Evaluation of the AMS Project Ice K-12 Teacher Professional Development Program on Ice Core Science and Paleoclimatology

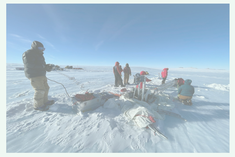
Chad Kauffman[1], Elizabeth Mills[2], Erin Smoak[2], Kristen Rahilly[3], Hyoung Joon Park[4], and Abigail Stimach[2]

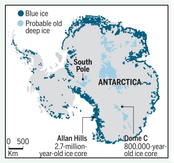
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What is COLDEX

- A multi-institution collaboration led by Oregon State University to explore Antarctica for the oldest possible polar ice samples and analyze those samples to understand the evolution and future of Earth's climate system



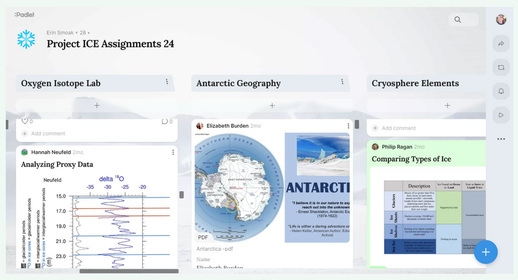


NSF/COLDEX/AMS Project Ice

- Part of the educational arm of COLDEX
- Project Ice is the newest of AMS' six grad-level K-12 teacher PD courses
- Component of Certified AMS Teacher (CAT) program
- Teachers integrate ice core science and paleoclimatology into their curriculum and share with other educators

Components

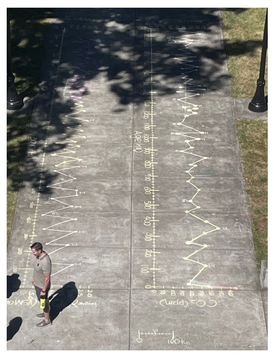
- Several weeks of online coursework
  - Padlet and Ed Puzzles work
- Oregon State University one-week residency
  - Five modules
  - Lab visits and hands-on activities
  - Ice Jam group work
- Post-course peer training
- Evaluation











Project Ice Evaluation Components

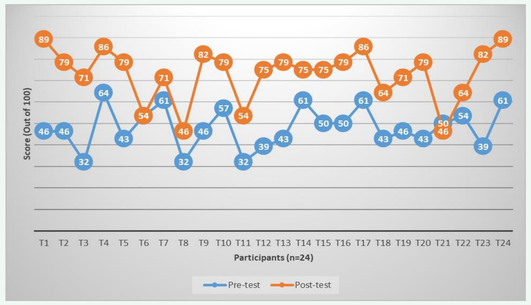
- Demographic survey
- Pre/post cognate test
- Pre/post pedagogical survey
- Workshop surveys
  - Daily feedback
  - Group member survey
  - Workshop survey
- Longitudinal survey/interview
- Evaluator – Hyoung Joon Park, OSU

Summer 2024 Demographic Survey Results

- 24 K-12 educators
- Grades taught: K-5: 1 (4%), 6-8: 10 (42%), 9-12: 11 (46%); Multiple levels (6-8 and 9-12): 2 (8%)
- Early career teachers: 5 (21%)
- Average percentage of non-white students: 58.5%
- Title I eligible schools: 19 (79%)
- Schoolwide Title I status: 15 (62.5%)
- Highest community poverty (Quartile 3 and 4): 8

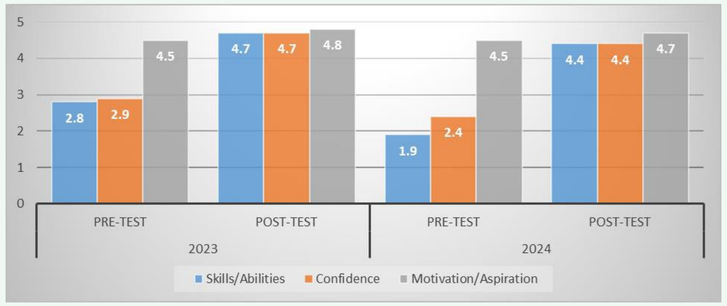


Summer 2024 Cognate Quiz Results

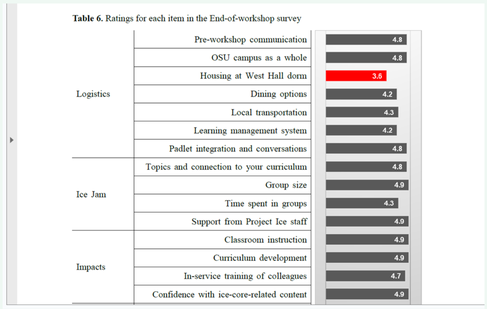


*The average score on the pre-test was 48%, which increased to 73% on the post-test, reflecting a **25% improvement**.* 22/24 showed score improvement, while one had the same score

Summer 2024 Pedagogical Survey Results



Sample of Workshop Survey Results

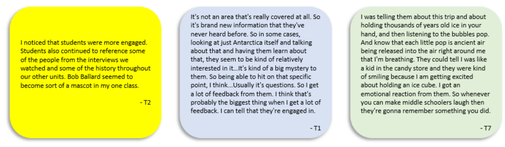


Summary of Evaluation Results

- Participants felt that their ability to teach students and train fellow teachers (and confidence in doing so) using ice-core-related content significantly improved through the Project Ice program.
- The results of the Cognate Assessment indicate that participants' understanding of ice-core-related content significantly improved
- Participants felt they achieved the greatest learning outcomes and gained valuable insights for future teaching during the lab tours and other workshop activities
- The Ice Jam group projects were helpful in planning future teaching activities, but the group environment had its challenges
- Although there were some negative comments regarding the accommodation environment, overall satisfaction with the on-site workshop was reported to be high.

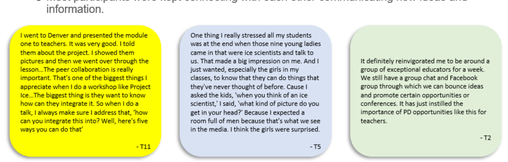
PI Impact on Teacher Participants' Students

- Changes in students' learning/engagement
  - Many teachers found their students were highly engaged in class when students were introduced to those that were addressed in Project Ice.
  - They noticed it through questions students ask and students' facial expressions during class.



PI Impact on Interactions with Colleagues and Students

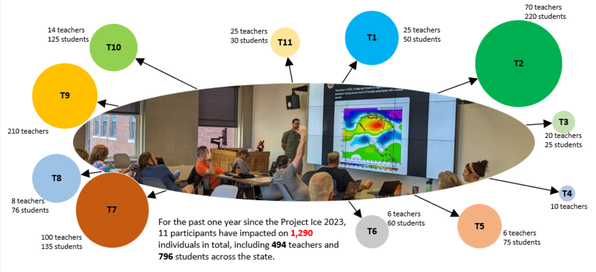
- Promoted interaction with colleagues and students
  - All participants actively shared what they learned from Project Ice with other teachers.
  - They motivated their students to be more interested in this field.
  - Most participants were kept connecting with each other communicating new ideas and information.







Ripple Effect of the Project Ice 2023 Course



Impact and Next Steps

- 11 summer 2023 pilot participants impacted nearly 500 teachers and 800 students
- 24 summer 2024 participants to be surveyed for longitudinal impact in spring 2025
- Project Ice offered in summers 2023-2025 with online coursework and in-person residency
- Sustainability - will likely transition to online, MOOC-format offering in summer 2026 and beyond
- Broader impact - Educational model for other discovery-based science programs

NSF | COLDEX Center for Oldest Ice Exploration | AMS American Meteorological Society | Oregon State University | PennWest ONLINE