ABSTRACT

West Bengal is a river state in India. Therefore, the vast river network exposes the floodplains downstream of the Ganges to several natural disasters each year, including floods caused by monsoons and the collapse of embankments. The study area is Bhagirathi-Hooghly River valley from Krishnanagar to Barrackpore. The study is generally based on remote sensing and Geographic Information System methods to detect the transformation of river bank and future probability of river bank deformation. In this paper it has been justified whether the land deformations have been increased or decreased over the period of 10 years and also access the rate of change of the riverbank. The bankline of the Bhagirathi Hooghly River was continuously recorded for 30 years at 10-year intervals and the eye height of the image was within 5 meters for accuracy. The captured riverbank was resampled with UTM 45 projection and finally proceed to justify the total valley area of the river is changing or not. In the period of 2001 to 2011 the valley area of Bhagirathi-Hooghly has increased rather than other respective years. To know the river pattern and consistency rate of river bank, Sinuosity Index has been applied. The Bhagirathi-Hooghly River course within the studied periods (1991–2021) normally followed meandering path, and the SI value is more than 1.5. Several Statistical tools has been applied such as Space time Pattern Mining with respect to the prevailing Emerging Hot Spot Analysis to find out the intensity of change in the valley area which includes both erosion and deposition. Thus, it explored that the deformations whether they are accretion or erosion is decreasing or increasing in an undulating pattern that portrayed a perception of seasonality of those transformations in the observed temporal periods with neighbourhood basis. In this paper, the DSAS method was applied. This allows you to calculate rate of change statistics from multiple historical locations. It also provides the statistical data needed to assess rate of change and justifies coastal forecasts with options to generate 10-year and / or 20-year coastal ranges and uncertainty bands. So, we investigated the relative efficiency of DSAS model such as SCE, NSM, LRR to assess the spatio-temporal magnitude of dynamism. After assessing transects with DSAS, it is found that approximately 14.26 sq.km of the left bank and 19.49 sq.km of the right bank area in total are under uncertainty for the possible deformations in 10 years scale.