

Global Chilling

By Paul R. Epstein

The New York Times, January 28, 2004

© 2004 The New York Times Company

It seemed incongruous when former Vice President Al Gore gave a speech on global warming on a bitterly cold day in New York City this month. But in fact it was an appropriate topic: New Yorkers may be able to blame the city's current cold spell -- the most severe in nearly a decade -- on global warming.

Global warming doesn't mean that every place on the globe gets warmer. The weather history that can be read in polar ice-core samples indicates that previous periods of warming affected North America and Europe far differently than they did the tropics -- the Northern Hemisphere got a lot colder.

It's far too early to say for sure, but the same processes may be at work today. In the past 50 years, the top two miles of the world's oceans have warmed significantly, and that warming is melting sea ice. In just four decades, the thickness of summer North Polar floating ice shrank 44 percent. In addition, warming makes droughts drier and longer, and when the evaporated water returns to earth it does so in heavier downpours.

Normally, water circulates in the North Atlantic like this: Cold, salty water at the top sinks; that sinking water acts as a pump, pulling warm Gulf Stream water north and thus moderating winter weather. But now, fresh water from the thawing ice and heavier rain is accumulating near the ocean's surface; it's not sinking as quickly. (The tropics are faced with the opposite phenomenon. According to Dr. Ruth Curry and her colleagues at the Woods Hole Oceanographic Institution, the tropical Atlantic is becoming saltier; as warming increases, so does evaporation, which leaves behind salt.) The "freshening" in the North Atlantic may be contributing to a high-pressure system that is accelerating trans-Atlantic winds and deflecting the jet stream -- changes that may be driving frigid fronts down the Eastern Seaboard. The ice-core records demonstrate that the North Atlantic can freshen to a point where the deep-water pump fails, warm water stops coming north, and the

northern ocean suddenly freezes, as it did in the last Ice Age. No one can say if that is what will happen next. But since the 1950's, the best documented deep-water pump, between Iceland and Scotland, has slowed 20 percent.

Why now? After all, the planet's previous periods of global warming resulted from changes in the earth's tilt toward the sun, and recent calculations of these cycles indicate that our hospitable climate was not due to have ended any time soon. But because of the warming brought by the buildup of carbon dioxide, mainly from the burning of fossil fuels, the equations have changed. We are entering uncharted waters. It's something for New Yorkers to ponder as they bundle up.

Paul R. Epstein is associate director of the Center for Health and the Global Environment at Harvard Medical School.