

Thousands of barges could save Europe from deep freeze

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It is ironic that one consequence of global warming is that Europe might plunge into a deep freeze. This possibility stimulated an unusual research project at the University of Alberta.

Dr. Peter Flynn, the Poole Chair in Management for Engineers in the U of A Department of Mechanical Engineering, has studied whether down-welling ocean currents can carry more dissolved carbon into the deep ocean. He learned they can't, but in the course of this research he found some evidence that the ocean currents that bring warm water to the oceans off northern Europe may be weakening.

The results of the research have been published recently in the journal *Climatic Change*.

"The current is like an ocean conveyor belt," Flynn explained. "It starts in the north Atlantic, where down-welling, cold, arctic water flows south at the bottom of the ocean, and then warm, tropical water flows north to fill in the vacuum created by the cold water, and this warm water helps ensure a mild climate in northern Europe,"

The melting of fresh water ice due to global warming can reduce the flow of the down-welling current, and a study published recently in the journal *Nature* by researchers at the University of Southampton in England reported evidence of weakening down-welling currents.

Flynn and a graduate student evaluated seven different methods to

enhance down-welling currents. They found one way was far more cost effective than the others: making thicker sea ice by pumping salty ocean water on top of ice sheets.

They envisioned more than 8,000 barges moving into the northern ocean in the fall, speeding the initial formation of sea ice by pumping a spray of water into the air, and then, once the ice is formed, pumping ocean water on top of it, trapping the salt in the ice and reaching a thickness of seven meters.

In the spring, water would continue to be pumped over the ice to melt it, forming a vast amount of cold, salty water that sinks and adds to the down-welling current to re-strengthen it.

The estimated cost is about \$50 billion.

"When we first did this study we thought this idea was way too expensive--we were shocked by the numbers," Flynn said. "But let's say conservatively that there are 100 million people in Europe affected by this current. Fifty billion dollars would come to 500 dollars per person, and we don't think that is an unreasonable price if the glaciers are at your backdoor and your way of life is disappearing."

Flynn emphasizes that his group does not propose this scheme as the first or best choice, since all geo-engineering projects have a risk of unforeseen circumstances.

"The best way to deal with global warming is to deal with the causes, fossil carbon in the atmosphere, not the symptoms," he said. "However, if our efforts to control CO₂ levels in the atmosphere fail and we reach a crisis, we can contemplate emergency action."

Source: University of Alberta

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