I–2. BATHYMETRIC SURVEY

By Kouji Onodera and Eiichi Honza

The Ryukyu Island arc system is divided into several bathymetric provinces, which trend in a NE to SW direction and are convex toward the SE. The regions are the Tunghai Shelf, Okinawa (Ryukyu) Trough, Ryukyu Ridge (Islands), Ryukyu (Nansei-Shoto) Trench and Philippine Basin from west to east respectively.

Tunghai Shelf

The continental shelf neighboring the Asian continent has lies at a depth of less than 100 meters. The typically smooth floor of the shelf is deformed at the shelf margin where high areas and depressions are present (Fig. I–2–1).

Okinawa (Ryukyu) Trough

The maximum depth of the trough increases gradually toward the SW. The trough is approximately 700 meters deep in its northern part off Kyushu and is approximately 2,200 meters at the SW margin off Ishigaki Island (Fig. I–2–2). However, an abrupt change of depth occurs west of Amami Island where the generally smooth bottom is interrupts by several hills. Many seamounts and hills are present in the trough. One of the largest seamounts in the southern part of the trough is north of Miyako Island. This seamount has a height of approximately 1,200 meters from the bottom of 2,100 to 2,200 meters depth and is designated as the "Onodera Seamount" (Fig. 1–2–3). The summit of the seamount is 815 meters in uncorrected depth.

The bottom topography of the trough becomes rough and shallower at the southern margin (rf. Line 2), and is relatively smooth in the central area. The center of the trough is marked by a channel which runs parallel to the extension of the trough (rf. Lines 3, 6 and 8).

Rough topography interrupted by ridges extends along the shelf margin and slope at the flank of the Tunghai Shelf.

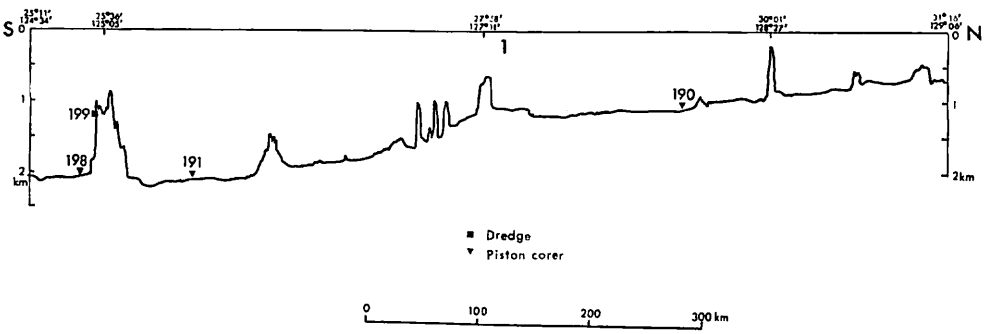

Fig. I–2–1 A topographical profile along the extended direction of the Okinawa Trough.

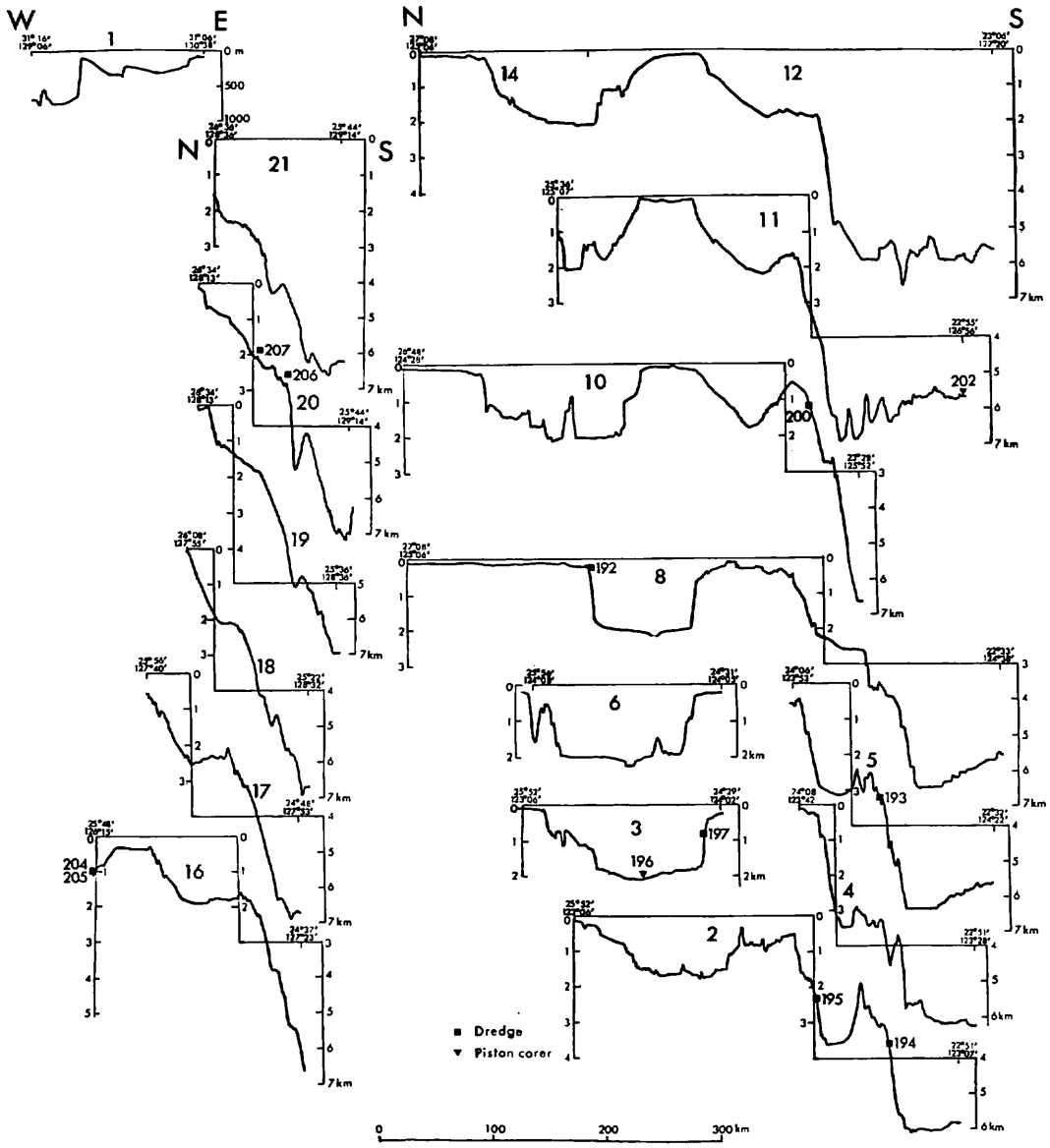

Fig. I-2-2 Topographical profiles.

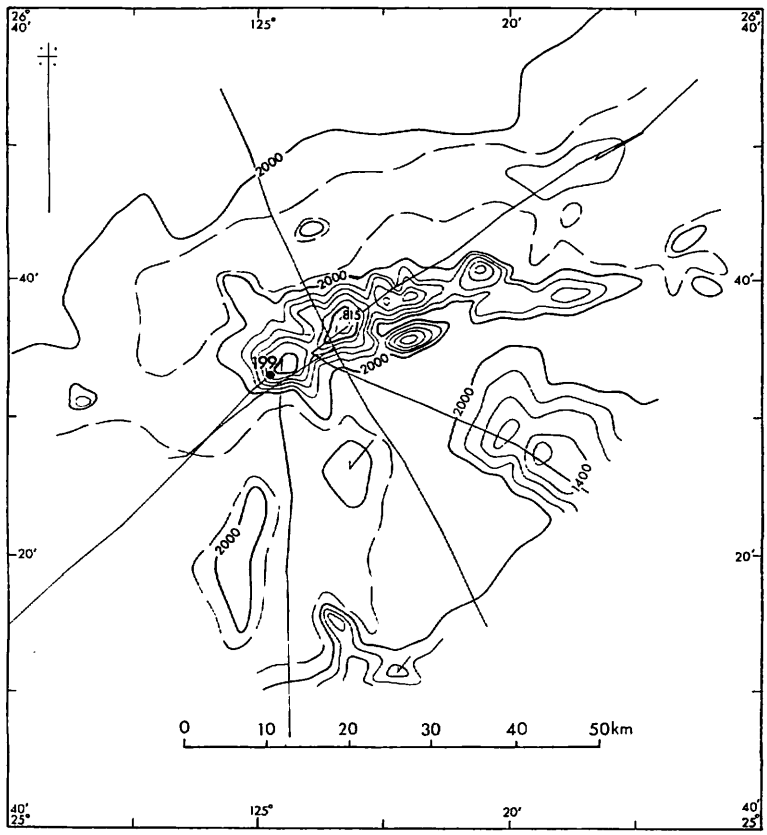

Fig. I–2–3 Bathymetry of the Onodera Seamount. Contours are plotted from the three crosses in this survey and from the Japanese Hydrographic Office Chart No. G 1305. Contour intervals 200 m.

Ryukyu Ridge

The Ryukyu Ridge has an apparent SE tilted structure accompanied by a fault scarp along the western margin. These features are marked by the steep slope along the western flank and the gentle slope along the eastern flank. There are a few ridges along the western flank. The continental slope and inner trench slope along the eastern flank of the ridge is narrower in comparison with that of the Japan Trench. The trench slope is often broken by highs.

Ryukyu Trench and Philippine Basin

The northern surveyed area of the Ryukyu Trench is characterized by a steep scarp, suggesting subduction beneath the ridge, such as beneath the Oki-Daito Ridge to the east of the Ryukyu Trench.

The trench has a flat bottom of approximately 10 km width in the central surveyed area. Not only the flat bottom, but also the depressed feature of the trench disapeares along the SW margin of the trench.