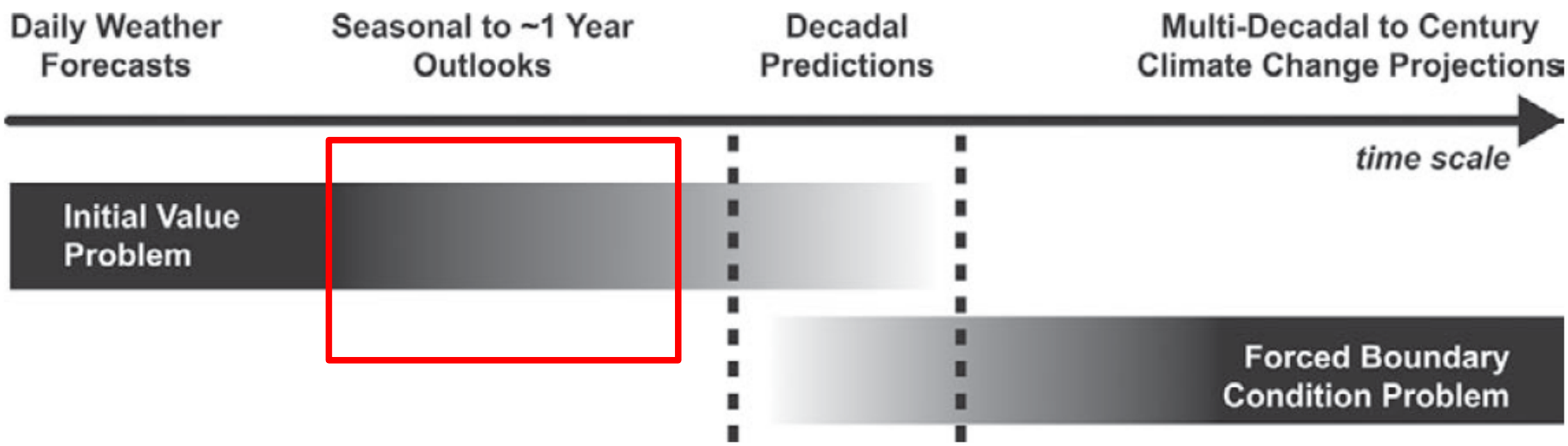
Presentation of the project:
Seasonal forecasting of extreme events

C. Prodhomme, F. Doblas-Reyes, A. Kumar

ICTP summer school, Attribution and Prediction of Extremes Events,
Trieste, Italy, July 21th – August 1st 2014

Seasonal forecasting of extreme events



Have the coupled models skill to forecast extreme events* at seasonal time scale ?

***** We will consider as extreme events, events that occurs few times during a season.

Presentation of data

MODEL DATA: ENSEMBLES prediction system

ENSEMBLES Multi-model:

- ECMWF's IFS/HOPE
- UK Met Office's HadGEM2
- Météo-France's ARPEGE/OPA
- INGV's ECHAM5/OPA
- IFM Kiel's ECHAM5/OM1

9 members each, with different initial conditions.

Seasonal forecasts between 1960 until 2005

4 different start dates (the first of February, May, August and November)

7 months leadtime

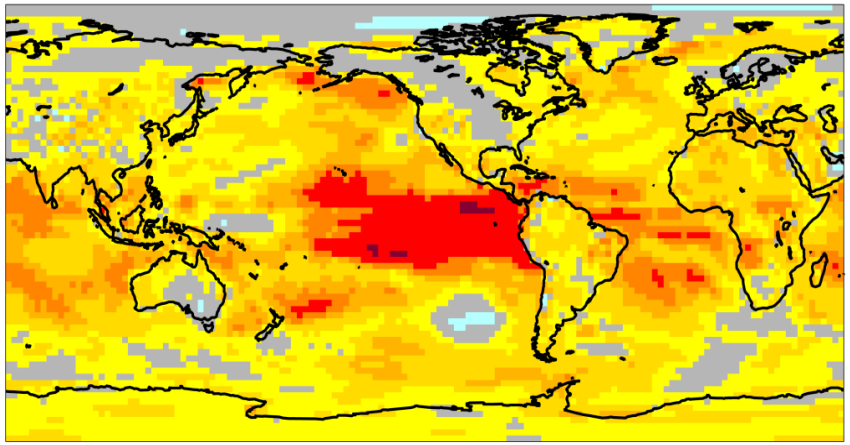
ERA-interim reanalysis data

Period 1979-Now.

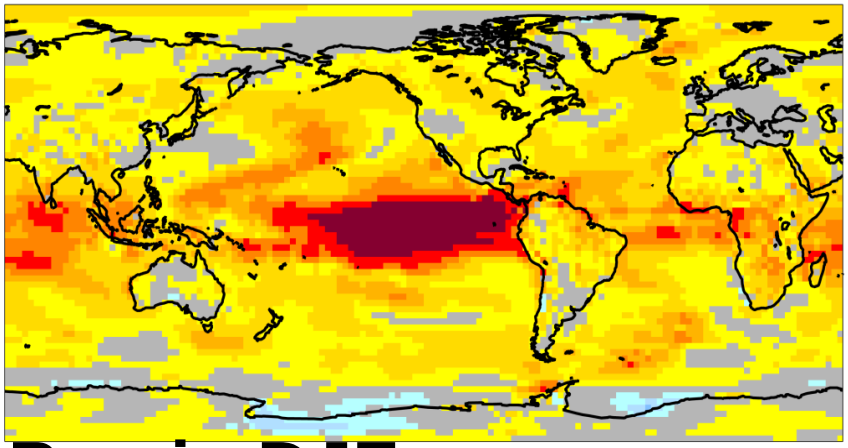
Typical seasonal forecast skill

Correlation of the ensemble mean for the ENSEMBLES multi-model ERA40-ERAInt (T2m over 1960-2005) and GPCP (precip over 1980-2005) with 1-month lead.

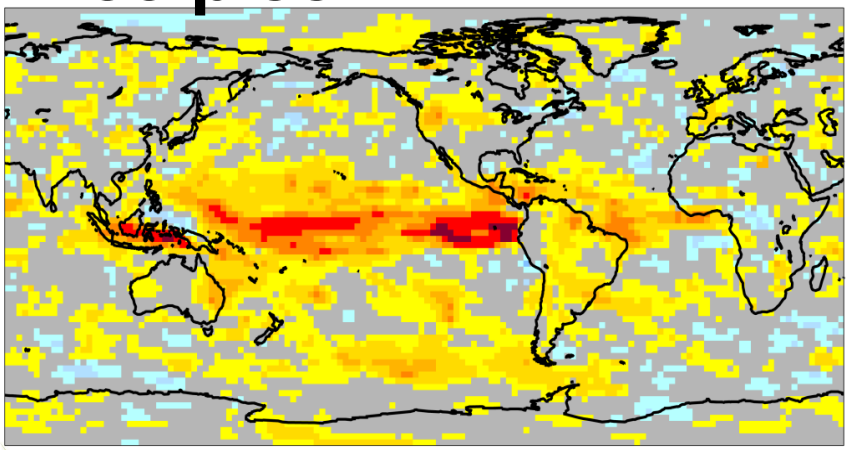
T2m JJA



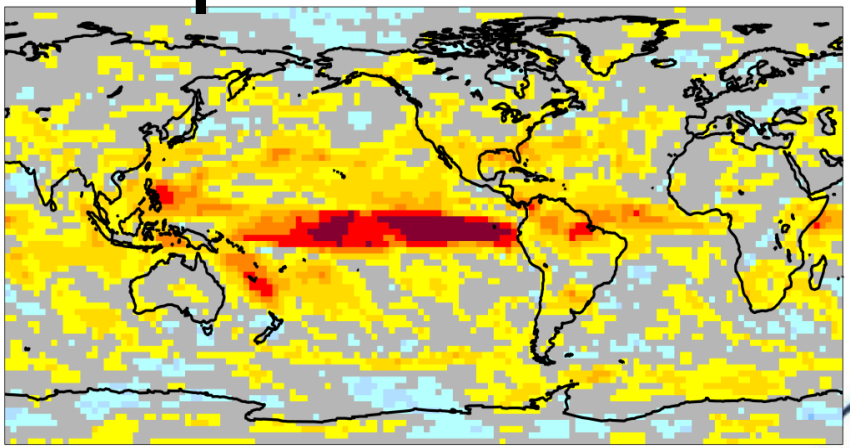
T2m DJF



Precip JJA



Precip DJF



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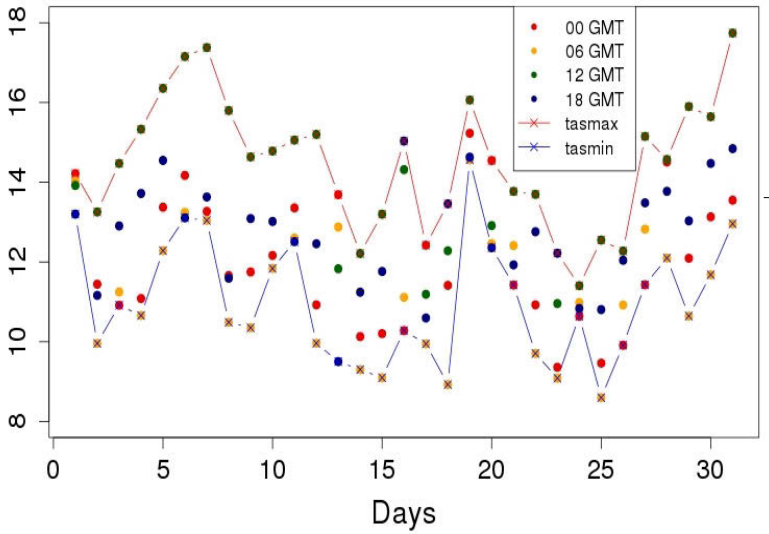
Seasonal forecasting of extreme events

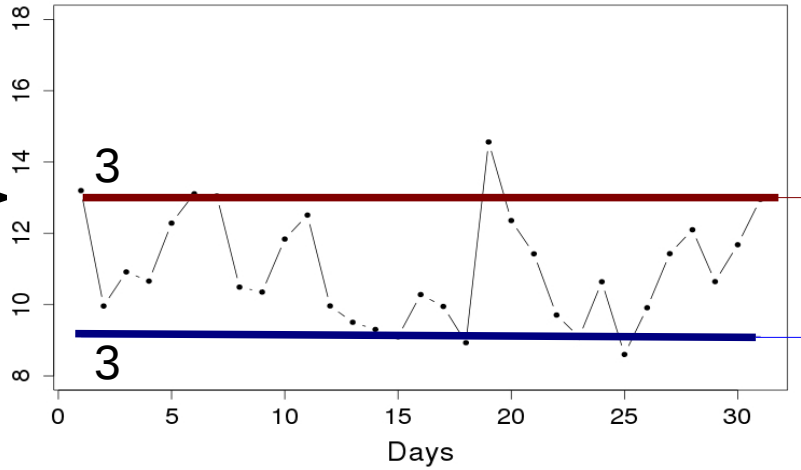
Extreme variables

6 hourly and 12 hourly data

6-hourly temperature
Jan 2013 BCN



Calculate daily values
Tasmin/Tasmax
Total precipitations



Monthly extreme variables

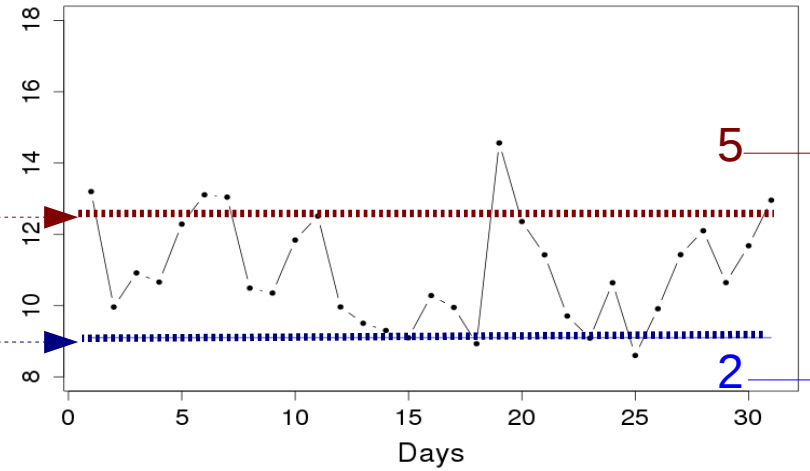
90th percentile

10th percentile

Whole time period: 1979 2005

Climatological 90th percentile Between 1979 and 2005

Climatological 10th percentile Between 1979 and 2005



Number of days over the climatological 90th percentile

Number of days under the climatological 10th percentile

Project subjects

Evaluate the skill of 90th percentile and number of days over the climatological 90th percentile as a function of the occurrence of ENSO events. Assess the impact of global warming.

Using data from the previous point, assess the skill for mean and extreme precipitation in the Indian (or African) monsoon region.

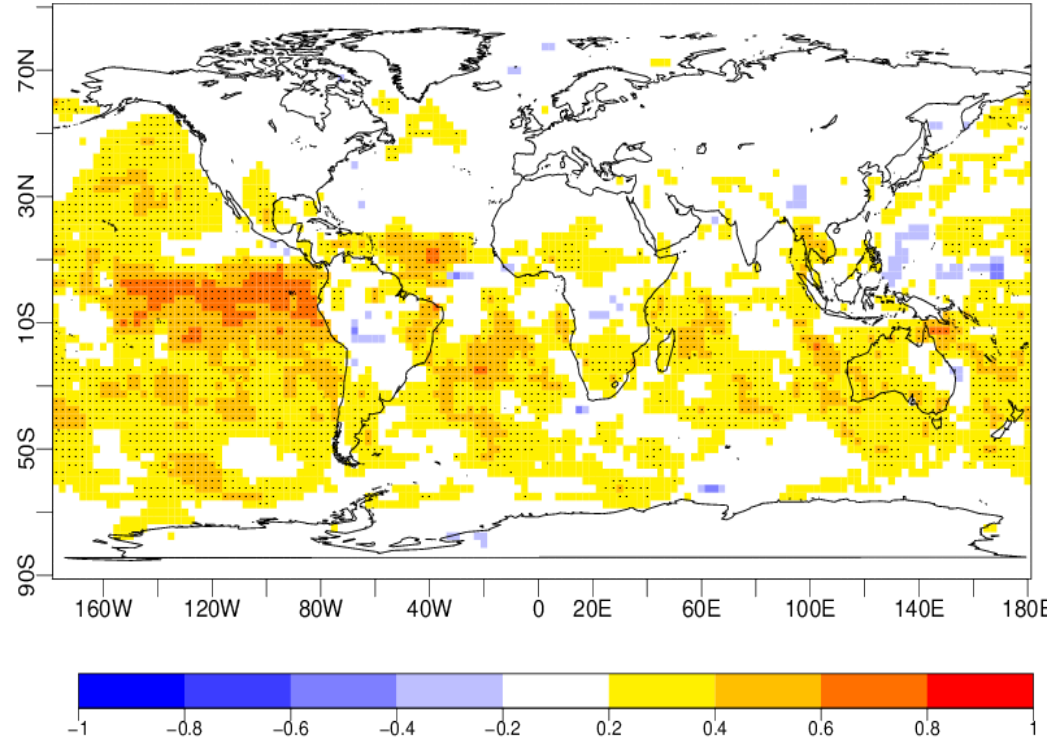
Evaluate the ability of ENSEMBLES to reproduce the trend in the seasonal mean and extreme variables.

Assess the capability of the multi-model to reproduce an extreme event.

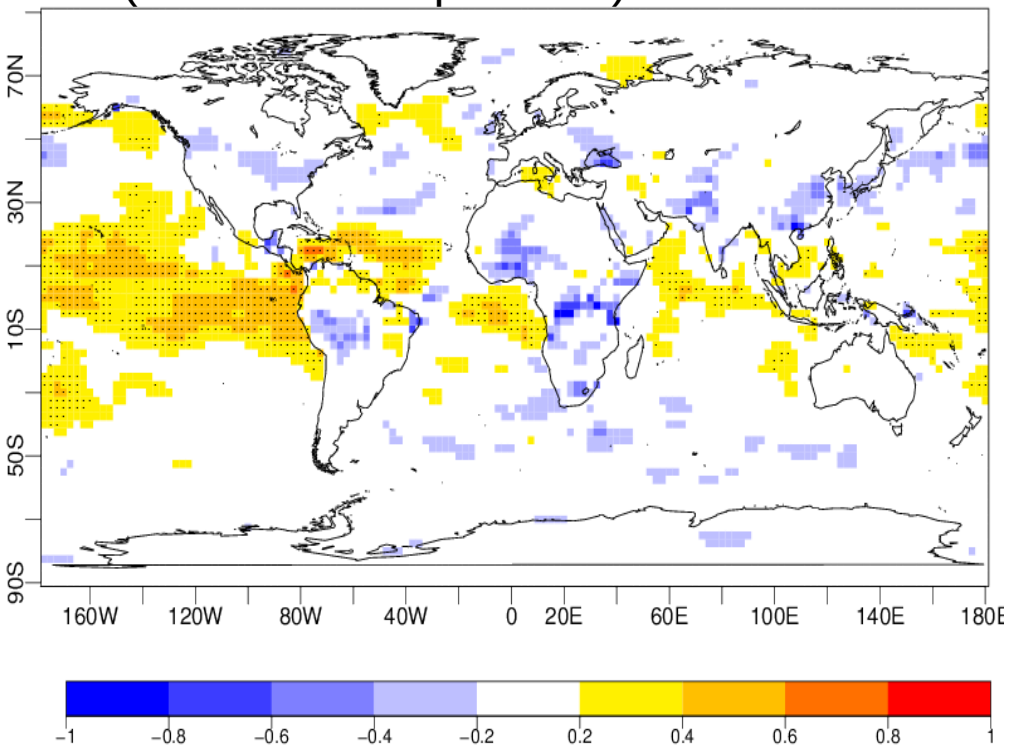
Preliminary encouraging results

Root mean square skill score of ENSEMBLES Multi model in March
for forecasts initialized in February (1979-2005)

90th percentile of tasmax



tas (mean 2m-temperature)



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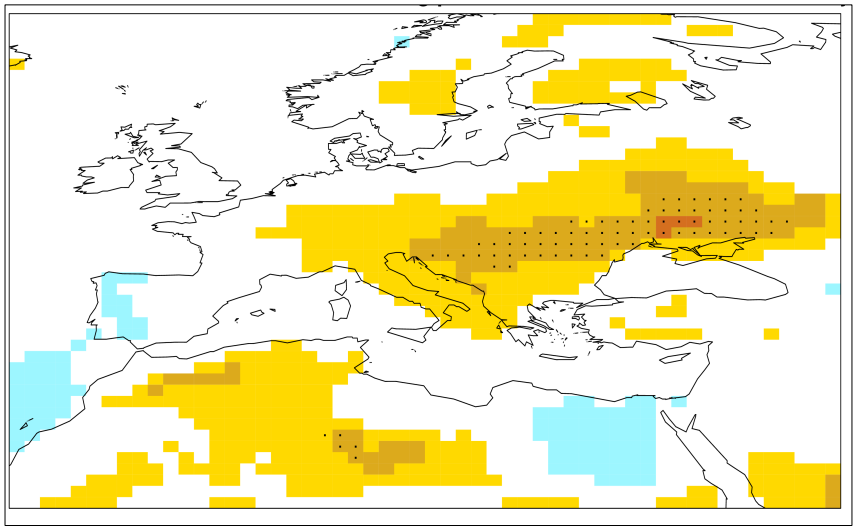
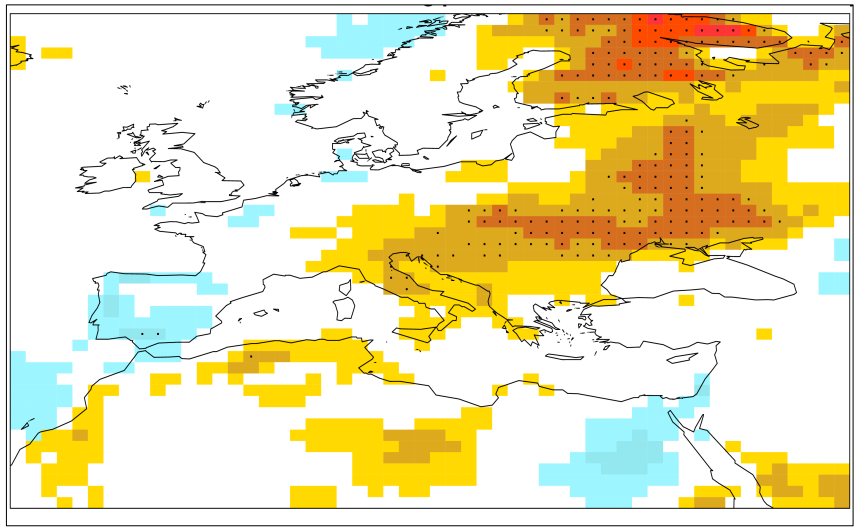
Examples of work done at the IC3: Impact of soil moisture on skill

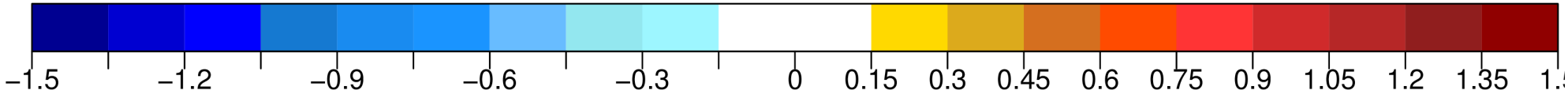
Difference of correlation skill for two seasonal forecast experiments done with EC-Earth2.3 with realistic and climatological initialization of soil moisture

Difference for mean T



Difference for T max





C. Prodhomme (IC3)