Alaska logic tree used in ASCE 7-16 and California Tsunami Hazard Maps

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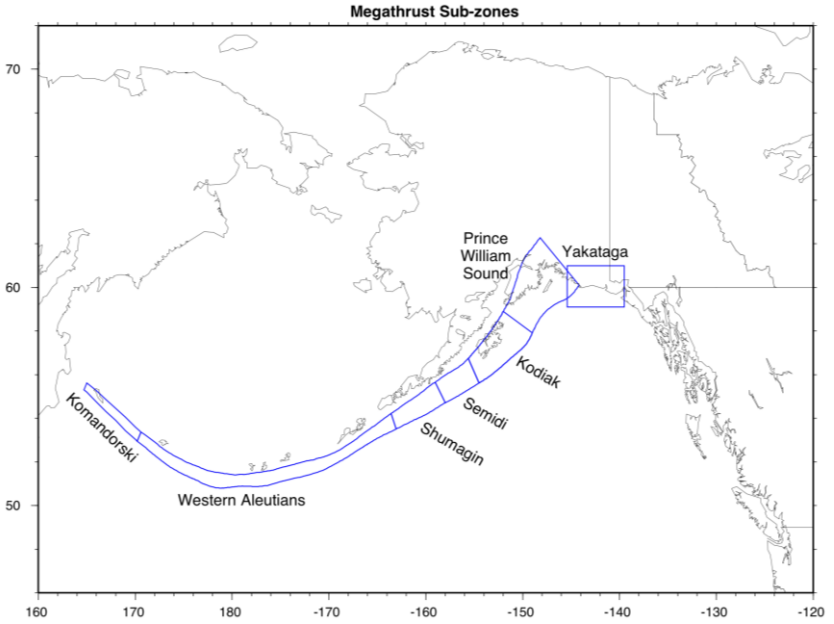
Considerations

- Generally, it is desirable to base the source recurrence models for PTHA on their seismic equivalents, with the extension to Tsunami specific parameters (e.g. slip distribution)
- Latest Alaska seismic hazard map: Wesson et al., 2007.
- Recent data suggests major updates to the 2007 model required

2007 USGS model



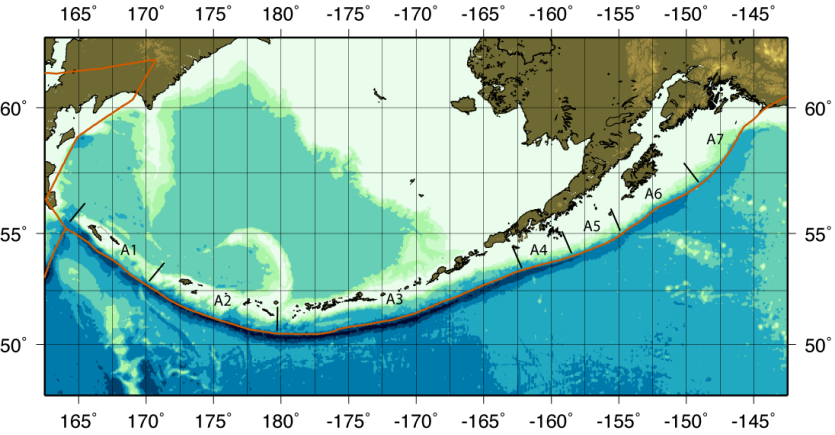
	Return Period	Recurrence model	Magnitude range
Yakataga	300-1600	G-R	7-8.1
East Aleutian	650	M-M	9.2
Kodiak	650	M-M	8.8
Semidi	1900-4300	G-R	8-8.5
Western Aleutian	130-800	G-R	8-9.2
Far West Aleutian	3000-25,000	G-R	8-9.2

Alaska-Aleutian update for ASCE 7/CGS

– Constraints:
  - Past events (1964, 1957, 1946, etc.)
  - Event observations (inc. age) for Yakataga, PWS, Kodiak,
  - Lack of large events (last 3000 yr) and no/low coupling in Shumagin section
  - Plate rates

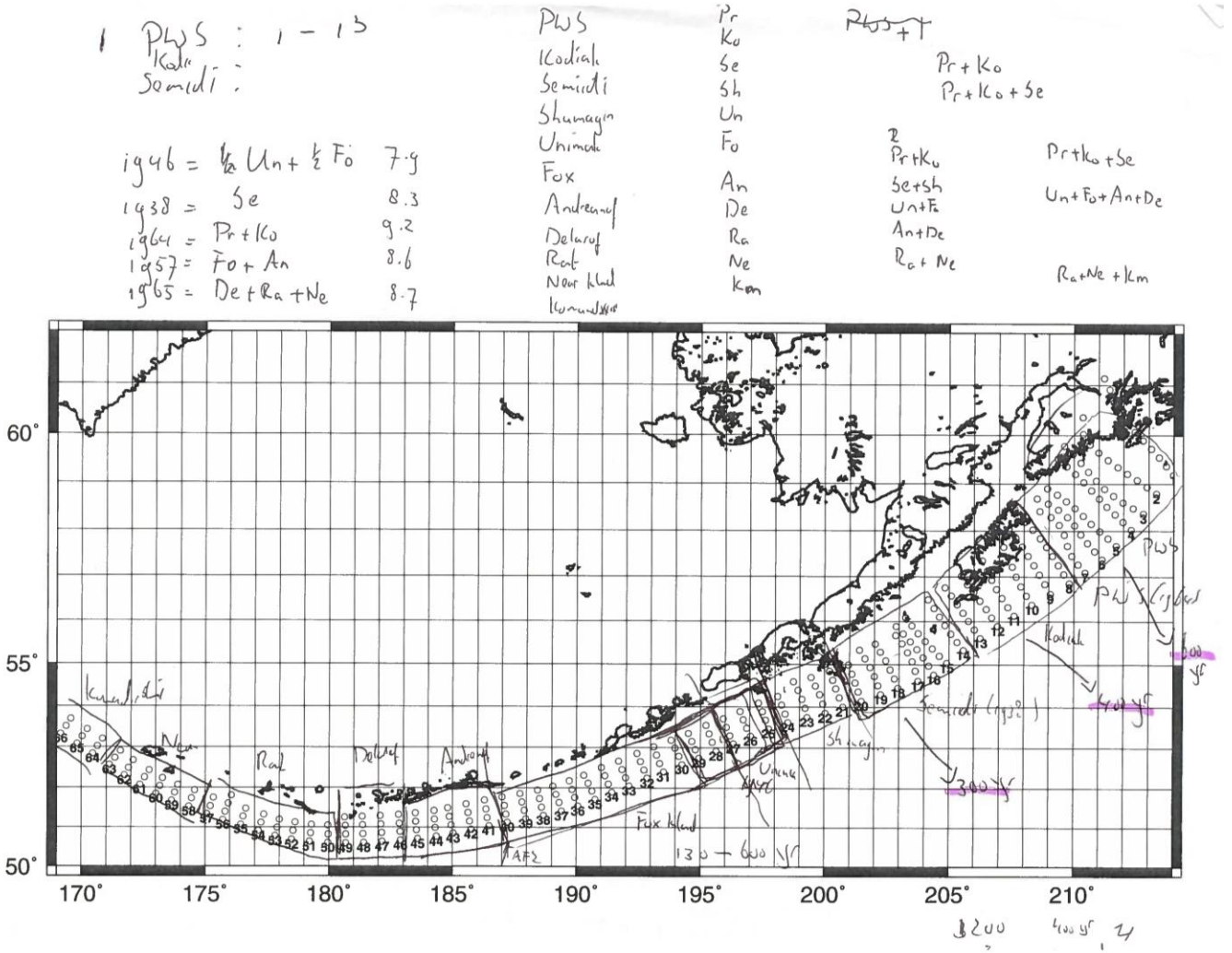
– Assumptions
  - Segmentation following Jacobs and Nishenko(), small enough to satisfy tsunamigenic events, but still manageable
  - Multi-segment ruptures possible
  - Largest ruptures extend from 180° longitude East or West
  - Largest rupture can involve Shumagin segment

Source recurrence model – epistemic uncertainty, max magnitude



Model	Segment	Mmax	Lon. range	Recur
USGS	All	7-8	-195.0 - -144.0	G-R
	Yakataga	7 – 8.1	-145.5 - -139.5	G-R
	East	9.2	-154.5 - -144.0	Max
	Kodiak	8.8	-154.5 - -149.0	Max
	Semidi	8 – 8.5	-158.0 - -154.0	G-R
	Shumagin	-	-163.0 - -158.0	-
	Western	8-9.2	-190.0 - -163.0	G-R
	Komandorski	8 – 8.2	-195.0 - -190.0	G-R
McCafrey	Alaska	9.5	-144 - -164	Max
	East Aleutian	9.3	-164 - -180	Max
	Western Aleutian	9.3	-180 - -195	Max

Segmentation



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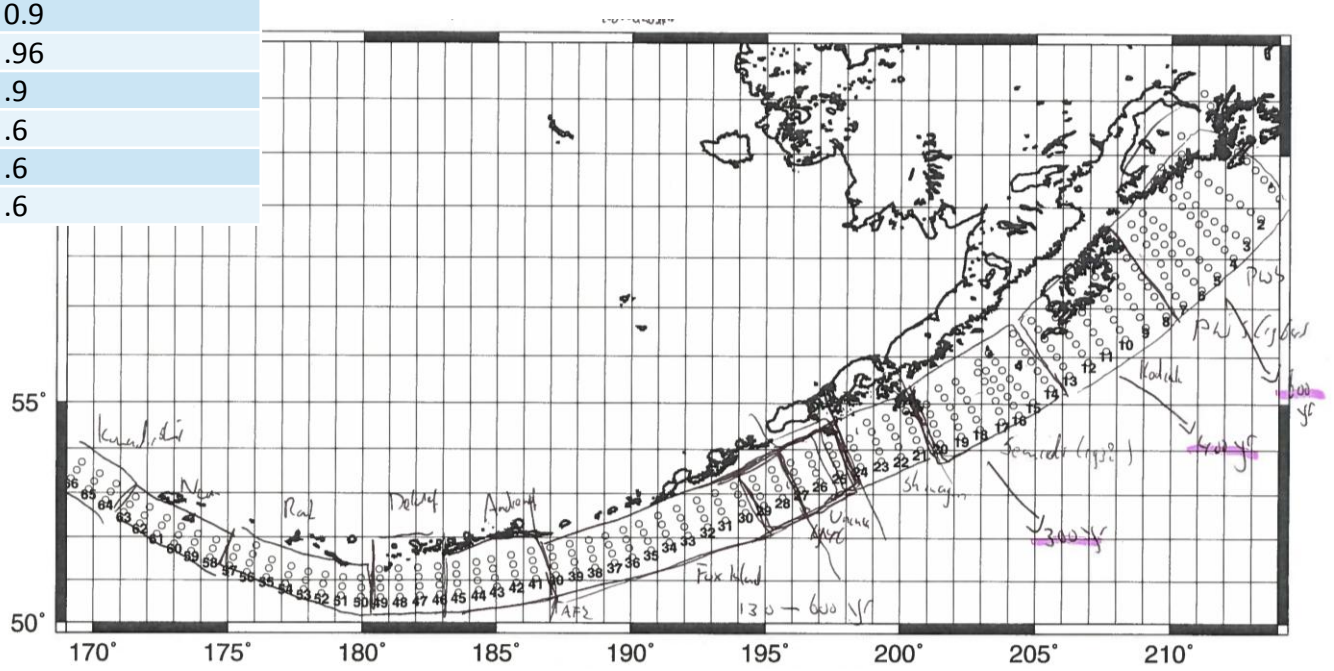
Current segmentation model

Segment	Rate (mm/yr)	Coupling
Yakataga	54	0.6
Prince-William Sound	55	0.62
Kodiak	64	0.8
Semidi	68	0.8-0.9
Shumagin	69	0.0-0.3
Unimak	70	.6-.9
Fox Island	65	0.9
Andreanof	61	.96
Delarof	50	.9
Rat Island	35	.6
Near Island	10	.6
Komandorsky	5	.6



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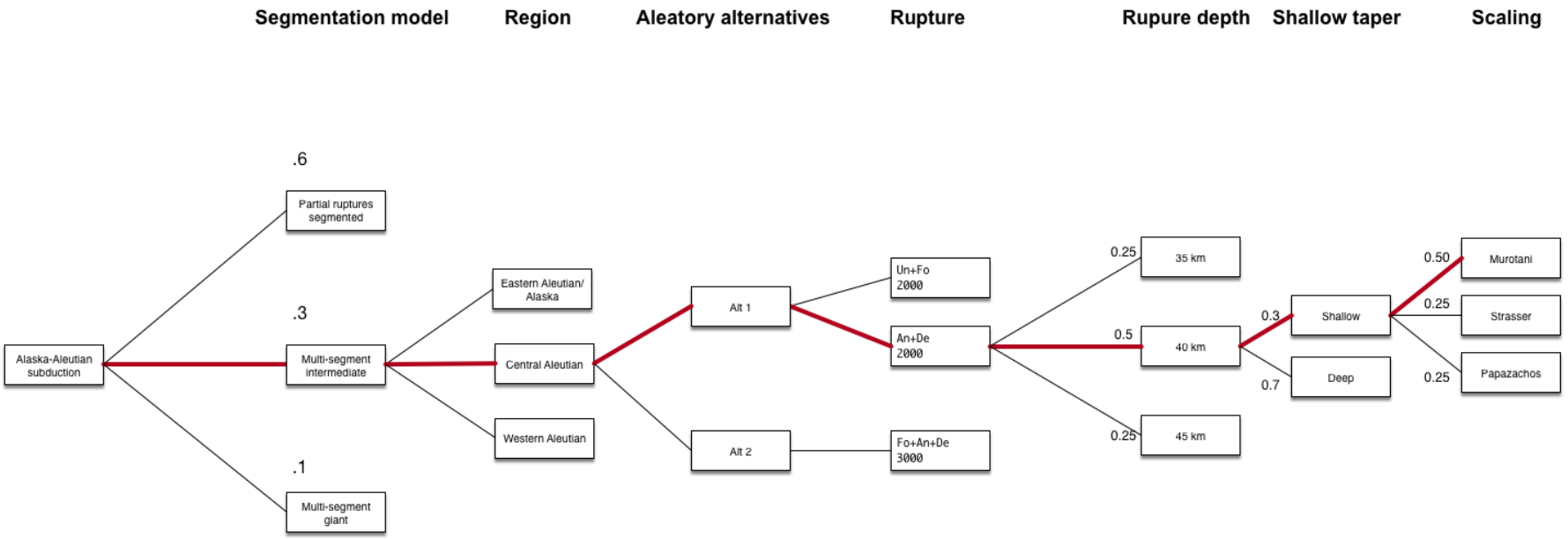
Alaska/Aleutian Logic Tree I



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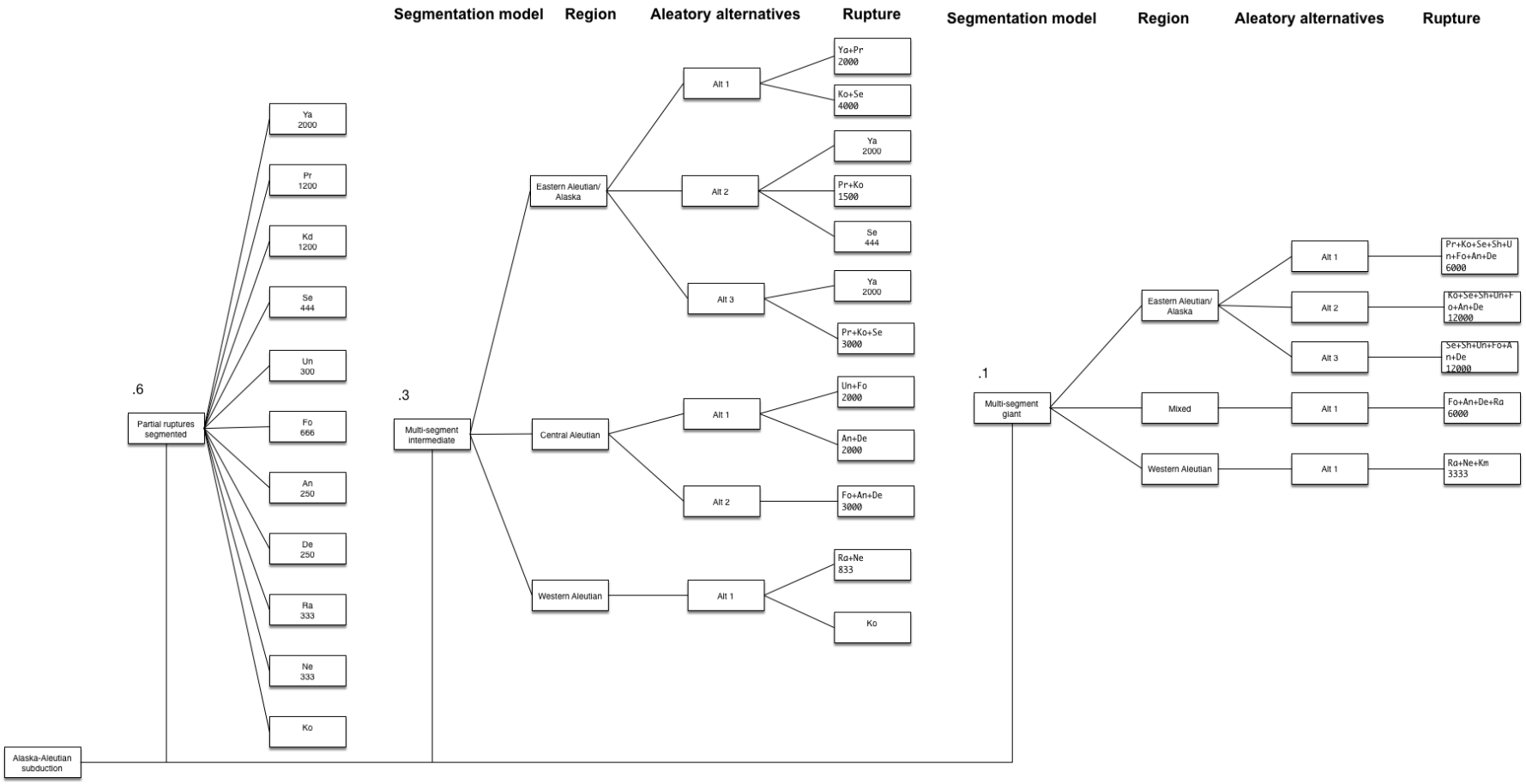
Alaska/Aleutian Logic Tree II



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