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Turbulence structure produced by coastal wave breaking

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Experimental results of waves propagation in large flume for both regular and irregular waves are presented. Time series of waves propagation were carried out measuring turbulent velocities at 0.4 m below water surface by means of a velocimeter SONTEK3-D. The probability distribution functions of the velocity fluctuations are analyzed and non Gaussian distribution is found both for regular and irregular waves. Finally, the behavior of the two energy spectrum components are presented. indicating that irregularity is an important source of turbulence. We describe detailled measurements of the velocity characteristics, including the structure functions of the wave induced turbulence at the CIEM large wave tank, and compare these measurements with lagrangian velocimetry and dispersion measurements of tracers in the wave induced turbulent environment. Especially for irregular wave transformations due to breaking in shallow waters. In contrast, regular wave transformations can be easily generated and investigated in the laboratory due to the capacity of instrument to generate waves with a given height and period. On the other hand, there is also the possibility to generate irregular waves in the laboratory by varying the wave height and period. The control of the height and period characteristics may help to understand the mechanism of wave energy dissipation. Consequently, some important informations on the structure of the turbulent cascade and its role on sediment entrainment and diffusion is important approximations which can play a key role to investigate the propagation of sand with either regular/irregular and breaking waves in real coastal and beach flows.
We also compare the results of laboratory experiment concerning regular and irregular waves of different heights and periods.
All experiments were carried out by means of a sonic velocimeter SONTEK3-D in a water channel 100 m of long within the European Union Project SPAN-WAVE..