Abstract View

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A New Method for Measuring the Directional Wave Spectrum. Part II. Measurement of the Directional Spectrum and Phase Velocity of Laboratory Wind Waves

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ABSTRACT

A new method for measuring the directional spectrum, introduced in the preceding paper (Rikiishi, 1978), has been applied to actual wind waves in a large experimental tank 70 m × 8 m with the water 3 m deep, and in a wind-wave tunnel 850 cm × 60 cm with the water 35 cm deep. Measurements of the directional spectrum have shown that the mean wave direction of propagation agrees generally with the wind direction, that a bimodal distribution in the spectrum is not generally seen, and that the angular width of the directional spectrum is not correlated consistently with the wave frequency. These results conflict with the existence of Phillips resonant angle. Measurements of the phase velocity have shown that the phase velocity of the spectral-peak component wave is larger than that obtained from linear small-amplitude wave theory. that the measured phase velocity shows a roughly constant value among frequencies near the dominant frequency, and that the deviation of the constant value from the theoretical varies with fetch in proportion to the wind speed over the water surface. Based on these observational facts, it has been stressed that wind waves under the direct action of wind stress should not be regarded as the linear superposition of free Airy waves.