

# ANTARCTICA WAS HOME TO RAINFORESTS 90 MILLION YEARS AGO: STUDY

Relevant for: Geography | Topic: The Earth, its Evolution and Origin of Life on Earth

This acrylic painting shows the palaeo-environmental conditions that could be reconstructed for the drilling area. The painting was created on the basis of the diverse scientific evidence being obtained from the drill core. | Photo Credit: [Alfred-Wegener-Institut, James McKay under Creative Commons licence C-BY 4.0](#)

Researchers have unearthed evidence of rainforests near the South Pole 90 million years ago, a finding which suggests that the climate at this time was exceptionally warm with a higher level of carbon dioxide in the atmosphere than previously thought.

The scientists, including those from Imperial College London in the UK, discovered forest soil pertaining to a time between 145 and 66 million years ago within 900 kilometres of the South Pole.

In the study, [published in the journal Nature](#), they analysed preserved roots, pollen, and spores from this soil, and showed that the world at that time — the Cretaceous period — was a lot warmer than previously thought.

“The preservation of this 90-million-year-old forest is exceptional, but even more surprising is the world it reveals,” said study co-author Tina van de Flierdt from Imperial College London.

“Even during months of darkness, swampy temperate rainforests were able to grow close to the South Pole, revealing an even warmer climate than we expected,” van de Flierdt said.

According to the study, the carbon dioxide levels in the atmosphere were higher than expected during the mid-Cretaceous period, 115-80 million years ago, challenging current climate models of the period.

The mid-Cretaceous was the heyday of the dinosaurs but was also the warmest period in the past 140 million years, with temperatures in the tropics as high as 35 degrees Celsius, and sea level 170 metres higher than today, the scientists said.

However, they said, very little is known about the environment south of the Antarctic Circle at this time.

The scientists compared the current evidence of a temperate rainforest in the region to what is found in New Zealand today.

They said the finding is even more significant considering that the South Pole experiences only a four-month polar night, meaning for a third of every year there is no life-giving sunlight at all.

According to the researchers, the presence of the forest suggests average temperatures in this region were around 12 degrees Celsius, with little likelihood for the presence of an ice cap at the South Pole at the time.

The study noted that the evidence for the Antarctic forest is based on a core of sediment drilled into the seabed near the Pine Island and Thwaites glaciers in West Antarctica.

One section of the core, they said, caught their attention with its strange colour.

On scanning this section with an X-ray CT scan, the scientists discovered a dense network of fossil roots, which was so well preserved that they could make out individual cell structures.

The samples noted in the study also contained countless traces of pollen and spores from plants, including the first remnants of flowering plants ever found at these high Antarctic latitudes.

To reconstruct this ecology, the team assessed the climatic conditions under which the plants' modern descendants live, as well as analysing temperature and rainfall indicators within the sample.

They found that the annual mean air temperature was around 12 degrees Celsius.

Putting this in perspective, the researchers said this is roughly two degrees warmer than the mean temperature in modern-day Germany.

They believe the average summer temperatures may have been around 19 degrees Celsius and water temperatures in the rivers and swamps to be 20 degrees. According to the study, the amount and intensity of rainfall in West Antarctica at this time may have been similar to those in today's Wales.

The scientists concluded that about 90 million years ago the Antarctic continent may have been covered with dense vegetation, with no land-ice masses on the scale of an ice sheet in the South Pole region.

They believe the carbon dioxide concentration in the atmosphere was far higher than previously assumed for the Cretaceous period.

"Before our study, the general assumption was that the global carbon dioxide concentration in the Cretaceous was roughly 1000 ppm," said lead author Johann Klages from the Alfred Wegener Institute in Germany.

"But in our model-based experiments, it took concentration levels of 1120 to 1680 ppm to reach the average temperatures back then in the Antarctic," Klages said. PTI VIS VIS VIS 04021114

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