Upgrades to the Italian Marine Research Observatory in the Arctic Region

Francesco Paladini de Mendoza[1], Stefano Miserocchi[2], Marco Pansera[1], Gianmarco Ingrosso[3], Francesco Filiciotto[1], Virginia Sciacca[1], Angelo Odetti[4], Gabriele Bruzzone[4], Francesco Smedile[1], Maria Papale[1], Angelina Lo Giudice[1], Manuel Bensi[5], Patrizia Giordano[2], Tommaso Tesi[2], Federico Giglio[2], Leonardo Langone[2], Maurizio Azzaro[1]

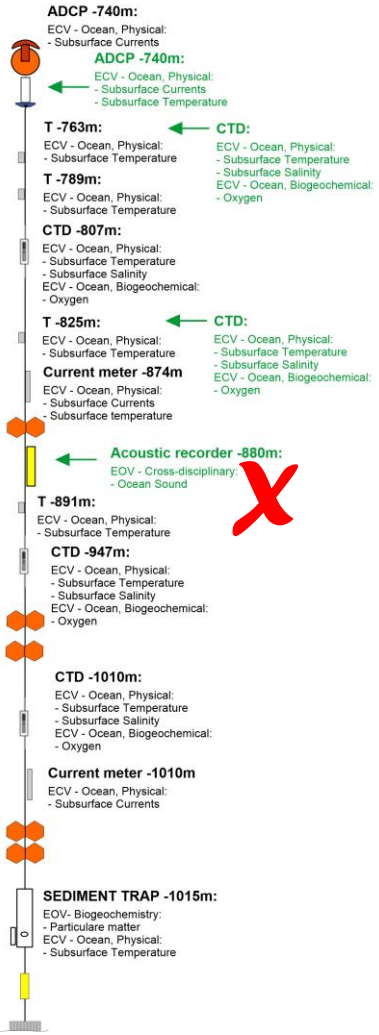
[1] CNR-ISP, Messina; [2]CNR-ISP, Bologna; [3],CNR-IRET, Lecce; [4] CNR-INM, Genova; [5] OGS, Trieste

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 "Education and Research" - Component 2: "From research to business" - Investment 3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures"

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani

UPGRADING of IT-SIOS observatory platforms

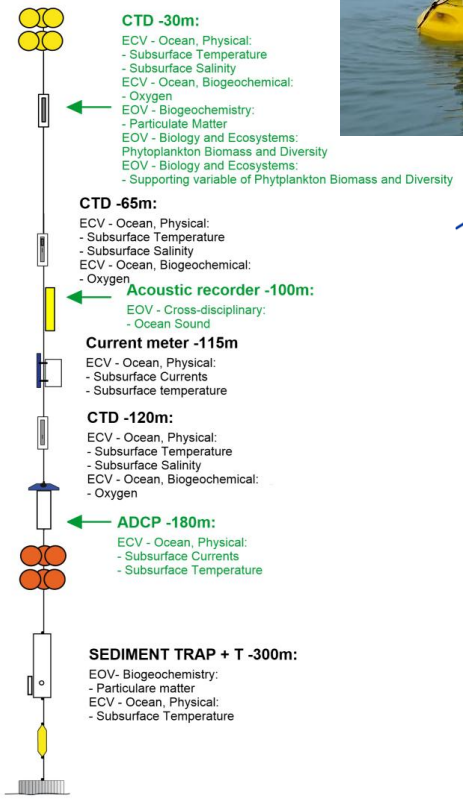
75% on S1 mooring
- New CTDs and ADCP installed in July 2025

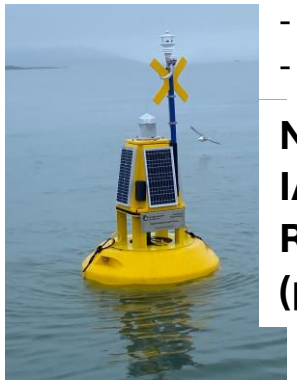


100% on KIM mooring
- Oxy sensor
- PAR sensor
- ECO-FLNTU sensor
- Ocean sound

INSTALLED IN JUNE 25

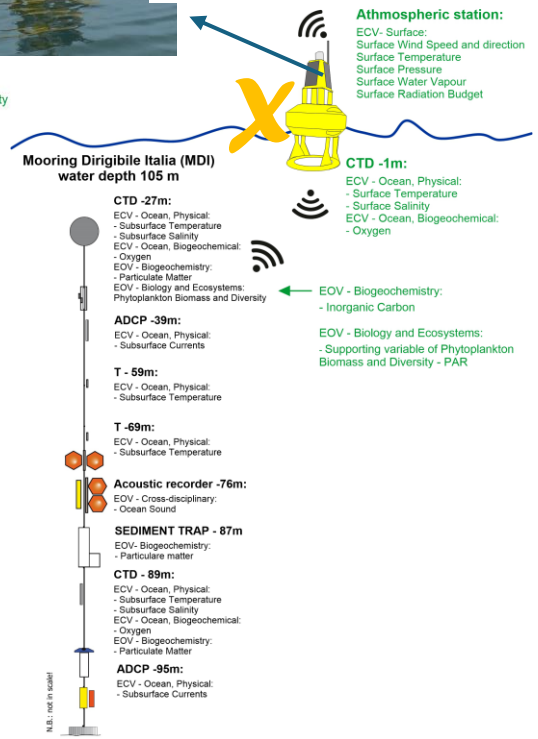
- ADCP currents

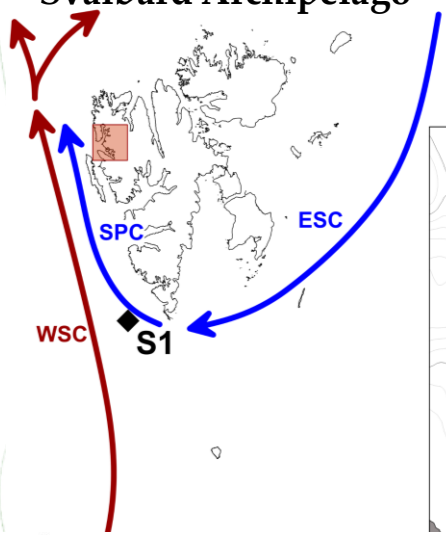




100% on MDI mooring
- CO_2 sensor installed in June 25
- Nitrate sensor
- PAR sensor

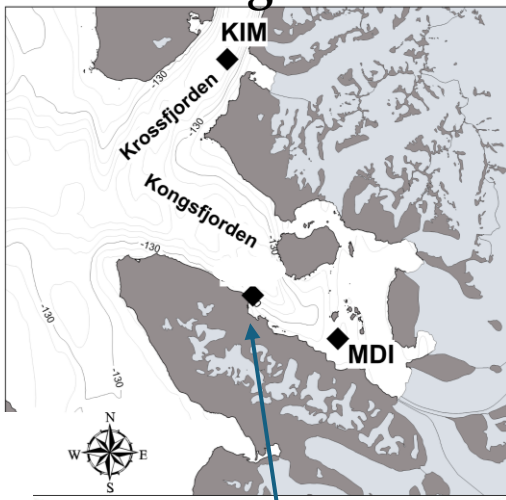
New Surface buoy, data in IADC, but <u>lost in April</u>
Replaced by <u>ARGO-FLOAT</u>
(planned for Spring 2026)





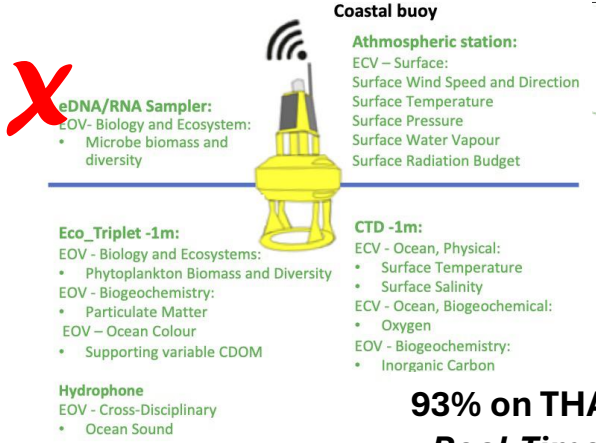
ITINERIS

Marine RI in Arctic region



Real-time and Near-Real time data transmission

Coastal buoy

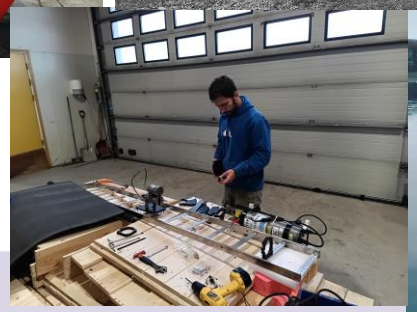


93% on THALASSOGRAPHIC BUOY
- ***<u>Real-Time since June 25</u>***
- Meteorology
- Physical and Biogeochemical sensors
- Ocean sound installed in Sept 25

All datasets from sensors installed before June 2025 are archived in IADC – ERRDAP repository, federated with IT-IOOS

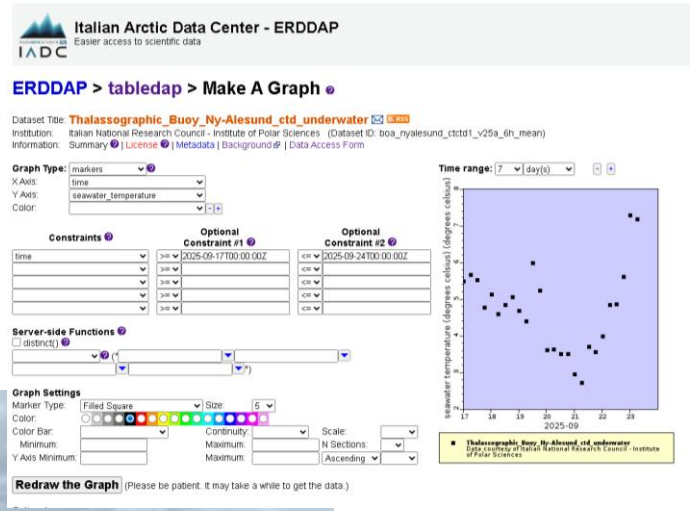
THALASSOGRAPHIC BUOY IN NY-ALESUND

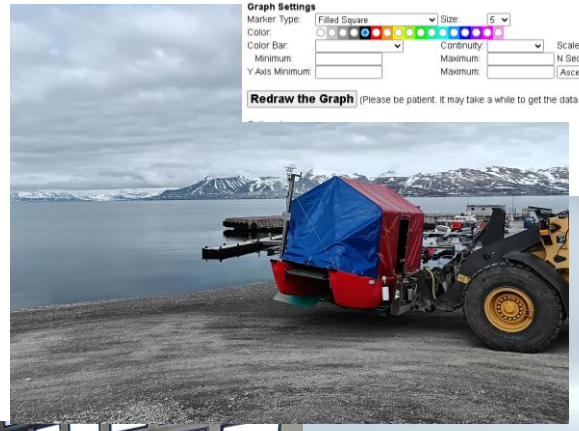
Structure designed and realized by CNR-INM (Odetti & Bruzzone)

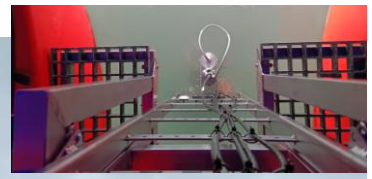


REAL-TIME DATA

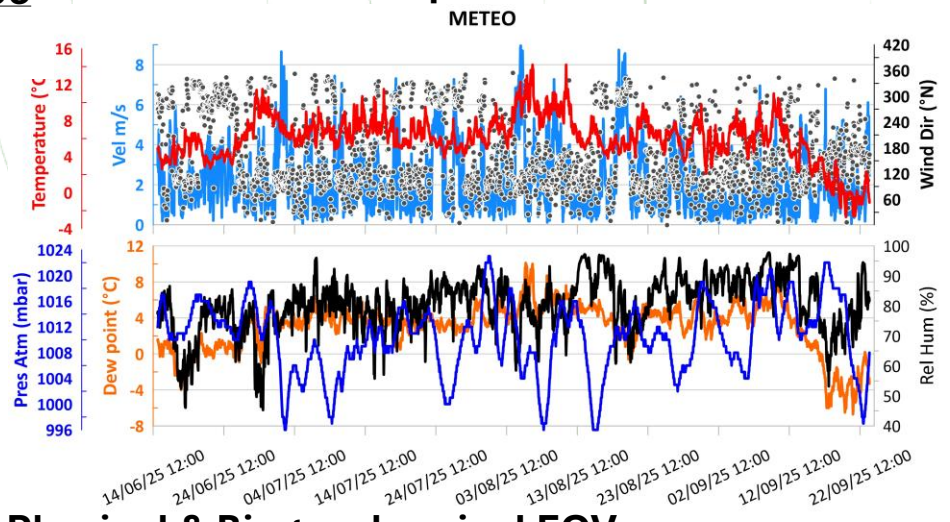
https://data.iadc.cnr.it/erddap/tabledap/boa_nyalesund_ctctd1_v25a_6h_mean.html



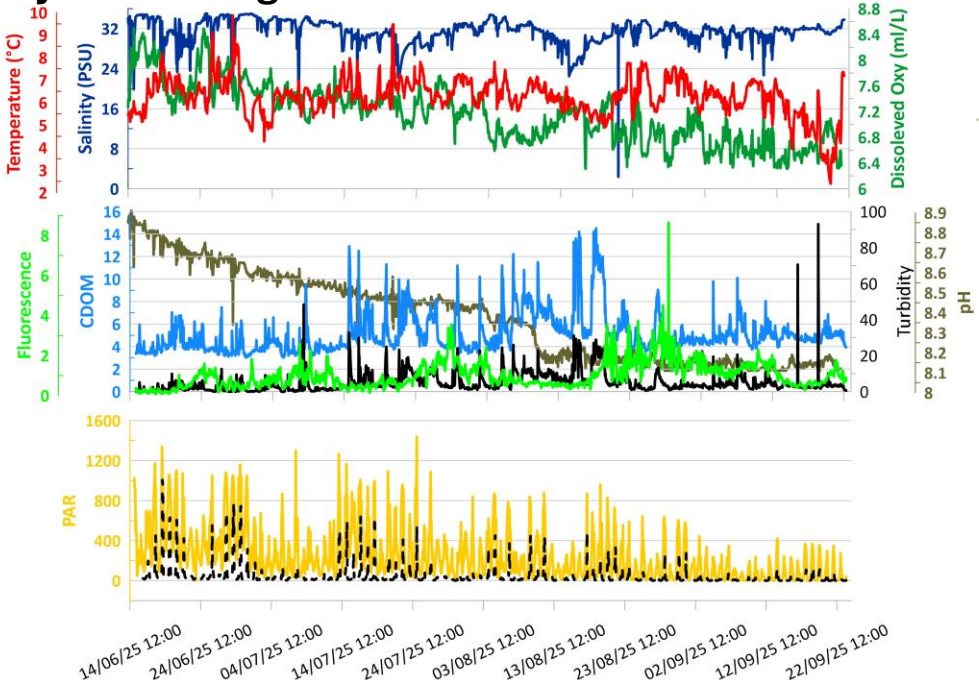




7 Essential Climate Variable - Atmosphere



8 Physical & Biogeochemical EOV s

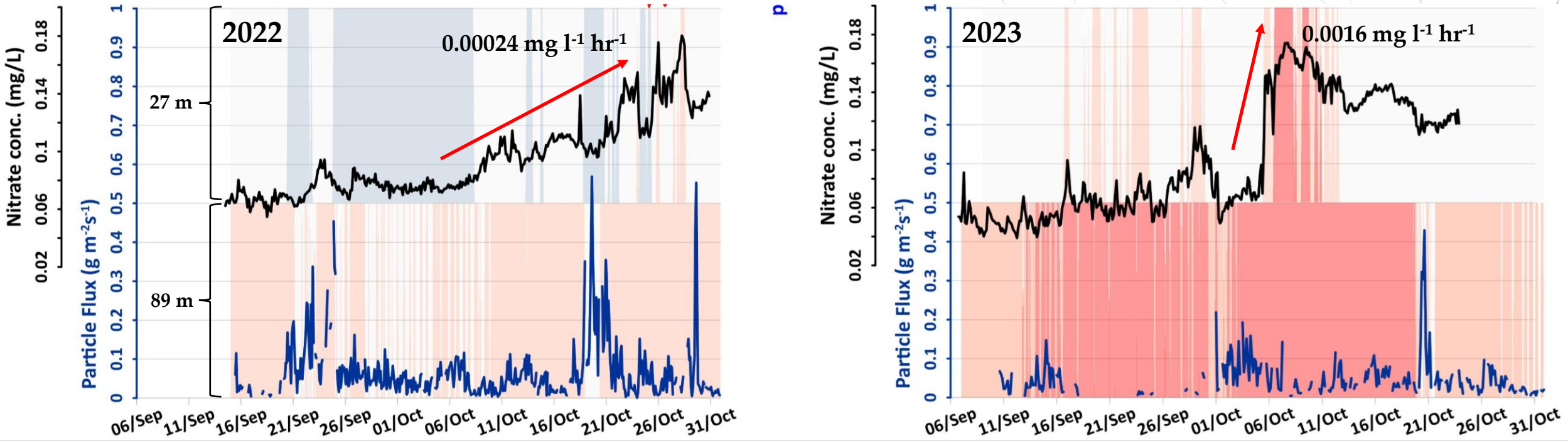


NEW BIOGEOCHEMICAL SENSOR UPGRADING ON MOORINGS

Increase of the knowledge about impact of climate change related processes (i.e. ATLANTIFICATION) on biogeochemical cycles (i.e NUTRIENT DYNAMIC)

Trasformed Atlantic Water
Atlantic Water
Surface Water

ATLANTIC WATER INTRUSION linked to FAST NITRATE REPLENISHMENT



IMPLEMENTATION OF SYNOPTIC OBSERVATION OF COASTAL ECOSYSTEM DYNAMICS IN THE ARCTIC REGION IN THE CONTEXT OF CLIMATE CHANGE

THANKS!

IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-Mission 4 “Education and Research” - Component 2: “From research to business” - Investment 3.1: “Fund for the realisation of an integrated system of research and innovation infrastructures”

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani