


EX83

MENU



## **Paleoseismic evidence for late Holocene tectonic deformation along the Saddle mountain fault zone, Southeastern Olympic Peninsula, Washington**

Bulletin of the Seismological Society of America

By: Elizabeth Barnett, Brian Sherrod , Jonathan F. Hughes, Harvey M. Kelsey, Jessica L. Czajkowski, Timothy J. Walsh, Trevor A. Contreras, Elizabeth R. Schermer, and Robert J. Carson

<https://doi.org/10.1785/0120140086>

Tweet

8

### Links

- More information: [Publisher Index Page \(via DOI\)](#)
- Download citation as: [RIS](#) | [Dublin Core](#)

### Abstract

Trench and wetland coring studies show that northeast-striking strands of the Saddle Mountain fault zone ruptured the ground about 1000 years ago, generating prominent scarps. Three conspicuous subparallel fault scarps can be traced for 15 km on Light Detection and Ranging (LiDAR) imagery, traversing the foothills of the southeast Olympic Mountains: the Saddle Mountain east fault, the Saddle Mountain west fault, and the newly identified Sund Creek fault. Uplift of the Saddle Mountain east fault scarp impounded stream flow, forming Price Lake and submerging an existing forest, thereby leaving drowned stumps still rooted in place. Stratigraphy mapped in two trenches, one across the Saddle Mountain east fault and the other across the Sund Creek fault, records one and two earthquakes, respectively, as faulting juxtaposed Miocene-age bedrock against glacial and postglacial deposits. Although the stratigraphy demonstrates that reverse motion generated the scarps, slip indicators measured on fault surfaces

suggest a component of left-lateral slip. From trench exposures, we estimate the postglacial slip rate to be 0.2 mm/yr and between 0.7 and 3.2 mm/yr during the past 3000 years. Integrating radiocarbon data from this study with earlier Saddle Mountain fault studies into an OxCal Bayesian statistical chronology model constrains the most recent paleoearthquake age of rupture across all three Saddle Mountain faults to 1170–970 calibrated years (cal B.P.), which overlaps with the nearby  $M_w$  7.5 1050–1020 cal B.P. Seattle fault earthquake. An earlier earthquake recorded in the Sund Creek trench exposure, dates to around 3500 cal B.P. The geometry of the Saddle Mountain faults and their near-synchronous rupture to nearby faults 1000 years ago suggest that the Saddle Mountain fault zone forms a western boundary fault along which the fore-arc blocks migrate northward in response to margin-parallel shortening across the Puget Lowland.

#### Additional publication details

---

**Publication type**

Article

---

**Publication Subtype**

Journal Article

---

**Title**

Paleoseismic evidence for late Holocene tectonic deformation along the Saddle mountain fault zone, Southeastern Olympic Peninsula, Washington

---

**Series title**

Bulletin of the Seismological Society of America

---

**DOI**

10.1785/0120140086

---

**Volume**

105

---

**Issue**

1

---

**Year Published**

2015

---

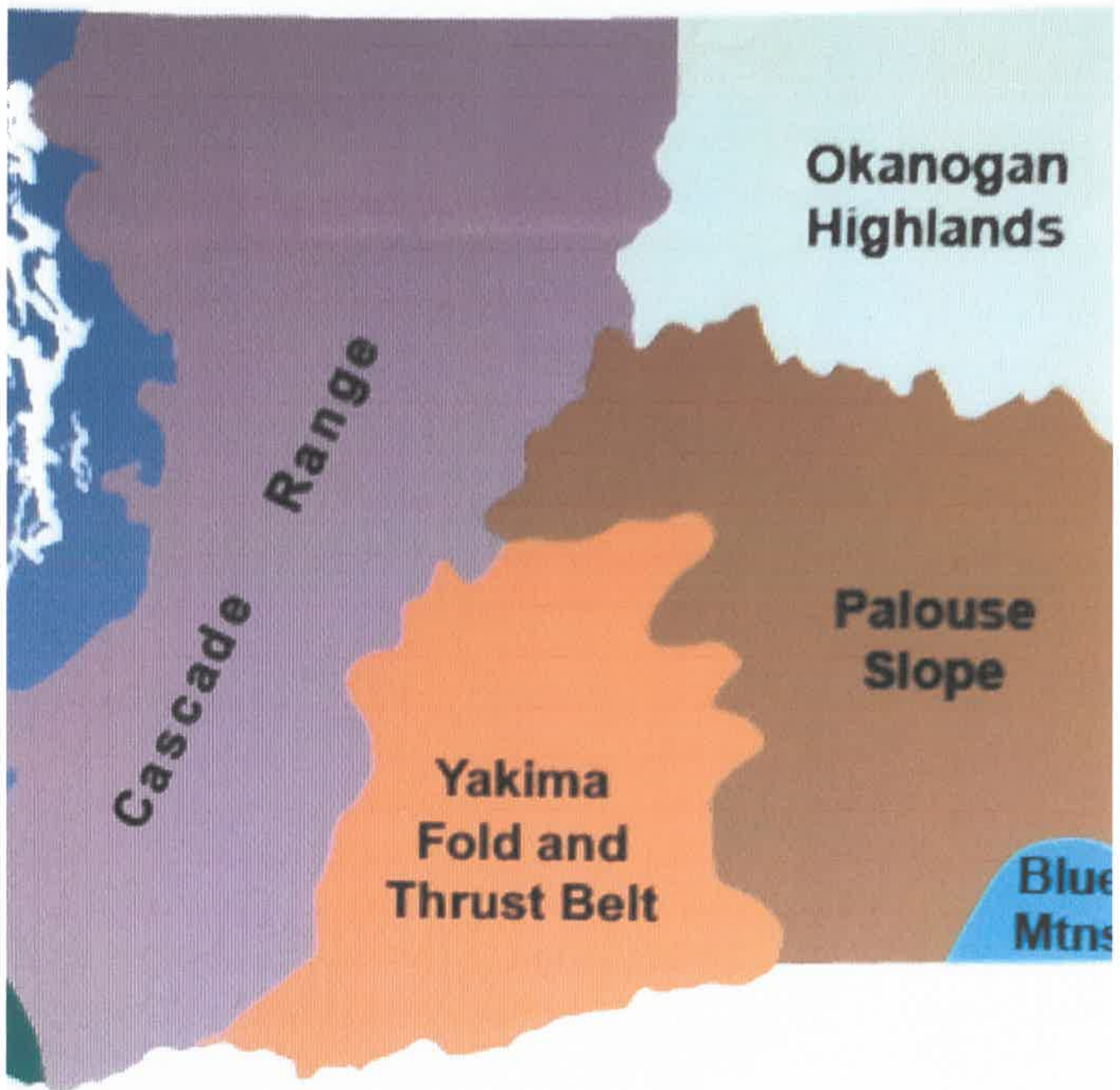
**Language**

English

---

**Publisher**

GeoScience World



provinces of Washington State—colors of provinces correspond to colors shown on both the map and in Table 1.

*read citation:* Czajkowski, J. L.; Bowman, J. D., 2014, and earthquakes in Washington State: Washington

