The big thaw
Experts expect significant climatic impact of carbon from permafrost

BY: ELMAR VEERMAN

Thawing ground in the far north in the coming century, only a fraction of its carbon into the air to go. Yet that global warming will significantly accelerate permafrost experts warn.

The permafrost is a lot of carbon locked up meters deep in the ground.

Despite decades of research, in which billions of dollars are spent, much remains unclear about the future of the climate. One of the big questions is: what will do the permafrost?

And there is not much research has been done. Really strange, because the frozen northern area covers about 18.8 million square kilometers, over 450 times Netherlands.

In that vast tract of land is a lot of carbon, usually in the form of plant residues. Together experts say 1.7 trillion tons. That's about four times as much as hitherto by human activity in the air has gone, and twice as many as at this moment across the Earth's atmosphere is, write Arctic biologists Edward Barn and Benjamin Abbott this week in Nature.

Previously scientists were less than one third of this amount. The estimates are a few years ago increased because it is clear that the stuff until much deeper in the ground than expected. Previously they looked only at the top meter.

All those billions of tons of carbon will certainly not suddenly fly into the sky. But assume that things are tidy, is not realistic. If plant material thaws, bacteria seize their chance and begin to digest it. They create CO2. Or, which is worse, methane. It has more than one hundred times stronger greenhouse effect than CO2. Because in the course of decades will be automatically converted to CO2, it counts as a calculation 20 times stronger greenhouse gas than CO2 when looking ahead a century, but as a potent greenhouse gas 72 times over a period of 20 years.

Chain?

What can we expect in the next century? How much permafrost melts, how much carbon is then free, and in what form? Will there be a chain reaction that will make it warmer on the planet? That's still quite uncertain.
Doing research in the cold, remote, marshy areas with permafrost is very difficult. Worldwide there are only a few stations that provide useful data. Sanding and Abbott have therefore taken a relatively weak research tool: a survey of experts from the Permafrost Carbon Network.

They took the future scenarios in the last IPCC report as a starting point and wrote scientific papers on people who have written on their permafrost. This yielded 41 completed questionnaires. The results are "striking" finding Barn and Abbott.

With the strongest warming scenario of the IPCC in the regions with permafrost to the year 2100 7.5 degrees warmer than it was between 1985 and 2004. If that is true, will the top three meters of permafrost has 9 to 15 percent in 2040, thawed, and at the end of the century is 67 to 61 percent, the experts expect. In the year 2300, their collective expectation is that even up to 67 to 79 percent.

The quantity of carbon thus airspace choose, they estimate up to 2040 at 30 to 63,000,000,000 tons. At the end of the century would have risen to something between 232 and 380 billion tons. By comparison, human action, this year about 9 billion tons of carbon in the form of CO2, roughly 7 billion tons of fossil fuels and deforestation 2 billion tons.

What the experts from the thawing permafrost may be, is less than the total human emissions of today (because if we continue like 90 years, we blow 810 billion tons of carbon into the air). At least, in weight. But, the warming effect of carbon or exceed our human, because the permafrost experts estimate that 2.7 percent of the carbon in the form of methane will escape. The result can be that the earth is warming up continues normally, even if no fossil fuels are used.

**Nothing to do**

It is really a big problem, warn the authors. Avoiding CO2 and methane found in vast, remote areas instead. So there is nothing to be done. And it strengthens itself. Once started, it is decades or even centuries. Even in the mildest, almost certainly too optimistic of the IPCC warming scenarios are already cooked turnips, according to these experts. Then about a third of the amount of carbon in the atmosphere leaking they provide the warmest scenario. Still very much so.

Perhaps this disaster scenario is already unfolding. Permafrost areas in recent years have seen alarming signs, such as rising temperatures, soil and bubbling methane. But as I said: scientific data are scarce.

Why does the result of a survey right now in *Nature*? Perhaps because the climate talks now underway in Durban, where a successor to the Kyoto Protocol must be decided. The warnings of the permafrost connoisseurs would ever be meant for the negotiators an extra sense of urgency to give. Whether it matters is the question.