A warmer earth: The signs mount

No longer an abstract threat

By Barry James
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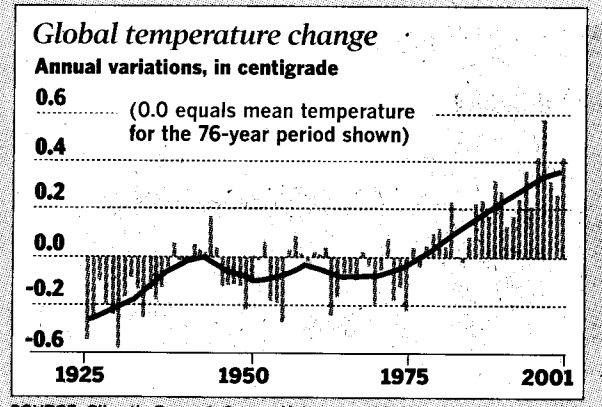
Climate change is no longer a future abstraction. Although plenty of uncertainty naturally shrouds a phenomenon with so many variables, most earth scientists concur that global warming, along with increasingly unpredictable weather, is happening already.

According to the World Meteorological Organization, the last decade was the warmest since accurate records began in the mid 19th century. If present trends continue, the Arctic will become a navigable ocean by the middle of this century, virtually free of ice throughout the summer. This week, scientists reported the collapse of a huge ice shelf in the Eastern Antarctic, apparently as a result of higher-than-usual temperatures in the region.

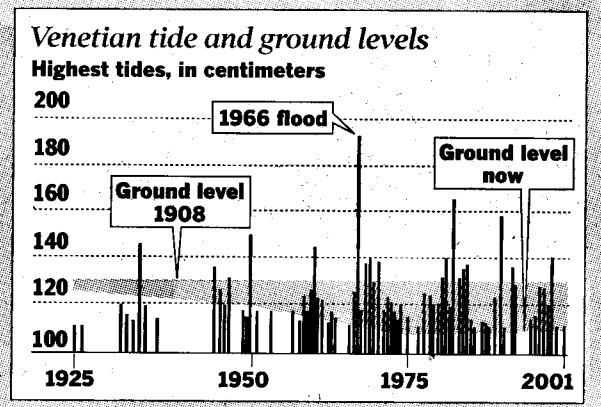
"We are seeing the signs of global warming everywhere," said the Canadian environment minister, David Anderson. In his country, he pointed to the melting of Arctic ice, steady erosion of glaciers and a prolonged drought in the southern prairie provinces.

Paradoxically, an increase in average temperature could mean some parts of the world get colder as weather patterns change. For instance, a large runoff of fresh water into the North Atlantic might in theory divert the Gulf Stream. The result could be chillier temperatures for much of Europe.

Climbing higher: Temperatures and tides, 1925-2001



SOURCE: Climatic Reseach Center, University of East Anglia, England



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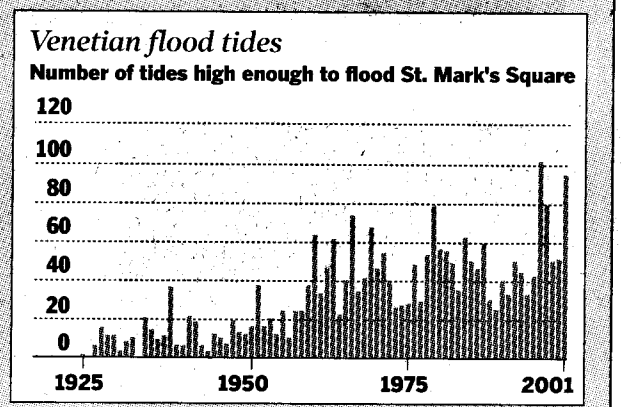

SOURCE: Corila

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Scientists say a principal factor driving climate change is a densening of gases in the atmosphere that trap the planet's warmth. Carbon dioxide and other gases let in energy from the sun but slow the release of terrestrial energy into space. They act as an invisible "greenhouse" that enables life to flourish.

The Intergovernmental Panel on Climate Change, an authoritative scientific body, said in its latest report that there was no doubt that the actions of 6 billion human beings were causing this greenhouse shield to become thicker and upset the natural balance in the flows of energy between earth and space. The panel is a body of experts formed in 1988 by the World Meteorological Organization and the UN Environment Program to assess scientific developments about the planet's environment.

Much of the carbon dioxide released into the atmosphere comes from the burning of oil, gas and coal by industries, power stations and motor vehicles. At the same time, the removal of much of the earth's forest cover eliminates nature's main way of absorbing this gas.

THE WARMEST YEAR As a result, the amount of carbon dioxide in the atmosphere has risen from 280 parts per million at the beginning of the industrial age, according to the panel, to 368 parts per million in 2000.

The earth's average temperature has increased from 14 centigrade (57.2 Fahrenheit) in 1960 to nearly 14.6 centigrade (58.3 Fahrenheit) in 1998, the warmest year in the warmest decade on record. Temperatures last year were only slightly less than in 1998. The panel believes that climate change could result in an average increase of temperature between 1.4 centigrade and 5.8 centigrade over the next century, or about two to ten times the total average increase in surface temperature observed since 1900.

In turn, sea levels could rise by a centimeter or so to nearly 90 centimeters, with considerable local variations, the panel says. That is because of melting ice in glaciers and polar regions, and because warm water takes more space than cold. Some scientists say the biggest danger is that this artificial heating of the atmosphere could in effect throw a switch that abruptly alters the natural circulation of winds and ocean currents. "We know from glacier studies in Greenland that climate change, when it happens, can come very quickly, in a matter of 20 or 40 years," said Svend Auken, the former Danish environment minister.

The nearly one-meter rise in sea levels, at the high end of the climate change panel's forecasts, means that some island states could disappear altogether. The Pacific Ocean state of Tuvalu is likely to be the first country to sink completely under the waves. Its 11,000 citizens already have started an exodus to New Zealand.