

6th Polar Marine Diatom Workshop 6-10 August, 2018

Description of the workshop for the IASC Website

The 6th Polar Marine Diatom Workshop, held at Lakeside Lab, was a success. A diverse group of researchers from students to full professors, representing 12 countries, spent the week engaged in microscope sessions, talks and posters. Microscope sessions were led by experts in order to facilitate consistent species identification. Each participant took home a set of reference slides. Biostratigraphy was one of the main foci of these sessions, given the current and upcoming IODP expeditions to the Southern Ocean. Scientific talks and posters were also presented; an upcoming issue of *Marine Micropaleontology* will showcase that work. In addition, outreach events were held at Lakeside Lab to encourage the local community to learn more about diatom research.

Scientific Highlights

- The Polar Marine Diatom Workshop (PMDW) provided several opportunities for taxonomic collaboration between students, individuals new to polar marine diatoms, and established experts.
- Each participant was able to take home a collection of taxonomic handouts and microscope slides based on the workshop.
- Talks and posters detailed results from recent studies and drilling expeditions and allowed the participants to network and keep up with the current state of the art.
- The biostratigraphic focus of the PMDW prepared participants who will sail on upcoming IODP missions in the Southern Ocean to operate within the same temporal and taxonomic framework.

Summary Report

The 6th Polar Marine Diatom Workshop successfully brought together 40 participants from undergraduate to full professor rank. The workshop highlighted diversity within the field. Its 40 participants representing 12 countries gathered at the Iowa Lakeside Lab on the shores of Lake Okoboji August 6-10, 2018. Sixty percent of participants were women and there were multiple LGBTQ participants. Graduate and undergraduate students comprised 46% of the group. The workshop included participants who have attended all previous Polar Marine Diatom Workshops in this series as well as students and other researchers who are new to the discipline.

A primary goal of this workshop was to prepare any diatomist to be able to consistently and confidently interpret diatom species and constrain their biostratigraphic and paleoenvironmental interpretations. To achieve this goal, we prioritized microscope sessions as the preferred presentation type. Individual microscopes were available for each participant so that all in attendance could gain first hand familiarity with the diversity of polar marine diatoms and really see the details that the presenters wanted to highlight. Each session was led by a different expert who came to the workshop with prepared slides to distribute. Enough slides were provided for each participant to take home their own set and one complete set was left at the Iowa Lakeside Lab as an archive. This sharing of materials is particularly important for maintaining a consistent taxonomic and biostratigraphic framework. It also aids in the training of future scientists because participants can share these slides with their students and other collaborators.

We began the week with a return to the basics with a complete review of sediment processing for diatom analysis and taxonomic microscope sessions focused on individual genera such as *Actinocyclus*, *Thalassiosira*, *Corethron*, *Fragilariopsis*, and *Proboscia*. After the genera-based taxonomic sessions, we continued the week with microscope sessions aimed at providing guidance on a variety of diatoms from across geologic time and across marine habitats. Our first keynote, Amy Leventer from Colgate University, led a microscope session examining the differences between shelf and slope diatoms around Antarctica. Four microscope sessions focused on applications of polar marine diatoms such as geochemical signals, sea ice proxies, and diatom preservation were offered and we expanded our usual topics by examining modern Arctic diatoms in one session. These sessions also provided reference slides for participants to add to their collections, detailing, for example, the difference between open ocean and sea ice habitats in the Quaternary. Finally, several sessions about biostratigraphy completed our week. These included our second keynote, led by David Harwood from the University of Nebraska Lincoln, which was a full-day biostratigraphy microscope session. This session was particularly significant in light of numerous recent and upcoming International Ocean Discovery Program research cruises happening in the Southern Ocean. As such, this session was given extra time and led to many scientists taking advantage of evening microscope availability to continue working on the biostratigraphy. Slides containing examples of significant biostratigraphic indicators from the Cretaceous to Modern were made available to scientists to examine. Camera mounts on selected microscopes also helped participants to create reference image sets for themselves from these slides.

In addition to guided microscope sessions, more traditional scientific talks and poster sessions occurred throughout the workshop. Ten talks were given covering a huge range of topics, including subglacial diatom records, diatom ecological interactions with other groups, and biogeochemical signals. The mix of microscope sessions, science talks and posters allowed for participants to become familiar with the state of the art in a wide variety of relevant topics in polar marine diatom science. A special volume is being prepared for publication in *Marine Micropaleontology*.

The second major objective of the workshop was to expand the population of polar diatom scientists by encouraging the next generation. The intimate atmosphere of Lakeside Lab allowed for students, early career scientists and established researchers to interact as peers. This is underscored by the fact that students and early career scientists led many of the microscope sessions and also presented talks and posters. As a contrast to many meetings where students and junior scientists present posters and senior scientists give talks, scientists of all levels presented in all formats available at the workshop (microscope sessions, talks, posters). This encouraged the next generation of polar marine diatom scientists to interact with more established scientists not only as students but as peers. By meeting at the relatively isolated Lakeside Lab, a sense of community was also built among the participants, further encouraging retention of younger scientists. Social opportunities were also provided to allow the interaction of all participants in order to build community. We had time to take part in prairie walks led by a local prairie expert, collect and examine diatoms from the nearby lake, and get out on the lake in boats, standup paddleboards, and by swimming.

The workshop also included a two-night biological illustration session, facilitated by artist, Claudia Stevens from California. Claudia is interested in designing art curriculum for elementary school children around diatom illustration. She came to the workshop to meet the diatomists and to be able to spend time at the microscope sketching and learning diatom taxonomy. In exchange, Claudia hosted these sessions that were open to the public. She taught several methods of illustrating diatom forms. The event was very popular among the workshop participants, with nearly everyone attending at least one

session to bring home their own diatom art. In addition, we used this opportunity to make diatom ink transfer post cards that were sent to diatomists who missed at the workshop this year. Postcards are a tradition of the workshop (though we don't generally make our own) and are a way that we can maintain and cultivate valuable relationships within the community.

Finally, the workshop included an outreach event, "Secrets of the diatoms: how microscopic algae from the Polar Regions reveal Earth's climate history," which attracted approximately 40 members of the public. Diatom research is common at Lakeside Lab, and the local community had been invited to several diatom-based events previously, so they were a relatively well-educated crowd. Three stations were available for the local community to learn about polar diatom work. The first showed participants how marine sediments are collected and processed for diatom work. The second was a discussion, led by students, about current research with polar marine diatoms. The third was a microscope session, where the public learned the basics of polar diatom identification and played diatom BINGO. The evening ended with a general open question session. The participants spoke highly about the event, and were glad to finally have a chance to see diatoms through a microscope after having learned about them at previous Lakeside Lab events.

Outreach related to the 6th Polar Marine Diatom Workshop

Caissie, Beth and Warnock, Jonathan. Fall 2018. Dozens of Diatomists Share Taxonomy and Applications in Northwest Iowa. *Ocean Discovery, the U.S. Scientific Ocean Drilling Community Newsletter*.

Caissie, Beth. Winter 2018. 6th Polar Marine Diatom Workshop (tentative title). *Friends of Lakeside Lab Newsletter*.

Duffy, Meghan, Luostarinen, Tiia, and Quinlan, Kaelyn. Nov. 28, 2018. Polar Marine Workshop 2018. Blog post on the *Young International Society for Diatom Research (ISDR) blog*.
<http://youngisdr.blogspot.com/2018/11/polar-marine-workshop-2018.html>

Peikes, Katie. Aug 12, 2018. Research on Polar Region Algae Clues Scientists Into Changing Climate. Two news spots on *Iowa Public Radio* and a blog post. <http://www.iowapublicradio.org/post/research-polar-region-algae-clues-scientists-changing-climate#stream/0>

Posts on the ISU Marine Sediments Lab and International Society for Diatom Research *Facebook* pages.

Tweets by several *Twitter* users including @SealceBeth, @MDuffy26, @SODiatomIsotope, @TheJR, @SavWorne, @LakesideLab_IA, @ZoeRoseby, and @NERC_CAO

Articles in preparation for *Diatom Research*, *The Micropalaeontological Society*, and *Scientific Drilling*.