Model experiments with HARMONIE – Fog and low clouds

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Case study

Vertraging Schiphol en drukke avondspits door mist

Uitgegeven: 25 november 2004 21:03
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SCHIPHOL - De mist zorgde donderdag voor aanzienlijke vertragingen op Schiphol en in de avondspits. Tot aan het einde van de middag waren 107 vluchten geannuleerd, zei een woordvoerster van de luchthaven. Het betrof vooral Europese vluchten van de KLM. In tegenstelling tot de ochtendspits had het avondverkeer wel last van de mist.

Reizigers hadden eerder op de dag te maken met vertragingen die opliepen tot twee uur. In de avond konden bijna alle binnenkomende en uitgaande vluchten doorgaan.

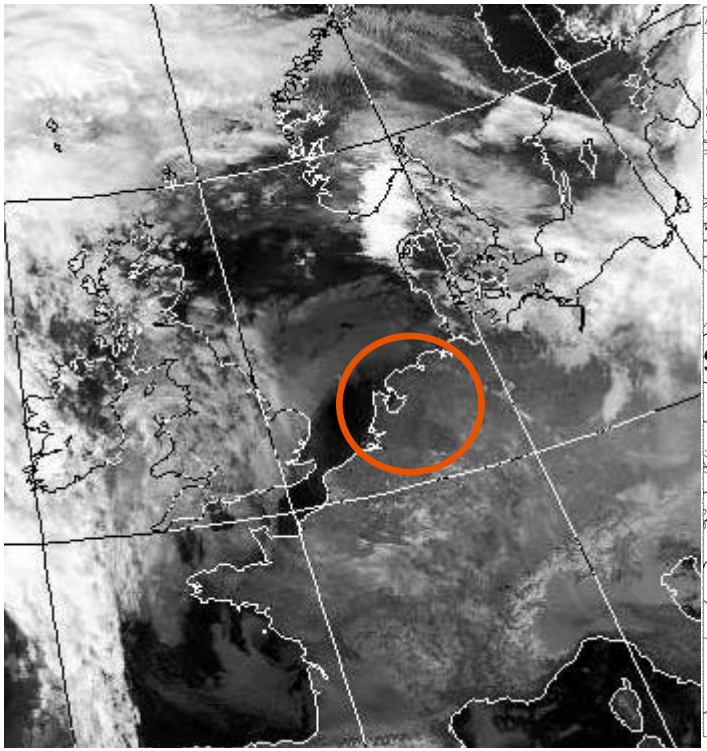
Op de snelwegen stonden volgens de ANWB in de avondspits een stuk meer files dan normaal. Om kwart voor zes waren er 55 files met een lengte van 310 kilometer, normaal staat er dan iets minder dan 200 kilomer file. Vooral in de regio Amsterdam was het druk en op de A12 tussen Den Haag en Utrecht. Het viel de ANWB op dat er weinig ongelukken gebeurden, "maar mist kun je zien en gladheid niet."

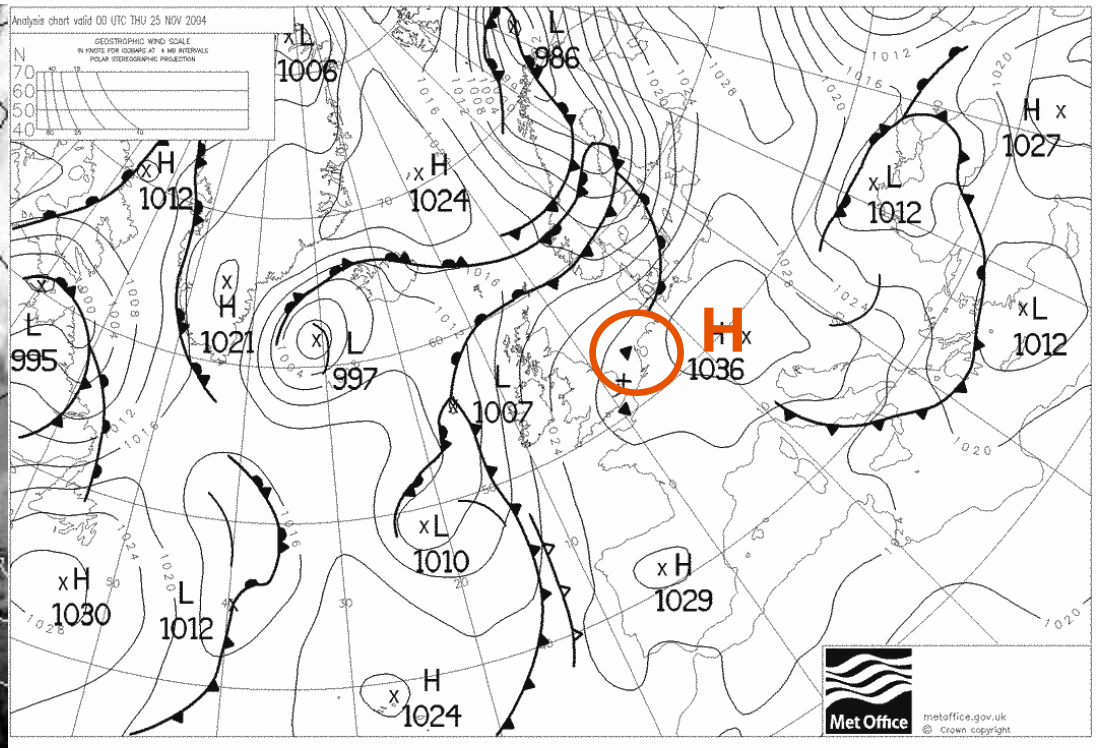
Introduction (difficult) case study

Fog event 25 November 2004 starting *early morning*

High pressure system over central Europe. Weak SE wind

Synoptic conditions 25-11-2004; 00.00 UTC

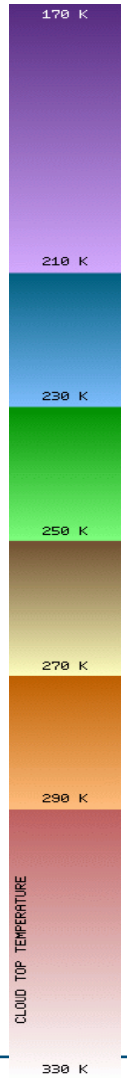


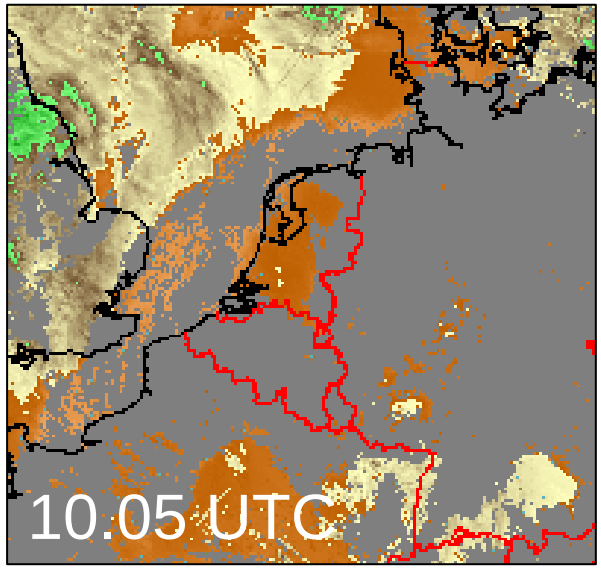


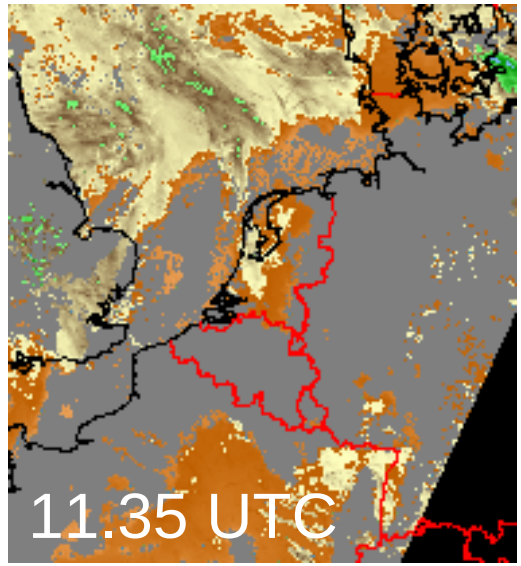
Case analysis and observations

Cloud-top temperature

Brown: relative warm cloud-tops => fog

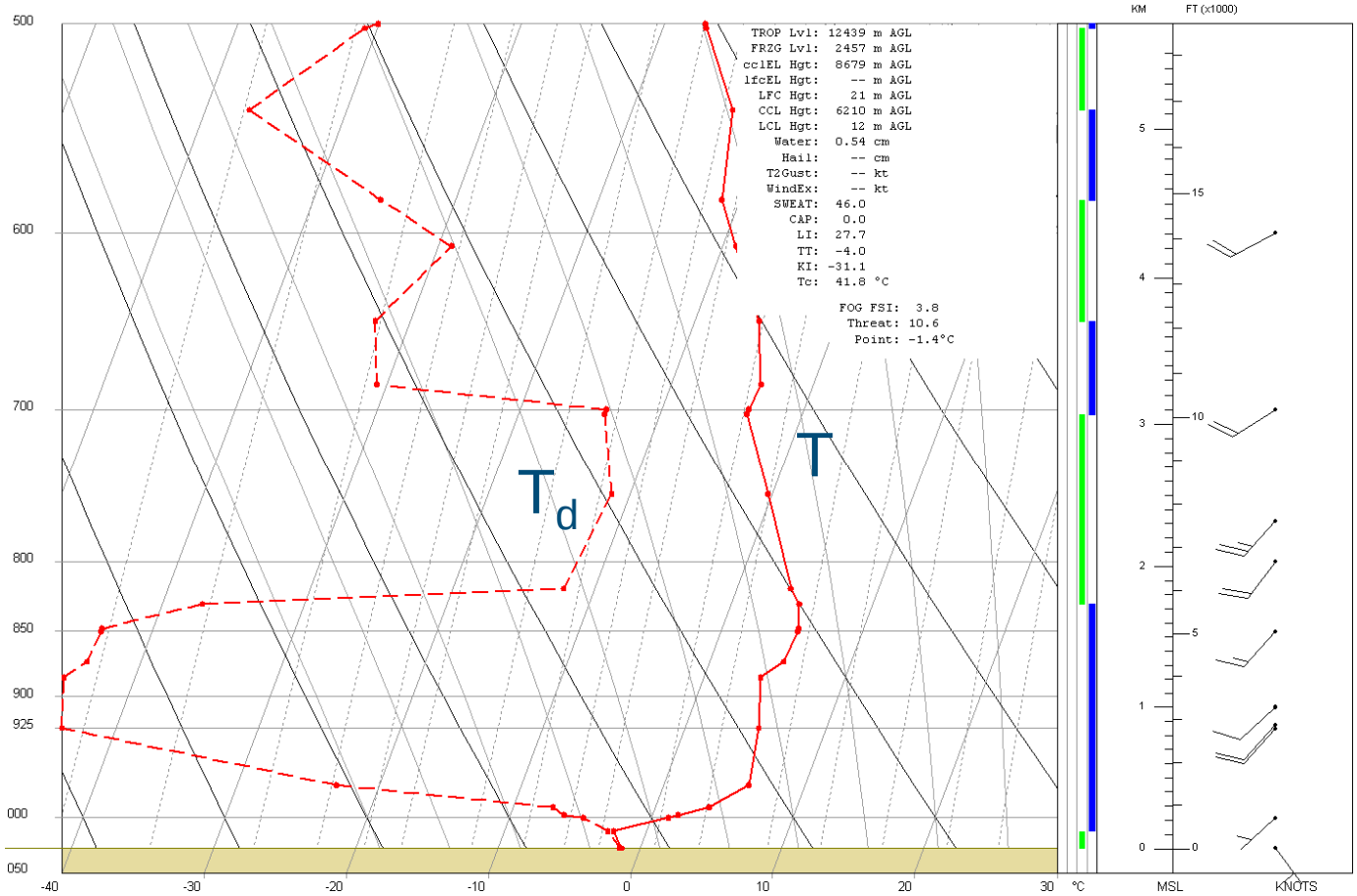




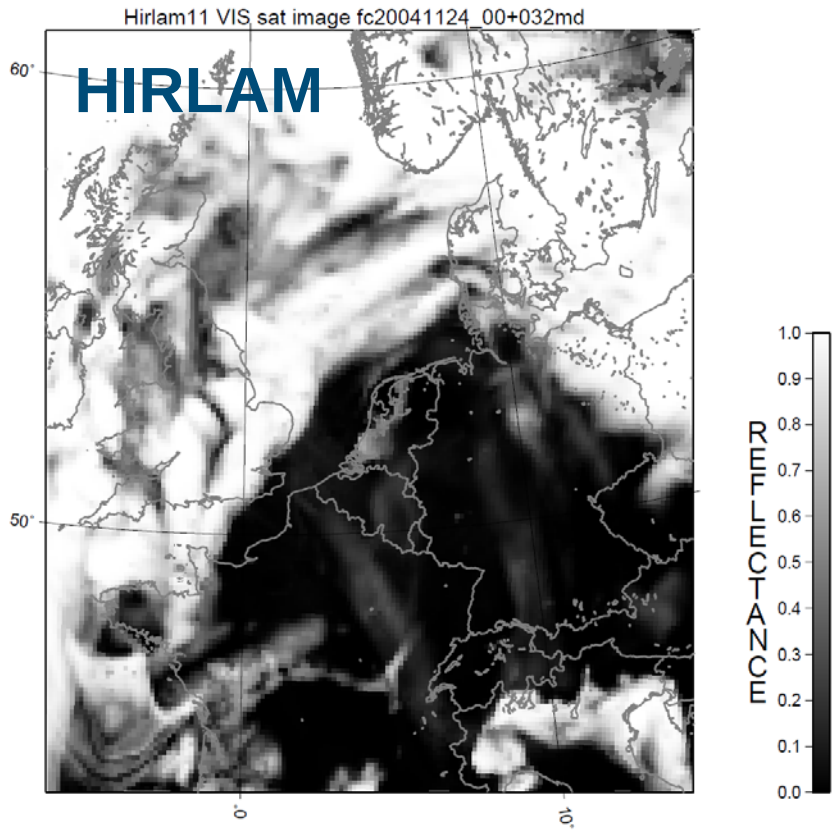


http://www.wdc.dlr.de/apollo/

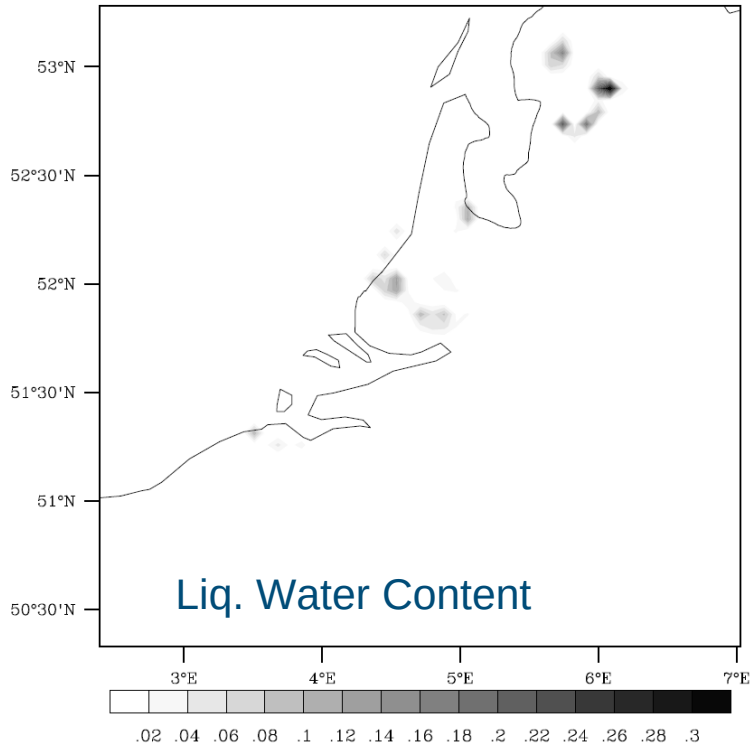
Special Case: Near freezing point & extremely dry aloft



HIRLAM, WRF



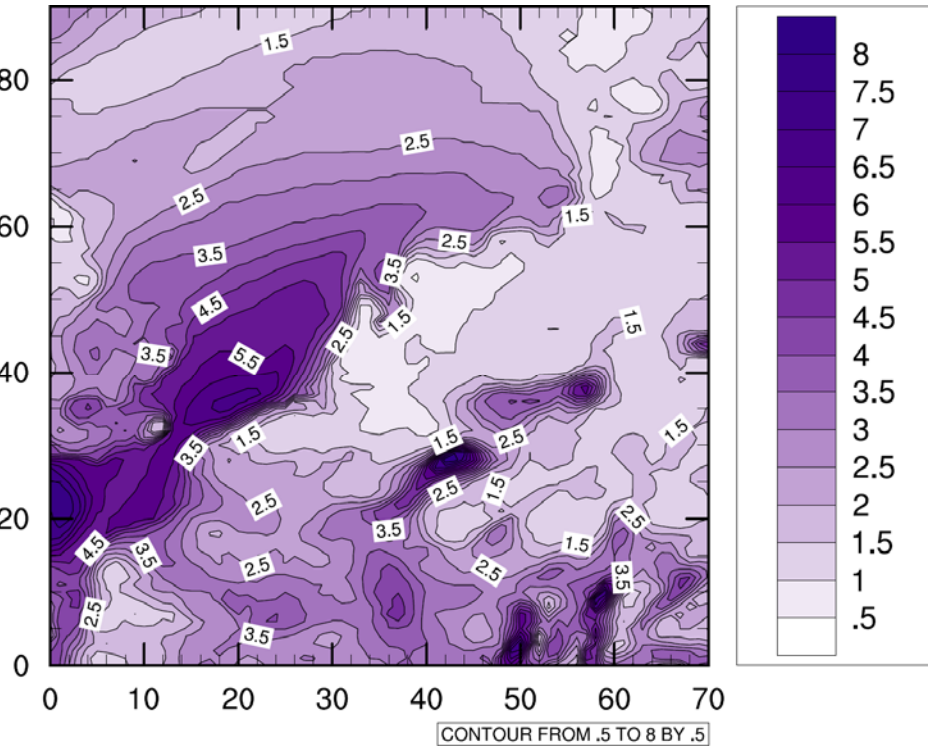
WRF



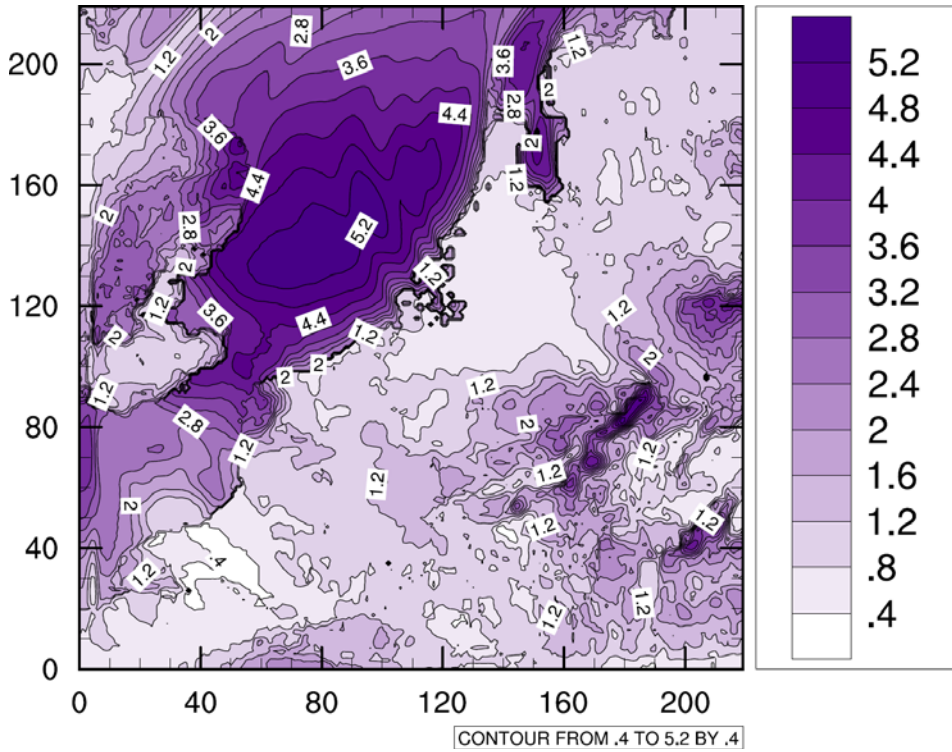
Velde, I.R. van der, G. J. Steeneveld, B.G.J. Wichers Schreur, and A.A.M. Holtslag, 2010: Modeling and Forecasting the Onset and Duration of Severe Radiation Fog under Frost Conditions, *Mon. Wea. Rev.*, in press.

Dew point depression 25 Nov 0 UTC

HIRLAM

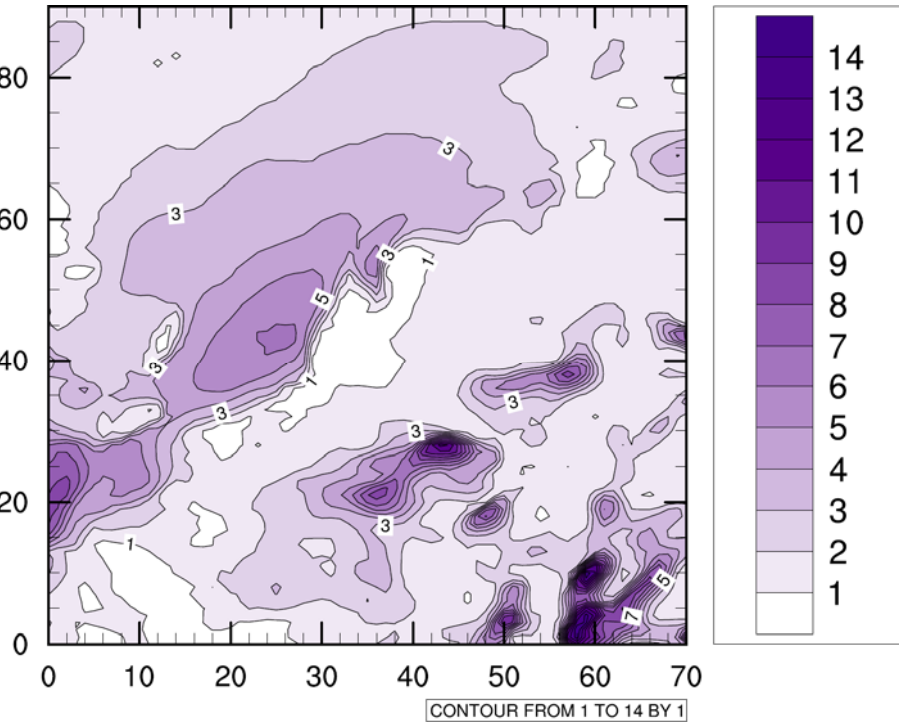


HARMONIE

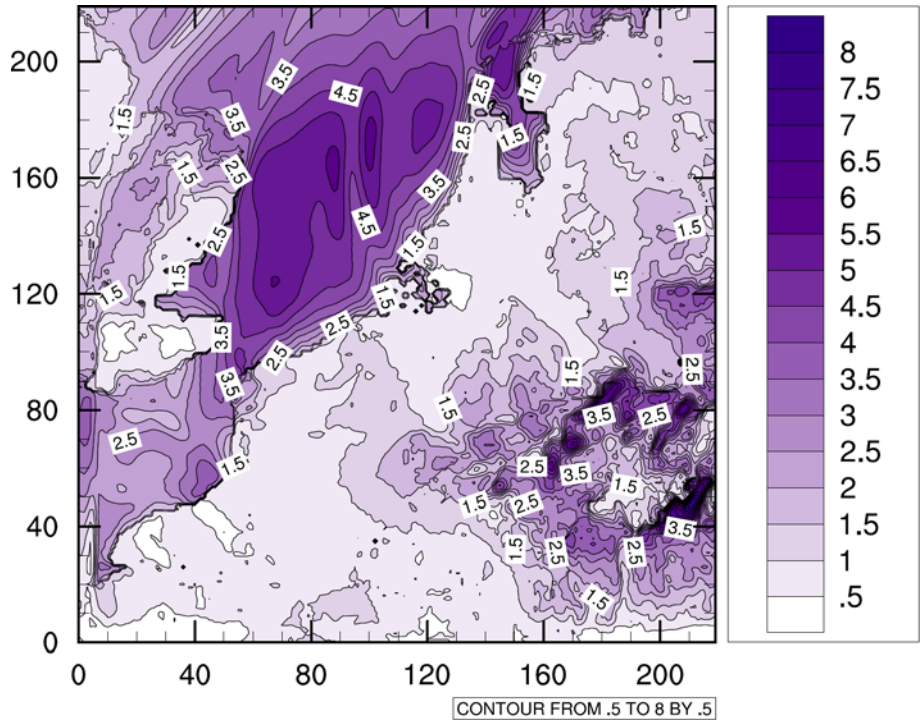


Dew point depression 25 Nov 6 UTC

HIRLAM

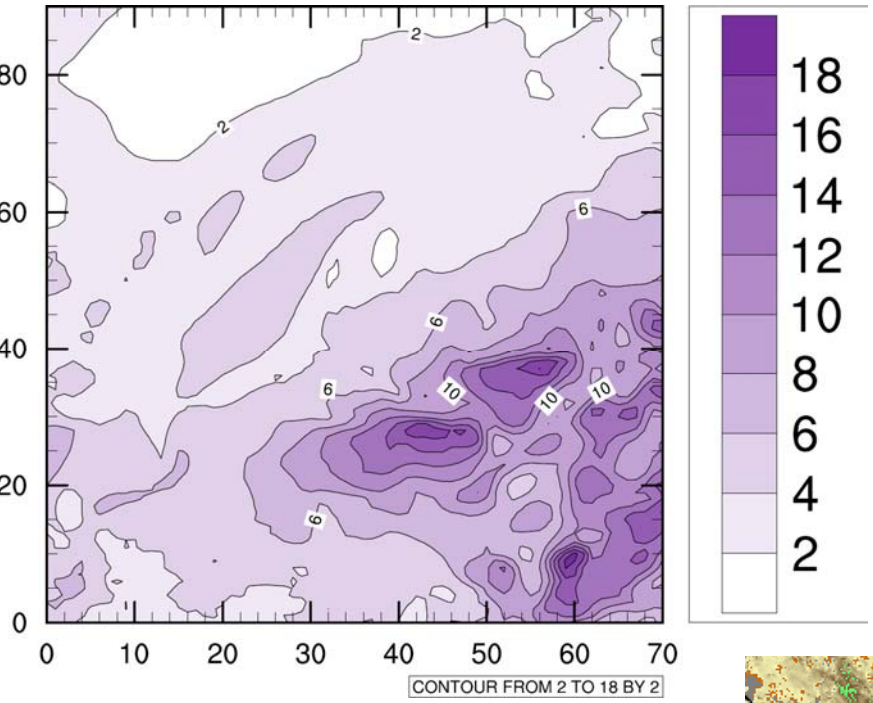


HARMONIE

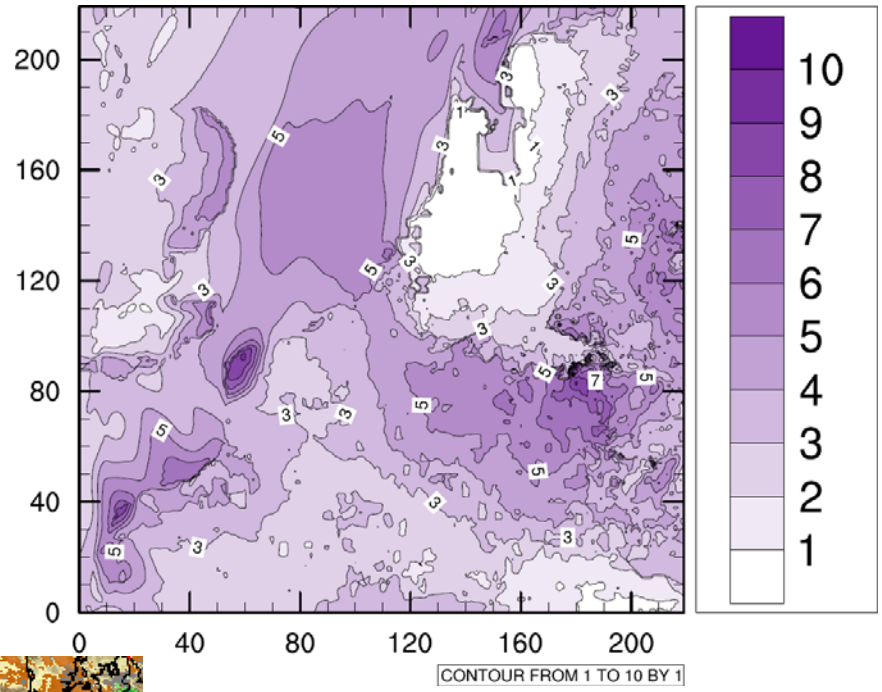


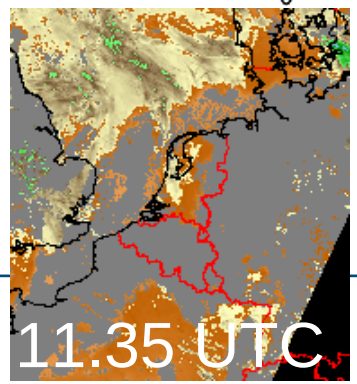
Dew point depression 25 Nov 12 UTC

HIRLAM



HARMONIE

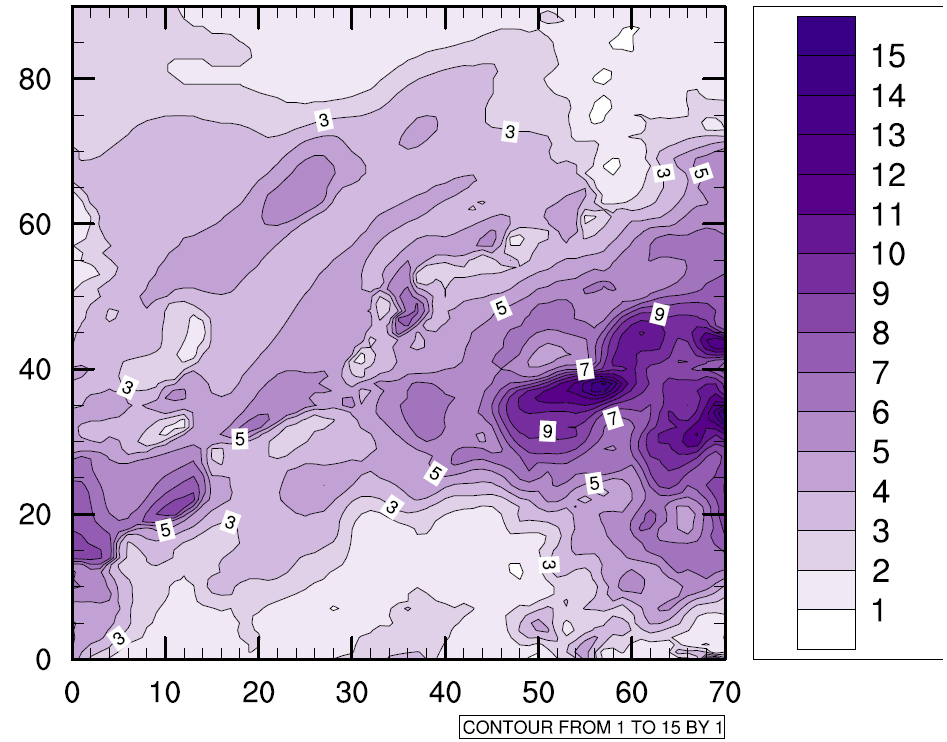




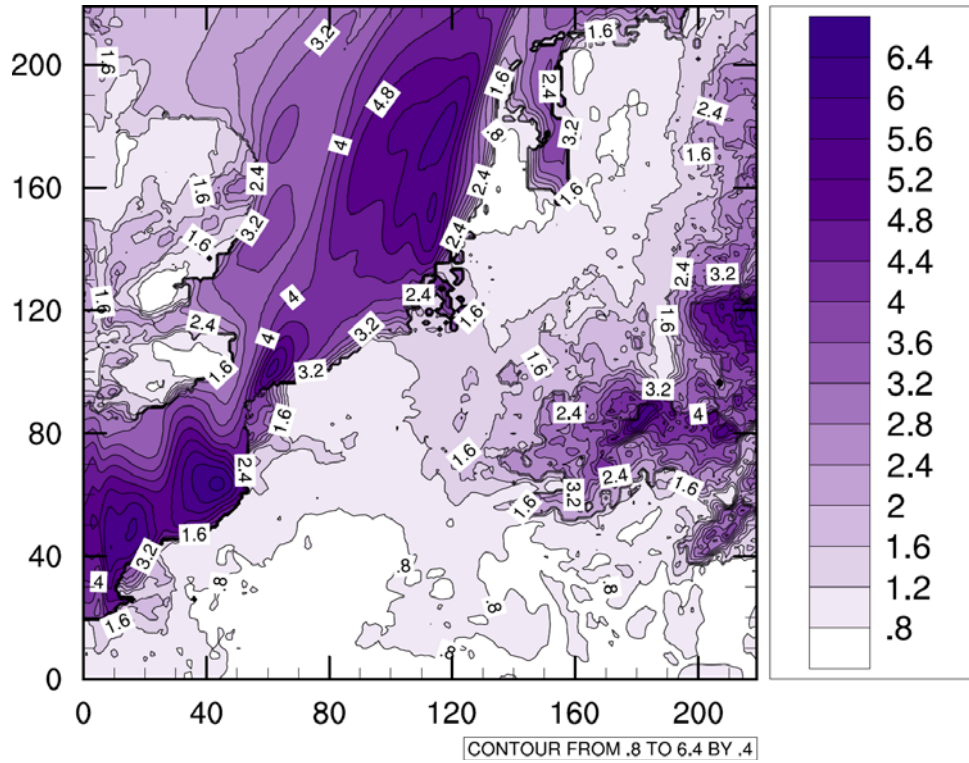
Fog well represented in HARMONIE @ 12UTC.

Dew point depression 25 Nov 18 UTC

HIRLAM



HARMONIE



Evening rush hour much better represented in HARMONIE

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Outlook

Explain model behaviour in terms of energy budgets

Quantify results in statistical scores

Systematic sensitivity studies

-forecast lead time

-domain configuration

More easy case of 5-7 Okt 2005

HARMONIE SET-UP

NETHERLANDS

```
TSTEP=60        # Time step
NLON=300        # Number of points (x)
NLAT=300        # Number of points (y)
LONC=4.9        # Longitude of domain centre (degrees)
LATC=51.967     # Latitude of domain center (degrees)
LON0=0.0        # Reference longitude of the projection (degrees)
LAT0=52.5       # Reference latitude of the projection (degrees)
GSIZE=2500.     # Grid size in meters (x,y)
```