

# Non-double-couple earthquake in the focal area of the 2000 Western Tottori earthquake by “0.1 manten” hyperdense seismic observation and spatial distribution of non-double-couple components

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Non-double-couple (NDC) earthquakes are defined as a faulting of ordinary double-couple (DC) earthquake on a fault associated with additional rupture at the hypocenter. They have been mainly observed in volcanic zones and interpreted as faulting related to fluid effects in the hypocentral region. Study on NDC earthquakes is important for understanding the faulting process and provides an opportunity to obtain new information on stress and strength of the Earth's crust.

We had installed 1,000 temporary seismic stations in and around the source region of the 2000 Western Tottori Earthquake during the period from April 2017 to April 2018. This observation is called “0.1 manten” hyperdense seismic observation. We determined hypocenters using the data of the seismic network of both the “0.1 manten” and Hi-net by NIED. We manually picked the arrival times and P wave polarities. We found that the observational polarity distribution was slightly different from that expected by a DC source model at certain areas. Especially, we observed positive polarities at the stations where the DC model suggested to be negative polarities on and around the null-axis and nodal planes. In this study, we attempted to estimate the precise moment tensor solution to explain the observed polarity for the NDC event. We adopted the tensile-shear model and searched optimal model by performing a grid search and correlation analysis of S/P wave amplitude ratio.

We revealed that most of the events were modeled as DC earthquake or DC earthquake with an opening crack. In addition, we found the trend that the events with large NDC components were located around the large co-seismic slip zone and the northern part of the aftershock area where we observed a branched fault zone. These results suggest that pressurized fluid or a weak tensile crack might exist along the rupture zone of the Western Tottori earthquake.

Keywords: non-double-couple, the 2000 Western Tottori earthquake, focal mechanism, tensile crack