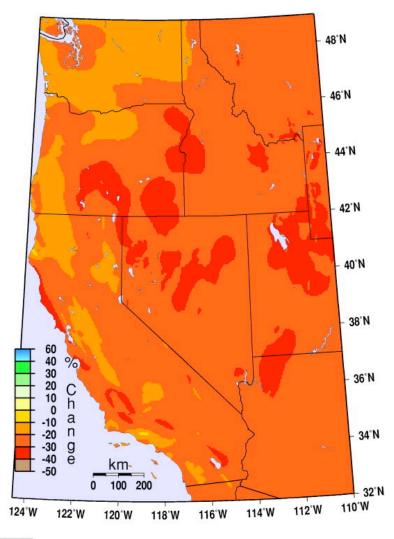
## Workshop on Implementation of Attenuation Equations in the National Seismic Hazard Maps of the Western U.S.

Participants: NGA developers, USGS review team, Expert panel

September 25-26, 2006



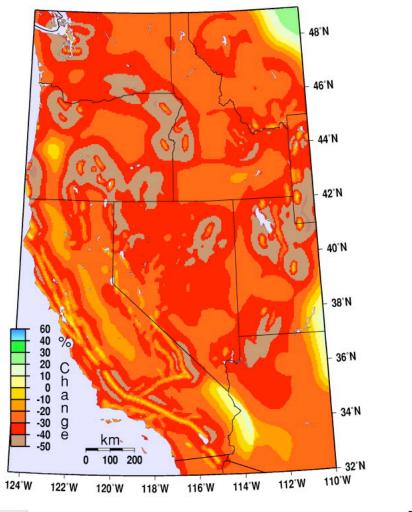
EMIT Sep 20 14:59 PRELIM PSHA WUS crustal sources. 1hz 2% in 50 yr PE. Use nga 4-model avg in numerator, >0 implied new est > old estimate

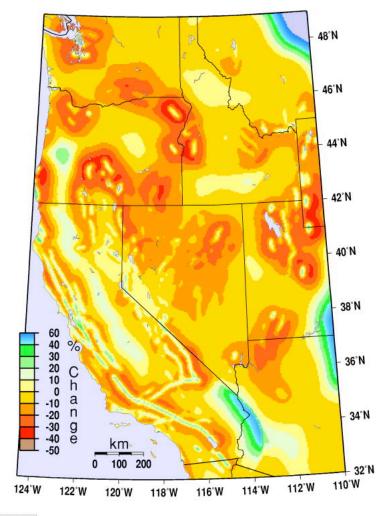
# Difference between NGA and equations used in 2002 maps

- 1. Definition of firm rock (760 m/s Vs30)
  - a. CB corrected rock eqn. using Boore et al. factor
  - b. Boore et al. used Vs30 directly
  - c. Sadigh et al. and AS used rock equations
- 2. Analysis of data used in NGA equations suggests that rock equations have a mean Vs30 of *520m/s*? instead of *760 m/s*. Therefore, we overestimated the ground motions by about 20-30% for 1s SA and 10% for 0.2s SA for the Sadigh et al. and the AS equations.
- 3. New data (especially M>7.3), new formulations and parameters (hanging wall, depth of rupture)

### Ratio of Chiou and Youngs (NGA 1hz)and Sadigh et al. for 760 m/s and for 520 m/s Vs30

%Change CY vs Sadigh ea 1-Hz SA w/2%PE50Y. 760 m/s Rock %Change CY vs Sadigh ea 1-Hz SA w/2%PE50yr. Rock 520m/s



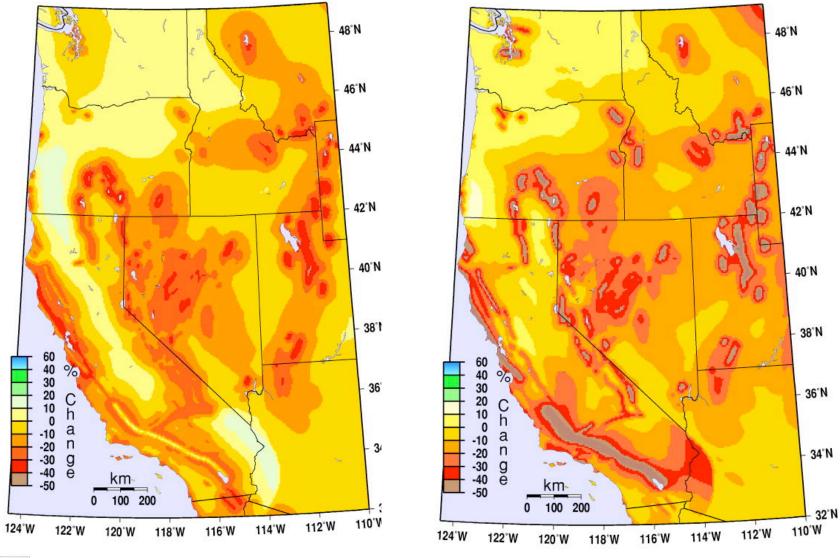


GMT Sep 21 14:02 PRELIM PSHA WUS crustal sources. Site 760ms. 1 Hz 2% in 50 yr PE. Use CY9/2006 model in numerator, >0 implied new est > old estim GMT Sep 21 13:36 PRELIM PSHA WUS crustal sources. Site 520ms. 1 Hz 2% in 50 yr PE. Use CY9/2006 model in numerator, >0 implied new est > old estim mplied new est > old estimate

#### Ratio of new NGA equations and old equations used in 2002 maps

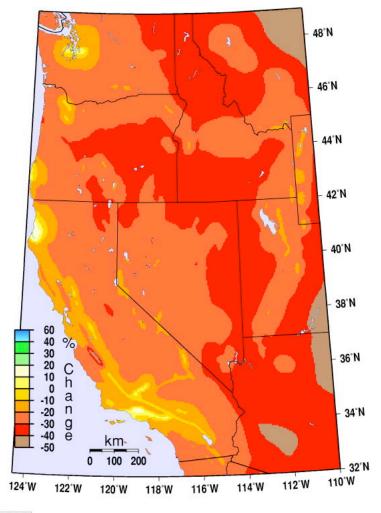
%Change CB06 vs CB03 1-Hz SA w/2%PE50yr

%Change BA vs BJF 1-Hz SA w/2%PE50yr

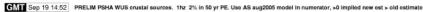


GMT Sep 20 14:21 PRELIM PSHA WUS crustal sources. 1hz 2% in 50 yr PE. Use CB06 model in numerator, >0 Implied new est > old es

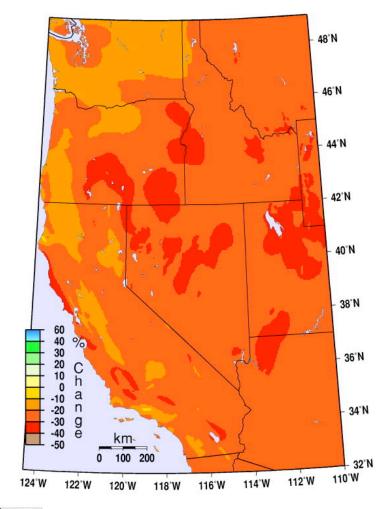
GMT Sep 19 15 20 PRELIM PSHA WUS crustal sources. 1hz 2% in 50 yr PE. Use BA9/2006 model in numerator, >0 implied new est > old estimate



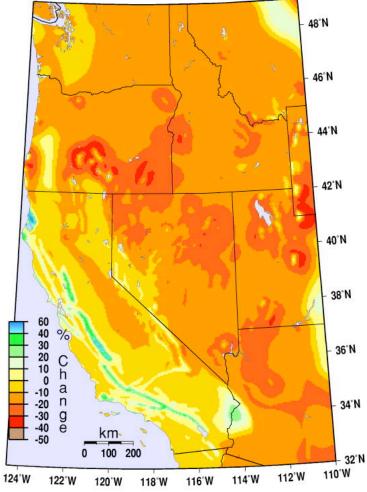
#### %Change AS nga vs AS97 1-Hz SA w/2%PE50yr



%Change NGA4 vs 2002-4 1-Hz SA w/2%PE50yr. Vs30=760



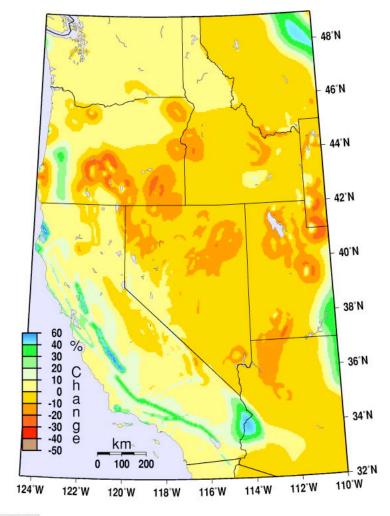
EMIT Sep 20 14:59 PRELIM PSHA WUS crustal sources. 1hz 2% in 50 yr PE. Use nga 4-model avg in numerator, >0 implied new est > old estimate



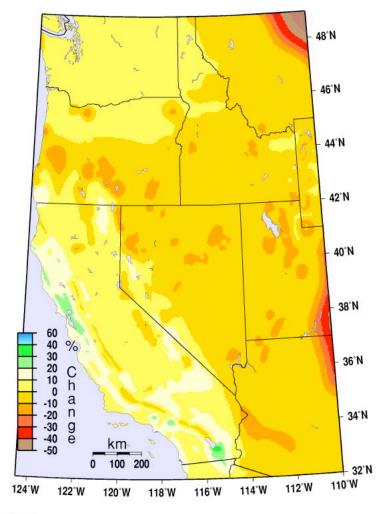
%Change CY vs Sadigh ea 5-Hz SA w/2%PE50yr

GMT Sep 21 11:47 PRELIM PSHA WUS crustal sources. 5hz 2% in 50 yr PE. Use CY9/2006 model in numerator, >0 implied new est > old estimate

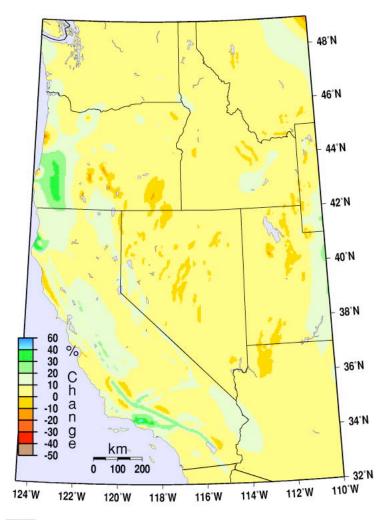
%Change CY vs Sadigh ea 5-Hz SA w/2%PE50yr. 520m/s Rock



GMT Sep 21 13:42 PRELIM PSHA WUS crustal sources.vs30 is 520 ms. 5-hz 2% in 50 yr PE. Use CY9/2006 model in numerator, >0 Implied new est > old estimate

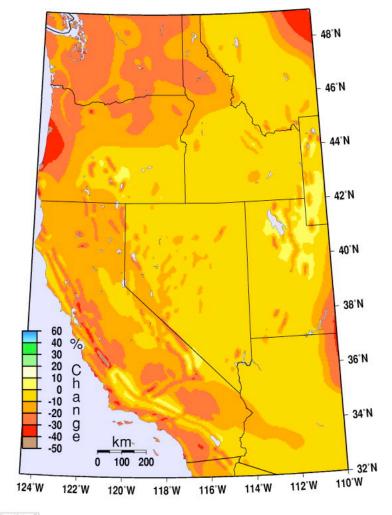






20 14:40 PRELIM PSHA WUS crustal sources. 5hz 2% in 50 yr PE. Use CB06 model in numerator, >0 implied new est > old estimate

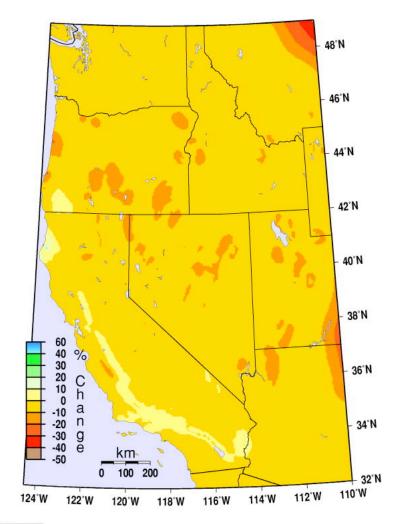
GMT Sep 19 15:18 PRELIM PSHA WUS crustal sources. 5hz spectral acc w/2% in 50 yr PE. Use BA9/2006 model in numerator, >0 implied new est > old estimate



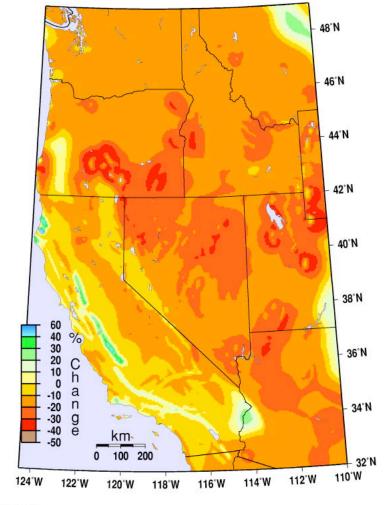
%Change AS nga vs AS97 5-hz SA w/2%PE50yr

CMT Sep 19 15:07 PRELIM PSHA WUS crustal sources. 5hz 2% in 50 yr PE. Use AS aug2005 model in numerator, >0 implied new est > old estimate

%Change NGA4 vs 2002-4 5-Hz SA w/2%PE50yr. Vs30=760



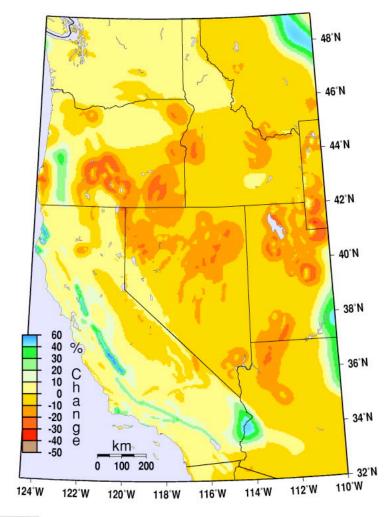
Sep 20 14:57 PRELIM PSHA WUS crustal sources. 5hz at rock760, 2% in 50 yr PE. Use nga 4-model avg in numerator, >0 implied new est > old estin



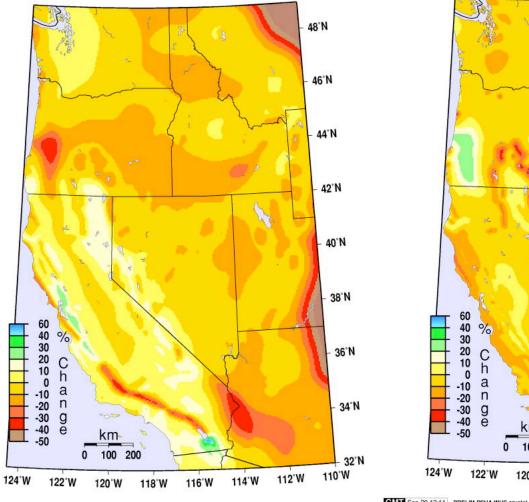
#### %Change CY vs Sadigh PGA w/2%PE50yr. Rock 760 m/s

GMT Sep 21 14.04 PRELIM PSHA WUS crustal sources. pga acc w/2% in 50 yr PE. Use CY9/2006 model in numerator, >0 implied new est > old estimate

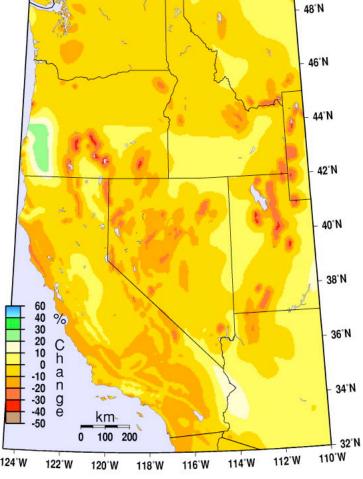
%Change CY vs Sadigh PGA w/2%PE50yr. 520m/s Rock



EMIT Sep 21 13:52 PRELIM PSHA WUS crustal sources. Site Vs30 520 m/s. PGA w/2% in 50 yr PE. Use CY-9/2006 model in numerator, >0 implied new est > old est



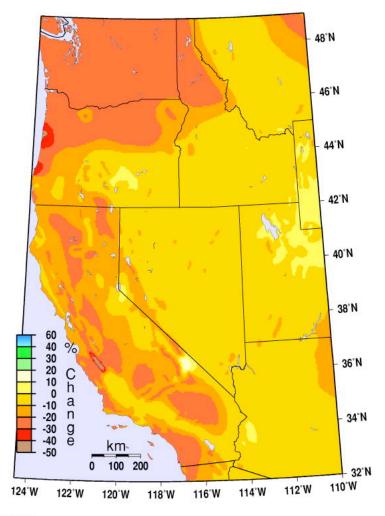
#### %Change CB06 vs CB03 PGA w/2%PE50yr. Vs30=760



EMIT Sep 19 15:43 PRELIM PSHA WUS crustal sources. pga acc w/2% in 50 yr PE. Use BA9/2006 model in numerator, >0 implied new est > old es

%Change BA vs BJF PGA w/2%PE50yr

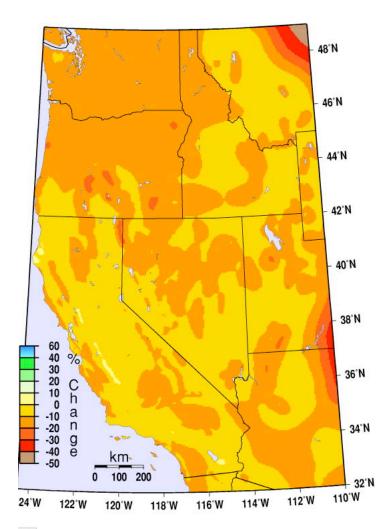
GMT Sep 20 12:11 PRELIM PSHA WUS crustal sources. pga at rock760. 2% in 50 yr PE. Use CB9/06 nga in numerator, >0 implied new est > old estimate



## %Change AS05 vs AS97 PGA w/2%PE50yr. Vs30=760

CMT Sep 19 16:26 PRELIM PSHA WUS crustal sources. pga at rock760. 2% in 50 yr PE. Use AS8/05 nga in numerator, >0 Implied new est > old estimate

hange NGA4 vs 2002-4 PGA w/2%PE50yr. Vs30=760



15:01 PRELIM PSHA WUS crustal sources. pga at rock760. 2% in 50 yr PE. Use nga 4-model avg in numerator, >0 implied new est > old estimate