European temperatures and North-Atlantic circulation in CMIP5

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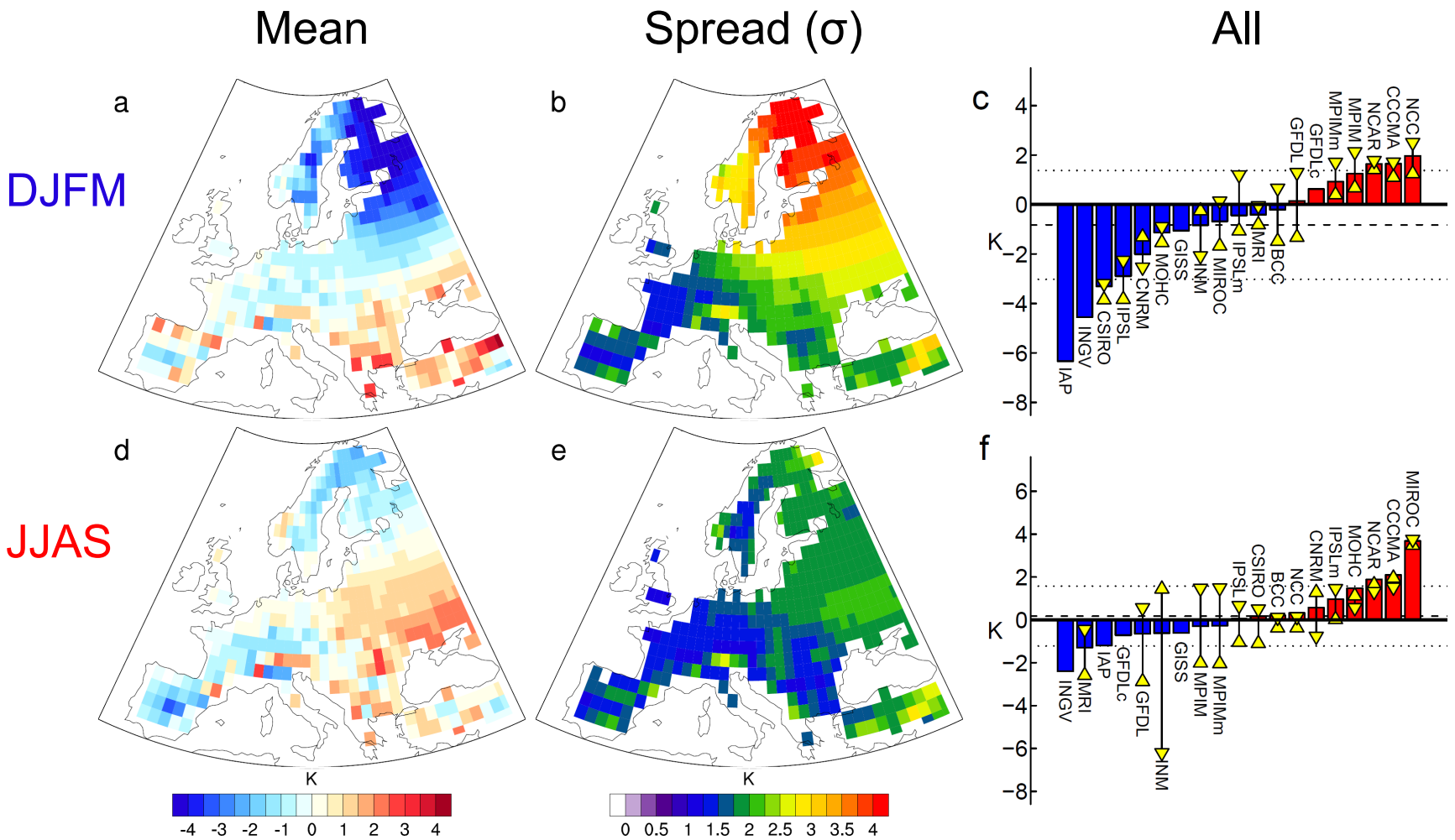
European temperatures: present-day biases

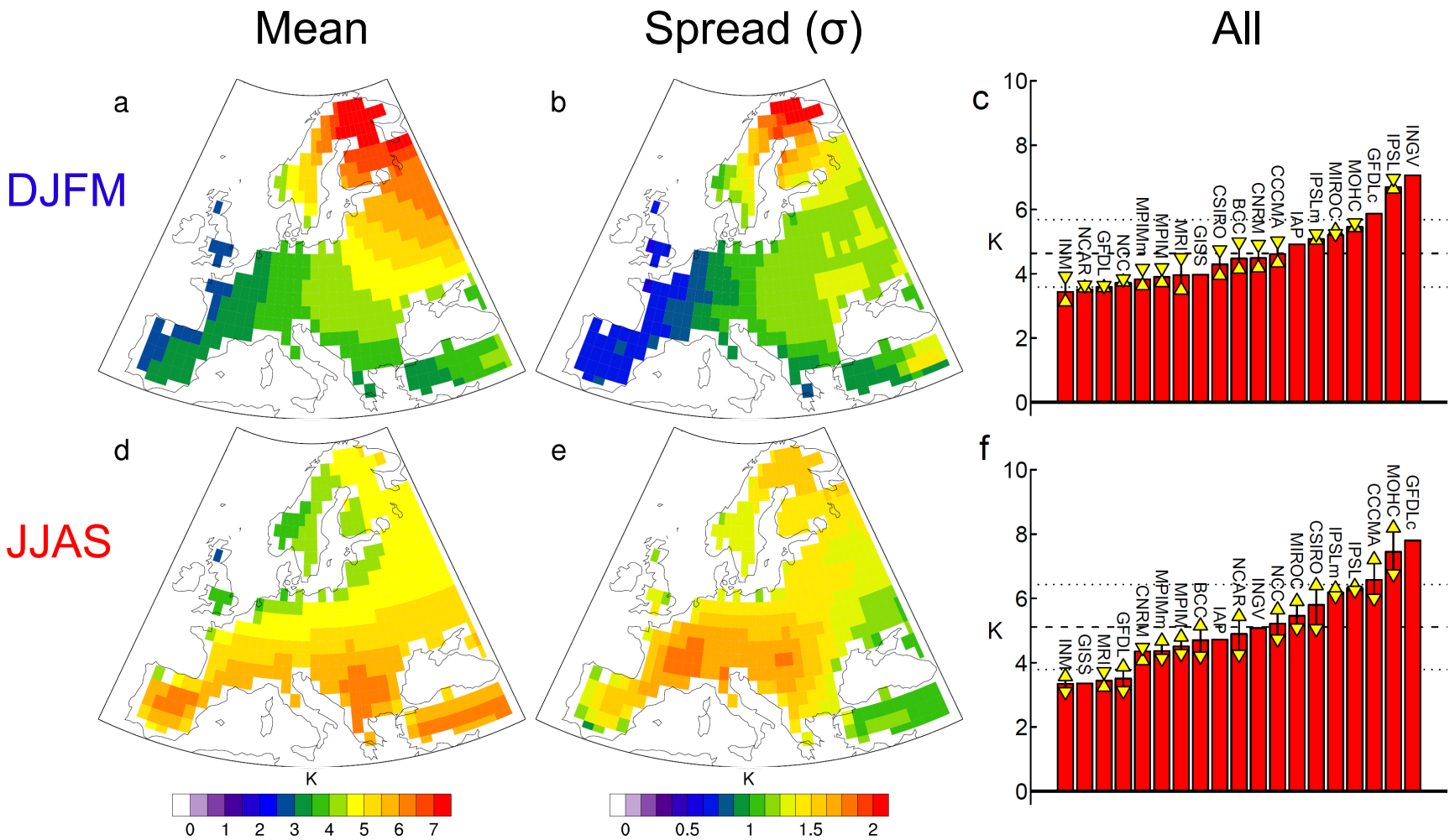
CMIP5 *vs* E-OBS — 1979–2008



Cattiaux et al., Clim. Dyn., submitted.

European temperatures: projected changes

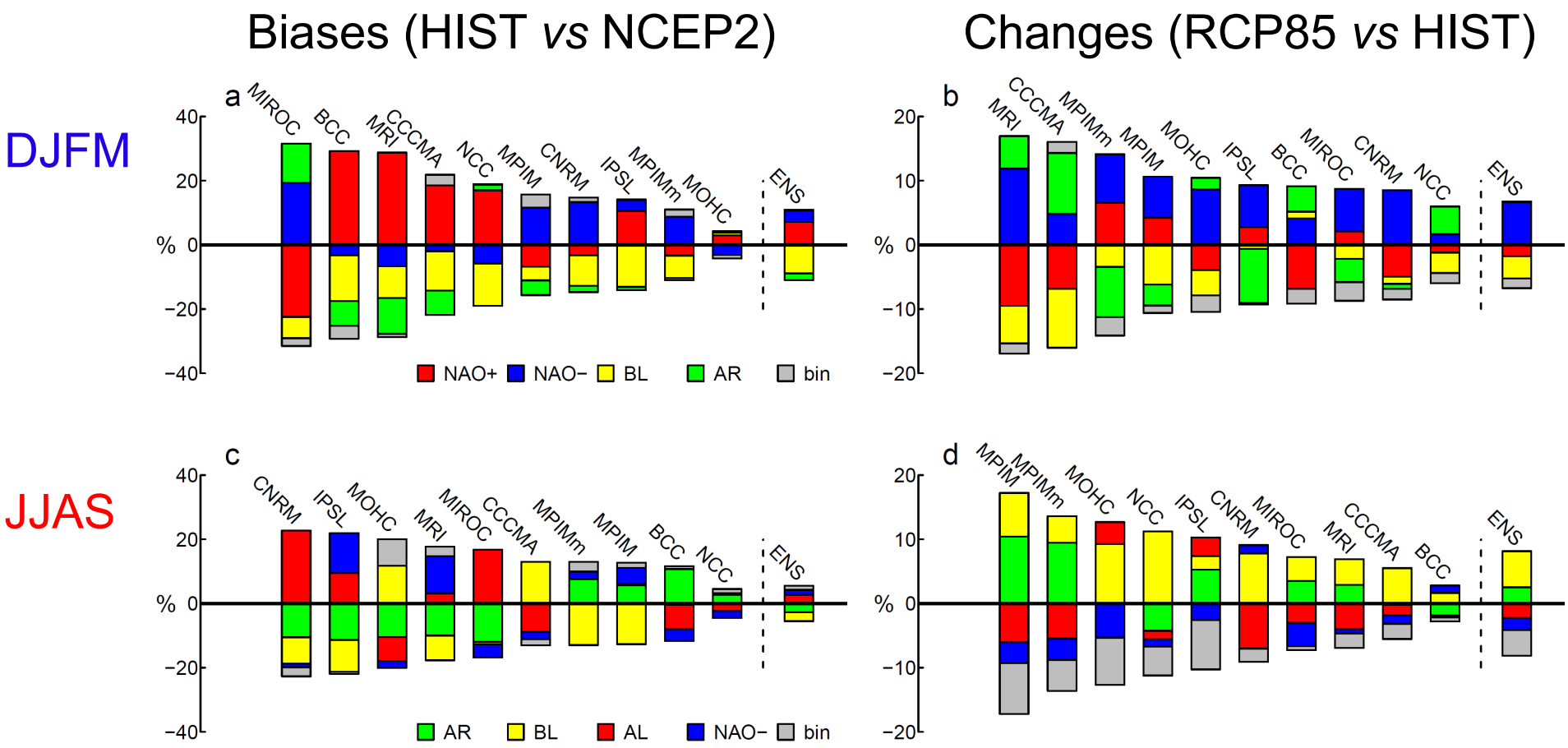
CMIP5 — RCP85 2070–2099 *vs* HIST 1979–2008



Cattiaux et al., Clim. Dyn., submitted.

Understanding the spread: weather regimes

CMIP5 *vs.* NCEP2 — Z500 — 1979–2008



→ Up to 50% of the temperature spread (esp. Western Europe & winter).

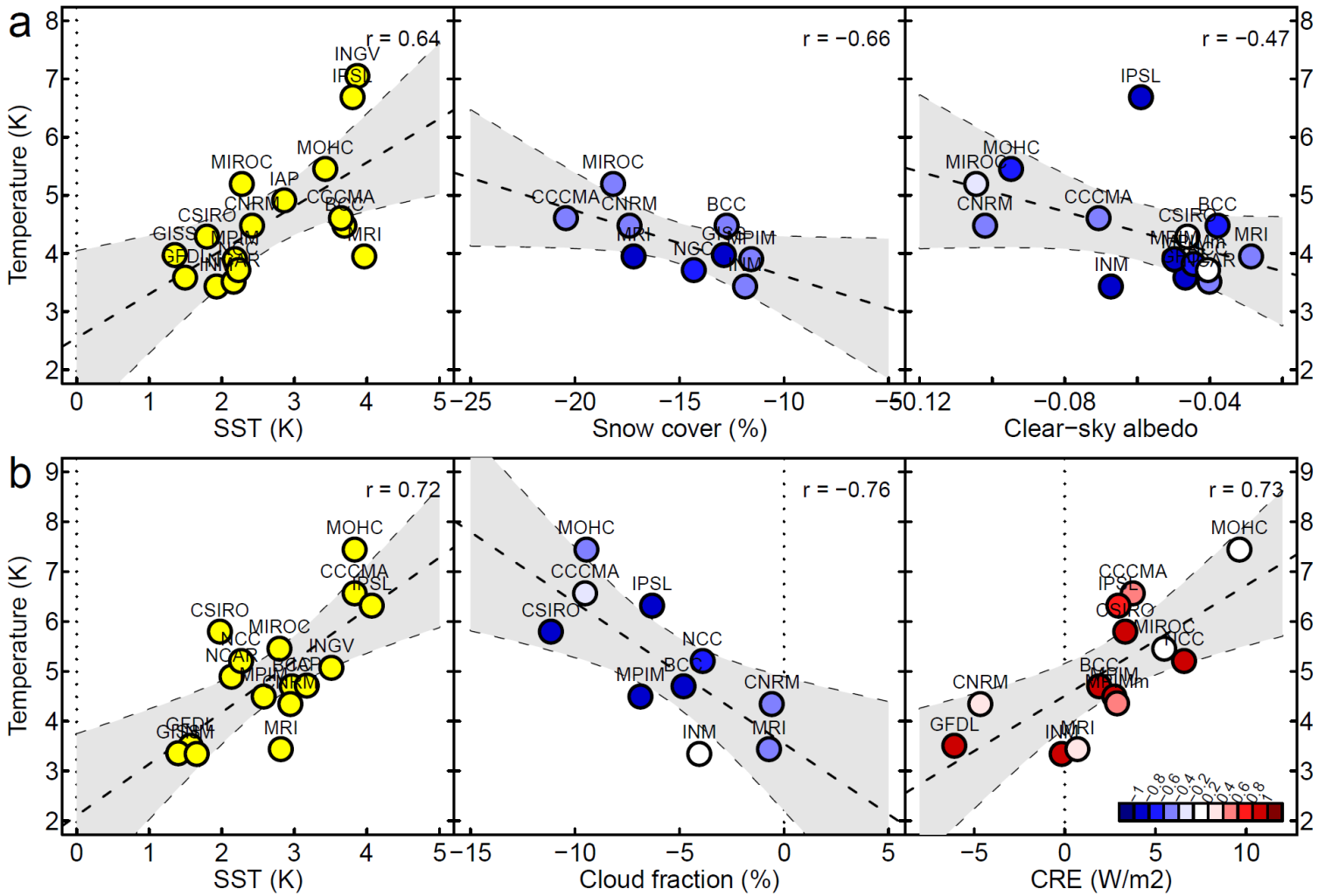
Cattiaux et al., Clim. Dyn., submitted.

Understanding the spread: others

CMIP5 — RCP85 2070–2099 *vs* HIST 1979–2008

DJFM

JJAS

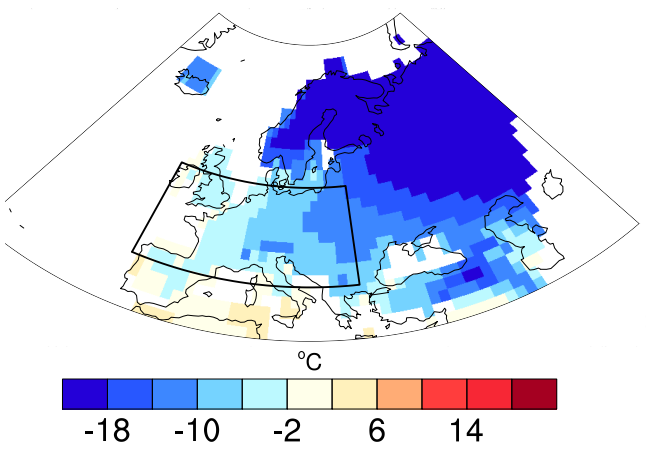


Cattiaux et al., Clim. Dyn., submitted.

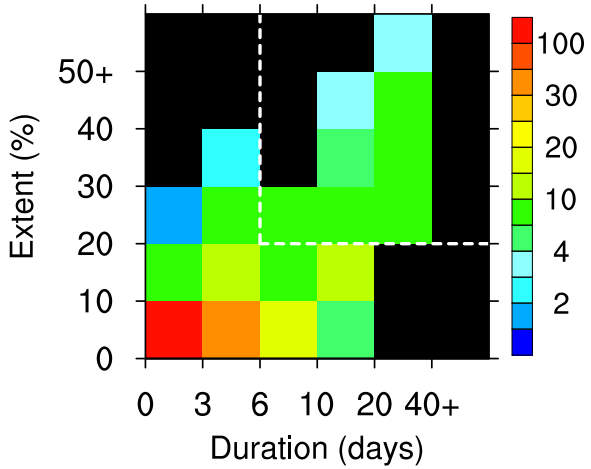
Focus on winter cold spells: biases

CMIP5 *vs* E-OBS — 1979–2008

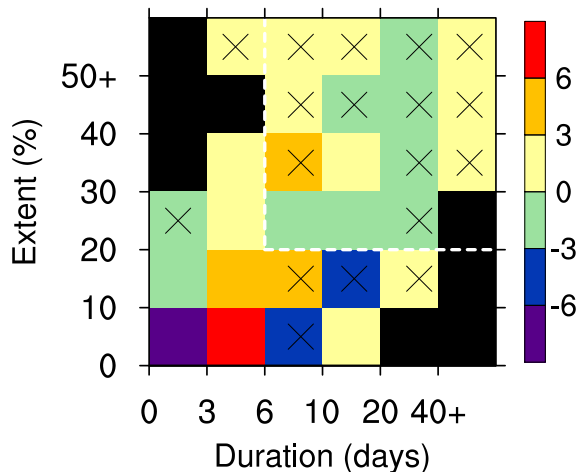
a) QU10 in EOBS



b) Cold events in EOBS



c) Multi-model bias

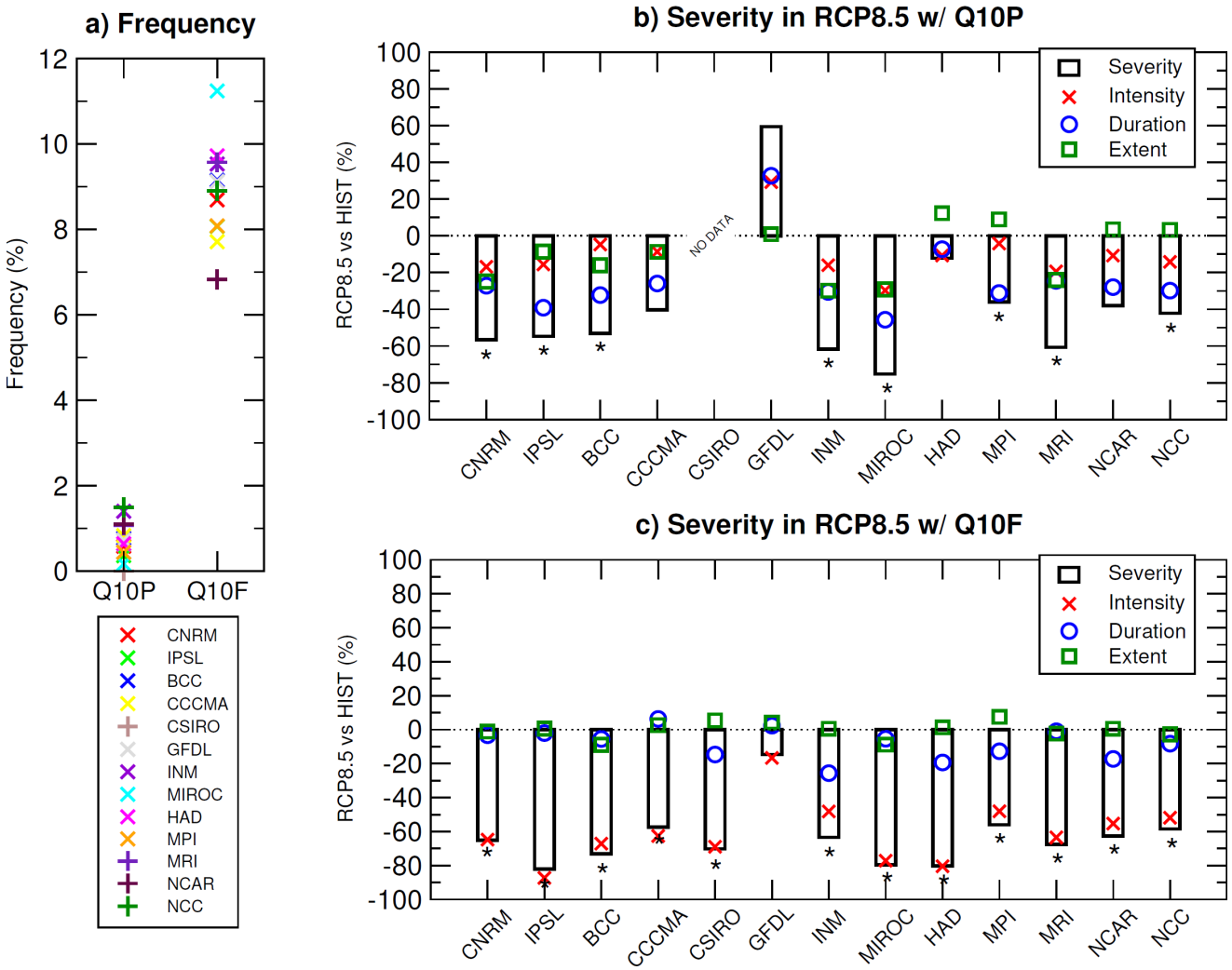


→ Cold spells: 6+ consecutive days below Q10 over 20+ % of the domain.

Peings et al., Clim. Dyn., 2012.

Focus on winter cold spells: changes

CMIP5 — RCP85 2070–2099 *vs* HIST 1979–2008



Peings et al., Clim. Dyn., 2012.

Changes in the AO: CMIP3 & 5 disagree

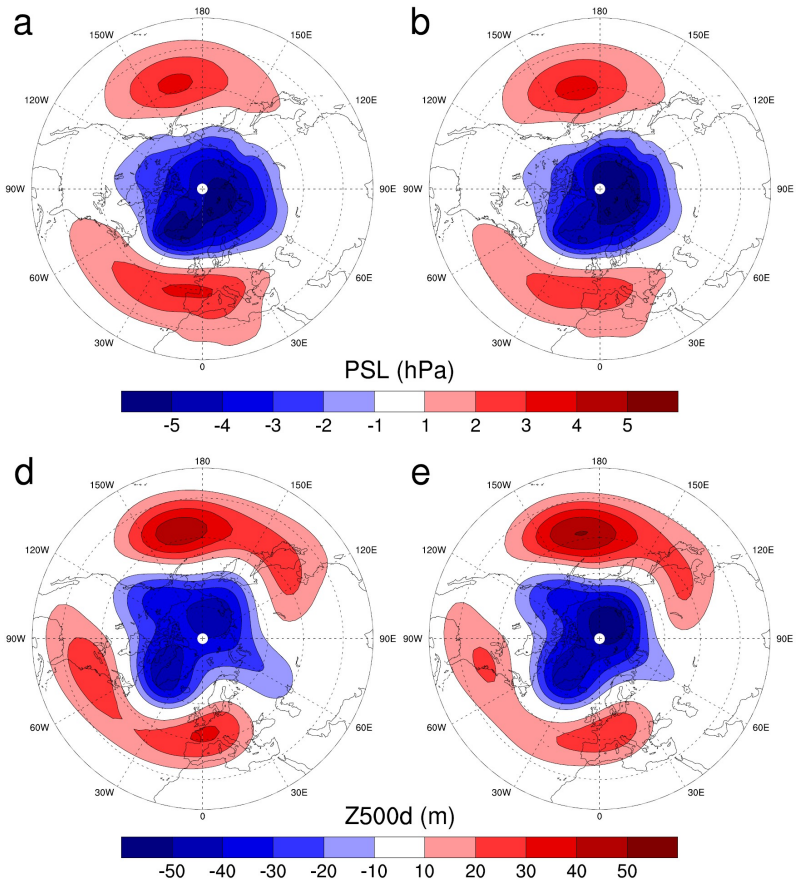
PC-based AO index ONDJFM

EOF1 CMIP3 vs CMIP5 (1950-1999)

PC1 CMIP3 (A1B/A2) vs CMIP5 (6.0/8.5)

PSL

Z500



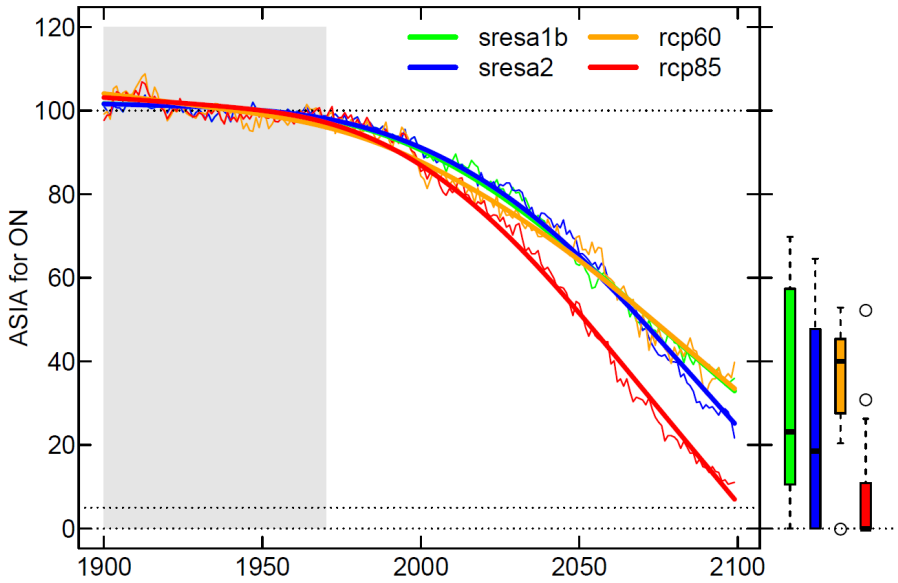
Cattiaux and Cassou, in prep.

Changes in the AO: why?

Work in progress...

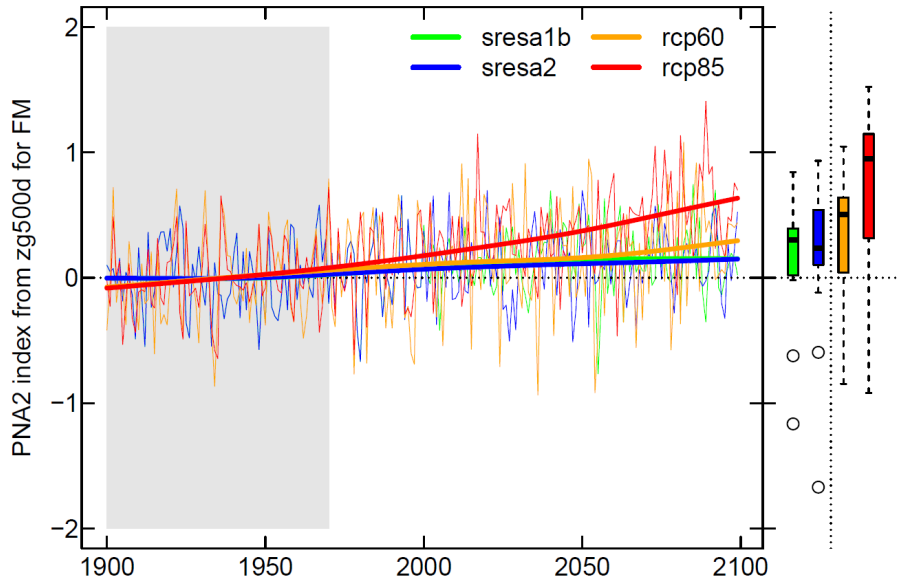
Early winter: baroclinic.

Arctic sea ice?



Late winter: barotropic.

L-S atmospheric modes?



Cattiaux and Cassou, in prep.

Refs

- J. Cattiaux et al. (2012), European temperatures in CMIP5: origins of present-day biases and future uncertainties, *Climate Dynamics*, *submitted*.
- Y. Peings et al. (2012), Evaluation and response of cold spells over Western Europe in CMIP5 models, *Climate Dynamics*, *published online*. DOI: 10.1007/s00382-012-1565-z

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Thanks.