Columbia University Astronomer Offers New Theory Into 400-year-old Lunar Mystery

Posted by Guy Pirro on 7/4/2007 3:59 PM

An image of a Transient Lunar Phenomena (TLP) taken in 1953 by the Columbia University Department of Astronomy. The TLP is the small, bright spot in the center of the image. (Image Credit: Columbia University)

| 1 Comments... |

Columbia University astronomy professor Arlin Crotts thinks he has solved a 400-year-old mystery: the origin of strange optical flashes often reported as appearing on the moon's surface.

Transient Lunar Phenomena (TLPs), in which the lunar surface reportedly changes in brightness, blurriness or color, have been photographed and observed by thousands of astronomers over the centuries. Yet explanations of why they occur and even their reality as true lunar phenomena have been hotly debated. The TLPs typically cover a space of a few kilometers and last for several minutes.

Crotts has uncovered a strong statistical relationship between TLPs and so-called outgassing events on the lunar surface. Outgassing occurs when gases trapped beneath a moon or planet are released and, if only briefly, become part of the object's atmosphere. A key component of this gas is radon.

"People over the years have attributed TLPs to all sorts of effects: turbulence in Earth's atmosphere, visual physiological effects, atmospheric smearing of light like a prism, and even psychological effects like hysteria or planted suggestion" says Crotts, "but TLPs correlate strongly with radon gas leaking from the moon. No earth-bound effect can fake that."

To arrive at his theory, Crotts correlated TLPs with known gas outbursts from the lunar surface as seen by several spacecraft, particularly NASA's Apollo 15 mission in 1971 and the robotic Lunar Prospector in 1998. What he discovered was a remarkable similarity in the pattern of outgassing event locations recorded by spacecraft across the face of the moon and reported TLP sites.

The pattern was further strengthened after Crotts performed a statistical test to rid the sample list of false reports and one time events that might not represent true outgassing sources. "The result," says Crotts "shows that some lunar event sites that were the focus of great observer excitement over recent decades disappeared from the more highly refined list of TLP sites." Crotts used two catalogs of such sightings amassed and edited three decades ago by now retired astronomers Barbara Middlehurst and Winifred Cameron.

Crotts says this research might lead to optical imaging of the lunar surface that could monitor how, when and where gas escapes from the moon. While the exact composition of this gas is largely unknown, he explains, hints from previous measurements indicate that it might contain substances beneficial for future moon explorations, especially water.

Until now, Crotts says two factors have worked against researchers solving the mystery of TLPs. Historically, outgassing has often been discussed by scientists, but many have considered the moon volcanically dead despite moonquakes and episodes of gas, such as argon, observed coming from the lunar surface. Another deterrent to researchers is the daunting volume of visual data associated with TLPs – a fact that plays to Crotts' particular research interest and skills.

Along with collaborators Professors Paul Hickson from the University of British Columbia, and Thomas Pfrommer and Cameron Hummels of Columbia, Crotts recently built the robotic camera at Cerro Tololo Inter-American Observatory in northern Chile. It will automatically scan the moon for TLPs every few seconds and produce an unbiased map of the distribution, free of potentially flawed sightings due to human error, poor equipment, or improperly recorded observations that have dominated TLP studies until now. The scientists are planning even more monitors and hope they will establish with much greater accuracy the exact locations of gas leaks on the moon.

Crotts says improved TLP maps are already pointing to intriguing features on the lunar surface.

For more information:

http://www.columbia.edu/cu/news/07/06/lunar.html