Abstract View

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A Study of the Effects of Local and Distant Weather on Sea Level in Hawaii

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ABSTRACT

A spectral analysis of sea-level data from Hilo, Hawaii (19° 44′ N, 155° 04′ W) shows a peak near 0.4 cycle per day (cpd) which is absent from all other Hawaiian tide stations that have been examined. A cross-spectrum study of the Hilo sea-level record with local weather variables shows some coherence, but not enough to ascribe the entire sea-level activity of the peak to local weather. An attempt was made to correlate the sea-level record with more distant weather. To do this, surface atmospheric pressure values were obtained on a 10° grid of 16 points in the Pacific Ocean, encompassing the Hawaiian Islands, and were correlated by cross-spectrum analysis with Hilo sea level. The results indicate that weather at some distance away is related to Hilo sea-level variations, with a suggestion that the entire activity of the 0.4-cpd peak may be ascribed to weather over a broad region around the Hawaiian Islands.

The sea-level record at Honolulu has a smaller peak near 0.5 cpd. The same analysis showed considerably less coherence, although the possibility of weather inducement of the peak cannot be disregarded.

No single measure of weather activity shows either peak, and the reason for the ocean's predilection for frequencies of 0.4 and 0.5 cpd has not been definitely established.

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