

# WP2 overview and progress

With thanks to

Lilo Bach, Martin Ridal, Per Unden, Tomas Landelius,  
Jelena Bojarova, Esbjörn Olsson, Eric Bazile,  
Patrick Le Moigne, Peter Jermey, Jemma Davie,  
and others...

# WP2

## Ensemble Data Assimilation Regional Reanalysis Dataset

**SMHI**

universität **bonn**



**Deutscher Wetterdienst**  
Wetter und Klima aus einer Hand



**METEO FRANCE**  
Toujours un temps d'avance

# WP2 Tasks

- T2.1 Ensemble-Variational DA Reanalysis ([Met Office](#))
- T2.2 Deterministic Reanalysis ([SMHI](#), [MF](#))
- T2.3 Downscaling ([MF](#))
- T2.4 Cloud Fraction Reanalysis ([SMHI](#))
- T2.5 Ensemble-Nudging DA Reanalysis ([UB](#))
- T2.6 Reanalysis Cross-Evaluation ([MO](#), [SMHI](#), [DWD](#), [UB](#))

## T2.1 Ensemble-Variational DA Reanalysis ([Met Office](#))

**Peter Jermey, Jemma Davie, Richard Renshaw**

# T2.1 Status

- LBCs: ERA-Interim not ERA5
- Ensemble system started from 1979
- Archiving/GRIB2 conversion now working – need to re-archive data so far
- Some teething problems:
  - error in interpolated SSTs
  - verification - were validating against all obs, including bad ones
- Deterministic with hybrid 4DVar - testing/tuning before starting production

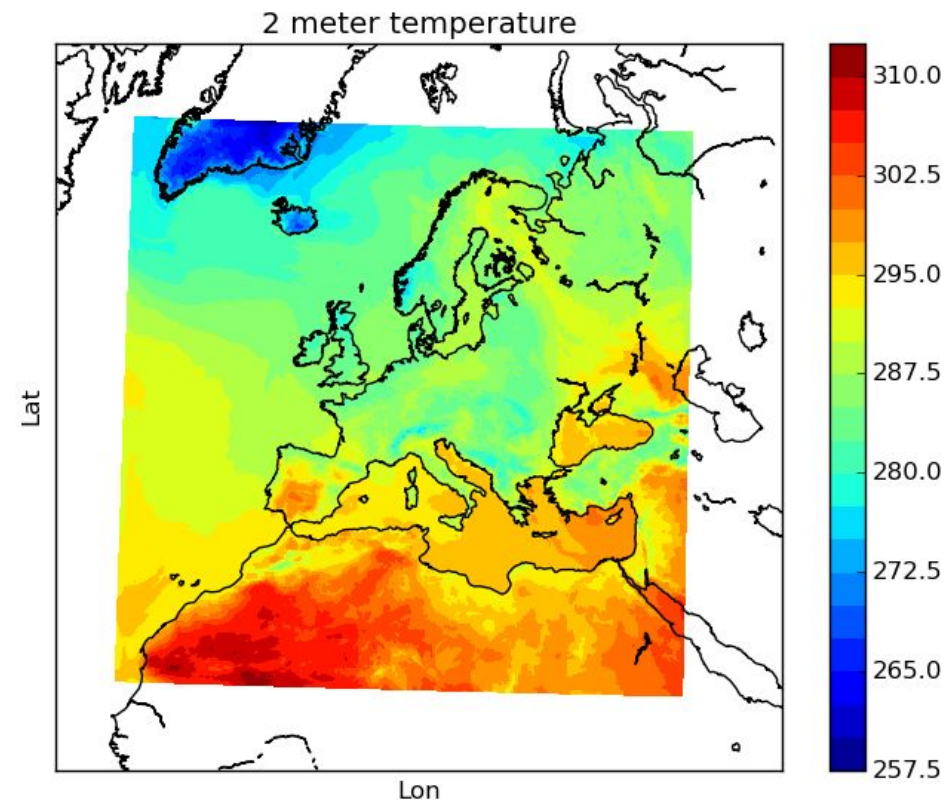
## T2.2 Deterministic Reanalysis ([SMHI](#), [MF](#))

**Martin Ridal**

**Per Unden, Esbjörn Olsson, Heiner Körnich, Ulf Andrae, Jelena Bojarova,  
Patrick Samuelsson, Tomas Landelius**

## 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
  - 2006-2010 using ALADIN and ALARO physics
  - 11 km, 576x576 grid points
  - Re-run is complete
  - Report D2.5 is available
  
- 50+ years regional reanalysis with HARMONIE
  - 2000-2015 is nearly ready
  - 1961-1999 – 3-5 years per decade completed
  - Report D.2.6 is available
  - Archiving in MARS has started



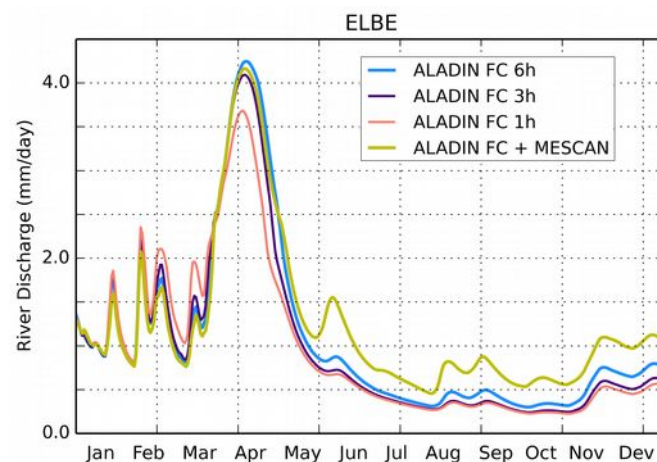
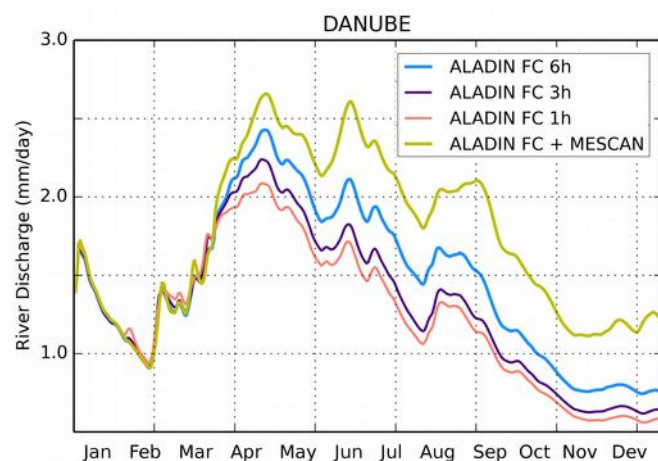
## T2.3 Downscaling Reanalysis (MF)

**Eric Bazile, Rachid Abida, Patrick Le Moigne**



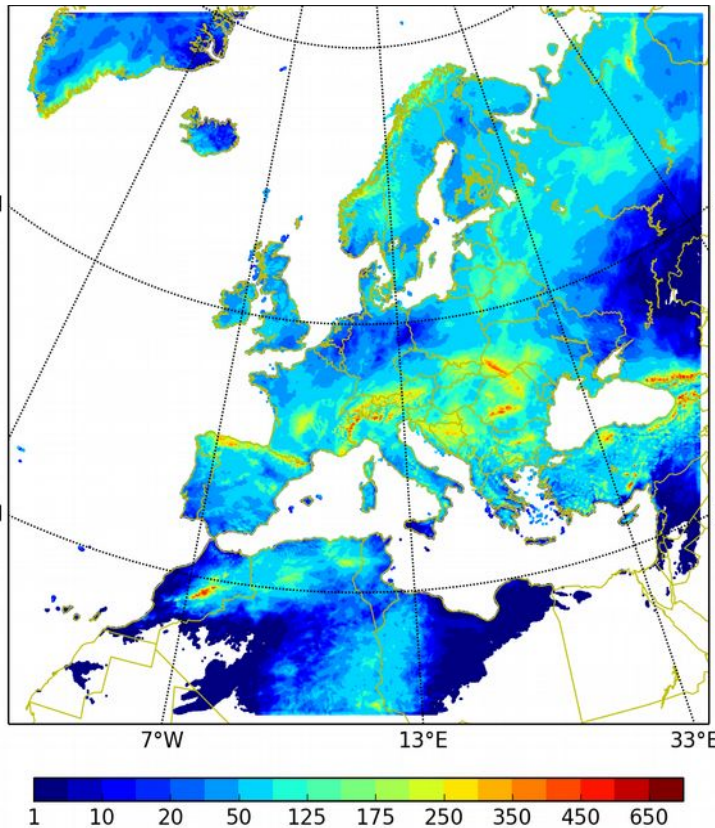
# MF Contribution

- For the period 2006-2010:
  - Ensemble is complete for the T2m/Hu2m with 8 members and for 24H precipitation analysis with 6 members. Grib1 file but not yet available on Mars
  - For the show case 2008 is available on Mars with analysis data and SURFEX output
- The reference production has started based on the new downscaled SMHI-3Dvar-ALADIN :
  - First we need to downscale the SMHI-ALADIN background (T2m, Hu2M and precipitation) : one month in one day. (behind SMHI production)
  - Period done: 1961-1964, 1970-1971, 1990-1993, 2000-2002, 2006-2012
  - Precipitation analysis done for 2006-2010 : one year in 1.5 days
  - Temperature/Relative humidity done for 2008, 2006, 2007 are still running : one month in one day
- River Discharge with MESCOAN-SURFEX-TRIP sensitivity experiments : ensemble with MESCOAN-ENSEMBLE will be done next month

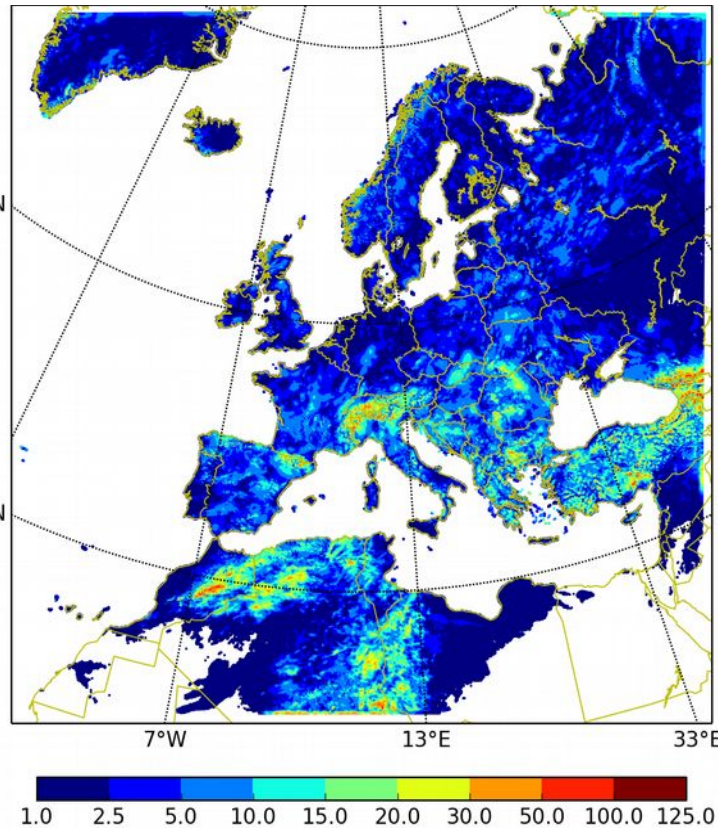


# MF Contribution – Precipitation analysis

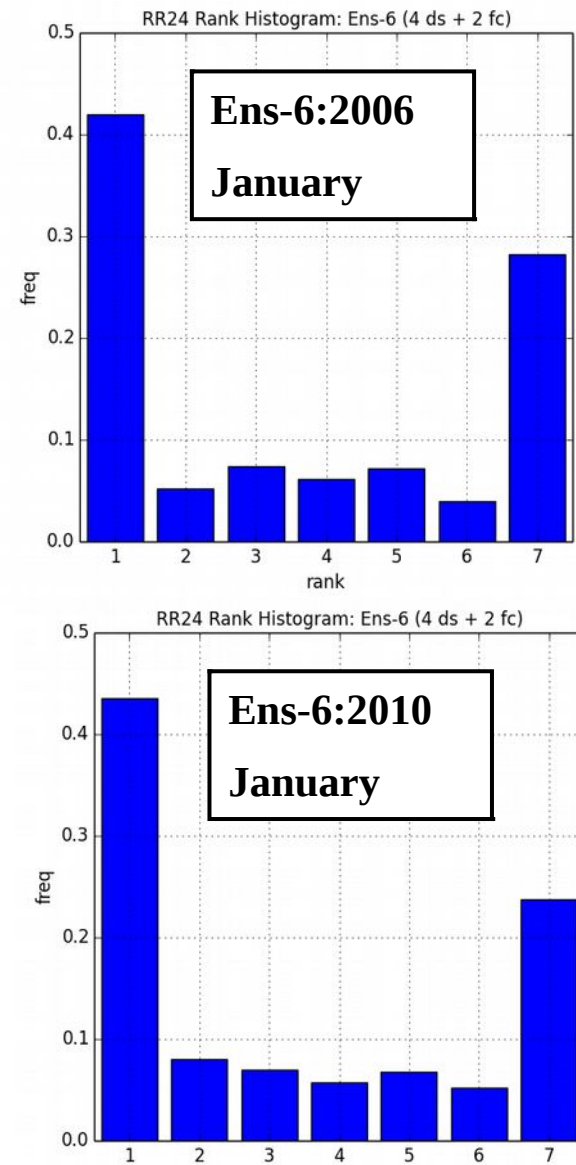
Ensemble mean for 24h precipitation (6 Members) June 2010



Standard deviation for 24h precipitation (6 Members) June 2010



Higher uncertainties over mountains & regions lacking observation, preliminary due to the model physics : over Atlas coefficient of variation (CV) can reach 80%



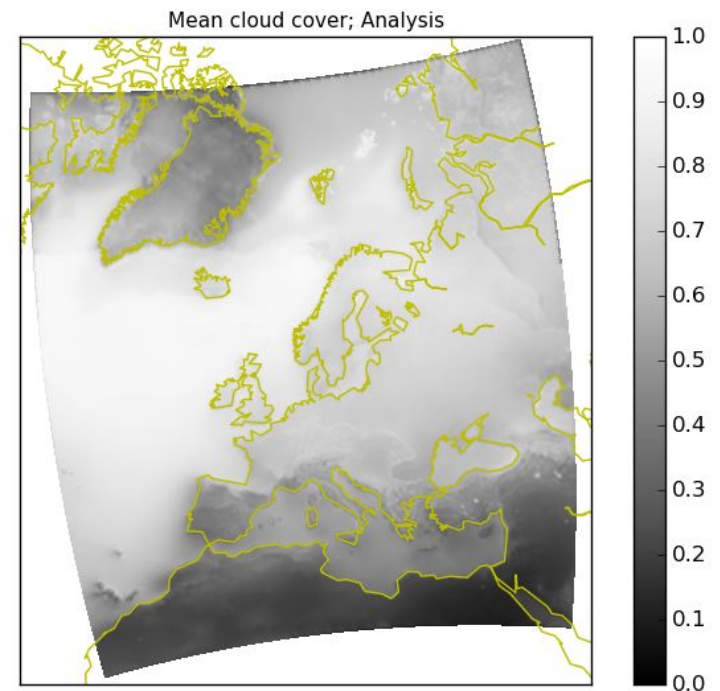
## T2.4 Cloud Fraction Reanalysis ([SMHI](#))

**Jelena Bojarova**

**Tomas Landelius, Martin Ridal, Per Unden, Esbjörn Olsson, Heiner  
Körnich, Ulf Andrae, Patrick Samuelsson**

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

- 30 years MESAN cloud analysis
  - 2D analysis of cloud fraction at 5.5 km resolution
  - 2004-2009 is produced with data from CLAAS-A1 (SEVIRI) and CLARA-A1 (AVHRR)
  - Report D2.10, for the first period, is available
  - Will be archived as GRIB2 in MARS



## T2.5 Ensemble-Nudging DA Reanalysis ([UB](#))

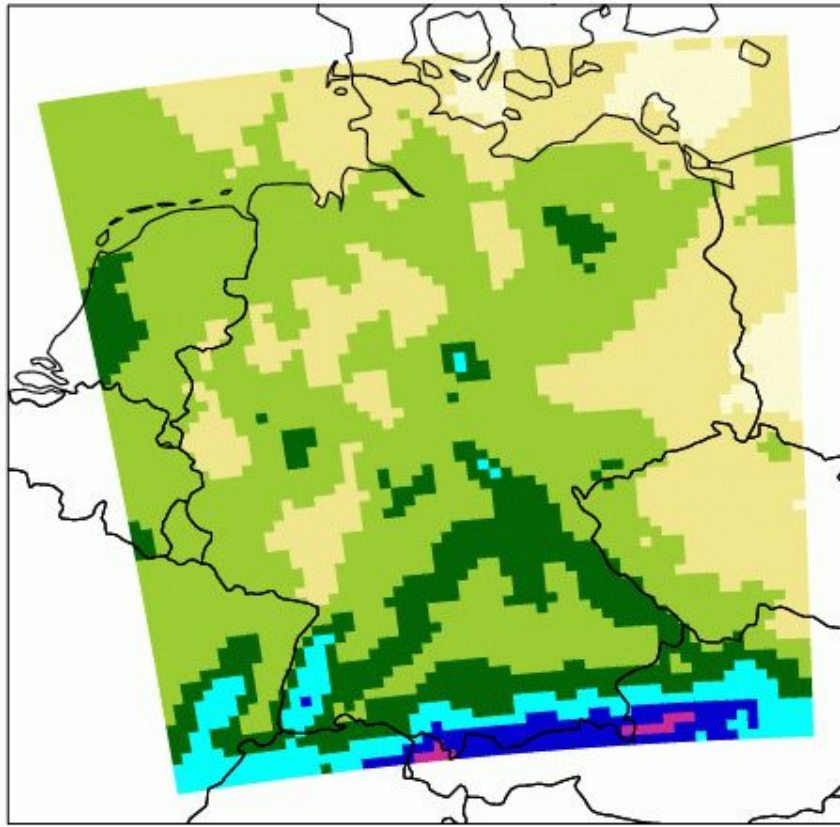
Lilo Bach

# Status

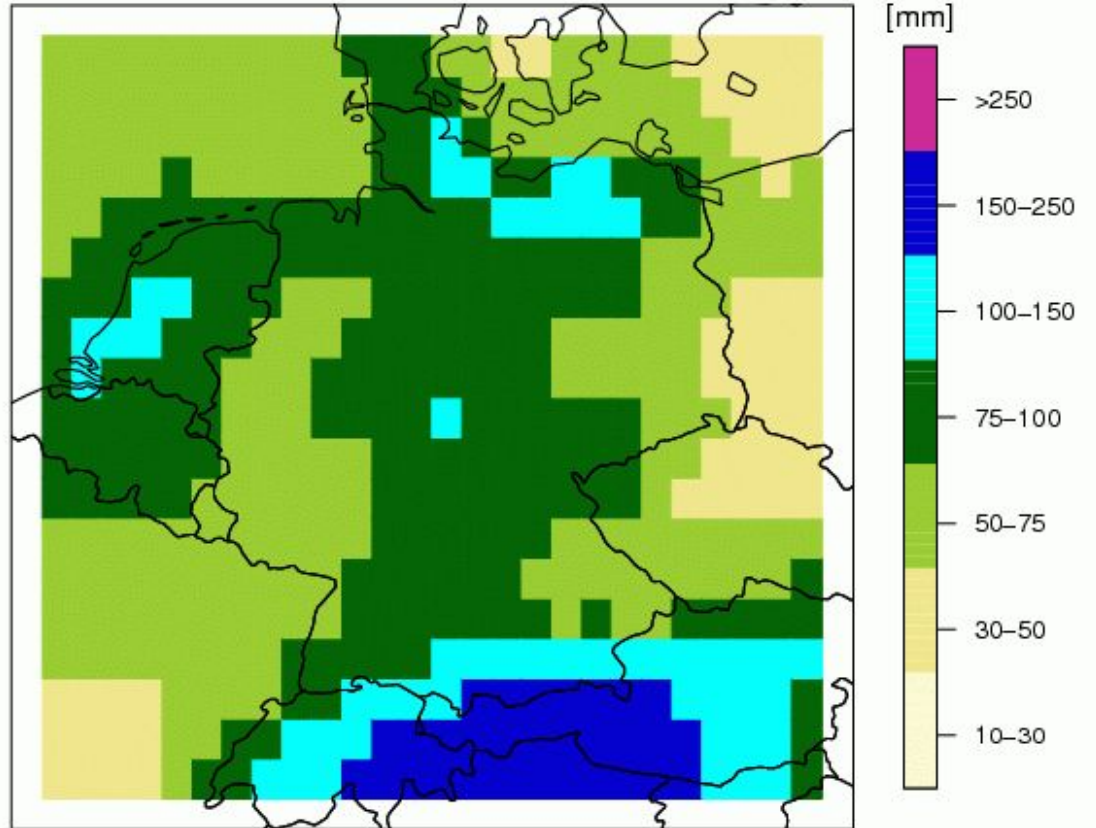
- Reanalysis based on ensemble nudging:
  - Obs uncertainty
  - SPPT (Stochastic Perturbation of Physical Tendencies)
  - Option for ensemble of ICON LBCs
- Archiving work ongoing
  - Production stopped for now until issues resolved



# Ensemble precipitation

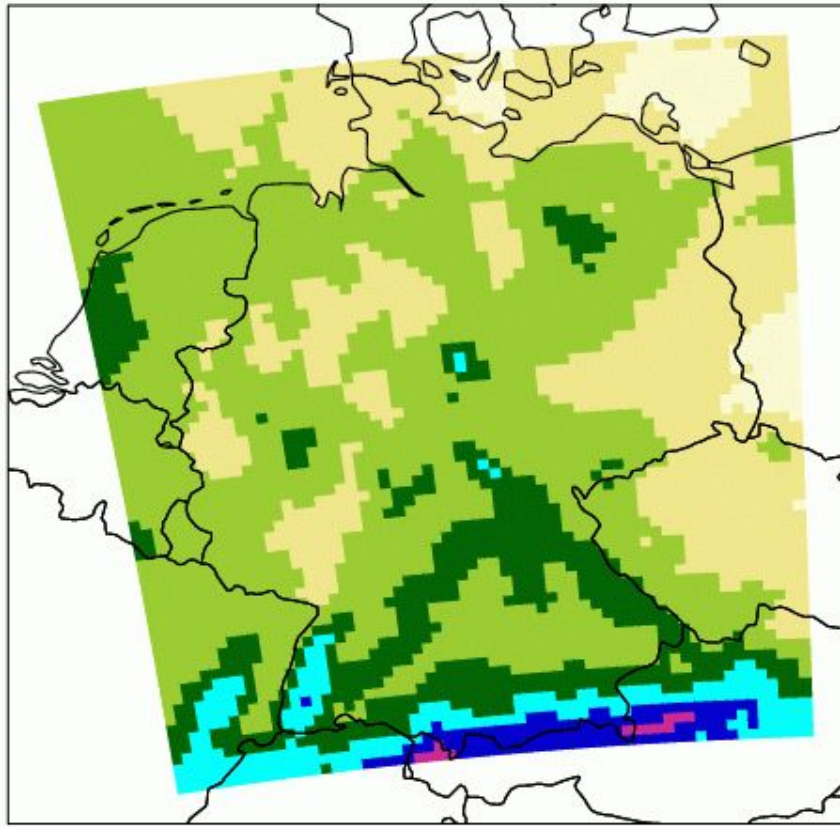


COSMO  
mean

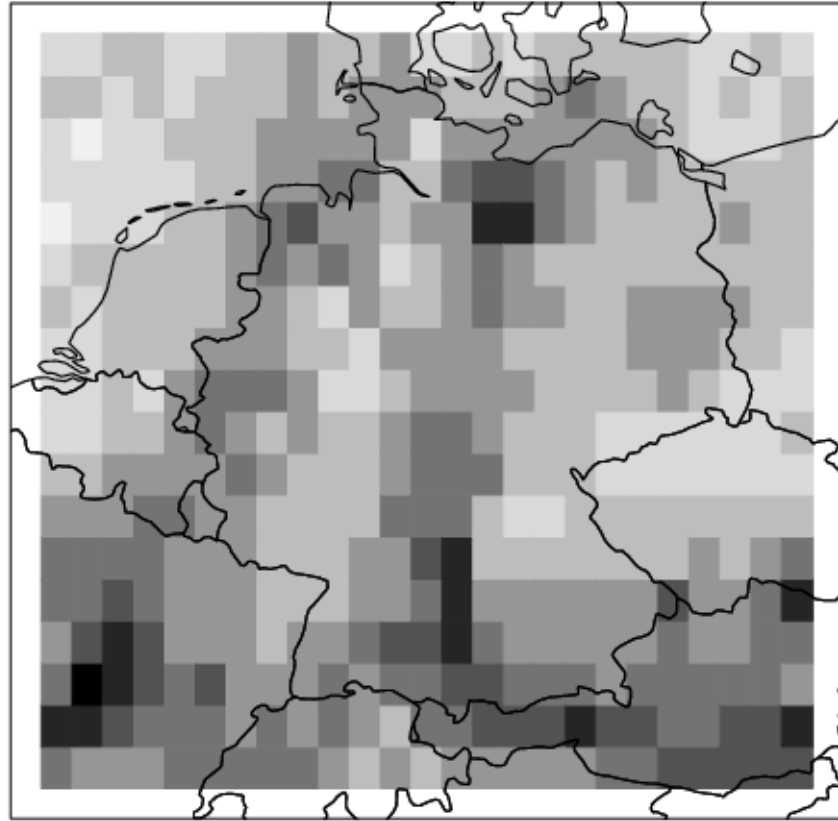


ERA-Interim

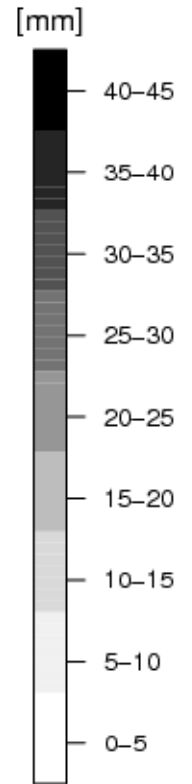
# Ensemble precipitation



COSMO  
mean



COSMO  
spread





## T2.6 Reanalysis Cross-Evaluation

(MO, SMHI, DWD, UB)

Evaluation of the regional reanalyses:

Evaluation of quality of EVDA, HARMONIE and KFENDA test mean and uncertainty estimates.

Ensemble reanalysis uncertainties will be evaluated by comparing EVDA, HARM and KFEN datasets against

a) Each other

b) Global (ERA-Clim)

# WP2 Deliverables Year 3

**D2.2** Report of observations and datasets assembled for the ensemble-based variational assimilation ([Met Office](#))

**D2.5** Report of results and datasets of two physics HARMONIE runs for spread estimation ([MeteoFrance](#))

**D2.6** Preliminary report of the first period of the RA ([SMHI](#))

**D2.10** UERRA-MESA-CL 30-year European cloud fraction dataset and report ([SMHI](#))

Aiming for December:

**D2.3** Preliminary report with ensemble diagnostics ([Met Office](#))

**D2.9** Ensemble surface reanalysis report (M30, [MeteoFrance](#))

# WP2 Deliverables Year 4

D2.4 Ensemble diagnostics report and documentation (M42, [Met Office](#))

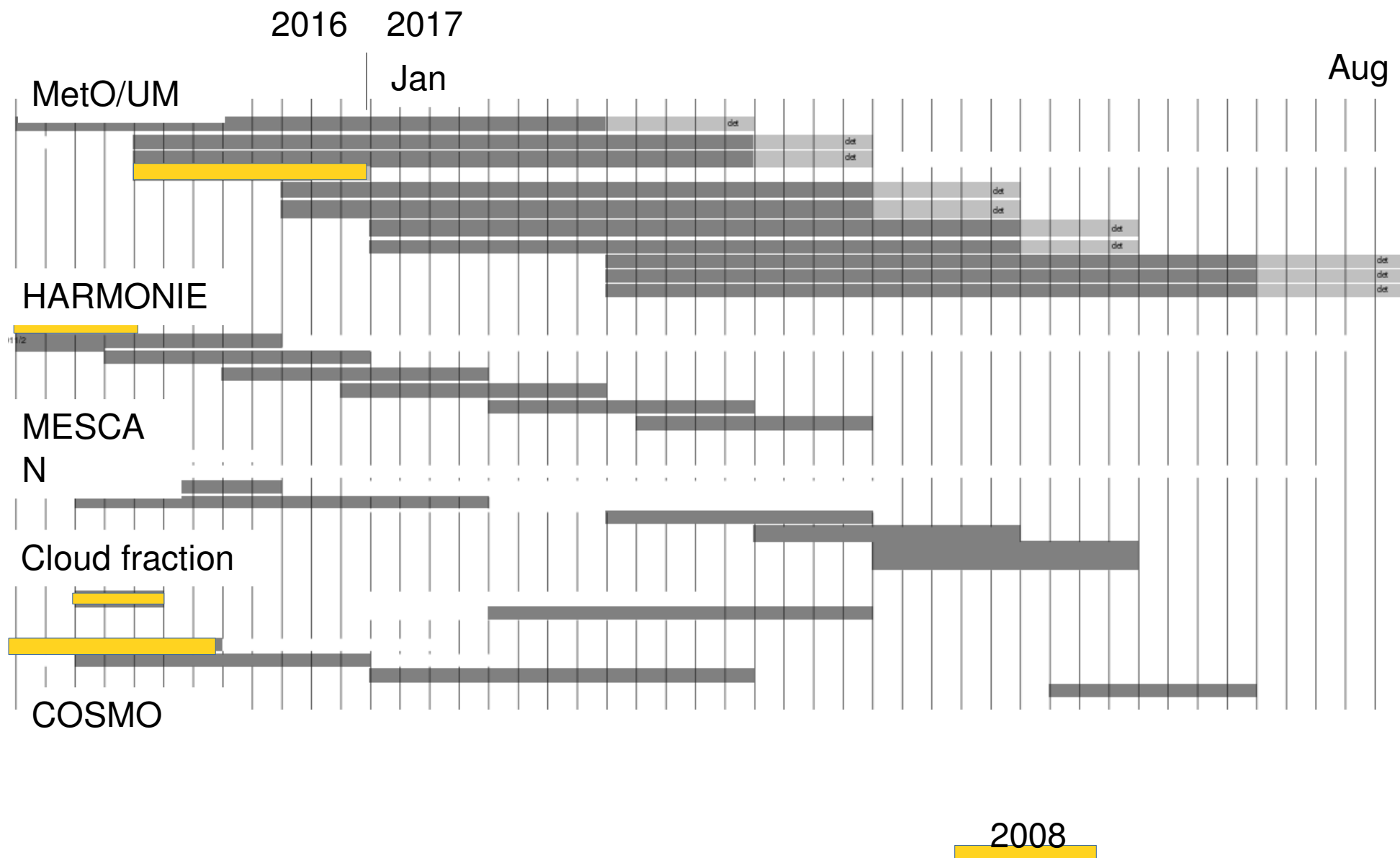
D2.7 HARMONIE reanalysis report of results and dataset (M45, [SMHI](#))

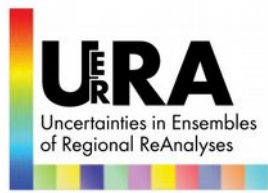
D2.8 MESCAN reanalysis dataset and report (M45, [MeteoFrance](#))

D2.13 KFENDA ensemble diagnostics report (M45, [U Bonn](#))

D2.14 RA uncertainty evaluation report (M45, [Met Office](#))

# Production Schedule





Thank You