Geophysical Research Abstracts
Vol. 15, EGU2013-5601-1, 2013
EGU General Assembly 2013

Regional climate models performance evaluation for runoff simulation in the mountainous watershed

Kazi Rahman, Christophe Etienne, Ana Gago da Silva, Chetan Maringanti, Martin Beniston, and Anthony Lehmann

Institute for Environmental Sciences, University of Geneva, Switzerland (kazi.rahman@unige.ch)

Streamflow forecasting is often done with the help of output obtained from Regional Climate Model (RCM) generated variables. The heterogeneity of the meteorological variables such as precipitation, temperature, wind speed and solar radiation often limit the ability of the hydrological model performance. This research assessed the sensitivity of RCMs outputs from the PRUDENCE project and their performance in reproducing the stream flow. The hydrological model, Soil and Water Assessment Tool (SWAT) was used to simulate the stream flow of the Rhone River watershed located in south-western part of Switzerland, with the climate variables obtained from four RCMs. We analyzed the difference in magnitude of precipitation, and maximum and minimum air temperature with respect to the observed values from the meteorological stations using tailor diagram. In addition we also focused on the impact of the grid resolution on model performance, by analyzing grids with resolutions of 50*50 km2 and 25*25 km2. We found that higher grid resolutions tend to improve model performance. The variability of the meteorological inputs from various RCMs is quite severe in the studied watershed. Among the four different RCMs, the Danish Meteorological Institute (DMI) provided the best performance when simulating runoff. In spite of reproducing similar patterns of hydrograph, it is nevertheless recommended to use a correction factor before using RCM outputs for impact modeling. Since the streamflow simulation in the mountainous watershed is highly driven by the temperature for snow and glacier melt processes, our recommendation is to emphasize the temperature lapse rate for bias correction while applying climate model output for impact modeling.