Geophysical Research Abstracts
Vol. 17, EGU2015-15856, 2015
EGU General Assembly 2015


# Improving flood prediction by assimilation of the distributed streamflow observations with variable uncertainty and intermittent behavior

Maurizio Mazzoleni, Leonardo Alfonso, and Dimitri Solomatine
UNESCO-IHE Institute for Water Education, Delft, The Netherlands (m.mazzoleni@unesco-ihe.org)

Data assimilation techniques have been used in the last decades to integrate water measurements for physical sensors in mathematical model in order to improve flood prediction. Parallel to this, the continued technological improvement has stimulated the spread of low-cost sensors used to infer hydrological variables in a more distributed way but less accurately. The main goal of this study is to demonstrate how assimilation of streamflow observations having variable uncertainty and intermittent characteristics can improve flood prediction using hydrological model.

The methodology is applied in the Brue catchment, South West of England. The catchment is divided in small sub-basins, about 2km2 resolution, in order to represent the spatial variability of the streamflow observations by means of a semi-distributed Kalinin-Milyukov-Nash Cascade model. The measured precipitation values are used as perfect forecast input in the hydrological model. Then, an Ensemble Kalman filter is implemented and adapted to account for streamflow observations having random uncertainty and coming at irregular time steps. Due to the fact that distributed observations are not available within the Brue basin, synthetic streamflow values are generated.

The results show how streamflow observations having variable uncertainty can improve the flood prediction according to the location from which these observations are coming. Overall, streamflow observations coming from low cost sensors can be integrated with physical sensors observation to improve flood prediction. This study is part of the FP7 European Project WeSenseIt Citizen Water Observatory (www.http://wesenseit.eu/).