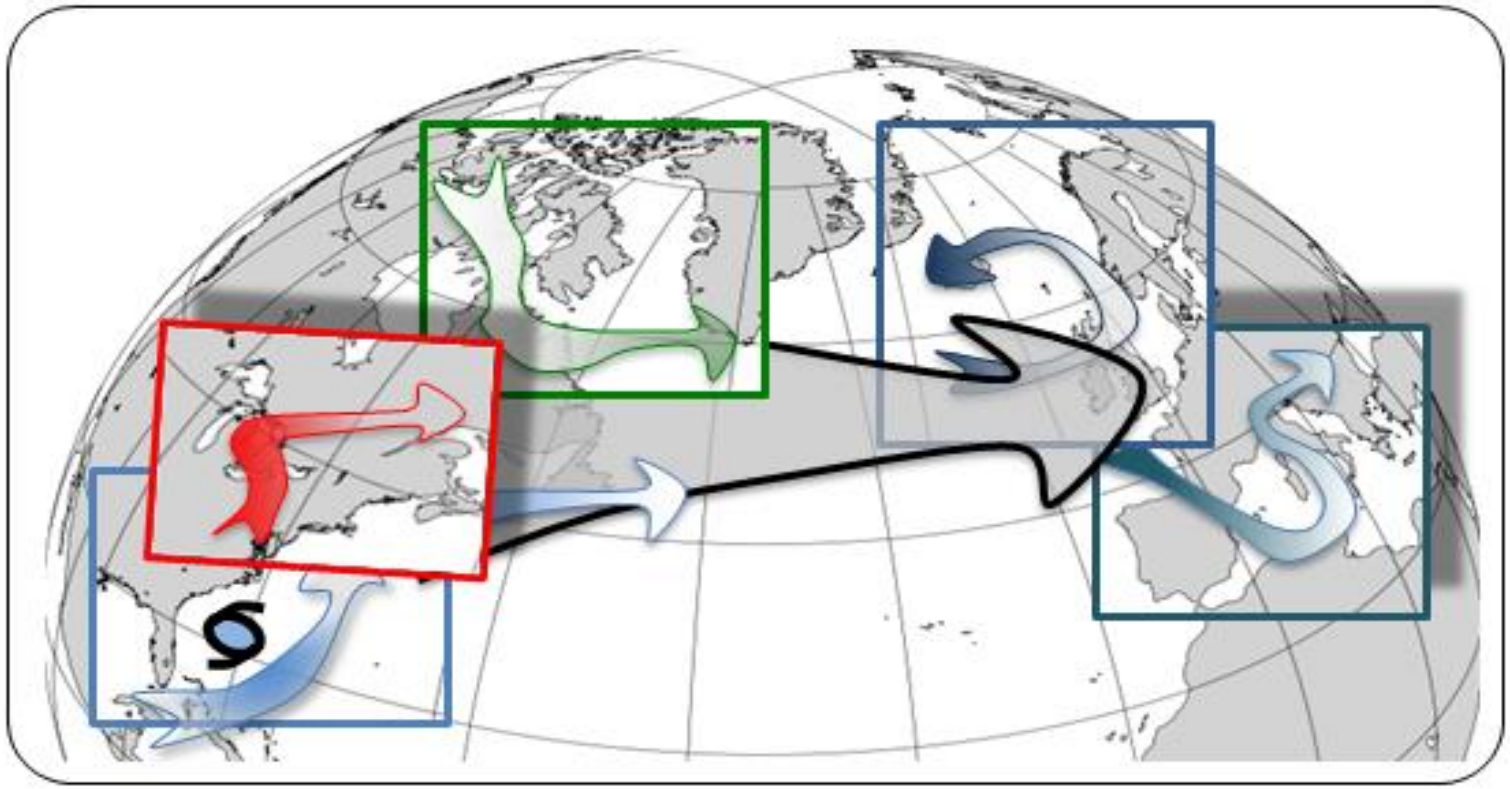
NAWDEX – Weather Discussion

01 October 2016, Keflavik 16 UTC



NAWDEX – Weather Discussion

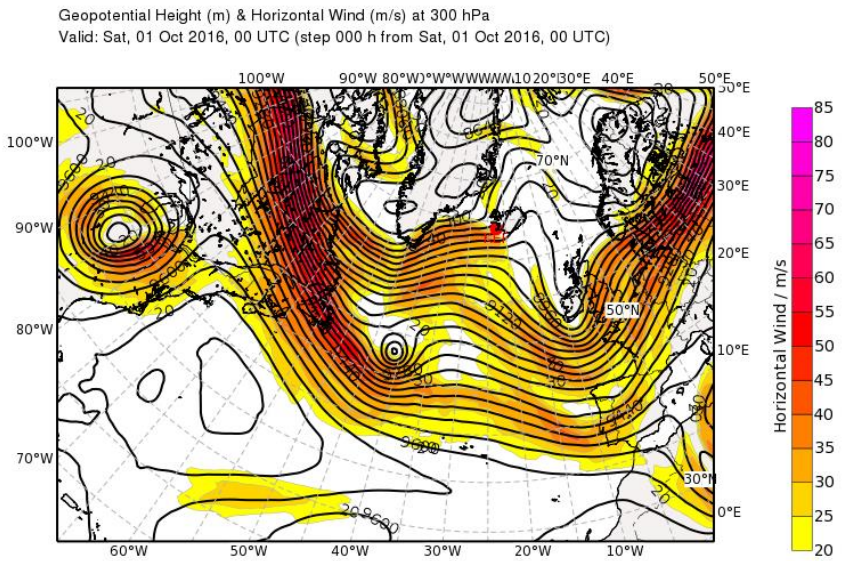
01 October 2016, Keflavik 16 UTC

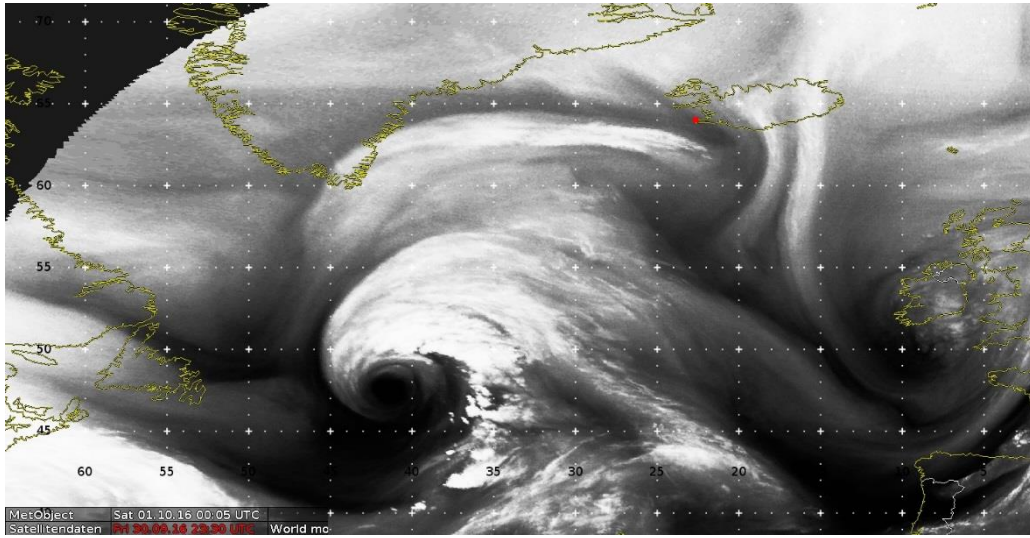
Topics

1. „Saturday cyclone“
    - Saturday HALO flight cancelled
    - Sunday flights ~~HALO~~, FALCON, SAFIRE
2. „frontal wave cyclone“ & associated strong WCB
    - Potential missions next week Tue-Thu
3. Strong poleward moisture transport Thu
4. Cut-off formation over Europe
5. Tropical cyclone activity in western North Atlantic

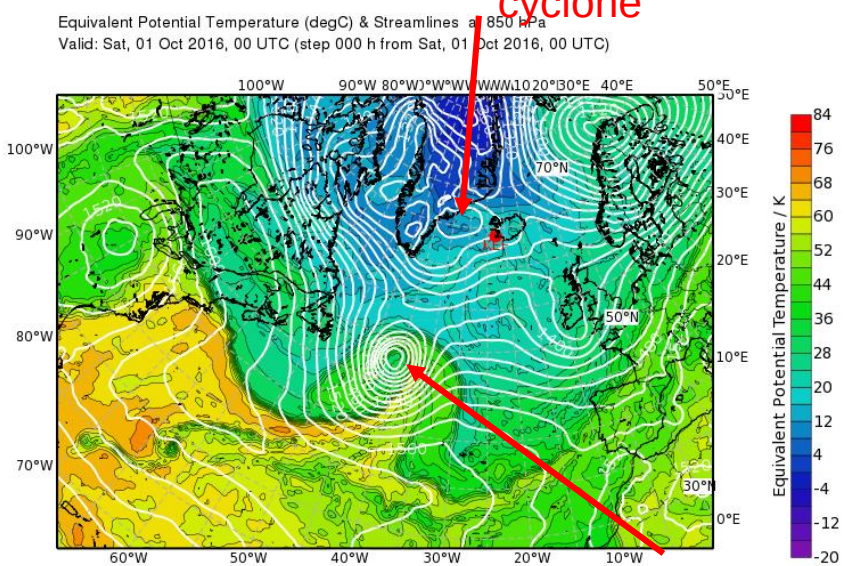
Analysis – 01 Oct 2016, 00 UTC

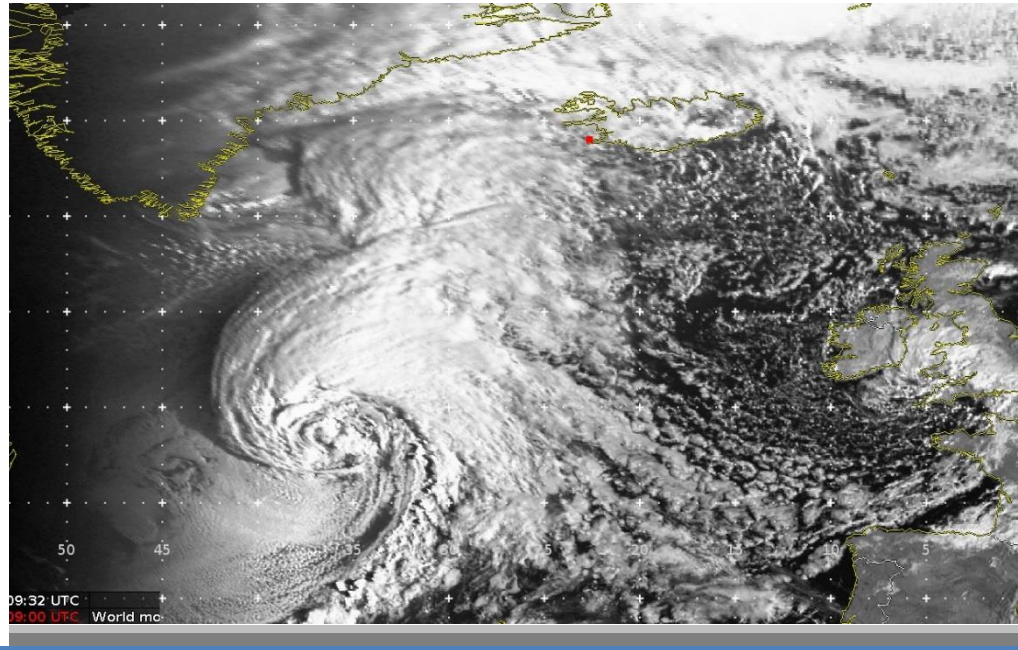
Z300, SAT WV
THE850, SAT VIS 9:15





Greenland lee cyclone

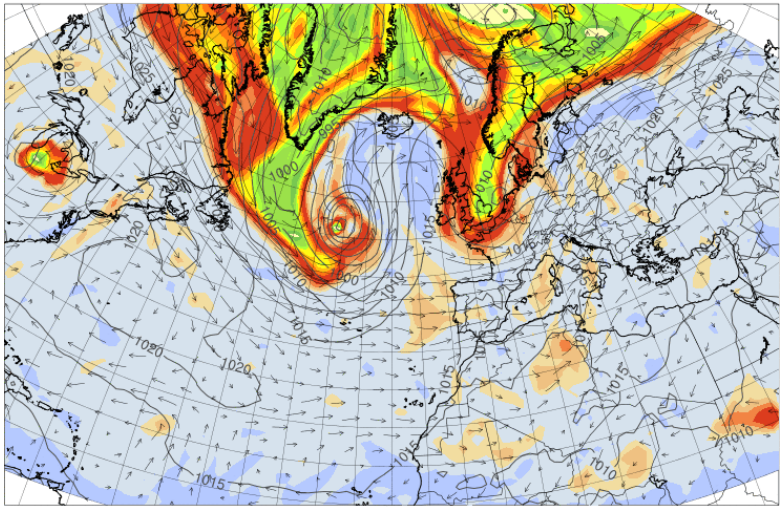




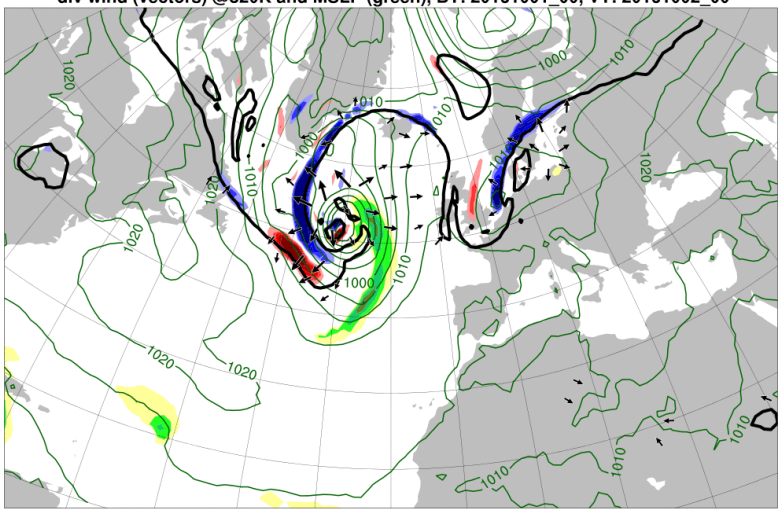
Saturday cyclone

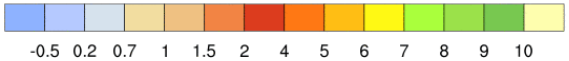
Forecast – Sun 2 Oct 2016, 00UTC PV320K, irrwind320K, THE850K, trajectories

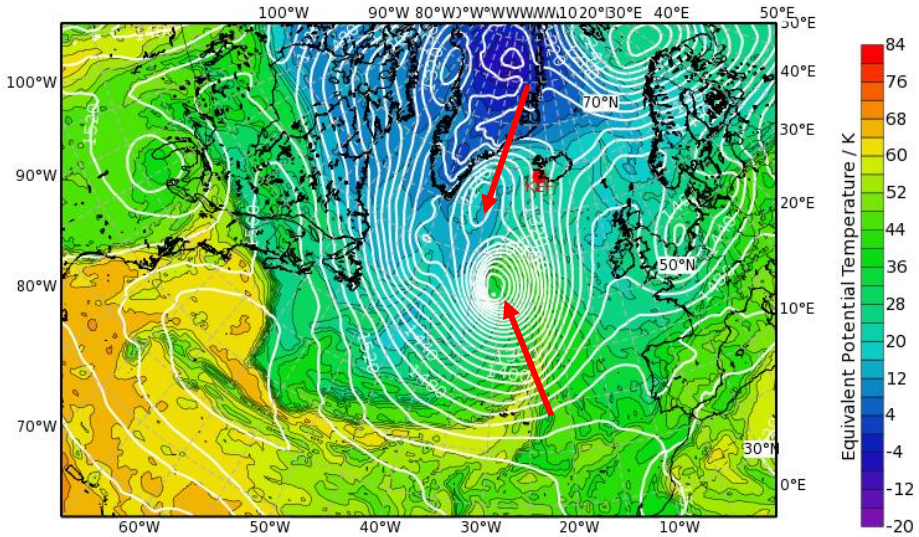
PV@320K at 20161002_00

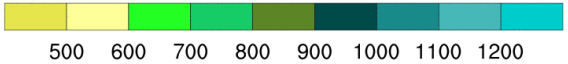


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161002_00

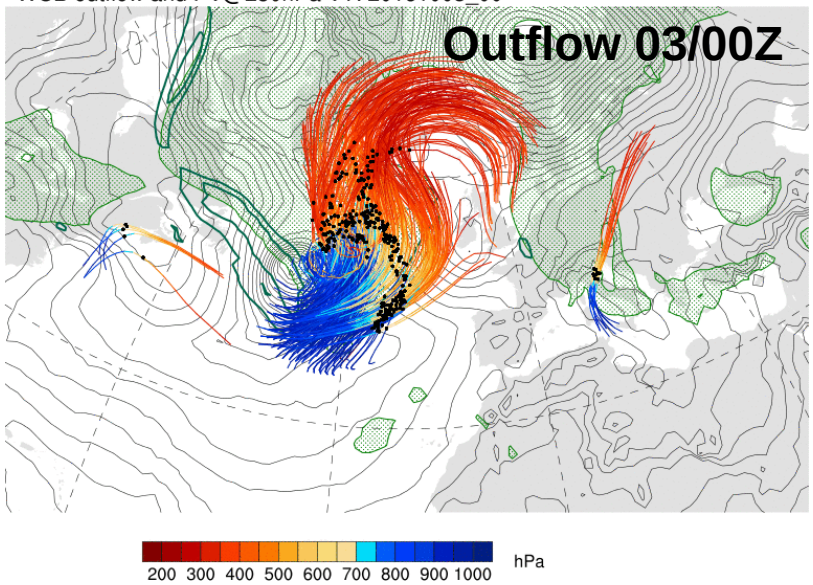








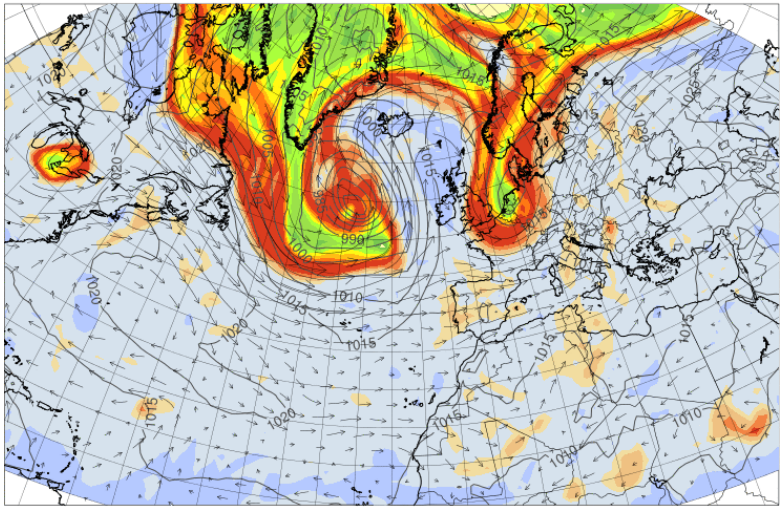
Trajectory start and SLP VT: 20161001_00
WCB outflow and PV@250hPa VT: 20161003_00



BT01/00Z

Forecast – Sun 2 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

PV@320K at 20161002_12



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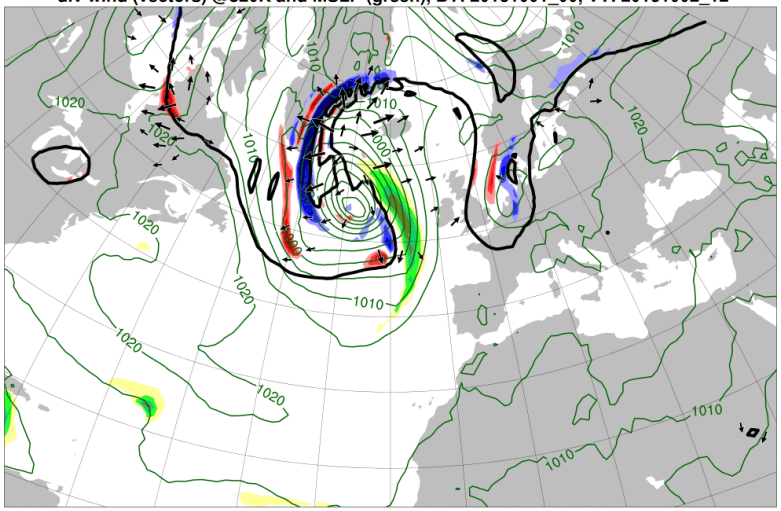

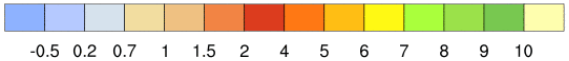

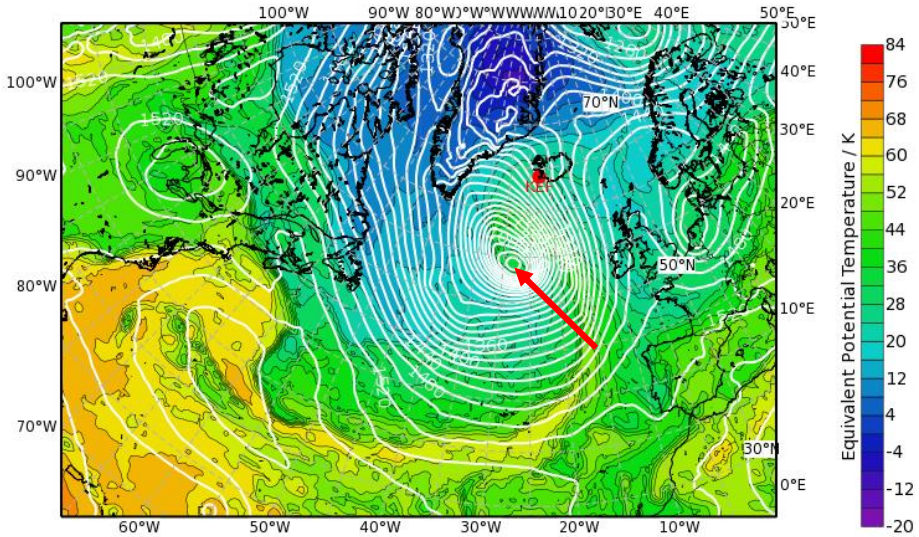

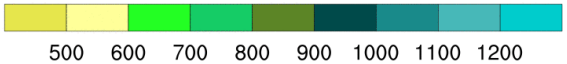

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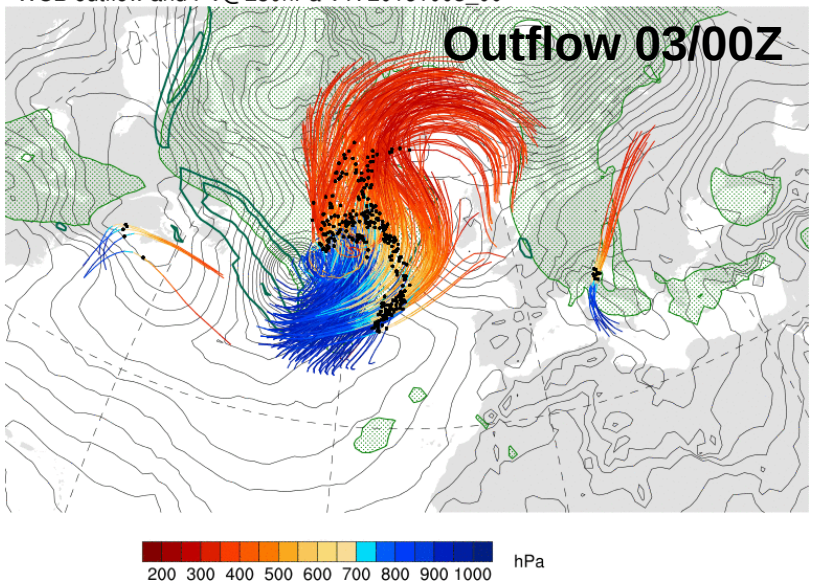

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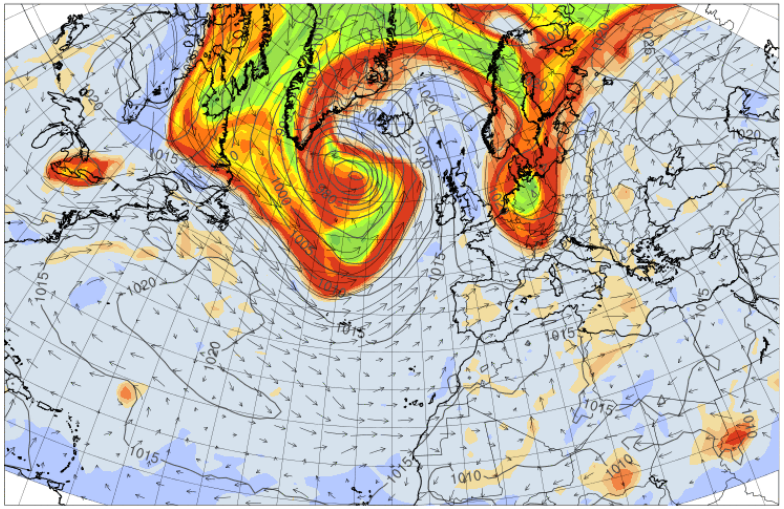
PV@320K at 20161003_00



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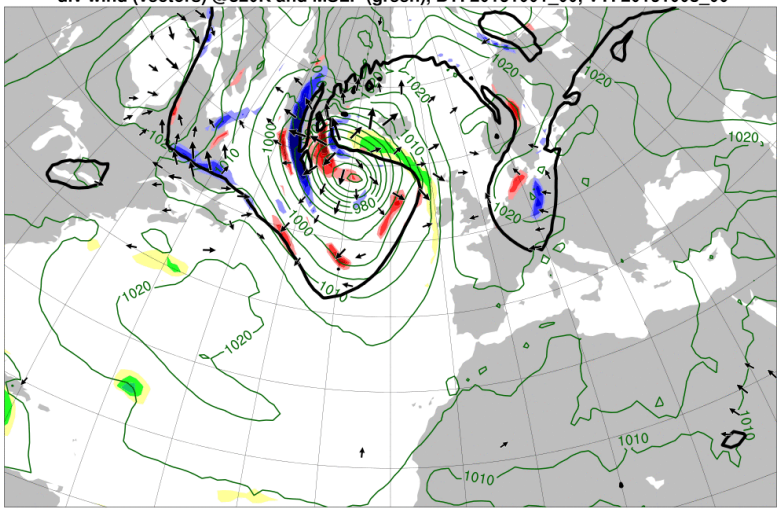

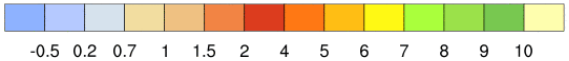

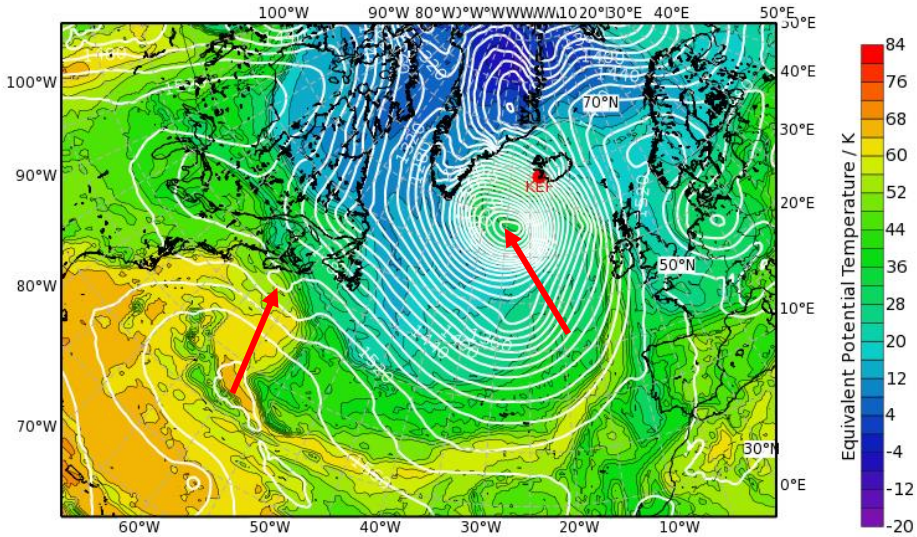

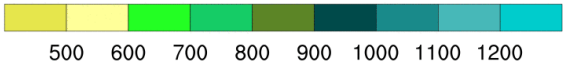

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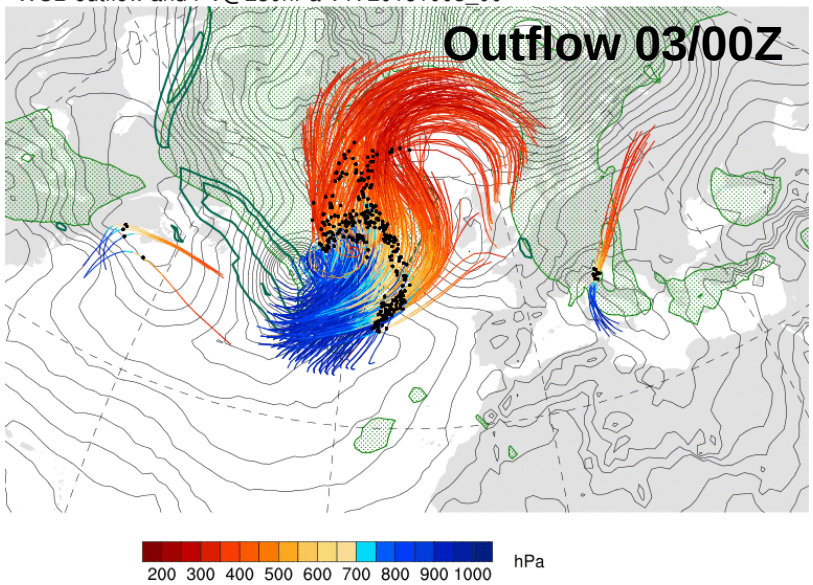

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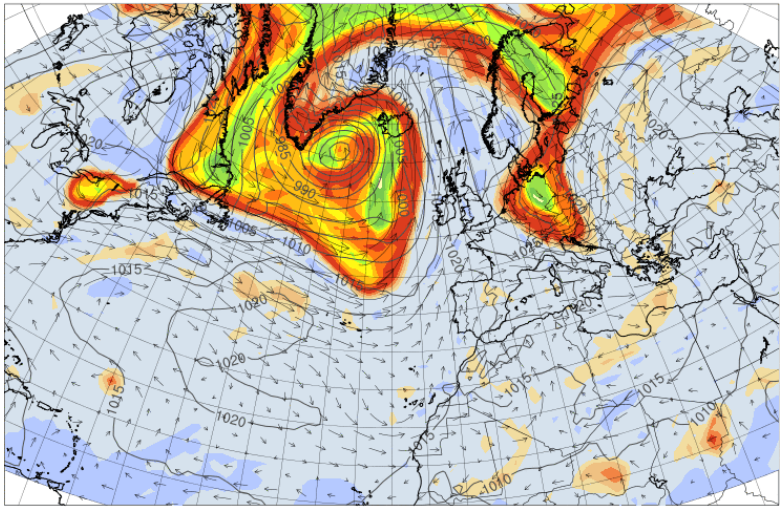
PV@320K at 20161003_12



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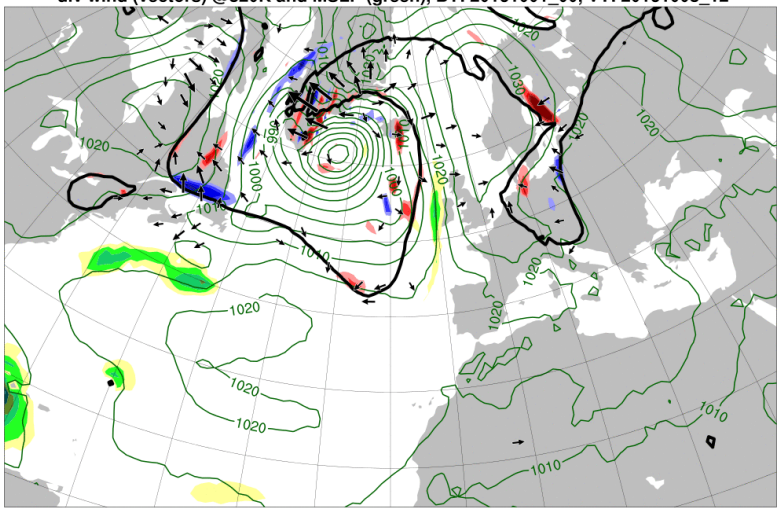

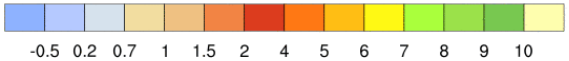

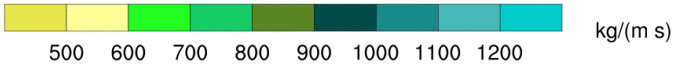

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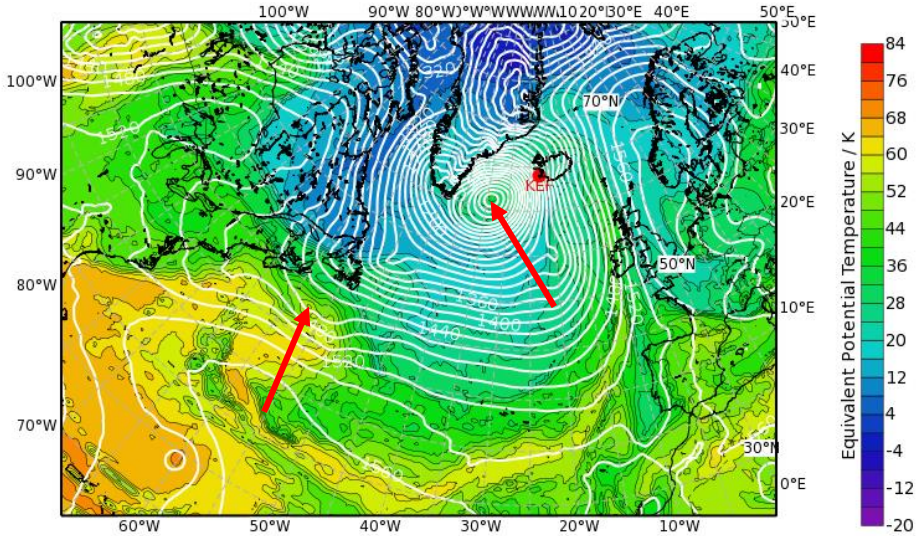
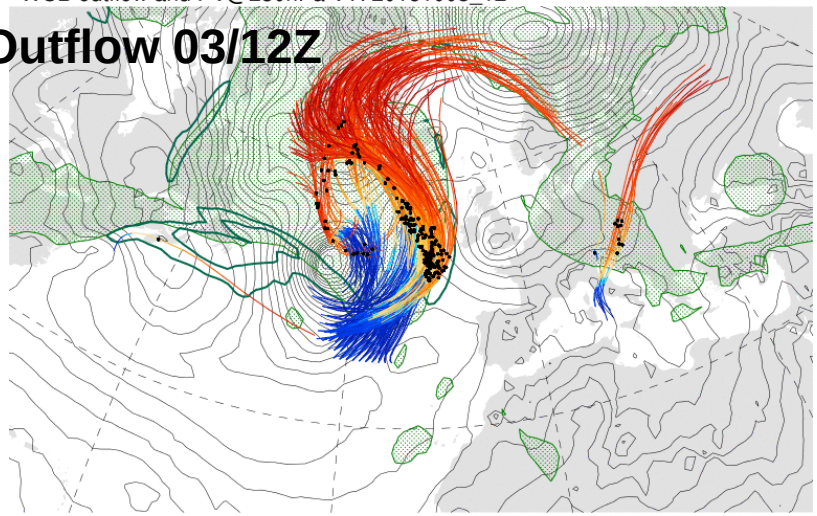


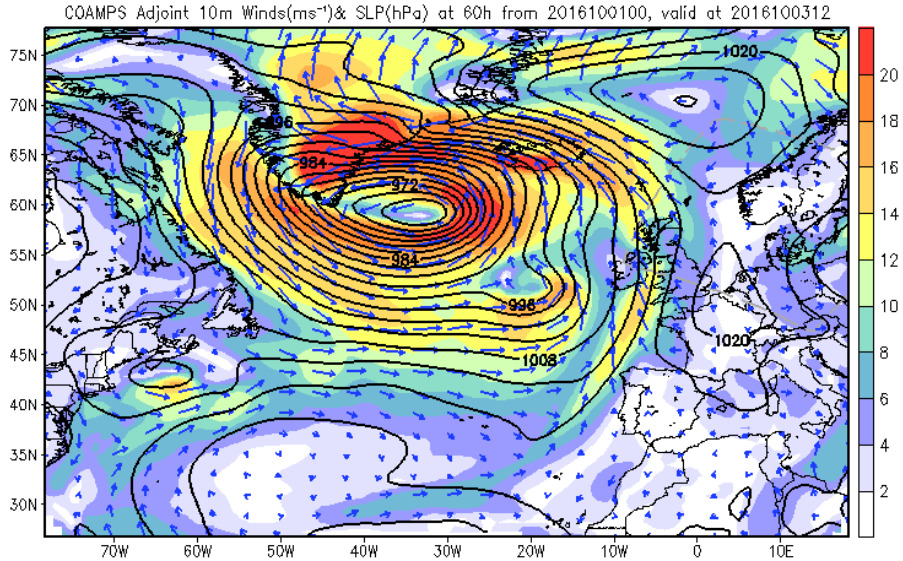


BT01/00Z

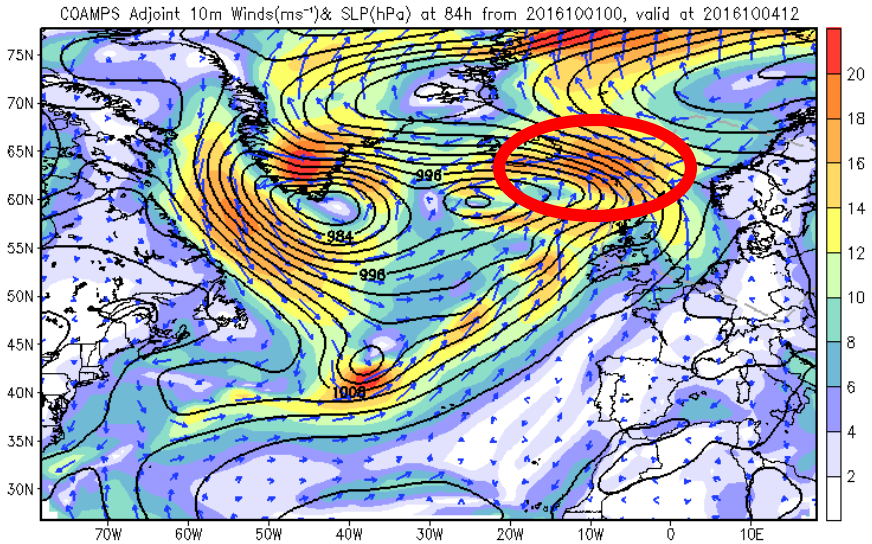
COAMPS Sensitivity (48h) Valid 12Z 3 Oct (Monday)

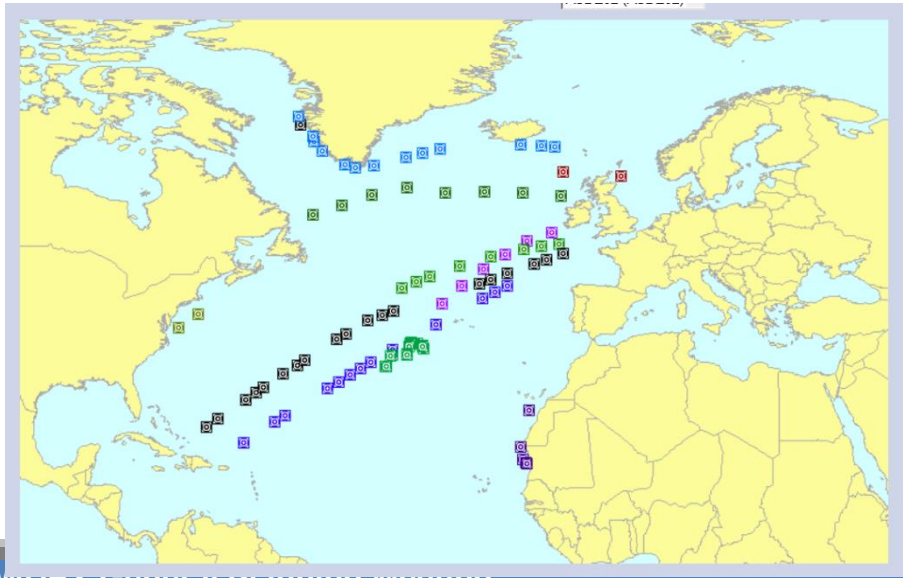
Radiosondes from ships

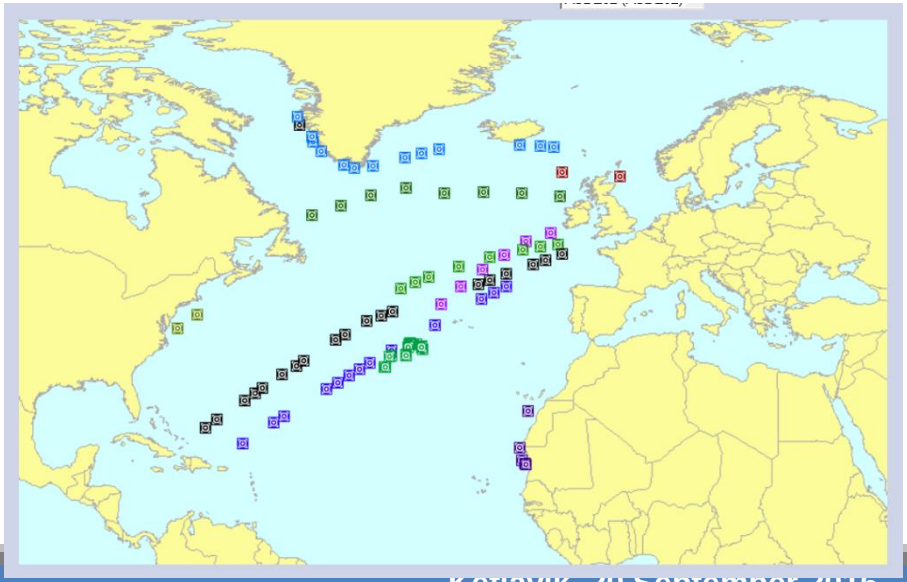
SLP, 10-m winds valid 12Z 3 OCT



SLP, 10-m winds valid 12Z 4 OCT







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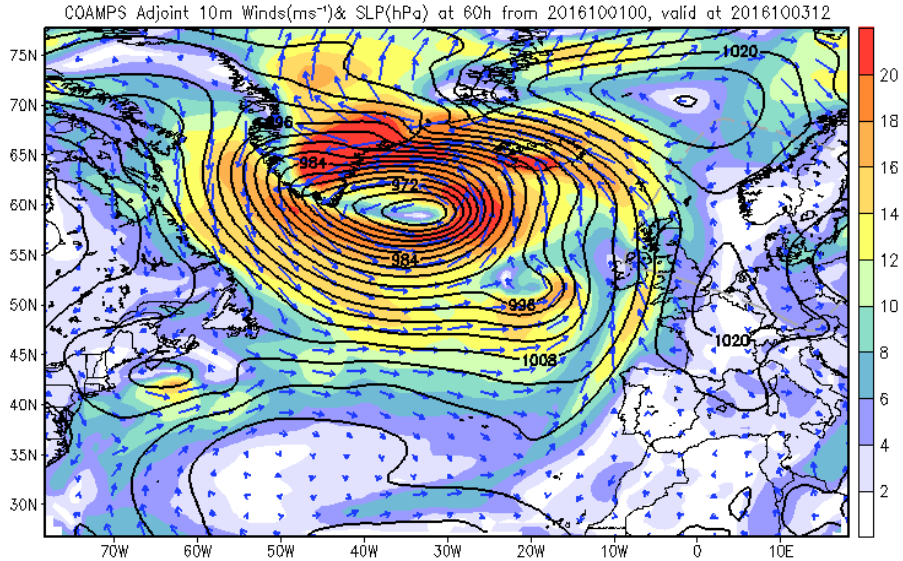

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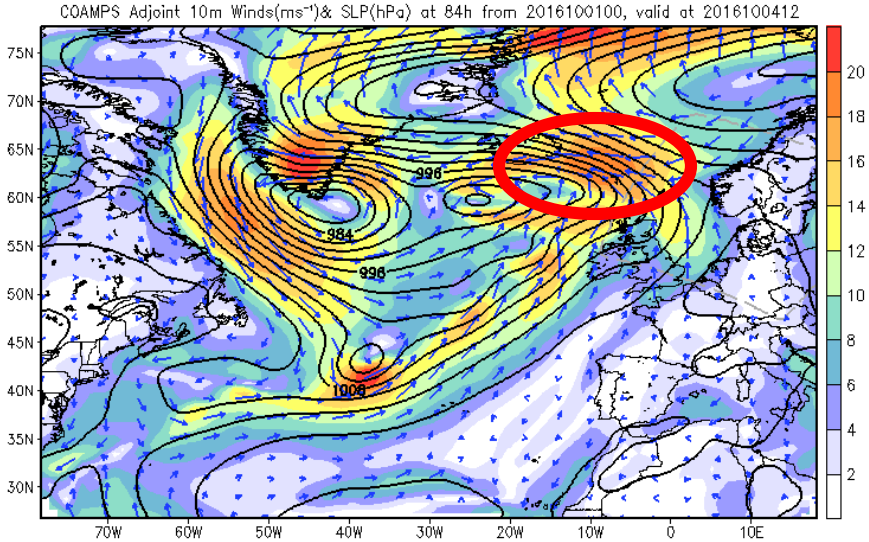
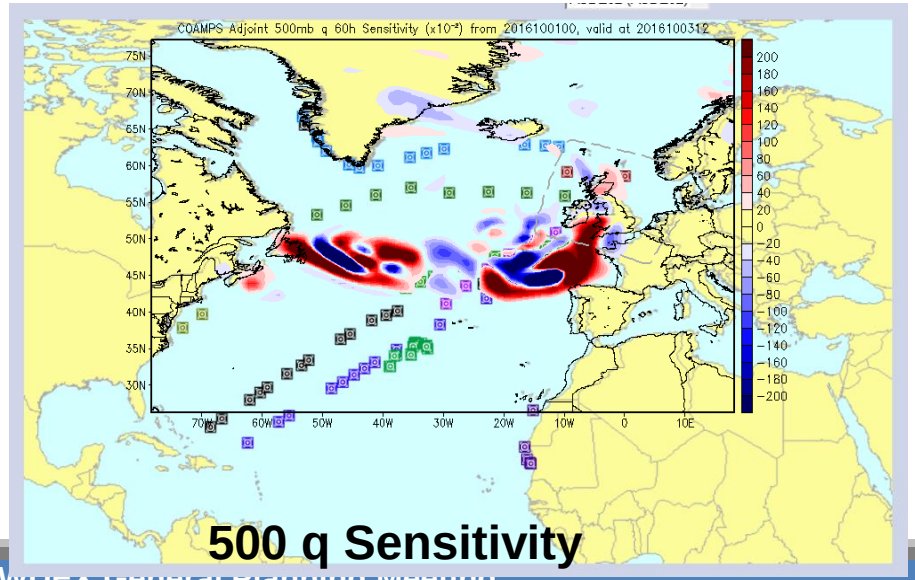
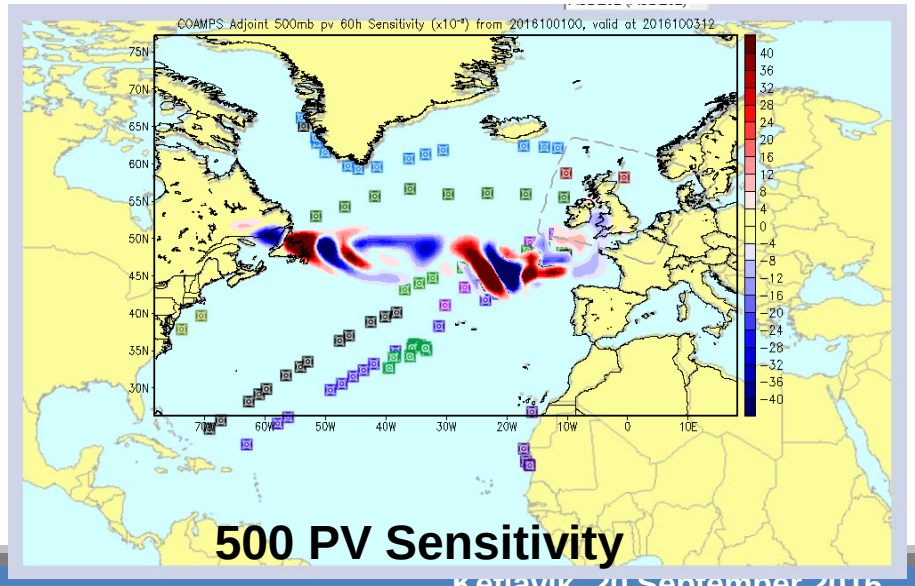


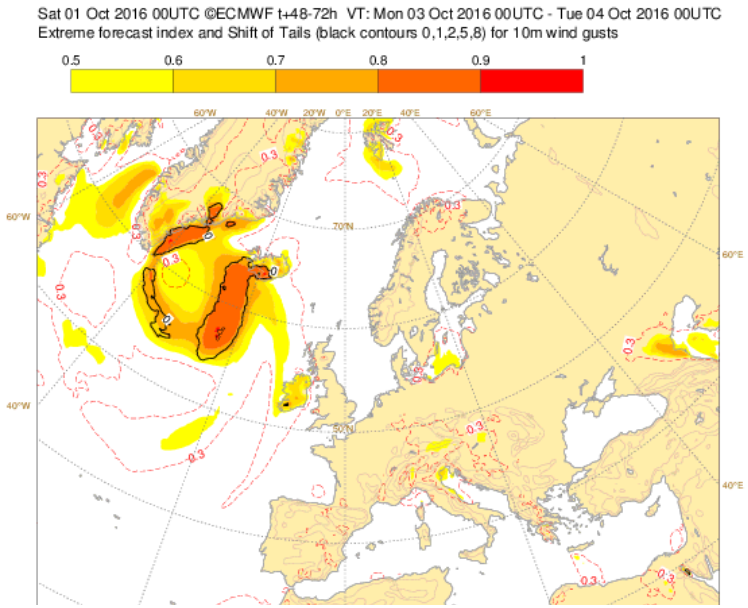


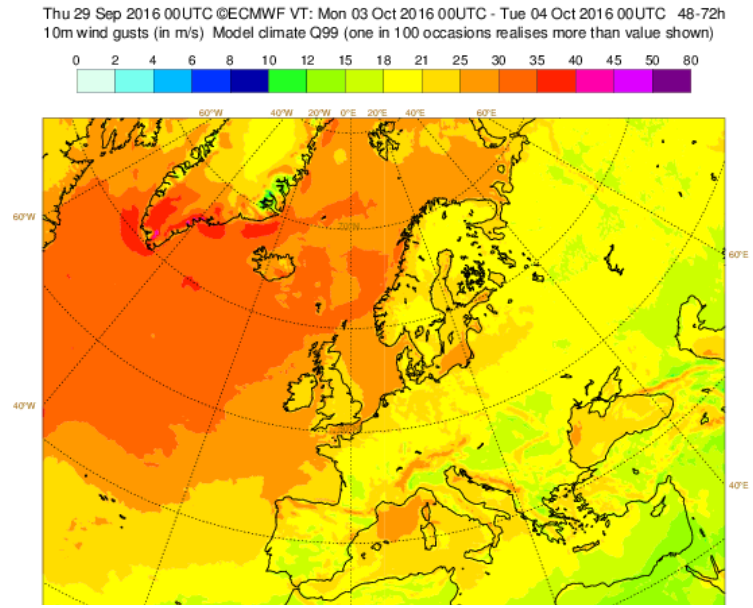
500 q Sensitivity

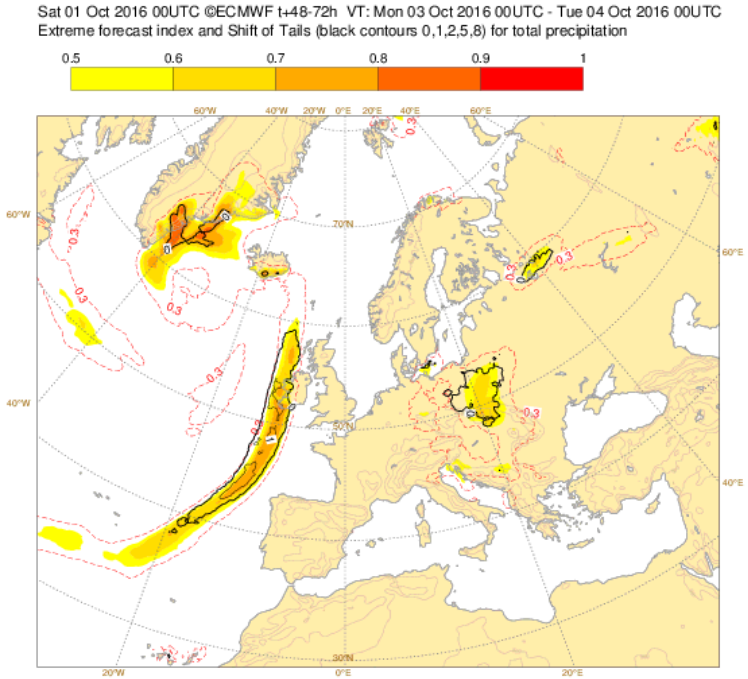


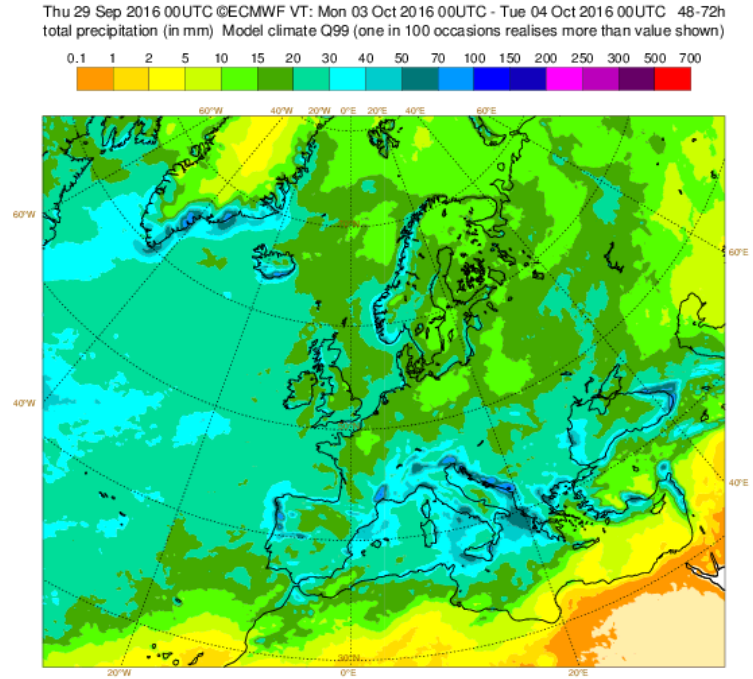
500 PV Sensitivity

EFI gusts and precip for Monday (BT 01/00z)





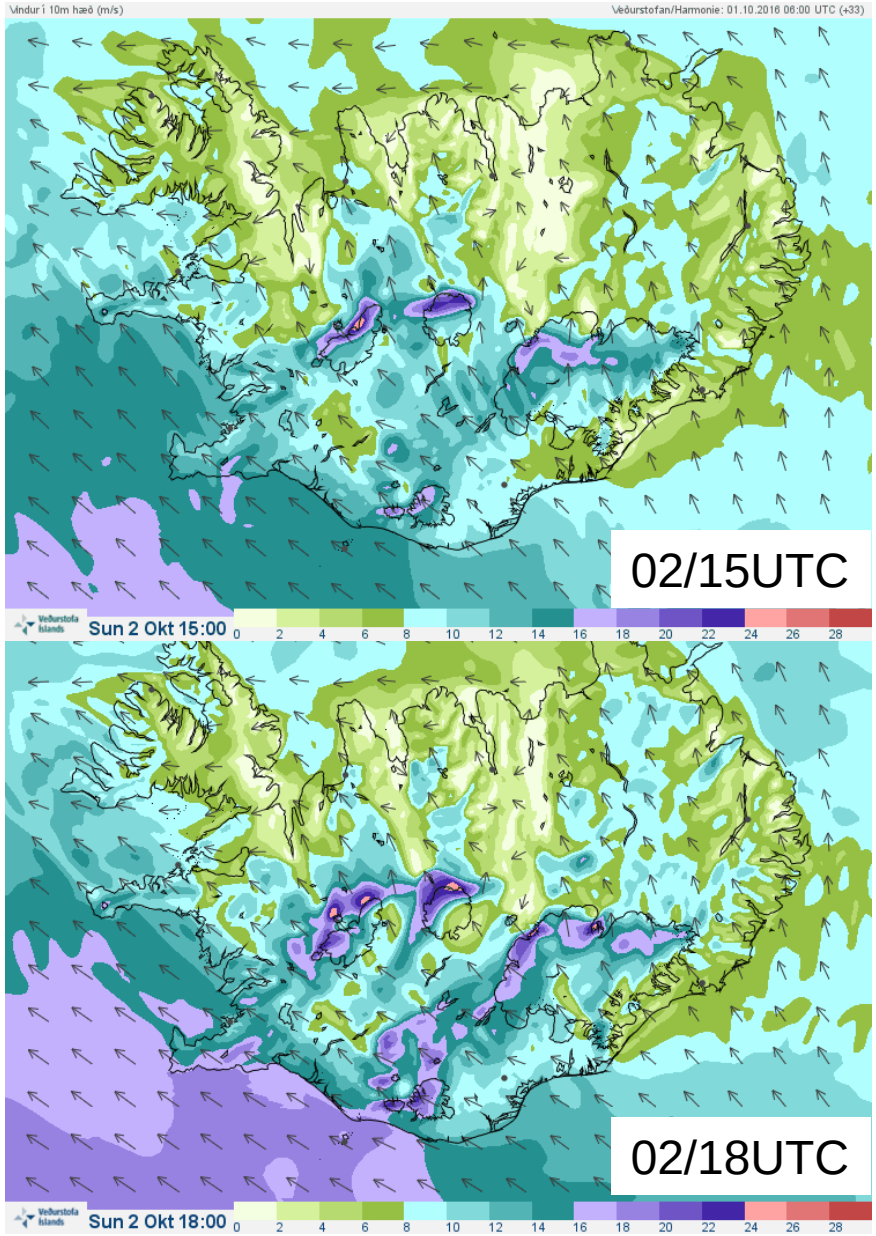


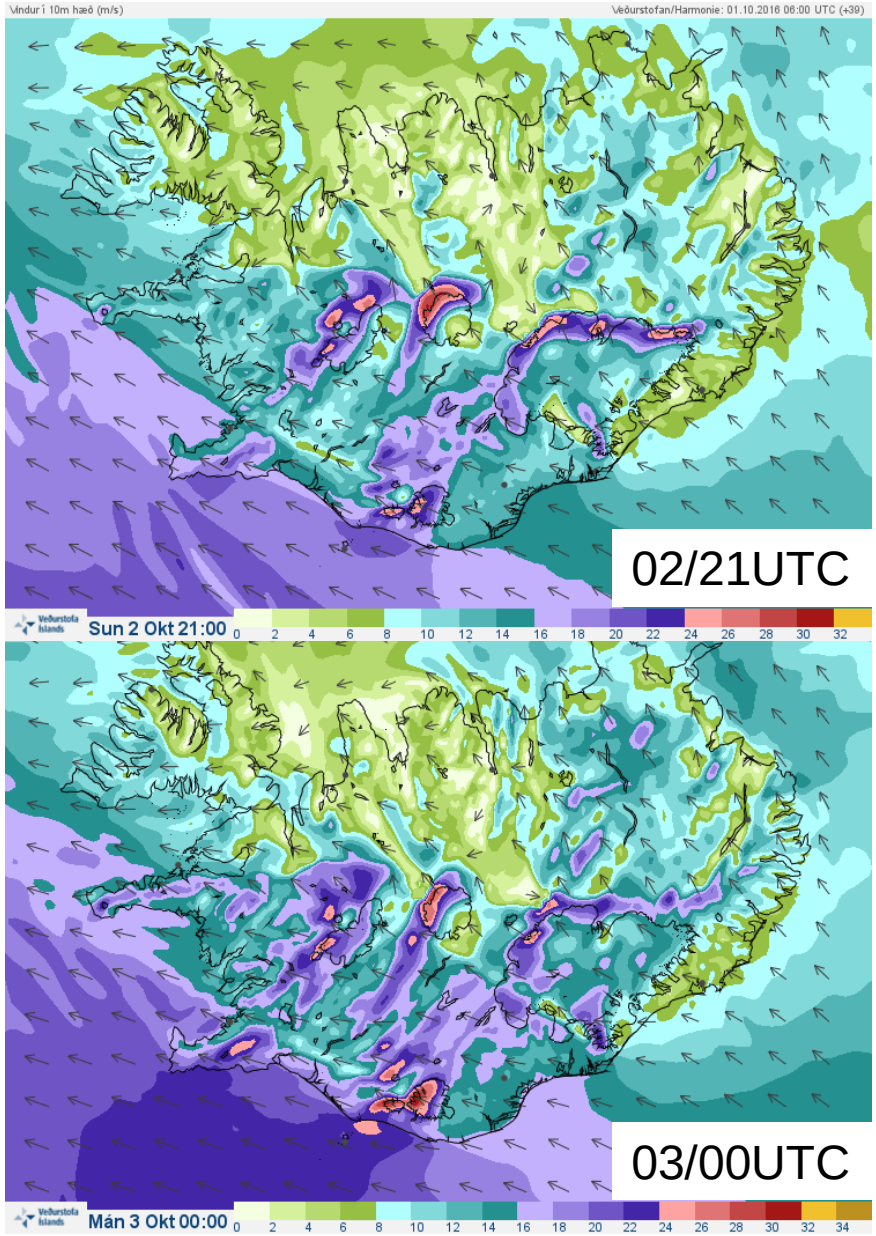


10m winds HARMONIE (2.5km) Sunday

HARMONIE vedur.is BT 01/06Z

http://en.vedur.is/weather/forecasts/elements/#type=wind





10m winds HARMONIE (2.5km) Monday

HARMONIE vedur.is BT 01/06Z

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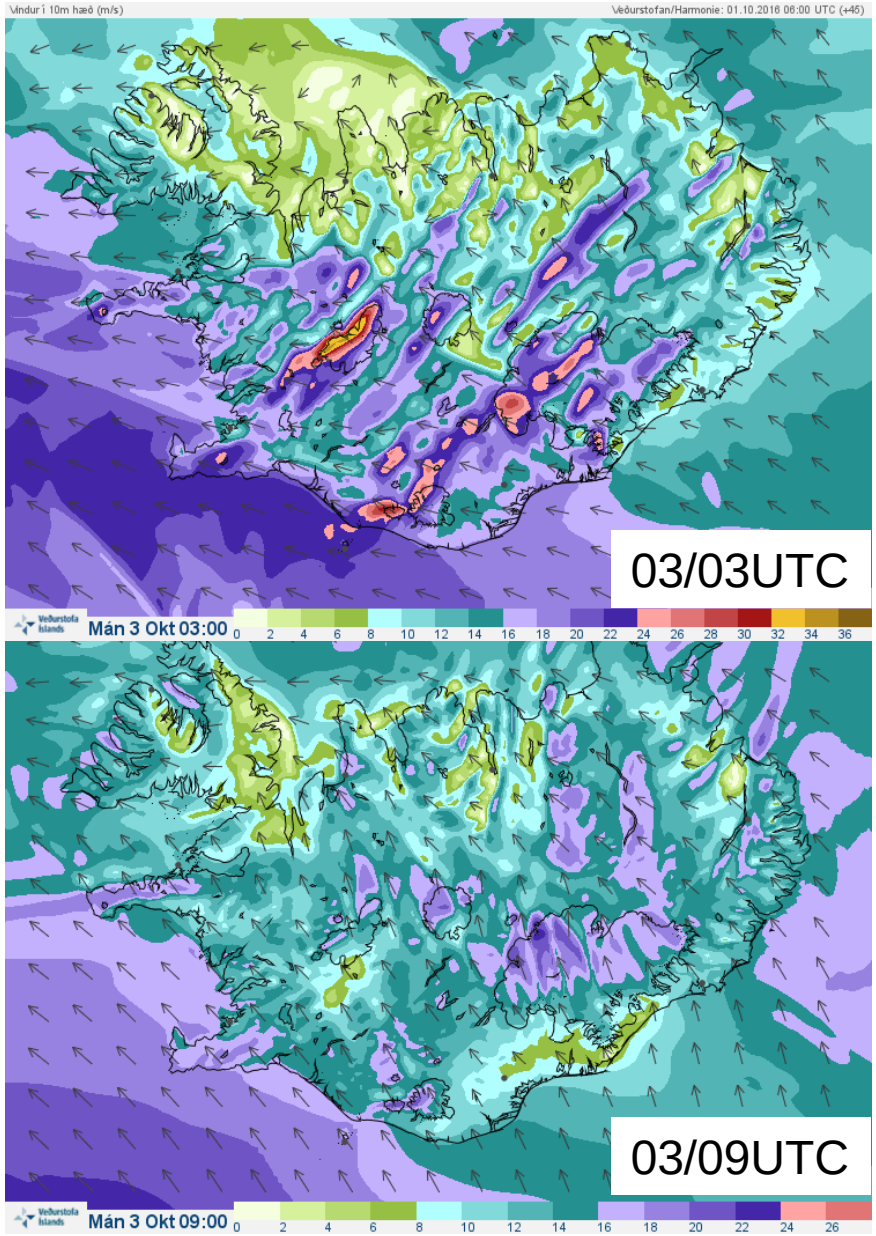

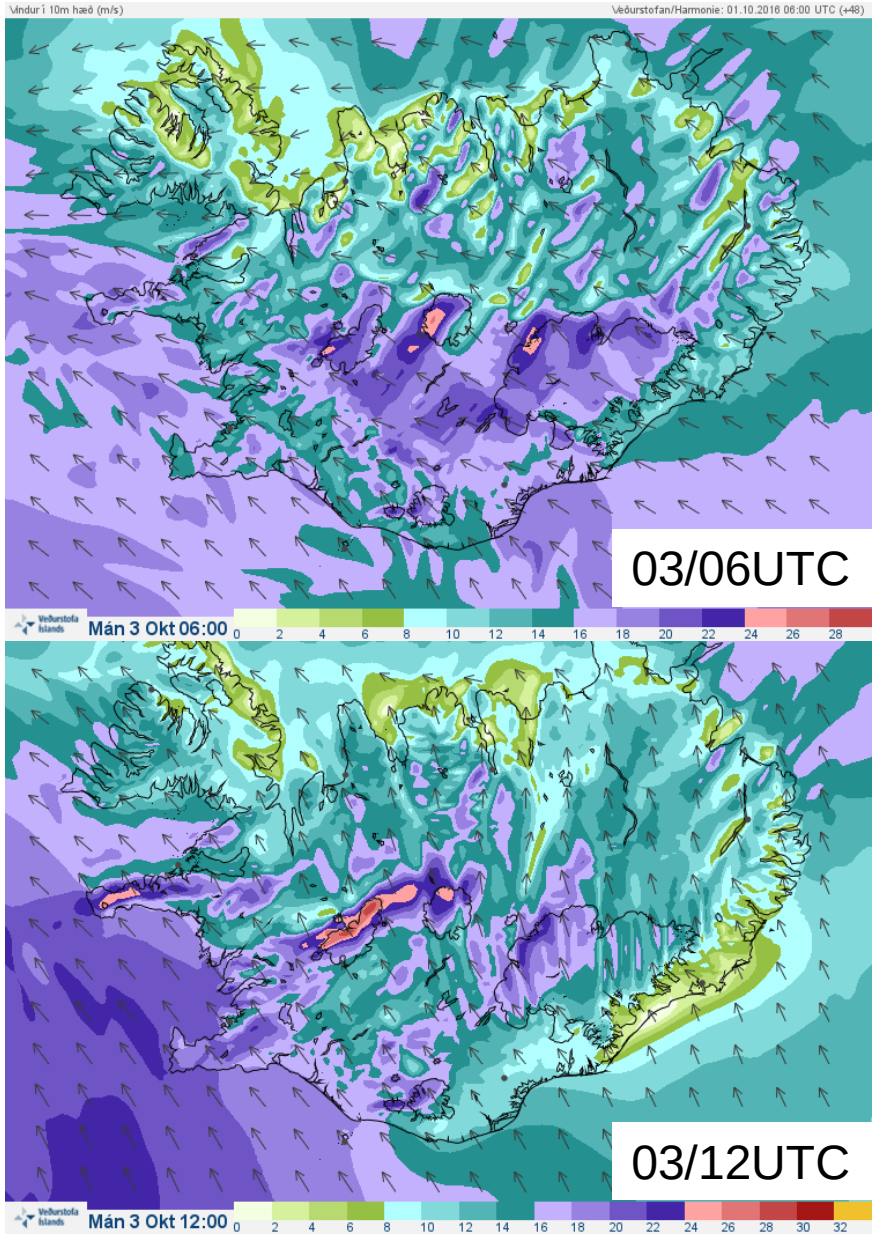

10m winds HARMONIE (2.5km) Monday

HARMONIE vedur.is BT 01/06Z

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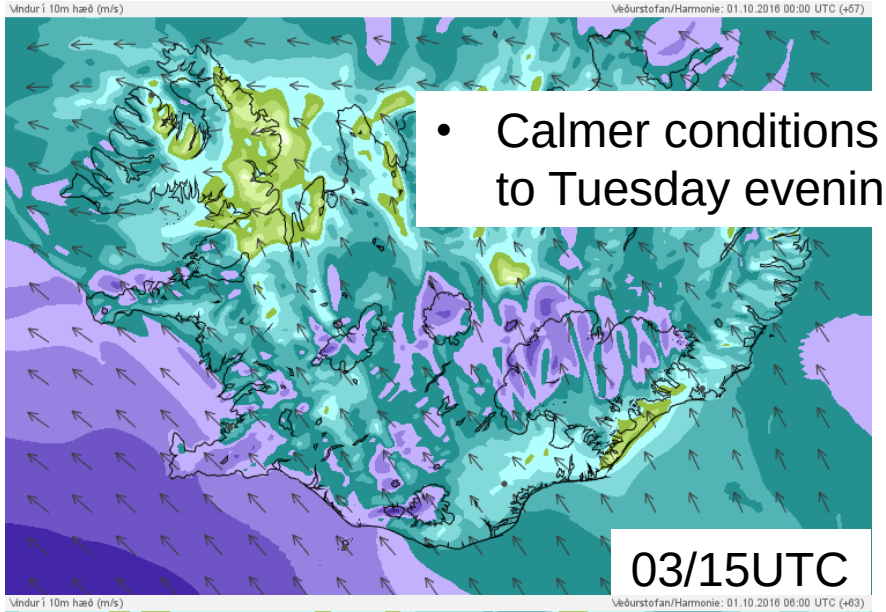
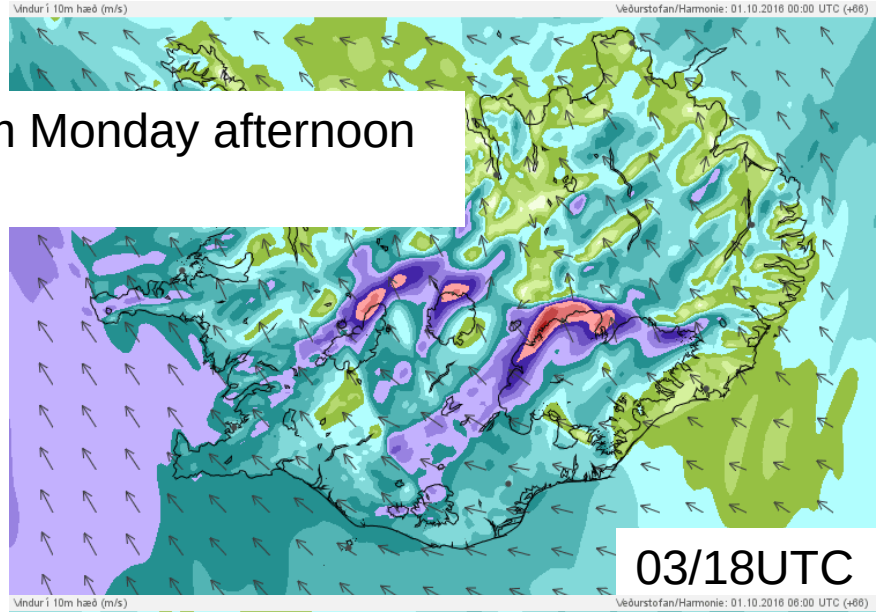
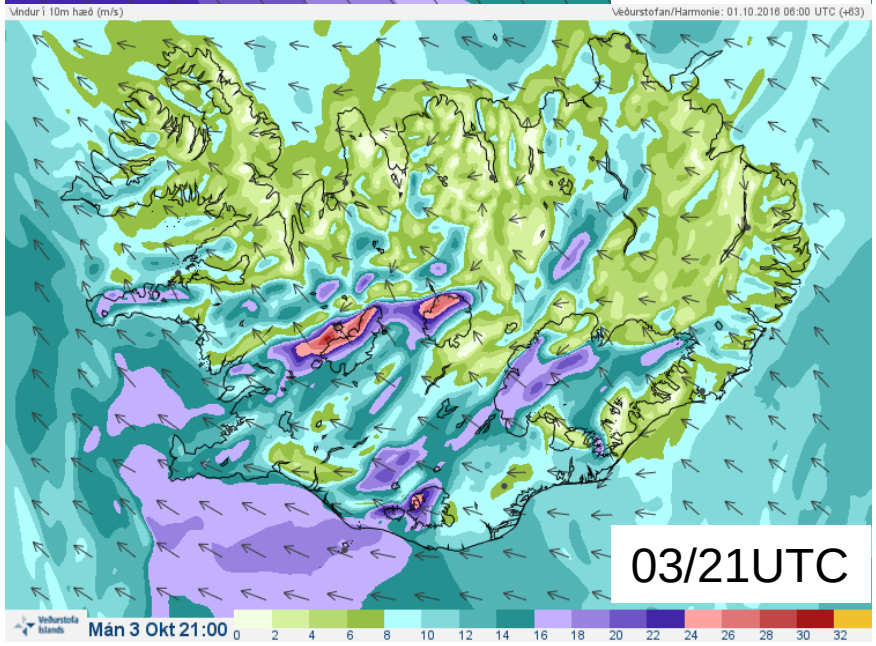
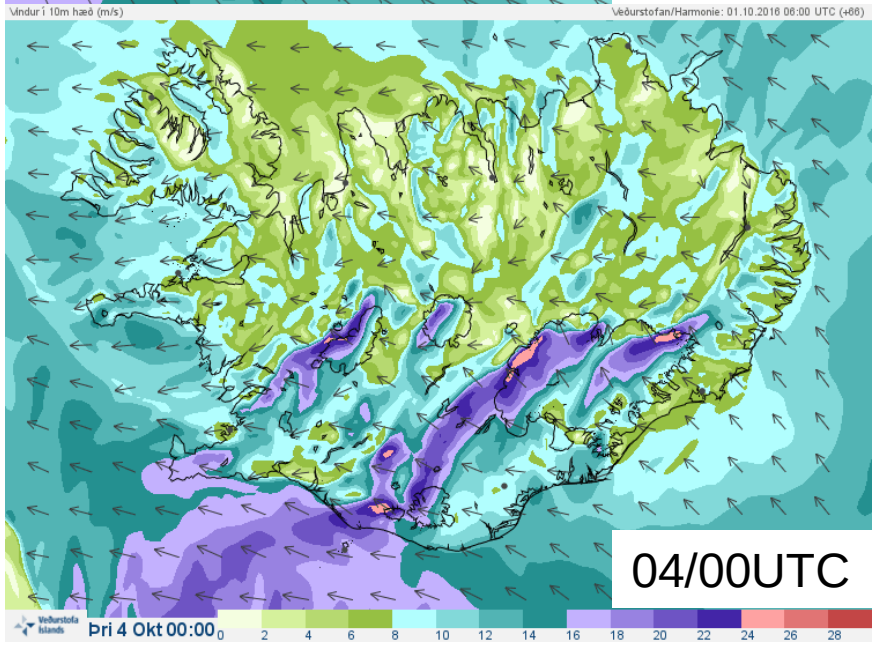
- Calmer conditions from Monday afternoon to Tuesday evening









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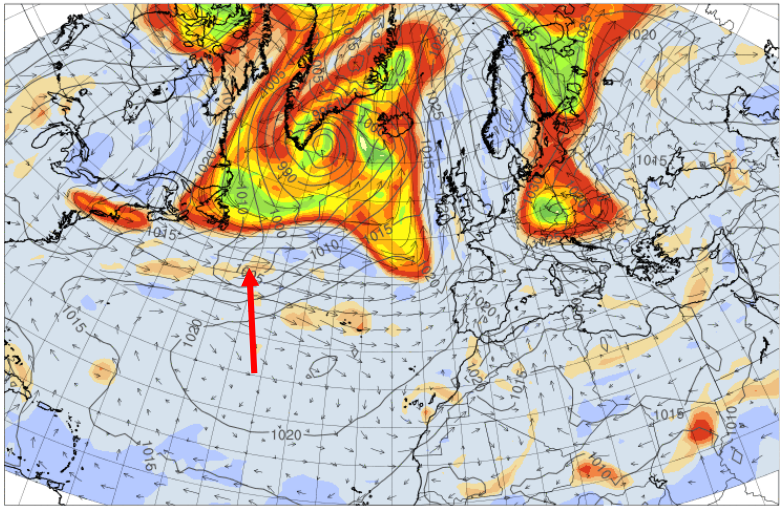
PV@320K at 20161004_00



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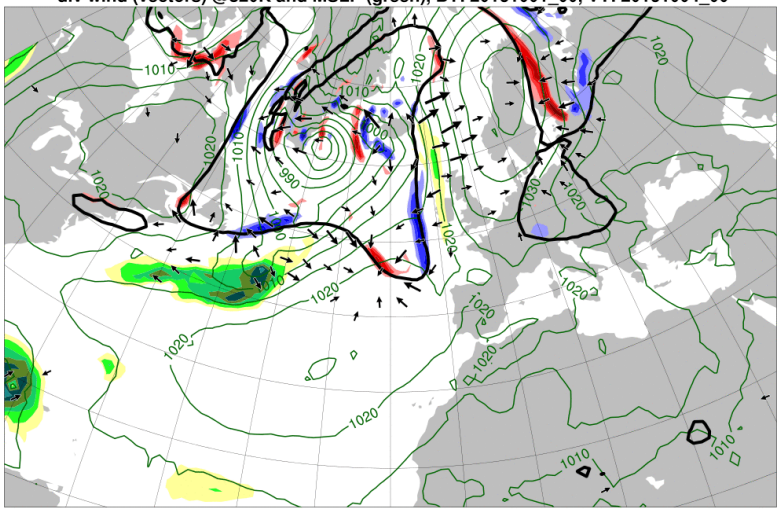
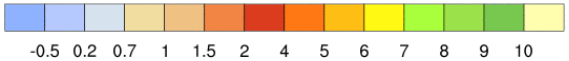
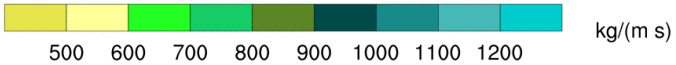
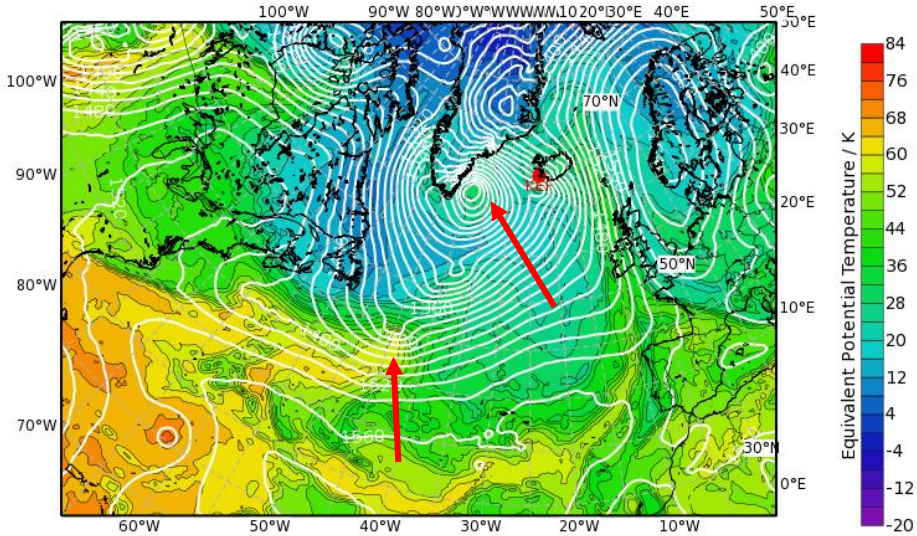
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161004_00



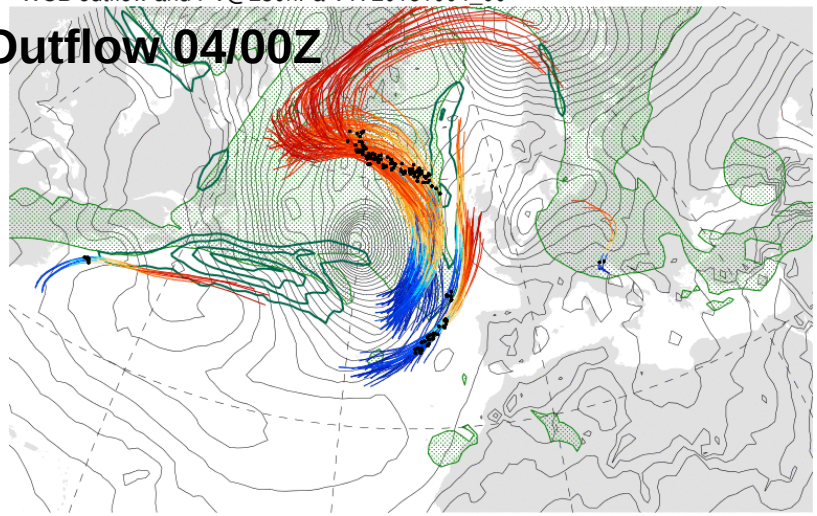






Trajectory start and SLP VT: 20161002_00
WCB outflow and PV@250hPa VT: 20161004_00

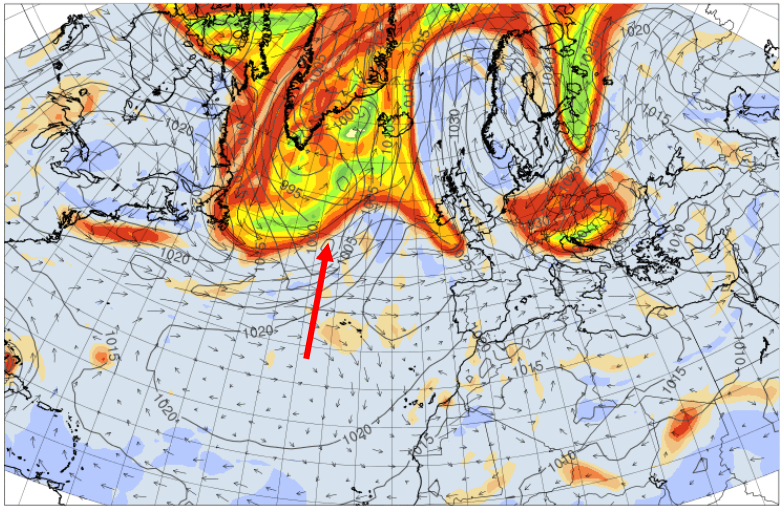
Outflow 04/00Z



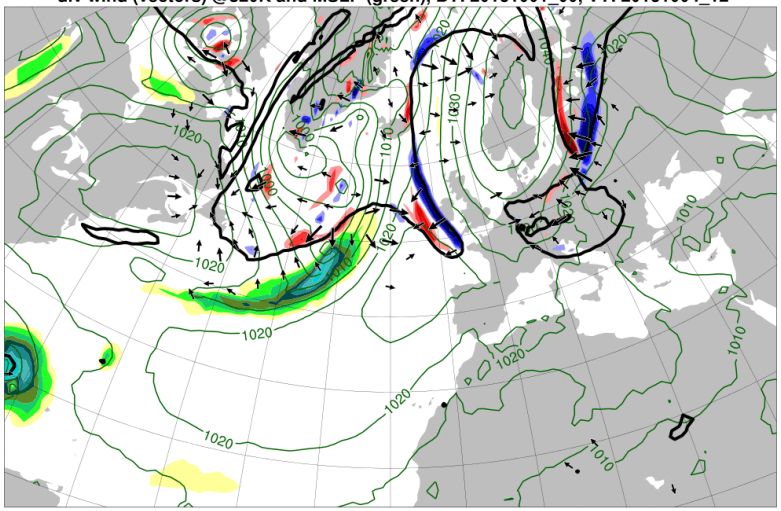
BT01/00Z

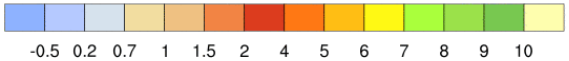
Forecast – Tue 4 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

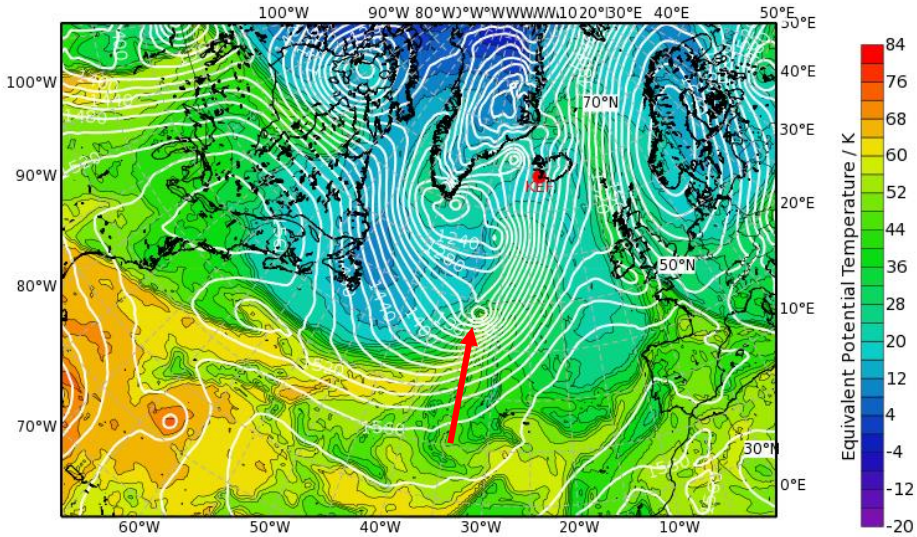
PV@320K at 20161004_12

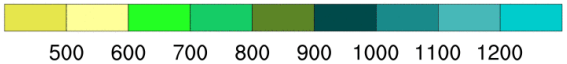


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161004_12

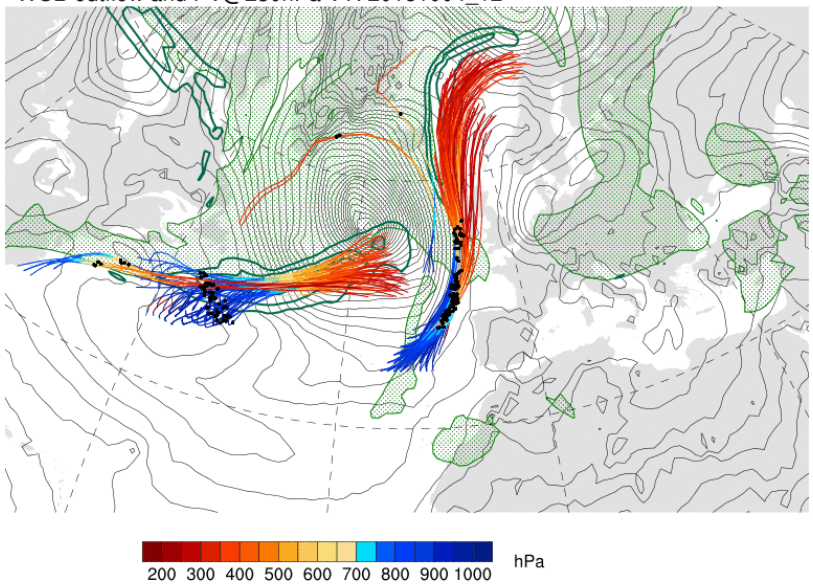




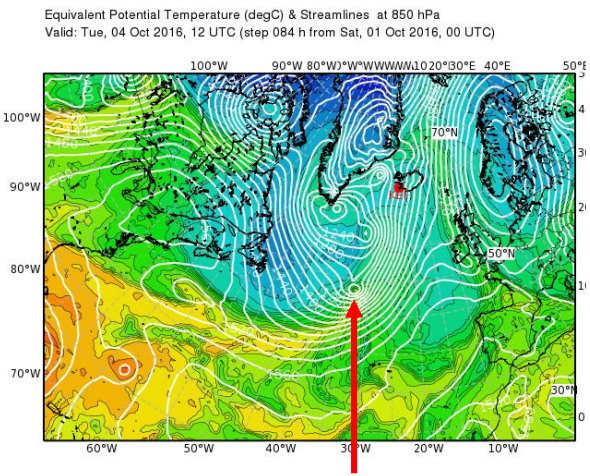




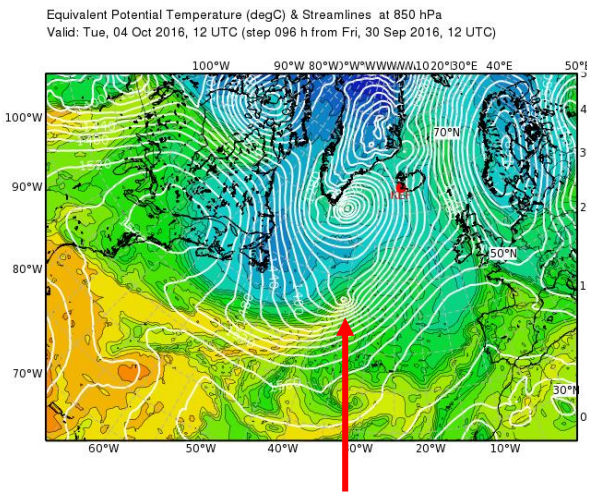
Trajectory start and SLP VT: 20161002_12
WCB outflow and PV@250hPa VT: 20161004_12



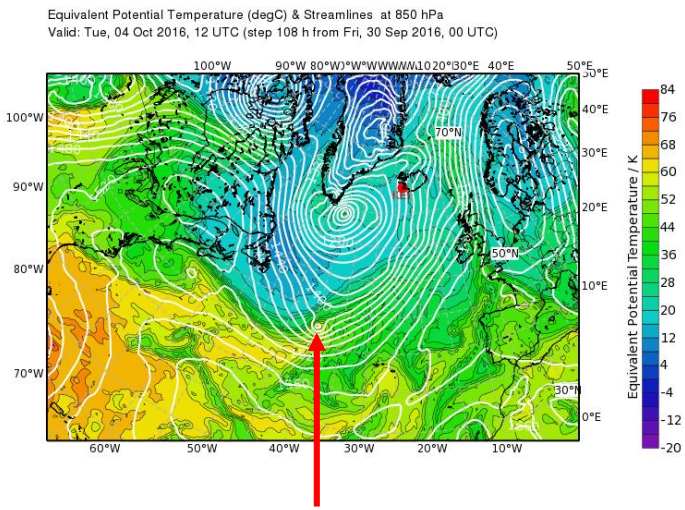
Model consistency for Tuesday 4 October 12UTC



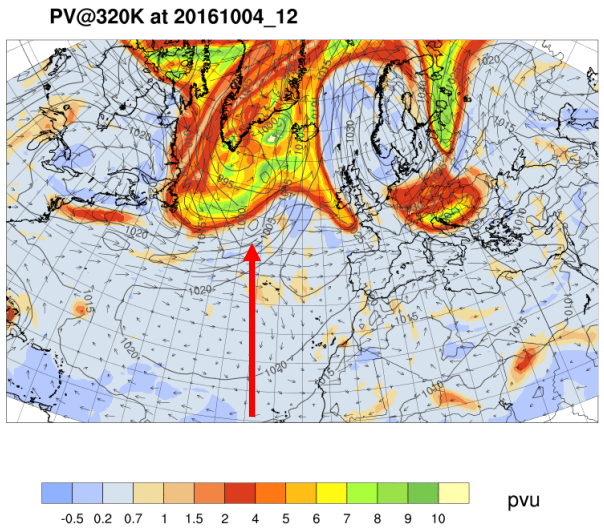
BT01/00Z

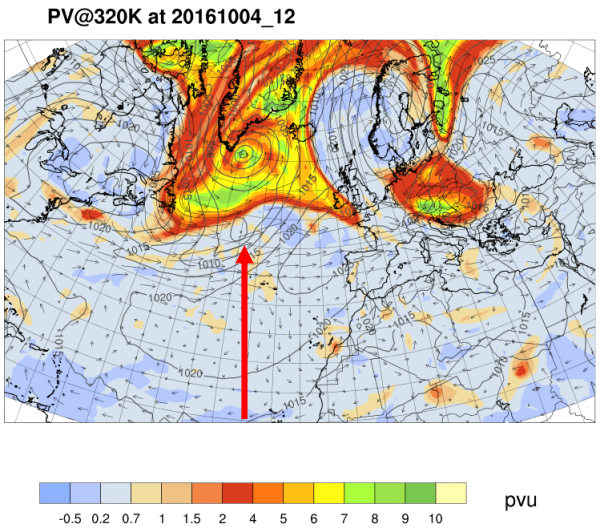


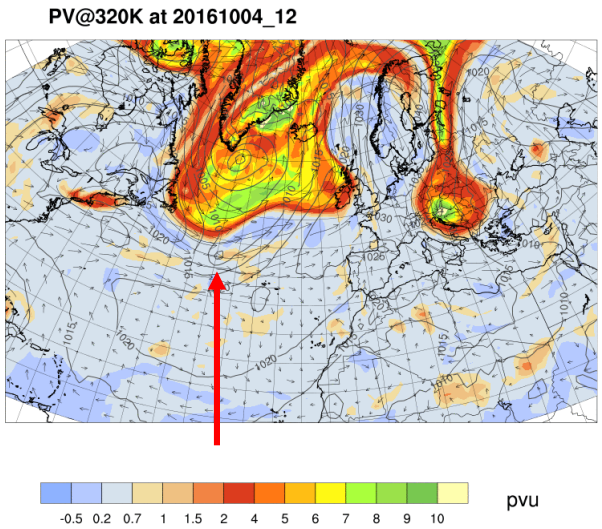
BT30/12Z



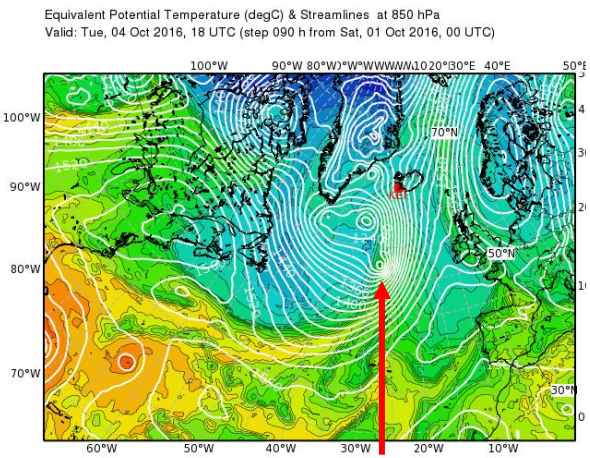
BT30/00Z



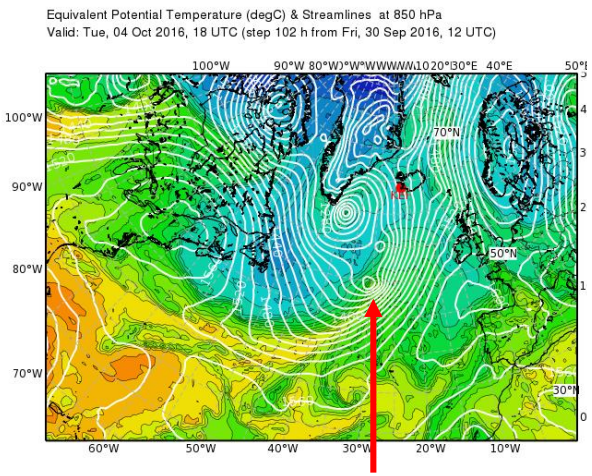




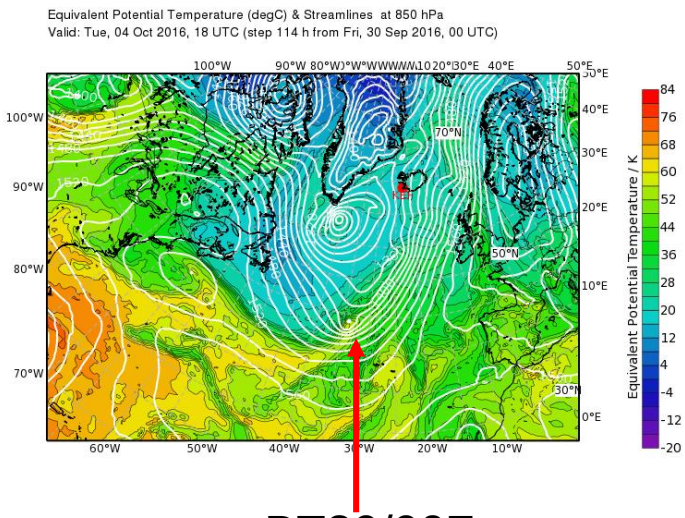
Model consistency for Tuesday 4 October 18UTC



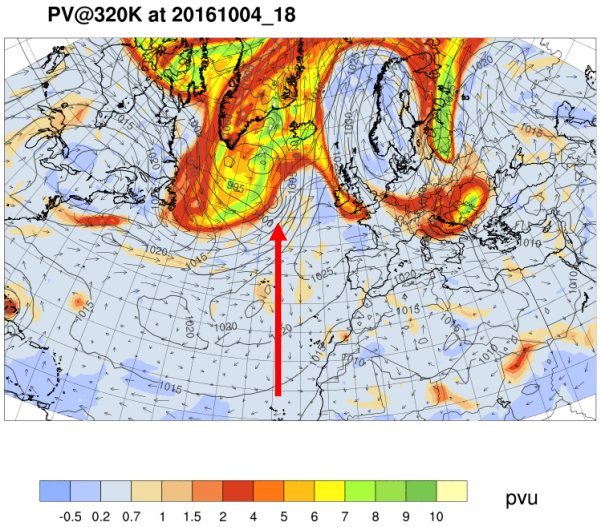
BT01/00Z

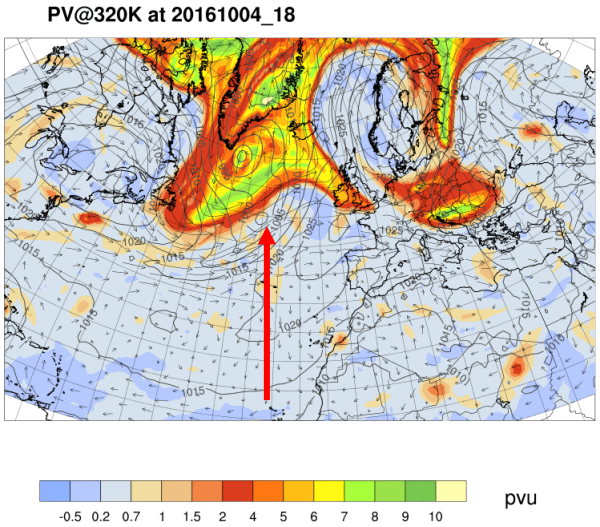


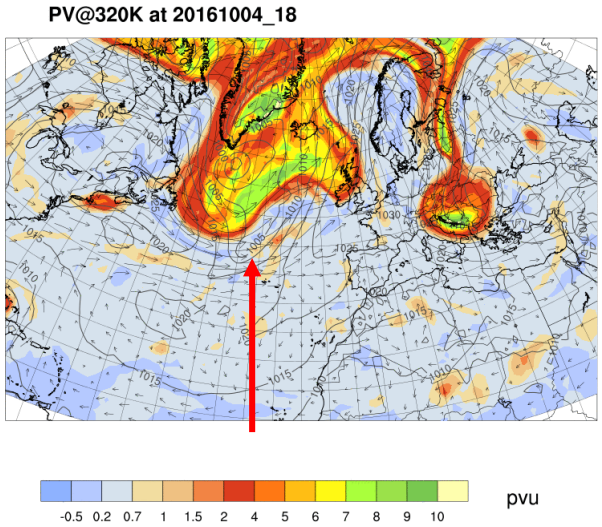
BT30/12Z



BT30/00Z



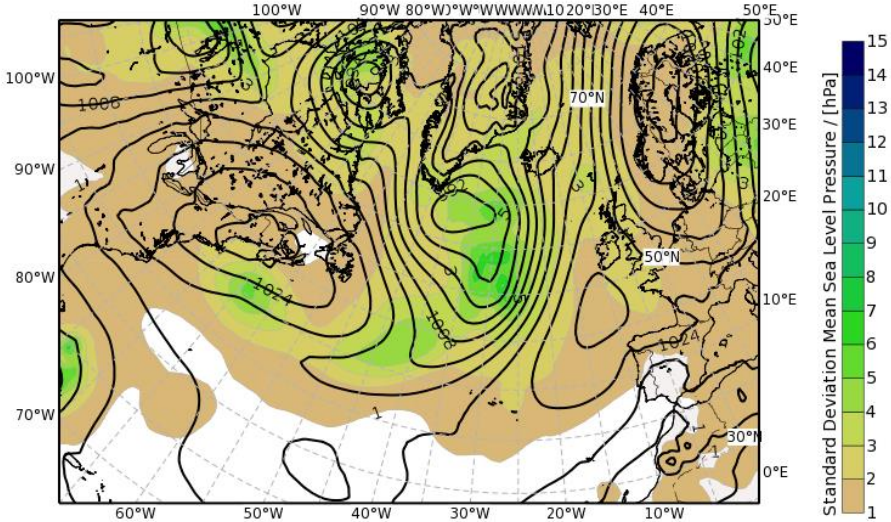




Model consistency for Tuesday 4 October 18UTC

ECMWF ENS MEAN & STDEV for MSLP / [hPa]
Valid: Tue, 04 Oct 2016, 18 UTC (step 090 h from Sat, 01 Oct 2016, 00 UTC

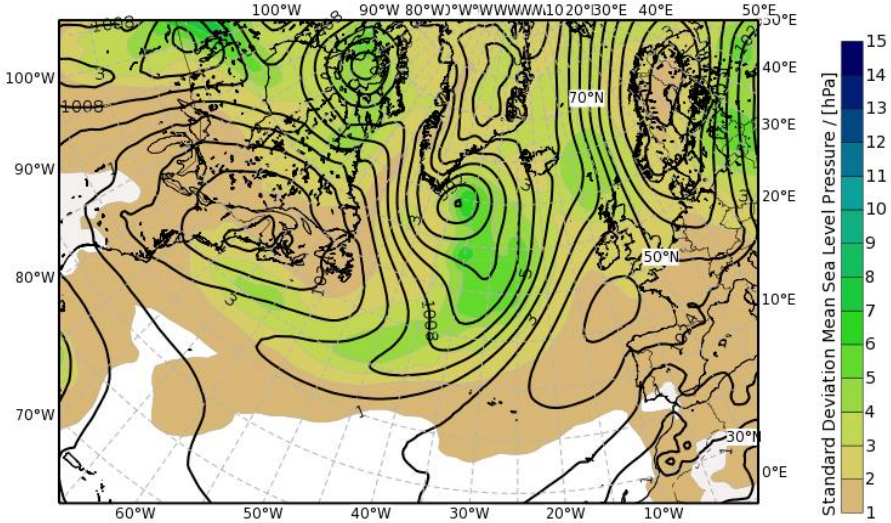
BT01/00Z



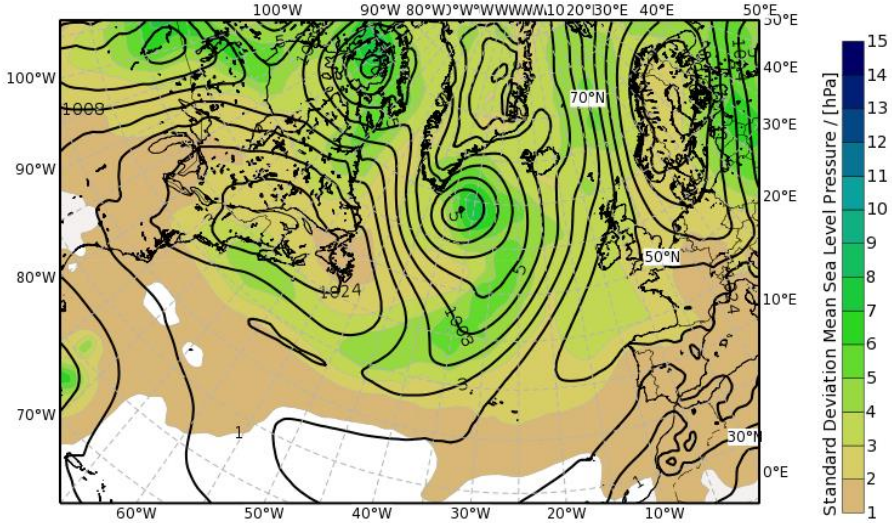
BT30/00Z

ECMWF ENS MEAN & STDEV for MSLP / [hPa]
Valid: Tue, 04 Oct 2016, 18 UTC (step 102 h from Fri, 30 Sep 2016, 12 UTC)

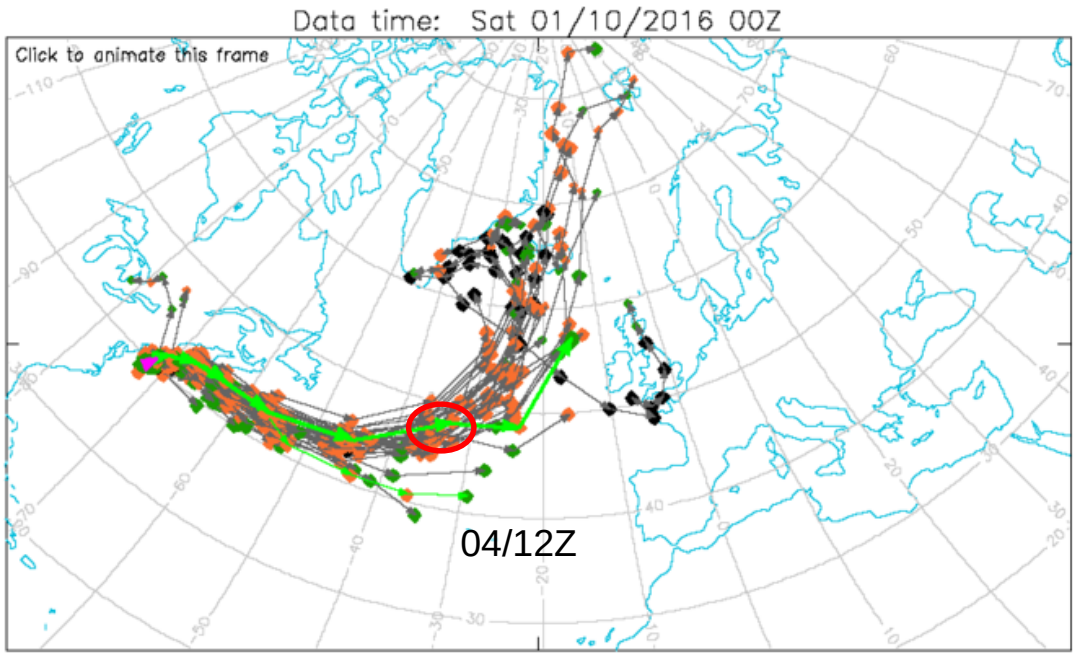
BT30/12Z



ECMWF ENS MEAN & STDEV for MSLP / [hPa]
Valid: Tue, 04 Oct 2016, 18 UTC (step 114 h from Fri, 30 Sep 2016, 00 UTC)

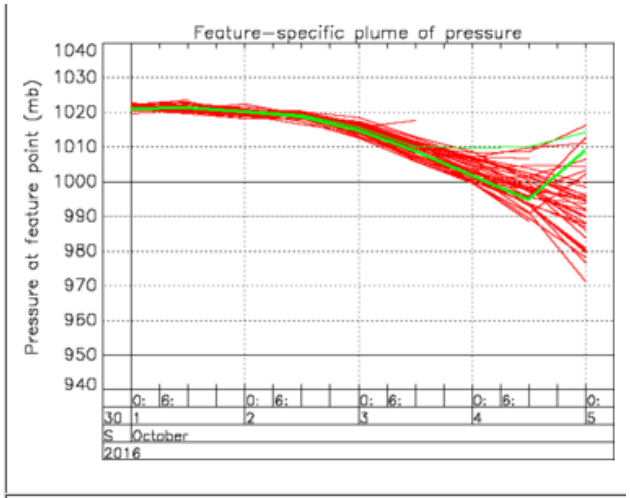


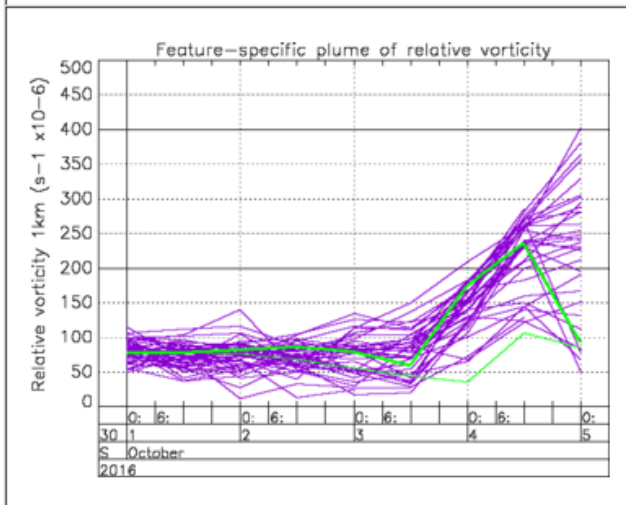
Track of frontal wave cyclone BT 01/00Z



Percentage of members in track, and a list of the member numbers:

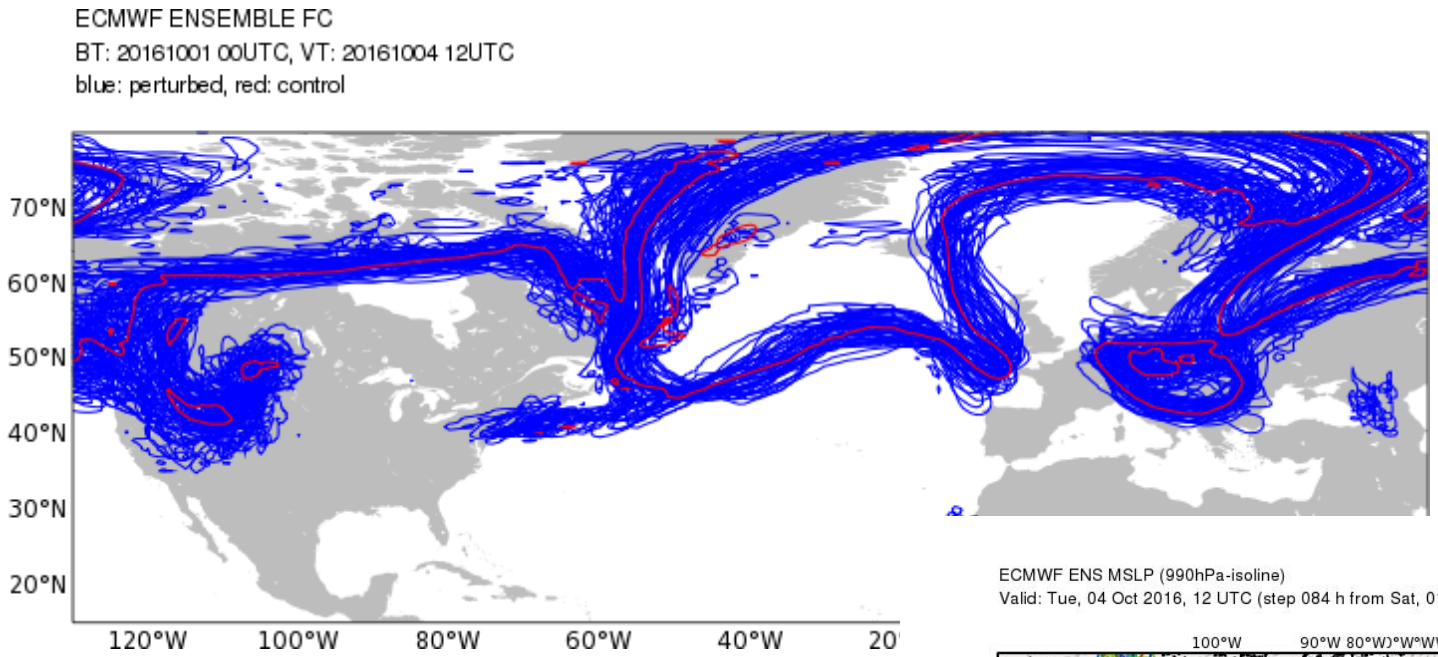
T+ 0:	100%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50
T+ 12:	96%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,38,39,40,41,43,44,45,46,47,48,49,50
T+ 24:	86%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,19,20,21,22,23,24,25,26,28,29,30,31,32,33,35,36,39,40,41,43,44,45,46,47,48,50
T+ 36:	82%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,19,20,21,22,23,24,25,26,28,29,30,31,32,33,36,39,40,41,43,45,46,47,48,50
T+ 48:	80%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,20,21,22,23,24,25,28,29,30,31,32,33,36,39,40,41,43,45,46,47,48,50
T+ 60:	75%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,20,21,22,24,25,26,29,30,31,32,33,36,39,40,41,43,46,47,48,50
T+ 72:	71%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,20,21,22,24,25,28,30,31,32,38,39,40,41,43,46,47,48,50
T+ 84:	69%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,20,21,22,24,26,30,31,32,38,39,40,41,43,46,47,48,50
T+ 96:	65%	Det, 0,1,2,3,4,5,6,7,8,9,10,11,12,13,16,17,18,20,22,24,28,30,31,32,38,39,40,41,43,46,47,48,50

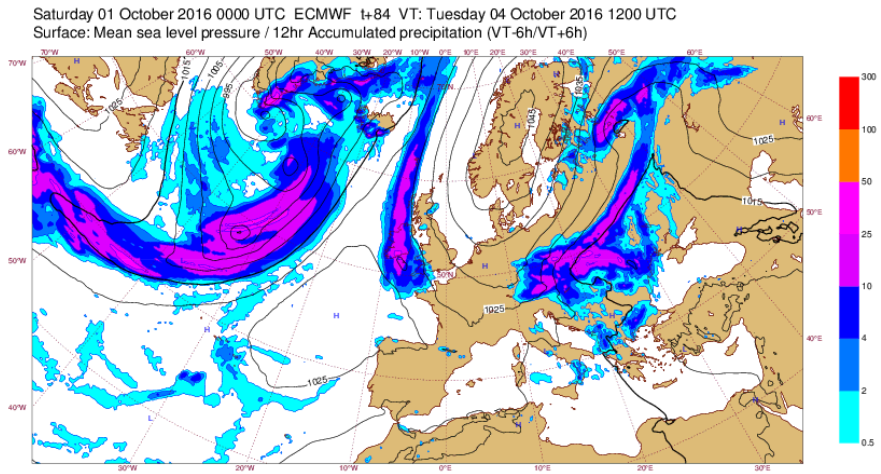


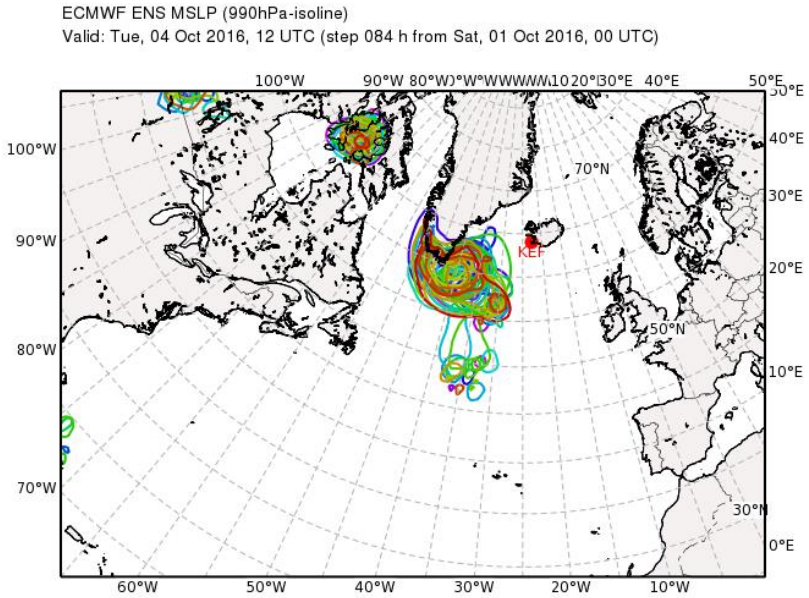


2PVU@320K, MSLP990 Spaghetti (based EC Ens 01/00Z)

Tue 04/12Z

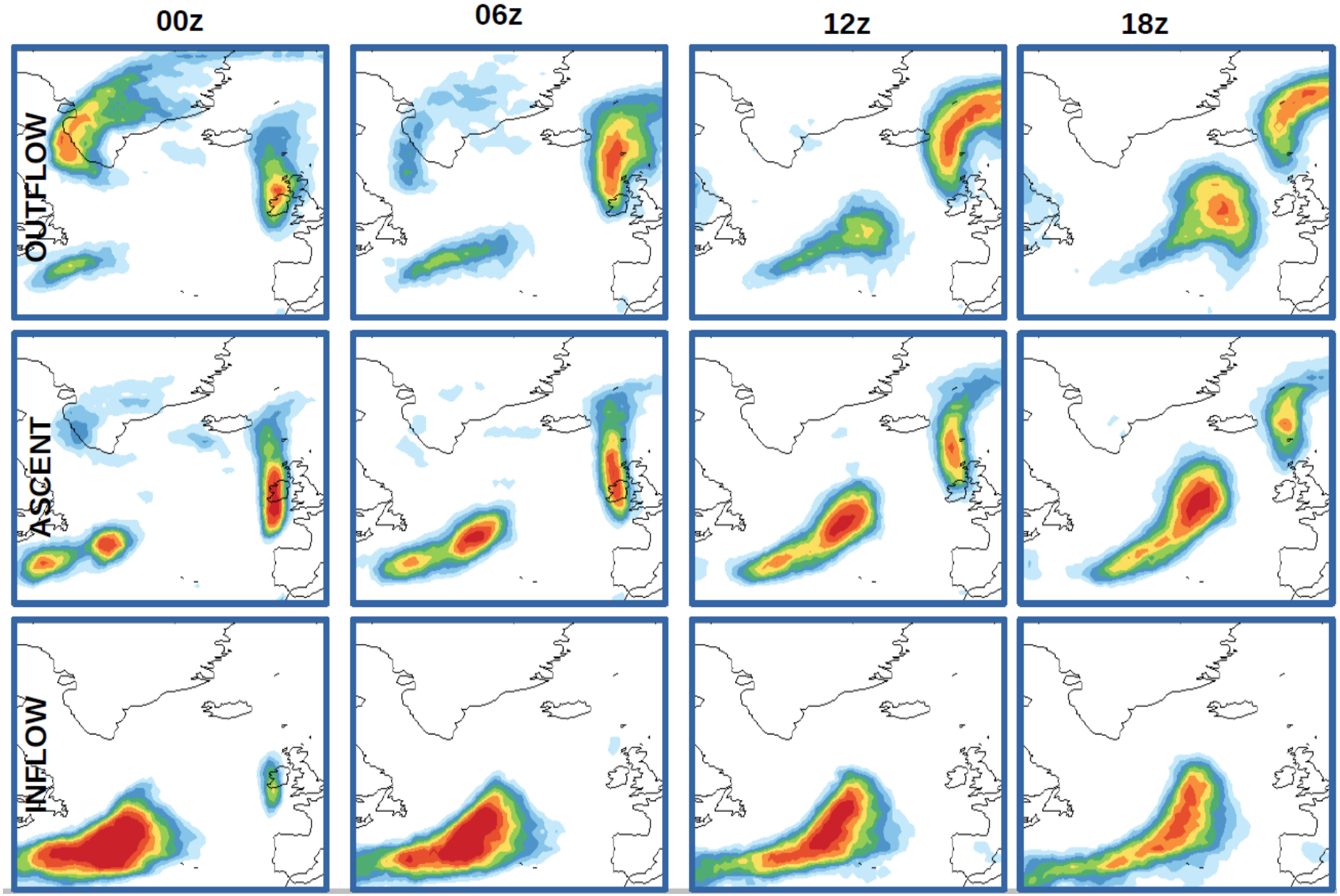






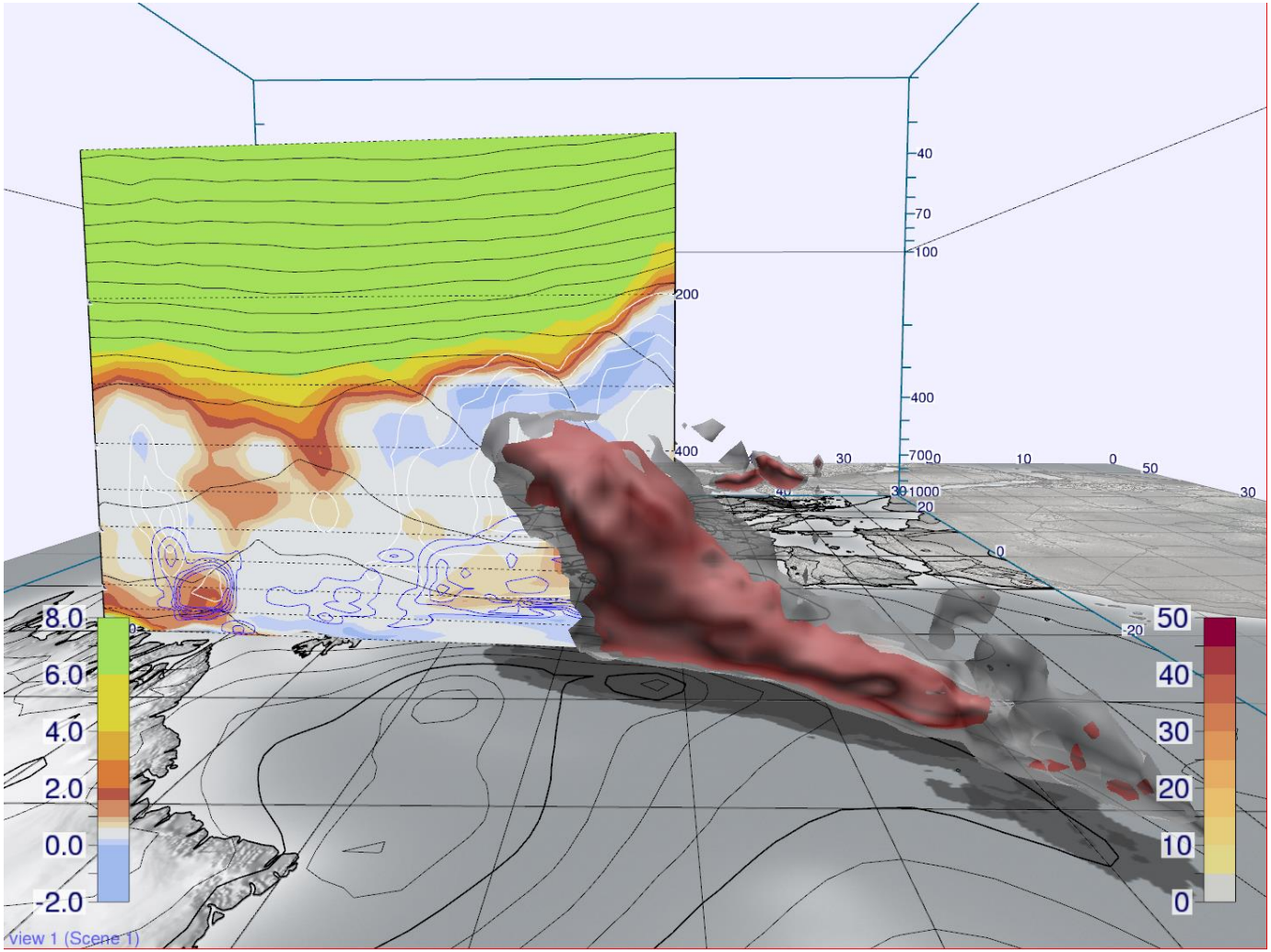
WCB probabilities Tuesday 4 October

BT01/00Z



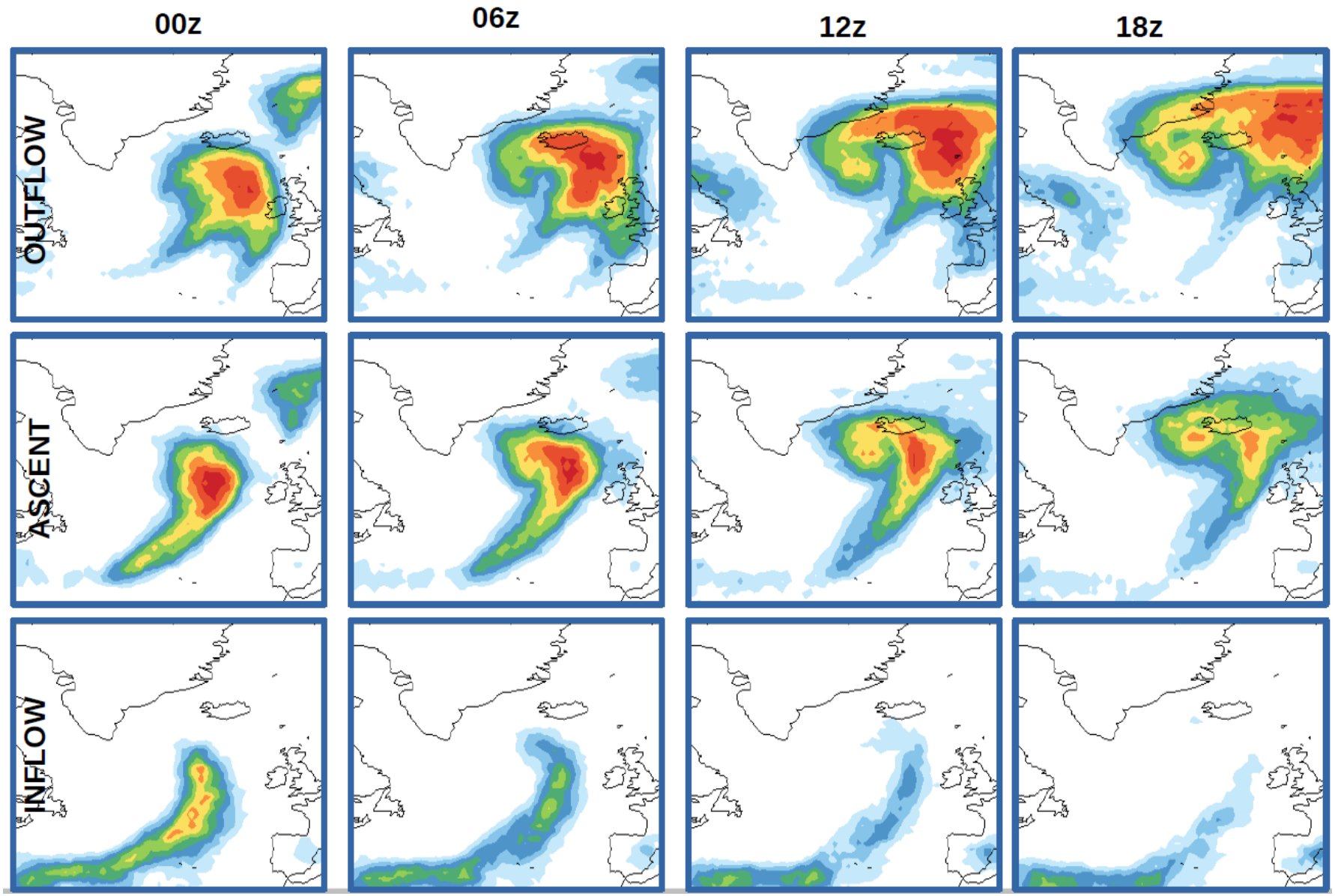
Tuesday 4 October 18 UTC, frontal wave cyclone

BT01/00Z



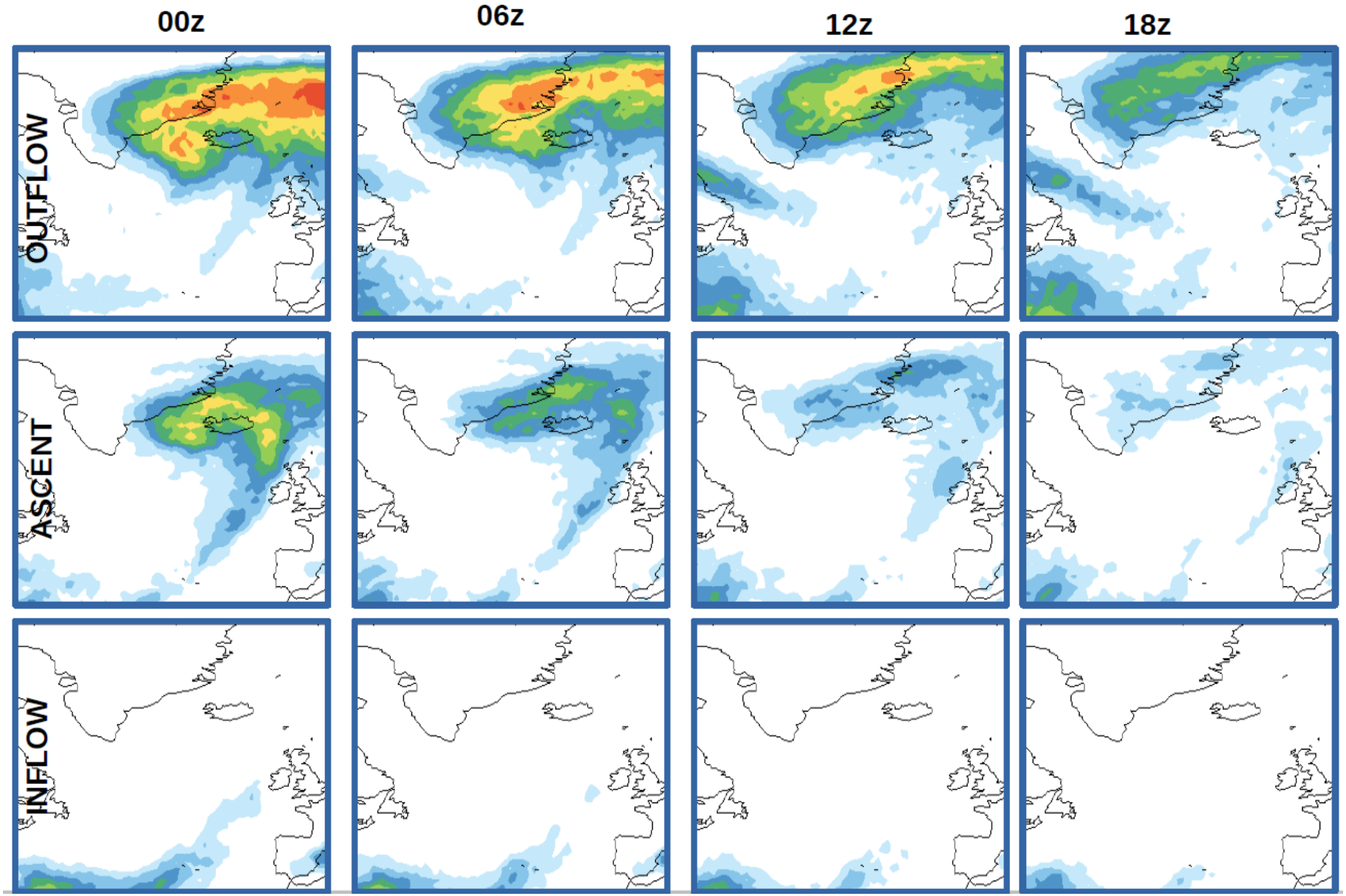
WCB probabilities Wednesday 5 October

BT01/00Z



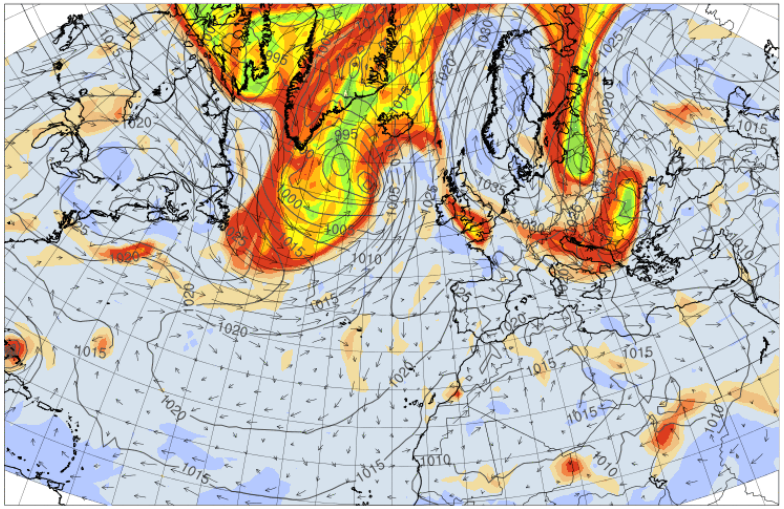
WCB probabilities Thursday 6 October

BT01/00Z

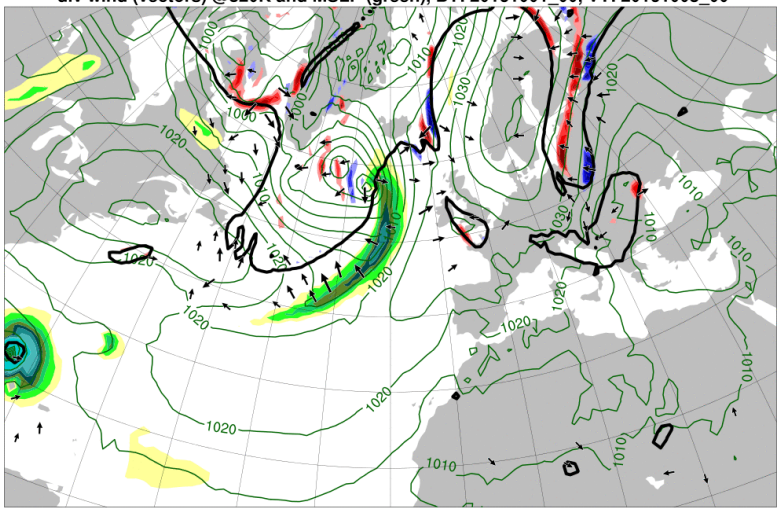


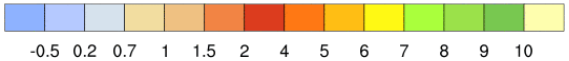
Forecast – Wed 5 Oct 2016, 00UTC PV320K, irrwind320K, THE850K, trajectories

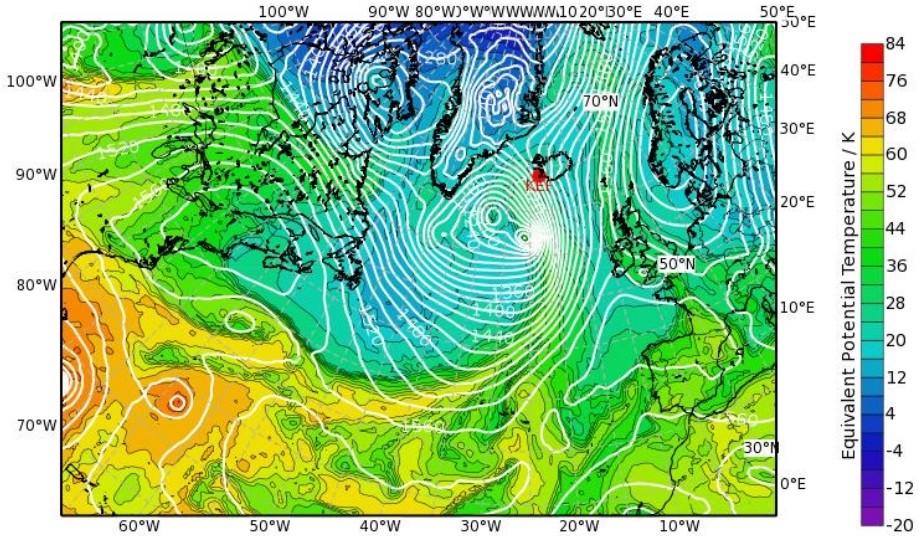
PV@320K at 20161005_00

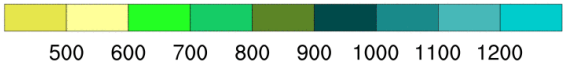


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161005_00

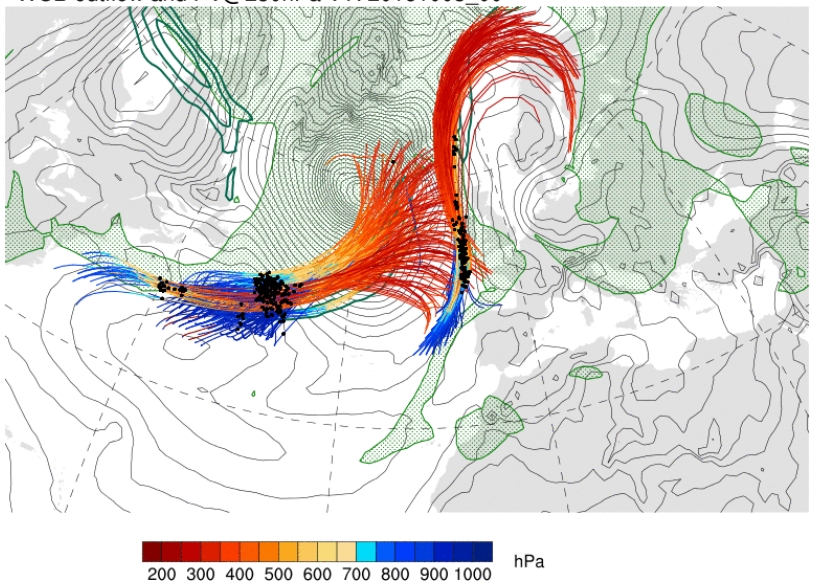






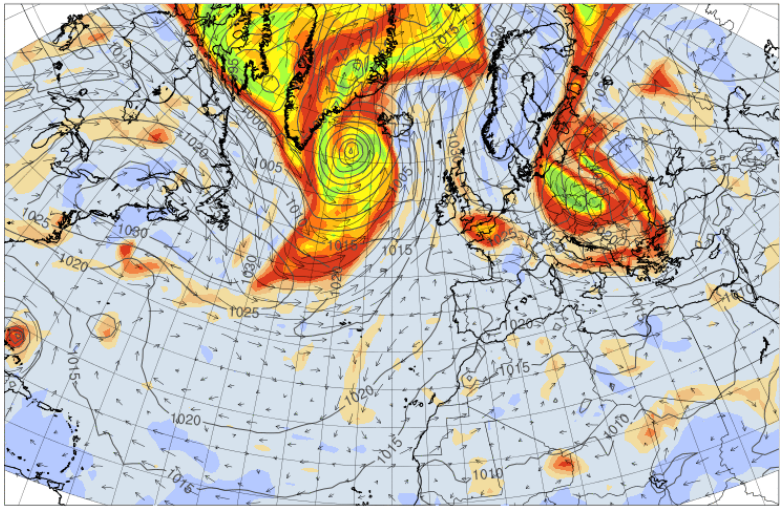


Trajectory start and SLP VT: 20161003_00
WCB outflow and PV@250hPa VT: 20161005_00

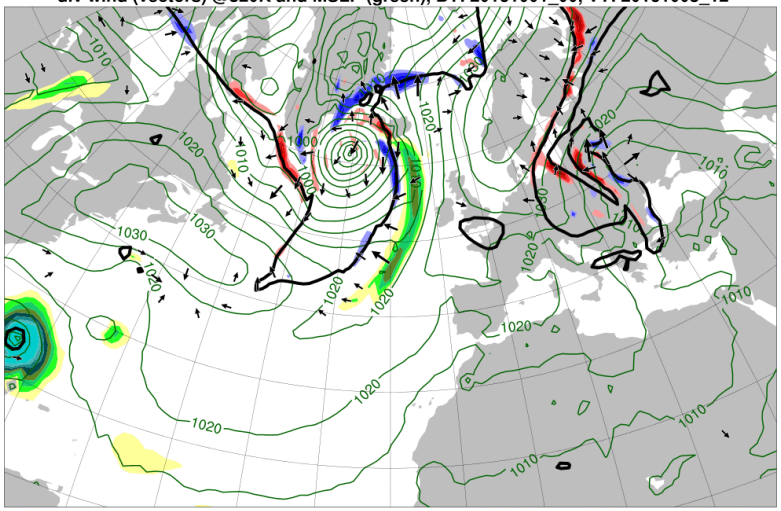


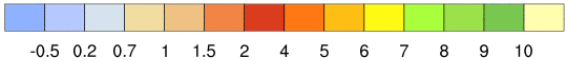
Forecast – Wed 5 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

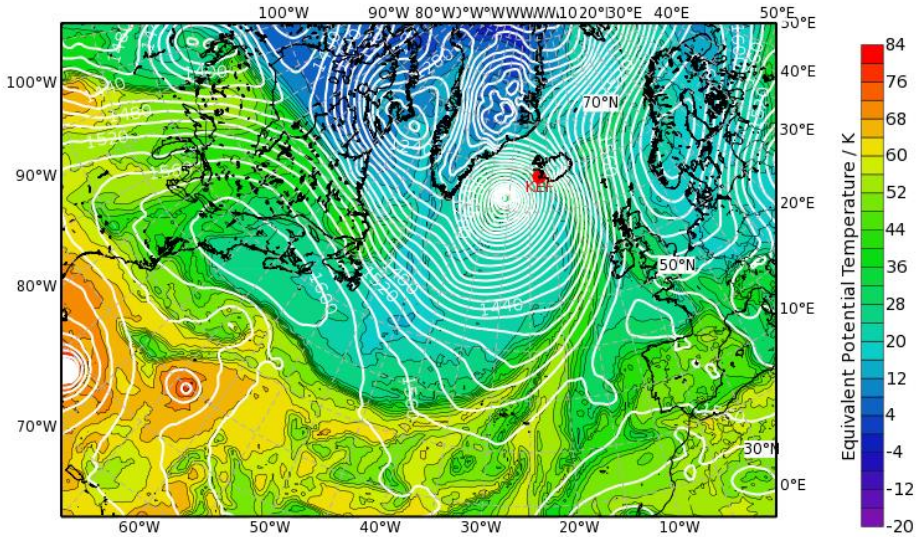
PV@320K at 20161005_12

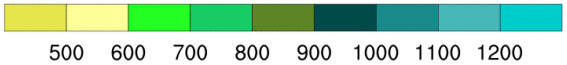


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161005_12

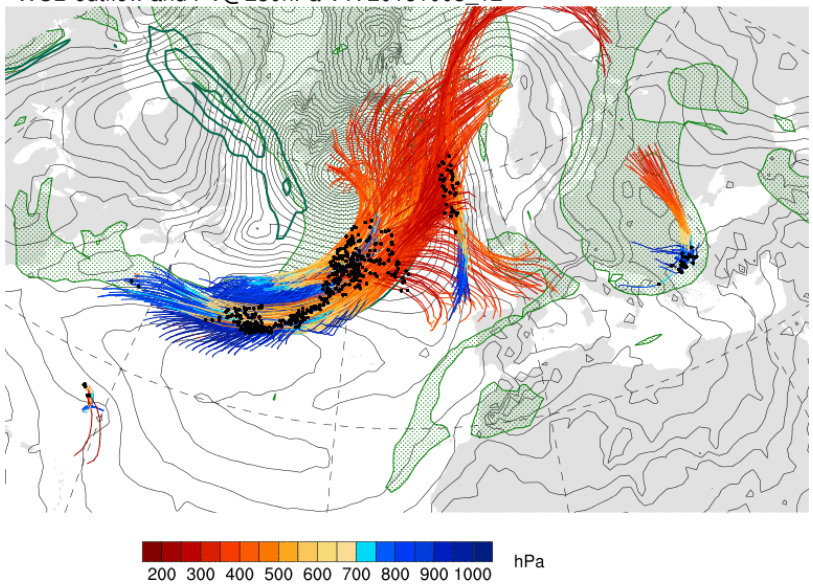






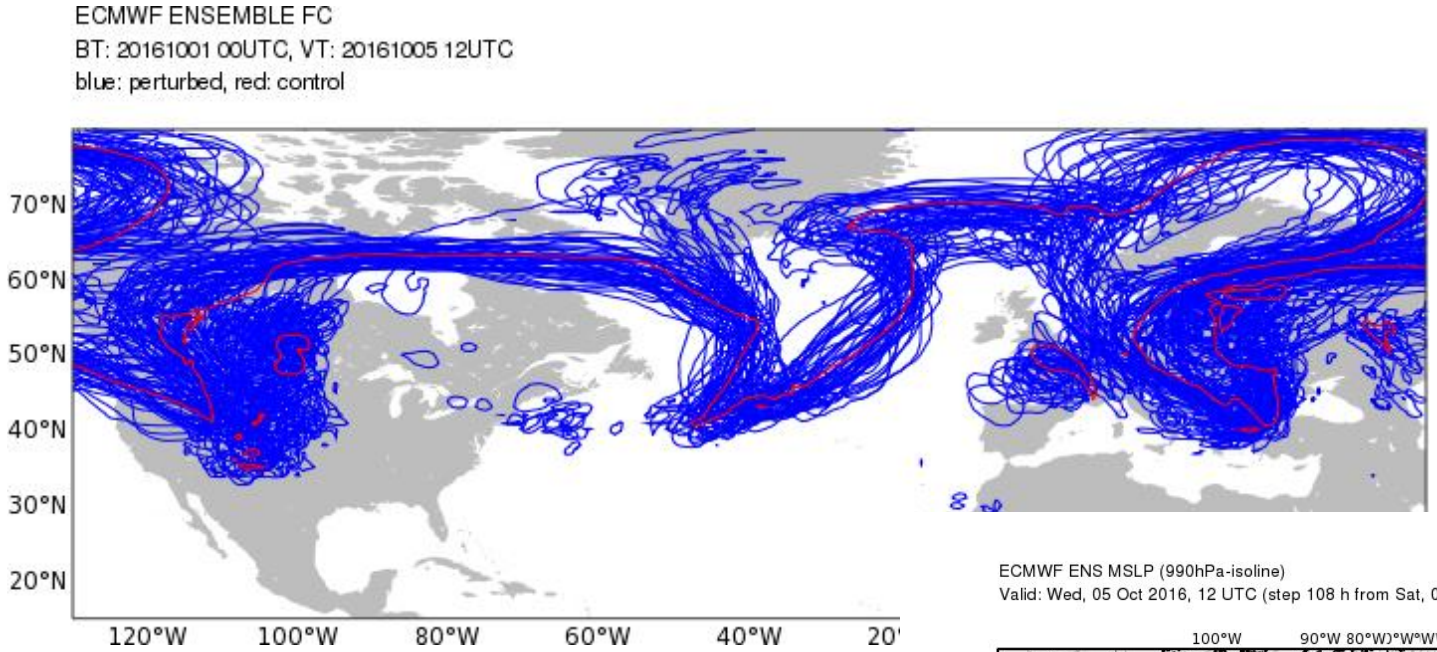


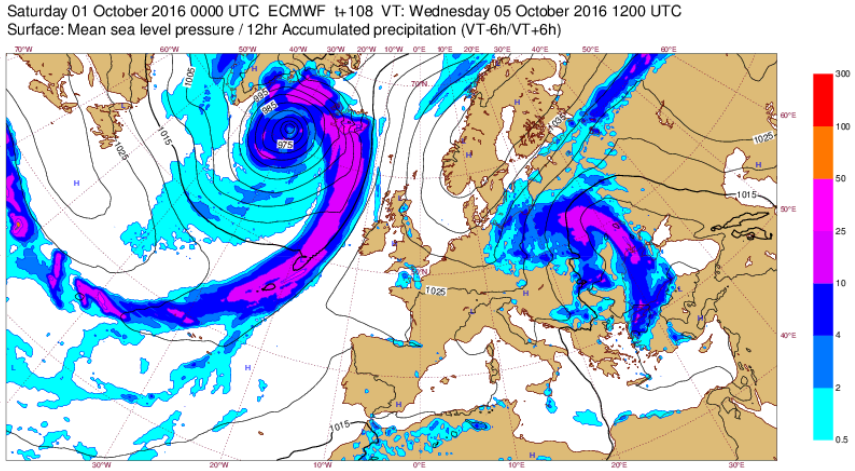
Trajectory start and SLP VT: 20161003_12
WCB outflow and PV@250hPa VT: 20161005_12

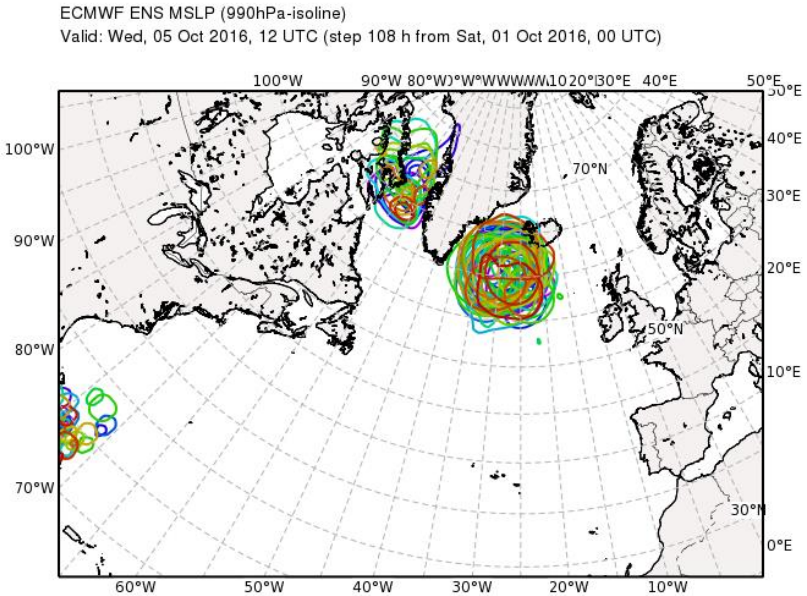


2PVU@320K, MSLP990 Spaghetti (based EC Ens 01/00Z)

Wed 05/12Z

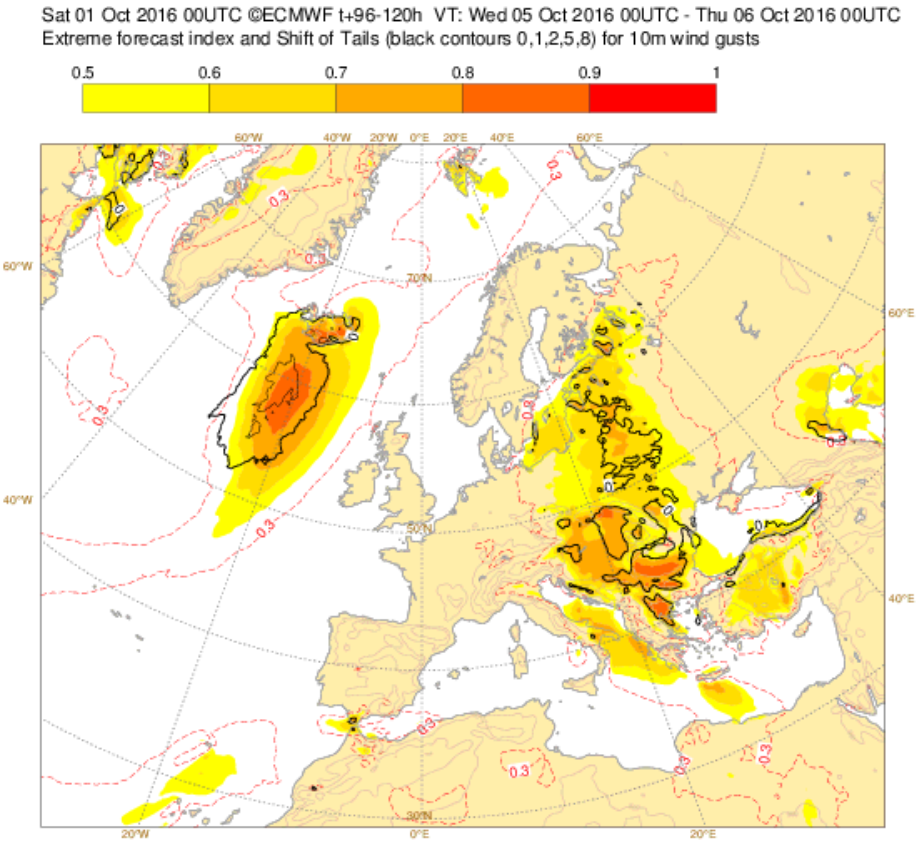


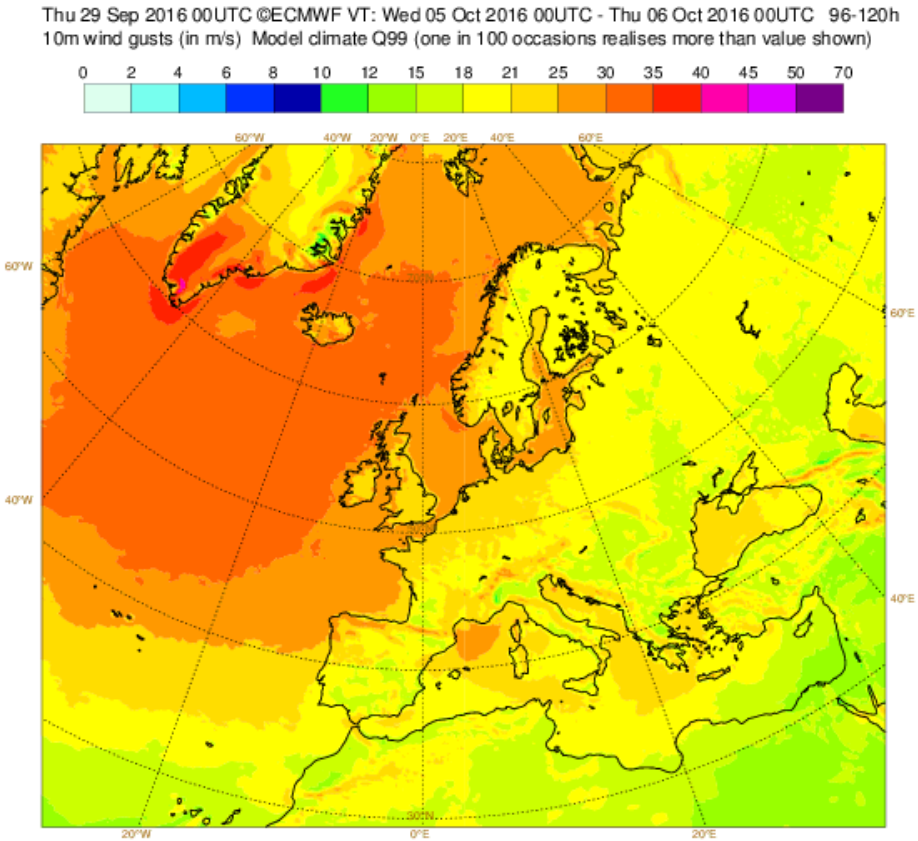




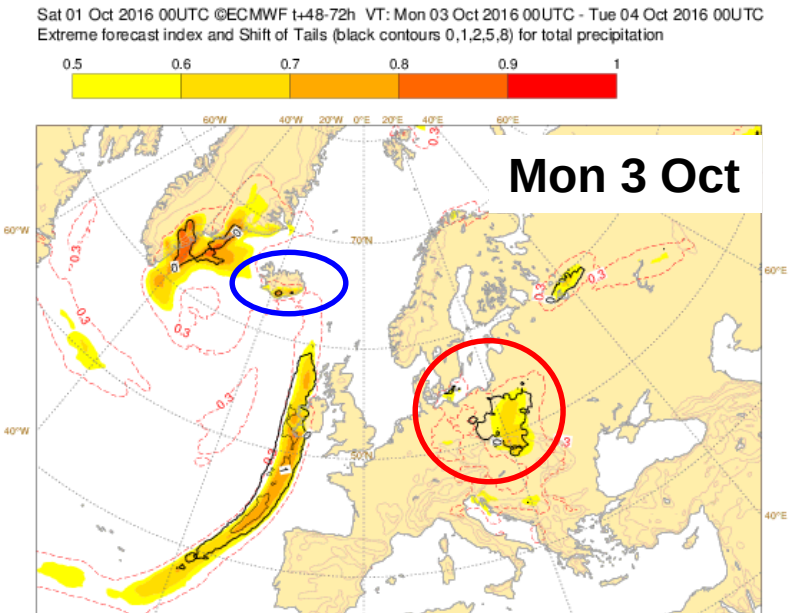
EFI gusts for Wednesday (BT 01/00z)

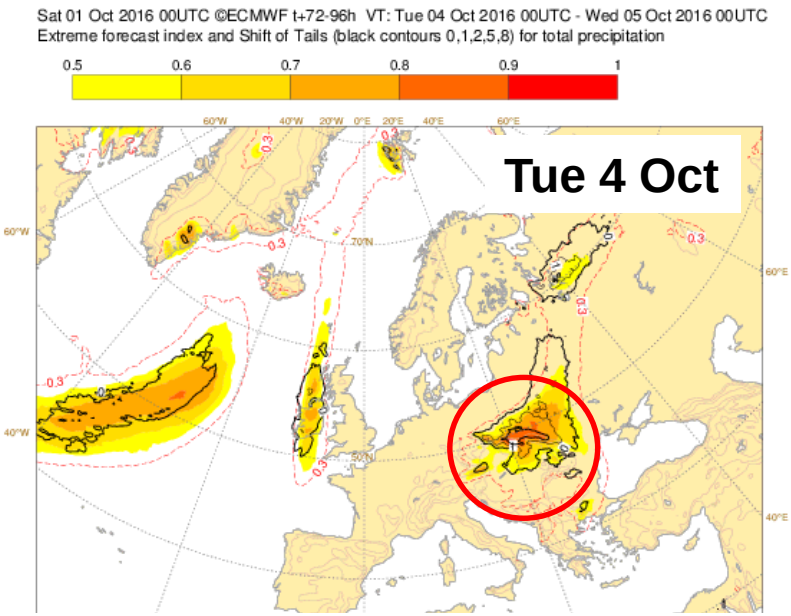
- Again more windy on Wednesday

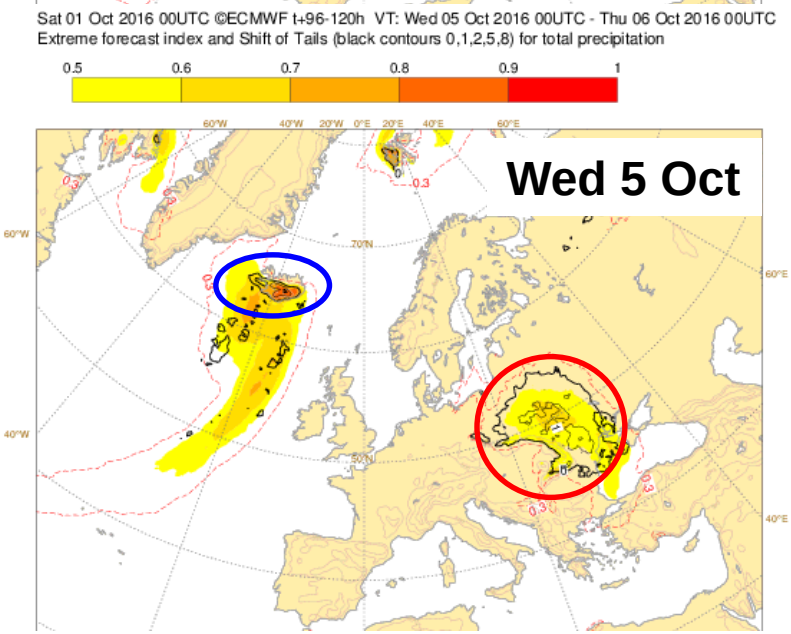


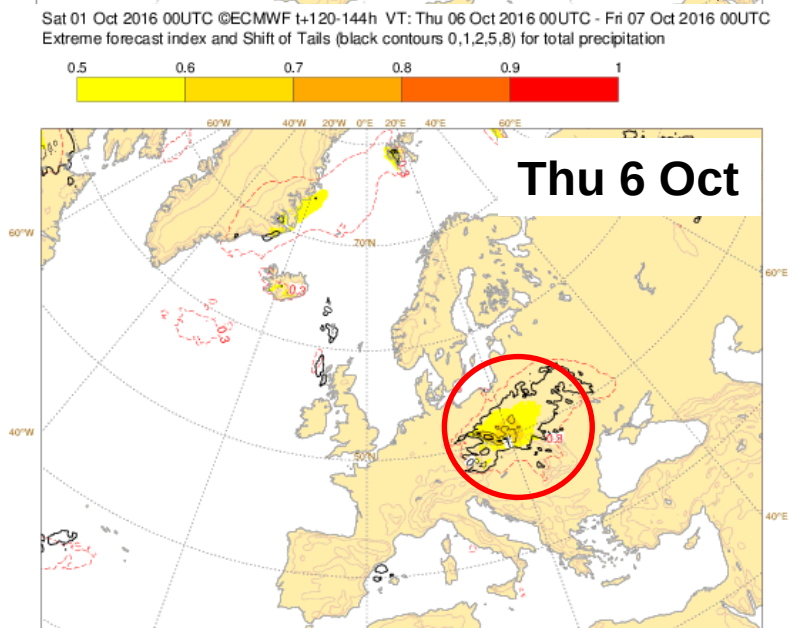


EFI precipitation for Mo 3 Oct - Thu 6 Oct (BT 01/00z)



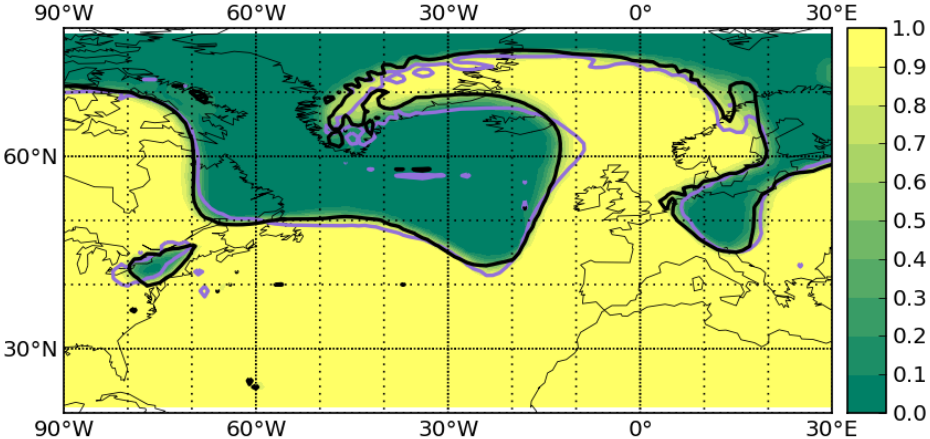




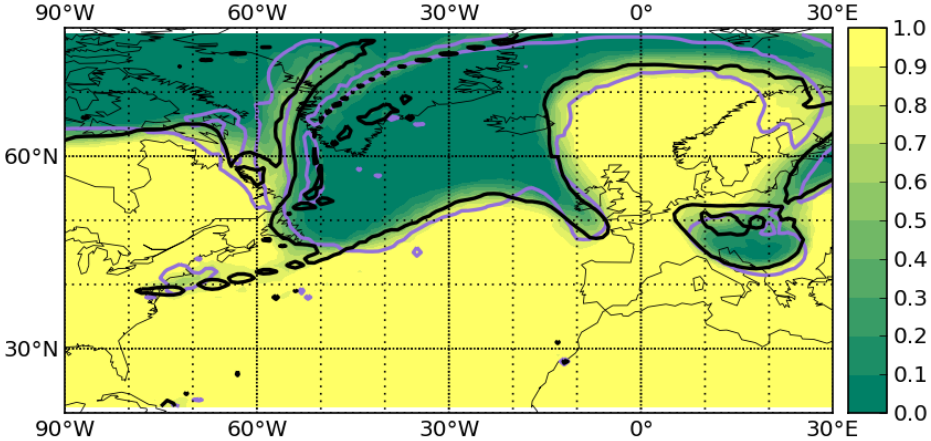


Probability 2PVU@320K (PV cut-off Europe) (BT 01/00z)

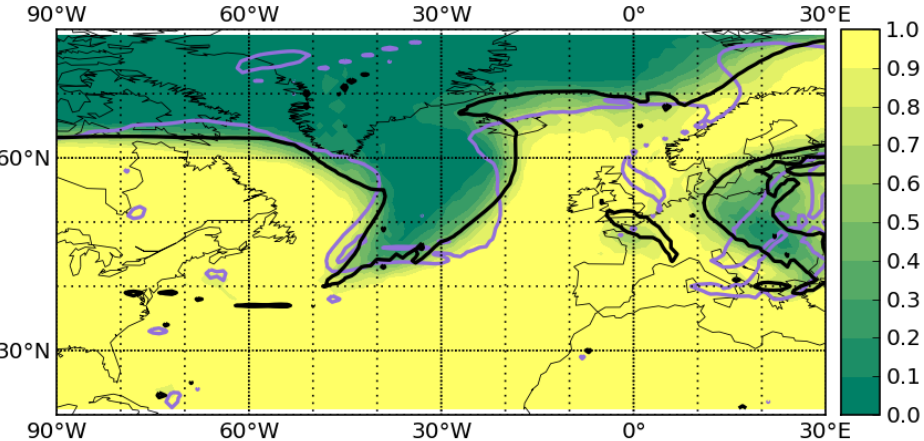
Mon 3 Oct



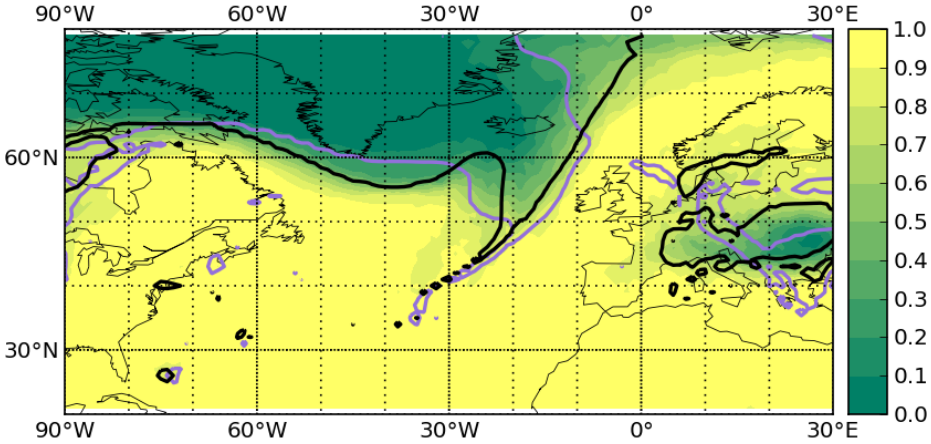
Tue 4 Oct



Wed 5 Oct

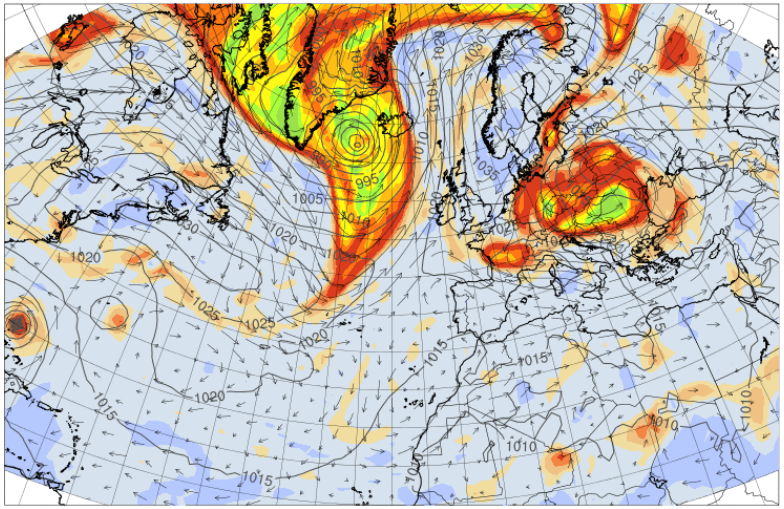


Thu 6 Oct

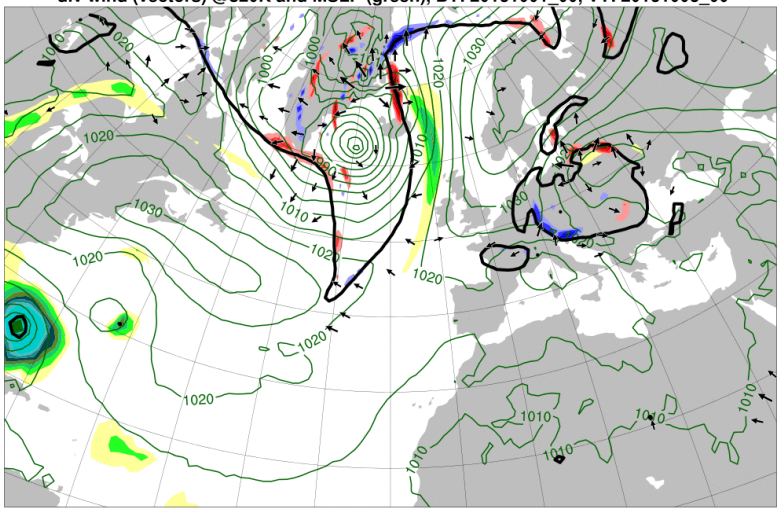


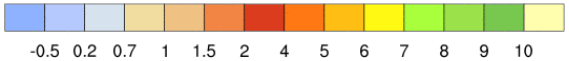
Forecast – Thu 6 Oct 2016, 00UTC PV320K, irrwind320K, THE850K, trajectories

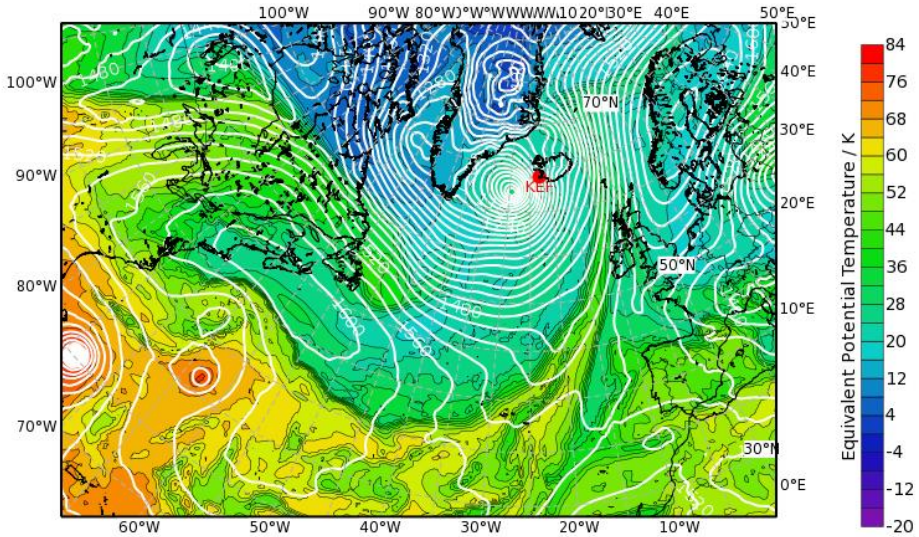
PV@320K at 20161006_00

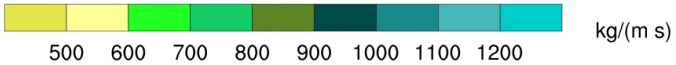


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161006_00

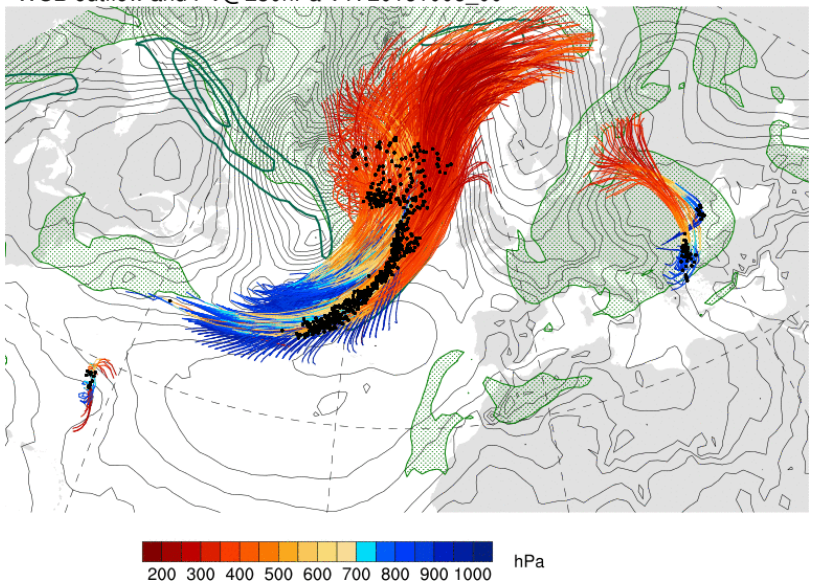






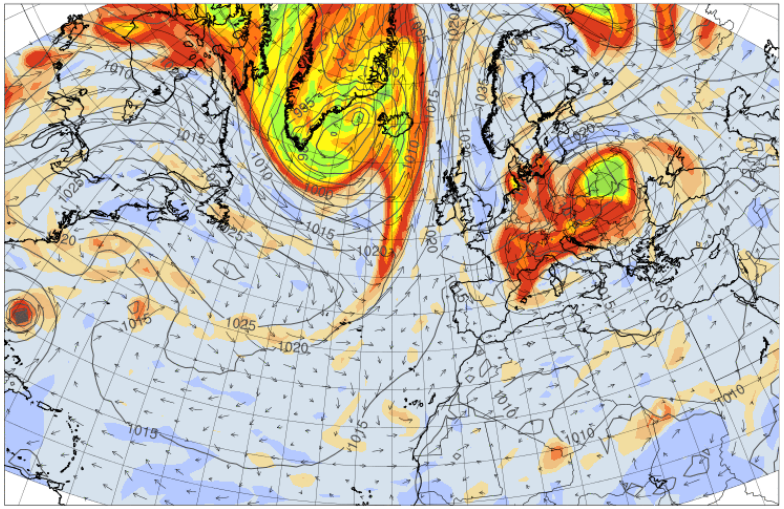


Trajectory start and SLP VT: 20161004_00
WCB outflow and PV@250hPa VT: 20161006_00

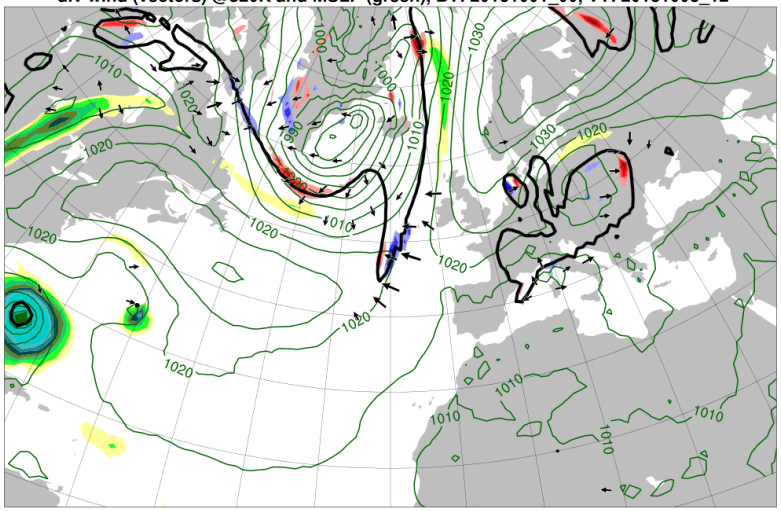


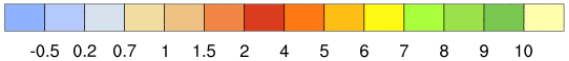
Forecast – Thu 6 Oct 2016, 12UTC PV320K, irrwind320K, THE850K, trajectories

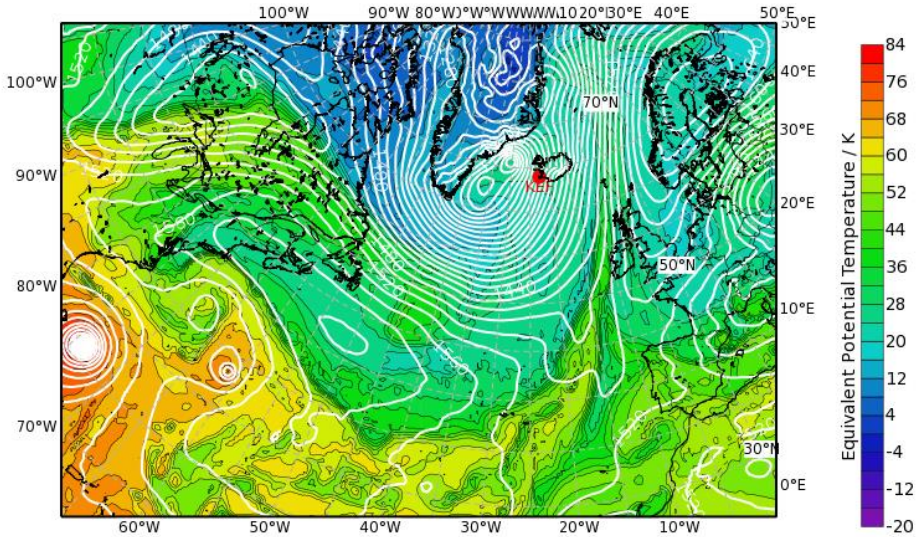
PV@320K at 20161006_12

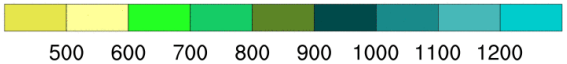


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161006_12

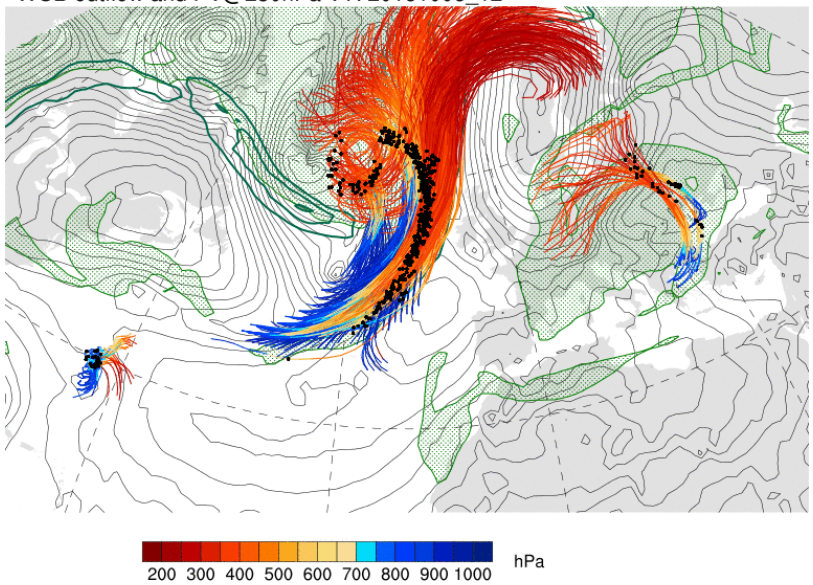






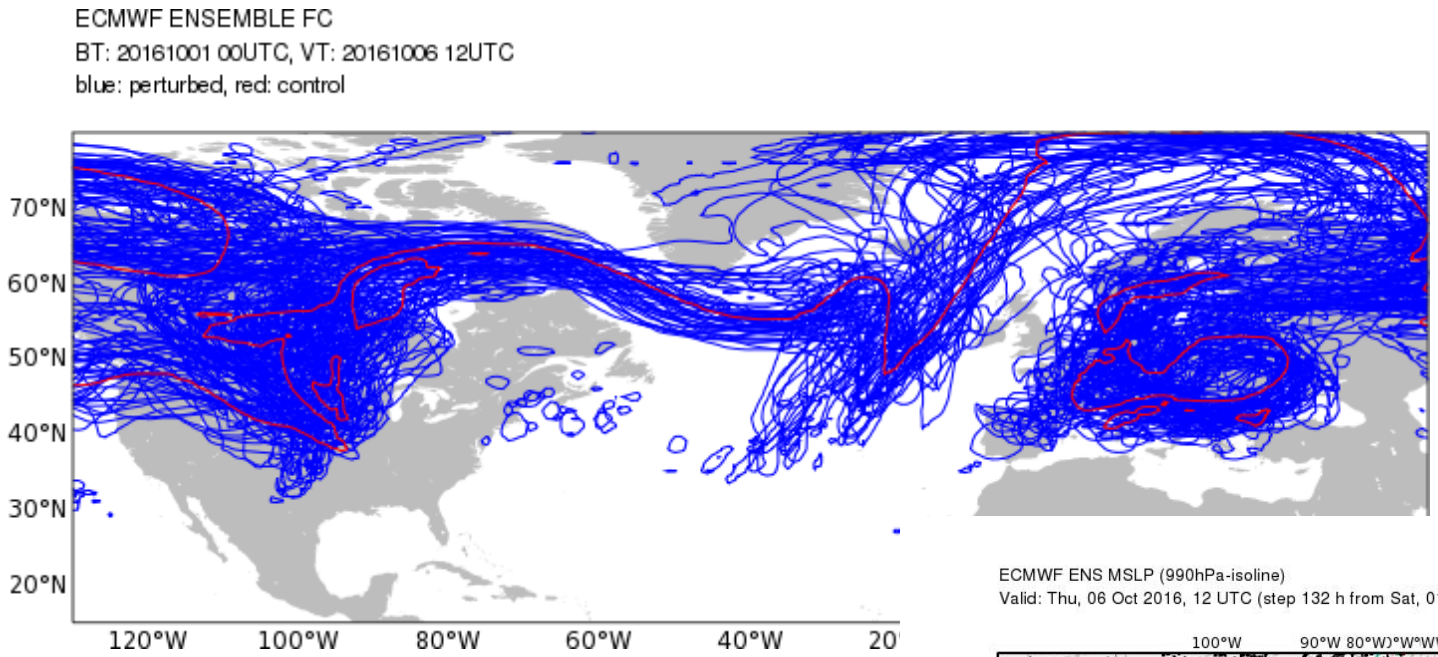


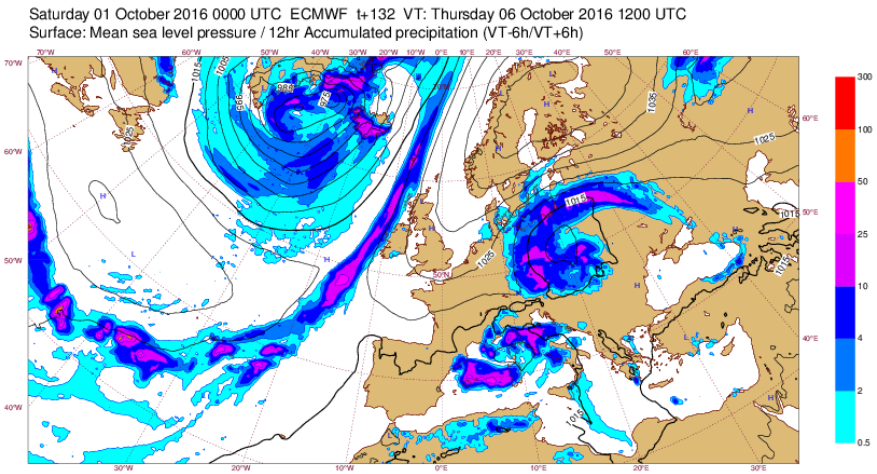
Trajectory start and SLP VT: 20161004_12
WCB outflow and PV@250hPa VT: 20161006_12

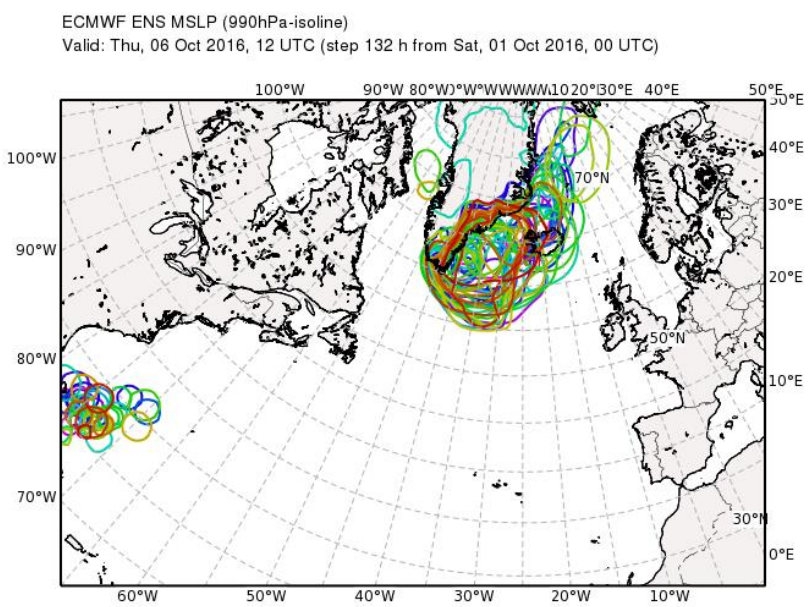


2PVU@320K, MSLP990 Spaghetti (based EC Ens 01/00Z)

Thu 06/12Z







Flight plans

Saturday 1 October

HALO flight

cancelled

Sunday 2 October

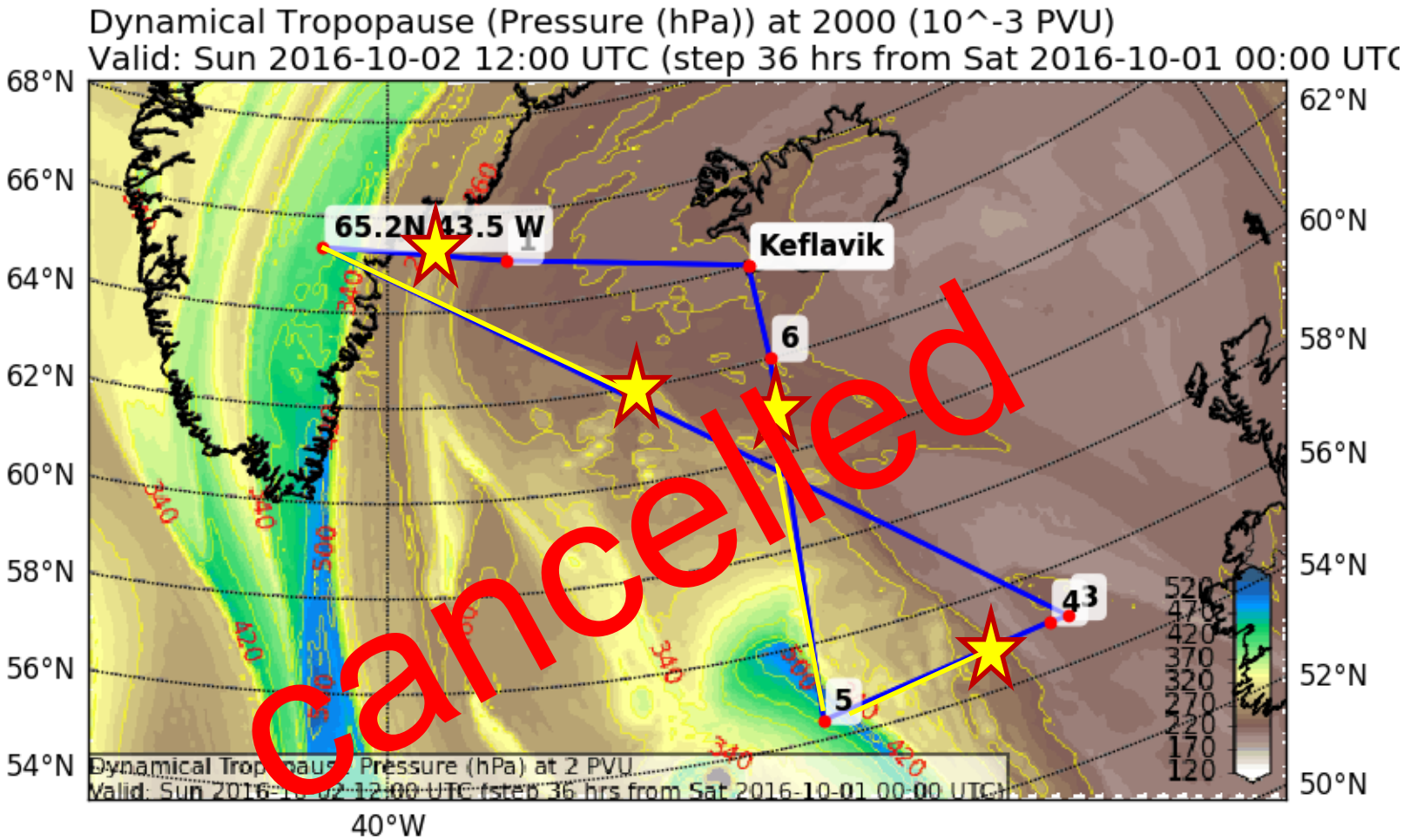
~~HALO~~, FALCON, SAFIRE flights

~~HALO,~~ French- and DLR Falcon flights on Sunday 2 Oct

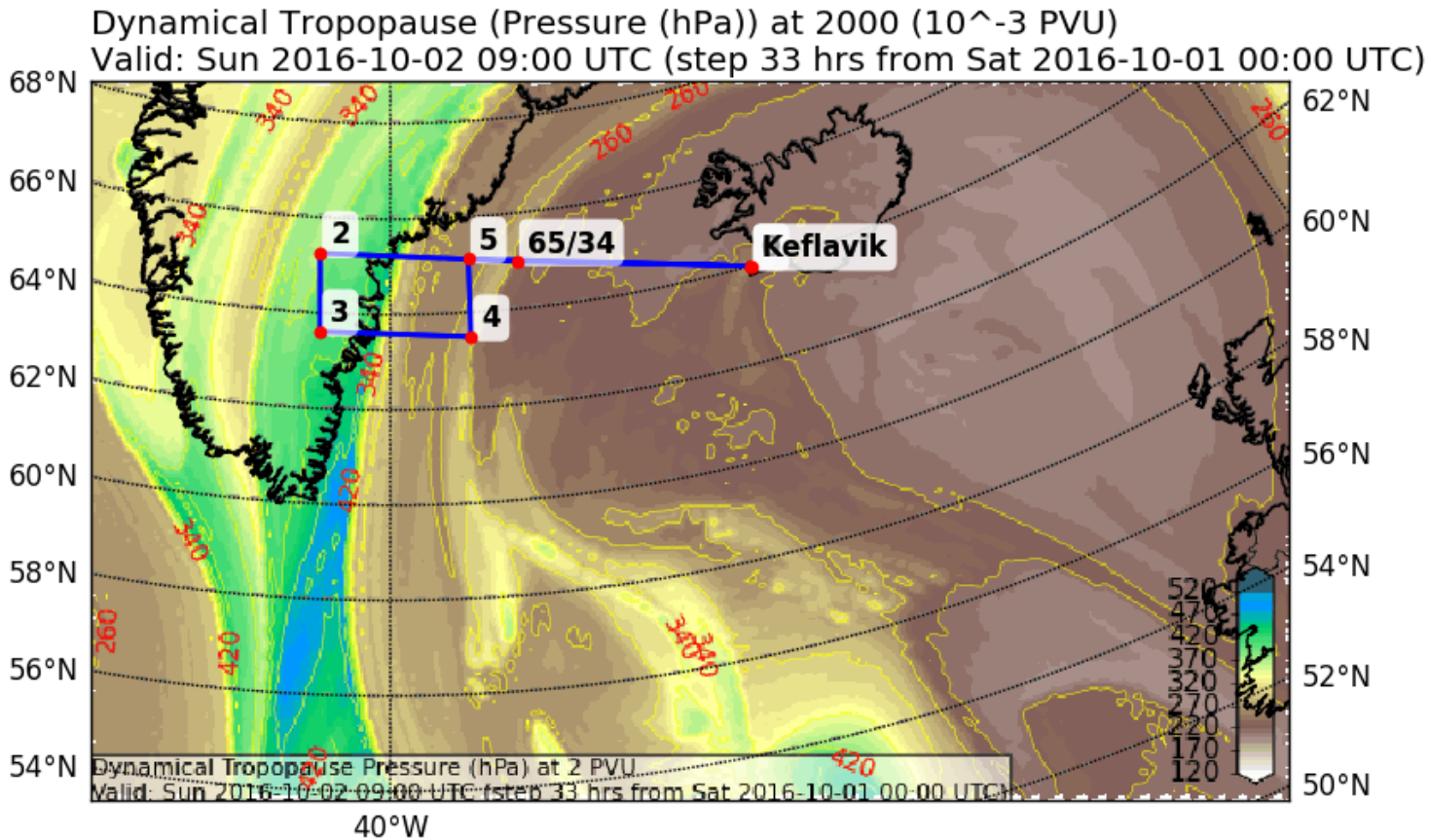
Take-off:

- DLR Falcon 8:20 UTC
- French Falcon 8:30 UTC
- ~~Halo 8:40 UTC~~

~~Sunday HALO flight~~ - dropsondes



Sunday Falcons flight

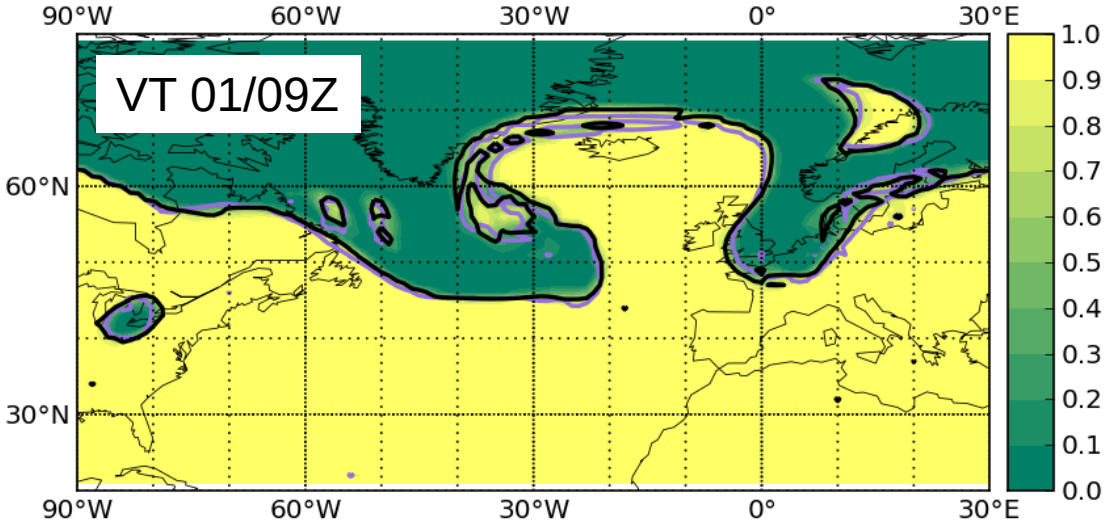


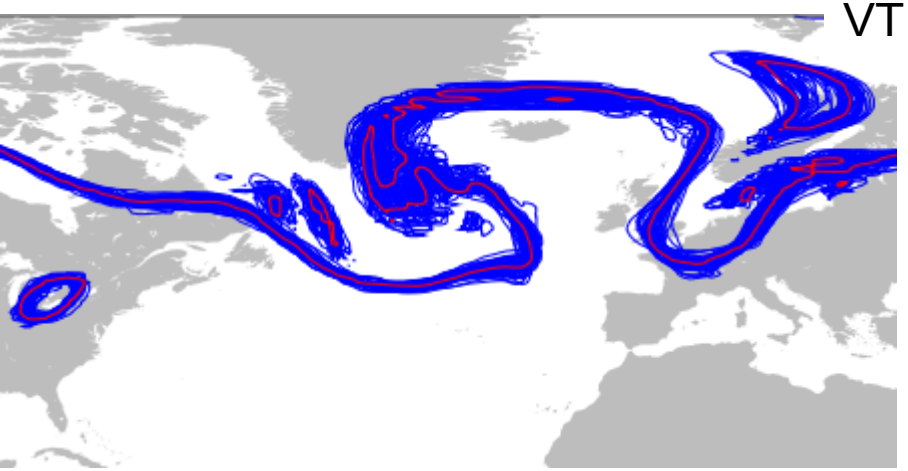
- SAFIRE dropsondes: 5 sondes on leg 5-2, 3 sondes from point 3 across the TP step.
- SAFIRE heading directly back from point 3 to KEF

Uncertainty for TP cliff on Sunday 2 October 09/12UTC

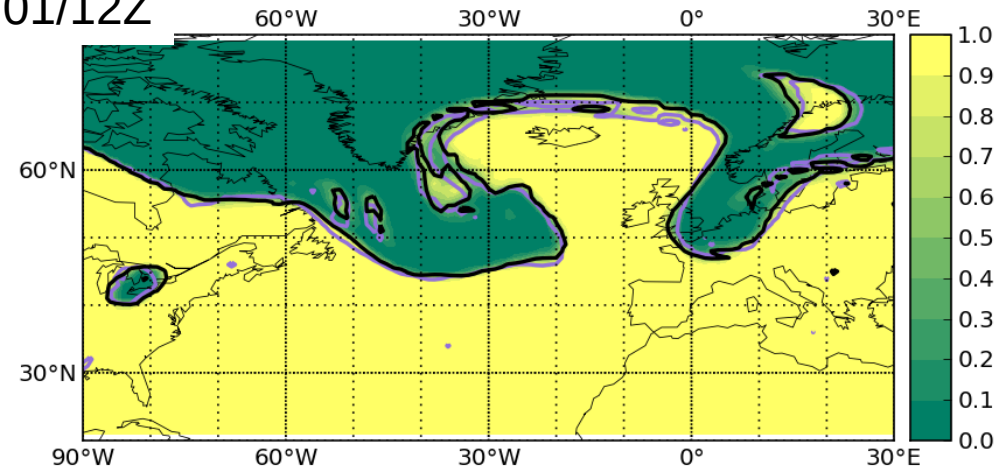
BT 01/00Z

- **2PVU@320K remains east of 43W**

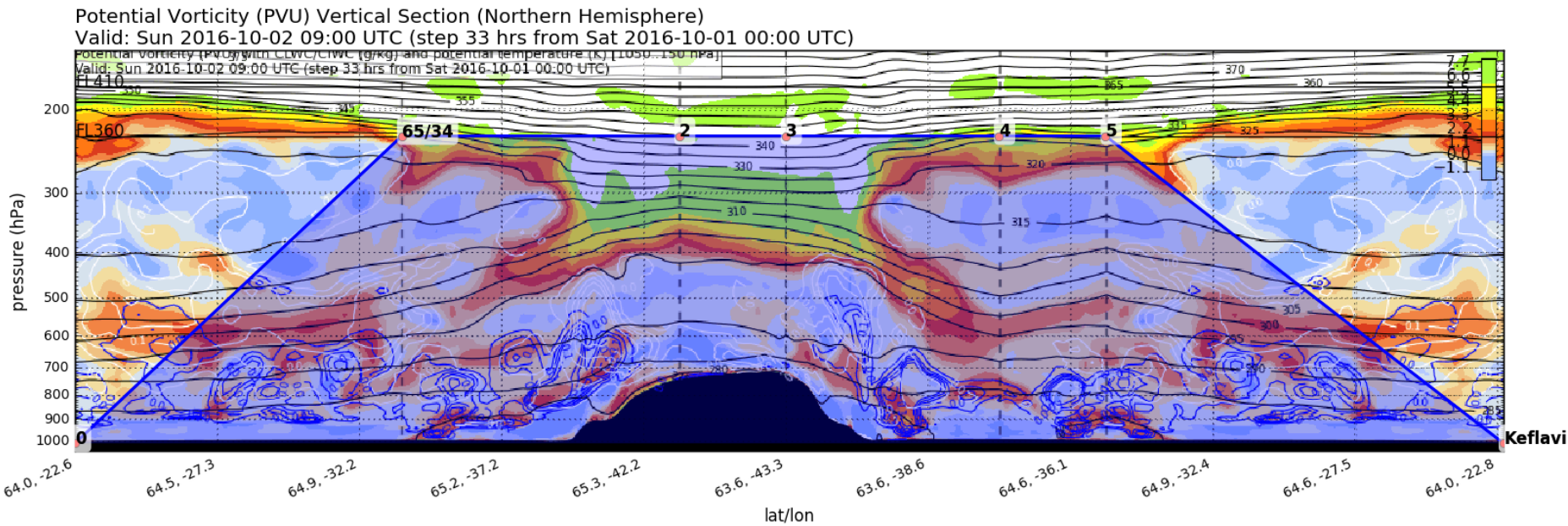




VT 01/12Z

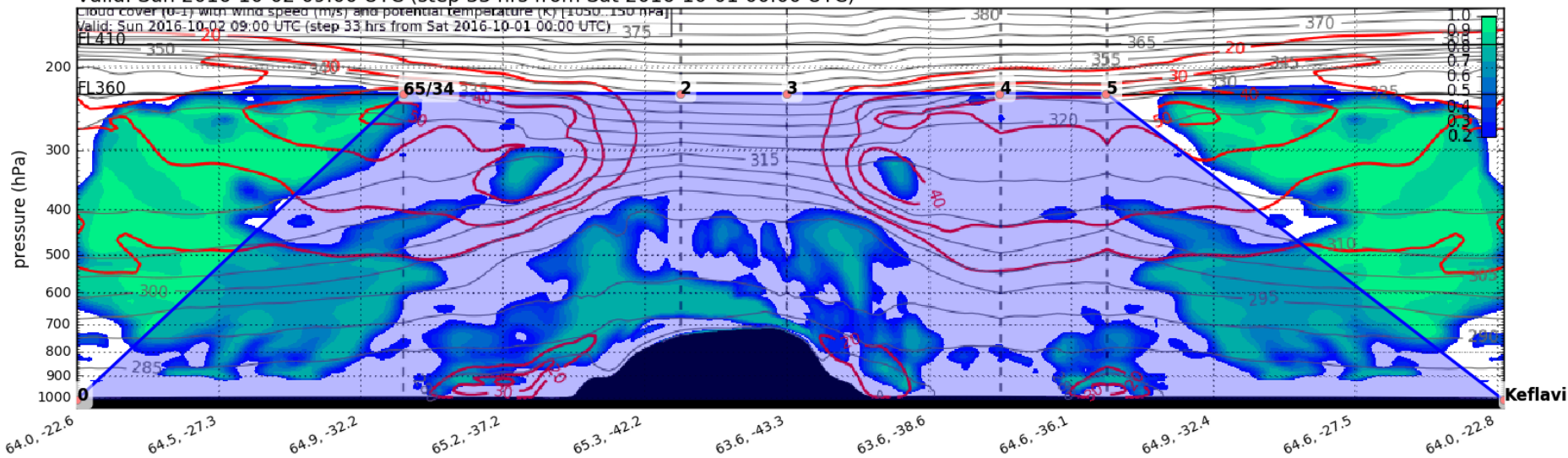


Sunday Falcons flight

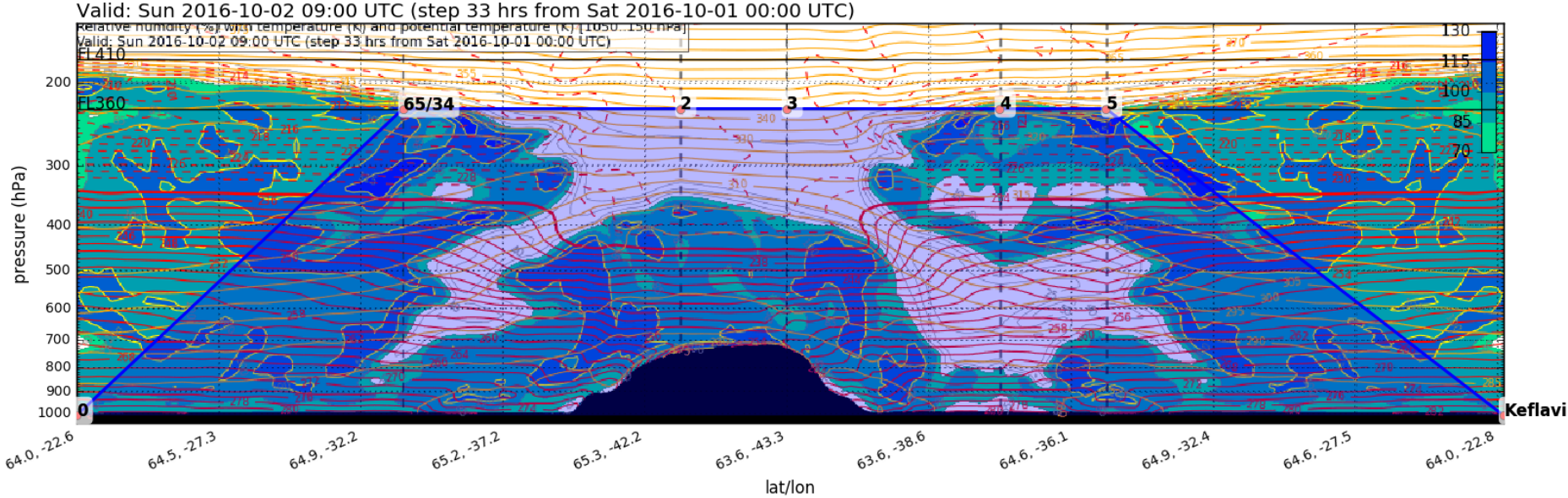


Sunday Falcons flight

Cloud Cover (0-1) and Wind Speed (m/s) Vertical Section
Valid: Sun 2016-10-02 09:00 UTC (step 33 hrs from Sat 2016-10-01 00:00 UTC)

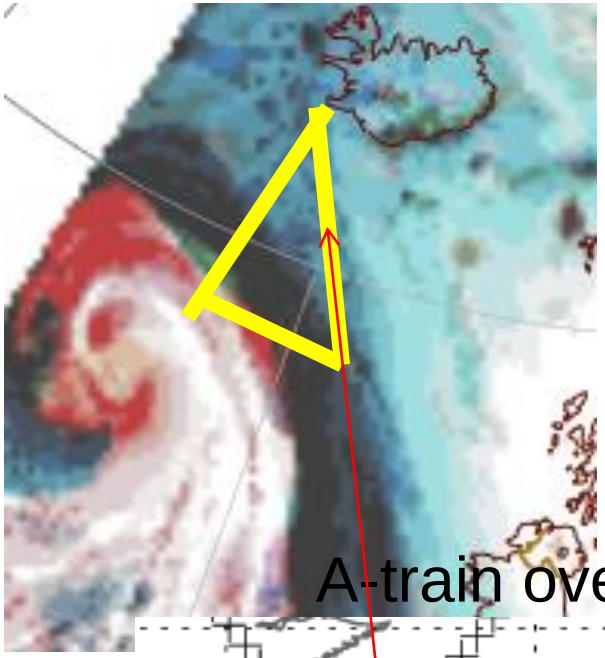


Relative Humdity (%) Vertical Section
Valid: Sun 2016-10-02 09:00 UTC (step 33 hrs from Sat 2016-10-01 00:00 UTC)

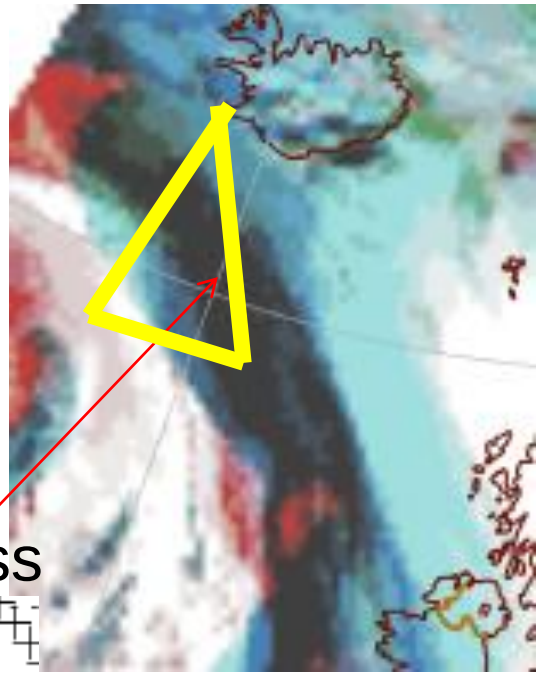


Second flight of SAFIRE French Falcon on Sunday afternoon

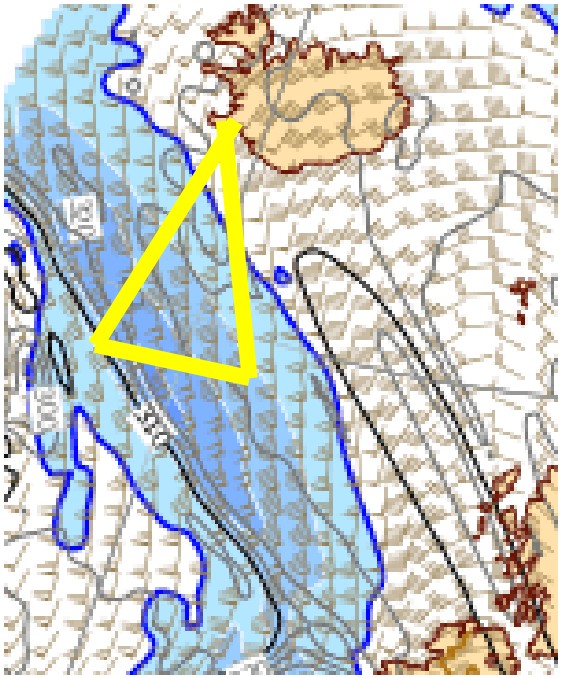
Cloud cover 2 Oct 12UTC



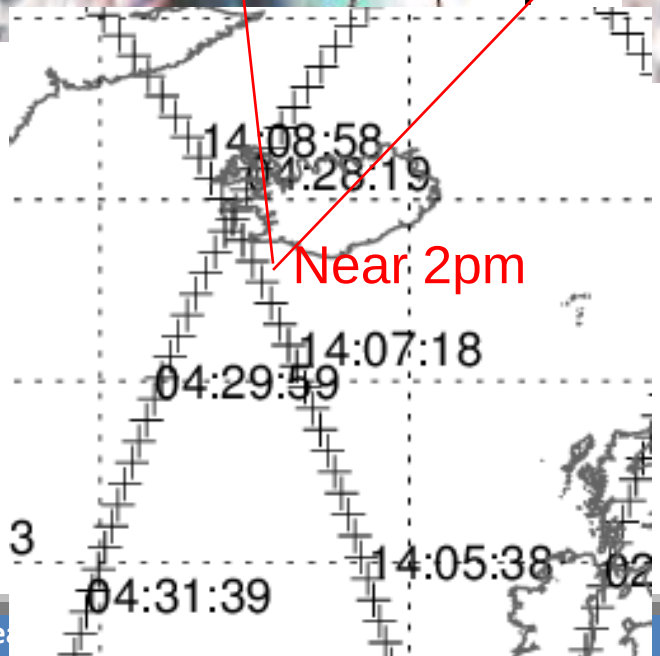
Cloud cover 2 Oct 18UTC



Jet at 1.5 PVU

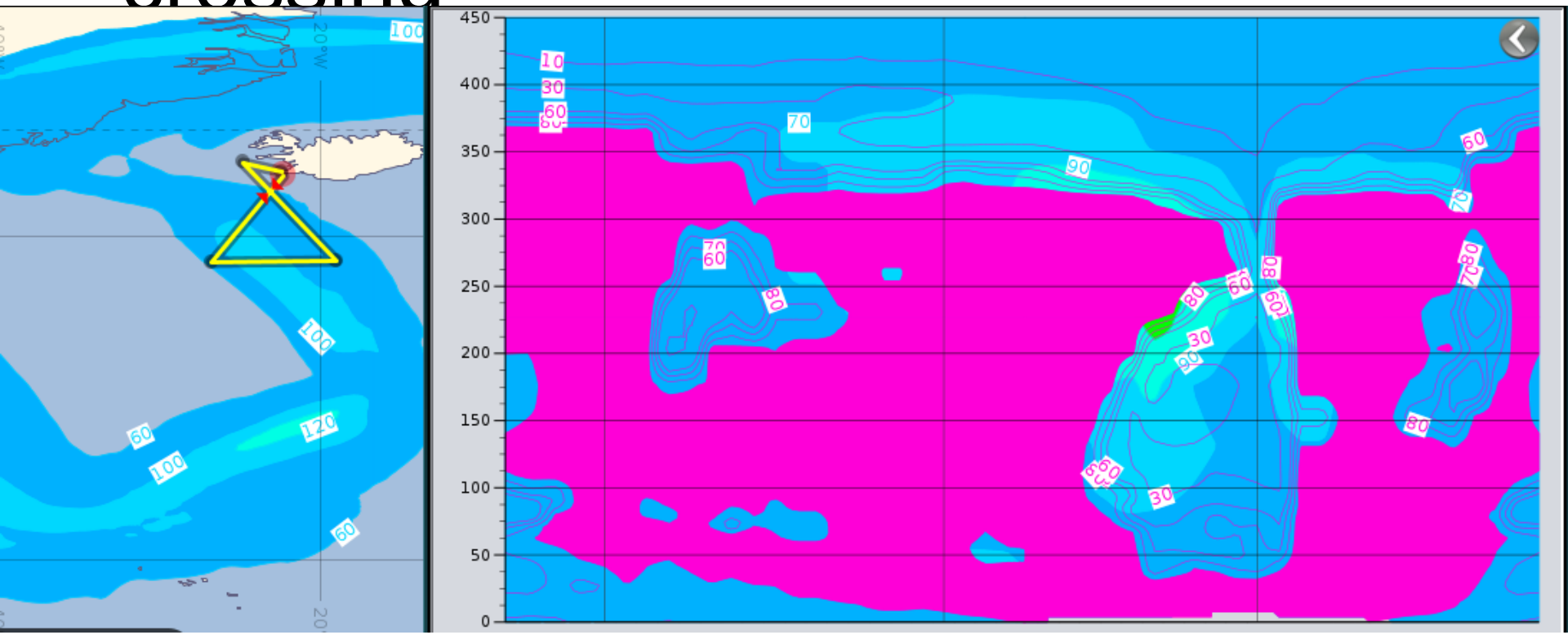


A-train overpass



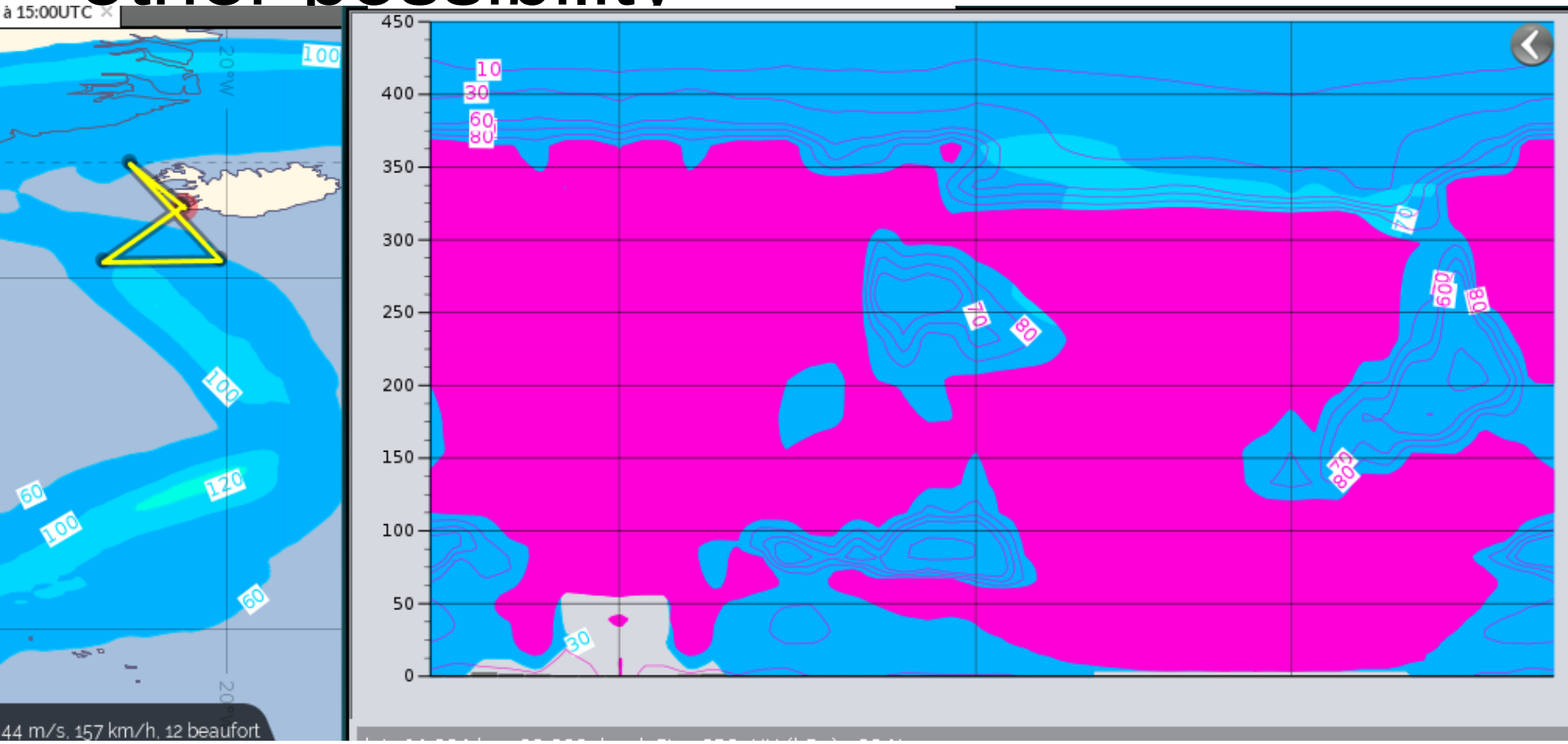
- Overpass of A-train near 2pm / mainly deep clouds
- Then crossing PV gradient /jet twice.

SAFIRE Falcon: Sunday Second flight: A-train Overpass + jet crossing



- Blue: wind speed at 300 hPa
- Pink: RH > 80%

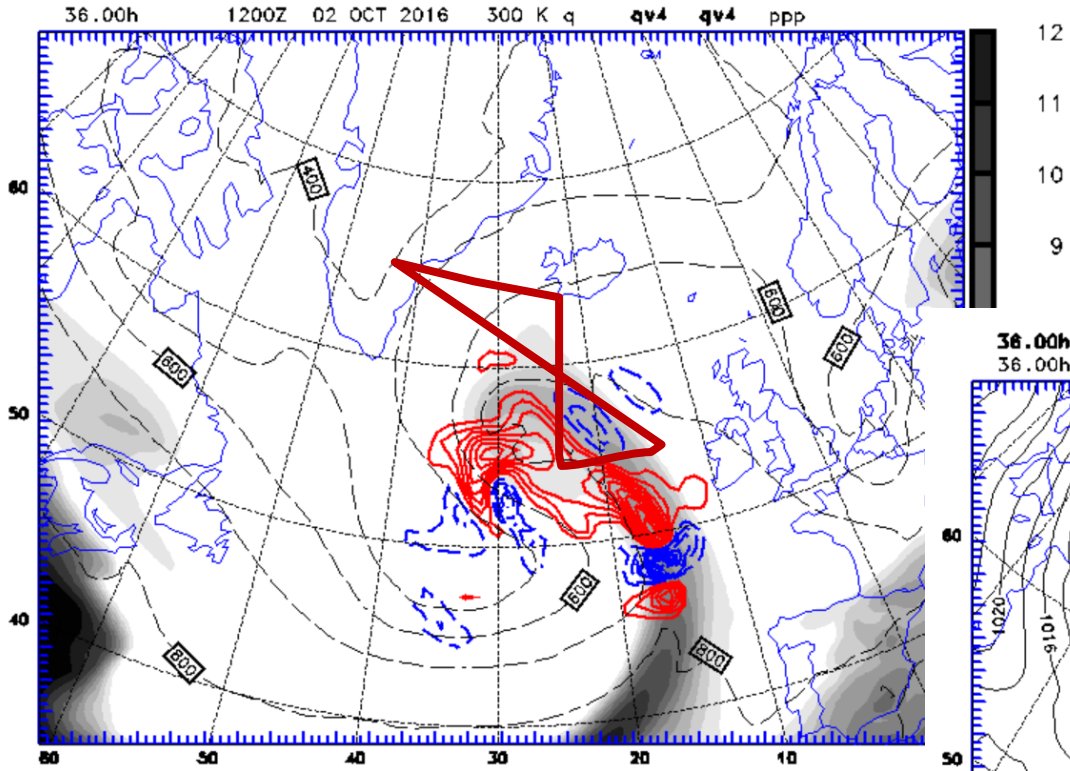
SAFIRE Falcon: Sunday 2nd flight: other possibility



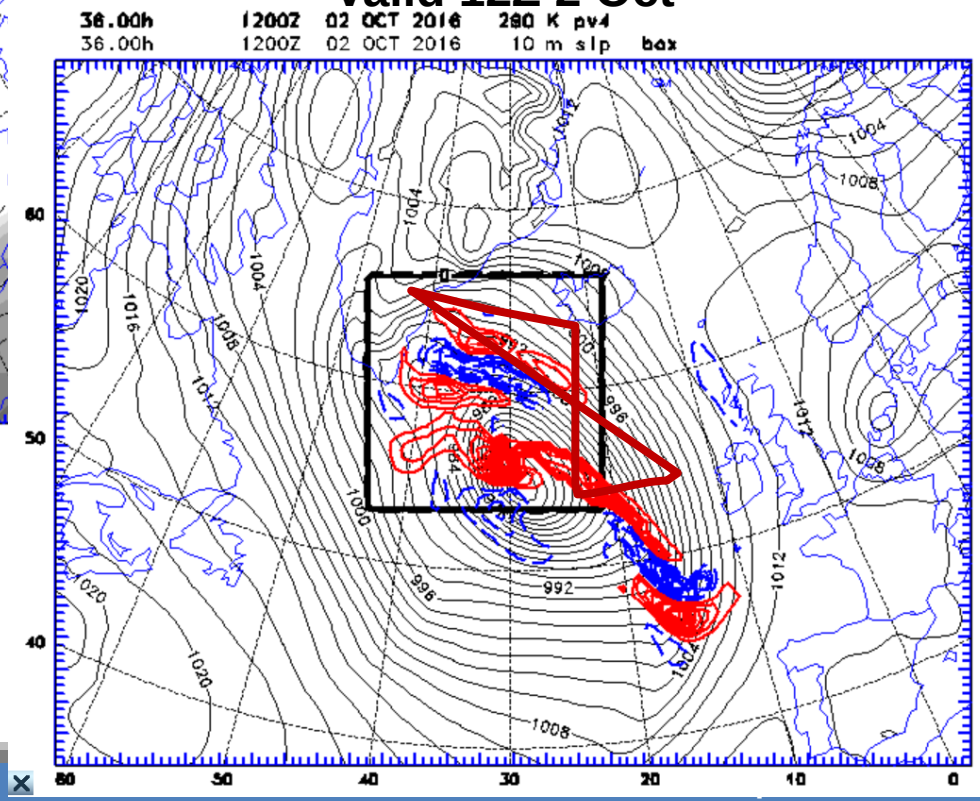
COAMPS Sensitivity (24h) Valid 12Z 2 Oct (Sunday Flight)

Box centered on cyclone (kinetic energy – Cyclone Intensity)

q Sensitivity and pressure on 300 K valid 12Z 2 OCT

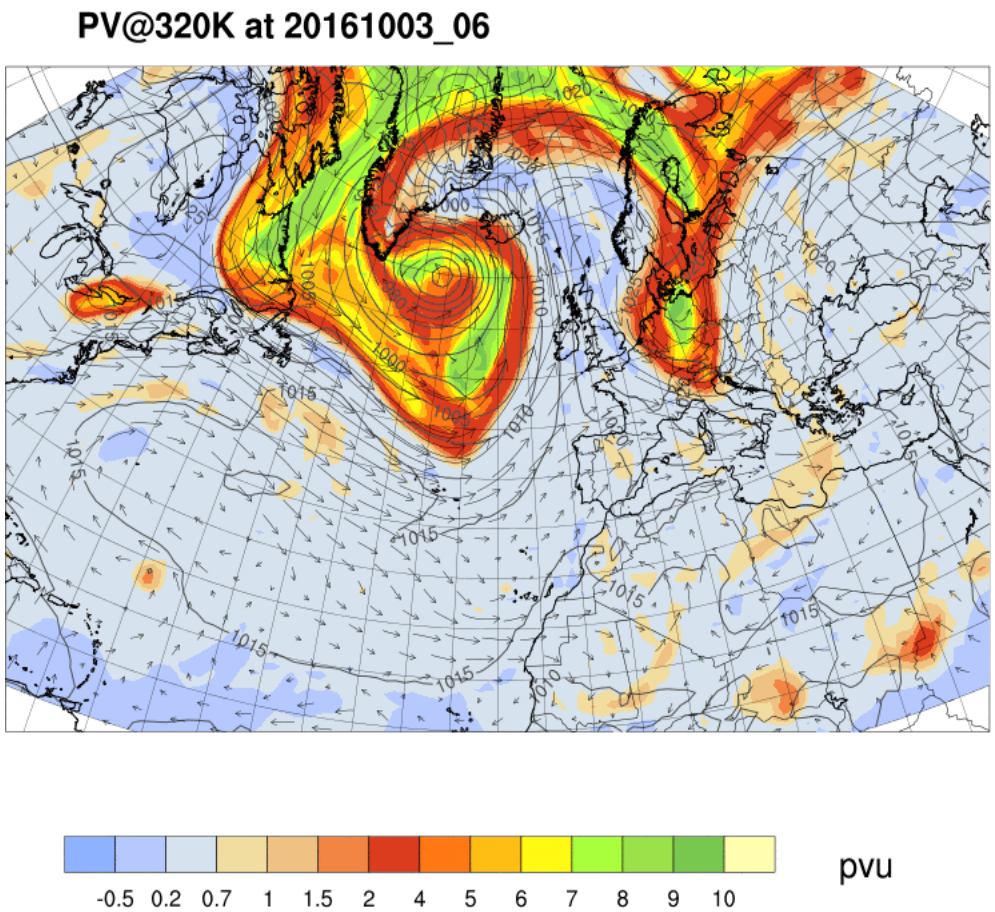


SLP and PV sensitivity (290 K) Valid 12Z 2 Oct



Radiosoundings

Monday 03 10 2016: 00Z - 12Z



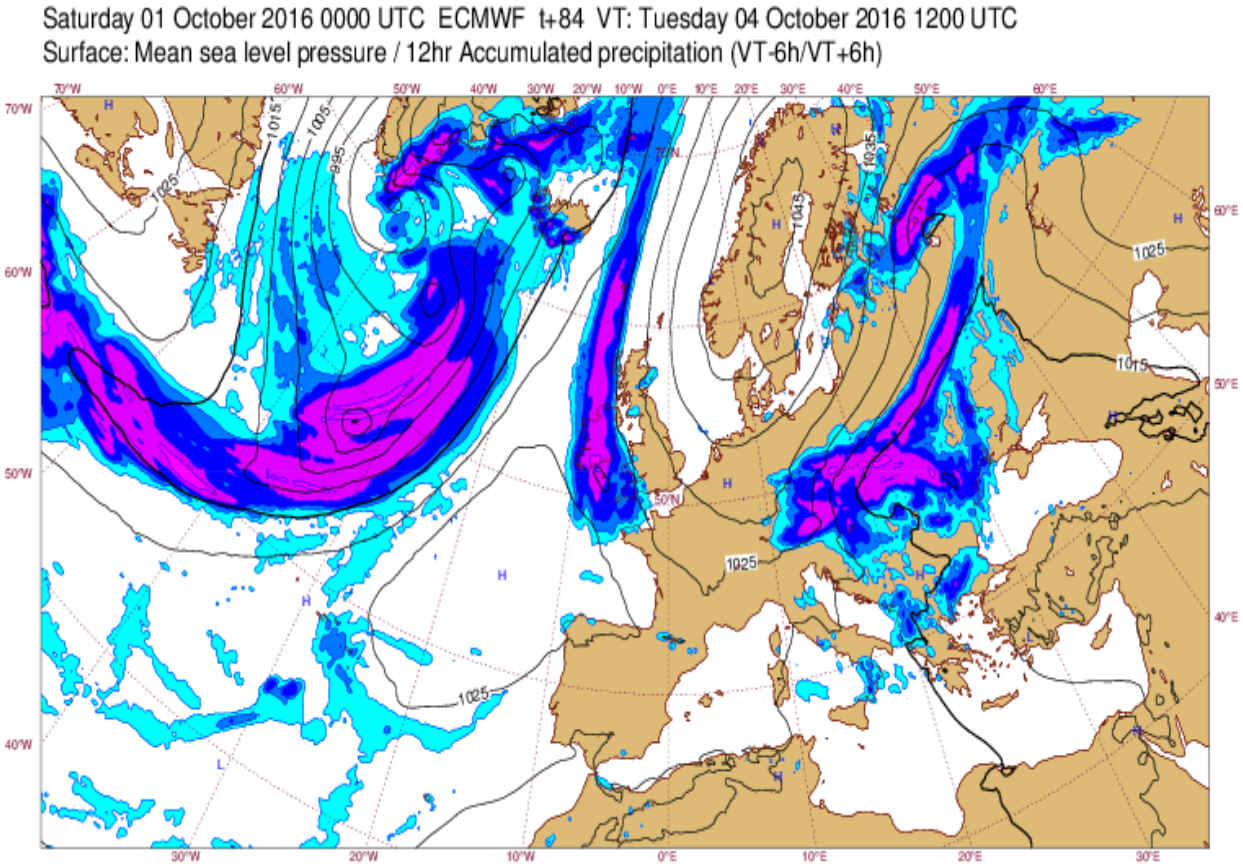
Requests:

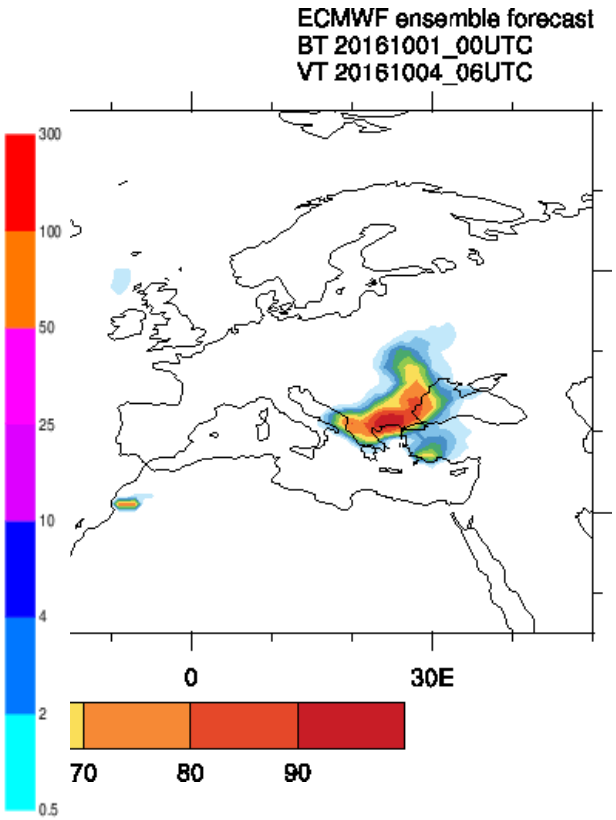
Greenland: 03, 06,

Jan Mayen: 03, 06, 09

Stavenger, Orland and Andoya: 03, 06, 09

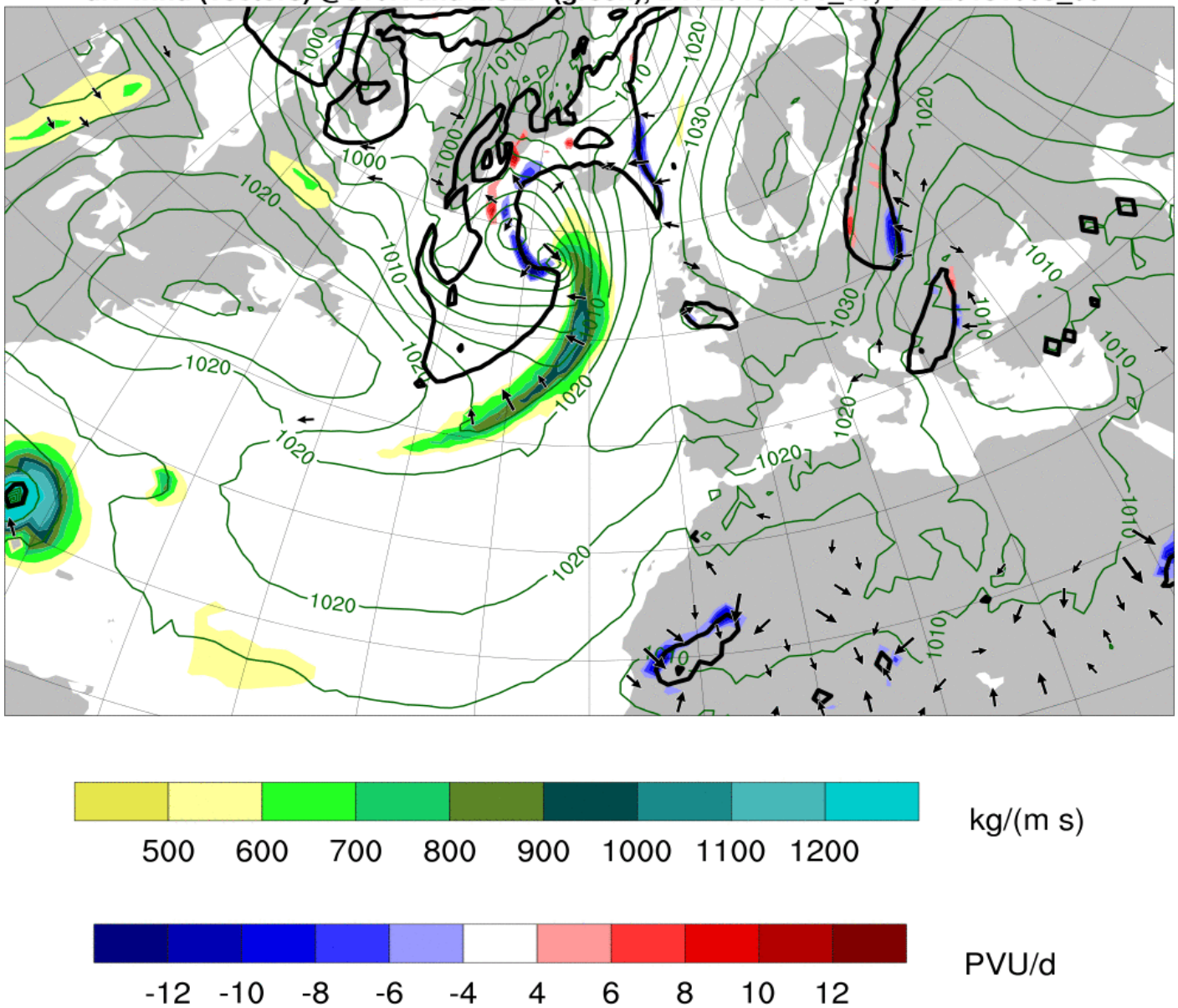
Mon 03 10 2016, 18Z – Tuesday 04 10, 12Z





Requests: Zadar, Brindisi, Beograd 18Z 03 10 2016, 06Z 04 10 2016
Poprad-Ganovce 18Z 03 10 2016, 06Z 04 10 2016

2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @310K and MSLP (green), BT: 20161001_00, VT: 20161005_00



Weds 05 10 2016, 00Z

Total requests Mon 03 10, Tues 04,10:

Greenland: 03, 06 x 2

Jan Mayen: 03, 06, 09

Norway: 03, 06, 09 x 3

Zadar: 18, 06

Brindisi: 18, 06

Beograd: 18, 06

Poprad-Ganovce: 18, 06

Azores: 00 (05 10)

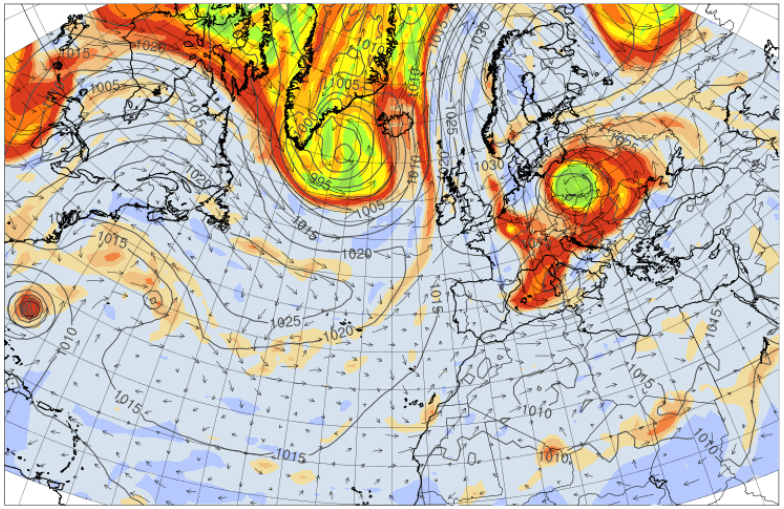
Total: 25

Outlook

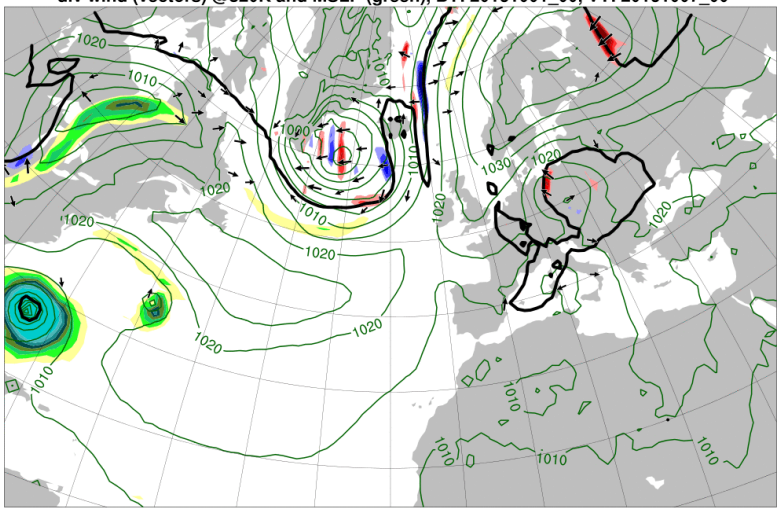
Forecast – Fri 7 Oct 2016, 00UTC

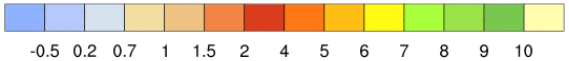
PV320K, irrwind320K, THE850K, trajectories

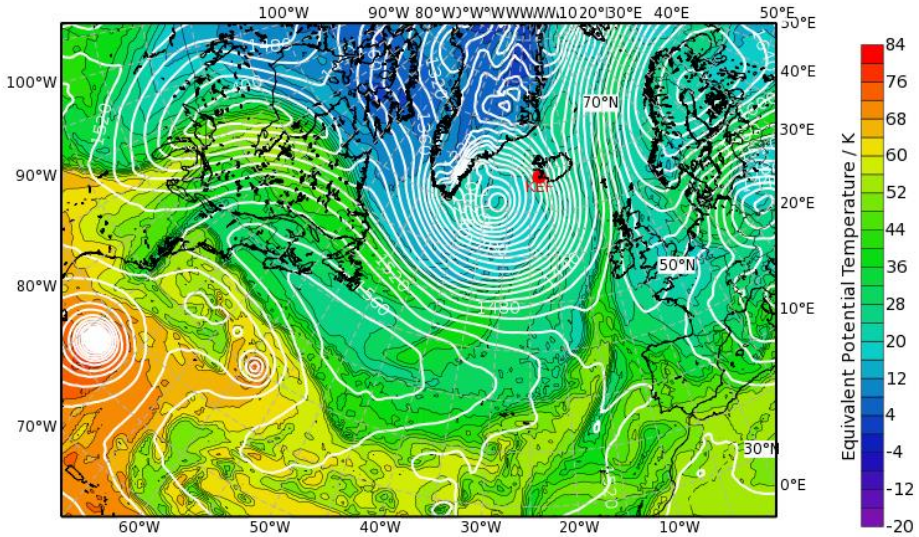
PV@320K at 20161007_00

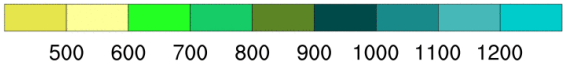


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161007_00

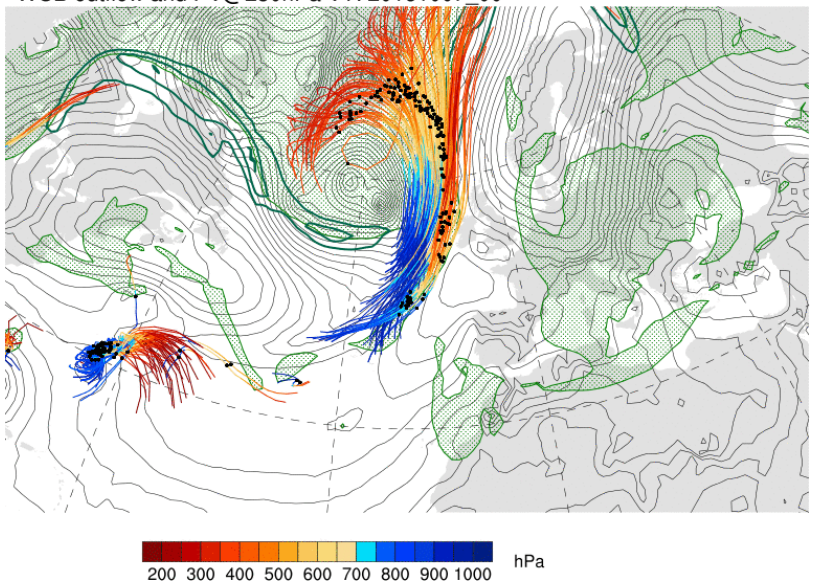








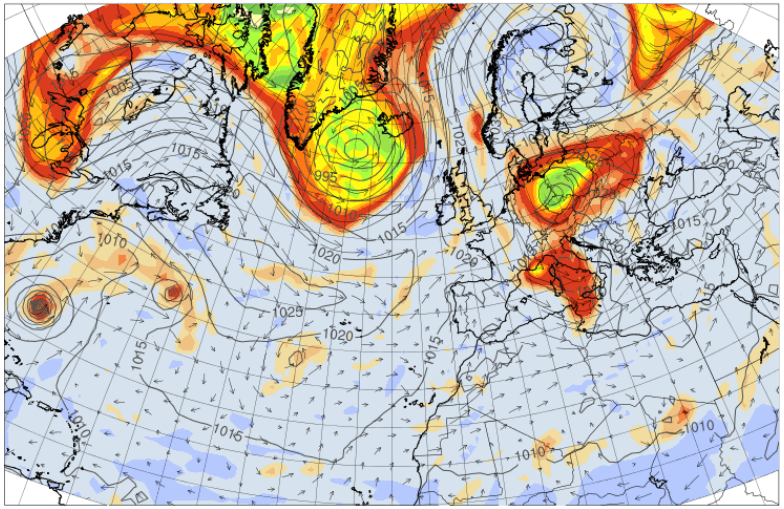
Trajectory start and SLP VT: 20161005_00
WCB outflow and PV@250hPa VT: 20161007_00



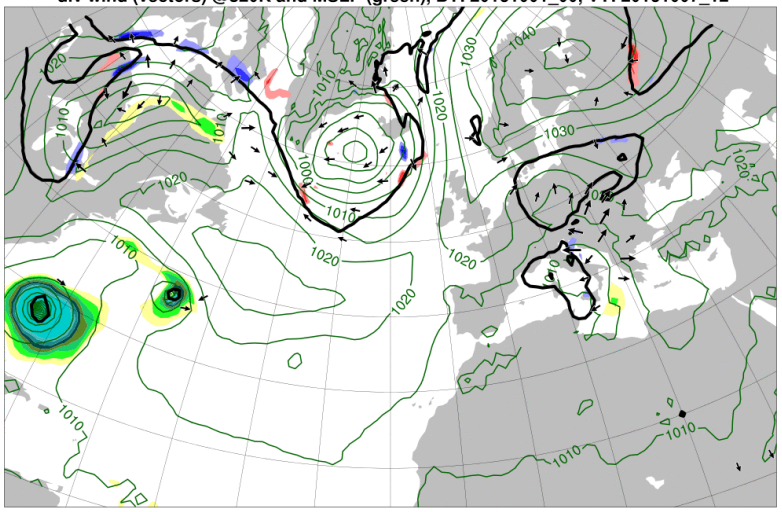
Forecast – Fri 7 Oct 2016, 12UTC

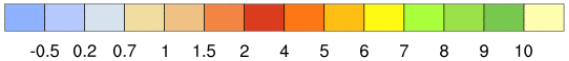
PV320K, irrwind320K, THE850K, trajectories

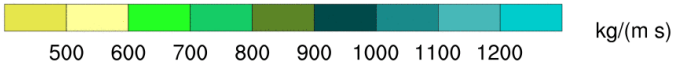
PV@320K at 20161007_12

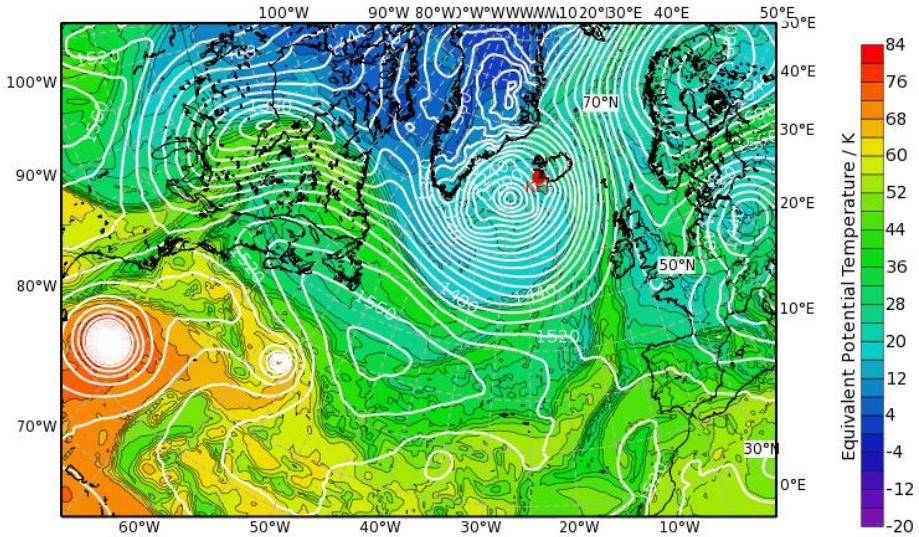


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161007_12

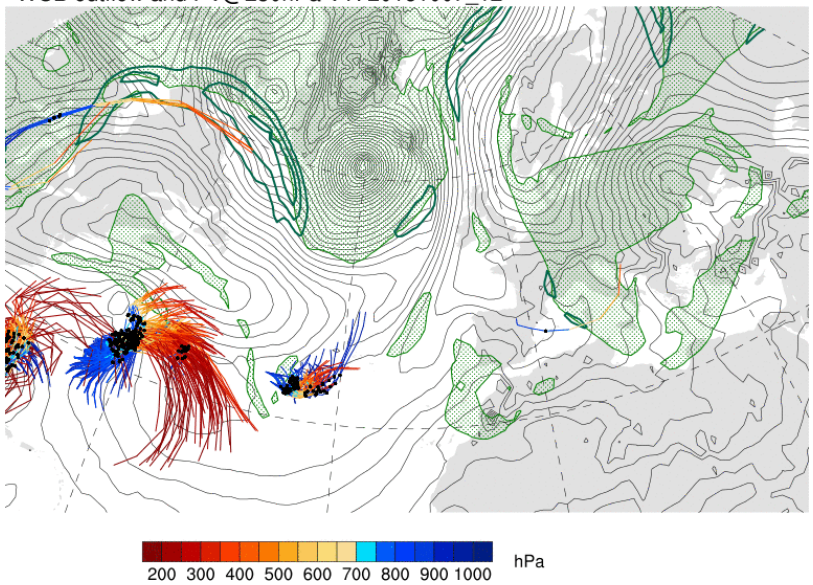






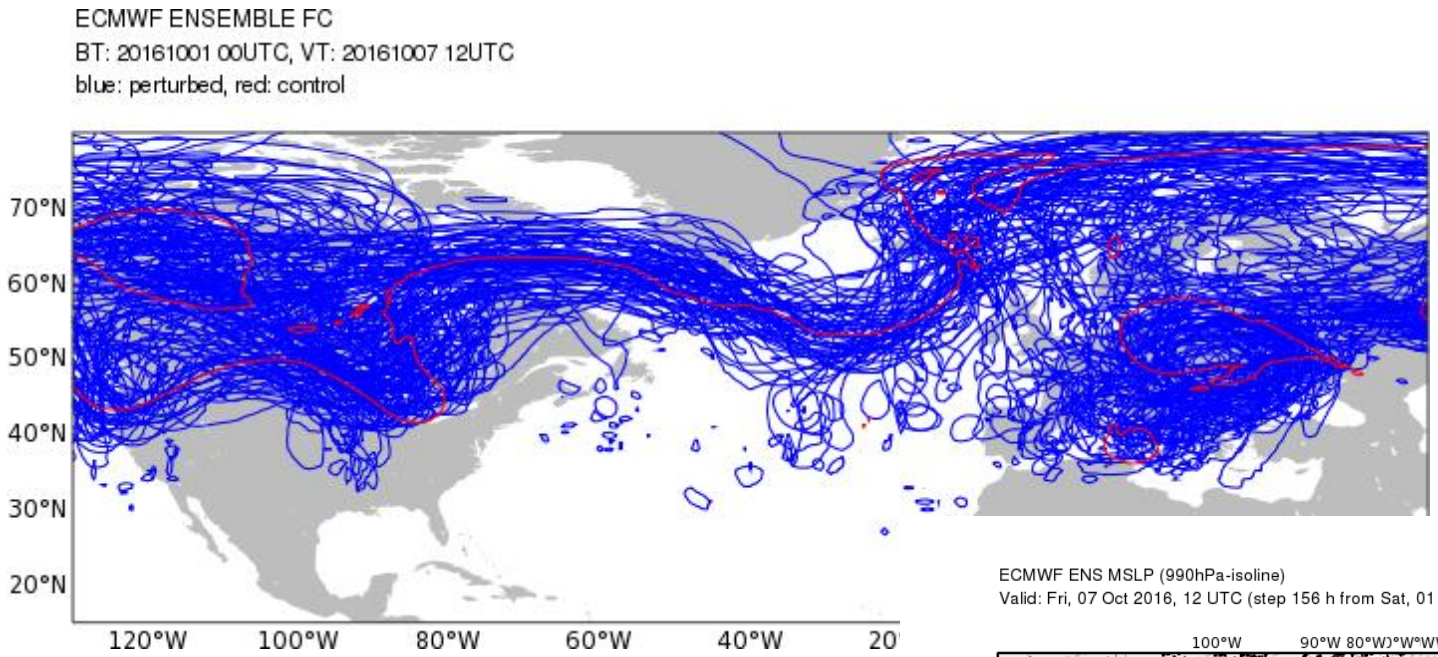


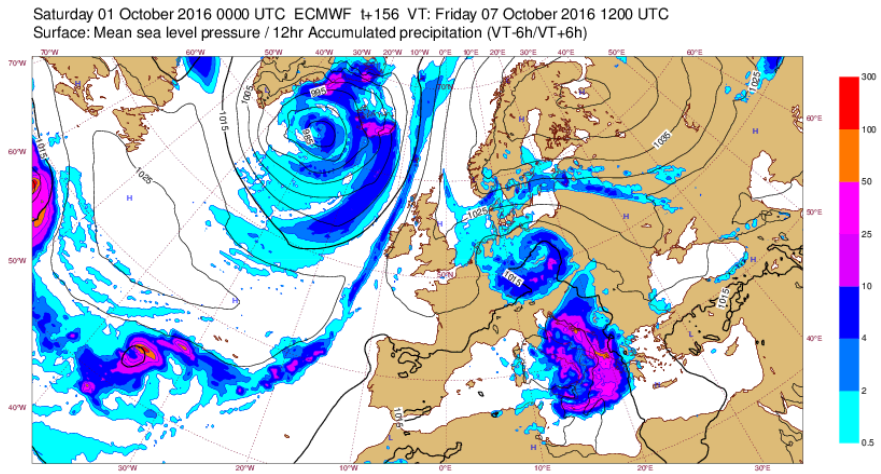
Trajectory start and SLP VT: 20161005_12
WCB outflow and PV@250hPa VT: 20161007_12

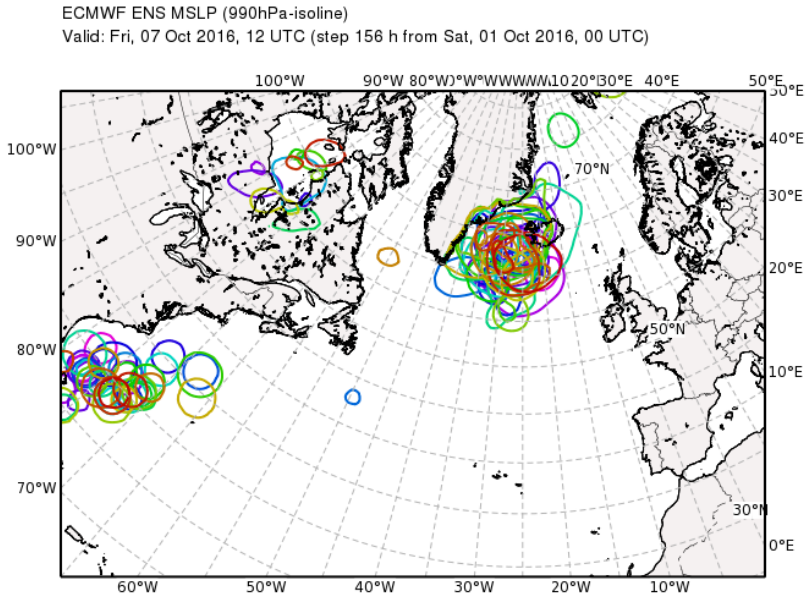


2PVU@320K, MSLP990 Spaghetti (based EC Ens 01/00Z)

Fri 07/12Z



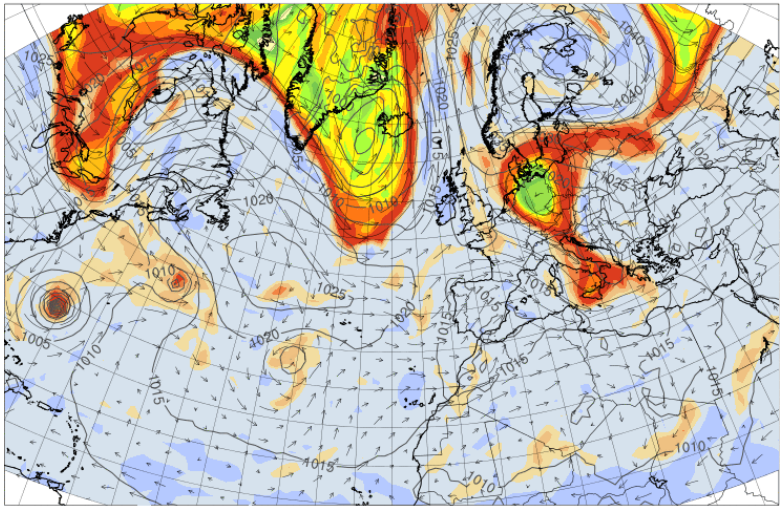




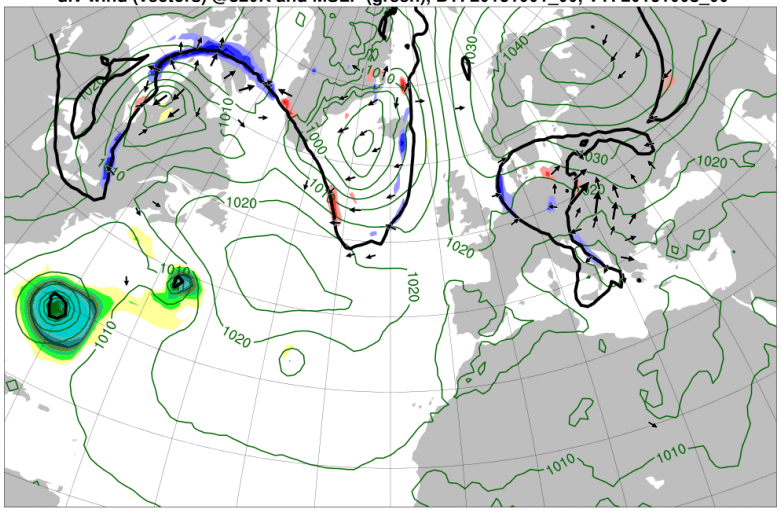
Forecast – Sat 8 Oct 2016, 00UTC

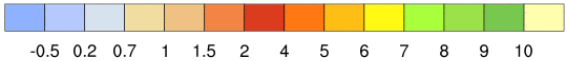
PV320K, irrwind320K, THE850K, trajectories

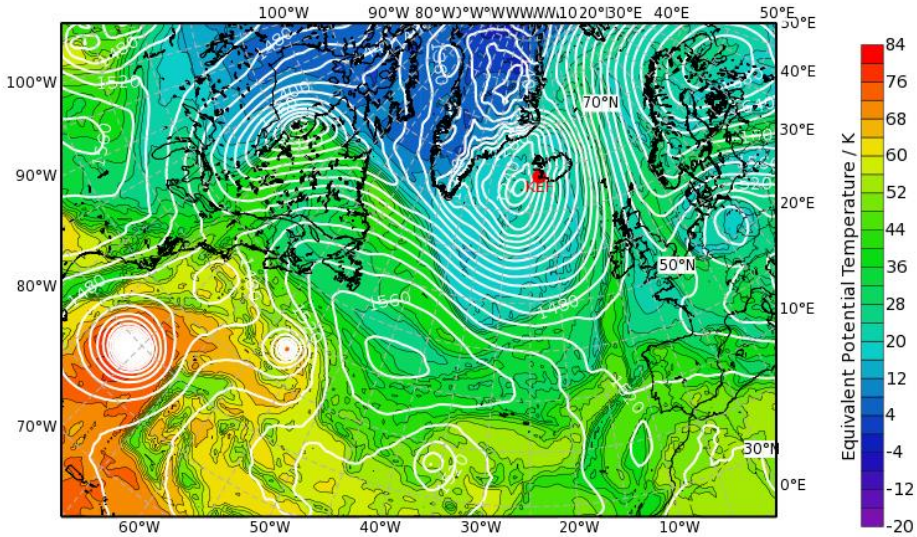
PV@320K at 20161008_00

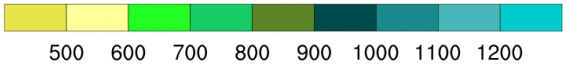


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161008_00

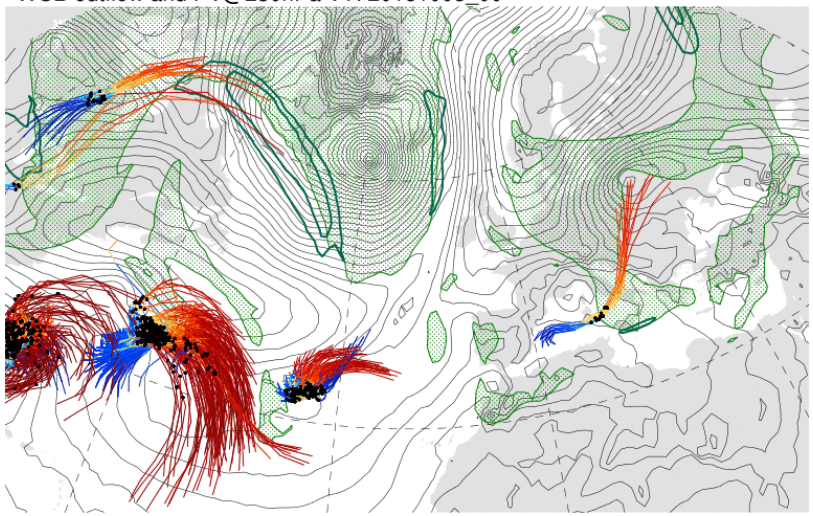


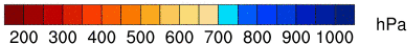






Trajectory start and SLP VT: 20161006_00
WCB outflow and PV@250hPa VT: 20161008_00

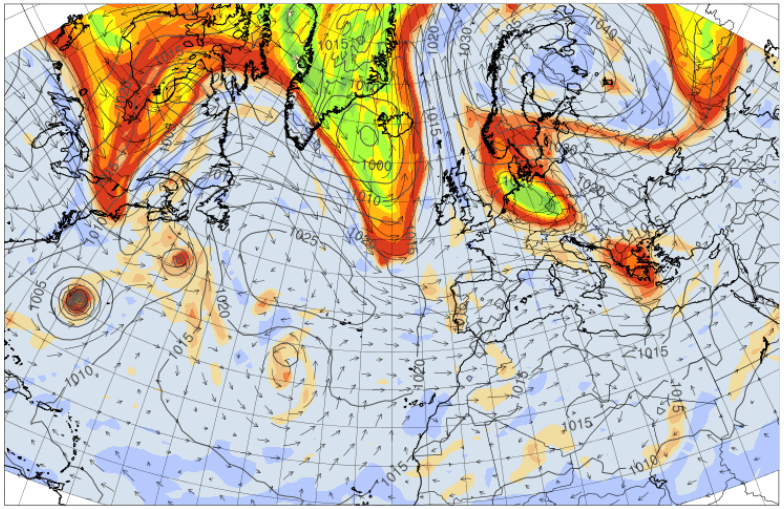




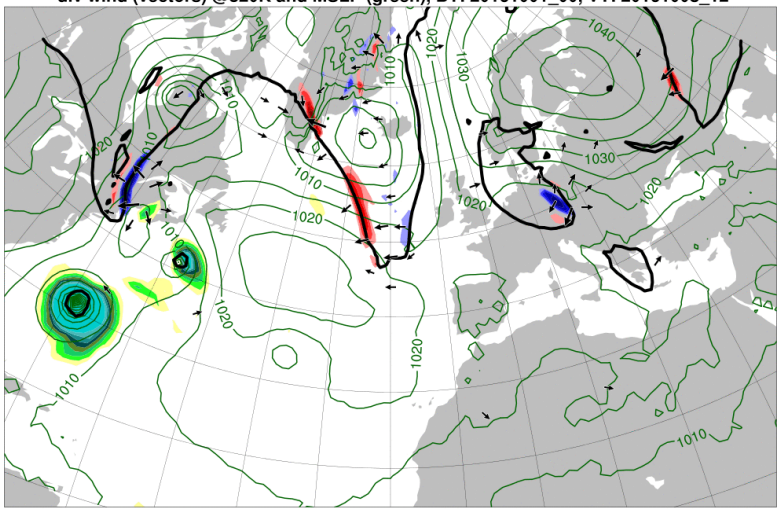
Forecast – Sat 8 Oct 2016, 12UTC

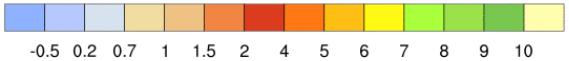
PV320K, irrwind320K, THE850K, trajectories

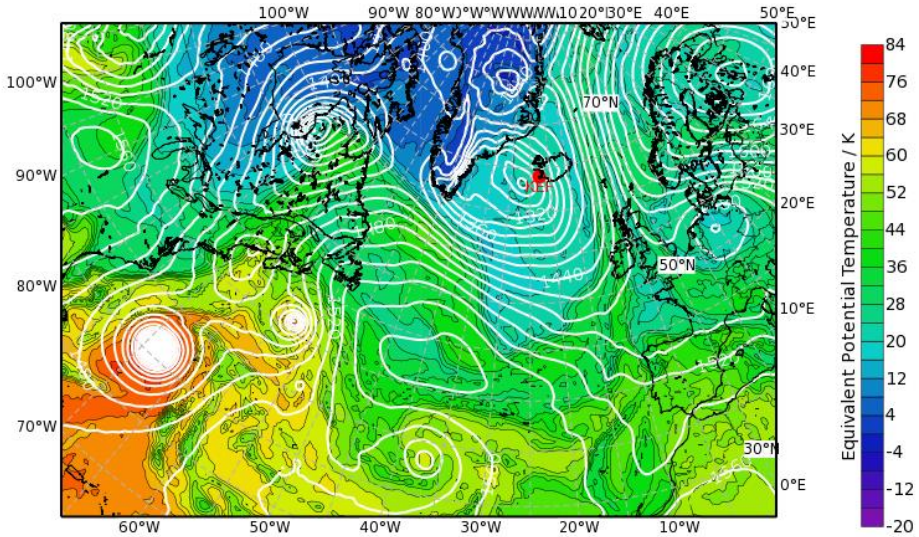
PV@320K at 20161008_12

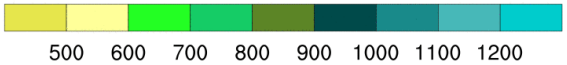


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161008_12

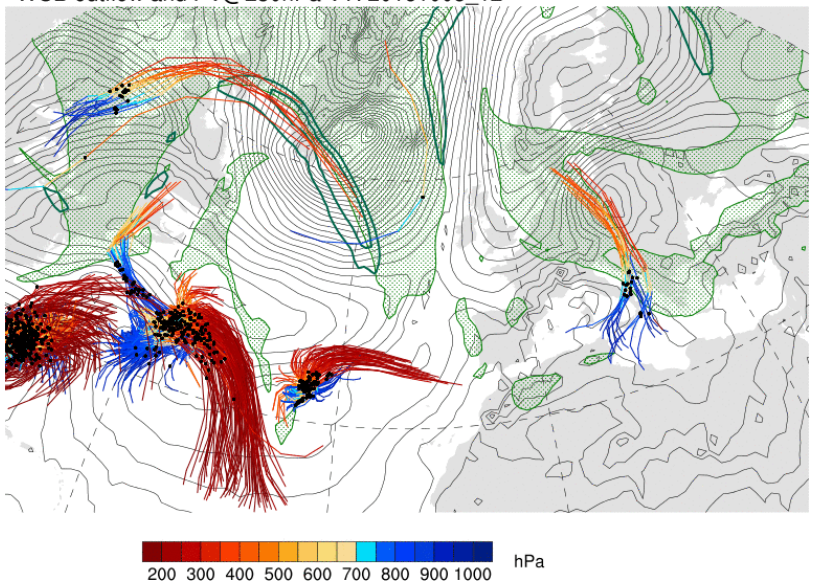






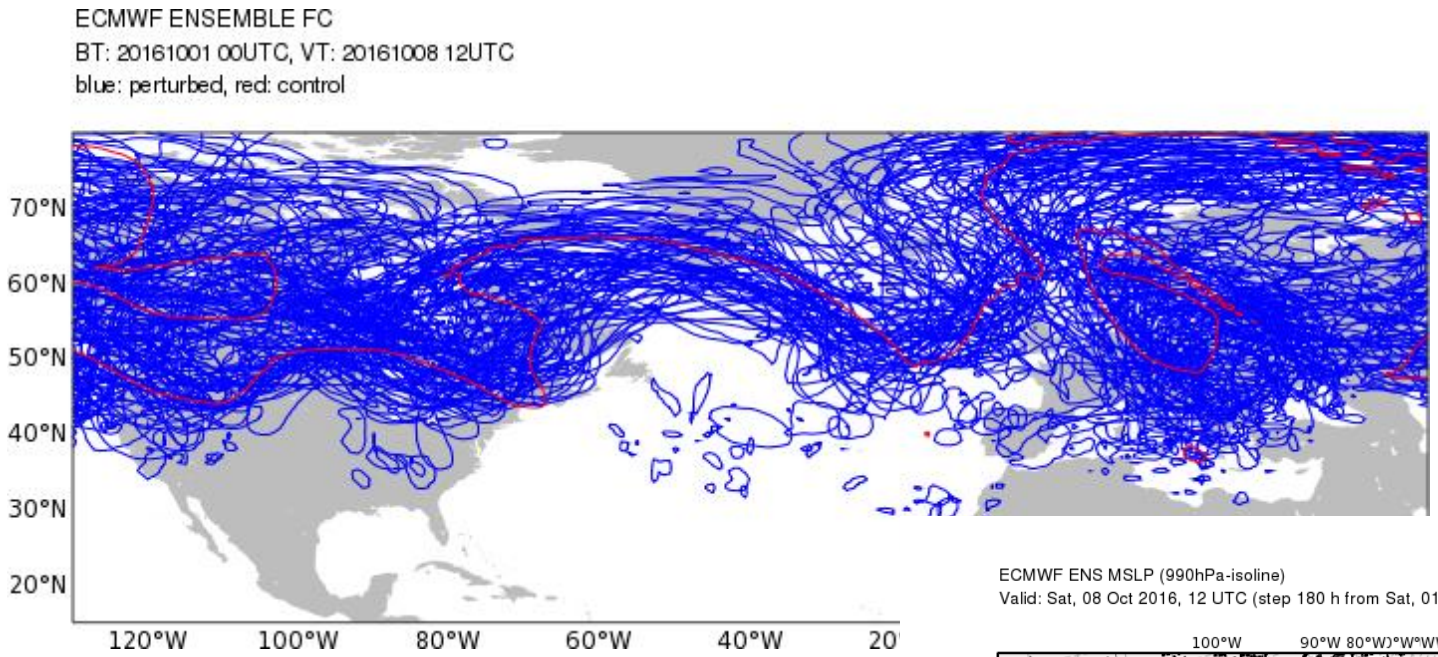


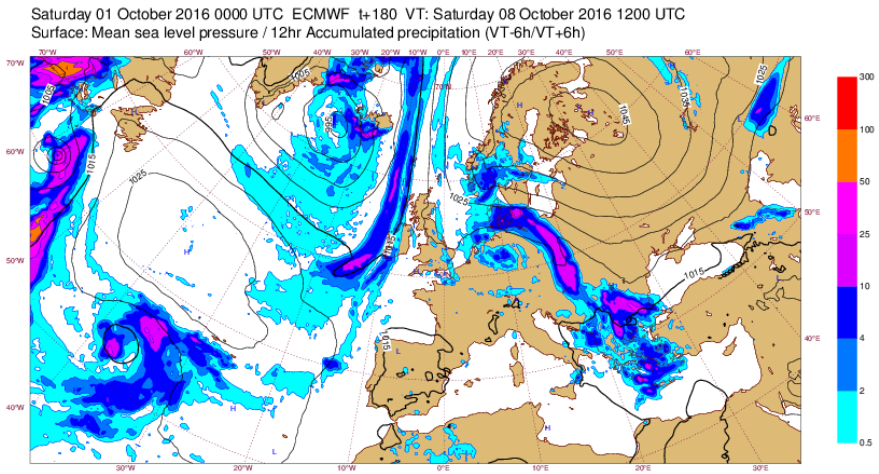
Trajectory start and SLP VT: 20161006_12
WCB outflow and PV@250hPa VT: 20161008_12

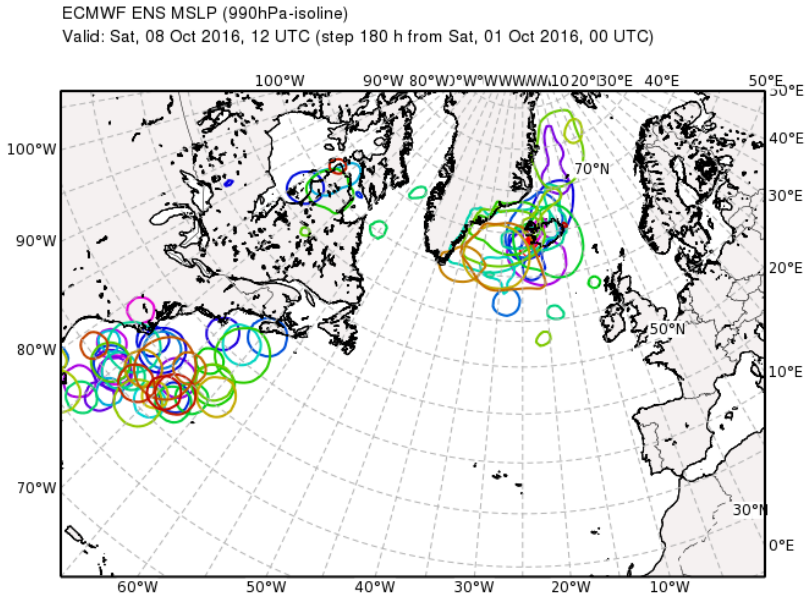


2PVU@320K, MSLP990 Spaghetti (based EC Ens 01/00Z)

Sat 08/12Z

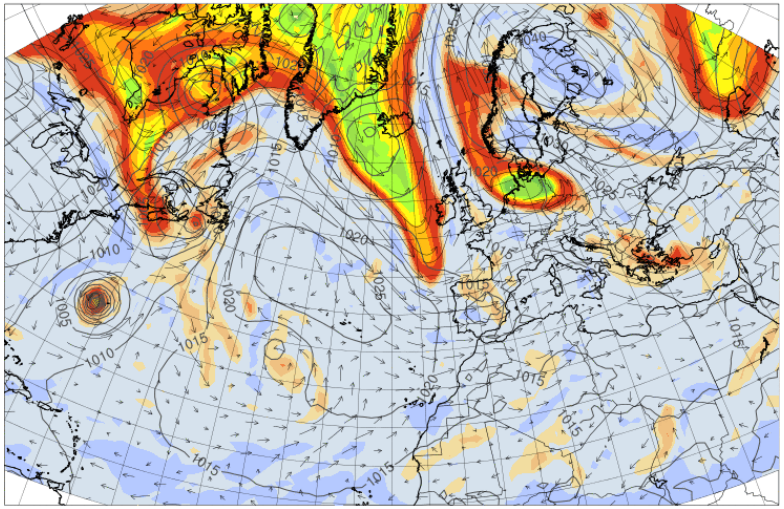




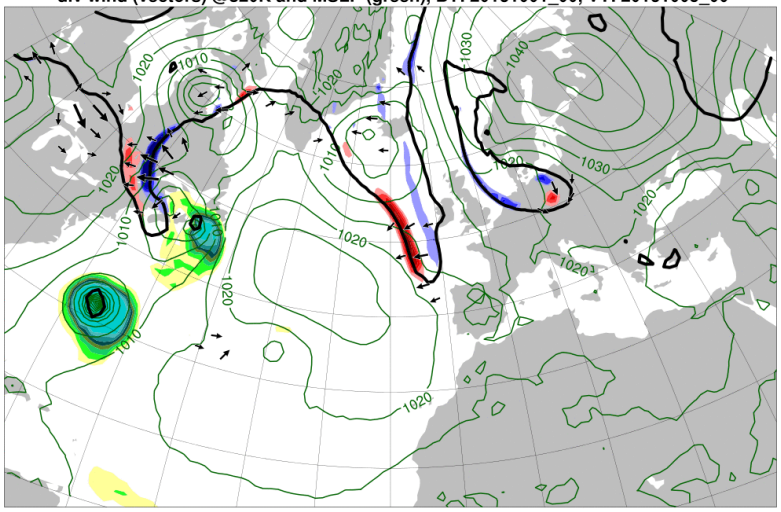


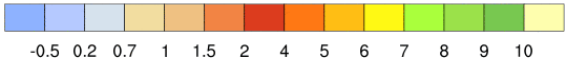
Forecast – Sun 9 Oct 2016, 00UTC PV320K, irrwind320K, THE850K, trajectories

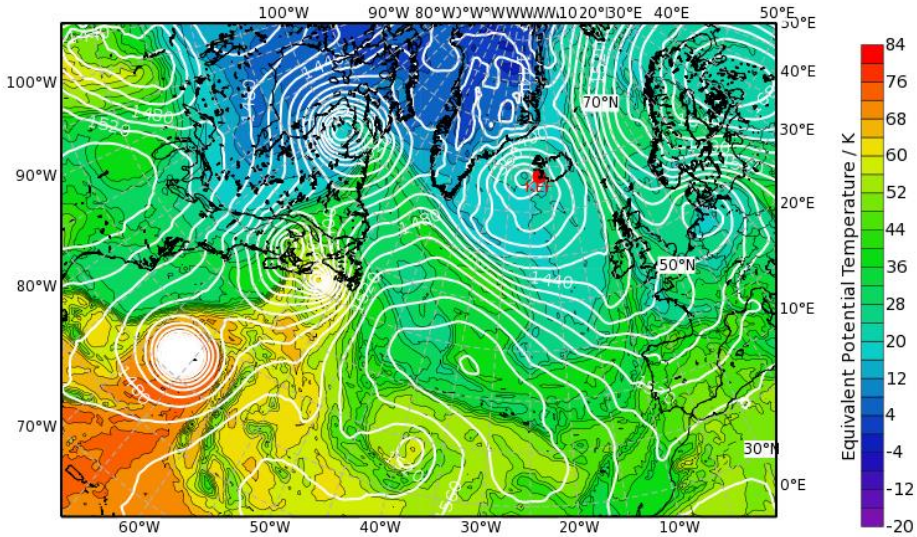
PV@320K at 20161009_00

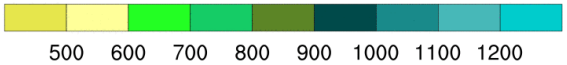


2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161001_00, VT: 20161009_00

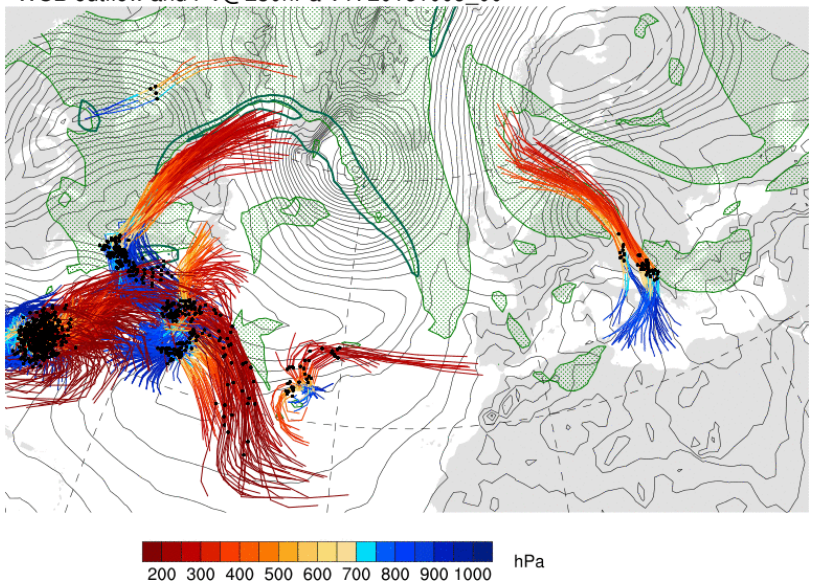




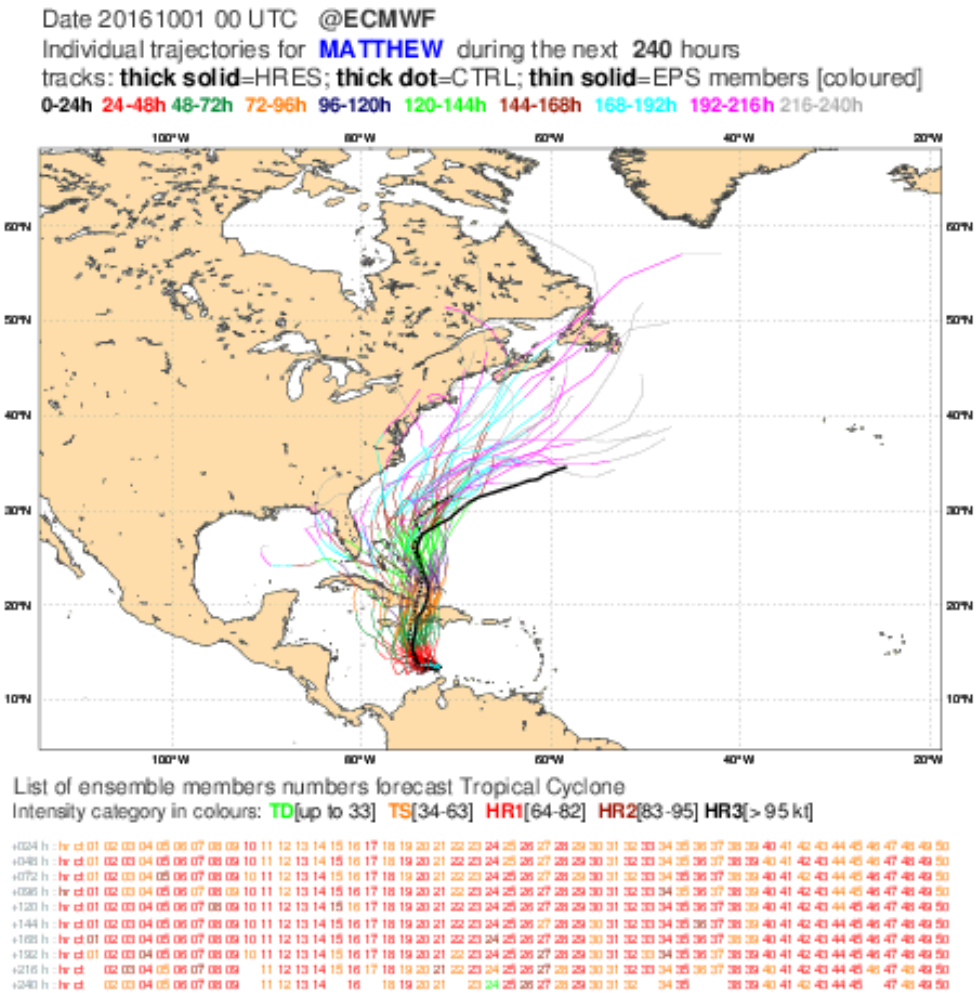


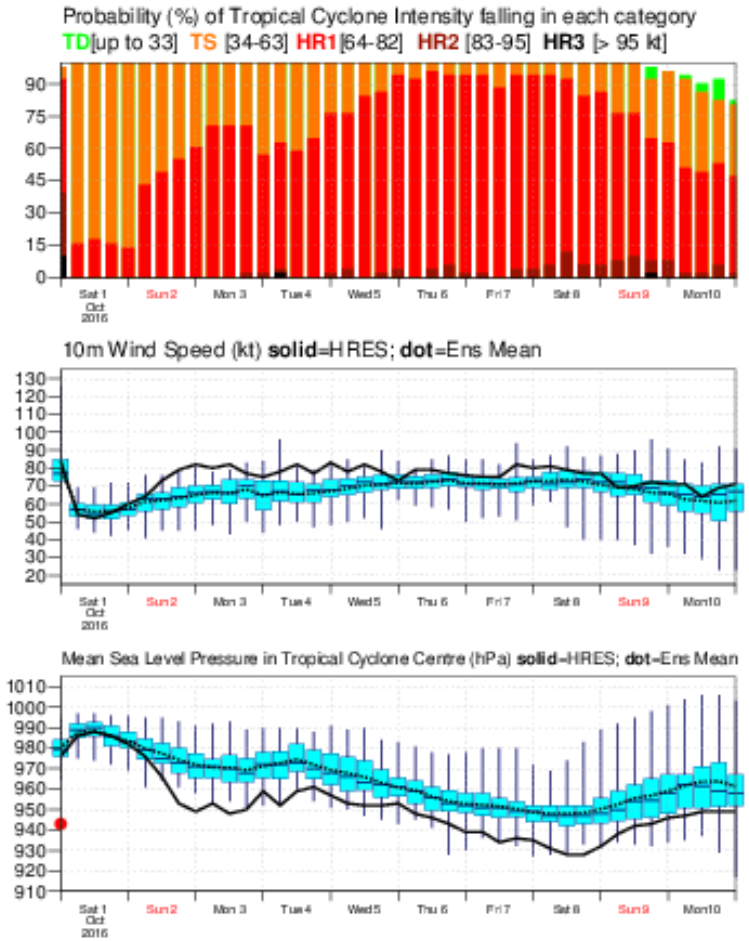


Trajectory start and SLP VT: 20161007_00
WCB outflow and PV@250hPa VT: 20161009_00



Potential extratropical transition of Hurricane Matthew (now cat. 5!)





Summary

- **Sunday – Monday 2-3 October**
  - Strong WCB activity with „Saturday cyclone“
  - Ridgebuilding and downstream PV streamer formation
- **Tuesday – Thursday 4-6 October:**
  - Windy conditions in KEF on MO morning and WED
  - frontal wave cyclone within reach Tue-Thu; interesting WCB inflow, ascent, outflow region; re-amplifying ridge
  - Heavy precipitation in Central Europe Tue-Thu due to dowstream cut-off
  - Strong poleward moisture transport, heavy precipitation in Iceland Wednesday
- **Thurday – Sunday 6-9 October:** TC heyday in western NATL