



Simulating and Forecasting Flooding Events in the City of Jeddah, Saudi Arabia

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Metropolitan cities in the Kingdom of Saudi Arabia, as Jeddah and Riyadh, are more frequently experiencing flooding events caused by strong convective storms that produce intense precipitation over a short span of time. The flooding in the city of Jeddah in November 2009 was described by civil defense officials as the worst in 27 years. As of January 2010, 150 people were reported killed and more than 350 were missing. Another flooding event, less damaging but comparably spectacular, occurred one year later (Jan 2011) in Jeddah. Anticipating floods before they occur could minimize human and economic losses through the implementation of appropriate protection, provision and rescue plans.

We have developed a coupled hydro-meteorological model for simulating and predicting flooding events in the city of Jeddah. We use the Weather Research Forecasting (WRF) model assimilating all available data in the Jeddah region for simulating the storm events in Jeddah. The resulting rain is then used on 10 minutes intervals to feed up an advanced numerical shallow water model that has been discretized on an unstructured grid using different numerical schemes based on the finite elements or finite volume techniques. The model was integrated on a high-resolution grid size varying between 0.5m within the streets of Jeddah and 500m outside the city. This contribution will present the flooding simulation system and the simulation results, focusing on the comparison of the different numerical schemes on the system performances in terms of accuracy and computational efficiency.