

Focal mechanism of 2017 DPRK nuclear explosion and its collapse event

Unlike the previous DPRK nuclear explosions, a rare collapse event followed the 2017 nuclear explosion after about 8 minutes and a half. As two kinds of special shallow depth seismic events with different source properties, the accurate inversion of the focal mechanisms of them is of great significance for the identification of CTBT events. In this study, the inversion of the moment tensor of the nuclear explosion and collapse event is carried out with the waveform data of the dense regional seismic stations. After that, the focal mechanisms of the two events with small waveform residual are compared from the surface wave amplitude ratio. The results show that the surface wave amplitude ratio has a certain screening effect on the waveform inversion. The resolution of the optimal solution of the nuclear explosion is higher, which is close to the crack source. Meanwhile, the solution resolution of the collapse event is lower and the source type cannot be accurately determined. One reason for the lower solution resolution of the collapse event may be the limitation of the observed data and also the complexity of the source process itself.

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