

# **Bruk av ubemannede farkoster i bestandsvurderinger – eksempler fra brisling og tobis -**



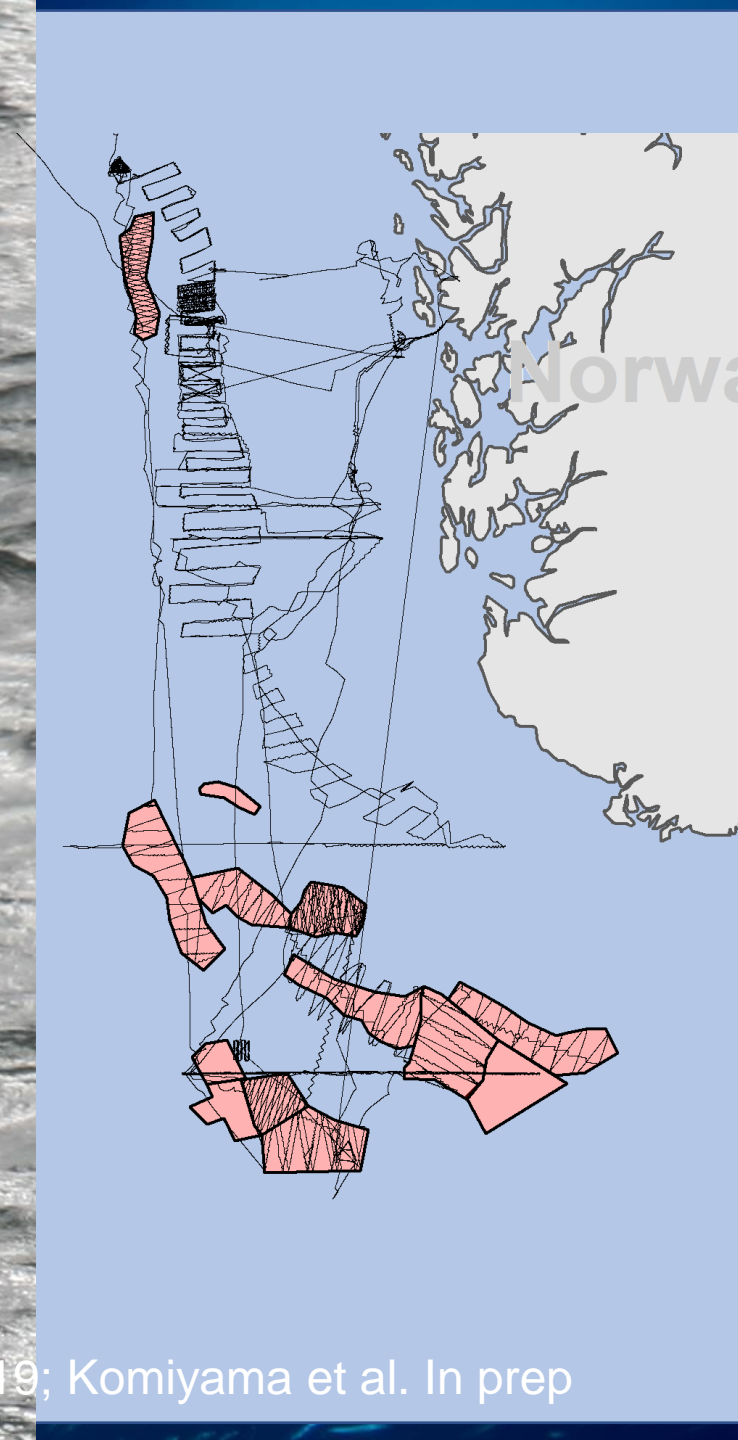
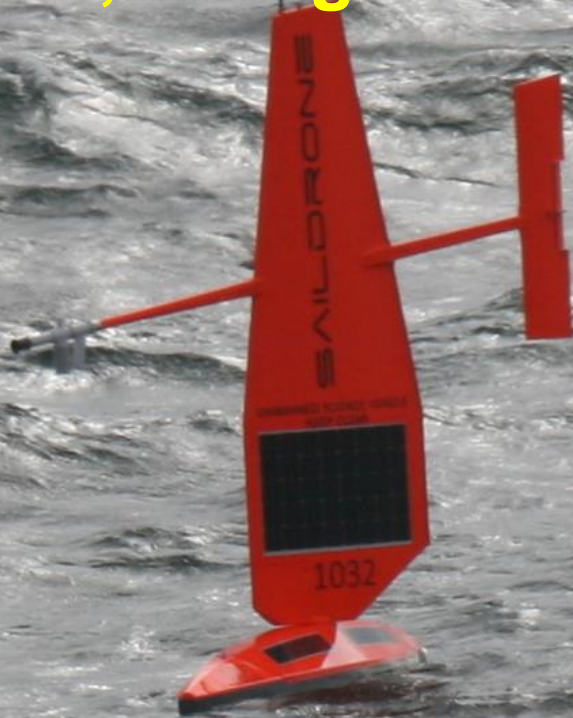
**Espen Johnsen  
FG Pelagisk fisk  
Havforskningsinstituttet**

Referansegruppen for Ressursforskning 22 september

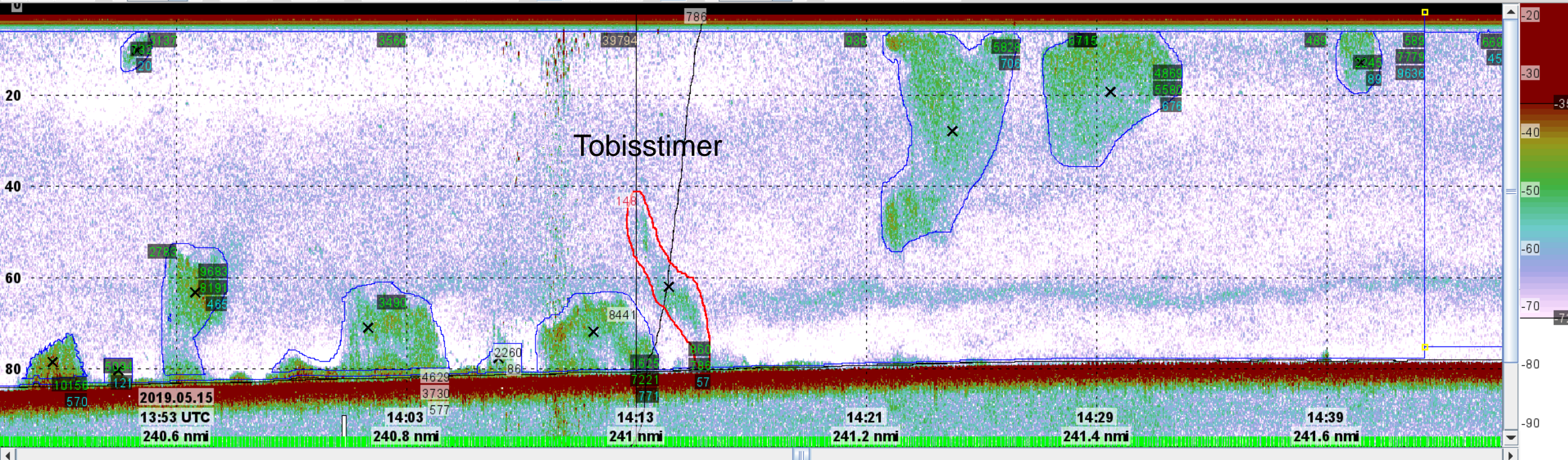


# Tokt i Nordsjøen 2019

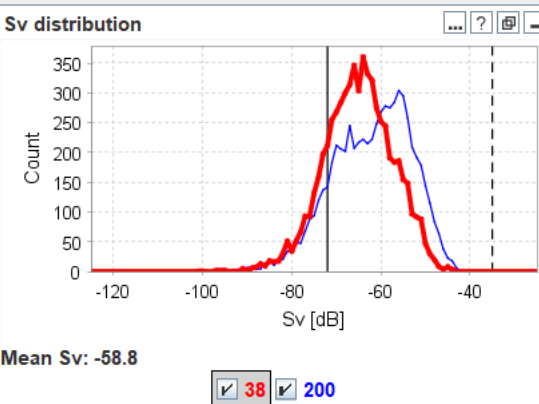
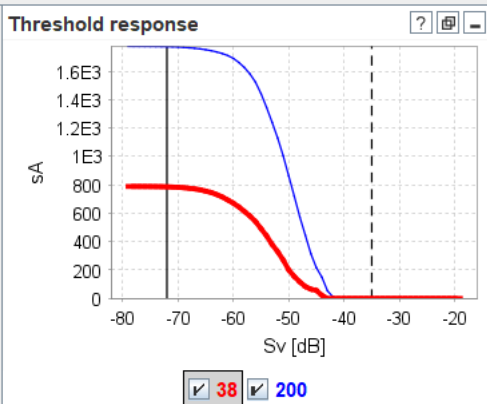
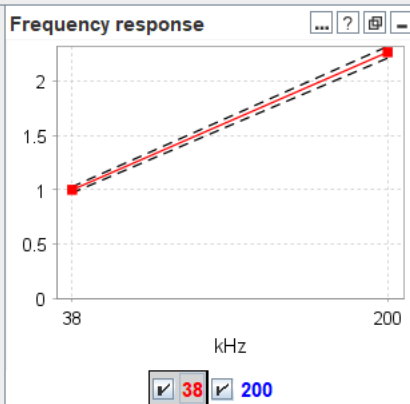
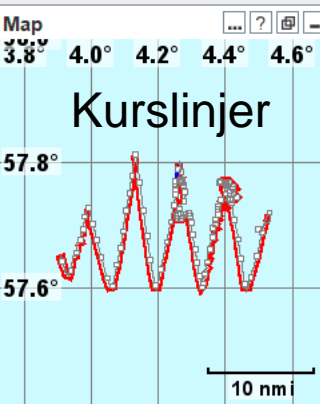
- 120 dager med to saildroner
- Tobis, sei og sild







Echogram plot



Interpretation

V. slice	Distance tot	Selected regi...
Date	2019.05.15	2019.05.15
Time	13:48:00	14:13:04
Duration	1:01:25	0:02:47
Dist[nmi]	240.4(1.306)	241.0(0.073)
#Ping	2416	109
S <sub>A</sub>	10602	786
S <sub>A</sub> corr.	10602	786

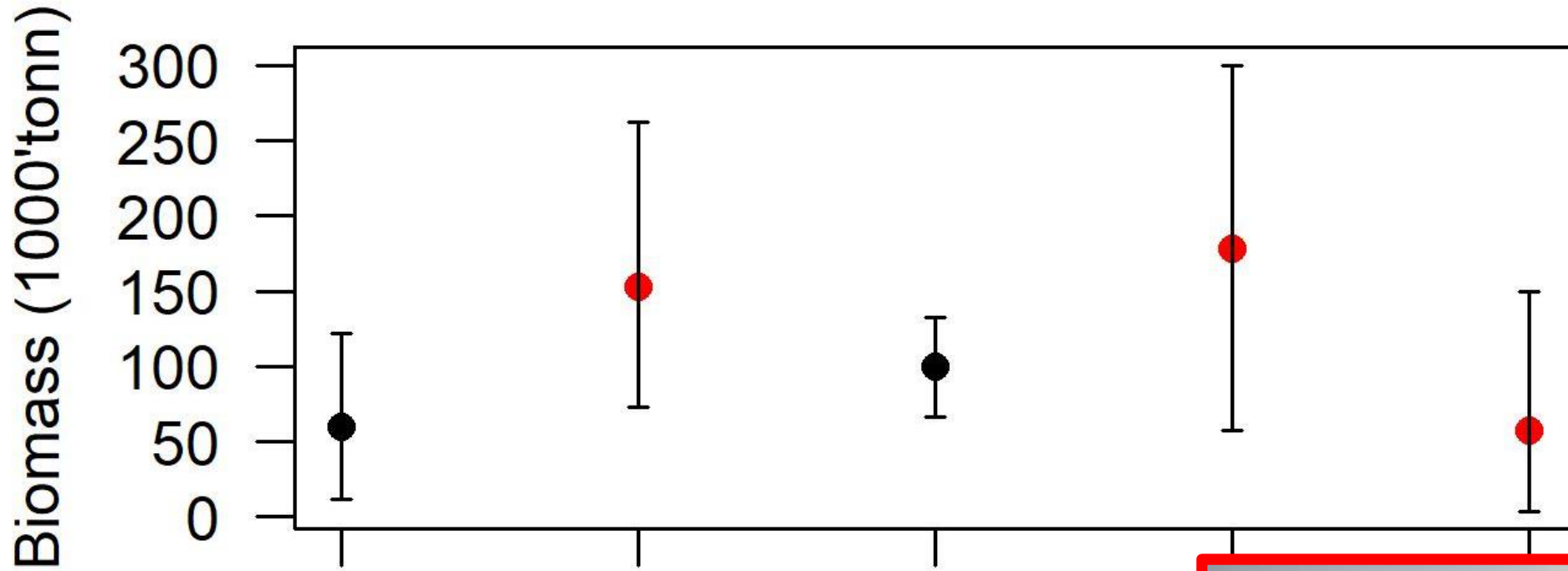
Categ...	Assignment	%	sA	R...
SAND		100	786	
Total		100	786	

Store [nmi]: 5 1 0.1 Delete

SAND PLANK OTHER



# Målte mer tobis nær overflaten med Saildrone enn med forskningsfartøy





# Brislingtokt i fjordene med Kajakkdrone - 2020, 2021 og 2023

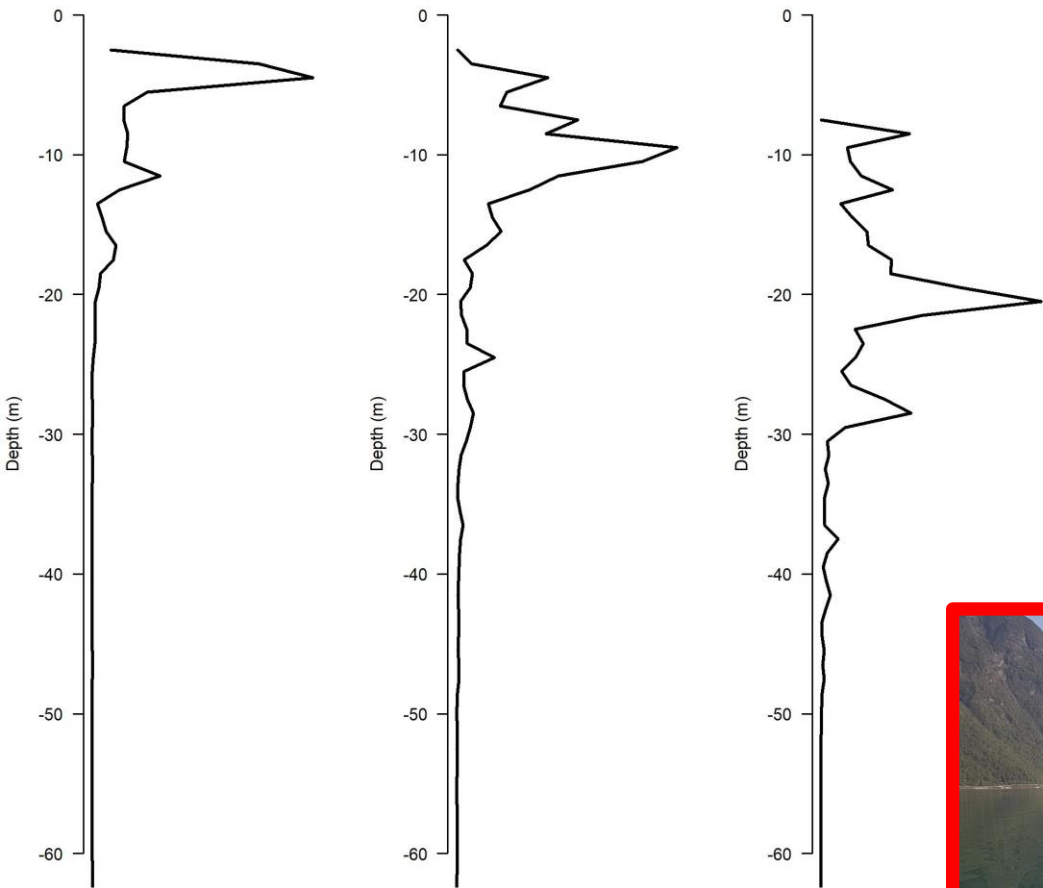


# Målte mye mer brisling nær overflaten med Kajakkdronen enn med forskningsfartøy

Kayak drone: Night

Kayak drone: Day

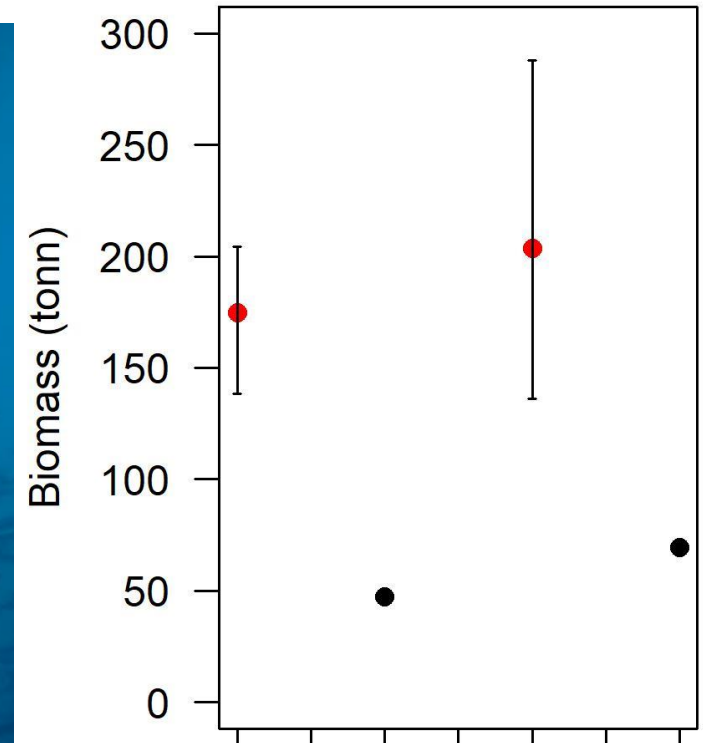
K. Bonnevie: Night



Echo density

Echo density

Echo density





# HI har kjøpt to USV Soundere

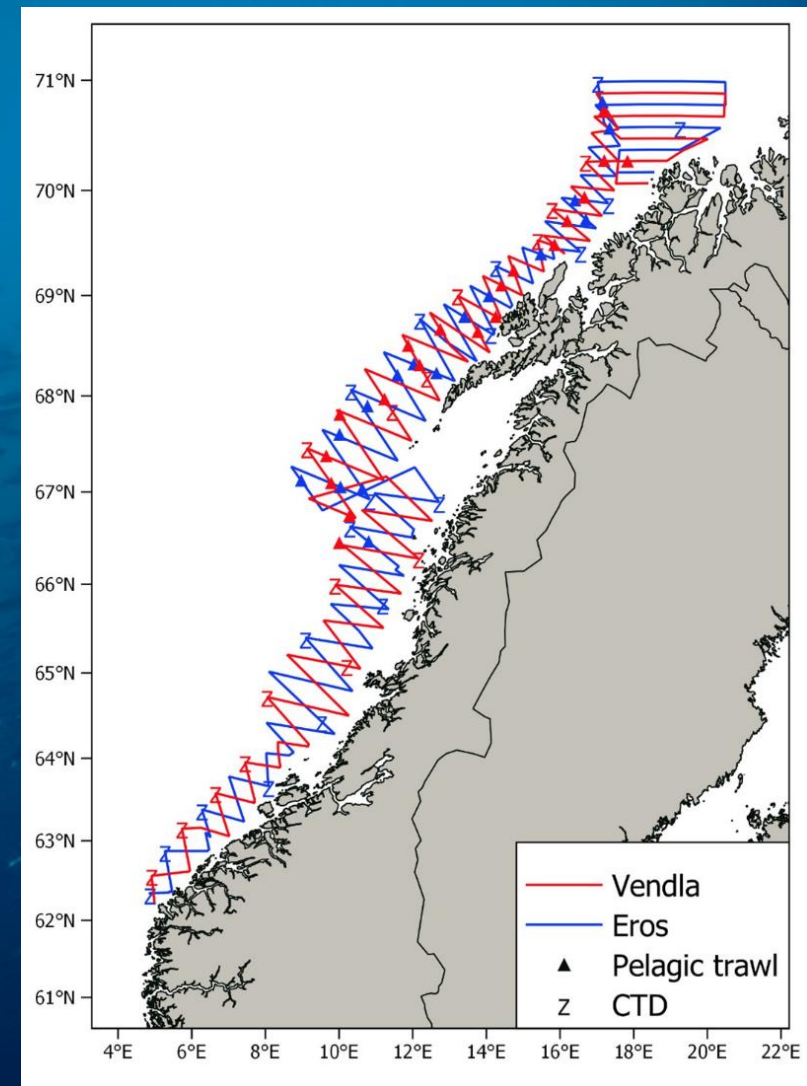
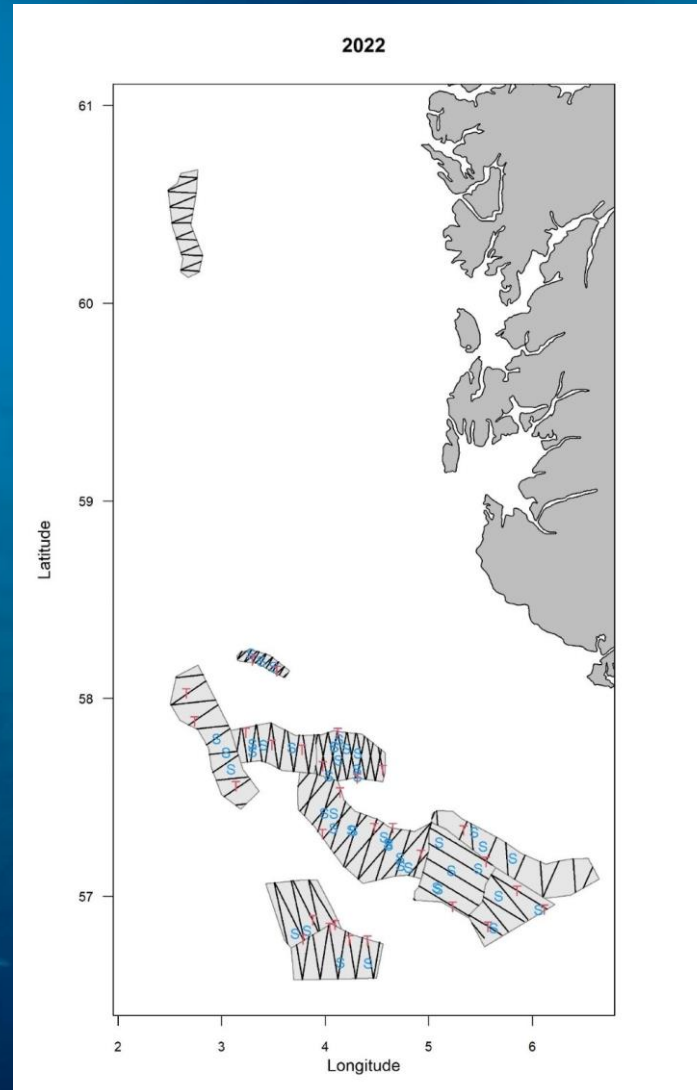
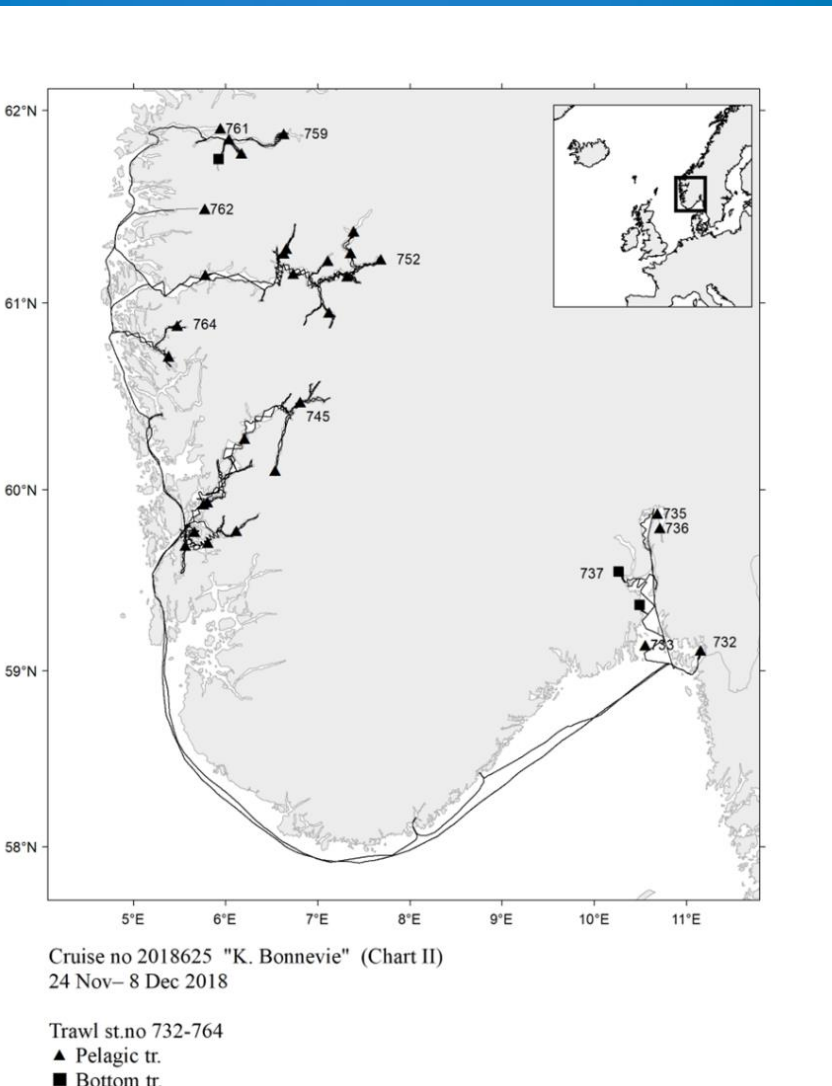
Velutstyrt med ekkolodd, sonar, ADCP og CTD vinsj







# HI har utviklet handlingsplaner for bruk av Sounder på tobistokt i Nordsjøen, for brislingtokt i fjordene, og for gytetokt for NVG sild. Full oppstart fra 2025! Uttesting i 2024

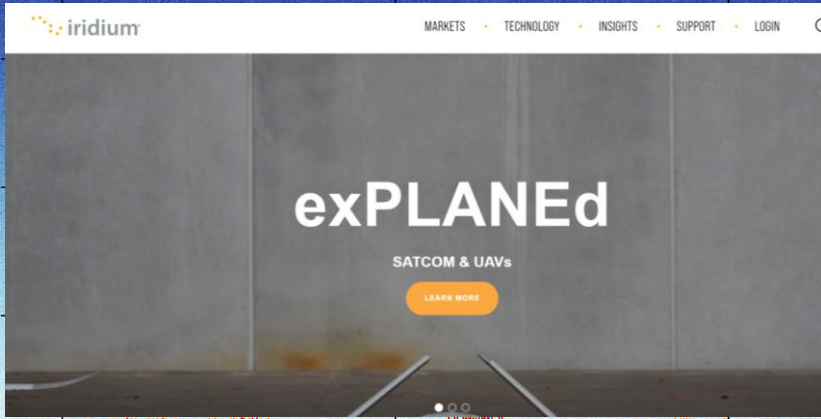




# Kommunikasjon




## STARLINK MARITIME



### Maritime Broadband Radio - MBR

The Maritime Broadband Radio is developed for use in maritime applications where digital high-speed reliable communication and data transfer are crucial for efficient and safe operations.





# Fartøyspesifikasjoner Sounder (to be updated)

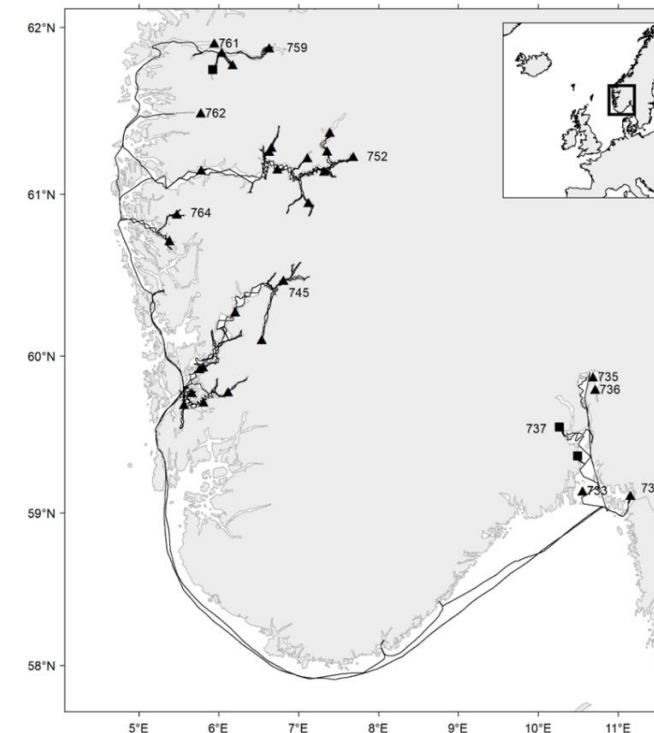
- Maksimum fart: 10-12 knop
- Slepefart: 10 knop
- Forventet toktfart: 4-5 knop
- Rekkevidde toktfart: 10-15 dager
- Distanse MBR: 20 km





# Toktspesifikke utfordringer

- Anti-kollisjon i kyst og fjord



Cruise no 2018625 "K. Bonnevie" (Chart II)  
24 Nov– 8 Dec 2018

Trawl st.no 732-764

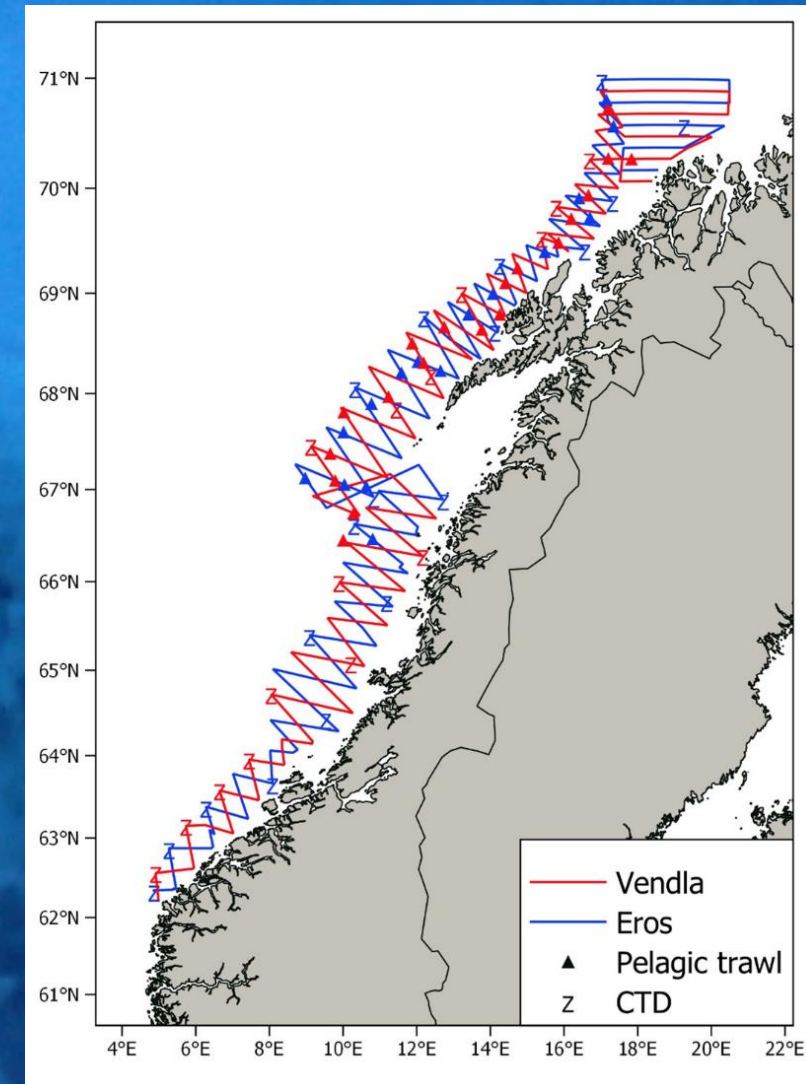
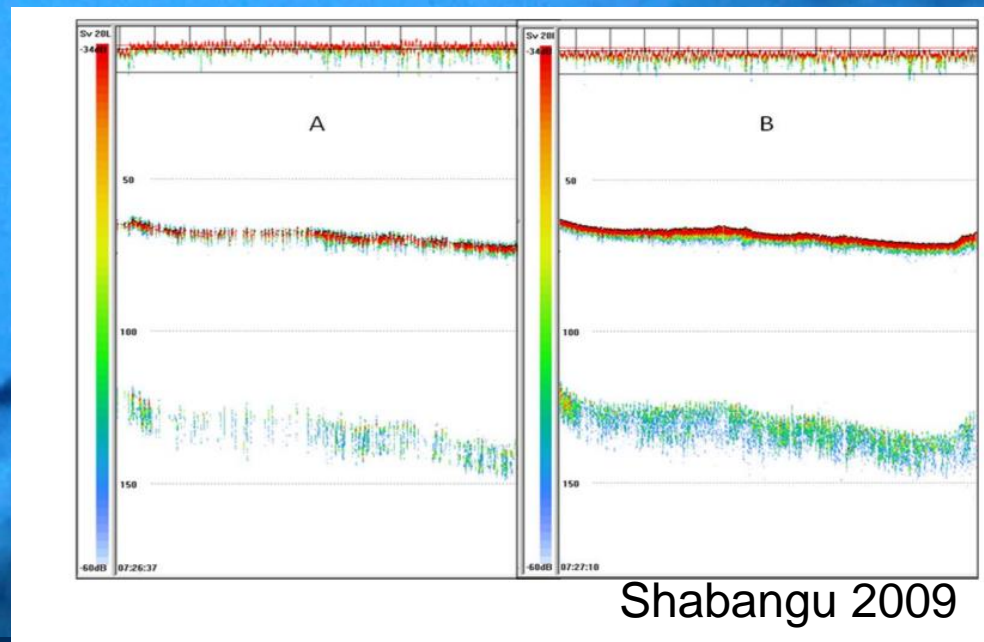
- ▲ Pelagic tr.
- Bottom tr.





# Toktspesifikke utfordringer

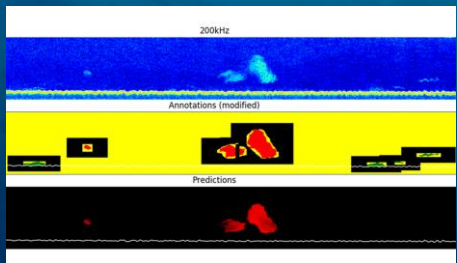
- Dårlig vær og distanser
  - Datakvalitet
  - Sjødyktighet
  - Rekkevidde



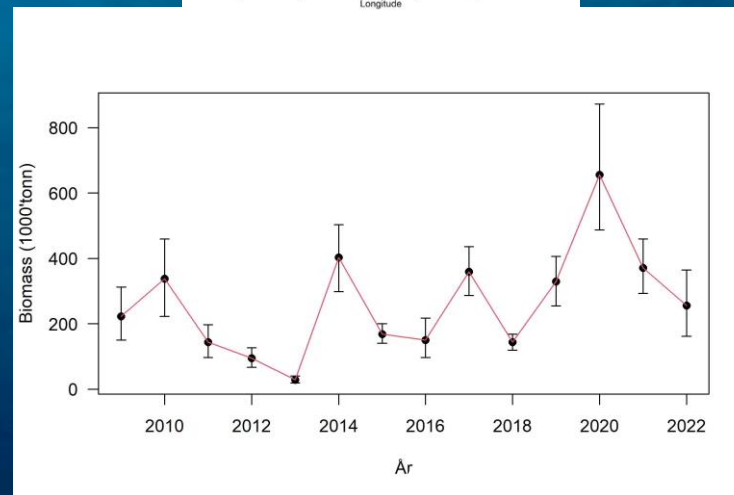
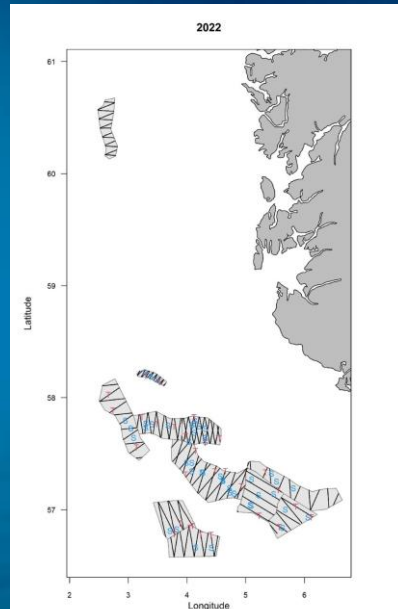


# Optimal utfordring: Hvordan gjennomføre et USV tokt uten bruk av forskningsfartøy?

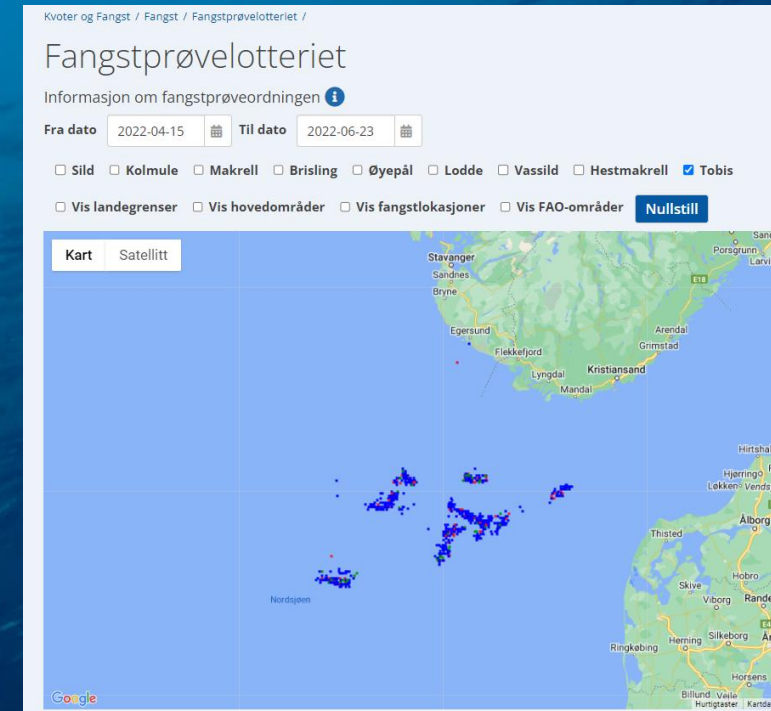
## Akustikk data



Brautaset et al. 2020



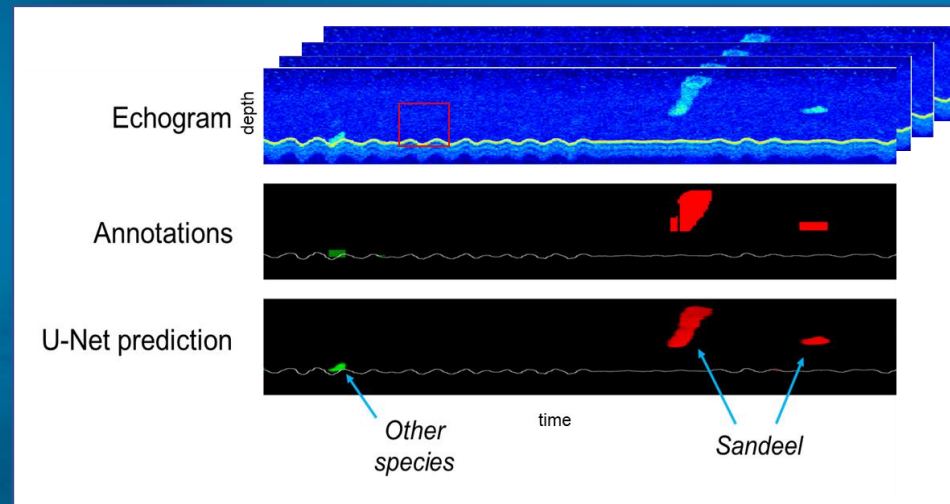
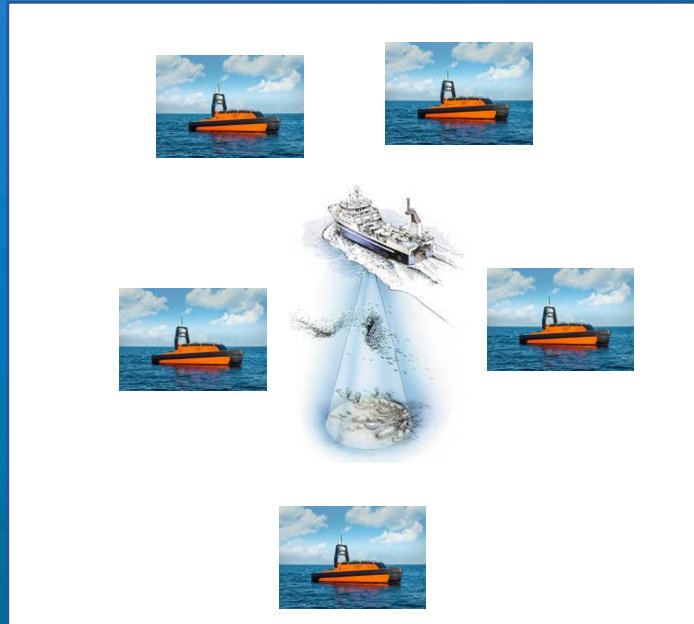
## Biologiske data fra kommersiell fartøy



Otterå et al. 2023



# Automatisk akustisk kategorisering





# Vellykket forsøk med Sounder lånt av Kongsberg i Hardanger august 2023.

- Gode akustiske data
- Kommunikasjonen fungerte tilfredstillende
- Navigasjonen fungerte tilfredstillende
- HI mottar sine to Soundere høsten 2023

