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high-precision methods of seismic monitoring for earthquakes and explosions find application for broad areas?

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Numerous studies have shown for small regions monitored by a sparse network, that modern methods of detecting and locating clusters of seismic events are orders-of-magnitude more effective that traditional methods (which analyze events one-at-a-time). But can modern methods be effective over broad areas? We describe practical experience answering this question in application to a large region of mainland East Asia, including a project to study the seismicity of Mongolia, and parts of southern Siberia, involving vigorous earthquake and mine-blasting activity, for a 5-year period (2012 to 2016) using open stations with significant archives. We report on experience gained with the many choices involved in: (1) identifying well-recorded seismic events; (2) obtaining their waveforms for use as templates; (3) cross-correlating templates against the continuous archive, to detect thousands of plausible new events having a pre-determined false alarm rate; (4) validating such detections; (5) measuring their relative arrival times as recorded at common stations; and then (6) relocating as many events as possible using double-difference methods. We report successful reduction of detection thresholds for parts of mainland East Asia, and substantial improvements in location precision.

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