Electronic Supplement to

Revision of Boore (2018) Ground-Motion Predictions for Central and Eastern North America: Path and Bias Adjustments and Extension to $200\ m/s \le V_{S30} \le 3000\ m/s$

By David M. Boore

This electronic supplement includes zip files containing the revised Boore (2018) (B18) ground-motion intensity measures (GMIMs) for the AB14mod1, AB14mod2, and the BCA10D ground-motion predictions (GMPs). It also includes zip files with png format figures of the revised B18 GMIMs as a function of distance for a suite of magnitudes, for the AB14mod1 and the BCA10D GMPs. The figures for the AB14mod2 model are very similar to those for the AB14mod2 model and therefore are not provided in this electronic supplement. Each figure is for one GMIM: these include PGV, PGA, and PSA at periods of 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, and 10.0 s. The reference site is for $V_{S30} = 2.0$ km/s; the figures for $V_{S30} = 3.0$ km/s are very similar and therefore are not provided.

The period-dependent conversion from as-record geometric means to RotD50 used in this article are given in Table S1.

This version of the Supplement differs from the one on the SRL web site by replacing “adjusted” with “revised” and adding “revised” to the names of the csv files in the zip files. I did not, however, rename the figures contained in the last two zip files discussed below.

Ground-Motion Predictions Archives

Download: revisedB18GMIMs.AB14mod1_2kps.zip [zipped plain text files; 7.1 Mb]. The revised ground-motion predictions for the AB14mod1 attenuation model and a site with $V_{S30} = 2.0$ km/s.

Download: revisedB18GMIMs.AB14mod1_3kps.zip [zipped plain text files; 7.1 Mb]. The revised ground-motion predictions for the AB14mod1 attenuation model and a site with $V_{S30} = 3.0$ km/s.

Download: revisedB18GMIMs.AB14mod2_2kps.zip [zipped plain text files; 7.1 Mb]. The revised ground-motion predictions for the AB14mod2 attenuation model and a site with $V_{S30} = 2.0$ km/s.

Download: revisedB18GMIMs.AB14mod2_3kps.zip [zipped plain text files; 7.1 Mb]. The revised ground-motion predictions for the AB14mod2 attenuation model and a site with $V_{S30} = 3.0$ km/s.

Download: revisedB18GMIMs.BCA10D_2kps.zip [zipped plain text files; 7.1 Mb]. The revised ground-motion predictions for the BCA10D attenuation model and a site with $V_{S30} = 2.0$ km/s.

Download: revisedB18GMIMs.BCA10D_3kps.zip [zipped plain text files; 7.1 Mb]. The revised ground-motion predictions for the BCA10D attenuation model and a site with $V_{S30} = 3.0$ km/s.

Each of the above-mentioned zip files contains just one large comma-separated-variable (csv) ASCII file with the revised B18 GMIMs for the B18 GMPs indicated in the zip filename. For example, in revisedB18GMIMs.AB14mod2_3kps.zip contains the revised motions for the AB14mod2 model, with a reference velocity of 3 km/s. The order of the predictor variables in each csv file is period, magnitude, and distance, in order of variation of the predictor variable, from slowest to most rapid. For example, the first block in each csv is for a constant period of -1 (PGV), constant **M**=3, and R_{RUP} varying from 0 km to 1200 km. Note that some entries have no value ("NA") for very short distances and small magnitudes; this is because the Boore and Thompson (2015) oscillator adjustments were not given for effective point-source distances (R_{PS}) less than 2 km.

The explanation of the column headings in the csv files is given in Table S2.

Model Comparison Figures Archives

Download: revisedAB14mod1_2kps_GMIM_vs_Rrup.zip [zipped plain text files; 0.4 Mb].

Figures of GMIMs vs R_{RUP} for the AB14mod1 model, for a site with $V_{S30} = 2.0$ km/s.

Download: revisedBCA10D_2kps_GMIM_vs_Rrup.zip [zipped plain text files; 0.4 Mb].

Figures of GMIMs vs R_{RUP} for the BCA10D model, for a site with $V_{S30} = 2.0$ km/s.

References

Boore, D. M. and E. M. Thompson (2015). Revisions to some parameters used in stochastic-method simulations of ground motion, *Bull. Seismol. Soc. Am.* **105**, 1029–1041.

Table S1. Conversion from as-recorded geometric mean (GM_AR) to RotD50.

Period	RotD50/GM_AR
-1.000	1.035
0.000	1.017
0.010	1.017
0.018	1.017
0.030	1.017
0.045	1.017
0.068	1.017
0.084	1.017
0.115	1.016
0.169	1.016
0.233	1.018
0.301	1.023
0.380	1.029
0.490	1.039
0.602	1.045
0.748	1.049
0.930	1.058
1.216	1.065
1.531	1.071
2.428	1.070
3.474	1.068
3.999	1.060
5.035	1.053
6.759	1.052
10.000	1.052

70

71 Table S2. Explanation of column headings of the adjusted B18 GMIMs given in the six zip files

72 listed above.

COLUMN HEADING	EXPLANATION
damp	Fractional damping
T	Period (-1=PGV, 0=PGA)
F	Frequency (-1=PGV, 999.99=PGA)
M	Moment magnitude. This is the magnitude metric for the B18 GMPMs.
Rrup	Rupture distance (km). This is the distance metric for the B18 GMPMs.
h	Finite-fault factor (km)
Rps	The effective point-source distance used in the simulations, equal to the square root of the sum of the squares of Rrup and h. See Boore and Thompson (2015) for more information.
k0	The distance-independent high-frequency attenuation parameter, with units of s. This is the value required by the NGA-East project.
numsource	The value of 1 indicates that a single-corner-frequency source was used (see the *.params files in the electronic supplement to B18 for the codes used for various sources).
S	The stress parameter used in the simulations (bars).
gmimdk80g	The ground-motion intensity measure in B18, in units of g (except PGV, which is in cm/s), computed using random-vibration theory with the oscillator adjustment based on work by Der Kiureghian published in 1980 ("dk80") (see Boore and Thompson, 2015, for details).
gmimdk80cgs	As above but all GMIMs, not just PGV, have cgs units
RotD50divGM_AR	The adjustment to convert a geometric mean GMIM to RotD50.
b	The slope coefficient for the path adjustment; see equation (3) in the article.
P	The path adjustment applied to the B18 GMIM; see equation (1) in the article.
antiP	The antilogarithm ("anti") of the path adjustment
C	The offset adjustment ("O" in equation (1) in the article) applied to the B18 GMIM. This adjustment uses the bias from a residual analysis considering only observation on rock sites (Vs30>=1000 m/s).
antiO	The antilogarithm ("anti") of the offset adjustment.
gmimdk80gPO	The adjusted B18 GMIM obtained by multiplying gmimdk80g by antiP and by antiO. This is the final revised B18 GMP if the GMIM is the equivalent to the geometric mean of two horizontal components.

gmimdk80gGM2RotPO	The adjusted B18 GMIM obtained by multiplying gmimdk80g by RotD50divGM_AR, antiP, and antiO. This is the final revised B18 GMP if the GMIM is the equivalent to RotD50.
gmimdk80gGM2Rot	The B18 GMIM obtained by multiplying gmimdk80g by RotD50divGM_AR. This is for information only, to see the impact of RotD50divGM_AR, and is not one of the final adjusted B18 GMPs (see the previous rows for those).

73

74

75