Geophysical Research Abstracts
Vol. 13, EGU2011-1068, 2011
EGU General Assembly 2011

GCMs simulative ability on climatic and extreme hydrologic conditions over Chinese Huai River Basin

Lu Wang (1), Paolo Reggiani (2), Pieter Van Gelder (1), and Han Vrijling (1)
(1) Delft University of Technology, Faculty of Civil Engineering, Delft, Netherlands, (2) Deltares, Delft, the Netherlands

Output of Global Climate Change models (GCM) is widely used to estimate the hydrological impact of climate change. In this paper the simulation capabilities of different GCM outputs on current climate condition are assessed for the Huai River basin, China. The GCM outputs ensemble is used to force a hydrological model with the aim to obtain the hydrological conditions corresponding to the simulated climate conditions. Extreme flood data from observations and GCM simulations are compared to assess the extreme-flood-estimation skill and the hydrological utility of GCM output ensembles.

First, an extreme flood is defined according to the monthly magnanimity at a control station. The threshold is quantified by the tail percentile of the probabilistic distribution based on historical runoff observation. Second, the DCSI statistical downscaling method is employed to downscale the GCM grid value to observation station during historical period (1961-1990). Then the downscaled data set from each GCM and observed data are compared, and the GCM ensemble simulative ability is assessed. The Xin'anjiang hydrological model is employed to transform the GCM precipitation into basin runoff. The discharge time series corresponding to each GCM output lead to an ensemble of simulated stream flow. Finally, the assessment of the skill of the GCM ensemble estimation on extreme floods is carried out. The peak-over-threshold extreme flood series are selected from the simulated ensemble and the statistical values derived from the observations and simulations are compared.

The above approach should lead to a more detailed risk-based design of flood defenses, where the estimates of the uncertainties in the forecasts of the loading variables are more accurately quantified based on the CGM assessments.