

Why did the Southern Gulf of California rupture so rapidly?

November 3 2011

The November *GSA Today* science article, "Why did the Southern Gulf of California rupture so rapidly? -- Oblique divergence across hot, weak lithosphere along a tectonically active margin," is now online.

Although California is better known for the <u>San Andreas fault</u> rift zone, the plate-tectonic boundary separating the North America plate from the Pacific plate in Southern and Baja California is also one of the best examples of an active continental rift zone on our planet.

One remarkable but incompletely understood feature of this rift zone is the rapid transition from the time of initial rifting of the North American lithosphere to the activation of <u>sea-floor</u> spreading in the Gulf of California. In many other settings, such as the formation of the Atlantic Ocean by rifting of the supercontinent Pangea, it would take about 30 million years for the rifting process to evolve into sea-floor spreading and the formation of a new <u>ocean basin</u>. In Southern/Baja California, this process was much faster, with new sea floor forming the Gulf of California in just 6 to 10 million years.

In the November 2011 issue of *GSA Today*, Paul Umhoefer of Northern Arizona University examines the <u>geological record</u> of this region to understand why this rift zone produced new sea floor so rapidly.

By examining multiple lines of evidence, Umhoefer concludes that the most likely cause is an inherent weakness in the plate-margin <u>lithosphere</u> of this area, resulting from a long history of plate subduction and



volcanism along the margin of western North America -- this thinner, hotter, and weaker material allowed for a more rapid progression of deformation and stretching of the crust, and ultimately produced a new ocean basin more quickly than would be possible elsewhere.

One interesting consequence of this work is the recognition that in these active-margin areas, rifting processes can move parts of crust -- as tectonic terranes or micro-plates -- very rapidly (about 1000 km in about 10 to 15 million years), which may provide an explanation for the complex geological history and assembly of western North America.

More information: Why did the Southern Gulf of California rupture so rapidly?—Oblique divergence across hot, weak lithosphere along a tectonically active margin Paul J. Umhoefer, Geology Program, School of Earth Sciences & Environmental Sustainability, Northern Arizona University, Flagstaff, Arizona 86011, USA; GSA Today, v. 21, no. 11, doi: 10.1130/G133A.1

Provided by Geological Society of America

Citation: Why did the Southern Gulf of California rupture so rapidly? (2011, November 3) retrieved 30 April 2024 from https://phys.org/news/2011-11-southern-gulf-california-rupture-rapidly.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.