

Geodetic Insights into Subduction Processes: The Example of Alaska

Julie Elliott, Purdue University

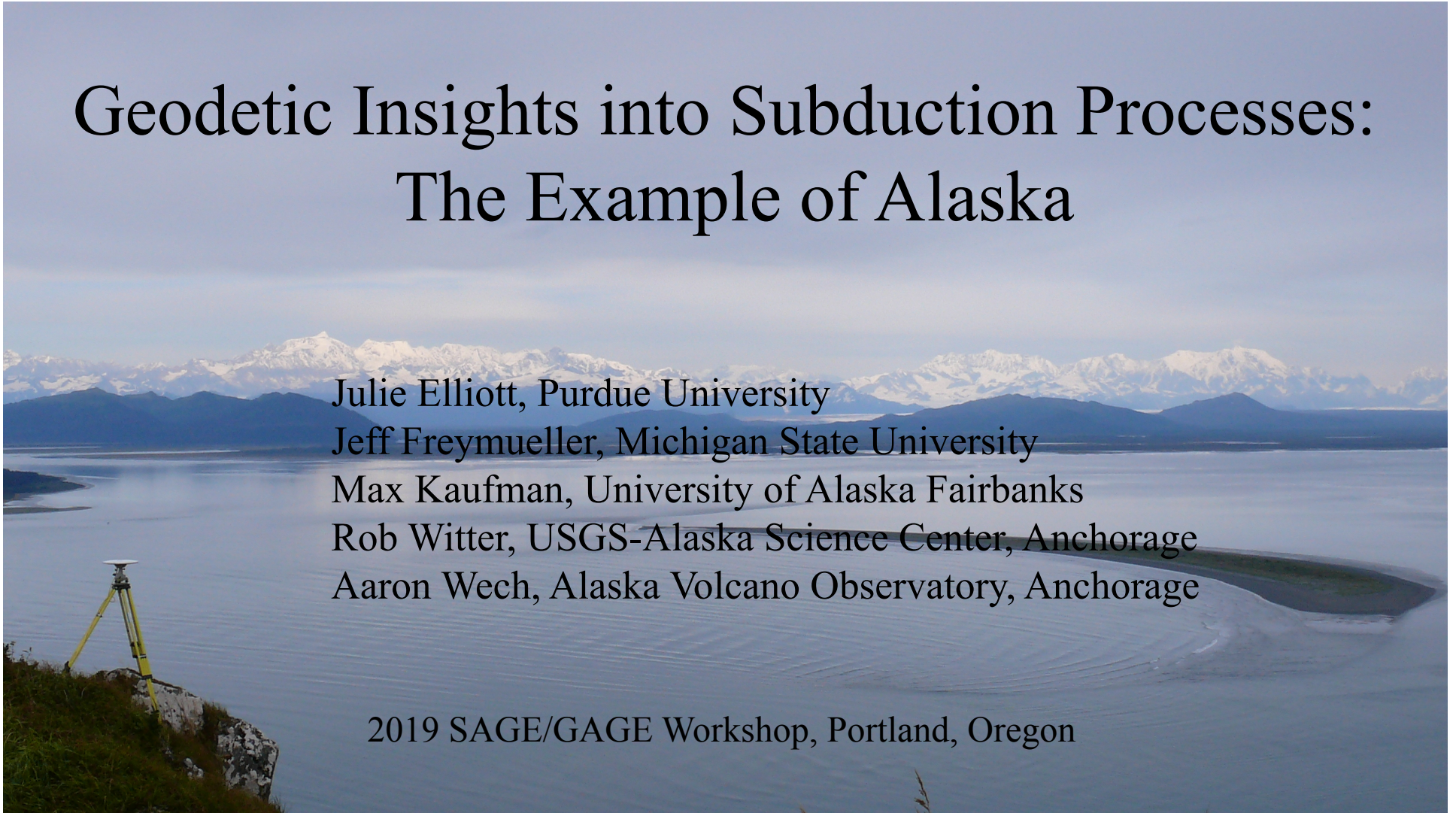
Jeff Freymueller, Michigan State University

Max Kaufman, University of Alaska Fairbanks

Rob Witter, USGS-Alaska Science Center, Anchorage

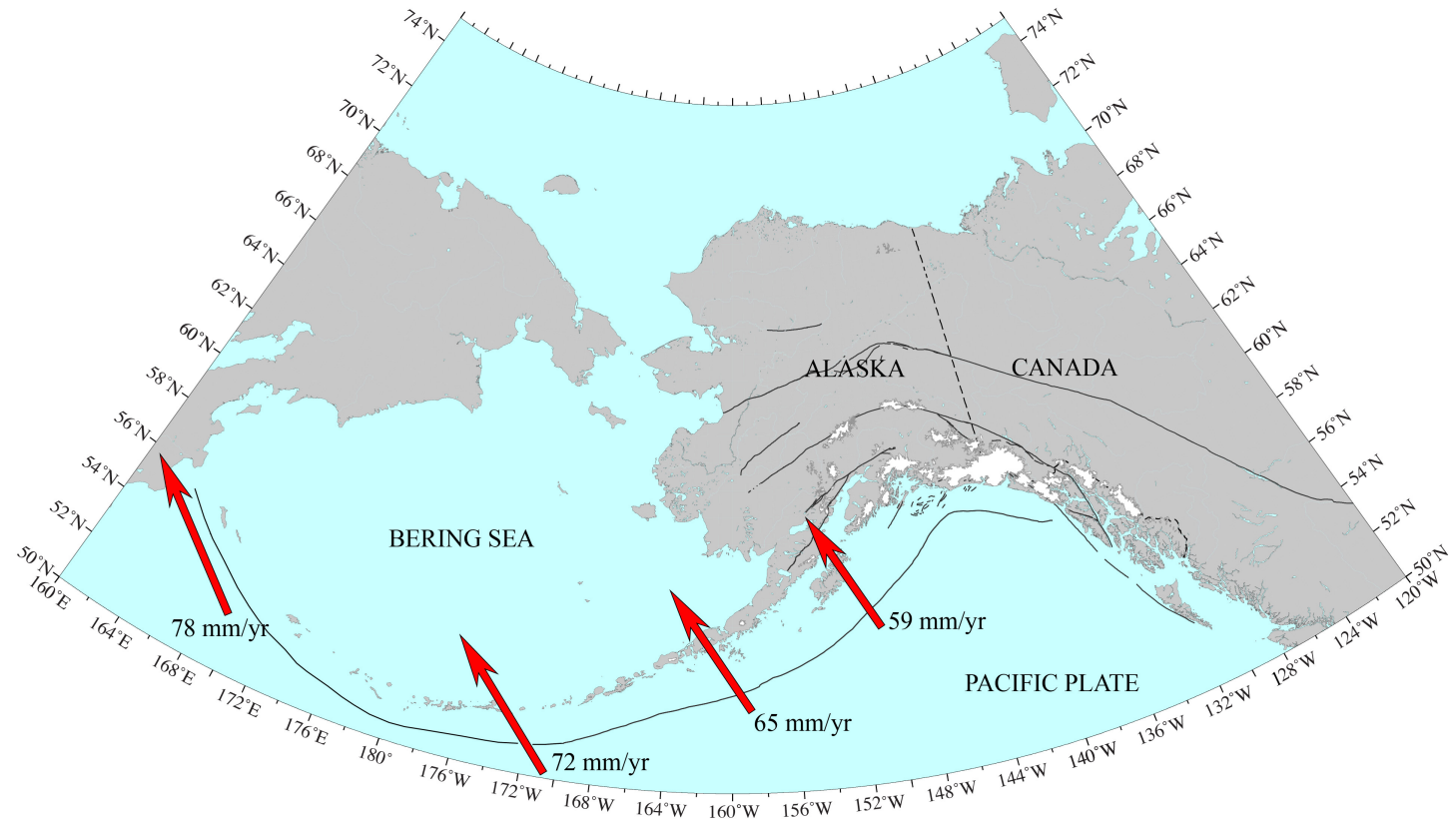
Aaron Wech, Alaska Volcano Observatory, Anchorage

2019 SAGE/GAGE Workshop, Portland, Oregon



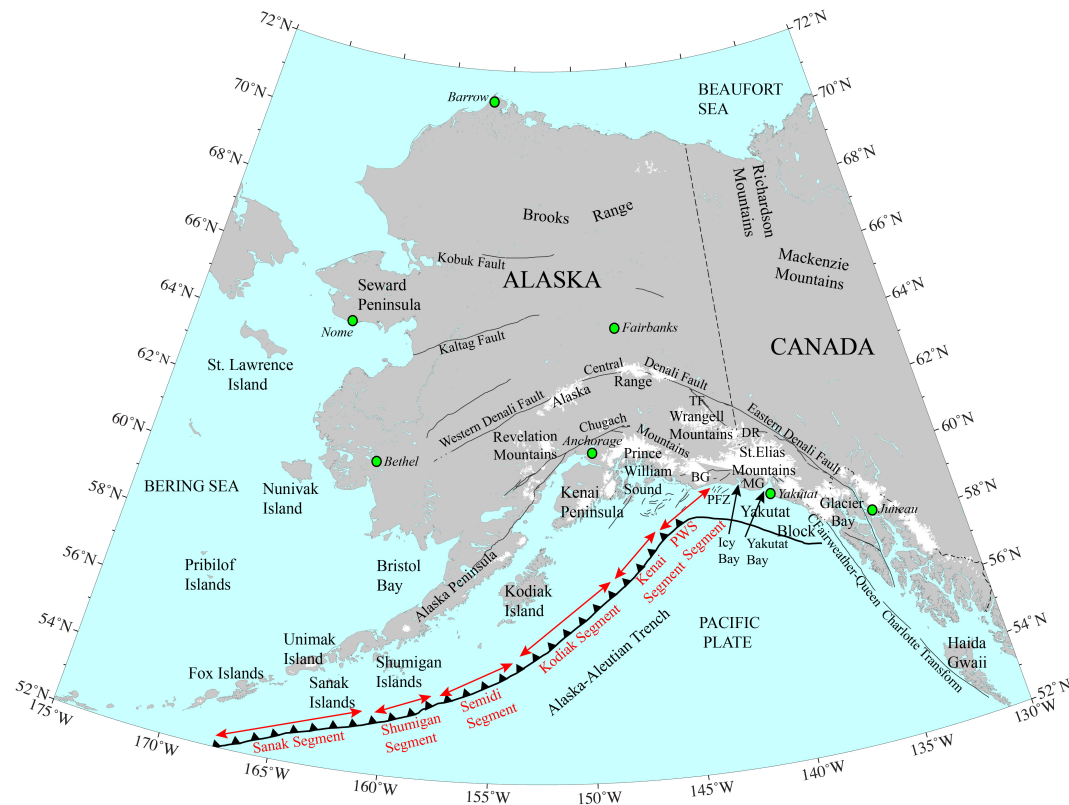
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The Alaska-Aleutian Subduction Zone



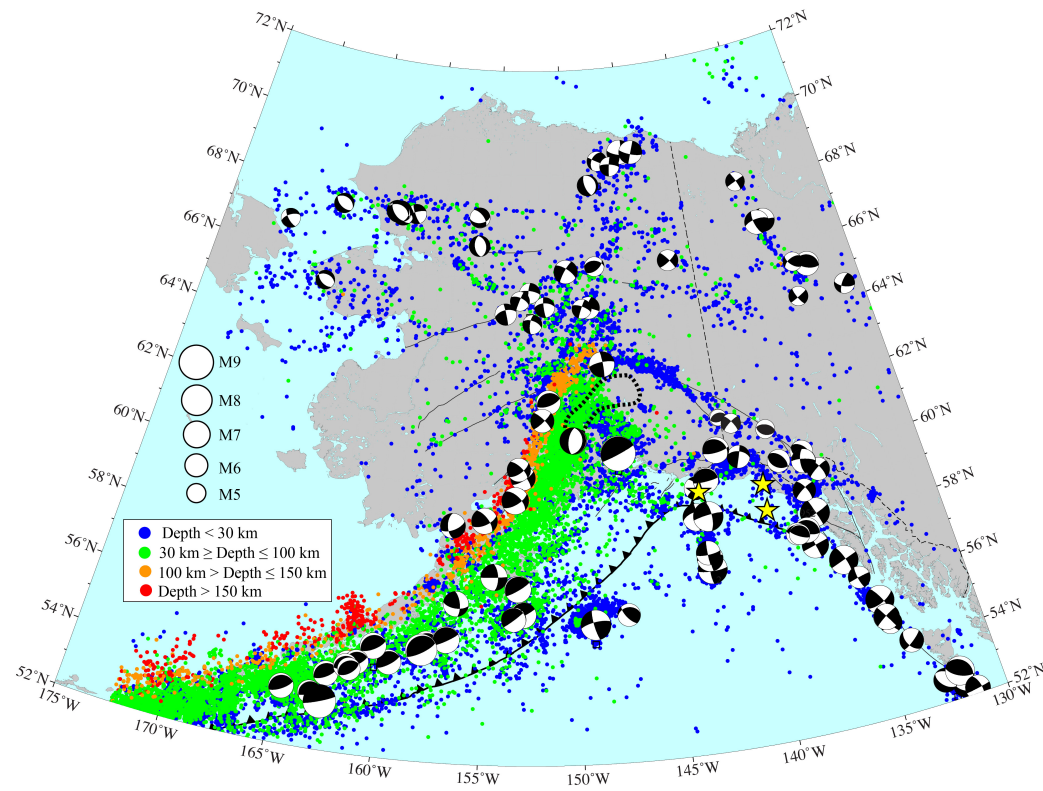
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The Alaska Subduction Zone



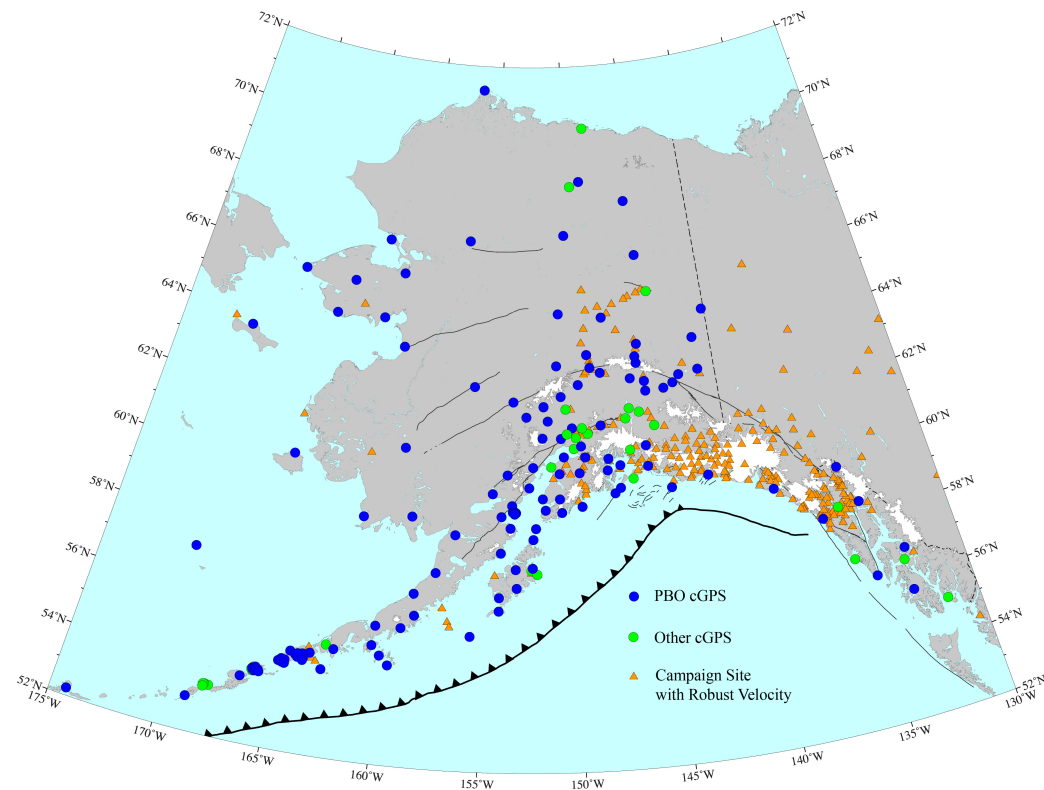
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Seismicity



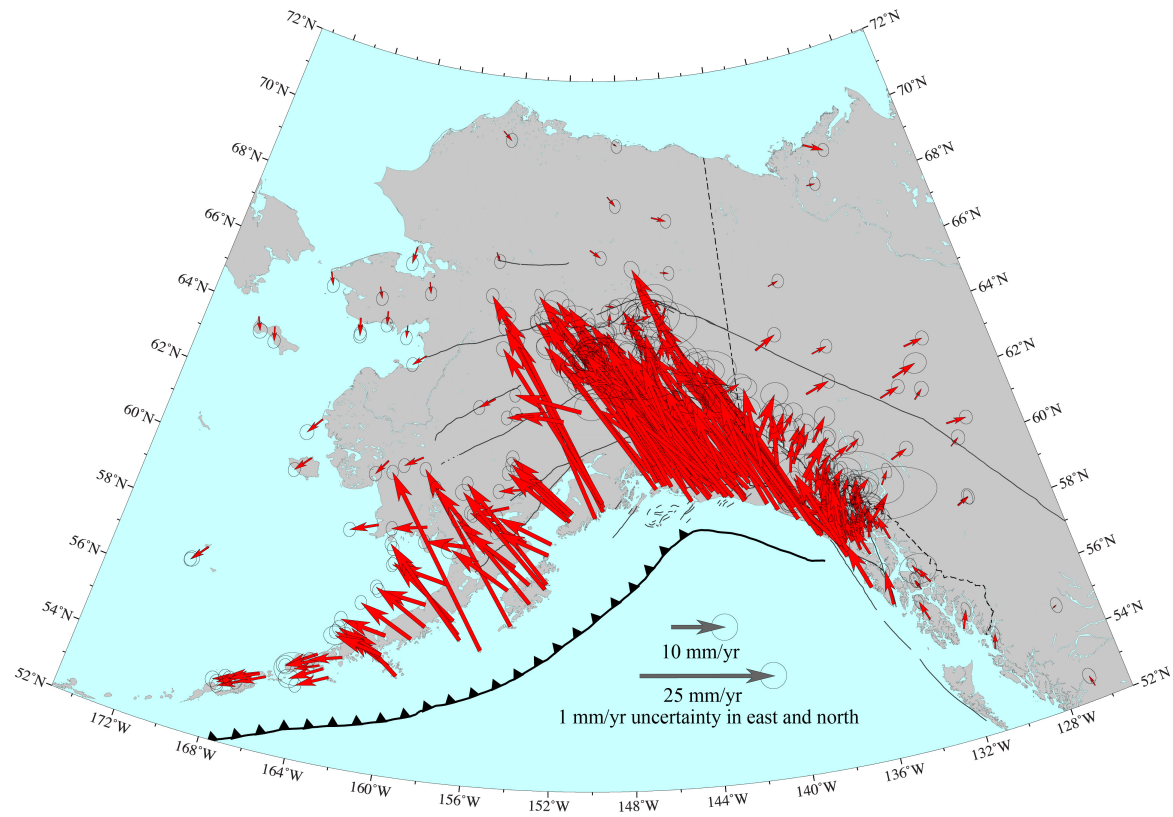
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GNSS Sites in Alaska



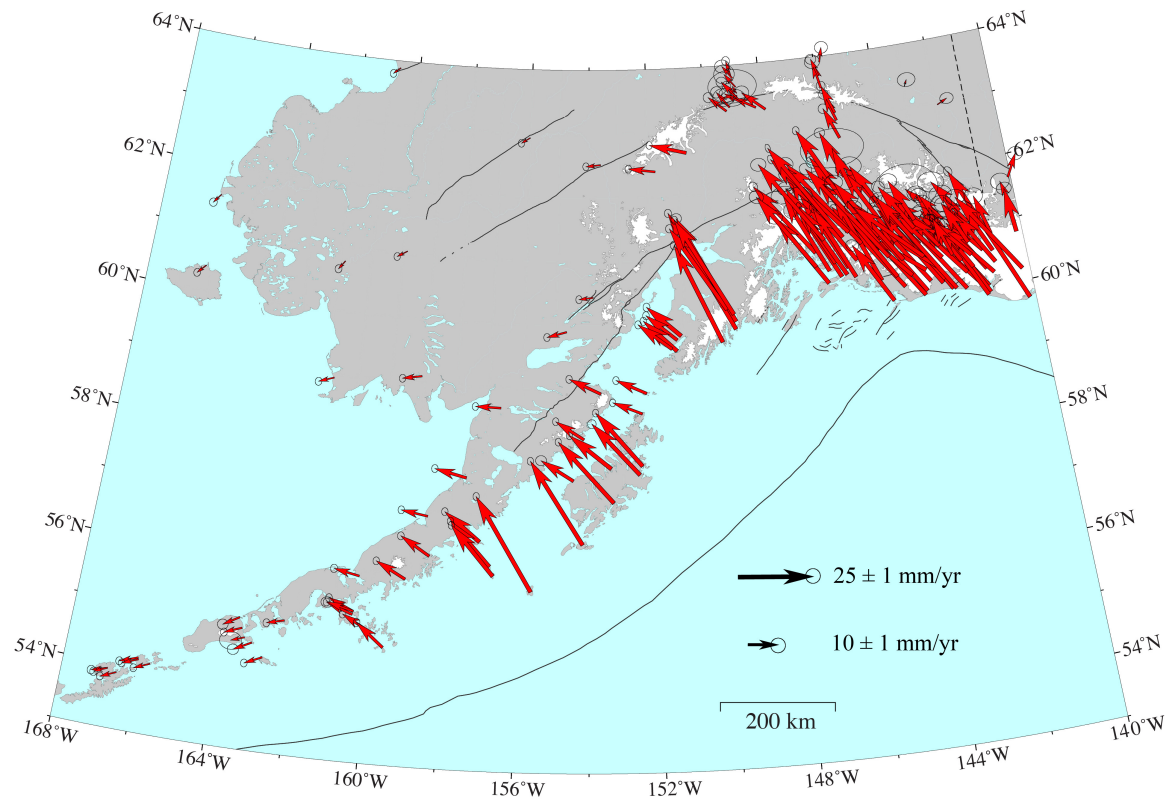
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Velocity Field



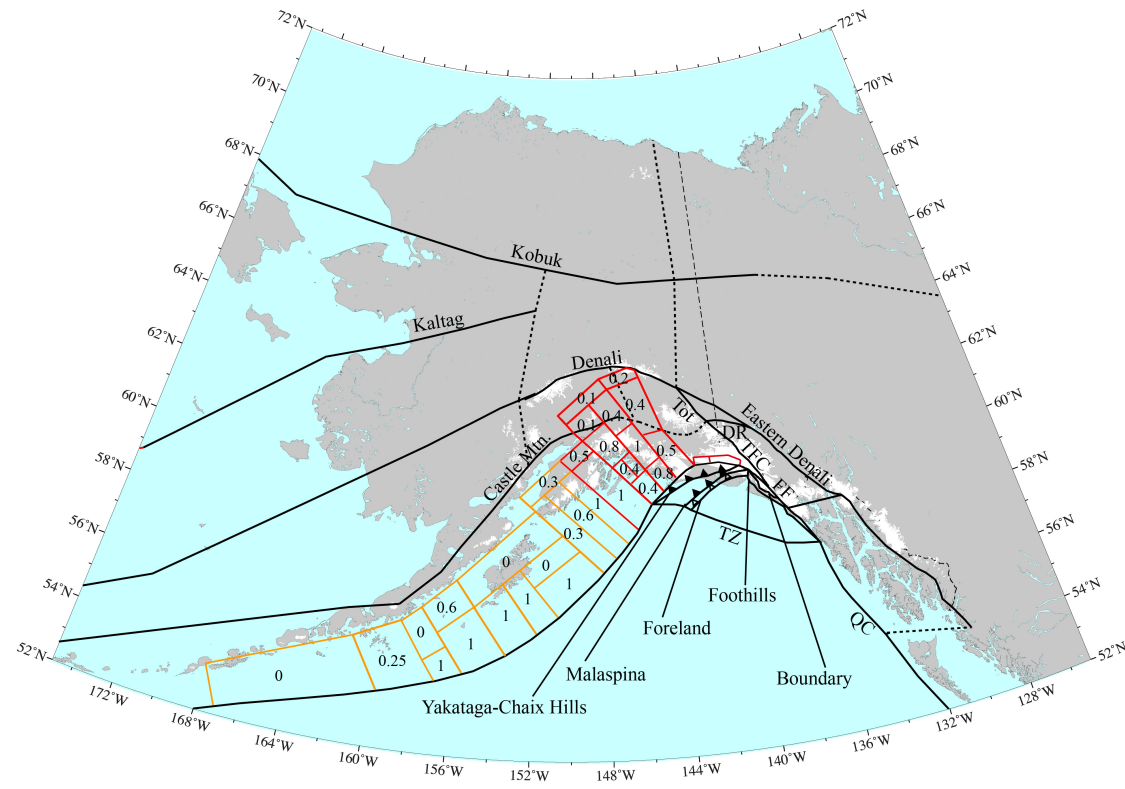
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Velocity Field



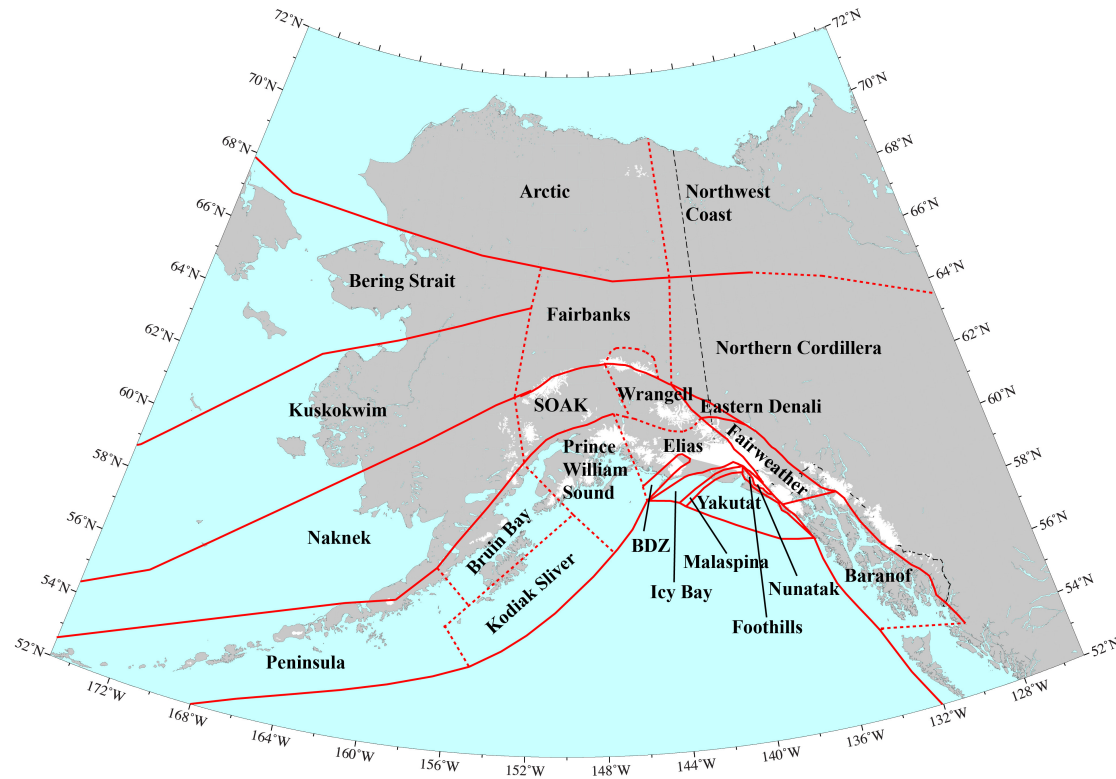
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Fault Geometries



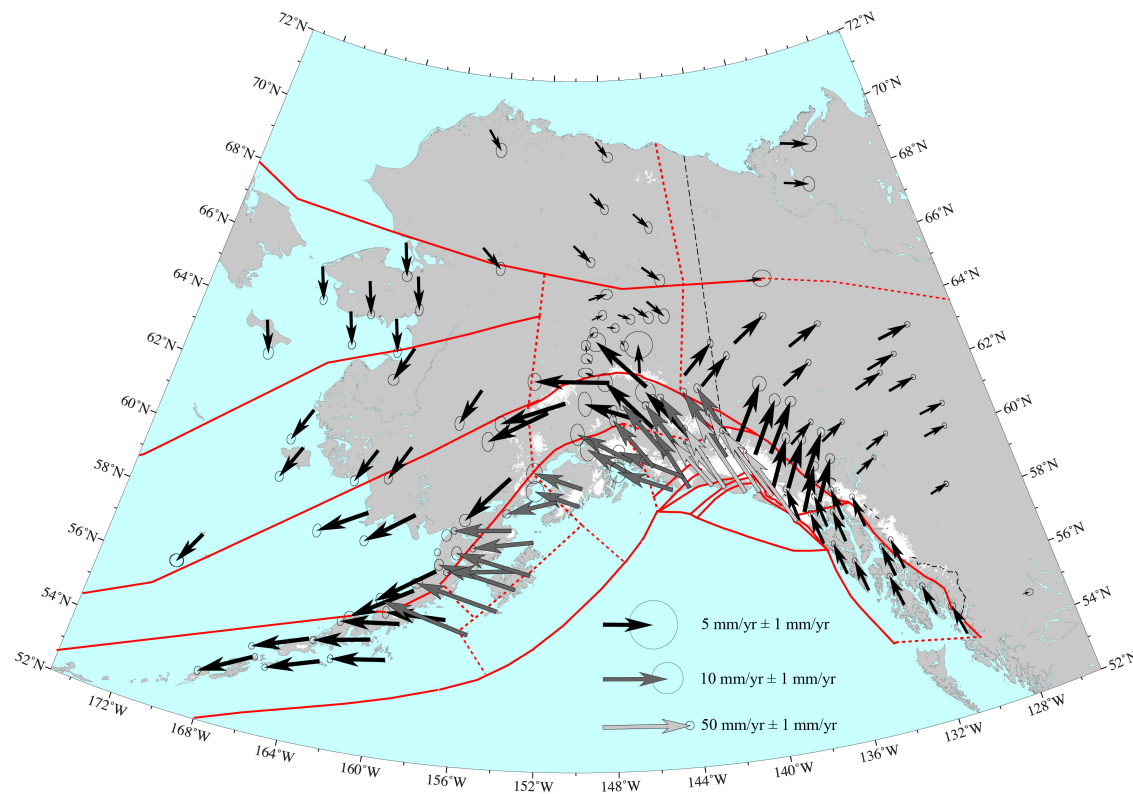
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Upper Plate Blocks



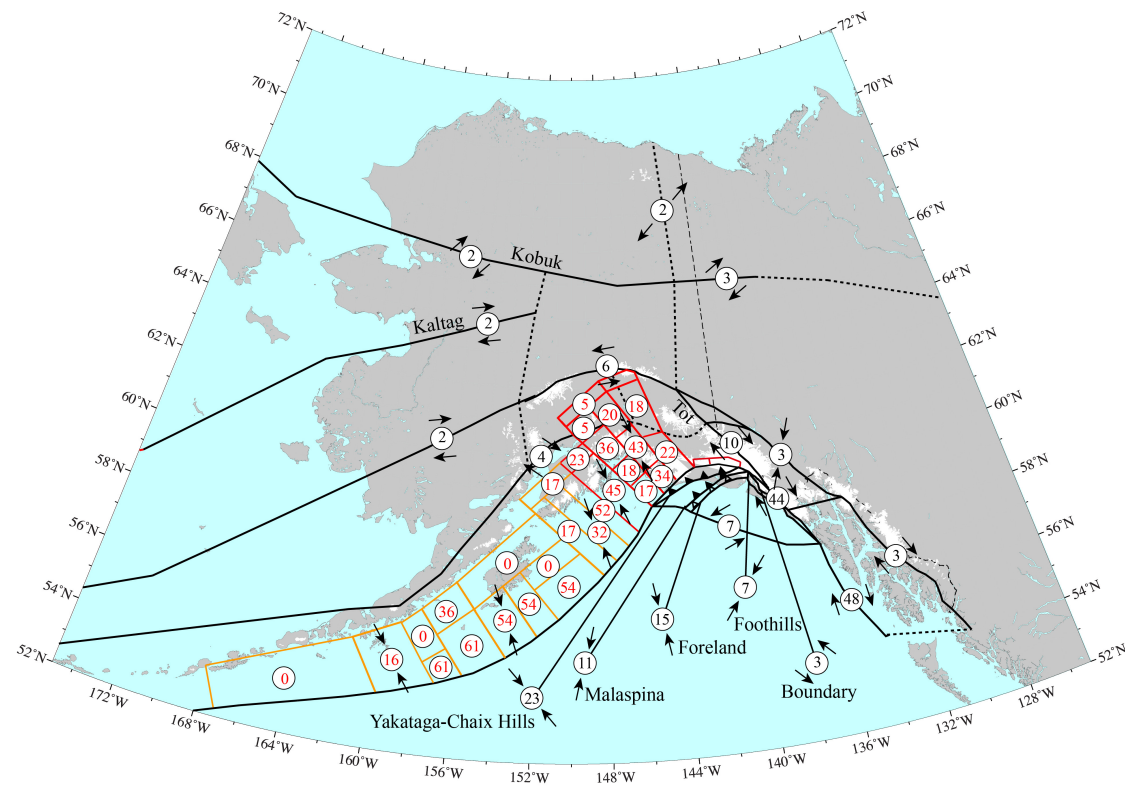
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Predicted Block Motions



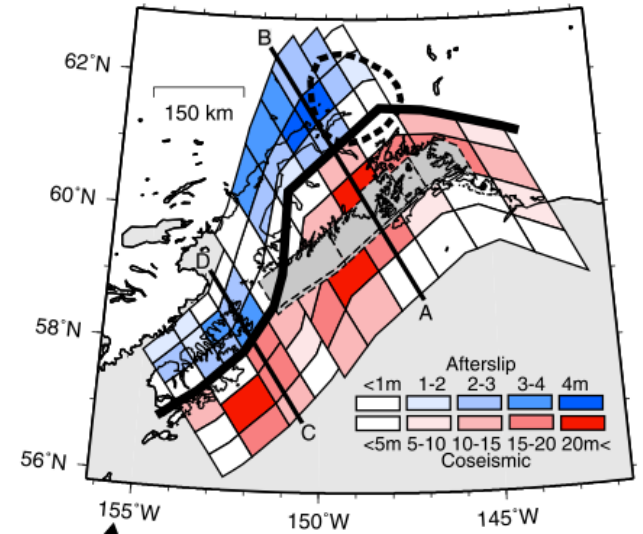
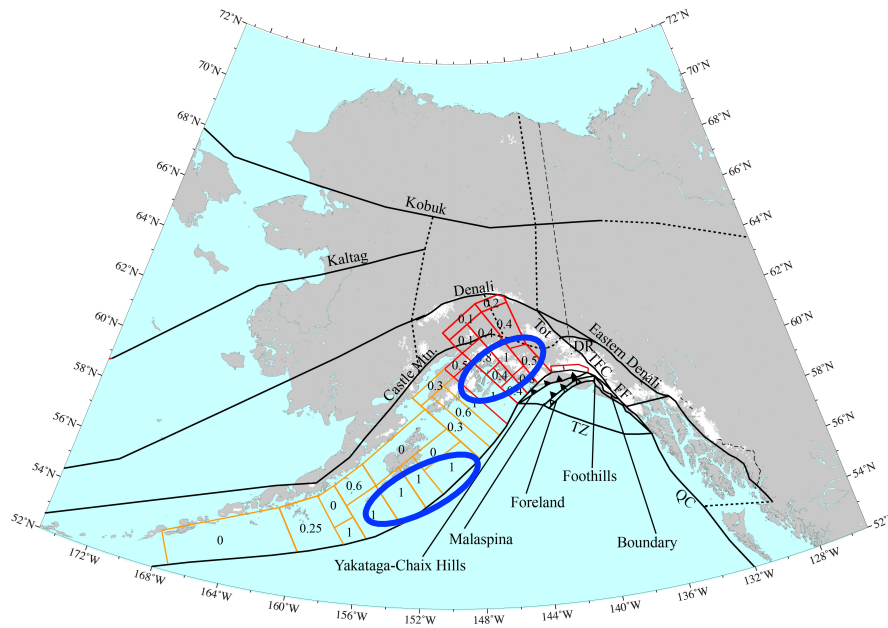
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Relative Block Motions



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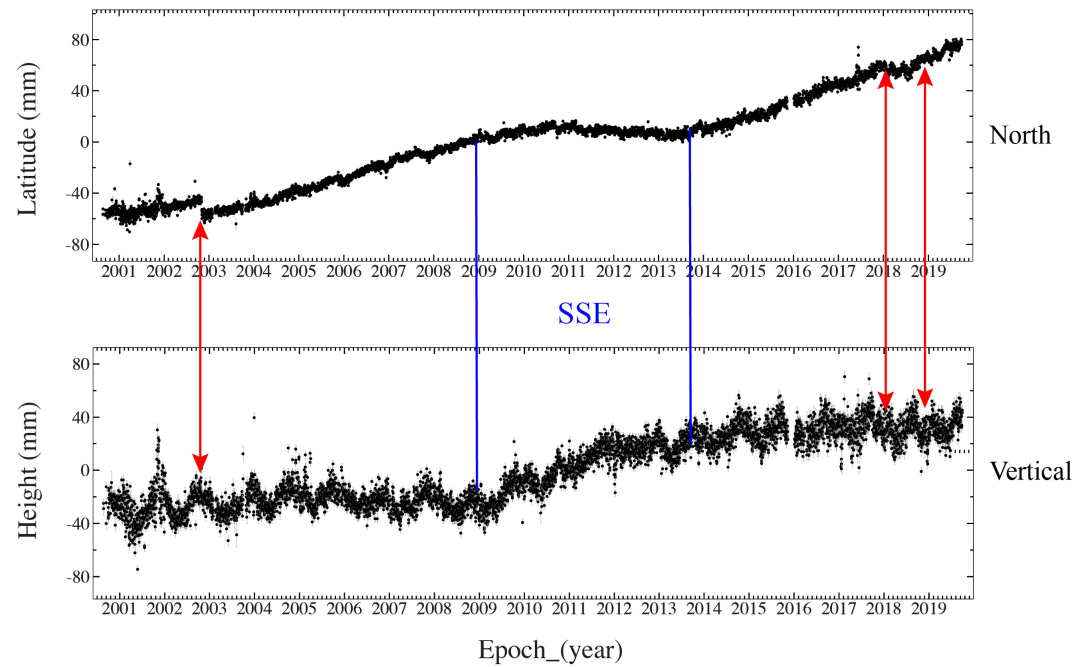
Coupling and the 1964 Earthquake



Suito and Freymueller (2009)

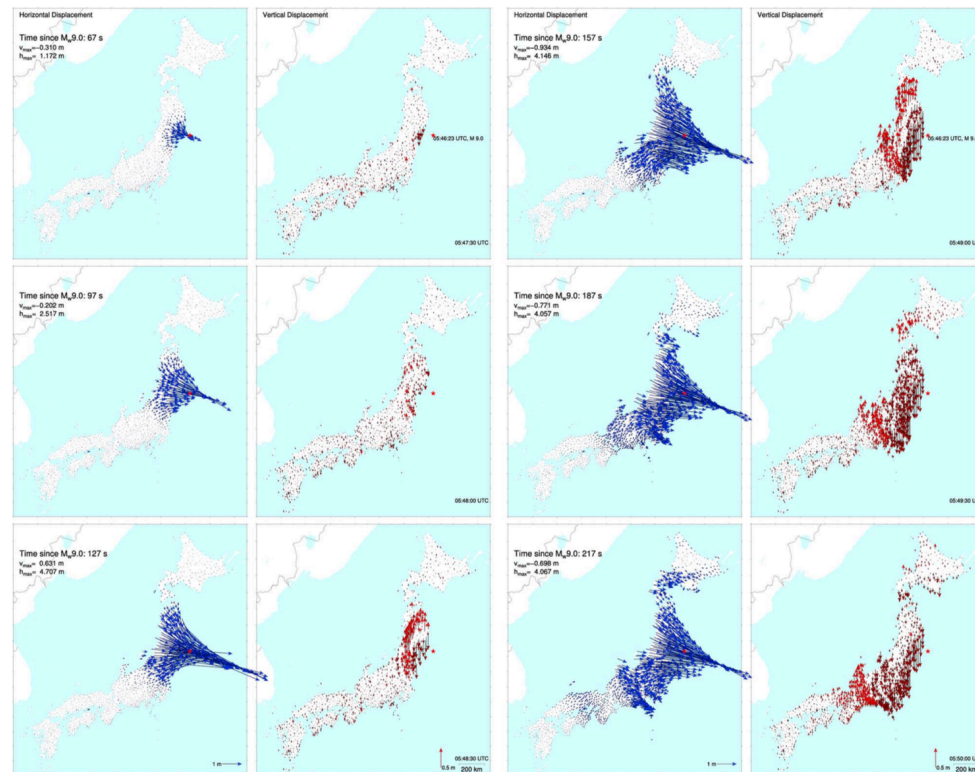
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Fault Geometries and Transient Events



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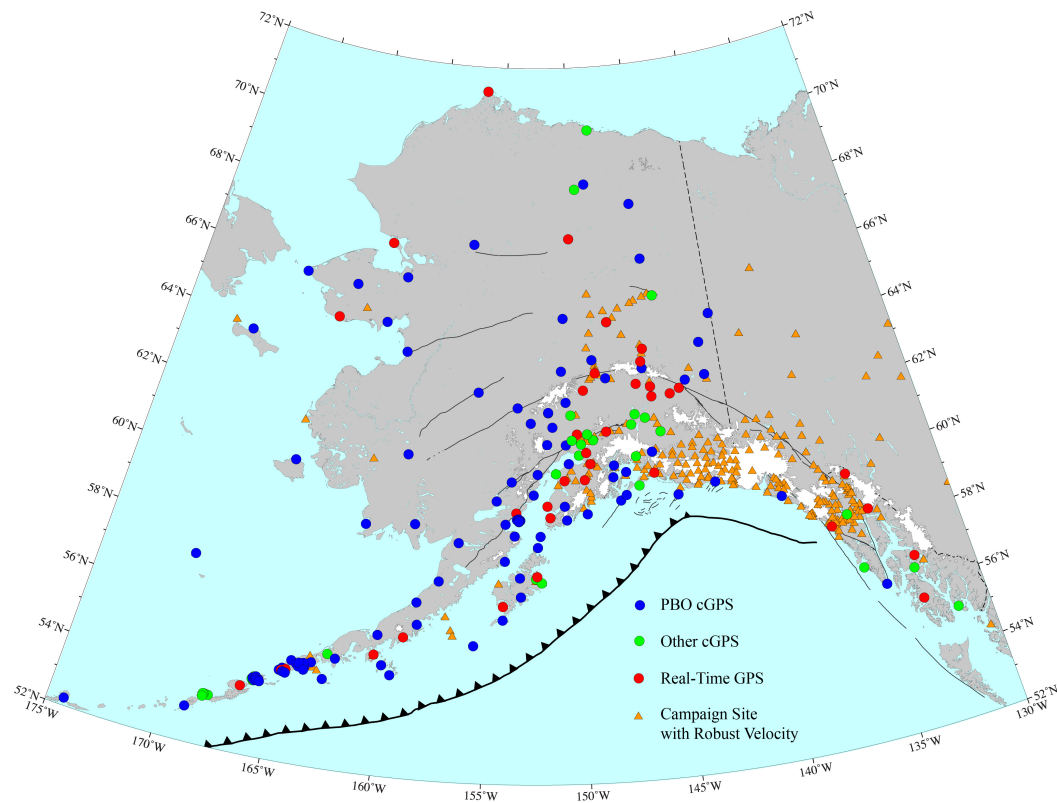
What is State-of-the-Art?



Grapenthin and Freymueller, 2012

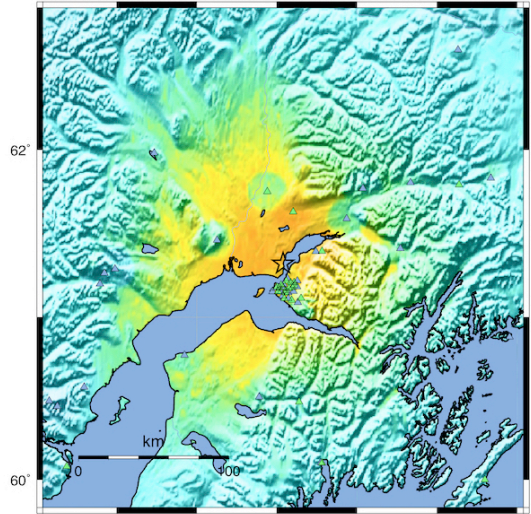
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GNSS Sites in Alaska



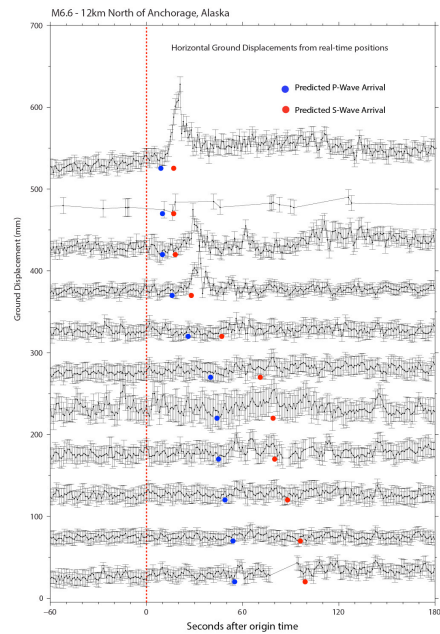
2018 Anchorage Earthquake

AEC ShakeMap : 7 miles NW of Elmendorf AFB
Nov 30, 2018 08:29:29 AM AKST M 7.0 N61.32 W149.92 Depth: 44.1km ID:20419010

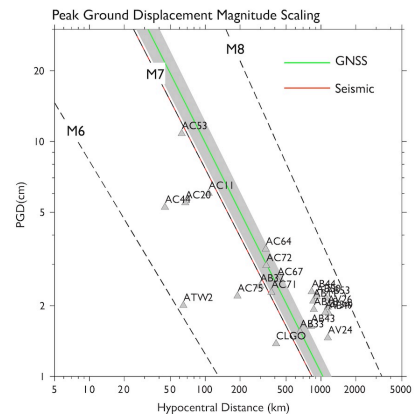
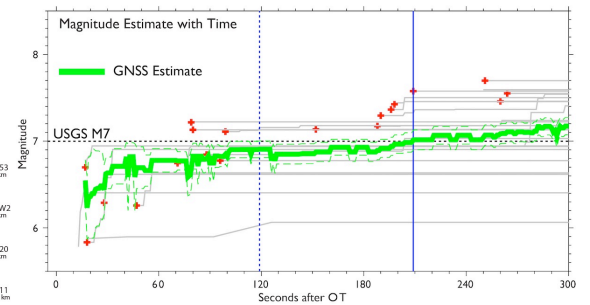


PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC (m/s ²)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL (cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2012)



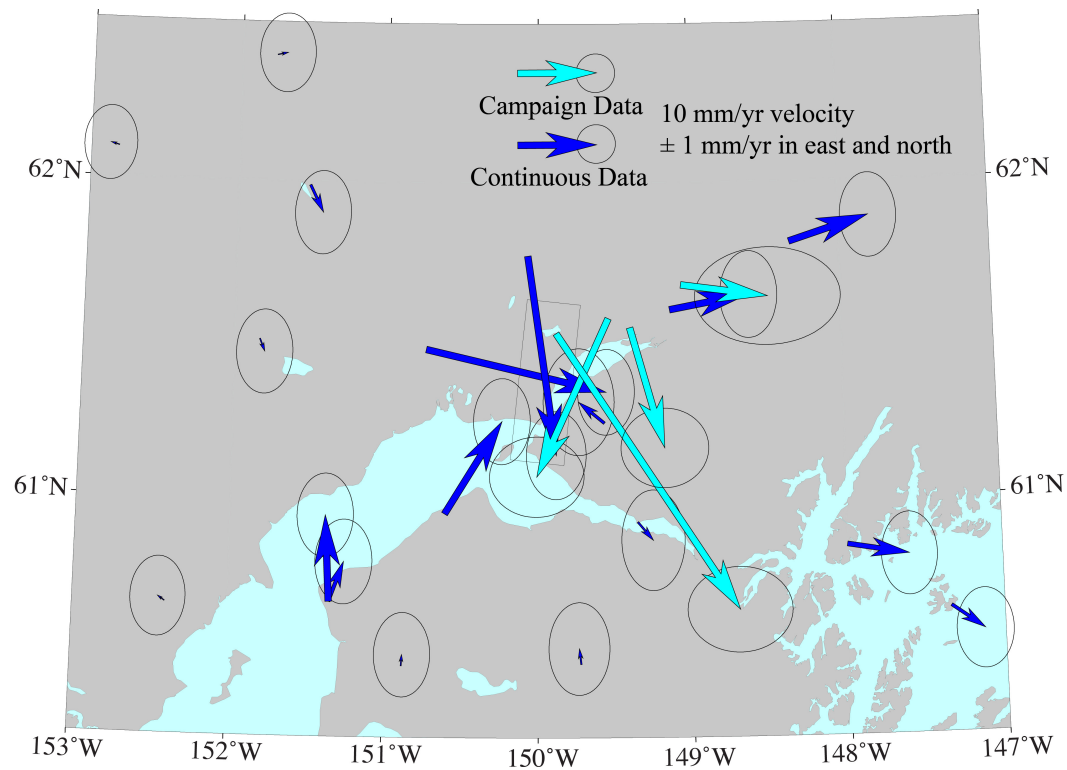
M 7.0 - 12km N of Anchorage, Alaska, 2018-11-30 17:29:29 (UTC)



Kathleen Hodgkinson, UNAVCO

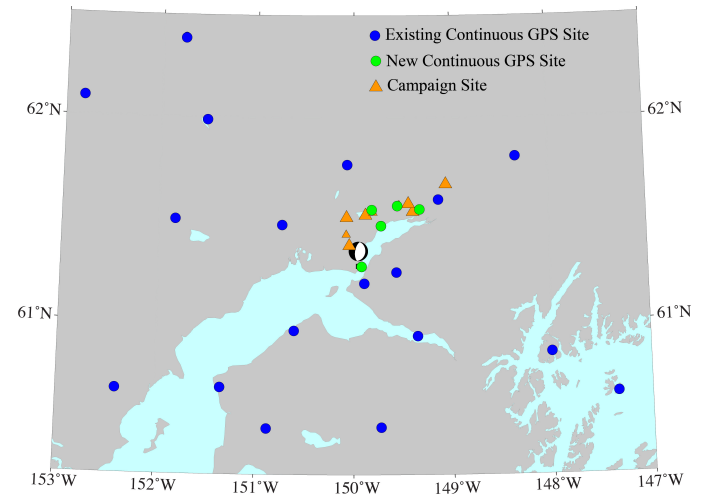
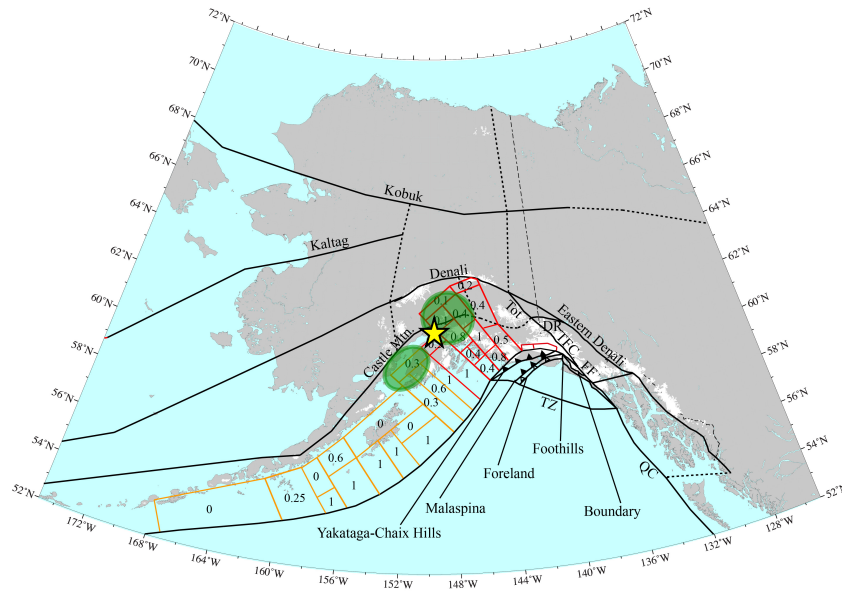
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Anchorage Earthquake Coseismic Offsets



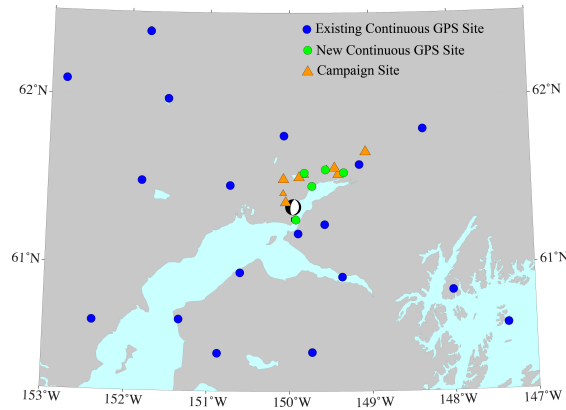
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2018 Anchorage Earthquake



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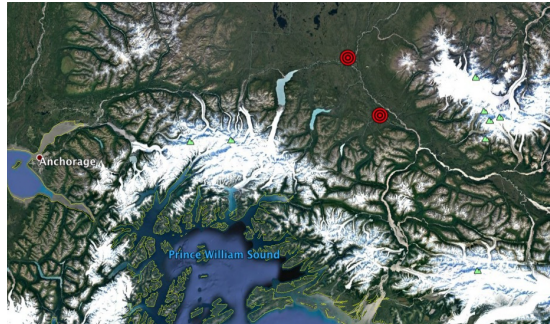
Outreach – GPS in Schools



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ELEMENTARY SCHOOL

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Questions?

