

Scripps Scientists to Participate in Historic Copenhagen Climate Change Summit

Researchers hope to inform negotiators with latest evidence on ocean acidification, black carbon, verification challenge among other topics

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Scripps Institution of Oceanography at UC San Diego will send a delegation of scientists and students to Copenhagen for the United Nations Framework Convention on Climate Change Conference of the Parties (COP-15), which begins Dec. 7.

Along with other scientific institutions and organizations, the researchers will be on hand to interact with international negotiators on policy decisions that could dictate the world's response to climate change threats. Scripps will attend the conference as part of the UC Revelle Program on Climate Science and Policy. The conference is anticipated to produce a successor or companion emissions agreement to the 1998 Kyoto Protocol, the first commitment period of which expires in 2012.

"What the research since Kyoto tells us is that we know enough to act," said Tony Haymet, director of Scripps Institution of Oceanography and leader of the UC Revelle delegation. "We are hopeful that Copenhagen negotiators will not opt to kick the problem down the road because Scripps science suggests that there is no time for more procrastination."

The Scripps Oceanography delegation includes the following researchers: **Tony Haymet**, director, Scripps Institution of Oceanography, UC San Diego **Victoria Fabry**, professor of biological oceanography and visiting research associate **Andrew Dickson**, professor of marine chemistry **Veerabhadran Ramanathan**, distinguished professor of climate and atmospheric sciences **Ray Weiss**, distinguished professor of geochemistry **Tamara Beitzel**, student, Applied Ocean Science curricular group **Brendan Carter**, student, Marine Chemistry and Geochemistry curricular group **Grant Galland**, student, Marine Biology curricular group **Kristina Pistone**, student, Climate Science curricular group

Dickson and Fabry will provide expertise on ocean acidification, a phenomenon in which increasing carbon dioxide uptake in the oceans makes seawater more acidic. The researchers will take part in a number of informational panel discussions, film screenings and presentations that are occurring in conjunction with the U.N. conference.

Weiss' research indicates that a major barrier to the effectiveness of emissions regulation legislation and carbon trading lies in the large discrepancies that can exist between actual greenhouse gas emissions and those calculated by current "bottom up" accounting methods. The Scripps delegates will emphasize the need to establish "top-down" verification mechanisms based on atmospheric measurements. Such verification is essential, researchers argue, for emission regulation legislation and carbon taxes or cap-and-trade schemes to succeed. Work done by atmospheric chemists shows that current reporting of emissions can grossly misrepresent true

levels of some greenhouse gas emissions in the atmosphere. Available monitoring technology, coupled with modeling of atmospheric transport, must be deployed broadly if this barrier to real greenhouse gas emissions reduction is to be removed, according to Weiss.

Ramanathan, an expert on the greenhouse effect especially from black carbon emissions, will be in Copenhagen to explain how fast-action mitigation can buy the world time as CO₂ reductions take effect. He calculates that immediate reduction of non-CO₂ greenhouse agents coupled with initial CO₂ reduction efforts can help society avoid reaching the threshold of catastrophic climate change in coming decades. Readily available technologies ranging from biochar carbon capture to the retrofit of regenerative filters on diesel-burning vehicles to methane-capture and hydrofluorocarbon (HFC) phase-out under an updated Montreal Protocol can start the world on the path to climate stability immediately. It would also provide a clear demonstration of the human imprint on climate.

The researchers contribute to an ongoing body of evidence that climate change is not only having its projected effects but that it is trending toward the most severe scenarios forecast only two to three years ago.

Satellite and direct measurements now demonstrate that both the Greenland and Antarctic ice sheets are losing mass and contributing to sea-level rise at an increasing rate. Additionally researchers point out that in 2008, carbon dioxide emissions from fossil fuels were about 40 percent higher than those in 1990. Even if emissions do not grow beyond today's levels, within just 20 years the world will have used up the allowable emissions to have a reasonable chance of limiting warming to less than two degrees Celsius.

Many of these findings are included in the Copenhagen Diagnosis, a synthesis of recent research compiled and issued by 26 leading international climate scientists including Richard Somerville, a distinguished professor of meteorology at Scripps. The text of the Copenhagen Diagnosis is available at copenhagendiagnosis.org.

During the conference, Scripps Oceanography will offer a website featuring the latest news and multimedia content from Copenhagen as well as blogs from participants and a reader discussion board. The site is viewable at scripps.ucsd.edu/cop15.

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