

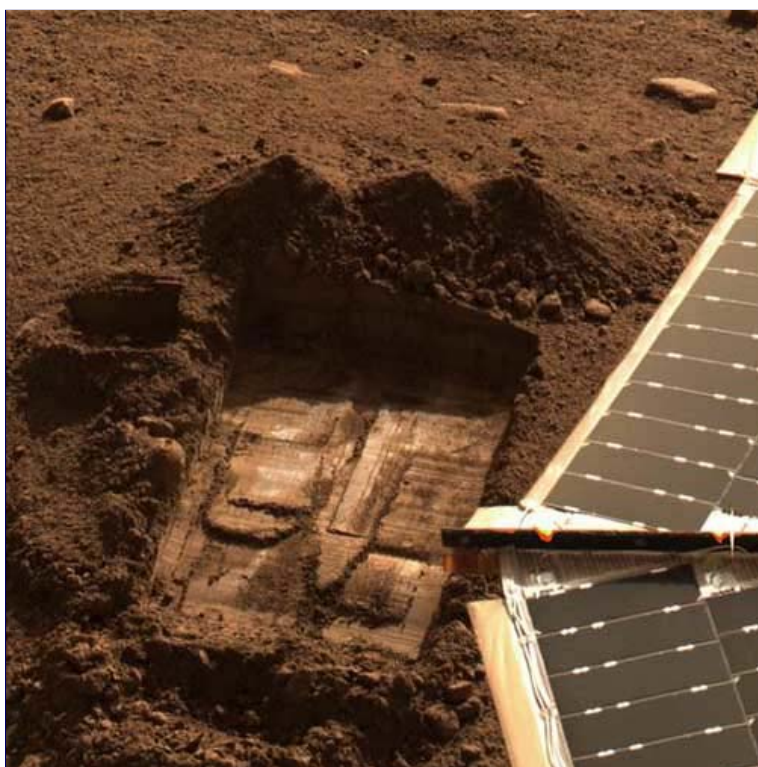


Perchlorate Discovery by Phoenix Lander Does Not End Search for Life On Mars

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*“Right now, we don't know whether finding perchlorate
is good news or bad news for possible life on Mars.”*

- Peter Smith, Ph.D., Phoenix Lander Principal Investigator



This image shows the trench informally called “Snow White” where the perchlorate has been detected. This image was acquired by NASA's Phoenix Mars Lander's Surface Stereo Imager on Sol 43, the 43rd Martian day after landing on July 8, 2008. Two samples were delivered to the Wet Chemistry Laboratory, which is part of Phoenix's Microscopy, Electrochemistry, and Conductivity Analyzer (MECA). The first sample was taken from the surface area just left of the trench and informally named “Rosy Red” It was delivered to the Wet Chemistry Laboratory on Sol 30 (June 25, 2008). The second sample, informally named “Sorceress” was taken from the center of the Snow White trench and delivered to the Wet Chemistry Laboratory on Sol 41 (July 6, 2008). Image credit: NASA/JPL-Caltech/Univ. of Arizona/Texas A&M.

Earthfiles, news category.

August 5, 2008 Pasadena, California - Responding to the growing buzz on the internet about suppressed Mars Phoenix Lander data and the White House Science Adviser being briefed on a new and potentially disturbing discovery in the lander's soil analysis, today Phoenix mission scientists spoke and answered questions in an hour phone conference produced by NASA and JPL.

The first person to speak was a NASA public affairs officer who denied there had been any consultation with the White House science advisor. However, a reporter from the Discovery Channel argued that she heard from a reputable aerospace reporter that such a briefing *was* held. Other reporters were confused about the implications of the perchlorate discovery by the wet chemistry team and wanted to know if the highly oxidating perchlorate, most commonly used on Earth in rocket fuels and explosives, would mean no life possibilities on the red, dry, cold, desert planet. NASA describes perchlorate as “an ion, or charged particle, that consists of an atom of chlorine surrounded by four oxygen

atoms. It is an oxidant that releases oxygen, but it is not a powerful one.” Perchlorate is also highly soluble in water.

[Editor's Note: Wikipedia - “Perchlorates are the salts derived from perchloric acid (HClO_4). They occur both naturally and through manufacturing. They have been used as a medicine for more than 50 years to treat thyroid gland disorders. They are also used as an oxidizer in rocket fuel and explosives and can be found in airbags and fireworks. Both potassium perchlorate (KClO_4) and ammonium perchlorate (NH_4ClO_4) are used extensively within the pyrotechnics industry, whereas ammonium perchlorate is a component of solid rocket fuel. Lithium perchlorate, which decomposes exothermically to give oxygen, is used in oxygen ‘candles’ on spacecraft, submarines and in other esoteric situations where a reliable backup or supplementary oxygen supply is needed. Most perchlorate salts are soluble in water.”]

Bottom line: the Phoenix Lander science team is surprised by the perchlorate discovery and are not really certain what it means. Is the perchlorate only a local phenomenon right at the spot where the Phoenix Lander is using its robotic arm to dig 2-inch-deep trenches because water ice prevents the arm from digging deeper? That means the perchlorate is a surface phenomenon. But how extensive might the perchlorate be on Mars? Is it everywhere on the oxidized red surface? How deep has it gone?

On Earth, a comparable geography with perchlorate in its surface soils is the Atacama desert in northern Chile. There isn't much organic life, but microbes have been found that can eat perchlorate or co-exist with perchlorate.



The Atacama Desert is a virtually rainless plateau in northern Chile, stretching 600 miles along the Pacific coast of South America, west of the Andes mountains. The rain shadow on the leeward side of the Andes keeps this over 20 million-year-old desert fifty times drier than California's Death Valley. It is the second-driest desert in the world, after the McMurdo Dry Valleys of Antarctic. The soil is mostly salt basins that have surface perchlorate salts and nitrates, sand, and lava flows. Image by *Wikipedia*.

During the phone press conference, Michael Hecht of NASA's Jet Propulsion Laboratory in Pasadena, said: “Finding perchlorates is neither good nor bad for life, but it does make us reassess how we think about life on Mars.” Hecht is the lead scientist for the Microscopy, Electrochemistry and Conductivity Analyzer (MECA), the instrument that includes the wet chemistry laboratory.

NASA's press release after the press conference quoted Michael Hecht further as saying: “If confirmed, the result is exciting because different types of perchlorate salts have interesting properties that may bear on the way things work on Mars *if* - and that's a big ‘if’ - the results from our two teaspoons of soil are representative of all of Mars, or at least a significant portion of the planet.”

NASA said the Phoenix team had wanted to check the finding with another lander instrument, the Thermal and Evolved-Gas Analyzer (TEGA), which heats soil and analyzes gases driven off. But as that TEGA experiment was underway last week, speculative news reports surfaced claiming the team was holding back a major finding regarding habitability on Mars. Scientists are still examining multiple hypotheses, given evidence that the soil contains perchlorate.

Phoenix Lander Principal Investigator Peter Smith of the University of Arizona, Tucson, said: “We decided to show the public science in action because of the extreme interest in the Phoenix mission, which is searching for a habitable environment on the northern plains

of Mars. Right now, we don't know whether finding perchlorate is good news or bad news for possible life on Mars.”

Perchlorate was discovered with a multi-use sensor that detects perchlorate, nitrate and other ions. The MECA team saw the perchlorate signal in a sample taken from the Dodo-Goldilocks trench on June 25, or Sol 30, or the 30th Martian day of the mission after landing, and again in another sample taken from the Snow White trench on July 6, or Sol 41.

When TEGA heated a sample of soil dug from the Dodo-Goldilocks trench on Sol 25 to high temperature, it detected an oxygen release, said TEGA lead scientist William Boynton of the University of Arizona. Perchlorate could be one of several possible sources of this oxygen, he said.

Late last week, when TEGA analyzed another sample, this one from the Snow White trench, the TEGA team looked for chlorine gas. The instrument detected none.

“Had we seen it, the identification of perchlorate would be absolutely clear, but in this run we did not see any chlorine gas. We may have been analyzing a perchlorate salt that doesn't release chlorine gas upon heating,” Boynton said. “There's nothing in the TEGA data that contradicts MECA's finding of perchlorates.”

As the Phoenix team continues its investigation of the arctic soil, the TEGA instrument will attempt to validate the perchlorate discovery and determine its concentration and properties.

More Information:

For further information about Mars explorations, please see reports below in **Earthfiles Archive**:

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University of Arizona: <http://phoenix.lpl.arizona.edu/>

Perchlorate: <http://en.wikipedia.org/wiki/Perchlorate>

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