f081norde[001-004]: Norderneyer Seegat (Germany)

Purpose

The purpose of this test is to verify the wave model in a situation with a complex bathymetry.

Situation

The Norderneyer Seegat is a tidal inlet situated between the barrier islands of Norderney and Juist (East-Frisian Islands in the north of Germany). The region behind the inlet is an inter-tidal area with shoals and channels over a distance of 7.5 km to the main land. The bathymetry for the 20 km x 25 km area is shown in Figure 1. The main channel (Norderneyer Riffgat, with a maximum depth of 16 m) penetrates deep around the head of Norderney to the east. Two smaller channels bifurcate from the Norderneyer Seegat to the south and southwest. North of the inlet lies a shoal on which most waves coming from the North Sea break. The wind generates a local wind sea in the inlet and behind the islands.

The geographical situation of the Norderneyer Seegat has been chosen, because wave observations are available at a high and low water situation (practically no tidal currents are present). For this verification, four typical cases of such high and low water (no currents) have been selected. The wind field and water level are assumed homogeneous in the area and quantified for each case in Table 1. The cases f081norde001, f081norde003 and f081norde004 are high tide cases. f08norde002 is a low tide case.

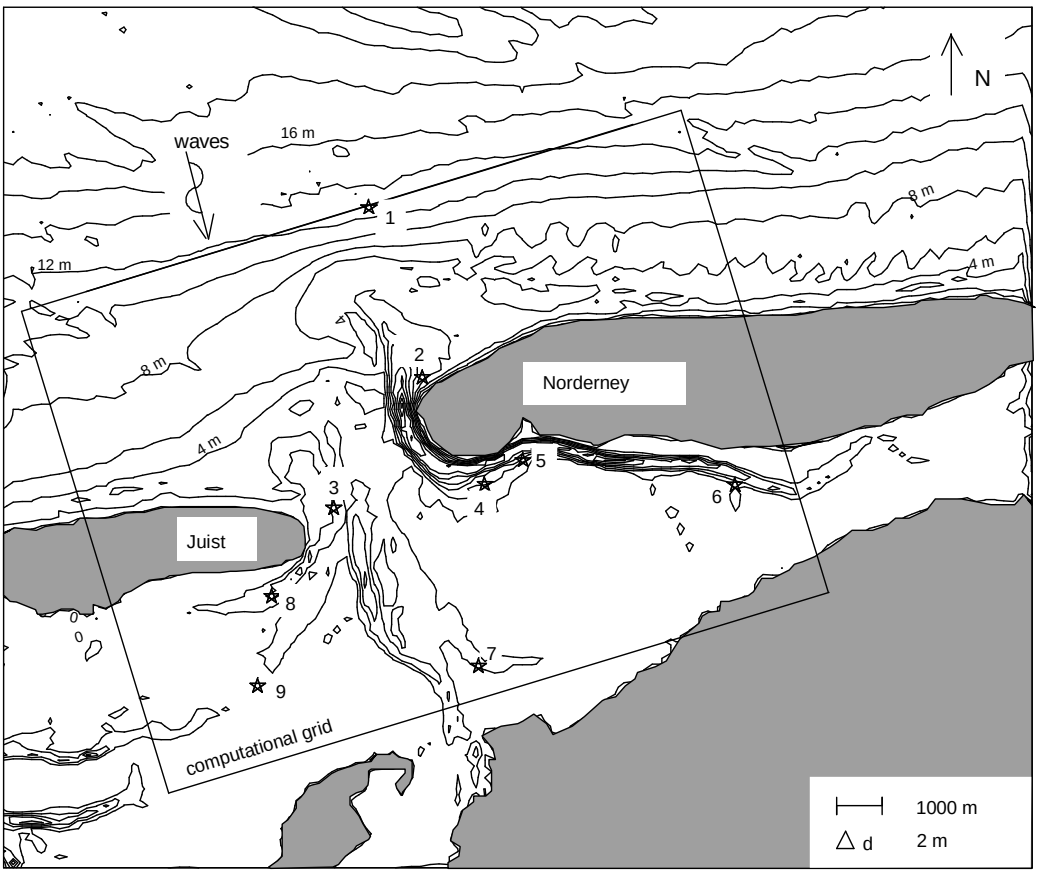

Figure 1 Bathymetry of the Norderneyer Seegat (Germany) with the locations of the nine observation stations.

Comparison

Energy density spectra of the model output are compared to observations of station 1, 2, 4, 5, 6, 7 and 9. For all stations (1, 2, 3, 4, 5, 6, 7, 8 and 9) comparison will be made for significant wave height, H_{m0}, and mean period, T_{m01}.

Case nr.	Date/Time	Wind (U_{10}) [m/s]	Direction [°]	+MSL [m]
001	17-11-1995 / 3:58 hrs	8	338	1.42
002	16-11-1995 / 21:58 hrs	13	315	-0.07
003	19-11-1995 / 7:59 hrs	11.5	340	1.75
004	16-11-1995 / 5:58 hrs	5	200	1.11

Table 1 Physical parameters for casef081delil. Wind direction according to nautical convention. Time is in UTC convention

Default Model commands

	COMPUTATIONAL GRID								
	1D/2D	XPC	YPC	ALPC	XLENC	YLENC			
	2D	66389	55613	287	11130	15200			
	ΔX	ΔY	DIR1	DIR2	Δθ	FLOW	FHIGH	MSC	
	100	100	0°	360°	10°	0.04545	1.0	32	
	PHYSICS								
	GEN	BREAK	FRIC	TRIADS	QUAD	WCAP	REFRAC	FSHIFT	SETUP
	3	on	on	on	on	on	on	on	off
	BOUNDARY CONDITIONS								
	TYPE	BOU	C/V	P/R	NAME OF FILE				
001	side	N	con	read boundary from file	'f081norde001.bnd'				
002	side	N	con	read boundary from file	'f081norde002.bnd'				
003	side	N	con	read boundary from file	'f081norde003.bnd'				
004	side	N	con	read boundary from file	'f081norde004.bnd'				

	BOTTOM:	**WIND:**		**CURRENT:**	**WATER LEVEL:**
001	'f081norde001.bot'	U_{10}: 8 m/s	θ_W: 292°	-	MSL+1.42m
002	'f081norde002.bot'	U_{10}: 13 m/s	θ_W: 315°	-	MSL-0.07 m
003	'f081norde003.bot'	U_{10}: 11.5 m/s	θ_W: 290°	-	MSL+1.75m
004	'f081norde004.bot'	U_{10}: 5 m/s	θ_W: 70°	-	MSL+1.11m

References

Niemeyer, H. D. and R. Kaiser, 1997: Variationen im lokalen Seegangsklimas infolge morphologischer Anderungen im Riffbogen. Berichte der Forschungsstelle Kuste, Band 41, 107-117, Norderney.

Acknowledgements

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