



## THE 2010 SOUTHWESTERN HEMISPHERE WORKSHOP SERIES ON CLIMATE CHANGE: CO<sub>2</sub>, THE BIOSPHERE AND CLIMATE

15 - 26 March 2010

University of Buenos Aires, Argentina

Co-sponsored by GFDL/NOAA, Princeton University and the University of Buenos Aires

### Introduction

The topic of Carbon cycle selected for the 2010 workshop is one of the important and relevant links to climate change, and it is the focal theme of this year's series.

The concentration of CO<sub>2</sub> in the atmosphere has risen from close to 280 parts per million (ppm) in 1800, at first slowly and then progressively faster to a value of 367ppm in 1999, echoing the increasing pace of global agricultural and industrial development. This is known from numerous, well-replicated measurements of the composition of air bubbles trapped in Antarctic ice. Atmospheric CO<sub>2</sub> concentrations have been measured directly with high precision since 1957; these measurements agree with ice-core measurements, and show a continuation of the increasing trend up to the present.

Atmospheric CO<sub>2</sub> is, however, increasing only at about half the rate of fossil fuel emissions; the rest of the CO<sub>2</sub> emitted either dissolves in seawater and mixes into the deep ocean, or is taken up by terrestrial ecosystems. Uptake by terrestrial ecosystems is due to an excess of primary production (photosynthesis) over respiration and other oxidative processes (decomposition or combustion of organic material). Terrestrial systems are also an anthropogenic source of CO<sub>2</sub> when land-use changes (particularly deforestation) lead to loss of carbon from plants and soils. Nonetheless, the global balance in terrestrial systems is currently a net uptake of CO<sub>2</sub>.

For the past decade, the major focus of the research has been on the fate of carbon dioxide emitted to the atmosphere by fossil fuel burning and changes in land use. For the last few years, scientists have developed earth systems models to estimate the carbon cycle in the present environment and projection of future climates when higher concentration of atmospheric CO<sub>2</sub> will be encountered. GFDL/NOAA and Princeton University scientists developed one of the most advanced earth system models. Paramount to the validation of such models is the accurate estimate of the sinks of CO<sub>2</sub> by the ocean. They have used coupled atmosphere-ocean models of climate warming to study the impact of anthropogenic climate warming on the ocean carbon cycle, and are presently engaged in a major collaborative effort to develop a new earth system model that will predict climate change and the global carbon cycle simultaneously.

### Workshop Sessions

- **Earth history of climate change:** Prof. Michael Bender - Professor of Geosciences, Princeton University
- **The present and future of greenhouse gases and climate forcing:** Dr. Hiram Levy - Group head, Atmospheric Physics, Chemistry & Climate, Geophysical Fluid Dynamics Laboratory/NOAA
- **Characteristics of the new earth system model:** Dr. Elena Shevliakova - Department of Ecology and Evolutionary Biology, Princeton University
- **The quality of climate prediction:** Dr. Lisa Goddard - The International Research Institute for Climate and Society, Department of Earth and Environmental Sciences Columbia University

### Participation

The workshop is mainly intended for young researchers and PhD students working in the areas of Physics, Chemistry, Atmospheric Physics and Dynamics, Climatology and Oceanography, from Central and South America that are members of the United Nations, UNESCO or IAEA. The principal objective of the ICTP is to help researchers from developing countries through a programme of training activities within a framework of international cooperation. Participants should have an adequate working knowledge of English. Due to budget limitations, every effort should be made by candidates to secure either total or partial support for their expenses. However, limited funds are available for some participants who are nationals of, and working in, developing countries, and who are not more than 45 years old. Participants are required to take part in all aspects of this activity for its entire duration. There is no registration fee.

### ORGANIZERS

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### INVITED SPEAKERS

**Michael BENDER**  
Princeton University  
USA

**Hiram LEVY**  
NOAA/GFDL,  
Princeton University  
USA

**Elena SHEVLIAKOVA**  
Princeton University  
USA

**Lisa GODDARD**  
IRI, Columbia University  
USA

**DEADLINE**  
**15 DECEMBER 2009**

Applications are to be submitted  
online through the activity webpage

<http://agenda.ictp.it/smr.php?2175>

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