

Grand ideas, global reverberations: Grand Canyon at its 6 millionth anniversary

September 23 2019



Grand Canyon on its six millionth anniversary. Photo taken 3 June 2010. Credit: Credit National Park Service

Etched onto the steep walls of Arizona's 6,000-foot-deep, 277-mile-long Grand Canyon are clues that chronicle the sweeping changes the region has experienced during the past two billion years. The canyon's colorful layers narrate tales of ancient environments come and gone, from lofty mountain ranges and tropical seas to a Saharan-scale desert that once stretched across much of western North America.

The Grand Canyon was carved by the Colorado River, a ribbon of life-giving water that flows through the center of a desert wilderness. It was down this uncharted river that naturalist John Wesley Powell, a one-armed Civil War veteran, and his crew plunged in 1869 when they rafted through the Grand Canyon in what has been called "one of the most daring journeys in American history."

In commemoration of the 150th anniversary of this remarkable expedition, as well as Grand Canyon National Park's 100th anniversary, four sessions at the Geological Society of Annual Meeting in Phoenix will highlight the unparalleled role the Grand Canyon plays in advancing [scientific discoveries](#), promoting geoscience research and education, and inspiring the millions of people who visit it each year.

On Monday, 23 Sept. 2019, a keynote session will cover geoscience research, education, and the human connections to the Grand Canyon, an "important but often overlooked space between new scientific research and its societal importance," says co-convener Karl Karlstrom, a University of New Mexico geologist. "These important milestones prompt us to reflect back, to take stock of the present, and also to look forward to the next 100 years."

When geologists look back, says Karlstrom, they really look back—so much so that he and the other conveners, including Steven Semken from Arizona State University, Eleanor Snow from the U.S. Geological Survey, and Laura Crossey from the University of New Mexico, added a

"six millionth" anniversary to the session title.

Current research suggests that was when the Colorado River stitched together several preexisting canyons into an integrated drainage that flowed along the river's current course from the Colorado Plateau to the Gulf of California. "Grand Canyon itself is geologically young when compared to the nearly two-billion-year-old rocks at its bottom," says Karlstrom, "so the conveners added the six millionth geologic anniversary to help put our human time scales into geoperspective."



Breaks frequently occur in the aging trans-canyon pipeline, whose deliveries to the South Rim are necessary to meet the needs of the park's six million annual visitors. Photo taken May 25, 2012. Credit: Credit National Park Service

Keynote speakers will include two Native Americans, Navajo Jason Nez and Ophelia Watahomigie-Corliss, a member of the Havasupai Tribal Council. Watahomigie-Corliss will explain why the centennial year is not a celebration for members of her tribe, and how the changes they have endured as a result of the national park's founding impacts them to the present day. Karlstrom hopes these talks will offer "a perspective that mixes some realism, some hope, and direction for improved future partnership."

Two additional oral sessions, one on Monday afternoon and a second on Tuesday morning, 24 September, plus a Wednesday, 25 September, poster session, will consider the Grand Canyon within a broader regional context and cover some of the numerous ongoing scientific debates regarding the Colorado Plateau and Rocky Mountain region—and their global implications.

One of the current debates revolves around the origin of the Great Unconformity, a 1.3-billion-year gap in the Grand Canyon's rock record that Powell recognized. This feature is unusual, says Karlstrom, in that it is the only such gap that appears to be global in its distribution.

Recent research suggests the Great Unconformity encompasses multiple episodes of erosion, each with a different cause. These appear to include the construction and breakup of a supercontinent, a "snowball Earth" episode during which the planet was completely frozen, and "a major flooding of the continent by advancing seas that was (somehow) related to one of the most interesting explosions in animal evolution in Earth history," says Karlstrom.

All four sessions will feature presentations that highlight the importance of the Grand Canyon for advancing geoscience research. These include

short-term management of water-related issues, such as providing drinking water for the national park's six million annual visitors, as well managing the new river ecosystem created by the network of dams placed on the Colorado River. Recent research on Grand Canyon rocks has also revealed new insights into the formation of the North American continent around 1.8-1.7 billion years ago as well as the explosion in the diversity of animal life that occurred about 650-550 million years ago.

Many of these advances, says Karlstrom, have had global reverberations, assuring that the influence of this iconic [canyon](#) will extend well beyond its next big set of anniversaries. "The Grand Canyon will continue to be at the forefront of geoscience research, public education, and resource management and sustainability," he says.

More information: Session No. 75 - P2. Grand Ideas, Grand Events: Geoscience Research, Geoscience Education, and Human Connections to Grand Canyon at its Six Millionth, 150th, and 100th Anniversaries
North Ballroom 120D, North Building (Phoenix Convention Center)
Session Link: gsa.confex.com/gsa/2019AM/meet...pp.cgi/Session/47774

Session No. 134. Grand Canyon, Colorado Plateau, and Rocky Mountain Debates and Their Global Reverberations, 150 Years after Powell I
Room 221AB, North Building (Phoenix Convention Center)
Session Link: gsa.confex.com/gsa/2019AM/webp...am/Session47823.html

Session No. 160. Grand Canyon, Colorado Plateau, and Rocky Mountain Debates and Their Global Reverberations, 150 Years after Powell II
Room 221AB, North Building (Phoenix Convention Center)
Session Link: gsa.confex.com/gsa/2019AM/webp...am/Session48592.html

Session No. 262. Grand Canyon, Colorado Plateau, and Rocky Mountain Debates and Their Global Reverberations, 150 Years after Powell
(Posters)

Hall AB, North Building (Phoenix Convention Center)

Session Link: [gsa.confex.com/gsa/2019AM/webp ...
am/Session48593.html](https://gsa.confex.com/gsa/2019AM/webpage/Session48593.html)

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