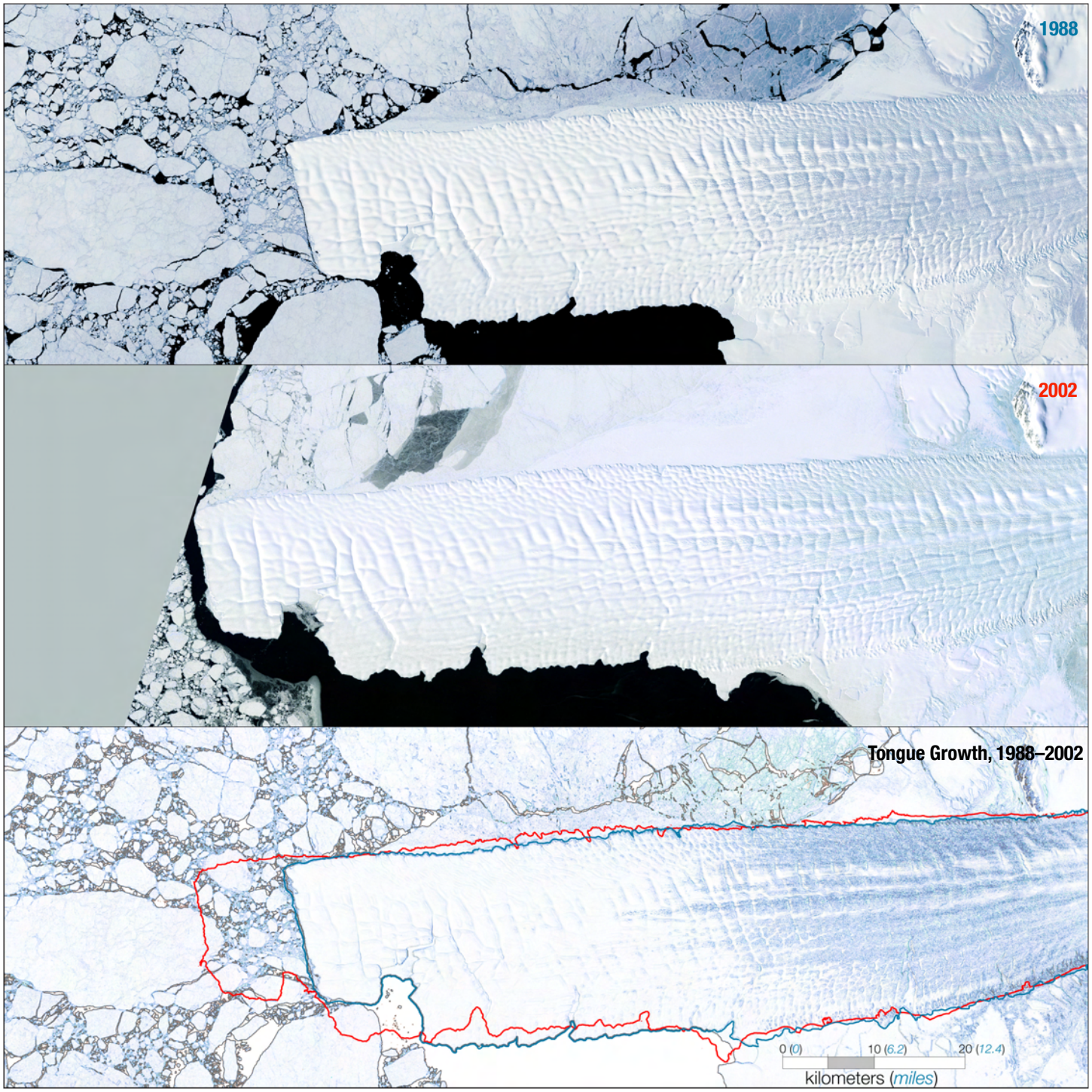
National Aeronautics and Space Administration

Antarctica's Drygalski Ice Tongue



The 20-kilometer wide floating slab, known as the Drygalski Ice Tongue, is being pushed into McMurdo Sound, fed by the David Glacier in East Antarctica. Although the sea eats away its ragged sides, the Tongue continues to grow, as shown in this image progression from 1988 (top) to 2002 (middle). Drygalski's 10-kilometer growth over those 14 years is shown on the bottom picture (red line), and is one measure of how fast some of the Antarctic ice sheet is moving into the sea.

USGS science for a changing world

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Goddard Space Flight Center

A Giant Tongue of Ice

In these satellite images, the Drygalski Ice Tongue juts out from the icy land of Antarctica into McMurdo Sound like a pier. Drygalski is a floating extension of a land-based glacier. It is one of the largest floating objects in the world, and contains ice that first fell as snow on the ice sheet thousands of years ago. Change is the norm for all glaciers, even for a behemoth the size of Drygalski. Glacier creation begins when more snow falls than melts, and gradually builds up over time. Eventually the weight of the snow squeezes out the air in the layers of snow beneath, until the compressed snow turns into ice. Forced by the weight of the accumulating ice, the glacier flows slowly downhill to lower elevations like a river in slow motion. Ice tongues like Drygalski normally change their size and shape as waves and storms weaken their ends and sides, breaking off pieces to float as icebergs.

Seeing Changes from Space

Viewing this glacier from space allows us to see the scale and scope of changes that we could not see any other way. From 1988 until 2002, Drygalski was pushed about 10 kilometers (6.2 miles) into McMurdo Sound. We can see these changes because of the long record of Landsat satellite observations. How difficult would it be to make such measurements from the ground?

Floating ice sits low in the water with 90 percent of its mass submerged below the waterline. Consider the power that has pushed this enormous tongue of ice so far out to sea!

Spectacular Views of the Coldest Continent

As dramatic as they are, these images of Drygalski provide only a glimpse of just one small portion of the "frozen continent." For years, scientists have longed for a complete high-resolution image of Antarctica in order to study its features in detail. Scientists are particularly interested in the structure of glaciers and the effects climate change has on them.

To meet this critical need, data from over a thousand Landsat 7 satellite images like those featured here were joined into the most detailed, high-resolution natural-color map ever produced of Antarctica. The Landsat Image Mosaic of Antarctica (LIMA) offers views of the southernmost continent on Earth in ten times greater detail than previously possible. Some locations in LIMA have not even been mapped before!

"This is like having a room aboard Landsat to see the whole ice sheet, yet being able to swoop down to see details as if one were just above the ice sheet's surface," says Robert Bindschadler, NASA scientist and Antarctic expert. Using LIMA, anyone can zoom in to a specific Antarctic region and explore it. NASA, the U.S. Geological Survey, the National Science Foundation and the British Antarctic Survey all contributed to the creation of LIMA.

International Polar Year

LIMA is the first large data set commissioned for the International Polar Year (IPY), a global science and education campaign, which ends March 1, 2009. As part of the IPY, people can visit exhibitions, learn and teach about the polar regions, watch films and documentaries, and contact scientists in the field.

About Landsat

Landsat satellites provide an unparalleled record of Earth's varying landscapes to help us understand how Earth is changing and what those changes mean for life on our planet. The consistency of Landsat's data from sensor to sensor and year to year, makes it possible to trace changes of individual areas of land from 1972 to the present. Landsat sensors have captured over two million digital photographs of Earth's continents and surrounding coastal regions. These digital images include information from wavelengths of light both visible and invisible to human eyes. NASA designs the Landsat Earth-observing satellites; USGS manages the satellites, archives the imagery, and makes the data available to all interested users.

The Drygalski ice tongue location on Antarctica. The land and ice boundaries on this map are approximate. LIMA will help establish more accurate cartographic information about Antarctica.

Explore LIMA and Antarctica:
http://lima.nasa.gov/

International Polar Year:
http://www.us-ipy.gov/

Landsat Program:
http://landsat.gsfc.nasa.gov
http://landsat.usgs.gov

For more products like this one:
http://landsat.gsfc.nasa.gov/education/resources.html
(Scroll down to "Landsat Lithographs.")