



Pilot study Forecasting Swimmer Safety around the Sand Engine

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Introduction

1. Motivation *Pilot Forecasting Swimmer Safety*
2. Operational model system CoSMoS
3. First results and experiences Sand Engine
4. Results Egmond aan Zee
5. Conclusions



20 Mm3
Summer 2011

Safety
Recreation
Nature value

Introduction

Motivation for studying swimmer safety - Sand Engine

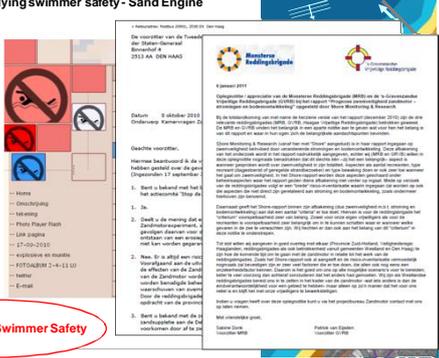
Old situation:

- rips predictab
- fixed in space
- no long-term c

Present situation:

- from controle
- very dynamic,
- altered recrea

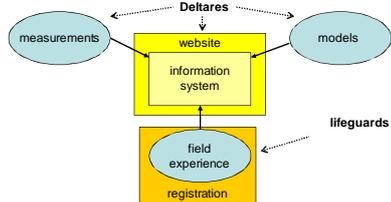
Pilot Forecasting Swimmer Safety



Pilot Forecasting swimmer safety Sand Engine

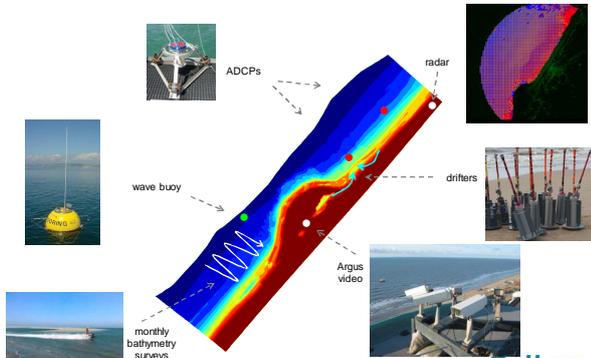
Goal: development of an operational information system to support lifeguards in their daily tasks

- Real-time forecast for next 1-2 days
- Based on numerical models combined with in-situ observations
- Predict timing, location and strength of rip currents
- To support lifeguards (and in future to inform general public?)
- Pilotphase: summer 2012/2013; evaluation: fall 2013



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Measurements



ADCPs

radar

wave buoy

drifters

Argus video

monthly bathymetry surveys

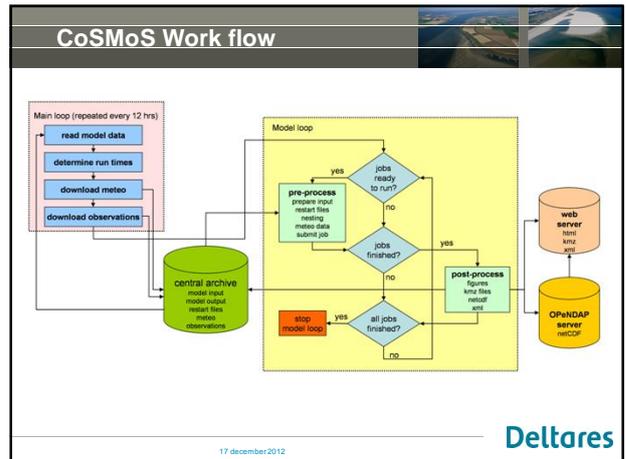
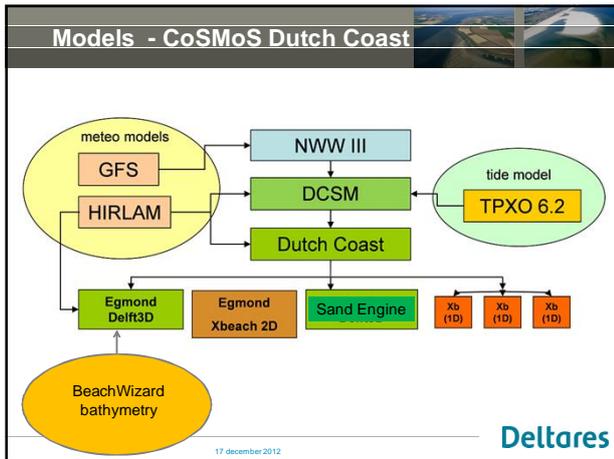
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CoSMoS modelling system

- Coastal Storm Modelling System
- Co-funded by USGS
- Uses WAVEWATCH III, Delft3D-FLOW, SWAN and XBeach
- Easily relocatable and easy to insert new model domains
 - Dutch coast
 - California
 - Hawaiian Islands
 - Gulf of Mexico
- Easy to run in forecast mode (real-time) or to study historic and future scenarios
- System runs on Windows machine
- Matlab based
- 48 hour forecasts (cycle every 12 hours)

17 december 2012

Deltares



BeachWizard model-data assimilation

- We need up-to-date bathymetry
- Beach-dune erosion and run-up
- Timing, location of rip currents

Egmond aan zee, 26 August 2009

- Compares observed wave dissipation patterns from ARGUS video imagery with computed patterns
- Adjusts model bathymetry where differences are found
- Uses relation between breaking wave height and local depth
- Operational at Egmond aan Zee (not yet at Sand Engine)

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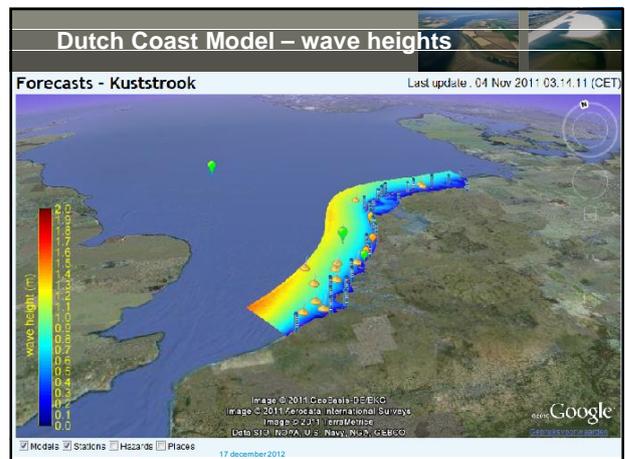
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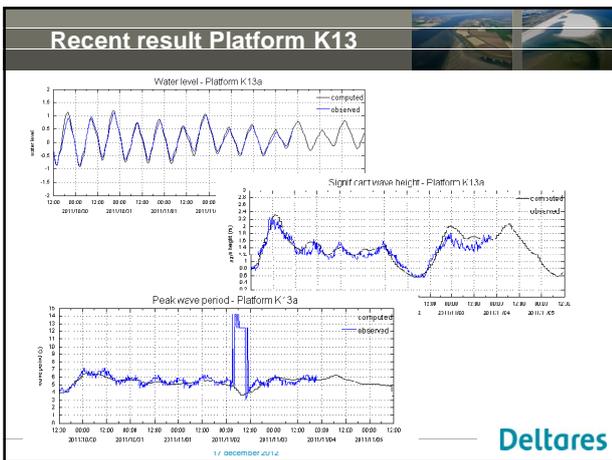
WAVEWATCH III – wave heights

<http://cosmos.deltares.nl>

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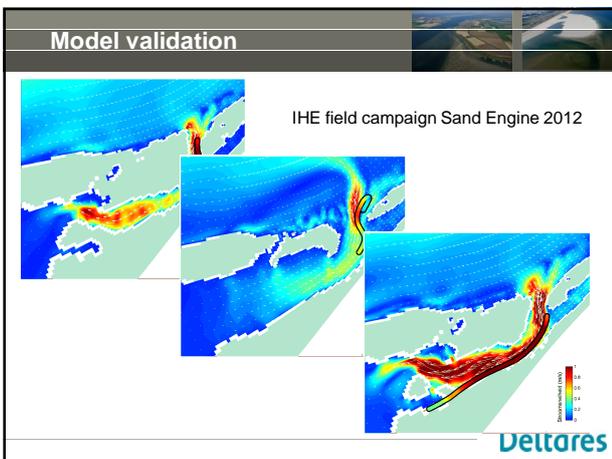




Information system swimmer safety

- Website
 - Automated twice-daily updates
 - GE visualisations
 - Warnings (e.g. rip strength)
 - Data viewer (video, radar)

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Experiences summer season 2012

Introduction of system at lifeguards

Lifeguards are generally enthusiastic

- Practical issues
 - Busy volunteers
 - Pc / internet facilities

Some resistance to new procedures and technology

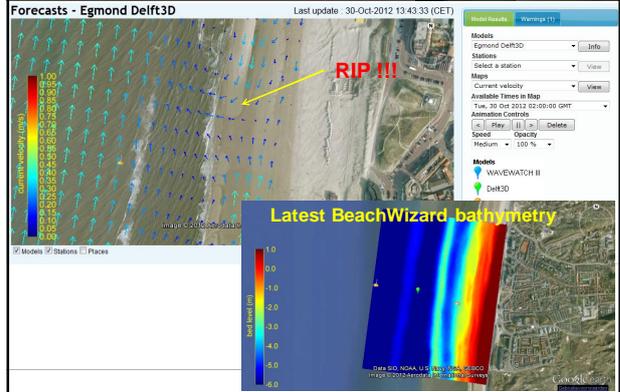
Simplicity is key!



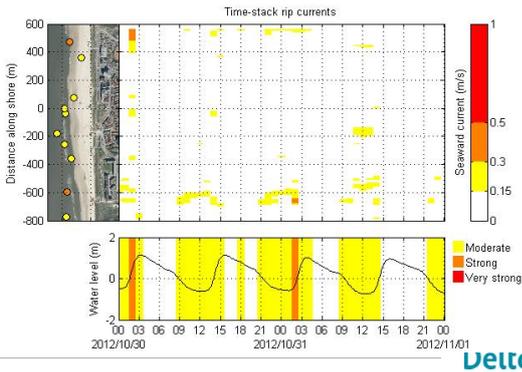
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Egmond aan Zee

Forecasts - Egmond Delft3D

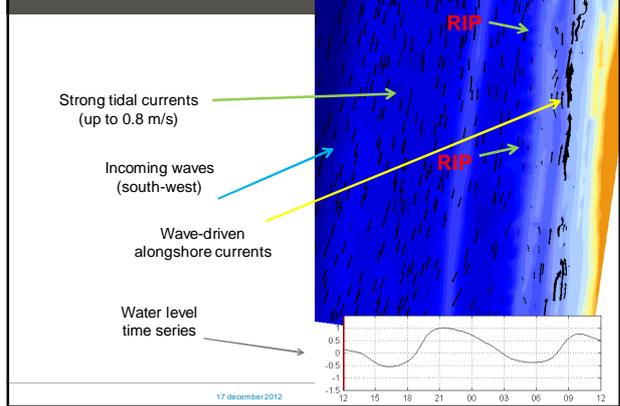


Rip current time stack



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Rip currents Egmond



Conclusions

- Development of a realtime nearshore forecast system
- Capable to predict general nearshore currents well (with minor offsets in timing / location)
- Up-to-date bathymetry crucial
 - in the high dynamic environment of the Sand Engine
 - to predict rip currents (rip channels)
- Integration of BeachWizard
 - operational at Egmond
 - work in progress at Sand Engine
- Needs (much) more validation! Preferably not just along the Dutch coast
- Implementation of system at lifeguard posts needs more attention
 - practical issues
 - simplicity is key

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