



The Glider Phase II project 2019-2023

Lionel Camus & Salve Dahle, Akvaplan.niva

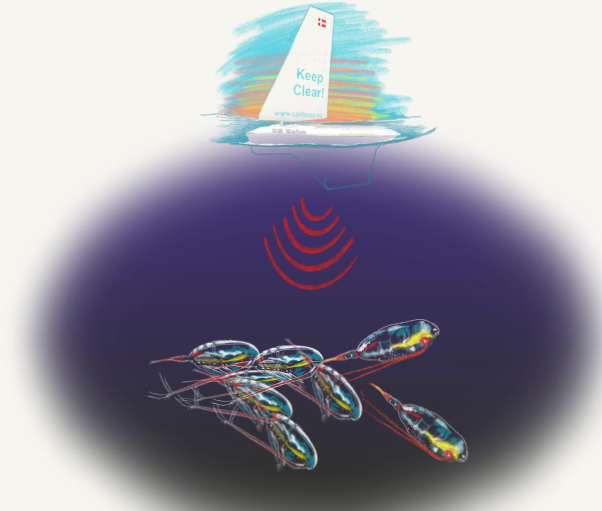
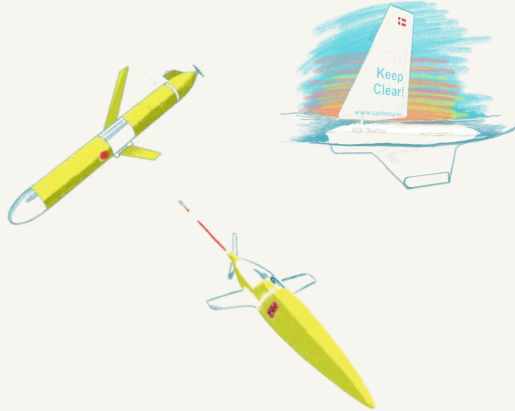
Financed by ConocoPhillips

Glider project Phase I - 2017-2019

ConocoPhillips

Forskningsrådet

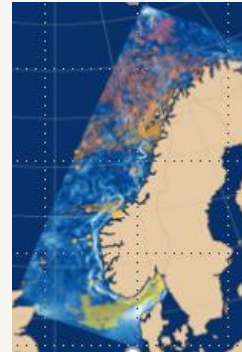
Target-oriented
Glider fleets
ecosystem
observation



Knowledge of plankton and
biomass drift



Sea mammal ecology



Assimilative
observational data
into the
operational model

Akvaplan.niva



Article

Autonomous Surface and Underwater Vehicles as Effective Ecosystem Monitoring and Research Platforms in the Arctic—The Glider Project [†]

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Abstract: Effective ocean management requires integrated and sustainable ocean observing systems enabling us to map and understand ecosystem properties and the effects of human activities. Autonomous subsurface and surface vehicles, here collectively referred to as “gliders”, are part of such



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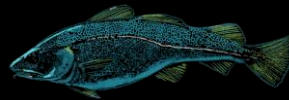
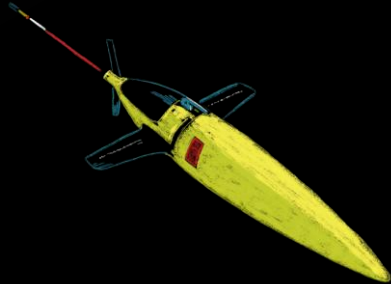
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Financed by ConocoPhillips

Phase II: Autonomous robotics and advanced digital system to measure impact of:

1. produced water and
 2. seismic activities
- at Ekofisk

Financed by ConocoPhillips



Justifications

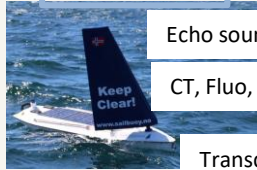
Today's monitoring methods

- Costly
- Personnel at risk
- Only one time point
- Low data resolution
- High CO₂ emission
- Long time from field survey to data interpretation and decision making



Technological assets

Surface



Echo sounder EK80

CT, Fluo, O₂

Transducers: 333, 200 & 120 KHz



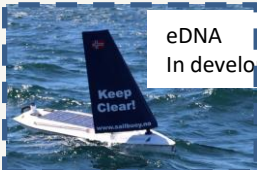
Echo sounder EK80

CT, Fluo, O₂



ADCP

CT, Fluo, O₂



eDNA
In development with NIVA



metOcean
Weather, oceanography

Subsea



CT, Fluo, O₂, turb, Cdom, Hydroph

Echo sounder EK80 & plankton sensor UVP6

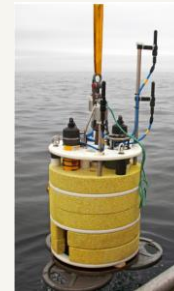
Hyroid Seaglider 0-1000m



CT, Fluo, O₂, turb, Cdom, Hydroph

Echo sounder EK80 & plankton sensor UVP6

Teledyne Slocum 0-200m



JASCO C lander
Hydrophone AMAR

Coastal



EK80 & SIMRAD Multibeam Echosounder

Sailbuoy

Waveglider

Autonomous Robotics rigged with a suite of sensors



UVP6 plankton sensor on Seaglider



EcoTaxa

EcoTaxa is a web application dedicated to the visual exploration and the taxonomic annotation of images that illustrate the beauty of planktonic biodiversity.



Observatoire Océanologique de Villefranche-sur-mer



Station Biologique de Roscoff



Oceanomics



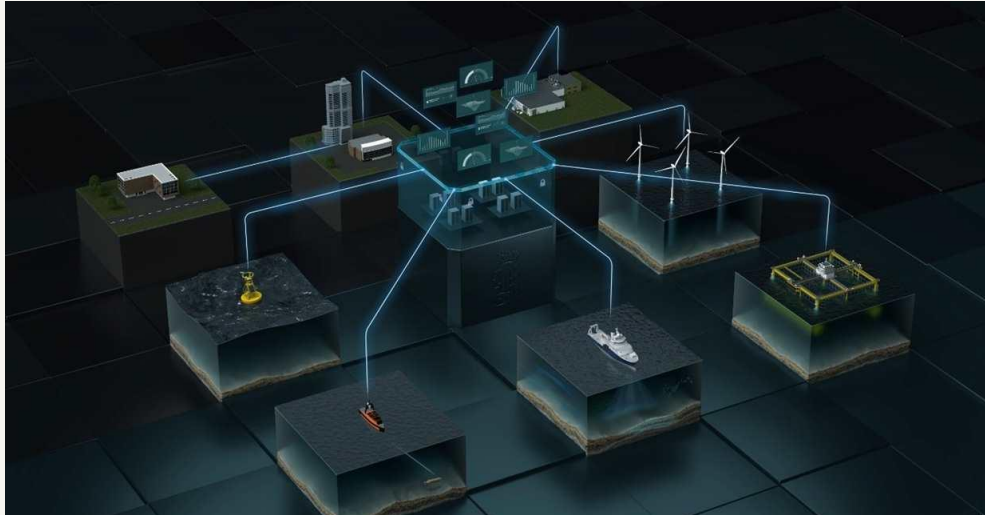
Partner University Fund

Akvaplan
niva

Blue Insight: A POWERFUL DIGITAL TOOLBOX FOR OCEAN DATA MANAGEMENT AND ANALYSIS



KONGSBERG



COLLECT, CONTEXTUALIZE, VISUALIZE, ANALYZE AND DISTRIBUTE

PRESSEMELDING - 12. OKTOBER 2021

Akvaplan-niva collaborates as Kongsberg Maritime launches a digital toolbox for ocean data management and analysis - Blue Insight

Blue Insight provides an open, modular platform for the processing, visualisation and sharing of ocean data. The core module contains the cloud framework – which has been built to the highest cyber security standards – and an application-specific dashboard, teamed with data storage and management functionalities. Additional modules can be added to this framework to tailor Blue Insight's functionality to suit all projects, however large or small.

Key to Blue Insight's data-streaming functionality is the concept of **sensor fusion**, by which data is streamlined from various onboard sensors and a local database for seamless transmission into the cloud. In addition, the module serves as a link with KM onboard sensors for remote operation.

Data can be collected from any platform, ranging from crewed to



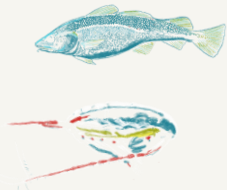


Lat. , Long. | Dist. 59.6535 , 3.6284 | 345.8 km , 186.73 nm

What have we achieved in 2021?



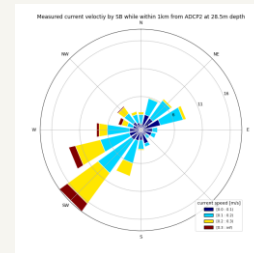
Echo sounder EK80



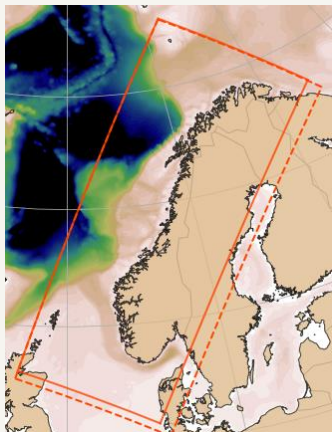
Impact of PW on biomass, zooplankton



Ocean current

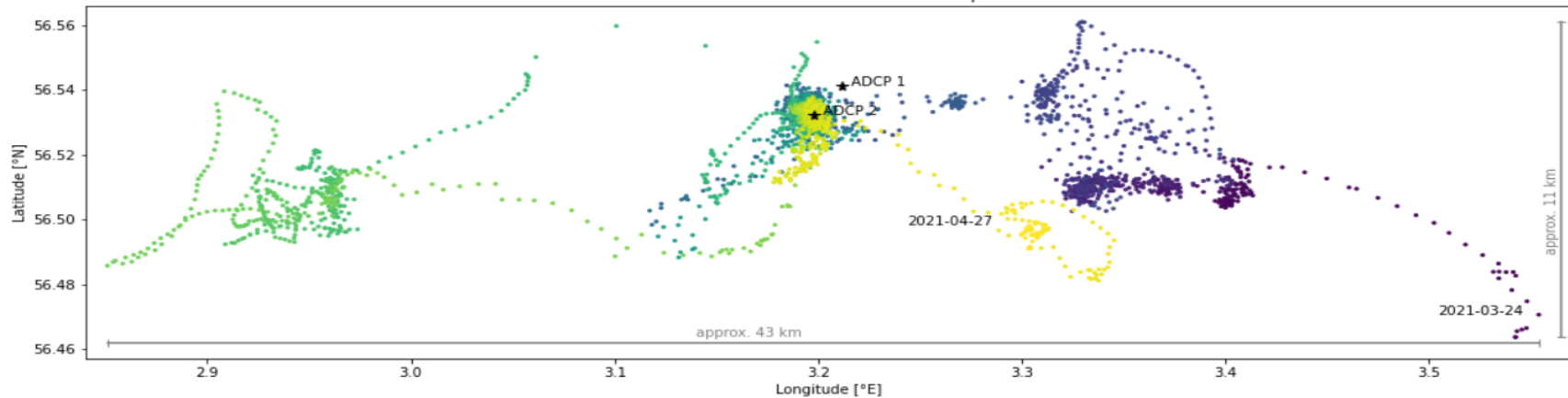


In collaboration with WCM programme

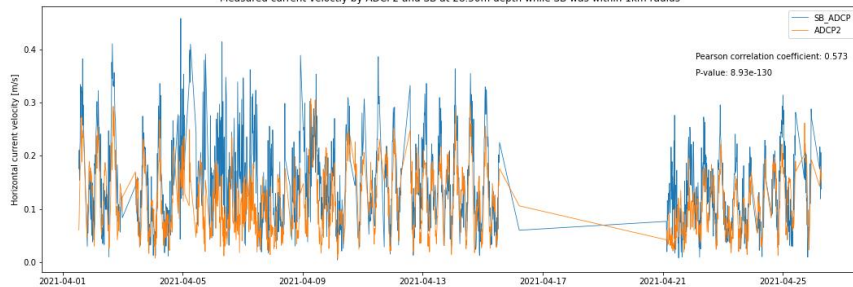


Developing a high resolution model at Ekofisk

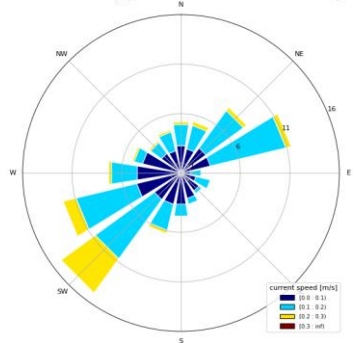
ADCP locations and SB track at Ekofisk April 2021



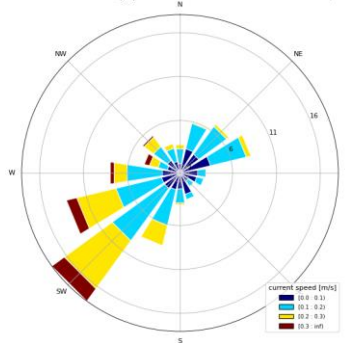
Measured current velocity by ADCP2 and SB at 28.50m depth while SB was within 1km radius



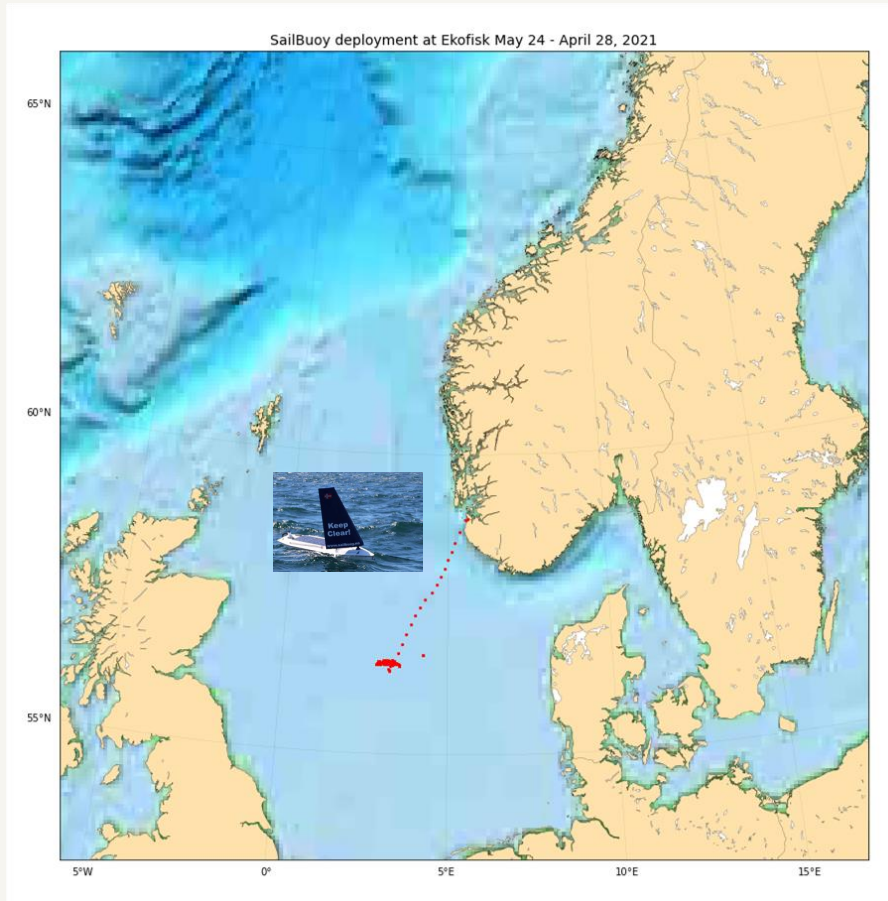
Measured current velocity by ADCP2 while SB within 1km radius at 28.50m depth



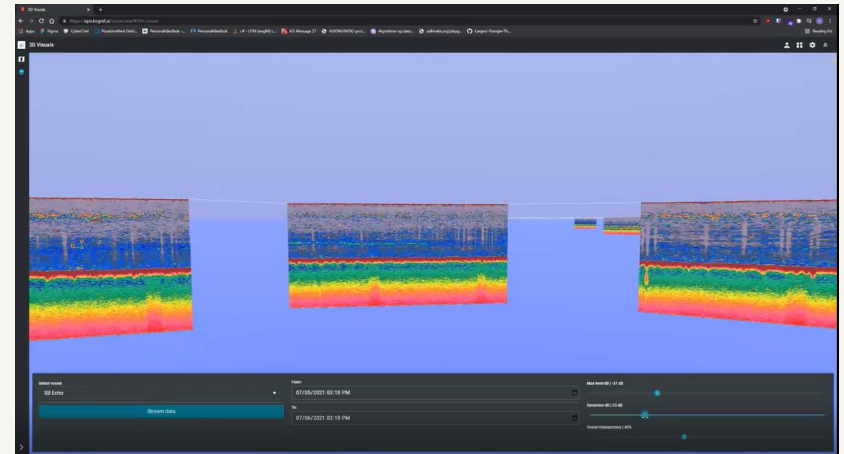
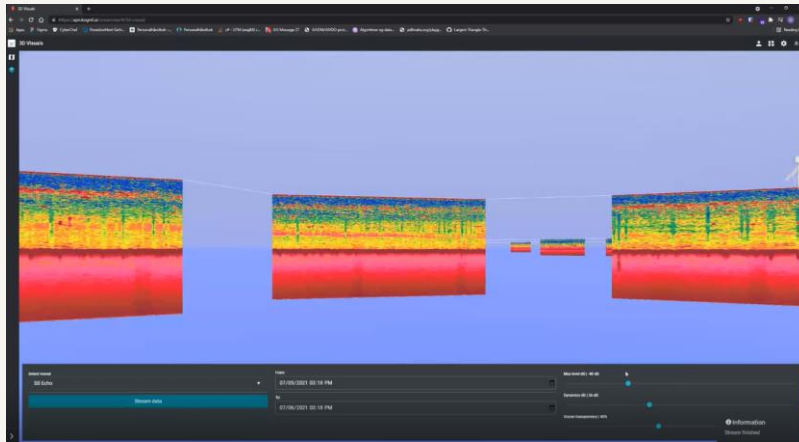
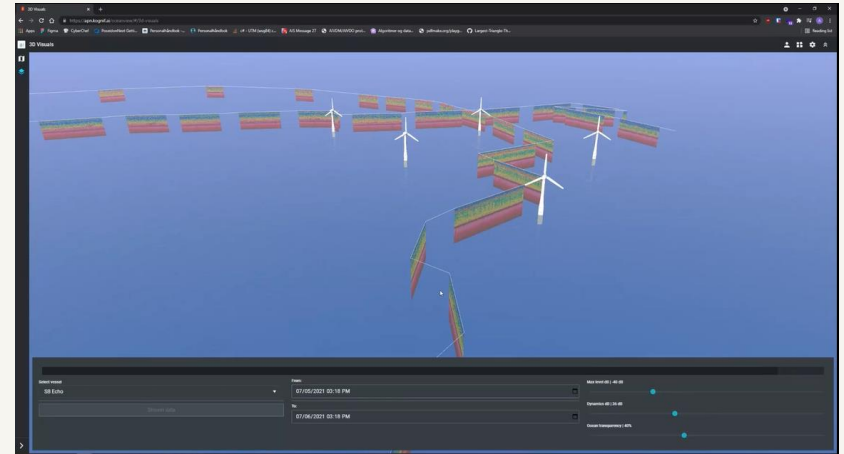
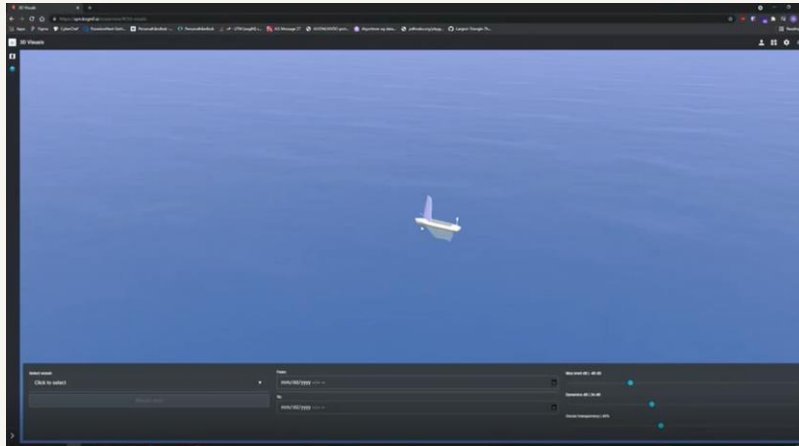
Measured current velocity by SB while within 1km from ADCP2 at 28.5m depth



Unmanned real time ocean current measurement robot!



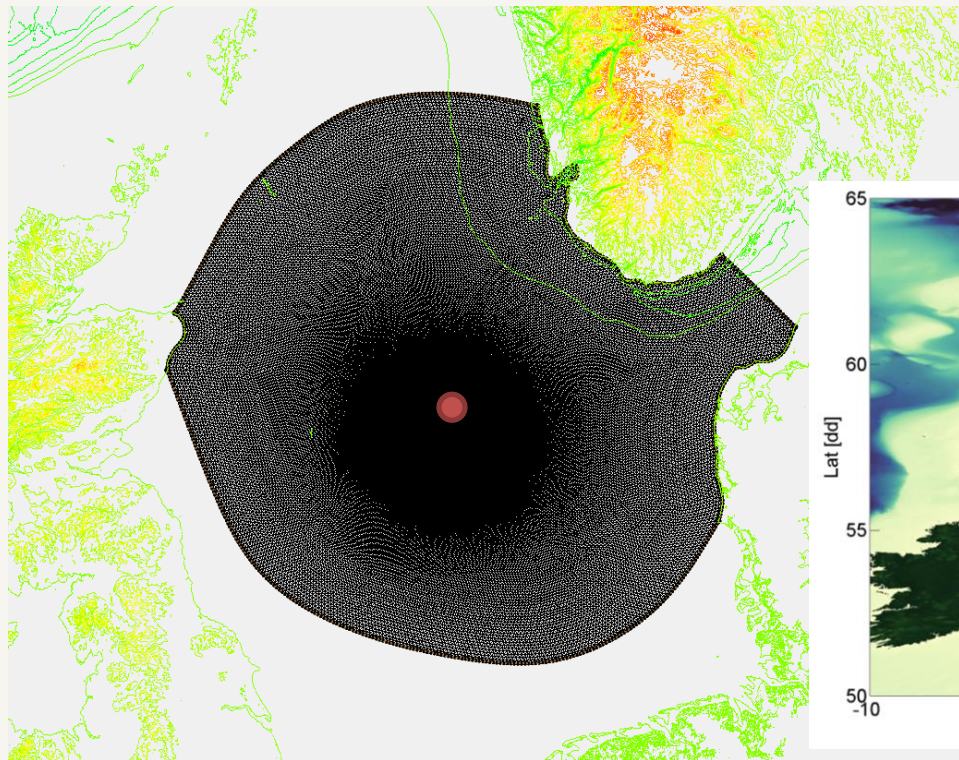
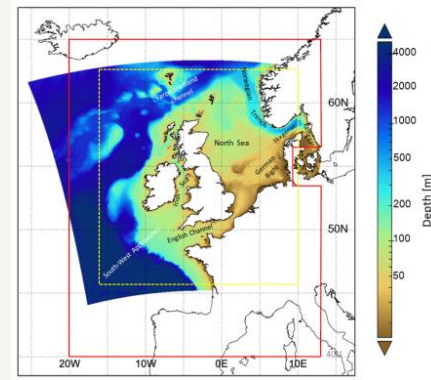
3D visualization and signal classification in taxonomic groups



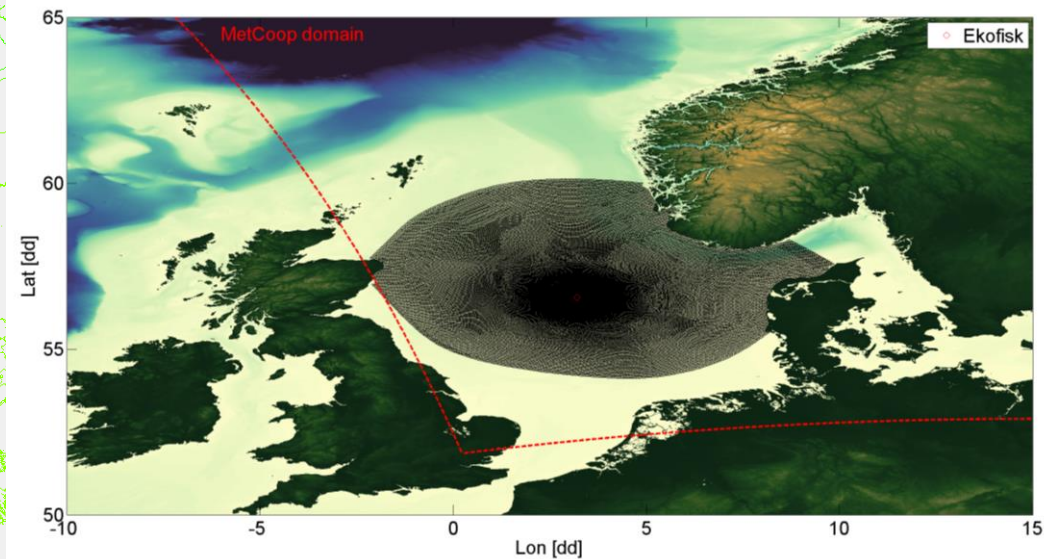
Model domain

Model resolution

Model forcing



North Sea model



Model domain

Model resolution

Model forcing

id

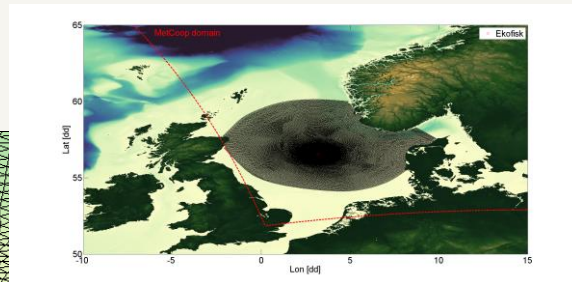
5 km at outer boundary

Ekofisk

Resolution increase

Resolution decrease

350 m resolution at circle showing the boundary of high-resolution Ekofisk

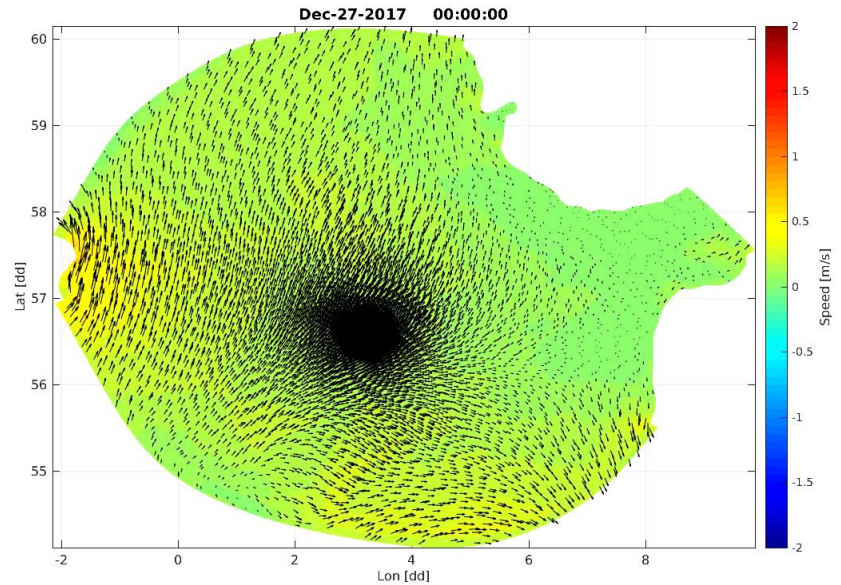
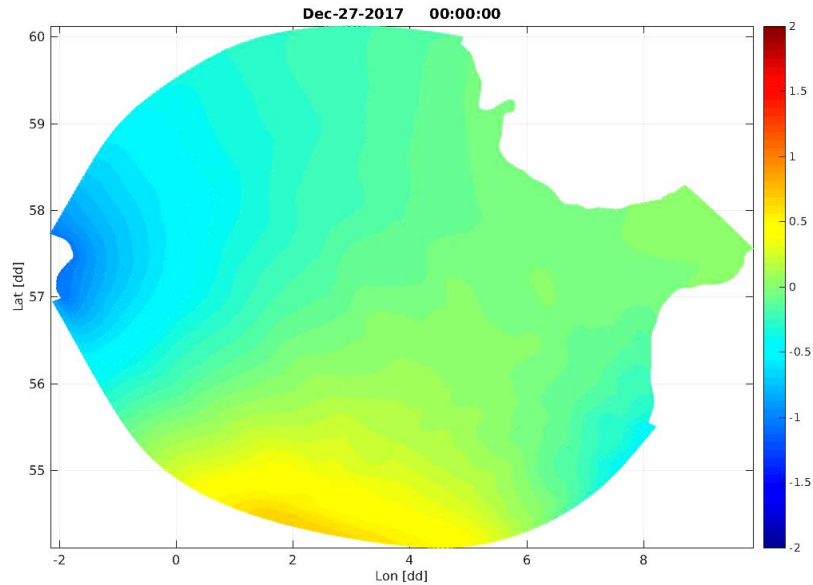


North Sea model

2D-North
Sea

3D-North
Sea

3D-Child



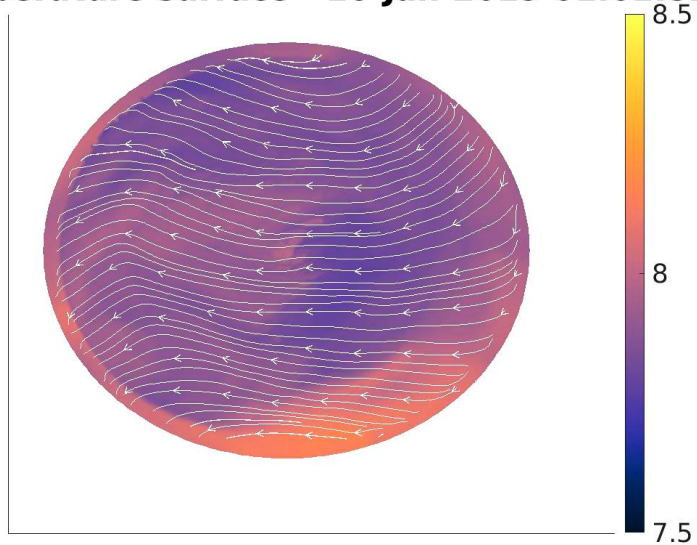
2D - simulations (2017-2021)
2D - simulations (2017 -2022)

2D-North
Sea

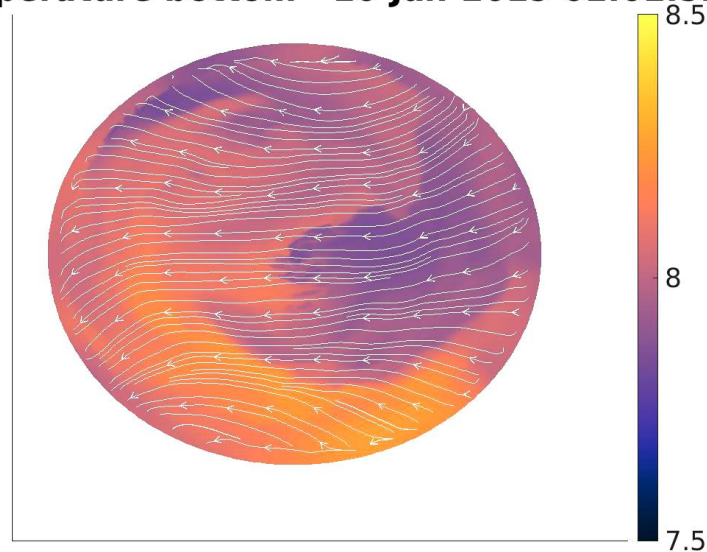
3D-North
Sea

3D-Child

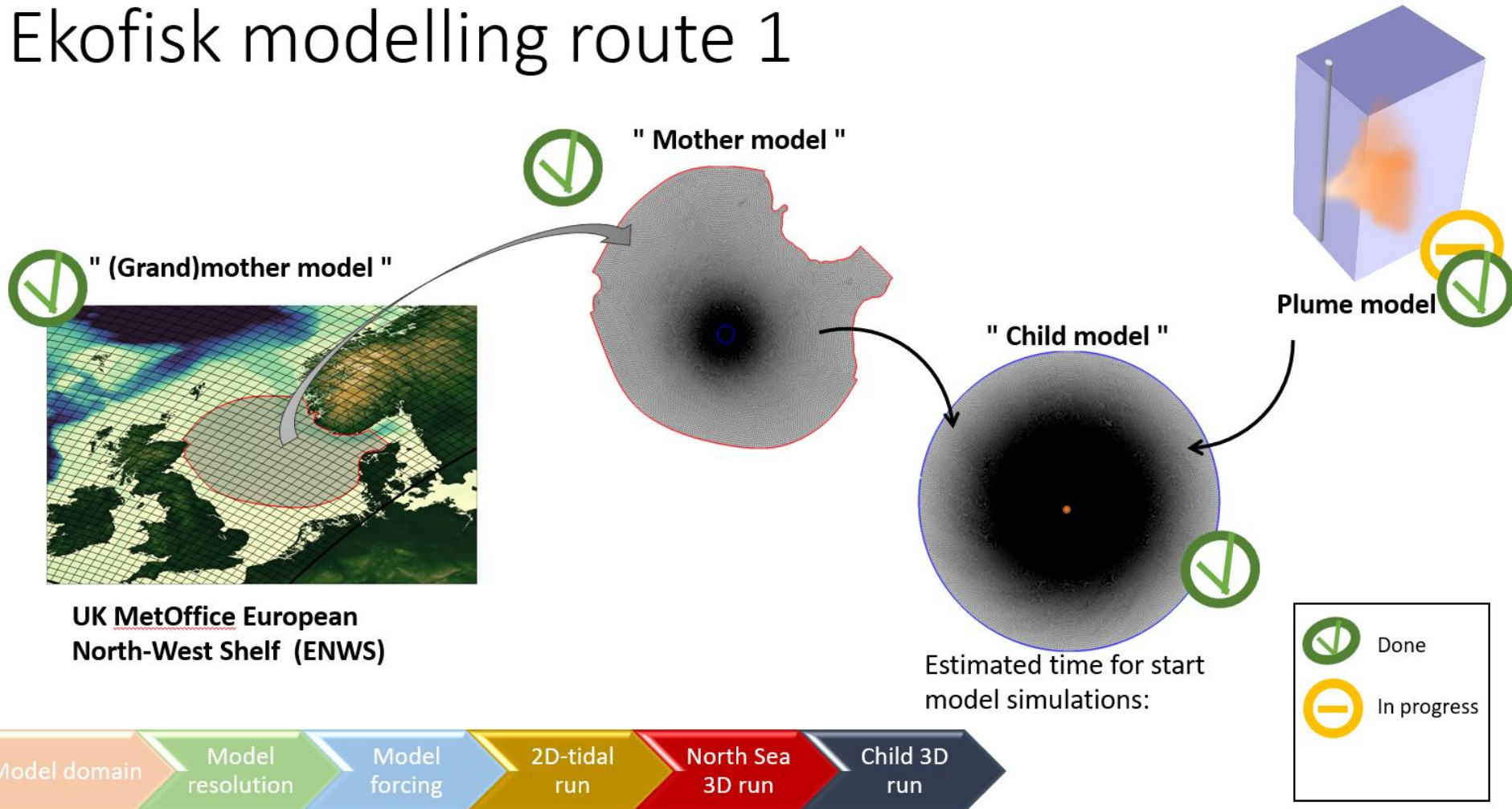
Temperature surface - 10-Jan-2019 01:01:52



Temperature bottom - 10-Jan-2019 01:01:52

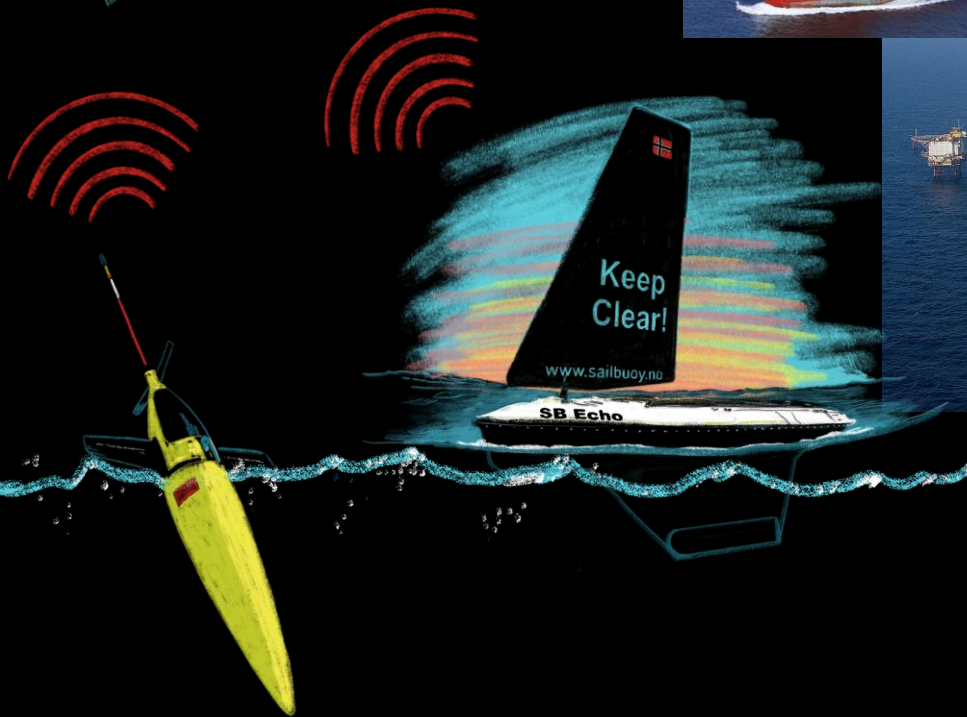
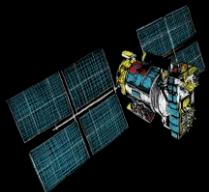


Ekofisk modelling route 1



What's next?

Spring 2022-impact of Seismic activity



Partners

Kongsberg Maritime

Institute of Marine Research

NIVA

Met.no

Anderaa

Offshore Sensing

Cyprus Subsea & Consulting Services