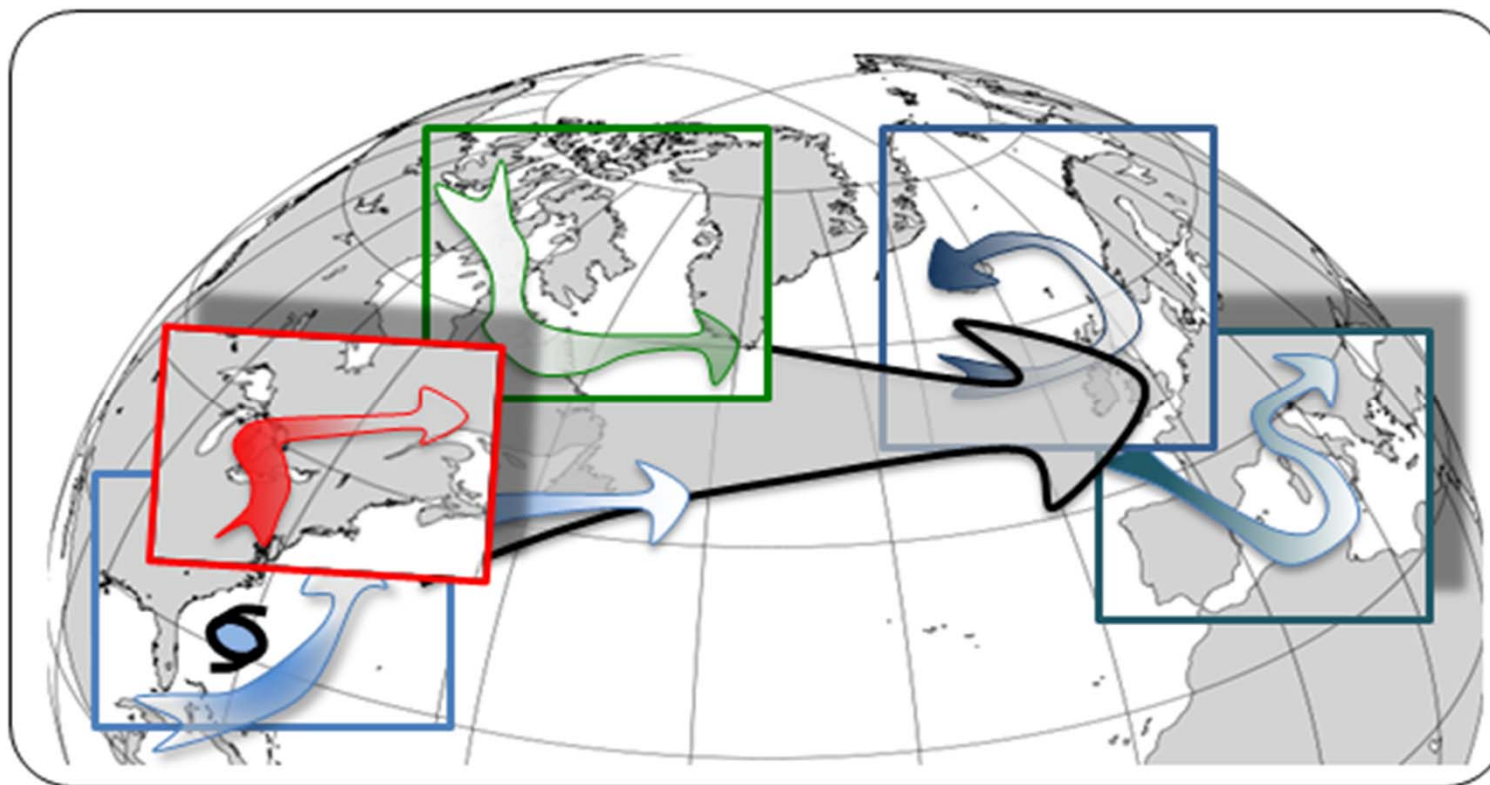


NAWDEX – General Planning Meeting

04 October 2016, Keflavik 11 UTC



NAWDEX – General Planning Meeting

04 October 2016, Keflavik 11 UTC

Topics

1. Weather overview until Thursday
2. Update for today's flight in „frontal wave cyclone“ & associated strong WCB
3. Plans for potential missions next week Wed / Thu

NAWDEX – General Planning Meeting

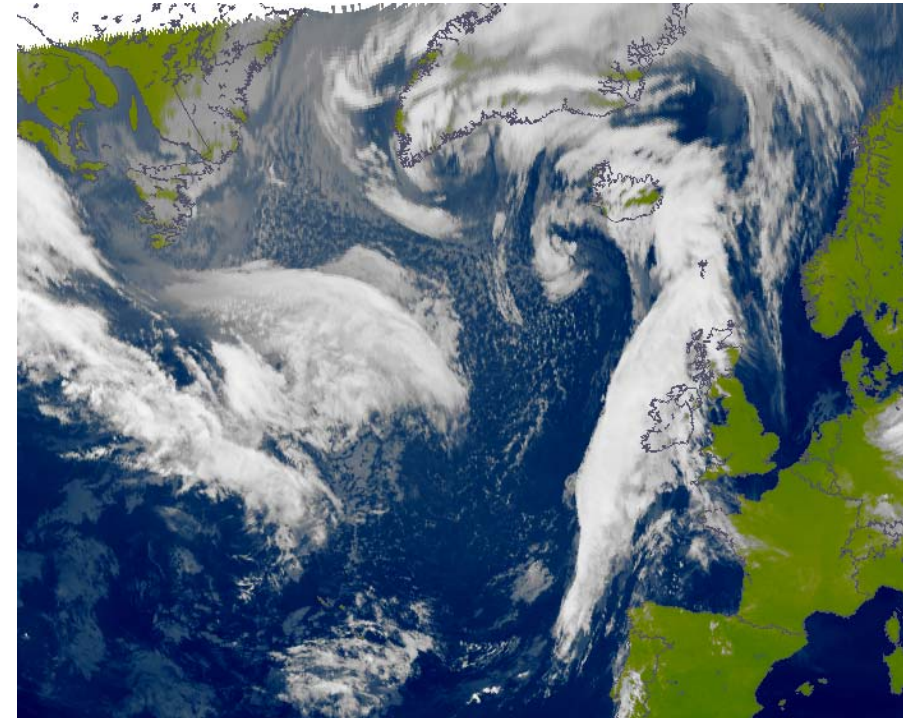
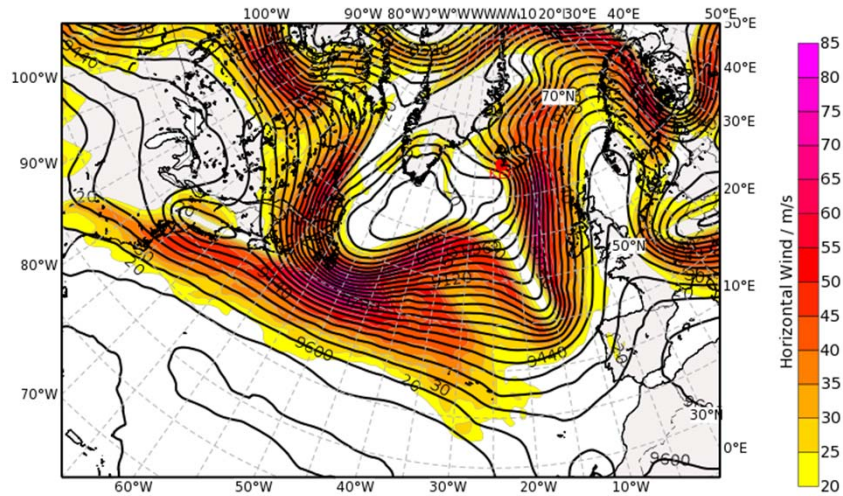
21 September 2016, Keflavik 11 UTC

Topics

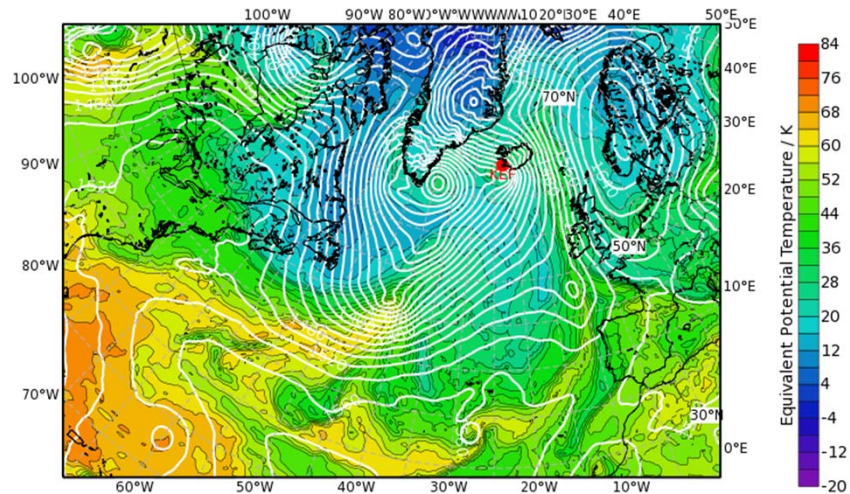
1. Key information from previous flight (2 minutes)
2. Aircraft status report by FX-Operations
3. Instrument status report by Instrument Manager
4. Short weather summary: information about flight options for the next days and update for planning for the next day with the latest forecast
5. Final discussion about flight pattern for next day (in case of 2 options)
6. Report of Ground-Based Observation coordinator
7. Announcement of tentative plans for Day+3
8. Coordination with other aircraft (Input from other groups)

Analysis – 04 Oct 2016, 00 UTC

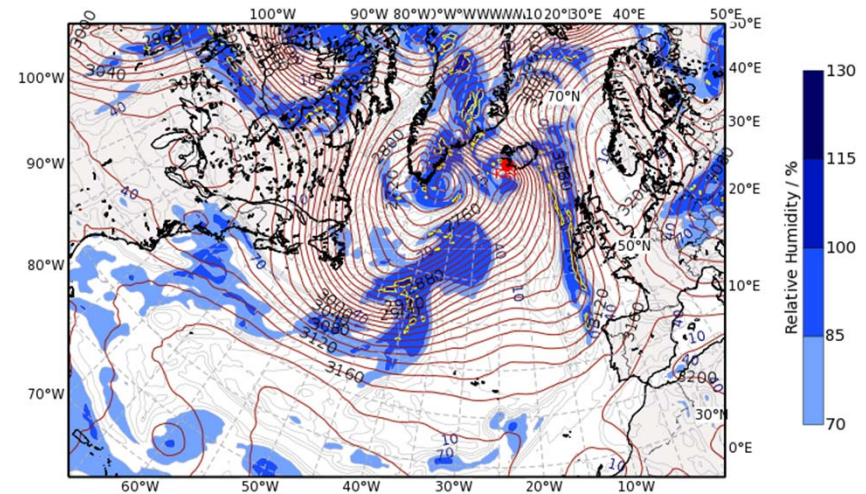
Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Tue, 04 Oct 2016, 00 UTC (step 000 h from Tue, 04 Oct 2016, 00 UTC)



Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Tue, 04 Oct 2016, 00 UTC (step 000 h from Tue, 04 Oct 2016, 00 UTC)



Relative Humidity (%) and Z (m) at 700 hPa
Valid: Tue, 04 Oct 2016, 00 UTC (step 000 h from Tue, 04 Oct 2016, 00 UTC)

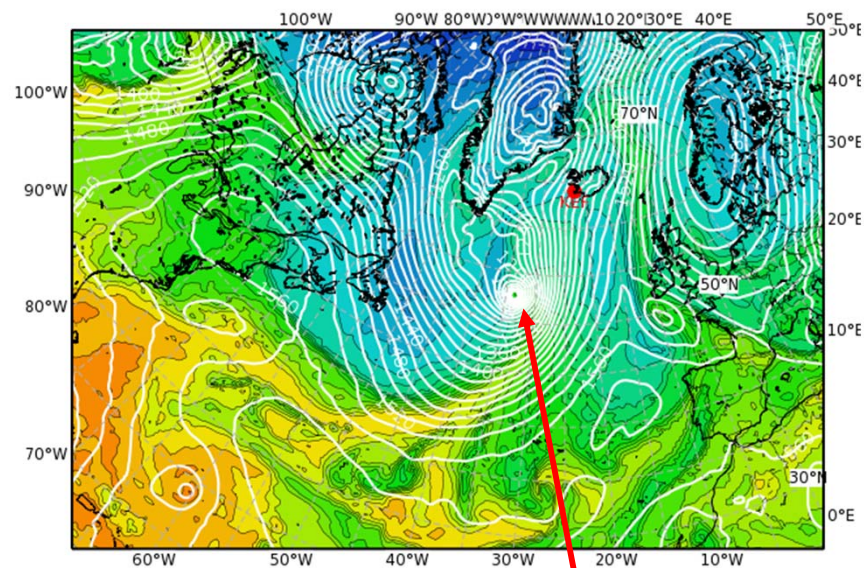


Today's Tuesday Flights HALO & 2xFalcon

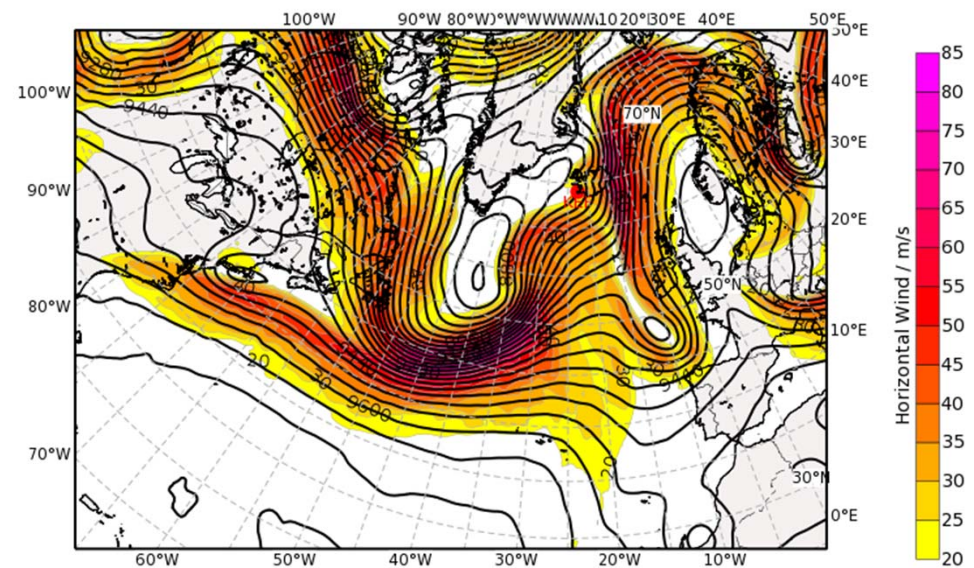
Forecast for Tue 04 Oct 2016 12 UTC

THE850, Z300 BT04/00Z

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Tue, 04 Oct 2016, 12 UTC (step 012 h from Tue, 04 Oct 2016, 00 UTC)



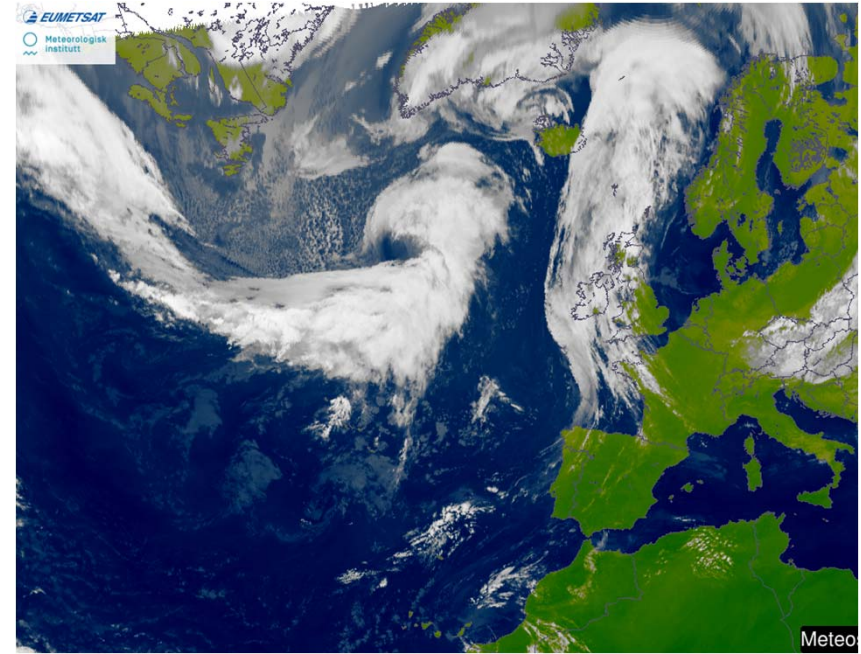
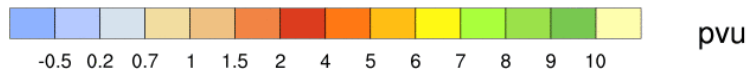
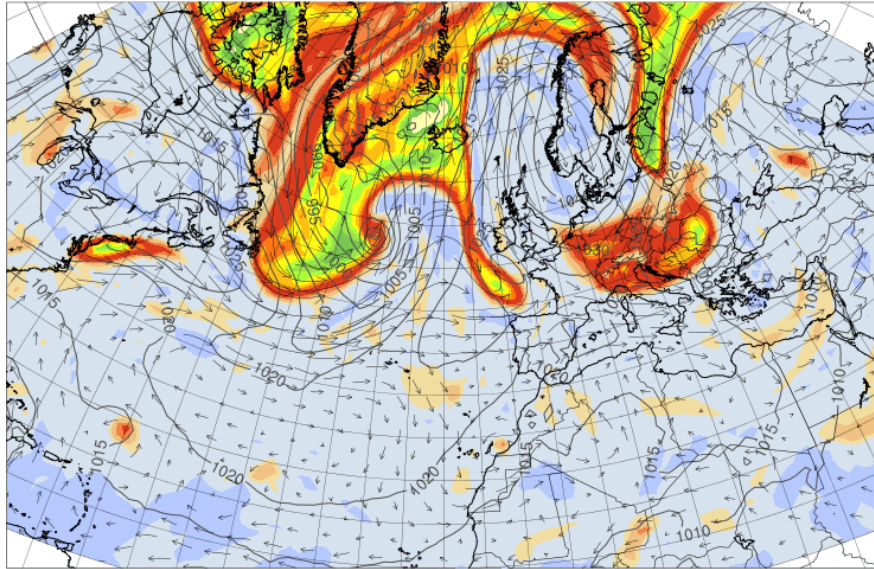
Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Tue, 04 Oct 2016, 12 UTC (step 012 h from Tue, 04 Oct 2016, 00 UTC)



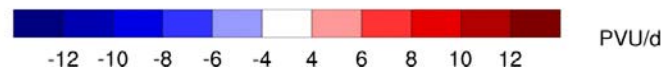
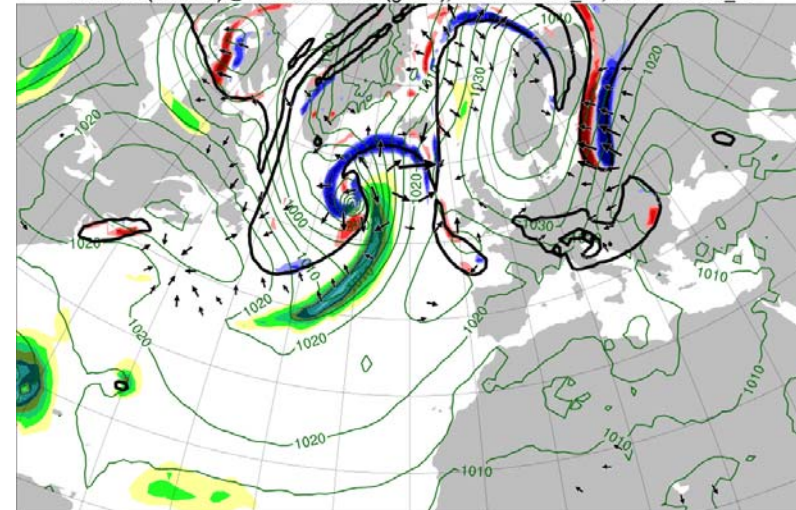
Deepening DRW
cyclone

Forecast for Tue 04 Oct 2016 12 UTC

PV@320K at 20161004_12



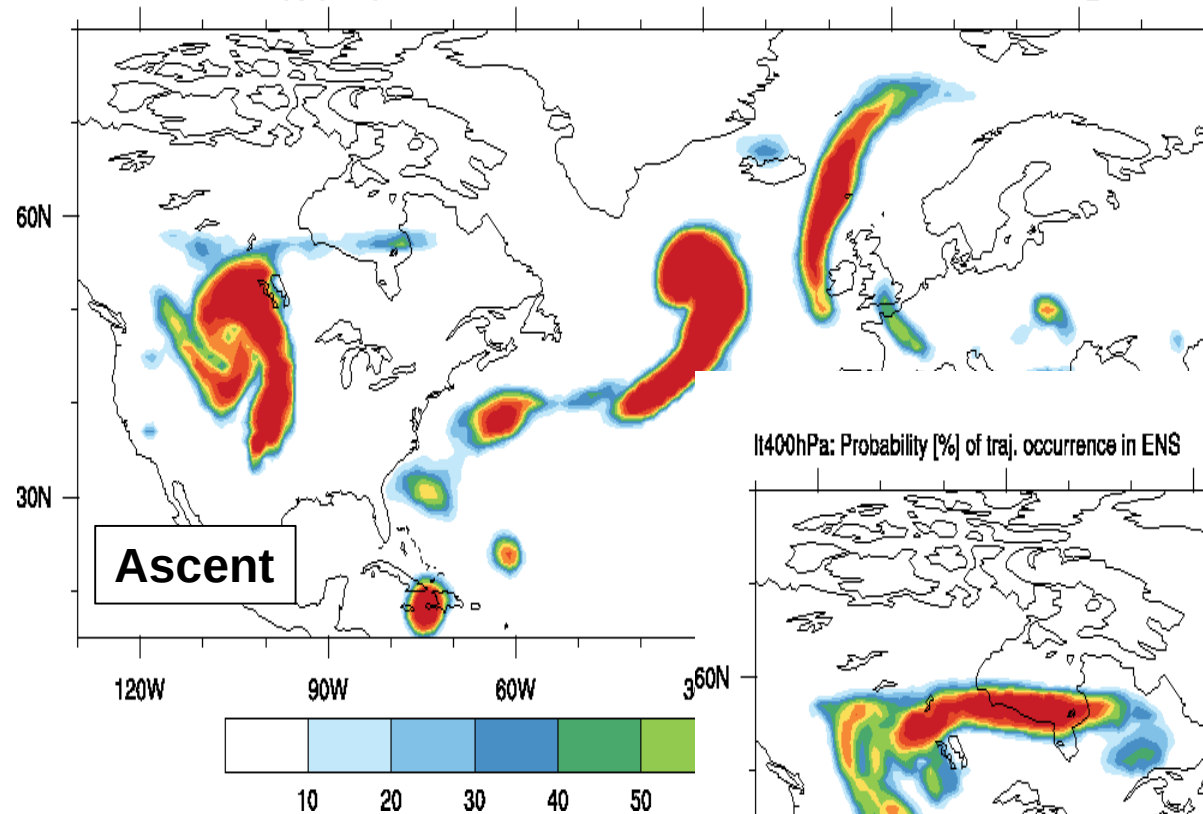
2 PVU (black), PV adv by div wind (shading),
div wind (vectors) @320K and MSLP (green), BT: 20161004_00, VT: 20161004_15



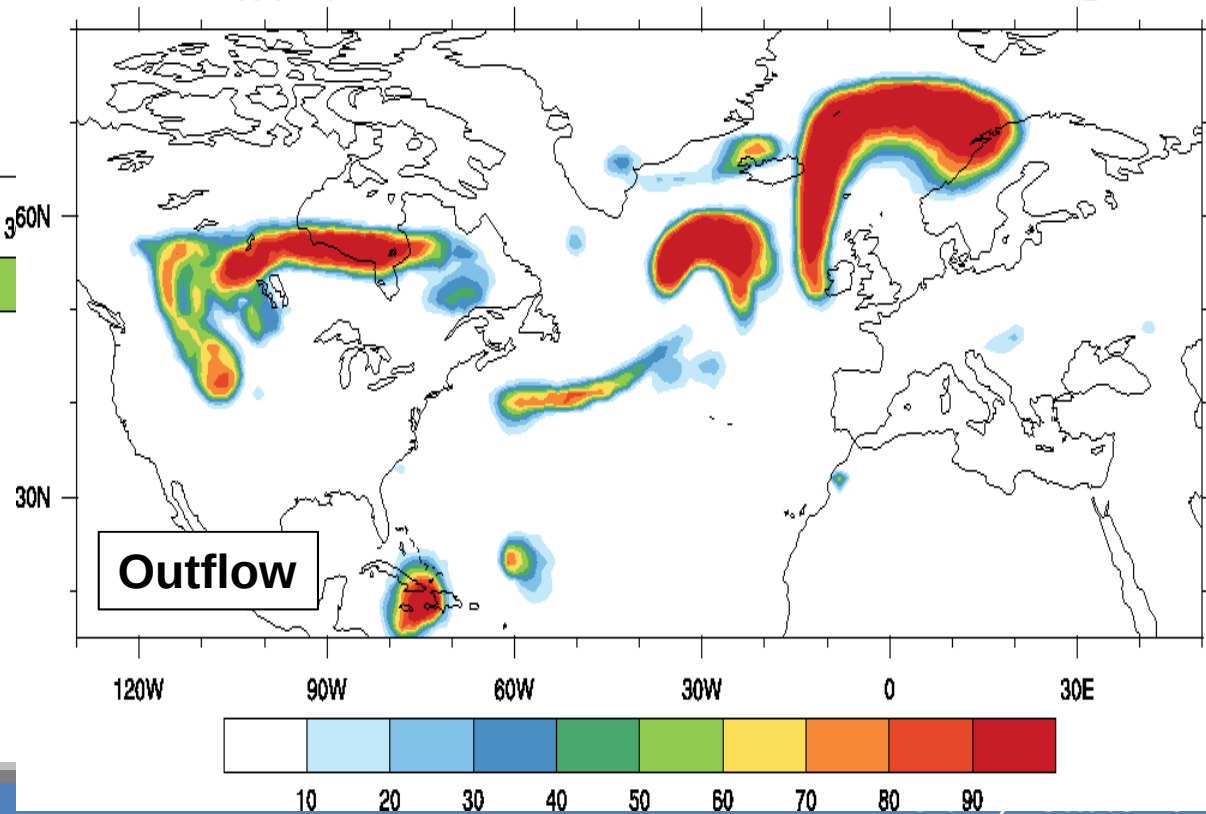
Forecast for Tue 04 Oct 2016 12 UTC

ECMWF ensemble forecast
BT 20161003_12UTC
VT 20161004_12UTC

in800-400hPa: Probability [%] of traj. occurrence in ENS



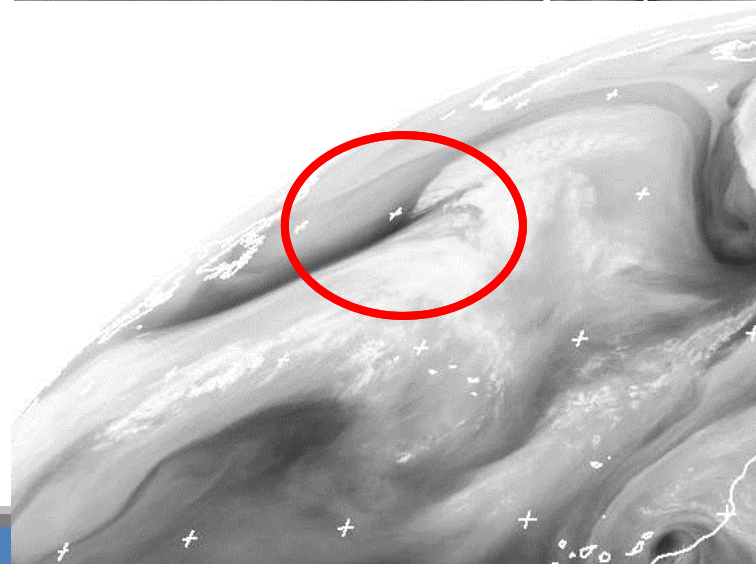
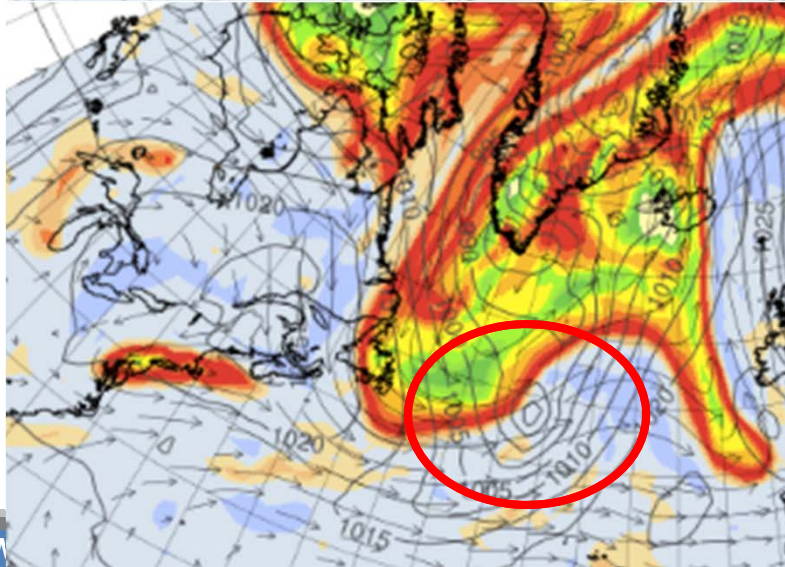
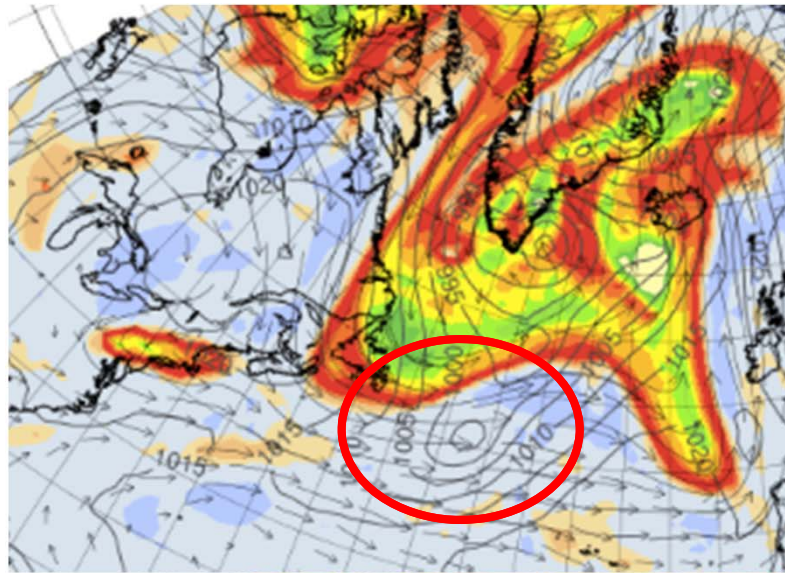
in400hPa: Probability [%] of traj. occurrence in ENS



ECMWF ensemble forecast
BT 20161003_12UTC
VT 20161004_12UTC

HALO flight Tue 04 Oct

Early phase of rapidly intensifying diabatic Rossby wave



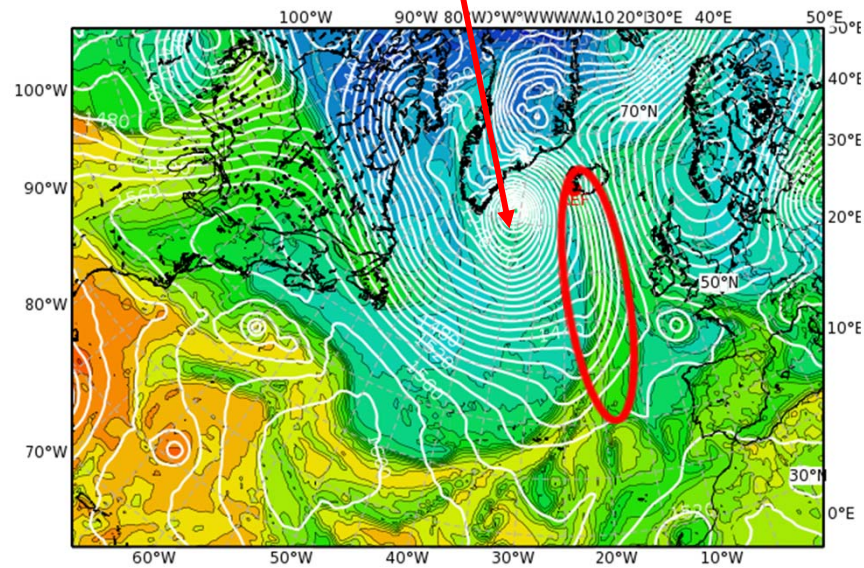
Wednesday, 5 Oct flights HALO

Forecast for Wed 05 Oct 2016 12 UTC

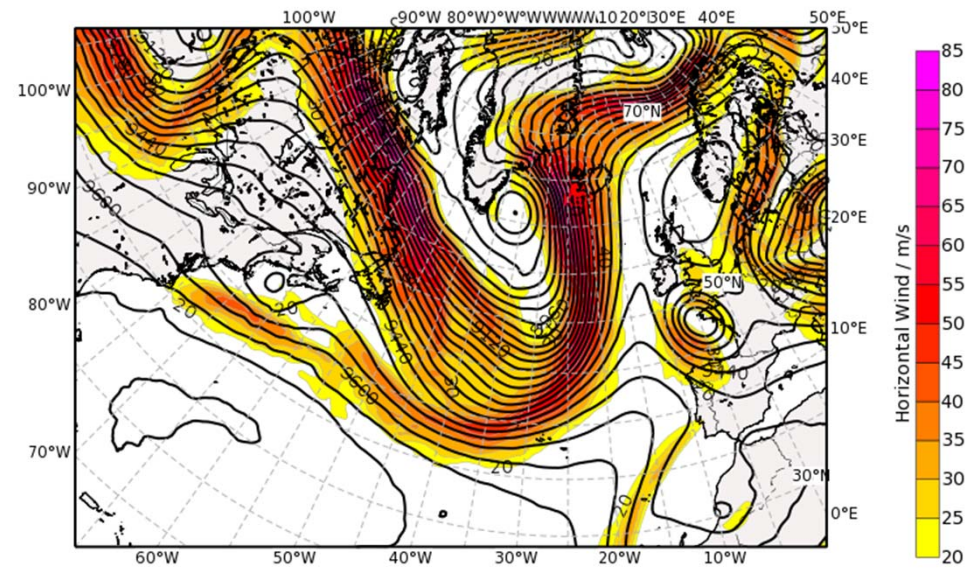
THE850, Z300 BT04/00Z

Mature DRW
cyclone

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Wed, 05 Oct 2016, 12 UTC (step 036 h from Tue, 04 Oct 2016, 00 UTC)

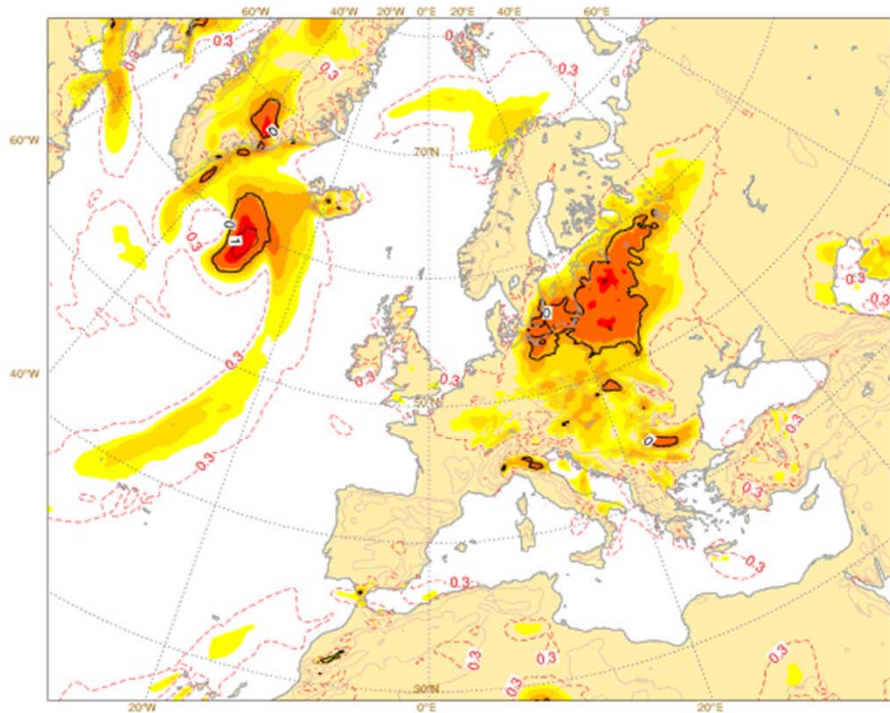


Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Wed, 05 Oct 2016, 12 UTC (step 036 h from Tue, 04 Oct 2016, 00 UTC)



EFI gusts for Wed 06 (BT 04/00z)

Tue 04 Oct 2016 00UTC @ECMWF t+24-48h 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 10m wind gusts



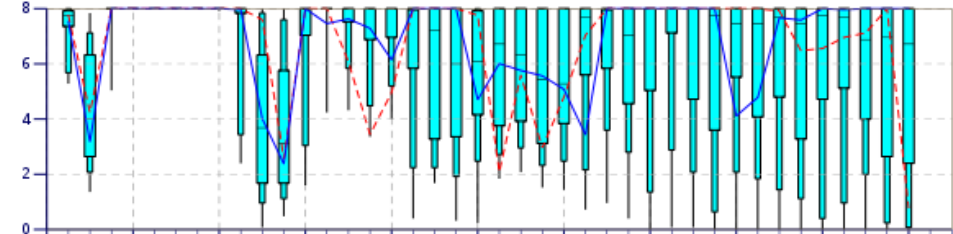
- Strong winds at 12UTC (15m/s, with gusts >20m/s), slowly weakening in the afternoon. Heavy rain.

ENS Meteogram

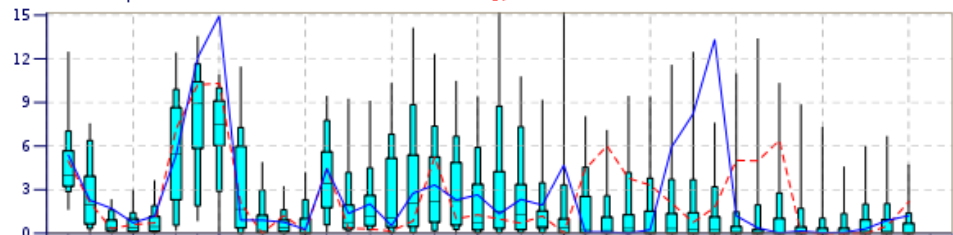
Keflavik, Iceland 63.89°N 22.26°W (ENS land point) 5 m

High Resolution Forecast and ENS Distribution Tuesday 4 October 2016 00 UTC

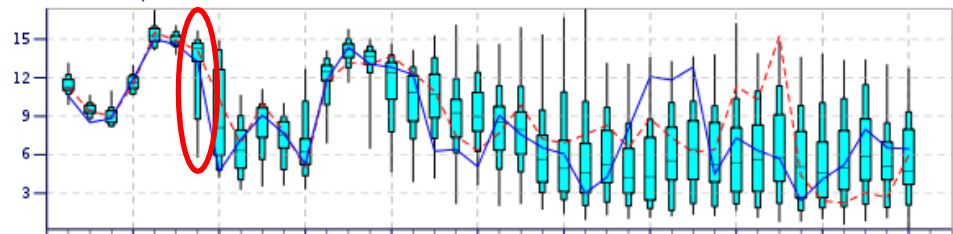
Total Cloud Cover (okta)



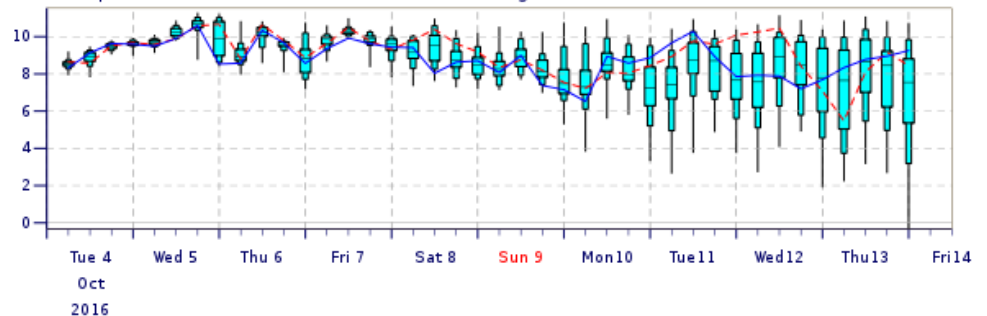
Total Precipitation (mm/6h)



10m Wind Speed (m/s)

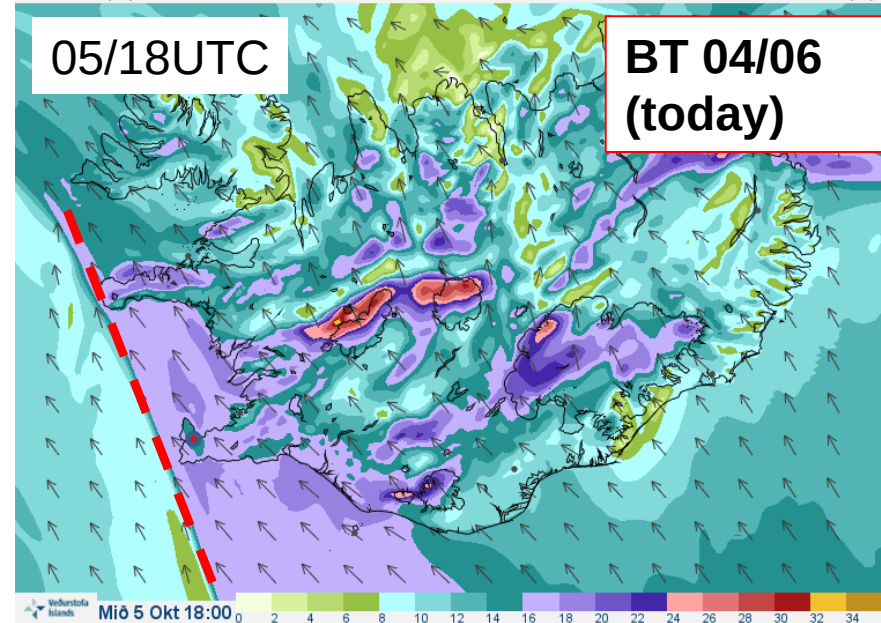
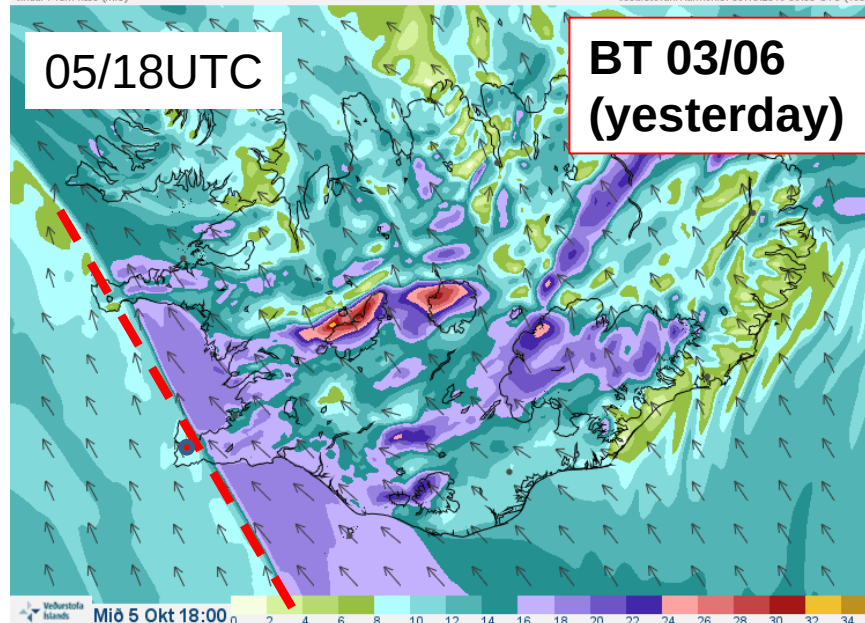
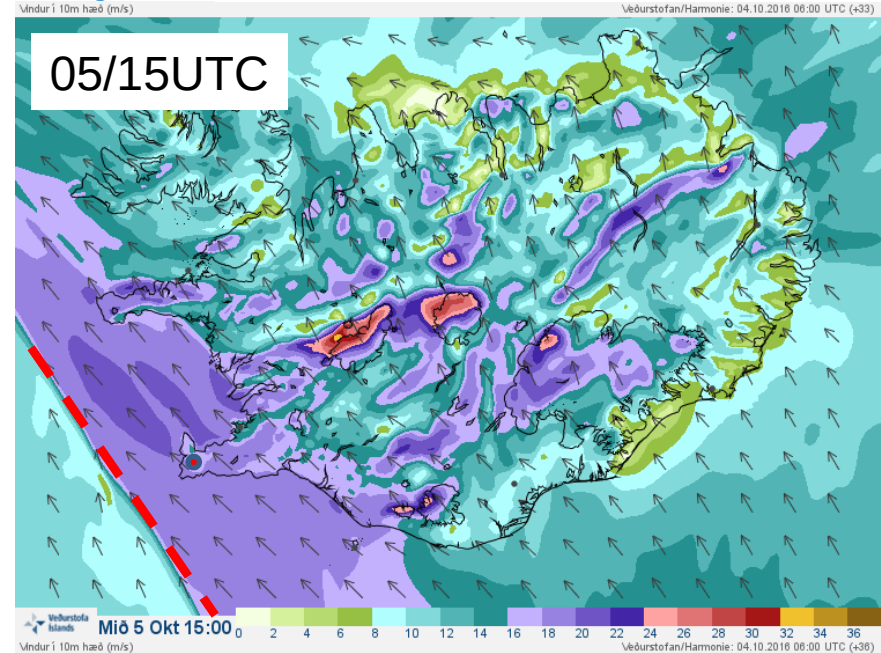
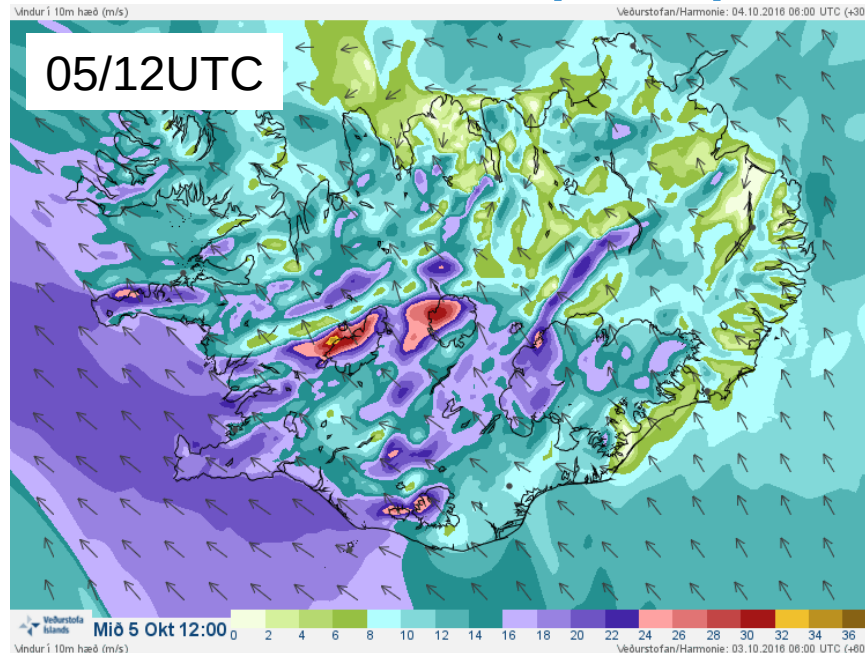


2m Temperature(°C) reduced to 5 m (station height) from 83 m (HRES) and 46 m (ENS)



10m winds HARMONIE (2.5km) Wednesday

HARMONIE vedur.is BT 04/06Z



Scientific Objective of Wednesday flight

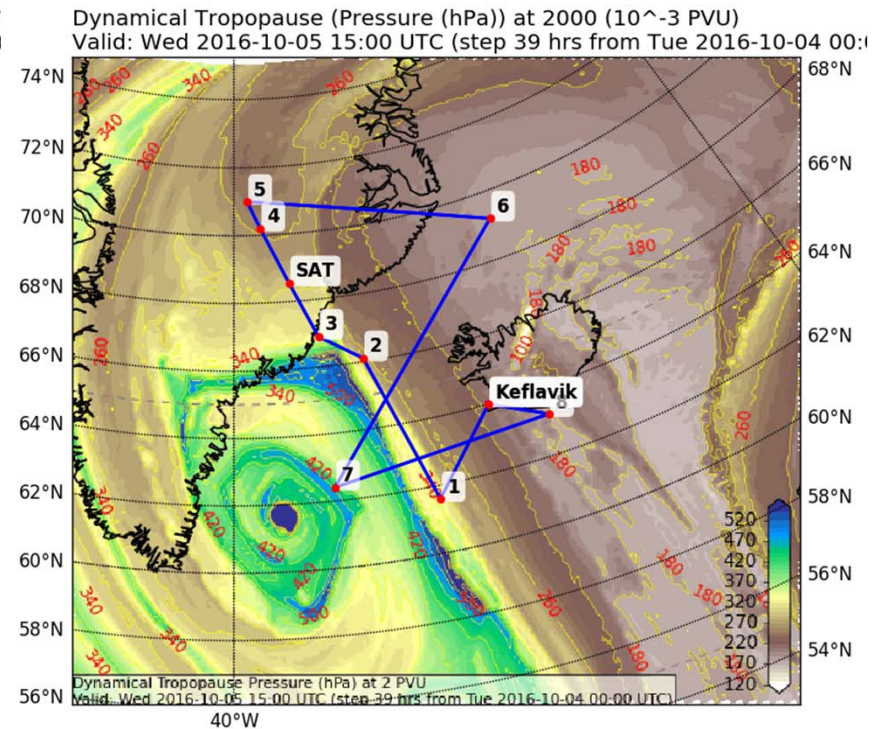
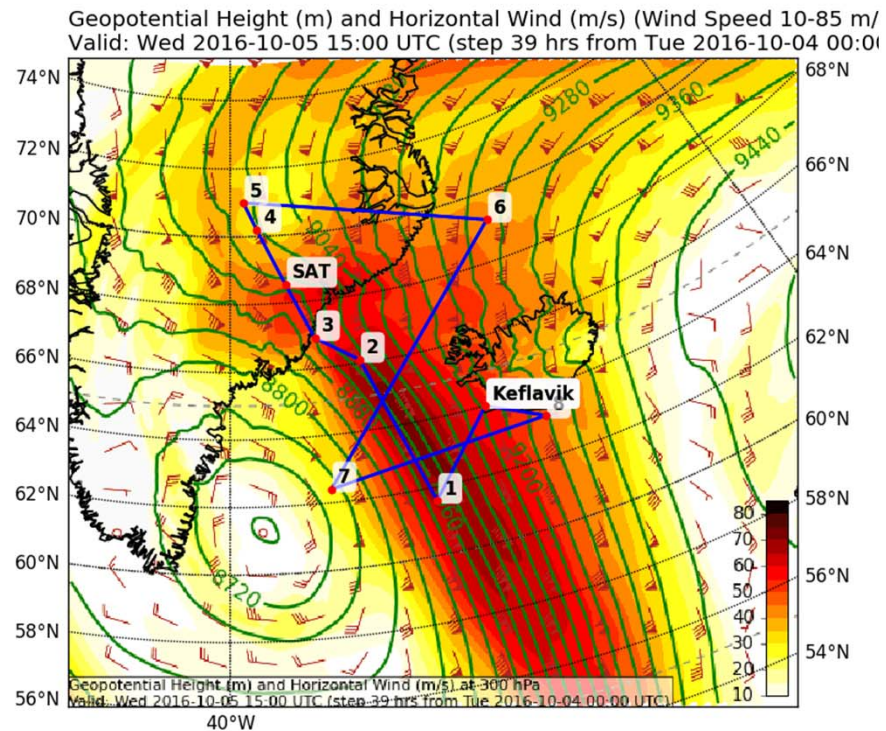
- Moisture transport
- Phases of the WCB ascent: strong ascent region
- Satellite overpass (coordinated with SAFIRE)
- CAT measurement
- Takeoff ~13 UTC
- Landing ~18 UTC

Change since yesterday: Shift of leg 1-2

Wednesday 5 October HALO flight

Geopot & Hor Wind at 300 hPa

P at 2 PVU

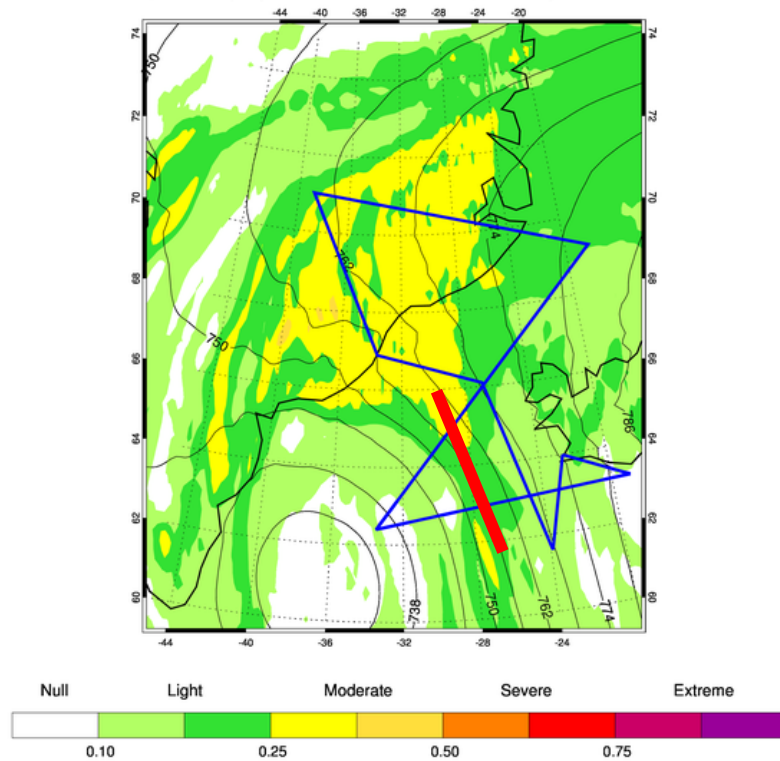


BT04/00Z VT05/15Z

Wednesday 5 October HALO flight

EDR at FL280

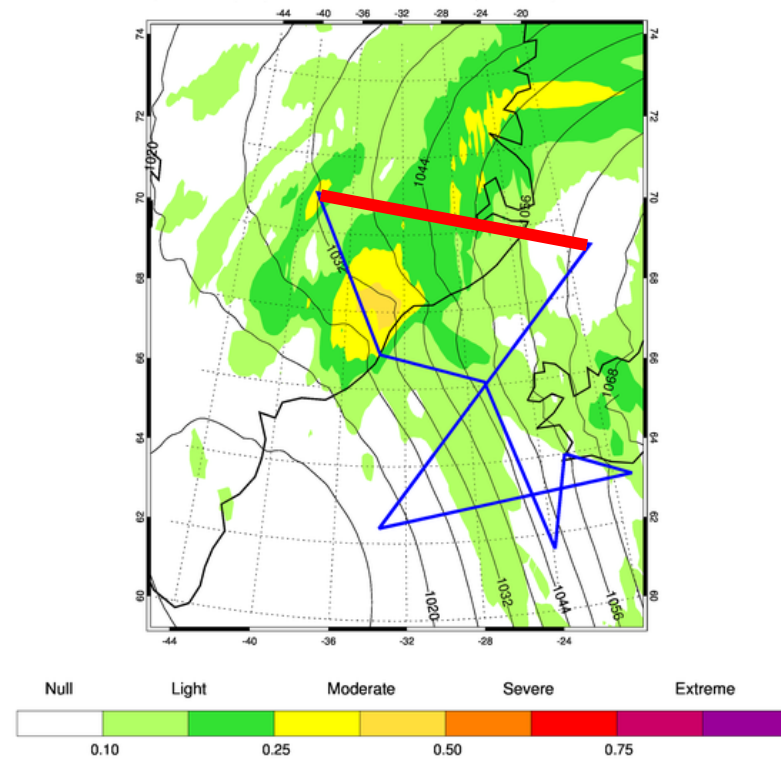
EDR / ($\text{m}^2 \text{s}^{-1}$), Geopotential Height / 10 m (contours), FL280
Valid: 05.10.2016, 12UTC (step 036 h from 04.10.2016, 00 UTC)



BT04/00Z VT05/12Z

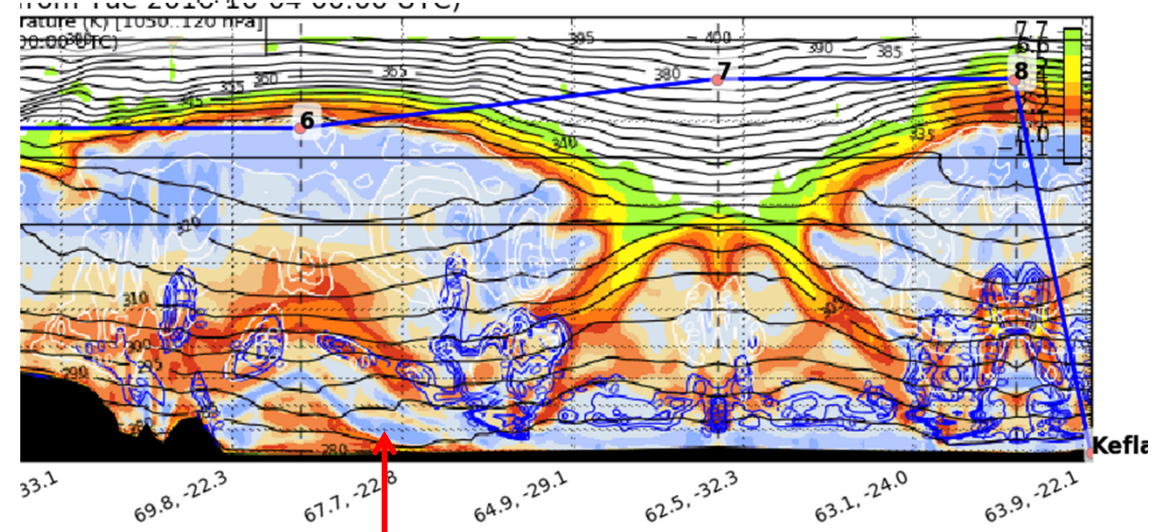
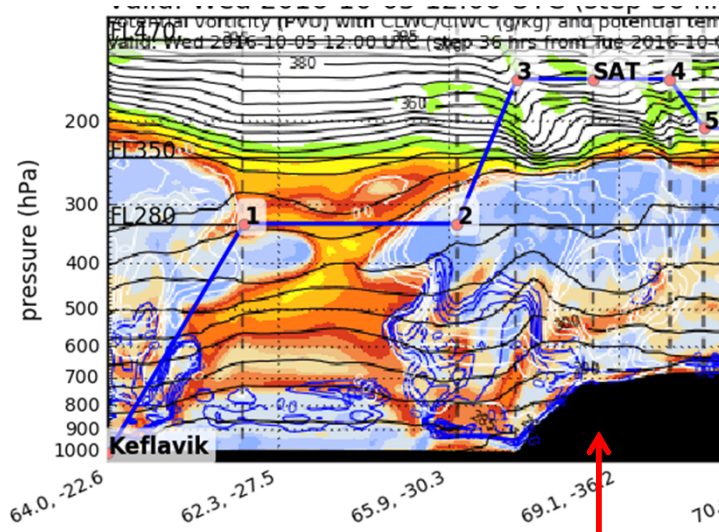
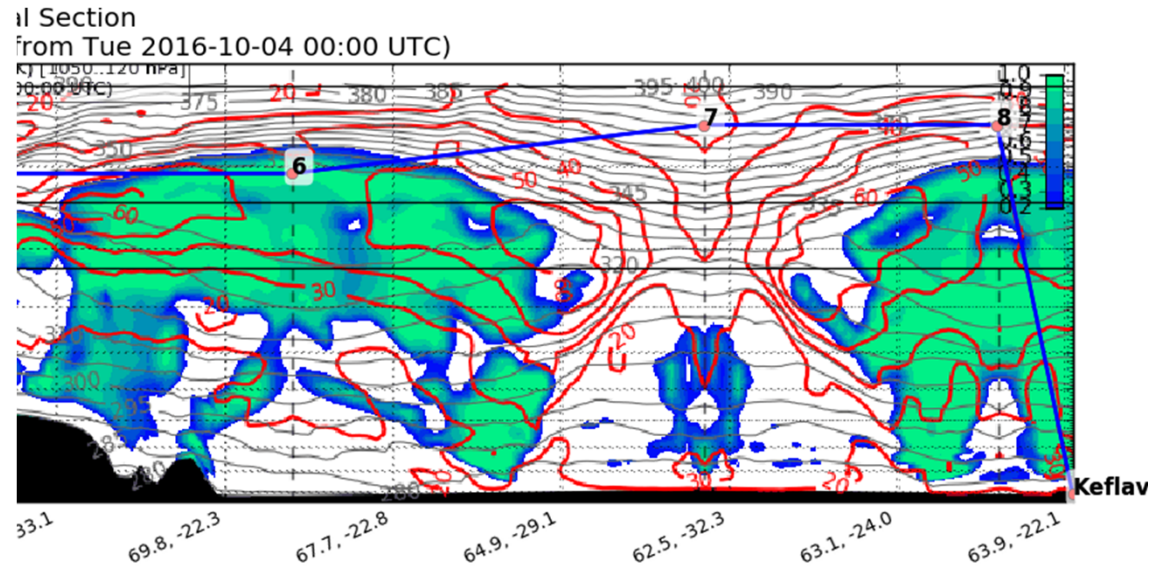
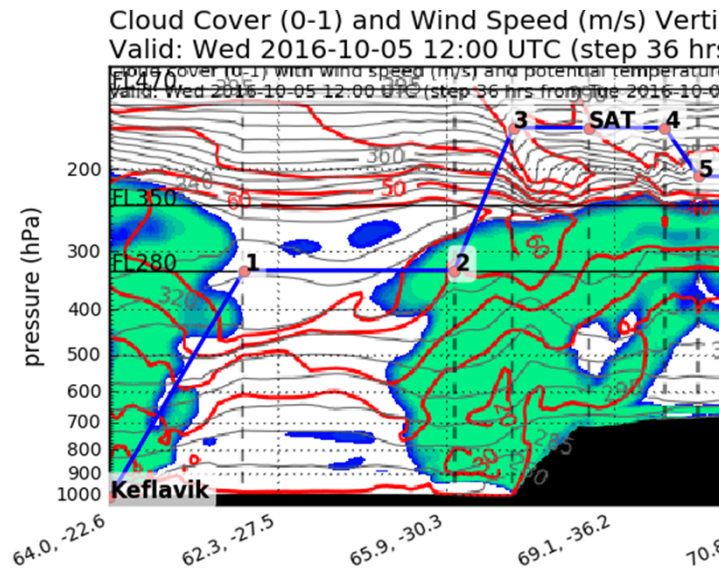
EDR at FL380

EDR / ($\text{m}^2 \text{s}^{-1}$), Geopotential Height / 10 m (contours), FL380
Valid: 05.10.2016, 15UTC (step 039 h from 04.10.2016, 00 UTC)



BT04/00Z VT05/15Z

Wednesday 5 October HALO flight



BT04/00Z VT05/12Z

+ SAFIRE, SAT

2 ★

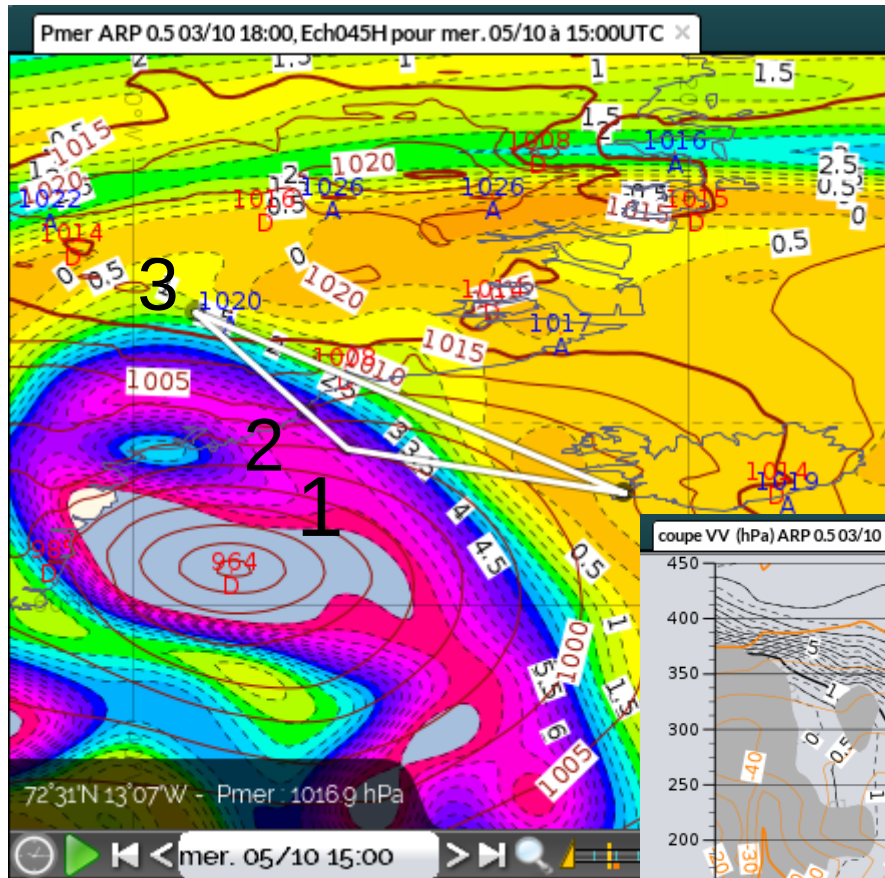
BT04/00Z VT05/15Z

What happens if we have to shift take off to a later time (ca 1-4 hours)?

Legs	Objective	Still valuable for later flight time?
1-2, 6-7	CAT	Yes, no change, even better, if flight on 3-4 level can still be altered.
3-4	SAT	NO!!!
3-4	Coordination with SAFIRE	Probably yes
6-7	WCB ascent, moisture transport	Yes, no change
6-7	Few Dropsondes	Yes, no change

- Little change in terms of dynamics
- Flight still valuable for CAT and WCB ascent
- Still valuable but clearly reduced value with regard to NAWDEX aims.

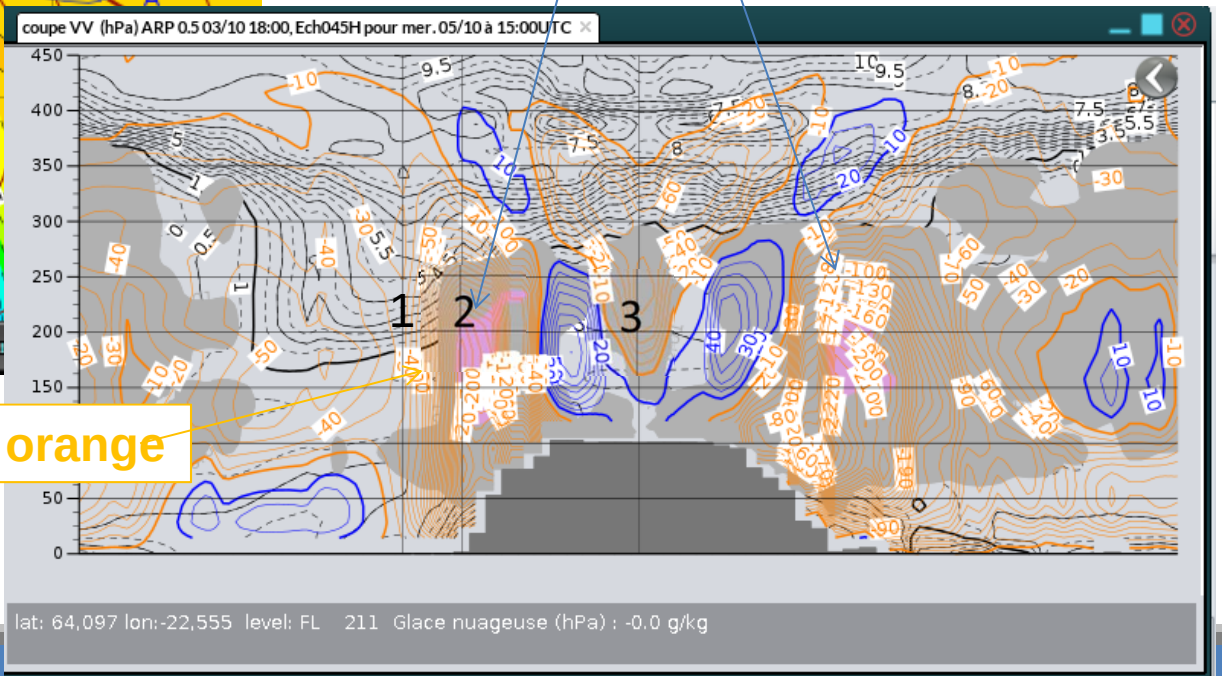
Flight plan for SAFIRE Falcon on Wed 5 : forecast from 03 Oct 18UTC Valid: Wed 05 Oct 15 UTC



A-train overpass between 1 and 3

Strong ascent over the Greenland coast and high quantity of ice water content (grey)

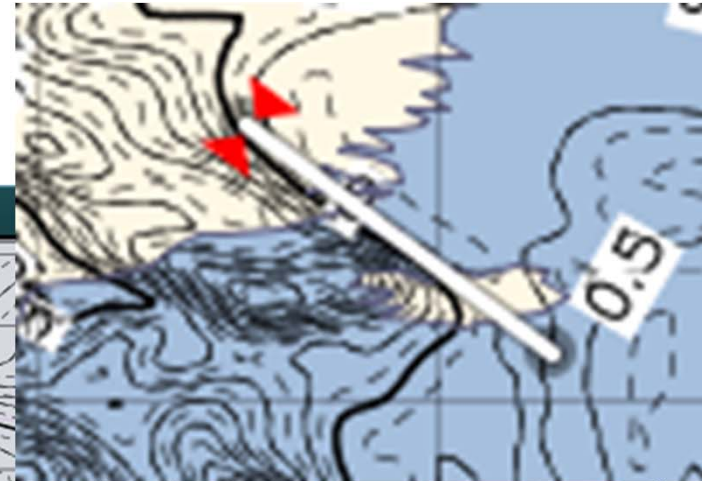
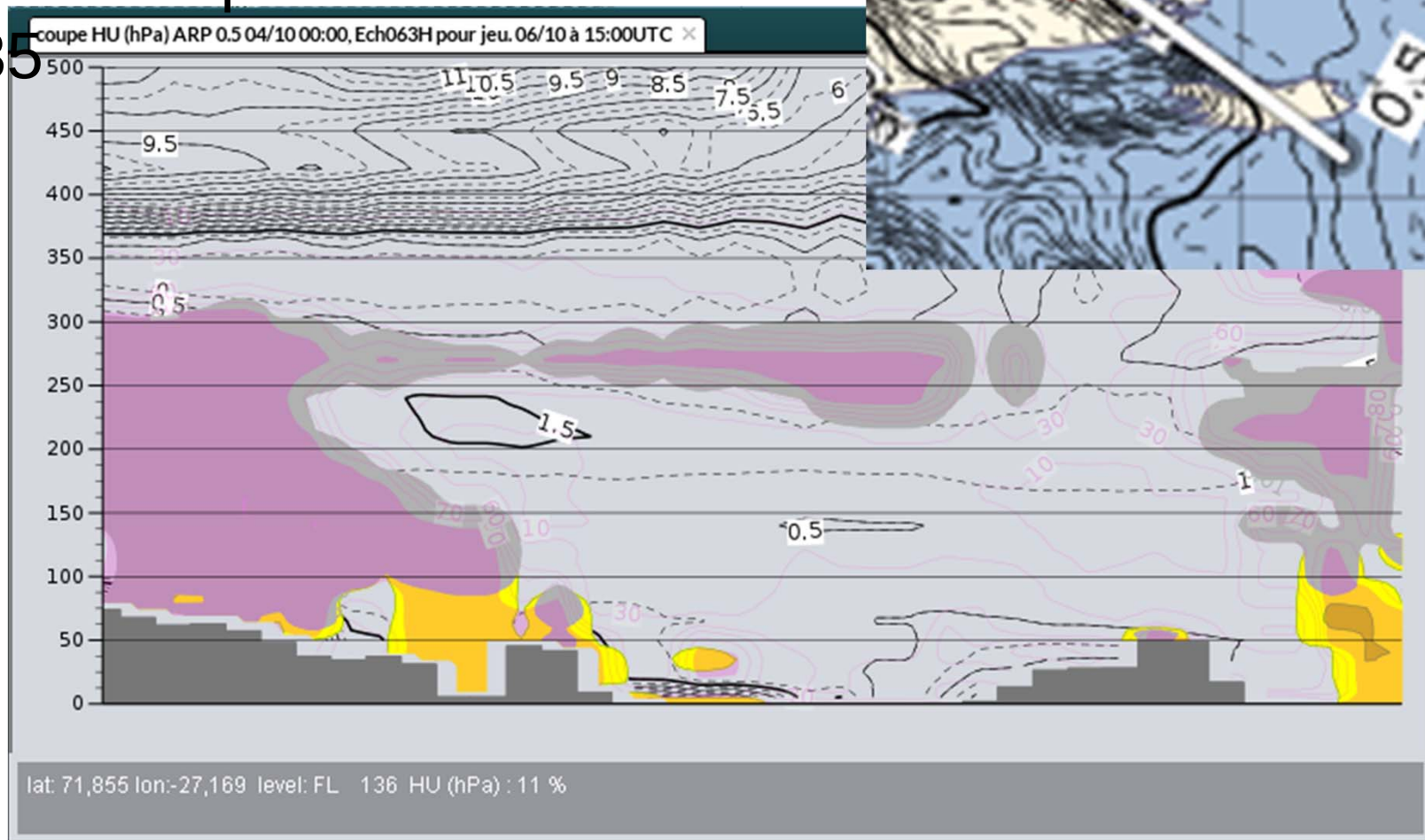
W>0 in orange



Flight plan for SAFIRE Falcon on Thurs 6 ? : forecast from 04 Oct 00UTC Valid: Thurs 06 Oct 15 UTC

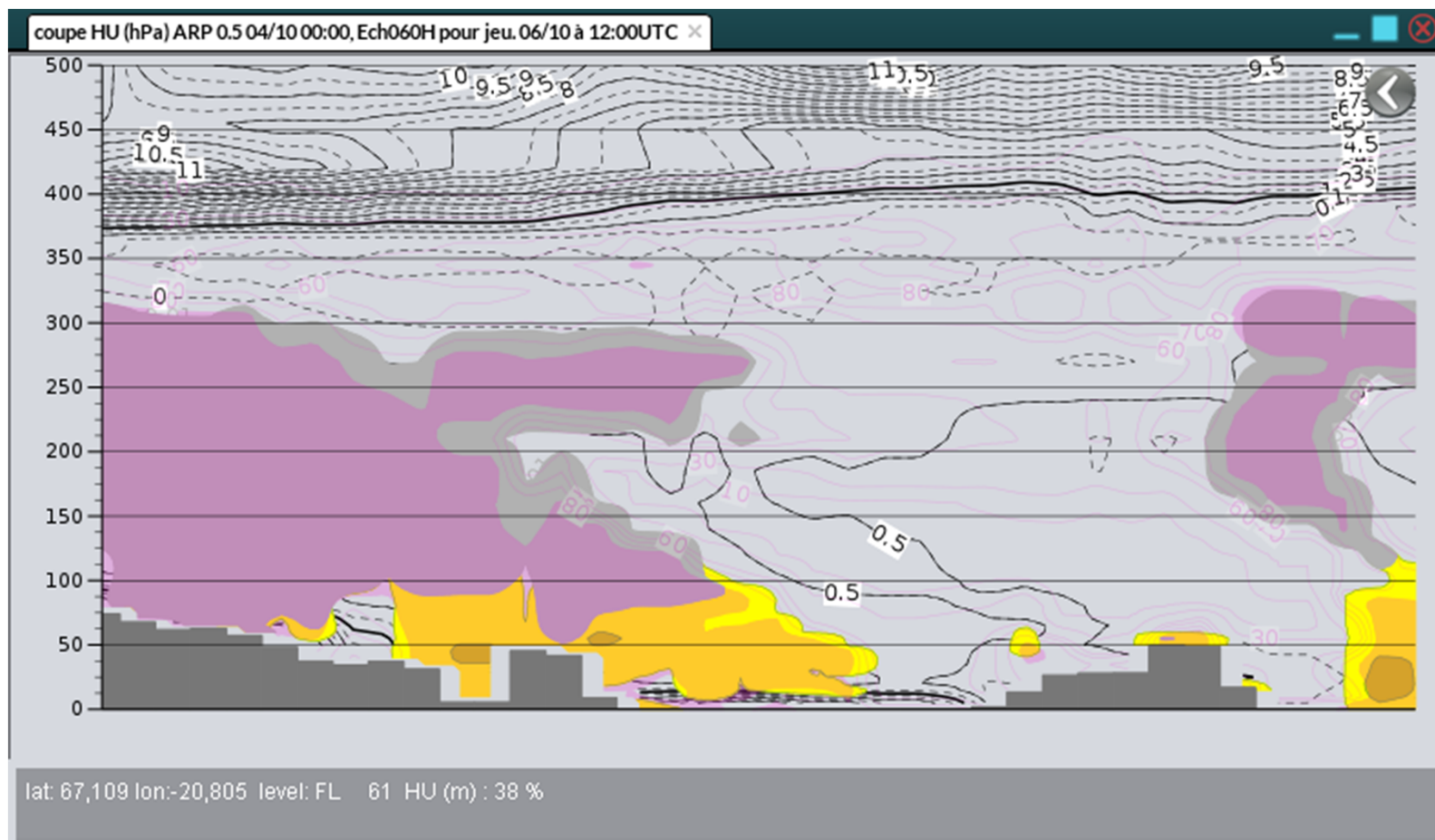
Vertical cross section along
A-train overpass around

13:35



Flight plan for SAFIRE Falcon on Thurs 6 ? : forecast from 04 Oct 00UTC Valid: Thurs 06 Oct 12 UTC

Vertical cross section along A-train overpass



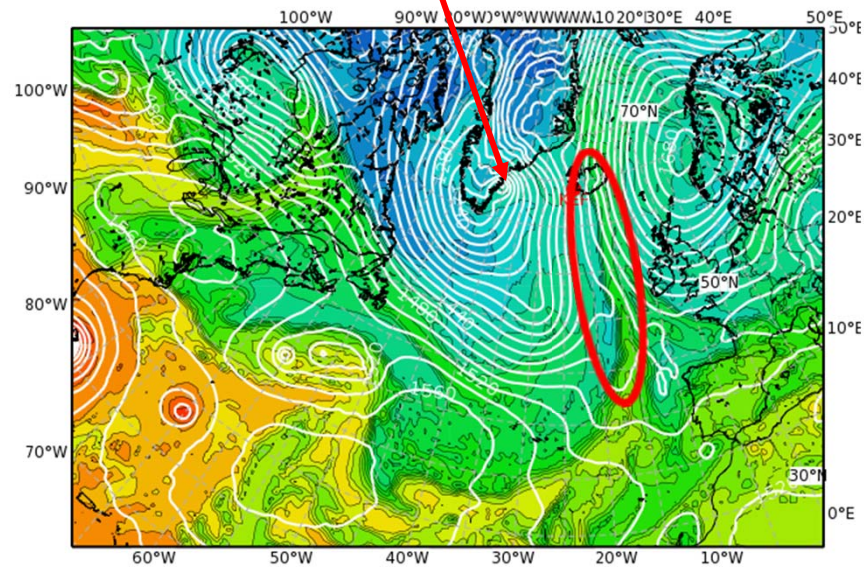
Thursday, 6 Oct plan HALO

Forecast for Thu 06 Oct 2016 12 UTC

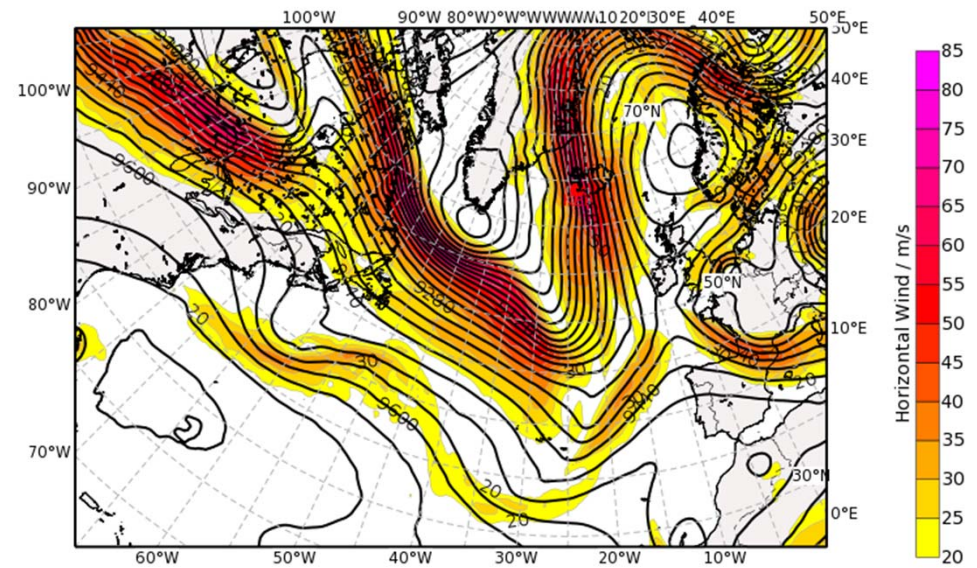
THE850, Z300 BT04/00Z

Mature DRW
cyclone

Equivalent Potential Temperature (degC) & Streamlines at 850 hPa
Valid: Thu, 06 Oct 2016, 12 UTC (step 060 h from Tue, 04 Oct 2016, 00 UTC)

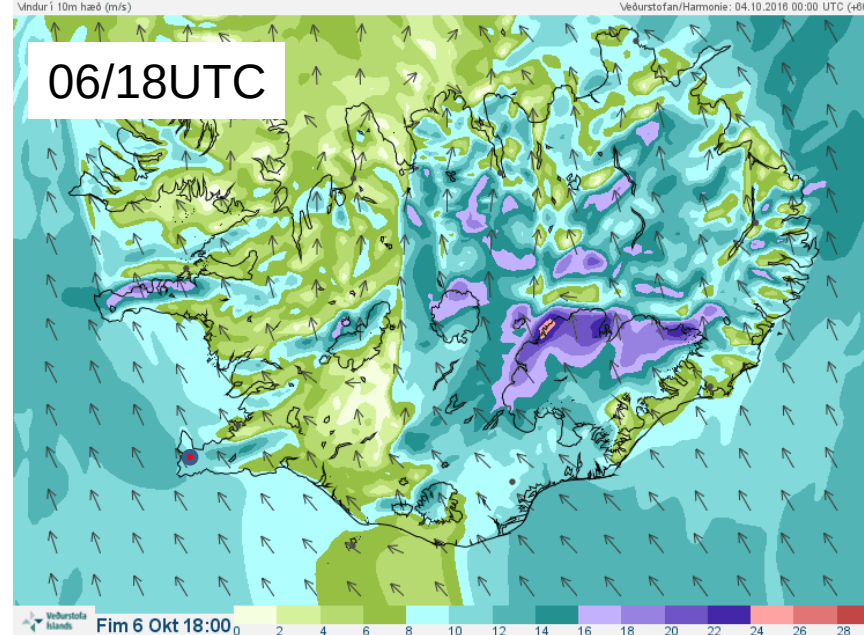
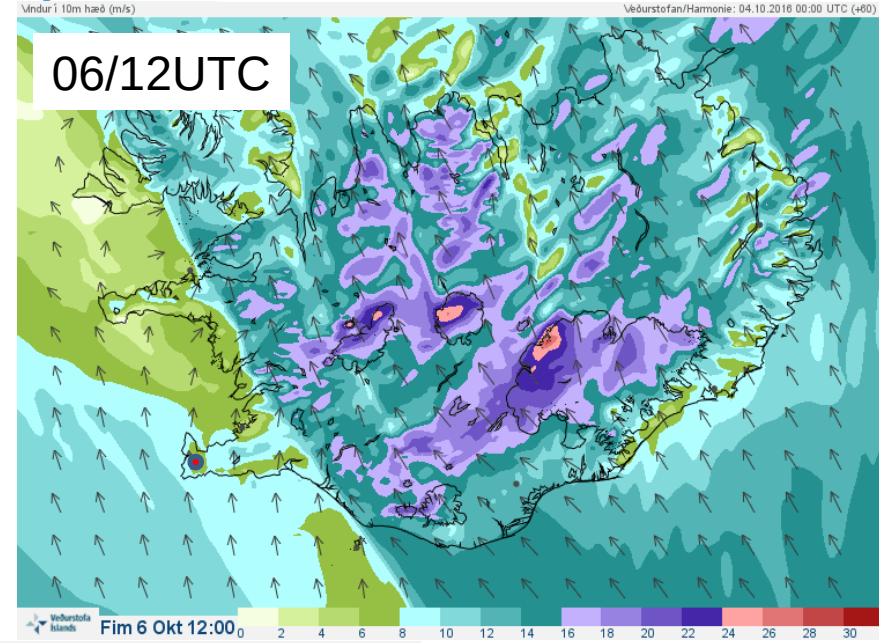
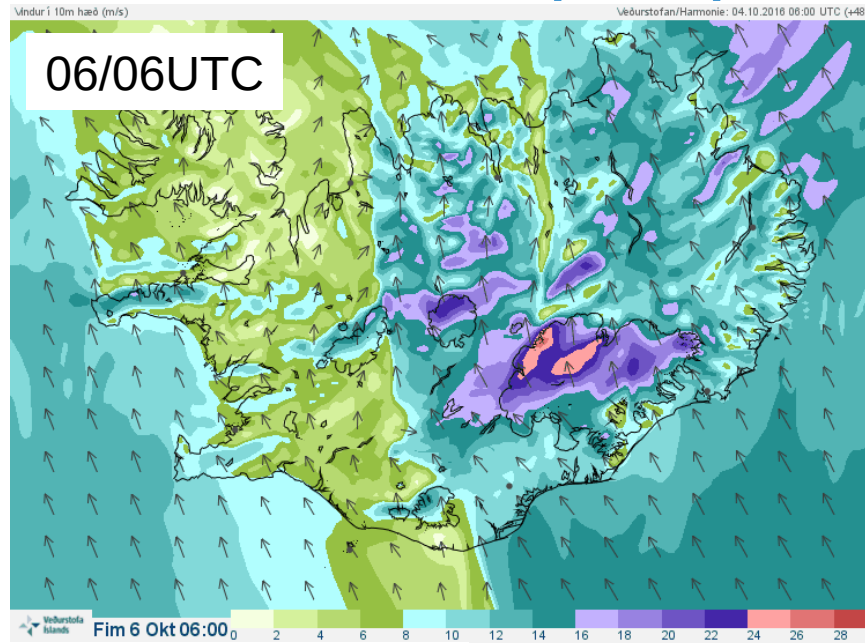


Geopotential Height (m) & Horizontal Wind (m/s) at 300 hPa
Valid: Thu, 06 Oct 2016, 12 UTC (step 060 h from Tue, 04 Oct 2016, 00 UTC)

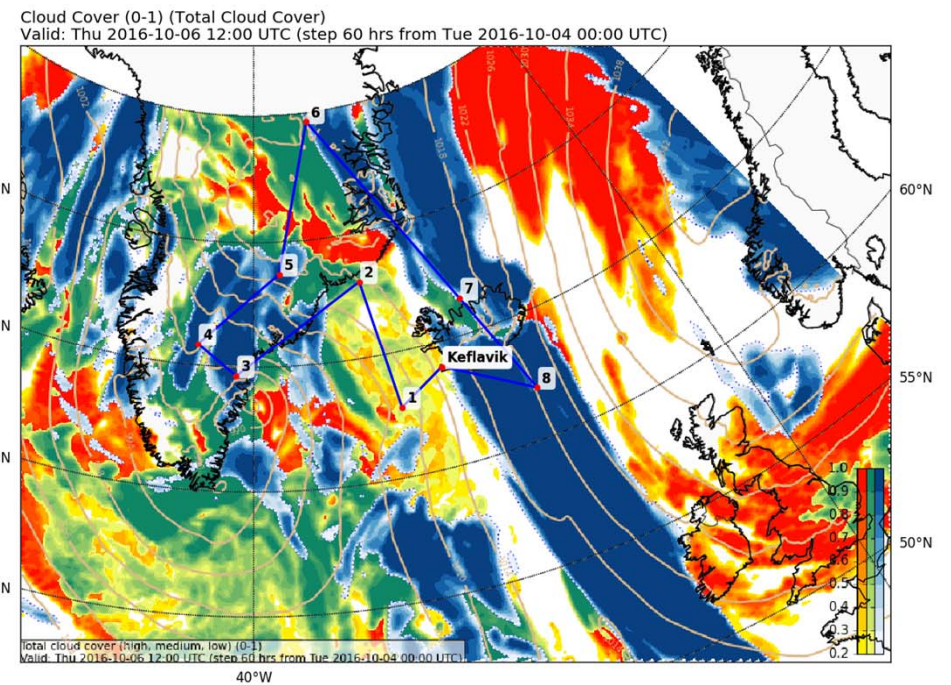
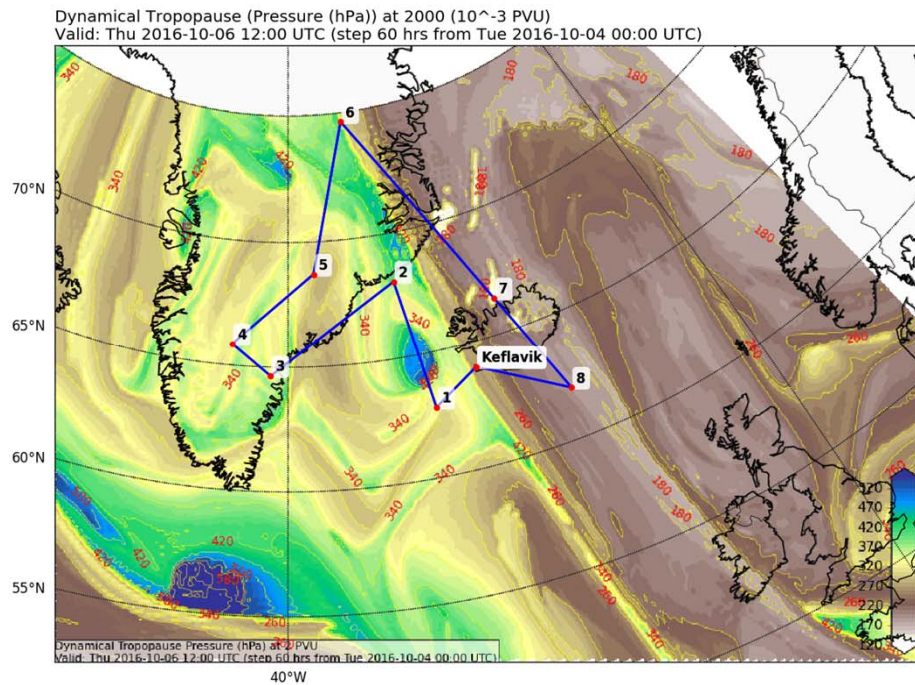


10m winds HARMONIE (2.5km) Thursday

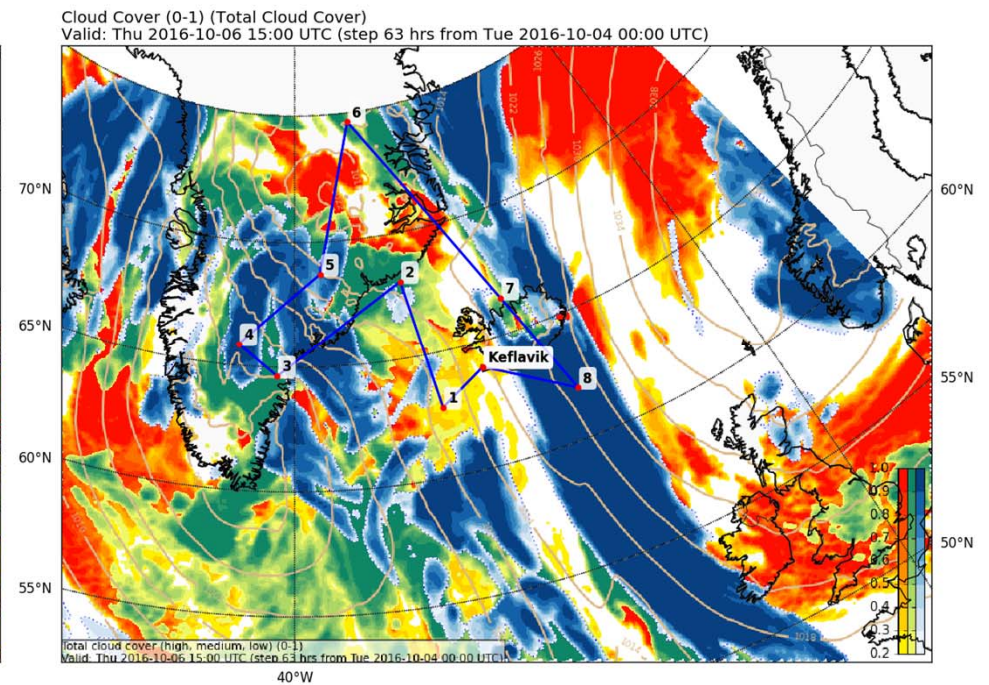
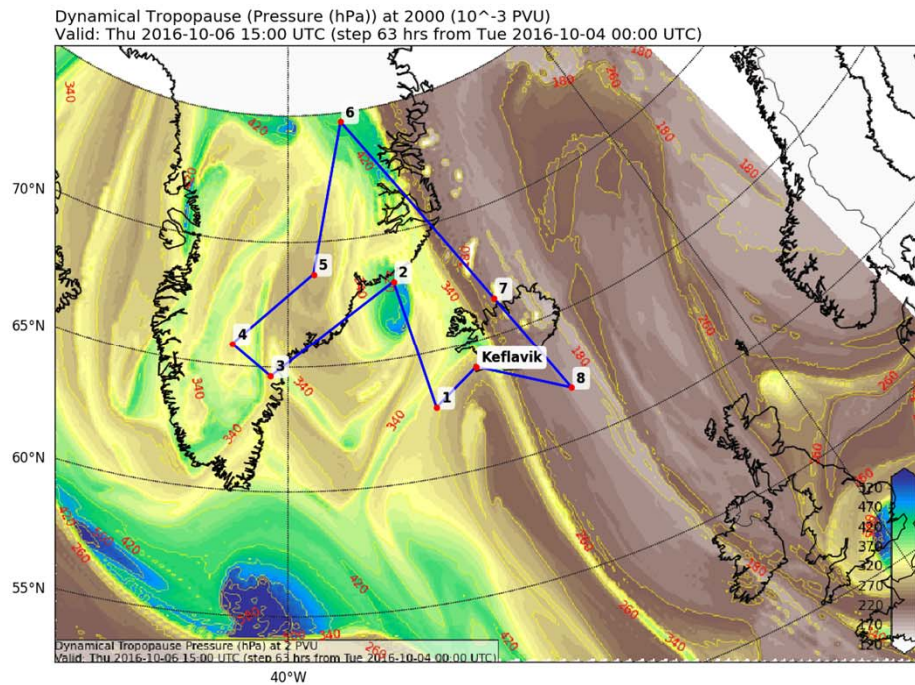
HARMONIE vedur.is BT 04/06Z



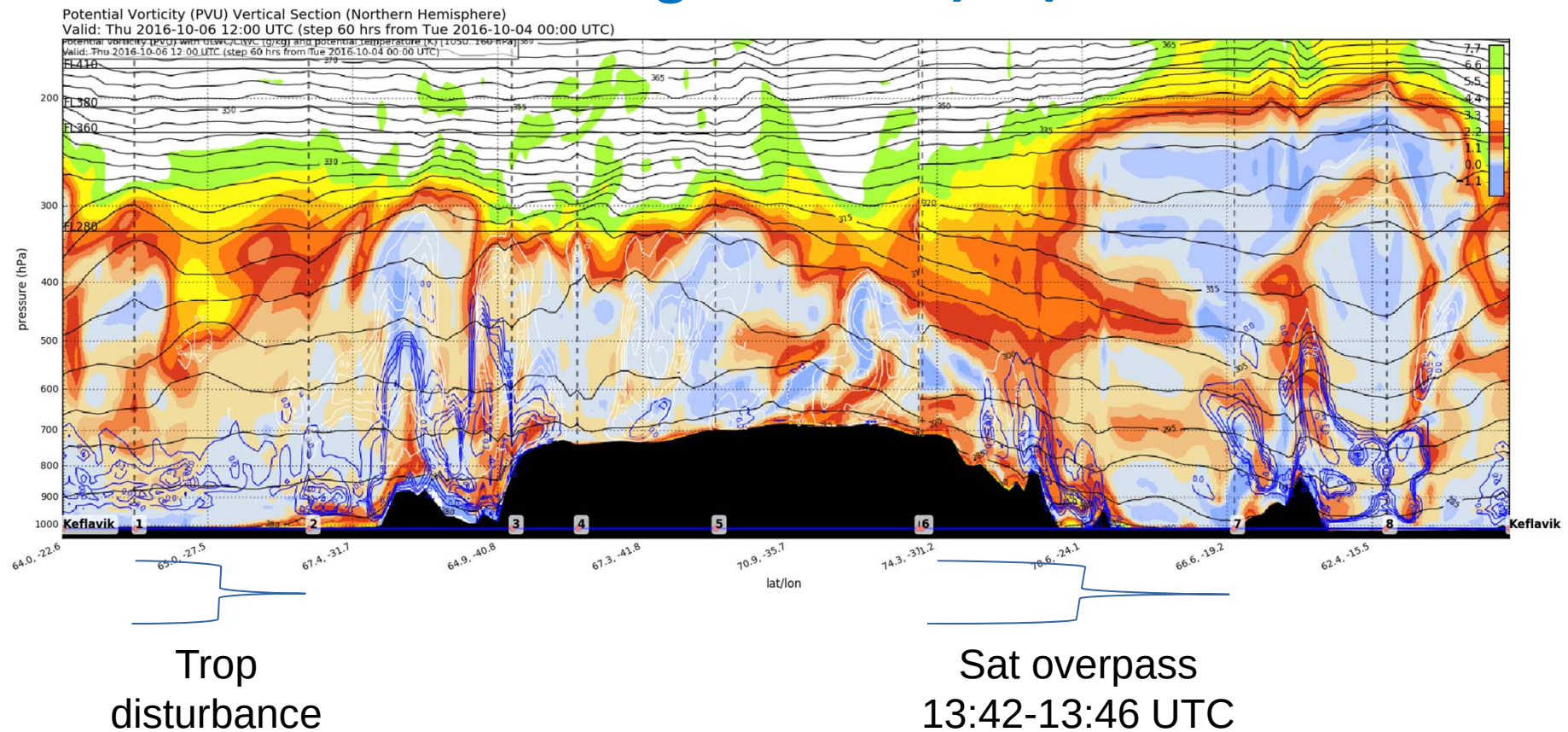
HALO flighttrack 06/10/2016, 12 UTC



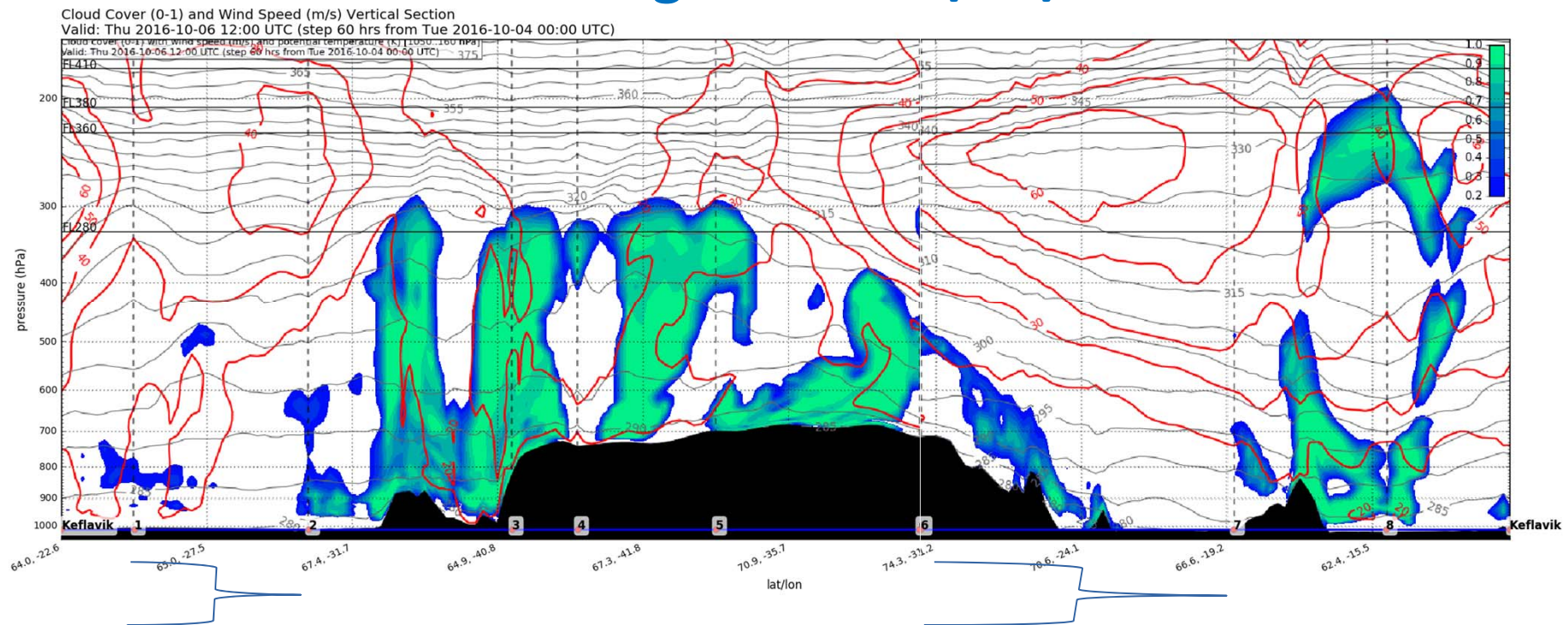
HALO flighttrack 06/10/2016, 15 UTC



HALO flighttrack 06/10/2016



HALO flighttrack 06/10/2016



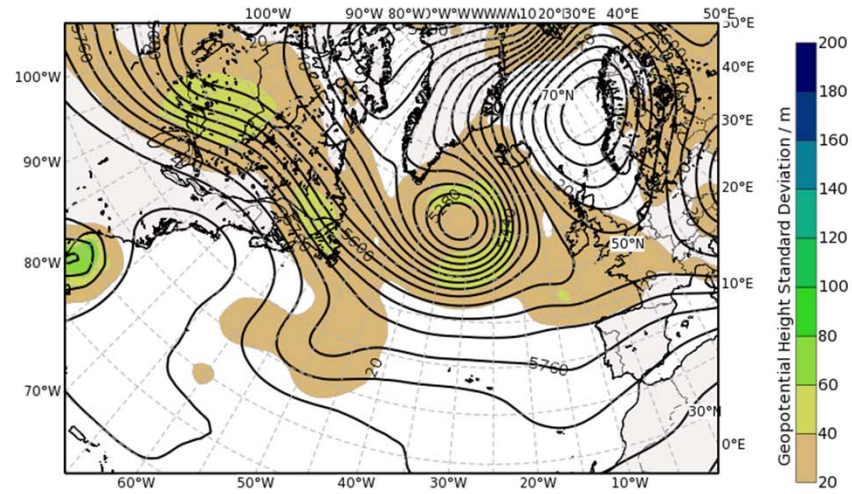
Trop
disturbance

Sat overpass
13:42-13:46 UTC

Outlook

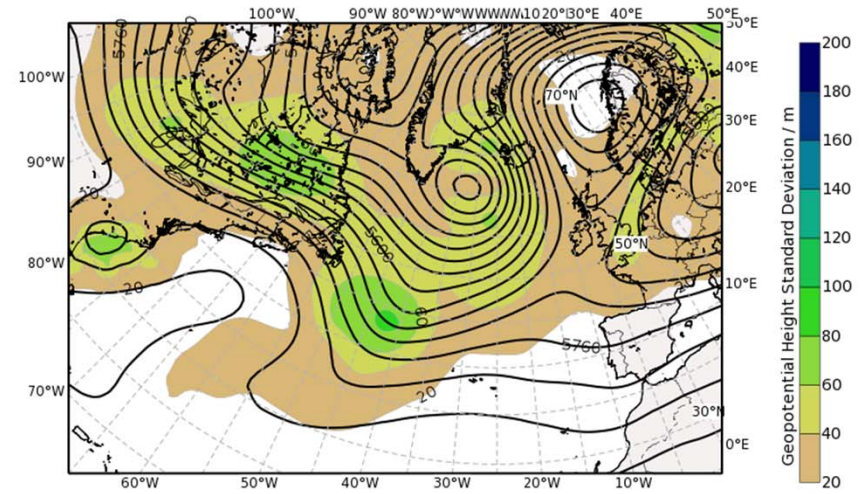
ECMWF ENS MEAN & STDEV @ Z500

Valid: Fri, 07 Oct 2016, 12 UTC (step 084 h from Tue, 04 Oct 2016, 00 UTC)



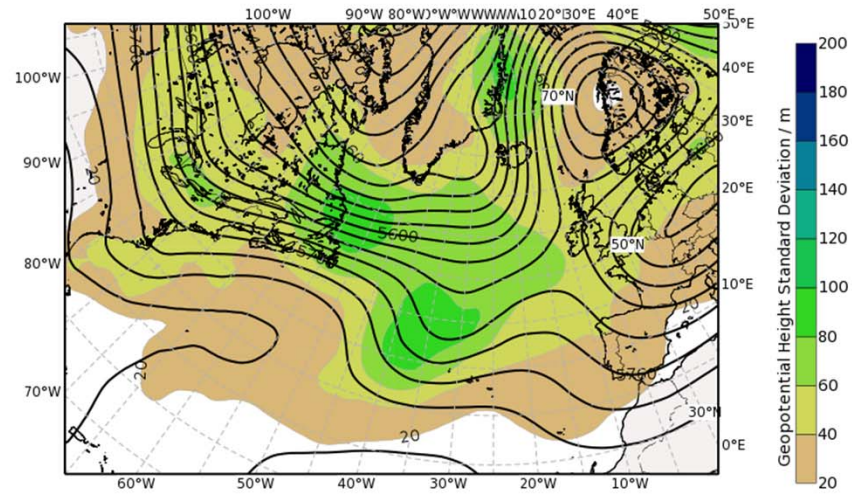
ECMWF ENS MEAN & STDEV @ Z500

Valid: Sat, 08 Oct 2016, 12 UTC (step 108 h from Tue, 04 Oct 2016, 00 UTC)



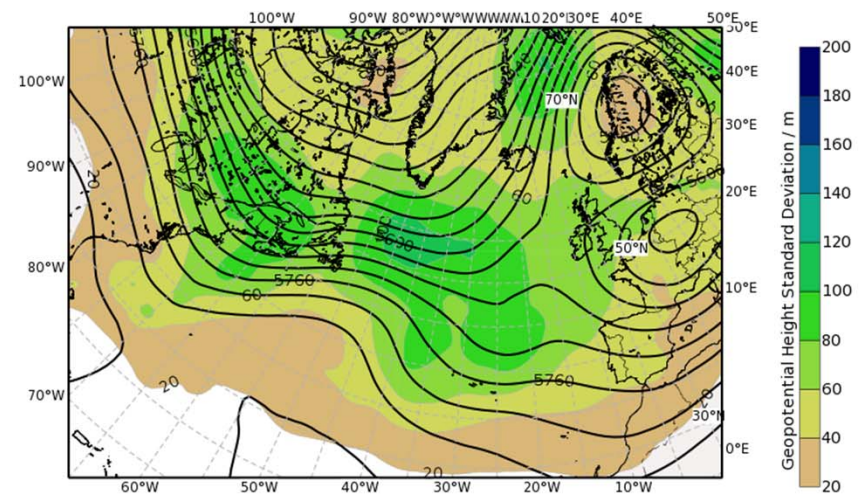
ECMWF ENS MEAN & STDEV @ Z500

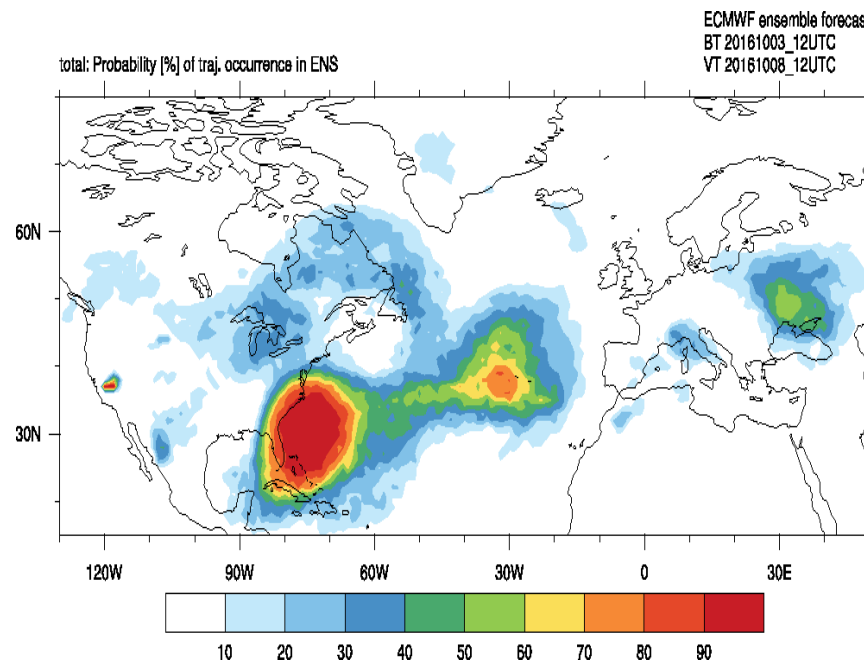
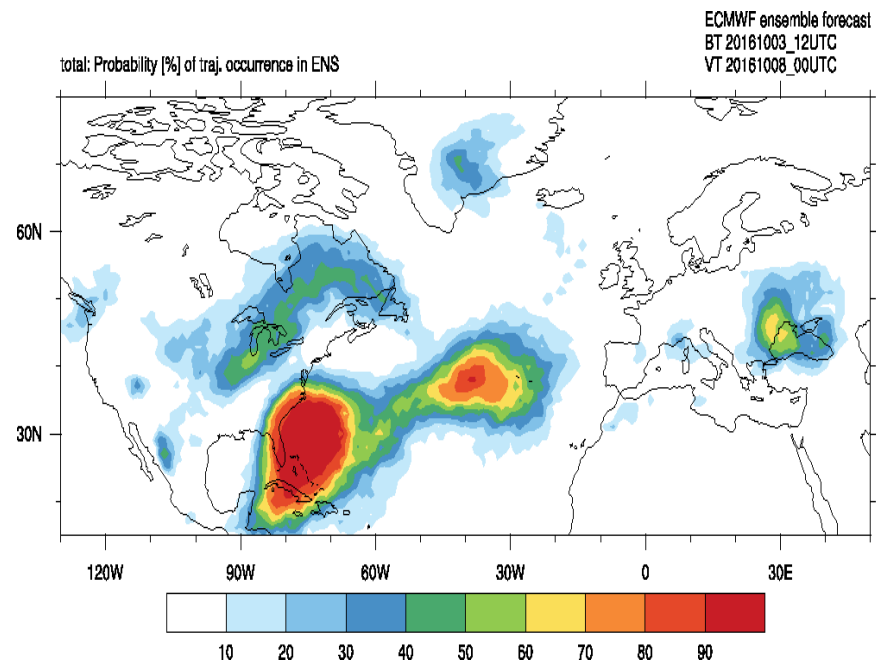
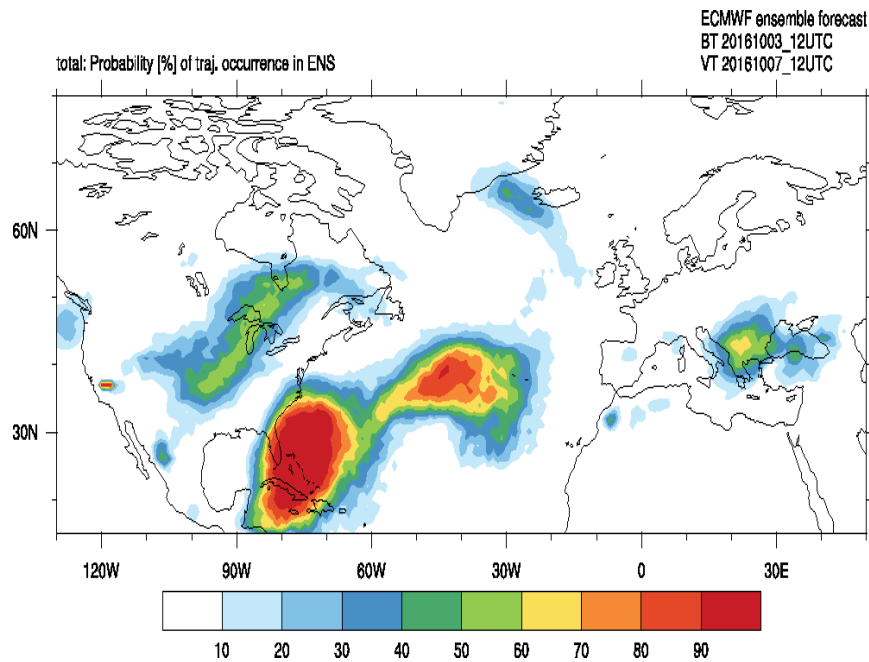
Valid: Sun, 09 Oct 2016, 12 UTC (step 132 h from Tue, 04 Oct 2016, 00 UTC)



ECMWF ENS MEAN & STDEV @ Z500

Valid: Mon, 10 Oct 2016, 12 UTC (step 156 h from Tue, 04 Oct 2016, 00 UTC)



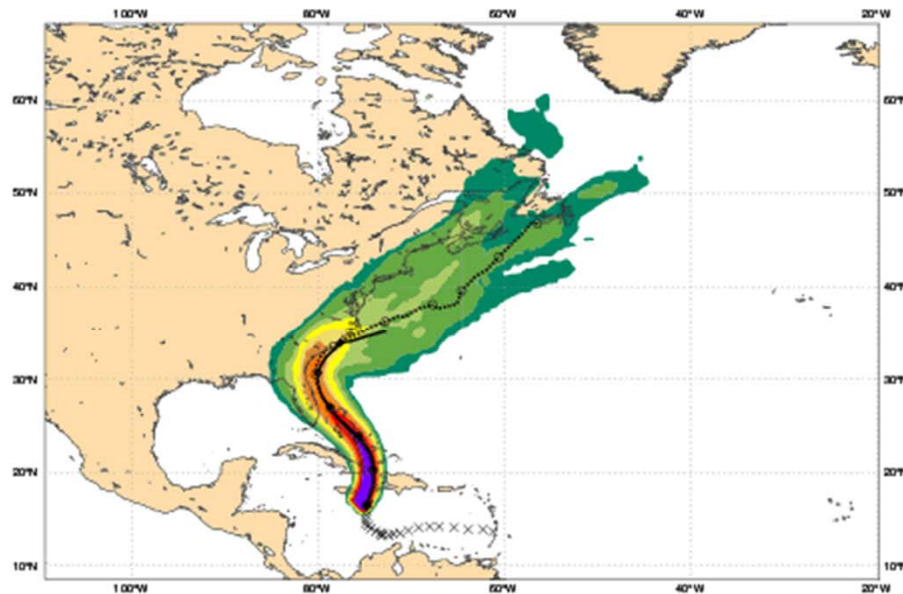


Situation Hurricane Matthew

Date 20161004 00 UTC @ECMWF

Probability that **MATTHEW** will pass within 120 km radius during the next 240 hours
tracks: **solid**=HRES; **dot**=Ens Mean [reported minimum central pressure (hPa) **934**]

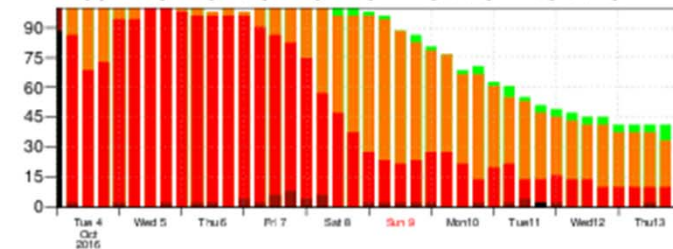
5-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80 80-90 >90%



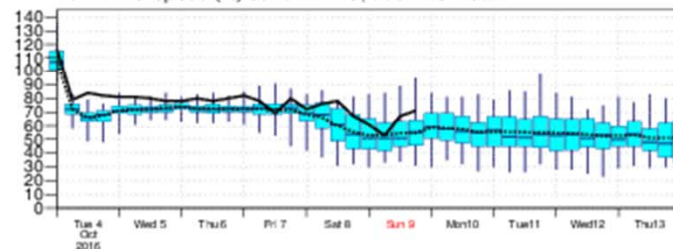
List of ensemble members forecast Tropical Cyclone
Intensity category in colours: **TD**[up to 33] **TS**[34-63] **HR1**[64-82] **HR2**[83-95] **HR3**[> 95 kt]

+024 h:	he	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:	he	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:	he	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:	he	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:	he	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:	ed	01	04	05	06	07	10	11	12	13	15	16	17	18	19	21	23	25	26	27	28	29	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50										
+168 h:	ed	01	03	04	05	06	07	10	11	13	15	17	18	19	21	23	25	26	27	28	29	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50											
+192 h:	ed	01	04	05	06	10	11	13	15	17	19	21	23	25	26	27	28	29	32	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50															
+216 h:	ed	01	04	05	06	10	11	13	15	17	23	25	26	27	28	29	32	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50																	
+240 h:	ed	01	04	05	06	11	13	15	17	23	25	26	27	28	29	32	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50																		

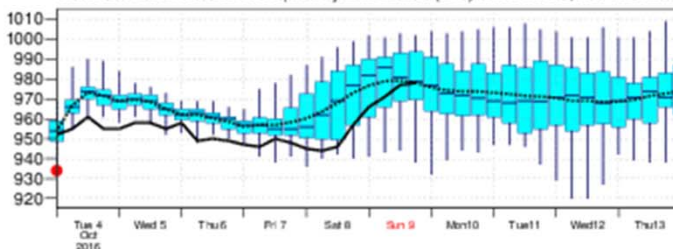
Probability (%) of Tropical Cyclone Intensity falling in each category
TD[up to 33] **TS**[34-63] **HR1**[64-82] **HR2**[83-95] **HR3**[> 95 kt]



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



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



SHOUT Global Hawk Mission to Observe the Environment Around Hurricane Matthew (CAT 4)

1900 UTC 4 Oct – 2000 UTC 5 Oct.



Summary plans

- **Tuesday 4 Oct**
 - **FALCON:** 2 flights jet transect / WCB outflow
 - **HALO** frontal wave cyclone / DRW
- **Wednesday**
 - **HALO:** WCB ascent, along jet & crossing for CAT observations, aircraft coordination with French Falcon, satellite underpass
- **Thursday:**
 - **HALO:** WCB ascent, along jet & crossing for CAT observations, aircraft coordination with French Falcon, satellite underpass