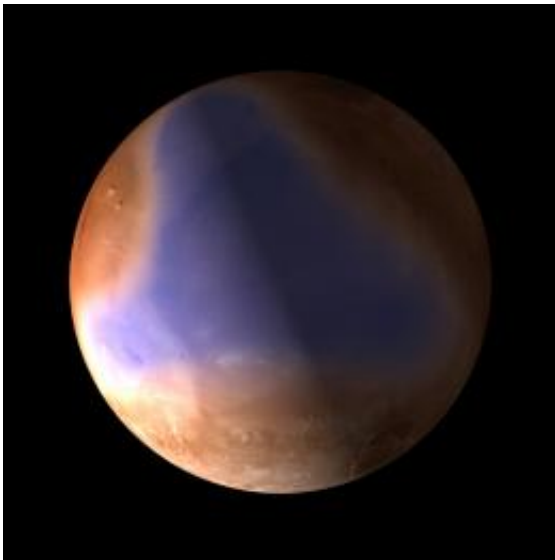


Mars Express radar gives strong evidence for former Mars ocean

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New results from the MARSIS radar on Mars Express give strong evidence for a former ocean of Mars. The radar detected sediments reminiscent of an ocean floor inside previously identified, ancient shorelines on the red planet. The ocean would have covered the northern plains billions of years ago. Credits: ESA, C. Carreau

(PhysOrg.com) -- ESA's Mars Express has returned strong evidence for an ocean once covering part of Mars. Using radar, it has detected sediments reminiscent of an ocean floor within the boundaries of previously identified, ancient shorelines on Mars.

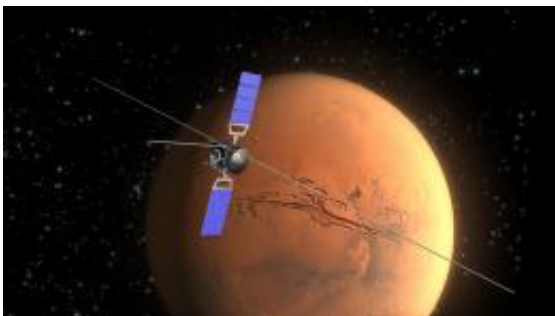
The MARSIS radar was deployed in 2005 and has been collecting data

ever since. Jérémie Mouginot, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG) and the University of California, Irvine, and colleagues have analysed more than two years of data and found that the northern plains are covered in low-density material.

"We interpret these as sedimentary deposits, maybe ice-rich," says Dr. Mouginot. "It is a strong new indication that there was once an ocean here."

The existence of oceans on ancient Mars has been suspected before and features reminiscent of shorelines have been tentatively identified in images from various spacecraft. But it remains a controversial issue.

Two oceans have been proposed: 4 billion years ago, when warmer conditions prevailed, and also 3 billion years ago when subsurface ice melted following a large impact, creating outflow channels that drained the water into areas of low elevation.



Mars Express has used its MARSIS radar to give strong evidence for a former ocean of Mars. The radar was deployed on the spacecraft in 2005 and has been collecting data from the subsurface ever since. Credits: ESA, C. Carreau

"MARSIS penetrates deep into the ground, revealing the first 60–80 metres of the planet's subsurface," says Wlodek Kofman, leader of the radar team at IPAG.

"Throughout all of this depth, we see the [evidence](#) for sedimentary material and ice."

The sediments revealed by MARSIS are areas of low radar reflectivity. Such sediments are typically low-density granular materials that have been eroded away by water and carried to their final destination.

This later ocean would however have been temporary. Within a million years or less, Dr. Mouginot estimates, the water would have either frozen back in place and been preserved underground again, or turned into vapour and lifted gradually into the atmosphere.

"I don't think it could have stayed as an [ocean](#) long enough for life to form."

In order to find evidence of life, astrobiologists will have to look even further back in Mars' history when liquid water existed for much longer periods.

Nevertheless, this work provides some of the best evidence yet that there were once large bodies of liquid water on Mars and is further proof of the role of [liquid water](#) in the martian geological history.

"Previous Mars Express results about water on Mars came from the study of images and mineralogical data, as well as atmospheric measurements. Now we have the view from the subsurface [radar](#)," says Olivier Witasse, ESA's Mars Express Project Scientist.

"This adds new pieces of information to the puzzle but the question remains: where did all the water go?"

[Mars Express](#) continues its investigation.

Provided by European Space Agency

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