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Sources of uncertainties: added value of the evolution of climate model simulations over Central Europe?

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Climate model results inherently contain uncertainties, that may be reduced, but not eliminated with scenario updates and model developments. Therefore it must be quantified in climate assessments, while it must be understood by the user. These uncertainties are originating from the natural climate variability; the approximate description of physical processes in the models; and the emission scenarios applied for describing future human activity. We quantified these uncertainties separately for the Carpathian Basin. We analysed mean temperature and precipitation projections following a modified methodology of Hawkins and Sutton (2011).
En ensemble of 30 simulations from the CMIP5 database carried out with 15 global models and two anthropogenic scenarios until 2100 were assessed. We seek the answer whether the CMIP5 results are leading to different conclusions regarding uncertainty fractions, signal-to-noise ratios over the Carpathian Basin than from CMIP3 dataset (of similar number of simulations and model families). Furthermore, altogether 24 regional climate model (RCM) experiments were investigated from the EURO-CORDEX database conducted with 12 RCMs and the same two RCP scenarios on both 0.44 (EUR-44) and 0.11-degree (EUR-11) horizontal resolutions. We examined the added value of fine-resolution RCMs regarding model uncertainty against their coarser resolution counterparts and the role of internal variability.
The current investigation is concentrating on the following specific issues through the evolution of simulations in various CMIP3, CMIP5, EUR-44 and EUR-11 ensembles: 1) fraction of total uncertainty on different lead times over the Carpathian Basin; 2) signal-to-noise ratios (reliability for the users) and when signal is larger than natural variability (urge to act for the users).