



Third workshop of the PAGES Sea ice Proxy (SIP) working group
Sea ice proxy synthesis and data-model comparison

June 23-25, 2014

Alfred Wegener Institute (AWI) Helmholtz Centre for Polar and Marine Research
(AWI), Bremerhaven, Germany, "Glashaus", building F, Bussestraße 24

TOPIC GENERALS AND AGENDA
(please read carefully and respond in time)

Topic: At the first (Montreal 2012) and the second (Cambridge 2013) meeting we focused on the strengths and weaknesses of each sea ice proxy individually and discussed the development of sea ice data syntheses for northern and southern polar areas for different time intervals and time slices as well as the strategy for multi-proxy compilation and reconstructions. At our third SIP meeting we plan to review and discuss four major topics concerning:

- the current progress in proxy development (marine and ice cores),
- multi-proxy compilations and directions for further publication of proxy inter-comparisons,
- sea ice data syntheses (time series and time slices) and directions for future common efforts on this topic,
- the progress in sea ice modeling and proxy data model comparisons.

We want to organize the meeting in workshop-style, thus allow for a maximum of flexibility, stimulate discussion, net-working and young scientists integration.

Oral presentations should (with few exceptions) not exceed 20 min. (ca. 15 min talk + 5 min for specific and short questions). Please keep more general questions and discussion remarks for the General Discussion at the end of each Topic Section. Please prepare yourself to enhance and contribute to this discussion! Considering the mixed audience (specialists in marine and ice core proxies, modeling, young and experienced scientists) the presentations should include a well understandable introduction and should not be over-detailed. To enhance discussion, the presentations should also raise critical questions and outline planned/potential future developments. To avoid disturbances/time losses with downloading of the contributions, all contributions will be done with one Mac. Downloads of the contributions will be done prior to the different oral sections (in the morning starting at ca. 8:45 h, and at the begin of the coffee and lunch breaks). To minimize problems with the

presentation you may prepare your presentations in pdf formate. Short presentation to support the discussion sections may be shown directly from a stick. All contributions will be deleted after the workshop from the Mac. In case you feel uncomfortable with this regulation please contact Rainer.Gersonde@awi.de. We will then find other solutions.

Posters (size A0 portrait format) will be presented during the entire workshop and can be discussed during the breaks. We have allocated time to allow poster presenters to present a short oral introduction to their poster (time per poster is ca. 5 min, ca. 3 slides).

The following agenda is yet not final and can be modified following your suggestions as far as available time allows for. So, in case you have suggestions to further enhance the style of the workshop or if you like to propose additional presentations/discussion themes please send this information to rainer.gersonde@awi.de, Eric Wolff (ew428@cam.ac.uk) and Anne de Vernal (devernal.anne@uqam.ca) **not later than June 17**.

We also look for volunteers (young scientists are especially encouraged) to act as moderators of the oral/poster sessions and discussion sections and to help in the generation of summaries of the discussion outcome. **We hope for responses via mail until June 17**.

AGENDA

Monday, June 23

- 09:00 – 9:30 **Introduction, summary of past two workshops and SIP3 workshop objectives** – Rainer Gersonde, Anne de Vernal, Eric Wolff
- 09:30 – 10:30** **“ADVANCES IN PROXIES (I)” (moderator tbd)**
09:30 – 09:50 **Jochen Halfar:** Crustose coralline algae: A novel annual-resolution marine sea ice proxy
09:50 – 10:10 ? **Simon Belt:** New advances in IP25
- 10:10 – 10:30** **SHORT PRESENTATIONS OF POSTERS “ADVANCES IN PROXIES”**
Kirsten Fahl: Organic carbon sources and variability in Arctic sea ice and sediment traps: Implications from biomarker proxies
Lukas Smik: A spatial assessment of diunsaturated highly branched isoprenoid (HBI) alkene as an Antarctic sea ice proxy.
Eric Wolff: Factors controlling sea salt transport to Antarctica
- 10:30 – 11:00** **COFFEE BREAK + Discussion at Posters**
- 11:00 – 13:00** **“ADVANCES IN PROXIES (II)” (moderator tbd)**
11:00 – 11:20 **Marcus Frey:** The blowing snow source of sea salt aerosol: laying the physical foundation for an ice core proxy of past sea ice extent
11:20 – 11:40 **James Levine:** Exploring the potential of sea salt as an ice core SIP on interannual to glacial-interglacial timescales
11:40 – 12:00 **Xin Yang:** Refining the parameterisation of blowing snow related sea salt production based on the Polarstern observations
12:00 – 12:20 **Morgane Philippe:** Past sea ice extent and its correlation patterns with Sodium, Sulfate and MSA in the coastal region of Dronning Maud Land, for the period 1973-2011
12:20 – 12:40 **Katy Pol:** Does the recent loss of Arctic sea ice show up in potential ice core proxies?
12:40 – 13:00 **Paul Vallelonga:** Advances in applying halogens as sea ice proxies

- 13:00 – 14:00 LUNCH**
- 14:00 – 15:50 “ADVANCES IN PROXIES (III)”**
 14:00 – 14:20 **Richard Telford:** Pitfalls of using transfer functions to reconstruct sea-ice
- 14:20 – 15:50 GENERAL DISCUSSION ON STATUS, FUTURE REQUIREMENTS AND STRATEGIES CONCERNING “ADVANCES IN PROXIES” (moderator tbd)**
- What are the critical advances in proxy development?(e.g. in ice core proxies (Antarctic/Greenland)*
What are the remaining problems (e.g. transfer function based proxies) and can this be solved?
Are we in the possession of appropriate tools to reconstruct past sea ice (e.g. winter, summer, seasonality, concentration, presence/absence, sea ice type...)?
What are the physical/biological processes needed to better interpret proxies?
What is the chance for new, yet little or unexplored sea ice proxies?
- 15:50 – 16:10 COFFEE BREAK + Discussion at Posters**
- 16:10 – 17:10 “MULTIPROXY COMPARISON AND DATA SYNTHESSES” (I) WITH SPECIAL FOCUS ON THE BERING SEA AREA (moderator tbd)**
- 16:10 – 16:30 **Beth Caissie:** Last Glacial Maximum to Holocene Sea Ice Decline in the Bering and Chukchi Seas: a Comparison of Diatom, Grain Size, and IP25 Sea Ice Proxies
- 16:30 – 16:50 **Rüdiger Stein et al.:** IP25-based sea ice reconstruction in the Bering Sea and the North Pacific.
- 16:50 – 17:10 **Jian Ren et al.:** Comparison of sea ice proxies (IP25, dinoflagellates, diatoms) in the subarctic Pacific
- 17:10 – 17:20 TRAVEL ISSUE REGULATIONS (e.g. collection of travel bills and receipts)**
- 19:00 CONFERENCE DINNER AT HOTEL HAVERKAMP** (Prager Straße 34, 27568 Bremerhaven, Tel.: 0471 48330)

Tuesday, June 24

- 09:00 – 10:20 “MULTIPROXY COMPARISON AND DATA SYNTHESSES” (II) (moderator tbd)**
- 09:00 – 09:20 **Marit-Solveig Seidenkrantz et al.:** Arctic sea-ice cover during the Holocene – comparison of multi-proxy reconstructions and preliminary models permutations
- 09:20 – 09:40 **Xiaotong Xiao et al.:** Last Glacial Maximum sea-ice cover in the Central Arctic: reconstruction from biomarkers
- 09:40 – 10:00 **Juliane Müller et al.:** Sea ice variability during the last glacial and deglacial: coincidence with or cause of abrupt climate changes?
- 10:00 – 10:20 SHORT PRESENTATIONS OF POSTER “MULTIPROXY COMPARISON AND DATA SYNTHESSES”**

- Rüdiger Stein et al.:** Centennial to millennial-scale variability in sea ice, primary productivity, and Pacific-Water inflow in the Chukchi/ East Siberian Sea area (Arctic Ocean)
- Cristof Pearce:** Reconstruction of circum-Arctic sea-ice cover during the Holocene
- Tanja Hörner et al.:** Late Quaternary variability of sea ice cover, terrigenous input and biologic productivity in the Arctic Ocean
- Henriette Kolling et al.** ArcTrain - International Research Training Group: Processes and impacts of climate change in the North Atlantic Ocean and the Canadian Arctic
- 10:20 – 10:50** **COFFEE BREAK + Discussion at Posters**
- 10:50 – 11:20** **“MULTIPROXY COMPARISON AND DATA SYNTHESSES” (III) (moderator tbd)**
- 10:50 – 11:10 **Rüdiger Stein et al.:** Reconstruction of Arctic Ocean sea-ice history: Quaternary and Pliocene IP25 records
- 11:10 – 11:20** **SHORT PRESENTATION OF POSTER “MULTIPROXY COMPARISON AND DATA SYNTHESSES”**
- Rüdiger Stein et al.:** Pliocene/Pleistocene changes in Arctic sea-ice cover: Biomarker and dinoflagellate records from Fram Strait/Yermak Plateau (ODP Sites 911 and 912)
- Caroline Clotten:** Pliocene Greenland Sea ice reconstruction using IP25
- 11:20 – 12:30** **GENERAL DISCUSSION ON STATUS, FUTURE REQUIREMENTS AND STRATEGIES CONCERNING “MULTIPROXY COMPARISON AND DATA SYNTHESSES” WITH SPECIAL FOCUS ON THE ARCTIC REALM (I) (moderator tbd)**
- What is the message from multi-proxy comparison of Arctic/Bering Sea sea ice proxies and do we need further inter-comparison exercises?*
- What is the significance and quality (relative) and what are the errors and limitations of individual proxies?*
- Feasibility of different proxy combinations? e.g. IP25 – dinoflagellate TF – diatom indicator species – ice core data – grain size data*
- What is the status of time series/time slice compilations e.g. LGM, Holocene?*
- Which time slices/time series are priorities for reconstruction?*
- What can we expect for the future and when would this be available?*
- What are the limitations of Arctic sea ice reconstruction?*
- What is required by modelers and what new proxy information would be most helpful in improving sea ice models?*
- 12:30 – 13:30** **LUNCH**
- 13:30 – 14:30** **GENERAL DISCUSSION ON STATUS, FUTURE REQUIREMENTS AND STRATEGIES CONCERNING “MULTIPROXY COMPARISON AND DATA SYNTHESSES” WITH SPECIAL FOCUS ON THE ARCTIC REALM (II) (moderator tbd)**
- 14:30 – 16:30** **“MULTIPROXY COMPARISON AND DATA SYNTHESSES” (III) (moderator tbd)**
- 14:30 – 14:50 **Verena Benz et al.:** Last Glacial to Holocene sea ice in the Pacific Southern Ocean

- 14:50 – 15:10 **Oliver Esper et al.:** Southern Ocean sea ice fields during Termination II and the Last Interglacial – Synthesis based on diatom records
- 15:10 – 15:30 **Rainer Gersonde et al.:** Southern Ocean sea ice synthesis – Time slices, time series, proxy comparisons

POSTER “SEA ICE MODELLING AND MODEL/DATA COMPARISON”

Verena Benz et al.: Southern Ocean sea surface temperature and sea ice fields since the Last Interglacial. (summary of Benz, Esper, Gersonde talks)

15:30 – 16:00 COFFEE BREAK + Discussion at Posters

16:00 – 17:00 GENERAL DISCUSSION ON STATUS, FUTURE REQUIREMENTS AND STRATEGIES CONCERNING “MULTIPROXY COMPARISON AND DATA SYNTHESSES” WITH SPECIAL FOCUS ON THE SOUTHERN OCEAN (moderator tbd)

What is the status of multi-proxy comparison of Southern Ocean sea ice proxies and how can we generate further inter-comparisons?

What is the significance and quality (relative) and what are the errors and limitations of individual proxies?

Is it feasible to combine different proxies? e.g. biomarker – diatom TF – diatom indicator species - opal%/flux – ice core proxies

What is the status of time series/time slice compilations? e.g. MIS6/MIS5, LGM, ACR, Holocene

What can we expect for the future?

What are the limitations?

What is required by modellers?

Wednesday, June 25

09:00 – 10:25 “SEA ICE MODELLING AND MODEL/DATA COMPARISON” (moderator tbd)

09:00 – 09:30 **Gerrit Lohmann:** Patterns of modelled temperatures and sea ice using the Earth system model COSMOS: Holocene, Younger Dryas, Boelling-Alleroed, H1, LGM, MIS3, and MIS5

09:30 – 10:00 **Hugues Goosse:** Model-data comparison and data assimilation of mid-Holocene Arctic sea-ice concentration

10:00 – 10:20 **Xu Zhang et al.:** to be announced

10:20 – 10:25 SHORT PRESENTATION OF POSTER “SEA ICE MODELLING AND MODEL/DATA COMPARISON”

Xiaouxu Shi: tba

10:25 – 10:45 COFFEE BREAK + Discussion at Posters

10:45 – 12:15 GENERAL DISCUSSION AND SUMMARY “SEA ICE MODELLING AND MODEL/DATA COMPARISON” (moderator tbd)

What is the status of sea ice modelling?

How sea ice modeling can bridge data gaps (areal, seasonal)?

What is the status of model/data comparisons?

What can we expect for the future?

What are the limitations?

12:15 – 13:00 **CONCLUDING POINTS – SIP summary on different topics – Recommendations for future research – future meetings** (Rainer Gersonde, Anne de Vernal, Eric Wolff)

13:00 – 14:00 **LUNCH**

14:00 **END**

PAGES SIP 3 Workshop participants

Name	First Name	Affiliation	Mail	Expertise
Abelmann	Andrea	AWI	Andrea.Abelmann@awi.de	Diatoms, opal isotopes
Allen	Claire	BAS, UK	csall@bas.ac.uk	Diatoms (SO)
Belt	Simon	Plymouth University, UK	S.Belt@plymouth.ac.uk	Biomarker
Benz	Verena	AWI	Verena.Benz@awi.de	Diatoms (SO)
Caissie	Beth E.	Iowa State U.	bethc@iastate.edu	Diatoms (Arctic/Subarctic)
Clotten	Caroline	Uni Climate, Uni Research AS Allégaten 55 5007 Bergen Tlf: +47-55583702	Caroline.Clotten@uni.no	IP25, Pliocene (subarctic)
de Vernal	Anne	UQAM	devernal.anne@uqam.ca	Dinoflagellates (Arctic/Subarctic)
Esper	Oliver	AWI	Oliver.Esper@awi.de	Diatoms, dinoflagellates (SO, NPac)
Fahl	Kirsten	AWI	Kisten.Fahl@awi.de	biomarker
Frey	Markus	British Antarctic Survey High Cross - Madingley Road CB3 0ET Cambridge, UK	maey@bas.ac.uk	modern sea ice processes (Antarctic)/ice core proxies
Gersonde	Rainer	AWI	Rainer.Gersonde@awi.de	Diatoms (SO, NPac)
Goosse	Hugues	UCL Belgium	hugues.goosse@uclouvain.be	modelling
Halfar	Jochen	Dept. of Chemical & Physical Sciences, University of Toronto at Mississauga Mississauga, ON L5L 1C6 , Canada Phone: (905) 828-5419	jochen.halfar@utoronto.ca.	Crustose coralline algal Sea Ice Proxy Development (or Sclerochronology)
Hörner	Tanja	AWI	Tanja.Hoerner@awi.de	Biomarker (Arctic)
Kolling	Henriette	AWI	h.kolling@awi.de	Biomarker (Arctic)
Levin	James	U. Birmingham, UK	j.g.levine@bham.ac.uk	Ice cores
Lohmann	Gerrit	AWI	Gerrit.Lohmann@awi.de	climate modelling, paleoclimate dynamics, data analysis
Philippe	Morgane	Laboratoire de Glaciologie - DSTE Université Libre de Bruxelles 50, Avenue F.D. Roosevelt - CP 160/03 1050 Bruxelles,BELGIUM Tel : +32 2 650 22 18	Morgane.Philippe@ulb.ac.be	Ice cores (Antarctic)
Müller	Juliane	AWI, now at Durham, UK	Juliane.Mueller@awi.de	Biomarker (Arctic/Subarctic)
Pearce	Christof	U Aarhus, DK	christof.pearce@geo.au.dk	Arctic
Pol	Katy	British Antarctic Survey High Cross Madingley Road Cambridge CB3 0ET United Kingdom Phone: +44 (0)1223 221560	katl@bas.ac.uk	Ice cores (Greenland)
Ren	Jian	AWI	Jian.Ren@awi.de	Diatoms (subarctic Pacific)

Seidenkrantz	Marit-Solveig	U Aarhus, DK	mss@geo.au.dk	Foram (Arctic/Subarctic)
Shi	Xiaoxu	AWI	Xiaoxu.Shi@awi.de	modelling
Smik	Lukas	Plymouth University, UK	lukas.smik@plymouth.ac.uk	Sea ice biomarker proxies (Arctic/Antarctic)
Stein	Rüdiger	AWI	Ruediger.Stein@awi.de	Biomarker (Arctic/Subarctic) Pre Quat sea ice
Telford	Richard	U. Bergen & Bjerknes Centre, Bergen, Norway	richard.telford@bio.uib.no	sea ice TFs, statistics,
Vallelonga	Paul	Centre for Ice and Climate - Niels Bohr Institute University of Copenhagen Denmark Telephone +45 35320043	PTRAVIS@nbi.ku.dk	Ice cores
Wolff	Eric	U. Cambridge, UK	ew428@cam.ac.uk	Ice cores
Xiao	Xiaotong	AWI	Xiaotong.Xiao@awi.de	Biomarker (Arctic/Subarctic)
Yang	Xin	NCAS-Climate; Centre for Atmospheric Science, Dept of Chemistry, University of Cambridge, UK Tel: 0044-1223-748895	xinyang55@bas.ac.uk	Ice cores
Zhang	Xu	AWI	Xu.Zhang@awi.de	modelling