NASA-conceived map of Antarctica lays ground for new discoveries

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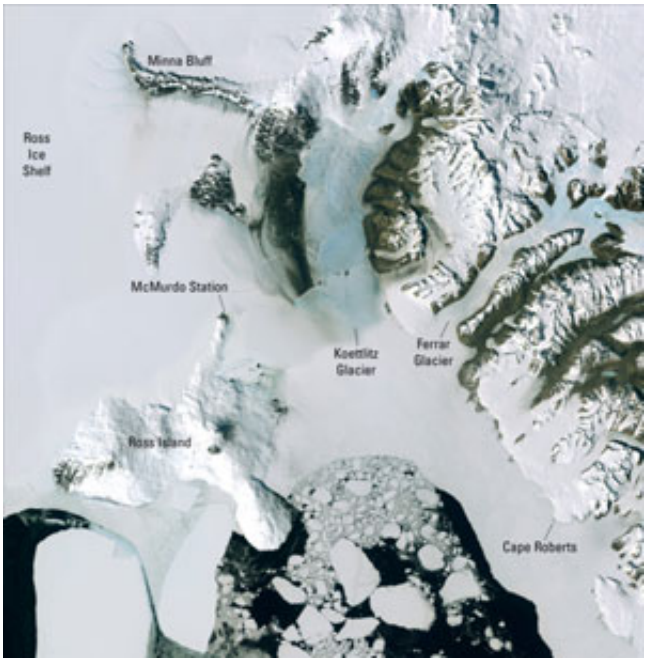

As can be seen in this sample Landsat image of the area around McMurdo Station, the new mosaic reveals in unprecedented detail the ice shelves, mountains, glaciers make Antarctica a fascinating and important place to study. Credit: USGS

A team of researchers from NASA, the U.S. Geological Survey, the National Science Foundation and the British Antarctic Survey unveiled a newly completed map of Antarctica today that is expected to revolutionize research of the continent's frozen landscape.

The Landsat Image Mosaic of Antarctica is a result of NASA's state-of-the-art satellite technologies and an example of the prominent role NASA continues to play as a world leader in the development and flight of Earth-observing satellites.

The map is a realistic, nearly cloudless satellite view of the continent at a resolution 10 times greater than ever before with images captured by the NASA-built Landsat 7 satellite. With the unprecedented ability to see features half the size of a basketball court, the mosaic offers the most geographically accurate, true-color, high-resolution views of Antarctica possible.

"This mosaic of images opens up a window to the Antarctic that we just haven't had before," said Robert Bindschadler, chief scientist of the Hydrospheric and Biospheric Sciences Laboratory at NASA's Goddard Space Flight Center in Greenbelt, Md. "It will open new windows of opportunity for scientific research as well as enable the public to become much more familiar with Antarctica and how scientists use imagery in their research. This innovation is like watching high-definition TV in living color versus watching the picture on a grainy black-and-white television. These scenes don't just give us a snapshot, they provide a time-lapse historical record of how Antarctica has changed and will enable us to continue to watch changes unfold."

Researchers can use the detailed map to better plan scientific expeditions. The mosaic's
higher resolution gives researchers a clearer view over most of the continent to help interpret changes in land elevation in hard-to-access areas. Scientists also think the true-color mosaic will help geologists better map various rock formations and types.

To construct the new Antarctic map, researchers pieced together more than a thousand images from three years of Landsat satellite

observations. The resulting mosaic gives researchers and the public a new way to explore Antarctica through a free, public-access Web portal. Eight different versions of the full mosaic are available to download.

In 1972, the first satellite images of the Antarctic became available with the launch of NASA's Earth Resources Technology Satellite (later renamed Landsat). The series of Landsat satellites have provided the longest, continuous global record of land surface and its historical changes in existence. Prior to these satellite views, researchers had to rely on airplanes and survey ships to map Antarctica's ice-covered terrain.

Images from the Landsat program, now managed by the U.S. Geological Survey, led to more precise and efficient research results as the resolution of digital images improved over the years with upgraded instruments on each new Earth-observing satellite.

"We have significantly improved our ability to extract useful information from satellites as embodied in this Antarctic mosaic project," said Ray Byrnes, liaison for satellite missions at the U.S. Geological Survey in Reston, Va. "As technology progressed, so have the satellites and their image resolution capability. The first three in the Landsat series were limited in comparison to Landsats 4, 5, and 7."

Bindschadler, who conceived the project, initiated NASA's collection of images of Antarctica for the mosaic project in 1999. He and NASA colleagues selected the images that make up the mosaic and developed new techniques to interpret the image data tailored to the project. The mosaic is made up of about 1,100 images from Landsat 7, nearly all of which were captured between 1999 and 2001. The collage contains almost no gaps in the landscape, other than a doughnut hole-shaped area at the South Pole, and shows virtually no seams.

"The mosaic represents an important U.S.-U.K. collaboration and is a major contribution to the International Polar Year," said Andrew Fleming of British Antarctic Survey in Cambridge, England. "Over 60,000 scientists are involved in the global International Polar Year initiative to understand our world. I have no doubt that polar researchers will find this mosaic, one of the first outcomes of that initiative, invaluable for planning science campaigns."

NASA has 14 Earth-observing satellites in orbit with activities that have direct benefit to humankind. After NASA develops and tests new technologies, the agency transfers activities to other federal agencies. The satellites have helped revolutionize the information that emergency officials have to respond to natural disasters like hurricanes and wildfires.

The Landsat Image Mosaic of Antarctica is now available on the Web at: lima.usgs.gov

Source: Goddard Space Flight Center, by Gretchen Cook-Anderson