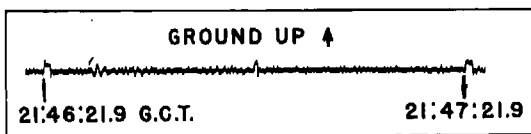


SEISMIC WAVES FROM ATOMIC BOMB TESTS

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Registration of seismic waves from atomic bombs provides a direct check on accepted travel-time curves. The Baker Day test at Bikini on July 24, 1946, U. T., was recorded at eight stations by short-period Benioff vertical-component seismometers. Only longitudinal waves (P) appear; no transverse waves or surface waves have been found. Figure 1 shows the seismogram at Mount Wilson; the others are similar.



We are indebted to the United States Coast and Geodetic Survey for a copy of the Tucson seismogram and to D. S. Carder of the Coast and Geodetic Survey for copies of those at Boulder City, Pierce Ferry, and Shasta Dam.

Fig. 1--Bikini atomic bomb test, July 24, 1946 (U. T.), Mount Wilson short-period vertical component Benioff seismogram. Original length of minute 60 mm

The Office of Naval Research has kindly furnished the following data: Time of detonation, 21^h34^m59^s.76 ± 0.1 sec, July 24 (U. T.); position, 11°35'N, 165°30'E. Results are shown in Table 1.

Table 1--Results of atomic bomb tests

Station	Distance	Time of P			Travel time		O - C
		h	m	s	m	s	
Shasta Dam	69.0	21	46	07.5	11	08	- 4
Tinemaha	72.2	21	46	28	11	28	- 3
Mount Wilson	72.4	21	46	28	11	28	- 4
Riverside	73.0	21	46	31	11	31	- 4
Palomar	73.5	21	46	35	11	35	- 3
Boulder City	75.0	21	46	42	11	42	+ 4
Pierce Ferry	75.6	21	46	47	11	47	+ 3
Tucson	78.6	21	47	04.5	12	05	- 3

In the column O - C are residuals obtained by subtracting from the observed travel times those calculated for a surface focus [see "References" at end of paper, GUTENBERG and RICHTER, 1939, p. 97]. These residuals are probably mainly due to the exceptional structure of the Pacific basin. The travel times referred to assume origin in a continental region. Supposing continental rocks to be absent in the Pacific basin, rough calculation indicates that travel times to large distances should be about two seconds less. Accordingly, the zero of the standard travel time curve is probably correct within a second or two. This confirms the result for the New Mexico test of 1945 [GUTENBERG, 1946], where the origin time had to be calculated from the arrival of the direct wave P at Tucson, and where the observed arrival of Pn at Tucson, Palomar, and Riverside was about one second later than expected. Recorded amplitudes of P from the Bikini test are about equal to those of a shock of magnitude 5.5 at the same distance.

References

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