II. BATHYMETRIC SURVEY

By Kouji Onodera and Eiichi Honza

The surveyed area is divided into several provinces from the topographical view point. They are the northern margin of the Izu-Ogasawara Trench, Japan Trench and southern part of the Kurile Trench, which are developed along the Pacific coasts of the Honshu, Hokkaido and southern Kurile Islands.

Northern Margin of the Izu-Ogasawara Trench

The actual slope angle change between the continental slope and the inner trench slope cannot be observed in Profile L1. The bottom topography of the continental slope and inner trench slope is rough and accompanies by canyons on the shelf and on the upper continental slope. Rough bottom topography may suggest a limited supply of terrigenous sediments or active faulting which precludes the formation of a smooth bottom topography. The bottom is more than 8,000 m deep at the trench bottom which is deeper in comparison with that of the Japan Trench.

The Japan Trench

The major trend of the Japan Trench axis is approximately parallel to the coast line of the Tohoku area, although, in detail it is a little oblique to the coast line increasing its distance from the coast of the north. Relatively flat plains are sometimes observed at depths of 1,000–2,000 m and of 4,000–5,000 m. However, they are not developed along the full length of the trench. Depths at the trench slope breaks are in the range of 1,500 to 3,500 m. The trench slope breaks are topographically represented by doming, which may be a structurally uplifted zone (HONZA, 1976). The trench bottom has a V-shaped profile which suggests active tectonic movement preventing the damming up of terrigenous sediments in the trench bottom by underthrusting of the Pacific plate beneath the Tohoku Arc.

Horst and graben structures which develop on the outer trench slope do not continue to the neighbouring surveyed lines which are separated every 15 miles, without a few possibility of continuations. A few faults can be extended within 10 miles in a N–S direction in areas where detailed surveys were carried out within a 5 mile interval. However, a few faults may extend for more than 10 miles as indicated by topographic expression (Figs. II-2 and II-3). Ridges on the inner trench slope may continue several tens of miles, possibly have resulted from the different structural developments of the trench slopes.

The Kurile Trench

A little different character is suggested by the continental slope and inner trench slope as compared with that in the Japan Trench. The trench slope breaks in the Kurile Trench are not clearly observed as a result of the uncertainty of the boundaries of continental slope and inner trench slope (Figs. II-5 and 6). A rather steep slope is developed on the upper most part of the continental slope where the slopes are steeper or

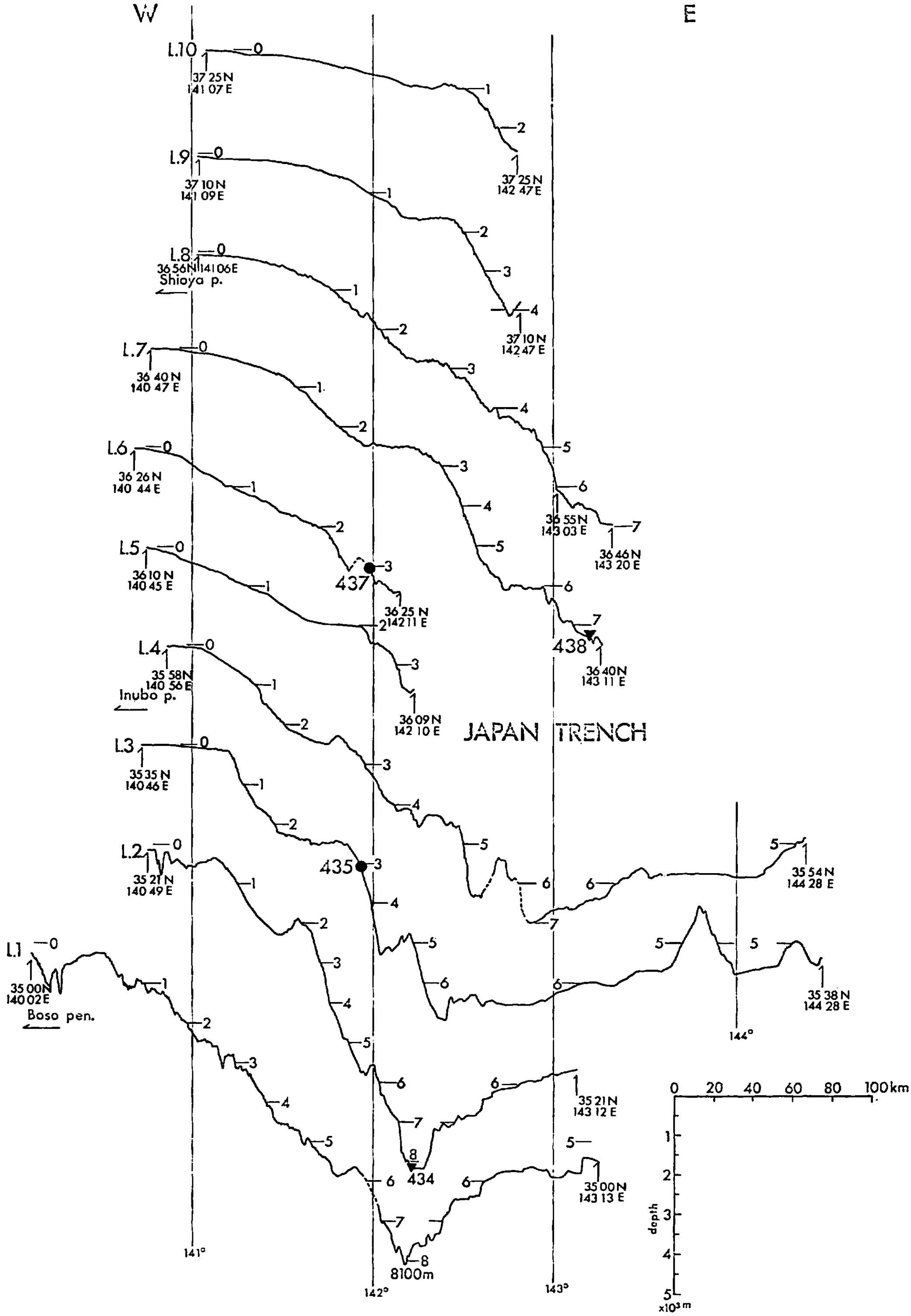

Fig. II-1 Topographical profiles in the northern margin of the Izu-Ogasawara Trench and in the southern Japan Trench (Line 1–10).

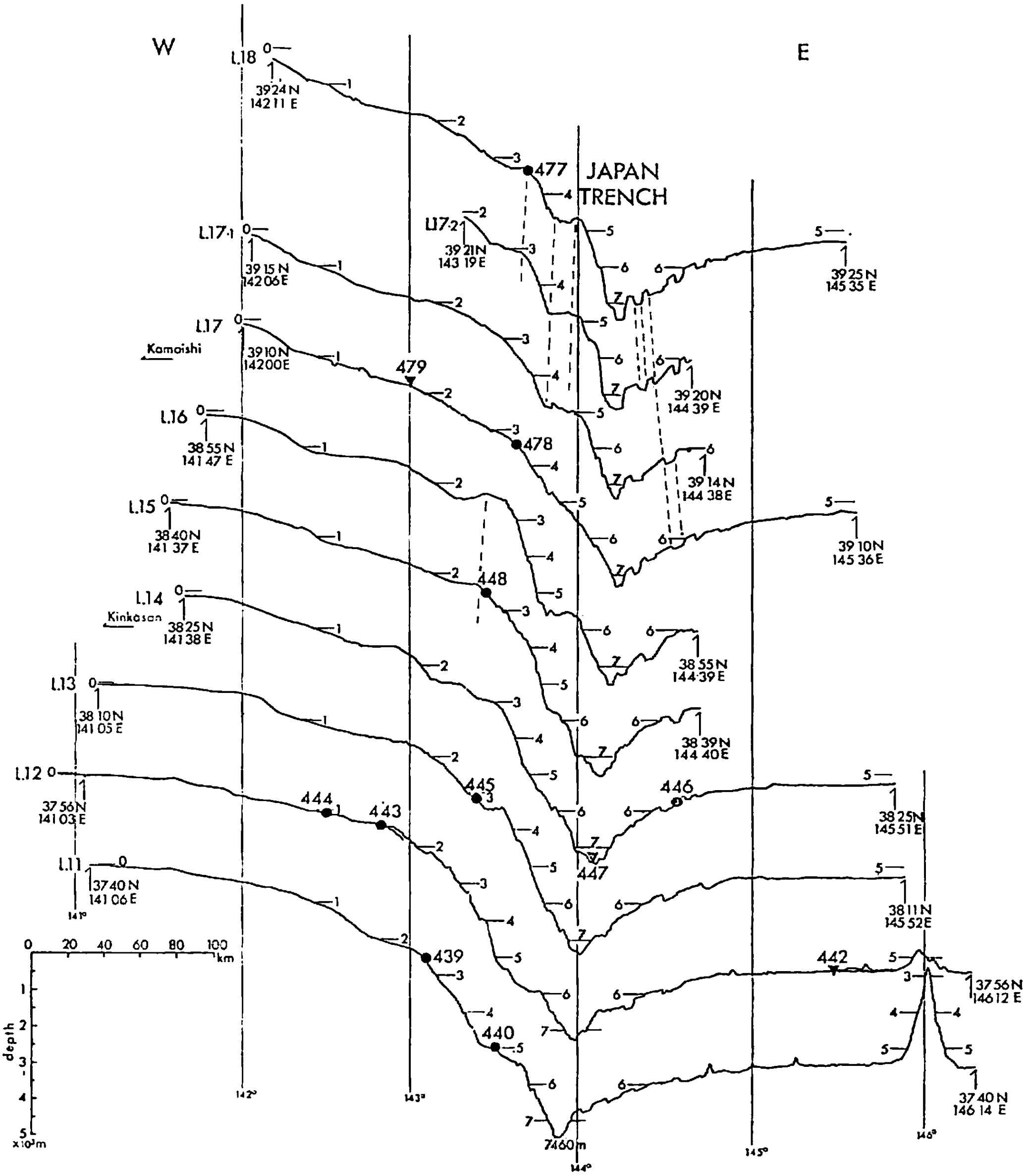

Fig. II-2 Topographical profiles of the Japan Trench (Line 11–18).

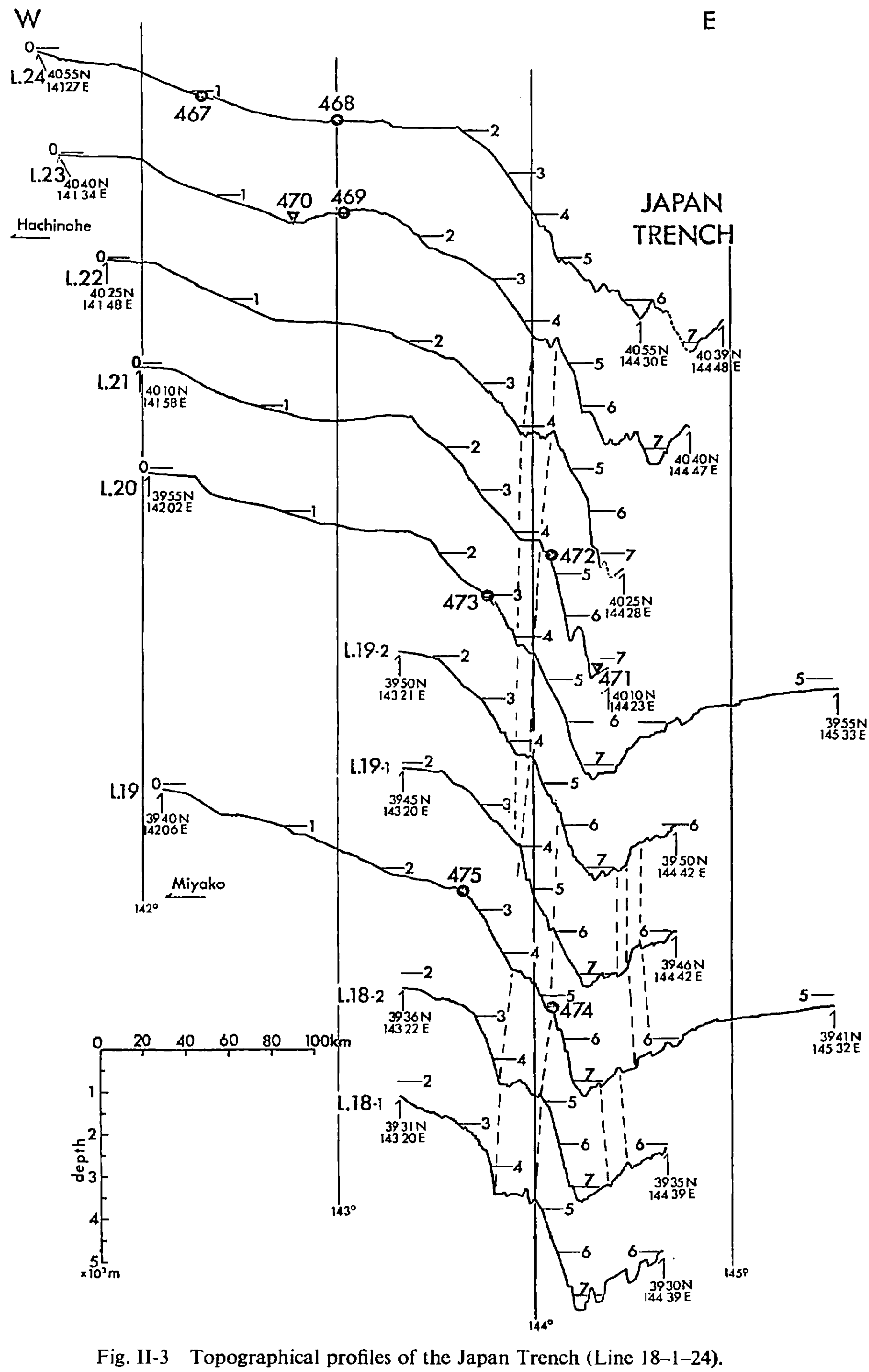

Fig. II-3 Topographical profiles of the Japan Trench (Line 18–1–24).

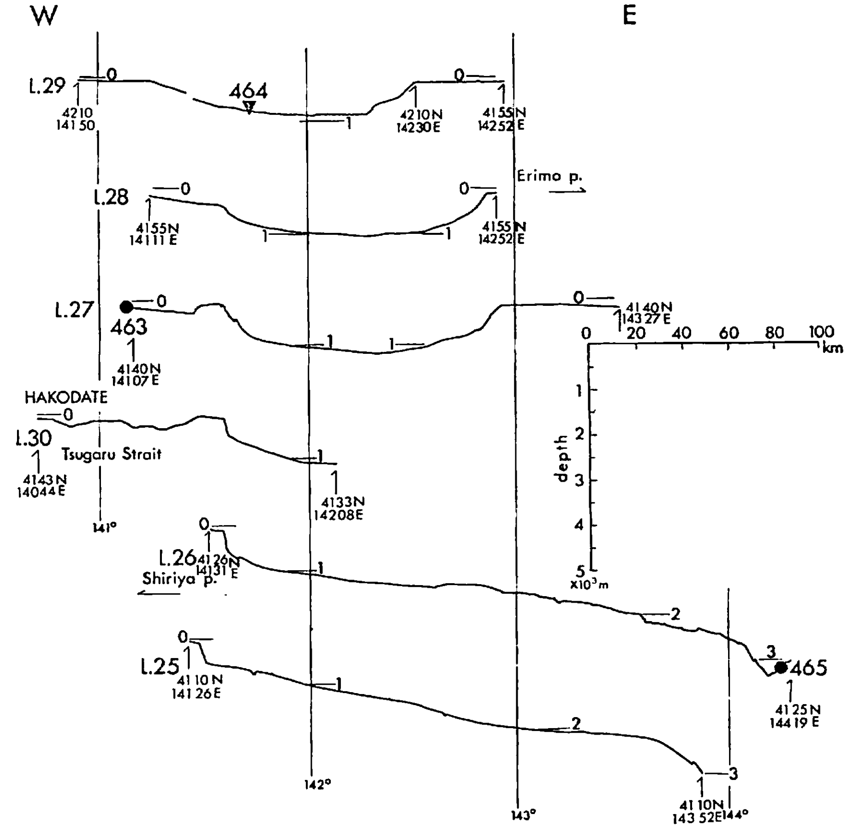

Fig. II-4 Topographical profiles of the Hidaka basin (Line 25–29).

equal in comparison with that of the inner trench slopes. The trench bottom has a V-shaped profile, except in the L. 35 profile. Horst and graben structures are less clearly observed on the outer trench slope.

These facts suggest a slow rate of supply of terrigenous sediments to the frontal slope and into the trench, coupled with active movement during the evolution of the trench.

It is suggested that the supply of terrigenous sedimetns in the frontal slope and trench bottom of the Kurile Trench is less than in the Japan Trench. However, terrigenous sediments more recent than Neogene time have approximately less than 2 seconds of reflection time on the continental slope of the Japan Trench (HONZA, 1976). No topographical similarity as that in the Japan Trench can be suggested when sediments of 2 second thickness are deposited in the Kurile frontal slope. Neverthless, the deformation of the overlying sediments is less clearly distinguished during the evolution of the trench.

The widths of arc-trench gaps with transverse limits defined by the volcanic front of the arc on the inner side and by trench slope break may be enlarged progressively by the uplifted zone due to accretion of the inner trench slope (DICKINSON, 1973; KARIG, *et al.*, 1975). The arc-trench gap of the Kurile Arc is narrower than that of the Tohoku Arc. The absence of a gentle continental slope and the narrow width of the arc-trench gap suggests the younger age of the Kurile Trench in comparison with that of the Japan Trench.

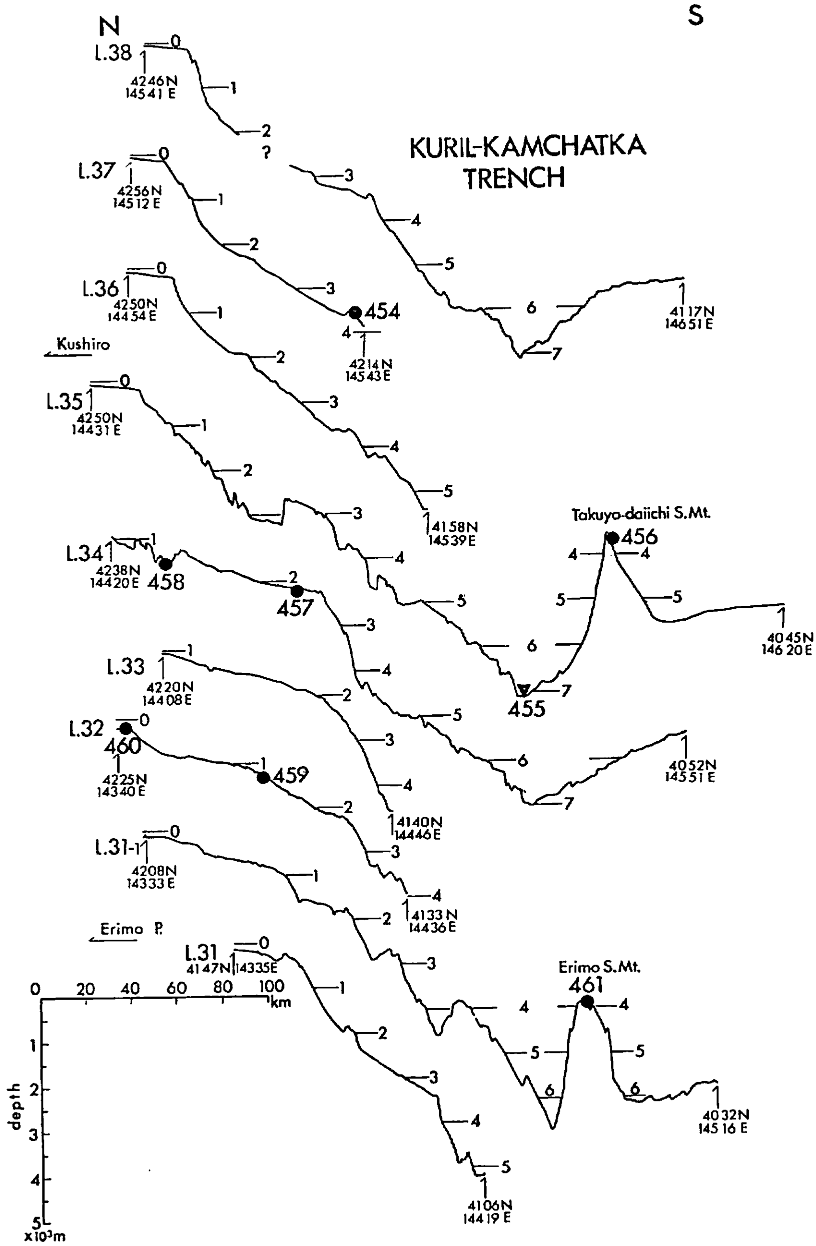

Fig. II-5 Topographical profiles of the Kurile Trench (Line 31–38).

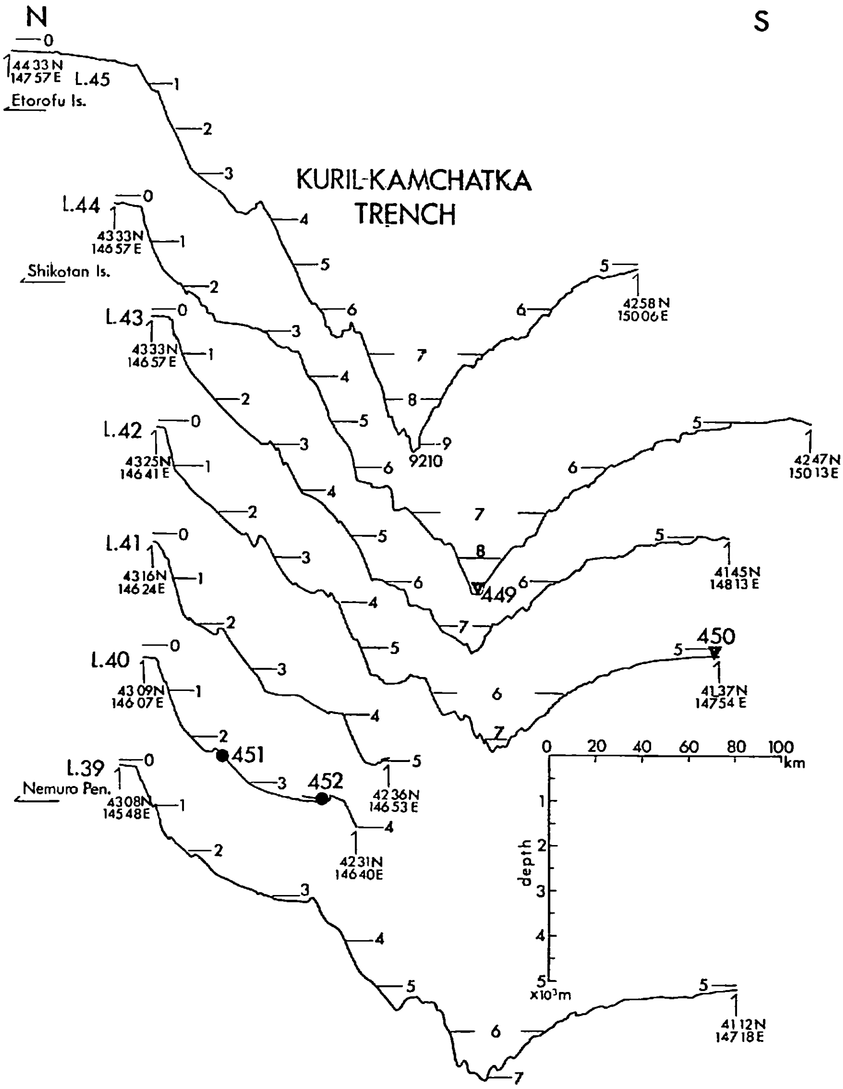

Fig. II-6 Topographical profiles of the Kurile Trench (Line 39–45).

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