

An underwater photograph showing a dark stingray resting on a sandy seabed. The stingray is positioned on the right side of the frame, facing left. Its body is dark with some lighter spots. In the background, there are several small, reddish-orange crustaceans, possibly amphipods, scattered across the sand. The lighting is dim, typical of an underwater environment.

Lofoten-Vesterålen Havobservatorium Fase 2 og veien videre

Espen Johnsen
Forskningsgruppe Økosystemakustikk
Havforskningsinstituttet

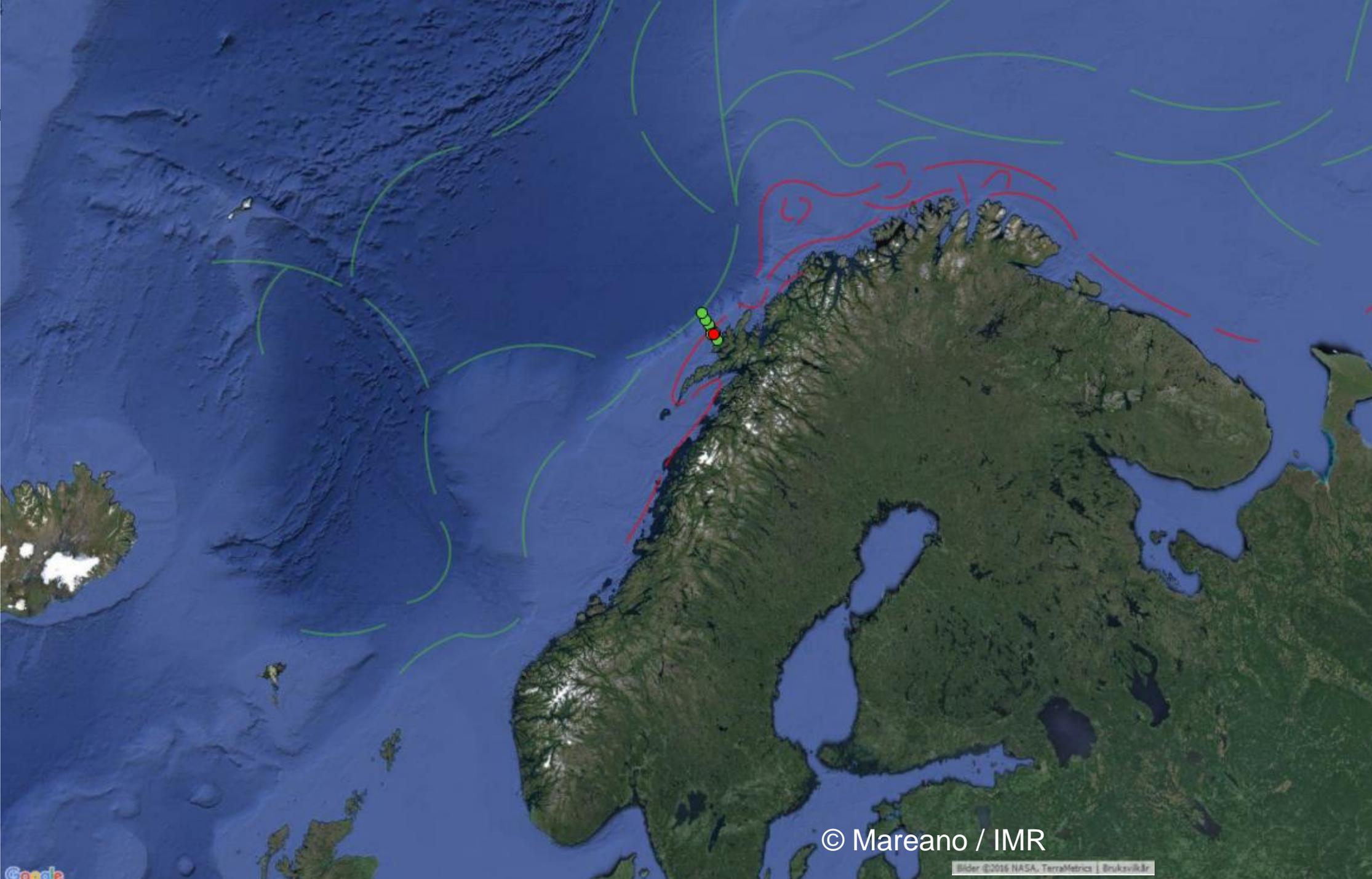
Medlemmer



LoVe havobservatorium

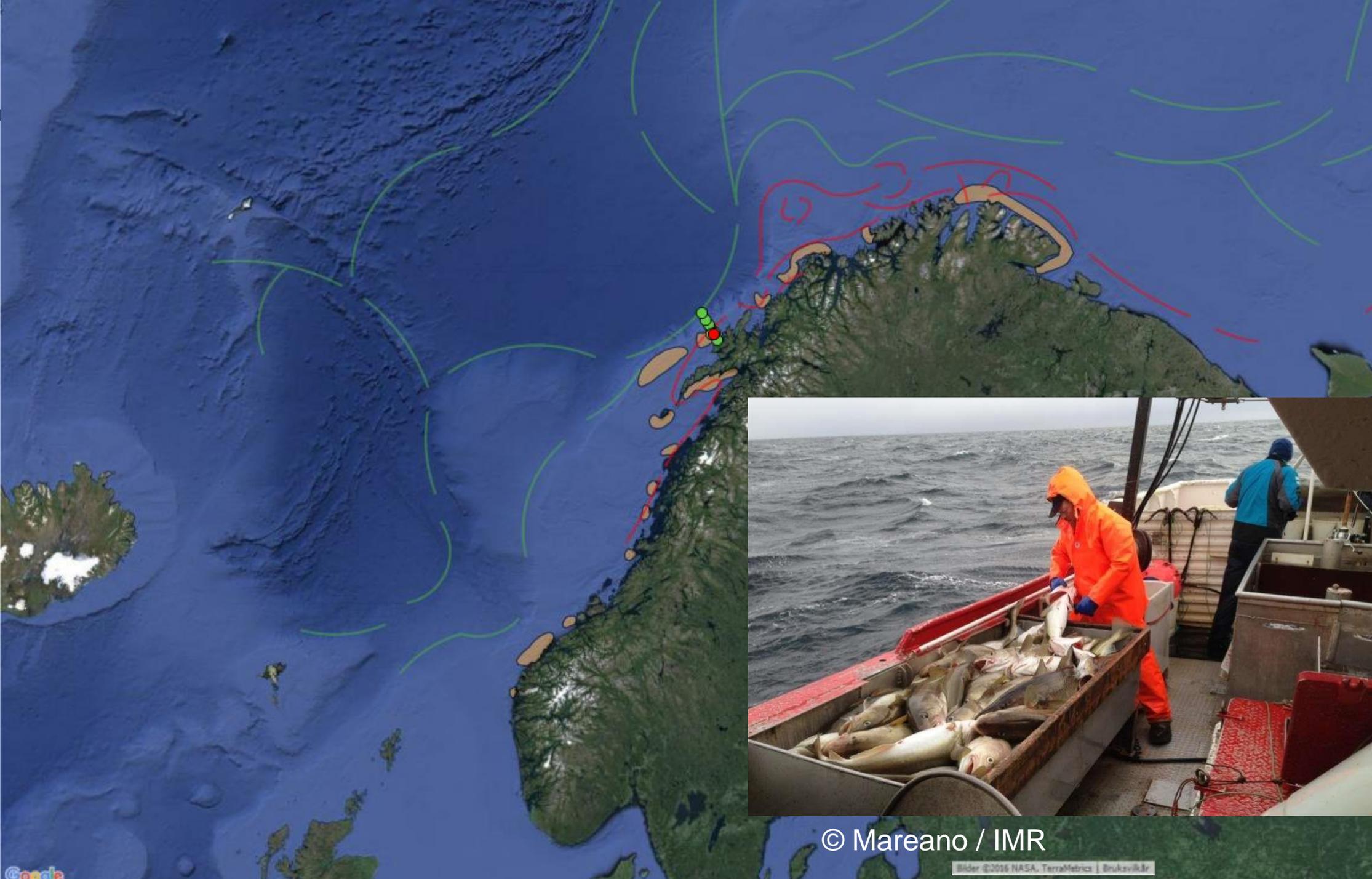
- Er plassert i en økologisk, geologisk, oseanografisk og økonomisk “hotspot”
- Er en forskningsinfrastruktur for grunnleggende og anvendt forskning
- Er en infrastruktur der industri kan teste ny undervannsteknologi og sensorer





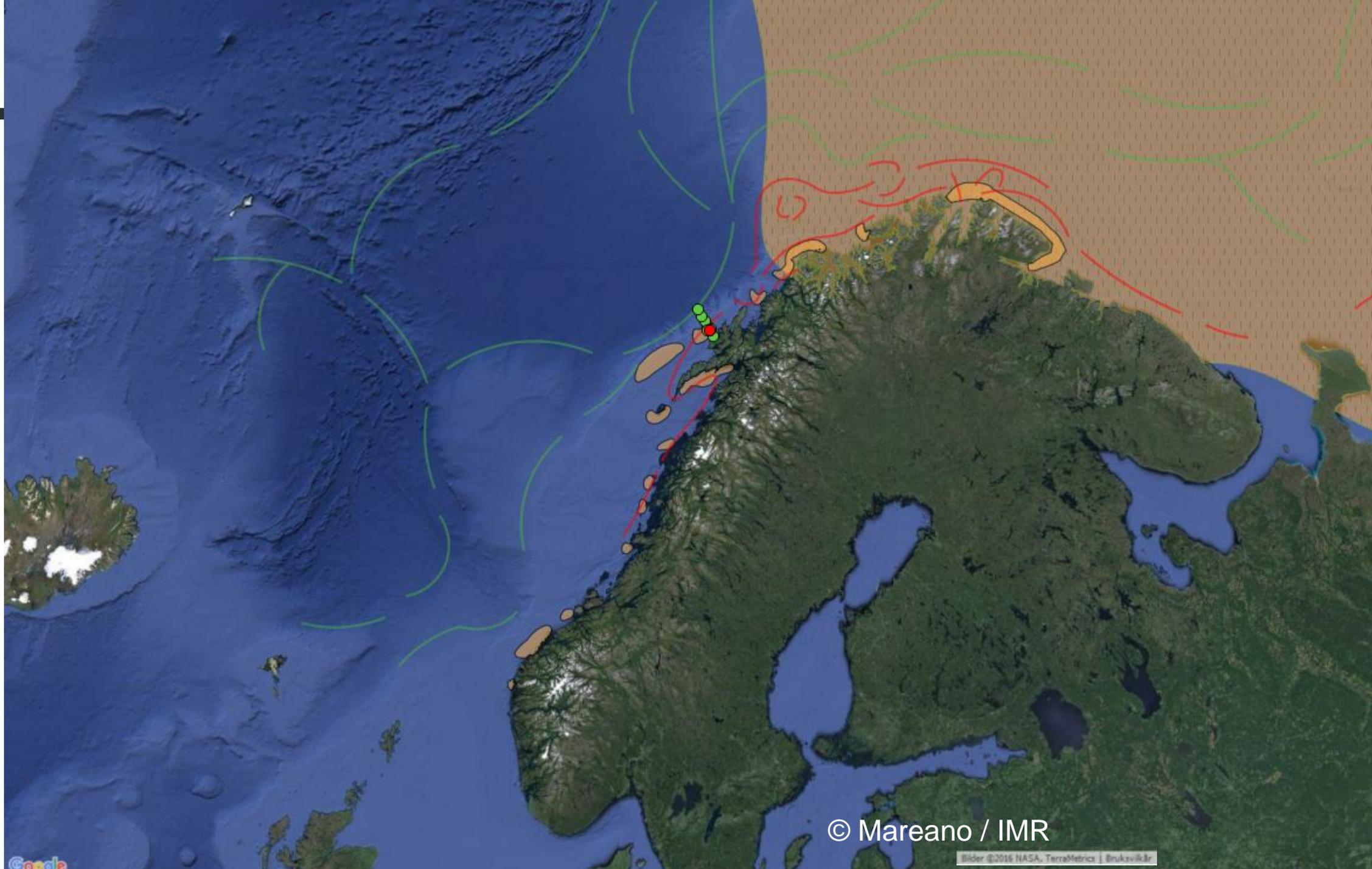
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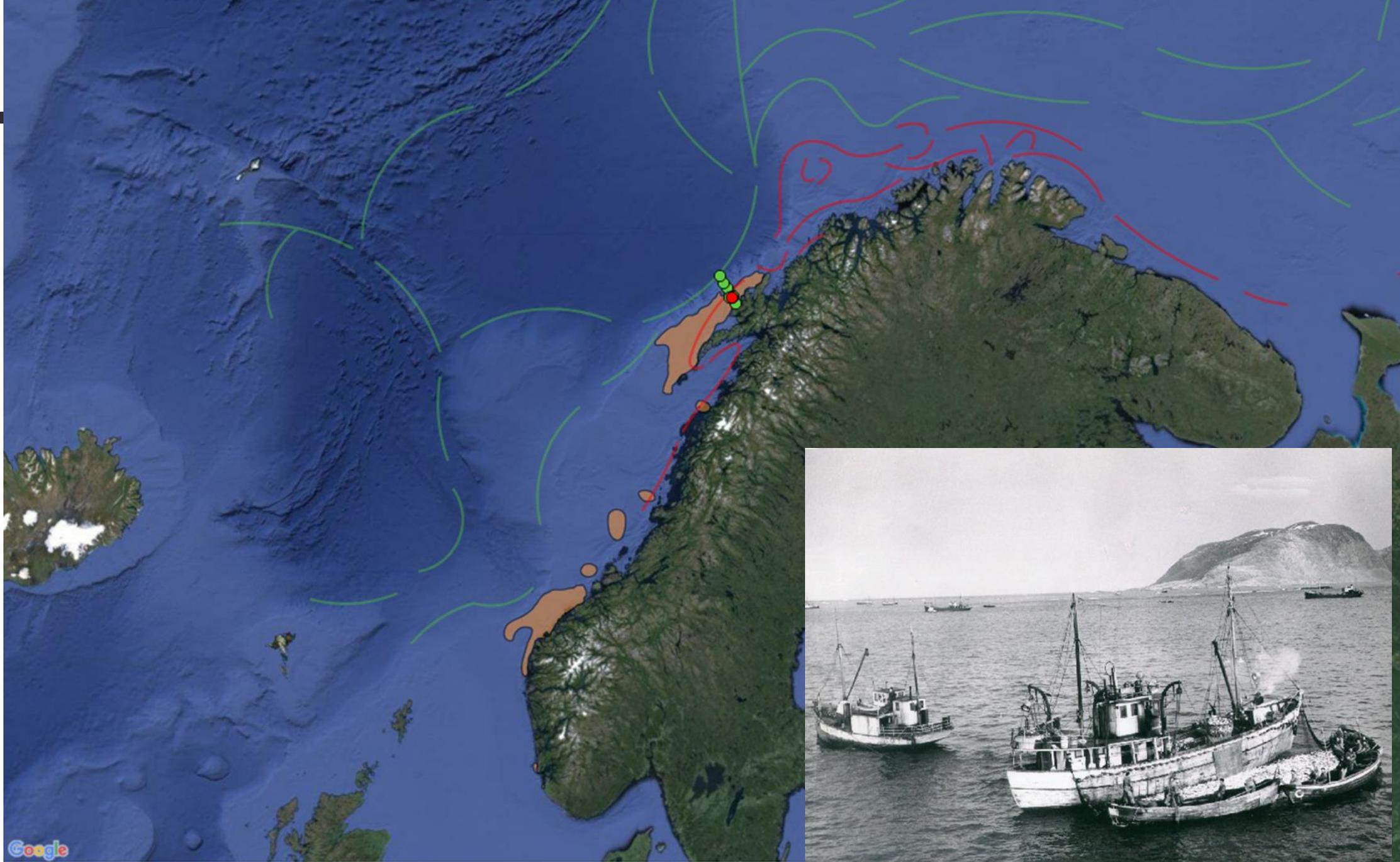
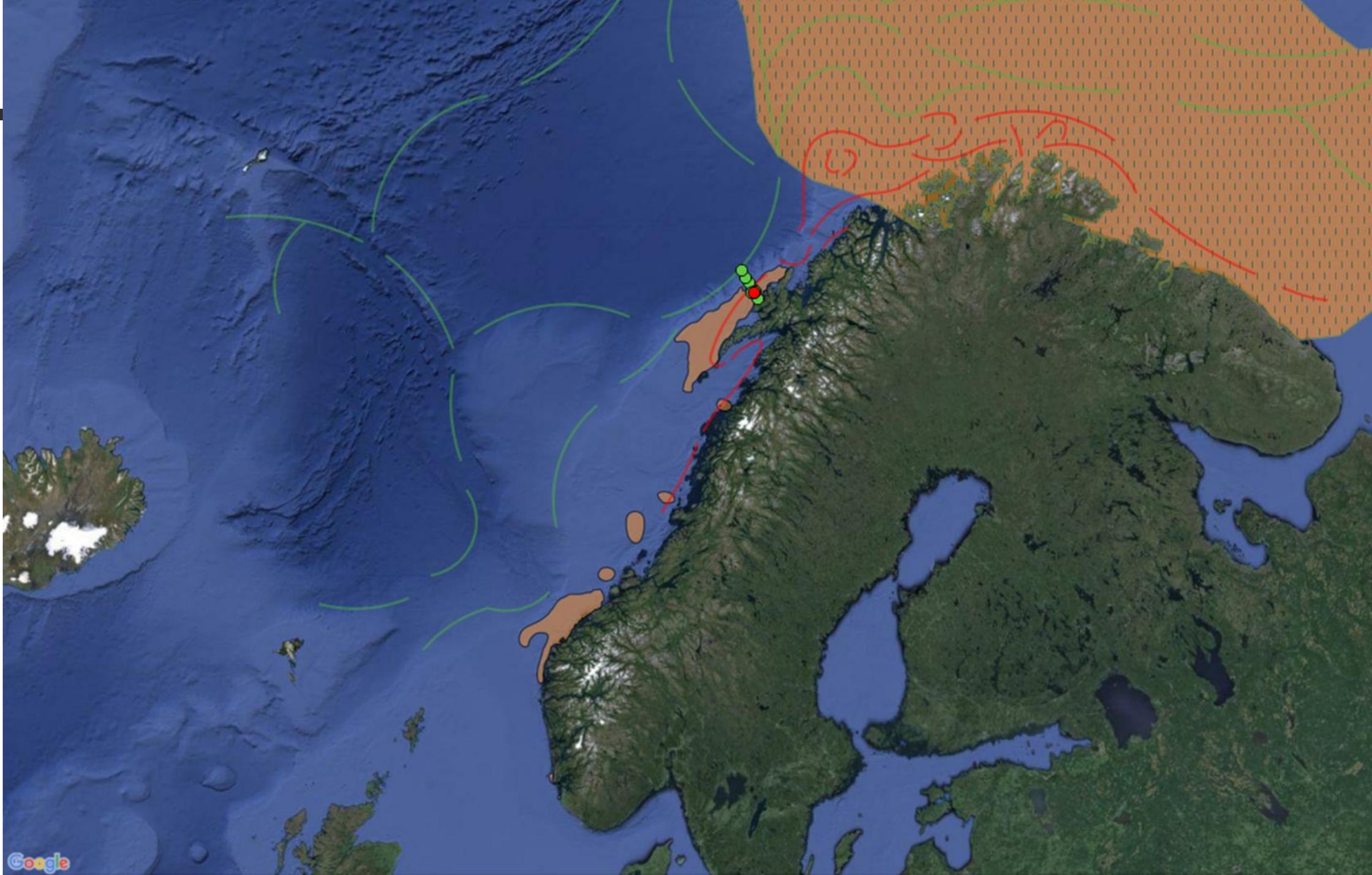


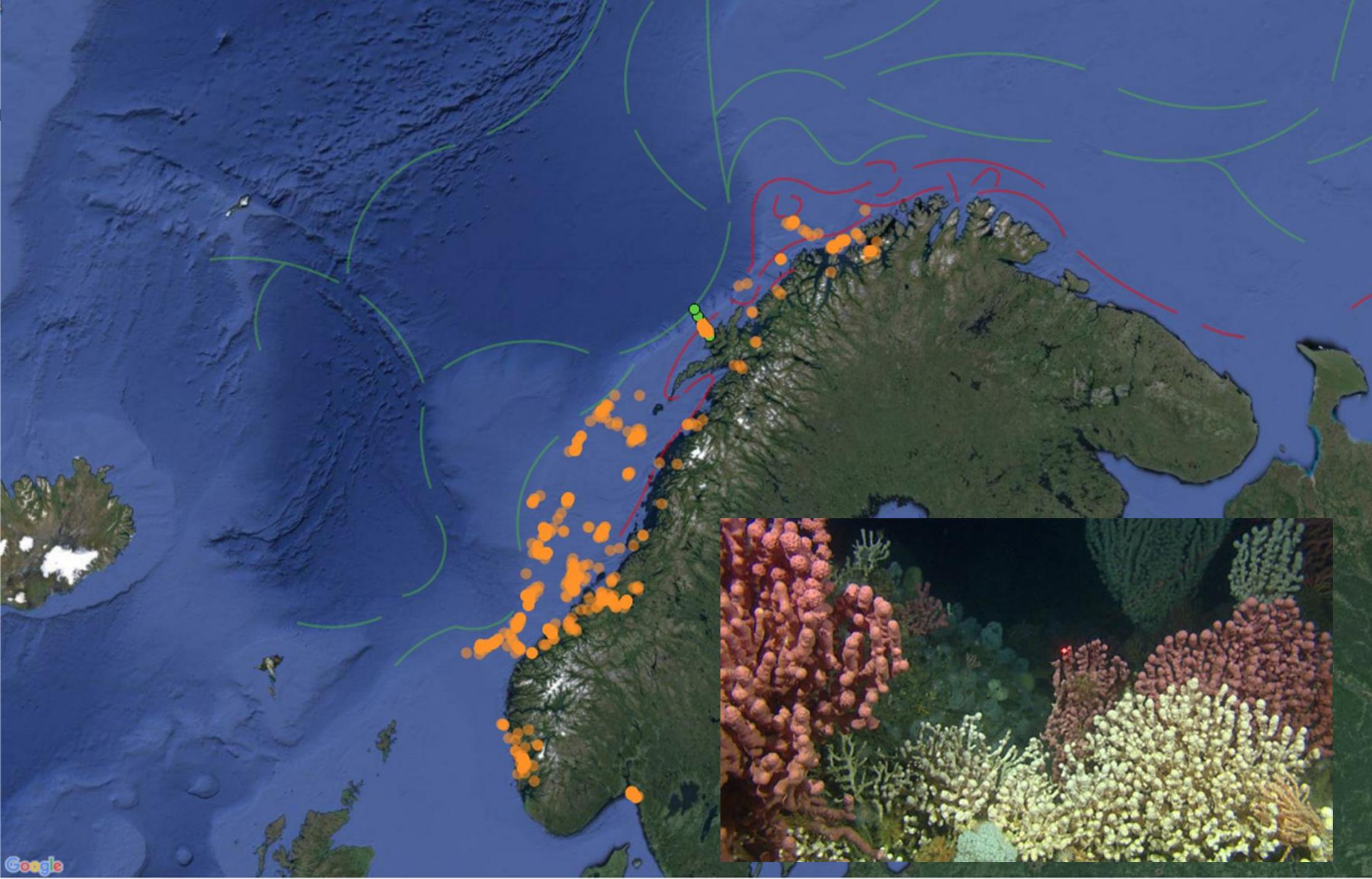
Foto: NTB

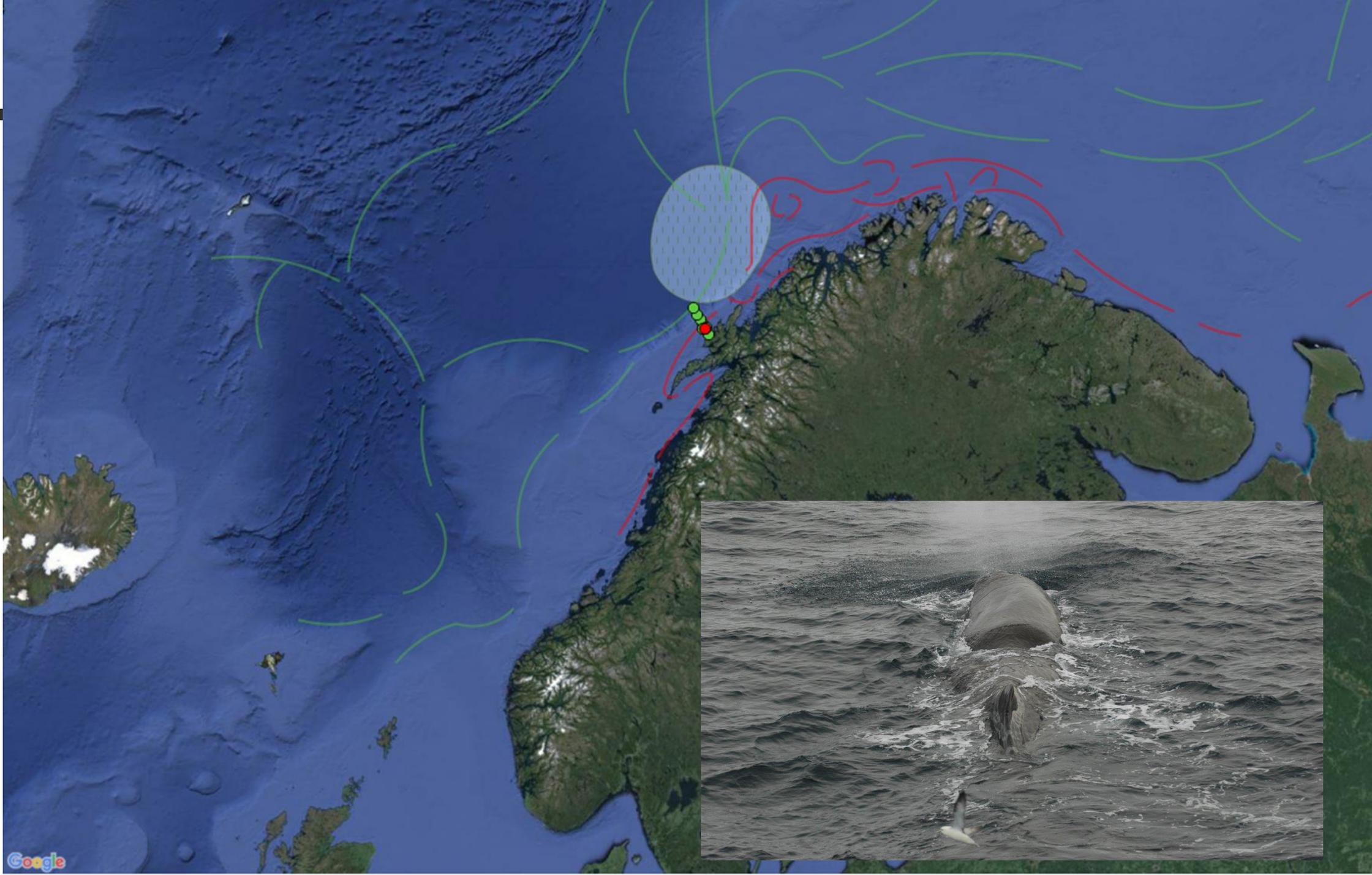
Telemuseet - avpublisert



Google

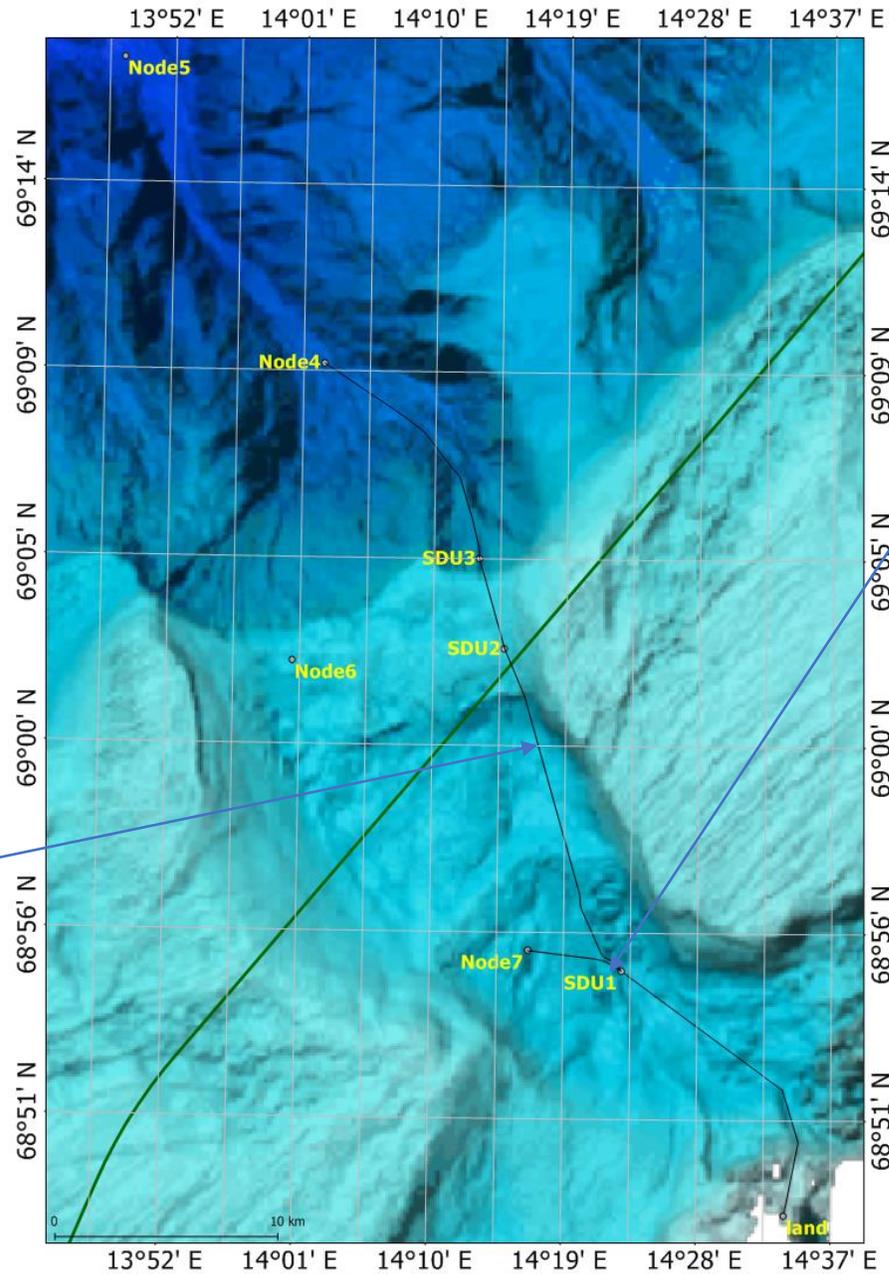




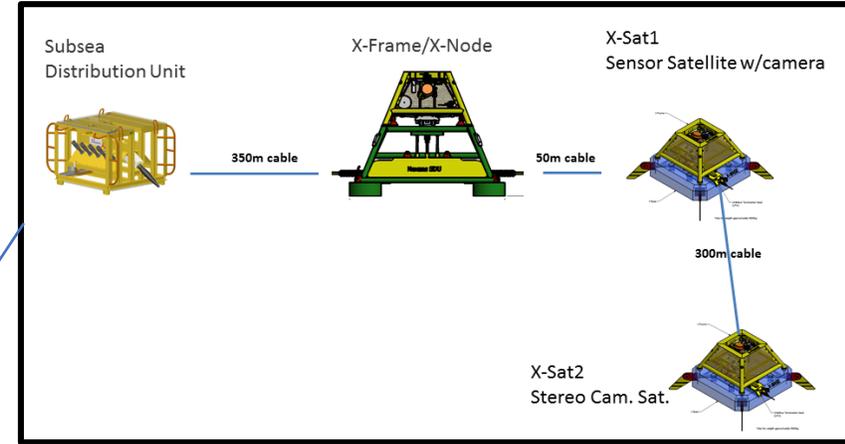


Infrastruktur

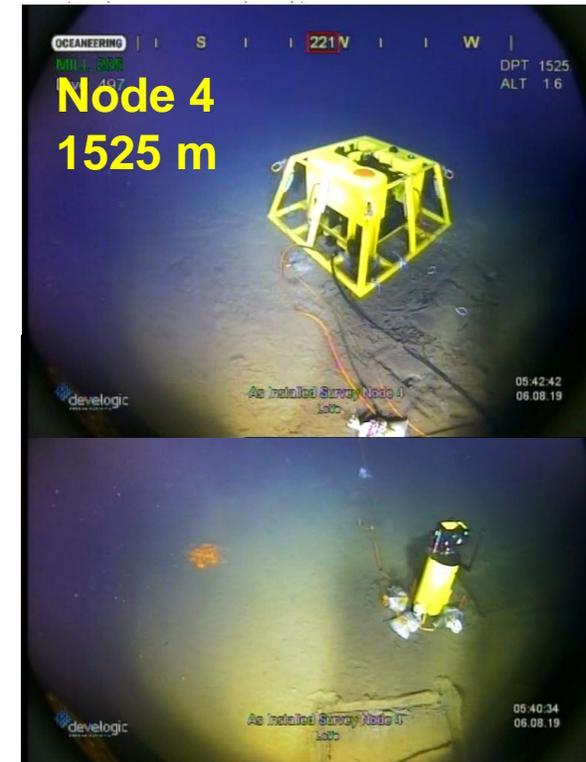
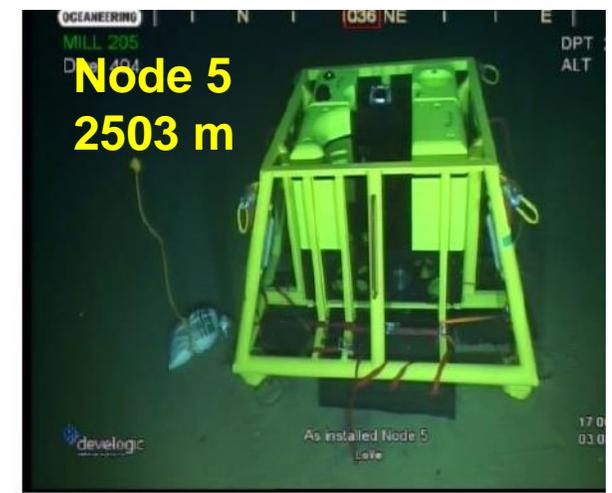
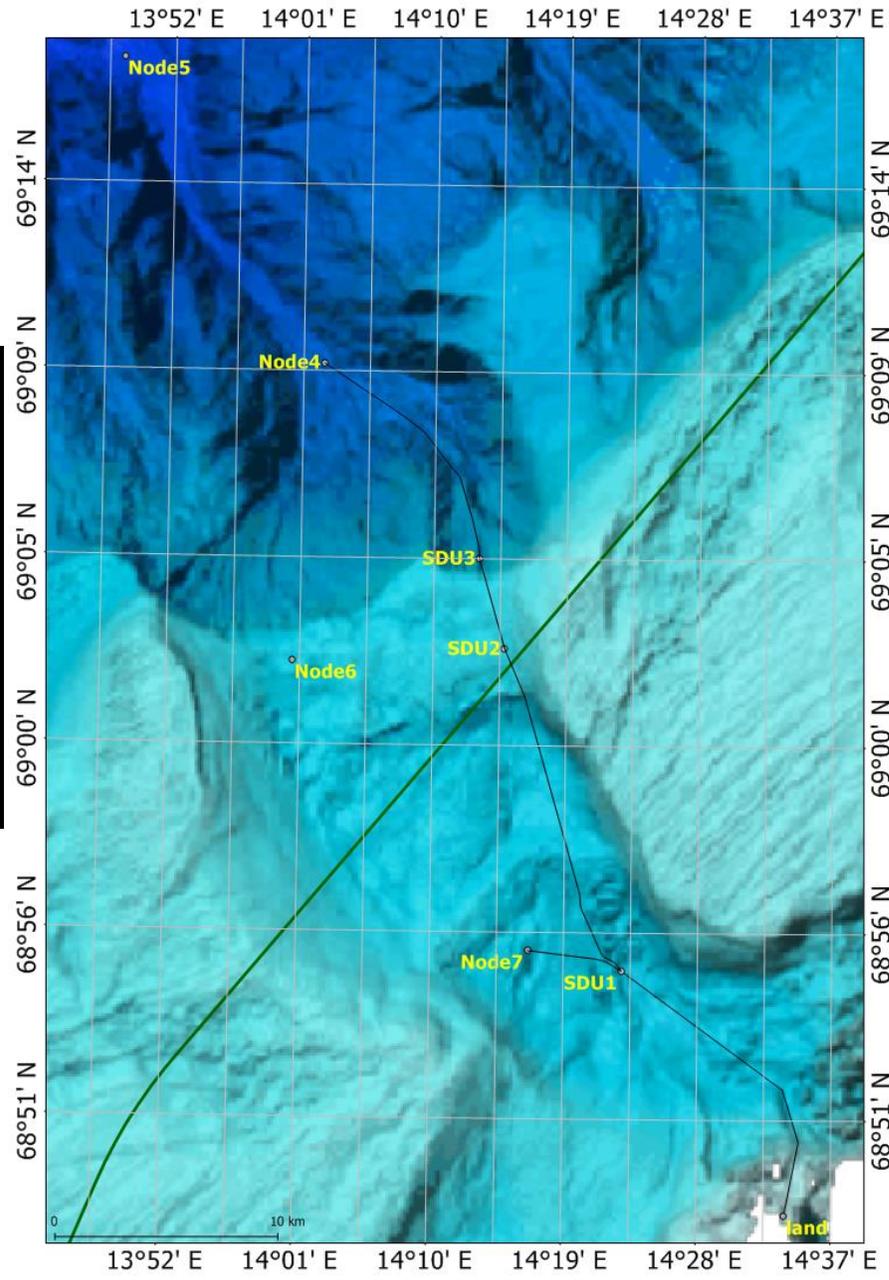
Alle kabler og SDU'er på plass



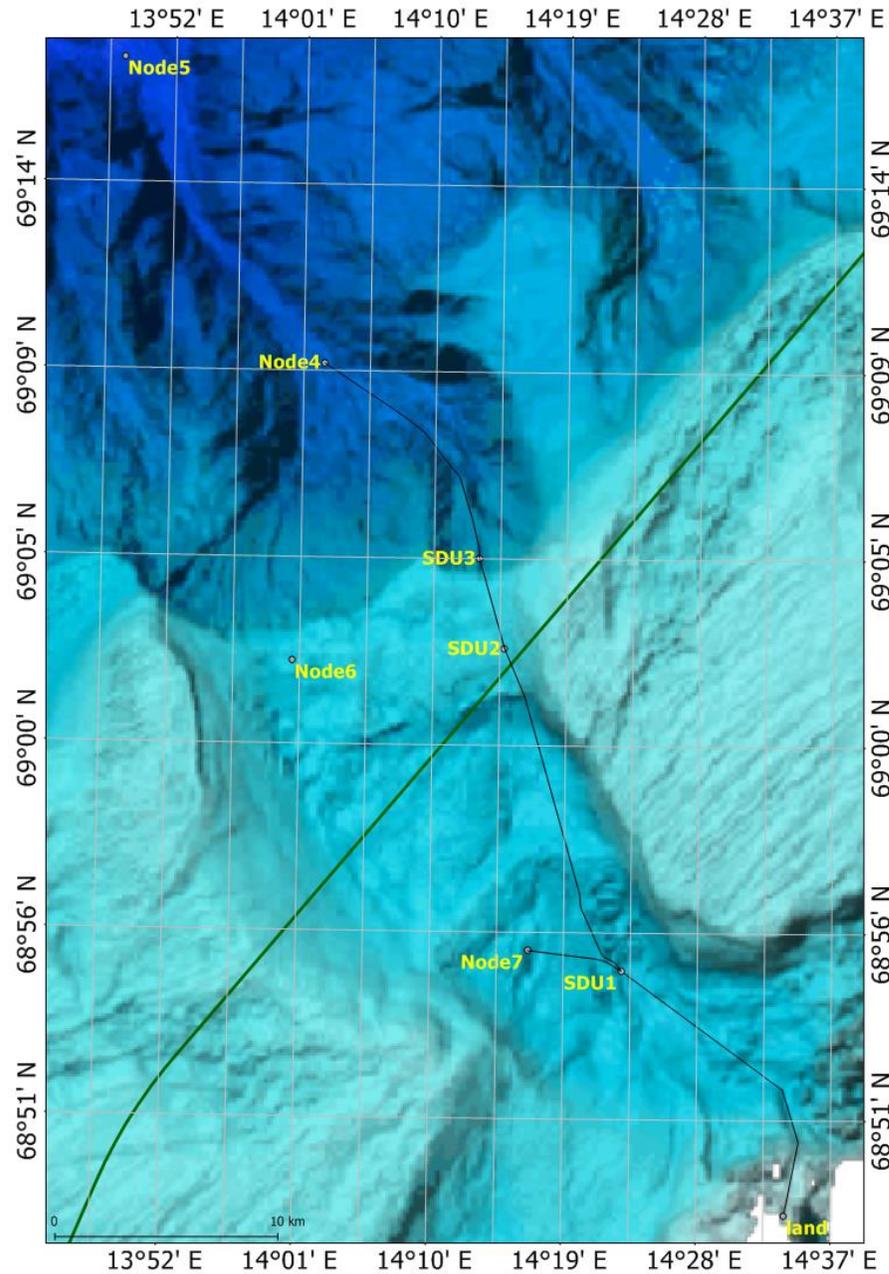
Node 1: 254 m



Infrastruktur



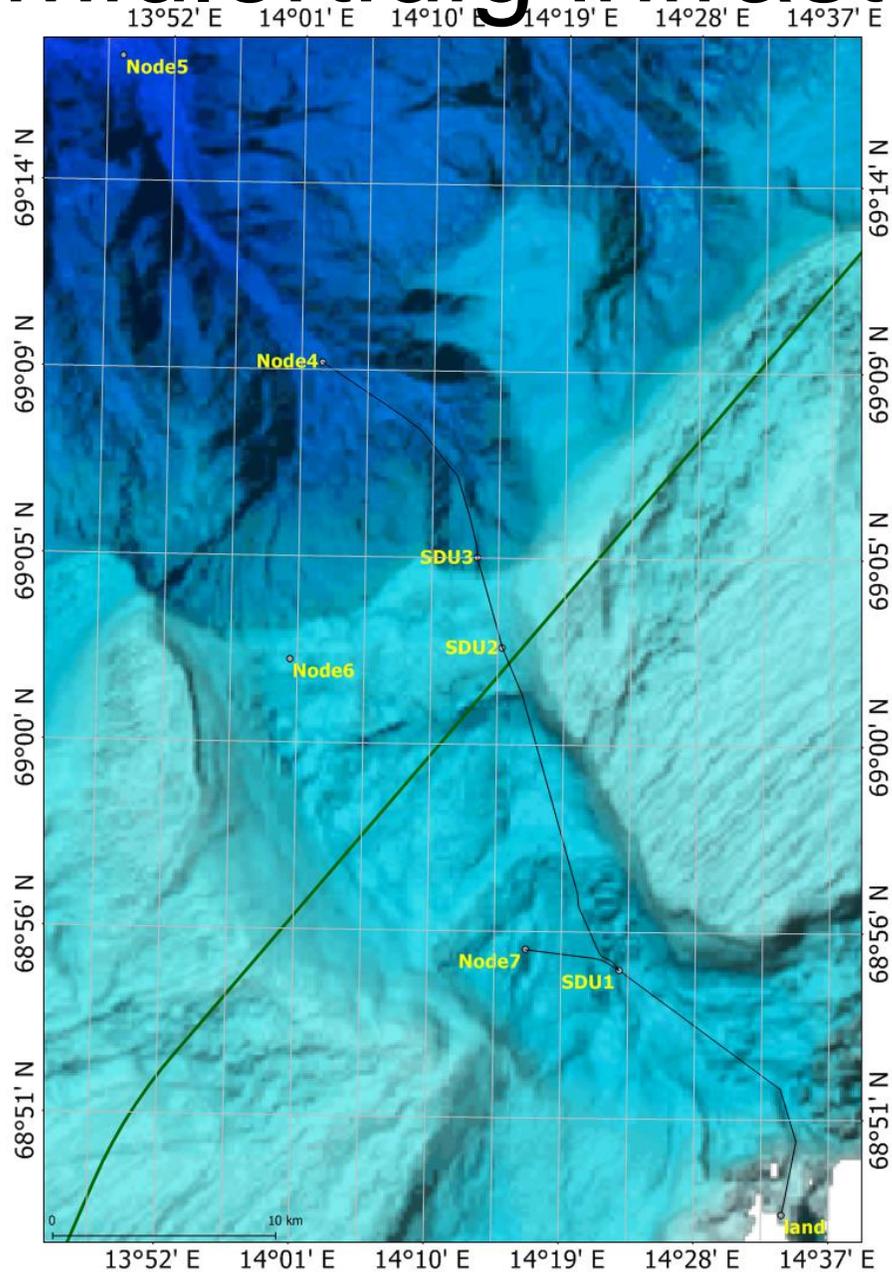
Ekstra infrastruktur – fra mai 2020



Mooring 4 + mooring 5



Midlertidig infrastruktur – våren 2021



SDU 2 (171 m): Autonomous Robotic Sea-Floor Infrastructure for Benthic-Pelagic Monitoring

MarTERA ARIM



-  Project coordinator
Field operation
-  iSeaMC
Develop autonomous crawler with manipulator
-  METAS
Develop garage for autonomous Crawler in X-Net
-  GEOMAR
Develop Deep-sea fuel cell
-  KRACKEN
Develop Autonomous operation of crawler
-  Deusto Sistemas
Software for autonomous processing and image analysis

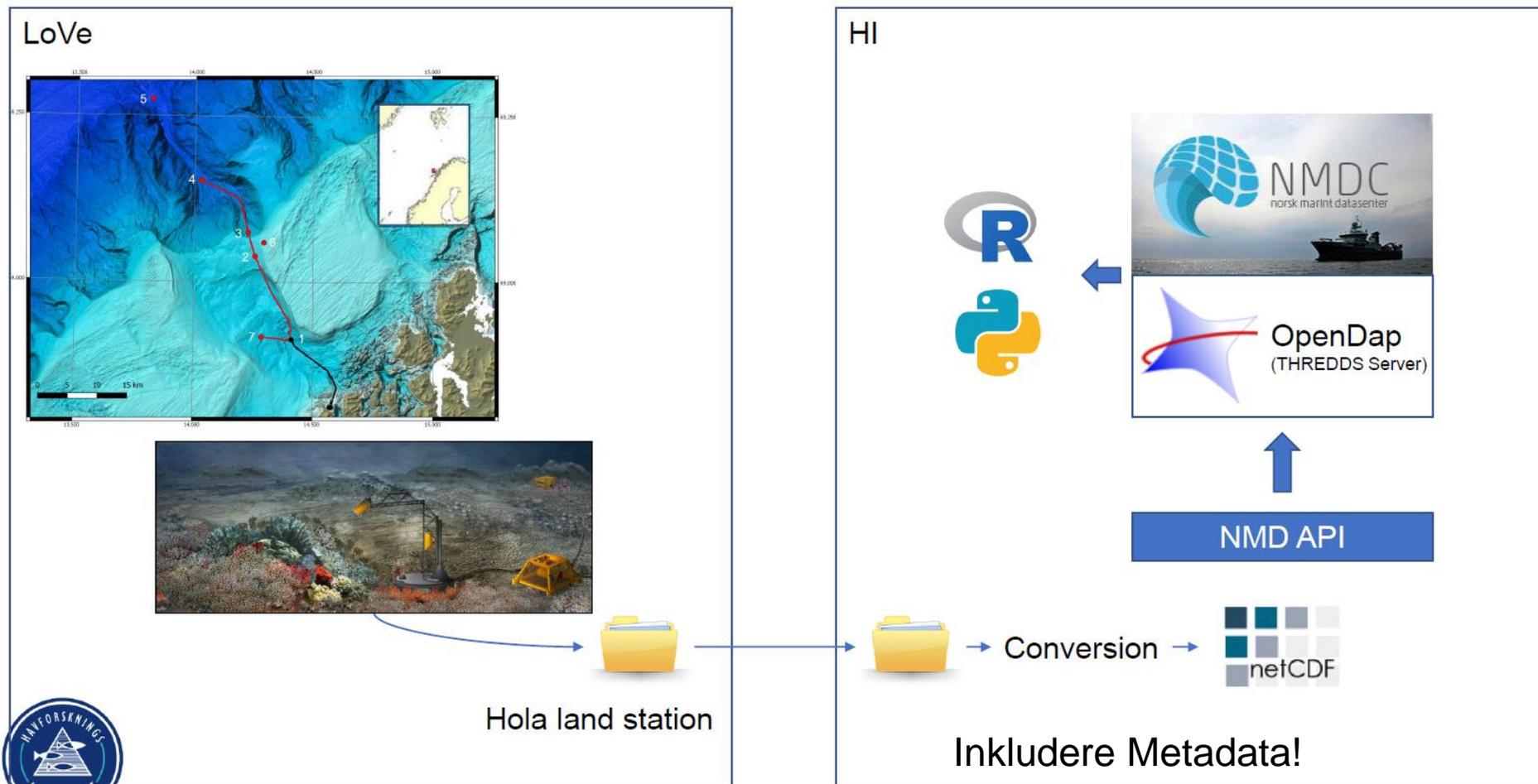


Mange typer sensorer

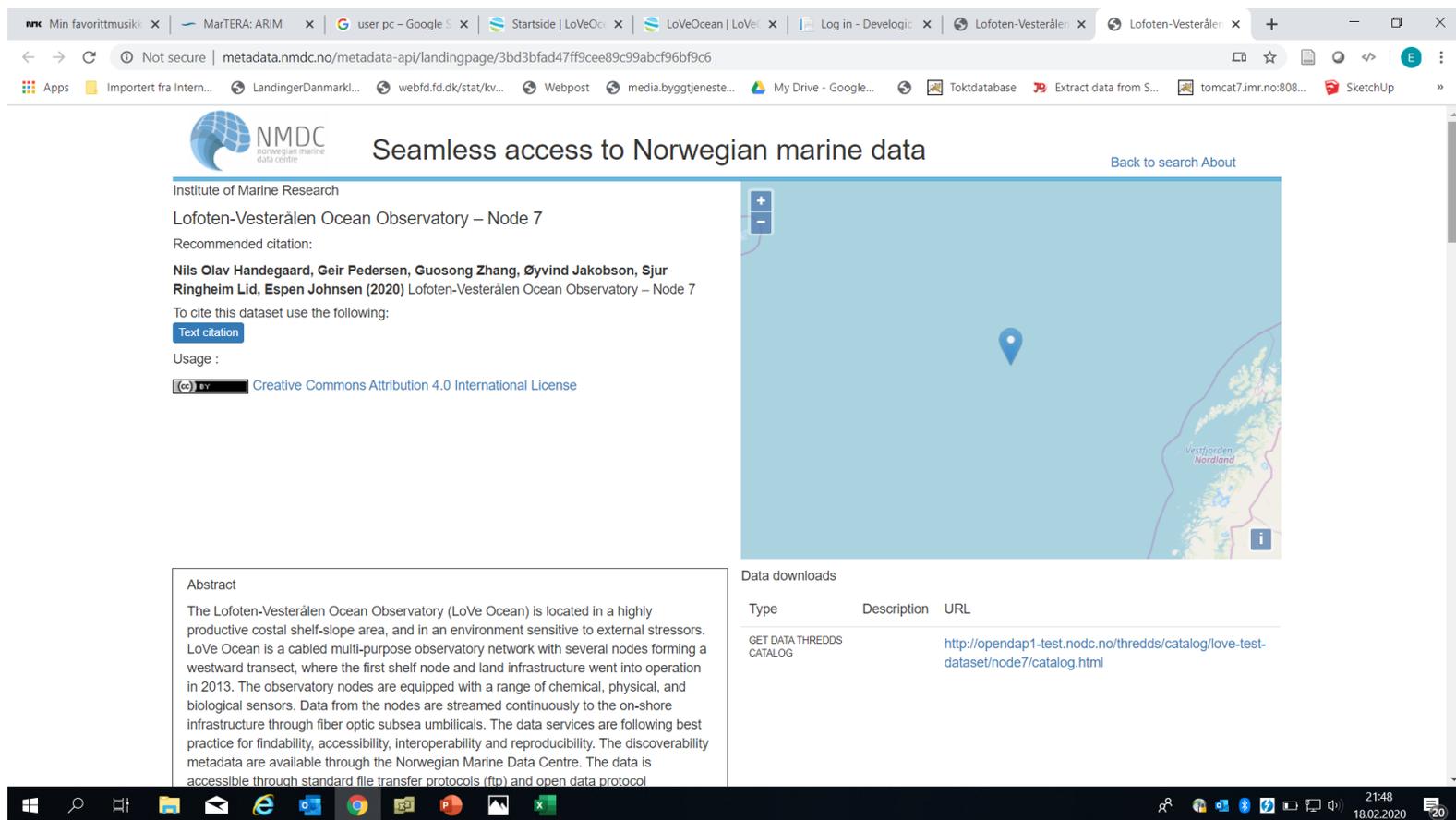
- Current profile
- Temperature, Conductivity, Pressure
- CO₂
- O₂
- pH
- Nitrate
- Chlorophyll
- Turbidity
- Sound pressure (hydrophone)
- Images (digital camera and flash)
- Acoustic backscatter at 70 kHz (echosounder)
- Wireless communication
- CH₄
- Coloured dissolved organic matter (CDOM)
- Polycyclic aromatic hydrocarbons (PAH)



Dataflyt/datalagring/dataportal



Dataflyt/datalagring/dataportal



nmrc Min favorittmusikk x MarTERA: ARIM x user pc - Google S x Startside | LoVeOc x LoVeOcean | LoVe x Log in - Develoic x Lofoten-Vesterålen x Lofoten-Vesterålen x + - □ X

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 **NMDC**
norwegian marine data centre

Seamless access to Norwegian marine data

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Institute of Marine Research
Lofoten-Vesterålen Ocean Observatory – Node 7

Recommended citation:
Nils Olav Handegaard, Geir Pedersen, Guosong Zhang, Øyvind Jakobson, Sjur Ringheim Lid, Espen Johnsen (2020) Lofoten-Vesterålen Ocean Observatory – Node 7

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Abstract
The Lofoten-Vesterålen Ocean Observatory (LoVe Ocean) is located in a highly productive coastal shelf-slope area, and in an environment sensitive to external stressors. LoVe Ocean is a cabled multi-purpose observatory network with several nodes forming a westward transect, where the first shelf node and land infrastructure went into operation in 2013. The observatory nodes are equipped with a range of chemical, physical, and biological sensors. Data from the nodes are streamed continuously to the on-shore infrastructure through fiber optic subsea umbilicals. The data services are following best practice for findability, accessibility, interoperability and reproducibility. The discoverability metadata are available through the Norwegian Marine Data Centre. The data is accessible through standard file transfer protocols (ftp) and open data protocol.

Data downloads

Type	Description	URL
GET DATA THREDDS CATALOG		http://opendap1-test.nodc.no/thredds/catalog/love-test-dataset/node7/catalog.html

Windows taskbar: 21:48 18.02.2020

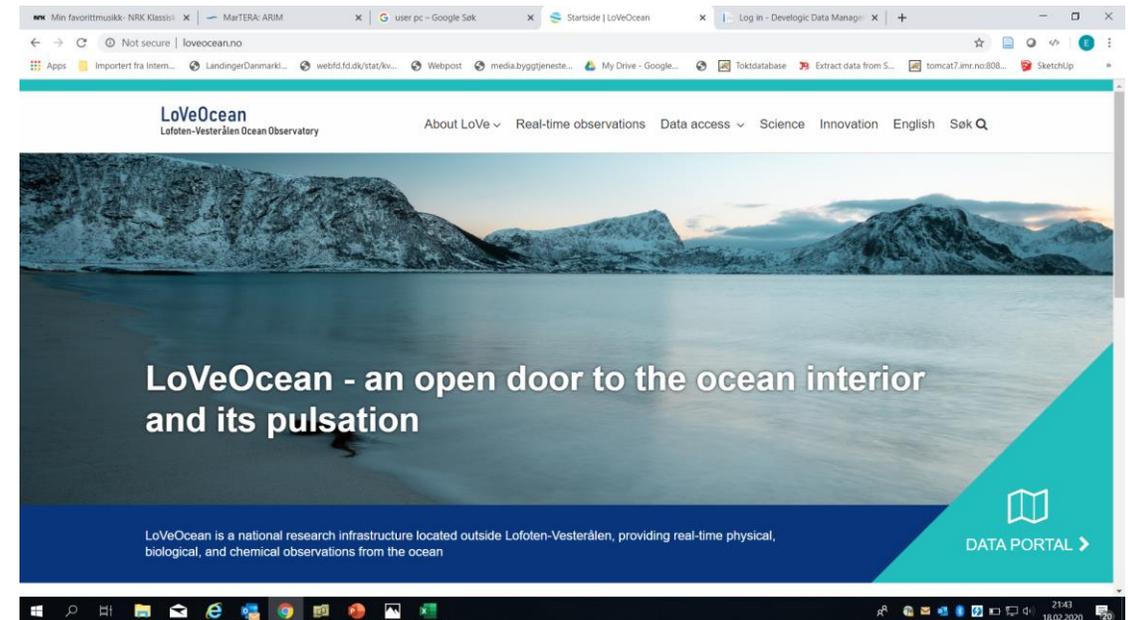


<http://metadata.nmdc.no/metadata-api/landingpage/3bd3bfad47ff9cee89c99abcf96bf9c6>

www.loveocean.no (Ikke publisert enda)

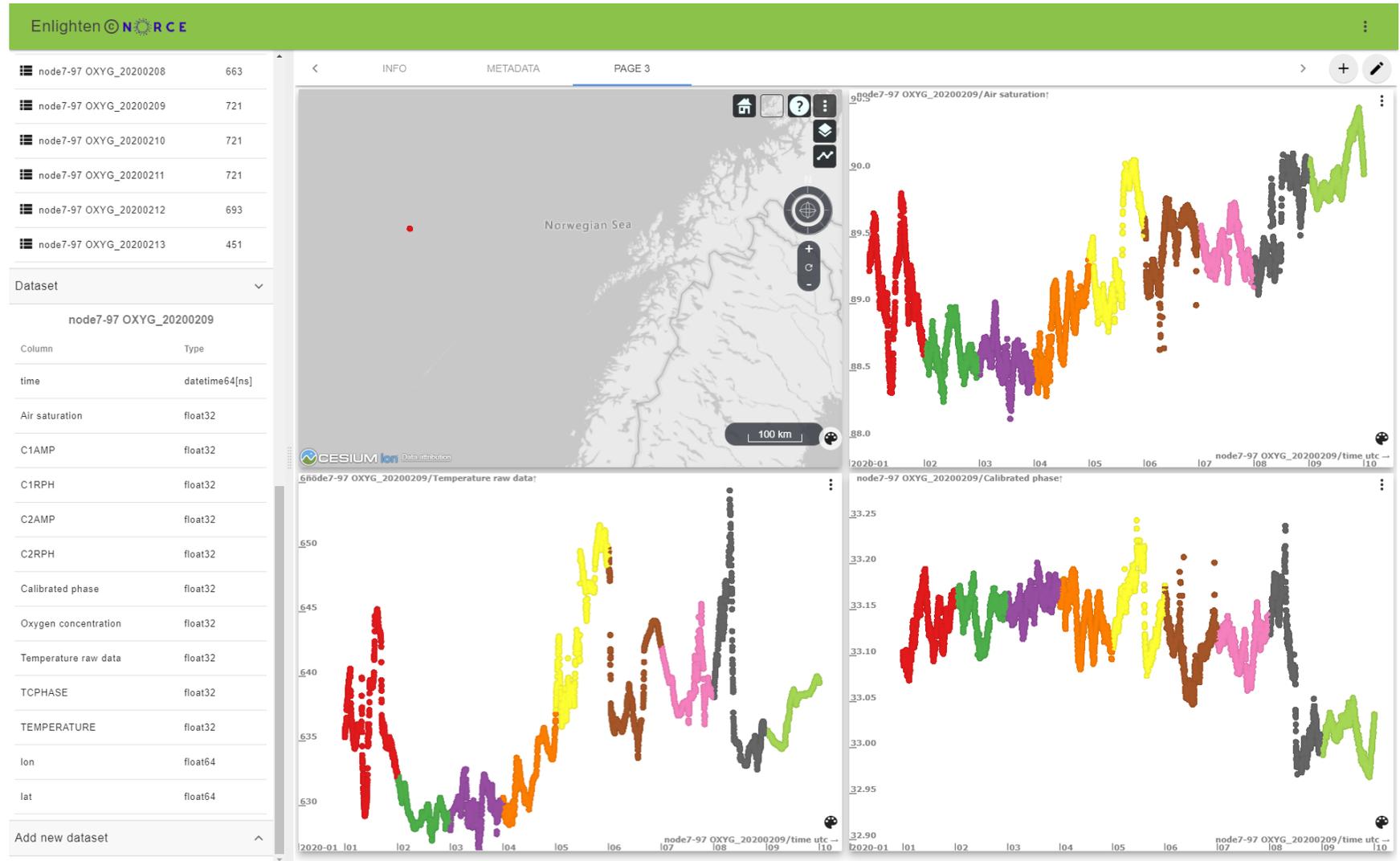
Website

- Har en skisse på plass
- Overtar mye av materialet på LoVe-equinor



www.loveocean.no (Ikke publisert enda)

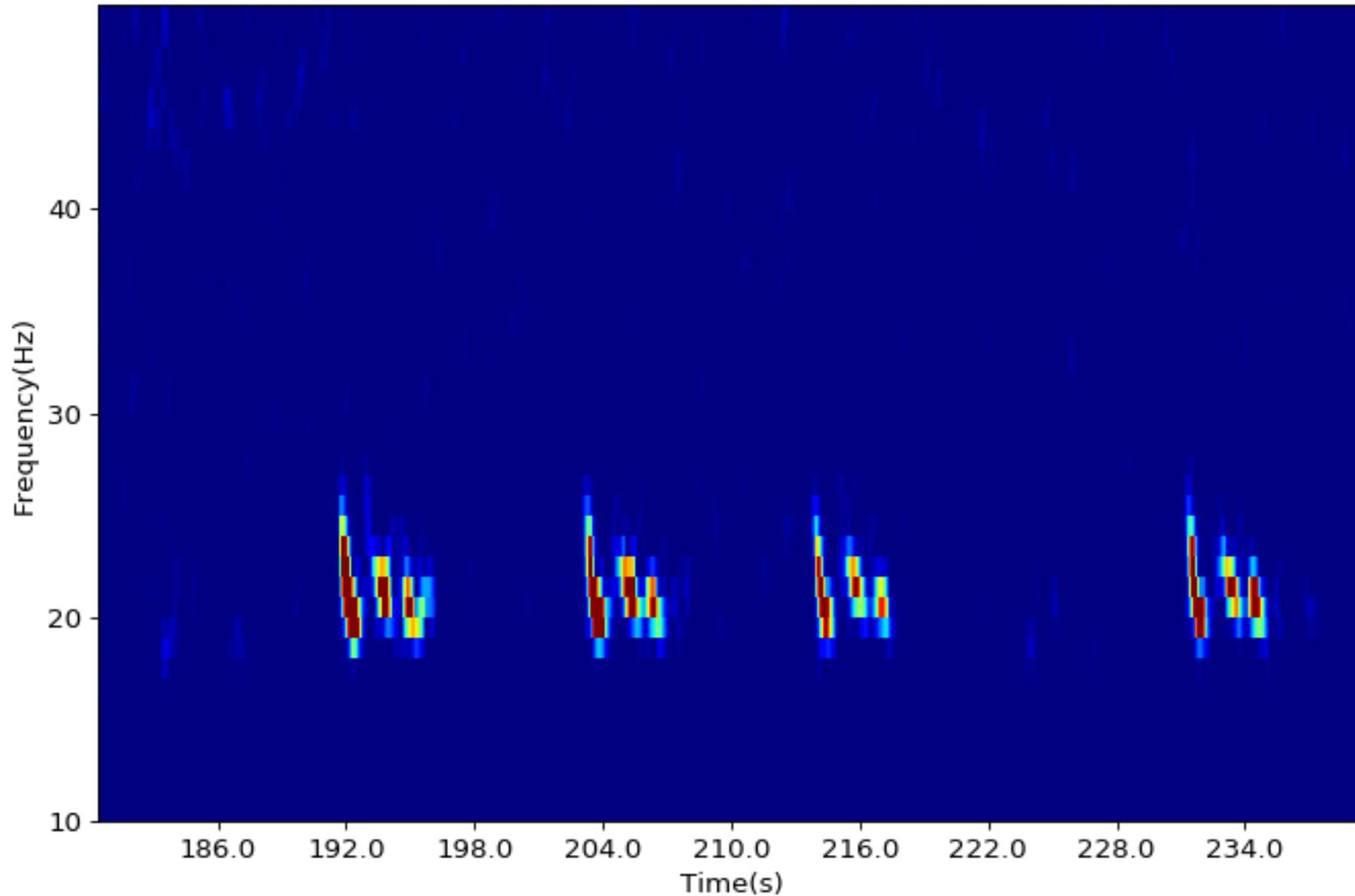
Dataportal



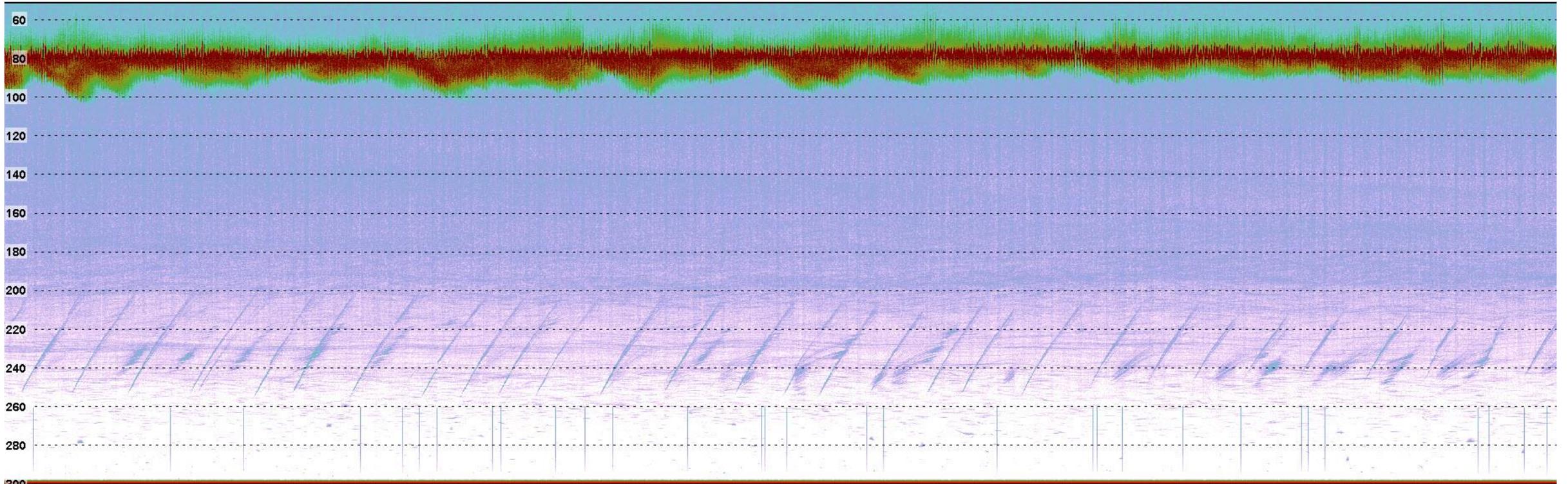
Noen smaksprøver på observasjoner



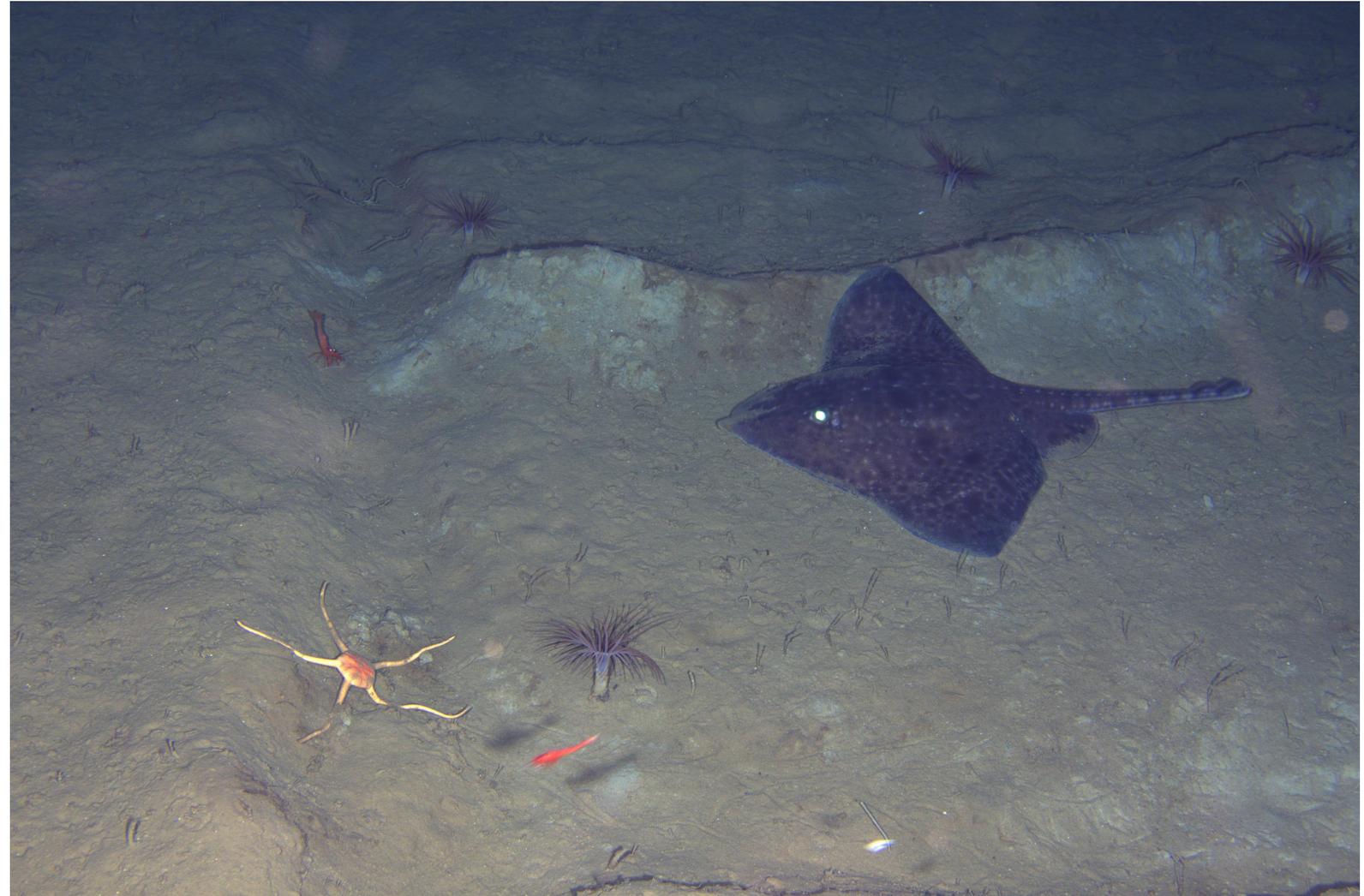
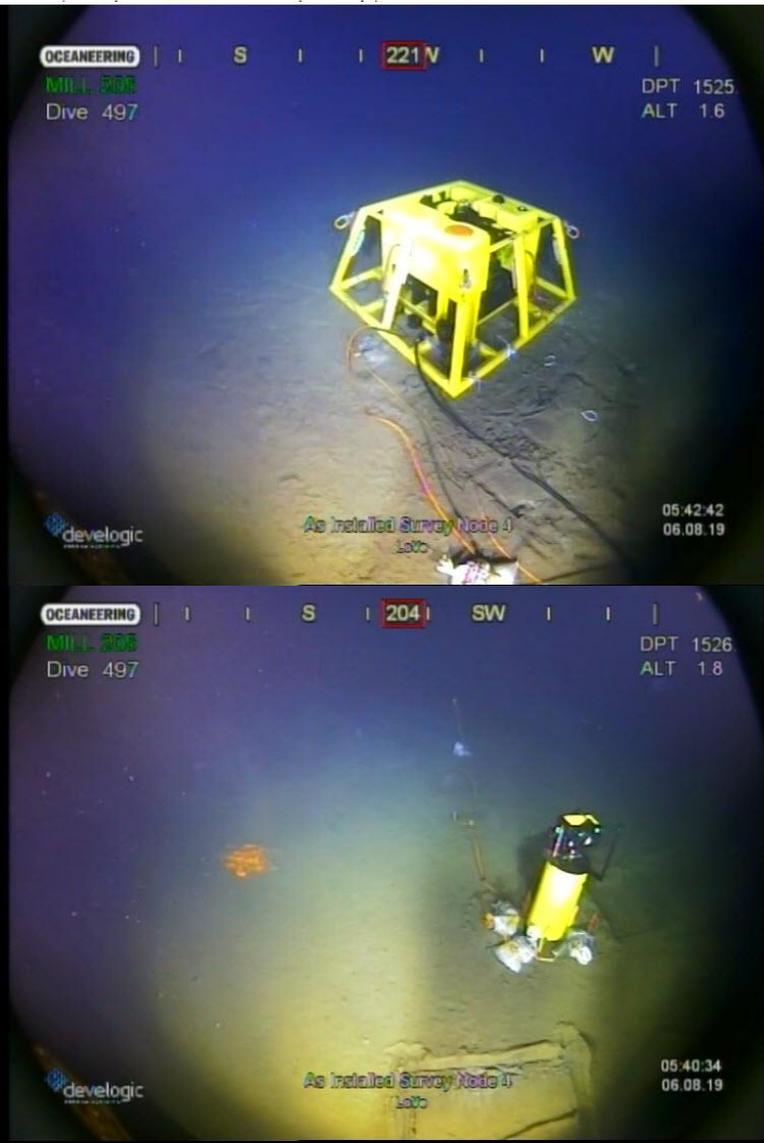
Node 7: «Finnhval kan høres»



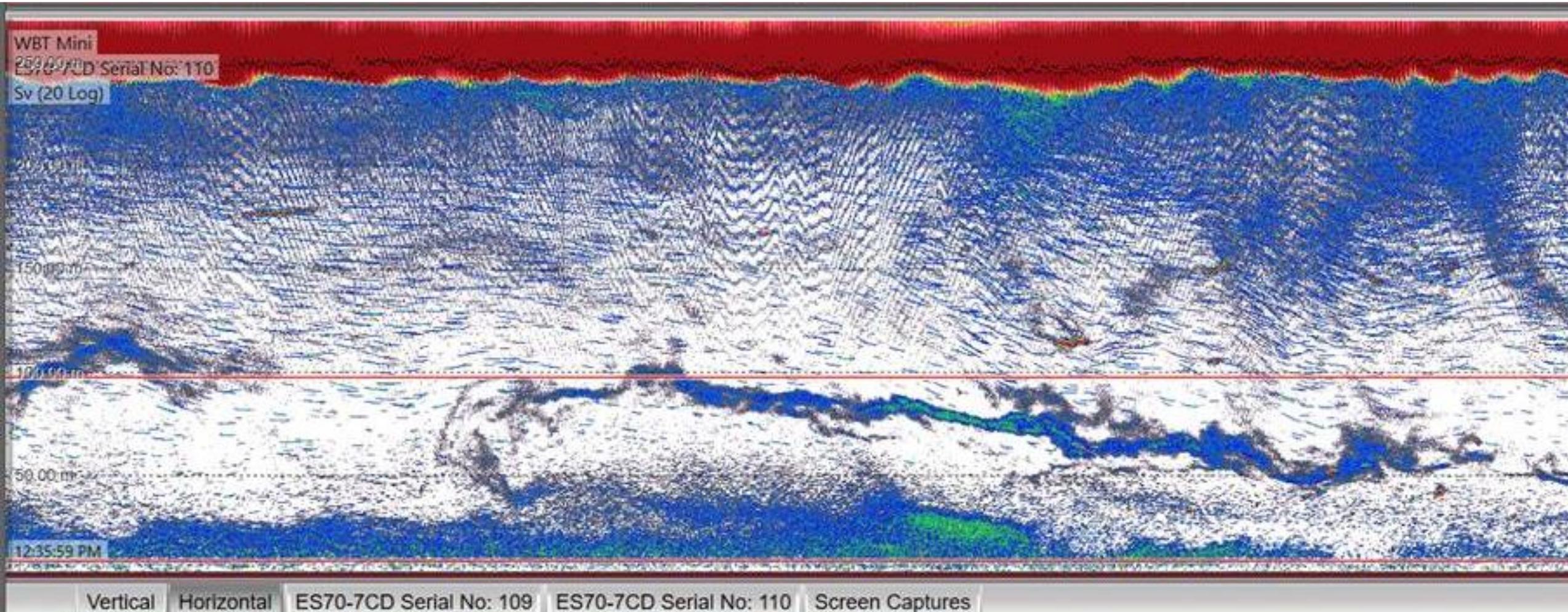
Node 7: «Gass fra bunnen»



Node 4: «Biologisk liv på 1500 m»



Node 1: «Dynamikk i vannmassene»



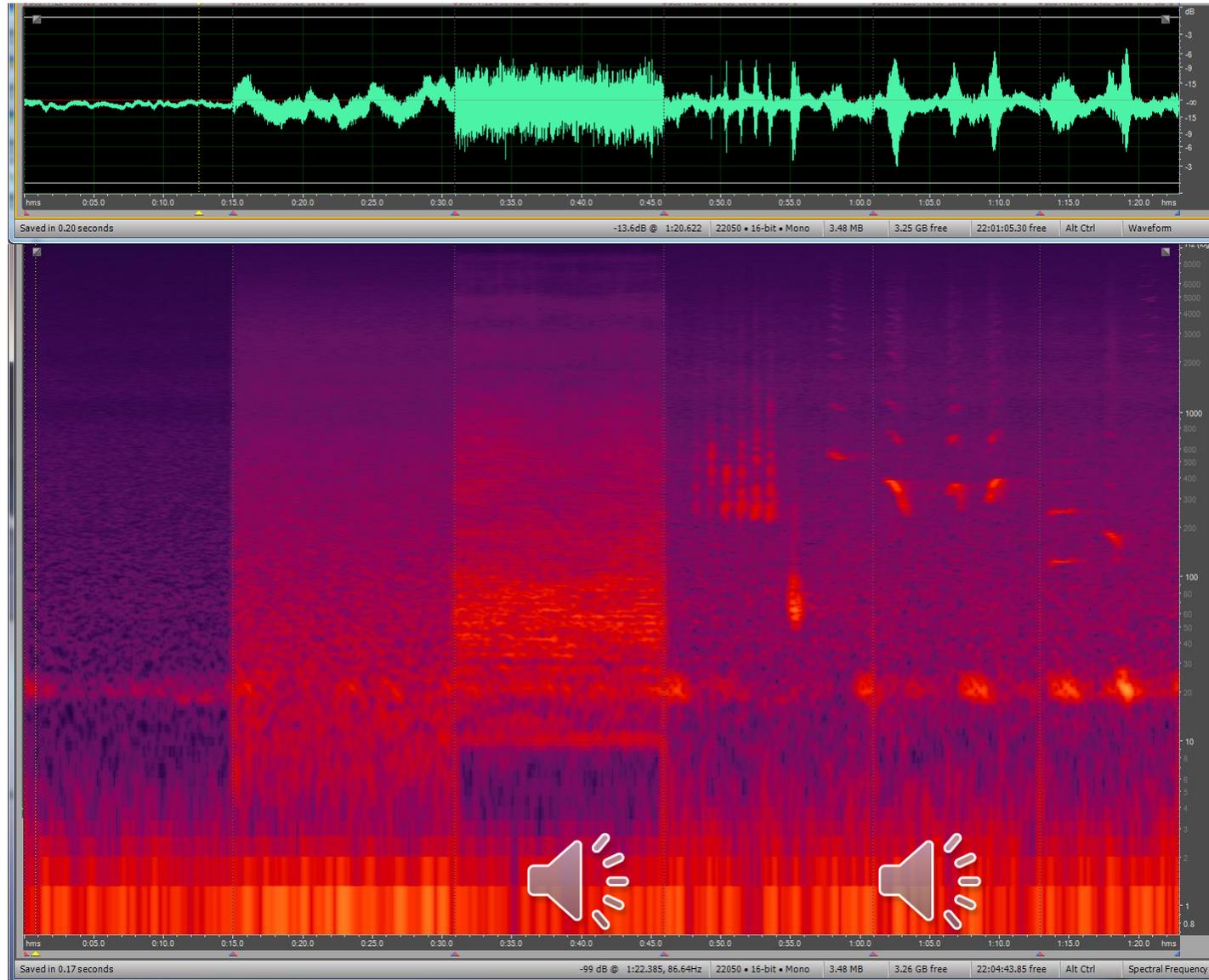
Node 1: «Støv i vannmassene»



B



3 m/s wind 18 m/s wind ship biological (Humpback whale)



1 Hz-10 kHz (log scale)

10 kHz

1 kHz

100 Hz

10 Hz



List of scientific work using LoVe data

- Zhang, G., Forland, T. N., Johnsen, E., Pedersen, G., & Dong, H. (2020). Measurements of underwater noise radiated by commercial ships at a cabled ocean observatory. *Marine Pollution Bulletin*, 153, 110948. <https://doi.org/10.1016/j.marpolbul.2020.110948>
- Strand, K. O., Breivik, Ø., Pedersen, G., Vikebø, F. B., Sundby, S., & Christensen, K. H. (2020). Long-Term Statistics of Observed Bubble Depth Versus Modeled Wave Dissipation. *Journal of Geophysical Research: Oceans*, 125(2). <https://doi.org/10.1029/2019JC015906>
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- Van Engeland, T., Godø, O. R., Johnsen, E., Duineveld, G. C. A., & van Oevelen, D. (2019). Cabled ocean observatory data reveal food supply mechanisms to a cold-water coral reef. *Progress in Oceanography*, 172, 51–64. <https://doi.org/10.1016/j.pocean.2019.01.007>
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- Aniceto, A. S., Biuw, M., Kettner, L., Lindstrøm, U., Pedersen, G., Primicerio, R., & Camus, L. (2019). Autonomous detection of humpback whales - migration and distribution in relation to Norwegian spring spawning herring. *WMMC'19 World Marine Mammal Conference*. Barcelona.
- Pedersen, G., Johnsen, E., Ødegaard, L. A., Zhang, G., Grimsbø, E., Macaulay, G., ... Hermansen, A. (2019). The Lofoten-Vesterålen Ocean Observatory—A cabled infrastructure for operational acoustical oceanography. *The Journal of the Acoustical Society of America*, 146(4), 2773–2773. <https://doi.org/10.1121/1.5136604>
- Øygard, S. H., Lunde, P., & Pedersen, G. (2019). *Simulations of acoustic transmission loss of Fin whale calls reaching the LoVe Ocean Observatory*. Retrieved from <https://www.researchgate.net/publication/333203278>
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- Möller, T., & Nattkemper, T. W. (2018). *Active Learning for the Classification of Species in Underwater Images from a Fixed Observatory PEMCA-PEREGRINO MARINE CALCAREOUS ALGAE View project Bacterial cell colonies in microfluidic chambers View project Active learning for the classification of species in underwater images from a fixed observatory*. <https://doi.org/10.1109/ICCVW.2017.341>
- Möller, T., Nattkemper, T. W., Oller, T. M., & Nilssen, I. (2018). *Change Detection in Marine Observatory Image Streams using Bi-Domain Feature Clustering (Preprint)*. <https://doi.org/10.1109/ICPR.2016.7899732>
- Möller, T., & Nattkemper, T. W. (2018). *Active learning for the classification of species in underwater images from a fixed observatory*.
- Moller, T., Nilssen, I., & Nattkemper, T. W. (2017, January 17). *Data-Driven Long Term Change Analysis in Marine Observatory Image Streams*. 13–18. <https://doi.org/10.1109/cvaui.2016.015>
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- Osterloff, J., Nilssen, I., & Nattkemper, T. W. (2016). Computational coral feature monitoring for the fixed underwater observatory LoVe. *OCEANS 2016 MTS/IEEE Monterey, OCE 2016*. <https://doi.org/10.1109/OCEANS.2016.7761417>
- Godø, O. R., Johnsen, S., & Torkelsen, T. (2014). The LoVe Ocean Observatory is in Operation. *Marine Technology Society Journal*, 48(2), 24–30. <https://doi.org/10.4031/MTSJ.48.2.2>

