Modelling random wave transformation and wave-induced currents in the nearshore

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Outline

- Overall Objective
- Model Description
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Overall Objective

To develop a robust and reliable 2D numerical model of:

- Nearshore Waves,
- Wave-Induced Currents,

for calculating sediment transport and morphological evolution
Model Description

Nearshore Waves Model

based on the Energy Balance Equation

(Mase, 2001; Nam et al., 2009)

- Refraction
- Diffraction
- Shoaling
- Wave Breaking
- Wave Reforming
Model Description

Wave-Induced Current Model

based on the Continuity & Momentum Eqs.

(Militello et al., 2004; Svendsen, 1984)

- Surface Roller
- Longshore Current
- Cross-shore Current
- Wave Setup
Model Validation

Wave flume at Delft University of Technology
(Grasmeijer and van Rijn, 1999)

Test B1

$H_o = 0.16 \text{ m}, \ T_p = 2.3 \text{ s}, \ Teta = 0 \text{ deg.}$
Model Validation

![Graphs of Significant Wave Height](image)
Concluding Remarks

- A robust and reliable numerical model of nearshore wave transformation and wave-induced currents was developed and validated.

- Good agreements between calculations and measurements were obtained for nearshore waves and undertow.

- Calculations for Cancun beach have been continuously carried out in order to simulate the beach morphological evolution in this area.
Vielen Dank!