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Table 1. Site Characterization Proxies Contained in the Site Database for K-NET and KiK-net Strong-Motion Stations

Source	Site condition proxy	Description
1D velocity profiles	$V_{P,surface}$	P-wave velocity at the ground surface, also denoted as V_{P0}
	$V_{P,borehole}$	P-wave velocity at borehole depth
	$V_{P,sb}$	Average P-wave velocity from the ground surface to borehole depth
	V_{Pz}	Average P-wave velocity from the ground surface to the depth z (z=5, 10, 15, 20, 30, 40, 50, 60, 70, 80, 90 and 100 m)
	V_{Px}	Average P-wave velocity to the P-wave iso-surface x (x=0.8, 1.0, 1.5 and 2.5 km/s)
	Z_{Px}	Depth to the P-wave iso-surface x (x=0.8, 1.0, 1.5 and 2.5 km/s)
	C_P	Largest P-wave velocity contrast between two adjacent layers (lower/upper) in a profile
	Z_{CP}	Depth of C_P
	V_P Inversion	Logic value indicating the presence of P-wave velocity inversion or the lack thereof
	$V_{S,surface}$	S-wave velocity at the ground surface, also denoted as V_{S0}
	$V_{S,borehole}$	S-wave velocity at borehole depth
	$V_{S,sb}$	Average S-wave velocity from the ground surface to borehole depth
	V_{Sz}	Average S-wave velocity from the ground surface to the depth z (z=5, 10, 15, 20, 30, 40, 50, 60, 70,
	V_{Sx}	Average S-wave velocity to the S-wave iso-surface x (x=0.8, 1.0, 1.5 and 2.5 km/s)
	Z_{Sx}	Depth to the S-wave iso-surface x (x=0.8, 1.0, 1.5 and 2.5 km/s)
	C_S	Largest S-wave velocity contrast between two adjacent layers (lower/upper) in a profile
	Z_{CS}	Depth of C_S
	V_S Inversion	Logic value indicating the presence of S-wave velocity inversion or the lack thereof
Earthquake HVSR	N_e	Number of recordings at each site
	Mag.min and *Mag.max*	Minimum and maximum magnitudes (JMA), respectively
	Mag.avg and *Mag.std*	Mean and standard deviation of magnitudes, respectively
	Repic.min and *Repic.max*	Minimum and maximum epicentral distances, respectively
	Repic.avg and *Repic.std*	Mean and standard deviation of epicentral distances, respectively
	HVSR(f)	Horizontal-to-vertical spectral ratio as a function of frequency (geometric mean over N_e recordings at
	$A_{0,HV}$, $f_{0,HV}$, $w_{0,HV}$, and $p_{0,HV}$	Amplitude of the first peak and its corresponding frequency, width and prominence, respectively
	$A_{P,HV}$, $f_{P,HV}$, $w_{P,HV}$, and $p_{P,HV}$	Amplitude of the predominant peak and its corresponding frequency, width and prominence, respectively
	No. of Peaks	Total number of significant peaks on a HVSR curve
Regional models/maps	Geological Age	Geological age from the Seamless Digital Geological Map of Japan (SGDM, 2014)
	Lithological Unit	Lithological Unit from the Seamless Digital Geological Map of Japan (SGDM, 2014)
	Geological Category	Geology from the 30”Japan Engineering Geomorphologic Classification Map (JEGM, Wakamatsu et al., 2005), as shown in Table 3
	Slope [Horn]	Ground slope derived from 30” and 15” digital terrain models using Horn (1981)'s algorithm
	Slope [ZT]	Ground slope derived from 30” and 15” digital terrain models using Zevenbergen and Thorne (1987)'s algorithm
	TPI	Topographic Position Index
	TRI	Terrain Ruggedness Index
	Roughness	Difference between the minimum and maximum elevations for cells within the neighborhood of a target cell
	Z_{Sx} [J-SHIS]	Depth parameters from a regional velocity model (J-SHIS), x=0.8, 1.0, 1.5 and 2.5 km/s
	Sediment Thickness	Sediment thickness from the 30” resolution global database developed by Pelletier et al. (2016)
	V_{S30} [WA]	Inferred V_{S30} from topographic slopes by Wald and Allen (2007)
	CTI	Compound topographic index from the 15” global CTI model of Marthews et al. (2015)
	Bouguer Anomaly	Local spherical gravity anomaly from the 2012 World Gravity Map (Balmino et al., 2012)
	Geomorphologic Unit	Geomorphologic unit from the 7.5”JEGM (Wakamatsu and Matsuoka, 2013), as shown in Table 2
	V_{S30} [WM]	Inferred V_{S30} from several topographic proxies by Wakamatsu and Matsuoka (2013)
	Amplification Factor	Amplification factor from V_s=400 m/s to the ground surface (Fujimoto & Midorikawa, 2006)
	D0 ~ D32	1D Model Extracted from a 3D velocity structure model (Fujiwara et al., 2012), as shown in Table 4. D0~D32 are the depths to the top of each layer for each cell. For the first (surface) layer, its value, i.e., D0, is always zero.

Table 2. Engineering Geomorphologic Classification Code (Wakamatsu and Matsuoka, 2013)

Code	Engineering geomorphologic classification
1	Mountain
2	Mountain footslope
3	Hill
4	Volcano
5	Volcanic footslope
6	Volcanic hill
7	Rocky strath terrace
8	Gravelly terrace
9	Terrace covered with volcanic ash soil
10	Valley bottom lowland
11	Alluvial fan
12	Natural levee
13	Back marsh
14	Abandoned river channel
15	Delta and coastal lowland
16	Marine sand and gravel bars
17	Sand dune
18	Lowland between coastal dunes and/or bars
19	Reclaimed land
20	Filled land
21	Rock shore, rock reef
22	Dry riverbed
23	River bed
24	Water body

Table 3. Geological Age Classificaiton (Wakamatsu et al., 2005)

Code	Geological age
1	Holocene
2	Pleistocene
3	Quaternary (volcanic)
4	Tertiary
5	Pre-Tertiary

Table 4. J-SHIS 3D Velocity Model (Fujiwara et al., 2012)

Code	V_P (m/s)	V_S (m/s)	ρ (kg/m^3)	Q_P	Q_S	Note
D0	1600	350	1850	60	60	
D1	1600	400	1850	60	60	
D2	1700	450	1900	60	60	
D3	1800	500	1900	60	60	
D4	1800	550	1900	60	60	
D5	2000	600	1900	100	100	
D6	2000	650	1950	100	100	
D7	2100	700	2000	100	100	
D8	2100	750	2000	100	100	
D9	2200	800	2000	100	100	$Z_{S0.8}$
D10	2300	850	2050	100	100	
D11	2400	900	2050	100	100	
D12	2400	950	2100	100	100	
D13	2500	1000	2100	150	150	$Z_{S1.0}$
D14	2500	1100	2150	150	150	
D15	2600	1200	2150	150	150	
D16	2700	1300	2200	150	150	
D17	3000	1400	2250	150	150	
D18	3200	1500	2250	150	150	$Z_{S1.5}$
D19	3400	1600	2300	150	150	
D20	3500	1700	2300	150	150	
D21	3600	1800	2350	150	150	
D22	3700	1900	2350	150	150	
D23	3800	2000	2400	200	200	
D24	4000	2100	2400	200	200	
D25	4000	2100	2400	200	200	
D26	5000	2700	2500	200	200	$Z_{S2.5}$
D27	4600	2900	2550	200	200	
D28	5000	2700	2500	200	200	
D29	5500	3100	2600	300	300	
D30	5500	3200	2650	300	300	
D31	5700	3300	2700	300	300	
D32	6000	3400	2750	300	300	