Estimating radome and rain attenuation (with uncertainties) from disdrometer observations

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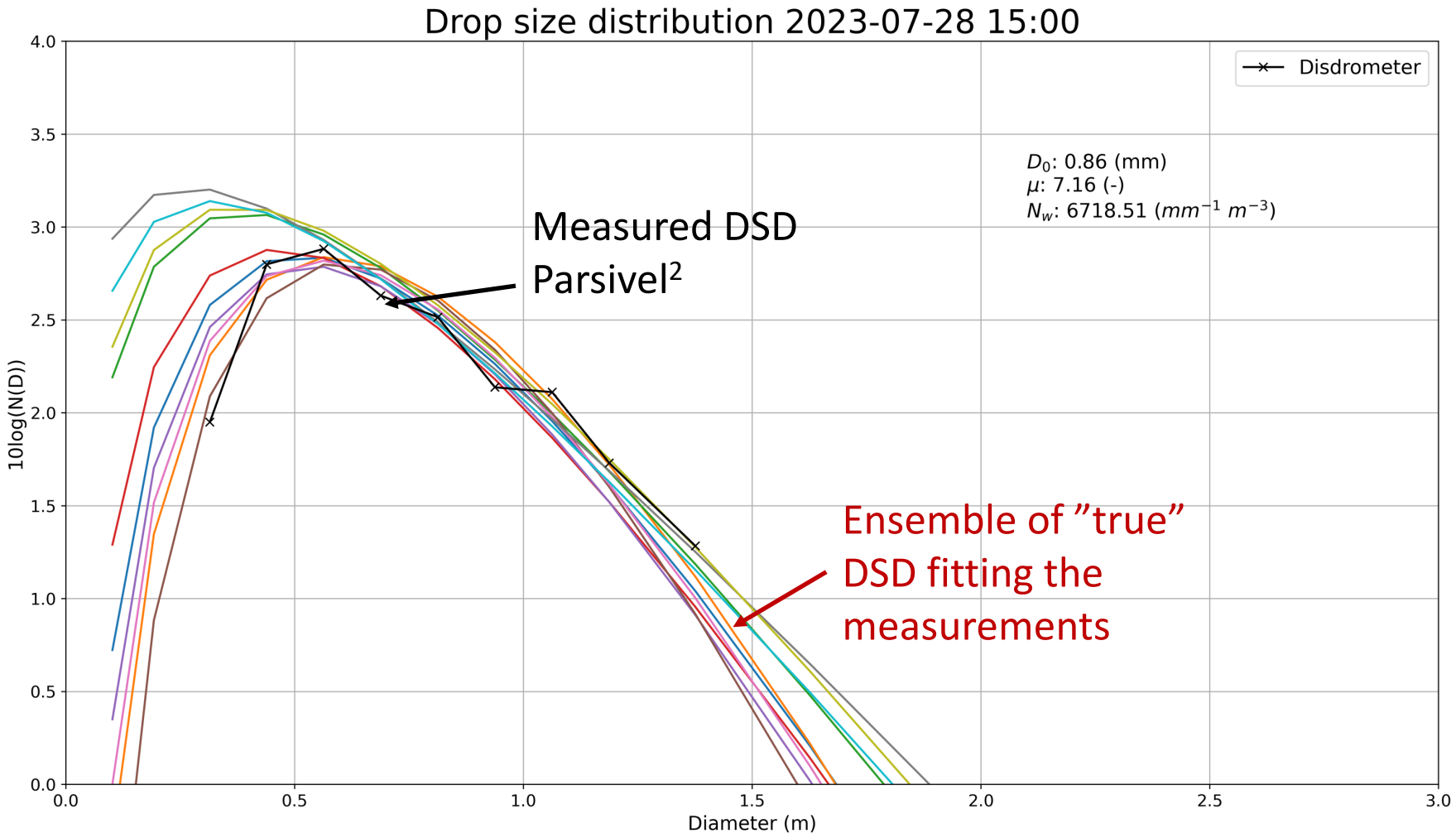


Two stage process:

First step: Input “true” {N_w, D_0, μ} to compute simulated measured {N_w, D_0, μ}

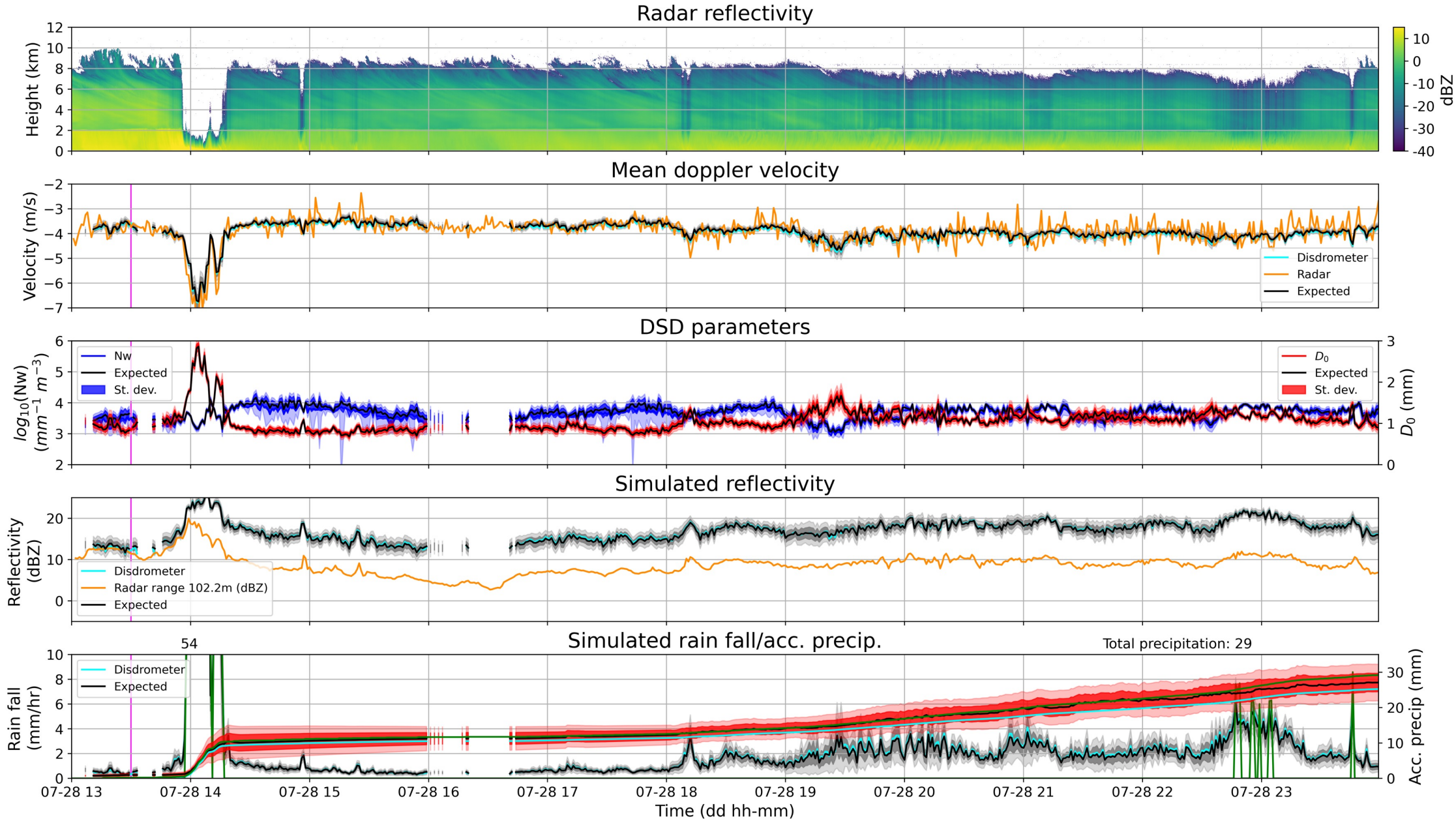
This is affected by

- Disdrometer sampling volume (measurement area, integration time)
- Small size truncation

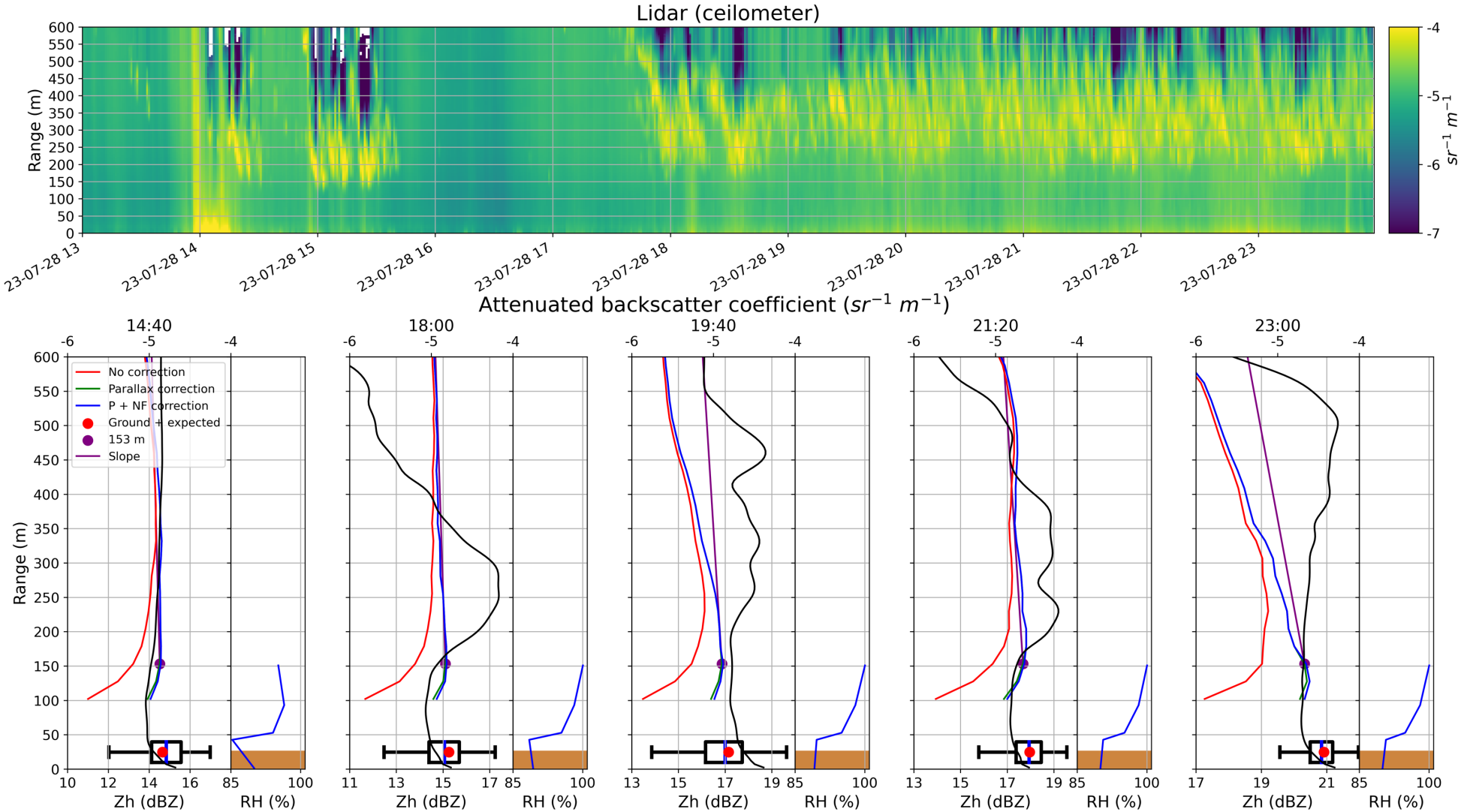
Perform 10^6-10^7 calculations such that simulated {N_w, D_0, μ} are representative of local climatology

Second stage: Compute {N_w, D_0, μ} from disdrometer observations and compare to simulated measurements => derive ensemble of “true” DSD parameters

Finally: Compute Z, R, MDV, specific attenuation and corresponding uncertainties



Example of a rain event and corresponding estimates (directly computed from disdrometer data, “expected” from ensemble of “true” DSD parameters, and uncertainties). The shading areas show (25, 75) and (5,95) percentiles



Can we use disdrometer for estimating rain attenuation?

It depends …

Slope in the measured Z is the same as specific attenuation

Slope in the measured Z is large than specific attenuation = > growth of drops due to seeder-feeder process (see lidar backscatter profile)