

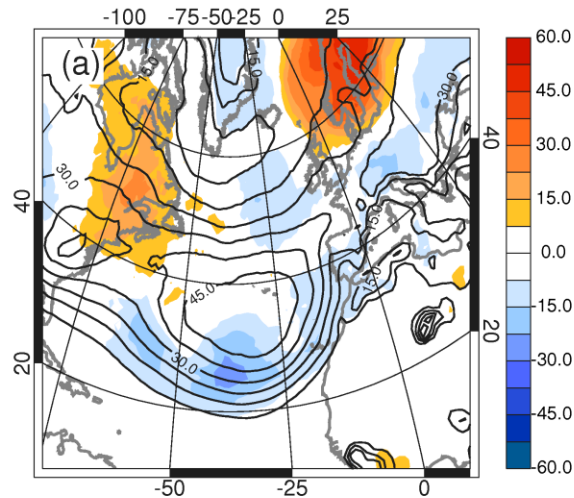


NAWDEX meteorological systems, flights, data

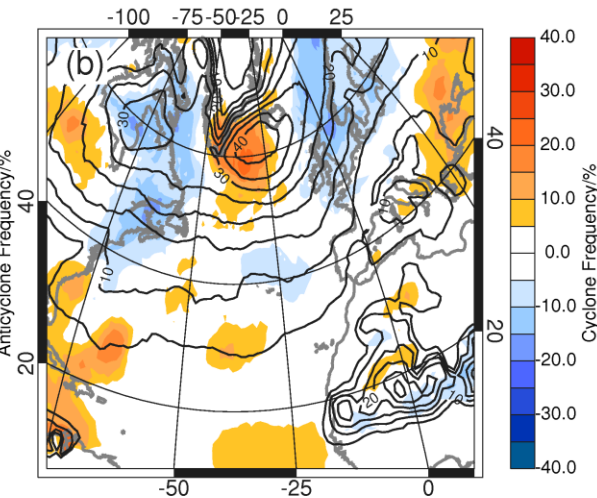
DIP-NAWDEX kick-off meeting: 5 Feb 2018

Meteorological situation

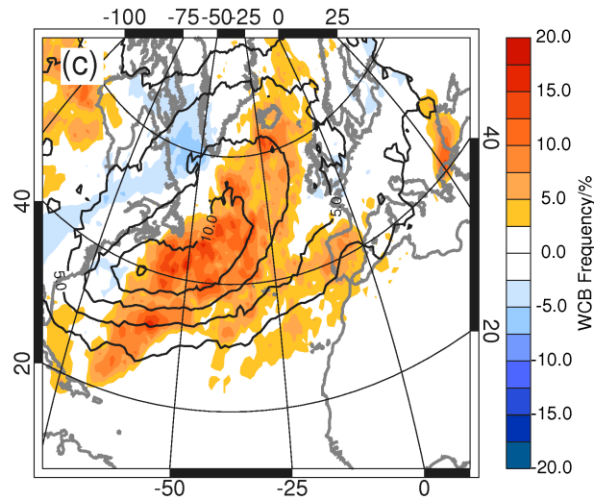
Surface
anticyclones



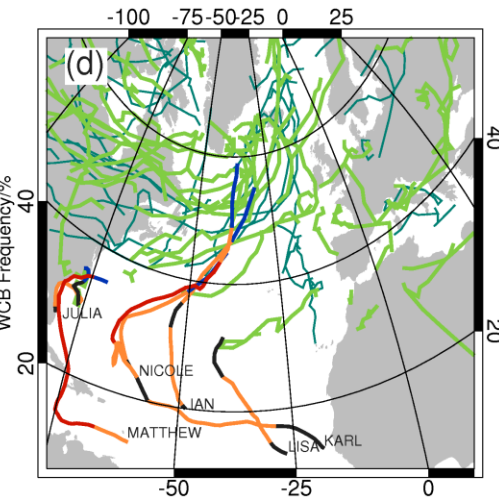
Surface
cyclones



Warm
conveyor
belts



Tropical and
extratropical
cyclone tracks



Large-scale circulation regimes, predictability & IOPs

Weather regimes

blocking

NAO+

NAO-

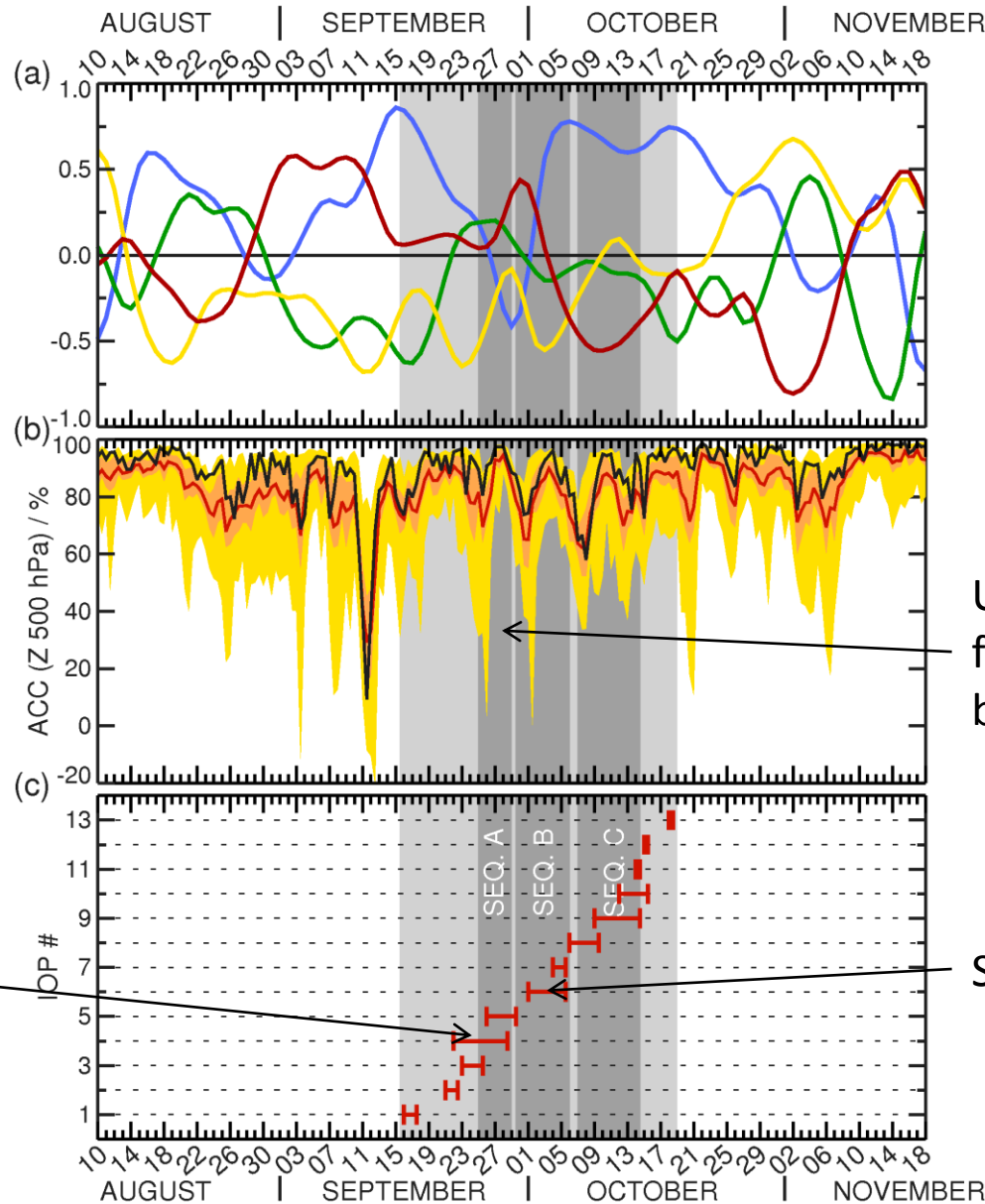
Atlantic ridge

5day-Forecast skills
(ECMWF)

Uncertainty in the
formation of the
blocking

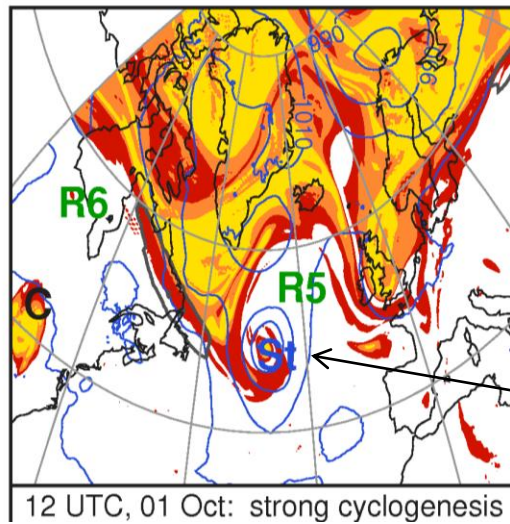
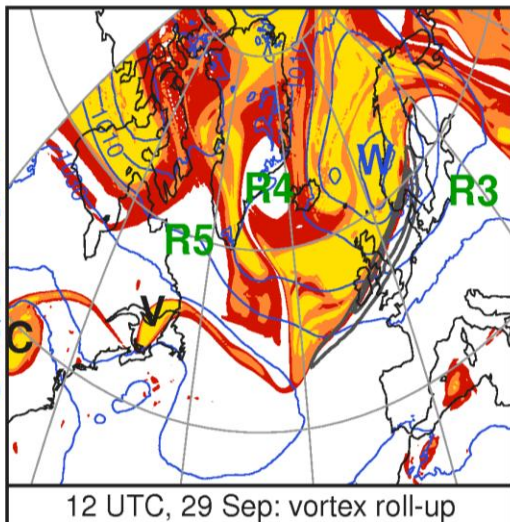
ET of TC Karl

Stalactite cyclone

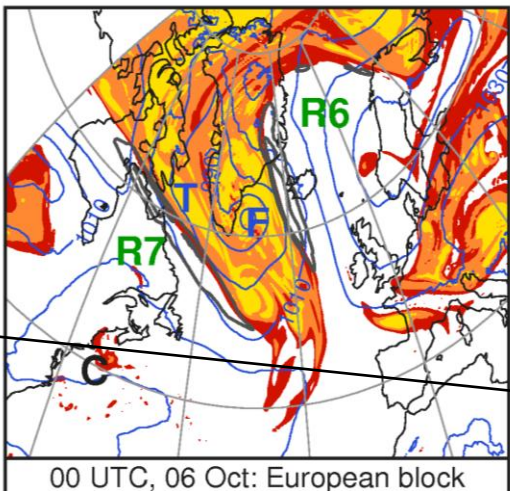
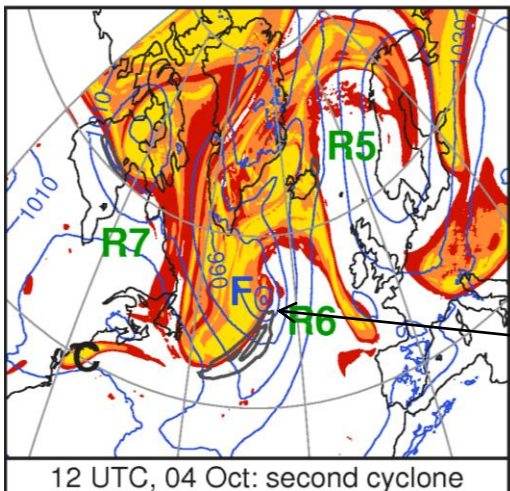


Cyclogenesis, ridge building and blocking formation

SEQUENCE B



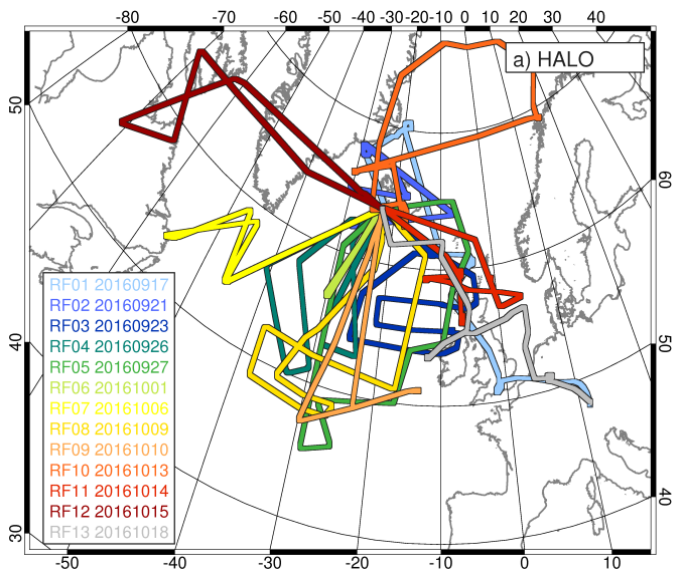
Stalactite cyclone



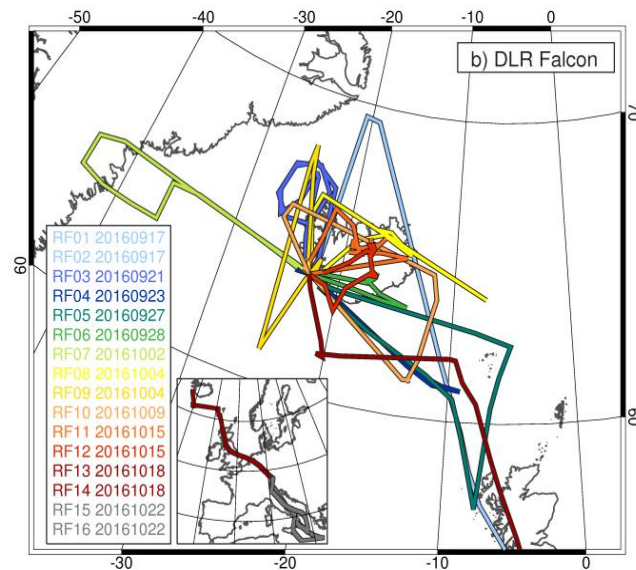
« frontal wave »
cyclone

All flights

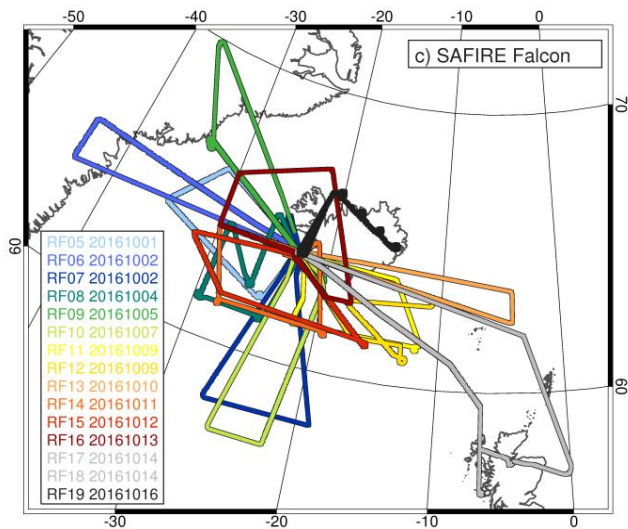
HALO



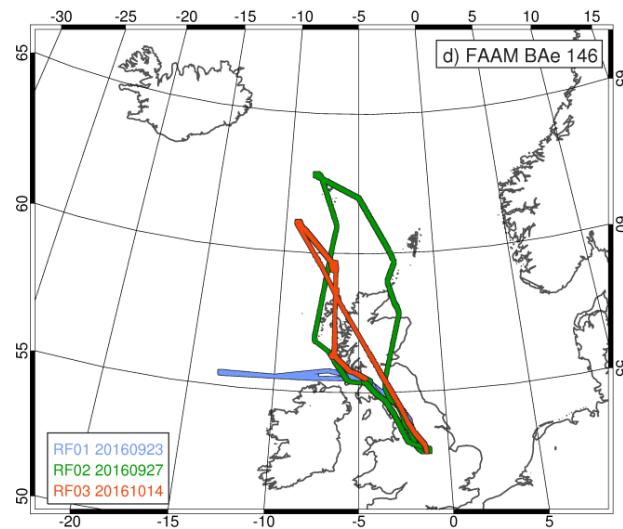
DLR
falcon



SAFIRE
falcon

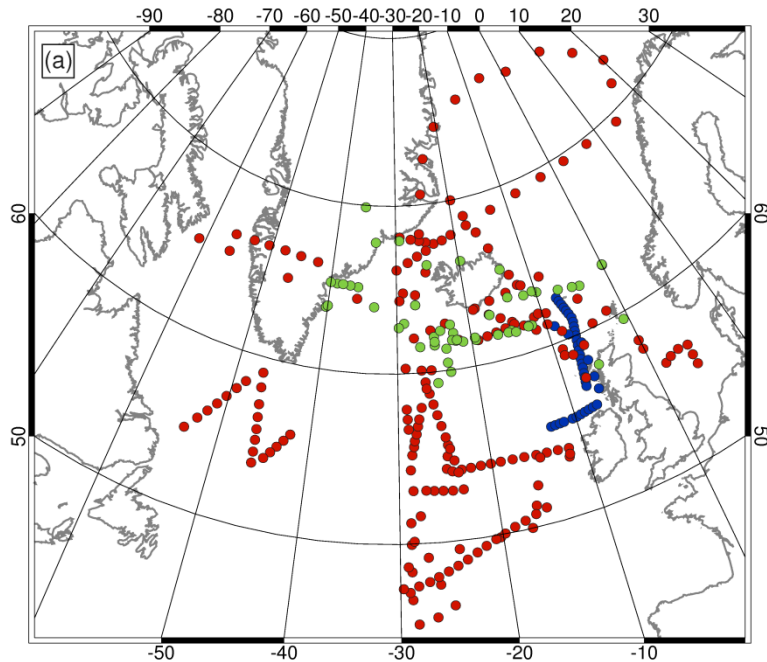


FAAM
Bae



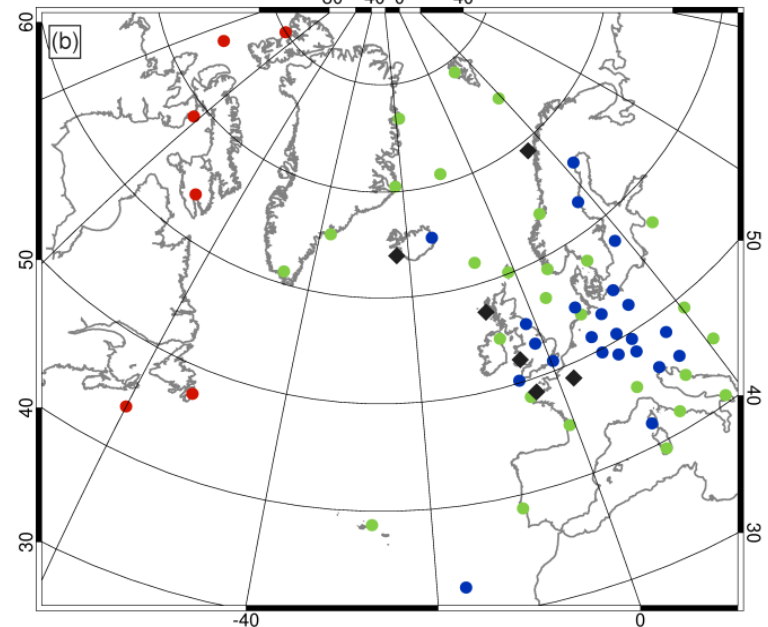
Dropsondes / radiosondes / ground-based observations

Dropsondes



- HALO ds
- SAFIRE ds
- FAAM BAe ds

Radiosondes and ground-based obs



- Canadian rs
- Oper rs + additional rs
- Oper rs only
- ◆ Sites with additional obs (remote sensing)

Falcon-20 flights summary

Date	Flights	Project	Description	DS	HALO	F20 DLR	BAe	Sat
01.10	f5	EPATAN	Test flight / moderate cyclone	3				
02.10	f6	EPATAN	Tropopause fold & WCB outflow	9				
	f7	EPATAN	Ascending part of the WCB	0				
03.10								
04.10	f8	EPATAN	WCB outflow & edge of the ridge building	5				
05.10	f9	EPATAN	WCB outflow. Orographic Greenland precip°	4				
06.10								
07.10	f10	NEAREX	Atmospheric river NW of a cyclone	7				
08.10								
09.10	f11	EPATAN	WCB to the southeast of Iceland	4				
	f12	EPATAN	Ascending region of the WCB	4				
10.10	f13	NEAREX	Atmospheric river east of Iceland	6				
11.10	f14	EPATAN NEAREX	Ascending region of a WCB	4				
12.10	f15	NEAREX	Atmospheric river / WCB. HIW over Iceland	8				
13.10	f16	EPATAN	Ascending region of WCB / orographic waves.	1				
14.10	f17	EPATAN	Sparse cloudy regions / 3 aircraft	1				
	f18	EPATAN	Coordinated flights	1				
15.10								
16.10	f19	EPATAN	Weak system with moist advection / Config ADM	2				

← Stalactite cyclone
← (<960 hPa)

← Frontal wave
← cyclone (~960 hPa)

← Atmospheric rivers

← WCBs and ridge
← building

← Coordinated flights

SAFIRE F20 Payload

Aircraft:

- Dassault Falcon 20
- Endurance: **3.5 flight hours**
- Maximum cruising altitude: **13 km**

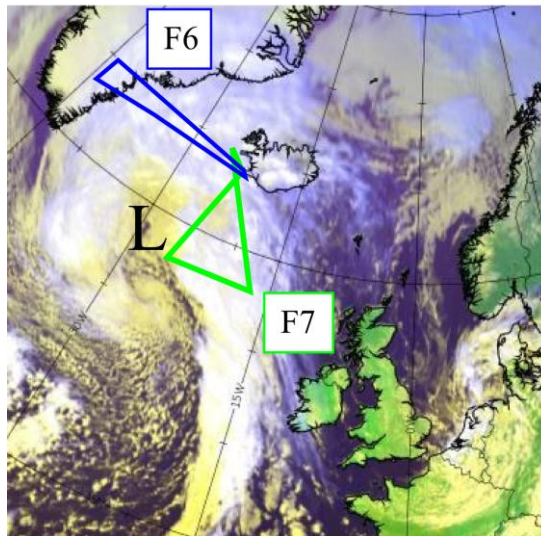
Payload:

- **High spectral resolution lidar** (355 nm), 532 and 1064 nm
- **Doppler cloud Radar** (95 GHz) – 3 antennas looking down
=> cloud wind retrieval (WIND): U, V, W+Vt
- IR radiometer CLIMAT (brightness temperature **8-10-12 micron**)
- L/S fluxes
- Drop sonde launching (profiles of T, p, hum, u, v)

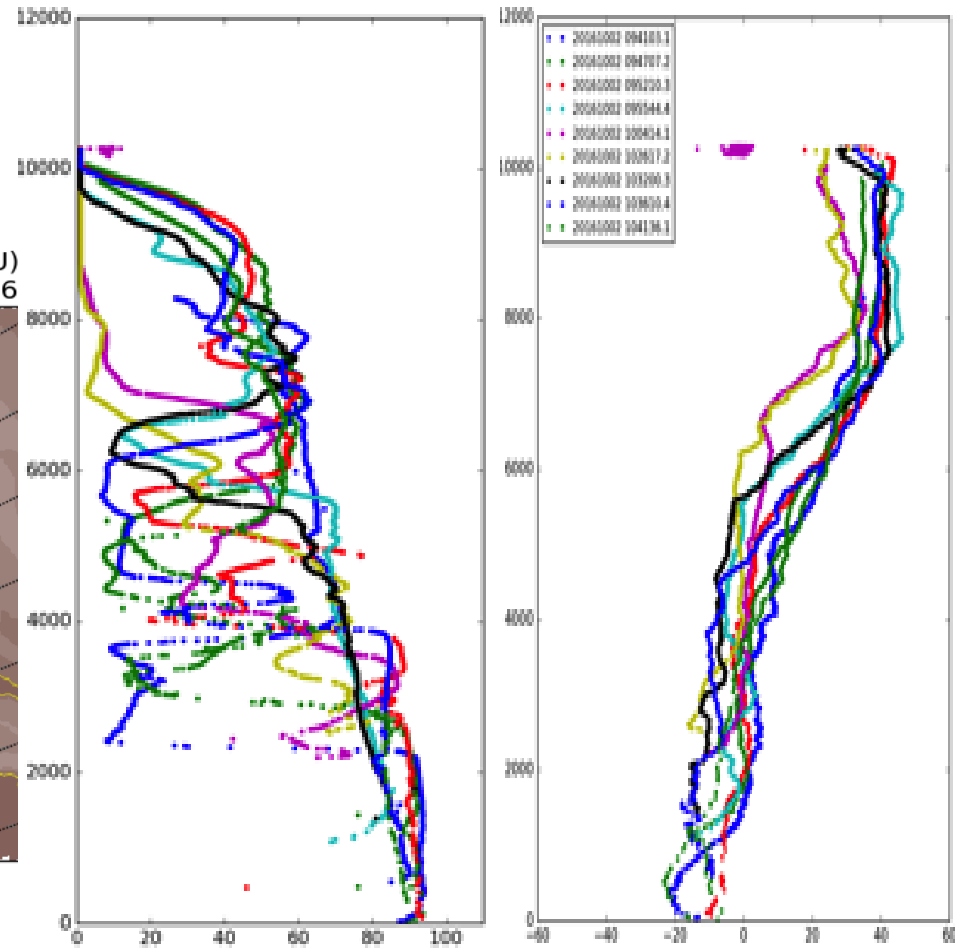
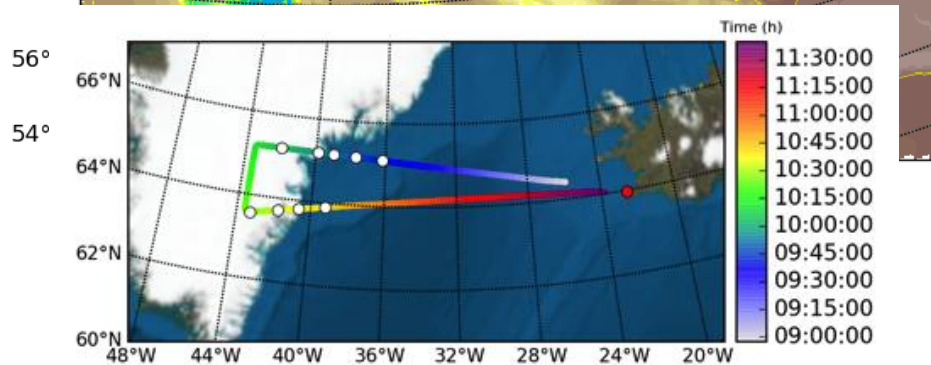
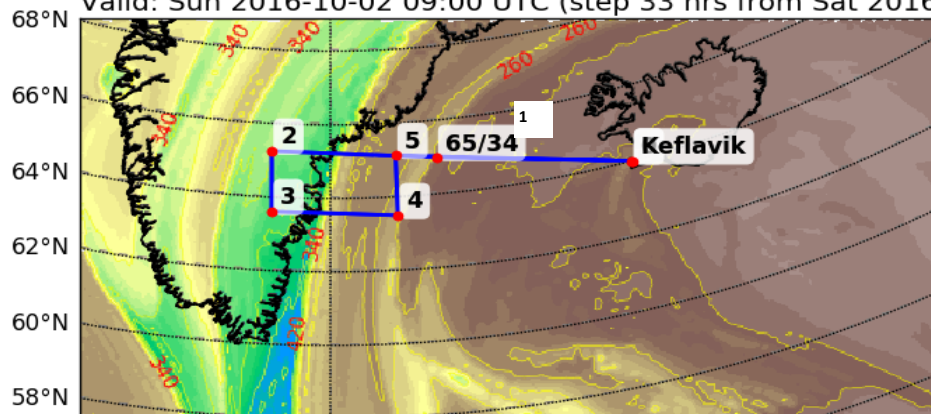
} IWC,
extinction
retrieval

2 Oct 2016 (13h UTC)

F6, tropopause fold, coordinat° DLR falcon



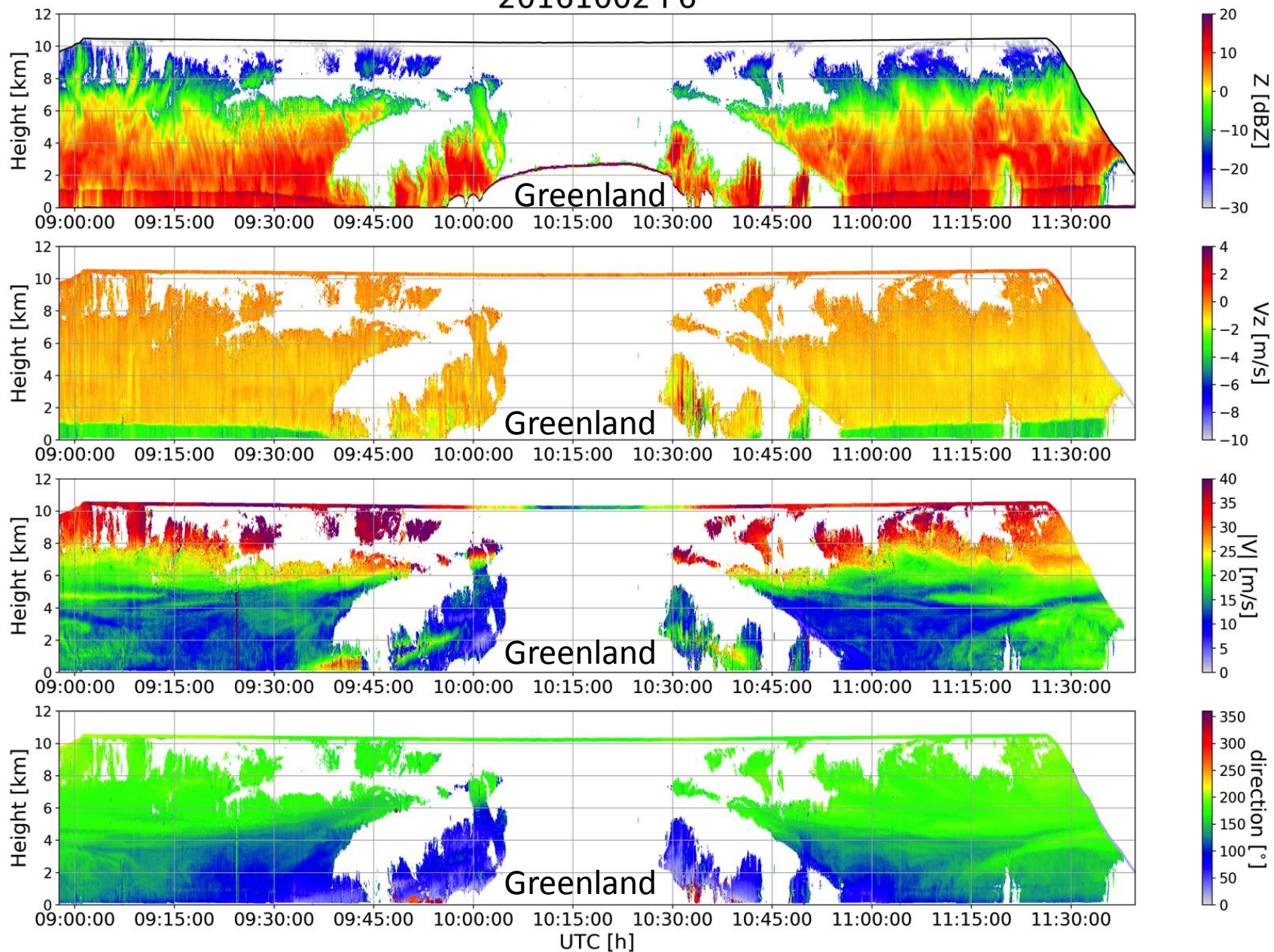
Dynamical Tropopause (Pressure (hPa)) at 2000 (10^{-3} PVU)
Valid: Sun 2016-10-02 09:00 UTC (step 33 hrs from Sat 2016



Humidity (%)

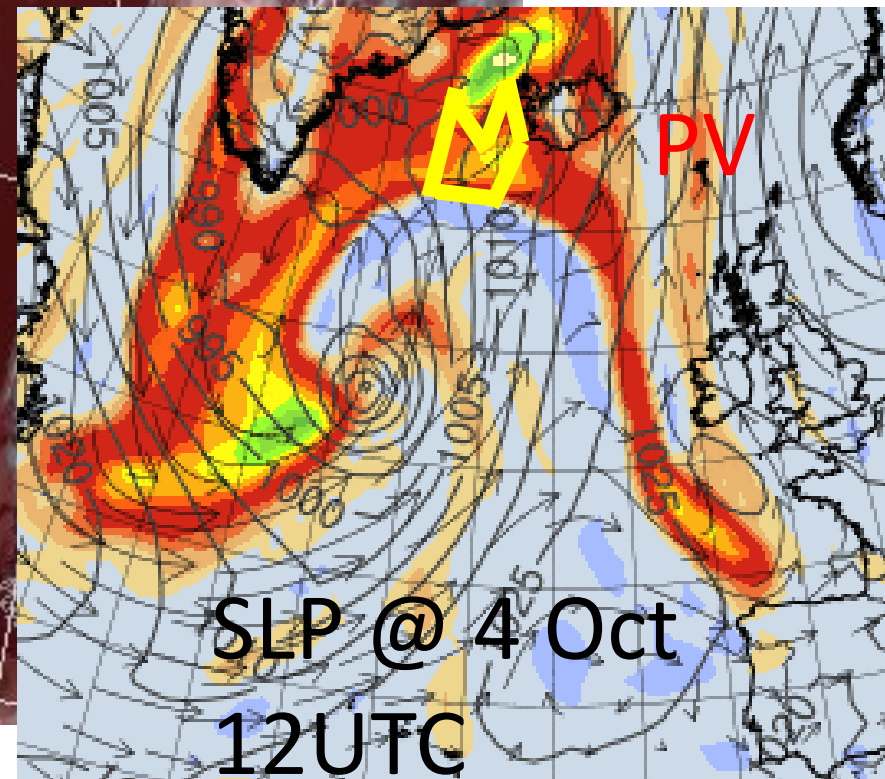
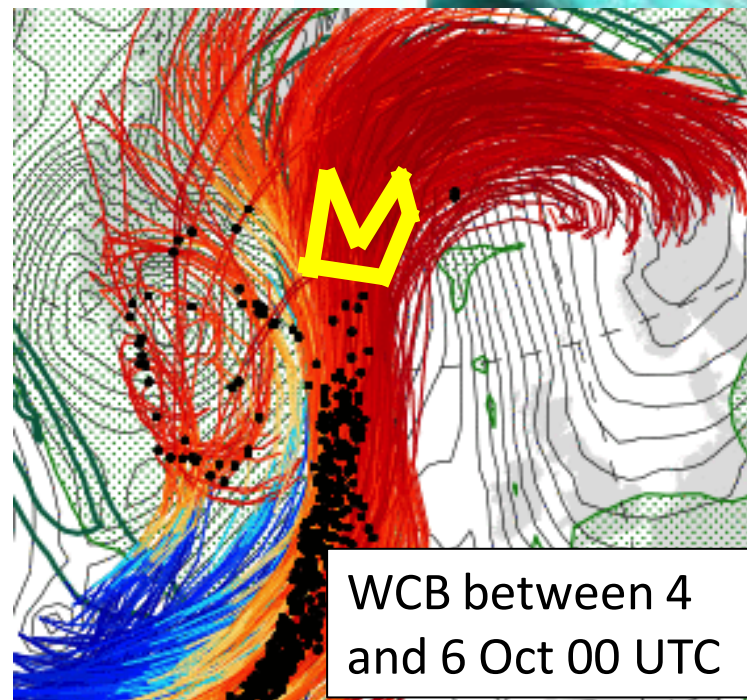
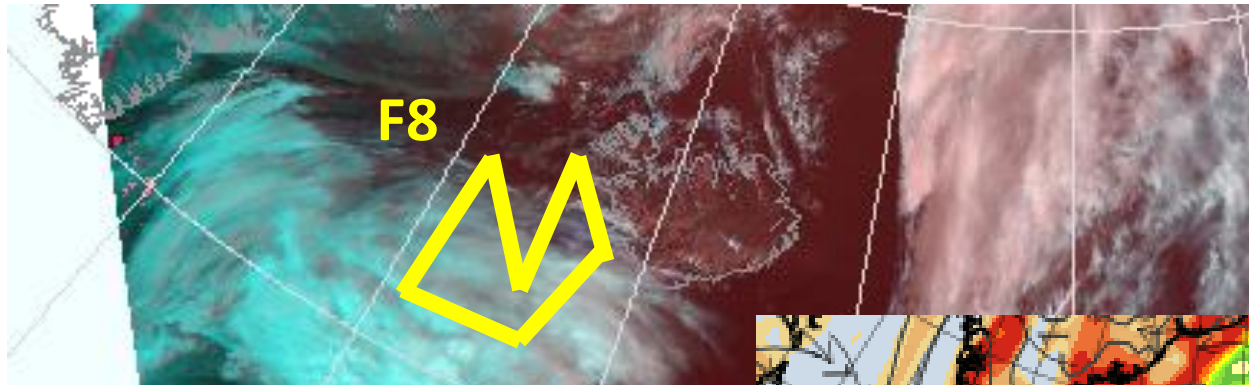
V (m/s)

20161002 F6

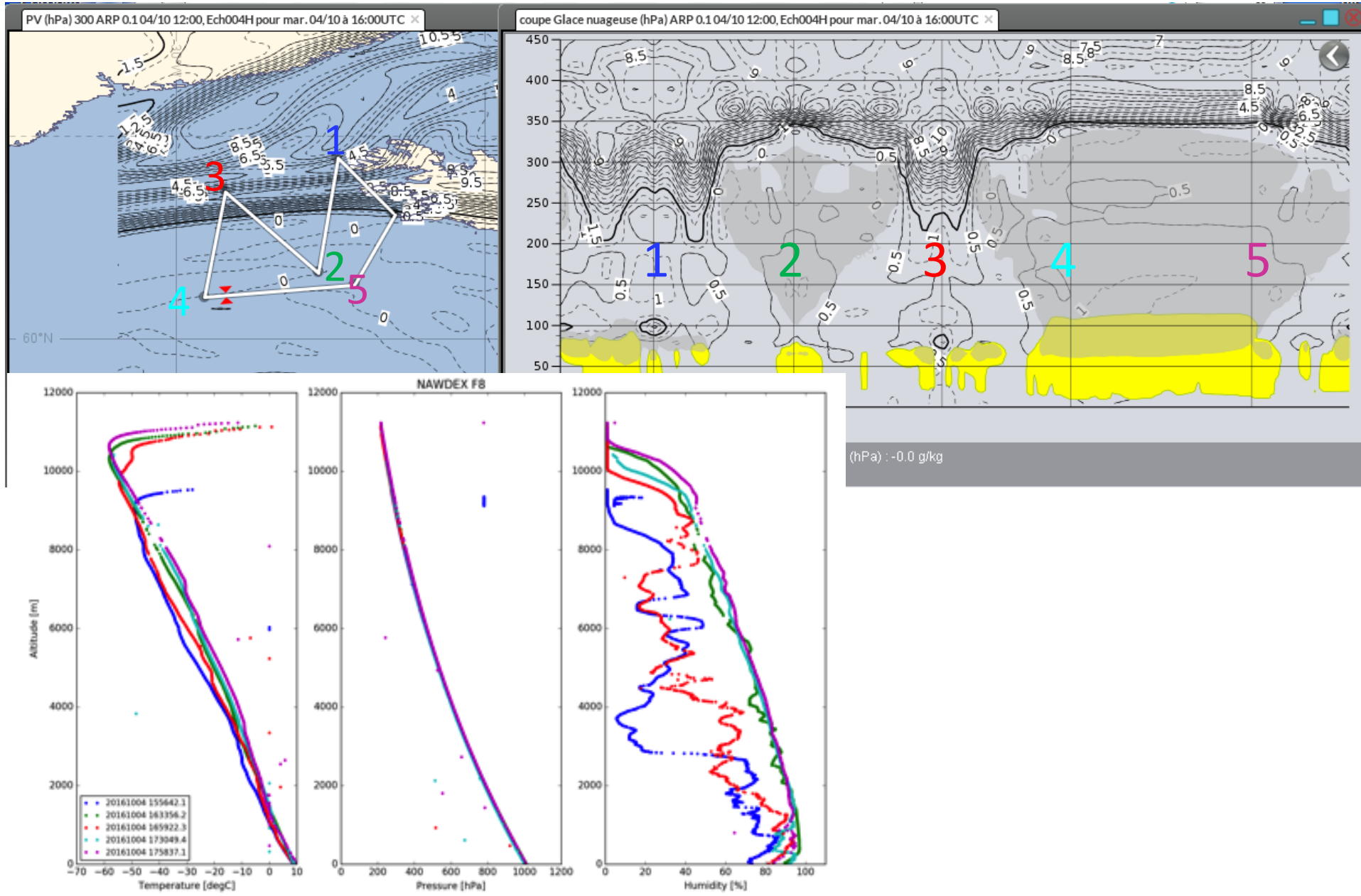


Mature stage of the frontal wave cyclone

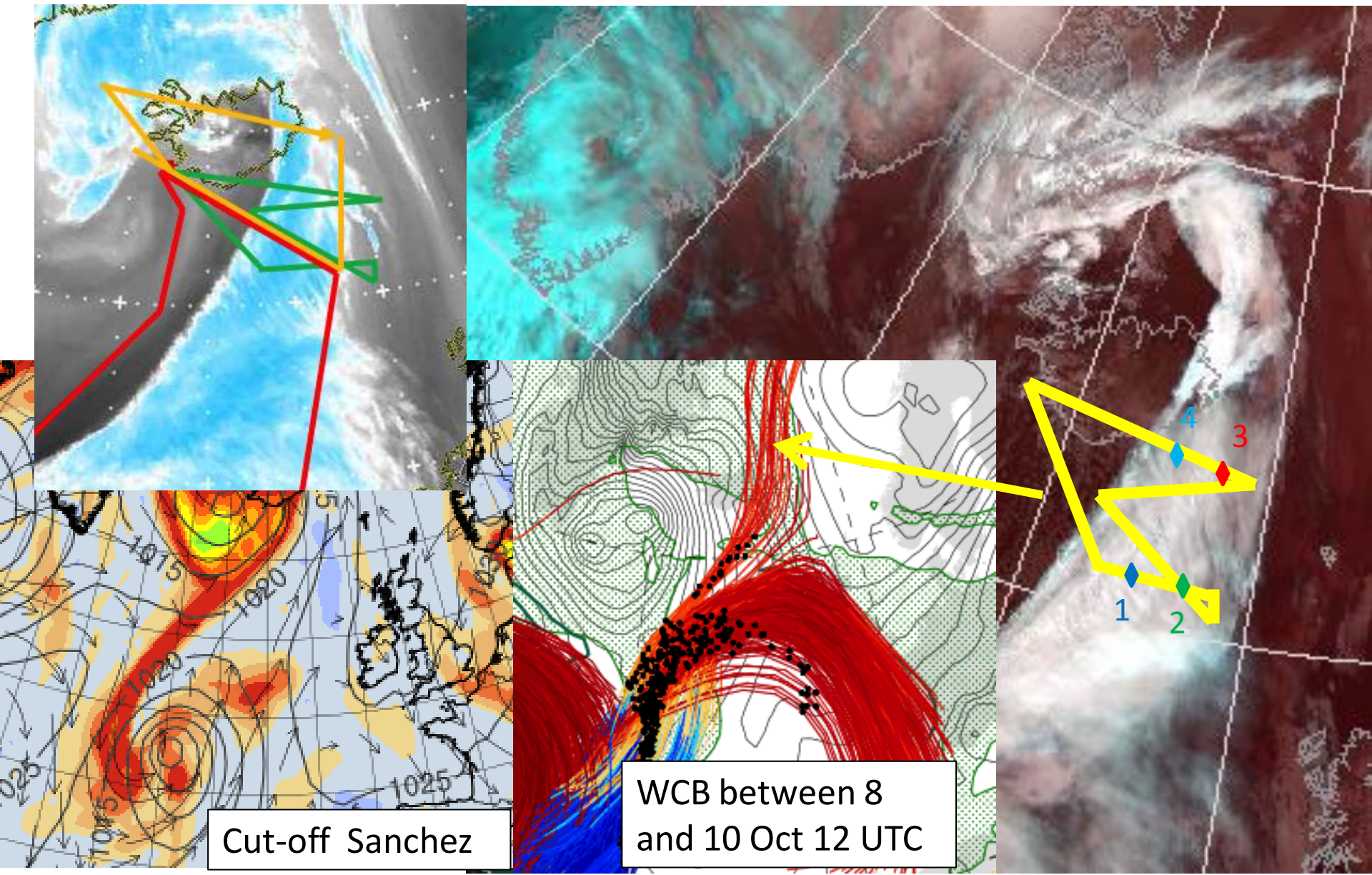
4 Oct: F8 on the edge of the ridge building



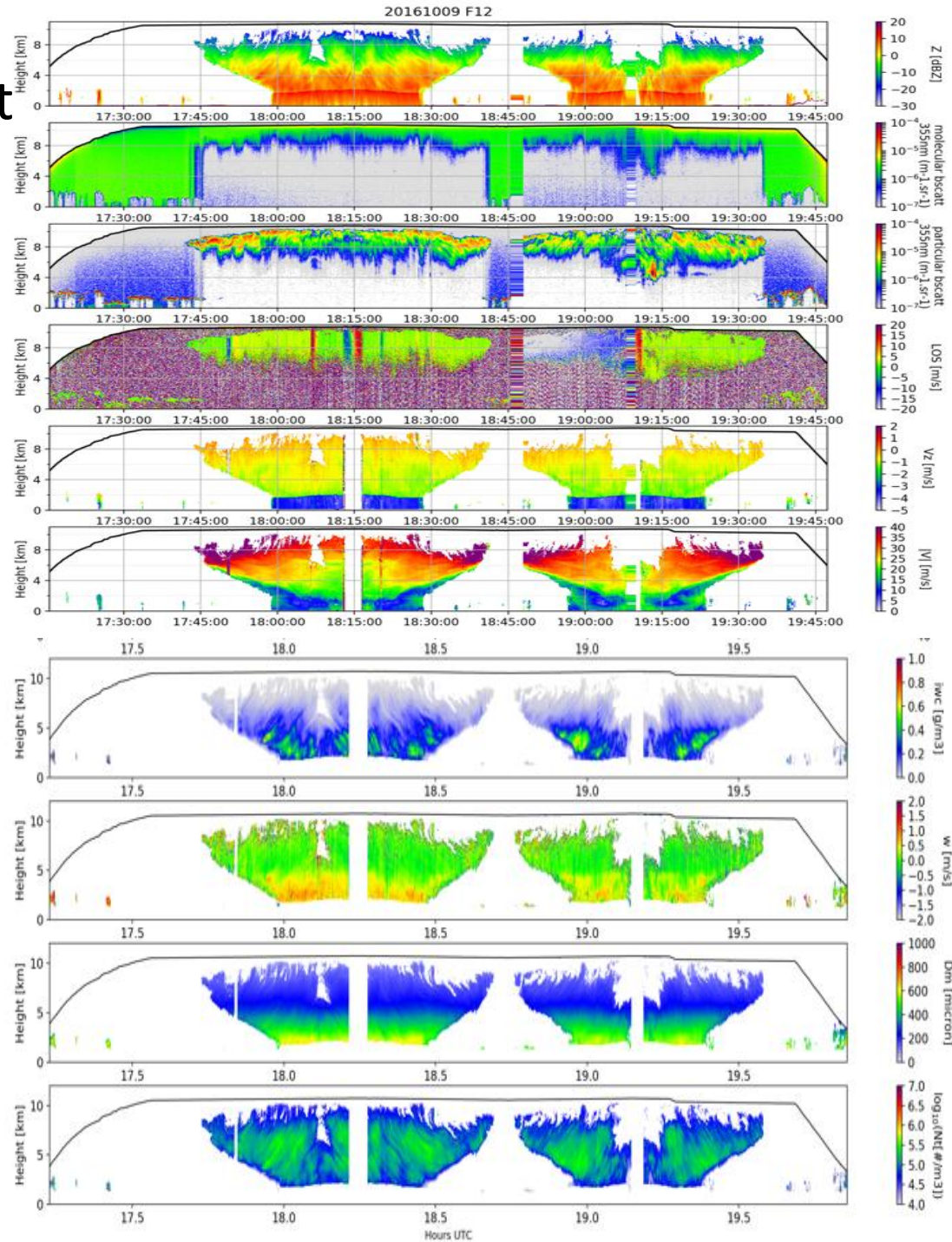
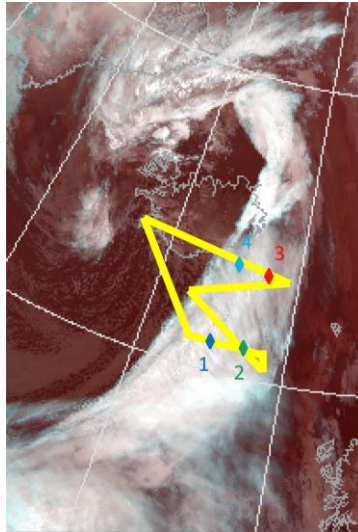
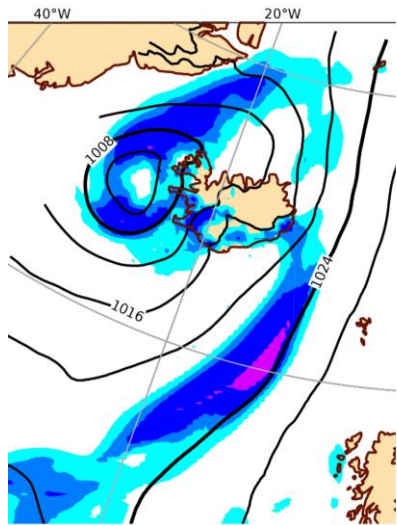
Cross-section along F8 on Oct 4th



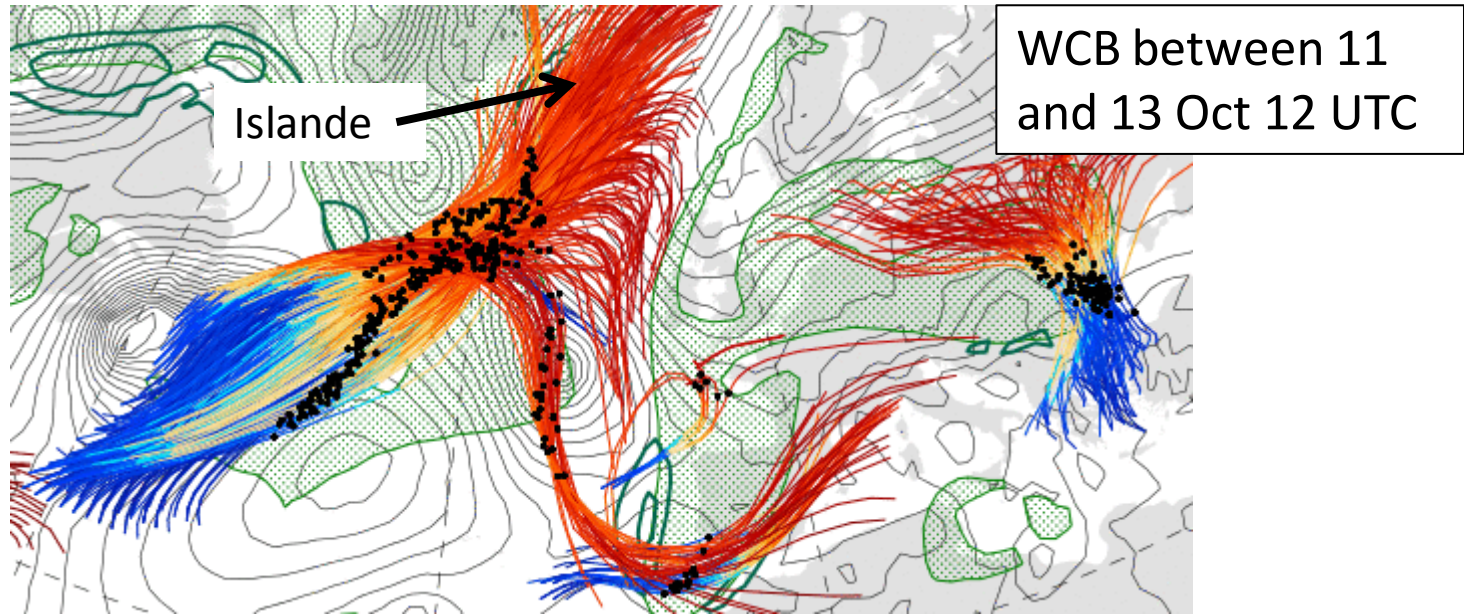
Oct 9: 2 flights across a moderate WCB + aircraft coordination



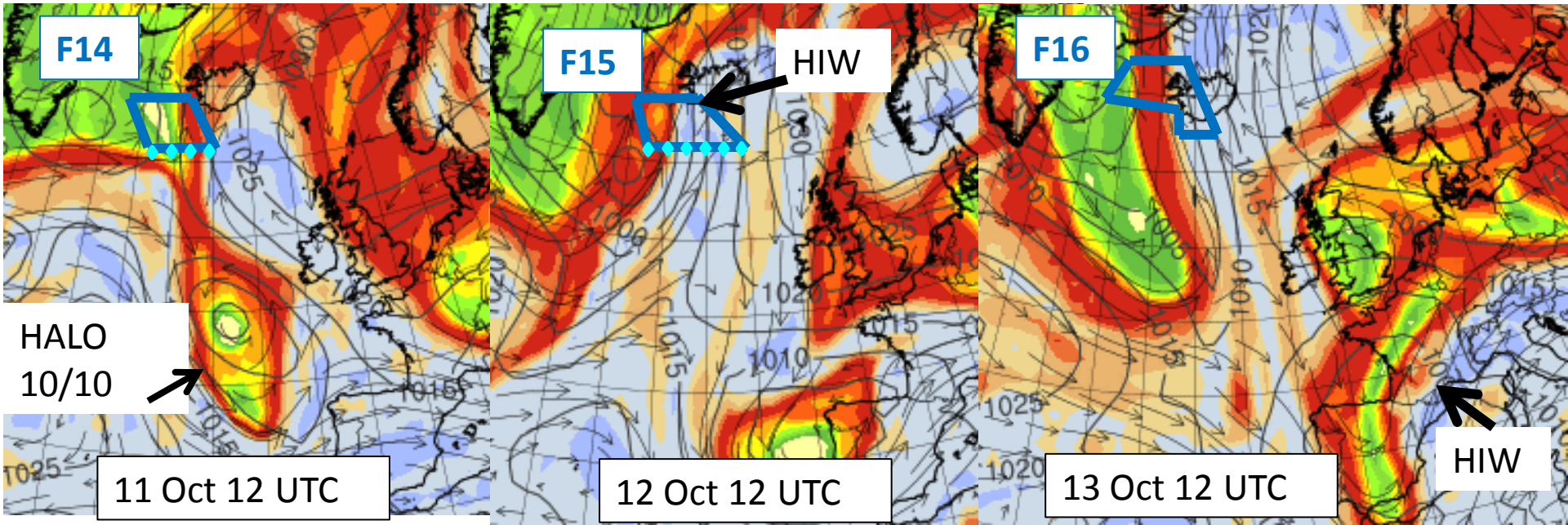
Oct 9: 2 flights across a moderate WCB + aircraft coordination



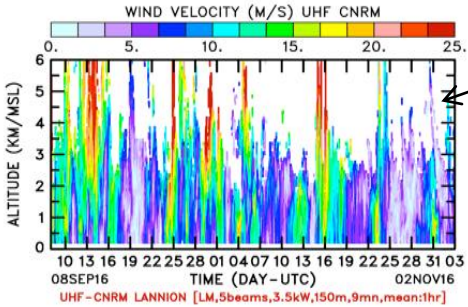
4) Ridge building & impact on the downstream trough ? Low predictability case



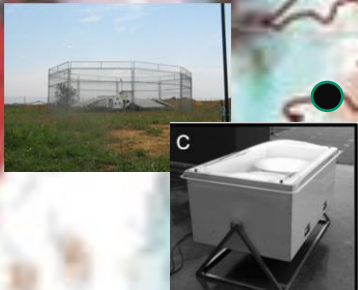
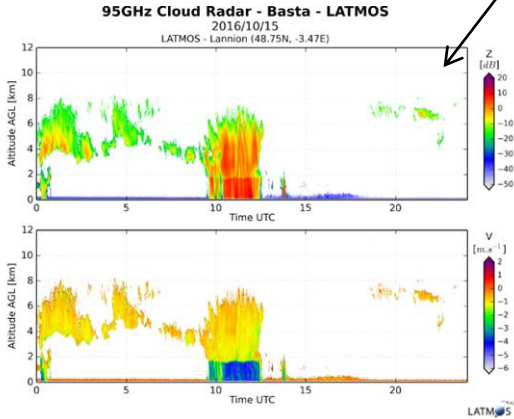
3 flights during 3 consecutive days



French ground-based observations



UHF radar
BASTA radar
GPS
Lannion



RS
BASTA radar
SIRTA
(Palais)



Summary of most interesting observed dynamical features

- 2 flights over the Stalactite storm leading to the blocking formation, very active WCB. Ascent + outflow region
- 2 flights over the 2nd storm « frontal wave cyclone » and blocking reinforcement, very active WCB. Mainly outflow region and Greenland precip°.
- 2 flights over a moderate WCB but coordinated flights.
- 3 flights related to single/multiple atmospheric rivers
- 3 flights over 3 successive days with strong northward moisture fluxes / link with ridge building on Oct 13.
HIW: one with strong precip° over Iceland & link with HPE over southern France ?