

Trend Analysis for Extreme Rainfall Events in New South Wales, Australia

Authors : Evan Hajani, Ataur Rahman, Khaled Haddad

Abstract : Climate change will affect the hydrological cycle in many different ways such as increase in evaporation and rainfalls. There have been growing interests among researchers to identify the nature of trends in historical rainfall data in many different parts of the world. This paper examines the trends in annual maximum rainfall data from 30 stations in New South Wales, Australia by using two non-parametric tests, Mann-Kendall (MK) and Spearman's Rho (SR). Rainfall data were analyzed for fifteen different durations ranging from 6 min to 3 days. It is found that the sub-hourly durations (6, 12, 18, 24, 30, and 48 minutes) show statistically significant positive (upward) trends whereas longer duration (sub-daily and daily) events generally show a statistically significant negative (downward) trend. It is also found that the MK test and SR test provide notably different results for some rainfall event durations considered in this study. Since shorter duration sub-hourly rainfall events show positive trends at many stations, the design rainfall data based on stationary frequency analysis for these durations need to be adjusted to account for the impact of climate change. These shorter durations are more relevant to many urban development projects based on smaller catchments having a much shorter response time.

Keywords : climate change, Mann-Kendall test, Spearman's Rho test, trends, design rainfall

Conference Title : ICESSE 2014 : International Conference on Environmental Systems Science and Engineering

Conference Location : Sydney, Australia

Conference Dates : December 15-16, 2014