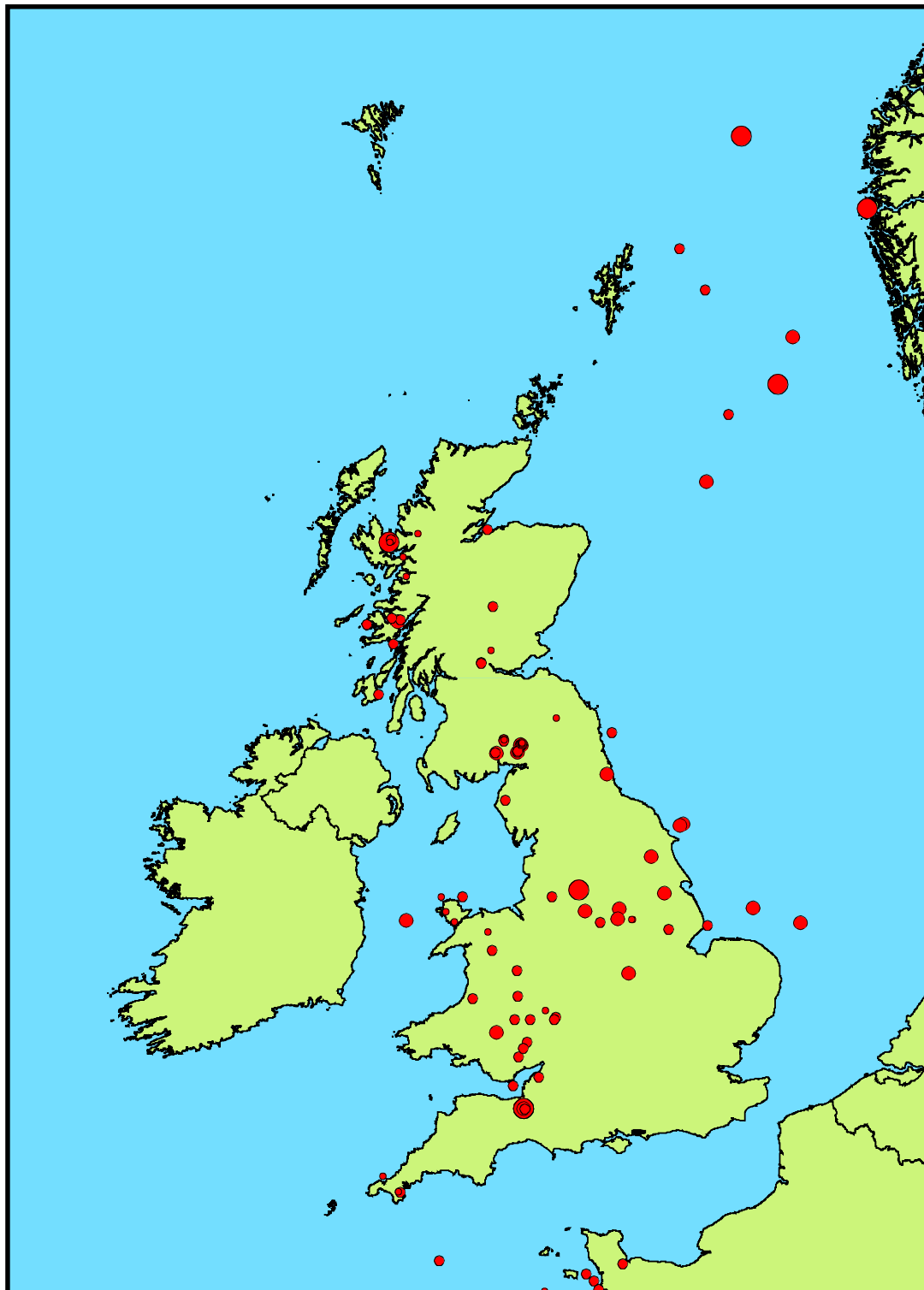




**British Geological Survey**

**BULLETIN OF BRITISH  
EARTHQUAKES 2004**



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BRITISH GEOLOGICAL SURVEY

REPORT IR/05/087

# Bulletin of British Earthquakes 2004

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Figure 7. Lower hemisphere equal area projection of the focal mechanism obtained for the Aberfoyle earthquake of 20 June 2003. 06:44 UTC, 3.2 ML.

## **TABLES**

Table 1. Catalogue of events in chronological order: 2004.

Table 2. Phase Data of the earthquakes in Table 1.

Table 3. Geographic coordinates and instrumentation of BGS seismograph stations.

# 1 Introduction

The British Geological Survey's (BGS) Seismic Monitoring and Information Service operates a nationwide network of seismograph stations in the United Kingdom (UK). The whole of the UK, including coastal waters, is covered within the limits of the detection capabilities of the seismograph network. Location accuracy is extended in offshore areas through data exchange with neighbouring countries. Seismic phase data, location details and magnitudes are presented in this Bulletin for all earthquakes detected and located by BGS during 2004 in Tables 1 and 2, together with maps showing the larger magnitude events since 1979 ( $ML > 2.5$ ) and since 1970 ( $ML > 3.5$ ). The bulletin covers all of the UK land mass and its coastal waters including the North Sea to 800 kmE and 1500 kmN.

All events believed to be of true tectonic origins are included. Coalfield events are also included. These are small events occurring near coal workings that 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.

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 mistaken as small earthquakes by local people. They are indicated by 'SONIC' in both the locality and comments column of Table 1.

Significant non-natural events, such as explosions, which received media attention or were greater than magnitude 2.5 ML or felt by local residents, are also included in Table 1. Smaller events that are known, or suspected to be of explosive origin are excluded from the bulletin where possible. These include explosions due to quarrying, mining, weapon testing or disposal, naval exercises, geophysical prospecting and civil engineering. Unfortunately, identification by record character, location and time of occurrence is not always conclusive and some man-made events may be included in the bulletin or, more rarely, a small natural event may have been excluded.

## 2 Summary of 2004 Seismicity

There were 131 earthquakes located by the monitoring network during the year (Figure 1), with 30 of them having magnitudes of 2.0 ML or greater and 8 having magnitudes of 3.0 ML or greater. Ten events with a magnitude of 2.0 ML or greater were reported felt, together with a further 10 smaller ones, bringing the total to 20 felt earthquakes in 2004.

The largest onshore earthquake had a magnitude of 3.3 ML and occurred offshore the Island of Raasay on 16 September 2004, at a depth of 5.3 km. No felt reports were received for this earthquake, this could be due to the remote location of the earthquake. A further 2 events were located in this area during 2004, with magnitudes of 1.7 and 0.4 ML, respectively.

The largest offshore earthquake occurred in the Northern North Sea on 13 May 2004, with a magnitude of 3.5 ML. It was located approximately 270 km northeast of Lerwick,

Shetland Islands. A further 9 events occurred in the North Sea and surrounding waters during the year, with magnitudes ranging between 1.1 and 3.1 ML.

An earthquake with a magnitude of 0.2 ML occurred in the Blackford area on 23 January. The BGS received one report for this event from a resident of Glendevon, who described, "felt a slight shudder" indicating an intensity of 2 EMS. This is an area that has continued to be active in recent years; 50 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, 3 events occurred in 1999, 4 events occurred in 2000, of which 3 were felt, 4 events occurred in 2001, of which 3 were felt, 4 events occurred in 2002, of which one was felt and 9 events occurred in 2003, of which 4 were felt. These are all in the same general area as the magnitude 3.2 ML Ochil Hills earthquake in 1979, which had a maximum intensity of 5 EMS.

Four events occurred on 29 January, in the Bridgwater area of Somerset with magnitudes between 2.7 and 3.1 ML. Felt reports were received from residents throughout Taunton, Wedmore, Ilminster and surrounding areas. The reports described, "the floor moved and there was a deep rumble", "the floor was shaking" and "the whole house shook", indicating intensities of 3 and 4 EMS. The events were located approximately 12 km northeast of Taunton and approximately 5 km south of Bridgwater. The four events were located within 200 metres from each other and the events occurred at a shallow depth of approximately 6.5 km.

An earthquake with a magnitude of 3.1 ML occurred on 29 February, near Oldham, Greater Manchester. The BGS received a number of reports from the Oldham area, which described "the wardrobe shook and I heard a rumble" and "the house shook violently", indicating an intensity of 4 EMS.

A magnitude 2.1 ML earthquake occurred on 15 April, with a location near Ardtornish, Highland. The BGS received one report for this event from Morvern, describing, "the furniture rattled and I heard a loud roar", indicating an intensity of 3 EMS.

Near Dumfries, Dumfries and Galloway, an earthquake with a magnitude of 2.3 ML, occurred on 7 August. The BGS received several reports from residents in the Dumfries area which described, "rumbling and a very loud banging", "felt like coming to a halt in a car", "the building shook" and "very noticeable shudder in our house", indicating an intensity of 3 EMS. A magnitude 1.5 ML earthquake also occurred in the area earlier in the year on 7 February.

Between 13 October and 30 December, a swarm of small earthquakes were detected in an area between Eskdalemuir, in the Borders, and Langholm, in Dumfries and Galloway. The BGS detected these events on nearby seismic stations. A total of 38 earthquakes have occurred since 13 October. These events occurred approximately 8km SSE of Eskdalemuir, at an average depth of 4.5km and with magnitudes ranging between -0.4 and 2.9 ML. The largest event, with a magnitude of 2.9 ML, occurred on 28 November and was felt near Lockerbie, Langholm and Eskdalemuir. Residents reported "the whole house shook", "felt a shudder for 4 to 5 seconds", "heard a booming noise like a gas explosion which woke me up", "all the china in the kitchen nearly fell off the wall" and "heavy bed jumped as well". Initial analysis suggested that the spatial extent of the earthquake source region was less than a few kilometres. A cross-correlation technique was applied, which identified three groups of similar events consisting of thirteen, three and two events. Timing of phases as well as amplitude ratios was nearly identical within the groups. The



main group contained the two largest earthquakes, suggesting that these two events had a similar hypocentre location and source mechanism. The focal mechanisms for the two largest events show normal faulting with the two nodal planes striking in a N to NNW direction and dipping either west or east.

Accurate and consistent phase arrivals were determined for events of the largest group using the cross-correlation technique. The resulting phase arrivals were input, together with the manually picked arrivals for the other events, to a joint location procedure. The majority of the earthquakes originate from an area about 2.5 km in north-south and 1 km in east-west direction.

The distribution of epicentres is clustered and shows no clear linear trend that may indicate a fault plane. The larger faults in the region are oriented southwest northeast, perpendicular to the nodal planes of the two largest events in the sequence. The event distribution and tectonic information, therefore, cannot be used to identify one of the nodal planes as causative fault.

Similar swarms of small earthquakes have been seen in the UK before, such as Manchester (2002), Comrie (1788-1801, 1839-46), Glenalmond (1970-72), Doune (1997), Blackford (1997-98, 2000-01), Constantine (1981, 1986, 1992-4), Johnstonbridge (mid1980s) and Dumfries (1991,1999).

Four events occurred in the Johnstonebridge area of Dumfries and Galloway during 2004 with magnitudes ranging from 0.4 to 1.2 ML, another 4 events occurred in the Dumfries and Galloway region during the year, this time near Lockerbie, with magnitudes ranging from 1.1 to 2.0 ML.

The coalfield areas of South Yorkshire, Nottinghamshire, Greater Manchester, Derbyshire and Gwent continued to experience shallow earthquake activity that is believed to be mining induced. Some, 6 coalfield events, with magnitudes ranging between 0.6 and 2.3 ML, were detected during the year. Local residents reported three of these events to be felt.

### 3 The BGS UK Seismograph Network

Operational seismograph stations in December 2004 are shown in Figure 2. The UK seismograph network consists of a number of sub-networks, which, in turn, consist 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 seismometer, are recorded digitally with the SEISLOG data acquisition system (Utheim and Havskov, 1993). The system records data continuously, but also creates event-triggered files. The sub-networks are accessed for data transfer from Edinburgh several times a day through Internet or dial-up modems. Once transferred, the events are analysed to provide rapid response for location and magnitude. At a number of sites, low-gain vertical seismometers are installed to 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 number of broadband seismic stations provide data with a larger dynamic range and over a wider frequency band.

The detection capabilities of a network depend upon station distribution, instrument sensitivity and background noise levels. Figure 3 shows the magnitude detection thresholds for seismograph stations operational in December 2004. The contours illustrate the lower threshold magnitude for an earthquake to significantly exceed 4 nanometers of noise (average) at 10 Hz on at least four seismographs. These detection levels hold true only if all stations are continuously monitored. Small events in unmonitored areas may go undetected unless they are felt and reported to BGS by local inhabitants, but detection capabilities by this process are strongly dependent on the population density.

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. 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, causing the 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.

Given the variability in the earthquake detection threshold, as governed by ambient noise conditions and the geometry of the observing network, the bulletin is biased towards certain localities. Figure 4 shows only earthquakes with magnitude 2.5 ML or greater, in the period 1979 to 2004. The data set is considered complete for these magnitudes in all localities onshore. Seismicity for the period 1970 to 2004 is shown in Figure 5 with a threshold magnitude of 3.5 ML. This is the period covered by BGS instrumentation that 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 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 that satisfies the observed pattern of arrivals. Instrumental locations in the bulletin were obtained using the computer program HYOPCENTRE (Lienert and Havskov 1995) that 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.

### 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 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 A<sub>0</sub> is that for a 'standard' magnitude zero earthquake at the same distance. The A<sub>0</sub> 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, A<sub>0</sub>, 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.

### 4.4 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<sub>max</sub>) usually found close to the epicentre. The maximum felt intensity is quoted, where known, on the European Macroseismic Scale (EMS), (Grünthal, 1998).

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# Appendix 1 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	N Yorkshire	North Yorkshire
Expl	Explosion	Notts	Nottinghamshire
D & G	Dumfries and Galloway	Lincs	Lincolnshire
Gtr	Greater	N'umberlnd	Northumberland
Her & Worcs	Hereford and Worcester	Staffs	Staffordshire
S'Clyde	Strathclyde	Leics	Leicestershire
S Yorkshire	South Yorkshire	W Mids	West Midlands
New-U-Lyme	Newcastle-Under-Lyme	Salop	Shropshire
Penin	Peninsula		

## Comments abbreviations

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

## Appendix 2 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

## Appendix 3 The European Macroseismic Scale (EMS 98)

### 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-98 scale is given in: Grunthal, G., (Ed) 1998. European Macroseismic scale 1998. Cahiers du Centre European de Geodynamique et de Seismologie. Vol 15.



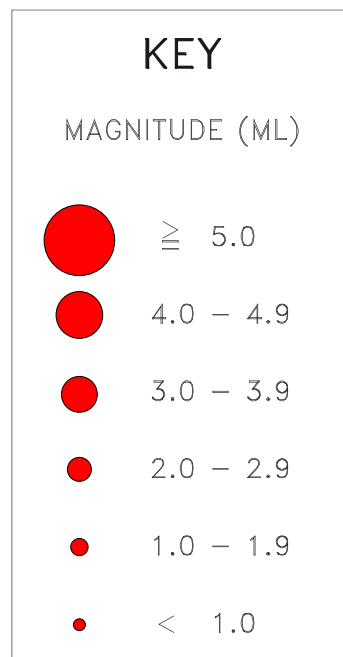
## Appendix 4 Significant earthquakes in 2004

### THE ESKDALEMUIR EARTHQUAKES 2004

Between 13 October and 30 December, a swarm of small earthquakes were detected in an area between Eskdalemuir, in the Borders, and Langholm, in Dumfries and Galloway. The BGS detected these events on nearby seismic stations. A total of 39 earthquakes have occurred since 13 October. These events occurred approximately 8km SSE of Eskdalemuir, at an average depth of 4.5km and with magnitudes ranging between -0.4 and 2.9 ML. The largest event, with a magnitude of 2.9 ML, occurred on 28 November and was felt near Lockerbie, Langholm and Eskdalemuir. Residents reported "the whole house shook", "felt a shudder for 4 to 5 seconds", "heard a booming noise like a gas explosion which woke me up", "all the china in the kitchen nearly fell of the wall" and "heavy bed jumped as well". Initial analysis suggested that the spatial extent of the earthquake source region was less than a few kilometres. A cross-correlation technique was applied, which identified three groups of similar events consisting of thirteen, three and two events. Timing of phases as well as amplitude ratios was nearly identical within the groups. The main group contained the two largest earthquakes, suggesting that these two events had a similar hypocentre location and source mechanism. The focal mechanisms for the two largest events show normal faulting with the two nodal planes striking in a N to NNW direction and dipping either west or east. Accurate and consistent phase arrivals were determined for events of the largest group using the cross-correlation technique. The resulting phase arrivals were input, together with the manually picked arrivals for the other events, to a joint location procedure. The majority of the earthquakes originate from an area about 2.5 km in north-south and 1 km in east-west direction. The distribution of epicentres is clustered and shows no clear linear trend that may indicate a fault plane. The larger faults in the region are oriented southwest northeast, perpendicular to the nodal planes of the two largest events in the sequence. The event distribution and tectonic information, therefore, cannot be used to identify one of the nodal planes as causative fault.

Similar swarms of small earthquakes have been seen in the UK before, such as Manchester (2002), Comrie (1788-1801, 1839-46), Glenalmond (1970-72), Doune (1997), Blackford (1997-98, 2000-01), Constantine (1981, 1986, 1992-4), Johnstonbridge (mid1980s) and Dumfries (1991,1999).





## **KEY TO EPICENTRE MAPS**



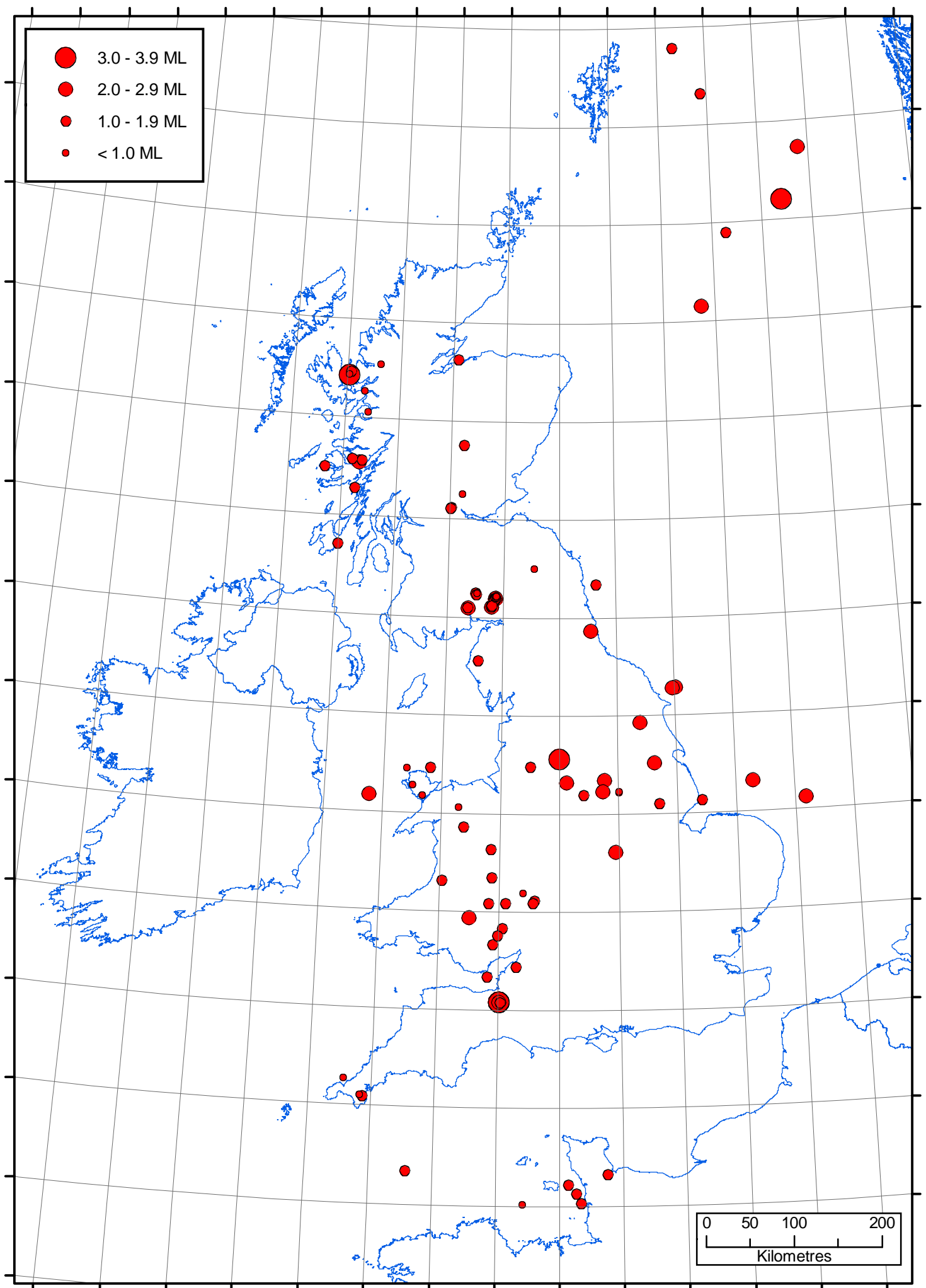


Figure 1. Epicentres of all UK earthquakes located in 2004.

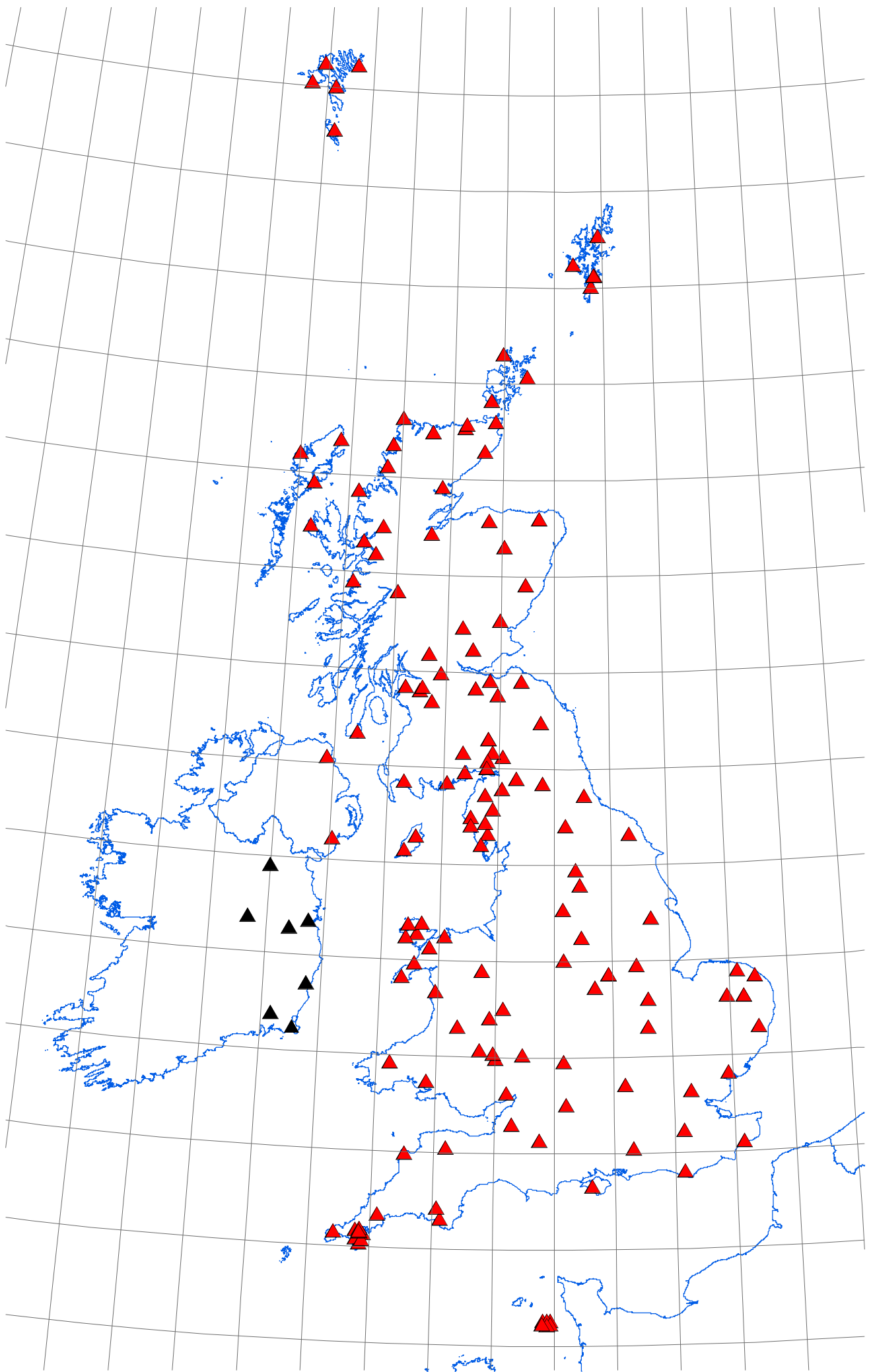


Figure 2. Seismograph network operational in December 2004. Colour coding shows the rapid access stations (red) and DIAS stations (black).

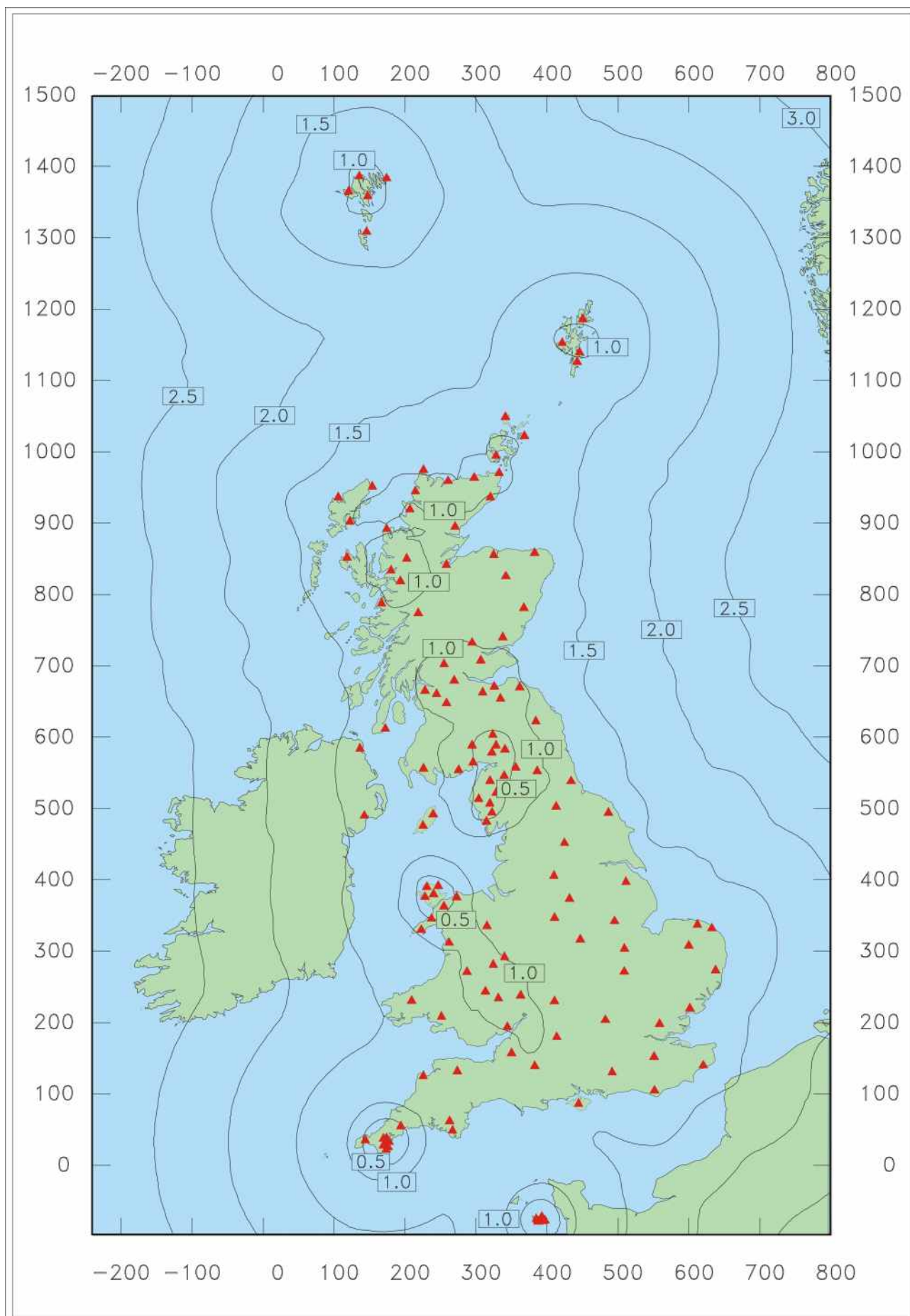


Figure 3. Earthquake detection capability in December 2004. Contour values are Richter local magnitude (ML) for 4 nanometres of noise (average) and S-wave amplitude twice that at the fourth nearest station.

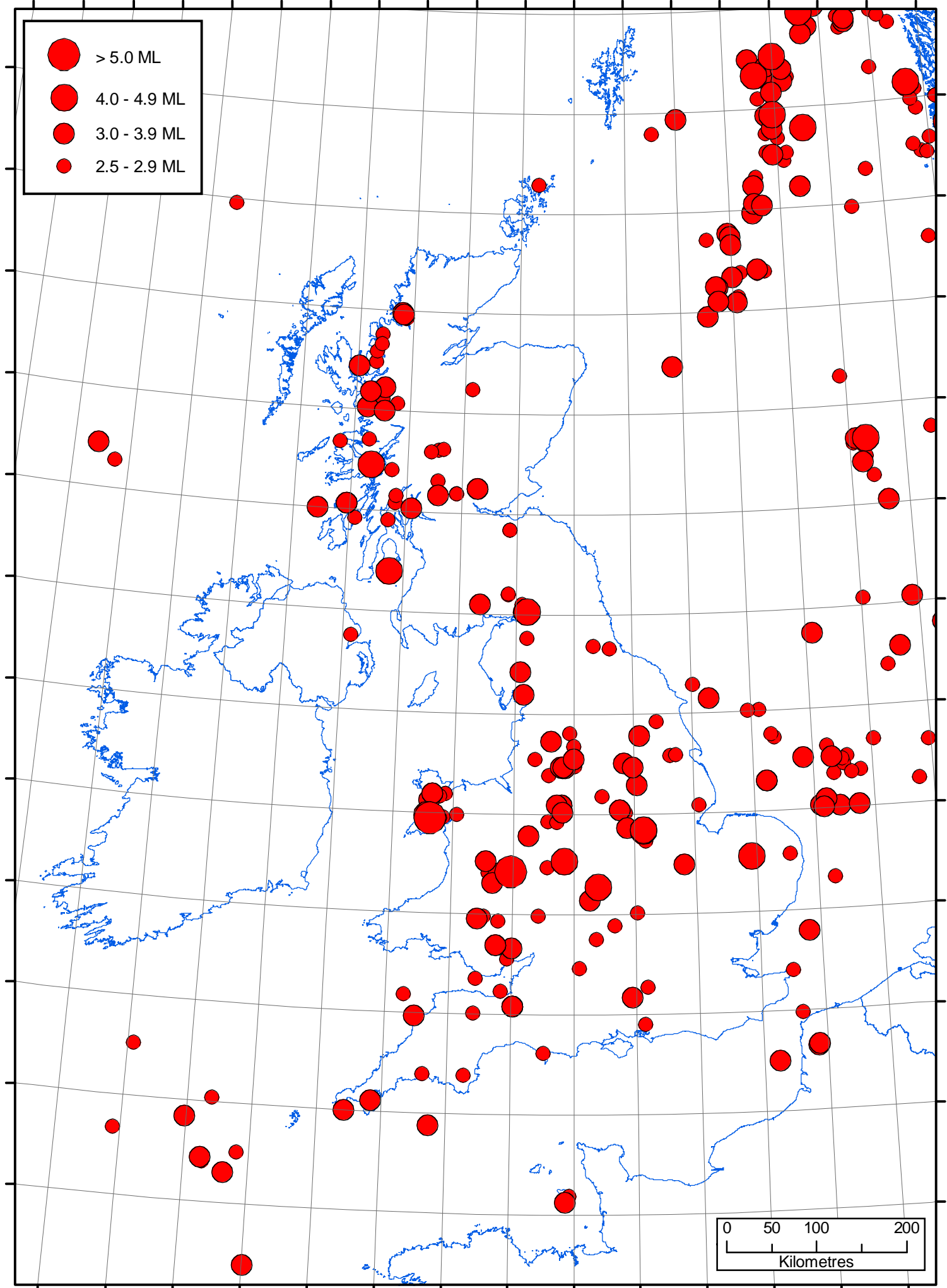


Figure 4. Epicentres of earthquakes with magnitudes 2.5 ML or greater, for the period 1979 - 2004.



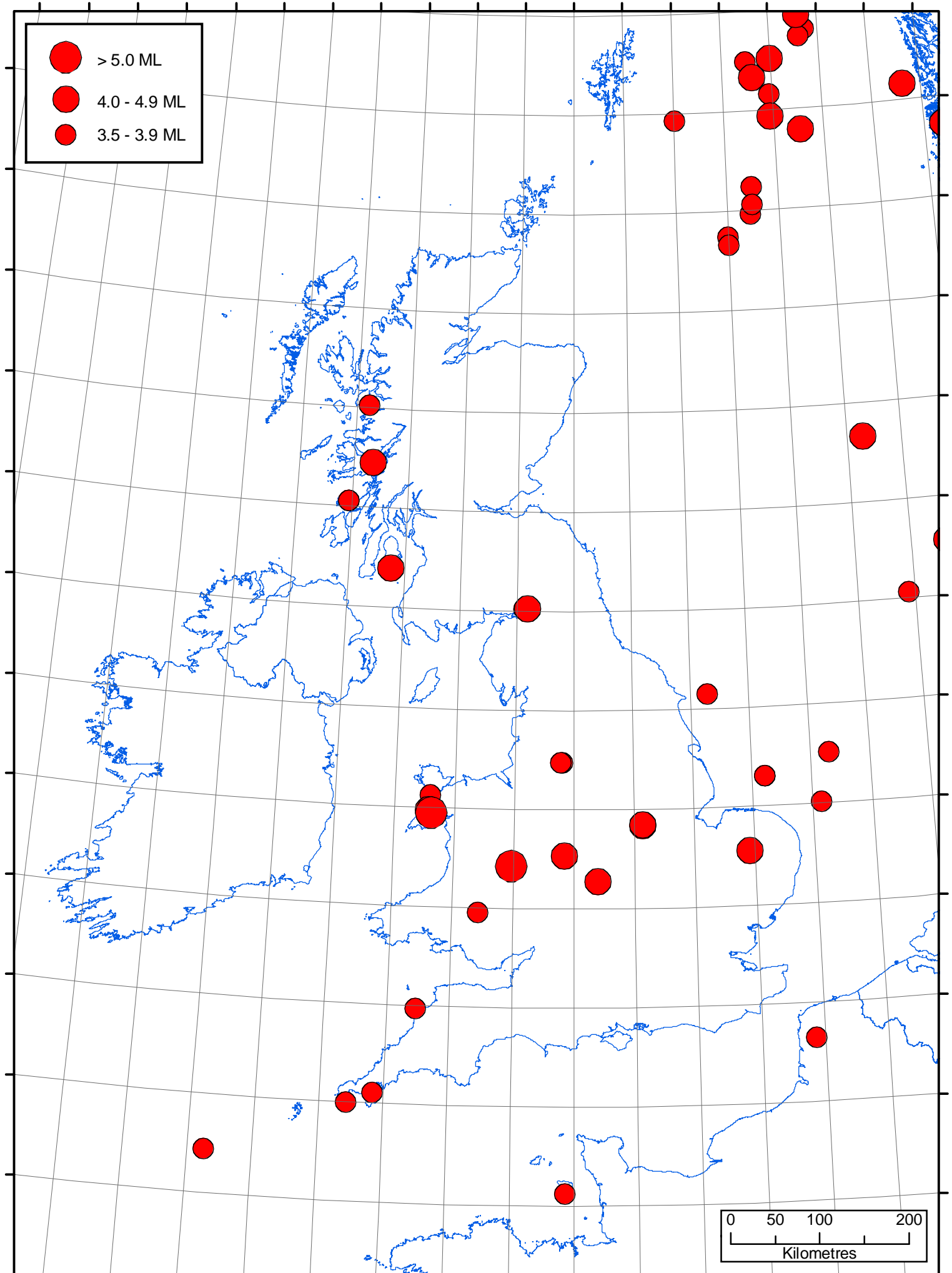


Figure 5. Epicentres of earthquakes with magnitudes 3.5 ML or greater, for the period 1979 - 2004.



Eskdalemuir, D & G 28 November 2004 08:11 UTC 2.9 ML

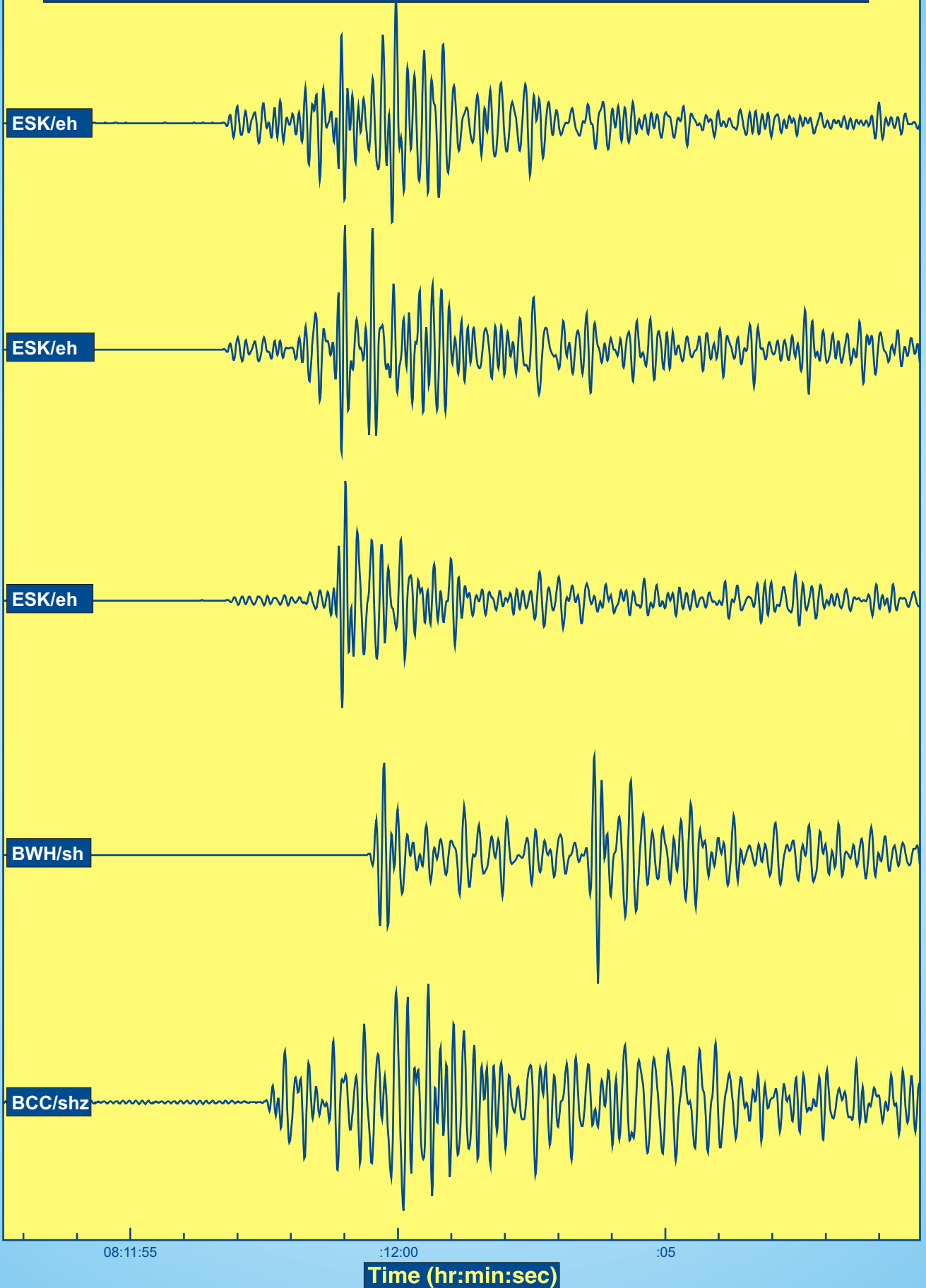


Figure 6. Seismograms of the Eskdalemuir earthquake of 28 November 2004 08:11 UTC 2.9 ML recorded on the Eskdalemuir and Borders seismic networks.

FAULT PLANE SOLUTION : ABERFOYLE EARTHQUAKE OF 20 JUNE 2003

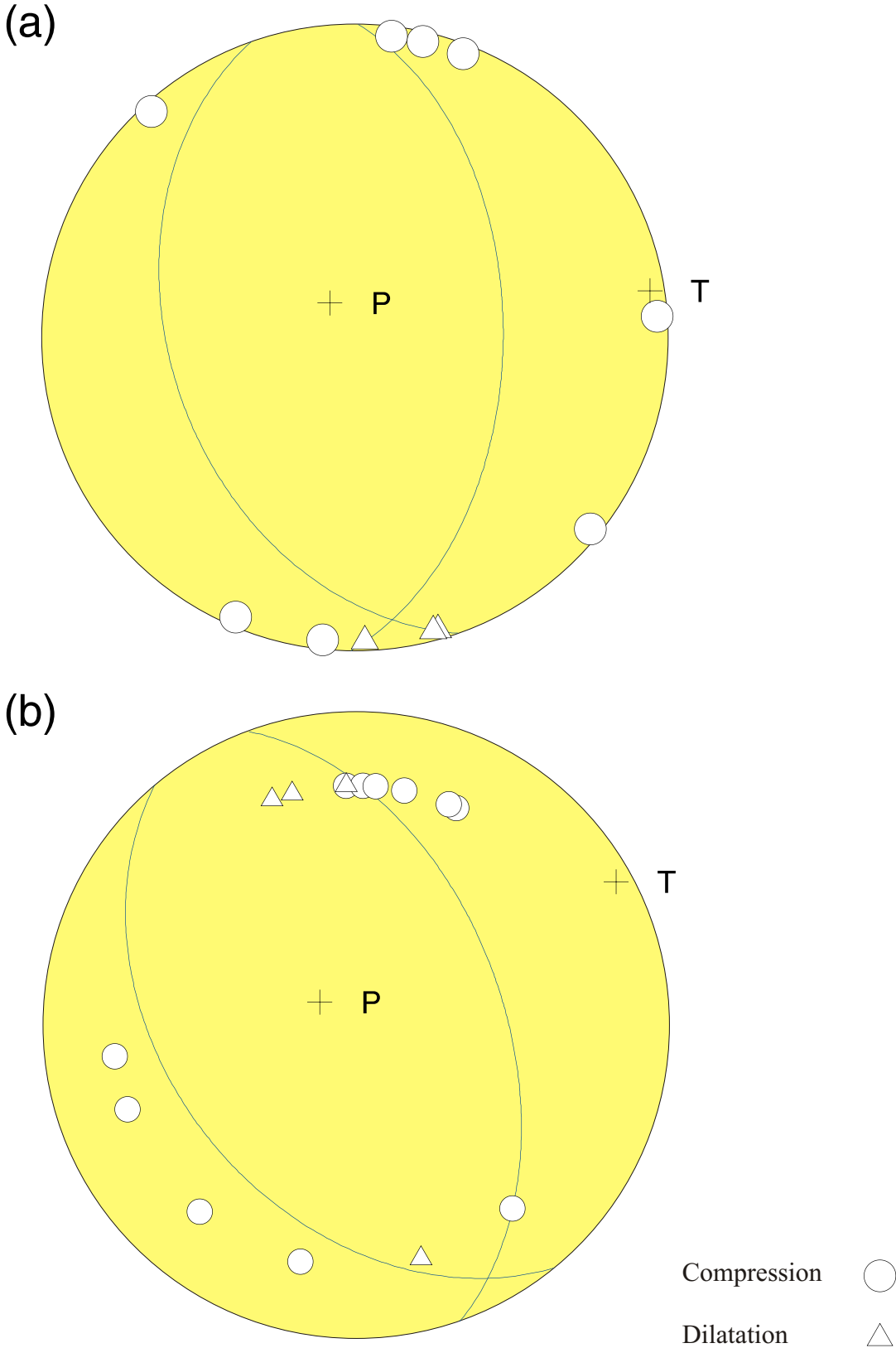


Figure 7. Equal area projection of the upper lower hemisphere for the Aberfoyle earthquake 20 June 2003 06:44 UTC 3.2 ML. The axes of maximum and minimum compressive stress are denoted by P and T respectively.

TABLE 1: CATALOGUE OF EVENTS LISTED CHRONOLOGICALLY: 2004

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmW	Dep	Mag	Locality	Int No	Gap	RMS	ERH	ERZ	Comments	
20040116	213829.9	54.30	0.01	530.8	491.0	32.9	2.6	OFF SCARBOROUGH,N YORKS	9	256	0.40	11.60	3.80	25KM OFFSHORE	
20040117	172049.0	54.29	-0.10	523.7	489.9	28.3	2.2	OFF SCARBOROUGH,N YORKS	3	311	0.20	18.06	5.60	22KM OFFSHORE	
20040118	035400.3	50.27	-5.45	154.1	47.1	0.7	0.9	OFF ST IVES, CORNWALL	6	256	0.10	3.10	64.90	7KM N OF ST IVES	
20040123	020106.5	56.25	-3.77	290.5	707.9	2.0	0.2	BLACKFORD, CENTRAL	2	148	0.10	2.94	3.60	FELT GLENDEVON	
20040125	032636.4	57.62	-3.91	285.7	860.8	2.6	1.2	MORAY FIRTH, HIGHLAND	8	121	0.20	4.30	4.50	3KM N OF NAIRN	
20040129	105601.6	51.09	-2.98	331.6	133.4	6.5	2.8	BRIDGWATER, SOMERSET	3	12	105	0.30	3.44	0.00	FELT SOMERSET...
20040129	105653.0	51.09	-2.98	331.5	133.4	6.5	3.2	BRIDGWATER, SOMERSET	3	13	105	0.30	3.22	0.00	FELT SOMERSET...
20040129	202335.3	51.07	-2.96	332.8	131.0	6.5	3.1	BRIDGWATER, SOMERSET	4	14	107	0.40	5.69	0.00	FELT SOMERSET...
20040129	202342.2	51.08	-2.97	332.0	131.6	6.5	3.1	BRIDGWATER, SOMERSET	4	6	135	0.20	3.62	0.00	FELT SOMERSET...
20040203	221111.3	53.49	-2.52	365.6	399.4	0.1	1.6	LEIGH, GTR MANCHESTER	3	13	72	0.50	4.69	7.00	C/P, FELT LEIGH
20040207	003729.8	53.12	-0.35	510.7	359.7	7.5	1.8	CONINGSBY, LINGS	6	220	0.30	13.06	24.20	8KM W OF CONINGSBY	
20040207	220514.2	55.11	-3.65	295.1	580.4	8.9	1.5	DUMFRIES, D & G	6	140	0.30	6.39	13.40		
20040209	055030.1	51.08	-2.96	332.4	131.8	8.1	1.5	BRIDGWATER, SOMERSET	10	184	0.20	5.02	6.00		
20040209	094706.4	56.57	-5.67	174.4	748.0	7.4	1.8	LOCHALINE, HIGHLAND	10	151	0.30	9.94	12.90		
20040222	182844.4	52.12	-2.40	372.3	246.8	16.4	1.6	GREAT MALVERN, HER & WOR	7	161	0.10	4.61	2.80		
20040223	065937.8	54.86	-1.44	435.9	552.3	17.0	2.0	SUNDERLAND, TYNE & WEAR	11	205	0.30	7.21	2.20	7KM SW OF SUNDERLAND	
20040224	220951.9	52.09	-3.18	319.4	244.3	6.6	1.0	HAY-ON-WYE, HER & WOR	5	109	0.10	2.33	4.00		
20040227	181204.0	61.14	4.85	768.3	1269.8	30.0	3.2	NORWEGIAN SEA	17	110	1.70	48.39	15.60		
20040228	035134.9	53.19	-1.58	428.1	366.0	8.7	1.0	MATLOCK, DERBYSHIRE	5	113	0.20	4.11	4.30	6KM N OF MATLOCK	
20040229	050805.2	53.56	-1.99	400.6	407.2	12.4	3.1	OLDHAM, GTR MANCHESTER	4	20	110	0.30	4.74	2.90	FELT OLDHAM...
20040301	034010.6	53.15	0.44	563.3	364.4	25.2	1.9	OFF SKEGNESS, LINGS	7	173	0.20	4.62	4.80	4KM OFFSHORE	
20040305	045037.8	52.09	-2.90	338.3	244.1	13.4	1.3	HEREFORD, HER & WOR	4	125	0.10	2.42	3.80	12KM W OF HEREFORD	
20040307	052657.6	52.09	-2.94	335.5	244.5	0.4	0.7	NEWRIDGE, GWENT	9	121	2.60	40.75	62.00	C/F	
20040309	161656.9	53.34	-1.88	408.3	382.2	2.6	2.3	CHAPEL-EN-LE-FRITH	11	116	0.30	4.70	6.90		
20040325	222300.0							SONIC-SCARBOROUGH	3	1				FELT SCARBOROUGH...	
20040327	014800.1	56.48	-6.36	131.4	740.3	8.2	1.0	ISLE OF MULL	6	225	0.20	13.99	0.00		
20040329	015152.9	52.87	-3.62	291.1	331.2	11.4	1.1	BALA, GWYNEDD	13	103	0.10	1.36	1.70		
20040405	051133.0	58.87	-1.31	590.6	1002.3	27.6	1.3	NORTHERN NORTH SEA	4	347	0.10	787.64			
20040408	205342.1	51.83	-2.95	334.7	214.6	17.6	1.3	ABERGAVENNY, GWENT	8	97	0.10	3.02	1.80	5KM E OF ABERGAVENNY	
20040409	054057.6	60.28	0.90	560.5	1158.8	20.9	1.1	NORTHERN NORTH SEA	4	331	0.40	656.06	446.40		
20040411	222043.6	49.14	-1.73	419.6	-84.4	8.5	1.2	CHERBOURG PENINSULA	5	345	0.00	1.98	10.90	23KM SE OF JERSEY	
20040412	070847.5	60.74	0.38	529.8	1208.7	16.7	1.9	NORTHERN NORTH SEA	4	333	0.20	17.22	6.90		
20040415	052523.4	56.56	-5.71	172.2	746.7	8.4	2.1	ARDTORNISH, HIGHLAND	12	140	0.40	8.68	0.00	FELT MORVEN	
20040415	053134.9	56.54	-5.82	165.0	745.0	11.4	1.1	LOCHALINE, HIGHLAND	4	221	0.20	27.31	70.30		
20040417	201257.2	52.62	-1.07	463.2	302.8	4.0	2.1	LEICESTER, LEICESTERSHIRE	11	86	0.20	3.48	4.30		
20040420	021604.8	49.22	-1.87	409.5	-75.4	11.6	1.5	JERSEY, CHANNEL ISLES	5	339	0.00	1.13	0.80	12KM E OF JERSEY	
20040421	215334.1	58.19	0.73	560.7	926.0	21.2	2.2	NORTHERN NORTH SEA	22	150	0.60	10.32	9.10		
20040425	112542.4	55.33	-1.35	441.4	604.5	12.7	1.8	OFF AMBLE, N'UMBERLAND	13	209	0.50	12.14	14.40	12KM OFFSHORE	
20040430	223837.7	56.57	-5.85	163.6	748.4	15.9	1.0	MORVERN, HIGHLAND	6	223	0.30	21.05	6.90		
20040502	070935.0	57.27	-5.66	179.2	826.4	2.7	0.5	KYLE OF LOCHALSH, HIGHLAND	5	112	0.10	3.11	3.00		
20040502	232317.0	55.25	-3.49	305.2	596.2	4.3	1.0	JOHNSTONEBRIDGE, D & G	7	197	0.20	3.14	2.60		
20040503	103802.7	61.34	-3.19	317.2	161.1	6.6	1.5	BRISTOL CHANNEL	11	95	0.20	2.15	6.90	5KM OFF BARRY	
20040513	065853.3	62.06	-1.88	602.4	1359.7	15.4	3.5	NORTHERN NORTH SEA	19	160	0.60	20.73	26.70		
20040513	111514.8	56.75	-3.77	291.5	763.8	1.6	1.1	BLAIR ATHOLL, TAYSIDE	10	156	0.20	5.38	5.60		
20040513	112044.4	55.72	-6.04	146.1	654.8	7.5	1.5	ISLAY, STRATHCLYDE	6	251	0.20	9.26	11.30		
20040524	195002.0							SONIC-IRISH SEA	1					FELT N WALES, MERSEYSIDE...	
20040529	101748.5	52.64	-3.14	323.0	305.2	12.6	1.3	WELSHPOOL, POWYS	8	143	0.10	3.89	2.10		
20040604	114936.4	49.33	-1.24	455.1	-62.8	7.5	1.8	CHERBOURG PENINSULA	5	354	0.00	768.85		60KM E OF JERSEY	
20040611	230104.0	52.20	-2.61	358.6	256.2	6.5	0.7	LEOMINSTER, HER & WOR	6	195	0.10	4.21	20.20	8KM ESE OF LEOMINSTER	
20040621	004400.5	54.99	-2.96	338.7	567.1	4.5	1.4	LOCKERBIE, D & G	12	112	99.90	70.40	21.40	9KM E OF LOCKERBIE	
20040621	060526.2	49.03	-1.66	425.1	-96.1	5.3	1.4	OFF CHERBOURG PENINSULA	5	348	0.00	3.39	0.80	30KM SE OF JERSEY	
20040621	152225.3	54.57	-3.42	307.9	520.3	5.8	1.1	CLEATOR MOOR, CUMBRIA	5	223	0.10	6.76	4.70	5KM NE OF CLEATOR MOOR	
20040622	154252.1	53.12	-2.18	679.6	366.5	4.3	2.4	SOUTHERN NORTH SEA	6	302	0.30	36.76	55.10		

TABLE 1: CATALOGUE OF EVENTS LISTED CHRONOLOGICALLY: 2004

20040629	003438.8	55.12	-3.21	322.7	581.0	4.5	2.0	LOCKERBIE, D & G	11	95	0.10	3.45	2.50	9KM E OF LOCKERBIE	
20040629	061329.6	51.95	-3.50	297.0	228.7	16.6	2.2	SENNYBRIDGE, POWYS	11	119	0.20	2.62	4.70	5KM E OF SENNYBRIDGE	
20040705	021731.0	53.94	-0.60	491.8	449.8	9.5	2.6	DRIFFIELD, HUMBERSIDE	19	140	0.30	4.16	10.10	10KM SW OF DRIFFIELD	
20040711	054719.9	57.44	-5.96	162.2	845.7	5.4	0.4	ISLAND OF RAASAY	4	206	0.00	3.00	1.00	OFFSHORE LOCATION	
20040712	191740.1	57.55	-5.39	197.4	856.5	8.0	0.9	KINLOCHWE, HIGHLAND	6	137	0.30	7.96	465.80	8KM SW OF KINLOCHWE	
20040713	044249.0	57.06	-5.57	183.5	802.1	3.4	0.4	KNOYDART, HIGHLAND	3	197	0.20	6.10	133.80		
20040719	032904.8	49.02	-2.58	357.9	-97.7	5.6	0.8	OFF JERSEY, CHANNEL ISLANDS	4	348	0.00	204.134	333.10	30KM SW OF JERSEY	
20040719	075345.8	53.07	-3.71	285.7	354.4	8.1	0.8	BETWS-Y-COED, GWYNEDD	6	155	0.20	4.19	9.00		
20040719	171344.3	53.23	-0.98	468.2	370.3	2.6	0.6	WALESBY, NOTTS	2	196	0.20	19.85	25.40	C/F, FELT WALESBY	
20040720	165418.7	53.23	-0.99	467.3	371.2	1.0	0.7	WALESBY, NOTTS	2	196	0.50	25.79	0.00	C/F, FELT WALESBY	
20040720	211028.3	53.52	-0.37	508.3	404.1	31.2	2.4	SCUNTHORPE, HUMBERSIDE	13	181	0.40	8.65	4.60	15KM SE OF SCUNTHORPE	
20040805	151153.4	57.46	-5.94	163.5	848.0	6.4	1.7	ISLAND OF RAASAY	11	98	0.20	2.15	2.70	OFFSHORE LOCATION	
20040807	045404.4	55.11	-3.62	296.8	580.5	8.0	2.3	DUMFRIES, D & G	3	31	87	0.30	5.10	9.60	FELT DUMFRIES
20040808	050625.5	53.46	-4.60	227.1	399.0	12.9	0.5	IRISH SEA	4	294	0.00	1.77	0.90	8KM OFFSHORE ANGLESEY	
20040820	022537.7	59.73	-2.81	670.0	1104.0	25.5	2.2	NORTHERN NORTH SEA	18	144	0.90	12.24	30.30	HORDA PLATFORM REGION	
20040823	001923.6	56.12	-3.97	277.4	693.3	5.9	1.4	STIRLING, CENTRAL	7	184	0.10	1.44	1.60		
20040824	090829.6	56.11	-3.98	276.7	692.9	7.1	1.0	STIRLING, CENTRAL	7	182	0.10	2.39	1.80		
20040906	033605.1	55.51	-2.45	371.8	624.1	1.9	0.8	JEDBURGH, BORDERS	9	206	0.20	6.12	5.20	7KM ENE OF JEDBURGH	
20040916	081743.2	57.44	-5.97	162.0	845.2	5.3	3.3	ISLAND OF RAASAY	15	147	0.00	1.20	1.40		
20040921	165500.0							SONIC-NORTH WALES	3					FELT NORTH WALES	
20040924	191001.7	49.35	-4.43	223.7	-58.1	2.7	1.1	ENGLISH CHANNEL	6	348	0.30	1193.27			
20041013	184118.3	55.20	-3.14	327.3	589.9	4.3	1.7	ESKDALEMUIR, D & G	34	95	0.10	1.43	0.30	FELT GRANGE FELL	
20041026	043519.7	53.18	-4.34	243.8	367.7	11.6	0.9	ANGLESEY, NORTH WALES	7	101	0.00	0.45	0.90		
20041026	112159.9	53.31	1.30	619.6	384.9	25.0	2.4	SOUTHERN NORTH SEA	10	250	0.10	5.72	5.00		
20041027	041633.4	55.20	-3.14	327.5	589.9	4.5	1.3	ESKDALEMUIR, D & G	2	34	96	0.10	1.87	19.10	FELT LOCKERBIE
20041027	235818.6	55.23	-3.12	328.7	593.9	2.3	-0.1	ESKDALEMUIR, D & G	21	305	0.20	2.51	0.60		
20041030	184251.4	52.36	-3.13	322.8	273.9	18.6	1.3	KNIGHTON, POWYS	5	176	0.10	5.82	3.60	6KM W OF KNIGHTON	
20041102	141031.5	55.21	-3.12	329.0	591.5	6.1	0.2	ESKDALEMUIR, D & G	21	315	0.00	0.81	1.50		
20041103	133451.8	55.20	-3.14	327.3	590.0	4.6	2.7	ESKDALEMUIR, D & G	3	42	115	0.20	2.28	18.40	FELT LANGHOLM...
20041103	140616.2	55.20	-3.16	326.0	590.3	4.3	1.5	ESKDALEMUIR, D & G	2	27	109	0.20	2.47	57.70	FELT GRANGE FELL
20041103	140617.6	55.20	-3.14	327.2	590.1	4.2	1.8	ESKDALEMUIR, D & G	2	24	144	0.10	2.50	76.80	FELT GRANGE FELL
20041103	141044.4	55.20	-3.14	327.6	590.1	4.6	2.1	ESKDALEMUIR, D & G	2	30	116	0.20	2.60	20.80	FELT LOCKERBIE
20041103	142236.3	55.22	-3.12	329.1	591.9	6.1	-0.3	ESKDALEMUIR, D & G	21	314	0.10	1.39	2.40		
20041103	142749.6	55.03	-5.37	184.9	575.3	0.0	2.9	EXP - NORTH CHANNEL	14	74	0.20	1.80	0.00	CONFIRMED EXPLOSION	
20041103	145204.3	55.20	-3.15	327.1	590.4	4.3	1.3	ESKDALEMUIR, D & G	2	27	114	0.10	2.09	71.00	FELT GRANGE FELL
20041104	015929.4	55.20	-3.14	327.3	590.3	4.3	1.2	ESKDALEMUIR, D & G	27	115	0.10	1.80	63.50		
20041104	020036.5	55.22	-3.12	328.8	591.9	6.2	-0.1	ESKDALEMUIR, D & G	21	314	0.00	0.58	1.00		
20041104	193024.9	55.22	-3.12	329.0	591.8	6.2	0.0	ESKDALEMUIR, D & G	21	314	0.00	0.58	0.90		
20041104	203850.8	55.22	-3.12	328.8	591.9	5.9	0.5	ESKDALEMUIR, D & G	21	314	0.00	0.50	1.00		
20041104	215054.4	55.22	-3.12	329.1	592.1	5.2	0.0	ESKDALEMUIR, D & G	21	314	0.00	1.08	3.00		
20041105	093604.9	55.22	-3.12	329.0	592.1	6.6	0.0	ESKDALEMUIR, D & G	21	313	0.00	0.58	0.90		
20041105	094042.0	55.20	-3.14	327.4	590.1	4.2	1.9	ESKDALEMUIR, D & G	27	140	0.10	2.47	1.10	FELT LANGHOLM	
20041105	103828.6	55.22	-3.12	328.9	591.8	6.0	-0.2	ESKDALEMUIR, D & G	21	314	0.00	0.72	1.20		
20041105	133608.0	55.22	-3.12	328.9	592.1	6.3	-0.1	ESKDALEMUIR, D & G	21	314	0.00	0.58	0.90		
20041107	170956.7	55.20	-3.14	327.7	590.1	4.2	0.9	ESKDALEMUIR, D & G	26	98	0.10	1.90	34.70		
20041107	183919.8	55.20	-3.14	327.8	590.6	4.2	0.8	ESKDALEMUIR, D & G	25	117	0.10	2.25	67.90		
20041107	205436.1	55.20	-3.14	327.5	590.5	4.3	0.9	ESKDALEMUIR, D & G	26	115	0.10	1.68	1.00		
20041110	233515.2	53.18	-5.24	183.4	369.3	7.5	2.1	IRISH SEA	17	109	0.30	3.52	7.10	45KM WSW HOLYHEAD	
20041111	005853.6	55.25	-3.49	305.2	596.2	4.5	1.1	JOHNSTONEBRIDGE, D & G	7	197	0.20	4.27	184.30		
20041112	001126.9	55.24	-3.49	305.5	595.2	4.1	1.0	JOHNSTONEBRIDGE, D & G	3	190	0.20	3.26	8.60		
20041113	112956.0	50.11	-5.17	173.0	28.0	7.3	0.8	CONSTANTINE, CORNWALL	5	127	0.00	0.82	0.60		
20041113	113101.0	50.11	-5.18	172.9	28.1	7.2	0.5	CONSTANTINE, CORNWALL	5	125	0.00	0.95	0.70		
20041115	003413.0	55.12	-3.21	322.7	581.1	4.1	1.2	LOCKERBIE, D & G	6	143	0.20	3.76	1.50	8KM E OF LOCKERBIE	
20041115	074924.6	55.19	-3.16	326.0	588.8	4.2	1.0	ESKDALEMUIR, D & G	3	209	0.10	3.98	95.90		
20041116	025208.8	52.32	-3.96	266.5	270.9	3.9	1.1	ABERYSTWYTH, DYFED	9	104	0.20	3.56	3.50	10KM SE OF ABERYSTWYTH	

TABLE 1: CATALOGUE OF EVENTS LISTED CHRONOLOGICALLY: 2004

20041119	025323.8	55.22	-3.12	328.9	592.0	6.2	0.1	ESKDALEMUIR, D & G	18	314	0.00	0.58	1.00	
20041119	130623.9	53.29	-4.50	233.1	380.0	11.2	0.2	HOLYHEAD, ANGLESEY	6	116	0.10	1.26	1.40	8KM ESE OF HOLYHEAD
20041121	154251.8	55.22	-3.12	329.0	591.8	4.1	-0.3	ESKDALEMUIR, D & G	14	315	0.10	1.50	49.00	
20041128	081153.6	55.21	-3.14	327.4	591.2	5.2	2.9	ESKDALEMUIR, D & G	41	114	0.30	5.91	190.40	FELT LANGHOLM...
20041128	081624.8	55.21	-3.13	327.8	591.1	4.3	0.5	ESKDALEMUIR, D & G	25	116	0.10	1.75	2.60	
20041128	190216.5	55.23	-3.12	329.1	593.2	3.0	-0.3	ESKDALEMUIR, D & G	21	309	0.20	4.83	4.40	
20041129	220702.7	55.22	-3.11	329.3	592.4	7.2	-0.1	ESKDALEMUIR, D & G	20	312	0.10	3.30	4.10	
20041130	043119.5	53.35	-1.23	451.2	384.3	2.6	2.2	ANSTON, S YORKSHIRE	7	149	0.40	20.65	19.20	C/F
20041130	183907.7	55.24	-3.12	328.5	594.1	2.2	-0.4	ESKDALEMUIR, D & G	21	303	0.20	2.42	0.60	
20041130	211052.8	55.22	-3.11	329.3	592.3	6.8	-0.3	ESKDALEMUIR, D & G	21	313	0.10	1.66	2.30	
20041201	053554.6	51.76	-3.02	329.8	207.7	22.9	1.9	BLAENAVON, GWENT	10	87	0.10	1.57	1.90	
20041202	201710.2	59.21	2.41	651.9	1044.4	30.9	3.0	NORTHERN NORTH SEA	16	292	0.20	101.21	92.50	
20041208	161337.0	52.09	-2.45	369.4	244.1	12.4	1.9	GT MALVERN, HER & WOR	12	177	0.20	4.65	4.10	
20041209	034844.6	55.22	-3.11	329.4	592.3	6.8	-0.2	ESKDALEMUIR, D & G	19	313	0.10	1.78	2.80	
20041213	235326.8	55.22	-3.11	329.3	592.2	4.1	-0.3	ESKDALEMUIR, D & G	21	313	0.10	7.23	15.50	
20041213	235901.6	55.22	-3.12	329.1	592.0	5.4	-0.4	ESKDALEMUIR, D & G	21	314	0.00	1.08	2.90	
20041216	022632.9	53.47	-4.21	253.3	399.2	14.8	1.1	OFF ANGLESEY, GWYNEDD	9	104	0.10	2.62	2.30	7KM NE OF ANGLESEY
20041220	064333.7	50.09	-5.14	175.7	26.4	6.2	1.0	FALMOUTH, CORNWALL	6	169	0.00	1.04	1.00	7KM SW OF FALMOUTH
20041220	191110.7	53.23	-1.23	451.4	370.9	1.0	2.3	BOLSOVER, DERBYSHIRE	8	258	0.30	35.52	0.00	C/F
20041221	120111.3							SONIC-IRISH SEA	3					FELT N WALES, MERSEYSIDE...
20041221	120900.0							SONIC-IRISH SEA	3					FELT N WALES, MERSEYSIDE...
20041221	122000.0							SONIC-IRISH SEA	3					FELT N WALES, MERSEYSIDE...
20041221	123000.0							SONIC-IRISH SEA	3					FELT N WALES, MERSEYSIDE...
20041221	222151.4	55.25	-3.12	329.0	592.3	6.4	-0.2	ESKDALEMUIR, D & G	20	313	0.00	1.22	2.00	
20041224	204647.5	55.25	-3.46	307.0	596.5	12.0	0.4	JOHNSTONEBRIDGE, D & G	21	341	0.00	0.94	1.00	
20041225	101903.3	55.22	-3.11	329.3	592.2	6.5	0.2	ESKDALEMUIR, D & G	21	313	0.00	1.08	1.70	
20041226	072749.3	55.22	-3.12	328.9	592.1	6.2	0.3	ESKDALEMUIR, D & G	21	313	0.00	0.58	1.00	
20041227	040132.6	55.20	-3.14	327.5	590.3	4.3	1.0	ESKDALEMUIR, D & G	24	115	0.20	2.53	52.60	
20041229	045226.1	55.13	-3.21	323.1	582.3	4.3	1.1	LOCKERBIE, D & G	25	102	0.10	2.60	2.80	
20041230	151944.0	55.22	-3.12	328.8	592.6	6.4	-0.3	ESKDALEMUIR, D & G	20	312	0.00	0.72	1.10	
20041231	075644.5	51.44	-2.72	350.0	171.7	18.8	1.2	BRISTOL, AVON	6	198	0.10	6.80	1.20	









TABLE 2: PHASE DATA 2004

Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations WME, WCB, HTR, MCH, HAE.

Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations KSB, KPL, EAB, PMS, PCS, KSK, ELO, PCA, GMK, GCL, EDI.

April 5 2004. Time: 05:11 33.0 UTC. Magnitude: 1.7 ML. Depth: 27.6 km. RMS: 0.10 secs. Locality: NORTHERN NORTH SEA. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations SAN, LRW, WAL, YEL.

April 15 2004. Time: 05:31 34.9 UTC. Magnitude: 1.1 ML. Depth: 11.4 km. RMS: 0.20 secs. Locality: LOCHALINE, HIGHLAND. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations KAR, KSB, KPL, KPS, KPL, PMS.

April 8 2004. Time: 20:53 42.1 UTC. Magnitude: 1.3 ML. Depth: 17.6 km. RMS: 0.10 secs. Locality: ABERGAVENNY, GWENT. Comment: 5KM E OF ABERGAVENNY. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations MCH, HTR, HAE, SMD, SSP, HSA, SWK, HEX.

April 17 2004. Time: 20:12 57.2 UTC. Magnitude: 2.1 ML. Depth: 4.0 km. RMS: 0.20 secs. Locality: LEICESTER, LEICESTERSHIRE. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations CWF, KSY, KTG, KWE, KWE, KBI, SKP, LHO, HLM, SWN, SWN, SWN, SWN, MCH, MCH, MCH, HPK, HPK.

April 9 2004. Time: 05:40 57.6 UTC. Magnitude: 1.1 ML. Depth: 20.9 km. RMS: 0.40 secs. Locality: NORTHERN NORTH SEA. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations YEL, LRW, LRW, LRW, LRW, SAN, WAL.

Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations CWF, KSY, KTG, KWE, KWE, KBI, SKP, LHO, HLM, SWN, SWN, SWN, SWN, MCH, MCH, MCH, HPK, HPK.

April 11 2004. Time: 22:20 43.6 UTC. Magnitude: 1.2 ML. Depth: 8.5 km. RMS: 0.00 secs. Locality: CHERBOURG PENINSULA. Comment: 23KM SE OF JERSEY. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations JQE, JRS, JRS, JRS, JRS, JLP, JLP, JSA, JVM.

April 20 2004. Time: 02:16 04.8 UTC. Magnitude: 1.5 ML. Depth: 11.6 km. RMS: 0.00 secs. Locality: JERSEY, CHANNEL ISLES. Comment: 12KM E OF JERSEY. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations JQE, JRS, JRS, JRS, JRS, JLP, JLP, JSA, JSA, JVM, JVM.

April 12 2004. Time: 07:08 47.5 UTC. Magnitude: 1.9 ML. Depth: 16.7 km. RMS: 0.20 secs. Locality: NORTHERN NORTH SEA. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations YEL, LRW, LRW, LRW, LRW, SAN, SAN, WAL.

April 21 2004. Time: 21:53 34.1 UTC. Magnitude: 2.2 ML. Depth: 21.2 km. RMS: 0.60 secs. Locality: NORTHERN NORTH SEA. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations SNART, SNART, SNART, MLA, MCD, MCD, MCD, ORE, KMY, KMY, MDO, ESY, ESY.

April 15 2004. Time: 05:25 23.4 UTC. Magnitude: 2.1 ML. Depth: 8.4 km. RMS: 0.40 secs. Locality: ARDTORNISH, HIGHLAND. Comment: FELT MORVEN. Intensity: 3. Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations KAR.

Table with 11 columns: Station, Azimuth, Distance, Phase, Weight, Priority, Time, Magnitude, Depth, RMS, and other parameters. Includes data for stations SNART, SNART, SNART, MLA, MCD, MCD, MCD, ORE, KMY, KMY, MDO, ESY, ESY.

**TABLE 2: PHASE DATA 2004**

EBH SZ 336.0 EP 3 21:54 20.61	<b>Grid Ref: 305.23 kmE 596.22 kmN</b>	<b>RMS: 0.20 secs</b>
EGD SZ 345.0 EP 21:54 20.32	<b>Locality: JOHNSTONEBRIDGE,D &amp; G</b>	
EGD SZ 345.0 ES 21:54 53.76	STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	
EGD SZ 345.0 AML 21:54 56.53 3 0.19	BWH SZ 13.4 IP C 23:23 19.88	
EDI SZ 347.0 EP 2 21:54 20.73	BWH SZ 13.4 ES 2 23:23 21.53	
EDI SZ 347.0 ES 3 21:54 54.70	ESK BE 19.5 IP C 23:23 20.87	
BER SZ 358.0 EP 21:54 21.64	ESK SZ 19.5 IP C 23:23 20.98	
BLS5 SZ 358.0 EP 21:54 22.74	ESK BN 19.5 ES 2 23:23 23.43	
BLS5 SZ 358.0 ES 21:54 57.97	ESK SN 19.5 ES 2 23:23 23.48	
BLS5 SZ 358.0 AML 21:55 00.06 12 0.30	ESK SE 19.5 AML 23:23 23.69 28 0.11	
ASK SZ 359.0 EP 21:54 21.90	ESK SN 19.5 AML 23:23 24.73 24 0.21	
ASK SZ 359.0 ES 21:54 56.97	EKB1 SZ 21.0 EP 23:23 21.20	
ASK SZ 359.0 AML 21:54 58.56 2 0.29	EKB1 SZ 21.0 ES 23:23 23.93	
EAU SZ 364.0 EP 3 21:54 23.05	BHH SZ 24.7 IP C 23:23 21.76	
EAB SZ 379.0 EP 2 21:54 25.66	BHH SN 24.7 ES 2 23:23 24.66	
EAB SZ 379.0 ES 3 21:55 02.17	BHH SE 24.7 AML 23:23 24.89 42 0.13	
ODD1 SZ 388.0 EP 21:54 25.31	BHH SN 24.7 AML 23:23 24.93 54 0.18	
SUE SZ 391.0 EP 21:54 26.28	BBH SZ 38.1 IP C 23:23 23.96	
SUE SZ 391.0 ES 21:55 03.99	BDL SZ 61.1 EP 2 23:23 27.93	
SUE SZ 391.0 AML 21:55 06.47 7 0.20	BTA SZ 64.3 EP 2 23:23 28.84	
EKB BZ 398.0 EP 21:54 26.54		
EKB BE 398.0 ES 21:55 05.25	<b>May 3 2004 Time: 10:38 02.7 UTC Magnitude: 1.5 ML</b>	
FOO SZ 449.0 EP 21:54 33.16	<b>Lat: 51.342N Lon: -3.189W</b>	<b>Depth: 6.6 km</b>
FOO SZ 449.0 ES 21:55 15.98	<b>Grid Ref: 317.19 kmE 161.05 kmN</b>	<b>RMS: 0.20 secs</b>
FOO SZ 449.0 AML 21:55 18.51 8 0.27	<b>Locality: BRISTOL CHANNEL</b>	
HYA SZ 451.0 EP 21:54 34.42	<b>Comment: 5KM OFF BARRY</b>	
HYA SZ 451.0 ES 21:55 18.17	STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	
KONO BZ 535.0 EP 21:54 43.96	SWK SZ 69.2 IP 10:38 14.42	
KONO BZ 535.0 ES 21:55 34.94	MCH SZ 74.1 EP 2 10:38 15.04	
MOL SZ 615.0 EP 21:54 54.80	MCH SN 74.1 ES 2 10:38 24.27	
MOL SN 615.0 ES 21:55 53.87	MCH SE 74.1 AML 10:38 27.03 9 0.27	
	MCH SN 74.1 AML 10:38 30.95 10 0.09	
<b>April 25 2004 Time: 11:25 42.4 UTC Magnitude: 1.8 ML</b>	HSA SZ 80.9 EP 3 10:38 16.25	
<b>Lat: 55.333N Lon: -1.348W</b>	HTR SZ 82.2 EP 2 10:38 16.27	
<b>Grid Ref: 441.36 kmE 604.52 kmN</b>	HAE SZ 89.3 EP 3 10:38 17.89	
<b>Locality: OFF AMBLE,N'UMBERLAND</b>	HTL HZ 98.5 EP 2 10:38 18.79	
<b>Comment: 12KM OFFSHORE</b>	HTL SZ 98.5 EP 2 10:38 18.79	
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	HTL SN 98.5 ES 2 10:38 30.86	
LCP SZ 66.8 IP C 11:25 53.68	HTL SZ 98.5 AML 10:38 33.48 15 0.48	
BTA SZ 97.6 EP 2 11:25 58.02	HTL SN 98.5 AML 10:38 35.20 19 0.46	
BTA SN 97.6 ES 2 11:26 10.60	DYA SZ 114.0 EP 2 10:38 21.51	
BTA SE 97.6 AML 11:26 11.92 21 0.34	DYA SN 114.0 ES 2 10:38 34.68	
BTA SN 97.6 AML 11:26 13.38 17 0.21	DYA SE 114.0 AML 10:38 37.28 28 0.20	
ESY SZ 103.0 EP 2 11:25 59.88	DYA SN 114.0 AML 10:38 38.28 27 0.26	
BBH SZ 103.0 EP 1 C 11:25 58.96	SSP SZ 120.0 EP 2 10:38 22.62	
LRN SZ 106.0 EP 3 11:25 59.49	SSP SN 120.0 ES 2 10:38 36.73	
BDL SZ 118.0 EP 2 11:26 00.50	SSP SN 120.0 AML 10:38 39.59 11 0.24	
EBL SZ 118.0 EP 2 11:26 01.30	SSP SE 120.0 AML 10:38 40.53 15 0.24	
ESK SZ 118.0 EP 2 11:26 00.81	DCO SZ 123.0 EP 2 10:38 22.95	
ESK SN 118.0 AML 11:26 16.18 12 0.22	HPE SZ 128.0 EP 2 10:38 23.84	
ESK SE 118.0 AML 11:26 16.88 8 0.15	SBD SZ 174.0 EP 3 10:38 30.98	
LNH SZ 119.0 EP 2 11:26 01.80		
BHH SZ 122.0 EP 2 11:26 01.18	<b>May 13 2004 Time: 06:58 53.3 UTC Magnitude: 3.5 ML</b>	
BHH SN 122.0 ES 2 11:26 16.74	<b>Lat: 62.063N Lon: 1.875W</b>	<b>Depth: 15.4 km</b>
BHH SE 122.0 AML 11:26 20.08 20 0.25	<b>Grid Ref: 602.44 kmE 1359.66 kmN</b>	<b>RMS: 0.60 secs</b>
BHH SN 122.0 AML 11:26 20.68 20 0.32	<b>Locality: NORTHERN NORTH SEA</b>	
BBO SZ 138.0 IP C 11:26 02.85	STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	
BBO SN 138.0 ES 2 11:26 21.15	FOO SZ 175.0 IP D 06:59 18.13	
BBO SE 138.0 AML 11:26 22.31 21 0.29	FOO SN 175.0 ES 2 06:59 36.61	
BBO SN 138.0 AML 11:26 22.40 20 0.25	SUE SZ 190.0 IP D 06:59 20.15	
BWH SZ 148.0 EP 2 11:26 04.51	SUE SN 190.0 ES 2 06:59 41.27	
HPK SZ 154.0 EP 3 11:26 06.63	SUE SN 190.0 AML 06:59 42.74 307 0.30	
HPK SN 154.0 ES 2 11:26 24.71	SUE SE 190.0 AML 06:59 42.81 444 0.33	
HPK SE 154.0 AML 11:26 25.93 68 0.23	YEL SZ 231.0 EP 9 06:59 43.62	
HPK SN 154.0 AML 11:26 27.52 45 0.26	HYA SZ 250.0 IP C 06:59 29.10	
	ASK SZ 251.0 IP D 06:59 28.20	
<b>April 30 2004 Time: 22:38 37.7 UTC Magnitude: 1.0 ML</b>	BER SZ 264.0 IP D 06:59 30.15	
<b>Lat: 56.568N Lon: -5.848W</b>	EGD SZ 269.0 EP 2 06:59 30.40	
<b>Grid Ref: 163.63 kmE 748.40 kmN</b>	LRW SZ 270.0 IP 9 06:59 48.76	
<b>Locality: MORVERN,HIGHLAND</b>	LRW SN 270.0 ES 9 07:00 17.96	
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	LRW SE 270.0 AML 07:00 20.27 238 0.41	
KAR SZ 39.1 EP 2 22:38 45.09	LRW SN 270.0 AML 07:00 20.74 234 0.38	
KAR SZ 39.1 ES 3 22:38 49.62	WAL SZ 275.0 EP 9 06:59 49.20	
KSB SZ 76.1 EP 2 22:38 50.80	SAN SZ 283.0 IP 9 D 06:59 50.14	
KPL SZ 86.7 EP 2 22:38 51.74	MOL SZ 300.0 IP D 06:59 35.15	
KPL SN 86.7 AML 22:39 06.31 6 0.13	MOL SN 300.0 ES 2 07:00 04.45	
KPL SE 86.7 AML 22:39 06.35 6 0.25	ODD1 SZ 351.0 EP 2 06:59 39.94	
EAB SZ 102.0 EP 2 22:38 54.10	BLS5 SZ 386.0 IP D 06:59 46.03	
PMS SZ 106.0 IP C 22:38 54.70	BLS5 SE 386.0 ES 2 07:00 24.22	
PMS SZ 106.0 ES 3 22:39 07.81	OWE SZ 406.0 EP 2 06:59 47.80	
PCO SZ 126.0 EP 3 22:38 57.83	OST SZ 411.0 EP 2 06:59 48.50	
	FSV SZ 429.0 EP 3 06:59 49.74	
<b>May 2 2004 Time: 07:09 35.0 UTC Magnitude: 0.5 ML</b>	FTO SZ 455.0 EP 3 06:59 53.38	
<b>Lat: 57.275N Lon: -5.663W</b>	OHO SZ 457.0 EP 2 06:59 54.23	
<b>Grid Ref: 179.21 kmE 826.40 kmN</b>	OBR SZ 474.0 EP 2 06:59 55.89	
<b>Locality: KYLE OF LOCHALSH,HIGHLAND</b>	FVA SZ 482.0 EP 2 06:59 56.54	
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	ORE SZ 500.0 EP 2 06:59 59.45	
KPL SZ 7.1 IP D 07:09 36.74	ORE SE 500.0 AML 07:00 50.51 100 0.44	
KPL SN 7.1 ES 2 07:09 37.85	ORE SN 500.0 AML 07:01 00.93 68 0.31	
KPL SN 7.1 AML 07:09 37.95	OTO SZ 527.0 EP 2 07:00 02.75	
KPL SE 7.1 AML 07:09 38.02 33 0.07		
KSB SZ 16.3 IP C 07:09 38.39		
KSB SZ 16.3 ES 2 D 07:09 40.66	<b>May 13 2004 Time: 11:15 14.8 UTC Magnitude: 1.1 ML</b>	
KAR SZ 41.0 IP C 07:09 42.45	<b>Lat: 56.753N Lon: -3.774W</b>	<b>Depth: 1.6 km</b>
RRR SZ 65.4 EP 2 07:09 47.40	<b>Grid Ref: 291.54 kmE 763.76 kmN</b>	<b>RMS: 0.20 secs</b>
KSK SZ 65.9 EP 3 07:09 46.17	<b>Locality: BLAIR ATHOLL,TAYSIDE</b>	
	STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	
<b>May 2 2004 Time: 23:23 17.0 UTC Magnitude: 1.0 ML</b>	EAB SZ 71.8 IP 1 C 11:15 27.12	
<b>Lat: 55.251N Lon: -3.491W</b>	MME SZ 79.5 EP 2 11:15 28.50	
	MDO SZ 84.5 EP 2 11:15 28.99	























**TABLE 2: PHASE DATA 2004**

EKB10 SZ 19.6 EP 17:10 00.72  
 EKB10 SZ 19.6 ES 17:10 03.25  
 BWH SZ 33.1 IP C 17:10 02.61  
 BTA SZ 43.7 EP 2 17:10 04.69  
 BTA SN 43.7 ES 2 17:10 10.07  
 BTA SN 43.7 AML 17:10 12.72 10 0.36  
 BTA SE 43.7 AML 17:10 12.99 9 0.29  
 BBO SZ 52.1 EP 2 17:10 06.29

EKR3 SZ 14.3 ES 20:54 41.19  
 EKB4 SZ 14.4 EP 20:54 39.20  
 EKB4 SZ 14.4 ES 20:54 41.23  
 EKR2 SZ 14.7 EP 20:54 39.27  
 EKR2 SZ 14.7 ES 20:54 41.34  
 EKR1 SZ 15.2 EP 20:54 39.33  
 EKR1 SZ 15.2 ES 20:54 41.46  
 EKB5 SZ 15.2 EP 20:54 39.35  
 EKB5 SZ 15.2 ES 20:54 41.44  
 EKB6 SZ 16.0 EP 20:54 39.46  
 EKB6 SZ 16.0 ES 20:54 41.64  
 EKB7 SZ 16.9 EP 20:54 39.60  
 EKB7 SZ 16.9 ES 20:54 41.88  
 EKB8 SZ 17.8 EP 20:54 39.73  
 EKB8 SZ 17.8 ES 20:54 42.07  
 EKB9 SZ 18.5 EP 20:54 39.88  
 EKB9 SZ 18.5 ES 20:54 42.31  
 EKB10 SZ 19.4 EP 20:54 39.99  
 EKB10 SZ 19.4 ES 20:54 42.50  
 BCC SZ 21.4 EP 2 20:54 40.04  
 BWH SZ 32.9 IP C 20:54 41.91  
 BTA SZ 44.1 IP C 20:54 44.00  
 BTA SE 44.1 ES 2 20:54 49.54  
 BDL SZ 46.3 EP 2 20:54 44.49

November 7 2004 Time: 18:39 19.8 UTC Magnitude: 0.8 ML  
 Lat: 55.204N Lon: -3.134W Depth: 4.2 km  
 Grid Ref: 327.84 kmE 590.56 kmN RMS: 0.10 secs  
 Locality: ESKDALEMUIR,D & G

November 10 2004 Time: 23:35 15.2 UTC Magnitude: 2.1 ML  
 Lat: 53.176N Lon: -5.241W Depth: 7.5 km  
 Grid Ref: 183.43 kmE 369.26 kmN RMS: 0.30 secs  
 Locality: IRISH SEA  
 Comment: 45KM WSW HOLYHEAD

STAT CO DIST PHAS WT P HrMn SECS AMPL PERI  
 EKB1 SZ 12.0 EP 18:39 22.54  
 EKB1 SZ 12.0 ES 18:39 24.37  
 EKR9 SZ 12.8 ES 18:39 24.47  
 EKR10 SZ 12.8 EP 18:39 22.54  
 EKR9 SZ 12.8 EP 18:39 22.60  
 EKR10 SZ 12.8 ES 18:39 24.40  
 EKB2 SZ 12.8 EP 18:39 22.69  
 EKB2 SZ 12.8 ES 18:39 24.57  
 EKR8 SZ 12.9 EP 18:39 22.62  
 EKR8 SZ 12.9 ES 18:39 24.49  
 EKR7 SZ 13.1 EP 18:39 22.65  
 EKR7 SZ 13.1 ES 18:39 24.52  
 EKR6 SZ 13.3 EP 18:39 22.69  
 EKR6 SZ 13.3 ES 18:39 24.60  
 ESK SZ 13.3 EP 2 18:39 22.74  
 ESK SE 13.3 AML 18:39 24.82 10 0.08  
 ESK SN 13.3 AML 18:39 26.61 7 0.20  
 BHH SZ 13.4 IP C 18:39 22.27  
 BHH SN 13.4 AML 18:39 24.00 164 0.13  
 BHH SE 13.4 AML 18:39 24.09 183 0.17  
 EKR5 SZ 13.5 EP 18:39 22.72  
 EKR5 SZ 13.5 ES 18:39 24.67  
 EKB3 SZ 13.6 EP 18:39 22.85  
 EKB3 SZ 13.6 ES 18:39 24.80  
 EKR4 SZ 13.9 EP 18:39 22.80  
 EKR4 SZ 13.9 ES 18:39 24.78  
 EKR3 SZ 14.2 EP 18:39 22.92  
 EKR3 SZ 14.2 ES 18:39 24.89  
 EKB4 SZ 14.3 EP 18:39 23.02  
 EKB4 SZ 14.3 ES 18:39 24.95  
 EKR2 SZ 14.7 EP 18:39 22.99  
 EKR2 SZ 14.7 ES 18:39 25.07  
 EKR1 SZ 15.1 EP 18:39 23.07  
 EKR1 SZ 15.1 ES 18:39 25.18  
 EKB5 SZ 15.1 EP 18:39 23.10  
 EKB5 SZ 15.1 ES 18:39 25.14  
 EKB6 SZ 15.9 EP 18:39 23.22  
 EKB6 SZ 15.9 ES 18:39 25.35  
 EKB7 SZ 16.8 EP 18:39 23.29  
 EKB7 SZ 16.8 ES 18:39 25.60  
 EKB8 SZ 17.7 EP 18:39 23.55  
 EKB8 SZ 17.7 ES 18:39 25.80  
 EKB9 SZ 18.4 EP 18:39 23.74  
 EKB9 SZ 18.4 ES 18:39 26.02  
 EKB10 SZ 19.2 EP 18:39 23.82  
 EKB10 SZ 19.2 ES 18:39 26.19  
 BWH SZ 33.3 IP C 18:39 25.55  
 BTA SZ 43.9 EP 2 18:39 27.55  
 BTA SN 43.9 ES 2 18:39 33.04  
 BBO SZ 52.5 EP 2 18:39 29.39

STAT CO DIST PHAS WT P HrMn SECS AMPL PERI  
 YRC SZ 45.2 IP C 23:35 23.10  
 YRC SZ 45.2 ES 3 23:35 28.12  
 WCB SZ 51.5 IP C 23:35 24.09  
 WCB SN 51.5 ES 2 23:35 29.90  
 WCB SE 51.5 AML 23:35 30.53 83 0.21  
 WCB SN 51.5 AML 23:35 30.65 146 0.18  
 WLF SZ 57.8 EP 1 C 23:35 25.02  
 YRE SZ 58.8 EP 1 D 23:35 25.06  
 WME SZ 67.2 IP C 23:35 26.53  
 YLL SZ 71.7 EP 2 23:35 27.26  
 DSB BZ 76.2 EP 2 23:35 28.08  
 DSB BN 76.2 ES 2 23:35 36.52  
 DSB BN 76.2 AML 23:35 37.82 89 0.25  
 DSB BE 76.2 AML 23:35 39.19 39 0.32  
 WPM SZ 89.7 EP 2 23:35 30.28  
 WIM SZ 114.0 EP 2 23:35 34.21  
 GMM SZ 127.0 EP 2 23:35 36.18  
 GIM SZ 134.0 EP 1 C 23:35 36.94  
 GIM SN 134.0 ES 3 23:35 53.09  
 GIM SE 134.0 AML 23:35 54.99 71 0.16  
 GIM SN 134.0 AML 23:35 55.58 130 0.14  
 SBD SZ 136.0 EP 2 23:35 36.92  
 HPE SZ 141.0 EP 2 23:35 37.97  
 SSP SZ 167.0 IP C 23:35 41.43  
 SSP SN 167.0 ES 2 23:36 00.80  
 SSP SE 167.0 AML 23:36 01.46 17 0.26  
 SSP SN 167.0 AML 23:36 02.49 18 0.17  
 HTR SZ 181.0 EP 2 23:35 43.35  
 GAL SZ 191.0 EP 2 23:35 44.05  
 GAL SN 191.0 AML 23:36 09.38 10 0.15  
 GAL SE 191.0 AML 23:36 13.78 14 0.33  
 MCH SZ 201.0 EP 23:35 45.74  
 MCH SN 201.0 AML 23:36 09.90 22 0.24  
 MCH SE 201.0 AML 23:36 10.45 17 0.23

November 7 2004 Time: 20:54 36.1 UTC Magnitude: 0.9 ML  
 Lat: 55.203N Lon: -3.140W Depth: 4.3 km  
 Grid Ref: 327.45 kmE 590.46 kmN RMS: 0.10 secs  
 Locality: ESKDALEMUIR,D & G

November 11 2004 Time: 00:58 53.6 UTC Magnitude: 1.1 ML  
 Lat: 55.251N Lon: -3.492W Depth: 4.5 km  
 Grid Ref: 305.17 kmE 596.22 kmN RMS: 0.20 secs  
 Locality: JOHNSTONEBRIDGE,D & G

STAT CO DIST PHAS WT P HrMn SECS AMPL PERI  
 EKB1 SZ 12.1 EP 20:54 38.92  
 EKB1 SZ 12.1 ES 20:54 40.67  
 EKB2 SZ 12.9 EP 20:54 38.94  
 EKB2 SZ 12.9 ES 20:54 40.87  
 BHH SN 13.1 ES 2 20:54 40.15  
 BHH SN 13.1 AML 20:54 40.39 150 0.08  
 BHH SE 13.1 AML 20:54 40.90 146 0.21  
 EKR9 SZ 13.1 EP 20:54 38.92  
 EKR8 SZ 13.1 EP 20:54 38.94  
 EKR8 SZ 13.1 ES 20:54 40.79  
 EKR10 SZ 13.1 EP 20:54 38.87  
 EKR10 SZ 13.1 ES 20:54 40.70  
 EKR9 SZ 13.1 ES 20:54 40.76  
 BHH SZ 13.1 IP C 20:54 38.63  
 ESK SZ 13.3 EP 2 20:54 39.06  
 ESK SN 13.3 AML 20:54 41.16 13 0.11  
 ESK SE 13.3 AML 20:54 41.26 20 0.18  
 EKR7 SZ 13.3 EP 20:54 38.97  
 EKR7 SZ 13.3 ES 20:54 40.82  
 ESK SE 13.3 EP 2 20:54 40.96  
 EKR6 SZ 13.5 EP 20:54 39.00  
 EKR6 SZ 13.5 ES 20:54 40.88  
 EKB3 SZ 13.7 EP 20:54 39.10  
 EKB3 SZ 13.7 ES 20:54 41.10  
 EKR5 SZ 13.7 EP 20:54 39.05  
 EKR5 SZ 13.7 ES 20:54 40.96  
 EKR4 SZ 14.0 EP 20:54 39.12  
 EKR4 SZ 14.0 ES 20:54 41.07  
 EKR3 SZ 14.3 EP 20:54 39.17

STAT CO DIST PHAS WT P HrMn SECS AMPL PERI  
 BWH SZ 13.3 IP C 00:58 56.36  
 ESK SZ 19.7 IP C 00:58 57.49  
 ESK SE 19.7 ES 2 00:58 59.97  
 ESK SE 19.7 AML 00:59 00.13 41 0.10  
 ESK SN 19.7 AML 00:59 00.79 35 0.34  
 BHH SZ 24.8 IP C 00:58 58.22  
 BHH SE 24.8 ES 2 00:59 01.18  
 BHH SE 24.8 AML 00:59 01.31 87 0.32  
 BHH SN 24.8 AML 00:59 01.31 89 0.19  
 BBH SZ 38.1 IP C 00:59 00.42  
 BBO SZ 59.4 EP 1 00:59 03.97  
 BBO SN 59.4 ES 3 00:59 11.41  
 BBO SN 59.4 AML 00:59 12.89 5 0.24  
 BBO SE 59.4 AML 00:59 13.17 6 0.12  
 BDL SZ 61.1 EP 2 00:59 04.34  
 BTA SZ 64.3 EP 2 00:59 05.15  
 BTA SE 64.3 ES 2 00:59 13.11  
 BTA SN 64.3 AML 00:59 15.26 18 0.29  
 BTA SE 64.3 AML 00:59 16.42 14 0.40

November 7 2004 Time: 20:54 36.1 UTC Magnitude: 0.9 ML  
 Lat: 55.203N Lon: -3.140W Depth: 4.3 km  
 Grid Ref: 327.45 kmE 590.46 kmN RMS: 0.10 secs  
 Locality: ESKDALEMUIR,D & G

November 12 2004 Time: 00:11 26.9 UTC Magnitude: 1.0 ML  
 Lat: 55.242N Lon: -3.487W Depth: 4.1 km  
 Grid Ref: 305.47 kmE 595.21 kmN RMS: 0.20 secs  
 Locality: JOHNSTONEBRIDGE,D & G

STAT CO DIST PHAS WT P HrMn SECS AMPL PERI  
 BWH SZ 13.0 IP C 00:11 29.72  
 BWH SZ 13.0 ES 2 00:11 31.36  
 ESK EZ 19.7 IP C 00:11 30.80

**TABLE 2: PHASE DATA 2004**

ESK SZ 19.7 IP C 00:11 30.81	HTL HZ 152.0 EP 2 02:52 33.42
ESK SN 19.7 ES 2 00:11 33.29	HTL HN 152.0 ES 2 02:52 51.73
ESK SE 19.7 AML 00:11 33.52	HTL HN 152.0 AML 02:52 53.63
ESK SN 19.7 AML 00:11 33.94	HTL HE 152.0 AML 02:52 53.97
BHH SZ 23.9 EP 1 00:11 31.57	
BHH SE 23.9 ES 2 00:11 34.51	
BHH SE 23.9 AML 00:11 34.63	
BHH SN 23.9 AML 00:11 34.72	
November 13 2004 Time: 11:29 56.0 UTC Magnitude: 0.8 ML	November 19 2004 Time: 02:53 23.8 UTC Magnitude: 0.1 ML
Lat: 50.108N Lon: -5.175W Depth: 7.3 km	Lat: 55.217N Lon: -3.117W Depth: 6.2 km
Grid Ref: 173.01 kmE 28.00 kmN RMS: 0.00 secs	Grid Ref: 328.94 kmE 591.99 kmN RMS: 0.00 secs
Locality: CONSTANTINE, CORNWALL	Locality: ESKDALEMUIR, D & G
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	STAT CO DIST PHAS WT P HrMn SECS AMPL PERI
CGW SZ 3.5 IP D 11:29 57.45	EKB1 SZ 10.9 EP 02:53 26.27
CGW SZ 3.5 ES 3 11:29 58.45	EKB1 SZ 10.9 ES 02:53 28.09
CMA SZ 4.5 EP 1 C 11:29 57.51	EKR10 SZ 11.0 EP 02:53 26.32
CGH SZ 6.5 IP D 11:29 57.71	EKR10 SZ 11.0 ES 02:53 28.14
CGH SZ 6.5 ES 3 11:29 59.05	EKR9 SZ 11.1 EP 02:53 26.37
CR2 SZ 6.5 IP C 11:29 57.76	EKR9 SZ 11.1 ES 02:53 28.22
CR2 SN 6.5 ES 1 11:29 59.05	EKR8 SZ 11.2 EP 02:53 26.37
CR2 SN 6.5 AML 11:29 59.15	EKR8 SZ 11.2 ES 02:53 28.24
CR2 SE 6.5 AML 11:29 59.19	EKR7 SZ 11.5 EP 02:53 26.39
CCA SZ 9.5 IP C 11:29 58.10	EKR7 SZ 11.5 ES 02:53 28.25
	EKB2 SZ 11.6 EP 02:53 26.40
	EKB2 SZ 11.6 ES 02:53 28.31
	EKR6 SZ 11.7 EP 02:53 26.45
	EKR6 SZ 11.7 ES 02:53 28.32
	EKR5 SZ 12.1 EP 02:53 26.50
	EKR5 SZ 12.1 ES 02:53 28.39
	ESK EZ 12.4 IP 1 C 02:53 26.48
	EKB3 SZ 12.4 EP 02:53 26.55
	EKB3 SZ 12.4 ES 02:53 28.55
	ESK EE 12.4 ES 2 02:53 28.41
	ESK EN 12.4 AML 02:53 28.70
	ESK EE 12.4 AML 02:53 28.84
	EKR4 SZ 12.5 EP 02:53 26.57
	EKR4 SZ 12.5 ES 02:53 28.52
	EKB4 SZ 13.1 EP 02:53 26.65
	EKB4 SZ 13.1 ES 02:53 28.70
	EKB5 SZ 13.8 EP 02:53 26.77
	EKB5 SZ 13.8 ES 02:53 28.90
	EKB6 SZ 14.6 EP 02:53 26.89
	EKB6 SZ 14.6 ES 02:53 29.06
	EKB7 SZ 15.4 EP 02:53 27.05
	EKB7 SZ 15.4 ES 02:53 29.32
	EKB8 SZ 16.3 EP 02:53 27.18
	EKB8 SZ 16.3 ES 02:53 29.52
	EKB9 SZ 17.0 EP 02:53 27.32
	EKB9 SZ 17.0 ES 02:53 29.75
	EKB10 SZ 17.8 EP 02:53 27.45
	EKB10 SZ 17.8 ES 02:53 29.95
November 13 2004 Time: 11:31 01.0 UTC Magnitude: 0.5 ML	November 19 2004 Time: 13:06 23.9 UTC Magnitude: 0.2 ML
Lat: 50.109N Lon: -5.177W Depth: 7.2 km	Lat: 53.290N Lon: -4.504W Depth: 11.2 km
Grid Ref: 172.87 kmE 28.12 kmN RMS: 0.00 secs	Grid Ref: 233.11 kmE 379.96 kmN RMS: 0.10 secs
Locality: CONSTANTINE, CORNWALL	Locality: HOLYHEAD, ANGLESEY
Comment: 8KM E OF LOCKERBIE	Comment: 8KM ESE OF HOLYHEAD
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	STAT CO DIST PHAS WT P HrMn SECS AMPL PERI
CGW SZ 3.4 IP C 11:31 02.39	YRC SZ 6.4 IP C 13:06 26.06
CGW SZ 3.4 ES 3 11:31 03.41	WLF SZ 7.2 EP 2 13:06 26.16
CMA SZ 4.6 IP D 11:31 02.47	WCB SZ 10.2 IP C 13:06 26.47
CR2 SZ 6.5 IP C 11:31 02.70	WCB SN 10.2 ES 1 13:06 28.23
CR2 SN 6.5 ES 1 11:31 03.98	WCB SE 10.2 AML 13:06 28.34
CR2 SN 6.5 AML 11:31 04.09	WCB SN 10.2 AML 13:06 28.42
CR2 SE 6.5 AML 11:31 04.14	WME SZ 17.9 IP D 13:06 27.46
CGH SZ 6.5 IP D 11:31 02.66	YLL SZ 27.8 EP 2 13:06 28.93
CGH SZ 6.5 ES 3 11:31 03.96	YRE SZ 34.7 EP 2 13:06 30.45
CCA SZ 9.4 IP D 11:31 03.04	
CCA SZ 9.4 ES 3 11:31 04.49	
November 15 2004 Time: 00:34 13.0 UTC Magnitude: 1.2 ML	November 21 2004 Time: 15:42 51.8 UTC Magnitude: -
Lat: 55.118N Lon: -3.212W Depth: 4.1 km	Lat: 55.215N Lon: -3.116W Depth: 4.1 km
Grid Ref: 322.71 kmE 581.08 kmN RMS: 0.20 secs	Grid Ref: 329.00 kmE 591.77 kmN RMS: 0.10 secs
Locality: LOCKERBIE, D & G	Locality: ESKDALEMUIR, D & G
Comment: 8KM E OF LOCKERBIE	
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	STAT CO DIST PHAS WT P HrMn SECS AMPL PERI
BHH SZ 2.8 IP D 00:34 14.21	EKB1 SZ 11.2 EP 15:42 54.32
BHH SN 2.8 ES 1 00:34 14.87	EKB1 SZ 11.2 ES 15:42 56.07
BHH SN 2.8 AML 00:34 15.12	EKR10 SZ 11.2 EP 15:42 54.27
BHH SE 2.8 AML 00:34 15.13	EKR10 SZ 11.2 ES 15:42 56.12
BCC AZ 11.4 EP 2 00:34 15.43	EKR9 SZ 11.3 EP 15:42 54.32
BCC AE 11.4 ES 2 00:34 16.98	EKR9 SZ 11.3 ES 15:42 56.14
ESK SZ 22.1 IP C 00:34 17.28	EKR8 SZ 11.5 EP 15:42 54.34
ESK SN 22.1 ES 2 00:34 20.01	EKR8 SZ 11.5 ES 15:42 56.22
ESK SE 22.1 AML 00:34 20.30	EKR7 SZ 11.7 EP 15:42 54.54
ESK SN 22.1 AML 00:34 20.56	EKR7 SZ 11.7 ES 15:42 56.22
BWH SZ 28.9 IP D 00:34 18.38	EKB2 SZ 11.9 EP 15:42 54.45
EKB10 SZ 29.2 IP C 00:34 18.42	EKB2 SZ 11.9 ES 15:42 56.25
EKB10 SZ 29.2 ES 3 00:34 21.93	EKR6 SZ 12.0 ES 15:42 56.32
BDL SZ 39.2 EP 2 00:34 20.73	EKR5 SZ 12.3 ES 15:42 56.36
	EKB3 SZ 12.6 EP 15:42 54.55
	EKB3 SZ 12.6 ES 15:42 56.54
	ESK EZ 12.6 EP 15:42 54.42
	ESK EE 12.6 ES 15:42 56.40
	ESK EE 12.6 AML 15:42 56.51
	ESK EN 12.6 AML 15:42 56.53
	EKB4 SZ 13.3 EP 15:42 54.72
	EKB4 SZ 13.3 ES 15:42 56.72
	EKB5 SZ 14.0 EP 15:42 54.80
	EKB5 SZ 14.0 ES 15:42 57.02
	EKB9 SZ 17.2 ES 15:42 57.73
	EKB10 SZ 18.0 ES 15:42 57.96
November 15 2004 Time: 07:49 24.6 UTC Magnitude: 1.0 ML	November 28 2004 Time: 08:11 53.6 UTC Magnitude: 2.9 ML
Lat: 55.188N Lon: -3.163W Depth: 4.2 km	
Grid Ref: 325.96 kmE 588.81 kmN RMS: 0.10 secs	
Locality: ESKDALEMUIR, D & G	
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	
BHH SZ 11.1 IP C 07:49 27.08	
BHH SE 11.1 ES 1 07:49 28.68	
BHH SN 11.1 AML 07:49 28.87	
BHH SE 11.1 AML 07:49 29.24	
ESK SZ 14.6 IP C 07:49 27.63	
ESK SE 14.6 ES 2 07:49 29.63	
ESK SN 14.6 AML 07:49 29.87	
ESK SE 14.6 AML 07:49 29.91	
BWH SZ 31.3 IP C 07:49 30.40	
BWH SZ 31.3 ES 3 07:49 34.31	
November 16 2004 Time: 02:52 08.8 UTC Magnitude: 1.1 ML	
Lat: 52.320N Lon: -3.959W Depth: 3.9 km	
Grid Ref: 266.49 kmE 270.95 kmN RMS: 0.20 secs	
Locality: ABERYSTWYTH, DYFED	
Comment: 10KM SE OF ABERYSTWYTH	
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI	
HTR SZ 54.3 EP 2 02:52 18.44	
SSP SZ 58.7 EP 1 C 02:52 18.95	
SSP SN 58.7 ES 2 02:52 25.89	
SSP SN 58.7 AML 02:52 26.17	
SSP SE 58.7 AML 02:52 26.96	
HPE SZ 70.2 EP 2 02:52 20.51	
MCH SZ 74.9 EP 2 02:52 21.74	
MCH SE 74.9 ES 2 02:52 30.31	
MCH SE 74.9 AML 02:52 30.82	
MCH SN 74.9 AML 02:52 33.18	
HLM SZ 76.6 EP 2 02:52 21.80	
YRE SZ 80.1 EP 2 02:52 22.40	
SBD SZ 80.6 EP 2 02:52 22.26	
HAE SZ 102.0 EP 2 02:52 25.92	



TABLE 2: PHASE DATA 2004

Lat: 55.210N Lon: -3.141W
Grid Ref: 327.40 kmE 591.24 kmN
Locality: ESKDALEMUIR,D & G
Comment: FELT LANGHOLM...

Depth: 5.2 km
RMS: 0.30 secs
Intensity: 4

Table with columns: STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI. Contains multiple rows of seismic event data for November 28, 2004.

Table with columns: STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI. Continuation of seismic event data for November 28, 2004, including stations like EKR7, EKR6, etc.

November 28 2004 Time: 19:02 16.5 UTC Magnitude: -
0.3 ML

Lat: 55.228N Lon: -3.115W
Grid Ref: 329.09 kmE 593.21 kmN
Locality: ESKDALEMUIR,D & G

Table with columns: STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI. Contains seismic event data for November 28, 2004, from 19:02 to 22:07 UTC.

November 29 2004 Time: 22:07 02.7 UTC Magnitude: -
0.1 ML

Lat: 55.221N Lon: -3.111W
Grid Ref: 329.33 kmE 592.43 kmN
Locality: ESKDALEMUIR,D & G

Table with columns: STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI. Contains seismic event data for November 29, 2004.





**TABLE 2: PHASE DATA 2004**

HPK SE 85.0 AML	19:11 35.92	170 0.25	December 25 2004 Time: 10:19 03.3 UTC Lat: 55.219N Lon: -3.112W Grid Ref: 329.26 kmE 592.21 kmN Locality: ESKDALEMUIR,D & G	Magnitude: 0.2 ML Depth: 6.5 km RMS: 0.00 secs
HPK SN 85.0 AML	19:11 38.39	225 0.17		
LWH SZ 128.0 EP 3	19:11 31.32			
SSP SZ 156.0 EP 2	19:11 41.80			
SSP SN 156.0 AML	19:12 04.06	32 0.49		
SSP SE 156.0 AML	19:12 04.71	37 0.28		
LCP SZ 168.0 EP 3	19:11 36.27			
LMI SZ 176.0 EP 3	19:11 40.44			

**December 21 2004 Time: 22:21 51.4 UTC Magnitude: -**  
**0.2 ML**  
 Lat: 55.220N Lon: -3.116W  
 Grid Ref: 329.01 kmE 592.33 kmN  
 Locality: ESKDALEMUIR,D & G

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EKR10	SZ	10.7	EP			22:21	53.90		
EKR10	SZ	10.7	ES			22:21	55.69		
EKR9	SZ	10.8	EP			22:21	53.94		
EKR9	SZ	10.8	ES			22:21	55.77		
EKR8	SZ	10.9	EP			22:21	53.95		
EKR8	SZ	10.9	ES			22:21	55.79		
EKR7	SZ	11.1	EP			22:21	53.96		
EKR7	SZ	11.1	ES			22:21	55.79		
EKB2	SZ	11.3	ES			22:21	55.88		
EKR6	SZ	11.4	ES			22:21	55.86		
EKR5	SZ	11.8	ES			22:21	55.93		
EKB3	SZ	12.1	EP			22:21	54.14		
EKB3	SZ	12.1	ES			22:21	56.11		
EKR4	SZ	12.2	ES			22:21	56.04		
ESK	SZ	12.2	IP		C	22:21	54.03		
ESK	SE	12.2	ES			22:21	55.95		
ESK	SN	12.2	AML			22:21	56.00	2	0.46
ESK	SE	12.2	AML			22:21	56.08	7	0.16
EKR3	SZ	12.6	ES			22:21	56.17		
EKB4	SZ	12.8	ES			22:21	56.22		
EKR2	SZ	13.1	ES			22:21	56.32		
EKB5	SZ	13.5	EP			22:21	54.42		
EKB5	SZ	13.5	ES			22:21	56.42		
EKR1	SZ	13.7	ES			22:21	56.62		
EKB6	SZ	14.3	ES			22:21	56.62		
EKB7	SZ	15.1	ES			22:21	56.86		
EKB8	SZ	16.0	ES			22:21	57.04		
EKB9	SZ	16.7	EP			22:21	54.87		
EKB9	SZ	16.7	ES			22:21	57.29		
EKB10	SZ	17.5	ES			22:21	57.49		

**December 24 2004 Time: 20:46 47.5 UTC Magnitude: 0.4 ML**  
**Lat: 55.254N Lon: -3.464W**  
**Grid Ref: 306.96 kmE 596.52 kmN**  
**Locality: JOHNSTONEBRIDGE,D & G**

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
ESK	EZ	17.9	IP		C	20:46	51.44		
ESK	SZ	17.9	IP		C	20:46	51.44		
ESK	EN	17.9	ES		2	20:46	54.20		
ESK	SE	17.9	ES		2	20:46	54.22		
ESK	SN	17.9	AML			20:46	54.32	8	0.06
ESK	EE	17.9	AML			20:46	54.33	9	0.10
ESK	EN	17.9	AML			20:46	54.33	8	0.18
ESK	SE	17.9	AML			20:46	54.35	10	0.07
EKB1	SZ	19.3	EP			20:46	51.67		
EKB1	SZ	19.3	ES			20:46	54.67		
EKB2	SZ	19.9	EP			20:46	51.77		
EKB2	SZ	19.9	ES			20:46	54.77		
EKR1	SZ	20.4	EP			20:46	51.84		
EKR1	SZ	20.4	ES			20:46	54.89		
EKB3	SZ	20.4	EP			20:46	51.85		
EKB3	SZ	20.4	ES			20:46	54.92		
EKR2	SZ	21.0	EP			20:46	51.94		
EKR2	SZ	21.0	ES			20:46	55.07		
EKB4	SZ	21.2	EP			20:46	51.95		
EKB4	SZ	21.2	ES			20:46	55.09		
EKR3	SZ	21.7	EP			20:46	52.02		
EKR3	SZ	21.7	ES			20:46	55.20		
EKB5	SZ	21.8	EP			20:46	52.04		
EKB5	SZ	21.8	ES			20:46	55.27		
EKR4	SZ	22.3	EP			20:46	52.13		
EKR4	SZ	22.3	ES			20:46	55.41		
EKB6	SZ	22.5	EP			20:46	52.17		
EKB6	SZ	22.5	ES			20:46	55.45		
EKR5	SZ	23.0	EP			20:46	52.24		
EKR5	SZ	23.0	ES			20:46	55.54		
EKB7	SZ	23.2	EP			20:46	52.27		
EKB7	SZ	23.2	ES			20:46	55.62		
EKR6	SZ	23.6	EP			20:46	52.34		
EKR6	SZ	23.6	ES			20:46	55.80		
EKB8	SZ	24.0	EP			20:46	52.38		
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EKR7	SZ	24.3	EP			20:46	52.44		
EKR7	SZ	24.3	ES			20:46	55.92		
EKB9	SZ	24.6	EP			20:46	52.50		
EKB9	SZ	24.6	ES			20:46	55.97		
EKR8	SZ	25.0	EP			20:46	52.55		
EKR8	SZ	25.0	ES			20:46	56.10		
EKB10	SZ	25.3	EP			20:46	52.59		
EKB10	SZ	25.3	ES			20:46	56.17		
EKR9	SZ	25.7	EP			20:46	52.65		
EKR9	SZ	25.7	ES			20:46	56.30		
EKR10	SZ	26.5	EP			20:46	52.73		
EKR10	SZ	26.5	ES			20:46	56.42		

**December 26 2004 Time: 07:27 49.3 UTC Magnitude: 0.3 ML**  
**Lat: 55.218N Lon: -3.118W**  
**Grid Ref: 328.88 kmE 592.10 kmN**  
**Locality: ESKDALEMUIR,D & G**

STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI
EKB1	SZ	10.8	EP			07:27	51.72		
EKB1	SZ	10.8	ES			07:27	53.55		
EKR10	SZ	10.9	EP			07:27	51.77		
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EKR9	SZ	11.0	EP			07:27	51.83		
EKR9	SZ	11.0	ES			07:27	53.65		
EKR8	SZ	11.1	EP			07:27	51.83		
EKR8	SZ	11.1	ES			07:27	53.66		
EKR7	SZ	11.3	EP			07:27	51.85		
EKR7	SZ	11.3	ES			07:27	53.70		
EKB2	SZ	11.5	EP			07:27	51.84		
EKB2	SZ	11.5	ES			07:27	53.75		
EKR6	SZ	11.6	EP			07:27	51.90		
EKR6	SZ	11.6	ES			07:27	53.77		
EKR5	SZ	11.9	EP			07:27	51.95		
EKR5	SZ	11.9	ES			07:27	53.84		
EKB3	SZ	12.2	EP			07:27	51.99		
EKB3	SZ	12.2	ES			07:27	53.97		
ESK	EZ	12.3	EP		2	07:27	51.92		
ESK	SZ	12.3	IP		C	07:27	51.95		
ESK	SE	12.3	ES		2	07:27	53.86		
ESK	EE	12.3	ES		2	07:27	53.86		
ESK	SN	12.3	AML			07:27	54.14	11	0.19
ESK	EN	12.3	AML			07:27	54.14	9	0.18
ESK	SE	12.3	AML			07:27	54.14	16	0.16
ESK	EE	12.3	AML			07:27	54.15	16	0.16
EKR4	SZ	12.3	EP			07:27	52.01		
EKR4	SZ	12.3	ES			07:27	53.95		
EKR3	SZ	12.8	EP			07:27	52.07		
EKR3	SZ	12.8	ES			07:27	54.07		
EKB4	SZ	12.9	EP			07:27	52.09		
EKB4	SZ	12.9	ES			07:27	54.12		
EKR2	SZ	13.3	EP			07:27	52.17		
EKR2	SZ	13.3	ES			07:27	54.22		
EKB5	SZ	13.7	EP			07:27	52.22		
EKB5	SZ	13.7	ES			07:27	54.32		
EKR1	SZ	13.8	ES			07:27	54.30		
EKB6	SZ	14.4	EP			07:27	52.37		
EKB6	SZ	14.4	ES			07:27	54.52		
EKB7	SZ	15.2	EP			07:27	52.49		
EKB7	SZ	15.2	ES			07:27	54.75		
EKB8	SZ	16.1	EP			07:27	52.62		
EKB8	SZ	16.1	ES			07:27	54.94		
EKB9	SZ	16.8	EP			07:27	52.77		
EKB9	SZ	16.8	ES			07:27	55.19		
EKB10	SZ	17.6	EP			07:27	52.90		
EKB10	SZ	17.6	ES			07:27	55.39		

TABLE 2: PHASE DATA 2004

Table with columns: Date/Time, Magnitude, Depth, RMS, Locality, STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI, and additional columns for secondary data. It contains three main data sections for December 27, 29, and 30, 2004, detailing seismic phase observations from various stations like ESK, BHH, EKR, BWA, and BDL.

TABLE 3

## GEOGRAPHIC COORDINATES OF SEISMOGRAPH STATIONS, 2004

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Comp
ABA	BACONSTHORPE	52.8884	1.1453	611.58	337.00	74	1
AEA	EAST ANGLIA UNIV	52.6208	1.2403	619.30	307.53	45	3M
AEU	EAST ANGLIA	52.6202	1.2347	618.93	307.45	28	SM
APA	PACKWAY	52.3006	1.4782	637.12	272.68	58	1
AWH	WHINBURGH	52.6297	0.9507	599.67	307.68	64	1R
AWI	WITTON	52.8319	1.4471	632.17	331.65	46	1
BBH	BRUNTSHEIL	55.1333	-2.9299	340.72	582.50	216	1
BBO	BOTHEL	54.7367	-3.2464	319.76	538.69	209	3
BCC	CHAPELCROSS	55.0153	-3.2201	321.99	569.66	138	1SM
BCM	CHAPELCROSS MIC	55.0151	-3.2212	321.92	569.64	78	M
BDL	DOBCROSS HALL	54.8030	-2.9385	339.68	545.76	157	1
BHH	HOWATS HILL	55.0931	-3.2181	322.27	578.31	216	3
BNA	NEW ABBEY	54.9658	-3.6242	296.03	564.68	28	1
BTA	TALKIN	54.9057	-2.6844	356.12	557.00	279	3
BWH	WARDLAW	55.1758	-3.6549	294.62	588.09	269	1
CBW	BUDOCK WATER	50.1482	-5.1144	177.53	32.29	94	1
CCA	CARMENELLIS	50.1866	-5.2277	169.62	36.90	210	1
CCO	CONSTANTINE	50.1357	-5.1957	171.66	31.14	168	1
CDU	DUNNERDALE	54.3362	-3.1952	322.30	494.08	355	1
CGH	GOONHILLY	50.0507	-5.1649	173.46	21.60	97	1
CGW	GWEEK	50.1006	-5.2228	169.56	27.32	9	1
CKE	KESWICK	54.5877	-3.1059	328.54	521.96	304	1
CMA	MANACCAN	50.0821	-5.1274	176.29	24.98	42	1
CPZ	PENZANCE	50.1566	-5.5828	144.12	34.72	199	1R
CR2	ROSEMANOWES 2	50.1667	-5.1687	173.74	34.51	143	3
CRQ	ROSEMANOWES	50.1672	-5.1726	173.46	34.57	156	SM
CSA	ST AUSTELL	50.3527	-4.8919	194.30	54.38	112	1
CSF	SCAFELL	54.4478	-3.2430	319.41	506.55	540	1
CSM	SELLAFIELD MIC	54.4183	-3.4913	303.24	503.58	50	M
CST	STITHIANS	50.1952	-5.1635	174.24	37.66	141	1
CWF	CHARNWOOD FST	52.7385	-1.3076	446.74	315.91	203	3BB
DCO	COMBE FARM	50.3201	-3.8721	266.74	48.43	117	1R
DYA	YADSWORTHY	50.4353	-3.9310	262.88	61.34	292	3RMLG
EAB	ABERFOYLE	56.1887	-4.3373	254.97	702.02	279	1R
EAU	AUCHINOON	55.8454	-3.4474	309.38	662.30	359	1R
EBH	BLACK HILL	56.2476	-3.5084	306.54	707.13	375	1R
EBL	BROAD LAW	55.7723	-3.0445	334.48	653.71	436	1R
ECK	CAULDKAINE HILL	55.1810	-3.1292	328.10	588.00	351	1R
EDI	EDINBURGH	55.9233	-3.1875	325.80	670.66	125	3BB
EDR	DRUMTOCHTY	56.9190	-2.5393	367.17	780.97	401	1R
EDU	DUNDEE	56.5477	-3.0110	337.85	739.97	421	1R
ELO	LOGIEALMOND	56.4703	-3.7112	294.59	732.21	523	1R
ESK	ESKDALEMUIR	55.3165	-3.2052	323.52	603.16	261	3RMLG
ESY	STONEYPATH	55.9175	-2.6141	361.62	669.55	337	1R
FHV	HALDARSVIK	62.2597	-7.0984	135.46	1385.95	380	1R
FSD	SUDUROY	61.5701	-6.7884	145.86	1308.06	480	1R
FSV	SVINOY	62.2598	-6.3550	173.99	1383.14	430	1R
FTO	TORSHAVN	62.0199	-6.8274	147.51	1358.21	325	3R
FVA	VAGAR	62.0575	-7.3520	120.46	1364.55	430	1R
GAL	GALLOWAY	54.8664	-4.7114	226.02	555.78	117	3MLG
GCD	CASTLE DOUGLAS	54.8630	-3.9403	275.48	553.76	184	1R
GCL	CUSHENDALL	55.0783	-6.1264	136.66	583.77	278	1R
GIM	ISLE OF MAN (North)	54.2923	-4.4672	239.44	491.35	346	3R
GMK	MULL OF KINTYRE	55.3458	-5.5934	172.19	611.64	164	1R
GMM	MTNS OF MOURNE	54.2377	-5.9498	142.66	489.67	155	1R
HAE	ALDERS END	52.0368	-2.5434	362.73	237.79	260	1R
HBL2	BONNYLANDS	52.0508	-3.0384	328.80	239.71	437	SM
HCG	CRAIG GOCH	52.3231	-3.6570	287.08	270.78	533	1R
HEX	EXMOOR	51.0664	-3.8026	273.71	131.28	230	1R

**TABLE 3: continued**

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Comp
HGH	GRAY HILL	51.6379	-2.8057	344.25	193.59	223	1R
HLM	LONG MYND	52.5184	-2.8807	340.25	291.57	429	1
HPE	PEMBROKE	51.9372	-4.7746	209.29	230.21	349	1R
HPK	HAVERAH PARK	53.9581	-1.6241	424.66	451.42	233	3R
HSA	SWANSEA	51.7500	-4.1532	251.38	207.94	293	1R
HTL	HARTLAND	50.9943	-4.4849	225.64	124.66	86	3RMLGSMBB
HTR	TREWERN HILL	52.0785	-3.2679	313.12	243.04	337	1R
JDC	DAM (CREST)	49.1947	-2.0469			39	SM
JDG	DAM (GALLERY)	49.1947	-2.0469			7	SM
JRS	MAISON ST LOUIS	49.1922	-2.0922			56	3RLG
JSA	ST AUBINS	49.1878	-2.1717			39	1R
JVM	VALLE D.L.MARE	49.2169	-2.2067			64	1R
KAC	ACHNASHELLACH	57.4989	-5.2988	202.36	850.19	206	1R
KAR	ARISAIG	56.9188	-5.8290	166.98	787.34	186	1
KBI	BIRLEY GRANGE	53.2543	-1.5279	431.49	373.17	272	1
KEY	KEYWORTH	52.8779	-1.0757	462.20	331.59	59	LG
KEY2	KEYWORTH (SM)	52.8790	-1.0770	462.13	331.73	76	SM
KNR	NEVIS RANGE	56.8219	-4.9714	218.68	773.97	1147	1R
KPL	PLOCKTON	57.3391	-5.6527	180.21	833.50	13	3RLGSM
KSB	SHIEL BRIDGE	57.2099	-5.4214	193.40	818.40	417	1R
KSK	SCOVAL	57.4659	-6.7002	118.21	851.46	265	1R
KSY	SYSTON	52.9642	-0.5872	494.88	341.73	121	1R
KTG	TILBROOK GRNGE	52.3264	-0.4019	508.90	271.06	83	1
KUF	UFFORD	52.6170	-0.3907	508.94	303.39	38	1R
KWE	WEAVER FARM	53.0164	-1.8412	410.65	346.61	328	1R
LCP	CASSOP	54.7370	-1.4744	433.84	538.14	185	1R
LDU	LEEDS	53.8058	-1.5540	429.37	434.51	74	MLGSM
LHO	HOLMEFIRTH	53.5453	-1.8548	409.62	405.44	462	1R
LMI	MILLOM	54.2206	-3.3070	314.79	481.35	129	3R
LMK	MARKET RASEN	53.4569	-0.3260	511.14	396.90	146	1R
LRN	RICHMOND	54.4165	-1.8007	412.93	502.37	313	1R
LRW	LERWICK	60.1360	-1.1779	445.66	1139.27	98	3RMLG
LWH	WHINNY NAB	54.3338	-0.6717	486.36	493.97	277	1R
MCD	COLEBURN DISTIL	57.5828	-3.2541	325.02	855.42	293	3RMLGSM
MCH	MICHAELCHURCH	51.9974	-2.9983	331.47	233.74	219	BBSM
MDO	DOCHFOUR	57.4409	-4.3633	258.17	841.39	415	1R
MFI	FISHRIE	57.6119	-2.2956	382.34	858.00	232	1R
MLA	LATHERON	58.3055	-3.3627	320.15	935.98	188	1
MME	MEIKLE CAIRN	57.3149	-2.9647	341.90	825.32	475	1
MVH	ACHVAICH	57.9250	-4.1825	270.75	894.90	185	1
OBR	BRABSTER	58.6142	-3.1626	332.47	970.13	89	1R
ODR	DOUNREAY	58.5822	-3.7256	299.68	967.27	100	SM
OHO	HOY	58.8322	-3.2465	328.05	994.48	172	1R
ORE	REAY	58.5480	-3.7622	297.45	963.52	100	3RMLG
OST	STRONSAY	59.0860	-2.5516	368.39	1022.20	21	1R
OTO	TONGUE	58.4953	-4.3939	260.49	958.79	338	1R
OWE	WESTRAY	59.3180	-3.0289	341.44	1048.36	87	1R
PCA	CARROT	55.7007	-4.2550	258.30	647.55	302	1
PCO	CORRIE	55.9880	-4.1002	269.00	679.21	267	1
PGB	GLENIFFERBRAES	55.8115	-4.4837	244.38	660.37	199	3
PMS	MUIRSHIEL	55.8459	-4.7452	228.15	664.82	351	1
POB	OBSERVATORY	55.8458	-4.4299	247.88	664.06	34	MLG
RCR	CAPE WRATH	58.6245	-4.9987	225.90	974.58	100	1R
REB	EISG-BRACHAIDH	58.1194	-5.2802	206.82	919.16	100	1R
RFO	FORSNAVAL	58.2133	-7.0052	106.10	935.83	195	1R
RRH	RHENIGIDALE	57.9197	-6.6881	122.43	901.86	103	1R
RRR	RUBHA REIDH	57.8577	-5.8067	174.19	891.68	61	3RMLGSM
RSC	SCOURIE	58.3485	-5.1683	214.61	944.33	60	1R
RTO	TOLSTA	58.3778	-6.2092	153.95	950.93	74	1R
SAN	SANDWICK	60.0179	-1.2392	442.41	1126.08	150	1

**TABLE 3: continued**

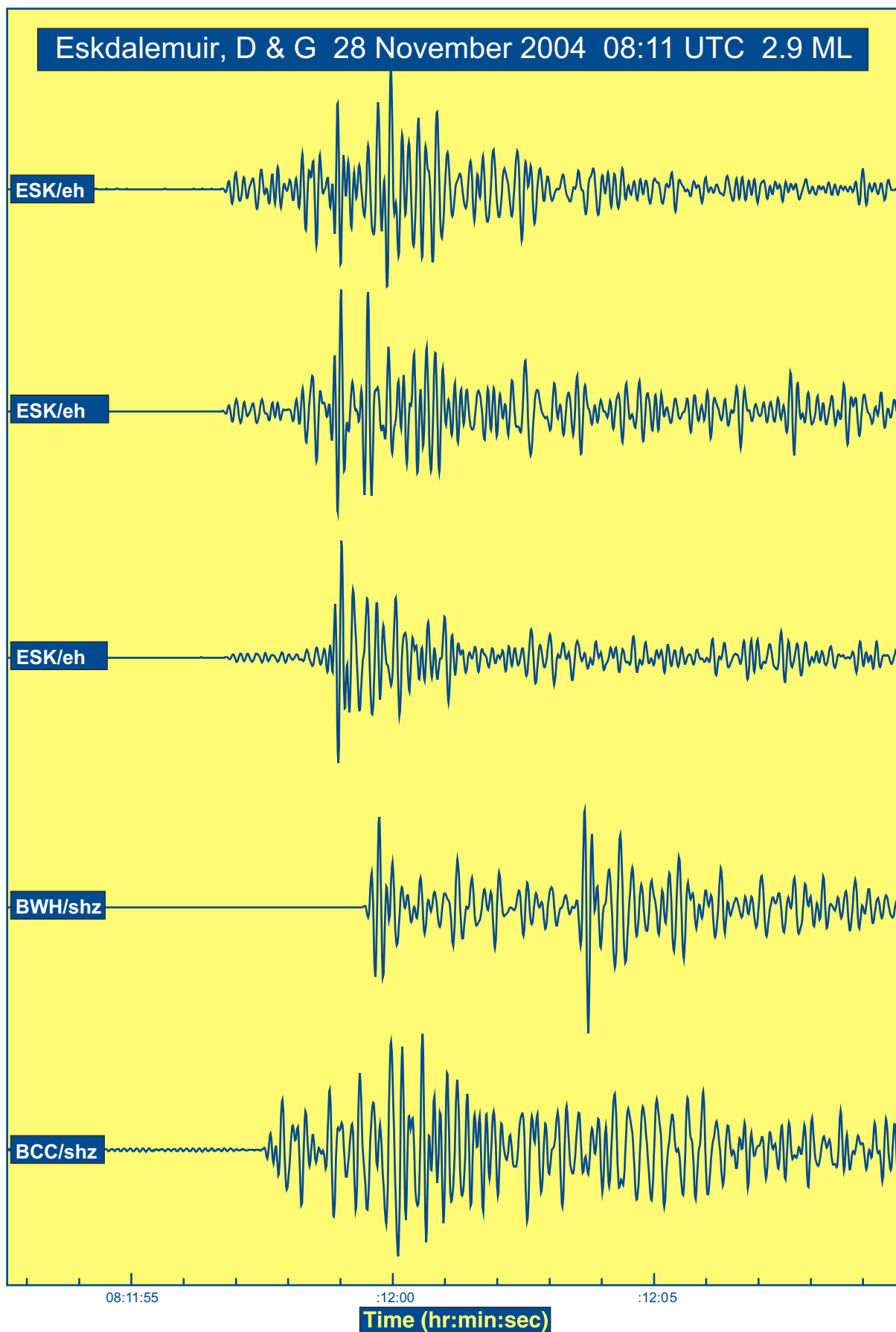
Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Comp
SBD	BRYN DU	52.9055	-3.2585	315.37	335.01	489	1
SFH	HASELMERE	51.0604	-0.6912	491.71	129.88	260	1
SHSD	LERWICK	60.1360	-1.1779	445.66	1139.27	98	BBSM
SIW	ISLE OF WHITE	50.6711	-1.3747	444.18	85.97	162	1
SKP	KOPHILL	51.7218	-0.8096	482.22	203.29	212	1
SMD	MENDIPS	51.3083	-2.7170	350.03	156.88	310	1
SSP	STONEYPOUND	52.4177	-3.1119	324.39	280.59	428	3
SSW	STOW-ON-WOLD	51.9667	-1.8499	410.31	229.86	291	1
SWK	WARMINSTER	51.1483	-2.2471	382.72	138.87	266	1
SWN	SWINDON	51.5137	-1.8007	413.83	179.49	192	3MLGSM
TBW	BRENTWOOD	51.6549	0.2913	558.48	197.66	89	1R
TCR	COLCHESTER	51.8347	0.9212	601.24	219.20	45	1R
TEB	EASTBOURNE	50.8187	0.1457	551.13	104.39	68	1R
TFO	FOLKESTONE	51.1135	1.1409	619.81	139.66	202	3MLGSM
TSA	SEVENOAKS	51.2426	0.1561	550.48	151.53	177	1
WAL	WALLS	60.2564	-1.6173	421.18	1152.46	167	1
WCB	CHURCH BAY	53.3782	-4.5467	230.62	389.87	139	3MSM
WFB	FAIRBOURNE	52.6831	-4.0383	262.23	311.48	316	1R
WIM	ISLE OF MAN(South)	54.1475	-4.6738	225.39	475.73	386	1R
WLF	LLYNFAES	53.2894	-4.3966	240.27	379.65	58	1
WME	MYNDD EILIAN	53.3969	-4.3032	246.88	391.40	129	1R
WPM	PENMAENMAWR	53.2581	-3.9048	272.95	375.18	353	1R
XAL	ALLENDALE	54.8617	-2.2147	386.22	551.91	458	1R
XDE	DENT	54.5056	-3.4902	303.52	513.29	301	1R
XSO	SOURHOPE	55.4924	-2.2510	384.14	622.10	516	1R
YEL	YELL	60.5509	-1.0830	450.29	1185.55	203	1
YLL	LLANBERIS	53.1402	-4.1704	254.84	362.57	159	1R
YRC	RHOSCOLYN	53.2508	-4.5753	228.21	375.77	22	1R
YRE	YR EIFL	52.9811	-4.4254	237.19	345.43	193	1R
YRH	RHIW	52.8336	-4.6288	222.94	329.51	286	1R

**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
LG	Single low-gain vertical seismometer
SM	Strong motion seismometers
BB	Broadband Instrument







Seismograms of the Eskdalemuir earthquake of 28 November 2004 08:11 UTC 2.9 ML recorded on the Eskdalemuir and Borders seismic networks.