

**A polar low named Vera: the use of
potential vorticity diagnostics to
assess its development.**

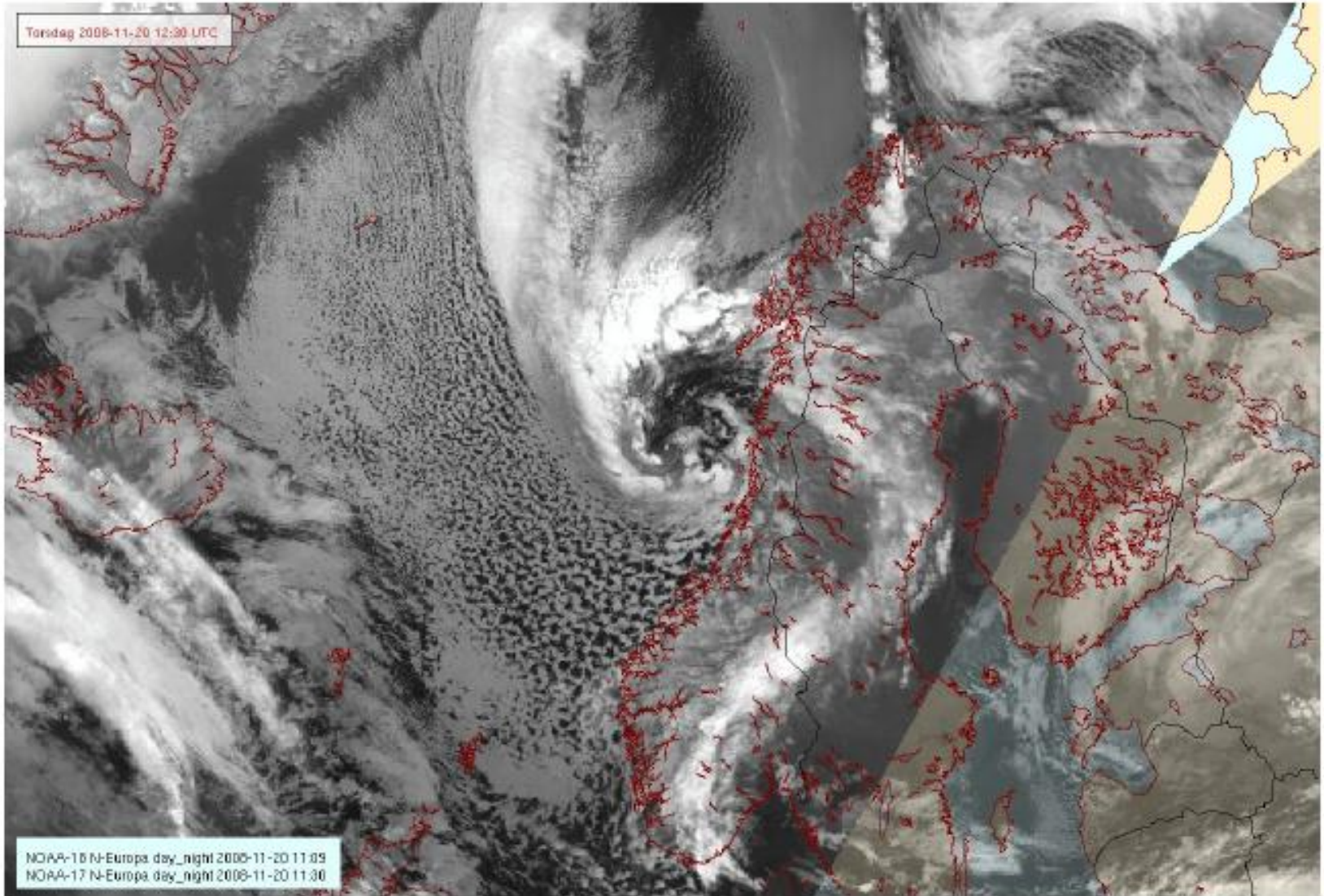
by

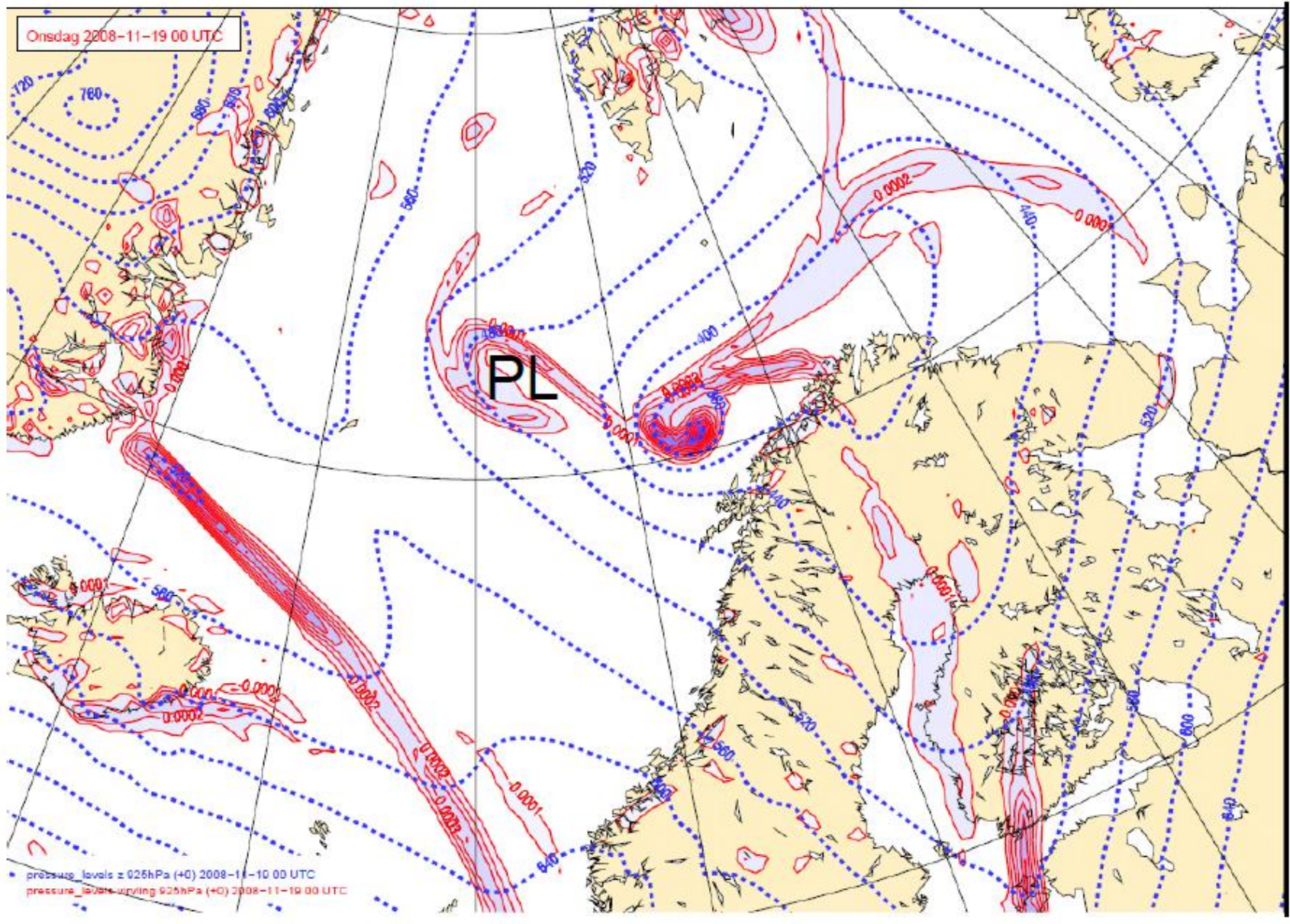
Thor Erik Nordeng

and

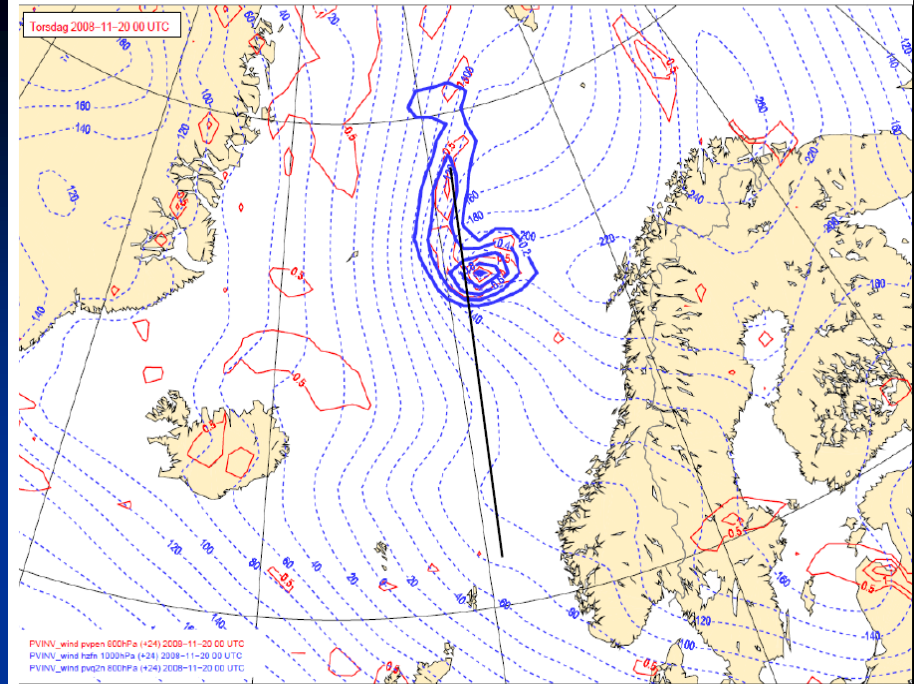
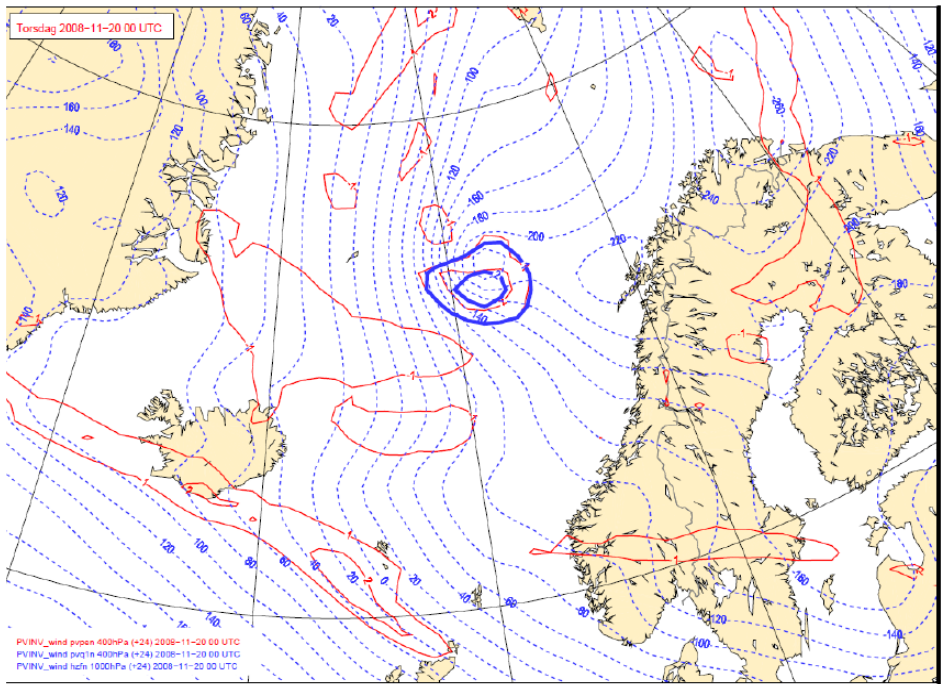
Bjorn Rosting

Q.J.R. Meteorol. Soc. 137: 1790-1803, October 2011 A



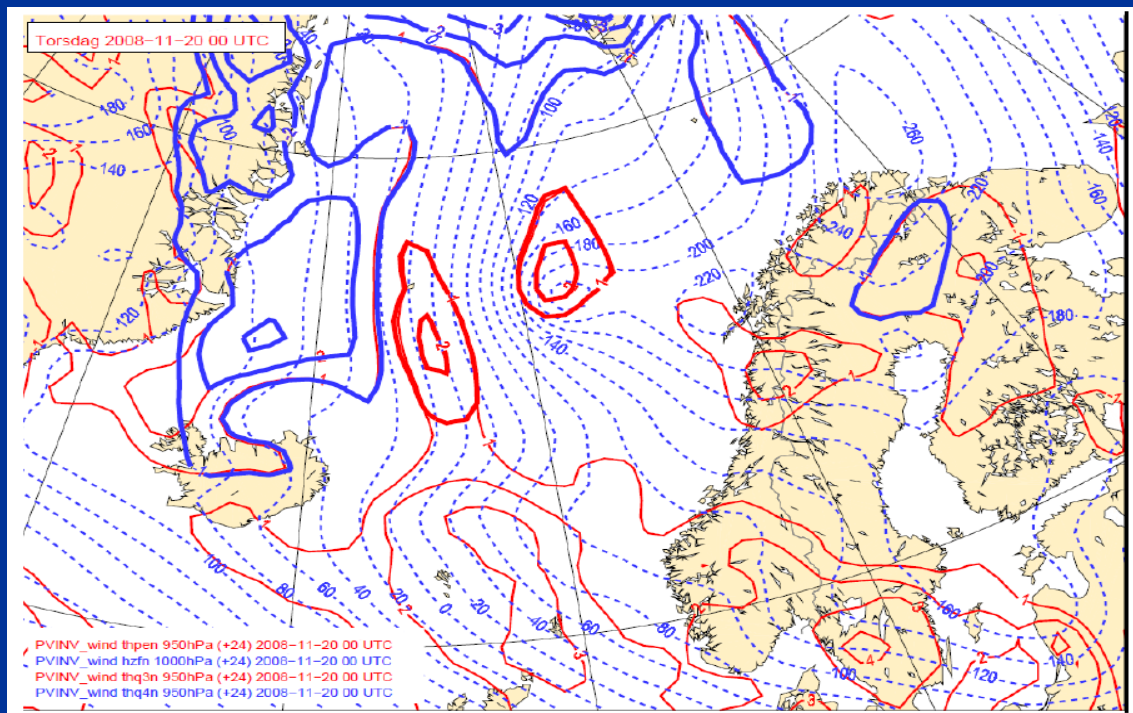


Relative vorticity at 925 hPa 00UTC 19.11.2008

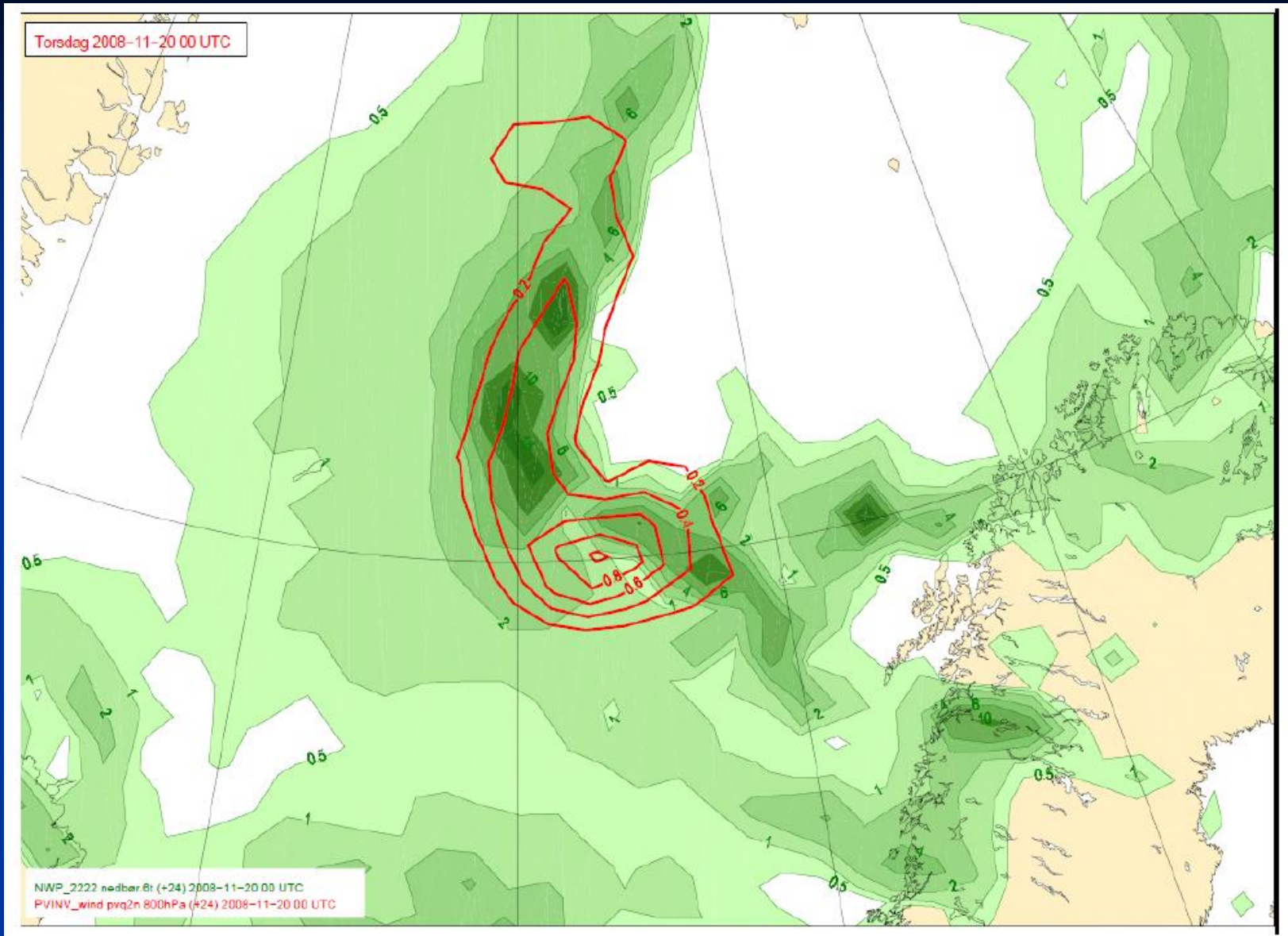


UPV1 400 hPa
 00UTC 20.11.2008
 contours every
 1PVU

TH1 and TH2
 950 hPa 00UTC
 20.11.2008,
 contours every
 deg.C

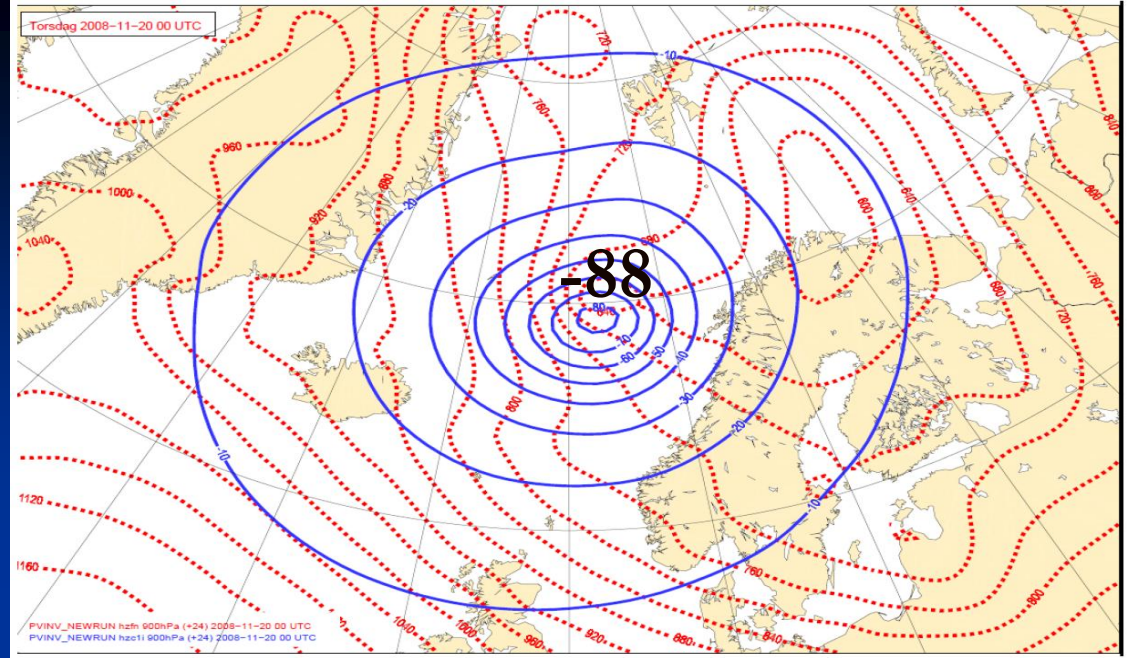


LPV1 800 hPa
 00UTC 20.11.
 2008, contours
 every 0.2 PVU

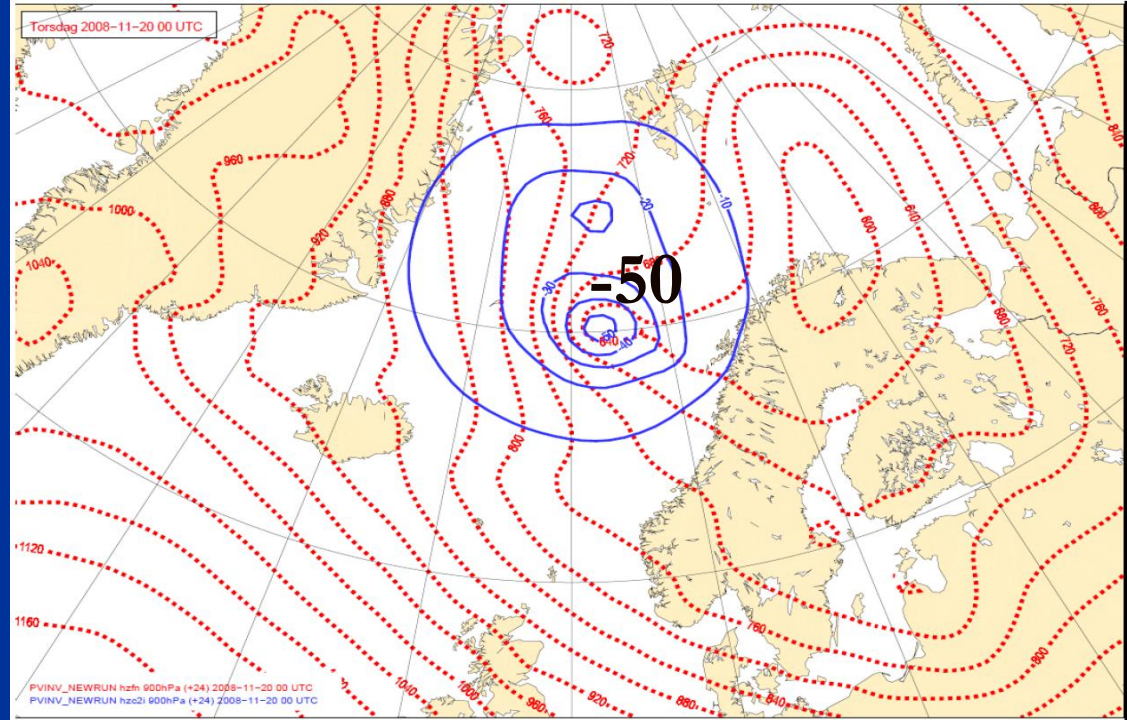


LPV at 800 hPa and 6 h prec. At 00UTC 20.11.2008

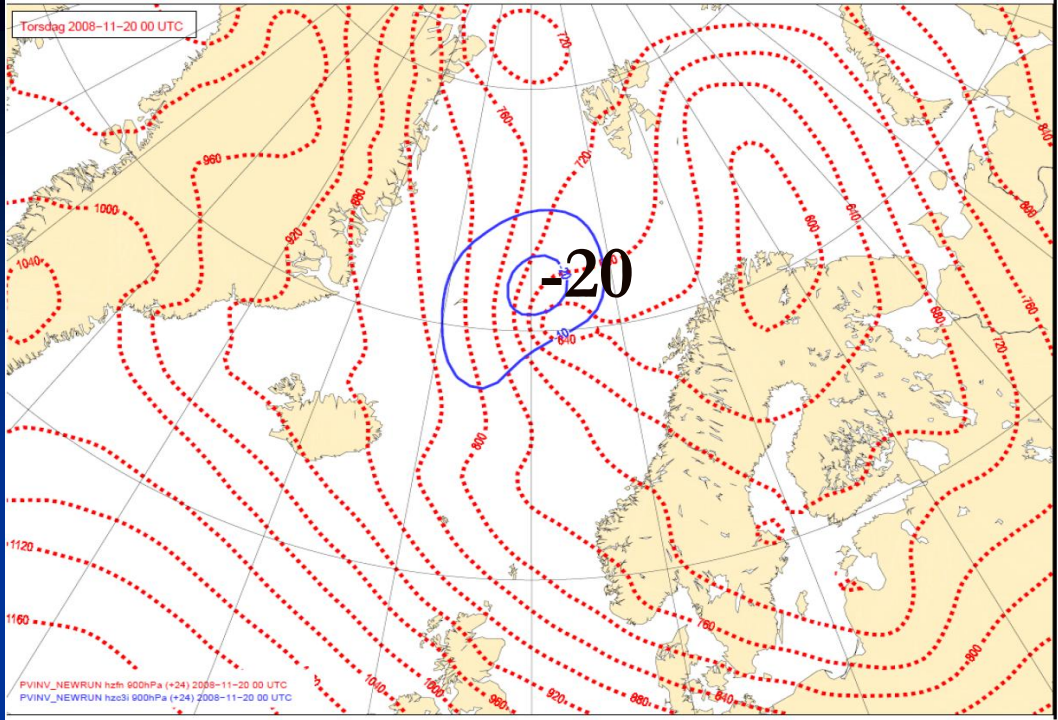
Contribution
from cyclonic
UPV anomaly
+24h, valid
00UTC 20.11.2008



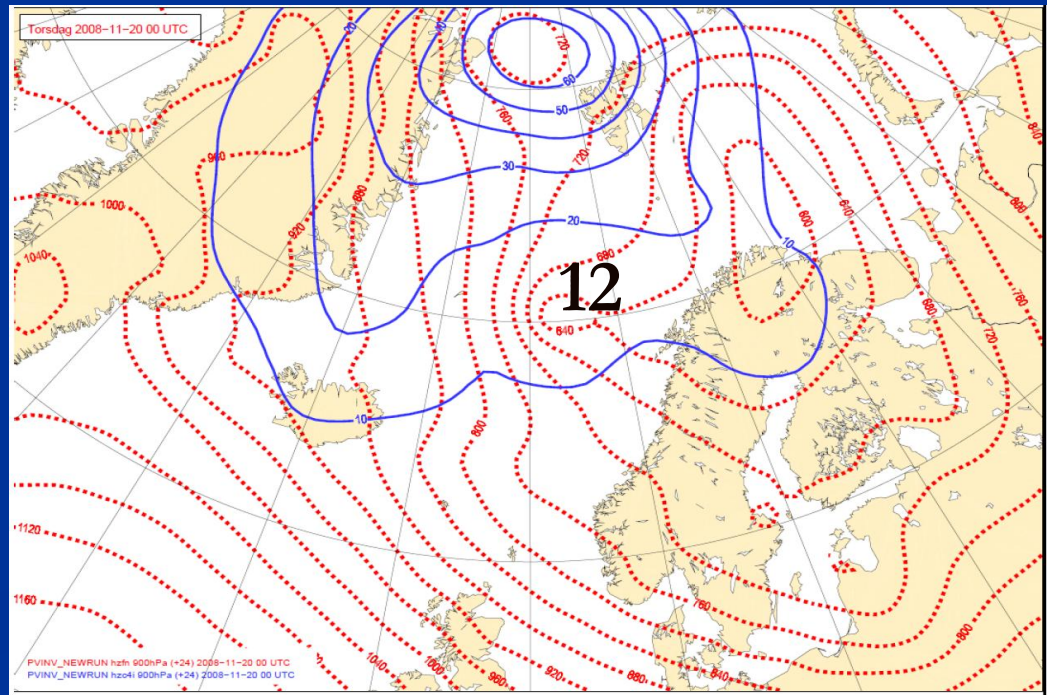
Contribution
from cyclonic
LPV anomaly
+24h, valid
00UTC
20.11.2008

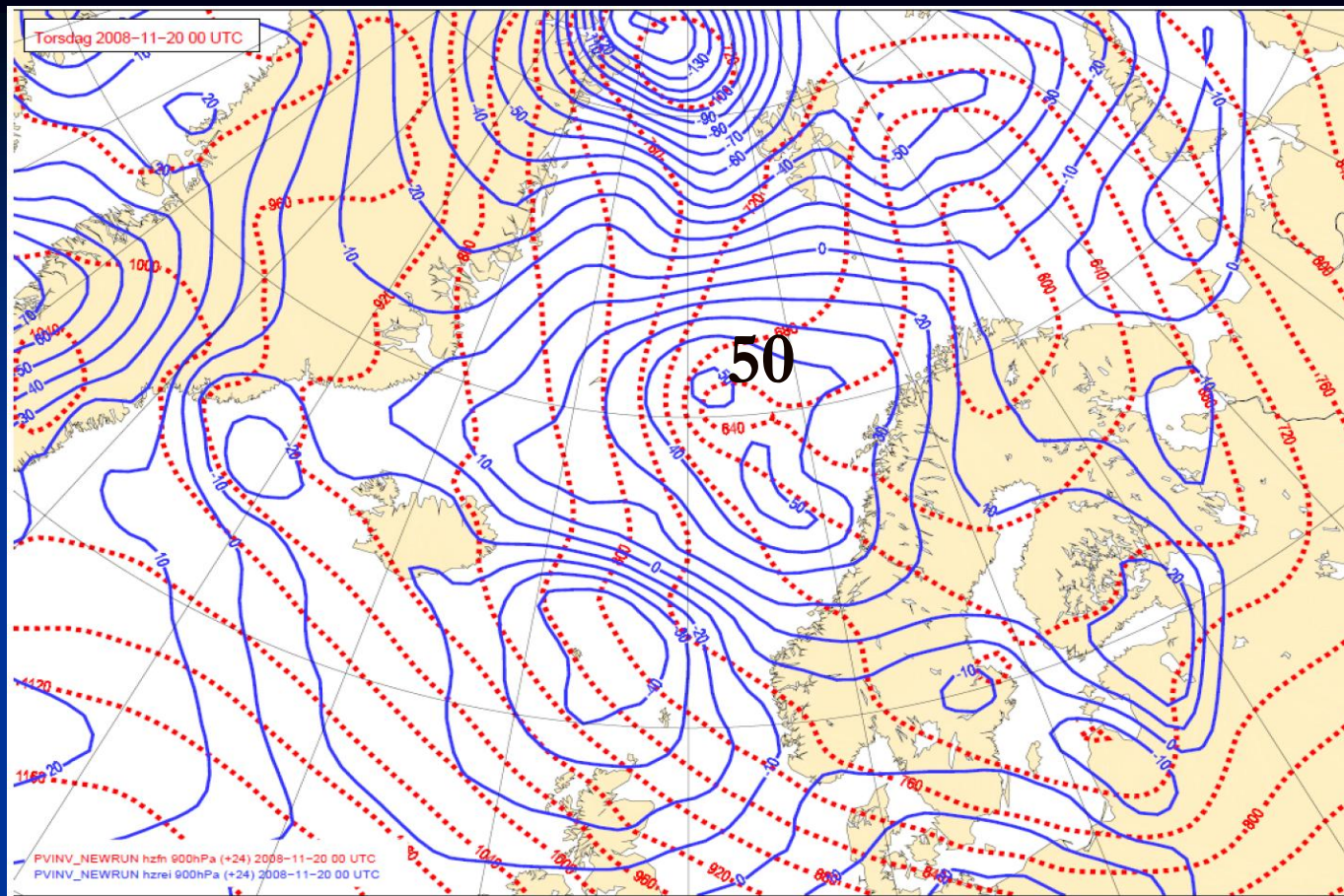


Contribution
from warm
anomaly
+24h, valid
00UTC
20.11.2008



Contribution
from cold
anomaly
+24h, valid
00UTC
20.11.2008



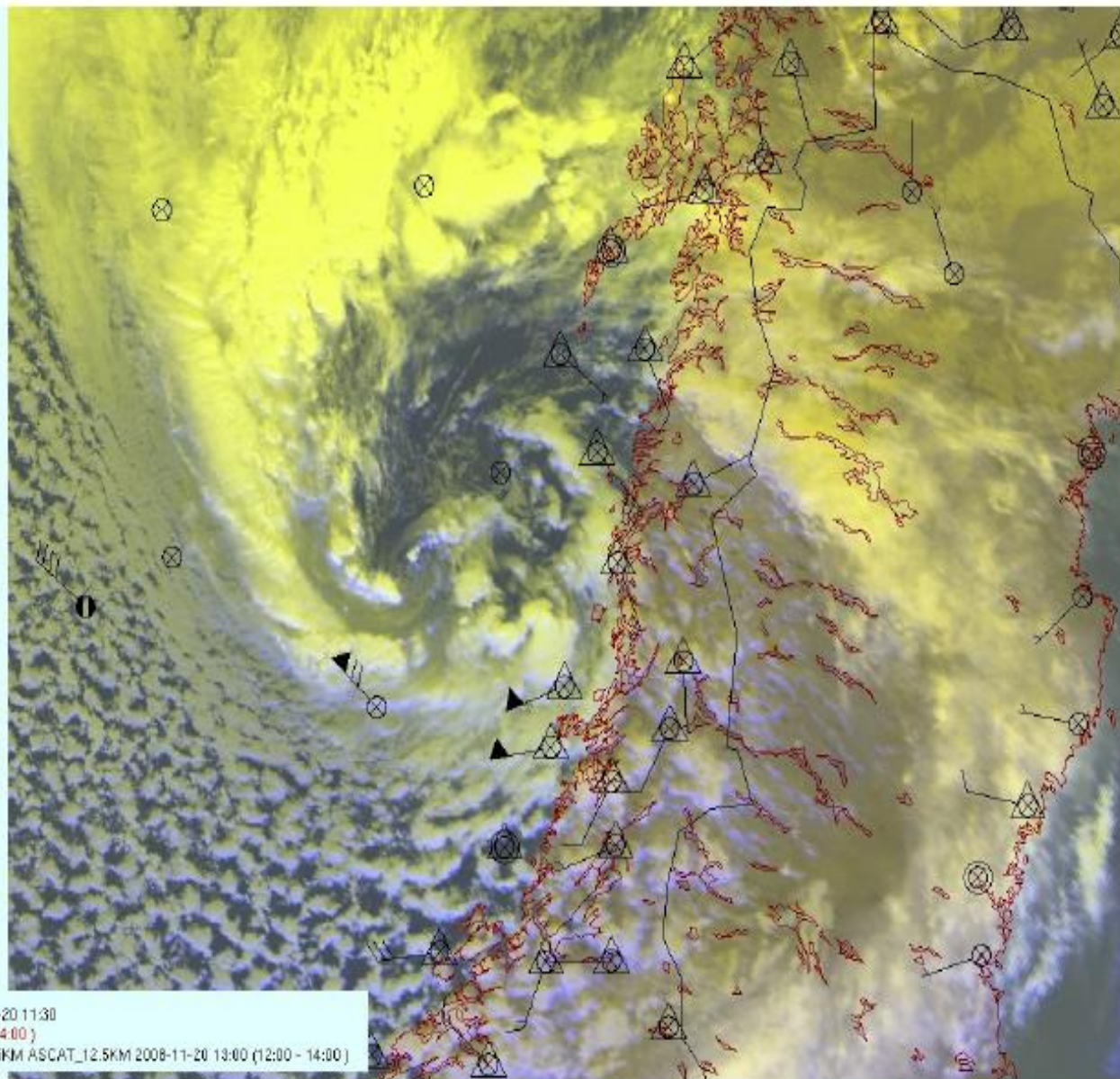


Contribution from residual PV anomaly
+24h, valid 00UTC 20.11.2008

Table 1. Contribution to 900 hPa geopotential height at polar low center

Time	00	06	12	18	24	30	36	42
UPV	-25	-27	-15	-45	-88	-111	-105	-57
LPV	-2	-2	-2	-31	-51	-64	-23	-47
TH1	-9	-9	-20	-37	-6	-6	-16	-13
TH2	64	63	36	11	12	17	17	22
RESIDUE	-63	-50	-32	75	48	48	11	19
TOTAL	-35	-24	-34	-27	-86	-116	-116	-76

Torsdag 2008-11-20 13 UTC



NOAA-17 M-Norge 4+2 2008-11-20 11:30
LYN 2008-11-20 13:00 (12:00 - 14:00)
SYNOP DRIBU METAR ASCAT25KM ASCAT_12.5KM 2008-11-20 13:00 (12:00 - 14:00)

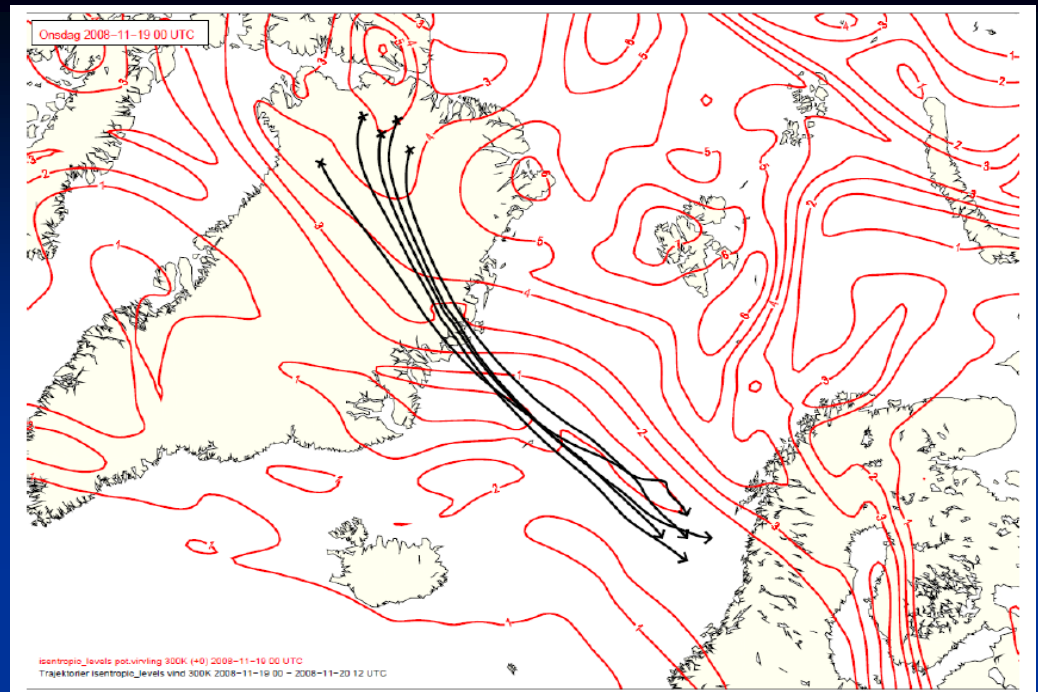
PV on 300K, 00UTC

19.11.2008

Backwards trajectories

Starting at +36h at

12UTC 20.11.2008



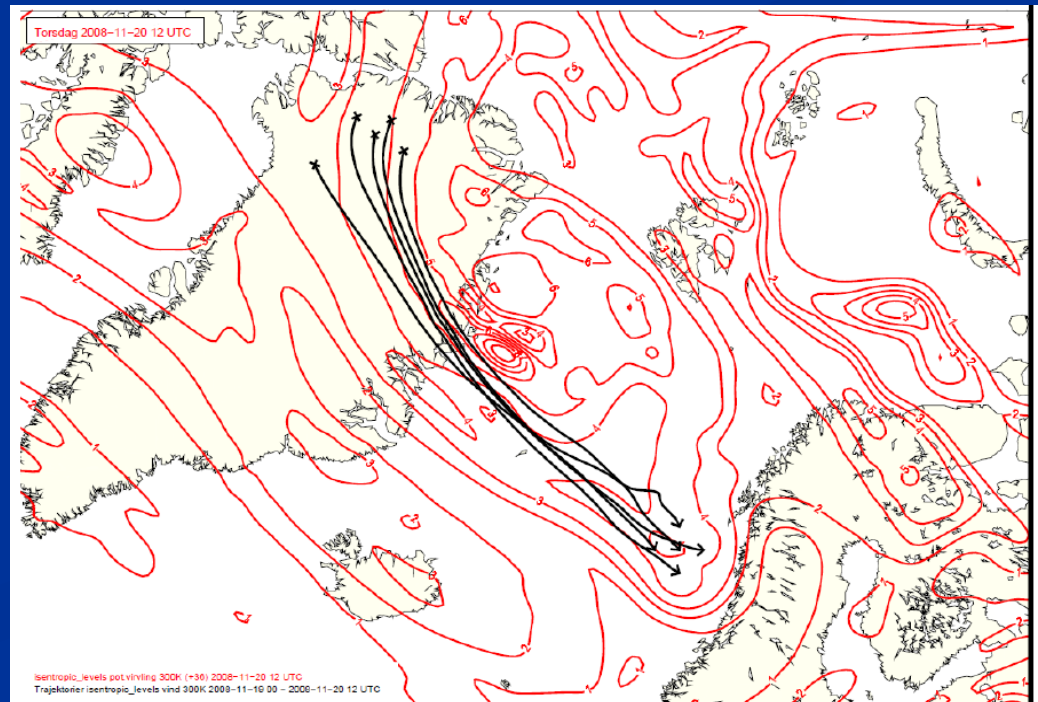
PV on 300K, 00UTC

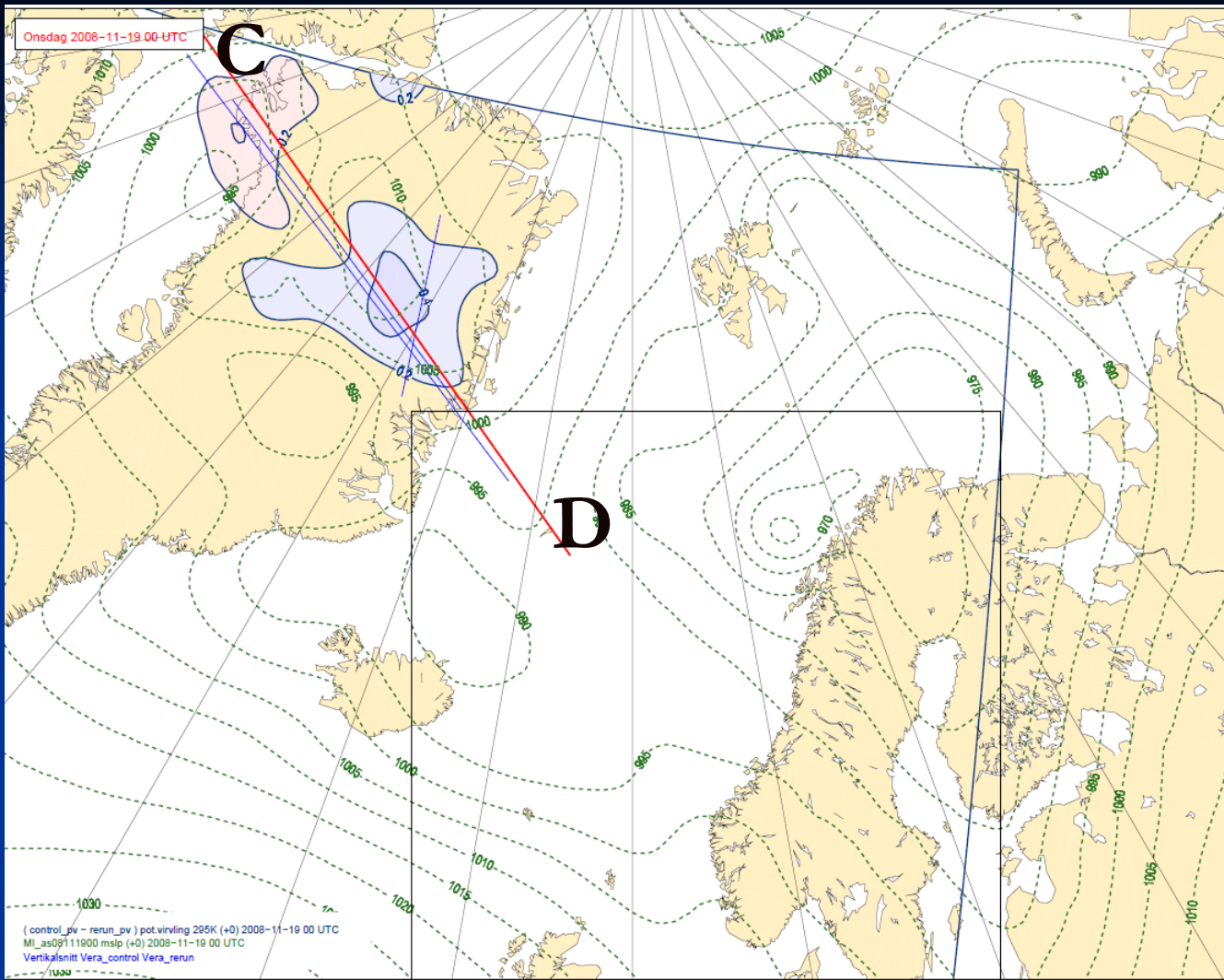
20.11.2008

Backwards trajectories

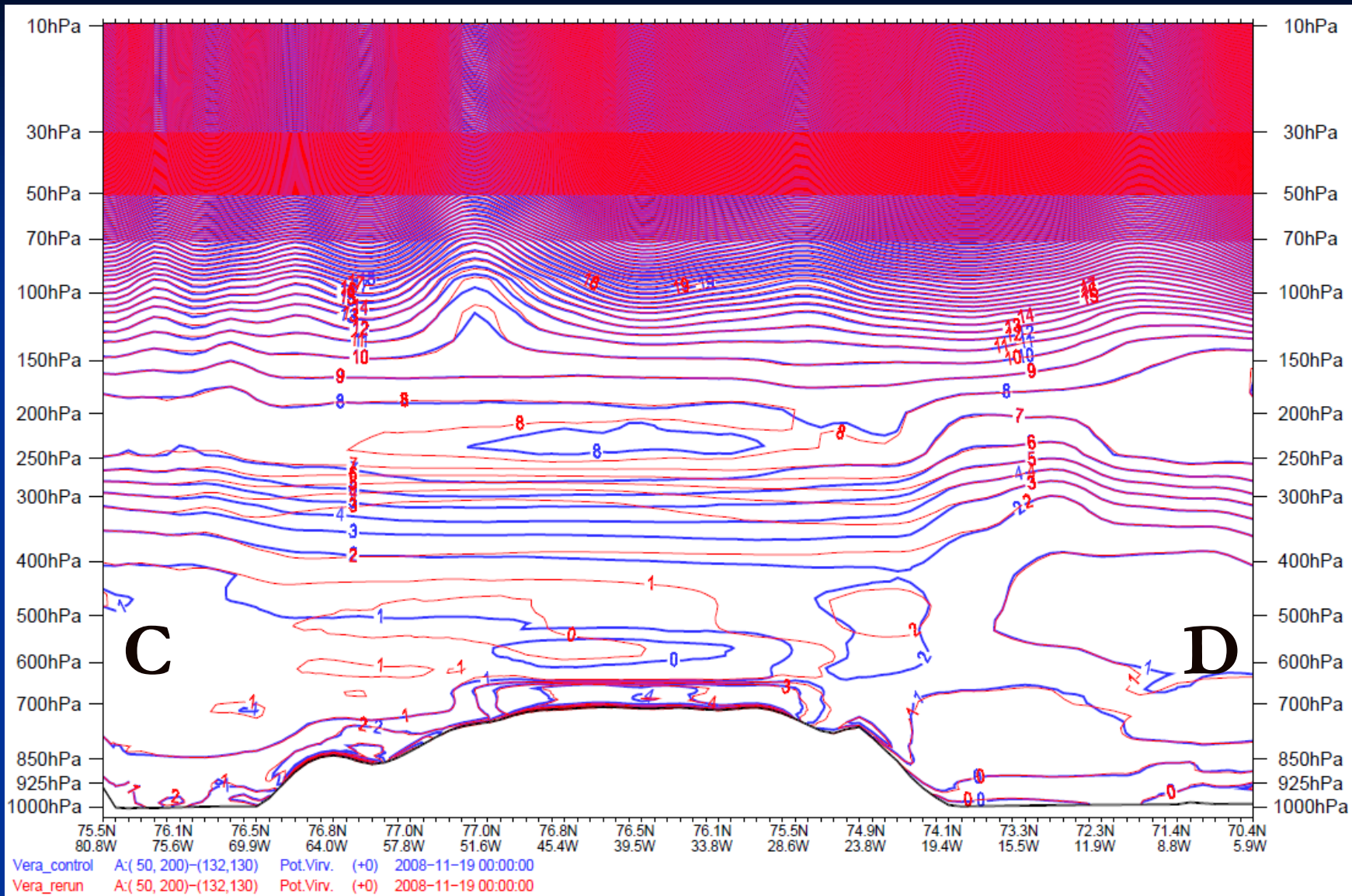
Starting at +36h at

12UTC 20.11.2008

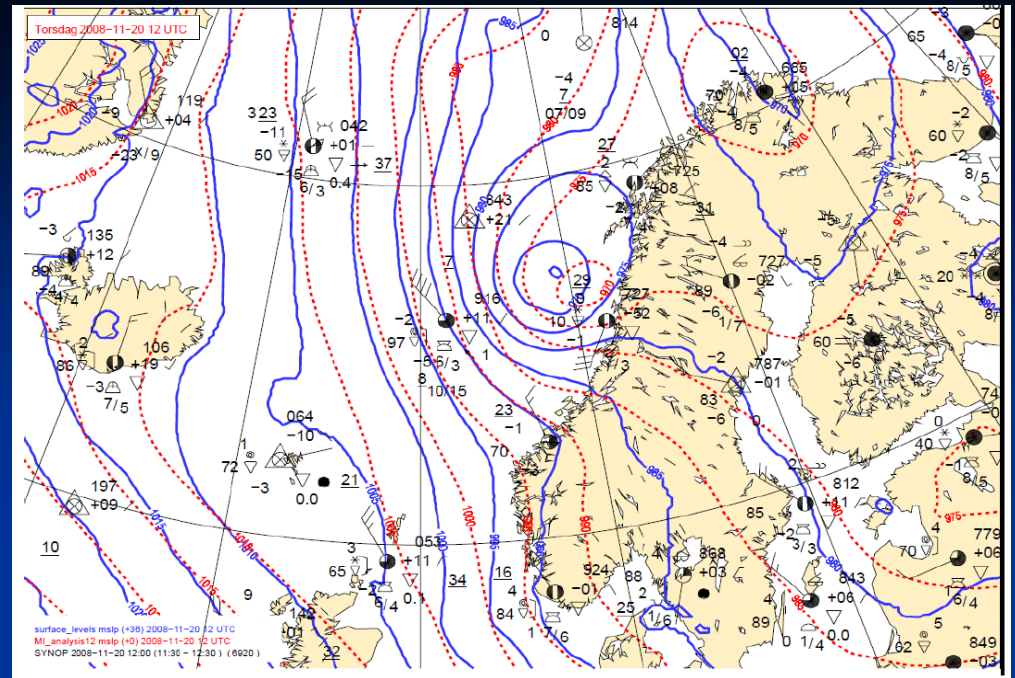




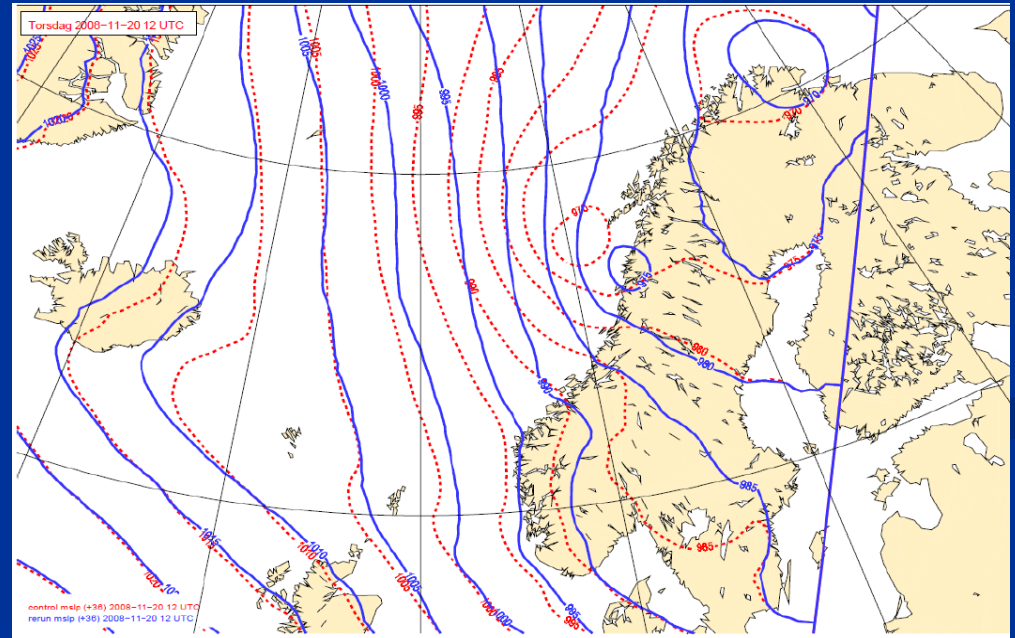
Change of upper level PV at 295K,
location of cross section C-D

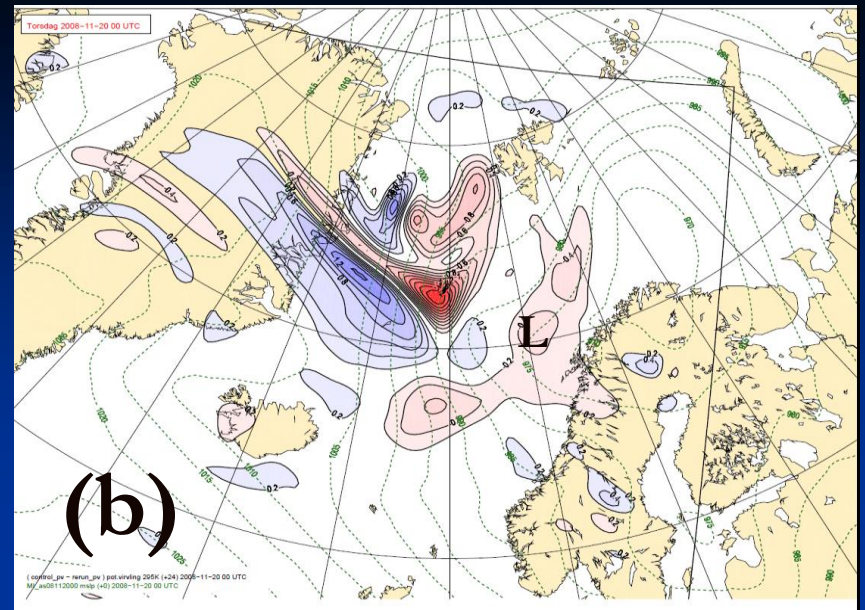
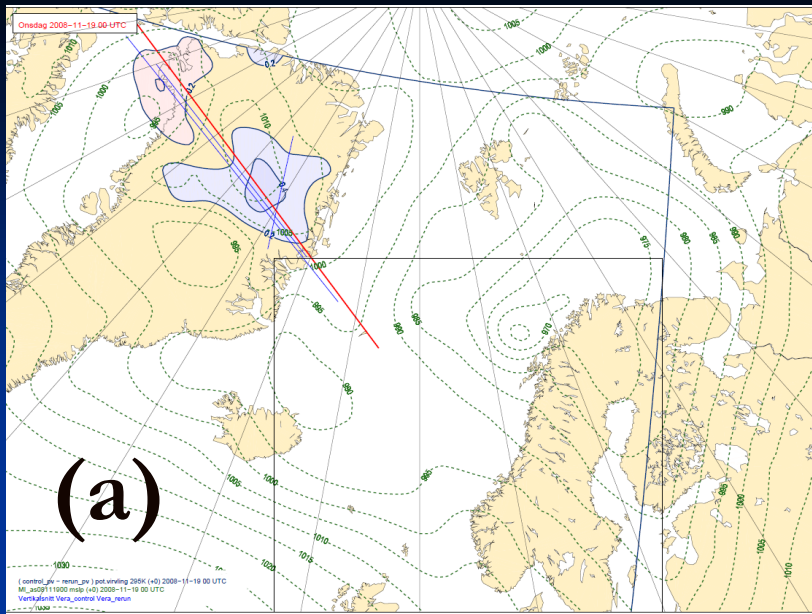


36 h simulation of mslp operational HIRLAM, valid 12 UTC 20.11. Synoptic analysis at the same time in dashed (red) contours.

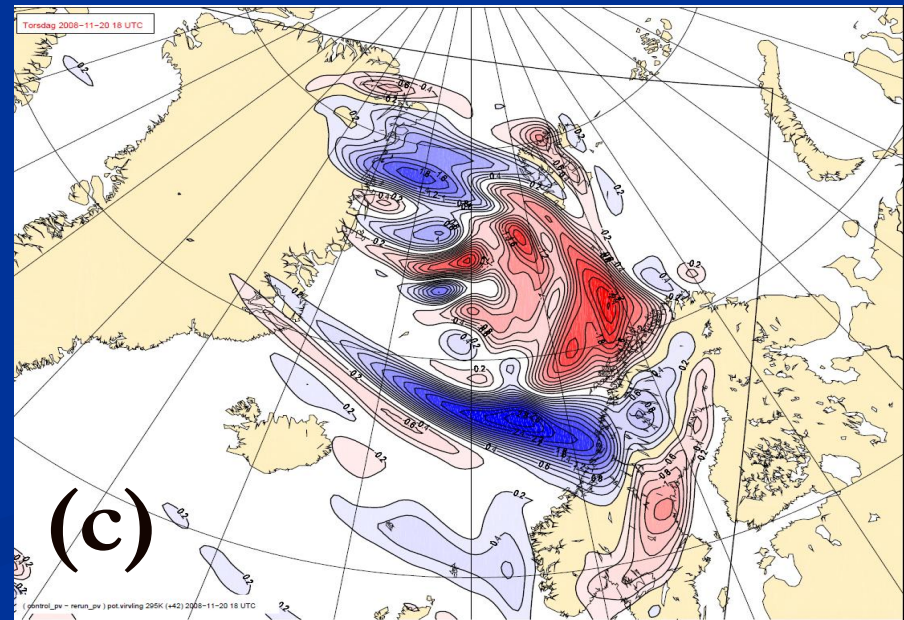


36 h control simulation of mslp in dashed (red) contours, valid 12UTC 20.11. 36 h rerun simulation based on initial modified PV in solid (blue) contours.





PV difference at 295K
 (~400 hPa over northern
 Greenland) between
 control and rerun. Initial
 (a), +24 h (b) and +42h
 (c)



Conclusions

- Piecewise potential vorticity inversion (PPVI) allows quantitative assessment of impact from selected PV anomalies on the polar low (PL).
- In the Vera case upper level PV over northern Greenland appeared to be a very important contribution to the development of the PL, shown by PPVI and sensitivity study.
- Low level PV important for PL development, also in the case of the Vera PL.

QUESTIONS AND COMMENTS ?