

PREFACE

Climate change alters morphometric parameters significantly and may result in hydro-meteorological problems. In this study, along with watershed delineation, the fuzzy analytic hierarchy process (FAHP) was used to prioritise sub-watersheds. For allocating appropriate weights to morphometric parameters, the fuzzy analytic hierarchy procedure was used, and these weights were then normalised to assign the final ranks to the sub-watershed. Topographic, geologic, and hydrological data were used to identify drainage morphometric parameters in order to analyse extreme weather occurrences (flood) in the Brahmani River Basin. Extreme rainfall incidences were calculated using the standardized precipitation index (SPI) and rainfall anomaly index (RAI) based on Indian meteorological information.

The RAI and SPI trends, as well as the hydro-climatological behaviour of the basin, were calculated. Extreme rain events occurred during the monsoon season in the years 2001, 2003, 2007, 2008, and 2011. Extreme flood episodes can be linked to fluctuations in high and severe rainfall over a short period of time, resulting in channel shifting and modifications. The findings revealed that both monsoonal rainfall and the frequency of extreme rainfall over the basin are increasing, which could be a contributing factor to the Brahmani river basin's high severity and frequency of flood events (Chaubey et al., 2019).