A consolidated data set for focal mechanism determination for earthquake in SW Japan: Toward regional principal stress inversion

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To better understand the tectonics in SW Japan, the stress field associated with the crust or plate must be constrained. In order to constrain the stress field in SW Japan, a detailed study of seismicity is required.

Earthquake focal mechanisms can constrain the stress field. The goal of our study is to elucidate the stress field in SW Japan by inversion of earthquake focal mechanisms. All earthquake data sets in Japan were consolidated in 1997, which has improved the station coverage. Earthquake focal mechanisms using combined data sets have been estimated by the Japan Meteorological Agency (JMA) since 1997. But, due to the low seismicity in the SW Japan region, we require a longer observation period for principal stress inversion, especially if we hope to resolve time-dendent changes in the stress field.

Although JMA had estimated focal mechanisms prior to 1997, these data have limited precision due to sparse station coverage. Local networks operated by universities can give much more complete coverage, but only for specific regions. Both JMA bulletin data and a consolidated catalogue for university network data (JUNEC) have recently been made available. We have re-estimated earthquake locations and focal mechanisms using both JMA and JUNEC data sets for 1985-1994. This data set can now be used for principal stress inversion for the SW Japan region. We have used HYPOINVERSE2000 by Klein [2000] and FPFIT by Park [1985] for the hypocenter and focal mechanism determination, respectively. The P-wave velocity structure model in our hypocenter determination algorithm is the identical to that used by JMA.