



Looking at deep earthquakes through their source time function

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There is no generally accepted model to explain the process of deep earthquakes, even 87 years after their discovery by Kiyoo Wadati. The most popular models for the rupture of deep earthquakes include phase transformation faulting, dehydration reaction and thermal runaway. High pressure and temperature at depths of more than 300 km requires that the rupture process of deep earthquakes be different than that of shallow earthquakes. However, source inversion of deep earthquakes does not show substantial non-double-couple component. This infers a process like shear faulting. We investigate the rupture process of 36 large and major deep earthquakes that have occurred since 1990 by using teleseismic body-waveform inversion. We specifically focus on the characters of their source time functions in order to find a common lead to their rupture process. Our analysis supports the thermal runaway model for the rupture of deep earthquakes.