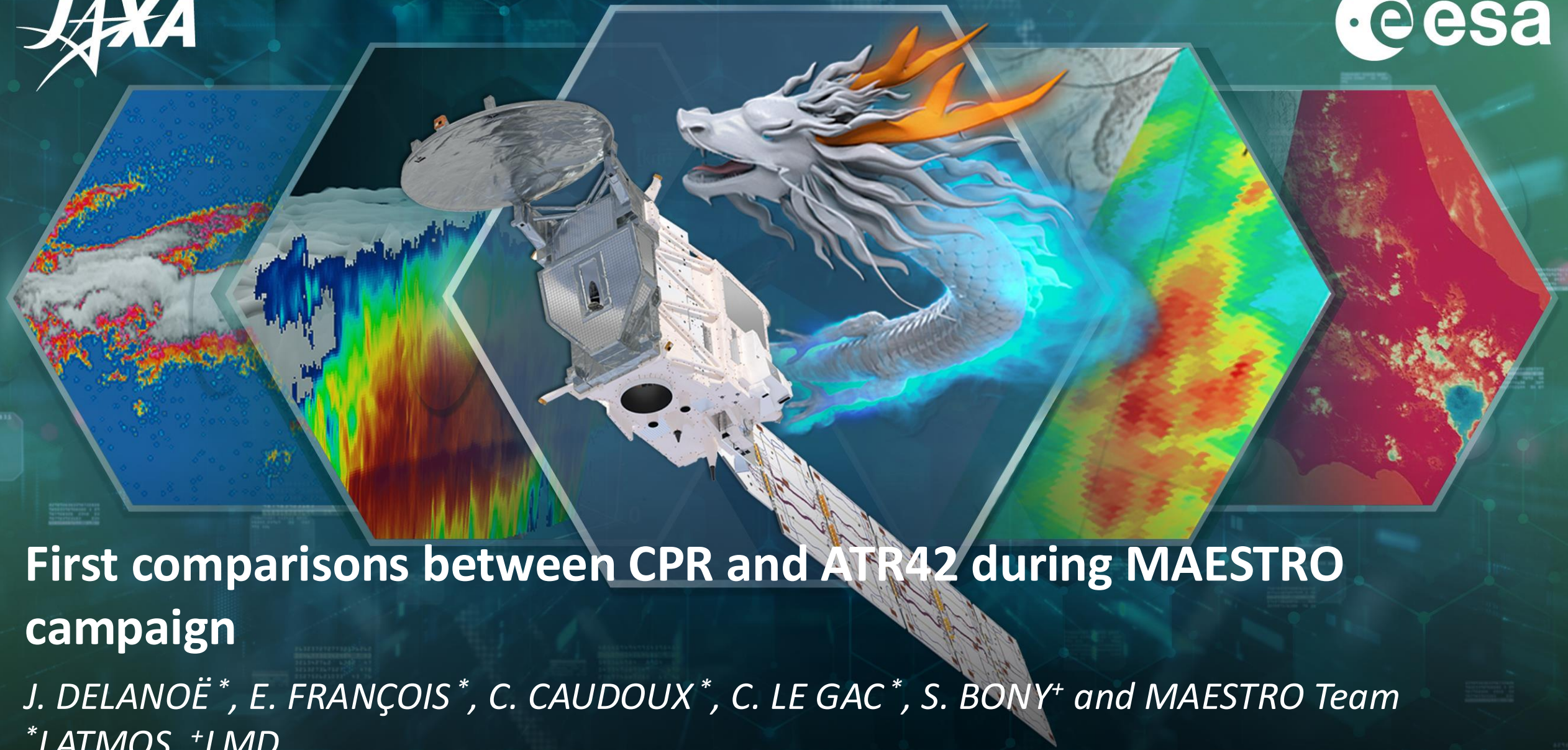

First comparisons between CPR and ATR42 during MAESTRO campaign

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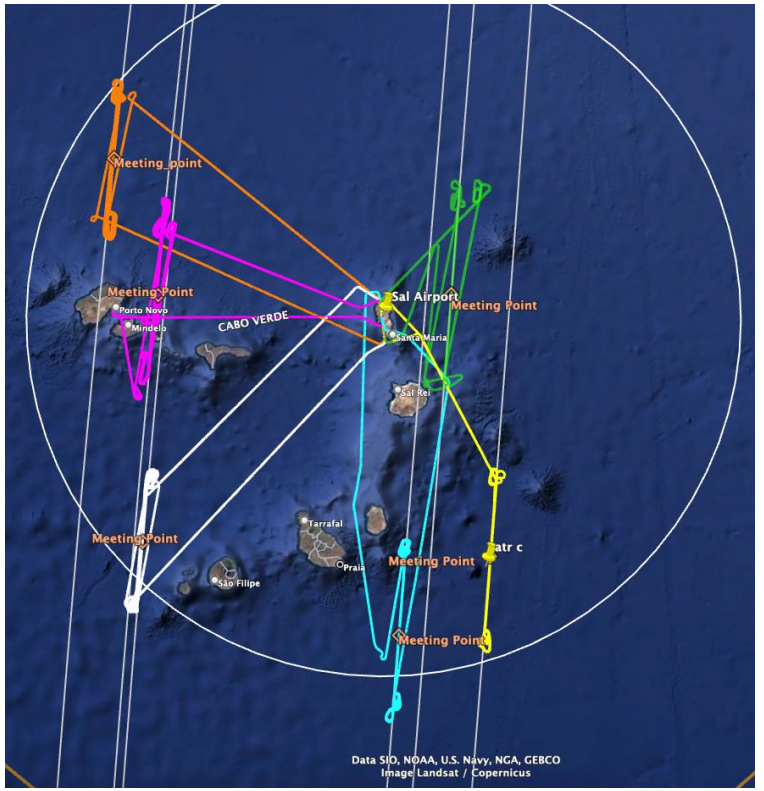
1st ESA-JAXA EarthCARE In-Orbit Validation Workshop

14 – 17 January 2025 | VIRTUAL EVENT

Introduction

- MAESTRO campaign (*Mesoscale Organisation of Tropical Convection*, PI: Sandrine Bony LMD)
- Operations out of Sal (Cape Verde), 10 Aug – 10 Sept 2024 → 86 F/H (24 flights)
- 5 legs have been processed (radar targets only available on the 31st of August)

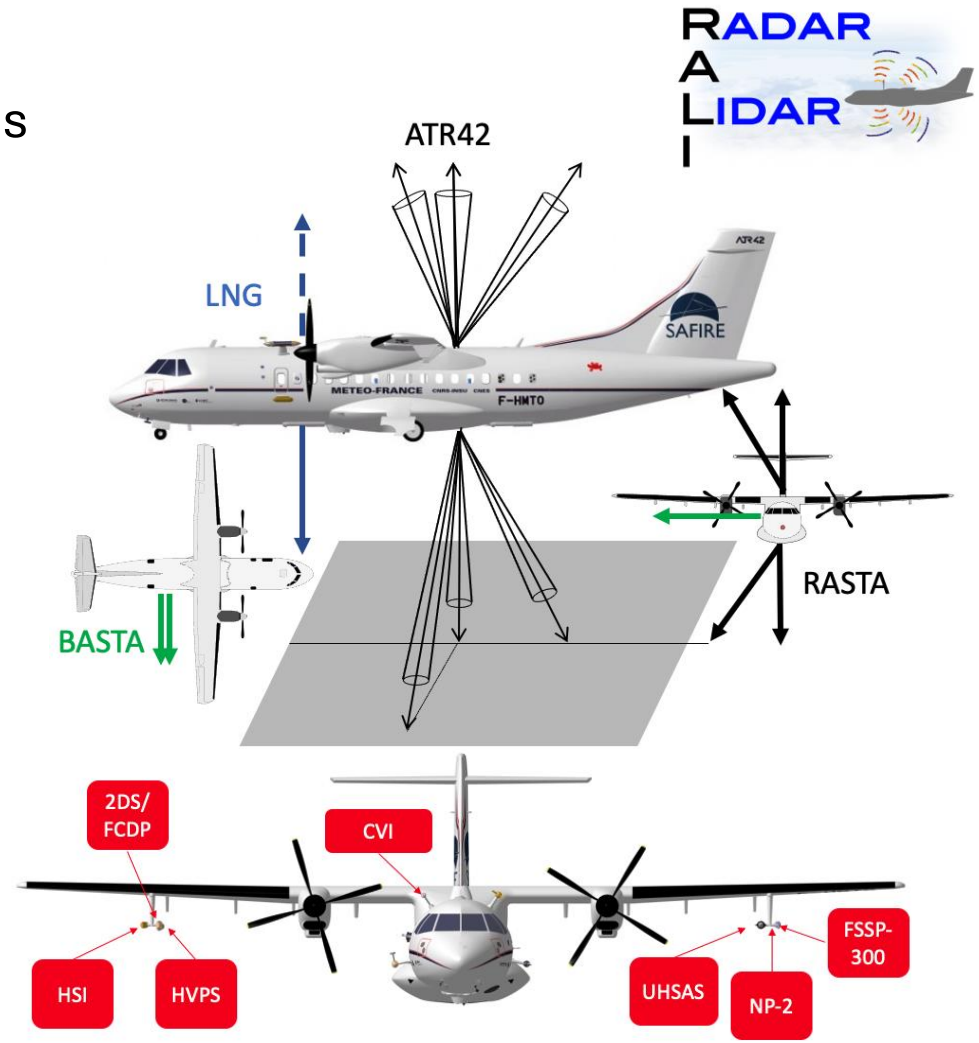


6 flights dedicated to EarthCARE CalVal

Airborne Payload

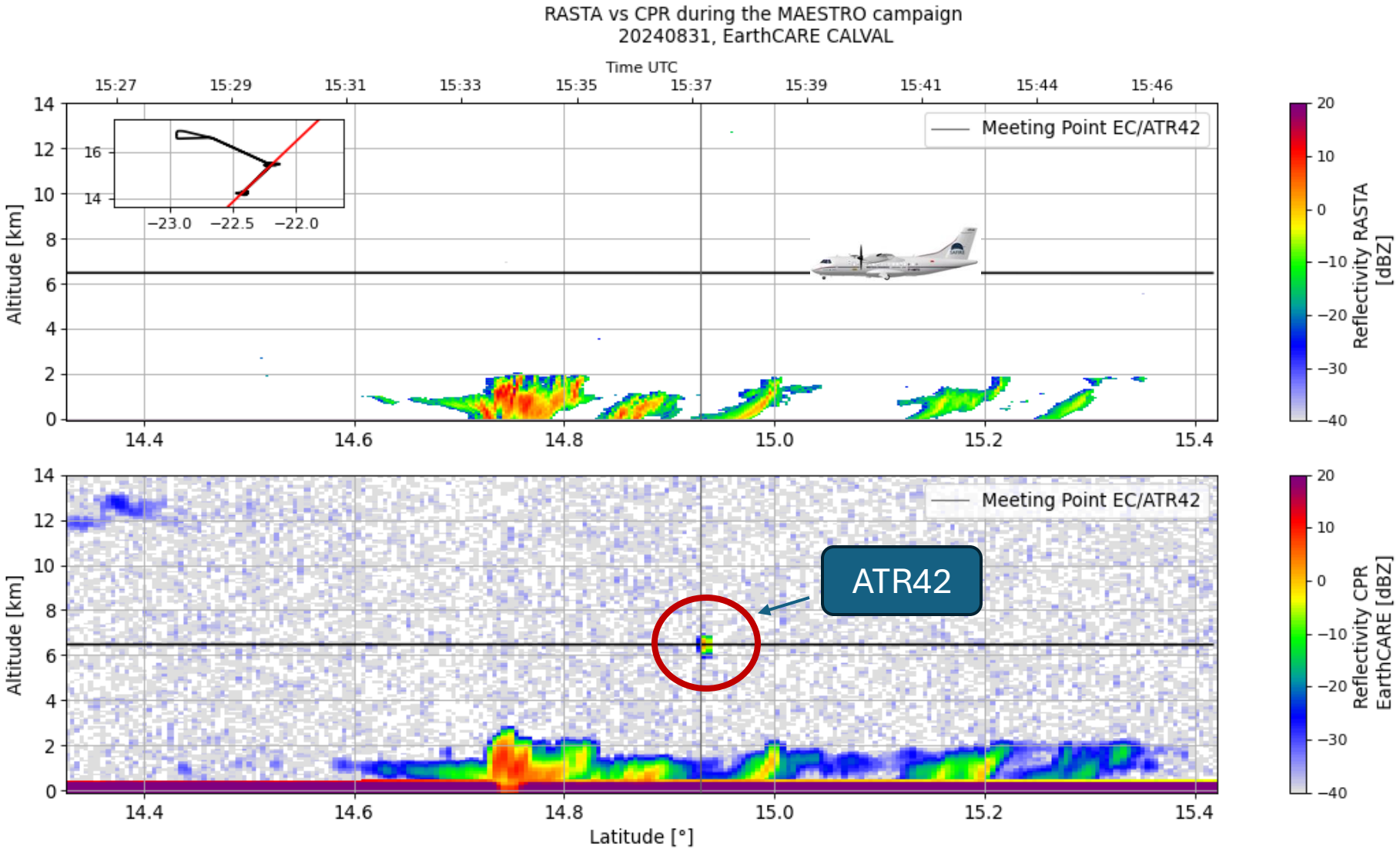
- **RASTA, looking up and down 6 antennas (Doppler W-band)**
- LNG, HRSL 355nm (backscatter 532&1064), 2 pointing directions
- **BASTAir, sideward looking W-band Doppler radar**
- aWALI, sideward looking 355nm raman lidar
- Large in-situ payload

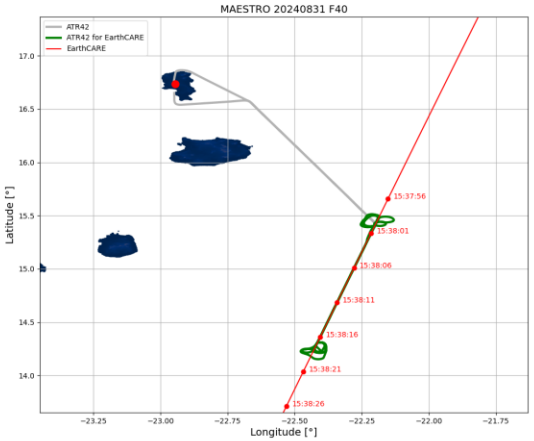
	Instruments \ Objectives	Aerosols	Clouds/precip	Water vapour/ Temp	Wind	Turbulence	Surface
Radar / lidar	LNG				cloud/aerosol		
	RASTA (6 antennas)				cloud/precipitation	cloud/precipitation	
	BASTA				cloud/precipitation	cloud/precipitation	
	aWALI			heterog eneities			
In-situ	FCDP/HVPS/2DS/U HSAS/CVI/NP/FSSP						
	Aircraft's baseline information				clear sky/cloud/aerosol		
Radiometry	CLIMAT						SST
	Pyrano-& pyrgeometers						



Flight summary

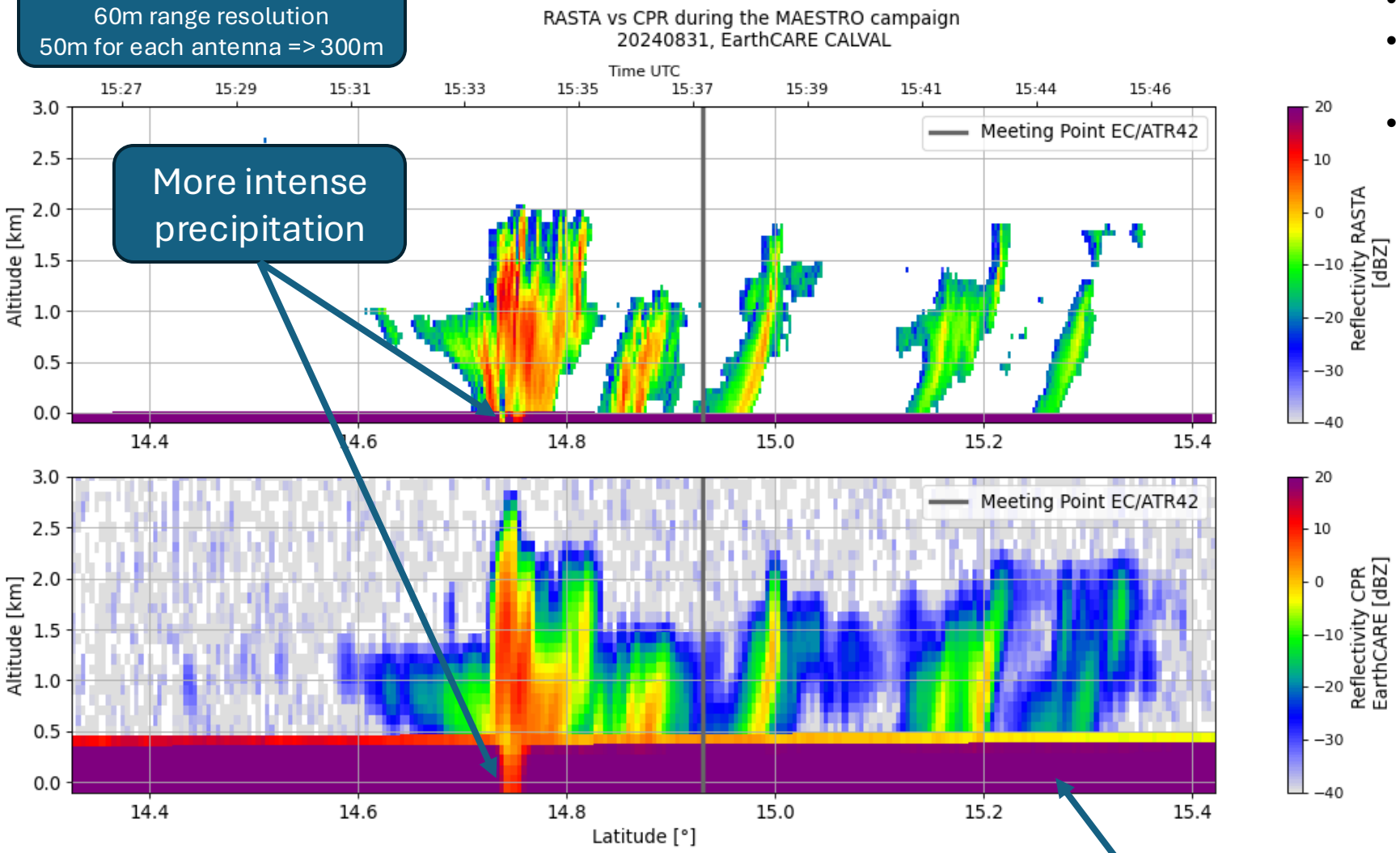
Date	Flight #	Take-off [TO] / Landing [LA]/ Meeting point [MP] times	Legs (convention from MAESTRO)	Comments
20240811	F24	TO 14:33:45.07Z LA 18:13:42.50Z MP 15:49	H1 6466m, time [s]: 54995.0 55718.0 H2 6467m, time [s]: 56379.0 57801.0	• Almost no radar signal (instrument OK) • Issue with LNG-lidar (part of track missing) • In-situ data OK
20240813	F25	TO 14:20:43.95Z LA 17:37:26.19Z MP 15:40	H1 6481m, time [s]: 54246.0 55595.0 H2 6483m, time [s]: 55898.0 57218.0	• Almost no radar signal (instrument OK) • LNG OK, good aerosol layer and tiny liquid clouds • In-situ data OK • Track slightly off due to issue in prediction
20240820	F31	TO 14:03:31.21Z LA 17:33:55.94Z MP 15:50	H1 6477m, time [s]: 56580.0 57480.0	• No radar signal (instrument OK) • LNG OK, good aerosol layer and tiny liquid clouds • In-situ data OK
20240822	F32	TO 13:55:27.23Z LA 17:32:49.48Z MP 15:41	H1 6785m, time [s]: 56040.0 57059.0	• No radar signal (instrument OK) • LNG OK, good aerosol layer and tiny liquid clouds • In-situ data OK
20240829	F38	TO 13:52:13.14Z LA 17:40:57.88Z MP 15:49	H1 6478m, time [s]: 56490.0 56894.0 H2 6800m, time [s]: 57140.0 57359.0	• No radar signal (instrument OK) • **No LNG due to computer issue** • In-situ data OK
20240831	**F40**	**TO 13:57:37.89Z LA 17:30:33.43Z MP 15:38**	**H1 6478m, time [s]: 56490.0 56894.0 H2 6800m, time [s]: 57140.0 57359.0**	• **Radar and lidar signals** • **In-situ data OK**



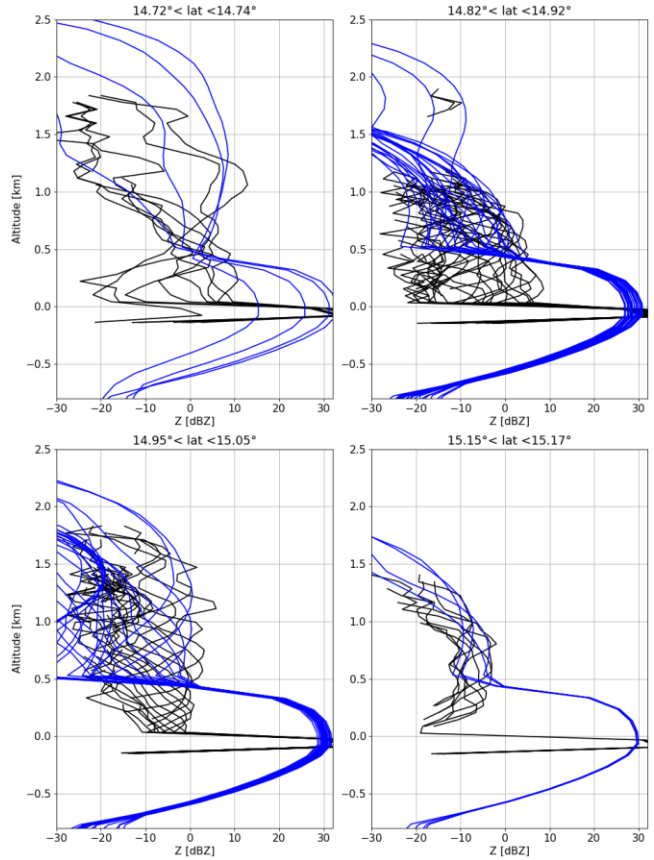


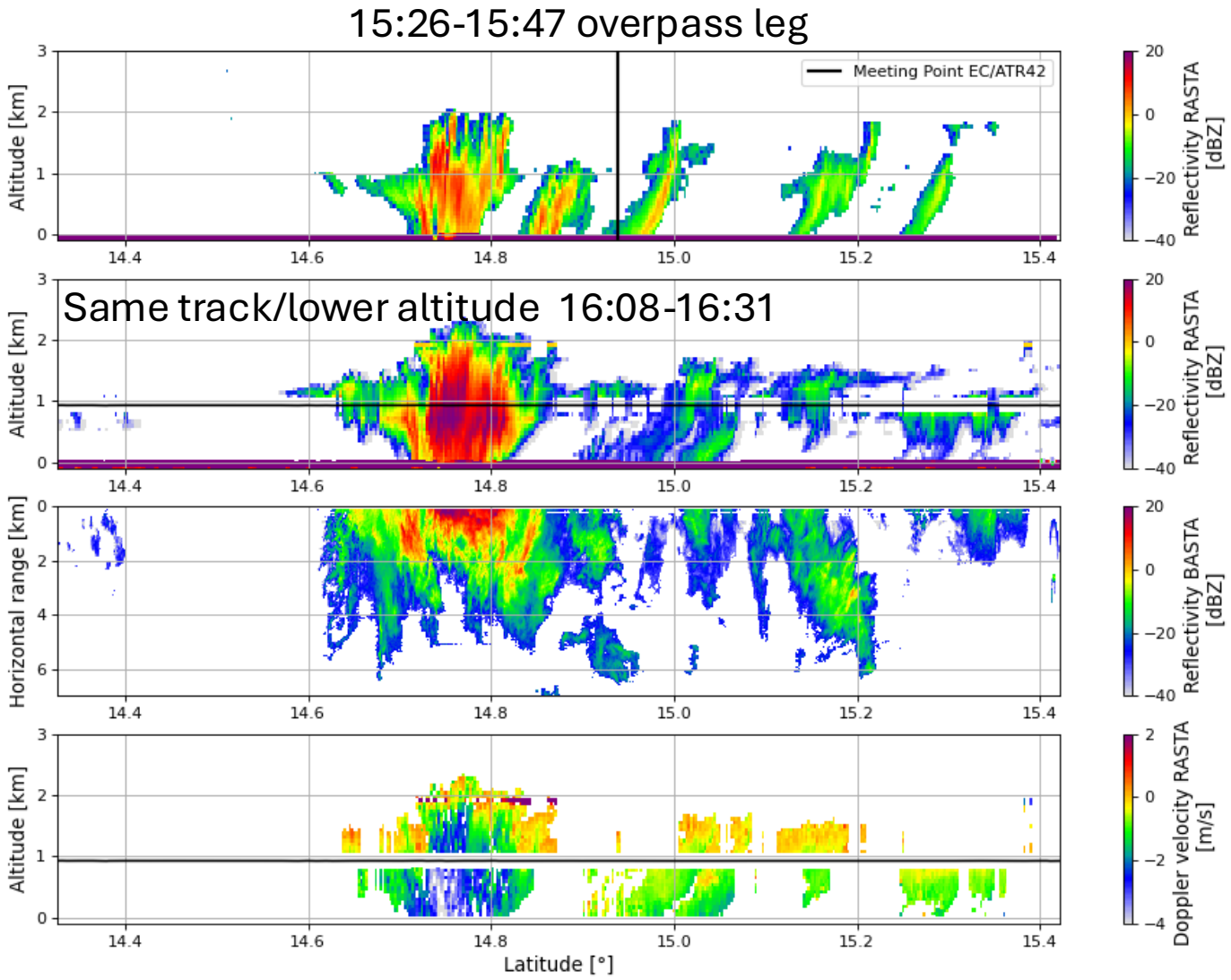
HALO+KingAir+ATR42

RASTA
60m range resolution
50m for each antenna => 300m



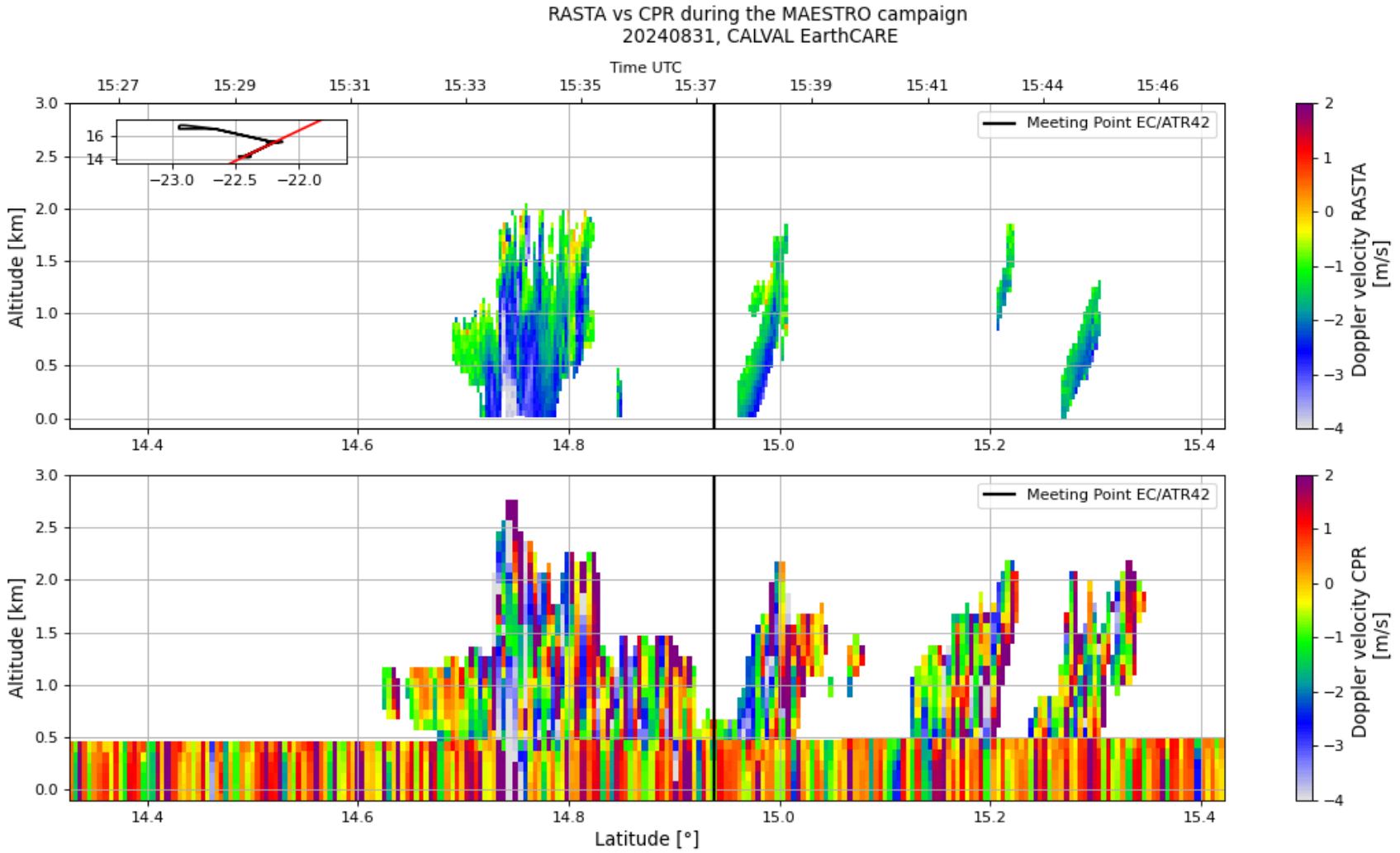
- Similar patterns
- Slight difference due to temporal evolution and CPR pointing
- No obvious issue in CPR measurements





Vertical cloud radar measurements

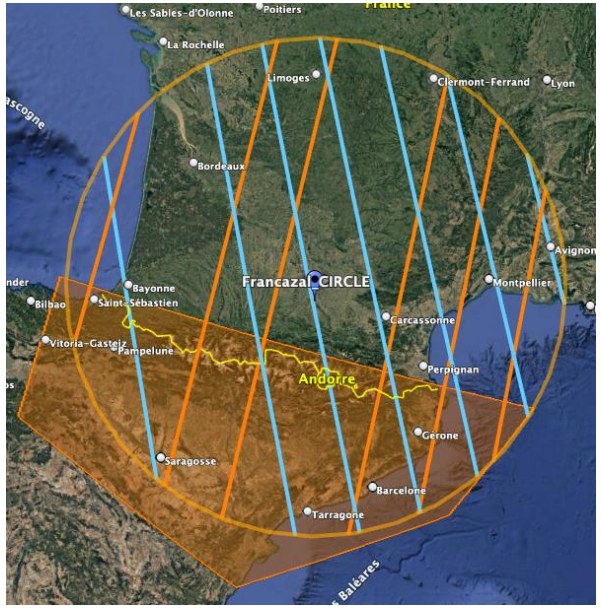
Horizontal cloud radar measurements



- Doppler not corrected yet

Conclusion

- 1 flight for CPR CalVal – very good co-location but cloud/precipitation system a bit tiny for an easy comparison.
  - Reflectivity profiles look consistent
  - CPR Doppler not OK for this example



Orbit forecast for MORECALVAL

What's next ?

- CPR L2 products to be investigated
- **MORECALVAL campaign : Toulouse, 17 March 2025 – 4 April 2025**