Geophysical Research Abstracts
Vol. 21, EGU2019-15260, 2019
EGU General Assembly 2019

Selection process of regional climate simulations – Sensitivity analysis on two cases

Renate Anna Irma Wilcke (1), Anna Maria Jönsson (2), Lars Bärring (1,3)

(1) Rossby Centre, SMHI, Norrköping, Sweden, (2) Department of Physical Geography and Ecosystem Science, Lund University, SE-223 62 Lund, Sweden , (3) Centre for Environment and Climate Research, Lund University, Sweden

Model inter-comparison experiments as well as regional downscaling experiments produce large matrices of GCM-RCM combinations. Such ensembles intend to sample a range of model assumptions and possible future climates. To further explore how a changing climate is affecting us and the environment, impact models use the climate model output data for the simulation of e.g. future crop yields, forest growth, water run-off and insect development. Even though it is advisable to take all available climate model data into account, often this is not feasible in impact research projects and thus only subsets of model ensembles are used. Therefore, the question of selecting an optimum representative subset of models needs to be answered.
A methodology has been developed to answer this question which takes into account information about the needs of the impact study and clusters the simulations along those information. The resulting subset of models fits the purpose of climate change impact research more appropriately. Here we explore the sensitivity of the method to the chosen selection criteria and set it into context with example target impact models. The representativeness of the resulting subset for the impact study's application is particularly scrutinised.
The examples used here are two insect models: spruce bark beetle (IPS) and Colorado potato beetle (CPB). In a first step climate change signals of climate variables (e.g. 2 m temperature) and indices related to the two models (e.g. 120 degree days above 5° C) are chosen as selection criteria. In a second step, the results of this selection are compared to selection results with insect model output variables (e.g. day of first generation first egg above 625 degree days) as selection criteria. This gives the possibility to perform a "before and after" impact model selection to investigate the spread of the subsets based on different input information. As these two insect models are computational cheap, we could run them for all GCM-RCM combinations from EURO-CORDEX, using bias adjusted (quantile-mapping) EUR-44 data.
Preliminary results indicate that the selected sub-ensemble is able to cover about the same variation in key response variables as the full ensemble.