

# DEEP-FOCUS EARTHQUAKES IN AMERICA

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THIS PAPER is based on detailed catalogues giving epicenters, origin times, and hypocentral depth for a large number of deep shocks.<sup>1</sup> In the Americas, shocks at very great depth (in excess of 600 km.) have been found in only four small areas east of the Andes (see figure 1). No shocks are known to have occurred in America at depths between 300 and 600 km. Shocks between 50 and 300 km. deep ("intermediate" shocks) are frequent along the Andes from 40° S to Colombia. South of 20° S, shocks at depths of 50–140 km. are found nearer the coast than those at depths of 150–290 km. Numerous shocks at the larger depths occur between 20° and 24° S, near 67° W; but this high activity breaks off abruptly to the south, coincidentally with the breaking off of the eastern Andean structures.

A few epicenters are on the West Indian arc. Two of these in Venezuela are shown in figure 1 of the paper entitled "Earthquake Epicenters and Structure of the Pacific Region of North America (Southern Part)" by C. F. Richter, p. 000, above. For other deep shocks in America, refer to the world map of deep shocks.

Shocks at depths near 100 km. are fairly frequent in the coastal region of Central America, from Nicaragua to Guatemala. Several such shocks have occurred along an east-west belt through central Mexico, which probably is associated with structures of the West Indian arc. No shocks at abnormal depth have been identified between Mexico and Alaska. Along the Alaskan-Aleutian arc several shocks at depths between 50 and 100 km. have been identified, and others are suspected.

Macroseismic and other evidence suggests that many shocks in central and eastern North America originate at a greater depth than those of the Pacific coastal region. However, this is probably due merely to a difference in structure; the shocks probably originate within the continental layers, and are not to be considered as having a deep focus. This may also apply to the two shocks in Canada (1925 and 1935) which are indicated on the world map.

Two epicenters are shown on the world map far off the coast of South America. To one there has been assigned a depth of 200 km., with some uncertainty; the other has been determined at 50 km., and may not be a deep shock. The region is one in which continental or quasi continental structures are indicated by other seismological data.

Between South America and the Antarctic there is a structural loop analogous to the West Indies. A few intermediate shocks have been located on this loop near its eastern limit.

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<sup>1</sup> B. Gutenberg and C. F. Richter, "Depth and Geographical Distribution of Deep-focus Earthquakes, *Bull. Geol. Soc. Am.*, 49:249–288, 1938; *idem*, second paper, *ibid.*, 50: 1511–1528, 1939.

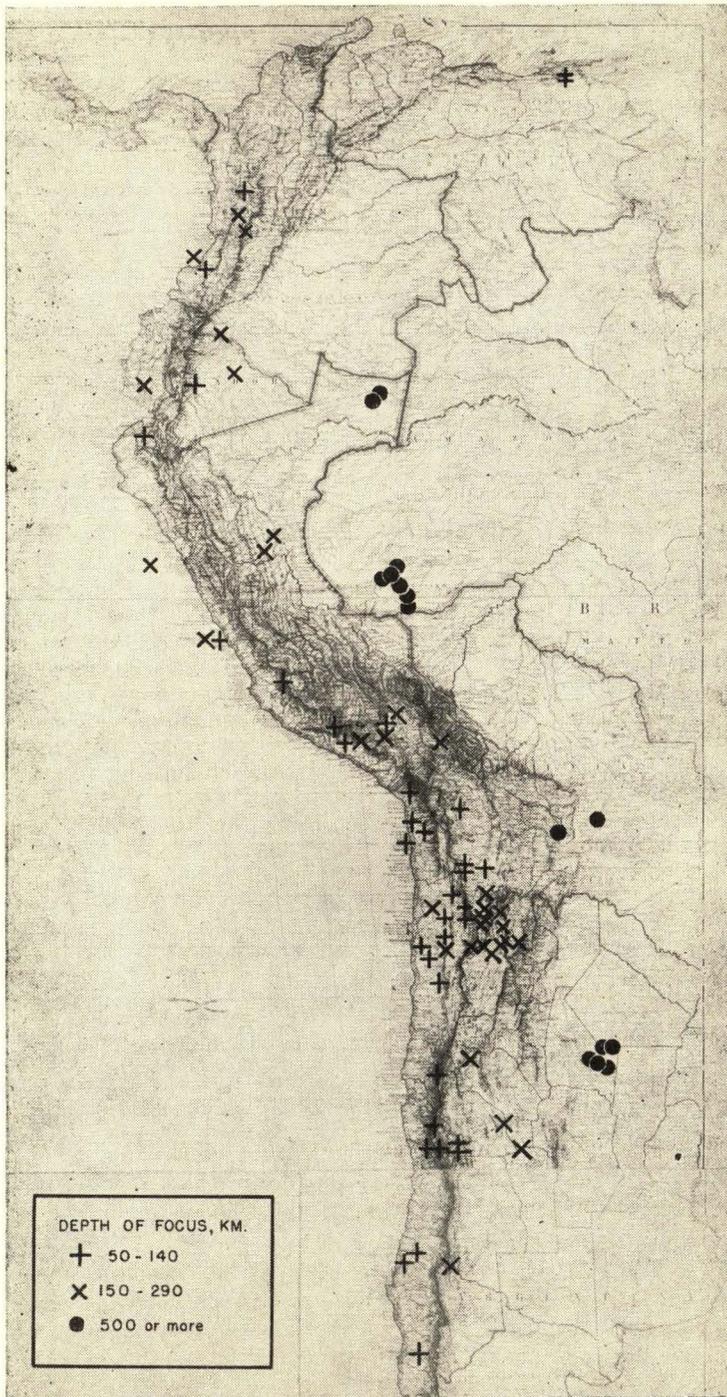


FIGURE 1.—Epicenters of deep-focus earthquakes in western South America.

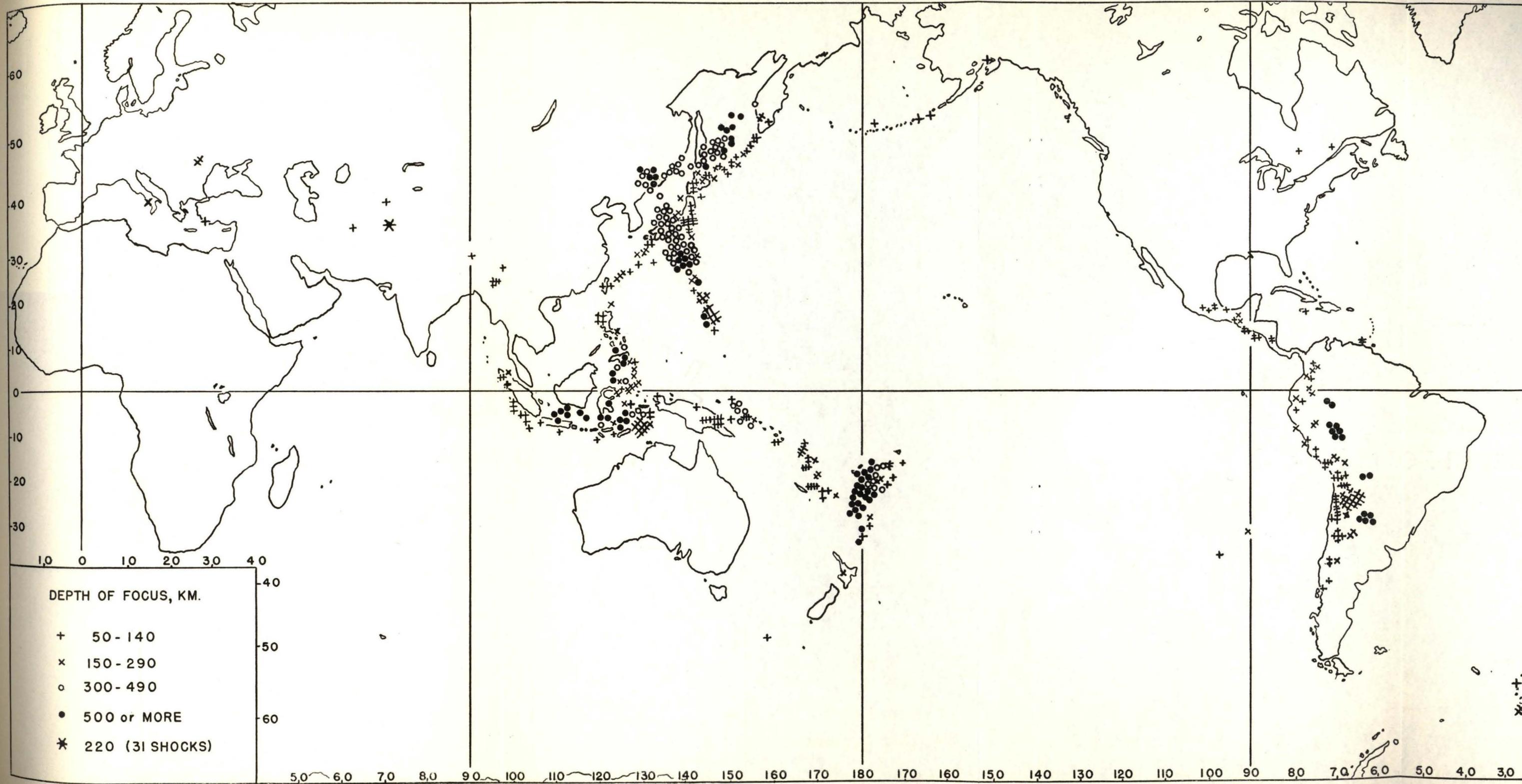


FIGURE 2.—Epicenters of deep-focus earthquakes.