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# Accuracy of tsunami source inversion with real-time GPS

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Modern tsunami early warning systems traditionally employ seismic method to determine source parameters. DART buoys help to gain additional source information in case of trans-oceanic tsunamis but would not be effective in the near-field, where a warning should be issued in 5-10 minutes. German-Indonesian Tsunami Early Warning System (GITEWS) was the first to employ continuous GPS for the near-field tsunami early warning. On-a-fly inversion of GPS-displacements, which become available already in few minutes after an event, provides additional constraints for source parameters. The use of GPS for tsunami early warning especially benefits when seismic methods tend to underestimate the full moment magnitude immediately after an event, e.g., for very large earthquakes (Great Sumatra 2004 or Tohoku 2011) or for so-called 'tsunami earthquakes' (like Sumatra Mentawai 2010 M7.8 event). However, the full potential of using real-time GPS for early warning remains still unemployed in both existing and planned TEWS. Probably, this is partly due to the lack of numerical studies aimed to demonstrate capacities of the new technology. Here we present results of numerical study which shows the theoretical resolution of coastal GPS arrays along the Indonesian Sunda margin. Assuming realistic real-time GPS accuracy, coastal array of closely spaced (ca. 50 km) stations is able to resolve most important tsunamigenic source parameters such as moment magnitude and centroid location for all potentially tsunamigenic earthquakes. Additionally, we show the role, GPS might have played in a warning center, by re-analysing several important historic cases.