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Flood Regimes of the River Ala in Akure, a Peri-urban City of Nigeria

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Abstract

Growing environmental challenges posed by floods on humans and animals is generating growing interest in measuring flow from open channels, especially in the developing countries. The stage and discharge of River Ala in Akure, Nigeria was investigated by use of trapezoidal weirs, placed at three major tributaries (westward: WT07 and WT08, northward: NT07 and NT08 and southward: ST07 and ST08) of the river during the 2007 and 2008 peaks of rainfalls (May-July). Climate analysis over a twenty five year period (1982-2006) showed a mean maximum rainfall of 17.8 mm, maximum mean air temperature and mean relative humidity of 38.6°C and 96.7%, respectively. Mean discharges from the WT07, ST07 and NT07 were 2.561s^{-1} (± 1.15), 2.83 (± 1.19) and 2.41 (± 0.89), respectively. The highest and lowest discharges, 2.831s^{-1} (± 1.19) and 2.351s^{-1} (± 1.01), were obtained from ST07 and ST08, respectively. The least significant difference among all measured discharges during the 2008 experiment was 0.408 and comparison of means among measured discharges from WT08, ST08 and NT08 showed no significant difference at 5% probability level. However, the difference between discharges of ST08 and NT08 were highly significant (LSD at $p \leq 0.05$). The highest and lowest water heads (h) values of 0.077 (± 0.032) and 0.064 (± 0.027) were obtained from the ST07 and NT08, respectively. Comparison of means of water heads in ST07 and NT07 showed a highly significant difference at ($p \leq 0.05$). The difference in mean water heads from WT08, NT08 and ST08 were not significant (LSD at $p \leq 0.05$). The result from this experiment is useful for the calibration of river stages (water heads) and the prediction of discharges that may accompany storm events during the peak of rainfall in the study area.

Keywords: Water discharge, Nigeria