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Estimation and comparison of temperature, precipitation and sea-level pressure changes in Europe derived from GCMs as interpreted by the MAGICC-SCENGEN 5.3 diagnostic software system

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Effects of projected climate changes are investigated by the use of global climate models of the IPCC AR4 (2007). Computed changes in 20 coupled ocean-atmosphere general circulation models (OAGCM) are first analysed for periods 2030-2049 and 2080-2099 compared to the 1980-1999 reference period.
The MAGICC/SCENGEN 5.3v2 diagnostic model (Wigley et al., 2009) is used to adjust the model results to the external forcing alternatives and the above time-horizons. The precipitation and temperature results, including their inter-model variance and change of temporal variability, are projected by the same global models additionally. The projections are based on the moderately rapid A1B emission scenario, and a mitigation-oriented scenario postulating climate stabilisation at the 450 ppm equivalent CO2-scenario. The diagnostic simulations are performed by moderate changes in the aerosol content and also without that. Seasonal and annual change patterns are mapped by the software itself. The study makes all reasonable inter-comparisons among the scenaria, the effect of aerosol changes, the seasons and, as inter-model variance, the models themselves. This means over 500 maps for Europe each of them coloured according to the global span of the changes i.e. in relatively similar manner for the related maps to enhance the visual comparability.
Spatial resolution of both OAGCM-based scenarios is 2.5 x 2.5 deg. Of course, this resolution is hardly enough to provide the spatial and temporal details that are requested for any impact study. But they may be appropriate to study the large scale robust patterns of the changes. The inter-model variability of the sea-level pressure changes are also investigated to provide an insight into the uncertainty of the estimation by embedded mezo-scale models in case of using just one or a few mainframe model to provide the boundary conditions.