

Study of the air-flow very close to the surface of wind-generated water waves
Marseille large air-water facility

Hubert Branger, CNRS, IRPHE, Marseilles, France

branger@irphe.univ-mrs.fr

The wind speed induces momentum transfer from the air to the water. One part of the transfer contributes to amplifying the waves through the form drag, whilst the other part contributes to amplifying the drift current through the viscous drag. Depending on the air and waves conditions, the form drag / viscous drag repartition is not yet well known. We developed experimental technics to measure the air-flow characteristics in the close vicinity of wind generated waves in the large IRPHE air-sea interaction facility in Marseilles. We measured both form drag and viscous stress for different wind and fetch conditions. These measurements provide a thorough description of the local structure of the wind in all the zones that are very close to the water surface.

The viscous stress and the static air-pressure fluctuations were found to vary along the wave's profile and there modulations along the wave phase depend on the wave-slope. The normalized wind input values and the normalized energy loss values show good collapse as a function of wave steepness. Systematic energy flux budgets for the interaction between wind and waves were obtained.

