

Deciphering the record of prehistoric Aleutian megathrust earthquakes and tsunamis west of Kodiak Island, Alaska



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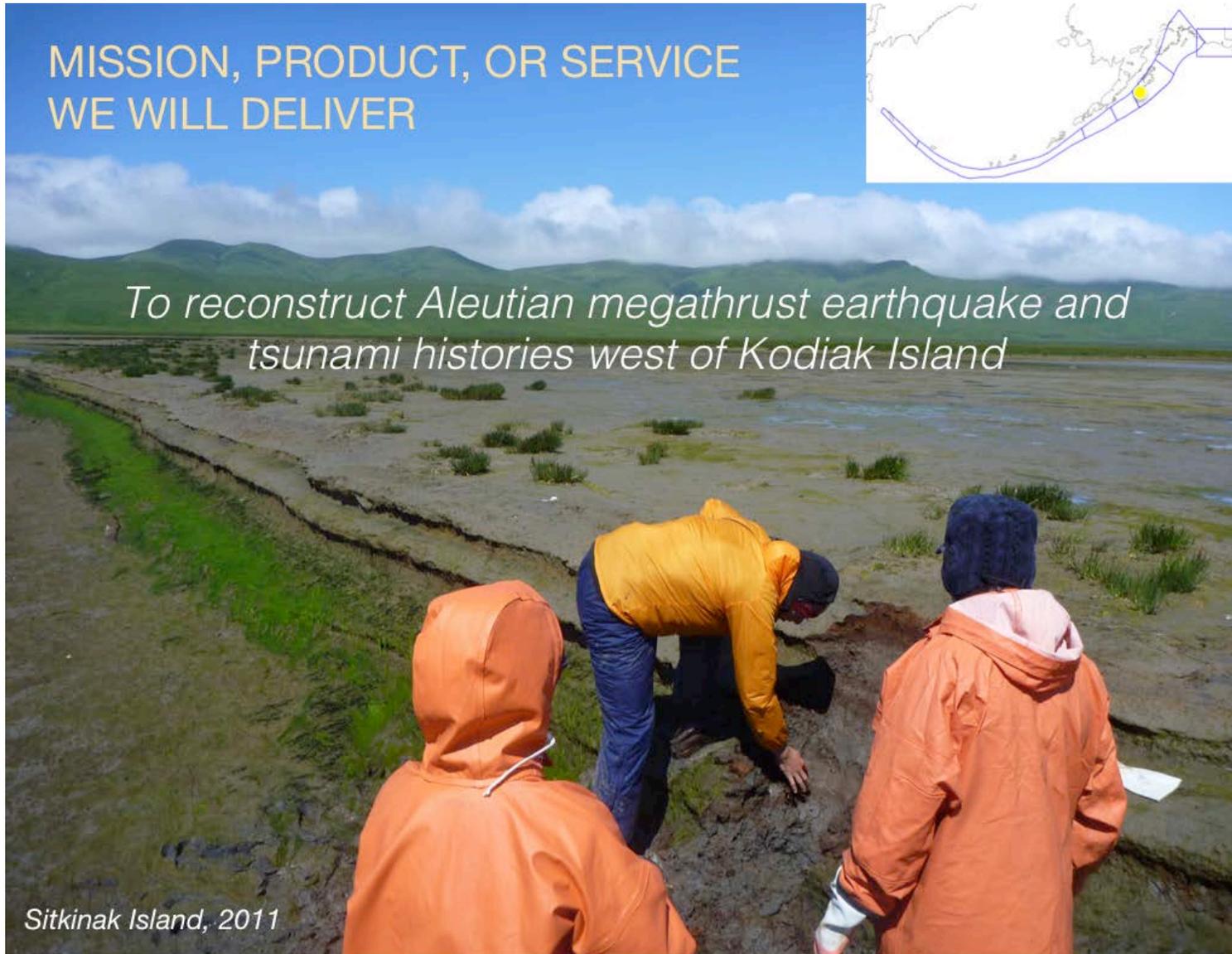
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MISSION, PRODUCT, OR SERVICE
WE WILL DELIVER



*To reconstruct Aleutian megathrust earthquake and
tsunami histories west of Kodiak Island*



Sitkinak Island, 2011

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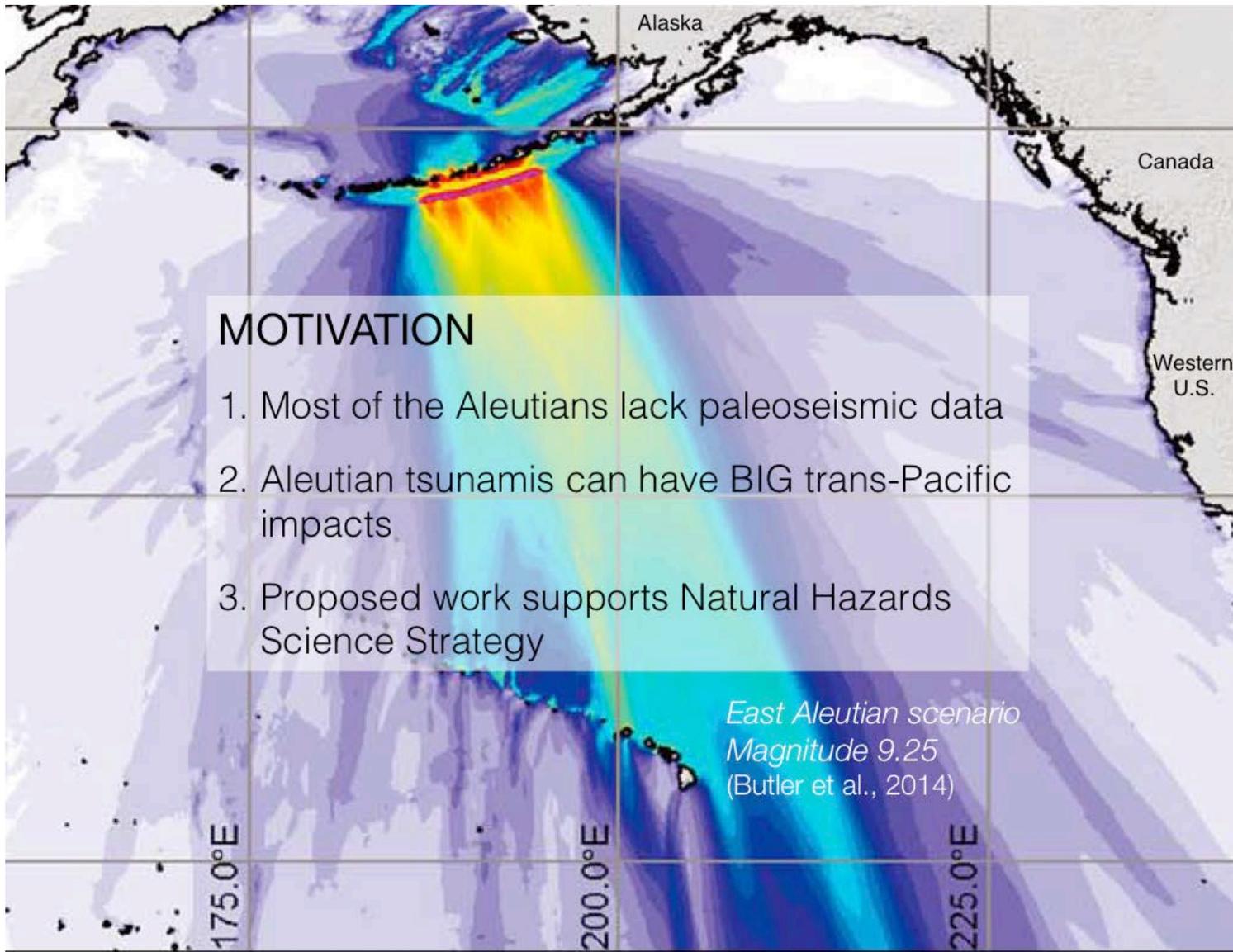
BIG SCIENCE QUESTIONS THAT NEED ANSWERING

- What are the recurrence intervals of Aleutian megathrust earthquakes and tsunamis?
- How has coseismic slip varied spatially along the megathrust?
- How do ancient rupture patterns compare to patterns of modern geodetic coupling?
- What controls rupture lengths for earthquakes of different magnitude?

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Field investigations 2010–2015

We want to double our productivity!



Eight sites investigated:

- | | |
|---|---|
|  Umnak Island |  Chirikof Island |
|  Sedanka Island |  Sitkinak Island |
|  Sanak Island |  Sitkalidak Island |
|  Simeonof Island |  Kenai Peninsula |

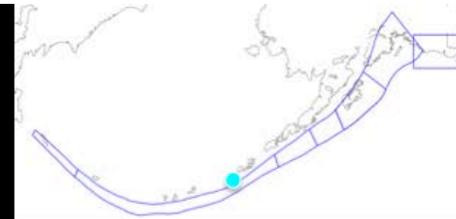


1946 tsunami deposit



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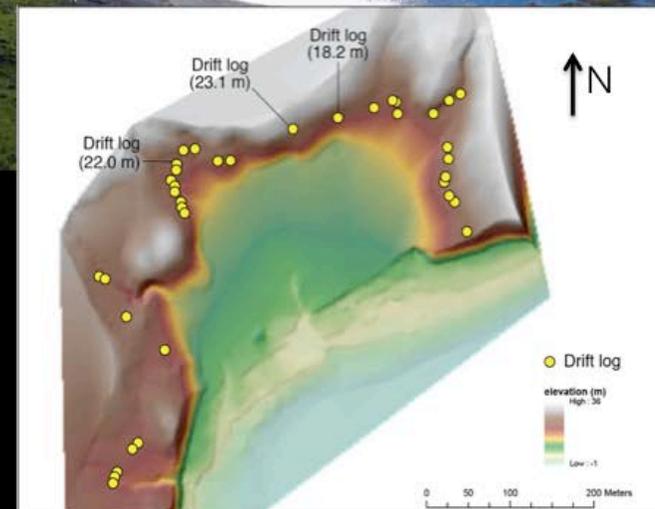
Umnak Island



← North



Epic inundation



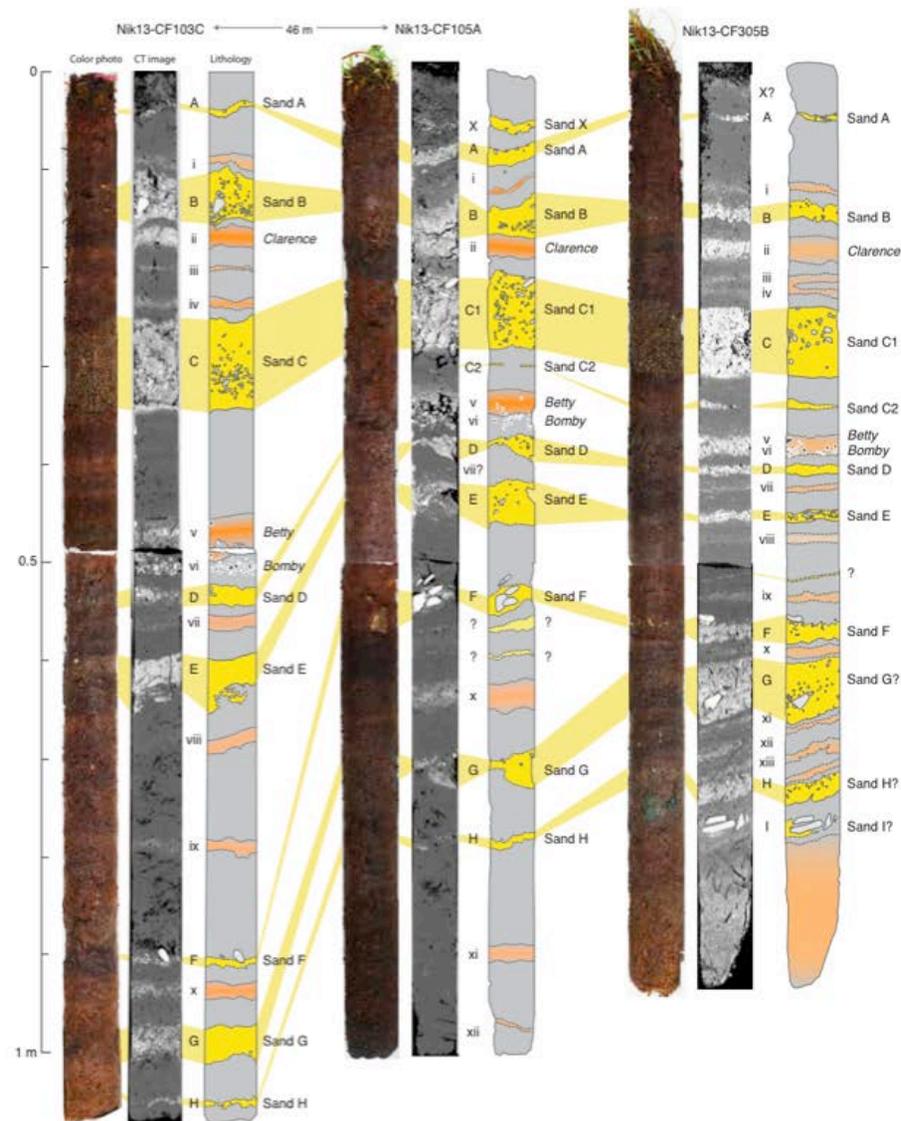
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Umnak Island

- 9 sand sheets in ~2200 yrs
- Sand sheets meet tsunami criteria
- Youngest sand sheet deposited in 1957
- Stranded drift logs indicate >23 m runup in 1957
- 270–340 yr average tsunami recurrence interval



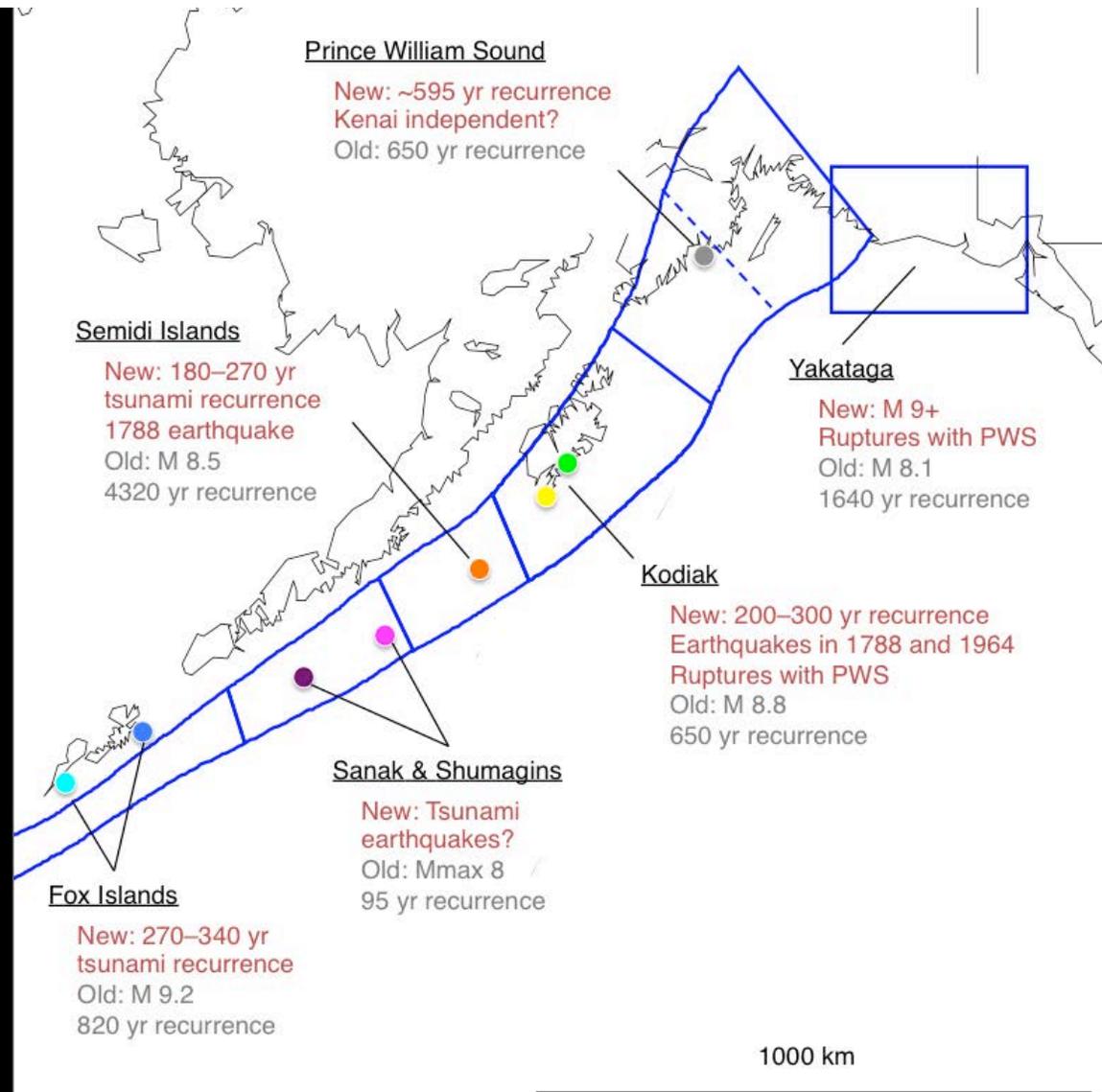
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WHO WILL BENEFIT AND HOW?

- Seismic hazard community
- Tsunami modeling community
- Risk assessments
- Emergency managers



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Sedanka Island
2012



Umnak Island
2013



Sanak Island
2014

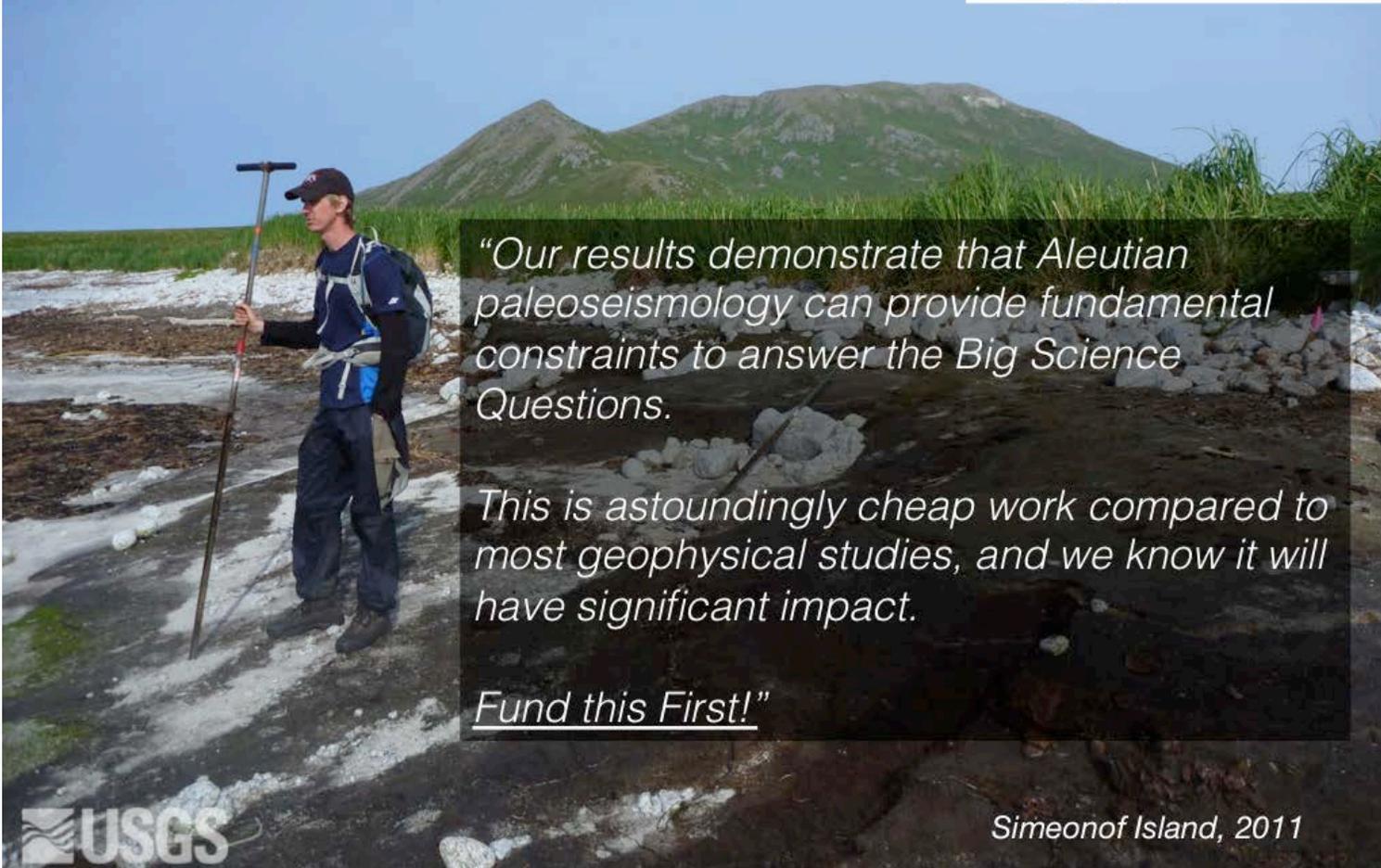


Sitkalidak Island
2015



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Need mega results?
Get megathrust paleoseismology!



“Our results demonstrate that Aleutian paleoseismology can provide fundamental constraints to answer the Big Science Questions.

This is astoundingly cheap work compared to most geophysical studies, and we know it will have significant impact.

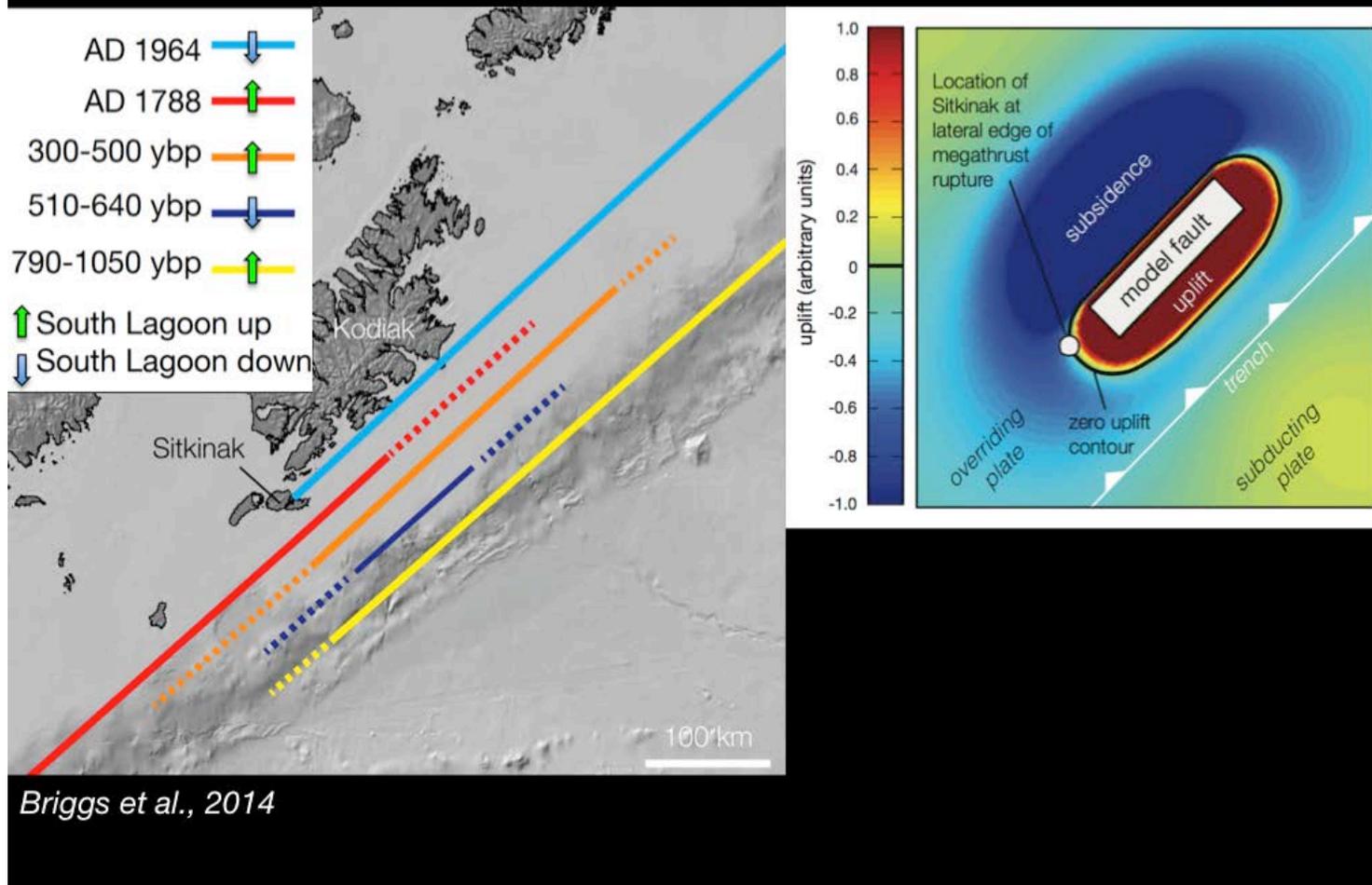
Fund this First!



Simeonof Island, 2011

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Large earthquakes don't always stop at Sitkinak

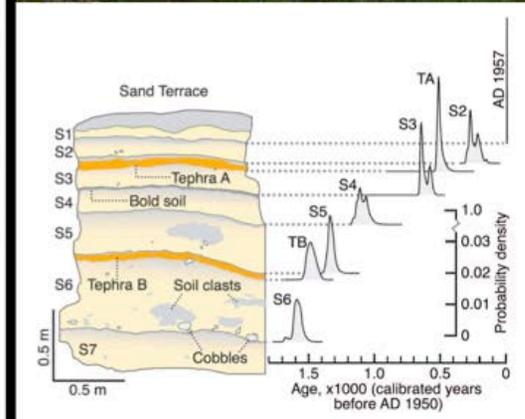
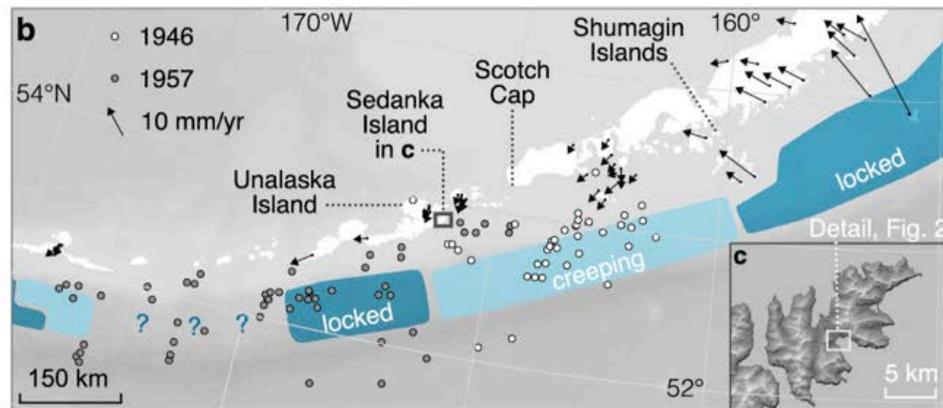
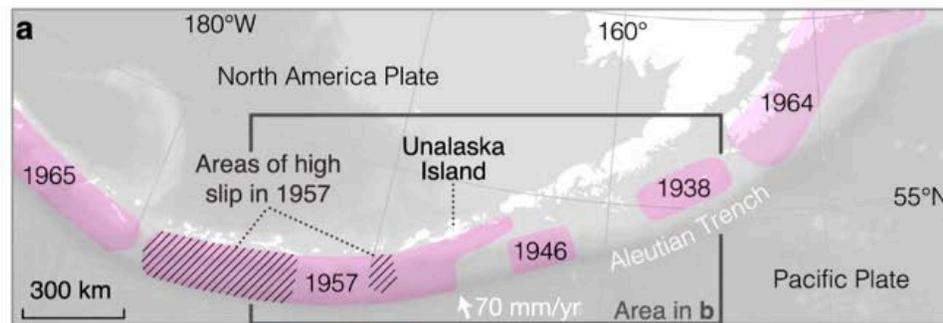


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Tsunami sources along a creeping megathrust



Witter et al., 2015

Tsunamis hit Stardust Bay every 300–340 yrs on average

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