



Abstract View

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Dekameter Radar Observations of Ocean Wave Growth and Decay

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ABSTRACT

Immediately following the passage of polar fronts that produced strong winds blowing away from Galveston Island and into the Gulf of Mexico, we used scattered LORAN-A radio waves, together with observations by wave stags, to measure the growth of 80 m waves as a function of angle to the wind, and the decay of the same wavelengths going against the wind. The LORAN signals at 2 MHz are in Bragg resonance with 80 m (7 s) ocean waves offshore, and were used to map the strength of both approaching and receding 80 m waves as a function of range and azimuth using Doppler velocity to determine wave directions. We found that 1) these waves grow as the cosine of the angle to the wind; 2) growth rates averaged over all angles are comparable to those previously published, 3) growth rates measured as a function of time by the wave staff were numerically the same as growth measured as a function of distance by the radar; 4) growth appears to be inhibited for waves having frequencies near the peak frequency of preexisting waves going against the wind, but apparently not at higher frequencies; 5) attenuation of waves going against the wind is very weak compared with growth rates under the same conditions; and 6) ~ 1% of wave energy incident on a very gently sloping natural beach is reflected back to sea.

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