Program: hazSUBNGA.f
Language: fortran95 (gfortran)
Purpose: Compute probabilistic seismic hazard at various sites from one fault or subducting slab whose top and bottom are specified.
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To run: hazSUBNGA.exe input.file > log.file
Sample Input File. Comments are given in blue. These blue comments are not read by the program. The data on the left side are what the program needs.
Here is an example input file:

```
0               !use grid-of-sites option (1 or more implies list of stations)
0 22. 0.1      !min lat, max lat, dlat.  Site grid in Thailand&Indonesia
94. 105. 0.1          !min long, max long, dlong (in degrees)
760. 1         !Vs in upper 30 m, 760 m/s here; depth to Vs2500 (km)
3              !number of spectral periods. Here, 3.
0.             !first period to consider 0 = PGA. Next line, output file
slab-pga.50z.new
2              ! number of attenuation models for PGA
2 0.5  1000. 1. 0  ! 2 is index for Geomatrix subduction
5 0.5 1000. 1. 0  !5 is index for ABSub, global coefficients
19                     !number of PGA values to sample and list them(g)
.005 .007 .0098 .0137 .0192 .0269 .0376 .0527 .0738 .103 .145 .203
.284 .397 .556 .778 1.09 1.52 2.13
0.2 sec PSA        !2nd period to consider. Here, 0.2-s SA, or 5-Hz
slab-5hz.50z.new
2
2 0.5  1000. 1. 0  !Geomatrix
5 0.5 1000. 1. 0  !ABSub, global
19
.005 .0075 .0113 .0169 .0253 .0380 .0570 .0854 .128 .192 .288 .432
.649 .973 1.46 2.19 3.28 4.92 7.38
1.0  sec PSA       !3rd period to analyze
slab-1hz.50z.new
2
2 0.5  1000. 1. 0  !Geomatrix
5 0.5 1000. 1. 0  !ABSub, global
20                     !number of SA levels for 1s SA
.0025 .00375 .00563 .00844 .0127 .0190 .0285 .0427 .0641 .0961
.144 .216 .324 .487 .730 1.09 1.64 2.46 3.69 5.54
```

```
5.                  !distance increment for source segment (km)
1. 1000.            !dR and Rmax (km) for source-to-site distances
2  2   Sumatra Megathrust
  7.2   1.0   9.2  9.2  0.1!first number is rate of M0, 1 is bvalue, 9.2 M
6    top            !number of sample points defining top-of-fault
17.42919239 93.68470752   5       !Lat, longº, depth (km) 1st point
13.66770451 92.14833959 5         !Lat, longº, depth (km) 2nd point
10.30064251 91.56807859 5
3.716000503 93.22699759 5
1.4869995 96.0882512 5.0          !Lat, longº, depth (km) 5th point
-7.197000 102.4520036 5.0
6 bottom            !number of points defining bottom-of-fault
17.094216 94.59746321 50          !Lat, longº, depth (km) 1st point
13.42208668 93.31859165 50
10.43153688 92.89230113 50
4.691394861 94.61522532 50
2.728670788 96.87101265 50.0
-5.594179503 103.4785157 50.0     !Lat, longº, depth (km) 6th point
```

Notes:
When running hazSUBXnga, only one fault or slab is allowed per run. The above is a complete file. You cannot add more sources.
If you want to perform analysis for a list of sites instead of a grid of stations, the first line of file should begin with *n*, the number of stations (<30). Then list the station coordinates and their names. Example:

```
2
13.65 100.7 Bangkok1
13.75 100.6 Bangkok2
…
```

In this example, PSHA analysis will be done for two sites in and around Bangkok.

There are many options the code is able to work with. You can use up to five attenuation models per spectral period. The index or code for each of these is contained in the comments early in the source code.

You can consider up to seven spectral periods per run. Different attenuation models work with different sets of periods. If you select common periods, such as 0.2 and 1.0 s, all of the models will work. If you select uncommon periods, such as 5.0 seconds, many models won't work. Newer models, such as Gregor(2006) often have more periods to choose from. Attenuation model indexes are different from those of hazgridXnga2 and hazFXnga7.
Here is a current list of attenuation models available in hazSUBnga:

Some are for fixed site conditions and some for
Vs-30 dependent site conditions. CEUS fixed site is HR or FR; WUS FR or soil.

INDEX	**Whose Model?**
1	not used in this code
2	Geomatrix subduction (Youngs *et al*, SRL, 1997)
3	Sadigh *et al.* (rock-site coeffs.& eqn) firm rock. Used for near-src sites
4	AB03 BC rock and Cascadia, Atkinson and B00re (BSSA, Aug. 2003)
5	AB03 BC rock and global source
6	Crouse (this relation is no longer used)
15	Gregor, BSSA(2002). Out of date do not use.
16	Gregor, SRL (2006). This replaces 15. Variable nonlinear site amplification, continuous function of Vs30.