Lunar Geminids

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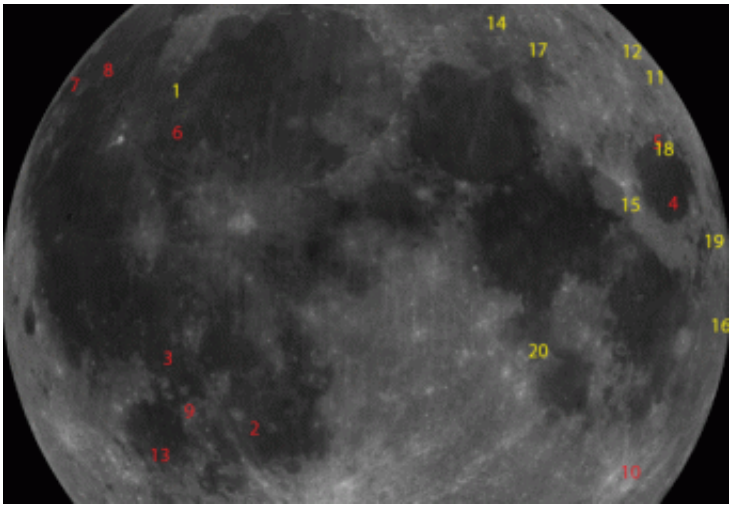

Lunar impacts since Nov. 2005. Numbers 14-16 and 19-20 are Geminids. Number 18 is a probable Geminid. Credit: NASA Meteoroid Environment Group.

Another meteor shower, another bunch of lunar impacts... "On Dec. 14, 2006, we observed at least five Geminid meteors hitting the Moon," reports Bill Cooke of NASA's Meteoroid Environment Office in Huntsville, AL. Each impact caused an explosion ranging in power from 50 to 125 lbs of TNT and a flash of light as bright as a 7th-to-9th magnitude star.

The explosions occurred while Earth and Moon were passing through a cloud of debris following near-Earth asteroid 3200 Phaethon. This happens every year in mid-December and gives rise to the annual

Geminid meteor shower: Streaks of light fly across the sky as rocky chips of Phaethon hit Earth's atmosphere. It's a beautiful display.

The same chips hit the Moon, of course, but on the Moon there is no atmosphere to intercept them. Instead, they hit the ground. "We saw about one explosion per hour," says Cooke.

How does a meteoroid explode? "This isn't the kind of explosion we experience on Earth," explains Cooke. The Moon has no oxygen to support fire or combustion, but in this case no oxygen is required: Geminid meteoroids hit the ground traveling 35 km/s (78,000 mph). "At that speed, even a pebble can blast a crater several feet wide," says Cooke. "The flash of light comes from rocks and soil made so hot by impact that they suddenly glow."

Cooke's group has been monitoring the Moon's nightside (the best place to see flashes of light) since late 2005 and so far they've recorded 19 hits: five or six Geminids, three Leonids, one Taurid and a dozen random meteoroids (sporadics). "The amazing thing is," says Cooke, "we've done it using a pair of ordinary backyard telescopes, 14-inch, and off-the-shelf CCD cameras. Amateur astronomers could be recording these explosions, too."

Indeed, he hopes they will. The NASA team can't observe 24-7. Daylight, bad weather, equipment malfunctions, vacations—"lots of things get in the way of maximum observing." Amateur astronomers could fill in the gaps. A worldwide network of amateurs, watching the Moon whenever possible, "would increase the number of explosions we catch," he says.

To that end, Cooke plans to release data reduction software developed specifically for amateur and professional astronomers wishing to do this type of work. The software runs on an ordinary PC equipped with a

digital video card. "If you have caught a lunar meteor on tape, this program can find it. It eliminates the need to stare at hours of black and white video, looking for split-second flashes."

More data will help NASA assess the meteoroid threat as the agency prepares to send astronauts back to the Moon.

Source: by Dr. Tony Phillips, Science@NASA