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Research on Local Event Detection Method Based on Deep Convolutional Neural Network

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An event detection method based on deep neural network combined with the average wave speed ratio of multiple stations is proposed for detecting local events under the global sparse seismic network. Firstly, the method uses multi-task convolution neural network to detect and identify the direct P and S phases, as well as estimate their arrival time. Then a joint network of GAN and LSTM is used to identify and eliminate the noise signals in detections. Finally，according to the principle that the P and S wave velocity ratios of local earthquakes in the regional network are consistent, the association of seismic phases from multiple stations are realized. The P and S phases arrival time and wave velocity ratio are used to estimate the preliminary origin time. The hyperbolic method based on station pairs is used to estimate the preliminary event location. Using the preliminary origin time and location of the event as the initial value of the conventional iterative inversion location method, and finally the exact event location and time are obtained

Promotional text

This paper proposed a local event detection method based on the deep convolution neural network. The test results verify the effectiveness of the deep learning method in seismic monitoring data processing.

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