Stress field in the source region of the 2007 Noto Hanto Earthquake, by a dense temporary seismic network

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A shallow Mw = 6.7 inland earthquake occurred on the west coast of the Noto Peninsula in Japan on March 25, 2007. Therefore, in order to be able to accurately assess the stress field in and around the source region in the study, we employ the distinctive aftershock data observed by a dense network of temporary seismic stations that were deployed by the group responsible for the aftershock observations immediately after the Noto Hanto Earthquake in 2007 (Sakai et al., 2008., Kato et al., 2008). Stress tensors in the source region were inverted directly from the first-motion data without assuming that focal mechanisms were known, applying the first-motion stress inversion method described by Abers and Gephart [2001].

We investigated depth-variations of the stress field. At shallow depths less than 4 km, the azimuth of the maximum principal stress axis is oriented to W20N with a small plunge angle, and the minimum principal axis is nearly horizontal. This stress field is favorable to the strike-slip type event. In contrast, at depths greater than 6 km, although the azimuth of the maximum principal stress axis is oriented to W20N with a small plunge angle, the minimum principal axis becomes nearly vertical. This stress field is favorable to the thrust type event. However, at depths greater than 10 km (deeper than the mainshock hypocenter), the azimuth of the maximum principal stress axis significantly scatters. It is considered that these heterogeneities in the stress field have an important role to generate the mainshock rupture.