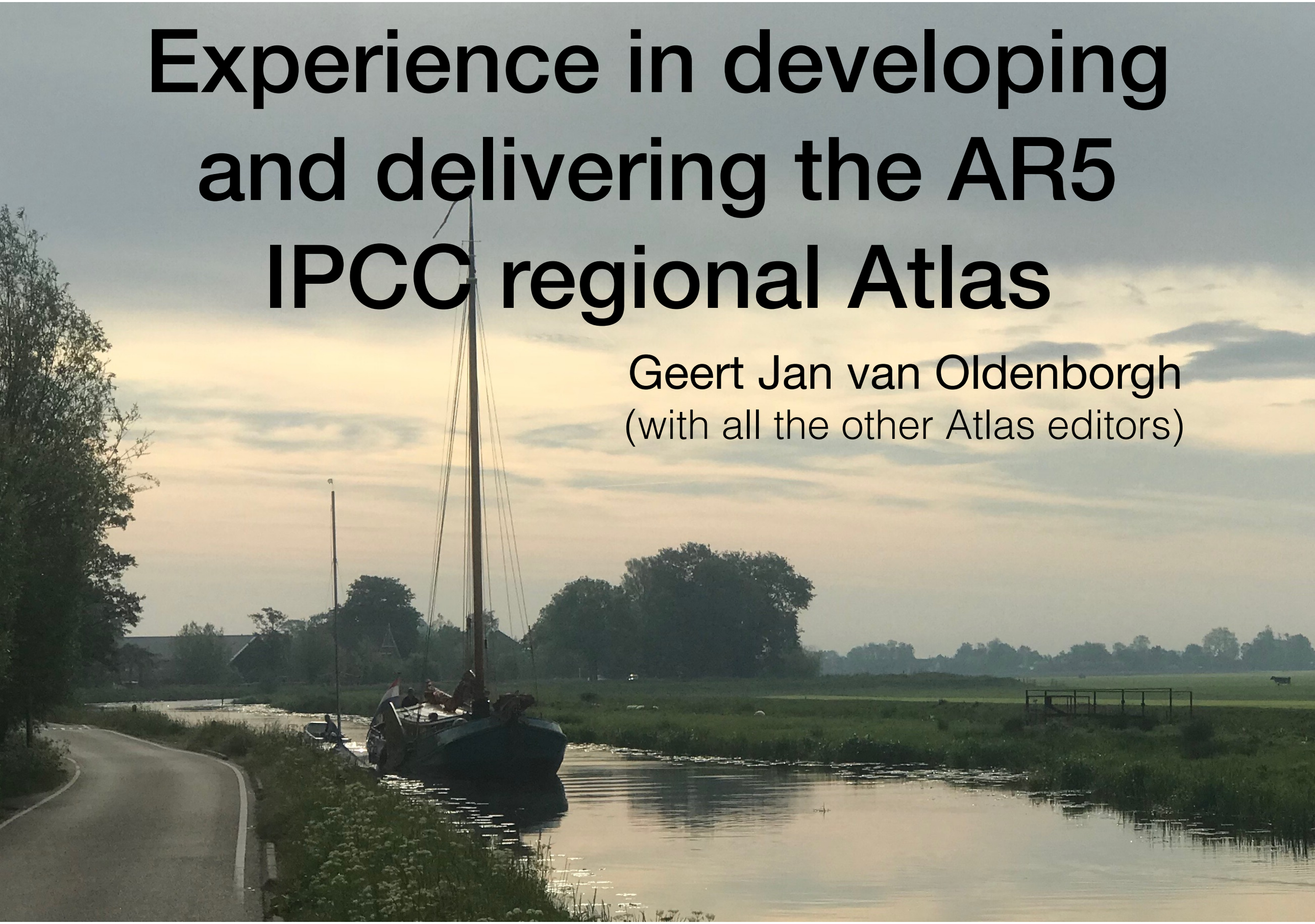
Experience in developing and delivering the AR5 IPCC regional Atlas

Geert Jan van Oldenborgh
(with all the other Atlas editors)



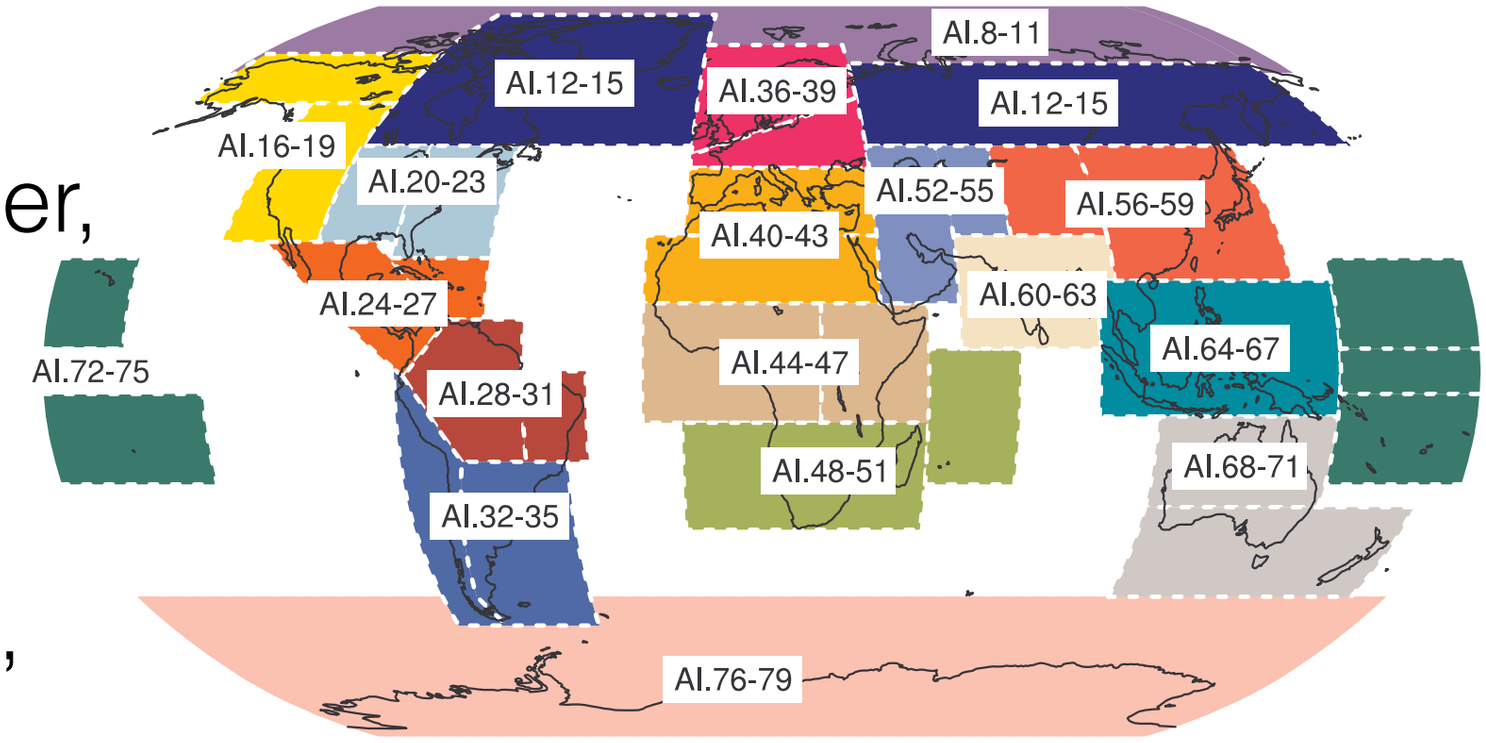
Design criteria

- Paper and PDF, interactive version a private afterthought
- Seasonal and annual means, not extremes
- Only temperature and precipitation, no observations
- Indication of uncertainty ranges, almost nobody is vulnerable to the mean
- Time series and maps, include natural variability, underlying data always available
- Based on CMIP5 (CORDEX not yet available), O(250km) resolution, all scenarios

Regions

- Global land & water,
- 26 SREX regions,
- Two polar regions,
- Six ocean regions with small islands,

⇒ 35 regions.



Variables, seasons

Change in temperature:

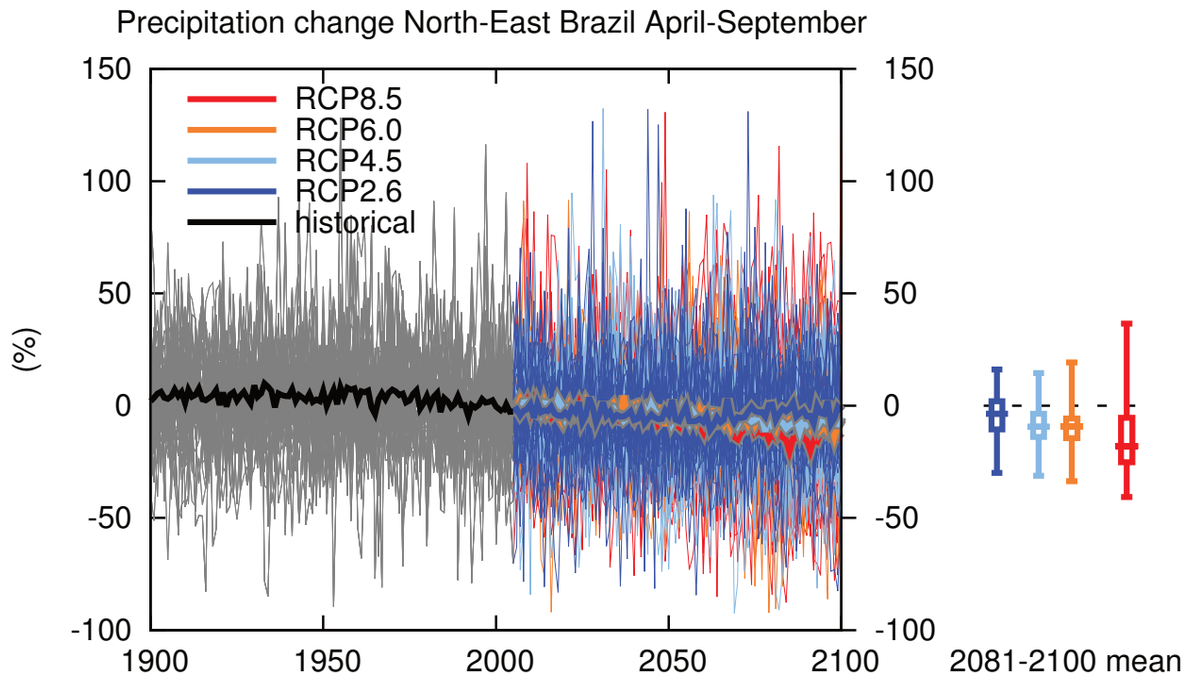
- printed June–August and December–February, annual mean and other two seasons in Supplementary Material.

Relative change in precipitation:

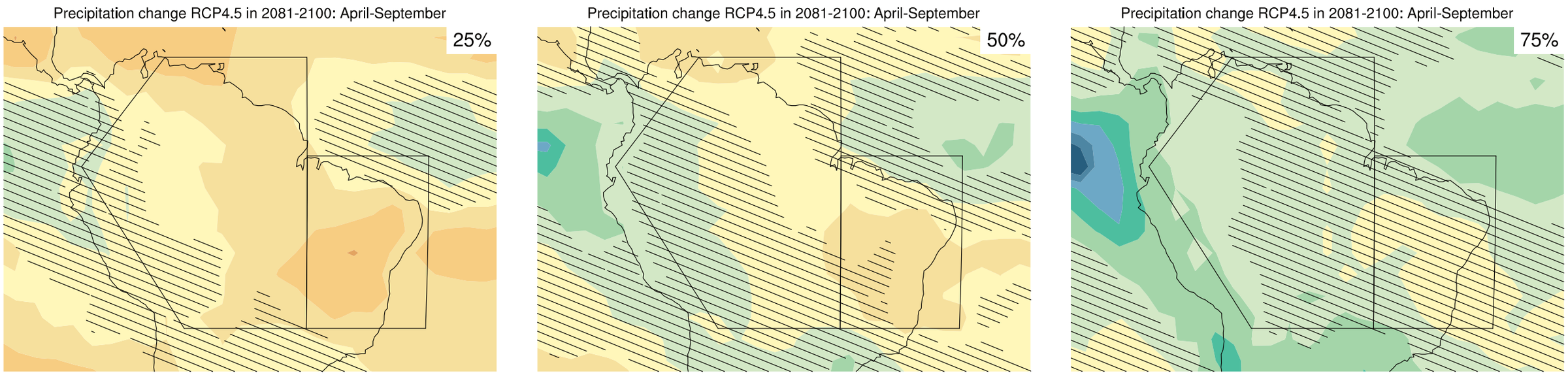
- printed April–September and October–March, annual mean in Supplementary Material.

Time series

- Average over region. For precipitation, the relative anomaly of the average.
- Interannual variability clear in spaghetti lines.
- Ensemble mean per scenario.
- Box-and-whisker plots give median, 25%–75% and 5%–95% ranges of 20-year mean for each scenario.



Maps



- Combined model uncertainty and natural variability indicated by 25% and 75% maps (per grid point). Later also added 50%

- Hatching indicates that the change in 20-yr means is smaller than the one standard deviation of this change.

- Printed RCP4.5, PDF also for the other scenarios.

KNMI Climate Change Atlas

- Identical standard maps
- All seasons
- More regions
- More variables
- More datasets
- More time periods
- climexp.knmi.nl/atlas

KNMI Climate Change Atlas

Select a region	
Type:	IPCC WG1 ◉ countries ○ place ○ box
Country:	Brazil
Select a season	
Season:	Annual data
Select a dataset and variable	
Dataset:	GCM: CMIP5 extremes (one ensemble member)
Variable:	Rx1day: annual maximum 1-day precipitation
	○ absolute ◉ relative changes are shown
Output:	◉ map ○ time series
Map options	
Scenario:	Historical + RCP8.5
Measure:	Difference of two periods
Reference period:	1986 - 2005
Future period:	2081 - 2100
Mean/percentiles:	mean

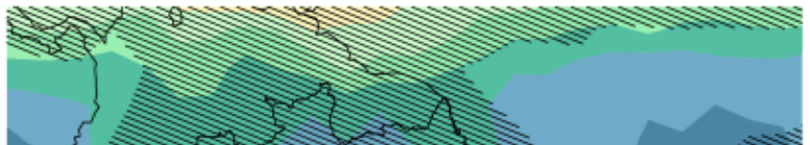
Make map May take up to 10 minutes the first time a season / measure is selected

Generating quantiles of signal ...
Found 24 model/experiment combinations with in all 48 ensemble members
Using intramodel variability to estimate natural variability for the hatching.

Please note that tropical cyclones (hurricanes, typhoons) are not well-simulated by these models. In areas wh

mean rcp85 relative Rx1day 2081-2100 minus 1986-2005 CMIP5 one member. The hatching represents areas where the signal is smaller than one standard deviation of natural variability (eps, pdf, netcdf)

mean rcp85 relative Rx1day 2081-2100 minus 1986-2005 CMIP5 one member



Usage

- 2017: 4 10^4 calls to atlas routine (of 1.5 10^6 Climate Explorer operations)
- Made about 4000 maps and time series the last 3 months
- Spatial: mainly countries, points, hardly any IPCC regions.
- I think mainly from impact world and from education.

Already / almost implemented

- Extremes: Jana Sillmann's CMIP5-based dataset (with extra quality control).

- Regional detail: CORDEX is being added, will include extremes.

- Traceability: Climate Explorer plots will soon include all metadata of the data used plus the operations executed on it.

Wish list

- Comparison with observations ⇒ reliability.

  (Note that Extreme Event Attribution ≈ Model trend verification of trends in extremes)

- More variables: drought, coastal sea level, snow, ... these need to be computed from climate model output.

- Better presentation, putting information in context. (Is this is a task for IPCC or for climate services or commercial consultancy firms?)

Challenges

- Political boundaries are important (and contested)
- How to deal with climate model biases and unreliability?
- Elephant in the room: funding

Thank you