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Focal depth distribution using depth phase in the south Ryukyu trench

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Determination of accurate hypocenter distribution is important for the investigation of stress field and geometry of the plate near the locked zone of Ryukyu trench. Recently, the locked zone, very low frequency earthquake and slow slip events have been detected along the Ryukyu trench region. However errors of the hypocenters are large because seismic stations are far from the Ryukyu trench. Then we determined the focal depths of earthquakes along the Ryukyu trench. using depth phase

Total 15 JMA's seismological stations are employed in this study. We used the events which occurred near 24.3N,125.3E between January 2005 and December 2006, where magnitudes are over 3.5. Most of them were the thrust type event from the CMT catalogue by NIED's F-net. In their wave pattern, large amplitude phase is confirmed between P phase and S phase. The phase is dominant with vertical component, These suggest that the phases are the converted sP phase from S phase at seafloor. Then we determined the focal depth using the phase.

The time difference between sP phase and P phase are distributed from 8 to 14 seconds at the epicentral distance of 100 km. The estimated depths using the sP-P difference time range from 20 to 40 km. In consequence, it is clear that earthquake is occur 20 to 40 km in south Ryukyu trench. This result compare with JMA's depth distribution of 16 to 40 km, Its range is more smaller than JMA's. Most of hypocenter is about 20 km, as a result. Philippine plate depth is estimated 20 km.

Keywords: hypocenter determination, Ryukyu trench, Philippine sea plate, depth phase