

NGA-East Workshop 2

Day 2 Summary

Oct 12, 2011

Site Terms for Correction to Reference Rock

- Site Data Collection
 - Identify high priority sites
 - Coordinate data collection with USGS efforts
- Site characterization approach
 - Consider using simple classes with VS30 assigned to each class
 - Consider use of Coda or receiver function
 - Use of pre-event noise as indication of site response in longer period range

Site Terms for Correction to Reference Rock

- Limitation of VS30
 - Weak correlation at low spectral frequencies
 - Any info on sediment depth may be helpful
- Proponent models
 - Consider putting site terms into regression, rather than just evaluating residuals
 - Can reduce some issues of correlations of mag, dist, site
 - Proponent models as based on different independent parameters (estimates of VS30)
 - Check residuals of each proponent model against the parameter from the other proponent model
 - Coordinate with USGS work on this topic

Regionalization

- Revise Workplan
 - Move box C3 to before C1
 - Puts the crustal models (data) as the start
 - Separate box C2 into two parts: empirical data, and GF simulations
 - Add a box, D1.5, to include evaluation of regional variation of median stress-parameter
- CEUS SSC includes hypocentral depths and focal mechanisms
 - Can include these parameters in the GMPEs
 - E.g. median stress-parameter can be depth dependent

Regionalization

- Regional differences
 - Strong differences seen for gulf coast and midcontinent
- Terminology – “Sediments” (Marin will call it rock)
 - Need to have consistent definition of rock in site correction and rock site crustal amplification
- Checks of 1-D velocity models
 - Models developed (Box C3)
 - Use other information to check the models
 - Dispersion curves from Herrmann
 - Scott Philips – LG wave tomography

Regionalization

- Empirical Evaluations
 - Data from TA in Western & Central of CENA exists
 - NE and eastern Canada
 - Density of stations is sufficient for evaluation
 - TA will arrive later, use TA data to check conclusions from the currently available data
 - Add data only for the regionalization evaluation
 - Focus on data within 100 km to evaluate Geometrical spreading at short distances
 - What is the effect of focal mechanism
 - Is $R^{-1.3}$ vs $R^{-1.0}$ due to focal mech?
 - Site amplification may lead to steeper atten, so need to remove site response
 - Check for regional differences in the distance range and spectral period for moho bounce (or other crustal layers)

Stress Parameter

- Boatwright evaluation
 - Sag or no sag?
 - Useful to compare with WUS data for the same mag range
 - Fourier spectra for NGA-west2
 - Influence of noise and surface waves at low freq (0.1 Hz)?
 - Depth dependence of stress-drop
 - Stress drop increases with depth
 - Data not sufficient to constrain a regional dependence of the median stress-drop
 - Magnitude dependence??

GMPE Approaches

- Point Source stochastic model
 - Missing finite fault effects?
 - Attempts to mimic finite fault effects through use of effective PS distance and mag dependent parameters such as mag dependent stress-parameter (similar to empirical GMPE)
 - Objective is to get GMPEs that work for large magnitudes, not to select the method with more physically realistic components
 - Simple method (less physical complexities) is not always bad
 - But more confidence in extrapolating the more physical models
 - Geometrical spreading
 - Function of magnitude
 - Should this also be a function of period?
 - Do these occur both in S_a and FAS?

GMPE Approaches

- Hybrid empirical method
 - Is there implicit assumption that slope of the $M(A)$ relations are the same in the host and target?
 - How to capture differences in the magnitude saturation in WUS and CENA?
 - Bias in NGA-west GMPEs for small magnitudes
 - Avoid transferring this bias to CENA
 - How to use stress-parameters from small mag CENA to extrapolate to high magnitudes?
 - Magnitude dependence of median stress parameter
 - Scherbaum:
 - Ratios of FAS don't translate to ratios in S_a
 - Kappa adjustments – robustness using traditional HEM vs empirical or Scherbaum method

GMPE Approaches

- Empirical
 - CENA data set is large enough to develop an empirical model
 - Useful for the $M < 5.5$ (6.0) range
 - Strong mag dependence of stress-parameter for small mag eqk
 - Both for Swiss data and Canadian data
 - Is mag dependence of stress-parameter really a kappa effect?
 - Kappa would change the corner freq
 - Is there a depth dependence of stress-parameter in the Swiss data?
 - How to constrain the mag dependence of the stress parameter at large magnitudes?

Sigma

- Check that the single path from aftershocks is not leading to underestimation of σ_{SS}
- Add the new CA NGA-west2 small mag data
 - Will help in the evaluation of the mag dependence