RELIABILITY ENSEMBLE AVERAGING (REA) of the EUROPEAN REGIONAL and GLOBAL CLIMATE CHANGE

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Introduction

The **Reliability Ensemble Averaging** (REA) method calculates average, uncertainty range and a measure of **reliability of simulated regional climate changes from ensembles of different model simulations**.

The REA method is applied to **mean seasonal temperature and precipitation changes** in the periods **2041-2070** and **2071-2100** relative to the reference period **1981-2010**.

Regional ensemble results of 55 scenario simulations for the RCP8.5 and RCP2.6 at 0.11 degree resolution over the common EURO-CORDEX domain, using 8 GCMs and 11 RCMs, are **compared with the driving CMIP5 global models and with the CMIP6 global models**.

The REA method (Giorgi and Mearns, 2002)

The **average change**, $\widetilde{\Delta T}$, is given **by a weighted average of the ensemble members:**

$$\widetilde{\Delta T} = \frac{\sum_i R_i \Delta T_i}{\sum R_i}$$

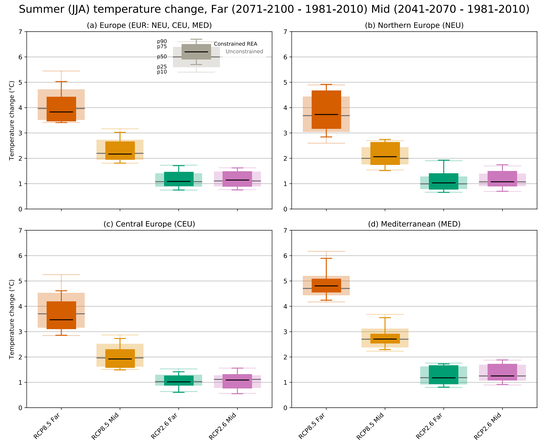
$$R_i = B_i \cdot D_i$$

$$= \left\{ \left[\frac{\varepsilon}{abs(B_{T,i})} \right]^m \left[\frac{\varepsilon}{abs(D_{T,i})} \right]^n \right\}^{[1/(mxn)]}$$

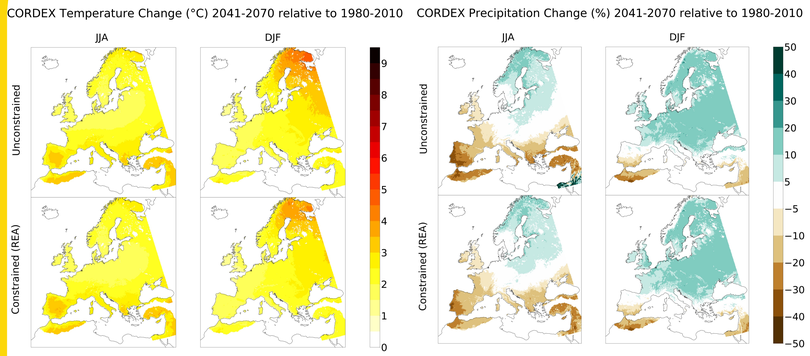
The higher the Bias, the lower the model weight (Performance criterion)

The higher the Distance, the lower the model weight (Convergence criterion)

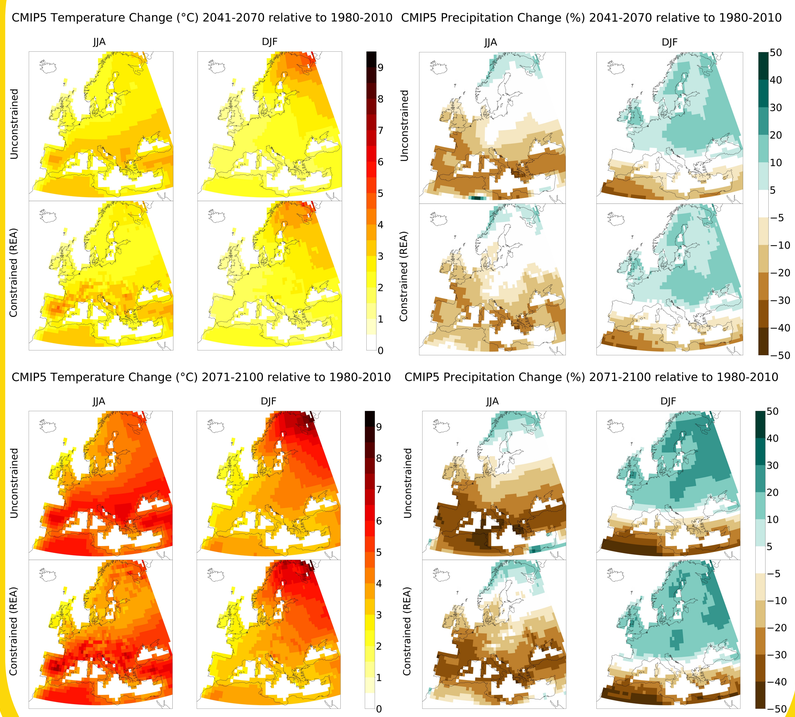
REA method application: EUROCORDEX, Mid - Far, RCP8.5 - RCP2.6



Application of the REA method to EURO-CORDEX



Application of the REA method to CMIP5



Application of the REA method to CMIP6