

The impact of temporal and spatial resolution on developing risk maps: case study of the Tubma basin, Thailand

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Abstract Flood and drought prevention and correction measures should be prioritised towards areas that most suffer, with the aid of a risk assessment. Flood and drought risk assessments in Thailand are often conducted based on runoff estimation from models with coarse temporal and spatial resolutions. This has the benefit of being easy to apply with modest data requirements. To improve the accuracy and resolution of runoff estimation, however, a model with higher temporal and spatial resolutions is suggested. This paper investigates whether, given readily available data, the ArcSWAT framework results in risk maps different from those produced using the rational formula at a relatively coarse spatial-temporal scale. Using the Tubma basin as a case study, the two methods produced significant differences in the sub-basin scale drought risk map, but not the flood risk map. Both the ArcSWAT model and rational formula yielded identical priority-area maps developed from the overlay of the flood and drought risk maps. This indicated that a model with coarse temporal and spatial resolutions, i.e. the rational formula, is comparable to a more complex model, i.e. ArcSWAT, when used for developing sub-basin scale priority maps given readily available data in Thailand. However, the potential for ArcSWAT or other distributed models to deliver higher resolution results with sufficient reliability needs to be further investigated.

Key words risk map; risk assessment; water balance; spatial resolution; temporal resolution; Thailand; Tubma basin; water availability