Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

SCG57-03 Room:A06 Time:May 27 14:45-15:00

Seismic structure in the southern Ryukyu Trench subduction zone

YAMAMOTO, Yojiro[1*] ; TAKAHASHI, Tsutomu[1] ; KAIHO, Yuka[1] ; ISHIHARA, Yasushi[1] ; ARAI, Ryuta[1] ; NAKANISHI, Ayako[1] ; OBANA, Koichiro[1] ; MIURA, Seiichi[1] ; KODAIRA, Shuichi[1] ; KANEDA, Yoshiyuki[2]

[1]JAMSTEC, [2]Nagoya University

In the Ryukyu Trench subduction zone, many large earthquakes occurred historically. Recent seismic and geodetic studies indicate that the occurrence of very low frequency earthquake [Ando et al., 2012] and slow slip events [Heki and Kataoka, 2008; Nishimura, 2014] in the southern Ryukyu subduction zone. In addition, the result of offshore geodetic observation showed interplate coupling occurs near the trench [Nakamura et al., 2010], where plausible seismogenic zone of the 1771 Yaeyama earthquake (Mw 8.0) is located [Nakamura, 2009]. These results suggest that the interplate coupling is not so weak and it is possible for the large interplate earthquake to occur in this region. However, not only the fault plane geometry of past large earthquakes but also the local seismic structure is uncertain due to the sparse seismic observation network. To investigate the hypocenter distribution and the subducted plate geometry, we have conducted the passive seismic observation using 6 land stations and 30 ocean bottom seismographs (OBSs) from Nov. 2013 to Mar. 2014, as a part of “Research project for compound disaster mitigation on the great earthquakes and tsunamis around the Nankai trough region” .

We performed a seismic tomography to estimate the hypocenter location and plate geometry by using a part of obtained data, although the data picking is still in progress. The initial P-wave model was established by referring the result of active source survey [Arai et al., 2014], and the initial S-wave model was calculated by assuming a Vp/Vs value of 1.73. As the initial S-wave velocity model did not include the low-velocity sediment layer just beneath the OBSs, we calculated a station correction value for the S-wave arrival data by using the differential times of arrivals between PS converted waves and direct P-waves.

Preliminary result shows northwestern dipping hypocenter distribution and low velocity layer in the forearc region. We interpreted this layer as the subducted oceanic crust. In that case, most of earthquakes located within the oceanic crust and the uppermost oceanic mantle, and the dip angle of plate boundary gradually increased from 10 degrees near the trench axis to 30 degrees beneath the island arc. We will add more data and estimate more detail relationship between earthquake location and plate geometry.

Keywords: The Ryukyu Trench, Ocean bottom seismograph, Seismicity, Plate geometry