Observational datasets

Renate Wilcke
SMHI

Thanks to Andreas Prein and Sven Kotlarski for their slides and papers

Different observational datasets

- varying station density
  - interpolation distance (smoothing)
- gauge undercatch correction (only Norway and Sweden)
- differences in measuring in different countries

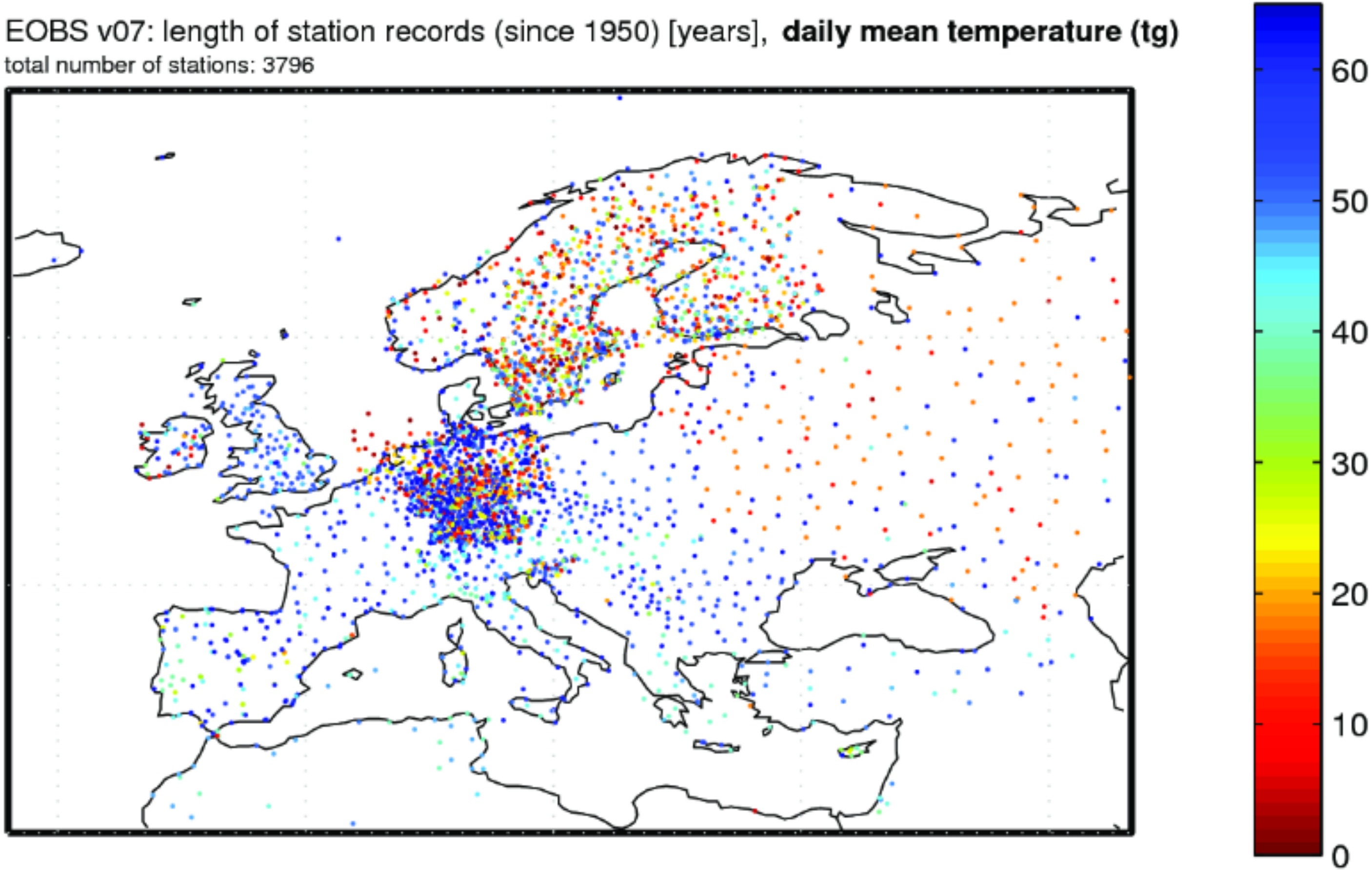
TEMPORAL AND SPATIAL INHOMOGENEITIES

E-OBS is based on les than 3.000 stations, spread unevenly across approximately 18.000 0.22 grid-boxes..

Slide: Sven Kotlarski

EOBS v07: length of station records (since 1950) [years], **daily mean temperature (tg)**

total number of stations: 3796



Low network density is associated with a considerable smoothing of spatial variability and of (daily) extremes! (Hofstra et al. 2010)

Nominal resoution (~25km) = effective resolution?

Differences EU-datasets vs. reg. datasets

Prein & Gobiet submitted

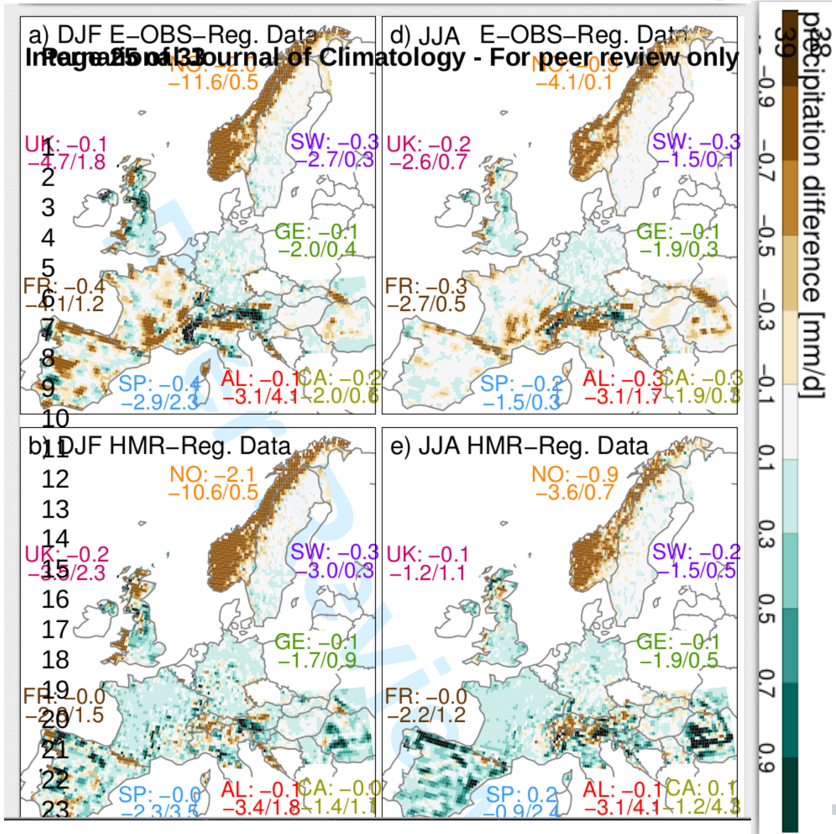


Fig 3. Seasonal averaged differences in precipitation between

- 1 row: E-OBS and regional datasets
- 2 row: Hirlam-MESAN and regional datasets

Numbers: mean, min, max precipitation difference

High differences in Norway and Sweden can be explained by having applied gauge undercatch correction (14%/80% fluid/solid) in the regional dataset.

Undercatch can account for 20%-40% of wet bias in models.

Extremes

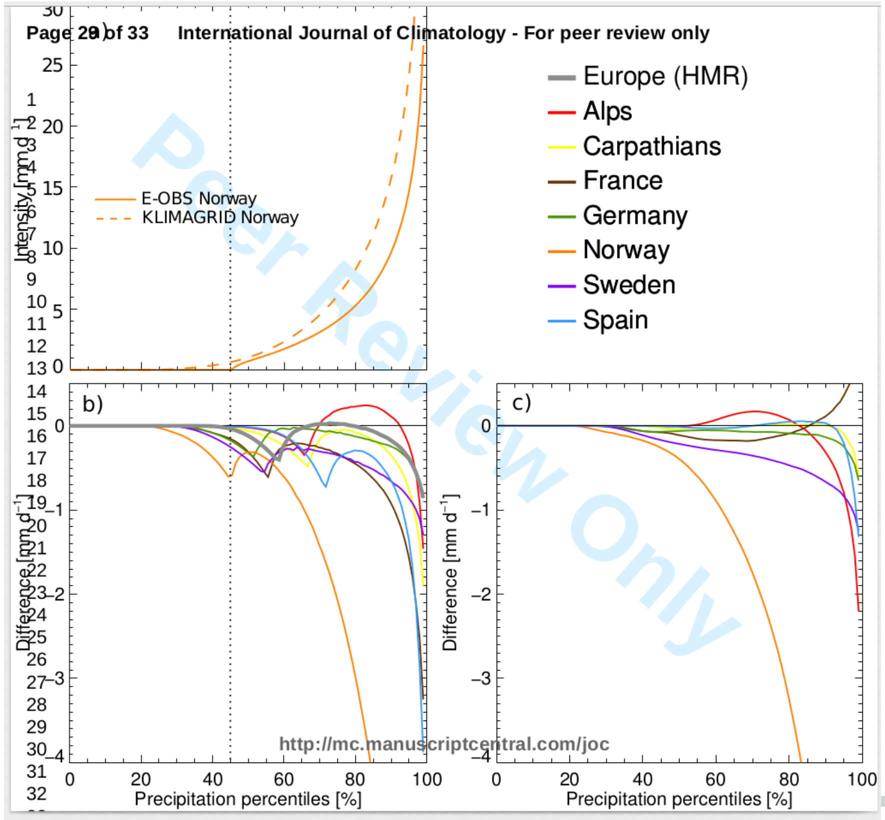
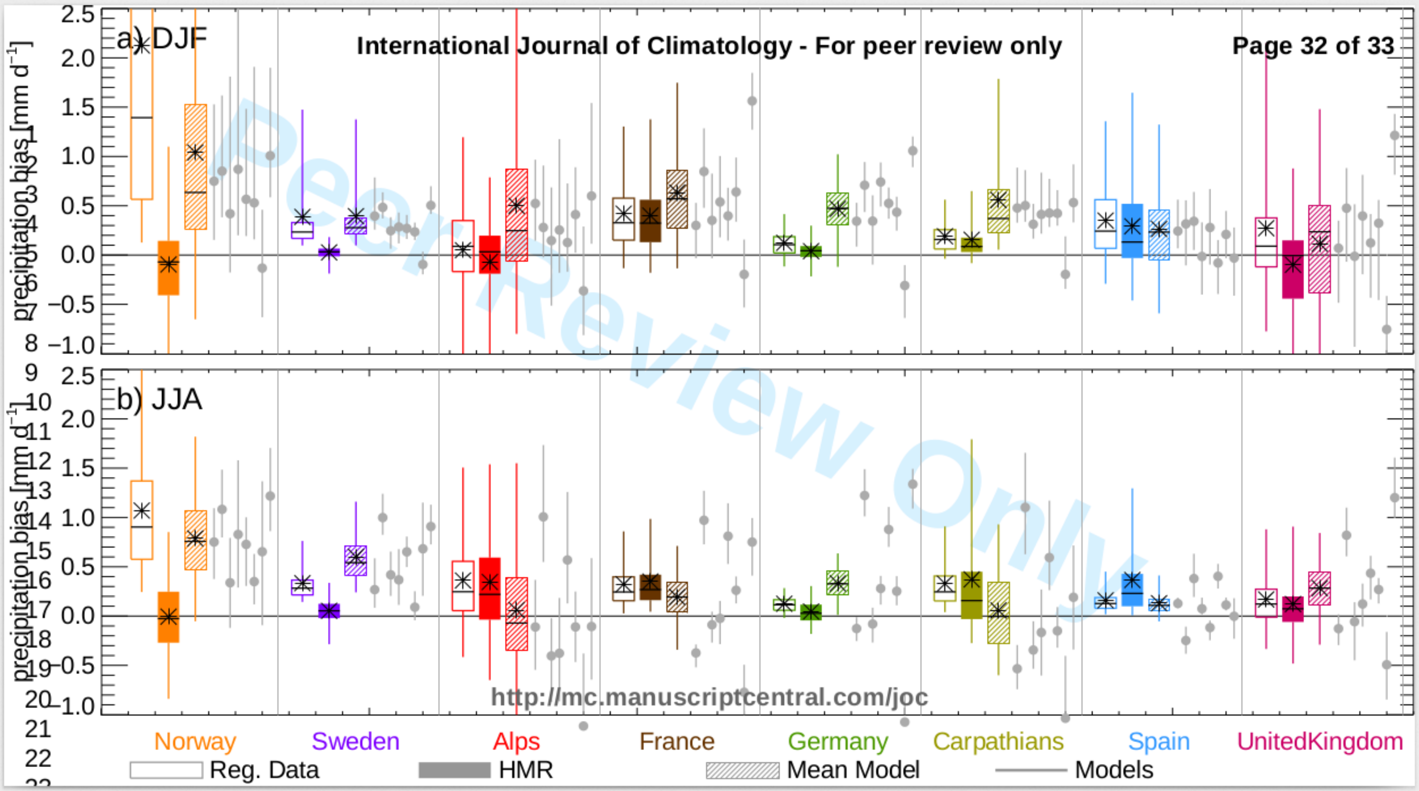


Fig. 7 Differenes between the empirical quantile functions of
b) E-OBS and regional datasets
c) HMR and regional datasets
during DJF. Gray dotted line depicts the percentile below which E-OBS has zero precip.

Interpolation: Biggest effect on extreme precip (Haylock et al. 2008, Hofstra et al. 2009, 2010). Technical specs: e.g. threshold for rain days in E-OBS at 0.5 mm/d. -> E-OBS has about 50% more dry days than HMR or reg. datasets.

Prein & Gobiet submitted

Seasonal mean biases E-OBS vs.



-Reg. datasets (unfilled)

-HMR (filled)

-mean model (hashed)

-single models (grey lines)

mulit-model mean biases and obs uncertainties of same order of magnitude.

Prein & Gobiet submitted

Temperature in Switzerland

RCMs versus **na-tional grid** with high underlying network density

RCMs versus **E-OBS**

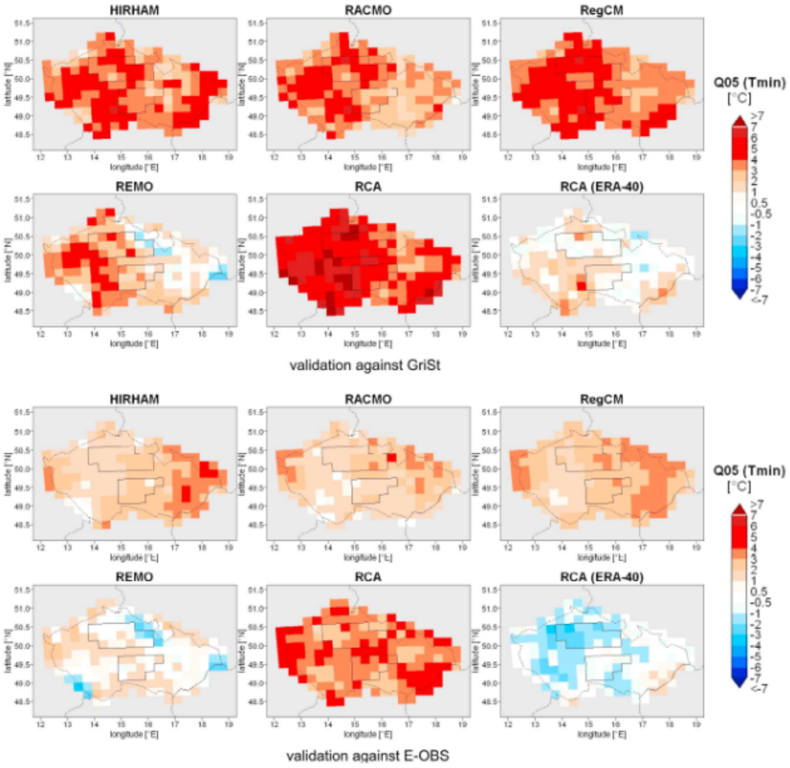


Figure 6. Differences in the 5% quantile of T_{min} in DJF between control simulations of RCMs (1961–1990) and gridded observed data for (top) GriSt and (bottom) E-OBS.

Kysely and Plavcova, 2010

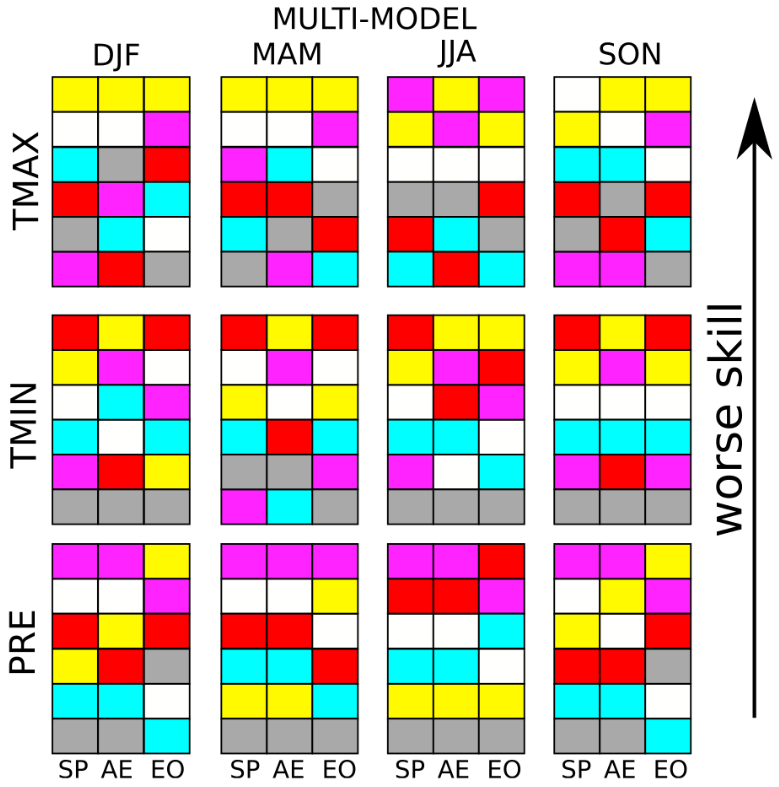
Validation of model results with two observational dataset.

Amplitude of bias

Sign of bias

Slide: Sven Kotlarski

Model skill



Each colour represents a model configuration.
3 observational datasets: SPAIN02, AEMET and E-OBS.
Grey squares represent the ensemble average.

Model skill not only different for season and variable, but also for observational dataset.

Gómez-Navarro et al. 2012

Consequences

- for model validation/verification?
- bias -> bias adjustment?
- impact studies chosing and using climate model data?
- policy makers?