

Geologic Icon: The Grand Canyon

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[1]The Grand Canyon in northern Arizona is a favorite for astronauts shooting photos from the International Space Station, as well as one of the best-known tourist attractions in the world. The steep walls of the Colorado River canyon and its many side canyons make an intricate landscape that contrasts with the dark green, forested plateau to the north and south.

The Colorado River has done all the erosional work of carving away cubic kilometers of rock in a geologically short period of time. Visible as a darker line snaking along the bottom of the canyon, the river lies at an altitude of 715 meters (2,345 feet), thousands of meters below the North and South Rims. Temperatures are furnace-like on the river banks in the summer. But Grand Canyon Village, the classic outlook point for visitors, enjoys a milder climate at an altitude of 2,100 meters (6,890 feet).

The Grand Canyon has become a geologic icon — a place where you can almost sense the invisible tectonic forces within the Earth. The North and South Rims are part of the Kaibab Plateau, a gentle tectonic swell in the landscape. The uplift of the plateau had two pronounced effects on the landscape that show up in this image. First, in drier parts of the world, forests usually indicate higher places; higher altitudes are cooler and wetter, conditions that allow trees to grow. The other geologic lesson on view is the canyon itself. Geologists now know that a river can cut a canyon only if the Earth surface rises vertically. If such uplift is not rapid, a river can maintain its course by eroding huge quantities of rock and forming a canyon.

This astronaut photograph (ISS039-E-5258) was taken on March 25, 2014 by the Expedition 39 crew, with a Nikon D3S digital camera using a 180 millimeter lens,

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Published on Scientific Computing (<http://www.scientificcomputing.com>)

and is provided by the ISS Crew Earth Observations Facility and the Earth Science and Remote Sensing Unit, Johnson Space Center. It has been cropped and enhanced to improve contrast, and lens artifacts have been removed.

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