

WORKSHOP SUMMARY

Terrestrial Ecosystems as Complex Adaptive Systems: how to integrate adaptive processes in response to disturbances into Dynamics Global Vegetation Models (DGVMs)?

17-19 November 2010, CIFOR-INIA, Madrid, Spain. Working Group 3: Modeling Plant Ecology

In this workshop a group of scientists with different expertise, spanning from Ecophysiology to Climate and Atmospheric sciences, discussed the possibility of considering the Earth as a complex adaptive system (CAS) and how to integrate this conceptual framework in dynamic global vegetation models (DGVMs). So far the focus in Ecology has been on analyzing ecosystem vulnerability and the likely effects of climate change on ecosystems responses. Biosphere, however, is an adaptive complex system in which multiple mechanisms create innovation, evolution and homeostasis at various level of biological organization. Global change will likely provoke vegetation responses at different scales, and processes such as local adaptation, plasticity, evolution and migration would be clue for the survival of the species. DGVMs do not yet incorporate processes that can strongly change the sign of climate change effects on ecosystems as genetic variability, plasticity and local adaptation at the individual and population level. Also at community level a number of processes can confer ecosystem resilience such species redundancy within plant functional types and ecological succession following disturbance.

The workshop was divided in several sections that represented the levels of study of the biosphere: genes, individuals, populations, communities, and biosphere. For each level, a couple of presentations introduced a discussion on the studied level and the representation of the biological complexity of the level in the current DGVMs. The participants pointed out the importance of improve the biological processes included in the DGVMs, and some tests will be performed to study the tree-grass dynamics with different modeling techniques.