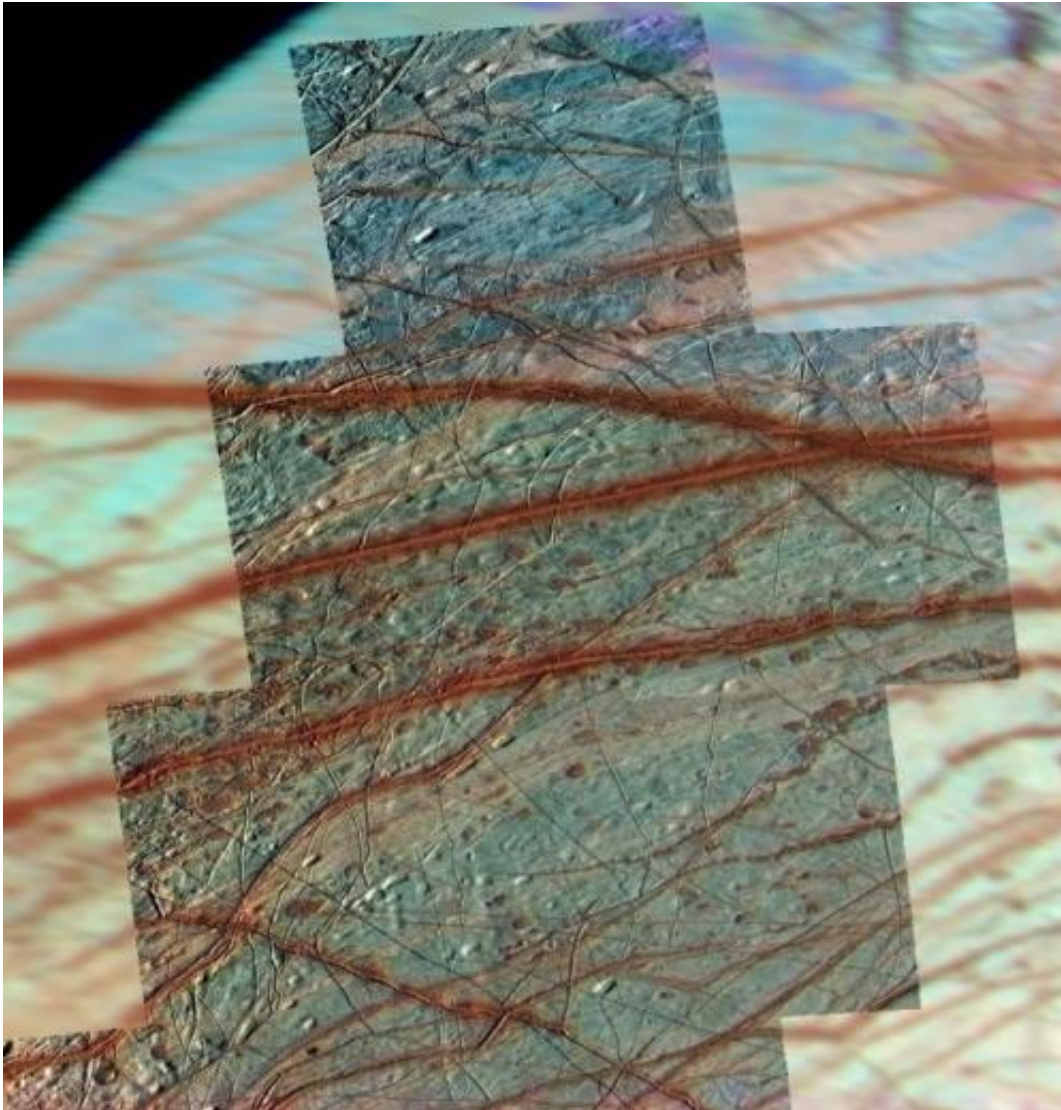


# Faraway moon mimics Earth tectonics

September 7 2014

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False-color image of Europa's trailing northern hemisphere, where subduction zones are hypothesized to exist. Credit: NASA/JPL/University of Arizona

Jupiter's icy moon Europa may have active tectonic plates similar to those that shape the Earth, which had long been thought unique in this respect, scientists said Sunday.

They used images captured by NASA's Galileo spacecraft, which orbited Jupiter and its moons from 1995 to 2003, to study the criss-cross of ridges and fractures on Europa's [ice](#) shell.

The moon, slightly smaller than the one orbiting Earth, has one of the youngest surfaces in the Solar System, implying "rapid recycling", said the team.

They found evidence that a piece of the surface had disappeared along a boundary between two ice plates, possibly when one sunk under the other.

They took this as evidence of surface material being recycled into the moon's interior—similar to parts of Earth's crust which sink into the underlying mantle at so-called subduction zones where tectonic plates converge.

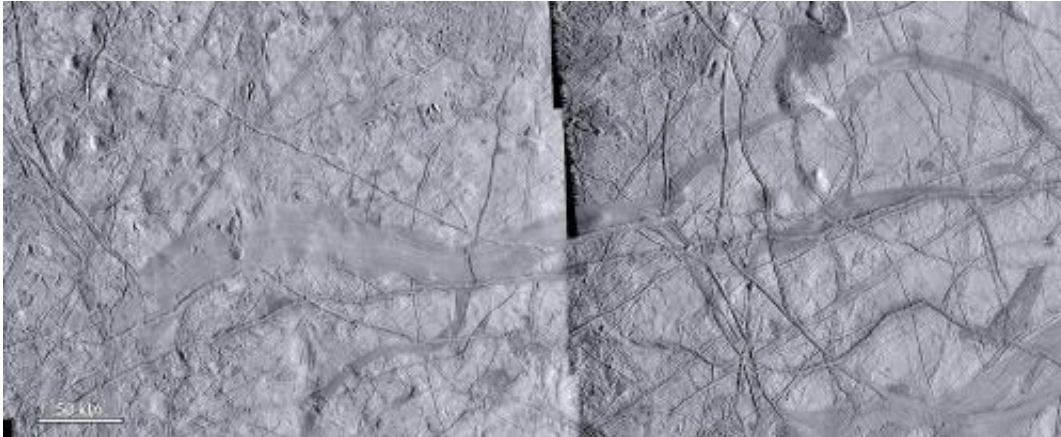
The team had studied an area of 134,000 square kilometres (51,700 square miles), using the images and a reconstruction of [geological features](#).

They found that a 20,000 km<sup>2</sup>-portion of surface was missing.

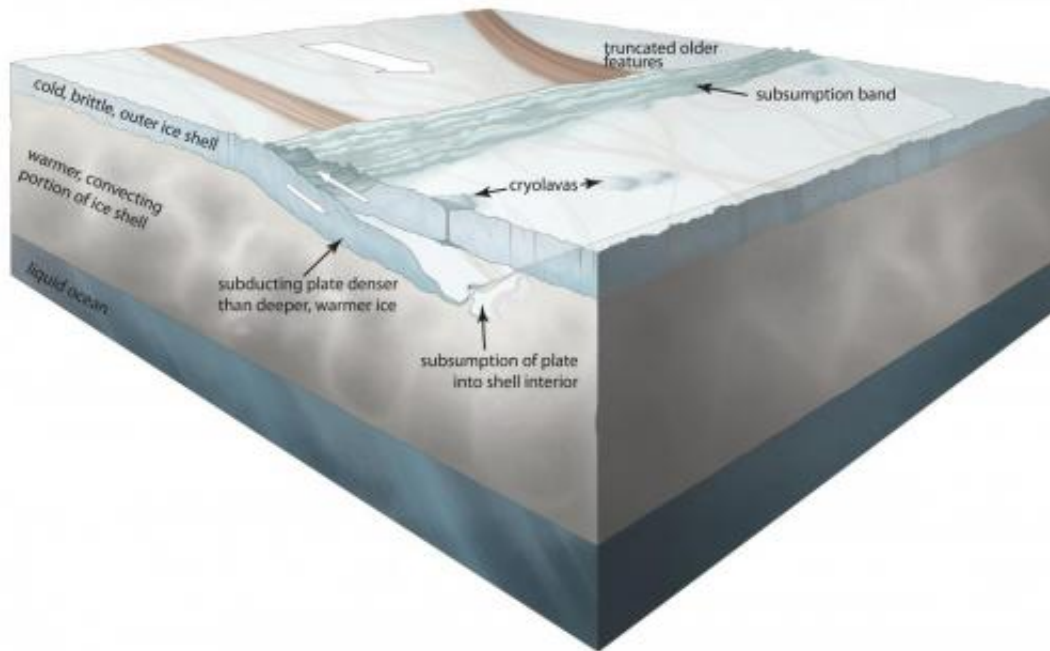
"We propose that Europa's [ice shell](#) has a brittle, mobile, plate-like system above convecting warmer ice," they wrote in the journal *Nature Geoscience*.

"Hence, Europa may be the only Solar System body other than Earth to exhibit a system of plate tectonics."

Europa is one of the four largest moons of Jupiter, the fifth planet from the Sun and the largest in our Solar System.



Close-up view of a proposed zone of mid-ocean-ridge-like plate spreading on Europa (unrelated to the region studied in this work). This dilational band called Phaidra Line, located in Europa's trailing hemisphere near Argadnel Regio, shows internal striations related to spreading and bilateral symmetry about a central axis. Older geological features can be matched perfectly to either side of the spreading zone. Black strip in the center of the image is a narrow region where there is no image coverage. Credit: NASA/JPL



Scientists have found evidence of plate tectonics on Jupiter's moon Europa. This conceptual illustration of the subduction process (where one plate is forced under another) shows how a cold, brittle, outer portion of Europa's 20-30 kilometer-thick (roughly 10-20 mile) ice shell moved into the warmer shell interior and was ultimately subsumed. A low-relief subsumption band was created at the surface in the overriding plate, alongside which cryolavas may have erupted. Credit: Noah Kroese, I.NK

**More information:** *Nature Geoscience*, [dx.doi.org/10.1038/ngeo2245](https://doi.org/10.1038/ngeo2245)

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