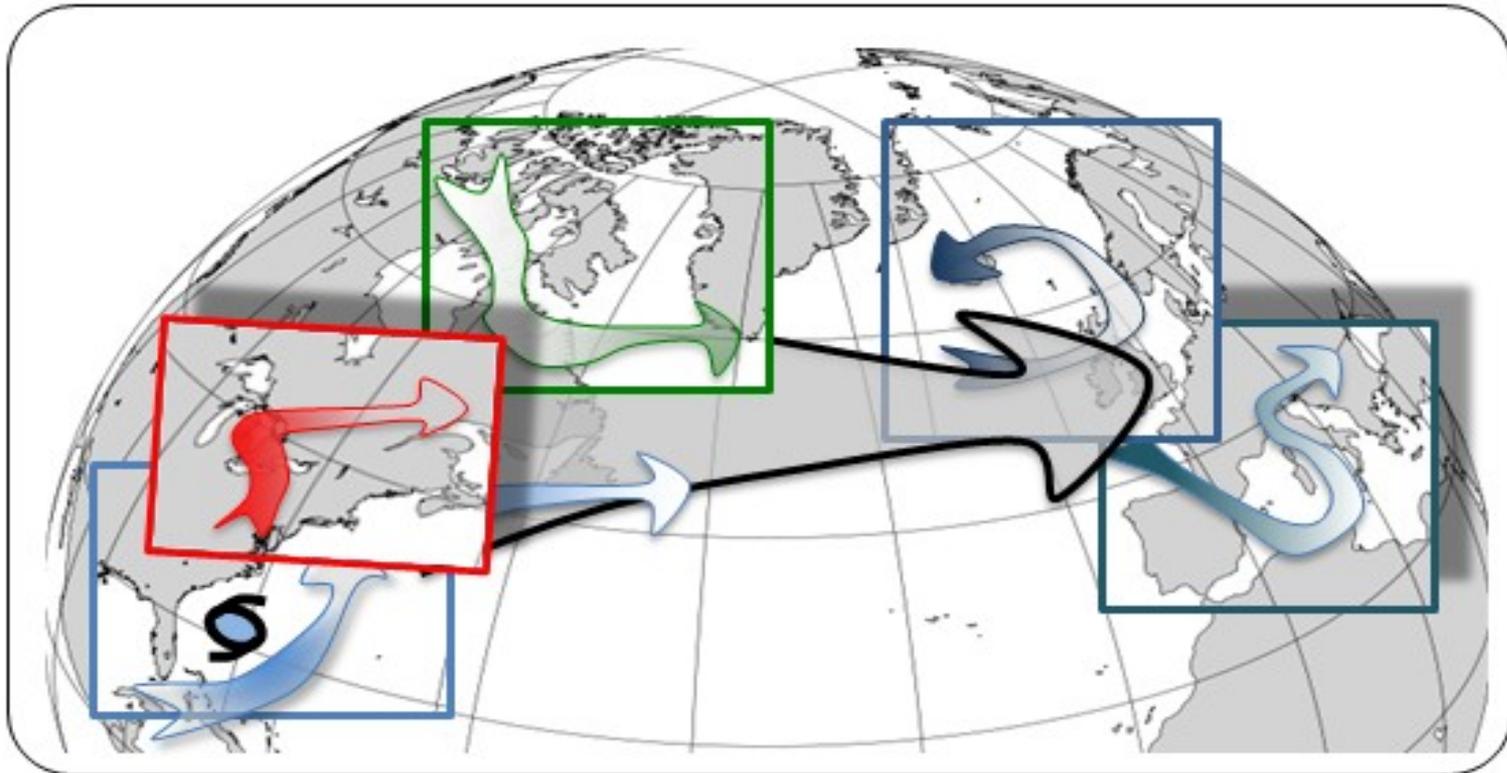


NAWDEX – General Planning Meeting

10 October 2016, Keflavik 11 UTC



NAWDEX – General Planning Meeting

10 October 2016, Keflavik 11 UTC

Key issues today

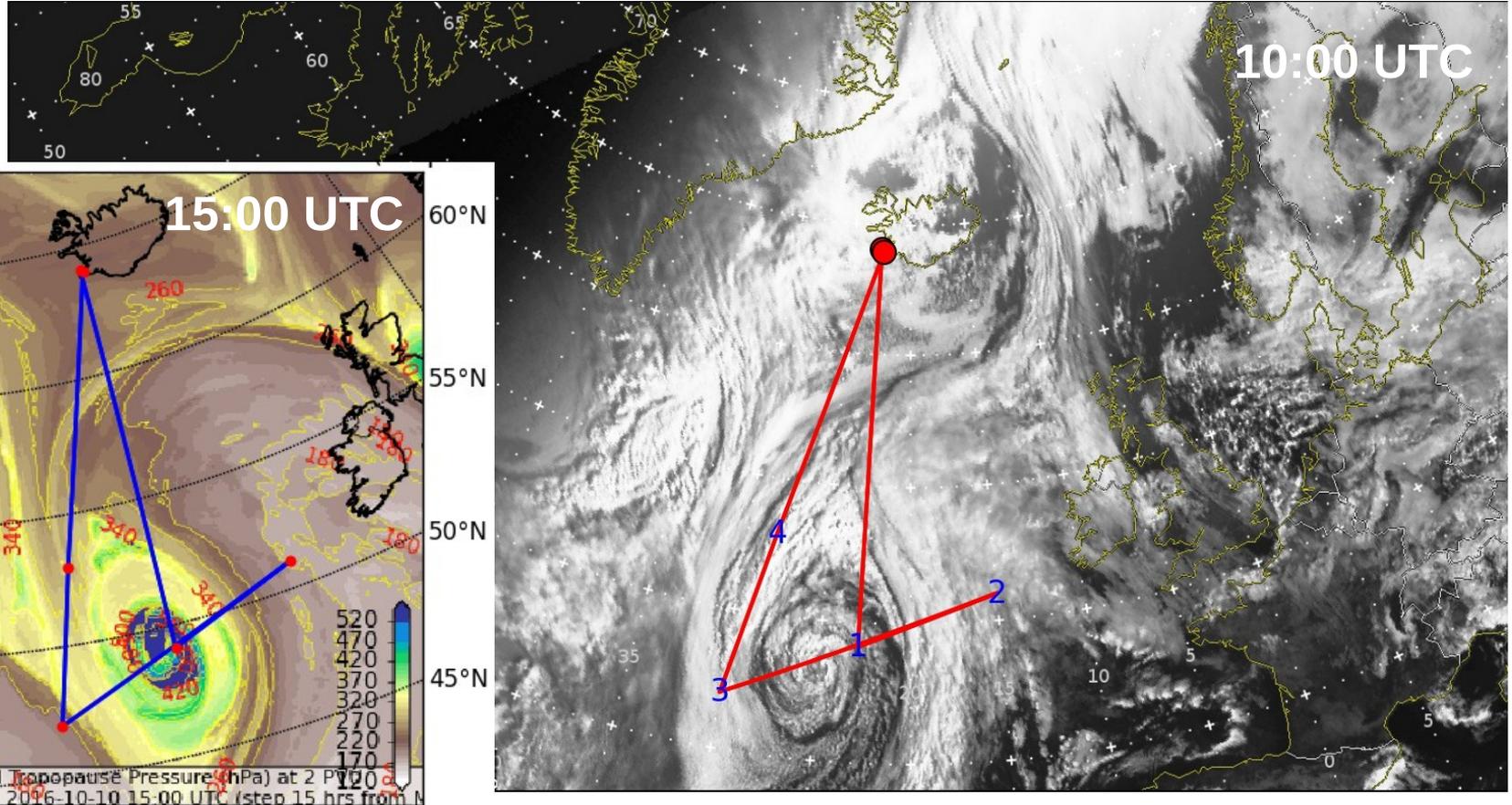
1. Today's HALO flight
 - HALO Take-off: 1200UTC
2. Coordinated flights of UK FAAM, HALO, Safire Falcon on Tuesday?
3. Tuesday DLR Falcon and Safire flights?
4. Wednesday Halo, Safire & DLR Falcon

NAWDEX – General Planning Meeting

10 October 2016, Keflavik 11 UTC

1. Current HALO flight
2. Aircraft status report by FX-Operations
3. Instrument status report by Instrument Manager
4. Short weather summary: information about flight options for the next days and update for planning for the next day with the latest forecast
5. Report of Ground-Based Observation coordinator
6. Decisions for Tuesday (radiometer intercomparison)
7. Wednesday flights discussion
8. Coordination with other aircraft (Input from other groups)

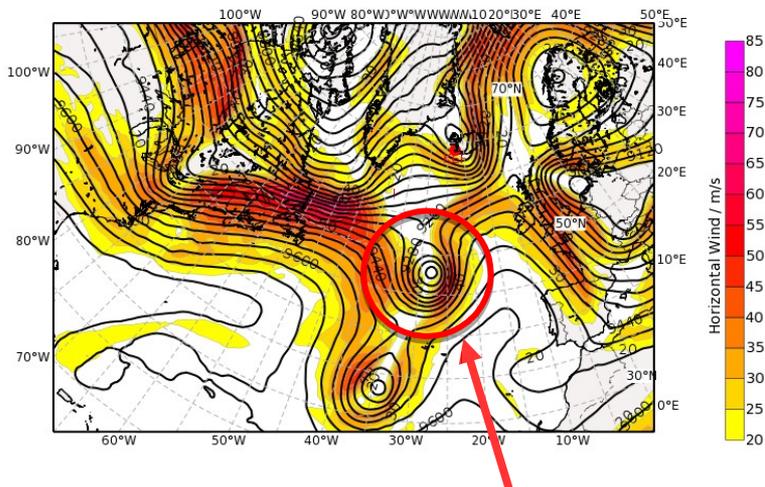
Today's HALO flight „Sanchez“



Analysis – 10 Oct 2016, 00 UTC

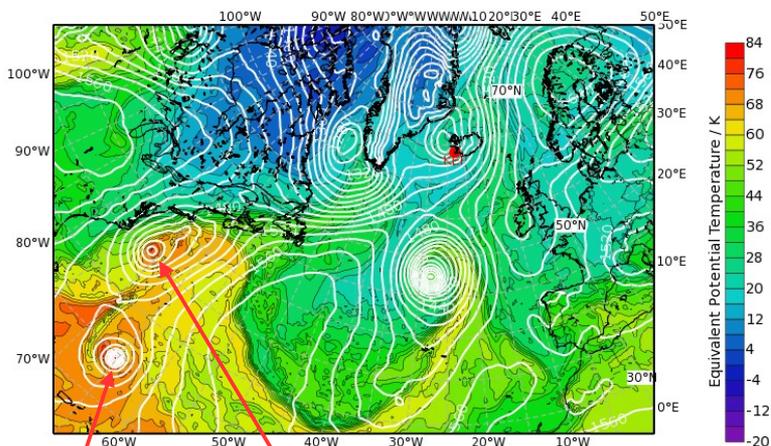
Z300, SAT
THE850

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Mon, 10 Oct 2016, 00 UTC (step 000 h from Mon, 10 Oct 2016, 00 UTC)

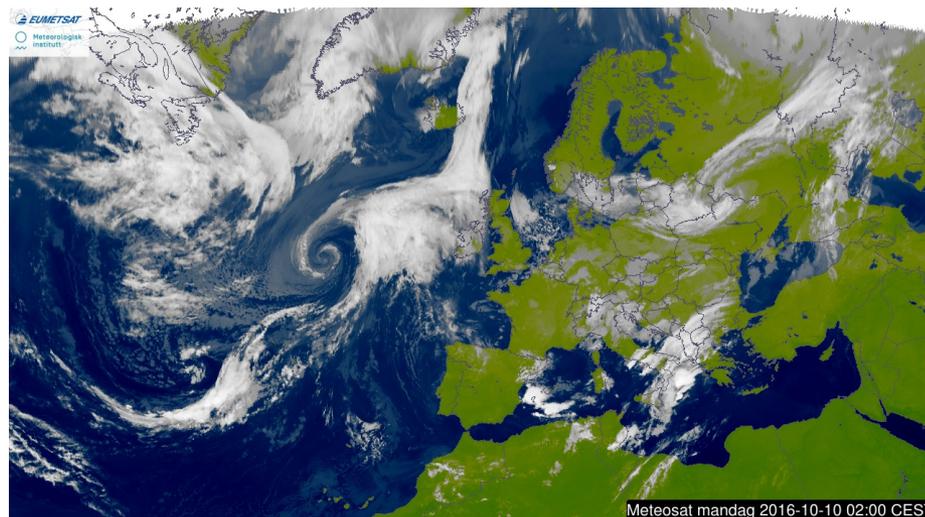


Cut-off "Sanchez"

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Mon, 10 Oct 2016, 00 UTC (step 000 h from Mon, 10 Oct 2016, 00 UTC)

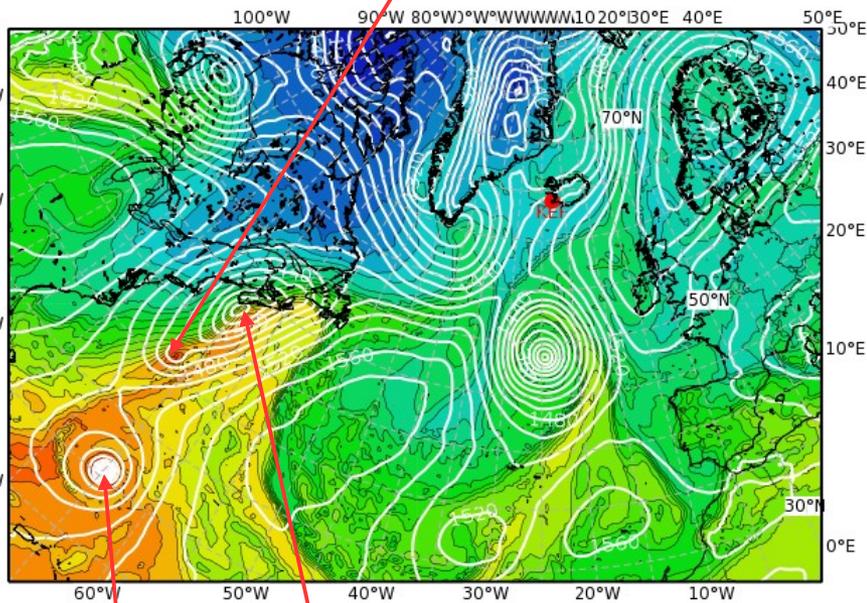


TC Nicole Ex-Matthew



Ex Matthew

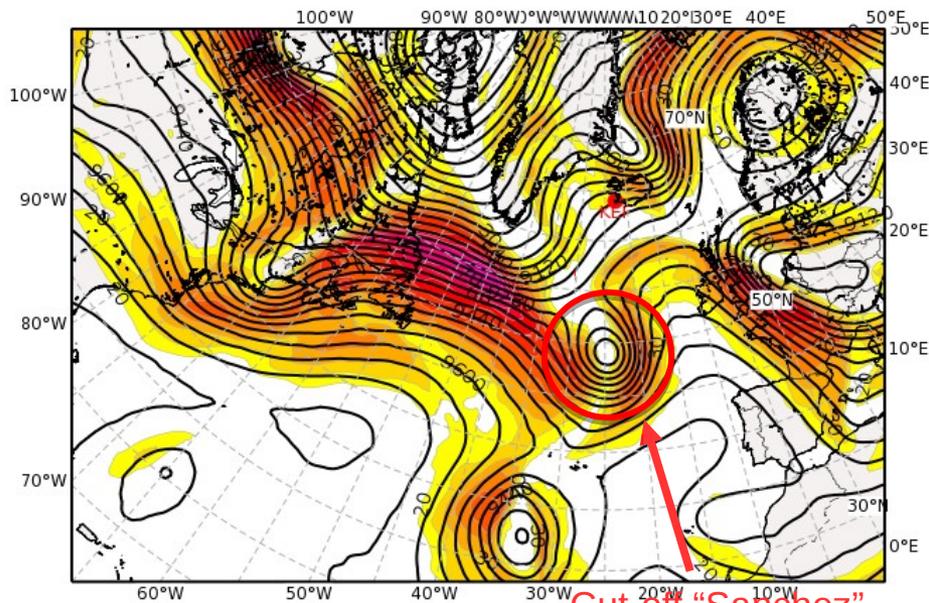
Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Mon, 10 Oct 2016, 12 UTC (step 012 h from Mon, 10 Oct 2016, 00 UTC)



TC Nicole

Downstream cyclone

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Mon, 10 Oct 2016, 12 UTC (step 012 h from Mon, 10 Oct 2016, 00 UTC)

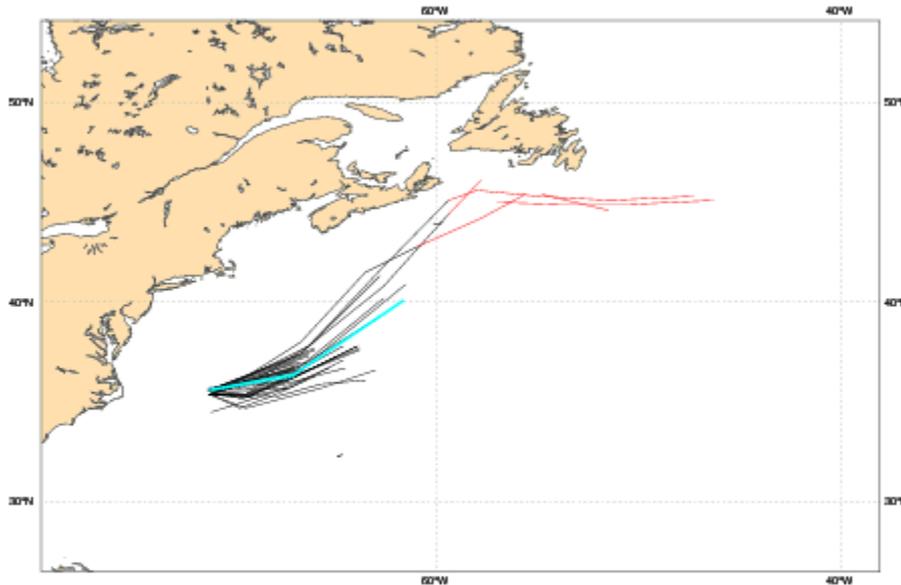


Cut-off "Sanchez"

Track forecast TC Matthew

Date 20161010 00 UTC @ECMWF

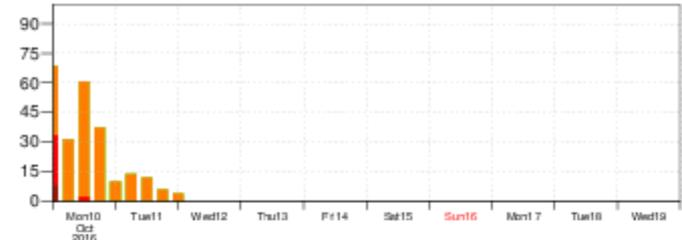
Individual trajectories for **MATTHEW** during the next 240 hours
 tracks: **thick solid**=HRES; **thick dot**=CTRL; **thin solid**=EPS members [coloured]
0-24h 24-48h 48-72h 72-96h 96-120h 120-144h 144-168h 168-192h 192-216h 216-240h



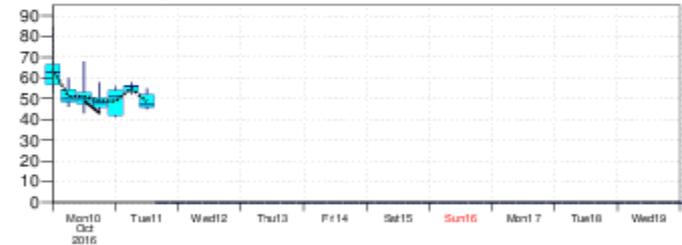
List of ensemble members numbers forecast Tropical Cyclone
 Intensity category in colours: **TD**[up to 33] **TS**[34-63] **HR1**[64-82] **HR2**[83-95] **HR3**[> 95 kt]

+024 h :		09	10	13	16		31
+048 h :	05						31
+072 h :							
+096 h :							
+120 h :							
+144 h :							
+168 h :							
+192 h :							
+216 h :							
+240 h :							

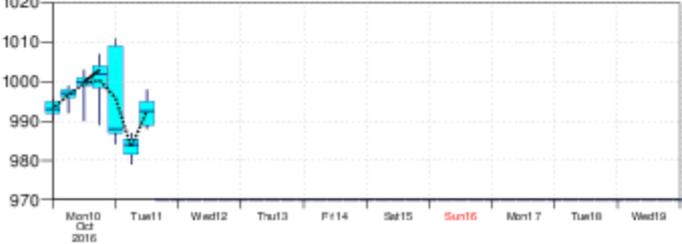
Probability (%) of Tropical Cyclone Intensity falling in each category
TD[up to 33] **TS** [34-63] **HR1**[64-82] **HR2** [83-95] **HR3** [> 95 kt]



10m Wind Speed (kt) **solid**=HRES; **dot**=Ens Mean

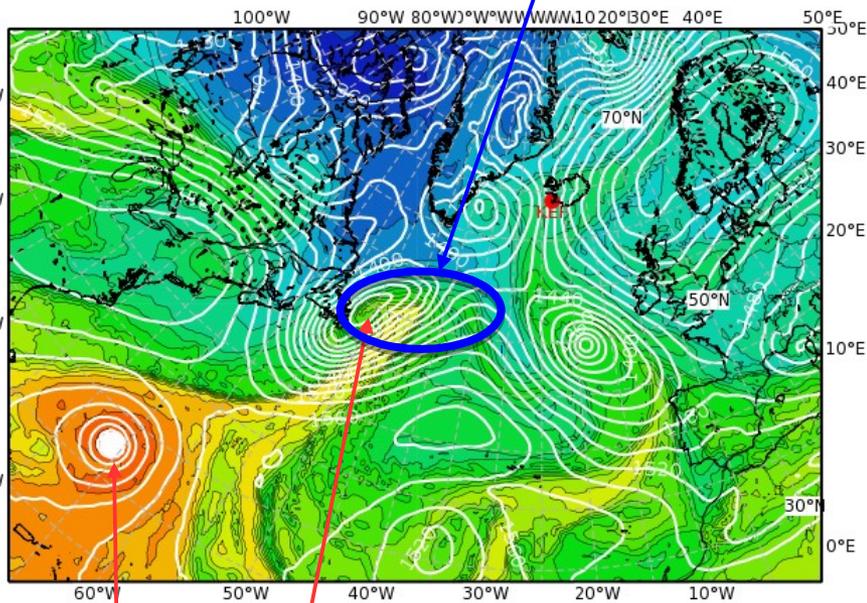


Mean Sea Level Pressure in Tropical Cyclone Centre (hPa) **solid**=HRES; **dot**=Ens Mean



First Ridge building

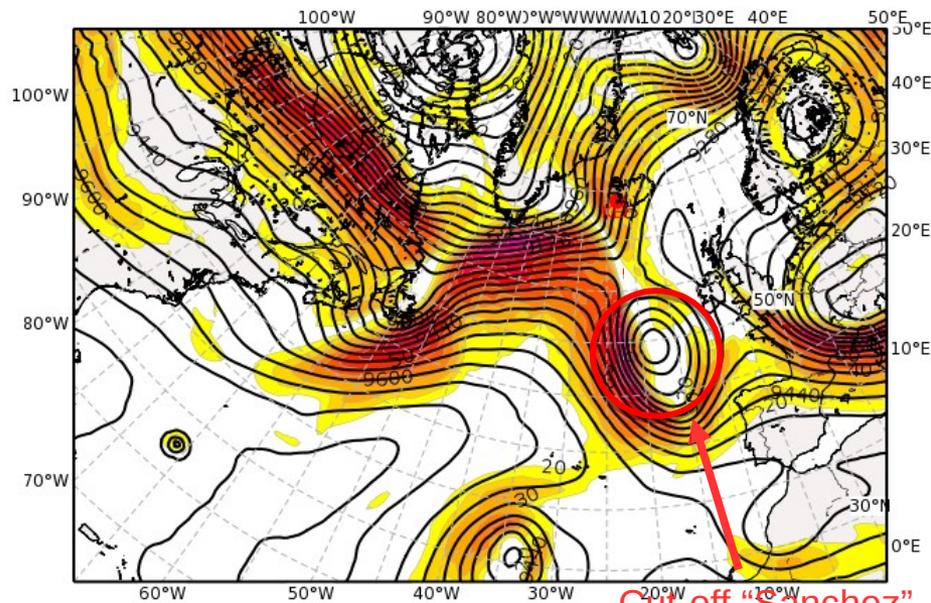
Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Tue, 11 Oct 2016, 12 UTC (step 036 h from Mon, 10 Oct 2016, 00 UTC)



TC Nicole

Downstream cyclone

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Tue, 11 Oct 2016, 12 UTC (step 036 h from Mon, 10 Oct 2016, 00 UTC)



Cut-off "Sanchez"



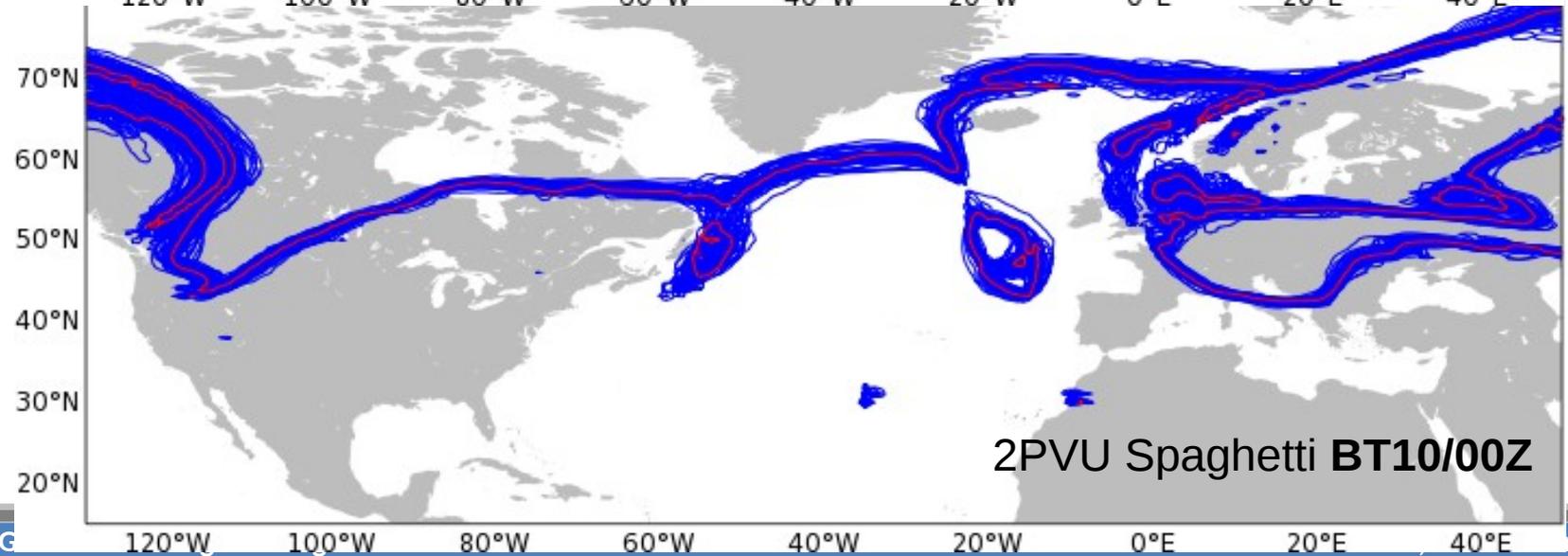
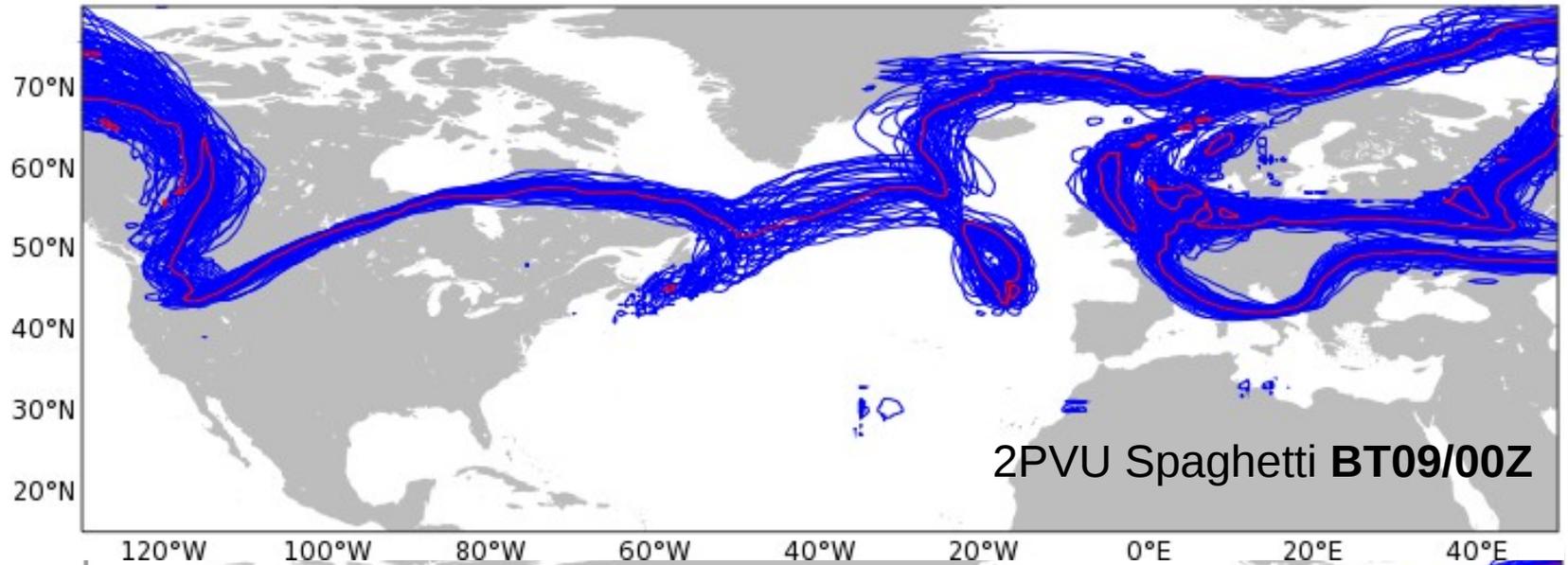
High cloud cover for radiometer comparison

Forecast for Tue, 11 Oct 2016 12 UTC

ECMWF ENSEMBLE FC

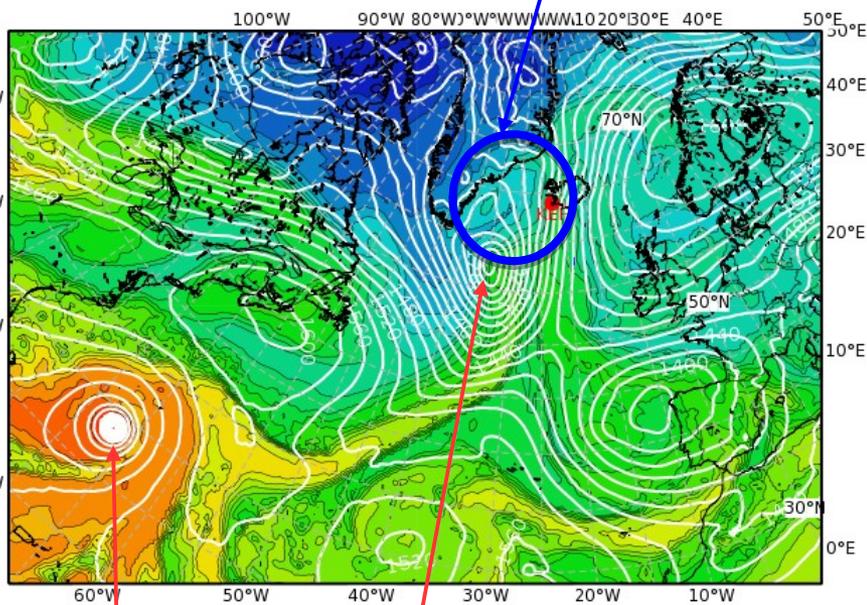
BT: 20161009 00UTC, VT: 20161011 12UTC

blue: perturbed, red: control



Second Ridge building,
WCB ascent close to KEF

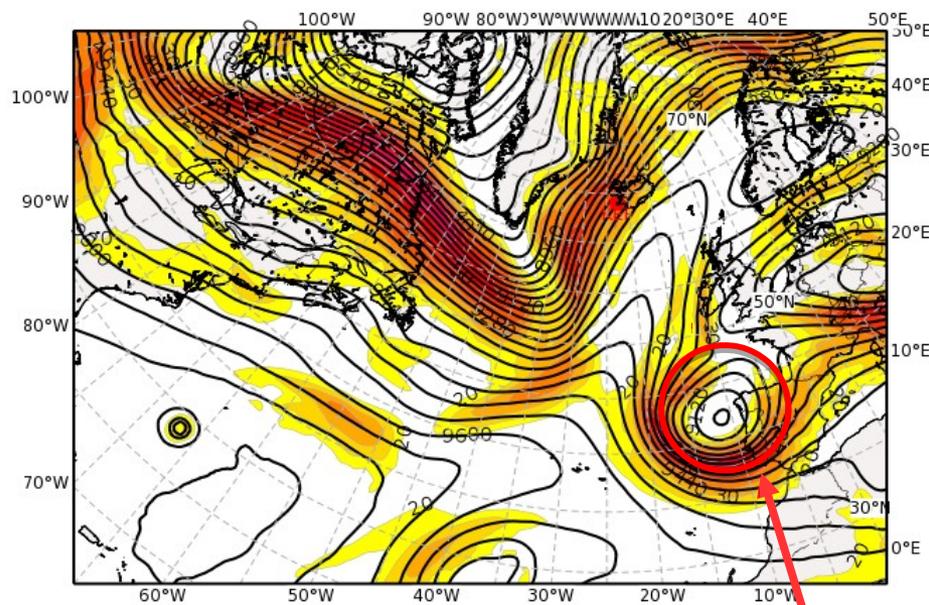
Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Wed, 12 Oct 2016, 12 UTC (step 060 h from Mon, 10 Oct 2016, 00 UTC)



TC Nicole

Downstream cyclone

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Wed, 12 Oct 2016, 12 UTC (step 060 h from Mon, 10 Oct 2016, 00 UTC)



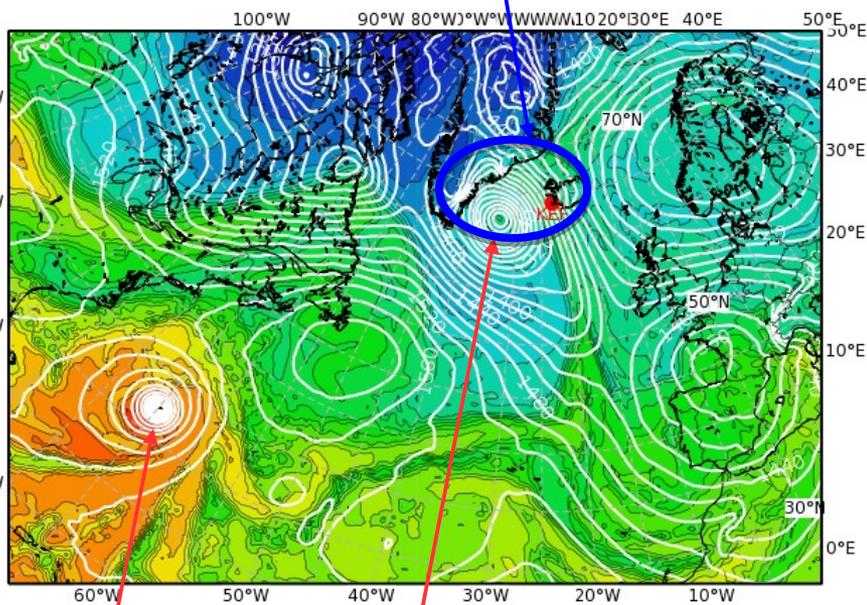
Cut-off "Sanchez"



High cloud cover for
radiometer comparison

Strong precipitation over Iceland and Southeast Greenland

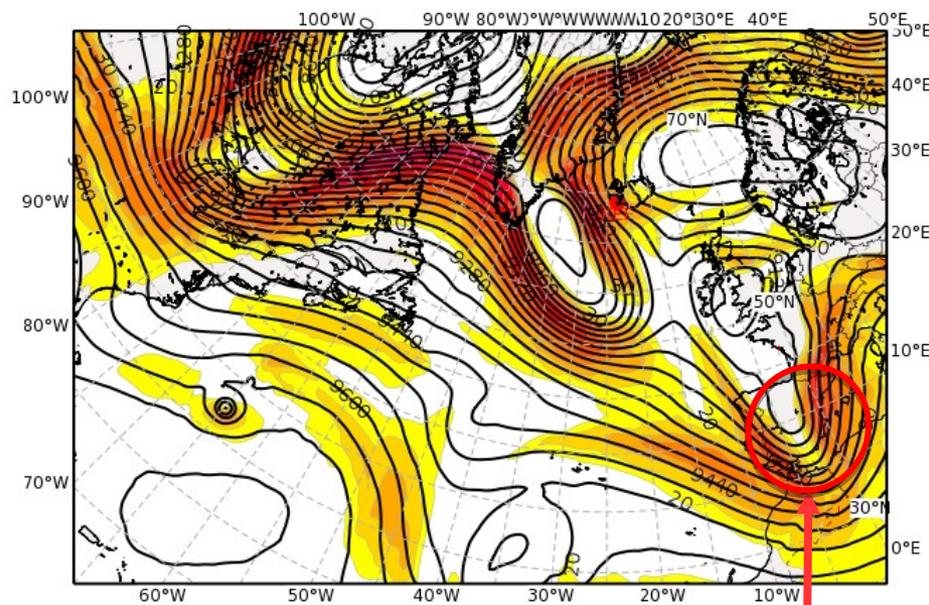
Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Thu, 13 Oct 2016, 12 UTC (step 084 h from Mon, 10 Oct 2016, 00 UTC)



TC Nicole

Downstream cyclone

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Thu, 13 Oct 2016, 12 UTC (step 084 h from Mon, 10 Oct 2016, 00 UTC)



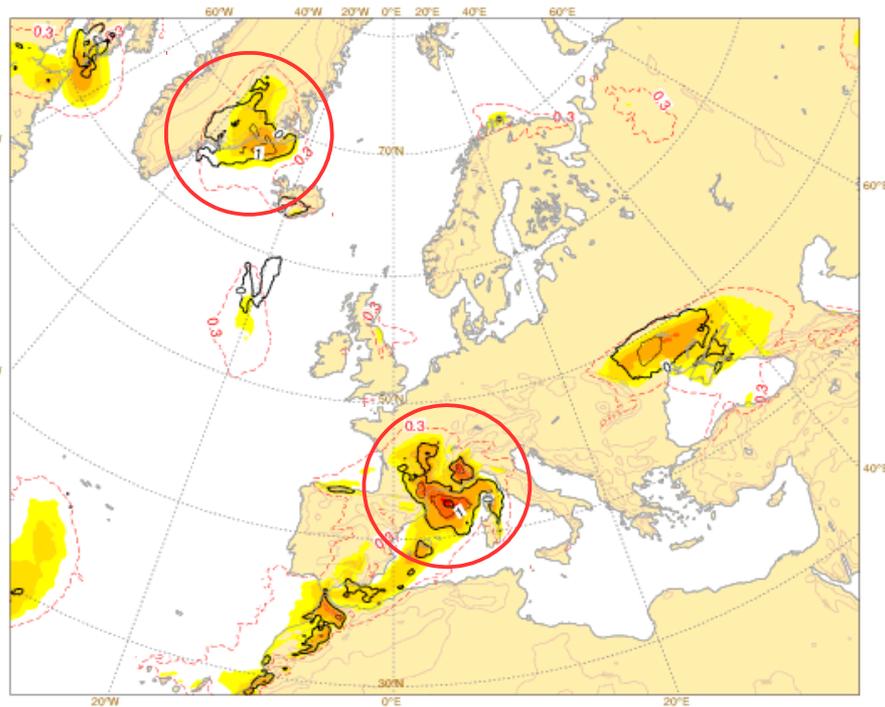
Ex Cut-off "Sanchez"



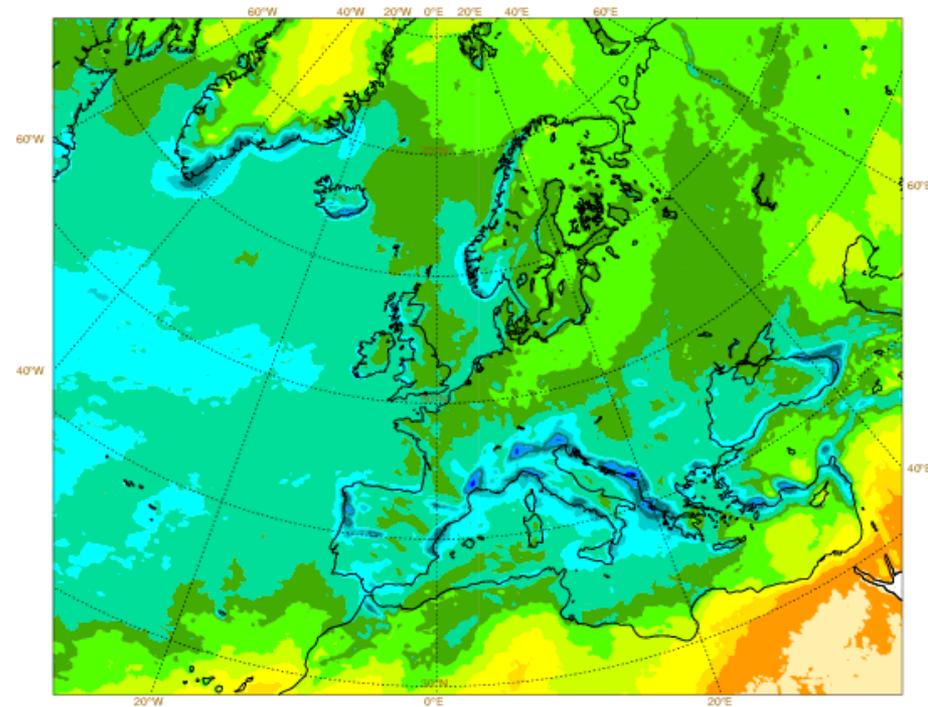
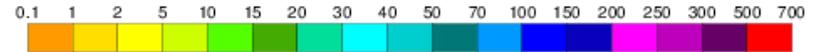
High cloud cover for radiometer comparison

EFI for precipitation on Thu, 13 Oct

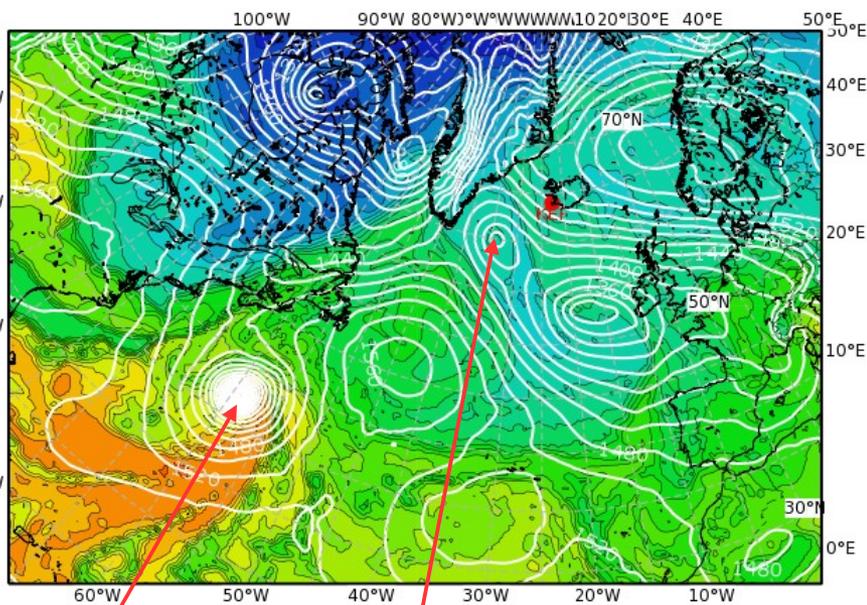
Mon 10 Oct 2016 00UTC ©ECMWF t+72-96h VT: Thu 13 Oct 2016 00UTC - Fri 14 Oct 2016 00UTC
Extreme forecast index and Shift of Tails (black contours 0,1,2,5,8) for total precipitation



Thu 06 Oct 2016 00UTC ©ECMWF VT: Thu 13 Oct 2016 00UTC - Fri 14 Oct 2016 00UTC 72-96h
total precipitation (in mm) Model climate Q99 (one in 100 occasions realises more than value shown)



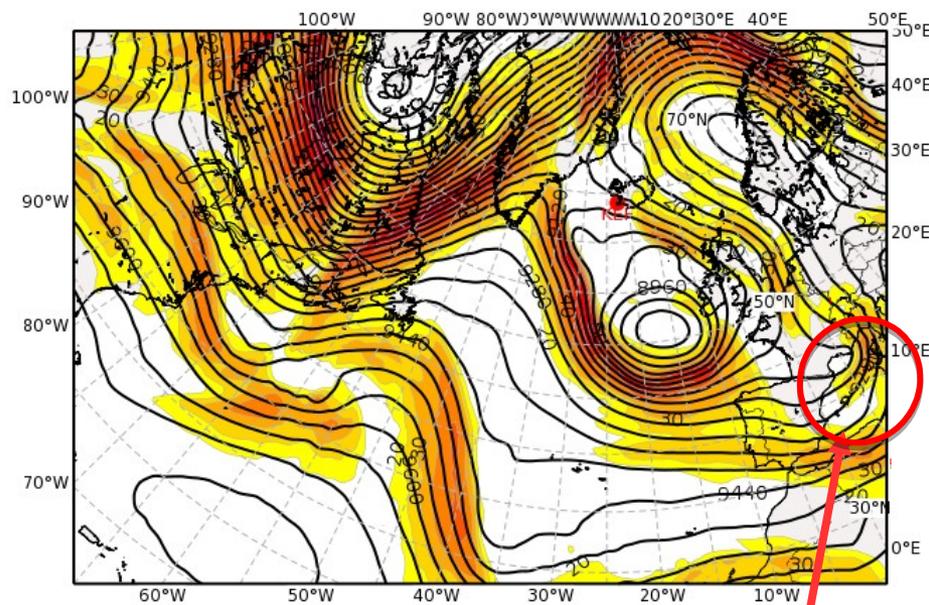
Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Fri, 14 Oct 2016, 12 UTC (step 108 h from Mon, 10 Oct 2016, 00 UTC)



TC Nicole

Downstream cyclone

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Fri, 14 Oct 2016, 12 UTC (step 108 h from Mon, 10 Oct 2016, 00 UTC)

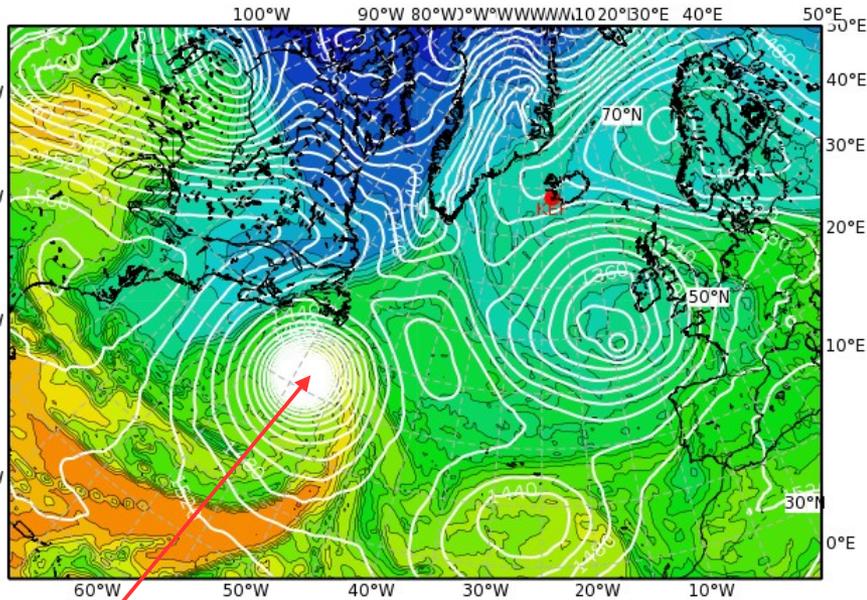


Ex Cut-off "Sanchez"

Forecast for Sat, 15 Oct 2016 12 UTC

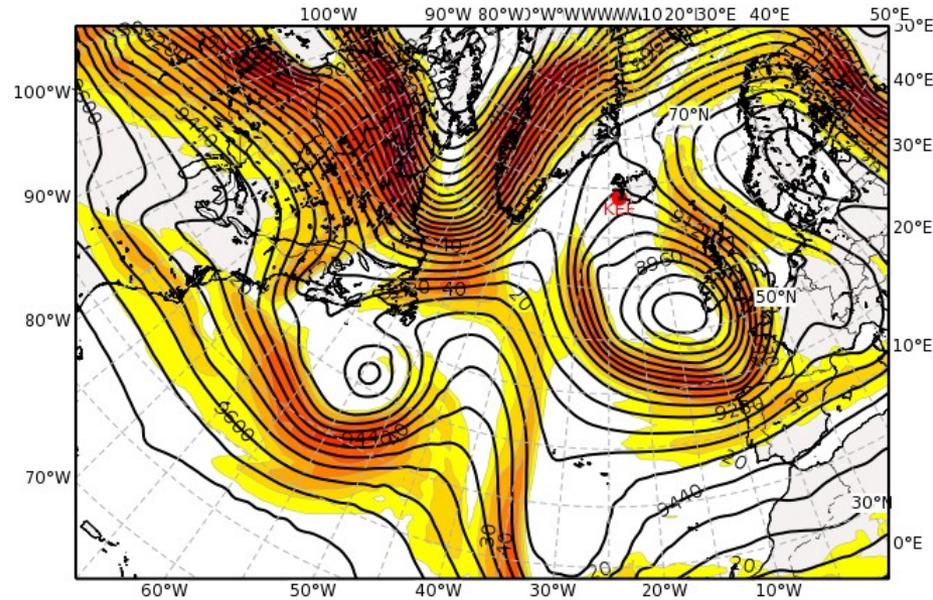
THE850, Z300 BT09/00Z

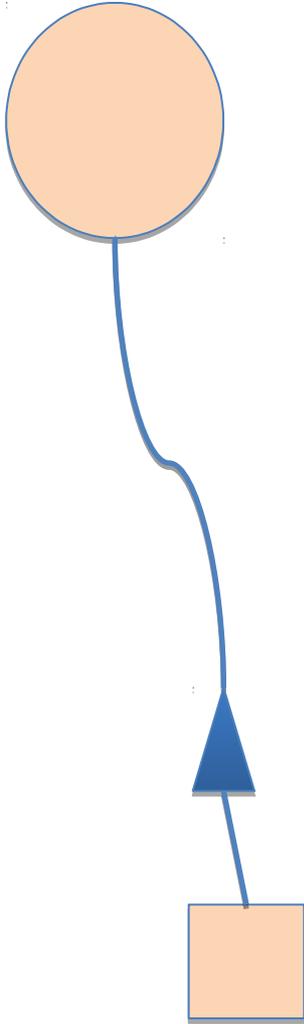
Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Sat, 15 Oct 2016, 12 UTC (step 132 h from Mon, 10 Oct 2016, 00 UTC)



TC Nicole

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Sat, 15 Oct 2016, 12 UTC (step 132 h from Mon, 10 Oct 2016, 00 UTC)



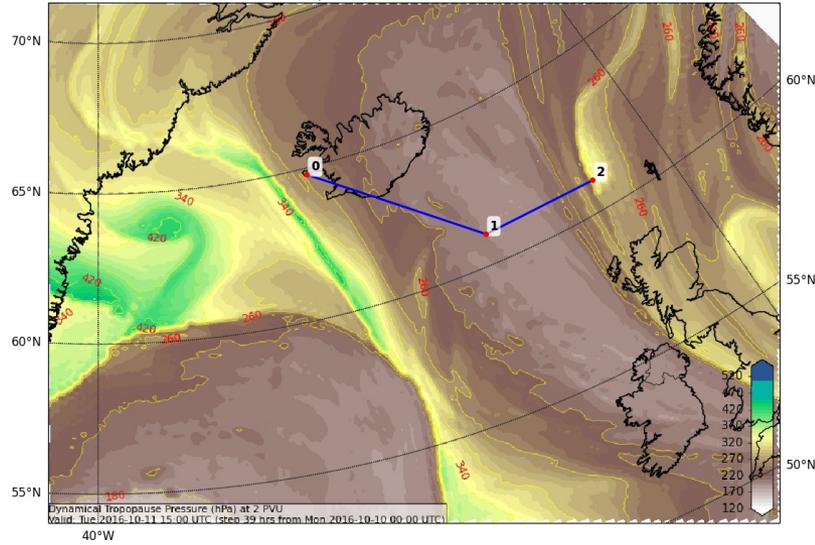


Update Radiosounding

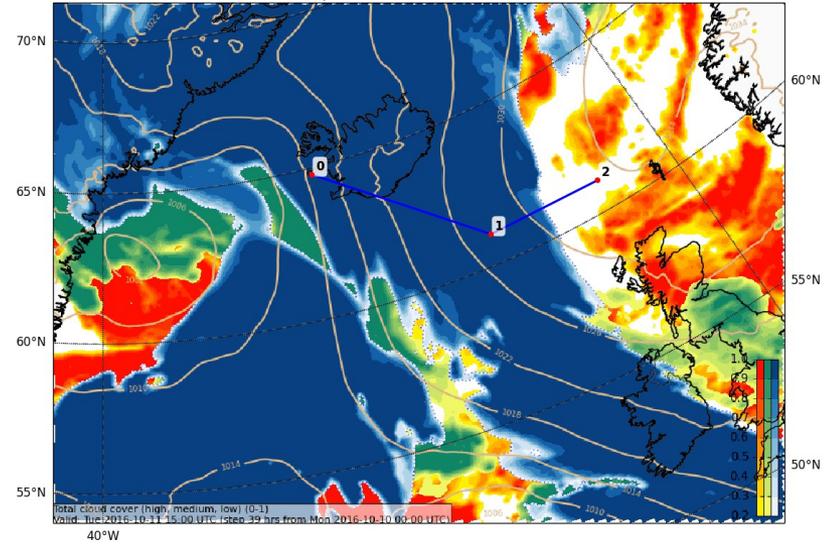
Requested to 8 OCT: 185 (EUMETNET)
Launched to 8 OCT: 123 (EUMETNET)
+28 requested since then

CLOUD FORECASTS TUE

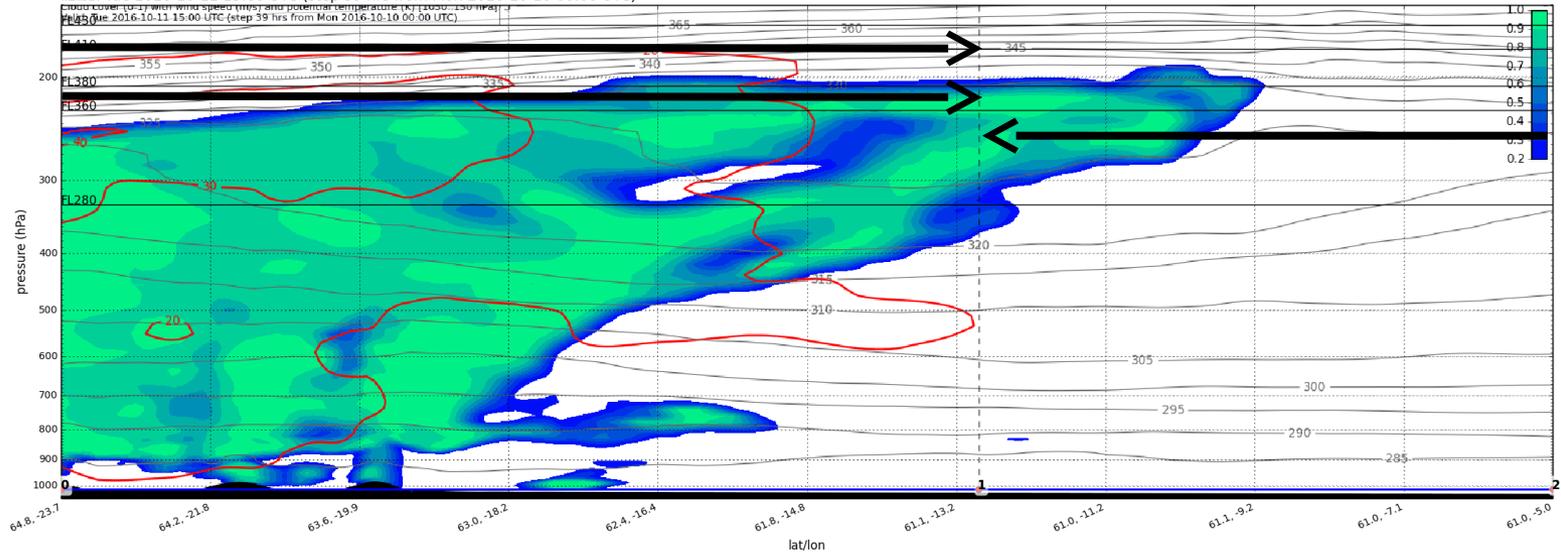
Dynamical Tropopause (Pressure (hPa) at 2000 (10^{-3} PVU)
Valid: Tue 2016-10-11 15:00 UTC (step 39 hrs from Mon 2016-10-10 00:00 UTC)



Cloud Cover (0-1) (Total Cloud Cover)
Valid: Tue 2016-10-11 15:00 UTC (step 39 hrs from Mon 2016-10-10 00:00 UTC)



Cloud Cover (0-1) and Wind Speed (m/s) Vertical Section
Valid: Tue 2016-10-11 15:00 UTC (step 39 hrs from Mon 2016-10-10 00:00 UTC)

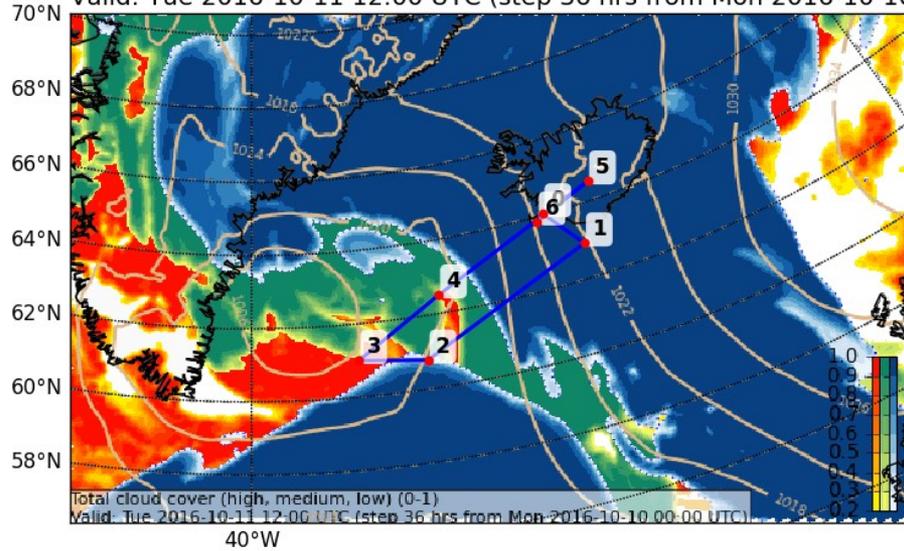


TUESDAY FLIGHT PLANS

Tue 11 12Z – DLR Falcon Plan

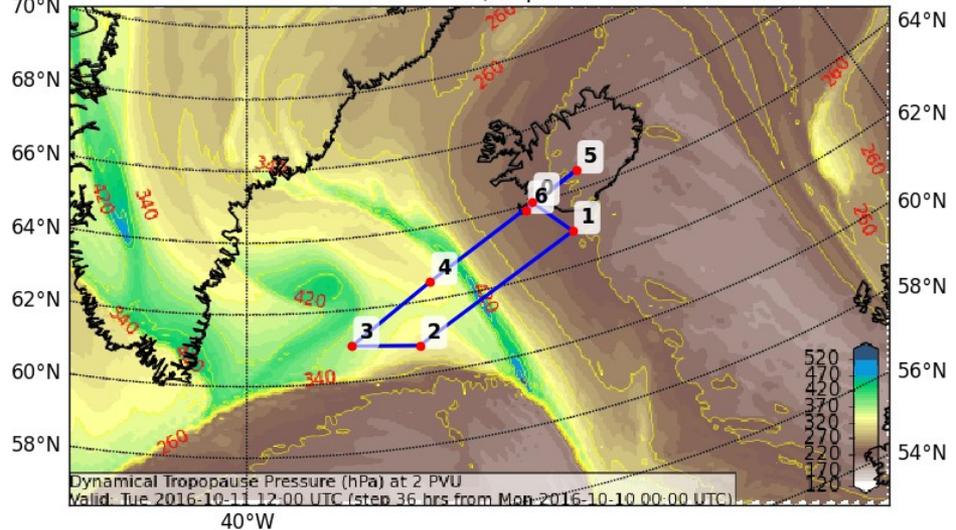
Cloud Cover (0-1) (Total Cloud Cover)

Valid: Tue 2016-10-11 12:00 UTC (step 36 hrs from Mon 2016-10-10 00:00 UTC)



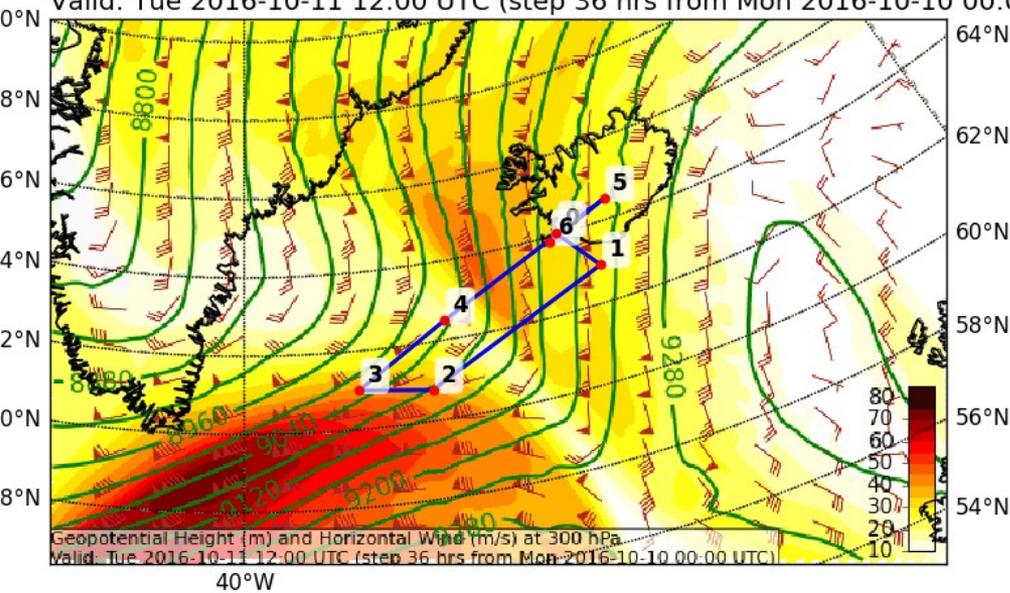
Dynamical Tropopause (Pressure (hPa)) at 2000 (10^{-3} PVU)

Valid: Tue 2016-10-11 12:00 UTC (step 36 hrs from Mon 2016-10-10 00:00 UTC)



Geopotential Height (m) and Horizontal Wind (m/s) (wind speed 1)

Valid: Tue 2016-10-11 12:00 UTC (step 36 hrs from Mon 2016-10-10 00:00 UTC)

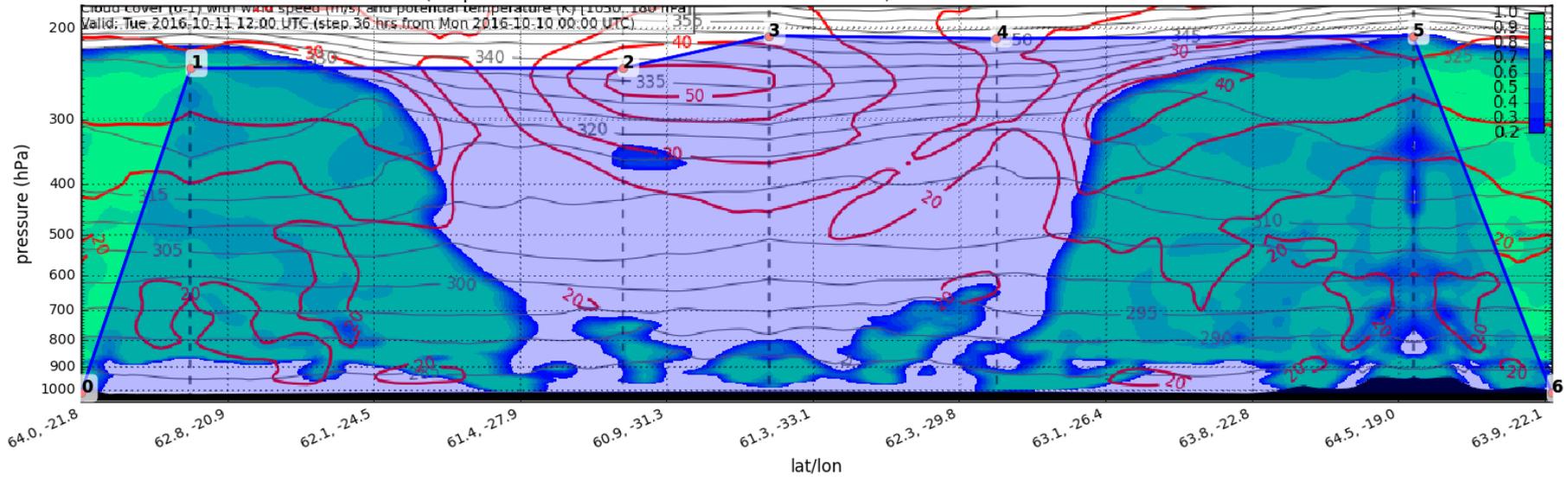


Coordinated leg with SAFIRE on the way to Keflavik (from point 3 or 4)

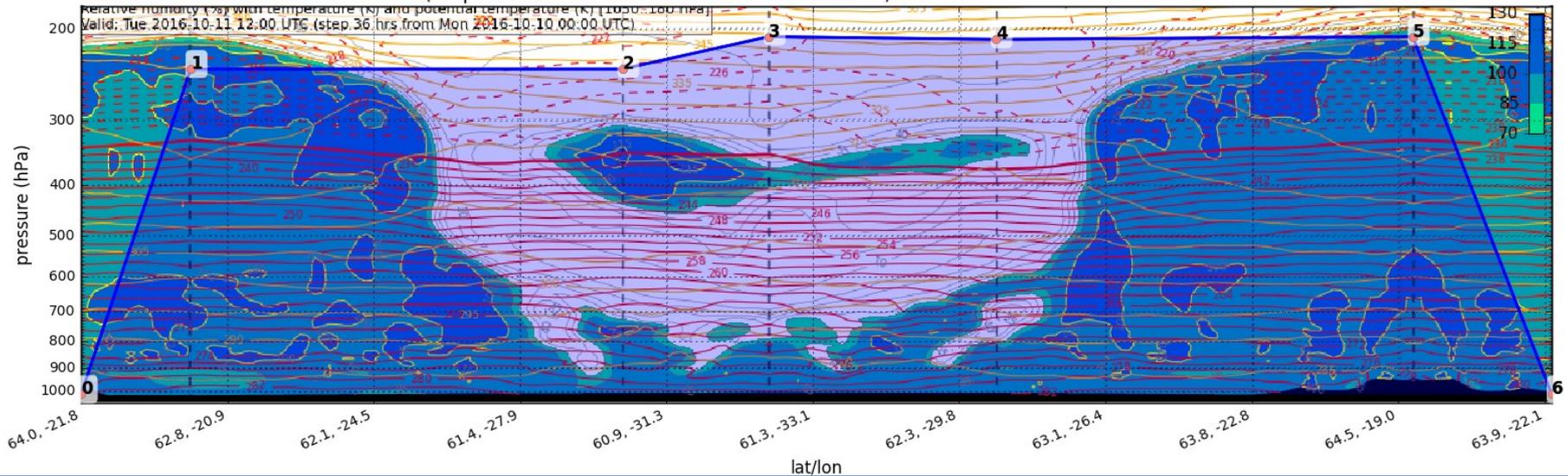
TAKE-OFF: ~around 10:30am
LENGTH: ~2000km
FLIGHT TIME: ~3h

Tue 11 12Z – DLR Falcon Plan

Cloud Cover (0-1) and Wind Speed (m/s) Vertical Section
Valid: Tue 2016-10-11 12:00 UTC (step 36 hrs from Mon 2016-10-10 00:00 UTC)



Relative Humidity (%) Vertical Section
Valid: Tue 2016-10-11 12:00 UTC (step 36 hrs from Mon 2016-10-10 00:00 UTC)



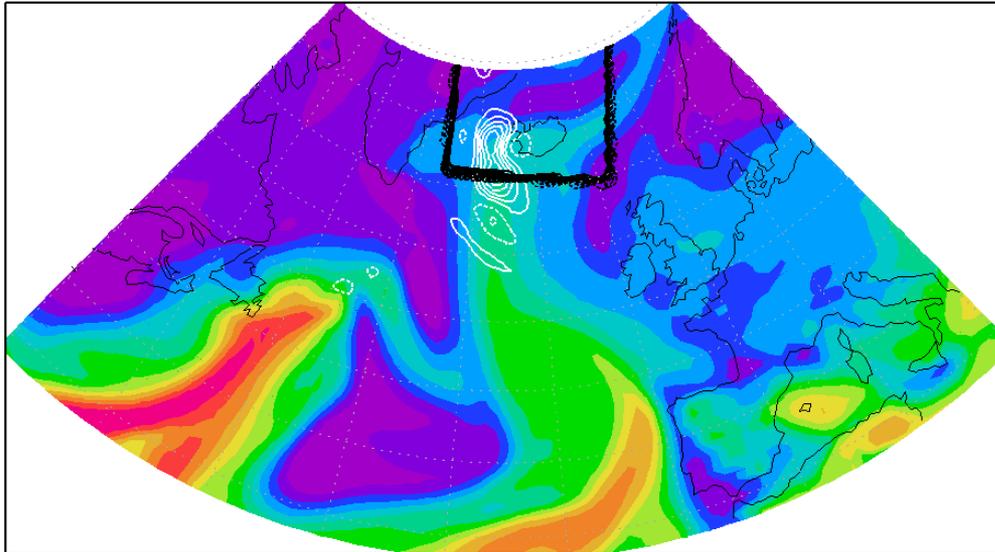
COAMPS Sensitivity (24h) Valid 12Z 11 Oct (Tuesday)

Box centered on Iceland (precipitation)

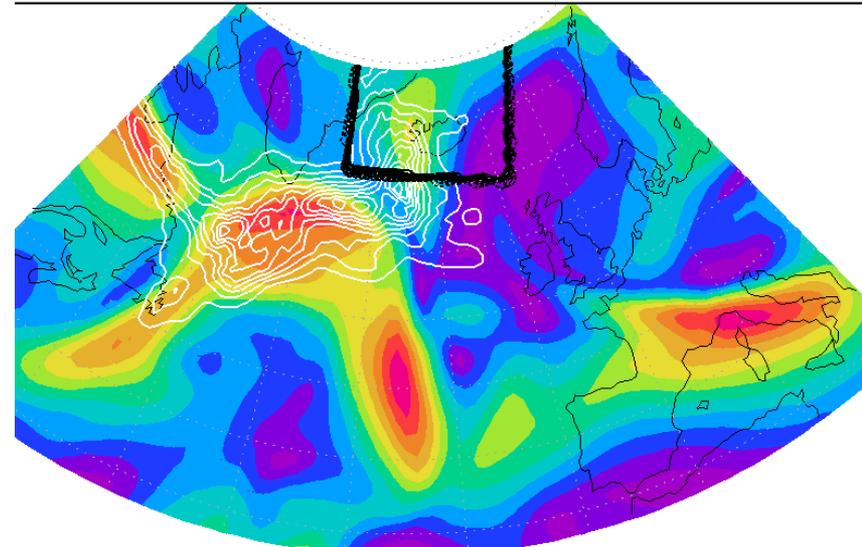
850-hPa q sensitivity (contour), and q

Integrated PV sensitivity (contours),
300-hPa winds(shaded)

850 WMAP, Q sensitivity, 12z11oct



300 wind speed, integrated PV sensitivity, 12z11oct



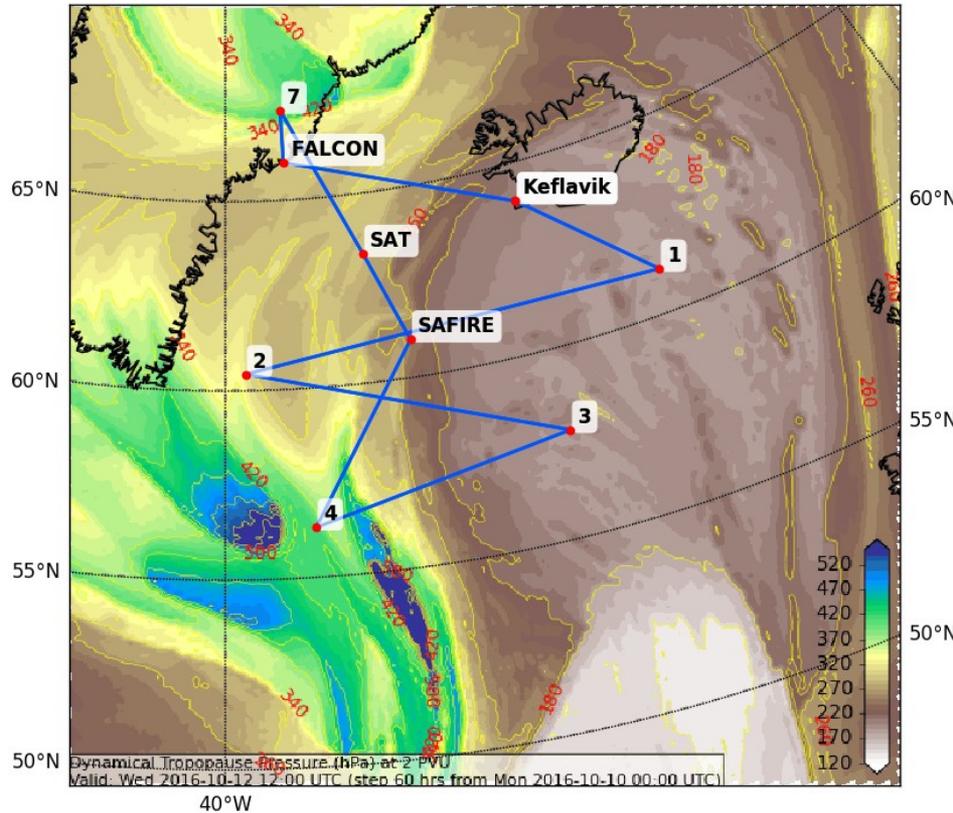
- **Box is located over Iceland and the metric is rainfall at the 24 h time (12Z on 11 Oct)**
- **Maximum moisture sensitivity along ascending moist plume**
- **PV sensitivity along ascent region and further upstream**

Wednesday October 12th

HALO flight

Wednesday October 12th HALO Flight 10:00 – 17:00 UTC

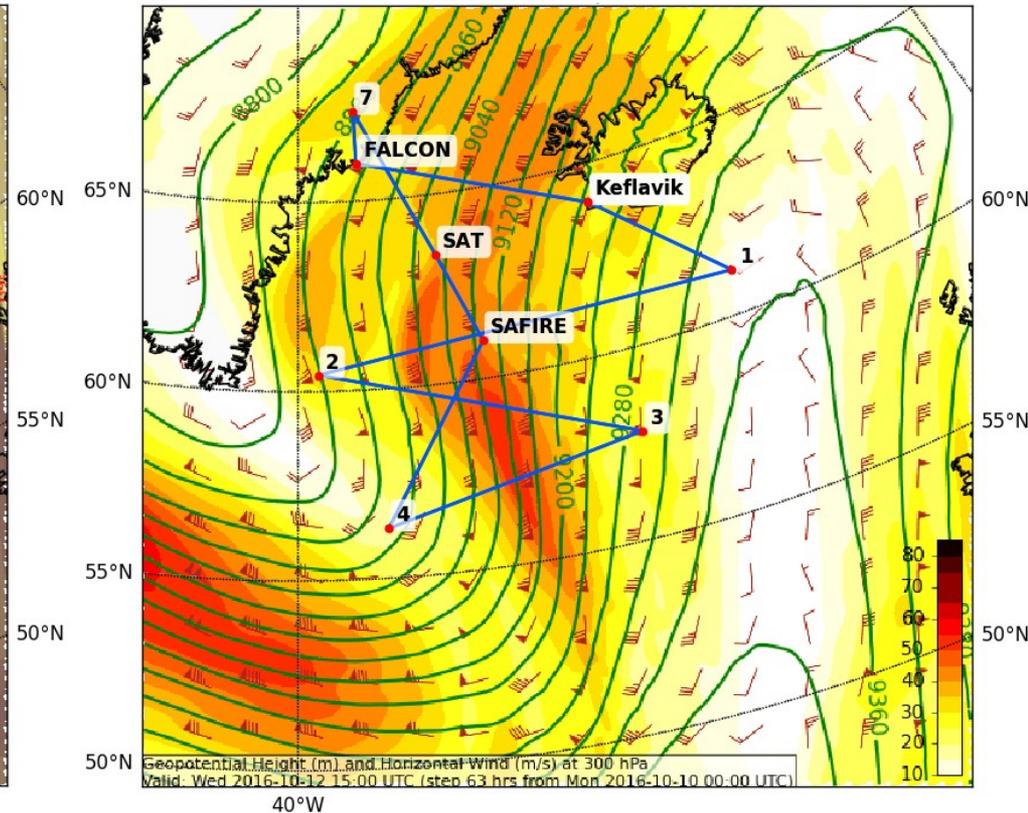
P (hPa) at 2 PVU



BT10/00Z VT12/12Z

- WCB outflow & ascent (1-4)
- WCB ascent (4-5)
- Coordinated leg with SAFIRE (5-7)

Geopot (m) & Hor Wind (m s⁻¹) at 300 hPa



BT10/00Z VT12/15Z

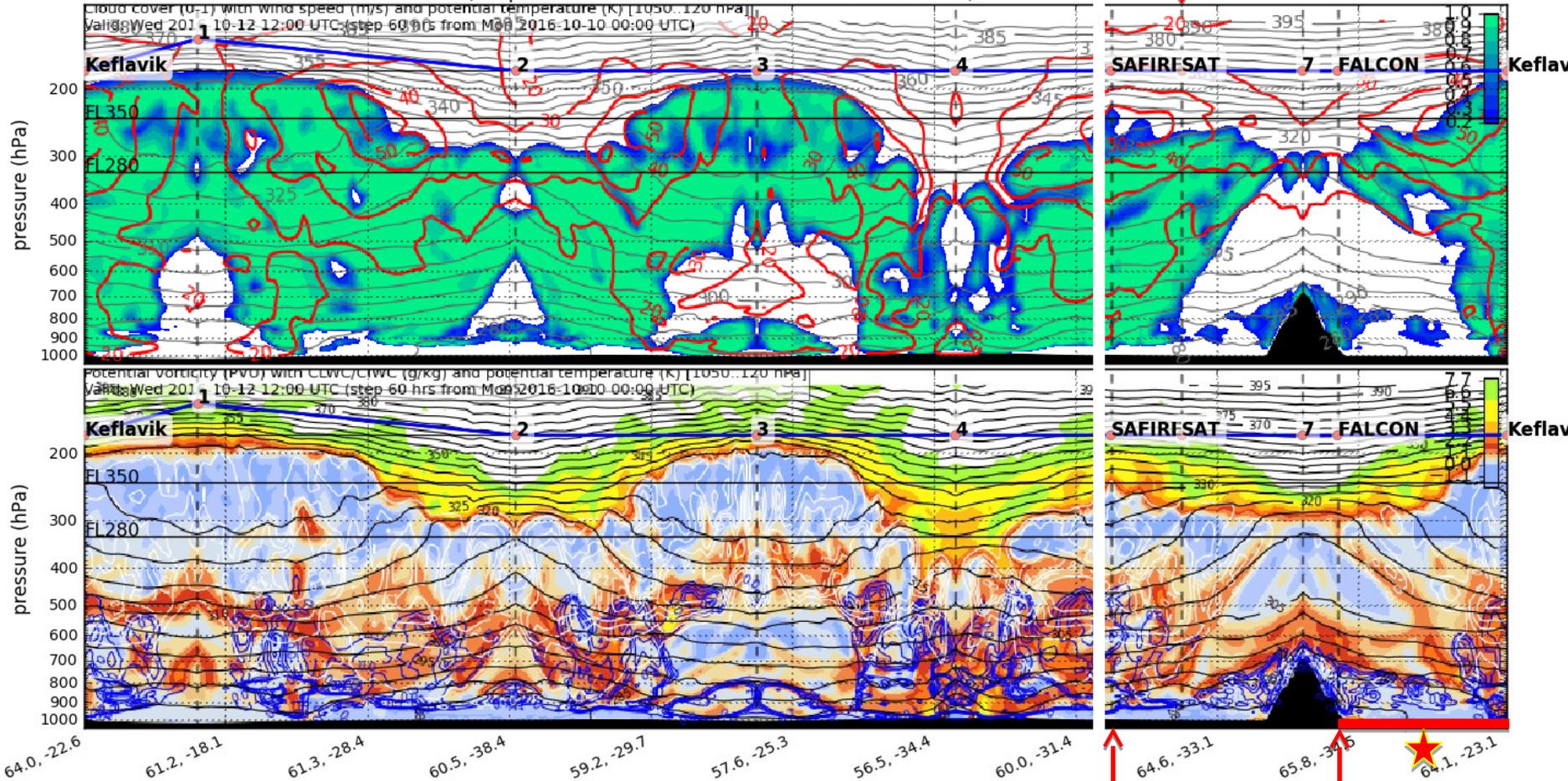
- SAT overpass at 14:45
- Coordinated leg with FALCON (8-9)
- Across Jet (8-9)

Wednesday October 12th HALO Flight 10:00 – 17:00 UTC

BT10/00Z VT12/12Z

Cloud Cover (0-1) and Wind Speed (m/s) Vertical Section

Valid: Wed 2016-10-12 12:00 UTC (step 60 hrs from Mon 2016-10-10 00:00 UTC)



Distance: 5600 km – 3060 nml

+ SAFIRE + FALCON

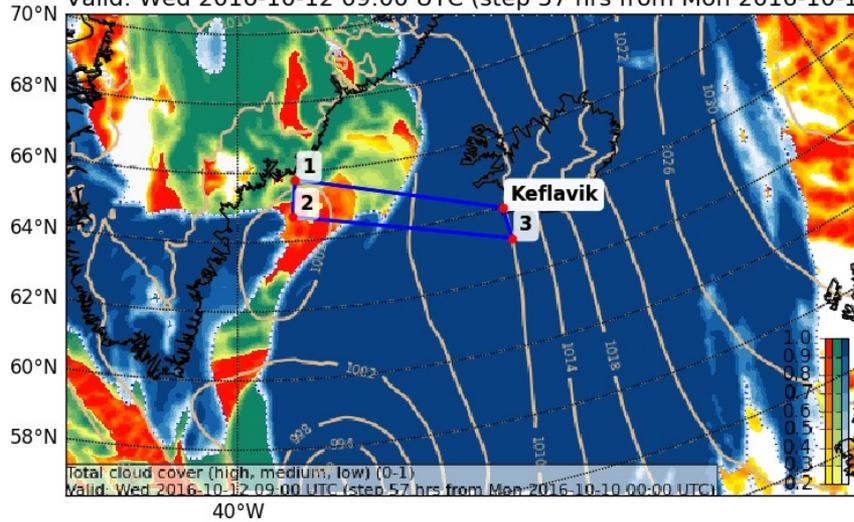
Wednesday October 12th

FALCON flight

Wed 12 09Z – DLR Falcon Plan

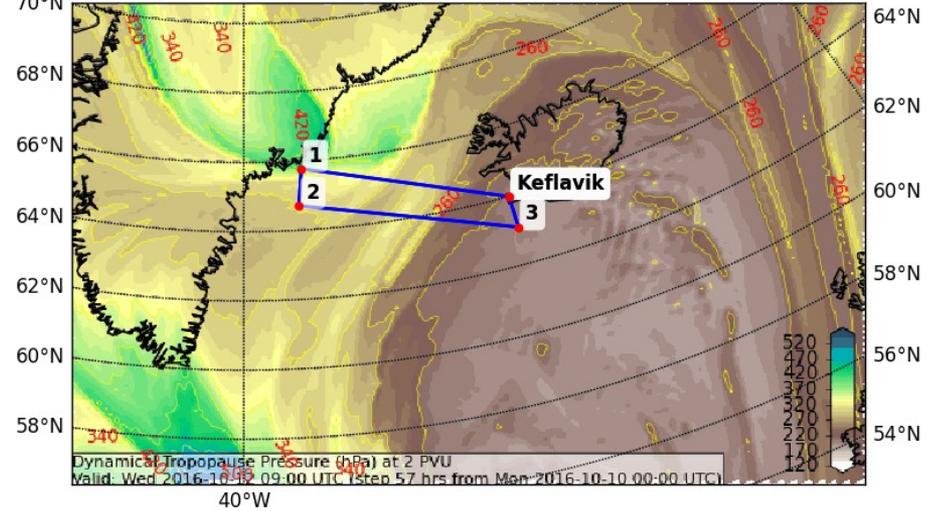
Cloud Cover (0-1) (Total Cloud Cover)

Valid: Wed 2016-10-12 09:00 UTC (step 57 hrs from Mon 2016-10-10 00:00 UTC)



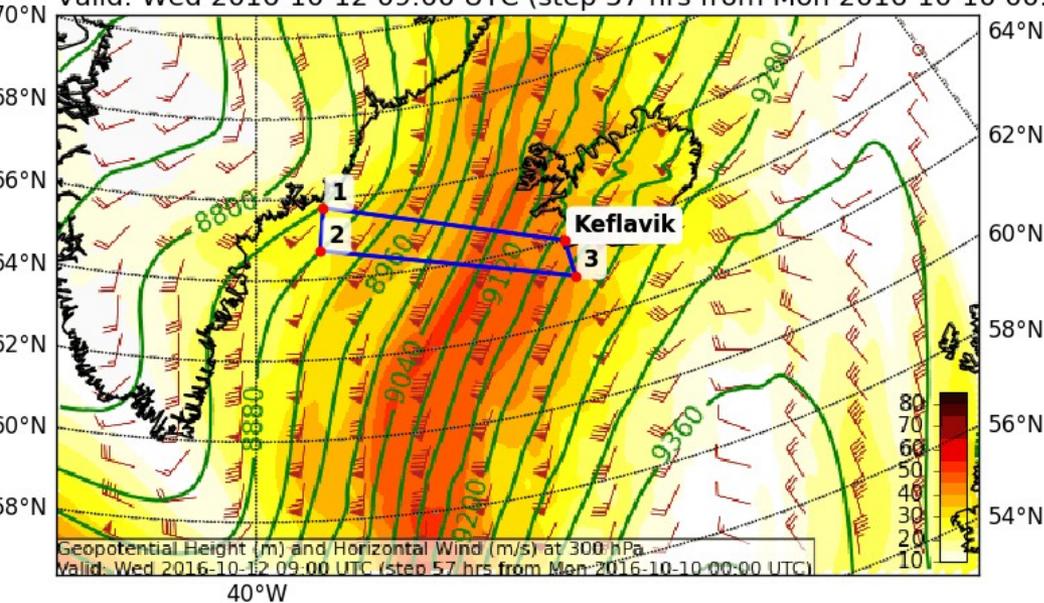
Dynamical Tropopause (Pressure (hPa)) at 2000 (10^{-3} PVU)

Valid: Wed 2016-10-12 09:00 UTC (step 57 hrs from Mon 2016-10-10 00:00 UTC)



Geopotential Height (m) and Horizontal Wind (m/s) (wind speed 10-85 m/s) at 300 (m/s)

Valid: Wed 2016-10-12 09:00 UTC (step 57 hrs from Mon 2016-10-10 00:00 UTC)



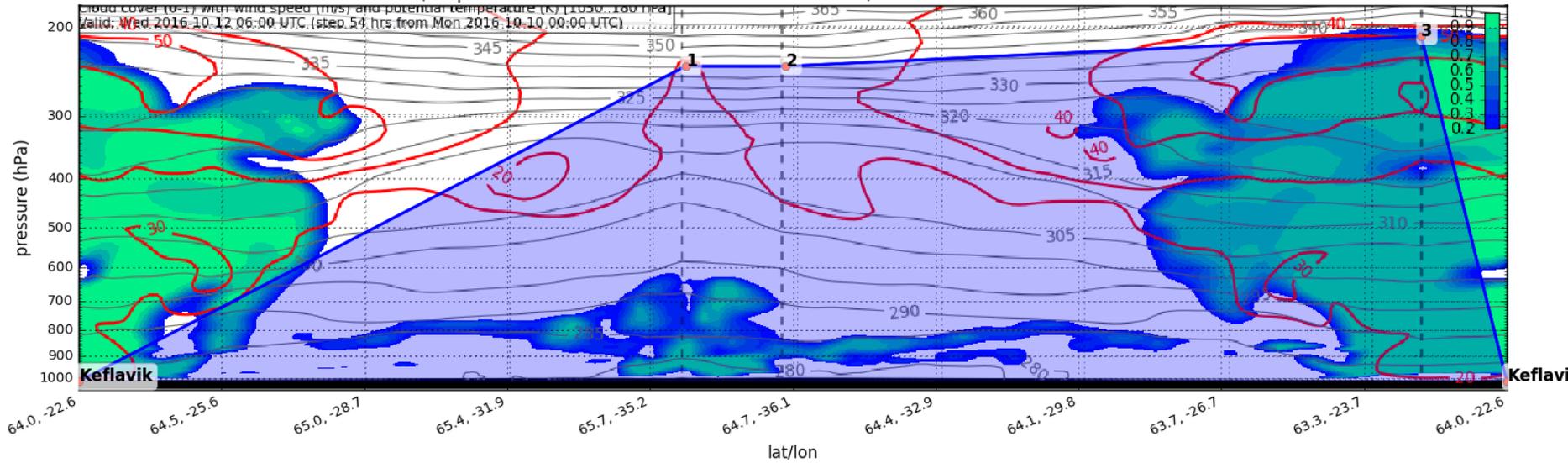
New forecast, now stronger jet west of Iceland and WCB outflow.

Possible coordination with HALO up to point 1.

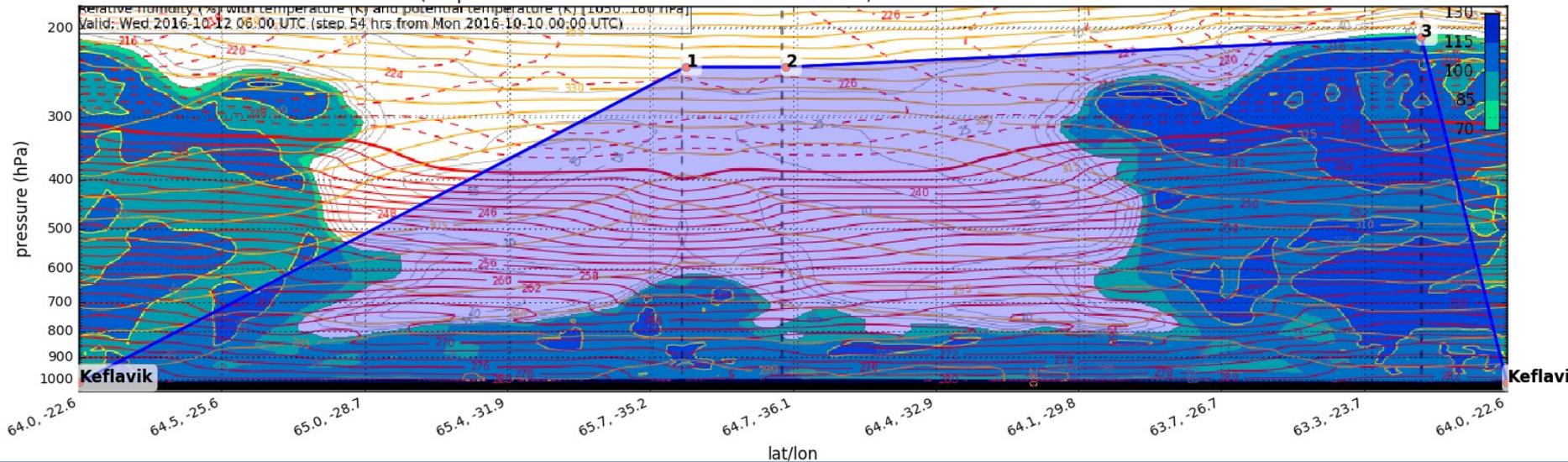
Strong winds at airport?

Wed 12 09Z – DLR Falcon Plan

Cloud Cover (0-1) and Wind Speed (m/s) Vertical Section
Valid: Wed 2016-10-12 06:00 UTC (step 54 hrs from Mon 2016-10-10 00:00 UTC)



Relative Humidity (%) Vertical Section
Valid: Wed 2016-10-12 06:00 UTC (step 54 hrs from Mon 2016-10-10 00:00 UTC)



Flight-patterns A2D Windscan

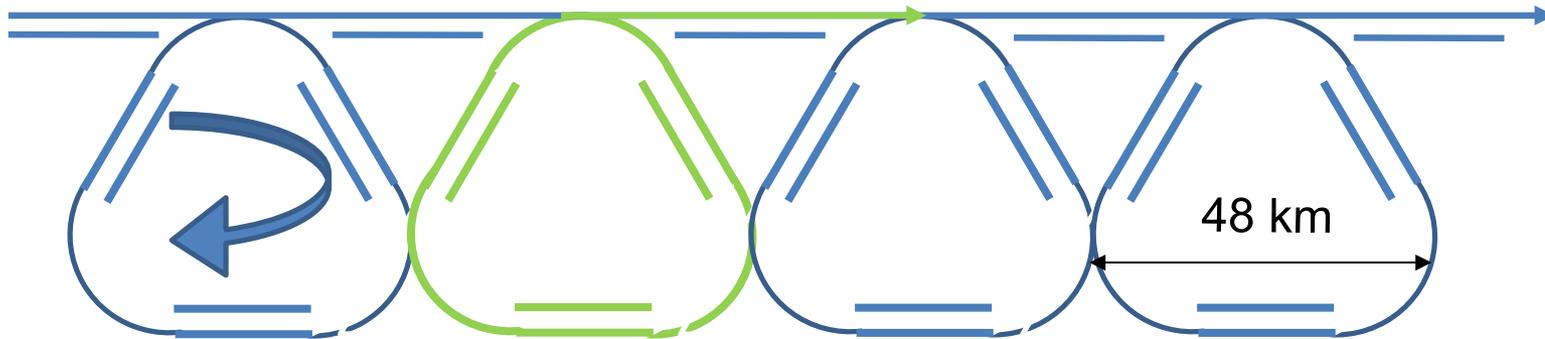
18 – 20 km straight (90 s. 5 Observations)

20° curves (12 km radius)

- Turns 20° right and straight:

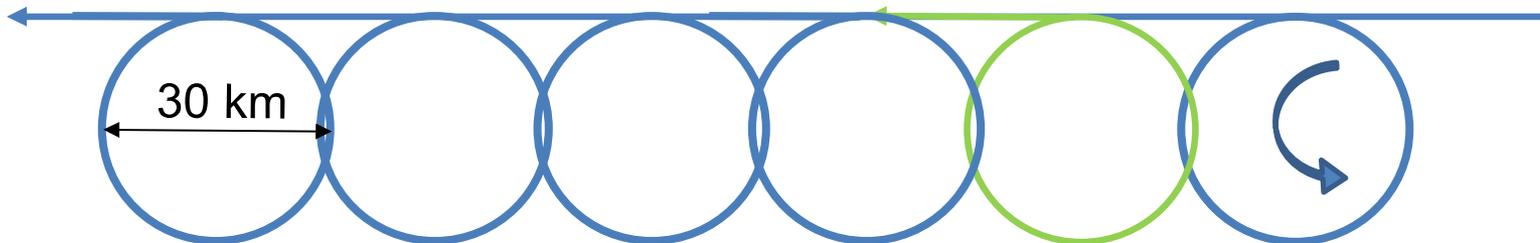
45 km Box. 35 km maximum wind profile separation

130 km total per scan (~ 11 min)



~ 15 min; 178 km

- Turns 15° left on the way back:



~ 10 min; 120 km



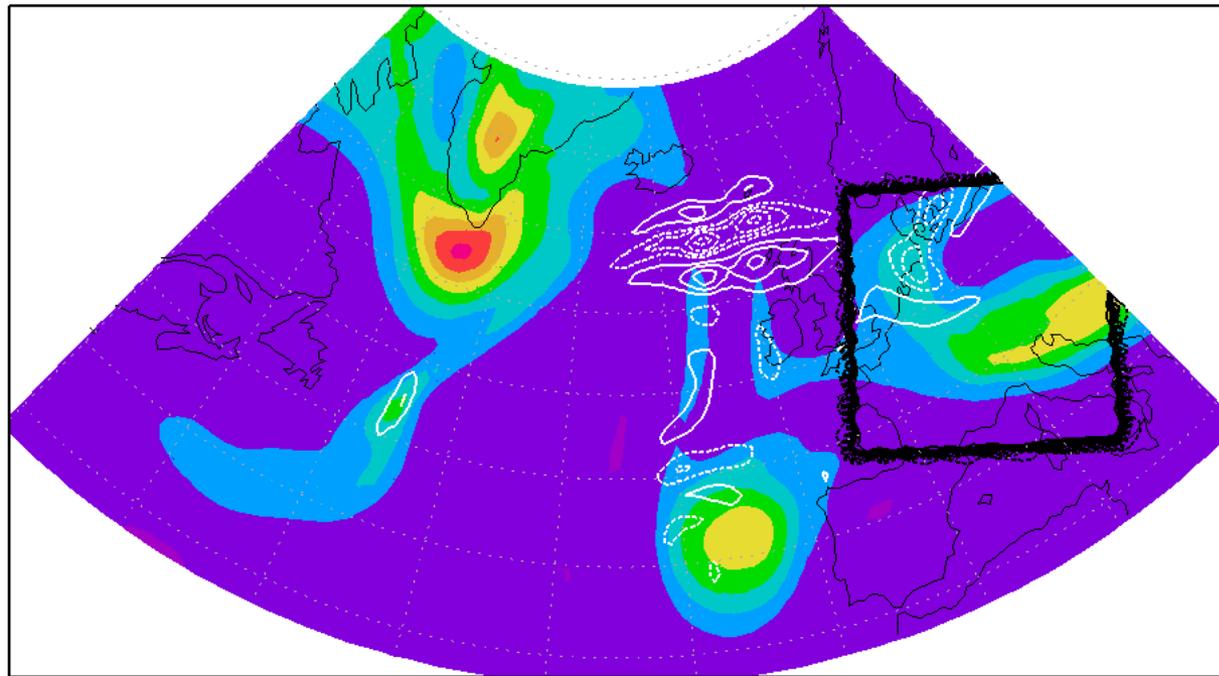
Summary

- HALO flight today, Take-off 12UTC
- Radiometer intercomparison of UK FAAM, Safire Falcon, HALO on Tuesday between Faroes and Scotland (decision now)
- **or** coordinated flights of Safire Falcon/DLR Falcon on Tuesday west of Iceland
- Wednesday: coordinated flights of Safire Falcon/DLR Falcon on Tuesday west of Iceland
- Thursday: last possible day for radiometer intercomparison

COAMPS Sensitivity (24h) Valid 06Z 12 Oct (Wednesday)

Box centered on Iceland (precipitation)
300-hPa PV (color) and PV Sensitivity (contours)

300 PV, PV sensitivity, 06z12oct



- **Box is located over Europe and the metric is rainfall at the 48 h time (06Z on 14 Oct)**
- **Maximum PV sensitivity just south of Iceland and in the cutoff to the south**
- **Moisture sensitivity (not shown) is near cutoff to the south**