



On procedures for model selection in providing climate scenario data for impact studies - A challenge to both communities

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Climate impact studies are based on climate simulations originating from regional or global climate models, provided either through the climate modeling centers directly or through climate data portals. In order to give the most beneficial results, the climate model data need to fulfill various requirements related to the respective impact models. These requirements, however, are often not well defined and subjected to individual impact models, and hence, can lead to discrepancies between the climate data provided by the climate modeling community and the data required by the impact models. As the climate model data are the first step in a process chain, limitations and problems with these data will affect the studies based on the results by the impact models and, hence, might confine the value of a project working with these results.

DMI has over the past years provided climate scenario data for impact studies in several international and national research projects, including ENSEMBLES, WATCH, CRES and HYACINTS as well as the still ongoing projects IMPRESSIONS, IMPACT2C and MODEXTREME, dealing with numerous different impact sectors. Thus DMI has gained experience with a wide range of projects from very different disciplines including agriculture, hydrology, socio-economics, air-pollution and sea-level rise. The lessons learned from all these projects is that there is no standard procedure that can be implemented, but rather that individual solutions have to be constructed on a case-by-case basis for each project. This is due to the fact that the requirements for different impact models differ. For example, some impact models may need monthly input data, while others need daily data. Some need very high horizontal resolution while others may make do with relatively coarse resolution; some operate on global scale while others focus on regional or local scale. Some models need only a few variables as e.g. precipitation and temperature, while others also require e.g. radiation and evaporation. All of these requirements – and many more – shape the outcome of each individual project.

Here, we highlight some of the procedures developed in some of the projects we have been involved in, and reason why the given steps were taken in those projects; focus is on MODEXTREME and IMPRESSIONS. We also point out some of the limiting factors that arise in concrete cases, often due to lack of useful observations or simulations. To conclude, we suggest a flow chart for decision as guidance to ease the procedure of providing suitable climate model output data for impact studies in future projects.