

Discovery waters down fears of fast-melting ice

ANNE MCILROY

Globe and Mail

September 18, 2008 at 8:52 PM EDT

A team of Canadian researchers has unearthed the most ancient ice ever found in North America – 700,000-year-old wedges that didn't melt when the Earth was much balmer than it is today.

The scientists say their discovery means the permafrost that covers a quarter of the land in the Northern Hemisphere may not release its vast stores of carbon as quickly as some experts fear.

That's not to say one of the most catastrophic global-warming scenarios isn't going to happen, said Duane Froese, an assistant professor in the Department of Earth and Atmospheric Science at the University of Alberta and lead author of a paper that will appear in today's edition of the journal *Science*. It will just happen more slowly, he said.

“There is a certain stubbornness to permafrost,” he said.

Dr. Froese first found the cone-shaped wedges about seven years ago only a few metres beneath the surface, not far from Dawson City, Yukon. It formed in cracks in the permafrost, or frozen soil.

Normally, ice is difficult to date beyond 50,000 years. But in this case, the wedges were under volcanic ash that the team, including researchers at the University of Toronto and the Geological Survey of Canada, determined was roughly 700,000 years old.

This means the ice didn't melt during two periods when many scientists believe the planet was warmer than it is today. In the most recent of those periods, 120,000 years ago, temperatures were likely several degrees higher than now. There was probably far less sea ice in the Arctic back then, and global sea levels were up to eight metres higher than today, Dr. Froese said.

It may have been even steamier 400,000 years ago.

In theory, the permafrost in the interior of Yukon and Alaska should have melted during these balmy periods, Dr. Froese said. Unlike the permafrost farther north, it is not continuous at those latitudes, and is found only in some parts of the landscape depending on exposure and vegetation coverage. This means it is more vulnerable to higher temperatures.

“Even in those areas, permafrost has existed over 700,000 years,” Dr. Froese said.

He and his colleagues insist their discovery is not an invitation to ignore the potentially serious impact of global warming, especially in the North, where temperatures are rising faster than anywhere on Earth and the sea ice is vanishing at a rate that has stunned the scientists who study it.

By some estimates, permafrost holds twice as much carbon as is in the atmosphere. So its fate in a warmer North is a critical question to scientists trying to predict the course and potential impact of climate change.

Several climate models predict significant melting of permafrost in the coming decades, or by the end of the century. Dr. Froese said the pace of the thaw could be slower.

“It may happen at time scales slower than those models are predicting,” he said.

How fast the permafrost thaws will greatly affect people who live in the North. When it melts, forests and houses tilt and sinkholes open.

“Permafrost is like a glue that holds the Arctic together,” said Alberto Reyes, a graduate student at the University of Alberta.

U.S. researcher Ted Schuur, an expert on the carbon contained in permafrost, says there is no scientific consensus on how fast it could melt as temperatures rise.

“We don't have a great understanding of how fast the permafrost thawing will be,” said Dr. Schuur, an associate professor of ecology at the University of Florida.

He says the discovery of the ancient ice is intriguing, but more research is required to assess whether it is a widespread phenomenon and not the result of conditions that are unique to this particular part of Yukon.

“How do we know it isn't a local effect?” he asked.

Still, he says, it is intriguing to learn that permafrost ice has lasted 700,000 years. “It is really cool research,” he said.

The Canadian ice is relatively modern compared with the oldest ice in the world, an eight-million-year-old fragment found in Antarctica. Scientists were also able to date it because they found it under ash from a volcanic eruption.