Near Real time Basin Scale hydrological modelling of Brahmaputra River for Flood predication

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Being the highest specific discharge river system in the world, the Brahmaputra river experiences a number of long-duration flood waves during the monsoon season annually. Not only that, flash floods in its Himalayan tributaries cause damages to flood plain infrastructures. Floods not only carry high peak water discharge, but also bring a large amount of silt and debris. Therefore, the damage by a flood is driven by many factors like meteorological, hydrological, flood plain infrastructure and peoples' adaptation. Near time flood prediction at basin scale with available rainfall forecast dataset is necessity for effective flood management.

In the present study, a semi-distributed hydrological model was developed and set up with near real time rainfall observed and forecast dataset. The rainfall dataset were obtained from different national and international observation and model forecasts. Real time flow measurement data (flow rate and water levels) were assimilated into the model for better accuracy of the predication. Other geospatial dataset such topographic, land use/land cover, antecedent moisture content and wetland storage were used as input layers of the modelling framework. The model has been tested for its performance of flood wave predication at different reaches of the Brahmaputra. Presently, a flood of about 10 year return period has been passing through the River from July 10 2019 and about 2.6 million people was under flood on July 14 2019. Near real time comparison of the model prediction with a few observation locations has been carried out. It is quite interesting that the trend of the flood (rising and falling) is well predicted, but discharge is over-predicted by 10-20 percent than that of the observation. The predication has been shared with people and administrator through social media.