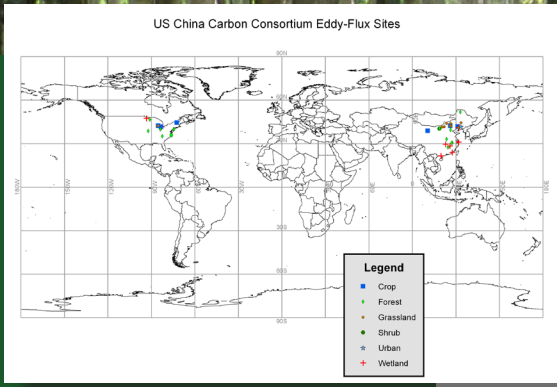
United States-China Carbon Consortium (USCCC)
(中美碳联盟)



Global climate change is the greatest environmental challenge facing humankind in the 21st century. The United States and China are the top two emitters of carbon dioxide, a strong greenhouse gas that significantly contributes to global climate change. Ecosystems take up carbon dioxide as they grow and are sources of clean water for human use. Understanding how climate change will impact ecosystems is the first step in maintaining forests, grasslands, and marshes in the future. The climate and ecosystems of China and the United States are similar, which allow for comparison of studies between the two countries. Both nations can benefit from shared research through the use of paired ecosystem studies.

Poplar Plantation, Beijing, China

In 2004, U.S. and Chinese scientists met in Beijing, China, to discuss how two countries could combine their limited resources to better understand climate change impacts on the carbon and water cycles. Initial support was provided by the U.S. Forest Service, Chinese Academy of Sciences, University of Toledo, Beijing Forestry University, Chinese Academy of Forestry, and Fudan University. Since 2004, the USCCC has grown into a multi-institutional research group with a primary focus on measuring and modeling carbon and water resources. Today, USCCC members maintain over 50 eddy flux sites that represent natural and managed ecosystems ranging from coastal wetlands to steppes, and from tropical mangroves to boreal conifer forests. Scientists use specially equipped towers located across China and the eastern U.S. to study these ecosystem changes. This site provides unique understanding about how ecosystems store carbon, and use and provide water for human use. Outputs from this work are being used to develop new and improved models to predict future impacts of climate change.

Mission

To facilitate a better understanding of environmental factors influencing the rate and magnitude of carbon sequestration and water cycling across a range of ecosystems and climates, using mutually agreed upon measurement protocols and equipment, and through a collaborated network of data sharing and analysis.

Goal

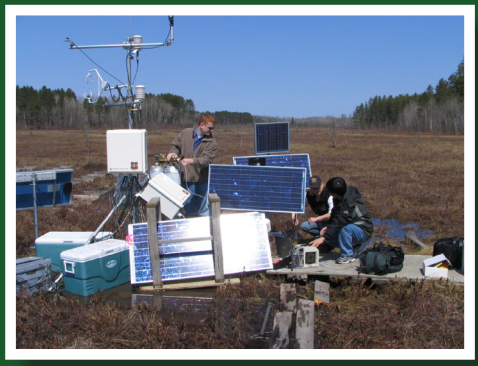
To develop a network of study sites sponsored by individual institutions to share data and results to assess impacts of climate change and humans on the carbon and hydrologic cycles at broad spatial scales. USCCC research is designed to test the following scientific hypotheses:

- Human disturbances increase variability and uncertainty of carbon sequestration and water cycle of a landscape in time and space primarily via influencing landscape structure (i.e., composition).
- Human disturbance regimes in the United States and China are significantly different and models describing the CO_2 and H_2O cycles should be different.

Shrubland, Inner Mongolia, China

USCCC (cont'd)

Mangrove, Zhanjiang, China



Open Wetland
Marcell Experimental Forest
Minnesota, USA

Cropland, Massachusetts, USA

Approach

To explore the underlying mechanisms controlling the fluxes of dominant ecosystems in both North America and Eastern Asia using an ecosystem approach. Central to the research are the flux towers using the eddy-covariance method to measure, directly and continuously, the net ecosystem exchange, of CO_2, H_2O, energy, and other greenhouse species. Integrated modeling tools are used to scale up site-level data to the continental scales. The USCCC openly shares data with the FLUXNET committee and contributes global synthesis.

Achievements

Held eight annual workshops in China; trained over 30 scientists and graduate students in ecosystem sciences through scientist exchange program; published more than 40 peer-reviewed journal papers and one special issue in Agricultural and Forest Meteorology (2009); participated in international synthesis activities (FLUXNET). These sites are providing a unique understanding about the functions of managed ecosystems. Outputs from this work are being used to develop new and improved models to predict the future impacts of climate change.

For more information, please visit the USCCC website or contact any of the following committee members:

USCCC Website: http://research.eeescience.utoledo.edu/lees/research/usccc/

USCCC Scientific Committee

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