Portable Broadband Instrument Center (PBIC)
1993 Annual Report

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Earthquake response

The Joshua Tree/Landers/Big Bear aftershock sequences occupied the attention of the PBIC for part of 1993. The PBIC finished the preliminary data association for the Joshua Tree portable aftershock deployment about mid-year. The associated dataset was delivered to the SCEC Data Center shortly thereafter. It has since been forwarded to UCSD where it is currently being phase picked and put into a format suitable for the Data Center's database. The adjoining table describes the event association performed at the PBIC on the portable dataset. The stations column represents the number of portable stations that recorded a given event.

Stations	Events
10	75
9	114
8	236
7	352
6	660
5	1232
4	1867
3	2689
2	3491
Total	10716

Equipment Usage

The following table summarizes the projects that utilized PBIC equipment in 1993. The vast majority of equipment remained up and in the field the entire year.

Dates	Institution	PI(s)	Experiment
09/21/92-07/19/93	USC	Abercrombie	Cajon Pass
09/21/92-10/25/93	USC	Yong-Gang Li	LA Basin
01/11/93-10/20/93	UCSB	Archuleta	Keenwyld
03/11/93-10/25/93	UCSB/USC	Archuleta/Chin	LA basin
09/13/93-10/14/93	LLNL	Goldstein/Rock	NTS Explosion
06/25/93-10/25/93	Princeton/UNR	Phinney	Sierra Transect
11/03/93-12/20/93	UCLA	Davis	SCEC/LARSE project

The PBIC has assisted in the deployment and maintenance of several portions of the SCEC/LARSE experiment spread. The PBIC has also assisted USC with the recent reinstallation of the Cajon Pass site using PASSCAL equipment.

Hardware

One recording system was stolen from the Cajon Pass site in July. A replacement system has been ordered with the majority of the cost covered by UCSB insurance. Several solar panels have been stolen from various experiment sites.

The two 24 bit DASs purchased early in 1993 have not performed quite as expected. There were several software problems that arose in early field deployments and an intermittent hardware problem with one unit that has not been resolved yet.

Eight GPS subsytems have been ordered to upgrade the PBIC's current stable of instruments to the more modern timekeeping system.

Purchases with this years equipment funds consisted of three more portable recorders, passive sensors and I/O devices. The recorders have increased dynamic range (24 bits) in response to PBICC recommendations. All new DASs are equipped with GPS timing subsystems.

Sensor Calibration

The PBIC is in the process of calibrating all of the SCEC sensors. It is hoped that an organized system of calibration will provide the SCEC user community with better response information for detailed analysis. This system should also provide tracking of sensor response changes over time and earlier detection of sensor problems.

The PBIC has integrated sensor response software from LLNL with a series of shells providing a means for performing organized calibrations. An additional program produces PostScript files describing sensor response characteristics in detail. Each page contains information about when and where calibrations were run, sensor parameters taken from the manufacturer's specification sheets, parameters derived using the LLNL software and four graphs depicting the sensor's response (Figure 1). The graphs provide a means of viewing the velocity sensitivity, phase shift, group delay and the actual data, both recorded and modeled, used to derive the calibration information. The sheet also includes the exact SAC routine call to deconvolve the recorded data back to earth motion. Copies of the PostScript files are maintained in the anonymous ftp account at quake.crustal.ucsb.edu:/scec/Cal.

PBIC personnel are collaborating with engineers at USC on methods of calibrating sensors that do not have calibration coils using these software packages. Hardware development has included fabrication of a box that can be used to provide a step response to the signal coil of a geophone and record the output.

Software

Development has continued on several software packages. Interaction with the PASSCAL programming group increased dramatically after the PASSCAL sponsored, April workshop in Boulder, CO. SCEC software is now included in the standard PASSCAL software release. In addition, modifications to PASSCAL software made by the PBIC have been integrated into the standard software.

The anonymous ftp account at quake.crustal.ucsb.edu has been reorganized. SCEC supported software is now in its own directory (/scec). The account is still in the process of being organized to provide SCEC members access to the most current information and software. The PBIC is now maintaining a copy of the most current PASSCAL software release at this site.