

SKYLIGHT/CAVE

Pavonis Mons

PROTECTED FROM

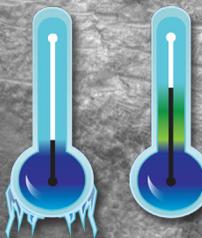


50 m

Photo Credit: NASA/JPL-Caltech/University of Arizona
For more HiRISE images of Mars visit <http://hirise.lpl.arizona.edu/>

VOLCANIC/HYDROTHERMAL

Home Plate

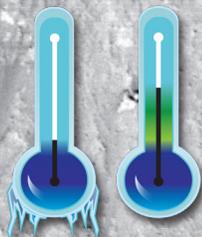


50 m

Photo Credit: NASA/JPL-Caltech/University of Arizona
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BRINY GULLIES

Palikir Grater



50 m

Photo Credit: NASA/JPL-Caltech/University of Arizona
For more HiRISE images of Mars visit <http://hirise.lpl.arizona.edu/>

DESERT

Utopia Planatia



Photo Credit: NASA/JPL-Caltech
For more images from the Viking 2 lander visit <http://photojournal.jpl.nasa.gov/>



Home Plate is a small plateau roughly 90 m across and 1 m high located within the Columbia Hills in Gusev Crater on Mars. It gets its name from the fact that the outline of the plateau is similar in shape to a baseball home plate. It was visited by the Mars Exploration Rover Spirit.

CURRENT ENVIRONMENT ON MARS

Temperatures range from -110° C at night to 35° C during the day. There is no evidence for salt. Layers in the surface material suggest liquid water dribbled into the ground fairly recently and frequently. Spirit was unable to test the pH of the rocks around Home Plate. Radiation levels are thought to be similar to what astronauts experience on the International Space Station.

PAST ENVIRONMENT ON MARS

The rocks of home plate are thought to have formed from explosive volcanic deposit. Nearby deposits are thought to have formed in hydrothermal conditions. This suggests a wet and hot environment where the pH varied locally from acidic to alkaline.

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The Viking 2 Lander was the second successful Mars lander mission. It explored an area of Mars called Utopia Planitia (Nowhere Plain).

CURRENT ENVIRONMENT ON MARS

Air temperatures between -30° C and -120° C were recorded by the lander. Analysis of the surface material revealed it to be alkaline (pH > 8). Salt crusts were also observed. Surface samples heated to 500° C released water vapor. Radiation levels are thought to be similar to what astronauts experience on the International Space Station. Some images from the lander showed a thin layer of white water frost on the surface. Frost was seen for about 100 days during each of the two martian winters observed.

PAST ENVIRONMENT ON MARS

Utopia Planitia appears to be an ancient lava plain with a large number of shallow troughs. Scientists think the troughs are formed from ice-wedge activity caused by permafrost.

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The discovery of skylight or caves has gotten the interest of scientists. The caves might offer safety to future astronauts. The skylight/cave seen on the front of the card is at the bottom of an impact crater.

CURRENT ENVIRONMENT ON MARS

Pavonis Mons is a small shield volcano, like the Hawaiian Islands. Temperatures range from -138° C at night to 20° C during the day. There are no signs of water or salt at the surface but they could be present in the cave/. The pH of the surface material is unknown. Radiation levels at the surface are thought to be similar to what astronauts experience on the International Space Station. In the cave/skylight, the overlying rock would offer protection from deadly solar flare radiation.

PAST ENVIRONMENT ON MARS

Caves often form in volcanic regions like this when lava solidifies on top, but keeps flowing underneath through an underground lava tube. These rivers of lava can then drain away leaving the tube empty.

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The dark streaks found on the inner walls of Palikir crater appear in early spring, grow longer in the downslope direction during spring and summer, and fade during fall and winter.

CURRENT ENVIRONMENT ON MARS

Temperatures up to 27° C have been measured on the crater walls. The streaks are thought to form due to the melting of brines (salty water) that remain in the liquid phase much longer than non-salty water. The pH of the liquid is unknown. Radiation levels are thought to be similar to what astronauts experience on the International Space Station.

PAST ENVIRONMENT ON MARS

Terra Sirenum is thought to be an ancient volcanic plain that may have had extensive lakes.

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CONGLOMERATE Gale Crater

Photo Credit: NASA/JPL-Caltech/MSSS
For more about NASA's Curiosity mission, visit: <http://www.jpl.nasa.gov/msl>

DESERT Meridiani Planum

Photo Credit: NASA/JPL-Caltech/Cornell
For more images from Opportunity visit <http://marsrover.nasa.gov/gallery/press/opportunity/>

PERIGLACIAL Vastitas Borealis

Photo Credit: NASA/JPL-Caltech/University of Arizona/Texas A&M University
For more images from the Phoenix mission visit http://phoenix.lpl.arizona.edu/imageCategories_lander.php

SALT DEPOSITS Terra Cimmeria

2000 m

Photo Credit: NASA/JPL-Caltech/MSSS
For more CTX images of Mars visit http://www.msss.com/msss_images/subject/mro_ctx.html



This false color image was obtained by the Mars Exploration Rover Opportunity. It shows exposed bedrock and cobble fields between large, wind-blown ripples. The rover had to navigate this!

CURRENT ENVIRONMENT ON MARS

Air temperature ranges from -80°C at night to 30°C during the day. No sign of water or salt deposits were seen. Radiation levels are thought to be similar to what astronauts experience on the International Space Station. Dust devils were observed quite often at this site.

PAST ENVIRONMENT ON MARS

The outcrops exposed in this area indicate they were formed through wind related sand dune formation. Patterns found in the rock show periods of sand dune formation and periods of deposit between sand dune formations. This pattern seems to demonstrate wind formation in older layers, with very shallow water zones or playas in the younger layers. These water plays may have been very salty.

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The lighter toned material found in the basin (depression) in the center of the image is thought to be rich in chloride salts.

CURRENT ENVIRONMENT ON MARS

Surface temperatures from -178°C at night to 29°C during the day have been recorded from orbit. The chloride minerals are thought to be salt. The pH of the material has not been measured. No signs of water have been found. Radiation levels are thought to be similar to what astronauts experience on the International Space Station.

PAST ENVIRONMENT ON MARS

The temperature is thought to have been warm enough for salty liquid water to exist on the surface that then evaporated to leave the current salt deposits. The pH of the water is unknown.

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The Curiosity rover landed in Gale Crater in search of present or past habitable environments. On its 39th martian day, the rover discovered an outcrop of conglomerate rocks. A conglomerate is made of small pebbles cemented together into a larger rock. These rocks are significant because they form in flowing water.

CURRENT ENVIRONMENT ON MARS

Air temperatures vary from -75°C at night to -5°C during the day. Perchlorate salts (organic) are confirmed in the surface. The pH of the surface has not been measured. Radiation levels are thought to be similar to what astronauts experience on the International Space Station.

PAST ENVIRONMENT ON MARS

Conglomerate rock indicates the area used to have flowing water, like a streambed. The number of channels in the area indicates a long period of repeated or continuous flows. This suggests the temperatures might have remained warm for a long period of time.

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The Phoenix mission examined the martian surface and subsurface near the martian north pole. Phoenix dug several trenches to collect surface material for analysis. These trenches exposed underlying water ice.

CURRENT ENVIRONMENT ON MARS

The spacecraft measured temperatures between -98°C at night and -20°C during the day. Icy regolith was found 3-5 cm below the surface in most locations. Snow was observed to fall from low clouds. Tests show the regolith is slightly alkaline (7.7 pH). Traces of an unknown salt were found in several samples. Radiation levels are thought to be similar to what astronauts experience on the International Space Station.

PAST ENVIRONMENT ON MARS

Minerals in the regolith indicate the site probably had a wetter and warmer climate in the past. During seasonal or longer cycles, water may have been present as thin films on the surface.

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