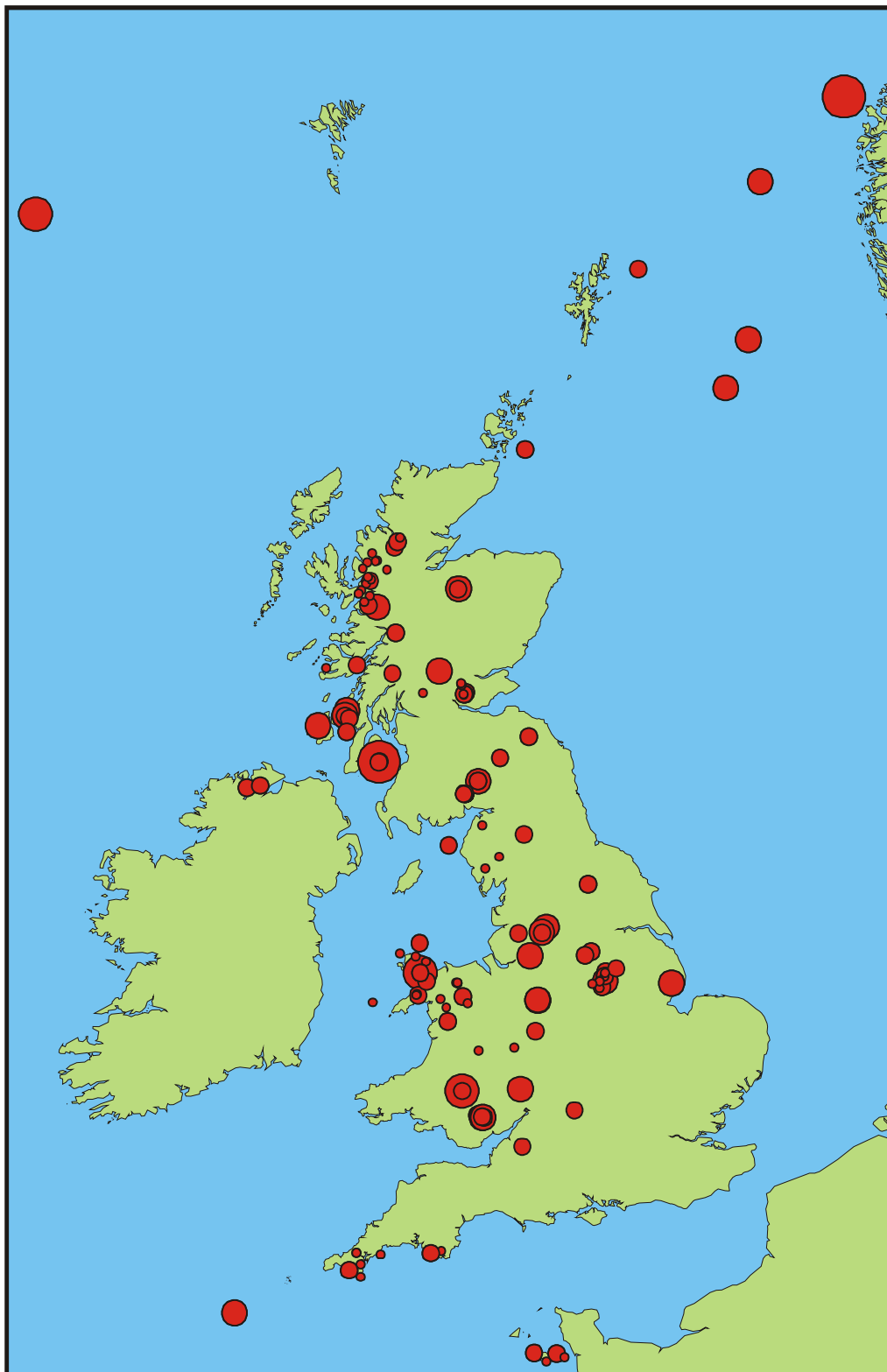




British Geological Survey

BULLETIN OF BRITISH EARTHQUAKES 1999



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TECHNICAL REPORT WL/00/01

Global Seismology and Geomagnetism Group

Bulletin of British earthquakes 1999

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BRITISH GEOLOGICAL SURVEY

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CONTENTS

	Page
1. INTRODUCTION.....	1
1.1 The Bulletin	1
1.2 Summary of 1999 Seismicity	1
2. BULLETIN FORMAT	5
2.1 Tables	5
2.2 Figures	5
3. THE BGS UK SEISMOGRAPH NETWORK	6
3.1 Instrumentation	6
3.2 Detection Threshold.....	6
3.3 Environmental Monitoring	6
4. HYPOCENTRE PARAMETERS AND THEIR ERRORS	7
4.1 Epicentre Location.....	7
4.2 Depth Determination	7
4.3 Seismicity Distribution	8
4.4 Magnitude	8
4.5 Intensity	8
5. BULLETIN CONTENT AND COMPLETENESS.....	9
5.1 The Geographical Area.....	9
5.2 Events Included	9
5.3 Events Excluded	9
5.4 Completeness	9
6. ACKNOWLEDGEMENTS.....	10
7. REFERENCES.....	11

Tables

Figures

Appendices:

Appendix A: Significant earthquakes in 1999

Appendix B: Earthquake information charges

Appendix C: The European Macroseismic Scale (EMS 92)

1. INTRODUCTION

1.1 The Bulletin

The British Geological Survey's Seismic Monitoring and Information Service operates a nationwide network of seismograph stations in the United Kingdom. The whole of the UK, including coastal waters, is covered within the limits of the detection capabilities of the seismograph network, and accuracy is extended through data exchange with neighbouring countries. Seismic phase data, location details and magnitudes are presented in the Bulletin for all earthquakes detected and located by BGS during 1999 together with maps showing the larger magnitude events since 1979 ($ML \geq 2.5$) and since 1970 ($ML \geq 3.5$). All felt areas are quoted in km^2 , and are for the area enclosed within isoseismal 3 EMS (European Macroseismic Scale, Appendix C).

1.2 Summary of 1999 Seismicity

There have been 147 earthquakes located by the monitoring network during the year, with 27 of them having magnitudes of 2.0 ML or greater. Of these, 12 are known to have been felt, together with a further 21 smaller ones, bringing the total to 33 felt earthquakes in 1999.

The largest onshore earthquake, with a magnitude of 4.0 ML, occurred 4 km south of Arran on 4 March (Appendix A1). A small aftershock 14 minutes later was also recorded, with a magnitude of 1.6 ML. The mainshock was felt up to 150 km away and over an area of 18,500 km^2 . A macroseismic survey yielded over 1000 replies and the resulting map of felt effects is shown in Appendix A1. The highest observed intensity was 5 EMS at Lamlash, Arran, where in a number of cases, objects such as ornaments, pictures or toys fell or were displaced, and in a few cases heavy objects were also said to have been displaced, including two washing machines, a cooker, a microwave and a sofa. Although the area has been seismically active with small magnitude earthquakes, this magnitude 4.0 event is the largest in both the instrumental and historical catalogues. The nearest 3-component strong motion instrument to record the earthquake was 135 km distant and accelerations of 1.4, 4.0 and 3.6 mms^{-2} , were recorded for the vertical, NS and EW components, respectively. The focal mechanism produced for the Arran earthquake represents dominantly strike-slip faulting with a varying component of dip-slip motion. The nodal planes strike NW and NE and the P-axes are consistent with the regional stress direction for the UK.

The largest offshore earthquake occurred on the Norwegian coast on 29 May. It had a magnitude of 4.1 ML and was located approximately 360 km northwest of the Shetland Islands. It was felt on the Norwegian coast over an area of approximately 300 km^2 . A further 5 events occurred in the North Sea and surrounding waters during the year, with magnitudes between 1.3 and 3.0 ML, and were located using both the BGS and Norwegian networks.

Near Boston, Lincolnshire, an earthquake, with a magnitude of 2.8 ML occurred on 21 January. Earthquakes of this size are usually felt when they occur onshore but enquiries to local police stations, post offices and coastguards, revealed that no felt reports were received. The time of day (11:10 UTC) and the depth of the earthquake (16.9 km) probably contributed to the lack of felt effects at the surface.

On 15 April an earthquake, with a magnitude of 2.9 ML, occurred near Mallaig, Highland. It was felt in Arnisdale, Loch Hourn and Glen Garry, with intensities of at least 3 EMS in the epicentral area. Felt reports described “a dull progressive rumbling” and “felt a shaking”. This is the largest event to have affected the area since the 30 January 1986 earthquake (magnitude 3.0 ML) which was also felt with intensities of at least 3 EMS.

Near Aviemore, Highland, an earthquake, with a magnitude of 2.2 ML, occurred on 29 May. Felt reports were received from residents of Boat of Garten, where intensities reached at least 3 EMS in the epicentral area. Felt reports described “the house shook” and “heard a loud bang”. This event locates in the same area as the magnitude 2.7 ML Aviemore earthquake which occurred in 1995 and was felt throughout the region with maximum intensities of 4 EMS.

An earthquake occurred near Hereford on 17 June, with a magnitude of 2.8 ML (Appendix A2). Felt reports were received from residents of Cradley and Welland, where intensities reached at least 3 EMS in the epicentral area. A single report was received from a resident in Cradley (who was awake at the time), some 18 km northeast of the epicentre, who described “the whole cottage shook like a heavy lorry passing outside” and “the dressing table rattled”. This event was recorded on the strong motion instrument near Hereford, some 33 km away, where accelerations of 8, 20 and 12 mms^{-2} for the vertical, NS and EW components, respectively, were measured. A focal mechanism for the event was calculated (Appendix A2) using data from stations up to 169 km away and shows dominant normal faulting with a component of strike-slip motion. The area has been seismically active in the past with earthquakes of 5.2 and 5.3 occurring in 1863 and 1896, respectively. These events were felt over most of England and Wales and caused damage in the epicentral area (Musson, 1994).

An earthquake, with a magnitude of 1.8 ML, occurred 6 km west of Jersey, Channel Islands on 13 July. Thirty five felt reports were received via colleagues at Jersey Airport, who had been contacted by residents throughout the west side of Jersey. Felt reports described “heard a loud noise”, “the walls and roof rattled”, “the house shook” and “the window and cooker shook”. The event locates approximately 5 km north west of the felt earthquake on 22 June 1997, which had a magnitude of 2.2 ML.

Near Loch Earn, an earthquake, with a magnitude of 2.0 ML, occurred on 19 July. Felt reports were received from residents of the village of St Fillans, where intensities reached at least 3 EMS. Felt reports described “the building shook violently” and “felt like a car crashing into the side of the house”. This is the first earthquake to be reported felt in the area and is the largest to be located since the 26 November 1975 Glen Almond earthquake which had a magnitude of 2.4 ML.

A magnitude 3.1 ML earthquake occurred near Caernarvon, Gwynedd on 1 September (Appendix A3). It was felt as far away as Barmouth, 60 km to the south and in Rhyl, 55 km to the east. Felt reports described “the whole house vibrated” and “heard loud rumblings and vibrations”. This earthquake was followed by a magnitude 1.2 ML aftershock, which was reported felt in the Llangefni area. A macroseismic survey was conducted for the main event and over 100 replies were received, giving a maximum intensity of 4 EMS. The event locates some 7 km northeast of the Caernarvon Bay earthquake which occurred on 29 July 1992, and was felt over 10,000 km^2 and had a magnitude of 3.5 ML.

Two felt earthquakes with magnitudes of 2.1 and 1.3 ML, occurred in the Johnstonebridge area of Dumfries and Galloway, with intensities of 3 and 2 EMS, respectively, on 3 September. Felt reports described “like an explosion” and “heard a loud rumble”. The area around Johnstonebridge has been seismically active for a number of years with most of the swarm activity occurring to the west of these events.

On 29 September, an earthquake with a magnitude of 3.0 ML, was located 370 km WSW of the Faroe Islands, in the North Atlantic. It was located using data from the recently installed station in the Faroe Islands (FTO), two Icelandic stations and the UK network.

An earthquake with a magnitude of 3.6 ML, occurred near Sennybridge, Powys on 25 October (Appendix A4). Felt reports described “everybody came running out into the street”, “the whole house shook” and “felt like an explosion”. A macroseismic survey was conducted and around 200 replies were received, giving a maximum intensity of 5 EMS. The focal mechanism for the Sennybridge earthquake represents dominant normal faulting with a varying component of strike-slip motion. The trend of the P-axis is consistent with that of the NW trending regional direction; however, the plunge of the P-axis varies from vertical to horizontal with increasing degrees of the strike-slip component of movement. Two weeks after the event, a small aftershock, with a magnitude of 1.9 ML was located in the same area. In the past thirty years, the area has experienced a number of small earthquakes (up to 2.6 ML) but historically, it has been affected by large earthquakes with magnitudes over 5.0 ML. They occurred near Swansea some 40 km to the southwest in 1727, 1775 and 1906 and caused damage in the epicentral area and were felt up to 200 km away.

On 22 November, an earthquake with a magnitude of 2.7 ML, occurred on Jura, Strathclyde. Felt reports described “sounded like a long rumble” and “the house shook”. This earthquake locates approximately 20 km southeast of the magnitude 3.5 ML Jura earthquake on 3 May 1998, which was felt with intensities of 4 EMS in the epicentral area. Two further Jura events occurred on 3 December in the same area, with magnitudes of 2.2 and 1.8 ML; no felt reports were received for either of these events. Offshore Jura, two events with magnitudes of 1.7 and 1.5 ML occurred on 4 and 15 September, respectively. No felt reports were received.

Near Altrincham, Greater Manchester, an earthquake, with a magnitude of 2.8 ML occurred on 14 December. Earthquakes of this size are usually felt when they occur onshore but enquiries to Manchester Police, revealed that no felt reports were received. The time of day (09:43 UTC) and the location, which is close to a motorway and Manchester Airport, probably contributed to the lack of felt effects at the surface.

Three earthquakes were detected in the Blackford area of Tayside during 1999, with magnitudes of 0.7, 0.8 and 0.7 ML. This is an area that has continued to be active in recent years; 49 events occurred in 1997, of which five were felt by local residents; 10 events occurred in 1998, of which 2 were felt by local residents. In the same general area, in 1979, the magnitude 3.2 ML Ochil Hills earthquake was felt with a maximum intensity of 5 EMS. Nine events, with magnitudes ranging between 0.6 and 1.9 ML, occurred near Dumfries, Dumfries and Galloway. Seven of these events were felt by local residents in the Newfield, Troston, Kirkton and Tinwald areas of Dumfries and Galloway.

In North Wales, three events with magnitudes of 1.2, 0.1 and -0.2 ML, were located on the Lley Peninsula, in the same area and at similar depths (20 km) as the magnitude 5.4 ML Lley earthquake of 19 July 1984, which was felt throughout England and Wales and into Scotland and Ireland.

The coalfield areas of central Scotland, Yorkshire, Staffordshire, West Midlands, Mid Glamorgan and Nottinghamshire continued to experience shallow earthquake activity which is believed to be mining induced. Some 25 coalfield events, with magnitudes ranging between 0.5 and 2.2 ML, were detected during the year. Seven of these were reported felt by local residents.

Two shallow events occurred near Newcastle-under-Lyme, Staffordshire, with magnitudes of 2.4 and 2.6 ML, both of these events were felt by local residents in the Keele and Newcastle-under-Lyme areas of Staffordshire, with intensities of at least 3 EMS.

Five events, with magnitudes ranging between 0.5 and 1.4 ML, were located near Clackmannan in the central region of Scotland. Three of these events were felt by local residents in the Forest Mill area. This is an area which has experienced many such mining induced events in the past.

The seismograph network detected two events near Donegal, Ireland with magnitudes of 1.7 and 1.3 ML. BGS received felt reports for both events via colleagues in Ireland and locations were achieved using both the BGS and DIAS (Ireland) seismograph networks.

2. BULLETIN FORMAT

2.1 Tables

Data on the earthquakes and seismograph stations operated in 1999 are arranged as follows:

TABLE 1: This is a chronological listing of all earthquakes in and near the UK for which a reliable epicentral location could be obtained together with felt sonic events and other significant non-natural events.

TABLE 2: This is a listing of earthquakes arranged in order of decreasing latitude to facilitate identification of earthquakes in selected regions.

TABLE 3: This is a chronological listing of felt sonic events and significant non-natural events detected by the seismograph network. These events are included in Table 1 but not Table 2.

TABLES 4: This is an alphabetical listing of the geographical co-ordinates of seismograph stations operated in 1999 by BGS, DIAS (the Dublin Institute of Advanced Studies) and KUN (Keele University). Table 4a lists the short period instruments; Table 4b the BGS low gain stations and Table 4c the BGS strong motion instruments.

TABLE 5: This lists the arrival times of phases for the events in Table 2 at each station, together with amplitude information used for magnitude calculation.

TABLE 6: This shows the crustal seismic velocity models used for event location.

2.2 Figures

FIGURE 1: Seismograph network operational in December 1999.

FIGURE 2: Detection threshold of the seismograph stations operational in December 1999 for average background noise conditions where the detection criterion is that the signal has to exceed 4 nanometers at 10 Hz on 4 stations.

FIGURE 3: Epicentral location map of all the events in 1999 that are listed in Table 2. It is estimated that the dataset is complete for the land area.

FIGURE 4: Locations of earthquakes in the UK of magnitude 2.5 ML and above in the period 1979 to 1999. It is estimated that the dataset is complete for the land area.

FIGURE 5: Locations of earthquakes in the UK of magnitude 3.5 ML and above in the period 1970 to 1999.

3. THE BGS UK SEISMOGRAPH NETWORK

3.1 Instrumentation

A standard seismic network consists of up to ten 'outstation' vertical seismometers radio-linked over distances of up to 100 km to a central site. Here the data, along with that from a local 3-component set of two horizontal and one vertical seismometers, are recorded onto a digital event-triggered recorder (SEISLOG). It is designed to trigger on events and write to a computer disk which is accessed from Edinburgh via a modem. Four times a day, data is transferred automatically to the Edinburgh central computer and the events are analysed during that day providing a rapid response for location and magnitude determinations. All of the recording centres in the UK have been upgraded to provide a SEISLOG system (Figs 1 and 2). At some centres, a continuous back-up facility is provided by the traditional magnetic tape Geostore recorders, and tapes are dispatched weekly to Edinburgh for analysis. SEISLOGS have the advantage over the Geostore system by providing digital data, of wider dynamic range (72 db), a bandwidth of up to 40 Hz and the capacity for 32 seismic channels. The system also has the facility to auto-reboot in the event of mains power failure and this normally takes three minutes once power has recovered.

At some locations, on-line paper chart recorders display three channels to enable local operators to view earthquake data. At other stations, low-gain vertical seismometers extend the dynamic range of the system (by 34 db) to stronger motions, and low frequency microphones are used to aid the discrimination of sonic booms. In addition, strong motion accelerometers have been installed at locations throughout the country and record accelerations up to 0.1g. A digitally recorded broad-band station (Guralp) located in Edinburgh, provides an assessment of surface-wave (Richter magnitude) for large Global earthquakes.

Recent developments in geographic coverage of the UK are described in Walker (2000, in press) and details of the SEISLOG system, which has been jointly developed by Bergen university and BGS are given in Uthman and Havskov (1993).

3.2 Detection Threshold

The detection capabilities of a network depend upon station distribution, instrument sensitivity and background noise levels. For the BGS UK network, the lower limit of sensitivity is governed by the background noise level. The contours in Figure 2 illustrate the lower threshold magnitude for an earthquake to significantly exceed 4 nanometers of noise (average) at 10 Hz on at least four seismographs. Noise sources such as wind, waves, traffic and livestock vary considerably with time (typically 0.5 to 15 nanometers, at 10 Hz) causing the magnitude thresholds to increase or decrease. In conditions of high noise, 0.8 ML should be added to the contour values.

The detection contours in Figure 2 hold true only if all stations are continuously monitored. Small events in unmonitored areas may then go undetected unless they are felt and reported to BGS by local inhabitants. The detection capabilities by this process are strongly dependent on population density.

3.3 Environmental Monitoring

The infrastructure provided by the UK nationwide seismic monitoring network, comprising remote sensing stations linked to computers, is ideal for expansion into a full-spectrum environmental monitoring network (including pollution, radioactivity and climate). The remote sites required for seismic stations (in order to escape 'cultural' vibration noise from industry, towns, roads etc) are ideal for establishing environmental baselines, long-term trends, the effects of sudden release incidents and the long-range impacts of power stations, traffic and city emissions. The data-rate for seismics, at 100 samples per second per channel, is very high compared to the normal requirements of an environmental monitoring station. It has, therefore, proved to be relatively simple to provide for the transmission of 16 channels of environmental data, at 1 minute intervals, alongside the seismics. To this end, BGS has established four environmental stations which are recording UVB, humidity, temperature, radioactivity, NO_x gases and radon. At Eskdalemuir observatory, in the Scottish Borders, a comprehensive, demonstration system for environmental monitoring has been installed to prove the capability through an INTERNET connection with the wider community.

4. HYPOCENTRE PARAMETERS AND THEIR ERRORS

4.1 Epicentre Location

By accurately timing the signal onsets at a minimum of three stations, a location can be found for an earthquake which satisfies the observed pattern of arrivals. Instrumental locations in the bulletin were obtained using the computer program HYPO71 (Lee and Lahr, 1975) which iteratively adjusts a trial hypocentre (latitude, longitude, depth, and origin time) until the observed and computed arrival times coincide closely.

The accuracy of locations is dependent on distances from the closest stations, the distribution of the stations around the epicentre, the resolution to which signal onsets can be timed from the records, and the accuracy with which the seismic wave velocity through the earth can be modelled.

The velocity models used for the location of events in 1999 are given in Table 6 and were derived from a series of refraction profiles traversing Britain, LISPB (Bamford et al, 1976; Bamford et al, 1978; Assumpção and Bamford, 1978 and Bott et al., 1985).

4.2 Depth Determination

The accurate determination of earthquake depth presents a more difficult problem, mainly because phase arrival patterns at the seismographs can still be satisfied for a large range of depths merely by adjusting the origin time to suit. Constraints on the depth can usually only be imposed when a station is very near the epicentre and even then the accuracy depends on the velocity model.

The best depth determinations have been obtained when an earthquake or earthquake series occurred almost beneath a network. For events at larger distances, and where the error columns (ERH and ERZ), in the tables, are blank, the depth errors can be up to tens of

kilometres. The quality factor of the event, as listed in the tables (SQD), is an indication of the depth error. As a general guide only, A*A, A*B, B*A and possibly B*B class events, have reliable depths.

4.3 Seismicity Distribution

Owing to variability in the earthquake detection threshold, which is governed by ambient noise conditions and the geometry of the observing network (see 3.2), the bulletin is biased towards certain localities. In order to present a consistent picture of UK seismic activity, earthquakes with magnitude 2.5 ML or greater, in the period 1979 to 1999, have been plotted in Figure 4. The data set is considered complete for these magnitudes in all localities of the onshore area. Seismicity for the period 1970 to 1999 is shown in Figure 5 with a threshold magnitude of 3.5 ML. This is the period covered by BGS instrumentation which in the early years, only consisted of the network around Edinburgh (LOWNET) and Eskdalemuir (ESK) and a station near Kyle of Lochalsh (KYL). The dataset is likely to be complete for such magnitudes.

4.4 Magnitude

All earthquakes in the bulletin have been assigned a local magnitude (ML) as defined by Richter (1935):

$$ML = \log_{10} (A/A_0)$$

where A is the maximum deflection (centre to peak in mm) registered by the earthquake on a Wood-Anderson seismograph and A₀ is that for a 'standard' magnitude zero earthquake at the same distance. The A₀ term is thus a distance correction factor tabulated by Richter out to 200 km, and later adjusted to include up to 600 km. Although Richter intended his method to be an approximate quantification of earthquake size and his attenuation term, A₀, strictly only applies to California, the formula is still used world-wide today. The ML magnitudes in this bulletin have been calculated according to Richter by converting the output of the BGS instruments to an equivalent Wood-Anderson deflection. Ideally, the measurements are made on two horizontal instruments and averaged but, if this was not possible, the mean of the magnitudes from a number of verticals has been used. Ground motion registered at a seismograph varies with site conditions, direction from the earthquake, and the nature of the ray path. Consequently, it is important to take the mean from a good distribution of stations. The resulting errors on magnitudes quoted in the bulletin will normally be less than 0.4 ML.

4.5 Intensity

Intensity is a measure of the effect of the shaking on people, structures and objects. It decreases with distance from a maximum value (I_{max}) usually found close to the epicentre. The maximum felt intensity is quoted, where known, on the European Macroseismic Scale (EMS), (Grünthal, 1993).

5. BULLETIN CONTENT AND COMPLETENESS

5.1 The Geographical Area

The bulletin covers all of the UK land mass and its coastal waters including the North Sea to 800 kmE and 1500 kmN.

5.2 Events Included

All events believed to be of true tectonic origins have been included, that is, events caused by natural stresses within the earth.

Coalfield events are also included. These are small events occurring near coal workings which are believed to be caused by the redistribution of stress as the coal is extracted and, in some cases by collapse in old workings. They are indicated by C/F in the comments column of Tables 1, 2 and 5.

Acoustic disturbances, such as sonic booms from supersonic aircraft, are included when they are felt. The air-borne waves are readily identified by their slow travel time across an array or by their signature on a microphone but they are frequently reported by local people as small earthquakes. They are indicated by 'SONIC' in both the locality and comments column of Tables 1 and 3. In 1999, eleven sonic events were reported felt and were detected by the UK network.

Significant non-natural events which received media attention or were greater than magnitude 2.5 ML and felt explosions are also included in Tables 1 and 3. The felt explosions are indicated by 'EXPL' in both the locality and comments column. In 1999, two felt explosions were detected.

5.3 Events Excluded

Events that are known, or suspected to be of explosive origin, are excluded from the bulletin. Explosions due to quarrying, mining, weapon testing or disposal, naval exercises, geophysical prospecting and civil engineering are all excluded where possible, unless they are greater than 2.5 ML or reported to be felt. Unfortunately, identification by record character, location and time of occurrence is not always conclusive and some man-made events may have been included in the bulletin or, more rarely, a small natural event may have been excluded.

5.4 Completeness

The contours of detection threshold in Figure 2 show that the whole of the UK is covered by the seismograph network for approximately magnitude 1.5 ML, and above, at times of average ambient noise levels. High noise levels may cause this threshold to rise to about 2.3 ML. Normally, however, an earthquake of this size would be felt, if not detected, in the areas of poorer instrumental coverage. The bulletin can, therefore, be assumed to be complete for all earthquakes of magnitude 2.3 ML and above.

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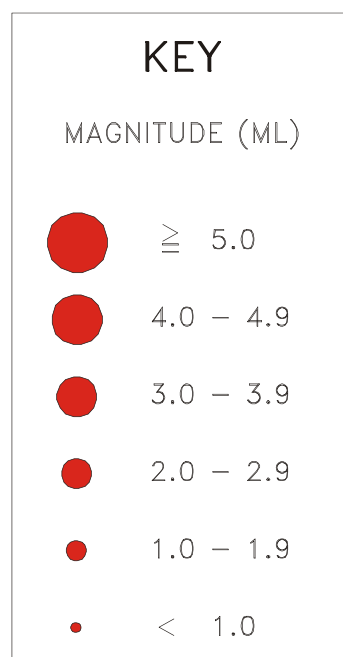
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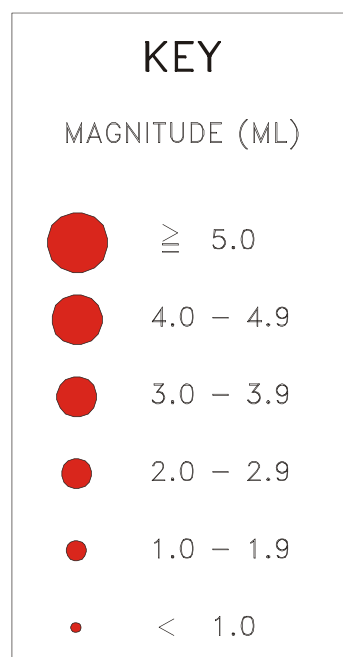
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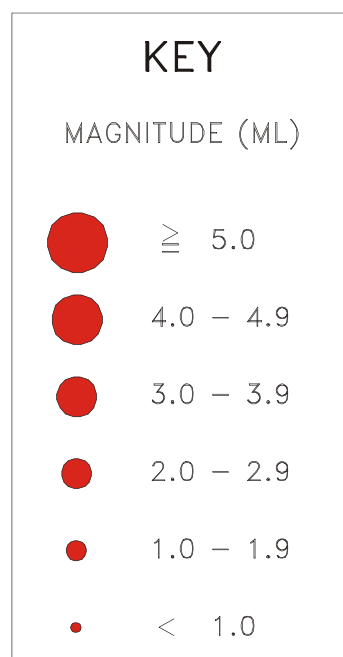
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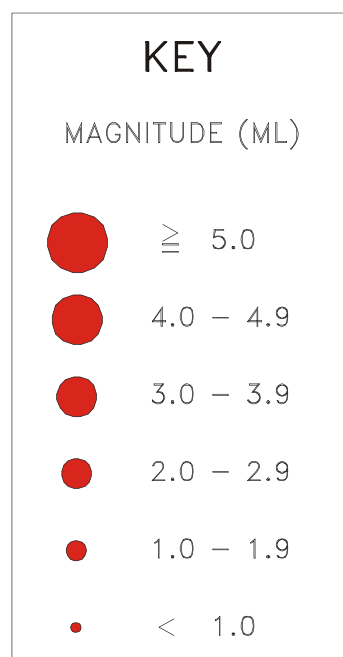
KEY TO EPICENTRE MAPS, FIGURES 3 TO 5



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UK Earthquake Monitoring Annual Reports

YEAR	AUTHOR(S)	BGS REPORT NO.
89/90	Browitt, CWA and Turbitt, T	WL/90/13
90/91	Browitt, CWA and Turbitt T	WL/91/26
91/92	Browitt, CWA and Turbitt T	WL/92/11
92/93	Browitt, CWA and Walker, AB	WL/93/08
93/94	Walker, AB and Browitt, CWA	WL/94/10
94/95	Walker, AB and Browitt, CWA	WL/95/10
95/96	Walker, AB and Browitt, CWA	WL/96/06
96/97	Walker, AB	WL/97/16
97/98	Walker, AB	WL/98/03
98/99	Walker, AB	WL/99/03
99/00	Walker, AB	WL/00/03

KEY TO BULLETIN ENCODING

YearMoDy	: Year, month and day of event.
HrMn Secs	: Time of occurrence of event in hours, mins and secs, (UTC).
Lat	: Latitude of the event, positive latitude indicates north.
Lon	: Longitude of the event, negative longitude indicates west.
kmE	: UK National Grid Reference in kilometres east of grid origin.
kmN	: UK National Grid Reference in kilometres north of grid origin.
Dep	: Depth of the hypocentre in kilometres.
Mag	: Richter local magnitude of the event.
Locality	: A geographical indication of the epicentral area, usually the nearest town followed by the region. A key to the abbreviations used in the locality column are given below.
Int	: Maximum EMS intensity. 2+ indicates felt, no macroseismic details. 3+, 4+ etc indicates felt at 3 or 4, but no survey carried out. 3, 4, 5 etc describes the maximum EMS intensity produced by the event.
Comments	: Additional comments about the event eg: C/F, see below under comments abbreviations.

The following abbreviations are extracted from the output of the location program HYPO71 (Lee and Lahr, 1975)

No	: Total number of P and S readings used in the event location.
DM	: Epicentral distance in kilometres to the closest station.
Gap	: Largest azimuthal separation in degrees between stations.
RMS	: Root Mean Square of the travel-time residuals in seconds.
ERH	: Standard error of the epicentre in kilometres. When this column is blank, the error is large and indeterminate.
ERZ	: Standard error of the focal depth in kilometres. When this column is blank, the error is large and indeterminate.
SQD	: S is quality factor ascribed to RMS, D is quality ascribed to number and distribution of stations.

Locality abbreviations

Sonic	: Sonic boom	Mid Glam	: Mid Glamorgan
Expl	: Explosion	Notts	: Nottinghamshire
D & G	: Dumfries and Galloway	S'Clyde	: Strathclyde
Her & Worcs	: Hereford and Worcester	S Yorkshire	: South Yorkshire
New-U-Lyme	: Newcastle-Under-Lyme	Gloucs	: Gloucestershire
Penin	: Peninsula	Staffs	: Staffordshire
Cum	: Cumbria	Lincs	: Lincolnshire
Gtr	: Greater		

Comments abbreviations

Sonic	: Sonic boom
Expl	: Explosion
C/F	: Coalfield type event
...	: and felt elsewhere

TABLE 1

CATALOGUE OF EVENTS LISTED CHRONOLOGICALLY: 1999

TABLE 1: CATALOGUE OF EVENTS LISTED CHRONOLOGICALLY:1999

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	DM	Gap	RMS	ERH	ERZ	SQD	Comments
19990106	053948.7	56.33	-5.07	210.4	719.7	3.6	1.3	INVERARAY, STRATHCLYDE		8	48	280	0.12	4.4	10.7	C*D	10KM NORTH OF INVERARAY
19990112	054150.0	53.10	-1.32	445.5	356.1	0.3	0.6	MANSFIELD, NOTTS		4	22	218	0.34			C*D	C/F, 6KM SW OF MANSFIELD
19990113	083540.5	53.63	-2.62	358.7	415.4	13.9	1.9	BOLTON, GTR MANCHESTER		13	52	99	0.25	1.3	3.6	B*D	10KM NW OF BOLTON
19990119	002309.0	53.26	-0.90	473.5	374.3	1.9	1.2	WORKSOP, NOTTINGHAMSHIRE		4	42	296	0.12			A*D	C/F
19990121	111018.2	53.09	0.07	538.7	357.1	16.9	2.8	BOSTON, LINCOLNSHIRE		9	46	141	0.11	1.1	1.9	B*C	15KM NE OF BOSTON
19990127	034008.6	49.97	-5.17	173.0	13.1	14.6	-0.1	OFF LIZARD PT, CORNWALL		4	8	353	0.17			B*D	
19990127	111358.0							EXPL-GARVE ISLAND	3+								EXPL-FELT DOUNREAY
19990127	111359.0							EXPL-GARVE ISLAND	3+								EXPL-FELT DOUNREAY
19990127	224036.4	53.13	-1.19	454.0	359.1	1.0	0.8	MANSFIELD, NOTTS	3+	4	27	247	0.24			B*D	C/F, FELT MANSFIELD
19990130	133437.2	57.03	-5.59	182.1	799.2	7.3	1.3	KNOYDART, HIGHLAND		5	22	324	0.23	4.5	9.7	C*D	
19990201	235859.0							SONIC-GRAMPIAN	2+								SONIC-FELT STONEHAVEN...
19990204	053401.0	57.66	-5.14	213.0	867.8	5.8	1.0	KINLOCHEWE, HIGHLAND		6	21	200	0.11	3.5	2.1	C*D	8KM NE OF KINLOCHEWE
19990206	232843.1	60.61	-0.18	499.4	1193.3	17.5	1.3	NORTHERN NORTH SEA		7	50	319	0.16	5.1	4.2	D*D	50KM EAST OF SHETLAND
19990208	164916.0							SONIC-CUMBRIA	2+								SONIC-FELT LONGTOWN...
19990209	010252.0	55.09	-3.62	296.5	578.1	7.5	0.7	DUMFRIES, D & G	2+	7	10	128	0.10	0.9	2.1	B*B	FELT NEWFIELD
19990209	081235.0							SONIC-DUMFRIES	2+								SONIC-FELT NEWFIELD
19990209	165734.0							SONIC-CUMBRIA	2+								SONIC FELT LONGTOWN
19990211	010928.7	53.22	-1.10	460.4	369.1	0.5	0.8	MANSFIELD, NOTTS		4	29	277	0.07			A*D	C/F, 7KM NE OF MANSFIELD
19990211	013217.3	54.68	-2.55	364.9	531.4	13.4	1.0	PENRITH, CUMBRIA		9	27	140	0.07	0.8	3.1	B*C	13KM EAST OF PENRITH
19990214	080109.5	57.29	-5.58	184.2	828.1	6.1	1.1	AUCHTERTYRE, HIGHLAND		4	7	187	0.11			A*D	
19990215	150046.3							SONIC-SHROPSHIRE	2+								SONIC-FELT SHREWSBURY...
19990218	022908.1	55.09	-3.63	295.8	579.0	10.3	1.0	DUMFRIES, D & G		9	9	134	0.07	0.4	1.0	A*B	
19990218	140823.8	57.42	-5.26	204.0	841.5	10.2	0.1	STRATHCARRON, HIGHLAND		4	9	216	0.02			A*D	
19990219	194622.1	49.13	-2.12	391.3	-85.9	9.4	0.9	JERSEY, CHANNEL ISLANDS		6	7	291	0.01	0.3	0.2	A*D	
19990228	072452.8	57.07	-5.67	177.3	803.7	6.8	0.5	KNOYDART, HIGHLAND		5	19	164	0.11	8.2	8.8	D*D	
19990301	211437.3	52.39	-3.30	311.7	278.2	13.0	0.8	NEWTOWN, POWYS		7	13	172	0.03	0.3	0.5	A*C	13KM SOUTH OF NEWTOWN
19990302	005846.4	55.09	-3.63	295.9	578.9	10.6	1.2	DUMFRIES, D & G	2+	8	9	133	0.04	0.3	0.8	A*B	FELT NEWFIELD
19990303	213454.5	50.28	-3.85	268.0	43.6	14.7	0.1	THURLESTONE, DEVON		4	5	358	0.03			A*D	
19990303	220858.7	55.09	-3.63	296.1	578.6	8.8	1.5	DUMFRIES, D & G	2+	5	10	131	0.07	1.1	3.7	B*D	FELT TROSTON
19990303	230244.2	51.73	-3.26	313.0	204.3	0.3	1.0	NEW TREDEGAR, MID GLAM		6	33	164	0.09	0.8	2.6	B*C	C/F
19990304	001651.8	55.40	-5.24	194.8	616.2	19.0	4.0	ARRAN, STRATHCLYDE	5	10	23	136	0.06	0.4	1.2	A*C	4KM SOUTH OF ARRAN
19990304	003057.0	55.40	-5.25	194.4	616.0	18.4	1.6	ARRAN, STRATHCLYDE		8	23	136	0.06	0.6	0.7	A*C	4KM SOUTH OF ARRAN
19990308	011951.2	51.71	-3.30	309.9	202.2	2.2	1.1	BEDLINOG, MID GLAMORGAN		7	35	171	0.06	0.5	1.2	A*C	C/F
19990308	211333.9	52.60	-2.31	378.8	300.9	9.5	1.0	ALBRIGHTON, SHROPSHIRE		10	40	116	0.15	0.7		C*C	
19990309	003843.2	56.87	6.36	909.2	806.2	15.0	3.0	NORWEGIAN-DANISH BASIN		12530	333	0.37				D*D	
19990310	233247.7	52.87	-5.16	187.4	334.6	5.6	0.9	IRISH SEA		6	36	300	0.06	3.9	7.2	C*D	60KM SW OF HOLYHEAD
19990311	122900.6	55.09	-3.63	296.1	579.0	8.3	0.6	DUMFRIES, D & G	2+	5	9	132	0.06	0.8	2.8	B*D	FELT NEWFIELD
19990311	140629.1	55.40	-5.24	194.9	616.5	15.6	1.1	ARRAN, STRATHCLYDE		8	23	137	0.16	1.1	4.6	B*C	4KM SOUTH OF ARRAN
19990314	145448.4	55.10	-3.63	295.9	579.2	11.0	1.9	DUMFRIES, D & G	3+	9	9	133	0.07	0.5	1.1	A*B	FELT KIRKTON
19990315	210439.0							SONIC-LINCOLNSHIRE	3+								SONIC FELT LINCOLN...
19990317	033155.4	57.33	-5.63	181.5	832.9	26.9	-0.1	PLOCKTON, HIGHLAND		4	1	147	0.03			A*D	
19990317	110647.7	53.11	-4.23	250.8	359.1	17.1	1.3	CAERNARVON, GWYNEDD		11	5	82	0.07	0.4	0.7	A*A	
19990317	203011.2	53.06	-1.19	454.0	351.5	2.9	0.7	LINBY, NOTTINGHAMSHIRE		5	31	150	0.01	0.2		C*D	C/F

TABLE 1: CATALOGUE OF EVENTS LISTED CHRONOLOGICALLY:1999 continued

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	DM	Gap	RMS	ERH	ERZ	SQD	Comments
19990318	023822.1	51.71	-3.30	310.5	202.5	1.9	1.1	BEDLINOG,MID GLAMORGAN		7	35	170	0.07	0.6	1.5	A*C	C/F
19990323	150337.7	55.09	-3.62	296.7	579.0	8.9	0.7	DUMFRIES,D & G	2+	7	9	164	0.07	0.6	2.2	B*C	FELT NEWFIELD
19990324	042415.4	51.77	-1.65	424.4	208.1	15.3	1.6	CARTERTON,OXFORDSHIRE		9	26	128	0.12	0.7	1.4	A*B	
19990326	015819.7	57.42	-5.74	175.6	842.8	8.5	0.6	APPLECROSS,HIGHLAND		5	10	246	0.03	1.5	1.3	B*D	
19990327	172531.5	56.25	-3.76	291.0	708.3	5.2	0.7	BLACKFORD,TAYSIDE		6	16	109	0.07	0.7	1.4	A*C	
19990329	151547.3	53.65	-2.21	386.1	416.8	1.3	2.2	ROCHDALE,GTR MANCHESTER		12	26	68	0.24	1.1	2.0	B*C	C/F
19990331	055134.9	53.64	-2.21	386.4	416.1	2.5	1.9	ROCHDALE,GTR MANCHESTER		10	26	91	0.24	1.4	2.3	B*C	C/F
19990405	031332.3	59.33	1.55	602.11	1054.1	18.8	2.9	NORTHERN NORTH SEA		19178	150	0.14	0.8	1.8	A*D		
19990409	050202.6	56.40	-5.75	168.8	729.8	5.9	1.8	ISLE OF MULL,S'CLYDE		7	58	250	0.13	4.9	9.4	C*D	
19990409	195612.3	57.51	-5.47	192.0	851.9	7.5	0.5	TORRIDON,HIGHLAND		4	10	247	0.01			A*D	5KM SOUTH OF TORRIDON
19990411	052651.6	52.96	-4.37	240.9	342.6	23.1	1.2	LLEYN PENIN,GWYNEDD		9	5	88	0.05	0.4	1.0	A*A	
19990415	004227.3	56.14	-3.71	293.7	695.4	1.1	0.5	CLACKMANNAN,CENTRAL		7	17	82	0.03	0.2	0.6	A*C	C/F
19990415	083104.0	57.02	-5.42	192.3	797.5	6.1	2.9	NEAR MALLAIG,HIGHLAND	3+	8	21	116	0.08	0.3	0.7	A*C	FELT GLEN GARRY...
19990427	224545.7	51.39	-2.53	363.1	165.9	17.0	1.8	BRISTOL,AVON		8	16	91	0.06	0.4	0.8	A*B	
19990428	081029.4	57.31	-5.56	185.5	830.0	6.2	0.3	PLOCKTON,HIGHLAND		4	6	158	0.09			A*D	4KM SE OF PLOCKTON
19990430	005133.8	55.07	-7.40	55.2	588.4	9.7	1.7	DONEGAL, IRELAND	3+	8	82	258	0.29	6.0	3.5	D*D	FELT CARROWKEEL
19990502	203031.5	57.58	-5.57	186.7	860.4	5.9	0.4	TORRIDON,HIGHLAND		7	19	145	0.18	1.7	2.7	B*C	4KM NW OF TORRIDON
19990502	203733.3	52.96	-3.59	293.3	341.4	11.5	1.0	BALA,GWYNEDD		14	23	137	0.06	0.4	0.5	A*C	
19990511	051535.7	52.93	-3.98	266.8	338.6	8.4	0.4	FFESTINIOG,GWYNEDD		6	27	180	0.07	0.9	5.1	C*D	
19990511	072101.9	53.13	-1.09	460.8	359.8	2.9	2.1	MANSFIELD,NOTTS		7	28	184	0.12	1.1	2.2	B*D	C/F,6KM E OF MANSFIELD
19990511	214900.6	53.13	-1.19	454.1	359.6	1.0	0.7	MANSFIELD,NOTTS	3+	5	26	173	0.09	1.2	2.6	B*D	C/F,FELT MANSFIELD AREA
19990515	071603.5	59.82	2.08	628.71	110.6	15.0	2.2	NORTHERN NORTH SEA		8183	172	0.35	7.7	7.2	D*D		
19990516	203204.1	53.51	-4.38	242.4	403.8	15.1	1.3	OFF ANGLESEY,GWYNEDD		7	13	273	0.03	0.8	0.5	A*D	8KM NORTH OF ANGLESEY
19990516	204838.0							SONIC-MID GLAMORGAN	3+								SONIC-FELT HENGOED
19990519	234127.2	52.96	-4.41	238.3	343.1	24.6	0.1	LLEYN PENIN,GWYNEDD		6	3	107	0.06	1.0	1.2	B*B	
19990527	041311.9	53.18	-1.11	459.4	365.0	0.2	0.8	MANSFIELD,NOTTS		6	29	132	0.28	2.6	8.5	C*C	C/F
19990527	185930.7	52.89	-3.50	298.8	333.7	10.5	0.8	BALA,GWYNEDD		10	17	118	0.06	0.4	0.7	A*B	8KM SE OF BALA
19990529	003141.7	62.28	4.58	741.21	395.3	7.1	4.1	NORWEGIAN COAST	3+	14	80	285	0.38	5.3	3.0	D*D	FELT NORWEGIAN COAST
19990529	114934.5	57.25	-3.85	288.4	819.0	5.6	2.2	AVIEMORE,HIGHLAND	3+	10	38	101	0.16	1.1	5.8	C*C	FELT BOAT OF GARTEN
19990530	023121.9	53.40	-1.44	437.1	389.7	1.0	1.0	SHEFFIELD,S YORKSHIRE		7	17	145	0.14	1.0	1.5	B*C	C/F
19990611	014447.5	53.18	-1.10	460.1	365.7	0.1	1.3	MANSFIELD,NOTTS		9	30	82	0.50	2.5	6.2	D*C	C/F,6KM NE OF MANSFIELD
19990613	202213.6	51.69	-3.23	314.8	200.0	2.6	0.9	BARGOED,MID GLAMORGAN		6	30	174	0.03	0.3	1.1	A*C	C/F
19990614	222450.6	52.69	-3.84	275.7	312.2	10.6	1.2	DOLGELLAU,GWYNEDD		9	13	102	0.16	1.2	1.9	B*B	6KM SOUTH OF DOLGELLAU
19990616	000556.4	53.39	-4.71	219.6	391.8	17.2	-0.3	HOLYHEAD BAY,ANGLESEY		6	11	292	0.02	1.1	0.5	B*D	10KM NW OF HOLYHEAD
19990617	022026.6	51.99	-2.57	360.9	233.0	21.1	2.8	HEREFORD,HER & WORCS	3+	7	5	109	0.04	0.7	1.0	A*B	FELT CRADLEY
19990626	141109.6	57.72	-5.09	216.3	873.8	7.8	1.7	KINLOCHEWE,HIGHLAND		9	27	82	0.11	0.6		C*C	17KM NE OF KINLOCHEWE
19990630	005641.8	53.44	-1.34	444.0	394.0	1.0	1.3	ROTHERHAM,S YORKSHIRE		8	24	107	0.05	0.3	0.5	A*C	C/F
19990707	004908.3	53.10	-3.69	287.1	357.1	7.8	0.3	BETWS-Y-COED,GWYNEDD		7	23	166	0.05	0.8	3.6	B*C	7KM EAST OF BETWS-Y-COED
19990707	065554.8	53.10	-3.69	286.7	357.6	8.8	0.4	BETWS-Y-COED,GWYNEDD		7	22	167	0.10	1.5	6.4	C*C	7KM EAST OF BETWS-Y-COED
19990707	204350.5	53.11	-3.71	285.7	357.8	11.5	0.0	BETWS-Y-COED,GWYNEDD		8	22	164	0.04	0.6	1.4	A*C	7KM EAST OF BETWS-Y-COED
19990707	232535.8	52.43	-2.68	353.7	281.5	13.6	0.9	LUDLOW,SHROPSHIRE		9	17	204	0.07	0.6	0.6	A*D	6KM NORTH OF LUDLOW
19990708	180916.5	52.84	-3.88	273.7	328.6	14.9	0.6	DOLGELLAU,GWYNEDD		9	21	86	0.08	0.6	2.0	B*B	10KM NORTH OF DOLGELLAU
19990709	061833.7	53.10	-3.68	287.2	357.3	8.6	0.3	BETWS-Y-COED,GWYNEDD		6	23	167	0.02	0.5	2.2	B*C	7KM EAST OF BETWS-Y-COED
19990709	061944.8	53.10	-3.69	286.9	357.0	7.2	0.2	BETWS-Y-COED,GWYNEDD		6	23	166	0.01	0.3	1.5	A*C	7KM EAST OF BETWS-Y-COED
19990709	143111.9	51.70	-3.22	315.8	200.6	2.1	1.9	BARGOED,MID GLAMORGAN	3+	7	29	172	0.02	0.2	0.5	A*C	C/F,FELT BLACKWOOD

TABLE 1: CATALOGUE OF EVENTS LISTED CHRONOLOGICALLY:1999 continued

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	DM	Gap	RMS	ERH	ERZ	SQD	Comments
19990710	031001.9	56.13	-3.70	294.3	694.9	2.0	0.7	CLACKMANNAN,CENTRAL		6	17	125	0.06	0.6	1.9	A*C	C/F
19990713	163342.1	49.21	-2.32	376.9	-76.1	10.2	1.8	JERSEY,CHANNEL ISLANDS	3+	7	8	331	0.02	0.5	0.2	A*D	FELT ST PETER...
19990719	175814.0	56.38	-4.18	265.6	722.5	2.9	2.0	LOCH EARN,CENTRAL	3+	9	23	114	0.06	0.4	1.0	A*C	FELT ST FILLANS
19990722	114523.7	58.72	-2.58	366.6	981.9	18.3	1.9	PENTLAND FIRTH		6	36	248	0.05	1.6	0.7	B*D	
19990723	004746.1	53.23	-1.09	460.9	370.5	1.3	1.0	OLLERTON,NOTTS		4	30	215	0.09			A*D	C/F
19990724	020341.6	55.10	-3.64	295.6	579.3	11.3	1.3	DUMFRIES,D & G	3+	7	9	136	0.03	0.4	0.7	A*C	FELT TINWALD
19990727	025108.2	57.13	-5.57	183.9	810.4	8.8	-0.4	LOCH HOURN,HIGHLAND		4	12	166	0.01			A*D	
19990730	093112.3	51.69	-3.20	317.0	199.7	6.4	2.7	BARGOED,MID GLAMORGAN		12	28	70	0.10	0.6	1.2	A*C	
19990730	140730.0							SONIC-ISLE OF LEWIS	4+								SONIC-FELT ISLE OF LEWIS
19990730	224317.8	51.69	-3.19	317.9	199.9	6.5	1.3	BARGOED,MID GLAMORGAN		7	27	124	0.10	0.9	1.7	A*C	
19990731	031511.0	56.14	-3.70	294.6	695.7	0.9	1.4	CLACKMANNAN,CENTRAL	2+	10	17	83	0.07	0.3	0.8	A*C	C/F,FELT FOREST MILL
19990731	073348.5	51.69	-3.21	316.3	200.3	7.3	1.1	BARGOED,MID GLAMORGAN		7	29	108	0.09	0.7	5.0	B*C	
19990731	075109.4	61.47	2.56	642.7	1295.5	10.1	2.2	NORTHERN NORTH SEA		14	127	201	0.39	5.2	5.5	D*D	
19990801	005457.2	49.17	-1.83	412.5	-81.2	12.0	0.8	JERSEY,CHANNEL ISLANDS		7	16	341	0.01	0.7	0.7	A*D	14KM SE OF JERSEY
19990803	212413.1	57.49	-5.66	180.8	849.9	7.6	0.3	LOCHCARRON,HIGHLAND		5	16	267	0.07	2.2		C*D	10KM NW OF LOCHCARRON
19990804	211437.8	56.14	-3.68	295.7	695.6	0.3	1.1	CLACKMANNAN,CENTRAL	2+	9	31	131	0.11	0.6	1.7	A*C	C/F,FELT FOREST MILL
19990808	052043.1	56.24	-3.74	292.1	706.4	3.6	0.8	BLACKFORD,TAYSIDE		7	14	103	0.08	0.6	1.7	A*C	
19990813	052858.6	51.69	-3.21	316.0	199.6	7.4	2.1	BARGOED,MID GLAMORGAN		8	37	91	0.13	1.0	5.8	C*C	
19990815	144103.0	52.97	-4.39	239.4	344.3	23.1	-0.2	LLEYN PENIN,GWYNEDD		6	2	188	0.01	0.4	0.3	A*D	
19990820	235505.0	55.09	-3.66	294.3	578.5	4.9	1.1	DUMFRIES,D & G		6	10	145	0.09	1.4	11.8	C*C	
19990825	041747.8	56.16	-3.66	296.7	697.6	0.0	1.0	DOLLAR,CENTRAL	2+	6	14	115	0.10	0.8	2.3	B*C	C/F,FELT FOREST MILL
19990827	120030.3	53.32	-4.25	250.0	382.2	7.1	-0.2	LLANBEDRGOCH,GWYNEDD		9	10	126	0.09	0.4	1.6	A*B	
19990829	225929.1	55.04	-7.65	39.3	586.1	6.1	1.3	DONEGAL,IRELAND	2+	4	97	340	0.13			A*D	FELT LETTERKENNY
19990901	050054.6	53.20	-4.35	243.1	369.3	16.3	3.1	CAERNARVON,GWYNEDD	4	10	11	87	0.07	0.5	1.1	A*A	FELT CAERNARVON...
19990901	052630.3	53.20	-4.35	243.2	369.1	15.9	1.2	CAERNARVON,GWYNEDD	3+	10	11	87	0.07	0.4	1.0	A*A	FELT LLANGEFNI
19990903	225750.5	55.23	-3.39	311.4	593.4	4.2	2.1	JOHNSTONEBRIDGE,D & G	3+	13	16	159	0.13	0.6		C*C	FELT JOHNSTONEBRIDGE...
19990903	230226.1	55.23	-3.40	311.0	593.9	4.5	1.3	JOHNSTONEBRIDGE,D & G	2+	12	16	163	0.15	1.2		C*C	FELT JOHNSTONEBRIDGE
19990904	200938.2	55.69	-5.87	156.9	651.4	8.4	1.7	SOUND OF JURA		6	43	243	0.07	4.6		C*D	
19990907	120156.7	52.93	-2.27	381.6	337.2	3.1	2.6	NEWCASTLE-U-LYME,STAFFS	3+	8	31	147	0.11	0.9	1.9	A*C	FELT KEELE
19990907	140207.0							SONIC-CUMBRIA									SONIC-FELT WASDALE...
19990908	054134.7	55.74	-6.41	123.1	658.6	9.1	2.0	ISLAY,STRATHCLYDE		11	68	209	0.20	2.0	2.5	B*D	
19990911	010709.4	54.55	-3.91	276.6	518.6	6.8	1.6	IRISH SEA		10	27	99	0.09	0.5	2.5	B*C	20KM WEST OF WHITEHAVEN
19990913	042108.9	56.76	-5.04	214.3	767.5	4.1	1.4	FORT WILLIAM,HIGHLAND		8	8	144	0.05	0.6	1.0	A*C	7KM SE OF FORT WILLIAM
19990913	134738.7	57.76	-5.03	219.6	878.8	7.7	0.9	ULLAPOOL,HIGHLAND		9	33	91	0.08	0.5		C*C	14KM SSE OF ULLAPOOL
19990915	034429.3	55.84	-5.84	159.6	667.0	10.5	1.5	SOUND OF JURA		7	57	249	0.24	5.5	12.3	D*D	
19990923	192205.4	57.24	-3.86	287.8	818.3	7.7	1.2	AVIEMORE,HIGHLAND	2+	8	38	121	0.12	0.8		C*C	FELT CARRBRIDGE
19990925	200619.6	50.22	-4.85	196.5	39.4	6.4	0.1	VERYAN BAY,CORNWALL		8	15	241	0.02	0.7	1.7	A*D	
19990926	002710.5	54.15	-1.38	440.6	472.8	10.1	1.4	RIPON,NORTH YORKSHIRE		5	27	210	0.09	3.9	13.3	C*D	10KM EAST OF RIPON
19990926	040542.1	56.14	-4.47	246.6	696.6	4.9	0.5	ABERFOYLE,CENTRAL		5	28	278	0.02	0.4	0.4	A*D	5KM SW OF ABERFOYLE
19990929	121125.2	60.73	-13.20	-208.9	1257.7	29.9	3.0	LOUSY BANK,N ATLANTIC		14	370	190	0.30	2.1	4.8	B*D	370KM WSW OF FAROES
19991002	035046.3	52.93	-2.28	381.2	337.4	3.9	2.4	NEWCASTLE-U-LYME,STAFFS	3+	8	31	147	0.11	1.0	2.1	B*C	FELT KEELE...
19991006	162647.7	49.95	0.42	573.5	8.8	0.5	3.2	U/W-ENGLISH CHANNEL		14	98	223	0.43	4.1	4.8	C*D	CONFIRMED DETONATION
19991012	071727.3	49.52	-7.18	24.9	-29.3	15.0	2.7	SW OF SCILLY ISLES		8	135	351	0.08	8.9	3.0	D*D	70KM SW OF SCILLY ISLES
19991021	023543.1	54.76	-3.31	316.0	541.8	12.9	0.2	ASPATRIA,CUMBRIA		7	5	203	0.04	0.8	0.5	A*D	
19991022	023516.5	49.21	-1.95	403.4	-76.8	9.4	1.1	JERSEY,CHANNEL ISLANDS		7	6	328	0.05	0.9	0.9	A*D	

TABLE 1: CATALOGUE OF EVENTS LISTED CHRONOLOGICALLY:1999 continued

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	DM	Gap	RMS	ERH	ERZ	SQD	Comments
19991025	191520.7	51.97	-3.57	292.2	230.8	14.1	3.6	SENNYBRIDGE, POWYS	5	8	24	115	0.08	0.6	1.0	A*B	FELT BRECON...
19991026	211055.6	56.35	-6.33	132.4	726.0	9.7	0.8	ROSS OF MULL, S'CLYDE		5	70	350	0.02	3.9	1.0	C*D	
19991104	010700.4	54.44	-2.99	336.1	505.2	12.6	0.4	AMBLESIDE, CUMBRIA		8	17	246	0.06	1.1	1.9	B*D	
19991106	045358.3	50.25	-4.02	255.7	40.8	8.4	1.2	ENGLISH CHANNEL		6	13	208	0.08	0.8	2.9	B*D	
19991108	122432.9	50.23	-5.25	167.9	41.3	0.3	0.2	REDRUTH, CORNWALL		9	5	307	0.03	0.3		C*D	COLLAPSE TYPE EVENT
19991109	065559.0	57.19	-5.74	174.1	817.3	11.9	0.0	ISLE OF SKYE, HIGHLAND		4	17	187	0.12			A*D	
19991110	024828.3	57.26	-5.65	179.7	825.1	6.3	0.8	LOCH ALSH, HIGHLAND		4	8	248	0.18			B*D	
19991112	095512.9	50.23	-5.25	168.2	41.3	0.2	0.6	REDRUTH, CORNWALL	3+	8	5	306	0.04	2.4	8.2	C*D	FELT REDRUTH
19991112	132743.6	51.96	-3.57	292.4	230.8	15.9	1.9	SENNYBRIDGE, POWYS		9	24	115	0.10	0.6	3.8	B*B	
19991113	200516.2	54.31	-3.24	319.6	491.5	12.5	-0.1	BROUGHTON FURNESS, CUM		6	4	159	0.03	0.8	0.7	A*C	
19991113	203953.7	56.24	-3.74	292.0	706.7	3.9	0.7	BLACKFORD, TAYSIDE		6	15	131	0.03	0.3	1.0	A*C	
19991114	180604.0	57.16	-5.79	170.8	813.5	7.6	0.1	ISLE OF SKYE, HIGHLAND		5	22	197	0.04	1.2		C*D	
19991114	203640.2	57.15	-5.78	171.2	813.4	5.6	0.3	ISLE OF SKYE, HIGHLAND		6	22	195	0.07	1.2	2.3	B*D	
19991122	010225.7	55.92	-5.89	157.0	676.4	7.9	2.7	JURA, STRATHCLYDE	2+	9	72	259	0.08	2.0		C*D	FELT ORMSARY
19991122	034000.0							SONIC-LINCOLNSHIRE	4+								SONIC-FELT SCUNTHORPE...
19991122	180739.3	55.86	-5.92	154.8	670.2	12.3	1.8	JURA, STRATHCLYDE		8	61	202	0.19	3.1	4.5	C*D	
19991125	002905.2	55.71	-2.46	370.9	645.9	13.8	1.9	GREENLAW, BORDERS		21	25	171	0.09	0.4	0.8	A*C	
19991202	150928.3							SONIC-NORTH NORFOLK	3+								SONIC-FELT SHERINGHAM
19991203	192710.2	55.85	-5.91	155.2	669.1	10.8	1.8	JURA, STRATHCLYDE		6	60	282	0.14	4.2	7.0	C*D	
19991203	192843.3	55.87	-5.92	154.5	670.6	10.7	2.2	JURA, STRATHCLYDE		7	62	203	0.07	1.6	4.5	B*D	
19991205	154039.8	50.10	-5.18	172.8	27.5	6.6	0.4	CONSTANTINE, CORNWALL		6	3	223	0.01	0.2	0.2	A*D	
19991205	194052.3	53.70	-2.13	391.5	422.7	7.6	2.3	BURNLEY, LANCASHIRE		6	25	209	0.08	1.7		C*D	9KM SW OF BURNLEY
19991207	023141.3	53.36	-4.44	237.7	388.1	10.5	0.4	NORTH ANGLESEY, GWYNEDD		7	7	146	0.01	0.1	0.2	A*C	
19991208	012731.5	57.50	-5.50	190.5	851.4	6.7	0.3	TORRIDON, HIGHLAND		4	12	246	0.06			A*D	5KM SOUTH OF TORRIDON
19991214	094357.5	53.40	-2.42	372.2	389.1	8.0	2.8	ALTRINCHAM, G MANCHESTER		15	41	66	0.12	0.5		C*C	
19991220	090426.3	55.48	-3.00	337.0	620.9	6.1	1.3	SELKIRK, BORDERS		8	22	138	0.12	0.8	1.7	A*C	12KM SW OF SELKIRK
19991224	171729.9	53.07	-1.15	456.8	352.4	1.6	1.3	PAPPLEWICK, NOTTS	3+	7	22	157	0.11	0.9	5.0	C*C	C/F, FELT PAPPLEWICK
19991226	194835.4	50.04	-5.36	159.6	20.9	13.0	1.1	MOUNT'S BAY, CORNWALL		10	12	224	0.05	0.7	1.6	A*D	

TABLE 2

**CATALOGUE OF EARTHQUAKES LISTED IN
ORDER OF DECREASING LATITUDE: 1999**

KEY TO BULLETIN ENCODING

YearMoDy	: Year, month and day of event.
HrMn Secs	: Time of occurrence of event in hours, mins and secs, (UTC).
Lat	: Latitude of the event, positive latitude indicates north.
Lon	: Longitude of the event, negative longitude indicates west.
kmE	: UK National Grid Reference in kilometres east of grid origin.
kmN	: UK National Grid Reference in kilometres north of grid origin.
Dep	: Depth of the hypocentre in kilometres.
Mag	: Richter local magnitude of the event.
Locality	: A geographical indication of the epicentral area, usually the nearest town followed by the region. A key to the abbreviations used in the locality column are given below.
Int	: Maximum EMS intensity. 2+ indicates felt, no macroseismic details. 3+, 4+ etc indicates felt at 3 or 4, but no survey carried out. 3, 4, 5 etc describes the maximum EMS intensity produced by the event.
Comments	: Additional comments about the event eg: C/F, see below under comments abbreviations.

The following abbreviations are extracted from the output of the location program HYPO71 (Lee and Lahr, 1975)

No	: Total number of P and S readings used in the event location.
DM	: Epicentral distance in kilometres to the closest station.
Gap	: Largest azimuthal separation in degrees between stations.
RMS	: Root Mean Square of the travel-time residuals in seconds.
ERH	: Standard error of the epicentre in kilometres. When this column is blank, the error is large and indeterminate.
ERZ	: Standard error of the focal depth in kilometres. When this column is blank, the error is large and indeterminate.
SQD	: S is quality factor ascribed to RMS, D is quality ascribed to number and distribution of stations.

Locality abbreviations

Sonic	: Sonic boom	Mid Glam	: Mid Glamorgan
Expl	: Explosion	Notts	: Nottinghamshire
D & G	: Dumfries and Galloway	S'Clyde	: Strathclyde
Her & Worcs	: Hereford and Worcester	S Yorkshire	: South Yorkshire
New-U-Lyme	: Newcastle-Under-Lyme	Gloucs	: Gloucestershire
Penin	: Peninsula	Staffs	: Staffordshire
Cum	: Cumbria	Lincs	: Lincolnshire
Gtr	: Greater		

Comments abbreviations

Sonic	: Sonic boom
Expl	: Explosion
C/F	: Coalfield type event
...	: and felt elsewhere

TABLE 2: CATALOGUE OF EARTHQUAKES LISTED IN ORDER OF DECREASING LATITUDE:1999

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	DM	Gap	RMS	ERH	ERZ	SQD	Comments
19990529	003141.7	62.28	4.58	741.2	1395.3	7.1	4.1	NORWEGIAN COAST	3+	14	80	285	0.38	5.3	3.0	D*D	FELT NORWEGIAN COAST
19990731	075109.4	61.47	2.56	642.7	1295.5	10.1	2.2	NORTHERN NORTH SEA		14127	201	0.39		5.2	5.5	D*D	
19990929	121125.2	60.73	-13.20	-208.9	1257.7	29.9	3.0	LOUSY BANK,N ATLANTIC		14370	190	0.30		2.1	4.8	B*D	370KM WSW OF FAROES
19990206	232843.1	60.61	-0.18	499.4	1193.3	17.5	1.3	NORTHERN NORTH SEA		7	50	319	0.16	5.1	4.2	D*D	50KM EAST OF SHETLAND
19990515	071603.5	59.82	2.08	628.7	1110.6	15.0	2.2	NORTHERN NORTH SEA		8183	172	0.35		7.7	7.2	D*D	
19990405	031332.3	59.33	1.55	602.1	1054.1	18.8	2.9	NORTHERN NORTH SEA		19178	150	0.14		0.8	1.8	A*D	
19990722	114523.7	58.72	-2.58	366.6	981.9	18.3	1.9	PENTLAND FIRTH		6	36	248	0.05	1.6	0.7	B*D	
19990913	134738.7	57.76	-5.03	219.6	878.8	7.7	0.9	ULLAPOOL,HIGHLAND		9	33	91	0.08	0.5		C*C	14KM SSE OF ULLAPOOL
19990626	141109.6	57.72	-5.09	216.3	873.8	7.8	1.7	KINLOCHEWE,HIGHLAND		9	27	82	0.11	0.6		C*C	17KM NE OF KINLOCHEWE
19990204	053401.0	57.66	-5.14	213.0	867.8	5.8	1.0	KINLOCHEWE,HIGHLAND		6	21	200	0.11	3.5	2.1	C*D	8KM NE OF KINLOCHEWE
19990502	203031.5	57.58	-5.57	186.7	860.4	5.9	0.4	TORRIDON,HIGHLAND		7	19	145	0.18	1.7	2.7	B*C	4KM NW OF TORRIDON
19990409	195612.3	57.51	-5.47	192.0	851.9	7.5	0.5	TORRIDON,HIGHLAND		4	10	247	0.01			A*D	5KM SOUTH OF TORRIDON
19991208	012731.5	57.50	-5.50	190.5	851.4	6.7	0.3	TORRIDON,HIGHLAND		4	12	246	0.06			A*D	5KM SOUTH OF TORRIDON
19990803	212413.1	57.49	-5.66	180.8	849.9	7.6	0.3	LOCHCARRON,HIGHLAND		5	16	267	0.07	2.2		C*D	10KM NW OF LOCHCARRON
19990218	140823.8	57.42	-5.26	204.0	841.5	10.2	0.1	STRATHCARRON,HIGHLAND		4	9	216	0.02			A*D	
19990326	015819.7	57.42	-5.74	175.6	842.8	8.5	0.6	APPLECROSS,HIGHLAND		5	10	246	0.03	1.5	1.3	B*D	
19990317	033155.4	57.33	-5.63	181.5	832.9	26.9	-0.1	PLOCKTON,HIGHLAND		4	1	147	0.03			A*D	
19990428	081029.4	57.31	-5.56	185.5	830.0	6.2	0.3	PLOCKTON,HIGHLAND		4	6	158	0.09			A*D	4KM SE OF PLOCKTON
19990214	080109.5	57.29	-5.58	184.2	828.1	6.1	1.1	AUCHTERTYRE,HIGHLAND		4	7	187	0.11			A*D	
19991110	024828.3	57.26	-5.65	179.7	825.1	6.3	0.8	LOCH ALSH,HIGHLAND		4	8	248	0.18			B*D	
19990529	114934.5	57.25	-3.85	288.4	819.0	5.6	2.2	AVIEMORE,HIGHLAND	3+	10	38	101	0.16	1.1	5.8	C*C	FELT BOAT OF GARTEN
19990923	192205.4	57.24	-3.86	287.8	818.3	7.7	1.2	AVIEMORE,HIGHLAND	2+	8	38	121	0.12	0.8		C*C	FELT CARRBRIDGE
19991109	065559.0	57.19	-5.74	174.1	817.3	11.9	0.0	ISLE OF SKYE,HIGHLAND		4	17	187	0.12			A*D	
19991114	180604.0	57.16	-5.79	170.8	813.5	7.6	0.1	ISLE OF SKYE,HIGHLAND		5	22	197	0.04	1.2		C*D	
19991114	203640.2	57.15	-5.78	171.2	813.4	5.6	0.3	ISLE OF SKYE,HIGHLAND		6	22	195	0.07	1.2	2.3	B*D	
19990727	025108.2	57.13	-5.57	183.9	810.4	8.8	-0.4	LOCH HOURN,HIGHLAND		4	12	166	0.01			A*D	
19990228	072452.8	57.07	-5.67	177.3	803.7	6.8	0.5	KNOYDART,HIGHLAND		5	19	164	0.11	8.2	8.8	D*D	
19990130	133437.2	57.03	-5.59	182.1	799.2	7.3	1.3	KNOYDART,HIGHLAND		5	22	324	0.23	4.5	9.7	C*D	
19990415	083104.0	57.02	-5.42	192.3	797.5	6.1	2.9	NEAR MALLAIG,HIGHLAND	3+	8	21	116	0.08	0.3	0.7	A*C	FELT GLEN GARRY...
19990309	003843.2	56.87	6.36	909.2	806.2	15.0	3.0	NORWEGIAN-DANISH BASIN		12530	333	0.37				D*D	
19990913	042108.9	56.76	-5.04	214.3	767.5	4.1	1.4	FORT WILLIAM,HIGHLAND		8	8	144	0.05	0.6	1.0	A*C	7KM SE OF FORT WILLIAM
19990409	050202.6	56.40	-5.75	168.8	729.8	5.9	1.8	ISLE OF MULL,S'CLYDE		7	58	250	0.13	4.9	9.4	C*D	
19990719	175814.0	56.38	-4.18	265.6	722.5	2.9	2.0	LOCH EARN,CENTRAL	3+	9	23	114	0.06	0.4	1.0	A*C	FELT ST FILLANS
19991026	211055.6	56.35	-6.33	132.4	726.0	9.7	0.8	ROSS OF MULL,S'CLYDE		5	70	350	0.02	3.9	1.0	C*D	
19990106	053948.7	56.33	-5.07	210.4	719.7	3.6	1.3	INVERARAY,STRATHCLYDE		8	48	280	0.12	4.4	10.7	C*D	10KM NORTH OF INVERARAY
19990327	172531.5	56.25	-3.76	291.0	708.3	5.2	0.7	BLACKFORD,TAYSIDE		6	16	109	0.07	0.7	1.4	A*C	
19990808	052043.1	56.24	-3.74	292.1	706.4	3.6	0.8	BLACKFORD,TAYSIDE		7	14	103	0.08	0.6	1.7	A*C	
19991113	203953.7	56.24	-3.74	292.0	706.7	3.9	0.7	BLACKFORD,TAYSIDE		6	15	131	0.03	0.3	1.0	A*C	
19990825	041747.8	56.16	-3.66	296.7	697.6	0.0	1.0	DOLLAR,CENTRAL	2+	6	14	115	0.10	0.8	2.3	B*C	C/F,FELT FOREST MILL
19990415	004227.3	56.14	-3.71	293.7	695.4	1.1	0.5	CLACKMANNAN,CENTRAL		7	17	82	0.03	0.2	0.6	A*C	C/F
19990731	031511.0	56.14	-3.70	294.6	695.7	0.9	1.4	CLACKMANNAN,CENTRAL	2+	10	17	83	0.07	0.3	0.8	A*C	C/F,FELT FOREST MILL
19990804	211437.8	56.14	-3.68	295.7	695.6	0.3	1.1	CLACKMANNAN,CENTRAL	2+	9	31	131	0.11	0.6	1.7	A*C	C/F,FELT FOREST MILL
19990926	040542.1	56.14	-4.47	246.6	696.6	4.9	0.5	ABERFOYLE,CENTRAL		5	28	278	0.02	0.4	0.4	A*D	5KM SW OF ABERFOYLE

TABLE 2: CATALOGUE OF EARTHQUAKES LISTED IN ORDER OF DECREASING LATITUDE:1999 continued

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	DM	Gap	RMS	ERH	ERZ	SQD	Comments
19990710	031001.9	56.13	-3.70	294.3	694.9	2.0	0.7	CLACKMANNAN,CENTRAL		6	17	125	0.06	0.6	1.9	A*C	C/F
19991122	010225.7	55.92	-5.89	157.0	676.4	7.9	2.7	JURA,STRATHCLYDE	2+	9	72	259	0.08	2.0		C*D	FELT ORMSARY
19991203	192843.3	55.87	-5.92	154.5	670.6	10.7	2.2	JURA,STRATHCLYDE		7	62	203	0.07	1.6	4.5	B*D	
19991122	180739.3	55.86	-5.92	154.8	670.2	12.3	1.8	JURA,STRATHCLYDE		8	61	202	0.19	3.1	4.5	C*D	
19991203	192710.2	55.85	-5.91	155.2	669.1	10.8	1.8	JURA,STRATHCLYDE		6	60	282	0.14	4.2	7.0	C*D	
19990915	034429.3	55.84	-5.84	159.6	667.0	10.5	1.5	SOUND OF JURA		7	57	249	0.24	5.5	12.3	D*D	
19990908	054134.7	55.74	-6.41	123.1	658.6	9.1	2.0	ISLAY,STRATHCLYDE		11	68	209	0.20	2.0	2.5	B*D	
19991125	002905.2	55.71	-2.46	370.9	645.9	13.8	1.9	GREENLAW,BORDERS		21	25	171	0.09	0.4	0.8	A*C	
19990904	200938.2	55.69	-5.87	156.9	651.4	8.4	1.7	SOUND OF JURA		6	43	243	0.07	4.6		C*D	
19991220	090426.3	55.48	-3.00	337.0	620.9	6.1	1.3	SELKIRK,BORDERS		8	22	138	0.12	0.8	1.7	A*C	12KM SW OF SELKIRK
19990304	001651.8	55.40	-5.24	194.8	616.2	19.0	4.0	ARRAN,STRATHCLYDE	5	10	23	136	0.06	0.4	1.2	A*C	4KM SOUTH OF ARRAN
19990304	003057.0	55.40	-5.25	194.4	616.0	18.4	1.6	ARRAN,STRATHCLYDE		8	23	136	0.06	0.6	0.7	A*C	4KM SOUTH OF ARRAN
19990311	140629.1	55.40	-5.24	194.9	616.5	15.6	1.1	ARRAN,STRATHCLYDE		8	23	137	0.16	1.1	4.6	B*C	4KM SOUTH OF ARRAN
19990903	225750.5	55.23	-3.39	311.4	593.4	4.2	2.1	JOHNSTONEBRIDGE,D & G	3+	13	16	159	0.13	0.6		C*C	FELT JOHNSTONEBRIDGE...
19990903	230226.1	55.23	-3.40	311.0	593.9	4.5	1.3	JOHNSTONEBRIDGE,D & G	2+	12	16	163	0.15	1.2		C*C	FELT JOHNSTONEBRIDGE
19990314	145448.4	55.10	-3.63	295.9	579.2	11.0	1.9	DUMFRIES,D & G	3+	9	9	133	0.07	0.5	1.1	A*B	FELT KIRKTON
19990724	020341.6	55.10	-3.64	295.6	579.3	11.3	1.3	DUMFRIES,D & G	3+	7	9	136	0.03	0.4	0.7	A*C	FELT TINWALLD
19990209	010252.0	55.09	-3.62	296.5	578.1	7.5	0.7	DUMFRIES,D & G	2+	7	10	128	0.10	0.9	2.1	B*B	FELT NEWFIELD
19990218	022908.1	55.09	-3.63	295.8	579.0	10.3	1.0	DUMFRIES,D & G		9	9	134	0.07	0.4	1.0	A*B	
19990302	005846.4	55.09	-3.63	295.9	578.9	10.6	1.2	DUMFRIES,D & G	2+	8	9	133	0.04	0.3	0.8	A*B	FELT NEWFIELD
19990303	220858.7	55.09	-3.63	296.1	578.6	8.8	1.5	DUMFRIES,D & G	2+	5	10	131	0.07	1.1	3.7	B*D	FELT TROSTON
19990311	122900.6	55.09	-3.63	296.1	579.0	8.3	0.6	DUMFRIES,D & G	2+	5	9	132	0.06	0.8	2.8	B*D	FELT NEWFIELD
19990323	150337.7	55.09	-3.62	296.7	579.0	8.9	0.7	DUMFRIES,D & G	2+	7	9	164	0.07	0.6	2.2	B*C	FELT NEWFIELD
19990820	235505.0	55.09	-3.66	294.3	578.5	4.9	1.1	DUMFRIES,D & G		6	10	145	0.09	1.4	11.8	C*C	
19990430	005133.8	55.07	-7.40	55.2	588.4	9.7	1.7	DONEGAL,IRELAND	3+	8	82	258	0.29	6.0	3.5	D*D	FELT CARROWKEEL
19990829	225929.1	55.04	-7.65	39.3	586.1	6.1	1.3	DONEGAL,IRELAND	2+	4	97	340	0.13			A*D	FELT LETTERKENNY
19991021	023543.1	54.76	-3.31	316.0	541.8	12.9	0.2	ASPATRIA,CUMBRIA		7	5	203	0.04	0.8	0.5	A*D	
19990211	013217.3	54.68	-2.55	364.9	531.4	13.4	1.0	PENRITH,CUMBRIA		9	27	140	0.07	0.8	3.1	B*C	13KM EAST OF PENRITH
19990911	010709.4	54.55	-3.91	276.6	518.6	6.8	1.6	IRISH SEA		10	27	99	0.09	0.5	2.5	B*C	20KM WEST OF WHITEHAVEN
19991104	010700.4	54.44	-2.99	336.1	505.2	12.6	0.4	AMBLESIDE,CUMBRIA		8	17	246	0.06	1.1	1.9	B*D	
19991113	200516.2	54.31	-3.24	319.6	491.5	12.5	-0.1	BROUGHTON FURNESS,CUM		6	4	159	0.03	0.8	0.7	A*C	
19990926	002710.5	54.15	-1.38	440.6	472.8	10.1	1.4	RIPON,NORTH YORKSHIRE		5	27	210	0.09	3.9	13.3	C*D	10KM EAST OF RIPON
19991205	194052.3	53.70	-2.13	391.5	422.7	7.6	2.3	BURNLEY,LANCASHIRE		6	25	209	0.08	1.7		C*D	9KM SW OF BURNLEY
19990329	151547.3	53.65	-2.21	386.1	416.8	1.3	2.2	ROCHDALE,GTR MANCHESTER		12	26	68	0.24	1.1	2.0	B*C	C/F
19990331	055134.9	53.64	-2.21	386.4	416.1	2.5	1.9	ROCHDALE,GTR MANCHESTER		10	26	91	0.24	1.4	2.3	B*C	C/F
19990113	083540.5	53.63	-2.62	358.7	415.4	13.9	1.9	BOLTON,GTR MANCHESTER		13	52	99	0.25	1.3	3.6	B*D	10KM NW OF BOLTON
19990516	203204.1	53.51	-4.38	242.4	403.8	15.1	1.3	OFF ANGLESEY,GWYNEDD		7	13	273	0.03	0.8	0.5	A*D	8KM NORTH OF ANGLESEY
19990630	005641.8	53.44	-1.34	444.0	394.0	1.0	1.3	ROTHERHAM,S YORKSHIRE		8	24	107	0.05	0.3	0.5	A*C	C/F
19990530	023121.9	53.40	-1.44	437.1	389.7	1.0	1.0	SHEFFIELD,S YORKSHIRE		7	17	145	0.14	1.0	1.5	B*C	C/F
19991214	094357.5	53.40	-2.42	372.2	389.1	8.0	2.8	ALTRINCHAM,G MANCHESTER		15	41	66	0.12	0.5		C*C	
19990616	000556.4	53.39	-4.71	219.6	391.8	17.2	-0.3	HOLYHEAD BAY,ANGLESEY		6	11	292	0.02	1.1	0.5	B*D	10KM NW OF HOLYHEAD
19991207	023141.3	53.36	-4.44	237.7	388.1	10.5	0.4	NORTH ANGLESEY,GWYNEDD		7	7	146	0.01	0.1	0.2	A*C	
19990827	120030.3	53.32	-4.25	250.0	382.2	7.1	-0.2	LLANBEDRGOCH,GWYNEDD		9	10	126	0.09	0.4	1.6	A*B	
19990119	002309.0	53.26	-0.90	473.5	374.3	1.9	1.2	WORKSOP,NOTTINGHAMSHIRE		4	42	296	0.12			A*D	C/F
19990723	004746.1	53.23	-1.09	460.9	370.5	1.3	1.0	OLLERTON,NOTTS		4	30	215	0.09			A*D	C/F

TABLE 2: CATALOGUE OF EARTHQUAKES LISTED IN ORDER OF DECREASING LATITUDE:1999 continued

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	DM	Gap	RMS	ERH	ERZ	SQD	Comments
19990211	010928.7	53.22	-1.10	460.4	369.1	0.5	0.8	MANSFIELD,NOTTS		4	29	277	0.07			A*D	C/F,7KM NE OF MANSFIELD
19990901	050054.6	53.20	-4.35	243.1	369.3	16.3	3.1	CAERNARVON,GWYNEDD	4	10	11	87	0.07	0.5	1.1	A*A	FELT CAERNARVON...
19990901	052630.3	53.20	-4.35	243.2	369.1	15.9	1.2	CAERNARVON,GWYNEDD	3+	10	11	87	0.07	0.4	1.0	A*A	FELT LLANGFNFI
19990527	041311.9	53.18	-1.11	459.4	365.0	0.2	0.8	MANSFIELD,NOTTS		6	29	132	0.28	2.6	8.5	C*C	C/F
19990611	014447.5	53.18	-1.10	460.1	365.7	0.1	1.3	MANSFIELD,NOTTS		9	30	82	0.50	2.5	6.2	D*C	C/F,6KM NE OF MANSFIELD
19990127	224036.4	53.13	-1.19	454.0	359.1	1.0	0.8	MANSFIELD,NOTTS	3+	4	27	247	0.24			B*D	C/F,FELT MANSFIELD
19990511	072101.9	53.13	-1.09	460.8	359.8	2.9	2.1	MANSFIELD,NOTTS		7	28	184	0.12	1.1	2.2	B*D	C/F,6KM E OF MANSFIELD
19990511	214900.6	53.13	-1.19	454.1	359.6	1.0	0.7	MANSFIELD,NOTTS	3+	5	26	173	0.09	1.2	2.6	B*D	C/F,FELT MANSFIELD AREA
19990317	110647.7	53.11	-4.23	250.8	359.1	17.1	1.3	CAERNARVON,GWYNEDD		11	5	82	0.07	0.4	0.7	A*A	
19990707	204350.5	53.11	-3.71	285.7	357.8	11.5	0.0	BETWS-Y-COED,GWYNEDD		8	22	164	0.04	0.6	1.4	A*C	7KM EAST OF BETWS-Y-COED
19990112	054150.0	53.10	-1.32	445.5	356.1	0.3	0.6	MANSFIELD,NOTTS		4	22	218	0.34			C*D	C/F,6KM SW OF MANSFIELD
19990707	004908.3	53.10	-3.69	287.1	357.1	7.8	0.3	BETWS-Y-COED,GWYNEDD		7	23	166	0.05	0.8	3.6	B*C	7KM EAST OF BETWS-Y-COED
19990707	065554.8	53.10	-3.69	286.7	357.6	8.8	0.4	BETWS-Y-COED,GWYNEDD		7	22	167	0.10	1.5	6.4	C*C	7KM EAST OF BETWS-Y-COED
19990709	061833.7	53.10	-3.68	287.2	357.3	8.6	0.3	BETWS-Y-COED,GWYNEDD		6	23	167	0.02	0.5	2.2	B*C	7KM EAST OF BETWS-Y-COED
19990709	061944.8	53.10	-3.69	286.9	357.0	7.2	0.2	BETWS-Y-COED,GWYNEDD		6	23	166	0.01	0.3	1.5	A*C	7KM EAST OF BETWS-Y-COED
19990121	111018.2	53.09	0.07	538.7	357.1	16.9	2.8	BOSTON,LINCOLNSHIRE		9	46	141	0.11	1.1	1.9	B*C	15KM NE OF BOSTON
19991224	171729.9	53.07	-1.15	456.8	352.4	1.6	1.3	PAPPLEWICK,NOTTS	3+	7	22	157	0.11	0.9	5.0	C*C	C/F,FELT PAPPLEWICK
19990317	203011.2	53.06	-1.19	454.0	351.5	2.9	0.7	LINBY,NOTTINGHAMSHIRE		5	31	150	0.01	0.2		C*D	C/F
19990815	144103.0	52.97	-4.39	239.4	344.3	23.1	-0.2	LLEYN PENIN,GWYNEDD		6	2	188	0.01	0.4	0.3	A*D	
19990411	052651.6	52.96	-4.37	240.9	342.6	23.1	1.2	LLEYN PENIN,GWYNEDD		9	5	88	0.05	0.4	1.0	A*A	
19990502	203733.3	52.96	-3.59	293.3	341.4	11.5	1.0	BALA,GWYNEDD		14	23	137	0.06	0.4	0.5	A*C	
19990519	234127.2	52.96	-4.41	238.3	343.1	24.6	0.1	LLEYN PENIN,GWYNEDD		6	3	107	0.06	1.0	1.2	B*B	
19990511	051535.7	52.93	-3.98	266.8	338.6	8.4	0.4	FFESTINIOG,GWYNEDD		6	27	180	0.07	0.9	5.1	C*D	
19990907	120156.7	52.93	-2.27	381.6	337.2	3.1	2.6	NEWCASTLE-U-LYME,STAFFS3+		8	31	147	0.11	0.9	1.9	A*C	FELT KEELE
19991002	035046.3	52.93	-2.28	381.2	337.4	3.9	2.4	NEWCASTLE-U-LYME,STAFFS3+		8	31	147	0.11	1.0	2.1	B*C	FELT KEELE...
19990527	185930.7	52.89	-3.50	298.8	333.7	10.5	0.8	BALA,GWYNEDD		10	17	118	0.06	0.4	0.7	A*B	8KM SE OF BALA
19990310	233247.7	52.87	-5.16	187.4	334.6	5.6	0.9	IRISH SEA		6	36	300	0.06	3.9	7.2	C*D	60KM SW OF HOLYHEAD
19990708	180916.5	52.84	-3.88	273.7	328.6	14.9	0.6	DOLGELLAU,GWYNEDD		9	21	86	0.08	0.6	2.0	B*B	10KM NORTH OF DOLGELLAU
19990614	222450.6	52.69	-3.84	275.7	312.2	10.6	1.2	DOLGELLAU,GWYNEDD		9	13	102	0.16	1.2	1.9	B*B	6KM SOUTH OF DOLGELLAU
19990308	211333.9	52.60	-2.31	378.8	300.9	9.5	1.0	ALBRIGHTON,SHROPSHIRE		10	40	116	0.15	0.7		C*C	
19990707	232535.8	52.43	-2.68	353.7	281.5	13.6	0.9	LUDLOW,SHROPSHIRE		9	17	204	0.07	0.6	0.6	A*D	6KM NORTH OF LUDLOW
19990301	211437.3	52.39	-3.30	311.7	278.2	13.0	0.8	NEWTOWN,POWYS		7	13	172	0.03	0.3	0.5	A*C	13KM SOUTH OF NEWTOWN
19990617	022026.6	51.99	-2.57	360.9	233.0	21.1	2.8	HEREFORD,HER & WORCS	3+	7	5	109	0.04	0.7	1.0	A*B	FELT CRADLEY
19991025	191520.7	51.97	-3.57	292.2	230.8	14.1	3.6	SENNYBRIDGE,POWYS	5	8	24	115	0.08	0.6	1.0	A*B	FELT BRECON...
19991112	132743.6	51.96	-3.57	292.4	230.8	15.9	1.9	SENNYBRIDGE,POWYS		9	24	115	0.10	0.6	3.8	B*B	
19990324	042415.4	51.77	-1.65	424.4	208.1	15.3	1.6	CARTERTON,OXFORDSHIRE		9	26	128	0.12	0.7	1.4	A*B	
19990303	230244.2	51.73	-3.26	313.0	204.3	0.3	1.0	NEW TREDEGAR,MID GLAM		6	33	164	0.09	0.8	2.6	B*C	C/F
19990308	011951.2	51.71	-3.30	309.9	202.2	2.2	1.1	BEDLINOG,MID GLAMORGAN		7	35	171	0.06	0.5	1.2	A*C	C/F
19990318	023822.1	51.71	-3.30	310.5	202.5	1.9	1.1	BEDLINOG,MID GLAMORGAN		7	35	170	0.07	0.6	1.5	A*C	C/F
19990709	143111.9	51.70	-3.22	315.8	200.6	2.1	1.9	BARGOED,MID GLAMORGAN	3+	7	29	172	0.02	0.2	0.5	A*C	C/F,FELT BLACKWOOD
19990613	202213.6	51.69	-3.23	314.8	200.0	2.6	0.9	BARGOED,MID GLAMORGAN		6	30	174	0.03	0.3	1.1	A*C	C/F
19990730	093112.3	51.69	-3.20	317.0	199.7	6.4	2.7	BARGOED,MID GLAMORGAN		12	28	70	0.10	0.6	1.2	A*C	
19990730	224317.8	51.69	-3.19	317.9	199.9	6.5	1.3	BARGOED,MID GLAMORGAN		7	27	124	0.10	0.9	1.7	A*C	
19990731	073348.5	51.69	-3.21	316.3	200.3	7.3	1.1	BARGOED,MID GLAMORGAN		7	29	108	0.09	0.7	5.0	B*C	
19990813	052858.6	51.69	-3.21	316.0	199.6	7.4	2.1	BARGOED,MID GLAMORGAN		8	37	91	0.13	1.0	5.8	C*C	

TABLE 2: CATALOGUE OF EARTHQUAKES LISTED IN ORDER OF DECREASING LATITUDE:1999 continued

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	DM	Gap	RMS	ERH	ERZ	SQD	Comments
19990427	224545.7	51.39	-2.53	363.1	165.9	17.0	1.8	BRISTOL,AVON		8	16	91	0.06	0.4	0.8	A*B	
19990303	213454.5	50.28	-3.85	268.0	43.6	14.7	0.1	THURLESTONE,DEVON		4	5	358	0.03			A*D	
19991106	045358.3	50.25	-4.02	255.7	40.8	8.4	1.2	ENGLISH CHANNEL		6	13	208	0.08	0.8	2.9	B*D	
19991108	122432.9	50.23	-5.25	167.9	41.3	0.3	0.2	REDRUTH,CORNWALL		9	5	307	0.03	0.3		C*D	COLLAPSE TYPE EVENT
19991112	095512.9	50.23	-5.25	168.2	41.3	0.2	0.6	REDRUTH,CORNWALL	3+	8	5	306	0.04	2.4	8.2	C*D	FELT REDRUTH
19990925	200619.6	50.22	-4.85	196.5	39.4	6.4	0.1	VERYAN BAY,CORNWALL		8	15	241	0.02	0.7	1.7	A*D	
19991205	154039.8	50.10	-5.18	172.8	27.5	6.6	0.4	CONSTANTINE,CORNWALL		6	3	223	0.01	0.2	0.2	A*D	
19991226	194835.4	50.04	-5.36	159.6	20.9	13.0	1.1	MOUNT'S BAY,CORNWALL		10	12	224	0.05	0.7	1.6	A*D	
19990127	034008.6	49.97	-5.17	173.0	13.1	14.6	-0.1	OFF LIZARD PT,CORNWALL		4	8	353	0.17			B*D	
19991012	071727.3	49.52	-7.18	24.9	-29.3	15.0	2.7	SW OF SCILLY ISLES		8135	351	0.08		8.9	3.0	D*D	70KM SW OF SCILLY ISLES
19990713	163342.1	49.21	-2.32	376.9	-76.1	10.2	1.8	JERSEY,CHANNEL ISLANDS	3+	7	8	331	0.02	0.5	0.2	A*D	FELT ST PETER...
19991022	023516.5	49.21	-1.95	403.4	-76.8	9.4	1.1	JERSEY,CHANNEL ISLANDS		7	6	328	0.05	0.9	0.9	A*D	
19990801	005457.2	49.17	-1.83	412.5	-81.2	12.0	0.8	JERSEY,CHANNEL ISLANDS		7	16	341	0.01	0.7	0.7	A*D	14KM SE OF JERSEY
19990219	194622.1	49.13	-2.12	391.3	-85.9	9.4	0.9	JERSEY,CHANNEL ISLANDS		6	7	291	0.01	0.3	0.2	A*D	

TABLE 3

CATALOGUE OF NON-NATURAL EVENTS LISTED CHRONOLOGICALLY: 1999

KEY TO BULLETIN ENCODING

YearMoDy	: Year, month and day of event.
HrMn Secs	: Time of occurrence of event in hours, mins and secs, (UTC).
Lat	: Latitude of the event, positive latitude indicates north.
Lon	: Longitude of the event, negative longitude indicates west.
kmE	: UK National Grid Reference in kilometres east of grid origin.
kmN	: UK National Grid Reference in kilometres north of grid origin.
Dep	: Depth of the hypocentre in kilometres.
Mag	: Richter local magnitude of the event.
Locality	: A geographical indication of the epicentral area, usually the nearest town followed by the region. A key to the abbreviations used in the locality column are given below.
Int	: Maximum EMS intensity. 2+ indicates felt, no macroseismic details. 3+, 4+ etc indicates felt at 3 or 4, but no survey carried out. 3, 4, 5 etc describes the maximum EMS intensity produced by the event.
Comments	: Additional comments about the event eg: C/F, see below under comments abbreviations.

The following abbreviations are extracted from the output of the location program HYPO71 (Lee and Lahr,1975)

No	: Total number of P and S readings used in the event location.
DM	: Epicentral distance in kilometres to the closest station.
Gap	: Largest azimuthal separation in degrees between stations.
RMS	: Root Mean Square of the travel-time residuals in seconds.
ERH	: Standard error of the epicentre in kilometres. When this column is blank, the error is large and indeterminate.
ERZ	: Standard error of the focal depth in kilometres. When this column is blank, the error is large and indeterminate.
SQD	: S is quality factor ascribed to RMS, D is quality ascribed to number and distribution of stations.

Locality abbreviations

Sonic	: Sonic boom	Mid Glam	: Mid Glamorgan
Expl	: Explosion	Notts	: Nottinghamshire
D & G	: Dumfries and Galloway	S'Clyde	: Strathclyde
Her & Worcs	: Hereford and Worcester	S Yorkshire	: South Yorkshire
New-U-Lyme	: Newcastle-Under-Lyme	Gloucs	: Gloucestershire
Penin	: Peninsula	Staffs	: Staffordshire
Cum	: Cumbria	Lincs	: Lincolnshire
Gtr	: Greater		

Comments abbreviations

Sonic	: Sonic boom
Expl	: Explosion
C/F	: Coalfield type event
...	: and felt elsewhere

TABLE 3: CATALOGUE OF NON-NATURAL EVENTS LISTED CHRONOLOGICALLY:1999[illegible]

TABLES 4

GEOGRAPHICAL COORDINATES OF SEISMOGRAPH STATIONS: DECEMBER 1999

TABLE 4a

GEOGRAPHIC COORDINATES OF SEISMOGRAPH STATIONS: DECEMBER 1999

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Yrs open	Comp	Agency
ABA	BACONSTHORPE	52.8884	1.1453	611.58	337.00	74	82-	1	BGS
AEA	EAST ANGLIA UNIV	52.6208	1.2403	619.30	307.53	45	84-	M	BGS
APA	PACKWAY	52.3006	1.4782	637.12	272.68	58	84-	1	BGS
AWH	WHINBURGH	52.6297	0.9507	599.67	307.68	64	80-	1R	BGS
AWI	WITTON	52.8319	1.4471	632.17	331.65	46	83-	1	BGS
BBH	BRUNTSHEIL	55.1333	-2.9299	340.72	582.50	216	92-	1	BGS
BBO	BOTHEL	54.7367	-3.2464	319.76	538.69	209	92-	3	BGS
BCM	CHAPELCROSS MIC	55.0151	-3.2212	321.92	569.64	78	92-	M	BGS
BDL	DOBCROSS HALL	54.8030	-2.9385	339.68	545.76	157	92-	1	BGS
BHH	HOWATS HILL	55.0931	-3.2181	322.27	578.31	216	92-	3	BGS
BNA	NEW ABBEY	54.9658	-3.6242	296.03	564.68	28	92-	1	BGS
BTA	TALKIN	54.9057	-2.6844	356.12	557.00	279	92-	3	BGS
BWH	WARDLAW	55.1758	-3.6549	294.62	588.09	269	92-	1	BGS
CBW	BUDOCK WATER	50.1482	-5.1144	177.53	32.29	94	81-	1	BGS
CCA	CARNMENELLIS	50.1866	-5.2277	169.62	36.90	210	81-	1	BGS
CCO	CONSTANTINE	50.1357	-5.1957	171.66	31.14	168	81-	1	BGS
CDU	DUNNERDALE	54.3362	-3.1952	322.30	494.08	355	92-	1	BGS
CGH	GOONHILLY	50.0507	-5.1649	173.46	21.60	97	81-	1	BGS
CGW	GWEEK	50.1006	-5.2228	169.56	27.32	9	93-	1	BGS
CKE	KESWICK	54.5877	-3.1059	328.54	521.96	304	92-	1	BGS
CMA	MANACCAN	50.0821	-5.1274	176.29	24.98	42	93-	1	BGS
CPZ	PENZANCE	50.1566	-5.5828	144.12	34.72	199	81-	1R	BGS
CR2	ROSEMANOWES 2	50.1667	-5.1687	173.74	34.51	143	81-	3	BGS
CSA	ST AUSTELL	50.3527	-4.8919	194.30	54.38	112	81-	1	BGS
CSF	SCAFELL	54.4478	-3.2430	319.41	506.55	540	92-	1	BGS
CSM	SELLAFIELD MIC	54.4183	-3.4913	303.24	503.58	50	92-	M	BGS
CST	STITHIANS	50.1952	-5.1635	174.24	37.66	141	81-	1	BGS
CWF	CHARNWOOD FST	52.7385	-1.3076	446.74	315.91	203	75-	3R	BGS
DCO	COMBE FARM	50.3201	-3.8721	266.74	48.43	117	82-	1R	BGS
DYA	YADSWORTHY	50.4353	-3.9310	262.88	61.34	292	82-	3R	BGS
EAB	ABERFOYLE	56.1887	-4.3373	254.97	702.02	279	69-	1R	BGS
EAU	AUCHINOON	55.8454	-3.4474	309.38	662.30	359	69-	1R	BGS
EBH	BLACK HILL	56.2476	-3.5084	306.54	707.13	375	69-	1R	BGS
EBL	BROAD LAW	55.7723	-3.0445	334.48	653.71	436	69-	1R	BGS
ECK	CAULDKAINE HILL	55.1810	-3.1292	328.10	588.00	351	81-	1R	BGS
EDI	EDINBURGH	55.9233	-3.1875	325.80	670.66	125	69-	3R	BGS
EDR	DRUMTOCHTY	56.9190	-2.5393	367.17	780.97	401	89-	1R	BGS
EDU	DUNDEE	56.5477	-3.0110	337.85	739.97	421	69-	1R	BGS
ELO	LOGIEALMOND	56.4703	-3.7112	294.59	732.21	523	69-	1R	BGS
ESK	ESKDALEMUIR	55.3165	-3.2052	323.52	603.16	261	65-	3R	BGS
ESY	STONEYPATH	55.9175	-2.6141	361.62	669.55	337	81-	1R	BGS
FHV	HALDARSVIK	62.2597	-7.0984	135.46	1385.95	380	99-	1R	BGS
FSD	SUDUROY	61.5701	-6.7884	145.86	1308.06	480	99-	1R	BGS
FSV	SVINOY	62.2598	-6.3550	173.99	1383.14	430	99-	1R	BGS
FTO	TORSHAVN	62.0199	-6.8274	147.51	1358.21	325	99-	3R	BGS
FVA	VAGAR	62.0575	-7.3520	120.46	1364.55	430	99-	1R	BGS
GAL	GALLOWAY	54.8664	-4.7114	226.02	555.78	117	89-	3M	BGS
GCD	CASTLE DOUGLAS	54.8630	-3.9403	275.48	553.76	184	89-	1R	BGS
GCL	CUSHENDALL	55.0783	-6.1264	136.66	583.77	278	89-	1R	BGS
GIM	ISLE OF MAN (North)	54.2923	-4.4672	239.44	491.35	346	89-	3R	BGS
GMK	MULL OF KINTYRE	55.3458	-5.5934	172.19	611.64	164	89-	1R	BGS
GMM	MTNS OF MOURNE	54.2377	-5.9498	142.66	489.67	155	89-	1R	BGS
HAE	ALDERS END	52.0368	-2.5434	362.73	237.79	260	82-	1R	BGS
HCG	CRAIG GOCH	52.3231	-3.6570	287.08	270.78	533	80-	1R	BGS
HEX	EXMOOR	51.0664	-3.8026	273.71	131.28	230	91-	1R	BGS
HGH	GRAY HILL	51.6379	-2.8057	344.25	193.59	223	80-	1R	BGS
HLM	LONG MYND	52.5184	-2.8807	340.25	291.57	429	84-	1	BGS

TABLE 4a (continued)

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Yrs open	Comp	Agency
HPE	PEMBROKE	51.9372	-4.7746	209.29	230.21	349	90-	1R	BGS
HPK	HAVERAH PARK	53.9581	-1.6241	424.66	451.42	233	78-	3R	BGS
HSA	SWANSEA	51.7500	-4.1532	251.38	207.94	293	87-	1R	BGS
HTL	HARTLAND	50.9943	-4.4849	225.64	124.66	86	81-	3RM	BGS
HTR	TREWERN HILL	52.0785	-3.2679	313.12	243.04	337	82-	1R	BGS
JLP	LES PLATONS	49.2486	-2.1039			129	81-	1R	BGS
JQE	QUEENS EAST	49.2000	-2.0383			58	91-	1	BGS
JRS	MAISON ST LOUIS	49.1922	-2.0922			56	81-	3R	BGS
JSA	ST AUBINS	49.1878	-2.1717			39	81-	1R	BGS
JVM	VALLE D.L.MARE	49.2169	-2.2067			64	81	1R	BGS
KAC	ACHNASHSELLACH	57.4989	-5.2988	202.36	850.19	206	83-	1R	BGS
KAR	ARISAIG	56.9188	-5.8290	166.98	787.34	186	83-	1	BGS
KBI	BIRLEY GRANGE	53.2543	-1.5279	431.49	373.17	272	88-	1	BGS
KLE	KEELE UNIVERSITY	53.0038	-2.2657	382.17	345.23	203		1	KUN
KLE3	NEWCHAPEL	53.0928	-2.2047	386.29	355.12	200		1	KUN
KNR	NEVIS RANGE	56.8219	-4.9714	218.68	773.97	1147	91-	1R	BGS
KPL	PLOCKTON	57.3391	-5.6527	180.21	833.50	13	86-	3R	BGS
KSB	SHIEL BRIDGE	57.2099	-5.4214	193.40	818.40	417	83-	1R	BGS
KSK	SCOVAL	57.4659	-6.7002	118.21	851.46	265	89-	1R	BGS
KSY	SYSTON	52.9642	-0.5872	494.88	341.73	121	88-	1R	BGS
KTG	TILBROOK GRNGE	52.3264	-0.4019	508.90	271.06	83	88-	1	BGS
KUF	UFFORD	52.6170	-0.3907	508.94	303.39	38	88-	1R	BGS
KWE	WEAVER FARM	53.0164	-1.8412	410.65	346.61	328	88-	1R	BGS
LCP	CASSOP	54.7370	-1.4744	433.84	538.14	185	91-	1R	BGS
LDU	LEEDS	53.8058	-1.5540	429.37	434.51	74	83-	M	BGS
LHO	HOLMEFIRTH	53.5453	-1.8548	409.62	405.44	462	91-	1R	BGS
LMI	MILLOM	54.2206	-3.3070	314.79	481.35	129	89-	3R	BGS
LMK	MARKET RASEN	53.4569	-0.3260	511.14	396.90	146	91-	1R	BGS
LRN	RICHMOND	54.4165	-1.8007	412.93	502.37	313	91-	1R	BGS
LRW	LERWICK	60.1360	-1.1779	445.66	1139.27	98	78-	3R	BGS
LWH	WHINNY NAB	54.3338	-0.6717	486.36	493.97	277	91-	1R	BGS
MCD	COLEBURN DISTIL	57.5828	-3.2541	325.02	855.42	293	81-	3RM	BGS
MCH	MICHAELCHURCH	51.9974	-2.9983	331.47	233.74	219	78-	3	BGS
MDO	DOCHFOUR	57.4409	-4.3633	258.17	841.39	415	81-	1R	BGS
MFI	FISHRIE	57.6119	-2.2956	382.34	858.00	232	88-	1R	BGS
MLA	LATHERON	58.3055	-3.3627	320.15	935.98	188	81-	1	BGS
MME	MEIKLE CAIRN	57.3149	-2.9647	341.90	825.32	475	81-	1	BGS
MVH	ACHVAICH	57.9250	-4.1825	270.75	894.90	185	84-	1	BGS
OBR	BRABSTER	58.6142	-3.1626	332.47	970.13	89	95-	1R	BGS
OHO	HOY	58.8322	-3.2465	328.05	994.48	172	95-	1R	BGS
ORE	REAY	58.5480	-3.7622	297.45	963.52	100	95-	3RM	BGS
OST	STRONSAY	59.0860	-2.5516	368.39	1022.20	21	95-	1R	BGS
OTO	TONGUE	58.4953	-4.3939	260.49	958.79	338	95-	1R	BGS
OWE	WESTRAY	59.3180	-3.0289	341.44	1048.36	87	95-	1R	BGS
PCA	CARROT	55.7007	-4.2550	258.30	647.55	302	83-	1	BGS
PCO	CORRIE	55.9880	-4.1002	269.00	679.21	267	83-	1	BGS
PGB	GLENIFFERBRAES	55.8115	-4.4837	244.38	660.37	199	84-	3	BGS
PMS	MUIRSHIEL	55.8459	-4.7452	228.15	664.82	351	83-	1	BGS
RCR	CAPE WRATH	58.6245	-4.9987	225.90	974.58	100	95-	1R	BGS
REB	EISG-BRACHAIDH	58.1194	-5.2802	206.82	919.16	100	95-	1R	BGS
RFO	FORSNAVAL	58.2133	-7.0052	106.10	935.83	195	95-	1R	BGS
RRH	RHENIGIDALE	57.9197	-6.6881	122.43	901.86	103	95-	1R	BGS
RRR	RUBHA REIDH	57.8577	-5.8067	174.19	891.68	61	95-	3RM	BGS
RSC	SCOURIE	58.3485	-5.1683	214.61	944.33	60	95-	1R	BGS
RTO	TOLSTA	58.3778	-6.2092	153.95	950.93	74	95-	1R	BGS
SAN	SANDWICK	60.0179	-1.2392	442.41	1126.08	150	85-	1	BGS
SBD	BRYN DU	52.9055	-3.2585	315.37	335.01	489	80-	1	BGS
SFH	HASELMERE	51.0604	-0.6912	491.71	129.88	260	93-	1	BGS
SIW	ISLE OF WHITE	50.6711	-1.3747	444.18	85.97	162	93-	1	BGS

TABLE 4a (continued)

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Yrs open	Comp	Agency
SKP	KOPHILL	51.7218	-0.8096	482.22	203.29	212	93-	1	BGS
SMD	MENDIPS	51.3083	-2.7170	350.03	156.88	310	93-	1	BGS
SSP	STONEY POUND	52.4177	-3.1119	324.39	280.59	428	90-	3	BGS
SSW	STOW-ON-WOLD	51.9667	-1.8499	410.31	229.86	291	93-	1	BGS
SWK	WARMINSTER	51.1483	-2.2471	382.72	138.87	266	93-	1	BGS
SWN	SWINDON	51.5131	-1.8004	413.85	179.42	192	93-	3	BGS
TBW	BRENTWOOD	51.6549	0.2913	558.48	197.66	89	89-	1R	BGS
TCR	COLCHESTER	51.8347	0.9212	601.24	219.20	45	89-	1R	BGS
TEB	EASTBOURNE	50.8187	0.1457	551.13	104.39	68	89-	1R	BGS
TFO	FOLKESTONE	51.1135	1.1409	619.81	139.66	202	89-	3	BGS
TSA	SEVENOAKS	51.2426	0.1561	550.48	151.53	177	89-	1	BGS
WAL	WALLS	60.2564	-1.6173	421.18	1152.46	167	80-	1	BGS
WCB	CHURCH BAY	53.3782	-4.5467	230.62	389.87	139	85-	3M	BGS
WFB	FAIRBOURNE	52.6831	-4.0383	262.23	311.48	316	85-	1R	BGS
WIM	ISLE OF MAN(South)	54.1475	-4.6738	225.39	475.73	386	85-	1R	BGS
WLF	LLYNFAES	53.2894	-4.3966	240.27	379.65	58	85-	1	BGS
WME	MYNDD EILIAN	53.3969	-4.3032	246.88	391.40	129	85-	1R	BGS
WPM	PENMAENMAWR	53.2581	-3.9048	272.95	375.18	353	85-	1R	BGS
XAL	ALLENDALE	54.8617	-2.2147	386.22	551.91	458	83-	1R	BGS
XDE	DENT	54.5056	-3.4902	303.52	513.29	301	83-	1R	BGS
XSO	SOURHOPE	55.4924	-2.2510	384.14	622.10	516	83-	1R	BGS
YEL	YELL	60.5509	-1.0830	450.29	1185.55	203	79-	1	BGS
YLL	LLANBERIS	53.1402	-4.1704	254.84	362.57	159	84-	1R	BGS
YRC	RHOSCOLYN	53.2508	-4.5753	228.21	375.77	22	84-	1R	BGS
YRE	YR EIFL	52.9811	-4.4254	237.19	345.43	193	84-	1R	BGS
YRH	RHIW	52.8336	-4.6288	222.94	329.51	286	84-	1R	BGS
DCN	CROGHAN	53.3439	-7.2767			150	77-	1R	DIAS
DLF	LYONS FARM	53.2958	-6.5314			96	91-	3	DIAS
DMUB	KINGSCOURT B	53.9000	-6.9086			280	94-	1	DIAS
ECB	CARRICKBYRNE	52.3661	-6.7811			125	81-	1R	DIAS
ECP	CARNSORE PT	52.1800	-6.3689			5	80-	3R	DIAS
ETA	TARA HILL	52.6958	-6.2100			140	82-	1R	DIAS
VAL	VALENTIA	51.9370	-10.2398			14	62-	3R	DIAS
ASK	ASKOY	60.4830	5.1950			50	83-	1	BER
BER	BERGEN	60.3838	5.3339			50		1	BER
EGD	ESPEGREND	60.2712	5.2257			20	91-	1	BER
FOO	FLORO	61.5980	5.0440			50		1	BER
KMY	KARMOY	59.2120	5.2470			58	84-	1	BER
MOL	MOLDE	62.5700	7.5480			98	87-	1	BER
ODD1	ODDA	59.9120	6.6280			684	87-	1	BER
SUE	SULEN	61.0570	4.7610			10	84-	1	BER
FAG		63.8751	-16.6538			35		1	ICE
SNB		63.7362	-18.6304			230		1	ICE

Component Codes:

1	Single vertical seismometer
3	Orthogonal set of 3 seismometers
M	Low-frequency microphone
R	Station coordinates registered with the International Seismological Centre (ISC), England and the National Earthquake Information Centre (NEIC), USA

Agency Codes:

BGS	British Geological Survey
DIAS	Dublin Institute of Advanced Studies
KUN	Keele University
BER	University of Bergen
ICE	Icelandic Meteorological Office

TABLE 4b

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Yrs open	Comp	Agency
AEU	EAST ANGLIA	52.6202	1.2347	618.93	307.45	28	94-	L	BGS
BCC	CHAPELCROSS	55.0153	-3.2201	321.99	569.66	138	92-	L	BGS
CRQ	ROSEMANOWES	50.1672	-5.1726	173.46	34.57	156	81-	L	BGS
DYA	YADSWORTHY	50.4353	-3.9310	262.88	61.34	292	82-	LR	BGS
EDI	EDINBURGH	55.9233	-3.1875	325.80	670.66	125	89-	LR	BGS
ESK	ESKDALEMUIR	55.3165	-3.2052	323.52	603.16	261	86-	LR	BGS
GAL	GALLOWAY	54.8664	-4.7114	226.02	555.78	117	89-	L	BGS
HBL2	BONNYLANDS	52.0508	-3.0384	328.80	239.71	437	91-	LR	BGS
HTL	HARTLAND	50.9943	-4.4849	225.64	124.66	86	87-	LR	BGS
JRS	MAISON ST LOUIS	49.1922	-2.0922			56	81-	LR	BGS
KEY	KEYWORTH	52.8779	-1.0757	462.20	331.59	59	88-	L	BGS
KPL	PLOCKTON	57.3391	-5.6527	180.21	833.50	13	86-	LR	BGS
LDU	LEEDS	53.8058	-1.5540	429.37	434.51	74	94-	L	BGS
LRW	LERWICK	60.1360	-1.1779	445.66	1139.27	98	78-	LR	BGS
MCH	MICHAELCHURCH	51.9974	-2.9983	331.47	233.74	219	78-	L	BGS
MCD	COLEBURN DISTIL	57.5828	-3.2541	325.02	855.42	293	81-	LR	BGS
ORE	REAY	58.5480	-3.7622	297.45	963.52	100	95-	LR	BGS
POB	OBSERVATORY	55.8458	-44299	247.88	664.06	34	92-	L	BGS
RRR	RUBHA REIDH	57.8577	-5.8067	174.19	891.68	61	95-	LR	BGS
SWN	SWINDON	51.5131	-1.8004	413.85	179.42	192	93-	L	BGS
TFO	FOLKESTONE	51.1135	1.1409	619.81	139.66	202	89-	L	BGS
WCB	CHURCH BAY	53.3782	-4.5467	230.62	389.87	139	85-	L	BGS

Component Codes:

L	Single low-gain vertical seismometer
R	Station coordinates registered with the International Seismological Centre (ISC), England and the National Earthquake Information Centre (NEIC), USA

Agency Codes:

BGS	British Geological Survey
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TABLE 4c

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Yrs open	Comp	Agency
AEU	EAST ANGLIA	52.6202	1.2347	618.93	307.45	28	82-95	S	BGS
BCC	CHAPELCROSS	55.0153	-3.2201	321.99	569.66	138	92-	S	BGS
CRQ	ROSEMANOWES	50.1672	-5.1726	173.46	34.57	156	87-	SR	BGS
JDC	DAM (CREST)	49.1947	-2.0469			39	92-	1	BGS
JDG	DAM (GALLERY)	49.1947	-2.0469			7	92-	S	BGS
HUA	HUNTERSTON A	55.7190	-4.8970	218.06	651.09	10	90-	S	BGS
HUB	HUNTERSTON B	55.7210	-4.8890	218.57	651.29	10	90-	S	BGS
KEY2	KEYWORTH	52.8790	-1.0770	462.13	331.73	76	97-	S	BGS
KPL	PLOCKTON	57.3391	-5.6527	180.21	833.50	13	94-	SR	BGS
HBL2	BONNYLANDS	52.0508	-3.0384	328.80	239.71	437	94-	SR	BGS
LDU	LEEDS	53.8058	-1.5540	429.00	435.00	74	98-	S	BGS
LRWS	LERWICK	60.1397	-1.1831	445.37	1139.69	80	96-	S	BGS
MCD	COLEBURN DISTIL	57.5828	-3.2541	325.02	855.42	293	98-	S	BGS
RRR	RUBHA REIDH	57.8577	-5.8067	174.19	891.68	61	95-	SR	BGS
SWN	SWINDON	51.5131	-1.8004	413.85	179.42	192	95-	S	BGS
TFO	FOLKESTONE	51.1135	1.1409	619.81	139.66	202	94-	S	BGS
TOA	TORNESS A	55.9692	-2.4037	374.80	675.20	5	94-	S	BGS
TOB	TORNESS B	55.9673	-2.4085	374.50	674.99	5	94-	S	BGS
WCB	CHURCH BAY	53.3782	-4.5467	230.62	389.87	139	98-	S	BGS

Component Codes:

S	Orthogonal set of 3 strong motion seismometers
1	Single strong motion seismometer - aligned NS
R	Station coordinates registered with the International Seismological Centre (ISC), England and the National Earthquake Information Centre (NEIC), USA

Agency Codes:

BGS	British Geological Survey
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TABLE 5

PHASE DATA: 1999

KEY TO PHASE DATA ENCODING

Time	: Time of occurrence of event in hours, mins and secs, (UTC).
Lat	: Latitude of the event, N indicates North.
Lon	: Longitude of the event, W indicates West, E indicates East.
Depth	: Depth of the hypocentre in kilometres.
Grid Ref	: UK National Grid Reference in kilometres east (kmE) and kilometres north (kmN) of grid origin.
Quality	: Solution quality of hypocentre averaged from QS and QD. A, excellent; B, good; C, fair; D, poor
RMS	: Root Mean Square of the travel-time residuals in seconds.
Magnitude	: Richter local magnitude of the event.
Locality	: A geographical indication of the epicentral area, usually the nearest town followed by the region.
Intensity	: Maximum EMS intensity. 2+ indicates felt, no macroseismic details. 3+, 4+ etc indicates felt at 3 or 4, but no survey carried out. 3, 4, 5 etc describes the maximum EMS intensity produced by the event.
Comments	: Additional comments about the event eg: C/F see list of comments abbreviations below.
STAT	: Station name
CO	: Station component S=short period Z=vertical N=north-south E=east-west
DIST	: Distance from earthquake to station (km)
PHAS	: Phase identifier; the first letter characterizes onset E=emergent I=impulsive, the second indicates the phase eg P, S, PG and PN.
WT	: Hypo weighting factor to arrival 0 or blank=full weighting to 4=zero weighting (ignore). 9=use P-S interval only for this line.
P	: Polarity C=Compression/up D=Dilatation/down
HrMn	: Hour, Minute of event
SECS	: Seconds of event
AMPL	: Amplitude centre to peak in nanometres (nm)
PERI	: Period in seconds

Locality abbreviations

Sonic	: Sonic boom	Mid Glam	: Mid Glamorgan
Expl	: Explosion	Notts	: Nottinghamshire
D & G	: Dumfries and Galloway	S'Clyde	: Strathclyde
Her & Worcs	: Hereford and Worcester	S Yorkshire	: South Yorkshire
New-U-Lyme	: Newcastle-Under-Lyme	Gloucs	: Gloucestershire
Penin	: Peninsula	Staffs	: Staffordshire
Cum	: Cumbria	Lincs	: Lincolnshire
Gtr	: Greater		

Comments abbreviations

Sonic	: Sonic boom
Expl	: Explosion
C/F	: Coalfield type event
...	: and felt elsewhere

January 6 1999 Time: 05:39 48.7 UTC
Lat: 56.332N Lon: 5.067W
Grid Ref: 210.44 kmE 719.67 kmN
Locality: INVERARAY, STRATHCLYDE
Comments: 10KM NORTH OF INVERARAY
 Magnitude: 1.3 ML
 Depth: 3.6 km
 RMS: 0.12 secs
 Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EAB	SZ	48	IP	1	C	05:39	57.08		
PMS	SZ	58	EP	1	C	05:39	58.65		
PGB	SZ	68	EP	2		05:40	00.47		
PGB	SN	68	ES	3		05:40	08.95		
PGB	SN	68				05:40	09.15	11	0.35
PGB	SE	68				05:40	09.73	12	0.14
PCO	SZ	71	EP	2		05:40	01.00		
ELO	SZ	85	EP	2		05:40	03.04		
PCA	SZ	87	EP	2		05:40	03.35		
EBH	SZ	97	EP	2		05:40	04.99		

January 12 1999 Time: 05:41 50.0 UTC
Lat: 53.100N Lon: 1.321W
Grid Ref: 445.46 kmE 356.11 kmN
Locality: MANSFIELD, NOTTS
Comments: C/F, 6KM SW OF MANSFIELD
 Magnitude: 0.6 ML
 Depth: 0.3 km
 RMS: 0.34 secs
 Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	22	EP	2		05:41	54.68		
KWE	SZ	36	EP	2		05:41	56.91		
CWF	SZ	40	EP	3		05:41	57.04		
CWF	SN	40	ES	3		05:42	03.86		
CWF	SN	40				05:42	04.88	5	0.22
CWF	SE	40				05:42	05.01	8	0.15

January 13 1999 Time: 08:35 40.5 UTC
Lat: 53.633N Lon: 2.625W
Grid Ref: 358.69 kmE 415.43 kmN
Locality: BOLTON, GTR MANCHESTER
Comments: 10KM NW OF BOLTON
 Magnitude: 1.9 ML
 Depth: 13.9 km
 RMS: 0.25 secs
 Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
LHO	SZ	52	IP	1	C	08:35	49.25		
HPK	SZ	75	EP	2		08:35	53.05		
HPK	SN	75	ES	2		08:36	02.18		
LMI	SZ	79	EP	2		08:35	53.82		
LMI	SN	79	ES	3		08:36	03.02		
LMI	SN	79				08:36	04.59	54	0.18
LMI	SE	79				08:36	04.92	61	0.19
KBI	SZ	84	EP	2		08:35	54.53		
KWE	SZ	86	EP	3		08:35	55.43		
CDU	SZ	87	EP	1	C	08:35	54.83		
CSF	SZ	99	EP	2		08:35	56.52		
LRN	SZ	103	EP	2		08:35	57.76		
CKE	SZ	111	EP	2		08:35	58.38		
WME	SZ	115	EP	1	C	08:35	58.06		
YLL	SZ	117	EP	2		08:35	58.59		
BBO	SZ	129	EP	4		08:36	00.65		
BBO	SN	129				08:36	16.39	32	0.40
BBO	SE	129				08:36	17.14	20	0.40
WCB	SZ	131	EP	4		08:36	00.43		
WCB	SN	131				08:36	16.94	8	0.07
WCB	SE	131				08:36	16.27	10	0.13

January 19 1999 Time: 00:23 9.0 UTC
Lat: 53.260N Lon: 0.898W
Grid Ref: 473.48 kmE 374.28 kmN
Locality: WORKSOP, NOTTINGHAMSHIRE
Comments: C/F
 Magnitude: 1.2 ML
 Depth: 1.9 km
 RMS: 0.12 secs
 Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	42	EP	1	D	00:23	16.62		
CWF	SZ	64	EP	2		00:23	20.24		
CWF	SE	64	ES	2		00:23	28.44		
CWF	SN	64				00:23	34.24	8	0.23
CWF	SE	64				00:23	28.65	10	0.21
KWE	SZ	69	EP	1	D	00:23	21.20		

January 21 1999 Time: 11:10 18.2 UTC
Lat: 53.092N Lon: 0.072E
Grid Ref: 538.71 kmE 357.05 kmN
Locality: BOSTON, LINCOLNSHIRE
Comments: 15KM NE OF BOSTON
 Magnitude: 2.8 ML
 Depth: 16.9 km
 RMS: 0.11 secs
 Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KSY	SZ	47	IP		C	11:10	26.49		
LMK	SZ	49	IP	1	D	11:10	26.78		
ABA	SZ	76	EP	1	C	11:10	30.74		
AWH	SZ	78	EP	2		11:10	31.00		
KTG	SZ	91	EP	1	D	11:10	33.13		
AWI	SZ	97	EP	1	D	11:10	34.01		
CWF	SZ	101	IP	1	C	11:10	34.19		
CWF	SN	101	ES	2		11:10	46.26		
CWF	SN	101				11:10	48.08	270	0.10
CWF	SE	101				11:10	48.73	304	0.10
KBI	SZ	108	EP	2		11:10	35.36		
KWE	SZ	128	EP	2		11:10	37.89		
LHO	SZ	138	EP	2		11:10	38.92		
LWH	SZ	147	EP	1	C	11:10	40.46		

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HPK	SZ	148	EP	1	C	11:10	40.37		
HPK	SE	148	ES	2		11:10	56.51		
TCR	SZ	151	EP	3		11:10	41.22		
SKP	SZ	164	EP	2		11:10	43.62		
SSW	SZ	181	EP	2		11:10	45.50		
LRN	SZ	192	EP	2		11:10	48.09		
SSP	SZ	228	EP	4		11:10	50.59		
SSP	SN	228				11:11	20.06	36	0.21
SSP	SE	228				11:11	20.41	38	0.12
MCH	SZ	242	EP	4		11:10	52.19		
MCH	SN	242				11:11	23.57	54	0.08
MCH	SE	242				11:11	24.24	52	0.15

January 27 1999 Time: 03:40 8.6 UTC
Lat: 49.974N Lon: 5.167W
Grid Ref: 172.99 kmE 13.14 kmN
Locality: OFF LIZARD PT, CORNWALL
Comments: C/F, FELT MANSFIELD
 Magnitude: -0.1 ML
 Depth: 14.6 km
 RMS: 0.17 secs
 Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CGH	SZ	9	EP	2		03:40	11.75		
CCO	SZ	18	EP	2		03:40	12.68		
CR2	SZ	21	EP	2		03:40	12.81		
CR2	SE	21	ES	3		03:40	16.89		
CR2	SN	21				03:40	19.34	7	0.09
CR2	SE	21				03:40	20.10	4	0.05

January 27 1999 Time: 22:40 36.4 UTC
Lat: 53.126N Lon: 1.194W
Grid Ref: 453.95 kmE 359.08 kmN
Locality: MANSFIELD, NOTTS
Comments: C/F, FELT MANSFIELD
 Magnitude: 0.8 ML
 Depth: 1.0 km
 RMS: 0.24 secs
 Quality: C
 Intensity: 3+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	27	EP	1	C	22:40	41.94		
KBI	SZ	27	ES	2		22:40	45.05		
CWF	SZ	44	EP	2		22:40	44.52		
CWF	SN	44				22:40	53.72	9	0.71
CWF	SE	44				22:40	51.32	10	0.36
KWE	SZ	45	EP	2		22:40	45.05		

January 30 1999 Time: 13:34 37.2 UTC
Lat: 57.032N Lon: 5.591W
Grid Ref: 182.11 kmE 799.18 kmN
Locality: KNOYDART, HIGHLAND
 Magnitude: 1.3 ML
 Depth: 7.3 km
 RMS: 0.23 secs
 Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KSB	SZ	22	IP	1	D	13:34	41.28		
KPL	SZ	34	EP	1	C	13:34	43.47		
KPL	SN	34	ES	2		13:34	47.77		
KPL	SN	34				13:34	47.86	24	0.08
KPL	SE	34				13:34	48.11	50	0.17
KAC	SZ	55	IP	1	D	13:34	46.86		
RRR	SZ	93	EP	3		13:34	53.45		
RRR	SN	93	ES	3		13:35	03.32		

February 4 1999 Time: 05:34 1.0 UTC
Lat: 57.661N Lon: 5.136W
Grid Ref: 212.96 kmE 867.79 kmN
Locality: KINLOCHEWE, HIGHLAND
Comments: 8KM NE OF KINLOCHEWE
 Magnitude: 1.0 ML
 Depth: 5.8 km
 RMS: 0.11 secs
 Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAC	SZ	21	IP	1		05:34	04.96		
KPL	SZ	47	IP		D	05:34	09.51		
KPL	SE	47	ES	2		05:34	15.24		
KPL	SN	47				05:34	20.76	8	0.11
KPL	SE	47				05:34	15.71	11	0.14
REB	SZ	52	EP	1	C	05:34	09.95		
KSB	SZ	53	EP	2		05:34	10.24		
RSC	SZ	77	EP	3		05:34	14.05		

February 6 1999 Time: 23:28 43.1 UTC
Lat: 60.611N Lon: 0.184W
Grid Ref: 499.41 kmE 1193.30 kmN
Locality: NORTHERN NORTH SEA
Comments: 50KM EAST OF SHETLAND
 Magnitude: 1.3 ML
 Depth: 17.5 km
 RMS: 0.16 secs
 Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
YEL	SZ	50	EP	3		23:28	51.88		
YEL	SZ	50	ES	3		23:28	58.18		
LRW	SZ	76	EP	3		23:28	55.59		
LRW	SE	76	ES	3		23:29	05.20		
LRW	SN	76				23:29	07.60	8	0.07
LRW	SE	76				23:29	07.03	10	0.19
WAL	SZ	88	EP	3		23:28	57.77		
WAL	SZ	88	ES	3		23:29	07.71		
SAN	SZ	88	ES	3		23:29	07.70		

February 9 1999 Time: 01:02 52.0 UTC
Lat: 55.087N Lon: 3.621W
Grid Ref: 296.55 kmE 578.12 kmN
Locality: DUMFRIES, D & G
Comments: FELT NEWFIELD
 Magnitude: 0.7 ML
 Depth: 7.5 km
 RMS: 0.10 secs
 Quality: B
 Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	10	IP	1	C	01:02	54.38		
BNA	SZ	14	IP	1	C	01:02	55.03		

PHASE DATA : 1999

TABLE 5 (cont'd)

BNA	SZ	14	ES	2	01:02	56.78		
GCD	SZ	32	EP	2	01:02	57.80		
ECK	SZ	33	IP	1	01:02	57.95		
ESK	SZ	37	EP	2	01:02	58.43		
ESK	SE	37	ES	3	01:03	03.54		
ESK	SN	37			01:03	03.87	6	0.10
ESK	SE	37			01:03	03.79	7	0.18
GAL	SZ	74	EP	2	01:03	04.69		
GAL	SN	74			01:03	17.45	4	0.24
GAL	SE	74			01:03	17.61	2	0.06

February 11 1999 Time: 01:09 28.7 UTC
Lat: 53.215N **Lon: 1.096W**
Grid Ref: 460.38 kmE 369.13 kmN
Locality: MANSFIELD, NOTTS
Comments: C/F, 7KM NE OF MANSFIELD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	29	EP	2		01:09	34.41		
CWF	SZ	55	EP	3		01:09	38.76		
CWF	SE	55	ES	3		01:09	46.10		
CWF	SN	55				01:09	50.97	4	0.11
CWF	SE	55				01:09	49.10	6	0.17
KWE	SZ	55	EP	2		01:09	38.84		

February 11 1999 Time: 01:32 17.3 UTC
Lat: 54.676N **Lon: 2.545W**
Grid Ref: 364.86 kmE 531.40 kmN
Locality: PENRITH, CUMBRIA
Comments: 13KM EAST OF PENRITH

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BTA	SZ	27	IP	1	D	01:32	22.63		
BTA	SN	27	ES	2		01:32	26.47		
BTA	SN	27				01:32	26.73	15	0.09
BTA	SE	27				01:32	26.67	16	0.20
BKE	SZ	38	IP	1	C	01:32	24.39		
BBO	SZ	46	IP	1	D	01:32	25.63		
BBO	SN	46	ES	2		01:32	31.20		
BBO	SN	46				01:32	31.29	10	0.23
BBO	SE	46				01:32	31.30	14	0.25
CSF	SZ	52	IP	1	C	01:32	26.56		
LRN	SZ	56	IP	1	D	01:32	27.21		
CDU	SZ	57	IP	1	C	01:32	27.23		
BBH	SZ	57	EP	2		01:32	27.31		
BHH	SZ	63	EP	2		01:32	28.61		
BHH	SN	63				01:32	38.08	13	0.43
BHH	SE	63				01:32	38.90	12	0.49
LMI	SZ	71	IP	1	D	01:32	29.64		
LMI	SN	71				01:32	39.88	5	0.16
LMI	SE	71				01:32	39.98	5	0.17

February 14 1999 Time: 08:01 9.5 UTC
Lat: 57.293N **Lon: 5.582W**
Grid Ref: 184.19 kmE 828.13 kmN
Locality: AUCHTERTYRE, HIGHLAND

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KPL	SZ	7	IP		D	08:01	11.47		
KPL	SN	7	ES	1		08:01	12.40		
KPL	SN	7				08:01	12.54	129	0.11
KPL	SE	7				08:01	12.59	218	0.09
KSB	SZ	13	IP		C	08:01	12.27		
KAC	SZ	29	IP	1	C	08:01	14.82		

February 18 1999 Time: 02:29 8.1 UTC
Lat: 55.094N **Lon: 3.633W**
Grid Ref: 295.81 kmE 578.96 kmN
Locality: DUMFRIES, D & G

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	9	EP	2		02:29	10.71		
BNA	SZ	14	IP		C	02:29	11.39		
BHH	SZ	27	IP	1	D	02:29	13.33		
BHH	SN	27	ES	2		02:29	16.58		
BHH	SN	27				02:29	16.73	41	0.22
BHH	SE	27				02:29	17.93	48	0.21
GCD	SZ	32	IP	1	C	02:29	14.14		
ECK	SZ	34	IP	1	C	02:29	14.31		
ESK	SZ	37	IP		C	02:29	14.79		
ESK	SE	37	ES	2		02:29	19.83		
ESK	SN	37				02:29	20.23	13	0.12
ESK	SE	37				02:29	20.16	15	0.16
BBH	SZ	45	IP	1	C	02:29	16.33		

February 18 1999 Time: 14:08 23.8 UTC
Lat: 57.422N **Lon: 5.264W**
Grid Ref: 204.04 kmE 841.55 kmN
Locality: STRATHCARRON, HIGHLAND

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAC	SZ	9	IP	1	C	14:08	26.30		
KPL	SZ	25	IP	1	C	14:08	28.56		
KPL	SN	25	ES	2		14:08	32.13		
KPL	SN	25				14:08	32.22	9	0.09
KPL	SE	25				14:08	32.28	3	0.07

KSB	SZ	26	IP	1	C	14:08	28.67		
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February 19 1999 Time: 19:46 22.1 UTC
Lat: 49.127N **Lon: 2.119W**
Grid Ref: 391.34 kmE -85.88 kmN
Locality: JERSEY, CHANNEL ISLANDS

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
JRS	SZ	8	IP		C	19:46	24.40		
JRS	SN	8	ES	1		19:46	26.02		
JRS	SN	8				19:46	26.13	112	0.09
JRS	SE	8				19:46	26.08	103	0.08
JSA	SZ	8	IP		C	19:46	24.42		
JQE	SZ	10	IP		C	19:46	24.67		
JVM	SZ	12	IP		D	19:46	24.93		
JLP	SZ	14	IP	1	C	19:46	25.18		

February 28 1999 Time: 07:24 52.8 UTC
Lat: 57.071N **Lon: 5.674W**
Grid Ref: 177.31 kmE 803.71 kmN
Locality: KNOYDART, HIGHLAND

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAR	SZ	19	IP	1	D	07:24	56.58		
KSB	SZ	22	IP		D	07:24	56.98		
KPL	SZ	30	EP	1	C	07:24	58.63		
KPL	SE	30	ES	1		07:25	02.18		
KPL	SN	30				07:25	03.07	6	0.18
KPL	SE	30				07:25	02.55	12	0.15
KAC	SZ	53	EP	2		07:25	02.08		

March 1 1999 Time: 21:14 37.3 UTC
Lat: 52.394N **Lon: 3.297W**
Grid Ref: 311.74 kmE 278.18 kmN
Locality: NEWTOWN, POWYS
Comments: 13KM SOUTH OF NEWTOWN

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
SSP	SZ	13	IP		C	21:14	40.43		
SSP	SN	13	ES	2		21:14	42.61		
SSP	SN	13				21:14	42.70	37	0.04
SSP	SE	13				21:14	42.97	50	0.11
HCG	SZ	26	IP	1	C	21:14	42.17		
HLM	SZ	32	IP	1	C	21:14	43.05		
HTR	SZ	35	IP	1	D	21:14	43.65		
MCH	SZ	49	EP	2		21:14	45.61		
MCH	SN	49	ES	2		21:14	51.63		
MCH	SN	49				21:14	51.69	6	0.15
MCH	SE	49				21:14	51.74	9	0.12

March 2 1999 Time: 00:58 46.4 UTC
Lat: 55.093N **Lon: 3.632W**
Grid Ref: 295.89 kmE 578.86 kmN
Locality: DUMFRIES, D & G
Comments: FELT NEWFIELD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	9	IP		C	00:58	49.00		
BNA	SZ	14	IP	1	C	00:58	49.63		
BHH	SZ	26	IP	1	D	00:58	51.59		
BHH	SE	26	ES	2		00:58	54.94		
BHH	SN	26				00:58	54.97	85	0.21
BHH	SE	26				00:58	56.18	93	0.21
GCD	SZ	32	IP	1	C	00:58	52.38		
ECK	SZ	34	IP		C	00:58	52.56		
ESK	SZ	37	IP		C	00:58	53.05		
ESK	SE	37	ES	2		00:58	57.87		
ESK	SN	37				00:58	58.41	20	0.19
ESK	SE	37				00:58	58.41	25	0.18

March 3 1999 Time: 21:34 54.5 UTC
Lat: 50.277N **Lon: 3.853W**
Grid Ref: 267.96 kmE 43.60 kmN
Locality: THURLESTONE, DEVON

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
DCO	SZ	5	IP	1	C	21:34	57.26		
DCO	SZ	5	ES	2		21:34	59.30		
DYA	SZ	19	IP	1	C	21:34	58.67		
DYA	SN	19	ES	2		21:35	01.60		
DYA	SN	19				21:35	01.98	7	0.05
DYA	SE	19				21:35	01.67	13	0.10

March 3 1999 Time: 22:08 58.7 UTC
Lat: 55.091N **Lon: 3.628W**
Grid Ref: 296.13 kmE 578.63 kmN
Locality: DUMFRIES, D & G
Comments: FELT TROSTON

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	10	IP		D	22:09	01.11		
BNA	SZ	14	IP	1	C	22:09	01.79		
BHH	SZ	26	IP	1	D	22:09	03.72		
BHH	SN	26	ES	2		22:09	06.98		
BHH	SN	26				22:09	07.12	121	0.23
BHH	SE	26				22:09	08.32	124	0.20
GCD	SZ	32	IP	1	C	22:09	04.53		

PHASE DATA : 1999

TABLE 5 (cont'd)

GIM	SZ	104	IP	1	D	22:09	16.49		
GIM	SN	104				22:09	31.15	15	0.23
GIM	SE	104				22:09	31.31	9	0.13

March 3 1999 Time: 23:02 44.2 UTC
Lat: 51.730N **Lon: 3.259W**
Grid Ref: 313.04 kmE 204.26 kmN
Locality: NEW TREDEGAR, MID GLAM
Comments: C/F
Magnitude: 1.0 ML
Depth: 0.3 km
RMS: 0.09 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HGH	SZ	33	IP		C	23:02	50.64		
MCH	SZ	35	EP	1	C	23:02	51.06		
MCH	SN	35	ES	2		23:02	56.27		
MCH	SN	35				23:02	57.03	18	0.18
MCH	SE	35				23:02	56.99	16	0.28
HTR	SZ	39	IP	1	C	23:02	51.58		
HAE	SZ	60	EP	2		23:02	55.30		
HSA	SZ	62	EP	3		23:02	55.51		
HTL	SZ	118	EP	3		23:03	04.30		

March 4 1999 Time: 00:16 51.8 UTC
Lat: 55.397N **Lon: 5.241W**
Grid Ref: 194.77 kmE 616.23 kmN
Locality: ARRAN, STRATHCLYDE
Comments: 4KM SOUTH OF ARRAN
Magnitude: 4.0 ML
Depth: 19.0 km
RMS: 0.06 secs
Quality: B
Intensity: 5

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	23	IP		C	00:16	56.80		
PMS	SZ	59	IP		D	00:17	01.82		
PGB	SZ	66	IP		C	00:17	02.93		
PGB	SN	66	ES	1		00:17	10.90		
GCL	SZ	67	IP	1	C	00:17	02.88		
GAL	SZ	68	IP	1	D	00:17	03.23		
GAL	SN	68	ES	1		00:17	11.38		
PCA	SZ	71	IP		C	00:17	03.56		
POB	SZ	72	EP	3		00:17	03.60		
PCO	SZ	97	EP	2		00:17	07.46		
GCD	SZ	102	IP		C	00:17	08.74		
BWH	SZ	104	IP	1	C	00:17	08.84		
BNA	SZ	114	EP	1	C	00:17	10.46		
ESK	SZ	129	EP	1	C	00:17	12.29		
ESK	SE	129	ES	2		00:17	27.54		
BHH	SZ	133	EP	1	C	00:17	13.43		
BCC	AZ	136	EP	4		00:17	14.08		
BCC	AN	136				00:17	30.06		
BCC	AE	136				00:17	30.38	2467	0.29
GMM	SZ	137	IP	1	D	00:17	13.13	3222	0.76
EDI	SZ	142	IP	4	C	00:17	13.88		
WIM	SZ	144	IP	4	D	00:17	14.04		
EBL	SZ	145	IP	4	C	00:17	14.22		
BBO	SZ	147	IP	4	C	00:17	14.68		
ESY	SZ	175	IP	4	C	00:17	18.10		
WCB	SZ	229	IP	4	D	00:17	24.80		
WME	SZ	231	IP	4	D	00:17	24.84		
WLF	SZ	241	IP	4	D	00:17	26.08		
YRC	SZ	243	IP	4	D	00:17	26.43		
YRE	SZ	274	IP	4	D	00:17	30.43		
SBD	SZ	306	IP	4	D	00:17	34.20		

March 4 1999 Time: 00:30 57.0 UTC
Lat: 55.395N **Lon: 5.247W**
Grid Ref: 194.43 kmE 616.04 kmN
Locality: ARRAN, STRATHCLYDE
Comments: 4KM SOUTH OF ARRAN
Magnitude: 1.6 ML
Depth: 18.4 km
RMS: 0.06 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	23	IP	1	D	00:31	01.94		
PMS	SZ	59	EP	2		00:31	07.23		
GCL	SZ	66	EP	2		00:31	08.15		
PGB	SZ	67	EP	2		00:31	08.21		
PGB	SE	67	ES	2		00:31	15.73		
PGB	SN	67				00:31	18.59	20	0.15
PGB	SE	67				00:31	18.81	20	0.19
GAL	SZ	68	EP	2		00:31	08.51		
GAL	SE	68	ES	2		00:31	16.67		
GAL	SN	68				00:31	19.89	25	0.07
GAL	SE	68				00:31	19.37	35	0.14
PCA	SZ	71	EP	2		00:31	08.85		

March 8 1999 Time: 01:19 51.2 UTC
Lat: 51.711N **Lon: 3.303W**
Grid Ref: 309.95 kmE 202.22 kmN
Locality: BEDLINOG, MID GLAMORGAN
Comments: C/F
Magnitude: 1.1 ML
Depth: 2.2 km
RMS: 0.06 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HGH	SZ	35	IP	1	C	01:19	57.74		
MCH	SZ	38	IP	1	C	01:19	58.13		
MCH	SN	38	ES	2		01:20	03.29		
MCH	SN	38				01:20	03.64	28	0.24
MCH	SE	38				01:20	03.81	14	0.26
HTR	SZ	41	IP	1	C	01:19	58.68		
HSA	SZ	59	EP	2		01:20	01.59		
HAE	SZ	64	EP	2		01:20	02.43		

HCG	SZ	72	EP	2		01:20	03.88		
HTL	SZ	115	EP	2		01:20	11.02		

March 8 1999 Time: 21:13 33.9 UTC
Lat: 52.605N **Lon: 2.314W**
Grid Ref: 378.76 kmE 300.89 kmN
Locality: ALBRIGHTON, SHROPSHIRE
Magnitude: 1.0 ML
Depth: 9.5 km
RMS: 0.15 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HLM	SZ	40	IP	1	C	21:13	40.75		
KWE	SZ	56	EP	2		21:13	43.44		
SSP	SZ	58	EP	2		21:13	43.78		
SSP	SE	58	ES	2		21:13	50.95		
HAE	SZ	65	EP	3		21:13	45.52		
CWF	SZ	70	EP	2		21:13	45.82		
CWF	SN	70	ES	2		21:13	53.78		
CWF	SN	70				21:13	54.61	5	0.26
CWF	SE	70				21:13	58.00	3	0.11
SBD	SZ	72	EP	2		21:13	46.02		
MCH	SZ	82	EP	3		21:13	47.52		
MCH	SN	82	ES	2		21:13	57.41		
MCH	SN	82				21:13	57.67	7	0.18
MCH	SE	82				21:13	57.73	7	0.17

March 9 1999 Time: 00:38 43.2 UTC
Lat: 56.867N **Lon: 6.365E**
Grid Ref: 909.18 kmE 806.22 kmN
Locality: NORWEGIAN-DANISH BASIN
Magnitude: 3.0 ML
Depth: 15.0 km
RMS: 0.37 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
MFI	SZ	530	EP	2		00:39	54.08		
EDR	SZ	543	EP	2		00:39	55.93		
ESY	SZ	564	EP	2		00:39	58.67		
MME	SZ	568	EP	2		00:39	58.20		
EDU	SZ	576	EP	3		00:40	00.05		
MCD	SZ	587	EP	2		00:40	00.89		
MCD	SN	587	ES	2		00:40	57.82		
MCD	SE	587				00:41	01.32	6	0.31
MCD	SE	587				00:41	02.74	4	0.10
EBL	SZ	595	EP	2		00:40	01.72		
EDI	SZ	599	EP	2		00:40	02.77		
MLA	SZ	603	EP	2		00:40	03.84		
EBH	SZ	610	EP	3		00:40	04.71		
ELO	SZ	619	EP	2		00:40	05.45		

March 10 1999 Time: 23:32 47.7 UTC
Lat: 52.867N **Lon: 5.160W**
Grid Ref: 187.35 kmE 334.62 kmN
Locality: IRISH SEA
Comments: 60KM SW OF HOLYHEAD
Magnitude: 0.9 ML
Depth: 5.6 km
RMS: 0.06 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
YRH	SZ	36	IP	1	C	23:32	54.16		
YRE	SZ	51	EP	2		23:32	56.64		
YRC	SZ	58	IP	1	C	23:32	57.56		
WCB	SZ	70	IP	1	D	23:32	59.57		
WCB	SN	70	ES	2		23:33	08.16		
WCB	SN	70				23:33	08.78	5	0.15
WCB	SE	70				23:33	09.51	5	0.11
WLF	SZ	70	IP	1	D	23:32	59.40		
WME	SZ	82	EP	2		23:33	01.83		

March 11 1999 Time: 12:29 0.6 UTC
Lat: 55.095N **Lon: 3.629W**
Grid Ref: 296.07 kmE 579.01 kmN
Locality: DUMFRIES, D & G
Comments: FELT NEWFIELD
Magnitude: 0.6 ML
Depth: 8.3 km
RMS: 0.06 secs
Quality: C
Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	9	IP		C	12:29	03.02		
BNA	SZ	14	IP		C	12:29	03.74		
BHH	SZ	26	IP	1	D	12:29	05.66		
BHH	SN	26	ES	2		12:29	08.94		
BHH	SN	26				12:29	09.08	16	0.22
BHH	SE	26				12:29	10.26	18	0.21
GCD	SZ	33	EP	2		12:29	06.60		

March 11 1999 Time: 14:06 29.1 UTC
Lat: 55.400N **Lon: 5.240W**
Grid Ref: 194.88 kmE 616.54 kmN
Locality: ARRAN, STRATHCLYDE
Comments: 4KM SOUTH OF ARRAN
Magnitude: 1.1 ML
Depth: 15.6 km
RMS: 0.16 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	23	IP	1	C	14:06	33.86		
PMS	SZ	59	EP	2		14:06	39.33		
PGB	SZ	66	EP	3		14:06	40.19		
PGB	SN	66	ES	2		14:06	48.43		
PGB	SN	66				14:06	48.72	7	0.26
PGB	SE	66				14:06	50.79	9	0.21
GCL	SZ	67	EP	2		14:06	40.20		
GAL	SZ	68	EP	2		14:06	41.00		
GAL	SN	68	ES	2		14:06	48.88		
PCA	SZ	71	EP	2		14:06	40.82		

March 14 1999 Time: 14:54 48.4 UTC
Lat: 55.097N Lon: 3.631W
Grid Ref: 295.93 kmE 579.25 kmN
Locality: DUMFRIES, D & G
Comments: FELT KIRKTON

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	9	IP			C 14:54	51.06		
BNA	SZ	15	IP			C 14:54	51.76		
BHH	SZ	26	IP			D 14:54	53.69		
BHH	SN	26	ES	2		14:54	56.97		
BHH	SN	26				14:54	57.10	343	0.20
BHH	SE	26				14:54	58.30	472	0.23
GCD	SZ	33	IP	1		C 14:54	54.49		
ECK	SZ	33	IP			C 14:54	54.66		
ESK	SZ	37	IP			C 14:54	55.13		
ESK	SE	37	ES	2		14:54	59.54		
ESK	SN	37				14:55	00.50	115	0.21
ESK	SE	37				14:55	00.50	151	0.19
BBH	SZ	45	EP	1		C 14:54	56.60		
BTA	SZ	64	IP	1		C 14:55	00.45		
BTA	SN	64				14:55	12.08	52	0.36
BTA	SE	64				14:55	13.79	46	0.32
GIM	SZ	105	EP	2		14:55	06.32		
GIM	SN	105				14:55	21.16	27	0.17
GIM	SE	105				14:55	20.72	27	0.31

March 17 1999 Time: 03:31 55.4 UTC
Lat: 57.334N Lon: 5.631W
Grid Ref: 181.47 kmE 832.92 kmN
Locality: PLOCKTON, HIGHLAND

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KPL	SZ	1	EP	2		03:31	59.82		
KPL	SE	1	ES	3		03:32	02.95		
KPL	SN	1				03:32	03.14	13	0.12
KPL	SE	1				03:32	03.25	11	0.10
KAC	SZ	27	EP	3		03:32	01.55		
KAR	SZ	48	EP	3		03:32	04.12		

March 17 1999 Time: 11:06 47.7 UTC
Lat: 53.108N Lon: 4.230W
Grid Ref: 250.76 kmE 359.15 kmN
Locality: CAERNARVON, GWYNEDD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
YLL	SZ	5	IP			C 11:06	50.55		
YRE	SZ	19	IP			C 11:06	51.98		
WLF	SZ	23	IP	1		D 11:06	52.28		
WPM	SZ	27	IP			C 11:06	53.06		
YRC	SZ	28	IP			D 11:06	53.00		
WME	SZ	33	IP			D 11:06	53.64		
WCB	SZ	37	IP			D 11:06	54.29		
WCB	SE	37	ES	2		11:06	58.79		
WCB	SN	37				11:07	00.76	19	0.18
WCB	SE	37				11:06	59.94	22	0.04
YRH	SZ	41	IP			C 11:06	54.87		
WFB	SZ	49	EP	2		11:06	56.01		
SBD	SZ	69	EP	1		D 11:06	59.11		
SSP	SZ	108	EP	2		11:07	05.34		
SSP	SN	108				11:07	20.33	9	0.10
SSP	SE	108				11:07	20.31	14	0.24

March 17 1999 Time: 20:30 11.2 UTC
Lat: 53.057N Lon: 1.194W
Grid Ref: 454.01 kmE 351.46 kmN
Locality: LINBY, NOTTINGHAMSHIRE
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	31	IP	1		C 20:30	16.97		
CWF	SZ	36	EP	1		D 20:30	17.85		
CWF	SE	36	ES	2		20:30	22.62		
CWF	SN	36				20:30	26.98	8	0.13
CWF	SE	36				20:30	26.60	11	0.13
KSY	SZ	42	EP	1		C 20:30	18.80		
KWE	SZ	44	IP	1		D 20:30	19.07		

March 18 1999 Time: 02:38 22.1 UTC
Lat: 51.714N Lon: 3.296W
Grid Ref: 310.50 kmE 202.52 kmN
Locality: BEDLINOG, MID GLAMORGAN
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HGH	SZ	35	IP			C 02:38	28.55		
MCH	SZ	38	EP	1		C 02:38	28.95		
MCH	SE	38	ES	2		02:38	34.06		
MCH	SN	38				02:38	34.92	12	0.16
MCH	SE	38				02:38	34.88	7	0.27
HTR	SZ	41	IP	1		C 02:38	29.48		
HSA	SZ	59	EP	2		02:38	32.56		
HAE	SZ	63	EP	2		02:38	33.37		
HCG	SZ	72	EP	2		02:38	34.72		
HTL	SZ	115	EP	2		02:38	42.02		
HTL	SN	115				02:38	57.00	8	0.11

Magnitude: 1.9 ML
Depth: 11.0 km
RMS: 0.07 secs
Quality: B

Intensity: 3+

HTL SE 115

02:38

56.71 11 0.16

March 23 1999 Time: 15:03 37.7 UTC
Lat: 55.094N Lon: 3.619W
Grid Ref: 296.70 kmE 578.95 kmN
Locality: DUMFRIES, D & G
Comments: FELT NEWFIELD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	9	IP			C 15:03	40.14		
BNA	SZ	14	IP			C 15:03	40.80		
BHH	SZ	26	EP	2		15:03	42.71		
BHH	SN	26	ES	2		15:03	45.99		
BHH	SN	26				15:03	46.15	22	0.22
BHH	SE	26				15:03	47.35	28	0.20
ECK	SZ	33	EP	2		15:03	43.72		
ESK	SZ	36	IP	1		C 15:03	44.20		
ESK	SE	36	ES	2		15:03	48.72		
ESK	SN	36				15:03	49.54	9	0.19
ESK	SE	36				15:03	49.55	10	0.17

March 24 1999 Time: 04:24 15.4 UTC
Lat: 51.770N Lon: 1.646W
Grid Ref: 424.45 kmE 208.05 kmN
Locality: CARTERTON, OXFORDSHIRE

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
SSW	SZ	26	IP	1		D 04:24	20.56		
SWN	SZ	31	EP	2		04:24	20.73		
SWN	SN	31	ES	2		04:24	25.61		
SWN	SN	31				04:24	27.82	118	0.20
SWN	SE	31				04:24	26.92	86	0.17
SKP	SZ	58	EP	2		04:24	25.33		
HAE	SZ	69	IP	1		D 04:24	26.92		
SWK	SZ	81	EP	2		04:24	29.01		
HGH	SZ	82	EP	2		04:24	28.84		
MCH	SZ	97	IP	1		D 04:24	31.27		
MCH	SN	97	ES	2		04:24	42.86		
MCH	SN	97				04:24	44.96	16	0.15
MCH	SE	97				04:24	47.30	15	0.26

March 26 1999 Time: 01:58 19.7 UTC
Lat: 57.420N Lon: 5.738W
Grid Ref: 175.56 kmE 842.79 kmN
Locality: APPLECROSS, HIGHLAND

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KPL	SZ	10	IP			C 01:58	22.23		
KPL	SE	10	ES	1		01:58	24.00		
KPL	SN	10				01:58	24.10	38	0.09
KPL	SE	10				01:58	24.11	44	0.12
KAC	SZ	28	EP	2		01:58	24.82		
KSB	SZ	30	IP			C 01:58	25.25		
KAR	SZ	56	EP	3		01:58	29.11		

March 27 1999 Time: 17:25 31.5 UTC
Lat: 56.255N Lon: 3.759W
Grid Ref: 291.03 kmE 708.27 kmN
Locality: BLACKFORD, TAYSIDE

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EBH	SZ	16	IP	1		C 17:25	34.62		
ELO	SZ	24	IP	1		D 17:25	36.14		
EAB	SZ	37	IP			C 17:25	38.14		
PCO	SZ	37	EP	2		17:25	38.34		
EDI	SE	51	ES	2		17:25	46.97		
EDI	SN	51				17:25	46.99	3	0.17
EDI	SE	51				17:25	47.13	5	0.18
EDU	SZ	57	EP	2		17:25	41.24		

March 29 1999 Time: 15:15 47.3 UTC
Lat: 53.647N Lon: 2.210W
Grid Ref: 386.13 kmE 416.82 kmN
Locality: ROCHDALE, GTR MANCHESTER
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
LHO	SZ	26	EP	2		15:15	52.14		
HPK	SZ	52	EP	2		15:15	56.50		
HPK	SE	52	ES	2		15:16	03.56		
KBI	SZ	63	IP	1		D 15:15	58.52		
KWE	SZ	74	IP	1		C 15:16	00.54		
LRN	SZ	90	IP	1		C 15:16	02.85		
LMI	SZ	96	EP	2		15:16	03.86		
LMI	SN	96	ES	2		15:16	15.68		
LMI	SE	96				15:16	18.61	43	0.18
CDU	SZ	100	EP	2		15:16	17.32	50	0.21
SBD	SZ	108	IP	1		C 15:16	04.14		
CSF	SZ	112	EP	2		15:16	05.06		
CWF	SZ	118	EP	4		15:16	06.11		
CWF	SN	118				15:16	07.49		
CWF	SE	118				15:16	24.85	32	0.15
WPM	SZ	121	EP	2		15:16	25.11	40	0.16
BBO	SZ	139	EP	4		15:16	06.71		
BBO	SN	139				15:16	10.72		
BBO	SN	139				15:16	29.09	40	0.36

BBO SE 139 15:16 28.56 68 0.28

March 31 1999 Time: 05:51 34.9 UTC Magnitude: 1.9 ML
Lat: 53.641N Lon: 2.206W Depth: 2.5 km
Grid Ref: 386.38 kmE 416.10 kmN RMS: 0.24 secs
Locality: ROCHDALE, GTR MANCHESTER Quality: C
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
LHO	SZ	26	IP		C	05:51	39.78		
HPK	SZ	52	IP	1	C	05:51	44.06		
HPK	SE	52	ES	2		05:51	50.93		
KBI	SZ	62	IP	1	C	05:51	46.20		
KWE	SZ	74	EP	2		05:51	47.34		
LMI	SZ	97	EP	2		05:51	51.23		
LMI	SE	97	ES	2		05:52	03.40		
LMI	SN	97				05:52	06.16	25	0.18
LMI	SE	97				05:52	04.83	29	0.32
CDU	SZ	101	EP	2		05:51	51.68		
SBD	SZ	108	EP	2		05:51	52.40		
CSF	SZ	113	EP	2		05:51	54.02		
CWF	SZ	117	EP	4		05:51	54.83		
CWF	SN	117				05:52	13.09	18	0.15
CWF	SE	117				05:52	12.00	22	0.11

April 5 1999 Time: 03:13 32.3 UTC Magnitude: 2.9 ML
Lat: 59.326N Lon: 1.552E Depth: 18.8 km
Grid Ref: 602.06 kmE 1054.15 kmN RMS: 0.14 secs
Locality: NORTHERN NORTH SEA Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
LRW	SZ	178	EP	2		03:13	57.94		
LRW	SE	178	ES	2		03:14	17.04		
LRW	SN	178				03:14	18.77	86	0.14
LRW	SE	178				03:14	18.65	63	0.17
YEL	SZ	201	EP	2		03:14	00.82		
EGD	SZ	232	EP	2		03:14	04.82		
EGD	SZ	232	ES	3		03:14	28.48		
OST	SZ	236	EP	2		03:14	05.67		
ASK	SZ	241	EP	2		03:14	05.84		
BER	SZ	242	EP	2		03:14	06.20		
BER	SZ	242	ES	3		03:14	30.65		
OWE	SZ	261	EP	2		03:14	08.72		
OHO	SZ	281	EP	2		03:14	10.75		
OBR	SZ	282	EP	2		03:14	11.06		
MFI	SZ	295	EP	2		03:14	12.50		
MLA	SZ	306	EP	2		03:14	13.85		
ORE	SZ	318	EP	2		03:14	15.31		
ORE	SN	318				03:15	03.40	27	0.33
ORE	SE	318				03:14	49.01	15	0.27
MCD	SZ	341	EP	2		03:14	18.33		
MCD	SN	341				03:15	07.12	51	0.38
MCD	SE	341				03:15	07.48	41	0.28
EDR	SZ	361	EP	2		03:14	20.71		
EDU	SZ	411	EP	2		03:14	27.31		
ESY	SZ	454	EP	2		03:14	32.15		

April 9 1999 Time: 05:02 2.6 UTC Magnitude: 1.8 ML
Lat: 56.404N Lon: 5.747W Depth: 5.9 km
Grid Ref: 168.85 kmE 729.84 kmN RMS: 0.13 secs
Locality: ISLE OF MULL, S'CLYDE Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAR	SZ	58	IP	1	D	05:02	12.44		
EAB	SZ	91	EP	3		05:02	17.66		
KSB	SZ	92	IP	1	D	05:02	17.62		
KPL	SZ	104	IP	1	D	05:02	19.86		
KPL	SE	104	ES	2		05:02	32.24		
KPL	SN	104				05:02	37.16	18	0.17
KPL	SE	104				05:02	36.45	21	0.11
KAC	SZ	125	EP	1	C	05:02	23.21		
ELO	SZ	126	IP	1	C	05:02	23.01		
EBH	SZ	140	EP	2		05:02	25.72		
EDI	SZ	168	EP	4		05:02	30.56		
EDI	SN	168				05:02	52.67	14	0.21
EDI	SE	168				05:02	52.87	11	0.52

April 9 1999 Time: 19:56 12.3 UTC Magnitude: 0.5 ML
Lat: 57.510N Lon: 5.472W Depth: 7.5 km
Grid Ref: 192.05 kmE 851.90 kmN RMS: 0.01 secs
Locality: TORRIDON, HIGHLAND Quality: C
Comments: 5KM SOUTH OF TORRIDON

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAC	SZ	11	IP		C	19:56	14.74		
KPL	SZ	22	IP	1	D	19:56	16.51		
KPL	SN	22	ES	1		19:56	19.58		
KPL	SN	22				19:56	19.77	17	0.15
KPL	SE	22				19:56	19.72	19	0.13
KSB	SZ	34	IP	1	D	19:56	18.33		

April 11 1999 Time: 05:26 51.6 UTC Magnitude: 1.2 ML
Lat: 52.957N Lon: 4.369W Depth: 23.1 km
Grid Ref: 240.87 kmE 342.58 kmN RMS: 0.05 secs
Locality: LLEYN PENIN, GWYNEDD Quality: A

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
YRE	SZ	5	IP	1	D	05:26	55.43		
YRH	SZ	22	IP		C	05:26	56.79		
YLL	SZ	24	IP		C	05:26	57.06		
WLF	SZ	37	EP	2		05:26	58.55		
WFB	SZ	38	IP	1	D	05:26	58.75		
WCB	SZ	48	IP	1	C	05:27	00.39		
WCB	SE	48	ES	2		05:27	06.14		
WCB	SN	48				05:27	06.94	14	0.14
WCB	SE	48				05:27	06.95	15	0.17
WME	SZ	49	IP	1	D	05:27	00.23		
SBD	SZ	75	EP	2		05:27	04.20		

April 15 1999 Time: 00:42 27.3 UTC Magnitude: 0.5 ML
Lat: 56.139N Lon: 3.711W Depth: 1.1 km
Grid Ref: 293.69 kmE 695.38 kmN RMS: 0.03 secs
Locality: CLACKMANNAN, CENTRAL Quality: B
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EBH	SZ	17	EP	2		00:42	31.00		
PCO	SZ	30	IP	1	D	00:42	33.07		
EAU	SZ	37	EP	2		00:42	34.22		
ELO	SZ	37	EP	2		00:42	34.31		
EAB	SZ	39	EP	2		00:42	34.62		
EDI	SZ	41	IP	1	C	00:42	34.91		
EDI	SN	41	ES	2		00:42	40.47		
EDI	SN	41				00:42	40.74	4	0.17
EDI	SE	41				00:42	41.04	4	0.17

April 15 1999 Time: 08:31 4.0 UTC Magnitude: 2.9 ML
Lat: 57.022N Lon: 5.423W Depth: 6.1 km
Grid Ref: 192.29 kmE 797.54 kmN RMS: 0.08 secs
Locality: NEAR MALLAIG, HIGHLAND Quality: B
Comments: FELT GLEN GARRY...

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KSB	SZ	21	IP		C	08:31	07.95		
KAR	SZ	27	IP		C	08:31	09.06		
KNR	SZ	35	IP		C	08:31	10.43		
KPL	SZ	38	IP		C	08:31	10.87		
KPL	SN	38	ES	2		08:31	15.38		
KAC	SZ	54	IP		C	08:31	13.36		
MDO	SZ	79	IP	1	D	08:31	17.34		
KSK	SZ	92	IP		C	08:31	19.47		
MCD	SZ	145	EP	4		08:31	26.74		
MCD	SN	145				08:31	45.82	116	0.32
MCD	SE	145				08:31	47.07	84	0.18
PGB	SZ	147	EP	4		08:31	28.18		
PGB	SN	147				08:31	47.60	227	0.21
PGB	SE	147				08:31	48.00	246	0.29
EDI	SZ	184	EP	4		08:31	33.50		
EDI	SN	184				08:31	57.54	110	0.40
EDI	SE	184				08:31	58.07	78	0.19

April 27 1999 Time: 22:45 45.7 UTC Magnitude: 1.8 ML
Lat: 51.391N Lon: 2.530W Depth: 17.0 km
Grid Ref: 363.10 kmE 165.93 kmN RMS: 0.06 secs
Locality: BRISTOL, AVON Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
SMD	SZ	16	IP	1	C	22:45	49.65		
SWK	SZ	33	EP	1	D	22:45	52.02		
HGH	SZ	34	IP	1	D	22:45	52.07		
SWN	SZ	53	EP	2		22:45	54.73		
SWN	SN	53	ES	2		22:46	01.53		
SWN	SN	53				22:46	01.85	58	0.15
SWN	SE	53				22:46	01.77	74	0.17
HAE	SZ	72	IP	1	C	22:45	57.59		
MCH	SN	75	ES	2		22:46	07.31		
MCH	SN	75				22:46	07.44	29	0.13
MCH	SE	75				22:46	07.80	27	0.16
SSW	SZ	80	EP	3		22:45	59.00		

April 28 1999 Time: 08:10 29.4 UTC Magnitude: 0.3 ML
Lat: 57.310N Lon: 5.562W Depth: 6.2 km
Grid Ref: 185.49 kmE 829.97 kmN RMS: 0.09 secs
Locality: PLOCKTON, HIGHLAND Quality: C
Comments: 4KM SE OF PLOCKTON

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KPL	SZ	6	IP		C	08:10	31.32		
KPL	SE	6	ES	1		08:10	32.32		
KPL	SN	6				08:10	32.48	18	0.10
KPL	SE	6				08:10	32.42	49	0.14
KSB	SZ	14	IP		C	08:10	32.32		
KAC	SZ	26	EP	2		08:10	34.33		

PHASE DATA : 1999

TABLE 5 (cont'd)

April 30 1999 Time: 00:51 33.8 UTC
Lat: 55.070N Lon: 7.403W
Grid Ref: 55.20 kmE 588.39 kmN
Locality: DONEGAL, IRELAND
Comments: FELT CARROWKEEL

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GCL	SZ	82	IP	1	C	00:51	47.31		
GMK	SZ	119	EP	2		00:51	53.30		
GMM	SZ	132	EP	2		00:51	54.51		
DMUB	SZ	134	EP	3		00:51	55.20		
DMUB	SZ	134	ES	3		00:52	11.70		
GAL	SZ	174	EP	3		00:51	59.98		
GAL	SN	174	ES	2		00:52	20.29		
GAL	SN	174				00:52	25.63	7	0.14
GAL	SE	174				00:52	25.92	7	0.24
DCN	SZ	192	EP	2		00:52	02.20		

Magnitude: 1.7 ML
Depth: 9.7 km
RMS: 0.29 secs
Quality: D
Intensity: 3+

SSP	SZ	158	EP	2		07:21	27.39		
SSP	SN	158	ES	3		07:21	46.55		
SSP	SN	158				07:21	50.38	23	0.24
SSP	SE	158				07:21	50.74	34	0.27

May 2 1999 Time: 20:30 31.5 UTC
Lat: 57.583N Lon: 5.569W
Grid Ref: 186.67 kmE 860.40 kmN
Locality: TORRIDON, HIGHLAND
Comments: 4KM NW OF TORRIDON

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAC	SZ	19	IP	1	C	20:30	35.11		
KPL	SZ	28	EP	2		20:30	36.90		
KPL	SE	28	ES	2		20:30	40.18		
KPL	SN	28				20:30	40.74	8	0.08
KPL	SE	28				20:30	40.75	17	0.10
RRR	SZ	34	EP	2		20:30	37.71		
RRR	SN	34	ES	3		20:30	41.55		
RRR	SN	34				20:30	42.43	4	0.10
RRR	SE	34				20:30	42.36	4	0.10
KSB	SZ	43	IP	1	C	20:30	39.04		
RSC	SZ	89	EP	3		20:30	46.40		

Magnitude: 0.4 ML
Depth: 5.9 km
RMS: 0.18 secs
Quality: C

May 11 1999 Time: 21:49 0.6 UTC
Lat: 53.131N Lon: 1.191W
Grid Ref: 454.14 kmE 359.60 kmN
Locality: MANSFIELD, NOTTS
Comments: C/F, FELT MANSFIELD AREA

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	26	EP	2		21:49	05.83		
CWF	SZ	44	EP	2		21:49	09.23		
CWF	SE	44	ES	2		21:49	14.79		
CWF	SN	44				21:49	15.43	5	0.17
CWF	SE	44				21:49	16.28	6	0.24
KSY	SZ	45	EP	2		21:49	08.91		
KWE	SZ	45	EP	2		21:49	09.05		

Magnitude: 0.7 ML
Depth: 1.0 km
RMS: 0.09 secs
Quality: C
Intensity: 3+

May 15 1999 Time: 07:16 3.5 UTC
Lat: 59.818N Lon: 2.079E
Grid Ref: 628.68 kmE 1110.60 kmN
Locality: NORTHERN NORTH SEA

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EGD	SZ	183	EP	2		07:16	30.02		
EGD	SZ	183	ES	3		07:16	49.87		
LRW	SZ	185	EP	2		07:16	31.09		
LRW	SN	185	ES	3		07:16	49.51		
LRW	SN	185				07:16	54.16	22	0.16
LRW	SE	185				07:16	54.82	18	0.12
OST	SZ	275	EP	2		07:16	41.89		
OWE	SZ	294	EP	2		07:16	44.25		
OHO	SZ	323	EP	3		07:16	47.07		
OBR	SZ	328	EP	2		07:16	47.85		
ORE	SZ	363	EP	3		07:16	51.61		
ORE	SN	363	ES	3		07:17	26.96		

Magnitude: 2.2 ML
Depth: 15.0 km
RMS: 0.35 secs
Quality: D

May 2 1999 Time: 20:37 33.3 UTC
Lat: 52.959N Lon: 3.588W
Grid Ref: 293.32 kmE 341.36 kmN
Locality: BALA, GWYNEDD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
SBD	SZ	23	IP		D	20:37	37.60		
WPM	SZ	40	IP		D	20:37	40.24		
WFB	SZ	43	IP	1	C	20:37	40.74		
YLL	SZ	44	EP	1	D	20:37	40.88		
YRE	SZ	56	IP	1	C	20:37	42.93		
WLF	SZ	66	EP	2		20:37	44.16		
WME	SZ	68	EP	2		20:37	44.68		
SSP	SZ	68	IP	1	D	20:37	44.89		
SSP	SE	68	ES	2		20:37	53.04		
SSP	SN	68				20:37	53.94	4	0.01
SSP	SE	68				20:37	54.77	9	0.12
HLM	SZ	69	EP	2		20:37	44.95		
YRH	SZ	71	EP	2		20:37	45.23		
HCG	SZ	71	IP	1	C	20:37	45.10		
YRC	SZ	74	EP	2		20:37	45.40		
WCB	SZ	79	EP	2		20:37	46.26		
WCB	SN	79	ES	2		20:37	55.43		
WCB	SN	79				20:37	55.52	4	0.12
WCB	SE	79				20:37	56.03	4	0.11

Magnitude: 1.0 ML
Depth: 11.5 km
RMS: 0.06 secs
Quality: B

May 16 1999 Time: 20:32 4.1 UTC
Lat: 53.507N Lon: 4.377W
Grid Ref: 242.38 kmE 403.78 kmN
Locality: OFF ANGLESEY, GWYNEDD
Comments: 8KM NORTH OF ANGLESEY

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
WME	SZ	13	IP		D	20:32	07.44		
WCB	SZ	18	IP		C	20:32	08.08		
WCB	SN	18	ES	2		20:32	10.74		
WCB	SN	18				20:32	10.89	75	0.09
WCB	SE	18				20:32	10.80	144	0.07
WLF	SZ	24	IP	1	D	20:32	08.88		
YRC	SZ	31	IP	1	C	20:32	09.83		
WPM	SZ	42	EP	1	D	20:32	11.48		
YLL	SZ	43	IP	1	C	20:32	11.68		
GIM	SZ	88	EP	2		20:32	18.66		
GIM	SE	88	ES	2		20:32	28.40		
GIM	SN	88				20:32	31.44	12	0.04
GIM	SE	88				20:32	30.71	16	0.14

Magnitude: 1.3 ML
Depth: 15.1 km
RMS: 0.03 secs
Quality: C

May 11 1999 Time: 05:15 35.7 UTC
Lat: 52.928N Lon: 3.981W
Grid Ref: 266.84 kmE 338.61 kmN
Locality: FFESTINIOG, GWYNEDD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
YLL	SZ	27	IP	1	D	05:15	40.28		
YLL	SZ	27	ES	3		05:15	43.70		
YLL	SZ	27				05:15	43.84	9	0.16
WFB	SZ	28	EP	1	C	05:15	40.51		
WFB	SZ	28				05:15	40.64	7	0.05
YRE	SZ	30	IP	1	D	05:15	41.02		
WPM	SZ	37	EP	2		05:15	42.14		
WPM	SZ	37				05:15	46.85	5	0.11
YRH	SZ	45	EP	3		05:15	43.39		

Magnitude: 0.4 ML
Depth: 8.4 km
RMS: 0.07 secs
Quality: D

May 19 1999 Time: 23:41 27.2 UTC
Lat: 52.960N Lon: 4.408W
Grid Ref: 238.30 kmE 343.06 kmN
Locality: LLEYN PENIN, GWYNEDD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
YRE	SZ	3	EP	1	C	23:41	31.32		
YRE	SZ	3	ES	3		23:41	33.87		
YRH	SZ	21	IP		C	23:41	32.37		
YLL	SZ	26	IP	1	C	23:41	32.94		
YLL	SZ	26	ES	3		23:41	36.70		
WFB	SZ	40	IP	1	C	23:41	34.73		
WCB	SN	47	ES	4		23:41	41.78		
WCB	SN	47				23:41	42.87	1	0.07
WCB	SE	47				23:41	42.55	2	0.10

Magnitude: 0.1 ML
Depth: 24.6 km
RMS: 0.06 secs
Quality: B

May 11 1999 Time: 07:21 1.9 UTC
Lat: 53.132N Lon: 1.091W
Grid Ref: 460.80 kmE 359.79 kmN
Locality: MANSFIELD, NOTTS
Comments: C/F, 6KM E OF MANSFIELD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KEY	SZ	28	IP		C	07:21	07.39		
KBI	SZ	32	IP		C	07:21	07.78		
KSY	SZ	39	EP	2		07:21	08.73		
CWF	SZ	46	IP	1	C	07:21	10.16		
CWF	SE	46	ES	1		07:21	15.94		
CWF	SN	46				07:21	16.10	67	0.13
CWF	SE	46				07:21	16.14	122	0.14
KWE	SZ	52	IP	1	C	07:21	11.09		
KUF	SZ	74	EP	2		07:21	14.54		
HLM	SZ	139	EP	3		07:21	24.94		

Magnitude: 2.1 ML
Depth: 2.9 km
RMS: 0.12 secs
Quality: C

May 27 1999 Time: 04:13 11.9 UTC
Lat: 53.178N Lon: 1.111W
Grid Ref: 459.42 kmE 364.98 kmN
Locality: MANSFIELD, NOTTS
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	29	EP	2		04:13	17.66		
KSY	SZ	42	EP	3		04:13	19.72		
CWF	SZ	51	EP	3		04:13	22.12		
CWF	SE	51	ES	3		04:13	29.22		
CWF	SN	51				04:13	33.12	6	0.25
CWF	SE	51				04:13	32.66	8	0.73
KWE	SZ	52	EP	2		04:13	21.72		
LMK	SZ	61	EP	3		04:13	23.34		

Magnitude: 0.8 ML
Depth: 0.2 km
RMS: 0.28 secs
Quality: C

PHASE DATA : 1999

TABLE 5 (cont'd)

May 27 1999 Time: 18:59 30.7 UTC
Lat: 52.891N Lon: 3.505W
Grid Ref: 298.78 kmE 333.75 kmN
Locality: BALA, GWYNEDD
Comments: 8KM SE OF BALA

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
SBD	SZ	17	IP		C	18:59	34.04		
SBD	SZ	17	ES	3		18:59	36.17		
WFB	SZ	43	IP		C	18:59	38.02		
WFB	SZ	43	ES	3		18:59	43.23		
WPM	SZ	49	IP	1	C	18:59	39.14		
YLL	SZ	53	EP	2		18:59	39.69		
SSP	SZ	59	EP	2		18:59	40.76		
SSP	SN	59				18:59	49.12	3	0.12
SSP	SE	59				18:59	49.20	4	0.30
YRE	SZ	63	IP		C	18:59	41.35		
WLF	SZ	74	EP	2		18:59	43.02		
YRH	SZ	76	IP	1	C	18:59	43.40		

May 29 1999 Time: 00:31 41.7 UTC
Lat: 62.281N Lon: 4.583E
Grid Ref: 741.16 kmE 1395.31 kmN
Locality: NORWEGIAN COAST
Comments: FELT NORWEGIAN COAST

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
FOO	SZ	80	IP		C	00:31	54.40		
MOL	SZ	103	EP	2		00:32	07.01		
SUE	SZ	137	IP			00:32	02.95		
SUE	SZ	137	ES	2		00:32	19.55		
ASK	SZ	204	IP		C	00:32	12.20		
BER	SZ	215	IP		C	00:32	13.55		
BER	SZ	215	ES	2		00:32	36.81		
KMY	SZ	345	IP		C	00:32	28.64		
YEL	SZ	359	IP	1	D	00:32	31.24		
LRW	SZ	391	EP	2		00:32	35.57		
LRW	SN	391	ES	2		00:33	13.82		
LRW	SN	391				00:33	16.37	123	0.19
LRW	SE	391				00:33	20.29	109	0.22
WAL	SZ	402	EP			00:32	36.52		
SAN	SZ	403	IP	1	D	00:32	36.59		
OST	SZ	528	EP	2		00:32	52.12		
OWE	SZ	530	EP	2		00:32	52.16		
OHO	SZ	576	EP	2		00:32	57.19		
OBR	SZ	591	EP	2		00:32	59.20		
ORE	SZ	620	EP	2		00:33	03.15		
ORE	SN	620				00:34	03.29	78	0.18
ORE	SE	620				00:34	06.99	63	0.21
MLA	SZ	624	EP	2		00:33	03.31		
EDR	SZ	720	EP	2		00:33	14.70		

May 29 1999 Time: 11:49 34.5 UTC
Lat: 57.248N Lon: 3.850W
Grid Ref: 288.37 kmE 818.97 kmN
Locality: AVIEMORE, HIGHLAND
Comments: FELT BOAT OF GARTEN

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
MDO	SZ	38	IP		C	11:49	41.16		
MCD	SZ	52	IP		D	11:49	43.59		
MCD	SN	52	ES	2		11:49	49.98		
MCD	SN	52				11:49	50.98	106	0.28
MCD	SE	52				11:49	50.58	102	0.20
MME	SZ	54	IP		C	11:49	43.60		
MVH	SZ	78	EP	2		11:49	47.68		
ELO	SZ	87	EP	3		11:49	48.90		
EDR	SZ	88	IP	1	C	11:49	49.13		
KAC	SZ	92	IP	1	C	11:49	49.75		
EDU	SZ	93	IP	1	C	11:49	50.30		
KPL	SZ	109	IP	1	C	11:49	52.57		
KPL	SN	109	ES	1		11:50	04.63		
KPL	SN	109				11:50	06.96	62	0.25
KPL	SE	109				11:50	06.57	53	0.13
RRR	SZ	135	EP	2		11:49	56.70		
RRR	SE	135	ES	2		11:50	12.60		
RRR	SN	135				11:50	14.14	26	0.23
RRR	SE	135				11:50	14.04	28	0.12
EDI	SZ	153	EP	2		11:49	59.52		
EDI	SN	153	ES	3		11:50	16.78		
EDI	SN	153				11:50	20.57	29	0.35
EDI	SE	153				11:50	19.05	46	0.22

May 30 1999 Time: 02:31 21.9 UTC
Lat: 53.403N Lon: 1.442W
Grid Ref: 437.12 kmE 389.71 kmN
Locality: SHEFFIELD, S YORKSHIRE
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	18	EP	2		02:31	25.71		
KBI	SZ	18	ES	3		02:31	28.09		

LHO	SZ	32	EP	2		02:31	27.94		
KSY	SZ	75	EP	2		02:31	34.09		
CWF	SZ	75	EP	2		02:31	34.02		
CWF	SE	75	ES	2		02:31	43.56		
CWF	SN	75				02:31	46.27	5	0.19
CWF	SE	75				02:31	44.68	5	0.13
LMK	SZ	75	EP	3		02:31	34.85		

June 11 1999 Time: 01:44 47.5 UTC
Lat: 53.184N Lon: 1.100W
Grid Ref: 460.10 kmE 365.66 kmN
Locality: MANSFIELD, NOTTS
Comments: C/F, 6KM NE OF MANSFIELD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	30	EP	1	D	01:44	52.86		
KSY	SZ	42	EP	1	D	01:44	54.98		
CWF	SZ	52	EP	2		01:44	57.46		
CWF	SE	52	ES	2		01:45	04.71		
CWF	SN	52				01:45	08.18	19	0.18
CWF	SE	52				01:45	05.76	18	0.24
KWE	SZ	53	EP	2		01:44	57.44		
LMK	SZ	60	EP	2		01:44	58.85		
LHO	SZ	64	EP	1	C	01:44	59.91		
HPK	SZ	93	EP	2		01:45	04.23		
HPK	SE	93	ES	3		01:45	14.96		

June 13 1999 Time: 20:22 13.6 UTC
Lat: 51.692N Lon: 3.233W
Grid Ref: 314.80 kmE 200.00 kmN
Locality: BARGOED, MID GLAMORGAN
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HGH	SZ	30	IP	1	C	20:22	19.14		
MCH	SZ	38	IP		C	20:22	20.40		
MCH	SE	38	ES	2		20:22	25.37		
MCH	SN	38				20:22	25.61	14	0.22
MCH	SE	38				20:22	25.75	14	0.11
HTR	SZ	43	EP	2		20:22	21.38		
HAE	SZ	61	EP	2		20:22	24.33		
HSA	SZ	64	EP	2		20:22	24.66		
HEX	SZ	80	EP	2		20:22	27.78		

June 14 1999 Time: 22:24 50.6 UTC
Lat: 52.693N Lon: 3.840W
Grid Ref: 275.66 kmE 312.18 kmN
Locality: DOLGELLAU, GWYNEDD
Comments: 6KM SOUTH OF DOLGELLAU

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
WFB	SZ	14	IP		C	22:24	53.61		
WFB	SZ	14	ES	3		22:24	55.25		
HCG	SZ	43	EP	2		22:24	57.75		
SBD	SZ	46	EP	2		22:24	58.55		
YRE	SZ	51	EP	2		22:24	59.45		
YLL	SZ	55	EP	2		22:24	59.69		
SSP	SZ	58	EP	2		22:25	00.51		
SSP	SN	58	ES	2		22:25	07.38		
SSP	SN	58				22:25	08.03	7	0.12
SSP	SE	58				22:25	08.15	13	0.12
HTR	SZ	79	EP	2		22:25	03.77		

June 16 1999 Time: 00:05 56.4 UTC
Lat: 53.391N Lon: 4.714W
Grid Ref: 219.57 kmE 391.76 kmN
Locality: HOLYHEAD BAY, ANGLESEY
Comments: 10KM NW OF HOLYHEAD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
WCB	SZ	11	IP	1	D	00:05	59.72		
WCB	SN	11	ES	2		00:06	02.06		
WCB	SN	11				00:06	02.16	9	0.06
WCB	SE	11				00:06	02.26	4	0.04
YRC	SZ	18	IP	1	D	00:06	00.49		
WLF	SZ	24	IP	1	D	00:06	01.18		
WME	SZ	27	EP	2		00:06	01.71		
YRE	SZ	50	EP	2		00:06	04.92		

June 17 1999 Time: 02:20 26.6 UTC
Lat: 51.994N Lon: 2.569W
Grid Ref: 360.91 kmE 233.00 kmN
Locality: HEREFORD, HER & WORCS
Comments: FELT CRADLEY

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HAE	SZ	5	IP		D	02:20	30.18		
MCH	SZ	30	IP		C	02:20	32.54		
MCH	SN	30	ES	2		02:20	36.97		
HBL2	SZ	33	IP	1	C	02:20	32.98		
HBL2	AN	33				02:20	37.96	6582	0.13
HBL2	AE	33				02:20	37.89	1425	0.11
HGH	SZ	43	IP	1	C	02:20	34.40		
HTR	SZ	49	IP	1	C	02:20	35.17		
SSW	SZ	50	IP	1	C	02:20	35.62		

PHASE DATA : 1999

TABLE 5 (cont'd)

SSP	SZ	60	IP	1	D	02:20	36.93			
SSP	SE	60	ES	2		02:20	44.51			
HLM	SZ	62	IP		D	02:20	37.02			
SWN	SZ	75	IP	1	D	02:20	39.57			
SWN	SE	75	ES	2		02:20	49.51			
SWN	SN	75				02:20	50.03	206	0.15	
SWN	SE	75				02:20	49.93	273	0.14	
HCG	SZ	83	IP		D	02:20	40.55			
SWK	SZ	97	IP	4	D	02:20	42.87			
HSA	SZ	112	IP	4	C	02:20	44.49			
SBD	SZ	112	IP	1	D	02:20	44.70			
KWE	SZ	124	IP	4	C	02:20	46.01			
HEX	SZ	134	IP	4	C	02:20	47.98			
KBI	SZ	157	IP	4	C	02:20	50.66			
SIW	SZ	169	IP	4	C	02:20	52.13			
HTL	SZ	173	EP	2		02:20	52.74			
HTL	SN	173				02:21	13.47	48	0.23	
HTL	SE	173				02:21	15.57	65	0.20	

June 26 1999 Time: 14:11 9.6 UTC
Lat: 57.716N Lon: 5.085W
Grid Ref: 216.25 kmE 873.75 kmN
Locality: KINLOCHEWE, HIGHLAND
Comments: 17KM NE OF KINLOCHEWE

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
KAC	SZ	27	IP		D	14:11	14.73			
RRR	SZ	46	IP	1	C	14:11	17.72			
RRR	SN	46	ES	2		14:11	23.13			
RRR	SN	46				14:11	23.78	24	0.09	
RRR	SE	46				14:11	23.20	24	0.19	
REB	SZ	46	IP		C	14:11	17.62			
MDO	SZ	53	IP	1	C	14:11	18.61			
KPL	SZ	54	EP	2		14:11	19.04			
KPL	SN	54	ES	2		14:11	25.37			
KPL	SN	54				14:11	25.52	33	0.15	
KPL	SE	54				14:11	25.69	32	0.13	
MVH	SZ	59	IP	1	C	14:11	19.56			
RSC	SZ	71	IP	1	D	14:11	21.25			
MCD	SZ	111	IP	1	C	14:11	27.82			
MCD	SN	111	ES	2		14:11	40.42			
MCD	SN	111				14:11	41.60	30	0.24	
MCD	SE	111				14:11	42.33	43	0.24	

June 30 1999 Time: 00:56 41.8 UTC
Lat: 53.440N Lon: 1.337W
Grid Ref: 444.02 kmE 393.96 kmN
Locality: ROTHERHAM, S YORKSHIRE
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
KBI	SZ	24	EP	1	D	00:56	46.55			
LHO	SZ	36	EP	1	D	00:56	48.66			
KWE	SZ	58	EP	1	C	00:56	52.26			
HPK	SZ	61	EP	3		00:56	52.75			
HPK	SE	61	ES	2		00:57	00.56			
LMK	SZ	67	EP	3		00:56	53.64			
KSY	SZ	73	EP	2		00:56	53.58			
CWF	SZ	78	EP	2		00:56	55.36			
CWF	SE	78	ES	2		00:57	05.42			
CWF	SN	78				00:57	09.72	7	0.24	
CWF	SE	78				00:57	10.80	13	0.31	

July 7 1999 Time: 00:49 8.3 UTC
Lat: 53.099N Lon: 3.687W
Grid Ref: 287.09 kmE 357.10 kmN
Locality: BETWS-Y-COED, GWYNEDD
Comments: 7KM EAST OF BETWS-Y-COED

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
WPM	SZ	23	IP	1	D	00:49	12.44			
WPM	SZ	23	ES	2		00:49	15.16			
WPM	SZ	23				00:49	15.32	9	0.14	
YLL	SZ	33	EP	2		00:49	14.00			
YLL	SZ	33				00:49	17.94	4	0.15	
SBD	SZ	36	IP	1	D	00:49	14.49			
YRE	SZ	51	EP	2		00:49	16.95			
YRE	SZ	51				00:49	23.82	3	0.13	
WLF	SZ	52	EP	2		00:49	16.85			
WFB	SZ	52	EP	2		00:49	17.13			
YRH	SZ	70	EP	2		00:49	19.96			

July 7 1999 Time: 06:55 54.8 UTC
Lat: 53.103N Lon: 3.692W
Grid Ref: 286.75 kmE 357.57 kmN
Locality: BETWS-Y-COED, GWYNEDD
Comments: 7KM EAST OF BETWS-Y-COED

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
WPM	SZ	22	EP	2		06:55	58.98			
WPM	SZ	22	ES	3		06:56	01.76			
YLL	SZ	32	EP	1	C	06:56	00.60			
SBD	SZ	37	IP	1	D	06:56	01.11			
SBD	SZ	37	ES	3		06:56	06.05			
YRE	SZ	51	EP	2		06:56	03.55			

WFB	SZ	52	EP	2		06:56	03.72			
WCB	SN	65	ES	3		06:56	12.95			
WCB	SN	65				06:56	15.15	2	0.09	
WCB	SZ	65				06:56	13.24	1	0.15	
YRH	SZ	70	EP	2		06:56	06.52			

July 7 1999 Time: 20:43 50.5 UTC
Lat: 53.105N Lon: 3.708W
Grid Ref: 285.68 kmE 357.84 kmN
Locality: BETWS-Y-COED, GWYNEDD
Comments: 7KM EAST OF BETWS-Y-COED

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
WPM	SZ	22	IP	1	D	20:43	54.63			
WPM	SZ	22	ES	3		20:43	57.37			
WPM	SZ	22				20:43	57.51	6	0.13	
YLL	SZ	31	EP	3		20:43	56.20			
YLL	SZ	31				20:44	00.05	3	0.17	
SBD	SZ	38	EP	2		20:43	57.09			
SBD	SZ	38	ES	3		20:44	01.56			
WLF	SZ	50	EP	2		20:43	59.04			
YRE	SZ	50	EP	2		20:43	59.16			
WFB	SZ	52	EP	3		20:43	59.36			

July 7 1999 Time: 23:25 35.8 UTC
Lat: 52.429N Lon: 2.682W
Grid Ref: 353.66 kmE 281.50 kmN
Locality: LUDLOW, SHROPSHIRE
Comments: 6KM NORTH OF LUDLOW

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
HLM	SZ	17	IP		C	23:25	39.37			
SSP	SZ	29	IP		C	23:25	41.31			
SSP	SE	29	ES	2		23:25	45.33			
SSP	SN	29				23:25	45.68	6	0.02	
SSP	SE	29				23:25	45.41	15	0.26	
HAE	SZ	45	EP	2		23:25	43.78			
MCH	SZ	53	EP	2		23:25	44.97			
MCH	SN	53	ES	2		23:25	51.48			
MCH	SN	53				23:25	51.74	17	0.15	
MCH	SE	53				23:25	51.61	13	0.13	
HTR	SZ	56	IP	1	D	23:25	45.45			
SBD	SZ	66	EP	2		23:25	46.98			
HCG	SZ	67	IP	1	C	23:25	47.25			

July 8 1999 Time: 18:09 16.5 UTC
Lat: 52.840N Lon: 3.875W
Grid Ref: 273.72 kmE 328.63 kmN
Locality: DOLGELLAU, GWYNEDD
Comments: 10KM NORTH OF DOLGELLAU

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
WFB	SZ	21	IP		C	18:09	20.71			
YLL	SZ	39	IP		D	18:09	23.24			
YRE	SZ	40	EP	2		18:09	23.67			
SBD	SZ	42	IP	1	C	18:09	23.89			
WPM	SZ	47	IP	1	D	18:09	24.59			
YRH	SZ	51	IP	1	C	18:09	25.26			
HCG	SZ	59	EP	2		18:09	26.33			
WLF	SZ	61	EP	2		18:09	26.56			
YRC	SZ	66	EP	2		18:09	27.29			
SSP	SZ	70	EP	2		18:09	28.34			
SSP	SN	70	ES	2		18:09	36.62			
SSP	SN	70				18:09	36.84	2	0.13	
SSP	SE	70				18:09	36.94	2	0.13	
WCB	SZ	75	EP	2		18:09	28.80			
WCB	SN	75	ES	2		18:09	37.69			
WCB	SN	75				18:09	39.56	2	0.13	
WCB	SE	75				18:09	37.97	2	0.03	
HLM	SZ	76	EP	2		18:09	29.43			

July 9 1999 Time: 06:18 33.7 UTC
Lat: 53.100N Lon: 3.685W
Grid Ref: 287.22 kmE 357.26 kmN
Locality: BETWS-Y-COED, GWYNEDD
Comments: 7KM EAST OF BETWS-Y-COED

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
WPM	SZ	23	IP	1	D	06:18	37.83			
WPM	SZ	23	ES	3		06:18	40.62			
WPM	SZ	23				06:18	40.71	7	0.13	
YLL	SZ	33	EP	2		06:18	39.44			
YLL	SZ	33				06:18	43.33	5	0.14	
SBD	SZ	36	EP	2		06:18	39.90			
YRE	SZ	52	IP	1	C	06:18	42.38			
YRE	SZ	52				06:18	49.21	2	0.14	
WFB	SZ	52	EP	2		06:18	42.57			
YRH	SZ	70	EP	2		06:18	45.45			

July 9 1999 Time: 06:19 44.8 UTC
Lat: 53.098N Lon: 3.689W
Grid Ref: 286.95 kmE 356.99 kmN
Locality: BETWS-Y-COED, GWYNEDD
Comments: 7KM EAST OF BETWS-Y-COED

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	
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PHASE DATA : 1999

TABLE 5 (cont'd)

WPM	SZ	23	IP	1	D	06:19	48.92			
WPM	SZ	23	ES	3		06:19	51.68			
YLL	SZ	33	EP	2		06:19	50.49			
SBD	SZ	36	EP	2		06:19	51.02			
YRE	SZ	51	EP	2		06:19	53.47			
WFB	SZ	52	EP	2		06:19	53.64			
WCB	SZ	65	EP	2		06:19	56.32			
WCB	SE	65	ES	3		06:20	02.86			
WCB	SN	65				06:20	05.30	1	0.08	
WCB	SE	65				06:20	03.81	1	0.11	
YRH	SZ	70	EP	2		06:19	56.54			

July 9 1999 Time: 14:31 11.9 UTC
Lat: 51.697N **Lon: 3.219W**
Grid Ref: 315.76 kmE 200.56 kmN
Locality: BARGOED, MID GLAMORGAN
Comments: C/F,FELT BLACKWOOD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HGH	SZ	29	IP		D	14:31	17.36		
MCH	SZ	37	IP	1	C	14:31	18.63		
MCH	SE	37	ES	2		14:31	23.55		
MCH	SN	37				14:31	24.47	126	0.28
MCH	SE	37				14:31	24.02	134	0.23
HTR	SZ	43	IP	1	C	14:31	19.60		
HAE	SZ	60	EP	2		14:31	22.41		
HSA	SZ	65	IP	1	D	14:31	23.18		
HCG	SZ	76	EP	2		14:31	25.08		
SSP	SZ	81	EP	2		14:31	25.96		
SSP	SN	81				14:31	43.26	24	0.25
SSP	SE	81				14:31	38.07	32	0.17
HEX	SZ	81	EP	1	C	14:31	25.89		
HTL	SZ	118	EP	2		14:31	32.19		
HTL	SN	118				14:31	47.96	20	0.16
HTL	SE	118				14:31	48.27	26	0.17

July 10 1999 Time: 03:10 1.9 UTC
Lat: 56.135N **Lon: 3.701W**
Grid Ref: 294.32 kmE 694.86 kmN
Locality: CLACKMANNAN, CENTRAL
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EBH	SZ	17	IP		C	03:10	05.41		
EAU	SZ	36	EP	2		03:10	08.68		
ELO	SZ	37	EP	1	D	03:10	08.89		
EDI	SZ	40	EP	2		03:10	09.25		
EDI	SN	40	ES	3		03:10	14.54		
EDI	SN	40				03:10	15.07	9	0.23
EDI	SE	40				03:10	17.13	6	0.21
EAB	SZ	40	EP	3		03:10	09.18		

July 13 1999 Time: 16:33 42.1 UTC
Lat: 49.214N **Lon: 2.318W**
Grid Ref: 376.86 kmE -76.14 kmN
Locality: JERSEY, CHANNEL ISLANDS
Comments: FELT ST PETER...

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
JVM	SZ	8	IP		C	16:33	44.52		
JVM	SZ	8	ES	1		16:33	46.23		
JSA	SZ	11	IP		D	16:33	44.85		
JLP	SZ	16	IP		C	16:33	45.54		
JRS	SZ	17	IP		D	16:33	45.60		
JRS	SN	17	ES	1		16:33	48.21		
JRS	SZ	17				16:33	48.48	492	0.10
JQE	SZ	20	IP		C	16:33	46.15		

July 19 1999 Time: 17:58 14.0 UTC
Lat: 56.375N **Lon: 4.177W**
Grid Ref: 265.57 kmE 722.45 kmN
Locality: LOCH EARN, CENTRAL
Comments: FELT ST FILLANS

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EAB	SZ	23	IP	1	C	17:58	18.27		
ELO	SZ	31	IP		C	17:58	19.59		
PCO	SZ	43	IP	1	D	17:58	21.86		
EBH	SZ	44	IP	1	C	17:58	21.94		
PGB	SZ	66	EP	2		17:58	25.26		
PGB	SN	66	ES	2		17:58	32.99		
PGB	SN	66				17:58	33.50	59	0.17
PGB	SE	66				17:58	33.14	49	0.22
PMS	SZ	69	EP	2		17:58	25.55		
KNR	SZ	70	IP	1	C	17:58	25.94		
EDI	SZ	80	EP	2		17:58	27.51		
EDI	SN	80	ES	2		17:58	37.33		
EDI	SN	80				17:58	42.23	38	0.18
EDI	SE	80				17:58	41.62	83	0.29
KAR	SZ	118	IP	4	C	17:58	33.81		
KPL	SZ	140	IP	4	C	17:58	37.46		

July 22 1999 Time: 11:45 23.7 UTC
Lat: 58.724N **Lon: 2.576W**
Grid Ref: 366.64 kmE 981.93 kmN
Locality: PENTLAND FIRTH

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
OBR	SZ	36	IP	1	D	11:45	30.54		
OST	SZ	40	IP		D	11:45	31.07		
OHO	SZ	41	IP		D	11:45	31.13		
OWE	SZ	71	EP	1	D	11:45	35.62		
ORE	SZ	72	IP	1	D	11:45	35.64		
ORE	SN	72	ES	2		11:45	44.22		
ORE	SN	72				11:45	45.18	50	0.09
ORE	SE	72				11:45	45.01	43	0.12
OTO	SZ	109	EP	2		11:45	41.37		

July 23 1999 Time: 00:47 46.1 UTC
Lat: 53.228N **Lon: 1.087W**
Grid Ref: 460.93 kmE 370.49 kmN
Locality: OLLERTON, NOTTS
Comments: C/F

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KBI	SZ	30	EP	2		00:47	51.79		
KSY	SZ	45	EP	2		00:47	54.29		
CWF	SZ	56	EP	3		00:47	56.57		
CWF	SE	56	ES	2		00:48	03.69		
CWF	SN	56				00:48	07.46	8	0.19
CWF	SE	56				00:48	07.38	7	0.19

July 24 1999 Time: 02:03 41.6 UTC
Lat: 55.097N **Lon: 3.637W**
Grid Ref: 295.55 kmE 579.28 kmN
Locality: DUMFRIES, D & G
Comments: FELT TINWALD

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	9	IP		D	02:03	44.25		
BNA	SZ	15	EP	2		02:03	44.92		
GCD	SZ	33	IP		C	02:03	47.67		
ECK	SZ	34	IP	1	C	02:03	47.83		
ESK	SZ	37	IP		C	02:03	48.31		
ESK	SN	37	ES	2		02:03	53.26		
ESK	SN	37				02:03	53.69	25	0.18
ESK	SE	37				02:03	53.68	30	0.16
BBH	SZ	45	EP		C	02:03	49.74		
BBO	SZ	47	IP	1	D	02:03	50.57		
BBO	SE	47	ES	2		02:03	56.70		
GAL	SZ	73	EP	2		02:03	54.31		
GAL	SN	73	ES	2		02:04	02.83		
GAL	SN	73				02:04	07.18	17	0.15
GAL	SE	73				02:04	06.89	12	0.07

July 27 1999 Time: 02:51 8.2 UTC
Lat: 57.134N **Lon: 5.571W**
Grid Ref: 183.93 kmE 810.39 kmN
Locality: LOCH HOURN, HIGHLAND

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KSB	SZ	12	IP	1	C	02:51	11.02		
KPL	SZ	23	EP	2		02:51	12.69		
KPL	SE	23	ES	2		02:51	15.94		
KPL	SN	23				02:51	18.58	1	0.05
KPL	SE	23				02:51	16.09	4	0.17
KAR	SZ	29	IP	1	C	02:51	13.48		

July 30 1999 Time: 09:31 12.3 UTC
Lat: 51.689N **Lon: 3.201W**
Grid Ref: 317.01 kmE 199.67 kmN
Locality: BARGOED, MID GLAMORGAN

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HGH	SZ	28	IP		C	09:31	17.50		
HGH	SZ	28	ES	3		09:31	21.41		
MCH	SZ	37	IP		C	09:31	18.86		
MCH	SN	37	ES	2		09:31	23.80		
HTR	SZ	44	IP		C	09:31	19.81		
SMD	SZ	54	IP	1	D	09:31	21.50		
HAE	SZ	60	IP	1	C	09:31	22.66		
HCG	SZ	77	IP	1	C	09:31	25.28		
SSP	SZ	81	IP	1	C	09:31	25.79		
SSP	SN	81				09:31	41.80	191	0.15
SSP	SE	81				09:31	36.30	142	0.15
HEX	SZ	81	IP	1	C	09:31	25.80		
HPE	SZ	112	EP	2		09:31	30.17		
HTL	SZ	118	IP	1	C	09:31	32.09		
HTL	SE	118	ES	2		09:31	45.47		
HTL	SN	118				09:31	47.02	163	0.18
HTL	SE	118				09:31	46.94	244	0.24

July 30 1999 Time: 22:43 17.8 UTC
Lat: 51.691N **Lon: 3.188W**
Grid Ref: 317.93 kmE 199.88 kmN
Locality: BARGOED, MID GLAMORGAN

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HGH	SZ	27	IP	1	C	22:43	22.93		

PHASE DATA : 1999

TABLE 5 (cont'd)

MCH	SZ	37	IP	1	C	22:43	24.27			
MCH	SE	37	ES	2		22:43	29.29			
MCH	SN	37				22:43	29.65	38	0.13	
MCH	SE	37				22:43	29.71	32	0.13	
HTR	SZ	43	EP	2		22:43	25.27			
SMD	SZ	54	EP	2		22:43	26.98			
HCG	SZ	77	EP	2		22:43	30.96			
HEX	SZ	82	EP	2		22:43	31.42			
HPE	SZ	113	EP	2		22:43	35.73			

July 31 1999 Time: 03:15 11.0 UTC
Lat: 56.142N Lon: 3.696W
Grid Ref: 294.65 kmE 695.67 kmN
Locality: CLACKMANNAN, CENTRAL
Comments: C/F,FELT FOREST MILL

Magnitude: 1.4 ML
Depth: 0.9 km
RMS: 0.07 secs
Quality: B
Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EBH	SZ	17	IP	1	D	03:15	14.51		
PCO	SZ	31	IP	1	C	03:15	17.04		
ELO	SZ	37	EP	2		03:15	18.02		
EAU	SZ	37	EP	2		03:15	17.92		
EDI	SZ	40	IP	1	D	03:15	18.49		
EDI	SN	40	ES	2		03:15	24.06		
EDI	SN	40				03:15	24.55	33	0.29
EDI	SE	40				03:15	22.89	55	0.05
EAB	SZ	40	IP	1	C	03:15	18.51		
PCA	SZ	60	EP	2		03:15	21.82		
PGB	SZ	61	EP	2		03:15	22.08		
PGB	SN	61	ES	2		03:15	29.82		
PGB	SN	61				03:15	35.22	19	0.44
PGB	SE	61				03:15	33.98	14	0.26
PMS	SZ	73	EP	2		03:15	24.24		

July 31 1999 Time: 07:33 48.5 UTC
Lat: 51.695N Lon: 3.211W
Grid Ref: 316.27 kmE 200.33 kmN
Locality: BARGOED, MID GLAMORGAN

Magnitude: 1.1 ML
Depth: 7.3 km
RMS: 0.09 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HGH	SZ	29	IP		C	07:33	53.78		
MCH	SZ	37	IP	1	C	07:33	55.11		
MCH	SN	37	ES	2		07:33	59.79		
MCH	SN	37				07:34	00.34	18	0.13
MCH	SE	37				07:34	00.37	20	0.22
HTR	SZ	43	EP	2		07:33	56.04		
HAE	SZ	60	EP	2		07:33	58.95		
HSA	SZ	65	EP	2		07:33	59.52		
HEX	SZ	81	EP	2		07:34	02.16		

July 31 1999 Time: 07:51 9.4 UTC
Lat: 61.465N Lon: 2.557E
Grid Ref: 642.70 kmE 1295.55 kmN
Locality: NORTHERN NORTH SEA

Magnitude: 2.2 ML
Depth: 10.1 km
RMS: 0.39 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
SUE	SZ	127	EP	3		07:51	29.98		
SUE	SZ	127	ES	3		07:51	44.72		
FOO	SZ	133	EP	3		07:51	30.64		
BER	SZ	193	EP	3		07:51	38.25		
BER	SZ	193	ES	3		07:51	59.18		
YEL	SZ	222	EP	2		07:51	41.10		
LRW	SZ	252	EP	3		07:51	45.34		
LRW	SE	252	ES	2		07:52	11.55		
LRW	SN	252				07:52	26.37	8	0.26
LRW	SE	252				07:52	26.27	10	0.22
SAN	SZ	263	EP	3		07:51	46.83		
WAL	SZ	264	EP	2		07:51	46.42		
ODD1	SZ	282	EP	3		07:51	47.67		
ODD1	SZ	282	ES	3		07:52	16.81		
KMY	SZ	293	EP	3		07:51	50.13		
KMY	SZ	293	ES	3		07:52	19.64		

August 1 1999 Time: 00:54 57.2 UTC
Lat: 49.169N Lon: 1.828W
Grid Ref: 412.55 kmE -81.18 kmN
Locality: JERSEY, CHANNEL ISLANDS
Comments: 14KM SE OF JERSEY

Magnitude: 0.8 ML
Depth: 12.0 km
RMS: 0.01 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
JQE	SZ	16	IP		D	00:55	00.69		
JQE	SZ	16	ES	3		00:55	03.18		
JRS	SZ	19	IP		D	00:55	01.18		
JRS	SE	19	ES	2		00:55	04.15		
JRS	SN	19				00:55	04.25	66	0.07
JRS	SE	19				00:55	04.46	27	0.04
JLP	SZ	22	IP		D	00:55	01.55		
JSA	SZ	25	EP	2		00:55	01.99		
JVM	SZ	28	IP	1	D	00:55	02.45		

August 3 1999 Time: 21:24 13.1 UTC
Lat: 57.486N Lon: 5.657W
Grid Ref: 180.82 kmE 849.87 kmN
Locality: LOHCARRON, HIGHLAND
Comments: 10KM NW OF LOHCARRON

Magnitude: 0.3 ML
Depth: 7.6 km
RMS: 0.07 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
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KPL	SZ	16	IP	1	D	21:24	16.45			
KPL	SE	16	ES	2		21:24	18.85			
KPL	SN	16				21:24	19.16	11	0.11	
KPL	SE	16				21:24	19.05	22	0.07	
KAC	SZ	22	IP		C	21:24	17.30			
KSB	SZ	34	IP	1	C	21:24	19.38			
KSB	SZ	34	ES	2		21:24	23.67			

August 4 1999 Time: 21:14 37.8 UTC
Lat: 56.142N Lon: 3.680W
Grid Ref: 295.65 kmE 695.59 kmN
Locality: CLACKMANNAN, CENTRAL
Comments: C/F,FELT FOREST MILL

Magnitude: 1.1 ML
Depth: 0.3 km
RMS: 0.11 secs
Quality: B
Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
PCO	SZ	31	EP	1	C	21:14	43.79		
EAU	SZ	36	EP	2		21:14	44.87		
ELO	SZ	37	EP	2		21:14	44.85		
EDI	SZ	39	EP	2		21:14	45.19		
EDI	SE	39	ES	2		21:14	50.85		
EDI	SN	39				21:14	54.63	22	0.35
EDI	SE	39				21:14	53.13	19	0.28
EAB	SZ	41	EP	1	C	21:14	45.74		
EBL	SZ	57	EP	1	C	21:14	48.28		
PCA	SZ	61	EP	2		21:14	48.65		
PMS	SZ	74	EP	2		21:14	51.21		

August 8 1999 Time: 05:20 43.1 UTC
Lat: 56.238N Lon: 3.741W
Grid Ref: 292.12 kmE 706.44 kmN
Locality: BLACKFORD, TAYSIDE

Magnitude: 0.8 ML
Depth: 3.6 km
RMS: 0.08 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EBH	SZ	15	IP		C	05:20	45.98		
ELO	SZ	26	IP	1	D	05:20	47.90		
PCO	SZ	36	IP	1	C	05:20	49.70		
EAB	SZ	38	IP		C	05:20	49.86		
EAU	SZ	47	EP	2		05:20	51.61		
EDI	SZ	49	EP	2		05:20	52.11		
EDI	SN	49	ES	2		05:20	58.02		
EDI	SN	49				05:21	00.71	5	0.24
EDI	SE	49				05:20	59.26	8	0.30

August 13 1999 Time: 05:28 58.6 UTC
Lat: 51.689N Lon: 3.215W
Grid Ref: 316.03 kmE 199.63 kmN
Locality: BARGOED, MID GLAMORGAN

Magnitude: 2.1 ML
Depth: 7.4 km
RMS: 0.13 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
MCH	SZ	37	IP		C	05:29	05.19		
MCH	SE	37	ES	2		05:29	10.10		
MCH	SN	37				05:29	10.49	128	0.14
MCH	SE	37				05:29	10.45	141	0.23
HTR	SZ	44	IP		C	05:29	06.12		
SMD	SZ	55	EP	2		05:29	07.81		
HAE	SZ	60	IP		C	05:29	08.98		
HSA	SZ	65	IP		C	05:29	09.44		
HCG	SZ	77	EP	2		05:29	11.66		
HEX	SZ	80	EP	2		05:29	12.17		
SWN	SZ	100	EP	2		05:29	15.96		
SWN	SN	100				05:29	33.80	51	0.18
SWN	SE	100				05:29	29.89	37	0.15
HTL	SZ	118	EP	2		05:29	18.41		
HTL	SN	118				05:29	34.68	53	0.16
HTL	SE	118				05:29	33.51	65	0.21

August 15 1999 Time: 14:41 3.0 UTC
Lat: 52.972N Lon: 4.393W
Grid Ref: 239.35 kmE 344.29 kmN
Locality: LLEYN PENIN, GWYNEDD

Magnitude: -0.2 ML
Depth: 23.1 km
RMS: 0.01 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
YRE	SZ	2	IP	1	D	14:41	06.76		
YRE	SZ	2				14:41	09.55	3	0.06
YRH	SZ	22	IP	1	C	14:41	08.15		
YRH	SZ	22	ES	3		14:41	11.69		
YRH	SZ	22				14:41	11.83	7	0.10
YLL	SZ	24	EP	2		14:41	08.39		
YLL	SZ	24	ES	3		14:41	12.01		
YLL	SZ	24				14:41	12.39	5	0.08
YRC	SZ	33	EP	2		14:41	09.56		

August 20 1999 Time: 23:55 5.0 UTC
Lat: 55.089N Lon: 3.657W
Grid Ref: 294.29 kmE 578.47 kmN
Locality: DUMFRIES, D & G

Magnitude: 1.1 ML
Depth: 4.9 km
RMS: 0.09 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BWH	SZ	10	IP		D	23:55	07.25		
BWH	SZ	10	ES	3		23:55	08.45		
BNA	SZ	14	IP		D	23:55	07.90		
GCD	SZ	31	IP		C	23:55	10.65		
BBO	SZ	47	IP		D	23:55	13.58		
BBO	SN	47	ES	2		23:55	19.73		
BBO	SN	47				23:55	20.48	4	0.10
BBO	SE	47				23:55	21.47	3	0.11

BBH	SZ	47	EP	2	23:55	12.90			
BTA	SZ	66	EP	2	23:55	16.65			
BTA	SN	66			23:55	28.22	10	0.35	
BTA	SE	66			23:55	28.92	8	0.19	
LMI	SZ	99	EP	2	23:55	22.48			
LMI	SN	99	ES	2	23:55	33.99			
LMI	SN	99			23:55	36.24	7	0.20	
LMI	SE	99			23:55	36.31	10	0.24	
GIM	SZ	103	EP	2	23:55	22.59			
GIM	SN	103	ES	2	23:55	35.64			
GIM	SN	103			23:55	37.28	7	0.21	
GIM	SE	103			23:55	36.96	5	0.24	

August 25 1999 Time: 04:17 47.8 UTC
Lat: 56.160N Lon: 3.664W
Grid Ref: 296.68 kmE 697.59 kmN
Locality: DOLLAR, CENTRAL
Comments: C/F,FELT FOREST MILL
Magnitude: 1.0 ML
Depth: 0.0 km
RMS: 0.10 secs
Quality: C
Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EBH	SZ	14	EP	2		04:17	50.97		
ELO	SZ	35	EP	2		04:17	54.71		
EAU	SZ	38	EP	2		04:17	55.12		
EDI	SZ	40	EP	2		04:17	54.96		
EDI	SN	40	ES	2		04:18	01.03		
EDI	SN	40				04:18	04.88	19	0.50
EDI	SE	40				04:18	04.46	12	0.32
EAB	SZ	42	EP	2		04:17	55.82		

August 27 1999 Time: 12:00 30.3 UTC
Lat: 53.315N Lon: 4.252W
Grid Ref: 249.99 kmE 382.24 kmN
Locality: LLANBEDRGOCH, GWYNEDD
Comments: C/F,FELT FOREST MILL
Magnitude: -0.2 ML
Depth: 7.1 km
RMS: 0.09 secs
Quality: B
Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
WLF	SZ	10	EP	1	C	12:00	32.27		
WME	SZ	10	IP		C	12:00	32.37		
YLL	SZ	20	EP	1	C	12:00	33.81		
WCB	SZ	21	EP	1	C	12:00	34.18		
WCB	SE	21	ES	3		12:00	36.57		
WCB	SN	21				12:00	37.08	4	0.31
WCB	SE	21				12:00	37.23	4	0.13
YRC	SZ	23	EP	2		12:00	34.35		
WPM	SZ	24	EP	1	C	12:00	34.59		
YRE	SZ	39	EP	1	C	12:00	37.17		
YRH	SZ	59	EP	2		12:00	40.43		

August 29 1999 Time: 22:59 29.1 UTC
Lat: 55.039N Lon: 7.647W
Grid Ref: 39.33 kmE 586.15 kmN
Locality: DONEGAL, IRELAND
Comments: FELT LETTERKENNY
Magnitude: 1.3 ML
Depth: 6.1 km
RMS: 0.13 secs
Quality: C
Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GCL	SZ	97	EP	2		22:59	44.98		
GCL	SZ	97	ES	3		22:59	56.69		
GCL	SZ	97				22:59	58.61	7	0.24
GMK	SZ	135	EP	2		22:59	50.92		
GMK	SZ	135				23:00	10.14	6	0.29
GAL	SZ	189	EP	3		22:59	58.71		
GAL	SE	189	ES	3		23:00	17.27		

September 1 1999 Time: 05:00 54.6 UTC
Lat: 53.197N Lon: 4.349W
Grid Ref: 243.09 kmE 369.30 kmN
Locality: CAERNARVON, GWYNEDD
Comments: FELT CAERNARVON...
Magnitude: 3.1 ML
Depth: 16.3 km
RMS: 0.07 secs
Quality: A
Intensity: 4

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
WLF	SZ	11	IP		D	05:00	57.73		
YLL	SZ	14	IP		C	05:00	58.10		
YRC	SZ	16	IP		D	05:00	58.44		
WME	SZ	22	IP		D	05:00	59.08		
WCB	SZ	24	IP		D	05:00	59.49		
WCB	SE	24	ES	2		05:01	02.59		
YRE	SZ	25	IP		C	05:00	59.46		
WPM	SZ	31	IP		C	05:01	00.32		
YRH	SZ	45	IP	1	C	05:01	02.22		
WFB	SZ	61	IP	1	D	05:01	04.70		
SBD	SZ	80	IP	1	D	05:01	07.61		
SSP	SZ	120	IP	1	D	05:01	14.08		
SSP	SN	120				05:01	31.13	293	0.21
SSP	SE	120				05:01	30.11	348	0.16
HLM	SZ	124	IP	1	D	05:01	14.73		
LMI	SZ	133	EP	2		05:01	15.31		
LMI	SN	133				05:01	32.76	284	0.16
LMI	SE	133				05:01	32.42	327	0.21
HTR	SZ	145	IP	1	D	05:01	17.57		
MCH	SZ	162	IP	1	D	05:01	19.79		
MCH	SN	162				05:01	40.36	367	0.22
MCH	SE	162				05:01	40.67	265	0.27
CWF	SZ	211	EP	2		05:01	25.83		
CWF	SN	211				05:01	52.00	192	0.31
CWF	SE	211				05:01	53.40	88	0.16

September 1 1999 Time: 05:26 30.3 UTC
Lat: 53.195N Lon: 4.348W
Grid Ref: 243.16 kmE 369.10 kmN
Locality: CAERNARVON, GWYNEDD
Comments: FELT LLANGEFNI
Magnitude: 1.2 ML
Depth: 15.9 km
RMS: 0.07 secs
Quality: A
Intensity: 3+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
WLF	SZ	11	IP		D	05:26	33.39		
YLL	SZ	13	EP	2		05:26	33.71		
YRC	SZ	16	IP	1		05:26	34.08		
WME	SZ	23	IP		D	05:26	34.75		
WCB	SZ	24	IP		D	05:26	35.14		
WCB	SN	24	ES	2		05:26	38.28		
WCB	SN	24				05:26	38.49	81	0.08
WCB	SE	24				05:26	38.49	59	0.18
YRE	SZ	24	IP	1	C	05:26	35.11		
WPM	SZ	30	IP		C	05:26	35.95		
YRH	SZ	45	IP		C	05:26	37.88		
WFB	SZ	61	EP	2		05:26	40.40		

September 3 1999 Time: 22:57 50.5 UTC
Lat: 55.227N Lon: 3.394W
Grid Ref: 311.36 kmE 593.39 kmN
Locality: JOHNSTONEBRIDGE, D & G
Comments: FELT JOHNSTONEBRIDGE...
Magnitude: 2.1 ML
Depth: 4.2 km
RMS: 0.13 secs
Quality: C
Intensity: 3+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
ESK	SZ	16	IP		C	22:57	53.73		
ESK	SN	16	ES	2		22:57	55.75		
BWH	SZ	18	IP		C	22:57	53.99		
ECK	SZ	18	IP		C	22:57	53.99		
BCC	SZ	26	IP	1	D	22:57	55.43		
BBH	SZ	31	IP		C	22:57	56.21		
BNA	SZ	33	IP		C	22:57	56.11		
GCD	SZ	54	IP	1	C	22:57	59.35		
BBO	SZ	55	IP	1	D	22:58	00.27		
BBO	SN	55	ES	2		22:58	07.10		
BBO	SE	55				22:58	07.78	49	0.25
BDL	SZ	55	IP		D	22:58	07.45	75	0.39
BDL	SZ	55	IP		D	22:58	00.50		
BTA	SZ	58	IP	1	D	22:58	00.85		
BTA	SN	58	ES	2		22:58	07.84		
BTA	SN	58				22:58	08.52	160	0.26
BTA	SE	58				22:58	08.16	102	0.27
EBL	SZ	65	IP	1	C	22:58	02.00		
EAU	SZ	69	IP	1	D	22:58	03.11		
CKE	SZ	74	IP	1	D	22:58	03.16		
PCA	SZ	76	IP	1	D	22:58	04.00		
XSO	SZ	78	IP	1	C	22:58	03.58		

September 3 1999 Time: 23:02 26.1 UTC
Lat: 55.231N Lon: 3.400W
Grid Ref: 310.96 kmE 593.89 kmN
Locality: JOHNSTONEBRIDGE, D & G
Comments: FELT JOHNSTONEBRIDGE
Magnitude: 1.3 ML
Depth: 4.5 km
RMS: 0.15 secs
Quality: C
Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
ESK	SZ	16	IP	1	C	23:02	29.38		
ESK	SN	16	ES	2		23:02	31.42		
ESK	SN	16				23:02	31.81	88	0.09
ESK	SE	16				23:02	31.98	75	0.11
BWH	SZ	17	IP	1	C	23:02	29.65		
ECK	SZ	18	IP		C	23:02	29.65		
BBH	SZ	32	IP	1	C	23:02	31.87		
BNA	SZ	33	IP	1	C	23:02	31.77		
GCD	SZ	54	EP	2		23:02	35.03		
BBO	SZ	56	IP	1	D	23:02	35.94		
BBO	SE	56	ES	2		23:02	42.67		
BBO	SN	56				23:02	43.43	11	0.24
BBO	SE	56				23:02	43.10	15	0.35
BDL	SZ	56	IP	1	D	23:02	36.15		
BTA	SZ	58	IP	1	D	23:02	36.53		
BTA	SN	58	ES	2		23:02	43.50		
BTA	SN	58				23:02	44.17	38	0.24
BTA	SE	58				23:02	43.82	23	0.30

September 4 1999 Time: 20:09 38.2 UTC
Lat: 55.695N Lon: 5.870W
Grid Ref: 156.86 kmE 651.38 kmN
Locality: SOUND OF JURA
Magnitude: 1.7 ML
Depth: 8.4 km
RMS: 0.07 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	43	IP		D	20:09	45.60		
GCL	SZ	71	IP	1	D	20:09	49.93		
PMS	SZ	73	IP	1	D	20:09	50.20		
PGB	SZ	88	IP	1	D	20:09	52.83		
PGB	SE	88	ES	2		20:10	02.86		
PGB	SN	88				20:10	04.20	22	0.18
PGB	SE	88				20:10	03.70	17	0.17
PCA	SZ	102	EP	2		20:09	54.54		
GAL	SZ	118	EP	2		20:09	58.01		
GAL	SE	118	ES	2		20:10	10.90		
GAL	SN	118				20:10	12.04	12	0.15
GAL	SE	118				20:10	12.04	16	0.15

PHASE DATA : 1999

TABLE 5 (cont'd)

September 7 1999 Time: 12:01 56.7 UTC
Lat: 52.931N Lon: 2.274W
Grid Ref: 381.58 kmE 337.19 kmN
Locality: NEWCASTLE-U-LYME, STAFFS
Comments: FELT KEELE
Magnitude: 2.6 ML
Depth: 3.1 km
RMS: 0.11 secs
Quality: B
Intensity: 3+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KLE	SZ	8	IP	9		12:02	00.00		
KLE	SZ	8	ES	4		12:02	01.14		
KLE3	SZ	19	IP	9		12:02	00.00		
KLE3	SZ	19	ES	4		12:02	02.61		
KWE	SZ	31	IP		C	12:02	02.26		
HLM	SZ	62	EP	2		12:02	07.38		
KBI	SZ	62	IP	1	C	12:02	07.39		
SBD	SZ	66	EP	2		12:02	07.99		
CWF	SZ	69	EP	2		12:02	08.74		
CWF	SN	69	ES	2		12:02	16.82		
CWF	SN	69				12:02	17.29	247	0.24
CWF	SE	69				12:02	17.27	213	0.25
SSP	SZ	81	EP	2		12:02	10.54		
SSP	SN	81	ES	2		12:02	20.26		
SSP	SN	81				12:02	22.48	106	0.26
SSP	SE	81				12:02	24.27	141	0.40
MCH	SZ	115	EP	2		12:02	16.48		
MCH	SN	115				12:02	33.16	198	0.21
MCH	SE	115				12:02	34.64	149	0.25

September 8 1999 Time: 05:41 34.7 UTC
Lat: 55.741N Lon: 6.412W
Grid Ref: 123.12 kmE 658.57 kmN
Locality: ISLAY, STRATHCLYDE
Magnitude: 2.0 ML
Depth: 9.1 km
RMS: 0.20 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	68	EP	2		05:41	46.15		
GCL	SZ	76	EP	2		05:41	47.19		
PMS	SZ	105	EP	2		05:41	51.94		
PGB	SZ	121	EP	2		05:41	54.44		
PGB	SN	121	ES	2		05:42	08.48		
PGB	SN	121				05:42	13.10	39	0.20
PGB	SE	121				05:42	11.68	39	0.20
PCA	SZ	136	EP	2		05:41	56.02		
KAR	SZ	136	EP	3		05:41	56.84		
EAB	SZ	139	EP	2		05:41	56.16		
GAL	SZ	145	EP	2		05:41	58.14		
GAL	SE	145	ES	2		05:42	14.76		
GAL	SN	145				05:42	17.62	26	0.22
GAL	SE	145				05:42	17.86	27	0.31
KNR	SZ	150	EP	2		05:41	58.22		
KPL	SZ	184	EP	3		05:42	02.61		
KPL	SN	184				05:42	28.99	8	0.21
KPL	SE	184				05:42	29.26	11	0.18
EDI	SZ	203	EP	3		05:42	07.91		
EDI	SN	203				05:42	34.25	13	0.32
EDI	SE	203				05:42	34.06	10	0.55

September 11 1999 Time: 01:07 9.4 UTC
Lat: 54.547N Lon: 3.908W
Grid Ref: 276.60 kmE 518.57 kmN
Locality: IRISH SEA
Comments: 20KM WEST OF WHITEHAVEN
Magnitude: 1.6 ML
Depth: 6.8 km
RMS: 0.09 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
XDE	SZ	28	EP	1	C	01:07	14.43		
GCD	SZ	35	IP	1	D	01:07	15.82		
CSF	SZ	45	EP	2		01:07	17.12		
GIM	SZ	46	EP	2		01:07	17.38		
CDU	SZ	52	EP	2		01:07	18.24		
CKE	SZ	52	EP	2		01:07	18.28		
LMI	SZ	53	IP	1	D	01:07	18.67		
LMI	SN	53	ES	2		01:07	25.39		
LMI	SN	53				01:07	25.76	26	0.20
LMI	SE	53				01:07	25.47	30	0.21
GAL	SZ	63	EP	2		01:07	20.37		
GAL	SN	63	ES	2		01:07	27.60		
GAL	SN	63				01:07	28.35	37	0.16
GAL	SE	63				01:07	28.40	24	0.09

September 13 1999 Time: 04:21 8.9 UTC
Lat: 56.762N Lon: 5.038W
Grid Ref: 214.34 kmE 767.50 kmN
Locality: FORT WILLIAM, HIGHLAND
Comments: 7KM SE OF FORT WILLIAM
Magnitude: 1.4 ML
Depth: 4.1 km
RMS: 0.05 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KNR	SZ	8	IP	1	C	04:21	10.74		
KAR	SZ	51	EP	2		04:21	17.98		
KSB	SZ	55	EP	2		04:21	18.49		
KPL	SZ	74	EP	2		04:21	21.73		
KPL	SE	74	ES	2		04:21	30.38		
KPL	SN	74				04:21	33.91	4	0.13
KPL	SE	74				04:21	31.28	8	0.15
EAB	SZ	77	EP	2		04:21	21.95		
KAC	SZ	84	EP	1	C	04:21	23.47		
MDO	SZ	86	EP	3		04:21	23.38		
ELO	SZ	88	EP	2		04:21	23.61		

MCD	SZ	141	EP	4		04:21	32.57		
MCD	SN	141				04:21	51.15	11	0.20
MCD	SE	141				04:21	50.91	14	0.11

September 13 1999 Time: 13:47 38.7 UTC
Lat: 57.763N Lon: 5.032W
Grid Ref: 219.64 kmE 878.84 kmN
Locality: ULLAPOOL, HIGHLAND
Comments: 14KM SSE OF ULLAPOOL
Magnitude: 0.9 ML
Depth: 7.7 km
RMS: 0.08 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAC	SZ	34	IP		D	13:47	44.80		
REB	SZ	42	IP		C	13:47	46.15		
RRR	SZ	47	EP	2		13:47	47.01		
RRR	SE	47	ES	2		13:47	52.63		
RRR	SN	47				13:47	52.96	15	0.11
RRR	SE	47				13:47	52.94	5	0.14
MDO	SZ	54	IP	1	C	13:47	47.88		
MVH	SZ	54	EP	2		13:47	47.86		
KPL	SZ	60	IP	1	C	13:47	49.11		
KPL	SE	60	ES	2		13:47	56.11		
KPL	SN	60				13:47	59.01	4	0.21
KPL	SE	60				13:47	59.07	3	0.22
RTO	SZ	98	EP	2		13:47	54.73		

September 15 1999 Time: 03:44 29.3 UTC
Lat: 55.836N Lon: 5.840W
Grid Ref: 159.61 kmE 667.01 kmN
Locality: SOUND OF JURA
Magnitude: 1.5 ML
Depth: 10.5 km
RMS: 0.24 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	57	EP	3		03:44	38.74		
PMS	SZ	69	EP	1	C	03:44	40.63		
PGB	SZ	85	EP	2		03:44	43.04		
PGB	SN	85	ES	2		03:44	53.88		
PGB	SN	85				03:44	56.13	13	0.14
PGB	SE	85				03:44	56.23	15	0.28
GCL	SZ	86	EP	3		03:44	43.85		
PCA	SZ	101	EP	1	C	03:44	46.03		
PCO	SZ	110	EP	2		03:44	47.07		

September 23 1999 Time: 19:22 5.4 UTC
Lat: 57.242N Lon: 3.859W
Grid Ref: 287.84 kmE 818.30 kmN
Locality: AVIEMORE, HIGHLAND
Comments: FELT CARRBRIDGE
Magnitude: 1.2 ML
Depth: 7.7 km
RMS: 0.12 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
MDO	SZ	38	IP		C	19:22	12.00		
MCD	SZ	53	IP	1	D	19:22	14.44		
MCD	SN	53	ES	2		19:22	20.84		
MCD	SN	53				19:22	21.83	9	0.29
MCD	SE	53				19:22	21.43	11	0.22
MME	SZ	55	EP	2		19:22	14.42		
KNR	SZ	82	EP	2		19:22	18.90		
EDR	SZ	88	EP	2		19:22	19.96		
KAC	SZ	91	EP	2		19:22	20.56		
KSB	SZ	95	EP	2		19:22	21.01		
KPL	SZ	109	EP	2		19:22	23.41		
KPL	SN	109	ES	2		19:22	35.56		
KPL	SN	109				19:22	37.79	7	0.31
KPL	SE	109				19:22	37.41	7	0.11

September 25 1999 Time: 20:06 19.6 UTC
Lat: 50.219N Lon: 4.853W
Grid Ref: 196.50 kmE 39.39 kmN
Locality: VERYAN BAY, CORNWALL
Magnitude: 0.1 ML
Depth: 6.4 km
RMS: 0.02 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CSA	SZ	15	IP	1	D	20:06	22.46		
CBW	SZ	20	EP	1	D	20:06	23.33		
CST	SZ	22	EP	2		20:06	23.63		
CR2	SZ	23	EP	2		20:06	23.77		
CR2	SN	23	ES	2		20:06	27.02		
CR2	SN	23				20:06	27.51	5	0.06
CR2	SE	23				20:06	27.42	7	0.07
CCA	SZ	27	EP	2		20:06	24.48		
CGH	SZ	29	EP	2		20:06	24.77		
CGW	SZ	30	IP	1	C	20:06	24.81		

September 26 1999 Time: 00:27 10.5 UTC
Lat: 54.149N Lon: 1.379W
Grid Ref: 440.58 kmE 472.81 kmN
Locality: RIPON, NORTH YORKSHIRE
Comments: 10KM EAST OF RIPON
Magnitude: 1.4 ML
Depth: 10.1 km
RMS: 0.09 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HPK	SZ	27	IP		C	00:27	15.38		
HPK	SN	27	ES	2		00:27	19.29		
HPK	SN	27				00:27	19.69	124	0.17
HPK	SE	27				00:27	19.55	138	0.19
LRN	SZ	41	IP	1	D	00:27	17.61		
LCP	SZ	66	EP	2		00:27	21.62		
LHO	SZ	74	IP		D	00:27	22.93		
LMI	SN	126	ES	2		00:27	46.80		

PHASE DATA : 1999

TABLE 5 (cont'd)

LMI SN 126 00:27 47.22 5 0.31
LMI SE 126 00:27 48.00 5 0.26

September 26 1999 Time: 04:05 42.1 UTC
Lat: 56.138N Lon: 4.469W
Grid Ref: 246.58 kmE 696.60 kmN
Locality: ABERFOYLE, CENTRAL
Comments: 5KM SW OF ABERFOYLE
Magnitude: 0.5 ML
Depth: 4.9 km
RMS: 0.02 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
PCO	SZ	28	IP			04:05	47.40		
PGB	SZ	36	EP	2		04:05	48.70		
PGB	SN	36	ES	2		04:05	53.59		
PGB	SN	36				04:05	53.79	6	0.16
PGB	SE	36				04:05	53.63	6	0.18
PMS	SZ	37	EP	2		04:05	48.82		
PCA	SZ	51	EP	2		04:05	50.95		

September 29 1999 Time: 12:11 25.2 UTC
Lat: 60.734N Lon: 13.203W
Grid Ref: -208.89 kmE 1257.71 kmN
Locality: LOUSY BANK, N ATLANTIC
Comments: 370KM WSW OF FAROES
Magnitude: 3.0 ML
Depth: 29.9 km
RMS: 0.30 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
FTO	SZ	370	EP	2		12:12	14.91		
FTO	SE	370	ES	3		12:12	51.05		
FTO	SN	370				12:12	56.42	13	0.26
FTO	SE	370				12:12	59.02	11	0.26
FAG	SZ	393	EP	2		12:12	17.76		
SNB	SZ	438	EP	3		12:12	24.03		
SNB	SZ	438	ES	3		12:13	05.43		
RFO	SZ	450	EP	2		12:12	24.94		
RRH	SZ	486	EP	2		12:12	29.36		
RSC	SZ	527	EP	3		12:12	34.43		
RRR	SZ	529	EP	2		12:12	35.10		
RRR	SN	529				12:13	27.91	6	0.27
RRR	SE	529				12:13	29.05	8	0.28
REB	SZ	536	EP	3		12:12	35.79		
OTO	SZ	557	EP	2		12:12	38.45		
ORE	SZ	586	EP	2		12:12	41.98		
ORE	SN	586				12:13	39.29	6	0.29
ORE	SE	586				12:13	37.89	5	0.25
OHO	SZ	598	EP	2		12:12	43.02		
LRW	SZ	666	EP	2		12:12	52.45		
LRW	SN	666				12:14	00.88	3	0.23
LRW	SE	666				12:13	57.47	4	0.18

October 2 1999 Time: 03:50 46.3 UTC
Lat: 52.933N Lon: 2.279W
Grid Ref: 381.24 kmE 337.42 kmN
Locality: NEWCASTLE-U-LYME, STAFFS
Comments: FELT KEELE...
Magnitude: 2.4 ML
Depth: 3.9 km
RMS: 0.11 secs
Quality: C
Intensity: 3+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KLE	SZ	8	IP			03:50	45.00		
KLE	SZ	8	ES	4		03:50	46.14		
KLE3	SZ	18	IP	9		03:50	46.00		
KLE3	SZ	18	ES	4		03:50	48.61		
KWE	SZ	31	IP		C	03:50	51.98		
HLM	SZ	62	EP	2		03:50	56.88		
KBI	SZ	62	IP		C	03:50	57.04		
SBD	SZ	66	IP	1	C	03:50	57.59		
CWF	SZ	69	EP	2		03:50	58.28		
CWF	SE	69	ES	2		03:51	06.42		
CWF	SN	69				03:51	07.00	222	0.23
CWF	SE	69				03:51	07.02	166	0.18
SSP	SZ	80	EP	1	C	03:51	00.13		
SSP	SN	80	ES	2		03:51	10.04		
SSP	SN	80				03:51	11.35	66	0.15
SSP	SE	80				03:51	13.46	80	0.23
KEY	SZ	81	EP	2		03:51	00.74		
MCH	SZ	115	EP	2		03:51	05.86		
MCH	SN	115				03:51	23.85	101	0.29
MCH	SE	115				03:51	21.49	82	0.25

October 12 1999 Time: 07:17 27.3 UTC
Lat: 49.520N Lon: 7.183W
Grid Ref: 24.94 kmE -29.33 kmN
Locality: SW OF SCILLY ISLES
Comments: 70KM SW OF SCILLY ISLES
Magnitude: 2.7 ML
Depth: 15.0 km
RMS: 0.08 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CPZ	SZ	135	EP	2		07:17	48.52		
CGW	SZ	155	EP	2		07:17	51.35		
CGH	SZ	157	EP	2		07:17	51.68		
CCO	SZ	159	EP	2		07:17	51.70		
CCA	SZ	159	EP	2		07:17	51.72		
CR2	SZ	162	EP	2		07:17	52.77		
CR2	SN	162	ES	2		07:18	10.30		
CR2	SN	162				07:18	12.43	90	0.12
CR2	SE	162				07:18	13.20	88	0.08
CBW	SZ	165	EP	3		07:17	52.43		

October 21 1999 Time: 02:35 43.1 UTC
Lat: 54.764N Lon: 3.306W
Grid Ref: 315.96 kmE 541.76 kmN
Locality: ASPATRIA, CUMBRIA
Magnitude: 0.2 ML
Depth: 12.9 km
RMS: 0.04 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
BBO	SZ	5	IP	1	D	02:35	45.70		
BBO	SN	5	ES	2		02:35	47.38		
BBO	SN	5				02:35	47.51	27	0.17
BBO	SE	5				02:35	47.45	24	0.17
CKE	SZ	24	EP	2		02:35	47.83		
XDE	SZ	31	EP	2		02:35	49.07		
CSF	SZ	35	IP	1	D	02:35	49.69		
GCD	SZ	42	EP	2		02:35	50.76		
CDU	SZ	48	EP	2		02:35	51.72		

October 22 1999 Time: 02:35 16.5 UTC
Lat: 49.209N Lon: 1.953W
Grid Ref: 403.43 kmE -76.79 kmN
Locality: JERSEY, CHANNEL ISLANDS
Magnitude: 1.1 ML
Depth: 9.4 km
RMS: 0.05 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
JQE	SZ	6	IP		D	02:35	18.57		
JRS	SZ	10	IP		D	02:35	18.99		
JRS	SN	10	ES	2		02:35	21.02		
JRS	SZ	10				02:35	21.23	157	0.08
JLP	SZ	12	IP		D	02:35	19.30		
JLP	SZ	12	ES	2		02:35	21.24		
JVM	SZ	19	IP		D	02:35	20.18		
JVM	SZ	19	ES	2		02:35	22.99		

October 25 1999 Time: 19:15 20.7 UTC
Lat: 51.965N Lon: 3.570W
Grid Ref: 292.16 kmE 230.84 kmN
Locality: SENNYBRIDGE, POWYS
Comments: FELT BRECON...
Magnitude: 3.6 ML
Depth: 14.1 km
RMS: 0.08 secs
Quality: B
Intensity: 5

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HTR	SZ	24	IP		C	19:15	25.54		
HBL2	AZ	38	IP		C	19:15	27.50		
HBL2	AN	38	ES	2		19:15	32.29		
HBL2	AN	38				19:15	32.80	14562	0.23
HBL2	AE	38				19:15	32.58	15721	0.28
HCG	SZ	40	IP		C	19:15	27.92		
HSA	SZ	47	IP		C	19:15	28.91		
SSP	SZ	59	IP	4	C	19:15	30.56		
HGH	SZ	64	IP		D	19:15	31.68		
HAE	SZ	71	IP		C	19:15	32.32		
HLM	SZ	78	IP	4	C	19:15	32.99		
HPE	SZ	83	IP	1	C	19:15	34.01		
WFB	SZ	86	IP	4	D	19:15	34.78		
HEX	SZ	101	IP	1	C	19:15	37.76		
HTL	SZ	125	IP	1	C	19:15	41.02		
YRE	SZ	127	IP	4	D	19:15	40.97		
YLL	SZ	137	IP	4	D	19:15	41.78		
WPM	SZ	146	IP	4	D	19:15	43.16		
WCB	SZ	171	EP	2		19:15	46.42		
WCB	SN	171				19:16	07.51	217	0.22
WCB	SE	171				19:16	07.24	236	0.13
CR2	SZ	229	EP	4		19:15	53.04		
CR2	SN	229				19:16	18.12	161	0.14
CR2	SE	229				19:16	23.85	126	0.10
CCA	SZ	229	IP	4	C	19:15	53.13		
LMI	SZ	252	EP	2		19:15	56.13		
LMI	SN	252				19:16	34.25	248	0.37
LMI	SE	252				19:16	33.63	434	0.34
GIM	SZ	266	EP	2		19:15	57.95		
GIM	SN	266				19:16	37.30	261	0.31
GIM	SE	266				19:16	38.92	244	0.24

October 26 1999 Time: 21:10 55.6 UTC
Lat: 56.351N Lon: 6.332W
Grid Ref: 132.43 kmE 726.01 kmN
Locality: ROSS OF MULL, S'CLYDE
Magnitude: 0.8 ML
Depth: 9.7 km
RMS: 0.02 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAR	SZ	70	EP	1	D	21:11	07.40		
KSB	SZ	111	EP	2		21:11	13.67		
KPL	SZ	118	EP	2		21:11	14.67		
KPL	SE	118	ES	3		21:11	28.54		
KPL	SN	118				21:11	31.70	2	0.27
KPL	SE	118				21:11	30.28	2	0.13
KAC	SZ	143	EP	3		21:11	18.12		

November 4 1999 Time: 01:07 0.4 UTC
Lat: 54.438N Lon: 2.986W
Grid Ref: 336.08 kmE 505.20 kmN
Locality: AMBLESIDE, CUMBRIA
Magnitude: 0.4 ML
Depth: 12.6 km
RMS: 0.06 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CSF	SZ	17	IP		C	01:07	04.19		
CKE	SZ	18	EP	1	D	01:07	04.41		
CDU	SZ	18	IP		C	01:07	04.26		
LMI	SZ	32	IP		C	01:07	06.40		
LMI	SE	32	ES	2		01:07	10.63		
LMI	SN	32				01:07	11.40	6	0.18

PHASE DATA : 1999

TABLE 5 (cont'd)

LMI	SE	32			01:07	11.76	6	0.14
XDE	SZ	34	EP	2	01:07	06.78		
BBO	SZ	37	EP	2	01:07	07.20		
BBO	SE	37	ES	2	01:07	11.94		
BBO	SN	37			01:07	12.34	3	0.16
BBO	SE	37			01:07	12.02	5	0.22

November 6 1999 Time: 04:53 58.3 UTC
Lat: 50.249N **Lon: 4.024W**
Grid Ref: 255.68 kmE 40.81 kmN
Locality: ENGLISH CHANNEL
Magnitude: 1.2 ML
Depth: 8.4 km
RMS: 0.08 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
DCO	SZ	13	IP		C	04:54	01.18		
DYA	SZ	22	IP		C	04:54	02.58		
DYA	SE	22	ES	1		04:54	05.49		
DYA	SN	22				04:54	05.86	50	0.11
DYA	SE	22				04:54	05.58	84	0.12
CR2	SZ	82	EP	3		04:54	11.69		
CR2	SE	82	ES	3		04:54	19.81		
CR2	SN	82				04:54	23.43	8	0.06
CR2	SE	82				04:54	23.86	11	0.05
CST	SZ	82	EP	3		04:54	11.73		
CCO	SZ	85	EP	3		04:54	12.19		

November 8 1999 Time: 12:24 32.9 UTC
Lat: 50.226N **Lon: 5.255W**
Grid Ref: 167.89 kmE 41.32 kmN
Locality: REDRUTH, CORNWALL
Comments: COLLAPSE TYPE EVENT
Magnitude: 0.2 ML
Depth: 0.3 km
RMS: 0.03 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CCA	SZ	5	IP		D	12:24	33.74		
CCA	SZ	5	ES	2		12:24	34.42		
CST	SZ	7	IP		D	12:24	34.24		
CST	SZ	7	ES	2		12:24	35.23		
CR2	SZ	9	IP		D	12:24	34.50		
CR2	SZ	9	ES	2		12:24	35.70		
CR2	SN	9				12:24	35.76	15	0.11
CR2	SE	9				12:24	35.77	27	0.05
CCO	SZ	11	IP		D	12:24	34.79		
CBW	SZ	13	IP		D	12:24	35.25		
CGW	SZ	14	IP		D	12:24	35.44		

November 9 1999 Time: 06:55 59.0 UTC
Lat: 57.191N **Lon: 5.739W**
Grid Ref: 174.14 kmE 817.29 kmN
Locality: ISLE OF SKYE, HIGHLAND
Magnitude: 0.0 ML
Depth: 11.9 km
RMS: 0.12 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KPL	SZ	17	IP	1	D	06:56	02.89		
KPL	SN	17	ES	2		06:56	05.11		
KPL	SN	17				06:56	05.30	7	0.12
KPL	SE	17				06:56	05.26	9	0.11
KSB	SZ	19	IP		C	06:56	03.03		
KAR	SZ	31	EP	2		06:56	04.71		

November 10 1999 Time: 02:48 28.3 UTC
Lat: 57.263N **Lon: 5.654W**
Grid Ref: 179.66 kmE 825.06 kmN
Locality: LOCH ALSH, HIGHLAND
Magnitude: 0.8 ML
Depth: 6.3 km
RMS: 0.18 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KPL	SZ	9	IP		D	02:48	30.64		
KPL	SN	9	ES	1		02:48	31.62		
KPL	SN	9				02:48	31.72	62	0.08
KPL	SE	9				02:48	31.78	78	0.08
KSB	SZ	15	IP		C	02:48	31.44		
KAC	SZ	34	EP	2		02:48	34.05		

November 12 1999 Time: 09:55 12.9 UTC
Lat: 50.225N **Lon: 5.250W**
Grid Ref: 168.20 kmE 41.25 kmN
Locality: REDRUTH, CORNWALL
Comments: FELT REDRUTH
Magnitude: 0.6 ML
Depth: 0.2 km
RMS: 0.04 secs
Quality: D

Intensity: 3+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CCA	SZ	5	IP		D	09:55	13.72		
CST	SZ	7	IP	1	D	09:55	14.22		
CR2	SZ	9	IP		D	09:55	14.48		
CR2	SN	9	ES	2		09:55	15.67		
CR2	SN	9				09:55	15.74	38	0.11
CR2	SE	9				09:55	15.75	73	0.06
CCO	SZ	11	IP		D	09:55	14.78		
CBW	SZ	13	IP		D	09:55	15.22		
CGW	SZ	14	IP		D	09:55	15.43		
CGH	SZ	20	IP	1	D	09:55	16.57		

November 12 1999 Time: 13:27 43.6 UTC
Lat: 51.965N **Lon: 3.566W**
Grid Ref: 292.43 kmE 230.76 kmN
Locality: SENNYBRIDGE, POWYS
Magnitude: 1.9 ML
Depth: 15.9 km
RMS: 0.10 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
HTR	SZ	24	IP		C	13:27	48.49		
MCH	SZ	39	IP		C	13:27	50.55		

MCH	SN	39	ES	2		13:27	55.65		
MCH	SN	39				13:27	55.78	106	0.19
MCH	SE	39				13:27	55.71	125	0.12
HCG	SZ	40	IP		D	13:27	50.94		
HSA	SZ	47	IP		C	13:27	51.83		
SSP	SZ	59	IP		C	13:27	53.53		
SSP	SN	59	ES	2		13:28	00.81		
SSP	SN	59				13:28	01.28	48	0.16
SSP	SE	59				13:28	01.17	69	0.21
HGH	SZ	64	IP	1	D	13:27	54.63		
HAE	SZ	71	EP	2		13:27	55.31		

November 13 1999 Time: 20:05 16.2 UTC
Lat: 54.312N **Lon: 3.237W**
Grid Ref: 319.55 kmE 491.47 kmN
Locality: BROUGHTON FURNACE, CUM
Magnitude: -0.1 ML
Depth: 12.5 km
RMS: 0.03 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CDU	SZ	4	IP		C	20:05	18.68		
CDU	SZ	4	ES	3		20:05	20.26		
LMI	SZ	11	IP		C	20:05	19.27		
LMI	SE	11	ES	2		20:05	21.47		
LMI	SN	11				20:05	21.53	9	0.18
LMI	SE	11				20:05	21.52	9	0.16
CSF	SZ	15	IP		D	20:05	19.76		
XDE	SZ	27	IP	1	D	20:05	21.54		

November 13 1999 Time: 20:39 53.7 UTC
Lat: 56.241N **Lon: 3.743W**
Grid Ref: 291.98 kmE 706.72 kmN
Locality: BLACKFORD, TAYSIDE
Magnitude: 0.7 ML
Depth: 3.9 km
RMS: 0.03 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EBH	SZ	15	IP		C	20:39	56.61		
EBH	SZ	15	ES	3		20:39	58.67		
EBH	SZ	15				20:39	58.74	35	0.09
ELO	SZ	26	EP	2		20:39	58.51		
PCO	SZ	36	IP	1	C	20:40	00.23		
EAB	SZ	37	IP		C	20:40	00.43		
EAB	SZ	37				20:40	00.46	7	0.09
EDU	SZ	57	EP	2		20:40	03.51		
EDU	SZ	57				20:40	10.82	6	0.16

November 14 1999 Time: 18:06 4.0 UTC
Lat: 57.155N **Lon: 5.790W**
Grid Ref: 170.80 kmE 813.53 kmN
Locality: ISLE OF SKYE, HIGHLAND
Magnitude: 0.1 ML
Depth: 7.6 km
RMS: 0.04 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KPL	SZ	22	IP		D	18:06	08.22		
KPL	SN	22	ES	2		18:06	10.91		
KPL	SN	22				18:06	11.14	10	0.10
KPL	SE	22				18:06	12.41	5	0.14
KSB	SZ	23	IP		C	18:06	08.37		
KAR	SZ	27	IP		D	18:06	08.89		
KAC	SZ	48	EP	2		18:06	12.38		

November 14 1999 Time: 20:36 40.2 UTC
Lat: 57.155N **Lon: 5.783W**
Grid Ref: 171.24 kmE 813.42 kmN
Locality: ISLE OF SKYE, HIGHLAND
Magnitude: 0.3 ML
Depth: 5.6 km
RMS: 0.07 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KPL	SZ	22	IP			20:36	44.46		
KPL	SE	22	ES	3		20:36	47.21		
KSB	SZ	23	IP			20:36	44.62		
KSB	SZ	23	ES	2		20:36	47.33		
KSB	SZ	23				20:36	47.70	13	0.11
KAR	SZ	26	IP		D	20:36	45.16		
KAR	SZ	26				20:36	48.90	4	0.26
KAC	SZ	48	EP	2		20:36	48.60		
KAC	SZ	48				20:36	54.49	4	0.15

November 22 1999 Time: 01:02 25.7 UTC
Lat: 55.919N **Lon: 5.890W**
Grid Ref: 157.00 kmE 676.40 kmN
Locality: JURA, STRATHCLYDE
Comments: FELT ORMSARY
Magnitude: 2.7 ML
Depth: 7.9 km
RMS: 0.08 secs
Quality: D

Intensity: 2+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
PMS	SZ	72	IP		C	01:02	37.61		
PGB	SZ	89	IP		C	01:02	40.38		
PGB	SN	89	ES	2		01:02	50.95		
POB	SZ	92	IP	1	C	01:02	40.91		
EAB	SZ	101	IP	1	C	01:02	42.20		
PCA	SZ	105	EP	1	C	01:02	42.86		
KAR	SZ	111	EP	2		01:02	43.74		
PCO	SZ	112	EP	1	C	01:02	43.83		
KNR	SZ	115	EP	2		01:02	44.66		
KPL	SZ	159	EP	4		01:02	50.46		
KPL	SN	159				01:03	12.95	49	0.13
KPL	SE	159				01:03	14.16	51	0.13
EDI	SZ	169	EP	4		01:02	52.62		
EDI	SN	169				01:03	14.19	119	0.50
EDI	SE	169				01:03	16.36	123	0.36

PHASE DATA : 1999

TABLE 5 (cont'd)

November 22 1999 Time: 18:07 39.3 UTC
Lat: 55.862N Lon: 5.920W
Grid Ref: 154.76 kmE 670.18 kmN
Locality: JURA, STRATHCLYDE
Magnitude: 1.8 ML
Depth: 12.3 km
RMS: 0.19 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	61	EP	2		18:07	49.64		
PMS	SZ	74	EP	2		18:07	51.57		
PGB	SZ	90	EP	2		18:07	54.57		
PGB	SN	90	ES	2		18:08	04.97		
PGB	SN	90				18:08	09.31	36	0.23
PGB	SE	90				18:08	07.23	24	0.28
EAB	SZ	105	EP	2		18:07	56.20		
PCA	SZ	106	EP	2		18:07	56.90		
PCO	SZ	115	EP	2		18:07	58.12		
KAR	SZ	118	EP	3		18:07	58.58		
GAL	SZ	135	EP	2		18:08	01.68		
GAL	SN	135				18:08	19.36	10	0.15
GAL	SE	135				18:08	19.92	12	0.19

November 25 1999 Time: 00:29 5.2 UTC
Lat: 55.706N Lon: 2.463W
Grid Ref: 370.90 kmE 645.93 kmN
Locality: GREENLAW, BORDERS
Magnitude: 1.9 ML
Depth: 13.8 km
RMS: 0.09 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
ESY	SZ	25	IP	1	D	00:29	10.08		
XSO	SZ	27	IP		D	00:29	10.41		
EBL	SZ	37	IP		C	00:29	11.90		
EDI	SZ	52	IP	1	C	00:29	14.18		
EDI	SN	52	ES	3		00:29	20.29		
EDI	SN	52				00:29	21.17	62	0.20
EDI	SE	52				00:29	21.04	30	0.20
ESK	SZ	64	IP	1	C	00:29	15.63		
ESK	SN	64	ES	3		00:29	23.57		
ESK	SN	64				00:29	24.97	29	0.13
ESK	SE	64				00:29	25.70	21	0.09
EAU	SZ	64	IP		C	00:29	16.15		
BBH	SZ	70	IP	1	D	00:29	17.04		
ECK	SZ	72	EP	1	D	00:29	17.09		
BHH	SZ	83	EP	2		00:29	18.97		
BHH	SE	83	ES	2		00:29	28.84		
BHH	SN	83				00:29	30.66	73	0.43
BHH	SE	83				00:29	31.07	58	0.29
EBH	SZ	89	EP	2		00:29	19.94		
BTA	SZ	90	EP	2		00:29	20.34		
BTA	SN	90	ES	3		00:29	31.54		
BTA	SN	90				00:29	32.27	32	0.31
BTA	SE	90				00:29	32.29	33	0.36
XAL	SZ	95	EP	2		00:29	20.77		
BWH	SZ	96	IP	1	D	00:29	20.68		
EDU	SZ	100	IP	1	C	00:29	21.25		
BDL	SZ	105	IP	1	D	00:29	22.06		
BNA	SZ	111	EP	2		00:29	22.88		
ELO	SZ	115	EP	2		00:29	23.79		
BBO	SZ	119	EP	2		00:29	23.81		
BBO	SN	119	ES	3		00:29	38.77		
BBO	SN	119				00:29	40.33	27	0.29
BBO	SE	119				00:29	39.98	81	0.28
GCD	SZ	133	EP	3		00:29	25.83		

December 3 1999 Time: 19:27 10.2 UTC
Lat: 55.853N Lon: 5.912W
Grid Ref: 155.21 kmE 669.10 kmN
Locality: JURA, STRATHCLYDE
Magnitude: 1.8 ML
Depth: 10.8 km
RMS: 0.14 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	60	EP	2		19:27	20.35		
PMS	SZ	73	EP	2		19:27	22.25		
PGB	SZ	90	EP	2		19:27	25.26		
PGB	SE	90	ES	2		19:27	35.69		
PGB	SN	90				19:27	40.09	34	0.16
PGB	SE	90				19:27	38.47	32	0.14
PCA	SZ	105	EP	2		19:27	27.63		
PCO	SZ	114	EP	2		19:27	28.55		
GAL	SZ	134	EP	2		19:27	32.90		
GAL	SN	134				19:27	50.34	9	0.13
GAL	SE	134				19:27	49.55	14	0.23

December 3 1999 Time: 19:28 43.3 UTC
Lat: 55.866N Lon: 5.924W
Grid Ref: 154.53 kmE 670.64 kmN
Locality: JURA, STRATHCLYDE
Magnitude: 2.2 ML
Depth: 10.7 km
RMS: 0.07 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GMK	SZ	62	IP	1	C	19:28	53.65		
PMS	SZ	74	IP		C	19:28	55.56		
PGB	SZ	91	EP	2		19:28	58.35		
PGB	SN	91	ES	2		19:29	08.90		
PGB	SN	91				19:29	13.39	173	0.24
PGB	SE	91				19:29	11.20	149	0.31
PCA	SZ	106	EP	2		19:29	00.78		
PCO	SZ	115	EP	1	C	19:29	01.91		
KAR	SZ	117	EP	2		19:29	02.13		
GAL	SZ	135	EP	2		19:29	05.33		

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
GAL	SN	135				19:29	23.50	34	0.13
GAL	SE	135				19:29	23.39	47	0.24
KPL	SZ	165	EP	4		19:29	08.75		
KPL	SN	165				19:29	30.96	11	0.11
KPL	SE	165				19:29	32.11	12	0.15

December 5 1999 Time: 15:40 39.8 UTC
Lat: 50.103N Lon: 5.178W
Grid Ref: 172.80 kmE 27.47 kmN
Locality: CONSTANTINE, CORNWALL
Magnitude: 0.4 ML
Depth: 6.6 km
RMS: 0.01 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CGW	SZ	3	IP	1	C	15:40	41.05		
CCO	SZ	4	EP	1	C	15:40	41.12		
CBW	SZ	7	IP		C	15:40	41.41		
CR2	SZ	7	IP		C	15:40	41.47		
CR2	SE	7	ES	1		15:40	42.75		
CR2	SN	7				15:40	42.76	29	0.05
CR2	SE	7				15:40	42.78	44	0.05
CST	SZ	10	IP		C	15:40	41.89		

December 5 1999 Time: 19:40 52.3 UTC
Lat: 53.700N Lon: 2.128W
Grid Ref: 391.55 kmE 422.69 kmN
Locality: BURNLEY, LANCASHIRE
Comments: 9KM SW OF BURNLEY
Magnitude: 2.3 ML
Depth: 7.6 km
RMS: 0.08 secs
Quality: D

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
LHO	SZ	25	IP		D	19:40	56.95		
HPK	SZ	44	IP		C	19:40	59.90		
HPK	SN	44	ES	1		19:41	05.59		
HPK	SN	44				19:41	05.98	492	0.17
HPK	SE	44				19:41	05.99	341	0.17
KBI	SZ	64	EP	2		19:41	03.17		
KWE	SZ	79	EP	2		19:41	05.46		
LRN	SZ	83	EP	2		19:41	06.02		
CWF	SZ	120	EP	2		19:41	12.16		
CWF	SE	120	ES	3		19:41	26.05		
CWF	SN	120				19:41	28.53	24	0.15
CWF	SE	120				19:41	28.30	36	0.17

December 7 1999 Time: 02:31 41.3 UTC
Lat: 53.364N Lon: 4.439W
Grid Ref: 237.72 kmE 388.08 kmN
Locality: NORTH ANGLESEY, GWYNEDD
Magnitude: 0.4 ML
Depth: 10.5 km
RMS: 0.01 secs
Quality: B

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
WCB	SZ	7	IP		D	02:31	43.48		
WCB	SN	7	ES	2		02:31	44.95		
WCB	SN	7				02:31	44.98	36	0.06
WCB	SE	7				02:31	45.02	33	0.04
WME	SZ	10	IP		C	02:31	43.74		
YRC	SZ	16	EP	1	D	02:31	44.49		
YLL	SZ	31	IP	1	D	02:31	46.78		
WPM	SZ	38	EP	3		02:31	47.92		
YRE	SZ	43	IP	1	D	02:31	48.66		

December 8 1999 Time: 01:27 31.5 UTC
Lat: 57.504N Lon: 5.497W
Grid Ref: 190.51 kmE 851.38 kmN
Locality: TORRIDON, HIGHLAND
Comments: 5KM SOUTH OF TORRIDON
Magnitude: 0.3 ML
Depth: 6.7 km
RMS: 0.06 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KAC	SZ	12	IP		C	01:27	34.10		
KPL	SZ	21	IP	1	D	01:27	35.51		
KPL	SE	21	ES	1		01:27	38.40		
KPL	SN	21				01:27	38.70	12	0.16
KPL	SE	21				01:27	38.62	16	0.10
KSB	SZ	33	EP	2		01:27	37.71		

December 14 1999 Time: 09:43 57.5 UTC
Lat: 53.398N Lon: 2.418W
Grid Ref: 372.22 kmE 389.09 kmN
Locality: ALTRINCHAM, G MANCHESTER
Magnitude: 2.8 ML
Depth: 8.0 km
RMS: 0.12 secs
Quality: C

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
LHO	SZ	41	IP		C	09:44	04.68		
KWE	SZ	57	IP	1	D	09:44	07.29		
KBI	SZ	61	IP	1	C	09:44	07.87		
SBD	SZ	79	EP	1	C	09:44	10.35		
HPK	SZ	82	IP	1	C	09:44	10.94		
HPK	SE	82	ES	2		09:44	20.39		
WPM	SZ	100	EP	1	C	09:44	14.04		
HLM	SZ	103	IP	1	D	09:44	14.22		
CWF	SZ	105	EP	2		09:44	14.47		
CWF	SN	105	ES	2		09:44	26.56		
CWF	SN	105				09:44	29.46	241	0.06
CWF	SE	105				09:44	28.27	205	0.16
LMI	SZ	109	EP	1	D	09:44	15.14		
LMI	SN	109	ES	2		09:44	28.29		
LMI	SN	109				09:44	29.58	125	0.14
LMI	SE	109				09:44	29.53	130	0.17
CDU	SZ	116	IP	1	D	09:44	16.10		
SSP	SZ	119	IP	1	D	09:44	16.69		
SSP	SN	119	ES	2		09:44	30.86		

PHASE DATA : 1999

TABLE 5 (cont'd)

SSP	SN	119				09:44	31.69	141	0.27
SSP	SE	119				09:44	32.91	282	0.22
WCB	SZ	142	EP	2		09:44	19.50		
WCB	SN	142				09:44	38.07	105	0.20
WCB	SE	142				09:44	36.82	171	0.18

December 20 1999 Time: 09:04 26.3 UTC Magnitude: 1.3 ML
 Lat: 55.478N Lon: 2.996W Depth: 6.1 km
 Grid Ref: 337.03 kmE 620.86 kmN RMS: 0.12 secs
 Locality: SELKIRK, BORDERS Quality: B
 Comments: 12KM SW OF SELKIRK

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
ESK	SZ	22	IP		D	09:04	30.55		
ESK	SE	22	ES	2		09:04	33.49		
ESK	SN	22				09:04	34.16	58	0.11
ESK	SE	22				09:04	34.17	52	0.12
EBL	SZ	33	IP	1	D	09:04	32.44		
ECK	SZ	34	IP		D	09:04	32.55		
BBH	SZ	39	IP	1	D	09:04	33.57		
BHH	SZ	45	EP	1	D	09:04	34.34		
BHH	SN	45	ES	2		09:04	39.90		
BHH	SN	45				09:04	40.37	60	0.24
BHH	SE	45				09:04	40.81	51	0.24
XSO	SZ	47	IP		C	09:04	34.52		

December 24 1999 Time: 17:17 29.9 UTC Magnitude: 1.3 ML
 Lat: 53.066N Lon: 1.153W Depth: 1.6 km
 Grid Ref: 456.75 kmE 352.43 kmN RMS: 0.11 secs
 Locality: PAPPLEWICK, NOTTS Quality: C
 Comments: C/F, FELT PAPPLEWICK Intensity: 3+

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
KEY	SZ	22	EP	2		17:17	34.29		
KBI	SZ	33	IP	1	D	17:17	35.99		
CWF	SZ	38	IP	1	D	17:17	36.69		
CWF	SN	38	ES	2		17:17	41.42		
CWF	SN	38				17:17	42.98	28	0.17
CWF	SE	38				17:17	41.70	40	0.19
KSY	SZ	40	EP	3		17:17	37.21		
KWE	SZ	47	EP	2		17:17	38.47		
KUF	SZ	72	EP	3		17:17	42.53		

December 26 1999 Time: 19:48 35.4 UTC Magnitude: 1.1 ML
 Lat: 50.039N Lon: 5.358W Depth: 13.0 km
 Grid Ref: 159.56 kmE 20.92 kmN RMS: 0.05 secs
 Locality: MOUNT'S BAY, CORNWALL Quality: C

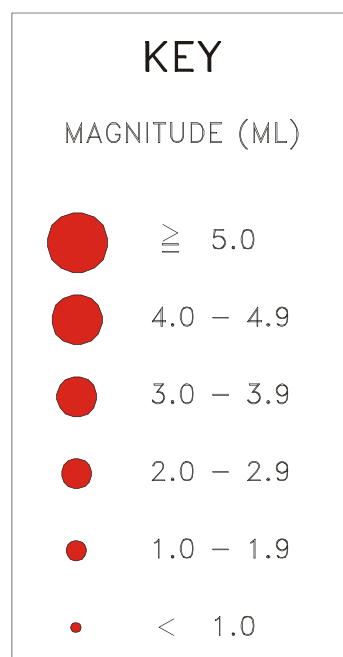
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
CGW	SZ	12	IP	1	C	19:48	38.53		
CGH	SZ	14	IP		C	19:48	38.65		
CCO	SZ	16	IP		C	19:48	38.99		
CMA	SZ	17	IP		C	19:48	39.09		
CCA	SZ	19	IP		C	19:48	39.45		
CR2	SZ	20	IP		C	19:48	39.48		
CR2	SN	20	ES	2		19:48	42.51		
CR2	SN	20				19:48	42.61	100	0.07
CR2	SE	20				19:48	42.58	69	0.04
CPZ	SZ	21	IP		D	19:48	39.61		
CBW	SZ	21	IP		C	19:48	39.61		
CST	SZ	22	IP	1	C	19:48	39.87		

TABLE 6
DEPTH/CRUSTAL VELOCITY MODELS

TABLE 6**Depth / crustal velocity models used in earthquake locations**

Structural area	Depth to top of layer (km)	P-wave velocity (km/sec)	Vp/Vs
North Sea	0.00	6.20	1.73
	12.00	6.50	
	23.00	7.10	
	31.00	8.05	
Lownet and general UK	0.00	4.00	1.73
	2.52	5.90	
	7.55	6.45	
	18.87	7.00	
	34.15	8.00	
Borders	0.00	4.10	1.71
	3.00	5.60	
	4.10	6.15	
	17.00	6.60	
	30.00	8.00	
North Wales (Lleyn)	0.00	5.40	1.68
	2.00	6.05	
	13.00	6.50	
	25.00	6.80	
	34.00	8.00	
Mid Wales	0.00	5.40	1.72
	3.80	6.05	
	15.50	6.65	
	34.30	8.00	
Cornwall	0.00	5.50	1.77
	0.30	5.76	
	15.00	6.90	
	30.00	8.00	

FIGURES 1 TO 5



KEY TO EPICENTRE MAPS, FIGURES 3 TO 5

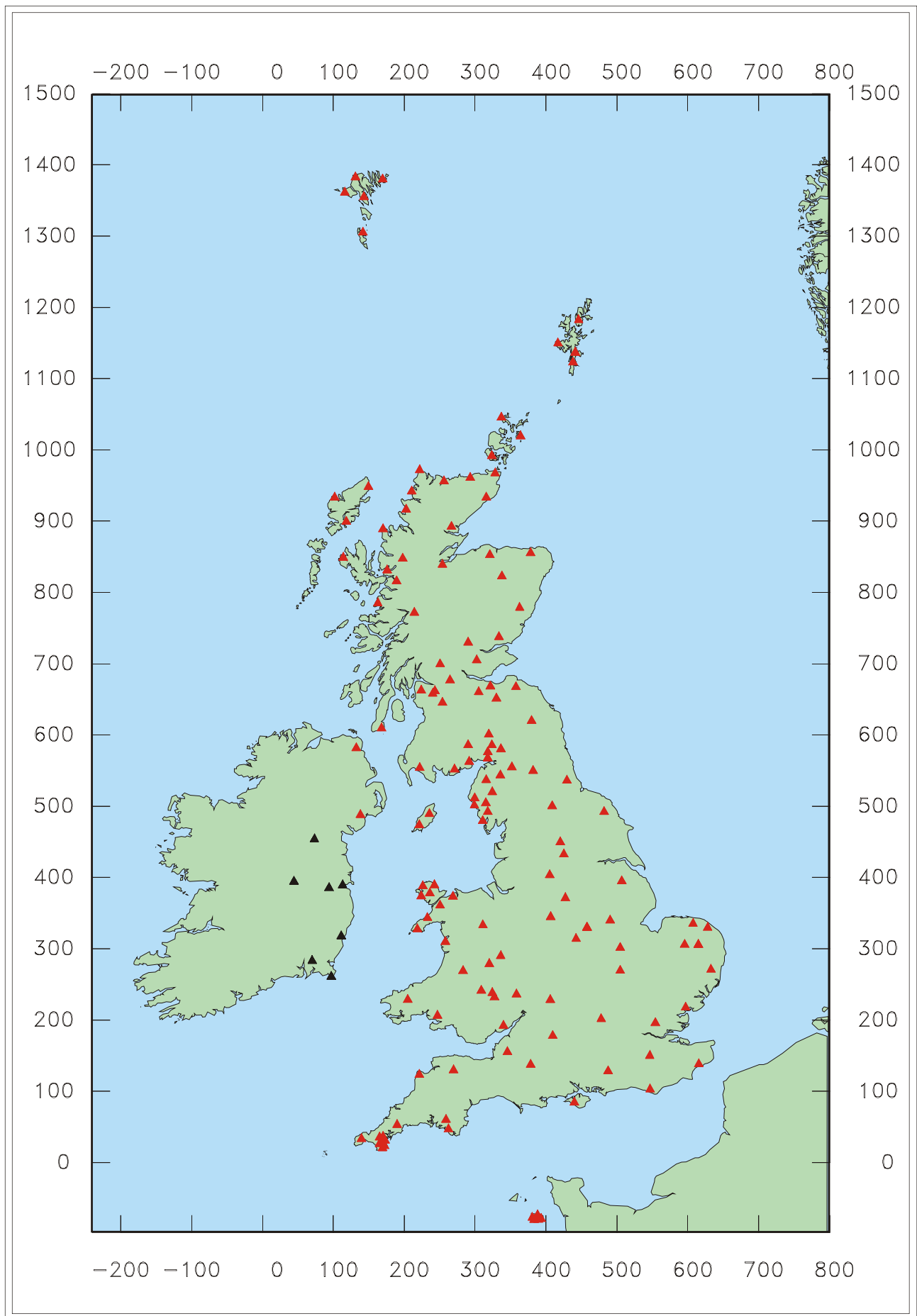


Figure 1. Seismograph network operational in December 1999. Colour coding shows the rapid access stations (red) and DIAS stations (black).

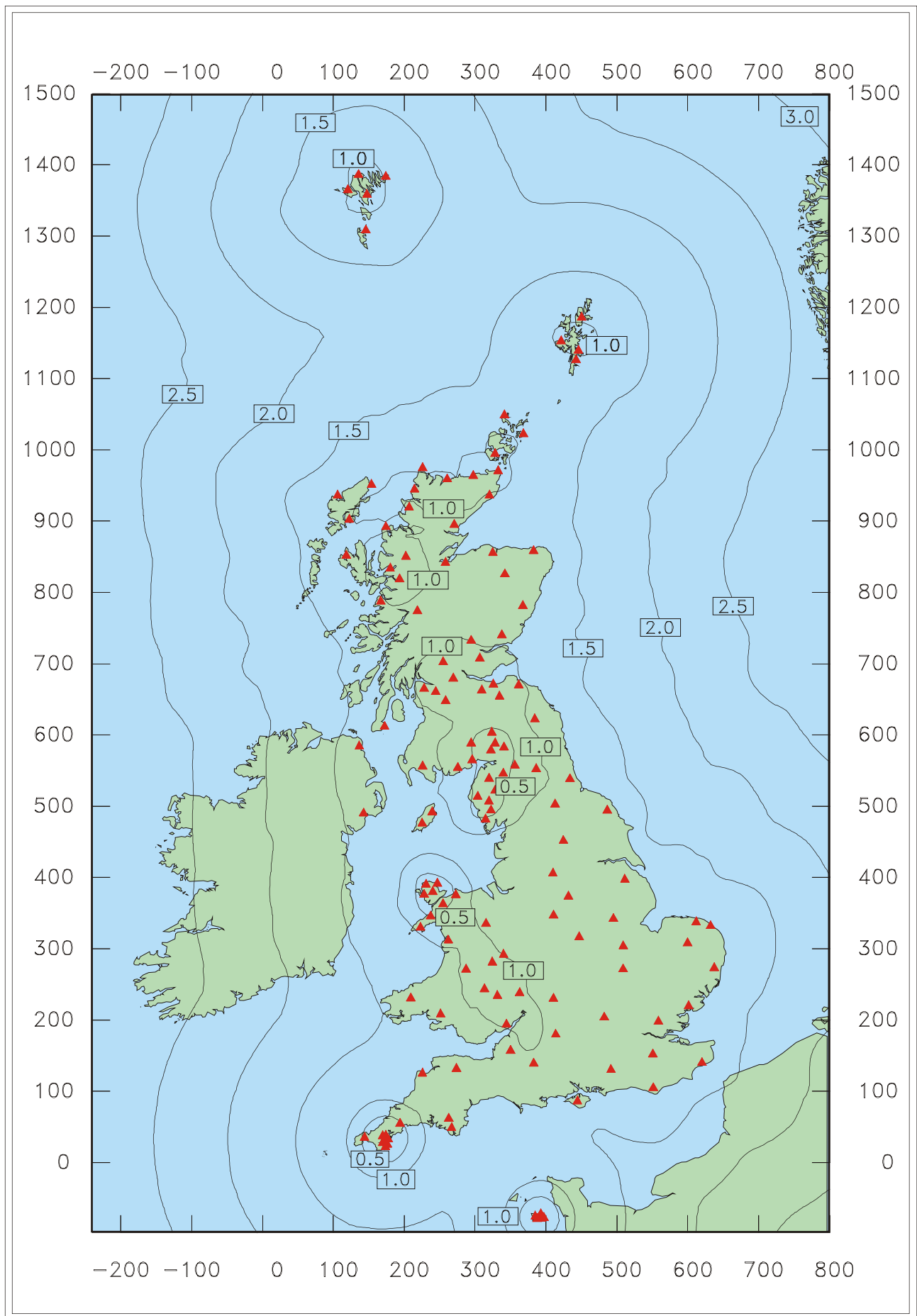


Figure 2. Earthquake detection capability in December 1999. Contour values are Richter local magnitude (ML) for 4 nanometres of noise (average) and S-wave amplitude twice that at the fourth nearest station.

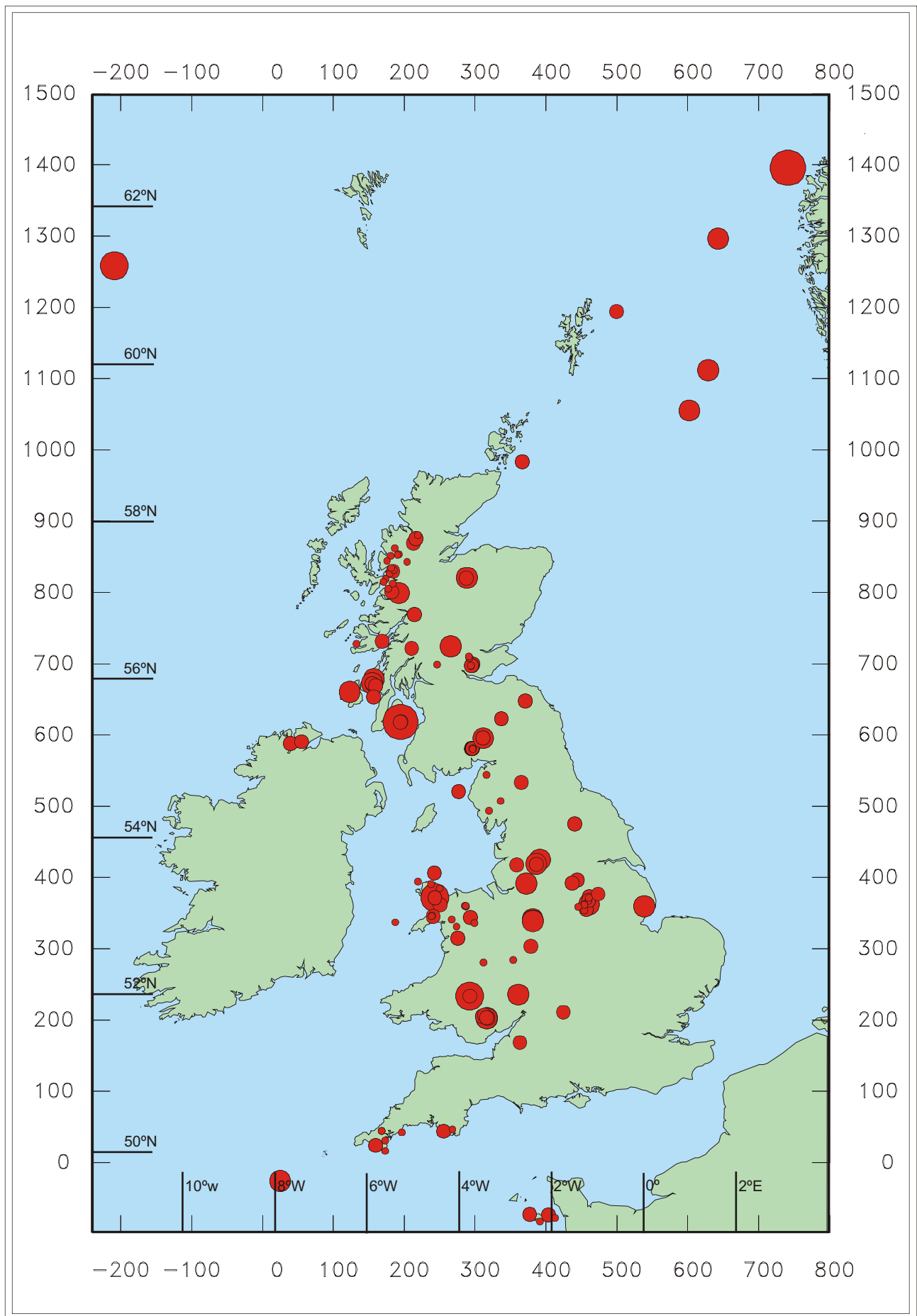


Figure 3. Epicentres of all UK earthquakes located in 1999.

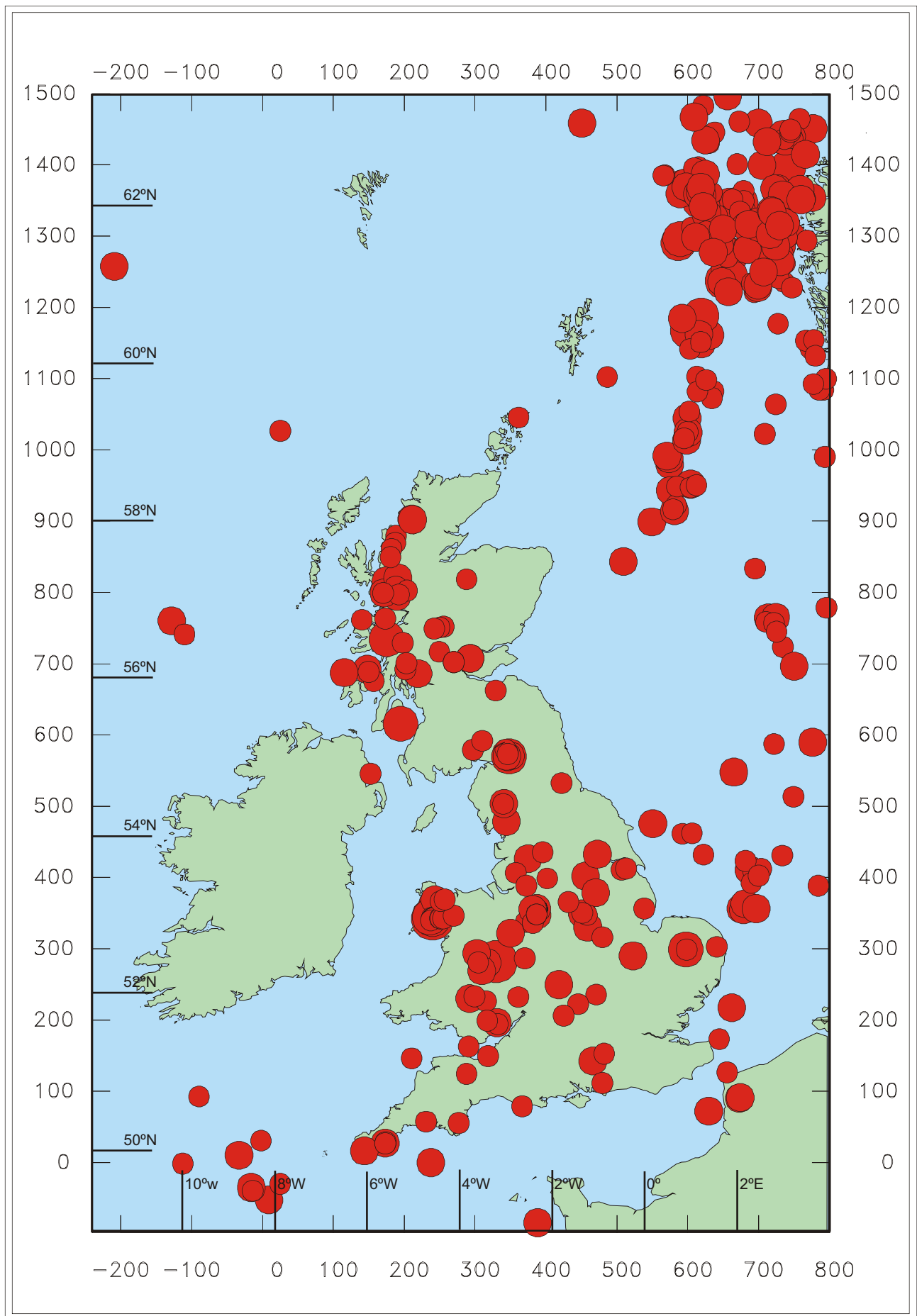


Figure 4. Epicentres of earthquakes with magnitudes 2.5 ML or greater, for the period 1979 to 1999.

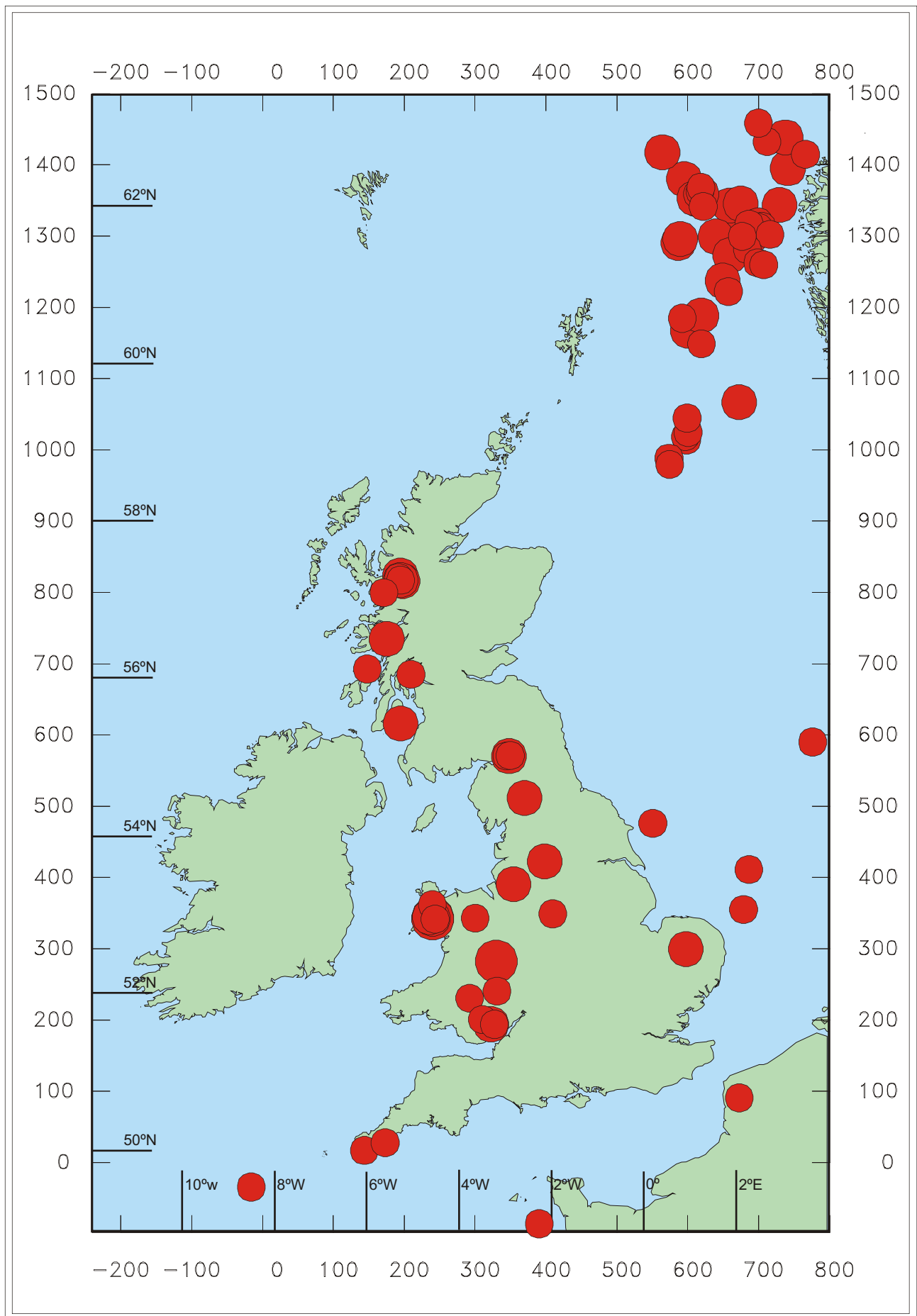


Figure 5. Epicentres of earthquakes with magnitudes 3.5 ML or greater, for the period 1970 to 1999.

APPENDIX A
SIGNIFICANT EARTHQUAKES IN 1999

APPENDIX A1

ARRAN EARTHQUAKE, 4 MARCH 1999

PARAMETERS

Date:	4 March 1999
Origin Time:	00:16 51.8 UTC
Latitude and longitude:	55.40° N 5.24° W
Grid Reference:	194.8 km E 616.2 km N
Depth:	19.0 km
Magnitude:	4.0 ML
Hypo Solution Quality:	B (A*C)
Epicentral Error (1 std. dev.):	3.0 km
Depth Error (1 std. dev.):	4.0 km

Discussion

The largest onshore earthquake, with a magnitude of 4.0 ML, occurred 4 km south of Arran on 4 March. A small aftershock 14 minutes later was also recorded, with a magnitude of 1.6 ML. The mainshock was felt up to 150 km away and over an area of 18,500 km². A macroseismic survey was conducted and over 1000 replies were received. The highest observed intensity was 5 EMS at Lamlash, Arran, where in a number of cases, objects such as ornaments, pictures or toys fell or were displaced, and in a few cases heavy objects were also said to have been displaced, including two washing machines, a cooker, a microwave and a sofa. Although the area has been seismically active with small magnitude earthquakes, this magnitude 4.0 event is the largest in both the instrumental and historical catalogues. The nearest 3-component strong motion instrument to record the earthquake was 135 km distant and accelerations of 1.4, 4.0 and 3.6 mms⁻², were recorded for the vertical, NS and EW components, respectively. The focal mechanism produced for the Arran earthquake represents dominantly strike-slip faulting with a varying component of dip-slip motion. The nodal planes strike NW and NE and the P-axes are consistent with the regional stress direction for the UK.

Seismograms recorded by the BGS networks around Borders and LOWNET are shown in Figure A1.1, the focal mechanism is shown in Figure A1.2 and an isoseismal map is shown in Figure A1.3.

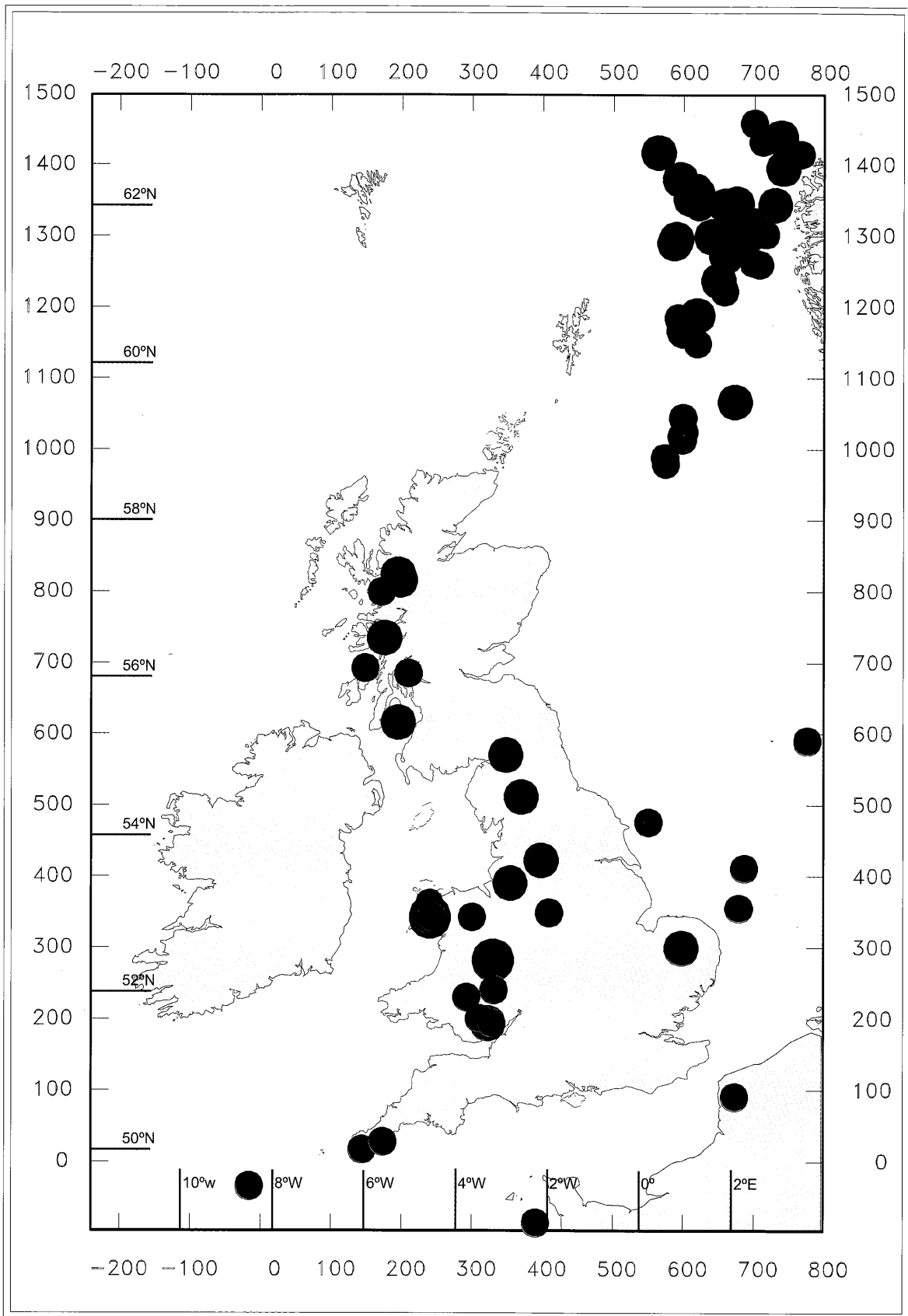


Figure 5. Epicentres of earthquakes with magnitudes 3.5 ML or greater, for the period 1970 to 1999.

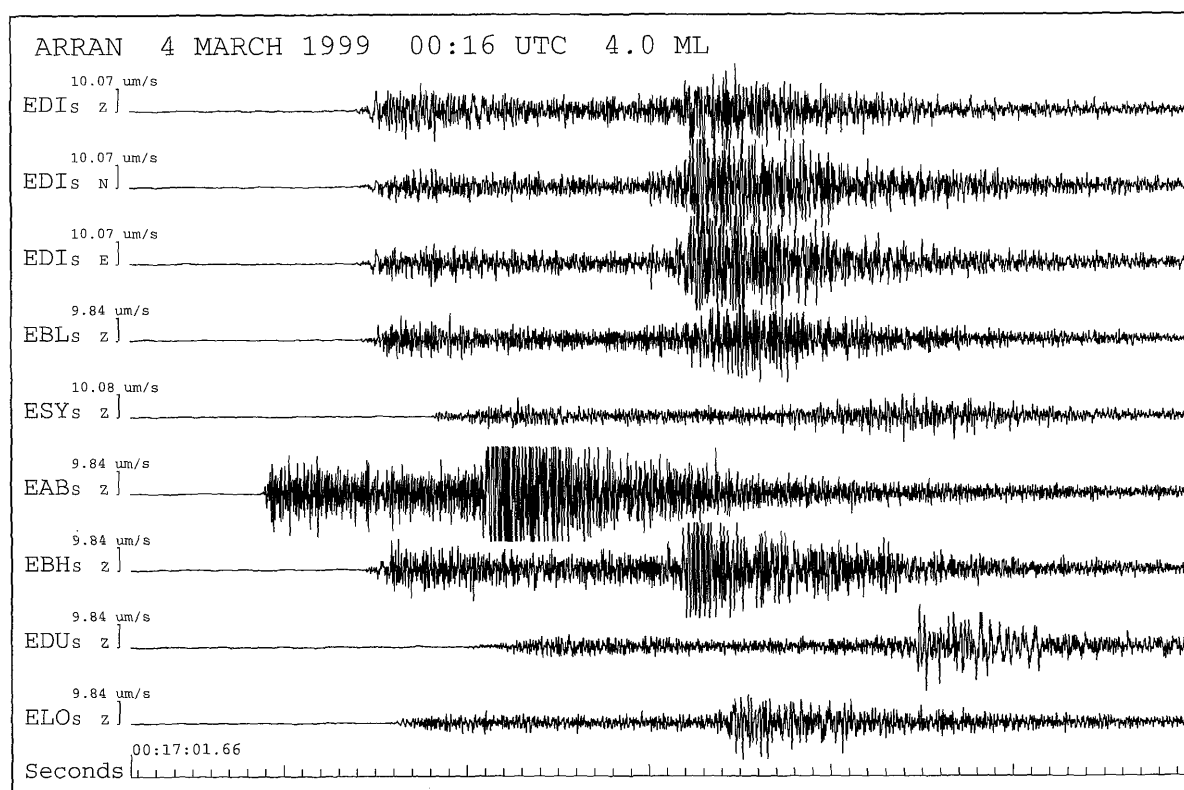
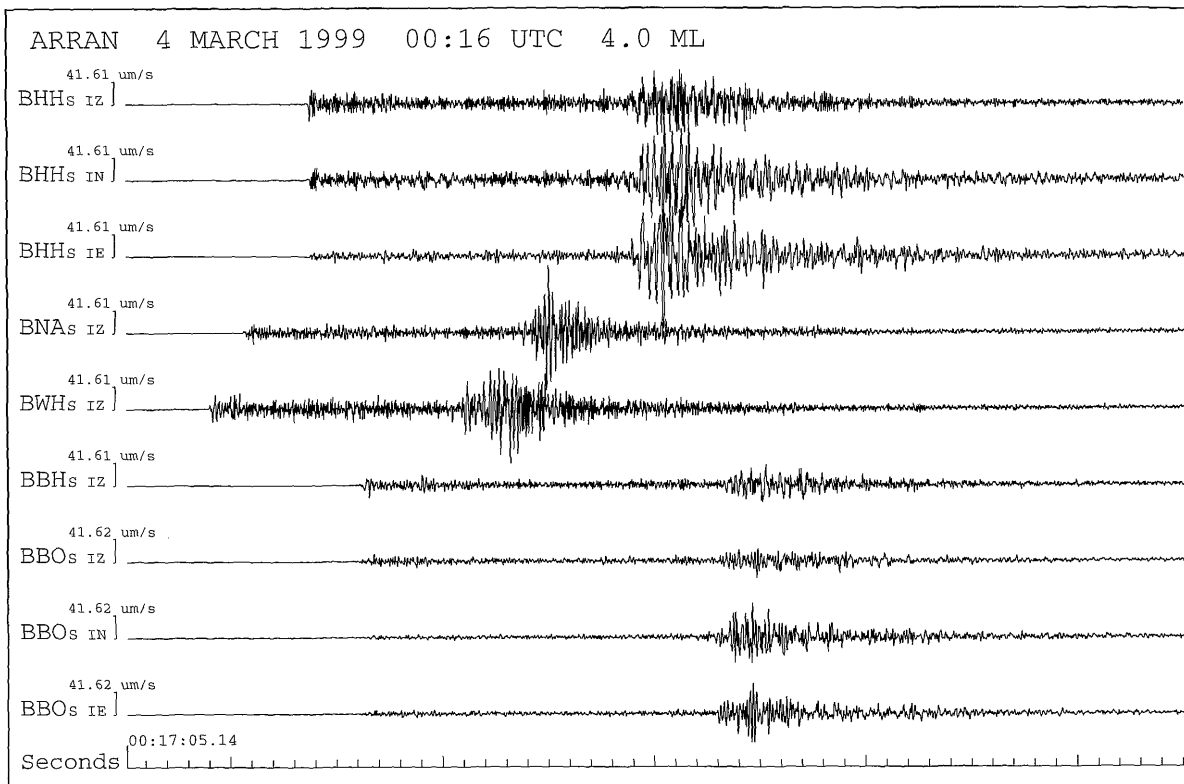


Figure A1.1. Seismograms of the Arran earthquake 4 March 1999 00:16 UTC 4.0 ML recorded on the Borders and LOWNET networks.

FAULT PLANE SOLUTION : ARRAN EARTHQUAKE OF 4 MARCH 1999

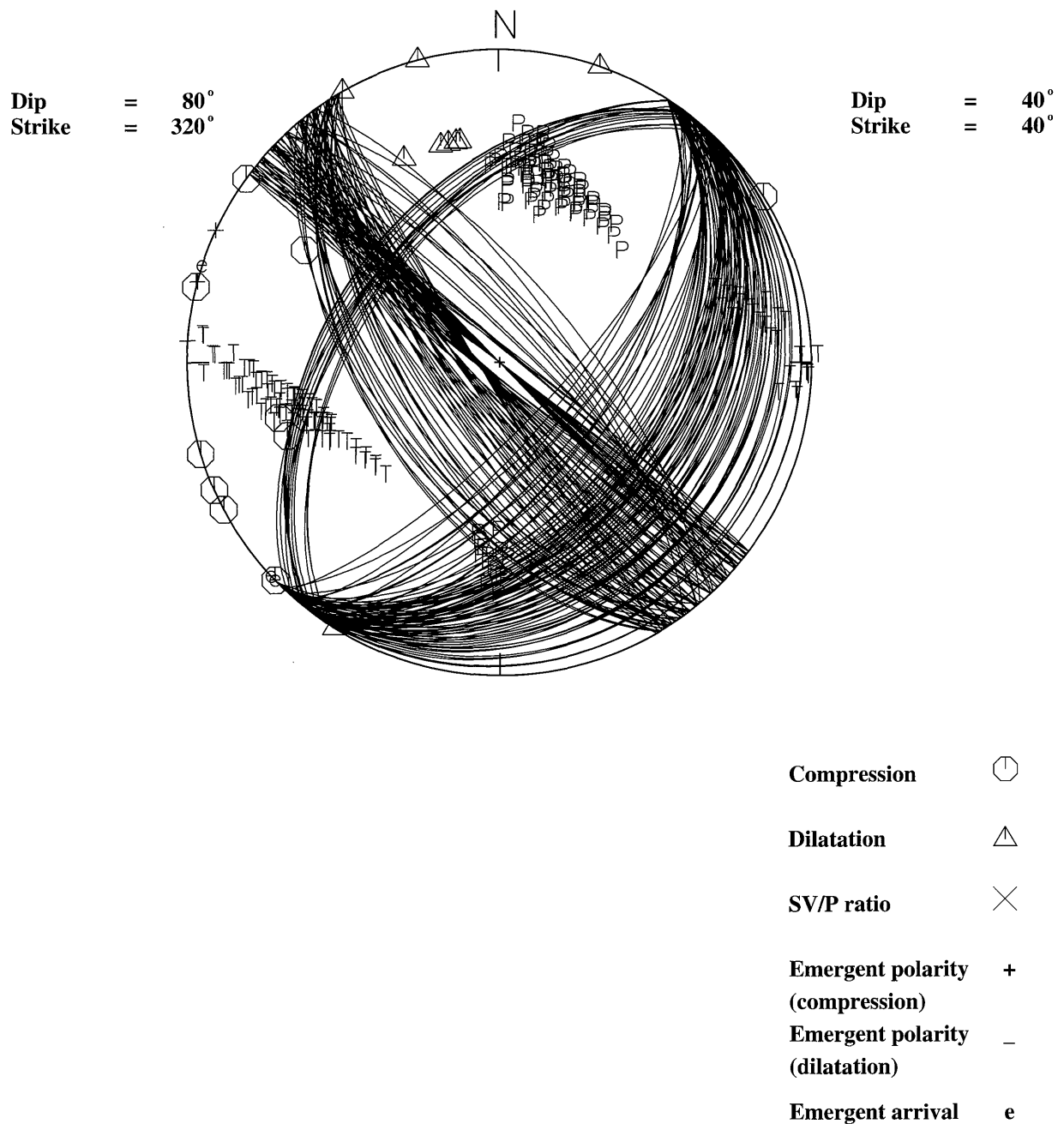


Figure A1.2 Equal area projection of the upper focal hemisphere for the Arran earthquake of 4 March 1999 4.0 ML. The axes of maximum and minimum compressive stress are denoted by P and T respectively.

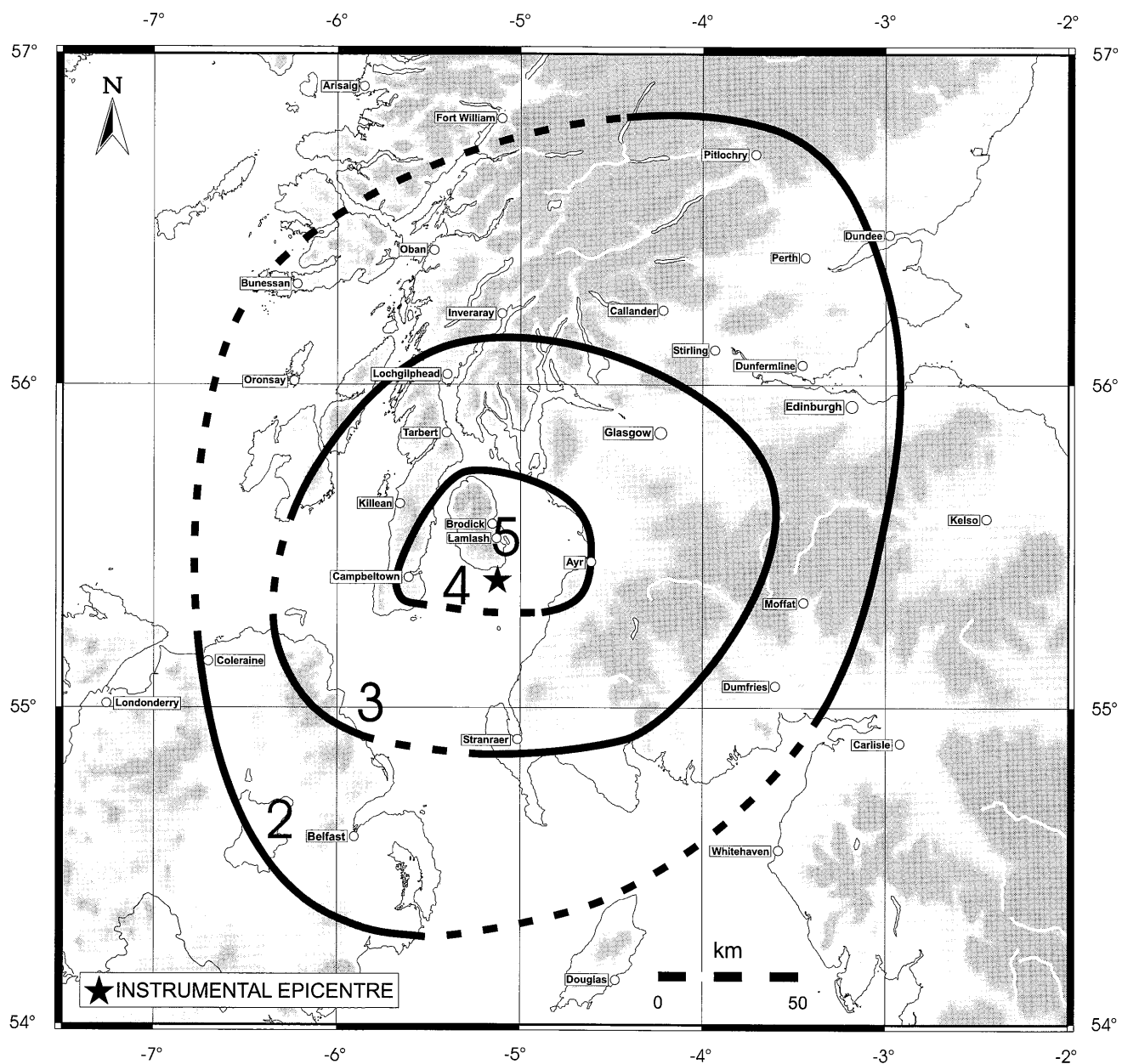


Figure A1.3. Arran Earthquake 4th March 1999, 00:16 UTC (4.0 ML) - EMS Intensities

APPENDIX A2

HEREFORD EARTHQUAKE, 17 JUNE 1999

PARAMETERS

Date:	17 June 1999
Origin Time:	02:20 26.6 UTC
Latitude and longitude:	51.99° N 2.57° W
Grid Reference:	360.9 km E 233.0 km N
Depth:	21.1 km
Magnitude:	2.8 ML
Hypo Solution Quality:	B (A*B)
Epicentral Error (1 std. dev.):	1.8 km
Depth Error (1 std. dev.):	1.8 km

Discussion

An earthquake occurred near Hereford on 17 June, with a magnitude of 2.8 ML. Felt reports were received from residents of Cradley and Welland, where intensities reached at least 3 EMS in the epicentral area. A single report was received from a resident in Cradley (who was awake at the time), some 18 km northeast of the epicentre, who described “the whole cottage shook like a heavy lorry passing outside” and “the dressing table rattled”. This event was recorded on the strong motion instrument near Hereford, some 33 km away, where accelerations of 8, 20 and 12 mms^{-2} for the vertical, NS and EW components, respectively, were measured. A focal mechanism for the event was calculated using data from stations up to 169 km away and shows dominant normal faulting with a component of strike-slip motion. The area has been seismically active in the past with earthquakes of 5.2 and 5.3 occurring in 1863 and 1896, respectively. These events were felt over most of England and Wales and caused damage in the epicentral area (Musson, 1994).

Seismograms recorded by the BGS networks around Hereford and Swindon are shown in Figure A2.1 and the focal mechanism in Figure A2.2.

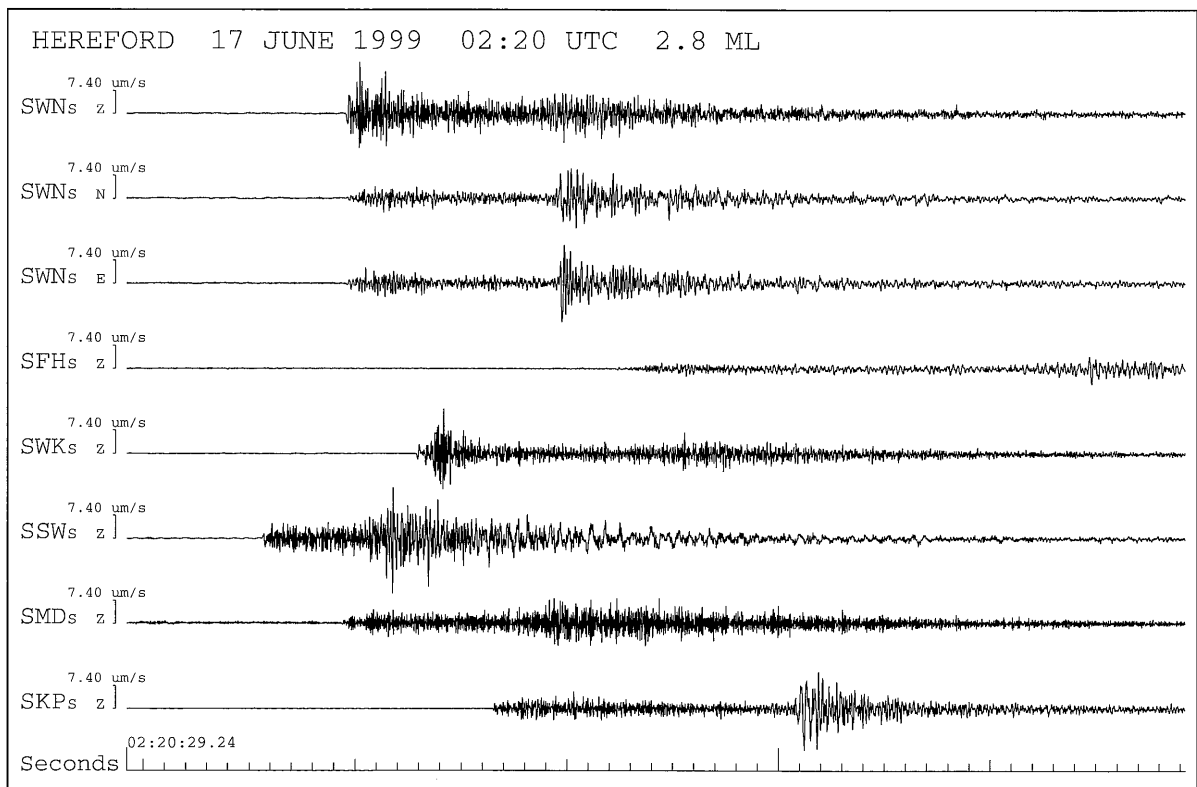
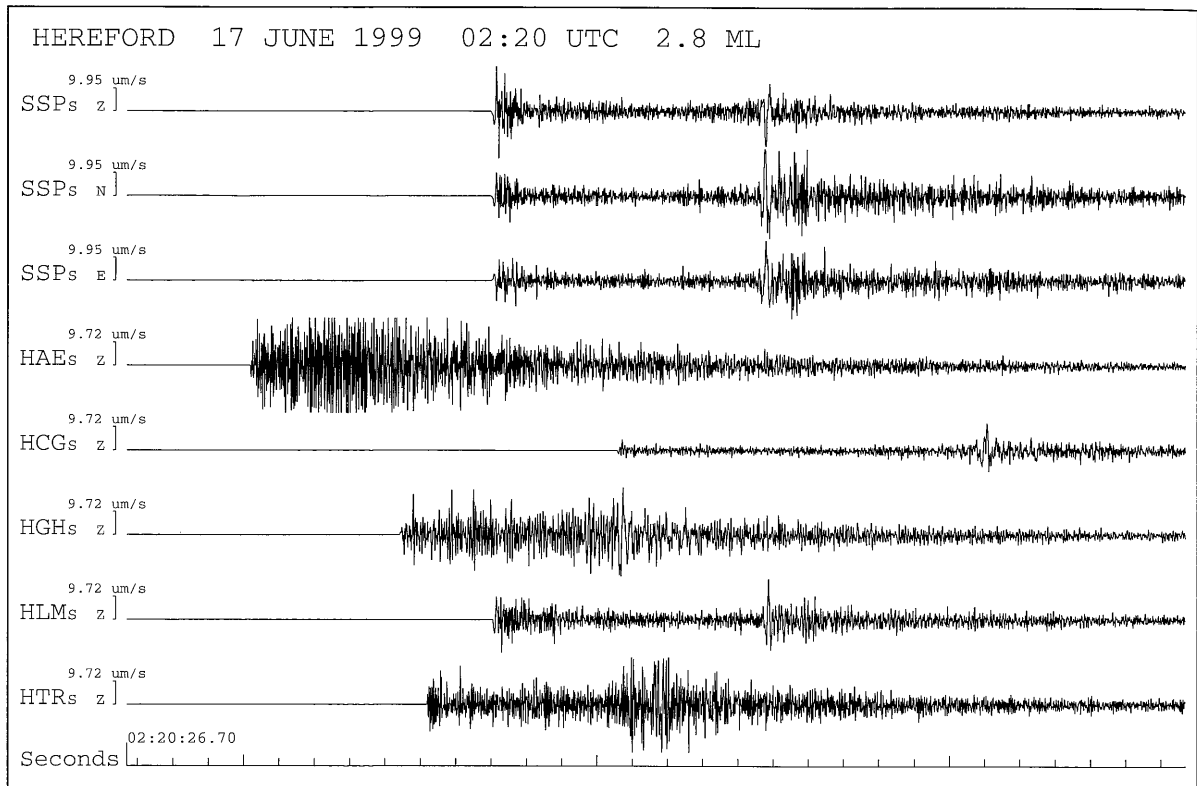


Figure A2.1. Seismograms of the Hereford earthquake 17 June 1999 02:20 UTC 2.8 ML recorded on the Hereford and Swindon networks.

FAULT PLANE SOLUTION : HEREFORD EARTHQUAKE OF 17 JUNE 1999

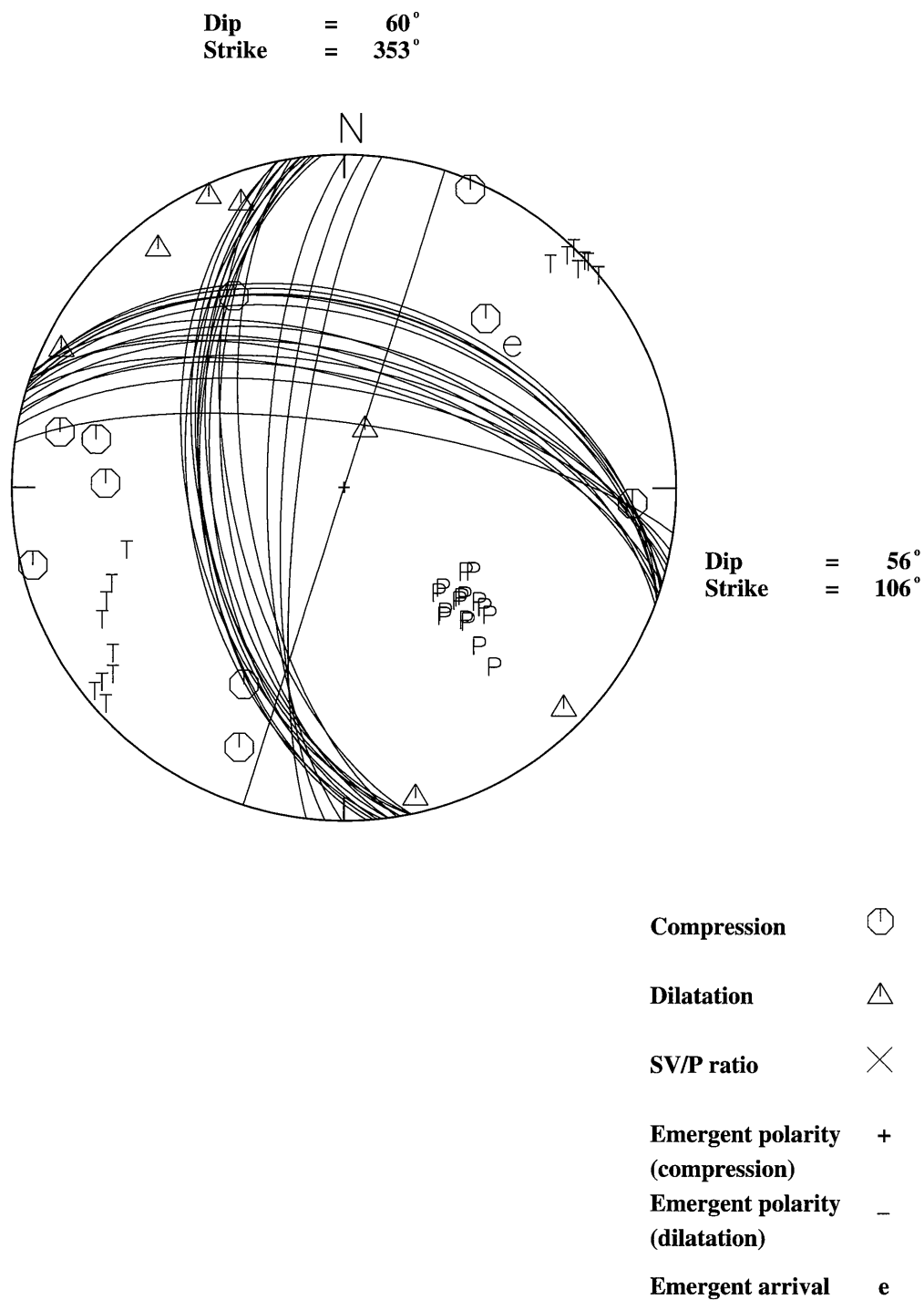


Figure A2.2 Equal area projection of the upper focal hemisphere for the Hereford earthquake of 17 June 1999 2.8 ML. The axes of maximum and minimum compressive stress are denoted by P and T respectively.

APPENDIX A3

CAERNARVON EARTHQUAKE, 1 SEPTEMBER 1999

PARAMETERS

Date:	1 September 1999
Origin Time:	05:00 54.6 UTC
Latitude and longitude:	53.20° N 4.35° W
Grid Reference:	243.1 km E 369.3 km N
Depth:	16.3 km
Magnitude:	3.1 ML
Hypo Solution Quality:	A (A*A)
Epicentral Error (1 std. dev.):	0.5 km
Depth Error (1 std. dev.):	3.1 km

Discussion

A magnitude 3.1 ML earthquake occurred near Caernarvon, Gwynedd on 1 September. It was felt as far away as Barmouth, 60 km to the south and in Rhyl, 55 km to the east. Felt reports described “the whole house vibrated” and “heard loud rumblings and vibrations”. This earthquake was followed by a magnitude 1.2 ML aftershock, which was reported felt in the Llangefni area. A macroseismic survey was conducted for the main event and over 100 replies were received, giving a maximum intensity of 4 EMS. The event locates some 7 km northeast of the Caernarvon Bay earthquake which occurred on 29 July 1992, and was felt over 10,000 km² and had a magnitude of 3.5 ML.

Seismograms recorded by the BGS networks around Keyworth and Leeds are shown in Figure A3.1 and an isoseismal map is shown in Figure A3.2.

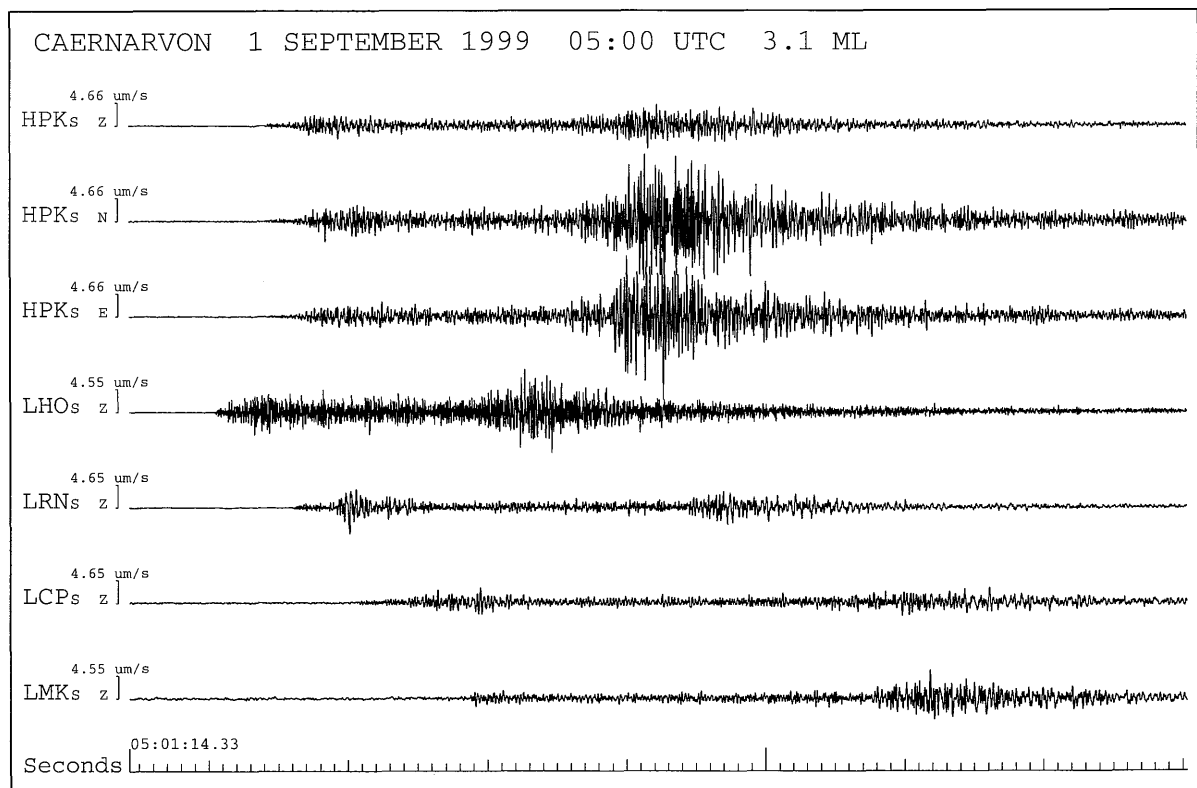
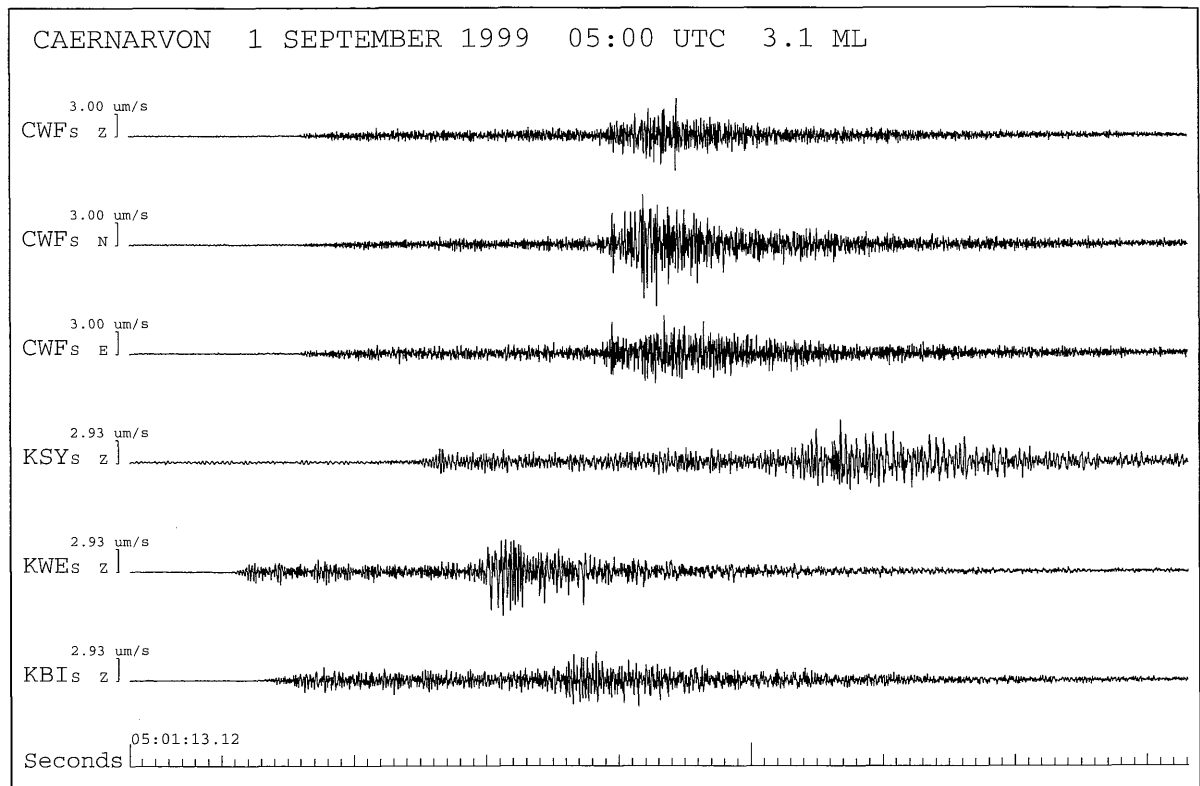


Figure A3.1. Seismograms of the Caernarvon earthquake 1 September 1999 05:00 UTC 3.1 ML recorded on the Keyworth and Leeds networks.

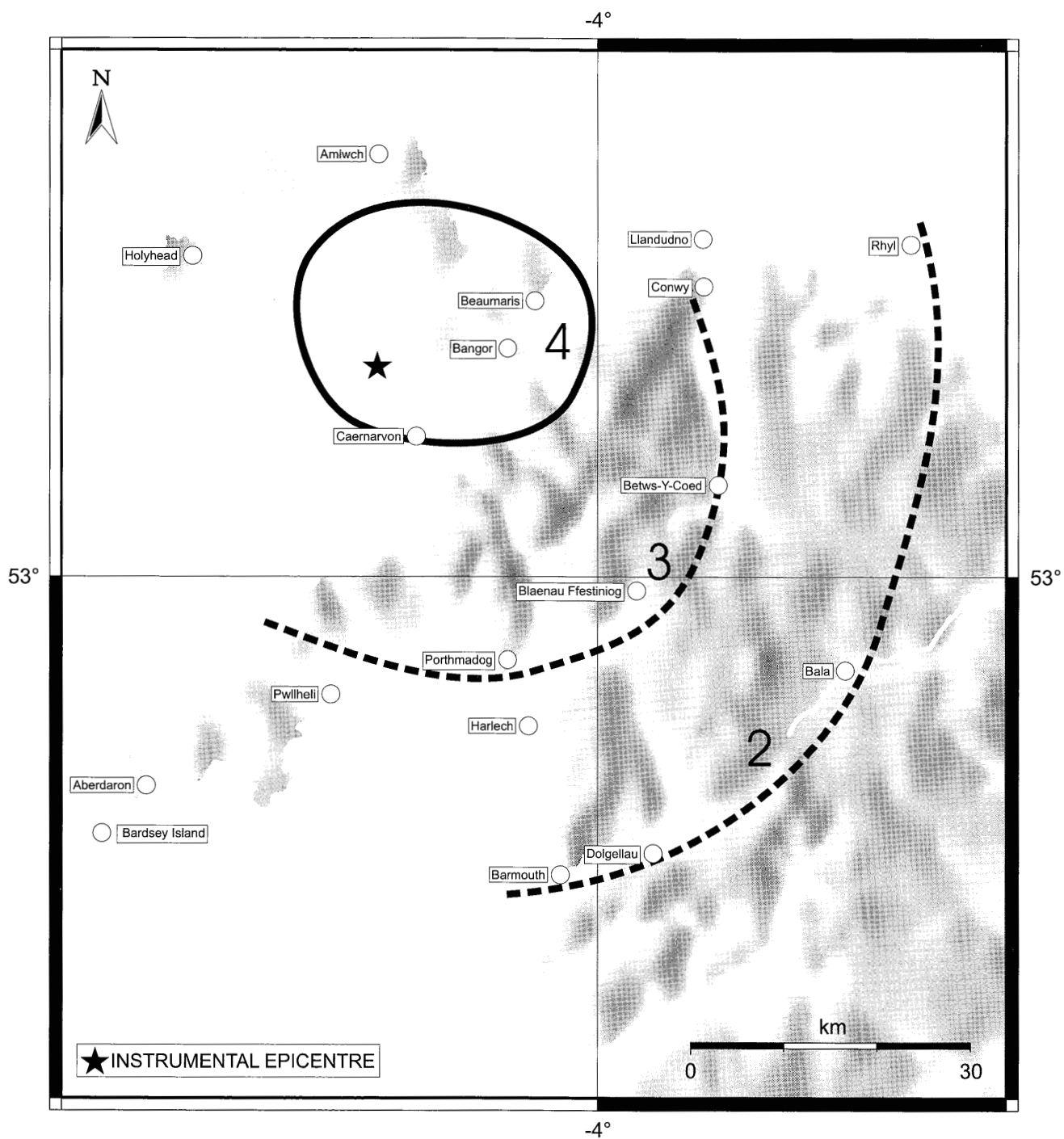


Figure A3.2. Caernarvon Earthquake 1st September 1999, 05:00 UTC (3.1 ML) - EMS Intensities

APPENDIX A4

SENNYBRIDGE EARTHQUAKE, 25 OCTOBER 1999

PARAMETERS

Date:	25 October 1999
Origin Time:	19:15 20.7 UTC
Latitude and longitude:	51.97° N 3.57° W
Grid Reference:	292.2 km E 230.8 km N
Depth:	14.1 km
Magnitude:	3.6 ML
Hypo Solution Quality:	B (A*B)
Epicentral Error (1 std. dev.):	2.7 km
Depth Error (1 std. dev.):	2.2 km

Discussion

An earthquake with a magnitude of 3.6 ML, occurred near Sennybridge, Powys on 25 October. Felt reports described “everybody came running out into the street”, “the whole house shook” and “felt like an explosion”. A macroseismic survey was conducted and around 200 replies were received, giving a maximum intensity of 5 EMS. The focal mechanism for the Sennybridge earthquake represents dominant normal faulting with a varying component of strike-slip motion. The trend of the P-axis is consistent with that of the NW trending regional direction; however, the plunge of the P-axis varies from vertical to horizontal with increasing degrees of the strike-slip component of movement. Two weeks after the event, a small aftershock, with a magnitude of 1.9 ML was located in the same area. In the past thirty years, the area has experienced a number of small earthquakes (up to 2.6 ML) but historically, it has been affected by large earthquakes with magnitudes over 5.0 ML. They occurred near Swansea some 40 km to the southwest in 1727, 1775 and 1906 and caused damage in the epicentral area and were felt up to 200 km away.

Seismograms recorded by the BGS networks around Cornwall and the strong motion instruments at Bonnylands (HBL2) are shown in Figure A4.1 and A4.2, the focal mechanism is shown in Figure A4.3 and an isoseismal map is shown in Figure A4.4.

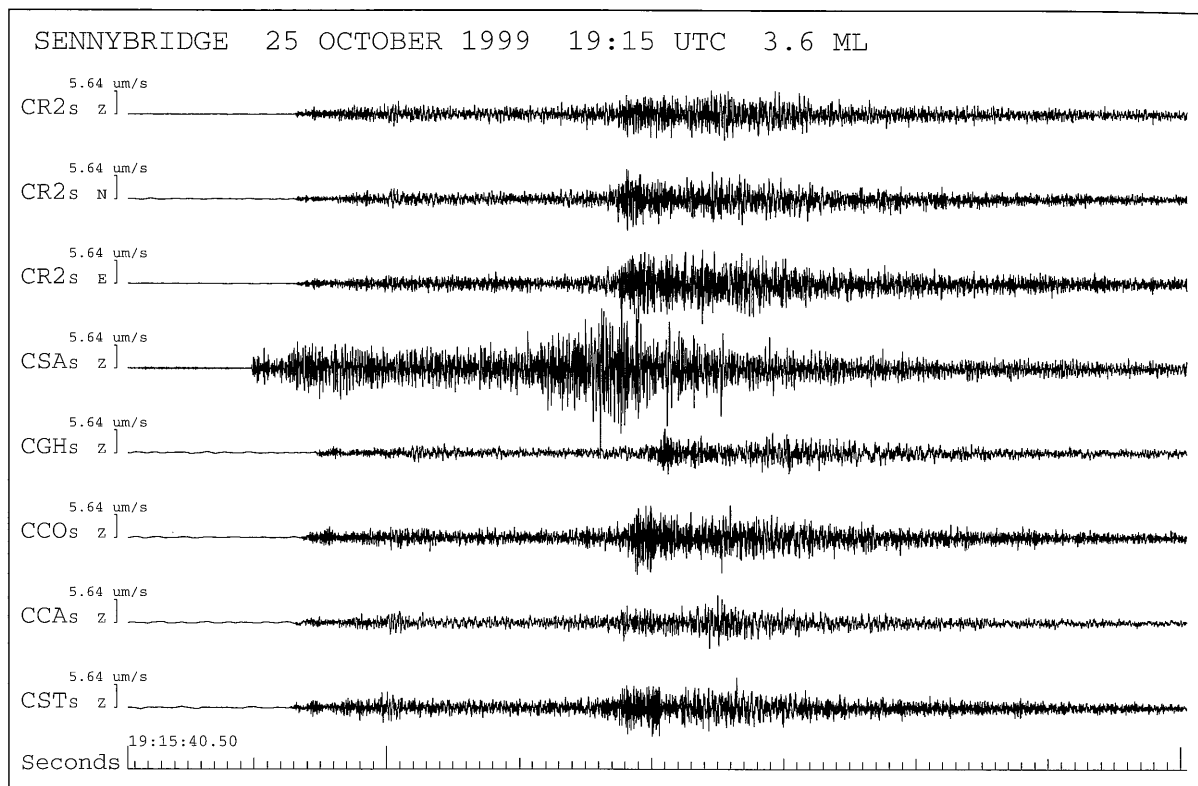


Figure A4.1. Seismograms of the Sennybridge earthquake of 25 October 1999 19:15 UTC 3.6 ML recorded on the Cornwall network.

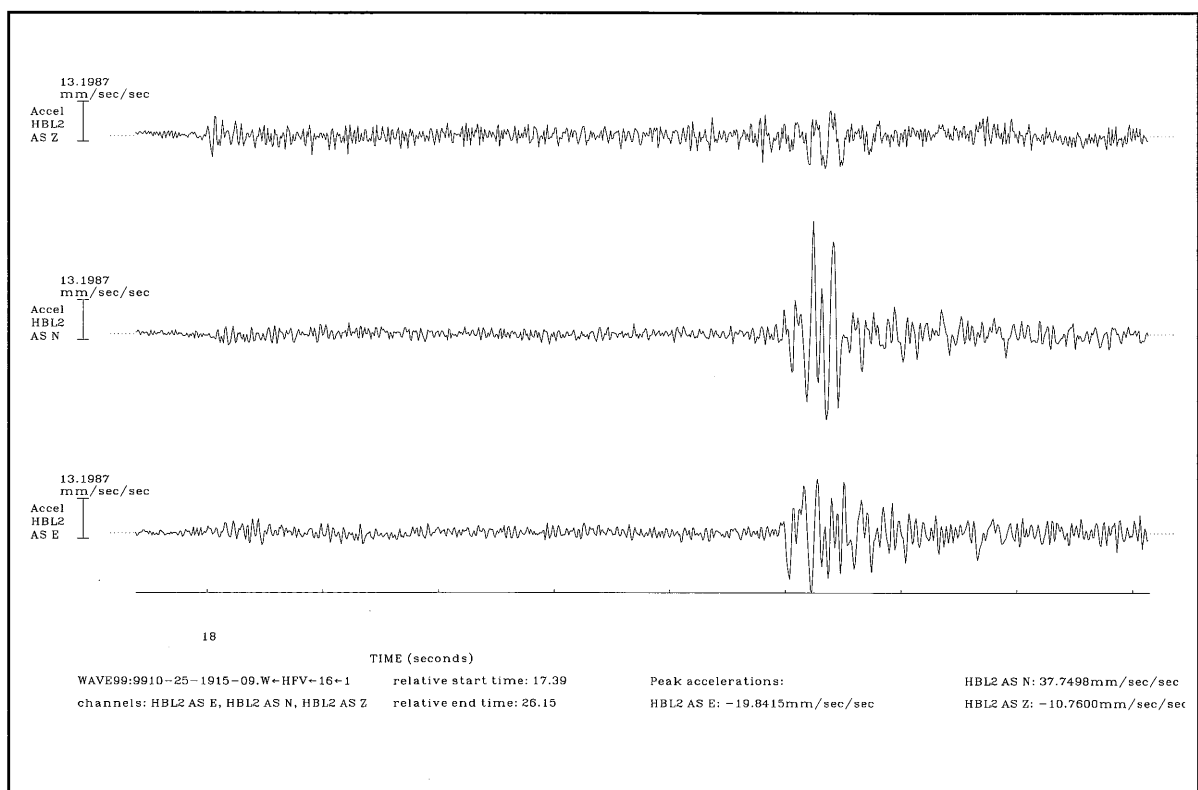


Figure A4.2. Seismograms of the Sennybridge earthquake of 25 October 1999 19:15 UTC 3.6 ML recorded on the strong motion instruments at Bonnylands (HBL2).

FAULT PLANE SOLUTION : SENNYBRIDGE EARTHQUAKE OF 25 OCTOBER 1999

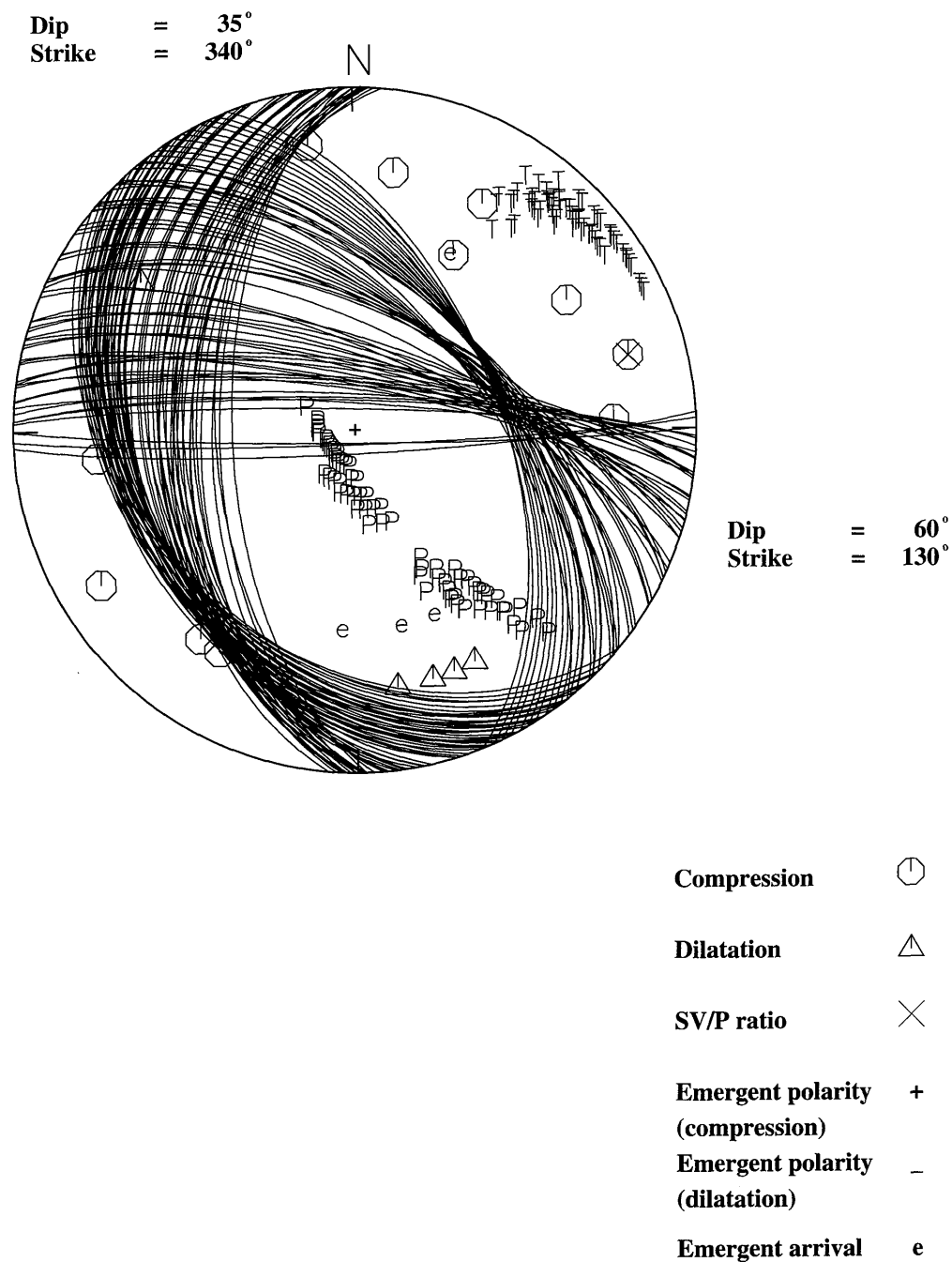


Figure A4.3. Equal area projection of the upper focal hemisphere for the Sennybridge earthquake of 25 October 1999 3.6 ML. The axes of maximum and minimum compressive stress are denoted by P and T respectively.

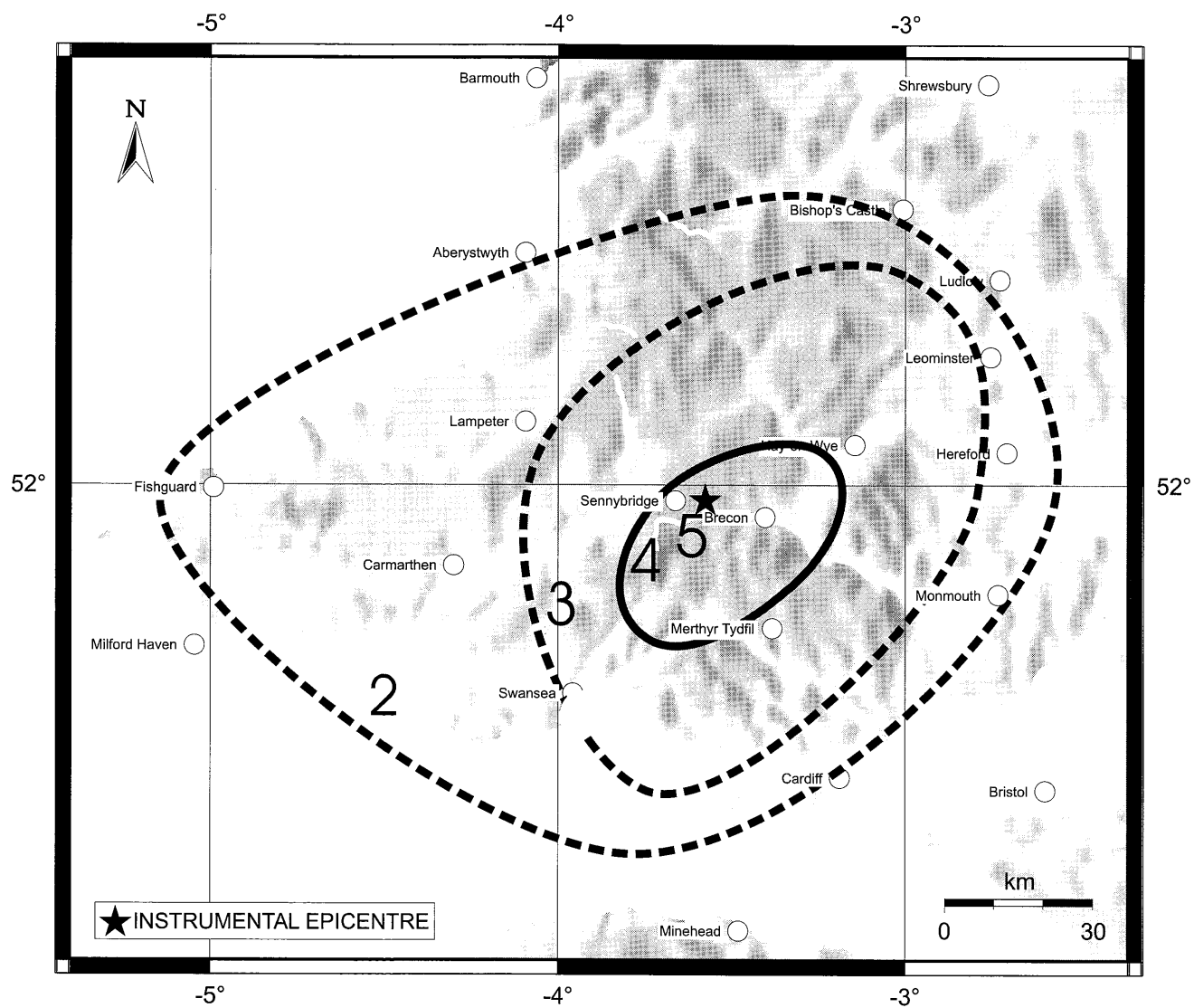


Figure A4.4. Sennybridge Earthquake 25th October 1999, 19:15 UTC (3.6 ML) - EMS Intensities

APPENDIX B

EARTHQUAKE INFORMATION CHARGES

APPENDIX B

SUMMARY OF CHARGES FOR DATABASE ENQUIRIES	COST (£)
A search of the instrumental database producing a catalogue list, a map of the seismicity, a key to the abbreviations and a covering letter.	£150.00 + VAT
A search of the historical database producing a catalogue list, a map of the seismicity, a key to the abbreviations and a covering letter.	£150.00 + VAT
A combined search of both the historical and instrumental database providing the above for both the historical and instrumental seismicity.	£275.00 + VAT
An enquiry involving searching data tapes for specific events. £80.00 for first hour and £40.00 for each additional ½ hour. Note: charges can be waived for the public, media and schools.	£80.00 + VAT
A search and interpretation of raw macroseismic data (felt reports) for a specific region for an individual earthquake.	£120.00 + VAT

For more information on the above and other services available please contact Mr Glenn D Ford, (g.ford@bgs.ac.uk) or Mr Bennett Simpson, (b.simpson@bgs.ac.uk) at the Global Seismology and Geomagnetism Group, Murchison House, West Mains Road, Edinburgh, EH9 3LA.

BULLETIN OF BRITISH EARTHQUAKES: PRICE LIST

Burton, P.W. and Neilson, G., 1980. Annual catalogues of British earthquakes recorded on LOWNET (1967-1978). Inst.Geol.Sci. Seismological Bulletin No.7.	£3 + pp
Turbitt, T., et al., 1984. Catalogue of British earthquakes recorded by the BGS seismograph network 1979, 1980, 1981. BGS Global Seismology Report No. 210.	£11 + pp
Turbitt, T., et al., 1985. Catalogue of British Earthquakes recorded by the BGS Seismograph Network 1982, 1983, 1984. BGS Global Seismology Report No. 260.	£15 + pp
Turbitt, T., et al., 1987. Bulletin of British Earthquakes 1985. BGS Global Seismology Report No. 303.	£10 + pp
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Turbitt, T., et al., 1990. Bulletin of British Earthquakes 1988. BGS Global Seismology Report No. WL/90/03	£10 + pp

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Turbitt, T., et al., 1990. Bulletin of British Earthquakes 1989. BGS Global Seismology Report No. WL/90/49	£12.50 + pp
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Walker, A.B., et al., 1993. Bulletin of British Earthquakes 1992. BGS Global Seismology Report No. WL/93/11.	£12.50 + pp
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Musson, R.M.W., 1994. A Catalogue of British earthquakes. BGS Global Seismology Report No. WL/94/04.	£15.00 + pp
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Walker, A.B., et al., 1994. Bulletin of British Earthquakes 1993. BGS Global Seismology Report No. WL/94/09.	£12.50 + pp
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Walker, A.B., et al., 1995. Bulletin of British Earthquakes 1994. BGS Global Seismology Report No. WL/95/04.	£12.50 + pp
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Walker, A.B., et al., 1996. Bulletin of British Earthquakes 1995. BGS Global Seismology Report No. WL/96/04.	£12.50 + pp
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Walker, A.B., et al., 1999. Bulletin of British Earthquakes 1998. BGS Global Seismology Report No. WL/99/01.	£12.50 + pp
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A complete list of Seismology group publications can be obtained by writing to the secretary at the Global Seismology and Geomagnetism Group, Murchison House, West Mains Road, Edinburgh, EH9 3LA.

APPENDIX C

EUROPEAN MACROSEISMIC SCALE (EMS 92)

APPENDIX C

SYNOPSIS OF EMS-92 INTENSITY SCALE

1 - Not felt

Not felt, even under the most favourable circumstances.

2 - Scarcely felt

Vibration is felt only by individual people at rest in houses, especially on upper floors of buildings.

3 - Weak

The vibration is weak and is felt indoors by a few people. People at rest feel a swaying or light trembling.

4 - Largely observed

The earthquake is felt indoors by many people, outdoors by very few. A few people are awakened. The level of vibration is not frightening. Windows, doors and dishes rattle. Hanging objects swing.

5 - Strong

The earthquake is felt indoors by most, outdoors by few. Many sleeping people awake. A few run outdoors. Buildings tremble throughout. Hanging objects swing considerably. China and glasses clatter together. The vibration is strong. Top heavy objects topple over. Doors and windows swing open or shut.

6 - Slightly damaging

Felt by most indoors and by many outdoors. Many people in buildings are frightened and run outdoors. Small objects fall. Slight damage to many ordinary buildings eg; fine cracks in plaster and small pieces of plaster fall.

7 - Damaging

Most people are frightened and run outdoors. Furniture is shifted and objects fall from shelves in large numbers. Many ordinary buildings suffer moderate damage: small cracks in walls; partial collapse of chimneys.

8 - Heavily damaging

Furniture may be overturned. Many ordinary buildings suffer damage: chimneys fall; large cracks appear in walls and a few buildings may partially collapse.

9 - Destructive

Monuments and columns fall or are twisted. Many ordinary buildings partially collapse and a few collapse completely.

10 - Very destructive

Many ordinary buildings collapse.

11 - Devastating

Most ordinary buildings collapse.

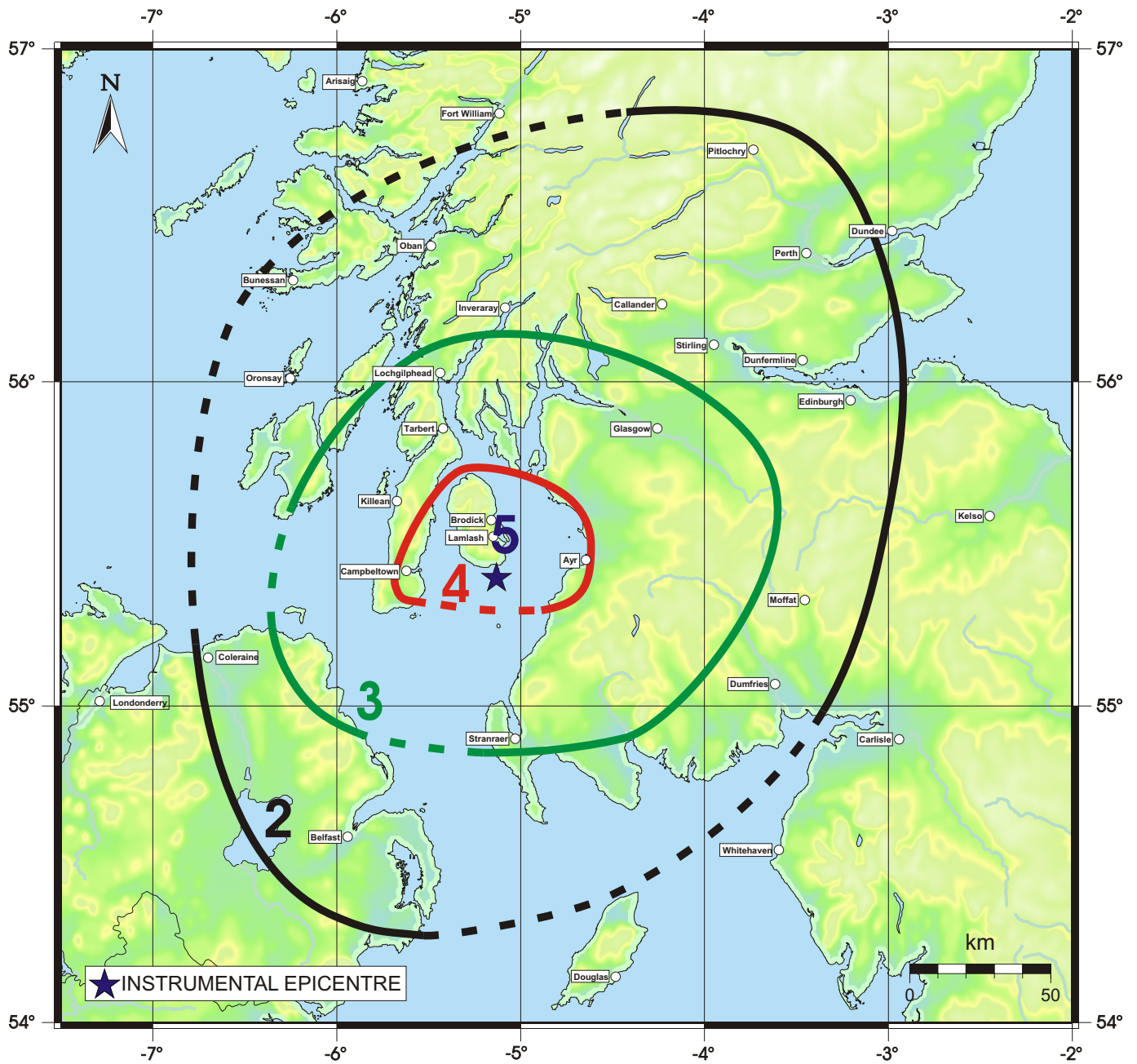
12 - Completely devastating

Practically all structures above and below ground are heavily damaged or destroyed.

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A complete description of the EMS-92 scale is given in:

Grunthal, G.,(Ed) 1993. European Macroseismic scale 1992 (up-dated MSK-scale). Cahiers du Centre European de Geodynamique et de Seismologie. Vol 7.



Arran Earthquake 4th March 1999, 00:16 UTC (4.0 ML) - EMS Intensities