Climate change to go on for at least "1,000 years"

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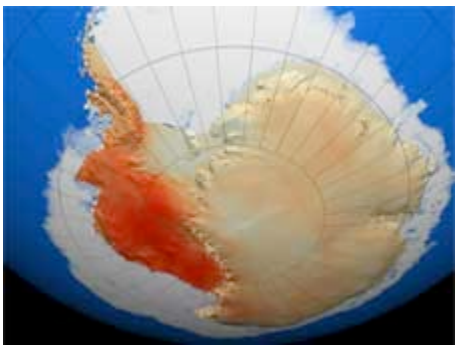
Courtesy University of Calgary
and World Science staff

Rising carbon dioxide levels in the Earth's atmosphere will cause unstoppable changes to the climate for at least the next 1,000 years, a new study suggests.

The findings have led researchers to estimate a collapse of the West Antarctic ice sheet by the year 3000, and an eventual rise in the global sea level of at least four metres (yards).



At the South Pole lies the Antartic Ice Sheet, shaded in red in the above diagram. It is considered vulnerable to melting due to global warming (Credit: NASA/GSFC Scientific Visualization Studio)

The study, to appear in the Jan. 9 advance online edition of the research journal *Nature Geoscience*, is billed as the first full climate model simulation to make predictions so far ahead. It's based on best-case, "zero-emissions" scenarios simulated by scientists from the Canadian Centre for Climate Modelling and Analysis at the University of Victoria, and at the University of Calgary, also in Canada.

"We created 'what if' scenarios," said researcher Shawn Marshall of the University of Calgary. "What if we completely stopped using fossil fuels and put no more [carbon dioxide] in the atmosphere? How long would it then take to reverse current climate change trends and will things first become worse?"

Excess carbon dioxide emissions, due to the burning of oil and other fossil fuels, are widely blamed by scientists as the main culprit for global warming.

The research team explored zero-emissions scenarios beginning in 2010 and in 2100.

The Northern Hemisphere fares better than the south in the computer simulations, with patterns of climate change reversing within the 1,000-year timeframe in places like Canada. At the same time parts of North Africa experience desertification as land dries out by up to 30 percent. Meanwhile, ocean warming of up to five degrees Celsius off of Antarctica is seen as likely to trigger widespread collapse of the West Antarctic ice sheet.

Researchers hypothesize that one reason for the difference between the North and South is the slow movement of ocean water from the North Atlanti c into the South Atlanti c. "The global ocean and parts of the Southern Hemisphere have much more inertia, such that change occurs more slowly," said Marshall. "The inertia in intermedia and deep ocean

currents driving into the Southern Atlanti c means those oceans are only now beginning to warm… [due to] emissions from the last century. The simulation showed that warming will continue rather than stop or reverse on the thousand-year time scale."

Wind currents in the Southern Hemisphere may also have an impact. Marshall said that winds in the global south tend to strengthen and stay strong without reversing. "This increases the mixing in the ocean, bringing more heat from the atmosphere down and warming the ocean."