



Water Vapor and Cloud Characteristics derived during NARVAL-SOUTH

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Considered instruments:

- HALO Microwave Package (HAMP) :

- radiometers:

- 26 channels within 22 - 183GHz
- footprint K-band@13km: 1.2km

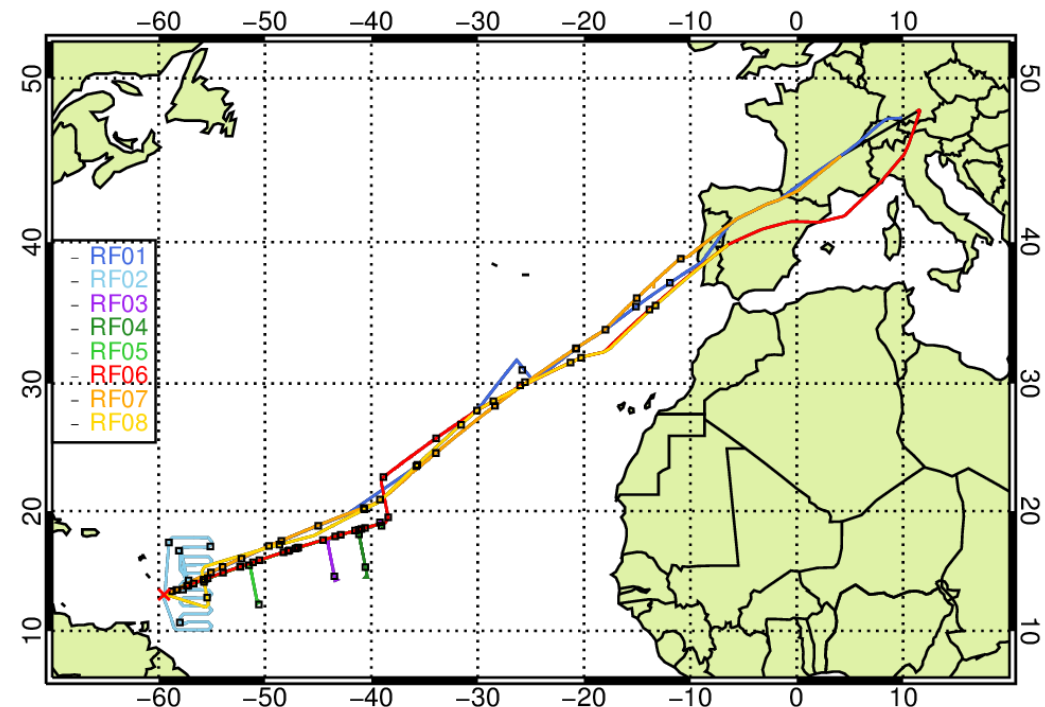
- radar:

- 36GHz pulsed doppler radar
- footprint @13km: 130m

- HALO-SR (University of Leipzig):

- 6 channels in VIS/NIR
- footprint @13km: 550m

- 75 dropsondes



HAMP passive radiometer:

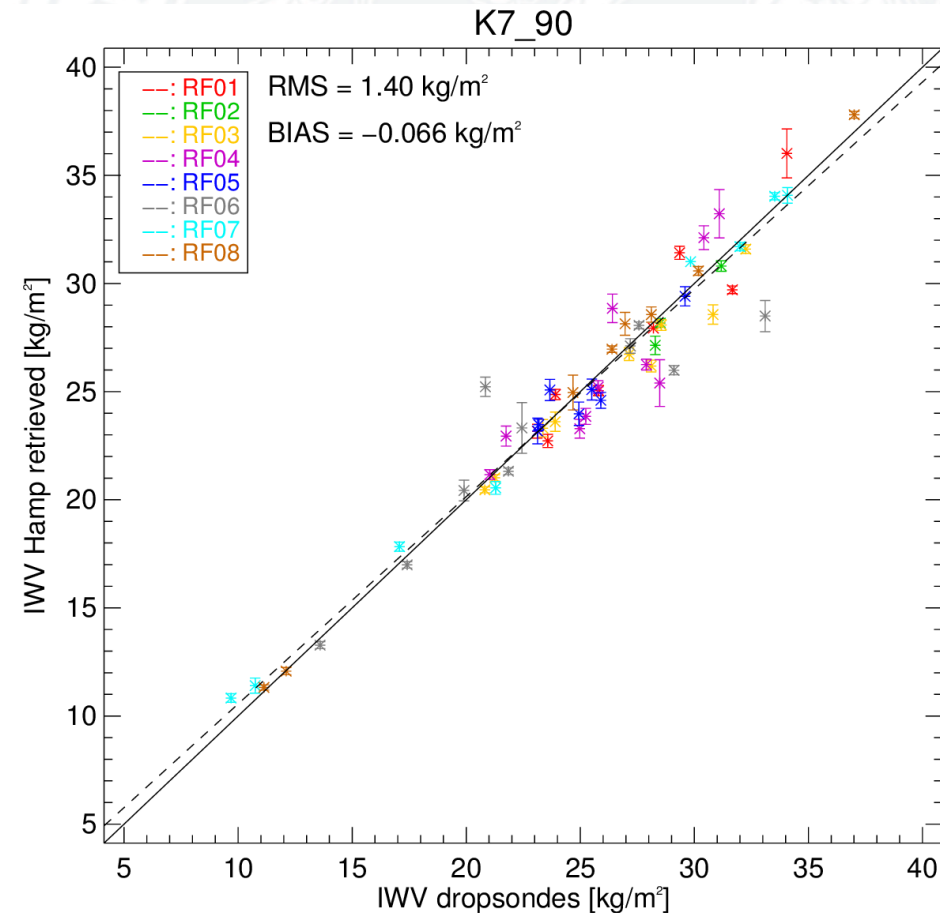
- Regression-based statistical retrieval with 7 K-band channels + 90GHz

- IWV:

- comparison to dropsondes

RMS = 1.4 kgm^{-2}

BIAS = 0.07 kgm^{-2}



HAMP passive radiometer:

- Regression-based statistical retrieval with 7 K-band channels + 90GHz
- IWV:
 - comparison to dropsondes
 - RMS = 1.4 kgm^{-2}
 - BIAS = 0.07 kgm^{-2}
- LWP:
 - uncertainty: 8 gm^{-2}
 - good comparison to HALO-SR retrieval for shallow, non-precipitating clouds

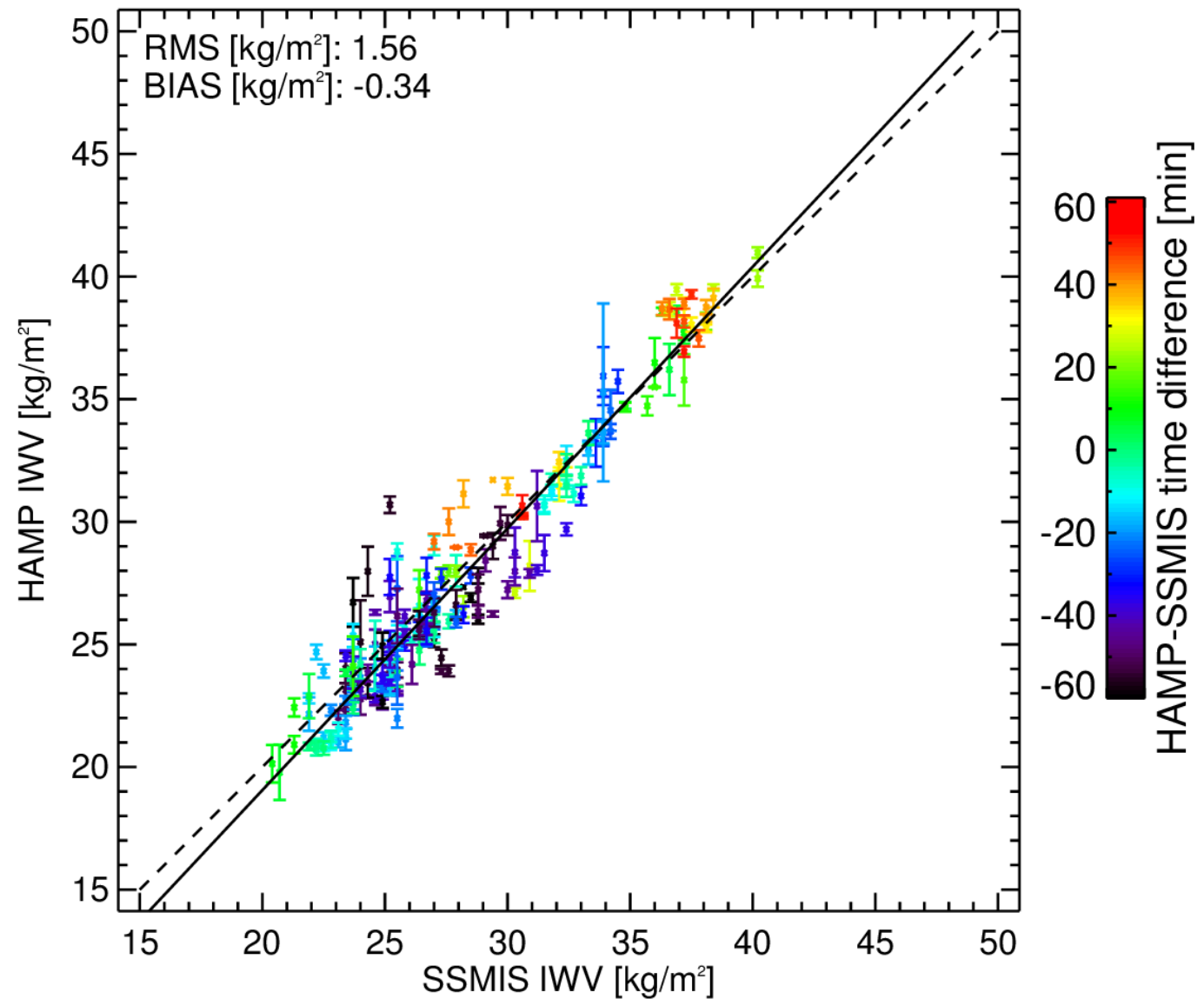
SSMIS:

- grid of
 $0.25^\circ \times 0.25^\circ$

-IWV:

RMS = 1.6 kgm^{-2}

BIAS = 0.3 kgm^{-2}



SSMIS:

- grid of
0.25° x 0.25°

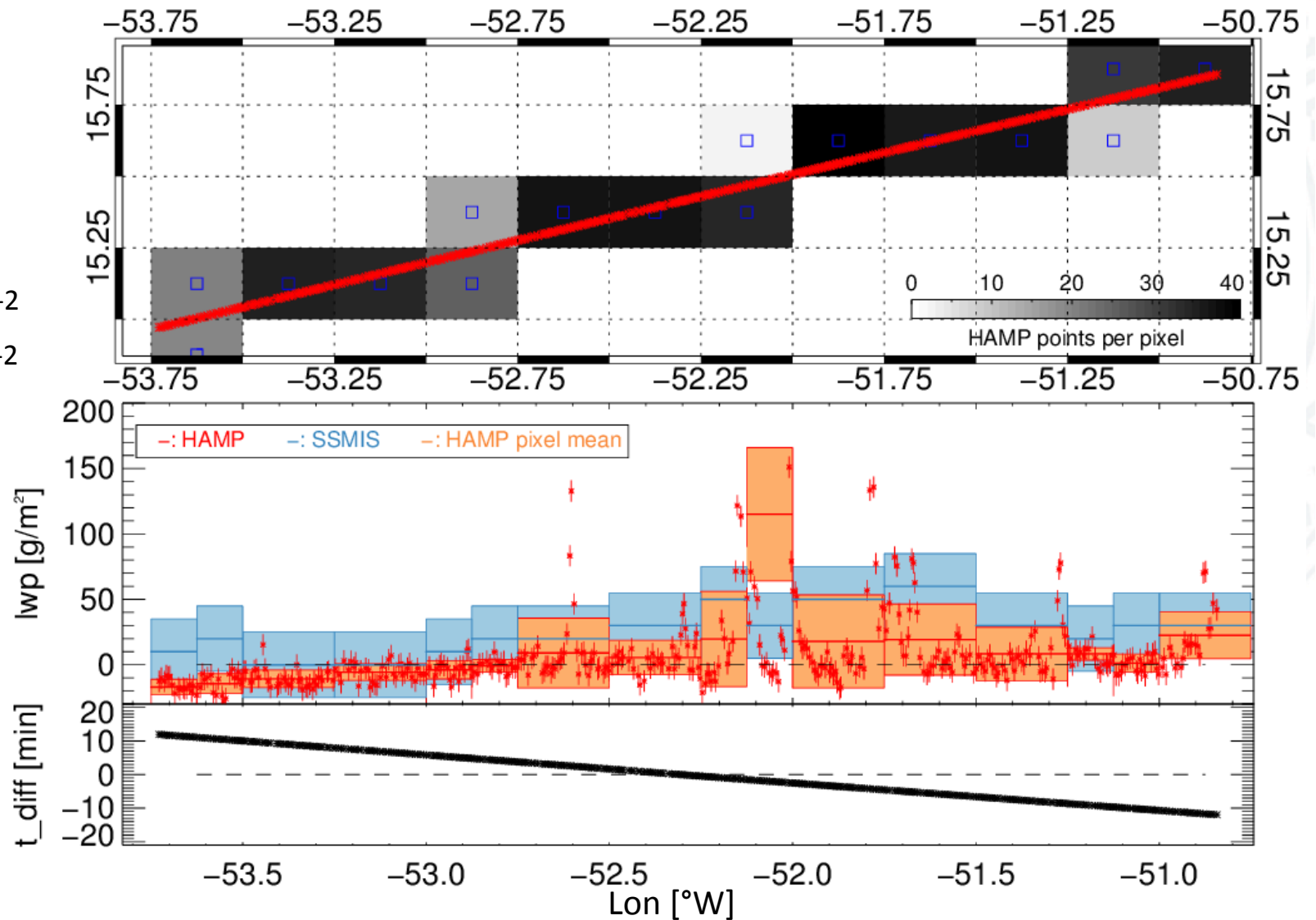
-IWV:

RMS = 1.6 kgm⁻²

BIAS = 0.3 kgm⁻²

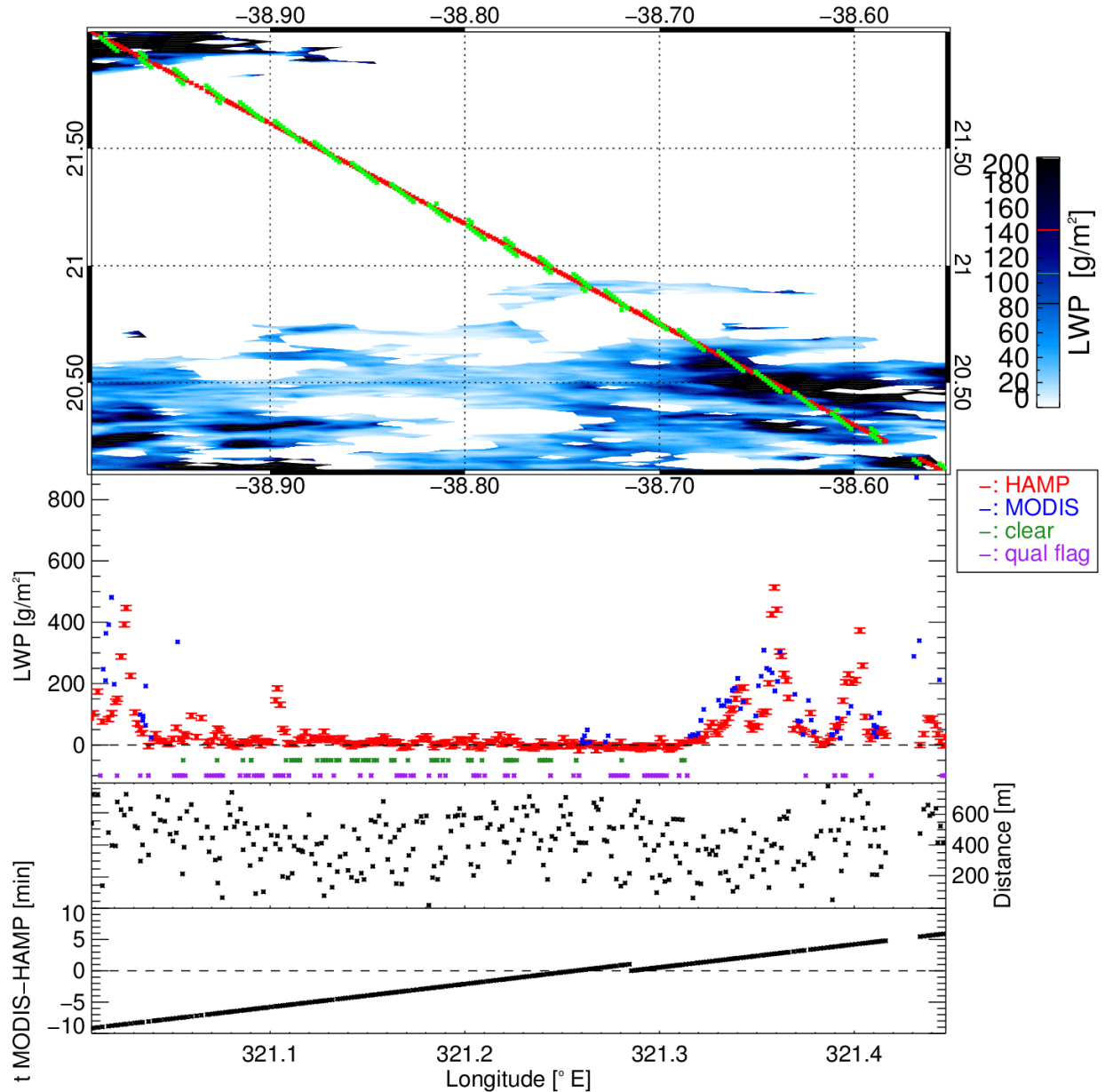
-LWP:

variability not
covered

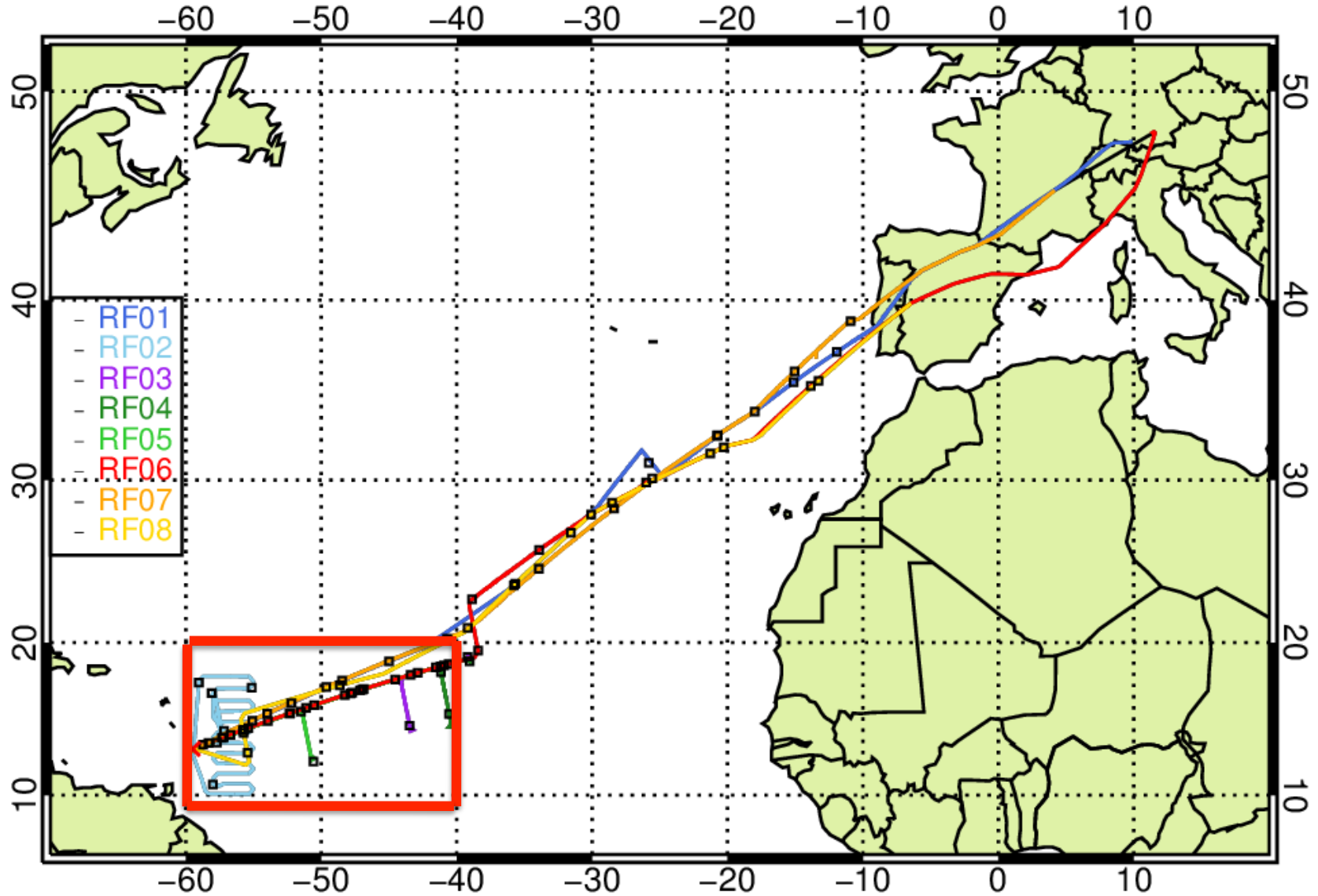


MODIS LWP:

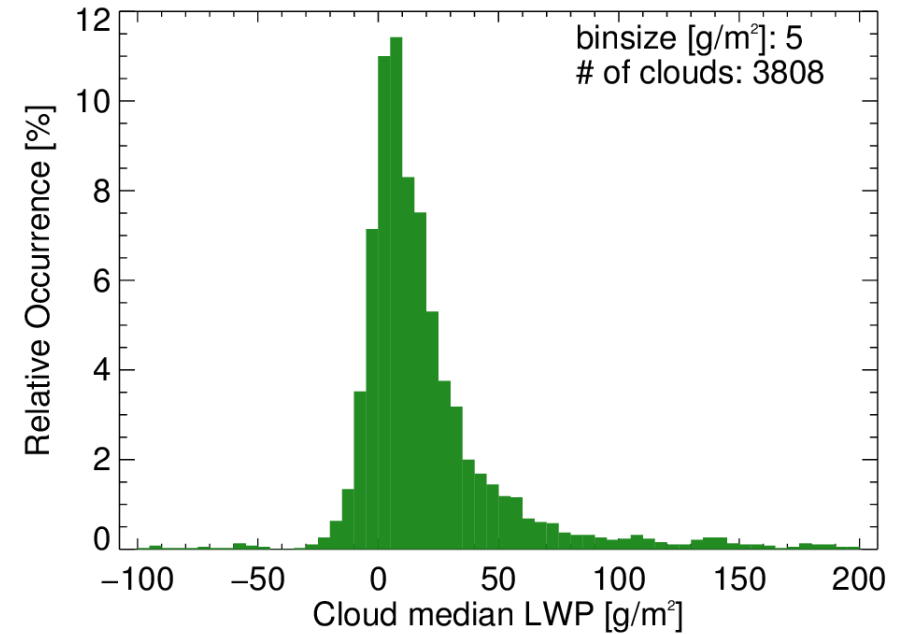
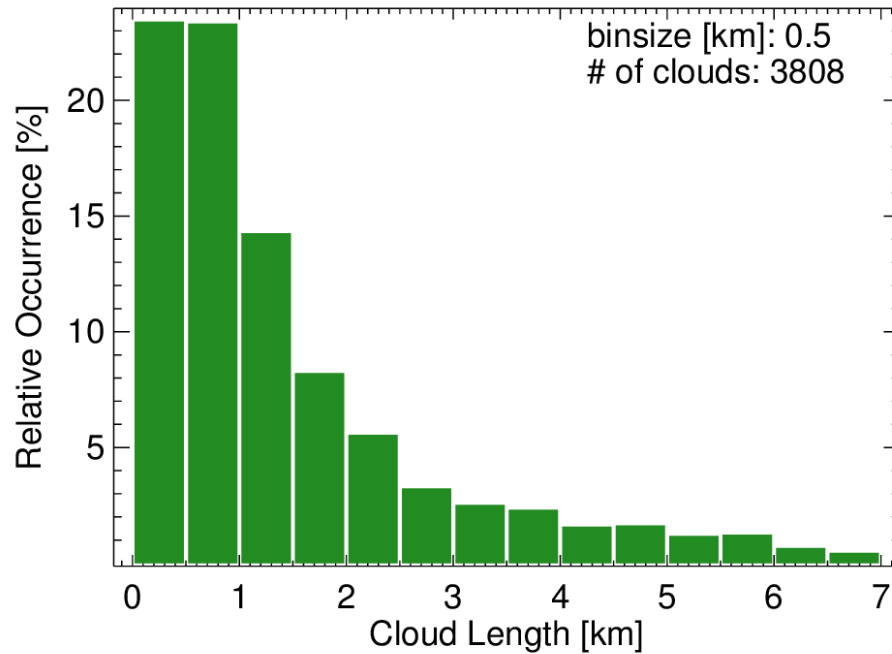
- 1km x 1km resolution
- overestimation
low LWP ($LWP < 200\text{g m}^{-2}$)
- underestimation
high LWP



tradewind driven region:



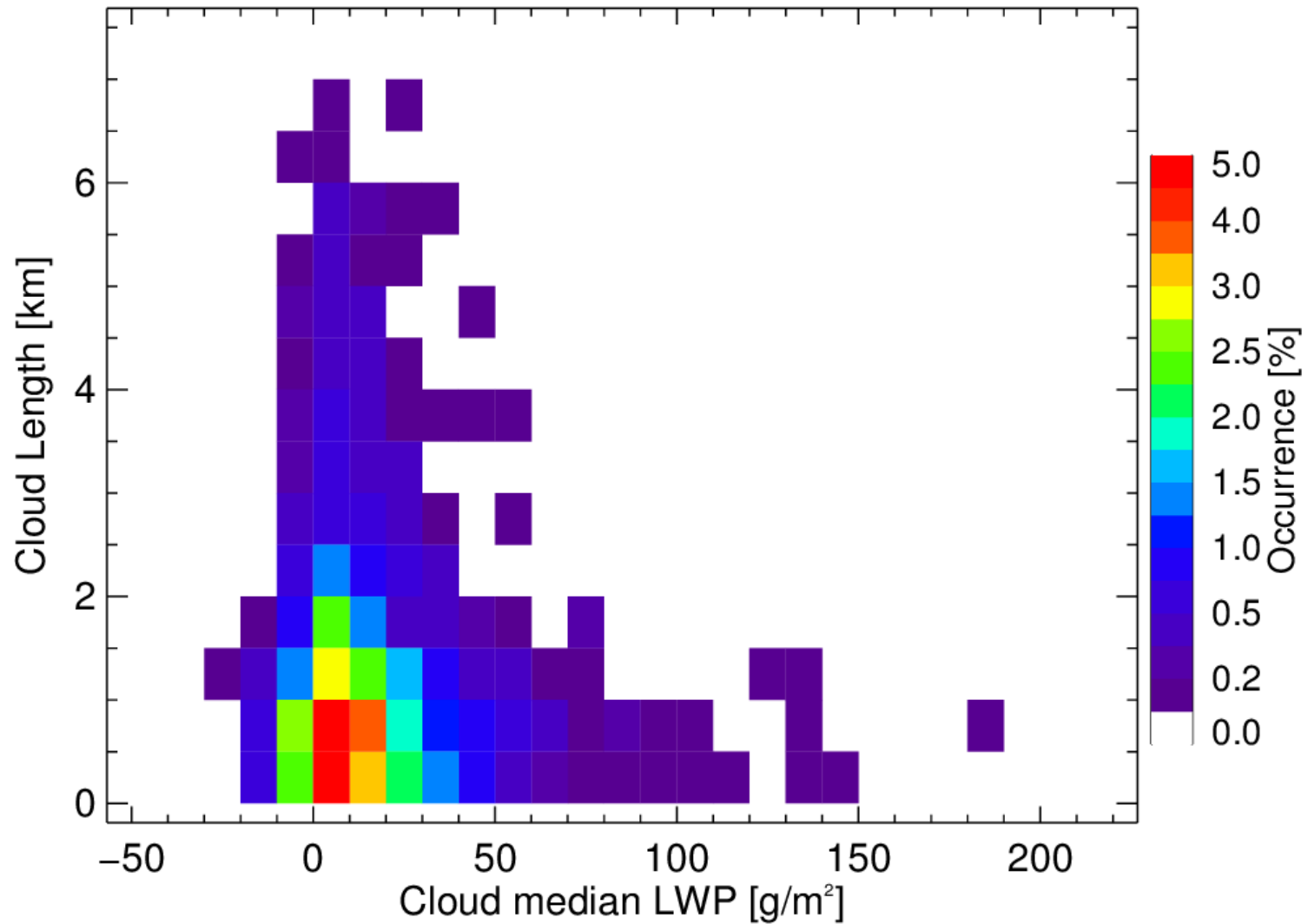
- cloud mask based on HALO-SR measurements, length resolution: 550m



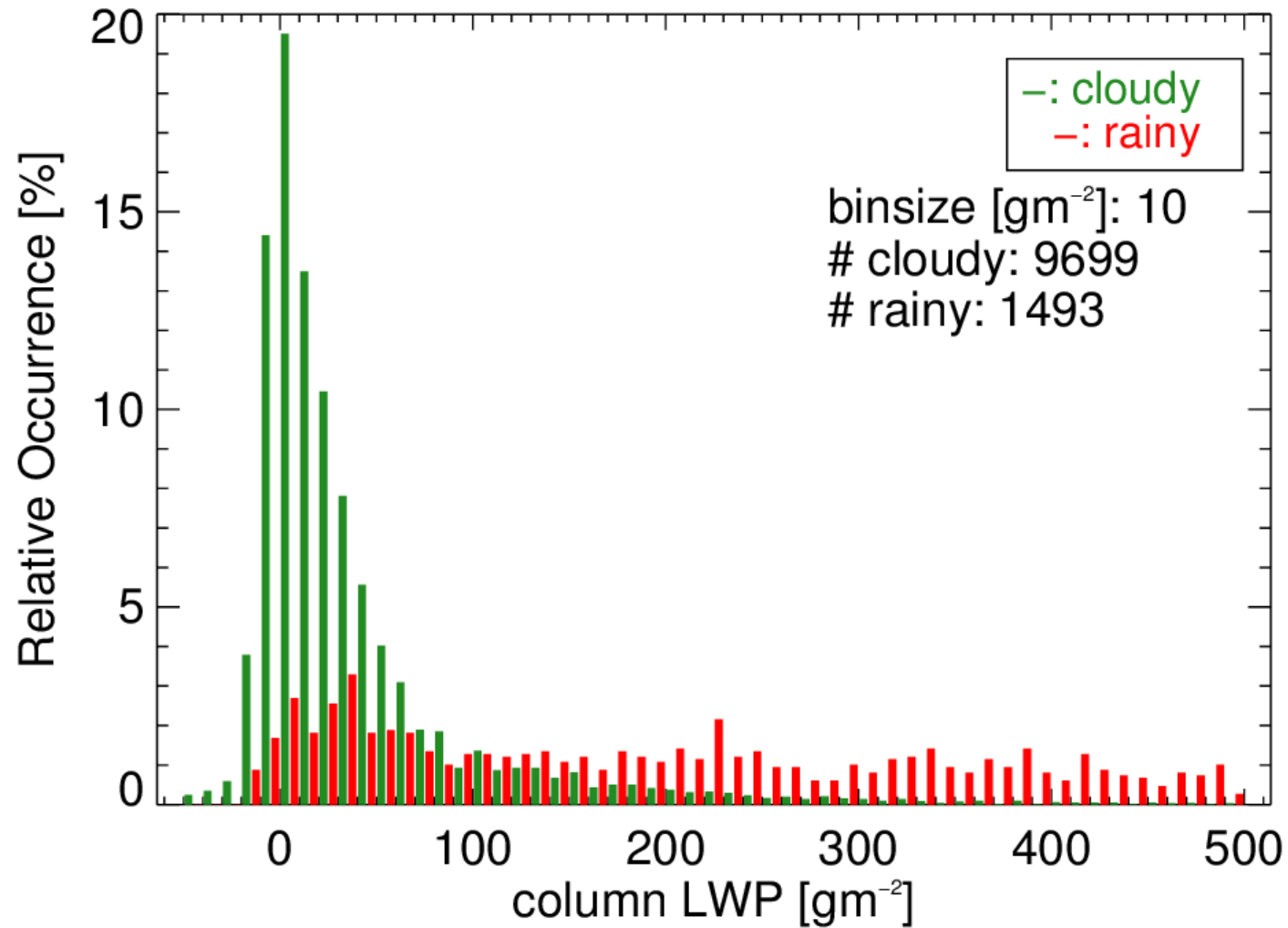
length [km]	occurrence [%]
< 2	69
> 7	10

LWP [g/m ²]	occurrence [%]
0 - 50	46
> 200	< 2

combined LWP-length statistics:



- radar for precipitation identification: 13% precipitating



Conclusion and future research:

- HAMP resolves IWV and LWP variability
- IWV: variability covered by SSMIS
- LWP: variability resolved by MODIS
- 69% of clouds < 2km, 46% < 50gm⁻² LWP
- 13% of clouds precipitating

Future Research and ideas for NARVAL II:

- increase measurement resolution
- increase data volume for satellite comparison
- same time stamp for all instruments



Thank you!