Abstract:
The uncertainty in operational hydrological forecast systems driven with numerical weather predictions inputs are often assessed by quantifying the uncertainty from the inputs and not from the hydrological model itself. However, part of the uncertainty in modelled discharge stems from the hydrological model and some models may be more suitable than others for particular processes. A hydrological multi-model hydrological system can account for some of this uncertainty, but there exists a plethora of model approaches and it is not trivial to choose models that fit specific needs and collectively capture a representative spread of model uncertainty. This paper provides a technical review of 24 large-scale hydrological and land-surface models to provide guidance in choosing a set of models to help overcome this problem. A choice of models is proposed for the European Flood Awareness System (EFAS) as example of an operational continental flood forecasting system. The assessment is based on process descriptions, flexibility in spatial resolution, input data requirements and availability of code and is guided by the requirements needed to set up the model operationally on a continental scale. The level of model complexity differs greatly and even though many similarities can be found between the models, the implementations of processes can differ. The model choice is in the end subjective, but this review is an attempt to objectively narrow down the number of choices.

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Publication Year:
2016

Science Areas:
Environment and climate change [2]