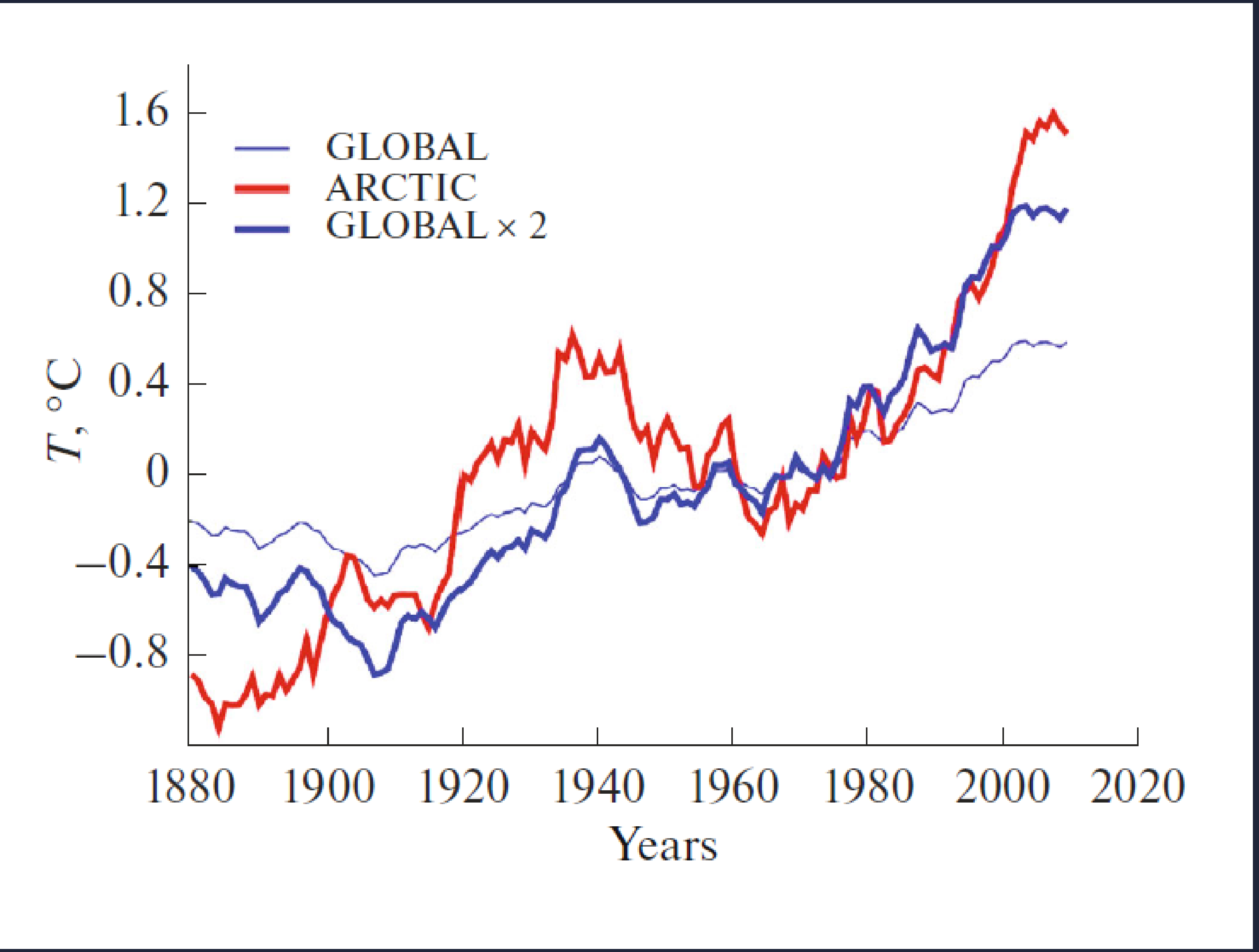
SESSILE EPIBENTHIC ASSEMBLAGES IN THE ISFJORDEN SHALLOWS

A 15-YEARLONG EXPERIMENTAL STUDY

SOWA ANNA, MORENO B., REGINIA K., BAŁAZY P., CHEŁCHOWSKI M., KUKLIŃSKI P.

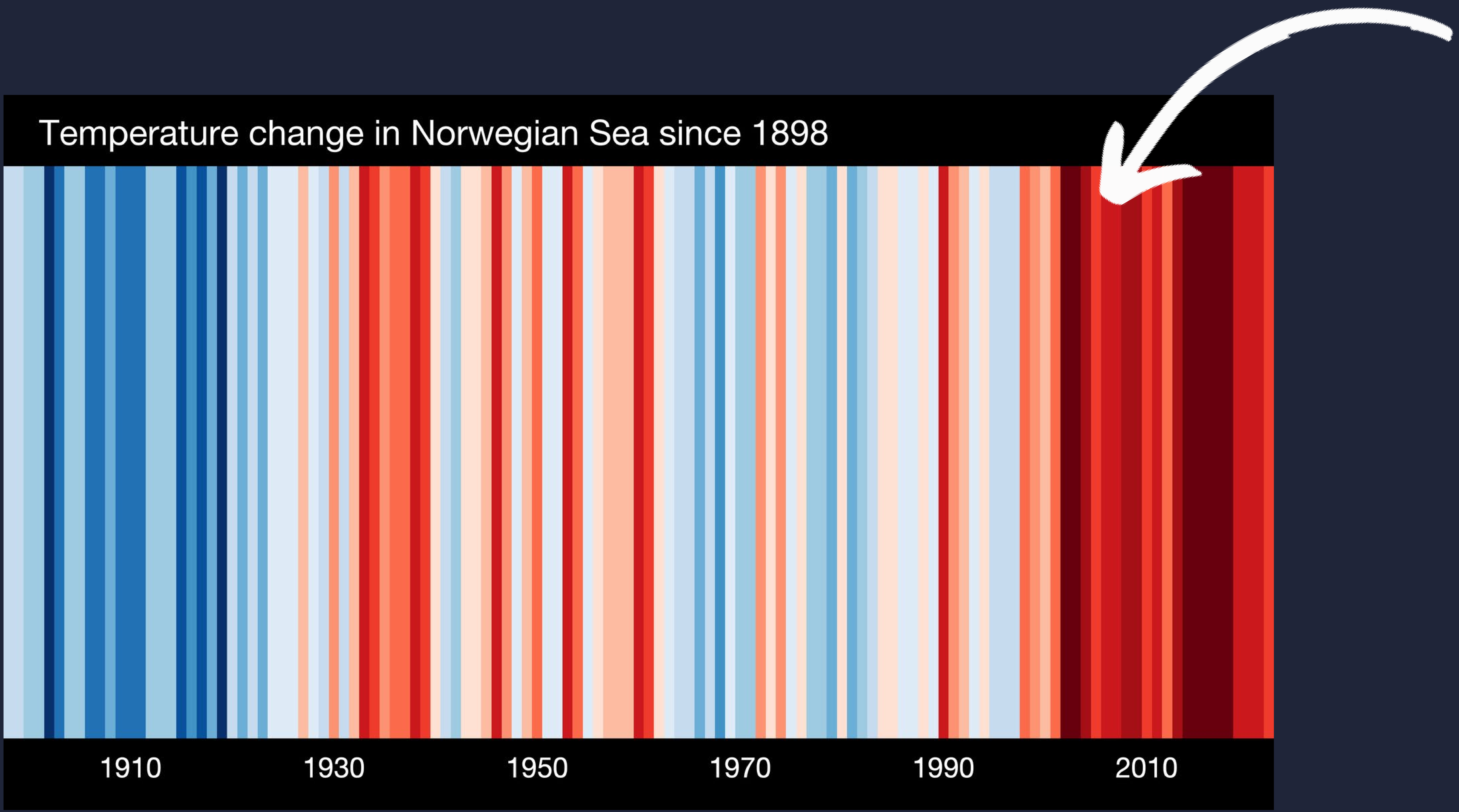
Scientific Diving TEAM



(Semenov et al., 2021)

Observed trends of atmospheric temperatures indicate that the Arctic has been warming almost four times faster than the rest of the world in the last half-century.

(Rantanen et al., 2022)



(showyourstripes.info)

Reported extreme events in the Arctic

1. beginning of the century (1999 -2000)
2. between 2005-2007
3. the summer of 2014
4. 2015/2016 Arctic winter
5. November 2020

ICES Journal of
Marine Science

ICES
CIEM
International Council for the Exploration of the Sea
Conseil International pour l'Exploration de la Mer

ICES Journal of Marine Science (2012), 69(5), 852–863. doi:10.1093/icesjms/fss056

Variability in Atlantic water temperature and transport at the entrance to the Arctic Ocean, 1997–2010

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Beszczynska-Möller, A., Fahrbach, E., Schauer, U., and Hansen, E. 2012. Variability in Atlantic water temperature and trans
to the Arctic Ocean, 1997–2010. – ICES Journal of Marine Science, 69: 852–863.

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AGU PUBLICATIONS

Geophysical Research Letters

RESEARCH LETTER
10.1002/2016GL071228

Analysis of the warmest Arctic winter, 2015–2016

Richard I. Cullather[1,2], Young-Kwon Lim[2,3], Linette N. Boisvert[1,4], Ludovic Brucker[4,5], Jae N. Lee[6,7], and Sophie M. J. Nowicki[4]

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Key Points:
- Record Arctic warming focused in Barents and Kara Seas, southwestern Alaska, and central Arctic Ocean
- El Niño and teleconnections explain warming over land but not for the central ... intrusion of ... d clouds

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ORIGINAL RESEARCH ARTICLE

Kongsfjorden and Hornsund hydrography — comparative study based on a multiyear survey in fjords of west Spitsbergen

Agnieszka Promińska*, Małgorzata Cisek, Waldemar Walczowski

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Received 14 July 2016; accepted 7 July 2017

Recent Extreme Arctic Temperatures are due to a Split Polar Vortex

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Joint Institute for the Study of the Atmosphere and Ocean, University of Washington, Seattle, Washington

(Manuscript received 18 April 2016, in final form 8 June 2016)

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ATMOSPHERIC & OCEANIC SCIENCE LETTERS

The extreme Arctic warm anomaly in November 2020

Check for updates

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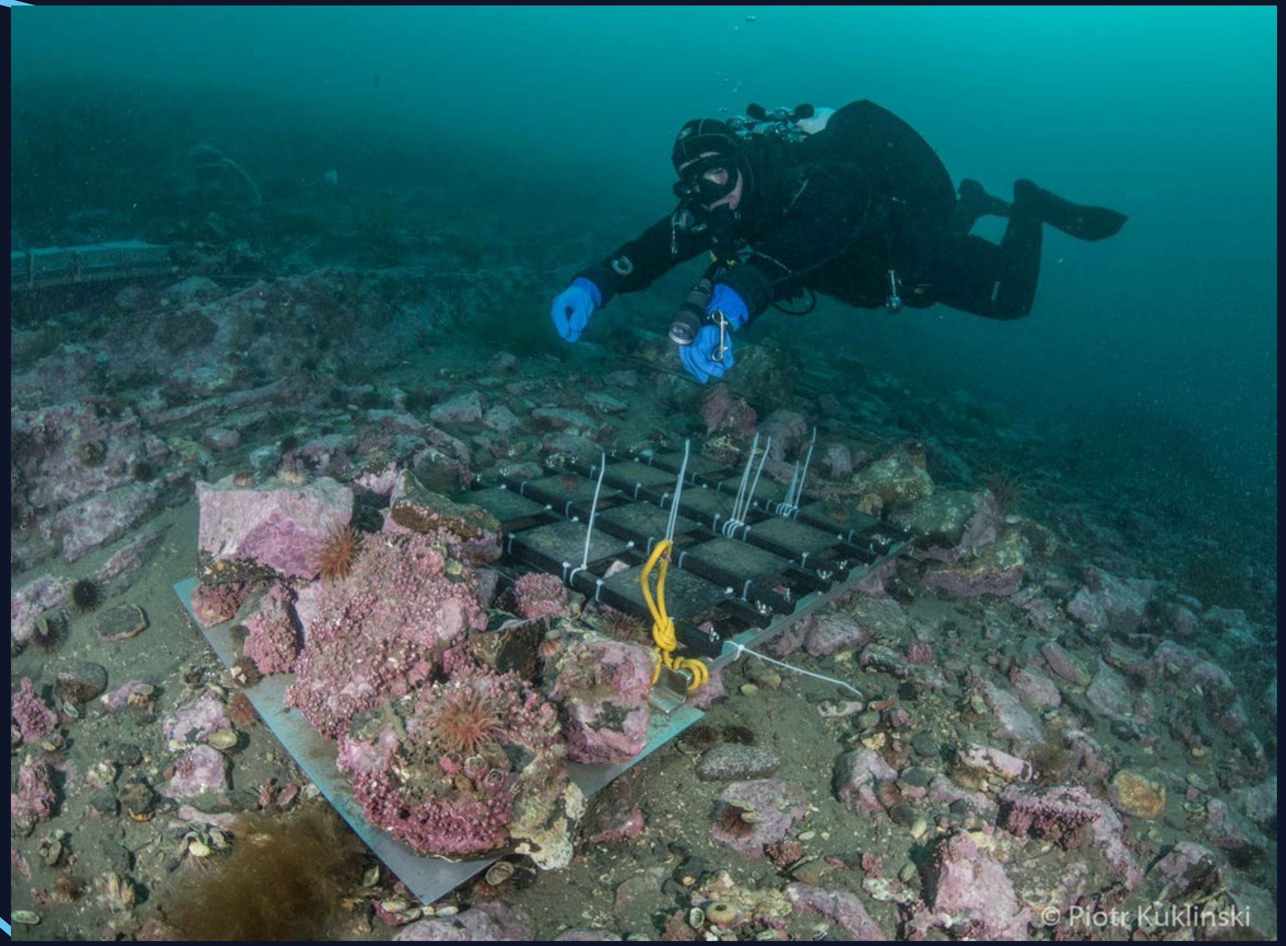
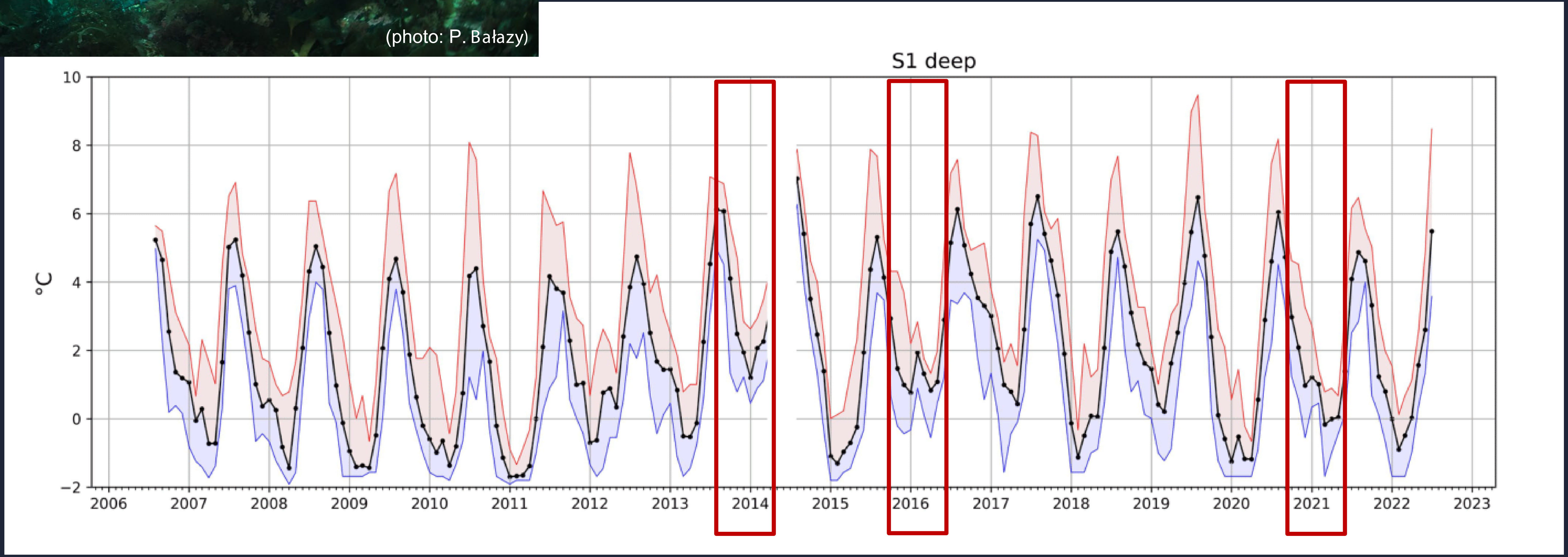
[d] *Nansen-Zhu International Research Center, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, China*

Study area




(photo: P. Bałazy)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Hard-bottom habitats

They are considered to support the highest biodiversity (Dunn & Halpin, 2009).

Those ecosystems are one of the best to investigate for environmental impacts (Kortsch et al., 2012).

Notoriously, they are the hardest to investigate especially on a longer time scale (Nicoletti et al., 2007; Renaud et al., 2007).

Research aims

- observe and describe the state and resilience of the hard bottom assemblages in the high Arctic fjord - Isfjorden
- describe stability of environmental conditions (temperature and light intensity)
- attempt to connect environmental observations with assemblage structure

Methods

FIELD WORK

annual collection of colonisation plates

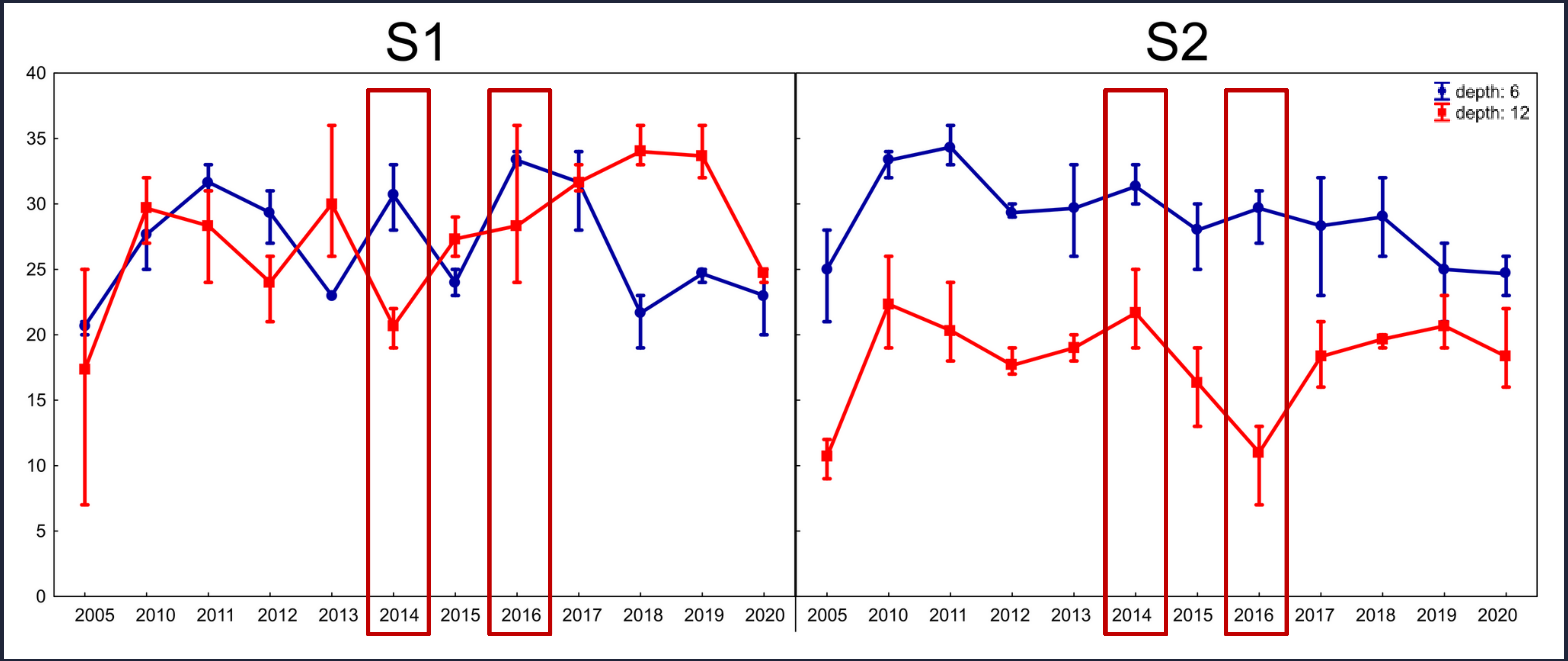
LAB WORK

analysis of the colonisation plates

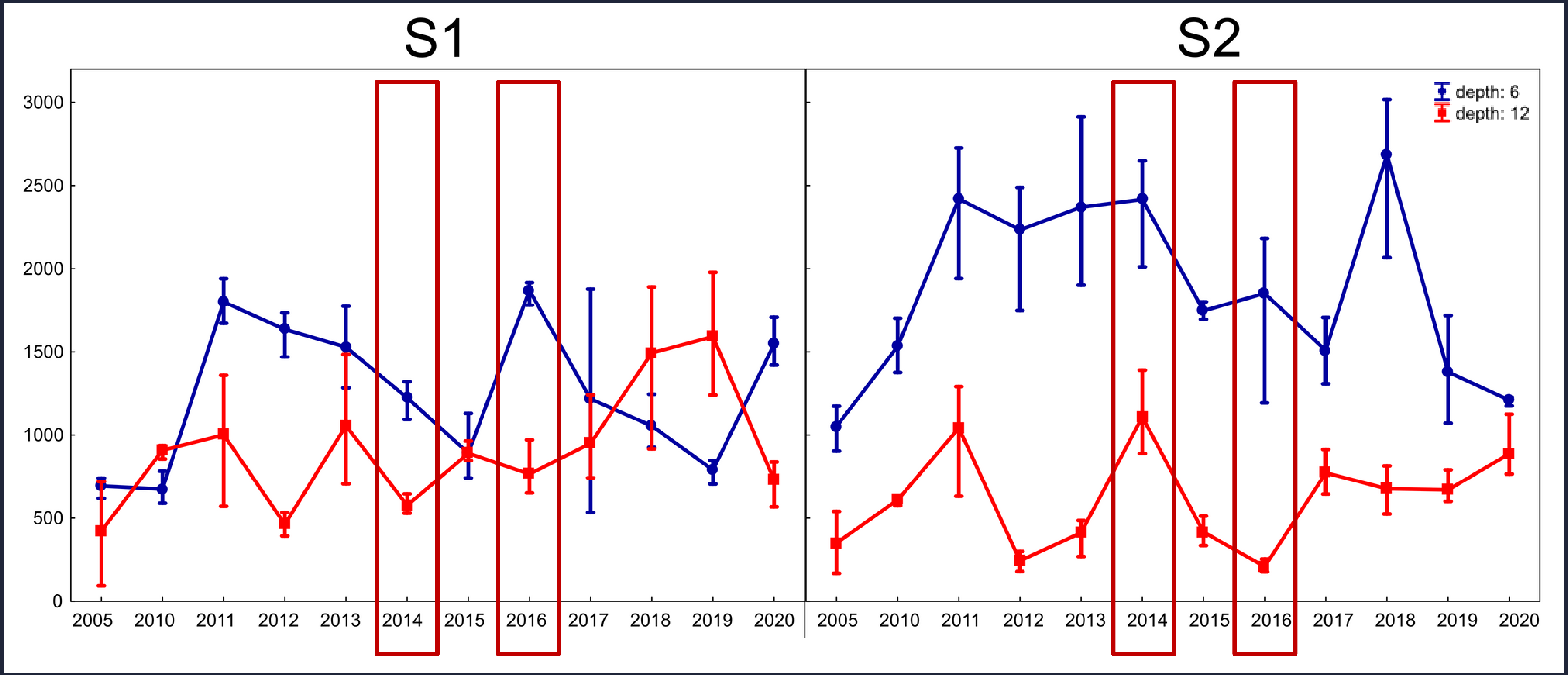
STATISTICS

data processing and statistical analysis

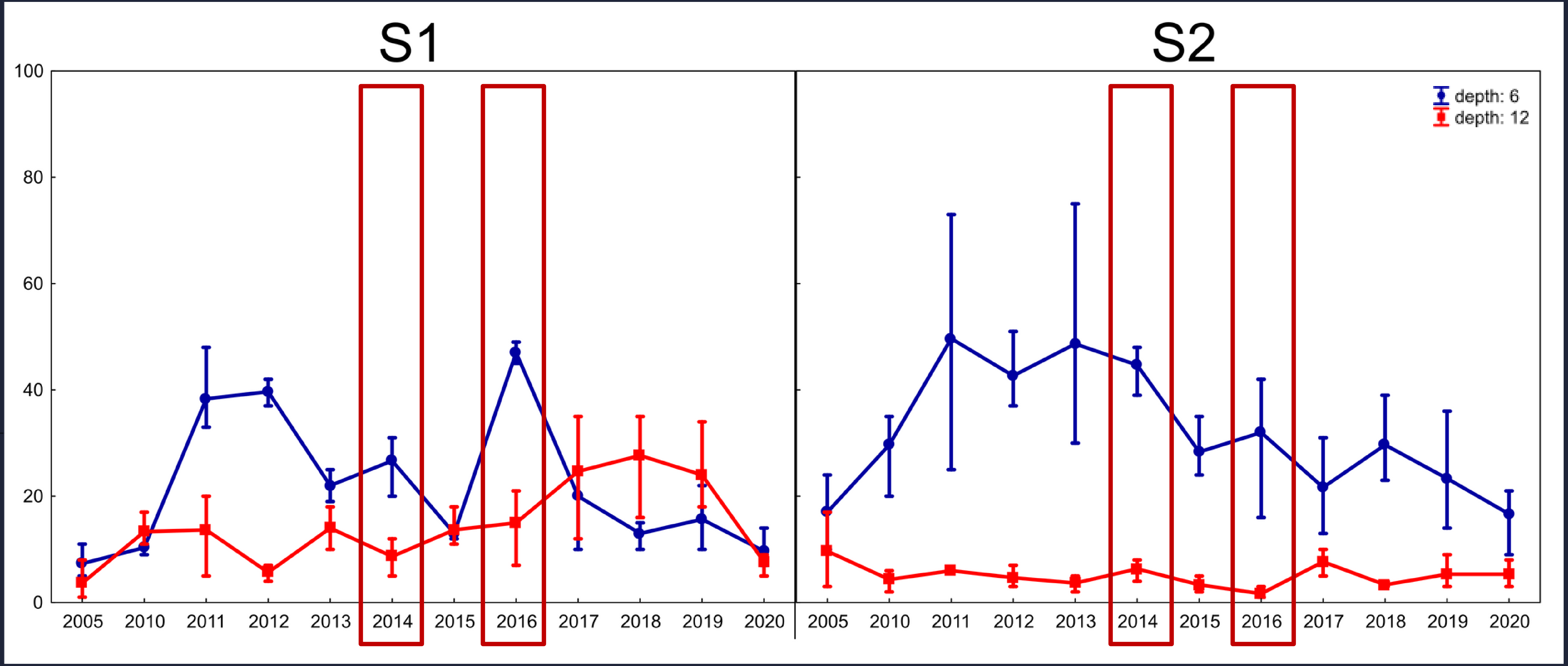
Number of taxa per 100 cm^2

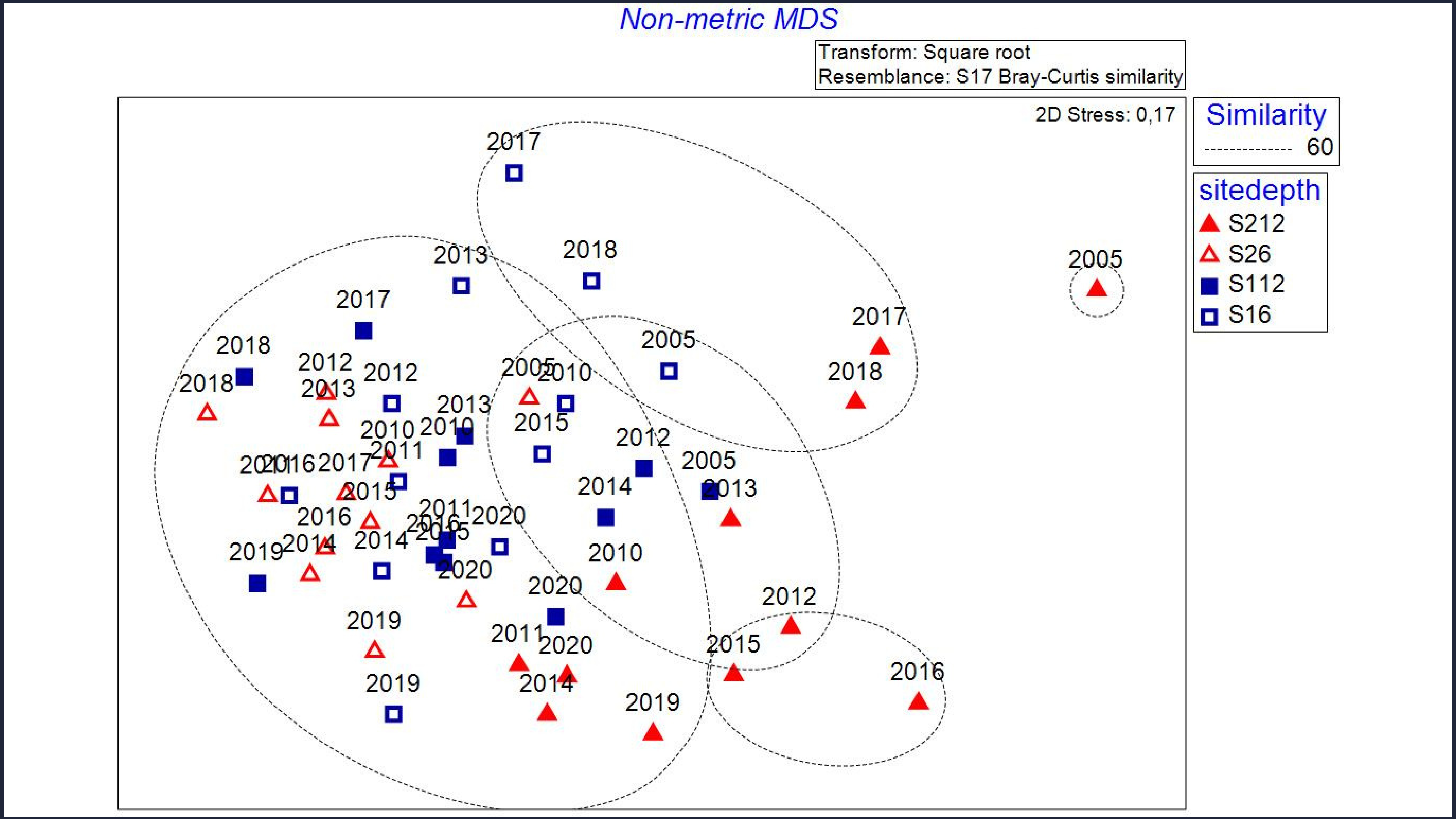


Abundance of ind. per 100 cm²

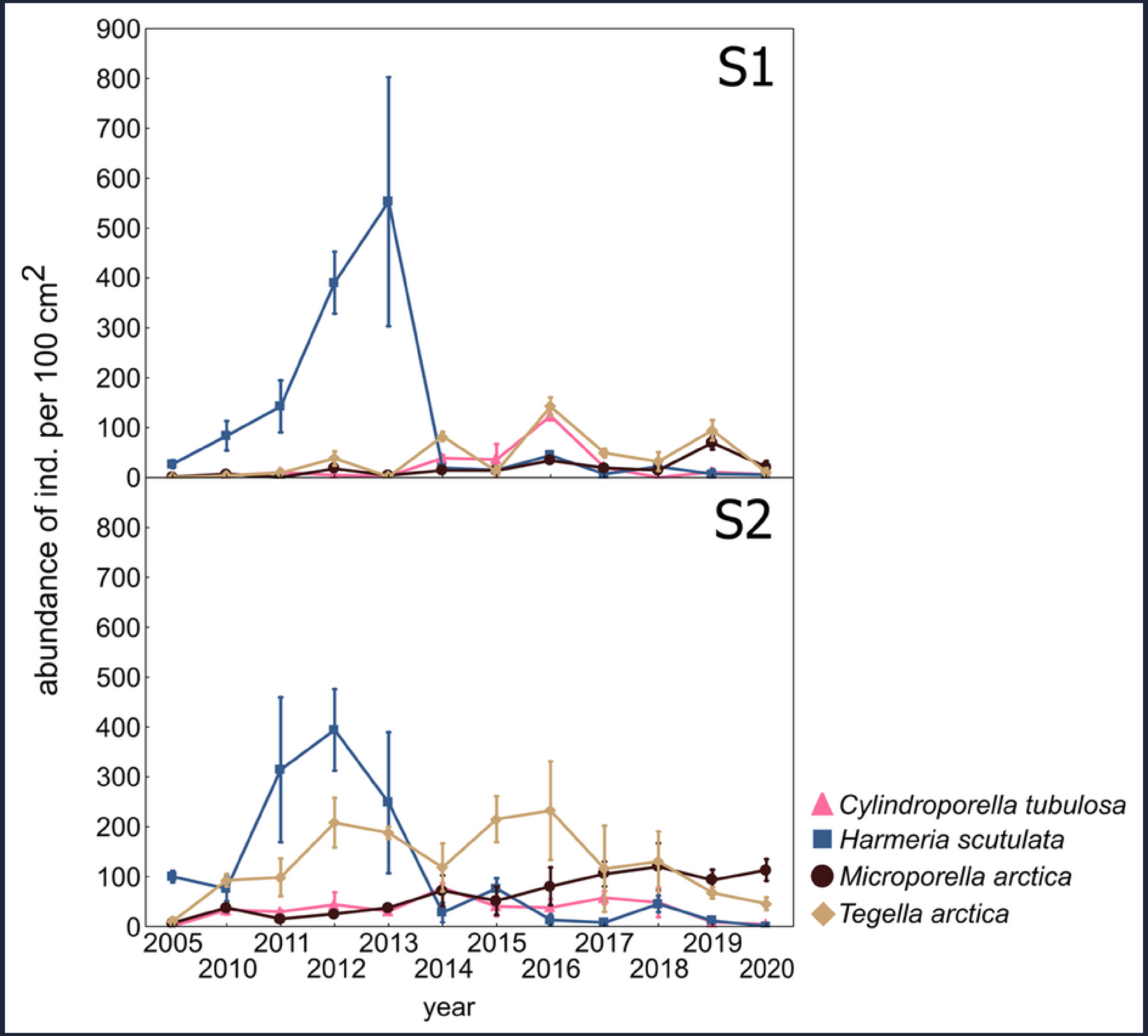


Relative coverage per 100 cm^2 [%]



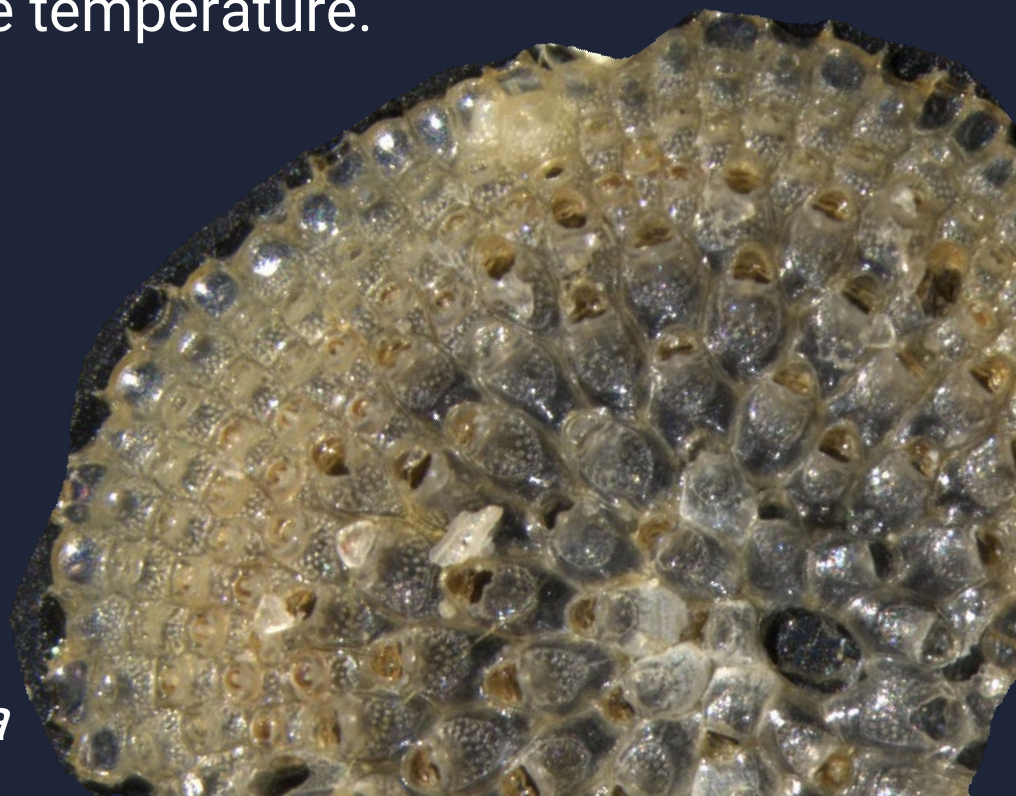


Non-metric MDS
Transform: Square root
Resemblance: S17 Bray-Curtis similarity
2D Stress: 0,17
Similarity
60
sitedepth
S212
S26
S112
S16



Multiannual changes in abundance of typically Arctic species at two study sites (depth of 6m)

The response of many typically arctic species is unambiguous and hard to predict as it can be related to more factors than just the temperature.



Harmeria scutulata

Observations & conclusions

- For such a species-rich assemblage with a high functional redundancy, we can conclude it to be relatively resilient to long-term changes, within the studied time frame.
- Variability in species composition, abundance and relative coverage seem to be mainly driven by local biological processes (eg. predation) excluding times of reported warm anomalies.
- From 2005, when a major Warm Water Anomaly was reported in the Arctic we observed a general increase in the number of recognized species.
- Assemblages at the study site closer to the mouth of the fjord appear to differ from the rest in the times coinciding with warm anomalies recorded in the Arctic region.

photo: P. Kuklinski


THANK YOU FOR YOUR ATTENTION
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photo: P. Kuklinski