

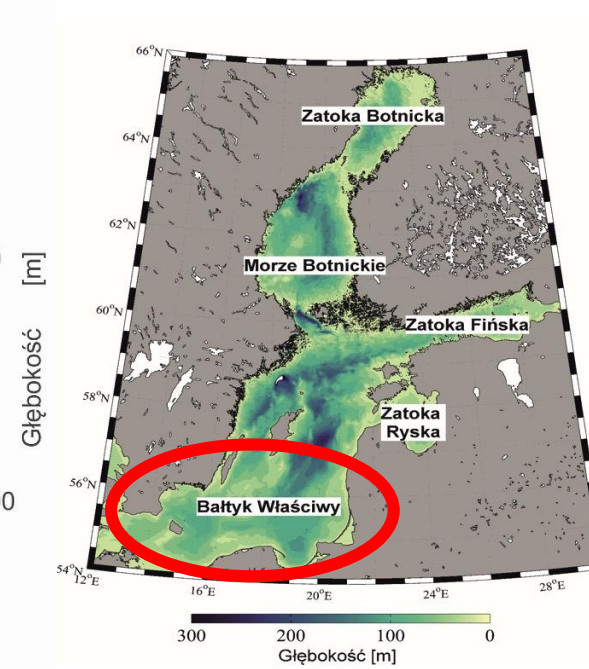
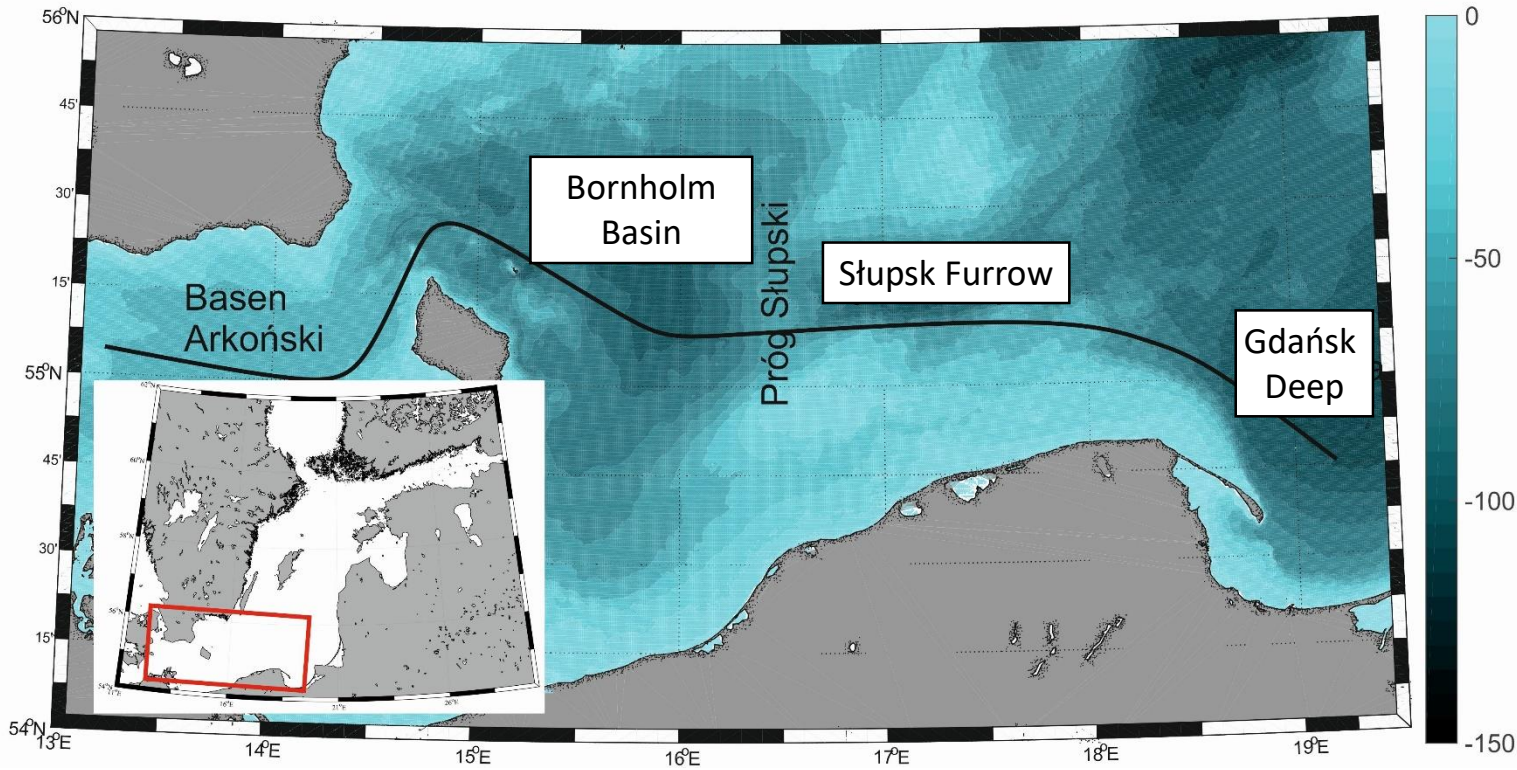


# **IOPAN reference data for DMQC of Baltic Sea floats**

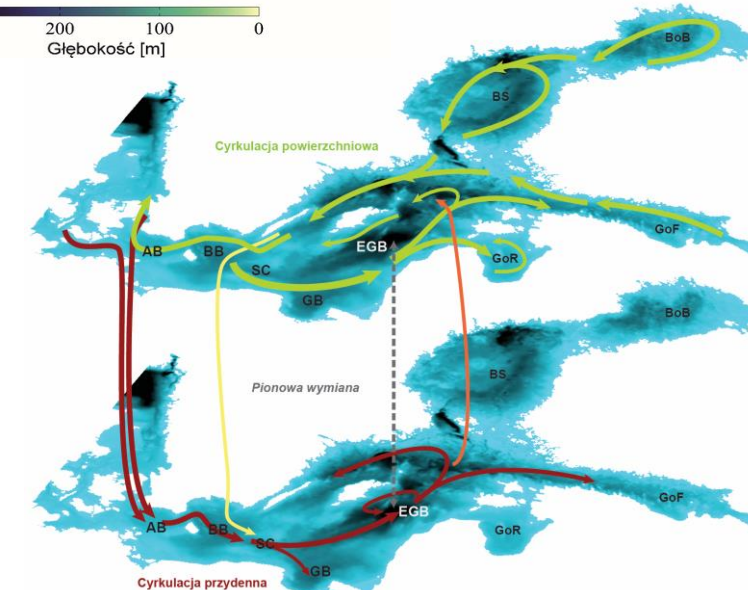
**Daniel Rak, Małgorzata Merchel, Waldemar Walczowski**

**Institute of Oceanology Polish Academy of Sciences  
Physical Oceanography Department**

# The research area - Baltic Proper



- **Bornholm Basin (BB)** – the region of accumulation of dense and salt inflow waters, originated from the North Sea
- **Słupsk Furrow (RS) together with the Słupsk Sill (PS)** - a transit area for the inflow waters
- **Gdańsk Deep (GG)** – the area acting a buffer role in which the part of inflow waters recirculates



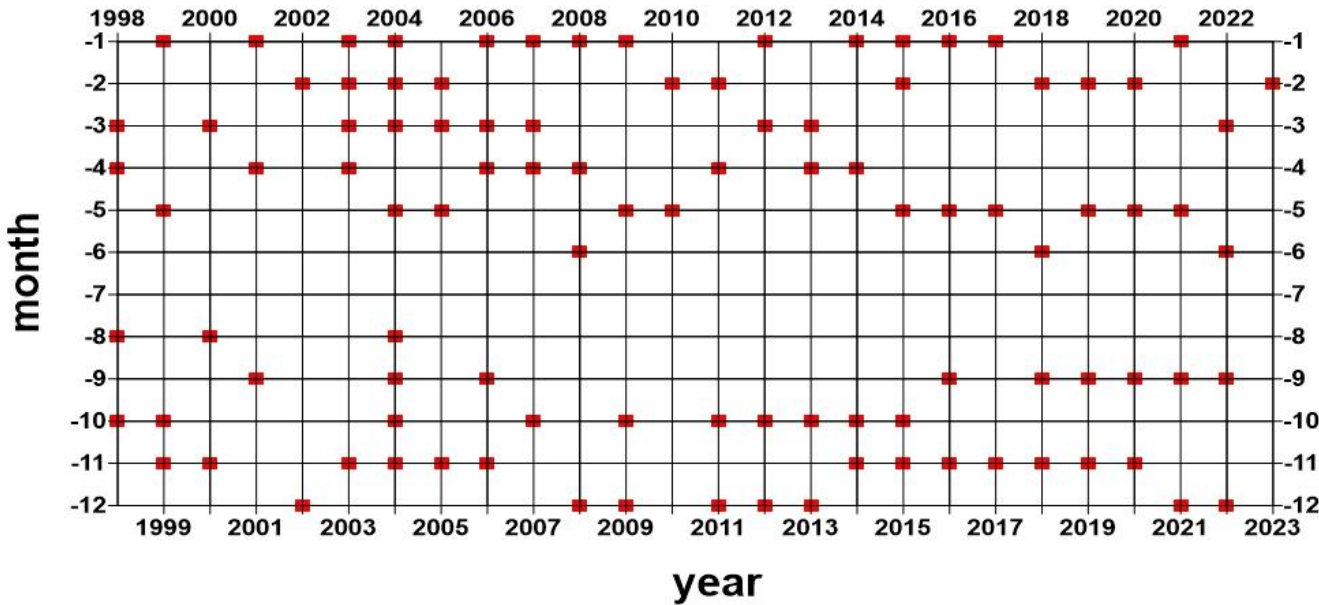
# Measurements from the r/v Oceania

## Repeated hydrographic sections:

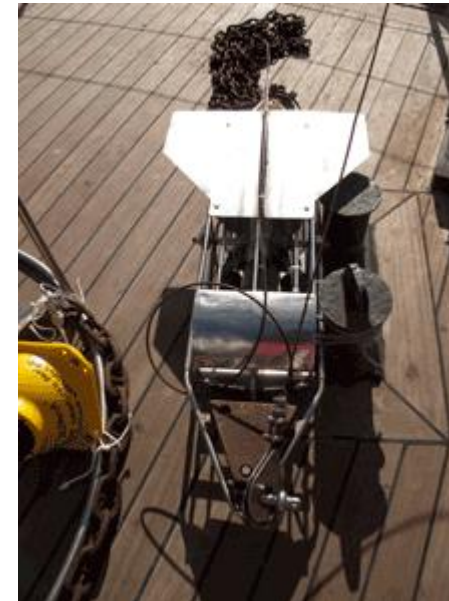
- **CTD measurements** with a towed probe  
93 hydrographic cruises (1998 – 2023)

Guildline 8710, Idronaut 316 oraz Seabird 49

- **DO measurements** with a Rinko II probe (2013 – 2023)
- **Vessel-mounted ADCP**



Monthly cruises schedule *r/v Oceania* 1998-2023



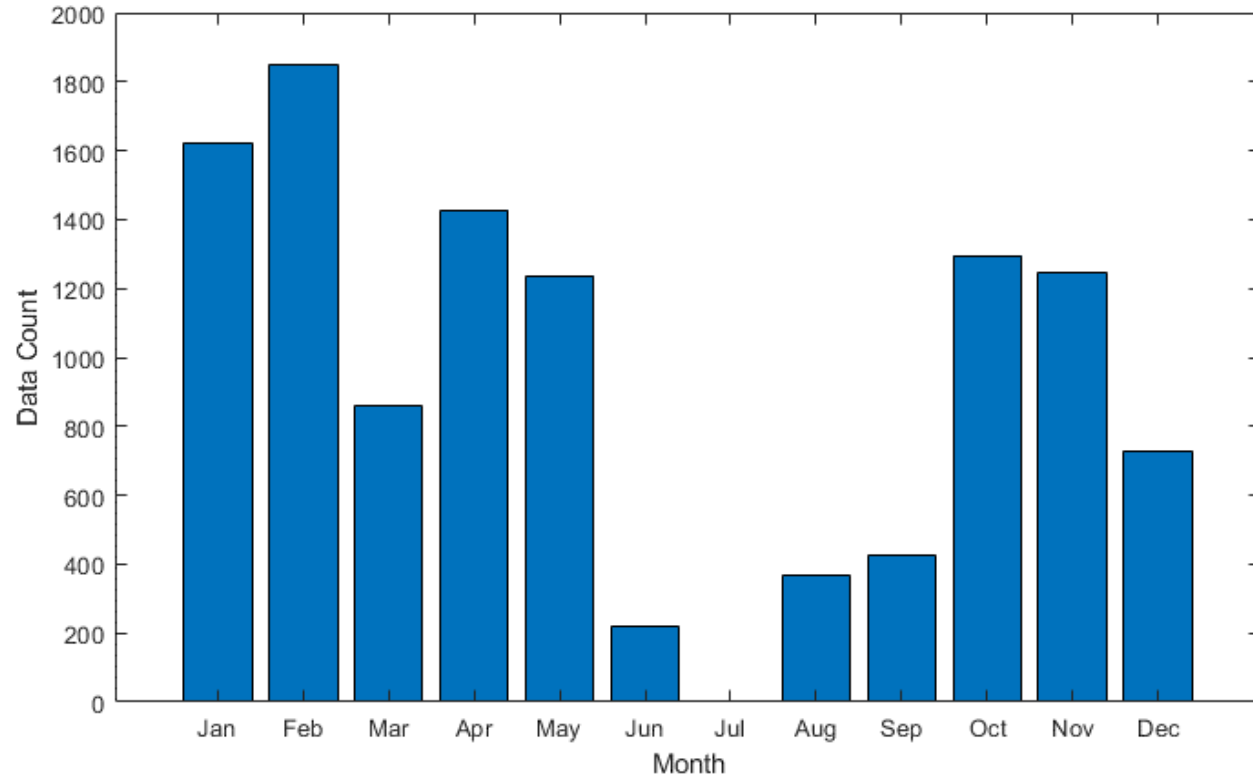
Towed CTD



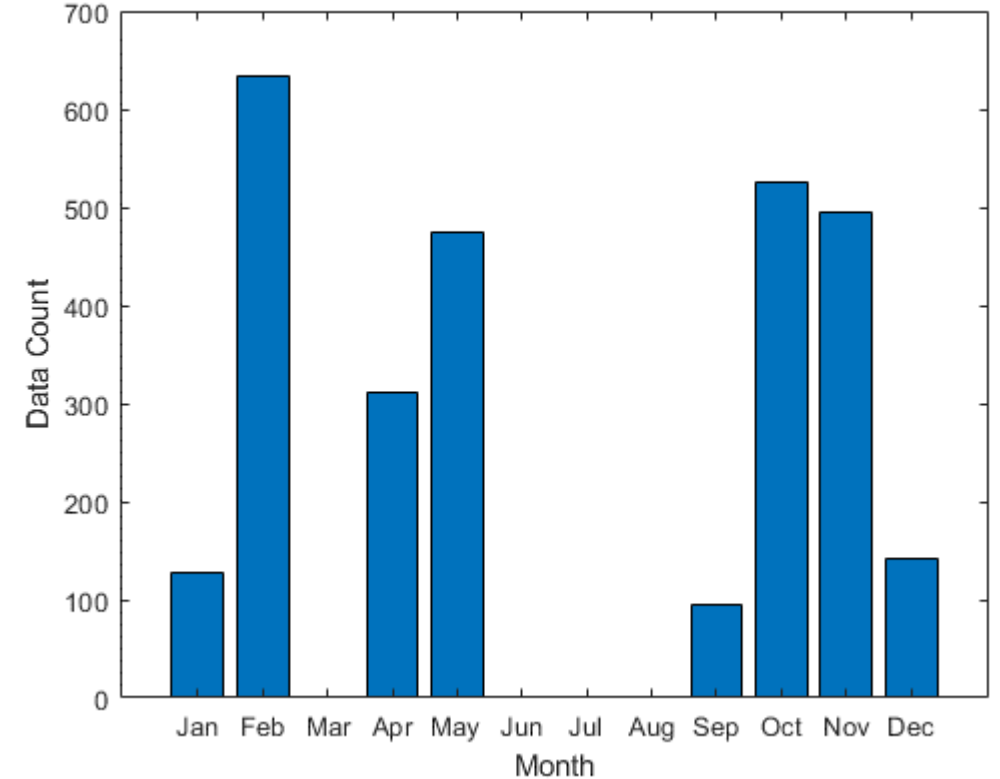
*r/v Oceania*

# Measurements from the r/v Oceania

## CTD



## O2



# Data processing

The image shows a MATLAB R2020b interface with a data processing workflow overlaid. The workflow consists of two rows of steps:

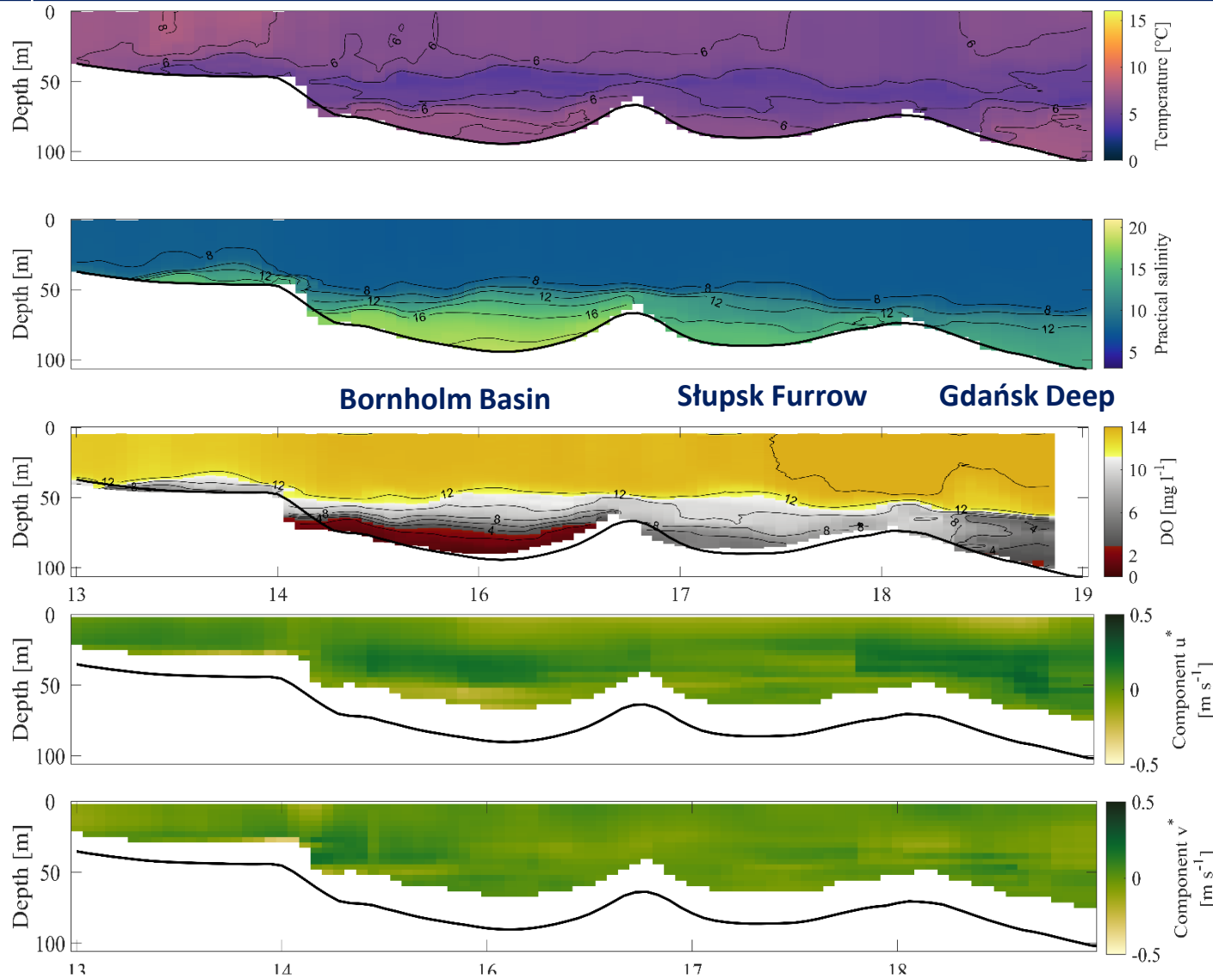
- Row 1: Data CTD (hex) → Data conversion (cnv) → Align CTD → Cell Thermal Mass → Filter → Bin average
- Row 2: CTD raw Data → SBE Data processing → Manage CTD in Matlab → File plotting -> Matlab, Ocean Data View

The MATLAB workspace on the right shows the following variables:

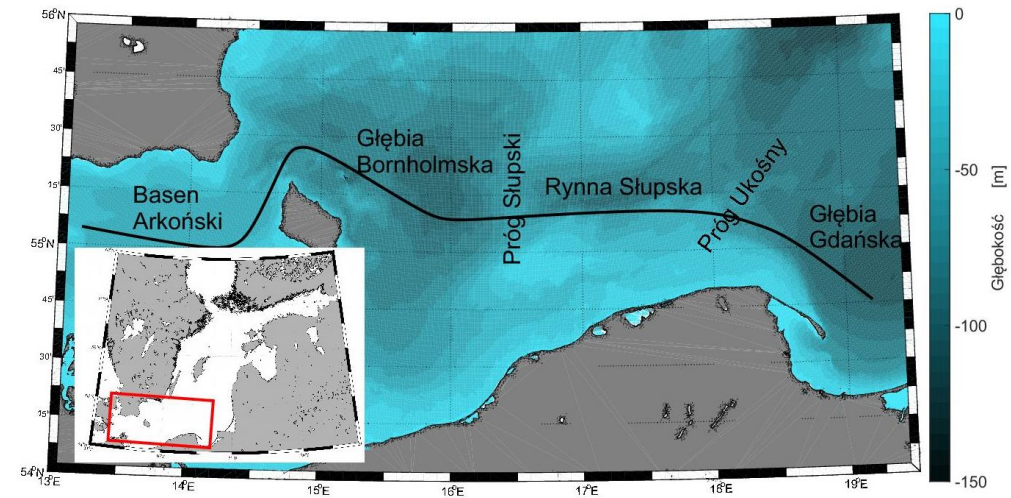
Name	Value
ans	'B1022'
counts	1x12 double
dataCount	1x12 double
edges	1x12 double
monthNames	1x12 cell
o2turb	35x47270 double
time	1x47270 double

```
7 - clc;
8 - fclose('all');
...
16
17
18 - parh...
19 - ...
20 - ...
21 - ...
22 - ...
23 - ...
24 - ...
25 - ...
26 - addpath pathexportfig
27 - %addpath('d:\VirtualDrive\OneDrive\Praca\MATLAB_programs\CNV_transect_lista\');
28 - %% Zmienne środowiskowe
29 - Sortowanie_Longitude=1; % Włącza sortowanie Longitude 1; Wylacza 0- wg CNV
30 - Grid_on=1; %siatka
31 - WartMax=400; % Wartość maksymalnej zadeklarowanej macierzy dla CTD
32 - File_type='ENX'; %Rozszerzenie plików
33 - %% Otworzy istniejący plik z danymi
34 - %%%
35 - load('Data2022.mat');
36 - end
37 - %% Topografia
38 - cd(pathetopo);
39 - Z_WATER = ncread('iowtopo2_rev03.nc','Z_WATER' );
40 - LANDMASK = ncread('iowtopo2_rev03.nc','LANDMASK' );
41 - Z_LAND = ncread('iowtopo2_rev03.nc','Z_LAND' );
42 - Z_TOPO = ncread('iowtopo2_rev03.nc','Z_TOPO' );
43 - XI_I = ncread('iowtopo2_rev03.nc','XI_I' );
44 - VT_T = ncread('iowtopo2_rev03.nc','VT_T' );
```

# Measurements from the r/v Oceania



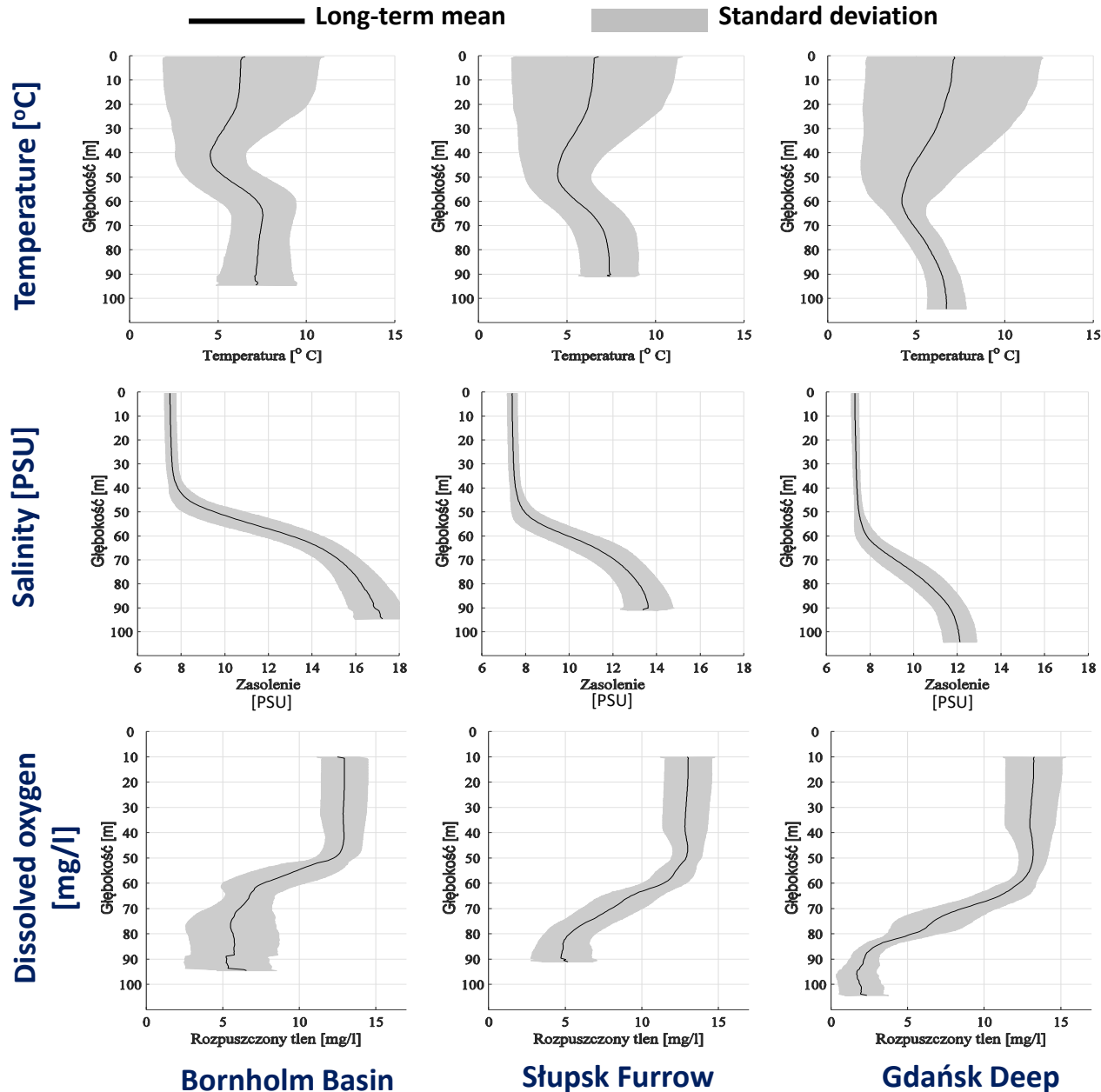
**Bornholm Basin      Słupsk Furrow      Gdańsk Deep**



**The main hydrographic section through the deep basins of the Proper Baltic**

**The temperature, salinity, dissolved oxygen and average flow components (parallel and perpendicular to the main axis) during small inflow in May, 2017**

# The long-term mean of physicochemical properties of water in the areas of interest



Temperature (mean 1998 – 2015)

Depth [m]	Bornholm Basin		Słupsk Furrow		Gdańsk Deep	
	T [°C]	STD [°C]	T [°C]	STD [°C]	T [°C]	STD [°C]
0,5	6,7	4,5	6,9	4,7	7,2	4,8
60	7,2	2,1	5,6	1,8	4,2	1,5
90	7,1	2,1	7,4	1,6	6,4	0,9

The annual heating-cooling cycle leads to high variability and mean temperatures in the upper layer

Salinity (mean 1998 – 2015)

Depth [m]	Bornholm Basin		Słupsk Furrow		Gdańsk Deep	
	S [PSU]	STD [PSU]	S [PSU]	STD [PSU]	S [PSU]	STD [PSU]
0,5	7,5	0,2	7,3	0,2	7,3	0,1
60	13,1	1,3	9,9	1,2	7,8	0,5
90	16,9	1,2	13,6	1,1	11,6	0,7

The variation in salinity shows the opposite of the temperature variation

Dissolved oxygen (mean 2013 – 2017)

Depth [m]	Bornholm Basin		Słupsk Furrow		Gdańsk Deep	
	O <sub>2</sub> [mg l <sup>-1</sup> ]	STD [mg l <sup>-1</sup> ]	O <sub>2</sub> [mg l <sup>-1</sup> ]	STD [mg l <sup>-1</sup> ]	O <sub>2</sub> [mg l <sup>-1</sup> ]	STD [mg l <sup>-1</sup> ]
10	11,6	1,5	12,1	1,6	12,2	2,1
60	6,9	2,3	10,1	2,6	11,1	1,1
90	3,5	2,9	4,3	1,7	2,4	1,1

The highest water oxygenation occurs in the surface layer

# The newest quality of measurements in the IOPAN



## Ocean Seven 316 Plus CTD 20Hz sampling rate

SEAPOINT – Fluorometer and Turbidity Meter

The internal and external submersible battery packs permit continuous probe operation for about 12 and 120 hours respectively.

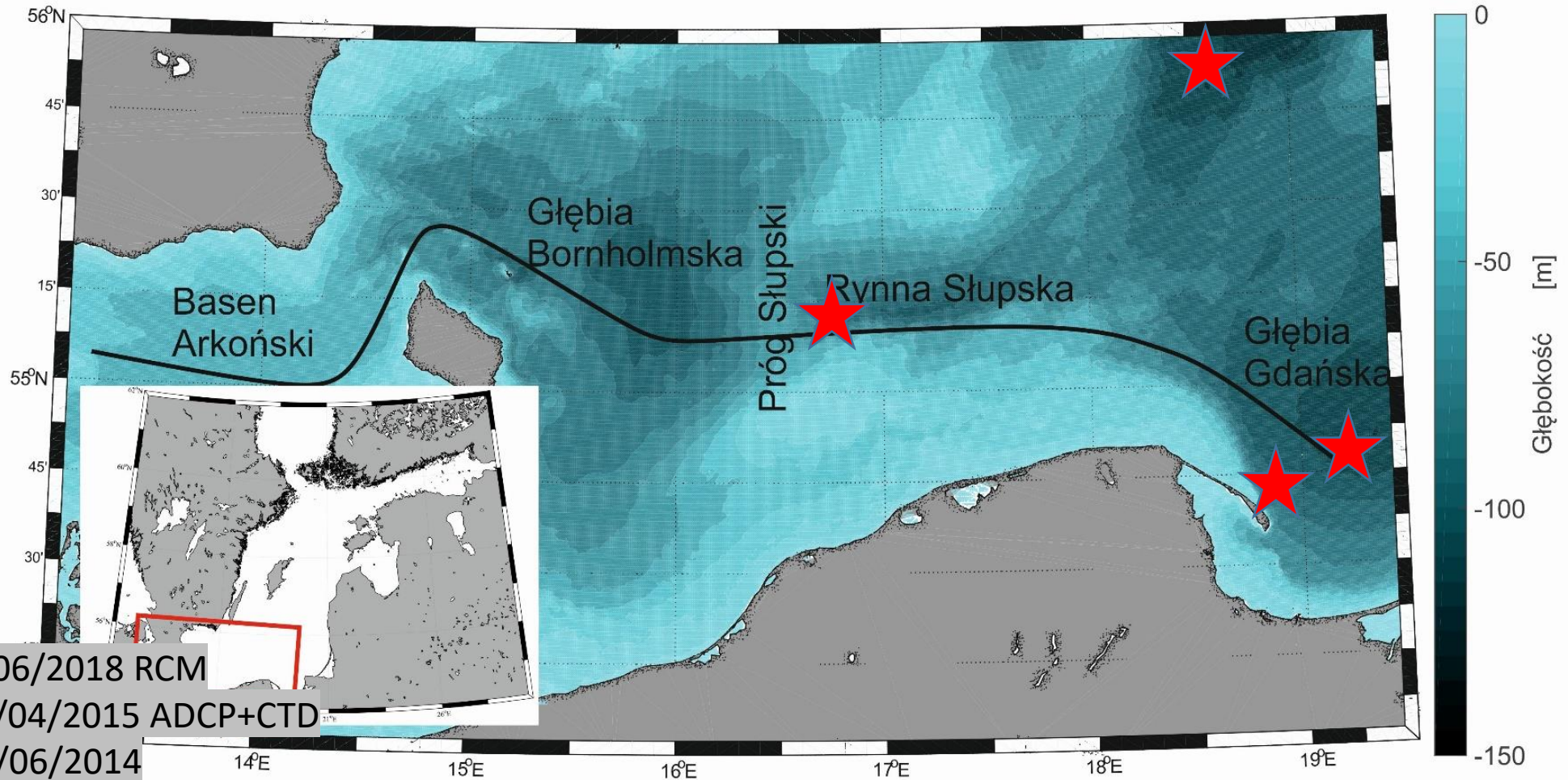
	Range	Initial Accuracy	Resolution	Response Time
<b>Pressure</b>	0.. 1000 dbar <sup>(1)</sup>	0.05 % full scale	0.002 % full scale	50 ms
<b>Temperature</b>	-3.. +50 °C	0.002 °C	0.0002 °C	50 ms
<b>Conductivity</b>	0.. 70 mS/cm	0.003mS/cm	0.0003 mS/cm	50 ms <sup>(3)</sup>
<b>Oxygen Polarographic</b>	0.. 50 ppm	0.1 ppm	0.01 ppm	3 s <sup>(4)</sup>
	0.. 500 % sat.	1 % sat.	0.1 % sat.	3 s <sup>(4)</sup>
<b>Oxygen Optical</b>	0..45 mg/l	0.1 mg/l	0.025 mg/l	3 s <sup>(5)</sup> or 1 s <sup>(6)</sup>
	0..250 %sat.	±0.2 %sat.	0.05 %sat.	3 s <sup>(5)</sup> or 1 s <sup>(6)</sup>
<b>pH</b>	1.. 13 pH	0.01 pH	0.001 pH	3 s
<b>Redox</b>	-1000.. +1000 mV	1 mV	0.1 mV	3 s
<b>Auxiliary inputs <sup>(2)</sup></b>	0.. 5000 mV	1 mV	0.1 mV	50 ms



# The future measurements from r/v Oceania



# Moorings



- 14/05/2018 -16/06/2018 RCM
- 05/02/2015 – 02/04/2015 ADCP+CTD
- 02/05/2014 - 02/06/2014
- 01/04/2014 – 04/06/2014 HEL
- 22/04/2013 - 15/06/2013 Gothland, RCM
- 09/03/2010 1year CTD+ ADCP
- 08/09/2009 1year ADCP=CTD

# Data availability



https://ecudo.pl/



Język Kontrast Rozmiar tekstu

- Strona główna
- Szukaj
- O projekcie
- Dokumentacja API
- Kontakt
- Deklaracja dostępności
- Mapa strony
- Koszyk

## Kryteria wyszukiwania

Skorzystaj z poniższego formularza, aby przeglądać katalog metadanych.

Możesz użyć wyszukiwania tylko tekstowego lub wybrać zaawansowane opcje, które pozwalają wybrać szczegóły, takie dane jak organizacja, słowa kluczowe, ograniczenia przestrzenne itp.

Wyszukaj Wyczyść

Wyszukiwanie pełnotekstowe

Daty pomiarów

Dostawcy

Tematy

Standardy zgodności

Statusy

Słowa kluczowe

Ograniczenia dostępu

Ograniczony obszar

Wyszukaj Wyczyść



The IOPAN's eCUDO project is aimed at enhancing our understanding of the Baltic Sea ecosystem by integrating remote sensing, in-situ observation, and numerical modelling.

The project aims to improve the temporal and spatial resolution of data on physical, chemical, and biological processes in the Baltic Sea

**Thank you for your attention**