

An Open Letter to the Prime Minister of Canada on Climate Change Science

April 18 2006

The Right Honourable Stephen Harper, P.C., M.P.
Prime Minister of Canada
Ottawa, ON K1A 0A3

Dear Prime Minister:

As climate science leaders from the academic, public and private sectors across Canada, we wish to convey our views on the current state of knowledge of climate change and to call upon you to provide national leadership in addressing the issue. The scientific views we express are shared by the vast majority of the national and international climate science community.

We concur with the climate science assessment of the Intergovernmental Panel on Climate Change (IPCC) in 2001, which has also been supported by the Royal Society of Canada and the national academies of science of all G-8 countries, as well as those of China, India and Brazil. We endorse the conclusions of the IPCC assessment that *“There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities”* and of the 2005 Arctic Climate Impact Assessment that *“Arctic temperatures have risen at almost twice the rate of those in the rest of the world over the past few decades”*.

Climate variability and change is a global issue and the international IPCC process for assessment of climate science, with its rigorous scientific peer review processes, is the appropriate mechanism for assessing what is known and not known about climate science. Many Canadian climate scientists are participating in the preparation of the IPCC Fourth Assessment Report which will be completed in 2007.

The following points emerge from the assessments and ongoing research by respected Canadian and international researchers:

- **There is increasingly unambiguous evidence of changing climate in Canada and around the world.**
- **There will be increasing impacts of climate change on Canada’s natural ecosystems and on our socio-economic activities.**
- **Advances in climate science since the 2001 IPCC Assessment have provided more evidence supporting the need for action and development of a strategy for adaptation to projected changes.**
- **Canada needs a national climate change strategy with continued investments in research to track the rate and nature of changes,**

understand what is happening, to refine projections of changes induced by anthropogenic release of greenhouse gases and to analyse opportunities and threats presented by these changes.

We have supplied justification and more detail for each of these points in the accompanying documentation.

We urge you and your government to develop an effective national strategy to deal with the many important aspects of climate that will affect both Canada and the rest of the world in the near future. We believe that sound policy requires good scientific input.

We would be pleased to provide a scientific briefing and further support, clarification and information at any time.

Yours sincerely:

Signed by 90 Canadian climate science leaders from the academic, public and private sectors across the country.

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Background and Supplementary Information

There is increasing unambiguous evidence of a changing climate in Canada and around the world. Over the past century, the globally-averaged annual temperature increased by 0.6°C and the world is now warmer than at any time in at least the last 1000 years. During the century, Canadian temperatures south of the 60th parallel warmed by about 0.9°C. Over the past 50 years, during which human influences on the climate have become more obvious, Canada has warmed faster than almost any other region on the globe, with the greatest warming - more than 2°C - occurring in the Mackenzie Basin. With the exception of the southern Prairies, Canada has also become noticeably wetter. The increases in average precipitation have been accompanied by increases in both extreme precipitation and dryness in some regions.

Summer Arctic sea ice has decreased in extent by 30% over the past 30 years and is projected to largely disappear by the middle of this century. Global sea level has risen 10-20 cm in the past 100 years. Future sea level rise could be much greater if there are massive ice sheet discharges from the Antarctic or Greenland, as recent evidence suggests. Higher sea-levels will enhance damage from coastal erosion and the expected increase in storm surges.

The 2001 IPCC report projected that global mean temperatures will increase between 1.4 to 5.8°C from 1990 to 2100. The warming over most of Canada is projected to be substantially above that of the global average, especially during winter. These projections are based on global climate models from leading climate research groups that have tested and validated them through simulations of past and present climates.

As the climate changes, **there will be increasing impacts on Canada's natural ecosystems and on its socio-economic activities.** Some impacts are:

- Inadequate water for Prairie agriculture and hydroelectric utilities due to increased drying of the continental interior and reduced snow pack and shrinking glaciers;
- Threats to the sustainability of Canada's natural resources due to an inability of our ecosystems to respond rapidly as the climate changes.
 - Warming allowing the spread of insects through our forests and prolonged drought making forests more susceptible to fires;
 - Warming of ocean and river waters, threatening survival of Pacific salmon, a cold water fish, by forcing it away from its spawning grounds;
- Increasing severity and frequency of some extreme weather events, including floods and droughts, some of which are already exceeding 100-year records and requiring more robust design specifications for infrastructure;
- Thawing of permafrost and associated effects on the human environment (infrastructure, roads, pipelines, buildings), sea ice, northern ecosystems and species, all leading to dramatic changes in the lives of northern people;
- Increased marine traffic through the northern sea routes, increasing the likelihood of environmental impacts and challenges to Canada's sovereignty claims in the Arctic.

Some of these projected impacts are already detectable.

Advances in climate science since the 2001 IPCC Assessment have provided more evidence supporting the need for action and development of a strategy for adaptation to projected changes. New results include:

- Progressive decreases in Arctic Sea ice coverage in summer and winter since 1979, with record lows in 2005. At the current rate we expect Arctic summers to be ice-free by 2050 - a state not seen on Earth for at least a million years;
- Analyses showing that climate may be more sensitive to additional greenhouse gases than previously determined;
- Improved understanding of the interactions between the climate system and the global carbon and sulphur cycle with the possibility that some terrestrial carbon reserves may become sources;
- Improved understanding that a small but significant fraction (about 15-20%) of the carbon dioxide that has been released into the atmosphere by human activities (mainly fossil fuel burning) will continue to affect climate for tens of thousands of years until it is eventually neutralized through carbonate reactions in the deep ocean;
- Confirmation that warming of the atmosphere near the surface is consistent with the projections of climate models;
- Linking of climate change and ozone recovery (affecting ultraviolet levels in the Arctic), and the attribution of recent surface temperature change over the Antarctic to the ozone hole;
- Identification of ocean warming to depths in excess of 700 metres and its attribution to anthropogenic (human-induced) causes. This stored heat will contribute to a continuing sea level rise for several centuries;
- Clear demonstration that the ocean is becoming more acidic, threatening marine organisms, especially corals.
- Identification of possible 'tipping points' in the carbon cycle, the North Atlantic Ocean circulation and the Greenland ice sheet, that may trigger irreversible trends with major global climatic consequences;
- Evidence that warm Atlantic water now moves farther into the Arctic Basin and may increase the rate of sea ice melt due to warming from below.

There is an increasing urgency to act on the threat of climate change. Stopping the growth in atmospheric greenhouse gas concentrations by reducing emissions would also have benefits for air quality, human health and energy security. But since mitigation measures will become effective only after many years, **adaptive strategies** are essential and need to begin now.

Our climate system is dynamic and complex: further knowledge is needed of the relationships among its components, to continue to inform decisions on adapting to the inevitable impacts that we will experience.

There are several key research questions whose resolution will lead to better understanding as to how the climate will change. For the sake of all Canadians and the global community, **Canada needs a national climate change strategy to provide**

the best advice for action, with continued investments in research to track the rate and nature of changes, understand what is happening, to refine projections of changes induced by anthropogenic release of greenhouse gases and to analyse opportunities and threats presented by these changes. Good policy requires good science.

We would be pleased to provide a scientific briefing and further support, clarification and information at any time.