

The construction of regional climate scenarios for the Netherlands

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Climate scenarios for the Netherlands are constructed by employing information from global climate models (GCMs), regional climate models (RCMs), and observations. The construction of the climate scenarios is based on a simplified, conceptual framework of three sources (levels) of uncertainty impacting on model predictions of local climate change. In this framework, the first level of uncertainty is determined by the global radiation balance, resulting in a range of projected changes in the global mean temperature. On the regional (1000-5000 km) scale, the response of the mean atmospheric circulation determines the second important level of uncertainty. The third level of uncertainty, acting mainly on a local scale (10-1000 km), is related to the small scale processes, like e.g. those acting in atmospheric convection, clouds and atmospheric meso-scale circulations – processes that play an important role in extreme events which are highly relevant for society.

GCMs are the main tools to quantify the first two levels of uncertainty, but RCMs are more suitable to quantify the third level. RCMs are nested models, and a large part of their climate response closely resembles that of the driving GCM simulation. Relatively few regional climate simulations have been performed, and these simulations therefore under-sample the total uncertainty. This points at the need to combine information from both GCMs and RCMs in order to represent the uncertainty range realistically. In this presentation we will illustrate how, with a few simple scaling relations inferred from the global and regional model results, the information from both models is combined to produce the climate scenarios for the Netherlands.