

# EUROFLEETS+ FINAL CONFERENCE

TAIPro2022 Cruise in the western Mediterranean Sea on R/V BELGICA

K. Schroeder<sup>1</sup>, M. Álvarez<sup>2</sup>, M. Castrillejo<sup>3</sup>, L. Coppola<sup>4</sup>, S. Jacquet<sup>5</sup>, A. Pallavicini<sup>6</sup>, S. Retelletti Brogi<sup>7</sup>, T. Tanhua<sup>8</sup> and all other cruise participants

<sup>1</sup>CNR-ISMAR Venice (Italy), <sup>2</sup>CSIC-IEO Vigo (Spain), <sup>3</sup>IC London (UK), <sup>4</sup>IMEV-LOV Villefranche (France), <sup>5</sup>MIO Marseille (France), <sup>6</sup>University of Trieste (Italy), <sup>7</sup>CNR-IBF Pisa (Italy), <sup>8</sup>GEOMAR Kiel (Germany)

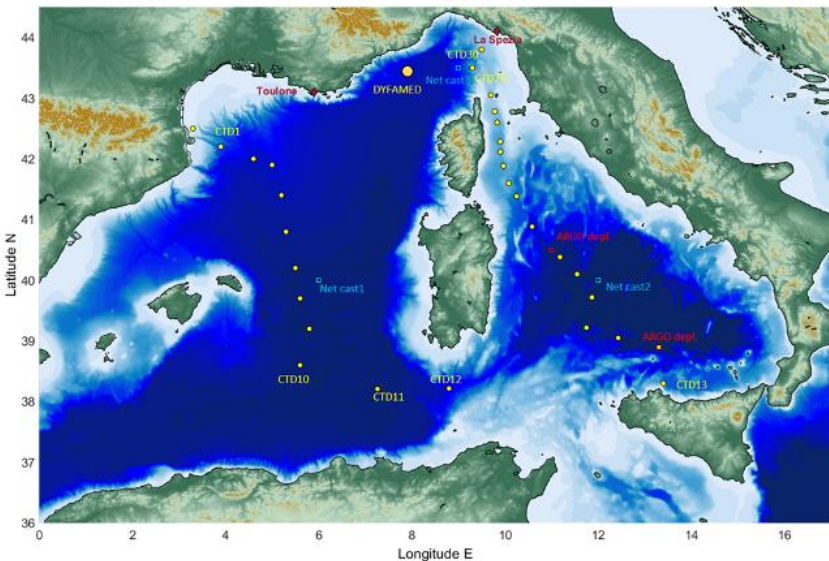


# CRUISE DETAILS

TAIPro 2022 Cruise

Tyrrenian Algero – Provençal Cruise 2022

24 full depth hydrographic stations



17th May 2022  
La Seyne sur Mer  
(France)



26th May 2022  
La Spezia (Italy)



# R/V BELGICA

## SILENT RESEARCH SHIP

Diesel-Electric (AC) propulsion  
(ABC – Rolls-Royce – Indar)  
(twin screw – 5-blade – fixed pitch)

Research silent Class

–  
Limited influence on environment &  
Optimal acoustic platform

## HEAVY DUTY

3 Cranes (fwd, mid, aft)  
2 CTD Winches (stbd)  
Multifunctional Winch (stbd)  
Hydrographic Winch (aft/stbd)  
2 Trawl Winches  
Net Drum Winch  
Split Net Drum Winch  
Net Sonde Winch  
2 Gilson Winches  
CTD Gantry & LARS (stbd)  
2 stbd T-frames  
Aft A-frame  
LARS incl. 15 m piston corer  
7 m Work Boat

–  
Able to deploy wide range of scientific gear up to 5000 m water depth

## FULL OCEAN RESEARCH VESSEL

71.4 m length, 16.8 m beam, 4.8 m draft  
11 kn operational speed (max. 13+ kn)  
North Sea, Atlantic Ocean, Mediterranean Sea  
Instrumentation adapted to water depths of 5000 m  
Ice Class for summer operations in Arctic areas

## GREEN SHIP

Waste-heat recovery  
MARPOL TIER III  
–  
Energy efficient &  
Low emission

## NEW CAPABILITIES

Dynamic Positioning Class 2 (DP-2)  
(2 aft thrusters – 2 bow thrusters)  
–  
2 integrated drop keels  
Hoppe roll stabilization System  
12 crew – 28 scientists & marine technicians  
(14 single & 13 double cabins)  
–  
30 day autonomy & 300 days at sea  
–  
Suitable for offshore research, survey &  
exploration



## MORE SPACE

More than 400 m<sup>2</sup> of lab space  
Wet Lab  
3 Dry Labs  
Wet and Dry Fish Lab  
AUMS Lab  
Aerosol Lab  
Diver Store  
Seismic Room  
Scientific Lab  
Operational Center  
CTD hangar  
Hangar  
Crow's Nest  
Cold & Freeze Rooms  
Large aft & stbd decks  
–  
Adapted to the scientific needs for the coming 30 years

CLASS: DNV-GI # 1A; ICE(1C); SPS; E0; DYNPOS(AUTR); COMF-V(2); COMF-C(2); BWM-T; TMON; Silent-R; NAUT(AW)

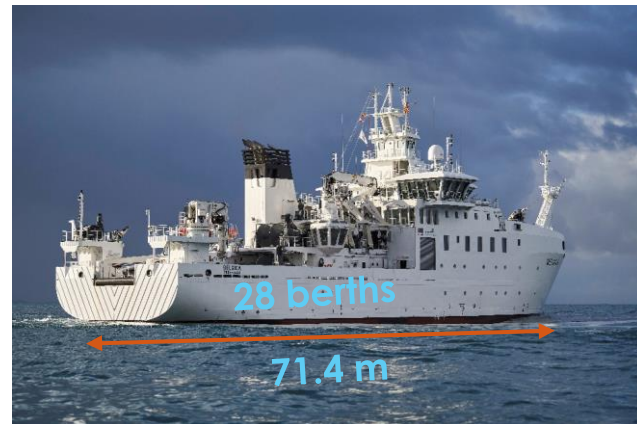
## FULL ACOUSTIC UNDERWATER INSTRUMENTATION SUITE

Shallow (EM2040) and deep-water (EM304) bathymetric multibeam echosounders (600 m & 8000 m)  
Parametric subbottom profiler (Tosap PS18) (11000 m)  
Scientific multibeam (ME70) & split-beam wideband echosounder (EK80) (>5000 m)  
Omnidirectional fish sonar (SU90) (4500 m)  
Net- and catch monitoring system (PX & FX80)  
Underwater position-reference system (USBL) (HIPAP 502) (5000 m)  
Acoustic Doppler Current Profilers (Ocean Surveyor 75 kHz & Workhorse 600 kHz) (1000 m & 50 m)  
–  
Mapping and analyses of full water column (incl. fauna), sea floor and subsurface

## ADAPTED TO EXISTING LARGE EUROPEAN MARINE RESEARCH INFRASTRUCTURE

Autonomous Underway Vehicles (AUVs)  
Remotely Operated Vehicles (ROVs)  
Unmanned Aerial Vehicles (UAVs)  
3D seismic systems  
Scientific sediment coring and rock drill devices  
Storage space of 7 ISO 20' containers  
–

A platform for European cooperation through which Belgian researchers get (free) access to large (and expensive) European marine research infrastructure





# OBJECTIVES



- detecting trends and variability in the Mediterranean Sea
- Repetition of the western zonal transects of Med-SHIP, 6 years after its first occupation in 2016 (EUROFLEETS2 TNA)
- Observations will be used to
  - 1) measure the changes in the thermohaline properties of Mediterranean water masses at the basin-scale;
  - 2) quantify the inorganic and organic dissolved carbon and dissolved oxygen storage in the western Mediterranean;
  - 3) quantify the uptake of anthropogenic carbon in the Western Mediterranean;
  - 4) quantify changes in the ventilation of the deep and intermediate water masses thanks to the transient tracers (CFCs, SF<sub>6</sub>, <sup>14</sup>C, <sup>129</sup>I, <sup>236</sup>U);
  - 5) measure concentrations of nutrients (nitrate, phosphate, silicate) in the water column, their ratio and assess changes;



# Med-SHIP: Mediterranean contribution to GO-SHIP



Med-SHIP includes a low-frequency zonal transect (GO-SHIP line MED01), and a number of high-frequency meridional transects

Level 1	Level 2	Level 3 (examples)
<ul style="list-style-type: none"> <li>DIC, TA, pH (any two)</li> <li>CTD/LADCP</li> <li>CTD oxygen</li> <li>Bottle salinity</li> <li>Nutrients by standard auto analyzer</li> <li>Dissolved oxygen</li> <li>CFC-11, -12, -113, SF6</li> <li>Surface underway (T, S)</li> <li>ADCP shipboard</li> <li>Underway nav and bathy</li> <li>Meteorological data</li> </ul>	<ul style="list-style-type: none"> <li>pCO2</li> <li>14C</li> <li>CCl4</li> <li><math>\delta^{13}C</math> of DIC</li> <li>DOC, DON</li> <li>Fe/trace metals</li> <li>CTD transmissometer</li> <li>Surface underway (pCO2, nutrients, O2, Chl, skin T)</li> <li>ADCP shipboard</li> <li>Underway nav and bathy</li> <li>Meteorological data</li> </ul>	<ul style="list-style-type: none"> <li>Chl, PP</li> <li>HPLC pigments</li> <li>Experimental continuous analyzers (such as pH, DIC, and TAlk, and O2/Ar)</li> <li><math>\delta^{15}N</math></li> <li><math>\delta^{18}O</math> of H2O</li> <li>NH4</li> <li>TOP</li> <li>Upper ocean optical properties</li> <li>Isotopes of O2</li> <li>N2, Ar, O2</li> </ul>

*Hydrographic measurements*

...are needed to determine ocean ventilation and circulation pathways and rates using chemical tracers

...are needed to reduce uncertainty in global freshwater, heat, and sea-level budgets

These results will be critical for evaluating ocean models and providing data constraints for state estimation, assimilation and inverse models. Cruises also provide cost-effective access to remote ocean areas for the deployment of other instruments.

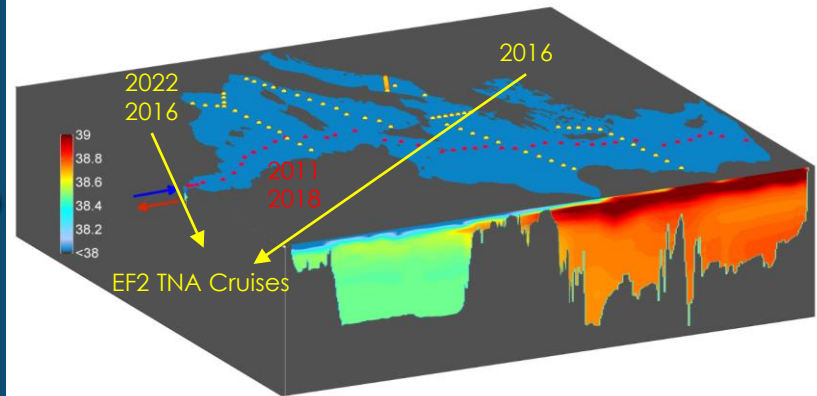
...are needed to determine the distributions and controls of natural and anthropogenic carbon (both organic and inorganic)

...are needed to augment the historical database of full water column observations necessary for the study of long timescale changes

...are needed to provide a standard for validating new sensors and a reference/calibration dataset for other observing system elements

...are needed to determine the significance of a wide range of biogeochemically and ecologically important properties in the ocean interior

...are needed to determine the variability and controls in water mass properties and ventilation





# CRUISE PREPARATION

We issued two calls, partially with the support of CIESM, the Mediterranean Science Commission:

«**Scientist of opportunity**» offering a couple of berths for additional scientists, that were not part of the original proposal

- eDNA sampling (Univ. Trieste)
- particulate Barium (CSIC)

«**Call for students**» from Mediterranean southern shore countries to participate to the cruise

- due to COVID-19 and VISA issues none of them came on board

TAIPro2022 was selected by a successful **Co-PI** proponent, so our team also performed 2 net casts to collect zooplankton in certain areas

We brought a **professional photographer** on board

## “Scientist of opportunity”

Open call for scientists to participate with complementary measurements



## Participate in a research cruise

Open call for students to participate in physical oceanography fieldwork



**Christian Clauwers**

Photographer. Explorer. Expedition guide.

[www.clauwers.com](http://www.clauwers.com)





# DATA MANAGEMENT PLAN

## 'FAIR', Open Data and CC0-licensed data (default Horizon 2020 )

DMP of our cruise details the steps we took to get the data ready before ingestion into the Eurofleets infrastructure, and after the project ends (preliminary and final DMP)

### Timeline for delivering raw data and metadata

- Metadata of the cruise (SeaDataNet Cruise Summary Report): within 2 weeks after the cruise
- Metadata of the datasets of the cruise: within 2 months after the cruise
- CTD data and data of deployed devices: within 2 months after the results are obtained
- "manual" data, e.g. observations on samples: within 2 months after the result is obtained (to allow lab analyses, does not include QC), together with operations metadata generated by the EARS software
- embargo: up to 2 years after the cruise, justified in the DMP









# REPORTING

**CSR submitted 2 weeks after the cruise**  
(<https://csr.seadatanet.org/report/20223094>)

**SeaDataNet** PAN-EUROPEAN INFRASTRUCTURE FOR OCEAN & MARINE DATA MANAGEMENT

**CRUISE SUMMARY REPORT INVENTORY (CSR)**

TAIPro-2022 CSR REF-NO : 20223094 Download XML CDI

**GENERAL INFORMATION**

ID	Platform/Ship
20223094	Belgica
Cruise begin	Cruise end
17.05.2022	26.05.2022
Port of Departure	Port of Return
La Seyne-sur-Mer, France	La Spezia, Italy

Chief Scientist(s)  
Dr. Katrin Schroeder - CNR, Istituto di Scienze Marine (Sezione di Venezia)

Responsibility Laboratory  
CNR, Istituto di Scienze Marine (Sezione di Venezia)

**DESCRIPTION**

Repeat hydrography, as organized through the GO-SHIP network, is fundamental for detecting trends and variability also in the Mediterranean Sea. For 10 days researchers from European Research Institutes have been on the cruise TAIPro2022, on board the brand new R/V Belgica, to repeat the western zonal transects of MedSHIP, the Mediterranean component of GO-SHIP, 6 years after its first occupation in 2016. The fieldwork will contribute to the sustained observational effort already existing at regional scale by repeating the basin-scale survey of the Tyrrhenian Sea and of the Algero-Provençal basin. These observations will be used to: 1) measure the changes in the thermohaline properties of Mediterranean water masses at the basin-scale; 2) quantify the inorganic and organic dissolved carbon and dissolved oxygen storage in the western Mediterranean; 3) quantify the uptake of anthropogenic carbon in the western Mediterranean; 4) quantify changes in the ventilation of the deep and intermediate water masses thanks to the transient tracers (CFCs, SF 6, 14 C, 129 I, 236 U); 5) measure the particulate size spectrum in the water column and to identify the zooplankton species. With respect to TAIPro2016, now data collected by an Underwater Vision Profiler (UVPS) integrated on the rosette, as well as data on Dissolved Organic Carbon (DOC) and a whole suite of radionuclides (14C, 129I, 236U) have been added. TAIPro2022 consisted of 30 full depth hydrographic stations crossing the Tyrrhenian Sea from north to south, then the Algero-Provençal Basin from south to north (following recommendations from the CIESM MedSHIP expert group and of Schroeder et al., 2015).

Full Cruise Report submitted 2 months after the cruise to the ship operator and the EF+ Coordinator

Available on Zenodo:  
<https://doi.org/10.5281/zenodo.6918731>



## TAIPro2022 CRUISE REPORT R/V BELGICA Cruise n. 2022/12

17th – 26th May 2022  
La Seyne sur Mer – La Spezia



Katrin Schroeder

R. Acerbi Amigo, M. Álvarez, B. Bogner, M. Borghini, A. Bosse, N. Casacuberta, M. Castrillejo, C. Clauwers, L. Coppola, V. Evangelista, F. Falcieri, M. García Ibáñez, M. Guerrazzi, A. E. R. Hassoun, S. Jacquet, B. Manzanares Obispo, M. Fourier, F. Martínez Ruiz, A. Pallavicini, L. Raimondi, S. Retelletti Brogi, C. Santinelli, T. Tanhua

CNR-Istituto di Scienze Marine

2022



# DATA SHARING

## Data submitted (GEOMAR OSIS Portal)

**GEOMAR**  
Helmholtz-Zentrum für Ozeanforschung Kiel

HOME RESEARCH DATA TUTORIALS SIGN UP PROJECTS READ MORE CONTACT US

**OSIS Tutorial**  
**FAQ OSIS**

Overview Expeditions Numerical Models Experiments More... Login...

Context: Any... Filter legs... Go

Legs » Cruise TAIPro-2022 » Leg TAIPro-2022

General Leg Info **Events (0)** **Files (10)** Related Links (2)

Edit Add Web Infos

Leg/Phase: TAIPro-2022  
Cruise/Expedition: TAIPro-2022  
Platform: Belgica  
Departure/Return: Departure: 2022/05/17 - La Seyne-sur-Mer (France)  
Return: 2022/05/26 - La Spezia (Italy)  
Add...  
Research Area: Mediterranean Sea  
Expocode: 11BU20220517  
Notes: OceanOPS Reference number: UBNRPAAIPM  
Project(s): EurofleetsPlus: Med-Repeat - Zirkulation des Mittelmeeres

Participating GEOMAR Research Unit(s):  
Organizing Institution: National Research Council  
Chiefscientist: Schröder, Katrin  
Chiefscientist's Affiliation: National Research Council  
Vicechiefscientist: Tanhua, Toste  
Created: 2022-06-13 11:41  
Last updated: 2022-07-19 11:47  
Community Context: [TAIPro-2022]

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General Leg Info **Events (0)** **Files (10)** Related Links (2)

...for Cruise (0) ...for this Leg (10) ...for Events (0)

Upload New File for Leg TAIPro-2022...

Filename	Version	Size [kB]	Q-Flag	Description	Uploaded	File Creator (Urheber)	Action...
wh600.nc	1	25368	final	Vessel mounted ADCP data (WH600 kHz), netcdf file	2022-07-29 17:11	Schröder, Katrin	Action...
os75nb.nc	2	1831	final	Vessel mounted ADCP data (OS 75 kHz), netcdf file	2022-07-29 17:08	Schröder, Katrin	Action...
TSGmean	1	18	preliminary	Data averaged every 15 min	2022-07-19 13:24	Coppola, Laurent	Action...
SubCtech_data_adjusted	1	22	preliminary	Adjusted for SST and DO	2022-07-19 12:00	Coppola, Laurent	Action...
TSG2_2022_0526_0634.xlsx	1	6854	preliminary	Thermosalinograph data	2022-07-19 09:30	Schröder, Katrin	Action...
weather.mat	1	3656	raw	Weather station data (Campbell Scientific)	2022-07-15 15:39	Schröder, Katrin	Action...
TAIPro_BTL_Total_CO2.xlsx	1	131	raw	Complete CO2 data set: pH, TA and DIC with flag s, also containing absorbances as raw data for p H... all coupled to BTL data as in the calibrated xls file already uploaded here by Katrin S.	2022-07-11 09:59	Alvarez, Marta	Action...
TAIPro2022_BTL_postcal.xlsx	1	82	calibrated	Post-calibrated bottle data (here all the other chemical data can be added)	2022-06-30 09:54	Schröder, Katrin	Action...
TAIPro2022_postcal_CT D.txt	1	6045	final	Txt file containing the post-calibrated CTD data	2022-06-30 09:53	Schröder, Katrin	Action...
TAIPro22_bt l.mat	1	20	raw	Preliminary transient tracer data, for now only in .mat format. Will be finalized with arrival of other bottle data	2022-06-24 12:48	Tanhua, Toste	Action...



# DATA SHARING

## Data repositories used by GO-SHIP

WWW.GO-SHIP.ORG



THE GLOBAL OCEAN SHIP-BASED HYDROGRAPHIC INVESTIGATIONS PROGRAM

HOME	<b>Data Directory</b>
ABOUT GO-SHIP	<b>CTD and Bottle Data</b> <b>CLIVAR and Carbon Hydrographic Data Office (CCHDO)</b> Principal Contact: Jim Swift, Director Email: <a href="mailto:jswift@ucsd.edu">jswift@ucsd.edu</a> Web-site: <a href="http://cchdo.ucsd.edu/">http://cchdo.ucsd.edu/</a>
SCIENCE COMMITTEE	<b>Carbon Data</b> <b>Ocean Carbon Data System (OCADS, former CDIAC)</b> Principal Contact: Alex Kozyr Email: <a href="mailto:alex.kozyr@noaa.gov">alex.kozyr@noaa.gov</a> Web-site: <a href="https://www.nodc.noaa.gov/ocads/">https://www.nodc.noaa.gov/ocads/</a>
REFERENCE SECTIONS	<b>S-ADCP Data</b> <b>Hawaii Joint Archive for Shipboard ADCP</b> Principal Contact: Patrick Caldwell Email: <a href="mailto:Patrick.Caldwell@noaa.gov">Patrick.Caldwell@noaa.gov</a> Web-site: <a href="http://lilikai.soest.hawaii.edu/sadcp/clivar.html">http://lilikai.soest.hawaii.edu/sadcp/clivar.html</a> Data: <a href="http://lilikai.soest.hawaii.edu/sadcp/main_inv.html">http://lilikai.soest.hawaii.edu/sadcp/main_inv.html</a>
DATA REQUIREMENTS	<b>The Global Ocean Surface Underway Data Project (GOSUD)</b> Principal Contact: Loic Petit de la Villeon Email: <a href="mailto:Loic.Petit.De.La.villeon@ifremer.fr">Loic.Petit.De.La.villeon@ifremer.fr</a> Web-site: <a href="http://www.gosud.org/">http://www.gosud.org/</a>
CRUISE PLANS	<b>L-ADCP Data</b> <b>Currents group at University of Hawaii</b> Principal Contact: Eric Firing Email: <a href="mailto:efiring@hawaii.edu">efiring@hawaii.edu</a> Web-site with data: <a href="http://currents.soest.hawaii.edu/clivar/ladcp">http://currents.soest.hawaii.edu/clivar/ladcp</a>
JOIN A CRUISE	<b>Surface Meteorological Data</b> <b>Surface Marine Meteorological Data Assembly Center, COAPS, FSU</b> Principal Contact: Shawn R. Smith Email: <a href="mailto:smith@coaps.fsu.edu">smith@coaps.fsu.edu</a> Web-site: <a href="http://www.coaps.fsu.edu/RVSMDC/CLIVAR/">http://www.coaps.fsu.edu/RVSMDC/CLIVAR/</a> Data: <a href="http://www.coaps.fsu.edu/RVSMDC/html/data.shtml">http://www.coaps.fsu.edu/RVSMDC/html/data.shtml</a>
DATA DIRECTORY	<b>Underway Data</b> <b>The Global Ocean Surface Underway Data Project (GOSUD)</b> Principal Contact: Loic Petit de la Villeon Email: <a href="mailto:Loic.Petit.De.La.villeon@ifremer.fr">Loic.Petit.De.La.villeon@ifremer.fr</a> Web-site: <a href="http://www.gosud.org/">http://www.gosud.org/</a>
HYDRO MANUAL	
DOCUMENTS	
BIBLIOGRAPHY	
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## Submitter's Data Submission List

Show  entries

Submission identifier (UUID)	Title of dataset	Status	Last Update	Controls
<input type="text" value="Search Submission identifier"/>	<input type="text" value="TAIPro"/>	<input type="text" value="All selected"/>		
0b3b0cdf-460c-49f7-bf15-c48587f8c956	Weather station data collected during Med-SHIP cruise TAIPro2022	<input checked="" type="checkbox"/> Published at Discovery and Access Service	2023-05-12 17:10:24.681003	<a href="#">VIEW</a>
ed83e921-e669-4752-9ebb-e511b7ca6a54	LADCP current profiles collected during Med-SHIP cruise TAIPro2022	<input checked="" type="checkbox"/> Published at Discovery and Access Service	2023-05-12 13:35:36.107308	<a href="#">VIEW</a>
bbe3fe2b-8508-45b5-87a7-299012dc4570	CTD data collected during the cruise TAIPro2022	<input checked="" type="checkbox"/> Published at Discovery and Access Service	2023-05-12 13:35:14.827115	<a href="#">VIEW</a>
524d7edb-38b8-4a3a-9b2a-dc6f593d98ff	Bottle data collected during the cruise TAIPro2022 (only from CTD sensors)	<input checked="" type="checkbox"/> Published at Discovery and Access Service	2023-05-12 13:34:45.339999	<a href="#">VIEW</a>
163e6607-010b-4b35-a10e-02e84a8b310e	Ferrybox data collected during Med-SHIP cruise TAIPro2022	<input checked="" type="checkbox"/> Published at Discovery and Access Service	2023-05-12 13:34:26.509254	<a href="#">VIEW</a>
a63c0b6d-36b4-4f4e-9a47-267328b6fb05	Continuous thermosalinograph data collected during Med-SHIP cruise TAIPro2022	<input checked="" type="checkbox"/> Published at Discovery and Access Service	2023-05-12 13:34:06.435368	<a href="#">VIEW</a>
3b3b1466-89cb-4091-9bb3-468a6b74f008	Vessel-mounted ADCP data (current profiles) collected during Med-SHIP cruise TAIPro2022	<input checked="" type="checkbox"/> Published at Discovery and Access Service	2022-10-19 14:19:53.433417	<a href="#">VIEW</a>

Showing 1 to 7 of 7 entries

Previous **1** Next

[ADD](#)

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### Details of CTD data collected during the cruise TAIPro2022

[BACK](#)

**Dataset identification**

**Title of dataset** CTD data collected during the cruise TAIPro2022

**Narrative summary of dataset** Repeat hydrography, as organized through the GO-SHIP network, is fundamental for detecting trends and variability also in the Mediterranean Sea. The Mediterranean component of GO-SHIP is MedSHIP and TAIPro is the western Mediterranean component. The TAIPro2022 cruise consisted of 26 full depth hydrographic stations crossing the Tyrrhenian Sea from north to south, then the Algero-Provençal Basin from south to north. Here the postcalibrated CTD data are made available. Postcalibration has been done by measuring dissolved oxygen and salinity on water samples collected by the rosette.



**Project/programme** EUROFLEETS+ - An Alliance of European marine research infrastructure to meet the evolving needs of the research and industrial communities

**Cruise** 120\_BSH20223094

**Start date** 2022-05-18

**End date** 2022-05-25

**Responsibilities**

**Country** Italy

**Organisation name** CNR, Istituto di Scienze Marine (Sezione di Venezia)

**Role of organisation** Originator of Dataset

**Country** Italy

**Organisation name** CNR, Istituto di Scienze Marine (Sezione di Venezia, ex ISDGM)

**Role of organisation** Originator of Dataset

# All data submitted to Emodnet Ingestion Portal



# DISSEMINATION

Social media profiles  
Blog



19 May 2022 –The best desk ever!

Blog  
<https://mediterranean-monitoring.wordpress.com/>

The science meeting room is maybe the thing that surprised me the most on this vessel. Every research vessel I have been on has a room dedicated to meetings and were scientists can hold short seminars. This one is different, not only the meeting room is very big (all of us can easily fit in it) but it has whole corner of windows right over the CTD working on a desk near one of those windows. This breathtaking view on a blue Mediterranean sea with no other ship on the horizon has a surprisingly calming effect. I will definitely miss it once I will be back in my office in the Venice Arsenal!

## GOOS Report Card



## GOOS News and SM



The Global Ocean Observing System  
News

**Under the surface: When a cruise through the Mediterranean Sea is not exactly a holiday**

Details  
Published: 07 November 2022  
Day and night, a group of scientists are gliding through a special route across the Mediterranean Sea, stopping every 25 nautical miles to measure important parameters, from the surface to the 3 km deep bottom. They undertake this journey every 5 to 8 years - not only to document the effects of climate change today, but also to witness what awaits in the near future.

## Arctic World Archive

AWA is a facility for data preservation, located in the Svalbard. It contains data of historical and cultural interest from several countries, as well as all of GitHub's open source code, in a deeply buried steel vault, with the data storage medium expected to last 500-1000 years



Pictures and footages taken by C. Clauwers during the TAIPro2022 cruise have been deposited there

Eurofleets+ Final Conference, 13<sup>th</sup> September 2023, Brussels, Belgium

## Story on UNESCO homepage

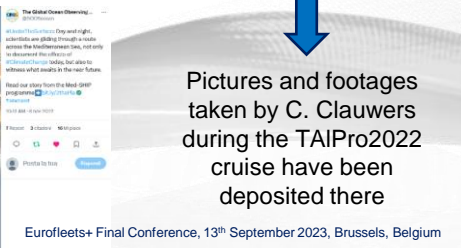
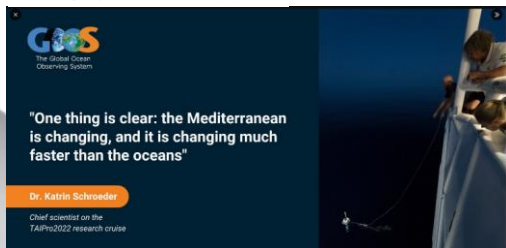


### Impact Stories

Find out how UNESCO is making an impact and building resilience in local communities around the world.



Access is not an impediment to education in Palestine  
Re-Shaping Cultural Policies for the Preservation of Fundamental Freedoms and the Diversity of Cultural Expressions in the Palestinian project  
Under the surface: When a cruise through the Mediterranean Sea is not exactly a holiday  
Pre-school children learn and play in Morocco





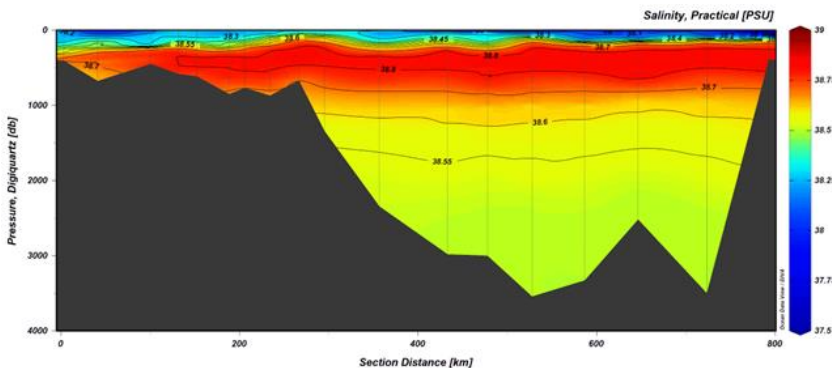
# PRELIMINARY RESULTS

Credits: C. Clauwers

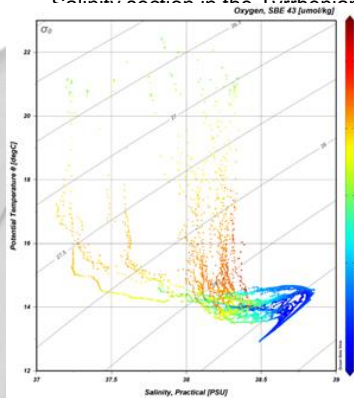


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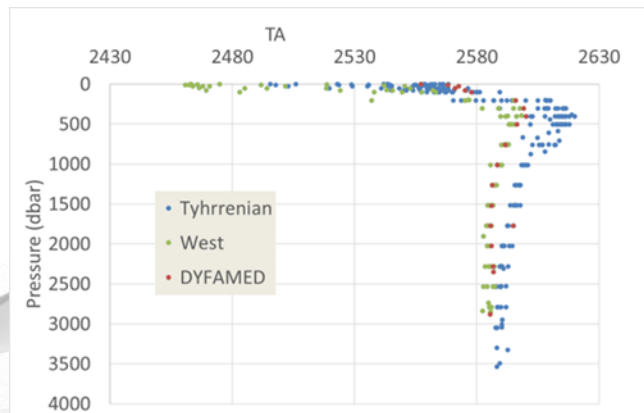
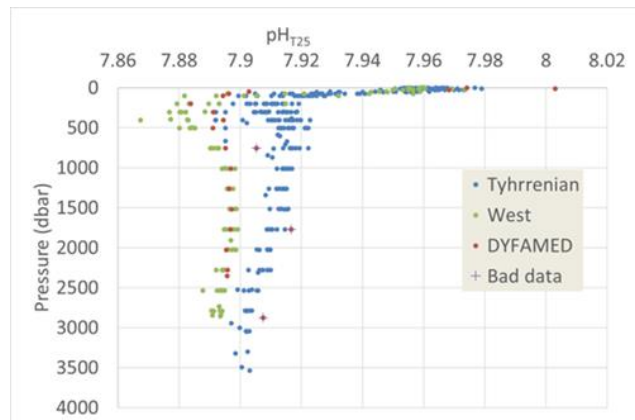
Vertical distribution of  $pH_{T25}$  and TA values for different areas: the Tyrrhenian Sea, the Western Provençal basin, and the DYFAMED stations.



Salinity section in the Tyrrhenian Sea (north is left), using post-calibrated CTD data.

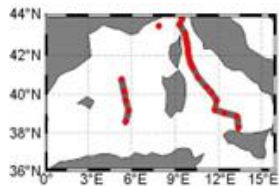


TS-diagram with dissolved oxygen values in the Algero-Provençal basin



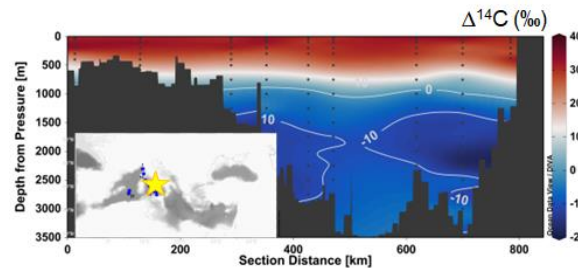
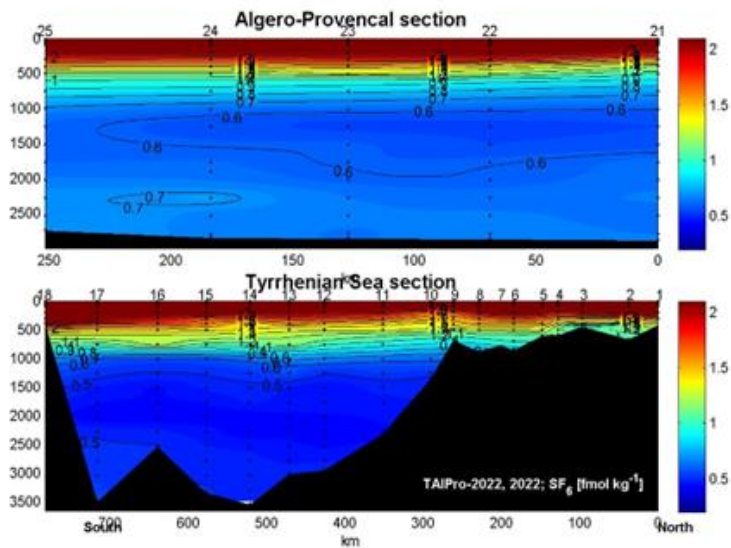


# PRELIMINARY RESULTS

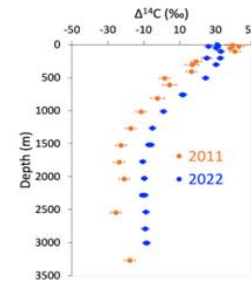


preliminary sections of SF<sub>6</sub> concentration along the two transect

By tracking changes in nuclear bomb contamination we can learn about shallow to deep water movement



Distribution of the radiocarbon in the Tyrrhenian  
→ most radioactive contamination remains in the upper layers



★  
St. 13  
Vertical transfer ↓

Comparison of radiocarbon distributions in 2011 and 2022 in the central Tyrrhenian  
→ water circulation has transported a substantial amount of radiocarbon from shallow to deep between 2011 and 2022



# FUTURE STEPS

Organize the 2<sup>nd</sup> post-cruise meeting

Topics of interest (conferences or potential papers)

- post-WMT situation
- Warming and Salinification of IW
- Ventilation rates estimates of the deep basins
- Carbon, Isotopes, Nutrients, eDNA, Barium ....

Data Repositories:

- conclude the submission of data to public repositories
- Prepare a data paper

Future of Med-SHIP:

- east-west transect (GO-SHIP Med01 line, 2024-2026), eastern Med north-south transects?
- Ocean Decade Call for Actions submitted

