A Berkeley student sends a detailed report:

The IARU Scientific Congress on Climate Change: Global Risks, Challenges, & Decisions is being held in the same conference center that is booked for the official Copenhagen treaty negotiations, a facility called the Bella Center about ten minutes outside of Copenhagen's city center. Like most of the other 1400+ conference attendees, I arrived by public transit and was greeted upon my arrival by a gigantic wind turbine in front of the very large complex. The parking lot was nearly empty.

The day started with the usual registration, coat check, and receipt of conference materials – including a free transit pass and a hemp conference bag. Drinks were served in recyclable cups, and water came from a cooler rather than bottles. Snacks were apples and pears, and Danish cookies in the afternoon. Having established a healthy, sustainable frame of mind, we all (including HRH the Crown Prince of Denmark) gathered in a large auditorium to hear a set of Danish music and then listen to the plenary speakers.

To entertain us while we waited, two large screens played dramatic stop-action images of glacier retreat. This is the most remarkable footage I've seen, and was taken by an organization called Extreme Ice Survey (http://www.extremeicesurvey.org/). (only 2 videos are available on the site, but we watched about ½ dozen, so there will probably be more posted soon)

Plenary speakers included:

· Dr. Rajendra Pachauri, Chair of the IPCC, Director-General of TERI University in India, (and soon-to-be part-time director of Yale's new Climate & Energy Institute);

· Connie Hedegaard, Danish Minister of Climate & Energy;

· Helge Sander, Danish Minister of Science, Technology & Innovation;

· Prof. Quinchen Chao, Deputy Director General of the Department of Science & Technology Development at the China Meteorology Administration;

· John Ashton, Special Representative for Climate Change of the UK Foreign & Commonwealth Office;

· Prof. Stefan Rahmstorf, Potsdam Institute for Climate Impact Research

· Prof. Katherine Richardson, Vice Dean at the University of Copenhagen and Chair of IARU's Scientific Steering Committee

· Prof. Ian Chubb, President of Australia National University & President of IARU*

· Dr. Richard Levin, President of Yale University
* IARU is the International Alliance of Research Universities (http://www.iaruni.org/). It is comprised of 10 leading research universities around the world, including UC Berkeley.

All of the plenary speakers emphasized the need for action, with several mentioning the need to use a new energy economy as a stepping stone out of the global financial crisis. Both Helge Sander and Connie Hedegaard of Denmark pointed to the Danish example of 75% growth in GDP with almost no growth in energy consumption over the past 25 years. Connie Hedegaard commended Pres. Obama on his 2050 goal of an 80% reduction versus 1990 emissions, and challenged the US to commit to "real reductions in the short- and medium-term". She implied that these reductions should be in line with targets for developed countries of 25-40% below 1990 levels by 2020. (Obama has currently committed to reaching 1990 levels by 2020.)

Several speakers also mentioned the need for better communication between scientists and politicians and media, and encouraged the media in the house to ask more questions to get a better understanding. John Ashton of the UK reminded the audience that "a good scientist is more skeptical of his/her own results than anyone else," but that politicians don't operate this way and thus discussions of uncertainty can become distorted. On a different thread, he noted that global emissions must peak within ten years, and that such an accomplishment would bring everyone across a "threshold of collective self-awareness."

Quinchen Chao of China reminded the audience that China is quite vulnerable to climate change, and that the Chinese government considers the problem of great importance. She emphasized that international scientific & technology cooperation and technology transfers must be strengthened. Prof. Stefan Rahmstorf of the Potsdam Institute discussed sea level rise, noting that the current 3mm/year exceeds the IPCC estimates by ~50% and that he projects a rise of 75-190cm by 2100.

Rajendra Pachauri of the IPCC reminded the audience of the history of climate

change policy, including the first world climate conference sponsored by the World Meteorological Organization in 1979, Jim Hansen's statement to Congress that "global warming is already happening" in 1988, the creation of the IPCC and the 1st assessment report in 1990, up through the 2007 IPCC 4th assessment report. He ended with a video of a TERI project that aims to address the 1.6 billion people who don't have electricity by providing solar lanterns. (http://labl.teriin.org/)

The plenary talks were split in half by a much-needed lunch break, during which participants conversed and browsed the adjacent section of posters. These posters will be rotated each day.

After the plenary session, participants broke out into 22 parallel sessions arranged under five themes (understanding climate change, equity issues, opportunities for mitigation, adapting to the inevitable, and human dimensions of climate change). Within each session, 10-12 speakers presented for 15-20 minutes each and took a handful of questions.

It was possible to hop between sessions, and I attended sessions under theme one (understanding climate change), including "vulnerability in carbon sinks", "tipping elements in the earth system", and "earth system feedbacks". Selected highlights…

Pep Canadell of the Global Carbon Project (http://www.globalcarbonproject.org/index.htm) provided some useful recent data. The 2008 data for atmospheric concentration of CO2 is now available, and it grew by 2.3ppm over the prior year to 385ppm. This is the 3rd highest rate this decade, and surprised researchers who expected to see evidence of the economic slowdown. The atmospheric concentration rate of change has increased in the past four decades ('70-'79: 1.3ppm/yr; '80-'89: 1.6ppm/yr; '90-'99: 1.5 ppm/yr.; '00-'08: 2.0ppm/yr.). India is currently on track to overtake the Russian Federation as the world's third largest CO2 emitter (after China & the USA). The developing world (non-Annex B countries) represented 53% of CO2 emissions in 2007, up from 38% in 1992 when the Framework Convention on Climate Change (FCCC) was first established. Fossil fuel emissions in the current decade are growing at 3.5%/year, which is in excess of the most pessimistic IPCC scenario (A1F1: 2.7%/yr) and much higher than the previous decade ('90-'99: 0.9%/yr). On somewhat good news, the airborne fraction for CO2 (the % that stays in the air after being emitted) has been fairly steady over the past fifty years, but is on a positive (bad) trajectory of +0.23%/yr. – largely due to the declining ocean sink. And on other somewhat good news, the global carbon intensity of GDP (tons CO2/$ GDP) has been decreasing for

decades (-1.7%/yr), but is more than made up by population increase and rising GDP per capita.

Prof. Corinne Le Quere of the University of East Anglia discussed the C4MIP comparative study of feedback effects across eleven climate models. All models show positive (bad) feedback, though with wide range. The width of the range stems from differing assumptions about feedbacks in the tropics (all models show a reduced land sink in the tropics; it's a matter of extent). Models agree that upper latitudes will have an increasing land sink and show mixed results for the mid-latitudes. Overall, the study shows that feedbacks will enhance climate change by 0.1-1.5C for the A2 scenario.

Prof. Nicholas Gruber of UCLA and ETH Zurich discussed the marine impact of climate change, and noted that eastern boundary upwelling regions (particularly along the west coast of the Americas) have notably low pH and are particularly vulnerable to increased acidification. He also noted that much more research is needed to understand the impact of acidification on the wide range of marine life.

Gian-Kasper Plattner, a post-doc at the University of Bern, Switzerland, discussed long-term climate change. He pointed out that the ocean eventually takes up most excess CO2, but on a multi-millenial timescale. He also noted that changes in precipitation patterns may be irreversible, and that scenarios exist in which the decrease in precipitation exceeds the 5-15% that we typically associate with a "major drought."

Michael Raupach of Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) closed with a quantification of vulnerabilities.

With that, the day ended and participants gathered for drinks before taking the metro back into the city center to sleep and clear our brains for tomorrow's information.