Table H-2
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Distributed Faulting

Distance from Principal Rupture (km)	Hanging Wall		Footwall	
	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture
2.5	24	183	0	207
3.0	26	220	0	246
3.5	4	215	0	219
4.0	6	236	0	242
4.5	6	290	0	296
5.0	2	232	0	234
5.5	0	269	0	269
6.0	0	246	0	246
6.5	0	295	0	295
7.0	0	277	0	277
7.5	0	260	0	260
8.0	0	325	0	325
8.5	0	308	0	308
9.0	0	300	0	300
9.5	0	299	0	299
10.0	0	286	0	286
10.5	0	346	0	346
11.0	0	330	0	330
11.5	0	332	0	332
12.0	0	325	0	325
12.5	0	373	0	373
13.0	0	348	0	348
13.5	0	340	0	340
14.0	0	379	0	379
14.5	0	352	0	352
15.0	0	394	0	394
15.5	0	374	0	374
16.0	0	367	0	367
16.5	0	394	0	394
17.0	0	417	0	417
1983 M_w 6.8 Borah Peak, ID				
0.5	14	152	22	144
1.0	6	122	10	118
1.5	4	129	4	129
2.0	12	200	4	208
2.5	2	152	2	152
3.0	6	186	4	188
3.5	8	153	4	157
4.0	14	174	4	184
4.5	10	214	4	220
5.0	8	166	2	172
5.5	8	209	4	213
6.0	6	180	0	186
6.5	2	238	0	240
7.0	0	218	0	218

Table H-2
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Distributed Faulting

Distance from Principal Rupture (km)	Hanging Wall		Footwall	
	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture
7.5	0	202	0	202
8.0	0	266	0	266
8.5	0	252	0	252
9.0	0	246	0	246
9.5	0	243	0	243
10.0	0	230	0	230
10.5	0	295	0	295
11.0	0	276	0	276
11.5	0	276	0	276
12.0	0	271	0	271
12.5	0	314	0	314
13.0	0	297	0	297
13.5	0	287	0	287
14.0	0	320	0	320
14.5	0	299	0	299
15.0	0	344	0	344
15.5	0	323	0	323
16.0	0	315	0	315
16.5	0	338	0	338
17.0	0	372	0	372
1954 M_w 6.8 Stillwater, NV				
0.5	4	146	2	148
1.0	4	126	6	124
1.5	8	128	0	136
2.0	10	190	0	200
2.5	10	140	0	150
3.0	6	172	0	178
3.5	0	162	0	162
4.0	0	179	0	179
4.5	0	213	0	213
5.0	0	178	0	178
5.5	0	203	0	203
6.0	0	190	0	190
6.5	0	223	0	223
7.0	0	215	0	215
7.5	6	200	0	206
8.0	6	245	0	251
8.5	0	245	0	245
9.0	0	236	0	236
9.5	0	243	0	243
10.0	0	234	0	234
10.5	4	271	0	275
11.0	2	270	0	272
11.5	2	266	0	268
12.0	0	269	0	269

Table H-2
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Distributed Faulting

Distance from Principal Rupture (km)	Hanging Wall		Footwall	
	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture
12.5	0	305	0	305
13.0	0	291	0	291
13.5	0	285	0	285
14.0	0	313	0	313
14.5	0	297	0	297
15.0	0	330	0	330
15.5	0	318	0	318
16.0	0	313	0	313
16.5	0	331	0	331
17.0	0	359	0	359
1954 M_w 6.6 Rainbow Mtn., NV				
0.5	12	75	26	61
1.0	12	68	0	80
1.5	2	84	2	84
2.0	2	116	0	118
2.5	0	96	0	96
3.0	0	108	0	108
3.5	0	108	0	108
4.0	0	116	0	116
4.5	0	150	0	150
5.0	0	124	0	124
5.5	0	140	0	140
6.0	0	136	0	136
6.5	0	160	0	160
7.0	0	156	0	156
7.5	0	152	0	152
8.0	0	190	0	190
8.5	0	184	0	184
9.0	0	180	0	180
9.5	0	184	0	184
10.0	0	180	0	180
10.5	0	215	0	215
11.0	0	211	0	211
11.5	0	212	0	212
12.0	0	212	0	212
12.5	0	247	0	247
13.0	0	232	0	232
13.5	0	228	0	228
14.0	0	255	0	255
14.5	0	240	0	240
15.0	0	272	0	272
15.5	0	260	0	260
16.0	0	256	0	256
16.5	0	276	0	276
17.0	0	298	0	298

Table H-2
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Distributed Faulting

Distance from Principal Rupture (km)	Hanging Wall		Footwall	
	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture
1986 M_w 6.2 Chalfant Valley, CA				
0.5	12	55	10	57
1.0	0	66	0	66
1.5	0	68	0	68
2.0	0	96	0	96
2.5	0	80	0	80
3.0	0	93	0	93
3.5	0	92	0	92
4.0	0	101	0	101
4.5	0	127	0	127
5.0	0	108	0	108
5.5	0	125	0	125
6.0	0	120	0	120
6.5	0	141	0	141
7.0	0	140	0	140
7.5	0	136	0	136
8.0	0	172	0	172
8.5	0	164	0	164
9.0	0	165	0	165
9.5	0	168	0	168
10.0	0	164	0	164
10.5	0	197	0	197
11.0	0	193	0	193
11.5	0	197	0	197
12.0	0	196	0	196
12.5	0	227	0	227
13.0	0	216	0	216
13.5	0	212	0	212
14.0	0	238	0	238
14.5	0	224	0	224
15.0	0	253	0	253
15.5	0	244	0	244
16.0	0	240	0	240
16.5	0	261	0	261
17.0	0	277	0	277
17.5	0	277	0	277
18.0	0	286	0	286
18.5	0	277	0	277
19.0	0	300	0	300
19.5	0	288	0	288
20.0	0	317	0	317
20.5	0	301	0	301
21.0	0	317	0	317
21.5	0	328	0	328
22.0	0	316	0	316

Table H-2
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Distributed Faulting

Distance from Principal Rupture (km)	Hanging Wall		Footwall	
	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture
22.5	0	341	0	341
23.0	0	328	0	328
23.5	0	357	0	357
24.0	0	356	0	356
24.5	0	372	0	372
1986 M_w 6.2 Chalfant Valley, CA with hanging wall cracking				
0.5	12	55	10	57
1.0	0	66	0	66
1.5	0	68	0	68
2.0	0	96	0	96
2.5	0	80	0	80
3.0	0	93	0	93
3.5	0	92	0	92
4.0	0	101	0	101
4.5	0	127	0	127
5.0	0	108	0	108
5.5	0	125	0	125
6.0	0	120	0	120
6.5	0	141	0	141
7.0	0	140	0	140
7.5	0	136	0	136
8.0	0	172	0	172
8.5	0	164	0	164
9.0	0	165	0	165
9.5	2	166	0	168
10.0	0	164	0	164
10.5	0	197	0	197
11.0	8	185	0	193
11.5	4	193	0	197
12.0	10	186	0	196
12.5	2	225	0	227
13.0	0	216	0	216
13.5	8	204	0	212
14.0	10	228	0	238
14.5	10	214	0	224
15.0	20	233	0	253
15.5	10	234	0	244
16.0	8	232	0	240
16.5	2	259	0	261
17.0	10	267	0	277
17.5	2	275	0	277
18.0	0	286	0	286
18.5	2	275	0	277
19.0	6	294	0	300

Distance from Principal Rupture (km)	Hanging Wall		Footwall	
	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture
19.5	2	286	0	288
20.0	2	315	0	317
20.5	0	301	0	301
21.0	2	315	0	317
21.5	0	328	0	328
22.0	2	314	0	316
22.5	0	341	0	341
23.0	0	328	0	328
23.5	0	357	0	357
24.0	0	356	0	356
24.5	0	372	0	372
1980 M_w 6.1 Mammoth Lake, CA				
0.5	8	108	2	114
1.0	20	74	8	86
1.5	22	70	2	90
2.0	8	129	6	131
2.5	2	92	0	94
3.0	0	121	0	121
3.5	0	105	0	105
4.0	0	122	0	122
4.5	0	153	0	153
5.0	0	120	0	120
5.5	0	149	0	149
6.0	0	133	0	133
6.5	0	168	0	168
7.0	0	158	0	158
7.5	0	148	0	148
8.0	0	194	0	194
8.5	0	186	0	186
9.0	0	183	0	183
9.5	0	185	0	185
10.0	0	175	0	175
10.5	0	223	0	223
11.0	0	213	0	213
11.5	0	215	0	215
12.0	0	212	0	212
12.5	0	244	0	244
13.0	0	234	0	234
13.5	0	228	0	228
14.0	0	257	0	257
14.5	0	238	0	238
15.0	0	277	0	277
15.5	0	261	0	261
16.0	0	254	0	254
16.5	0	279	0	279

Table H-2
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Distributed Faulting

Distance from Principal Rupture (km)	Hanging Wall		Footwall	
	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture
17.0	0	299	0	299
1950 M_w 5.6 Fort Sage, CA				
0.5	2	46	0	48
1.0	0	46	0	46
1.5	0	50	0	50
2.0	0	72	0	72
2.5	0	62	0	62
3.0	0	74	0	74
3.5	0	74	0	74
4.0	0	82	0	82
4.5	0	106	0	106
5.0	0	90	0	90
5.5	0	106	0	106
6.0	0	102	0	102
6.5	0	122	0	122
7.0	0	122	0	122
7.5	0	118	0	118
8.0	0	150	0	150
8.5	0	146	0	146
9.0	0	146	0	146
9.5	0	150	0	150
10.0	0	146	0	146
10.5	0	178	0	178
11.0	0	174	0	174
11.5	0	178	0	178
12.0	0	178	0	178
12.5	0	206	0	206
13.0	0	198	0	198
13.5	0	194	0	194
14.0	0	218	0	218
14.5	0	206	0	206
15.0	0	234	0	234
15.5	0	226	0	226
16.0	0	222	0	222
16.5	0	242	0	242
17.0	0	260	0	260
1979 M_w 5.5 Homestead Valley, CA				
0.5	0	28	6	22
1.0	0	26	0	26
1.5	0	30	0	30
2.0	0	52	0	52
2.5	4	38	0	42
3.0	2	53	0	55
3.5	0	54	0	54
4.0	0	63	0	63

Table H-2
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Distributed Faulting

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Distance from Principal Rupture (km)	Hanging Wall		Footwall	
	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture	Number of 0.5 km² Pixels with Distributed Rupture	Number of 0.5 km² Pixels without Distributed Rupture
4.5	0	87	0	87
5.0	0	70	0	70
5.5	0	87	0	87
6.0	0	82	0	82
6.5	0	107	0	107
7.0	0	102	0	102
7.5	0	98	0	98
8.0	0	128	0	128
8.5	0	130	0	130
9.0	0	127	0	127
9.5	0	130	0	130
10.0	0	126	0	126
10.5	0	163	0	163
11.0	0	155	0	155
11.5	0	159	0	159
12.0	0	158	0	158
12.5	0	187	0	187
13.0	0	178	0	178
13.5	0	174	0	174
14.0	0	200	0	200
14.5	0	186	0	186
15.0	0	219	0	219
15.5	0	206	0	206
16.0	0	202	0	202
16.5	0	223	0	223
17.0	0	242	0	242

Table H-3
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Angle Between Strikes of Principal and Distributed Ruptures

	n = 2		n = 3		n = 4		n = 5		n = 6	
θ	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
1983 M_w 6.8 Borah Peak, ID										
0 to 5	20	0.049	5	0.051	3	0.047	1	0.023	0	0
5 to 10	11	0.027	5	0.051	3	0.047	2	0.045	2	0.077
10 to 15	6	0.015	4	0.041	3	0.047	3	0.068	2	0.077
15 to 20	69	0.169	12	0.122	7	0.109	4	0.091	1	0.038
20 to 25	6	0.015	6	0.061	4	0.062	3	0.068	3	0.115
25 to 30	70	0.172	10	0.102	6	0.094	3	0.068	2	0.077
30 to 35	9	0.022	7	0.071	5	0.078	3	0.068	1	0.038
35 to 40	24	0.059	8	0.082	6	0.094	6	0.136	4	0.154
40 to 45	13	0.032	8	0.082	3	0.047	2	0.045	2	0.077
45 to 50	7	0.017	3	0.031	2	0.031	2	0.045	2	0.077
50 to 55	9	0.022	6	0.061	6	0.094	3	0.068	2	0.077
55 to 60	8	0.020	8	0.082	5	0.078	3	0.068	1	0.038
60 to 65	98	0.240	5	0.051	4	0.062	4	0.091	2	0.077
65 to 70	0	0	0	0	0	0	0	0	0	0
70 to 75	32	0.078	0	0	0	0	0	0	0	0
75 to 80	8	0.020	6	0.061	3	0.047	3	0.068	1	0.038
80 to 85	7	0.017	3	0.031	3	0.047	2	0.045	1	0.038
85 to 90	11	0.027	2	0.020	1	0.016	0	0	0	0
1932 M_w 7.2 Cedar Mtn, NV										
0 to 5	1	0.029	0	0	0	0	0	0	0	0
5 to 10	2	0.059	0	0	0	0	0	0	0	0
10 to 15	2	0.059	2	0.200	0	0	0	0	0	0
15 to 20	2	0.059	1	0.100	1	0.333	1	0.333	0	0
20 to 25	5	0.147	2	0.200	0	0	0	0	0	0
25 to 30	3	0.088	1	0.100	0	0	0	0	0	0
30 to 35	3	0.088	0	0	0	0	0	0	0	0
35 to 40	3	0.088	1	0.100	1	0.333	1	0.333	1	1.0
40 to 45	1	0.029	0	0	0	0	0	0	0	0
45 to 50	55	0.147	1	0.100	0	0	0	0	0	0
50 to 55	3	0.088	1	0.100	0	0	0	0	0	0
55 to 60	0	0	0	0	0	0	0	0	0	0
60 to 65	1	0.029	1	0.100	1	0.333	1	0.333	0	0
65 to 70	0	0	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	1	0.029	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	2	0.059	0	0	0	0	0	0	0	0
1986 M_w 6.2 Chalfant Valley, CA										
0 to 5	23	0.291	5	0.312	4	0.667	1	0.500	1	1.0
5 to 10	20	0.253	2	0.125	0	0	0	0	0	0
10 to 15	17	0.215	5	0.312	1	0.167	1	0.500	0	0
15 to 20	10	0.127	0	0	0	0	0	0	0	0
20 to 25	4	0.051	2	0.125	0	0	0	0	0	0
25 to 30	2	0.025	1	0.062	0	0	0	0	0	0
30 to 35	1	0.013	0	0	0	0	0	0	0	0
35 to 40	2	0.025	1	0.062	1	0.167	0	0	0	0

Table H-3
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Angle Between Strikes of Principal and Distributed Ruptures

θ	n = 2		n = 3		n = 4		n = 5		n = 6	
	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
40 to 45	0	0	0	0	0	0	0	0	0	0
45 to 50	0	0	0	0	0	0	0	0	0	0
50 to 55	0	0	0	0	0	0	0	0	0	0
55 to 60	0	0	0	0	0	0	0	0	0	0
60 to 65	0	0	0	0	0	0	0	0	0	0
65 to 70	0	0	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1954 M_w 6.8 Dixie Valley, NV										
0 to 5	46	0.162	34	0.183	26	0.173	16	0.163	12	0.154
5 to 10	42	0.148	34	0.183	32	0.213	24	0.245	20	0.256
10 to 15	54	0.190	28	0.151	20	0.133	12	0.122	10	0.128
15 to 20	36	0.127	34	0.183	28	0.187	18	0.184	16	0.205
20 to 25	24	0.085	8	0.043	8	0.053	4	0.041	4	0.051
25 to 30	16	0.056	8	0.043	2	0.013	0	0	0	0
30 to 35	18	0.063	10	0.054	8	0.053	6	0.061	4	0.051
35 to 40	8	0.028	8	0.043	6	0.040	6	0.061	6	0.077
40 to 45	10	0.035	6	0.032	6	0.040	2	0.020	2	0.026
45 to 50	6	0.021	2	0.011	2	0.013	2	0.020	2	0.026
50 to 55	2	0.007	2	0.011	2	0.013	0	0	0	0
55 to 60	10	0.035	4	0.022	4	0.027	4	0.041	2	0.026
60 to 65	4	0.014	2	0.011	2	0.013	0	0	0	0
65 to 70	2	0.007	2	0.011	2	0.013	2	0.020	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	6	0.021	4	0.022	2	0.013	2	0.020	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1993 M_w 6.1 Eureka Valley,CA										
0 to 5	0	0	0	0	0	0	0	0	0	0
5 to 10	2	0.020	0	0	0	0	0	0	0	0
10 to 15	2	0.020	0	0	0	0	0	0	0	0
15 to 20	1	0.010	0	0	0	0	0	0	0	0
20 to 25	1	0.010	0	0	0	0	0	0	0	0
25 to 30	7	0.070	1	0.059	0	0	0	0	0	0
30 to 35	12	0.120	2	0.118	0	0	0	0	0	0
35 to 40	20	0.200	2	0.118	1	0.167	0	0	0	0
40 to 45	8	0.080	4	0.235	2	0.333	0	0	0	0
45 to 50	14	0.140	4	0.235	1	0.167	0	0	0	0
50 to 55	19	0.190	0	0	0	0	0	0	0	0
55 to 60	4	0.040	2	0.118	0	0	0	0	0	0
60 to 65	3	0.030	0	0	0	0	0	0	0	0
65 to 70	2	0.020	0	0	0	0	0	0	0	0
70 to 75	2	0.020	1	0.059	1	0.167	0	0	0	0
75 to 80	2	0.020	0	0	0	0	0	0	0	0
80 to 85	1	0.010	1	0.059	1	0.167	1	1.000	0	0

Table H-3
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Angle Between Strikes of Principal and Distributed Ruptures

θ	n = 2		n = 3		n = 4		n = 5		n = 6	
	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
85 to 90	0	0	0	0	0	0	0	0	0	0
1954 M_w 7.1 Fairview Peak, NV										
0 to 5	25	0.181	17	0.191	13	0.197	12	0.245	9	0.231
5 to 10	35	0.254	22	0.247	17	0.258	11	0.224	10	0.256
10 to 15	12	0.087	10	0.112	9	0.136	4	0.082	4	0.103
15 to 20	18	0.130	10	0.112	7	0.106	6	0.122	5	0.128
20 to 25	19	0.138	13	0.146	8	0.121	6	0.122	5	0.128
25 to 30	8	0.058	3	0.034	3	0.045	2	0.041	2	0.051
30 to 35	6	0.043	6	0.067	4	0.061	4	0.082	1	0.026
35 to 40	9	0.065	4	0.045	2	0.030	2	0.041	2	0.051
40 to 45	0	0	0	0	0	0	0	0	0	0
45 to 50	3	0.022	2	0.022	2	0.030	2	0.041	1	0.026
50 to 55	1	0.007	0	0	0	0	0	0	0	0
55 to 60	0	0	0	0	0	0	0	0	0	0
60 to 65	1	0.007	1	0.011	0	0	0	0	0	0
65 to 70	1	0.007	1	0.011	1	0.015	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1950 M_w 5.6 Fort Sage, CA										
0 to 5	1	1.0	1	1.0	0	0	0	0	0	0
5 to 10	0	0	0	0	0	0	0	0	0	0
10 to 15	0	0	0	0	0	0	0	0	0	0
15 to 20	0	0	0	0	0	0	0	0	0	0
20 to 25	0	0	0	0	0	0	0	0	0	0
25 to 30	0	0	0	0	0	0	0	0	0	0
30 to 35	0	0	0	0	0	0	0	0	0	0
35 to 40	0	0	0	0	0	0	0	0	0	0
40 to 45	0	0	0	0	0	0	0	0	0	0
45 to 50	0	0	0	0	0	0	0	0	0	0
50 to 55	0	0	0	0	0	0	0	0	0	0
55 to 60	0	0	0	0	0	0	0	0	0	0
60 to 65	0	0	0	0	0	0	0	0	0	0
65 to 70	0	0	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1975 M_w 5.2 Galway Valley										
0 to 5	1	0.143	0	0	0	0	0	0	0	0
5 to 10	0	0	0	0	0	0	0	0	0	0
10 to 15	0	0	0	0	0	0	0	0	0	0
15 to 20	1	0.143	0	0	0	0	0	0	0	0
20 to 25	3	0.429	1	1.0	1	1.0	0	0	0	0
25 to 30	0	0	0	0	0	0	0	0	0	0
30 to 35	0	0	0	0	0	0	0	0	0	0

Table H-3
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Angle Between Strikes of Principal and Distributed Ruptures

	n = 2		n = 3		n = 4		n = 5		n = 6	
θ	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
35 to 40	0	0	0	0	0	0	0	0	0	0
40 to 45	0	0	0	0	0	0	0	0	0	0
45 to 50	0	0	0	0	0	0	0	0	0	0
50 to 55	0	0	0	0	0	0	0	0	0	0
55 to 60	0	0	0	0	0	0	0	0	0	0
60 to 65	1	0.143	0	0	0	0	0	0	0	0
65 to 70	1	0.143	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1959 M_w 7.4 Hebgen Lake, MT										
0 to 5	13	0.143	8	0.151	5	0.135	5	0.156	3	0.130
5 to 10	6	0.066	5	0.094	3	0.081	3	0.094	3	0.130
10 to 15	18	0.198	12	0.226	7	0.189	6	0.187	4	0.174
15 to 20	3	0.033	1	0.019	0	0	0	0	0	0
20 to 25	0	0	0	0	0	0	0	0	0	0
25 to 30	6	0.066	5	0.094	5	0.135	5	0.156	4	0.174
30 to 35	14	0.154	3	0.057	3	0.081	2	0.062	1	0.043
35 to 40	4	0.044	4	0.075	3	0.081	2	0.062	1	0.043
40 to 45	3	0.033	0	0	0	0	0	0	0	0
45 to 50	8	0.088	6	0.113	5	0.135	3	0.094	3	0.130
50 to 55	5	0.055	4	0.075	2	0.054	2	0.062	1	0.043
55 to 60	6	0.066	4	0.075	3	0.081	3	0.094	2	0.087
60 to 65	1	0.011	1	0.019	1	0.027	1	0.031	1	0.043
65 to 70	0	0	0	0	0	0	0	0	0	0
70 to 75	1	0.011	0	0	0	0	0	0	0	0
75 to 80	1	0.011	0	0	0	0	0	0	0	0
80 to 85	1	0.011	0	0	0	0	0	0	0	0
85 to 90	1	0.011	0	0	0	0	0	0	0	0
1979 M_w 5.5 Homestead Valley, CA										
0 to 5	6	0.120	0	0	0	0	0	0	0	0
5 to 10	6	0.120	0	0	0	0	0	0	0	0
10 to 15	5	0.100	2	0.667	0	0	0	0	0	0
15 to 20	25	0.100	0	0	0	0	0	0	0	0
20 to 25	11	0.220	1	0.333	1	1.000	1	1.000	0	0
25 to 30	4	0.080	0	0	0	0	0	0	0	0
30 to 35	2	0.040	0	0	0	0	0	0	0	0
35 to 40	1	0.020	0	0	0	0	0	0	0	0
40 to 45	2	0.040	0	0	0	0	0	0	0	0
45 to 50	1	0.020	0	0	0	0	0	0	0	0
50 to 55	3	0.060	0	0	0	0	0	0	0	0
55 to 60	2	0.040	0	0	0	0	0	0	0	0
60 to 65	1	0.020	0	0	0	0	0	0	0	0
65 to 70	1	0.020	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0

Table H-3
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Angle Between Strikes of Principal and Distributed Ruptures

	n = 2		n = 3		n = 4		n = 5		n = 6	
θ	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1992 M_w 7.4 Landers, CA										
0 to 5	11	0.143	8	0.136	6	0.200	6	0.353	4	0.333
5 to 10	7	0.091	5	0.085	1	0.033	0	0	0	0
10 to 15	6	0.078	4	0.068	4	0.133	2	0.118	1	0.083
15 to 20	8	0.104	4	0.068	3	0.100	3	0.176	2	0.167
20 to 25	7	0.091	6	0.102	4	0.133	2	0.118	1	0.083
25 to 30	6	0.078	6	0.102	3	0.100	1	0.059	1	0.083
30 to 35	2	0.026	1	0.017	0	0	0	0	0	0
35 to 40	4	0.052	2	0.034	1	0.033	0	0	0	0
40 to 45	2	0.026	2	0.034	1	0.033	0	0	0	0
45 to 50	55	0.065	3	0.051	2	0.067	1	0.059	1	0.083
50 to 55	4	0.052	4	0.068	2	0.067	1	0.059	1	0.083
55 to 60	1	0.013	1	0.017	0	0	0	0	0	0
60 to 65	3	0.039	3	0.051	0	0	0	0	0	0
65 to 70	2	0.026	2	0.034	0	0	0	0	0	0
70 to 75	3	0.039	2	0.034	1	0.033	1	0.059	1	0.083
75 to 80	3	0.039	3	0.051	0	0	0	0	0	0
80 to 85	1	0.013	1	0.017	1	0.033	0	0	0	0
85 to 90	2	0.026	2	0.034	1	0.033	0	0	0	0
1980 M_w 6.1 Mammoth Lake, CA										
0 to 5	8	0.061	3	0.120	1	0.143	0	0	0	0
5 to 10	11	0.083	3	0.120	1	0.143	0	0	0	0
10 to 15	17	0.129	1	0.040	1	0.143	1	0.250	0	0
15 to 20	4	0.030	3	0.120	1	0.143	1	0.250	0	0
20 to 25	19	0.144	7	0.280	2	0.286	2	0.500	1	1.000
25 to 30	11	0.083	1	0.040	0	0	0	0	0	0
30 to 35	8	0.061	1	0.040	0	0	0	0	0	0
35 to 40	31	0.235	4	0.160	1	0.143	0	0	0	0
40 to 45	1	0.008	1	0.040	0	0	0	0	0	0
45 to 50	0	0	0	0	0	0	0	0	0	0
50 to 55	10	00.076	0	0	0	0	0	0	0	0
55 to 60	3	0.023	1	0.040	0	0	0	0	0	0
60 to 65	2	0.015	0	0	0	0	0	0	0	0
65 to 70	75	0.038	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	2	0.015	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1872 M_w 7.6 Owens Valley, CA										
0 to 5	29	0.266	8	0.229	6	0.250	4	0.250	4	0.286
5 to 10	20	0.183	5	0.143	4	0.167	3	0.187	2	0.143
10 to 15	4	0.037	4	0.114	1	0.042	1	0.062	1	0.071
15 to 20	27	0.248	4	0.114	2	0.083	1	0.062	1	0.071
20 to 25	5	0.046	5	0.143	4	0.167	2	0.125	2	0.143
25 to 30	8	0.073	5	0.143	3	0.125	2	0.125	1	0.071

Table H-3
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Angle Between Strikes of Principal and Distributed Ruptures

θ	n = 2		n = 3		n = 4		n = 5		n = 6	
	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
30 to 35	8	0.073	2	0.057	2	0.083	1	0.062	1	0.071
35 to 40	45	0.046	2	0.057	2	0.083	2	0.125	2	0.143
40 to 45	1	0.009	0	0	0	0	0	0	0	0
45 to 50	1	0.009	0	0	0	0	0	0	0	0
50 to 55	1	0.009	0	0	0	0	0	0	0	0
55 to 60	0	0	0	0	0	0	0	0	0	0
60 to 65	0	0	0	0	0	0	0	0	0	0
65 to 70	0	0	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1915 M_w 7.3 Pleasant Valley, CA										
0 to 5	4	0.200	1	0.111	1	0.167	0	0	0	0
5 to 10	1	0.050	1	0.111	0	0	0	0	0	0
10 to 15	1	0.050	1	0.111	1	0.167	0	0	0	0
15 to 20	1	0.050	1	0.111	1	0.167	1	0.500	1	0.500
20 to 25	1	0.050	1	0.111	0	0	0	0	0	0
25 to 30	1	0.050	1	0.111	0	0	0	0	0	0
30 to 35	6	0.300	2	0.222	2	0.333	1	0.500	1	0.500
35 to 40	2	0.100	0	0	0	0	0	0	0	0
40 to 45	0	0	0	0	0	0	0	0	0	0
45 to 50	2	0.100	0	0	0	0	0	0	0	0
50 to 55	1	0.050	1	0.111	1	0.167	0	0	0	0
55 to 60	0	0	0	0	0	0	0	0	0	0
60 to 65	0	0	0	0	0	0	0	0	0	0
65 to 70	0	0	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1954 M_w 6.6 Rainbow Mtn., NV										
0 to 5	5	0.098	2	0.100	1	0.111	1	0.143	1	0.500
5 to 10	4	0.078	2	0.100	1	0.111	0	0	0	0
10 to 15	13	0.255	1	0.050	1	0.111	0	0	0	0
15 to 20	4	0.078	1	0.050	0	0	0	0	0	0
20 to 25	1	0.020	0	0	0	0	0	0	0	0
25 to 30	2	0.039	0	0	0	0	0	0	0	0
30 to 35	7	0.137	2	0.100	1	0.111	1	0.143	0	0
35 to 40	2	0.039	1	0.050	1	0.111	1	0.143	0	0
40 to 45	1	0.020	1	0.050	0	0	0	0	0	0
45 to 50	2	0.039	1	0.050	1	0.111	1	0.143	1	0.500
50 to 55	0	0	0	0	0	0	0	0	0	0
55 to 60	3	0.059	2	0.100	1	0.111	1	0.143	0	0
60 to 65	5	0.098	5	0.250	1	0.111	1	0.143	0	0
65 to 70	1	0.020	1	0.050	0	0	0	0	0	0
70 to 75	1	0.020	1	0.050	1	0.111	1	0.143	0	0

Table H-3
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Angle Between Strikes of Principal and Distributed Ruptures

	n = 2		n = 3		n = 4		n = 5		n = 6	
θ	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1887 M_w 7.4 Sonora, Mexico										
0 to 5	25	0.145	18	0.161	16	0.188	8	0.154	3	0.091
5 to 10	24	0.140	16	0.143	13	0.153	12	0.231	7	0.212
10 to 15	18	0.105	14	0.125	12	0.141	6	0.115	4	0.121
15 to 20	19	0.110	15	0.134	13	0.153	8	0.154	3	0.091
20 to 25	11	0.064	9	0.080	7	0.082	5	0.096	4	0.121
25 to 30	14	0.081	7	0.062	5	0.059	5	0.096	5	0.152
30 to 35	13	0.076	7	0.062	5	0.059	2	0.038	2	0.061
35 to 40	12	0.070	8	0.071	4	0.047	1	0.019	1	0.030
40 to 45	14	0.081	8	0.071	4	0.047	2	0.038	2	0.061
45 to 50	9	0.052	5	0.045	3	0.035	2	0.038	1	0.030
50 to 55	6	0.035	2	0.018	2	0.024	1	0.019	1	0.030
55 to 60	2	0.012	2	0.018	0	0	0	0	0	0
60 to 65	2	0.012	0	0	0	0	0	0	0	0
65 to 70	1	0.006	0	0	0	0	0	0	0	0
70 to 75	1	0.006	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	1	0.006	1	0.009	1	0.012	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
1954 M_w 6.8 Stillwater, NV										
0 to 5	7	0.159	3	0.097	3	0.187	2	0.286	1	0.200
5 to 10	7	0.159	4	0.129	0	0	0	0	0	0
10 to 15	7	0.159	4	0.129	3	0.187	1	0.143	1	0.200
15 to 20	25	0.114	5	0.161	0	0	0	0	0	0
20 to 25	5	0.114	5	0.161	3	0.187	1	0.143	1	0.200
25 to 30	3	0.068	3	0.097	3	0.187	1	0.143	0	0
30 to 35	1	0.023	1	0.032	1	0.062	0	0	0	0
35 to 40	4	0.091	2	0.065	1	0.062	1	0.143	1	0.200
40 to 45	2	0.045	2	0.065	1	0.062	0	0	0	0
45 to 50	2	0.045	1	0.032	0	0	0	0	0	0
50 to 55	1	0.023	1	0.032	1	0.062	1	0.143	1	0.200
55 to 60	0	0	0	0	0	0	0	0	0	0
60 to 65	0	0	0	0	0	0	0	0	0	0
65 to 70	0	0	0	0	0	0	0	0	0	0
70 to 75	0	0	0	0	0	0	0	0	0	0
75 to 80	0	0	0	0	0	0	0	0	0	0
80 to 85	0	0	0	0	0	0	0	0	0	0
85 to 90	0	0	0	0	0	0	0	0	0	0
Combined Statistics										
0 to 5	225	0.125	113	0.148	85	0.166	56	0.167	38	0.160
5 to 10	198	0.110	104	0.136	75	0.147	55	0.164	44	0.186
10 to 15	182	0.101	92	0.120	63	0.123	37	0.110	27	0.114
15 to 20	213	0.119	91	0.119	63	0.123	43	0.128	29	0.122
20 to 25	122	0.068	66	0.086	42	0.082	26	0.078	21	0.089

Table H-3
Summary of Data from S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996, Plate 21) for Frequency of Angle Between Strikes of Principal and Distributed Ruptures

	n = 2		n = 3		n = 4		n = 5		n = 6	
θ	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.
25 to 30	161	0.090	52	0.068	30	0.059	19	0.057	15	0.063
30 to 35	110	0.061	44	0.058	31	0.061	20	0.060	11	0.046
35 to 40	131	0.073	47	0.061	30	0.059	22	0.066	18	0.076
40 to 45	58	0.032	32	0.042	17	0.033	6	0.018	6	0.025
45 to 50	65	0.036	28	0.037	18	0.035	13	0.039	11	0.046
50 to 55	65	0.036	21	0.027	16	0.031	8	0.024	6	0.025
55 to 60	39	0.022	24	0.031	13	0.025	11	0.033	5	0.021
60 to 65	122	0.068	18	0.024	9	0.018	7	0.021	3	0.013
65 to 70	16	0.009	6	0.008	3	0.006	2	0.006	0	0
70 to 75	40	0.022	4	0.005	3	0.006	2	0.006	1	0.004
75 to 80	23	0.013	13	0.017	5	0.010	5	0.015	1	0.004
80 to 85	11	0.006	6	0.008	6	0.012	3	0.009	1	0.004
85 to 90	16	0.009	4	0.005	2	0.004	0	0	0	0

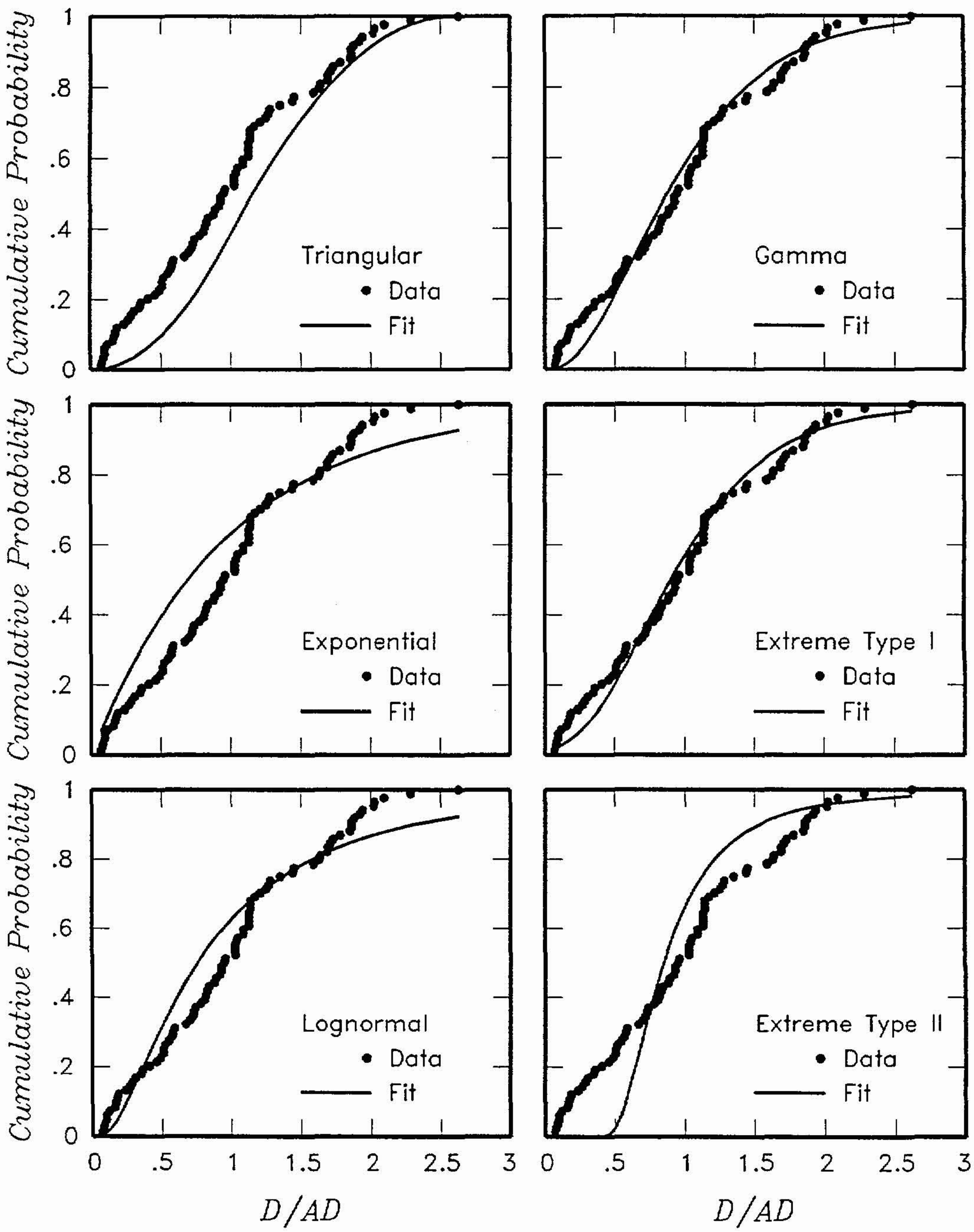

Figure H-1 Comparison of empirical CDF for the ratio D/D_{avg} developed by the DFS team with the CDFs for various statistical distributions fit to the data

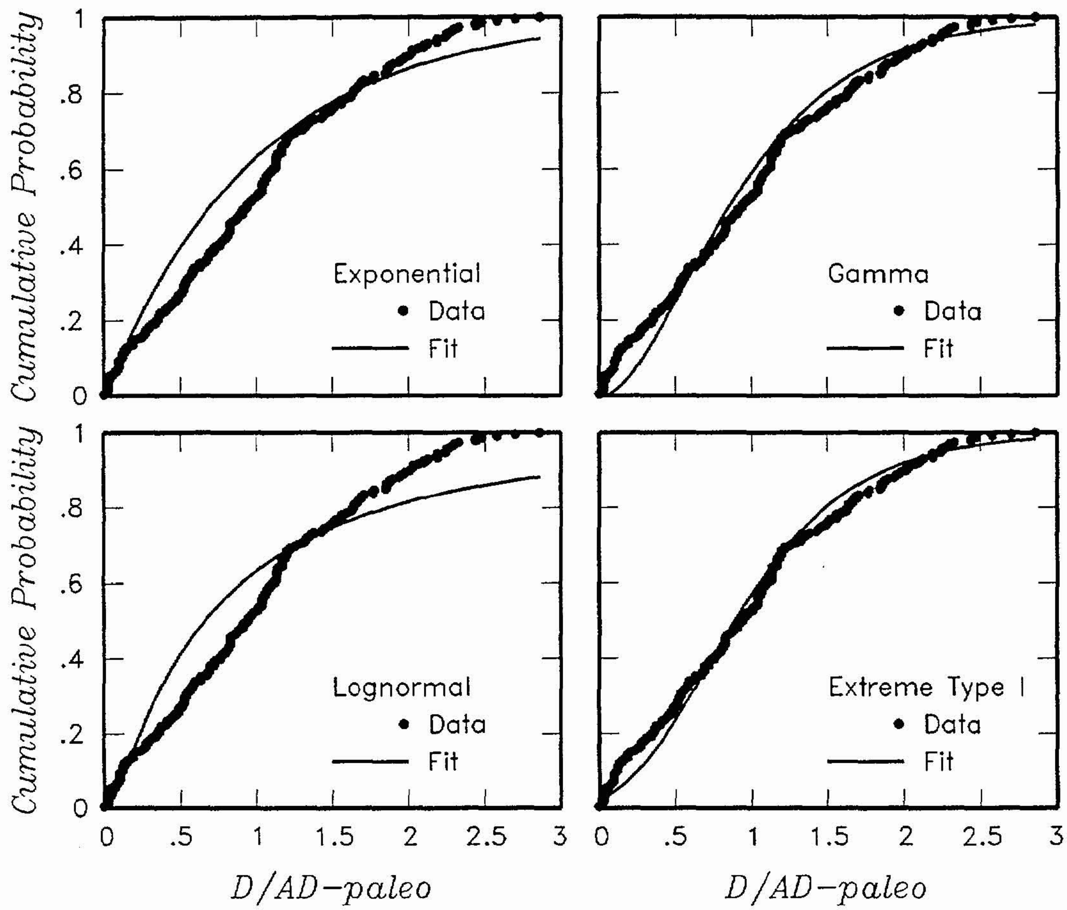

Figure H-2 Comparison of empirical CDF for the ratio D/Davg-paleo developed by the SBK team with the CDFs for various statistical distributions fit to the data

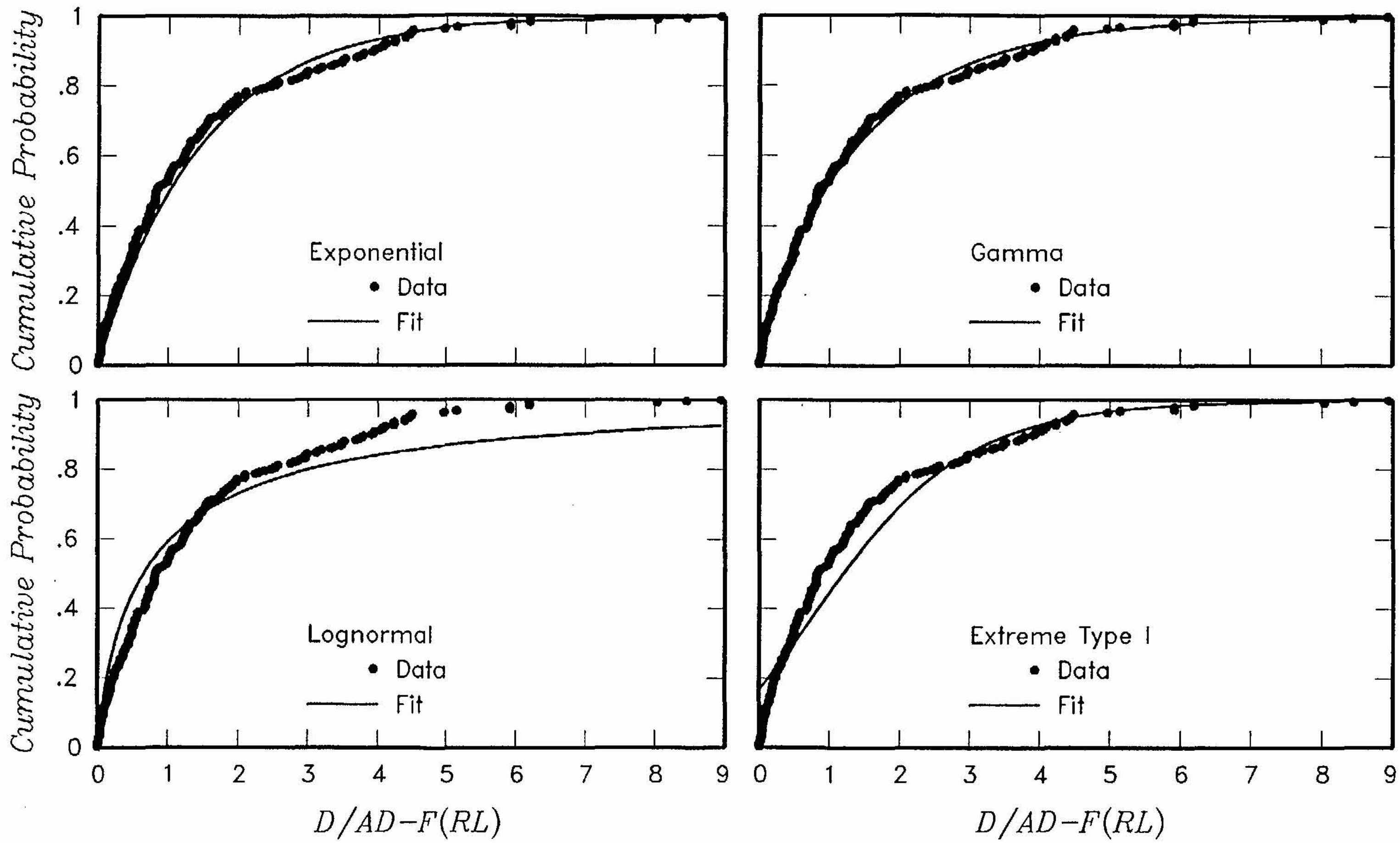

Figure H-3 Comparison of empirical CDF for the ratio $D/D_{avg-F(RL)}$ developed by the SBK team with the CDFs for various statistical distributions fit to the data

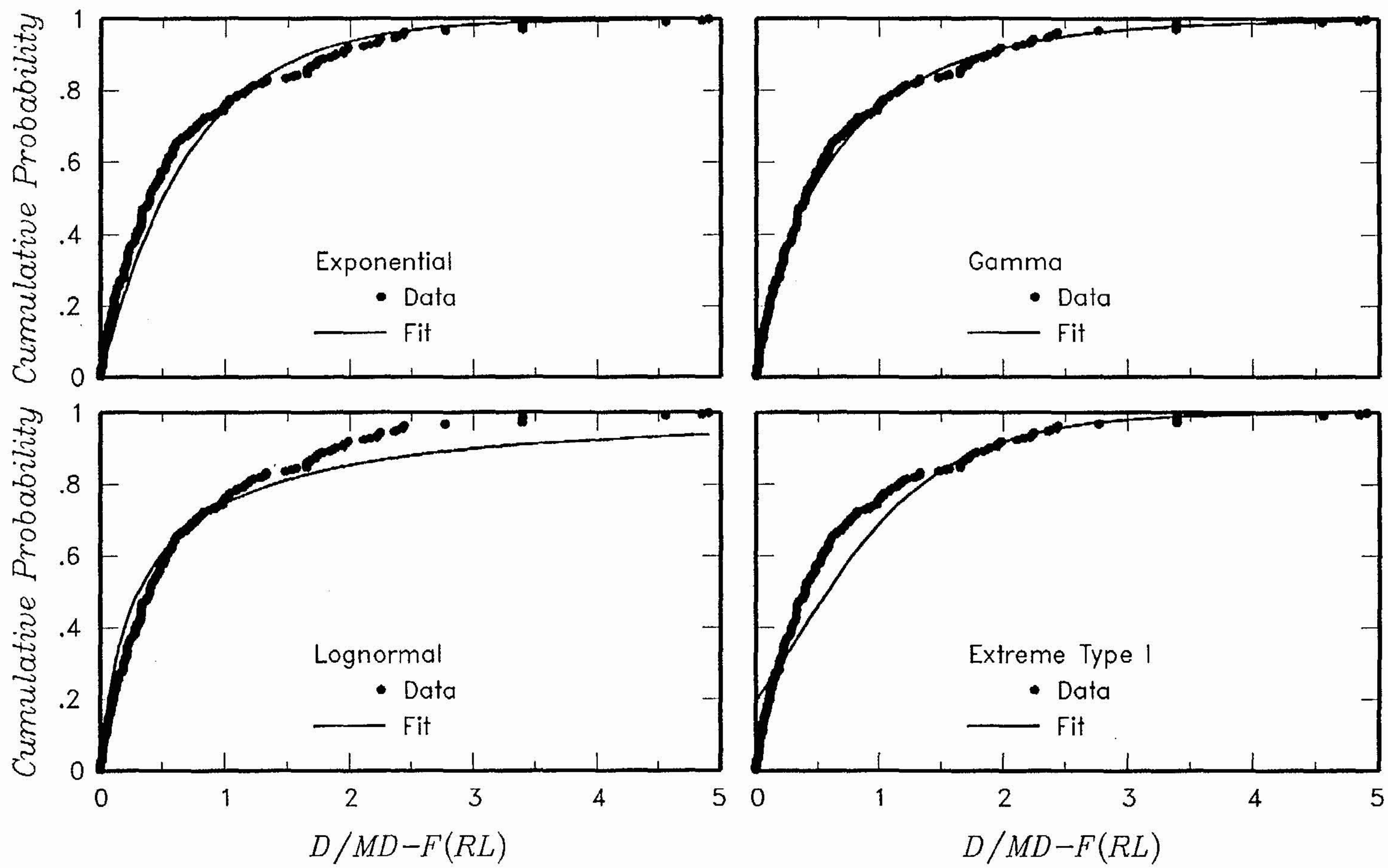

Figure H-4 Comparison of empirical CDF for the ratio $D/D_{max\text{-}F(RL)}$ developed by the SBK team with the CDFs for various statistical distributions fit to the data

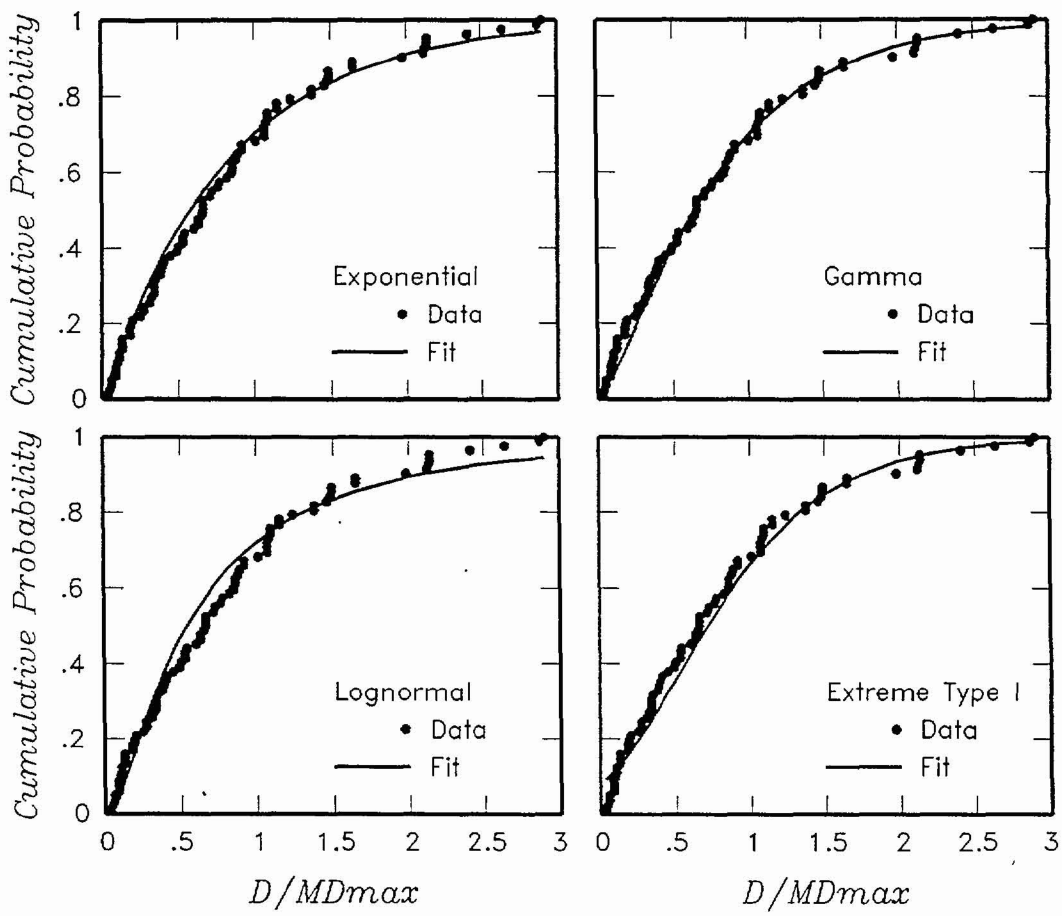

Figure H-5 Comparison of empirical CDF for the ratio D/D^{max} developed by the AAR team with the CDFs for various statistical distributions fit to the data

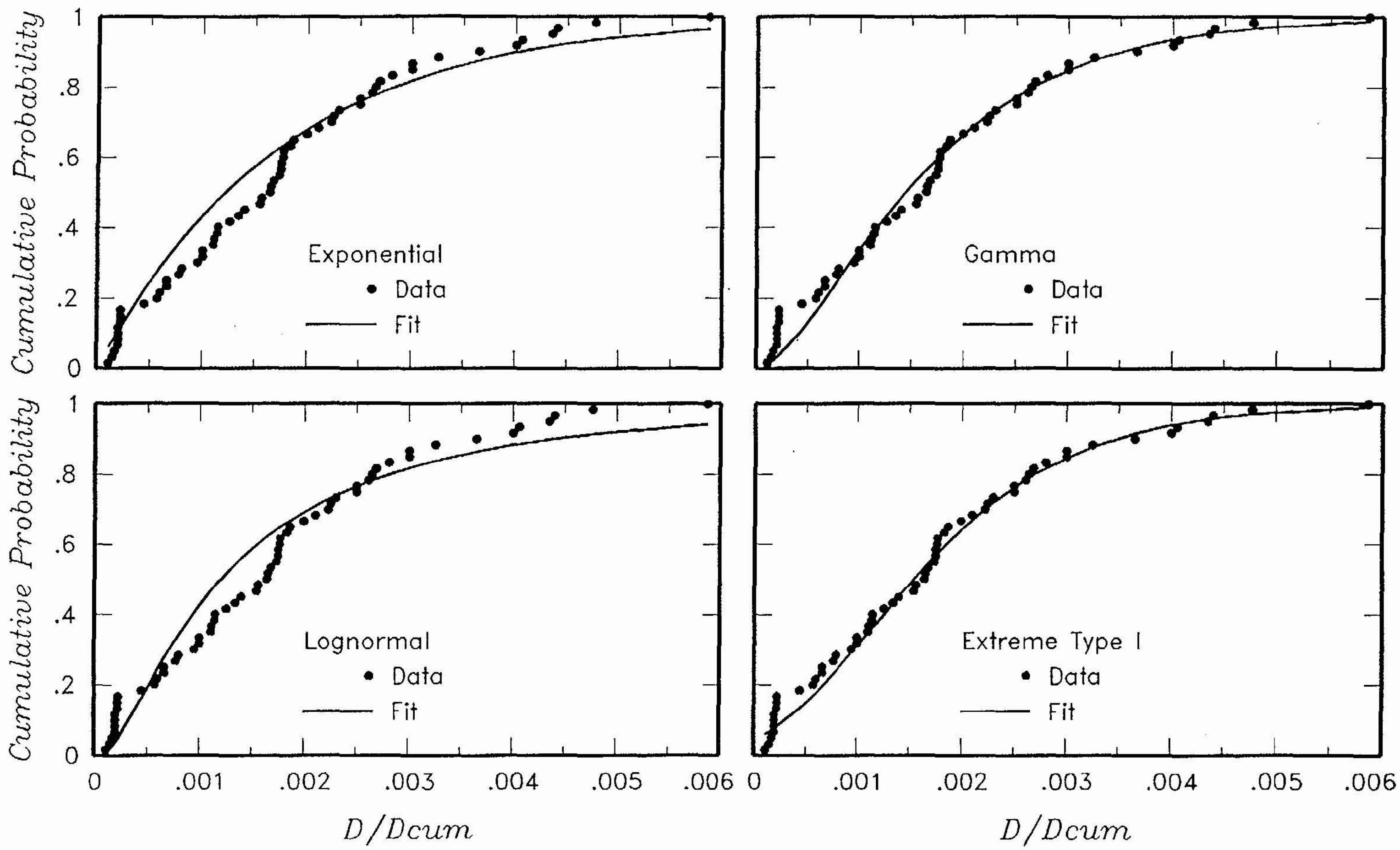

Figure H-6 Comparison of empirical CDF for the ratio D/Dcum developed by the SBK team with the CDFs for various statistical distributions fit to the data

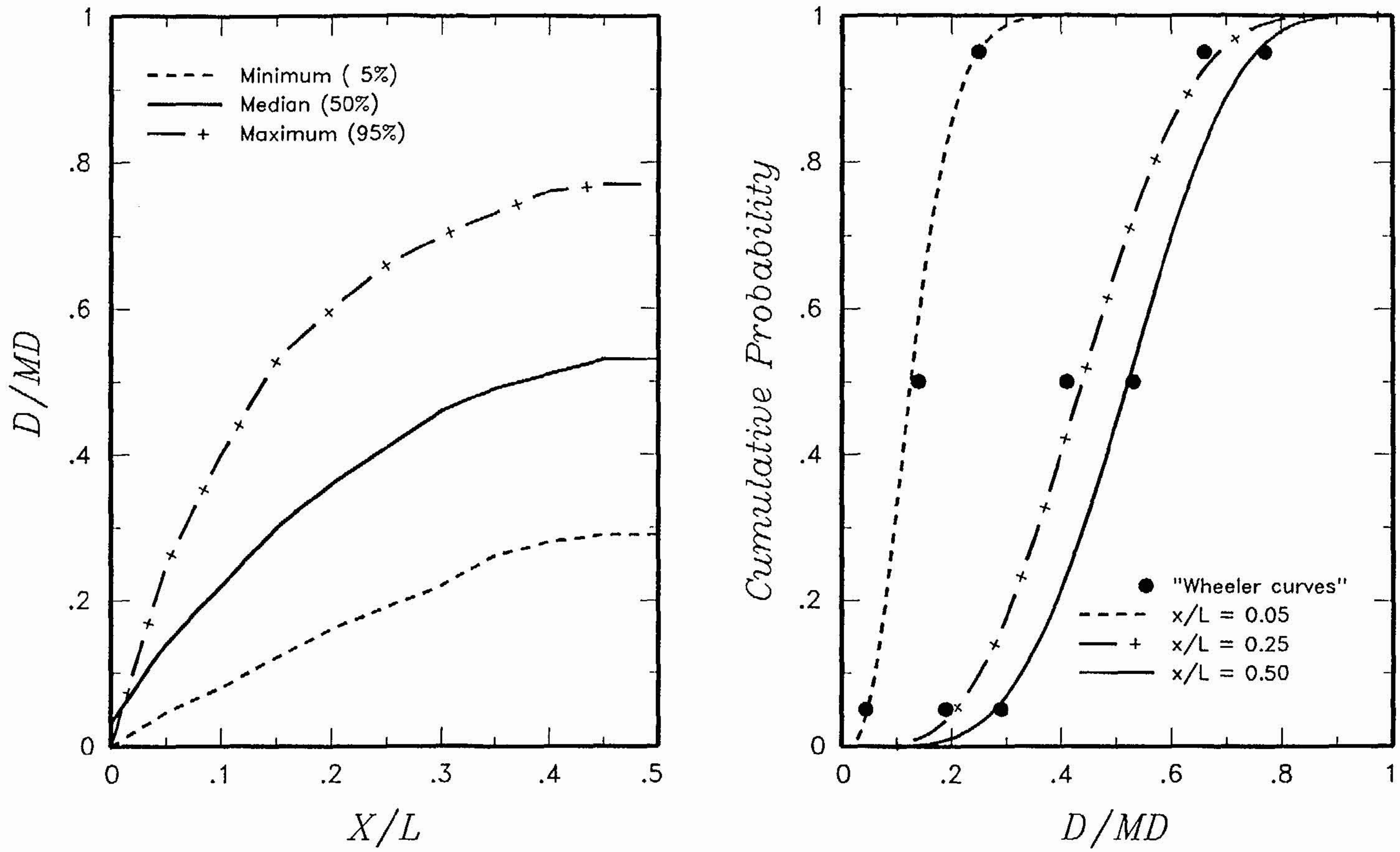

Figure H-7 Probability distributions for D/D_{max} as a function of normalized location, x/L, along a principal rupture. Left, smooth curves for minimum, median, and maximum values of D/D_{max} developed by the ASM team from analysis of historical ruptures presented in Wheeler (1989). Right, CDFs for beta distributions computed using the beta parameters from the smooth curves shown on Figure H-8.

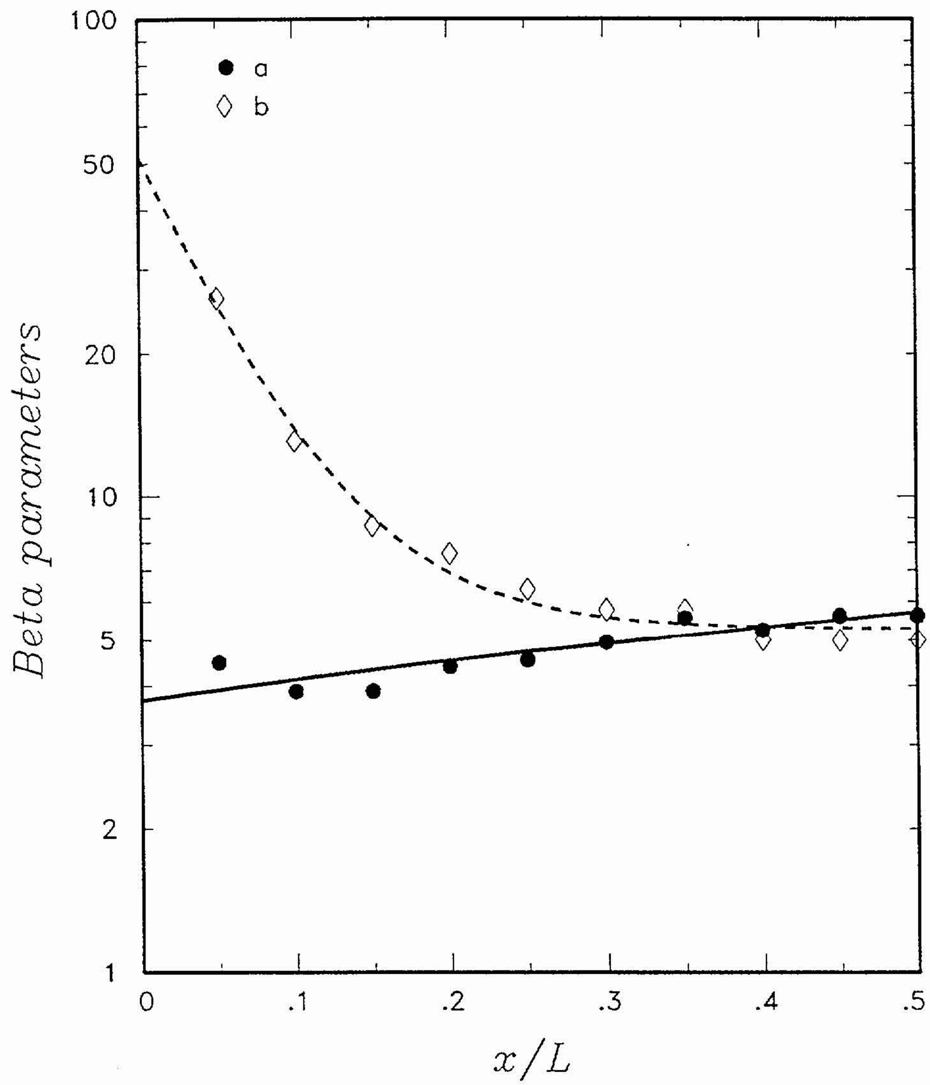

Figure H-8 Beta distribution parameters a and b developed at specific values of x/L from the "Wheeler" curves shown on the left of Figure H-7 and the smooth curves fit to these parameters

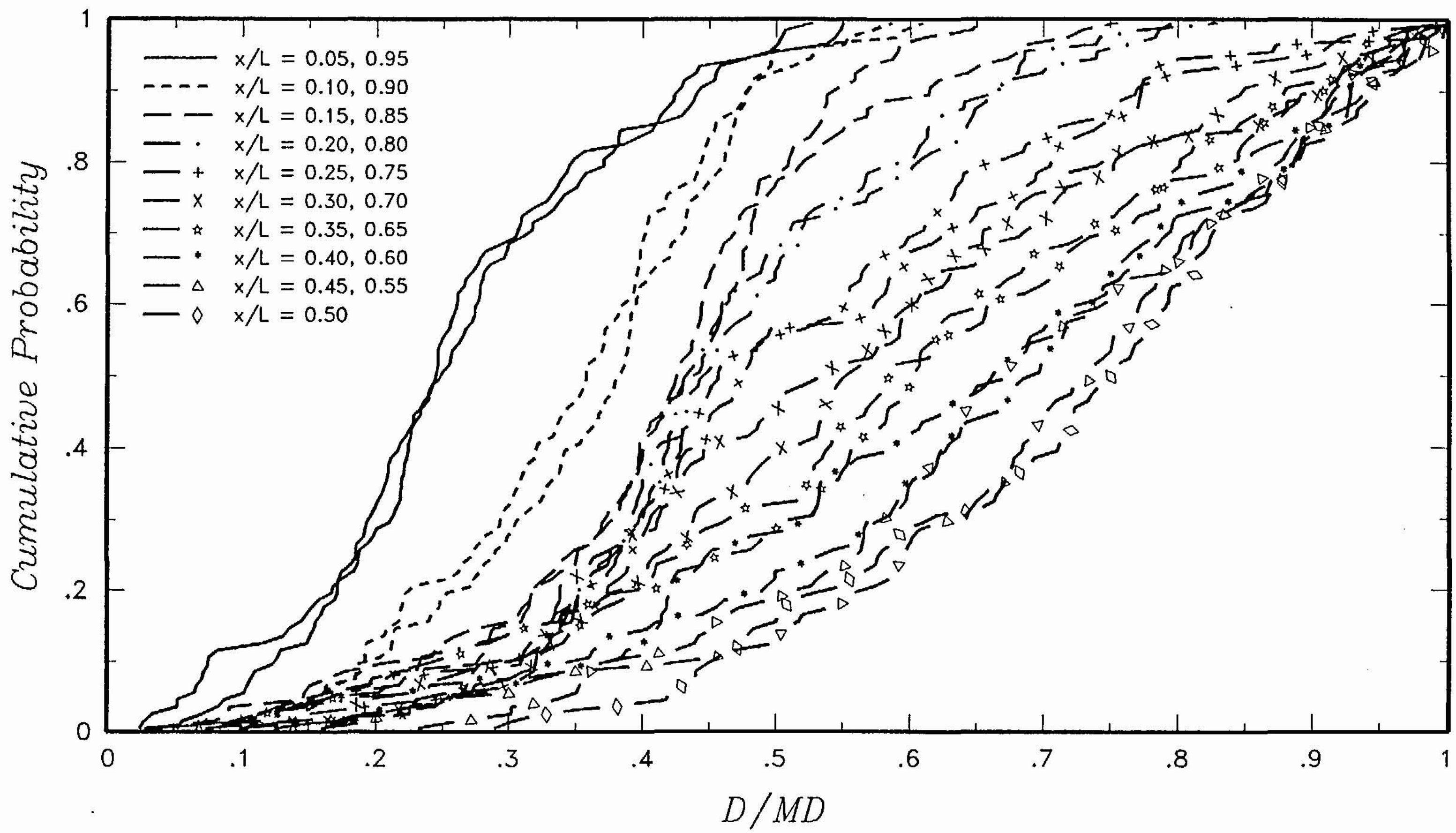

Figure H-9 Probability distributions for D/Dmax as a function of normalized location, x/L, along a principal rupture developed by the SBK team using numerical simulations of slip with fractal fault roughness

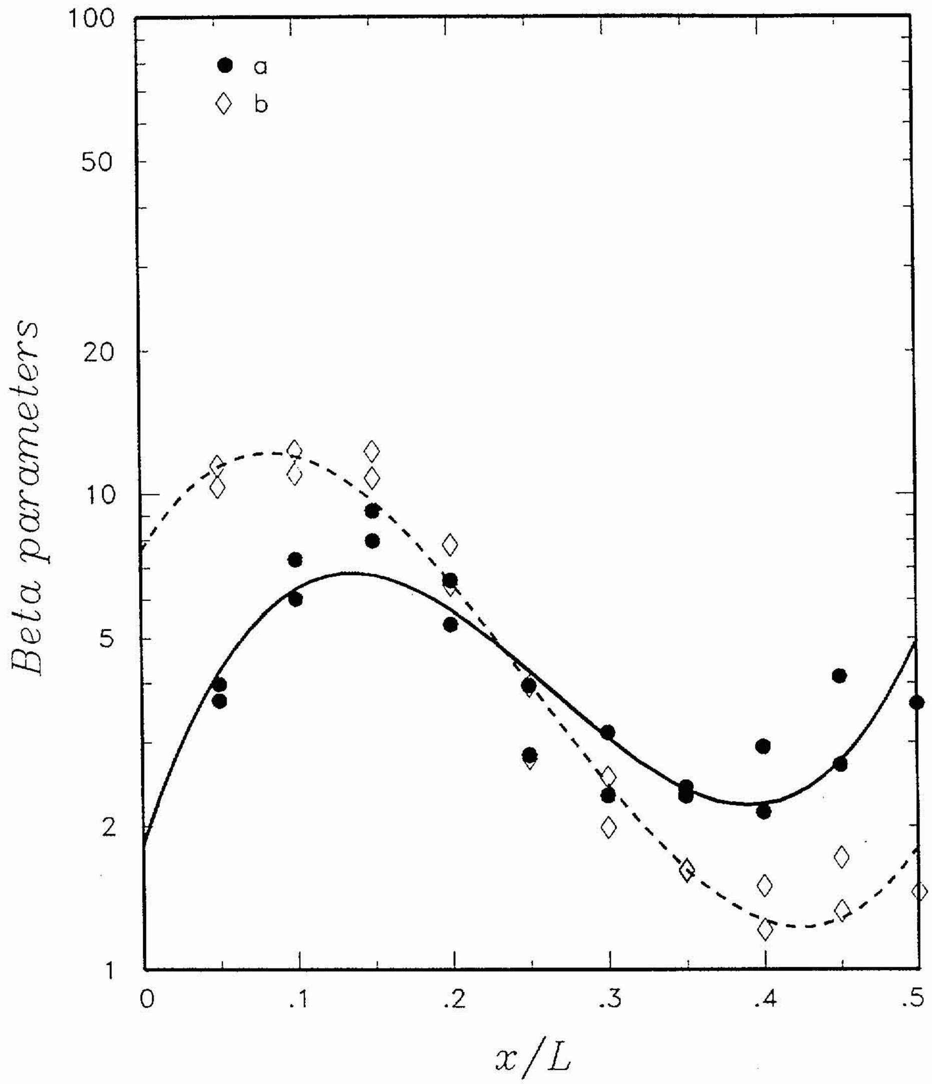

Figure H-10 Beta distribution parameters a and b developed at specific values of x/L from the simulation results shown on Figure H-9 and the smooth curves fit to these parameters

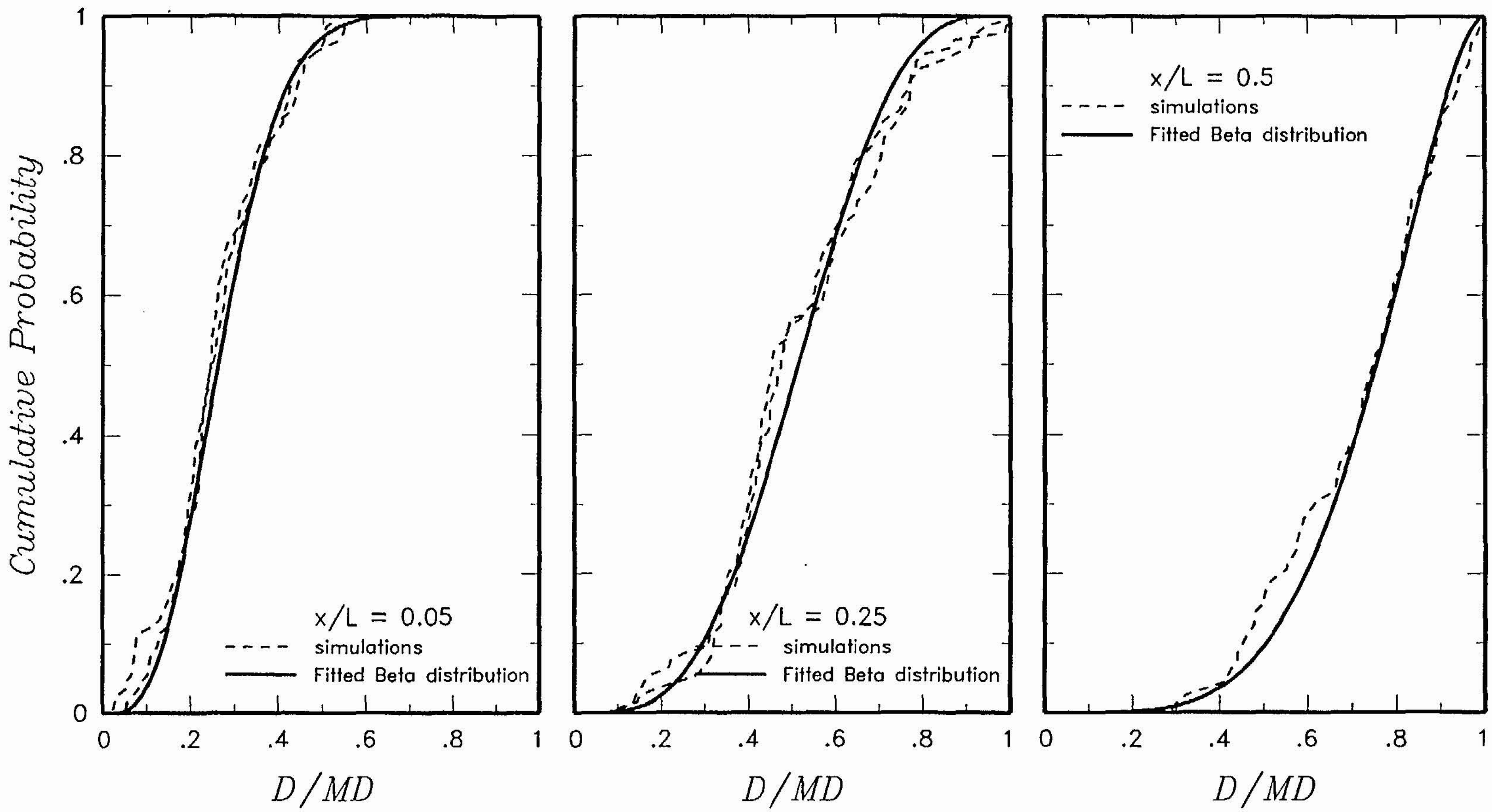

Figure H-11 CDFs for simulations of D/D_{max} as a function of normalized location, x/L, from Figure H-9 compared to CDFs for beta distributions computed using the beta parameters from the smooth curves shown on Figure H-10

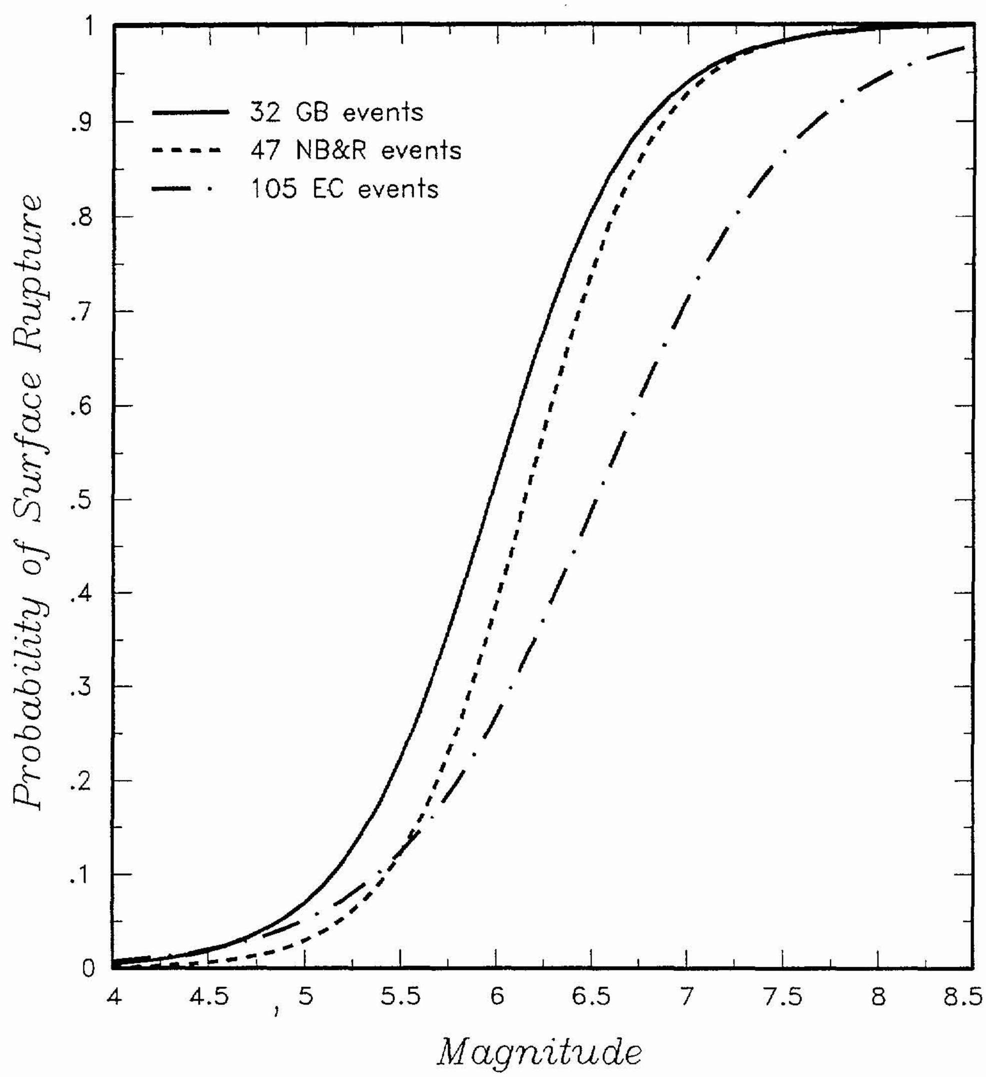

Figure H-12. Logistic regression models for the probability of surface rupture as a function of moment magnitude developed from three data sets presented in S.K. Pezzopane and T.E. Dawson (USGS, written communication, 1996). GB = Great Basin post 1930, NB&R = northern Basin and Range post 1930, and EC = extensional cordillera.

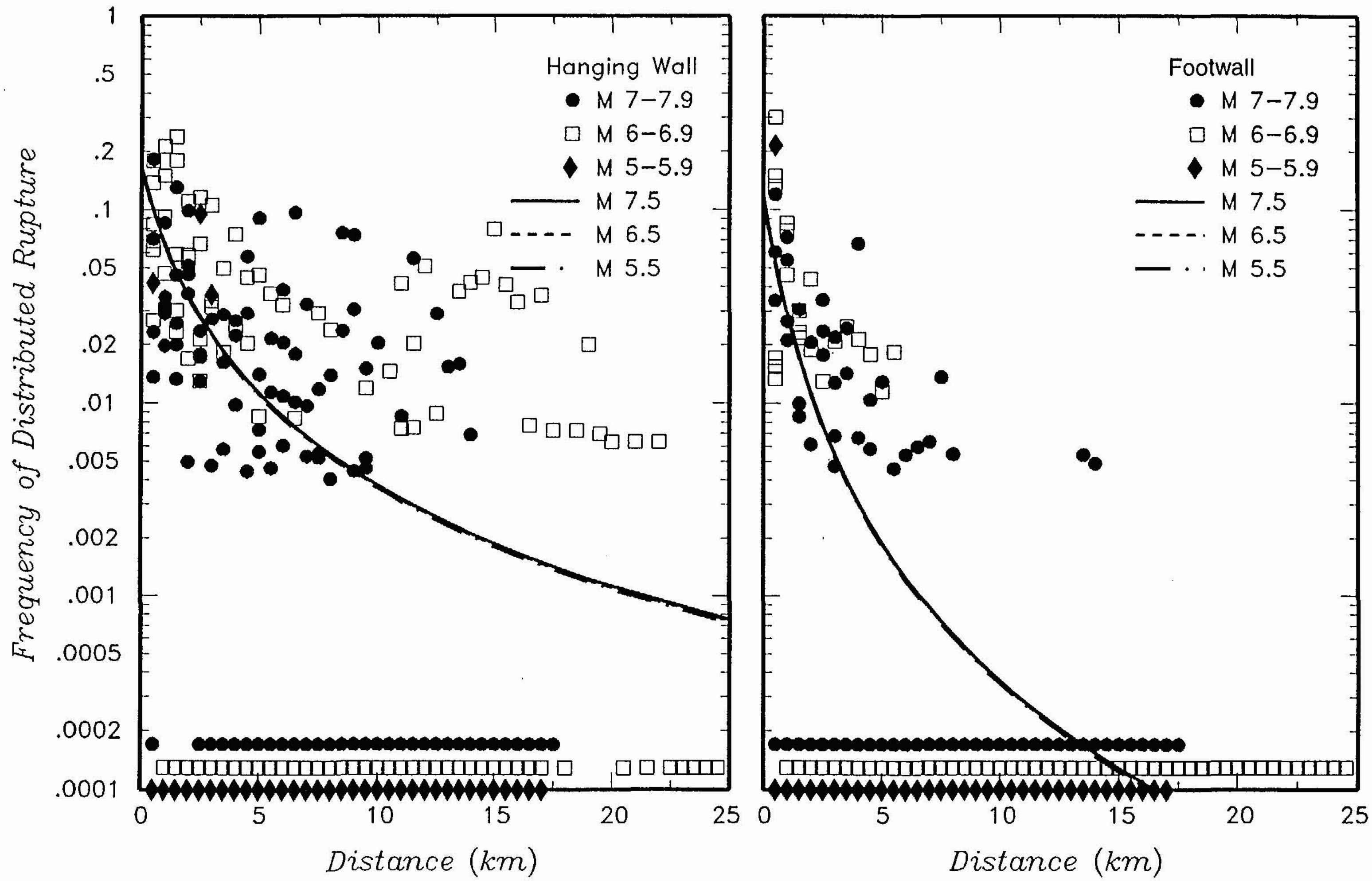

Figure H-13a Frequency of distributed rupture as a function of distance from principal rupture. Data include hanging wall cracking from 1988 Chalfant Valley earthquake. Points along bottom of plot represent distances for individual earthquakes where observed frequency was zero. The data for the three magnitude intervals are offset for clarity.

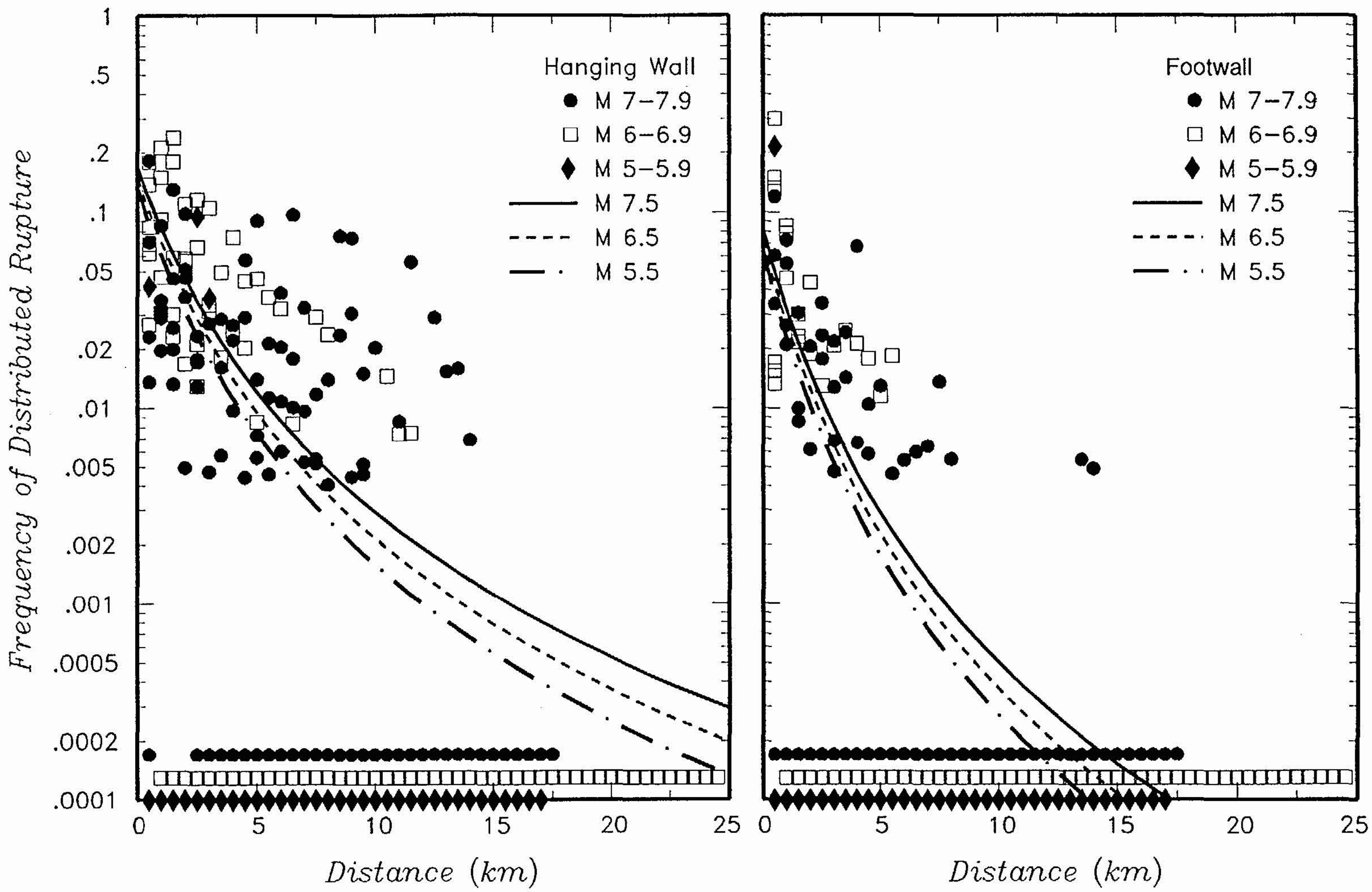

Figure H-13b Frequency of distributed rupture as a function of distance from principal rupture. Data do not include hanging wall cracking from 1988 Chalfant Valley earthquake. Points along bottom of plot represent distances for individual earthquakes where observed frequency was zero. The data for the three magnitude intervals are offset for clarity.

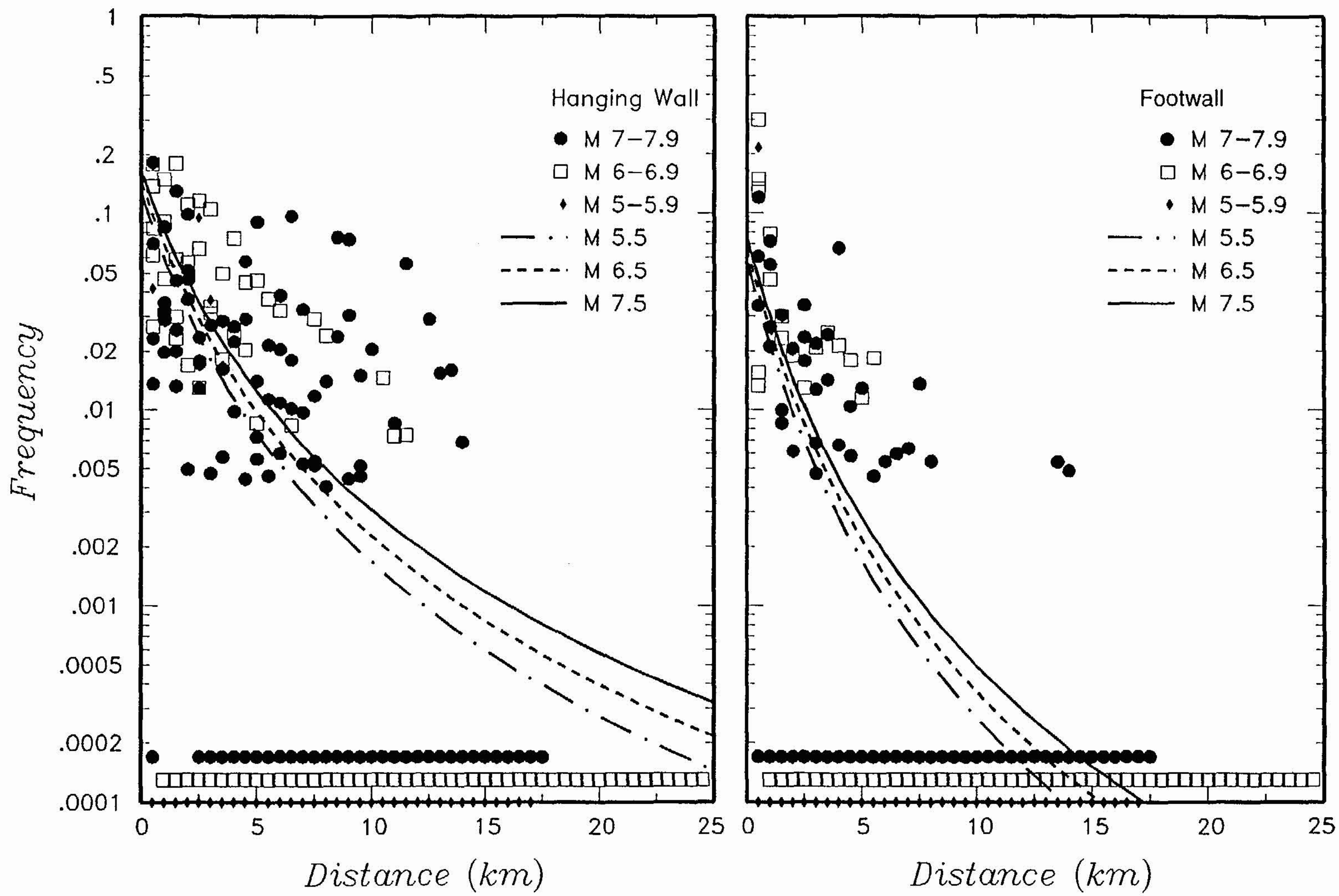

Figure H-13c Frequency of distributed rupture as a function of distance from principal rupture developed for thr AAR and SDO teams. The plot on the left shows hanging wall data, the plot on the right shows footwall data. Data do not include hanging wall cracking from the 1988 Chalfant Valley earthquake or data from the 1980 Mammoth earthquake. Points along bottom of plot represent distances for individual earthquakes where observed frequency was zero. The data for the three magnitude intervals are offset for clarity.

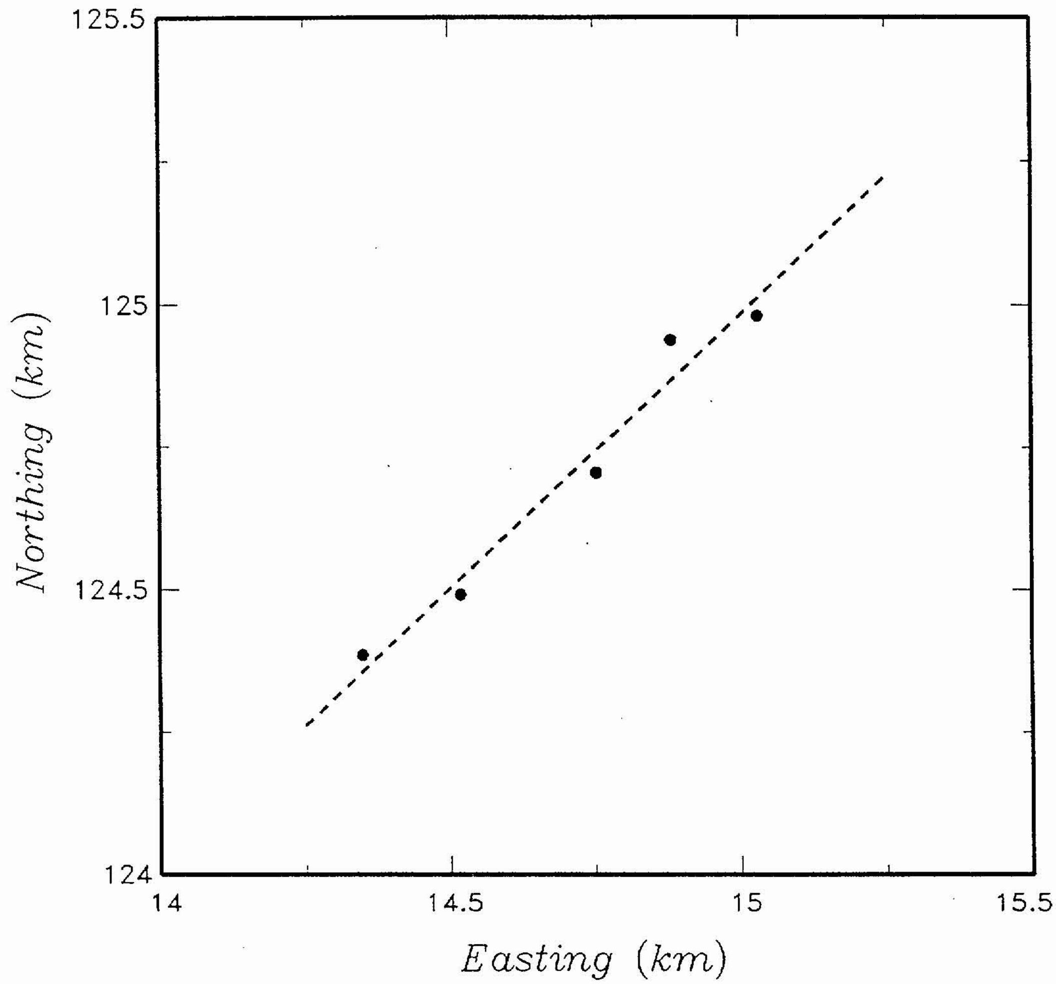

Figure H-14 Example of fitting straight line (dashed line) to digitized rupture trace (solid points) to determine the average strike azimuth

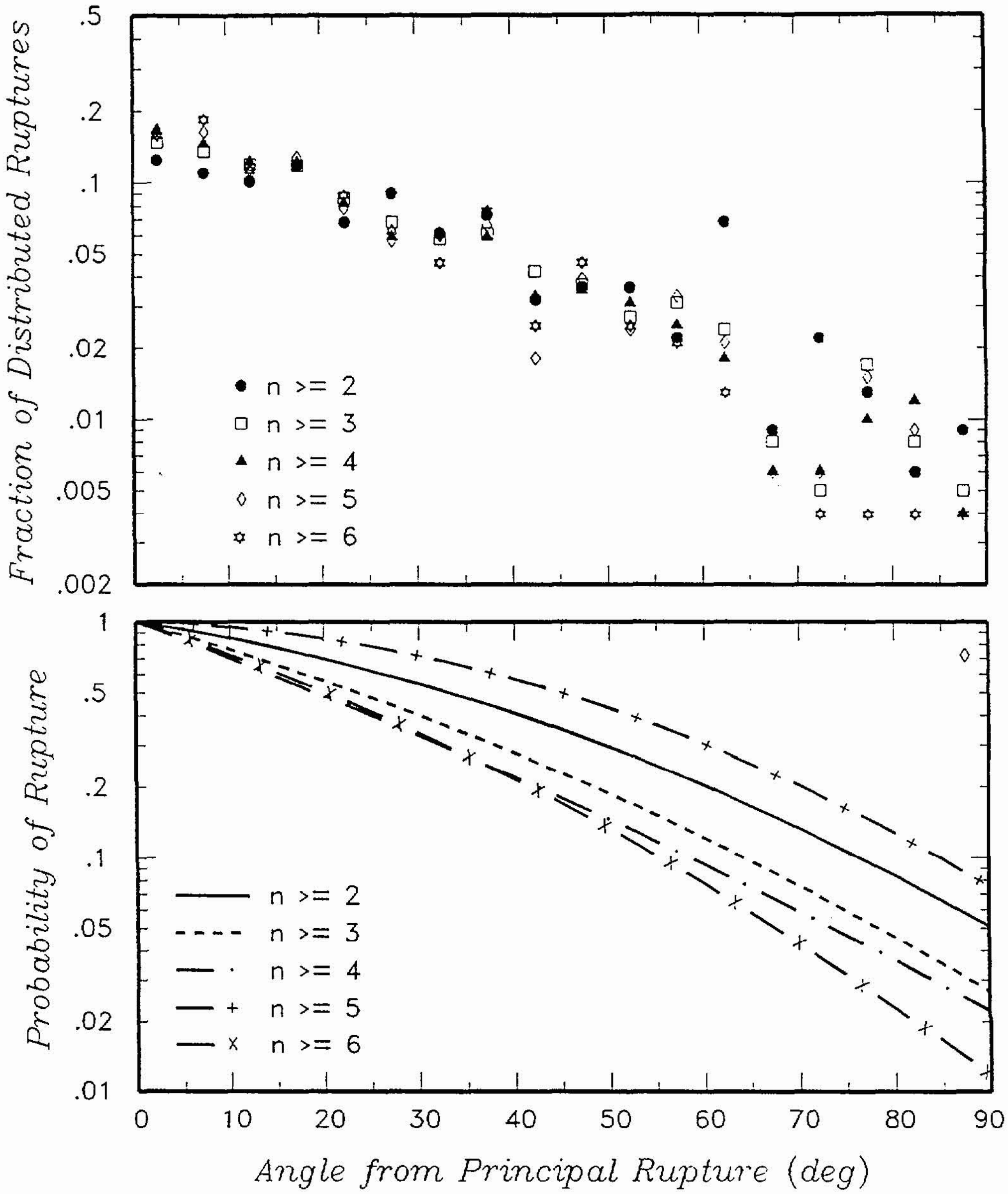

Figure H-15 Frequency distribution for angle between average strike of principal rupture and strike of individual distributed rupture traces. Parameter n denotes the number of digitization points along an individual rupture trace. Top plot shows the data from Table H-3 presented in terms of fraction of total ruptures. Bottom plot shows exponential fits to the data normalized to unity at a relative angle of 0°.

APPENDIX I

RESULTS OF REGRESSION ATTENUATION ANALYSES

APPENDIX I

RESULTS OF REGRESSION ATTENUATION ANALYSES

The following tables summarize the regression coefficients developed from each experts' point estimates. The equation forms adopted for the regressions are discussed in Chapter 6.

TABLE I-1A
J. G. ANDERSON: REGRESSION COEFFICIENTS
MEDIAN MODEL

COMPONENT	FREQUENCY (HZ)	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	SIGMA FIT
Horiz	PGA	1.9771	0.4586	-1.4197	-0.3066	0.2303	0.0000	0.0076	6.7	0.2144	-0.3545	5.2	6.0	0.1493
	20	2.8264	0.4586	-1.5590	-0.3066	0.2303	0.0136	-0.0263	7.4	0.2236	-0.3492	5.0	6.1	0.1455
	10	3.0127	0.4586	-1.5426	-0.3066	0.2303	0.0123	0.0354	7.4	0.1317	-0.3955	5.0	5.9	0.1631
	5	2.5847	0.4586	-1.3715	-0.3066	0.2303	-0.0100	0.0220	6.7	0.2009	-0.3174	5.3	6.0	0.1598
	2	1.7055	0.4586	-1.1607	-0.2628	0.2303	-0.0469	0.0382	5.8	0.2553	-0.3625	5.3	5.9	0.1521
	1	0.7983	0.4586	-1.0296	-0.2628	0.2303	-0.0803	-0.0330	5.0	0.3555	-0.2645	5.0	6.1	0.1557
	0.5	-0.5006	0.4586	-0.8625	-0.1752	0.2303	-0.1139	-0.1220	2.9	0.3861	-0.0211	5.0	6.5	0.1889
	0.3	-1.0946	0.4586	-0.8745	-0.0876	0.2303	-0.1407	-0.1366	3.0	0.2769	-0.0830	5.0	6.7	0.1992
	PGV	6.0533	0.4586	-1.2687	-0.1752	0.2303	-0.0476	0.0217	5.9	0.2551	-0.3154	5.1	6.0	0.1696
Vert	PGA	1.8132	0.7399	-1.5441	0.2825	0.1375	0.0000	0.1492	7.8	0.3229	-0.2993	5.1	6.5	0.1728
	20	2.7352	0.7399	-1.6777	0.2825	0.1375	0.0066	0.1284	7.6	0.3390	-0.2740	5.5	6.3	0.1668
	10	3.1549	0.7399	-1.6122	-0.1412	0.1375	-0.0364	0.1170	7.7	0.3135	-0.3205	5.1	6.5	0.2131
	5	2.5230	0.7399	-1.4196	-0.1695	0.1375	-0.0475	0.1274	8.2	0.3532	-0.2886	5.2	6.5	0.2079
	2	1.7173	0.7399	-1.2318	-0.1695	0.1375	-0.1003	0.1907	8.0	0.3075	-0.2739	5.0	6.2	0.2090
	1	0.5757	0.7399	-1.0973	-0.1695	0.1375	-0.1243	0.2956	6.9	0.2498	-0.1456	5.4	7.0	0.1679
	0.5	-0.0541	0.7399	-1.0697	-0.1695	0.1375	-0.1933	0.5981	5.8	-0.1117	-0.3472	5.0	5.5	0.2462
	0.3	-0.7565	0.7399	-0.9967	-0.1695	0.1375	-0.2338	0.6419	4.7	-0.1892	-0.5016	5.3	6.5	0.2554
	PGV	6.0353	0.7399	-1.3048	-0.1695	0.1375	-0.1137	0.4000	7.7	0.0160	-0.4243	5.0	5.9	0.2679

TABLE I-1B
J. G. ANDERSON: REGRESSION COEFFICIENTS
SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	b_1	b_2	b_3	b_4	SIGMA FIT
Horiz	PGA	0.5590	-0.0543	0.0	6.8	0.0094
	20	0.5598	-0.0597	0.0	6.8	0.0105
	10	0.5756	-0.0680	0.0	6.9	0.0155
	5	0.6074	-0.0659	0.0	6.9	0.0148
	2	0.6603	-0.0637	0.0	7.0	0.0158
	1	0.7316	-0.0456	0.0	7.0	0.0091
	0.5	0.8199	-0.0392	0.0	6.9	0.0159
	0.3	0.8646	-0.0901	0.0	6.1	0.0224
	PGV	0.7201	-0.0202	0.0	7.0	0.0102
Vert	PGA	0.6326	-0.0205	0.0	6.2	0.0081
	20	0.6528	-0.0182	0.0	6.5	0.0082
	10	0.6742	-0.0636	0.0	5.9	0.0103
	5	0.6530	-0.0606	0.0	5.8	0.0146
	2	0.6573	-0.0691	0.0	5.8	0.0148
	1	0.6838	-0.0453	0.0	5.8	0.0169
	0.5	0.7221	-0.0156	0.0	5.8	0.0183
	0.3	0.7640	-0.0382	0.0	5.8	0.0219
	PGV	0.6299	-0.0370	0.0	5.8	0.0173

TABLE I-1C
J. G. ANDERSON: REGRESSION COEFFICIENTS
SIGMA-MU MODEL

COMPONENT	FREQUENCY (HZ)	c_1	c_2	c_3	c_4	c_5	c_6	MINIMUM	SIGMA FIT
Horiz	PGA	0.9620	0.0	-0.3323	0.0516	0.0304	6.0	0.2	0.0989
	20	0.9291	0.0	-0.2891	0.0434	0.0100	6.0	0.2	0.1008
	10	0.9696	0.0	-0.3295	0.0496	0.0386	6.0	0.2	0.0968
	5	0.9489	0.0	-0.3064	0.0457	0.0260	6.0	0.2	0.0996
	2	0.9234	0.0	-0.2859	0.0425	0.0240	6.0	0.2	0.0961
	1	0.9467	0.0	-0.3018	0.0465	0.0394	6.0	0.2	0.1025
	0.5	0.8838	0.0	-0.2370	0.0393	0.0071	6.0	0.2	0.1059
	0.3	0.8841	0.0	-0.1975	0.0327	-0.0180	6.0	0.2	0.1128
	PGV	0.9170	0.0	-0.2645	0.0412	0.0060	6.0	0.2	0.1081
Vert	PGA	0.9061	0.0	-0.2806	0.0480	0.0242	6.0	0.2	0.1220
	20	0.9655	0.0	-0.2351	0.0349	-0.0417	6.0	0.2	0.1257
	10	0.8968	0.0	-0.2670	0.0438	0.0269	6.0	0.2	0.1131
	5	0.8608	0.0	-0.2251	0.0366	0.0584	6.0	0.2	0.1058
	2	0.8496	0.0	-0.1971	0.0315	0.0232	6.0	0.2	0.1073
	1	0.9472	0.0	-0.2968	0.0551	-0.0050	6.0	0.2	0.1308
	0.5	0.8773	0.0	-0.2503	0.0602	0.0613	6.0	0.2	0.2003
	0.3	0.8719	0.0	-0.1939	0.0476	0.0375	6.0	0.2	0.1721
	PGV	0.8580	0.0	-0.2441	0.0483	0.0259	6.0	0.2	0.1412

TABLE I-1D
J. G. ANDERSON: REGRESSION COEFFICIENTS
SIGMA-SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	d_1	d_2	d_3	d_4	SIGMA FIT
Horiz	PGA	0.1147	0.0	0.0	0.0	0.0
	20	0.1095	0.0	0.0	0.0	0.0
	10	0.1262	0.0	0.0	0.0	0.0
	5	0.1221	0.0	0.0	0.0	0.0
	2	0.1322	0.0	0.0	0.0	0.0
	1	0.1325	0.0	0.0	0.0	0.0
	0.5	0.1539	0.0	0.0	0.0	0.0
	0.3	0.1549	0.0	0.0	0.0	0.0
	PGV	0.1197	0.0	0.0	0.0	0.0
Vert	PGA	0.1310	0.0	0.0	0.0	0.0
	20	0.1153	0.0	0.0	0.0	0.0
	10	0.1419	0.0	0.0	0.0	0.0
	5	0.1411	0.0	0.0	0.0	0.0
	2	0.1473	0.0	0.0	0.0	0.0
	1	0.1390	0.0	0.0	0.0	0.0
	0.5	0.1702	0.0	0.0	0.0	0.0
	0.3	0.1929	0.0	0.0	0.0	0.0
	PGV	0.1240	0.0	0.0	0.0	0.0

TABLE I-2A
D. M. BOORE: REGRESSION COEFFICIENTS
MEDIAN MODEL

COMPONENT	FREQUENCY (HZ)	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	SIGMA FIT
Horiz	PGA	1.5497	0.3084	-1.3607	0.0428	0.1679	0.0000	-0.0091	6.6	0.3143	-0.1556	5.0	6.6	0.0652
	20	2.6166	0.3084	-1.5608	0.0428	0.1679	0.0060	-0.0008	7.2	0.3150	-0.1482	5.2	6.5	0.0745
	10	2.8493	0.3084	-1.5616	0.0428	0.1679	-0.0015	0.0202	7.8	0.2528	-0.1906	5.0	6.4	0.0891
	5	2.4108	0.3084	-1.4094	0.0428	0.1679	-0.0139	0.0240	7.5	0.2560	-0.1443	5.0	6.5	0.0880
	2	1.5149	0.3084	-1.1710	0.0428	0.1679	-0.0522	-0.0020	5.8	0.3720	-0.1352	5.0	6.6	0.0779
	1	0.7658	0.3084	-1.0502	0.0428	0.1679	-0.0864	-0.0353	5.0	0.4619	-0.1113	5.0	6.8	0.0812
	0.5	-0.2483	0.3084	-0.9440	0.0428	0.1679	-0.1015	-0.1290	4.8	0.3628	-0.0287	5.1	6.7	0.0939
	0.3	-0.5903	0.3084	-0.9312	0.0428	0.1679	-0.1629	-0.2092	4.1	0.1632	-0.0246	5.1	6.5	0.0825
	PGV	5.8882	0.3084	-1.1710	0.0428	0.1679	-0.1051	-0.0677	5.5	0.3161	-0.2053	5.0	6.1	0.1341
Vert	PGA	1.6973	0.5387	-1.5373	0.2029	0.1404	0.0000	-0.0580	6.4	0.3991	-0.0696	5.6	6.4	0.0707
	20	3.1350	0.5387	-1.7786	0.2029	0.1404	0.0058	-0.0629	7.0	0.3832	-0.0957	5.7	6.3	0.0799
	10	3.0993	0.5387	-1.7441	0.2029	0.1404	-0.0027	-0.0034	7.3	0.3445	-0.1193	5.6	6.4	0.0872
	5	1.9869	0.5387	-1.4854	0.2029	0.1404	-0.0142	0.0407	6.7	0.3542	-0.0831	5.6	6.3	0.0852
	2	0.6682	0.5387	-1.1881	0.2029	0.1404	-0.0404	0.0537	5.3	0.3557	-0.0107	5.5	6.4	0.0934
	1	-0.1466	0.5387	-1.0425	0.2029	0.1404	-0.0646	0.0188	4.4	0.3217	0.0840	5.5	6.5	0.0963
	0.5	-1.0320	0.5387	-0.9188	0.2029	0.1404	-0.0963	-0.0472	3.4	0.3081	0.1089	5.6	6.5	0.1120
	0.3	-1.3453	0.5387	-0.9122	0.2029	0.1404	-0.1313	-0.0431	3.3	0.2441	0.0609	5.2	6.5	0.1209
	PGV	5.0911	0.5387	-1.2405	0.2029	0.1404	-0.0725	0.1002	6.3	0.0365	-0.1530	5.0	6.2	0.1720

TABLE I-2B
D. M. BOORE: REGRESSION COEFFICIENTS
SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	b_1	b_2	b_3	b_4	SIGMA FIT
Horiz	PGA	0.5060	-0.0601	0.0	7.1	0.0004
	20	0.5246	-0.0607	0.0	7.1	0.0004
	10	0.5399	-0.0616	0.0	7.1	0.0003
	5	0.5855	-0.0598	0.0	7.1	0.0004
	2	0.6540	-0.0573	0.0	7.1	0.0005
	1	0.7089	-0.0540	0.0	7.1	0.0004
	0.5	0.7786	-0.0498	0.0	7.1	0.0004
	0.3	0.6838	-0.0839	0.0	7.1	0.0006
	PGV	0.5048	-0.0588	0.0	7.2	0.0021
Vert	PGA	0.5577	-0.0807	0.0	7.0	0.0049
	20	0.5954	-0.0770	0.0	7.0	0.0044
	10	0.5954	-0.0770	0.0	7.0	0.0044
	5	0.5954	-0.0576	0.0	7.0	0.0044
	2	0.5954	-0.0576	0.0	7.0	0.0044
	1	0.5954	-0.0576	0.0	7.0	0.0044
	0.5	0.5954	-0.0576	0.0	7.0	0.0044
	0.3	0.6121	-0.0576	0.0	7.0	0.0044
	PGV	0.4924	-0.0600	0.0	7.2	0.0022

TABLE I-2C
D. M. BOORE: REGRESSION COEFFICIENTS
SIGMA-MU MODEL

COMPONENT	FREQUENCY (HZ)	c_1	c_2	c_3	c_4	c_5	c_6	MINIMUM	SIGMA FIT
Horiz	PGA	0.5471	-0.0146	-0.1968	0.0337	0.0358	6.0	0.2	0.0659
	20	0.5194	0.0186	-0.1558	0.0269	0.0384	6.0	0.2	0.0691
	10	0.5976	0.0331	-0.1950	0.0323	0.0330	6.0	0.2	0.0660
	5	0.6248	0.0482	-0.2179	0.0361	0.0192	6.0	0.2	0.0603
	2	0.3572	0.0034	-0.0872	0.0187	0.0305	6.0	0.2	0.0543
	1	0.2909	-0.0070	-0.0330	0.0090	0.0523	6.0	0.2	0.0652
	0.5	0.2121	-0.0561	0.0153	0.0123	0.0502	6.0	0.2	0.0891
	0.3	0.2584	-0.0061	0.0870	-0.0082	0.0773	6.0	0.2	0.1139
	PGV	0.3575	0.0070	-0.1036	0.0271	0.0050	6.0	0.2	0.0840
Vert	PGA	0.3162	-0.0271	-0.0839	0.0201	0.0411	6.0	0.2	0.0726
	20	0.4047	-0.0043	-0.0734	0.0157	0.0076	6.0	0.2	0.0808
	10	0.2951	-0.0211	-0.0745	0.0187	0.0451	6.0	0.2	0.0679
	5	0.3058	-0.0036	-0.0760	0.0213	0.0599	6.0	0.2	0.0858
	2	0.2463	0.0210	-0.0090	0.0123	0.0444	6.0	0.2	0.0874
	1	0.3998	-0.0363	-0.1366	0.0329	0.0324	6.0	0.2	0.0847
	0.5	0.3062	0.0196	-0.0457	0.0207	0.0741	6.0	0.2	0.1323
	0.3	0.4412	-0.0852	-0.0048	0.0092	0.0306	6.0	0.2	0.1680
	PGV	0.1711	0.0371	0.0060	0.0035	0.1135	6.0	0.2	0.0744

TABLE I-2D
D. M. BOORE: REGRESSION COEFFICIENTS
SIGMA-SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	d_1	d_2	d_3	d_4	SIGMA FIT
Horiz	PGA	0.1	0.0	0.0	7.1	0.0
	20	0.1	0.0	0.0	7.1	0.0
	10	0.1	0.0	0.0	7.1	0.0
	5	0.1	0.0	0.0	7.1	0.0
	2	0.1	0.0	0.0	7.1	0.0
	1	0.1	0.0	0.0	7.1	0.0
	0.5	0.1	0.0	0.0	7.1	0.0
	0.3	0.1	0.0	0.0	7.1	0.0
	PGV	0.1	0.0	0.0	7.1	0.0
Vert	PGA	0.1	0.0	0.0	7.1	0.0
	20	0.1	0.0	0.0	7.1	0.0
	10	0.1	0.0	0.0	7.1	0.0
	5	0.1	0.0	0.0	7.1	0.0
	2	0.1	0.0	0.0	7.1	0.0
	1	0.1	0.0	0.0	7.1	0.0
	0.5	0.1	0.0	0.0	7.1	0.0
	0.3	0.1	0.0	0.0	7.1	0.0
	PGV	0.1	0.0	0.0	7.1	0.0

TABLE I-3A
K. W. CAMPBELL: REGRESSION COEFFICIENTS
MEDIAN MODEL

COMPONENT	FREQUENCY (HZ)	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	SIGMA FIT
Horiz	PGA	1.8960	0.2126	-1.4434	-0.2258	0.2412	0.0000	0.0399	6.5	0.0000	0.0000	0.0	0.0	0.1105
	20	2.7450	0.2126	-1.5910	-0.2258	0.2412	0.0132	0.0291	6.9	0.0000	0.0000	0.0	0.0	0.1168
	10	2.7735	0.2126	-1.5481	-0.2032	0.2412	0.0144	0.0483	7.0	0.0000	0.0000	0.0	0.0	0.1180
	5	2.3798	0.2126	-1.3963	-0.1806	0.2412	-0.0011	0.0574	6.8	0.0000	0.0000	0.0	0.0	0.1230
	2	1.7052	0.2126	-1.2043	-0.1671	0.2412	-0.0496	0.0483	5.7	0.0000	0.0000	0.0	0.0	0.1487
	1	1.0160	0.2126	-1.1143	-0.1671	0.2412	-0.0885	0.0519	5.2	0.0000	0.0000	0.0	0.0	0.1519
	0.5	0.1935	0.2126	-1.0324	-0.1671	0.2412	-0.1418	0.0549	4.7	0.0000	0.0000	0.0	0.0	0.1782
	0.3	-0.2184	0.2126	-1.0371	-0.1671	0.2412	-0.2034	0.0269	4.6	0.0000	0.0000	0.0	0.0	0.1910
	PGV	6.0095	0.2126	-1.2345	-0.1671	0.2412	-0.0840	0.0469	4.9	0.0000	0.0000	0.0	0.0	0.1305
Vert	PGA	1.9650	0.4014	-1.6105	0.0000	0.2009	0.0000	0.1042	6.8	0.0000	0.0000	0.0	0.0	0.1308
	20	3.2137	0.4014	-1.8135	0.0000	0.2009	0.0040	0.0972	7.3	0.0000	0.0000	0.0	0.0	0.1464
	10	3.0633	0.4014	-1.7233	0.0000	0.2009	0.0001	0.1022	7.3	0.0000	0.0000	0.0	0.0	0.1405
	5	2.0716	0.4014	-1.4754	0.0000	0.2009	-0.0101	0.0949	7.0	0.0000	0.0000	0.0	0.0	0.1262
	2	1.0862	0.4014	-1.2540	0.0000	0.2009	-0.0531	0.1019	6.1	0.0000	0.0000	0.0	0.0	0.1309
	1	0.4391	0.4014	-1.1841	0.0000	0.2009	-0.0920	0.1647	5.7	0.0000	0.0000	0.0	0.0	0.1077
	0.5	-0.2319	0.4014	-1.1386	0.0000	0.2009	-0.1564	0.2868	4.7	0.0000	0.0000	0.0	0.0	0.1118
	0.3	-0.6304	0.4014	-1.1370	0.0000	0.2009	-0.2225	0.3577	4.3	0.0000	0.0000	0.0	0.0	0.1582
	PGV	5.4130	0.4014	-1.3230	0.0000	0.2009	-0.0702	0.1917	6.7	0.0000	0.0000	0.0	0.0	0.1153

TABLE I-3B
K. W. CAMPBELL: REGRESSION COEFFICIENTS
SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	b_1	b_2	b_3	b_4	SIGMA FIT
Horiz	PGA	0.4952	-0.0718	0.0	7.1	0.0107
	20	0.5000	-0.0756	0.0	7.1	0.0095
	10	0.5180	-0.0759	0.0	7.1	0.0097
	5	0.5518	-0.0743	0.0	7.1	0.0094
	2	0.6156	-0.0722	0.0	7.1	0.0090
	1	0.6611	-0.0697	0.0	7.1	0.0090
	0.5	0.7137	-0.0666	0.0	7.1	0.0087
	0.3	0.7203	-0.0649	0.0	7.1	0.0087
	PGV	0.5657	-0.0789	0.0	7.1	0.0032
Vert	PGA	0.5842	-0.0642	0.0	6.8	0.0134
	20	0.6238	-0.0628	0.0	6.7	0.0124
	10	0.6287	-0.0644	0.0	6.7	0.0124
	5	0.6327	-0.0550	0.0	6.7	0.0123
	2	0.6475	-0.0586	0.0	6.7	0.0121
	1	0.6596	-0.0584	0.0	6.8	0.0121
	0.5	0.6838	-0.0603	0.0	6.8	0.0128
	0.3	0.6929	-0.0603	0.0	6.8	0.0128
	PGV	0.5989	-0.0652	0.0	6.8	0.0137

TABLE I-3C
K. W. CAMPBELL: REGRESSION COEFFICIENTS
SIGMA-MU MODEL

COMPONENT	FREQUENCY (HZ)	c_1	c_2	c_3	c_4	c_5	c_6	MINIMUM	SIGMA FIT
Horiz	PGA	0.7267	0.0	-0.3005	0.0535	0.0173	6.0	0.2	0.0800
	20	0.7021	0.0	-0.2571	0.0486	0.0132	6.0	0.2	0.0829
	10	0.8492	0.0	-0.3861	0.0691	0.0222	6.0	0.2	0.0660
	5	0.9030	0.0	-0.4097	0.0721	0.0007	6.0	0.2	0.0601
	2	0.5303	0.0	-0.1899	0.0395	0.0131	6.0	0.2	0.0843
	1	0.4384	0.0	-0.1203	0.0273	0.0477	6.0	0.2	0.0992
	0.5	0.2665	0.0	0.0325	0.0096	0.0263	6.0	0.2	0.1223
	0.3	0.2476	0.0	0.1379	-0.0106	0.0240	6.0	0.2	0.1341
	PGV	0.7873	0.0	-0.3460	0.0620	0.0272	6.0	0.2	0.1085
Vert	PGA	0.6835	0.0	-0.2488	0.0476	0.0222	6.0	0.2	0.1022
	20	0.7763	0.0	-0.2297	0.0423	0.0085	6.0	0.2	0.1093
	10	0.7307	0.0	-0.3015	0.0569	0.0342	6.0	0.2	0.0964
	5	0.8226	0.0	-0.3631	0.0677	0.0620	6.0	0.2	0.0944
	2	0.5424	0.0	-0.1390	0.0318	0.0378	6.0	0.2	0.1164
	1	0.7375	0.0	-0.2475	0.0475	-0.0049	6.0	0.2	0.1283
	0.5	0.5831	0.0	-0.1478	0.0433	0.0501	6.0	0.2	0.1541
	0.3	0.5651	0.0	-0.0052	0.0136	0.0817	6.0	0.2	0.1910
	PGV	0.8300	0.0	-0.3837	0.0728	0.1044	6.0	0.2	0.1112

TABLE I-3D
K. W. CAMPBELL: REGRESSION COEFFICIENTS
SIGMA-SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	d_1	d_2	d_3	d_4	SIGMA FIT
Horiz	PGA	0.1	0.0	0.0	7.1	0.0
	20	0.1	0.0	0.0	7.1	0.0
	10	0.1	0.0	0.0	7.1	0.0
	5	0.1	0.0	0.0	7.1	0.0
	2	0.1	0.0	0.0	7.1	0.0
	1	0.1	0.0	0.0	7.1	0.0
	0.5	0.1	0.0	0.0	7.1	0.0
	0.3	0.1	0.0	0.0	7.1	0.0
	PGV	0.1	0.0	0.0	7.1	0.0
Vert	PGA	0.1	0.0	0.0	7.1	0.0
	20	0.1	0.0	0.0	7.1	0.0
	10	0.1	0.0	0.0	7.1	0.0
	5	0.1	0.0	0.0	7.1	0.0
	2	0.1	0.0	0.0	7.1	0.0
	1	0.1	0.0	0.0	7.1	0.0
	0.5	0.1	0.0	0.0	7.1	0.0
	0.3	0.1	0.0	0.0	7.1	0.0
	PGV	0.1	0.0	0.0	7.1	0.0

TABLE I-4A
A. F. McGARR: REGRESSION COEFFICIENTS
MEDIAN MODEL

COMPONENT	FREQUENCY (HZ)	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	SIGMA FIT
Horiz	PGA	1.6594	0.2412	-1.4068	-0.1238	0.2153	0.0000	0.0166	6.8	0.0000	0.0000	0.0	0.0	0.1588
	20	2.6292	0.2412	-1.5697	-0.1238	0.2153	0.0074	-0.0037	7.3	0.0000	0.0000	0.0	0.0	0.1796
	10	2.8002	0.2412	-1.5646	-0.1238	0.2153	0.0050	0.0153	7.7	0.0000	0.0000	0.0	0.0	0.1764
	5	2.3506	0.2412	-1.4123	-0.0825	0.2153	-0.0088	0.0439	7.4	0.0000	0.0000	0.0	0.0	0.1633
	2	1.5042	0.2412	-1.1972	-0.0413	0.2153	-0.0471	0.0690	6.1	0.0000	0.0000	0.0	0.0	0.1648
	1	0.7751	0.2412	-1.0911	0.0000	0.2153	-0.0819	0.0620	5.4	0.0000	0.0000	0.0	0.0	0.1687
	0.5	-0.0836	0.2412	-0.9972	0.0413	0.2153	-0.1217	0.0304	5.1	0.0000	0.0000	0.0	0.0	0.1765
	0.3	-0.5679	0.2412	-0.9422	0.0413	0.2153	-0.1860	-0.0560	4.4	0.0000	0.0000	0.0	0.0	0.1545
	PGV	5.9472	0.2412	-1.2788	0.0413	0.2153	-0.0740	0.0723	5.7	0.0000	0.0000	0.0	0.0	0.1747
Vert	PGA	1.8472	0.3457	-1.6393	-0.1253	0.2179	0.0000	0.0630	6.8	0.0000	0.0000	0.0	0.0	0.1728
	20	3.0364	0.3457	-1.8353	-0.1253	0.2179	0.0115	0.0401	7.5	0.0000	0.0000	0.0	0.0	0.1927
	10	2.8984	0.3457	-1.7478	-0.1253	0.2179	0.0100	0.0391	7.8	0.0000	0.0000	0.0	0.0	0.1796
	5	2.2051	0.3457	-1.5680	-0.0835	0.2179	-0.0082	0.0592	7.4	0.0000	0.0000	0.0	0.0	0.1683
	2	1.3797	0.3457	-1.3725	-0.0418	0.2179	-0.0555	0.1148	6.9	0.0000	0.0000	0.0	0.0	0.1712
	1	0.5173	0.3457	-1.2524	0.0000	0.2179	-0.0879	0.1526	6.2	0.0000	0.0000	0.0	0.0	0.1494
	0.5	-0.4559	0.3457	-1.1451	0.0418	0.2179	-0.1399	0.2048	5.0	0.0000	0.0000	0.0	0.0	0.1516
	0.3	-1.0476	0.3457	-1.1063	0.0418	0.2179	-0.1827	0.2133	4.6	0.0000	0.0000	0.0	0.0	0.1560
	PGV	5.4176	0.3457	-1.4111	0.0418	0.2179	-0.0483	0.1238	6.4	0.0000	0.0000	0.0	0.0	0.2830

TABLE I-4B
A. F. McGARR: REGRESSION COEFFICIENTS
SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	b_1	b_2	b_3	b_4	SIGMA FIT
Horiz	PGA	0.5670	-0.0441	0.0	6.9	0.0034
	20	0.5714	-0.0462	0.0	6.9	0.0041
	10	0.5895	-0.0543	0.0	6.8	0.0055
	5	0.6240	-0.0520	0.0	6.8	0.0053
	2	0.6939	-0.0486	0.0	6.7	0.0056
	1	0.7523	-0.0370	0.0	6.8	0.0032
	0.5	0.8528	-0.0302	0.0	6.8	0.0045
	0.3	0.8541	-0.0494	0.0	6.8	0.0070
	PGV	0.7480	-0.0256	0.0	5.8	0.0041
Vert	PGA	0.5404	-0.0636	0.0	6.8	0.0036
	20	0.5557	-0.0625	0.0	6.8	0.0036
	10	0.5716	-0.0754	0.0	6.7	0.0069
	5	0.5757	-0.0735	0.0	6.7	0.0075
	2	0.6194	-0.0986	0.0	6.2	0.0090
	1	0.6572	-0.0593	0.0	6.6	0.0074
	0.5	0.7320	-0.0665	0.0	6.3	0.0097
	0.3	0.7732	-0.0849	0.0	6.1	0.0109
	PGV	0.6176	-0.0454	0.0	5.8	0.0089

TABLE I-4C
A. F. McGARR: REGRESSION COEFFICIENTS
SIGMA-MU MODEL

COMPONENT	FREQUENCY (HZ)	c_1	c_2	c_3	c_4	c_5	c_6	MINIMUM	SIGMA FIT
Horiz	PGA	0.4361	0.0	-0.1255	0.0231	0.0170	6.0	0.2	0.0944
	20	0.4444	0.0	-0.0793	0.0147	0.0093	6.0	0.2	0.0933
	10	0.5028	0.0	-0.1443	0.0256	0.0145	6.0	0.2	0.0833
	5	0.5358	0.0	-0.1647	0.0283	-0.0043	6.0	0.2	0.0829
	2	0.3175	0.0	-0.0454	0.0106	0.0012	6.0	0.2	0.0858
	1	0.3177	0.0	-0.0251	0.0075	0.0198	6.0	0.2	0.0943
	0.5	0.2482	0.0	0.0727	-0.0044	0.0056	6.0	0.2	0.1191
	0.3	0.2057	0.0	0.1263	-0.0157	0.0154	6.0	0.2	0.1098
	PGV	0.3386	0.0	-0.0486	0.0133	0.0072	6.0	0.2	0.1265
Vert	PGA	0.3355	0.0	-0.0288	0.0061	-0.0004	6.0	0.2	0.0977
	20	0.4595	0.0	-0.0238	0.0019	-0.0302	6.0	0.2	0.1128
	10	0.3773	0.0	-0.0699	0.0165	0.0148	6.0	0.2	0.0919
	5	0.2906	0.0	-0.0434	0.0157	0.0613	6.0	0.2	0.0899
	2	0.2361	0.0	0.0213	0.0027	0.0069	6.0	0.2	0.1045
	1	0.4178	0.0	-0.0855	0.0194	-0.0507	6.0	0.2	0.1106
	0.5	0.2854	0.0	-0.0087	0.0196	0.0659	6.0	0.2	0.1487
	0.3	0.2291	0.0	0.0702	0.0018	0.1555	6.0	0.2	0.1379
	PGV	0.4553	0.0	-0.1333	0.0277	0.1640	6.0	0.2	0.1883

TABLE I-4D
A. F. MCGARR: REGRESSION COEFFICIENTS
SIGMA-SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	d_1	d_2	d_3	d_4	SIGMA FIT
Horiz	PGA	0.1010	0.0073	0.0	7.2	0.0045
	20	0.1015	0.0097	0.0	7.2	0.0046
	10	0.1072	0.0102	0.0	7.2	0.0046
	5	0.1040	0.0092	0.0	7.2	0.0038
	2	0.1156	0.0171	0.0	7.2	0.0035
	1	0.1207	0.0239	0.0	7.2	0.0042
	0.5	0.1620	0.0396	0.0	7.2	0.0034
	0.3	0.1818	0.0496	0.0	7.1	0.0047
	PGV	0.1347	0.0273	0.0	7.2	0.0022
Vert	PGA	0.1435	0.0324	0.0	7.2	0.0072
	20	0.1402	0.0322	0.0	7.2	0.0065
	10	0.1431	0.0271	0.0	7.2	0.0074
	5	0.1322	0.0207	0.0	7.2	0.0071
	2	0.1364	0.0215	0.0	7.2	0.0082
	1	0.1332	0.0257	0.0	7.2	0.0079
	0.5	0.1893	0.0477	0.0	7.2	0.0095
	0.3	0.2130	0.0609	0.0	6.9	0.0111
	PGV	0.1858	0.0449	0.0	7.2	0.0066

TABLE I-5A
W. J. SILVA: REGRESSION COEFFICIENTS
MEDIAN MODEL

COMPONENT	FREQUENCY (HZ)	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	SIGMA FIT
Horiz	PGA	1.8005	0.3153	-1.3837	-0.2558	0.2277	0.0000	-0.1026	6.5	0.2448	-0.2330	5.3	6.1	0.1025
	20	2.7125	0.3153	-1.5541	-0.2558	0.2277	0.0167	-0.1075	7.0	0.2384	-0.2658	5.2	6.2	0.1244
	10	2.9773	0.3153	-1.5532	-0.2558	0.2277	0.0107	-0.0789	7.5	0.1681	-0.2994	5.1	6.0	0.1266
	5	2.6009	0.3153	-1.4075	-0.2558	0.2277	-0.0054	-0.0685	7.2	0.1991	-0.2360	5.3	6.1	0.1167
	2	1.6999	0.3153	-1.1745	-0.2345	0.2277	-0.0455	-0.0619	5.9	0.3161	-0.1954	5.1	6.2	0.1026
	1	0.9533	0.3153	-1.0575	-0.2131	0.2277	-0.0823	-0.1434	5.6	0.3724	-0.1700	5.3	6.2	0.1075
	0.5	0.0547	0.3153	-0.9277	-0.2131	0.2277	-0.1430	-0.2633	4.5	0.3164	-0.0652	5.4	6.3	0.1123
	0.3	-0.4523	0.3153	-0.9075	-0.2345	0.2277	-0.2005	-0.2867	4.3	0.3268	-0.0615	5.0	7.4	0.1246
	PGV	5.9145	0.3153	-1.1166	-0.2558	0.2277	-0.0938	-0.1484	5.5	0.3349	-0.1934	5.0	6.7	0.1001
Vert	PGA	1.8504	0.2013	-1.6070	-0.3040	0.2360	0.0000	-0.2461	6.3	0.3630	-0.2009	5.1	6.5	0.1031
	20	3.1590	0.2013	-1.8481	-0.3040	0.2360	0.0138	-0.2468	7.3	0.3313	-0.2651	5.2	6.5	0.1239
	10	3.0835	0.2013	-1.7702	-0.2606	0.2360	0.0090	-0.1158	7.8	0.2430	-0.2923	5.1	6.2	0.1238
	5	2.1817	0.2013	-1.5370	-0.2606	0.2360	-0.0083	-0.0119	6.9	0.3048	-0.1845	5.2	6.5	0.1094
	2	1.1944	0.2013	-1.2980	-0.2606	0.2360	-0.0514	0.0302	5.6	0.4316	-0.1490	5.0	6.6	0.1045
	1	0.5178	0.2013	-1.1971	-0.2606	0.2360	-0.0885	-0.1312	5.4	0.4854	-0.1251	5.1	6.6	0.1141
	0.5	-0.4204	0.2013	-1.0913	-0.2606	0.2360	-0.1457	-0.3447	4.5	0.4766	-0.0200	5.2	6.7	0.1182
	0.3	-0.9693	0.2013	-1.0845	-0.2823	0.2360	-0.2036	-0.3732	4.3	0.4332	0.0053	5.0	7.2	0.1408
	PGV	5.3774	0.2013	-1.2790	-0.2823	0.2360	-0.0798	-0.1293	5.2	0.4871	-0.1266	5.0	6.9	0.1054

TABLE I-5B
W. J. SILVA: REGRESSION COEFFICIENTS
SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	b_1	b_2	b_3	b_4	SIGMA FIT
Horiz	PGA	0.6246	-0.0606	0.0	6.1	0.0062
	20	0.6107	-0.0696	0.0	6.2	0.0072
	10	0.6391	-0.0722	0.0	6.1	0.0066
	5	0.6648	-0.0696	0.0	6.1	0.0071
	2	0.7288	-0.0584	0.0	6.2	0.0069
	1	0.7716	-0.0311	0.0	6.8	0.0058
	0.5	0.8620	-0.0439	0.0	6.1	0.0081
	0.3	0.9044	-0.0671	0.0	5.9	0.0098
	PGV	0.7744	-0.0278	0.0	5.8	0.0091
Vert	PGA	0.6479	-0.0586	0.0	6.1	0.0060
	20	0.6414	-0.0667	0.0	6.2	0.0069
	10	0.6744	-0.0688	0.0	6.1	0.0062
	5	0.6797	-0.0683	0.0	6.1	0.0069
	2	0.7237	-0.0588	0.0	6.2	0.0070
	1	0.7586	-0.0316	0.0	6.8	0.0059
	0.5	0.8342	-0.0453	0.0	6.1	0.0084
	0.3	0.8780	-0.0690	0.0	5.9	0.0101
	PGV	0.7614	-0.0283	0.0	5.8	0.0093

TABLE I-5C
W. J. SILVA: REGRESSION COEFFICIENTS
SIGMA-MU MODEL

COMPONENT	FREQUENCY (HZ)	c_1	c_2	c_3	c_4	c_5	c_6	MINIMUM	SIGMA FIT
Horiz	PGA	0.3235	0.0	0.0	0.0	0.0415	6.0	0.2	0.0489
	20	0.3439	0.0	0.0	0.0	0.0585	6.0	0.2	0.0567
	10	0.3432	0.0	0.0	0.0	0.0442	6.0	0.2	0.0543
	5	0.3372	0.0	0.0	0.0	0.0233	6.0	0.2	0.0532
	2	0.3141	0.0	0.0	0.0	0.0606	6.0	0.2	0.0417
	1	0.3046	0.0	0.0	0.0	0.0705	6.0	0.2	0.0580
	0.5	0.3462	0.0	0.0	0.0	0.0929	6.0	0.2	0.0610
	0.3	0.4627	0.0	0.0	0.0	0.0756	6.0	0.2	0.0959
	PGV	0.3673	0.0	0.0	0.0	0.0344	6.0	0.2	0.0954
Vert	PGA	0.2695	0.0	0.0	0.0	0.0167	6.0	0.2	0.0710
	20	0.3043	0.0	0.0	0.0	0.0591	6.0	0.2	0.0759
	10	0.3016	0.0	0.0	0.0	0.0240	6.0	0.2	0.0830
	5	0.2917	0.0	0.0	0.0	0.0012	6.0	0.2	0.0847
	2	0.2500	0.0	0.0	0.0	0.0489	6.0	0.2	0.0669
	1	0.2294	0.0	0.0	0.0	0.0945	6.0	0.2	0.0757
	0.5	0.2881	0.0	0.0	0.0	0.0996	6.0	0.2	0.0689
	0.3	0.4034	0.0	0.0	0.0	0.0888	6.0	0.2	0.1069
	PGV	0.2940	0.0	0.0	0.0	0.0700	6.0	0.2	0.0990

TABLE I-5D
W. J. SILVA: REGRESSION COEFFICIENTS
SIGMA-SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	d_1	d_2	d_3	d_4	SIGMA FIT
Horiz	PGA	0.1335	0.0354	0.0	6.0	0.0050
	20	0.1298	0.0345	0.0	5.9	0.0054
	10	0.1379	0.0383	0.0	5.9	0.0054
	5	0.1326	0.0403	0.0	5.8	0.0056
	2	0.1384	0.0631	0.0	5.9	0.0059
	1	0.1275	0.0649	0.0	6.0	0.0065
	0.5	0.1469	0.0711	0.0	6.1	0.0081
	0.3	0.1855	0.0508	0.0	6.8	0.0090
	PGV	0.1454	0.0669	0.0	6.1	0.0066
Vert	PGA	0.1317	0.0383	0.0	5.9	0.0049
	20	0.1287	0.0342	0.0	5.9	0.0053
	10	0.1360	0.0375	0.0	5.9	0.0053
	5	0.1319	0.0400	0.0	5.8	0.0056
	2	0.1388	0.0632	0.0	5.9	0.0059
	1	0.1282	0.0648	0.0	6.0	0.0066
	0.5	0.1499	0.0720	0.0	6.1	0.0084
	0.3	0.1900	0.0519	0.0	6.8	0.0092
	PGV	0.1468	0.0674	0.0	6.1	0.0068

TABLE I-6A
P. G. SOMERVILLE: REGRESSION COEFFICIENTS
MEDIAN MODEL

COMPONENT	FREQUENCY (HZ)	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	SIGMA FIT
Horiz	PGA	1.9958	0.4419	-1.4672	-0.0696	0.1873	0.0000	0.0474	7.4	0.1137	-0.3247	5.2	6.0	0.1357
	20	2.8175	0.4419	-1.6032	-0.0696	0.1873	0.0088	0.0192	7.5	0.1163	-0.3085	5.0	6.1	0.1331
	10	3.2424	0.4419	-1.6657	-0.0696	0.1873	0.0115	0.0692	8.6	0.0472	-0.3688	5.1	5.9	0.1415
	5	2.7528	0.4419	-1.4804	-0.0696	0.1873	-0.0101	0.0698	7.9	0.0888	-0.3043	5.1	6.0	0.1419
	2	1.8591	0.4419	-1.2335	-0.0696	0.1873	-0.0592	0.0723	6.4	0.1728	-0.2919	5.3	5.9	0.1362
	1	0.9851	0.4419	-1.1037	-0.0696	0.1873	-0.0981	0.0358	5.7	0.2394	-0.2533	5.1	6.0	0.1408
	0.5	-0.2631	0.4419	-0.9365	-0.0696	0.1873	-0.1388	-0.0296	4.0	0.2554	-0.1006	5.0	6.2	0.1682
	0.3	-0.7669	0.4419	-0.9285	-0.0696	0.1873	-0.1725	-0.0665	3.8	0.1646	-0.1141	5.0	7.0	0.1806
	PGV	6.1419	0.4419	-1.2895	-0.0696	0.1873	-0.0818	0.0720	6.0	0.1300	-0.3366	5.2	5.9	0.1831
Vert	PGA	1.7975	0.7212	-1.5779	0.3965	0.1132	0.0000	0.0977	7.2	0.1952	-0.2478	5.1	6.5	0.1377
	20	2.9792	0.7212	-1.7716	0.3965	0.1132	0.0048	0.0938	7.6	0.1789	-0.2697	5.2	6.5	0.1366
	10	3.0338	0.7212	-1.7444	0.3965	0.1132	0.0036	0.1249	7.7	0.1519	-0.2566	5.1	6.3	0.1380
	5	2.2087	0.7212	-1.5319	0.3965	0.1132	-0.0066	0.1270	7.7	0.1861	-0.2233	5.1	6.3	0.1346
	2	1.2175	0.7212	-1.2841	0.3965	0.1132	-0.0595	0.1763	7.2	0.1857	-0.1821	5.1	6.0	0.1521
	1	0.1031	0.7212	-1.1187	0.3965	0.1132	-0.0900	0.2377	6.1	0.1295	-0.0242	5.1	6.0	0.1248
	0.5	-0.7137	0.7212	-1.0516	0.3965	0.1132	-0.1418	0.3920	4.9	0.0000	-0.3000	6.5	7.4	0.1833
	0.3	-1.3183	0.7212	-1.0035	0.3965	0.1132	-0.1706	0.4636	4.2	0.0000	-0.4000	6.2	7.4	0.2021
	PGV	5.3412	0.7212	-1.3183	0.3965	0.1132	-0.0770	0.3185	7.0	0.0000	-0.3000	5.0	7.4	0.1912

TABLE I-6B
P. G. SOMERVILLE: REGRESSION COEFFICIENTS
SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	b_1	b_2	b_3	b_4	SIGMA FIT
Horiz	PGA	0.5454	-0.0613	0.0	6.9	0.0059
	20	0.5396	-0.0694	0.0	6.9	0.0071
	10	0.5714	-0.0767	0.0	6.8	0.0094
	5	0.6028	-0.0732	0.0	6.8	0.0089
	2	0.6665	-0.0721	0.0	6.8	0.0090
	1	0.7130	-0.0597	0.0	6.9	0.0046
	0.5	0.7717	-0.0538	0.0	6.9	0.0096
	0.3	0.7958	-0.1063	0.0	6.1	0.0134
	PGV	0.6876	-0.0535	0.0	6.1	0.0072
Vert	PGA	0.6137	-0.0504	0.0	6.5	0.0058
	20	0.6436	-0.0465	0.0	6.5	0.0062
	10	0.6492	-0.0785	0.0	6.3	0.0089
	5	0.6337	-0.0701	0.0	6.2	0.0109
	2	0.6336	-0.0895	0.0	6.1	0.0126
	1	0.6502	-0.0533	0.0	6.4	0.0115
	0.5	0.6701	-0.0545	0.0	6.4	0.0161
	0.3	0.7010	-0.0963	0.0	6.0	0.0197
	PGV	0.5972	-0.0676	0.0	6.0	0.0103

TABLE I-6C
P. G. SOMERVILLE: REGRESSION COEFFICIENTS
SIGMA-MU MODEL

COMPONENT	FREQUENCY (HZ)	c_1	c_2	c_3	c_4	c_5	c_6	MINIMUM	SIGMA FIT
Horiz	PGA	0.4746	-0.0453	-0.1543	0.0312	0.0132	6.0	0.2	0.0697
	20	0.4341	-0.0389	-0.1050	0.0255	-0.0082	6.0	0.2	0.0787
	10	0.5688	-0.0117	-0.2377	0.0492	0.0298	6.0	0.2	0.0746
	5	0.5514	-0.0025	-0.2143	0.0438	0.0085	6.0	0.2	0.0787
	2	0.4041	-0.0191	-0.1270	0.0315	0.0187	6.0	0.2	0.0855
	1	0.3950	-0.0398	-0.1307	0.0329	0.0502	6.0	0.2	0.0905
	0.5	0.3231	-0.0260	-0.0168	0.0179	0.0012	6.0	0.2	0.1039
	0.3	0.2431	0.0271	0.1117	-0.0081	-0.0317	6.0	0.2	0.1216
	PGV	0.3855	0.0034	-0.0656	0.0137	-0.0022	6.0	0.2	0.1132
Vert	PGA	0.3466	-0.0558	-0.0529	0.0164	0.0179	6.0	0.2	0.1088
	20	0.5132	-0.0676	-0.0360	0.0075	-0.0614	6.0	0.2	0.1086
	10	0.3193	-0.0411	-0.0549	0.0183	0.0299	6.0	0.2	0.1035
	5	0.2389	-0.0050	-0.0177	0.0155	0.1039	6.0	0.2	0.1167
	2	0.2227	0.0080	0.0725	-0.0031	0.0506	6.0	0.2	0.1237
	1	0.4351	-0.0868	-0.1008	0.0301	0.0191	6.0	0.2	0.1147
	0.5	0.4045	-0.0669	-0.0585	0.0360	0.0896	6.0	0.2	0.1836
	0.3	0.4448	-0.0947	-0.0035	0.0238	0.0291	6.0	0.2	0.1773
	PGV	0.2434	0.0309	-0.0209	0.0123	0.1925	6.0	0.2	0.1203

TABLE I-6D
P. G. SOMERVILLE: REGRESSION COEFFICIENTS
SIGMA-SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	d_1	d_2	d_3	d_4	SIGMA FIT
Horiz	PGA	0.1648	-0.0070	0.0	5.8	0.0062
	20	0.1619	-0.0055	0.0	5.8	0.0062
	10	0.1748	0.0062	0.0	7.2	0.0060
	5	0.1715	0.0055	0.0	7.2	0.0043
	2	0.1759	0.0593	0.0	6.0	0.0064
	1	0.1713	0.0992	0.0	5.9	0.0078
	0.5	0.1858	0.1278	0.0	5.9	0.0055
	0.3	0.1957	0.1219	0.0	5.9	0.0044
	PGV	0.1924	0.0850	0.0	6.0	0.0048
Vert	PGA	0.1727	0.0057	0.0	7.2	0.0052
	20	0.1626	-0.0010	0.0	6.5	0.0042
	10	0.1741	0.0148	0.0	5.8	0.0056
	5	0.1763	0.0228	0.0	5.8	0.0056
	2	0.1843	0.0952	0.0	5.8	0.0060
	1	0.1741	0.1405	0.0	5.8	0.0078
	0.5	0.1919	0.1762	0.0	5.8	0.0067
	0.3	0.1995	0.1538	0.0	5.8	0.0044
	PGV	0.1805	0.1120	0.0	5.9	0.0088

TABLE I-7A
M. C. WALCK: REGRESSION COEFFICIENTS
MEDIAN MODEL

COMPONENT	FREQUENCY (HZ)	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	SIGMA FIT
Horiz	PGA	1.9092	0.2170	-1.4495	-0.1943	0.2237	0.0000	-0.1331	7.4	0.1574	-0.2079	5.1	6.3	0.0721
	20	2.7014	0.2170	-1.5881	-0.1943	0.2237	0.0216	-0.1501	7.6	0.2096	-0.1813	5.5	6.2	0.0775
	10	2.7707	0.2170	-1.5581	-0.1943	0.2237	0.0171	-0.1007	7.8	0.1045	-0.2559	5.0	6.0	0.0982
	5	2.5077	0.2170	-1.4277	-0.1943	0.2237	-0.0054	-0.1224	7.7	0.1503	-0.1854	5.0	6.4	0.0829
	2	1.6685	0.2170	-1.1947	-0.1943	0.2237	-0.0550	-0.1270	6.2	0.2306	-0.1506	5.1	6.1	0.0732
	1	0.8069	0.2170	-1.0454	-0.1943	0.2237	-0.0956	-0.1003	5.3	0.2657	-0.1260	5.3	6.0	0.0816
	0.5	-0.1650	0.2170	-0.9097	-0.1943	0.2237	-0.1406	-0.1338	4.5	0.2454	0.0210	5.0	6.0	0.1039
	0.3	-0.5989	0.2170	-0.9200	-0.1943	0.2237	-0.1764	-0.1613	4.6	0.1336	-0.0249	5.3	7.0	0.1074
	PGV	6.3192	0.2170	-1.3065	-0.1943	0.2237	-0.0782	-0.1320	6.8	0.3225	-0.2042	5.0	6.7	0.1270
Vert	PGA	2.0111	0.3076	-1.6747	-0.0548	0.1979	0.0000	-0.0856	7.2	0.2393	-0.1406	5.5	6.5	0.0876
	20	3.1584	0.3076	-1.8811	-0.0548	0.1979	0.0171	-0.0874	7.8	0.2197	-0.1740	5.6	6.3	0.1029
	10	2.9870	0.3076	-1.7765	-0.0548	0.1979	0.0118	-0.0870	8.0	0.1850	-0.1570	5.6	6.3	0.0990
	5	2.2835	0.3076	-1.5785	-0.0548	0.1979	-0.0102	-0.0954	7.7	0.2268	-0.1040	5.7	6.2	0.0838
	2	1.5135	0.3076	-1.3836	-0.0548	0.1979	-0.0632	-0.0658	7.0	0.2301	-0.0831	5.5	6.4	0.0842
	1	0.7035	0.3076	-1.2693	-0.0548	0.1979	-0.0958	-0.0031	6.5	0.2117	0.0130	5.5	6.3	0.0898
	0.5	-0.5457	0.3076	-1.0812	-0.0548	0.1979	-0.1405	0.0455	4.5	0.2538	0.1001	5.1	6.5	0.1082
	0.3	-0.9148	0.3076	-1.1201	-0.0548	0.1979	-0.1834	0.0927	4.7	0.1565	-0.0677	5.7	6.2	0.1171
	PGV	5.1786	0.3076	-1.2816	-0.0548	0.1979	-0.0599	0.0255	5.1	0.3538	-0.0906	5.0	6.8	0.1381

TABLE I-7B
M. C. WALCK: REGRESSION COEFFICIENTS
SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	b_1	b_2	b_3	b_4	SIGMA FIT
Horiz	PGA	0.5377	-0.0799	0.0	6.8	0.0116
	20	0.5398	-0.0817	0.0	6.8	0.0109
	10	0.5556	-0.0842	0.0	6.8	0.0112
	5	0.5895	-0.0813	0.0	6.8	0.0116
	2	0.6509	-0.0731	0.0	6.9	0.0108
	1	0.6993	-0.0675	0.0	7.1	0.0144
	0.5	0.7753	-0.0558	0.0	7.2	0.0099
	0.3	0.7917	-0.0705	0.0	6.8	0.0152
	PGV	0.7140	0.0446	0.0	5.8	0.0204
Vert	PGA	0.5681	-0.0698	0.0	6.8	0.0086
	20	0.5793	-0.0684	0.0	6.8	0.0075
	10	0.5838	-0.0769	0.0	6.8	0.0131
	5	0.6052	-0.0784	0.0	6.8	0.0135
	2	0.6472	-0.0830	0.0	6.8	0.0176
	1	0.6921	-0.0696	0.0	6.9	0.0183
	0.5	0.7536	-0.0753	0.0	6.7	0.0221
	0.3	0.7861	-0.0813	0.0	6.6	0.0224
	PGV	0.6522	-0.0154	0.0	6.5	0.0360

TABLE I-7C
M. C. WALCK: REGRESSION COEFFICIENTS
SIGMA-MU MODEL

COMPONENT	FREQUENCY (HZ)	c_1	c_2	c_3	c_4	c_5	c_6	MINIMUM	SIGMA FIT
Horiz	PGA	0.4410	0.0	-0.1066	0.0180	0.0220	6.0	0.2	0.0342
	20	0.4270	0.0	-0.0826	0.0166	0.0273	6.0	0.2	0.0457
	10	0.4561	0.0	-0.1182	0.0225	0.0151	6.0	0.2	0.0423
	5	0.4926	0.0	-0.1386	0.0237	0.0138	6.0	0.2	0.0398
	2	0.3457	0.0	-0.0568	0.0111	0.0133	6.0	0.2	0.0430
	1	0.3454	0.0	-0.0684	0.0136	0.0424	6.0	0.2	0.0575
	0.5	0.2627	0.0	-0.0027	0.0073	0.0447	6.0	0.2	0.0684
	0.3	0.2924	0.0	0.0682	-0.0086	0.0274	6.0	0.2	0.0724
	PGV	0.4004	0.0	-0.0878	0.0184	0.0292	6.0	0.2	0.0909
Vert	PGA	0.4292	0.0	-0.0364	0.0085	-0.0061	6.0	0.2	0.0533
	20	0.5320	0.0	-0.0759	0.0148	-0.0112	6.0	0.2	0.0598
	10	0.4840	0.0	-0.0941	0.0209	0.0126	6.0	0.2	0.0555
	5	0.4053	0.0	-0.0295	0.0112	0.0358	6.0	0.2	0.0693
	2	0.3742	0.0	-0.0048	0.0054	0.0125	6.0	0.2	0.0605
	1	0.4533	0.0	-0.0666	0.0142	-0.0085	6.0	0.2	0.0592
	0.5	0.3733	0.0	0.0239	0.0027	-0.0032	6.0	0.2	0.0845
	0.3	0.4412	0.0	0.0000	0.0074	0.0124	6.0	0.2	0.0973
	PGV	0.3698	0.0	-0.0176	0.0088	0.0322	6.0	0.2	0.0902

TABLE I-7D
M. C. WALCK: REGRESSION COEFFICIENTS
SIGMA-SIGMA MODEL

COMPONENT	FREQUENCY (HZ)	d_1	d_2	d_3	d_4	SIGMA FIT
Horiz	PGA	0.1757	0.0072	0.0	7.2	0.0035
	20	0.1757	0.0075	0.0	7.2	0.0034
	10	0.1826	0.0115	0.0	7.2	0.0035
	5	0.1794	0.0131	0.0	7.2	0.0022
	2	0.1786	0.0281	0.0	6.8	0.0036
	1	0.1779	0.0343	0.0	7.0	0.0057
	0.5	0.1956	0.0423	0.0	7.2	0.0075
	0.3	0.2137	0.0505	0.0	7.2	0.0105
	PGV	0.1826	0.0202	0.0	6.9	0.0088
Vert	PGA	0.2010	0.0203	0.0	7.2	0.0066
	20	0.1990	0.0197	0.0	7.2	0.0063
	10	0.2036	0.0205	0.0	7.2	0.0077
	5	0.1933	0.0192	0.0	7.2	0.0061
	2	0.1885	0.0264	0.0	7.1	0.0075
	1	0.1877	0.0350	0.0	7.2	0.0082
	0.5	0.2058	0.0446	0.0	7.2	0.0150
	0.3	0.2305	0.0567	0.0	7.2	0.0141
	PGV	0.1860	0.0194	0.0	7.2	0.0108

APPENDIX J

HYPOCENTRAL DISTANCE METRIC: DEVELOPMENT OF MODELS FOR AREAL SOURCES

APPENDIX J
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APPENDIX J

HYPOCENTRAL DISTANCE METRIC: DEVELOPMENT OF MODELS FOR AREAL SOURCES

J.1 INTRODUCTION

The attenuation relations developed directly from the experts' point estimates were formulated to describe ground motions from planar seismogenic sources (faults). However, most hazard models - including those proposed for the Yucca Mountain PSHA project - incorporate areal sources over which uniform seismic activity is expected. These areal sources typically model background seismic activity (activity which cannot be assigned to known faults) or activity arising from a laterally distributed source zone. In the hazard analysis, areal sources are typically treated as point sources. The distance measure for a point source is hypocentral distance as opposed to the 'closest distance to the fault' measures used by the experts in this study.

In this appendix, a conversion from hypocentral distance to "closest distance" is developed that accounts for the finite dimension of the fault rupture. This conversion affects both the median ground motion and the aleatory variability and, to a lesser extent, the epistemic uncertainty in both.

J.2 MEDIAN GROUND MOTION

We consider a fault rupture dimension as given by the Wells and Coppersmith (1994)[1] magnitude-area and magnitude-width scaling relations for all fault types. For this study, we only used the mean relations for the rupture dimension scaling relations. (This will tend to underestimate the aleatory variability impact; however, it is a small effect). For each magnitude, the hypocenter is located at various locations on the rupture plane along-strike and down-dip (Figure J-1). Since hypocenters tend to be located near the bottom of fault ruptures, a minimum depth (in terms of the fraction of the fault width) is used to constrain the depth distribution of the hypocenters. Note that this constraint is in terms of the location of the hypocenter on the rupture plane, which is not the same as the depth distribution of the hypocenters. The top of the hypocenters is defined by the parameter T, where T=0

[1] Wells, D.L. and Coppersmith, K.J., 1994, New empirical relationships among magnitude, rupture length, rupture width, rupture area, and surface displacement: Bulletin of the Seismological Society of America, v. 84, p. 974-1002.

corresponds to the top of the rupture and T=1 corresponds to the bottom of the rupture (Figure J-1).

For each hypocenter, sites were located in a circle around the hypocenter (sites with constant hypocentral distance, Figure J-2). For each site, the rupture distance was computed. The mean and standard deviation of the rupture distance for the ith hypocenter are denoted R_i and σ_{R_i}, respectively. This process was applied for both vertical faults and 60 degree dipping faults (no distinction is made for the difference due to fault dip).

The resulting correlation between hypocentral distance and mean rupture distance (R_i) for T=0.25 is shown on Figure J-3 for magnitude 6.5. Based on the trends on Figure J-3, the following functional form was adopted

For $H \leq 30$ km,

$$\overline{R}(H,M,T) = H\left(1 + e_1 + \left(e_2 + e_9(T-0.25)\right)(M-5)\right) + H^2\left(e_3 + \left(e_4 + e_{10}(T-0.25)\right)(M-5)\right) \quad \text{(J-1a)}$$

and for $H > 30$ km,

$$\overline{R}(H,M,T) = H + 30\left(e_1 + \left(e_2 + e_9(T-0.25)\right)(M-5)\right) + 900\left(e_3 + \left(e_4 + e_{10}(T-0.25)\right)(M-5)\right)$$
(J-1b)

where $\overline{R}$ is the mean rupture distance (in km), M is moment magnitude, H is hypocentral distance (in km), and T is the top of the hypocenter zone on the fault rupture (in fraction of fault width). An ordinary least-squares regression analyses was performed. The resulting coefficients are listed in Table J-1; the standard deviation of the fit is $\sigma_{\overline{R}}$ = 1.2 km.

The mean $\overline{R}$ is plotted versus hypocentral distance on Figures J-4a, J-4b, and J-4c for magnitudes 5.0, 5.8, and 6.5, respectively. This model can be used to convert the hypocentral distance for a given magnitude to a closest-distance measure.

J.3 ALEATORY VARIABILITY

The correlation of the aleatory variability of the individual estimates of R_i with hypocentral distance is shown on Figure J-5 for M = 6.5 and T = 0.25. This correlation suggests a relation of the form

$$\sigma_{Ri}(H,M,T) = \left(e_5 + \left(e_6 + e_{11}(T-0.25)\right)(M-5)\right)\tanh\left\{H\left(e_7 + e_8(M-5)\right)\right\} \quad \text{(J-2)}$$

The estimated coefficients resulting from an ordinary least-squares regression are listed in Table J-1. The aleatory variability for magnitude 5.0, 5.8 and 6.5 are plotted versus hypocentral distance on Figures J-6a, J-6b, and J-6c, respectively.

The total aleatory variability is the combination of σ_{Ri} and the equation fitting variability of the $\overline{R}_i$

$$\sigma_R(H,M,T)=\sqrt{\sigma^2_{R_i}(H,M,T)+\sigma^2_{\overline{R}}} \tag{J-3}$$

The effect of variability of rupture distance (given *H, M* and *T*) on the resulting ground motion is computed by standard propagation of errors:

$$\sigma_{Hypo}(H,M,T)=\sqrt{\left(\frac{\partial Y}{\partial R}\right)^2\cdot\sigma^2_R(H,M,T)} \tag{J-4}$$

where Y is the natural log ground motion attenuation relation. For the functional form used in this study (Eq. 6-1 in Section 6; without hanging wall and footwall effects)

$$\frac{\partial Y}{\partial R}=\left(a_3+a_5(M-6.25)\right)\frac{R(H,M,T)}{R^2(H,M,T)+a_8^2} \tag{J-5}$$

where a_3, a_5, and a_8 are coefficients in the regression equations for each expert (Appendix I).

Substituting Equations J-5 and J-3 into Equation J-4 leads to:

$$\sigma_{Hypo}(H,M,T)=\left(\left(a_3+a_5(M-6.25)\right)\frac{R(H,M,T)}{R^2(H,M,T)+a_8^2}\right)\sqrt{\sigma^2_{R_i}(H,M,T)+\sigma^2_{\overline{R}}} \tag{J-6}$$

This additional aleatory variability should be added (using square-root-sum-squares) to the aleatory variability of the experts models (σ_{Total}) given in Equation 6-6. The σ_{hypo} is plotted on Figure J-7.

J.4 EPISTEMIC UNCERTAINTY

The epistemic uncertainty was estimated by considering the uncertainty in the model resulting from uncertainty in T given by σ_T,.

The epistemic uncertainty in the median is given by

$$\sigma_{\mu}^{Hypo}(H,M,T)=\sqrt{\left(\frac{\partial Y}{\partial T}\right)^{2}\cdot\sigma_{T}^{2}} \tag{J-7}$$

where

$$\frac{\partial Y}{\partial T}=\frac{\partial Y}{\partial R}\frac{\partial R}{\partial T} \tag{J-8}$$

and

$$\frac{\partial R(H,M)}{\partial T}=\begin{cases} e_9 H(M-5)+e_{10}H^2(M-5) & \text{for } H \leq 30 \text{ km} \\ e_9 30(M-5)+e_{10}900(M-5) & \text{for } H > 30 \text{ km} \end{cases} \tag{J-9}$$

The epistemic uncertainty in the aleatory variability is expressed as

$$\sigma_{\sigma}^{Hypo}=\sqrt{\left(\frac{\partial\sigma_{Hypo}}{\partial T}\right)^{2}\sigma_{T}^{2}} \tag{J-10}$$

$$=\left|\frac{\partial Y}{\partial R}\right|\frac{\partial\sigma_{R}}{\partial T}\sigma_{T} \tag{J-11}$$

where

$$\frac{\partial\sigma_{R}}{\partial T}=e_{11}(M-5)\tanh\{H(e_7+e_8(M-5))\} \tag{J-12}$$

For this study, we assumed that $\sigma_T = 0.15$ (i.e., 15% of the down-dip width).

The resulting epistemic uncertainty in the median variability is plotted on Figure J-8 for M_w 6.5 and 5.8. The epistemic uncertainty in the aleatory variability is negligible.

J.5 CONCLUSIONS

If the hypocentral distance is simply applied to the attenuation equations developed in Section 6 in place of the "closest distance to the fault rupture," the resulting median ground motion will be overestimated and the aleatory variability will be underestimated. The factors developed in this appendix provide an approximate correction for these effects so that the hazard for areal sources can be easily evaluated using the attenuation relations developed in Section 6.

TABLE J-1
REGRESSION MODEL COEFFICIENTS

COEFFICIENT	ESTIMATE
e_1	-0.207
e_2	-0.323
e_3	0.0058
e_4	0.0059
e_5	1.894
e_6	3.854
e_7	0.0116
e_8	0.0094
e_9	-0.177
e_{10}	0.0055
e_{11}	0.0111

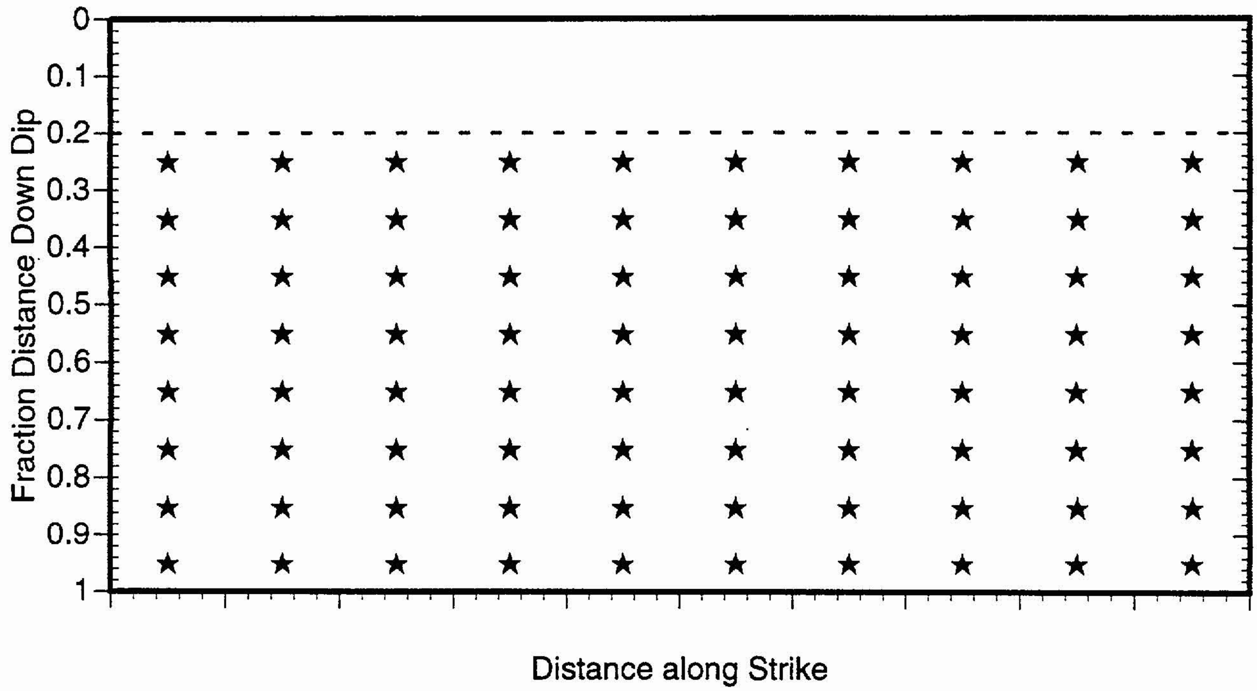

Figure J-1 Example distribution of hypocenters (stars) on the rupture plane for T = 0.2. If T = 0, then hypocenters would be uniformly distributed over the rupture plane. If T = 0.5, then the hypocenters would be uniformly distributed over the lower half of the rupture plane.

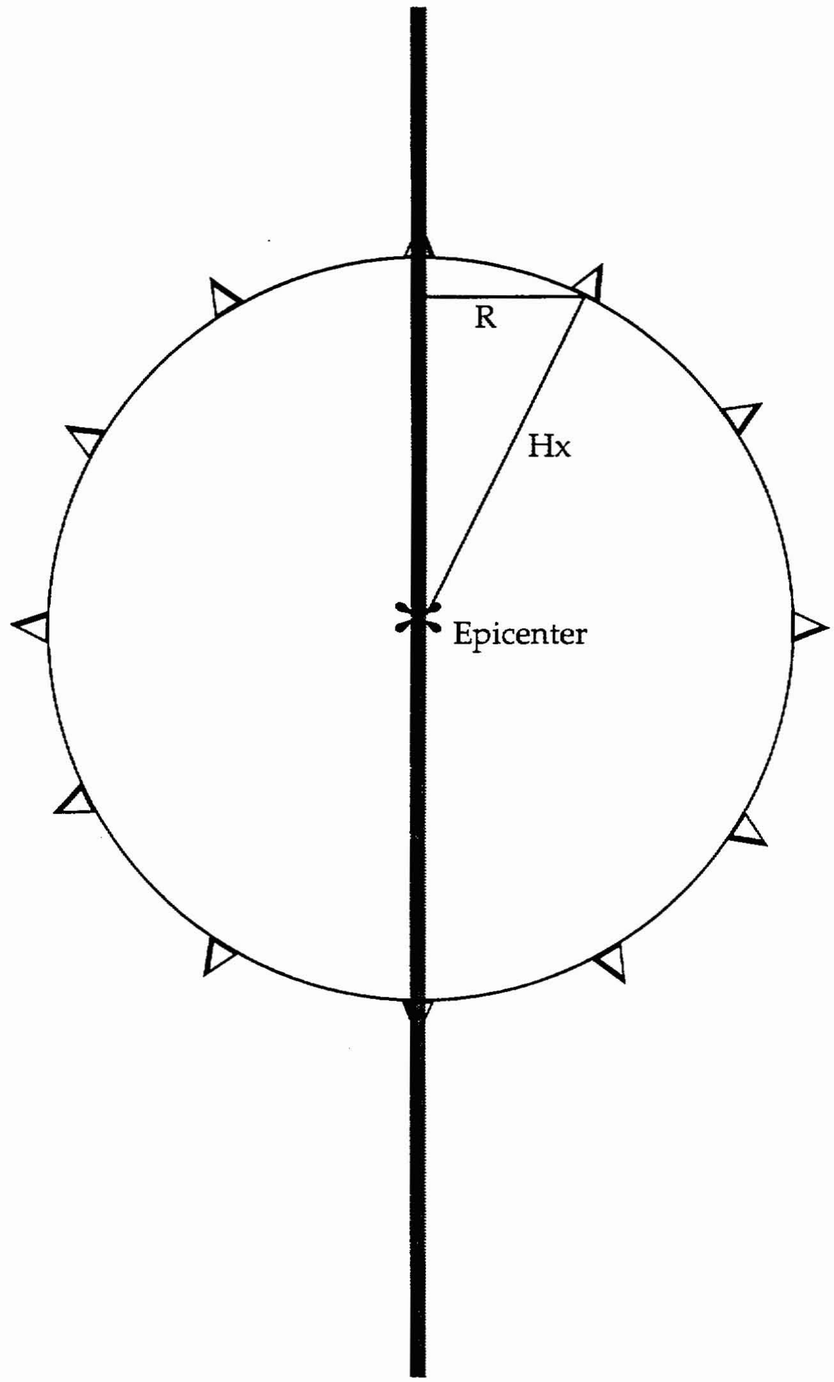

Figure J-2 Map view of a vertical fault rupture plane. For each hypocenter on the rupture plane, a suite of locations (shown by the triangles) is used for each hypocentral distance. The closest distance is then computed for each location to produce a set of hypocentral distance-rupture distance pairs.

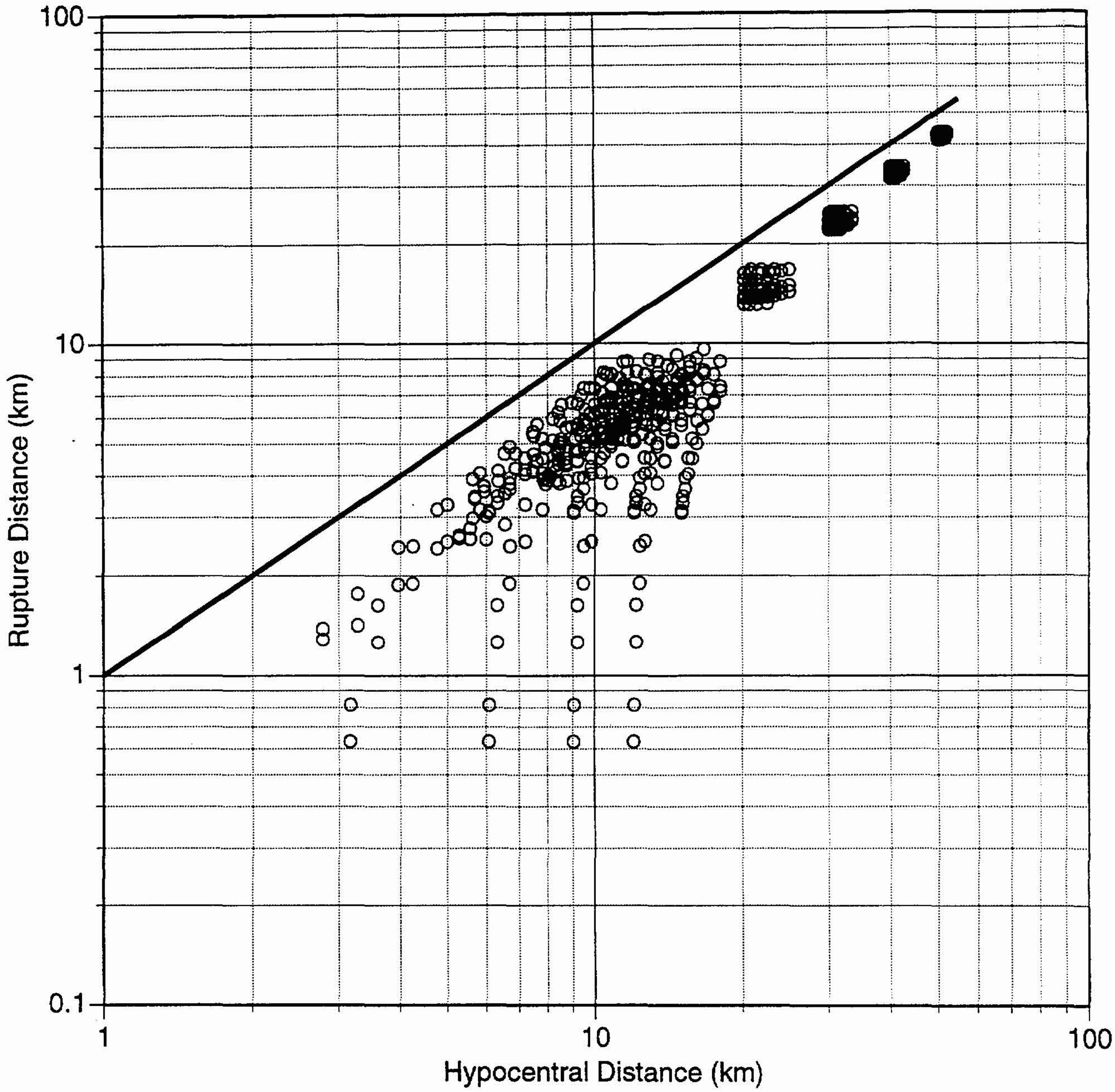

Figure J-3 Mean rupture distance versus hypocentral distance for M_W 6.5 for T = 0.25. The rupture distance is less than the hypocentral distance (the points all plot below the R = H line).

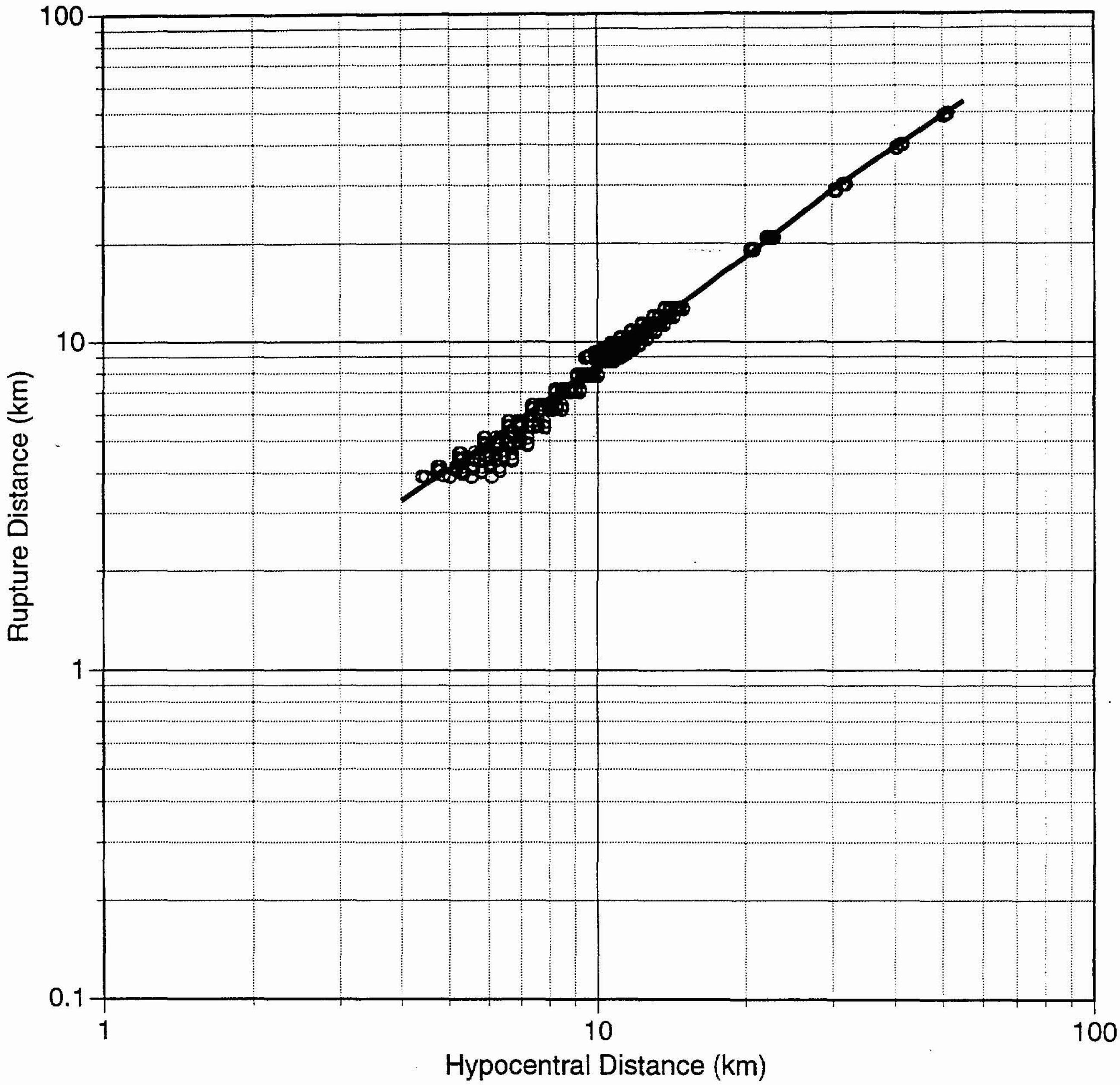

Figure J-4a Model of the mean rupture distance versus hypocentral distance for M_W 5.0 for T = 0.25

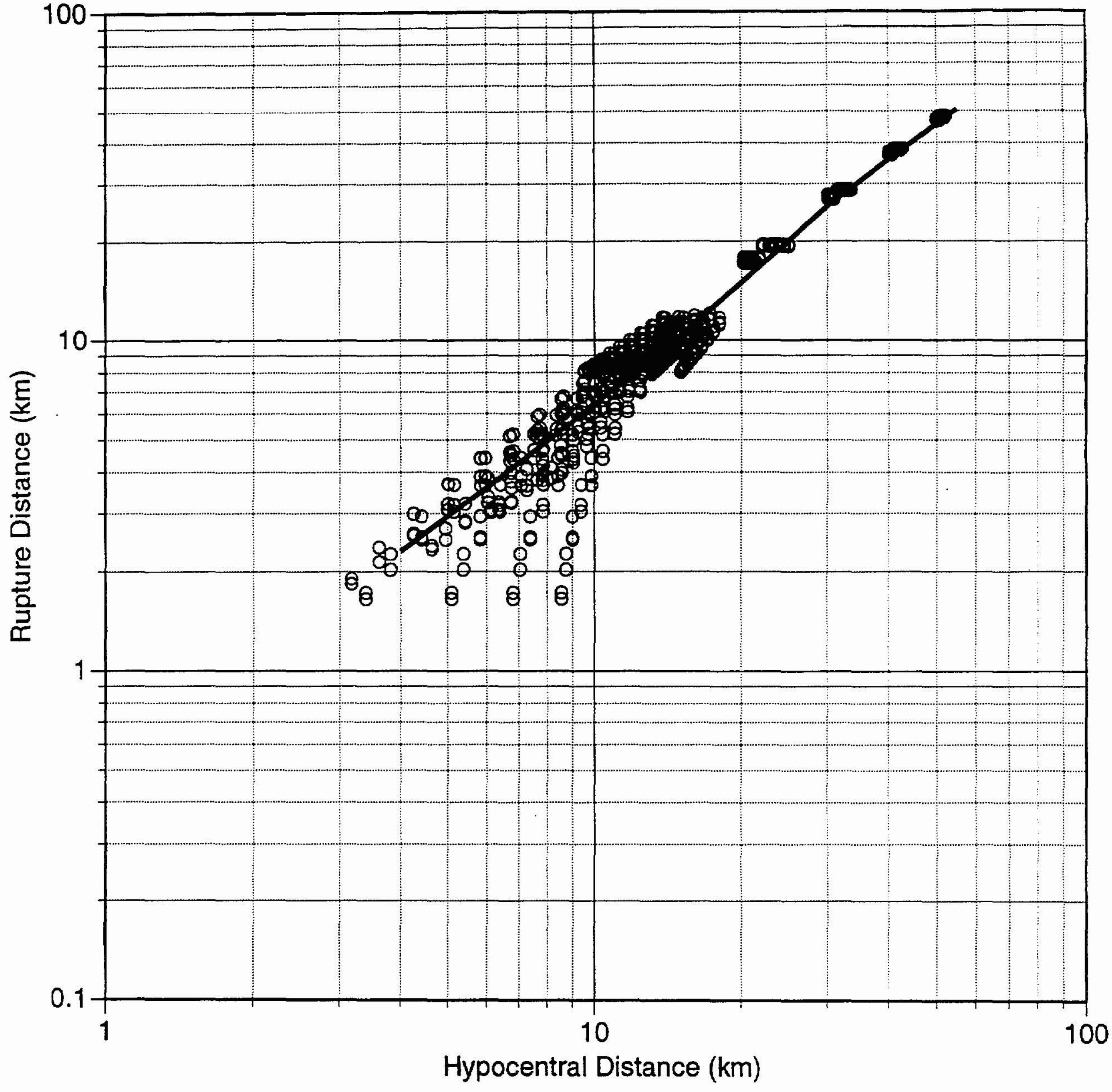

Figure J-4b Model of the mean rupture distance versus hypocentral distance for M_W 5.0 for T = 0.25

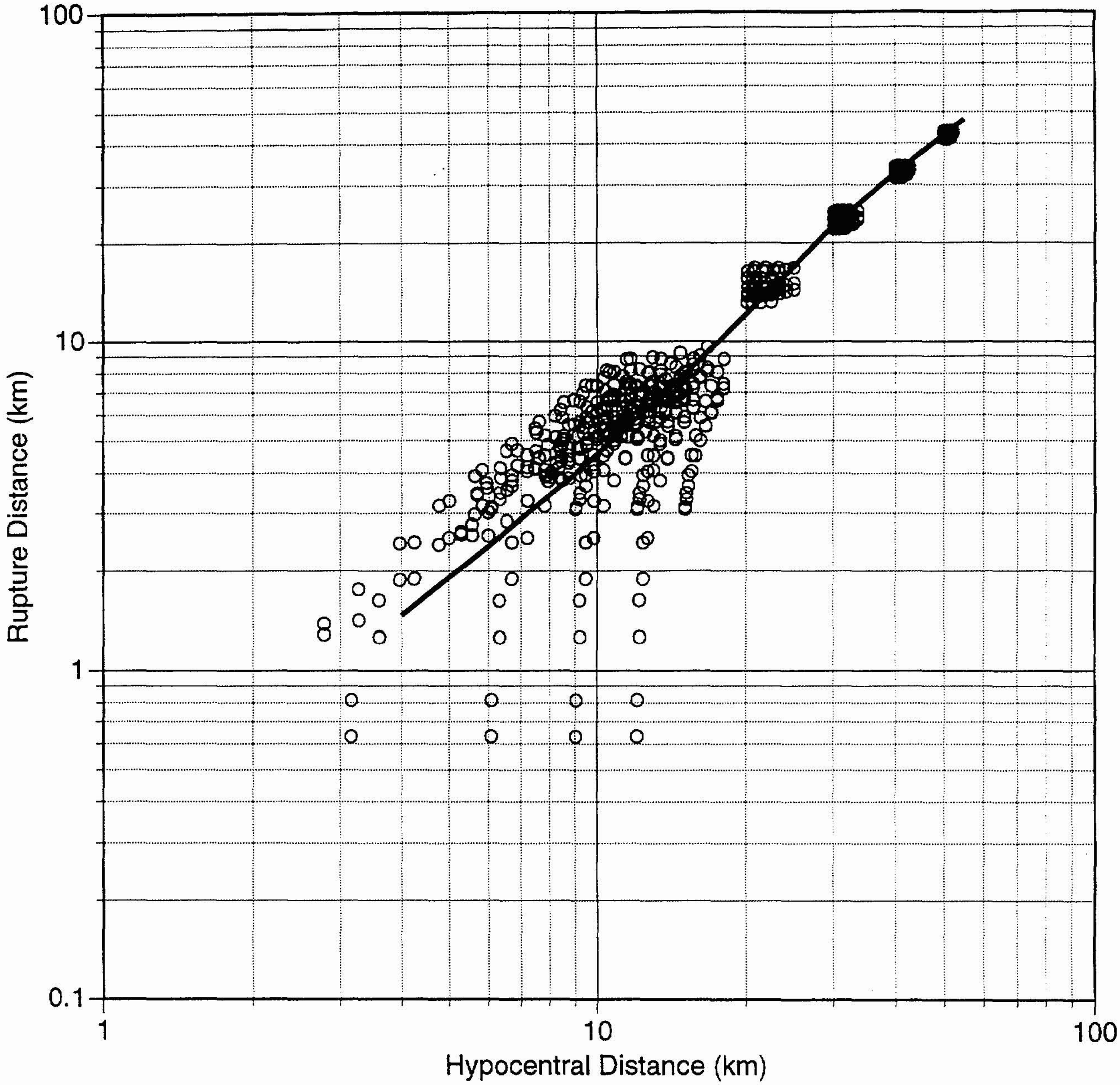

Figure J-4c Model of the mean rupture distance versus hypocentral distance for M_W 6.5 for T = 0.25

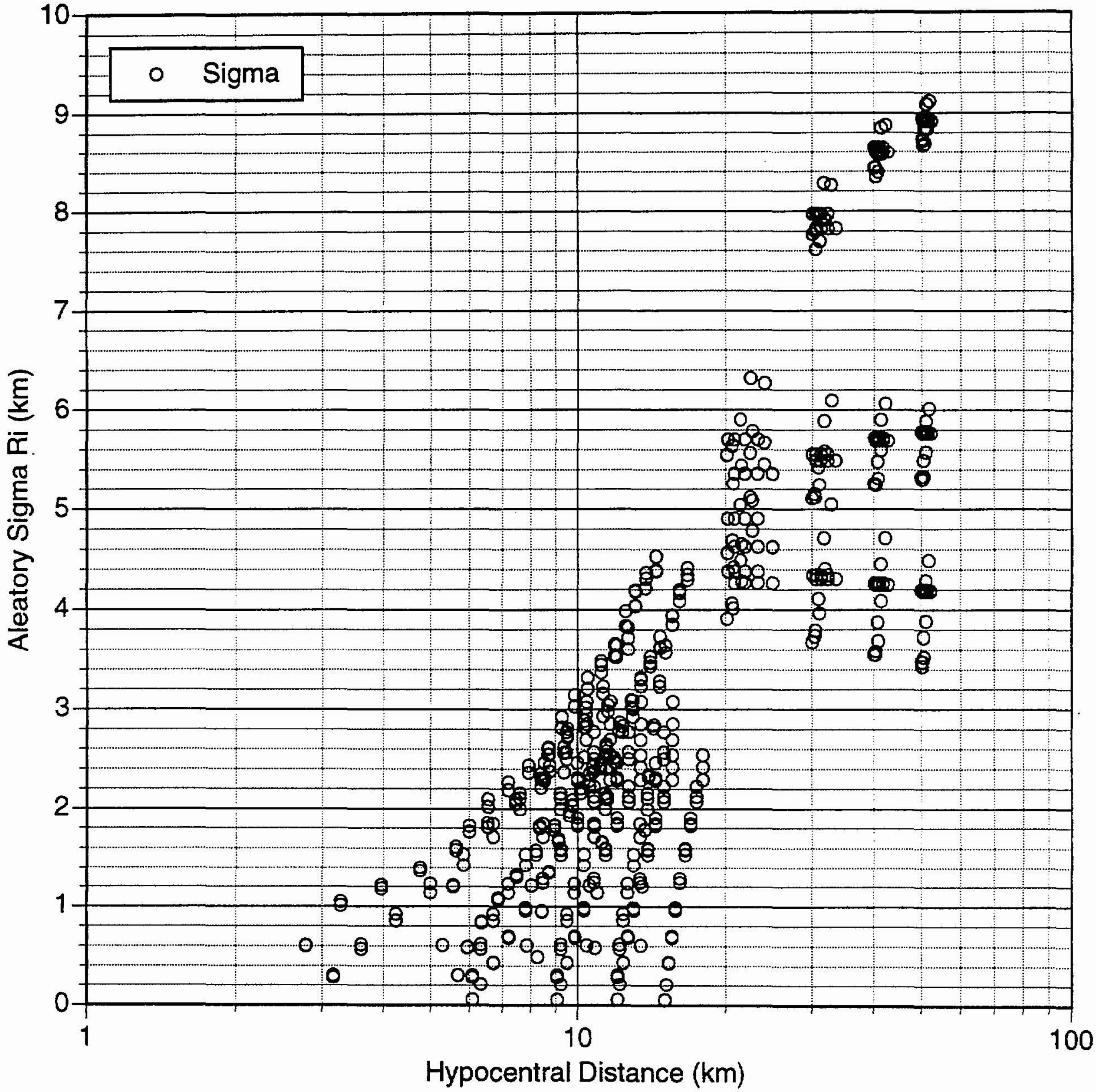

Figure J-5 Aleatory variability of the individual estimates of Ri given a hypocentral distance and M_W 6.5 and T = 0.25

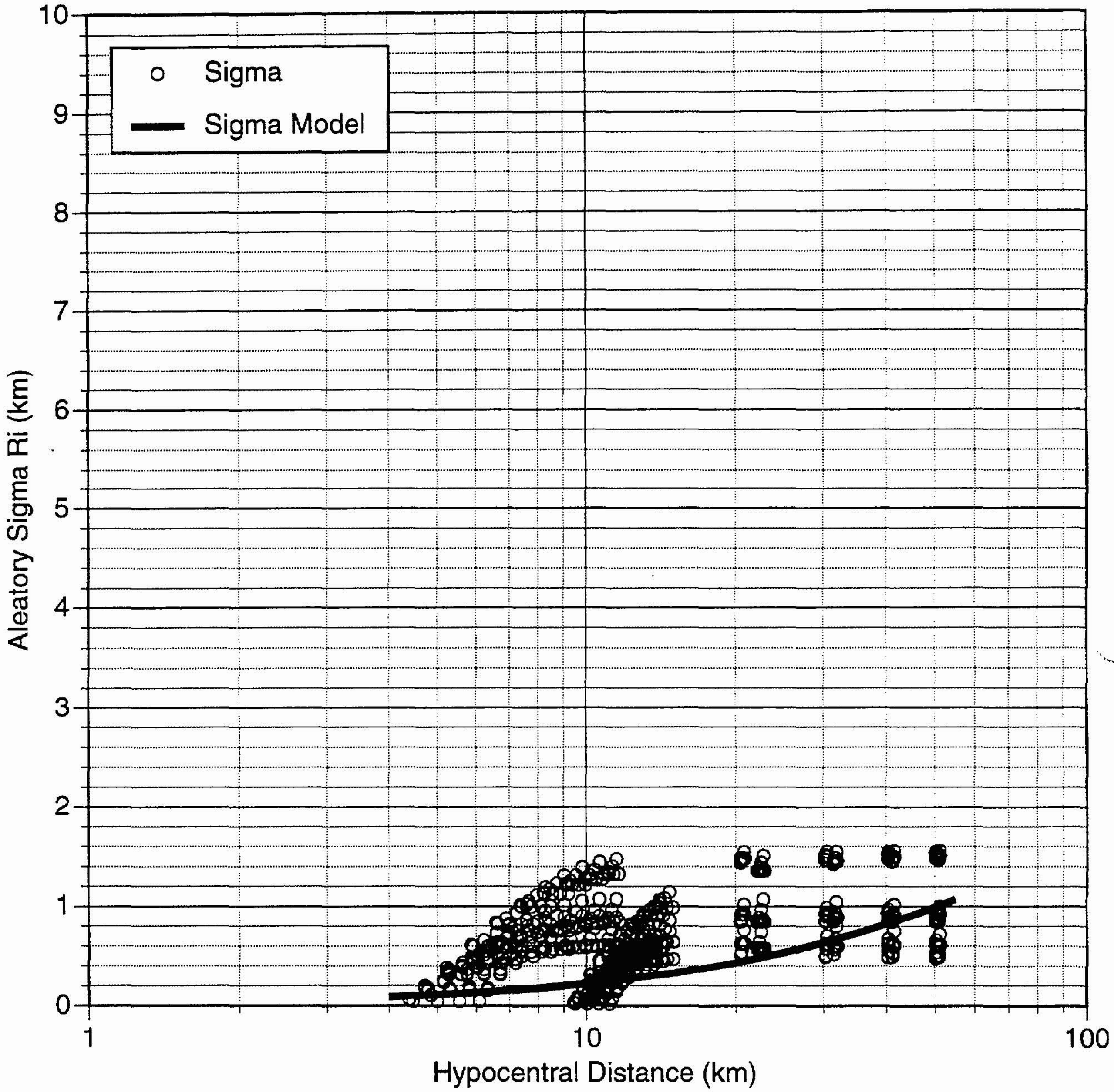

Figure J-6a Aleatory variability of the individual estimates of Ri given a hypocentral distance and M_W 5.0 and T = 0.25

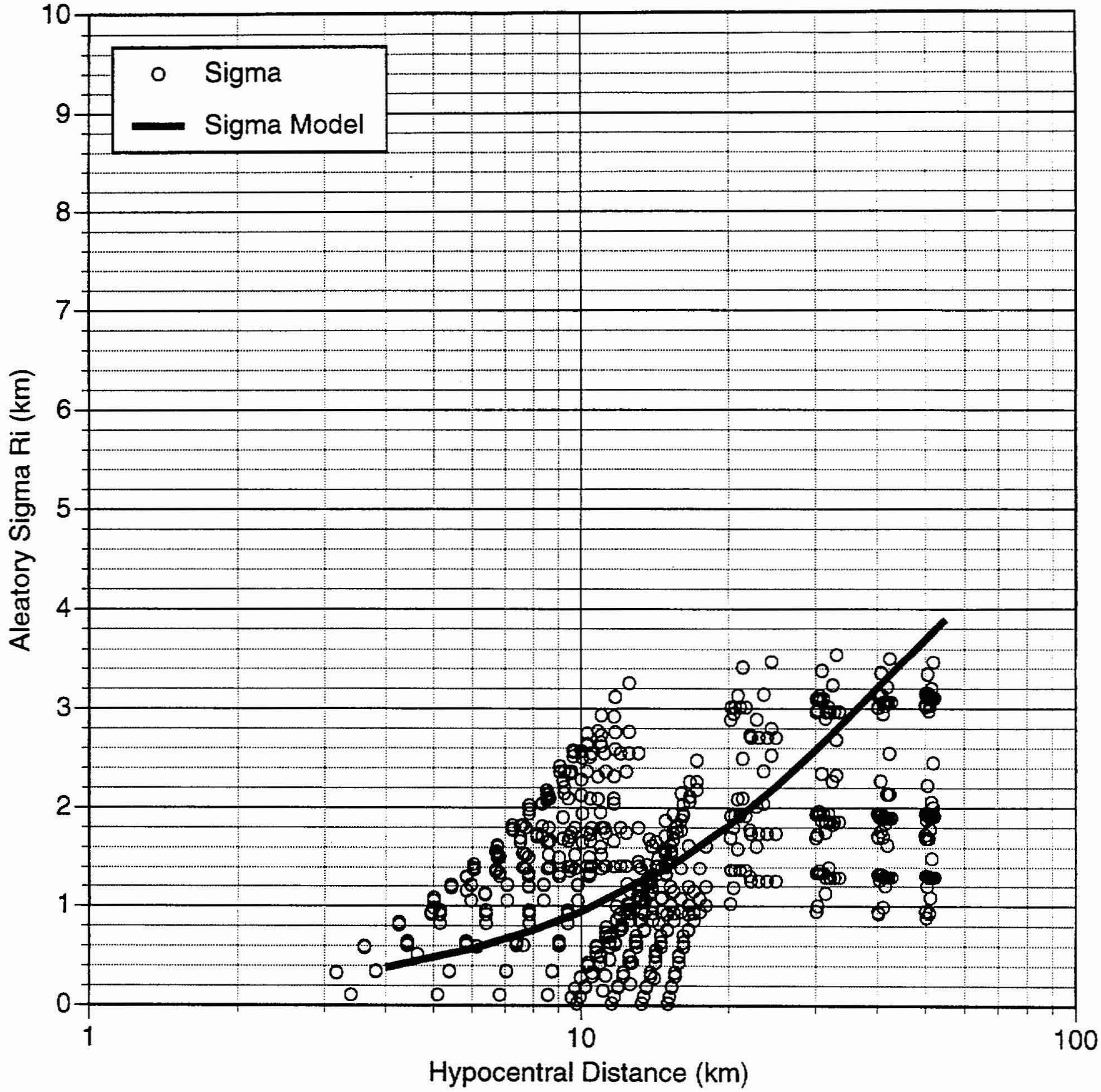

Figure J-6b Aleatory variability of the individual estimates of Ri given a hypocentral distance and M_W 5.8 and T = 0.25

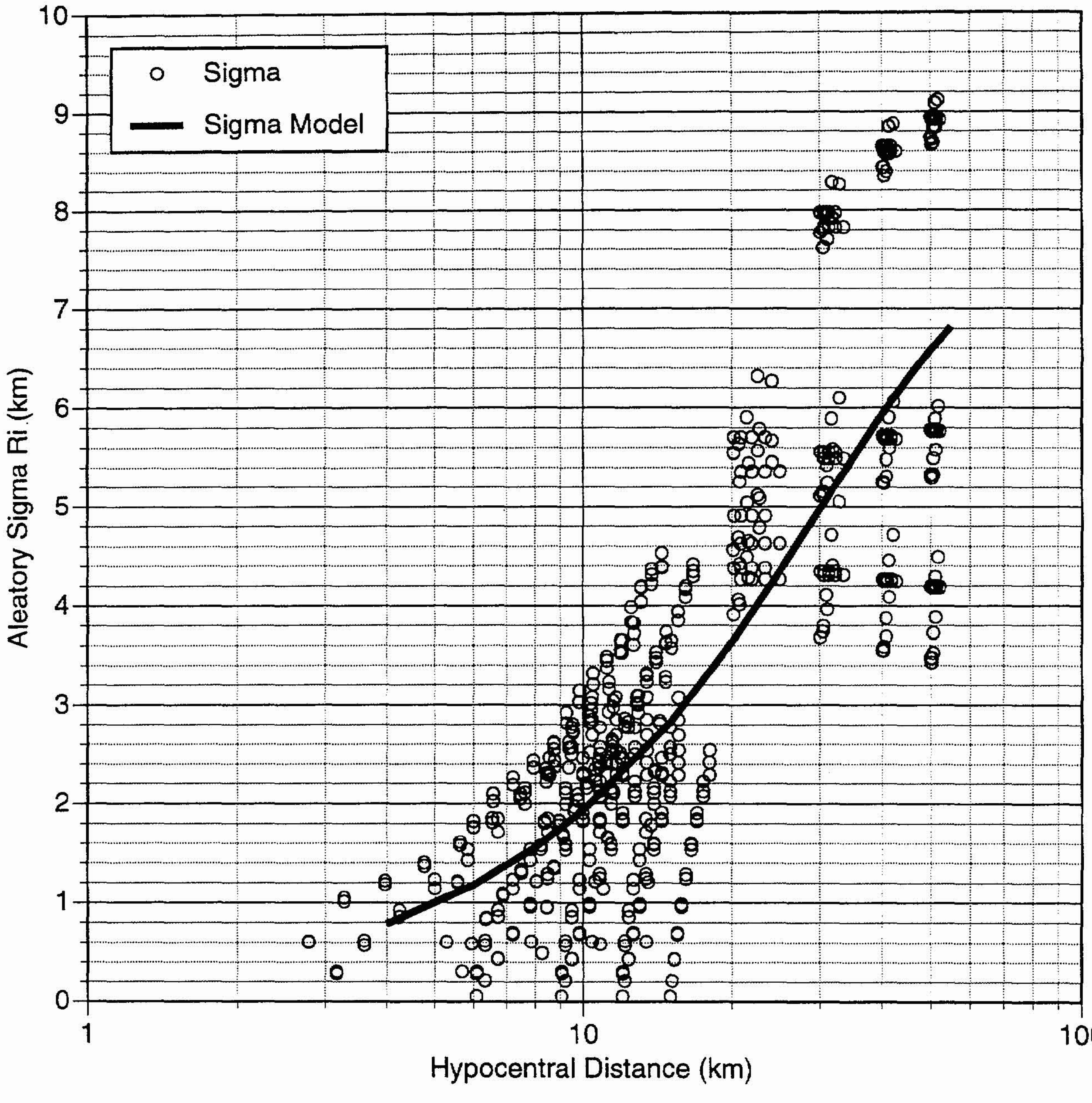

Figure J-6c Aleatory variability of the individual estimates of Ri given a hypocentral distance and M_W 6.5 and T = 0.25

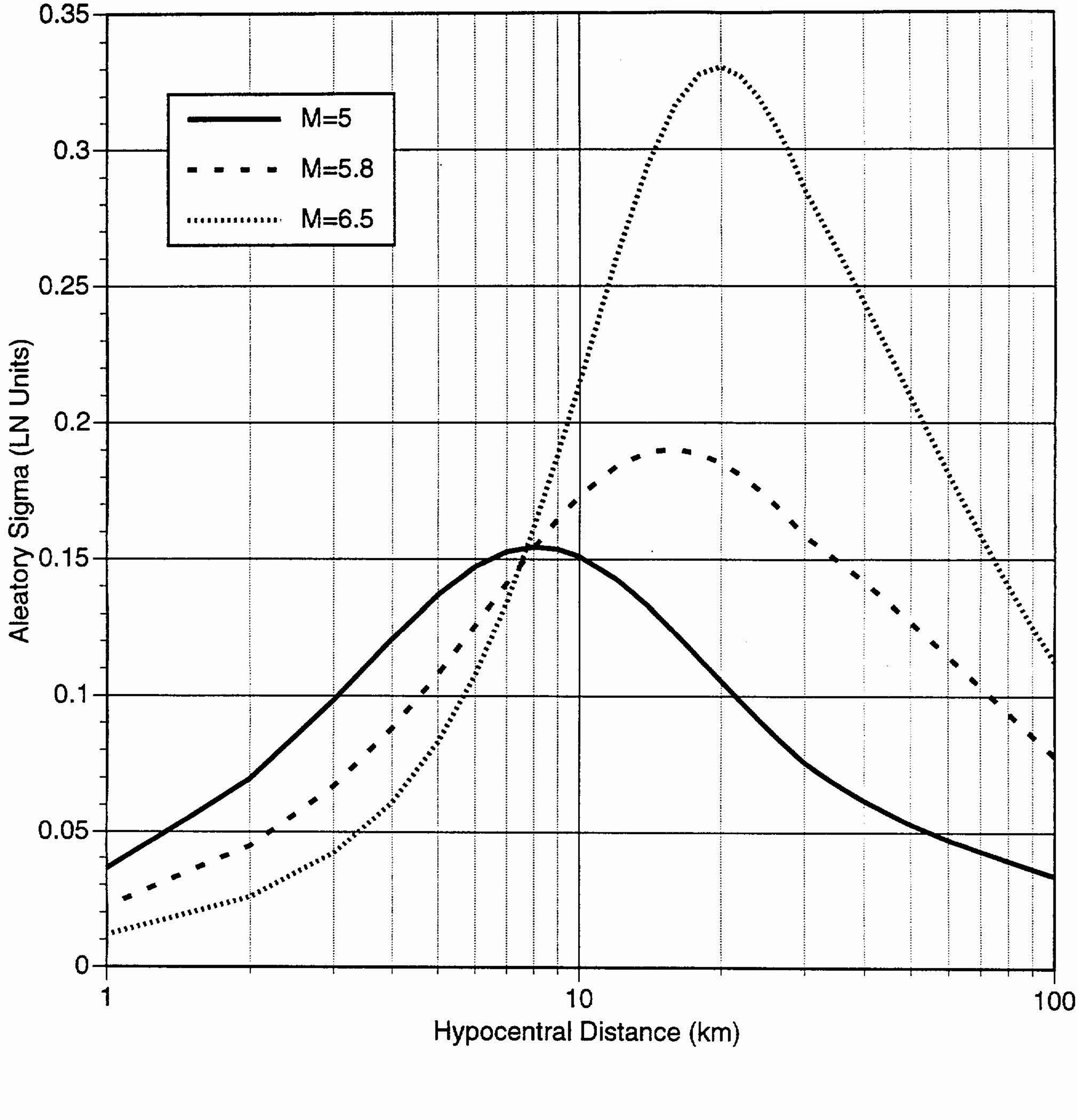

Figure J-7 Example of additional aleatory variability (Sigma hypo) in the natural log ground motion due to hypocentral distance. This is added (using SRSS) to the aleatory variability given by the experts. This example is for horizontal PGA using the Anderson model

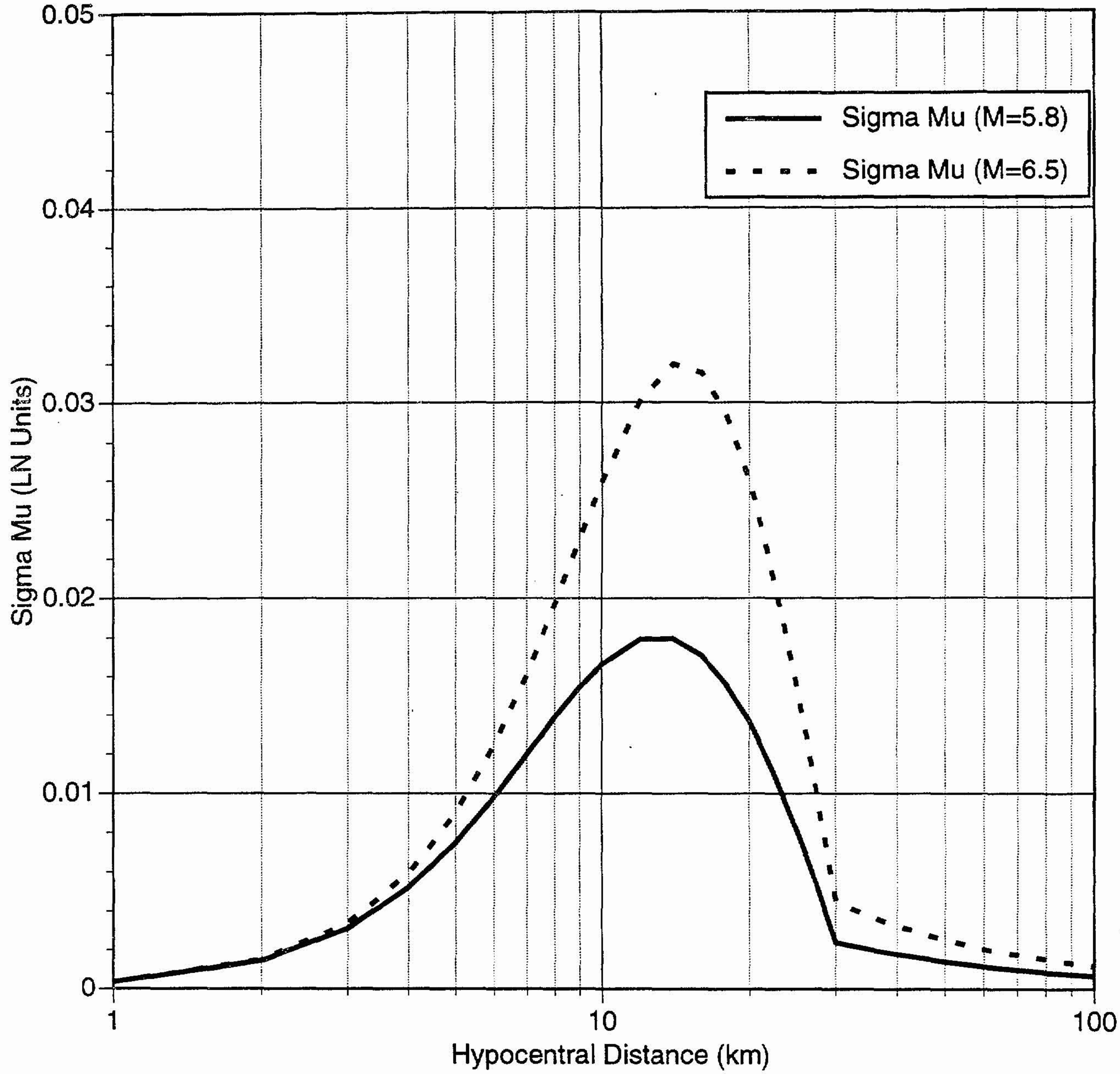

Figure J-8 Example of epistemic uncertainty in the median natural log ground motion due to uncertainty in the T value (depth distribution of hypocenters). This example is for horizontal PGA using Anderson's results. This additional epistemic uncertainty is negligible.