MEETINGS

Discussing Progress in Understanding Ice Sheet–Ocean Interactions

Advanced Climate Dynamics Course 2010: Ice Sheet–Ocean Interactions; Lyngen, Norway, 8–19 June 2010

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Sea level rise is one of many expected consequences of climate change, with accompanying complex social and economic challenges. Major uncertainties in sea level rise projections relate to the response of ice sheets to sea level rise and the key role that interactions with the ocean may play. Recognizing that probably no comprehensive curriculum currently exists at any single university that covers this novel and interdisciplinary subject, the Advanced Climate Dynamics Courses (ACDC) team brought together a group of 40 international students, postdocs, and lecturers from diverse backgrounds to provide an overview and discussion of state-of-the-art research into ocean–ice sheet interactions and to propose research priorities for the next decade.

Among the key issues addressed were small-scale processes near the Antarctic ice shelves and Greenland outlet glaciers. These are fast changing components in the climate system, often related to large-scale forcings (atmospheric teleconnections and oceanic circulation). Progress in understanding and modeling is hampered by the range of scales involved, the lack of observations, and the difficulties in constraining, initializing, and providing adequate boundary conditions for ice sheet and ocean models.

Providing bounds on the contribution of ice mass loss to sea level rise is a problem of great scientific and societal urgency. It requires sustained and coordinated interdisciplinary efforts between the observational and modeling communities in the glaciological, oceanographic, atmospheric, and paleoclimate sciences. Specific research priorities identified at the meeting include better theoretical understanding of ice, ocean, and climate dynamics and enhanced observations for theory and model testing. For the oceans, priorities include long-term monitoring, particularly targeting regions adjacent to ice shelves and outlet fjords. Innovative techniques are required to improve data sets of basal topography and sediment properties, geothermal flux, and meltwater drainage and to chart processes in ice shelf cavities. Participants also agreed that a common priority is the need to synthesize remote and in situ measurements into a dynamical framework to bridge the gap between small- and large-scale measurements. The role of feedbacks will require ice-ocean-atmosphere model coupling. High-resolution (annual) Eemian (~130,000–115,000 years ago) ice cores will give insight into paleoclimate dynamics and offer additional constraints on future ice sheet behavior.

This year's ACDC was an important step toward community building, educating a new generation of climate scientists, exchanging expertise, and identifying focus areas for future research. The course was the second in a series organized jointly by the Bjerknes Centre for Climate Research (Bergen, Norway), the Massachusetts Institute of Technology (MIT; Cambridge), and the University of Washington (Seattle), with major funding through the Norwegian Centre for International Cooperation in Higher Education (SIU). Additional support this year came from NASA's Cryospheric Sciences Program and the U.S. Department of Energy's Office of Advanced Scientific Computing Research. This year's location, at the MIT Fab Lab in Norway's Lyngen Alps, provided the infrastructure for a mix of lectures, student presentations, discussions, and outreach activities by students, such as science experiments at a local school. It also gave the opportunity to introduce the challenges of paleoclimate reconstructions of the last deglaciation through a field trip. This summary was prepared by the students with guidance from the organizers. A course Web site is available at http://www.bccr.no/acdc/.

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Observing the Greatest Earthquakes

AGU Chapman Conference on Giant Earthquakes and Their Tsunamis; Viña del Mar and Valparaíso, Chile, 16–20 May 2010

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An AGU Chapman Conference commemorated the fiftieth anniversary of the 1960 *M* 9.5 Chile earthquake. Participants reexamined this earthquake, the largest ever recorded instrumentally, and compared it with Chile's February 2010 *M* 8.8 earthquake. They also addressed the giant earthquake potential of subduction zones worldwide and strategies for reducing losses due to tsunamis. The conference drew 96 participants from 18 countries, and it reached out to public audiences in Chile. Its program and abstracts are posted at http://www.agu.org/meetings/chapman/2010/acall/pdf/Scientific_Program.pdf.

The conference centered on 4 days of talks, posters, and discussions and 1 day of public outreach. These activities took place in Viña del Mar and Valparaíso, along the rapidly developing coast near Chile's largest city, Santiago. All three cities were still contending with damage from the February earthquake. The municipalities of Viña del Mar and Valparaíso helped sponsor the conference, as did Pontificia Universidad Católica de Valparaíso (UCV); Universidad de Chile; the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Intergovernmental Oceanographic Commission; and the U.S. Geological Survey (USGS).

Overview talks, led off by George Plafker (USGS), examined splay faulting during giant earthquakes, controls on interplate coupling, Andean faulting near Santiago, and earthquake and tsunami preparedness. Topical sessions began with a half day on tectonics of the enigmatic 1960 earthquake and on multicentury recurrence intervals of its predecessors. These sessions were followed by a full day of presentations and discussion on the unprecedented wealth of geophysical and geological observations from the 2010 earthquake and tsunami. These observations spurred debate on coseismic and postseismic displacements, on late-arriving tsunami waves that took lives in Chile 3 hours after the earthquake, and on the pros and cons of supplementing public education with technological warnings of near-field tsunamis. The conference also explored controls over earthquake size; subduction zones of the Americas, the Indian Ocean, the western Pacific, and Europe; and tsunami modeling and warning.

Looking back to 1960, to a time before the coining of the term "plate tectonics," participants marveled at advances in scientific understanding, seismic design, and tsunami awareness. Still, differing views of Chile's resilience to the 2010 earthquake and tsunami emerged among the participants, the press, and the Chilean public. Foreigners