



EFFECTS OF LONG WAVES ON WIND-GENERATED SMALL SCALE WAVES

G. Caulliez and M. Joëlson

Institut de Recherche sur les Phénomènes Hors Equilibre, Marseille, France
(guil@irphe.univ-mrs.fr / Fax: +33-491-419620)

Observations of effects of mechanically-generated long waves on wind-generated waves of shorter scales were carried out in the large IRPHE wind wave tank. Measurements of water surface heights and mean air flow parameters were made simultaneously by capacitance wave gauges and hot X-wire probes. The modulation of short waves both in energy and scales along the long wave profiles is the first striking effect observed. The modulation transfer function is estimated by two methods respectively based on the wavelet decomposition and the windowed Fourier transform and the results compared. The role of wind on the intensity and the phase of the modulation is thus analysed and discussed within the framework of the recent coupled air-flow theories. The second impact of long waves on wind wave fields consists in a noticeable damping of the dominant waves. This effect is quantified at the different stages of the wind wave development. The relevant mechanisms at the origin of this phenomenon are then discussed in the light of the results.