

Aids to Understanding Deterministic Hazard Calculations for American Samoa

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Deterministic hazard in the Samoa region is computed from the event that produces the largest median ground motion. This tends to be the largest and closest considered earthquake but can be a more distant source. For example, deep intraplate sources generate larger median ground motions than shallow crustal sources with the same epicenter and magnitude. Median ground motion is further defined in a companion note in this folder.

The data in these deterministic hazard files are arranged by receiver or site in scan-line order. Table 1 shows the meaning of each column of a data record in the file.

Table 1.

Column 1	2	3	4	5	6	7
Site Longitude°	Site Latitude°	Median Spectral Acceleration(g)	Logarithmic standard dev.	Event slant distance or Rcd(km)	Event magnitude	Source Index

Source index (column 7) refers to the nature of the source that produces the strongest median motion. These indexes range from 1 to 11. These source types are explained briefly in Table 2. A few sites in the broad study area had no modeled source contributions because these sites are more than the maximum considered distance from every source in the model. At those sites we have assigned zero (0) to the source index.

Table 2.

1	Tonga-Kermedec subduction zone shallow seismicity with M=7
2	New Hebrides subduction zone shallow seismicity with M=7
3	New Hebrides subduction zone interface earthquake with M=9.0
4	Deep seismicity with depth in the 200-300 km range and with M=8.15
5	New Hebrides greater Outer Rise zone shallow seismicity with M=8.15
6	Tonga-Kermedec greater Outer Rise zone shallow seismicity with M=8.15
7	General background hazard from shallow earthquakes with M=7.25
8	Deep seismicity with depth in the 100-200 km range and with M=8.15
9	Deep seismicity with depth in the 50-100 km range and with M=8.15
10	Fiji region hazard from shallow earthquakes with M=7.25
11	Tonga-Kermedec subduction zone interface earthquake with M=9.0

Maps of the motions (column 3) and the source index (column 7) are provided in the Maps area of this Samoa URL.

The deterministic files were prepared at the time of the Open File Report 2012-1084. The subsequent update was not considered for deterministic calculations. At American Samoa (principally, Tutuila, T'au, Olosega, and Ofu) the effect of the update on deterministic ground motions is nil, even though its effect on probabilistic ground motions is substantial. This is because events with even an almost vanishingly small probability of occurrence are still counted as the nearest source in deterministic calculations. Changing the modeled mean rate of such events by considering different catalog smoothing approaches has no effect on these deterministic events.