



Abstract View

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Observation of the Power Spectrum of Ocean Waves Using a Cloverleaf Buoy

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ABSTRACT

The power spectra of typical sets of ocean wave data obtained in the open ocean using a cloverleaf buoy are analyzed to determine an idealized form for the spectrum of ocean surface waves. It is shown that most of the single-peaked spectra observed in a generation area can be described well by the spectral form of the JONSWAP type. Two parameters α and β ; characterizing the spectral form are calculated for each spectrum measured. Their relations to the dimensionless peak frequency $\bar{f}_m (=f_m U/g)$ are then determined. These relations are further converted into fetch relations for α and β ; through a relation between \bar{f}_m and a dimensionless fetch $\bar{F} (=gF/U^2)$.

Another spectral form proposed by Toba (1978) is examined and shown to fit as well to the observed spectra at high frequencies. This fact shows quasi-equivalence of the JONSWAP spectrum and Toba's spectrum in the high-frequency range. On the basis of the agreements of both spectral forms at high frequencies, properties of the dimensionless constant α' in Toba's spectrum are examined. It is shown that α' depends very weakly on the dimensionless fetch \bar{F} .

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