



## Turbulence generation and diffusion in coastal breaking waves

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Turbulence in the surf zone is a complex topic of study, of importance for both hydromorphodynamic and environmental studies. In this paper experimental results of turbulent flows for field tests in the Spanish Mediterranean coast are presented. The spatial and temporal resolution of measurements were limited by the ElectroMagnetic Sensors which result in "filtering" out the small scales and observing; thus only macroturbulence due to breaking waves has been measured. The experimental field-results have been obtained during DELTA'93 and DELTA'96 largescale surf zone experiments in the Ebro Delta, (Spain), under Spilling/plunging breaking waves (Rodriguez, 1997, PhD Thesis UPC, Barcelona). The field works include several measurements as topo-bathymetric surveys, water levels, 2DH and 2DV velocities, suspended sediment concentrations, sediment properties, meteorological conditions, etc. Several test across the surf zone with high vertical resolution were obtained, covering low, medium and high energy levels. Macroturbulence has been splitted from oscillatory for irregular waves with a recent technique and then turbulent characteristics have been obtained. This turbulent properties are compared with state-of-art macroturbulence characteristics and a new semi-empirical length-scale formulation is proposed. Further measurements on structure functions of the velocity turbulent fluctuations are compared with the distributions of effective surface diffusivity.