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Study of Ananomalous Behavoir of Atmospheric Parameters as an Earthquake Precursors for Himalayan Region Earthquakes

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Abstract

This research work concentrates on how the atmospheric parameters act as a precursor of earthquakes occurred in the Himalayan region. In the past decade, several literature results suggest there is a link between the observation of atmospheric phenomenon and the earthquake occurrence. In this study we have chooses to analyse the outgoing longwave radiation (OLR) and relative humidity (RH) scenario prior to the occurrence of earthquakes. Eight notable earthquakes (M≥5.0) are selected that happened in the Himalayan region, along the Main Central Thrust (MCT). The Himalayas are emphasized by one of the world's largest continental megathrusts, which causes the occurrence of massive seismic events that produce significant destruction. The atmospheric parameters like OLR and RH data sets were derived from satellite observation and variations were identified using the Z-factor method. The temporal analysis of the atmospheric parameters was done for six months before the occurrence of the earthquake. An abnormal deviation was observed in OLR and RH before the occurrence of the earthquake. From the observation, all the anomalies present in the atmospheric parameters were observed ten days prior to the occurrence of the earthquake except for two events, which shows the heterogeneous nature of the earthquake process. For all earthquakes, the RH value dropped predominantly before observing the anomaly rise of the OLR. Similarly, the pattern of these atmospheric parameters indicates sudden drops of RH value followed by the sudden rise in the OLR, which is proposed by the LAIC model. Thus, the authors concluded that atmospheric parameters like OLR and RH are the important short-term earthquake precursor to forecast the earthquakes.

Keywords: Outgoing longwave radiation (OLR), Relative humidity (RH), Earthquake, Earthquake precursors