

Latest MIKE Marine developments – ready for you!

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20th DHI UK Symposium 11-12 September 2018, Stafford, UK



BIG Congratulation to the DHI UK team!

Interesting stuff from DHI!

Cool stuff!



8th DHI UK User Group Meeting / Symposium Lion Quays 2006

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#3



Overview

1. Major news in MIKE Marine Release 2019
(coming start November 2018)
2. Online services speeding up your projects
3. Quick Q&A

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01.

Major news in MIKE Marine Release 2019



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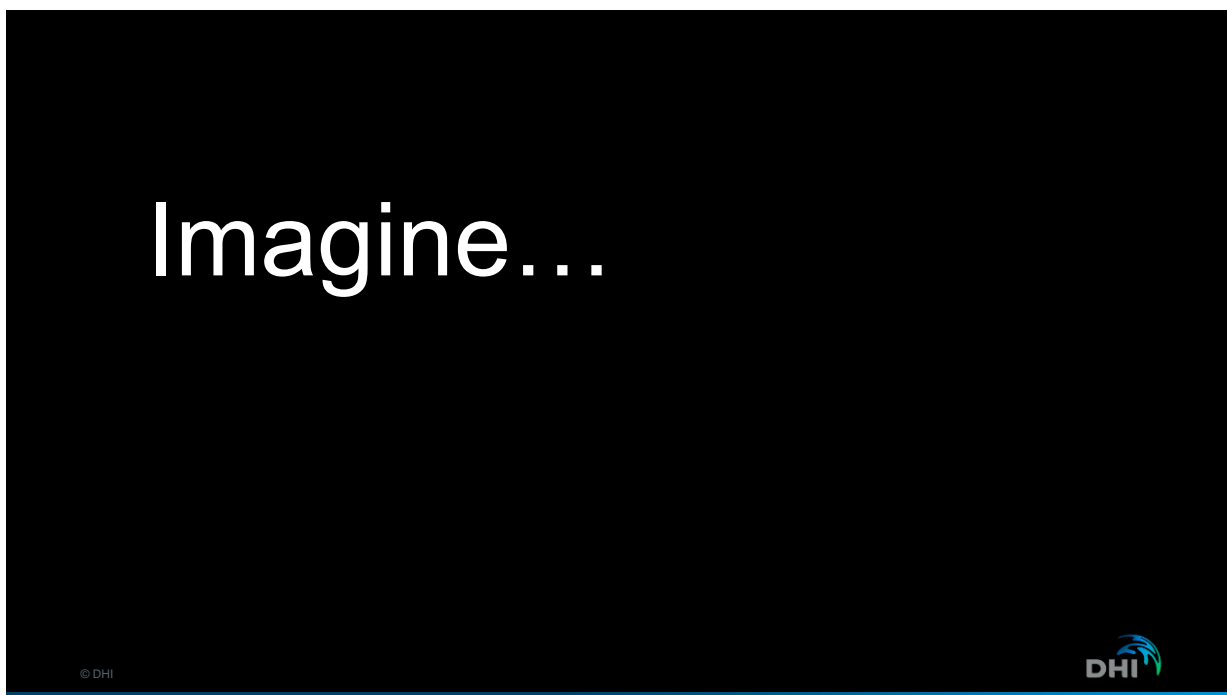
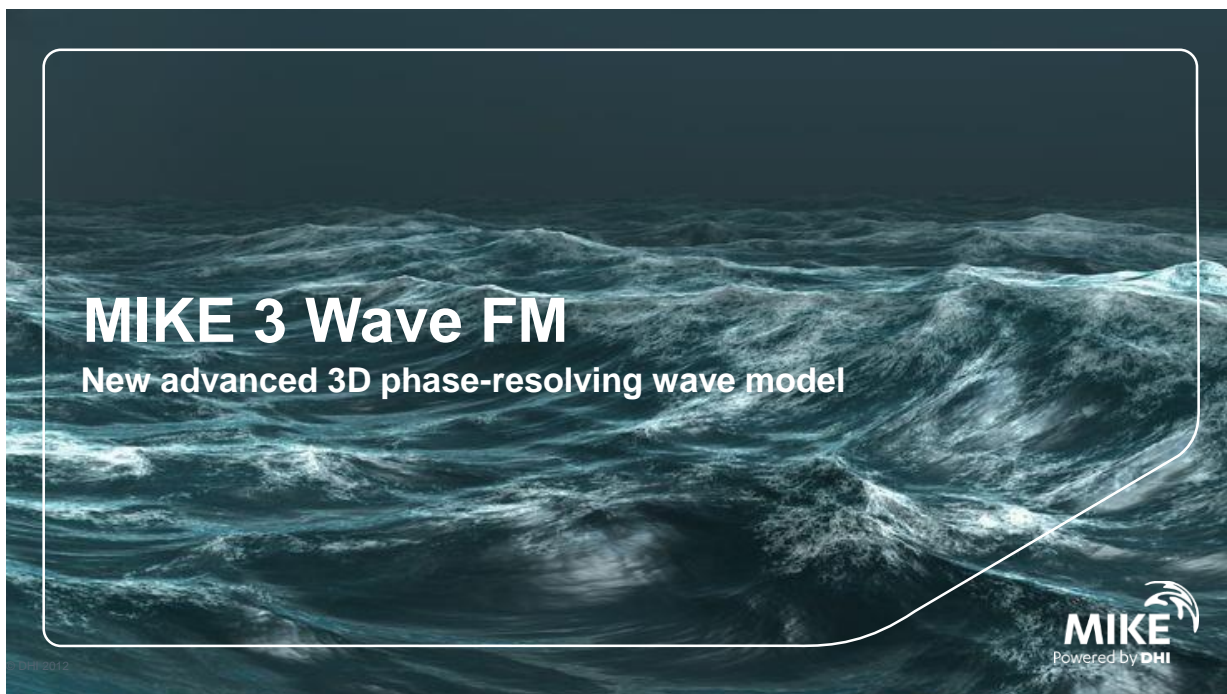
Long list of new products, tools and features

Release 2019

- MIKE 3 Wave Model FM – New Product
- Multi-body simulations in MIKE 21 Mooring Analysis
- New Shoreline Morphology and Sand Transport features, MIKE 21 SM/ST
- Extended Tidal Tools, MIKE Marine PP
- Binary Particle File Format, MIKE 21/3 FM (ABM Lab/OS/PT)
- Structured Grids in MIKE 21/3 FM
- New licensing for FM decoupled modules
- Improved Flooding/Drying in MIKE 21/3 FM
- Unlock the power of MIKE FM with a professional Linux license
- New MATLAB tools for download for UAS
- ...

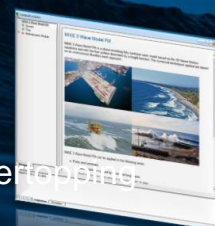
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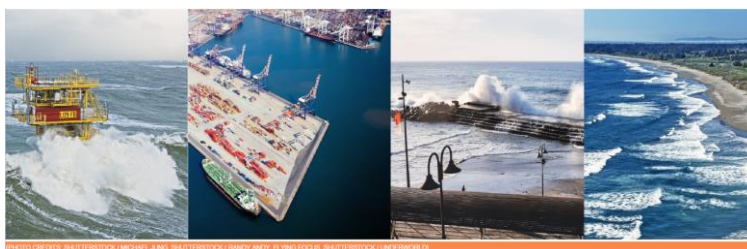
...you have access to a tool

- with no physical limitation on wave height, period or water depth
- that handles 3D porous structures (with natural porosity)
- with fast and easy workflow for specifying sponge and porosity zones
- including stable and user-friendly wave generation
- with workflow similar to other MIKE 21/3 FM models
- with well-known user interface
- that simulates robustly wave breaking, wave run-up and overtopping
- that interfacing easily with other MIKE products



...applied in these application areas

- Offshore environments
- Ports & Terminals
- Maritime
- Coastal structures
- Coastal areas



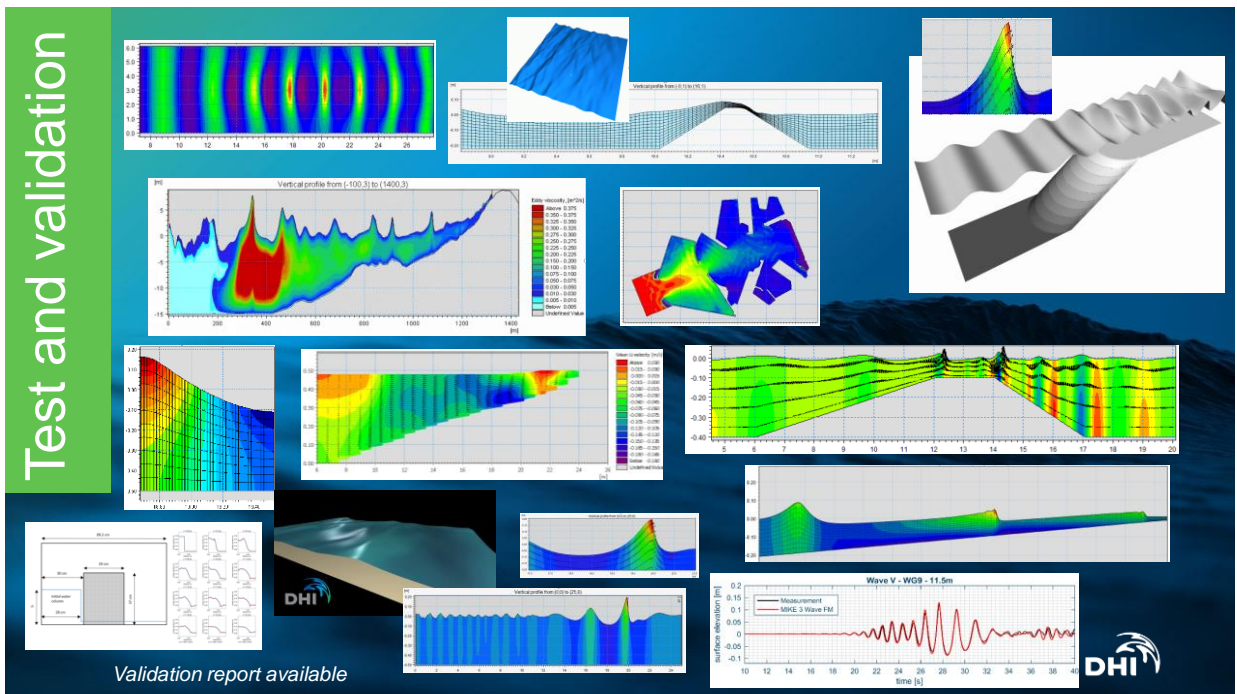
What?

1. Model based on non-hydrostatic 3D Navier-Stokes equations
2. Covers fully nonlinear, fully dispersive surface gravity waves and flow
3. Includes handling of wave breaking, wave run-up and overtopping
4. Flexible computational mesh
5. The engine code is highly parallelized
6. Engine is significantly faster than CFD VOF models
7. Engine has been tested and validated extensively
8. Engine has already been used in commercial projects and in R&D activities

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Can we trust the model results and
is it really easy to use?

DHI



Easy to use? - ask the users

- Workshop May 2018
- 10 modellers in one room
- 3 intensive days
- 10 very different cases considered

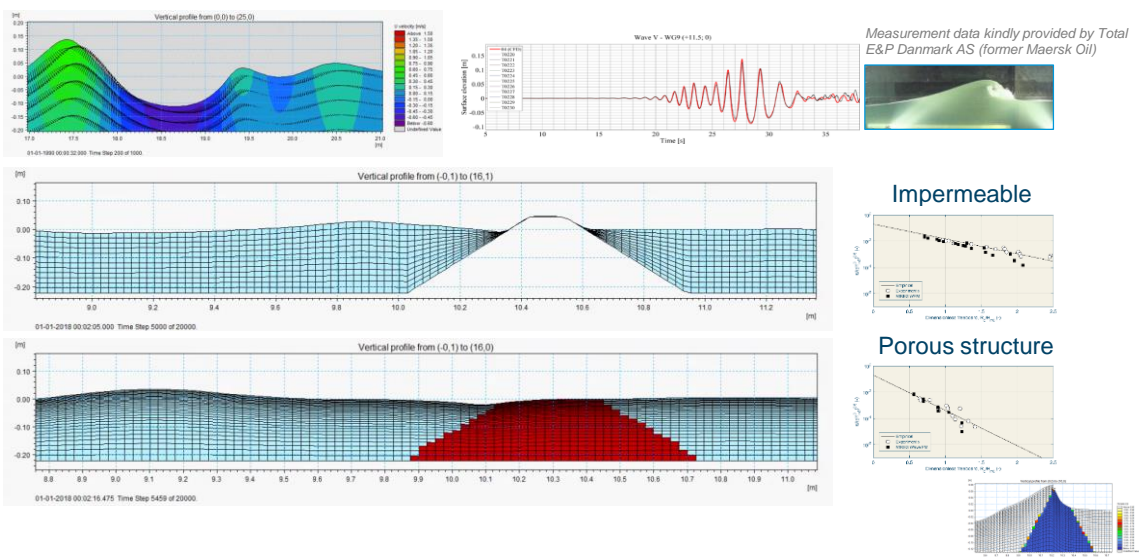
=> Very positive response 😊



A game changer for modelling of coastal flooding?

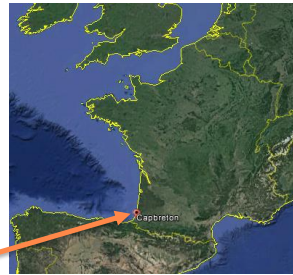
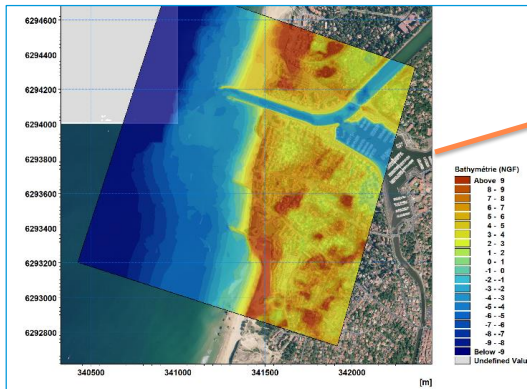


Breaking, run-up and overtopping – good prediction

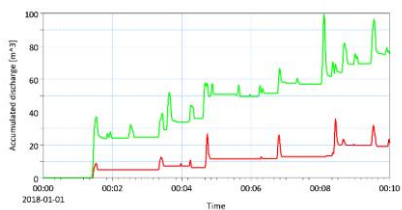
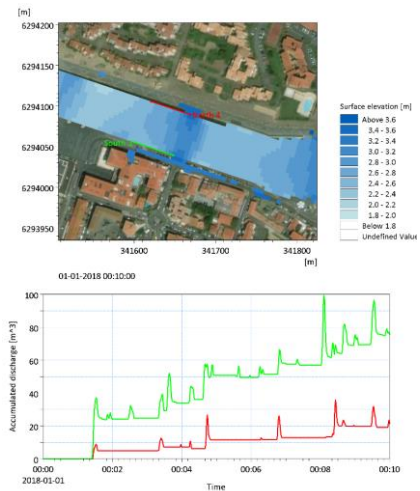
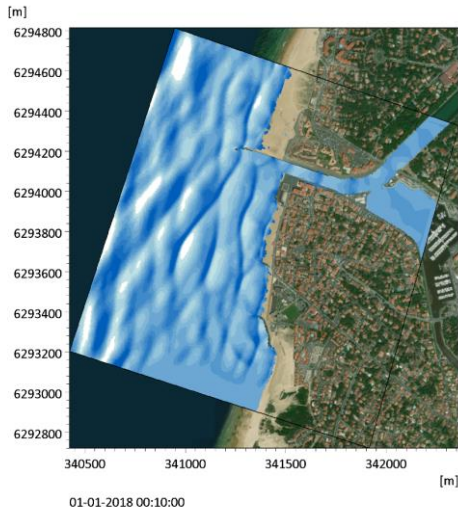


Coastal flooding in Capbreton, France

Capbreton in South-western France is exposed to coastal flooding during storm events (**surge, tide, wave run-up and overtopping**)



Coastal flooding in Capbreton, France – Results



Time series of the accumulated discharges across output lines over the duration of the simulation.

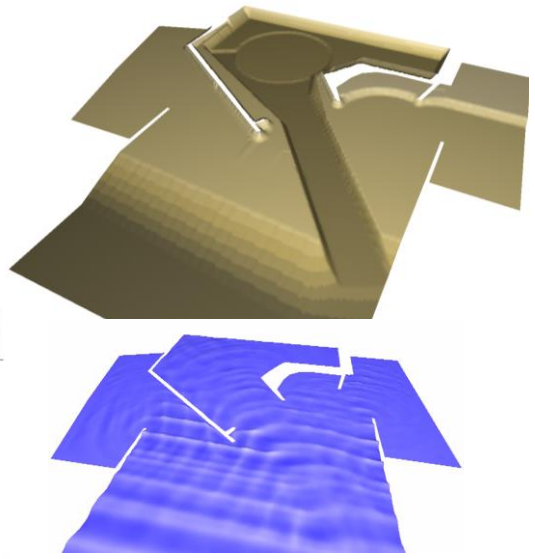
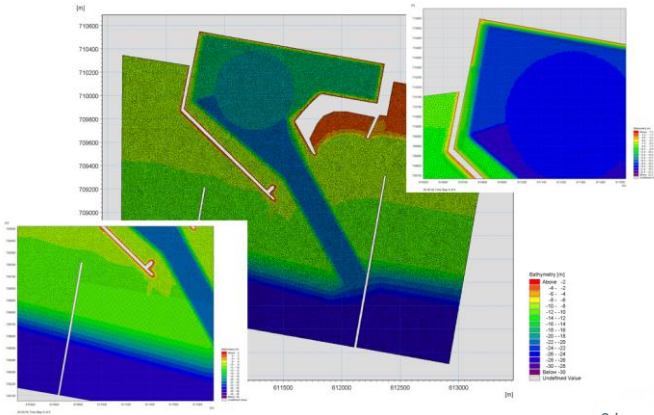


Wave agitation studies:

(sea, swell, infragravity waves)

MIKE 3 Wave FM vs MIKE 21 BW

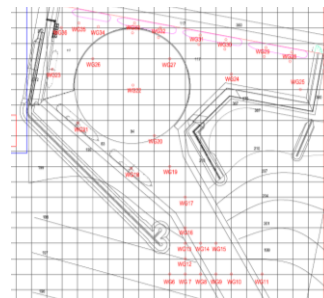
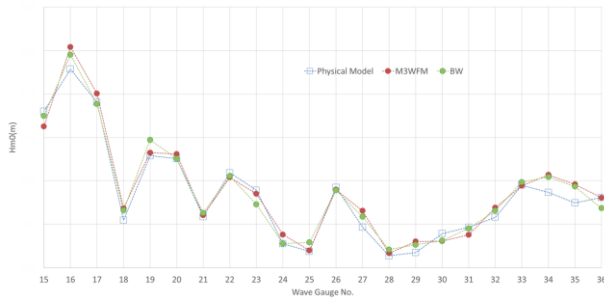
M3W FM Mesh



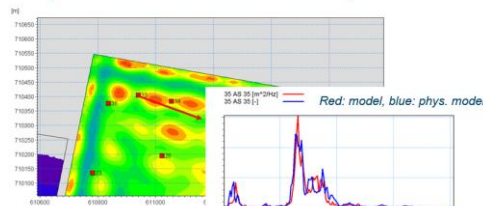
- 3 layers
- 5-10m spatial resolution



Comparison of model results - H_{m0}



Comparison of model results - Spectra



M21BW is > 5 times faster than M3WFM!



Future MIKE development focus:

Phase averaging: **MIKE 21 SW FM**

Phase resolving: **MIKE 3 Wave FM**



MIKE 21 MA was released in 2017



Vessel motions caused by a passing vessel

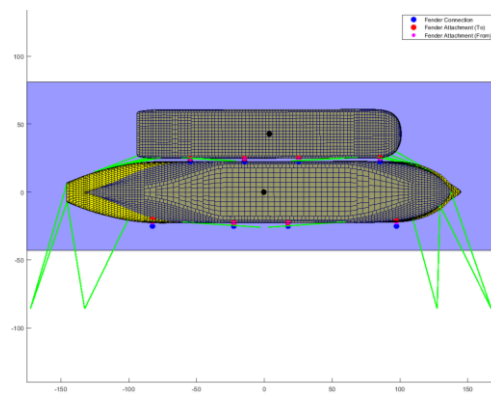
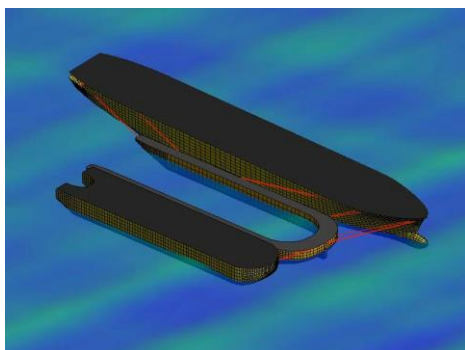


Vessel motions caused by wind, sea, swell and infragravity waves

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Now it handles multiple vessels – with forcing from MIKE

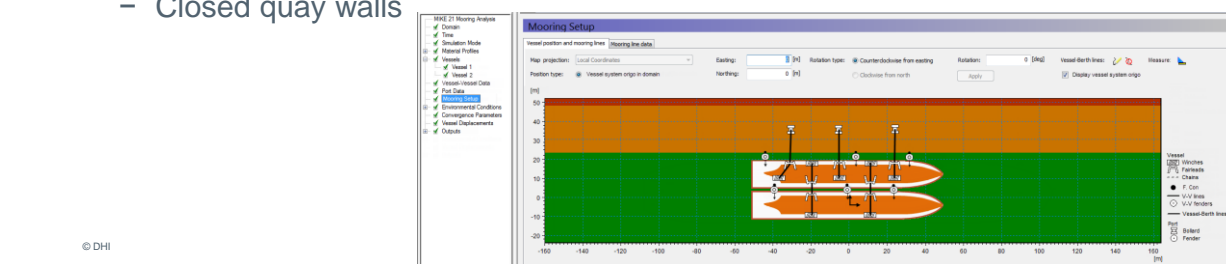


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Multi-body simulations in MIKE 21 Mooring Analysis + much more

- User interface support for simulating various floating structures, which influence each other, such as
 - Tandem moorings
 - Floating Storage and Regasification Units (FSRU)
 - Closed quay walls



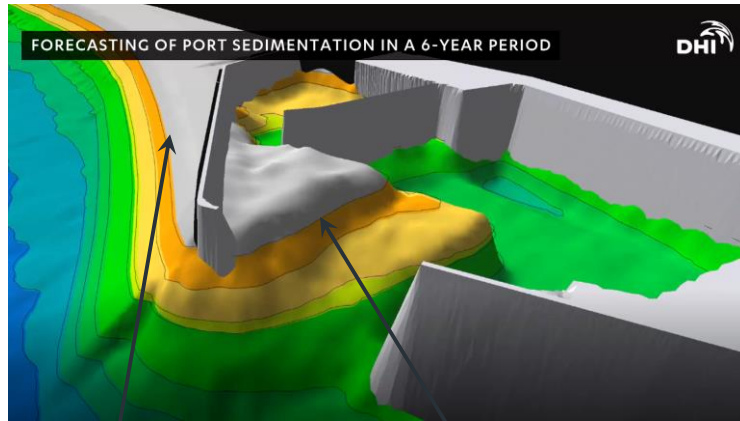
New Shoreline Morphology and Sand Transport features

- MIKE 21 SM and MIKE 21 ST



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The dream: Combine 2D and Shoreline Morphology in same model!



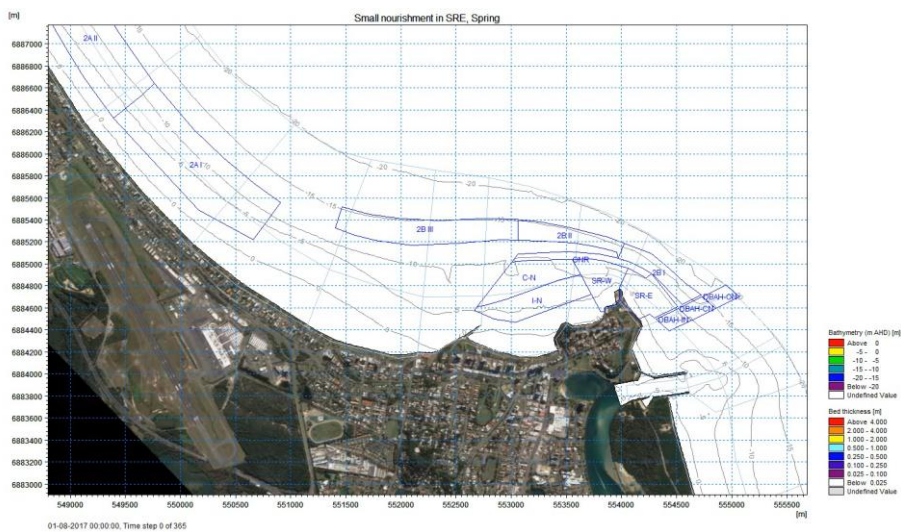
Shoreline morphology

2D morphology

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Combine 2D and Shoreline Morphology in same Model



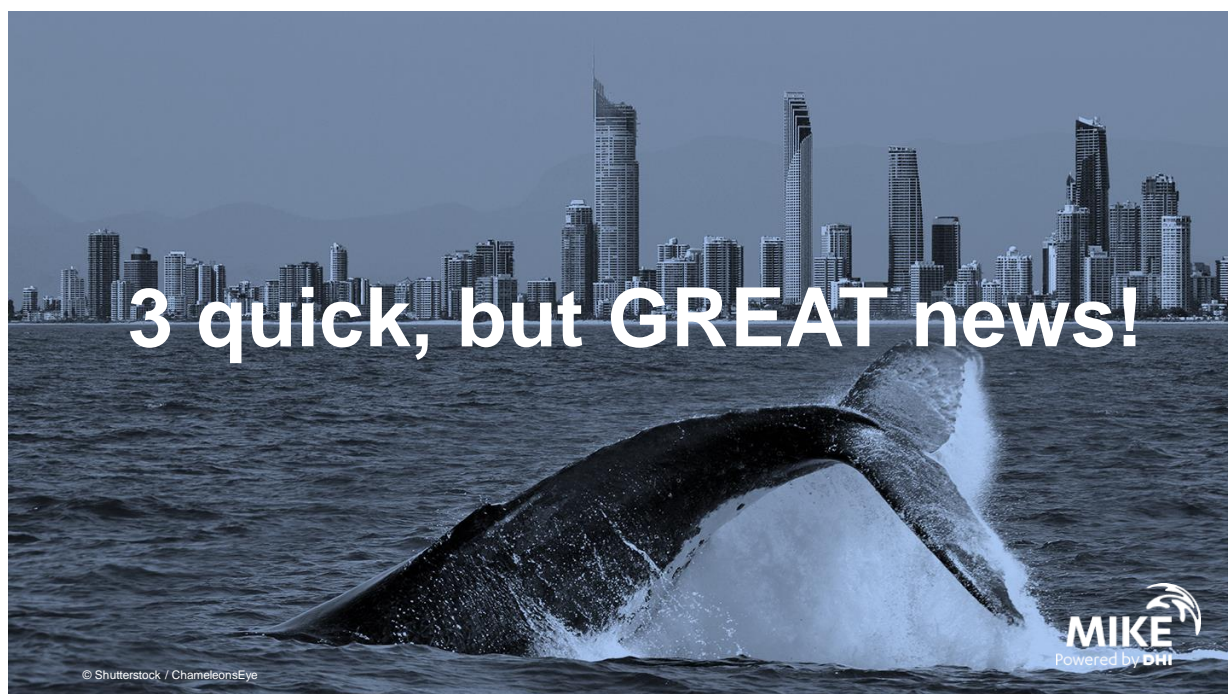
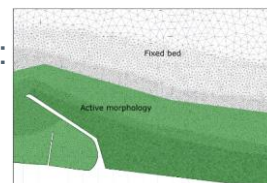
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Shoreline morphology: MIKE 21 SM and MIKE 21 ST

New developments:

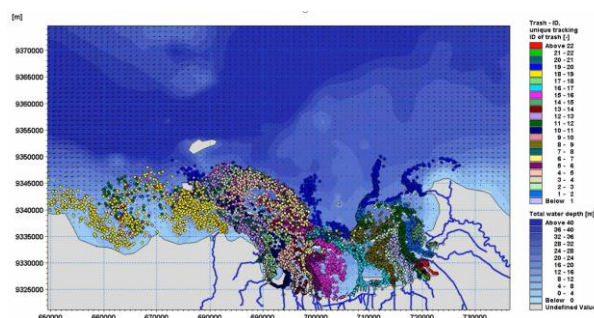
1. Combine 3 calculation methods in the same model:
 - No sediment dynamics
 - Sediment dynamics (MIKE 21 ST)
 - Shoreline Morphology (MIKE 21 SM)
2. Bed level sources and sinks: Add beach nourishment or navigation channel dredging to the simulation
3. Dune erosion model
4. Predefined time varying coastal profile in SM model



Technology enhancement for agent-based Process modules

- New Binary Particle Track for instantaneous result viewing
- Optimized XML particle track outputs
- Available for following MIKE 21/3 FM Process Modules:

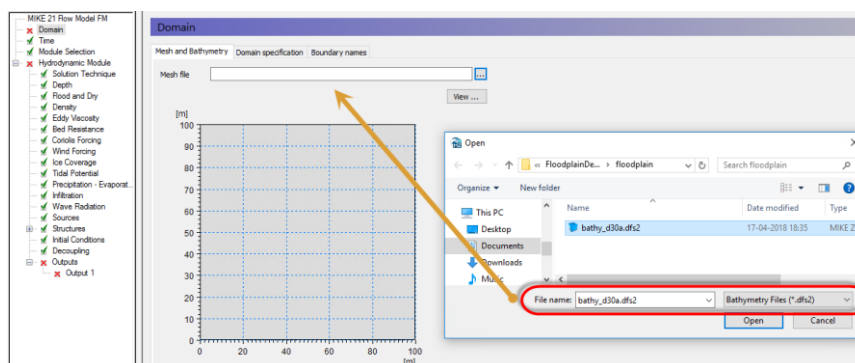
- Oil Spill
- Particle Tracking
- ABM Lab



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Structured Grids in MIKE FM

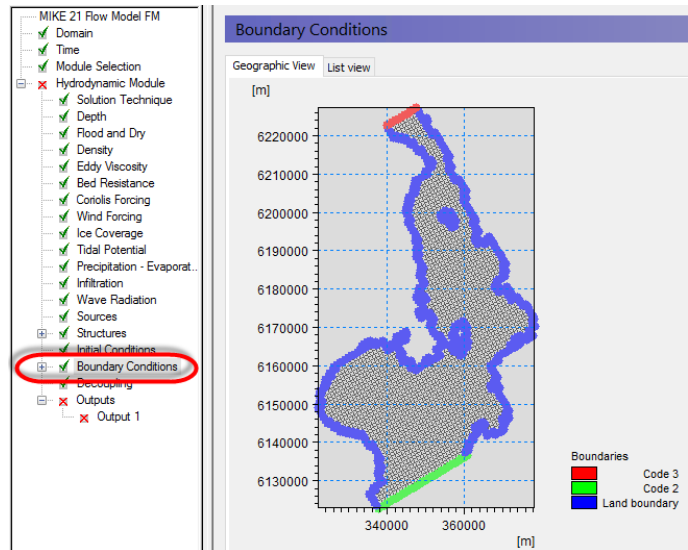
- Now possible to use Structured Grids as input for your Domain specification in **Flow Model FM**



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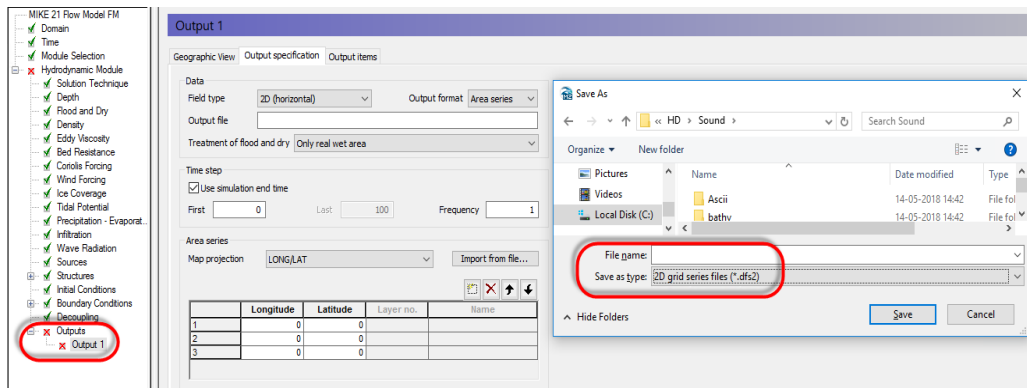
Grids in MIKE FM

- Use the **power of GPU processing** to run FM Flow Models with Structured Grid
- Boundaries in the Grid are correctly interpreted



Grids in MIKE FM - output

- Grid (DFS2) input → Grid (DFS2) Output



Get the most out of your existing FM Process Module licences

- There will no longer be a HD module license check for running MIKE 21/3 HD FM in decoupled mode
- This means you can now run all your process modules in parallel on a decoupled setup!



02.

Online services speeding up your projects



Digital Data Portals launched within the past 12 months!



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Thank you!

hkh@dhigroup.com

71%
- our playground





Any questions?



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