DWD regional reanalyses
COSMO-REA

- **COSMO-REA12 ensemble (UERRA)**
- **COSMO-REA6 (now DWD, previously Uni Bonn)**
- **COSMO-REA2 (Uni Bonn, Uni Cologne)**

COSMO-REA – who does what

R&D at the **Meteorological Institute, University of Bonn** (MIUB) and the **Institute for Geophysics und Meteorology, University of Cologne** (IGMK) within the Hans Ertel Centre for Weather Research programme (**HErZ**), funded by the Deutscher Wetterdienst (DWD).

Sucessful reanalysis system to be continued operationally at **DWD** (as is the case with **COSMO-REA6**).

Motivation for COSMO-REA

- for COSMO-REA6 and REA2 (HerZ DWD)
  - Higher temporal and spatial resolution than global reanalyses
  - Focus on near-ground variables
  - Interest in extremes, frequency distributions

- For COSMO-REA12 ensemble:
  - Ensemble for uncertainty estimation

COSMO-REA public and free data access

COSMO-REA12 ensemble (20+1 members): Europe, 2006-2010

-> UERRA archive

COSMO-REA6: Europe, 1995-2015:

-> Deutscher Wetterdienst (DWD), Climate Data Center (CDC)

ftp://ftp-rea.dwd.de/pub/REA/

COSMO-REA2: Germany+, 2007-2014:

University of Bonn

http://reanalysis.meteo.uni-bonn.de/?Download_Data___COSMO-REA2

COSMO-system

The regional reanalysis system based on the COSMO-NWP-model of the German Meteorological Service (DWD) (developed at the Hans-Ertel-Center for Weather Research (HErZ) at University of Bonn)

ERA-Interim Reanalysis (T255) — Every 3 hours

COSMO-REA6 (6.2 km)

- CORDEX EUR-11 Domain
- Data assimilation …

Soil moisture analysis (SMA)

Continuous nudging

SYNOP, SHIP, PILOT, TEMP, AIREP, AMDAR, ACARS,…

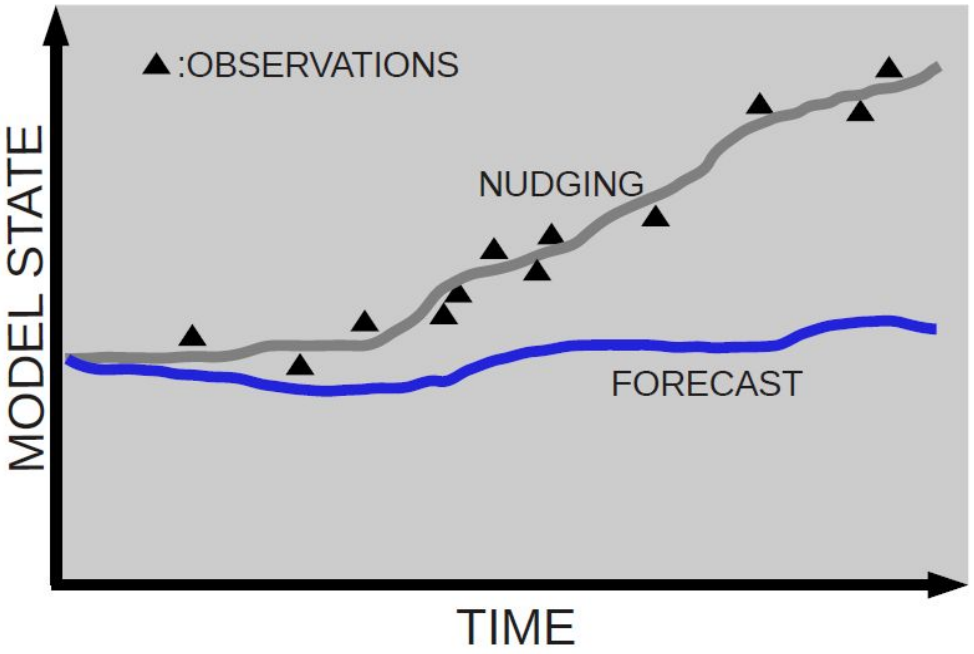
SST analysis (daily)
Snow analysis (6-hourly)

Courtesy: Jan Keller (DWD HErZ)

Ensemble nudging
COSMO-REA12 Ensemble

Credits:
Lilo Bach,
Univ. of Bonn

- Perturb the observations assuming
  - normally distributed
  - stationary
  - spatio-temporally uncorrelated
  - unbiased *obs errors*



Spread ~ Uncertainty arising fr observations

COSMO- REA6/REA12 obs

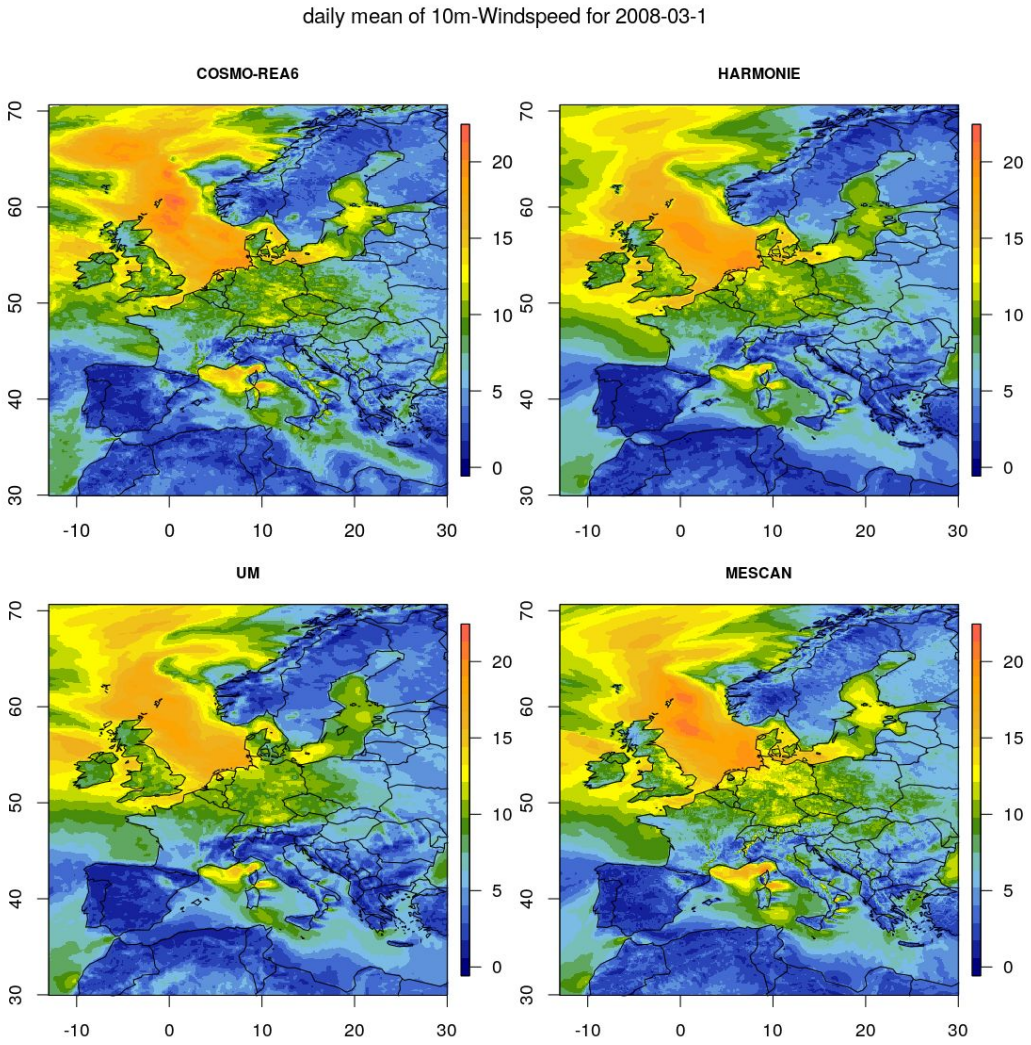
Observing system	Report type	Observed variable
Radiosondes	PILOT	Upper-air wind
	TEMP	Upper-air wind, temperature, humidity
		Surface-level wind temperature, humidity, geopotential
Aircraft	AIREP	Wind, temperature
	AMDAR	Wind, temperature
	ACARS	Wind, temperature
Wind profiler		Upper-air wind
Surface systems	SYNOP	Screen level pressure, wind, humidity
	SHIP	Screen level pressure, wind, humidity
	DRIBU	Screen level pressure, wind, humidity

COSMO- REA2 obs: +Radar latent heat nudging

Results

COSMO-REA6 and COSMO-REA12 are fairly similar.

Generally agreeing with the other UERRA regional reanalyses.



From Deborah Niermann (DWD)

Results tbc

When zooming in, details differ.

COSMO-REA6 was found best for wind speed over Germany (see UERRA deliverables and papers from M. Borsche, A. Kaiser-Weiss)