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# of seismic events (2006 to 2020) in North Korea using P/Lg amplitude ratios from regional stations and a bivariate discriminant function

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Two events of magnitude (m_b) 3.6-3.8 occurred in southern North Korea (NK) on 27 June 2019 and 11 May 2020. Although these events were located about 330-400 km from the known nuclear test site, the fact that they occurred within the territory of NK, a country with a recent history of underground nuclear tests, made them events of interest. We used P/Lg ratios from regional stations to categorize seismic events that occurred in NK from 2006 to May 2020, including the two recent events, the six declared NK nuclear tests, and the cavity collapse and triggered earthquakes that followed the 3 September 2017 nuclear explosion. We were able to separate the cavity collapse from the population of nuclear explosions. However, the distinction between the earthquakes and the cavity collapse is ambiguous. We used cross-spectral Pg/Lg and Pn/Lg ratios jointly in a quadratic discriminant function and successfully categorized the six declared nuclear tests and the triggered earthquakes that followed the September 2017 explosion. Our analyses also confirm that the recent southern events are both tectonic earthquakes that occurred naturally.

Promotional text

This study aligns with the SnT2021 goal of identifying methods for improving nuclear test monitoring and verification. The performed discriminant analyses suggest that combining cross-spectral Pg/Lg and Pn/Lg results in improved discriminant power.

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