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Trends of stream runoff in Sri Lanka

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Because of the topographic nature and dendritic stream network, Sri Lanka is vulnerable to river flooding. Most of the rivers originating in the central highlands of Sri Lanka show agreement on climate change impact on downstream flooding. The objective of the research is to capture historical trends in river discharges. The five decadal (1961-2013) data investigated consist of monthly volume (in million cubic meters) at 28 runoff gauging stations distributed in 15 major rivers covering 10 rainfall stations in Sri Lanka. The non-parametric Sen slopes were examined for the trend significance. The streamflow and rainfall data were used to estimate the runoff/rainfall ratio as well. Results show nearly 35% of gauging stations had increasing river discharge. Significantly increasing trend slopes were detected at three stations in Baddegama and Giriulla of Gin Ganga and Maha Oya respectively, which tailsoff in the western coast of Sri Lanka. Regarding monthly analysis, the majority of the stations (65%) detected with a negative linear trend were located in the south-western part of Sri Lanka. They also exhibited a bimodal pattern of runoff, which may correspond to the overall decreased rainfall as well. Although observed trends were mostly attributable to the significant changes in intense and heavy rainfall, the rapid transformation of natural lands in Sri Lanka might have exaggerated downstream flooding.

Keywords: Flood, hydrology, linear trend, runoff, Sen slope

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