Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09301, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09301
EGU General Assembly 2008

Characteristic slopes of small-scale wind waves observed in laboratory

G. Caulliez

Institut de Recherche sur les Phénomènes Hors Equilibre, Marseille, France.
(caulliez@irphe.univ-mrs.fr / Phone: +33-491-829690)

The geometric properties of wind waves at the different stages of wave development as observed along a large wind wave tank for very small to high winds are investigated using single-point laser slope measurements and longitudinal wave profile images. These observations show that at a given wind speed, the dominant wave mean square slope (mss) is strongly wave scale dependent, its amplitude and its angular width both reaching a maximum for gravity-capillary waves of 10 to 40 cm wavelength. In this range of dominant scales, the mss of equilibrium range waves is rather small but highly cross-wind distributed. The large decrease in dominant wave mss following the overshoot may be explained by a sharp increase in wave dissipation due to microbreaking and breaking, both responsible of an intense generation of widely spread capillaries. At large fetch, when the wave field is well-developed, the wave field mms dependency on wind friction velocity is mainly controlled by the equilibrium range mss dependency. Thus it can be characterized by three regimes associated with the different stages of the dominant wave development and the related modes of capillary wave generation. Finally, the results are compared with previous observations and discussed.