



EarthCARE 2026 Science and Validation workshop

8–12 June 2026 | Rhodes House | Oxford, UK

Comparisons between EarthCARE and ATR42 during the NAWDIC-DICHOTOMI field campaign (L2a and L2b products)

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LATMOS¹, ENS-LMD², LAMP-OPGC³



NAWDIC – DICHOTOMI

*North Atlantic Waveguide, Dry Intrusion, and Downstream Impact Campaign –
Dry Intrusion and Cloud Head winds On Top Of Marine Interfaces*



DICHOTOMI, PI : G. RIVIERE (part of the international field campaign NAWDIC)

Ireland, Shannon airport, 3 February 2026 – 4 March 2026

Objective : aims at better understanding the formation of damaging surface winds in extratropical cyclones, in particular near the dry intrusions and the cloud head regions

NAWDIC

DICHOTOMI



ATR42



TUBS Cessna F406



HALO

remote sensing and in-situ measurements

+ ground-based network (French coasts) : Doppler cloud radar,
Doppler wind lidars, water vapor lidars, KIT-cube

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ATR42



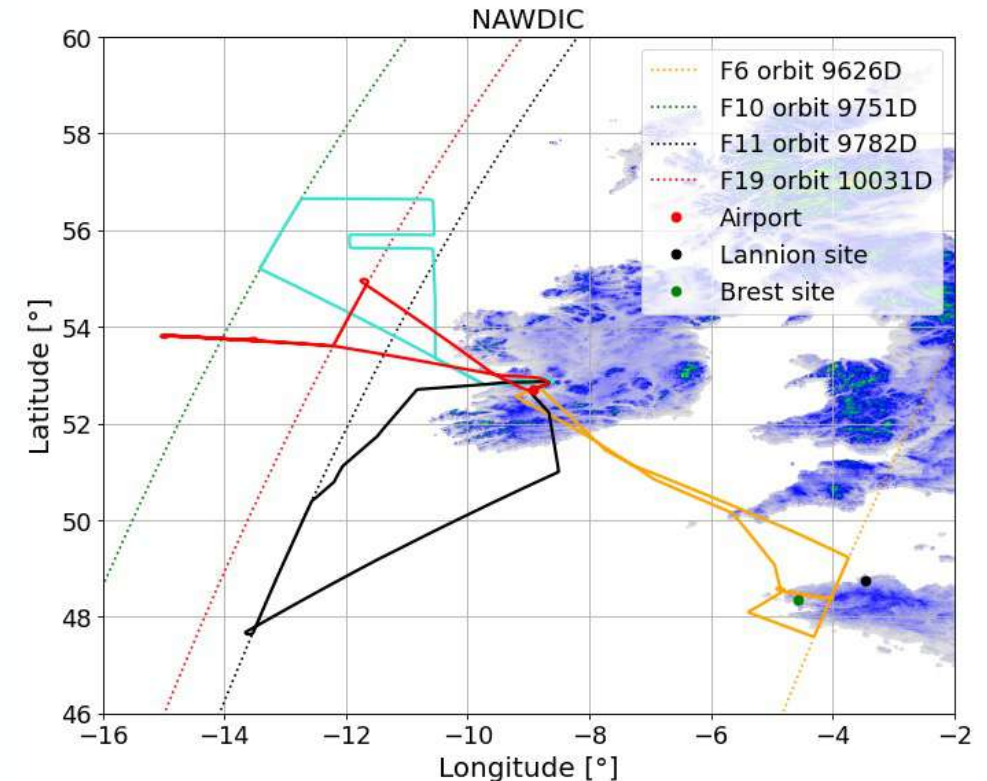
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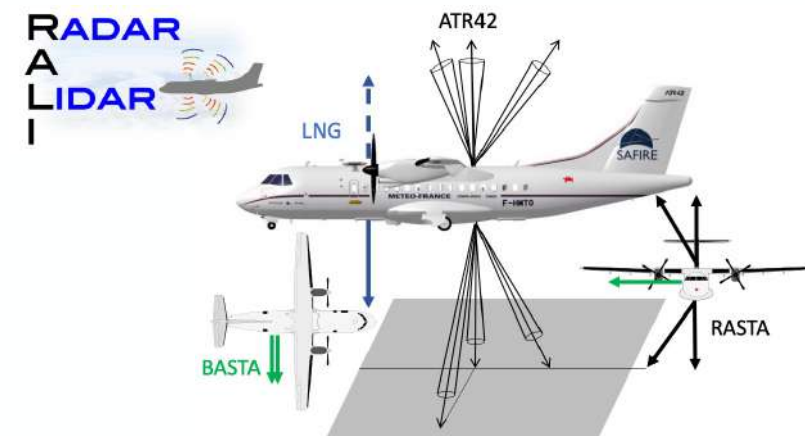
⇒ ATR42 : 16 research flights including **4 targeted EarthCARE orbits** 9626D, 9751D, 9782D, 10031D

ATR42 instrumentation



BASTAir radar, sideward looking Doppler W-band radar

RASTA radar, looking up and down 6 antennas (Doppler W-band)



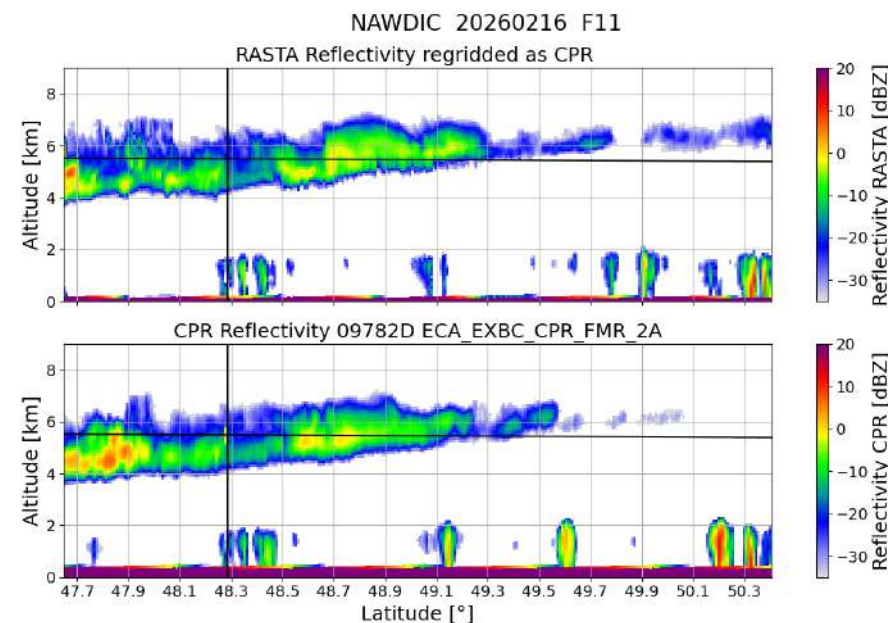
EarthCARE products used

Corrected Doppler velocity : **BC_CPR_CD__2A**

Reflectivity : **BC_CPR_FMR_2A**

airborne
radar

CPR



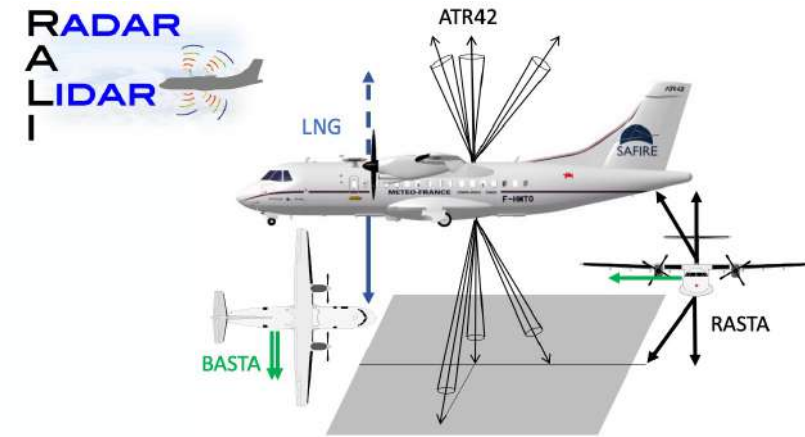
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LNG lidar, HSRL 355nm (backscatter 532&1064), 2 pointing directions



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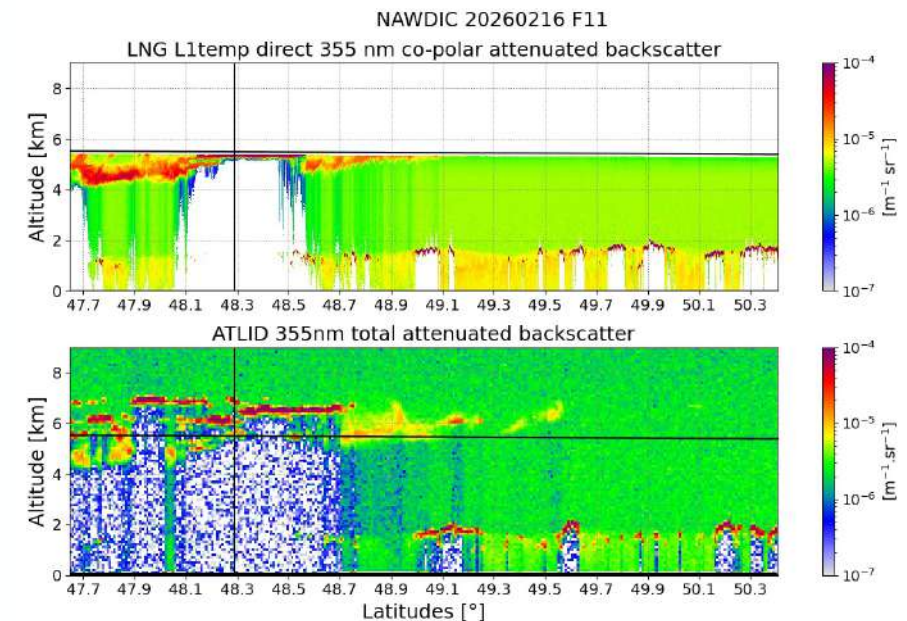
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Backscatter (Mie & Rayleigh) : **BC_ATL_EBD_2A**

airborne
lidar

ATLID



ATR42 instrumentation



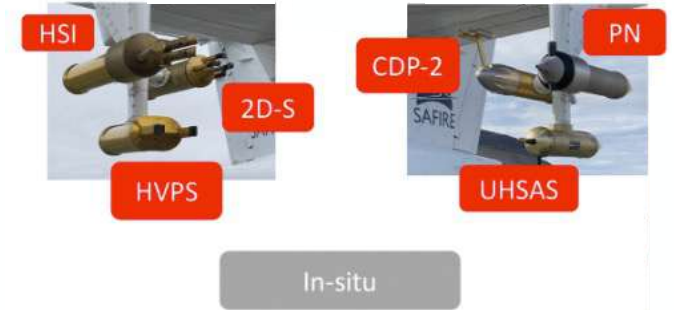
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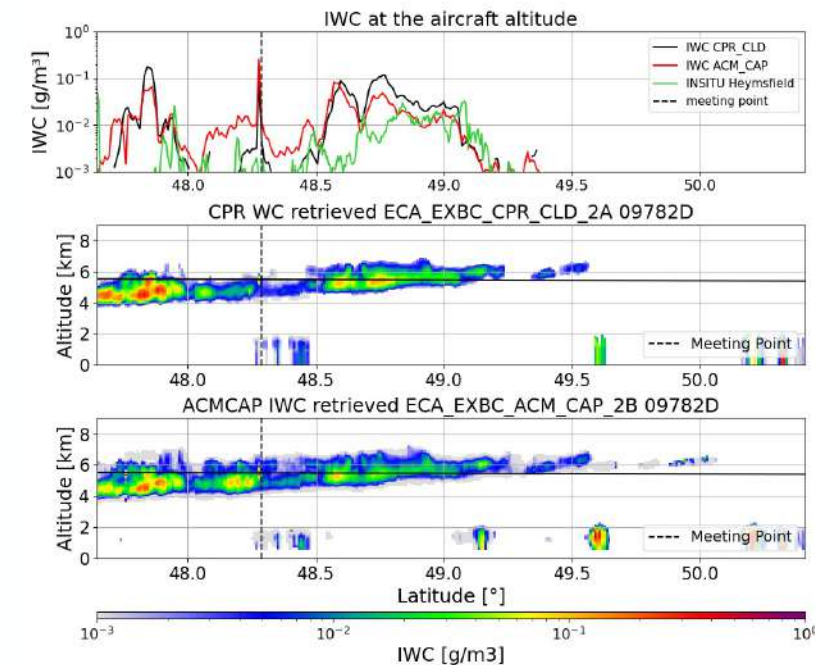
Large **in-situ** payload **preliminary data**

PICARRO, water isotope



NAWDIC 20260216 F11 - IWC

WC CPR_CLD
IWC ACM_CAP
IWC in-situ



EarthCARE products used

Corrected Doppler velocity : **BC_CPR_CD__2A**

Reflectivity : **BC_CPR_FMR_2A**

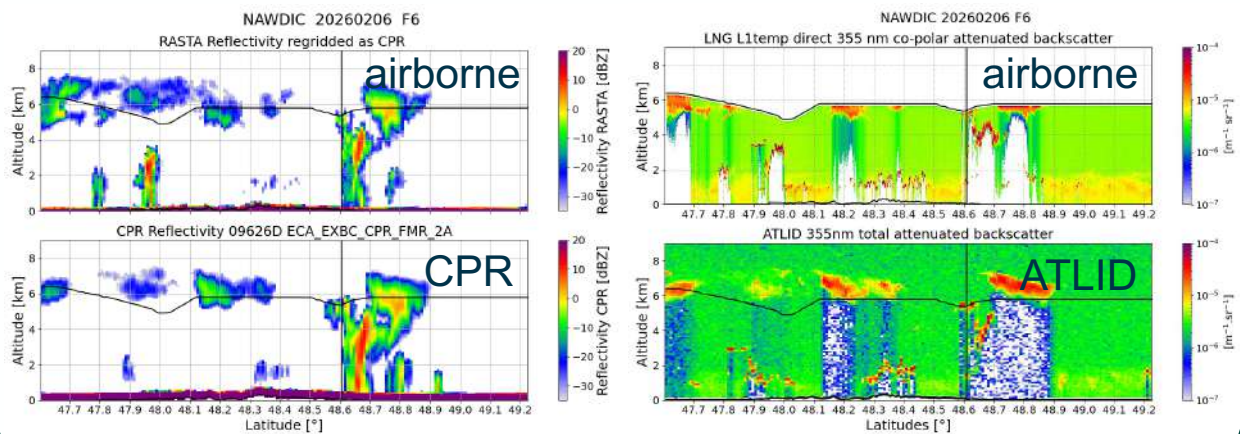
Backscatter (Mie & Rayleigh) : **BC_ATL_EBD_2A**

WC / IWC : **BC_CPR_CLD_2A / BC_ACM_CAP_2B**

Flights summary

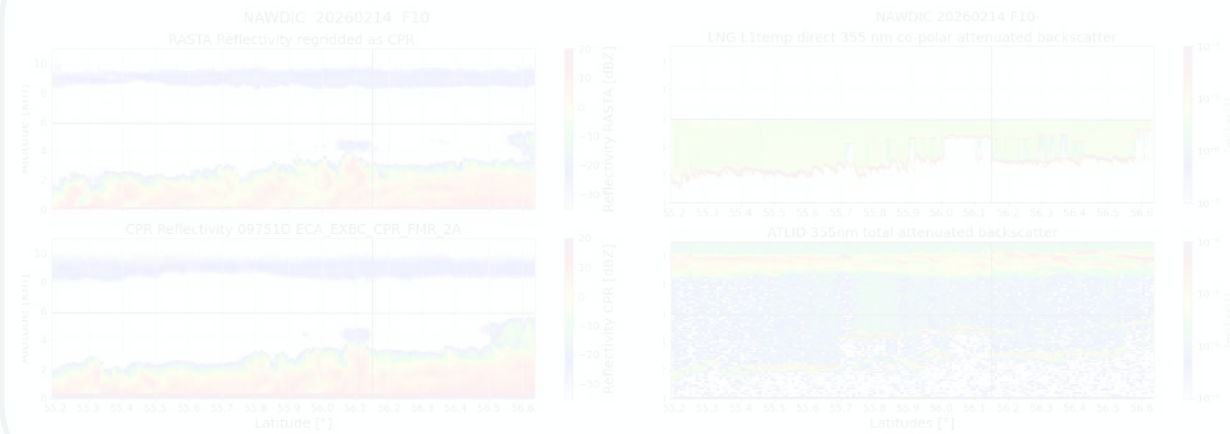


Orbit 9626D - F6 - 20260206



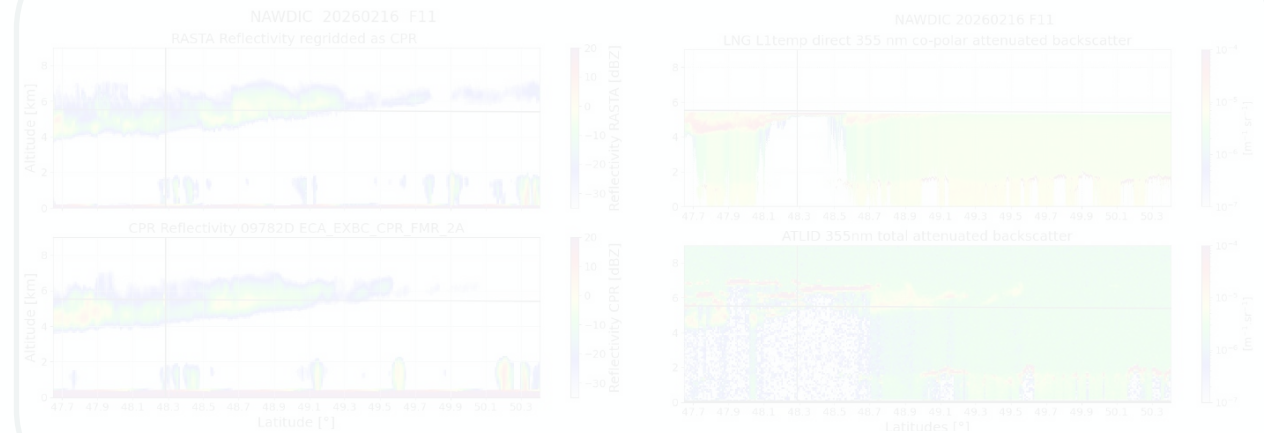
radar, lidar and in-situ comparisons

Orbit 9751D - F10 - 20260214



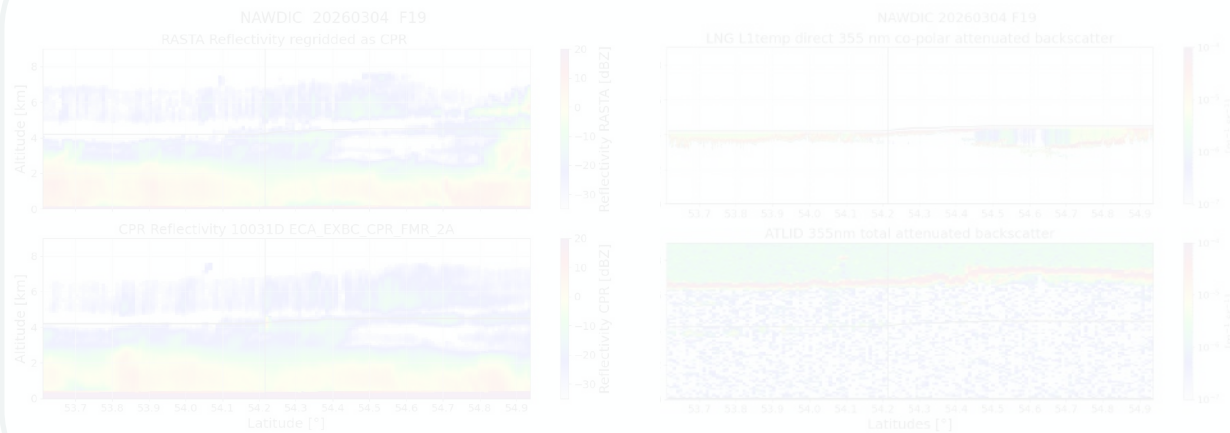
radar and lidar comparisons

Orbit 9782D - F11 - 20260216



EarthCARE 2 | radar, lidar and in-situ comparisons | Oxford, UK

Orbit 10031D - F19 - 20260304

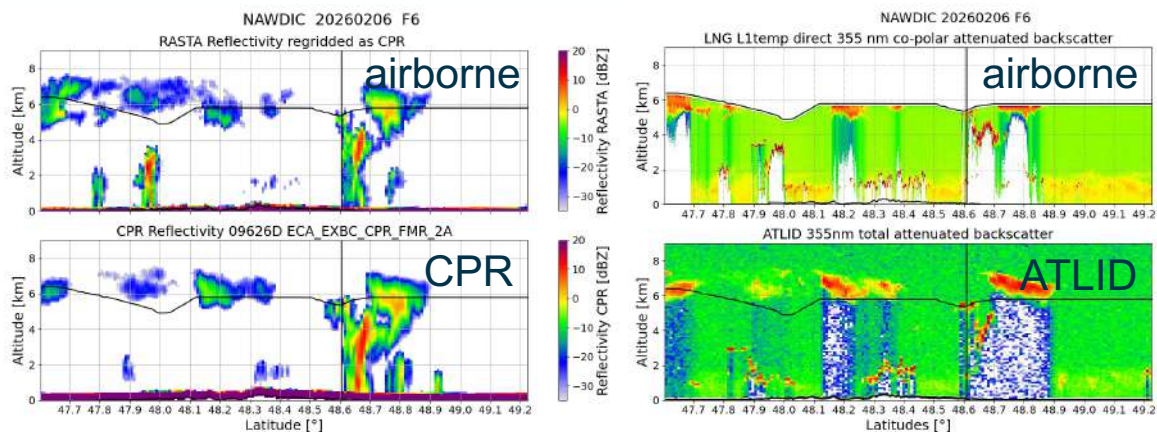


radar and in-situ comparisons

Flights summary

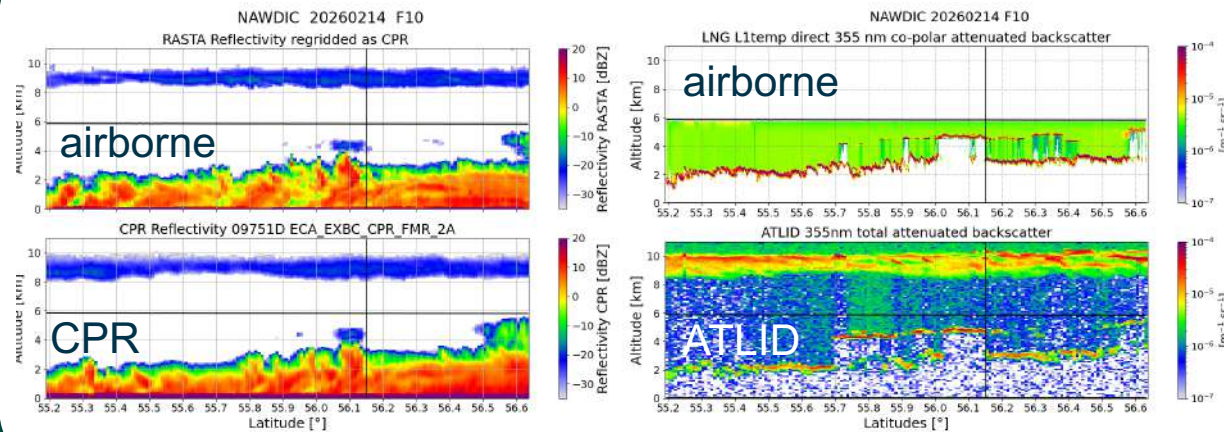


Orbit 9626D - F6 - 20260206



radar, lidar and in-situ comparisons

Orbit 9751D - F10 - 20260214



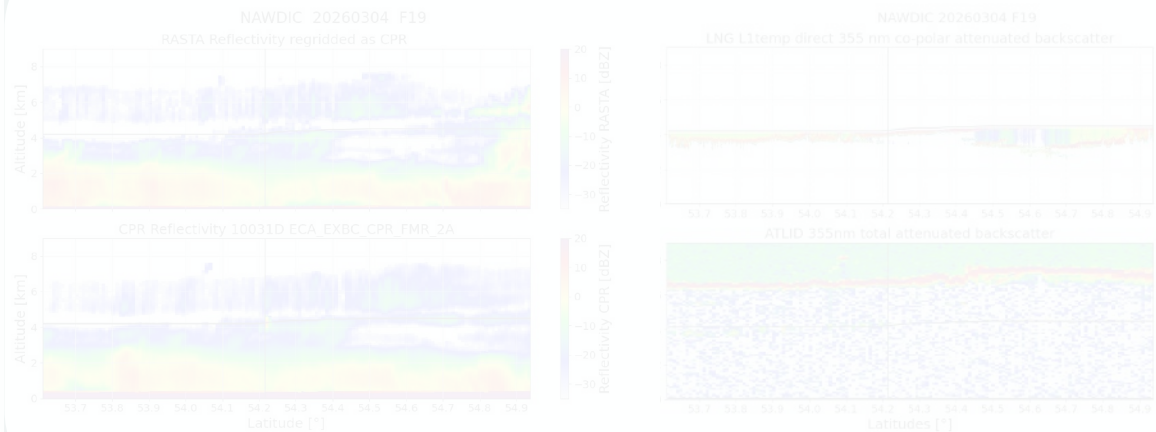
radar and lidar comparisons

Orbit 9782D - F11 - 20260216



EarthCARE 2 | radar, lidar and in-situ comparisons | Oxford, UK

Orbit 10031D - F19 - 20260304

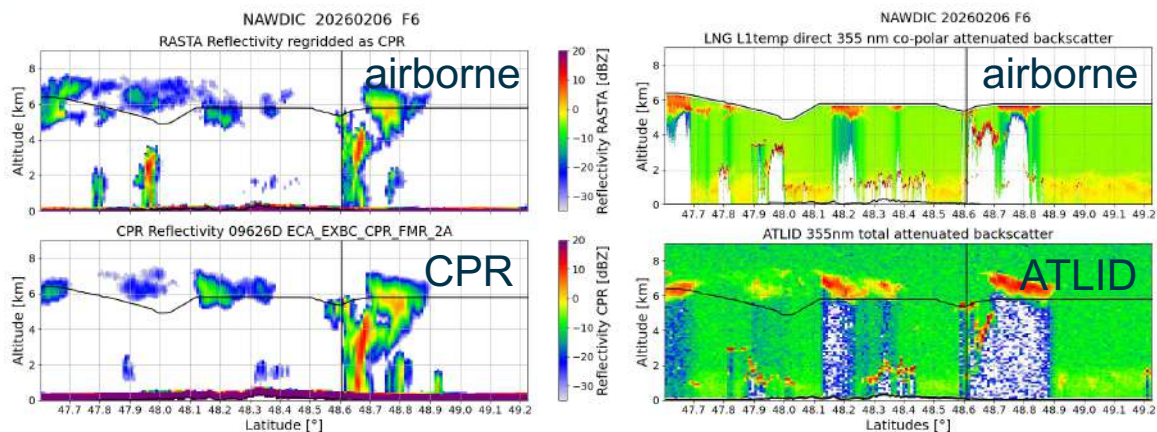


radar and in-situ comparisons

Flights summary

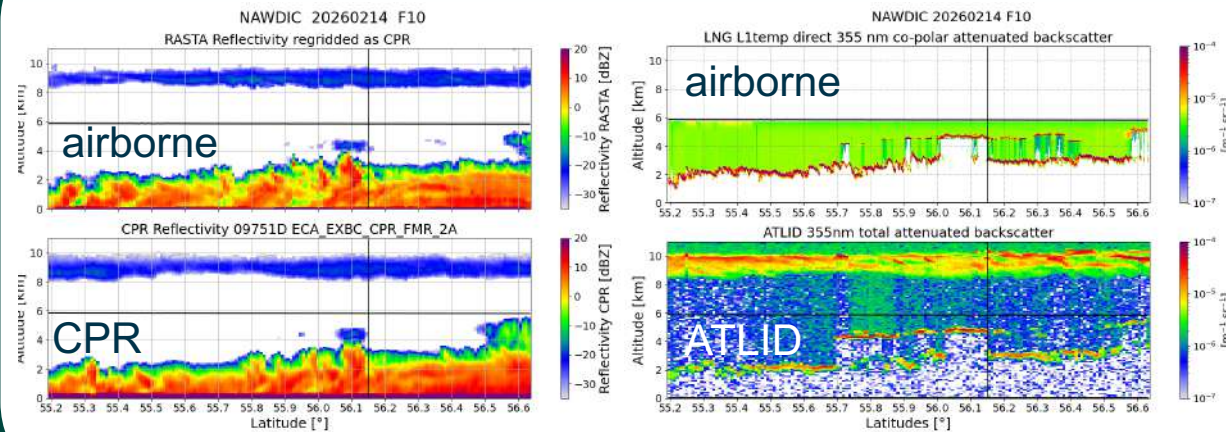


Orbit 9626D - F6 - 20260206



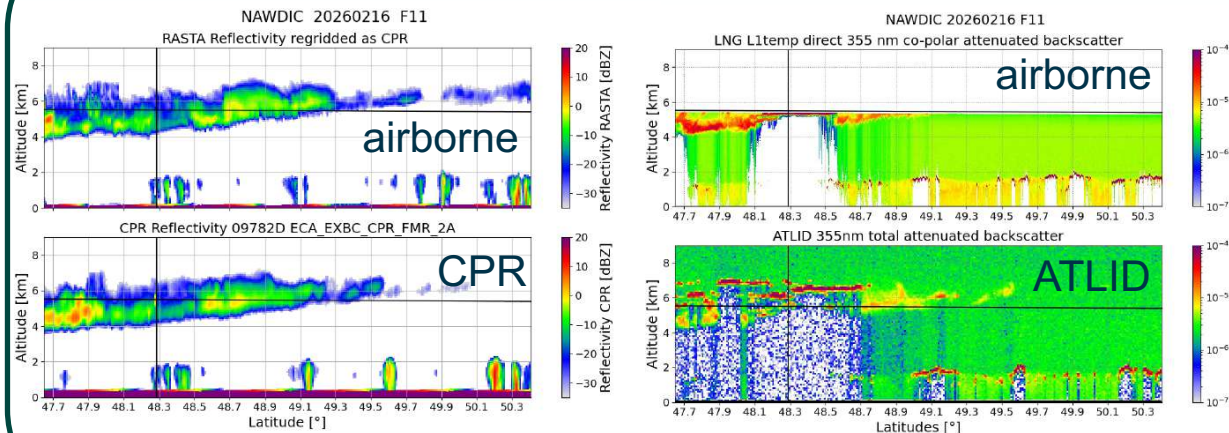
radar, lidar and in-situ comparisons

Orbit 9751D - F10 - 20260214



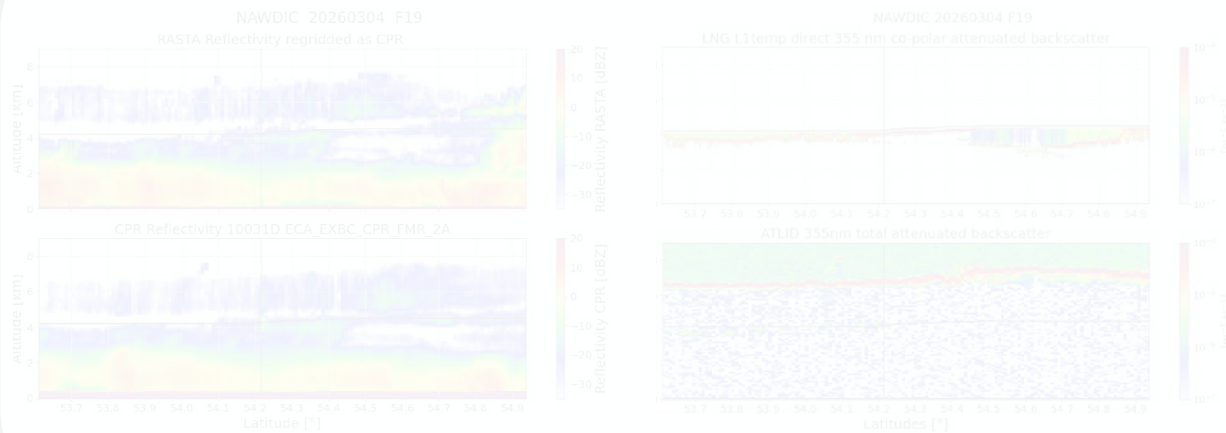
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Orbit 9782D - F11 - 20260216



radar, lidar and in-situ comparisons

Orbit 10031D - F19 - 20260304

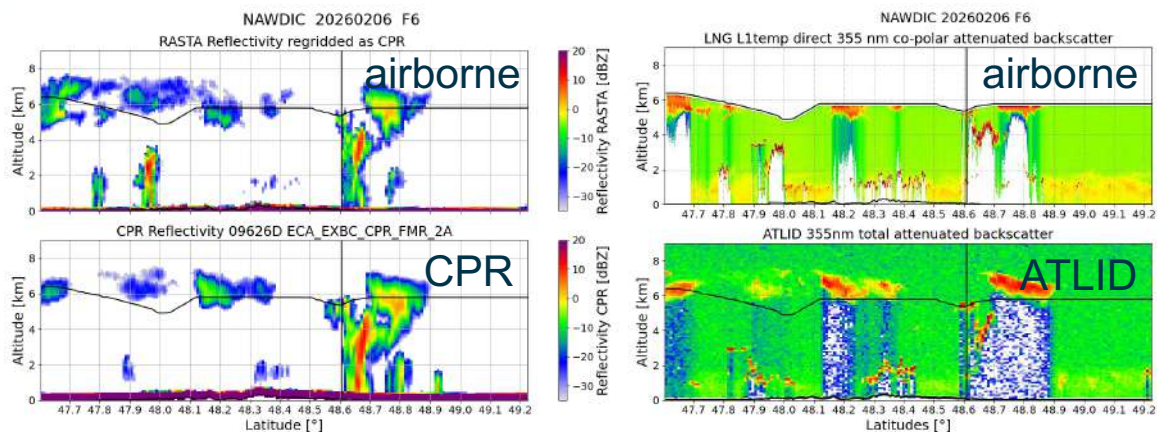


radar and in-situ comparisons

Flights summary

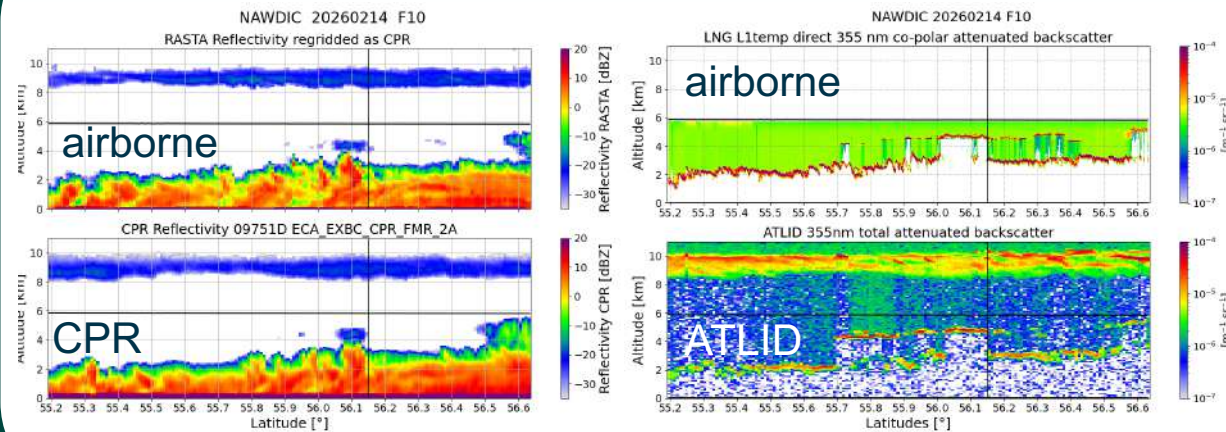


Orbit 9626D - F6 - 20260206



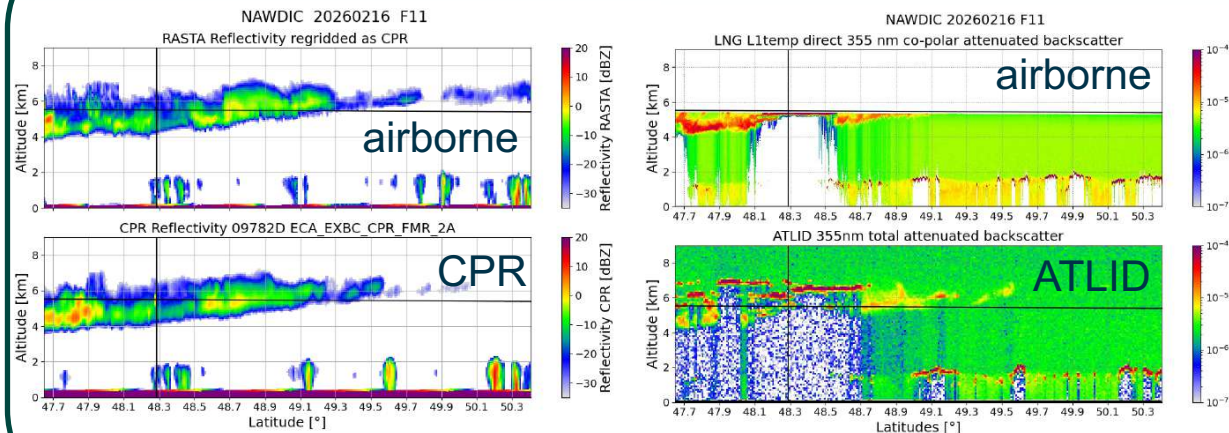
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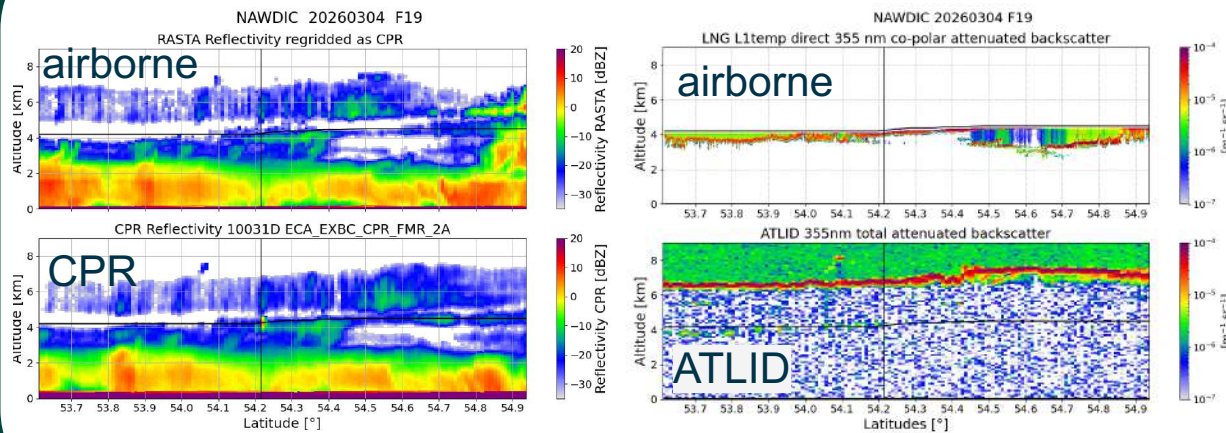
radar and lidar comparisons

Orbit 9782D - F11 - 20260216



radar, lidar and in-situ comparisons

Orbit 10031D - F19 - 20260304



radar and in-situ comparisons

Verification of CPR calibration F19, 10031D



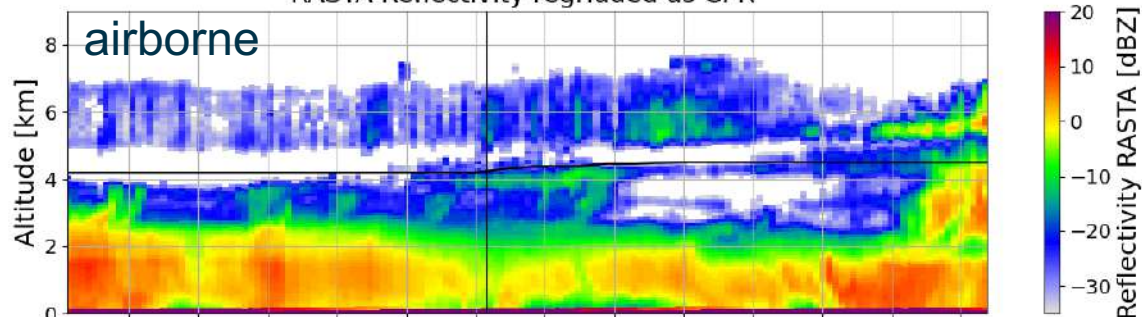
front wind 15-25 m/s



NAWDIC 20260304 F19

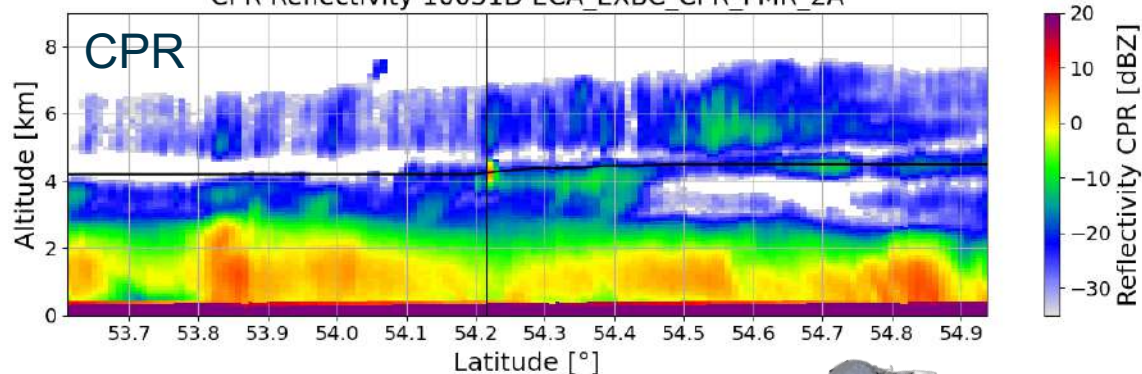
RASTA Reflectivity regridded as CPR

airborne

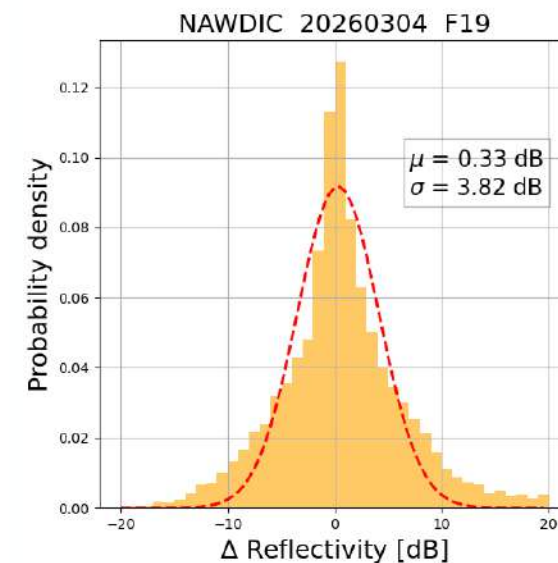
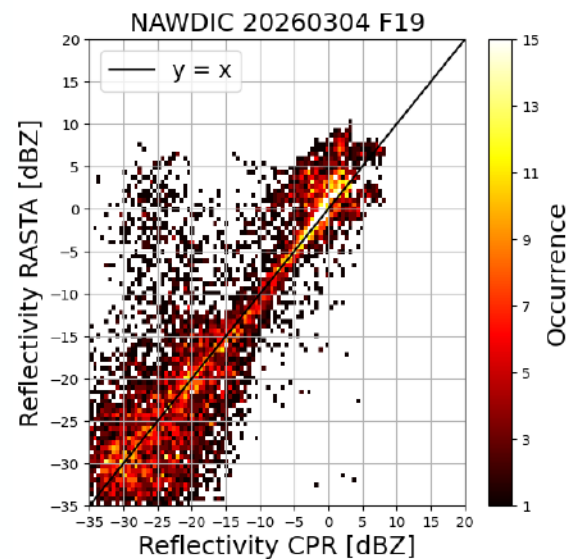


CPR Reflectivity 10031D ECA_EXBC_CPR_FMR_2A

CPR



descending orbit



For all flights, average difference between the measurements of both instruments < 1 dB (instrument calibration accuracy of RASTA, airborne radar)

CPR corrected Doppler velocity verification F19, 10031D



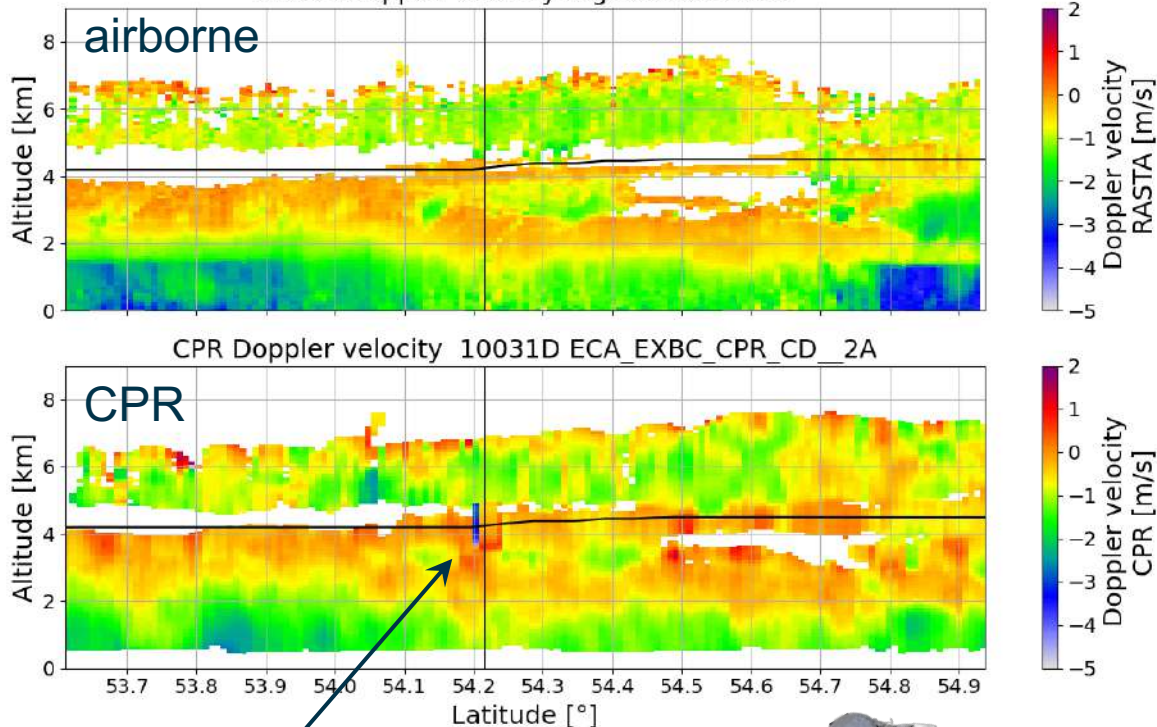
front wind 15-25 m/s



NAWDIC 20260304 F19

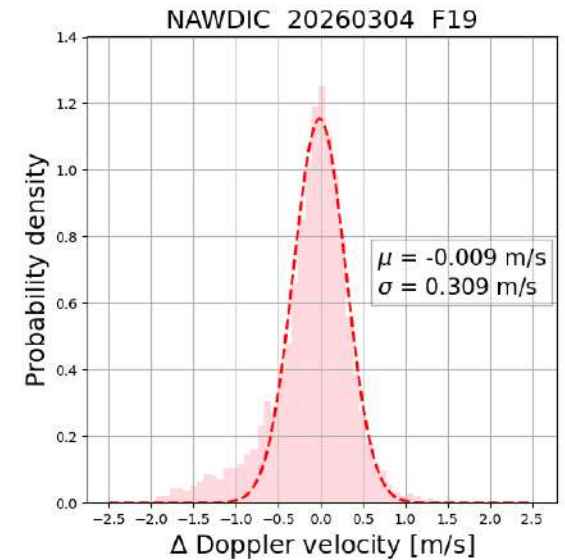
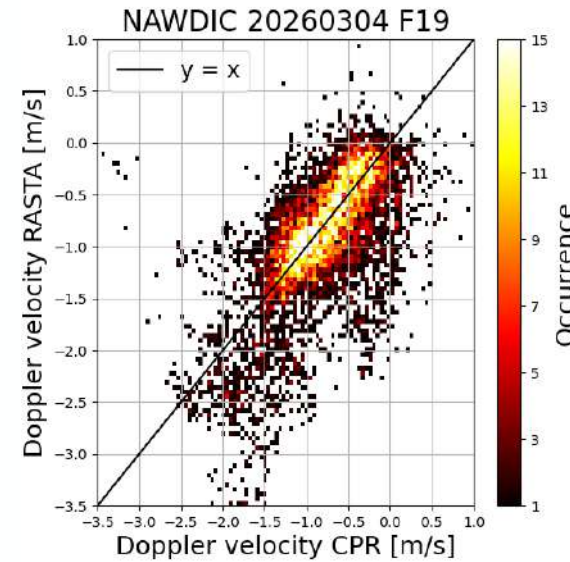
RASTA Doppler velocity regridded as CPR

airborne



aircraft

descending orbit

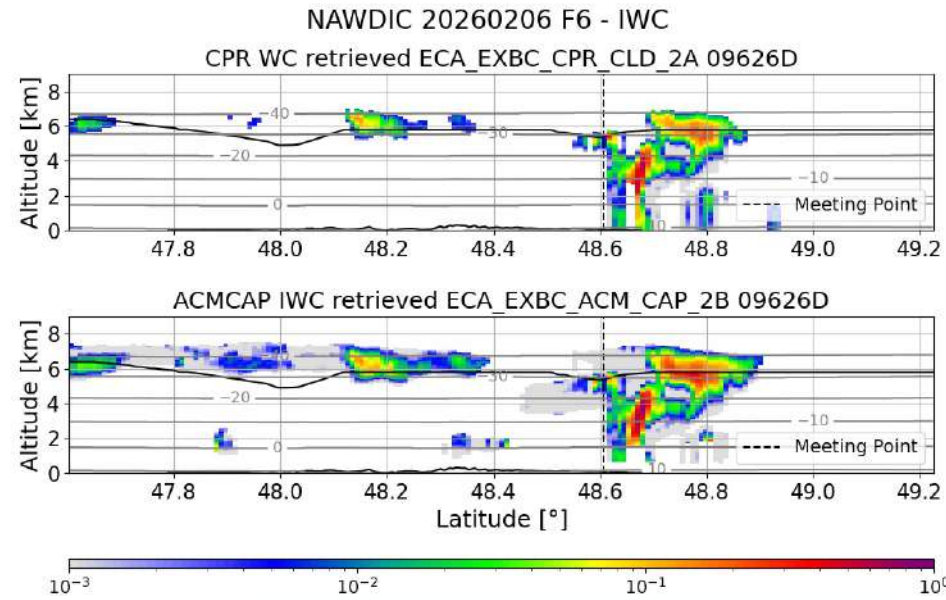
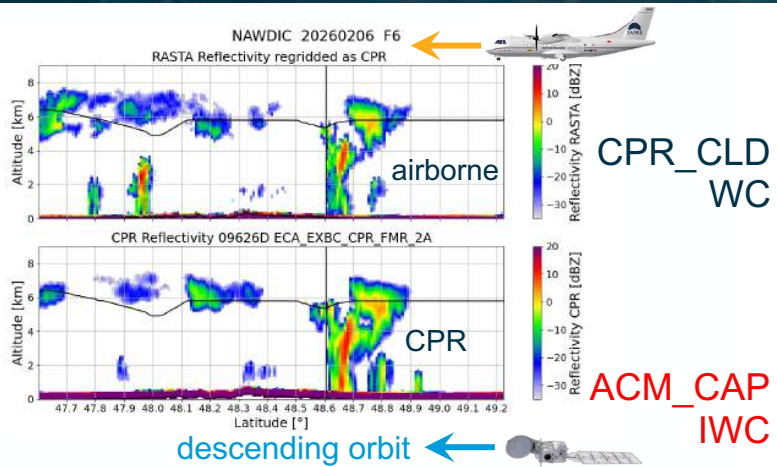


The average difference between both instruments

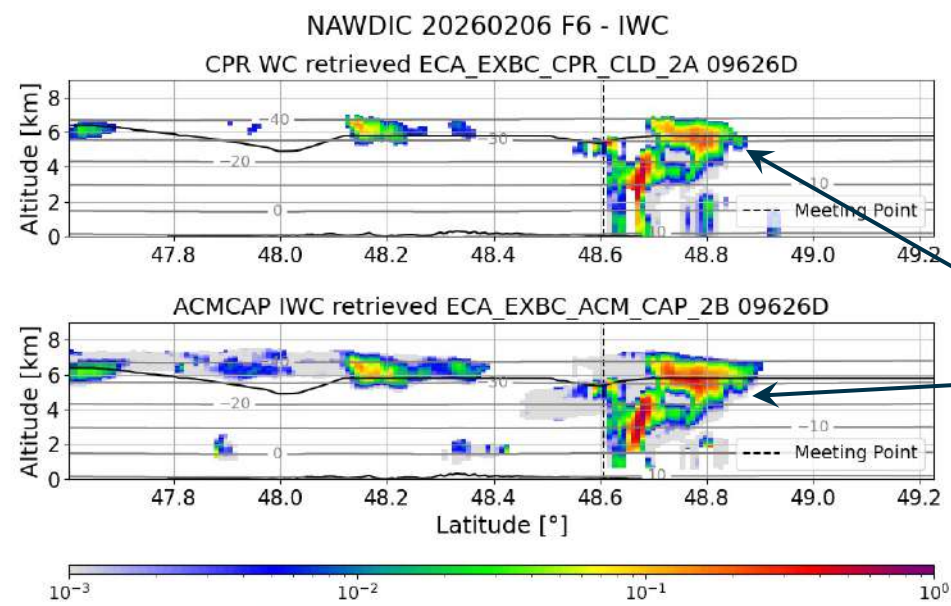
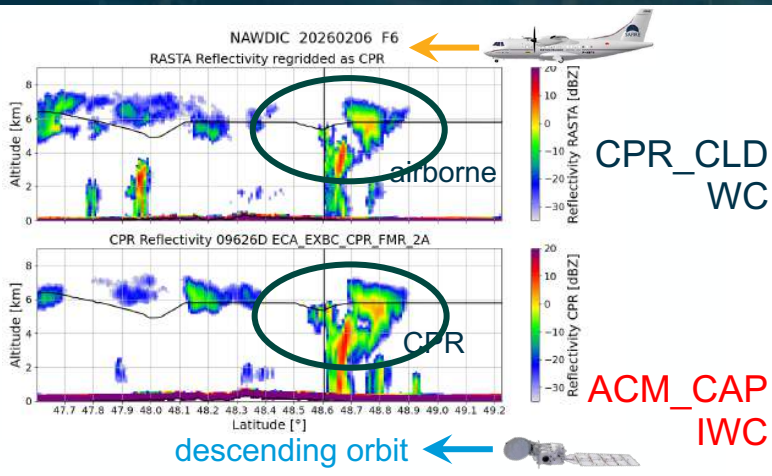
< 20 cm/s for F6 and F11

< 6 cm/s for F10 and F19

Comparison of IWC retrieved in CPR_CLD and ACM_CAP F6, 9626D

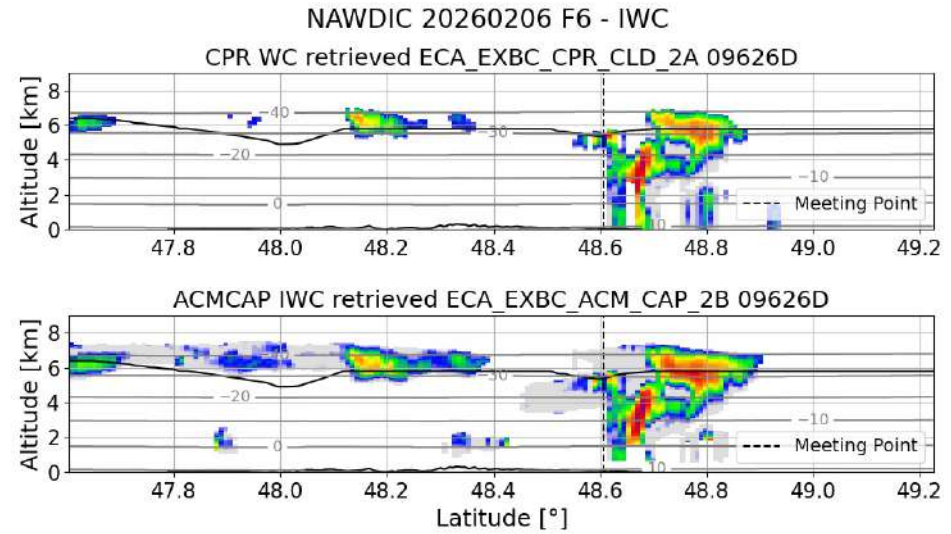
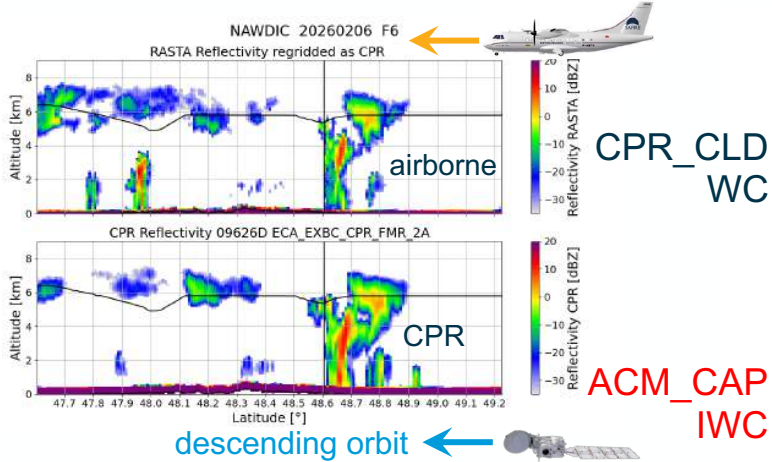


Comparison of IWC retrieved in CPR_CLD and ACM_CAP F6, 9626D

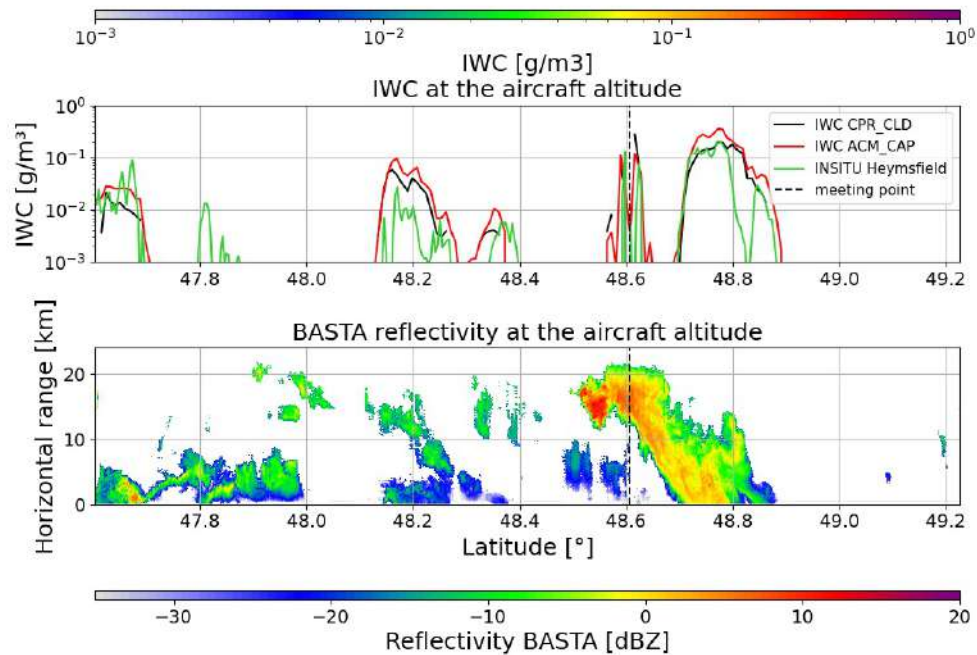


good agreement between each product

Comparison of IWC retrieved in CPR_CLD and ACM_CAP F6, 9626D

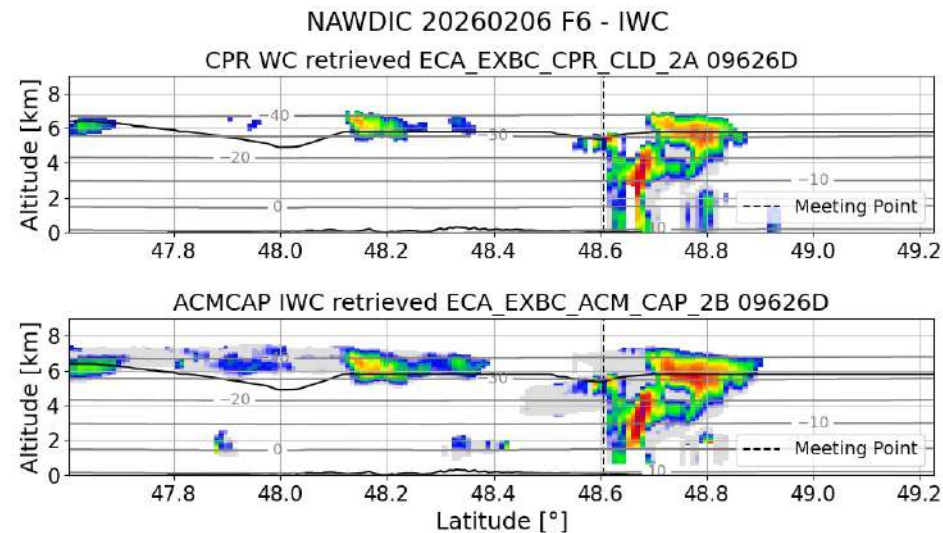
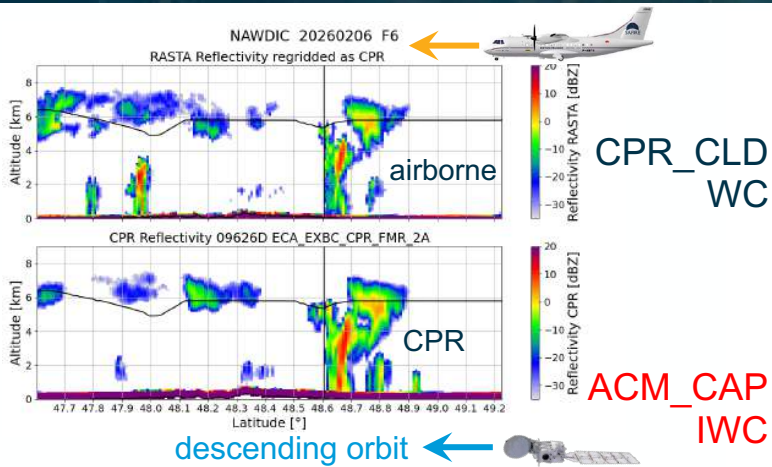


WC CPR_CLD
IWC ACM_CAP
IWC in-situ

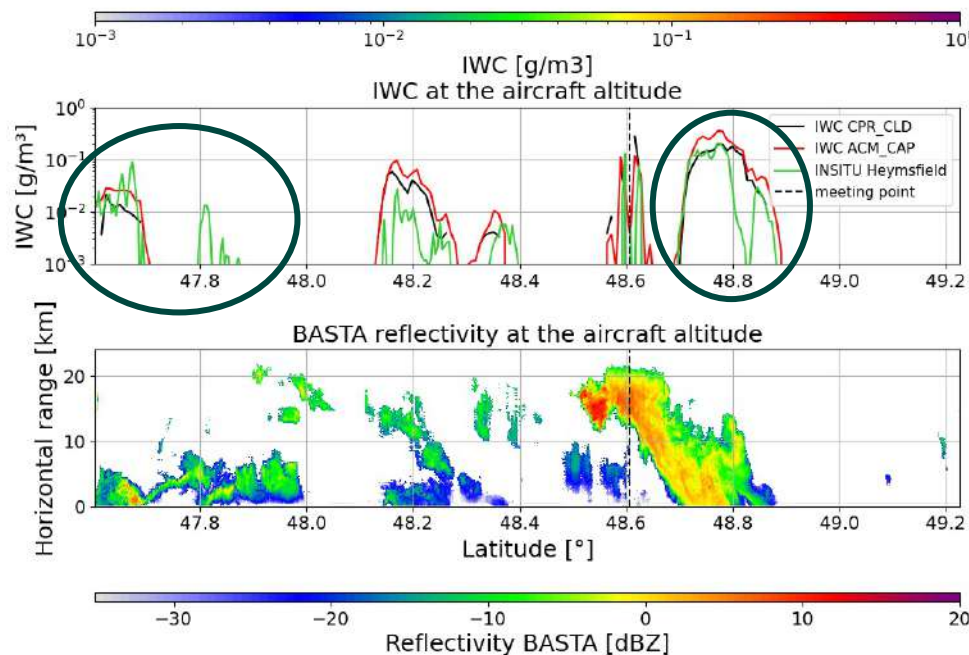


!! IWC INSITU preliminary data

Comparison of IWC retrieved in CPR_CLD and ACM_CAP F6, 9626D



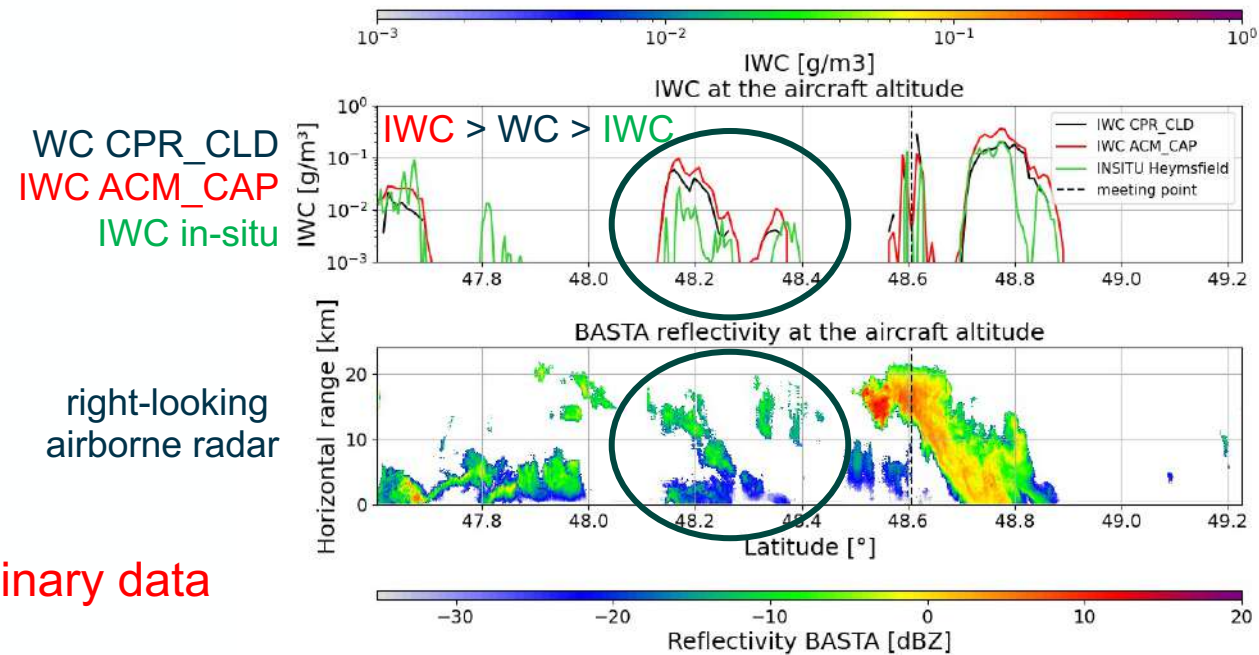
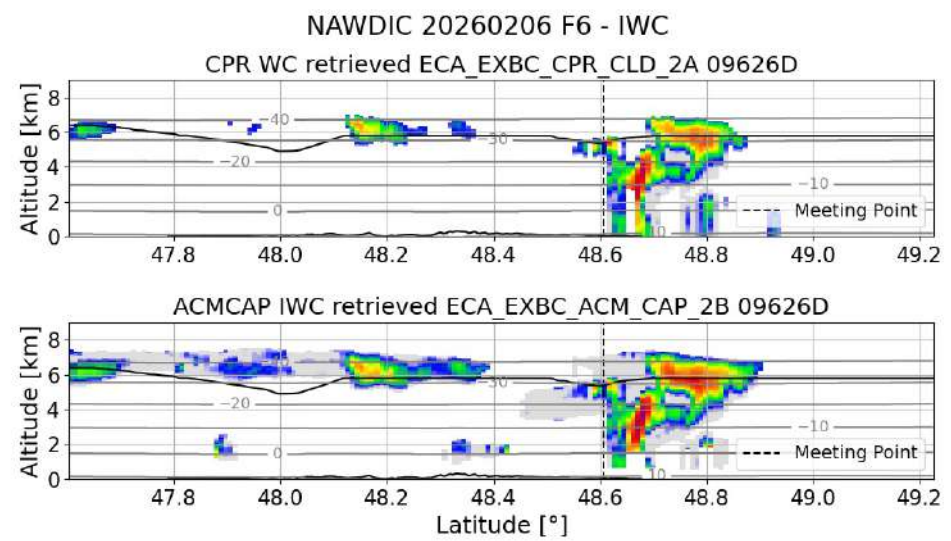
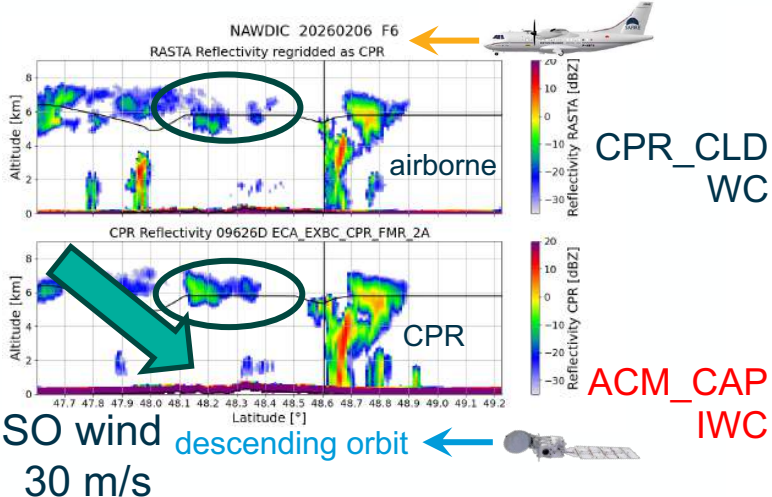
WC CPR_CLD
IWC ACM_CAP
IWC in-situ



IWC, WC, IWC → same order of magnitude

!! IWC INSITU preliminary data

Comparison of IWC retrieved in CPR_CLD and ACM_CAP F6, 9626D



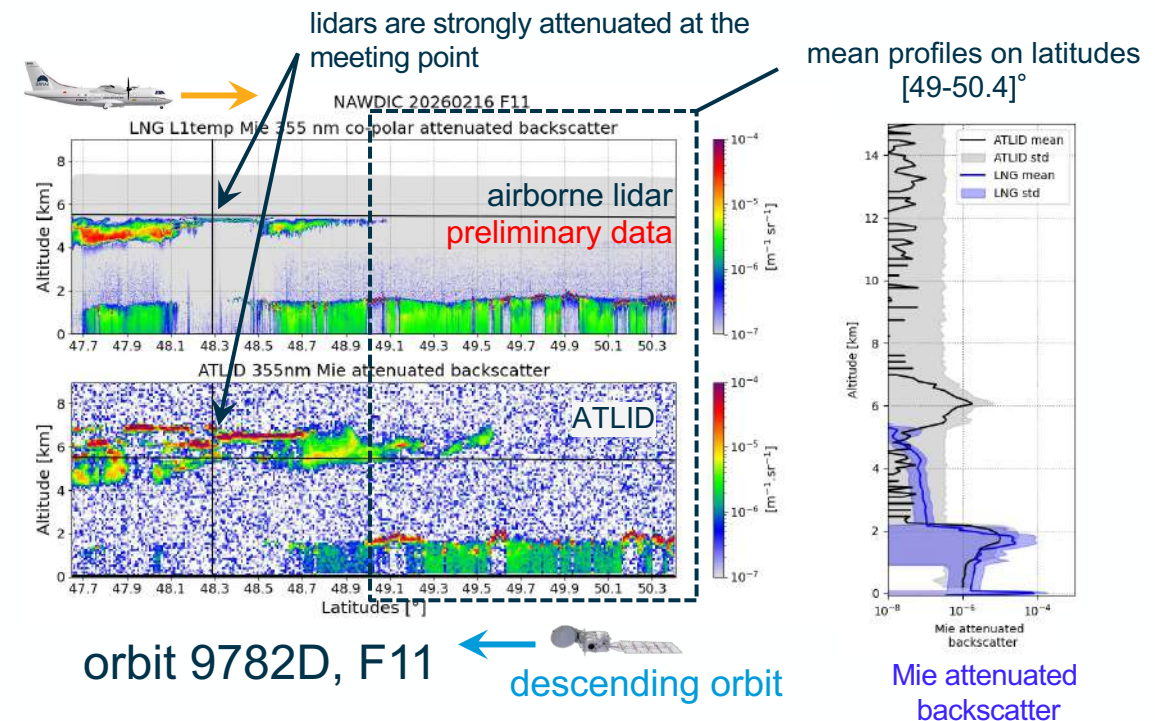
!! IWC INSITU preliminary data

Conclusion

- NAWDIC-DICHOTOMI has ended three months ago : the airborne data is still being processed.
- 4 underflights were performed during the NAWDIC-DICHOTOMI campaign and provide conditions allowing the verification of ATLID, CPR and synergistics products.
- So far, the calibration of CPR and the good retrieval of corrected Doppler velocity with baseline BC were checked and a preliminary verification of IWC (CPR_CLD product and synegetic product ACM_CAP) was carried out.

Next step:

- **Comparison of IWC** retrieved from EarthCARE products with processed insitu data (September 2026) + IWC retrieved with airborne radar RASTA.
- **Comparison L2 lidar products for NAWDIC-DICHOTOMI and MORECALVAL** (Toulouse, March 2025) field campaigns (redesign of the airborne lidar processing chain is currently in progress).
- Radar-lidar synergistic products from RALI platform vs EarthCARE with VarPyMix algorithm : classification, IWC and LWC...





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Thank you for your attention

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