Media Relations

UNH Scientists To Provide Sea Level Rise Data For Next IPCC Report

November 29, 2011

DURHAM, N.H. – Scientists at the University of New Hampshire's Institute for the Study of Earth, Oceans, and Space (EOS) have been funded by NASA to improve estimates of how melting mountain glaciers around the globe will contribute to sea level rise in the future. The data, which are currently poorly understood, will be a critical new element in the next assessment by the Intergovernmental Panel on Climate Change (IPCC).

"Our role in this project is to plug new meltwater estimates into the global water balance/river transport model we developed here at UNH and move it all downstream to gauge potential sea level rise," says co-investigator and lead UNH scientist Richard Lammers of the Water Systems Analysis Group. "It's an accounting of the world's water under changing conditions."

The multi-institution project also involves scientists from the University of Alaska, Fairbanks and Ohio State University who will, respectively, run glacier mass balance models to determine how all this ice will change under different climate scenarios, and improve estimates of all the global mountain glaciers by means of "remotely sensed" satellite maps.

For decades, the massive ice sheets in Greenland and Antarctica have been the subject of intense scientific investigation to assess their potential contribution to sea level rise, but a full assessment and study of the smaller and scattered population of mountain glaciers around the globe has not been factored into climate models. This is due in part to a scarcity of data; while some 131,000 mountain glaciers have been cataloged, twice that number are thought to exist worldwide.

Says Lammers, "While there are large parts of the world where small glaciers have been identified and mapped, such as the Himalayas, in other regions they are neither well mapped nor sufficiently investigated with respect to what a warming climate will do to them."

The hydrological resource implications of continuing glacial melt will affect more than 1.1 billion people living in glacier or snowmelt-fed river basins around the globe. Moreover, glacial meltwater often provides the only source of water for humans and biodiversity during dry seasons. Increased melt due to climate change has the potential to substantially alter both the magnitude and timing of freshwater discharge.

The three-year study will estimate and predict the contribution of mountain glaciers to sea level for the last decade and out to the end of this century. The interdisciplinary work combines glaciology, meteorology, hydrology, satellite remote sensing, and sea-level research.

An important aspect of UNH's water balance/river transport modeling will be taking into account meltwater that does not make its way downstream to oceans due to human intervention such as dams, irrigation, or because the rivers flow into landlocked or "endorheic" drainage basins.

"We will establish which glaciers are providing water to the oceans and which are sending it to these endorheic basins," Lammers says. Moreover, he adds, because irrigation is a huge factor in the overall equation, even if melting glaciers and icecaps are adding in meltwater that heretofore has not been part of the global hydrological cycle, the vast amounts of water removed for irrigation purposes will not directly contribute to overall sea level rise.

"So human effects may mitigate somewhat the affects of the excess melt and eventual sea level rise, and getting a better understanding of all that is part of our work with the water balance/transport model," Lammers notes.

The principal investigator for the project is Regine Hock of the University of Alaska, Fairbanks. Hock will use climate projections such as temperatures and precipitation amounts from IPCC data in glacier mass balance models on all of the individual mountain glaciers identified for the study. Co-investigator Jason Box of Ohio State University will develop and refine global-scale land ice inventories using satellite remote sensing imagery from a variety of NASA Earth-orbiting satellites.
The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 12,200 undergraduate and 2,300 graduate students.

-30-

Photograph to download:
http://earthobservatory.nasa.gov/IOTD/view.php?id=43391
Caption: The Himalayan Mountain Range holds thousands of glaciers, including one in southern China that flows from southwest to northeast to terminate in a glacial (terminal) lake. The meltwater from these glaciers flows to heavily populated regions, which depend on the fresh water for crop irrigation, before flowing to the world's oceans. This 2009 image is from the Advanced Land Imager on NASA's Earth Observing-1 satellite.

Editors and reporters: Research assistant professor Richard Lammers can be reached via email at Richard.lammers@unh.edu.

Media Contact: David Sims | 603-862-5369 | Institute for the Study of Earth, Oceans, and Space

---