Canadian Foundation for Climate and Atmospheric Sciences (CFCAS)
Fondation canadienne pour les sciences du climat et de l'atmosphère (FCSCA)

UNIVERSITÉ LAVAL

PRESS RELEASE

CANADIAN CARBON PROGRAM
New Research Consortium

Ottawa, March 9, 2007 – Université Laval and the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) today launched the **Canadian Carbon Program** (CCP), a Canada-wide research network that will work to develop a carbon monitoring and prediction system for North America. The work of the network will be funded over the next 3 years by a $4.4 million grant from CFCAS.

The official announcement was made today in Ottawa by Gordon McBean, Chair of the CFCAS Board of Trustees, Yvan Hardy, Chief Scientist, Natural Resources Canada and by the CCP scientific leader, Université Laval professor Hank Margolis. It was followed by presentations from leading Canadian scientists Francis Zwiers (Environment Canada) and Werner Kurz (Natural Resources Canada), who described recent developments in climate change science and the potential of forests to help control greenhouse gases under future climate change scenarios.

Human activity is emitting more carbon dioxide (CO_2) and other greenhouse gases (GHGs) to the atmosphere than terrestrial and ocean ecosystems can absorb. The increase in atmospheric concentrations is believed to be changing the planet's climate. The consortium builds on the work of an earlier research network (Fluxnet Canada), to reduce uncertainty in estimates of carbon levels in Canada and North America. The findings will help with development of management strategies for mitigating and adapting to the effects of climate change. It will also allow better detection, attribution, adaptation to, and mitigation of the impacts of climate change on Canada's forests, through improved forest management.

Based at the Faculty of Forestry and Geomatics at Université Laval, the Canadian Carbon Program will coordinate the efforts of scientists from 12 universities as well as Environment Canada, Natural Resources Canada (Canadian Forest Service), the Ontario Forest Research Institute and the British Columbia Ministry of Forests. According to professor Margolis, " the new network will concentrate its work on four major, closely related components : high-precision atmospheric greenhouse concentrations and related isotopes; ecosystem fluxes; regional to continental scale modeling of carbon sources and sinks; and process modelling to support forest carbon accounting and carbon management."

CFCAS is an independent foundation established in 2000 to support university-based research on weather and climate. It enhances Canada's scientific capacity by funding the generation of knowledge in areas of extreme weather, air quality, climate and weather prediction, and the marine environment. CFCAS has invested $109 million of its federal endowment of $110 million in research to support federal priorities and policy needs, advance knowledge and train new scientists.

Founded in 1663 in Quebec's historic capital city, Université Laval is the first French-language university on the continent. It is one of Canada's leading research universities, ranking 9th among the country's 93 university-level institutions in terms of research funding, with more than $240 million devoted to research last year. Université Laval's 1,500 professors-researchers share their knowledge with 38,000 students, 25% of whom are enrolled in graduate-level programs.

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Canadian Foundation for Climate and Atmospheric Sciences (CFCAS)
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backgrounder

CANADIAN CARBON PROGRAM

Since the beginning of the industrial revolution, humans have been emitting more carbon dioxide (CO_2) and other greenhouse gases (GHGs) to the atmosphere than terrestrial and ocean ecosystems can absorb. This increase in atmospheric concentrations is believed to be changing the planet's climate. Irrespective of any current international agreements, with 10% of the world's forests and 45% of the land surface of North America, Canada has a responsibility to help understand and quantify the current and future carbon (C) budget of North America. In meeting this responsibility, the CCP will provide critical information for the development of federal and industrial strategies for climate change.

The product of the CCP will be the development of a scientific framework for reducing uncertainty in estimating the carbon budget of Canada and North America at monthly to multi-annual time scales, through a coordinated program of measurements and modelling. By evaluating the sensitivity of Canadian forests to climate and disturbance, the CCP will analyze and suggest ways to integrate the effects of climate variability into Canada's forest carbon accounting system and help develop a predictive capability for analyzing the effects of different climate scenarios on future carbon stocks. Working in close collaboration with government partners (Natural Resources Canada's Canadian Forest Service, Environment Canada's Atmospheric Sciences and Technology Directorate, NOAA's[1] Global Monitoring Division), the CCP will measure ecosystem fluxes, atmospheric trace gas concentrations, and ecosystem component processes as well as use existing data from remote sensing of land surface properties and from forest inventories. The researchers also expect to work in collaboration with related efforts in the U.S. and Mexico within the framework of the North American Carbon Program (NACP). The combination of high-quality field measurements and coordinated modelling within the CCP are essential to the development of a scientific framework for an integrated carbon cycle monitoring and prediction system for Canada.

Benefits to Canada: by providing the scientific foundation for an integrated carbon monitoring and prediction system, the CCP will optimize the use of the large suite of C-cycle measurements that are now technically feasible, so as to *detect* changes and *attribute* whether the changes are due to climate variability or intentional human actions. The information will help make accurate *assessments* of Canada's current and future role in the global C-cycle. Landscape-level-scale models including coupled hydrology-carbon models will be tested alongside Canada's current carbon accounting model to better define how disturbance regimes (harvesting, fire, pests, etc.) influence carbon sinks and sources in Canadian ecosystems. This will help develop management strategies for *adapting* to and *mitigating* the impacts of climate change.

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[1] National Oceanic and Atmospheric Administration (U.S.)

The development of long-term carbon sequestration models for Canadian forests will also help develop strategies for *adaptation* and *mitigation*. Examining potential "biosphere surprises", such as prolonged periods of drought or massive insect outbreaks, will allow the scientists better to *detect*, *attribute*, *adapt* to, and *mitigate* climate change impacts on Canada's forests through improved forest management. The development of a predictive capability for assessing the impacts of climate change on Canada's natural ecosystems is critical to the environmental security of Canadians. It is also critical for the sustainable development of Canada's natural resources and for maintaining export markets.

There are four major, closely interrelated, components to the CCP network:

1. **High-Precision Atmospheric Greenhouse Gas Concentrations & Related Isotopes:** In the summer of 2007, the CCP, in collaboration with Environment Canada, will begin making high precision measurements of atmospheric CO2, carbon monoxide (CO) and methane (CH4) over a black spruce forest near Chibougamau, Quebec and a fen near Lac Labiche, Alberta. This data will supplement the GHG measurements currently being made by Environment Canada at multiple sites across the country, including a CCP flux station near Prince Albert, Saskatchewan. These measurements will help reduce the uncertainty of C budget estimates for several of Canada's major ecozones.

2. **Ecosystem Fluxes:** The goals of the ecosystem flux measurements are to provide a better understanding of (a) what drives the inter-annual variability of carbon cycling in Canadian forests and peatlands; (b) the dynamics of the C sinks and sources occurring in young and intermediate-aged forests; and (c) the CO2 and CH4 cycles of northern peatlands. To attain these objectives, the CCP will measure carbon, water and energy exchange at more than 25 sites in forest and peatland ecosystems in seven provinces, so as to cover several of Canada's major plant functional types.

3. **Regional, National, and Continental Scale Modelling of Carbon Sources and Sinks:** The CCP will develop a modelling framework that will serve as the scientific foundation for an integrated carbon monitoring and prediction system for Canada and North America. Not only will it permit large-scale estimates of carbon sources and sinks for given periods of time, but it will also allow the researchers to attribute mechanisms to the observed phenomena and enable them to predict carbon sequestration/emission scenarios with respect to climate change.

4. **Process Modelling to Support Forest Carbon Accounting and Carbon Management:** The CCP will provide information on the impact of disturbance and climate on forest growth for integration into the CBM-CFS3 model, which forms the core module of Canada's National Forest Carbon Monitoring, Accounting and Reporting System (NFCMARS). The network will also develop a capacity to model the effects of climate change and forest management practices on carbon stocks.