

Title: Suitability of ANN applied as a hydrological model coupled with statistical downscaling model: a case study in the northern area of Peninsular Malaysia

Author/Authors: Zulkarnain Hassan, Supiah Shamsudin, Sobri Harun, Marlinda Abdul Malek, Nuramidah Hamidon

Abstract: The increase in global surface temperature in response to the changing composition of the atmosphere will significantly impact upon local hydrological regimes and water resources. This situation will then lead to the need for an assessment of regional climate change impacts. The objectives of this study are to determine current and future climate change scenarios using statistical downscaling model (SDSM) and to assess climate change impact on river runoff using artificial neural network (ANN) and identification of unit hydrographs and component flows from rainfall, evaporation and streamflow data (IHACRES) models, respectively. This study investigates the potential of ANN to project future runoff influenced by large-scale atmospheric variables for selected watershed in Peninsular Malaysia. In this study, simulations of general circulation models from Hadley Centre 3rd generation with A2 and B2 scenarios have been used. According to the SDSM projection, daily rainfall and temperature during the 2080s will increase by up to 2.23 mm and 2.02 °C, respectively. Moreover, river runoff corresponding to downscaled future projections presented a maximum increase in daily river runoff of 52 m³/s. The result revealed that the ANN was able to capture the observed runoff, as well as the IHACRES. However, compared to the IHACRES model, the ANN model was unable to provide an identical trend for daily and annual runoff series.