

IX. SEISMIC REFRACTION RECORDS IN THE NORTHEASTERN MARGIN OF THE CENTRAL PACIFIC BASIN

Kensaku Tamaki and Manabu Tanahashi

Three sono-buoy refraction measurements (SB8, 9, and 10) were carried out with an air gun sound source in the northeastern Central Pacific Basin (Fig. IX-1). The refracted wave was received and transmitted with a OKI OC-01 type sono-buoy and received by a JRC NRE-8A type receiving system. The condition of the survey was listed in Table IX-1, and the obtained records are shown in Figs. IX-2, -3, and -4. Calculated results based on horizontally layered model without correction for dip are shown in Table IX-2. Only one-way measurements were carried out at three sites.

The structure on the profile is nearly uniform and horizontal at SB8. At SB9 and 10, a few knolls confused the refraction arrivals. We could identify the oceanic layers 2B, 2C, and 3 at SB8, and the oceanic layers 2B and 2C at SB9. The each layer has normal velocity and thickness as the oceanic layer in the Western Pacific. Reasonable structural solution was not obtained at SB10 because of confused arrivals of the refracted wave. The structures at these sites lack the oceanic layer 2A of velocity less than 4.0 km/sec.

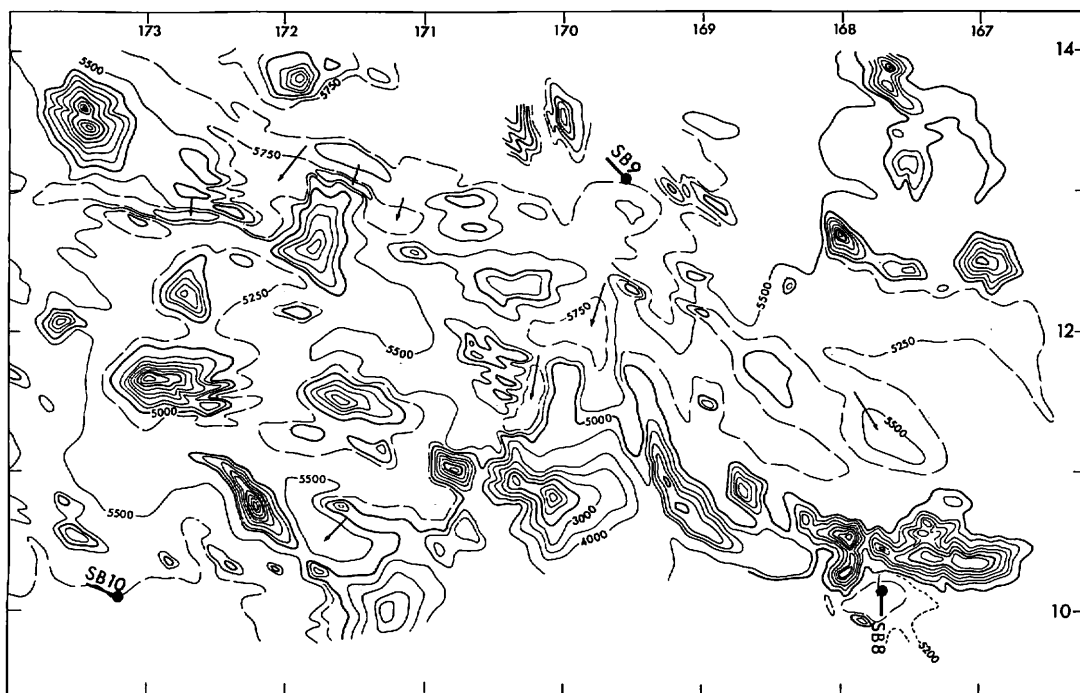


Fig. IX-1 Locality of refraction survey. Solid circle indicates location of sono-buoy. Solid line indicates shot line.

Table IX-1 Conditions of refraction survey.

Air gun	Bolt 1900C × 2
Firing chamber	150 in ³ × 2
Pressure	1800 psi
Ship speed	6 knots
Shot interval	15-20 sec
Filter	10-50 Hz

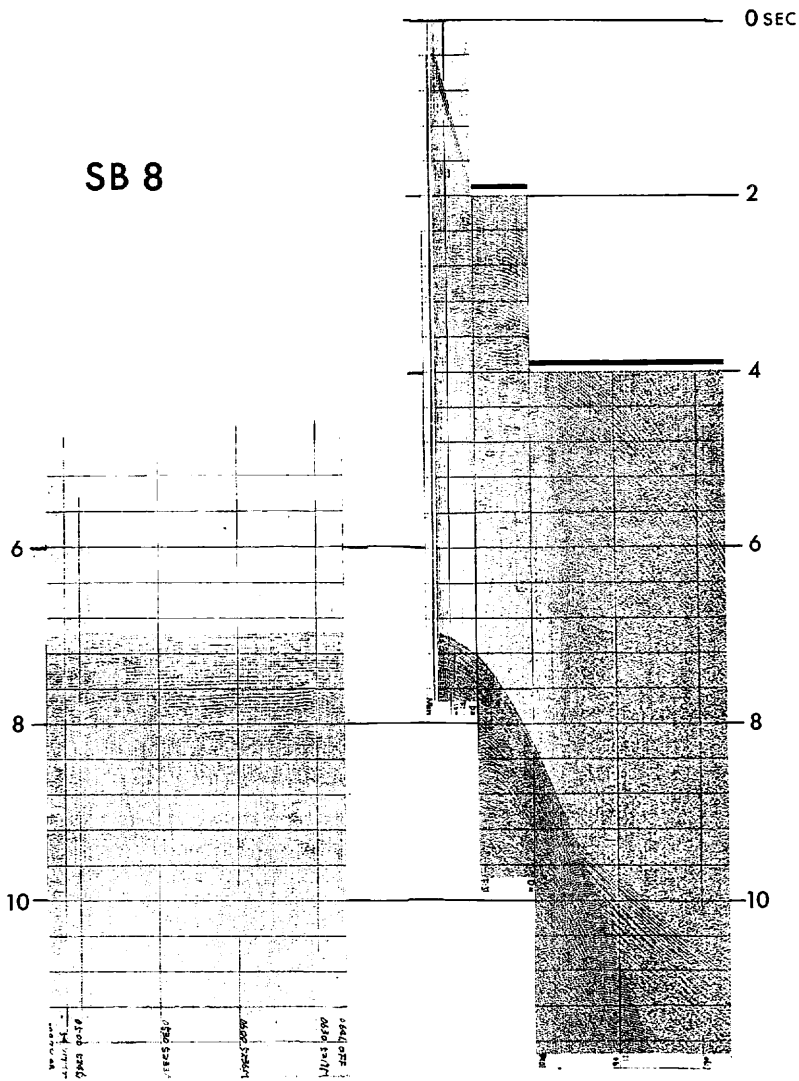


Fig. IX-2 Reflection and refraction record of SB8.

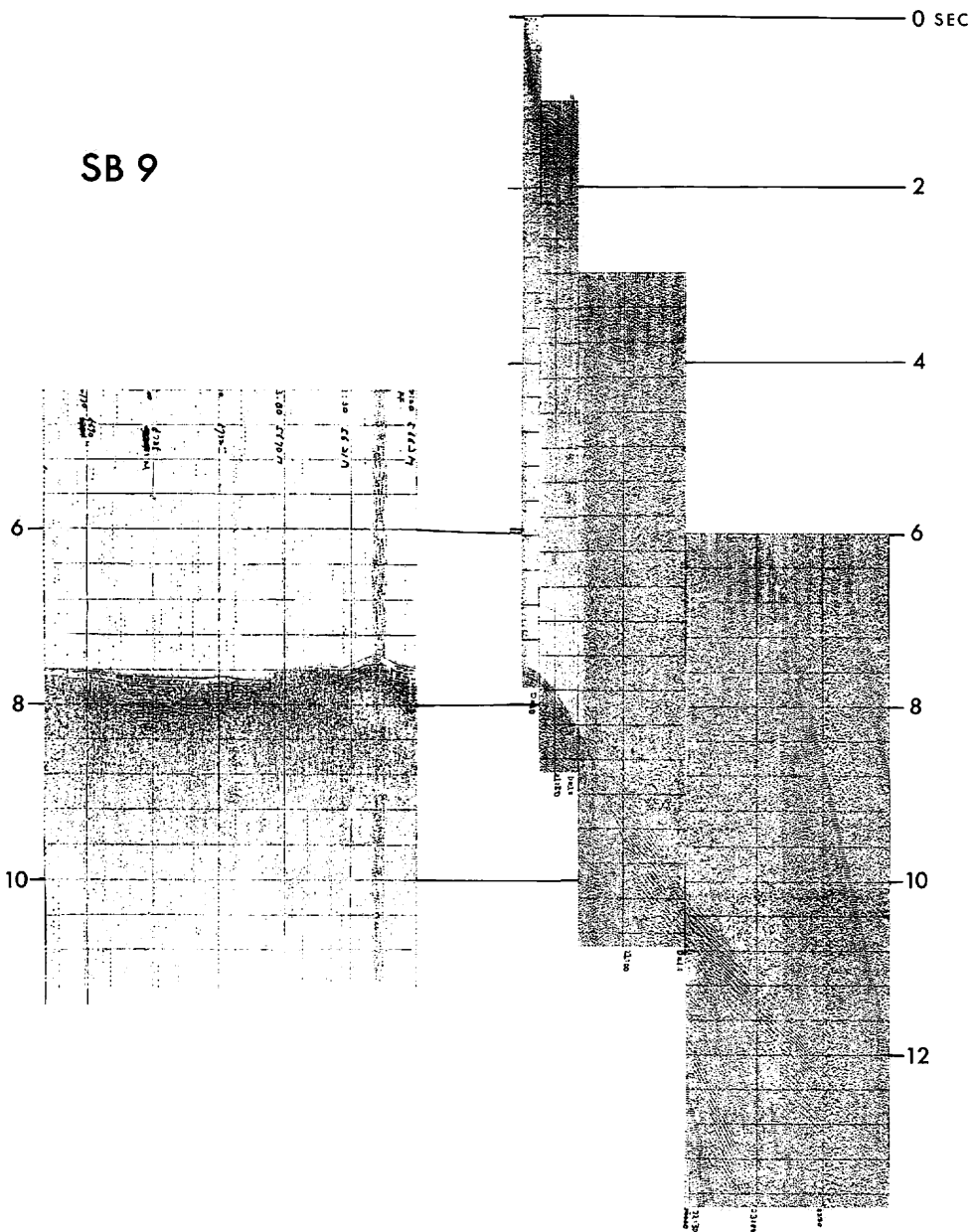


Fig. IX-3 Reflection and refraction record of SB9.

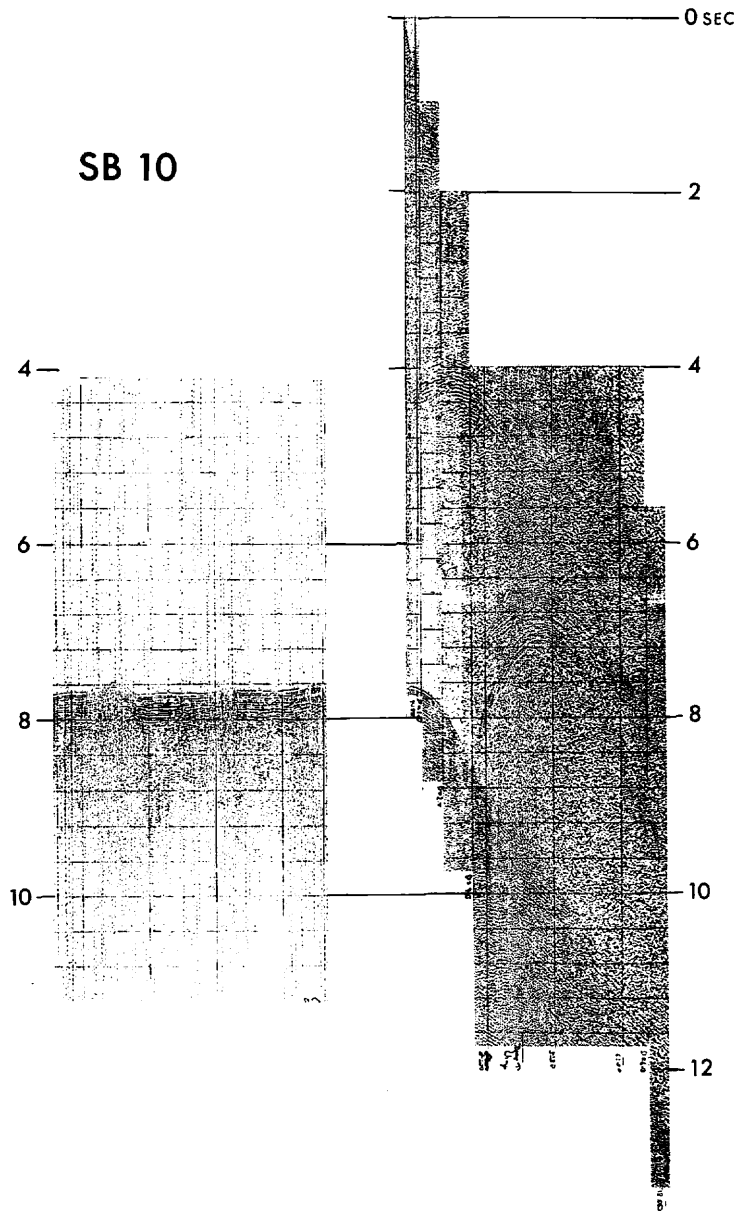


Fig. IX-4 Reflection and refraction record of SB10.

Table IX-2 Results of refraction survey.

	SB 8	SB 9	SB 10
Location Lat. (N)	10°8.5'	13°0.0'	10°5.8'
Long. (W)	167°40.7'	169°30.1'	173°13.5'
V ₁ (sea water) km/s	1.50	1.50	1.50
V ₂ (Layer 1) km/s	2.0*	2.0*	2.0*
V ₃ (Layer 2B) km/s	4.62	4.61	(4.43)
V ₄ (Layer 2C) km/s	5.92	5.89	6.01
V ₅ (Layer 3) km/s	6.56		
h ₁ (water depth) km	5.23	5.70	5.74
h ₂ (Layer 1) km	0.80	0.27	?
h ₃ (Layer 2B) km	0.95	0.88	?
h ₄ (Layer 2C) km	0.43		

*: assumed velocity.

(): doubtful velocity.

The lack of the oceanic layer 2A is common on the crust much older than 15 m.y. in the Pacific Ocean (HOUTZ, 1976). Velocity structures at three sites appear to be homogeneous. This suggest that the upper section of the crust in the survey area is uniform excluding seamounts region.

Reference

HOUTZ, R. E. (1976) Seismic properties of layer 2A in the Pacific. *J. Geophys. Res.*, vol. 81, p. 6321-6331.