



UNECE Meeting: Climate Data Update

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Climate information on different spatial scales and spatial context of the project

1) Global assessments:

Global General Circulation Models, e.g. ~300 km to ~100 km

2) National or continental scale assessments:

Global General Circulation Models
Regional Climate Models, on e.g. ~50 km

3) Regional (subcontinental) assessment:

Regional Climate Models, on ~50 km to ~10 km

4) Local assessment:

(Non-hydrostatic) Regional Climate Models on ~1 km to ~100 m

Statistical downscaling

Combined approaches of dynamic and statistical downscaling

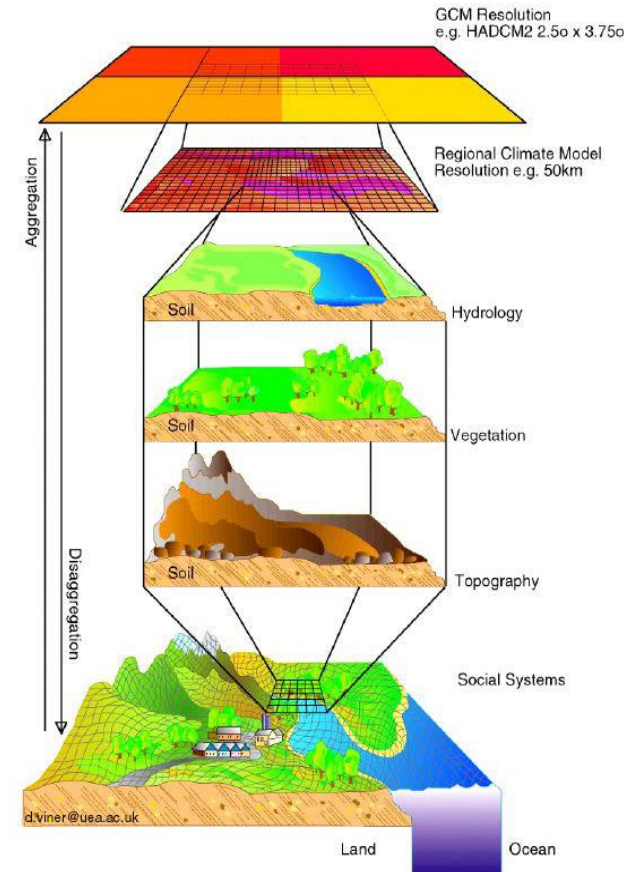
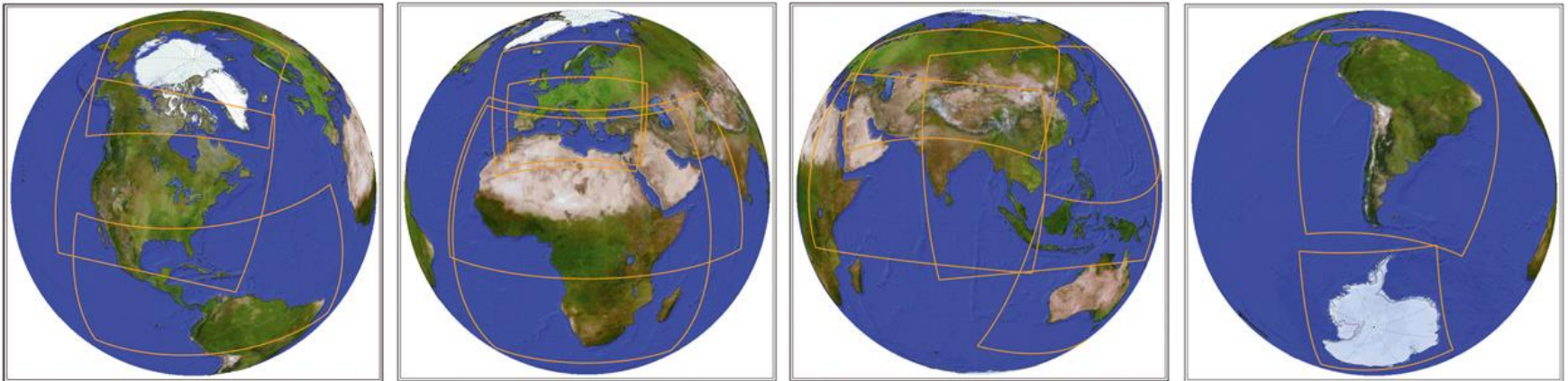


Figure source: David Viner, CRU, University of East Anglia, UK

■ The Coordinated Regional Climate Downscaling Experiment (CORDEX) www.cordex.org

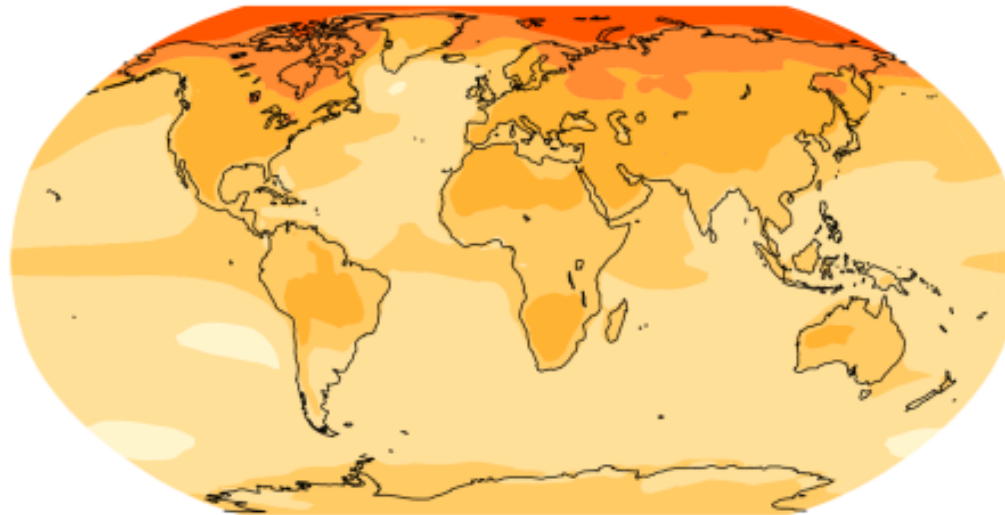
- 14 domains or areas where simulations are available
- Number of simulations varies regionally, and by RCP
- Data are available



- Using CORDEX data to meet the initial requirements (from the March meeting) for the UNECE region would mean a data volume in the region of 6 terabytes

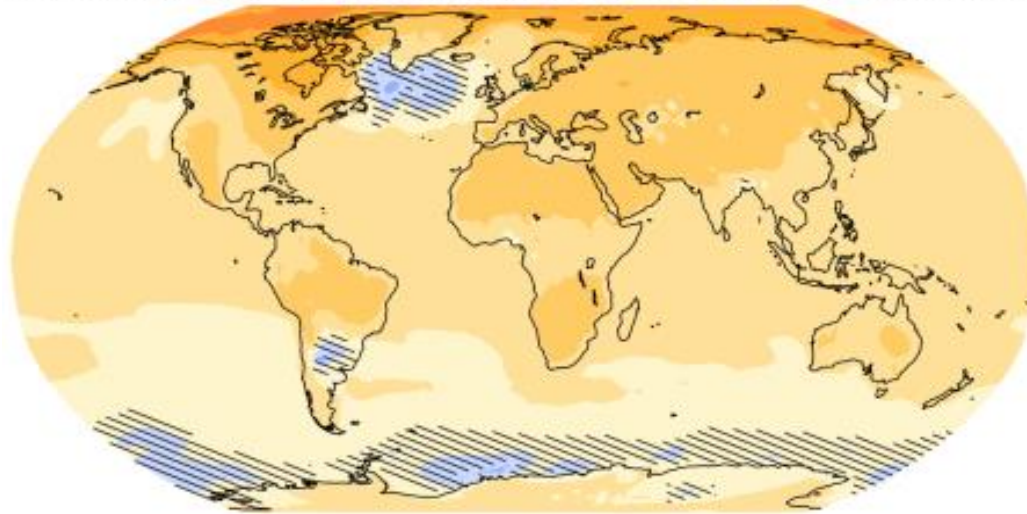
■ GCM analysis: change in annual maximum temperature

mean rcp45 Tmax 2021-2050 minus 1971-2000 Jan-Dec full CMIP5 ensemble



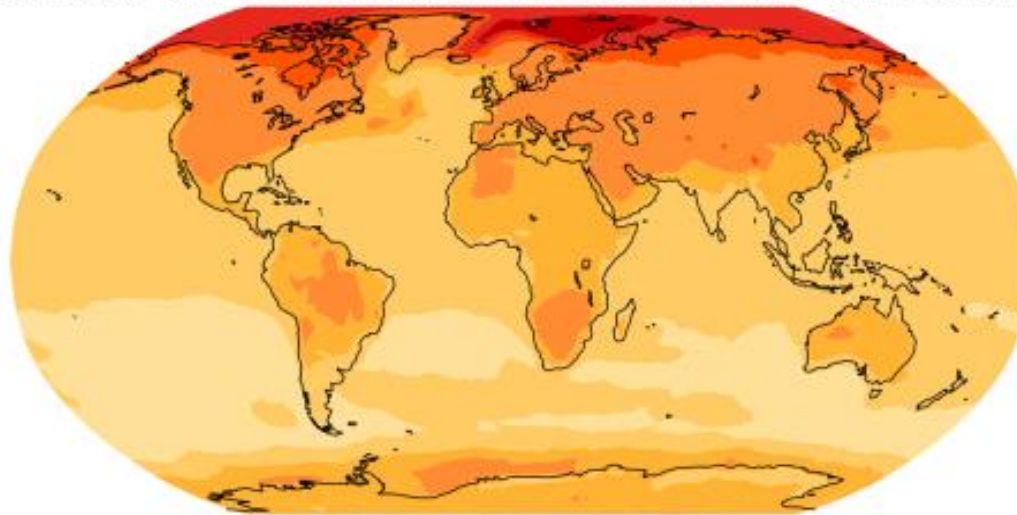
■ GCM analysis: change in annual maximum temperature

10% rcp45 Tmax 2021-2050 minus 1971-2000 Jan-Dec full CMIP5 ensemble



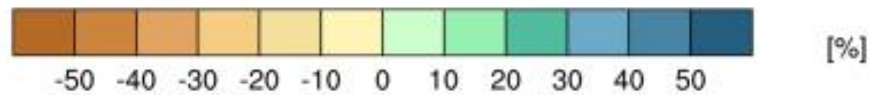
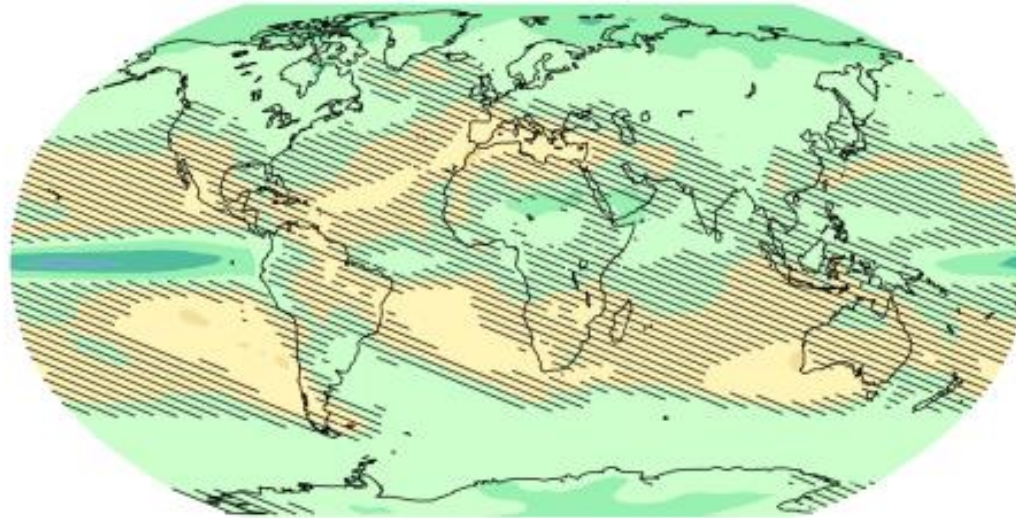
■ GCM analysis: change in annual maximum temperature

90% rcp45 Tmax 2021-2050 minus 1971-2000 Jan-Dec full CMIP5 ensemble



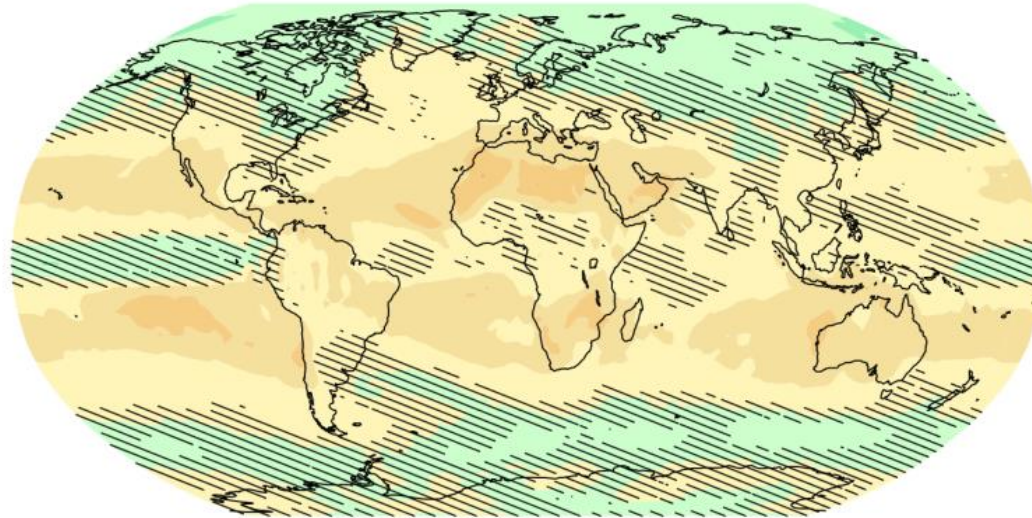
■ GCM analysis: change in annual precipitation

mean rcp45 relative precipitation 2021-2050 minus 1971-2000 Jan-Dec full CMIP5 ensemble



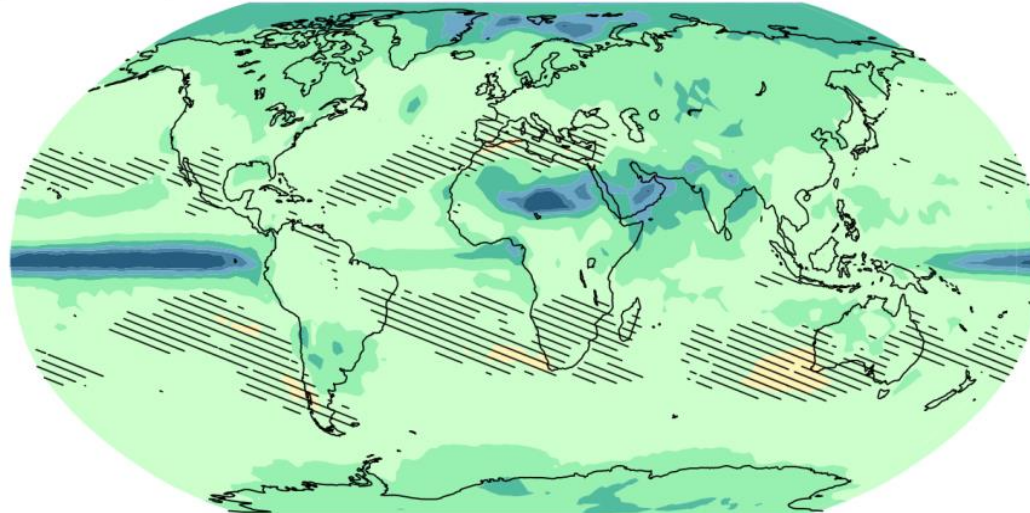
■ GCM analysis: change in annual precipitation

10% rcp45 relative precipitation 2021-2050 minus 1971-2000 Jan-Dec full CMIP5 ensemble



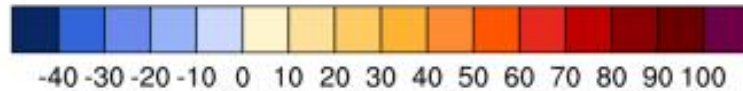
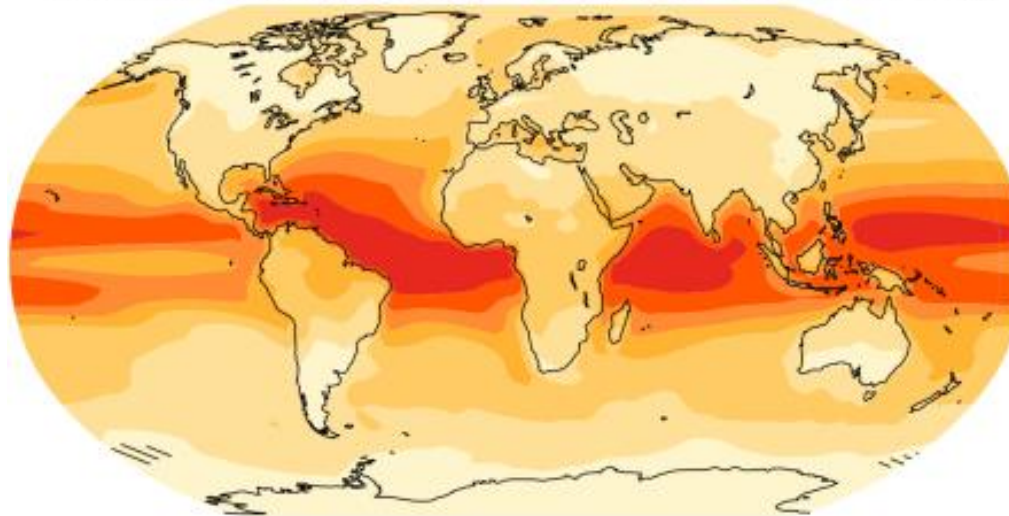
■ GCM analysis: change in annual precipitation

90% rcp45 relative precipitation 2021-2050 minus 1971-2000 Jan-Dec full CMIP5 ensemble



■ GCM analysis: change in % of days when maximum temperature is greater than the 90th percentile

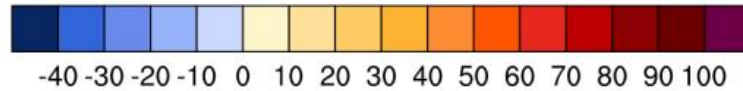
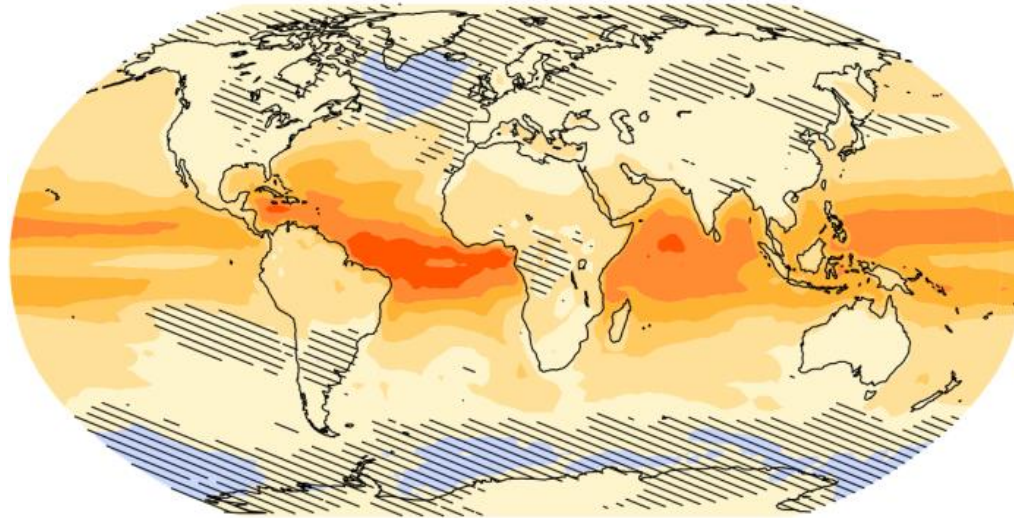
mean rcp45 TX90p 2021-2050 minus 1971-2000 full CMIP5 ensemble



[%]

■ GCM analysis: change in % of days when maximum temperature is greater than the 90th percentile

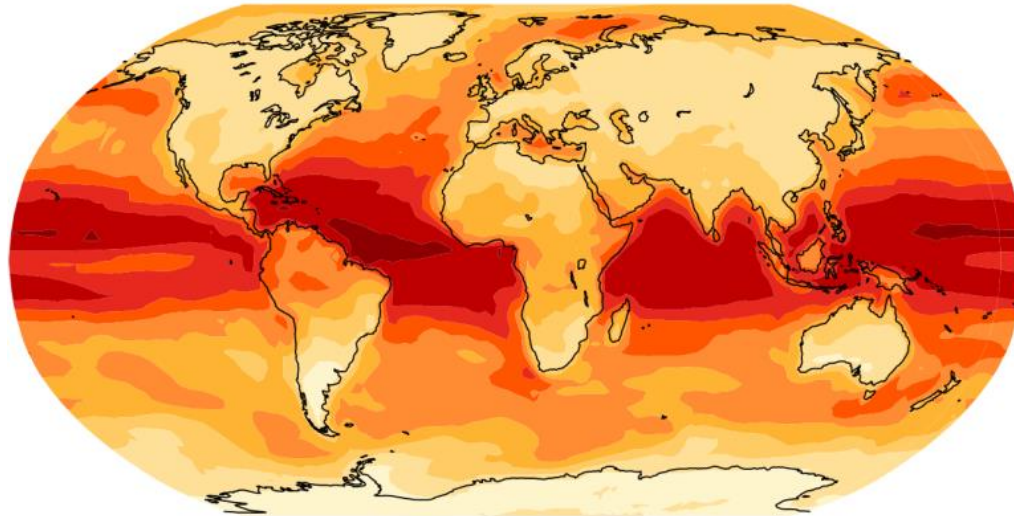
10% rcp45 TX90p 2021-2050 minus 1971-2000 full CMIP5 ensemble



[%]

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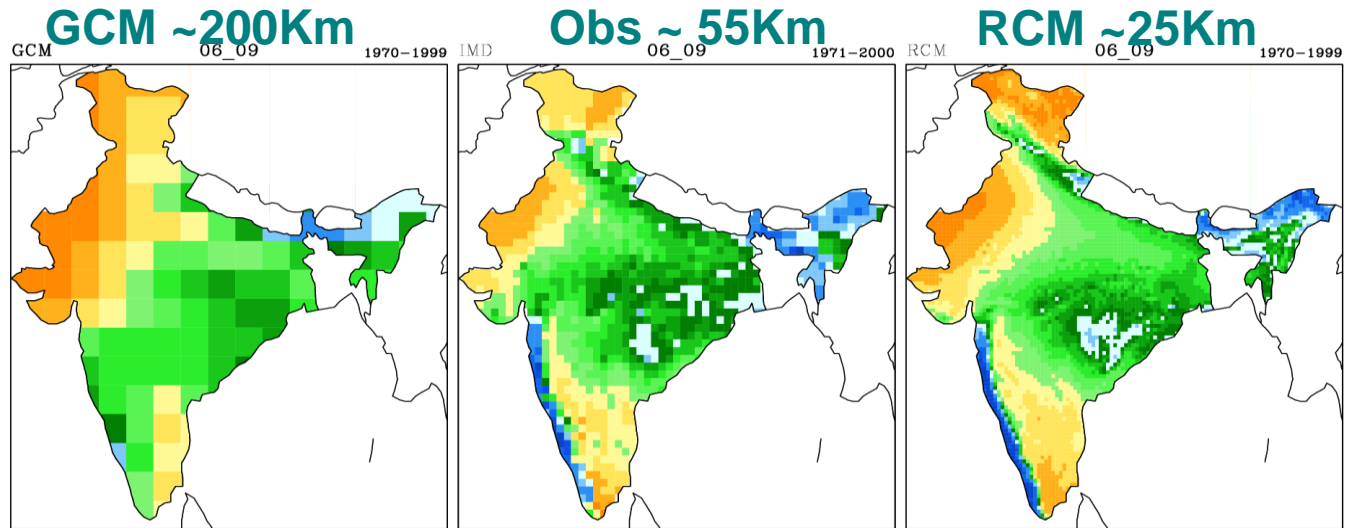
90% rcp45 TX90p 2021-2050 minus 1971-2000 full CMIP5 ensemble



[%]

■ GCM, RCM, observation differences

Monsoon precipitation JJAS



**More realistic
monsoon
precipitation
in RCM simulations**



(mean of 3 RCMs driven by 2 GCMs)
(1970-1999) Source: Pankaj Kumar, High Noon Project, MPI-M

■ Acknowledgement

The GCM maps were produced using the KNMI Climate Change Atlas

https://climexp.knmi.nl/plot_atlas_form.py

Thanks to Geert Jan van Oldenborgh, KNMI.



Thank you

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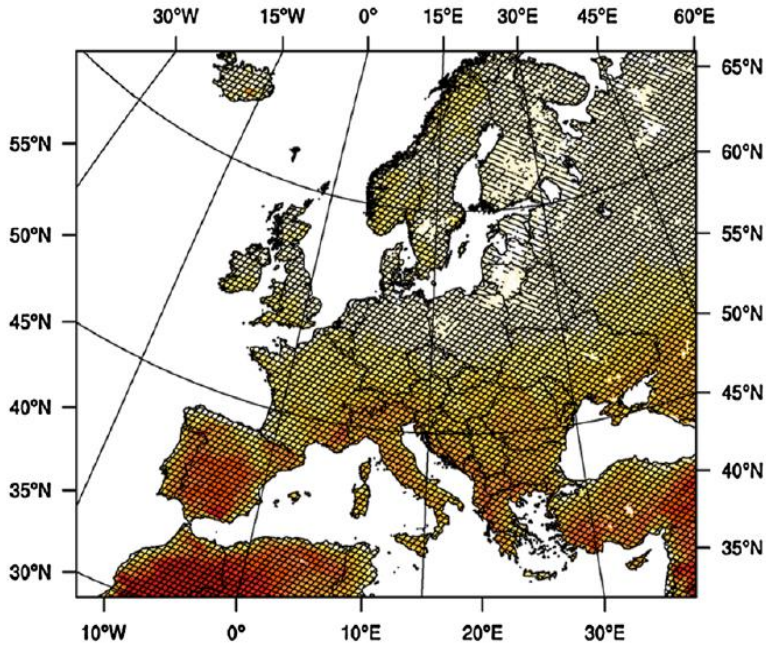
Spare slides



Projected change in heat waves

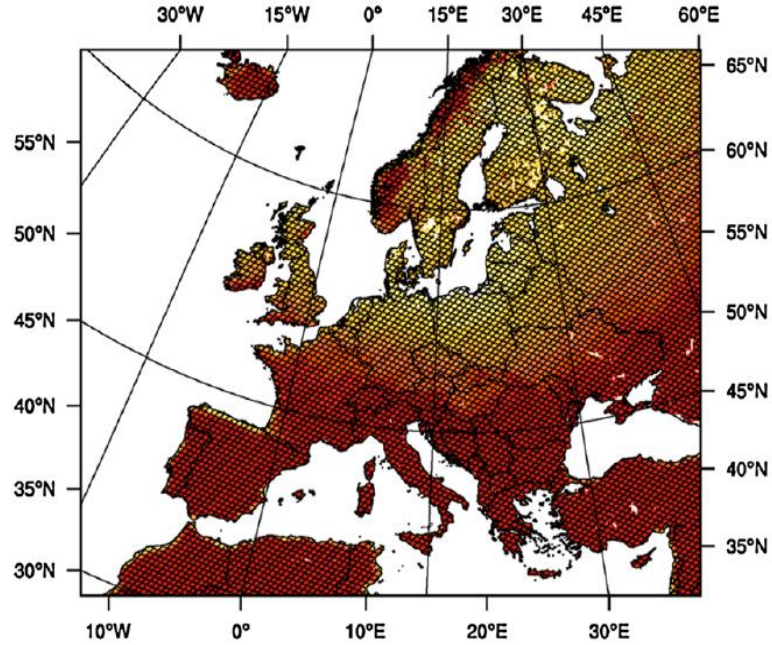
Projected changes of heat waves 2071–2100 vs. 1971–2000

RCP45



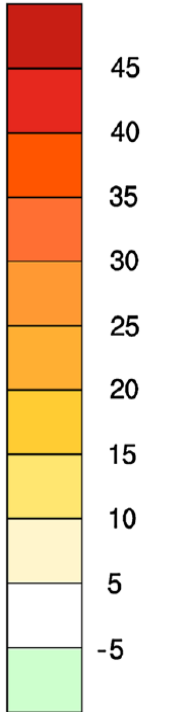
/: significant
 \: robust

RCP85



/: significant
 \: robust

[number of hw]



Jacob et al. (2014)

- Increase in number of heat waves in southern Europe in both RCPs

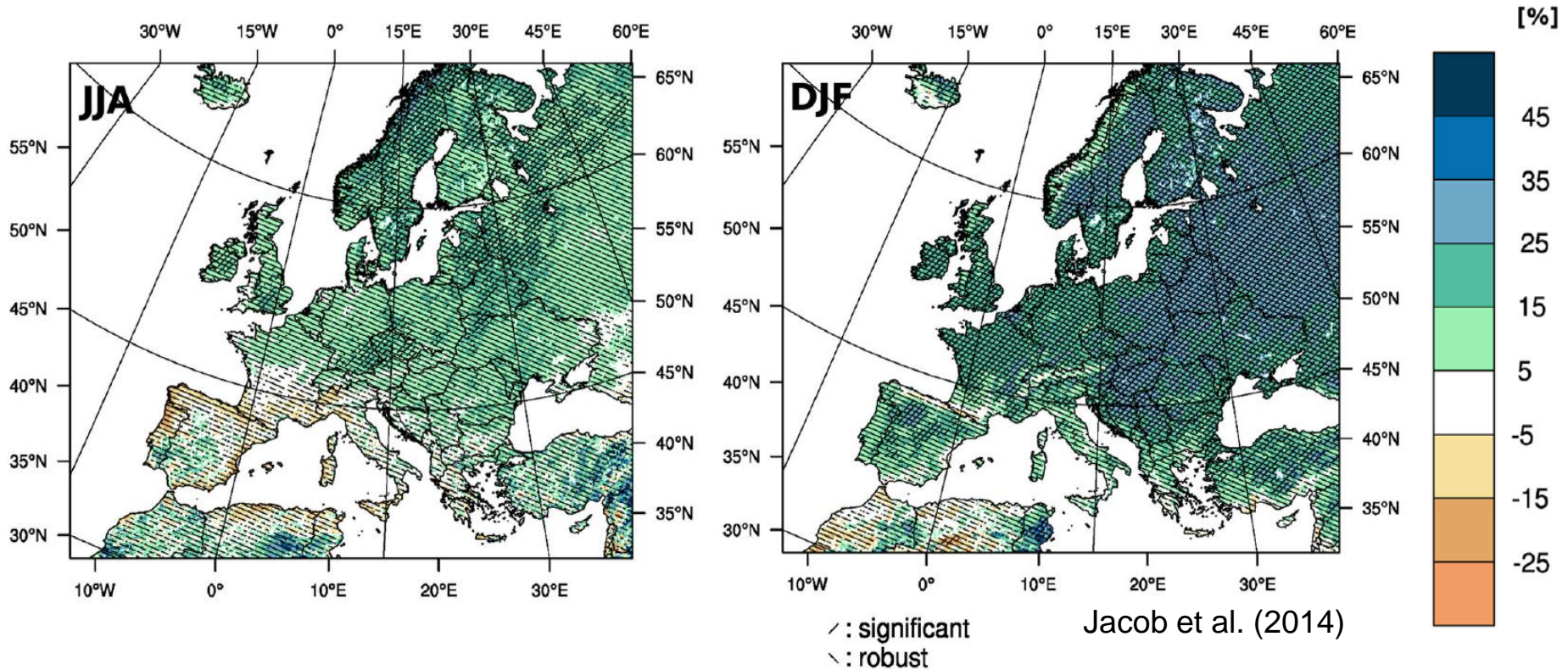
Heat waves:

Periods of more than 3 consecutive days exceeding the 99th percentile of the daily maximum temperature of the May to September season for the control period (1971–2000).

Projected change in heavy precipitation



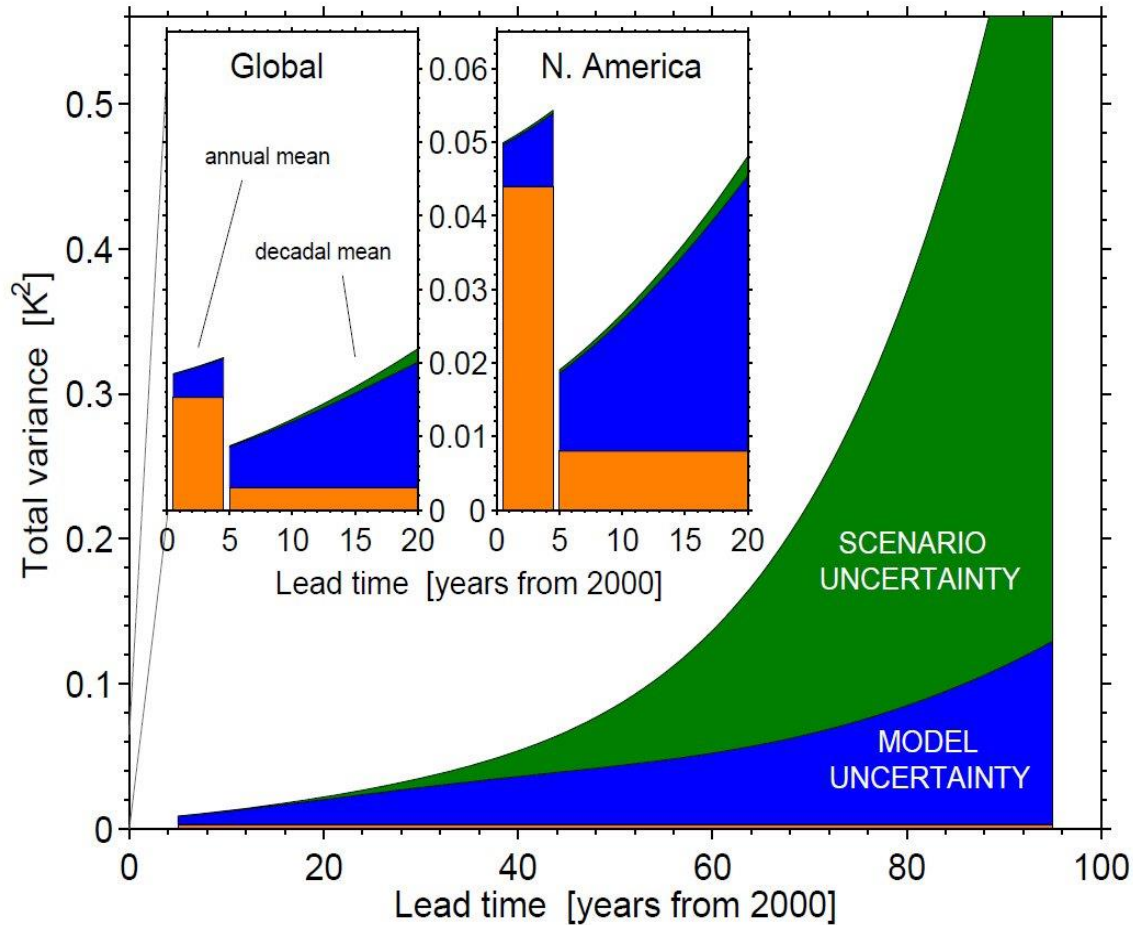
RCP8.5: Projected changes of heavy precipitation 2071–2100 vs. 1971–2000



- Up to 45 % increase in large areas in winter in Northern and Eastern Europe
- No decrease besides isolated regions in Southern Europe (mostly along coastlines)

Heavy precipitation: 95th percentile of daily precipitation (only days with precipitation 1 mm/day are considered)

Sources of uncertainty in climate model projections



Source:
Hawkins &
Sutton 2009