



# The Antarctica Challenge

Review Written by: [Michael Jessen](#)

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It is Earth's fifth largest continent, yet devoid of permanent human inhabitants. Bigger than the contiguous 48 United States and Mexico together, Antarctica is the coldest, windiest and driest place on the planet.

Containing approximately 87 percent of the world's ice and 70 percent of the world's fresh water, Antarctica is often represented on maps merely as outlined white space since it is 98 percent covered by an ice sheet that averages 2,164 metres (1.5 miles) in depth.

The remaining two percent of Antarctica is bare rock and constitutes Earth's largest desert. With under five centimetres (two inches) of precipitation per year, it averages less than Africa's Sahara Desert.

Antarctica's climate is characterized by temperatures rarely above freezing, high wind velocities, and frequent blizzards. High altitude and continuous darkness in winter combine to make the interior of this land mass the coldest place on Earth. In 1983 the world's lowest temperature, minus 89.6 degrees Celsius (-128.6 Fahrenheit) was recorded at the South Pole.

Yet during Antarctic summer, more solar radiation reaches the surface at the pole than is received at the equator in an equivalent period. In the dry, dust-free air, one can see for tens of miles in clear weather. Distances are deceptive and mirages are common.

Maps of Antarctica date back to the time of Roman geographer and astronomer Ptolemy who envisioned a land in the southern hemisphere to counterbalance that in the north to satisfy an ancient sense of proportion. Claimed to be discovered in 1820, Antarctica is mostly known through the exploits of a trio of adventuring explorers; Robert Falcon Scott, Ernest Shackleton, and Roald Amundsen. Today the world's most mysterious continent is home to about 1,000 scientific personnel during the winter, swelling to about 4,000 during the Antarctic summer.

Antarctica has long been perceived as a frigid, pristine part of the world and as such inhospitable to flora and fauna. The French nature documentary March of the Penguins introduced the world to the yearly journey of the continent's emperor penguins, receiving the 2005 Academy Award for Best Documentary Feature. In addition, adélie and chinstrap penguins inhabit the sea ice and open waters of Antarctica. The climate supports only a small community of land plants - two types of flowering plants and many

varieties of lichens and mosses - but the rich offshore food supply sustains penguins, aquatic mammals, and immense seabird rookeries of migrating petrels, skuas, terns, cormorants, and gulls. The largest and best-known of the Antarctic petrels are the albatrosses, which breed in tussock grass on islands north of the pack ice. With a wing span of three metres (10 feet), they roam freely over the westerly wind belt of the Southern Ocean.

But this ‘terra incognita’ at the base of our world has been undergoing rapid changes - changes that scientists conclude could have profound effects on the rest of Earth.

Recent climate change has driven significant changes in the physical and living environment of the Antarctic. Environmental change is most apparent in the Antarctic Peninsula. Adélie penguins, a species well adapted to sea ice conditions, have declined in numbers and been replaced by open-water species such as chinstrap penguins. Melting of perennial snow and ice covers has resulted in increased colonization by plants. A long-term decline in the abundance of Antarctic krill in the southwest Atlantic sector of the Southern Ocean may be associated with reduced sea ice cover. Albatrosses are declining in alarming numbers as they are drowned in the nets of long line fishermen.

Large changes have occurred in the ice cover of the peninsula. Many glaciers have retreated and around 10 ice shelves that formerly fringed the peninsula have been observed to retreat in recent years and some have collapsed completely. Furthermore, 87 percent of glaciers along the west coast of the peninsula have retreated in the last 50 years, and in the last 12 years most have accelerated.

The Antarctic region is an important regulator of global climate. The Southern Ocean is a significant sink for both heat and carbon dioxide, acting as a buffer against human-induced climate change. The sea ice that forms around the continent each winter controls the exchange of energy between the Sun and the Earth, and its partition between atmosphere and ocean. As sea ice forms, brine rejected from the ice increases the density of the upper ocean. These waters then sink and form the deep ocean currents that carry heat around the globe.

Antarctica made big headlines over three days in March 2002 when one of the most dramatic alterations to the map of the continent since the last ice age occurred. The 650-foot thick Larsen B floating ice shelf, larger than Luxembourg, had been attached to the peninsula for thousands of years. But at the end of that Antarctic summer, it fractured like a plate of glass, shattering into hundreds of huge icebergs that floated into the South Atlantic.

“Really we don’t think there is much doubt that the collapse of the Larsen B shelf was caused by man-made climate change,” says John King, chief climatologist at the [British Antarctic Survey](#) (BAS). From their base at Rothera, on Adelaide Island, BAS researchers have mapped in detail how a pulse of warmer air temperatures has pushed south across the peninsula over the past fifty years, lengthening the summer melt season, sending glaciers into retreat, and destabilizing ice shelves.

Antarctica started turning green over the southern summer of 2004. Beginning at its northern tip, great green swards of Antarctic hair-grass began forming extensive meadows in what was once home to only rock and ice. Then the air above Antarctica began behaving strangely. A 2006 study of archived data collected by weather balloons positioned above the continent over the previous thirty years revealed a heating of Antarctica's atmosphere three times higher than the global average.

March 2007 to March 2009 was the fourth International Polar Year (IPY), following those in 1882-83, 1932-33, and 1957-58. In order to have full and equal coverage of both the Arctic and the Antarctic, an IPY covers two full annual cycles. Organized through the International Council for Science and the World Meteorological Organization, IPY 2007-09 involved more than 200 projects with thousands of scientists from more than 60 nations examining a wide range of physical, biological, and social research topics.

Canadian filmmaker Mark Terry, president of Toronto's [Polar Cap Productions](#), decided to make a documentary on Antarctica focusing on studies made there during the most recent IPY. His film, **The Antarctica Challenge: A Global Warning**, brings its audience face to face with what global warming actually looks like in one of the most delicate ecosystems on Earth.

Already nominated for Best Picture in the Climate Change category of the New Delhi Environmental and Wildlife Film Festival to be held October 27 to 31, Terry's film premieres at the Blue Planet Film Festival in Santa Monica, September 5, 6 and 7. It will also be shown September 9 to 12 at the International Film Festival in Tipperary, Ireland, to the [Antarctic and Southern Ocean Coalition](#) in Washington, D.C. on September 22, the MIPCOM television and film marketplace in Cannes, France from October 5 to 9 and the Planet in Focus Film Festival in Toronto October 21 to 25.

Its most influential showing, however, could be in Copenhagen, Denmark in December. Terry's film has been chosen to be screened before world leaders at the United Nations Framework Convention on Climate Change that will seek to forge a successor agreement to the Kyoto Protocol.

Terry's documentary explores new discoveries about the ozone layer, diminishing populations of penguins and other marine life, the greening of the world's largest desert, and global warming.

Footage of field study and interviews with scientists stationed in Antarctica reveal some startling data never before included in a television documentary for the public at large. Here are just a few of the findings **The Antarctica Challenge** showcases:

- Several species of insect life indigenous to Antarctica are facing extinction due to the increase of temperature caused by the increasing hole in the ozone layer situated over the continent.
- Other species of insect life have evolved a unique means of surviving the deadly increase in ultra-violet rays from the sun. They have developed a hormone that acts as a sunscreen lubricant protecting their bodies.
- Many varieties of starfish have stopped reproducing and their numbers are exponentially diminishing as they no longer procreate. Their species is

expected to face extinction in the coming years due to a two-degree increase in water temperature.

- Certain varieties of penguins are exhibiting a disturbing behavior pattern. Groups gather away from their feeding and nesting grounds for a period of time. They then split up and return to their respective areas, except for one. This sole penguin turns and faces the interior on the continent and begins a march that doesn't end until he dies.

There is evidence to suggest that all these catastrophic changes to the wildlife of Antarctica are directly related to the warming temperatures and the unprotected solar rays bombarding the continent over the past five years.

“We were all stunned at the findings being made there this past year,” says Terry. “From penguin suicide to grass growing in the world’s largest desert, the environmental face of Antarctica is changing faster than anyone had previously thought - and the impact on us is imminent.”

Polar Cap Productions (<http://www.youtube.com/user/polarcapproductions>) formed a partnership with the United Nations Environment Programme to present the screening as part of the United Nations ‘Seal the Deal’ campaign, a call to action to clinch an ambitious and effective agreement on climate change.

“Of all the canaries in the climate coal mine, the polar regions and the mountain glaciers are singing the hardest and the loudest,” said Achim Steiner, UN Under-Secretary General and Executive Director of the United Nations Environment Programme. “Mark Terry’s new climate change documentary underlines these realities with some of the latest and increasingly sobering scientific findings, providing further stark evidence as to why governments need to Seal the Deal in Copenhagen.”

The conference, held from December 7 to 18, will be attended by nearly 190 world leaders and ministers and about 11,000 delegates.

It is planned to screen the film’s trailer on a giant video screen in the centre of Copenhagen, and on the ‘Climate Express’ train commuting delegates between Brussels and Copenhagen.

Terry said there is an historic trend of temperature increase in Antarctica that indicates it’s going to continue for the next 100 years.

Recently, researchers at the University of Leeds writing in the journal *Geophysical Research Letters* said the Pine Island Glacier in West Antarctica is thinning at a rate four times faster than just a decade ago. The glacier is the largest in West Antarctica and at 175,000 square kilometres is roughly the size of the province of New Brunswick and the island of Newfoundland combined.

Professor Andrew Shepherd, a co-author of the research, suggested warming waters around the continent are likely responsible for the thinning of the glacier at a rate of up to

16 metres a year. The resulting ice melt could have implications on estimates of sea level rise around the world, Shepherd said.

Speaking about his film, Terry says, "I think the important thing is to have the scientists talk very frankly, bluntly and honestly about both the good and the bad of what they've discovered down there."

"I didn't want to go in with an agenda," he adds. "I simply wanted to do a reportage of what the scientists were discovering right now today."

There is no denying that this is happening and there's no stopping it from happening but they are trying to find a way that would save us and protect us," Terry says.

"The main thing they're trying to do now is educate. They have to get the word out and films like this will help do that."

**The Antarctica Challenge** could become the 'little engine that could' of the film world, propelling the continent at the bottom of the world to the top of the planet's climate change agenda.