Tropical cyclone track Analysis over Indian Coast Using Spatio-Temporal data-mining

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Tropical cyclones are a natural hazard which largely affects the lives and property with its destructive wind and heavy rainfall. Fluctuations in the frequency and intensity complicate the detection of long-term trends and play an important role in the global climate system; therefore understanding and predicting tropical cyclones track, intensity, and landfall location is of both societal and scientific significance. In this study a data-mining approach is being used to analyze the tropical cyclone track both in the temporal and spatial scale. Basically, the Indian coast line is divided into four zones viz. north east, south east in the eastern side adjoining Bay of Bengal and North west and south west in the western side adjoining Arabian sea as these coastal areas are very much vulnerable for disaster due to maximum number of landfall of Tropical Cyclones. The track and landfall associated with all the cyclones are clustered based on their intensity (Severe, moderate and low) and landfall location. The analyses are carried out for landfall location and the extent of track separately for the events happening in two seasons i.e. pre-monsoon and post-monsoon period. Along with categorization of intensity, trend analysis of track and the targeted zone of maximum damage also been studied. Algorithms are being developed for potential resilient and impact assessment of the parameters associated with cyclone disaster in the coastal region of India. One of the important objectives of this present work is also the identification of most disaster prone coastal area and becoming a part of the information support system during the cyclone period. Based on the statistics like mean, Standard Deviation, regression and correlation analysis, an index is developed which determines the level of damage and vulnerability along the coastal region. This index can be used for the early warning system of particular coastal areas for the preparedness and mitigation of future cyclone events.