

SOME FEATURES OF SEA LEVEL FLUCTUATIONS
AT ISLAND STATIONS IN THE TROPICAL PACIFIC

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN OCEANOGRAPHY

AUGUST 1978

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ABSTRACT

Power spectra and cross spectra of tide gauge records from a group of nine and another group of six Pacific island stations for periods from about three to about 14 days have been studied in order to learn features that are common to the power spectra and cross spectra of records from these stations.

The average spectrum of sea level fluctuations for each of the two groups of stations was obtained by averaging the sea level power spectra from each respective group. At some frequency bands, the energy in both average spectra was "coherent", in an average sense, over at least a few stations. The average spectra probably represent background oscillations occurring everywhere.

Significant coherences at about the the 2.6-2.9 day period range are seen as evidence for a free oscillation mode of the Pacific basin.

Observed latitudinal patterns of high resolution sea level energy densities at the 3-, 4-, and 5.5-day periods appear to agree with results by Wunsch and Gill (1975).

Zonal variations of coherences and of phase differences of 10⁷ resolution sea level cross spectra may be due to the response of the sea surface to 4-5 day westward traveling waves in the atmosphere.

Ratios of the rms amplitude and phase differences of cross spectra between the equilibrium tide and sea level fluctuations at the lunar fortnightly period indicate that the fortnightly tide is in quasistatic equilibrium.