

Extraction of seismicity pattern over a wide area and forecast

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To forecast crustal activity, it is necessary to recognize the pattern of the occurring phenomena in the area. From observation to recognition of the pattern of the phenomena, a systematic process of data preprocessing, feature extraction and classification is necessary. From this view point we try to preprocess data and to extract the feature of seismicity pattern over a wide area of Kanto and Chubu region, by utilizing JMA earthquake catalog in recent years. We first declustered the earthquake data and then defined several parameters to characterize the regional seismicity in the relatively short-time period. We adopt parameters such as earthquake frequency, total magnitude, b-value, fractal dimension, mean distance of each earthquake pair, ratio of areas occupied by earthquakes, and so on. We obtained the value of each parameter in every short-time period. From the distribution of observed sample in each period, we define outliers of the parameter. Then we extract the sampling periods with outlier as abnormal periods for each parameter. By plotting outlier periods against time for all these parameters, we examined the temporal variation of the appearance of the abnormal period. The result shows that the total number of the abnormal period increase significantly around the end of 2002 to 2003. After these period several large earthquakes occurred in wide area of Kanto and Chubu region. We think this method of data preprocessing, feature extraction and monitoring is important and useful to extract and recognize seismicity pattern and finally to forecast large earthquakes.