

## Warm rock keeps North America from drowning, geologists say

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Much of North America would be underwater were it not for heat that makes rock buoyant, new research indicates. Scientists listed various parts of the continent that stay afloat thanks to heat within Earth's rocky crust, and how far those regions would sink beneath sea level if they lacked that heat-induced lift. On the coast, New York City would sit 1,427 feet (435 meters) below the Atlantic; New Orleans 2,416 feet (736 meters) underwater and Los Angeles 3,756 feet (1,145 meters) beneath the Pacific, researchers said. Rather than perched a mile high (1.6 kilometers), Denver would be 727 feet (222 meters) below sea level. "If you subtracted the heat that keeps North America's elevations high, most of the continent would be below sea level, except the high Rocky Mountains, the Sierra Nevada, and the Pacific Northwest west of the Cascade Range," said Derrick Hasler of the University of Utah in Salt Lake City, a researcher on the study. Typically, geologists attribute differences in elevation to movements of sections of the Earth's crust called tectonic plates, mountain-building collisions, and sinking or "subduction" of old seafloor. But Hasler and his University of Utah colleague David S. Chapman say tectonic forces contribute to elevation by affecting the composition and temperature of rock that they move. For example, as crustal plates collide to form mountains like the Himalayas, the mountains rise because the collision makes lighter crustal rock get thicker and warmer, thus more buoyant. "We have shown for the first time that temperature differences within the Earth's crust and upper mantle explain about half of the elevation of any given place in North America," with most of the rest due to differences in what the rocks are made of, Chapman said. The findings were published on June 23 as two reports in the *Journal of Geophysical Research-Solid Earth*.

Courtesy American Geophysical Union and World Science staff