

Modelling of the Oslofjord

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NTNU, 10-04-2025

Agenda

- About DHI
- The Oslofjord
- The model
- Validation
- Conclusion

DHI in brief

Consultants, research & software development within water and environment



Global consulting company with deep expertise, leading technology and continuous innovation



Independent foundation, profit-for-purpose



Supporting sustainability in aquatic environments

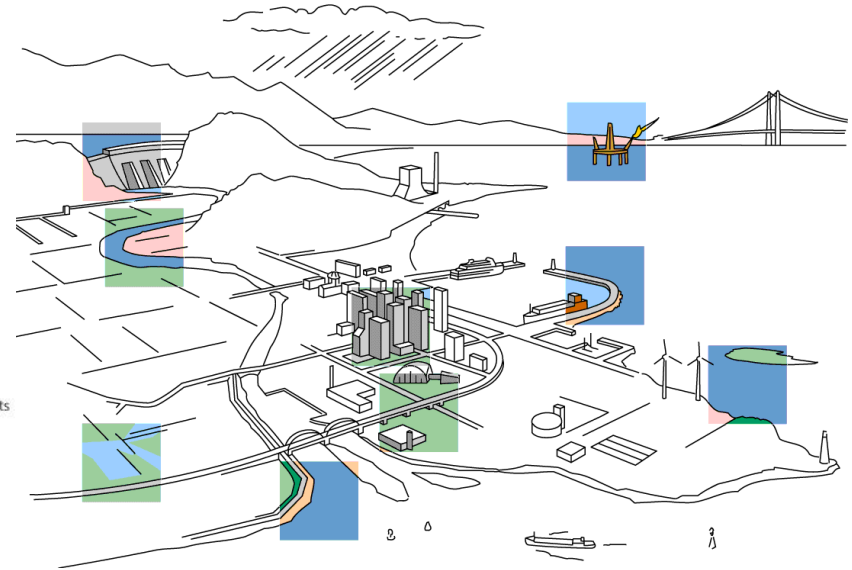


1200+ employees, 80% with MSc or PhD



Representing 65+ years of experience and dedicated research

MIKE Modeling tools

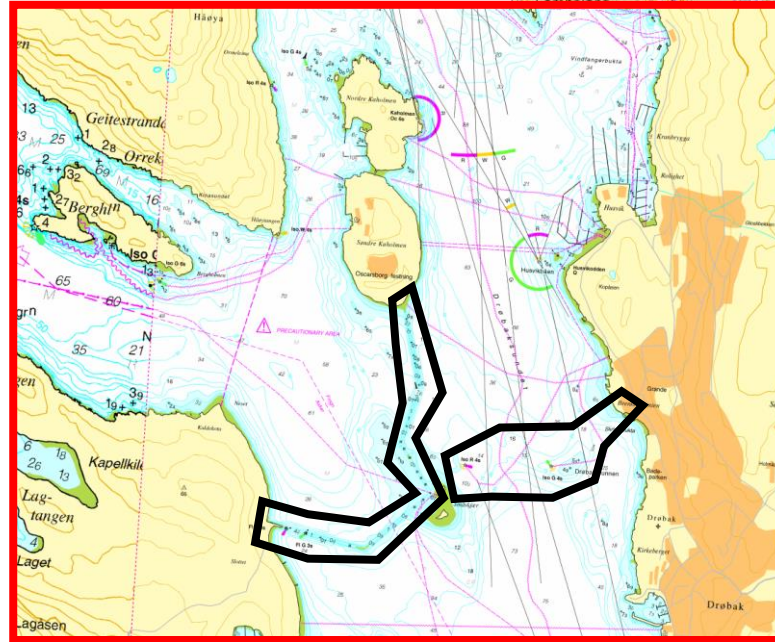


*Model the world of water and all its interactions - from **mountain streams** to the **sea**, from **lakes** to **drinking water** and **below the surface**...*



The Oslofjord

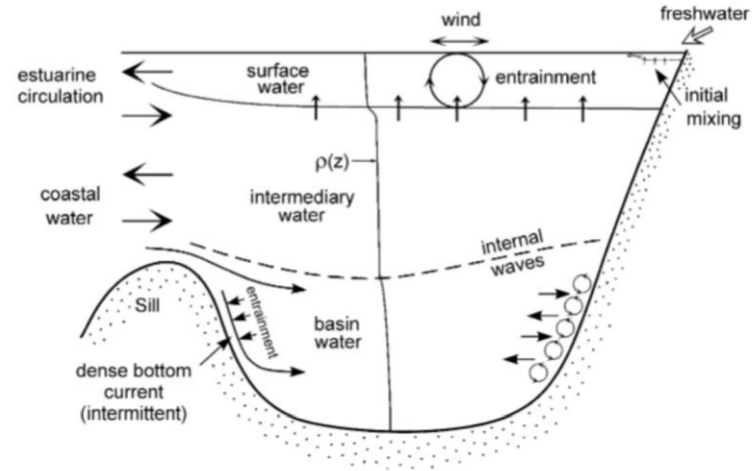
- Sill
- Jetty



From www.kystinfo.no

Theory

- Sill fjords
- Break-inn
- Previous theory: An opening in the jetty will weaken the internal waves
 - Less mixing
 - Less often inflow of salt water
- Based on several simplifications



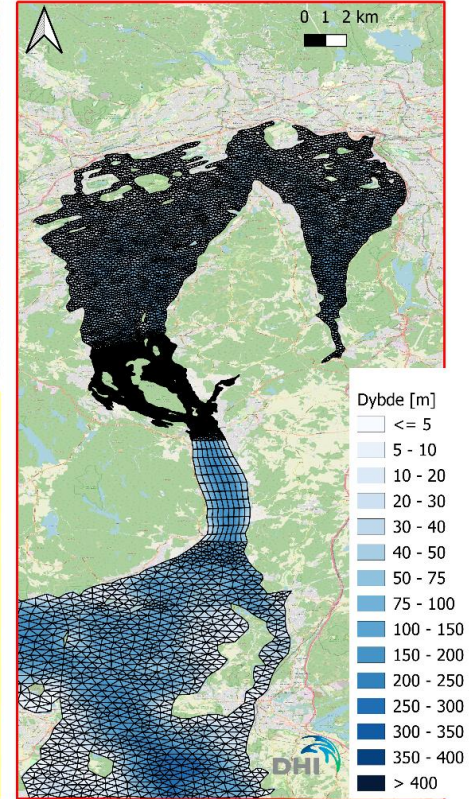
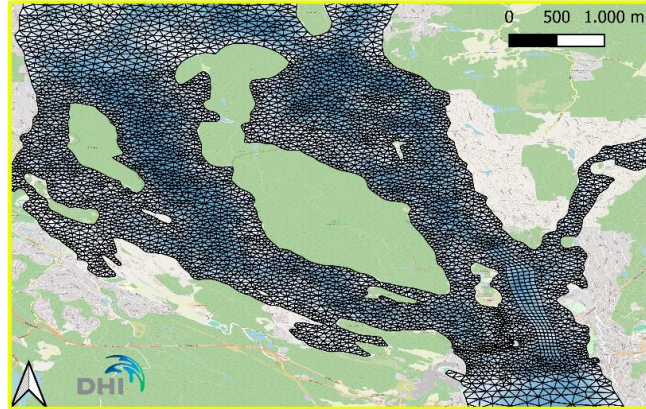
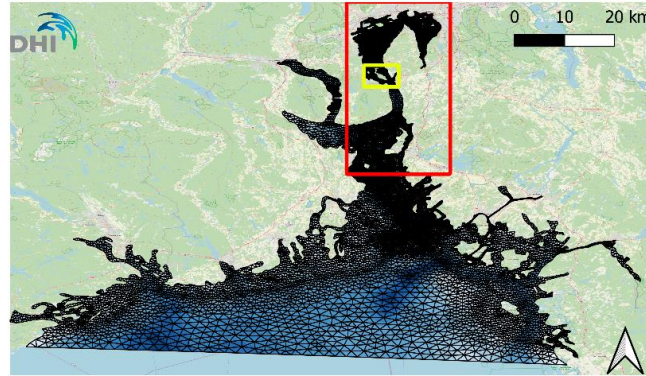
From Stigebrandt 2012

The task

- K15: Investigate issues related to water exchange to Inner Oslofjord through the Drøbak sound near Oscarsborg and possible measures to possibly improve water exchange. Possible measures must be assessed against other considerations, including the jetty's cultural and historical values.

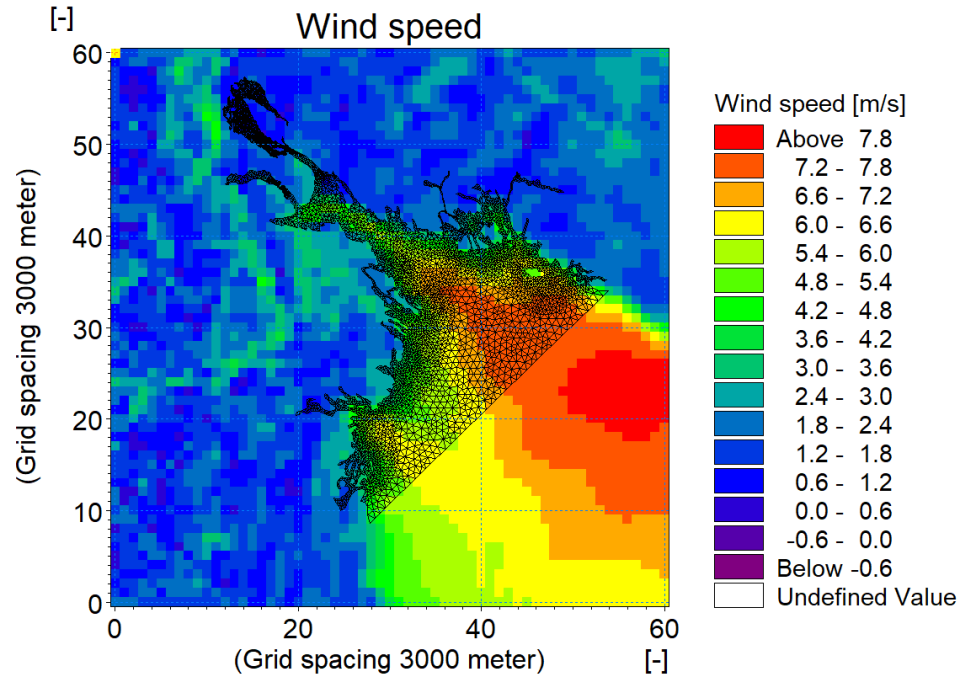
Mesh

- Combining quad and triangles
- Flexible mesh, combining coarse and high resolution

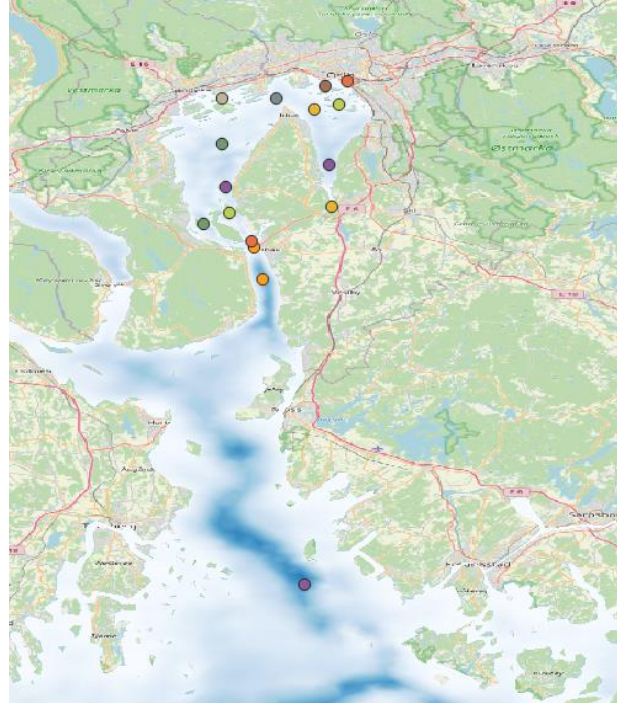


Setup

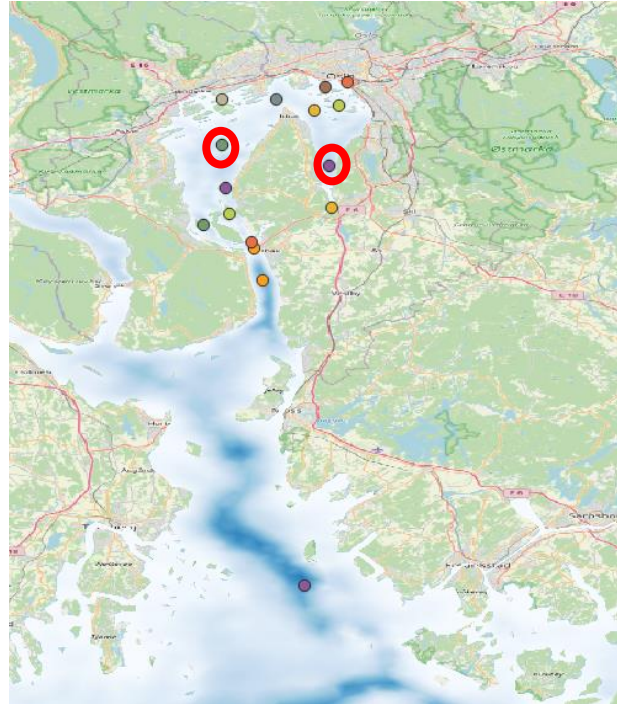
- 6 years (2018-2023)
- Wind and meteorology
- Boundary conditions
- Rivers
- Water treatment plant



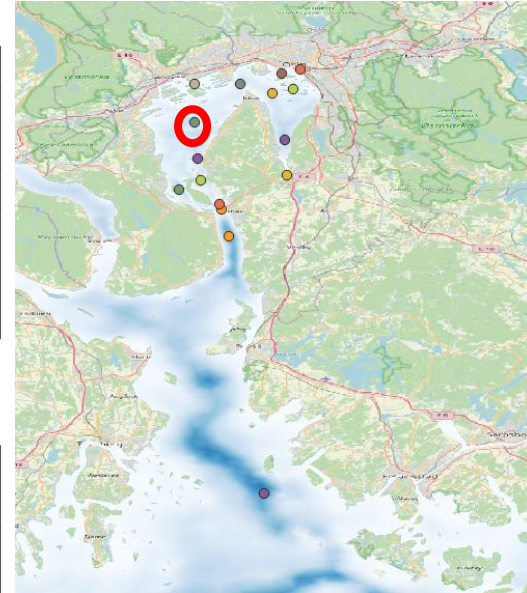
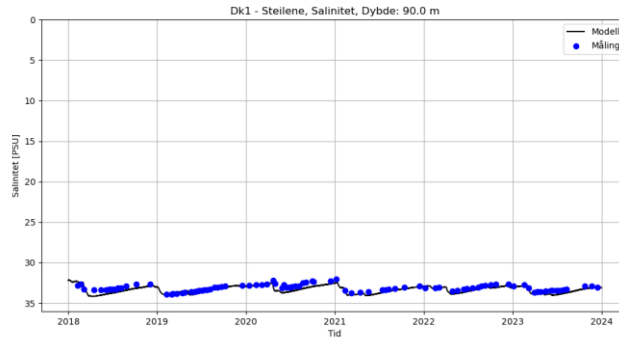
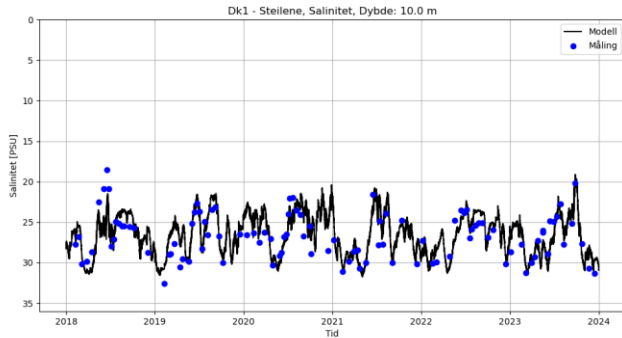
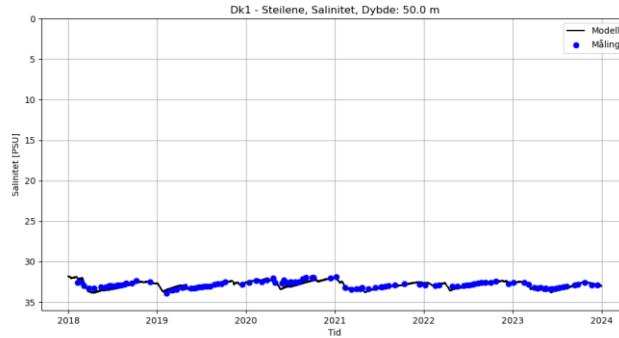
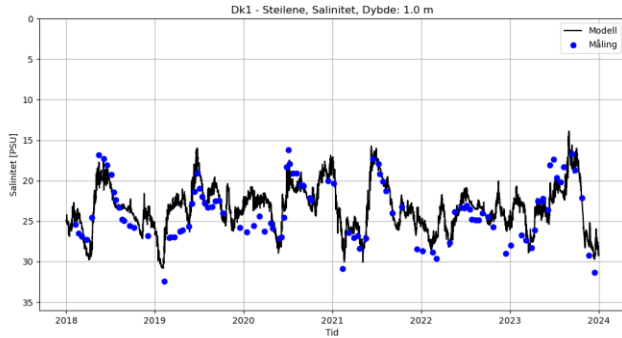
Measurement stations



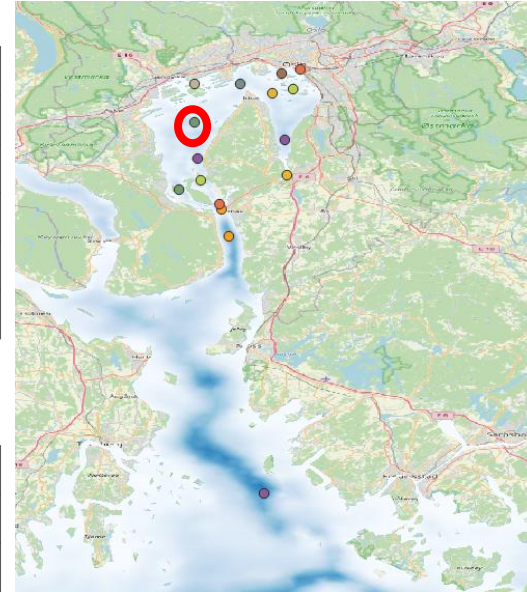
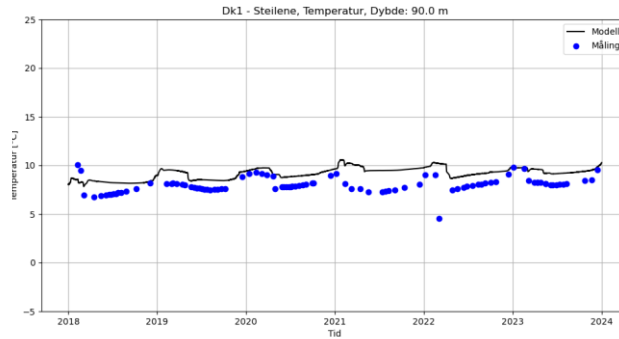
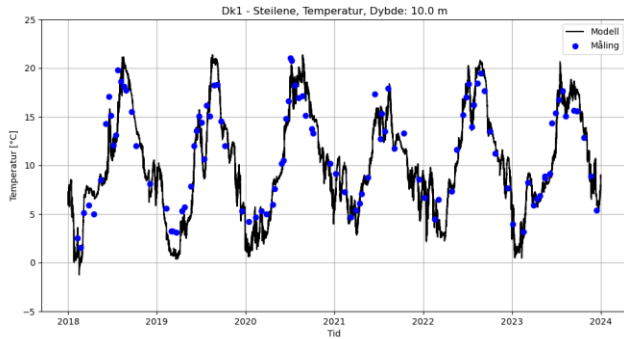
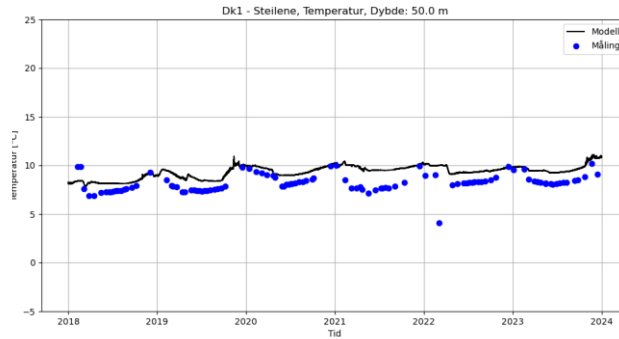
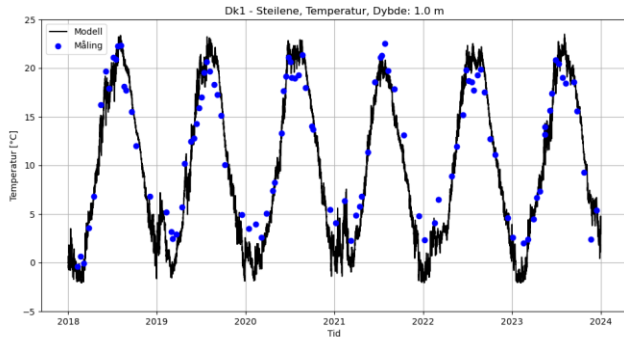
Measurement stations



Measurement stations – Salinity - Dk1 Steilene



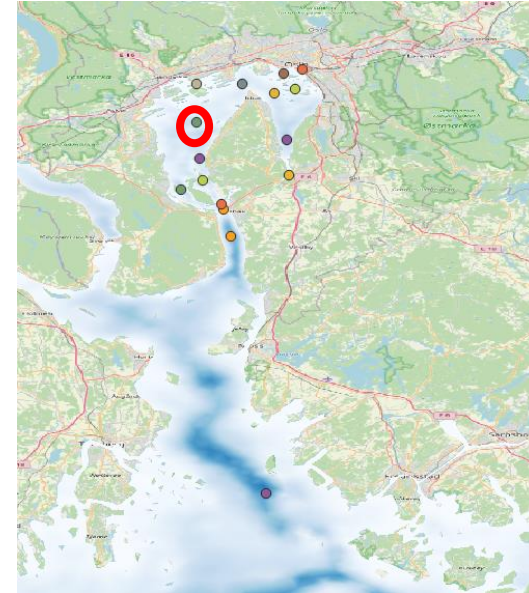
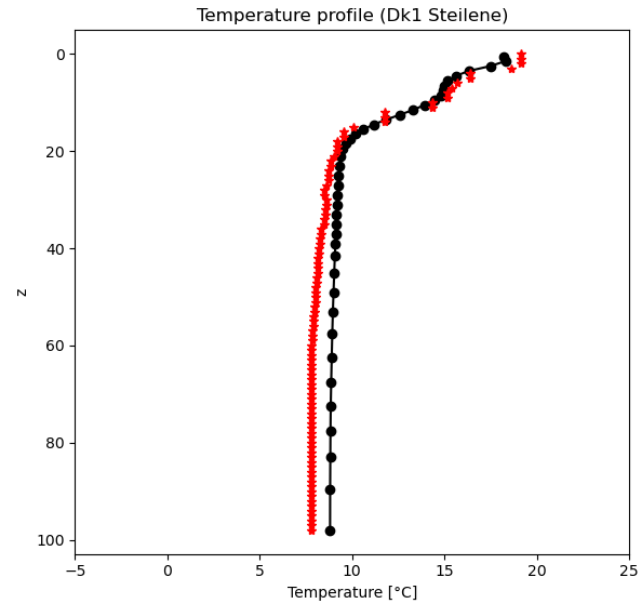
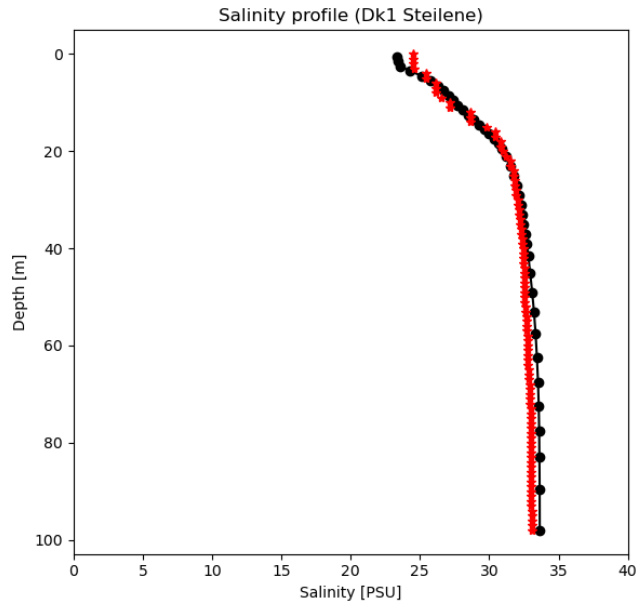
Measurement stations – Temperature - Dk1 Steilene



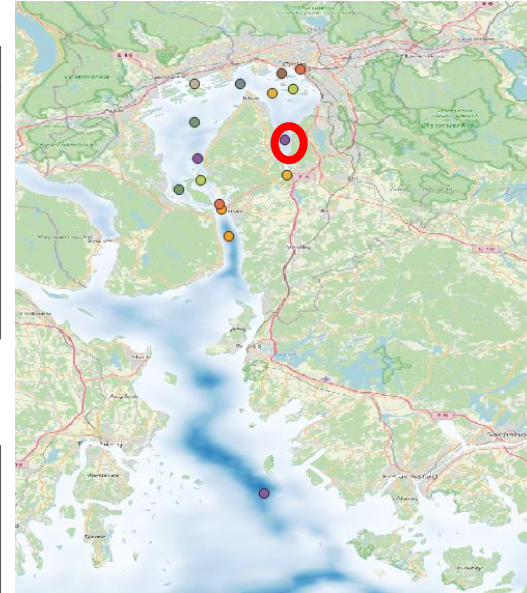
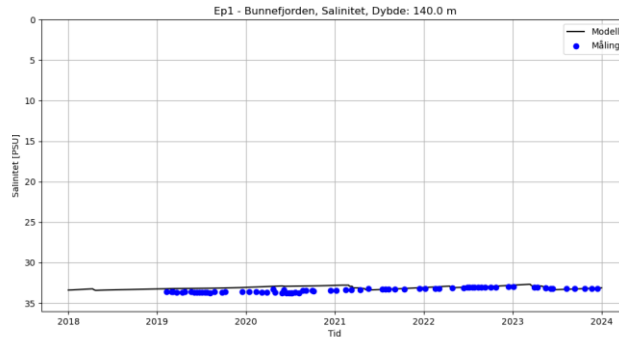
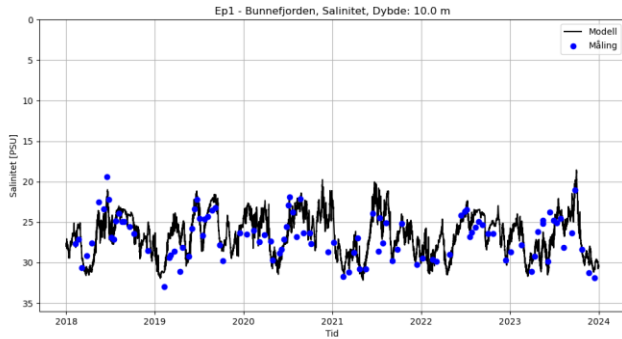
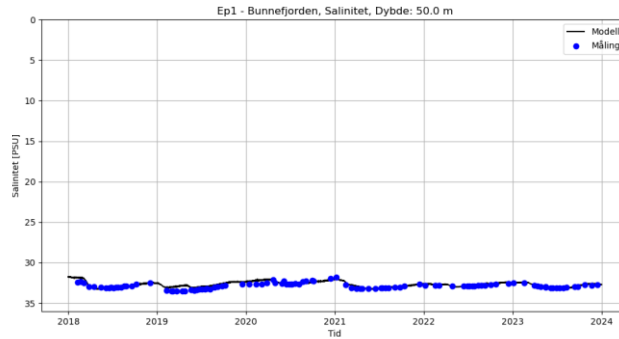
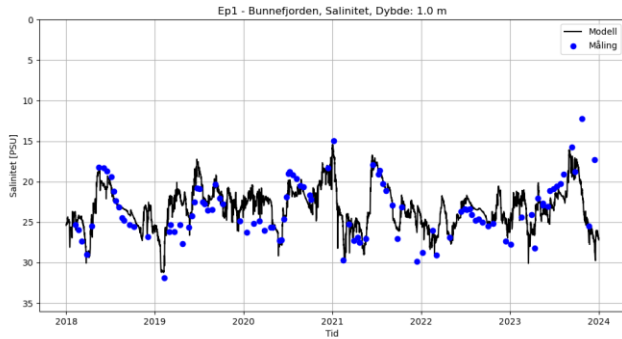
Measurement stations – Profile - Dk1 Steilene

Dk1 - Steilene - 2020-06-15

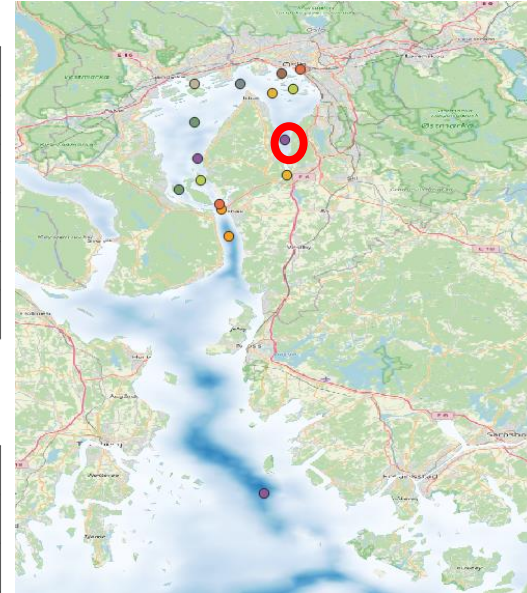
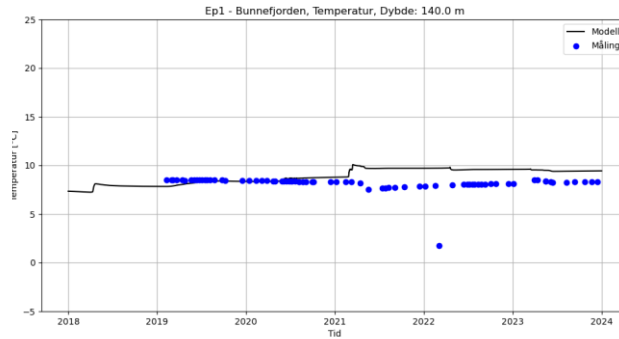
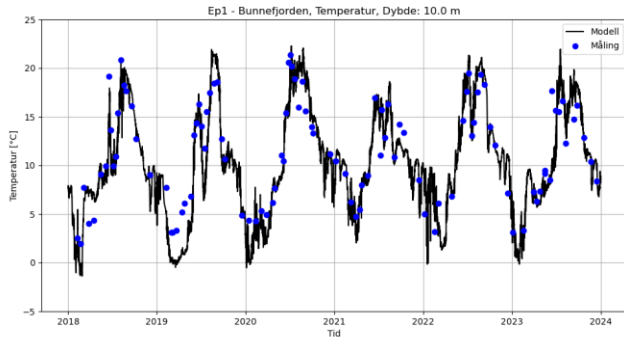
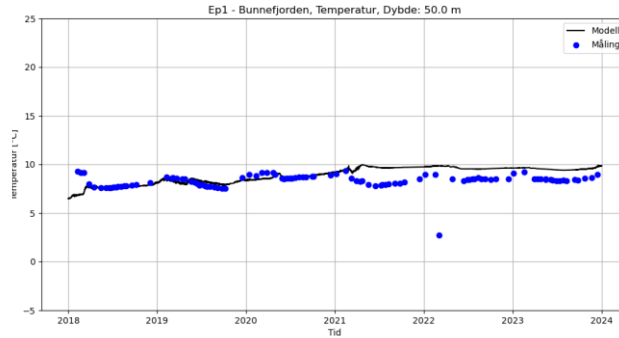
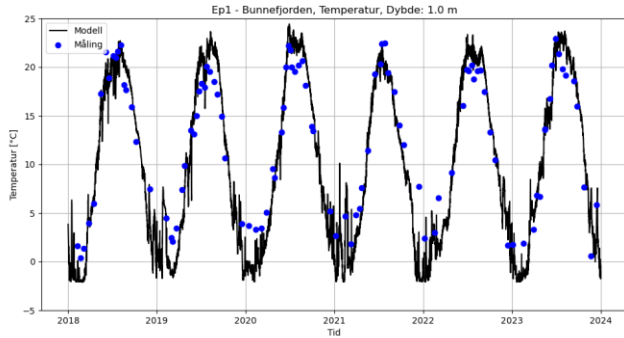
★ Measurement 2020-06-15 ● Model 2020-06-15



Measurement stations – Salinity - Ep1 Bunnefjorden



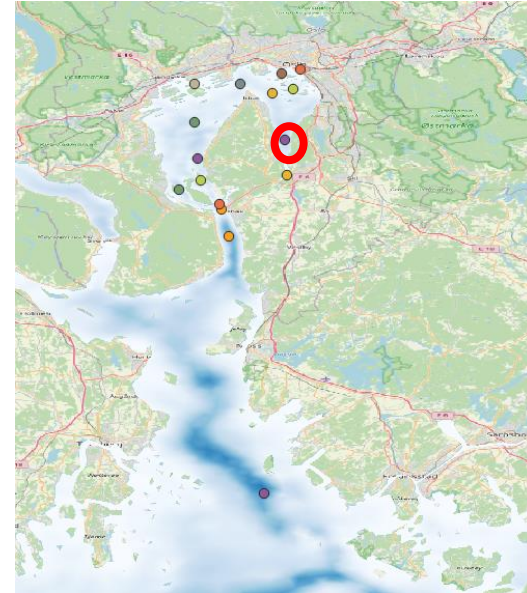
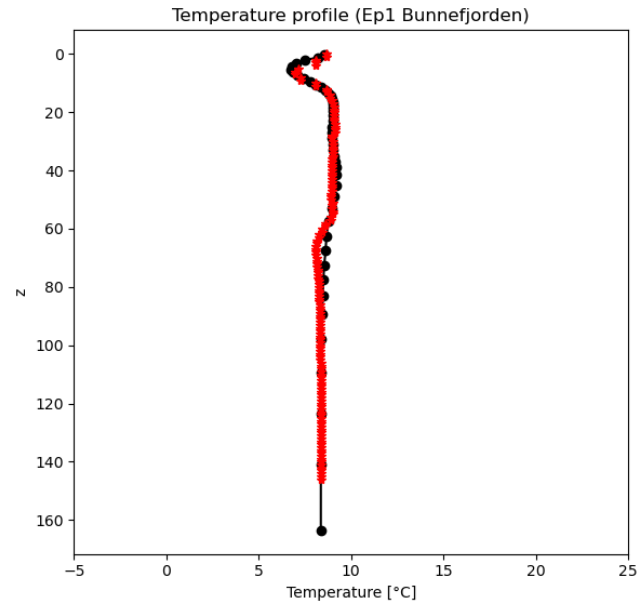
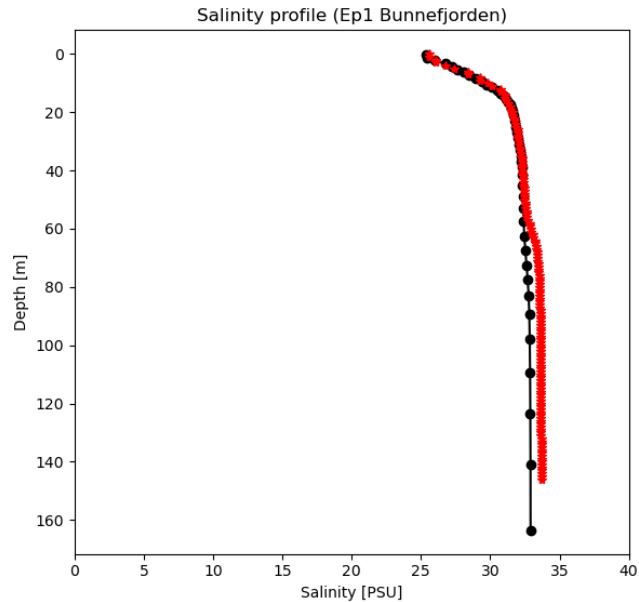
Measurement stations – Temperature - Ep1 Bunnefjorden



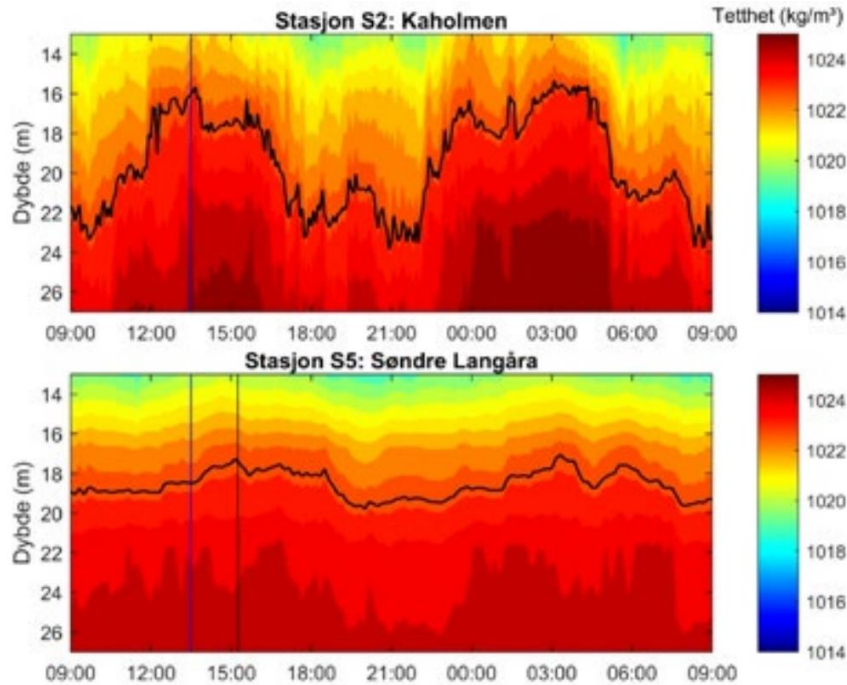
Measurement stations – Profile - Ep1 Bunnefjorden

Ep1 - Bunnefjorden - 2020-04-30

★ Measurement 2020-04-30 ● Model 2020-04-30



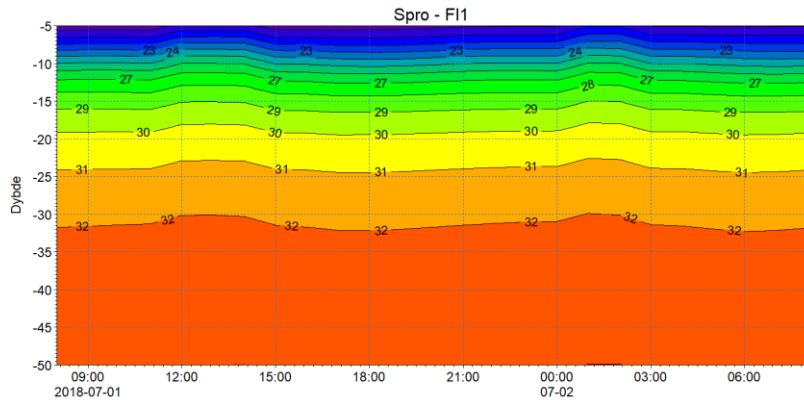
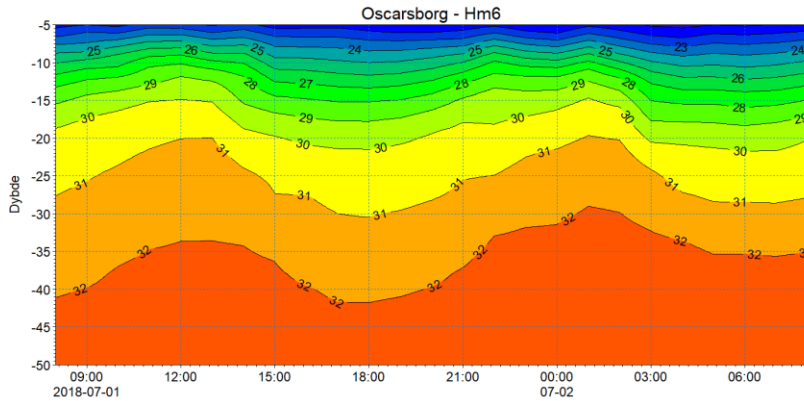
Internal waves



Taken from NIVA



Internal waves



Conclusion

- Validated model
- Includes the internal waves
- Includes the break inns

A child in silhouette stands with arms raised in an aquarium tank. The tank is filled with various marine life, including fish, a jellyfish, and a manta ray. The scene is lit with a deep blue light, creating a serene and immersive atmosphere.

Questions?