

عنوان مقاله:

PREDICTION OF JAPAN TOHOKU (2011) EARTHQUAKE AFTERSHOCKS DISTRIBUTION USING ARTIFICIAL NEURAL NETWORKS

محل انتشار:

ششمین کنفرانس بین المللی زلزله شناسی و مهندسی زلزله (سال: 1390)

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خلاصه مقاله:

In this paper an approach is presented to predict the concentration and the trend of aftershocks of Tohoku earthquake on April 07, 2011. The method is based on inputting first aftershocks to Kohonen artificial neural network. Artificial neural networks, which are inspired from human brain, consist of several artificial neurons which are connected with some weight vectors to each other. Artificial neural networks are able to classify a large volume of input data (i.e. earthquake catalogue) simultaneously and in parallel, and can recognize seismic patterns very well. Kohonen neural networks consist of several neurons that effect mutually on each other to display important statistical characteristics of the input space (i.e. first aftershocks). Combination of associative and competitive learning rules results in formation of Kohonen's self-organizing feature map (SOFM) algorithm. SOFM algorithm has converged; the feature map computed by the SOFM algorithm indicates the concentration and the trend of aftershocks precisely. This paper focuses on the shapes of clusters of Japan earthquakes that can be visualized in their network based on distance between two events (the pairs of linked neighbors) by using artificial neural networks. The knowledge can be extracted from the number of events and links in their networks. We find that there is strong correlation between small earthquakes ($M_s > 4.5$) that are very important to the stress transfers in this region. It is demonstrated that the synthetic clustering in space and time of earthquakes is useful for seismic hazard assessment and intermediate-range earthquake forecasting by using Self-Organizing Neural networks. This level signifies that the network has achieved the desired statistical accuracy as it produces the required events for a given sequence of inputs data.

کلمات کلیدی:

Clustering; Prediction; Aftershock; Kohonen Artificial Neural Network

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