

Analysis of spatial and temporal rainfall variability impact on flow prediction: Case study Ourthe river basin

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Spatio-temporal rainfall characteristics have an important influence on the hydrologic response. In this research, the sensitivity of flow discharge to cell-storm properties is examined for the Ourthe Catchment, Belgium. We mainly focus on the following questions: (i) how the spatial resolution of rainfall impacts the flood forecast accuracy at various lead times; (ii) how the flood forecast accuracy is affected or varies according to the spatial location of high intensities of the storm (heterogeneity of rainfall distribution) (iii) what factors decrease or increase the lead time with a minimal predefined accuracy.

This is done by using TRMM multi-satellite precipitation analysis (TMPA) information fed into the distributed model W-FLOW. To analyse these we first build a model that forecasts rain based on the methodology known as tracking Radar Echoes Correlation (TREC). For this experiment only one direction and velocity is contemplated, for the second a number of scenarios with different direction and velocity are created. This is done to represent the possible storm paths of the single extreme storm. For the third question a multiple time steps analysis using the TREC method with the TMPA was also evaluated in the W-FLOW model. This research contributes to a better understanding of the sensitivity in forecasting problems linked with models using what has been called by other authors hyperresolution ignorance of spatial rainfall information for hydrological applications.