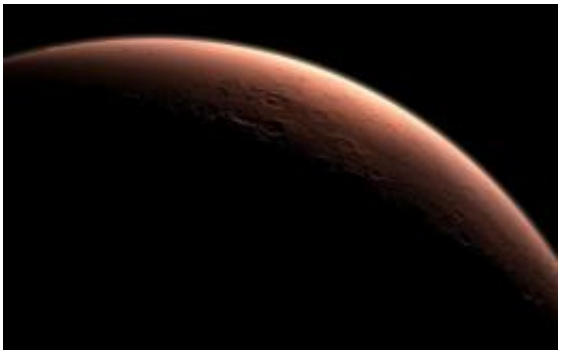
Life possible on 'large parts' of Mars: study

December 12 2011, by Amy Coopes



This NASA computer-generated image depicts part of Mars at the boundary between darkness and daylight, with an area including Gale Crater, beginning to catch morning light. Australian scientists who modelled conditions on Mars to examine how much of the red planet was habitable said that "large regions" could sustain life.

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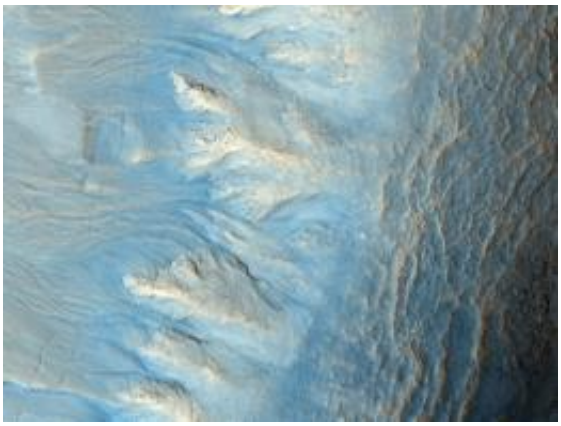
Charley Lineweaver's team, from the Australian National University, compared models of temperature and pressure conditions on Earth with those on Mars to estimate how much of the distant planet was liveable for Earth-like organisms.

While just one percent of Earth's volume -- from core to upper atmosphere -- was occupied by life, Lineweaver said their world-first

modelling showed three percent of Mars was habitable, though most of it was underground.

"What we tried to do, simply, was take almost all of the information we could and put it together and say 'is the big picture consistent with there being life on Mars?'," the astrobiologist told AFP on Monday.

"And the simple answer is yes... There are large regions of Mars that are compatible with terrestrial life."



This NASA image, taken by the High Resolution Imaging Science Experiment (HiRISE) camera on NASA's Mars Reconnaissance Orbiter in 2010, shows the west-facing side of an impact crater in the mid-latitudes of Mars' northern hemisphere. Australian scientists who modelled conditions on Mars to examine how much of the red planet was habitable said that "large regions" could sustain life.

Where previous studies had taken a "piecemeal" approach by examining particular sites on Mars for signs of life, Lineweaver said his research was a "comprehensive compilation" of the entire planet using decades of data.

Frozen water has been found at the poles on Mars and the ANU study examined how much of the planet could sustain water "that could be habitable by Earth-like standards by Earth-like microbes".

The low-pressure environment of Mars means water cannot exist as a liquid and will vaporise on the surface, but Lineweaver said the conditions are right underground, where the weight of the soil gives the added pressure required.

It would also be warm enough, at certain depths, for bacteria and other micro-organisms to thrive due to heat from the planet's core.

The average surface temperature on Mars, Earth's nearest neighbour, is minus 63 degrees Celsius (minus 81 Fahrenheit).

Lineweaver said his study was "the best estimate yet published of how habitable Mars is to terrestrial microbes" and a significant finding given mankind had evolved from microbial life.

This artist concept shows NASA's Mars Science Laboratory Curiosity rover, a mobile robot for investigating Mars' past or present ability to sustain microbial life.

"It's not important if you want to figure out what the laws of physics are and you want to talk to some intelligent aliens who could build spaceships," he said.

"If you're interested in the origin of life and how likely life is to get started on other planets, that's what relevant here."

NASA's Curiosity Rover, the largest, most sophisticated robotic explorer ever built, is en route to Mars and due to land in August 2012.

It has a laser beam for zapping rocks and a tool kit to analyse their contents as well as a robotic arm, drill, cameras and sensors to enable it to report back on the Martian weather and atmospheric radiation.

Curiosity is scheduled to land at the Gale Crater, near Mars' equator, chosen for its five kilometre (three mile) high sediment mountain which will hopefully reveal clues about the planet's wetter past

Lineweaver said the NASA mission "sadly" did not have the capability to dig deep enough to find the life his study had modelled but Curiosity would be able to examine "at least the edges" of what was once the Martian depths at the crater.

"But these have been exposed for a long time and therefore are probably devoid of volatiles and they are not warm like they used to be," he said.

Lineweaver's paper was published Monday in the scientific journal *Astrobiology*.