Project

Theme 6 | Assessment of uncertainties in regional climate change

Description of research

In this study I will quantify uncertainties in future climate projections and predictions for different time and spatial scales and for different variables, in order to guide the development of adequate climate change scenarios.

Research question

What are the uncertainties in predictions of future climate change and its impacts? How can this uncertainty optimally be represented in scenarios to be used by decision makers?

The most important conclusions

- Insight in the uncertainties of precipitation trends in existing and new global and regional climate simulations at a range of spatial and temporal scales.
- Insight in the uncertainties of trends in precipitation extremes and their relevance for river discharge.
- Insight in the physical mechanisms behind past changes in precipitation (extremes).

Possible applications from the project

For locations that are particularly vulnerable to climate change, provide guidance in developing climate change scenarios of relevant climate change variables (e.g. water management).

Bottlenecks of the project

- Availability of reliable, long term, high resolution (both spatial and temporal) measurements to validate the performance of climate models over the past century.
- Large natural variability for certain variables.

Opportunities for the project

Climate change studies produce a wide range of possible future climate conditions. Although the results of these studies are useful to stress the consequences of different greenhouse gas emission scenarios, they are often too long-term and uncertain to guide regional adaptation strategies. Different Atmosphere/Ocean General Circulation Models (AOGCMs) can simulate quite different regional climate changes, even under the same anthropogenic forcing. Regional Climate Models (RCMs), which are forced at their boundaries by AOGCMs, add additional regional scale information, but the simulated large scale patterns are often similar to the ones from the driving AOGCM.

For policy and decision making, predictions of regional changes are in many areas of greater relevance than predictions on a global scale. Often not only changes in means of key variables are important to assess climate change impact, but also the (change in) extreme events is of major importance. There are however large biases in the simulation of present day extremes, which imply that projected future values may be biased as well.

There is a widely recognized need for probabilistic estimates of climate change impacts, beyond simple scenario analysis. Future climate scenarios need to be accompanied by quantitative estimates of the associated uncertainty in order to render them usable to these communities. It is the goal of this study to quantify this uncertainty range across scales.

More information

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