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## HAWAIIAN SEISMIC EVENTS DURING 1966

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*Abstract.*—During 1966, 388 earthquakes having a magnitude of 2.0 to 4.5 occurred in the Hawaiian Islands. The foci of four-fifths of these were along structural features beneath the active Kilauea and Mauna Loa volcanoes. Nearly 100 earthquakes were felt by residents of the Island of Hawaii.

The location of earthquakes in Hawaii during 1966, compiled by the Hawaiian Volcano Observatory, U.S. Geological Survey, are graphically displayed in this report, the fifth of a series of annual reports showing

the distribution of Hawaiian earthquakes (Koyanagi, 1964; Koyanagi and Endo, 1965; Koyanagi and Okamura, 1966; and Koyanagi, 1968).

Earthquakes having a magnitude of 2.0 or greater that occurred beneath the five volcanoes and along the principal structural features of the island of Hawaii (fig. 1) during each quarter of 1966 are located in figure 2. Earthquakes having a magnitude of 2.0 or greater that occurred offshore along the Hawaiian Ridge from lat 18° to 23° N. and long 153° to 160° W. are plotted in figure 3. The earthquakes are plotted in 3 depth groups (less than 10, 10 to 20, and 20 to 60 kilometers) and 2 magnitude groups (2.0 to 3.5 and greater than 3.5). Also, quarterly counts and annual totals beneath the five volcanoes and offshore areas are given in figure 4.

The methods used to determine the location of the earthquakes are similar to those used in earlier reports and are subject to the same limitations. Due to travelt ime anomalies and occasional recording inadequacies, a 5-km sphere of error should be allowed for the location of earthquake beneath the island of Hawaii. For events occurring offshore in areas of limited seismometric coverage, errors as large as 10 km may be expected.

## CHRONOLOGY OF SEISMIC EVENTS DURING 1966

Small earthquakes numbering several tens per day occurred beneath the south flank of Kilauea during the first 3 weeks of January, as activity of the Kilauea flank eruption and seismic crisis of December 1965 (Fiske and Koyanagi, 1968) subsided. As flank seismicity decreased, however, a gradual increase in the number of shallow Kilauea caldera shocks (magnitude <2) was noticed. From less than 50 per day during the first 2 months, the average daily count rose to 80 during March, and reached a maximum in April when daily counts often exceeded 150.

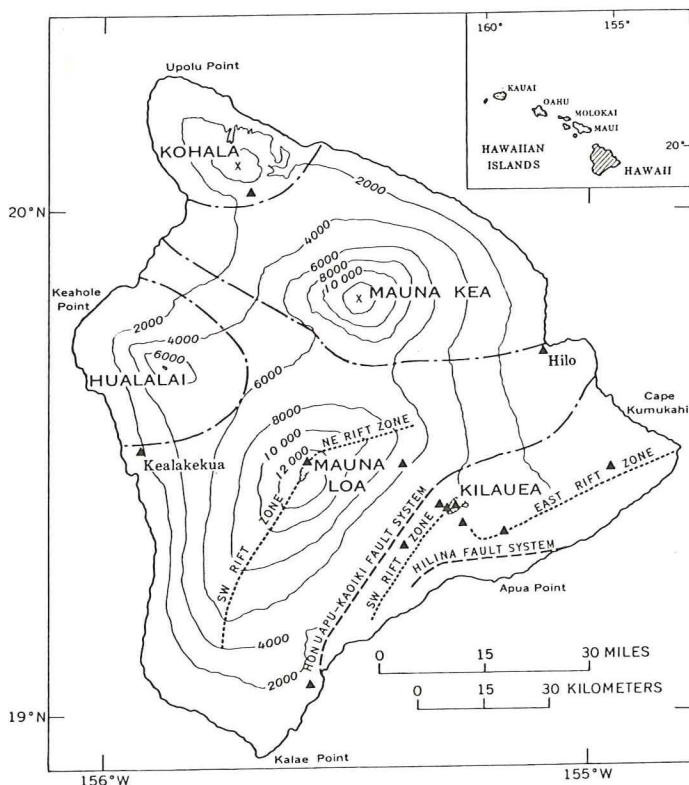


FIGURE 1.—Map of the island of Hawaii, showing the five volcanoes and their principal structural features. Dot-and-dash lines are boundaries of volcanic systems. Location of seismograph stations is indicated by closed triangles. Contour interval is 2,000 feet, and datum is mean sea level.

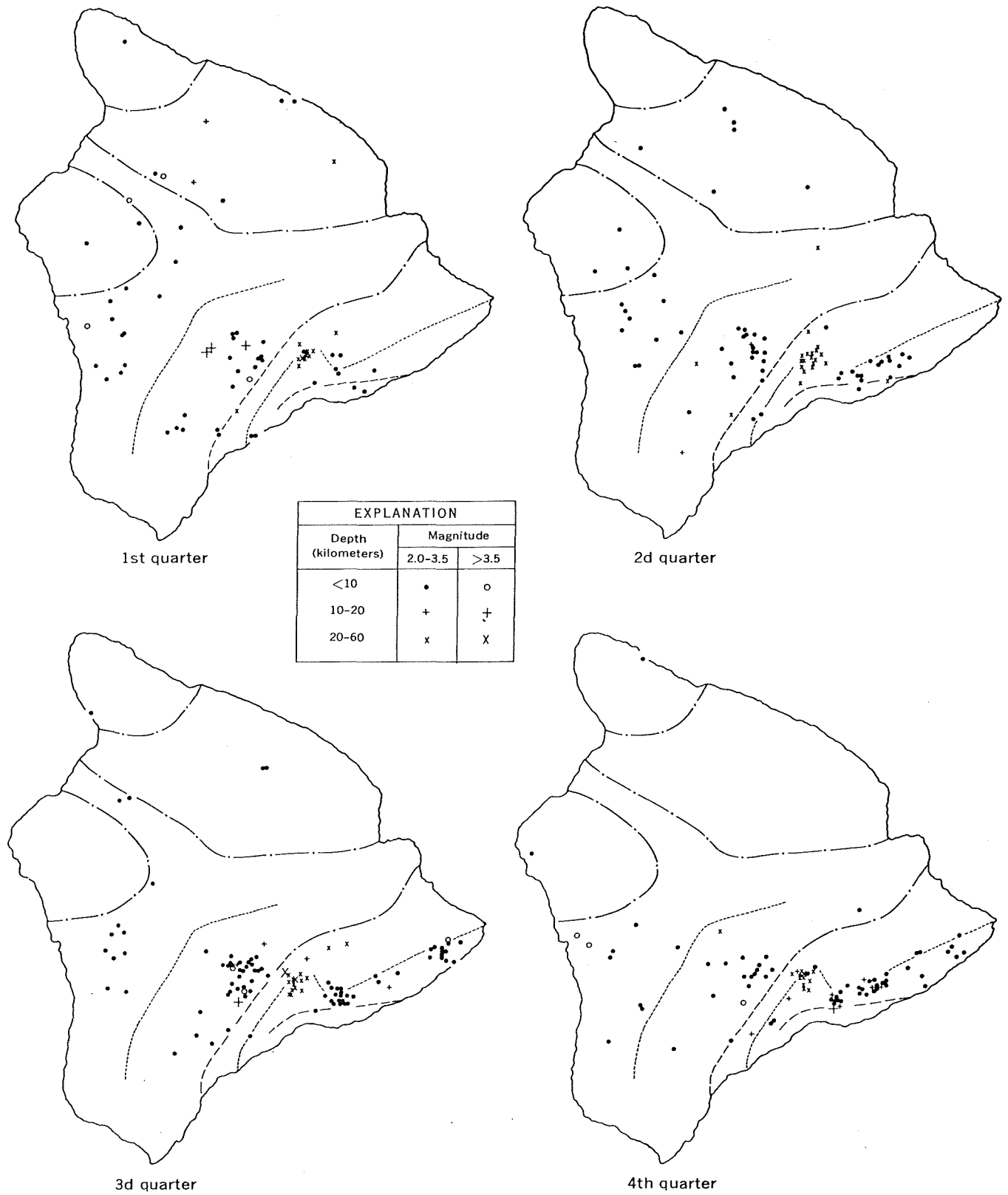
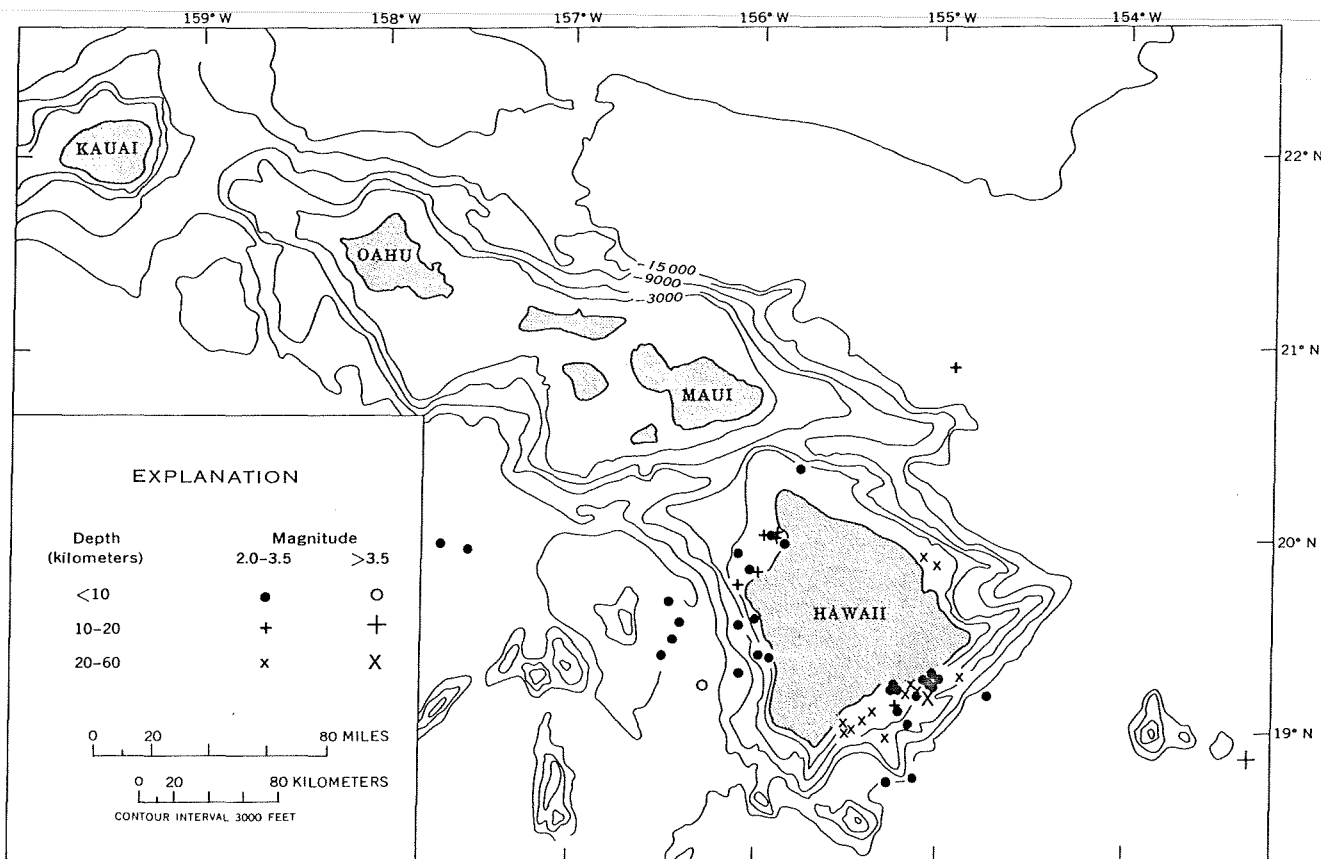


FIGURE 2.—Plot of epicenters of earthquakes having a magnitude of 2.0 or greater beneath the island of Hawaii during each quarter of 1966. Dot-and-dash lines are boundaries of volcanic systems, long-dashed lines are fault systems, and short-dashed lines are rift zones. Geographic names are shown in figure 1.



Base from U.S. Navy Hydrographic Office Preliminary Sheet BC 04N

FIGURE 3.—Map of the Hawaiian Islands, showing epicenters of earthquakes having a magnitude of 2.0 or greater that occurred off the island of Hawaii during 1966.

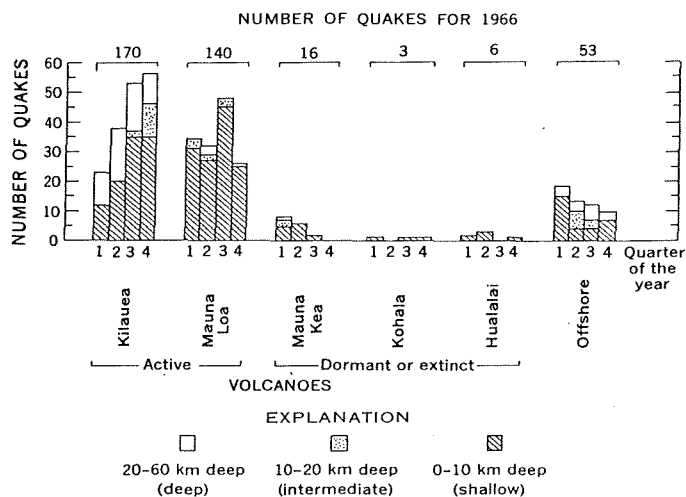


FIGURE 4.—Geographic location and the distribution, with depth, of earthquakes having a magnitude of 2.0 or greater that occurred in the Hawaiian Islands during 1966.

On July 5 a swarm of about 500 earthquakes occurred along the upper east rift and adjacent fault systems. On July 6 the largest event during this episode

registered a magnitude of 2.8 at 01<sup>h</sup>11<sup>m</sup> and was felt in the Kilauea summit area.<sup>1</sup> Also in July, and extending into August, an increased level of activity was noticed along the lower east rift of Kilauea. Earthquake counts fluctuated from several per day to several tens per day. After the first week of August, seismic quiescence prevailed. A magnitude-4.5 quake from the Kaoiki fault zone proved to be the largest event of the year and was felt islandwide at 06<sup>h</sup>33<sup>m</sup>, September 5.

In the final quarter, activity resumed along the lower east rift. During November, the peak month of activity, 217 earthquakes having a magnitude of 0.1 to 3.5 were recorded. Five of the largest events, ranging in magnitude from 2.5 to 3.5, were felt by residents of the eastern part of the island.

**SUMMARY**

Of the several tens of thousands of earthquakes recorded in 1966, 388 having a magnitude of 2 or

<sup>1</sup>Times are in hours and minutes, Hawaiian standard time.

greater were located and plotted. Eighty percent of these larger quakes originated beneath the active Kilauea and Mauna Loa volcanoes. As in earlier years, offshore events were concentrated along the southeastern and western coasts of the island of Hawaii. The quakes were predominantly of intracrustal depths with the exception of a persistent family of Kilauean earthquakes originating from a depth of about 30 km. In all, nearly 100 shocks ranging in magnitude from 2.0 to 4.5 were felt by residents of the island. Five larger ones having a magnitude of 3.7 to 4.5 were felt islandwide; four of these occurred along the active Kaoiki fault, a scarp which marks the surface boundary of the Mauna Loa and Kilauea volcanoes.



## REFERENCES

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