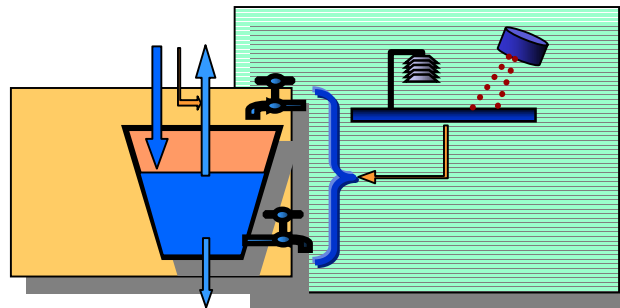




Development of a European Land Data Assimilation System to predict Floods and Droughts (ELDAS)

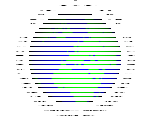
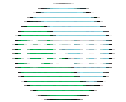
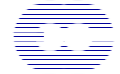
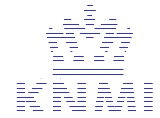
Combined Research/Demonstration project EU 5th framework





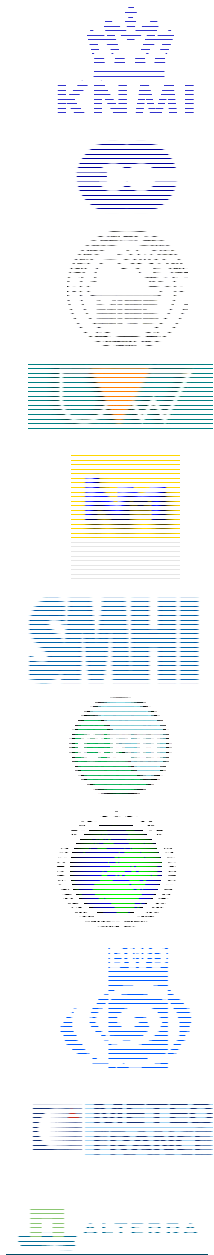
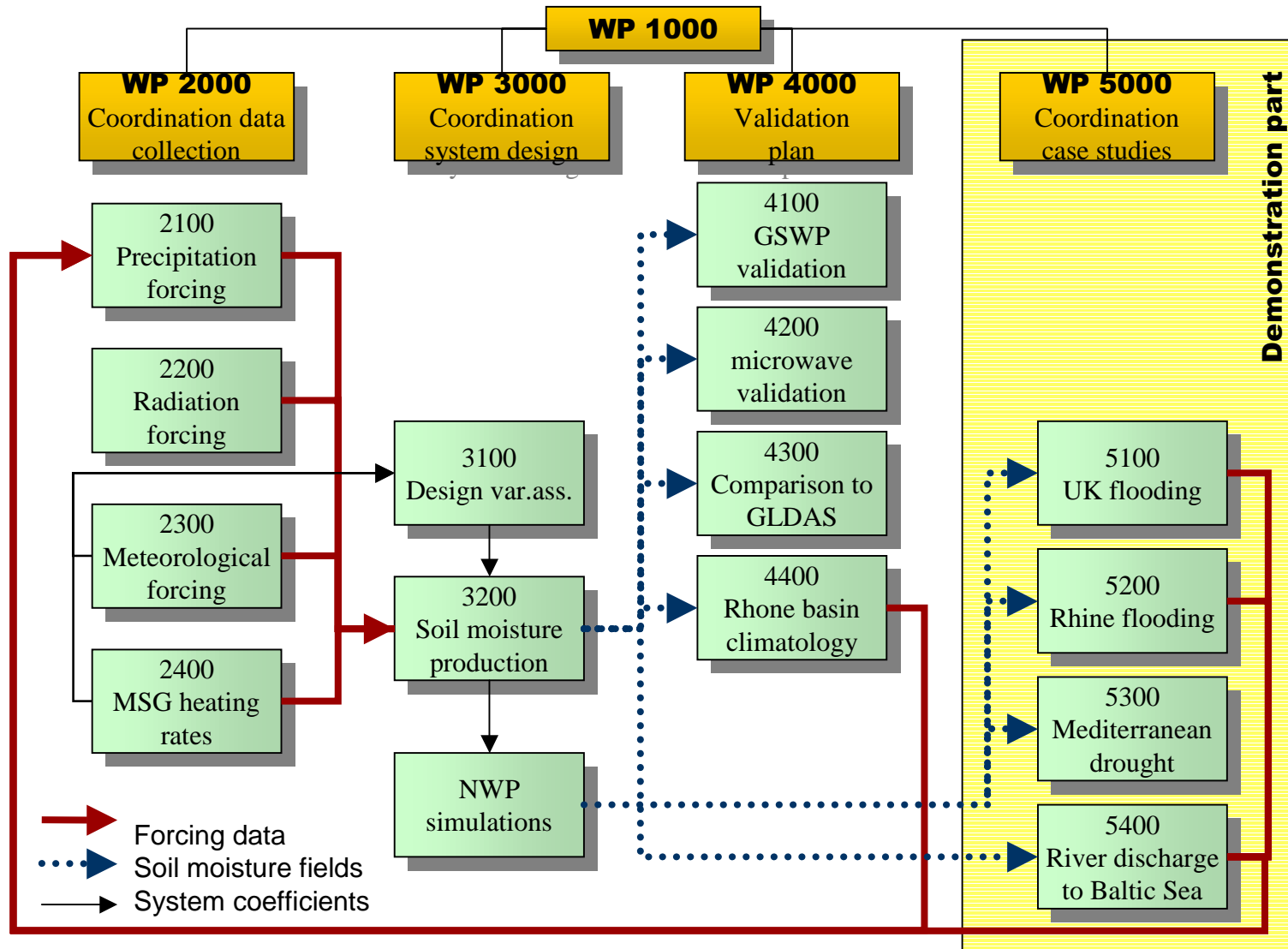
Motivation

- Pilot study, to combine (European) expertise on soil moisture assimilation
- Provide a European contribution to GLDAS research
- Prepare/apply use of satellite data for soil moisture assimilation
 - MSG: thermal/visible
 - SMOS: microwave





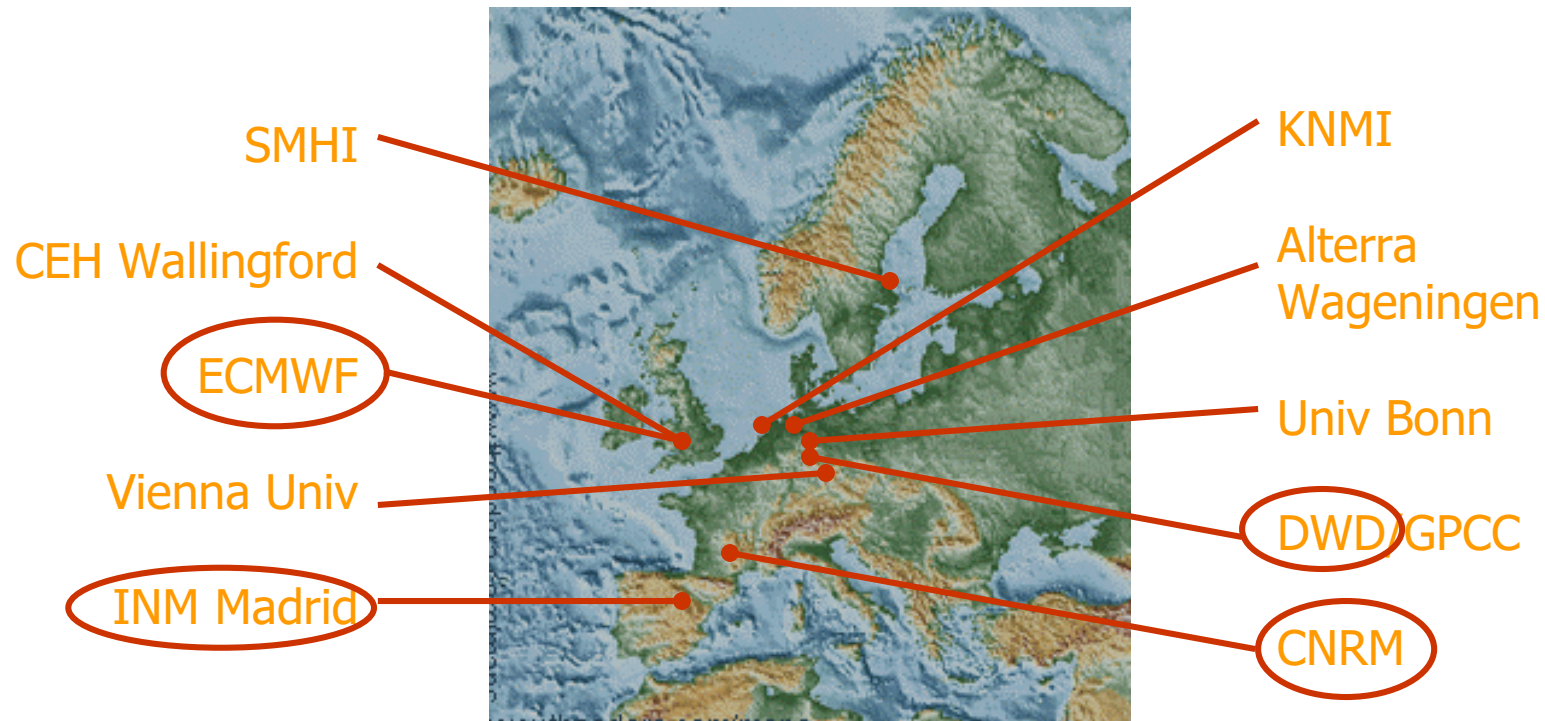
Structure of the project





Partners

○ = places where DA experiments are carried out



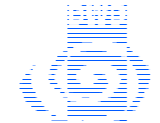
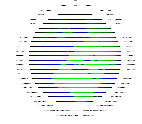
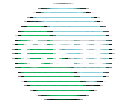
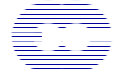
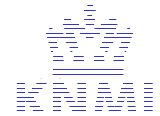
Plus User Advisory Board





Validation

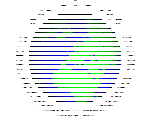
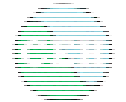
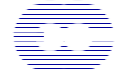
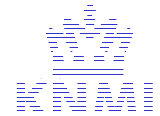
- **GSWP**
 - point data, remote sensing, runoff data
- **Microwave satellite data**
 - AMSR, SSM/I
 - anticipate on use of SMOS using synthetic dataset
- **GLDAS**
 - Offline modelling over Europe using GLDAS land schemes
- **Rhone valley**
 - multi-year comparison to runoff, snow cover and soil moisture climatology





Demonstration studies

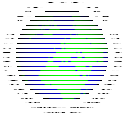
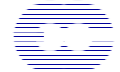
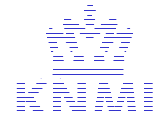
- UK flooding
 - Autumn 2000: impact on off-line runoff prediction
- Rhine flooding
 - Evaluation of hydrological cycle
- Seasonal drought
 - European NWP-suite during one growing season
- Baltic Sea area
 - impact of radar data; use of information extracted from data assimilation for LSP-development



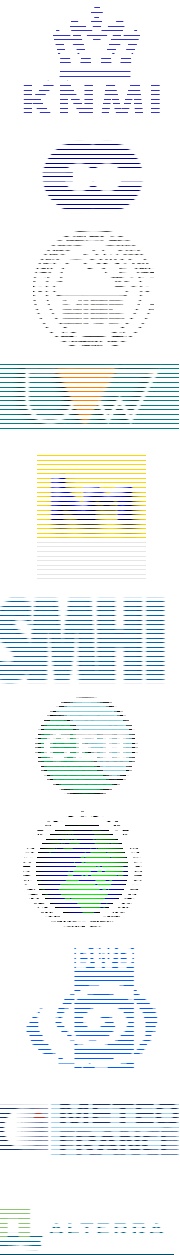
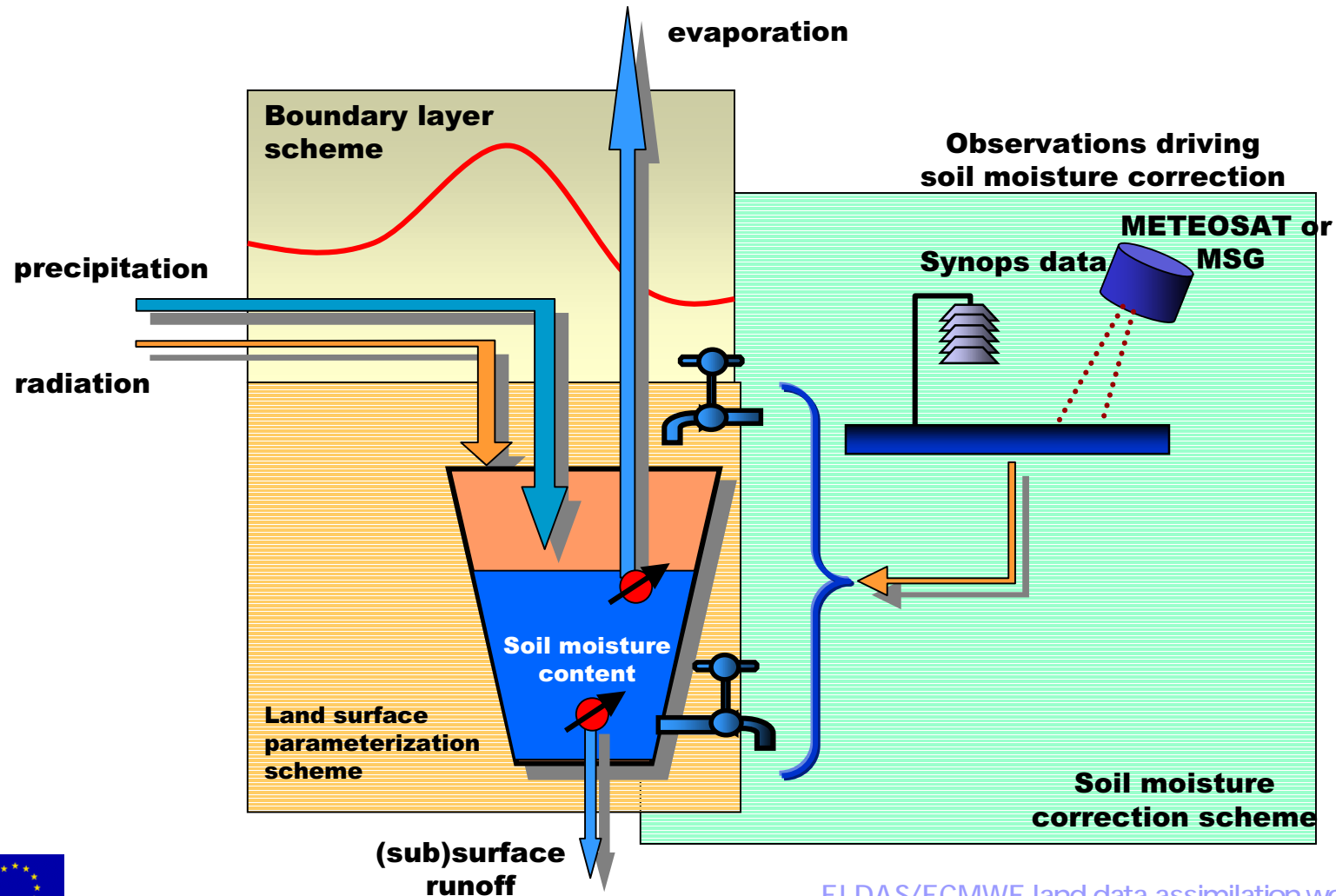


Task distribution

- KNMI
 - Coordination; heating rate
- ECMWF
 - Data collection; DA suite
- CEH
 - UK flooding case study
- Alterra
 - GSWP validation study
- SMHI
 - Baltic Sea case study
- DWD/GPCC
 - Data collection; DA suite
- Vienna
 - Precipitation database
- CNRM
 - Rhone validation study; DA suite
- Bonn Univ
 - μ -wave validation; radiation processing
- INM
 - Drought case study; DA suite

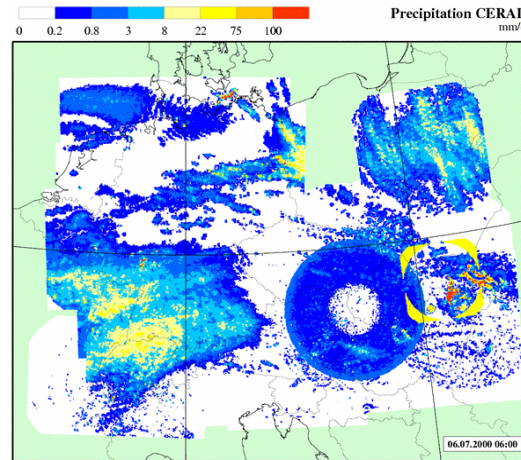
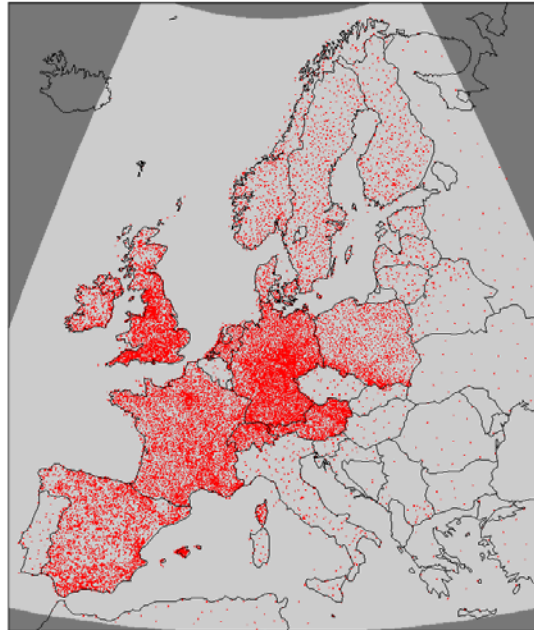


Design of assimilation system

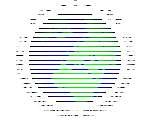
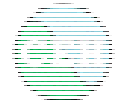
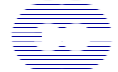
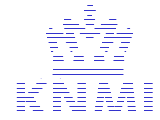




Observations: precipitation

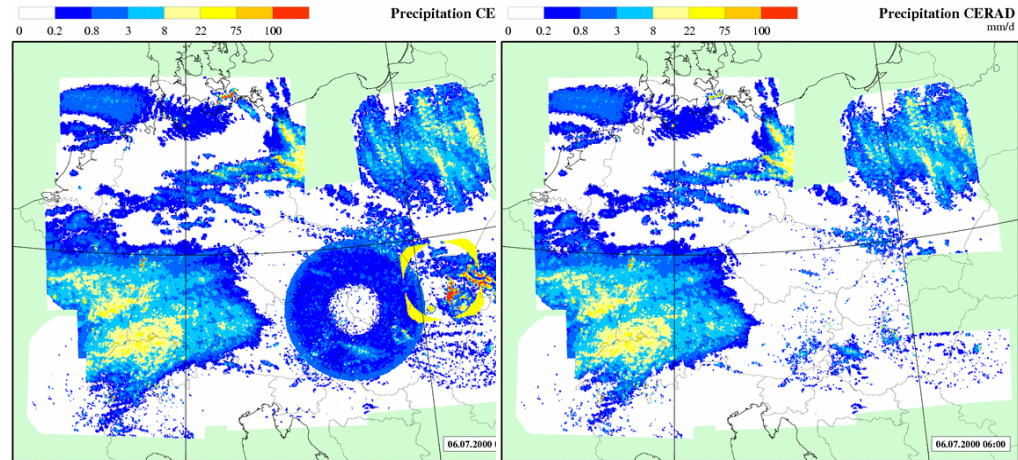
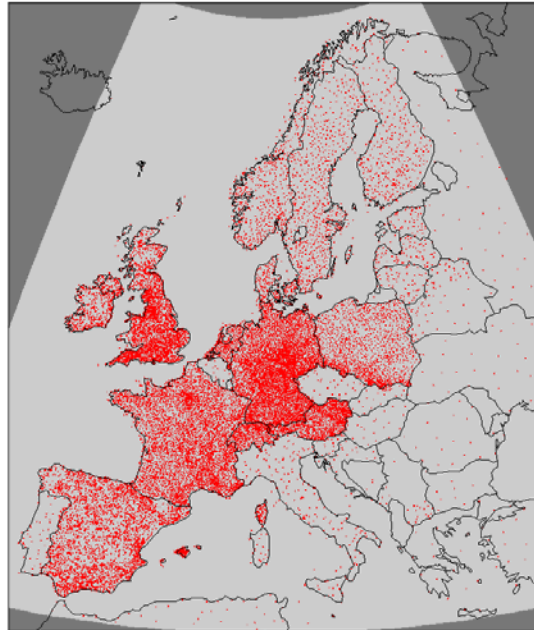


Raw radar data

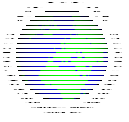
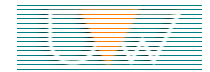
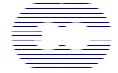
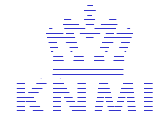




Observations: precipitation

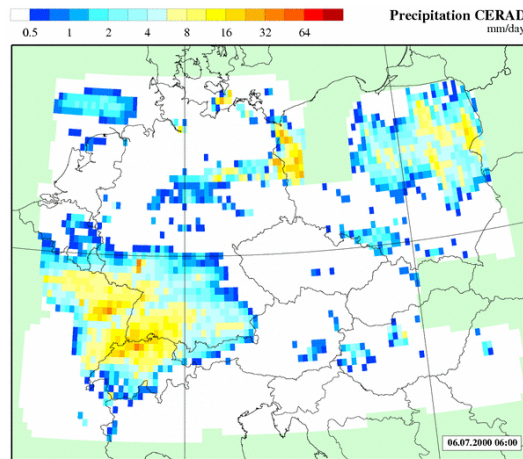
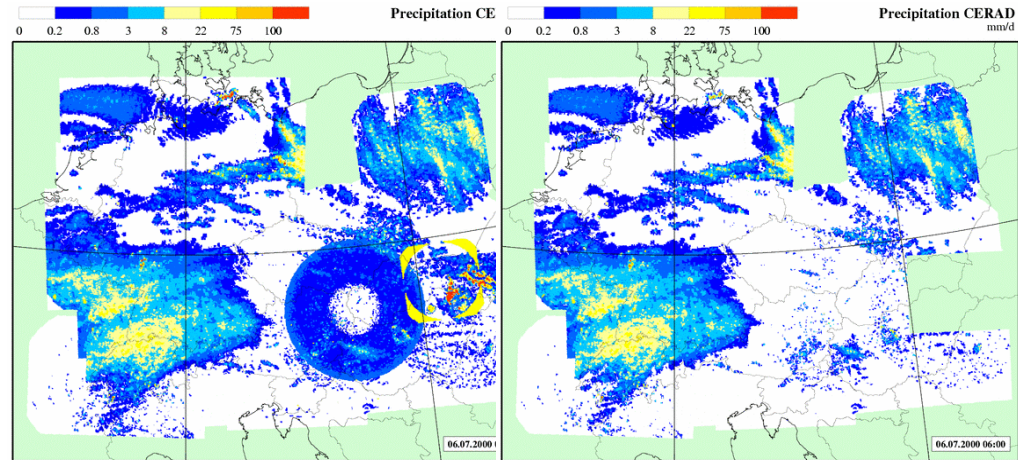
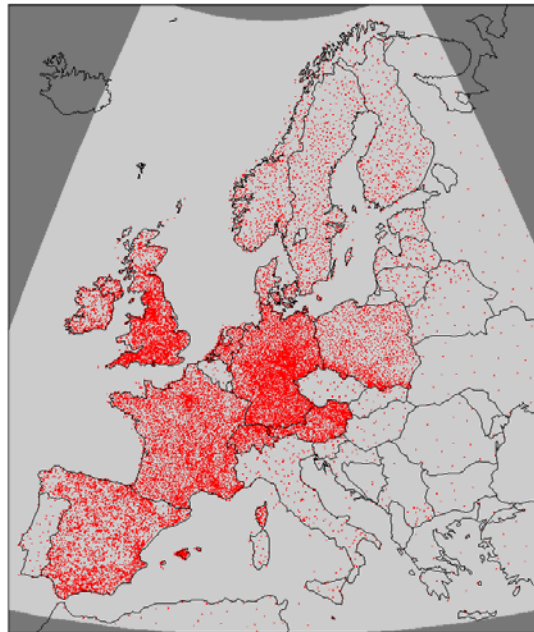


Corrected radar data

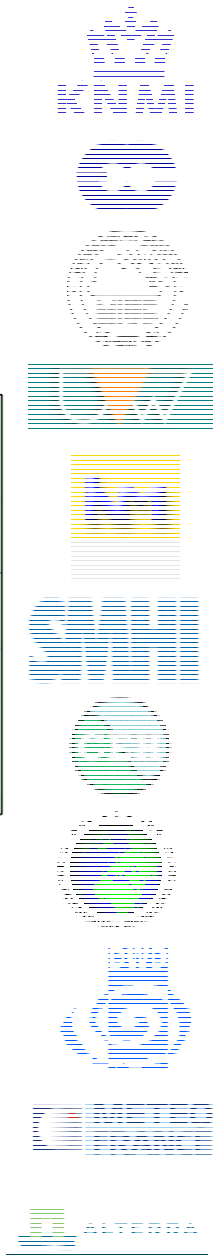




Observations: precipitation

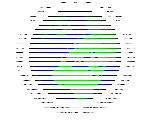
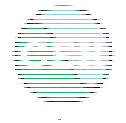
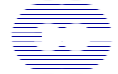
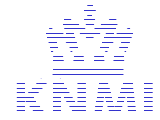
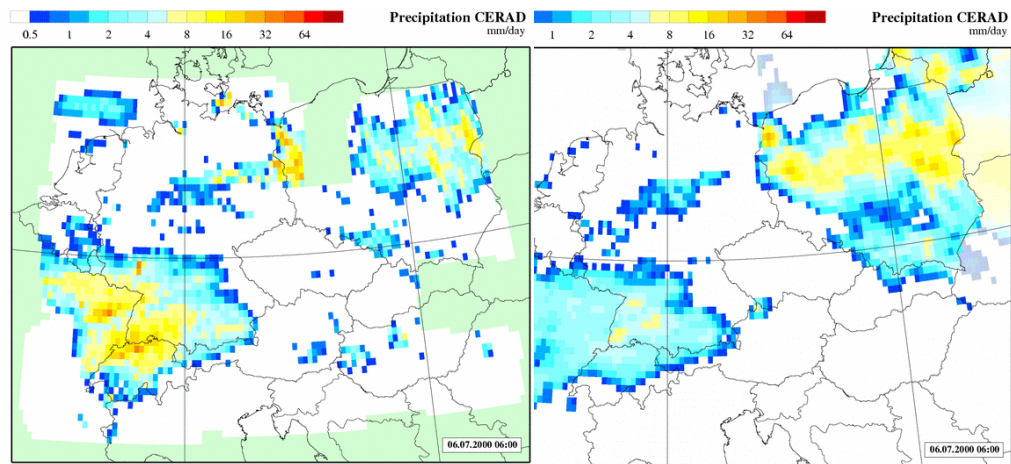
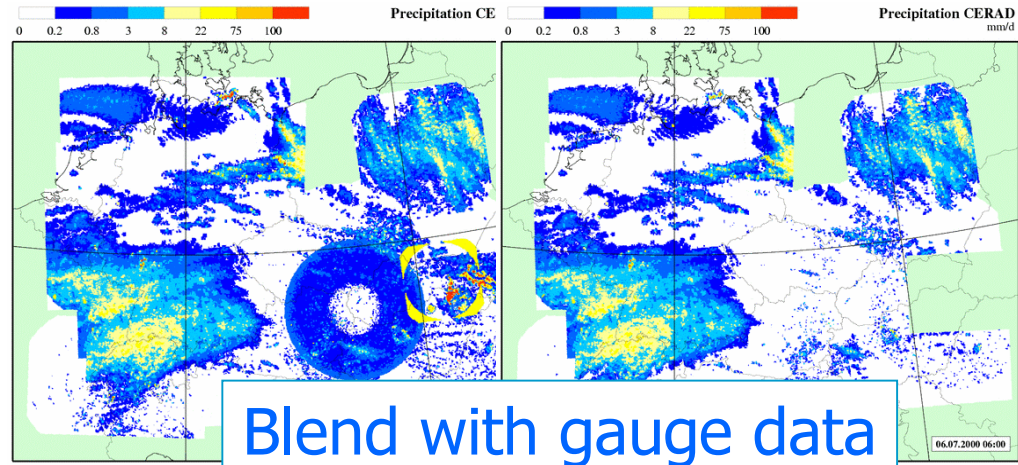
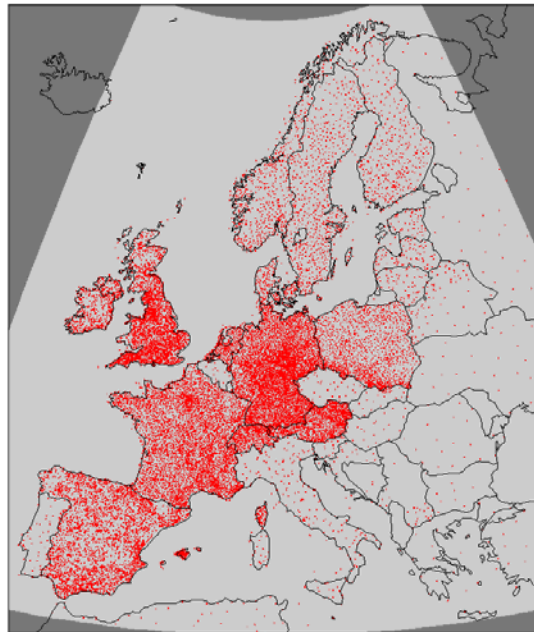


Interpolation to
ELDAS grid





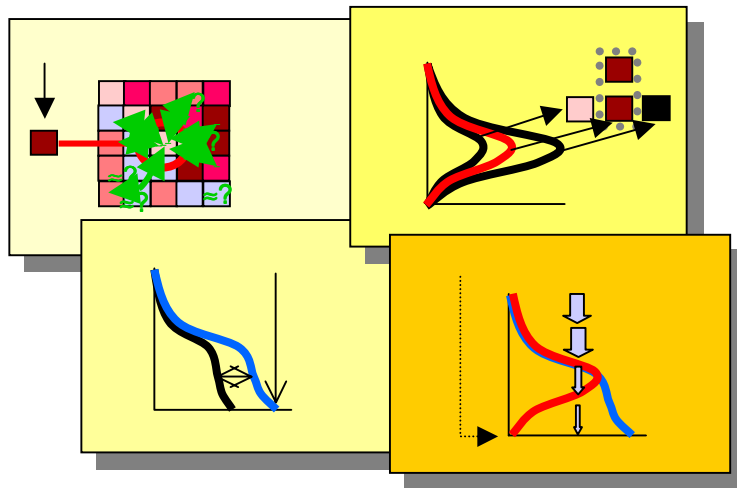
Observations: precipitation



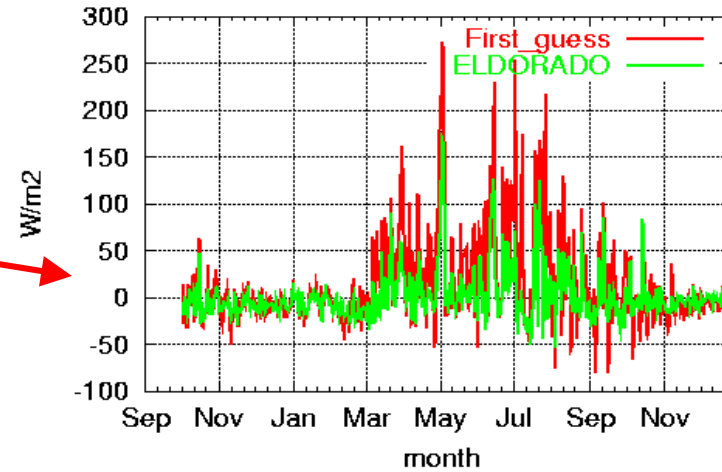


ELDORADO LW & SW Radiation

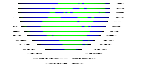
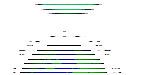
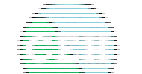
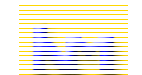
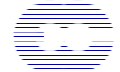
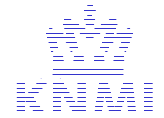
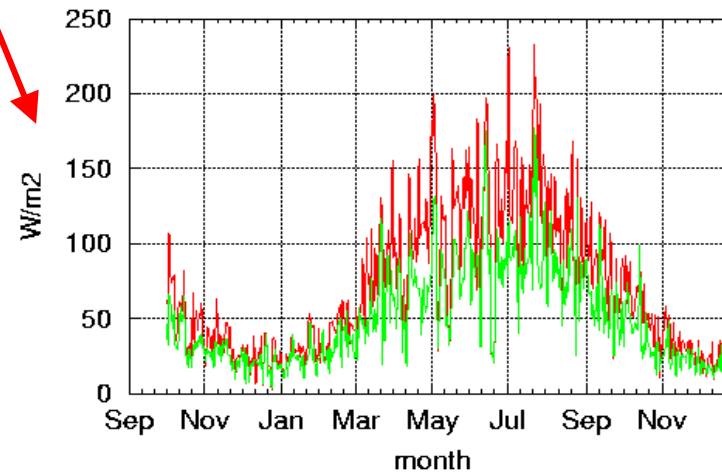
- Simple data assimilation of METEOSAT TOA products in NWP RT model
- Verified against BSRN & local SW networks



Bias daily radiation

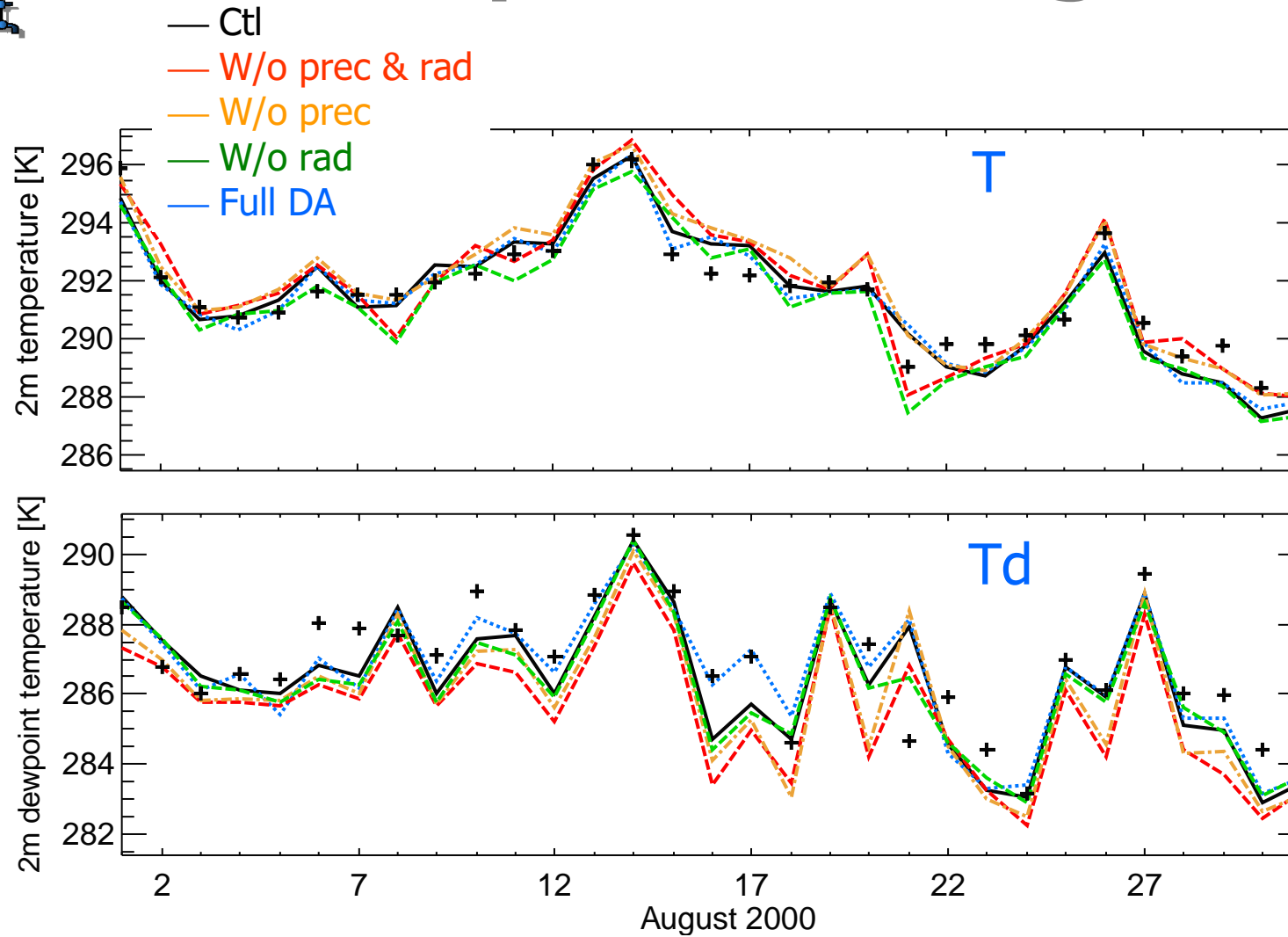


RMS score



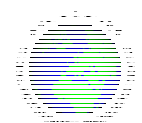
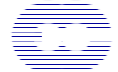
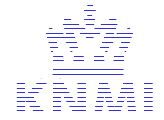


Impact of forcings



Loobos, NL

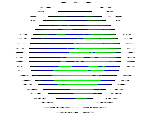
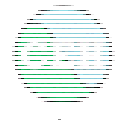
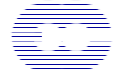
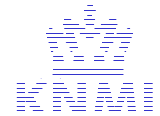
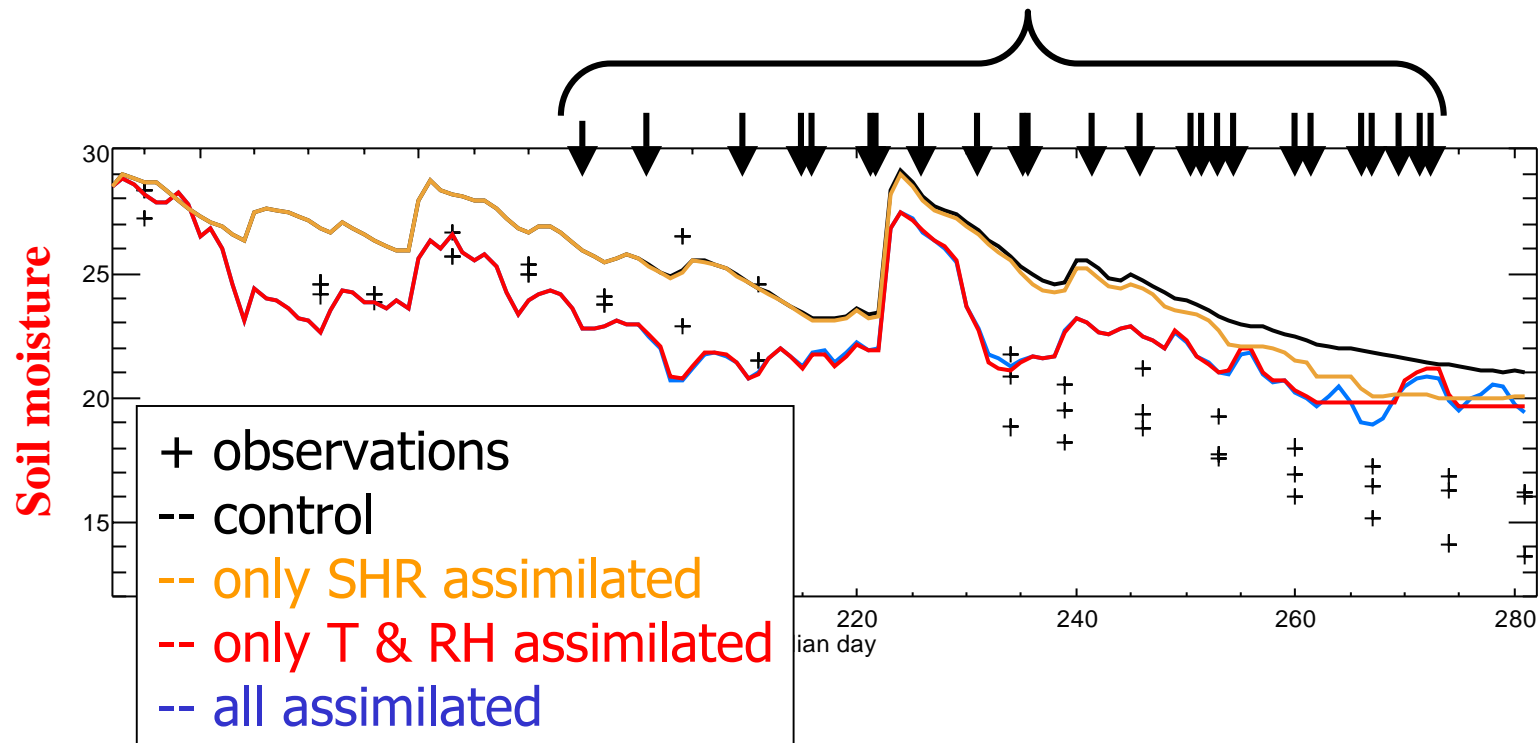
ELDAS/ECMWF land data assimilation workshop





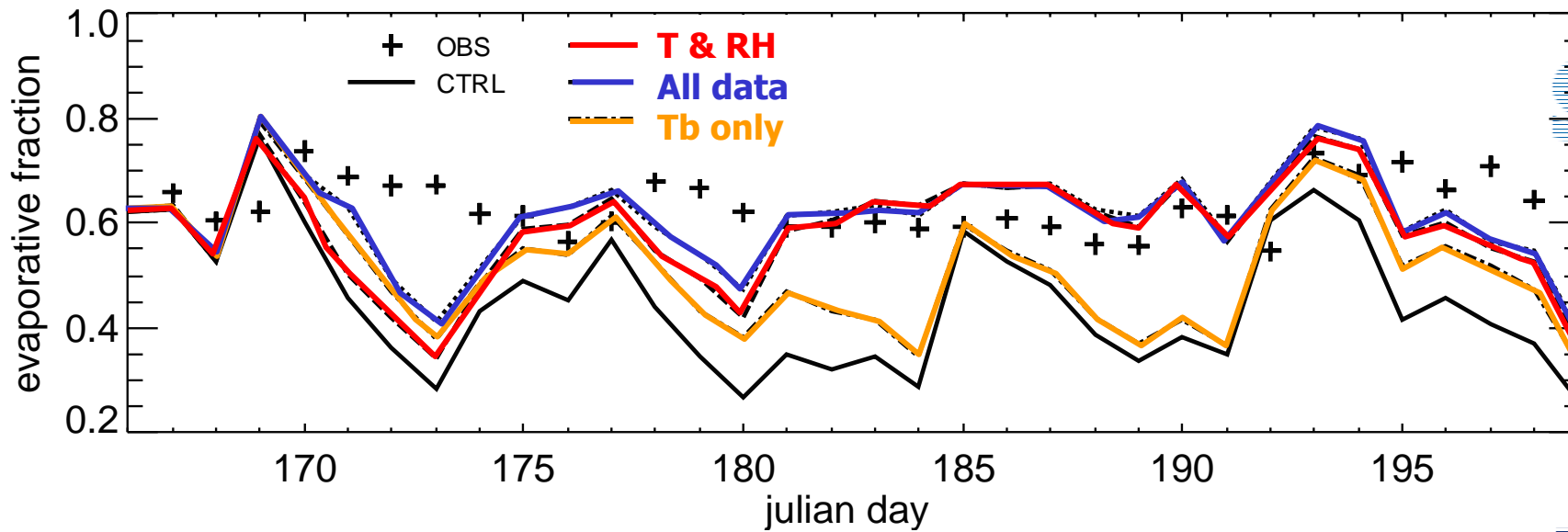
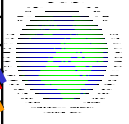
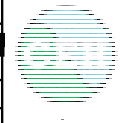
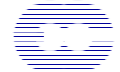
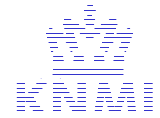
Trial assimilation of surface heating rates (Murex)

Days when SHR is available (50% data missing, 25% cloudy)



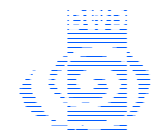
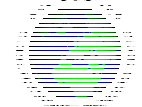
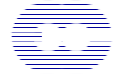
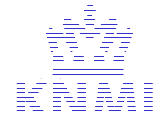
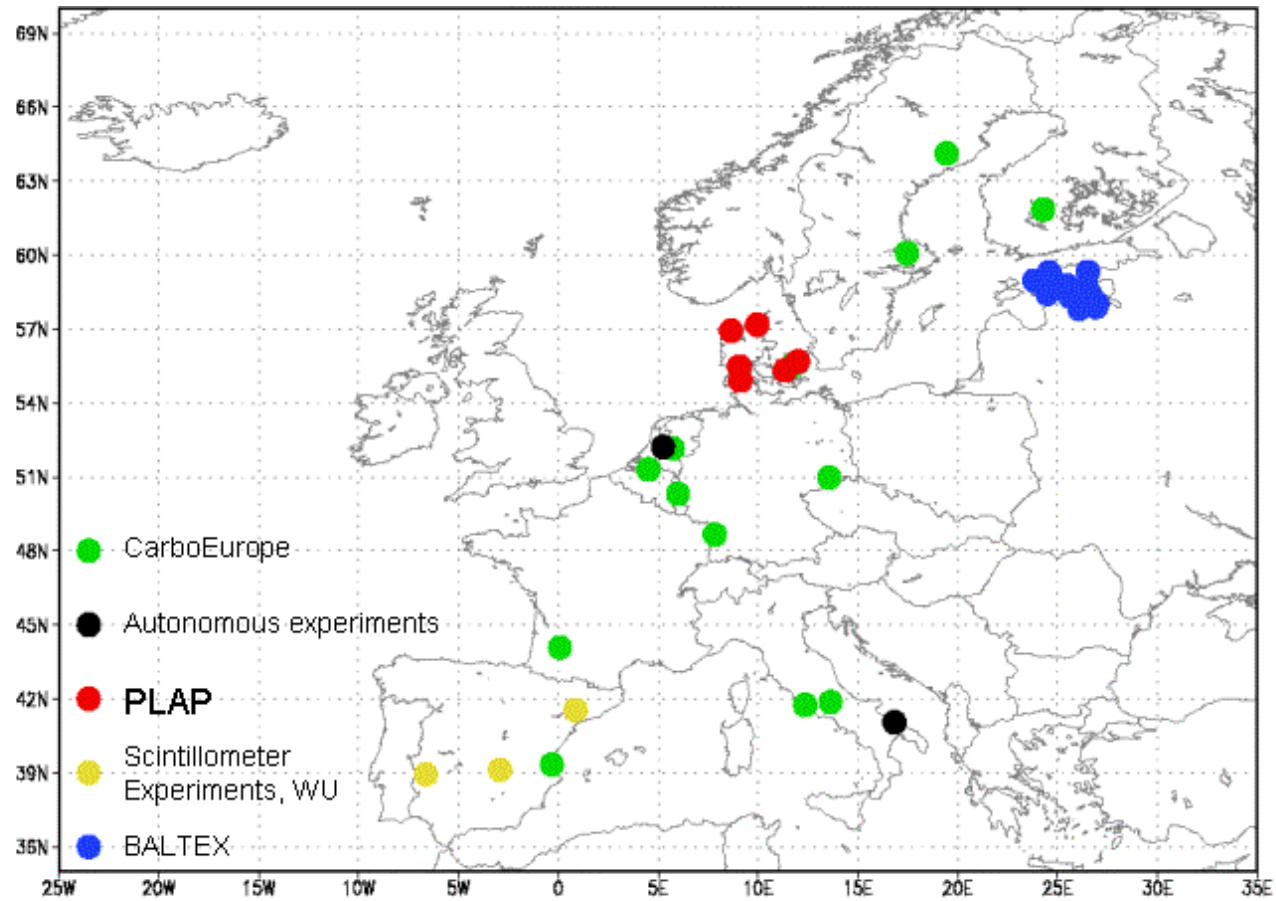


Assimilation of μ -wave data (SGP97)



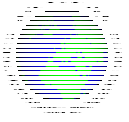
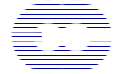
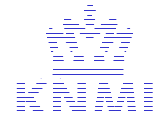
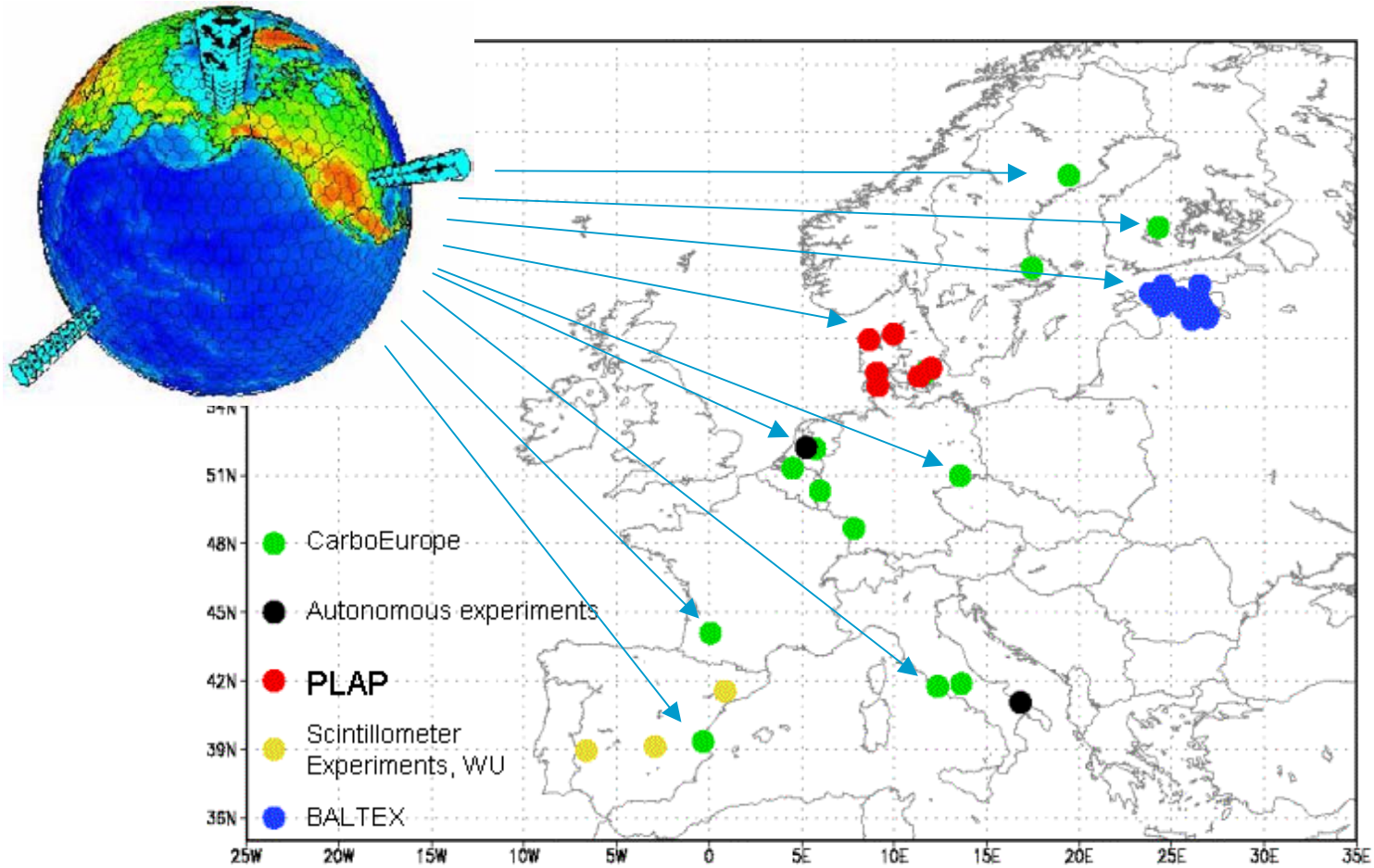


Validation sites



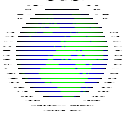
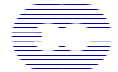
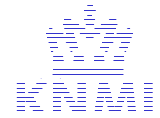
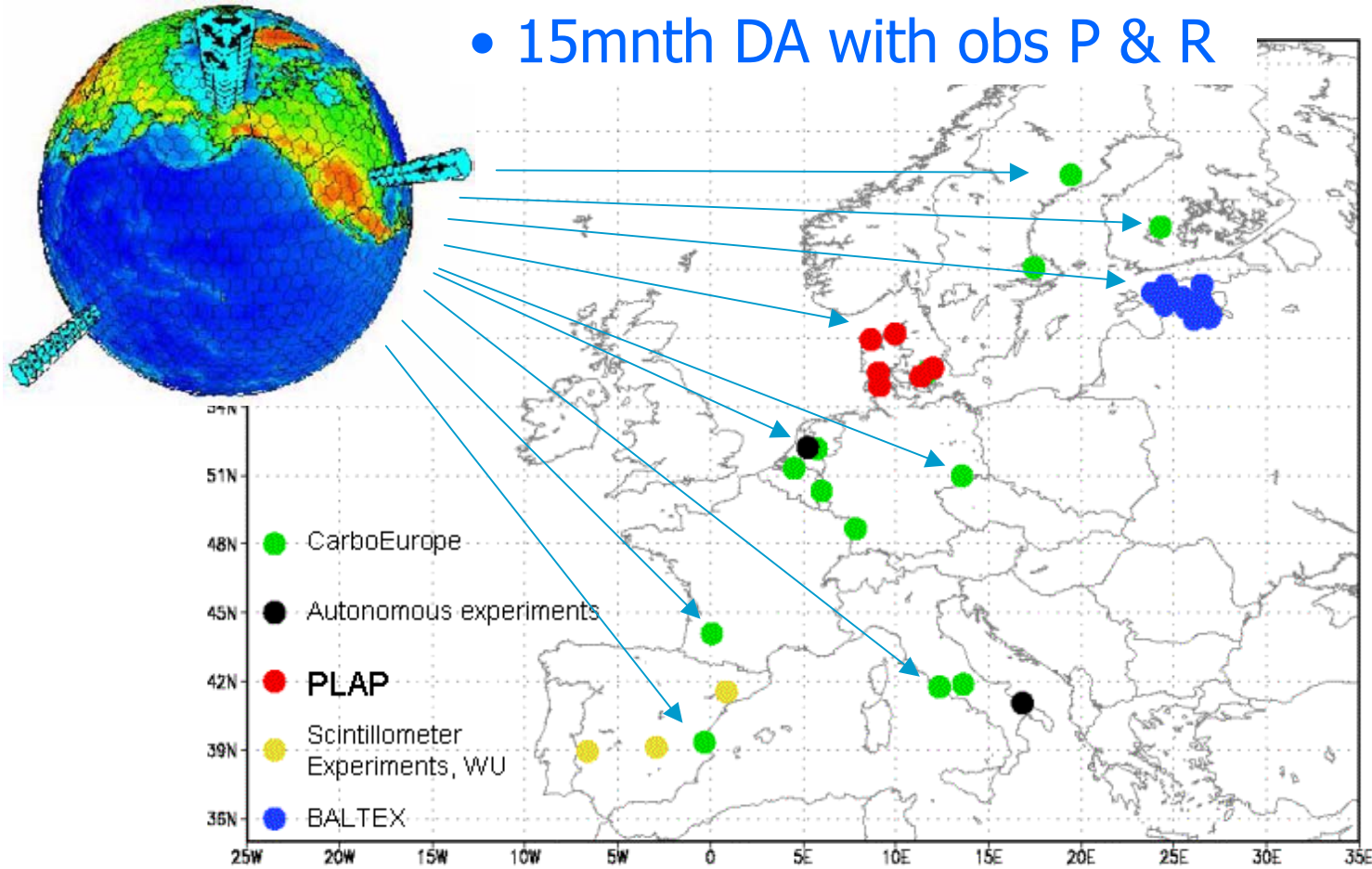


Validation sites



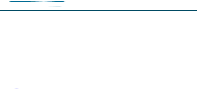
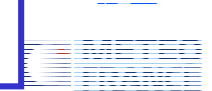
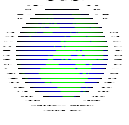
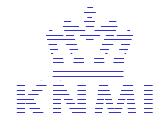
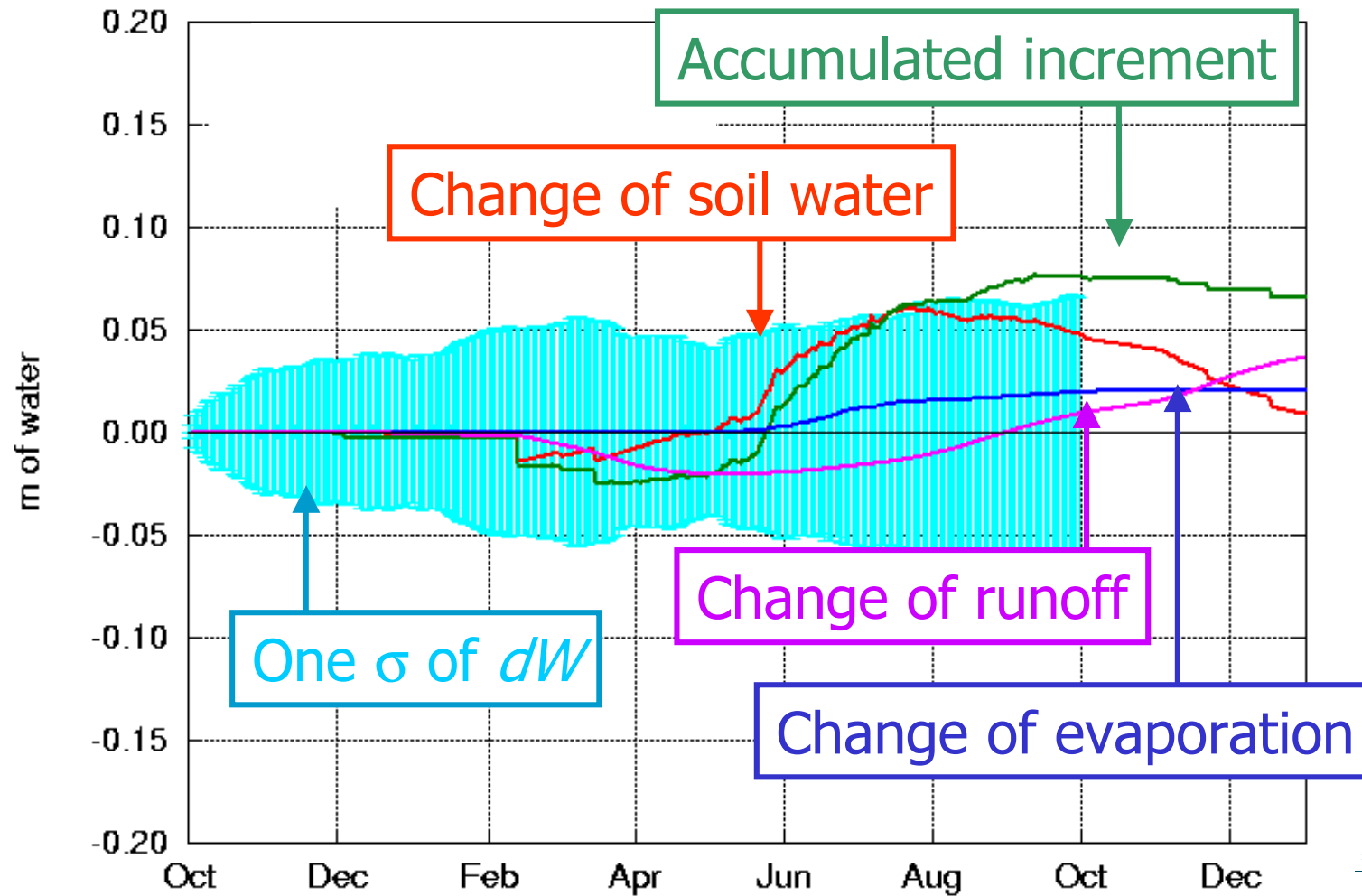


- 20yr 'PILPS'-climatology (driven by ERA40)
- 15mnth CTL with obs P & R
- 15mnth DA with obs P & R





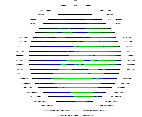
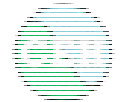
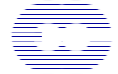
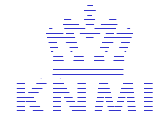
Effect of data assimilation





What ELDAS-results can you expect these days?

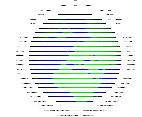
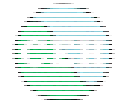
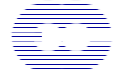
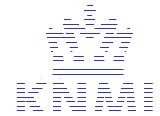
- Observations
 - The generation of the precipitation database (Franz Rubel)
 - Surface radiation and heating rates from METEOSAT (Bart vd Hurk)
- Infrastructure
 - The data assimilation systems:
 - DWD (Werner Wergen)
 - CNRM (Gianpaolo Balsamo)
 - ECMWF (Janneke Ettema)





What ELDAS-results can you expect these days?

- Demonstration
 - ELDAS data bases in crop modelling (Allard de Wit)
 - The significance for NWP (Ernesto Rodriguez)
 - Use of soil moisture in hydrological forecasting (Eleanor Blyth)
- Validation
 - Point validation (Cor Jacobs)
 - Catchment scale validation (Phil Graham)





...and much more

- Valuable contributions on:

Sea level prediction (Rolf Reichle)

Inter-American L-DAS (Ken Mitchell/Dag Lohmann)

Sampling (Alan Betts)

Continental scale validation (Paul Dirmeyer)

Precipitation observation from space (Peter Bauer)

The GEOLAND project (Jean-Christophe Calvet)

Skin temperature modelling (Isabel Trigo)

L-DAS progress & results (Matt Rodell)

The FCOCI-IMAP database (Jean-Louis Champeaux)

Snow assimilation (Matthias Drusch)

Assimilation of satellite-derived vegetation variables (Wolfgang Knorr)





Let's go ahead.

