



The Sky is Falling! Tales from Outer Space

By Cathryn Hoyt (with assistance from Blaine Hall and Jim Whitford-Stark)

The sky is falling, and it's big news. From the 2,500-year-old folktale of Chicken Little, to the millions of dollars spent today on monitoring "near-earth asteroids," it's apparent that people are unnerved by the thought of a large, fast-moving object falling from the sky. So what are the chances that a killer asteroid might land in west Texas? If the past is any clue, perhaps better than you think.

As you travel north on Highway 385 out of Marathon, you'll pass through the grasslands of the Marathon Basin and up and over the Glass Mountains. As you descend, you'll see a small group of tree-covered hills to the northeast. These hills—known locally as the Sierra Madera—aren't really spectacular. In fact, you've probably driven past them many times without giving them a second thought.

But next time you make the trip between Marathon and Fort Stockton, pull over and really look at Sierra Madera. The hills aren't spectacular, but on closer inspection, you'll notice that they're...different. They rise about 600 feet above the desert floor, and a map will show you that the Sierra Madera is exceptionally round, especially compared to the linear Glass Mountains.

Then look around you. You'll notice that you and the Sierra Madera sit in a bowl-shaped depression. About two miles away is a ring of hills that rise slightly above the general level of the plains and encircle Sierra Madera. The ring of hills, the bowl-shaped depression and the Sierra Madera are collectively known as an "astrobleme" or a scar left on the surface of the earth by an asteroid impact.

Although geologists are still working out the details, there is general consensus that Sierra Madera was formed about 65 million years ago, when an asteroid or perhaps a comet came streaking from space and exploded above the plains. The shock wave from the explosion created a crater about 8 miles in diameter. The rock from the crater was thrown up and out creating the ring of low hills that surround the Sierra Madera.

The Sierra Madera itself was created when overlying pressure from the center of the crater was released and the oldest rocks were uplifted over 4000 ft. into a dome-like structure. 65 million years of erosion has removed any of the materials directly related to the explosion, weathered the dome into hills, and filled much of the crater with sediment, but enough of it remains to provide some thought-provoking moments about what would happen if the sky did fall on your next drive to Fort Stockton.

Sierra Madera is on private ranch land and is not accessible to the public, but if you want to walk into a meteor crater, head northeast towards Odessa. Here you'll find the second largest meteor crater in the United States and the sixth largest in the world.

The Odessa Crater and four smaller craters nearby, were formed about 25,000 years ago when a shower of nickel-iron meteorites collided with the earth leaving impact and explosion craters spread across a 2-mile area. Recent research by the University of Texas indicates that the largest crater, the Odessa Crater, was created by a meteor over 50 feet in diameter that arrived at high speed and at a near-grazing angle. Over 100,000 cubic yards of crushed rock were ejected from the crater by the energy released at impact, creating a funnel-shaped depression approximately 550 feet in diameter and about 100 feet in depth.

Although many people have searched for the meteorite that created the Odessa Crater, very little material has been found associated with the crater itself. Geologists now believe that the meteorite was traveling at such a high rate of speed that it exploded and vaporized upon contact with the earth's surface creating an explosion crater rather than a true impact crater.

The site, now designated as a National Natural Landmark, has a small museum and visitors center with exhibits on meteorites, tektites, and other meteorite impact products. A trail with interpretive signage guides you through the crater itself. The Odessa Meteor Crater Visitor Center is 9 miles southwest of Odessa off Interstate 20.

If craters that are 65 million years old, or even 25,000 years old, don't have you behaving like Chicken Little, think about this. Just about 10 years ago, residents in Monahans were enjoying a quiet Sunday afternoon when they heard a loud boom. Looking to the skies, some reported seeing a flash of light or several flashes of light. A 2.5 pound meteorite fell to earth with a thud about 25 feet from a group of boys playing basketball. When they found the meteorite, it was still warm to the touch and burned black.

Everett Gibson, a meteorite specialist at NASA's Johnson Space Center heard about the discovery, and by noon the next day had traveled halfway across the state to examine the meteorite. He persuaded the city of Manahans to lend NASA the meteorite for research and within 48 hours of impact, it was in a lab revealing unheard of secrets.

Although a relatively ordinary-looking meteorite on the outside, when the Monahans meteorite was cracked open, researchers discovered something extraordinary—purple extraterrestrial salt crystals with tiny pockets of primordial water trapped inside. The first water ever recovered from space.

Chemical dating of the crystals revealed that the salt was formed 4.56 billion years ago, thus aging the water trapped within the crystals to the very beginning of our solar system. These tiny droplets of ancient water have the potential to tell scientists much about the very origin of water.

Where did water come from? Did hydrogen and oxygen molecules first bond in interstellar space and then travel into our solar system as ice in comets? Or is water the result of some process that occurs during planetary formation? We don't know, but the mystery of water may become a little clearer because of the Monahans meteorite.

So yes, Chicken Little, the sky is falling. And thank goodness. It certainly makes the world an interesting place.

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Have a question or comment about this episode? Contact Nature Notes Coordinator Megan Wilde at mwilde@cdri.org. Or discuss this episode on [Nature Notes' Facebook page](#). This episode originally aired on Marfa Public Radio, March 6, 2008.