

**AIMES AND WGCM:  
What form will the next generation Earth System Models take?**

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We are entering a crucial period of climate model development where several communities now have functioning components, beyond the traditional global coupled model components of atmosphere, ocean, land surface and sea ice, that could be included in global coupled earth system models. These include carbon cycle, dynamical vegetation, aerosols and chemistry. Developments across these disparate communities have been rapid, and it is urgent that these communities communicate closely regarding the form the next generation earth system models will take, with particular application for the IPCC Fifth Assessment Report (AR5). A number of international panels representing these various communities recognize that representatives must meet within the next year, with summer of 2006 identified as an ideal time frame.

We propose that the Working Group on Coupled Models (WGCM) and Stratospheric Processes and their Role in Climate (SPARC) on the WCRP side, and Analysis, Integration and Modeling of the Earth System (AIMES) and the International Global Atmospheric Chemistry program (IGAC) on the IGBP side organize together an AGCI workshop of perhaps 20 to 30 people who would represent these communities in addition to representatives from the emission scenario community.

The purpose of this workshop would be to define a roadmap to accelerate progress in the area of climate/chemistry modeling at the international level. The participation of representatives from other interested projects (eg., iLEAPS, GEWEX, SOLAS, etc.) would be desirable. It is believed that several scientific issues will have to be considered by this workshop. Issues distinguishing 1<sup>st</sup> generation Earth System Models from Climate System Models include, for example;

- 1) The coupled carbon cycle capability (inc. marine and terrestrial ecosystems)
- 2) Coupled climate - photochemistry (esp. ozone and chemical lifetimes, with related emission modeling issues)
- 3) aerosols and radiation (the indirect effect, with links to chemistry, dust etc)
- 4) dynamic vegetation (with links to climate biophysically and through emissions of trace gases)

The central question is: what should be the strategy to improve our ability to model with more certainty these processes, and what form will these processes take in the next generation of earth system-type models.

We have proposed an Aspen Global Change Institute to take place during the summer of 2006, and the outcome could fuel some discussion at the ESSP Open Science Conference in Beijing in November 2006, as well as the joint WGCM/AIMES meeting in September, 2006. The objective of the workshop would be to establish a coherent approach through

WCRP and IGBP (jointly), and to "distribute" the responsibilities and tasks between the different IGBP and WCRP Projects in preparation for climate change simulations that would be performed by this next generation of models for the IPCC AR5.