

Multi-channel seismic reflection experiments in the Western Pacific in 2006

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We execute wide-angle seismic and multi-channel seismic reflection experiments in 2006 at the Western Pacific; Kyusyu-Palau Ridge, Daito Ridge group, Shikoku Basin and the periphery of Minami Tori Shima. In this report, we introduce the data acquired by multi-channel seismic reflection experiments.

Multi-channel seismic reflection experiments were conducted at 9 survey lines. Total length of the survey lines is more than 5,400 km. The seismic survey was carried out by S/V 'Tairikudana'. We used 8,040 cubic inch tuned air-gun array and shot every 50 m (about 25 sec) for reflection experiments. A 480 ch multi-channel streamer (total length is 6,000 m) was used as the reflection seismic receivers. The sampling rate is 2 msec and the record length is 12-15 sec.

The acquired data was processed through re-sampling, band-pass filtering, delay correction, gain control, deconvolution, demultiple, CMP stack and time migration etc.

1. Kyusyu-Palau Ridge

There were three survey lines in the area of the Kyusyu-Palau Ridge. One is the line along the Kyusyu-Palau Ridge, one is on the landward trench slope parallel to the Ryukyu Trench axis and the last one is the line that is crossing the Kyusyu-Palau Ridge where a thicker crust is expected. Except for the line of the landward trench slope, we can confirm a top transparent sediment layer which has 0.5-1.0 sec (two-way travel time) thickness. In addition to, we can trace the clear reflection which is likely Moho reflections in the west part of the line crossing Kyusyu-Palau Ridge.

2. Daito Ridge group

Two lines are set in Daito Ridges region. The one is crossing over the Ryukyu Trench, Amami Plateau, Daito Ridge and Oki-Daito Ridge. This line is 1,180 km in length. At the southern slope of the Amami Plateau, Daito Ridge and Oki-Daito Ridge, there is sediment layer which has 0.3-0.5 sec thickness only in concavities. In contrast, the sediment layer with thickness of 0.3-0.5 sec is observed extensively in the northern slope of the Amami plateau. The thickness of the sediment layers in the North and South Daito Basin are more than 1.0 sec. On the other hand, the sediment thickness in the West Philippine Basin is less than 0.2 sec. Another line crosses the Daito Ridge and the Oki-Daito Ridge in the direction of NE-SW. In the southwest part of this line, the seafloor topography shows large undulations and there is the sediment layer which has 0.2-0.4 sec thickness only in concavities. In the Northeast part, there is a thin sediment layer with thickness of 0.5-1.0 sec.

3. Shikoku Basin

Two lines are set to traverse the Shikoku Basin. Both lines pass over the Kyusyu-Palau Ridge in the west part of survey line and Shikoku Basin in the east part of survey line. In the line which is located more northward, the top sediment layer exists continuously. However in the line which locates southward, there is little sediment layer except for the concavities. This sediment layer of the concavities has 0.2-0.4 sec thickness.

4. Minami Tori Shima

There two survey lines are positioned around Minami Tori Shima. One is 900 km in length and it is crossing over Marcus-Wake Seamount Chain. The clear reflections are observed in both lines. These clear signals seem to be Moho reflections. Another line is 595 km in length and passes over four seamounts, including Kanrin, Takuyo Daiyon and Takuyo Daigo Seamount.