

## Evolution of the permafrost at Mont Jacques-Cartier

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The world scientific community agrees that we are experiencing a major period of climate change. Our environment is being affected by these changes in various ways.

Parc national de la Gaspésie is home to islands of permafrost. Little is known about the behaviour of permafrost in an alpine environment in relation to temperature variations. In 2006, a team from Université de Montréal tried to answer two specific questions in this respect. First, what is the evolution of the permafrost atop Mont Jacques-Cartier and can a signal of climate change be detected? What will be the influence of climate change on this permafrost and how will it be represented in the ground? Using air and ground temperature data collected over the last several years atop Mont Jacques-Cartier along with data from the region's meteorological stations, the researchers developed a model to make various simulations over time.

The study did not reveal a clear signal regarding the influence of climate change on the past evolution of the permafrost atop Mont Jacques-Cartier. However, the simulations confirmed that in the future, an increase in the surface temperature would have an influence on the entire soil profile. For example, at a depth of 11 m, where the limit of the annual zero degree is currently situated, the variation will be from 1.6 °C to 2.2 °C over a period extending from 1961 to 2099. At the rate of climate warming anticipated by the models, the permafrost will not be maintained in the first 30 metres of the profile. If frozen patches remain deep in the ground, they are destined to disappear. The maintenance of the permafrost at the summit of Mont Jacques-Cartier is thus far from assured.

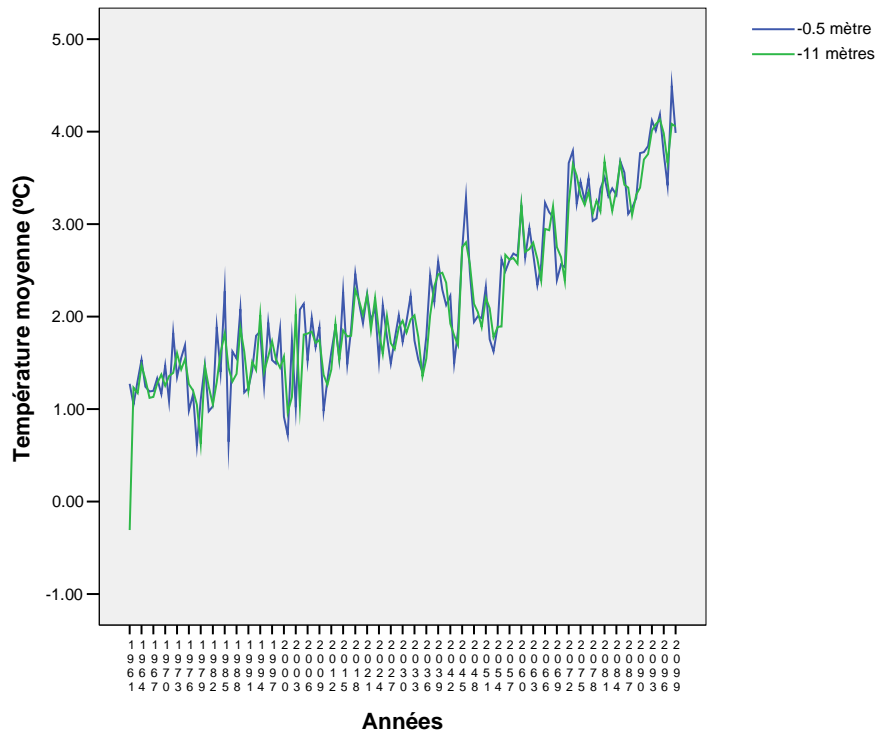
Consideration should be given to the speed at which the changes will occur in the components of this arctic-alpine environment. There is reason to believe that the geomorphological landscapes, the polygonal soils, the rocky glaciers and the other characteristic forms of the Gaspé massif could become inactive in the upcoming decades. To ensure that this evolution is monitored, the researchers planned the setting up of an automatic soil temperature recorder.

Here is another example of the impact of global warming on our environment. Little is known about all the consequences of these soil temperature variations at the summit of Mont Jacques-Cartier. However, several pessimistic scenarios have been put forward. The acquisition of knowledge concerning the evolution of the ecosystems within the current context is slow and difficult, but it is essential. Despite everything, several responsible attitudes and behaviours are known and can be adopted right away in order to reduce the scope of the impacts that already influence many aspects of our life.

Other achievements:

- Winter warming and dynamics of avalanches in the Gaspésie region (Université du Québec à Rimouski, University of Moncton);
- Sampling of diptera of the *fanniidae* family (Bishop's University).

**FIGURE 2 : Time series of simulated soil temperatures at depths of 0.5 m and 11 m according to the HadCM3 model and scenario a2**



0.5 metres  
11 metres

Mean temperature  
Years