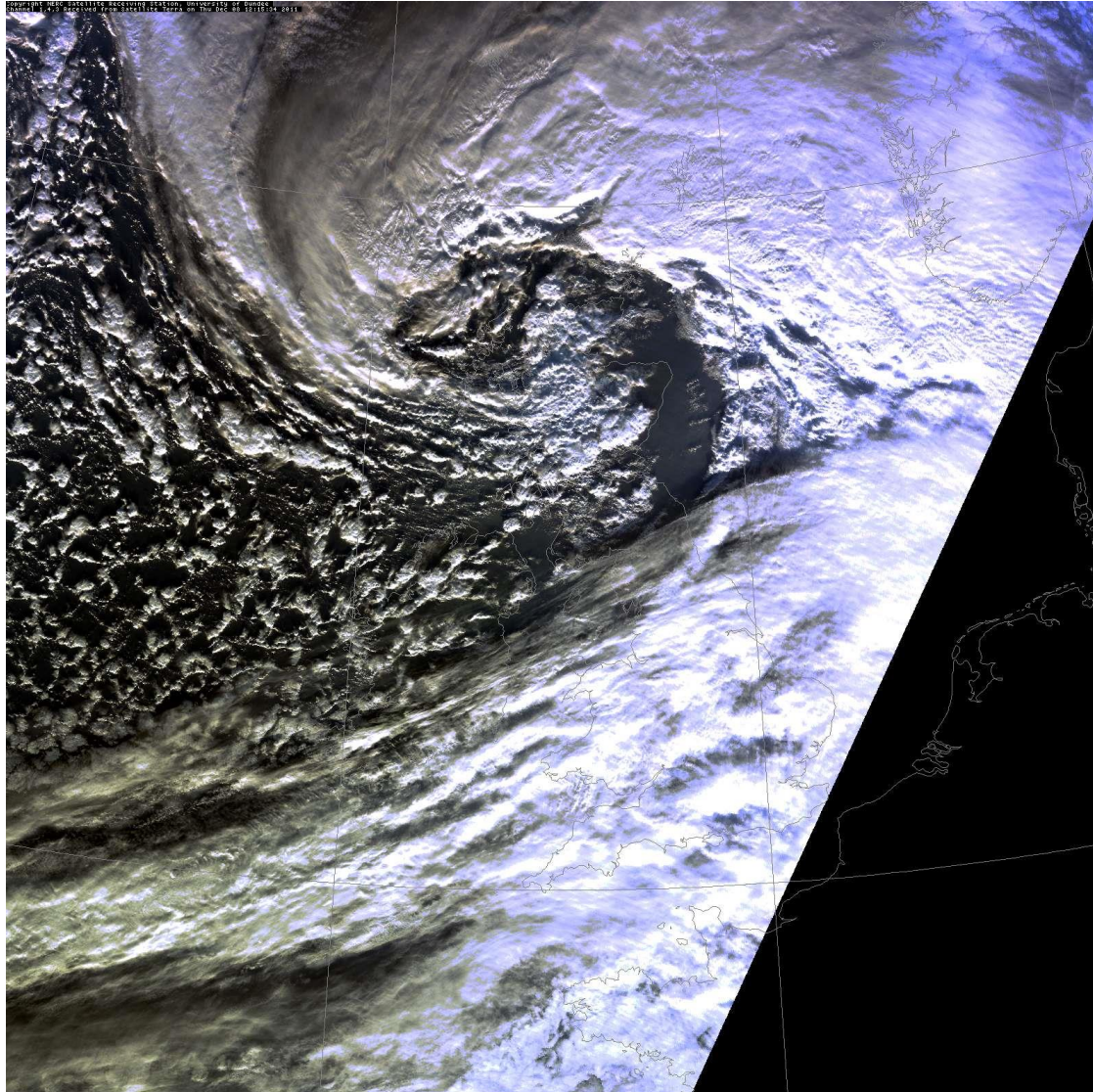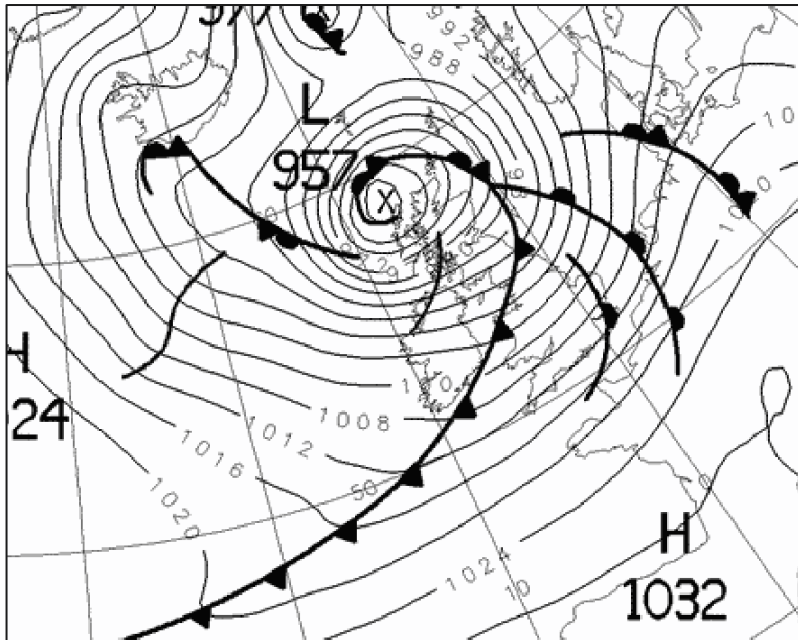# Progress on the analysis of IOP-8 11 December 2011

Oscar Martínez-Alvarado, Laura Baker

Suzanne Gray, John Methven and Bob Plant

Department of Meteorology
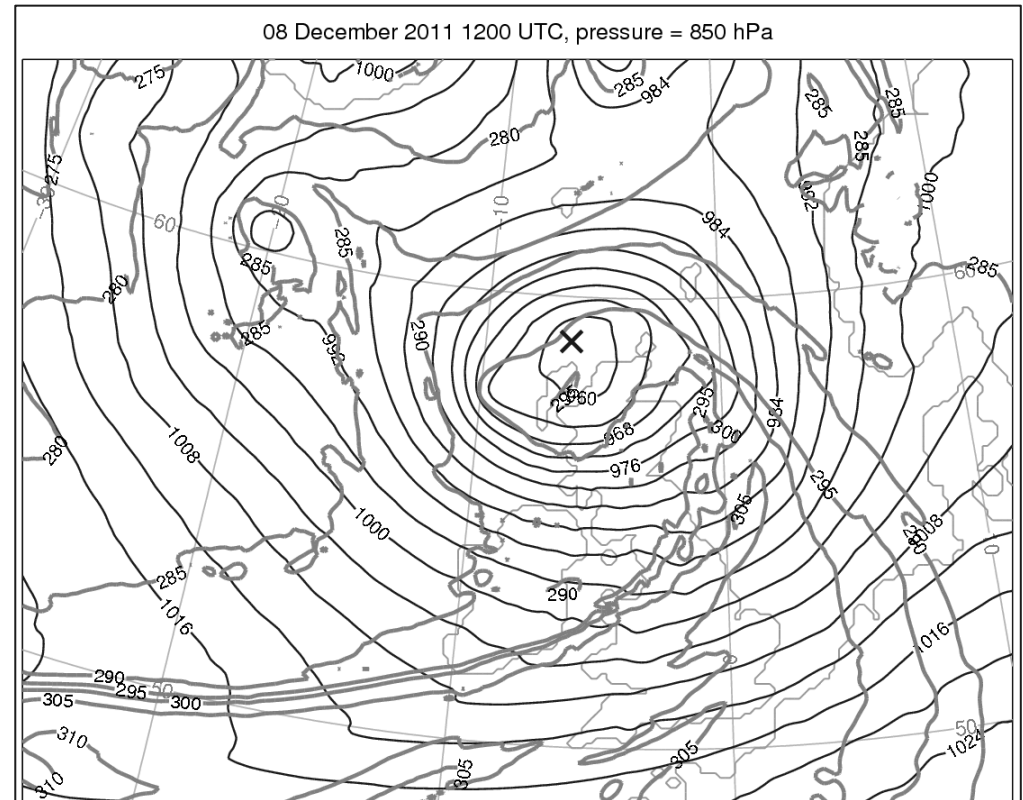
University of Reading

Visible satellite image at 1215 UTC
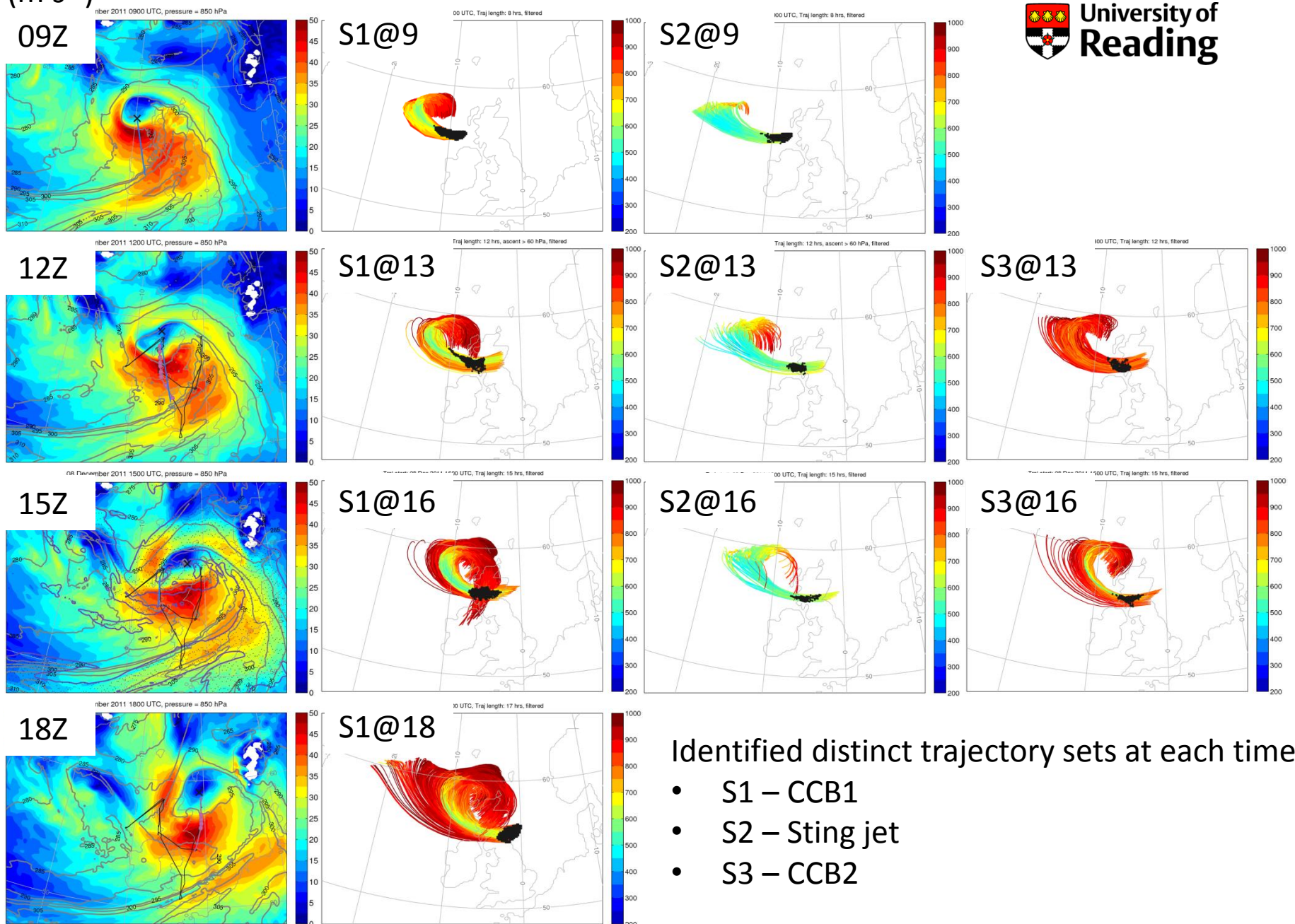
Synoptic model validation

Met Office Analysis Chart valid at 1200 UTC 11 Dec 2011

08 December 2011 1200 UTC, pressure = 850 hPa

Model MSLP (thin black) and 850-hPa theta_e (grey bold) at 1000 UTC 11 Dec 2011

850-hPa wind speed (m s^{-1})

Identified distinct trajectory sets at each time:

- S1 – CCB1
- S2 – Sting jet
- S3 – CCB2

Identification of air masses arriving in high wind regions
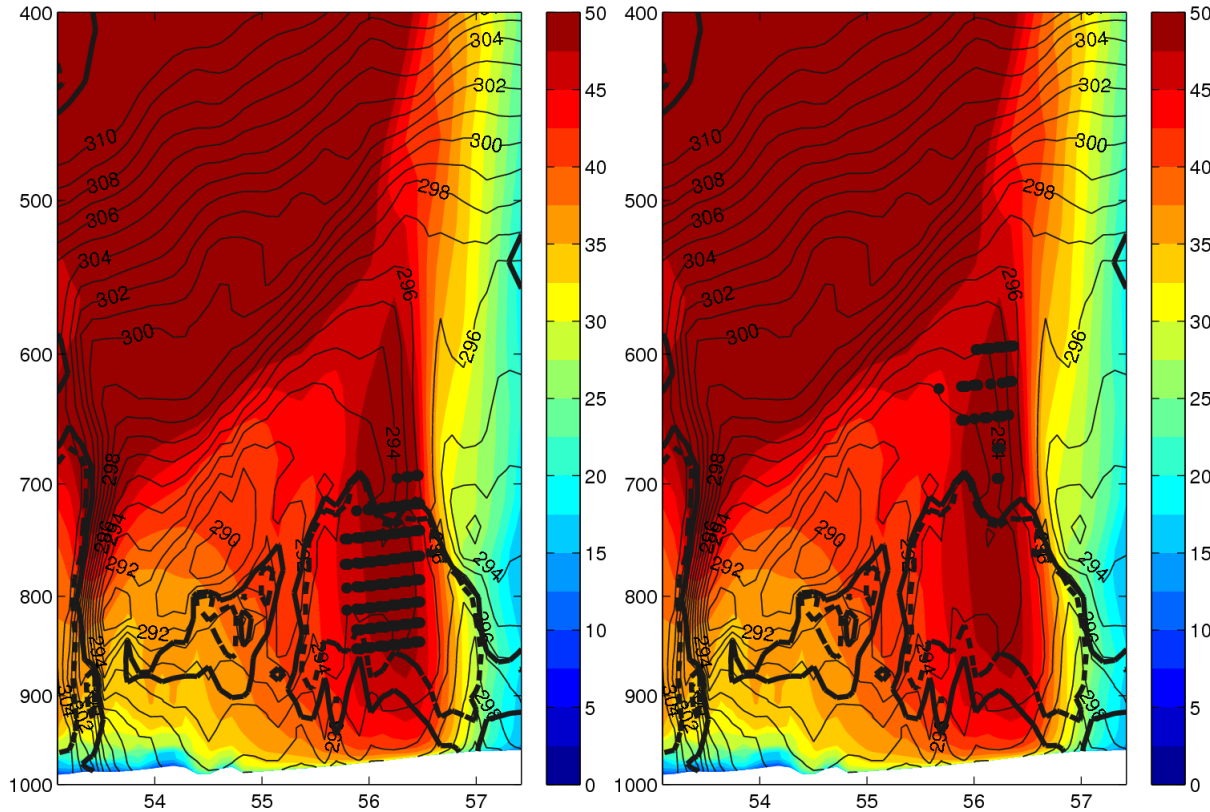
S1@9

S2@9

0900 UTC

Colour shades: wind speed (m s^{-1})
Thin lines: theta_e (K)
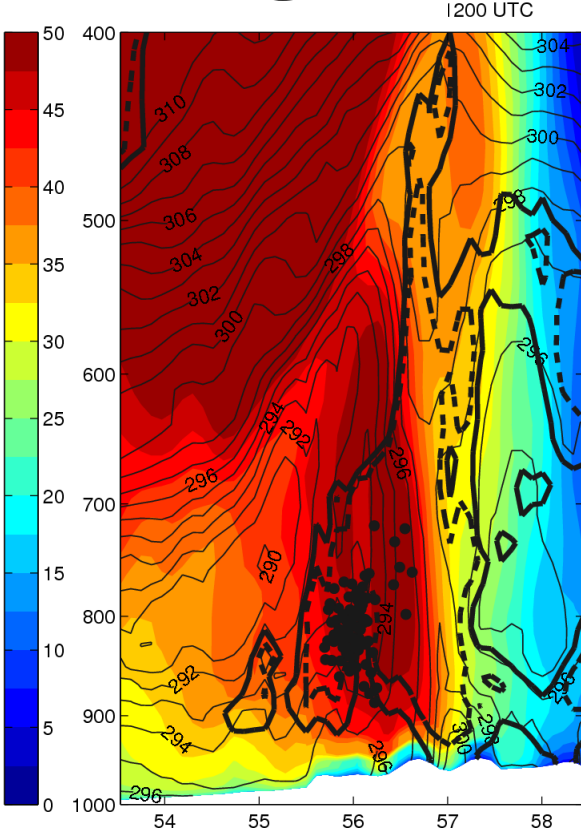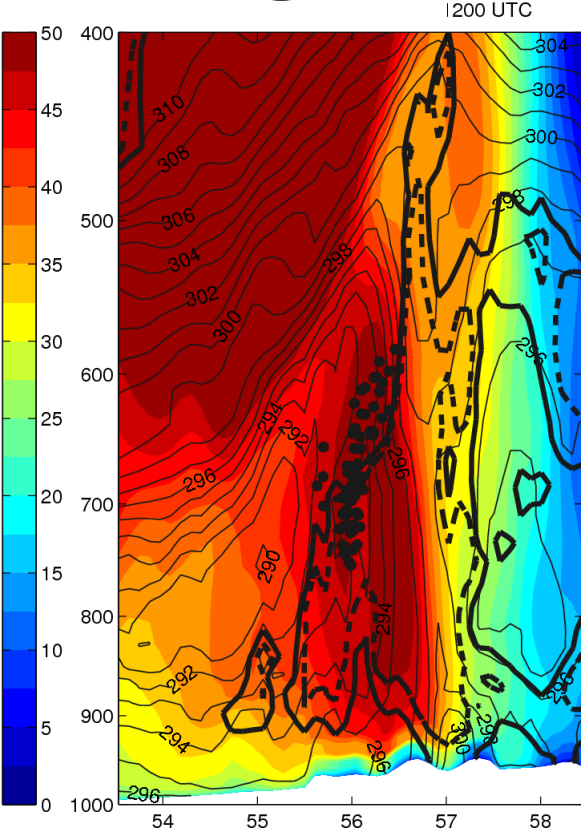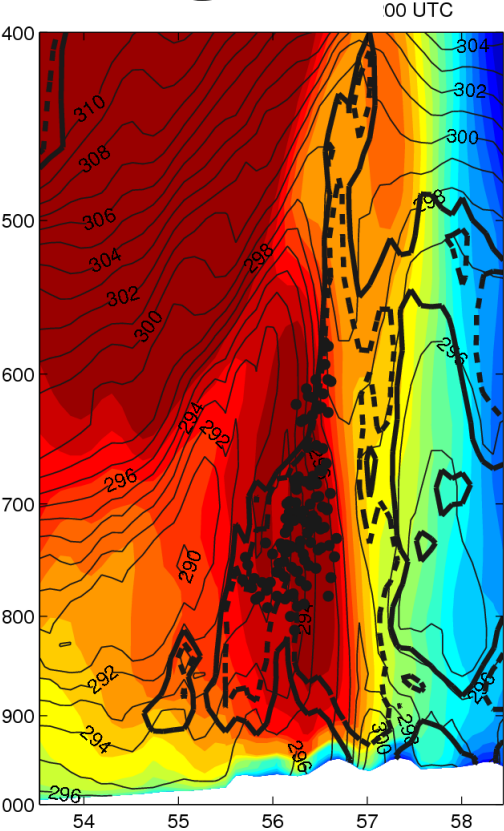Bold solid: 80% RH(ice)
Bold dashed: 90% RH(ice)

Identification of air masses arriving in high wind regions
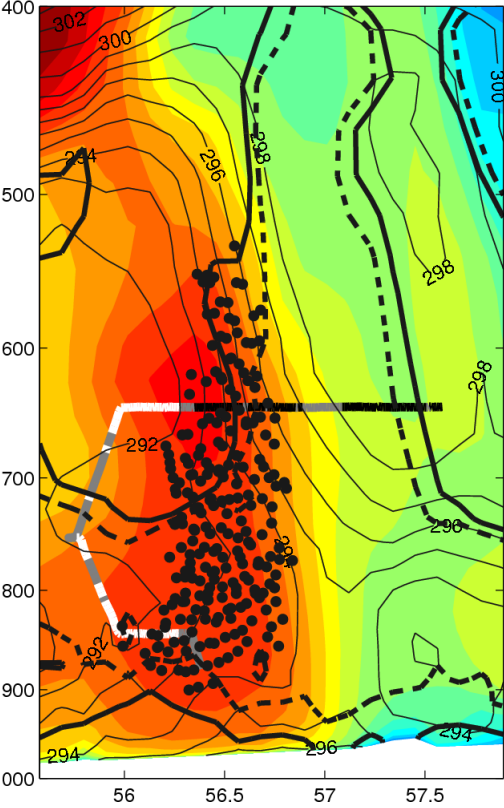
S1@13

S2@13

S3@13

1200 UTC

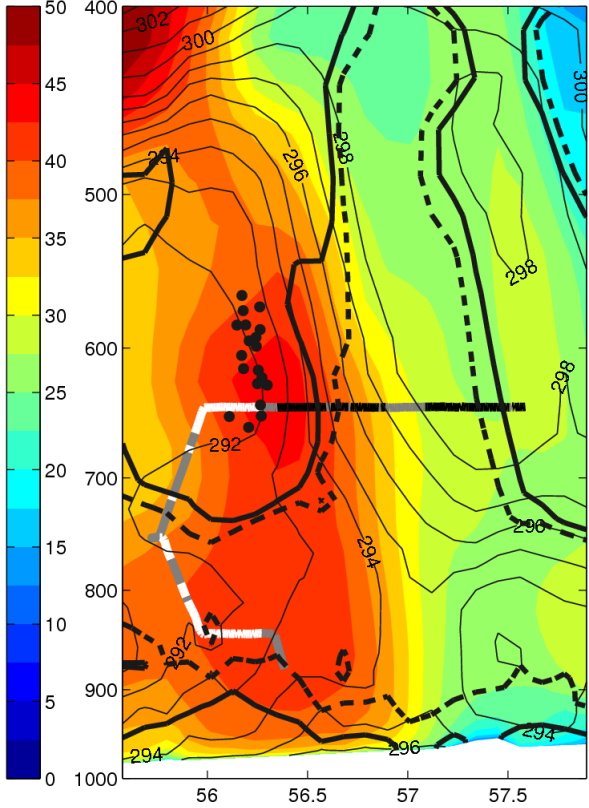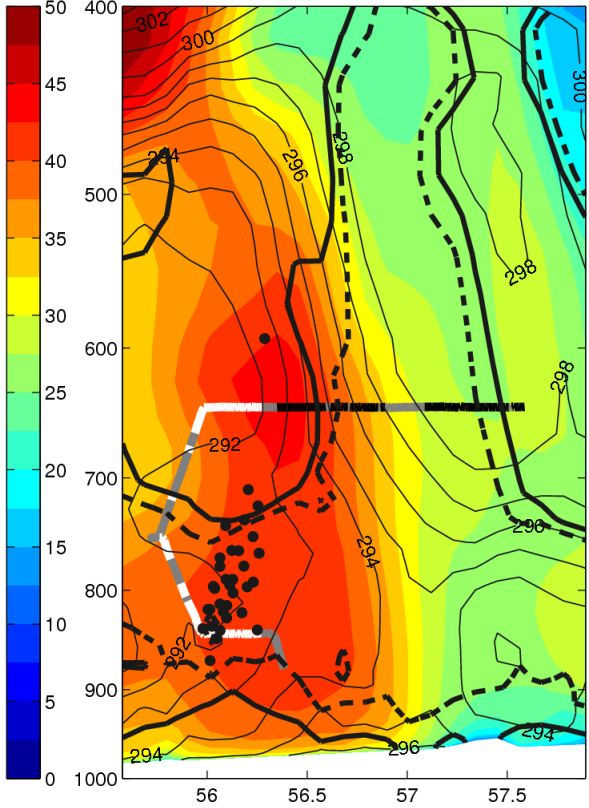# Identification of air masses arriving in high wind regions
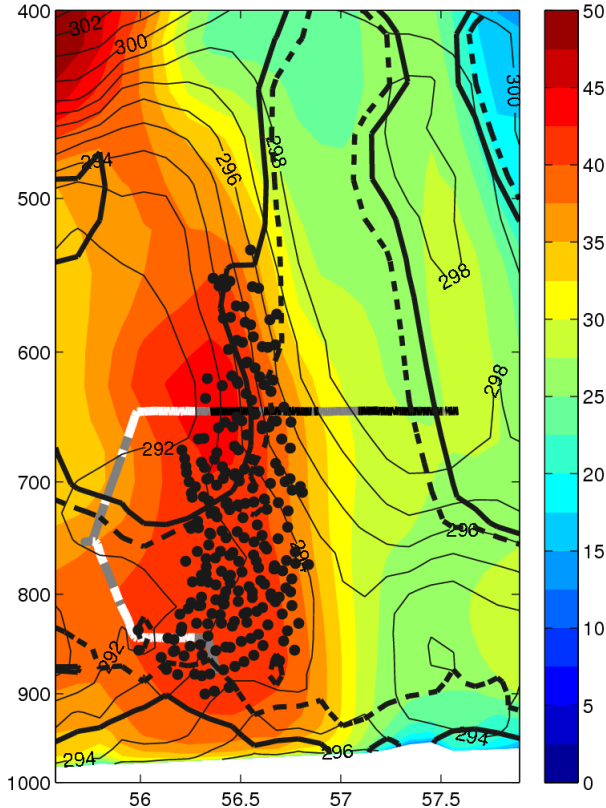
University of Reading

S1@16 S2@16 S3@16

Flight track coloured by measured CO simply ranked as low (**black**) medium (**grey**) and high (white)

1500 UTC
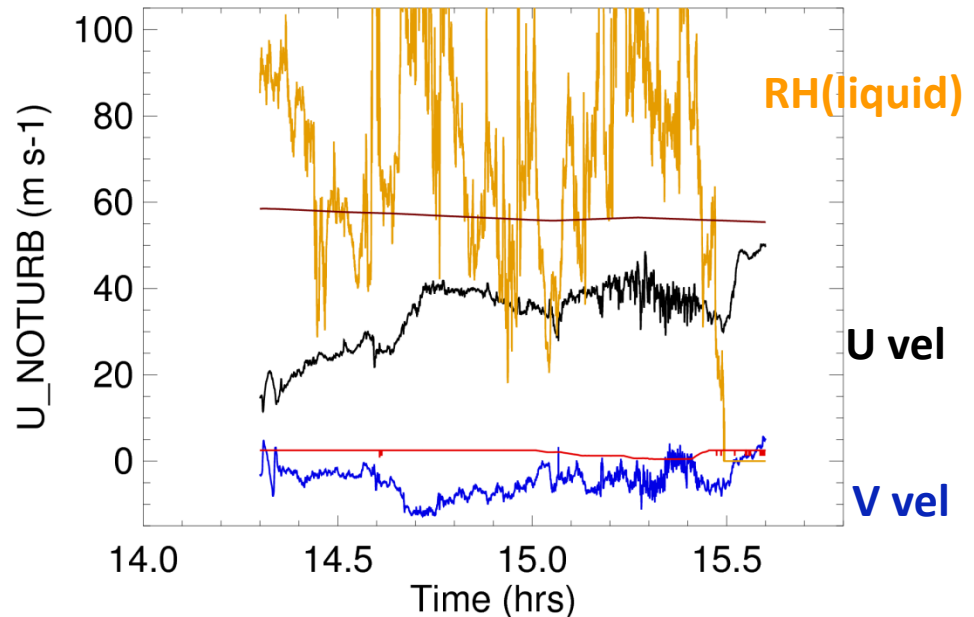
Identification of air masses arriving in high wind regions

### S1@16, 1500 UTC

ndd, wind, 08 December 2011 1500 UTC

Flight track coloured by measured CO simply ranked as low (**black**) medium (grey) and high (white)

14:18 to 15:36 UTC 08/12/2011

By matching measured variables to model section:
- Strong horizontal wind shear located more to the south in the model than in observations
- Wind speed overestimated by the model
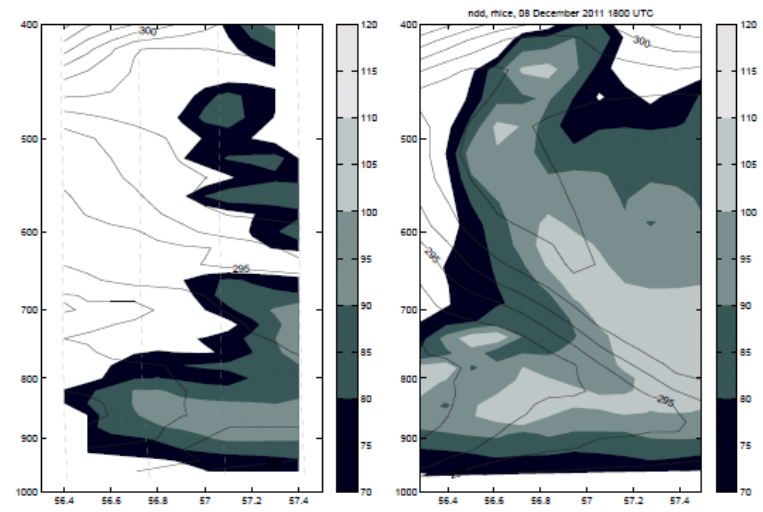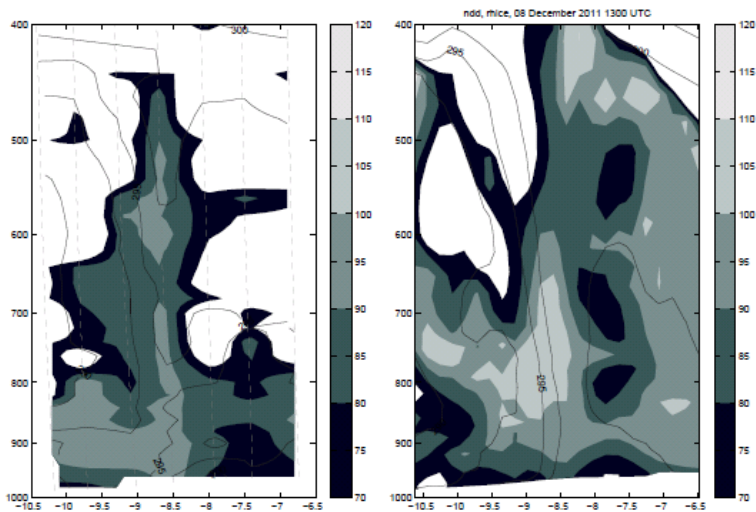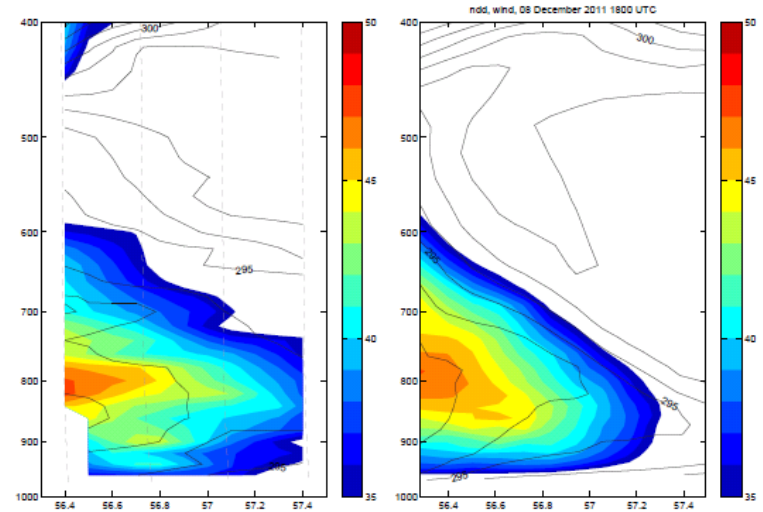- Cloud regions located more to the north in the model than in observations
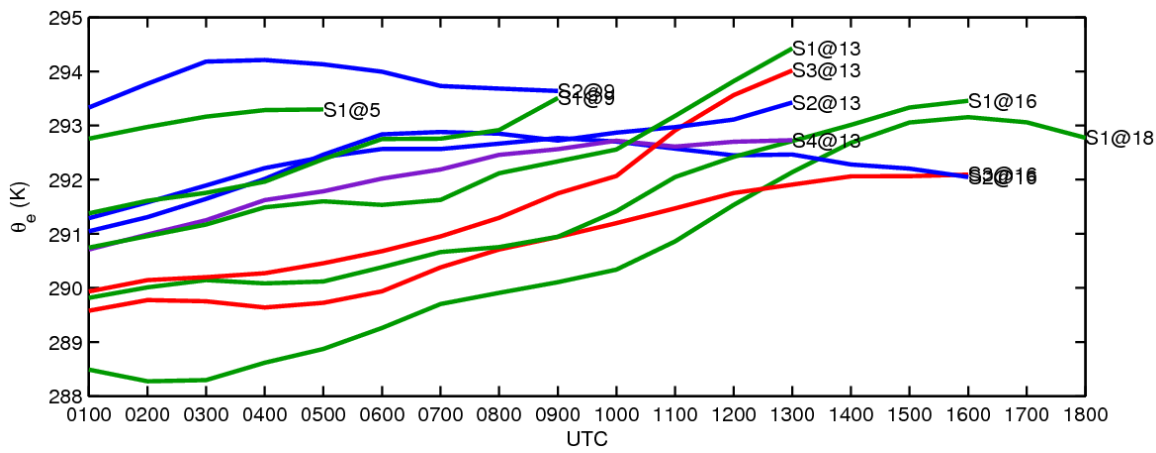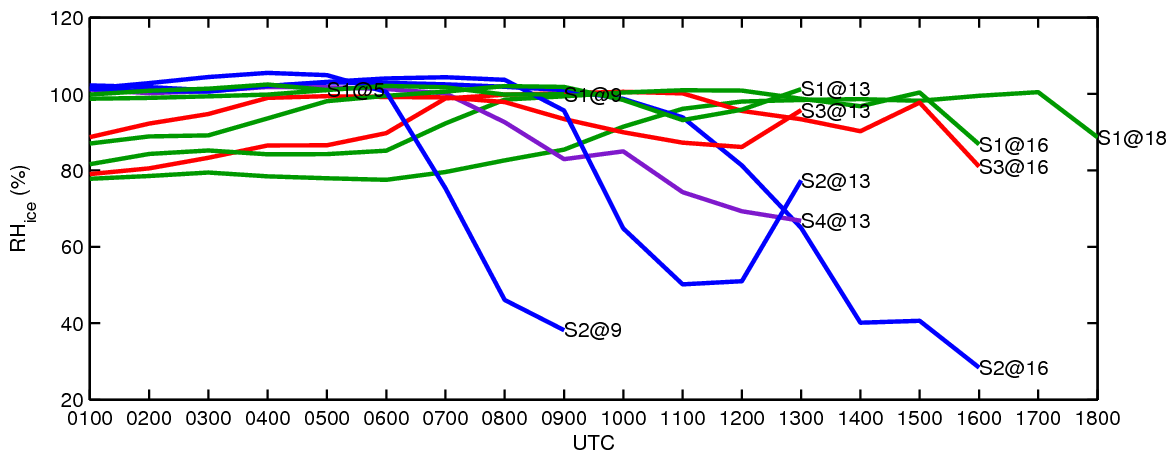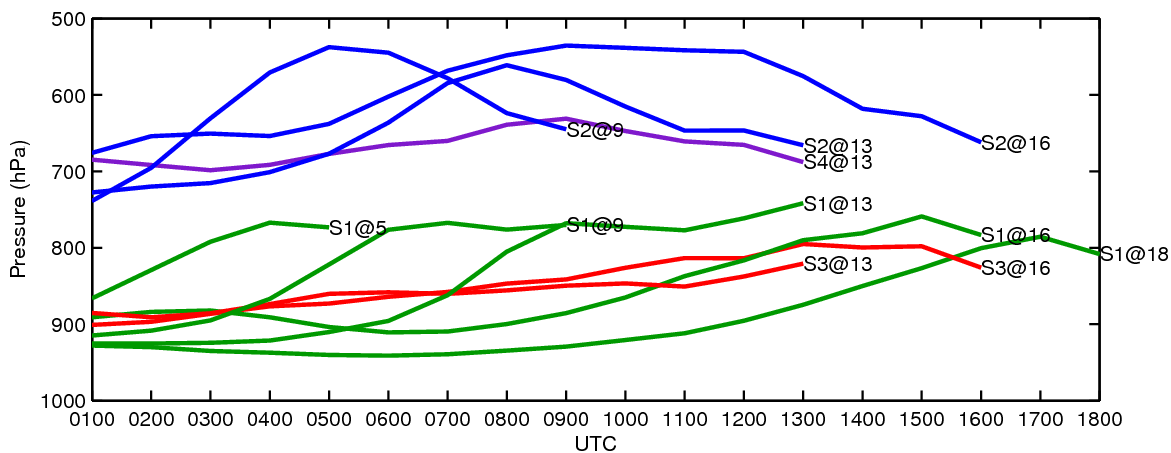
Variables along trajectories showing the trajectory-ensemble median for the identified air masses

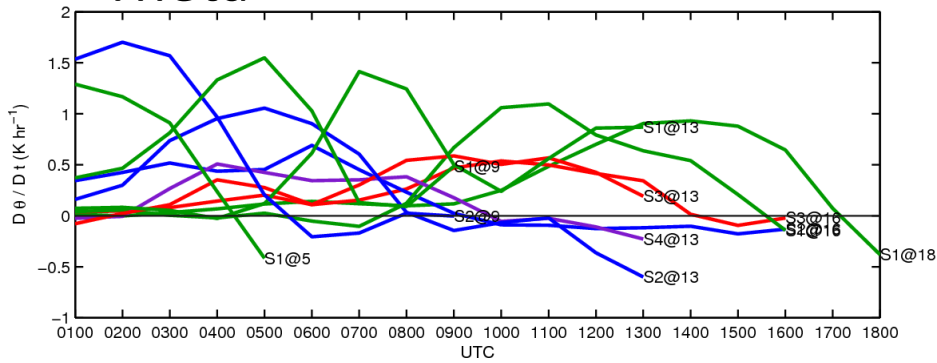# Model v observations

Dropsondes 11-17   Model at 1300UTC
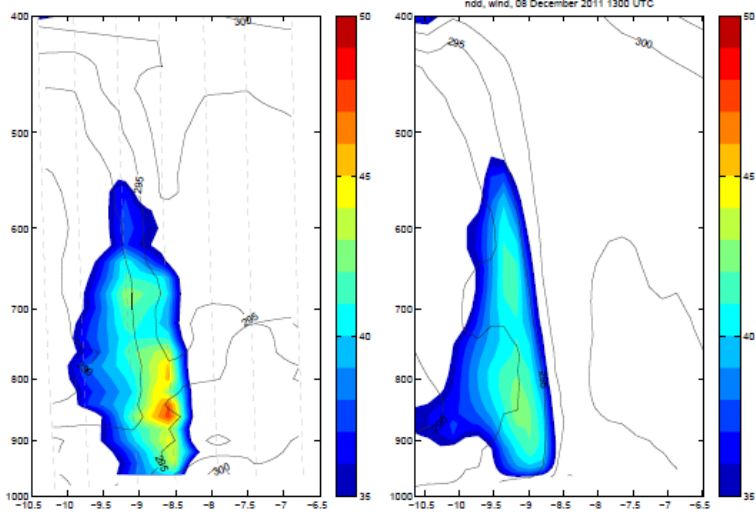
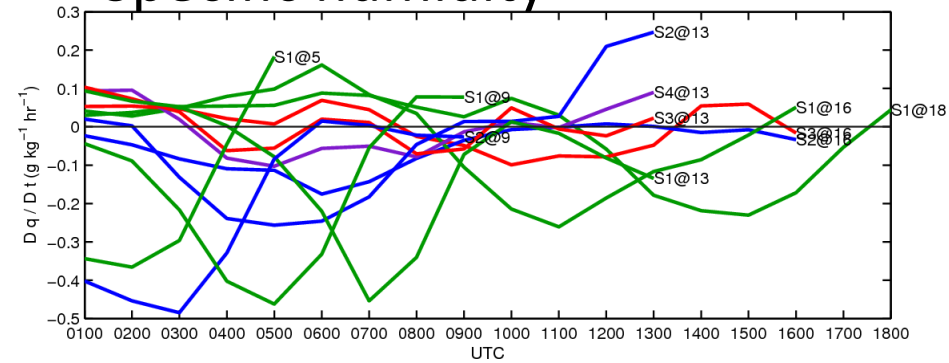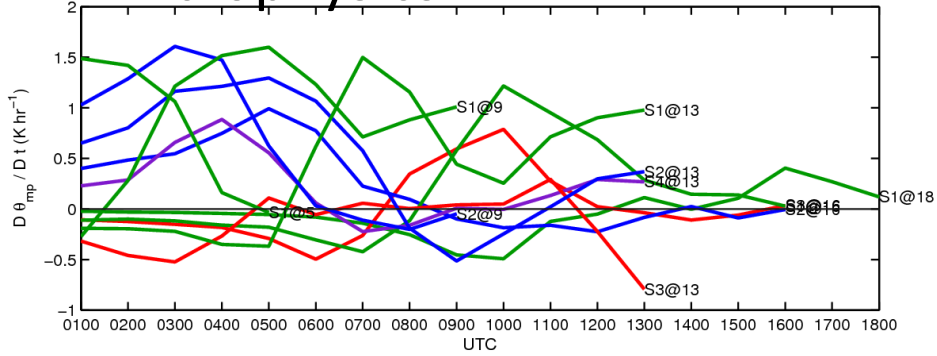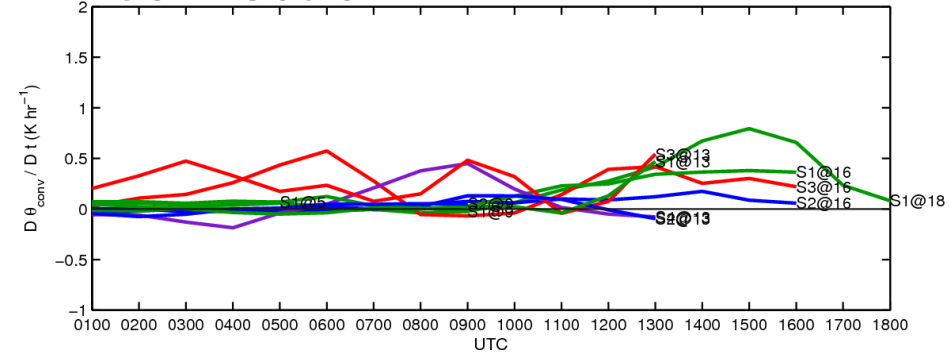Dropsondes 18-22   Model at 1800UTC

Physical processes

Mesoscale instability

S1@16

S2@16

S3@16

ND CSI CI II II+CI S
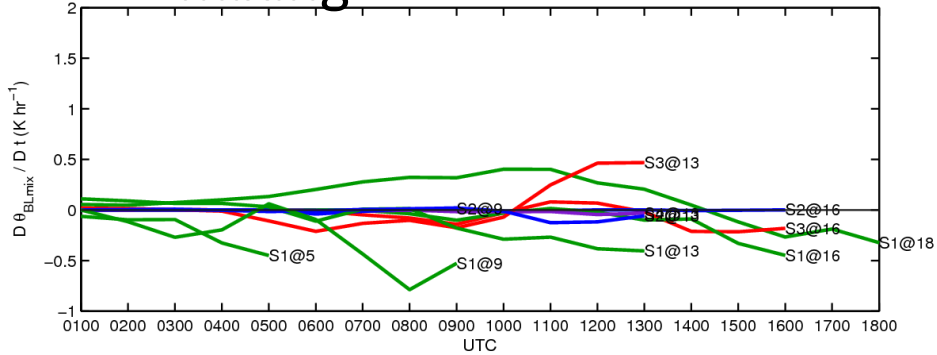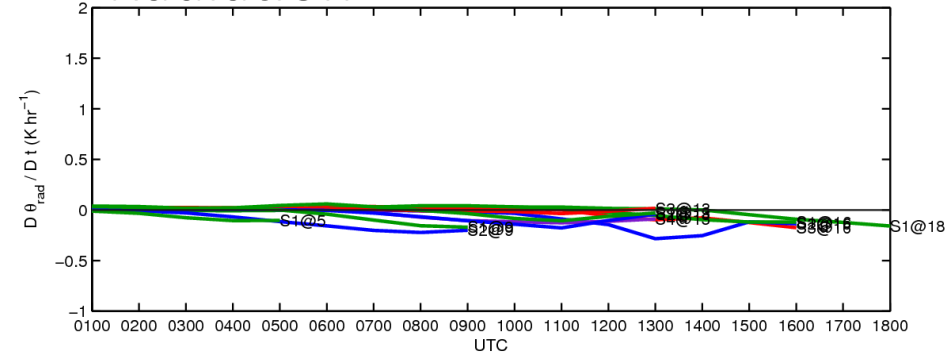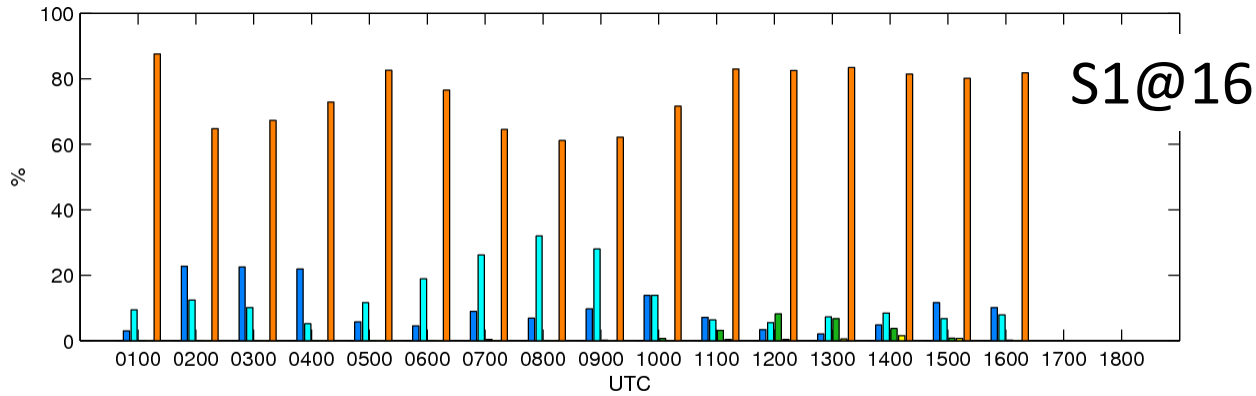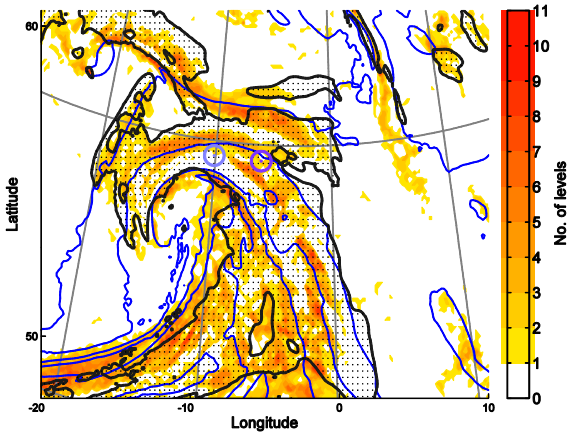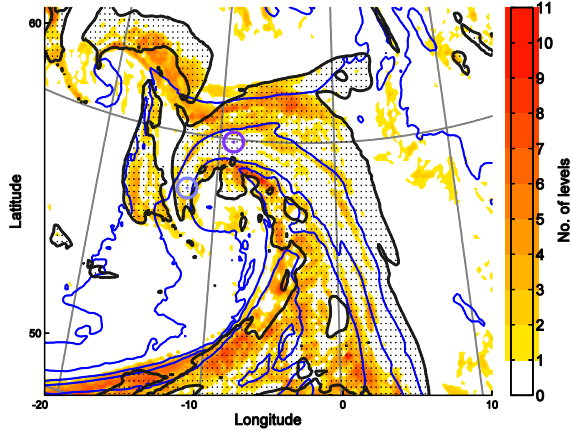
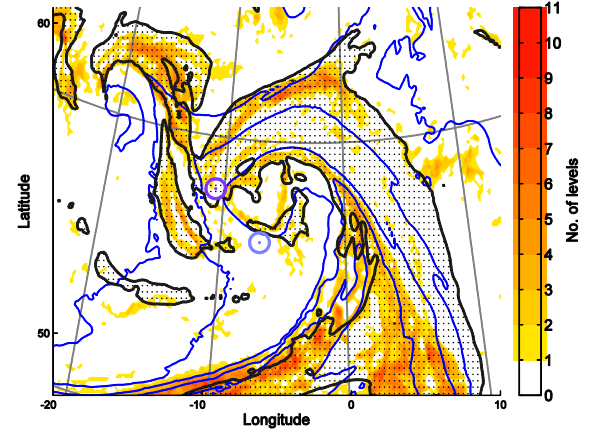Percentage of trajectories satisfying instability conditions
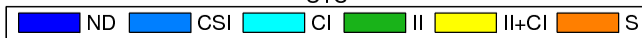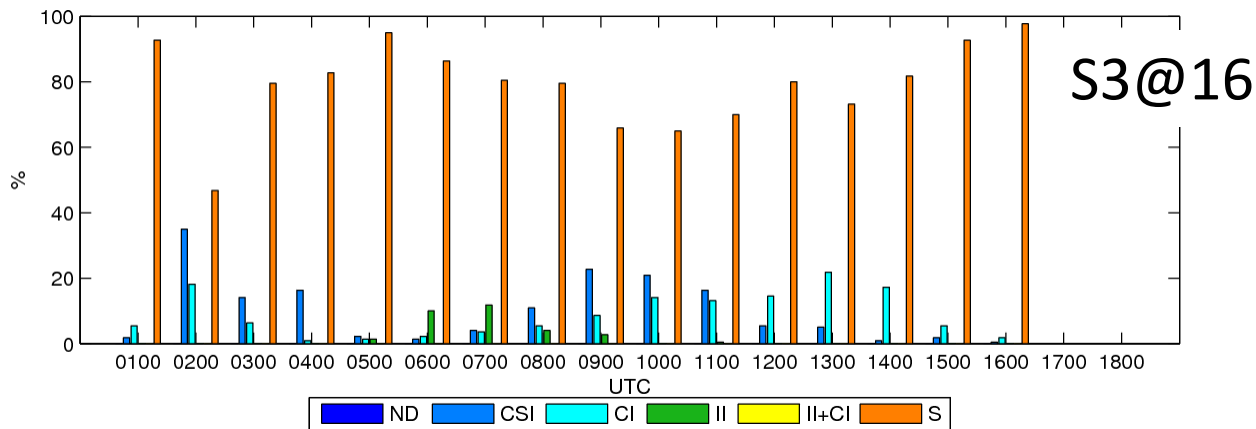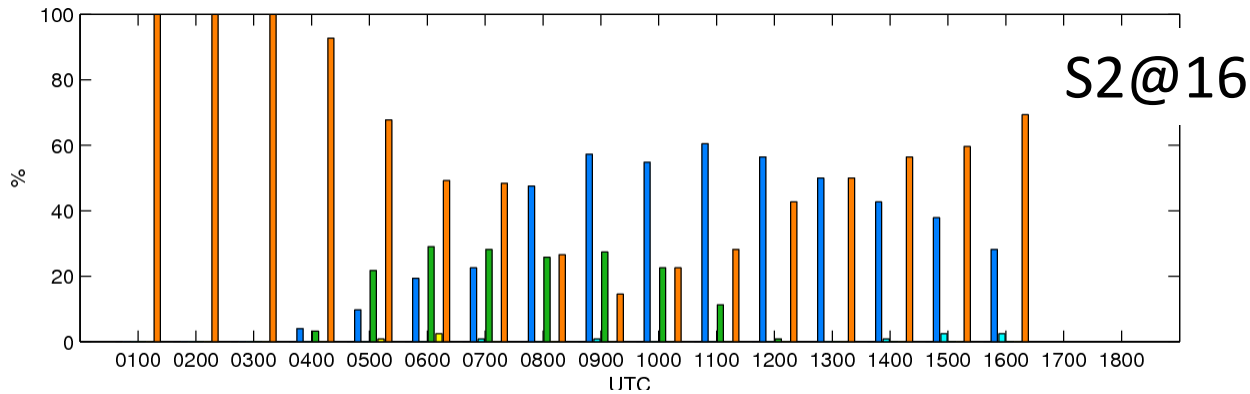
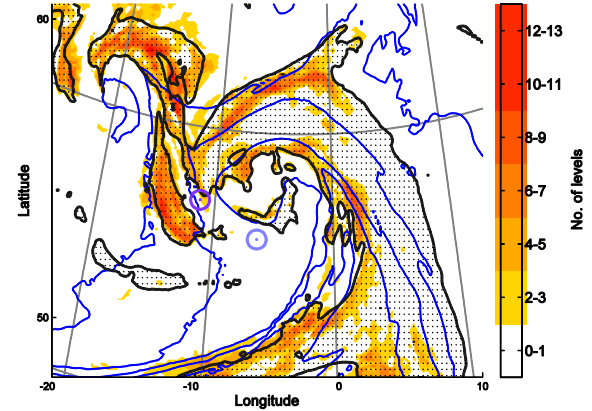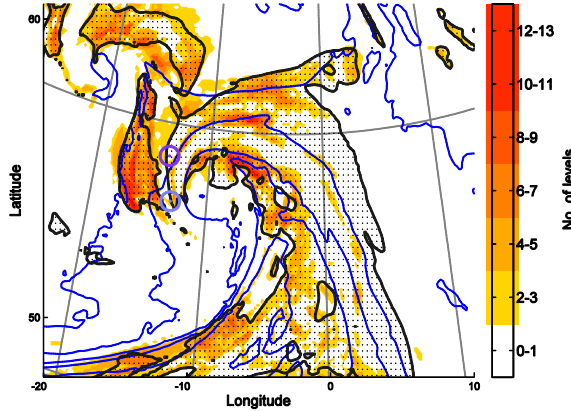# Mesoscale instability maps: CSI
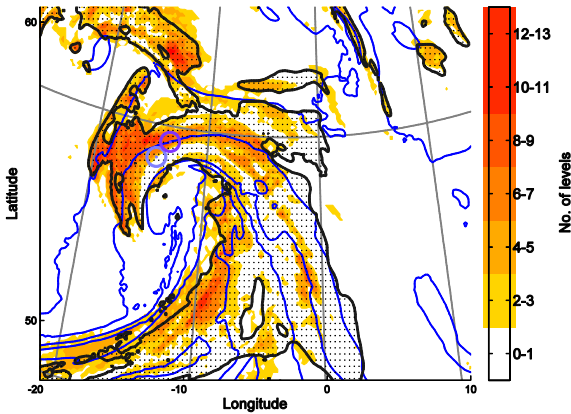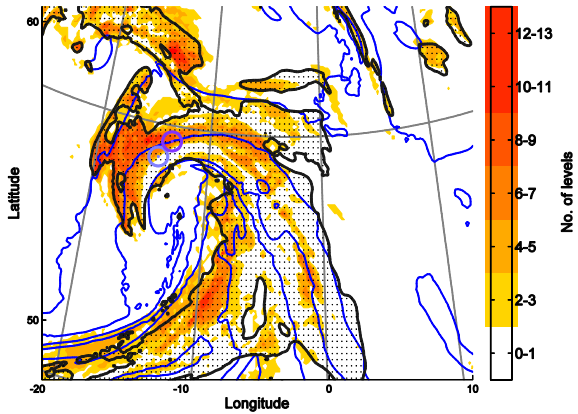
0600 UTC   0900 UTC   1200 UTC
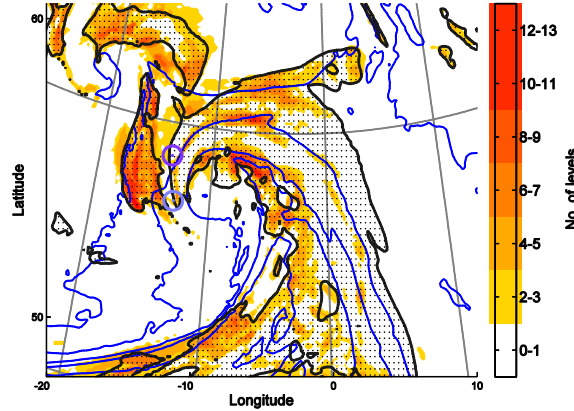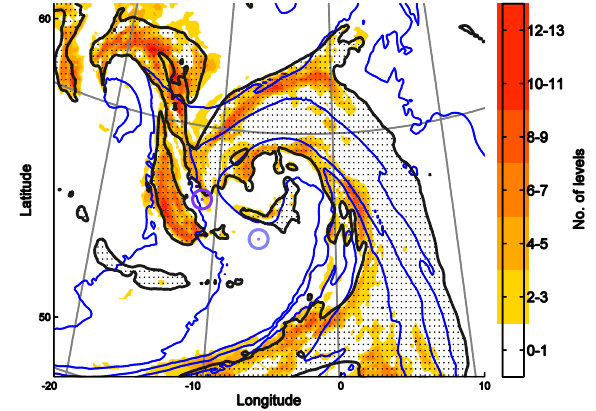

S1@13,S1@16. CSI points at levels 950-700hPa

S2@13,S2@16. CSI points at levels 800-500hPa
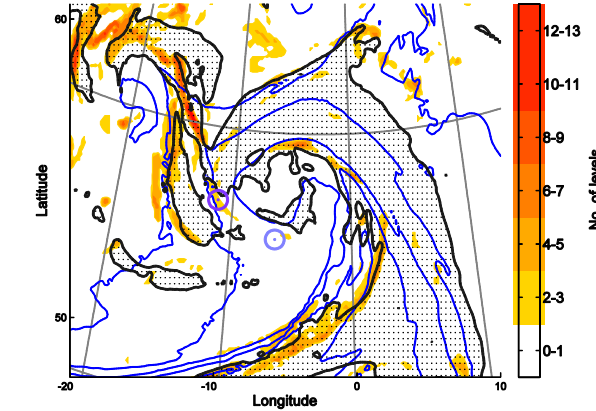
Mesoscale instability maps: CSI vs II

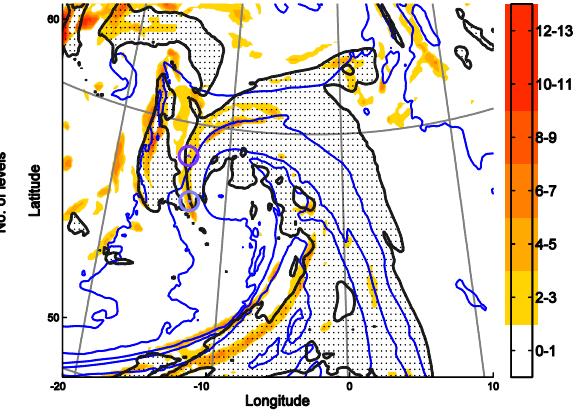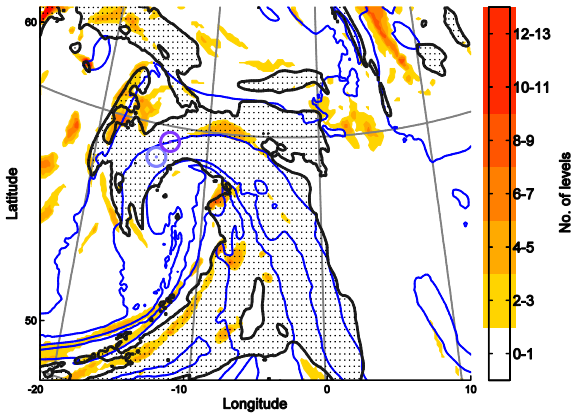0600 UTC　　　　0900 UTC　　　　1200 UTC

S2@13,S2@16. CSI points at levels 800-500hPa

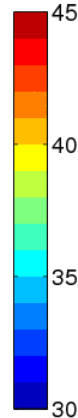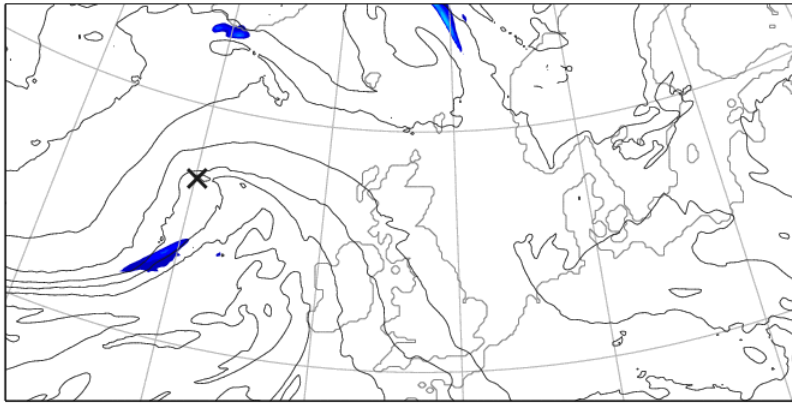S2@13,S2@16. II points at levels 800-500hPa

600 hPa
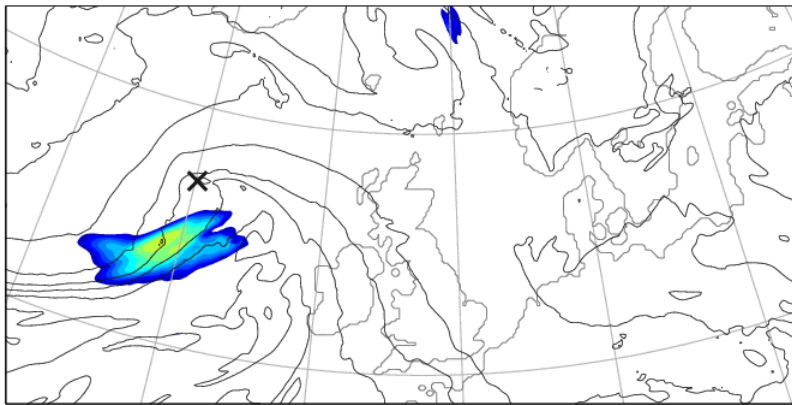
700 hPa

850 hPa

System-relative winds

System velocity computed as the domain-average 700-hPa velocity
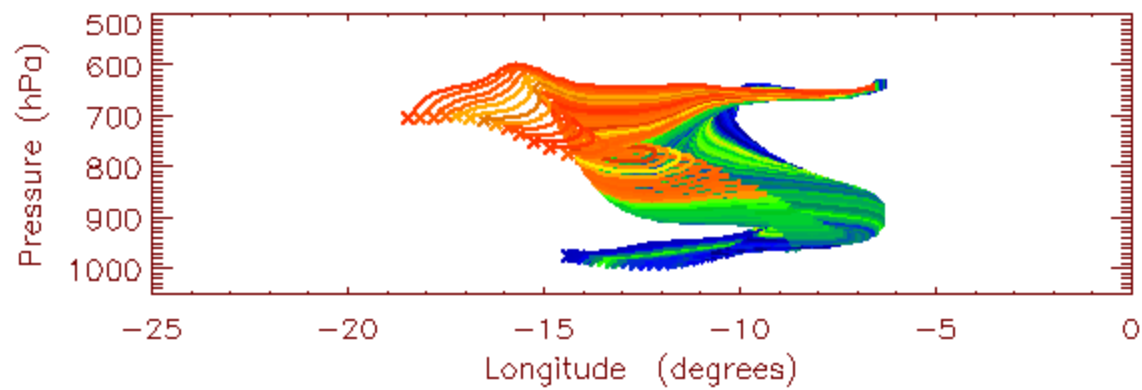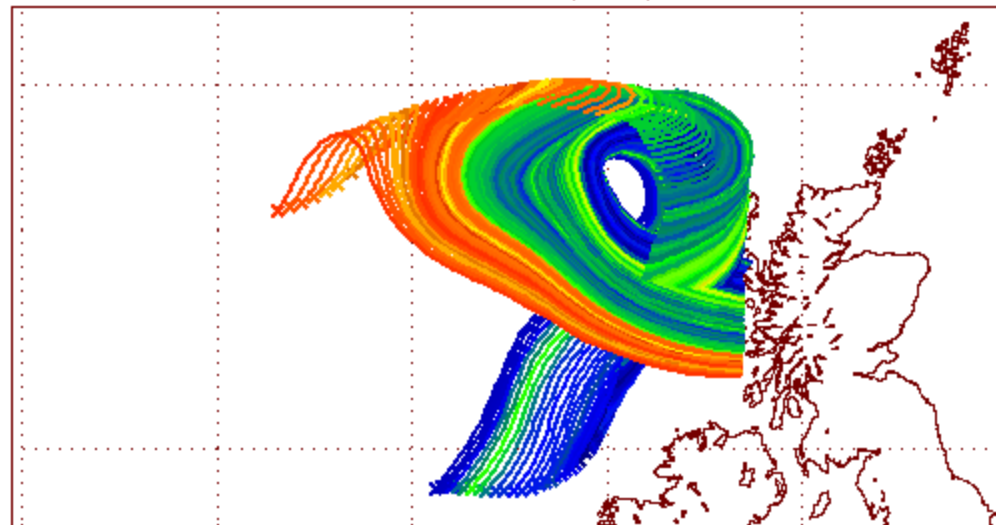Thin lines represent 850-hPa θ_e
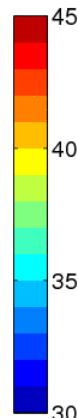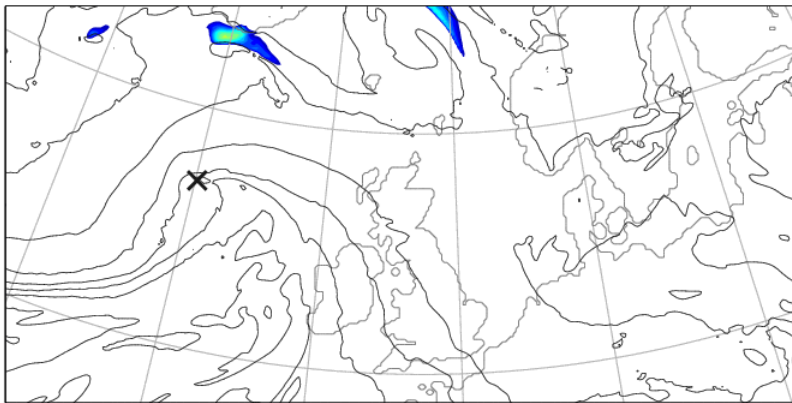
Traj release 14:34 to 14:58 UT 08/12/2011   T=1.062 days

Traj release 14:58 to 15:15 UT 08/12/2011   T=1.333 days