PMC
Programa Mexicano del Carbono

Instituto Nacional de Ecología

CarboNA

Statement of Common Interest and Intent to Work Together on Carbon Cycle Research in North America Canada, Mexico, and the United States

1. Statement of Common Interest

1.1. The scientific community:

1.1.1. Is aware of how human activities (especially fossil fuel use and land use change) have contributed to a rise in the levels of greenhouse gases, namely CO2, CH4, and N2O, in the global atmosphere;
1.1.2. Acknowledges the large body of scientific evidence that links the increased concentrations of these greenhouse gases to global climate change;
1.1.3. Appreciates the major role that the Earth's oceans and terrestrial ecosystems play in the exchange of these gases with the atmosphere (i.e., the global carbon cycle), including the large potential for ecosystems to take up and store atmospheric carbon; and
1.1.4. Recognizes that historically climate change, natural disturbance, and human activities have altered the movement of carbon among atmospheric, terrestrial, and oceanic pools.
1.1.5. Appreciates that since the Industrial Revolution, humans became the main force behind that movement of carbon via fossil fuel-based energy systems and new technology, which facilitated a huge increase in the global population and intensified consumer lifestyles.

1.2. Canada, Mexico, and the United States have mutual interests in improving the scientific understanding of carbon cycle science to address issues including, but not restricted to, the following:

1.2.1. The temporal and regional distributions and magnitudes of carbon sources, sinks and greenhouse gas fluxes;
1.2.2. Understanding how climate change, natural disturbance, and socioeconomic and institutional drivers (e.g., changes in lifestyles, demographic dynamics) affect the pools and fluxes of the carbon cycle, and ultimately the concentrations of CO2, CO, CH4 and N2O in the atmosphere;
1.2.3. The complex interrelationships between the carbon cycle and the climate system in order to account for past variability in atmospheric CO2 and to predict future climate and carbon cycle fluxes;
1.2.4. Developing management strategies and new technologies to reduce greenhouse gas emissions and/or enhance carbon stocks; and
1.2.5. Evaluating environmental, economic and social costs and benefits of potential management strategies, new technologies and their implementation.

1.3. To address these scientific questions, an optimal research strategy would include, but not be limited to:

1.3.1. Integrating studies of carbon stock changes and flux, measurements associated with various ecosystems, management strategies, and new technologies with studies of atmospheric composition and remote sensing at regional and continental scales;
1.3.2. Belowground carbon stocks and fluxes and measurement technologies, including the problem of scale, especially how to scale-up from point measurements;
1.3.3. Focusing on a continental scale in an attempt to account for all major sources and sinks of CO2, CH4, and N2O, terrestrial and oceanic, and thereby understand and quantify the carbon budget for the North American continent;
1.3.4. Securing consistent, high-quality regional and continental data sets to permit the scientific community to conduct rigorous analyses of carbon dynamics at larger spatial scales;
1.3.5. Developing a level of confidence in our understanding of the key factors controlling biospheric sources and sinks for CO2, CH4, and N2O to be able to predict the dynamic changes in the future sources and sinks of greenhouse gases under a variety of scenarios;

1.3.6. Understanding how different mixes of related causes and underlying drivers (social, economic, political, physical and biological), operating at diverse scales, interact to produce emissions trajectories by the three countries and their regions;
1.3.7. Evaluating cost-effective management strategies and new technologies that could be implemented to reduce biospheric emissions or enhance carbon sinks, including the exploration of both social, economic and institutional constraints to and opportunities for the implementation of those strategies and technologies.
1.3.8. Identifying social and economic constraints and needs for capacity building to attack the problems of how to reduce emissions

2. Statement of Intent to Work Together

2.1. We agree to work together on carbon cycle research by:

2.1.1. Establishing a Government Coordination Working Group on carbon cycle research that is co-chaired by a representative selected from each country. The U.S. Carbon Cycle Interagency Working Group will designate the representatives from the U.S.; a Mexican working group will designate representatives from Mexico; and a Canadian Working Group will designate the representatives from Canada.
2.1.2. Establishing a joint Science Steering Committee for joint research on carbon cycle science for the North American continent and adjacent ocean basins to provide guidance and advice on research priorities and activities within joint and complementary research initiatives;
2.1.3. Organizing a joint workshop to identify priority areas for cooperative research activities and research areas where we have common interests and complementary expertise;
2.1.4. Identifying the scope of disciplines and research expertise needed to address common research questions and ensuring that the major organizations within each country are given an opportunity to participate;
2.1.5. Identifying existing research groups and projects within each and between countries and encouraging better scientific integration among them. Where appropriate, agencies and individuals from each country will work with their respective researchers to encourage them to develop standardized measurement protocols and share results and insights;
2.1.6. Developing international projects that could form the focus for new initiatives that could be considered for cooperative funding by appropriate agencies in the respective countries; and
2.1.7. Exploring the opportunity to make this research an important element in cooperative agreements between countries (e.g., a Bilateral Agreement on Climate Change), thereby raising its profile and recognizing the importance of this research at high levels within each country.
2.2. It is understood that each country will work within its government and institutions to secure the support needed to participate in this venture, both at the organizational and planning stages, and to facilitate access to funds to carry out the relevant research activities. Approved as a working document on June 13, 2006 by representatives of Canadian, Mexican, and U.S.Government agencies involved in carbon cycle research.

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North American Carbon Program (CarboNA) Science Plan

Goals:

To determine the temporal and regional distribution and magnitudes of carbon pools and greenhouse gas fluxes throughout North America and the adjacent oceans;
To understand how these affect and are affected by disturbances, societal drivers, and climate;
To predict future climate change through an improved understanding of potential feedbacks;
To explore the factors shaping mitigation responses and evaluate carbon related mitigation strategies and new technologies for measuring and monitoring carbon.

Mission:

CarboNA (formerly the Joint North American Carbon Program, JNACP) is a joint government-level initiative between Canada, the US and Mexico whose purpose is to establish greater cohesion across North America in the fields of carbon pool and greenhouse gas flux dynamics and of carbon related mitigation strategies, through the identification of continental or sub-continental-scale issues and promotion of collaborative research in areas of common interest and complementary expertise.

Over-riding science questions:

What is the current carbon budget of North American land, water, and adjacent oceans, including spatial and temporal variability? What is the uncertainty of the estimates?

What natural processes control the spatial and temporal variability of carbon stocks and fluxes at the continental and sub continental scales within North America? What societal processes determine carbon emissions and sinks at these scales?

What are the past and projected trends in the North American carbon budget, and what factors are expected to be important in the future? When will sinks saturate? Will they become sources? What are possible surprises?

What will be the response of terrestrial ecosystems and coastal oceans to climate change and rising atmospheric CO2? Which stocks and flows of carbon are most vulnerable?

What is the role of economic development, energy technology, trade, and policy actions in driving changes in fossil fuel emissions?

What are the impacts of different continental and sub continental greenhouse gas policies on future carbon stocks and fluxes? What data are needed to understand and support carbon emission reduction and adaptation policies and the factors that shape them; and how can we improve North American carbon observation systems?

Special emphasis for international collaboration in North America:

Monitor and predict responses of terrestrial, aquatic and marine ecosystem carbon cycles to natural variability in climate and disturbance regimes, to increasing CO2 and to climate change along an ecological gradient from the Arctic to the Tropics;

Estimate continental budgets for atmospheric greenhouse gases using data from land-based, airborne, marine, and space borne platforms including the integration of inventory-based carbon stock estimates for the three member countries;

Establish a working group to identify research needs leading to improved understanding and quantification of carbon cycle processes and budgets in the Gulf of Mexico Basin;

Improve understanding of the current state and likely future changes in carbon cycling in continental coastal ocean environments, including river inputs of POC, DOC, DIC, and nutrients; impacts on fisheries and coastal economies; exchange between coastal oceans and deep ocean basins; and air-sea gas exchange;

Identify the need for and support the development of government–level agreements on data sharing and harmonization, standardization of data collection and management, and criteria for using data. This includes, but is not limited to, forest inventories, agricultural data, fossil fuel emissions by source, land-use data, energy, technologies, population dynamics, markets, GDP, flux towers, and trace gas measurements,. This should include development of trilateral databases from which "seamless" spatial data products can be downloaded from tropics to Arctic following acceptable international protocols to the extent practicable;

Develop an approach for a long-term, consistent, and integrated observation and reporting system for greenhouse gas mitigation across North America;

Identify the impacts of possible tri-lateral mitigation strategies and opportunities for reducing emissions, increasing greenhouse gas sequestration, and possibly, increasing use of biofuels; and how the 3 countries can work together to implement them. For example, improve understanding of: the barriers to devising a North American carbon market or other mechanism for exchanging greenhouse gas credits; the potential role of Reducing Emissions from Deforestation and Forest Degradation (REDD); and the impacts of policy decisions in one country on the carbon balance, environmental services, and social systems in other countries;

Coordinate efforts to develop and deploy decision-support tools to explore the socio-demographic, socio-economic, and socio-political causes of variability in carbon dioxide (CO2) emissions, as a way to mitigate increases, at the national, state and local level. This could help assess the effectiveness of actions undertaken by stakeholders aimed at mitigating CO2 emissions or adapting to climate change.