

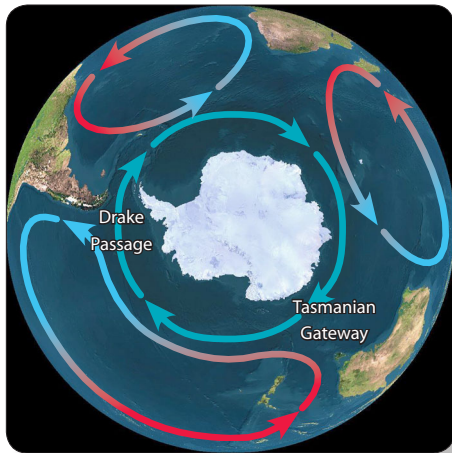
# Decoding Antarctica's Climate History

Scientists are working to uncover and decode Antarctica's climate secrets. In order to piece together a complete story, they study tiny things such as the different types of oxygen molecules in the shells of marine fossils, and large things such as changes in global sea level. ANDRILL's rock cores contain pieces of evidence that are key to answering questions about Antarctica's past climates.

## The Role of Plate Tectonics

Over time, movements of Earth's tectonic plates have changed the face of our planet. Many continents have changed shapes and locations. Continents have moved together to form large supercontinents, then moved apart again.

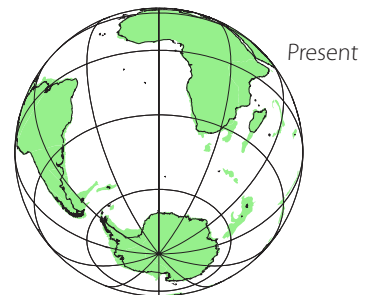
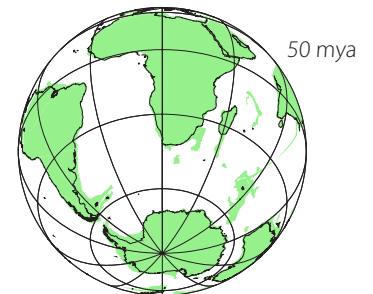
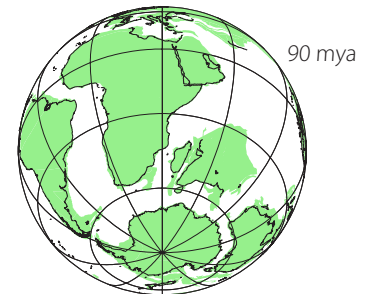
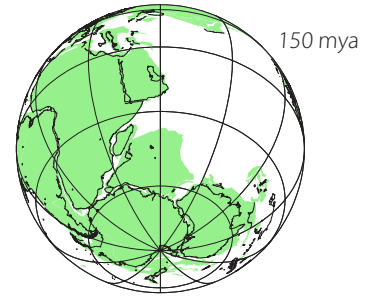
The continent of Antarctica has stayed near the South Pole for the past 120 million years. It was once part of a huge southern continent called Gondwana. By around 40 million years ago, Africa, India, Australia, and South America were all moving away from Antarctica, leaving it behind.



The Antarctic Circumpolar Current (ACC) flows around Antarctica, blocking warm waters from other oceans from reaching Antarctica.

This rearrangement of continents resulted in a new ocean around Antarctica. That ocean developed a strong current that flows in a circle around the continent. The fast-moving cold water blocked warmer water from the Pacific, Atlantic, and Indian Oceans from reaching Antarctica's shores. By about 35 million years ago, the entire continent was isolated from the rest of the planet's warmth. Temperatures on Antarctica plunged, and they remained low enough that snow began to accumulate and ice sheets began to grow.

In this final unit, you'll build an interactive graph and decode rock cores to show how temperature has changed over time. You'll also make a model to explore how Antarctica might look in the future. You'll end by comparing the potential for rising sea level in two models.

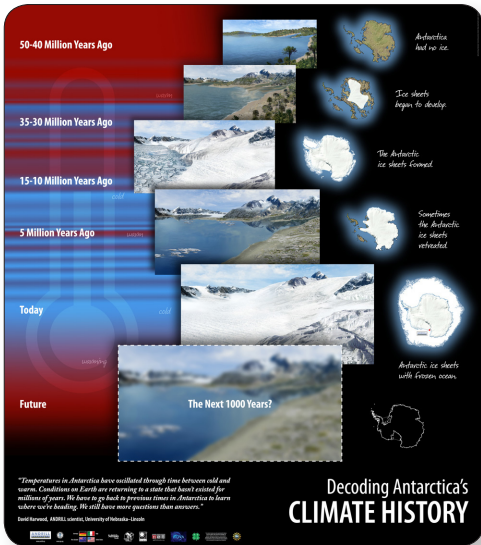


The breakup of Gondwana, from 150 million years ago to the present. Courtesy of the Ocean Drilling Stratigraphic Network, University of Bremen.

# Introduction

# Unit 5 - Decoding Antarctica's Climate History

## Unit 5 Banner



Examine and discuss the *Decoding Antarctica's Climate History* banner. Electronic versions of the banners are available at <http://www.andrill.org/flexhibit>.

## Unit 5 Podcasts

The following podcasts show information that goes along with this unit. They can be viewed or downloaded from <http://www.andrill.org/flexhibit>.

- 🔊 CO<sub>2</sub> and Climate Change
- 🔊 Antarctic Environments Through Time
- 🔊 The Larsen B Ice Shelf

## Activities in this unit. . .

### Activity 5A - Charting Temperature Changes ..... 173

Build a display to show how Antarctica's climate has changed over time. Read climate clues from rocks and show your interpretation on the display.

### Activity 5B - What If the Ice Shelves Melted? ..... 195

Make a model of Antarctica and its ice sheets. Watch what happens to the ice sheets when you remove the major ice shelves.

### Activity 5C - How Does Melting Ice Affect Sea Level? ..... 205

Compare what happens when ice melts on land with what happens when floating ice melts.