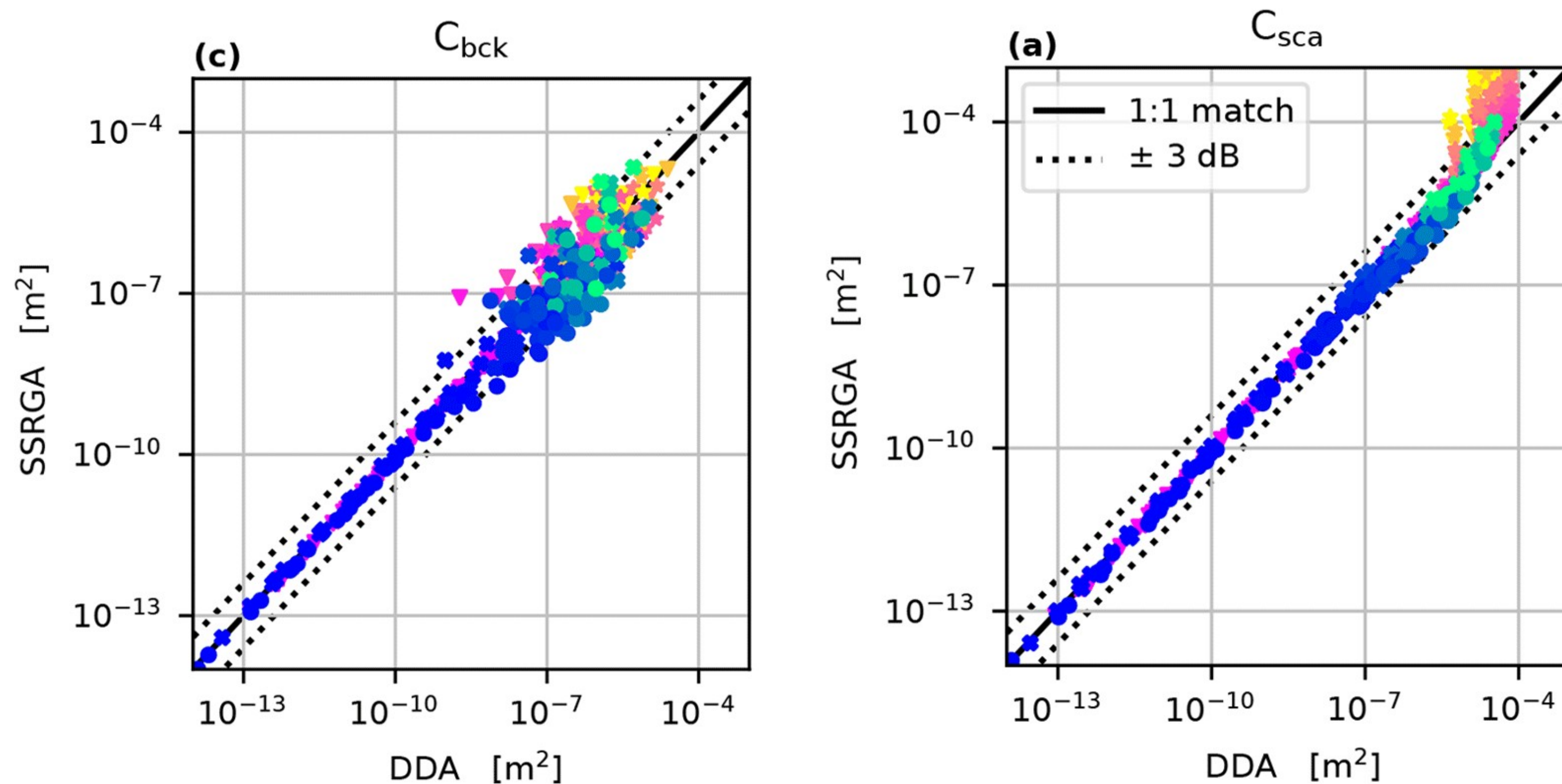
- 1) snowflake properties are extremely variable
- 2) Scattering DB assume fixed properties
- 3) SSRGA computes scattering taking into account ensemble variability
- 4) snowScatt is developed to allow the consistent evaluation of snow microphysical and scattering properties

<https://github.com/OPTIMICE-team/snowScatt>

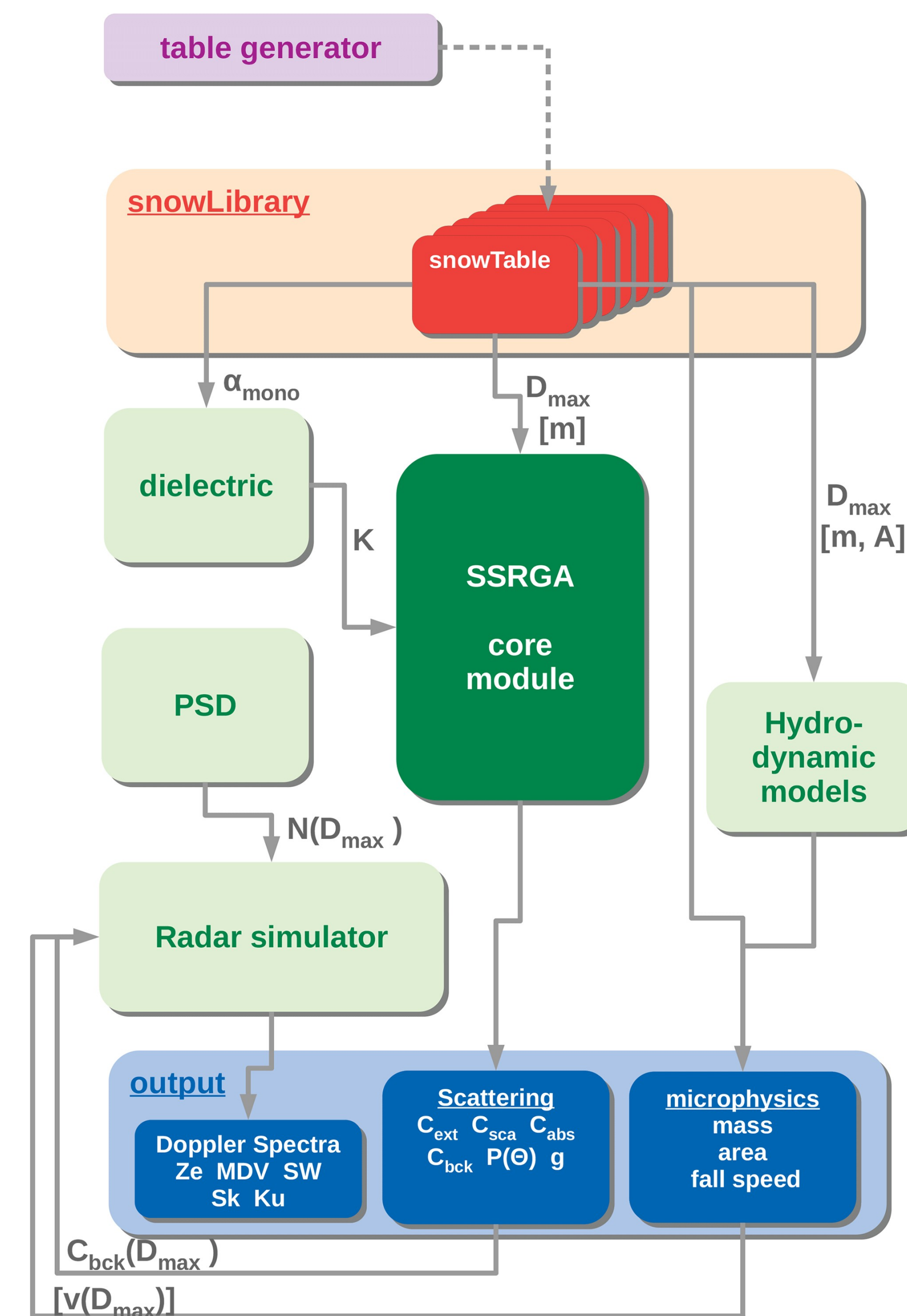
SCATTERING



F1: Backscattering and total scattering efficiency as a function of the effective size parameter for various models

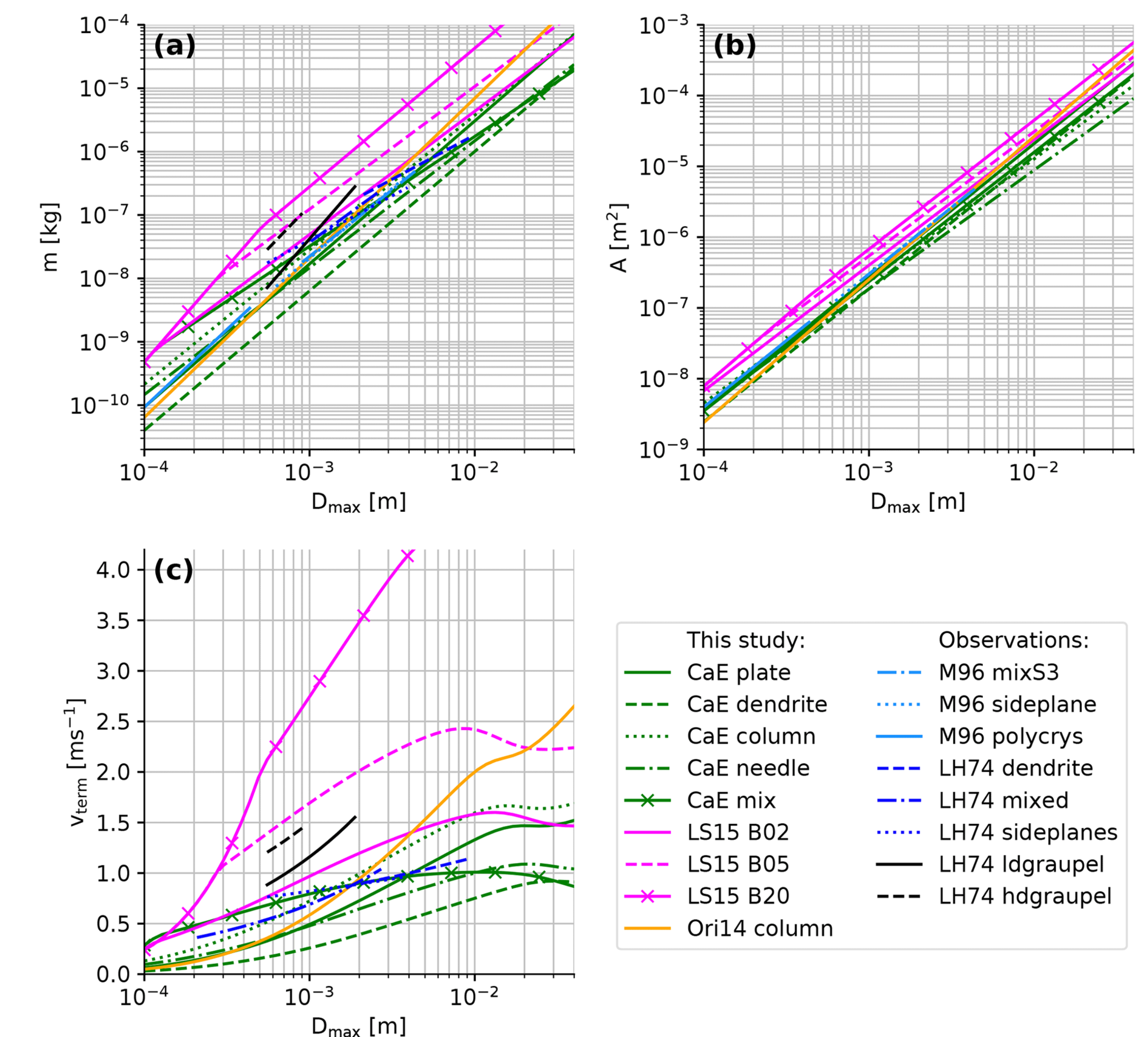


F2: Comparison of backscattering and scattering cross section computed with DDA and SSRGA



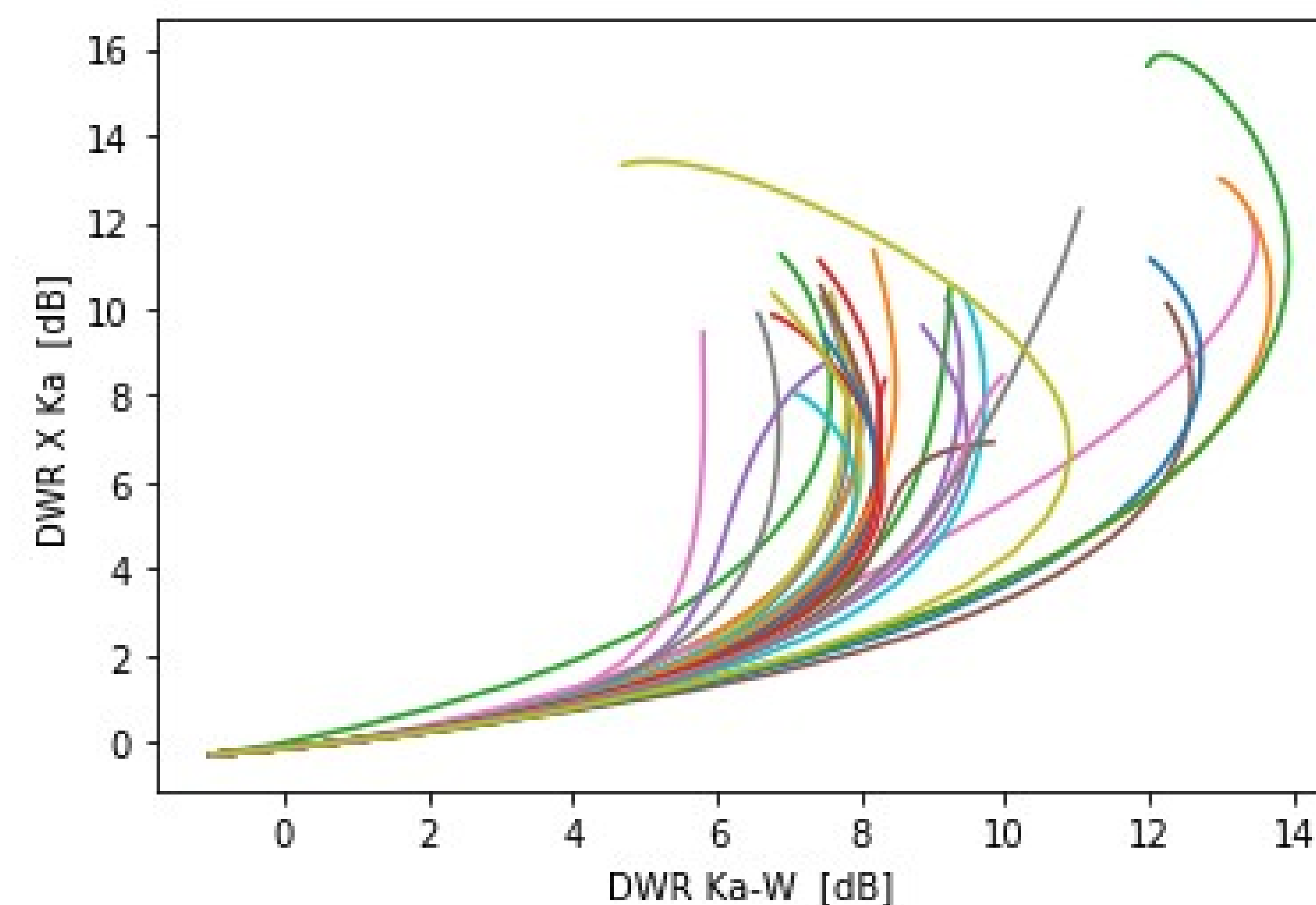
F3: Schematics of the snowScatt modules

MICROPHYSICS



F5: Microphysical properties (mass, area, fallspeed) modeled for some snow aggregates included in snowScatt

RADAR SIMULATOR



F4: Characteristic triple-frequency curves (X-Ka-W band assuming inverse exponential PSD) for the 30 particle types currently included in the snowScatt library (>70k shapes in total)

SUMMARY

With snowScatt you can:

- Compute SSRGA parameters of snow ensembles (and possibly contribute to the public snowLibrary)
- Model the microphysical properties of snow (various fallspeed models included)
- Calculate the scattering properties of unrimed and rimed aggregates (good for radar applications, some caveats for passive)
- Simulate basic radar Doppler spectra and moments (help PSD functions included)