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Workshop Examines Warming of Lakes Worldwide

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MEETINGS

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First Global Lake Temperature Collaboration (GLTC) Workshop; Lincoln, Nebraska, 1–5 June 2012

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It is widely recognized that climate change is affecting terrestrial and aquatic ecosystems. Recent studies have revealed significant warming of lakes throughout the world, and this rate of warming is often larger than that of the ambient air temperature (up to 2–3 times more rapid). Although hypotheses have been proposed to explain these high rates of lake warming (e.g., ice albedo feedbacks or changes in cloud cover), the fundamental drivers remain poorly understood. Furthermore, these rapid warming rates have profound implications for lake hydrodynamics, productivity, and biotic communities. It is essential therefore that global data sets of water temperature be compiled to monitor and understand these long-term changes in lakes, reservoirs, and other inland water bodies.

To address this need, a grassroots network of limnologists, climatologists, and remote sensing scientists recently gathered at the University of Nebraska-Lincoln (UNL) for the first Global Lake Temperature Collaboration workshop. The GLTC project comprises more than 50 scientists from 15 countries and is led by principal investigators Simon Hook (Jet Propulsion Laboratory; California Institute of Technology), John Lenters (UNL), Peter McIntyre (University of Wisconsin-Madison), and Catherine O'Reilly (Illinois State University). The workshop was the first formal gathering of GLTC participants and was cosponsored by the U.S. National Science Foundation, NASA, and UNL's Institute of Agriculture and Natural Resources.

During the workshop, participants formed working groups to address the goals of the GLTC initiative and examine the following scientific questions:

- What are the global and regional patterns of lake warming (or cooling) over the past several decades, and are they concordant across space and time?
- What climatic and geographic factors control these patterns (e.g., air temperature, solar radiation, latitude, elevation, or lake size)?
- Are the observed warming/cooling rates different between surface and bottom waters, and what does this imply for vertical mixing and stratification?
- How do inferences from in situ records compare with those from satellite data?
- What are the ecological consequences of the observed changes in lake temperature?

One of the primary objectives of the GLTC workshop was to compare satellite-based estimates of lake temperature (dating back to 1985) with in situ data sets, several of which extend for more than 40 years. Other breakout groups at the workshop examined potential climatic drivers as well as their effects on lake mixing regimes.

Over the course of 5 days, the working groups analyzed data from roughly 200 lakes around the globe. Workshop participants also developed data sharing and coauthorship policies, and an outreach group was formed to create educational activities and outreach material related to the GLTC project. Highlights of the workshop are available on the GLTC Web site (http://www.laketemperature.org/), including a workshop program, summary flyer, and outreach poster. Data analysis and publication plans are ongoing, and additional informal gatherings of GLTC investigators are continuing at other conferences, such as the 14th meeting of the Global Lake Ecological Observatory Network (GLEON; http://www.gleon.org/).

The GLTC project welcomes new investigators with an interest in and access to global lake temperature records. Potential collaborators are encouraged to contact the lead investigator, John Lenters (jlenters2@unl.edu), or the GLTC outreach coordinator, Brittany Potter (bpotter@huskers.unl.edu).

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