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Evaluate the stability of the Kalman filter in real-time flood forecasting

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The Kalman filter is considered as a recursive algorithm which estimates the true state of model over time by consideration of the noise existing in model simulation and observation. The application of the filter has been observed widely in hydrological modelling and flood forecasting. Basically, the Kalman filter itself is not a model and should be used in conjunction with a rainfall-runoff model. A new developed lumped hydrological model called ERM model and the Kalman filter has been applied to develop a new real-time flood forecasting scheme.
According to visual and numerical comparison, it was confirmed that implementing the Kalman filter in forecasting model could be achieved to reliable forecasts in real-time. But the question is how much the Kalman filter is stable over a time? In other words, if the updating process is stopped after a time step, and the forecasting process to be continued without any updating what will be happened for the whole of the forecasted hydrograph? Basically, in this study, the whole shape of the leading hydrograph will be considered to check the stability of Kalman filter in forecasting the shape of hydrograph. In this term, after each time interval and performing the updating process, the forecasting part will be carried out without any correction on model states. Therefore, after each time interval the forecasted hydrograph will be generated and the hydrographs will be compared according to the peak runoff and runoff volume.
The evaluation was performed by ten flood events and the analyses shown that, according to the Kalman filter mechanism which is a recursive process, the filter requires continues updating. Therefore, by stopping the updating process, it is not expected to obtain the whole shape of forecasted hydrograph properly and another strategy is required to achieve the accurate form of the forecasted hydrograph.