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learning based earthquakes-explosion discrimination for Sea of Galilee seismic events of July 2018

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Discrimination between earthquakes and explosions is an essential component of nuclear test monitoring. Discrimination methods currently used by the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) are often ineffective for regional events, particularly in Israel's region.
For instance, five seismic events whose epicenters lie near the Sea of Galilee (Lake Kinneret) were reported by the CTBTO in July of 2018. Those were relatively strong regional events, which were observed by stations hundreds of kilometers from the epicenter. Notably, three out of those five events were not screened out by the CTBTO as natural events, though they were a part of a swarm of earthquakes.
In this work, the diffusion maps-based discrimination method is configured and applied for discrimination of the July 2018 Sea of Galilee seismic events. Utilizing waveforms of the Israel Cooperating National Facility (CNF) station HRFI, we show that this machine learning method correctly classifies as earthquakes all July 2018 Sea of Galilee seismic events with durational magnitude Md > 2.3.

Promotional text

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