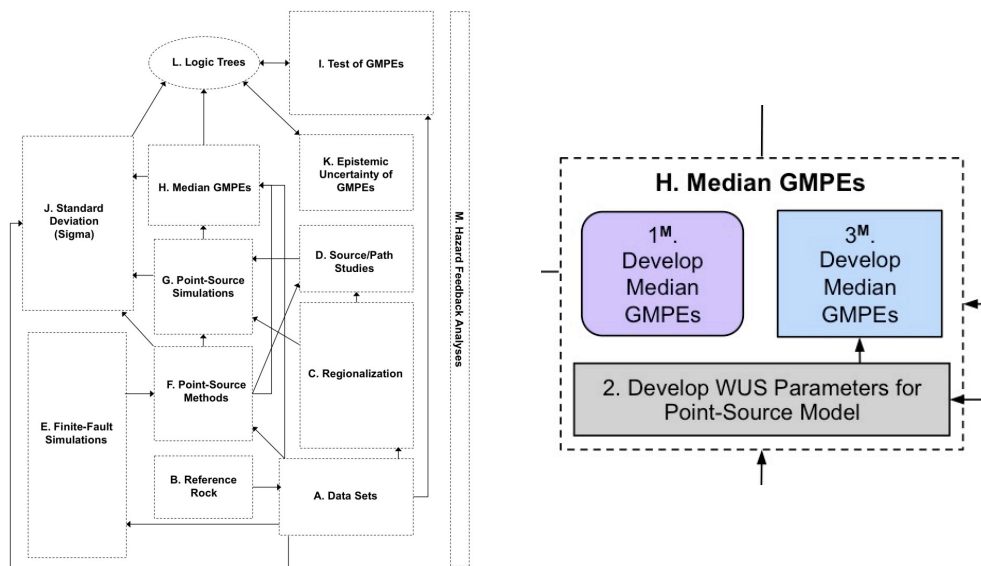# NGA East
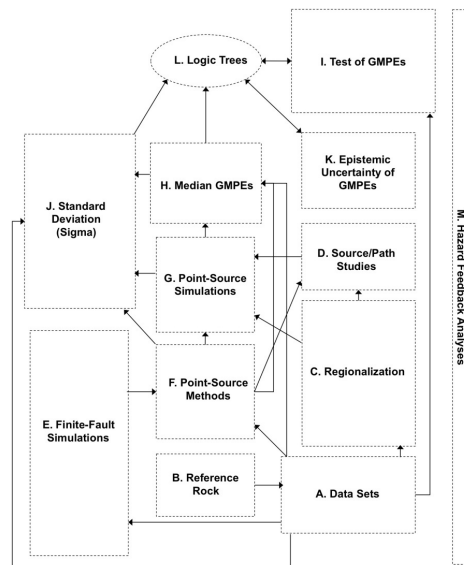# Development and Testing of GMPEs
Boxes H, I, and J

Workshop 2

October 12, 2011

Afternoon Session

Box H - Development of Median Component of GMPEs

Task H.1-TI team will develop a set of median GMPEs

- Base primarily on a wide suite of point source stochastic simulations (Box G)
- Simulations will be based on a new set of parameterizations for the point source model (Box F) based on
  - Finite fault simulations (Box E)
  - Source/path characterization (Box D)
  - Regionalization (Box C)
  - Data (Box A)

L. Logic Trees
I. Test of GMPEs
K. Epistemic Uncertainty of GMPEs
J. Standard Deviation (Sigma)
H. Median GMPEs
D. Source/Path Studies
G. Point-Source Simulations
F. Point-Source Methods
C. Regionalization
E. Finite-Fault Simulations
B. Reference Rock
A. Data Sets
M. Hazard Feedback Analyses

Task H.3 Alternative Median GMPEs

- Fund 2 to 3 alternative approaches to development of GMPEs, e.g.
  - Hybrid
  - Extended source simulation
  - Primarily empirical
  - ?
- Evaluate these GMPEs along with those from Task H.1 to populate the median GMPE logic tree (Box L)

Task H.2 – Parameterize WUS/ Active Tectonic Regions

- Anticipated that a Hybrid model will be one of the alternative approaches
- Developer of approach will need to parameterize active tectonic region characteristics in order to develop transfer functions
  - Past applications indicate that this will be in the form of point source models
  - Other approaches are not precluded

Box H Proponent Discussions

- Bob Darragh
- Ken Campbell
- Shahram Pezeshk
- Philippe Renault
- Gail Atkinson

Box I – Testing of GMPEs
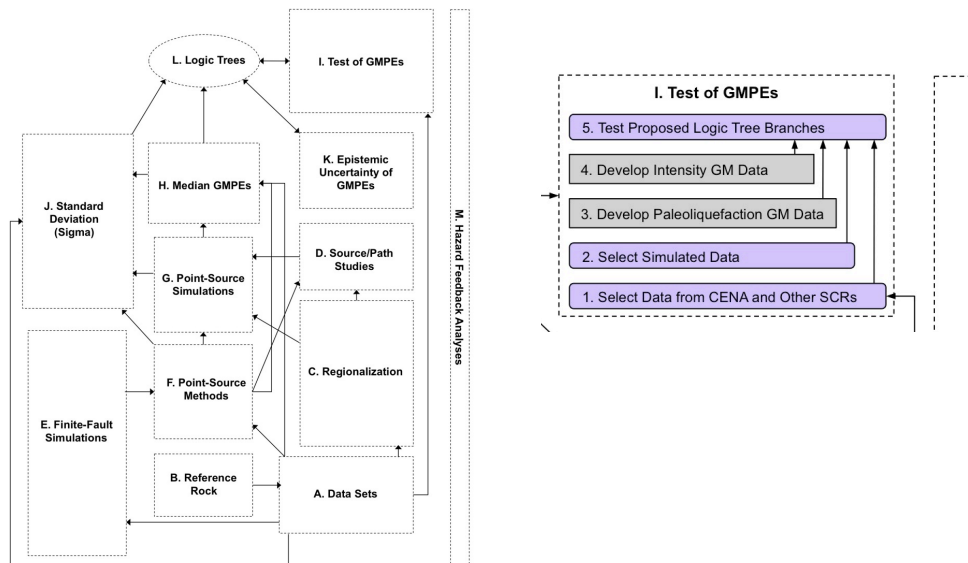
Tests against strong motion data (Task I.1) - Issues

- CENA data
  - Site amplification
  - ?

- Other SCR data
  - Different crustal structure and Q
  - Correlation of magnitudes for earthquakes with **M**
  - Lack of site condition data
  - ?

# Tests against finite fault simulation data (Task I.2) - Issues

- ?

Tests against liquefaction data (Task I.3) - Issues

- Paleoliquefaction data: Issues
  - Estimation of magnitude of paleo earthquakes is in some cases based on existing GMPEs
  - ?
- Is there historic liquefaction data that could be used?

Tests against intensity data (Task I.4) - Issues

- Need for intensity database
  - DYFI or other source
  - ?
- Need for translation of intensity into ground motion parameters
  - Use existing models?
  - Develop new models?

Box J – Aleatory Variability (Sigma) Component of of GMPEs
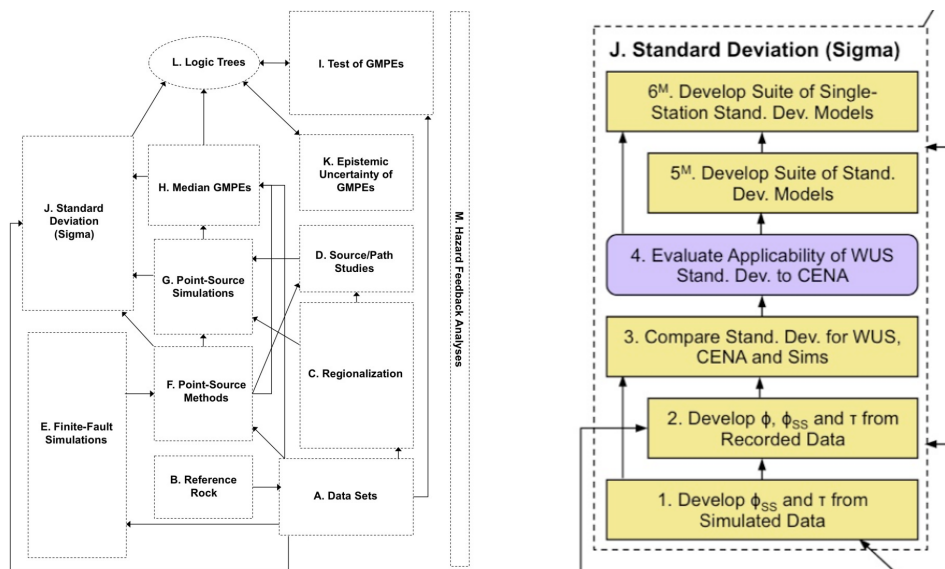
Aleatory Models

- Developed separately from median models
- Develop assessments for
  - Event to event standard deviation – τ
  - Ergodic within-event standard deviation – Φ
  - Single-station-event standard deviation – Φ_{ss}

Presentations

- Hazard sensitivity to alternative sigma models – Linda Al Atik (Sigma WG)
- Alternative station sigma model - Adrian Rodriguez-Marek

Sigma Issues

- Applicability of data from active tectonic regions to CENA
- Applicability of data from small magnitudes to magnitudes of interest
- ?