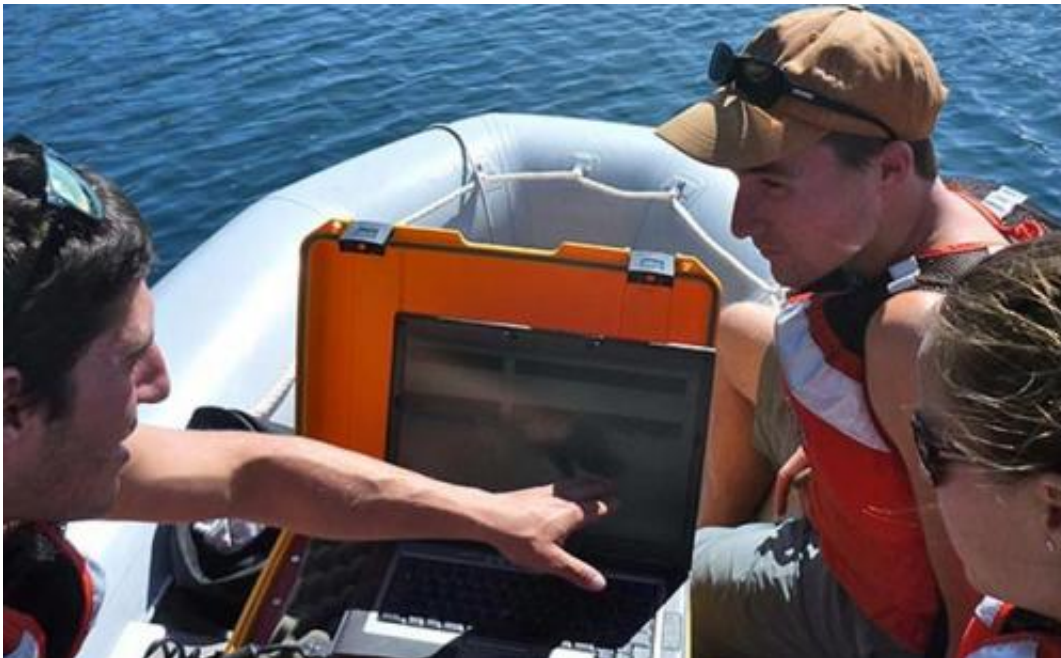


## Regional insights set latest study of climate history apart

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Students use acoustic imaging to select a coring site in southern Alaska lake.

(Phys.org) —As climate studies saturate scientific journals and mainstream media, with opposing viewpoints quickly squaring off in reaction and debate, new findings can easily be lost in the noise.

But in the case of Northern Arizona University Regents' professor Darrell Kaufman and a study appearing in *Nature Geoscience*, obscurity is an unlikely fate.

What Kaufman—the lead co-author of "Continental-scale [temperature variability](#) during the last two millennia"—and 78 experts from 24 countries have done is to assemble the most comprehensive study to date of temperature change of Earth's continents over the past 1,000 to 2,000 years.

By looking regionally, the researchers found considerable complexity hidden within a global average.

"We wanted a new and ambitious effort to reconstruct past climate," Kaufman said of the PAGES 2k network of researchers. "One of the strongest aspects of the consortium study is that it relies on regional expertise."

Members of the consortium represent eight continental-scale regions. They lent their insights about the best proxy records—such as tree-ring measurements—to use for a particular region, and how to interpret the data based on regional climatology.

While the study does not attempt to attribute temperature changes to natural or human-caused factors, Kaufman said the finding of a long-term [global cooling](#) trend that ended late in the 19th century is further evidence that increased [greenhouse gasses](#) have had an influence in later years.

"The pre-industrial trend was likely caused by natural factors that continued to operate through the 20th century, making 20th century warming more difficult to explain if not for the likely impact of increased greenhouse gasses," Kaufman said.

While that sounds like a familiar theme, the study's findings of regional variations are less well known. Because of extensive participation by scientists working in the [Southern Hemisphere](#), Kaufman said, data from

those regions broadened what had been a view previously centered on Europe.

"We know the most about the long-term temperature history in Europe, but we find that not every region conforms with that pattern," Kaufman said. He noted that temperatures varied by region against the backdrop of the long-term cooling identified by the study.

The regional focus on the past 2,000 years is significant for two reasons, Kaufman said. First, climate change at that scale is more relevant to societies and ecosystems than global averages. And second, "regional scale differences help us to understand how the climate system works, and that information helps to improve the models used to project future climate."

Kaufman's own research team added to the strong regional input. His research in Alaska and elsewhere formed part of the dataset.

"The questions that my team hopes to address involve the larger climate system, and our research contributes one piece of the global puzzle," he said.

Kaufman's role as lead co-author came about partly from good timing—he was on sabbatical as a visiting scientist at the Bern, Switzerland, headquarters of Past Global Changes (PAGES) organization, as the data were being assembled, so he took the lead in writing the manuscript.

Later, as the paper underwent a substantial reworking to address the scrutiny of peer review, co-author Nick McKay, a post-doctoral researcher at NAU, "did the heavy lifting," Kaufman said. "He analyzed the data from each of the regions to uncover the most important similarities and differences, which we needed for the synthesis."

In another of the study's major contributions, the entire database on which it was based has been tabulated and will be made available publicly for further analysis. Kaufman and his co-authors have posted the data along with frequently asked questions about the study on the PAGES project website.

"My co-authors and I look forward to seeing the data used by others in future analyses because science moves forward with well-informed alternative interpretations," Kaufman said.

Provided by Northern Arizona University

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