



An attempt of ensemble modelling of future hydrological regime for selected river basin.

A. Valainis, A. Timuhin, and U. Beters

Laboratory for Mathematical Modelling of Environmental and Technological Processes, Faculty of Physics and Mathematics, University of Latvia(avalainis@gmail.com)

Ensemble modelling of hydrological regime may refer to usage of different Regional Climate Models (RCMs) coupled with one hydrological model, or usage of one RCM coupled with multiple hydrological models.

Our goal was to examine future flow regimes based on different hydrological models. We conducted a river basin study based on one particular subbasin (Berze) of the river Lielupe basin. Lielupe is a lowland river with basin area of 17000 sq.km, situated in Latvia and Lithuania. Area of chosen subbasin is approximately 1000 sq.km.

Ensemble of hydrological models consisted of MIKE SHE, and MIKE BASIN by DHI, the runoff model embedded in RCM, and in-house FiBasin model. MIKE SHE is grid based distributed hydrological model coupled with MIKE 11 flow routing model. MIKE Basin has embedded, conceptual catchment based NAM model. FiBasin is spatially distributed, finite volume based hydrological model with hydraulic routing network.

The RCM and climate change scenarios are provided by Prediction of Regional scenarios and Uncertainties for Defining European Climate change risks and Effects (PRUDENCE) project. Time period for climate change scenarios is 2071-2100.

The different responses from climate change, using different calibration sets were evaluated. The uncertainty related to choice of hydrological models is evaluated. It is found that the choice of hydrological model can lead to uncertainty which is comparable with the even to difference between the climate scenarios, or the climate change itself. This conclusion is valid for the area of study in which the expected change of the hydrological regime is rather small.