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Tsunami early warning using earthquake rupture duration

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Effective tsunami early warning for coastlines near a tsunamigenic earthquake requires notification within 5-15 minutes. We have shown recently that tsunamigenic earthquakes have an apparent rupture duration, T0, greater than about 50 s. Here we show that T0 gives more information on tsunami importance than moment magnitude, Mw, and we introduce a procedure using seismograms recorded near an earthquake to rapidly determine if T0 is likely to exceed T=50 or 100 s. We show that this "duration-exceedance" procedure can be completed within 3-10 min after the earthquake occurs, depending on station density, and that it correctly identifies most recent earthquakes which produced large or devastating tsunamis. This identification forms a complement to initial estimates of the location, depth and magnitude of an earthquake to improve the reliability of tsunami early warning, or, in some cases, make possible such warning.