

## Mars Weathercam Helps Find Big New Crater

Leslie Tamppari: The Mars Reconnaissance Orbiter--or MRO--that I work on has recently discovered the biggest impact crater in the solar system that's been confirmed with before-and-after imaging. The diameter of this crater is about half the length of a football field. My colleague Bruce Cantor at Malin Space Science Systems discovered this by using the Mars Color Imager, or MARCI, which takes daily global weather maps.

He observed a large dark spot that he wasn't sure had ever been there before. Searching through many of the images, Bruce was able to go back in time to try to pin down if this spot was there on one day and not on another day. The spot was not there on March 27, 2012, but did show up on the next day.

He suspected this spot to have been caused by an impact event. Using the Context Camera we were able to take higher-resolution images. And we were able to see two craters where that dark spot occurred. Comparing that image to an earlier image of that same area, we were able to see that the earlier image did not show the craters, and so these were fresh craters.

We have an even higher-resolution camera--HiRISE--able to resolve features as small as a kitchen table. Using the HiRISE camera we were able to see a dozen or so smaller craters scattered near the two bigger ones. The small craters and the two larger ones may have been caused by an impactor coming through the atmosphere and breaking into many pieces before hitting the ground. The HiRISE camera also revealed that there were many landslides in the area that are probably causing the darkening which was seen by the MARCI images. These landslides could have been caused by a shock wave from an explosion in the atmosphere or by the ground impacts that excavated the craters.

Between the Mars Reconnaissance Orbiter and the other Mars orbiters, we've discovered about 400 fresh impact craters confirmed with before and after imaging. However, this is the only time that we've seen a fresh impact using the MARCI weather camera and the only time that we've been able to pin down the time of impact to such a small time window of one Martian day or "sol."

We're interested in understanding the current rate that impactors are hitting Mars and the other planets. And we also are interested in: what are they excavating from the subsurface? And in some cases they're excavating water ice. And that tells us where on the planet subsurface water ice exists.