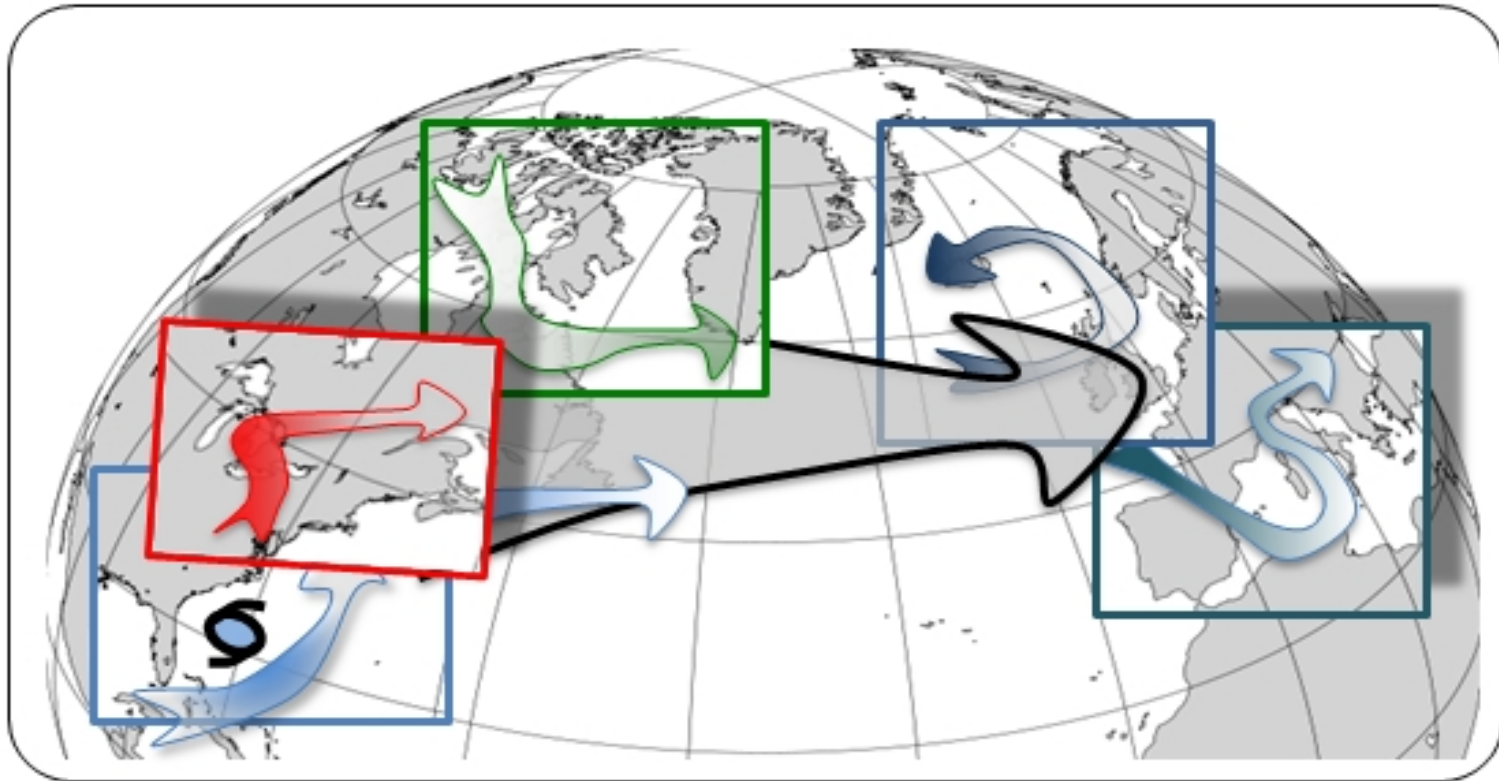


NAWDEx - Weather Discussion

13 October 2016, Keflavik 16 UTC



NAWDEX – Weather Discussion

13 October 2016, Keflavik 16 UTC

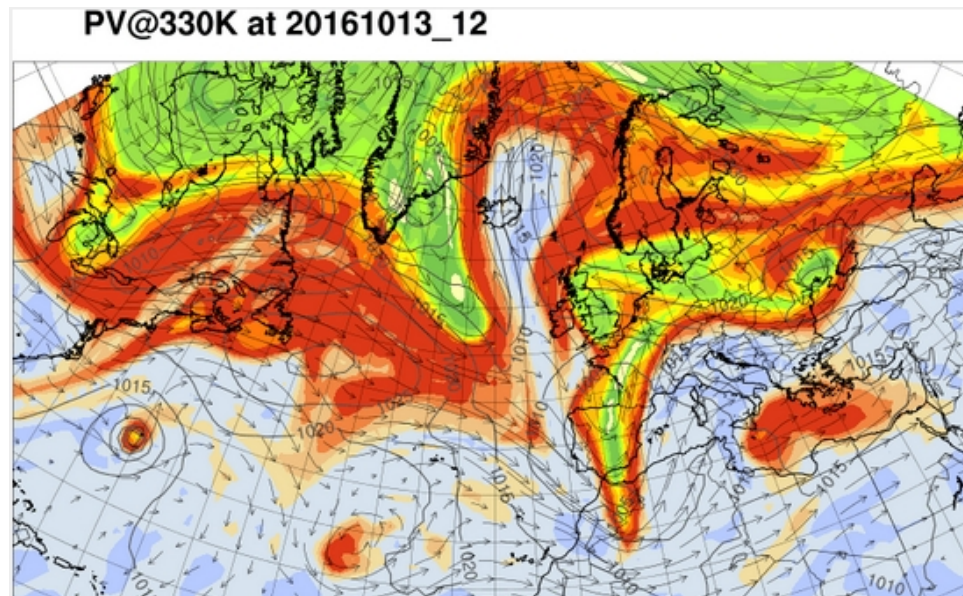
- **Key issues for today:**
- HALO and SAFIRE flights (both FALCON flights are canceled)
- Current synoptic situation and forecast until Monday 17th 00UTC
- Intercomparison flight of UK FAAM, HALO and SAFIRE tomorrow
- Saturday flights: HALO, FALCON (double flight)

Update on today's HALO flight

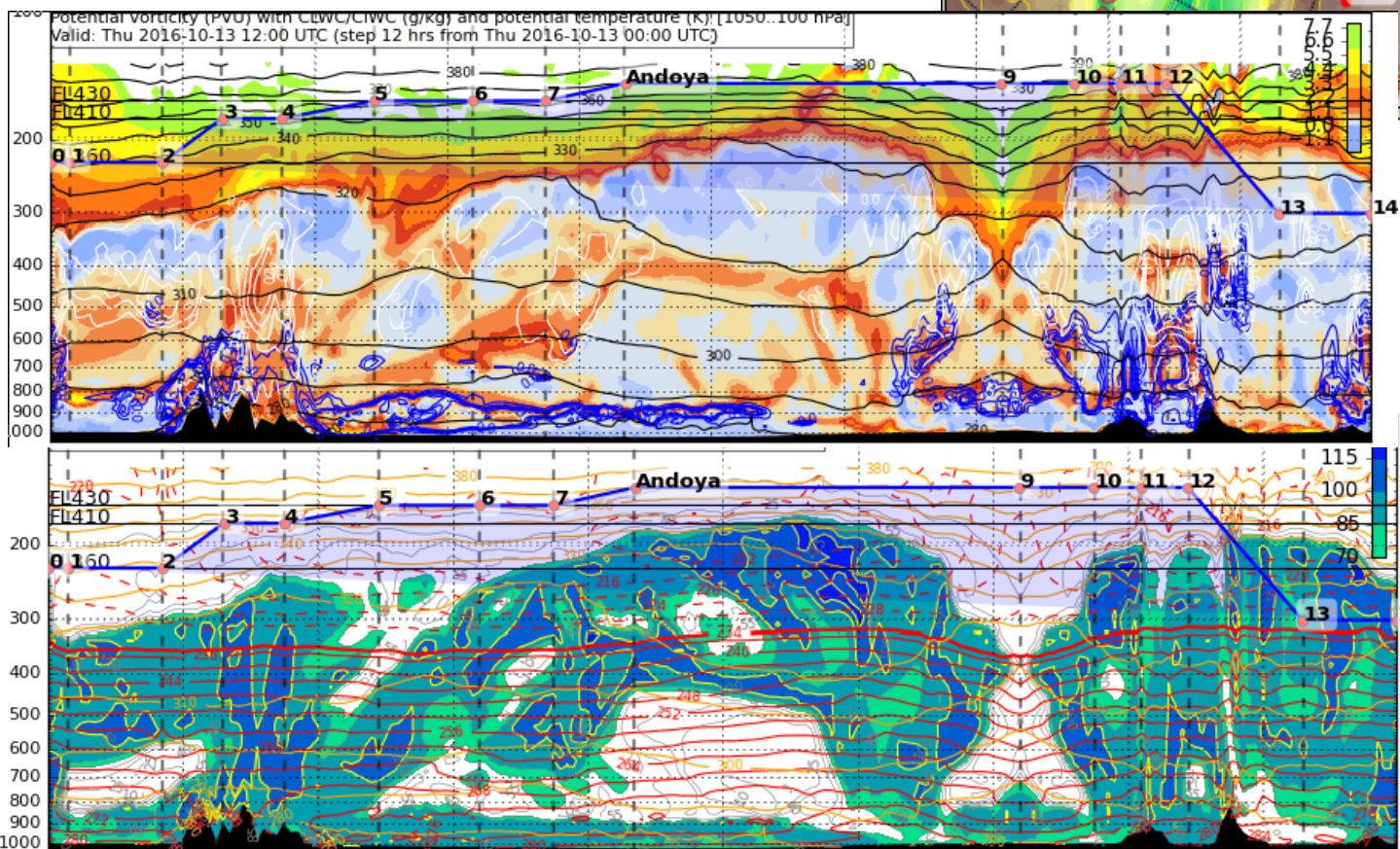
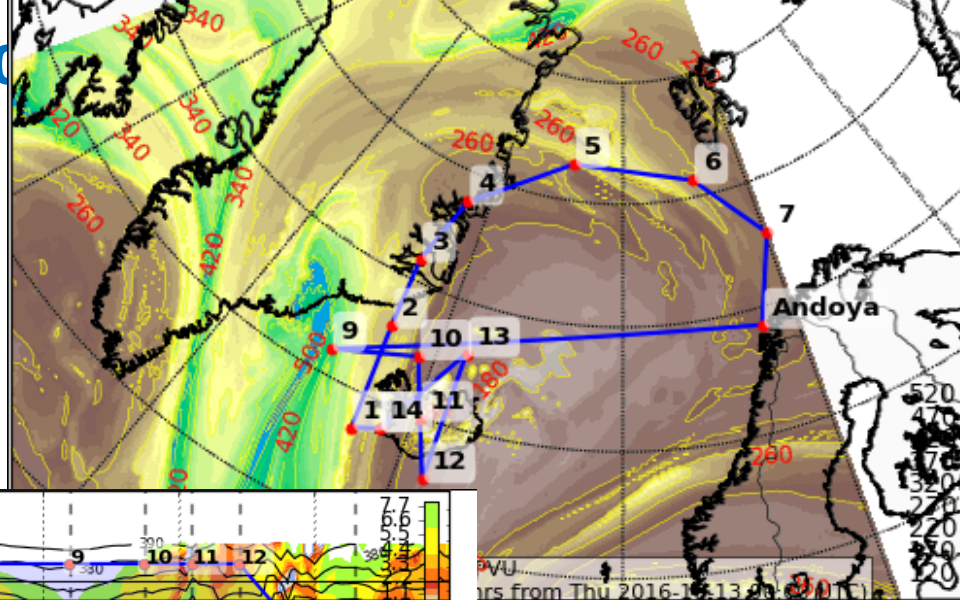
HALO Flight on Thursday 13.10.16: “Iceland-ridge Thor-Peter”

Objectives / features:

- Tropopause structure in ridge (moisture gradient)
- CAT measurement
- WCB outflow
- Satellite underpass (13:50)
- PV gradient measurement (PV-o-meter, with Falocon)
- Overflight of radar station “Andoya”
- Orographic gravity waves over Iceland
- Dropsonde and radiosonde sampling

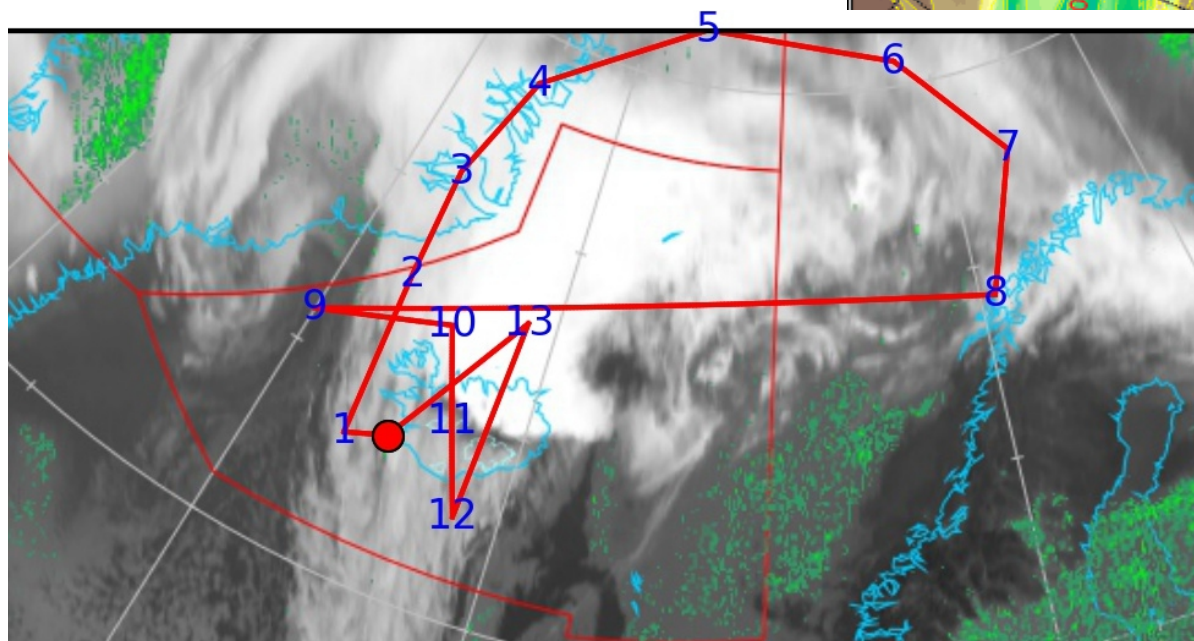
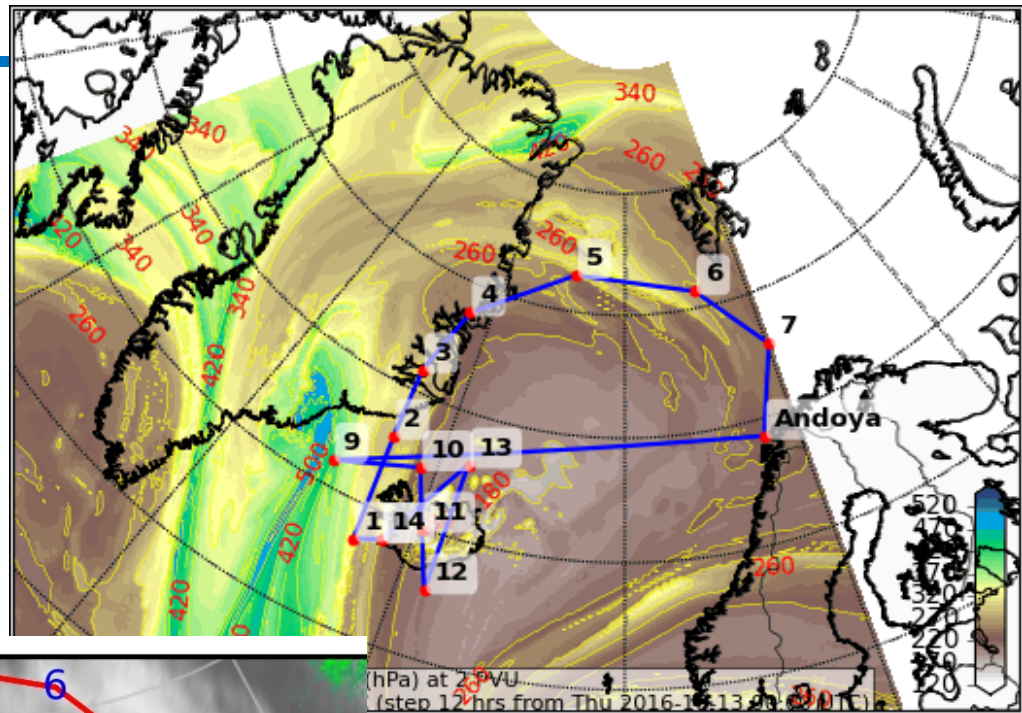


HALO Flight on Thursday 13.10 “Iceland-ridge Thor-Peter”

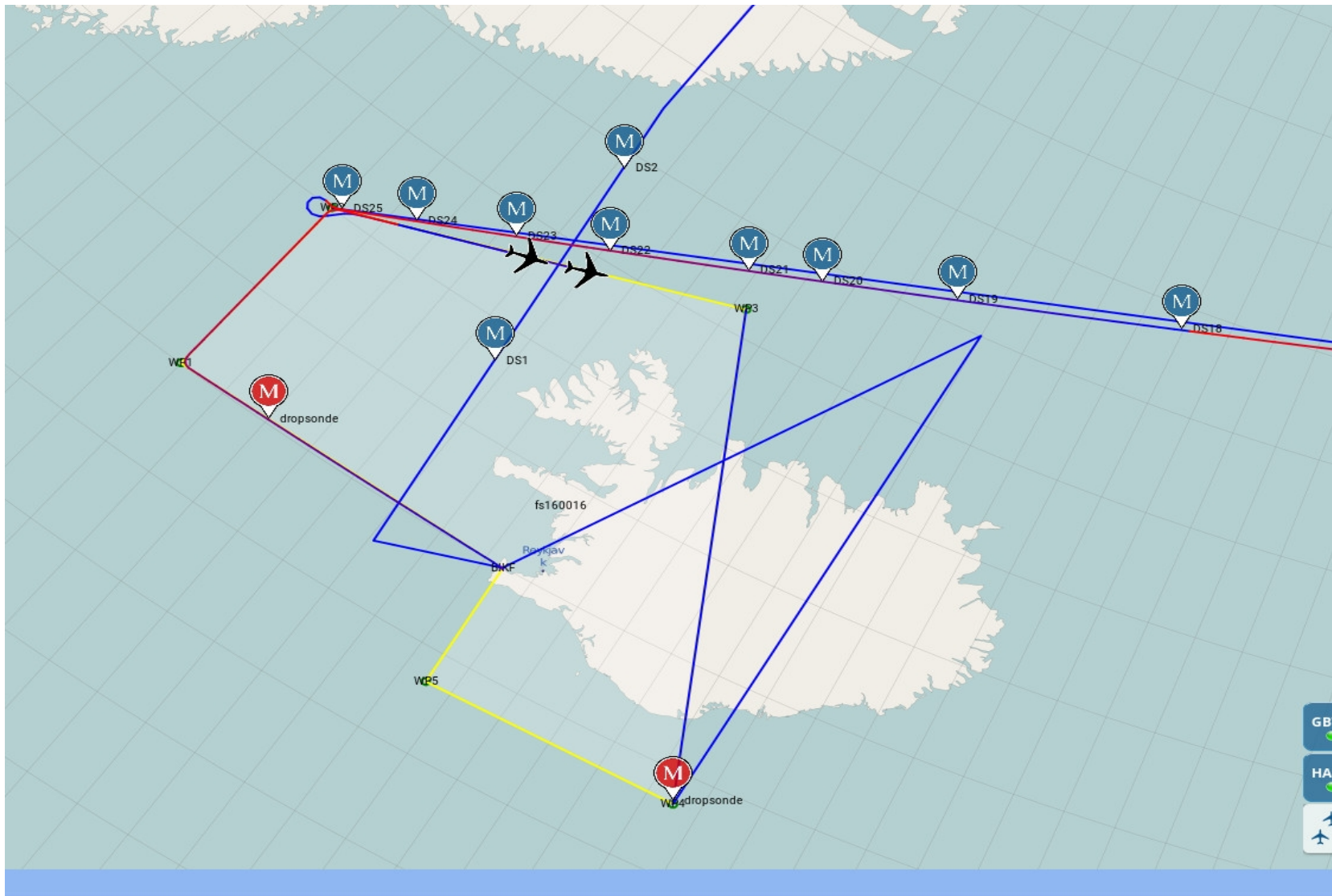


PVO
hrs from Thu 2016-10-13 00:00 UTC

HALO Flight on Thursday 13. “Iceland-ridge Thor-Peter”



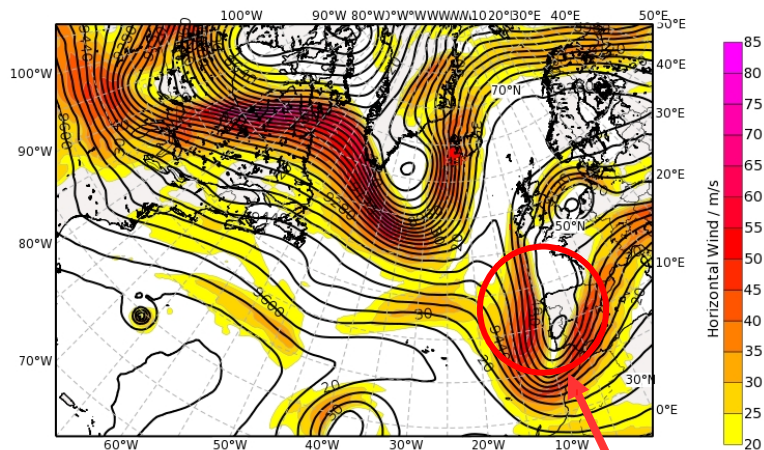
HALO Flight on Thursday 13.10.16: “Iceland-ridge Thor-Peter”



Forecast till Monday 00UTC

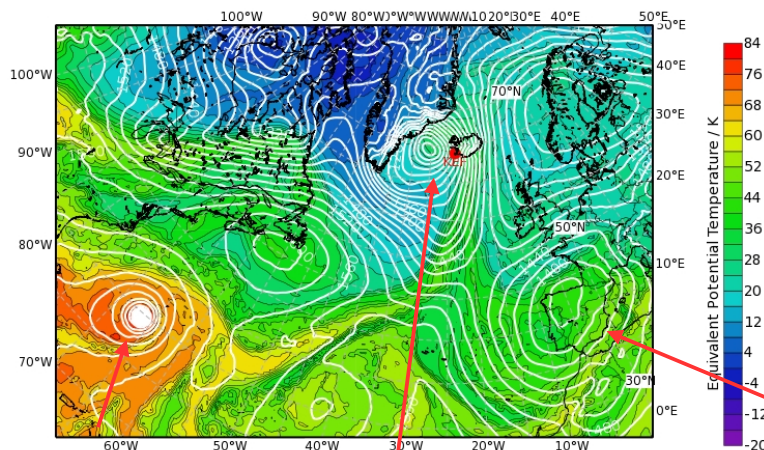
Analysis – 13 Oct 2016, 00 UTC

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Thu, 13 Oct 2016, 00 UTC (step 000 h from Thu, 13 Oct 2016, 00 UTC)



Ex Cut-off "Brigitte"

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Thu, 13 Oct 2016, 00 UTC (step 000 h from Thu, 13 Oct 2016, 00 UTC)

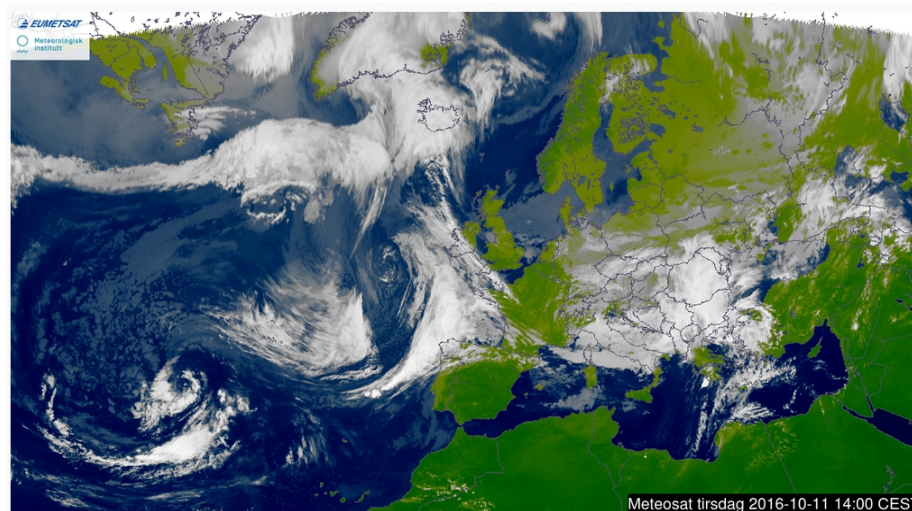


TC Nicole

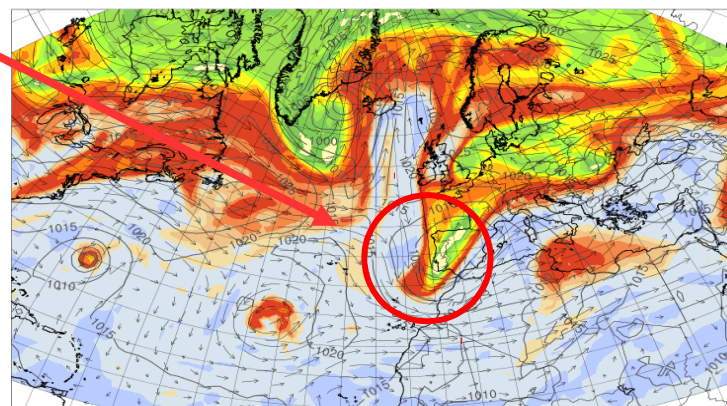
Downstream Cyclone

Brigitte

Z300, SAT (TO UPDATE)
THE850, PV300



PV@330K at 20161013_00



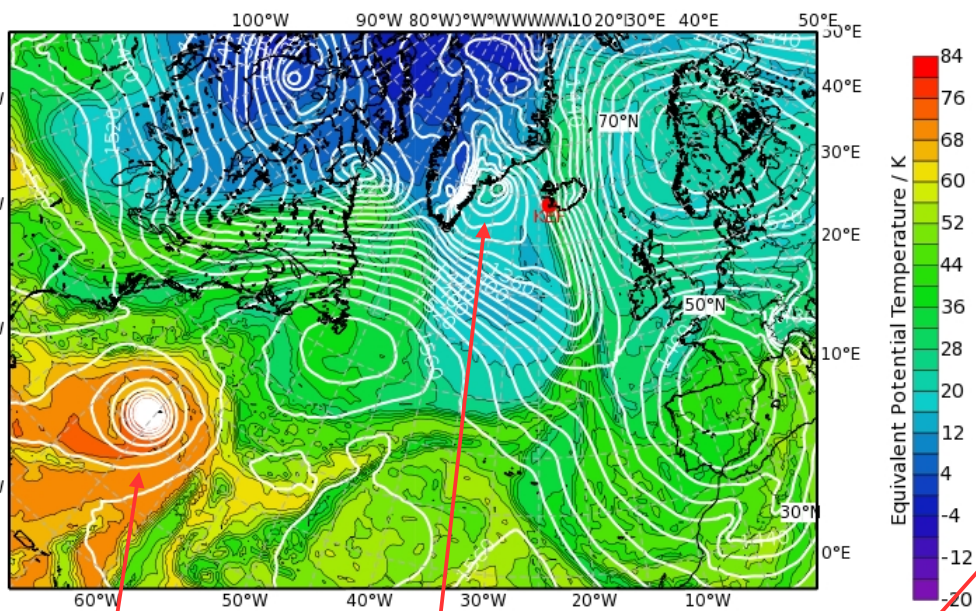
-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.

Forecast for Thu, 13 Oct 2016 12 UTC

THE850, PV320K, PV330 K BT13/00Z

New ridge: Bór/Peter

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Thu, 13 Oct 2016, 12 UTC (step 012 h from Thu, 13 Oct 2016, 00 UTC)

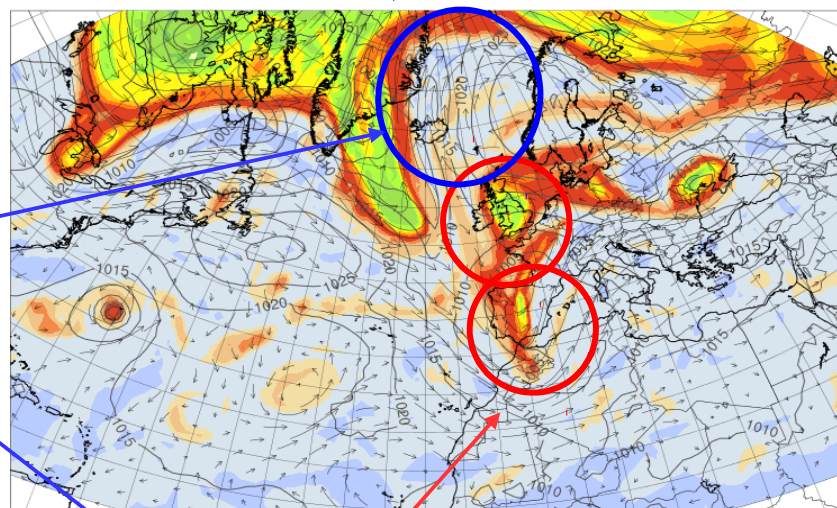


TC Nicole

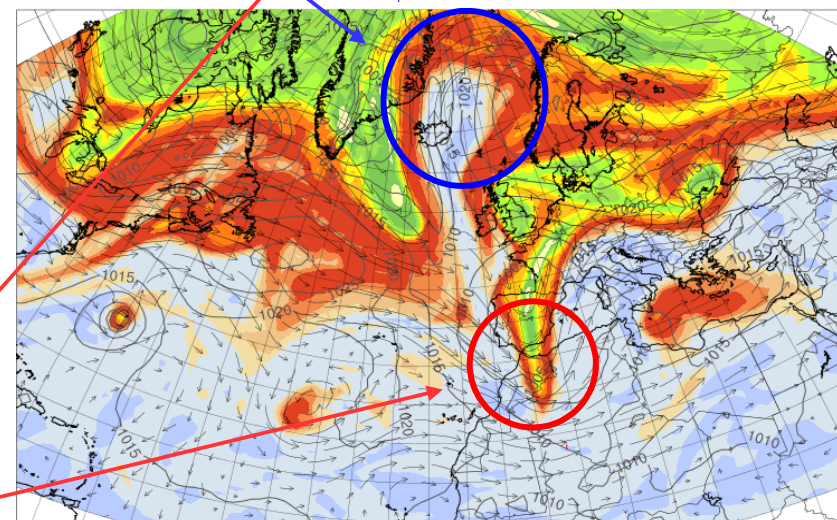
Downstream
cyclone

Ex Cut-off "Brigitte"

PV@320K at 20161013_12



-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.
PV@330K at 20161013_12



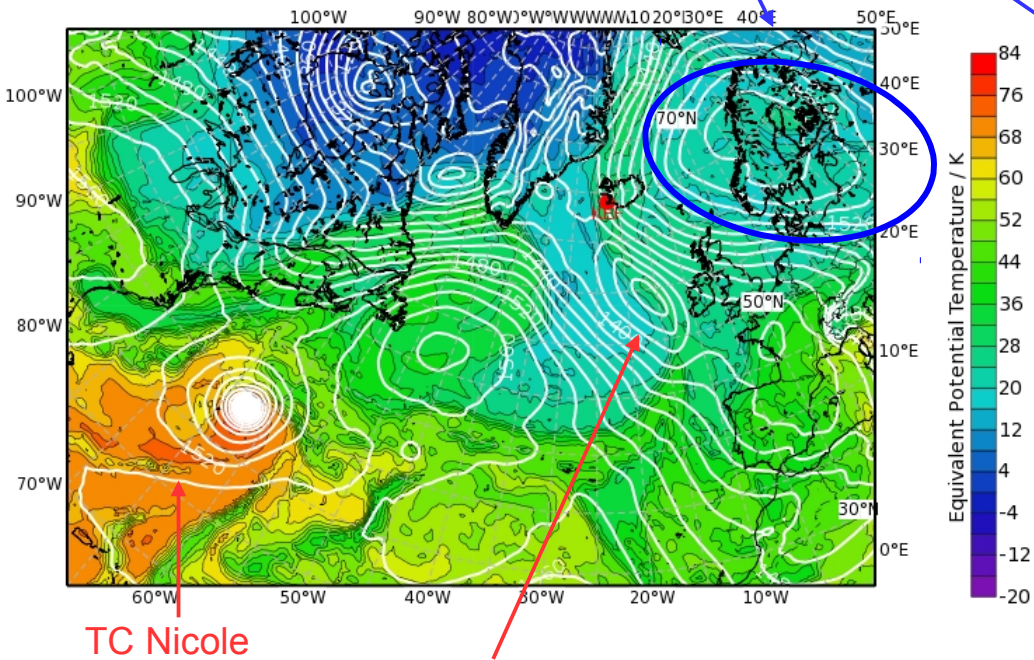
-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.

Forecast for Fri, 14 Oct 2016 00 UTC

THE850, PV320K, PV330 K BT13/00Z

Ridge Þór/Peter

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Fri, 14 Oct 2016, 00 UTC (step 024 h from Thu, 13 Oct 2016, 00 UTC)

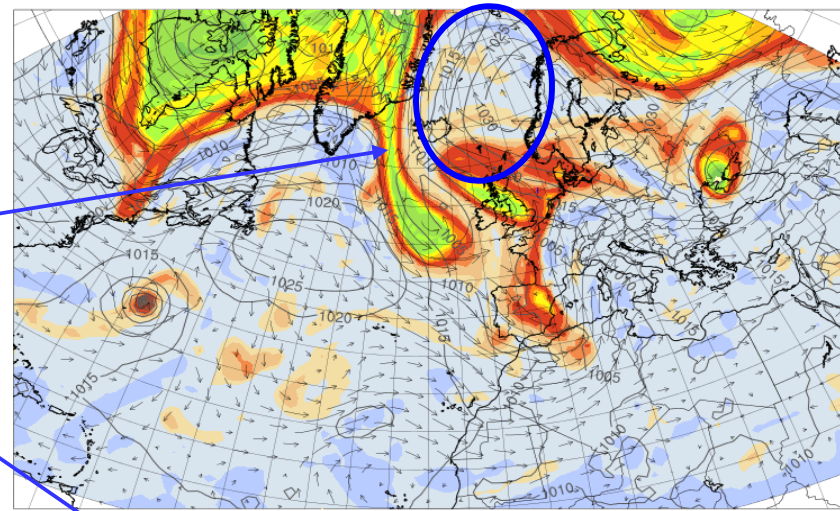


TC Nicole

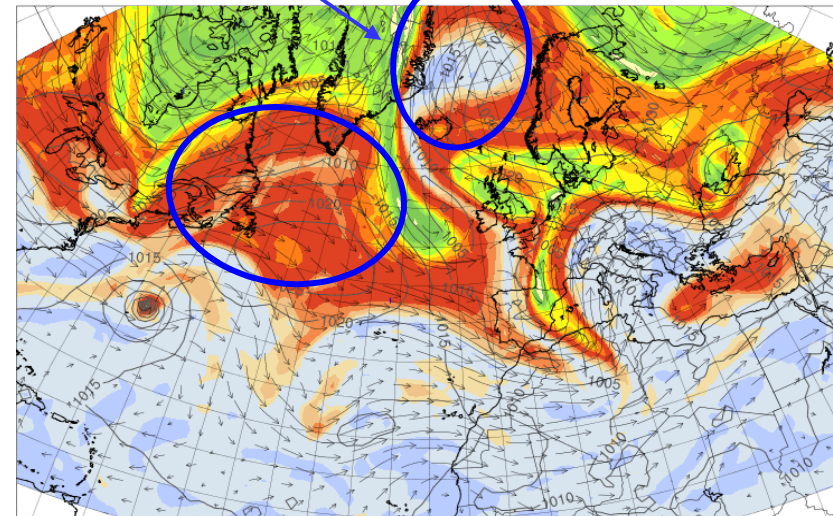
Frontal cyclone

Weak PV gradients

PV@320K at 20161014_00



-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.
PV@330K at 20161014_00



-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.

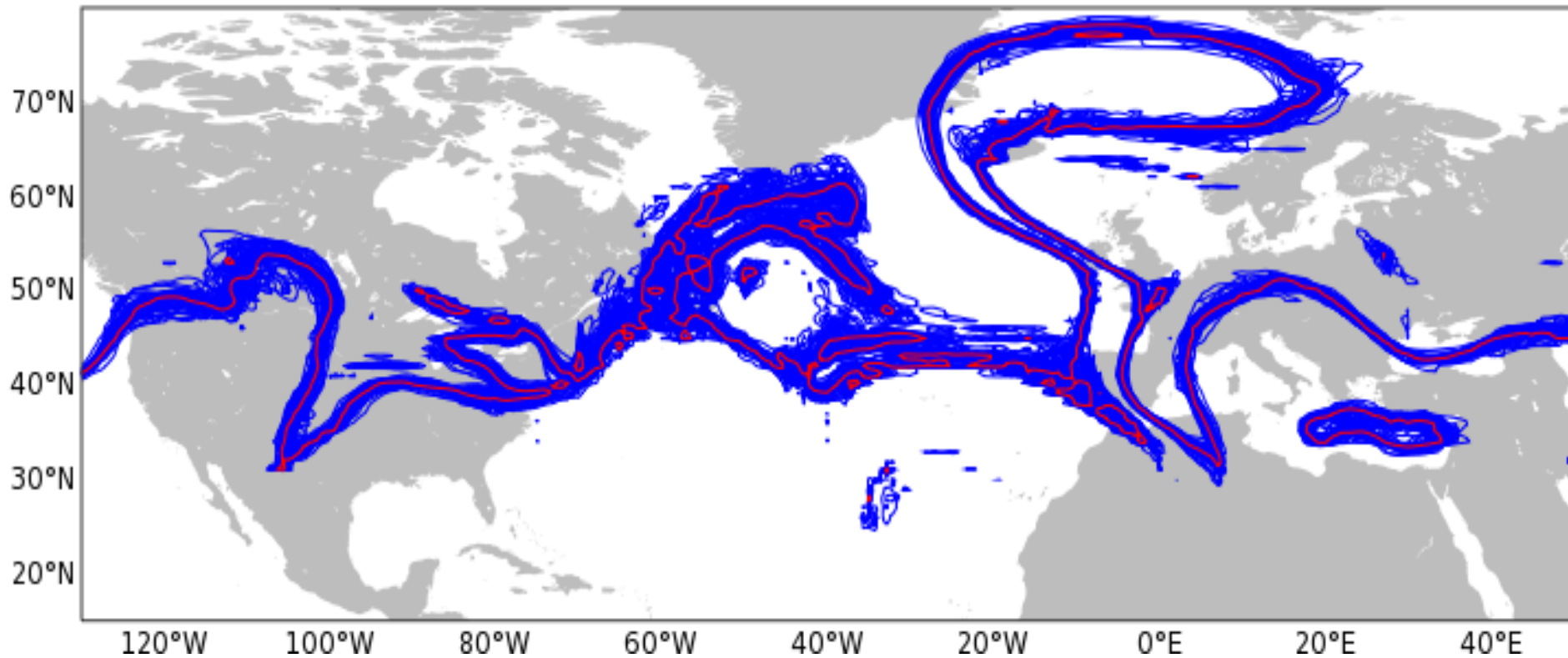
Forecast for Fri, 14 Oct 2016 00 UTC

2PVU 330 K **BT13/00Z**

ECMWF ENSEMBLE FC

BT: 20161013 00UTC, VT: 20161014 00UTC

blue: perturbed, red: control

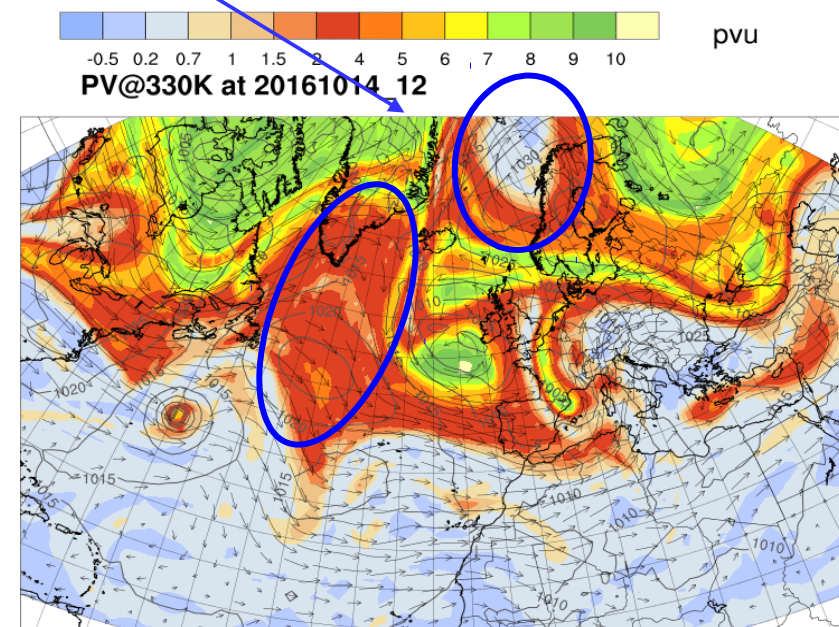
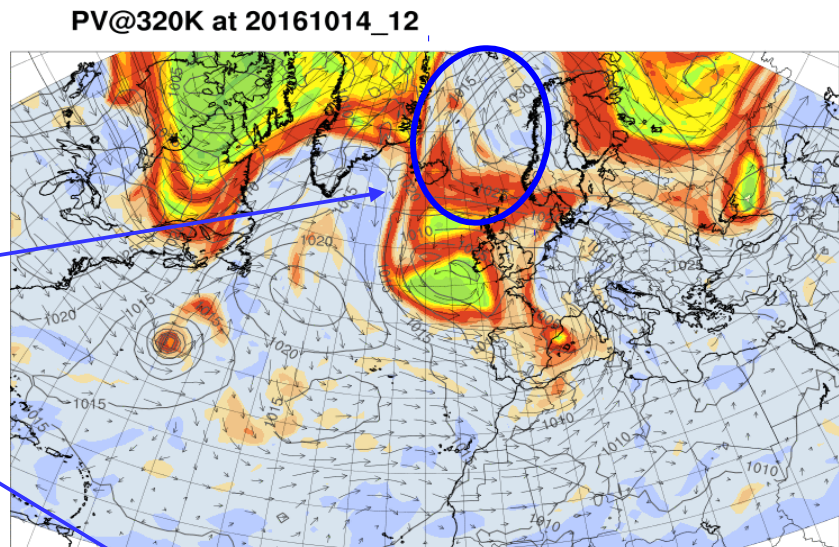
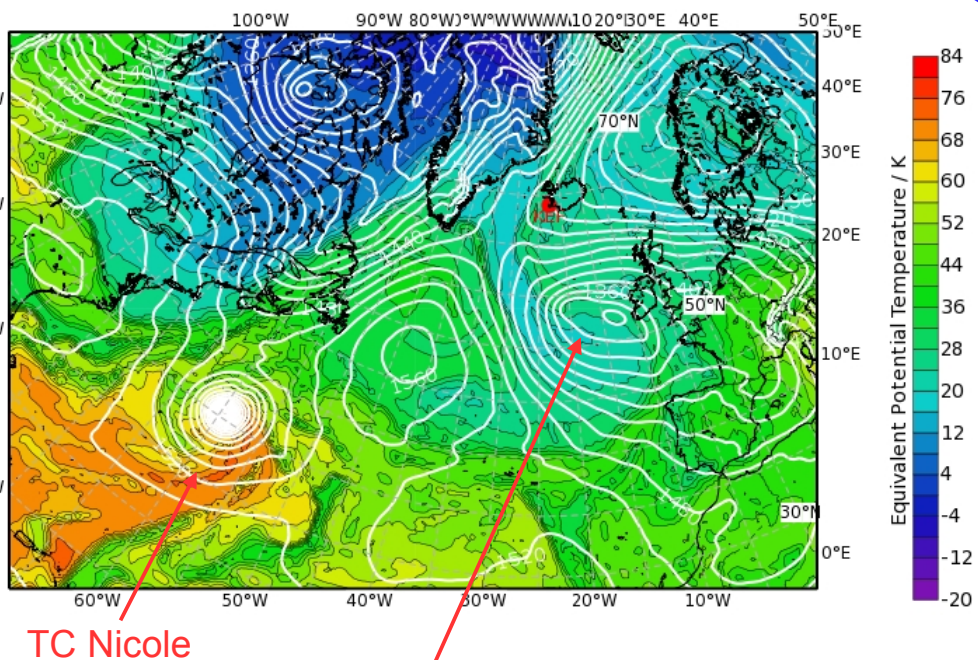


Forecast for Fri, 14 Oct 2016 12 UTC

THE850, PV320K, PV330 K BT13/00Z

Cut-off Þór/Peter

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Fri, 14 Oct 2016, 12 UTC (step 036 h from Thu, 13 Oct 2016, 00 UTC)

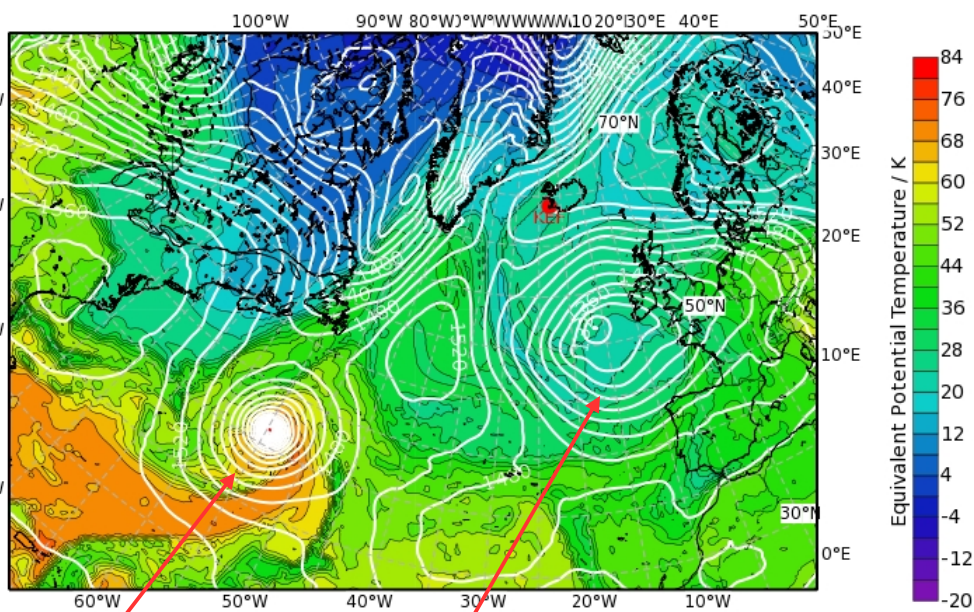


Forecast for Sat, 15 Oct 2016 00 UTC

THE850, PV320K, PV330 K BT13/00Z

Cut-off Þór/Peter

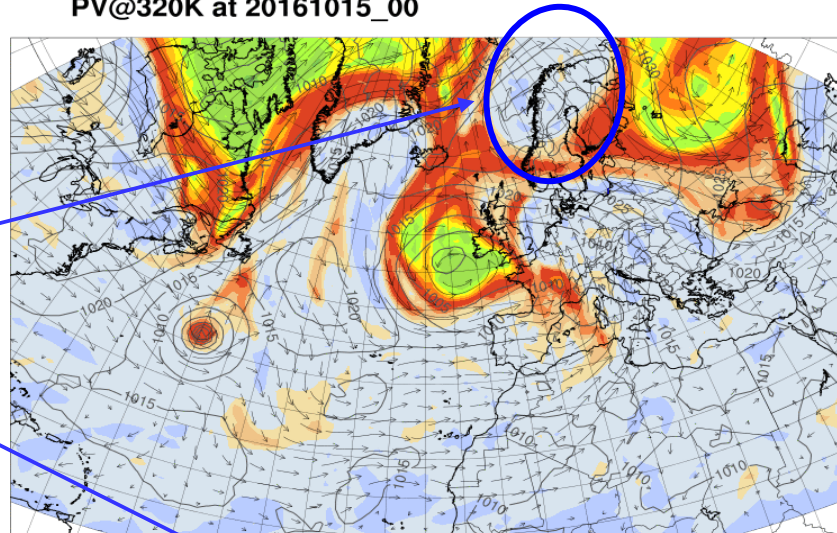
Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Sat, 15 Oct 2016, 00 UTC (step 048 h from Thu, 13 Oct 2016, 00 UTC)



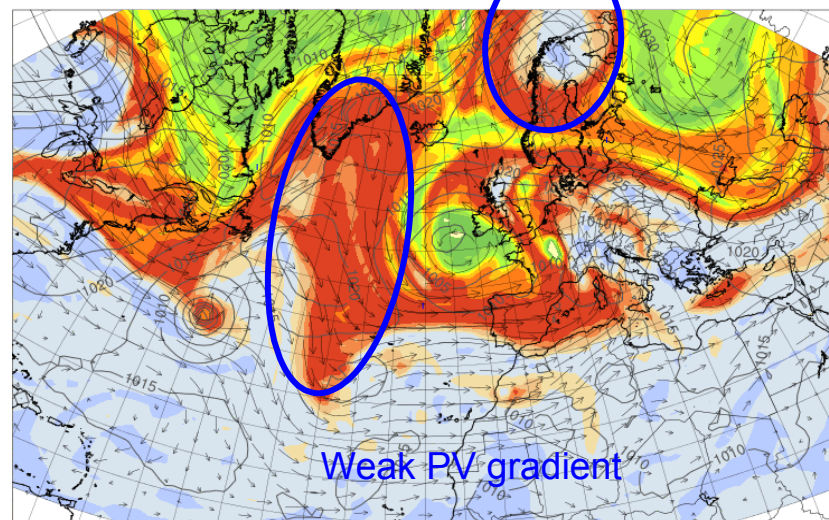
TC Nicole

Frontal cyclone

PV@320K at 20161015_00



PV@330K at 20161015_00



-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.

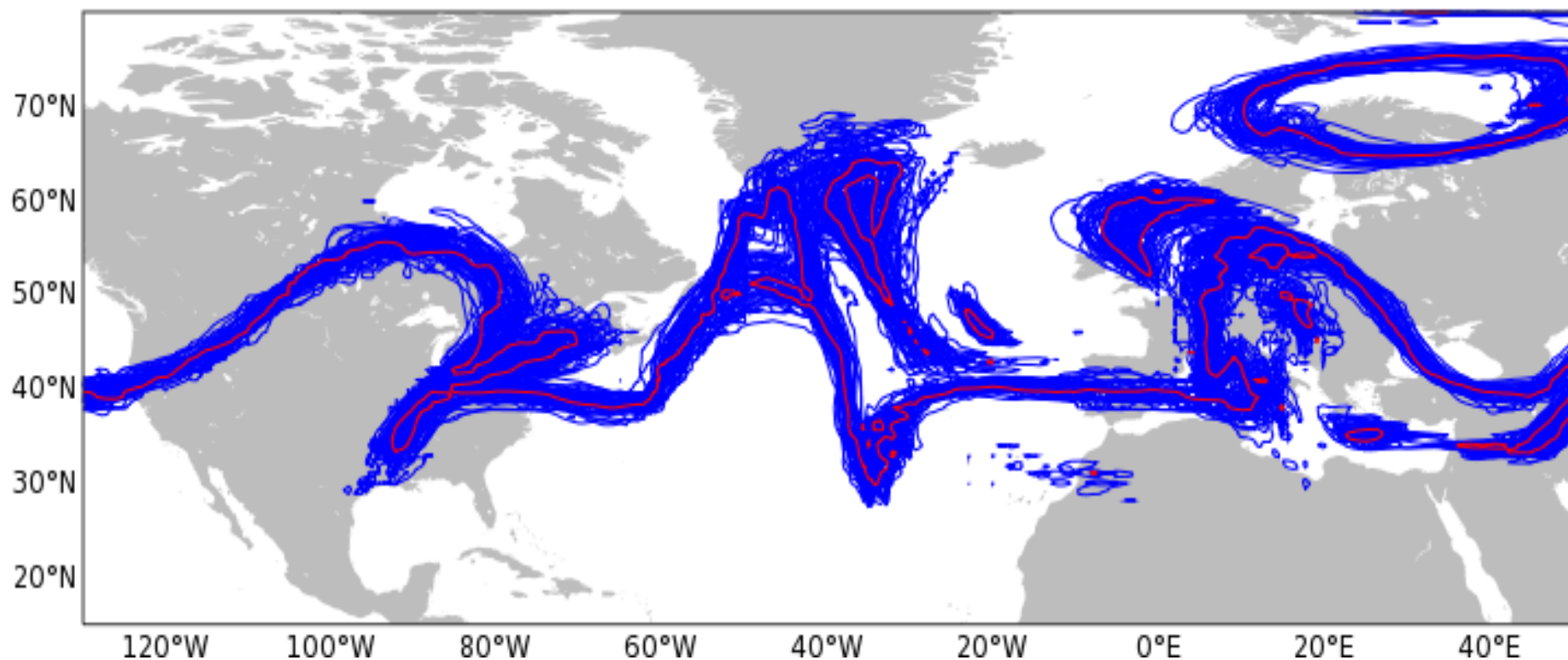
Forecast for Sat, 15 Oct 2016 00 UTC

2PVU 330 K **BT13/00Z**

ECMWF ENSEMBLE FC

BT: 20161013 00UTC, VT: 20161015 00UTC

blue: perturbed, red: control



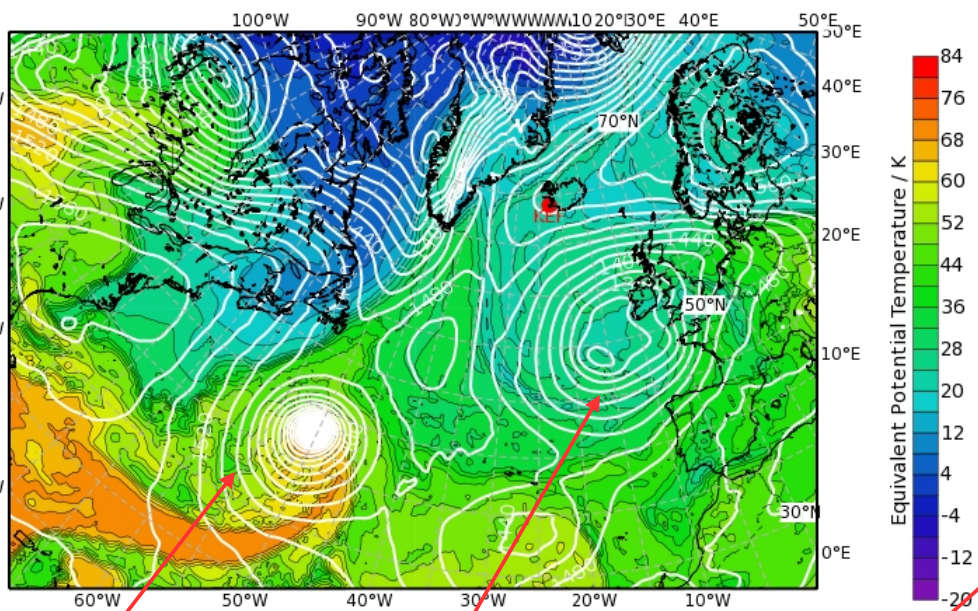
Still some uncertainty, but forecast much more reliable than previous days

Forecast for Sat, 15 Oct 2016 12 UTC

THE850, PV320K, PV330 K BT13/00Z

Cut-off Þór/Peter

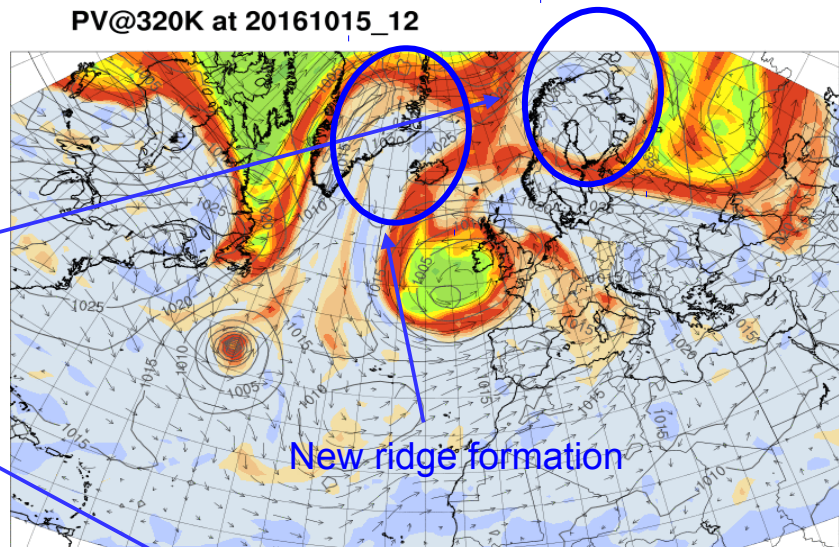
Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Sat, 15 Oct 2016, 12 UTC (step 060 h from Thu, 13 Oct 2016, 00 UTC)



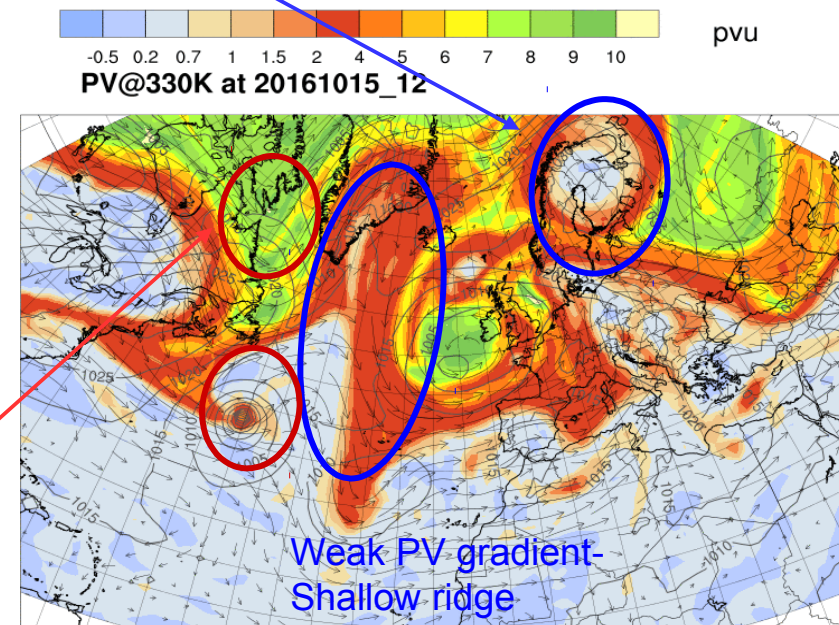
TC Nicole

Frontal cyclone

TPV



New ridge formation



Weak PV gradient-
Shallow ridge

WCB Ens Probabilities (BT: 13/00z)

Fri 14

Sat 15

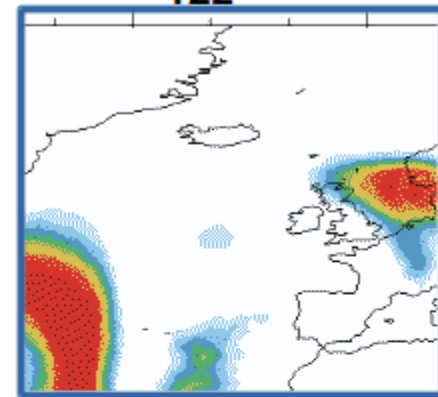
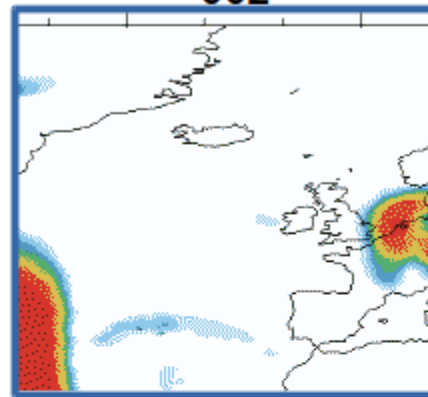
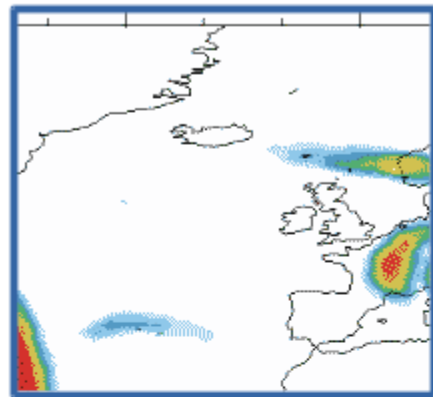
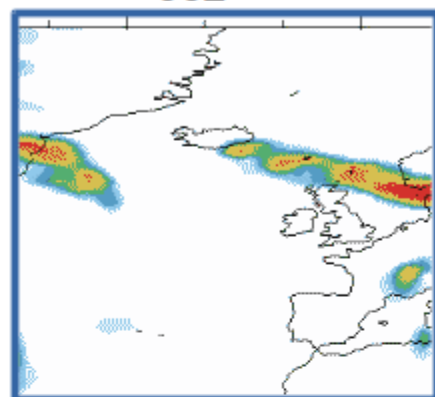
00z

12z

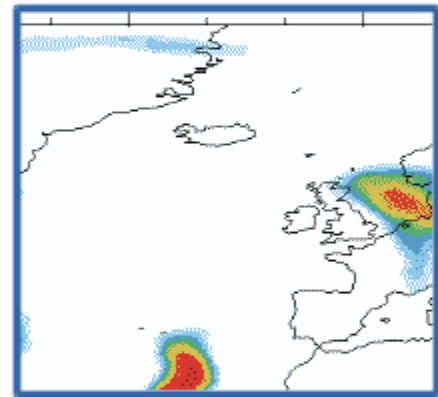
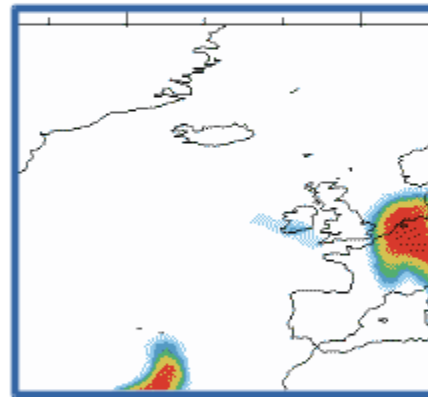
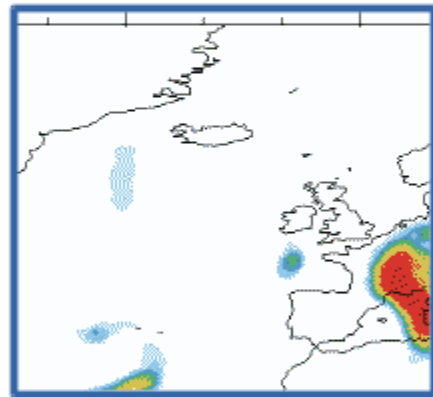
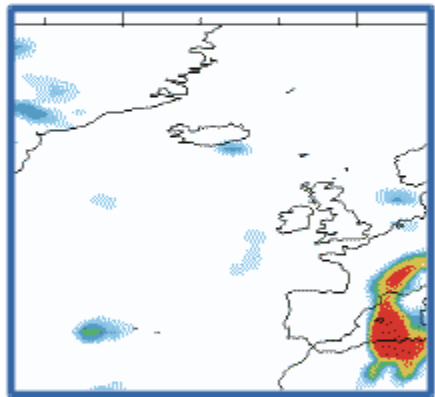
00z

12z

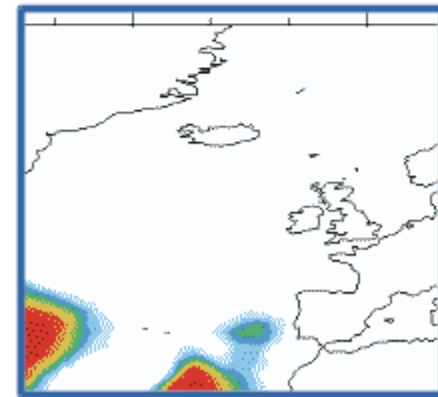
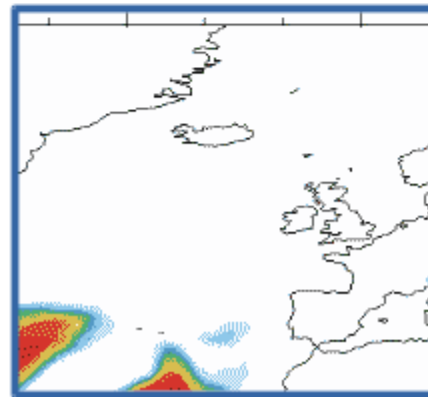
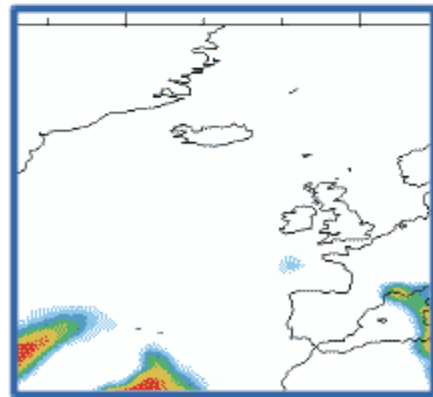
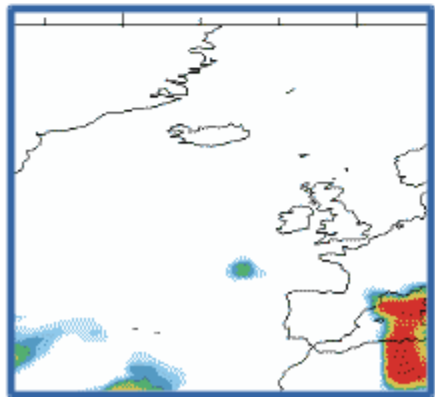
OUTFLOW



ASCENT



INFLOW

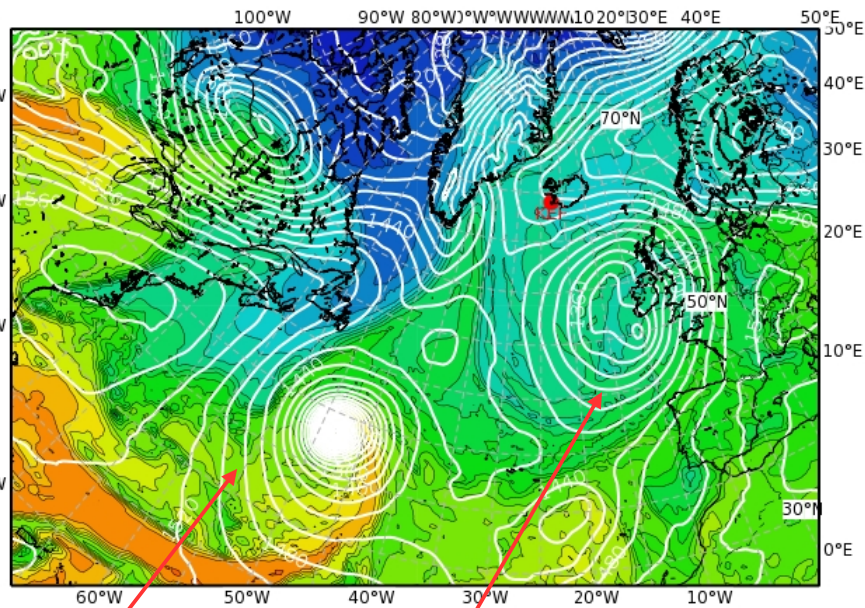


Forecast for Sun, 16 Oct 2016 00 UTC

THE850, PV320K, PV330 K BT13/00Z

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa

Valid: Sun, 16 Oct 2016, 00 UTC (step 072 h from Thu, 13 Oct 2016, 00 UTC)



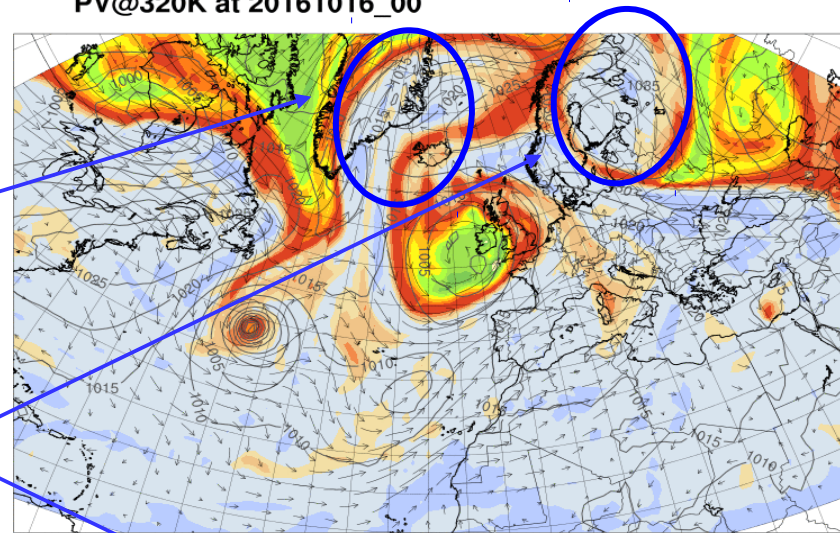
TC Nicole

Frontal cyclone

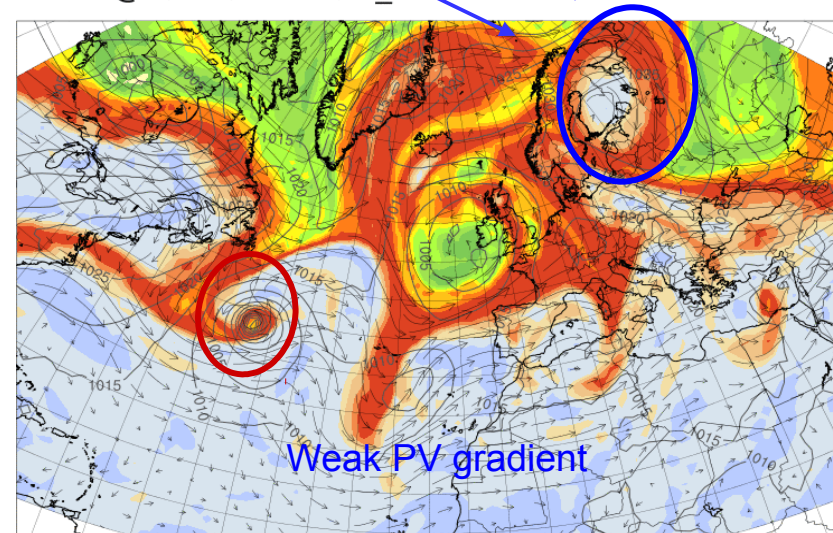
New ridge

Cut-off Þór/Peter

PV@320K at 20161016_00



PV@330K at 20161016_00



Weak PV gradient

-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.

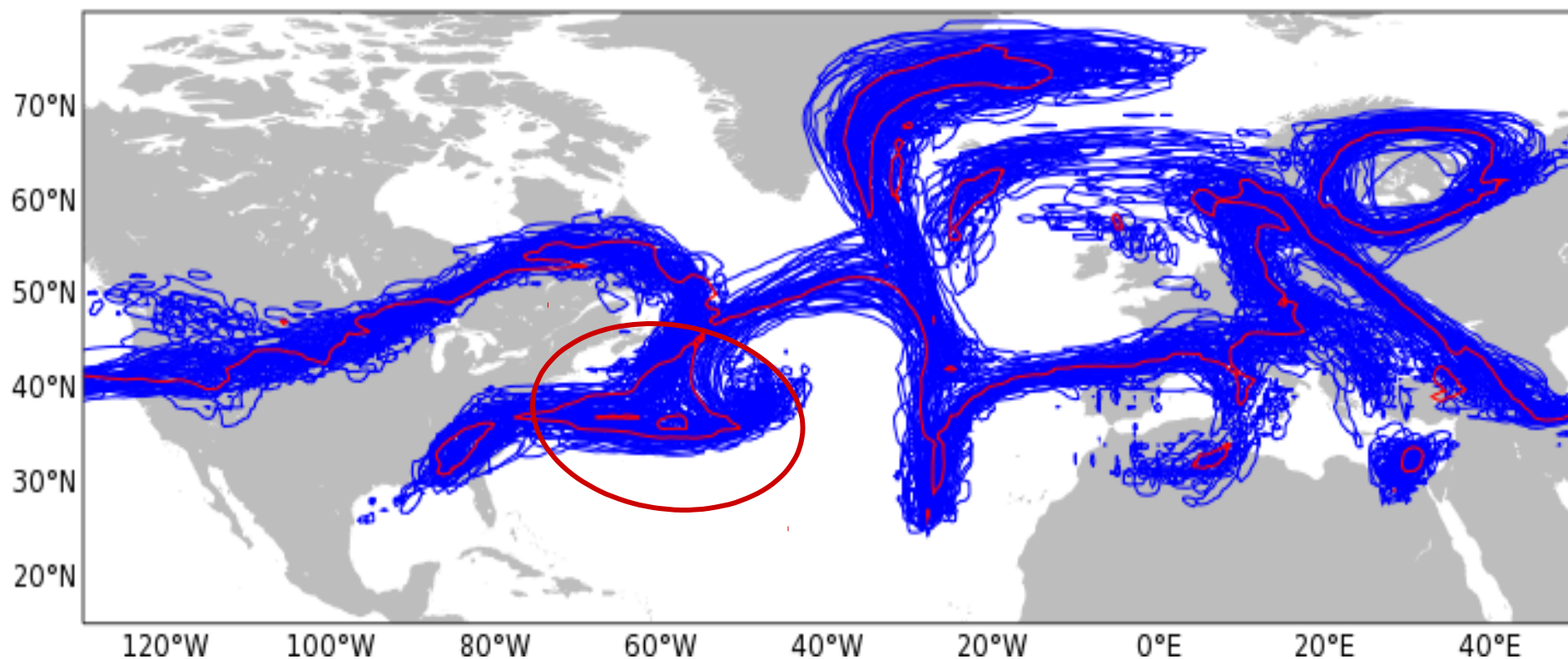
Forecast for Sun, 16 Oct 2016 00 UTC

2PVU 330 K **BT13/00Z**

ECMWF ENSEMBLE FC

BT: 20161013 00UTC, VT: 20161016 00UTC

blue: perturbed, red: control



Forecast for Sun, 16 Oct 2016 12 UTC

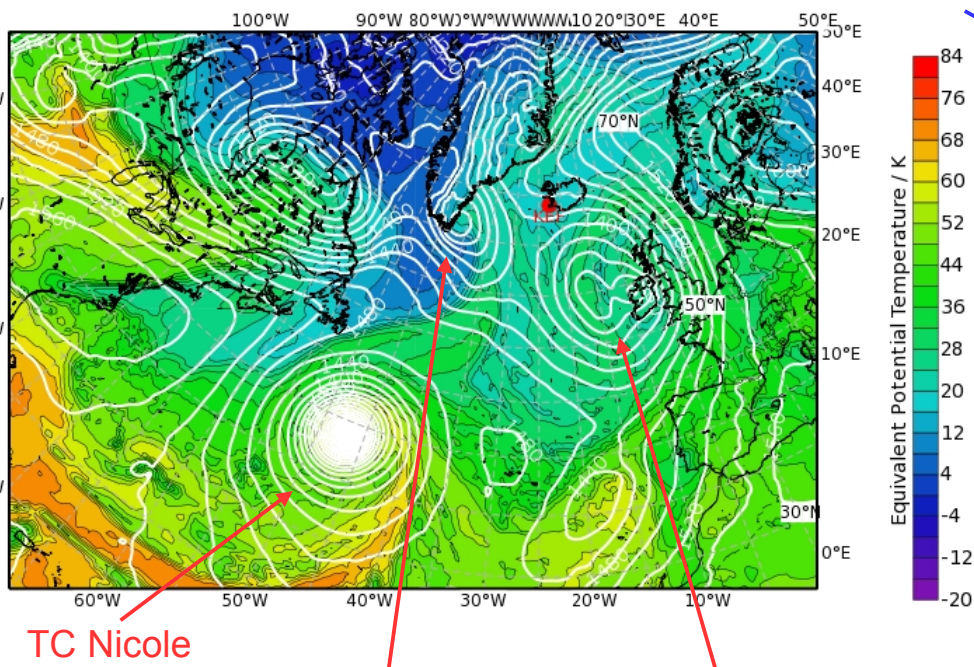
THE850, PV320K, PV330 K BT13/00Z

New ridge

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa

Valid: Sun, 16 Oct 2016, 12 UTC (step 084 h from Thu, 13 Oct 2016, 00 UTC)

Cut-off Þór/Peter

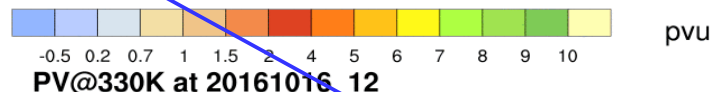
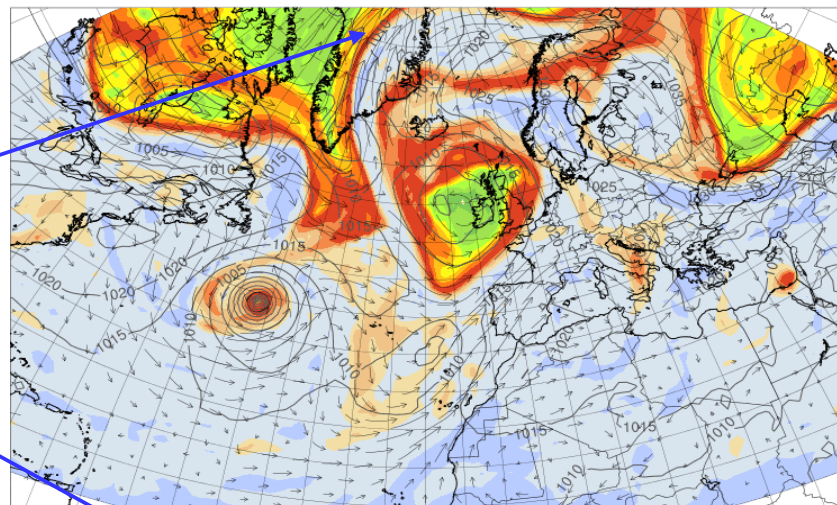


TC Nicole

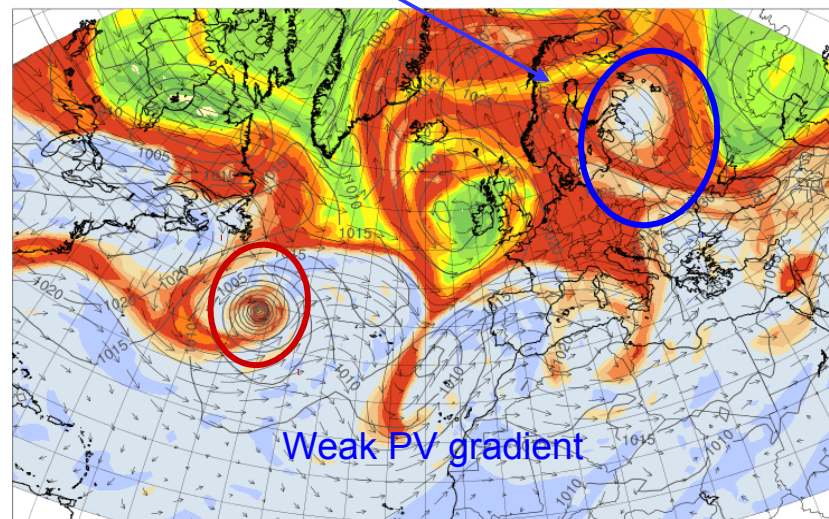
New cyclone

Former frontal cyclone

PV@320K at 20161016_12



PV@330K at 20161016_12



Weak PV gradient

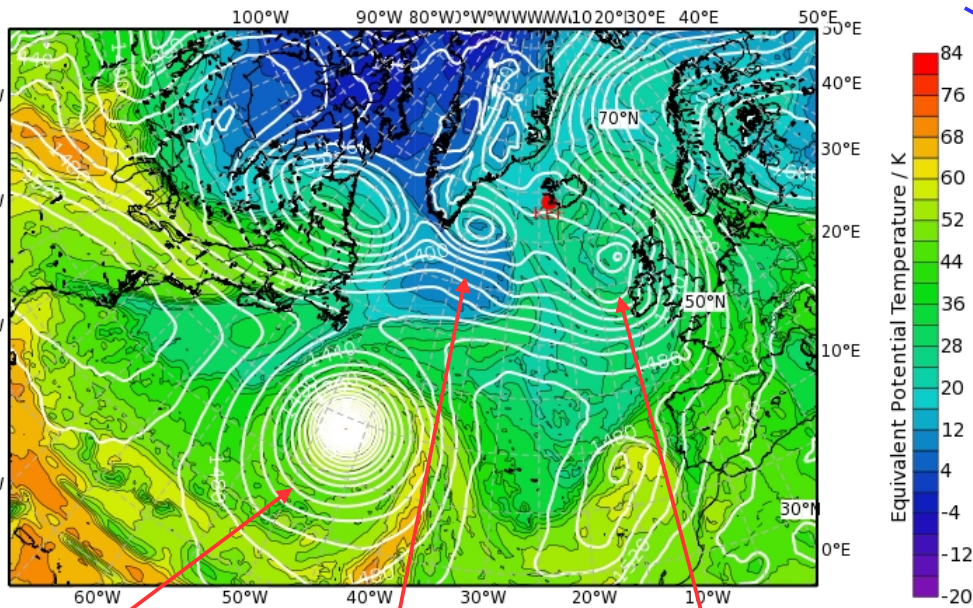


Forecast for Mon, 17 Oct 2016 00 UTC

THE850, PV320K, PV330 K BT13/00Z

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa

Valid: Mon, 17 Oct 2016, 00 UTC (step 096 h from Thu, 13 Oct 2016, 00 UTC) Cut-off Þór/Peter

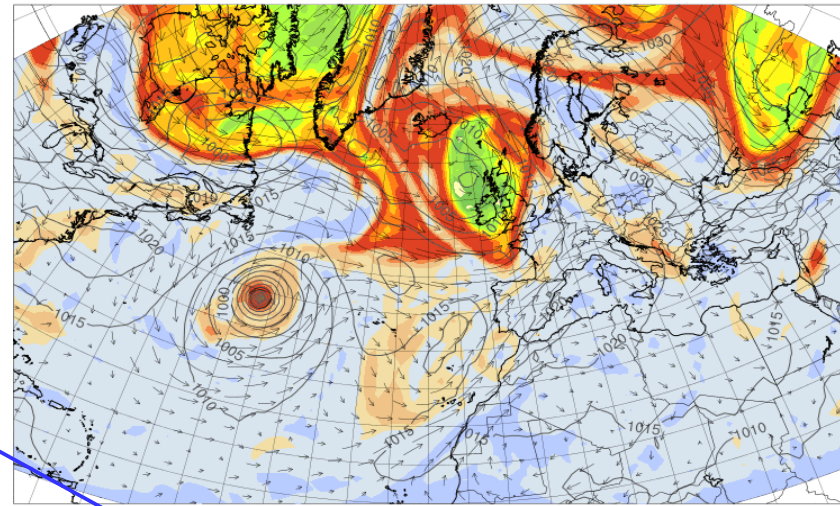


TC Nicole

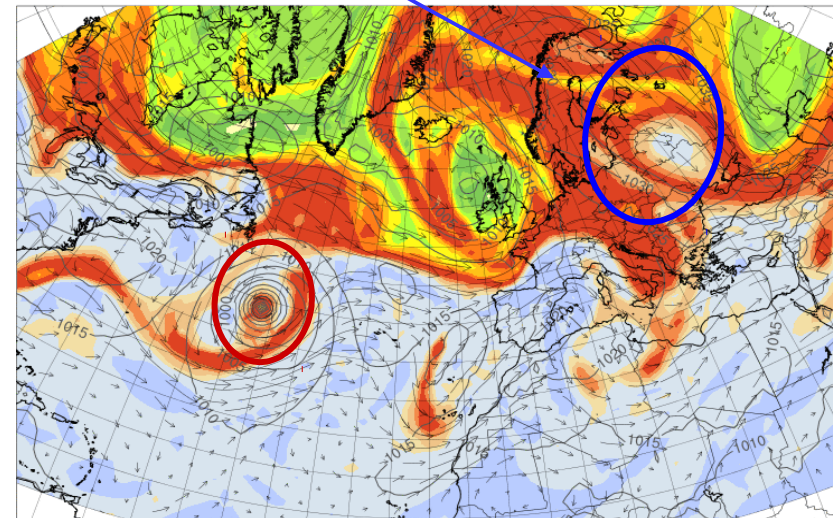
New cyclone

Former frontal
cyclone

PV@320K at 20161017_00



-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.
PV@330K at 20161017_00



-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10 p.u.

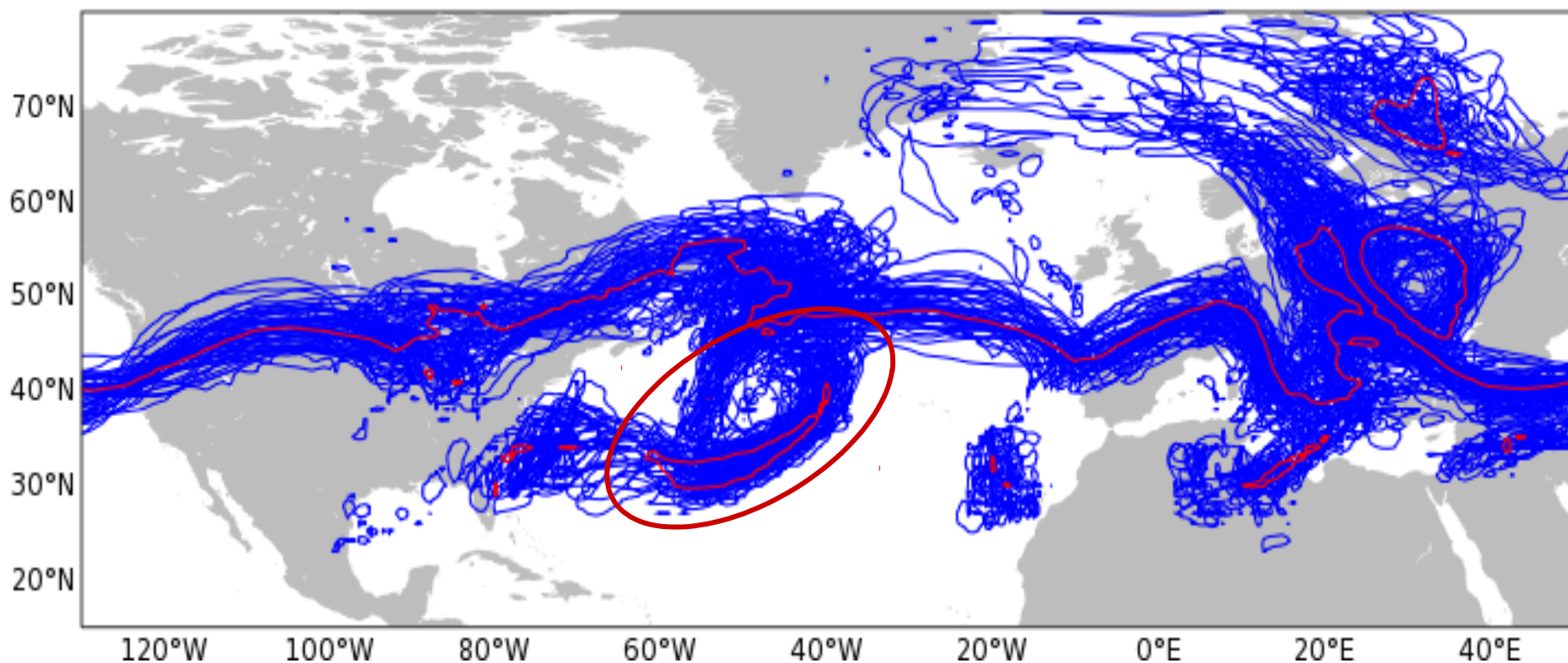
Forecast for Mon, 17 Oct 2016 00 UTC

2PVU 330 K **BT13/00Z**

ECMWF ENSEMBLE FC

BT: 20161013 00UTC, VT: 20161017 00UTC

blue: perturbed, red: control

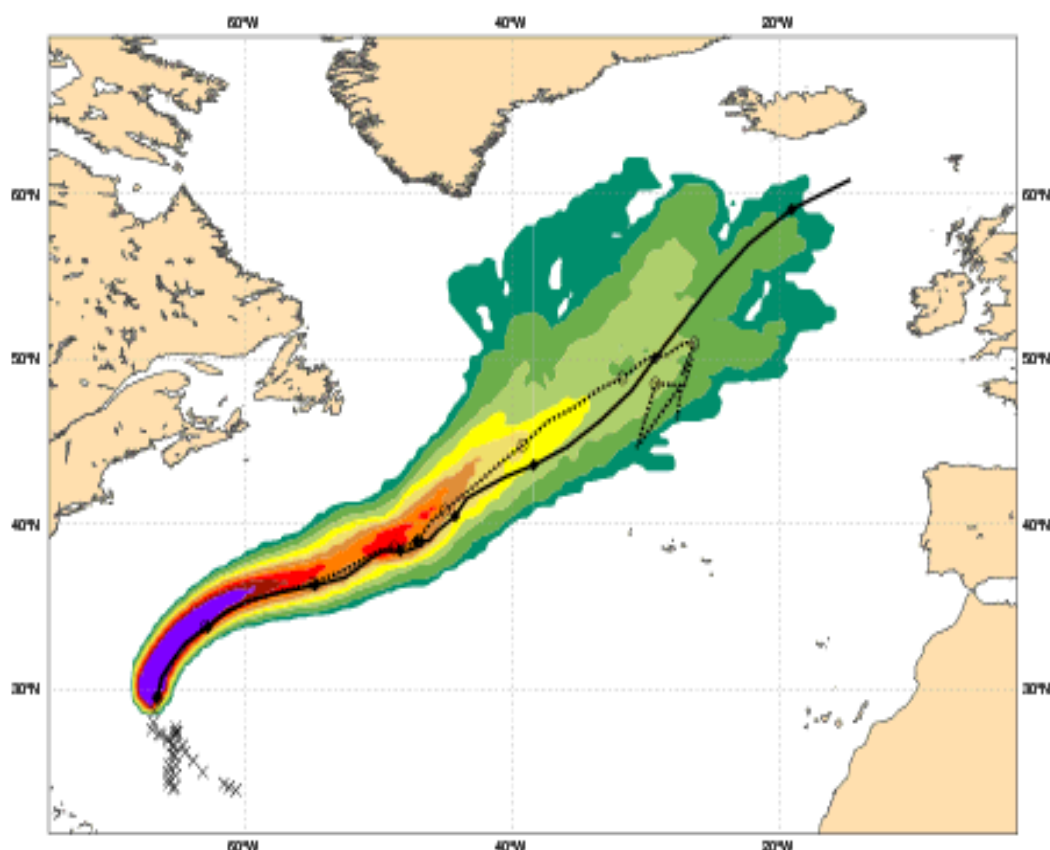


Date 20161013 00 UTC @ECMWF

Probability that **NICOLE** will pass within 120 km radius during the next 240 hours

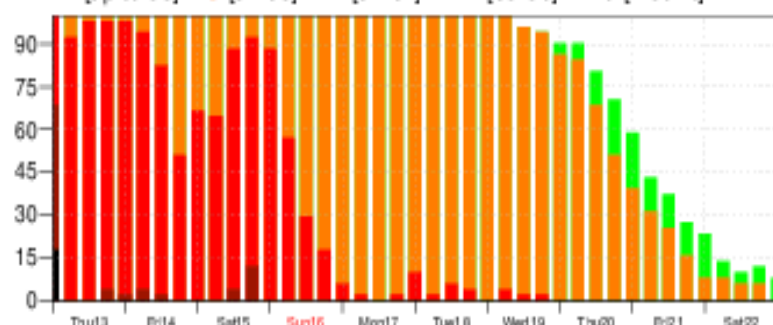
tracks: **solid**=HRES; **dot**=Ens Mean [reported minimum central pressure (hPa) **954**]

5-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80 80-90 > 90%

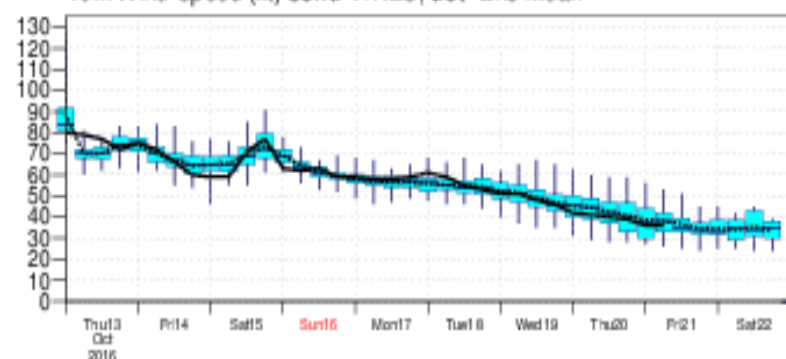


Probability (%) of Tropical Cyclone Intensity falling in each category

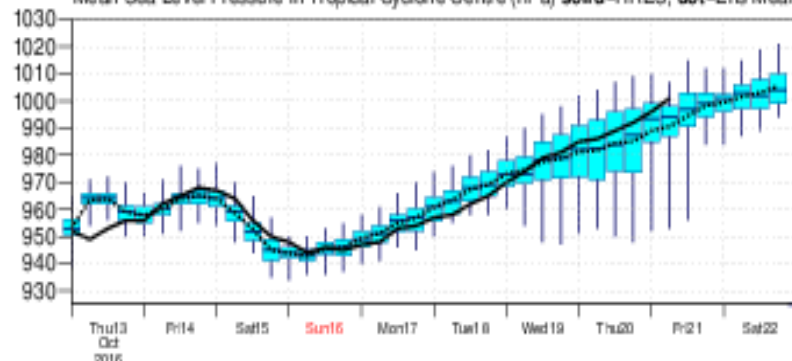
TD [up to 33] TS [34-63] HR1 [64-82] HR2 [83-95] HR3 [> 95 kt]



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



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



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]

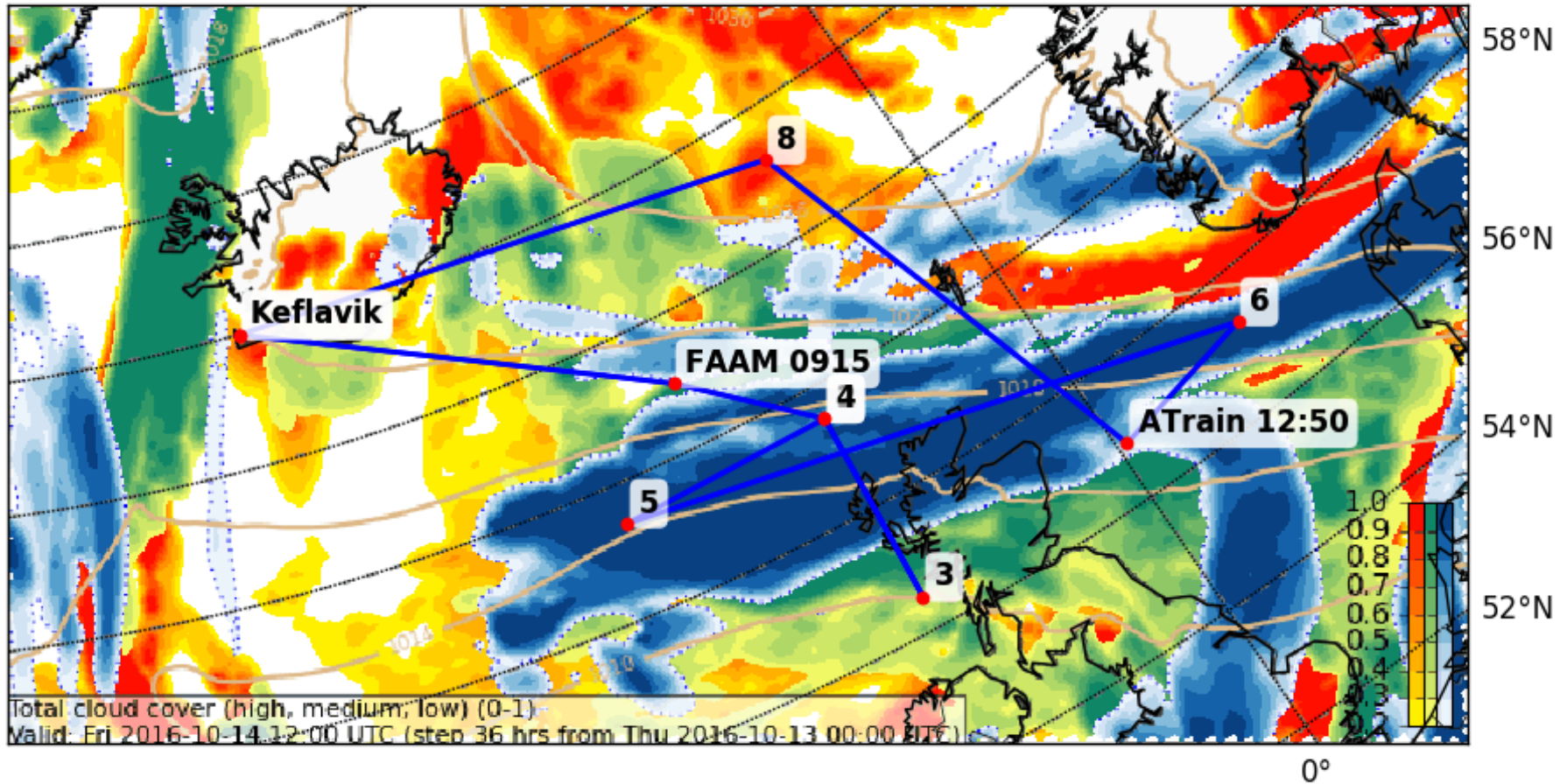
+024 h: hr: d: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
+048 h: hr: d: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
+072 h: hr: d: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
+096 h: hr: d: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
+120 h: hr: d: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
+144 h: hr: d: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
+168 h: hr: d: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 30 31 32 34 35 37 38 39 40 41 42 43 44 46 47 48 50
+192 h: hr: d: 01 02 04 05 07 11 12 13 14 16 17 18 20 21 23 25 26 27 30 32 34 37 38 40 41 42 43 44 46 48
+216 h: hr: d: 01 04 14 18 20 21 25 30 32 34 37 38 40 41 42 43 44 46 48
+240 h: hr: d: 04 18 20 21

HALO SAFIRE flight on Friday 14th – Intercomparison with UK FAAM

Fri 14 – HALO Flight Planning

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

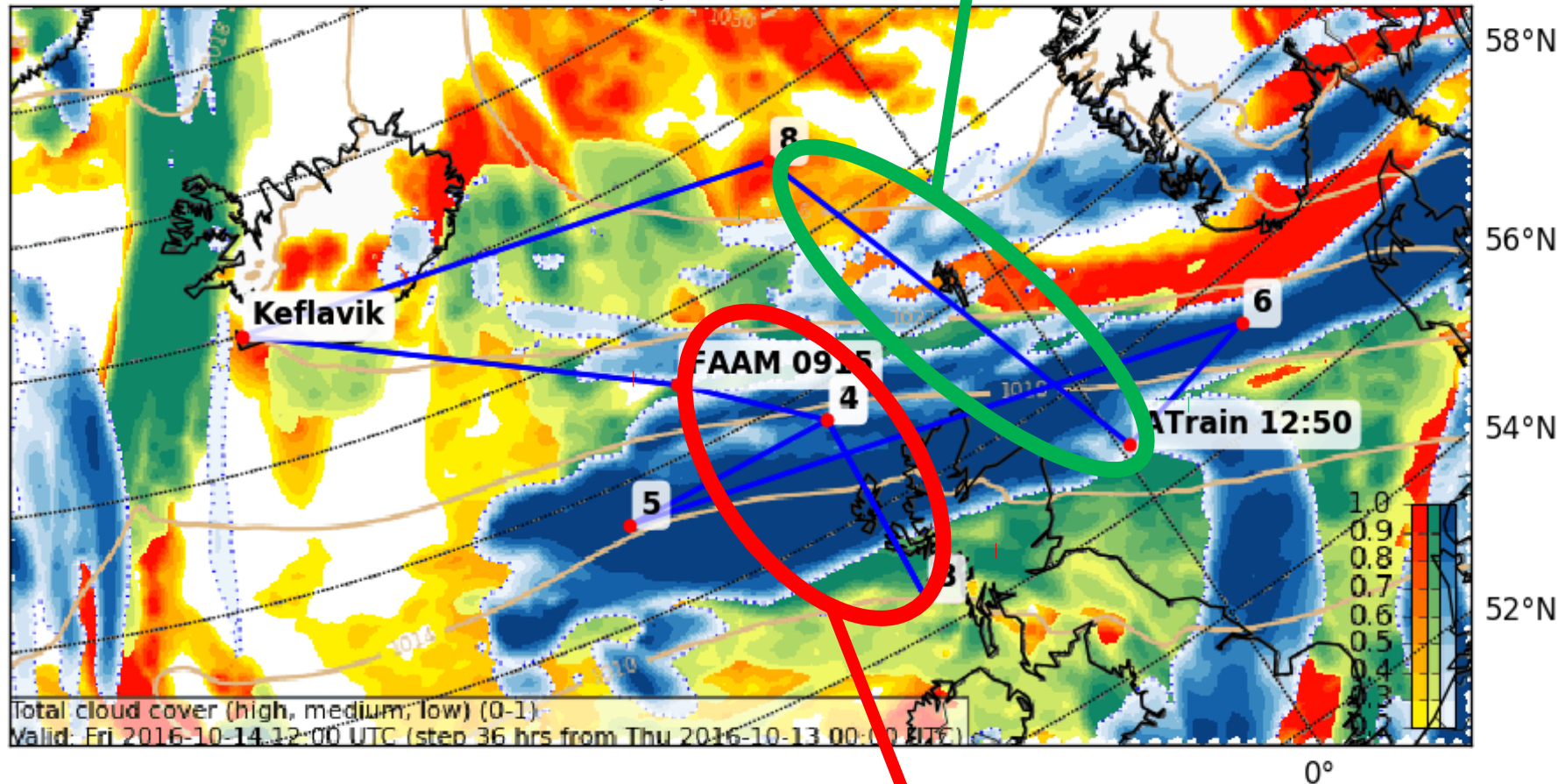
Valid: Fri 2016-10-14 12:00 UTC (step 36 hrs from Thu 2016-10-13 00:00 UTC)



Fri 14 – HALO Flight Planning

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

Valid: Fri 2016-10-14 12:00 UTC (step 36 hrs from Thu 2016-10-13 00:00 UTC)

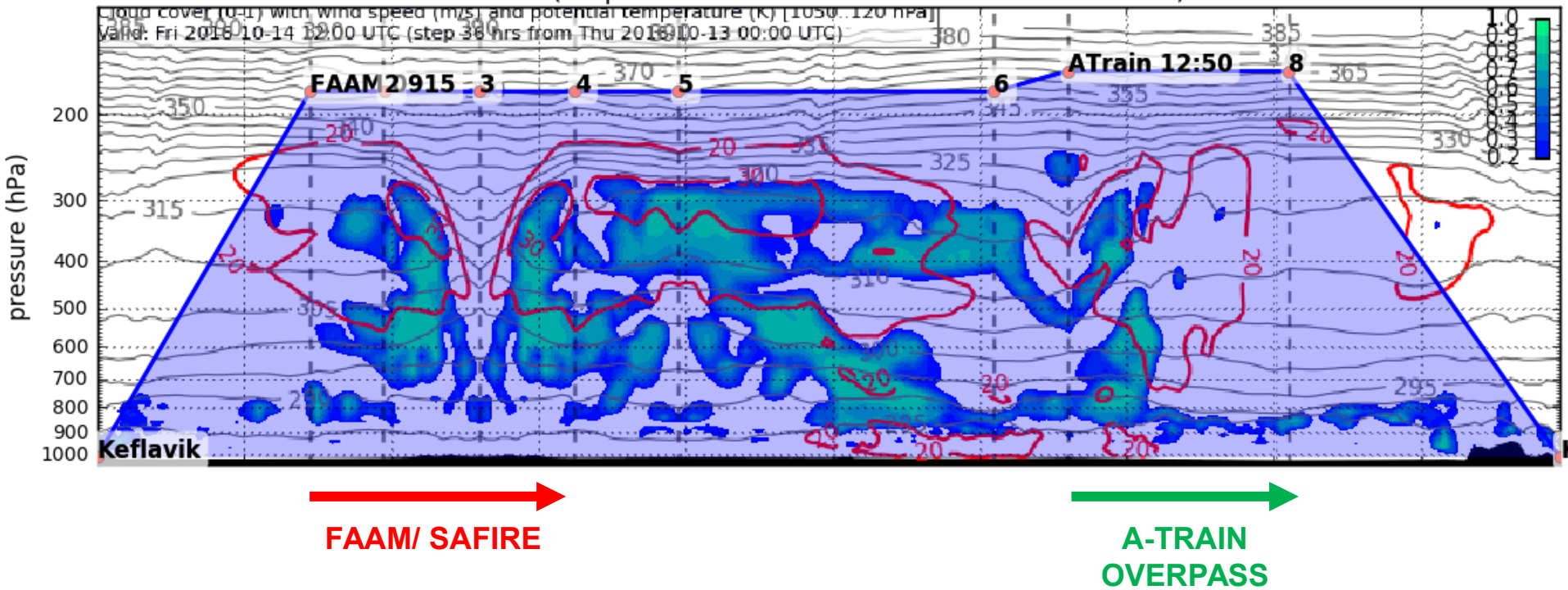


**Radiometer
intercomparison with
FAAM and SAFIRE**

Fri 14 – HALO Flight Planning

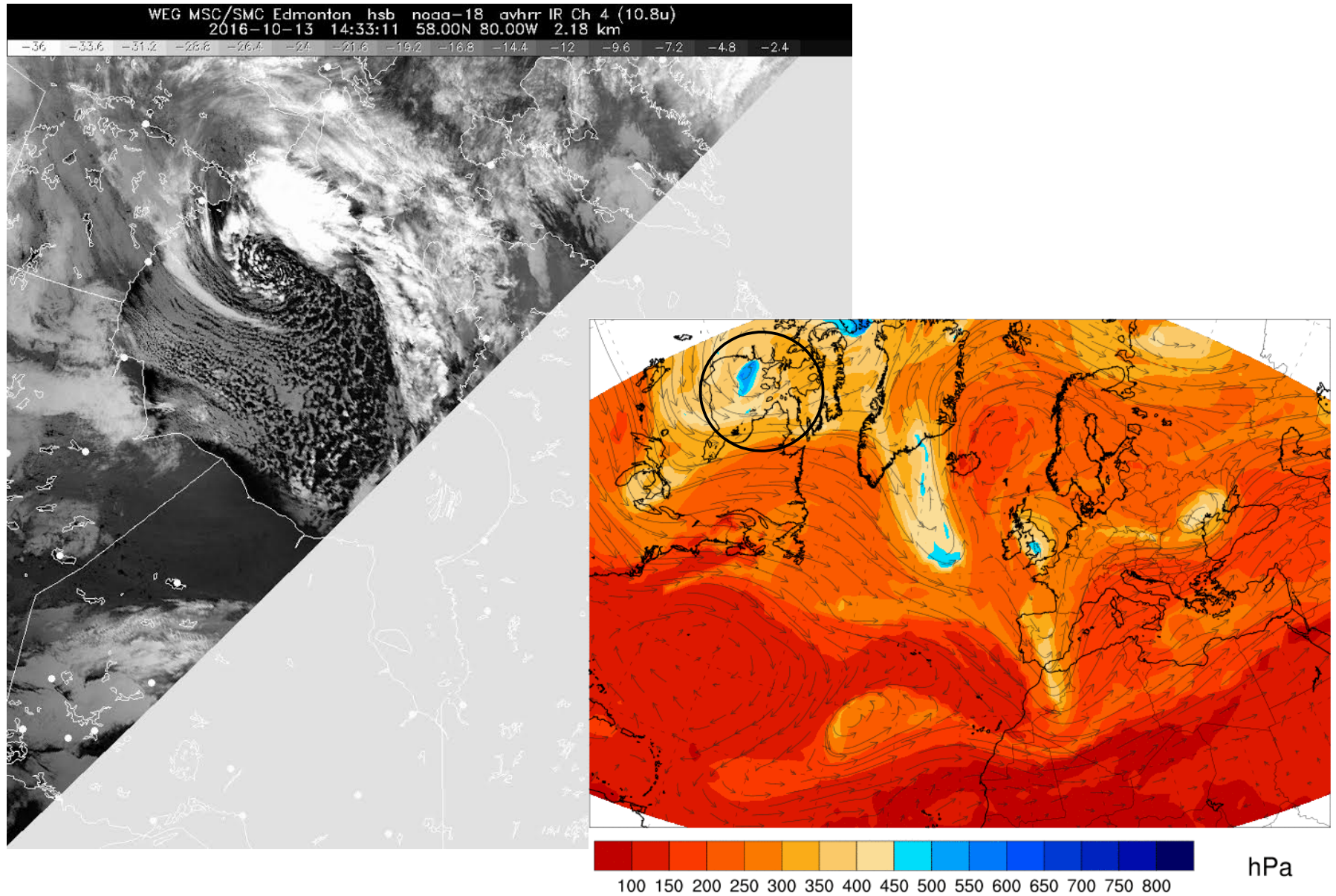
Cloud Cover (0-1) and Wind Speed (m/s) Vertical Section

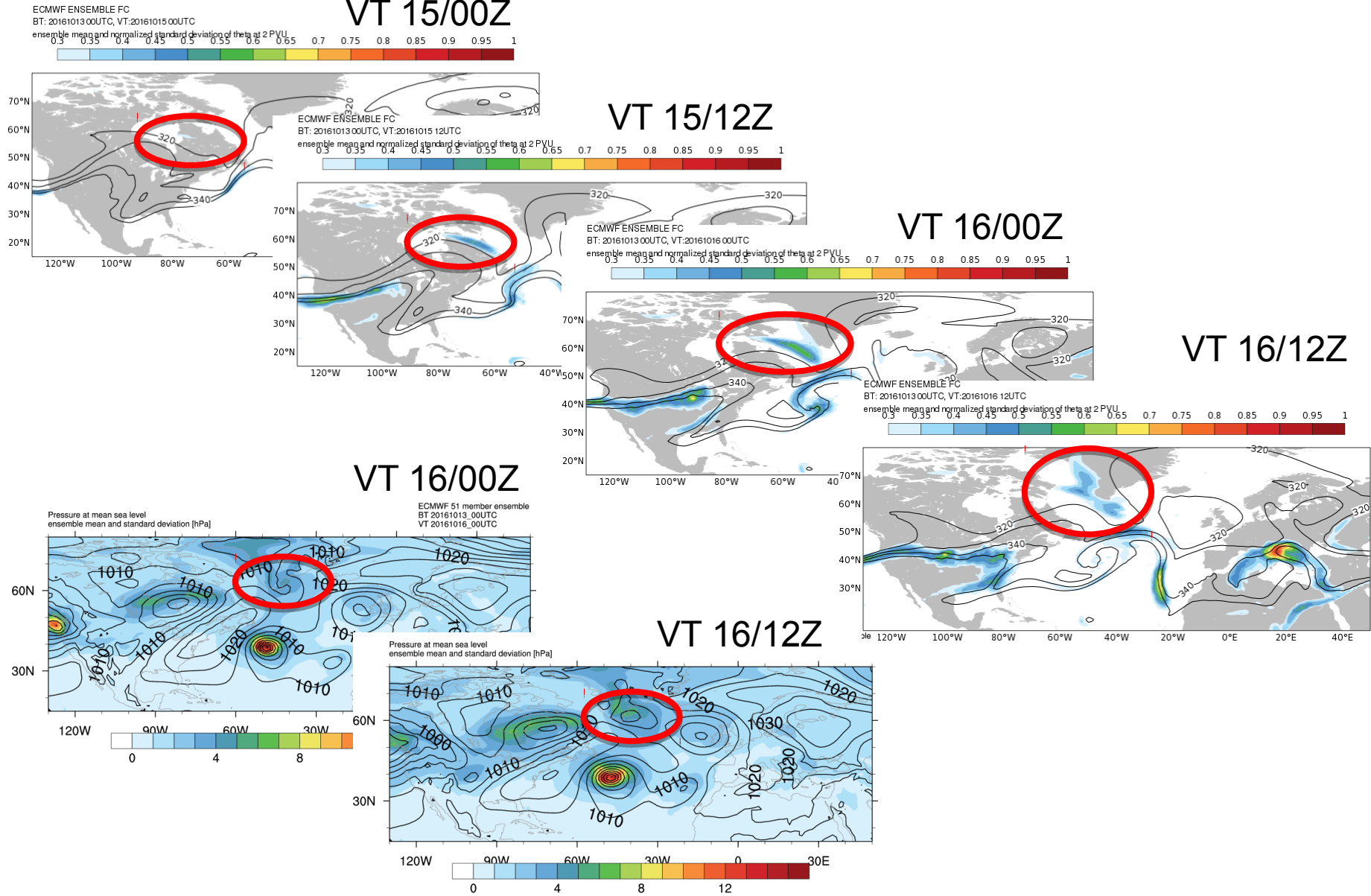
Valid: Fri 2016-10-14 12:00 UTC (step 36 hrs from Thu 2016-10-13 00:00 UTC)



**HALO flight on Saturday
+
Tropopause Polar Vortex analysis**

Tropopause polar vortex – Today

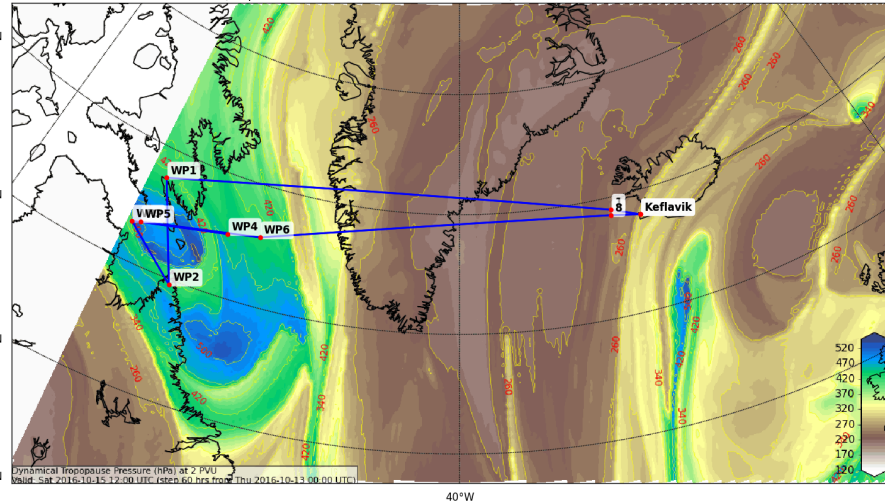




Tropopause polar vortex and Greenland ridge – 15 Oct

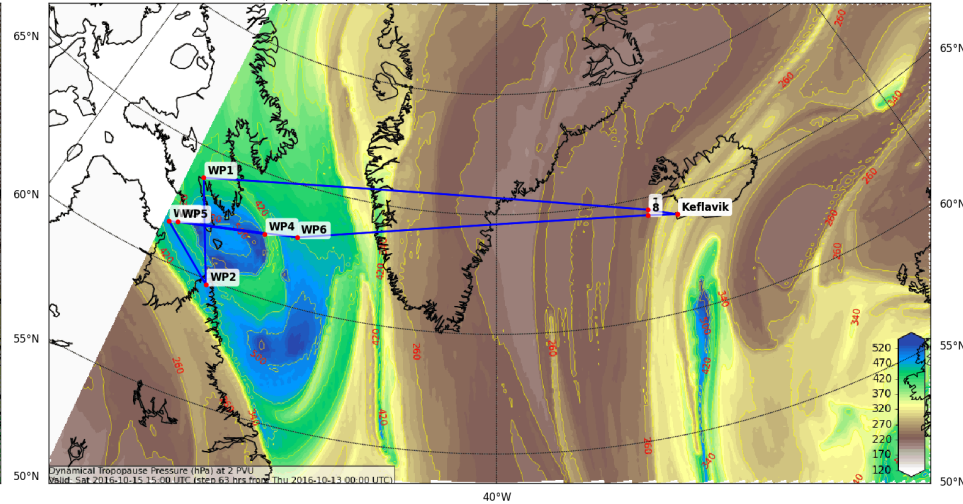
15 Oct, 12 UTC

Dynamical Tropopause (Pressure (hPa)) at 2000 (10^{-3} PVU)
Valid: Sat 2016-10-15 12:00 UTC (step 60 hrs from Thu 2016-10-13 00:00 UTC)



15 Oct, 15 UTC

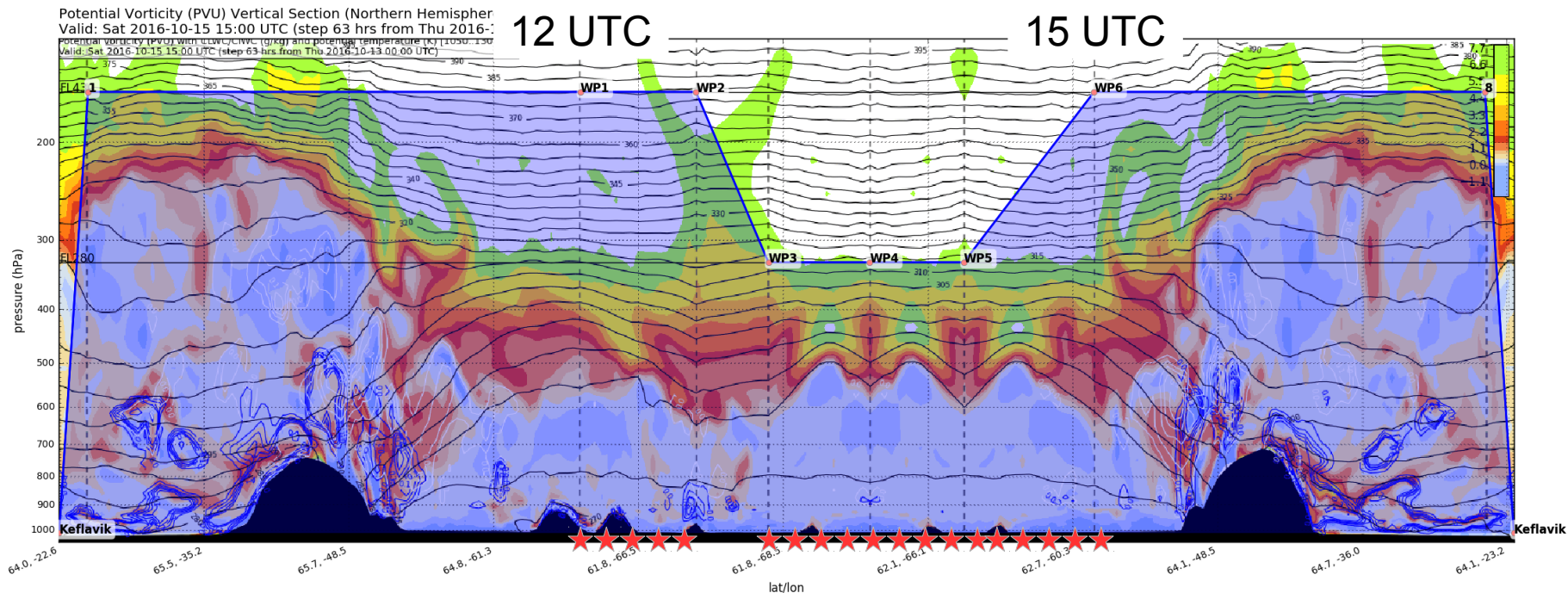
Dynamical Tropopause (Pressure (hPa)) at 2000 (10^{-3} PVU)
Valid: Sat 2016-10-15 15:00 UTC (step 63 hrs from Thu 2016-10-13 00:00 UTC)



- Moisture gradient across deep tropopause fold and below TPV
- Dropsondes across tropopause fold/TPV → measurements in region where TPV interacts with waveguide → very exciting in terms of predictability
- Mixed phase clouds and moisture structure across ridge over Greenland

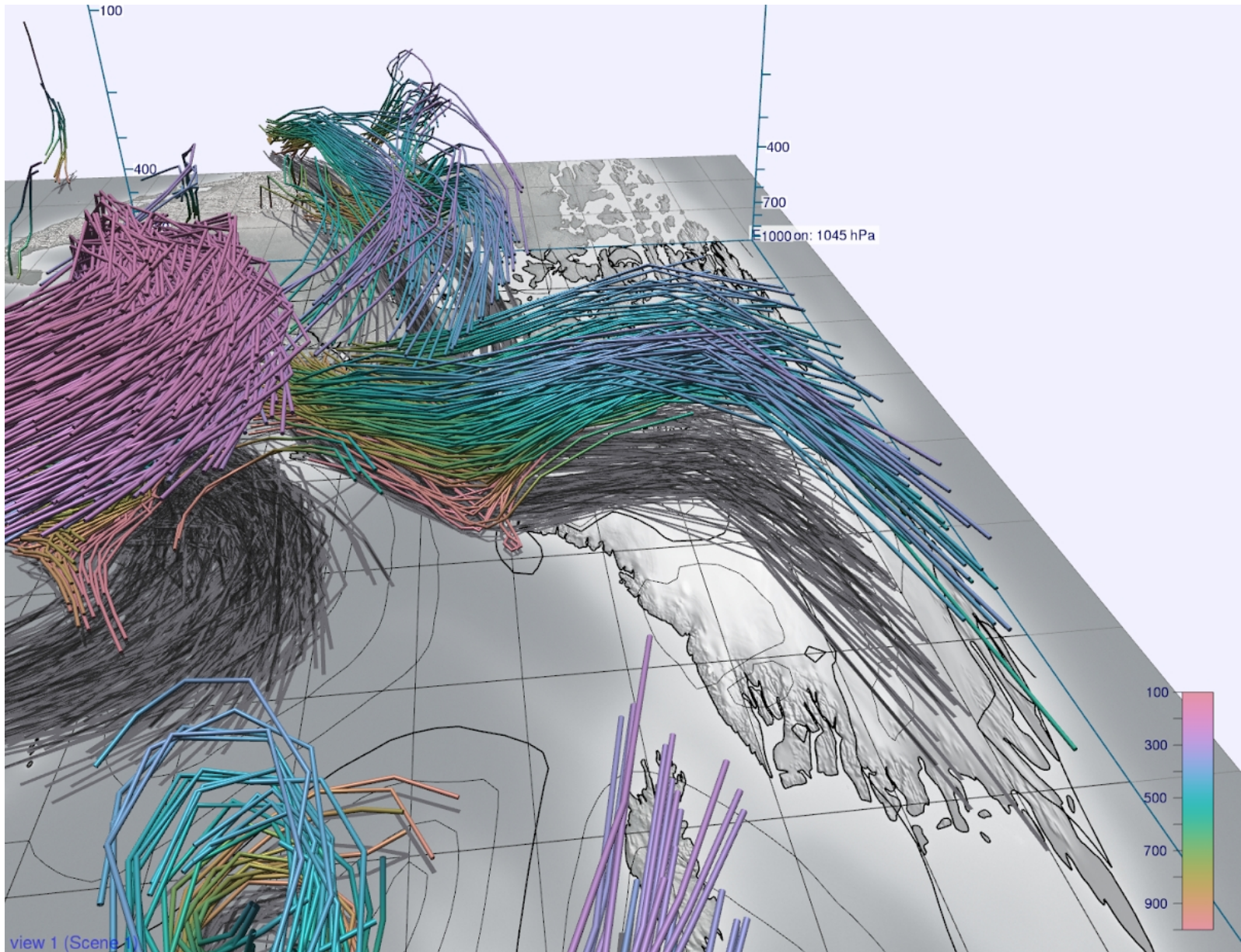
Tropopause polar vortex and Greenland ridge – 15 Oct

15 Oct, 15 UTC



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Tropopause polar vortex and Greenland ridge – 15 Oct



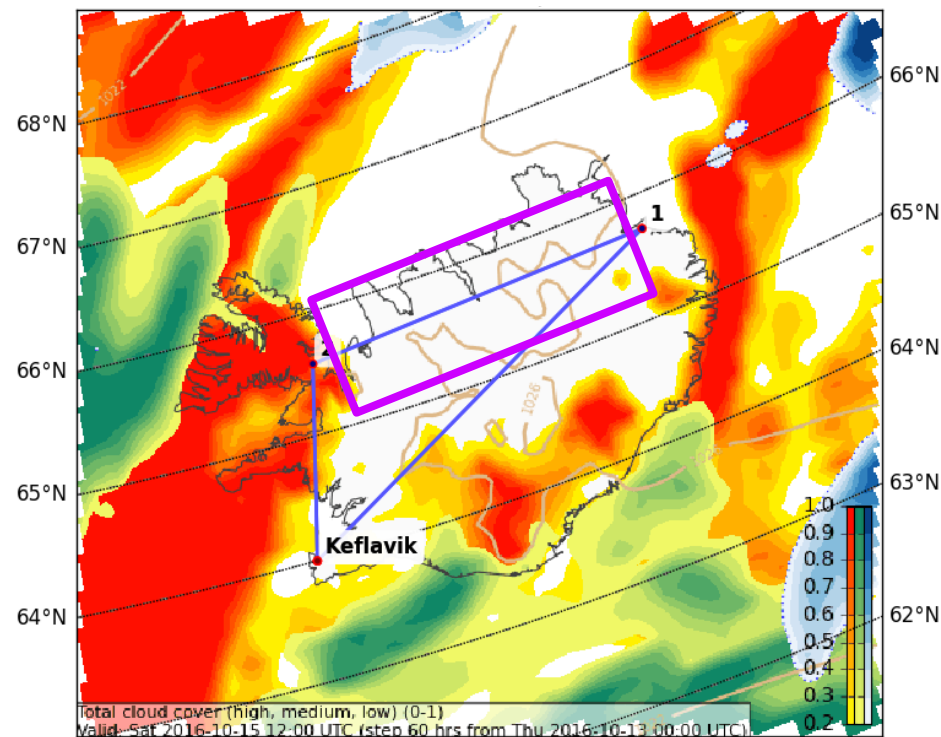
FALCON flights (x2) on Saturday

Saturday October 15th

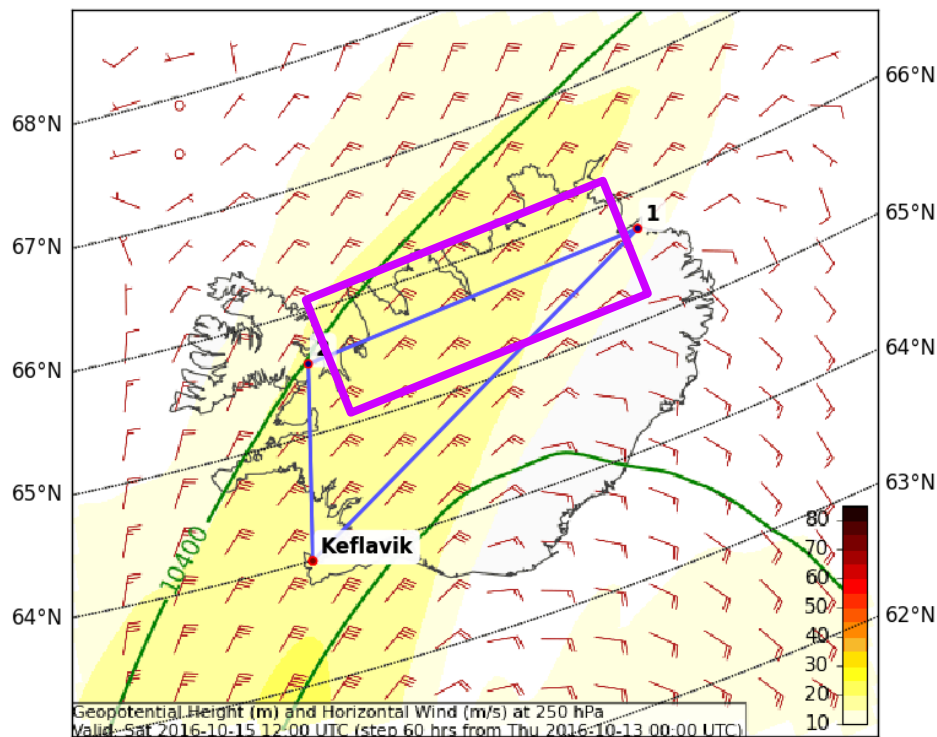
1st FALCON flight

Saturday October 15th FALCON Flight 10:00 – 13:30 UTC

Total Cloud Cover

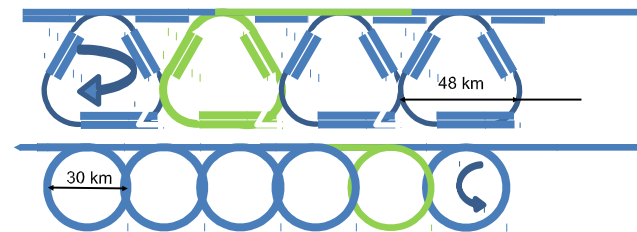


Hor Wind (m/s) at 300 hPa



BT13/00Z VT15/12Z

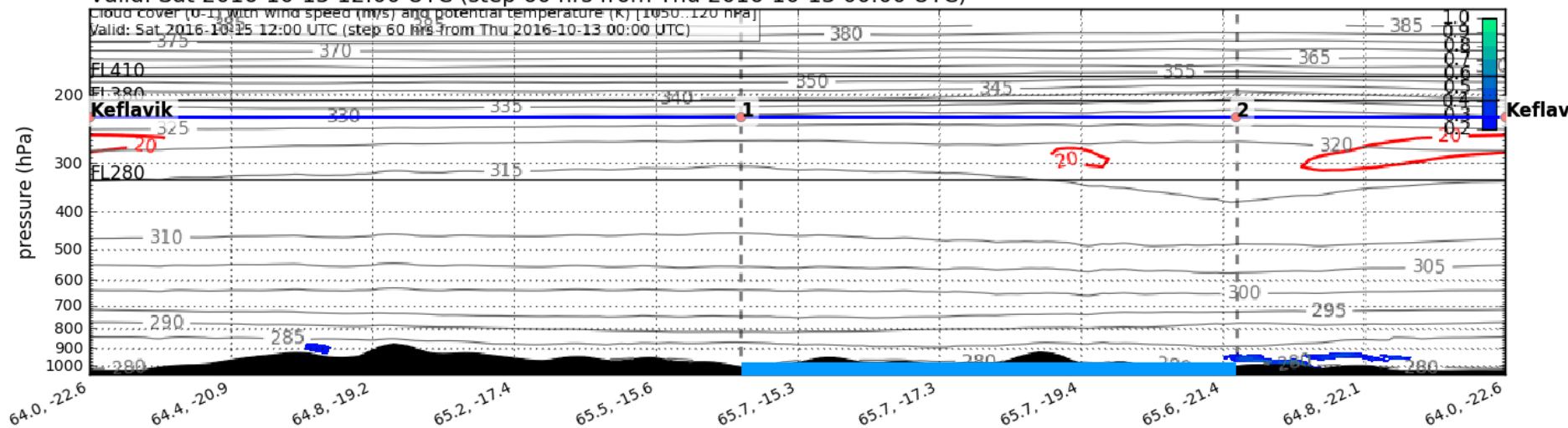
- Scan pattern in box to estimate 3D wind
- Mostly cloud free region needed
- FL360



Saturday October 15th FALCON Flight 10:00 – 13:30 UTC

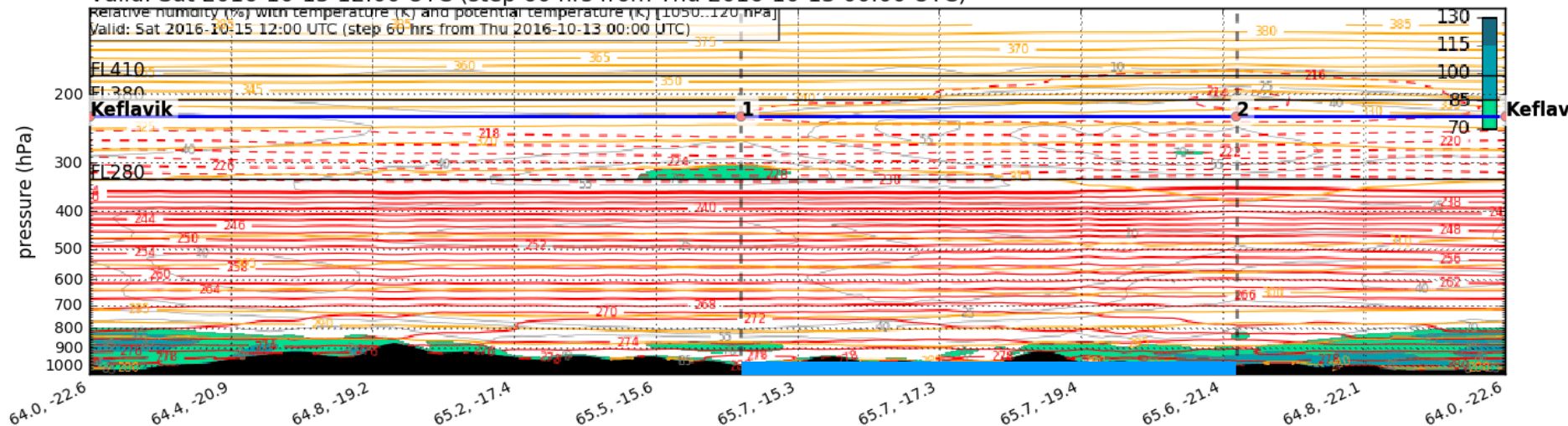
Cloud Cover (0-1) and Wind Speed (m/s) Vertical Section

Valid: Sat 2016-10-15 12:00 UTC (step 60 hrs from Thu 2016-10-13 00:00 UTC)



Relative Humidity (%) Vertical Section

Valid: Sat 2016-10-15 12:00 UTC (step 60 hrs from Thu 2016-10-13 00:00 UTC)



BT13/00Z VT15/12Z

Saturday 15th October

DLR Falcon Plan

2nd Flight

Sat 15 18Z – DLR Falcon Plan (2nd flight)

Objectives

-> Calibration for the A2D incoherent lidar

Needs clear sky above Icelandic glaciers

Infos (already discussed)

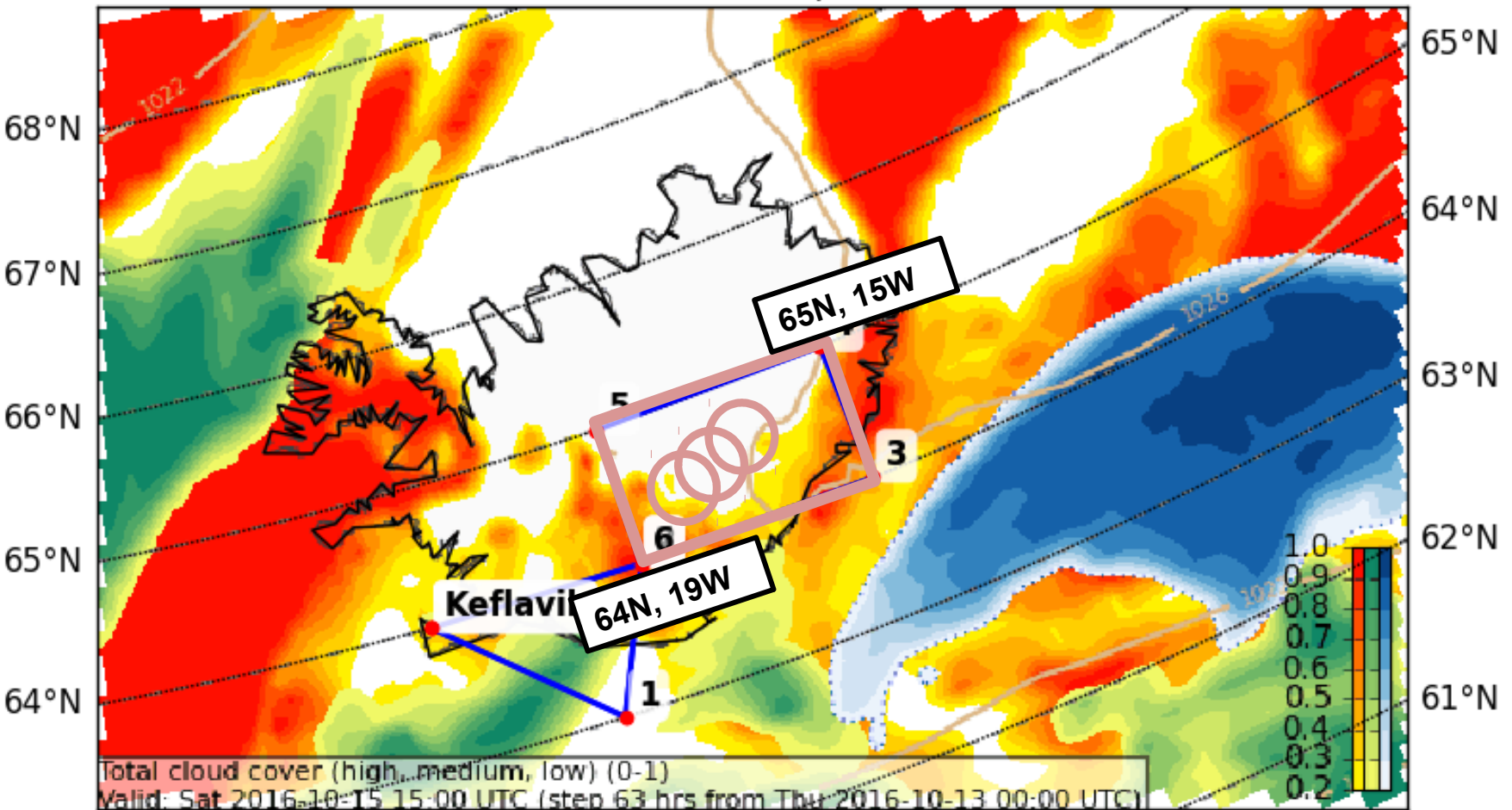
Take-off time: 14:30

Landing: 17:30-18:00

Sat 15 18Z – DLR Falcon Plan (2nd flight)

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

Valid: Sat 2016-10-15 15:00 UTC (step 63 hrs from Thu 2016-10-13 00:00 UTC)



FL-350/380 - Circles over the glaciers in a box NW of WP2, for 2:20 hours.

NAWDEX – Weather Discussion

13 October 2016, Keflavik 16 UTC

- **Today's summary:**
- SAFIRE & HALO are flying FALCON is not
- Intercomparison flight of UK FAAM, HALO and Safire Falcon Tomorrow
- Saturday flights: HALO, FALCON (double flight)