Transient fluvial incision and active surface uplift in the Woodlark Rift of Eastern Papua New Guinea

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The Woodlark Rift off-shore of eastern Papua New Guinea is the fastest extending continental crust on Earth.

In the center of the rift, the D'Entrecasteaux Islands exceed elevations of 2,500 meters and include the youngest ultrahigh-pressure rocks on Earth, which were transported from more than 90 km deep since rifting began about eight million years ago.

Even though the Woodlark Rift presents an unparalleled view into the processes that govern the rifting of continental crust, little is known about the history and spatial pattern of vertical bedrock motions over the past million years.

Over this time, plate motions have changed significantly, with extension and rock uplift possibly migrating from the center of the rift to its southern margin on the Papuan Peninsula.

In order to better understand the mechanisms that have brought deeply exhumed rocks to Earth's surface, a community of earth scientists has been working to understand the history and pattern of vertical rock motions within the Woodlark Rift.

In this study, Scott Miller and colleagues present data about the lengthwise elevations of rivers draining the D'Entrecasteaux Islands and

the Papuan Peninsula.

These rivers are gauges that adjust their slopes in response to mountain-building processes, such that their profile shapes record patterns in the amount and history of rock uplift and, hence, fault motion.

These river profiles indicate that the islands and the peninsula have increased in mean elevation, likely over the past few hundred thousand years.

This study is part of a growing body of work that suggests that profound rock uplift continues to the present day in both the D'Entrecasteaux Islands and the Papuan Peninsula, driven by continental extension and upwelling, buoyant mantle.

More information: Scott R. Miller et al., Dept. of Earth Sciences, 204 Heroy Geology Laboratory, Syracuse University, Syracuse, New York 13244, USA. *Lithosphere*. Posted online 25 Jan. 2012; print issue: April 2012; doi: 10.1130/L135.1