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Trend analysis in precipitation and accessing the influence of climate indices in Baluchistan

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Abstract: Pakistan's largest province, by area, Baluchistan hosts deep sea Gawadar port, and is playing a vital role in one belt one road (OBOR) plan. CPEC, a Regional route comes under OBOR which connect Pakistan's Gawadar port to Chinese Xinjiang Province. CPEC Corridor upon construction is expected to revolutionize the infra-structure, economy, trade, finance, demography, environment, culture, socio- economic conditions, of Pakistan. Much of western and central CPEC routes pass through it. However, Baluchistan, due to its topography and rugged terrain, is under constant risk of rainfall driven flash floods. Flash floods are responsible for colossal damages to the infra-structure, especially roads, bridges, trade, communication that ultimately badly affects the humans, economy and the environment. The intensity and frequency of rainfall are increasing due to climate change and flash floods put everything at high risk. In this view, the assessment of changes in rainfall has got significant importance. More or less no appreciable studies have been conducted on the precipitation trend analysis and influence of climate indices in Baluchistan.

This research is focused on assessment of trend analysis in precipitation of Baluchistan using 40 years (1977-2017) data of 14 stations in Baluchistan. The data has been obtained from Pakistan Meteorological Department (PMD). Statistical tests, being the most direct methods of detecting changes in extreme rainfall intensities were adopted. Two nonparametric tests Mann-Kendall (MK) and Spearman's rho (SR) have been used to find the trends in annual and seasonal precipitations. Nonparametric methods are selected as they are less sensitive to data gaps, if it exists. The regional MK test has been applied to test the regional trends and the partial Mann-Kendall (PMK) test has also been employed to evaluate the variation of trends due to the influence of climate indices data.

Keywords. Trend Analysis, Rainfall driven flash floods, Mann-Kendall, Climate Indices

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