Bezpośrednie obserwacje dna morskiego

Piotr Bałazy Piotr Kukliński

Scientific Diving TEAM

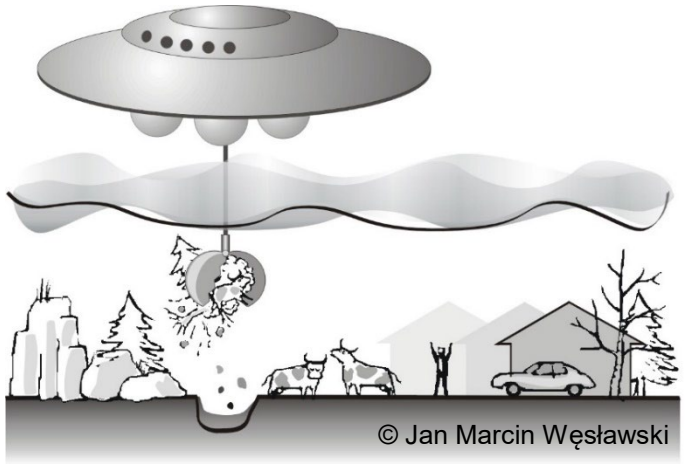
39 Sympozjum Polarne
18 Maja, Sopot

Hennequin Point, KGI, 33 m

© Piotr Bałazy

„you will learn more in an hour [underwater] than you'll learn ten hours with books”

Wesley Roswell Coe (1869-1960)
zoolog Yale Univ. / Scripps Institution



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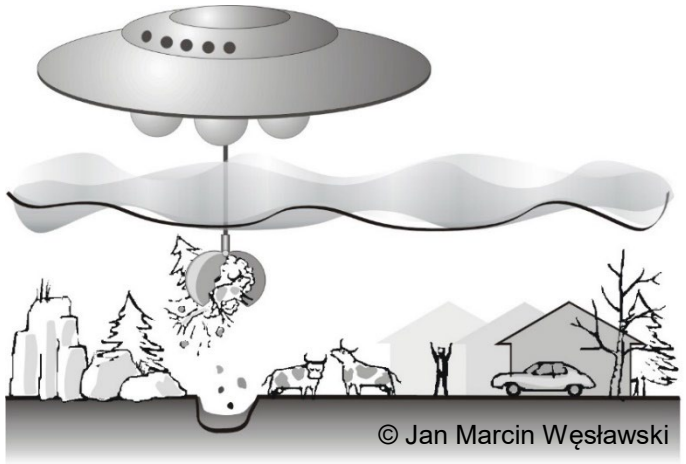
zoolog Yale Univ. / Scripps Institution



vs.

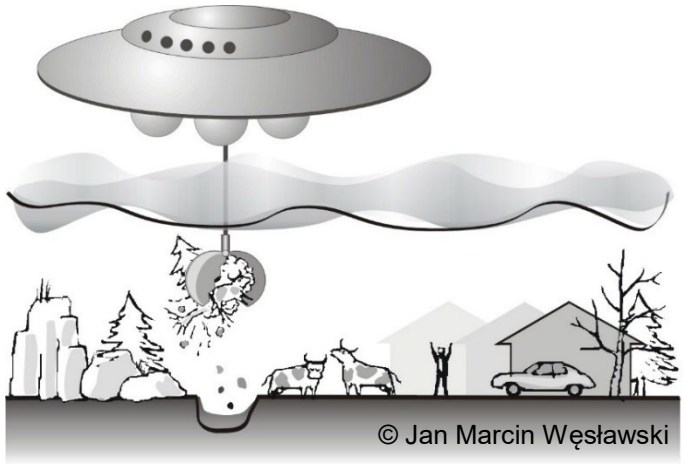
Fot. Kajetan Deja

vs.

vs.

„you will learn more in an hour [underwater] than you'll learn ten hours with books”

Wesley Roswell Coe (1869-1960)
zoolog Yale Univ. / Scripps Institution



vs.

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Fot. Kajetan Deja

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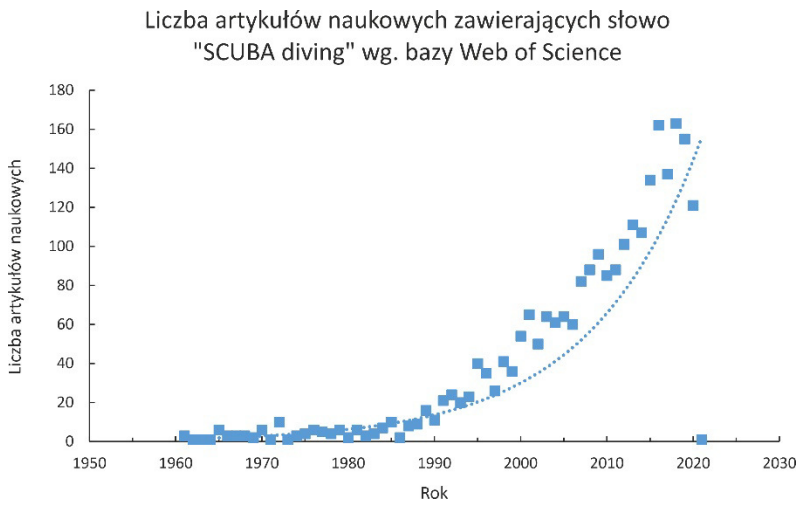


- 16 km zasięgu
- Prawie 6 h ciągłej pracy (kilka nurkowań)
- Prędkość do 200 m/min. = 12 km/h
- Do 220 m głębokości

- Nawigacja podwodna
- GPS wypuszczany na powierzchnię
- Łączenie w zestawy

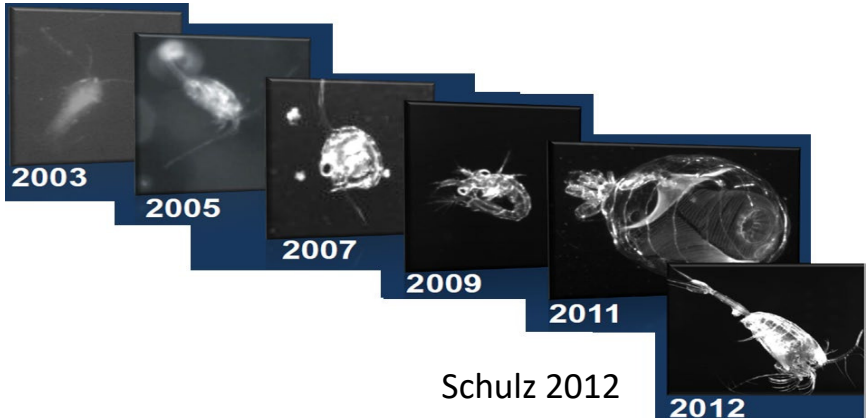
FOG

2021, VOL 58

Polar night diving – lessons learned from the past four seasons

Piotr Balazy[1]

[1]Institute of Oceanology, Polish Academy of Sciences, Powstańców Warszawy 55, 81-712 Sopot, Poland, balazy@iopan.pl



Schulz 2012

Zakres działań

- Długoterminowy monitoring fauny bentosowej pod kątem procesów kolonizacji i sukcesji
- Badania bioróżnorodności
- Bezpośrednie obserwacje biologiczne z użyciem kamer poklatkowych
- Badania meroplanktonu
- Wpływ obecności ptasich kolonii na zespoły bentosowe
- Badania wpływu sezonowych czynników środowiskowych na organizmy morskie w rejonach polarnych
- Badania biogenicznych węglanów i czynników kontrolujących ich geochemię

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LIMNOLOGY and OCEANOGRAPHY: METHODS

ASLO

Limnol. Oceanogr.: Methods 21, 2023, 169–177
© 2023 The Authors. *Limnology and Oceanography: Methods* published by Wiley Periodicals LLC on behalf of Association for the Sciences of Limnology and Oceanography.
doi: 10.1002/lom3.10537

Image analysis and benthic ecology: Proceedings to analyze in situ long-term image series

Romero-Ramirez Alicia,[1]* **Morales Luna Hadrys Laura**,[2] **Kuklinski Piotr**,[2] **Chelchowski Maciej**,[2] **Balazy Piotr**[2]
[1]University of Bordeaux, EPOC-UMR 5805, Arcachon, Aquitaine, France
[2]Polska Akademia Nauk Instytut Oceanologii, Sopot, Poland

frontiers in Marine Science

ORIGINAL RESEARCH
published: 24 May 2021
doi: 10.3389/fmars.2021.656772

Shallow-Water Scavengers of Polar Night and Day – An Arctic Time-Lapse Photography Study

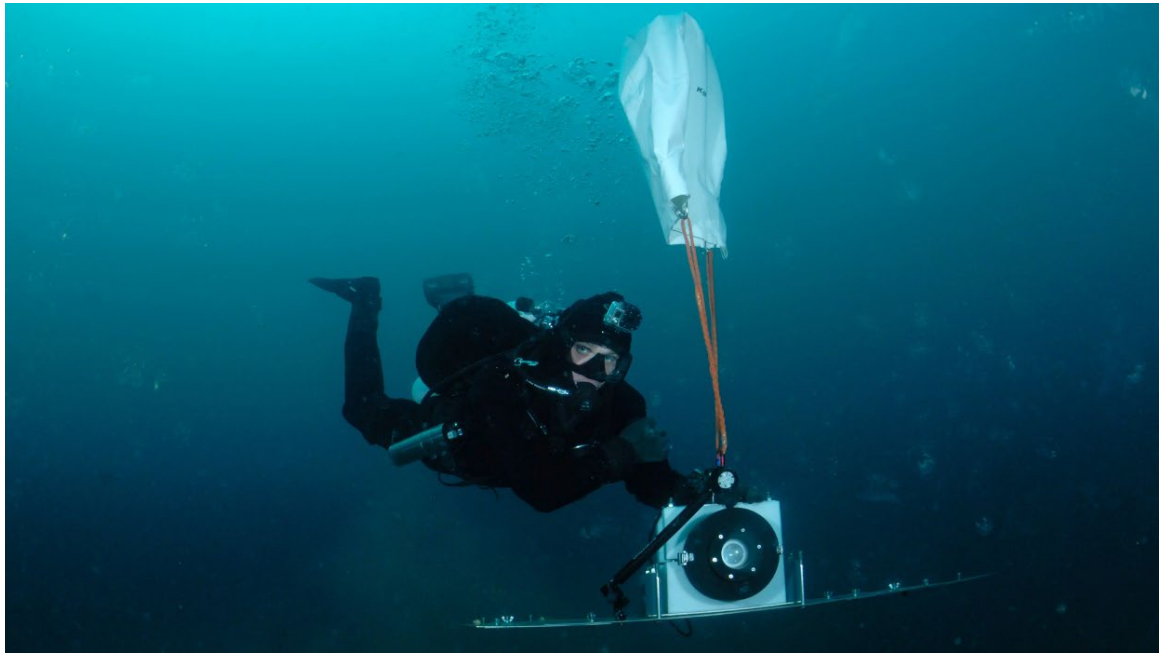
Piotr Balazy[1,2], Marti J. Anderson[3,4], Maciej Chelchowski[1], Maria Włodarska-Kowalczuk[1], Piotr Kuklinski[1] and Jørgen Berge[5,6,7]*

JOURNAL OF MARINE ENGINEERING & TECHNOLOGY, 2017
https://doi.org/10.1080/20464177.2017.1357164

Taylor & Francis
Taylor & Francis Group

Diver deployed autonomous time-lapse camera systems for ecological studies

Piotr Balazy[a], Piotr Kuklinski[a,b] and Jørgen Berge[c,d]



Rocky bottom epifauna

6-10.08.2016
5 min. intervals
Isfjorden, Spitsbergen
19 m depth

PolarTimeLapse.Net
balazy@iopan.pl

EXTREME DIVING
GRALmarine
EXPEDITION SUPPORT

www.PolarTimeLapse.net

Aktywność filtratorów

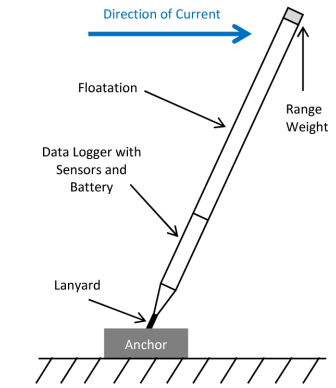
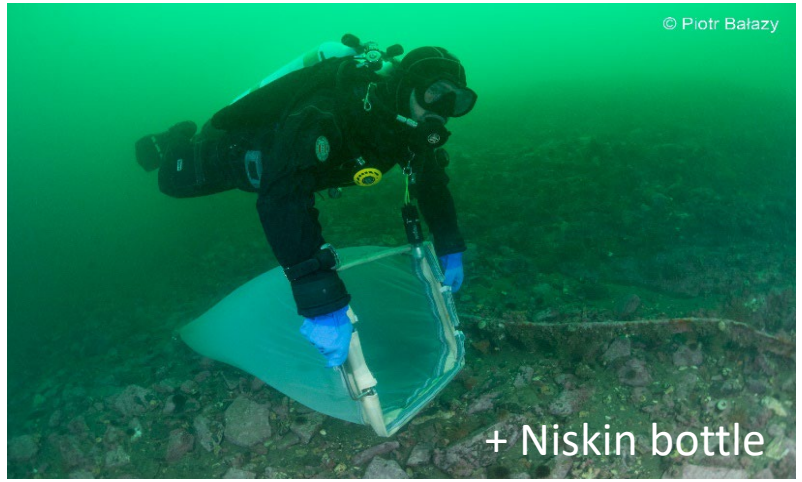
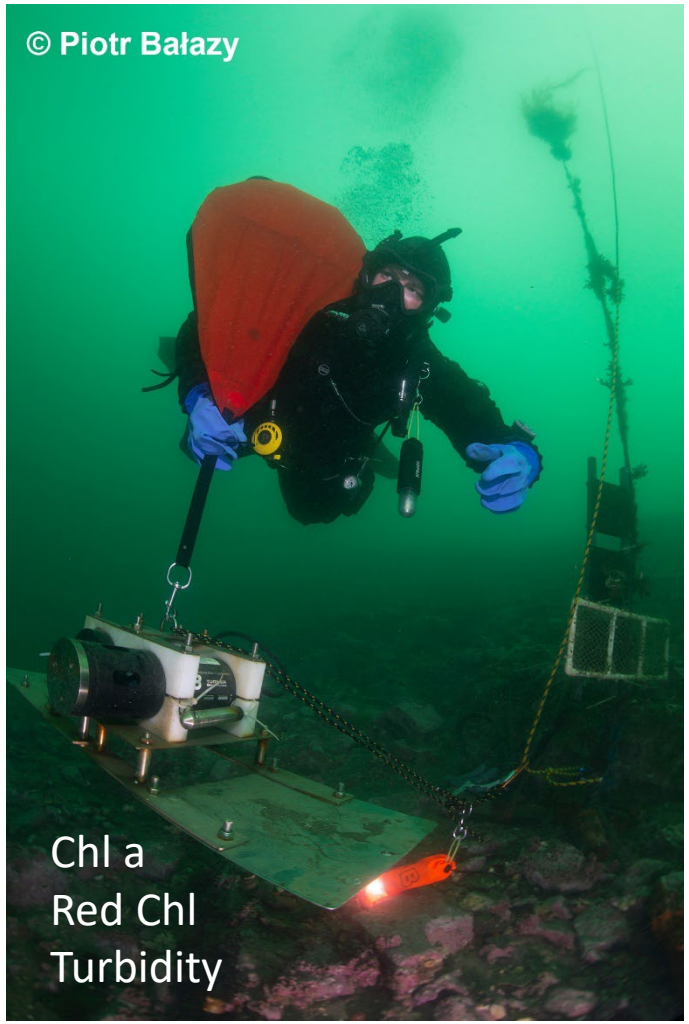
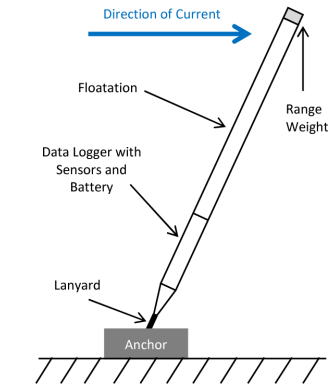


Fig. 1: Drawing of TCM-1 tilt current meter showing basic elements.





Aktywność filtratorów



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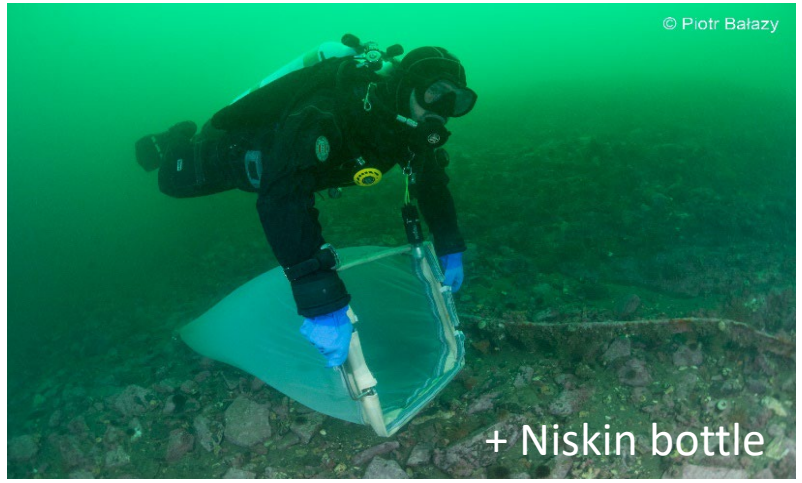
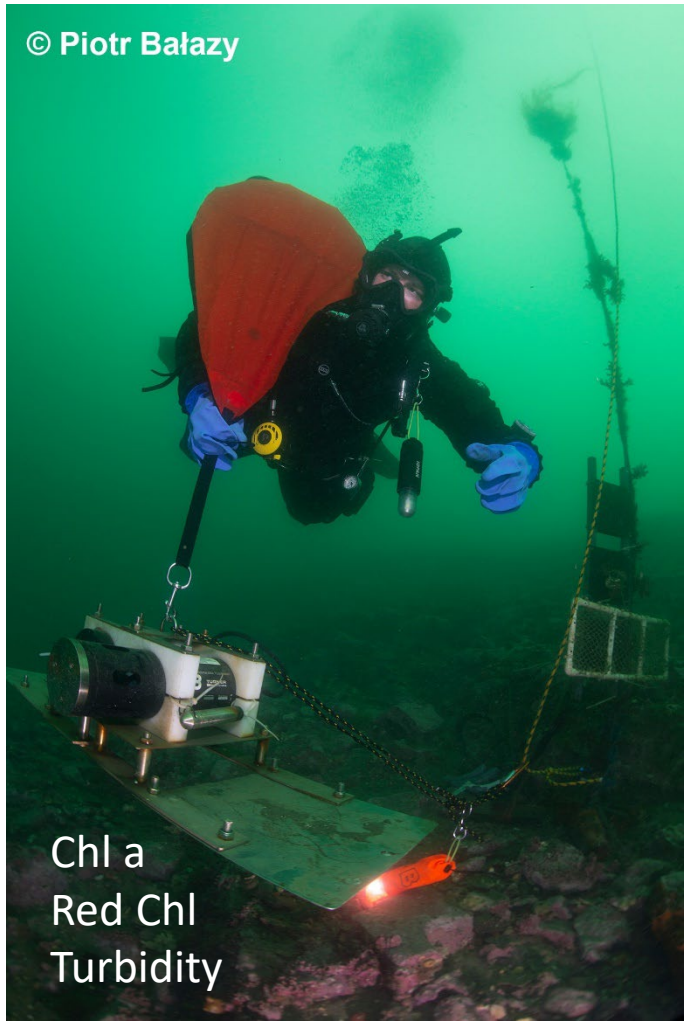
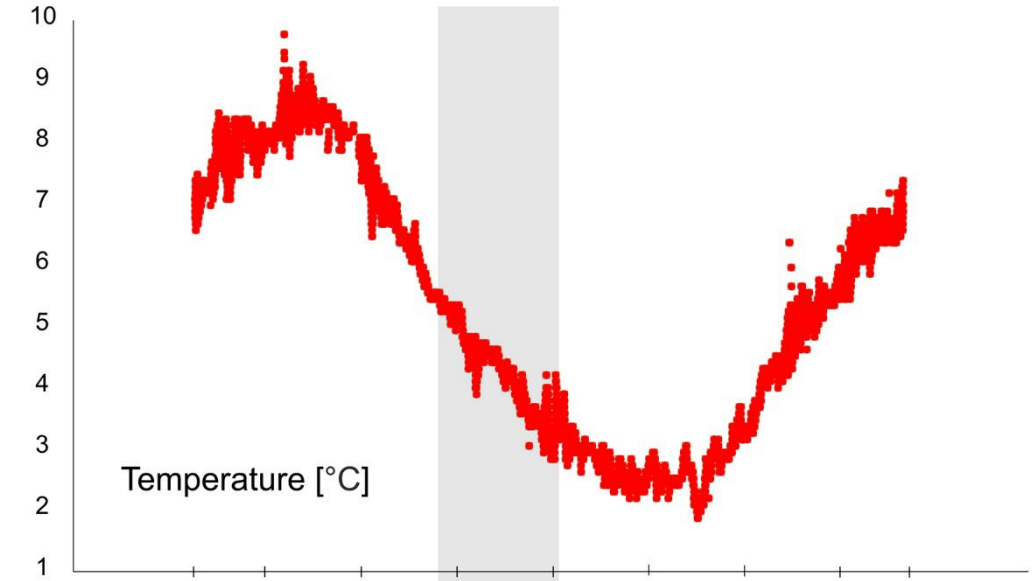
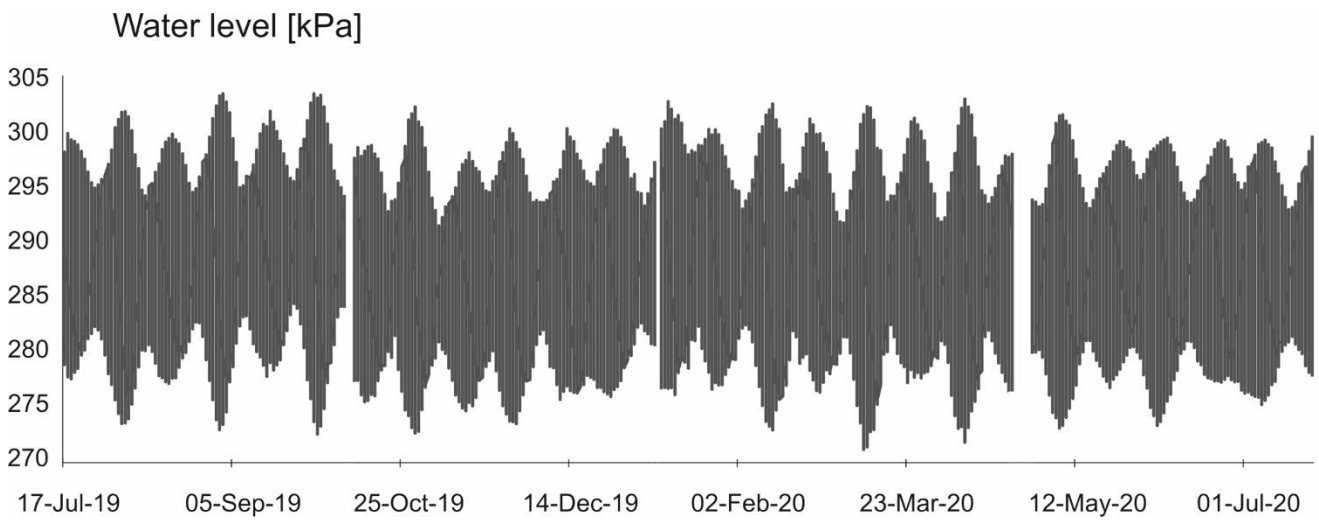
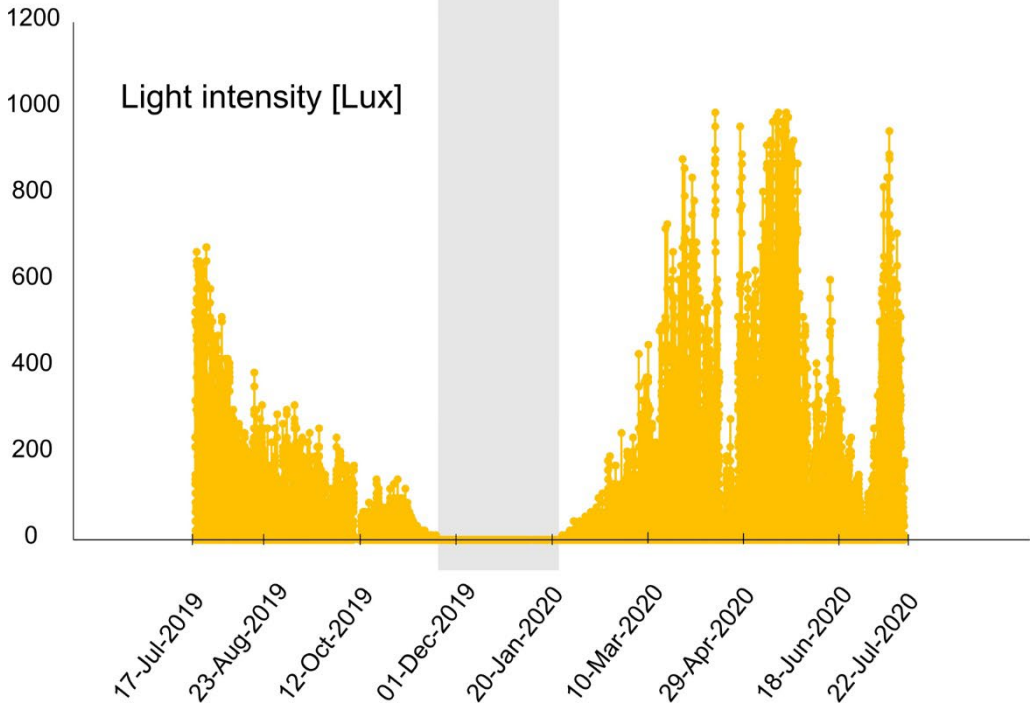
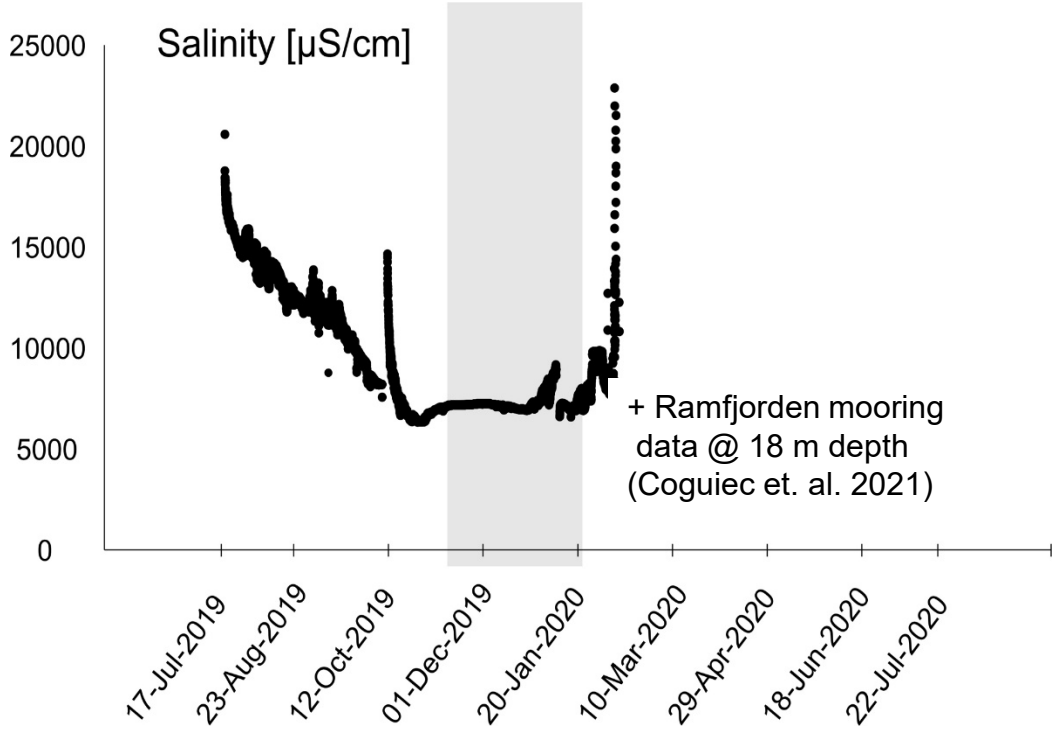


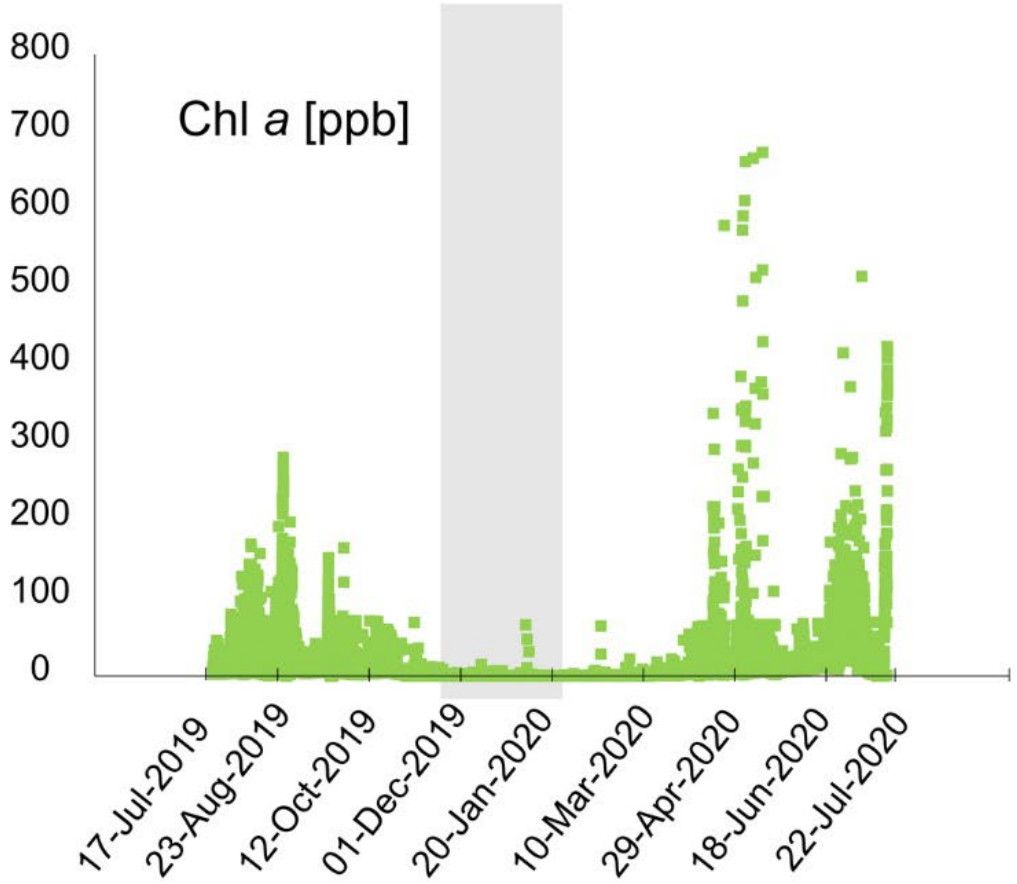


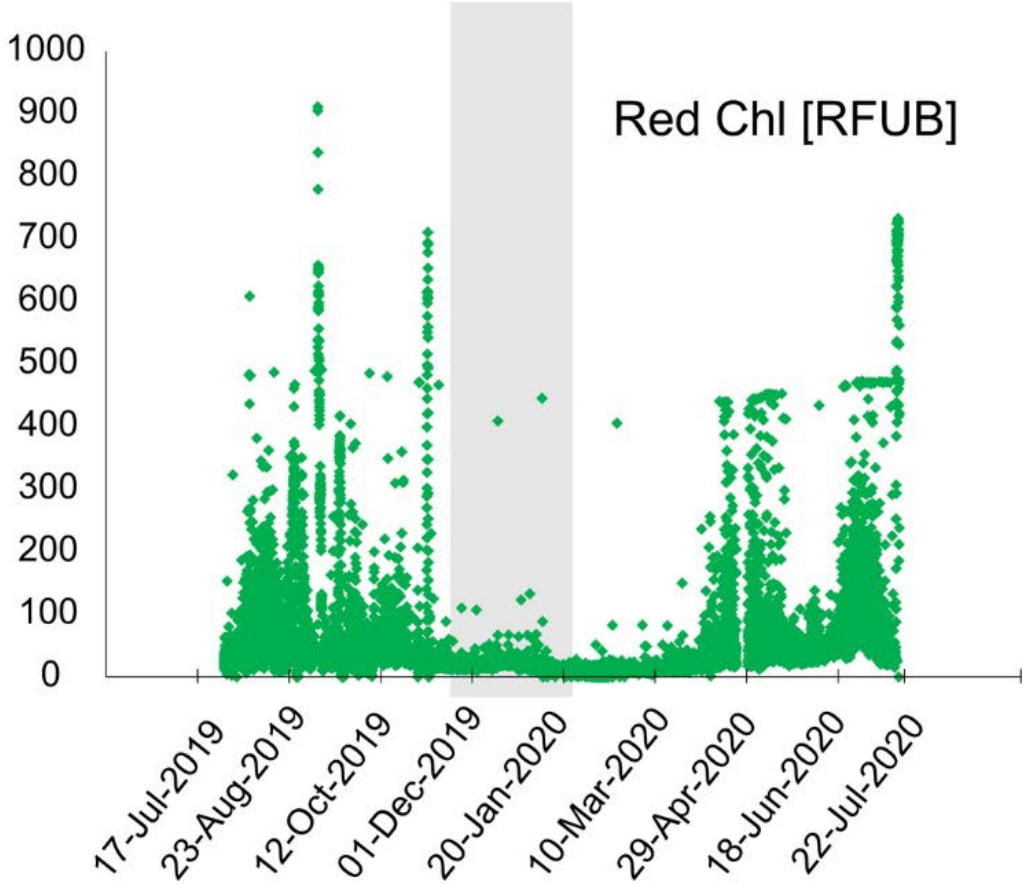

Temperature [°C]
10
9
8
7
6
5
4
3
2
1


Water level [kPa]
305
300
295
290
285
280
275
270
17-Jul-19
05-Sep-19
25-Oct-19
14-Dec-19
02-Feb-20
23-Mar-20
12-May-20
01-Jul-20


Light intensity [Lux]
1200
1000
800
600
400
200
0
17-Jul-2019
23-Aug-2019
12-Oct-2019
01-Dec-2019
20-Jan-2020
10-Mar-2020
29-Apr-2020
18-Jun-2020
22-Jul-2020


Salinity [µS/cm]
25000
20000
15000
10000
5000
0
+ Ramfjorden mooring data @ 18 m depth (Coguiec et. al. 2021)
17-Jul-2019
23-Aug-2019
12-Oct-2019
01-Dec-2019
20-Jan-2020
10-Mar-2020
29-Apr-2020
18-Jun-2020
22-Jul-2020


Chl *a* [ppb]
800
700
600
500
400
300
200
100
0
17-Jul-2019
23-Aug-2019
12-Oct-2019
01-Dec-2019
20-Jan-2020
10-Mar-2020
29-Apr-2020
18-Jun-2020
22-Jul-2020


Red Chl [RFUB]
1000
900
800
700
600
500
400
300
200
100
0
17-Jul-2019
23-Aug-2019
12-Oct-2019
01-Dec-2019
20-Jan-2020
10-Mar-2020
29-Apr-2020
18-Jun-2020
22-Jul-2020

Contents lists available at ScienceDirect

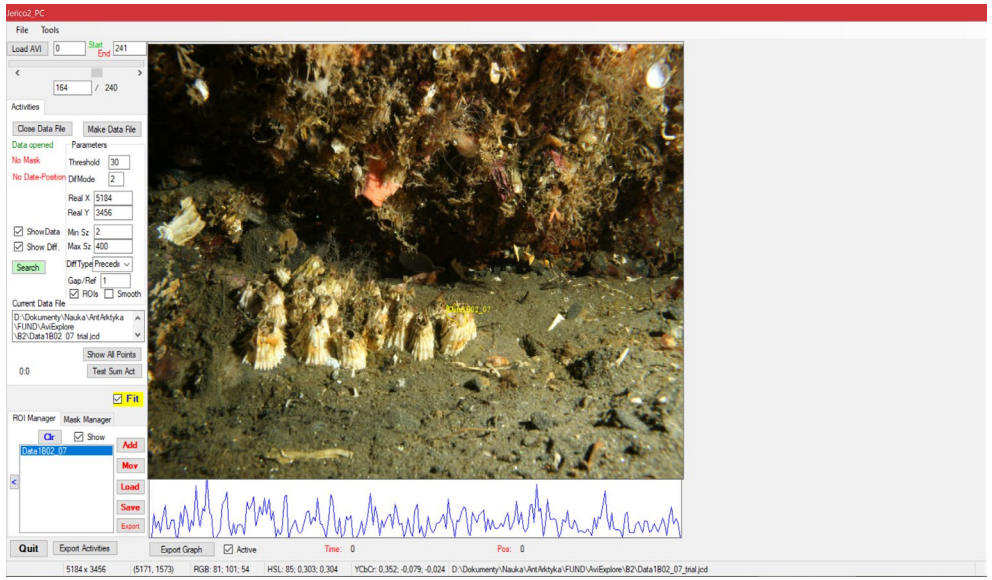
Journal of Marine Systems

journal homepage: www.elsevier.com/locate/jmarsys

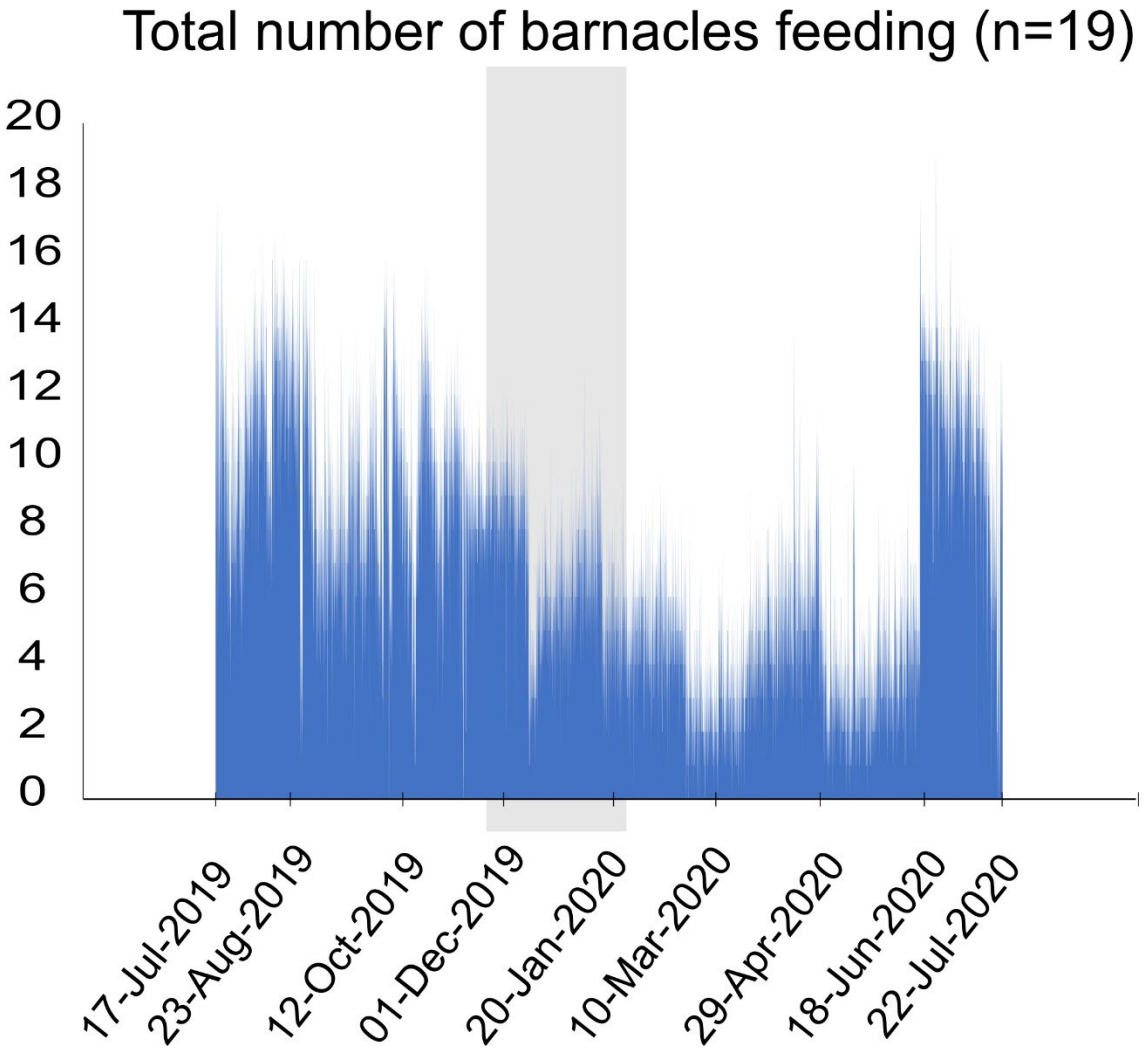
Development and validation of a video analysis software for marine benthic applications

A. Romero-Ramirez *, A. Grémare, G. Bernard [1], L. Pascal, O. Maire, J.C. Duchêne

University of Bordeaux – CNRS, EPOC, UMR 5805, F33120 Arcachon, France



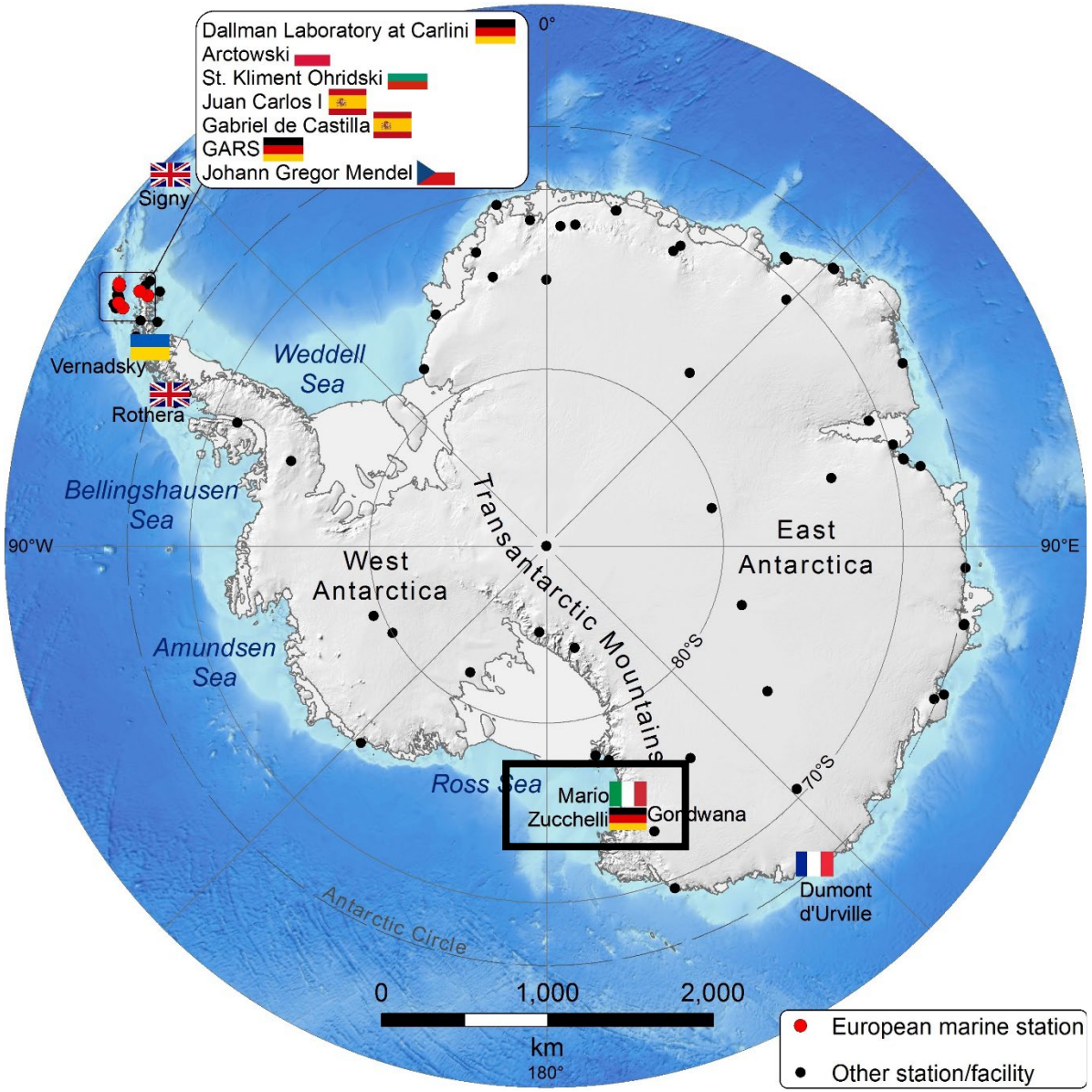
- Temp. r=0.64
- Zasolenie r=0.58



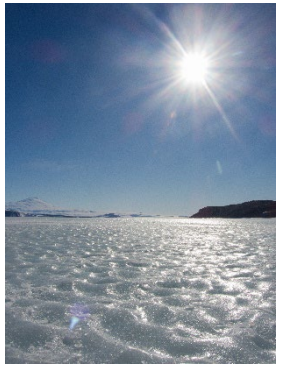
Bałazy et al. in. prep.

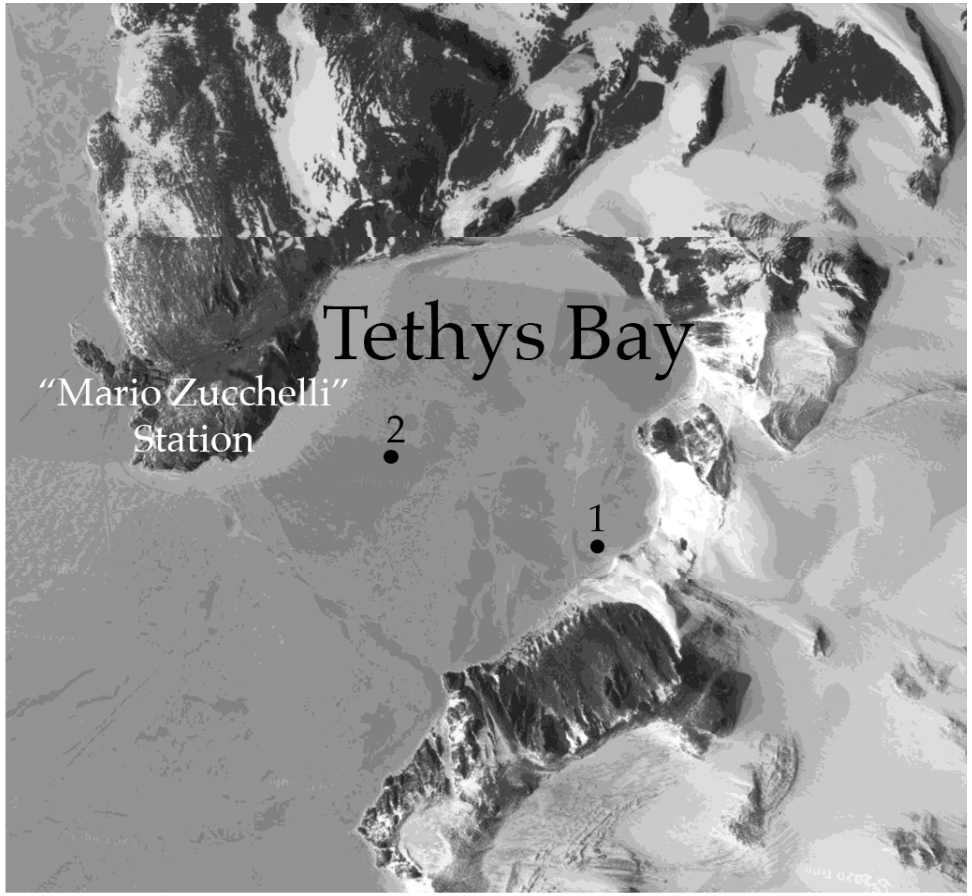
IceClimaLizers - *Antarctic biomineralizers as proxies of climate change: in situ monitoring and transplantation experiment*

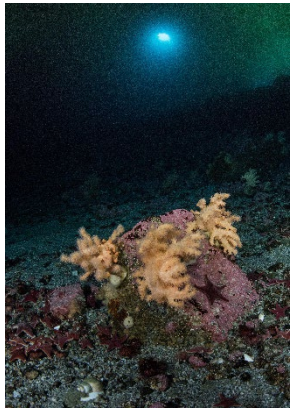
Antarktyda


Dallman Laboratory at Carlini
Arctowski
St. Kliment Ohridski
Juan Carlos I
Gabriel de Castilla
GARS
Johann Gregor Mendel
Signy
Vernadsky
Rothera
Weddell Sea
Bellingshausen Sea
Amundsen Sea
Ross Sea
West Antarctica
East Antarctica
Transantarctic Mountains
Mario Zucchelli
Gondwana
Dumont d'Urville
Antarctic Circle
0°
90°W
90°E
180°
80°S
70°S
0
1,000
2,000
km
European marine station
Other station/facility

Rejon badań







Logistyka nurkowań w Antarktyce

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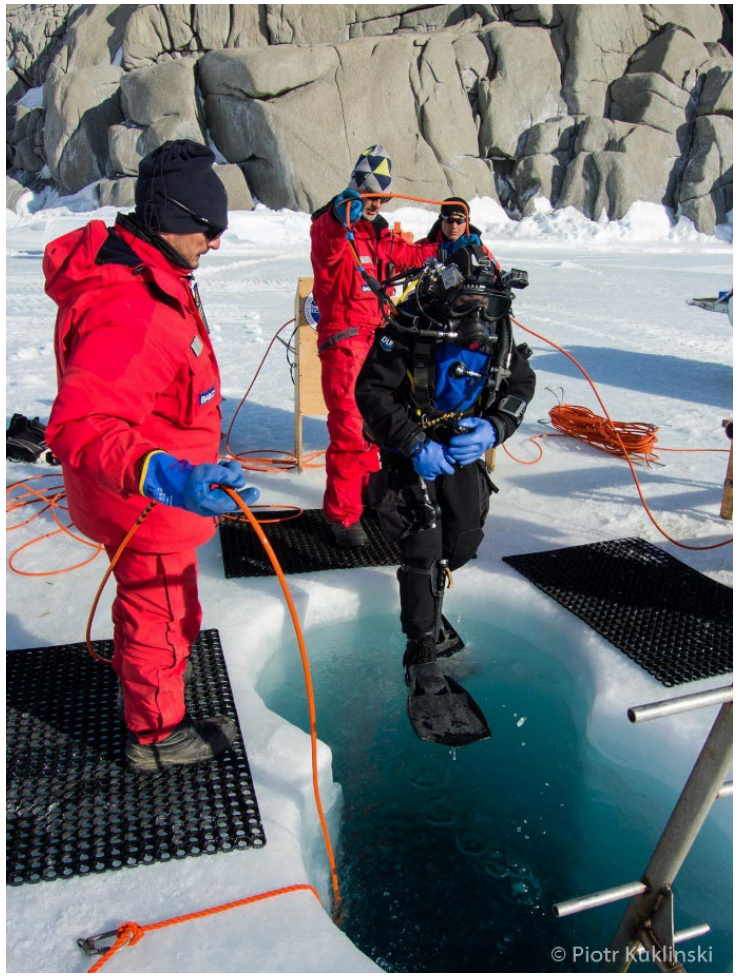

Logistyka nurkowań w Antarktyce

Logistyka nurkowań w Antarktyce

Badania

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Article

Assessment of Annual Physico-Chemical Variability via High-Temporal Resolution Monitoring in an Antarctic Shallow Coastal Site (Terra Nova Bay, Ross Sea)

Chiara Lombardi [1], Piotr Kuklinski [2,*], Andrea Bordone [1], Edoardo Spirandelli [3] and Giancarlo Raiteri [1]

minerals MDPI

Article

Structural and Geochemical Assessment of the Coralline Alga *Tethysphytum antarcticum* from Terra Nova Bay, Ross Sea, Antarctica

Matthias López Correa [1,2], Sebastian Teichert [1], Federica Ragazzola [3,*], Salvador Cazorla Vázquez [4], Felix B. Engel [4], Katrin Hurle [1], Claudio Mazzoli [5], Piotr Kuklinski [6], Giancarlo Raiteri [7] and Chiara Lombardi [7]

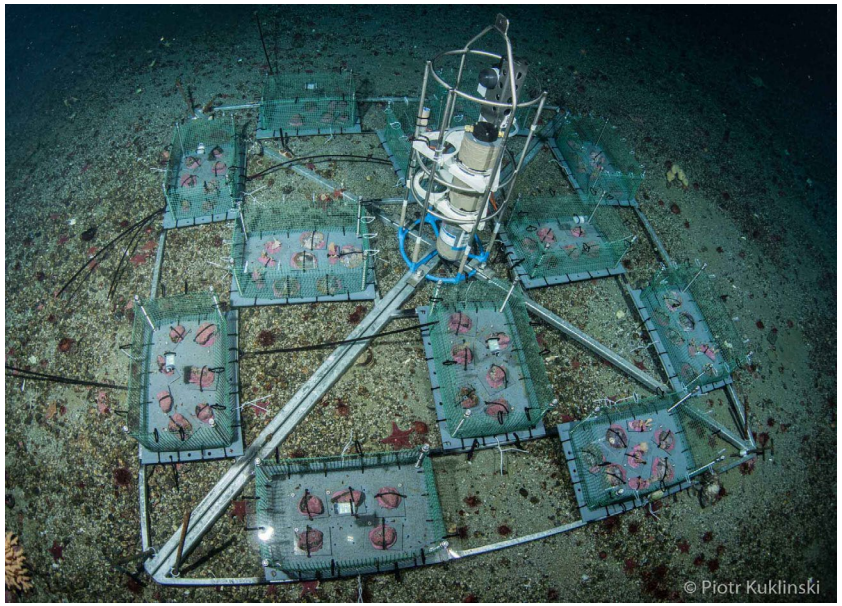
minerals MDPI

Article

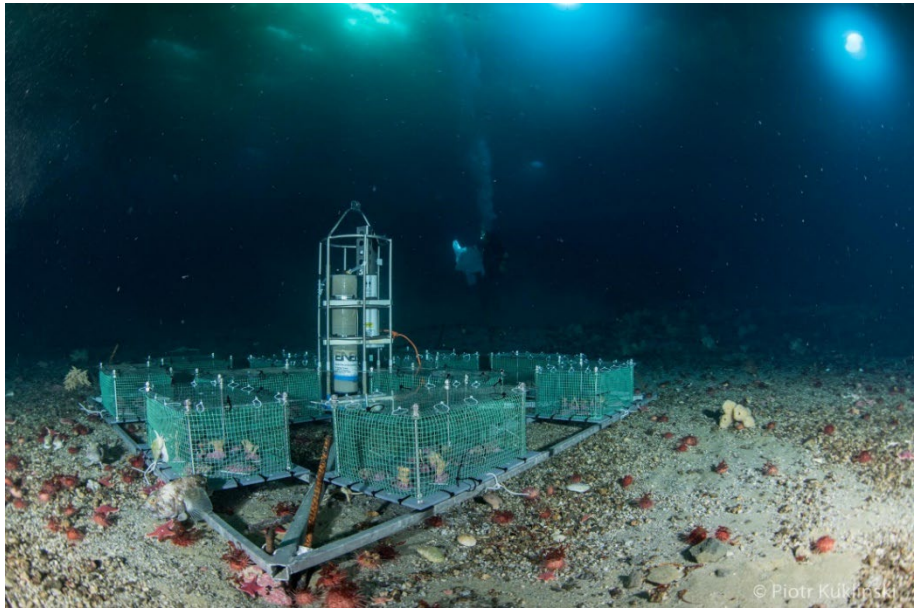
Antarctic Bioconstructional Bryozoans from Terra Nova Bay (Ross Sea): Morphology, Skeletal Structures and Biomineralization

Chiara Lombardi [1,*], Piotr Kuklinski [2], Edoardo Spirandelli [3], Giorgio Bruzzone [3], Giancarlo Raiteri [1], Andrea Bordone [1], Claudio Mazzoli [4], Matthias López Correa [5,6], Robert van Geldern [6], Laurent Plasseraud [7], Jérôme Thomas [8] and Frédéric Marin [8]

Badania



Jak warunki środowiskowe wpływają na geochemię struktur wapiennych wybranych organizmów morskich?



Wyniki

Określenie zmienności warunków fizykochemicznych

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Article

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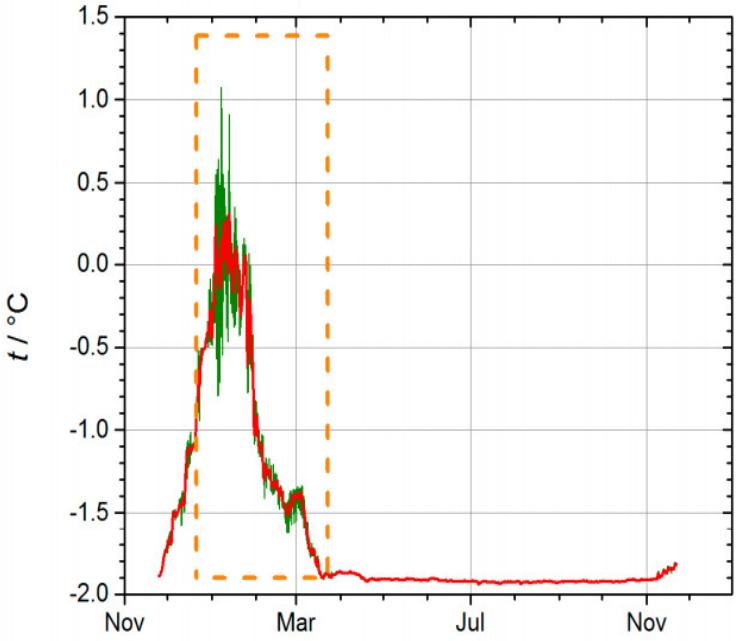
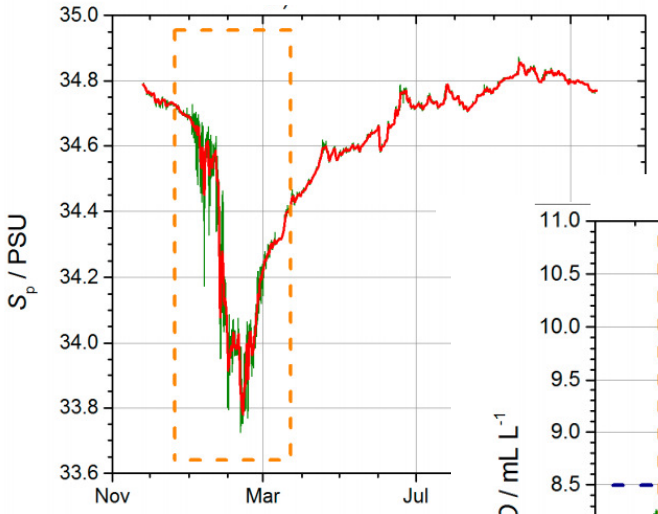
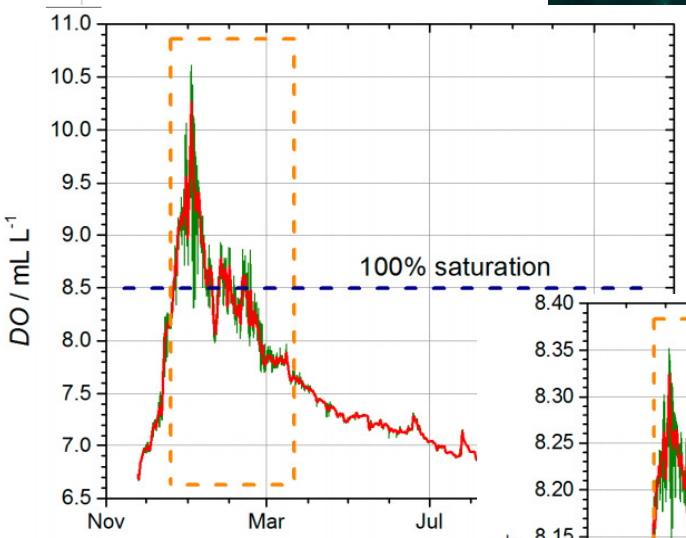
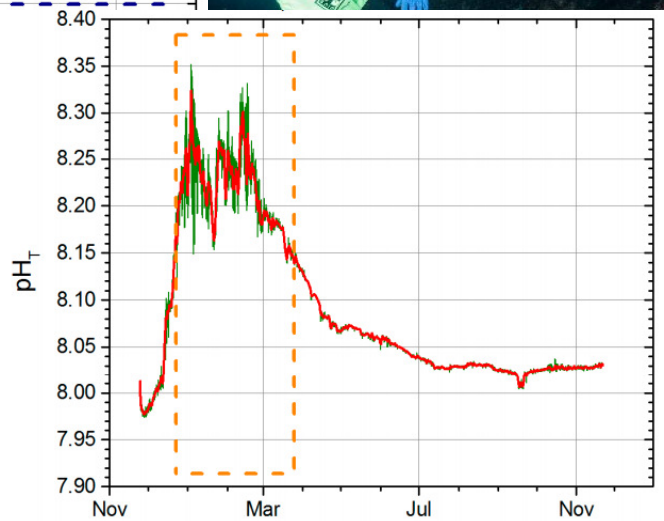


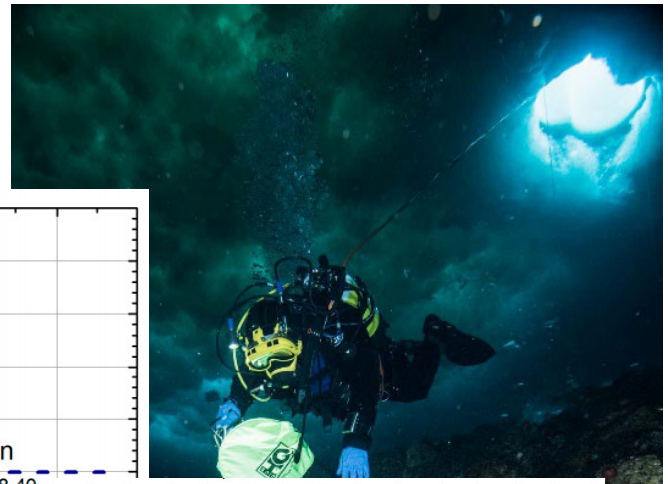
Wyniki

Określenie zmienności warunków fizykochemicznych



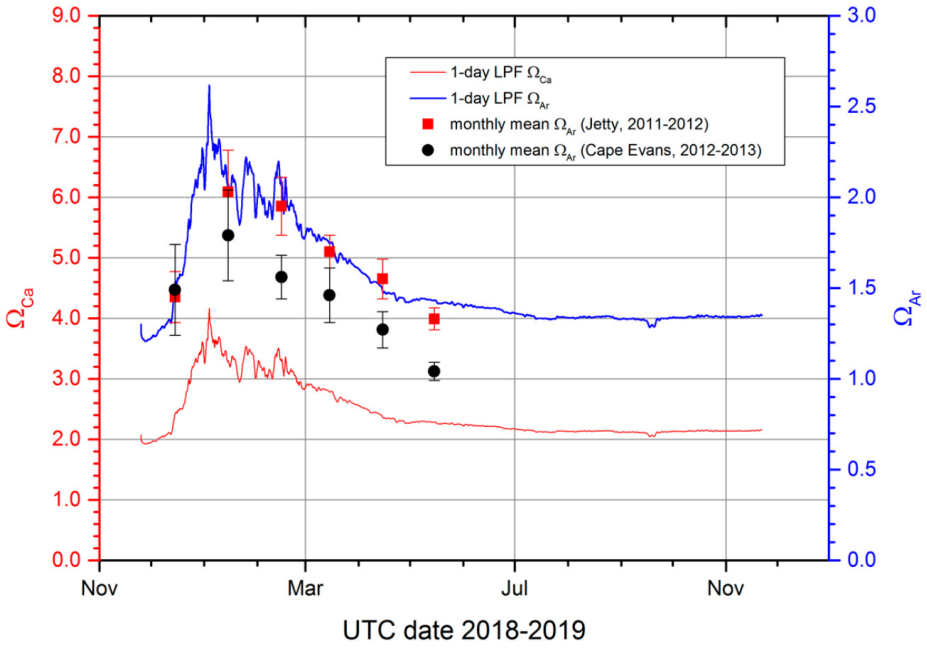


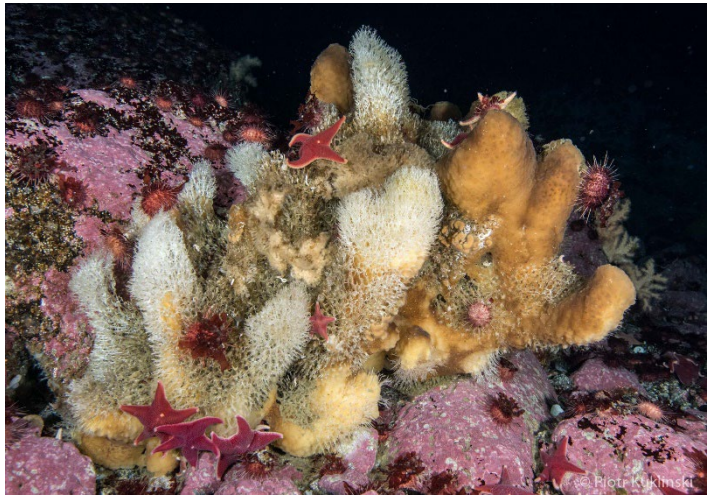




Wyniki

Określenie zmienności warunków fizykochemicznych





Wyniki

Badania geochemiczne struktur węglanowych wybranych organizmów morskich

minerals MDPI

Article

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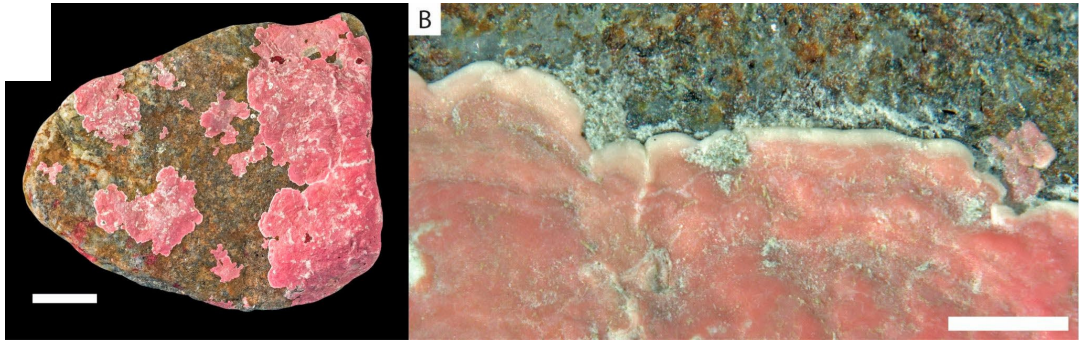

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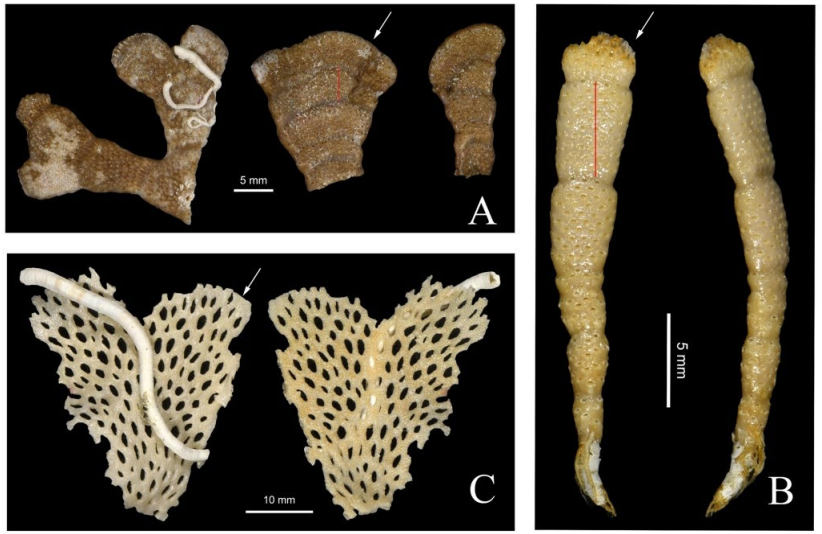
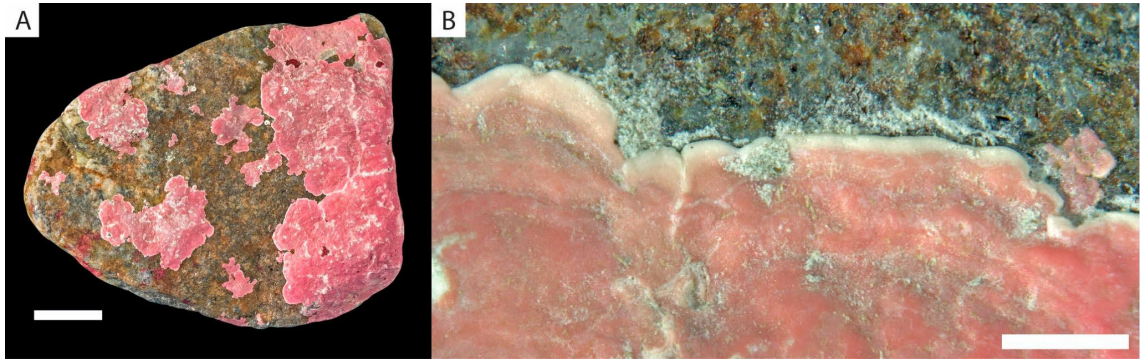
Chiara Lombardi [1,*], Piotr Kuklinski [2], Edoardo Spirandelli [3], Giorgio Bruzzone [3], Giancarlo Raiteri [1], Andrea Bordone [1], Claudio Mazzoli [4], Matthias López Correa [5,6], Robert van Geldern [6], Laurent Plasseraud [7], Jérôme Thomas [8] and Frédéric Marin [8]



Wyniki

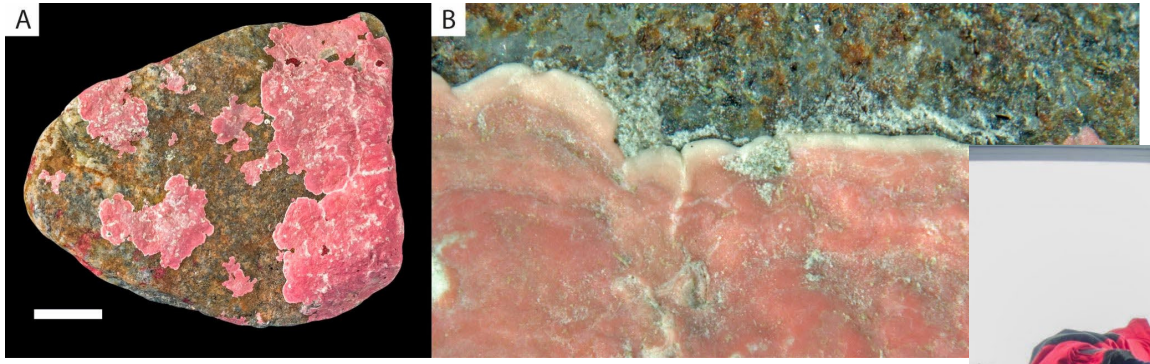
Badania geochemiczne glonów wapiennych



Wyniki

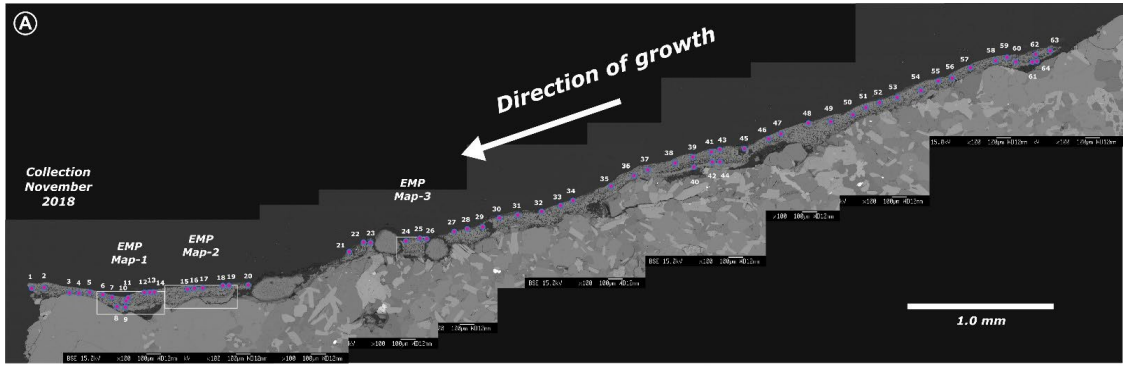
Badania geochemiczne glonów wapiennych

Zabarwianie rejonów wzrostu organizmu w celu rozpoznania początku eksperymentu

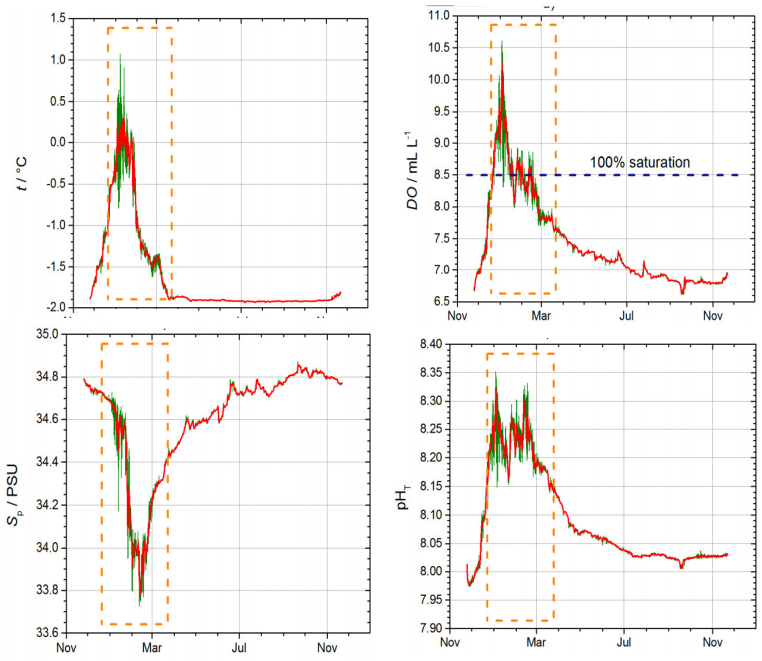


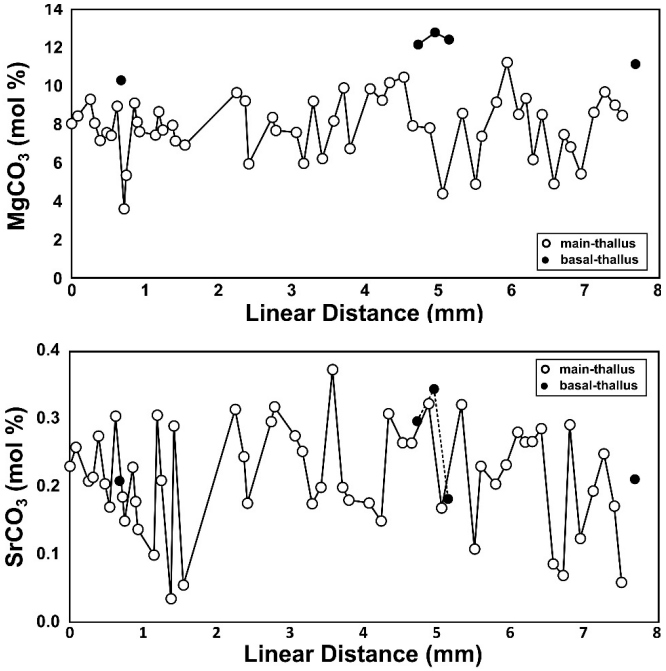
Wyniki

Badania geochemiczne glonów wapiennych



6.75 mm wzrostu w ciągu roku





Arktyka - Svalbard

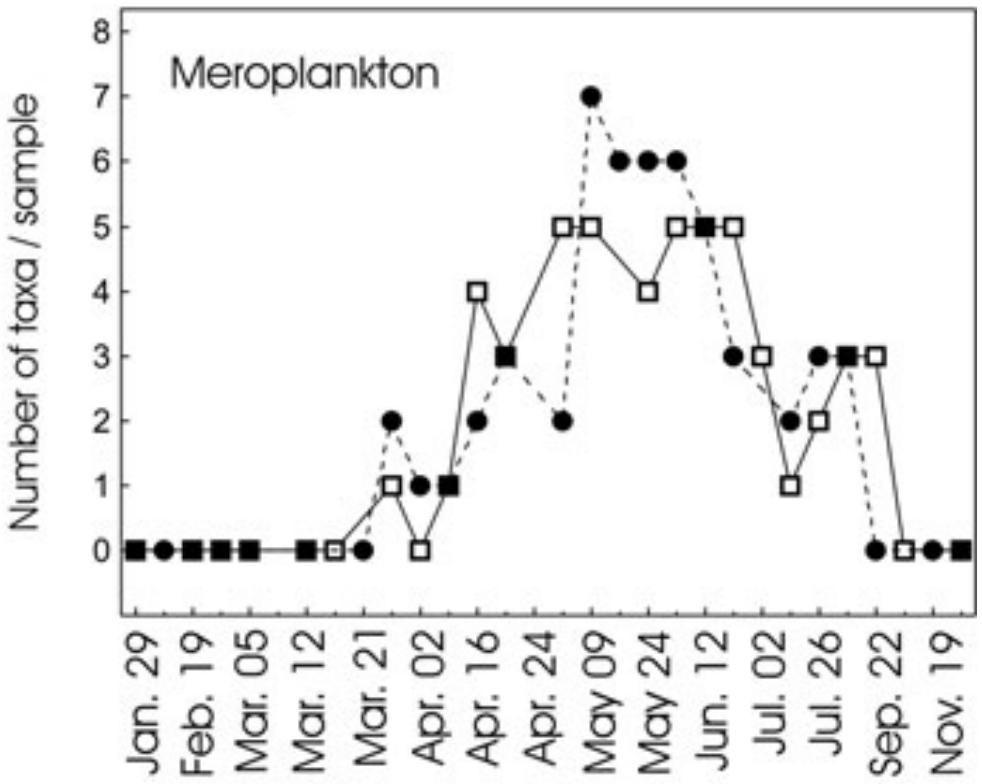
Bioróżnorodnośc bentosu arktycznego – gdzie są ich larwy?

Bioróżnorodnośc bentosu arktycznego – gdzie są ich larwy?

Klasyczne metody poboru prób planktonu

Bioróżnorodnośc bentosu arktycznego – gdzie są ich larwy?

Niska bioróżnorodność larw organizmów bentosowych w stosunku do ilości gatunków organizmów występujących na dnie

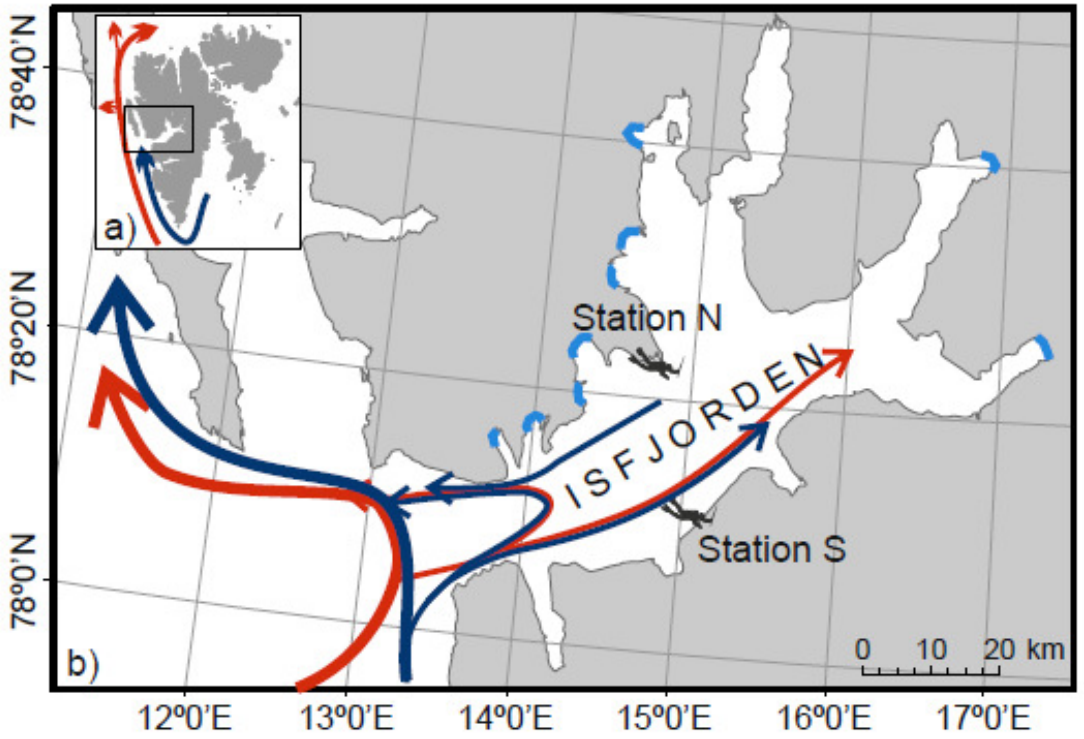


Kuklinski et al. 2013

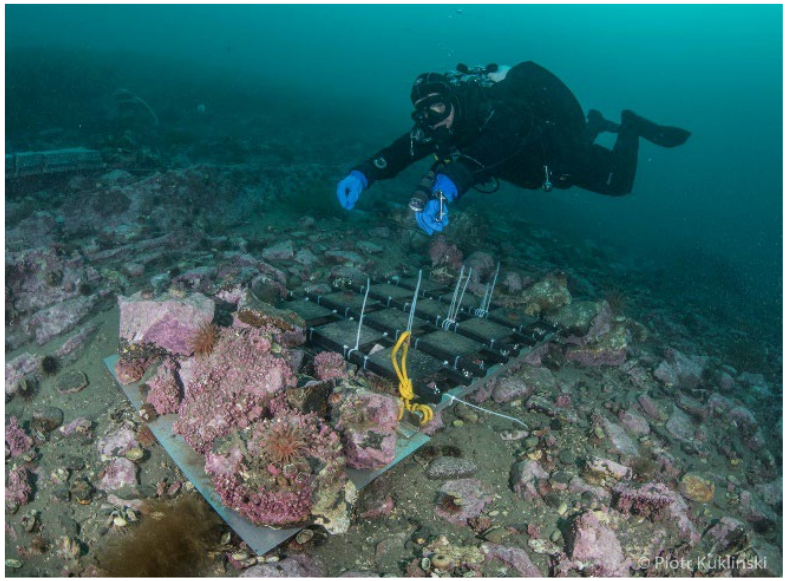
LARVAE

Wpływ warunków środowiskowych i zmian sezonowych na reprodukcję i sukcesję zbiorowiska arktycznej epifauny.

Rejon badań


78°40'N
78°20'N
78°0'N
a)
b)
Station N
Station S
ISFJORDEN
0 10 20 km
12°0'E
13°0'E
14°0'E
15°0'E
16°0'E
17°0'E

Metodyka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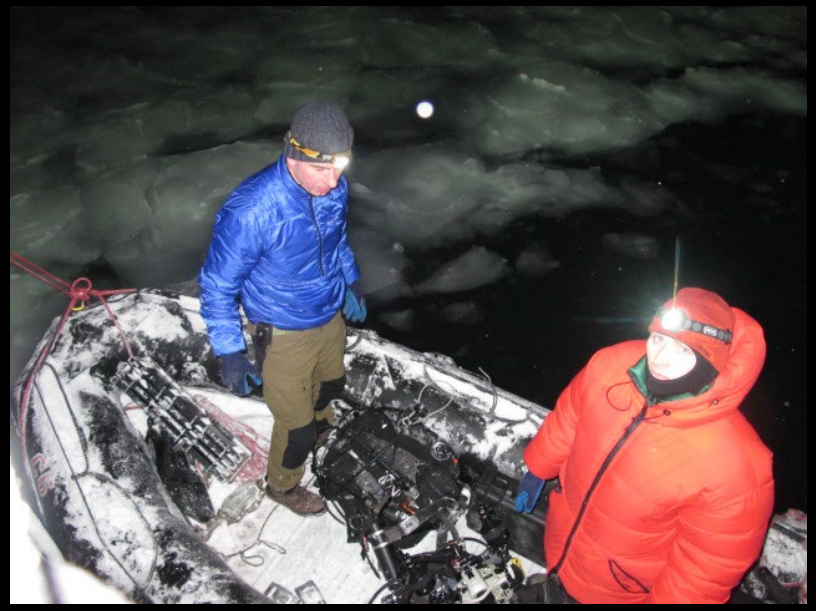
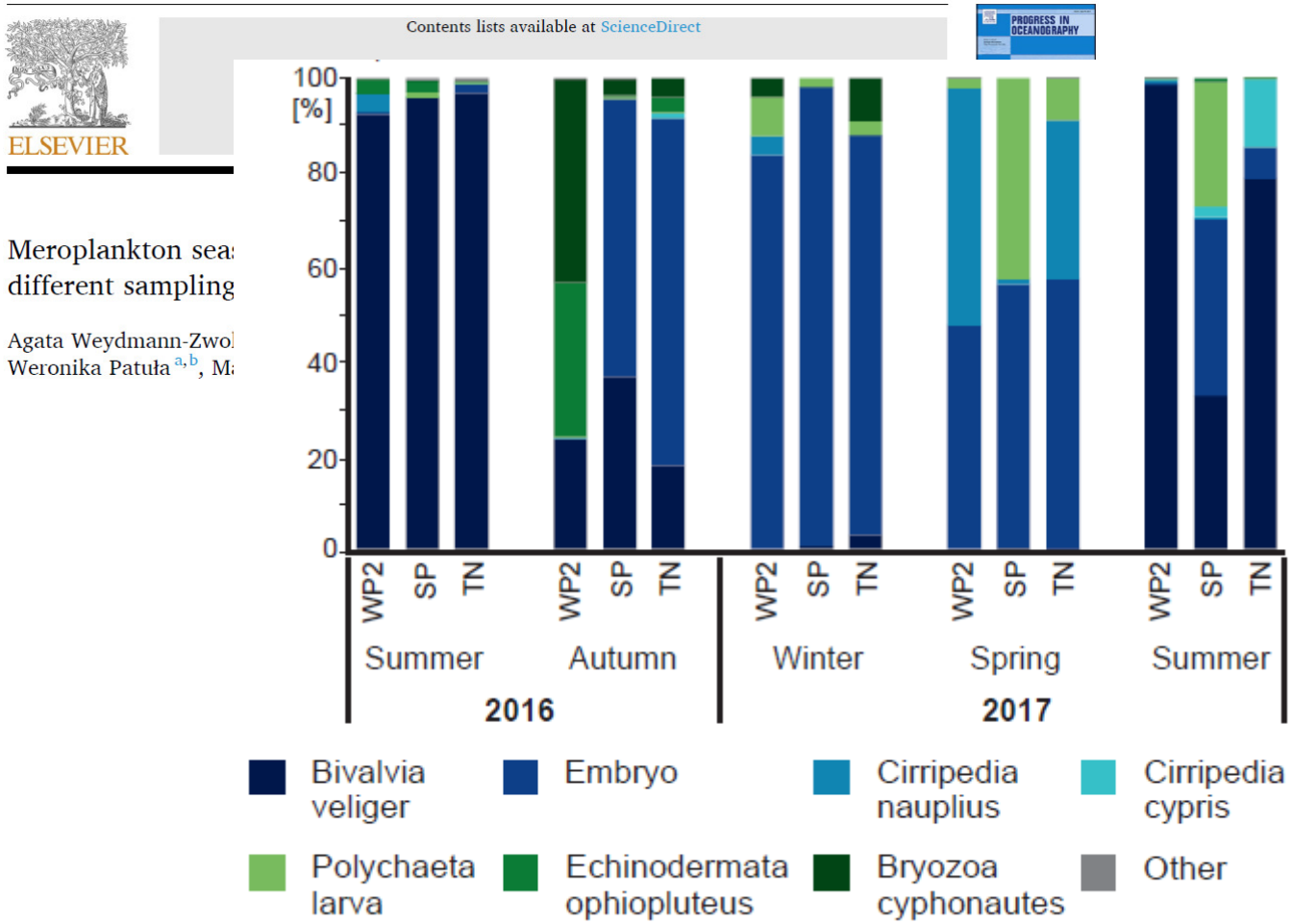
Noc polarna

Noc polarna



Wyniki

Skład taksonomiczny meroplanktonu pobierany różnymi metodami poboru prób



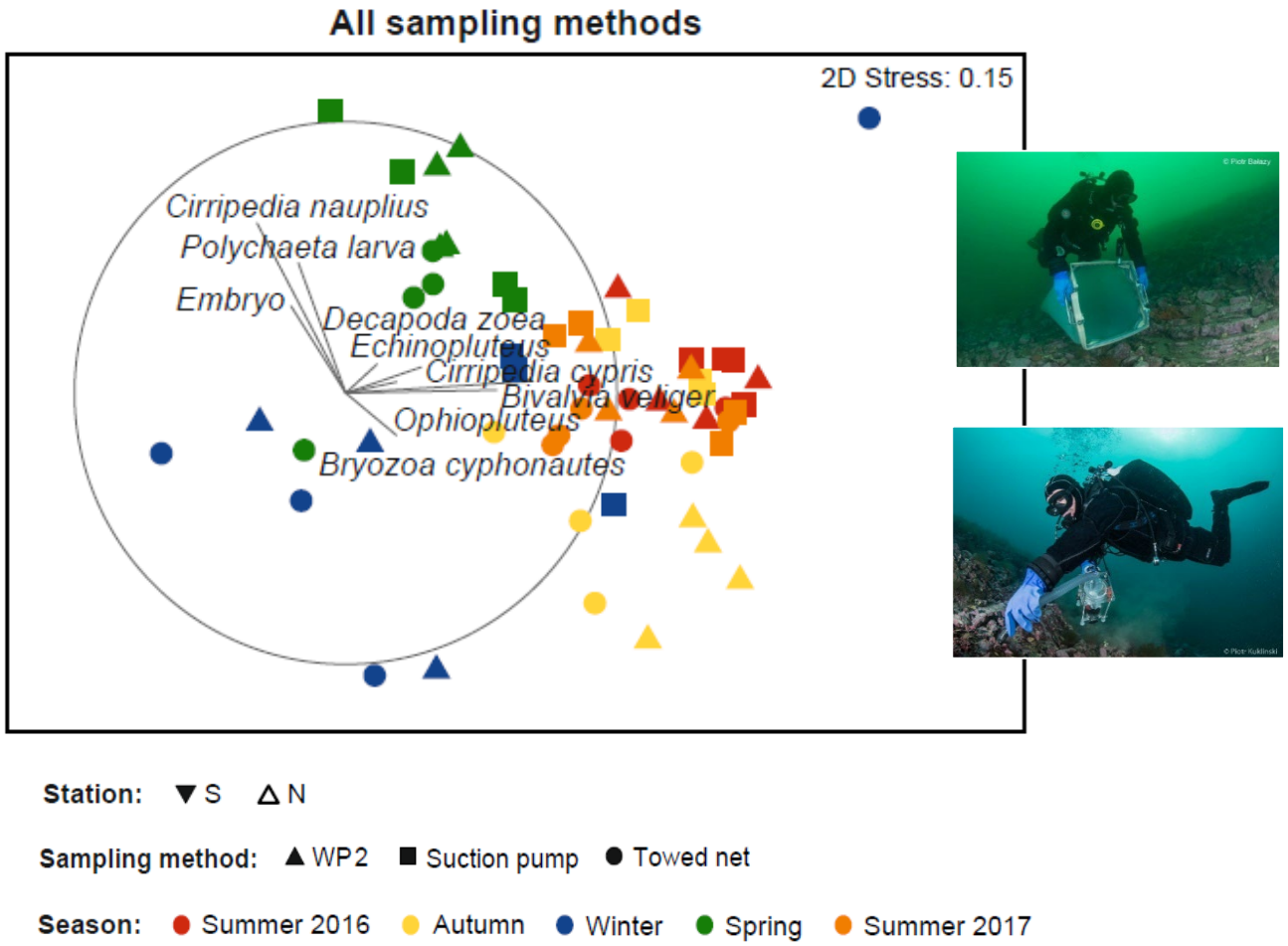
Wyniki

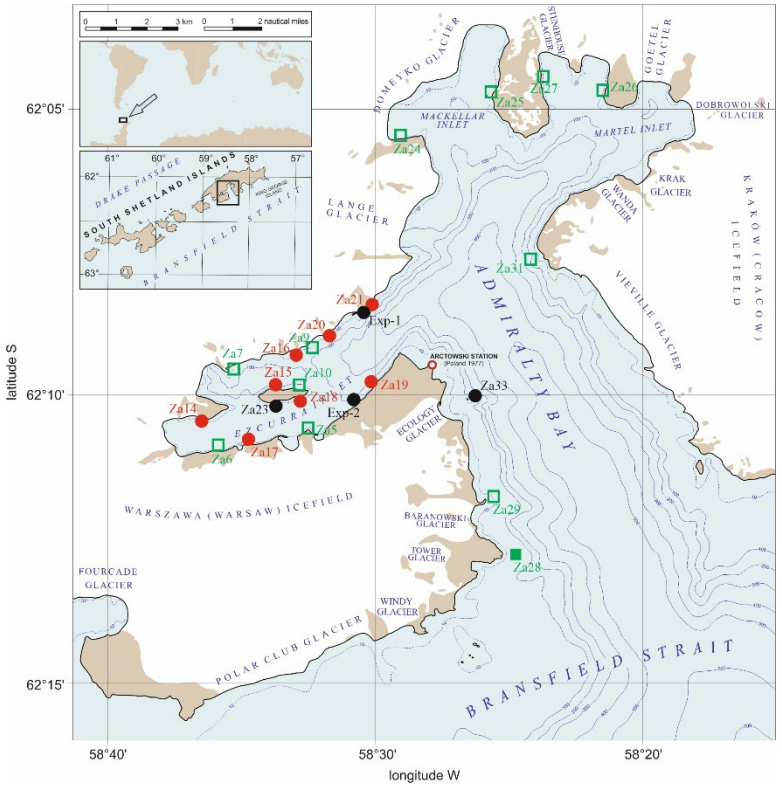
Różnorodność taksonomiczny meroplanktonu dla różnych metod poboru prób

Sampling method	Meroplankton		
	No. of samples	Number of OTUs	MVDISP
WP2	19	9	1.1
Suction pump	19	9	0.9
Towed net	20	9	0.92

Wyniki

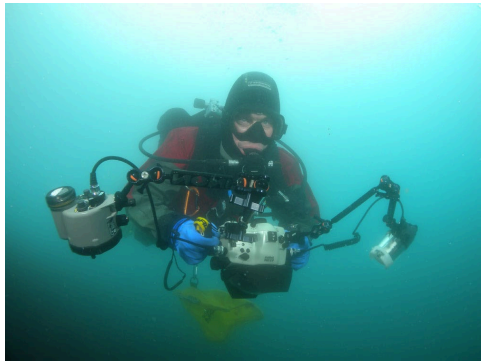
Metody poboru – komplementarne

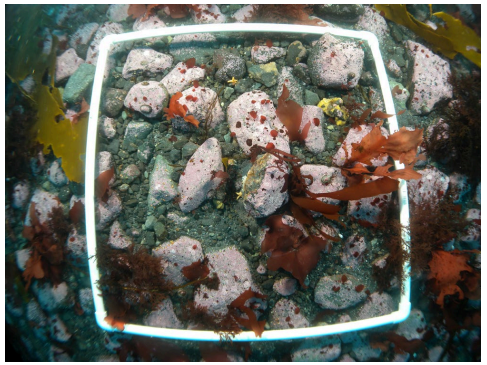




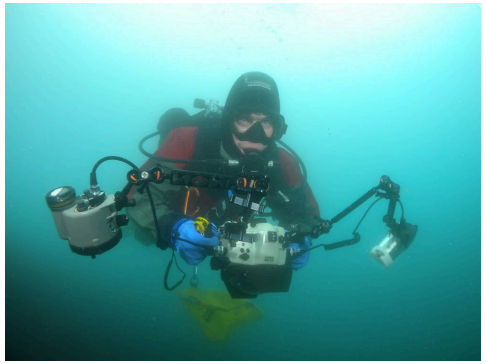
- 2010/2011 vs. 2023
- 30-25-20-15-10-6-(3) m
- Szkarłupnie
- Monitoring

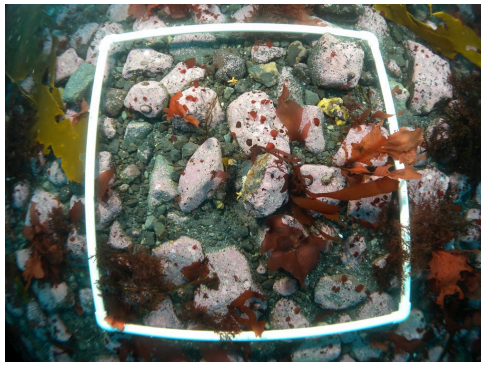
  + obs. podwodne





)/2011 vs. 2023
5-20-15-10-6-(3) m
rłupnie
itoring
s. podwodne





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rłupnie
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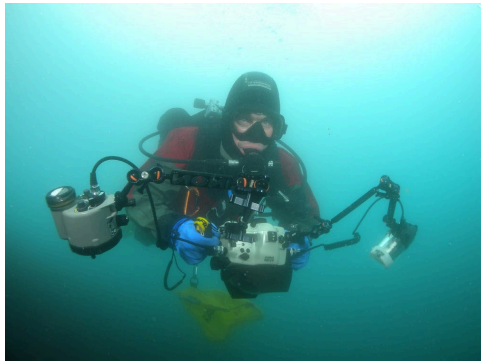
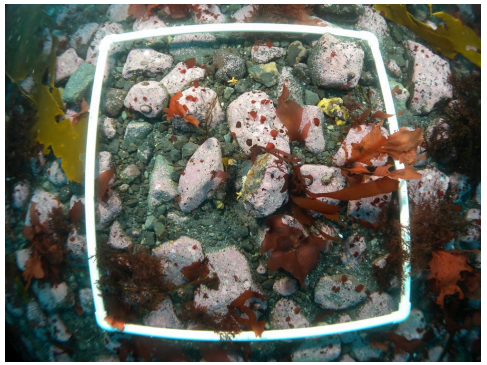
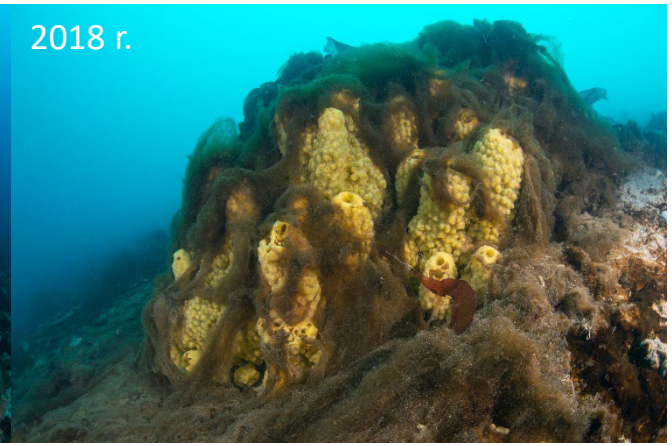
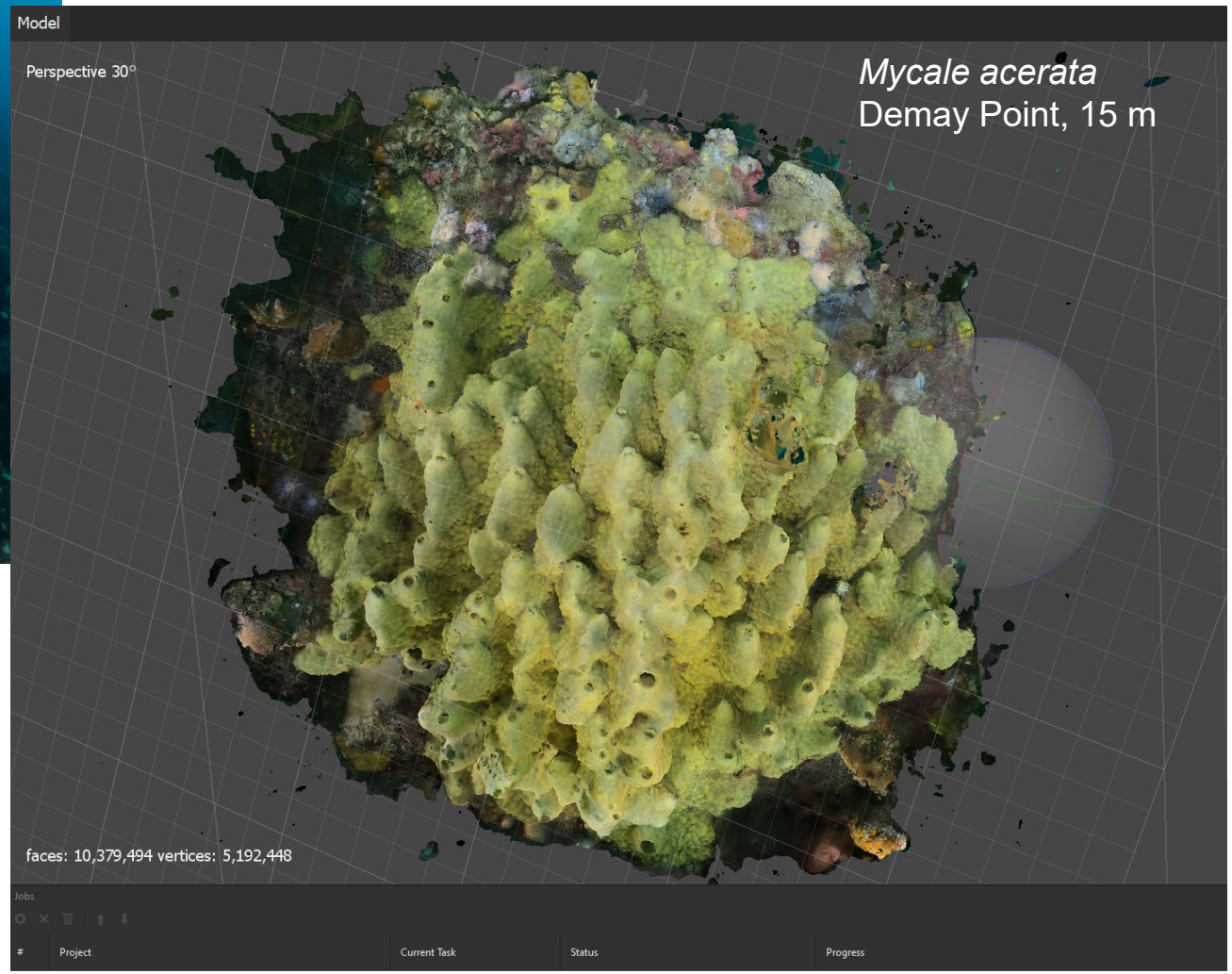
s. podwodne







Bałazy & Bałazy in press. Frontiers in Ecol.&Evol.



https://sketchfab.com/balazy.piotr

Podziękowania

Źródła finansowania

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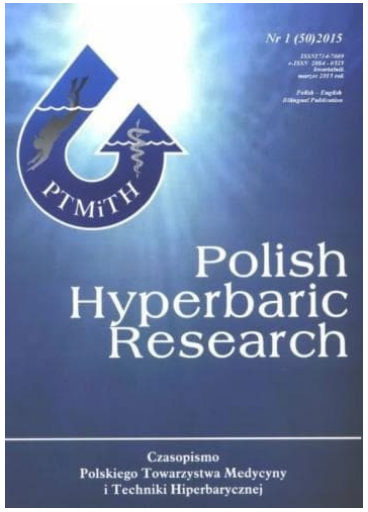

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Journal of Polish Hyperbaric Medicine and Technology Society

SCIENTIFIC DIVING IN POLAND AND INVITATION TO THE POLISH COMMITTEE ON SCIENTIFIC DIVING

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