

Combining Seismic Hazard Files

Part II: WUS Fault Sources

Once the background or gridded hazard for the WUS sources have been combined (see the Part I readme), the binary output files need to be combined with fault source files. The fault-source hazard files are typically sampled at 0.05 degrees in latitude and longitude. These combine steps are performed in two scripts, `hazall.wus.csh` and `combine.2008h.csh`. These scripts also run the program `hazallXL.v2.f` several times. As stated in the Part I readme, the input files to `hazallXL.v2.f` have to be binary files. The scripts and associated input files are found in the zip file `combine.wushazard.zip`.

The WUS fault-source combine is performed in two steps. The first step combines files associated with a given branch of ground-motion uncertainty. There are three such branches, a central branch, an upper-gm branch, where files have a `.p` extension, and a lower-gm branch, where files have a `.m` extension. The central branch files have no such extension, and their names typically end stating the ground motion, e.g., `pga`, `1hz`, or `5hz`. WUS background source contributions and Cascadia source contributions are also combined in this first step.

The second step, which uses `combine.2008h.csh`, combines the three ground-motion uncertainty branches into a single mean seismic hazard curve at each site. The various input files associated with combining hazard for PGA, 1-s SA, and 0.2-s SA have been included in the zip file. Some sample combine files that yield the 2% PE in 50 year ground motion estimates are also included. These can be easily modified to output the ground motion corresponding to any other probability of exceedance. These values are often called “uniform hazard” values because they are spatially invariant with respect to probability of the indicated ground motion being exceeded in a given time interval. The uniform hazard ground motions at this step will be valid for the westernmost part of the grid region, for example Washington, Oregon, California, and so on.

There is a final step to perform, which is the combining of the WUS with CEUS hazard curves. This step is important in a broad region where WUS and CEUS have some overlapping hazard contributions. Some states where CEUS and WUS contributions overlap significantly are Montana, Wyoming, Colorado, New Mexico and Texas. This step is further discussed in Part III.