



## **New Plant Seismic Issues Resolution Program**

**Task G1.3 – Truncation of the Ground  
Motion Distribution**

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## G1.3 Summary

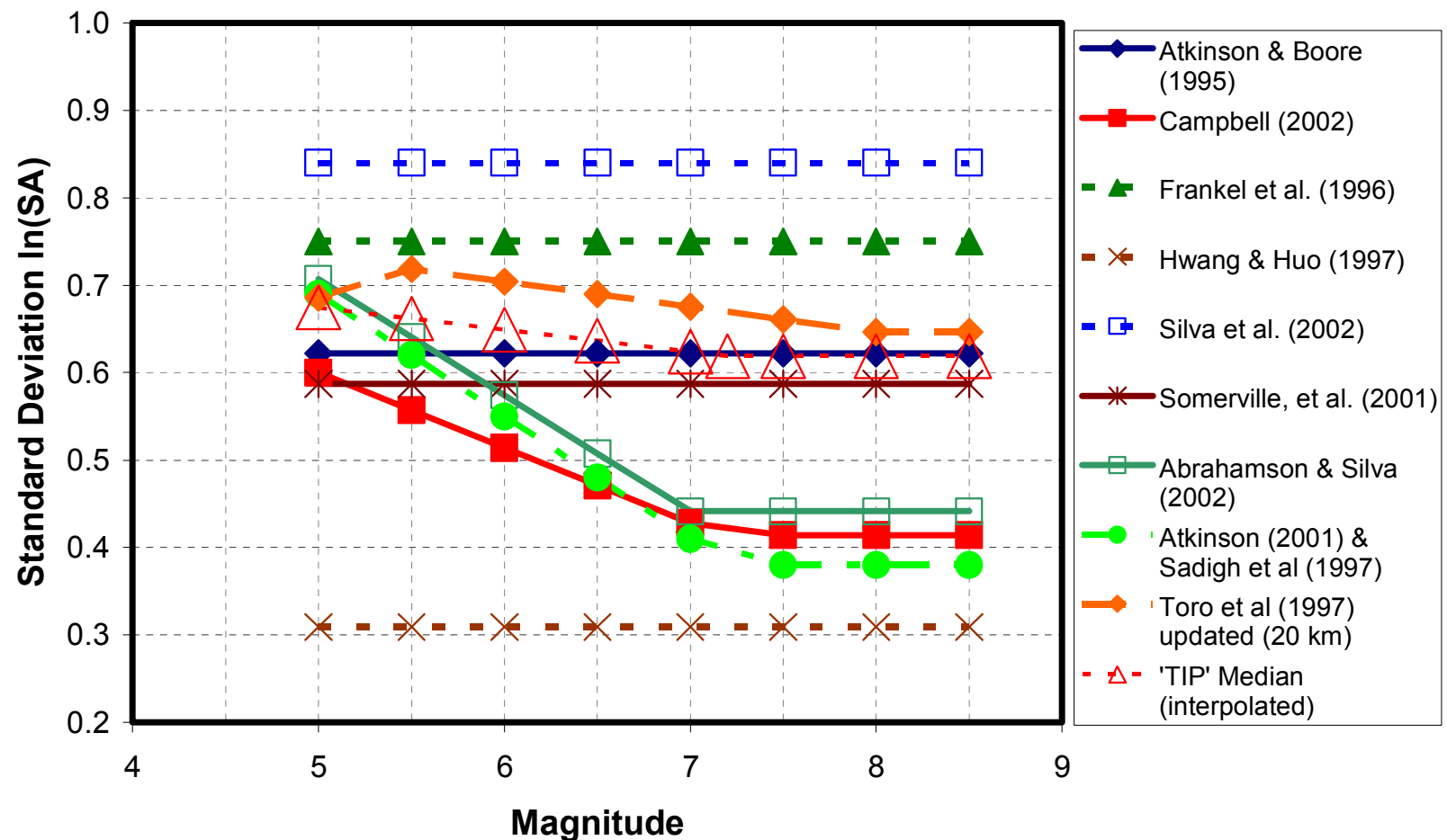
- Truncation of the ground motion distribution
  - Evaluation of empirical recordings and numerical simulations show that there is no basis for a truncation at less than 3 sigma
  - No significant improvement in hazard calculation for EUS sites
  - Report documenting evaluations
- Value of the standard deviation
  - Standard deviation models used in EPRI (2003) appear to be too large
  - Increase in standard deviation at short distances is not applicable
    - Important since short distances dominate the high frequency hazard for low probability levels
  - Report will give recommendations for reduced standard deviations

# Value of the Standard Deviation

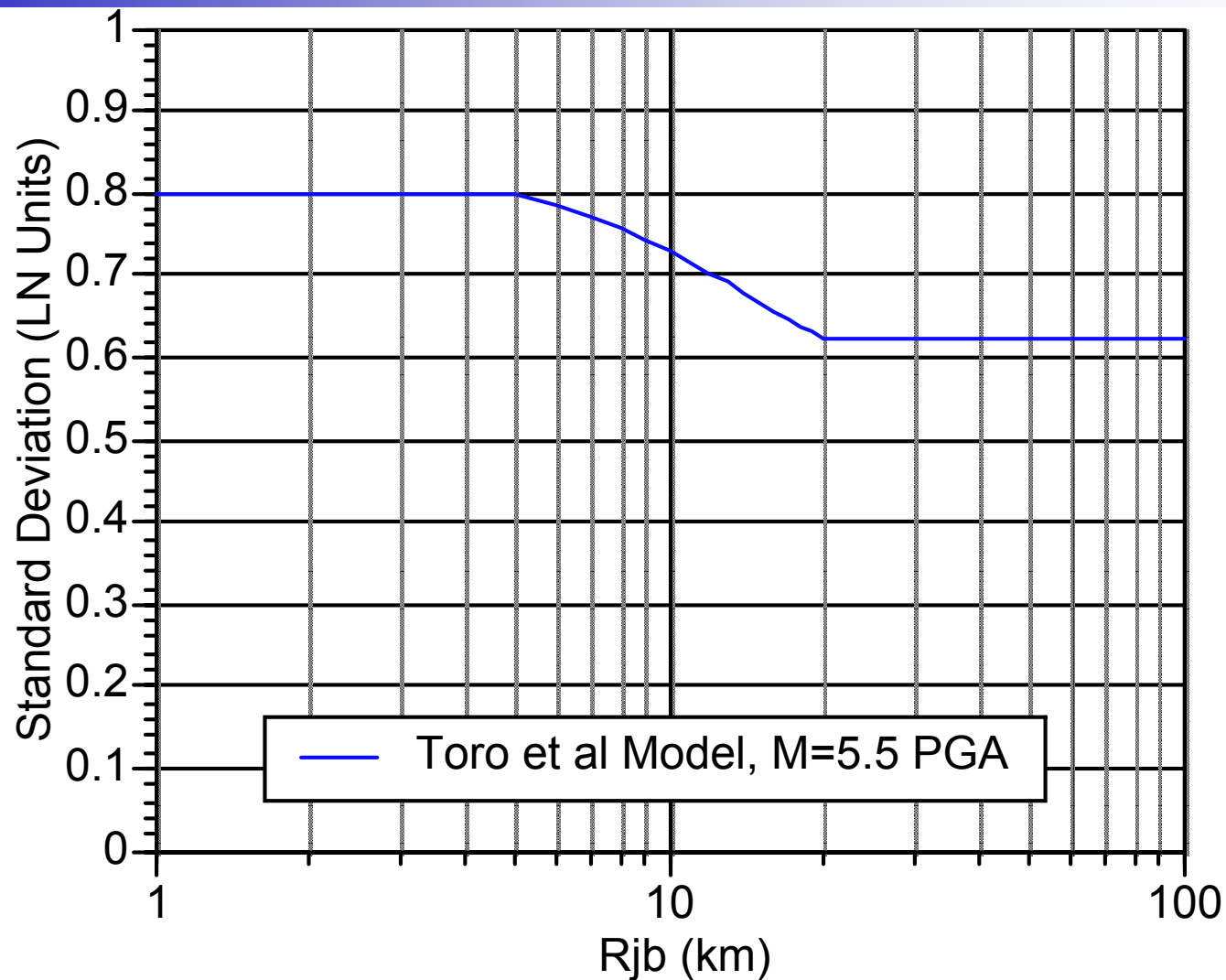
- WUS data (PEER NGA studies)
  - Standard deviations are independent of magnitude
  - PGA
    - Inter-event sigma = 0.3
    - Intra-event sigma = 0.5
    - Total = 0.59
  - 5 Hz spectral accelerations
    - Inter-event sigma = 0.35
    - Intra-event sigma = 0.53
    - Total = 0.63
  - Depth Dependence of moderate magnitudes (M5-6)
    - Shallow earthquakes have smaller than average ground motions
    - Deeper earthquakes have larger than average ground motions
    - Correlation implies no need for increase in standard deviation at short distances with use of JB distance (no depth dependence)

# Standard Deviation Models Considered in EPRI (2003)

## Aleatory Variability - 100 Hz SA



# Distance Dependent Std Dev in Toro et al Model

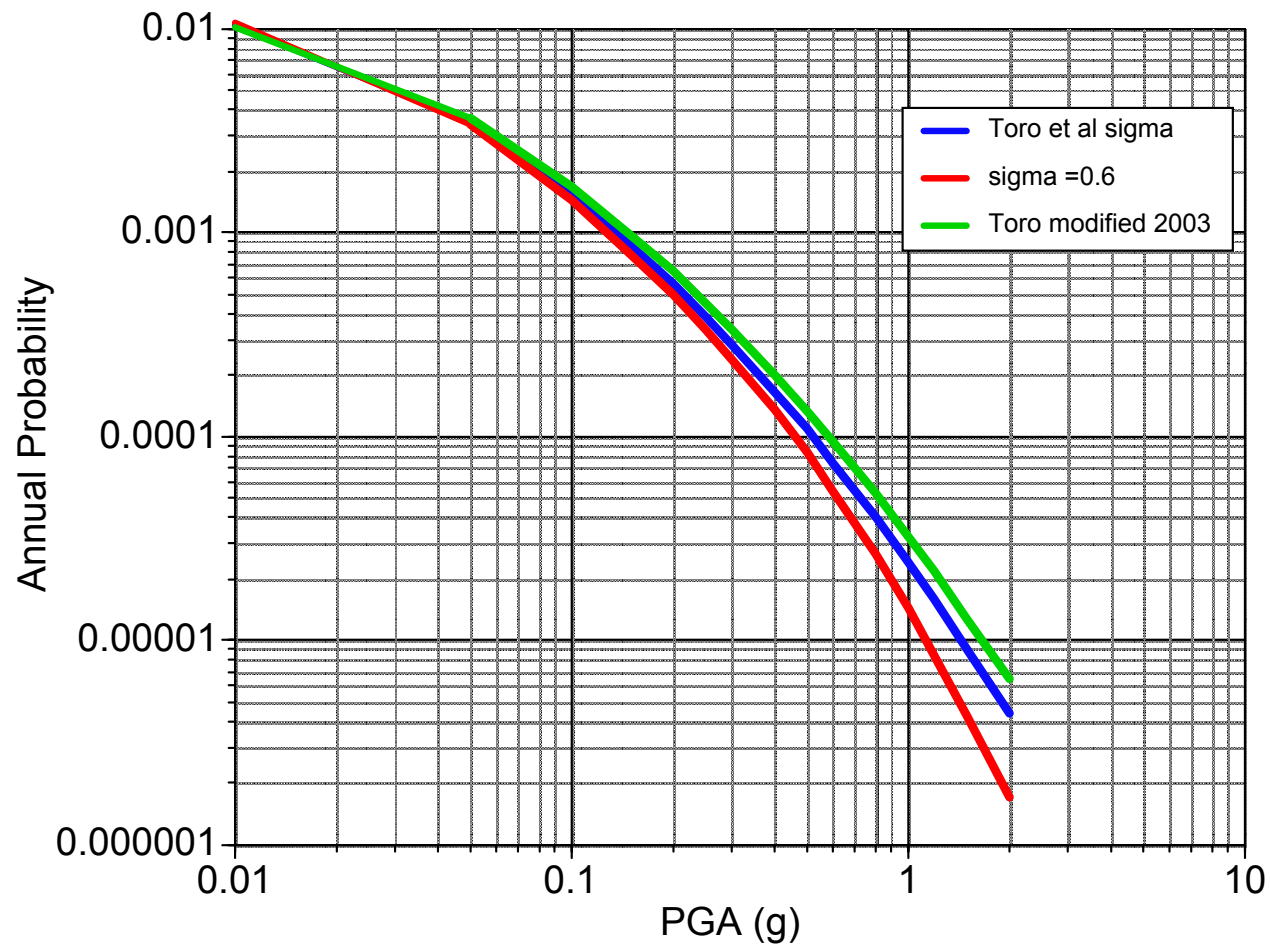


# Standard Deviation Summary

- Toro et al (1997, before update) standard deviations for  $R_{jb} > 20$  km are similar to new WUS models
  - Toro 1997 is about 0.1 units smaller than EPRI (2003) model
- Distance dependence of Toro et al standard deviations may overestimate sigma at short distance.

# Example CEUS Hazard

(from USGS smoothed seismicity)



# Ongoing Work on G1.3

- Developing a standard deviation model for the CEUS
  - Intra-event variability
    - Empirical data
      - Limited strong motion data
    - Numerical simulations
      - Focus on short distances ( $< 50$  km)
  - Inter-event variability
    - Distributions of source parameters from earthquake catalogs
    - Comparisons between active and stable regions
  - Is the WUS standard deviation model applicable to the CEUS?
    - Is there a reason to increase the standard deviation at short distances?