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Assessment of soil-moisture memory in a limited-area seasonal prediction framework

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Seasonal predictions are increasingly adopted for a wide range of commercial and societal interests such as weather risk management, agriculture or humanitarian reasons. Typical forecast lead times vary between 3 and 12 months. Nowadays, coupled global circulation models are able to predict the response of ‘‘large-scale” forcings (i.e, anomolous SST forcing). On the regional scale, the impact of smaller-scale, i.e., regional forcings such as soil-moisture increases. The importance of regional scale forcing by the regional soil-mositure content and its initialization is often discussed.

Here, the impact of different strategies for soil initalization is assesed in an idealized framework. All experiments are carried out in the framework of the regional climate model CLM with a target resolution of 50km over Central Europe. The atmospheric lateral boundary and initial data are derived from ECMWF reanalyses in all experiments. Thus, the impact of different initialization strategies for the soil fields can be investigated. Specifically, the importance of the ‘‘soil-memory” for short (i.e., 3 months) and long (9 to 12 months) predictions is assessed through series of year-long predictions initialized before the winter or the summer season. The soil initialization uses either climate-type data derived from a long climate-run lacking any soil ‘‘memory” or reanalysis data including, by construction, memory through observational information. Preliminary results indicate the relevance of the soil-memory, in particular for the summer season.