



# **SMHI HARMONIE RA**

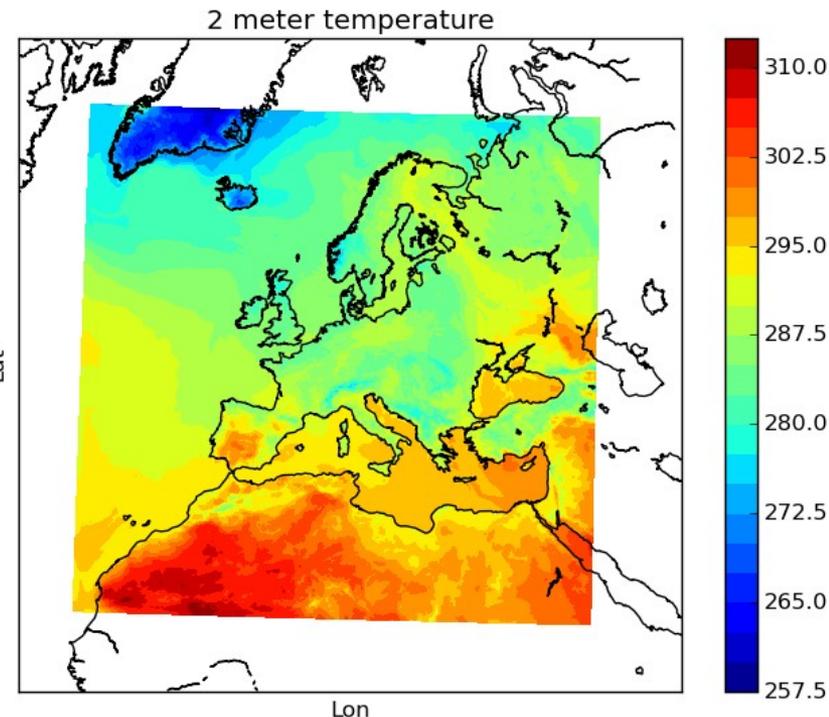
*Overview and production status*

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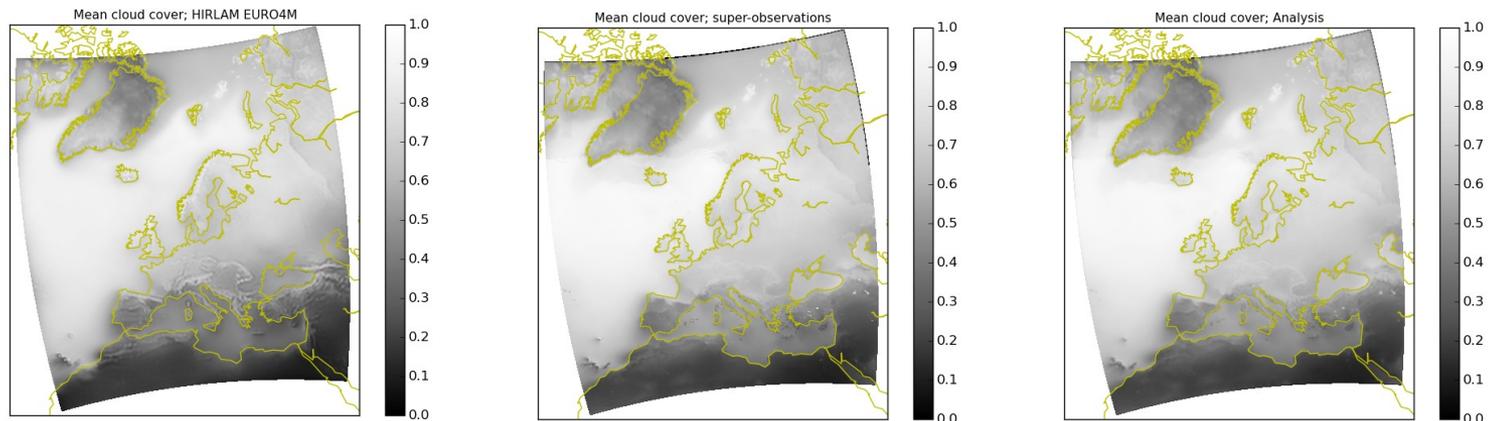
## WP2: Ensemble Data Assimilation Regional Reanalysis Data set – SMHI

- 82 pm over 4 years (~48 consumed), plus 8 (WP4 downstream services), plus ~17 (WP5, 6, 7, 9 scientific coordination, management, outreach...)
  
- 5 year HARMONIE mini ensemble
  - Preparation for the longer re-analysis
  - 2006-2010 using ALADIN and ALARO physics
  - 11 km, 576x576 grid points
  - Re-run of both ALADIN and ALARO are done
  - Report D2.5 is available
  
- 50+ years regional reanalysis with HARMONIE<sup>lat</sup>
  - ALADIN physics is used
  - 2000-2015 is nearly ready
  - 1961-1999 – 3-5 years per decade completed
  - Report D.2.6 is available
  - Archiving in MARS has started



## WP2: Ensemble Data Assimilation Regional Reanalysis Data set – SMHI

- SURFEX leaf area index (LAI) sensitivity
  - Sensitivity studies of prognostic
  - Investigate the possibility to assimilate LAI
  
- 30 years MESAN cloud analysis
  - 2D analysis of cloud fraction for 30 years
  - 5.5 km resolution 1982-2013
  - 2004-2009 is produced with data from CLAAS-A1 (SEVIRI) and CLARA-A1 (AVHRR)
  - Good quality data is available for 1991-2015 and will be run later this year
  - No good quality data is available for 1983-1991
  - Report D2.10, for the first period, is available
  - Will be archived as GRIB2 in MARS



*Mean cloud cover for the years 2004 – 2009*

## HARMONIE (HIRLAM ALADIN Regional/Mesoscale Operational NWP In Europe)

- HARMONIE
  - Cy38h1.1
  - Semi implicit, semi Lagrangean, hydrostatic dynamics
  - ALADIN physics
  - SURFEX
  
- Data assimilation
  - 3DVar for upper air – Conventional observations (SYNOP, Ship, Buoys, Radiosondes, Pilot and Aircraft)
  - Large scale constraint – Jk
  - OI for the surface – T2m, RH2m and snow water equivalent
  
- Forecasts
  - Long forecasts at 00 and 12
  - 1 hour resolution up to 6 hours, 3 hour resolution up to 30 hours

## 50+ year re-analysis, 1961-2015

- HARMONIE with ALADIN physics
  - Showed better scores in the verification of the 5-year runs
  
- Run in several parallel streams with 4 months overlap
  - 2011 – 2015      Done
  - 2006 – 2010      Done
  - 2000 – 2005      ~1 year to go
  - 1990 – 1999      ~5 years to go
  - 1979 – 1989      ~5
  - 1970 – 1978      ~5
  - 1961 – 1969      ~4
  
- Observations and boundaries
  - 1961-2001 we will use ERA40 observations with addition of Swedish and French observations in the early years. After that operational data
  - 1961-1979 we will use ERA40 boundaries. After that ERAinterim

# Archiving

- Extract data
  - Get data from ECFS
  - Extract fields for archiving
  
- Conversion to GRIB2
  
- Archiving in MARS
  - Preferably only one user
  
- Progress
  - One month needs about two weeks (the limitation is ECFS)
  - 2008 is archived
  - 2006 (almost done) and 2007 (done) runs in parallel
  - Next in line is 2009 and 2010
  - More parallel streams?

# Computer resources

- Special project
  - Special project at ECMWF with 30 milj. SBU per year for three years
  - Extension with 10 milj. SBU
  
- National resources
  - Almost all were used in September
  - All production were put on hold
  
- UK MetOffice to the rescue
  - 60 milj. SBU were given to SMHI UERRA runs
  - To be used before the end of the year
  - We have consumed ~30 milj. so far
  
- New special project
  - Granted for 2017 (66 milj. SBU) and 2018 (24 milj. SBU)

# Summary

- 5 year mini ensemble
  - Re-run is complete
  - ALADIN as part of the long re-analysis
  
- 50+ year re-analysis
  - More than half way – the “modern years” are complete
  - Archiving in MARS started
  - More in upcoming presentation by Esbjörn
  
- Cloud analysis
  - Very good progress
  - More in upcoming presentation by Jelena