

a021shoal[001]: Shoaling

Purpose

The purpose of this test is to validate depth-induced shoaling

Situation

An infinitely long plane beach with parallel depth contours (slope 1:200) is considered. The x-axis is normal to the depth contours (see Figure 1). At a water depth of 20m, monochromatic, uni-directional waves enter the model area. At the up-wave boundary the incoming waves propagate at an angle of 30° relative to the positive x-axis. The distance of the up-wave boundary to the waterline is 4000 m. The incident wave height H_i and period T_i are 1 m and 10 s respectively. Ambient currents and wind are absent.

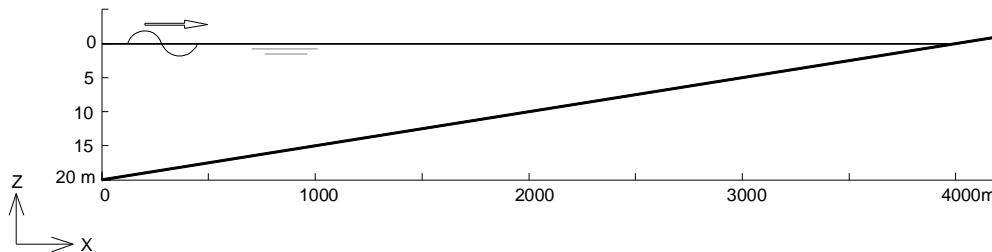


Figure 1 Shoaling on a infinitely long beach (normal wave incidence)

Comparison

Model results are compared with the analytical solution along a line perpendicular to the depth contours. This is calculated with (see Mei, 1983):

$$\frac{H^2}{H_i^2} = \frac{c_{g,i}}{c_g} \quad (\text{A2.1})$$

Comparison is made for wave height, wave period and wave direction.

Default model commands

COMPUTATIONAL GRID											
	1D/2D		XPC	YPC		ALPC	XLENC		YLENC		
001	2D		0	0		0	16000		4000		
	ΔX	ΔY	DIR1	DIR2	$\Delta\theta$	FLOW	FHIGH	MSC			
001	800	40	80°	100°	0.25°	0.05	0.25	40			
PHYSICS											
	GEN	BREAK	FRIC	TRIADS	QUAD	WCAP	REFRAC	FSHIFT	SETUP		
	off	off	off	off	off	off	on	off	off		
BOUNDARY CONDITIONS											
	TYPE	BOU	C/V	P/R	SHAPE	PE/ME	DSPR	HS	PER	PDIR	DD
001	side	S	con	par	Gauss 0.01	peak	power	1	10	90°	500
	BOTTOM:			WIND:			CURRENT:		WATER LEVEL:		
001	'a021shoal001.bot'			-			-		-		

References

Mei, C.C., 1983: *The applied dynamics of ocean surface waves*, Wiley, New York, 740 p.

Acknowledgements

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