

ALAR

Aleutian Arc Seismic Experiment

Submitted By

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PASSCAL Data Report 96-016



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Data Report for the 1994 Southwest-Alaska Seismic Experiment

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1 Introduction

In July 1994 Stanford University collaborated with The University of Delaware, LDEO, and WHOI to record onshore multi-channel marine seismic lines in the Aleutian region of Alaska. The study was designed to investigate the structure of a volcanic island arc and the growth of continental crust. The recorded marine seismic lines and the locations of the land recording stations are shown in figure 1.

2 Data Acquisition

The locations for the land recorders were chosen to cover the eastern Aleutian Arc as evenly as possible and as close as possible to the ship track in order to record short offsets. The stations were deployed by small airplanes, which restricted the choice of sites to the immediate vicinity of appropriate landing places. Since the instruments were supposed to record for up to two weeks without servicing between deployment and pick-up, we deployed two independent recording systems at most sites. The sensors were either buried in firm soil or plastered to bedrock or building foundations. The horizontal components of the three-component geophones were oriented north (channel 2) and east (channel 3) with respect to magnetic north. The exact

location of each station was determined by averaging the horizontal positions provided by the internal GPS (Global Positioning System) clock every hour. The RMS-error of the GPS time series was about 30 m for a one-week recording period. Station elevation was measured from USGS topographic maps (available scales were 1:63360 and 1:250000).

3 Instruments

We used REFTEK 72A-07/G/1GB three-channel recorders owned by IRIS/PASSCAL in continuous recording mode. We recorded at a rate of 100 samples/s; timing was provided by an internal GPS synchronised chronometer, which is consistent with the timing of the marine shots. The sensors were Mark Products L-28 LBH 4.5 Hz three-component geophones.

4 Data Reduction

The raw field data were stored in PASSCAL-SEG Y format (ref2seg y routine) as continuous data broken up into 10-min-long files separate for each channel (these data are available from the authors at the Department of Geophysics, Stanford University, Stanford, CA, 94305-2215). These were then cut into receiver gathers according to the shot time-and-position files provided by the marine survey. Time corrections were applied as recorded in the REFTEK log files. Station 27 (Cape Newenham) did not receive GPS satellite time during the recording period. A clock drift of 28 ms was recorded at pick-up time by comparison with GPS satellite lock. DC offsets were removed from the final traces. The final SEG Y data set has the following format:

- one SEG Y file for each channel of a single station on one 120 m DDS2 DAT tape.
- 10 ms sample interval
- 6000 samples/trace
- source- and receiver positions are geographic coordinates (WGS-84 reference system) in arcseconds

- receiver elevations are in metres
- offsets (in metres) are calculated for a spherical earth of 6370949 m radius
- traces are sorted by FFID (bytes 9–12) or source number (bytes 17–20)
- bytes 173 and 174 contain the station number
- channel numbers (bytes 13–16) are 1 for the vertical, 2 for the north, and 3 for the east component

5 Station Table

Number	Station Name	Latitude	Longitude	Elevation (m)	# of traces
1	Atka 1	52.23087	-174.22234	50	35319
2	Atka 2	52.20401	-174.20800	100	35319
3	Nikolski 1	52.92432	-168.91967	50	38724
4	Nikolski 2	52.97345	-168.85180	150	38735
5	Fort Glenn 1	53.39465	-167.90602	50	62506
6	Fort Glenn 2	53.39488	-167.84792	10	62826
7	Chernofski	53.38887	-167.51456	50	55219
8	Kashega	53.45852	-167.13869	25	54806
9	Captain's Bay 1	53.82544	-166.60549	45	36405
10	Captain's Bay 2	53.82605	-166.60481	30	18377
11	Iliuliuk 1	53.84169	-166.50627	95	18911
12	Iliuliuk 2	53.84085	-166.50697	100	18678
13	Beaver Inlet	53.72962	-166.32657	30	50710
14	Akutan	54.13588	-165.76442	25	49407
15	Akun	54.24761	-165.57701	50	49392
16	Cape Sarichef 1	54.58772	-164.90612	85	55398
17	Cape Sarichef 2	54.59199	-164.87656	210	55480
18	False Pass	54.85078	-163.43011	5	20698
19	Izembek	55.29703	-162.79035	5	25691
20	Mount Simeon	55.18563	-162.78601	120	24612
21	Sand Point 1	55.32382	-160.50307	60	22435
22	Sand Point 2	55.31785	-160.51509	30	20137
23	David River 1	55.90942	-161.63680	20	44426
24	David River 2	55.91165	-161.63685	15	44340
25	Port Heiden 1	56.94430	-158.57437	35	24369
26	Port Heiden 2	56.96715	-158.66771	15	24216
27	Cape Newenham	58.64383	-162.05027	200	32446

Southwest Alaska MCS lines and land stations

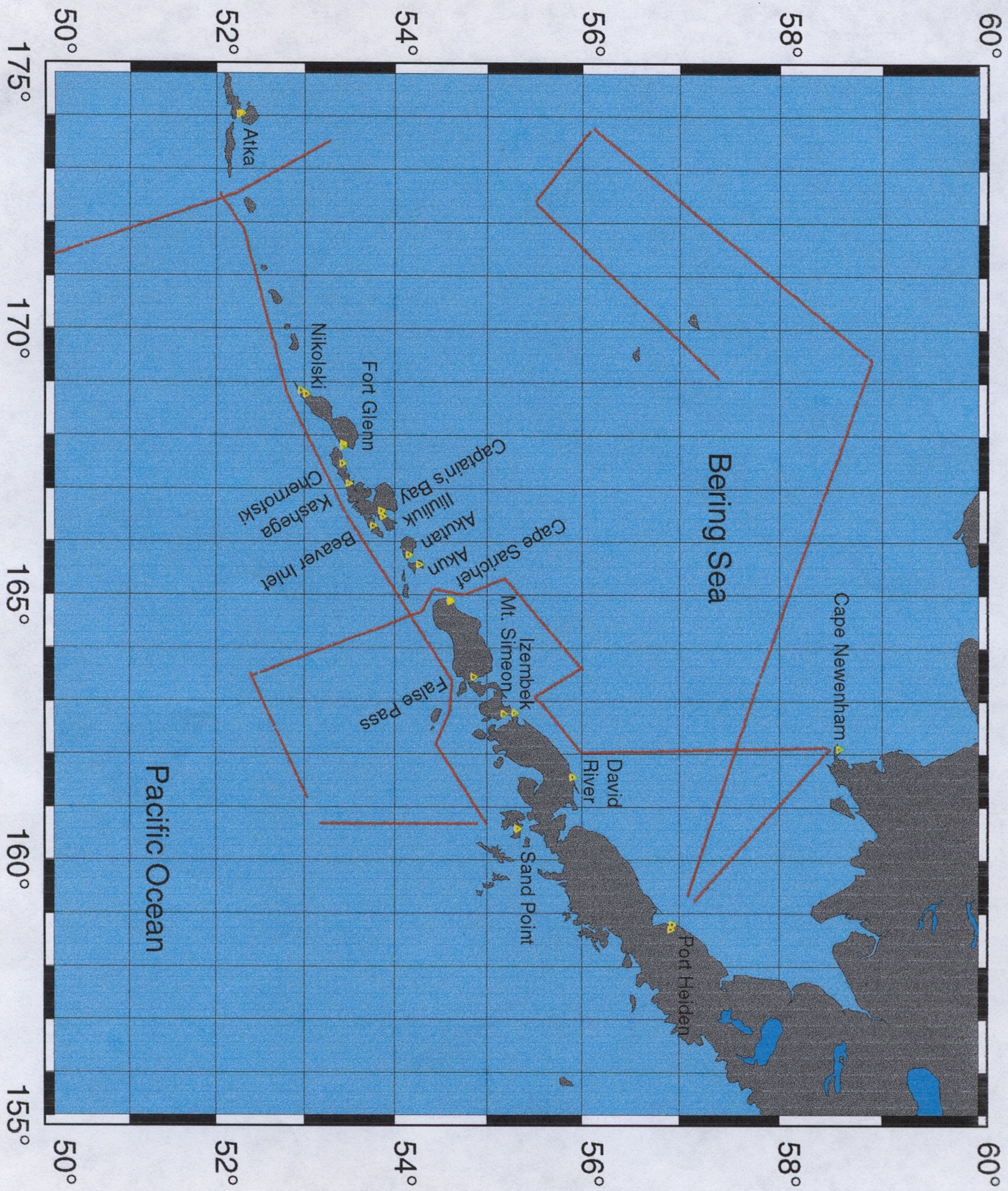


Figure 1

Map of southwest Alaska, showing the land recorders (yellow triangles) and the shotpoints of the marine seismic lines (red)