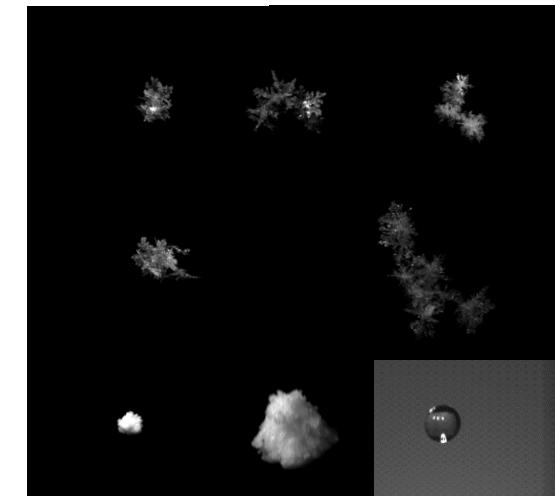
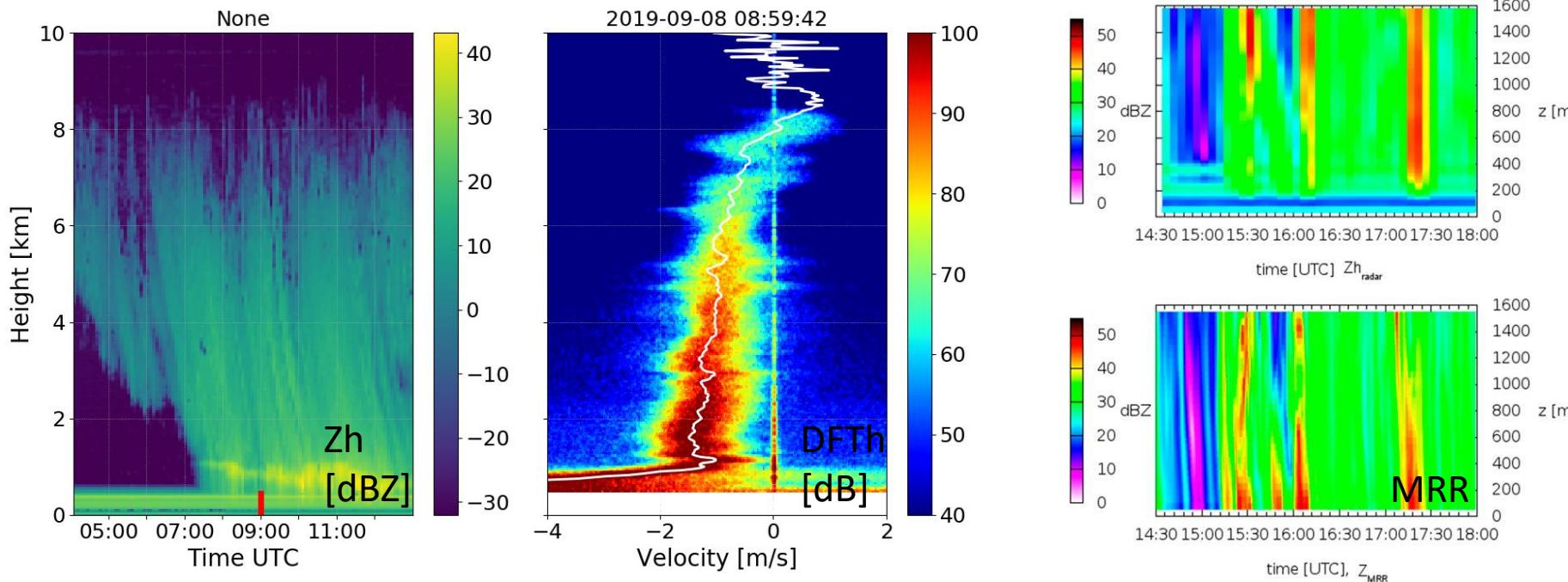


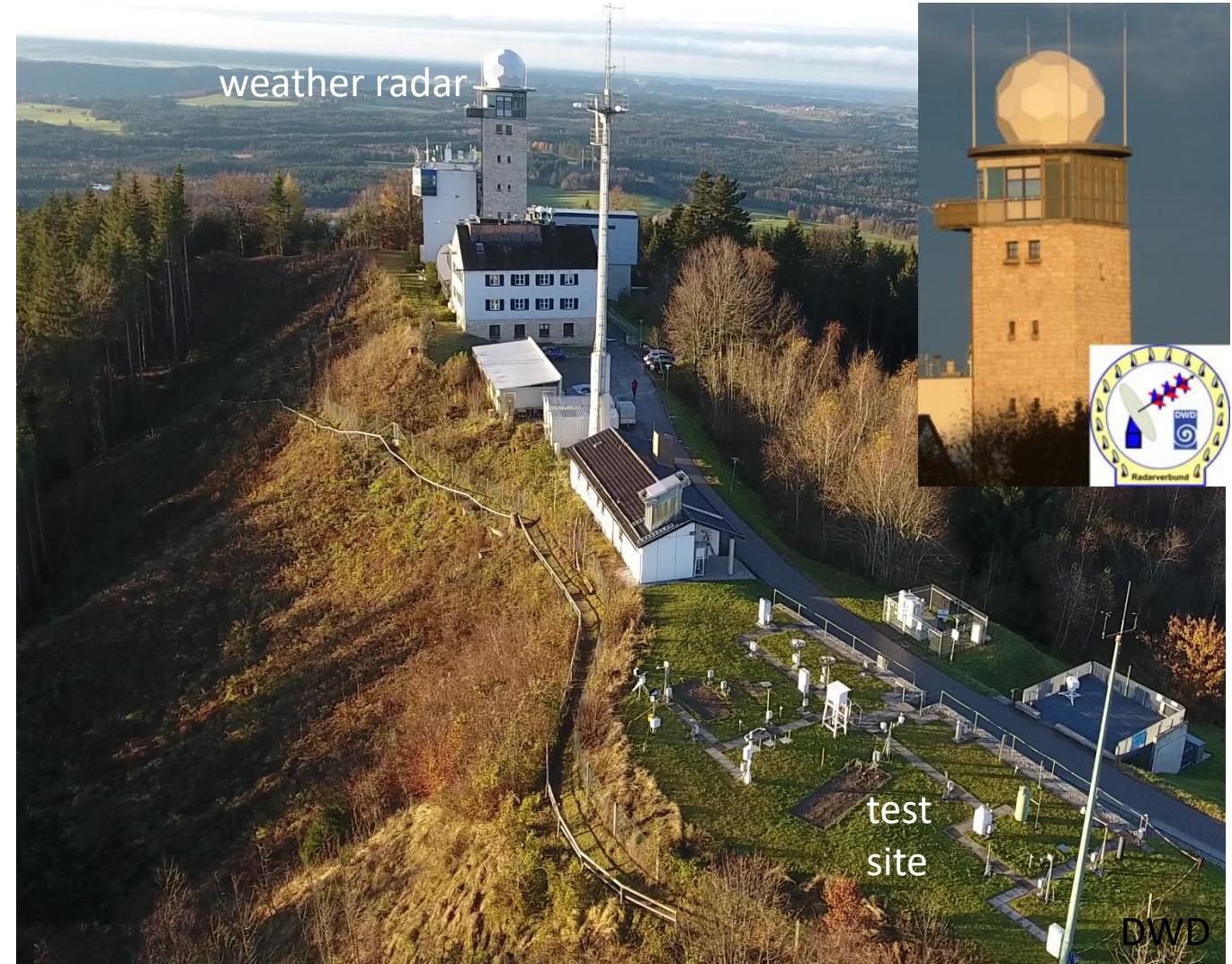
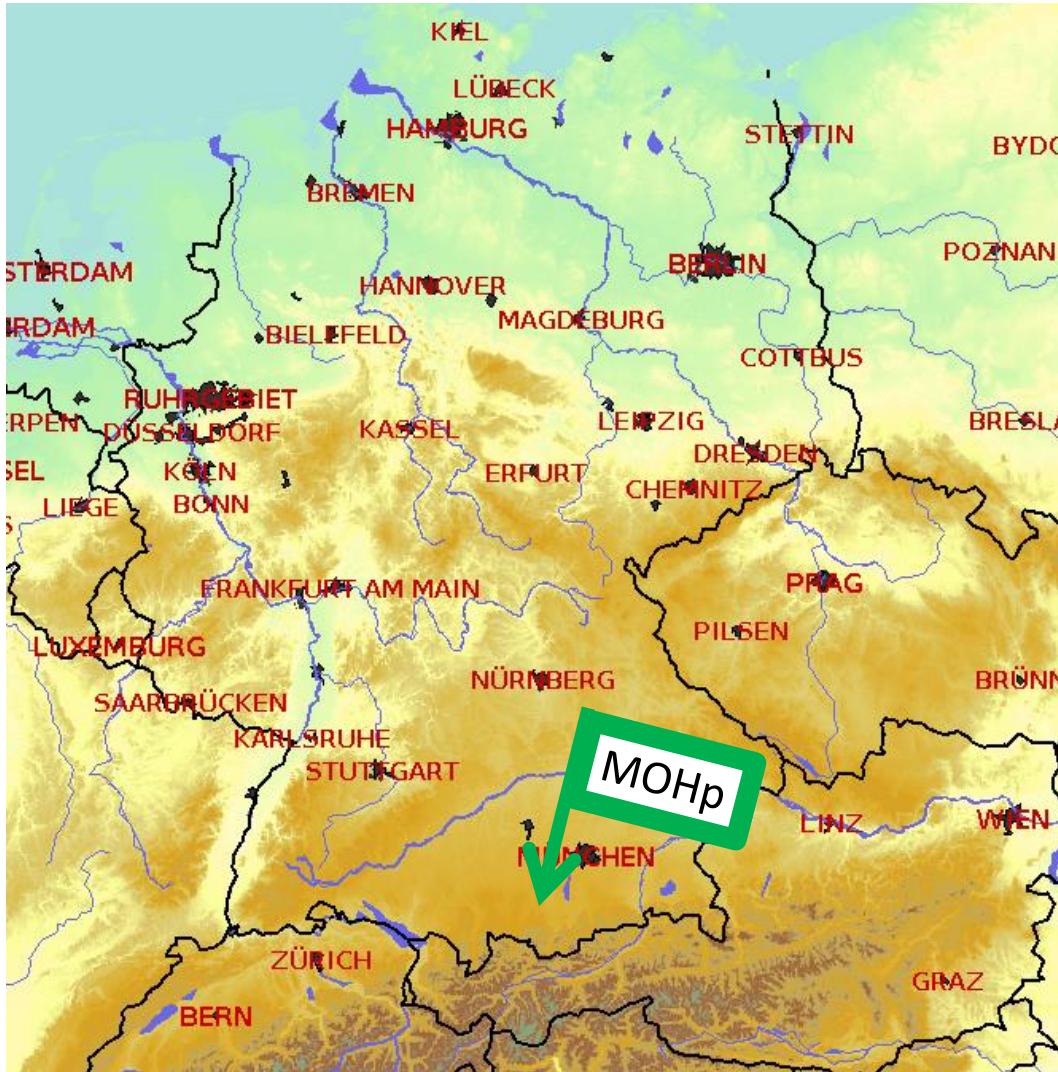
A seamless profile of the precipitation process of mixed-phase clouds employing data from a polarimetric C-band radar, a Micro Rain Radar and disdrometers

Mathias Gergely, Deutscher Wetterdienst (DWD)



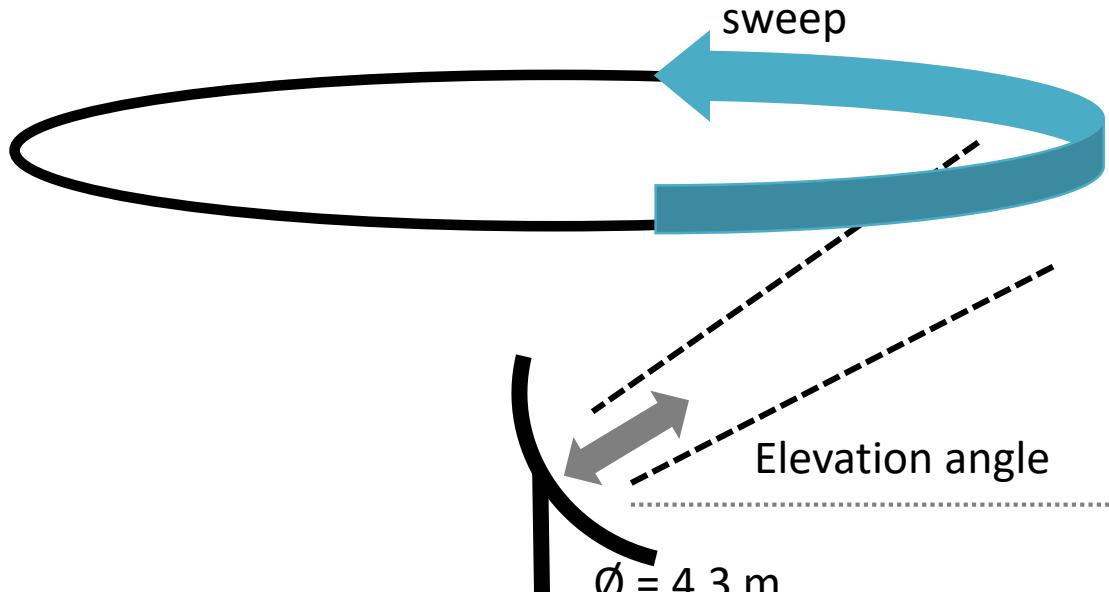
Setup: weather radar + MRR + in situ sensors

- MOHp (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich



Idea: weather radar + MRR + in situ sensors

- MOHp (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich

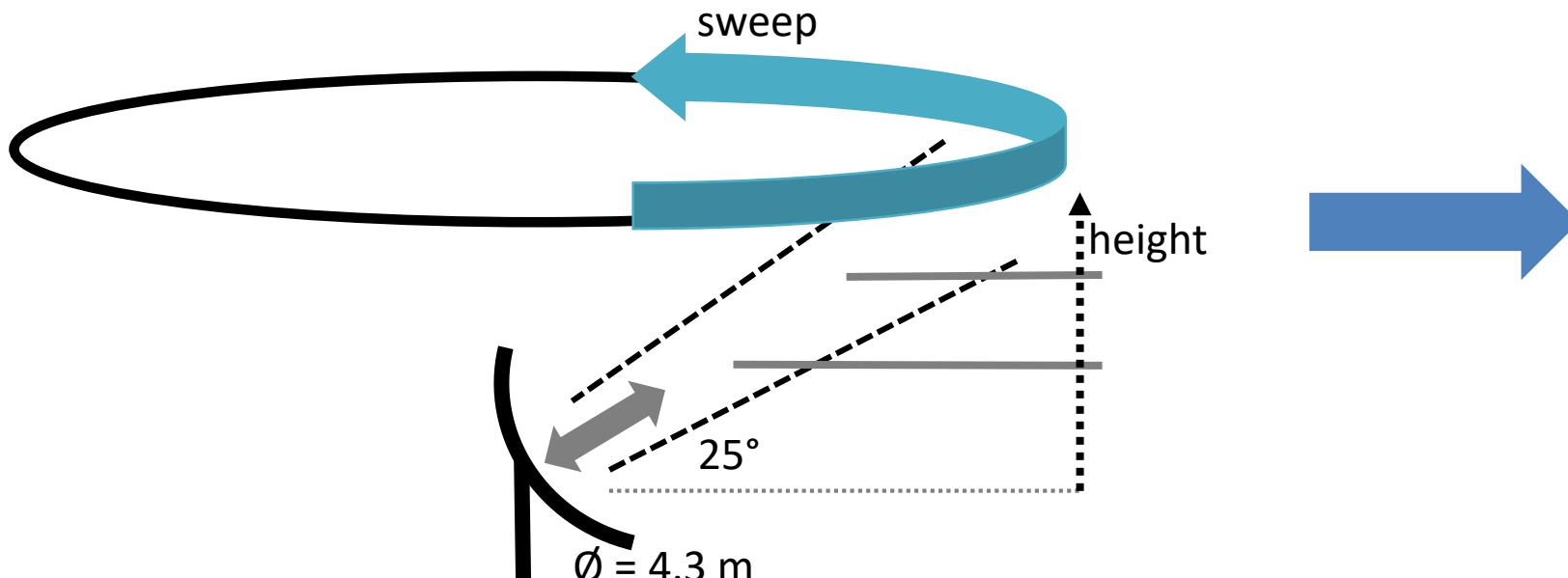


C-band polarimetric
Doppler radar:

- Polarimetric moments Z_h , ZDR , ...
- Doppler spectrum

Idea: weather radar + MRR + in situ sensors

- MOHp (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich



C-band polarimetric
Doppler radar:

- Polarimetric moments Z_h , ZDR , ...
- Doppler spectrum

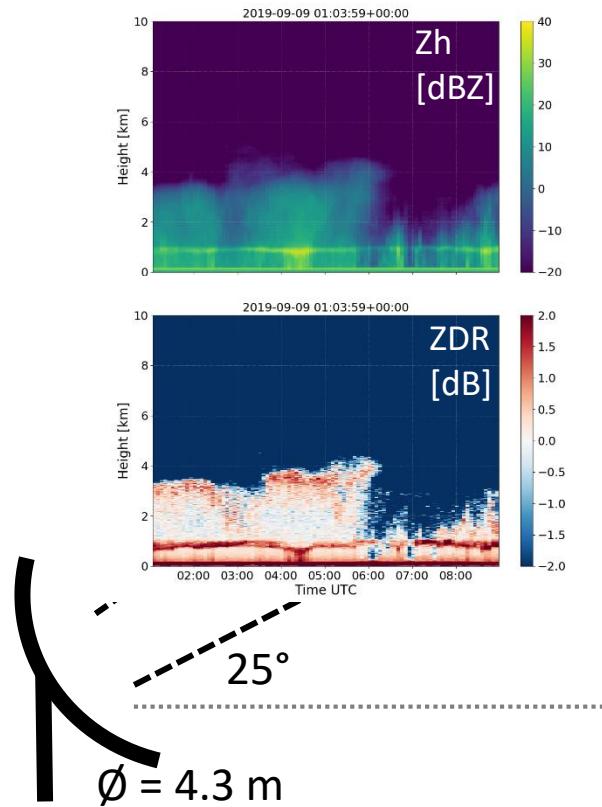
Quasi-Vertical Profile (QVP)
for 25° elevation
 $\rightarrow \Delta_{\text{hor}} / \Delta_{\text{ver}} \approx 2.1$

OR

- for limited azimuth ranges
- from multiple elevations

Idea: weather radar + MRR + in situ sensors

- MOHp (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich

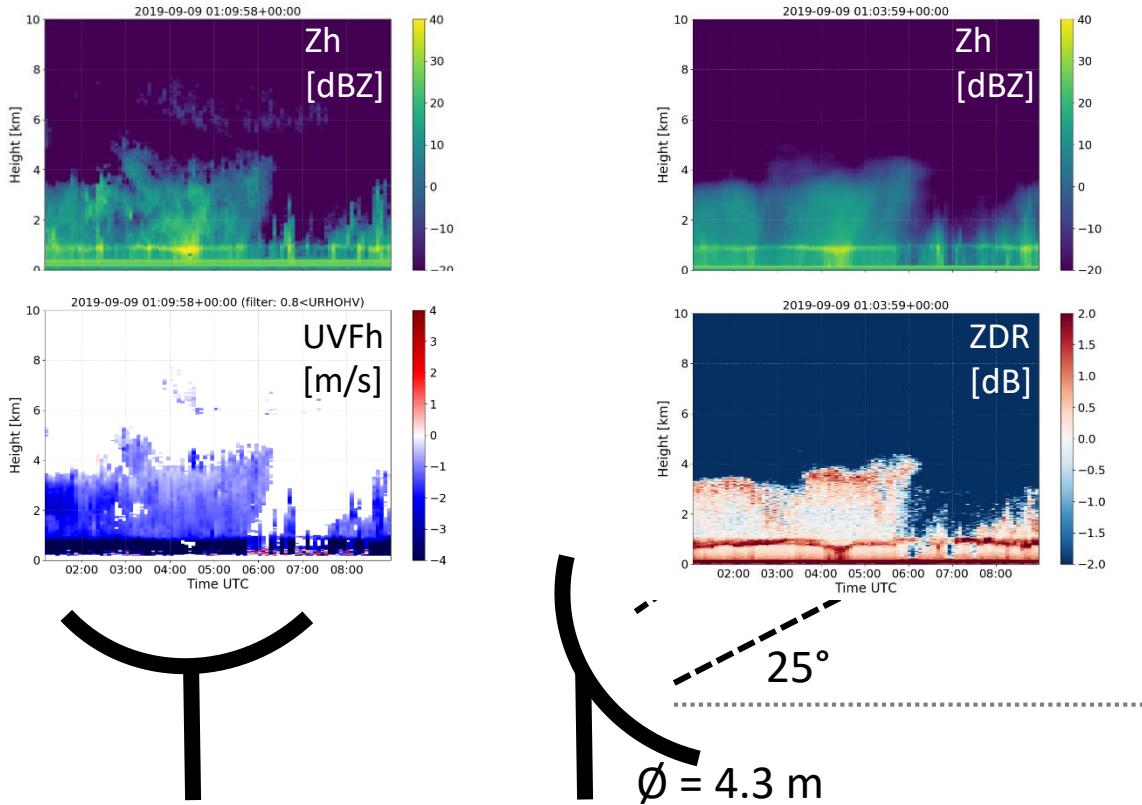


C-band polarimetric
Doppler radar:

- Polarimetric moments Z_h , ZDR , ...
- Doppler spectrum

Idea: weather radar + MRR + in situ sensors

- MOHp (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich

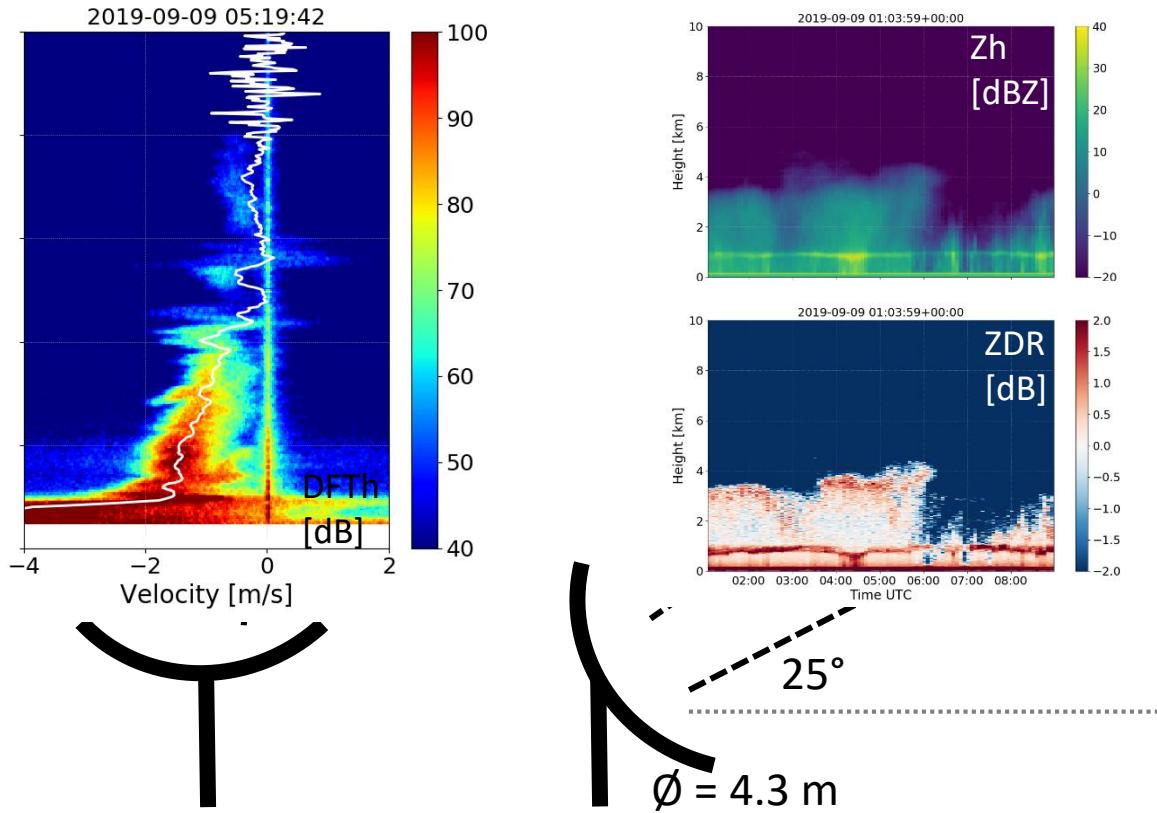


C-band polarimetric
Doppler radar:

- Polarimetric moments Zh, ZDR, ...
- Doppler spectrum

Idea: weather radar + MRR + in situ sensors

- MOHp (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich



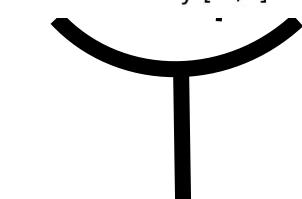
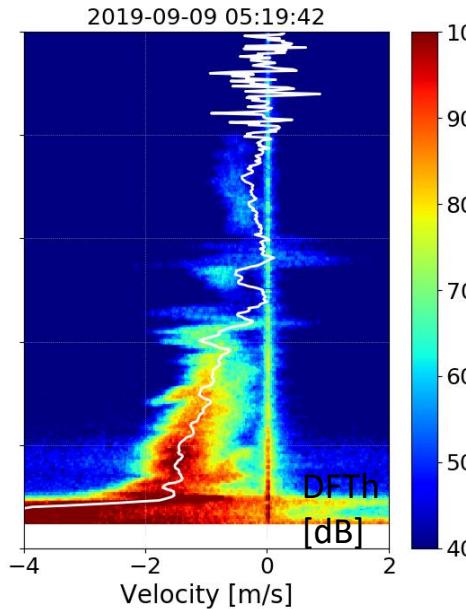
C-band polarimetric

Doppler radar:

- Polarimetric moments Zh, ZDR, ...
- Doppler spectrum

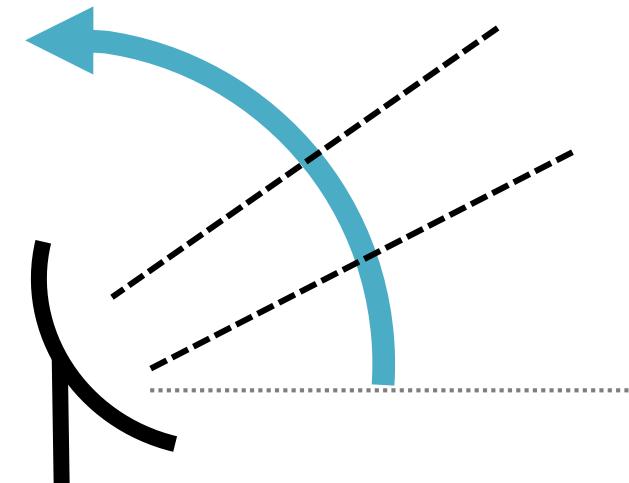
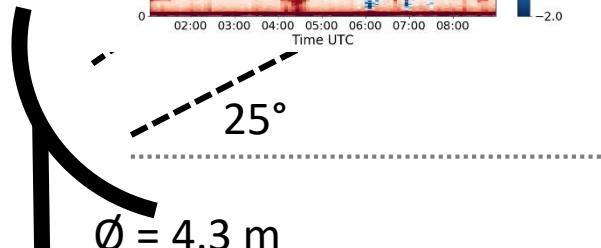
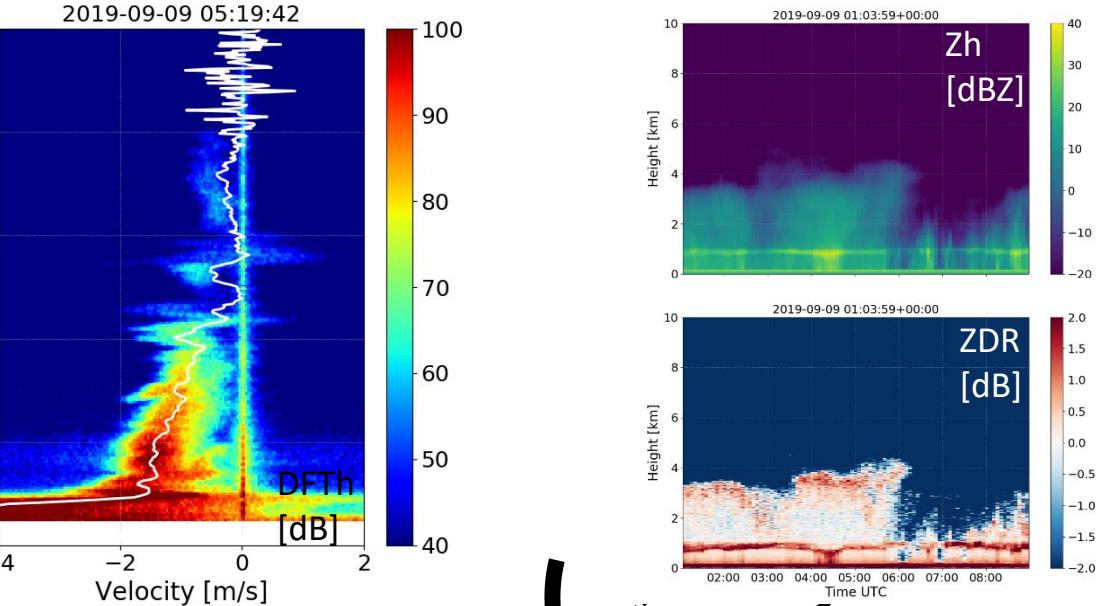
Idea: weather radar + MRR + in situ sensors

- MOHp (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich



C-band polarimetric
Doppler radar:

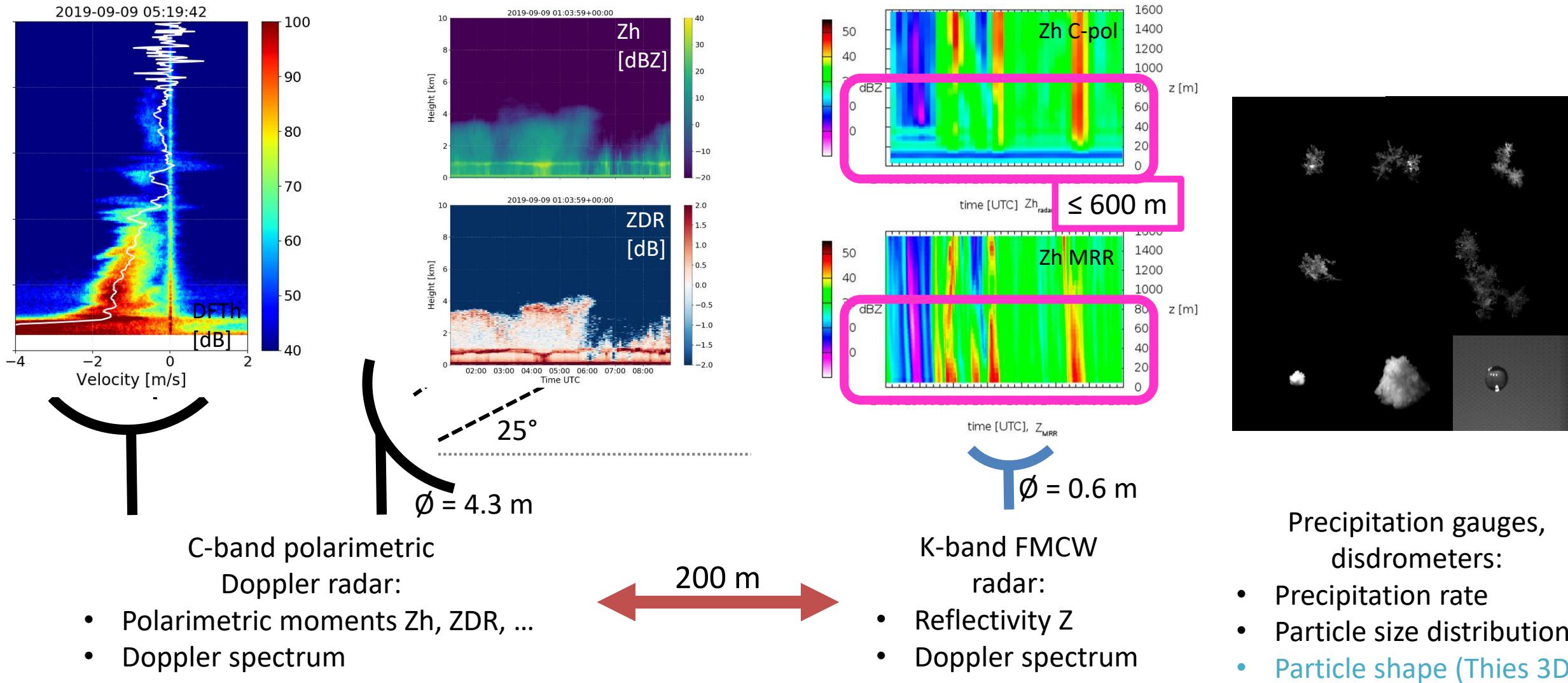
- Polarimetric moments Zh, ZDR, ...
- Doppler spectrum



+ RHI scans
(TROPOS)

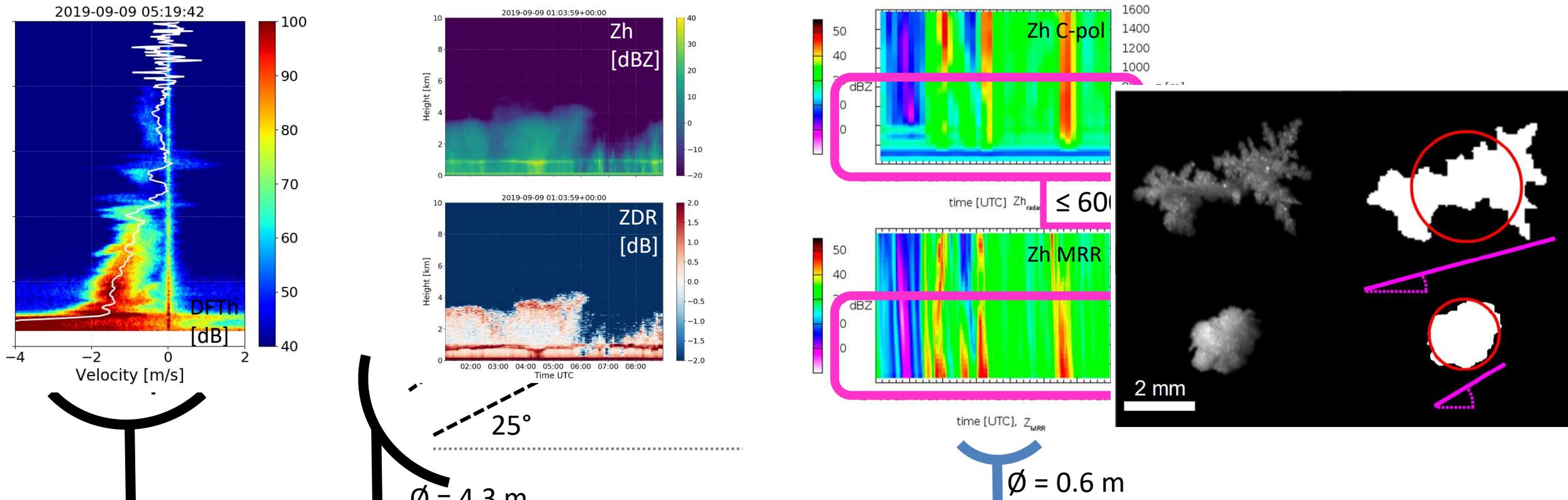
Idea: weather radar + MRR + in situ sensors

- MOHP (DWD) Hohenpeißenberg, ~1000 m a.s.l., 50 km SW of Munich



Idea: weather radar + MRR + in situ sensors

- MOHP (DWD) Hohenpeißenberg, ~1000 m a.s.l., 50 km SW of Munich



C-band polarimetric

Doppler radar:

- Polarimetric moments Zh, ZDR, ...
- Doppler spectrum

200 m

K-band FMCW

radar:

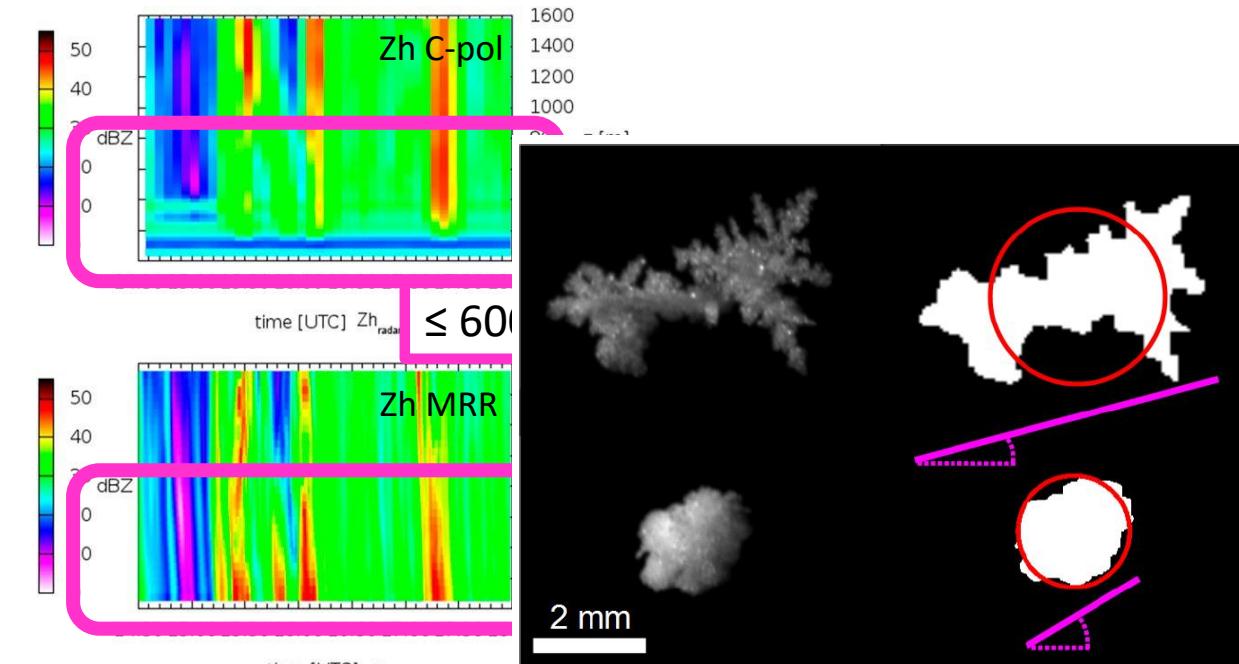
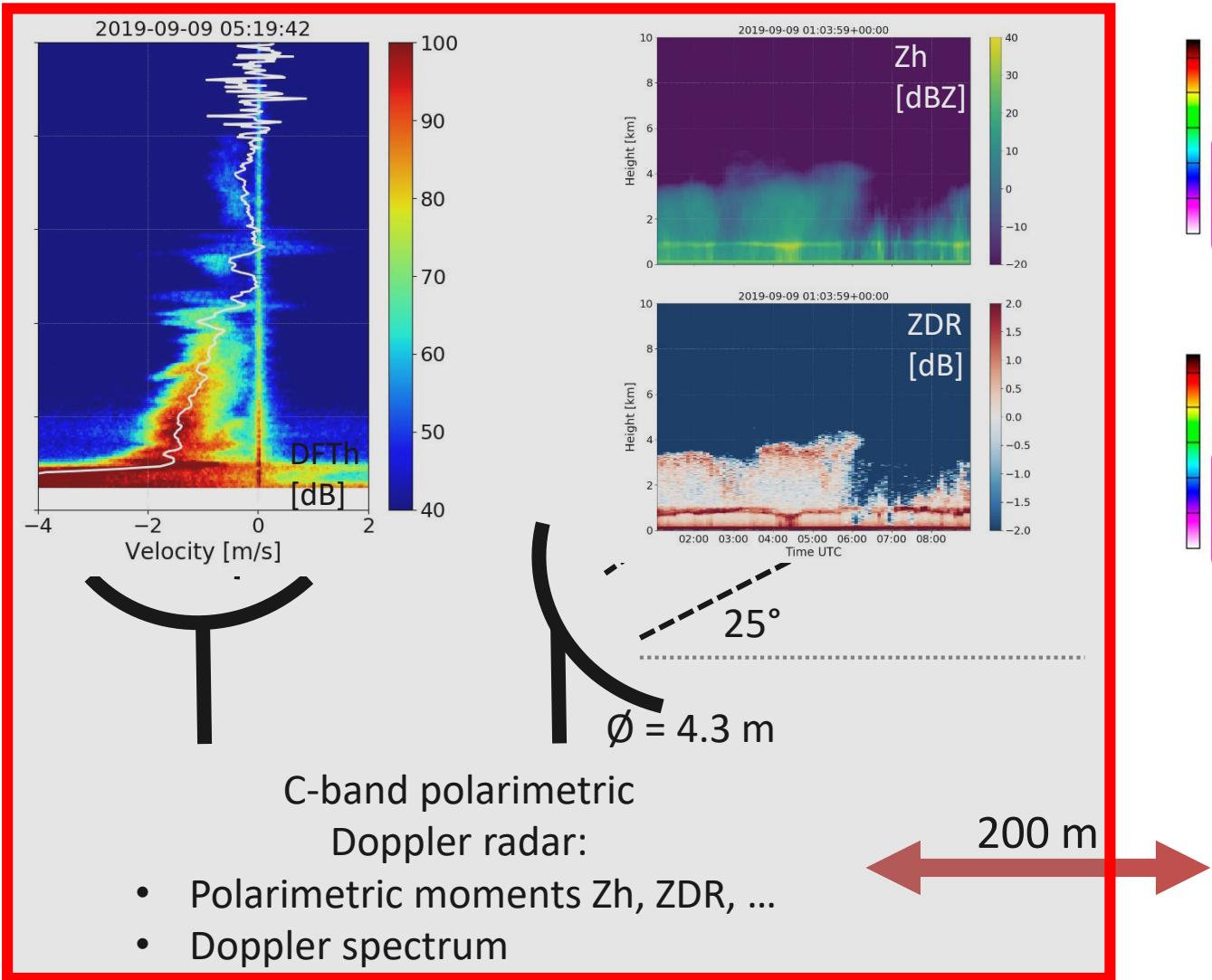
- Reflectivity Z
- Doppler spectrum

Precipitation gauges,
disdrometers:

- Precipitation rate
- Particle size distribution
- Particle shape (Thies 3D)

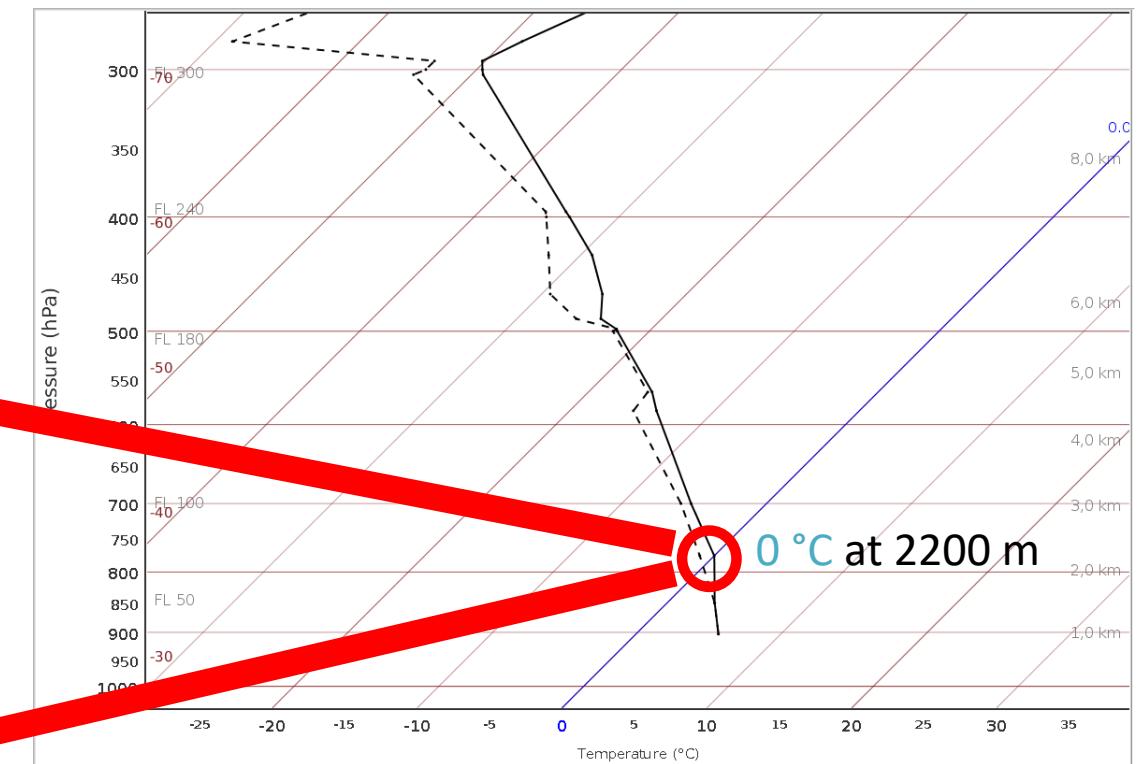
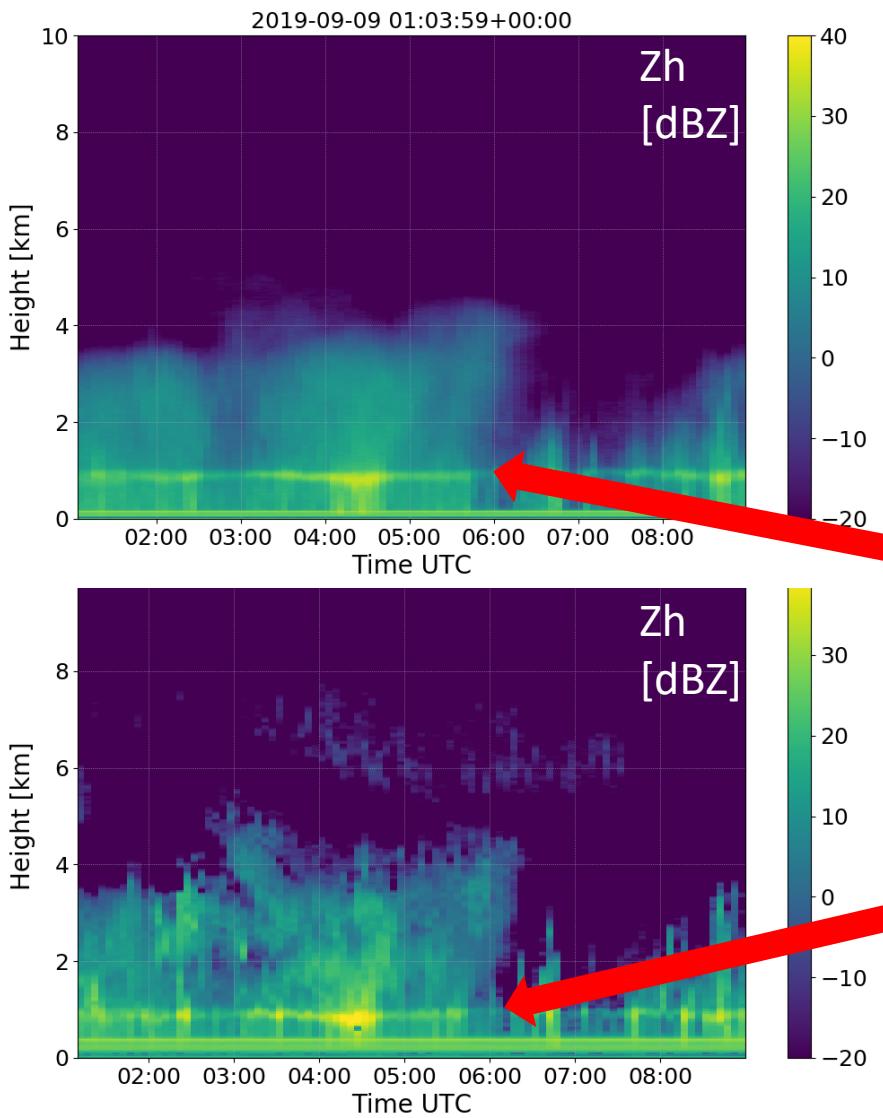
Idea: weather radar + MRR + in situ sensors

- MOHP (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich

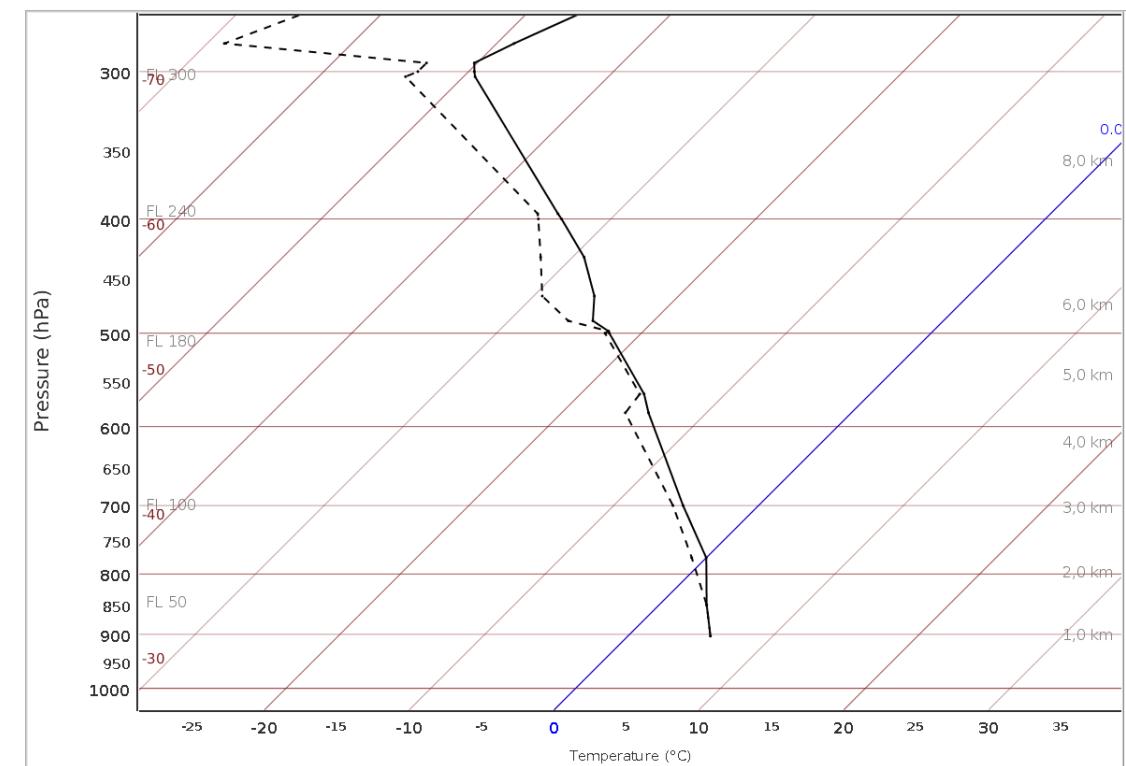
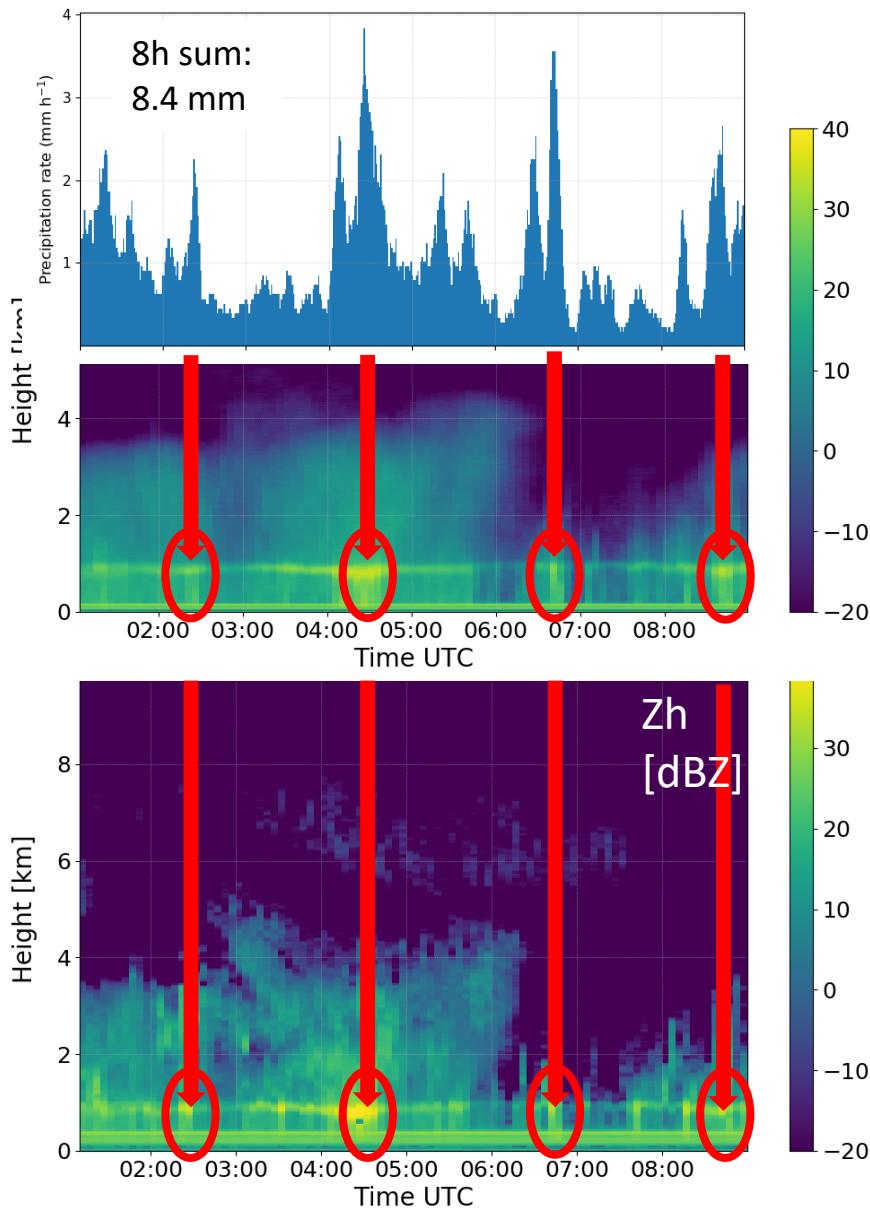


- Precipitation rate
- Particle size distribution
- Particle shape (Thies 3D)

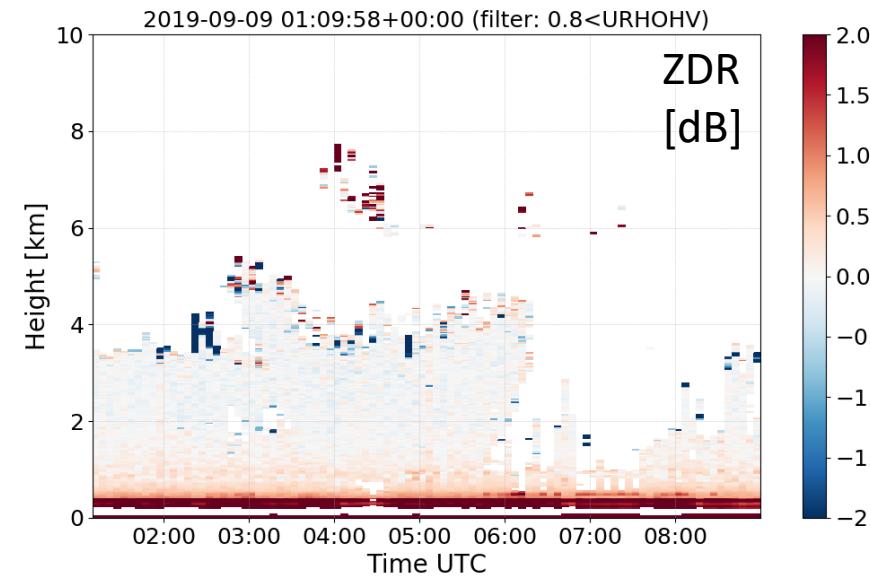
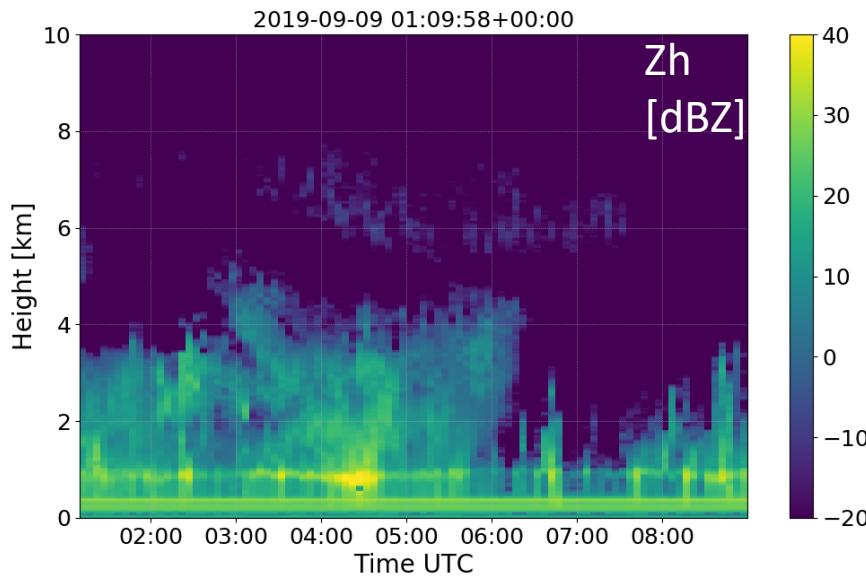
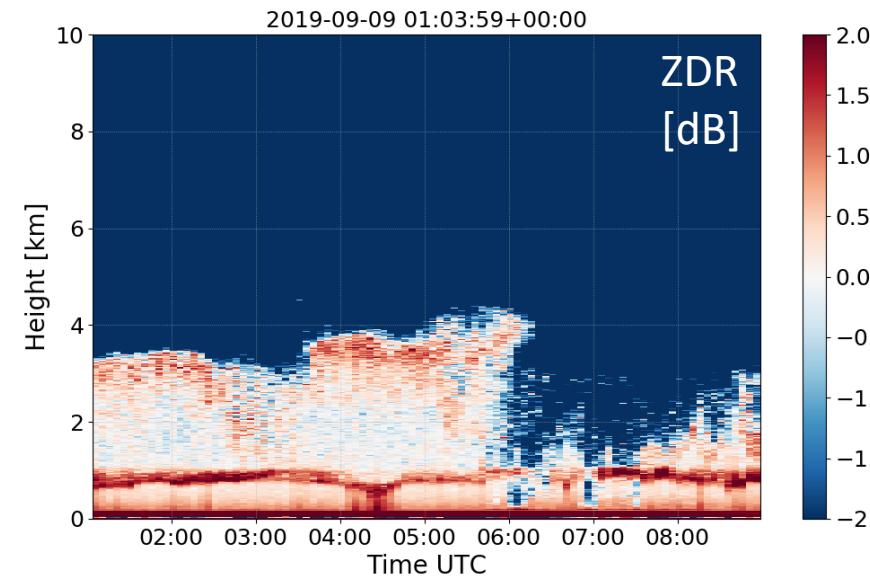
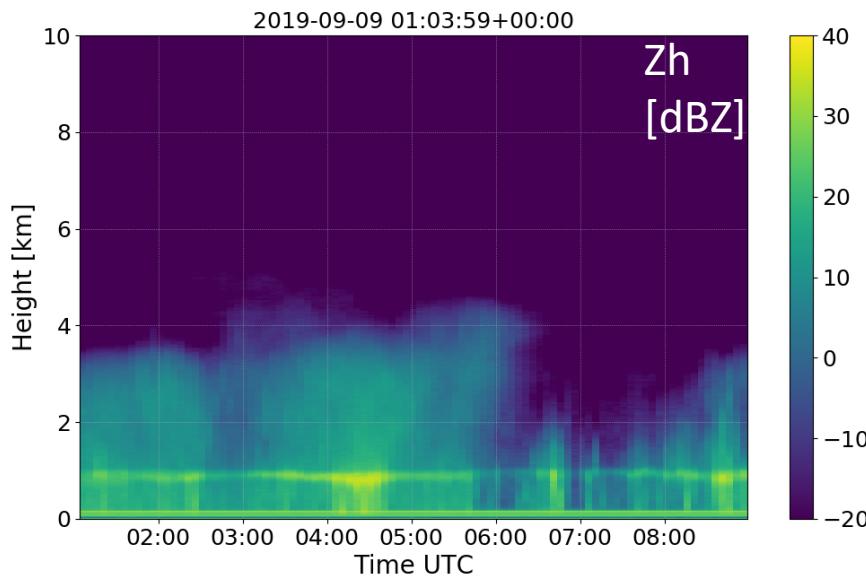
Example: 09 Sep 2019



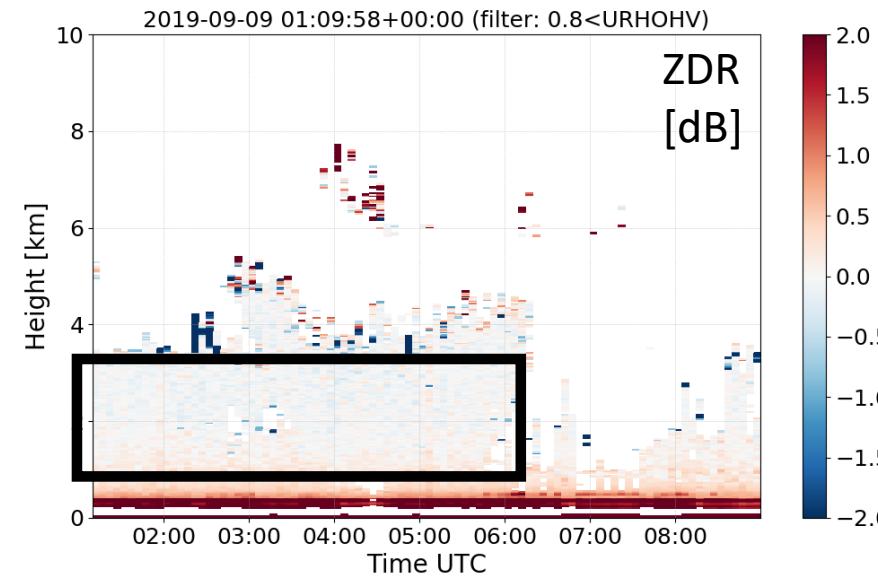
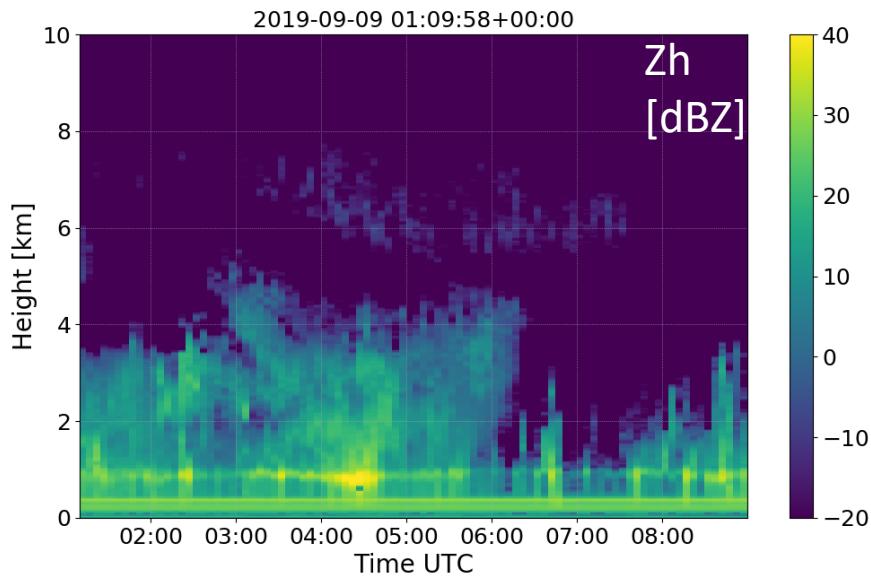
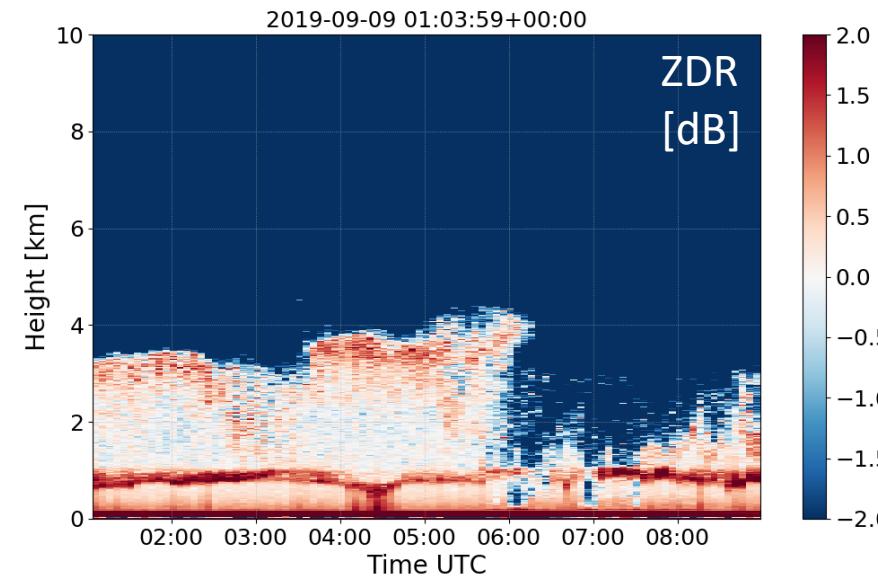
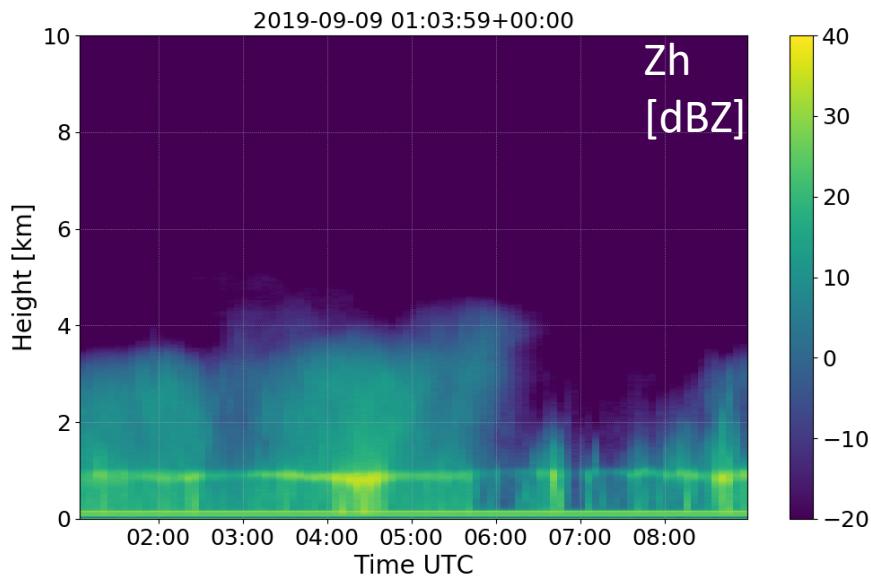
Example: 09 Sep 2019



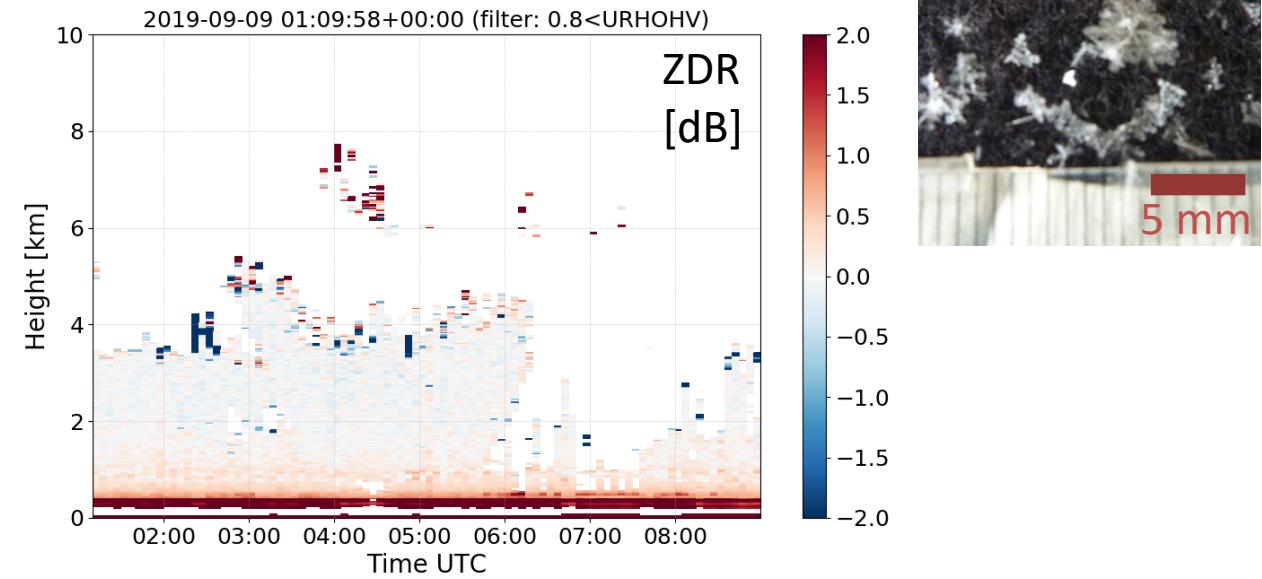
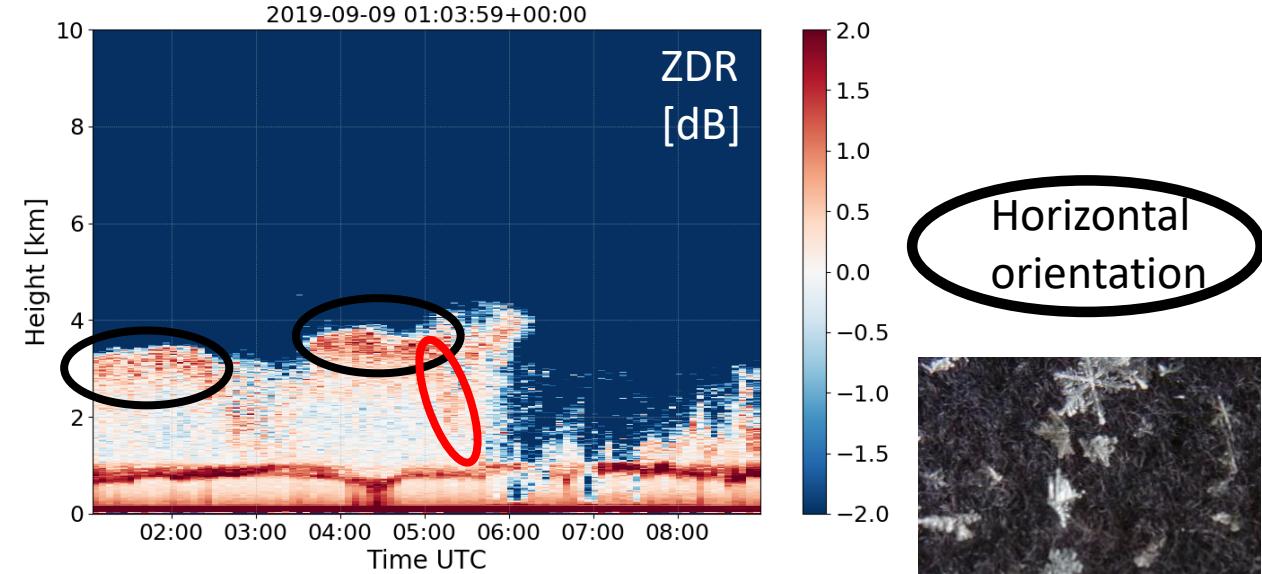
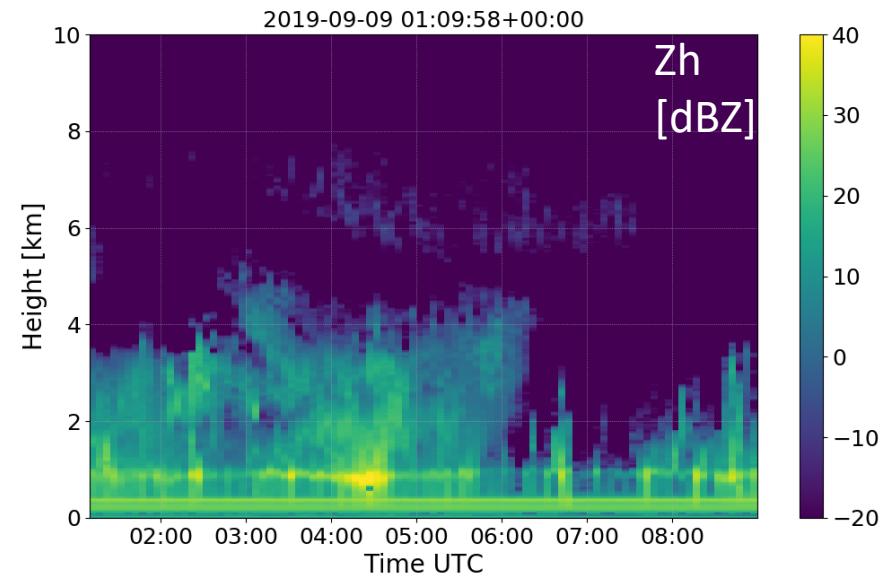
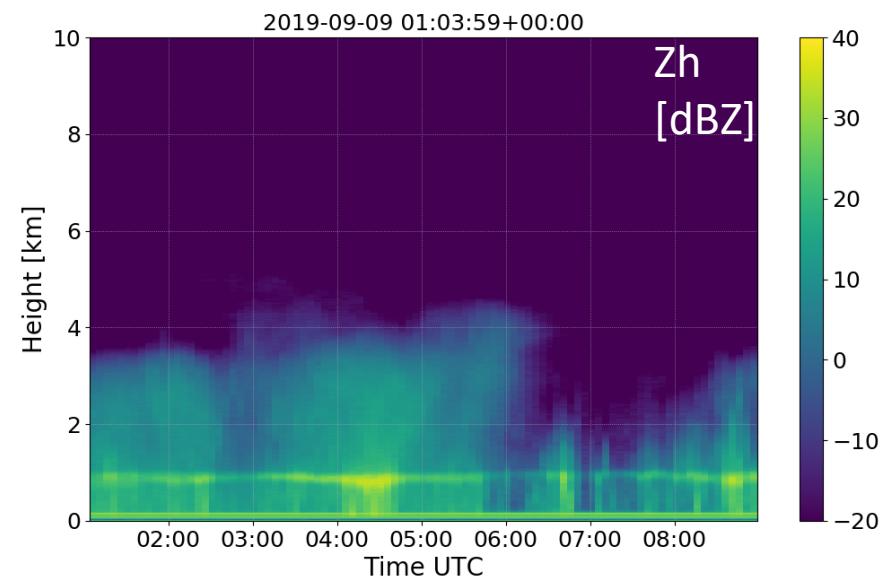
Example: 09 Sep 2019



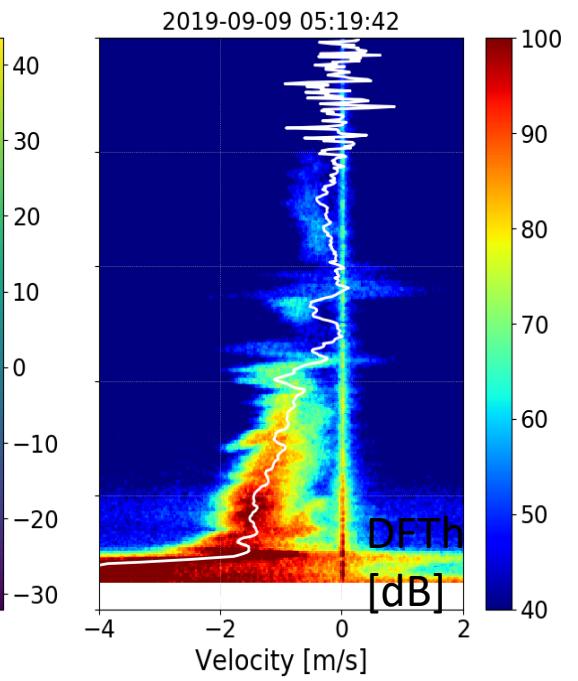
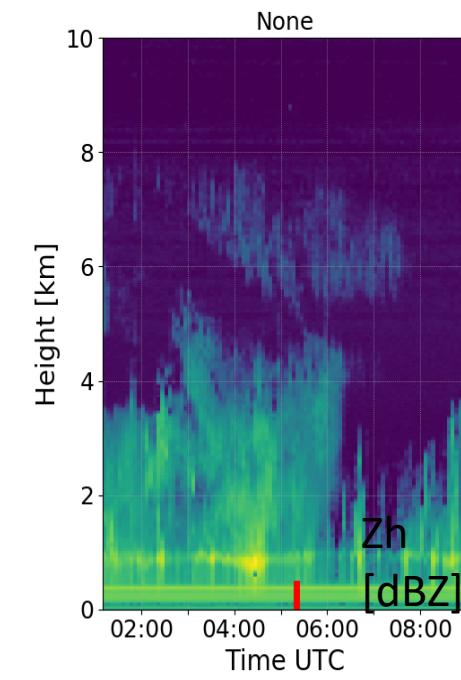
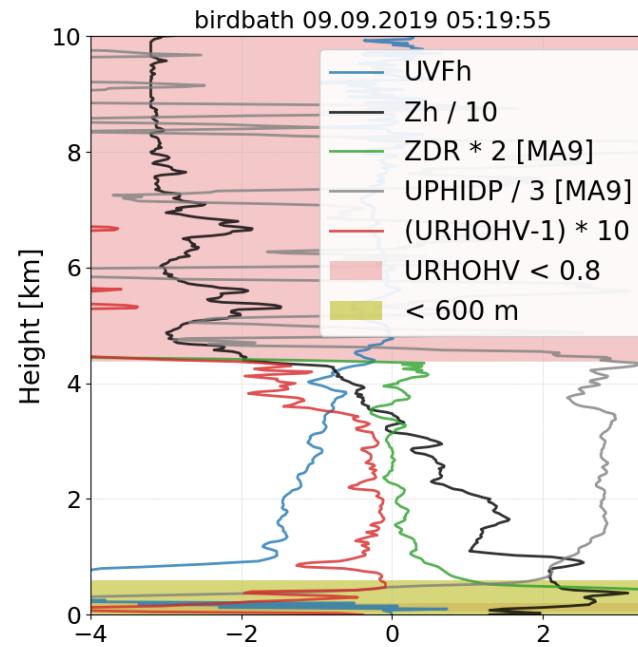
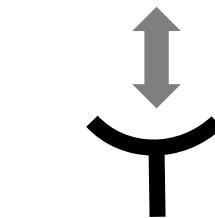
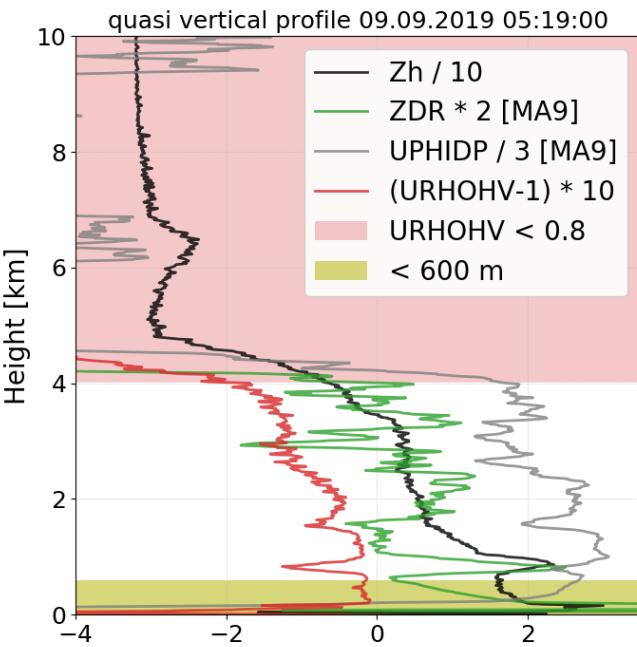
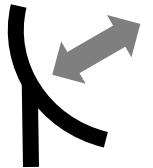
Example: 09 Sep 2019



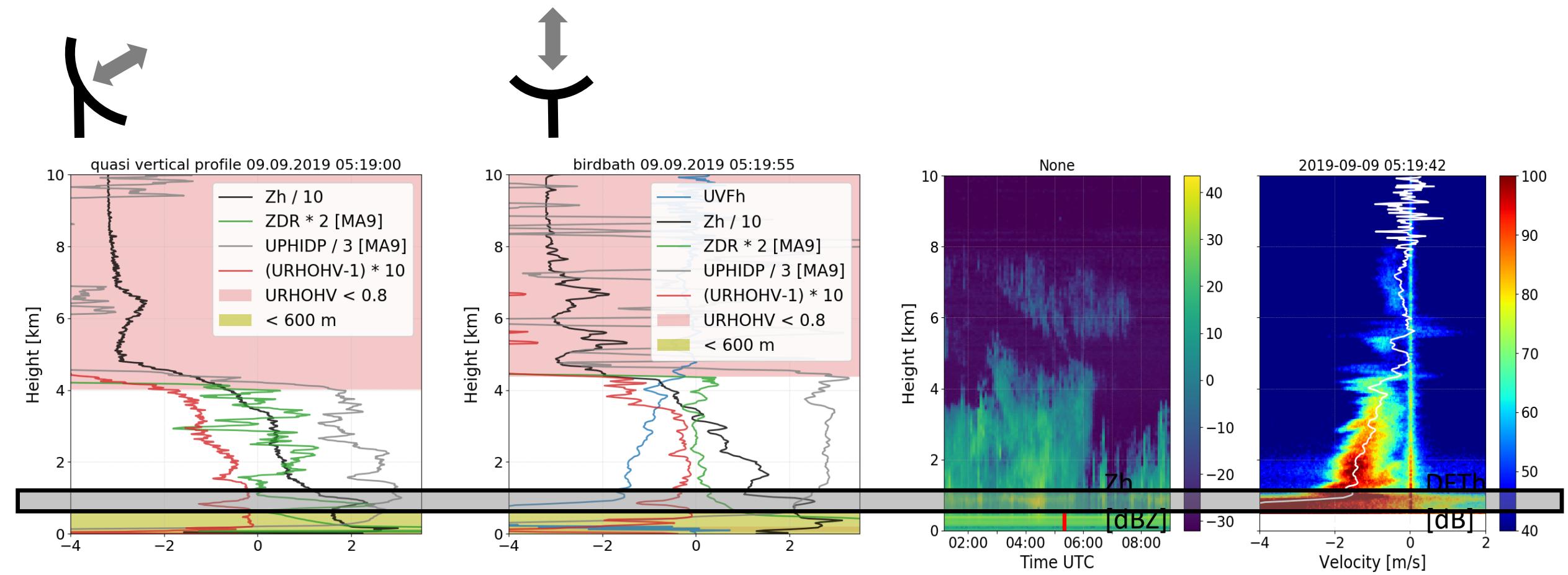
Example: 09 Sep 2019



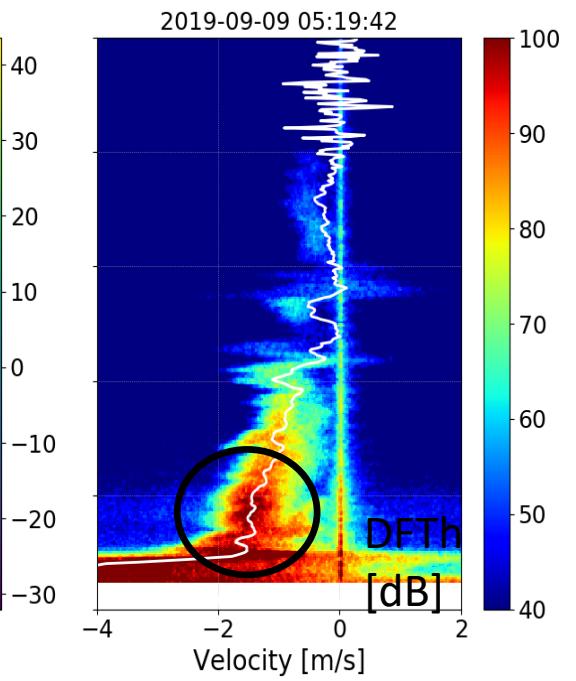
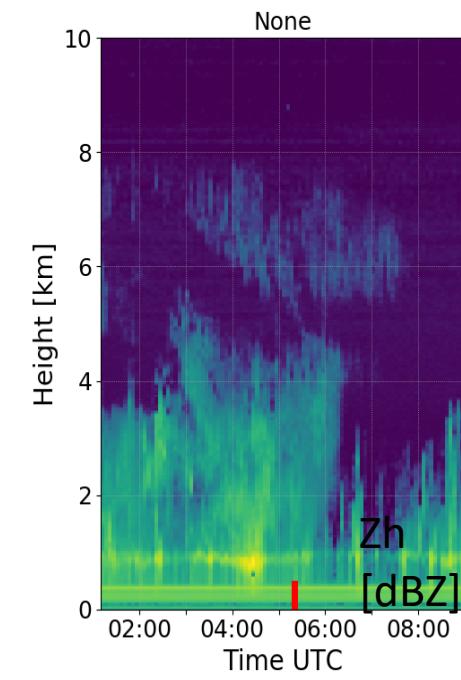
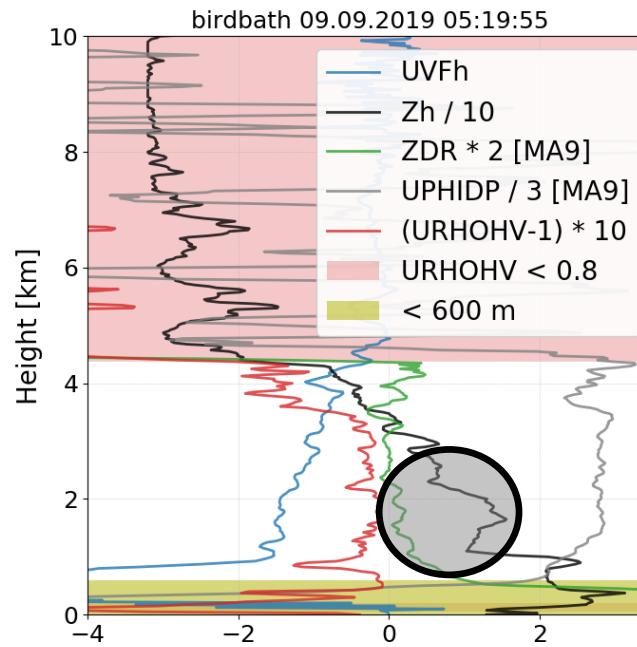
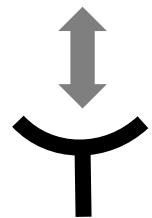
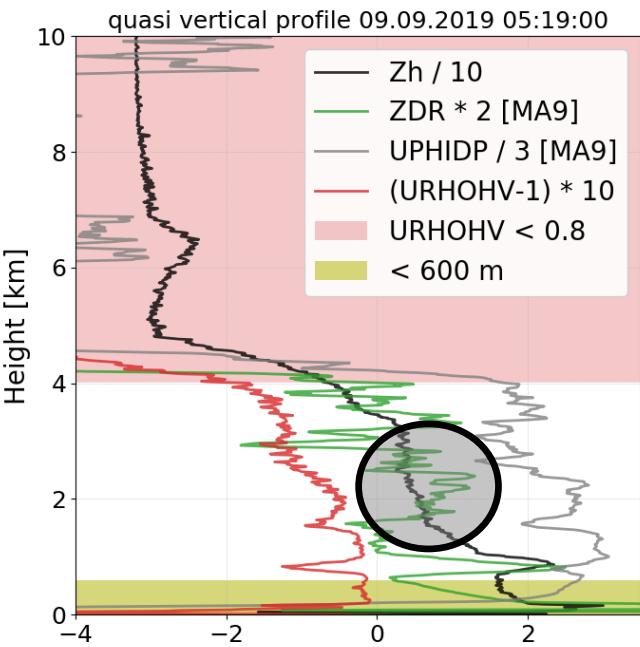
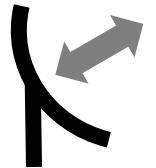
Example: 09 Sep 2019, 05:20 h



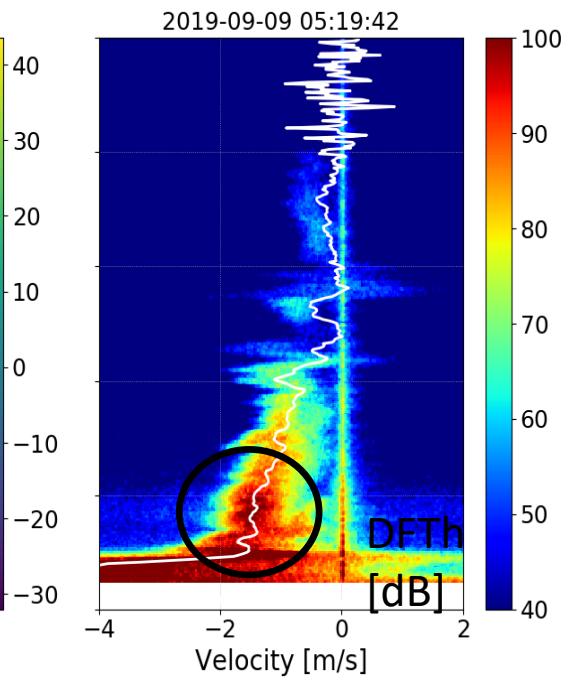
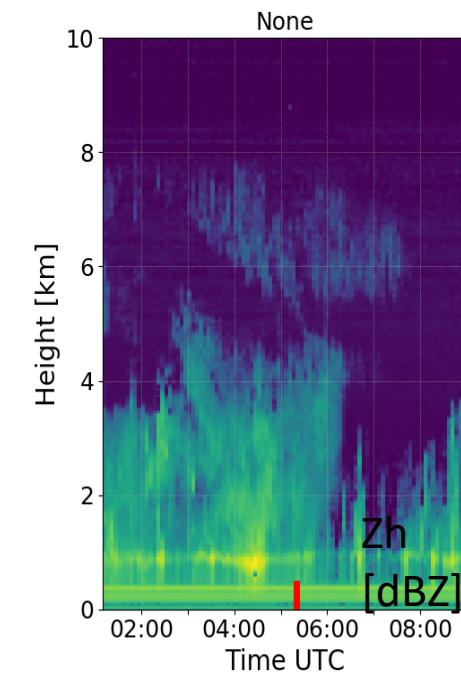
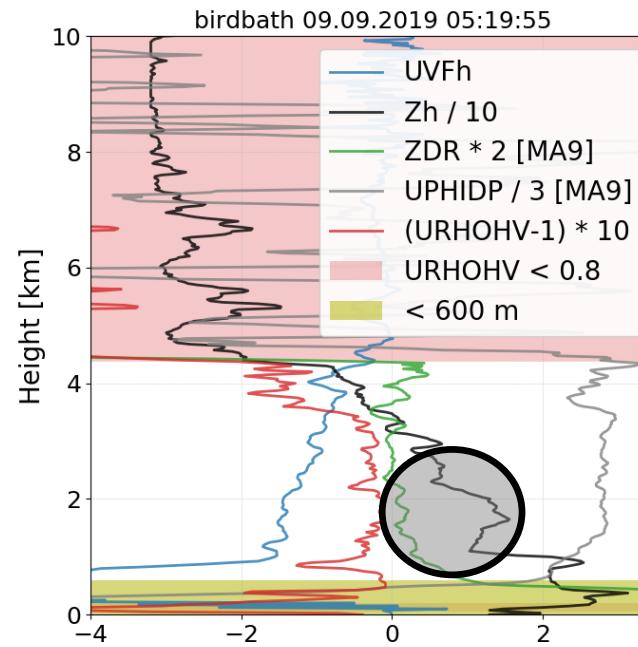
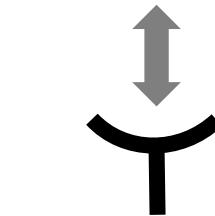
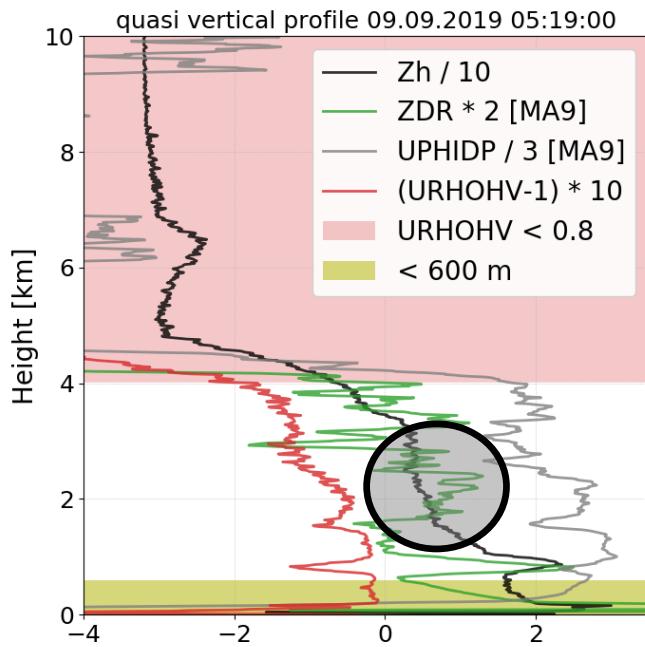
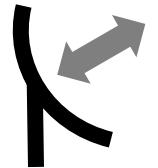
Example: 09 Sep 2019, 05:20 h



Example: 09 Sep 2019, 05:20 h

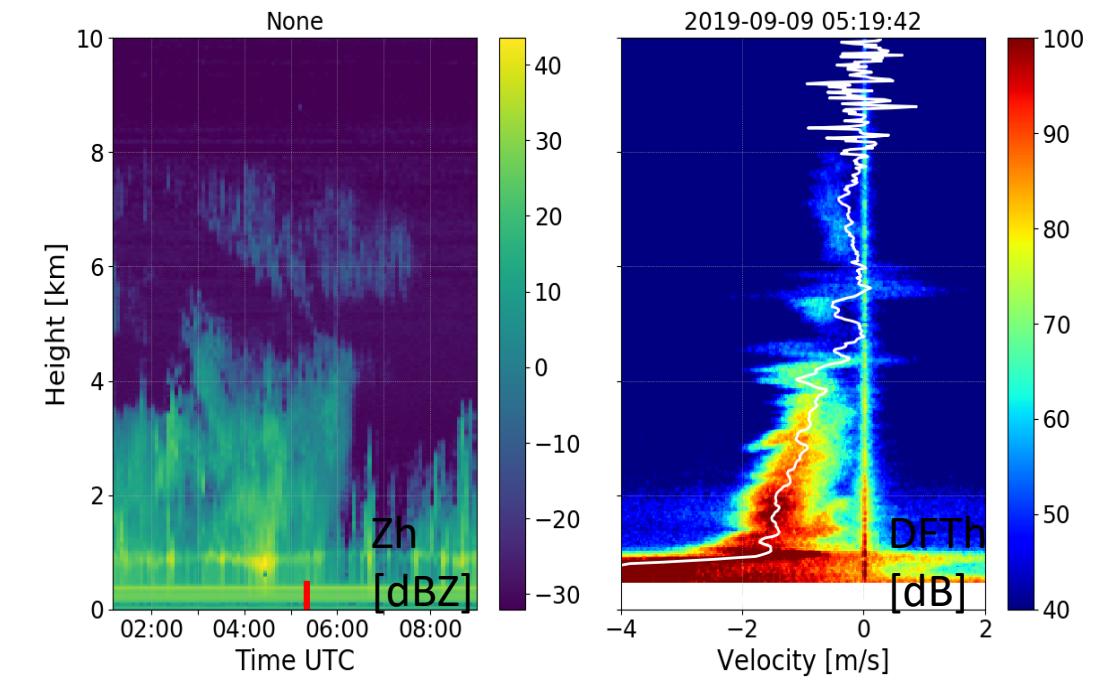
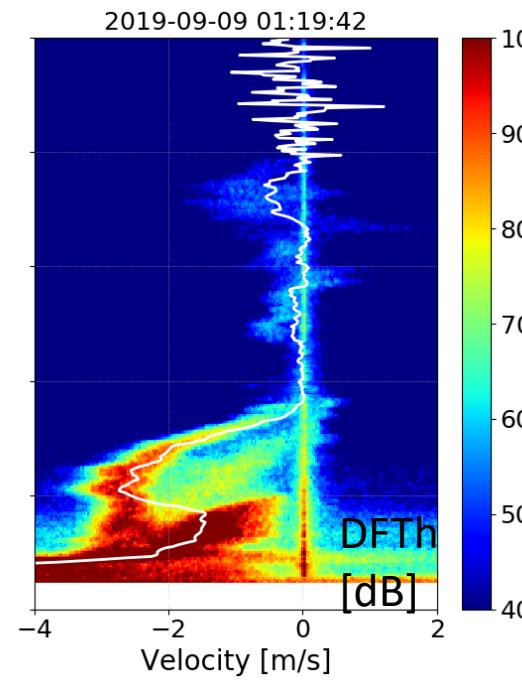
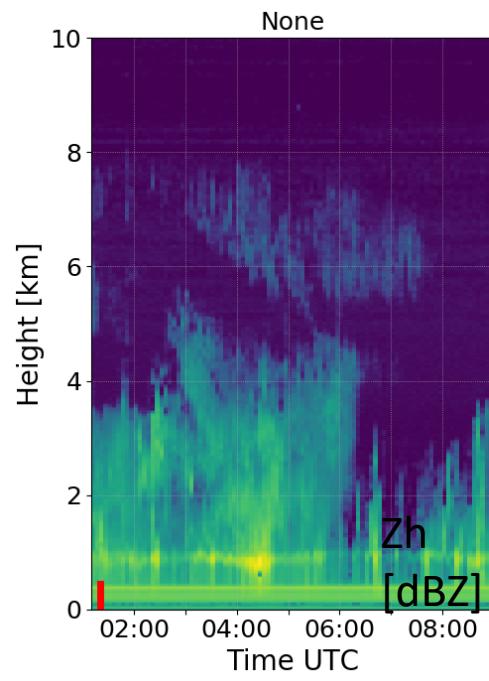


Example: 09 Sep 2019, 05:20 h

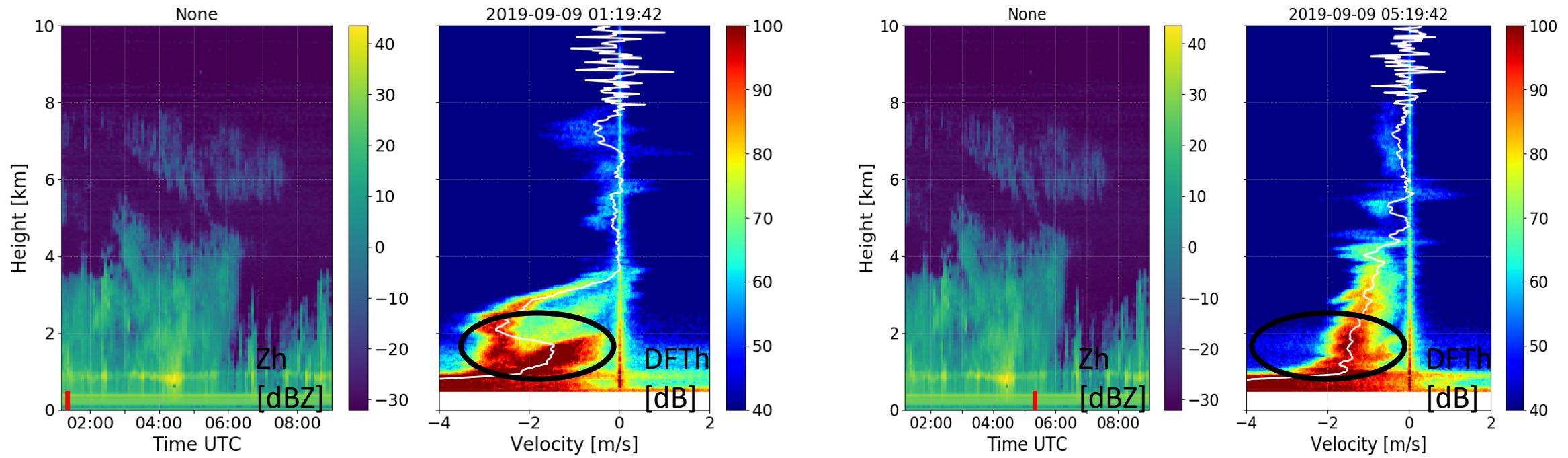


Challenges: variability, temporal averaging, sedimentation speed

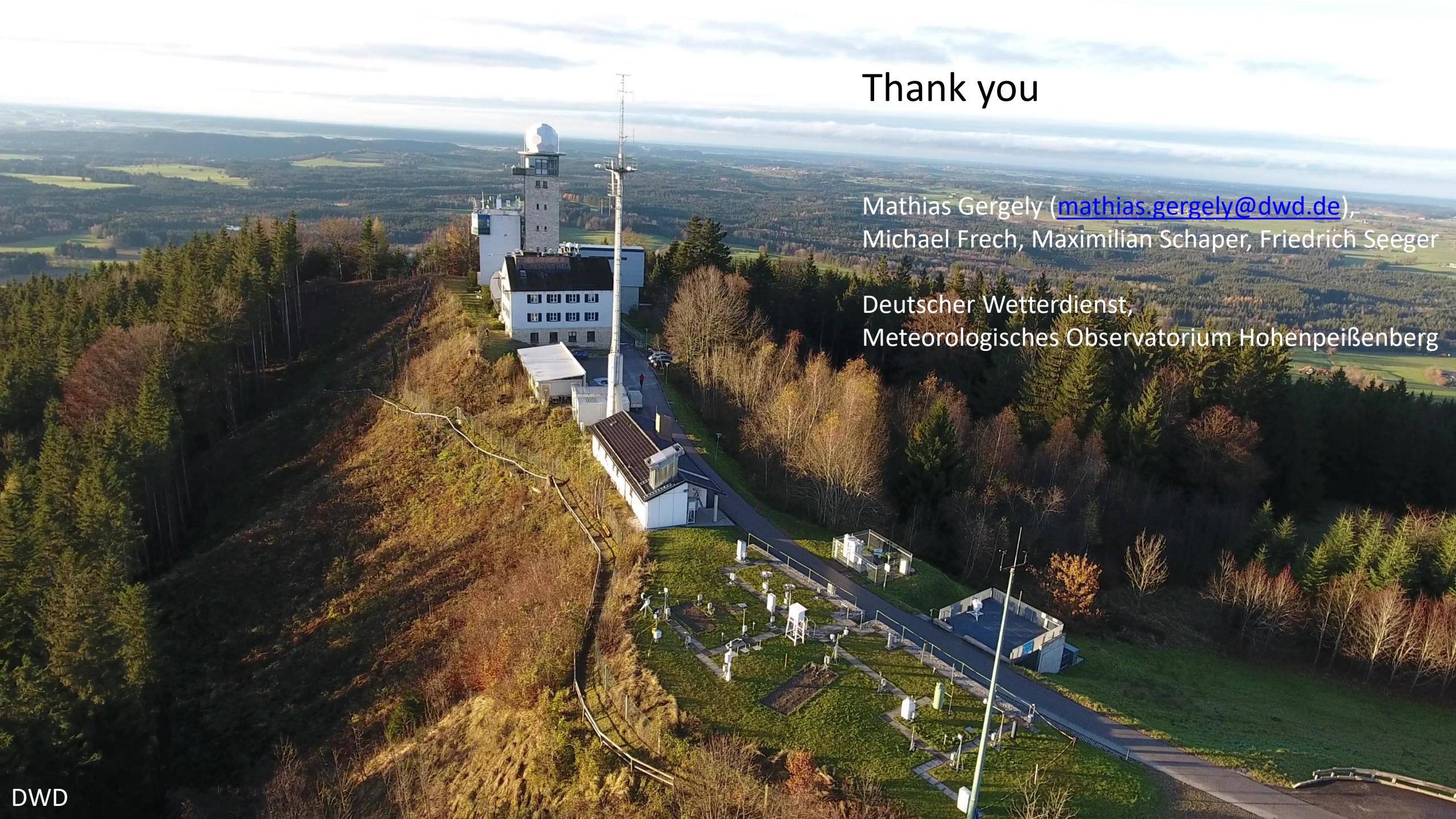
Example: 09 Sep 2019, 01:20 h and 05:20 h



Example: 09 Sep 2019, 01:20 h and 05:20 h



Characterize dominant microphysical processes by moments , e.g., mean, spectrum width, skewness, ..., and multiple maxima(?)

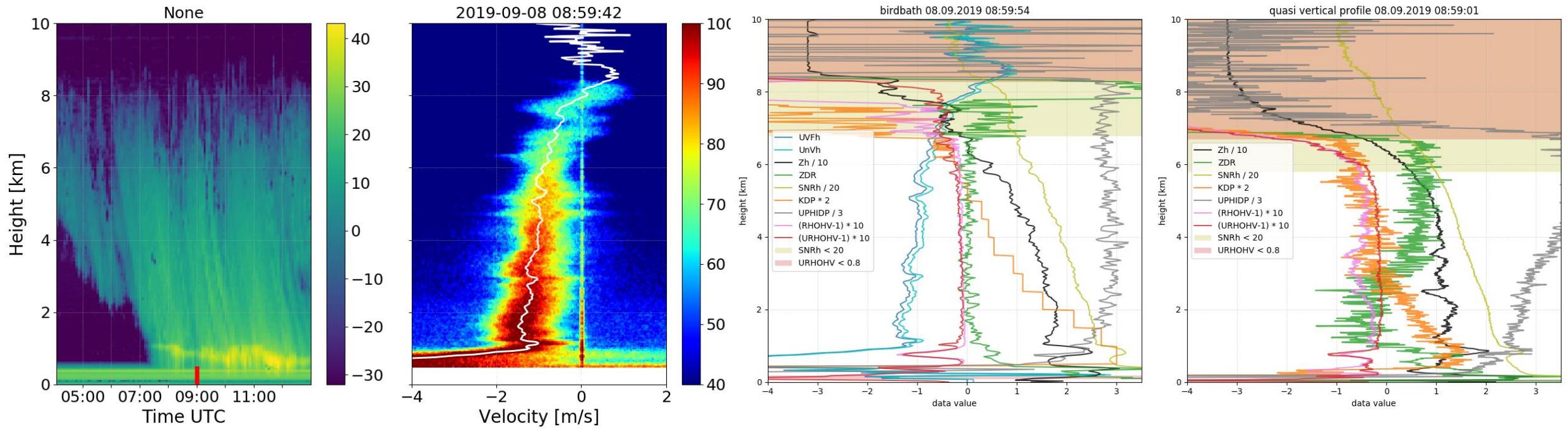
An aerial photograph of the Meteorological Observatory Hohenpeissenberg. The observatory is situated on a grassy hillside with several buildings, including a prominent white tower with a dome and a tall antenna. A paved path leads up the hill, and there are various scientific instruments and equipment installed along the slope. The surrounding landscape is a mix of green fields and dense forests under a clear sky.

Thank you

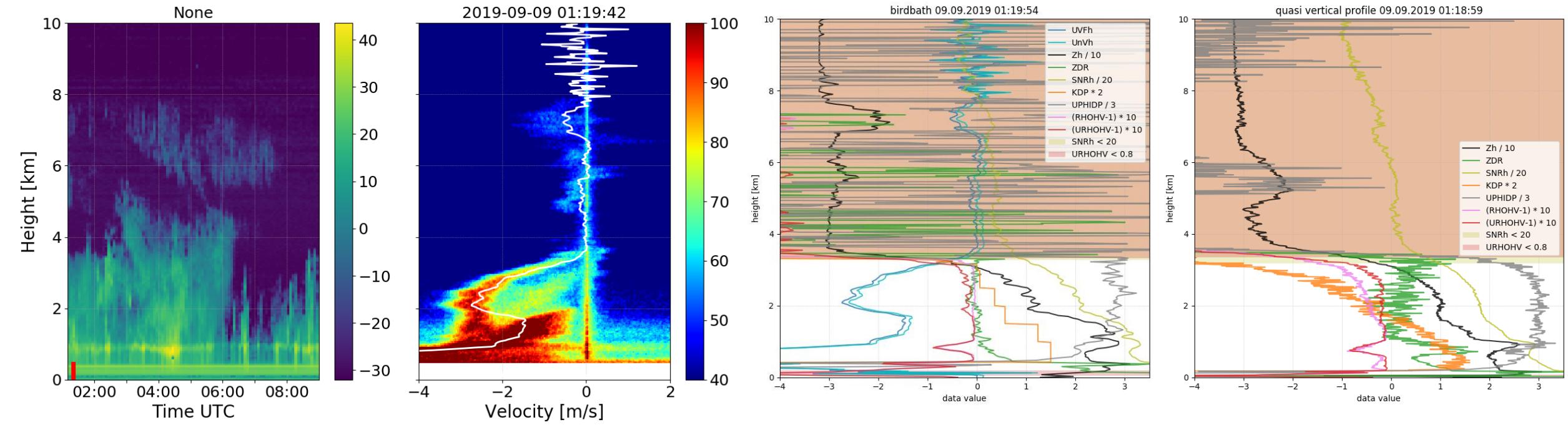
Mathias Gergely (mathias.ergely@dwd.de),
Michael Frech, Maximilian Schaper, Friedrich Seeger

Deutscher Wetterdienst,
Meteorologisches Observatorium Hohenpeissenberg

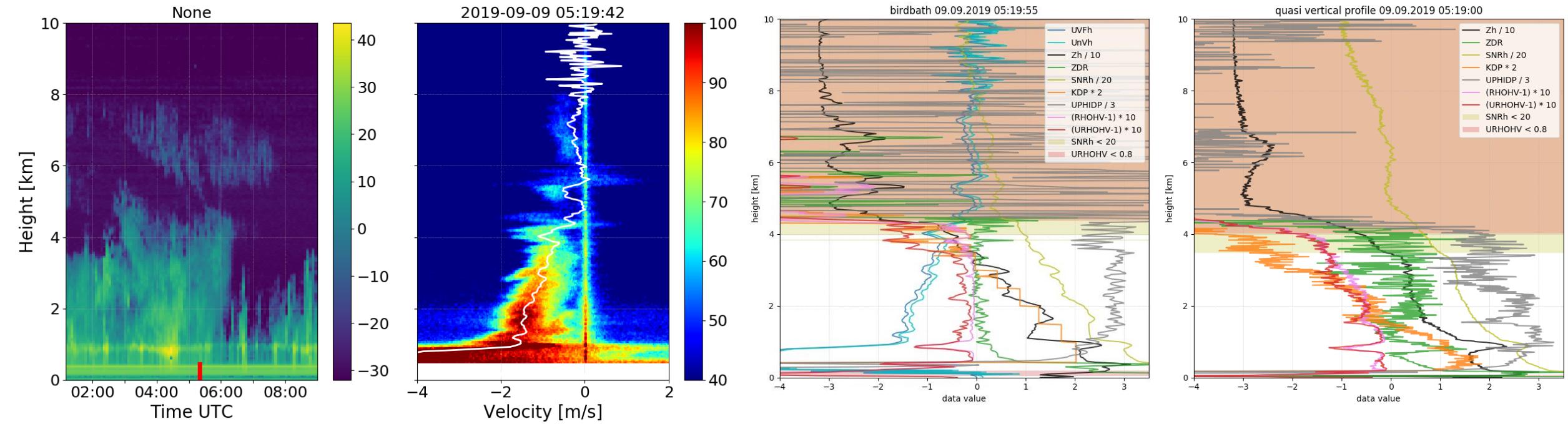
Extra



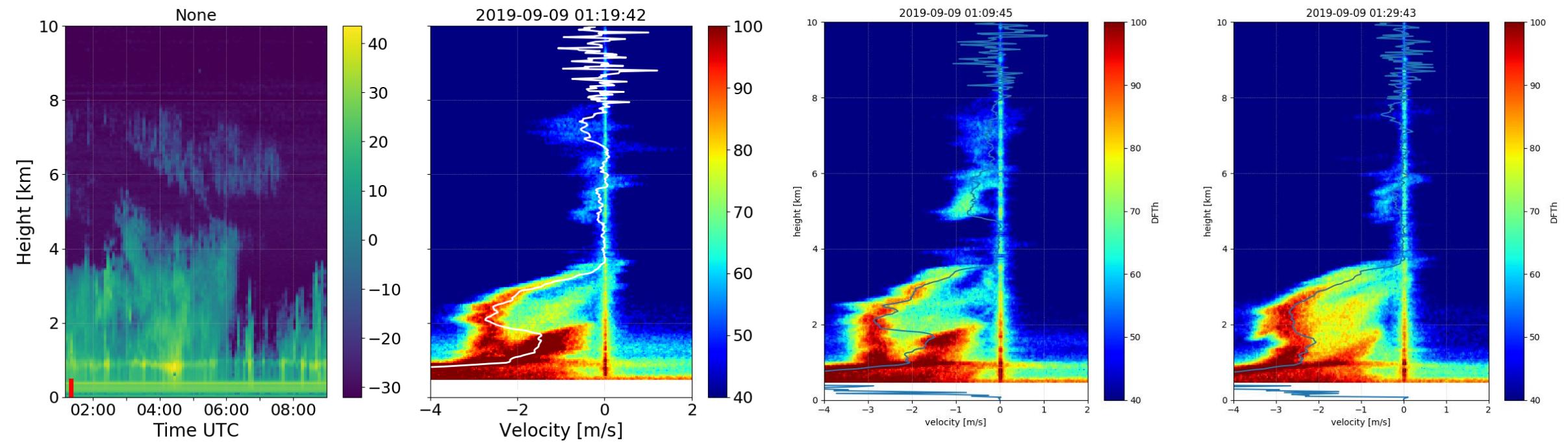
Extra



Extra

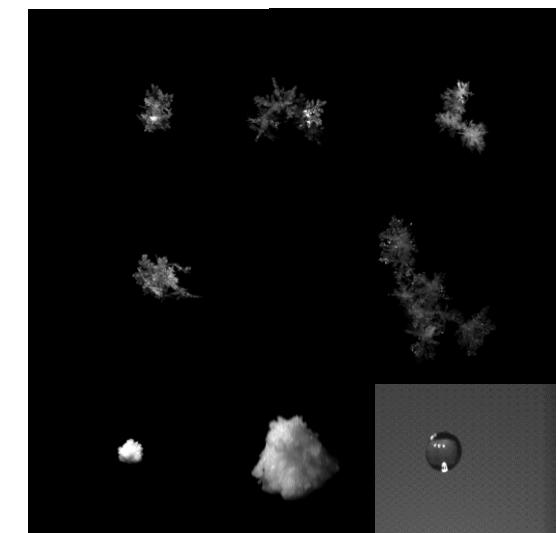
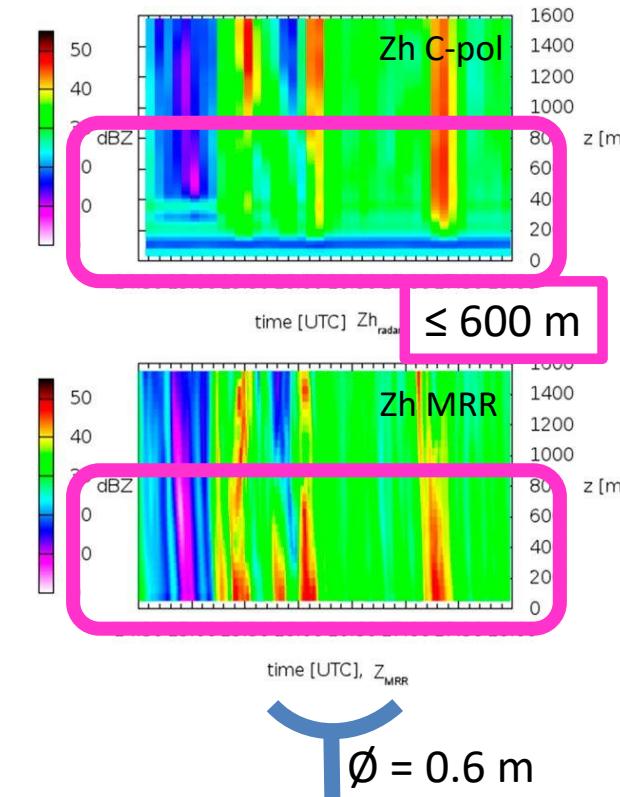
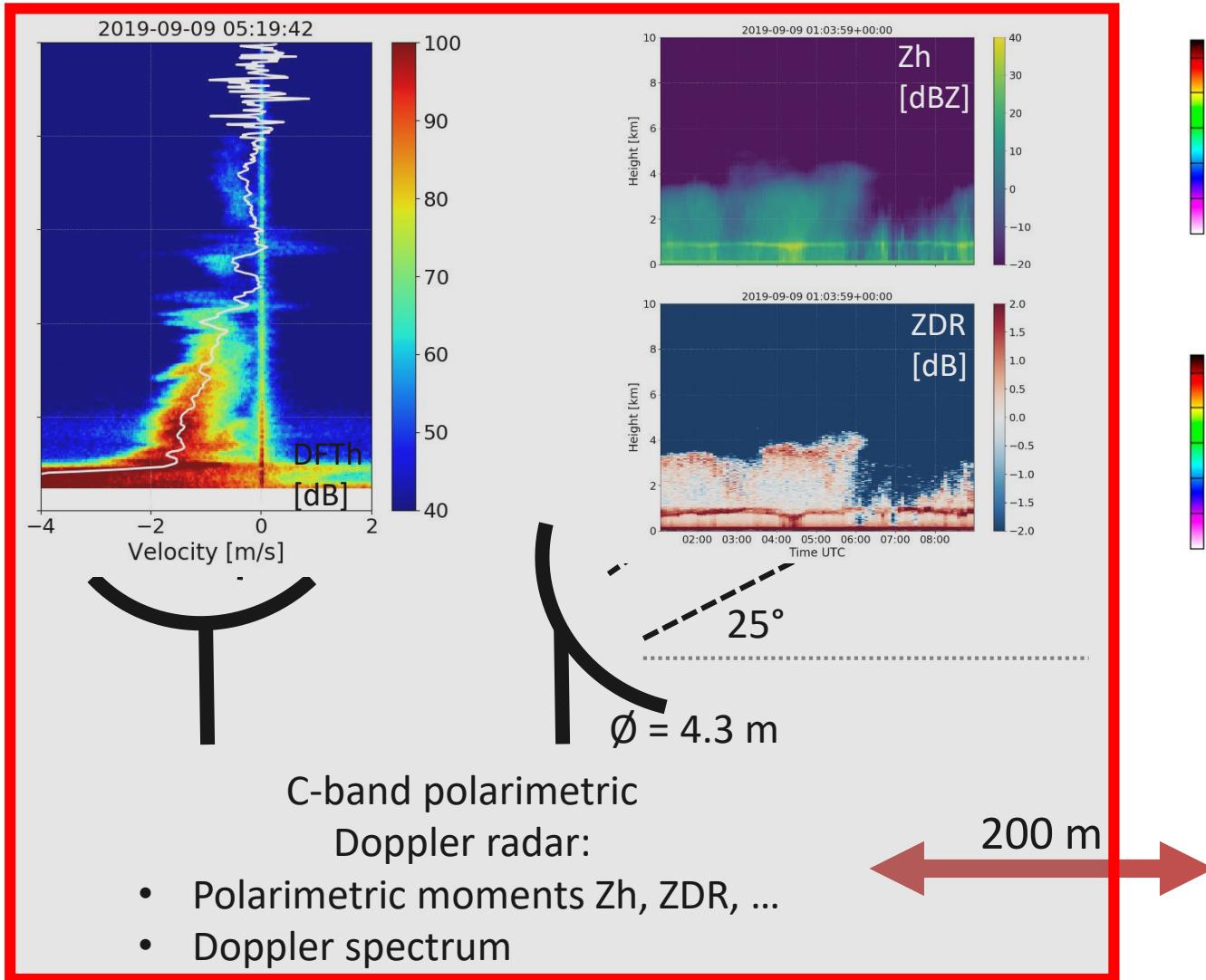


Extra



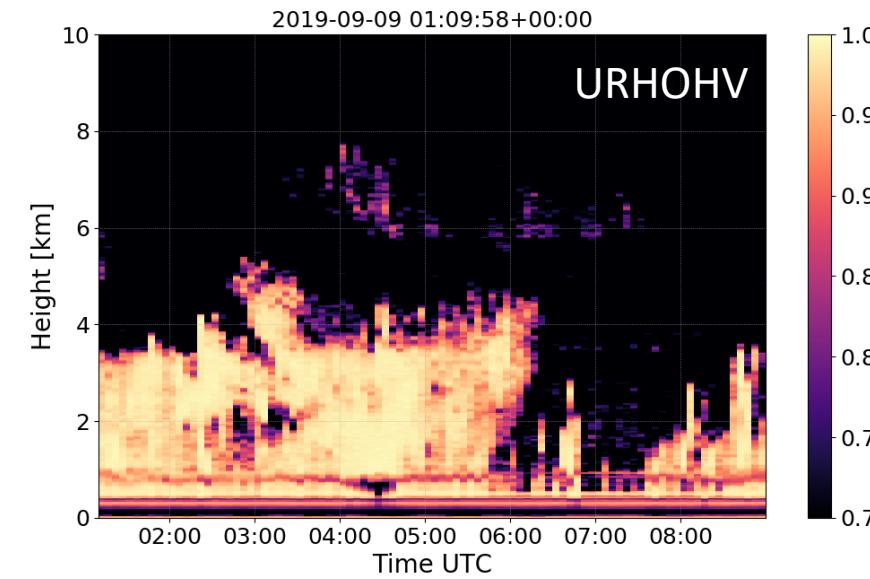
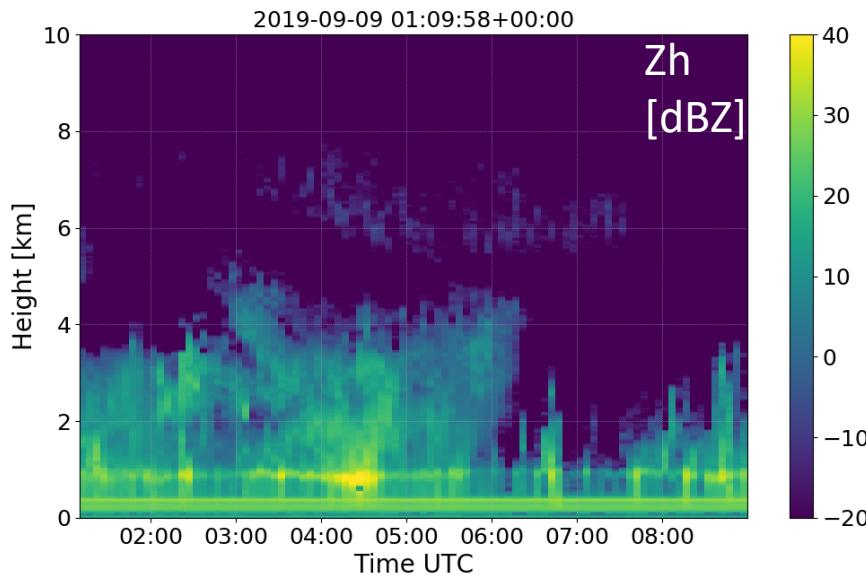
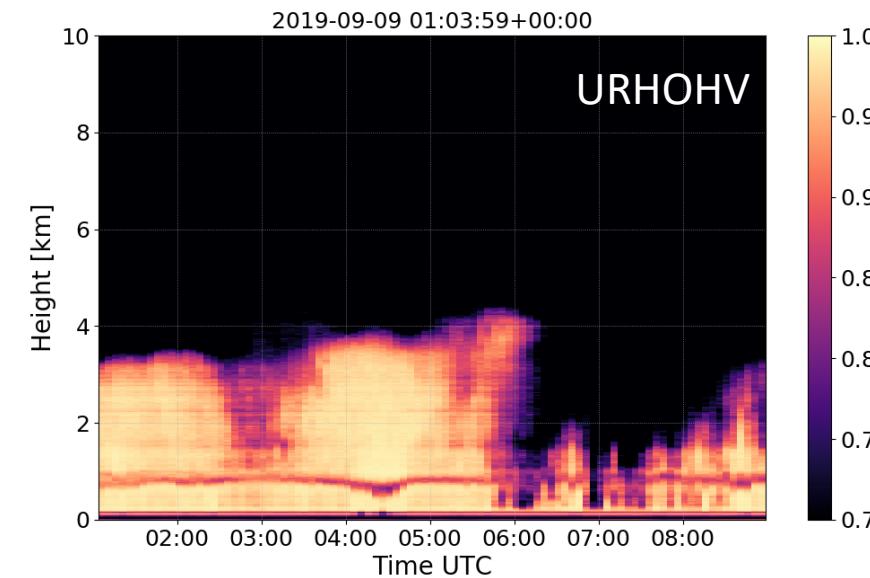
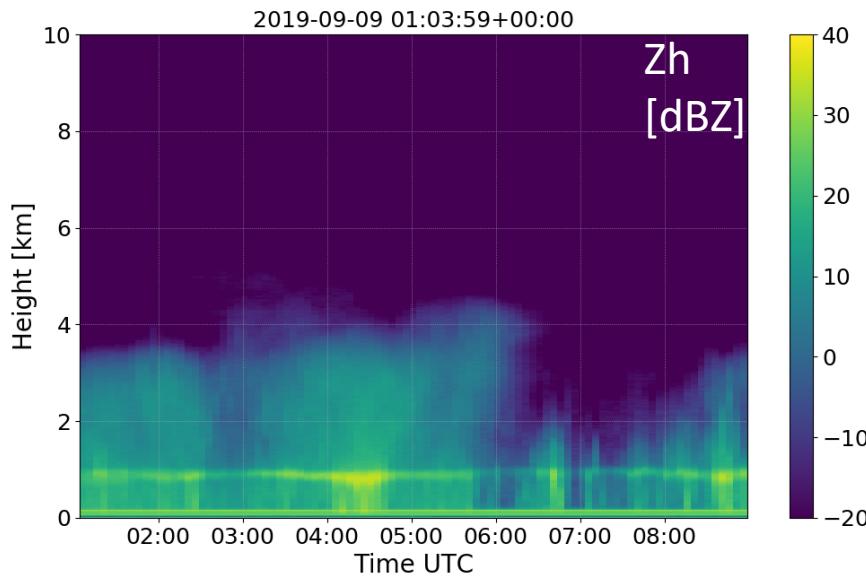
Idea: weather radar + MRR + in situ sensors

- MOHP (DWD) Hohenpeißenberg, ~ 1000 m a.s.l., 50 km SW of Munich

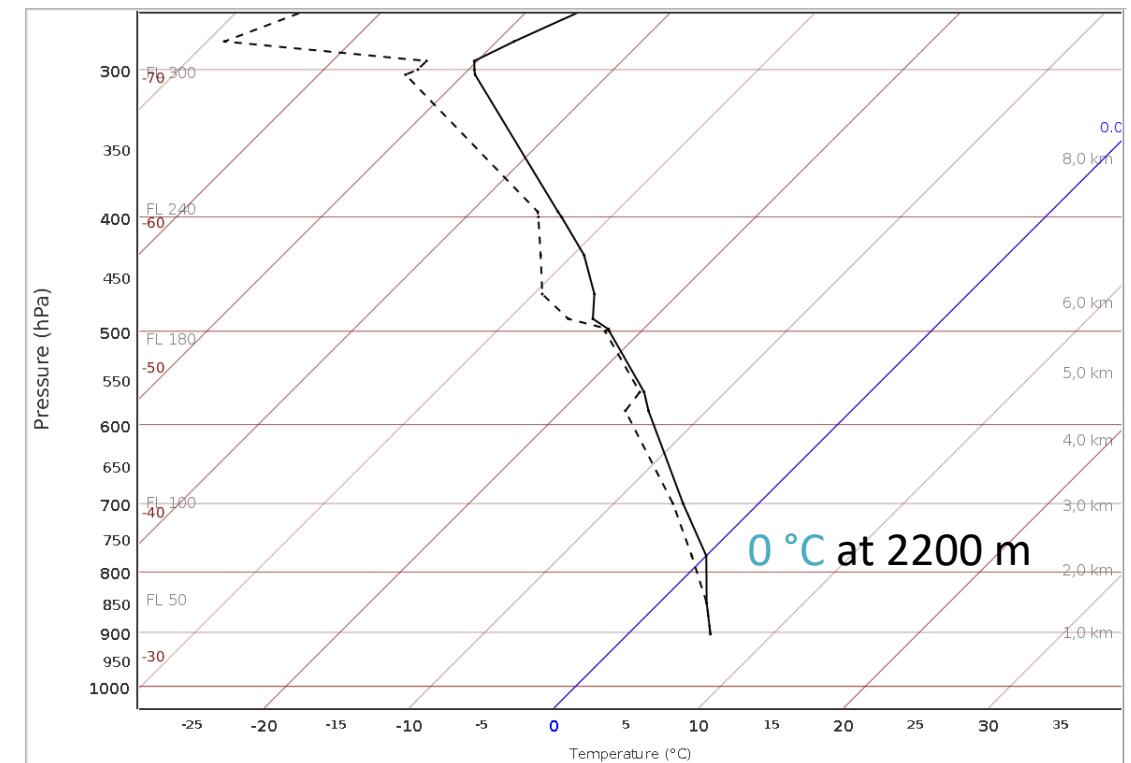
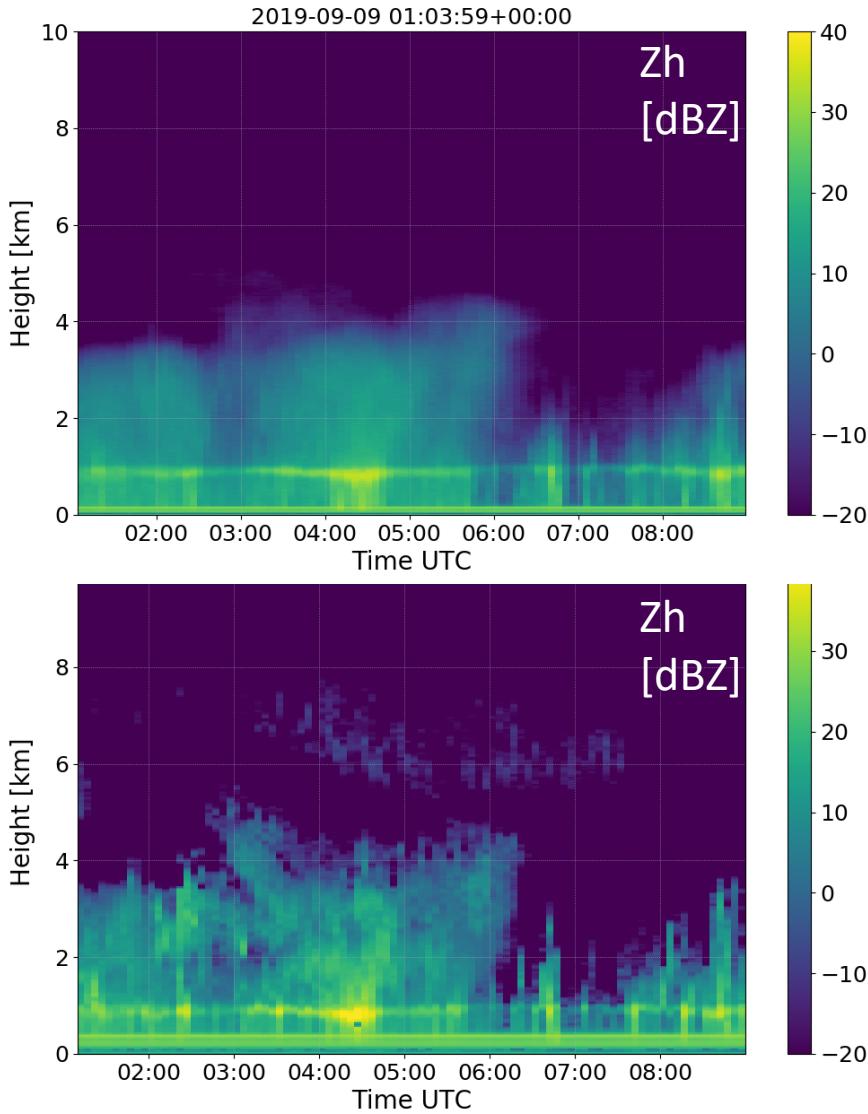


- Precipitation gauges, disdrometers:
- Precipitation rate
 - Particle size distribution
 - Particle shape (Thies 3D)

Example: 09 Sep 2019



Example: 09 Sep 2019



Example: 09 Sep 2019

