Summer 2009

An Ocean of Change

St. Norbert College

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ST. NORBERT COLLEGE MAGAZINE ONLINE

Summer 2009 | Caring for creation

The oceanic research of Tim Boyer '89 was part of the initiative leading to a 2007 Nobel Peace Prize.

An ocean of change

By Mike Dauplaise '84

Climate spurs alum's research work

One call to **Tim Boyer '89** and you know all you need to know about his work: "I'm an oceanographer," his voicemail states.

The message is there to differentiate him from a colleague with the same name, but reinforces the fact that Boyer has moved on from his physics and math studies at St. Norbert to a new field of scientific endeavor.

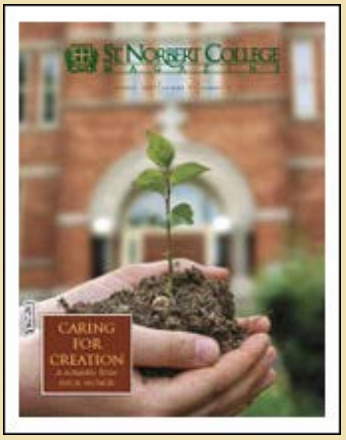
Boyer conducts research on ocean heat changes at the National Oceanic and Atmospheric Administration's Ocean Climate Laboratory in Silver Spring, Md. He is part of a large team of scientists that contributes to the UN's Intergovernmental Panel on Climate Change (IPCC) report.

The IPCC and Al Gore were honored in 2007 with the Nobel Peace Prize, for creating an ever-broader informed consensus regarding the connection between human activities and global warming. The IPCC publishes a report on the state of the climate approximately every five years, including forecasts on where things are headed.

"Creativity is just as necessary in science as in other fields," noted Boyer, who earned his graduate degree in oceanography from Old Dominion University in Norfolk, Va. "There are so many surprises in the physical earth, and putting the pieces together is helped by having the flexibility of mind that comes from having a liberal arts education."

Any change in the ocean's heat content leads to thermal expansion and a rise in sea level. Even a fraction of an inch change in sea level is a huge deal. Since the world is not seeing uniform change, Boyer and his colleagues collect data and make observations from key areas around the world in compiling their chapter of the report. For example, the ocean is rising in the equatorial Pacific region, but the North Indian Sea has decreased over the past half-dozen years.

"There's more than one reason why sea level would rise," Boyer



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Original compositions by student musicians.

Commencement 2009
A gallery of images from this major event in the academic calendar.

Environmental ethics
Excerpts from a new work by **Larry Waggle** (Philosophy).

An ocean of change
Tim Boyer '89 on research honored with the 2007 Nobel Peace Prize.

A green collaboration
Student researchers talk about their plans for an environmentally responsible science facility.

Lines of connection
A vibrant multicultural community depicted in new artwork on campus.

Faces of Japan

explained. “The first is thermal expansion, but in taking calculations of the ocean heat content, thermal expansion accounts for less than half of the sea-level rise.

“The other part is probably from water being added to the ocean. Large quantities of ice are melting from the Greenland and Antarctica glaciers. Over the last 15 years, ocean levels have increased significantly – an average of 3 millimeters per year.”

Boyer and his team published a paper this spring pertaining to fresh water content in the oceans – thought to be a key component to rising ocean levels and their ability to impact global warming. He gave a presentation May 17 in Geneva, Switzerland, on changes measured in the Bay of Bengal and the Arabian Sea.

Many variables impact ocean characteristics, including salinity, temperature and external forces such as glacier melt. Warmer water typically is saltier than cold water, but the saltier that water becomes, the more it contracts. Very small changes (in the parts per million variety) can be difficult to quantify and could be due to instrument calibration variances. Additionally, there is very little historical data for comparison’s sake in the way of salinity measurements.

“Only in recent years have we had enough data to even start looking at this,” Boyer said. “If you add water, it changes the gravity structure of that part of the ocean. We’re starting to have the tools to hopefully see a full picture of sea-level rise and what is making it rise.”

One of the team’s primary initiatives, in addition to making their own observations, is the collection of oceanic and fisheries data from governments, navies and other entities around the world. Boyer got the opportunity to travel to Antarctica in 2004, where he participated in the study of ocean measurements and the krill population. Krill are shrimp-like marine animals critical to the food chain.

“I was in charge of the instruments, and it helped me understand the challenges of taking measurements,” he said. “We had 50-foot waves while crossing the Drake Passage.”

Records from the former Soviet Union are proving invaluable to the study of ocean research. The Soviets collected a significant amount of data, but didn’t have the resources to conduct research. In some areas, such as the Arctic Ocean off the cost of Murmansk, the Russians had been collecting data since the 1890s.

“We work a lot with the Russians on joint research,” Boyle said. “Thousands of measurements were recovered before they were lost. Without them, we couldn’t make statements about change because we wouldn’t have enough historical data.

“To separate out the data and say something is long-term change as opposed to a natural 10-year cycle is an important step to understanding climate change.”

Office of Communications

Phone: (920) 403-3557
Fax: (920) 403-4010
E-mail:
communications@snc.edu

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