

Temperatures of sea water fringing South Pole were tropical 50 million years ago

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(PhysOrg.com) -- The temperature difference between equatorial and polar sea waters was minimal during the extremely warm 'Greenhouse world' 60 to 50 million years ago. This is the main conclusion drawn by a team of scientists from Utrecht University, the Netherlands, the NIOZ Royal Netherlands Institute for Sea Research and the University of California, Santa Cruz. The team of scientists, headed by Peter Bijl, show that circum-Antarctic sea water exceeded 30°C at that time. The results were published in *Nature* this week.

The conclusions are based on analyses on sediments retrieved from the ocean floor east of Tasmania. This area bordered to Antarctica during the early Paleogene (60-35 milion years ago). Much [global warming](#)

research is focused on polar areas, because these are particularly sensitive to climate change.

Previously, scientists from Utrecht University and the Royal NIOZ presented in a suite of *Nature* and *Science* articles the manifestation of Greenhouse climates in the Arctic regions, with the invasion of tropical algae and sea surface temperatures of up to 24°C. Meanwhile, temperatures of waters fringing the Antarctic continent during the Greenhouse climates were a great unknown to climate scientists. The multidisciplinary research, published in *Nature*, now reached a breakthrough.

What emerges from these results is that the Greenhouse pole-to-equator [sea surface temperature](#) gradient was close to non-existent. After the warmest phase (about 50 million years ago), the world gradually cooled down to an 'Icehouse' state, like today. Along with this cooling, the temperature gradient turned more and more into its present day shape.

The interest to society is evident: the fossil Greenhouse world is generally considered to be a potential analogue for future climates. "The fossil Greenhouse world of 50 Million years ago is generally considered analogous to future climates", says Peter Bijl, paleo-climatologist at Utrecht University. "These field data imply that polar temperatures can be much higher than the IPCC computer models predict for a high-CO₂ world. In turn, [climate](#) change can be even more severe than the worst case scenario's of the IPCC."

More information: Letter in *Nature*: Early Palaeogene Temperature evolution of the Southwest Pacific Ocean, by Peter K. Bijl, Stefan Schouten, Appy Sluijs, Gert-Jan Reichert, James C. Zachos and Henk Brinkhuis.

Provided by Utrecht University ([news](#) : [web](#))

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