

# Les re-analyses sur l'Europe: UERRA puis Copernicus

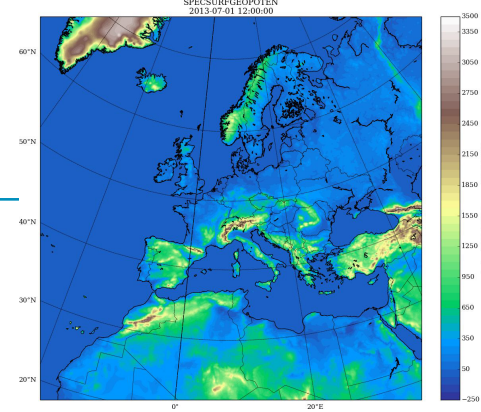
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Cliquez pour ajouter un texte

E. Bazile, P. Le Moigne, A. Verrelle,  
F. Besson, C. Soci, R. Abida, C. Szczypta, R. Abida

# UERRA : Uncertainties in Ensembles Regional ReAnalysis (2014-2017)

## Per Uden SMHI



SMHI  
HARMONIE - ALADIN  
11 km  
65 levels  
3D-Var

UK MetOffice  
12 km  
70 levels  
4D-Var  
Including satellite info.  
20 ens. members  
36 km

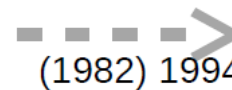
University of Bonn  
Hans Ertel Centre  
12 km  
40 levels  
Nudging (LETKF prepare)  
20 ens. Members  
12 km



**1961-2015**

Météo-France  
MESCAN  
Surface  
6-8 en. Members  
OI MESCAN  
5 km

**1979-2015**



SMHI  
MESAN  
Cloud Analysis

**2006-2010**

SMHI  
HARMONIE-ALARO

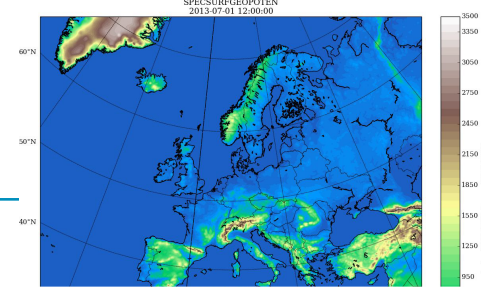
[www.uerra.eu](http://www.uerra.eu)



Rencontre Irstea-CNRM  
Toulouse 24 Oct 2018



# UERRA : Uncertainties in Ensembles Regional ReAnalysis (2014-2017) Per Unden SMHI



Données disponibles sur MARS (ECMWF) :

apps.ecmwf.int/datasets/data/uerra-mescan-surfex/levtype=sfc/stream=oper/type=an/

Rechercher

ECMWF

Contact Log In

Public Datasets Select dataset Current activity Help

## UERRA, MESCAN-SURFEX

Please login before retrieving data from this dataserver.

Type of level

- Soil levels
- Surface

Type

- Analysis
- Forecast

Models

- HARMONIE/V1
- HARMONIE/V2
- UM
- UM/En
- COSMO/En
- MESAN/V1
- MESCAN-SURFEX**
- MESCAN-SURFEX/En

Select a month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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www.uerra.eu

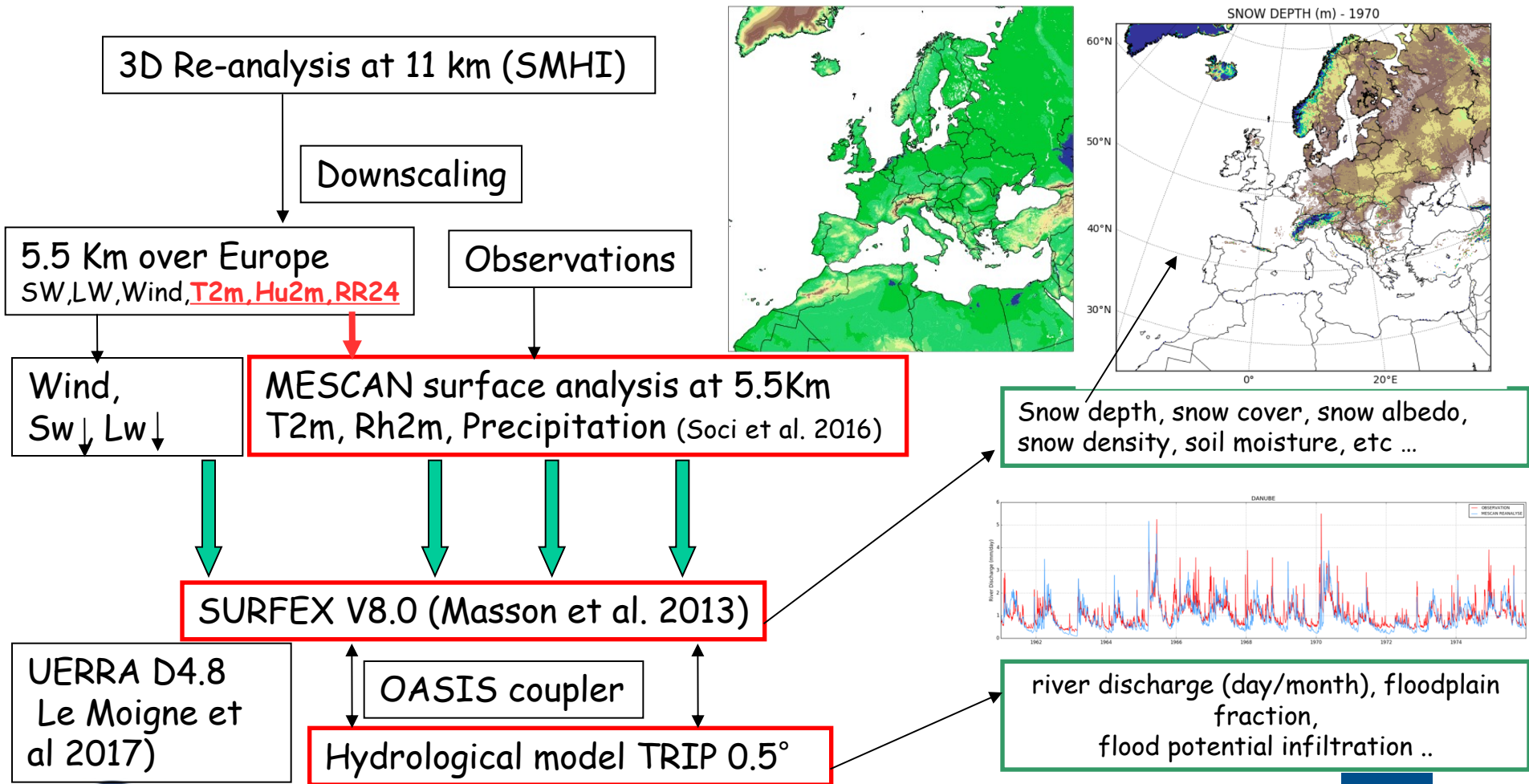


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# UERRA surface re-analysis 1961-2015 : MESCAN-SURFEX (UERRA D2.8 Bazile et al. 2017)

-2D surface analysis at 5.5km for 1961-2015 with precipitation analysis

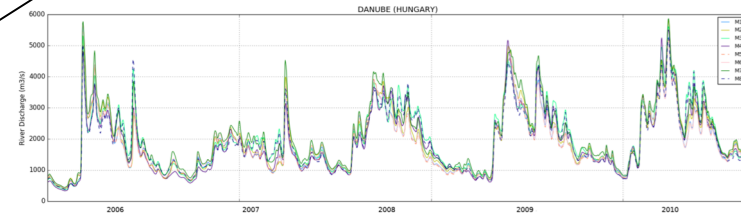
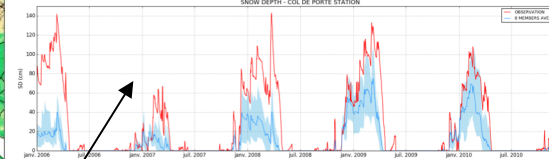
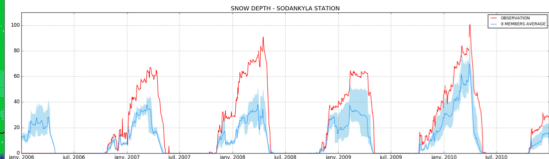
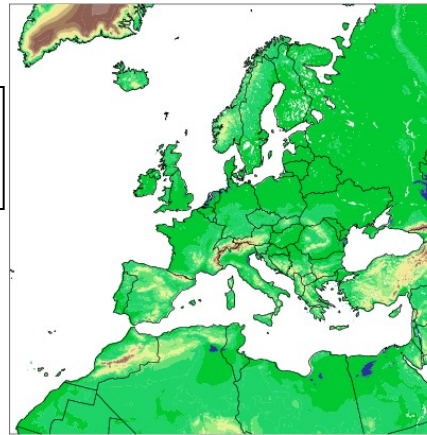
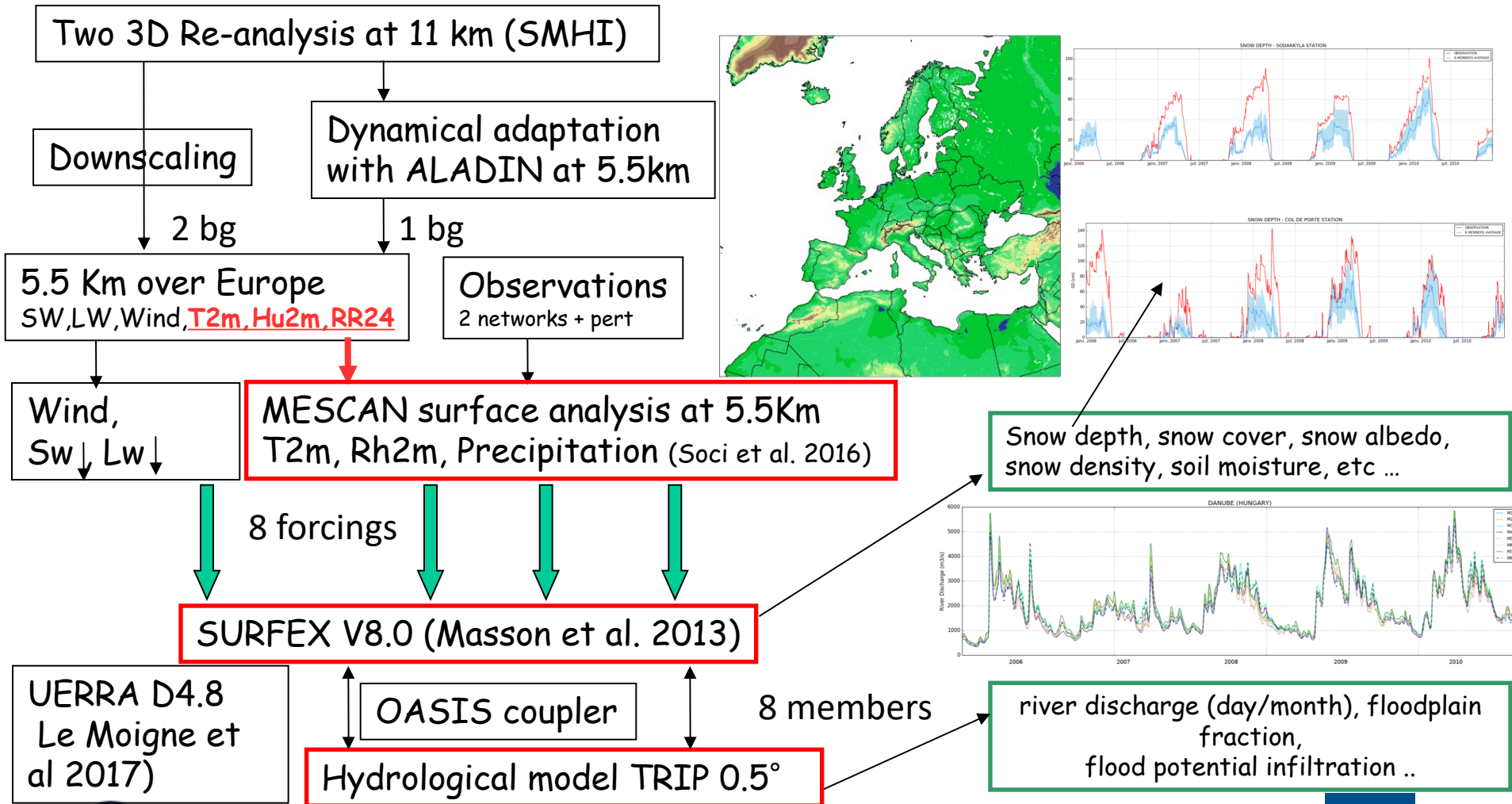


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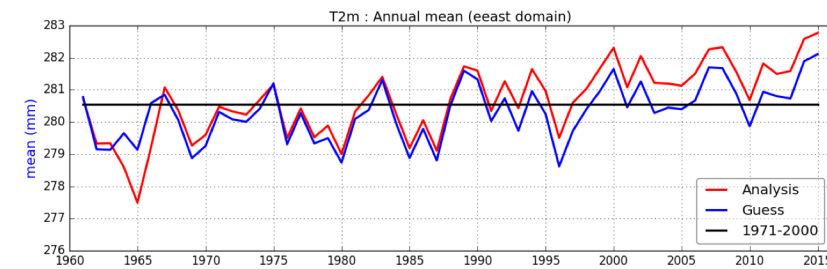
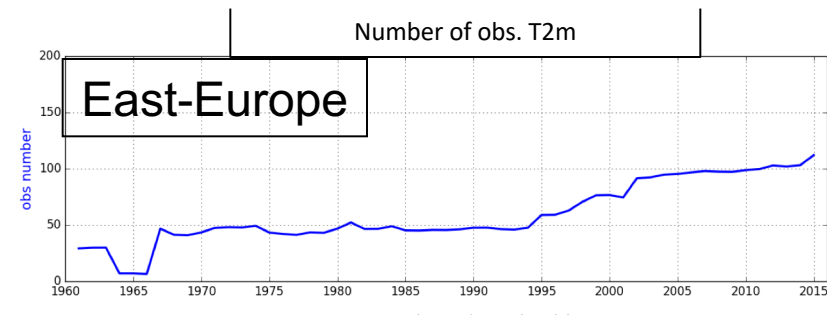
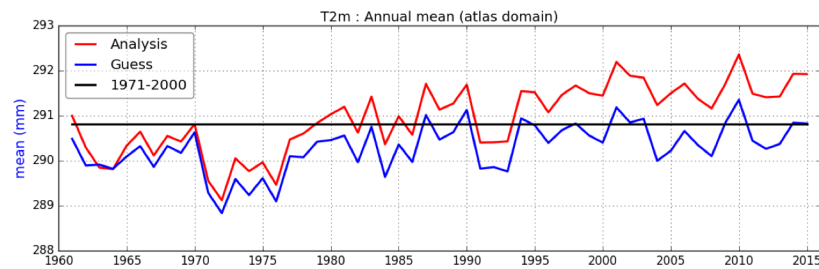
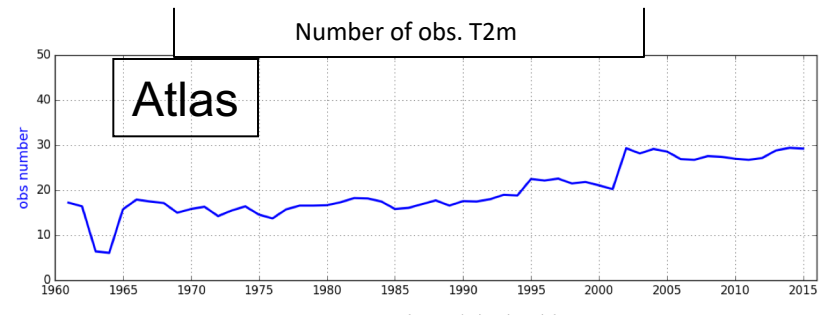
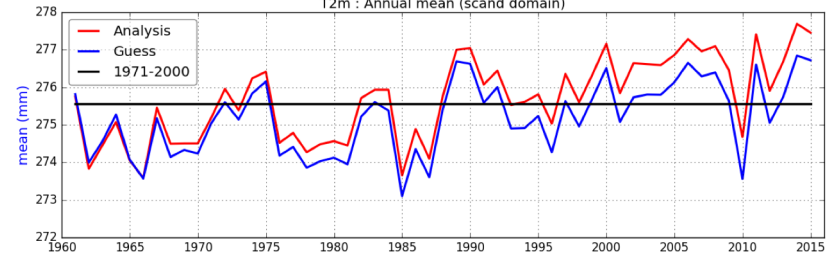
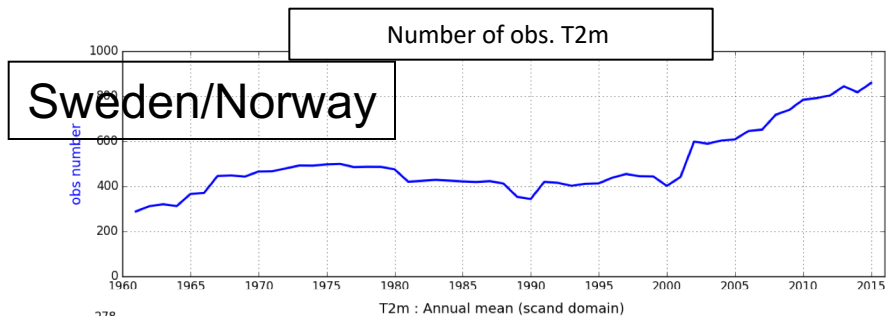
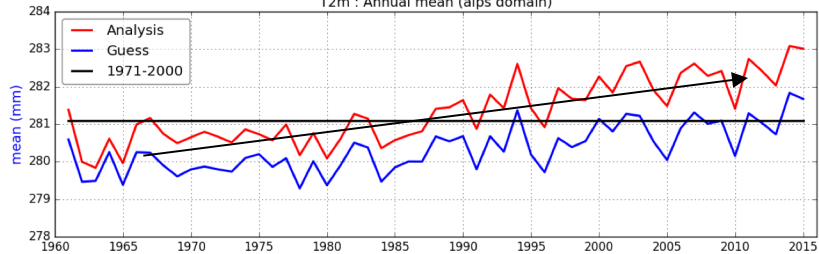
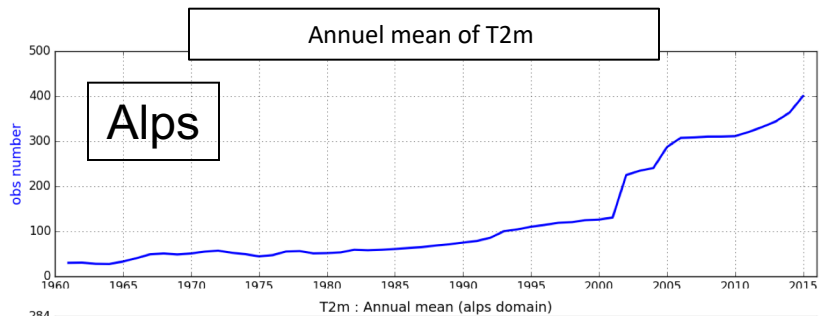


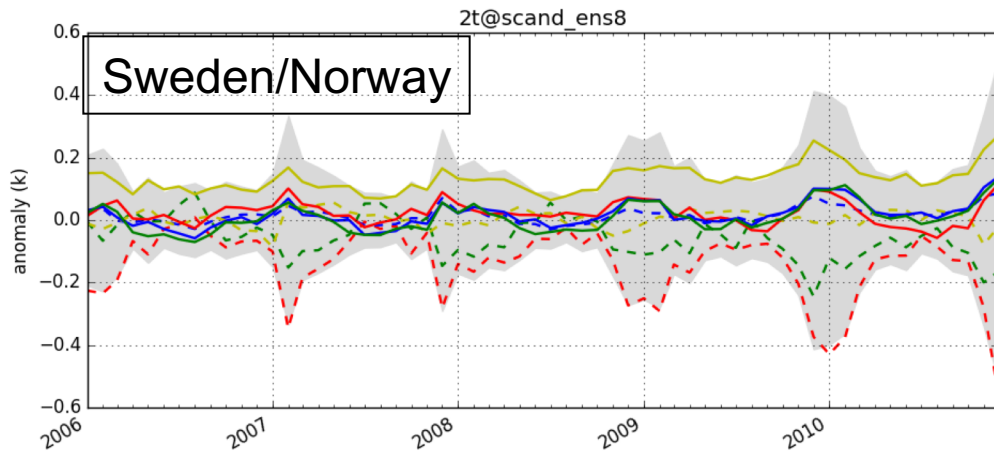
# Ensemble with 8 members

## ONLY 2006-2010 (UERRA D2.9 Bazile et al. 2017)

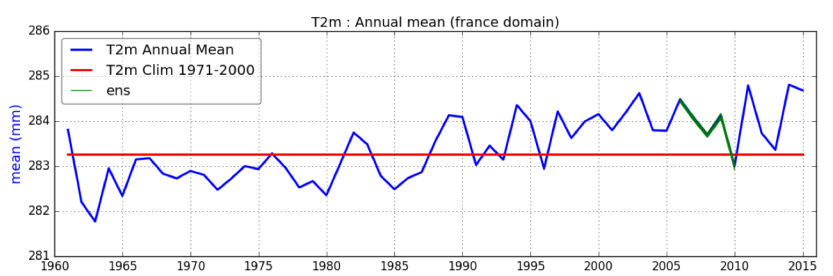
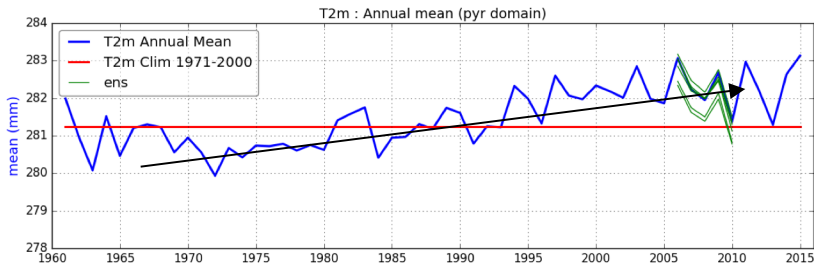
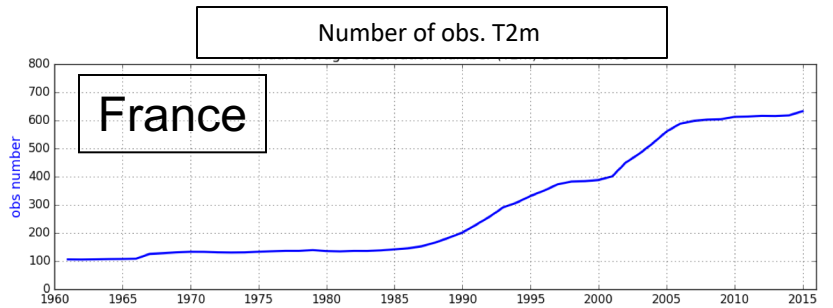
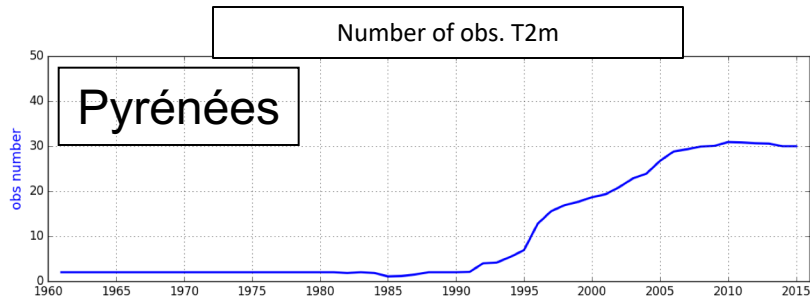
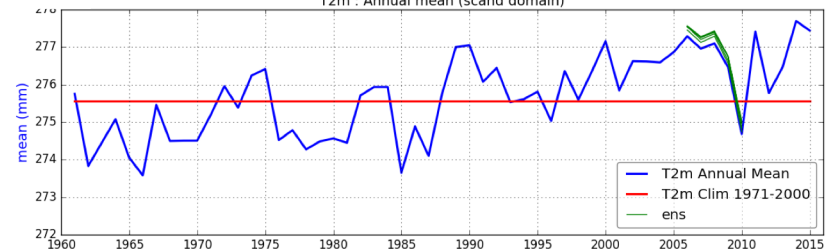
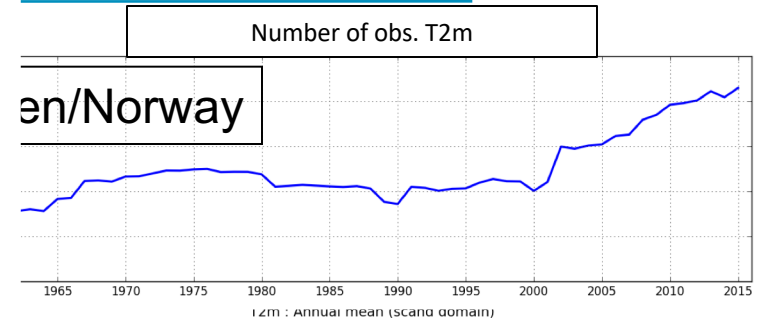


# Annual mean 2m temperature: 1961-2015

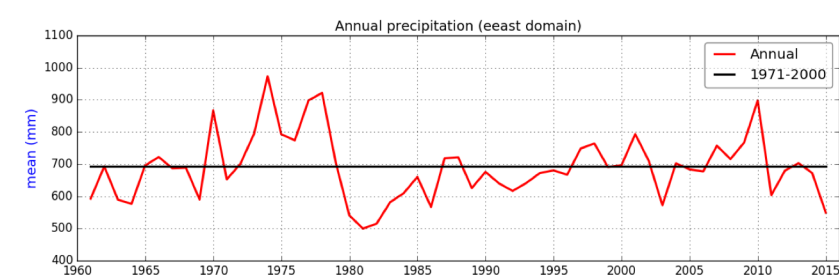
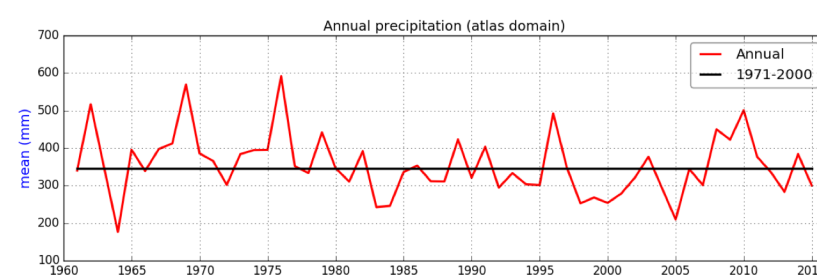
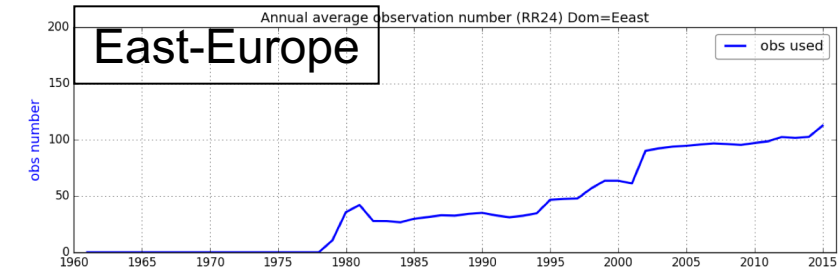
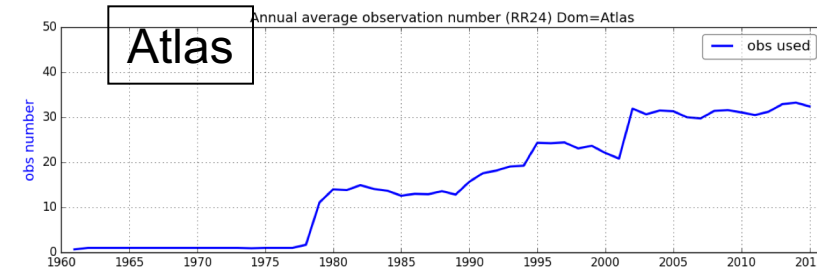
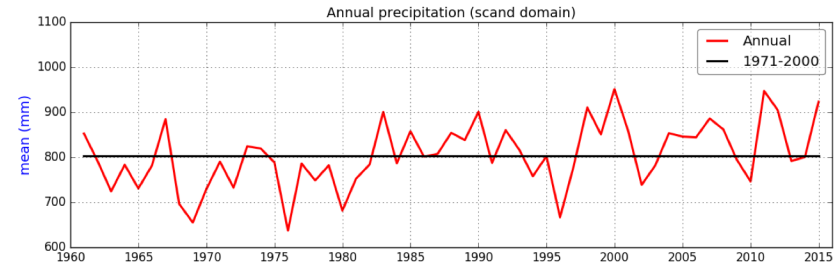
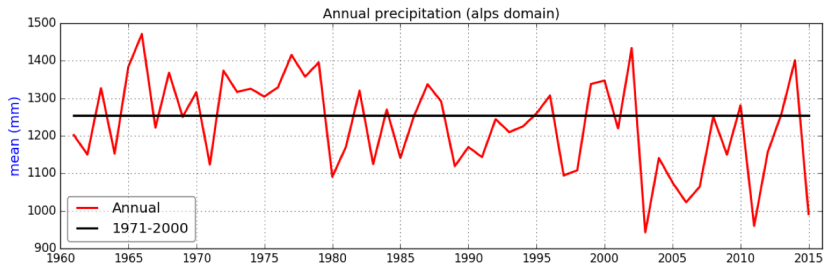
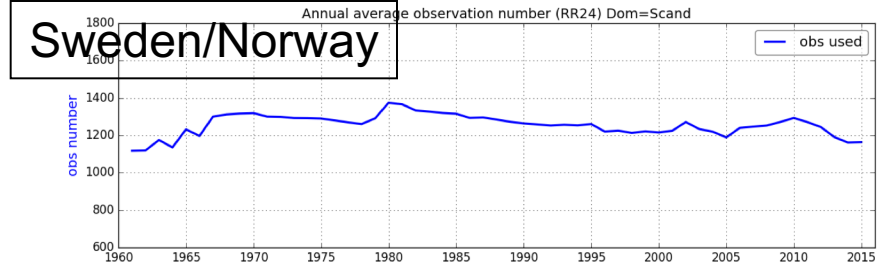
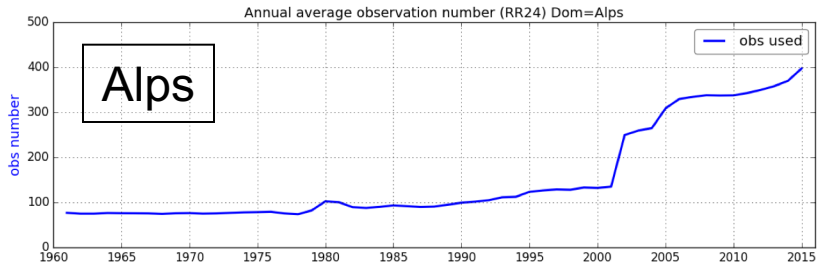
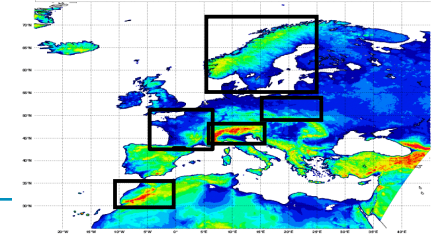




# Temperature: 1961-2015

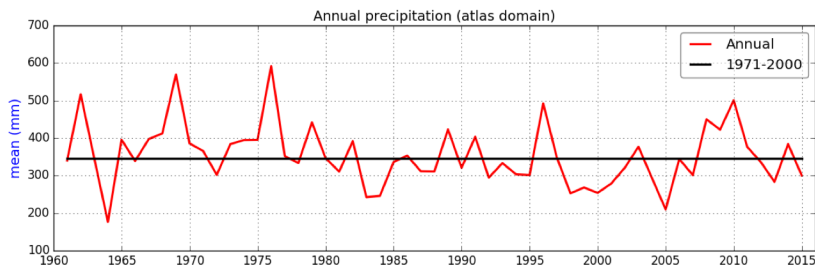
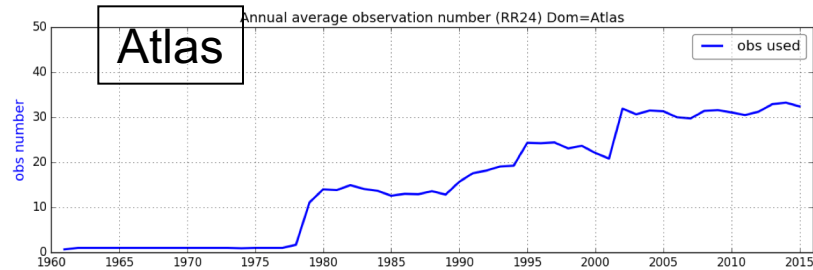
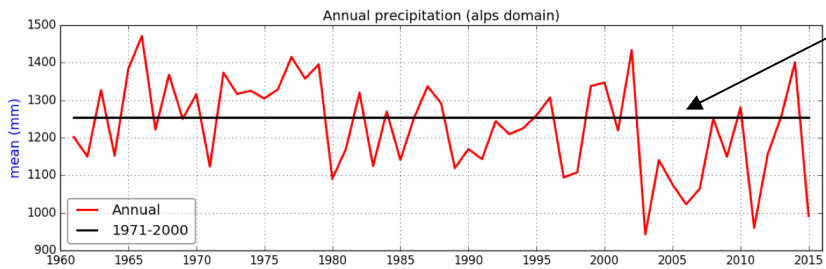
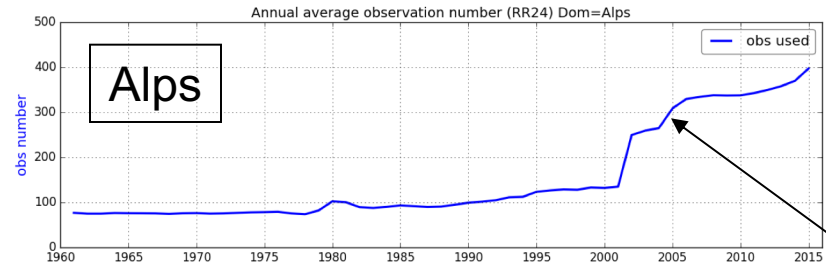


# Annual rainfall 1961-2015



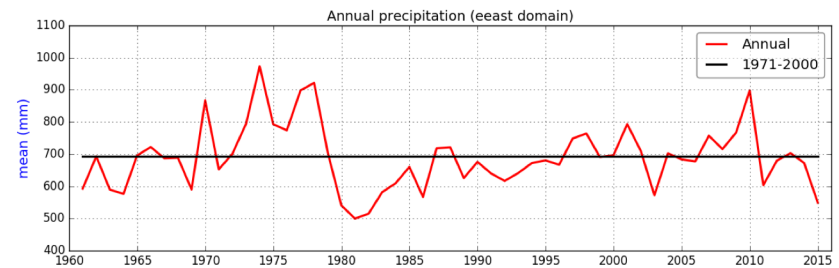
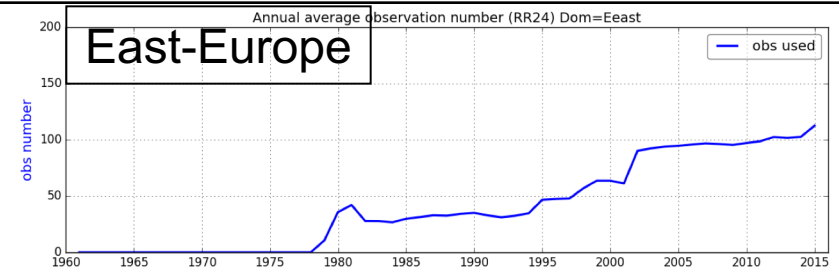


# Annual rainfall 1961-2015

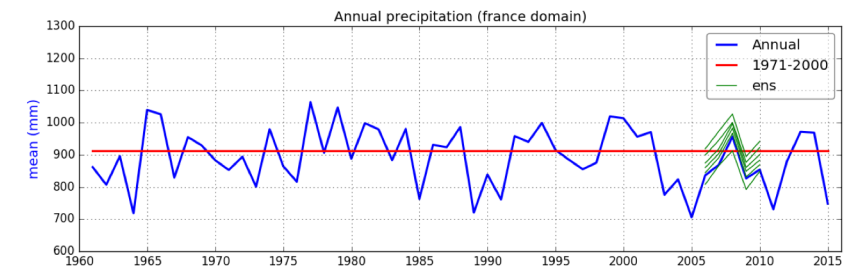
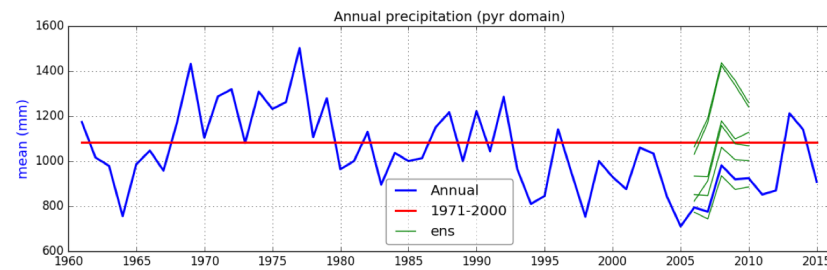
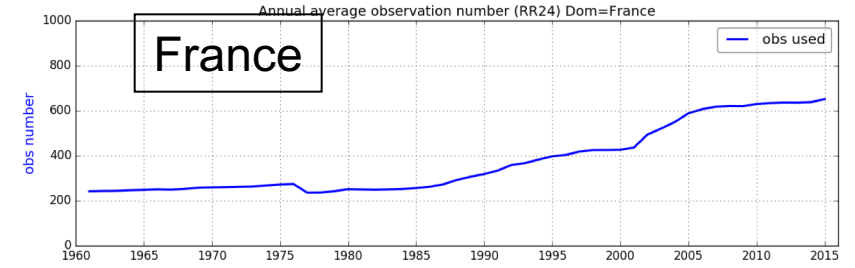
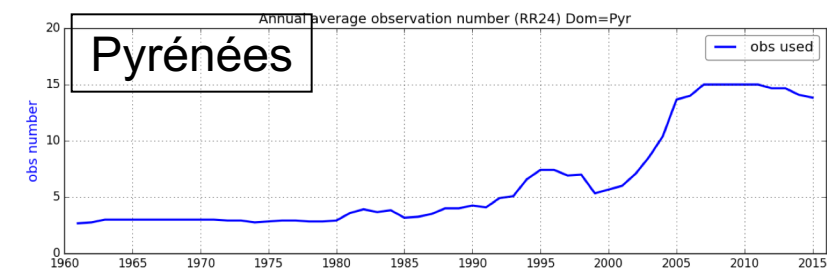
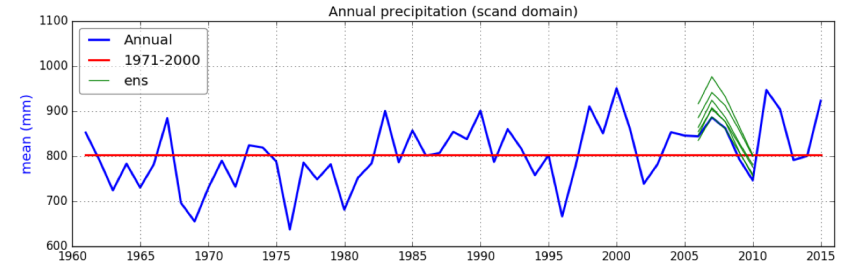
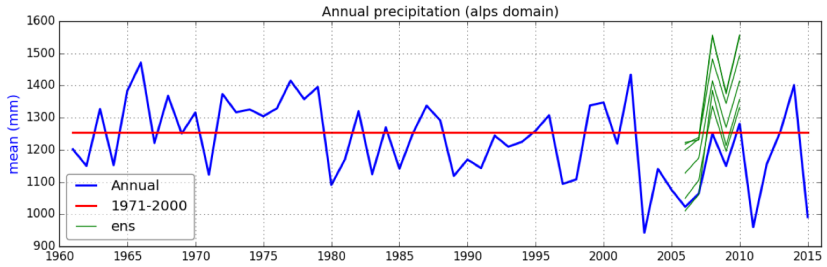
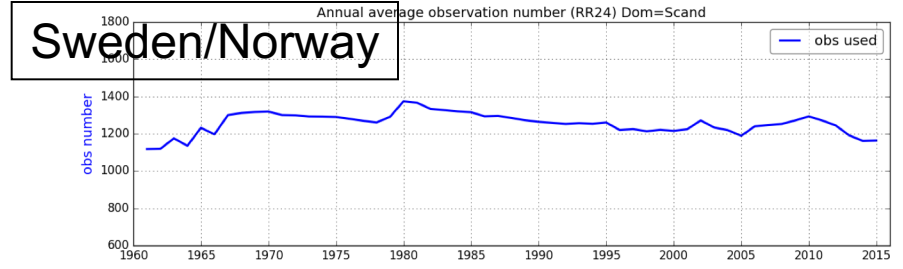
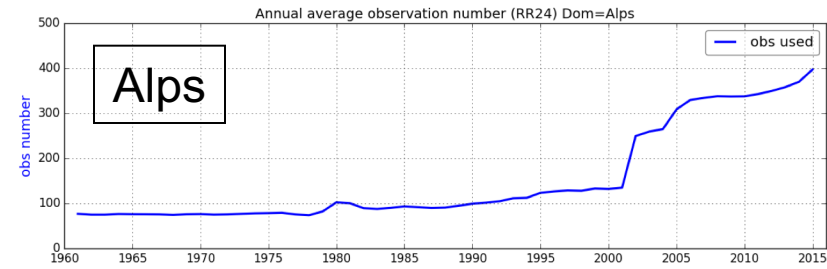


NWP models have a tendency to overestimate the precipitations over mountain. With more observations available → more corrections so less overestimation.

How the increase of the number of observations affect the trends of precipitation over the Alps ?



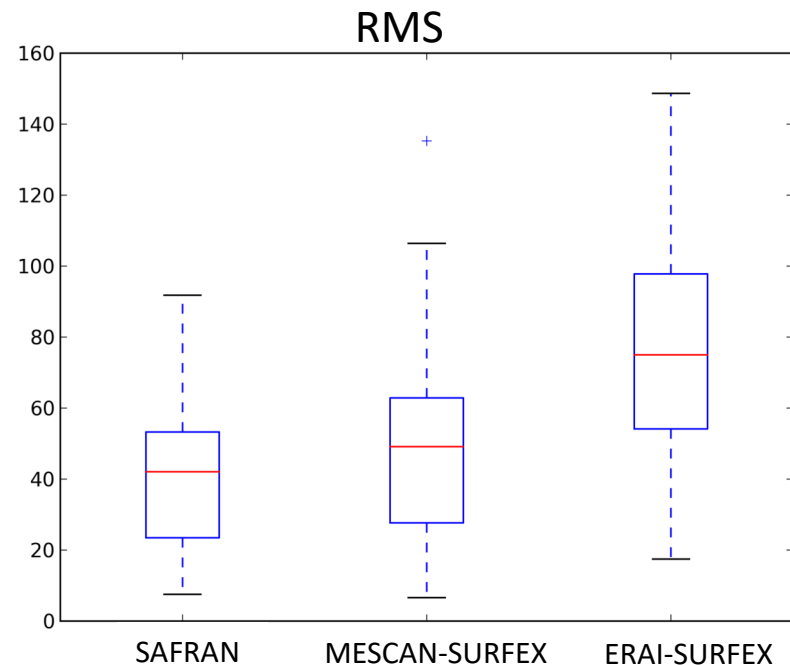
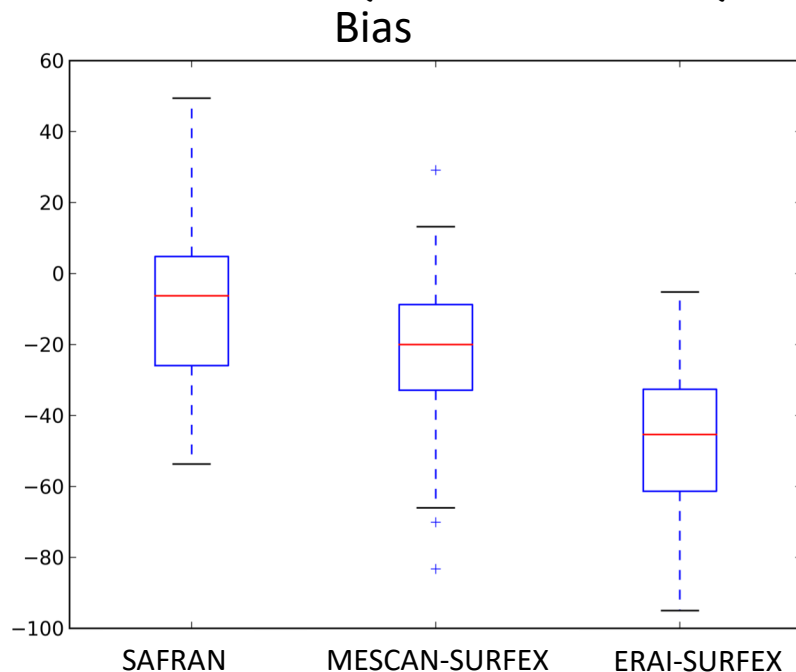
# Annual rainfall 1961-2015



# UERRA-MESCAN-SURFEX

## Snow depth evaluation (2001-2011)

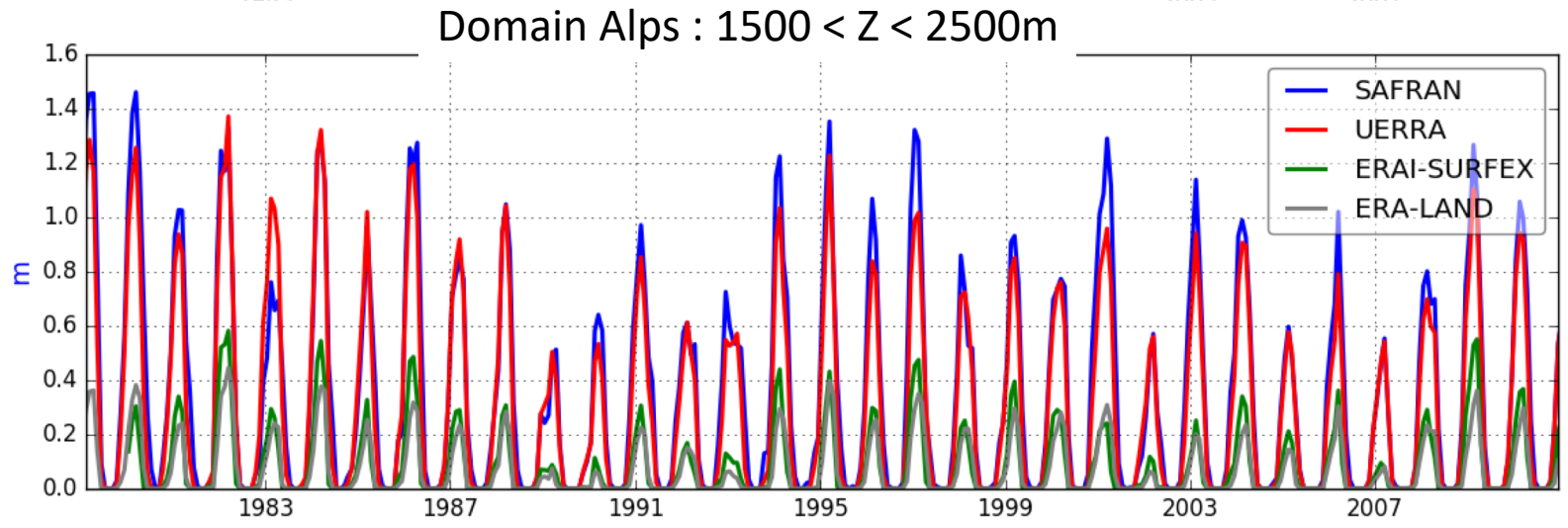
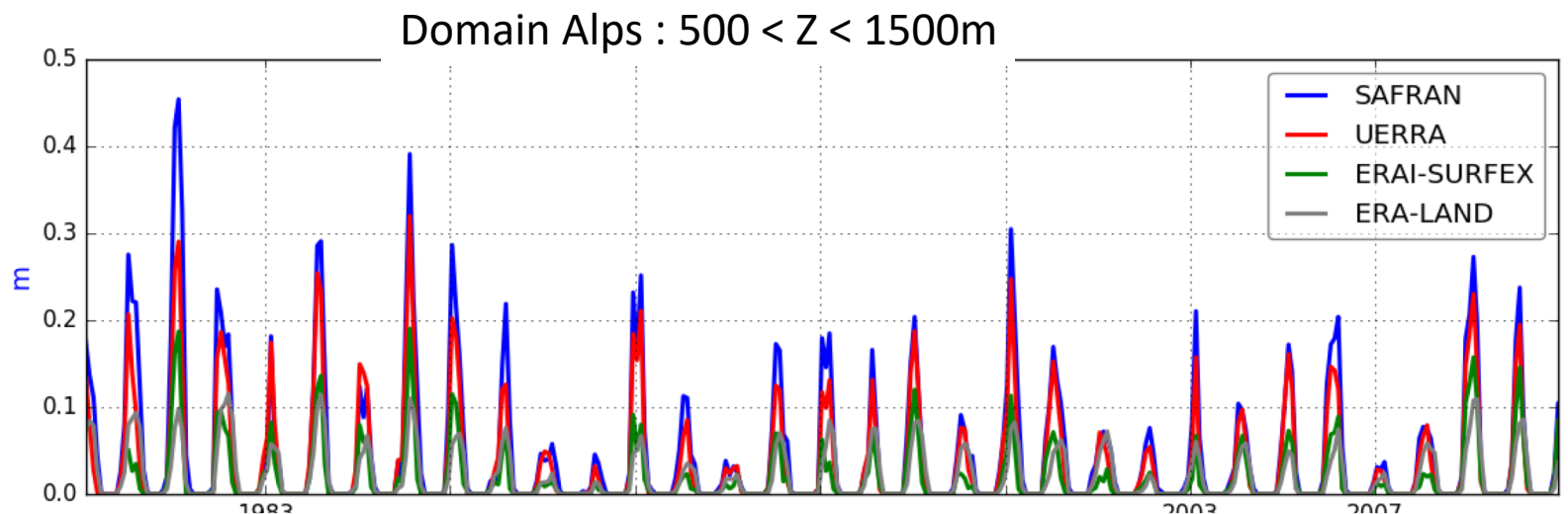
Snow depth measurement: independent observations for MESCAN-SURFEX but not for SAFRAN (operational Meteo-France system for snow avalanches). ERAI-SURFEX (Boisserie et al (2016)).



The MESCAN analysis improves the snow height computed by SURFEX ; thanks to the MESCAN precipitation analysis versus GPCC correction and a better horizontal resolution



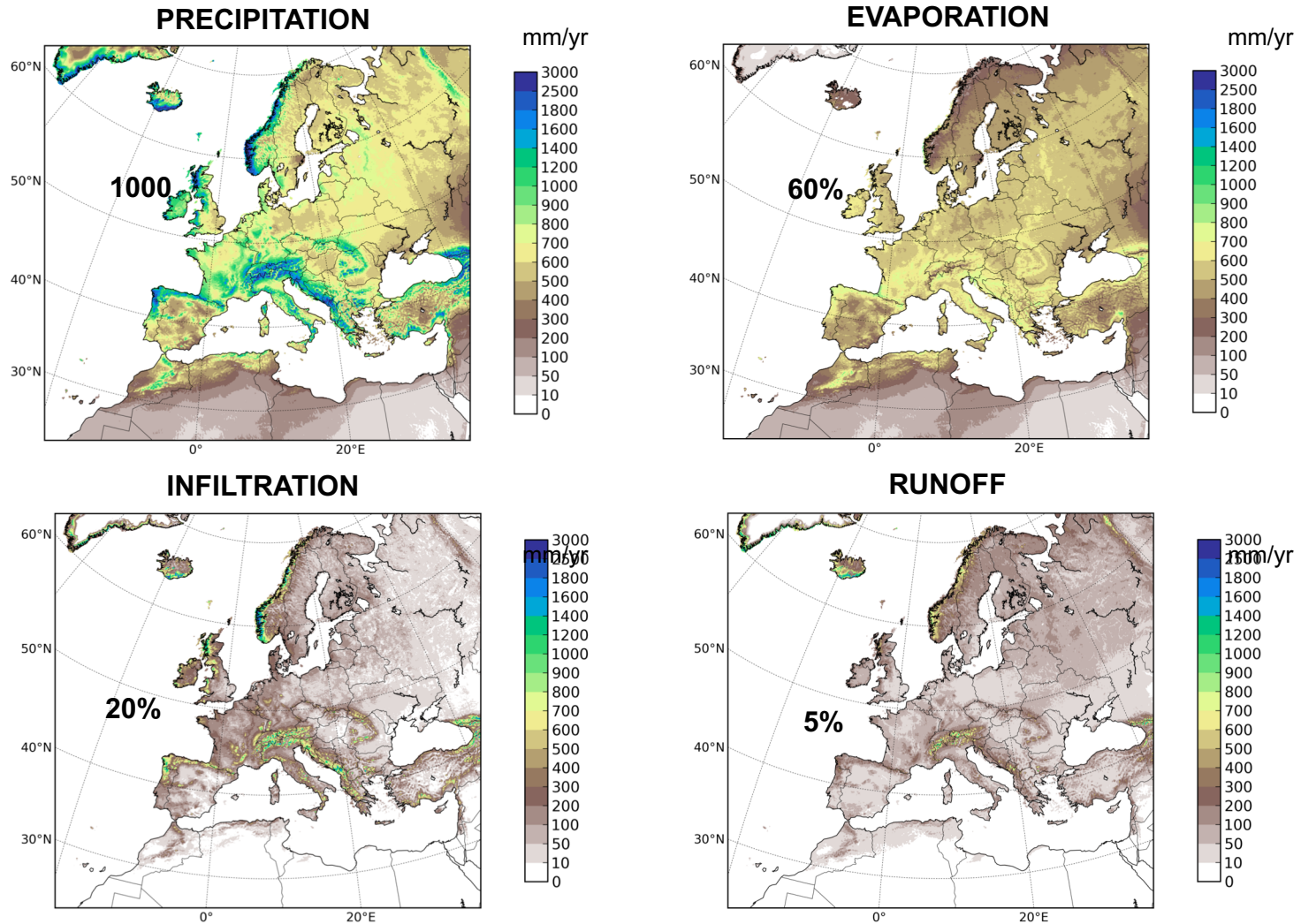
# Snow height comparison between SAFRAN, UERRA-MESCAN-SURFEX, ERA-Land & ERAI-SURFEX.



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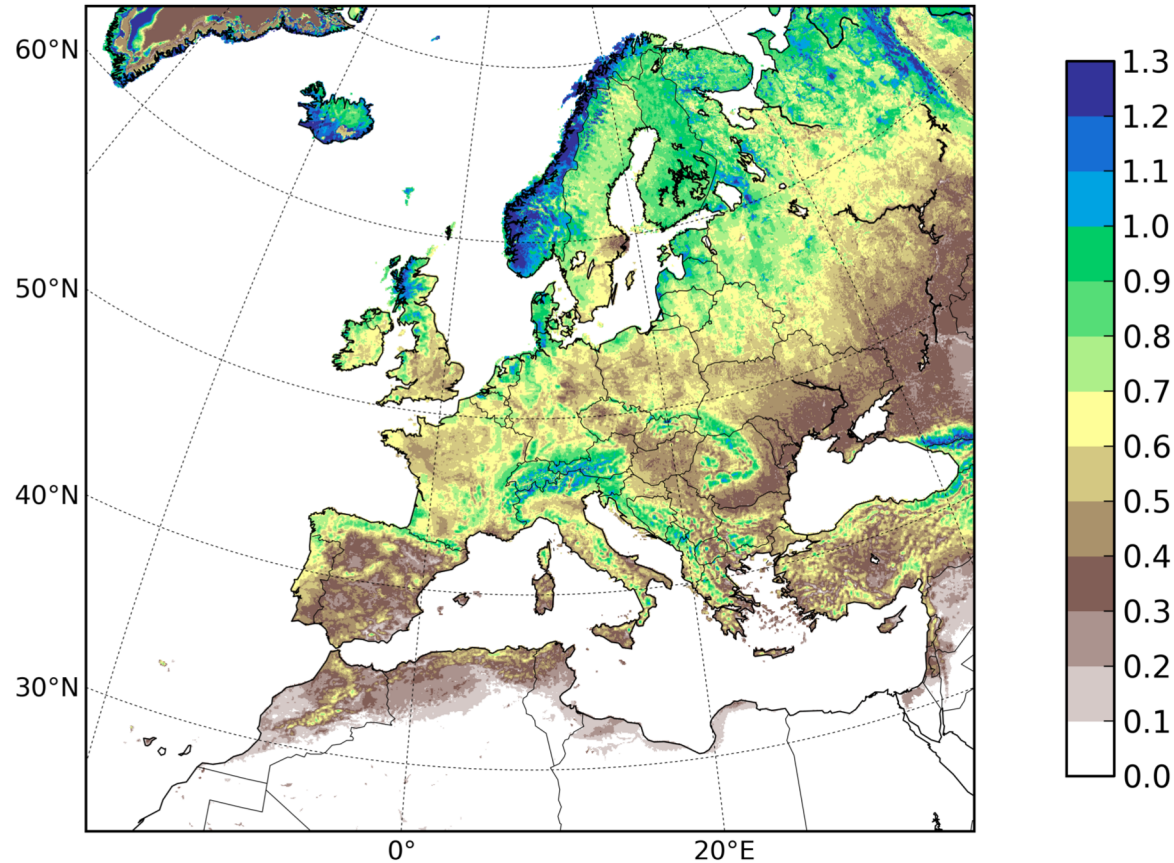
# Water Balance Components: 1961-2010



# Soil Wetness Index: 1961-2010

Water storage = Precip – Evap – Runoff – Infiltration

$$\text{SWI} = (W_g - W_{\text{wilt}}) / (W_{\text{fc}} - W_{\text{wilt}})$$



# Après 2017: Copernicus C3S\_322 lot1 & lot2

- **Lot 1 : Europe. Lead : SMHI avec Météo-France (CNRM) et Met-Norway (PRECISE):**

- Continuation de la production du SMHI et de Météo-France d'UERRA pour 2016-2018
- **Re-analyse atmo 3DVar à 5.5km sur l'Europe même domaine que UERRA avec la physique d'ARPEGE au moins 100 niveaux verticaux.**
- Analyse de surface et de precipitation avec MESCAN puis SURFEX offline comme dans UERRA.
- **Probable rétroaction de l'analyse de precipitation MESCAN dans la re-analyse 3D**
- **Assimilation d'ensemble ~ 12km**
- Nouveau système opérationnel en 2019 Periode 1979 → 2019 puis temps réel.
- 3 postes sur 3.5 ans ( 2 au GMAP et 1 au GMME)

- **Lot 2 : Arctique Lead : MetNorway avec SMHI, DMI, Météo-France (CNRM) (CARRA)**

- 2 domaines avec HARMONIE-AROME à 2.5km et 65niveaux 1979 →2018
- Météo-France tres peu impliqué (1 poste -1 an)



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