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PARALLEL SESSION C : IMPACTS AND APPLICATIONS
C3: REGIONAL SCALE HYDROCLIMATE: FROM OBSERVATIONS TO MODELLING TO APPLICATIONS

Preparing for fully coupled climate-hydrological modelling in data-sparse regions applied over the Crati River catchment in Southern Italy

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Dynamically coupled atmospheric and hydrology modelling is an emerging field of research driven by an ambition to include a wider range of processes at a high spatio-temporal level of detail by utilizing or extending existing model codes to achieve a more skilful reproduction of model output variables. With the use of highly advanced model codes follows a higher demand for a wider range of high quality data used to both drive and validate the models in terms of spatial coverage, temporal resolution, representation of local attributes and data selection. Most notable in terms of local data demands is the land surface/hydrology model representing local features on even sub-km scales. Therefore, most studies have been performed over regions of vast data coverage. The improvement in model outcome as sought by the coupled approach however is not targeted exclusively for regions with good data.

We here investigate the performance of the distributed MIKE SHE hydrology model coupled with the SWET land surface model as used in recent studies with a dynamical coupling to atmospheric simulations using the HIRHAM regional climate model (RCM). The study is performed over the Crati River catchment in Southern Italy. The catchment is selected due to: 1) availability of data in terms of discharge, a flux tower station, climate stations and gridded data products such as ERA-I, E-OBS, SWBM and RCM output (e.g. MED-CORDEX) but otherwise resembles problems of data sparse regions in terms of lack of temporal overlap, gap filling, availability, hydrogeological interpretations and land use. 2) The regional location in the Mediterranean area previously shown to exhibit substantial biases which could potentially be reduced by the future coupled setup. 3) The local scale location in the Mediterranean highlands with large variations in orography and land use which can be difficult to represent in models and 4) existing model runs using the WRF-Hydro model enabling the basis for valuable comparison studies. In the present study the model is parameterized through inverse calibration using variations of the available data to highlight the influence of data quality and availability on the model outcome and assets/disadvantages of individual products.

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