

# Model Uncertainty of Ground Motions due to Site Response

September 24, 2006

**The BA equation for predicting ground motion  $Y$  is:**

$$\ln Y = F_M(M) + F_D(r_{jb}, M) + F_S(V_{s30}, r_{jb}, M) \quad (1)$$

For  $pga4nl \leq pga\_low$ :

$$F_S(V_{s30}, M, r_{jb}) = b_{ln} \ln(V_{s30} / V_{ref}) + b_{nl}(pga\_low / 0.1). \quad (2)$$

For  $pga4nl > pga\_low$ :

$$F_S(V_{s30}, M, r_{jb}) = b_{ln} \ln(V_{s30} / V_{ref}) + b_{nl} \ln(pga4nl / 0.1). \quad (3)$$

**The CB site response term:**

For  $V_{s30} < k_1$ :

$$f_5 = c_{10} \ln(V_{s30} / k_1) + k_2 (\ln(A_{1100} + c(V_{s30} / k_1)^n) - \ln(A_{1100} + c)) \quad (4)$$

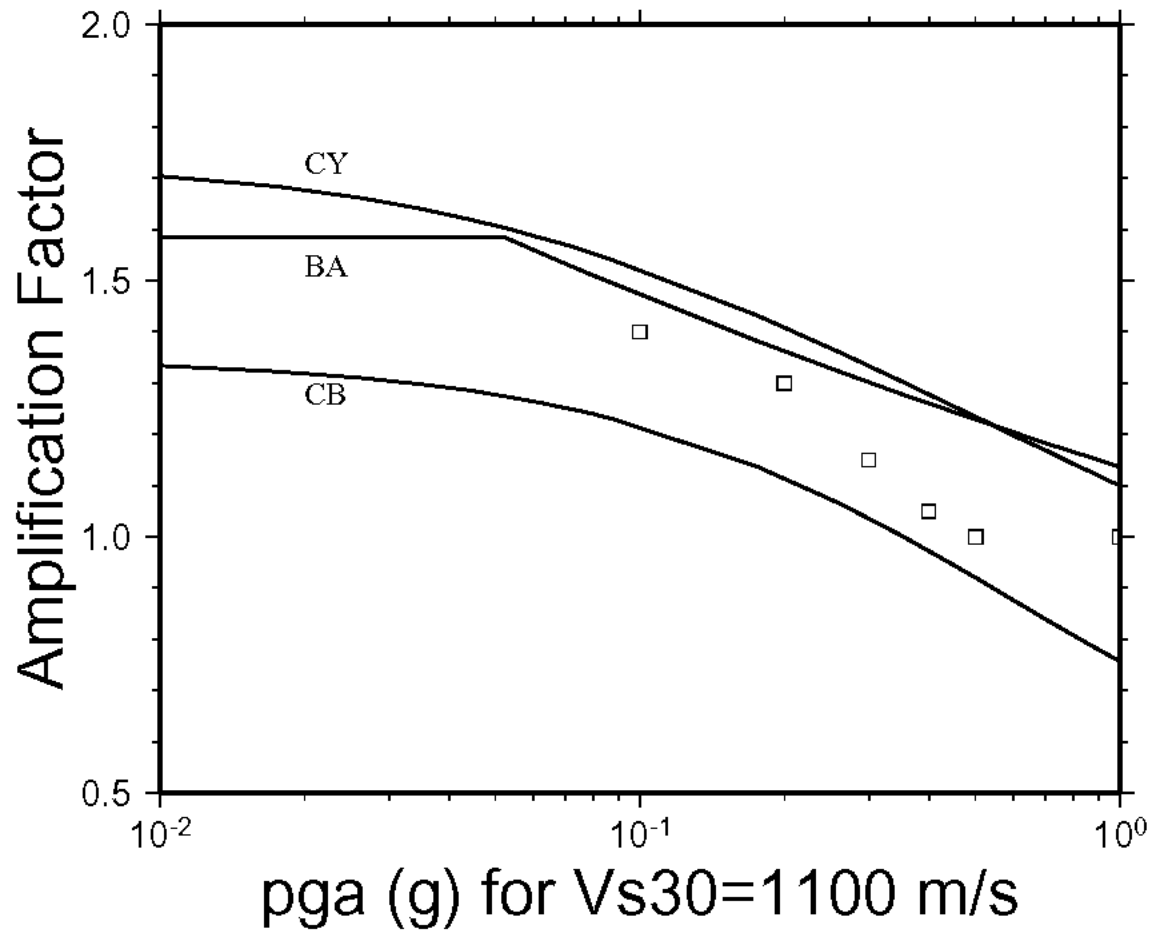
For  $V_{s30} \geq k_1$ :

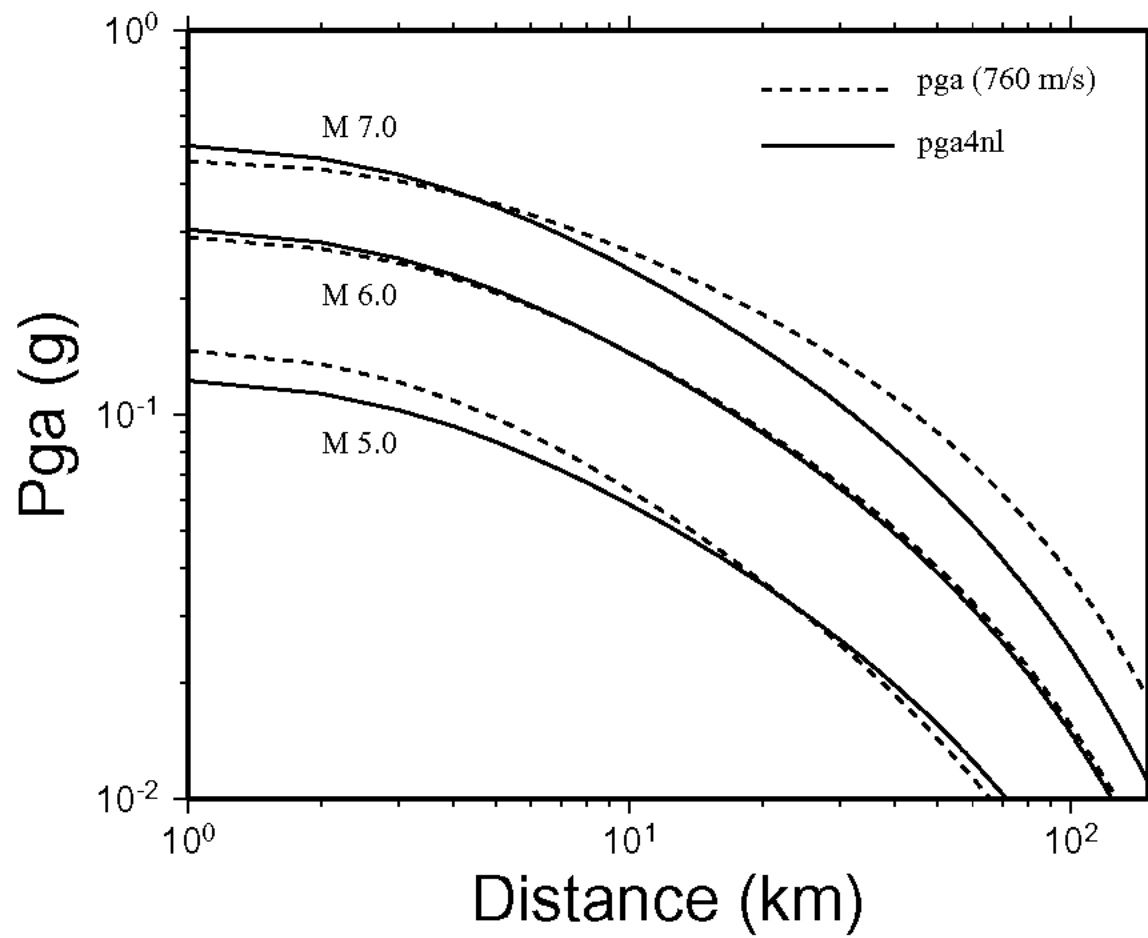
$$f_5 = (c_{10} + k_2 n) \ln(V_{s30} / k_1) \quad (5)$$

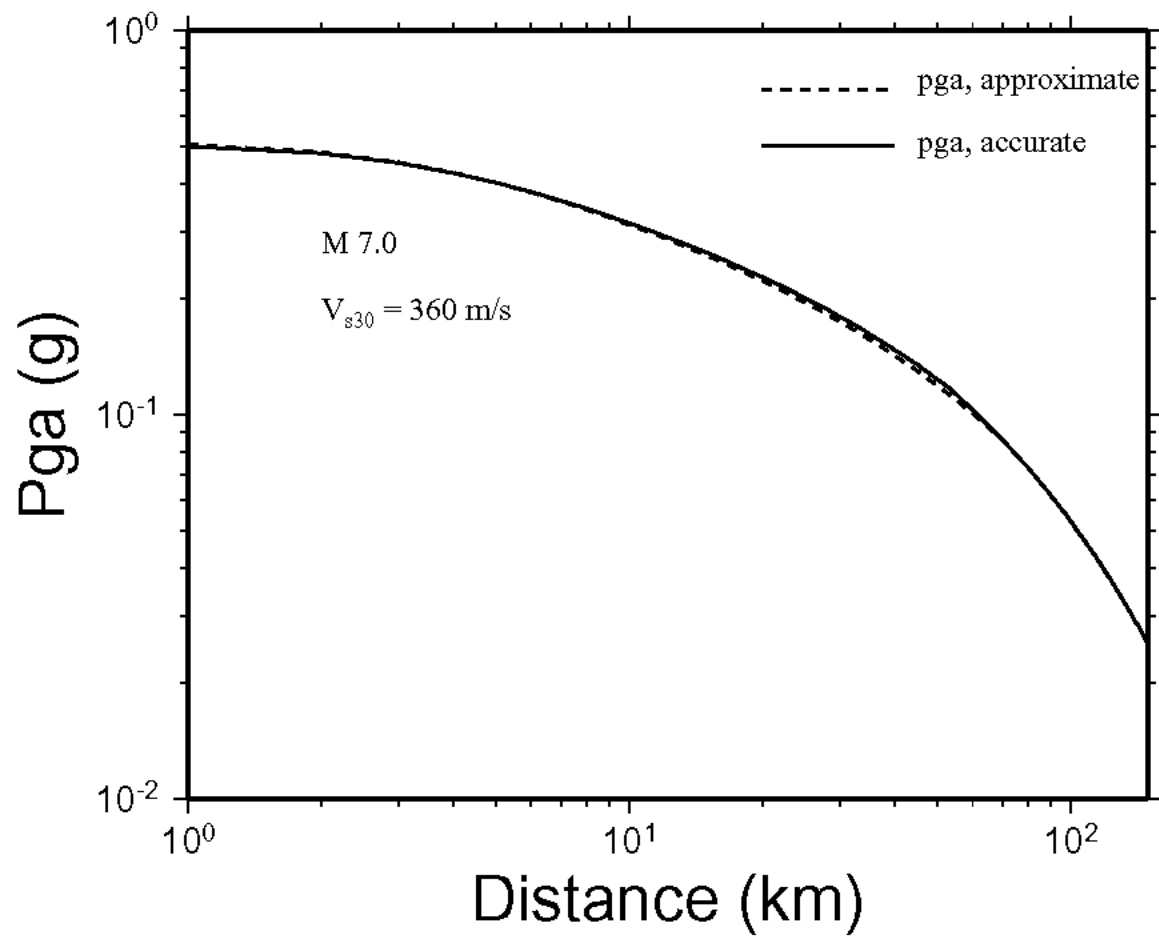
**The CY site response term:**

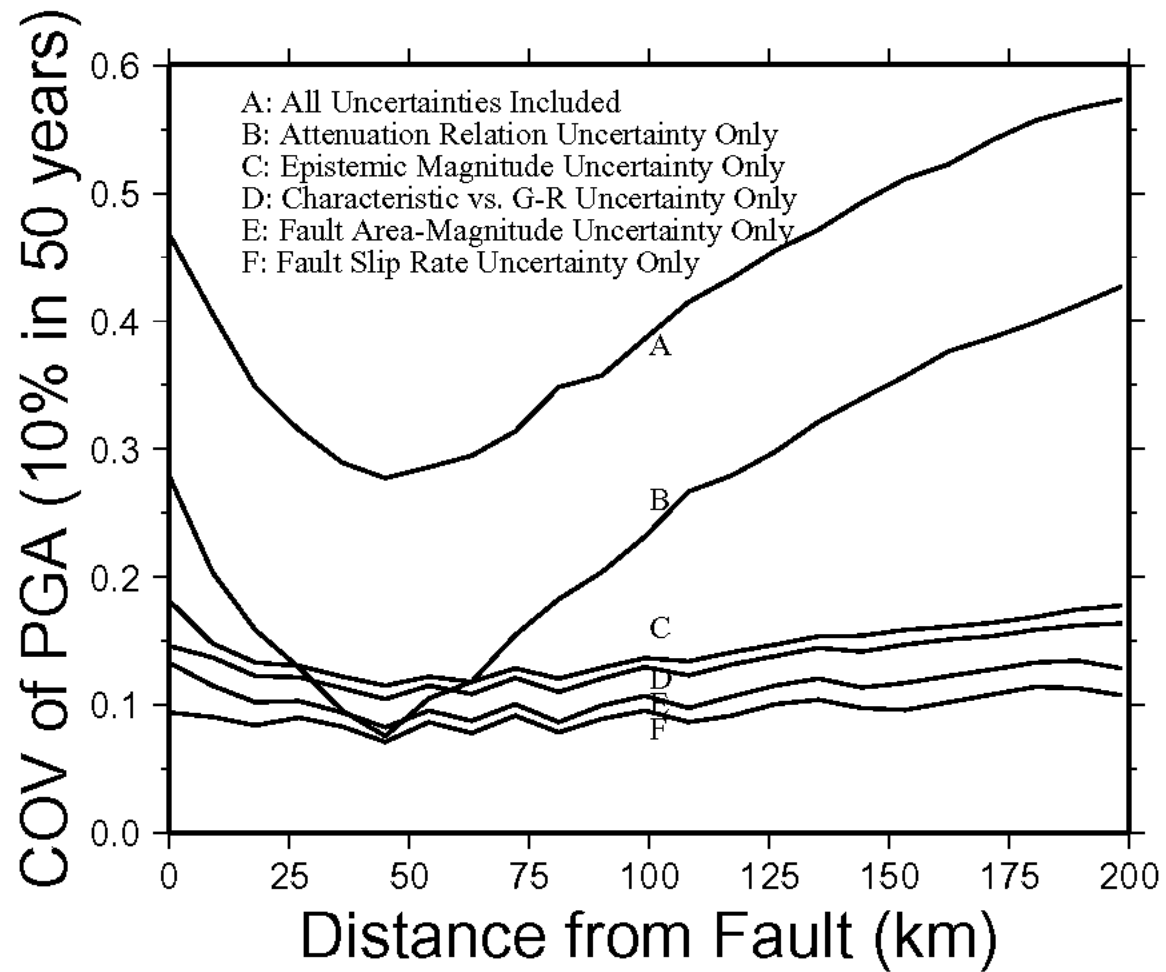
$$f_{site} = \phi_1 \ln(V_{s30} / 1130) + \phi_2 \exp(\phi_3 \times (V_{s30} - 360)) \ln((SA_{1130} + \phi_4) / \phi_4) \quad (6)$$

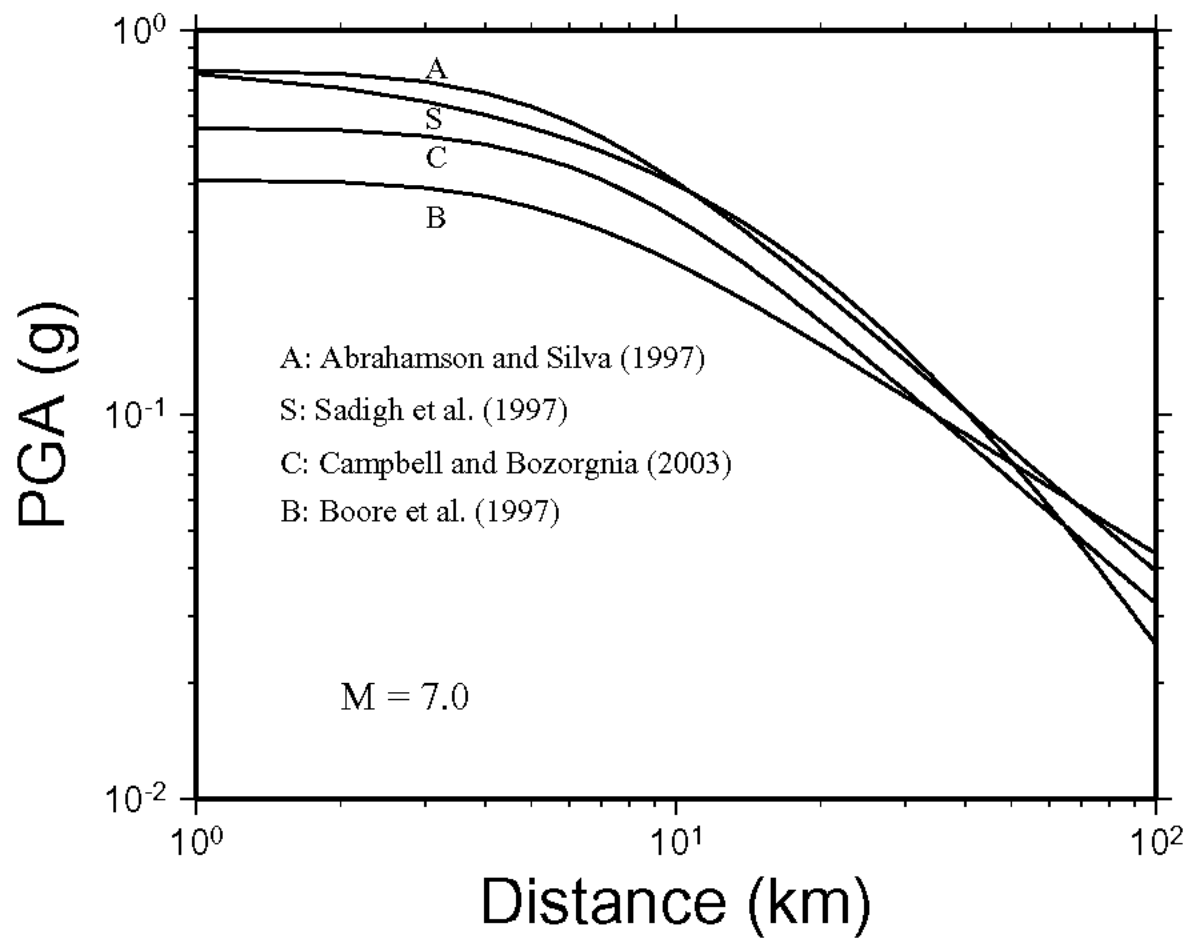
where the coefficients  $\phi_1$ ,  $\phi_2$ ,  $\phi_3$ , and  $\phi_4$  are dependent to the ground motion period.

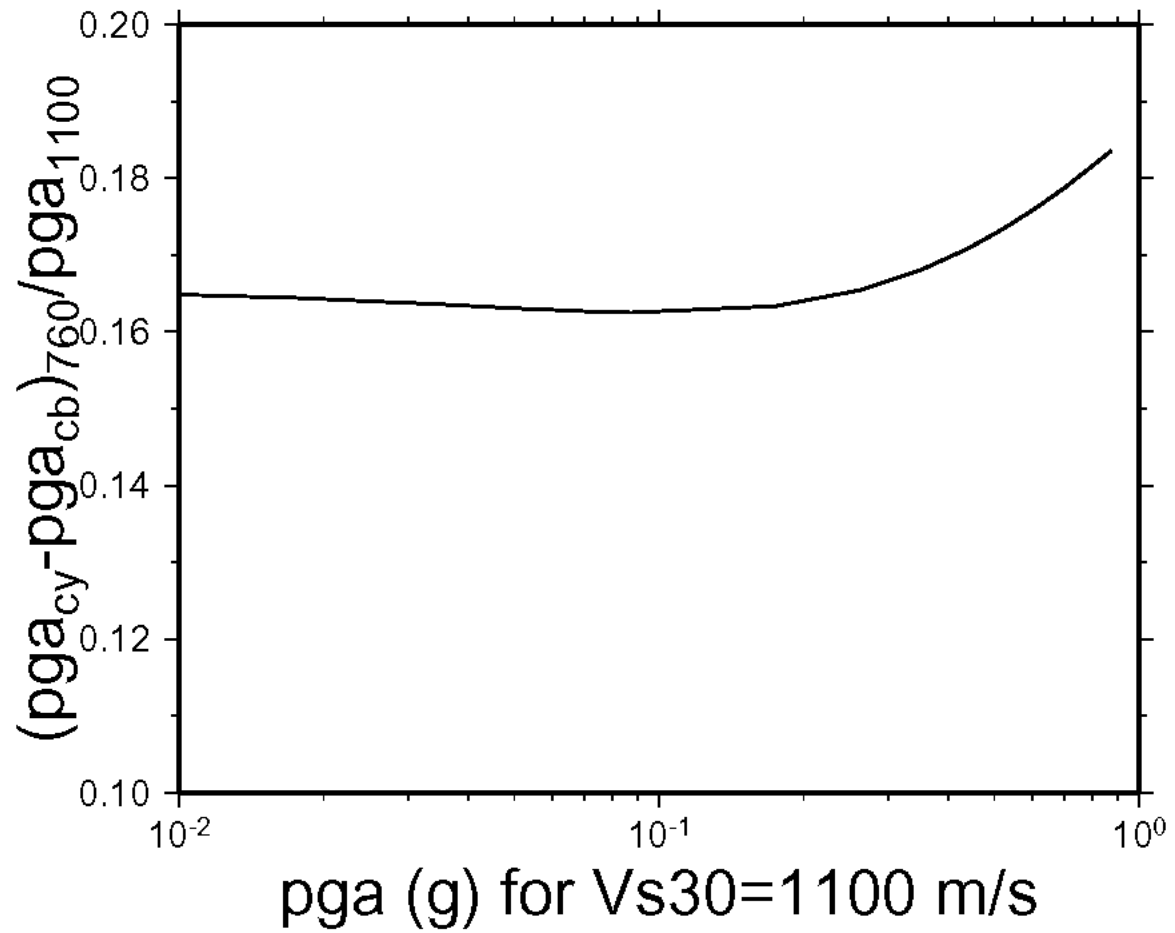






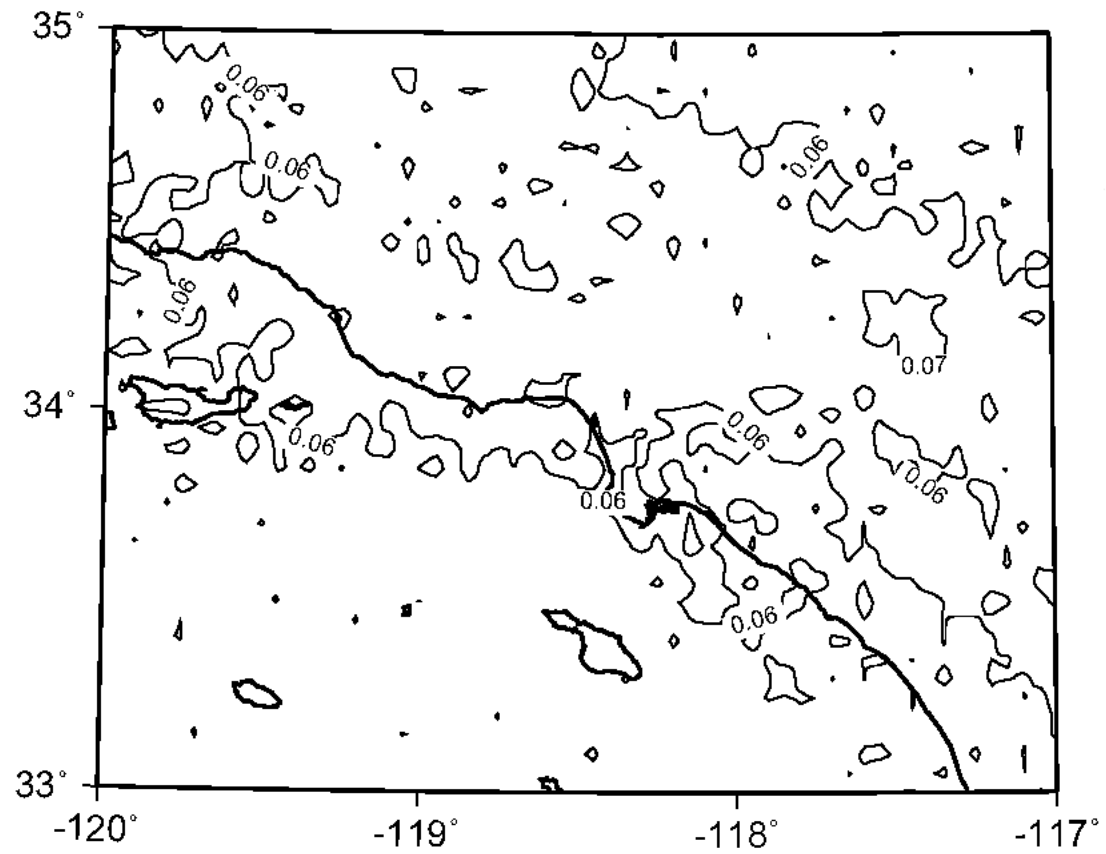


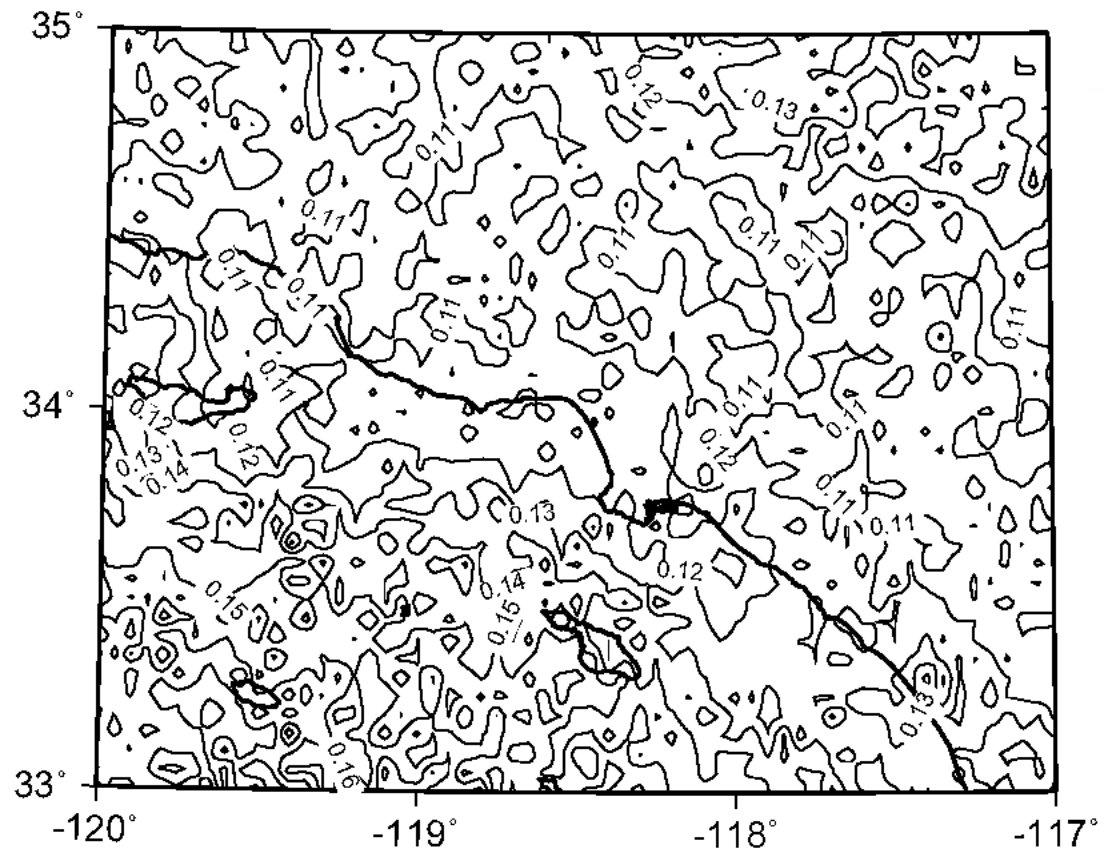






# Site Amplification Only





# All Uncertainties

