Three-dimensional plate geometry model from the Nankai to the Ryukyu subduction zone

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Considering the large slip distribution of the 2004 Sumatra earthquake, possible coseismic rupture area of megathrust earthquakes from the Tokai to Ryukyu cannot be denied. Characteristics of occurrence of great earthquakes is also different between these neighboring subduction zones. Historically, megathrust earthquakes have been generated repeatedly along the Nankai Trough at intervals of approximately 100-200yrs (e.g. Ando, 1975).Along the Ryukyu Trench, although great earthquakes have occurred only twice over the last 300 years: the 1771 Yaeyama earthquakes and the 1911 earthquake off Kikai, recent studies of tsunami deposits indicated that the Ryukyu Islands have been periodically hit by large tsunamis with an interval of several hundred years [e.g. Ando et al., 2017]. Moreover, the coupling condition of the plate interface along the Ryukyu Trench is different from that of the Nankai Trough based on the seismic survey and observations [Arai et al. 2016]. They reported that the Ryukyu Trench is dominated by slow earthquakes at any depths and lacks a typical locked zone such as the Nankai Trough.
To understand relation between the structure around the subducting Philippine Sea plate and seismicity including slow earthquake phenomena, it is necessary to know the geometry and property of the plate boundary from the Nankai to the Ryukyu subduction zone. Three-dimensional plate geometry model will be also important for a precise estimate of the maximum range of the coseismic rupture zone of the Nankai megathrust earthquake. The model is also very useful to construct a new three-dimensional seismic velocity model of the Nankai Trough for depth conversion of interpreted active faults in time section of seismic reflection data [Katsuyama et al., 2019 JPGU].
Based on the result (three-dimensional plate geometry model of the Nankai Trough) from marine active and passive source seismic data [Nakanishi et al., 2018], three-dimensional plate geometry model from Nankai to Ryukyu subduction zone is tried to be constructed using the result of seismic studies around the Ryukyu Trench [Iwasaki et al, 1990; Kodaira et al., 1996; Arai et al., 2016, 2017; Nishizawa et al, 2017; Yamamoto et al., 2018].The model of Nakanishi et al. [2018] is also updated by using the result of deep seismic tomography off the Kii peninsula [Yamamoto et al., 2014, 2017].
In this presentation, a preliminary version of the combined three-dimensional model will be shown.
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