I–5. CONTINUOUS SEISMIC REFLECTION PROFILING SURVEY

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A continuous seismic reflection profiling (air-gun) survey was carried out with neumatic sound source over almost the whole of the surveyed area.

A Bolt 1900 B type air-gun was used for the sound source with chambers of 80 and 120 cubic inches and a high pressure of 1300 to 1600 psi (approximately 90–110 kg/cm^2). The hydrophone streamer cable was towed behind the ship. The Teledyne Exploration Co. Model 24257 was used for detecting reflected waves, which has 50 plus 50 detecting elements of Recon HP–1 or GSC MP–7 crystal hydrophones. The hydrophone amplifier system Model 24220 of Teledyne Co. was used as a receiving system. Reflected information was ultimately fed into the Raytheon Model 196 B and 196 C universal graphic recorders. The ship speed was controlled to keep at approximately twelve knots.

Tunghai Shelf

Thick Neogene and Pleistocene sedimentary layers are suggested on the Tunghai Shelf (NIINO and EMERY, 1961; WAGEMAN *et al.*, 1970). The surveyed tracks run only in the marginal area of the shelf. The Taiwan-Sinzi folded zone runs along the marginal area of the shelf where uplift of the acoustic basement is observed.

Okinawa Trough

Thick sedimentary layers of Neogene and Pleistocene age are deposited in the Okinawa Trough. The thickness of the layers is not certain, although they are more than three seconds in reflection time (approximately 3,000 meters) in the reflection profiles (Fig. I–5–1). The thickness is a little thinner in the southern marginal area of the trough.

Many hills and seamounts interrupt the bottom of the trough, as suggesting volcanic disturbance. The layers have a reflection pattern of turbidites which are deformed by folding, faulting and igneous activity. Such structural deformations may have caused the rough topography of the trough. Nevertheless turbidites are also present. A channel runs along the central part of the trough, and may be the surface expression of subaerial erosion along the depressional axis (Fig. I–5–2).

Ryukyu Ridge

Tilting toward the SE is suggested by the reflection profiles across the Ryukyu Ridge. A fault scarp develop at the NW margin of the tilted block. A steep slope is developed at the inner trench and the gentle slope along the outer trench.

Relatively thin sedimentary layers of Neogene and Pleistocene age, in comparison with those in the Okinawa Trough, are suggested on the frontal slope of the ridge. However, in some parts, the sediments are approximately 1,000 meters thick in the trough which is located mid-way along the slope.

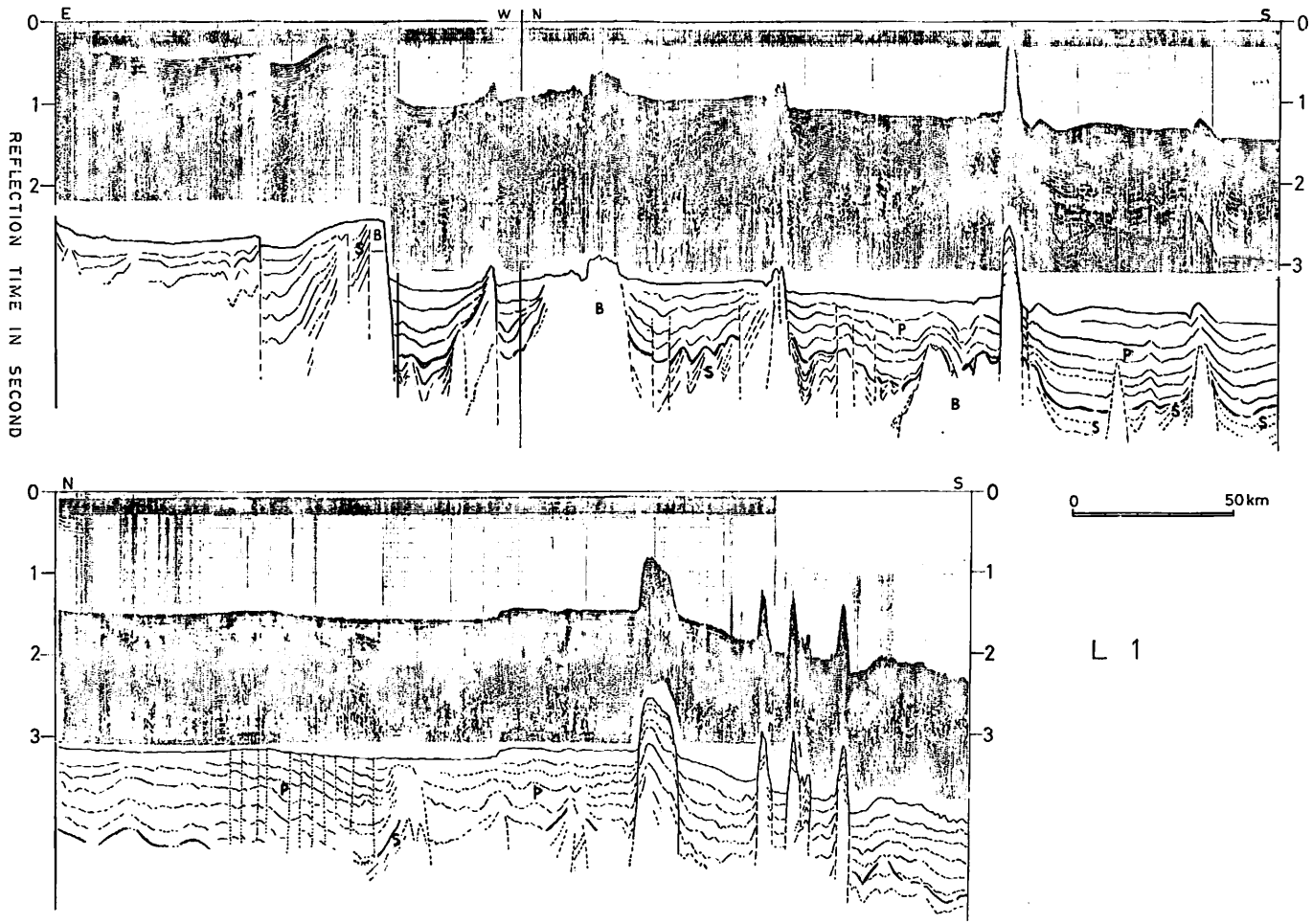

Fig. 1–5–1 A continuous seismic reflection profiling record (Line 1).

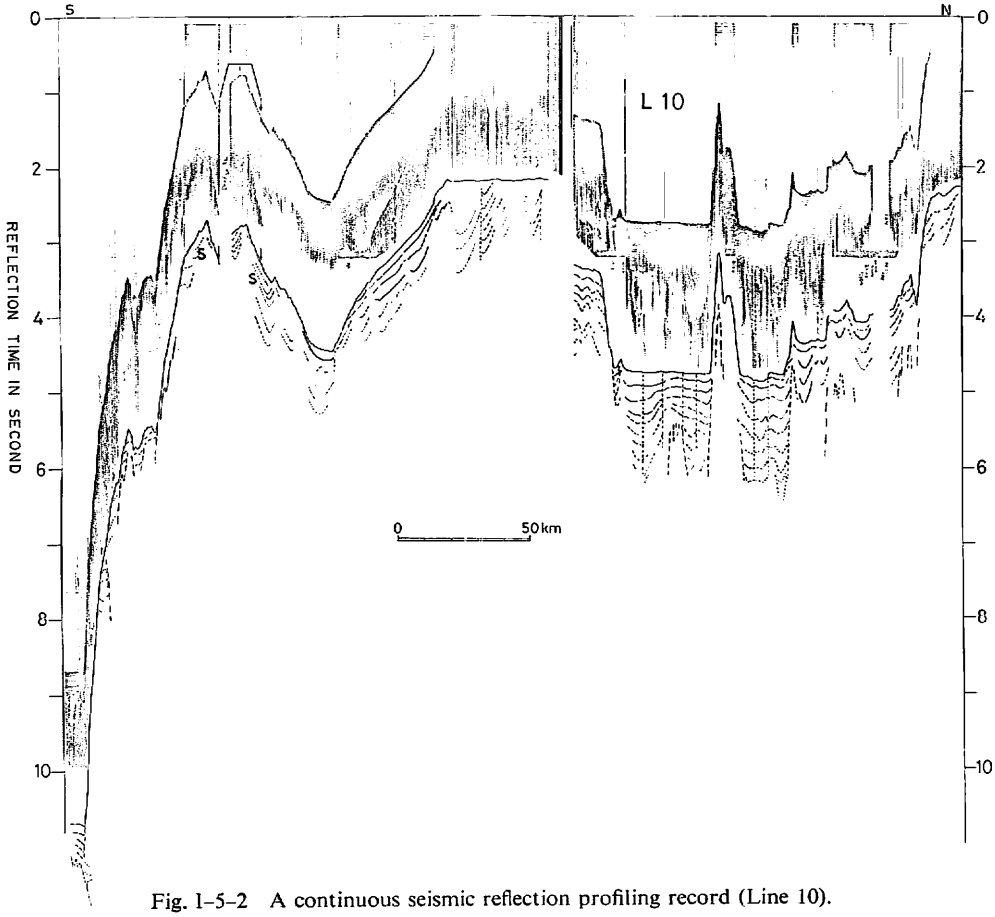

Fig. 1–5–2 A continuous seismic reflection profiling record (Line 10).

Ryukyu Trench and Northern Philippine Basin

The trench bottom is approximately 10 kilometers wide and is filled by layered sediments in the southern part. It is deformed by ridges and a V-shaped trough with steep walls in the northern part SE off Okinawa Island. Such deformation may have resulted from the subduction of the Northern Philippine Basin beneath the Ryukyu Ridge where the Daito and Oki-Daito Ridges border the trench.

No layered sediments are detected on the inner trench slope, except for a few thin deposits with a layered pattern in the depressions.

Thin sediments are also suggested in the Northern Philippine Basin where the acoustic basement is commonly exposed on the bottom. This may have caused the rough bottom topography of the basin.

References Cited

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