

A Machine Learning Approach for Earthquake Prediction in Various Zones Based on Solar Activity

Authors : Viacheslav Shkuratsky, Aminu Bello Usman, Michael O'Dea, Saifur Rahman Sabuj

Abstract : This paper examines relationships between solar activity and earthquakes; it applied machine learning techniques: K-nearest neighbour, support vector regression, random forest regression, and long short-term memory network. Data from the SILSO World Data Center, the NOAA National Center, the GOES satellite, NASA OMNIWeb, and the United States Geological Survey were used for the experiment. The 23rd and 24th solar cycles, daily sunspot number, solar wind velocity, proton density, and proton temperature were all included in the dataset. The study also examined sunspots, solar wind, and solar flares, which all reflect solar activity and earthquake frequency distribution by magnitude and depth. The findings showed that the long short-term memory network model predicts earthquakes more correctly than the other models applied in the study, and solar activity is more likely to affect earthquakes of lower magnitude and shallow depth than earthquakes of magnitude 5.5 or larger with intermediate depth and deep depth.

Keywords : k-nearest neighbour, support vector regression, random forest regression, long short-term memory network, earthquakes, solar activity, sunspot number, solar wind, solar flares

Conference Title : ICSR 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020