

## Amplitude Attenuation and Applied in Earthquake and Explosion Identification

In our study, we analyzed the identification ability of first motion amplitude  $Pi\bar{P}$  maximum amplitude  $Pm$  to  $S$  maximum amplitude  $Sm$  ratios based on the small magnitude earthquakes and explosions occurred in Huailai, Beijing. Considering the variations of amplitude attenuation influenced by propagation paths, we selected reasonable formula to study attenuation characteristics of  $P$ ,  $S$  amplitudes with epicenter distance, and obtained that amplitudes of explosion attenuated faster than earthquakes. After attenuation correction, we calculated the amplitude ratios again and found that the correct recognition rate of  $Pi/Sm$  amplitude ratios was improved from 84% to 98% and the  $Pm/Sm$  amplitude ratios was improved from 92% to 100%. This method has also been used to recognizing small magnitude event in North Korea. The correct recognition rate of  $Pi/Sm$  amplitude ratios was improved from 77% to 93% and the  $Pm/Sm$  amplitude ratios was improved from 87% to 92%. In conclusion, the results show that as an additional criterion to maximum amplitude ratio, the initial amplitude ratio has a better effect on recognition. After attenuation correction, the amplitude ratio criterion can be better applied to small magnitude earthquakes and explosions identification.

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