

MAVEN: Mars Atmospheric Loss

Transcript:

[music] When you take a look at Mars, you probably wouldn't think that it looks like a very nice place to live: it's dry, it's dusty, and there's practically no atmosphere. But some scientists think that Mars may have once looked like a much nicer place to live, with a thicker atmosphere, cloudy skies, and possibly even liquid water flowing over the surface. So how do you go from something like this...to something like this? NASA's MAVEN spacecraft will give us a clearer idea of how Mars lost its atmosphere, and scientists think that several processes have had an impact. One of these processes is called Sputtering, where atoms are knocked away from the atmosphere due to impacts from energetic particles. In our solar system, the Sun constantly emits high-energy photons. When one of these photons enters the atmosphere of a planet, it can crash into a molecule, knocking loose an electron and turning it into an ion. Ions by themselves don't do much, but when a magnetic field is nearby they'll spin around the field. Conveniently, the Sun generates a giant magnetic field that is carried by the solar wind. As the magnetic field sweeps past the planet, some ions will get carried away. Other ions, depending on where they form, won't get carried away but will hit the top of the atmosphere. These ions can then crash into other molecules and fling atoms everywhere, like a cue ball in a game of pool. Some of these atoms can be knocked, or sputtered, into space, causing atmospheric loss, and over billions of years this could have caused quite a bit of change, especially since the solar wind may have been more intense early in our solar system's history. Scientists think that all of this may have caused Mars to gradually transform from what may have been a very nice place to live, into the dry, dusty world we know today, and MAVEN will study this process and tell us how it really works. [music, satellite beeping]