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envelope-based approach for seismic signal discrimination

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Seismic event source identification is one of the vital and primordial tasks in seismic signal processing. Indeed, the first goal of seismic signal analyst is to recognize the source of each recorded seismogram. For example, one of the main goals of CTBTO is to identify nuclear explosion from natural seismic events. Several complex methods have been studied in the previous researches.
The aim of the present research study is to investigate the capability of signal envelop, both in time and frequency domain, to classify seismic seismograms of different classes. To do so, a large database of real seismic seismogram was used. An algorithm is developed to extract the envelope of each seismogram in time and frequency domain and combine them to determine the corresponding seismogram class. The experimental results showed that, in addition to the simplicity of this approach, it achieves good accuracy. The algorithm is explained in details so that it can be reproduced in other seismic networks all over the world.

Promotional text

The aim of this work is to develop more simple and efficient seismic signal classification algorithms to help CTBT in recognizing nuclear explosions from other seismic events.

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