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Improving the seismic imaging in the southern Ryukyu subduction system by using multiple attenuation methods

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The southern Ryukyu subduction system is at the boundary where the Philippine sea plate subducts northwestward beneath the Eurasian plate near the Taiwan orogen. In previous studies, the boundary where the PSP subducts northward beneath the EP have no clear answers due to a lack of high-resolution crustal-scale geophysical constraints. We want to know the Moho boundary. We analyze in this study the dynamics of SRA system with TAIGER program of 2009, multi-channel marine seismic reflection (MGL0906_23, MGL0906_28, MGL0906_26A, MGL0906_13, MGL0906_18N). Data area covers about 30,000 km^2. Shots are spaced every 50 m, hydrophones are spaced every 12.5 m, and CDP spacing is 6.25 m. Recording length is 15 s. Signal of the source is low frequencies (20Hz$\sim$60Hz), which can penetrate the shallow sediments and reflex signal of the deep crust. Because multiple can affect the deep structure signals. Therefore, we use a variety of methods to remove multiple effects, and increase Moho signals. In this study, we use four ways to remove the multiple. (1) Increases CDP spacing. (2)Deconvolution. (3) Surface Related Multiple Elimination (SRME). (4)Radon Transform multiple attenuation. From the TAIGER marine reflection data. The shallow structure are Huatung Basin, Yeyama Accretionary Prism, Forearc Basin and Ryukyu Arc (from south to north), respectively. We discover a lot of transform fault zone, and account these stress related with shear zone of Ryukyu subduction system. The deep structure, the crust of PSP velocity is about 5$\sim$7 km/s, the PSP Moho velocity is 7.5 km/s. In multichannel reflection seismic, the PSP Moho deep is about 15$\sim$20 km under the seabed.

Keywords: multiple; Moho boundary; subduction zone; southern Ryukyu Arc (SRA)