

Mars Gravity Map

Transcript:

NARRATOR:

A fleet of robotic spacecraft is exploring the Red Planet, and scientists are finding new ways to mine an ever-growing mountain of data.

Satellites always orbit a planet's center of mass, but they can be pulled slightly off course by the gravity of massive features like Olympus Mons, the solar system's tallest peak.

Now, a team of scientists at NASA's Goddard Space Flight Center has used small fluctuations in the orbital data of three spacecraft to map the gravity field of Mars.

In this new map, low gravity canyons like Valles Marineris, in blue, stand out from the high-gravity reds and whites of the Tharsis mountains.

By comparing gravity with topography, the scientists made an improved estimate for the crustal thickness of Mars, shedding light on its geologic history and confirming earlier indications that the planet has a molten outer core.

The orbital data also revealed seasonal variations in the mass of the polar caps, showing that up to four trillion tons of carbon dioxide cycle annually between the poles.

The new gravity map should prove useful to future missions as well, by allowing spacecraft to enter orbit more precisely, thus ensuring that the Mars fleet continues to return a massive trove of data.