

Back-projection imaging of the 2007 Chuetsu-oki earthquake using strong-motion seismograms observed at a nuclear power plant

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The 2007 Chuetsu-oki, Japan, earthquake occurred near the Kashiwazaki-Kariwa nuclear power plant, which is the largest in the world. The strong motions were recorded by seven seismometers installed at the foundation slab (base mat) of the plant, and exceeded the design level of the ground motion for the plant. The strong-motion observed by the seismographs in and around the plant show high-coherency with two or three significant pulses.

In order to understand the cause of the pulses, the rupture process of the earthquake was estimated using these seismograms. Seismograph network was taken into account as a dense array and semblance-enhanced waveform stacking was performed. By projecting the power of the stacked waveforms on to the fault plane, the rupture propagation generating the two significant pulses was successfully reconstructed.

The overall pattern of the imaged asperities coincides well with the slip distribution determined by conventional waveform inversions.