Appendix C Coefficients for envelope parameters

The station corrections for 6 channels (acceleration, velocity, and displacement in the horizontal and vertical directions) are includd (Excel format) as external multimedia objects. Rock stations are those with NEHRP site class BC and above. Soil stations are those with NEHRP site class C and below.

- ENU.a.rock.PS.stacorr.xls
- ENU.a.soil.PS.stacorr.xls
- ENU.v.rock.PS.stacorr.xls
- ENU.v.soil.PS.stacorr.xls
- ENU.d.rock.PS.stacorr.xls
- ENU.d.soil.PS.stacorr.xls
- Z.a.rock.PS.stacorr.xls
- Z.a.soil.PS.stacorr.xls
- Z.v.rock.PS.stacorr.xls
- Z.v.soil.PS.stacorr.xls
- Z.d.rock.PS.stacorr.xls
- Z.d.soil.PS.stacorr.xls

Coefficients for rms horizontal acceleration on rock sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.06	5.5×10^{-4}	0.27	-	-	-	-	-0.37	0.22
A_P	0.72	3.3×10^{-3}	1.20	1.6	1.05	-	-	-1.06	0.31
ΔT_P	-	2.58×10^{-3}	0.21	-	-	-	-	-0.22	0.39
τ_P	0.047	-	0.48	-	-	-	0.82	-0.75	0.28
γ_P	-0.032	-1.81×10^{-3}	-0.1	-	-	0.27	-	0.64	0.16
$T_{rise,S}$	0.64	-	0.48	-	-	-	-	-0.89	0.23
A_S	0.78	2.6×10^{-3}	1.35	1.48	1.11	-	-	-0.64	0.31
ΔT_S	-	-4.87×10^{-4}	0.13	-	-	-	-	0.0024	0.21
τ_S	0.037	-	0.39	-	-	-	1.73	-0.59	0.18
γ_S	-0.014	-5.28×10^{-4}	-0.11	-	-	0.38	-	0.26	0.09
noise								-2.0	

Coefficients for rms horizontal acceleration on soil sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.07	1.2×10^{-3}	0.24	-	-	-	-	-0.38	0.26
A_P	0.74	3.3×10^{-3}	1.26	2.41	0.95	-	-	-1.05	0.29
ΔT_P	0.03	2.37×10^{-3}	0.39	-	-	-	-	-0.59	0.36
τ_P	0.087	-1.89×10^{-3}	0.58	-	-	-	0.58	-0.87	0.31
γ_P	-0.48	-1.42×10^{-3}	-0.13	-	-	0.26	-	0.71	0.21
$T_{rise,S}$	0.055	1.21×10^{-3}	0.34	-	-	-	-	-0.66	0.25
A_S	0.836	2.3×10^{-3}	1.56	2.42	1.05	-	-	-0.34	0.31
ΔT_S	0.028	-	0.07	-	-	-	-	-0.102	0.23
τ_S	0.0557	-8.2×10^{-4}	0.51	-	-	-	1.63	-0.68	0.24
γ_S	-0.015	-5.89×10^{-4}	-0.163	-	-	0.39	-	0.299	0.13
noise								-2.5	

Table C.1: Envelope attenuation relationships for rms horizontal acceleration on rock and soil sites. All attenuation relationships model $\log_{10}$ of the envelope parameter as functions of magnitude, distance, and (for the amplitude parameters) site condition.

Coefficients for rms horizontal velocity on rock sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.06	1.33×10^{-3}	0.23	-	-	-	-	-0.34	0.25
A_P	0.80	8.4×10^{-4}	1.24	0.76	1.03	-	-	-3.103	0.27
ΔT_P	0.054	1.93×10^{-3}	0.16	-	-	-	-	-0.36	0.40
τ_P	1.86×10^{-2}	5.37×10^{-5}	0.41	-	-	-	0.73	-0.51	0.30
γ_P	-0.044	-1.65×10^{-3}	-0.16	-	-	0.33	-	0.72	0.20
$T_{rise,S}$	0.093	-	0.48	-	-	-	-	-0.96	0.25
A_S	0.89	4.29×10^{-4}	1.44	1.11	1.11	-	-	-2.60	0.28
ΔT_S	0.02	-	-	-	-	-	-	0.046	0.23
τ_S	0.029	8.0×10^{-4}	0.25	-	-	-	1.61	-0.31	0.23
γ_S	-0.024	-1.02×10^{-3}	-0.055	-	-	0.36	-	0.207	0.11
noise								-3.9	

Coefficients for rms horizontal velocity on soil sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.07	4.35×10^{-4}	0.47	-	-	-	-	-0.68	0.26
A_P	0.84	5.4×10^{-4}	1.28	1.21	0.97	-	-	-3.13	0.26
ΔT_P	0.03	2.03×10^{-3}	0.289	-	-	-	-	-0.45	0.40
τ_P	0.0403	-1.26×10^{-3}	0.387	-	-	-	0.58	-0.372	0.37
γ_P	-6.17×10^{-2}	-2.0×10^{-3}	0	-	-	-	-	0.578	0.25
$T_{rise,S}$	0.087	4.0×10^{-4}	0.49	-	-	-	-	-0.98	0.30
A_S	0.96	8.33×10^{-4}	1.59	1.98	1.06	-	-	-2.35	0.30
ΔT_S	0.028	-	0.046	-	-	-	-	-0.083	0.23
τ_S	0.045	-5.46×10^{-4}	0.46	-	-	-	-	-0.55	0.25
γ_S	-0.031	-4.61×10^{-4}	-0.162	-	-	-	-	0.302	0.13
noise								-3.64	

Table C.2: Envelope attenuation relationships for rms horizontal velocity on rock and soil sites. All attenuation relationships model $\log_{10}$ of the envelope parameter as functions of magnitude, distance, and (for the amplitude parameters) site condition.

Coefficients for rms horizontal displacement on rock sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.05	1.29×10^{-3}	0.27	-	-	-	-	-0.34	0.28
A_P	0.95	1.68×10^{-6}	1.27	2.16	1.08	-	-	-4.96	0.28
ΔT_P	0.047	-	0.45	-	-	-	-	-0.68	0.43
τ_P	-	-	0.19	-	-	-	-	-0.07	0.39
γ_P	-0.062	-2.3×10^{-3}	-	-	-	-	-	0.61	0.26
$T_{rise,S}$	0.109	7.68×10^{-4}	0.38	-	-	-	-	-0.87	0.29
A_S	1.03	1.01×10^{-7}	1.43	1.09	1.13	-	-	-4.34	0.27
ΔT_S	0.04	1.1×10^{-3}	-0.15	-	-	-	-	0.11	0.23
τ_S	0.029	-	0.36	-	-	-	-	-0.38	0.26
γ_S	-0.025	-4.22×10^{-4}	-0.145	-	-	-	-	0.262	0.12
noise								-5.2	

Coefficients for rms horizontal displacement on soil sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.05	1.19×10^{-3}	0.47	-	-	-	-	-0.58	0.26
A_P	0.94	-5.17×10^{-7}	1.16	2.26	1.02	-	-	-5.01	0.30
ΔT_P	0.051	1.12×10^{-3}	0.33	-	-	-	-	-0.59	0.41
τ_P	0.035	-1.27×10^{-3}	0.19	-	-	-	-	-0.03	0.43
γ_P	-0.061	-1.9×10^{-3}	0.11	-	-	-	-	0.39	0.31
$T_{rise,S}$	0.12	-	0.45	-	-	-	-	-0.89	0.34
A_S	1.08	1.2×10^{-6}	1.56	1.95	1.09	-	-	-4.1	0.32
ΔT_S	0.03	-	0.037	-	-	-	-	-0.066	0.28
τ_S	0.038	-1.34×10^{-3}	0.48	-	-	-	-	-0.39	0.30
γ_S	-2.67×10^{-2}	2.0×10^{-4}	-0.217	-	-	-	-	0.274	0.14
noise								-4.9	

Table C.3: Envelope attenuation relationships for rms horizontal displacement on rock and soil sites.

Coefficients for vertical acceleration on rock sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.06	7.45×10^{-4}	0.37	-	-	-	-	-0.51	0.22
A_P	0.74	4.01×10^{-3}	1.2	1.75	1.09	-	-	-0.96	0.29
ΔT_P	-	2.75×10^{-3}	0.165	-	-	-	-	-0.245	0.41
τ_P	0.03	-	0.58	-	-	-	-	-0.97	0.26
γ_P	-0.027	-1.75×10^{-3}	-0.18	-	-	-	-	0.74	0.15
$T_{rise,S}$	0.069	-	0.49	-	-	-	-	-0.97	0.23
A_S	0.78	2.66×10^{-3}	1.38	1.76	1.11	-	-	-0.75	0.30
ΔT_S	0.03	-1.4×10^{-3}	0.22	-	-	-	-	-0.17	0.20
τ_S	0.031	-	0.34	-	-	-	-	-0.44	0.19
γ_S	-0.0149	-4.64×10^{-4}	-0.122	-	-	-	-	0.255	0.095
noise								-2.44	

Coefficients for vertical acceleration on soil sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.06	5.87×10^{-4}	0.23	-	-	-	-	-0.37	0.23
A_P	0.739	5.17×10^{-7}	1.20	2.03	0.97	-	-	-0.77	0.31
ΔT_P	-	1.76×10^{-3}	0.36	-	-	-	-	-0.48	0.41
τ_P	0.057	-1.36×10^{-3}	0.63	-	-	-	-	-0.96	0.28
γ_P	-0.024	-1.6×10^{-3}	-0.24	-	-	-	-	0.84	0.18
$T_{rise,S}$	0.059	2.18×10^{-3}	0.26	-	-	-	-	-0.66	0.25
A_S	0.751	2.47×10^{-3}	1.47	1.59	1.01	-	-	-0.355	0.30
ΔT_S	0.03	-1.78×10^{-3}	0.307	-	-	-	-	-0.313	0.25
τ_S	0.06	-1.45×10^{-3}	0.51	-	-	-	-	-0.60	0.22
γ_S	-0.0197	-	-0.242	-	-	-	-	0.378	0.13
noise								-1.96	

Table C.4: Envelope attenuation relationships for vertical acceleration on rock and soil sites.

Coefficients for vertical velocity on rock sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.06	7.32×10^{-4}	0.25	-	-	-	-	-0.37	0.26
A_P	0.82	8.54×10^{-4}	1.36	1.14	1.1	-	-	-2.9	0.26
ΔT_P	0.046	2.61×10^{-3}	-	-	-	-	-	-0.213	0.41
τ_P	0.03	8.6×10^{-4}	0.35	-	-	-	-	-0.62	0.29
γ_P	-0.039	-1.88×10^{-3}	-0.18	-	-	-	-	0.76	0.18
$T_{rise,S}$	0.116	-	0.503	-	-	-	-	-1.14	0.27
A_S	0.90	1.03×10^{-3}	1.51	1.39	1.09	-	-	-2.78	0.25
ΔT_S	0.018	-	-	-	-	-	-	-0.072	0.23
τ_S	0.04	9.4×10^{-4}	0.25	-	-	-	-	-0.34	0.23
γ_S	-0.028	-8.32×10^{-4}	-0.123	-	-	-	-	0.325	0.11
noise								-4.03	

Coefficients for vertical velocity on soil sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.06	1.08×10^{-3}	0.22	-	-	-	-	-0.36	0.24
A_P	0.812	2.65×10^{-6}	1.48	1.4	1.0	-	-	-2.55	0.30
ΔT_P	0.031	1.7×10^{-3}	0.26	-	-	-	-	-0.52	0.42
τ_P	0.311	-6.4×10^{-4}	0.44	-	-	-	-	-0.55	0.32
γ_P	-0.037	-2.23×10^{-3}	-0.14	-	-	-	-	0.71	0.22
$T_{rise,S}$	0.11	1.24×10^{-3}	0.38	-	-	-	-	-0.91	0.313
A_S	0.882	5.41×10^{-4}	1.48	1.53	1.04	-	-	-2.537	0.27
ΔT_S	0.017	-6.93×10^{-4}	0.119	-	-	-	-	-0.05	0.27
τ_S	0.051	-1.41×10^{-3}	0.438	-	-	-	-	-0.368	0.26
γ_S	-0.0334	-	-0.21	-	-	-	-	0.325	0.15
noise								-3.67	

Table C.5: Envelope attenuation relationships for vertical velocity on rock and soil sites.

Coefficients for vertical displacement on rock sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.08	1.64×10^{-3}	0.13	-	-	-	-	-0.33	0.27
A_P	0.956	1.98×10^{-6}	1.34	1.66	1.16	-	-	-4.79	0.28
ΔT_P	0.058	2.02×10^{-3}	-	-	-	-	-	-0.253	0.42
τ_P	0.05	8.9×10^{-4}	0.16	-	-	-	-	-0.387	0.36
γ_P	-0.052	-1.67×10^{-3}	-0.21	-	-	-	-	0.849	0.22
$T_{rise,S}$	0.123	1.3×10^{-3}	0.257	-	-	-	-	-0.749	0.30
A_S	1.04	1.12×10^{-5}	1.37	1.38	1.18	-	-	-4.74	0.25
ΔT_S	0.033	2.6×10^{-4}	-	-	-	-	-	-0.015	0.25
τ_S	0.024	-	0.303	-	-	-	-	-0.22	0.26
γ_S	-0.015	-	-0.229	-	-	-	-	0.309	0.12
noise								-5.24	

Coefficients for vertical diplacement on soil sites

	M	R	$\log_{10} R$	c_1	c_2	τ	γ	intercept	σ
$T_{rise,P}$	0.067	1.21×10^{-3}	0.28	-	-	-	-	-0.46	0.27
A_P	0.932	1.09×10^{-7}	1.23	1.5	1.04	-	-	-4.739	0.31
ΔT_P	0.043	9.94×10^{-4}	0.19	-	-	-	-	-0.42	0.41
τ_P	0.052	-	0.12	-	-	-	-	-0.166	0.39
γ_P	-0.066	-2.5×10^{-3}	-	-	-	-	-	0.63	0.27
$T_{rise,S}$	0.124	-	0.439	-	-	-	-	-0.82	0.403
A_S	1.034	4.92×10^{-6}	1.36	1.55	1.08	-	-	-4.569	0.28
ΔT_S	0.023	-7.18×10^{-4}	0.074	-	-	-	-	-0.005	0.26
τ_S	0.022	-1.65×10^{-3}	0.44	-	-	-	-	-0.19	0.28
γ_S	-0.0176	5.65×10^{-4}	-0.25	-	-	-	-	0.236	0.14
noise								-4.95	

Table C.6: Envelope attenuation relationships for vertical displacement on rock and soil sites.