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Improving the Analysis Method of ULF Geomagnetic Data for Earthquake Precursor Monitoring in the Sumatera Region

Although the earthquake prediction is still in controversial for the seismologists, there are significant progress in the detection of earthquake precursor using geomagnetic data. We developed the Earthquake Precursor Monitoring System (EPMS) based on the geomagnetic data recorded in the Geomagnetic Stations located in the Sumatera. The seismomagnetic anomaly is calculated and analyzed weekly by using the power spectral ratio method of the Ultra Low Frequency (ULF) signal. The Anomaly is used to estimate the Magnitude and leadtime of coming potential earthquake. While the azimuthal coverage of the anomaly sources are used to determine the direction and distance of the earthquake. By running EPMS for about 03 years, we found that the system are able to predict earthquake with Magnitude > 5 from 2014 has occurred at Sumatera region. The occurrence of the predicted earthquakes are in the range of 3-24 days after the geomagnetic precursor detected and the location of the earthquakes are within the cross-section area of the azimuthal coverage between two or more stations. By using the result of 20 predicted earthquake we find an empirical formula to estimate the magnitude as the following M=0.088*Amp+0.002*distance+4.334. This results have a possibility improving monitoring the precursor of large earthquake.

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