Abstract View

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Airborne Measurements of Wave Growth for Stable and Unstable Atmospheres in Lake Michigan

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ABSTRACT

This paper presents the results of a joint program combining airborne laser profilometer and Waverider buoy measurements of synoptic wave conditions in Lake Michigan during the passage of an intense cold front. Measurements were made both before and after passage of the front under different atmospheric stabilities. The results demonstrate the distinctive role stability plays in wave growth processes. Specifically, it is evident that the wind speed and fetch distance required to generate the same wave conditions are less for an unstable atmosphere than for a stable atmosphere. Therefore, an unstable atmosphere is usually accompanied by higher waves for the same 10 m winds. Fetch-limited wave growth is seen to follow stable or unstable quasi-equilibrium relations between corresponding wave-energy and peak-energy frequency parameters. Synoptic wave height maps for Lake Michigan have been prepared from the measured data.