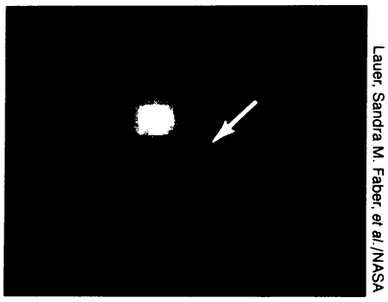
Astronomy

Andromeda's twin peaks

With dust obscuring the center of our own galaxy, astronomers sometimes turn for answers to Andromeda, the nearest galaxy similar to the Milky Way. The core of this spiral neighbor, researchers reason, should contain features resembling those at the heart of our galaxy.



Lauer, Sandra M. Faber, et al./NASA

Hubble's false-color image shows two luminous spots at the core of the Andromeda galaxy. The dimmer spot (arrow) had never before been seen.

But Andromeda may not fully merit its reputation as a Milky Way look-alike. Newly released images, taken in 1991 by the Hubble Space Telescope, suggest that Andromeda has two distinct clusters of stars at its core. The Milky Way has just one.

The brighter cluster, visible from Earth, was thought to lie at Andromeda's exact center. But Hubble has uncovered a second, dimmer nucleus of stars at the true center of the galaxy. The brighter cluster is offset from the dimmer center by about 5 light-years, says Tod R. Lauer of the National Optical Astronomy Observatories in Tucson, Ariz.

When Lauer and his colleagues first examined the Hubble images, they were hoping to find an intense spike of light — evidence supporting the notion that a black hole lurks at Andromeda's heart. Instead, they found two less intense peaks.

Other spiral galaxies have double centers, but Andromeda's twin peaks are more difficult to explain, Lauer says.

The brighter cluster could represent the remnant of a smaller galaxy that collided with Andromeda and was swallowed up by it a billion or so years ago, he says. However, the black hole thought to lie at Andromeda's center would have torn apart the remnant core in just a few hundred thousand years. The remnant might have survived longer if it had its own black hole, but its gravity would likely have distorted the true center of Andromeda, and the images don't show this, he adds.

Alternatively, the two peaks might actually be part of the same star cluster. A thick ring of dust cutting across the galaxy's center could create the illusion of two separate peaks, Lauer notes. But this explanation also poses problems, he says. Dust grains of average size would scatter visible light, causing the galaxy to appear redder — brighter at longer wavelengths. Alas, Hubble detected no such effect.

A ring of larger dust grains could create the twin-peak illusion without producing reddening. But the dominance of larger grains at Andromeda's core would pose another puzzle: Why and when were the more typical, finer dust grains destroyed?

For now, admits Lauer, the Hubble images "raise more questions than they answer."

Radio days: VLBA turns on

Radio astronomy will reach a milestone on Aug. 20 when the Very Long Baseline Array (VLBA), the world's largest astronomical instrument, begins formal operation. Featuring 10 receivers spread across 5,000 miles of U.S. territory and working as a single radio telescope, the VLBA has the ability to discern radio sources as small as the letters on this page from a distance of 3,000 miles. The network of telescopes has been under construction since 1986. Astronomers made their first observations with the completed system on May 29, when they examined a nearby star-forming region of our galaxy.

Earth Science

Alaskan glacier starting to surge

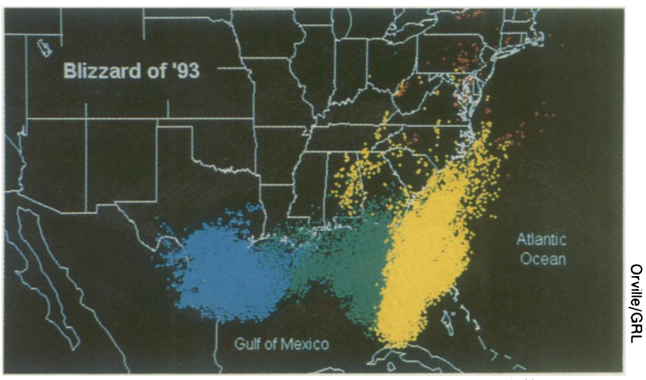
From the air, North America's largest glacier appears perfectly still, like a vast river of milk frozen in place. But the Bering Glacier in southern Alaska is actually speeding downslope. For the first time in 26 years, much of the glacier has started to surge, says Bruce F. Molnia of the U.S. Geological Survey in Reston, Va.

Surging occurs when a large fraction of a glacier accelerates, in some cases reaching speeds 100 times greater than normal. Glaciologists believe surging results when water buoys the glacier off the bedrock, reducing friction on the ice. Researchers first noticed evidence of the Bering surge in early June. Normally, this glacier moves at a rate of about 3 meters per day. Scientists are now trying to gauge its current speed and determine how much of it is surging.

The 191-kilometer-long glacier entered a similar phase of rapid movement in the late 1950s and again in 1965 through 1967. Prior to those events, it had surged periodically around 1900, 1920, and 1940, with evidence of previous episodes going back several centuries, says Molnia. The current surge could produce an abnormal number of icebergs and cause local flooding.

A shocking side to the blizzard of '93

The mammoth blizzard that buried the East Coast with snow in mid-March also generated record-breaking amounts of lightning. Within two days, sensors along the storm track detected more than 59,000 flashes from cloud to ground, reports Richard E. Orville of Texas A&M University in College Station.



Orville/GRL

Colored dots trace locations of lightning flashes at different times during the March storm. Each color represents a 12-hour time block. For reasons not yet known, the cloud-to-ground flashes dwindled as the storm moved north of the Carolinas.

The blizzard developed over Texas and the Gulf of Mexico and then rolled straight up the East Coast between March 12 and 14. It pounded Florida with heavy winds and tornadoes and dropped record snowfall farther north, causing 200 deaths.

Compared with summer storms, winter blizzards do not normally create much lightning. But sensors recorded a surge in lightning strikes as the blizzard gained strength, peaking at 5,100 flashes per hour on March 13, Orville reports in the July 9 GEOPHYSICAL RESEARCH LETTERS. That exceeds the highest flash rate ever reported in the scientific literature for any storm, summer or winter — a record that stood at 3,300 flashes per hour. Orville notes, however, that he has seen unpublished data on summer storms with 9,100 flashes per hour.

Researchers have yet to figure out why the March blizzard sparked so many bolts. Most winter storms lack the strong vertical air currents that build tremendous electric charges in clouds, but this one clearly did not fit the usual pattern.