l011wavbr[001-002]: Wave breaking

Purpose

The purpose of this test is to verify depth-induced wave breaking.

Situation

The dissipation by depth-induced wave breaking is tested using the laboratory data of Battjes and Janssen (1978). Random, uni-directional waves propagate towards a bar-trough beach profile, accompanied by depth-induced wave breaking over the bar (see Figure 1). The up-wave boundary condition is a rather narrow spectrum (JONSWAP spectrum, $\gamma = 3.3$, $\sigma_a = 0.07$ and $\sigma_b = 0.09$), virtually uni-modal except for a secundary peak at about twice the peak frequency.

l011wavbr001 corresponds to run 13 of Battjes and Janssen (1978) with incident significant wave height and mean period H_{m0} and T_{m01} equal to 0.147 m and 2.02 s respectively. This represents a situation with mildly breaking waves. Maximum water depth is 0.762 m for this case.

l011wavbr002 corresponds to run 15 of Battjes and Janssen (1978) with incident significant wave height and mean period H_{m0} and T_{m01} equal to 0.202 m and 1.89 s respectively. This represents a situation with violently breaking waves. Maximum water depth is 0.615 m for this case.

The observed water levels (including wave-induced set-up) are available in numerical format.
Ambient currents and wind are absent.

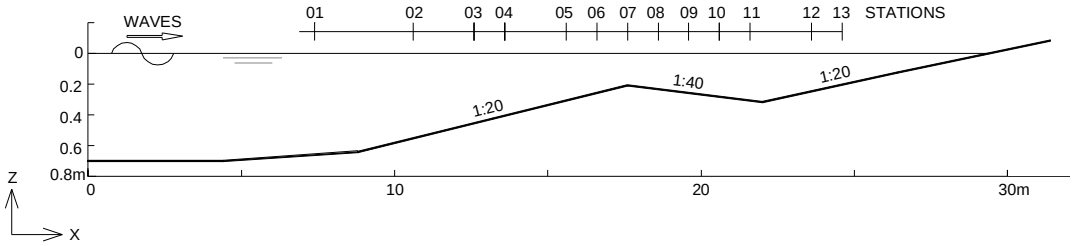

Figure 1 Bathymetry of laboratory experiment of Battjes and Janssen (1978).

Comparison

Comparisons of H_{m0} are made with observations of Battjes and Janssen (1978).

Default Model commands

	COMPUTATIONAL GRID										
	1D/2D		XPC		YPC		ALPC		XLENC		YLENC
	ID		7.4		0		0		30		0
	ΔX	ΔY		DIR1	DIR2		Δθ	FLOW	FHIGH		MSC
	0.1	0		-10°	10°		0.5°	0.2485	3.5714		30
	PHYSICS										
	GEN	BREAK		FRIC	TRIADS	QUAD	WCAP	REFRAC	FSHIFT		SETUP
	3	on		on	on	off	on	on	off		off
	BOUNDARY CONDITIONS										
	TYPE	BOU	C/V	P/R	SHAPE	PE/ME	DSPR	HS	PER	PDIR	DD
001	side	W	con	par	Jonswap	peak	power	0.147	2.012	0	500
002	side	W	con	par	Jonswap	peak	power	0.2022	1.886	0	500
	BOTTOM:			**WIND:**			**CURRENT:**		**WATER LEVEL:**		
001	'l011wavbr001'			_			_		'l011wavbr001'		
002	'l011wavbr002'			_			_		'l011wavbr002'		

References

Battjes, J.A. and J.P.F.M. Janssen, 1978: Energy loss and set-up due to breaking of random waves, *Proc. 16th Int. Conf. Coastal Engineering*, ASCE, 569-587

Acknowledgements

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