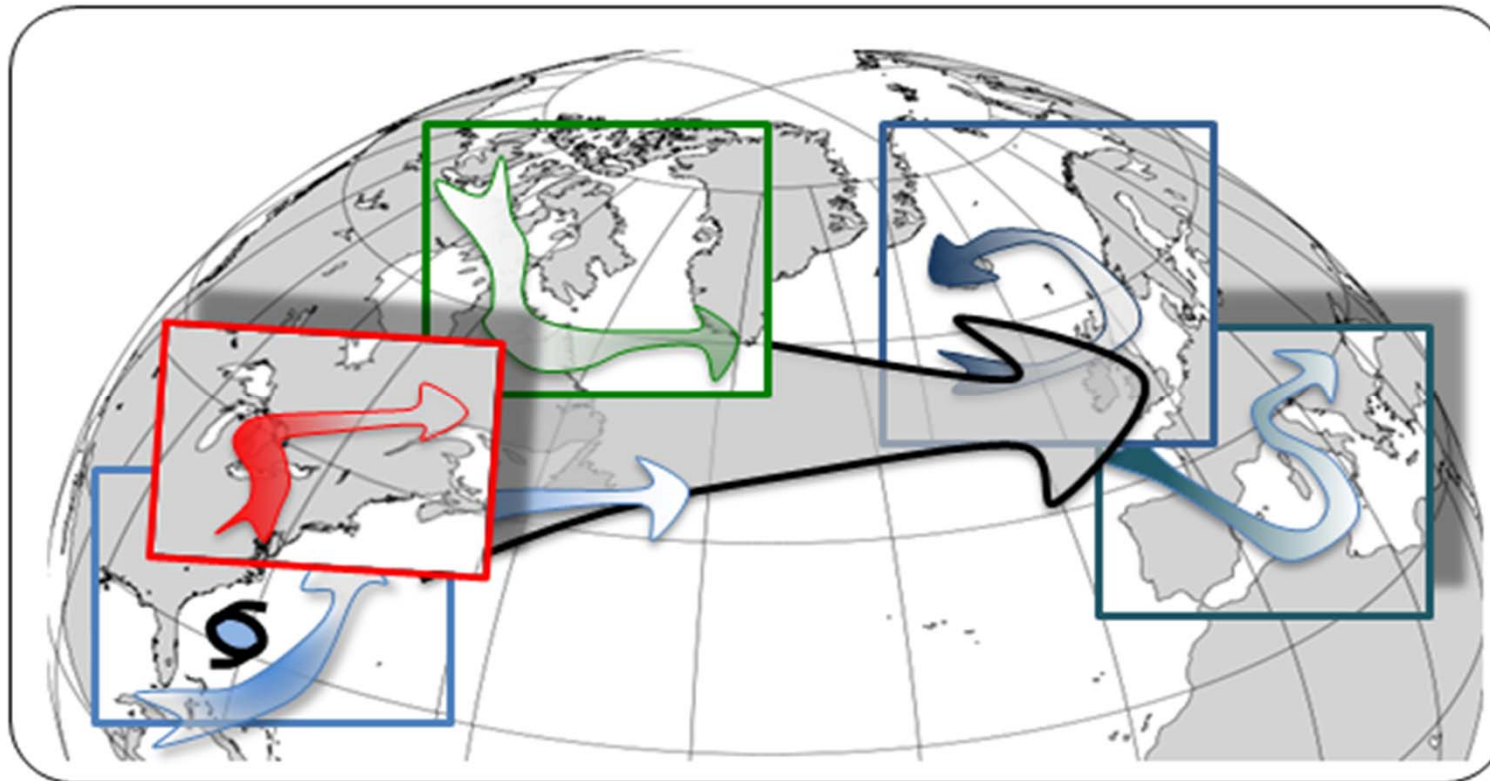


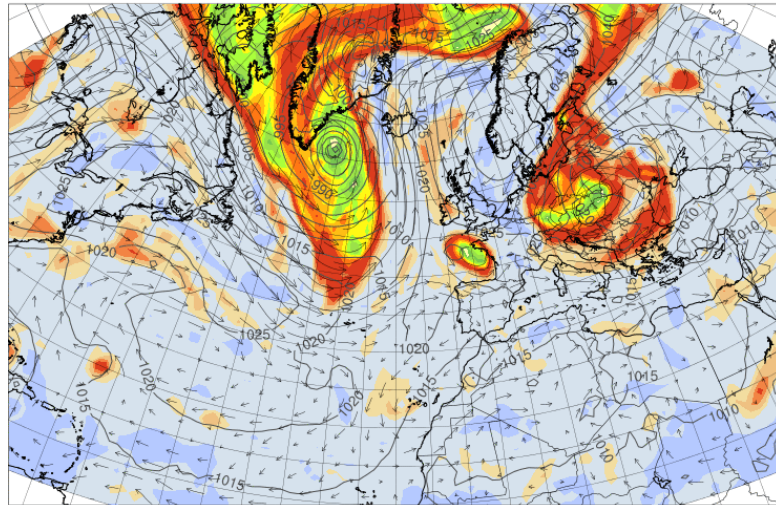
NAWDEX – Weather Discussion

05 October 2016, Keflavik 17 UTC

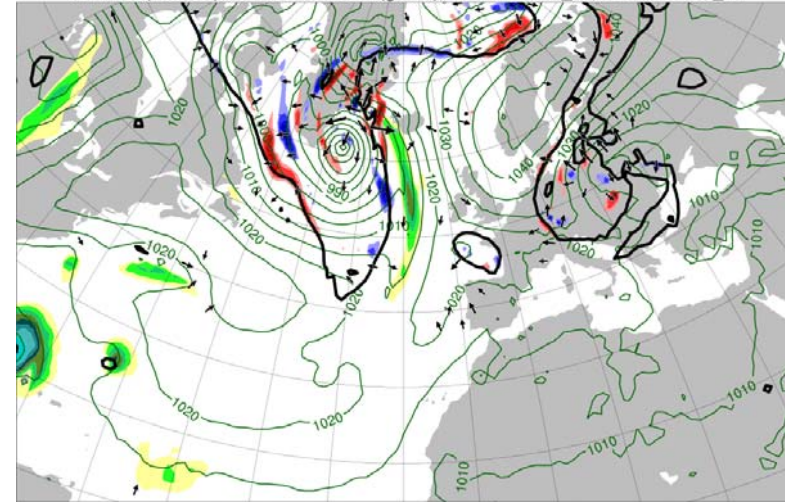


Forecast – Wed 5 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

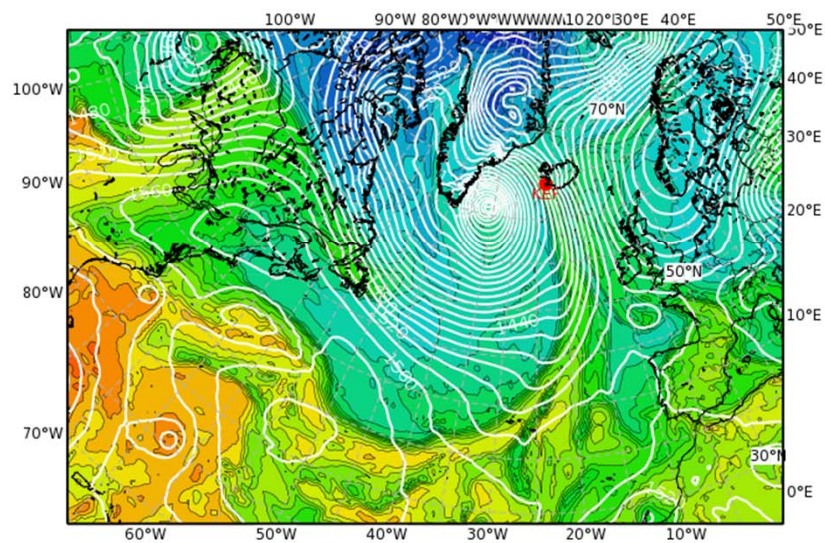
PV@320K at 20161005_12



2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005_00, VT: 20161005_12

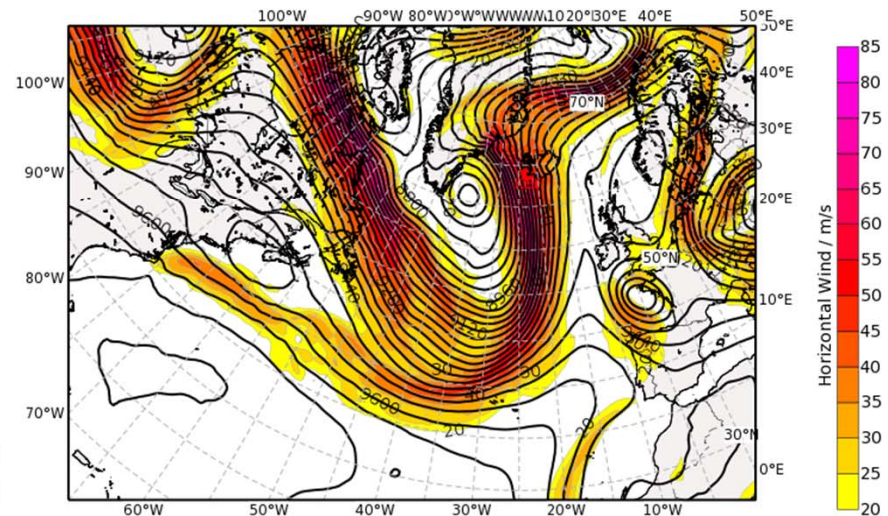


Color scale for PVU: -0.5, 0.2, 0.7, 1, 1.5, 2, 4, 5, 6, 7, 8, 9, 10

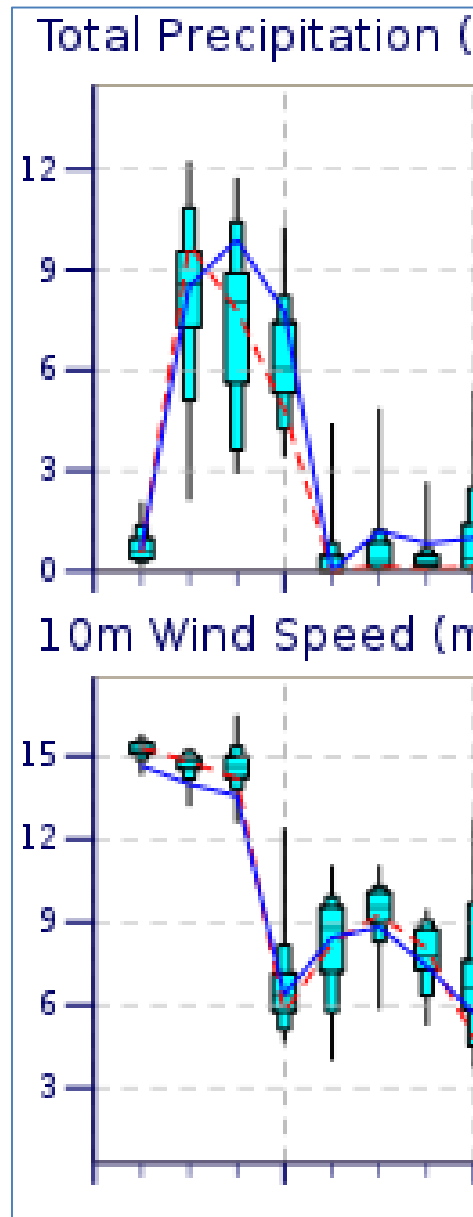


Color scale for kg/(m s): 500, 600, 700, 800, 900, 1000, 1100, 1200

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Wed, 05 Oct 2016, 12 UTC (step 012 h from Wed, 05 Oct 2016, 00 UTC)



Strong winds on Wed 5 Oct 2016

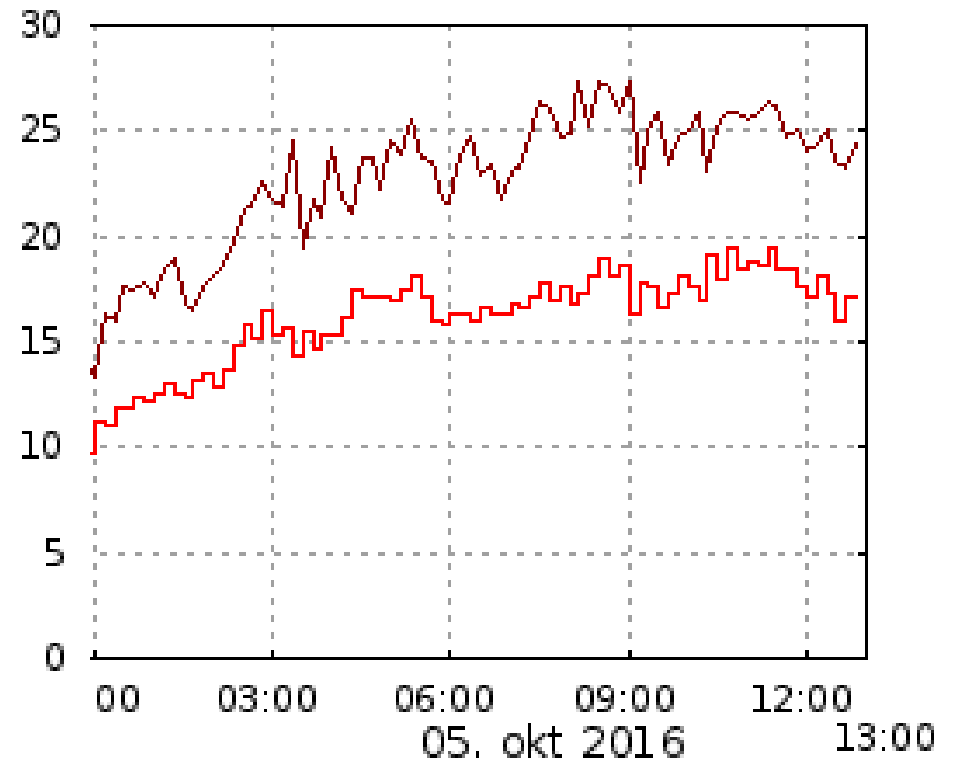


ECMWF

06Z: 15m/s
12Z: 14-15m/s
18Z: 14m/s

Vindhraði og hviður [m/s]

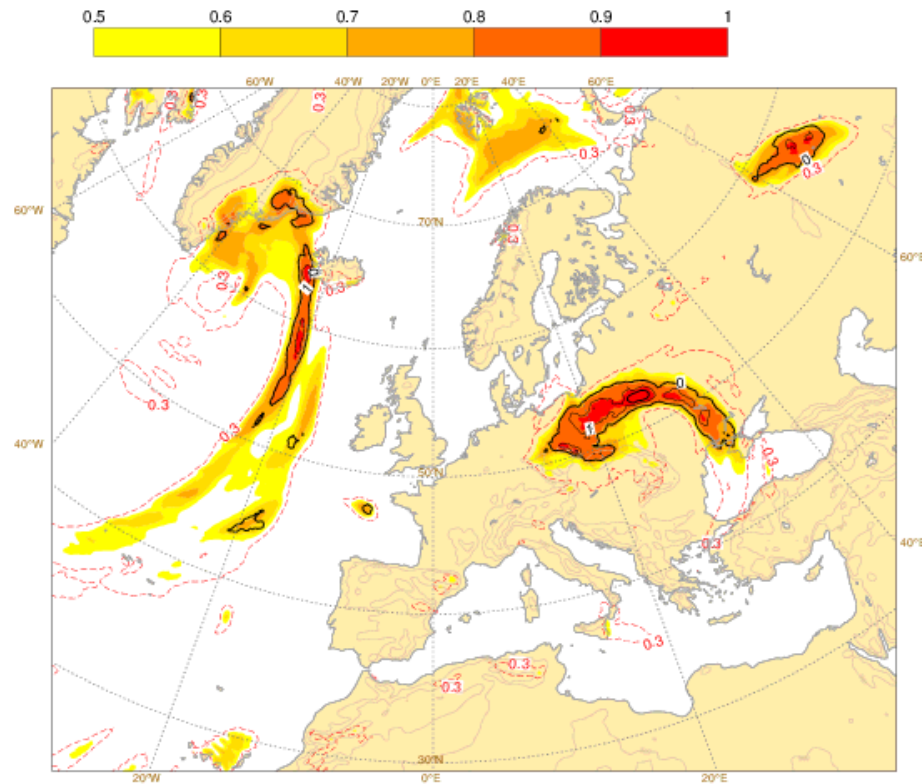
OBSERVATIONS:



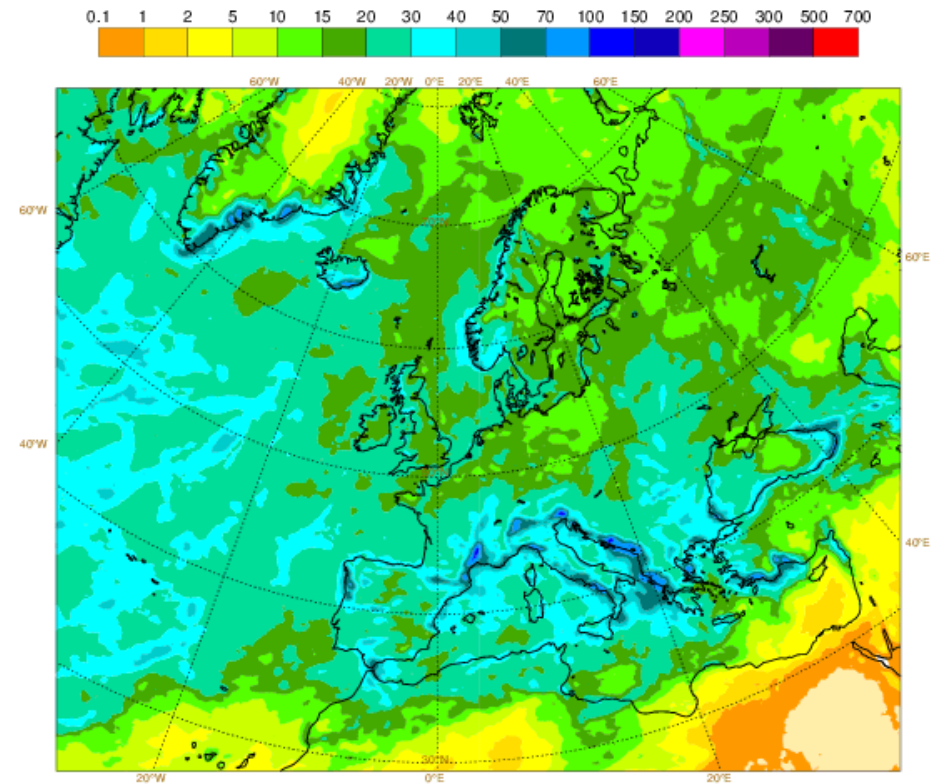
- Stronger wind than predicted by ECMWF ensemble, agreement with HARMONIE 2.5 km-resolution model.

Heavy rain on Wed 5 Oct 2016

Wed 05 Oct 2016 00UTC ©ECMWF t+0-24h VT: Wed 05 Oct 2016 00UTC - Thu 06 Oct 2016 00UTC
Extreme forecast index and Shift of Tails (black contours 0,1,2,5,8) for total precipitation

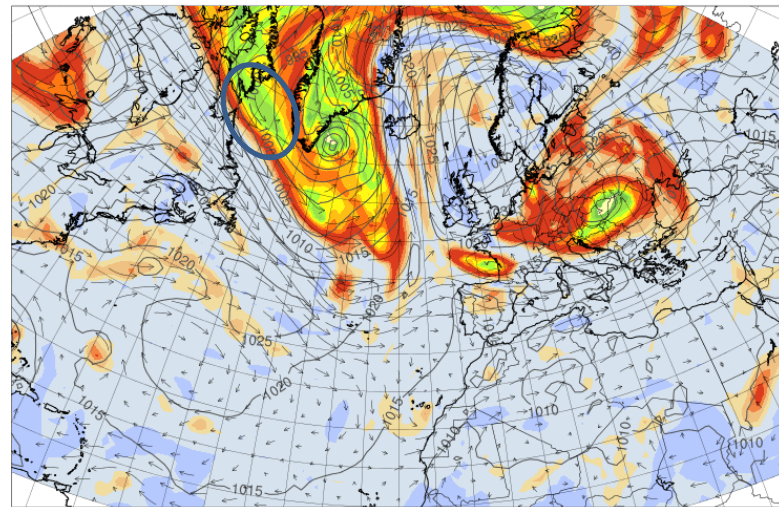


Mon 03 Oct 2016 00UTC ©ECMWF VT: Wed 05 Oct 2016 00UTC - Thu 06 Oct 2016 00UTC 0-24h
total precipitation (in mm) Model climate Q99 (one in 100 occasions realises more than value shown)

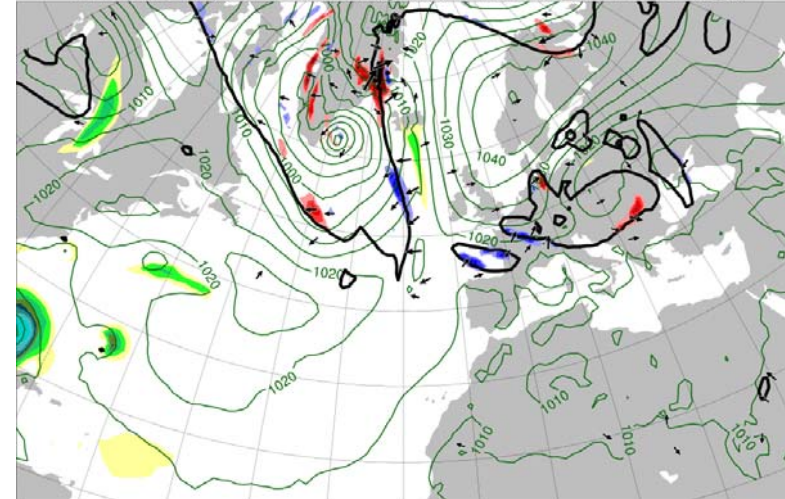


Forecast – Thu 6 Oct 2016, 00 UTC PV320K, irrwind320K, THE850K, trajectories

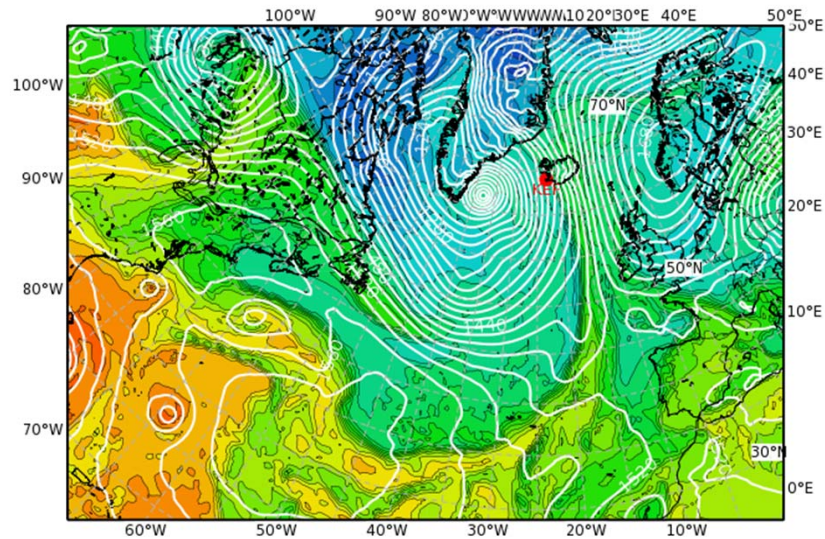
PV@320K at 20161006_00



2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005_00, VT: 20161006_00

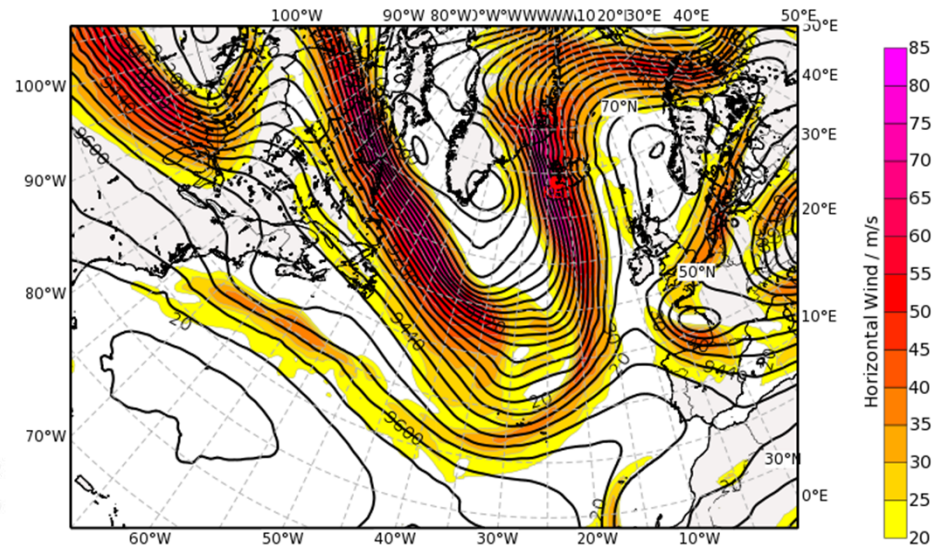


Color scale for PVU (Potential Vorticity Units): -0.5, 0.2, 0.7, 1, 1.5, 2, 4, 5, 6, 7, 8, 9, 10.



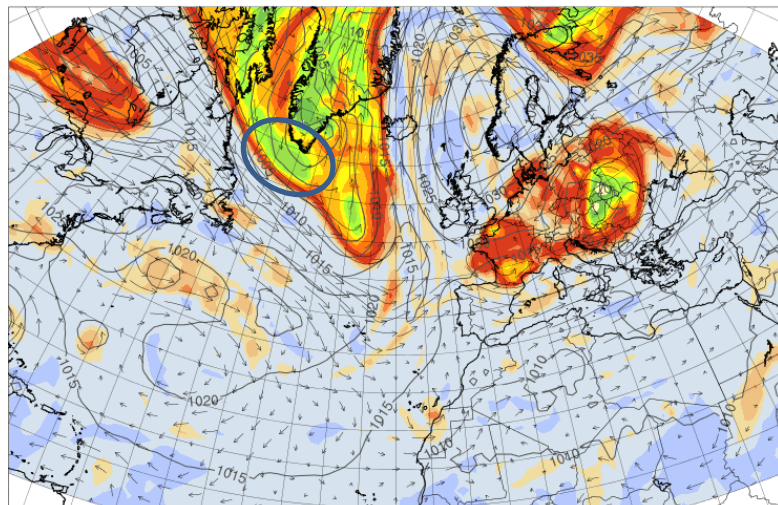
Color scale for Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa: 500, 600, 700, 800, 900, 1000, 1100, 1200 kg/(m s).

Valid: Thu, 06 Oct 2016, 00 UTC (step 024 h from Wed, 05 Oct 2016, 00 UTC)

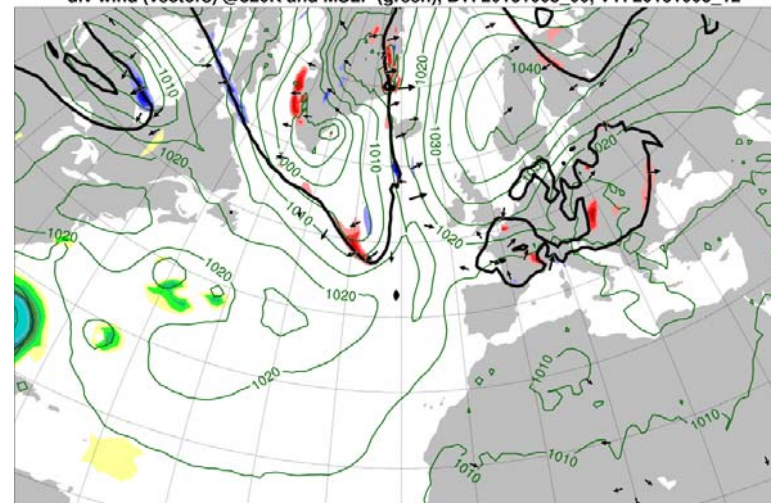


Forecast – Thu 6 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

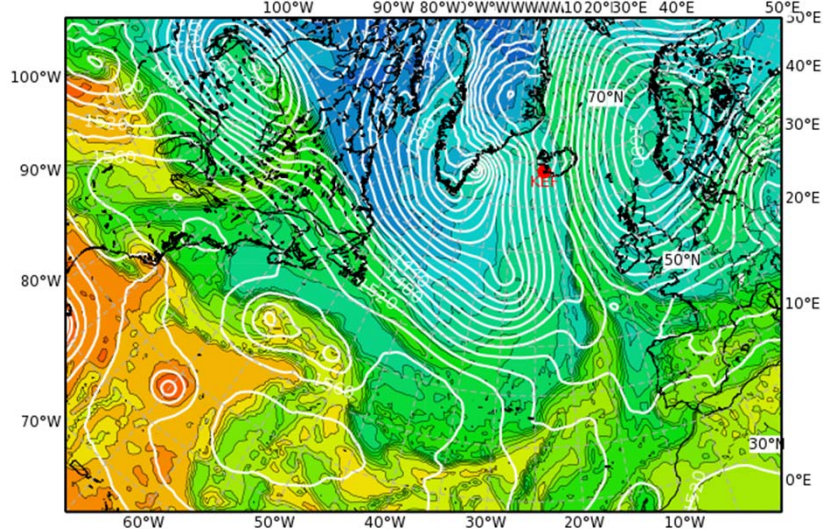
PV@320K at 20161006_12



2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005_00, VT: 20161006_12

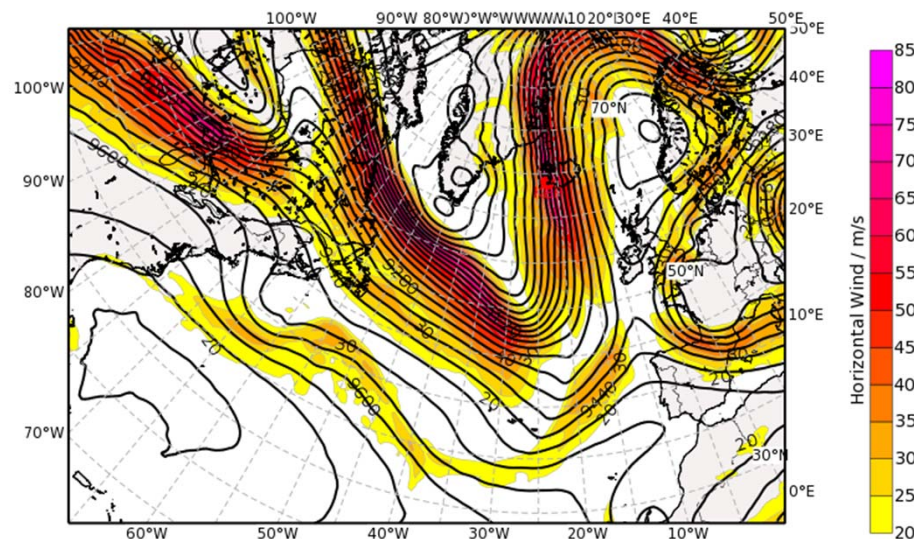


Color scale for PVU (Potential Vorticity Units): -0.5, 0.2, 0.7, 1, 1.5, 2, 4, 5, 6, 7, 8, 9, 10.



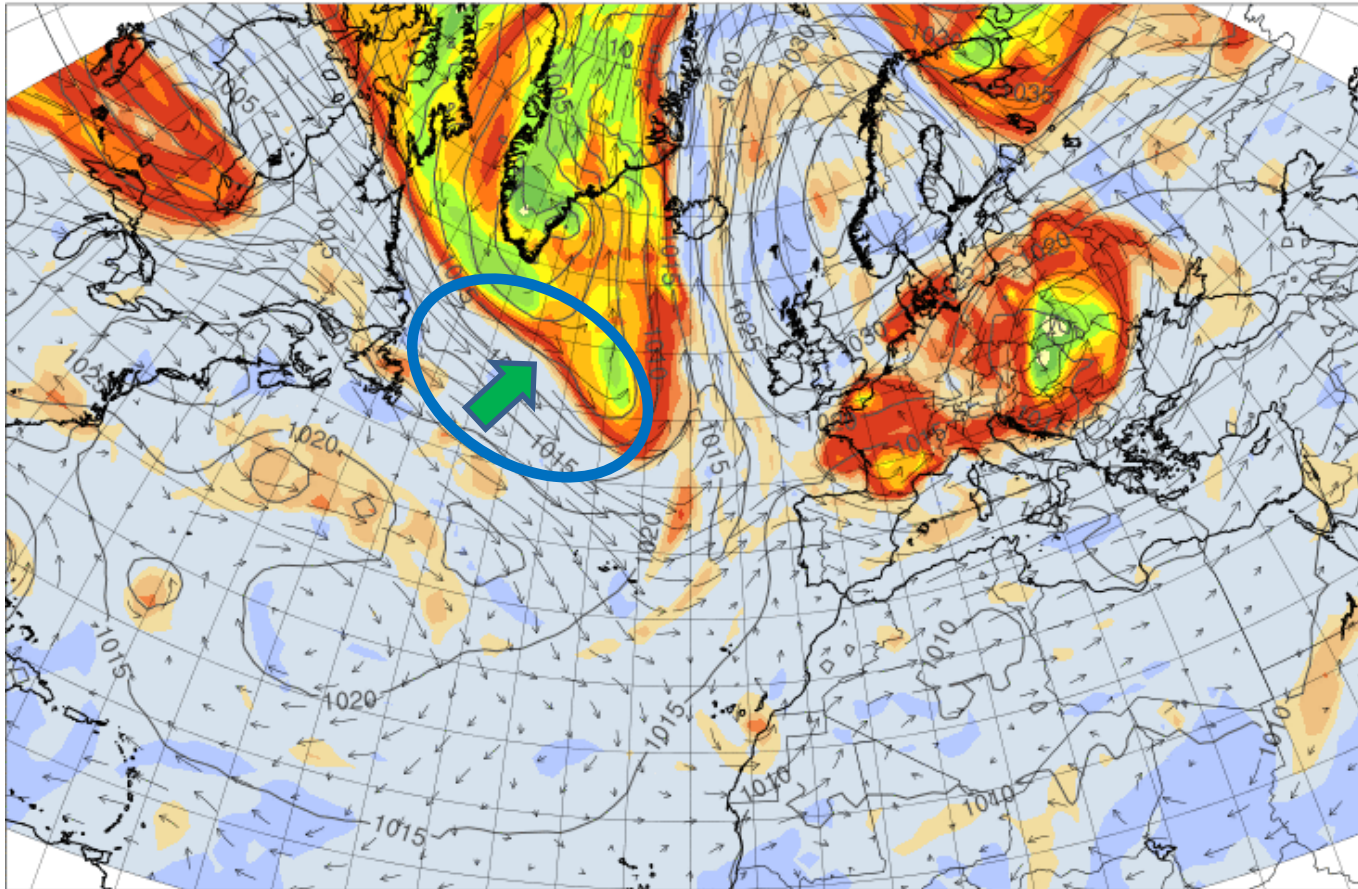
Color scale for kg/(m s): 500, 600, 700, 800, 900, 1000, 1100, 1200.

Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Thu, 06 Oct 2016, 12 UTC (step 036 h from Wed, 05 Oct 2016, 00 UTC)



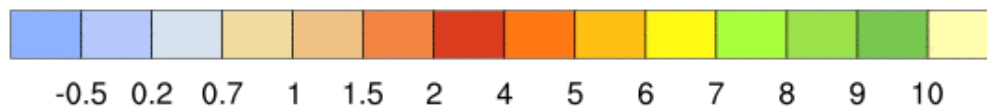
Tropopause Polar Vortices (TPVs)

PV@320K at 20161006_12



TPVs can induce tropopause undulations and initiate RWI.

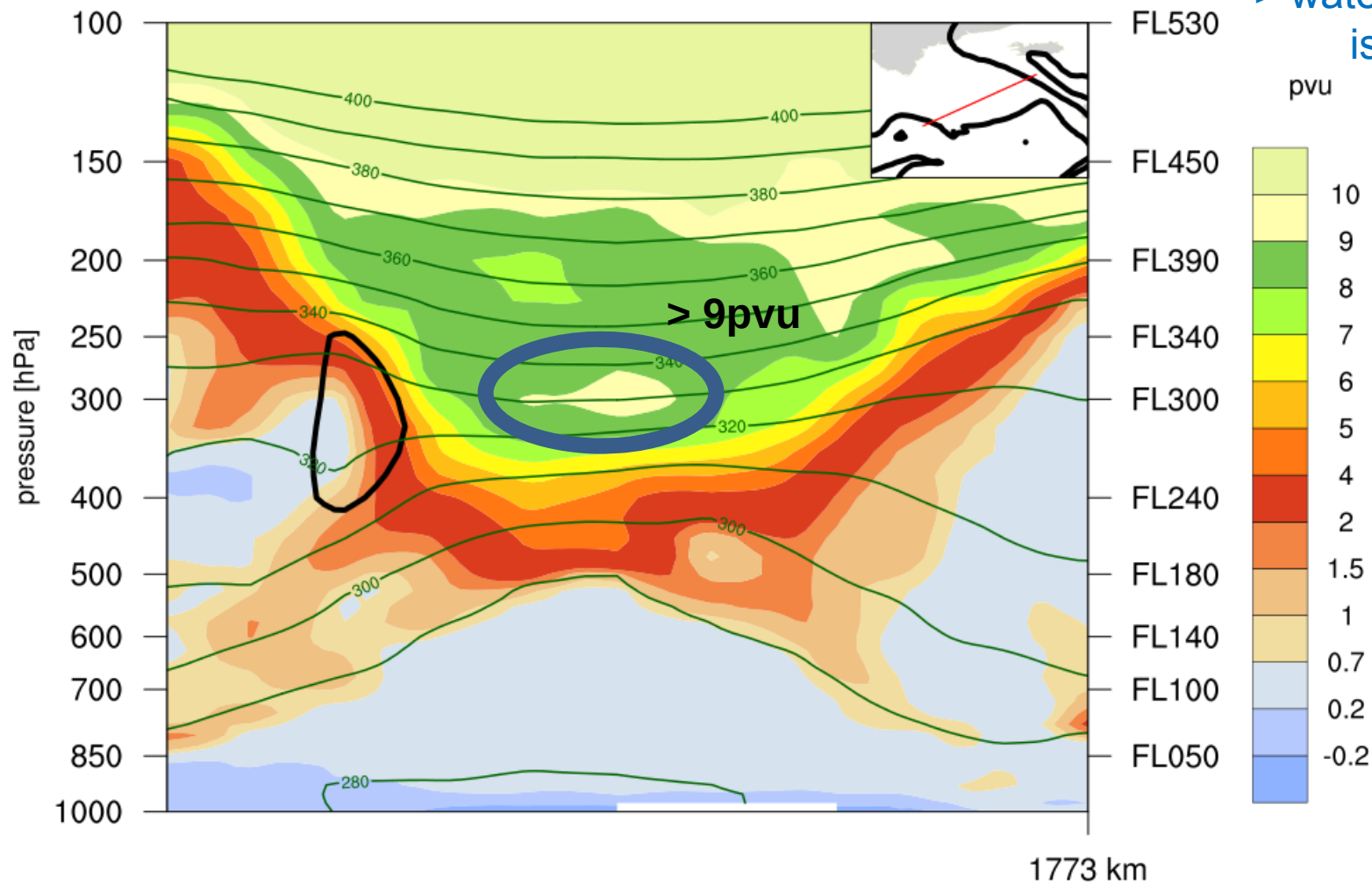
The balanced component of the flow is responsible of that.



pvu

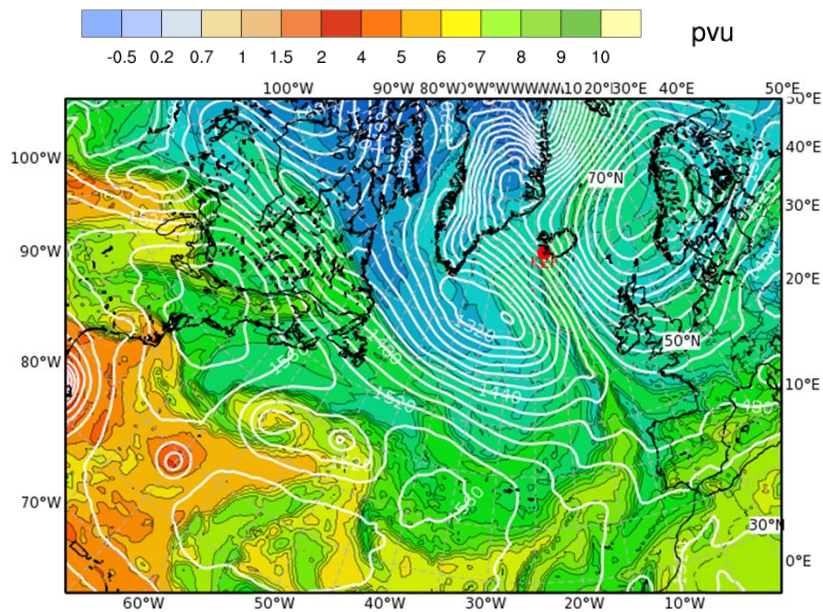
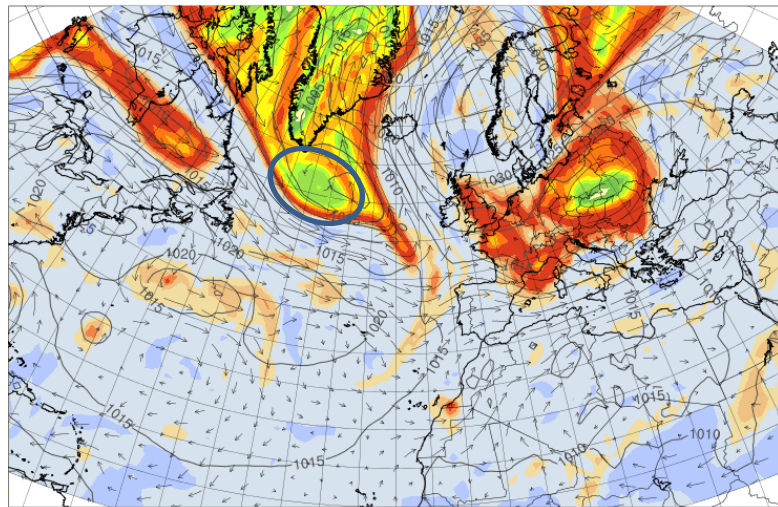
Cross section at Fri 07/12UTC

- Very high PV values.
- **Radiative processes drive the PV increase.**
-> water vapor gradient is the key



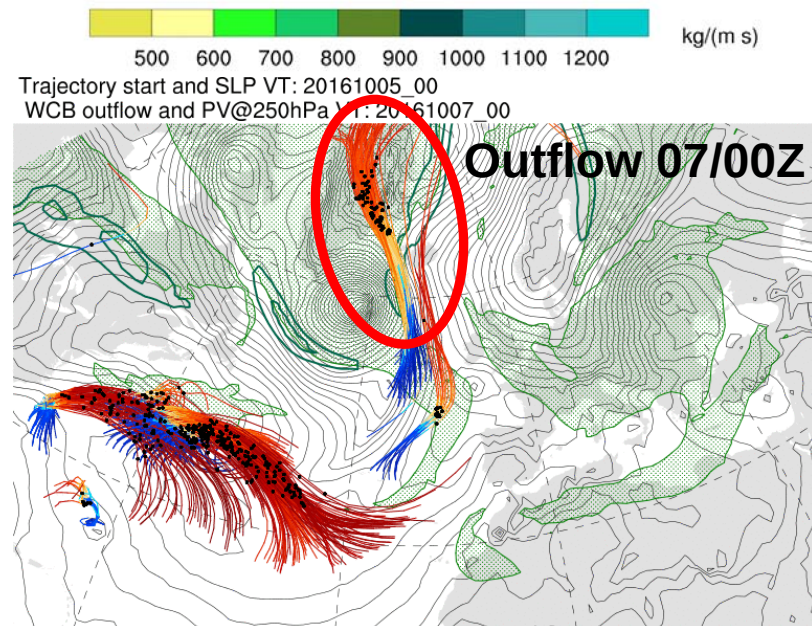
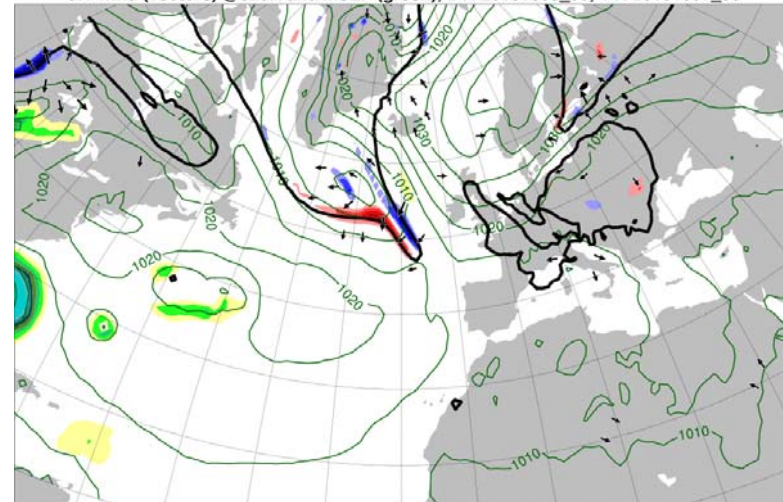
Forecast – Fri 7 Oct 2016, 00UTC

PV@320K at 20161007_00



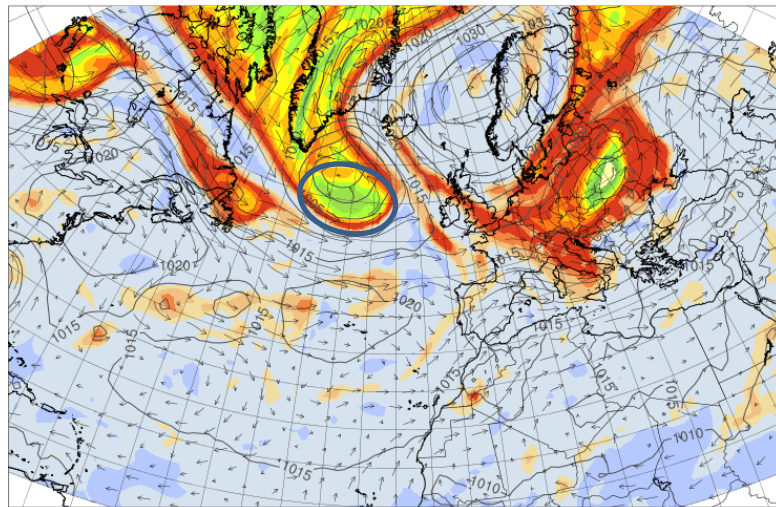
PV320K, irrwind320K, THE850K, trajectories

2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005_00, VT: 20161007_00



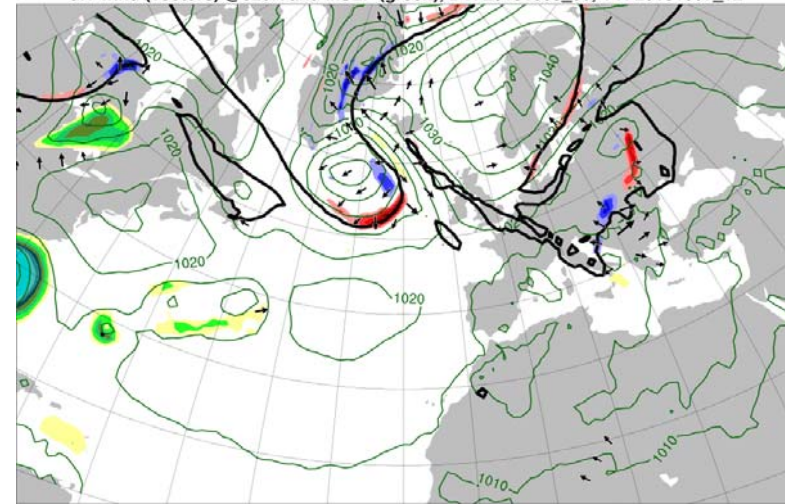
Forecast – Fri 7 Oct 2016, 12UTC

PV@320K at 20161007_12

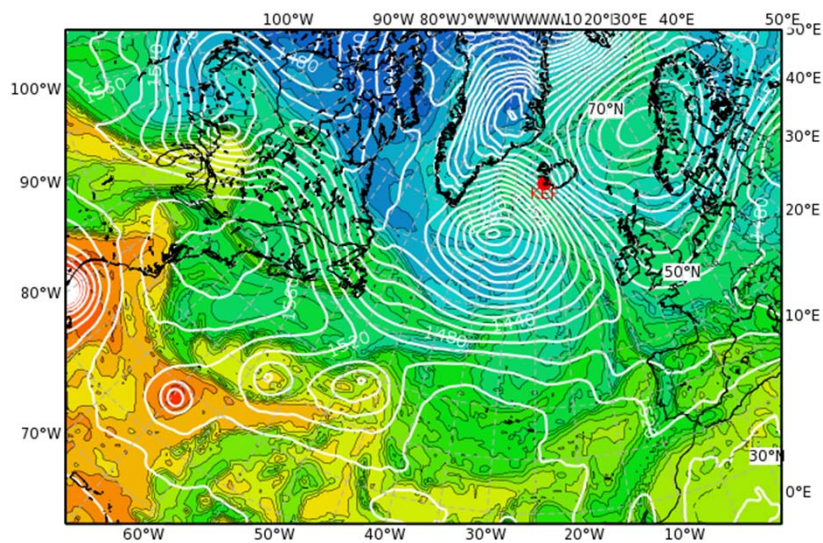


PV320K, irrwind320K, THE850K, trajectories

2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005_00, VT: 20161007_12

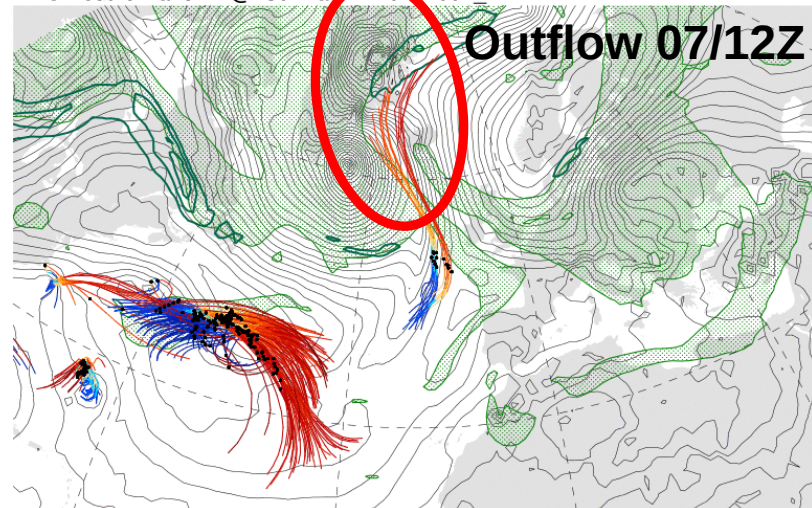


Color scale for PVU (Potential Vorticity Units) ranging from -0.5 to 10.



Color scale for kg/(m s) ranging from 500 to 1200.

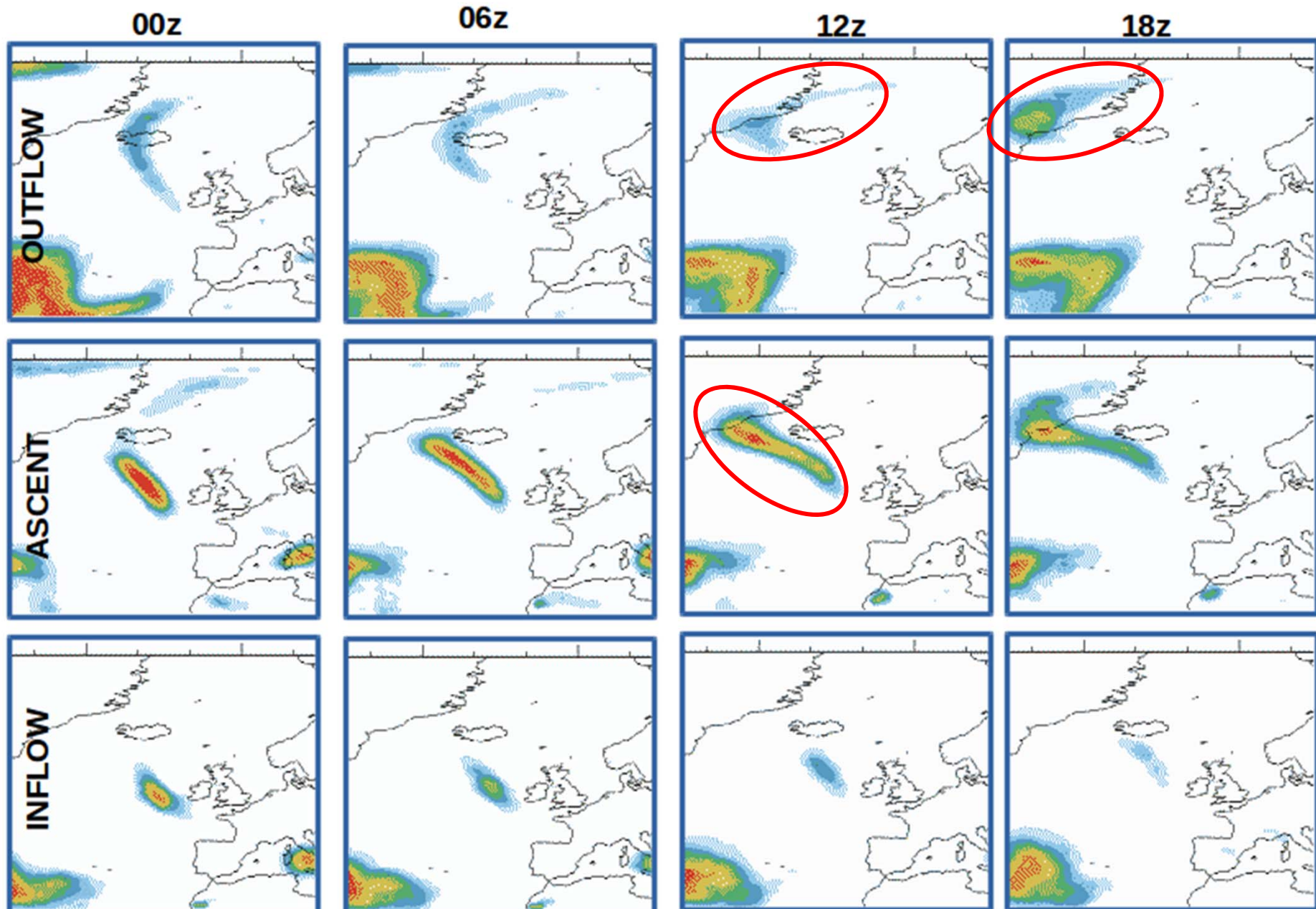
Trajectory start and SLP VT: 20161005_12
WCB outflow and PV@250hPa VT: 20161007_12



Outflow 07/12Z

Color scale for hPa ranging from 200 to 1000.

WCB Ens Probabilities Friday 7 Oct (BT: 05/00z)



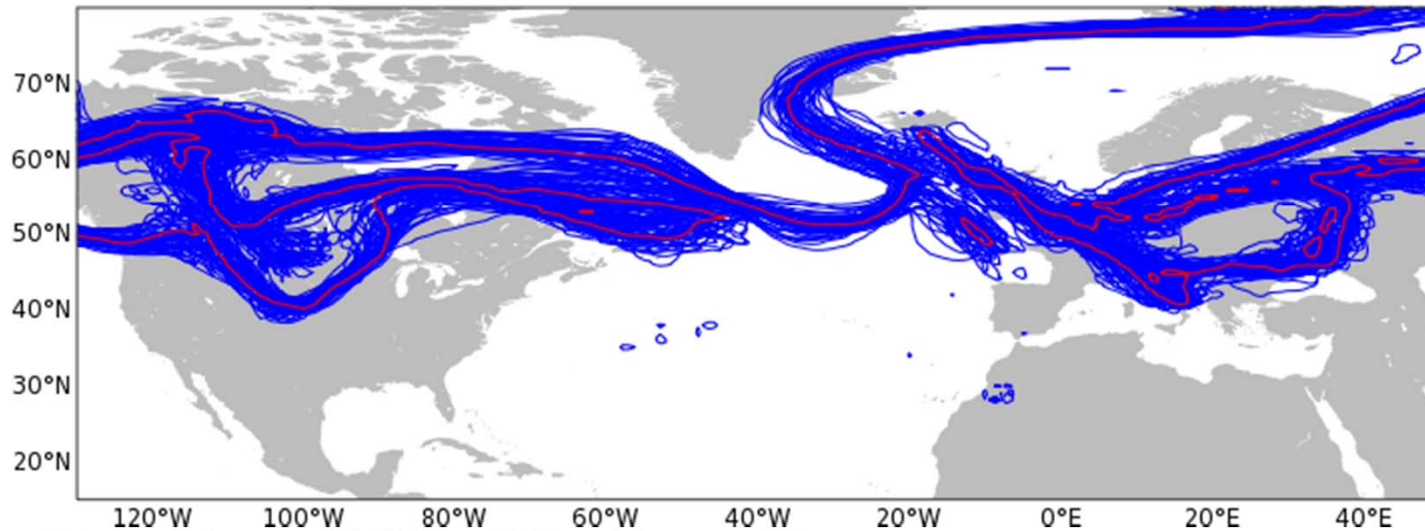
2PVU@320K, MSLP990 Spaghetti (based EC Ens 05/00Z)

ECMWF ENSEMBLE FC

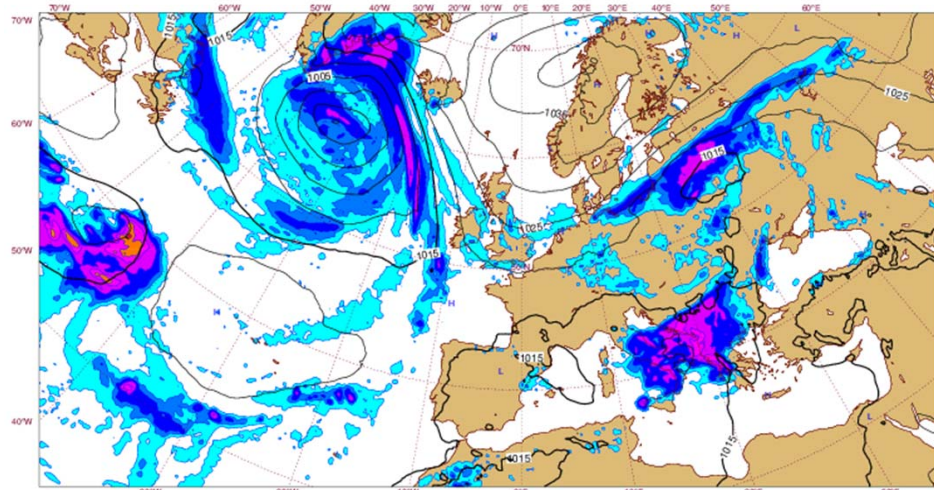
BT: 20161005 00UTC, VT: 20161007 12UTC

blue: perturbed, red: control

Fri 07/12Z

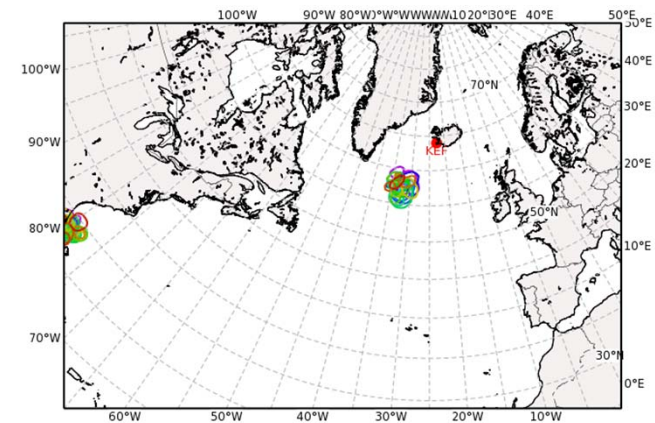


Wednesday 05 October 2016 0000 UTC ECMWF 1+60 VT: Friday 07 October 2016 1200 UTC
Surface: Mean sea level pressure / 12hr Accumulated precipitation (VT-6h/VT+6h)



ECMWF ENS MSLP (990hPa-isoline)

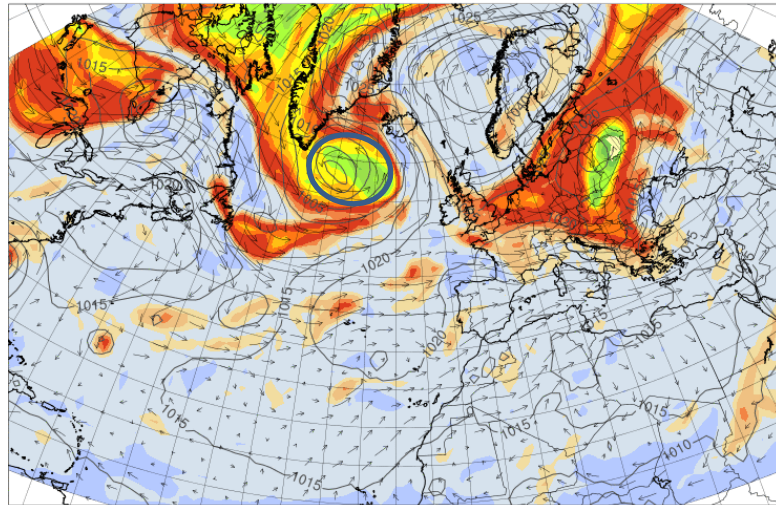
Valid: Fri, 07 Oct 2016, 12 UTC (step 060 h from Wed, 05 Oct 2016, 00 UTC)



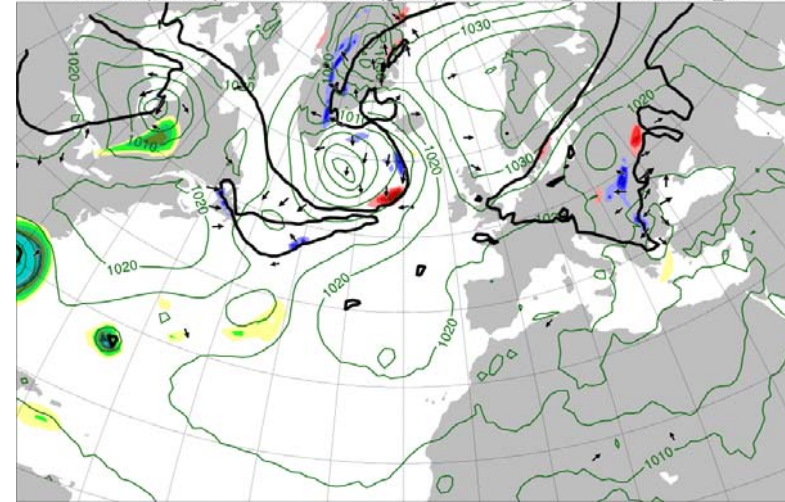
Low pressure
development
due to TPV.

Forecast – Sat 8 Oct 2016, 00UTC PV320K, irrwind320K, THE850K, trajectories

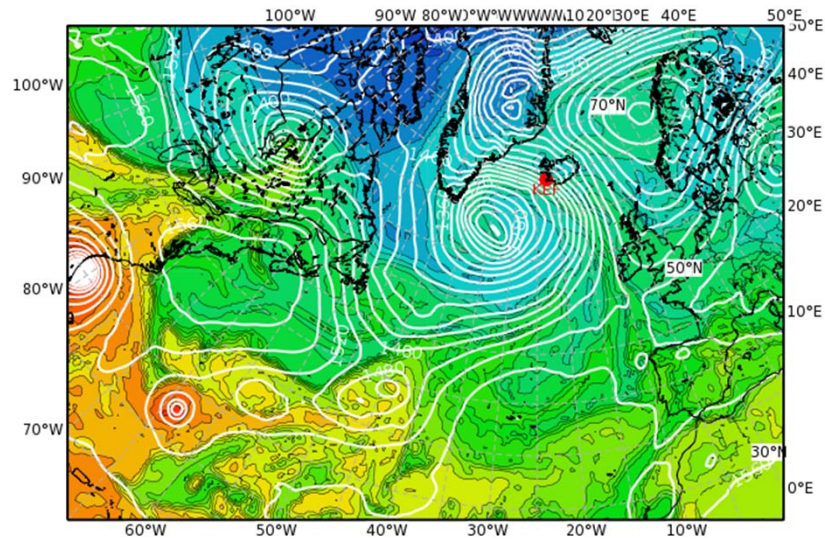
PV@320K at 20161008_00



2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005_00, VT: 20161008_00

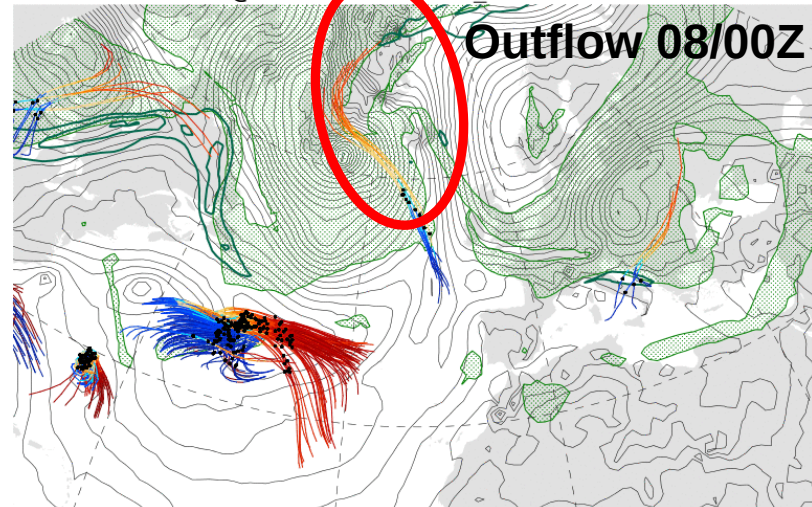


pvu
-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10



kg/(m s)
500 600 700 800 900 1000 1100 1200

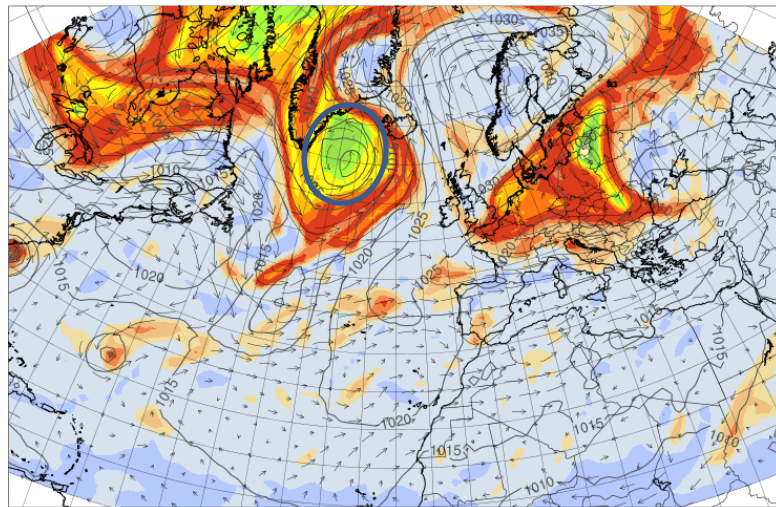
Trajectory start and SLP VT: 20161006_00
WCB outflow and PV@250hPa VT: 20161008_00



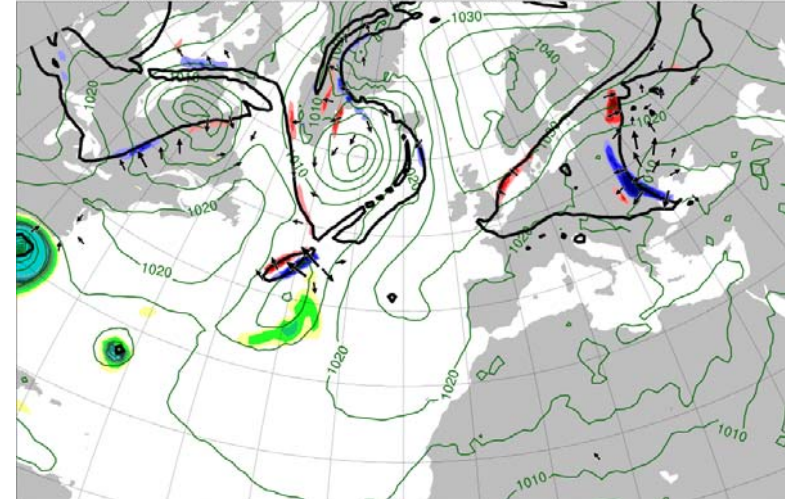
hPa
200 300 400 500 600 700 800 900 1000

Forecast – Sat 8 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

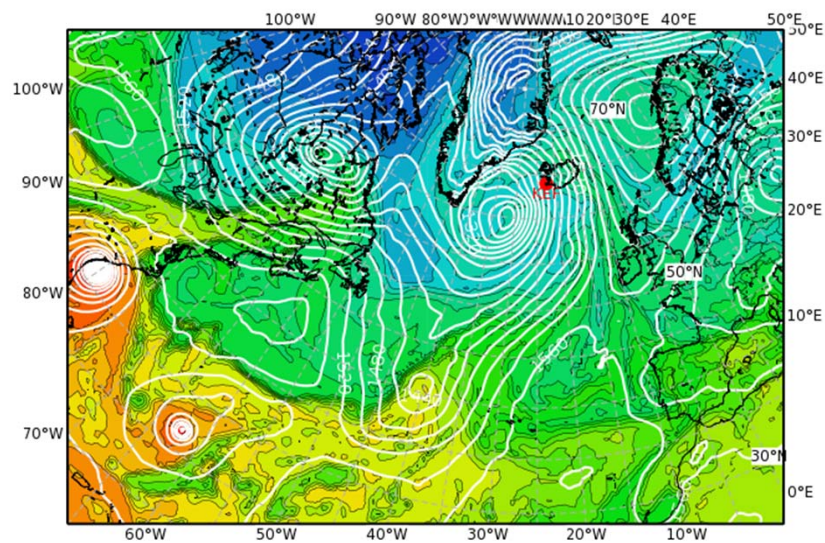
PV@320K at 20161008_12



2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005_00, VT: 20161008_12

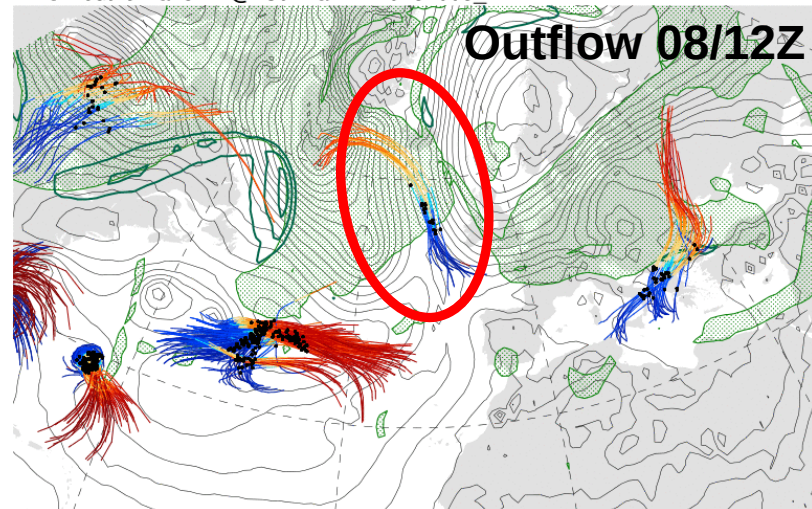


pvu
-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10



kg/(m s)
500 600 700 800 900 1000 1100 1200

Trajectory start and SLP VT: 20161006_12
WCB outflow and PV@250hPa VT: 20161008_12



hPa
200 300 400 500 600 700 800 900 1000

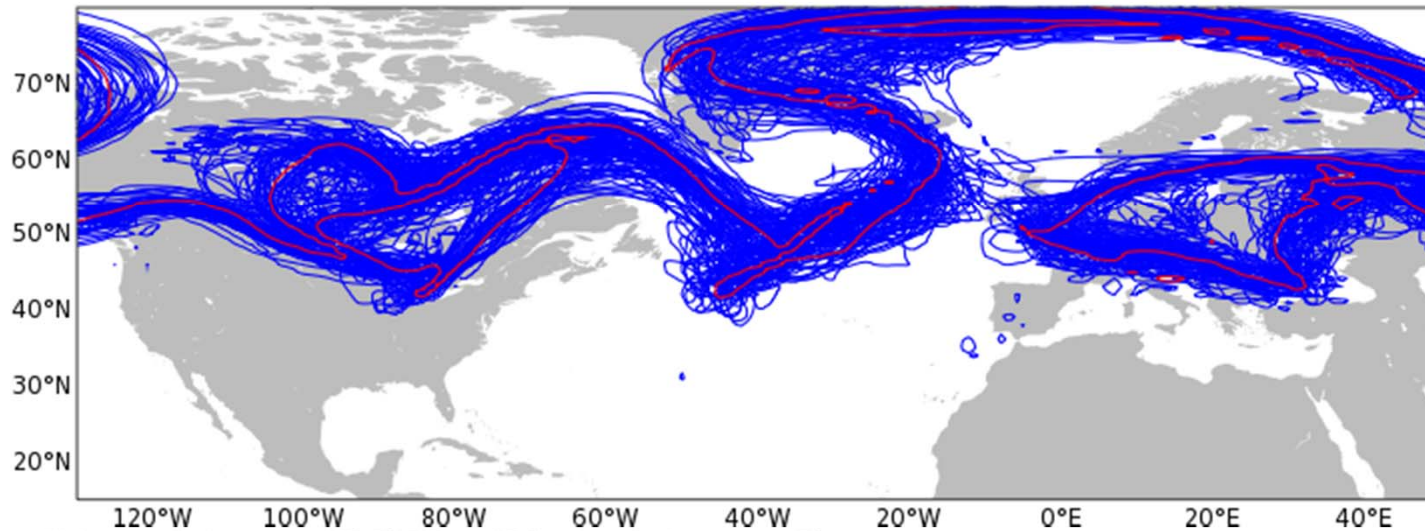
2PVU@320K, MSLP990 Spaghetti (based EC Ens 05/00Z)

ECMWF ENSEMBLE FC

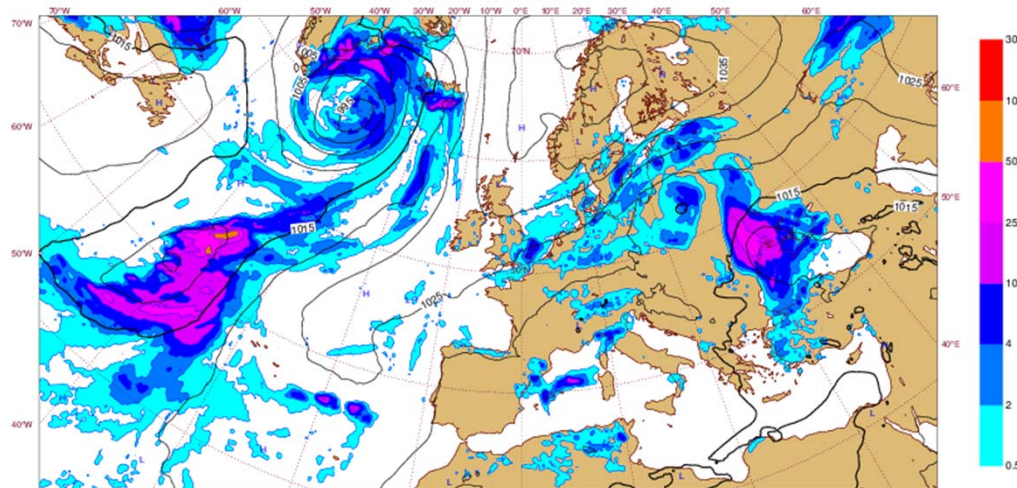
BT: 20161005 00UTC, VT: 20161008 12UTC

blue: perturbed, red: control

Sat 08/12Z

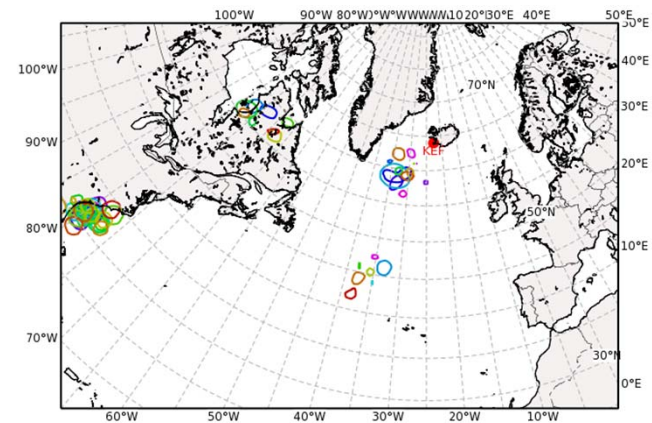


Wednesday 05 October 2016 0000 UTC ECMWF 1+84 VT: Saturday 08 October 2016 1200 UTC
Surface: Mean sea level pressure / 12hr Accumulated precipitation (VT-6h/VT+6h)



ECMWF ENS MSLP (990hPa-isoline)

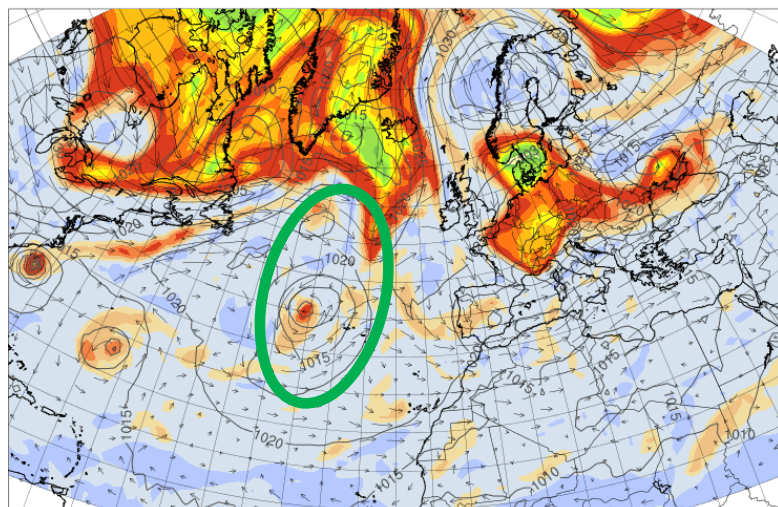
Valid: Sat, 08 Oct 2016, 12 UTC (step 084 h from Wed, 05 Oct 2016, 00 UTC)



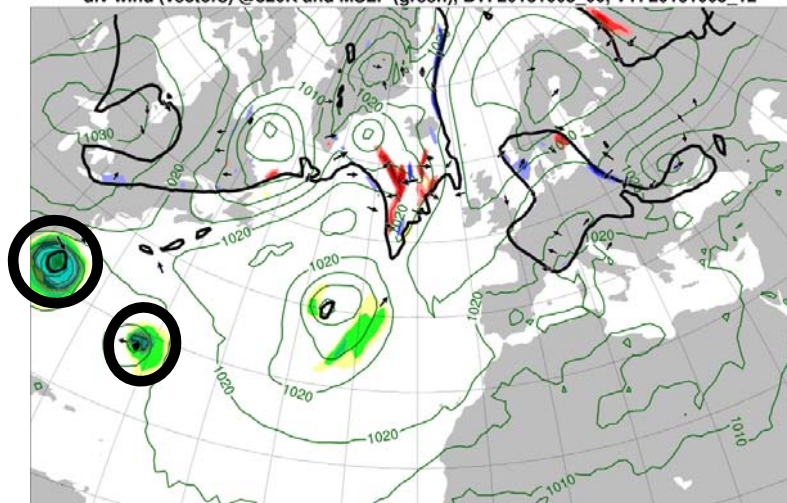
Low pressure
development
due to TPV.

Forecast – Sun 9 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

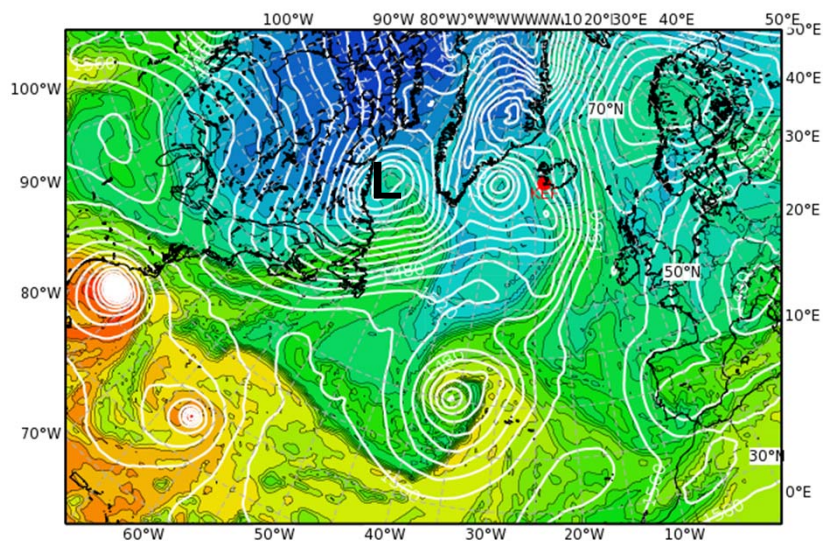
PV@320K at 20161009_12



2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005 00, VT: 20161009_12

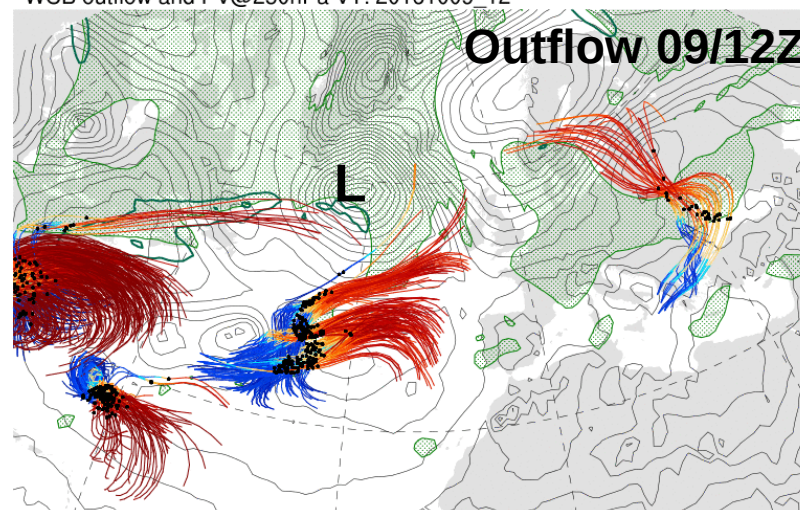


Color scale for PVU (Potential Vorticity Units) ranging from -0.5 to 10.



Color scale for kg/(m s) ranging from 500 to 1200.

Trajectory start and SLP VT: 20161007_12
WCB outflow and PV@250hPa VT: 20161009_12



Outflow 09/12Z

Color scale for hPa ranging from 200 to 1000.

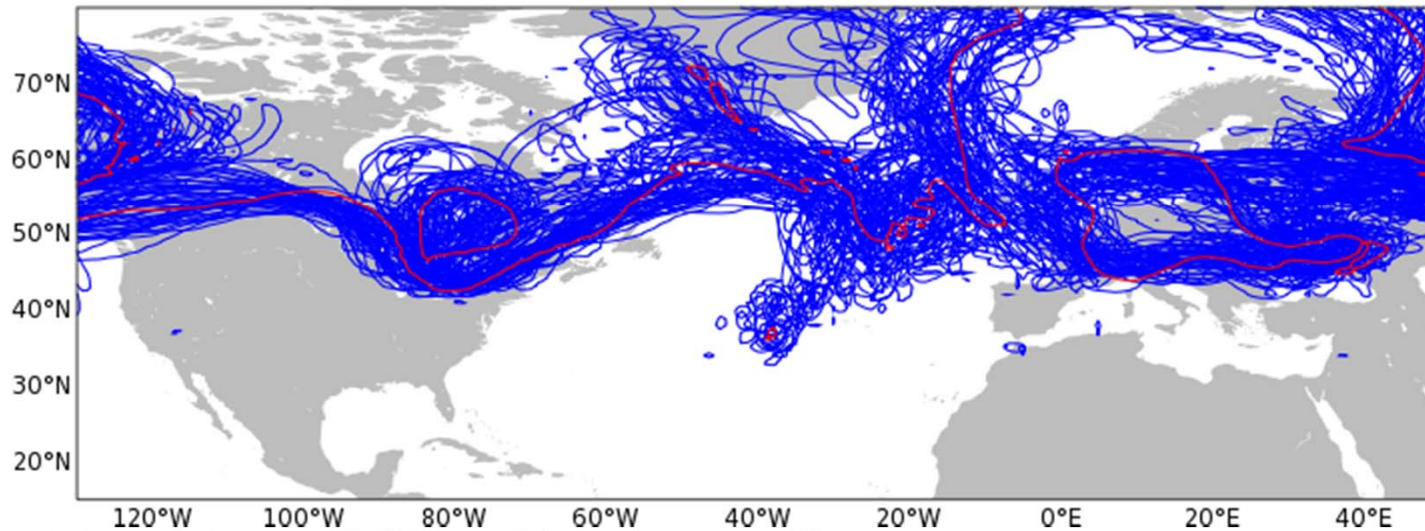
2PVU@320K, MSLP990 Spaghetti (based EC Ens 05/00Z)

ECMWF ENSEMBLE FC

BT: 20161005 00UTC, VT: 20161009 12UTC

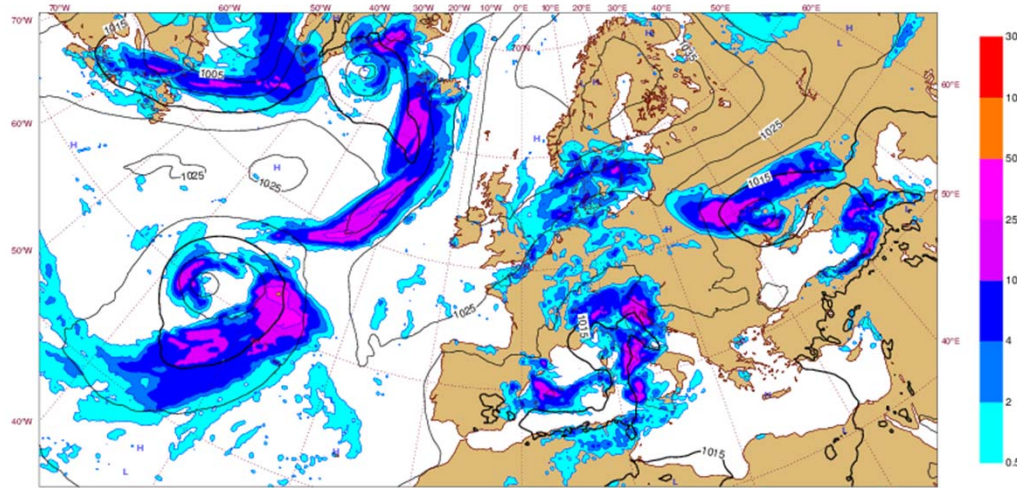
blue: perturbed, red: control

Sun 09/12Z



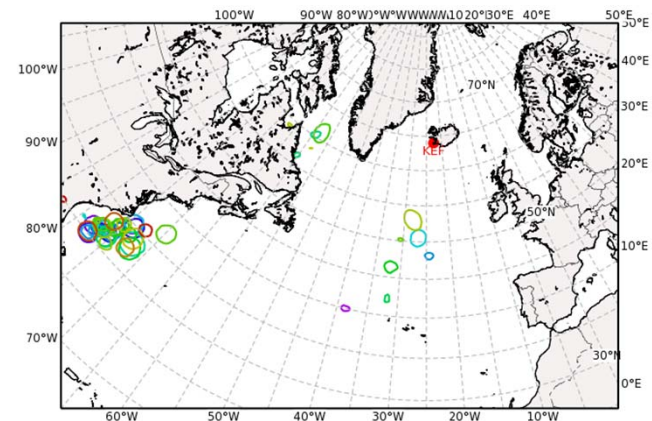
Wednesday 05 October 2016 0000 UTC ECMWF t+108 VT: Sunday 09 October 2016 1200 UTC

Surface: Mean sea level pressure / 12hr Accumulated precipitation (VT-6h/VT+6h)



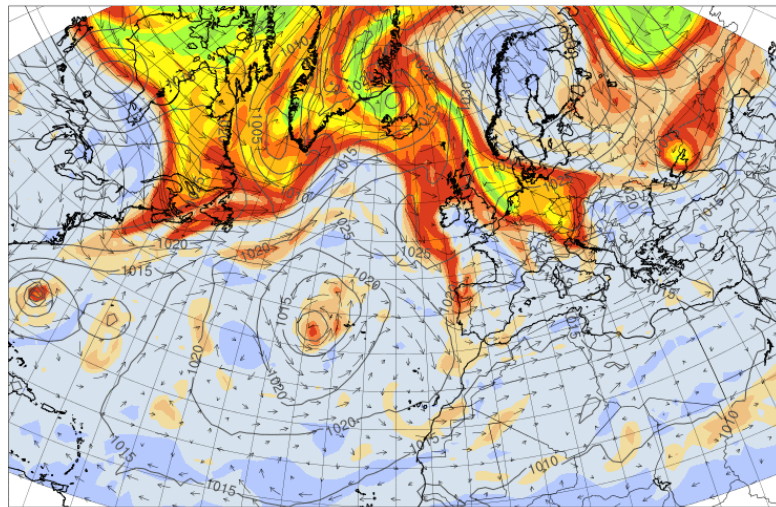
ECMWF ENS MSLP (990hPa-isoline)

Valid: Sun, 09 Oct 2016, 12 UTC (step 108 h from Wed, 05 Oct 2016, 00 UTC)

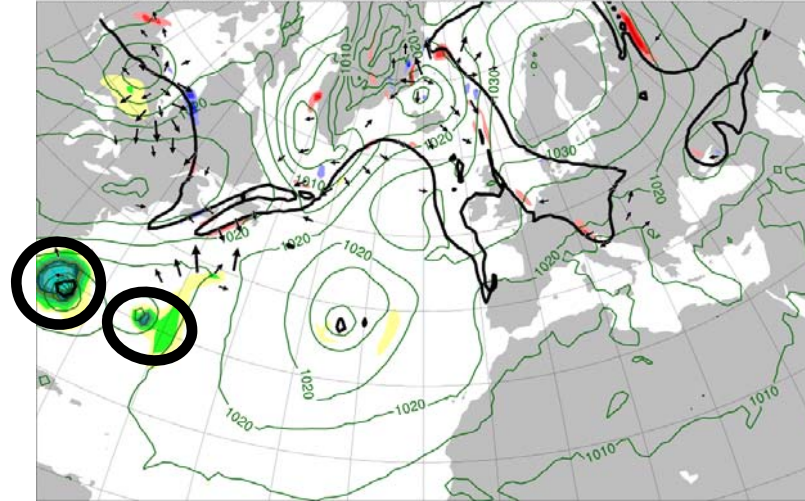


Forecast – Mon 10 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

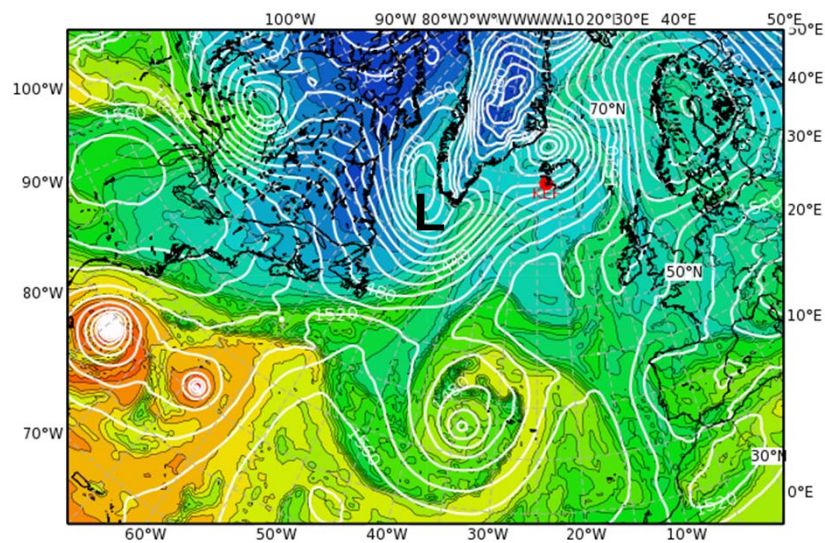
PV@320K at 20161010_12



2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161005_00, VT: 20161010_12

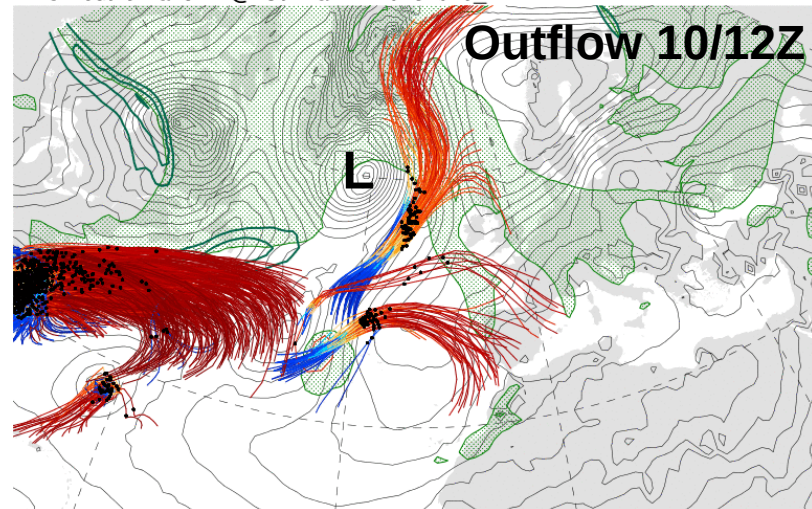


pvu
-0.5 0.2 0.7 1 1.5 2 4 5 6 7 8 9 10



kg/(m s)
500 600 700 800 900 1000 1100 1200

Trajectory start and SLP VT: 20161008_12
WCB outflow and PV@250hPa VT: 20161010_12



hPa
200 300 400 500 600 700 800 900 1000

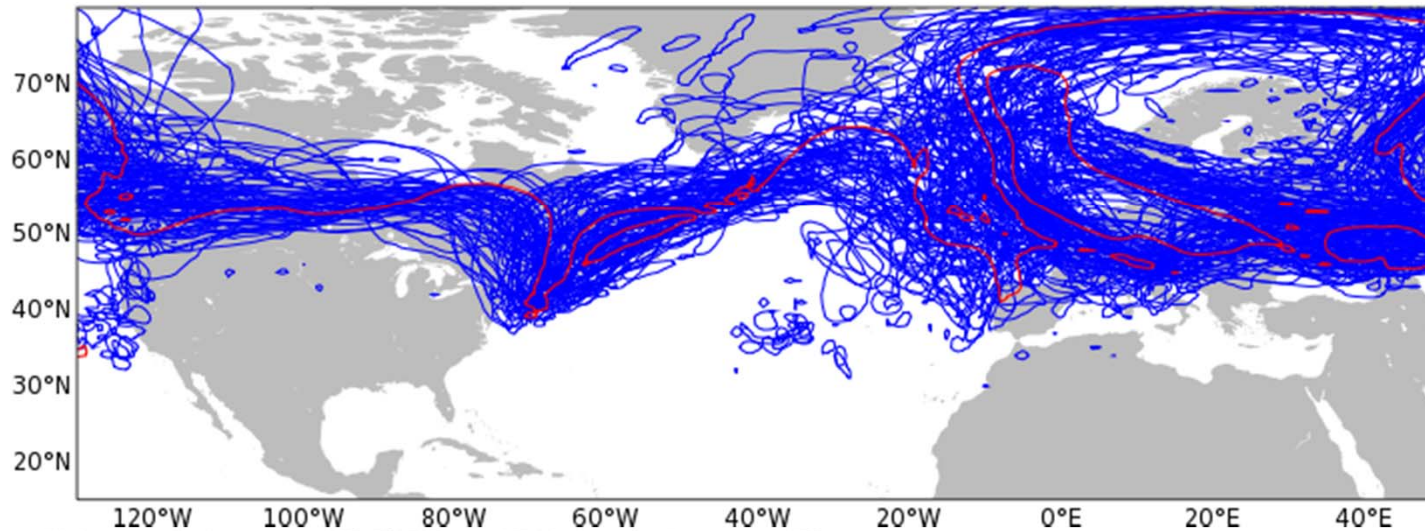
2PVU@320K, MSLP990 Spaghetti (based EC Ens 05/00Z)

ECMWF ENSEMBLE FC

BT: 20161005 00UTC, VT: 20161010 12UTC

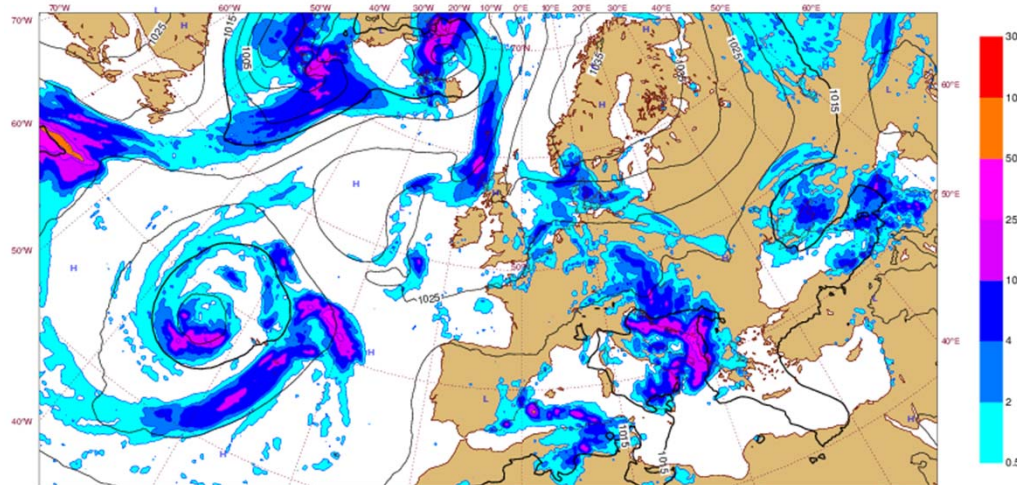
blue: perturbed, red: control

Mon 10/12Z



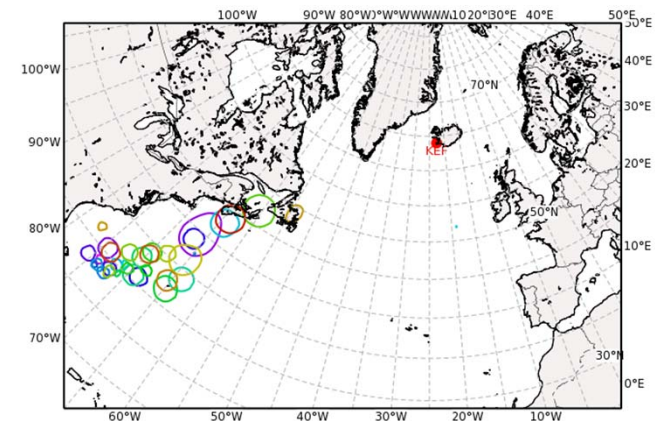
Wednesday 05 October 2016 0000 UTC ECMWF t+132 VT: Monday 10 October 2016 1200 UTC

Surface: Mean sea level pressure / 12hr Accumulated precipitation (VT-6h/VT+6h)



ECMWF ENS MSLP (990hPa-isoline)

Valid: Mon, 10 Oct 2016, 12 UTC (step 132 h from Wed, 05 Oct 2016, 00 UTC)



Uncertainty
on position of
TC Matthew.

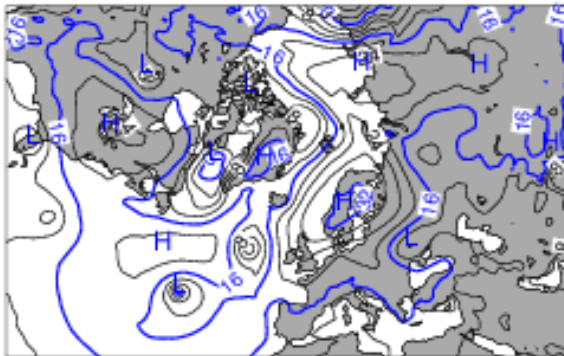
Outlook Mon 10 -> Wed 12

Ensembles cluster towards two scenarios:

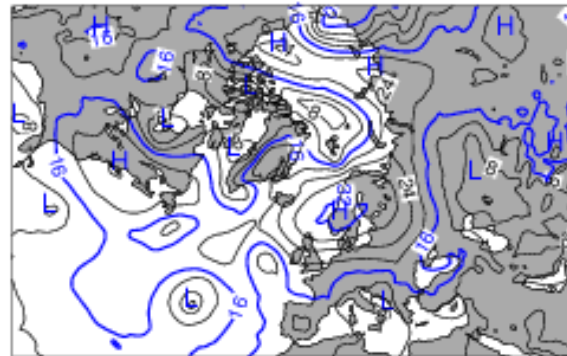
- 1) No ET of Matthew, still southerly flow over Iceland with some diabatic activity.
- 2) ET of Matthew and movement to Iceland by mid next week.

Wednesday 5 October 2016 00UTC ECMWF EPS Cluster scenario - 1000 hPa Geopotential
Reference step t+120-168 Based on the 500hPa Geopotential Clustering

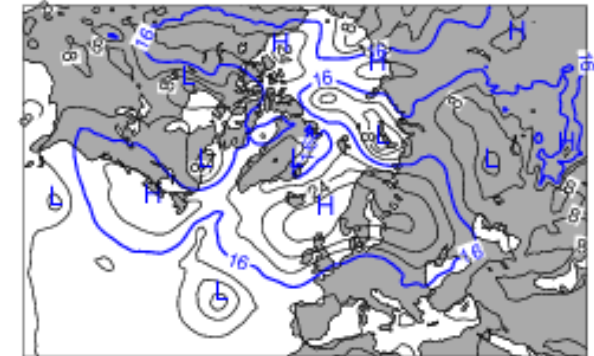
forecast t+120 VT Monday 10 October 2016 00UTC
Cluster: 1(of 3), population: 19, repres. member: 12



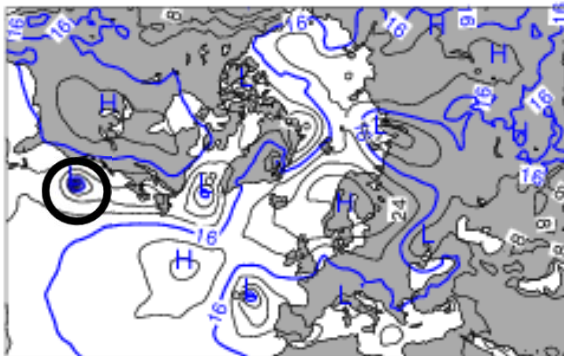
forecast t+144 VT: Tuesday 11 October 2016 00UTC
Cluster: 1(of 3), population: 19, repres. member: 12



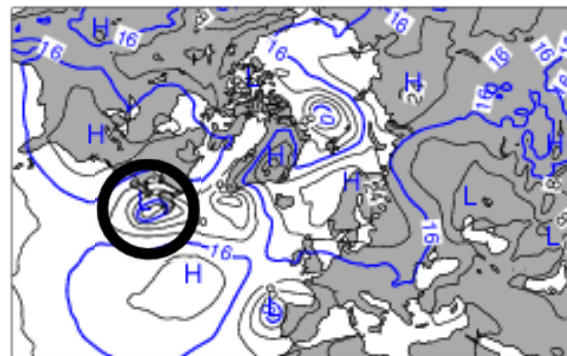
forecast t+168 VT: Wednesday 12 October 2016 00UTC
Cluster: 1(of 3), population: 19, repres. member: 12



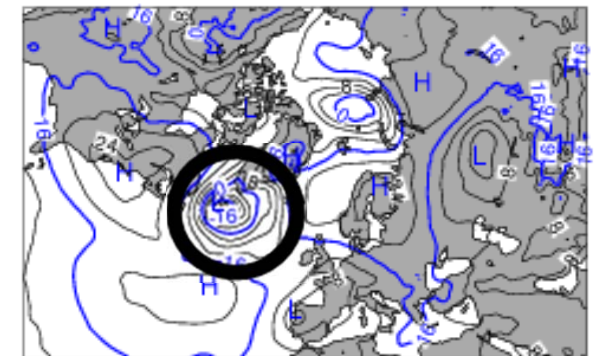
forecast t+120 VT Monday 10 October 2016 00UTC
Cluster: 2(of 3), population: 16, repres. member: 16



forecast t+144 VT: Tuesday 11 October 2016 00UTC
Cluster: 2(of 3), population: 16, repres. member: 16



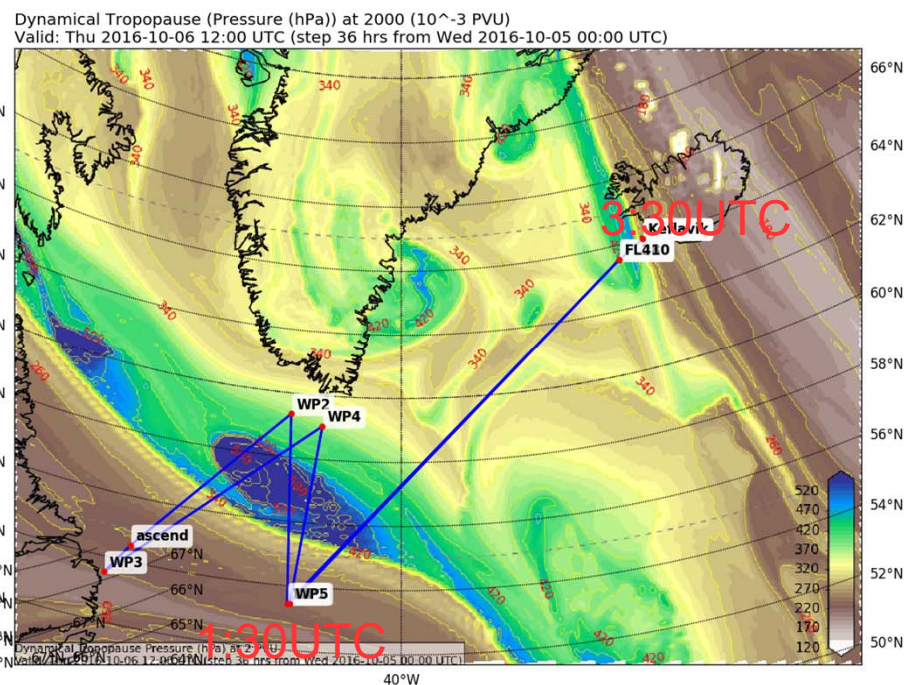
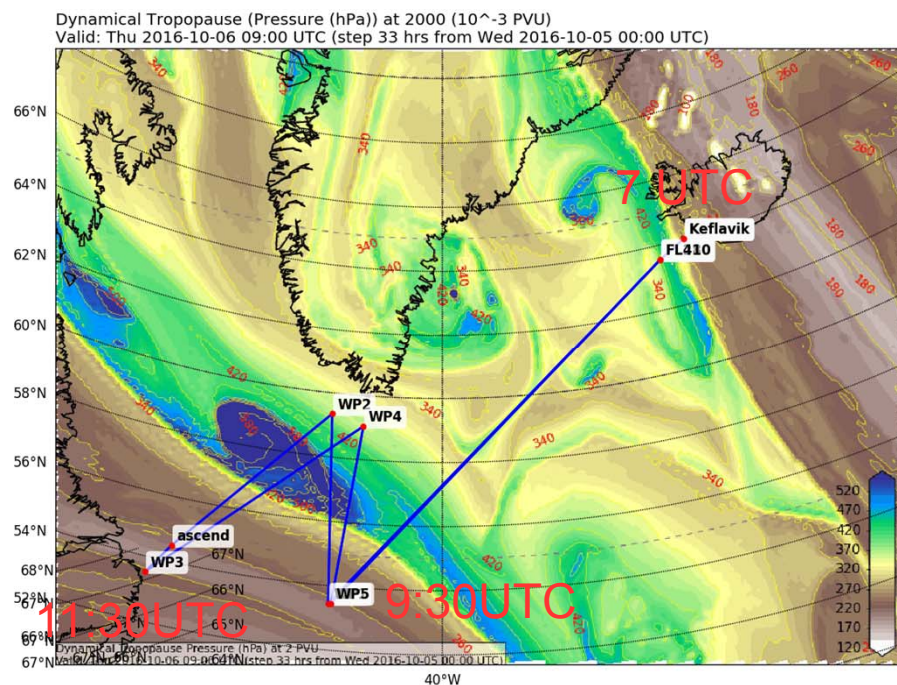
forecast t+168 VT: Wednesday 12 October 2016 00UTC
Cluster: 2(of 3), population: 16, repres. member: 16



HALO

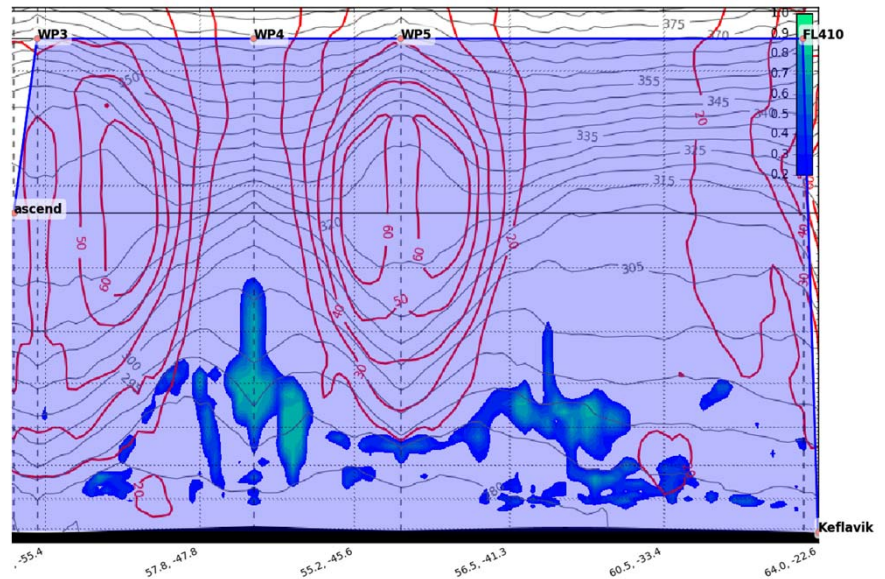
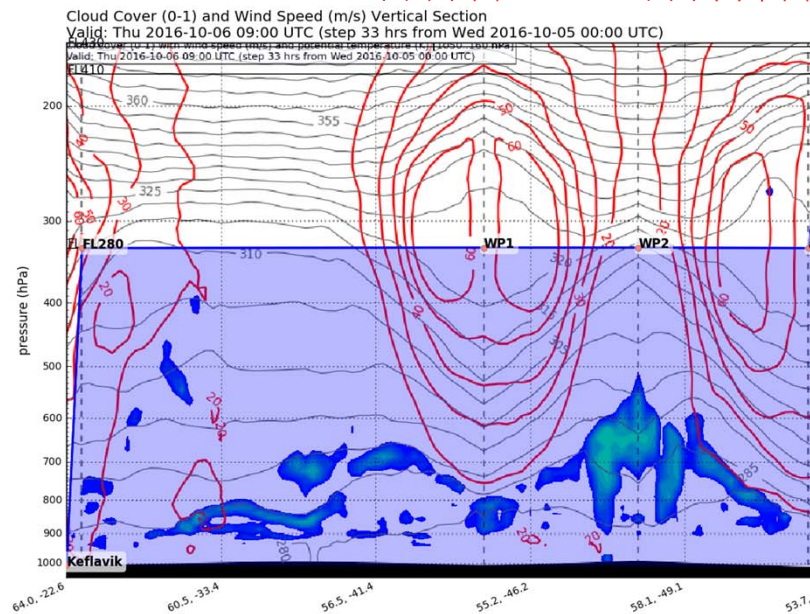
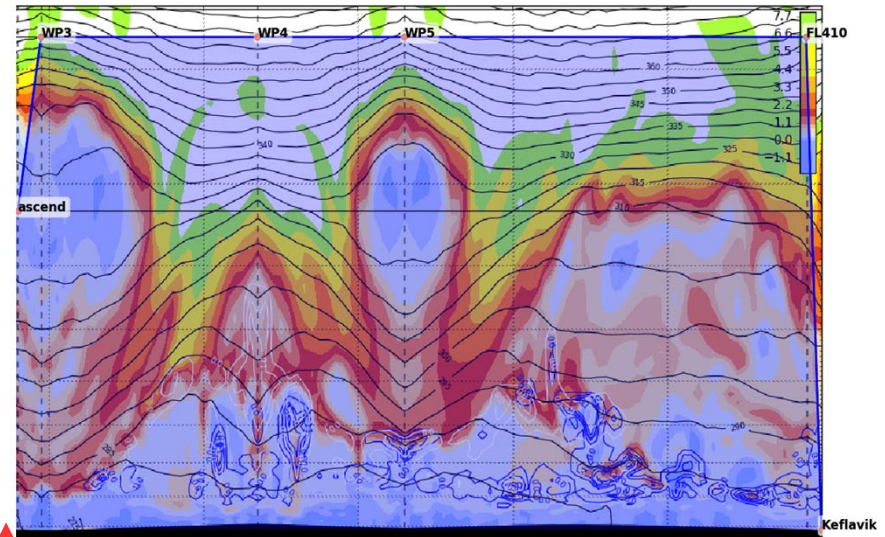
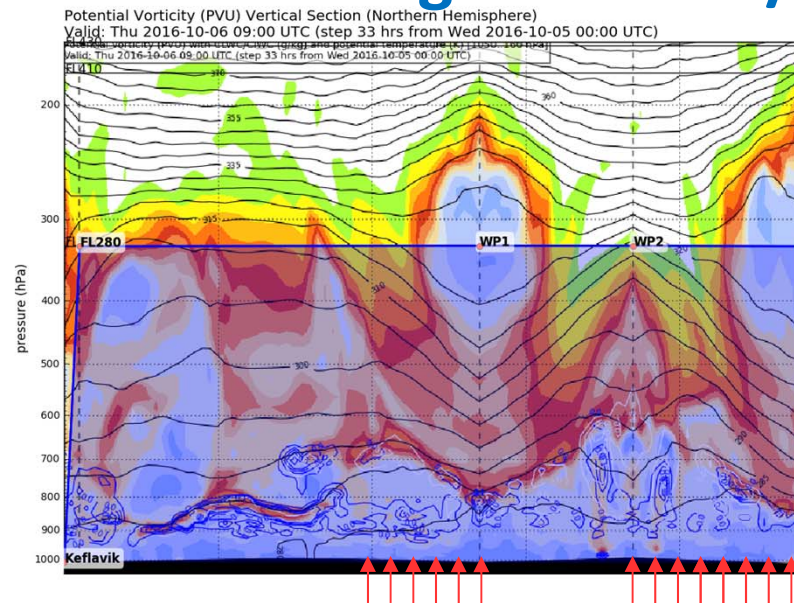
Thursday 06 Oct. flight

HALO flighttrack 06/10/2016, 0700-1530Z

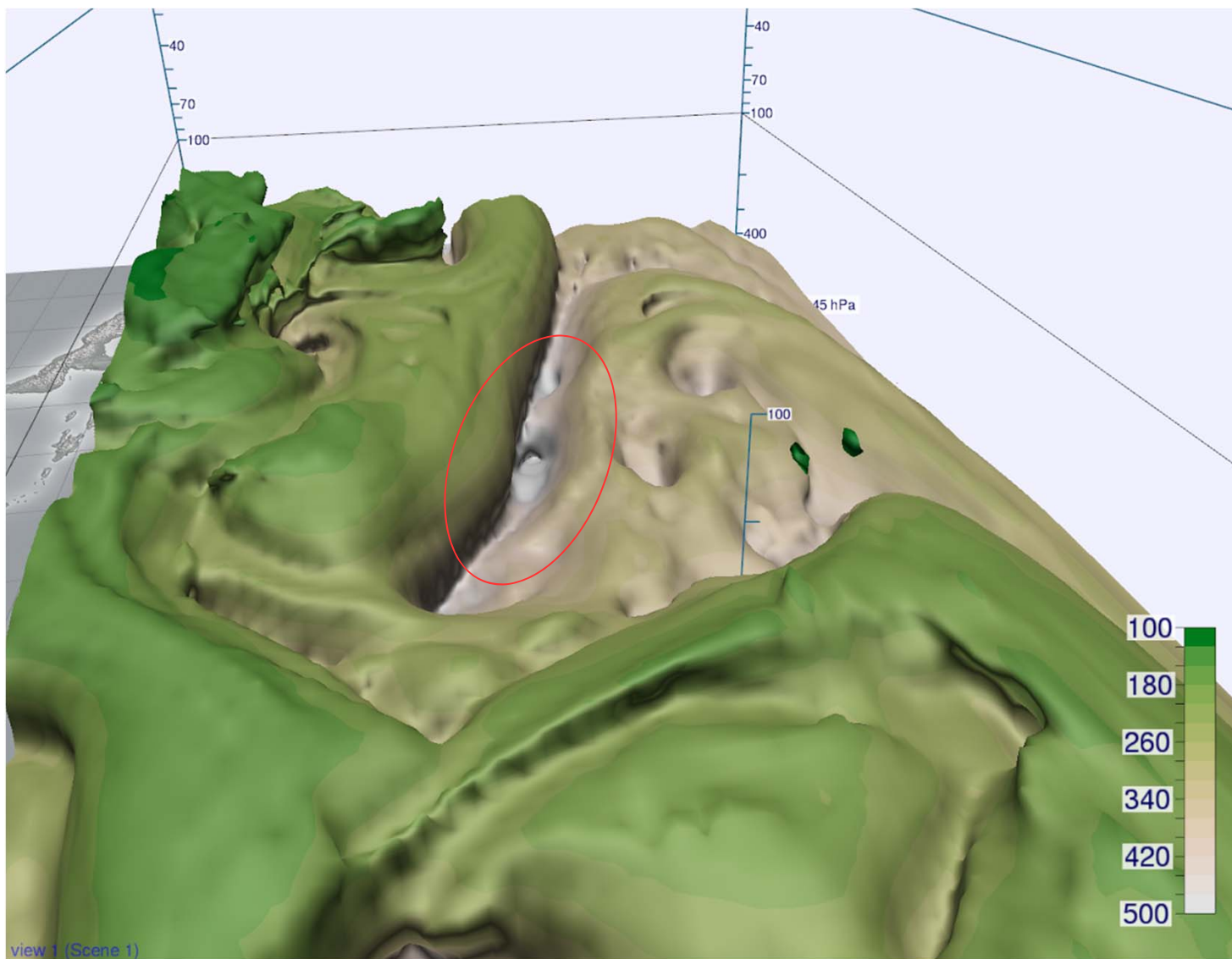


- Moisture gradient across deep tropopause fold and below TPV
- Lagrangian tracking of TPV with downstream flights on Friday
- Dropsondes across tropopause fold/TPV
- → measurements in region where TPV interacts with waveguide

HALO flighttrack 06/10/2016, 0700-1530Z



HALO flighttrack 06/10/2016, 0700-1530Z

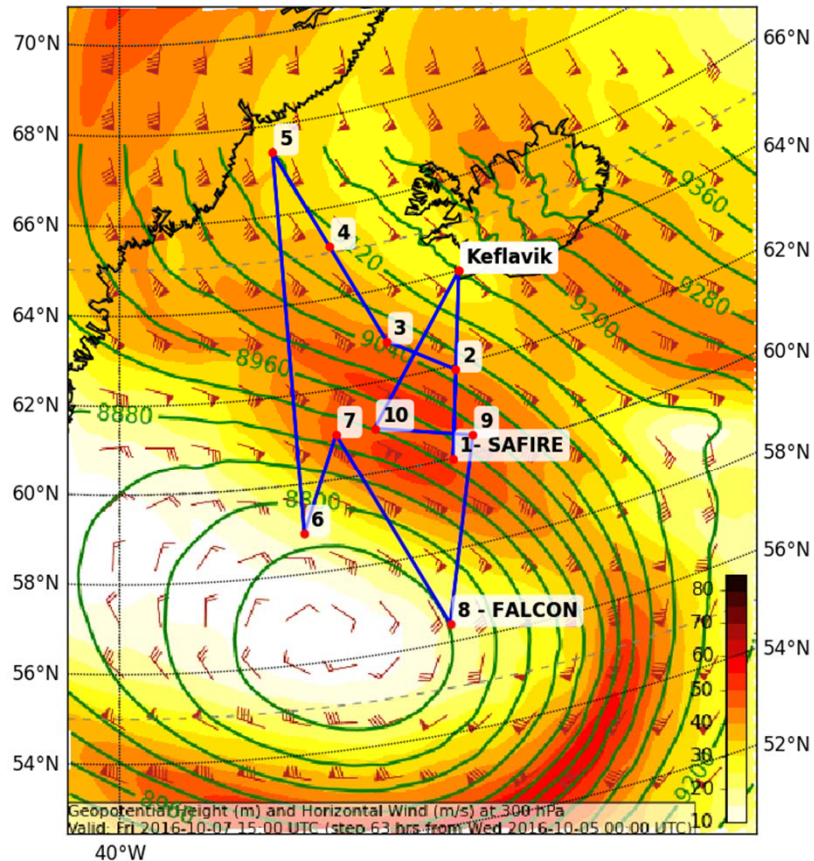


HALO

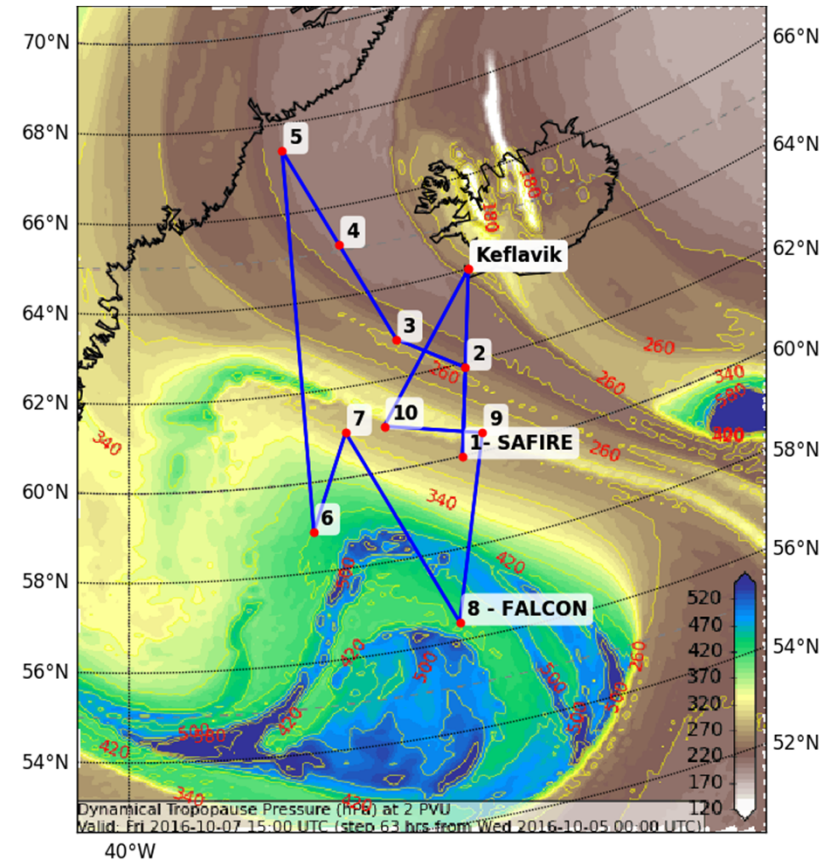
Friday 07 Oct. flight

Friday 7 October HALO flight

Geopot (m) & Hor Wind (m/s) at 300 hPa



P (hPa) at 2 PVU



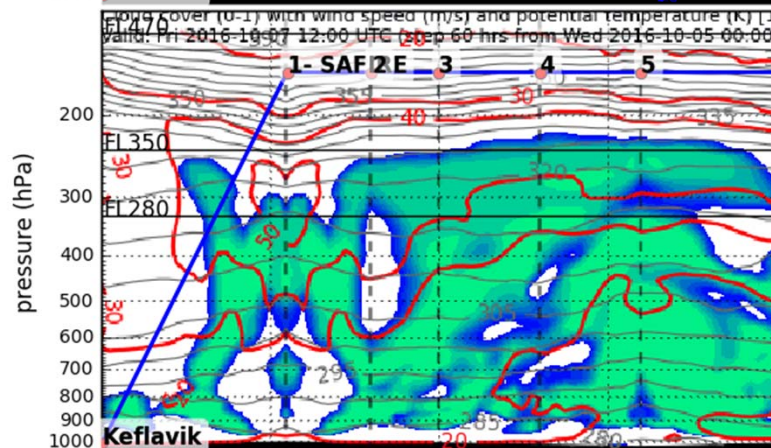
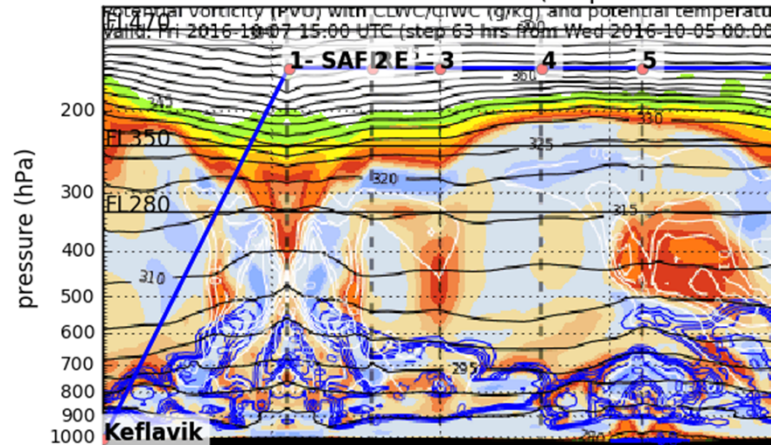
BT05/00Z VT07/15Z

- Meet SAFIRE at 13:40 (1)
- Coordinated leg (1-2)
- Sat overpass at 14:27 & WCB ascent (3-5)
- Trough (6)
- Meet FALCON at 17:15 (8)
- Coordinated leg (8-10)

Friday 7 October HALO flight

BT05/00Z VT07/12Z

Potential Vorticity (PVU) Vertical Section (Northern hemisphere)
Valid: Fri 2016-10-07 15:00 UTC (step 63 hrs from Wed 2016-10-05 00:00 UTC)

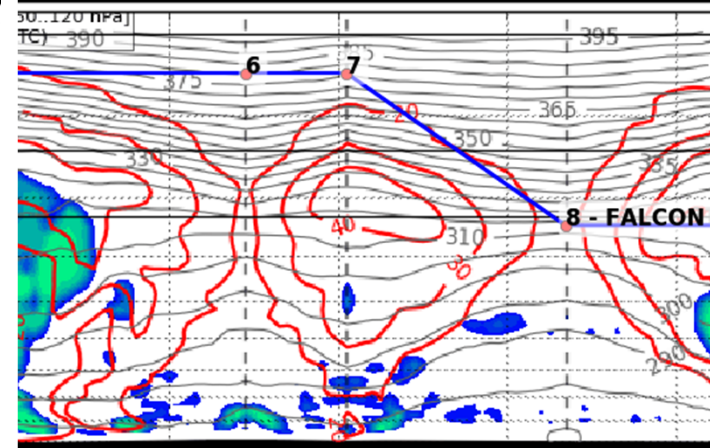
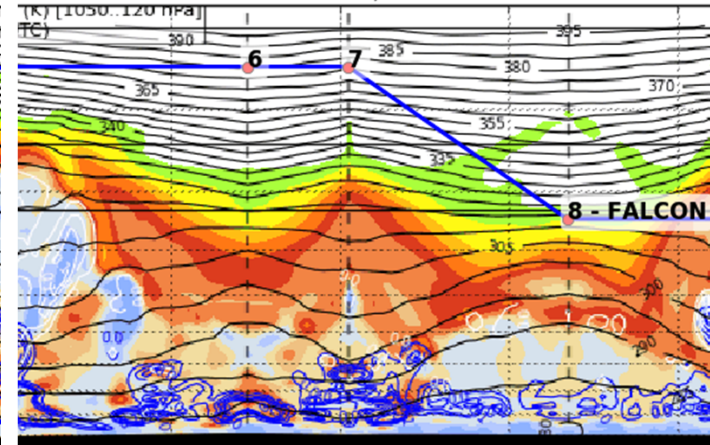


SAFIRE

SAT

BT05/00Z VT07/15Z

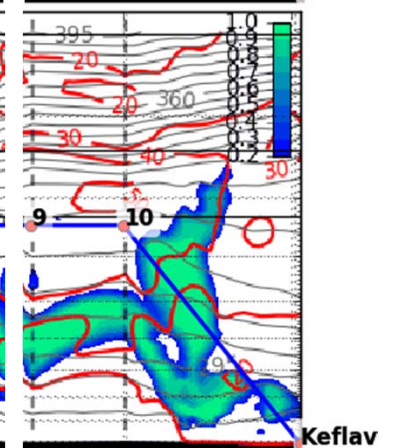
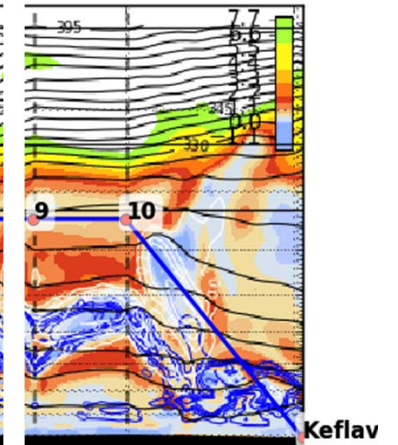
Potential Vorticity (PVU) Vertical Section (Northern hemisphere)
Valid: Fri 2016-10-07 15:00 UTC (step 63 hrs from Wed 2016-10-05 00:00 UTC)



FALCON

BT05/00Z VT07/18Z

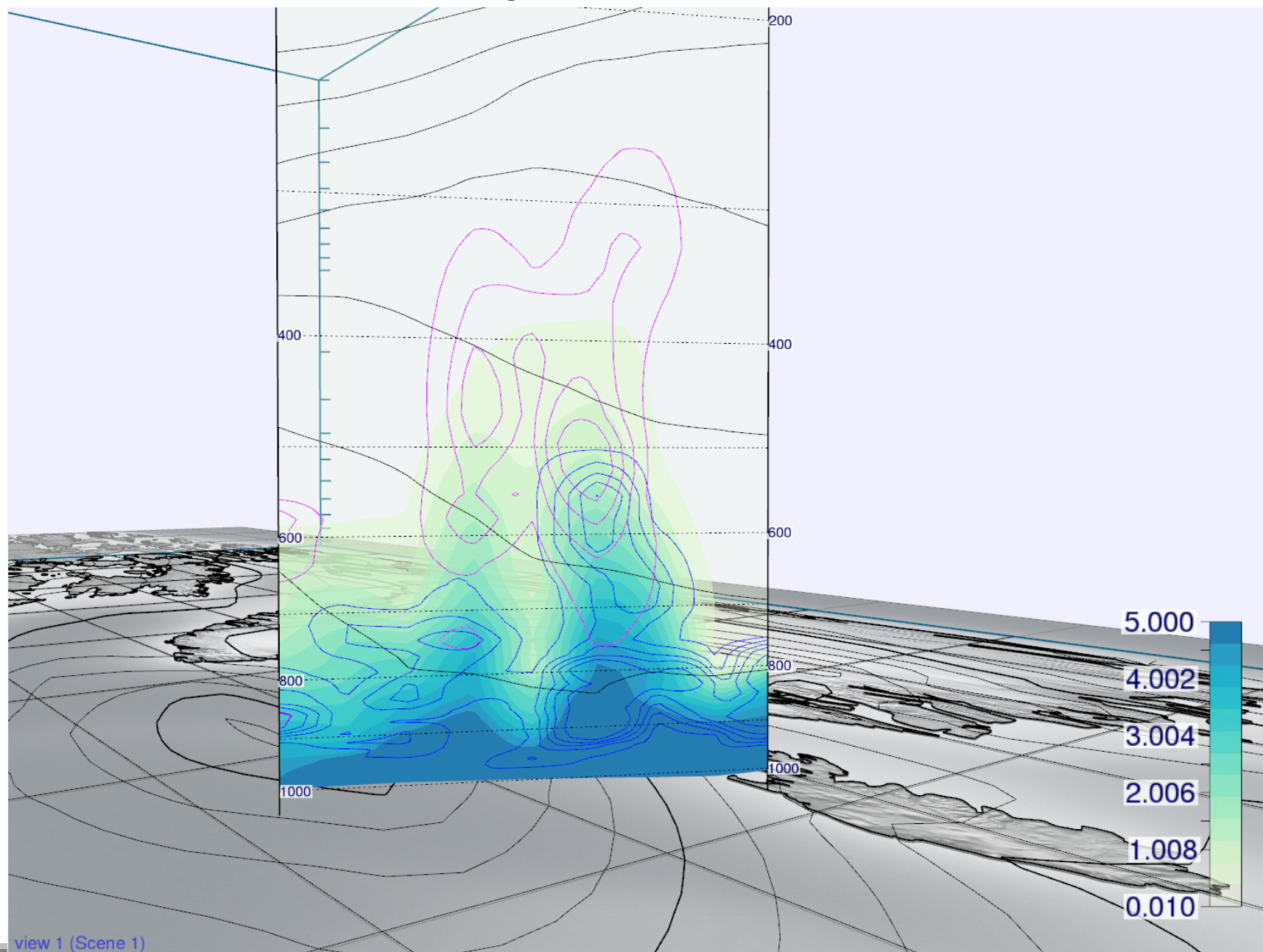
Potential Vorticity (PVU) Vertical Section (Northern hemisphere)
Valid: Fri 2016-10-07 15:00 UTC (step 63 hrs from Wed 2016-10-05 00:00 UTC)



Keflavik

Keflavik

5->1: Coordinated leg with SAFIRE



FALCON

Friday 07 Oct. flight

DLR-FALCON Friday Flight

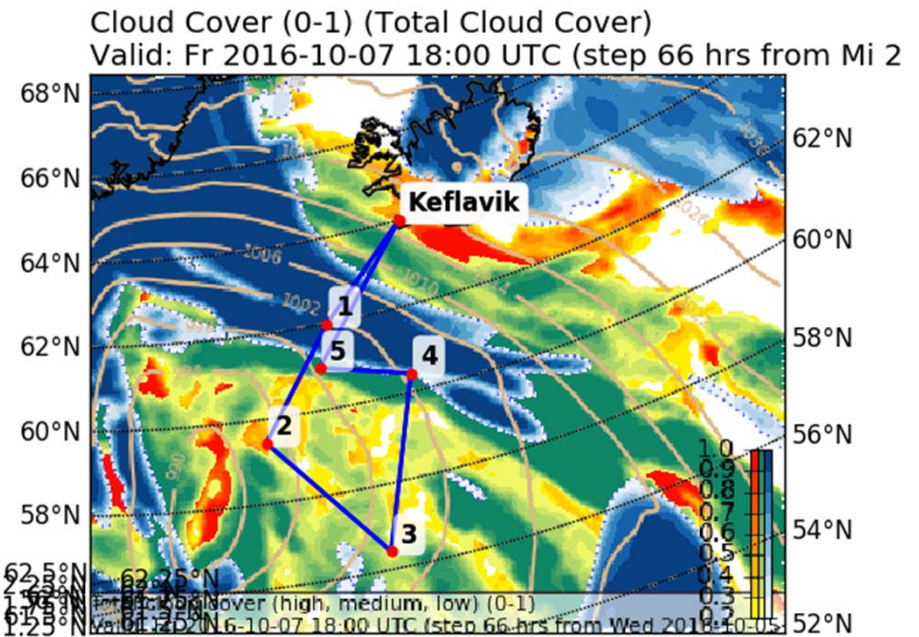
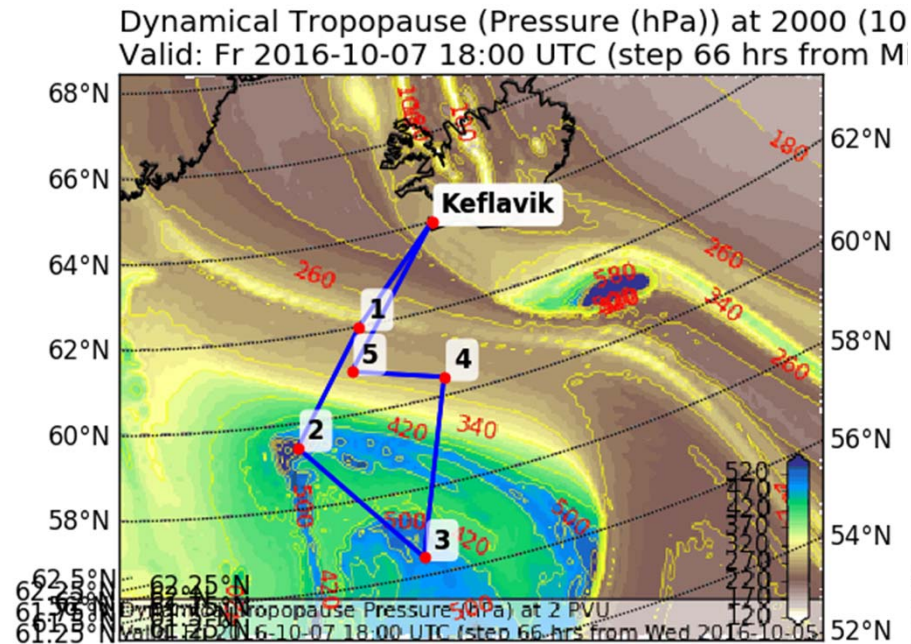
- Coordinated legs with HALO
- “PV-meter” in combination with HALO & dropsondes
- Circuit to estimate divergence

Timing: Centered around meeting point with HALO, 1800Z, waypoint 3.

Take off ~ 1620Z, flighttime ~3h 15min.

Falcon flight Friday, 07 Oct

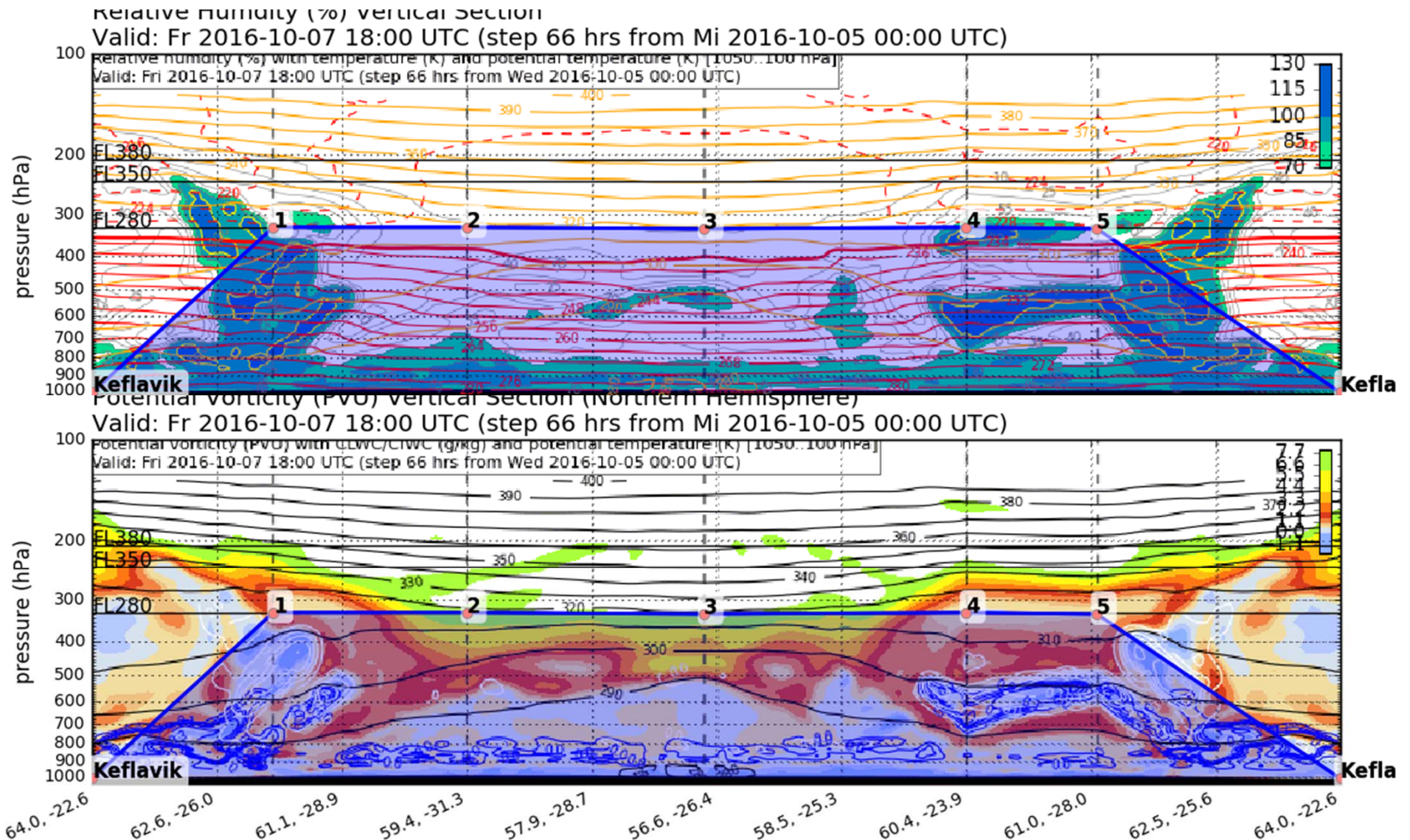
BT 05/00Z, VT 07/18Z



- Legs 3-5 coordinated with HALO
 - PV-meter legs
- Leg 4-5 must be ok for LIDAR, ie., might be adjusted (southward) due to clouds
- Flight level constraints due to NAT TRACKS -> TBD how high we can go.
-> “the higher the better”

Falcon flight Friday, 07 Oct

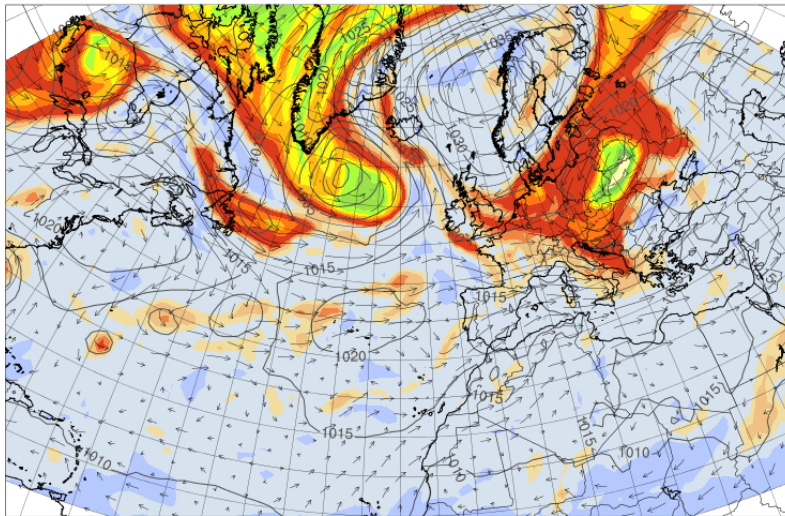
BT 05/00Z, VT 07/18Z



Falcon flight Friday, 07 Oct

BT 05/00Z, VT 07/18Z

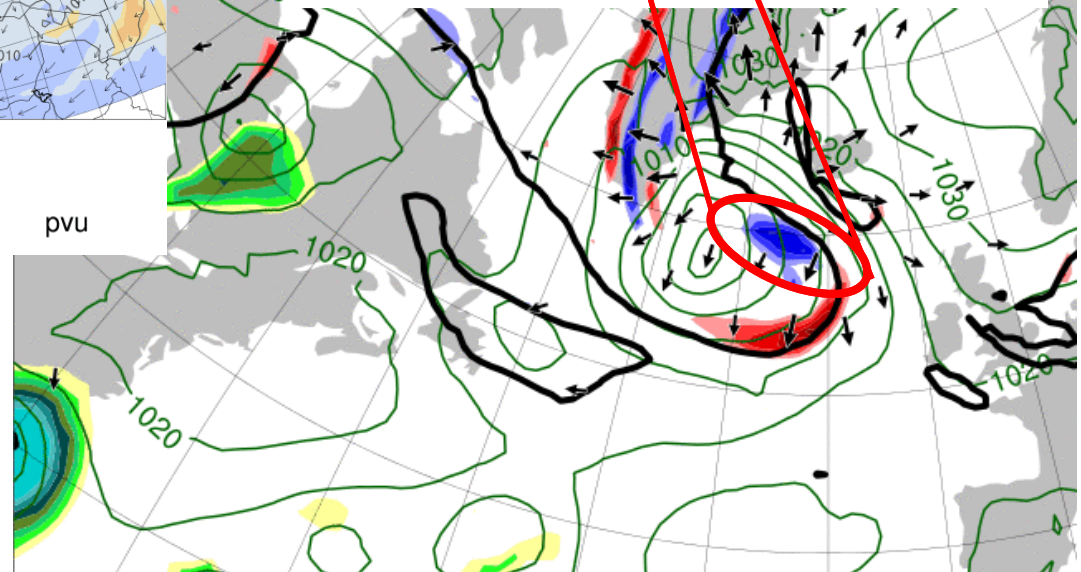
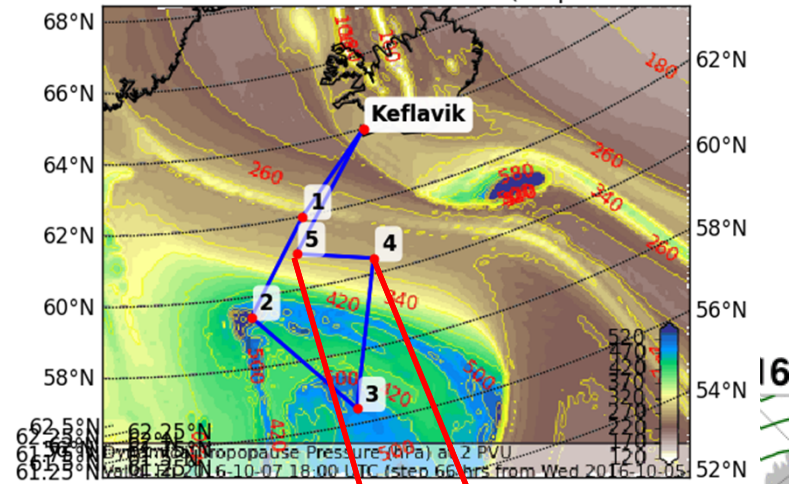
PV@320K at 20161007_18



VU (bl
/ wind

pvu

Dynamical Tropopause (Pressure (hPa)) at 2000 (10
Valid: Fr 2016-10-07 18:00 UTC (step 66 hrs from M



RADIOSONDES

Update