f031harin[001-004]: Haringvliet estuary (the Netherlands)

Purpose

The purpose of this test is to verify the model (in particular triads and regeneration of waves by local wind) in a complex bathymetry in the field.

Situation

The Haringvliet is a relatively shallow branch of the Rhine estuary in the southwest of the Netherlands, separated from this estuary by sluices (see Andorka Gal, 1995). The water depth is 4 to 6 m and the surface area is about 10 km × 10 km (see Figure 1). The bay is partly protected from the southern North Sea by a shoal (called "Hinderplaat") extending half way across the bay entrance. The waves approach the estuary from deep water and break over the shoal with a reduction of wave energy. Behind the shoal, the local wind regenerates the waves (which is evident as a high-frequency peak in the observed spectra). A constant and homogeneous wind speed U_{10} is considered for each test case. Currents are assumed to be absent.

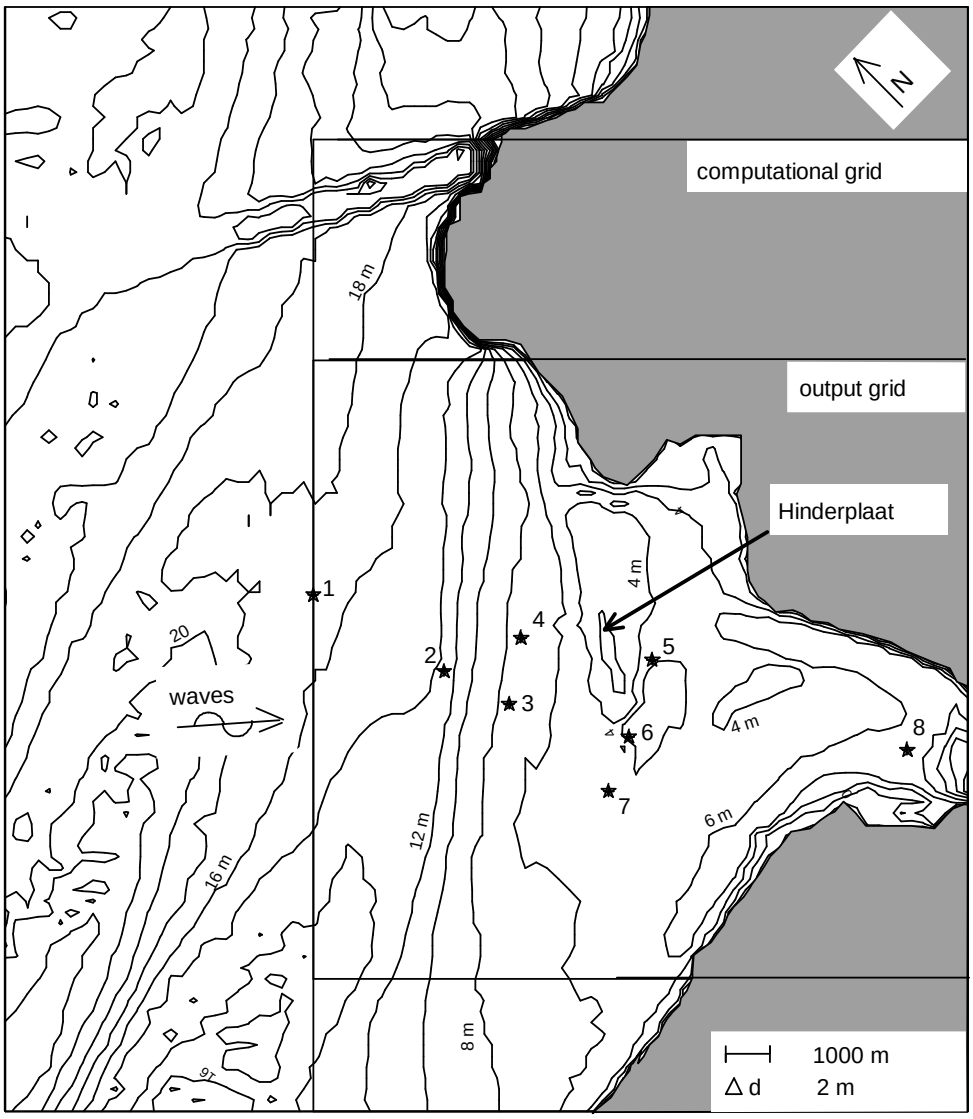

Figure 1 Bathymetry of the Haringvliet estuary (the Netherlands) with the locations of the eight observation stations.

For each case the relevant physical parameters are summarized in Table 1. These cases have been selected because (a) the wind speed and the wind direction were fairly constant, (b) the waves were fairly high (for the observation period of 13 weeks), (c) the water level was sufficiently low to see the generation of a significant secondary peak in the spectra near the shoal, but not so low that the shoal would be dry.

Comparison

At eight locations observations are available. Comparisons are made for energy density spectra, significant wave height H_{m0} and mean wave period T_{m01}.

Case nr.	Date/Time [dd-mm-yyyy/hh:mm]	Water level [m]	Wind (U_{10}) [m/s]	Direction [^{0}]
001	14-10-1982 / 21.00 hrs	+.30	12	330
002	14-10-1982 / 22.00 hrs	+.90	17	300
003	14-10-1982 / 23.00 hrs	+1.70	14	300
004	14-10-1982 / 24.00 hrs	+2.10	15	300

Table 1 Physical parameters for case f031harin. Wind speed in U_{10} and direction according to nautical convention. Time in UTC.

Default Model commands

	COMPUTATIONAL GRID								
	1D/2D	XPC	YPC	ALPC	XLENC	YLENC			
	2D	6960.2	0	0	14789.8	22000			
	ΔX	ΔY	DIR1	DIR2	Δθ	FLOW	FHIGH	MSC	
	150	250	0°	360°	10°	0.0521	1.0	31	
	PHYSICS								
	GEN	BREAK	FRIC	TRIADS	QUAD	WCAP	REFRAC	FSHIFT	SETUP
	3	on	on	on	on	on	on	off	off
	BOUNDARY CONDITIONS								
	TYPE	BOU	C/V	P/R	NAME OF FILE				
001	side	W	con	read boundary from file	'f031harin001.bnd'				
002	side	W	con	read boundary from file	'f031harin002.bnd'				
003	side	W	con	read boundary from file	'f031harin003.bnd'				
004	side	W	con	read boundary from file	'f031harin004.bnd'				
	BOTTOM:		**WIND:**		**CURRENT:**		**WATER LEVEL:**		
001	'f031harin001.bot'		U_{10}: 12m/s	θ_W: 8.8°	-		+0.30 m		
002	'f031harin002.bot'		U_{10}: 17m/s	θ_W: 8.8°	-		+0.90 m		
003	'f031harin003.bot'		U_{10}: 14m/s	θ_W: 8.8°	-		+1.70 m		
004	'f031harin004.bot'		U_{10}: 15m/s	θ_W: 8.8°	-		+2.10 m		

References

Andorka Gal, J.H., 1995: Verification set Haringvliet -October 14, 1982- October 15, 1982-, Rep. -95.112x, Ministry of Transport, Public Works and Water Management, Den Haag, The Netherlands

Dingemans, M.W., 1983: Verification of numerical wave propagation models with field measurements; CREDIZ verification Haringvliet, Rep. W488, Part 1b, Delft Hydraulics, Delft, The Netherlands

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