Center for Environmental Sciences and Engineering
University of Connecticut

Monitoring Climate Change

Ecological Impacts of Climate Change in South Africa

Climate change is causing significant ecological changes throughout the world. Its effects may include increased coastal erosion, greater ferocity and frequency of forest fires, loss of habitats, and either drought or flooding. To predict how future climate change will affect particular ecosystems, we must first understand how past climate change has affected them.

This project examines the effects of climate change in the Cape Floristic Region (CFR) of South Africa. A hotspot of plant biodiversity, the CFR is home to more than 8,000 species. Most of these species are locally abundant but have small ranges. As a result, the region's plants are especially vulnerable to decreased rainfall and to seasonal rainfall shifts, which are the predicted results of future climate change in the region.

This research addresses the challenges of monitoring plant health over the large region and determining how plants have responded to past climatic fluctuations. It integrates a study of specific ecological processes (plant growth, reproduction, and fire) with the physics of reflected light and the tools of remote sensing (from satellite and ground observations).

Since the late 1970s, satellites have measured light reflected from the earth. These measurements can be used to determine the relative health of plants growing on the surface. Analyzing the satellite data therefore offers a way to link individual plant processes with changes across the landscape.

Adam Wilson measures light reflected from leaves of the spicy conebush *(Leucadendron tinctum)*. These measurements will be compared with satellite data to learn how climate change affects plants.

However, it is difficult to interpret satellite data without corresponding data collected from the ground. To overcome this problem, the project will investigate satellite data through time and across space. Measurements of reflected light collected from the ground in known ecosystems will be compared with satellite data. This procedure will permit a better understanding of the satellite record and will provide a means to track how plants in the CFR have changed in the recent past.

The overall goal is to understand how weather and climate have affected plants and fires in the CFR in the recent past, to help predict and plan for the future. The results will help decision makers (such as reserve managers, conservation biologists, and policymakers), who need reliable information and models to develop effective management practices.

Award recipient: Adam Wilson, Department of Ecology and Evolutionary Biology
Mentors: John Silander, Department of Ecology and Evolutionary Biology, and Dan Civco, Department of Natural Resources Management and Engineering

This project was supported by the Center for Environmental Research and Engineering's 2007 Multidisciplinary Environmental Research Awards.

2007

3107 Horsebarn Hill Road, Building 4 Annex, U-4210
Storrs, CT 06269-4210
Phone: (860) 486-4015 Fax: (860) 486-5488
Web: www.cese.uconn.edu Email: environment@uconn.edu