

Sampling of the large climate model ensemble for climate change adaptation strategies planning

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Availability of high number of climate model simulations, e.g., from CMIP5 or CORDEX ensembles, helps in capturing uncertainties related to the future climate development. On the other hand, a big ensemble of climate model projection poses a challenge when it comes to decision which particular simulated trajectory of the climate development should be followed and translated into very specific actions to adapt to the future climate conditions.

We present a method of sampling of the Euro-Cordex EUR-11ensemble of regional climate model (RCM) simulations to define a small subset of RCMs that will be then used for climate change impact assessment and adaptation measures design. RCMs are selected in two steps. The first selection is done thought the validation of the GCM-driven control runs against the high density station observation dataset and it reduce the number of RCM simulations from 19 to 12. The magnitude of climate change signal in RCP8.5 bias corrected simulation is then used to further narrow down this number to 1, 3, 5 or 7 RCMs that are afterwards used for the adaptation strategies planning.

When evaluating RCM control runs, we considered the following validation criteria: annual course of monthly precipitation and air temperatures (mean, minimum, maximum), spatial correlation and variability of their seasonal values. Except of air temperatures and precipitation we also take into account validation scores of relative humidity, global solar radiation and wind speed.

To evaluate magnitude of the climate change signal in RCP8.5 simulations we used the square of Euclidean distance from the centroid that is defined as the average of values over all models.

The final RCM subset is derived from RCP8.5 simulation analysis and it is composed from:

1) one central RCM that represents and "ensemble mean" of projected changes of temperature and precipitation,

2) two warmer and colder RCMs representing above and below average warming during the 21st century,

3) two wetter and drier RCMs representing above and below average change of the annual precipitation during the 21st century,

4) two other RCMs representing wider range of driving GCMs and also having some distinct features, e.g., high number of tropical days.

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