

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

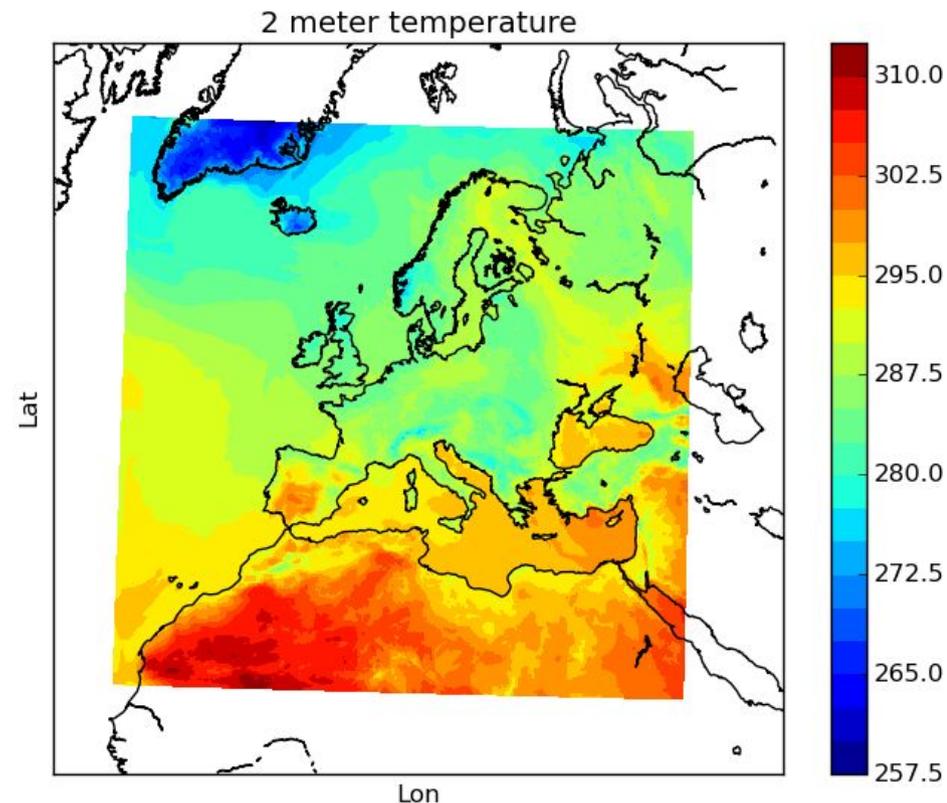
**Per Uden, Esbjörn Olsson, Heiner Körnich, Ulf Andrae, Jelena Bojarova,
Patrick Samuelsson, Tomas Landelius**

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

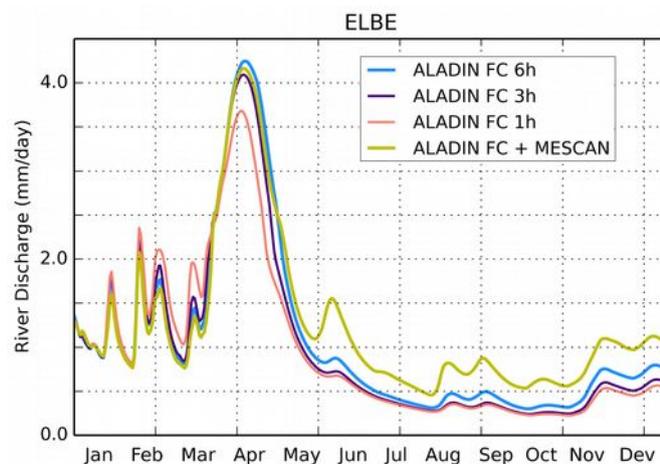
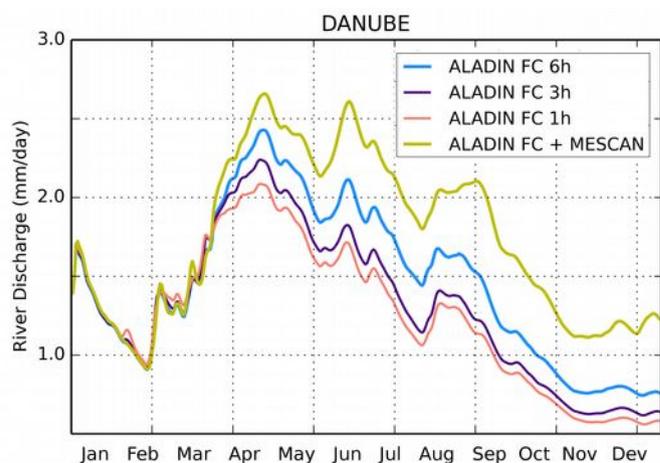


T2.3 Downscaling Reanalysis (MF)

Eric Bazile, Rachid Abida, Patrick Le Moigne

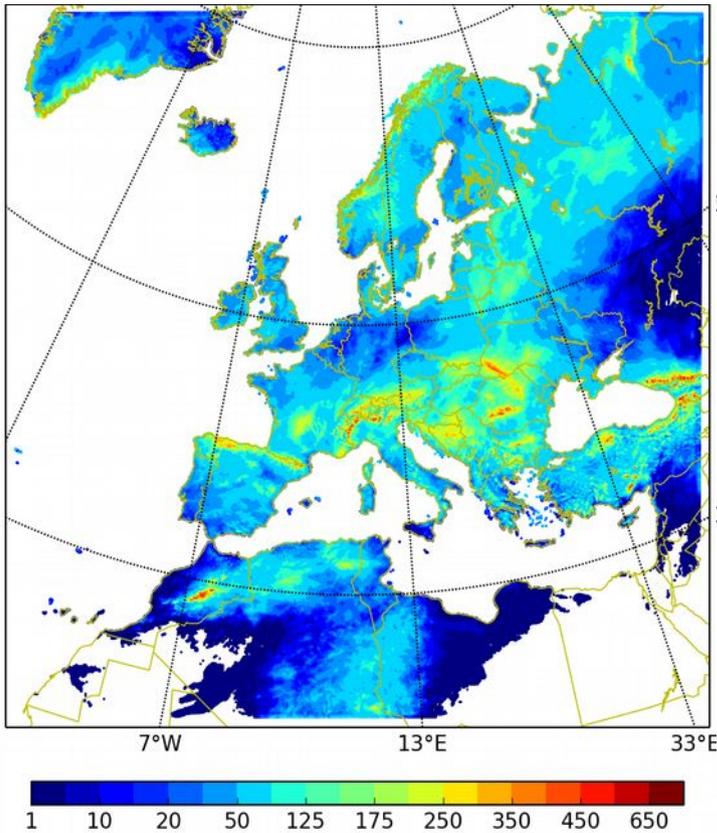
MF Contribution

- 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 MESCAN-SURFEX-TRIP sensitivity experiments : ensemble with MESCAN-ENSEMBLE will be done next month

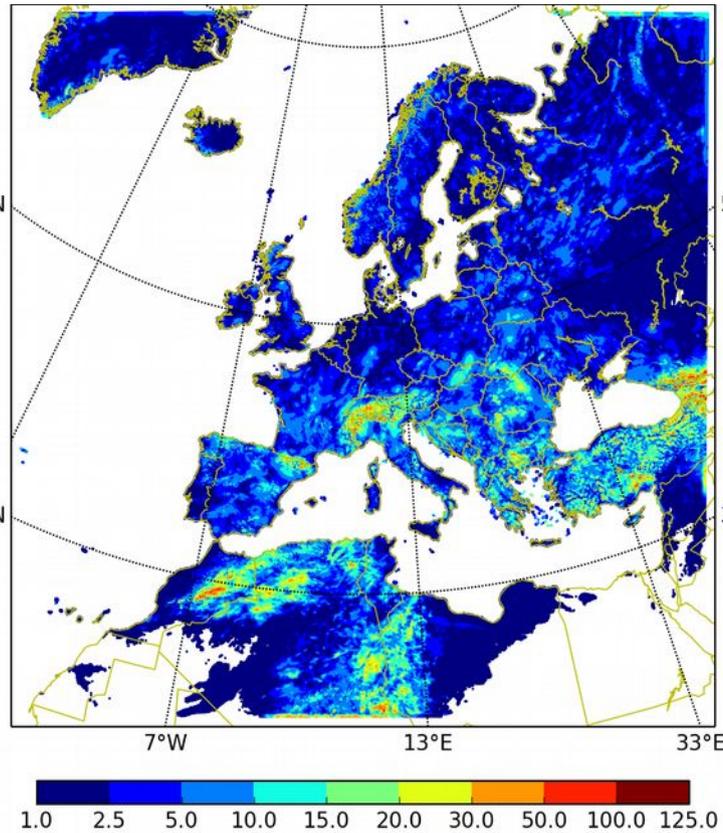


MF Contribution – Precipitation analysis

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

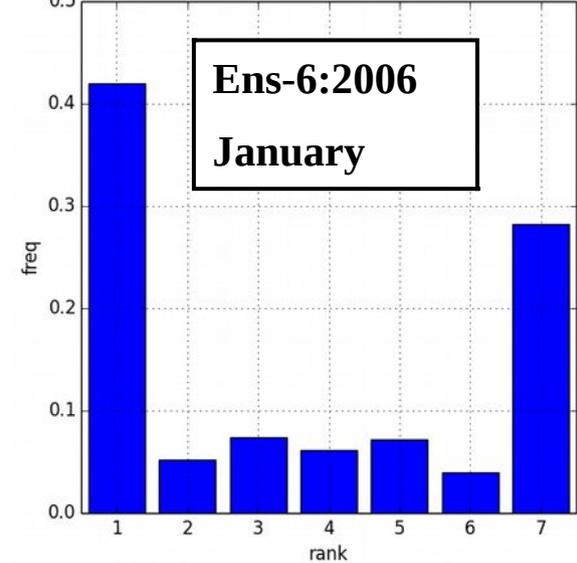


Standard deviation for 24h precipitation (6 Members) June 2010

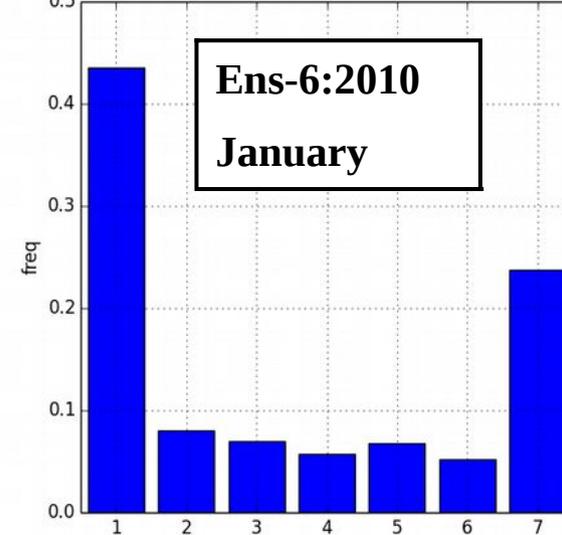


Higher uncertainties over mountains & regions lacking observation, preliminary due to the model physics : over Atlas coefficient of variation (CV) can reach 80%

RR24 Rank Histogram: Ens-6 (4 ds + 2 fc)



RR24 Rank Histogram: Ens-6 (4 ds + 2 fc)



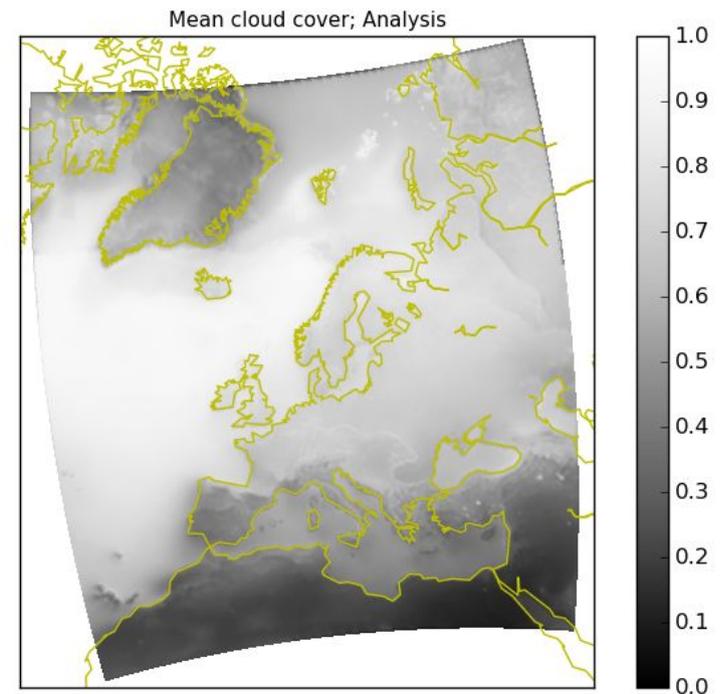
T2.4 Cloud Fraction Reanalysis ([SMHI](#))

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



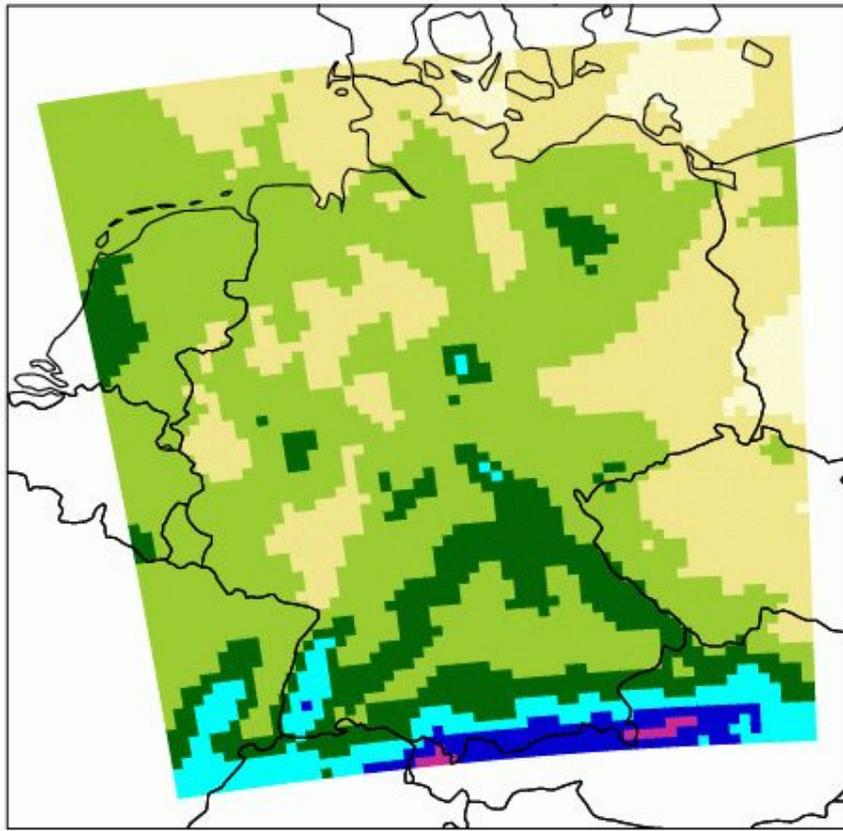
T2.5 Ensemble-Nudging DA Reanalysis (**UB**)

Lilo Bach

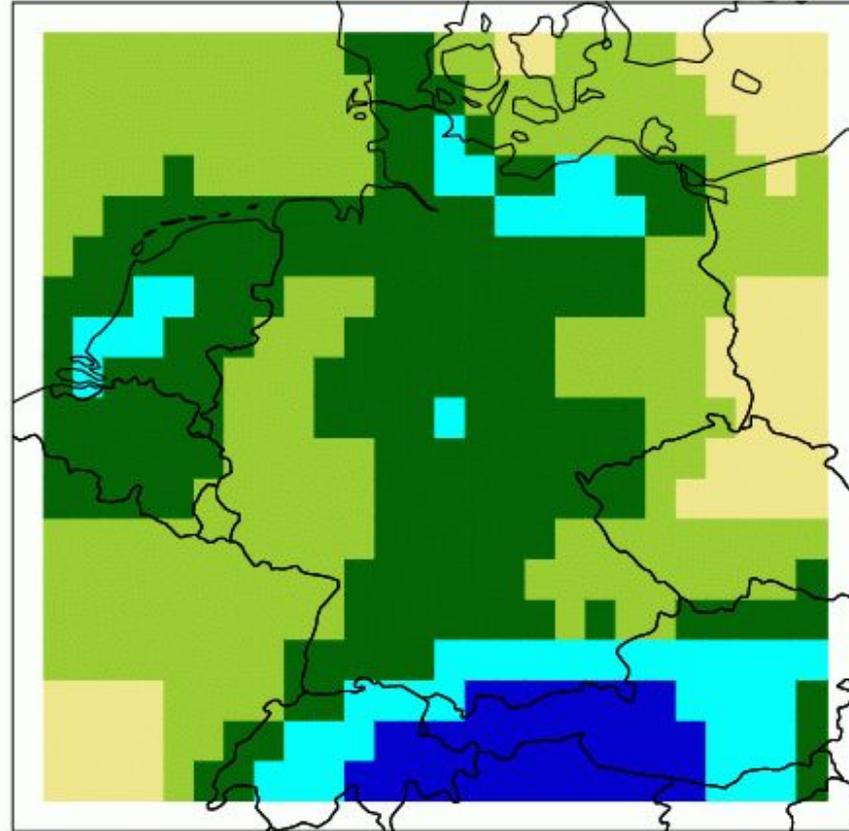
Status

- 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

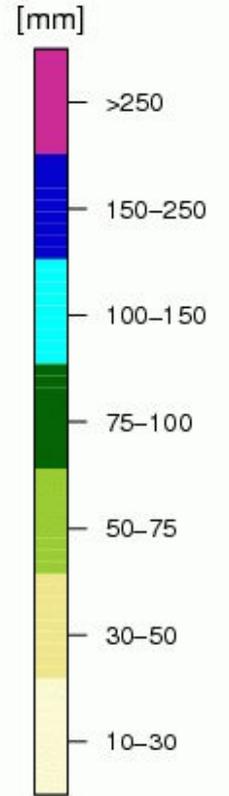
Ensemble precipitation



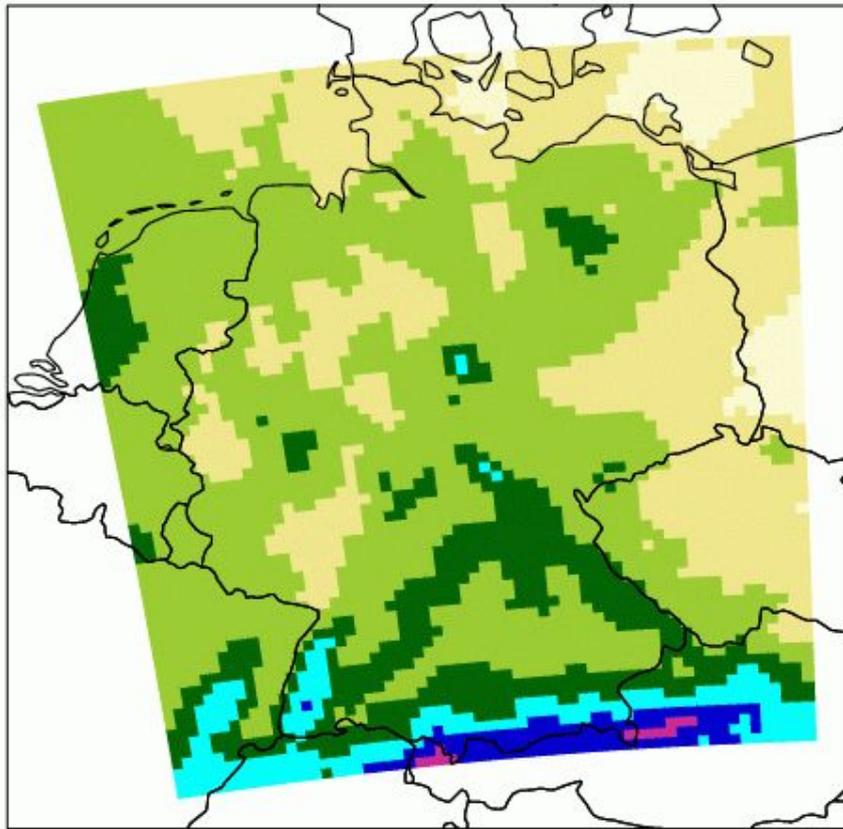
COSMO
mean



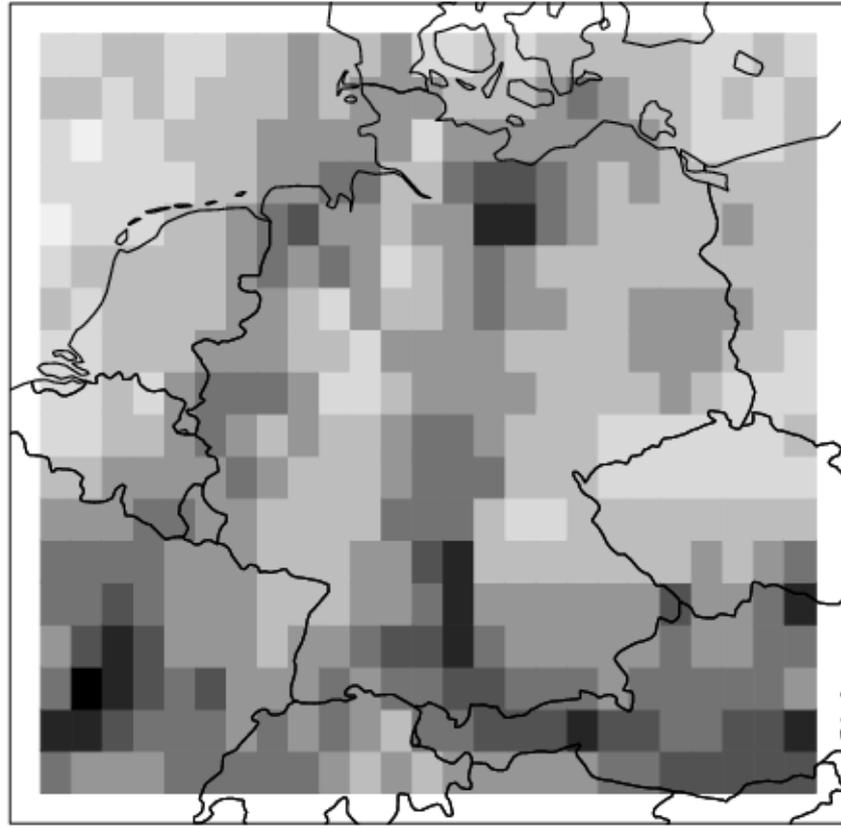
ERA-Interim



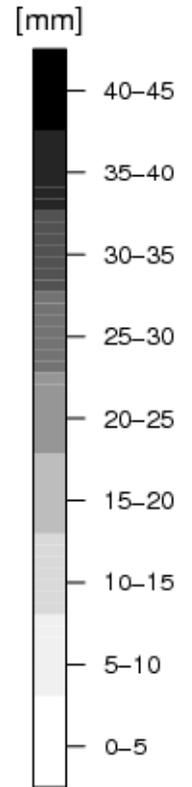
Ensemble precipitation



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](#))

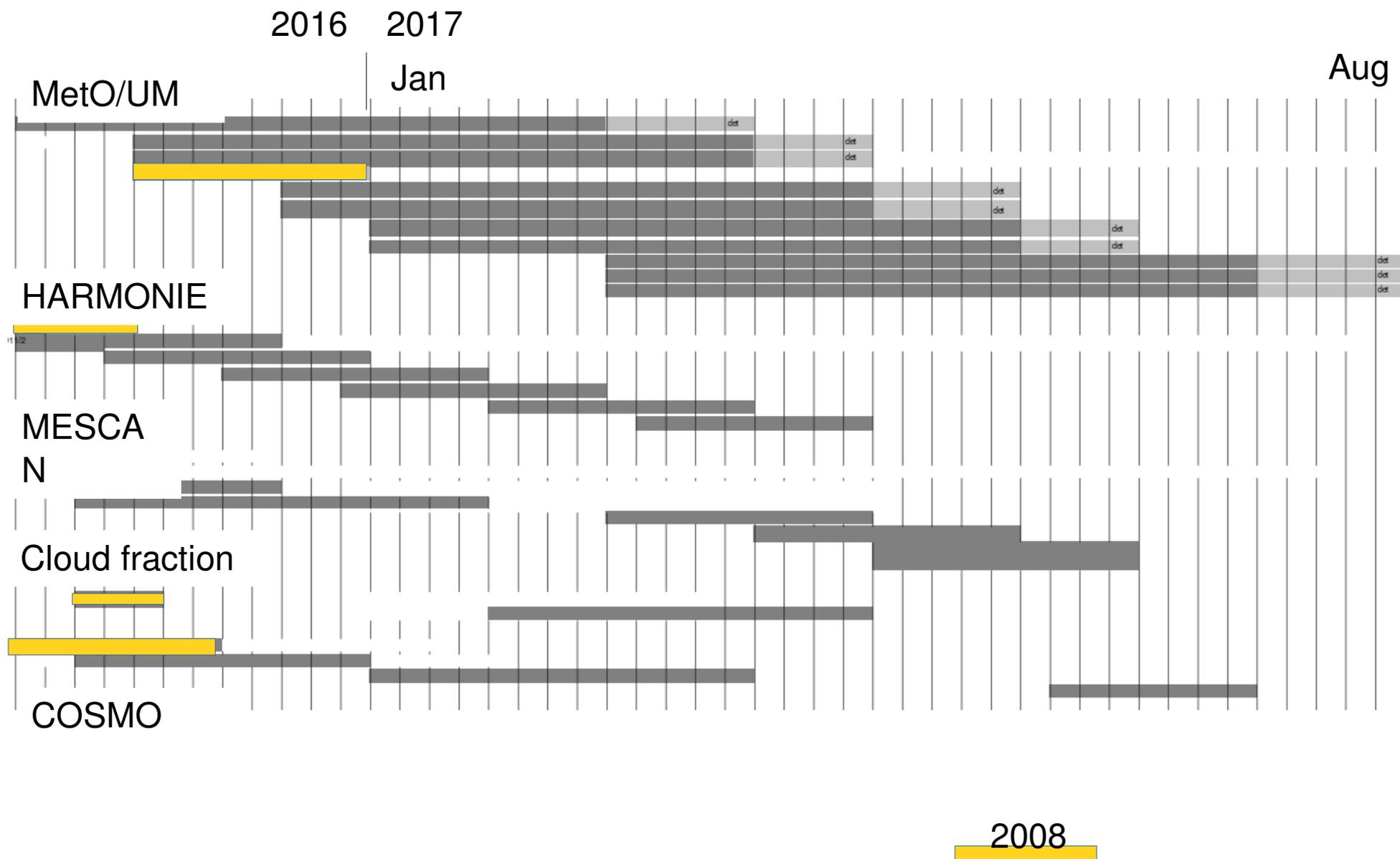
D2.7 HARMONIE reanalysis report of results and dataset (M45, [SMHI](#))

D2.8 MESCOAN 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