



**NZCCRI – NIWA Seminar**

## **Development of Earth System Models and Application to Climate Policy**

**Speaker:**

**Professor Ron Prinn**

*Director, Center for Global Change Science,  
Massachusetts Institute of Technology*



The global environment is a complex and dynamic system. Earth system modeling is needed to help understand changes in interacting subsystems, elucidate the influence of human activities, and explore possible future changes. Integrated assessment of the environment and human development is arguably the most difficult and most important "systems" problem that we face. To illustrate this, Ron Prinn will present results from the MIT Integrated Global System Model (IGSM), which consists of coupled sub-models addressing economic development, atmospheric chemistry, climate dynamics and ecosystem processes. An uncertainty analysis implies that, without mitigation policies, the global average surface temperature may rise between 3.5° and 7.4°C from 1991-2000 to 2091-2100, with polar temperatures rising between 6.4° and 14°C (90% confidence limits). Analysis of four mitigation policy cases with increasingly stringent stabilization of greenhouse gases at various levels, indicate that the greatest effect of these policies is to lower the probability of extreme changes. The economic sub-model shows that the probability for global mitigation costs exceeding 2% (expressed as % welfare losses in 2050), ranges from 30% to 0.25% for the same stabilization levels. The IGSM is also used to elucidate potential unintended environmental consequences of renewable energy at large scales. Earth system models help to inform about the significant reasons for attention to climate adaptation in addition to climate mitigation and can also be used to evaluate whether "climate-engineering" is a viable option or a dangerous diversion. The problem of preserving a habitable planet will engage present and future generations, and if research is to better inform the public and policymakers, scientists must improve communication.

**Date: Thursday 23 February 2012**

**Time: 12:30 – 1:30 pm**

**Venue: Rutherford House, Lecture Theatre 2**

Professor Ron Prinn has been head of the MIT Department of Earth, Atmospheric and Planetary Sciences and is actively engaged in a wide range of projects in atmospheric chemistry, biogeochemistry, climate science, and integrated assessment of the science and policy regarding climate change. He leads the Advanced Global Atmospheric Gases Experiment (AGAGE), in which the rates of change of the concentrations of the trace gases involved in the greenhouse effect and ozone depletion have been measured continuously for the last three decades. Ron is also working extensively with social scientists to link the science, economics and policy aspects of global change.