

SEIS-UK – A New Centre for Seismic Equipment and Data Management in the UK

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2. PKH Maguire, RW England, CJ Ebinger, CMR Fowler, GW Stuart, RS White, K Priestley (A Consortium from the Universities of Leicester, Royal Holloway, London, Leeds and Cambridge); Executive Manager: Paul Denton; Seismologist: Alex Brisbourne; IT: Andy Myers.

INTRODUCTION

SEIS-UK (Seismic Equipment Infra-Structure in the U.K.) is a new facility to assist academic geoscientists acquire and manage seismic data. SEIS-UK is funded by a Joint Infrastructure Fund (JIF) grant won by a consortium of four UK universities (Leicester, Cambridge, Royal Holloway College and Leeds). The facility provides the field equipment, computers and software necessary for experiments involving onshore recording of both controlled seismic sources and earthquakes. Training in the use of both the field equipment and the data management facility is also provided. The facility is housed at the University of Leicester.

MISSION STATEMENT

- ❑ Procure and house the seismic acquisition systems.
- ❑ Develop and publish operational procedures for data acquisition and data archiving using the seismic systems.
- ❑ Provide scheduled training for users of the systems.
- ❑ Provide computers and software for use on field projects that will enable the archiving of raw data onto tape in a rapid and efficient manner.
- ❑ Set up and maintain a central computing facility in the UK for performing data archiving. This facility is freely available to all interested parties.

BROADBAND SEISMOLOGY WITH SEIS-UK FROM FIELD TO SEED

FIELD ACQUISITION

FIELD INSTRUMENTATION

SEIS-UK can supply up to 30 Broadband Seismic Systems:

- ❑ 10 x 120s Guralp GMG-3TD sensors
- ❑ 20 x 30s Guralp CMG-40TD sensors
 - ❑ supplied with integral 24bit digitiser, data recorder with 9Gb SCSI disks, solar panels, cabling etc

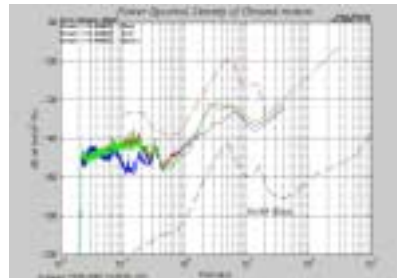


- ❑ Pre-deployment training and advice can be provided regarding field methods. In-field assistance is also available.

FIELD DATA PROCESSING

FIELD DATA QC AND STORAGE

- ❑ PC and/or Sun workstations are provided for data QC, storage and processing in the field.
- ❑ Guralp supplied Scream software and utilities are used in the field for data QC and conversion
- ❑ Laptops and palmtops are provided for communication with broadband seismic stations
- ❑ DLT and DAT tape drives available for field data storage

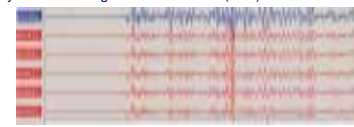


- ❑ Advice and training is available for data QC, conversion and storage

DATA MANAGEMENT

ARCHIVE-QUALITY DATA VOLUME PRODUCTION

- ❑ Complete seismic data archiving facility in the UK
 - ❑ Sun Enterprise 220R rack mounted server with 2 processors and 2 Gb memory.
 - ❑ Sun T3 fibre-channel RAID disk array 9 x 73 Gb disks.
 - ❑ Sun DLT8000 and DAT DDS4 autochanger tape drives
- ❑ PDCC software (IRIS) is used to produce dataless seed volumes, used in conjunction with miniSEED data
- ❑ The facility exists to produce archive-ready data sets in the field during the experiment. However, this can be done most easily at the data management facility in Leicester
- ❑ Full seed network-event volumes are derived from network-day volumes using weed and rdseed (IRIS)



- ❑ SEIS-UK can provide full training in the use of PDCC software for the production of the dataless seed volumes
- ❑ SEIS-UK aim to have the ability to maintain a permanent data archive through collaboration with both IRIS DMC and ORFEUS.



SHORT PERIOD INSTRUMENTATION

- Short period instrumentation will become available for controlled-source and passive experiments in mid-2001
- SEIS-UK are in the process of acquiring 150 x 1Hz sensors and very low power data recorders
- Available short period instrumentation is currently undergoing evaluation by the consortium

SEIS-UK

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LOANS PROCEDURE

- Once the system has been commissioned then applications will be welcomed from all interested academic groups to use the equipment and facilities.
- The schedule of experiments on which the SEIS-UK equipment will be used will be posted on the SEIS-UK website and kept up to date. Once a time slot has been identified (in discussion with the Executive Manager and the SEIS-UK Consortium) then a standard NERC Geophysical Equipment Pool (GEP) equipment loan form should be filled out, identifying the equipment required as SEIS-UK items.
- These applications will then be reviewed under the existing NERC GEP scientific review procedures before being passed on to the SEIS-UK committee for scheduling.
- Existing NERC GEP procedures will then also be used for monitoring equipment performance and publications.

INSTRUMENTATION SCHEDULE 2000-2003

120 Second Broadband (CMG-3TD)

Experiment	2000			2001			2002												2003											
	Oct	Nov	Dec	Jan	Feb	Mar	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N. Atlantic / Cambridge				7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
New Zealand / Cambridge				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		
Ethiopia / Leicester / Leeds																	3	3	3	3	3	3	3	3	3	3	3	3		
Total (available by)				3	3	3	10	10	10	10	10	10	10	10	10	10	7	10	10	10	10	10	10	6	6	6	6	6	6	6

30 Second Broadband (CMG-40TD)

Experiment	2000			2001			2002												2003											
	Oct	Nov	Dec	Jan	Feb	Mar	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N. Atlantic / Cambridge																														
New Zealand / Cambridge				20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20		
Ethiopia / Leicester / Leeds																	20	20	20	20	20	20	20	20	20	20	20	20		
Total (available by)				20	20	20	20	20	20	20	20	20	20	20	20	20	0	20	20	20	20	20	20	20	20	20	20	20		

1 Second Short Period

Experiment	2000			2001			2002												2003											
	Oct	Nov	Dec	Jan	Feb	Mar	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ethiopia / Leicester / Leeds																	100	100	100	100	100	100	100	100	100	100	100	100		
New Zealand / Cambridge																	50	50	50	50	50	50	50	50	50	50	50	50		
Azores / Cambridge																														
Mexico / Cambridge / Imperial																														
Total (available by Sept 2001*)																100	100	100	100	100	100	100	100	100	100	100	100			

NEW ZEALAND

The Taupo Volcanic Zone is an excellent example of the initial stages of back-arc spreading in continental lithosphere. Data from broadband seismometers deployed across the TVZ will be used to study the change in geometry and velocity structure across the transition from near-zero to marked crustal extension.

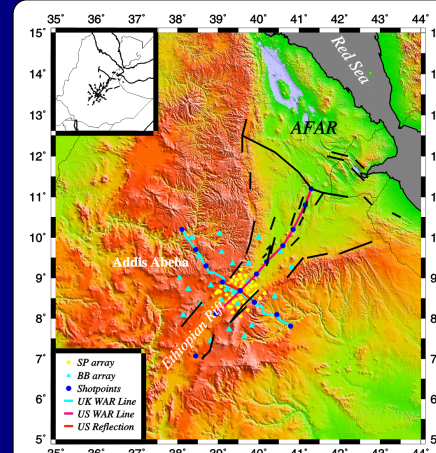


CURRENT PROJECTS



NORTH ATLANTIC

The Icelandic plume has played a major role in the initial opening of the Atlantic; it is responsible for the excess crustal thickness forming Iceland and the Greenland-Iceland-Faeroes ridge; and it affects the bathymetry over much of the NE Atlantic. Surface waves for single and two-station paths across the NE Atlantic will be recorded. These data will provide information on the crust and upper-mantle S-wave structure of the plume, which is much more sensitive to the thermal structure than is the P-wave velocity structure.



ETHIOPIA

Controlled source and passive seismic experiments will be undertaken to image the crust and upper mantle just prior to break-up in the northern Ethiopian Rift where the transition from continental rifting to incipient spreading is captured. It is a region where extensional velocities are low (4mm/yr), rift basins are asymmetric and bounded by steep border faults, and an echelon arrangement of the new magmatic segmentation shows little correlation with the older border fault pattern.