Assessing the influence of using different rainfall remote sensing products on flood modelling in the Brahmaputra basin

Maurizio Mazzoleni, Biswa Bhattacharya, and Dimitri Solomatine
IHE Delft Institute for Water Education, Delft, Netherlands (b.bhattacharya@unesco-ihe.org)

The accurate flood prediction in ungagged basins is a vital problem that has received a lot of attention in the last decades. In fact, in many basins around the world one of the main problems for a proper water resources management is the scarcity of data in both spatial and temporal domains due to costly maintenance and lack of personnel. One possible solution to the problem of data scarcity is the use of satellite products. However, remote sensing information is affected by various sources of uncertainty that can be significant at smaller temporal scales, and this is an important issue for hydrological modelling for flood forecasting.

The main objective of this study is to assess the specific influence of using various remote sensing products of precipitation on the performance of a distributed hydrological model - in the context of flood forecasting in the Brahmaputra basin. The hydrological model is based on the conceptual HBV-96 model and the PCRaster framework in order to adequately represent the spatio-temporal behaviour of the river flow. Three remotely sensed datasets of precipitation (MSWEP, TMPA and PERSIANN-CDR) are used as input to the distributed hydrological model.

The preliminary results achieved in this study demonstrated the sensitivity of the hydrological model to the choice of remotely sensed rainfall datasets. Overall, better model results are achieved using MSWEP and TMPA. However, PERSIANN-CDR allows for a better representation of the rising limb and peak of the flow hydrograph, while both MSWEP and TMPA tend to underestimate such extreme values. Additional analysis will be performed to validate the preliminary findings of this research and including more global rainfall datasets and flood event to provide more general conclusions and recommendations.