

Standardized Variability Index (SVI) : A multiscale index to assess the variability of precipitation

*Ravi kumar Guntu¹, Ankit Agarwal¹

1. Department of Hydrology, Indian Institute of Technology Roorkee, 247667, India

Quantifying the spatiotemporal variability of precipitation is the principal component for the assessment of the impact of climate change on the hydrological cycle. A better understanding of the quantification of variability and its trend is vital for water resources planning and management. Therefore, a multitude of studies has been dedicated to quantify the precipitation variability over the years. Despite their importance for modeling precipitation variability, the studies mainly focused on the amount of precipitation and its spatial patterns. The studies investigating the spatial and temporal variability of precipitation across the Indian subcontinent, in general, and at multiscale, in particular, are limited. In this study, we introduce a novel measure, Standardized Variability Index (SVI), based on information entropy to investigate the spatiotemporal variability of precipitation. The proposed measure is independent of the temporal scale, the length of the data and can compare the precipitation variability at multiple timescales. Distinct spatial patterns were observed for information entropies at the monthly and seasonal scale. Stations with statistically significant trends were observed and vary from monthly to seasonal scale. There is an increase in the variability of precipitation amount across Central India. Trend analysis revealed there is changing behavior in the precipitation amount as well as rainy days, showing an increase in the probability of occurrence of extreme events in the near future. In addition, coupling the mean annual rainfall with SVI enables a relative assessment of the water resources availability.

Keywords: Precipitation variability, Apportionment entropy, Intensity entropy, Standardized variability index, Mann-Kendall test, Indian Subcontinent

