

UERRA Regional reanalysis systems

Uncertainties in Ensembles of Regional ReAnalyses

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FP7 SPACE 2013-1

Project Partners

Swedish Meteorological and Hydrological Institute (SMHI)

Météo France (MF)

Het Koninklijk Nederlands Meteorologisch Instituut (KNMI)

The Met Office (MO)

Climatic Research Unit, University of East Anglia (UEA)

**Federal Office of Meteorology and Climatology
(MeteoSwiss),**

**subordinated to Eidgenoessisches Departement des Innern
(EDI)**

University Rovira i Virgili (URV)

National Meteorological Administration (NMA-RO)

**European Centre for Medium Range Weather Forecast
(ECMWF)**

**German Meteorological Service - Deutscher Wetterdienst
(DWD)**

Norwegian Meteorological Institute (MI)

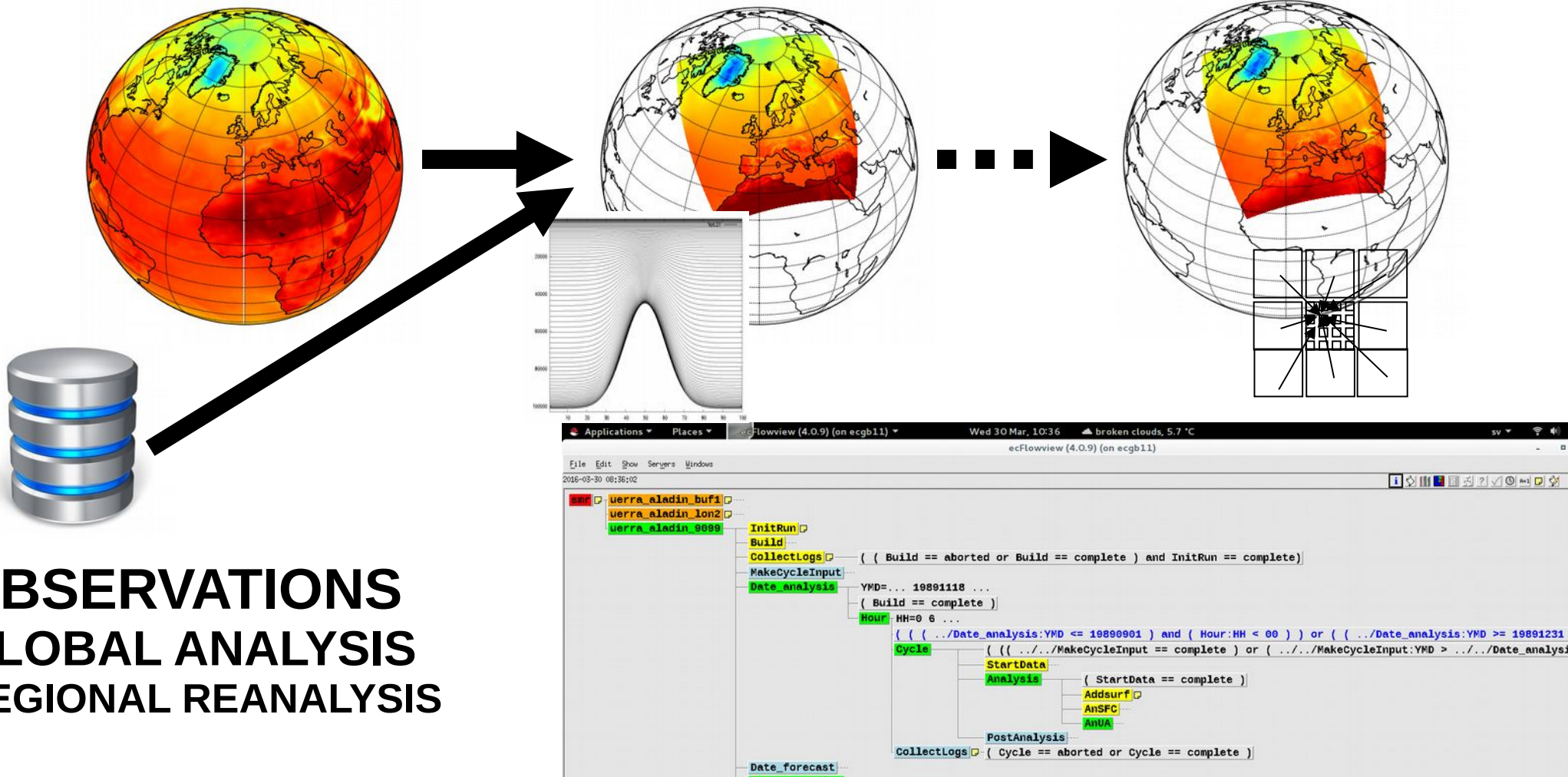
Meteorological Institute at the University of Bonn (UB)



2-dim downscaling & reanalysis

3-dim regional reanalysis

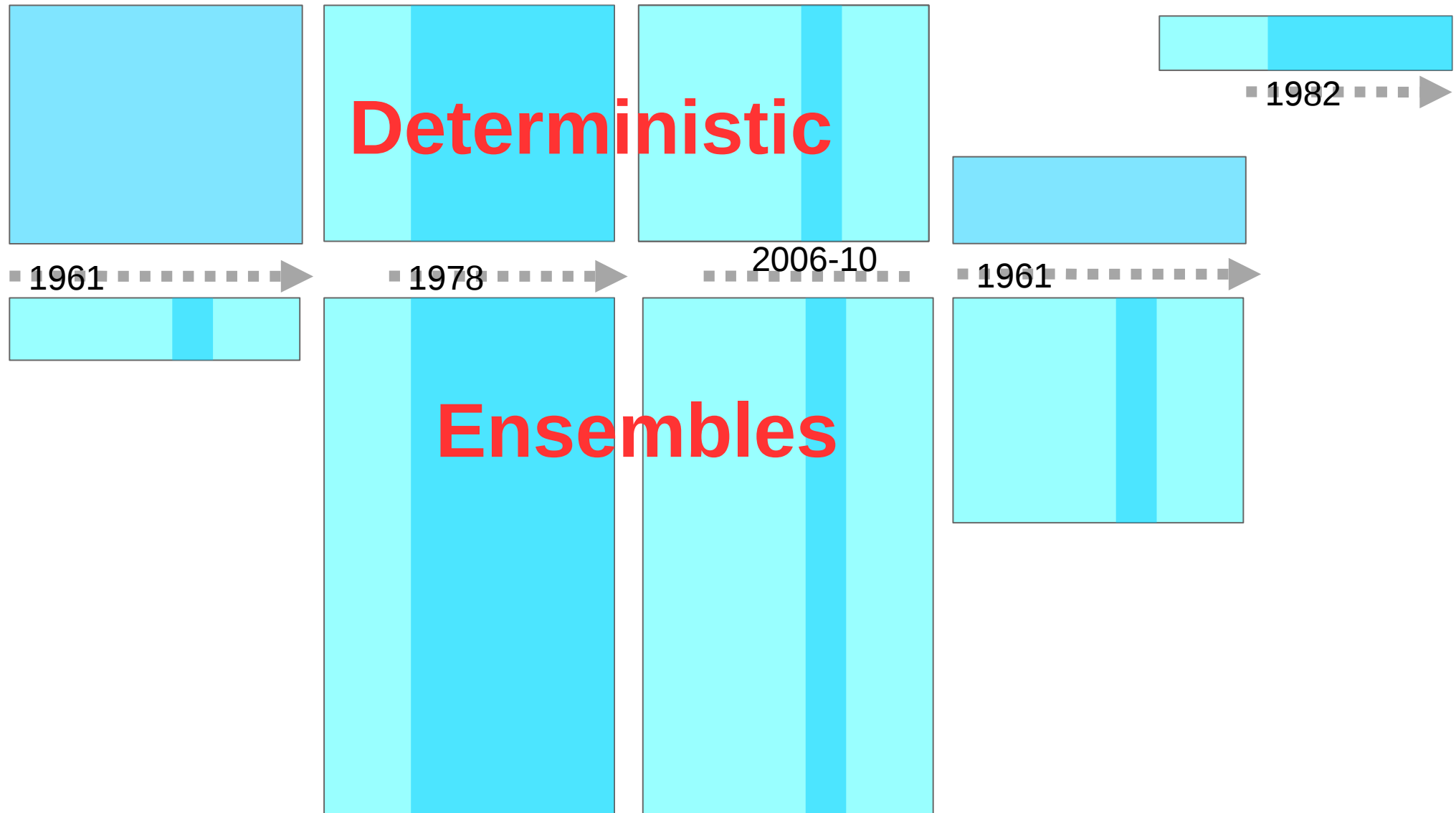
ERA-INTERIM reanalysis boundaries



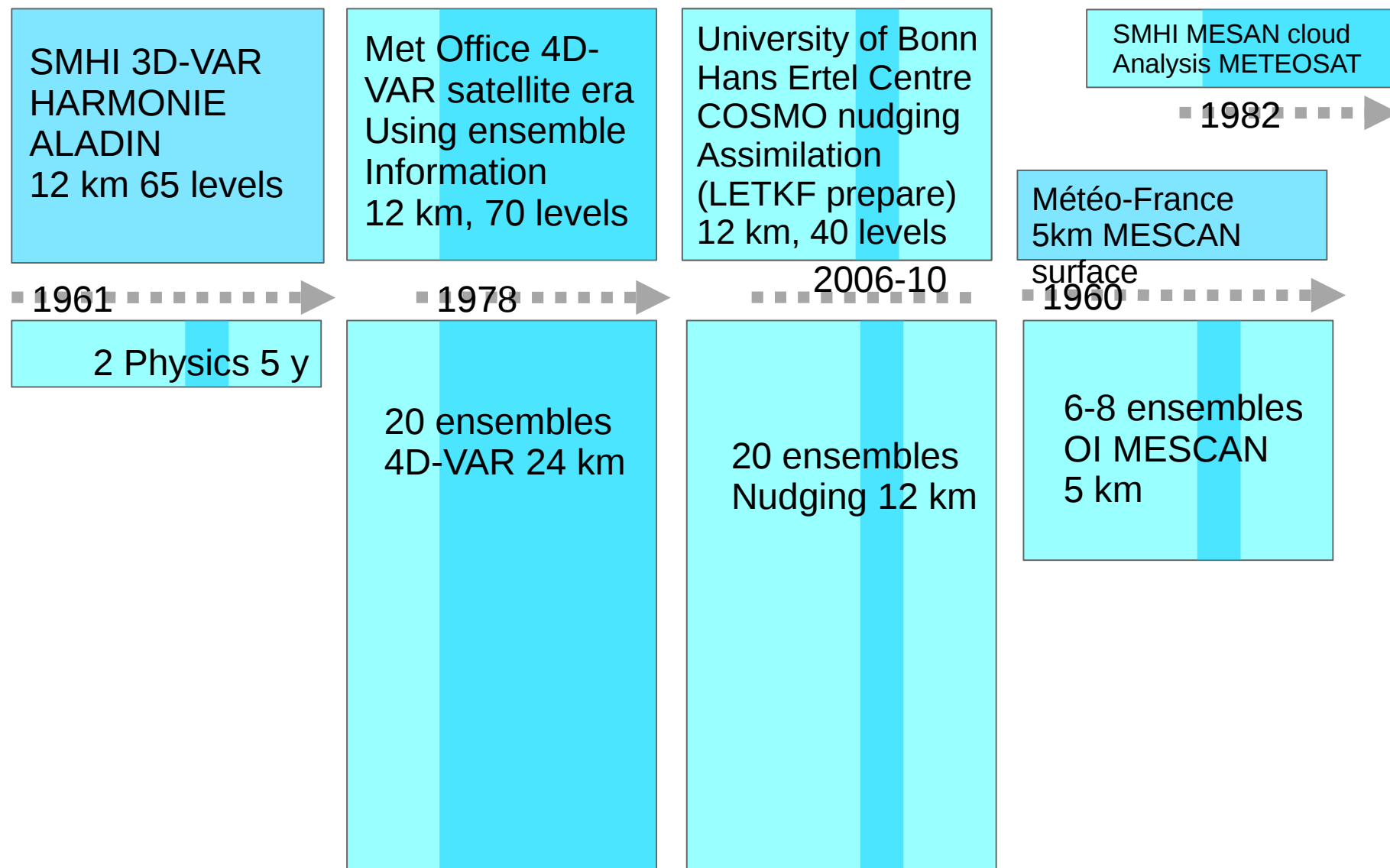
OBSERVATIONS
GLOBAL ANALYSIS
REGIONAL REANALYSIS

- + Regional reanalyses driven by global forcing and upper-air and surface observations using frozen systems
- + Multi-model and ensembles of reanalyses
- + Surface and upper-air parameters

European Area 11 | 5 km || Multi-model
|| 2, 6, 20 Ensembles || 55 | 35 | 30 | 5 y

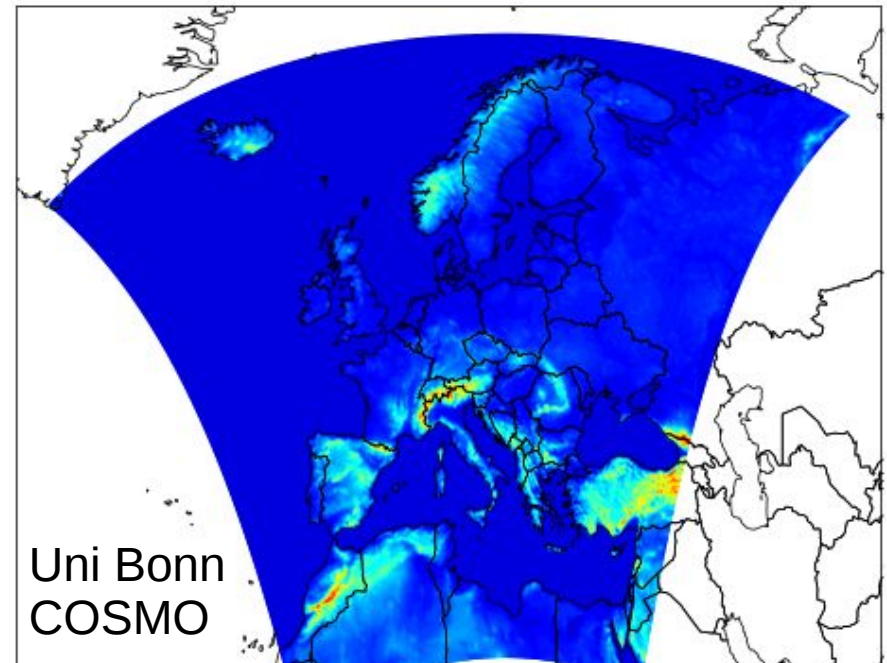
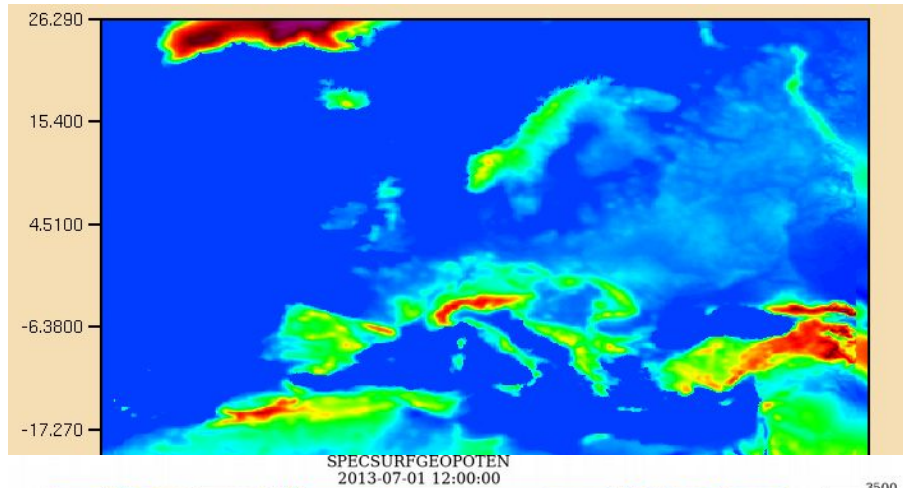


European Area 11 | 5 km || Multi-model || 2, 6, 20 Ensembles || 55 | 35 | 30 | 5 y



UERRA Domain & projections

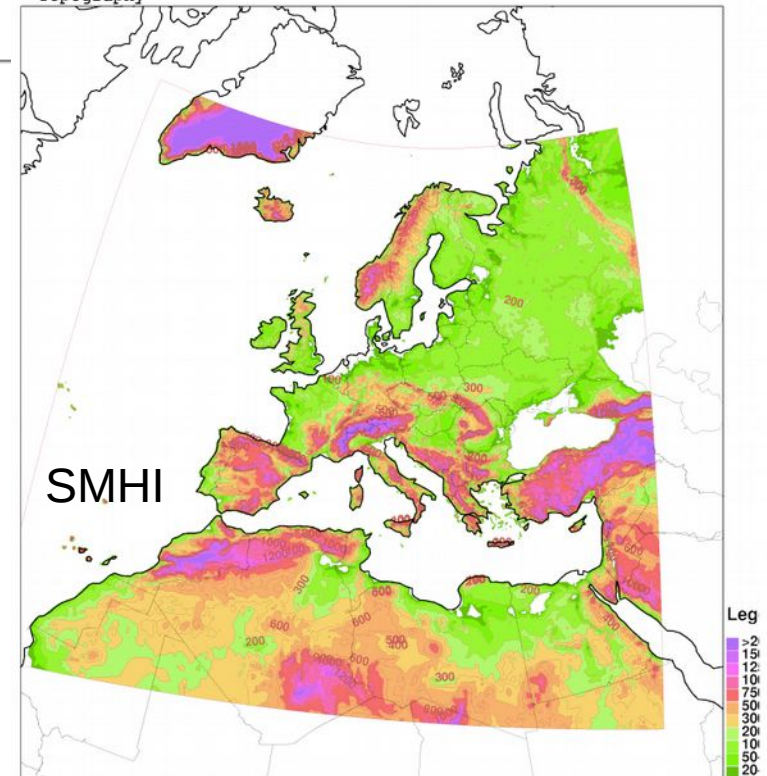
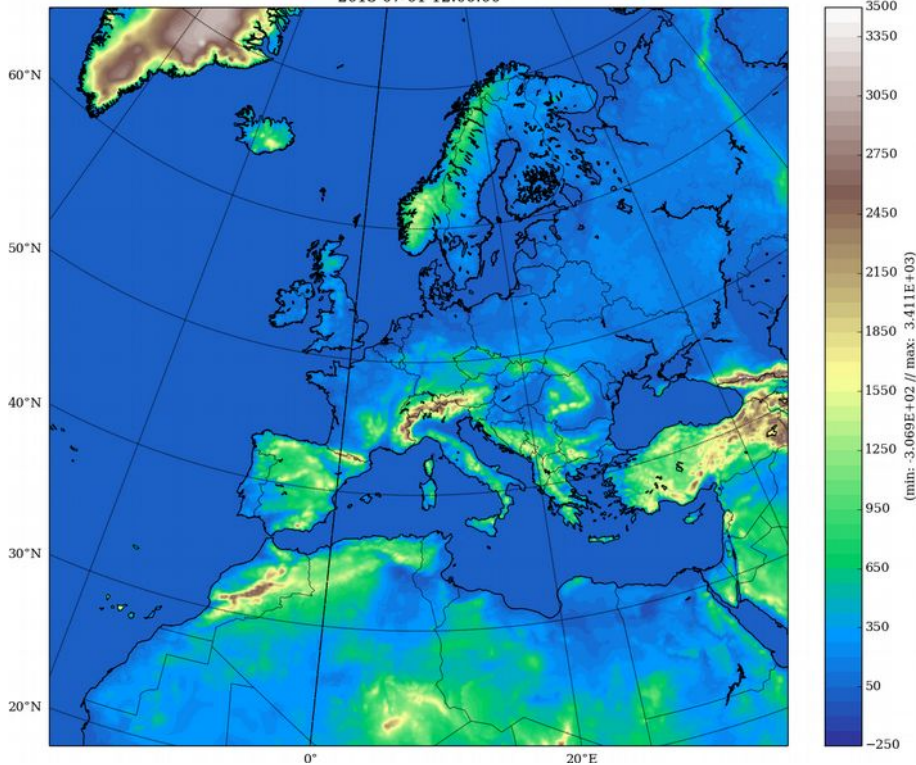
Met Office
CORDEX
EU 11 km



Uni Bonn
COSMO

Alaro UERRA
Topography

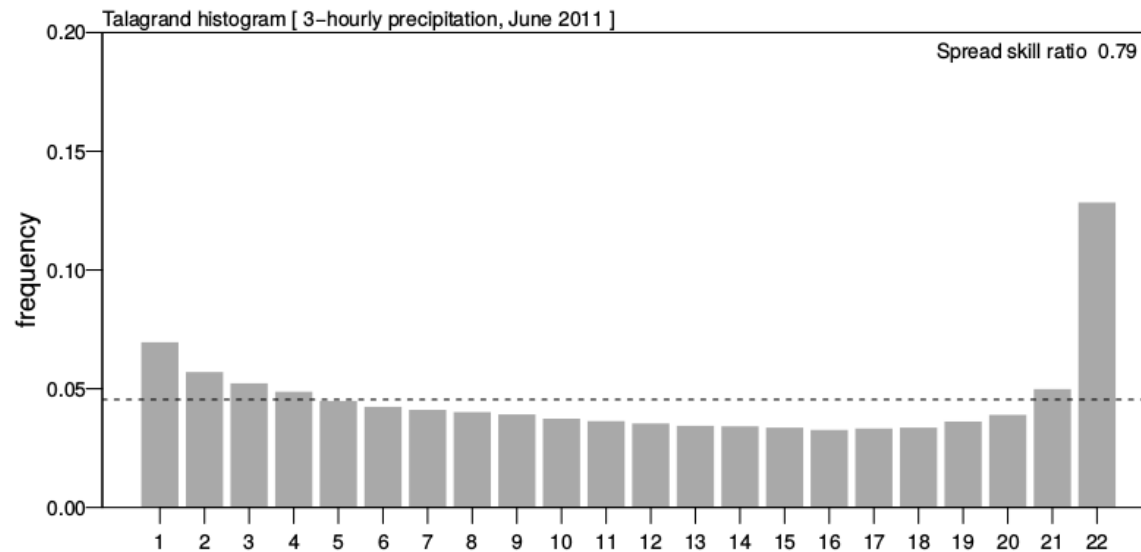
MF



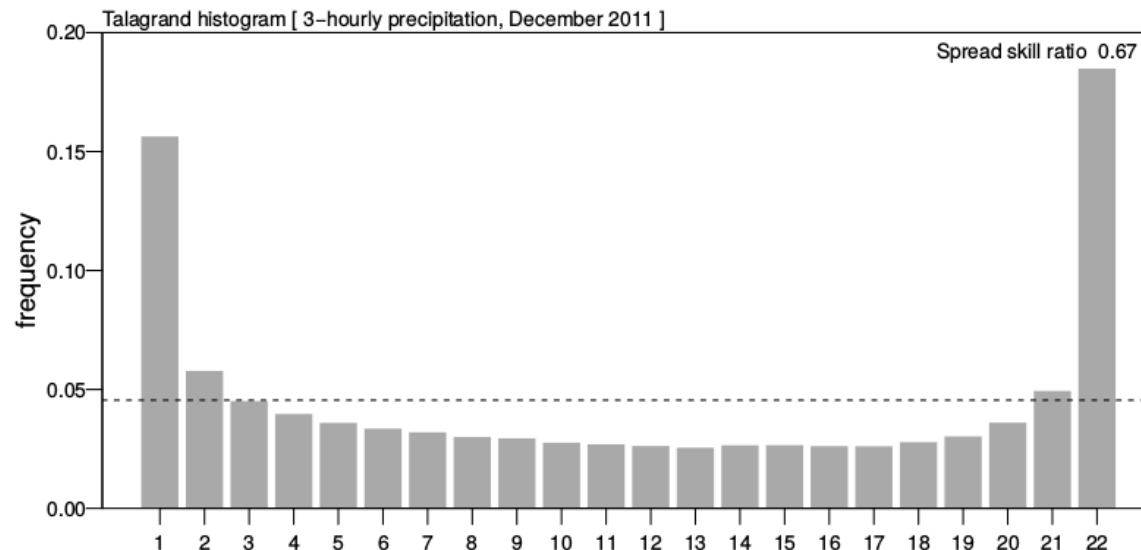
Mon 1 Jul 2013 00Z +06h
valid Mon 1 Jul 2013 06Z

Analysis rank histogram - validating ensemble quality

June

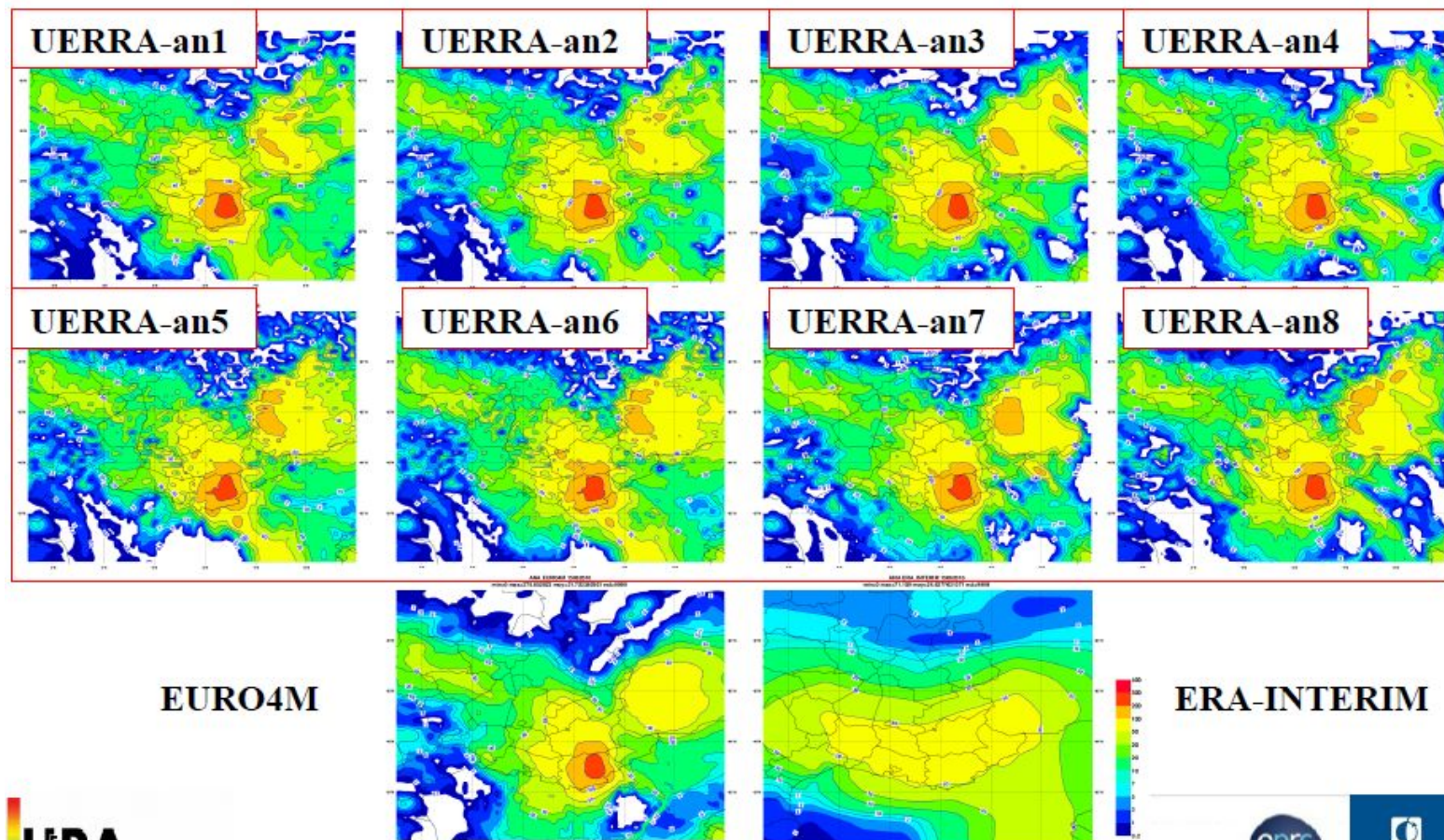


December



Ensemble members due to different model backgrounds

Extreme precipitation events of 15 June 2010
8 members : RR24h UERRA Analysis



EURO4M

ERA-INTERIM

2-D surface fields analyses driven by 3D reanalyses

MF/SMHI
MESCAN

2D advanced
Statistical
Interpolation

Downscaled
ALADIN model
background

Surface and climate
stations
T, Td,
precipitation

5 km Europe
T2m, RH, 24 h
precipitation

1961 - ~2016

SMHI
MESAN

2D advanced
Statistical
interpolation

Downscaled
3D HIRLAM model
Climatological
adaptation background

AVHRR, METEOSAT
SEVIRI and
MVIRI

5 km Europe
Cloud fraction
hourly

~1982 - 2013

SMHI
HYPE

Hydrological
physical
model

ERA, EURO4M and
UERRA reanalyses
Precipitation and
temperature forcing

No input observations
Validation against
discharge data

River discharge
35000 catchments
Europe, median
215 km²

~1979 - 2010

MF SURFEX
and TRIP

Surface flux model
Hydrological physical
model

MESCAN
atmospheric
variables and
precipitation

No input observations
Validation against
discharge data

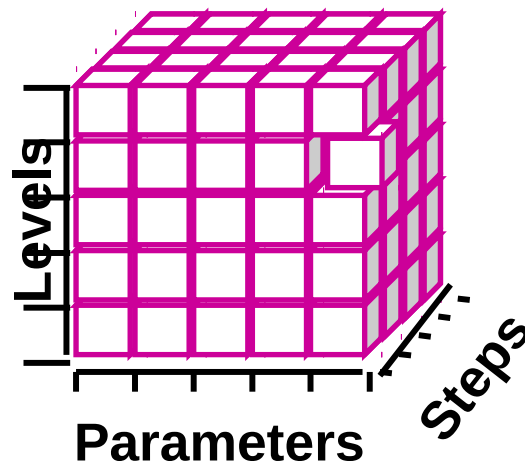
River discharge
25 km -> rivers

~1981 - 2010

ARCHIVING IN MARS

Data Services

- + *The common UERRA archive is MARS at ECMWF*
Common set of parameters chosen for all models
GRIB2 (some new definitions)
- + *Data services from MARS and ESGF interface*
- + *Web Map Servers*
- + *Visualisation through Metview and WMS*



Mars contents

Applications ▾ Places ▾ Firefox Web Browser ▾ Wed 28 Sep, 15:09 light rain, 17.2 °C

Mozilla Firefox

AM25H2_long.... × Models - UERR... × Documentation... × ENS meteogra... × UERRA - Home × Wetterzentrale - T... × Copernicus C3... × http://a...lass=ur × https://...rc=exch ×

apps.ecmwf.int/mars-servers/marsscratch/?origin=eswi&stream=oper&levtype=hl&expver=test&month=dec&year=1993&type=an&class= Search

Navigation

- Home
- MARS Activity
- Job list

See also...

- FAQ
- Accessing forecasts
- GRIB decoder

MARS Catalogue

Date (1 values)	Time (4 values)	Level (11 values)	Parameter (5 values)
1993-12-31	00:00:00	15	Pressure
	06:00:00	30	Relative humidity
	12:00:00	50	Temperature
	18:00:00	75	Wind direction
		100	Wind speed
		150	
		200	
		250	
		300	
		400	

- ▶ [Check for availability](#)
- ▶ [View the MARS request](#)
- ▶ [Estimate download size](#)
- ▶ Retrieve the selection in [GRIB](#) or [NetCDF](#) (experimental)

Note about availability

Some of the fields may not be archived at all levels or all forecast time steps. Before retrieving data you may want to check the availability of the requested fields. For that, follow the [Check for availability](#) link.

Retrieving

In order to retrieve data, you must select at least one item in the lists above. You can select more than one item in each list.

Current selection:

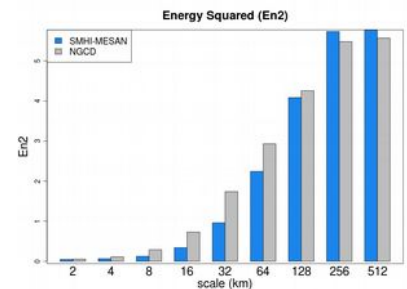
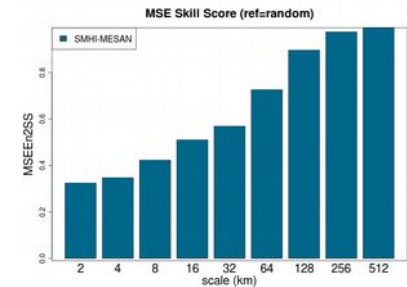
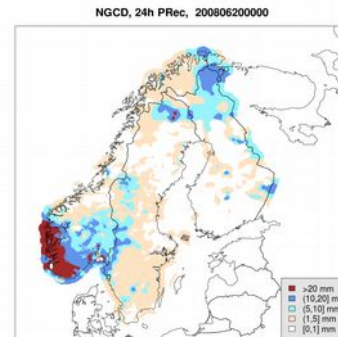
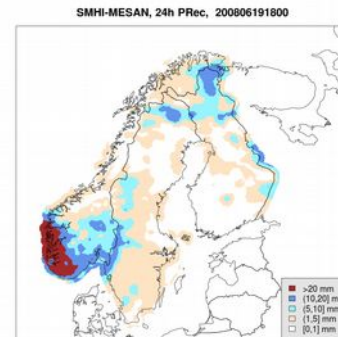
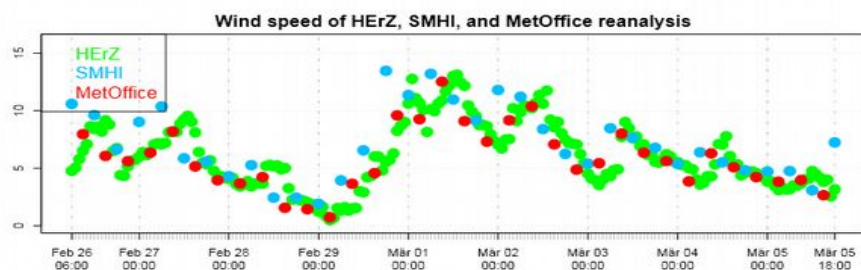
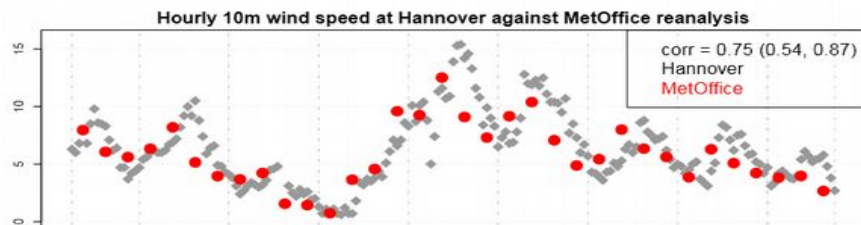
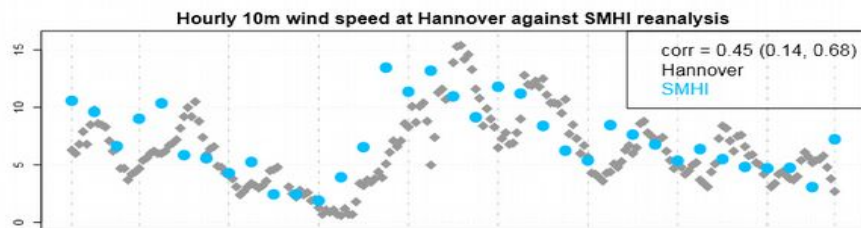
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[month](#) [dec](#)
[year](#) [1961](#), [1962](#), [1963](#), [1993](#), [2010](#)
[type](#) [an](#), [fc](#)
[stream](#) [enda](#), [oper](#)
[origin](#) [edzw](#), [eswi](#), [fpo](#)
[expver](#) [prod](#), [test](#)
[class](#) [be](#), [co](#), [cs](#), [de](#), [dm](#), [e2](#), [ea](#), [ei](#), [em](#), [en](#), [ep](#), [et](#), [fr](#), [gr](#), [j5](#), [la](#), [mc](#), [ms](#), [nr](#), [od](#), [rd](#), [rm](#), [s2](#), [se](#), [sr](#), [ti](#), [tr](#), [uk](#), [ur](#)

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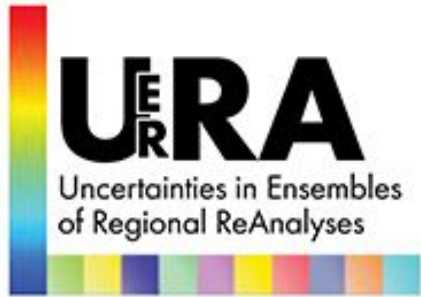
Home FP7H2020Uncertaintycomm... Mozilla Firefox a000405@c20507:~/Desktop Inbox - Mozilla Thunderbird UERRA production schedules ... 1 / 2

Evaluation

Nordic Gridded Climate Dataset as one reference



Evaluation R-library for spatial verification PDF based
12



UERRA user workshop

- Participants presented their applications and requirements
- About 50% had some experience with re-analyses data
- The list of UERRA data products seems fairly complete
- Time and spatial resolution requested for was very variable; some cannot be provided by UERRA
- Most users were not familiar with 'Feedback' information provided by the re-analyses systems,
- Easy access to re-analyses data is the most important requirement
- Evaluation tools and visualization tools are of interest to a significant number of users



[Link to agenda, presentations and full workshop report: http://www.uerra.eu](http://www.uerra.eu)



Timeline

2015 – SMHI HARMONIE 2006-2010 2 physics

2016 – HARMONIE another 25 years now → 1961 – 2015

- Météo-France MESCAN → 5 + 25 years
- SMHI MESAN cloud analysis 25 years
- Met Office UM 4D-VAREnsemble 4D-VARs 20-30 years
- Uni Bonn COSMO Ensemble 5 years

2017 – HARMONIE complete

- MESCAN - > 1961 -2015
- UM Ensemble 4DVAR → 1978-2015 years

Operational

2015 – SMHI HARMONIE Regional reanalysis

2016 – Uni Bonn COSMO Nudging reanalysis

- Uni Bonn Cosmo Nudging Ensemble reanalysis
- Météo-France MESCAN near surface reanalysis
- Met Office UM 4D-VAR Deterministic reanalysis
- Met Office UM 4D-VAR Ensemble of 4D-VARs

2016-11-23/24 – Showcase Event at ECMWF

Research and to be proven

2016 – Archiving and data services

- Uncertainty evaluation and user oriented uncertainties, user evaluation and feedback
- Refinements in surface, biosphere and cryosphere climate evolution or interactive feedbacks – more modelling
- Always more observations from data records, affected by restrictive national data policies
- Reprocessed satellite data and quality control of conventional and remote sensing data

2017-2018 - User products

End

Showcase Workshop afternoon 23/11 -24/11
ECMWF, Shinfield Park, Reading

Read more on www.uerra.eu

www.uerra.eu