File: \peer_nga\dave\More Data for Cape Mendocino 1992.doc
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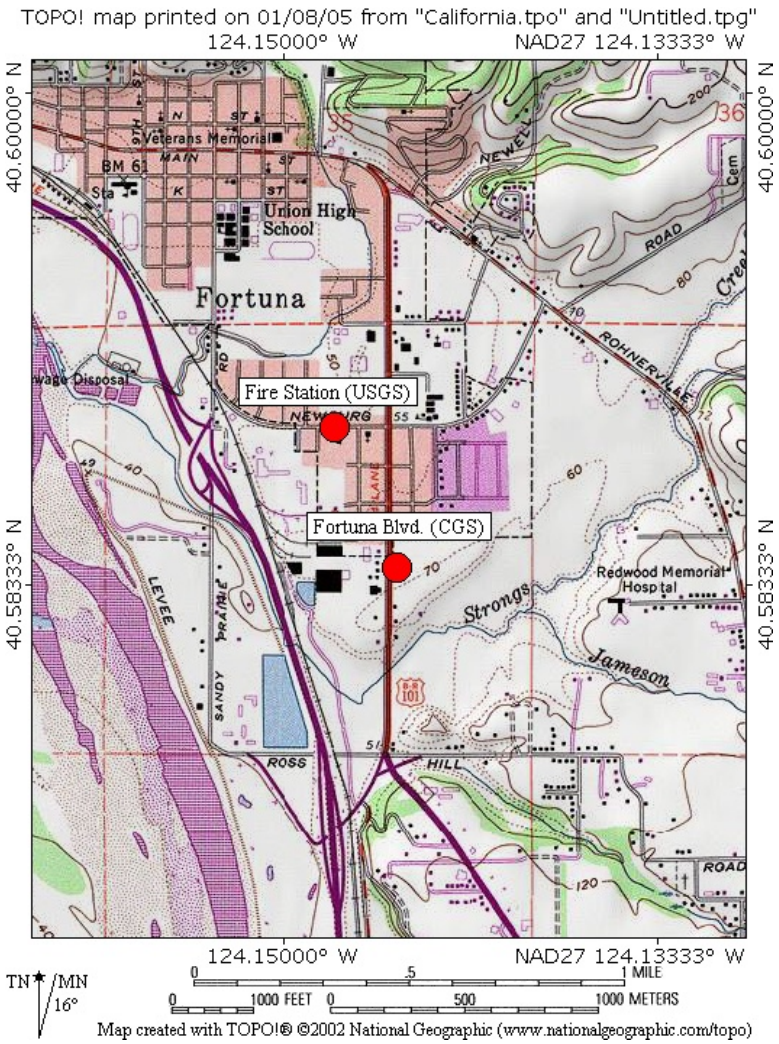
I notice that there are no USGS data in the NGA database for the 1992 Cape Mendocino mainshock. Unprocessed data have been available for at least four years from http://nsmp.wr.usgs.gov/data_sets/petrolia.html. For use in the subduction ground-motion paper that Gail and I published I did some quick processing of the data (using a low-cut filter of 0.2 Hz for all records), and summaries of the resulting of the resulting accelerations and velocities for those records is included in Table 1. For comparison, Table 2 contains information for the CGS recordings. Note that the USGS data are distances and ampltidues to be relevant, with a number of peak accelerations between about 0.2 and 0.4g, and PGV as large as 75 cm/s. It is quite likely that the data would permit filtering at lower frequencies (see below for one example) --- the choice of 0.2 Hz was conservative, and no effort was made to explore lower frequency filters.

One possible reason that the USGS data were not included is that the file headers indicate that there were stalls on a number of recordings. This is probably not a good reason to exclude the data: there are indications of definite stalls on 3 of the 8 recordings, possible stalls on 2 recordings, and no stalls on 3 recordings. In addition, the times of the stalls for several of the records identified as having stalls do not coincide with the portion of strong shaking. Finally, Chris Stephens looked at what seems to be the worst case (Ferndale), and thinks that the record has had a first order correction applied to account for the stalls (he also points out that there are stretches as well as stall). It is possible to do a correction because time code traces are available on the recordings (UNLIKE THE RINALDI RECEIVING STATION RECORD OF THE 1994 NORTHRIDGE MAINSHOCK, WHICH ALSO HAD STALLS (Trifunac et al., 1998). I also studied the displacements from two closely located stations in Fortuna (see Figure 1 for locations). The CGS recordings used a low-cut filter tapering from 0.07 to 0.05 Hz; to use a similar filter for the USGS data, I applied an acausal Butterworth filter with a 0.06 corner frequency. The comparisons are in Figure 2. Although the file header indicates possible stalls at 50+0.5 and 50+6 s ("50" is the length of the zero pad applied before filtering), they do not seem to have had much effect on the motions (judging from the relatively good match with the CGS displacements).

In addition to the data, there are shear-wave velocity profiles at Ferndale (from Shannon and Wilson) and Loleta, College of the Redwoods, Fortuna Fire Station, Redwood Village Mall (Fortuna), and Rio Dell overcrossing free field (the latter two are CDMG strong motion stations for which data are in the NGA database). The velocities are in USGS OFR 02-203 and are available from the compilation I put together (see my web site: http://quake.usgs.gov/~boore).

It would be a shame not to include the USGS data in the NGA database.

--Dave


TOPO! map printed on 01/08/05 from "California.tpo" and "Untitled.tpg"
124.15000° W
NAD27 124.13333° W
40.60000° N
40.58333° N
Veterans Memorial
Union High School
Fortuna
Fire Station (USGS)
Fortuna Blvd. (CGS)
Redwood Memorial Hospital
Strongs
Jameson
ROSS
HILL
ROAD
ROHNERVILLE
NEWBURG
LEVEE
PRAIRIE
SANDY
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NEWELL
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16°
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Map created with TOPO!® ©2002 National Geographic (www.nationalgeographic.com/topo)

Figure 1.

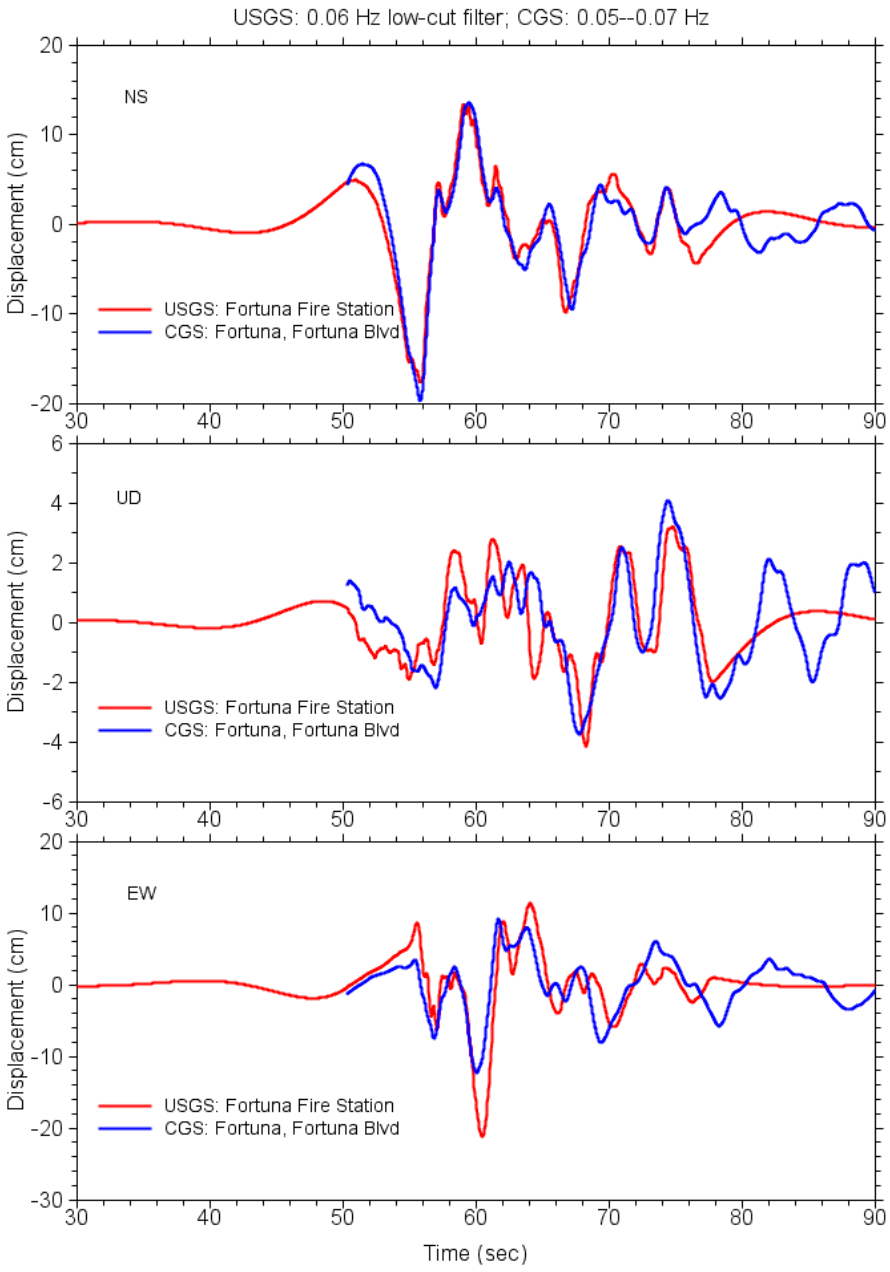

Figure 2. The USGS records include the padded portions before (less than 50 sec) and after (greater than 78 sec) the recorded motions.

Table 1. USGS recordings (with 0.2 Hz low-cut filter)

station_name	r_ep	ivrt	ihrz	fltr1	fltr2	pga(cm/s/s)	pgv(cm/s)
Butler Valley Sta. 2	60	****	60	0.2	-2	152.1	14.1
Butler Valley Sta. 2	60	0	****	0.2	-2	72.7	10.7
Butler Valley Sta. 2	60	****	330	0.2	-2	136.7	20.4
Ferndale FS	24	****	360	0.2	-2	266.5	39.3
Ferndale FS	24	0	****	0.2	-2	61.9	7.4
Ferndale FS	24	****	270	0.2	-2	452.3	74.8
Loleta FS	32	****	360	0.2	-2	251.5	24.5
Loleta FS	32	0	****	0.2	-2	132.4	5.7
Loleta FS	32	****	270	0.2	-2	246.8	29.4
Centerville Beach	22	****	360	0.2	-2	451.3	59.4
Centerville Beach	22	0	****	0.2	-2	137.2	11.5
Centerville Beach	22	****	270	0.2	-2	302.7	48.4
College of the Redwoods	38	****	360	0.2	-2	170.5	29.3
College of the Redwoods	38	0	****	0.2	-2	73.5	7.1
College of the Redwoods	38	****	270	0.2	-2	168.7	25.1
South Bay Union School	42	****	360	0.2	-2	189.6	23.2
South Bay Union School	42	0	****	0.2	-2	64.9	6.6
South Bay Union School	42	****	270	0.2	-2	149.3	23.5
Fortuna FS	29	****	360	0.2	-2	281	27.4
Fortuna FS	29	0	****	0.2	-2	80.5	6.3
Fortuna FS	29	****	270	0.2	-2	348.5	33.7
Bunker Hill	15	****	360	0.2	-2	225.5	29.1
Bunker Hill	15	0	****	0.2	-2	76.6	12.4
Bunker Hill	15	****	270	0.2	-2	185	46.6

Table 2. CGS data

station_name	r_ep	ivrt	ihrz	fltr1	fltr2	pga(cm/s/s)	pgv(cm/s)
CAPE MENDOCINO	10	90	90	0.05	0.07	1019.4	40.5
CAPE MENDOCINO	10	0	0	0.05	0.07	738.9	60.3
CAPE MENDOCINO	10	90	0	0.05	0.07	1468.3	126.1
EUREKA - 5TH & H FEDERAL BLDG.	52	90	80	0.12	0.24	152.7	28.6
EUREKA - 5TH & H FEDERAL BLDG.	52	0	0	0.12	0.24	35.4	6.2
EUREKA - 5TH & H FEDERAL BLDG.	52	90	350	0.12	0.24	86.4	17
EUREKA - MYRTLE & WEST AVENUE	52	90	90	0.08	0.16	174.7	28.6
EUREKA - MYRTLE & WEST AVENUE	52	0	0	0.08	0.16	41.6	7.3
EUREKA - MYRTLE & WEST AVENUE	52	90	0	0.08	0.16	151	20
FORTUNA - 701 S. FORTUNA BLVD.	28	90	90	0.05	0.07	111.9	20.9
FORTUNA - 701 S. FORTUNA	28	0	0	0.05	0.07	47.9	5.8

BLVD.							
FORTUNA - 701 S. FORTUNA BLVD.	28	90	0	0.05	0.07	113.6	28.8
PETROLIA	5	90	90	0.05	0.07	649.4	89.5
PETROLIA	5	0	0	0.05	0.07	159.7	20.9
PETROLIA	5	90	0	0.05	0.07	578.1	48.3
RIO DELL - 101/PAINTER ST. OVE	21	90	272	0.05	0.07	378.3	44.7
RIO DELL - 101/PAINTER ST. OVE	21	0	0	0.05	0.07	191.5	10.2
RIO DELL - 101/PAINTER ST. OVE	21	90	2	0.05	0.07	538.5	42.6
SHELTER COVE - AIRPORT	36	90	90	0.25	0.5	173	6.9
SHELTER COVE - AIRPORT	36	0	0	0.25	0.5	49.5	1.8
SHELTER COVE - AIRPORT	36	90	0	0.25	0.5	222	7

Trifunac, M.D., M.I. Todorovska, and V.W. Lee (1998). The Rinaldi strong motion accelerogram of the Northridge, California earthquake of 17 January 1994, *Earthquake Spectra* **14**, 225--239.

Dave's reading notes: Add intervals to correct for many stalls. The resulting a,v,d, and rs differ from the ``old" both because of the added stalls and because some peaks in the old digitizing were underestimated. Overall, however, the results do not differ by much. This may be because the stalls are apparently of short duration (the longest being 0.1 sec, but this being well after the strong shaking) and because no stall occurred during the strongest pulse. A complication in the analysis is that the 1/2 sec time marks are missing on the top and bottom of the trace--- so time has to be obtained by assuming 1 cm = 1 sec.