Prediction of Future Flood in Terengganu River Basin, Malaysia

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Abstract

Extreme rainfall is expected to occur more frequently in the future due to global warming. This phenomenon coupled with rapid development which transform vegetated or natural landuse into more impervious surfaces could lead to a more devastated flood impact. Study on future flood affected by climate change was carried out in Terengganu river basin, Malaysia. The present landuse in the river basin is dominated by agriculture (51.9%), followed by forest (40.5%), developed areas (4.54%) and water bodies (3.08%). By year 2020, the developed area is expected to double to 178 km^2 while the forest and agriculture areas would decrease by 1.56% and 8.72% respectively. Future rainfall data was obtained from the National Hydraulics Research Institute Malaysia (NAHRIM). The rainfall data was downscaled from the Canadian GCM (CGCM1) for IS92a scenario. The coarse grid resolution of about 410 km was downscaled to Peninsular Malaysia at fine spatial resolution of 6 km x 6 km. Future rainfall intensities were predicted to increase by 6 to 10%. A climate change factor of 1.18 was applied in the simulation of future 100 years   flood. Infowork RS software was used for 2D flood mapping. The hydrological simulation achieved 92% and 80% accuracy for flood events in 2008 and 2010. The calibrated model parameters were then used to produce flood map (extent and depth) for the 2014 flood event. The 2D hydrodynamic model validation yield 82% accuracy when compared with the 20 observed flood marks. The simulation results of future 100 years food reveal additional 14% flood extent and 13% flood depth compared to the historical 100 years flood.

Keyword: climate change, flooding, flood depth and extent, Infowork