BASIX

BASIX 1991 WIDE-ANGLE FAN SHOTS

Submitted by
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BASIX Stanford Reftek Data - 1991 Wide-angle Fans

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Using IRIS/Passcal Reftek digital seismographs, wide-angle seismic refraction and reflection data were recorded in a fan geometry across the major faults in the San Francisco Bay Area during the 1991 BASIX survey. An airgun array source from a multichannel reflection survey (and 2 lines exclusively for wide-angle recording) shot in the San Francisco Bay Area waterways was recorded on land north and south of the source along the San Gregorio, San Andreas, Hayward/Rogers Creek, Calaveras/Green Valley, and Antioch Faults.

The acquisition of the multichannel data, and a description of the source used for the wide-angle data, is outlined in McCarthy and Hart 1993, USGS Open File Report 93-301. Other wide-angle data recorded during the survey are described by Brocher and Moses 1993, USGS Open File Report 93-276, and by Brocher and Pope 1994, USGS Open File Report 94-156.

Five exabyte tapes contain the Stanford-Reftek data in SEGY format. Multiple SEGY files are on each tape, separated by tape marks.

Shot lines are defined as:

100 = BASIX lines 101-113 = 8890 shots
200 = BASIX lines 201-202 = 1560 shots
obs2 = BASIX lines TR1/OBS2 = 1094 shots

The shots are NOT sorted or binned by location, but are simply ordered by sequential shotpoint number. The ship usually reversed its path during a line, and shot lines from subsequent nights overlap.

Reftek receiver stations are named N/S for north/south of the shot lines, a number for the general site, and E/W for the eastern/western nearby stations. For example, S8E is the eastern station of the pair near Palo Alto, south of the shot lines. Stations B2, B4, and B5 are single-channel stations east of Berkeley that recorded the western shot lines. Stations A1-A5 have not been archived due to data recovery and timing problems.

Each file contains a single Reftek station and a shot line as above. The trace order is:

shot1-channel1, shot1-channel2, ..., shot1-channel6, shot2-channel1, ...

where the channels are from a 6-channel 500m-long vertical-component array. This array can be safely stacked (after editing out bad channels and traces) at the reducing velocity provided.

The traces are 30 seconds long, 50 samples/second, 1501 samples. They are reduced at 6 km/s, and the traces start at -5.000 s reduced time. The headers should contain all geometry and other identification information. They are standard SEGY, extended by the USGS definition for refraction data (Luetgert et al. 1990, USGS Open File Report 90-426). I have defined "ictime", bytes 109-110 integer, as the trace start time minus the shot time (i.e., the reducing time minus 5s) in milliseconds. All other header words are defined by Luetgert et al. 1990. The data are 2-byte integer. Zeroed traces are inserted for shots that were not recorded at that receiver.

There is some evidence that the shot times used to reduce line obs2 are incorrect by an integer number of seconds at the west (large shot number) end of the line. The evidence is poor because the data for these shots are poor.

Further processing I'd recommend prior to interpretation (but that I didn't want to push on others) would include:

edit out bad channels or shots,
filter,
stack 6-channel array (at 6km/s reducing velocity),
filter,
bin shots by location along crooked multi-pass lines (NOT by offset or azimuth),
filter.

Timing problems were encountered at several sites, and significant effort was made to untangle these problems. The sites that had problems affecting all or part of the data are noted below:

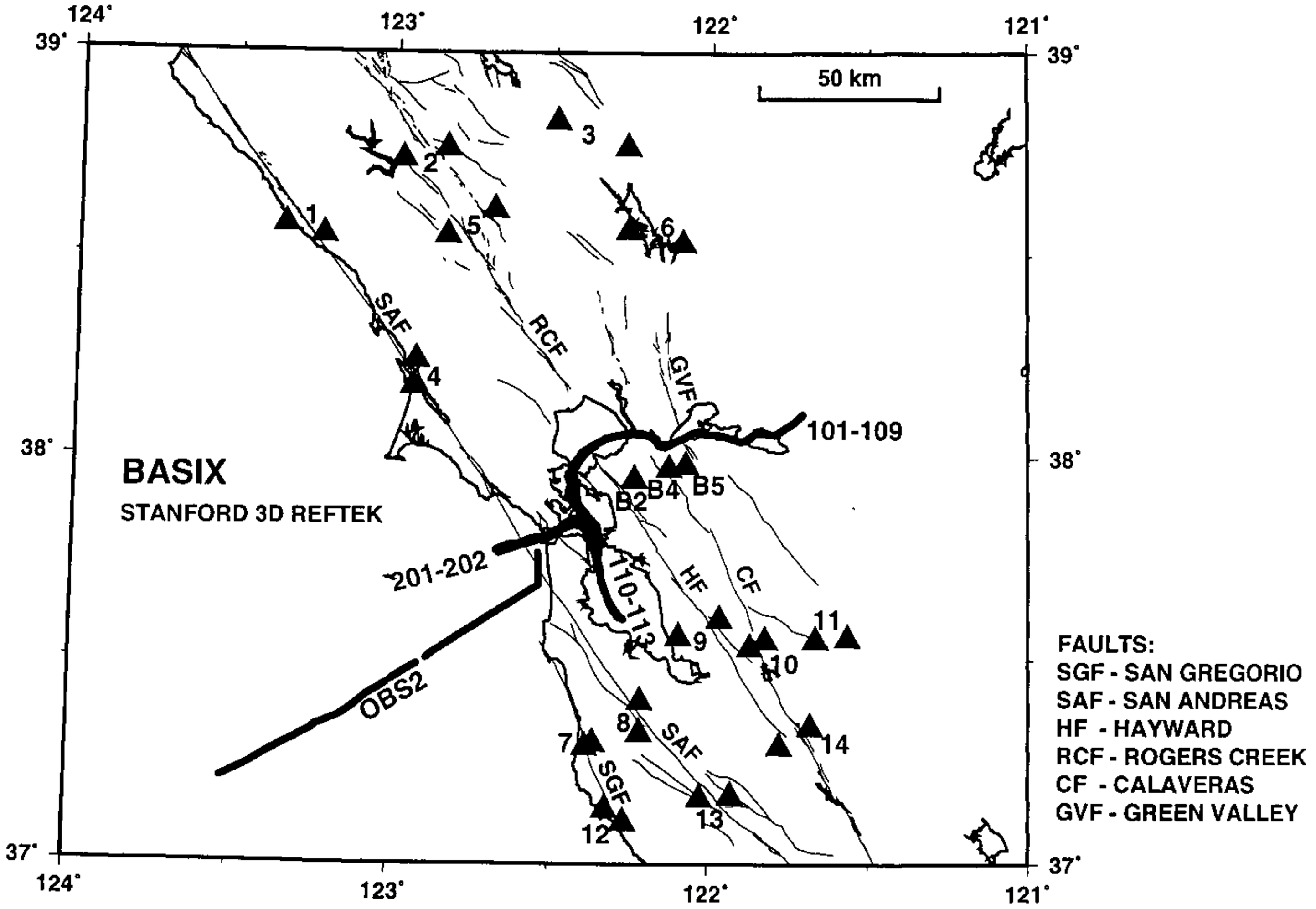
N1E	linear drifts, false jerks
N1W	linear drifts, 10 s offset
N2E	2 s offset
N3W	10 s offset
N4E	10 s offset
N5E	linear drifts, false jerks, N s offsets
S8E	linear drifts, false jerks, N s offsets
S8W	linear drifts
S9W	linear drifts, false jerks
S10E	linear drifts, extrapolated drift
S11W	extrapolated drift
S12E	linear drifts, false jerks
S14E	linear drifts, extrapolated drift
A1-A5	linear drifts, master clock not rated
B2-B5	linear drifts, N s offset

<u>Tape 1:</u>			
N1E	100, 200, obs2	files 1-3	
N1W	100, 200, obs2	files 4-6	
N2E	100, 200, obs2	files 7-9	
N2W	100, 200, obs2	files 10-12	
N3E	100	file 13	
N3W	100	file 14	
<u>Tape 2:</u>			
N4E	100	file 1	
N4W	100, 200, obs2	files 2-4	
N5E	100, 200, obs2	files 5-7	
N5W	100, 200, obs2	files 8-10	
N6E	100	file 11	
N6W	100	file 12	
<u>Tape 3:</u>			
S7E	100, 200, obs2	files 1-3	
S7W	100, 200, obs2	files 4-6	
S8E	100, 200, obs2	files 7-9	
S8W	100, 200, obs2	files 10-12	
S9E	100, 200	files 13-14	
S9W	100, 200	files 15-16	
<u>Tape 4:</u>			
S10E	100	file 1	
S10W	100	file 2	
S11E	100	file 3	
S11W	100	file 4	
B2	100, 200, obs2	files 5-7	** single-channel station
B4	100, 200, obs2	files 8-10	** single-channel station
B5	100, 200, obs2	files 11-13	** single-channel station
<u>Tape 5:</u>			
S12E	100, 200, obs2	files 1-3	
S12W	100, 200, obs2	files 4-6	
S13E	100, 200, obs2	files 7-9	
S13W	100, 200, obs2	files 10-12	
S14E	100	file 13	
S14W	100, 200, obs2	files 14-16	

SHOT LINES RECORDED AT EACH RECEIVER

	101	102	103	104	105	107	108	109	110	111	112	113	201	202	OBS2
N1E	P	P	P	P	F	F	F	F	F	F	F	F	F	F	Pp
N1W	P	P	P	F	F	F		G	F	P	P	P	F	F	Pp
N2E	P	P	P	F	F	Fp			F	F	F	F	F	F	Pp
N2W	P	P	P	F	F	F	G	G	G	G	G	G	G	F	Pp
N3E				G											
N3W	F	F	G	G	G	G	G	G							
N4E	P	P	F		G	G	G	G	G	G	G	G			
N4W	P	P	P	Fp	F		G	G	G	F	F	F	F	F	F
N5E	F	F	F	G	G	G	G	G	G	G	G	G	G	G	P
N5W	P	P	P	F	F	F	F	F	F	F	F	F	F	F	P
N6E		G	G	G	Gp										
N6W	G	G													
S7E		F	F					G	G	G	G	G	G	G	G
S7W	P	P	P	Pp						F	F	F	F	F	F
S8E	P	P	P	P	F	G	G	G	G	G	G	G	G	G	Pp
S8W	P	P	P	P	P	P	P				G	G	G	G	Pp
S9E				G	G	G	G	G	G	G	G	G	G		
S9W				F	F		F	F	F	F	F	F	F		
S10E	F	F	F	G	G	G	Gp								
S10W				G	G	G									
S11E	G	G	G	G	G										
S11W		G	G	G											
S12E						F	F	F		G	G	G	F	F	F
S12W	P	P	P	Pp		P	P	P		P	P	P	P	P	P
S13E			F	F	F	F	F	Gp	G	G	G	G	G	G	Gp
S13W	F	F	F	G	G	G	G	G	G	G	G	G	G	G	Pp
S14E	F	G	G					F	G	G	G	G			
S14W				F	G		Gp					G	G	G	Fp
B2										G	G	G	G	G	P
B4										G	G	G	G	G	P
B5										G	G	G	G	G	P

A very subjective quality index (Good/Fair/Poor) indicates which shot lines were recorded at each receiver. (p = line partially recorded)
Lines 101-105 are in the Sacramento River and Suisun Bay; Lines 107-109 are in San Pablo Bay, Lines 110-113 are in San Francisco Bay (Line 112 is also called OBS1); Lines 201-202 are from San Francisco Bay to the Pacific Ocean; Line OBS2 is in the Pacific Ocean.


124°
123°
122°
121°
39°
38°
37°
50 km
BASIX
STANFORD 3D REFTEK
1
2
3
4
5
6
7
8
9
10
11
12
13
14
B2
B4
B5
SAF
RCF
GVF
HF
CF
SGF
101-109
110-113
201-202
OBS2
FAULTS:
SGF - SAN GREGORIO
SAF - SAN ANDREAS
HF - HAYWARD
RCF - ROGERS CREEK
CF - CALAVERAS
GVF - GREEN VALLEY