

### **Observation of Ocean Bottom Crustal Deformation in Ryukyu trench**

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Ryukyu trench is a major convergent plate boundary where the Philippine Sea plate is subducting at a rate of about 8 cm/yr. No large earthquake (inter-plate earthquake) has been reported along the Ryukyu subduction zone for the last 300 years. However, the presence of the coupling in the Ryukyu trench has been unclear. Detection of deformation by coupling using land-based GPS network (about 100 km far from the trench) would be difficult if the coupling area is distributed near the trench.

To mitigate earthquake and tsunami disaster the clarification of the subduction process along the Ryukyu trench is important to understand for the Ryukyu Islands. We have started observation of sea floor crustal deformation to investigate the inter-plate seismic coupling in the central Ryukyu trench.

We had set the seafloor reference point at about 35 km landward from the axis of the Ryukyu trench by R/V Tonan-Maru (Okinawa Prefectural Fisheries and Ocean Research Center). A set of three acoustic transponders has been installed on the seafloor, at a depth of about 2900m. The transponders are placed to form a triangular (side length of 2 km). We carried out three campaign observations for the period from January to July 2008. Each epoch consists of three observation days. The RMS of travel time residuals for each campaign analysis is about 70 micro-seconds.

Difference of positions between January-February and July epochs indicates an easterly movement of about 19 cm. This is inconsistent with the movement estimated from plate coupling (about 2.5 cm northwestward for a half-year) or decoupling (0cm for a half-year) models.

Earthquake swarm had started from 31 May 2008 (maximum  $M_w=4.7$ ) near the trench about 20km trench-ward from the reference point. These events were normal faulting type and occurred in the subducted Philippine Sea plate. The observed easterly movement may indicate a slow-slip (slip of about 2m) event in the Philippine Sea plate.