

Bulletin of British Earthquakes 2007

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1 Introduction

The British Geological Survey's (BGS) Seismic Monitoring and Information Service operate a nationwide network of seismograph stations in the United Kingdom (UK). Earthquakes in the UK, and coastal waters, are detected within limits dependent on the distribution of seismograph stations. Location accuracy is improved in offshore areas through data exchange with neighbouring countries. This bulletin contains locations, magnitudes and phase data for all earthquakes detected and located by the BGS during 2007, listed in Tables 1 and 2. Maps showing seismic activity in 2007 (Figure 1), and the larger magnitude events since 1979 ($ML > 2.5$) and since 1970 ($ML > 3.5$) are also included. The bulletin covers all of the UK land mass and its coastal waters including the North Sea to 875 kmE and 1550 kmN.

All events believed to be of true tectonic origin are included. Coalfield events are also included. 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 the public. 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 The BGS UK Seismograph Network

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 by SDAS or 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 to Edinburgh several times a day through Internet or dial-up modems. Once transferred, the events are analysed to determine 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. At present the seismic network is undergoing an upgrade with the installation of broadband seismometers that record with a larger dynamic range and over a wider frequency band. Data from these together with some short-period data is transmitted and processed at the central recording site in Edinburgh in real time. Operational seismograph stations in December 2007 are shown in Figure 2.

The detection capabilities of a network depend upon station distribution, instrument sensitivity and background noise levels. Figure 3 shows the magnitude detection thresholds for the seismograph stations operational in December 2007. The contours illustrate the lower threshold

magnitude for an earthquake to significantly exceed 4 nanometres of noise (average) at 10 Hz on at least four seismographs. These detection levels hold true only if data from all stations are continuously monitored. Small events may go undetected unless they are felt and reported to BGS by local inhabitants, so the detection capabilities of 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, ocean waves and traffic vary considerably with time (typically 0.5 to 15 nanometres, 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 2007. The data set is considered complete for these magnitudes in all localities onshore. Seismicity for the period 1970 to 2007 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 data set is likely to be complete for such magnitudes.

3 Earthquake Parameters and Their Errors

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 HYPOCENTER (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 velocities through the Earth are known.

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. Depth is usually only well constrained when there is a station very close to the epicentre.

The best depth determinations are obtained when an earthquake or earthquake series occurs almost beneath a network. For events at larger distances the depth errors can be many kilometres. Where the depth error, ERZ in Table 1, is 0.0, this indicates that the depth has been fixed in the hypocentre calculation. This is the case for explosions, which are known to occur at the surface, and for events at larger distances, where depth control is poor.

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 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 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 worldwide today. The ML magnitudes in this bulletin have been calculated according to Richter's formula after 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 is not possible, the mean of the magnitudes from a number of verticals are used. Ground motion registered at a seismograph varies with site conditions, distance and 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.

INTENSITY

Intensity is a measure of the effect of the shaking produced by the earthquake 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, with reference to the European Macroseismic Scale (EMS), (Grünthal, 1993).

4 Summary of 2007 Seismicity

There were 111 earthquakes located by the BGS seismic monitoring network during the year, with 38 having magnitudes of 2.0 ML or greater, twelve having magnitudes of 3.0 ML or greater and four having magnitudes of 4.0 ML or greater. Thirteen events with a magnitude of 2.0 ML or greater were reported felt, together with a further 23 smaller ones, bringing the total to 36 felt earthquakes in 2007.

The largest onshore earthquake of the year with a magnitude of 4.3 ML occurred in Folkestone, Kent on 28 April at 07:18 UTC, at a depth of about 5 km. BGS received a number of reports via the media, the Police and from a number of residents throughout Kent. Typical reports described "the shaking lasted for approximately 10 seconds, causing all our houses to shake", "the whole experience really scared me", "the whole house was shaking from the roof to the floor" and "a loud noise and then a shaking sensation woke me up". This earthquake was followed by 12 aftershocks with magnitudes between 0.8 and 1.7 ML. A macroseismic survey was launched on the BGS 'Earthquakes' web site, which yielded over 1,000 replies. The most distant felt reports were from Norwich approximately 175 km away and Bognor approximately 130 km away. The earthquake was felt over an area of 8,500 sq km for isoseismals 3-5. In parts of Folkestone, where the highest observed intensity was 6 EMS, many houses suffered minor structural damage to chimneys and walls. Data from a strong motion instrument, not located on bedrock, approximately 5 km from the epicentre suggests that peak ground acceleration (PGA) may have been as large as 0.1 g. While no previous earthquakes have been detected near Folkestone in instrumental times (since 1970), a few historical earthquakes are known to have occurred in the Dover Straits, namely a 5.8 ML earthquake in 1382, a 5.8 ML in 1580 and a 4.1 ML in 1776. A source mechanism for the earthquake was determined by inversion of regional broadband waveforms. The solution shows a strike slip mechanism with a normal component and either

right lateral movement on a WSW-ENE striking or left lateral movement on a NNW-SSE striking nodal plane. The NNW-SSE striking nodal plane matches the trend of the main faults affecting the Kent Coalfield.

The largest offshore earthquake occurred in the Norwegian Sea on 7 January, with a magnitude of 4.8 ML. It was located approximately 230 km northeast of Lerwick, Shetland Islands. The BGS received several reports from residents in the Shetland Islands which described, “my computer table rocked back and forth” and “the rattle was much more severe and prolonged than I have ever heard before” indicating an intensity of at least 3 EMS. On 28 January an earthquake with a magnitude of 4.0 ML was felt in southern Norway. It occurred in the eastern North Sea region, approximately 50 km southwest of the southern Norwegian Coast. A further 15 events occurred in the North Sea and surrounding waters during the year, with magnitudes ranging between 2.0 and 4.4 ML. Two of these events occurred in the Northern Atlantic Ocean, approximately 170 km northwest of Ireland, on 17 June and 21 July, with magnitudes of 2.2 and 2.7 ML, respectively. These are the first earthquakes in the area since a magnitude 2.9 ML event on 19 December 1986 and before that a 3.3 ML event on 13 April 1980.

Between 7 March and 19 April, sixteen events were recorded, with magnitudes ranging between 1.0 and 1.7 ML, in the Maltby area of South Yorkshire. The BGS received reports, for all the events, via Doncaster City Council and from residents in Maltby, typically describing “movement of the house which physically rocked” and “a faint rumbling”. Their shallow depths (around 2 km) and characteristics of their seismograms are similar to previous activity in the area that was associated with mining.

An earthquake with a magnitude of 2.0 ML and at a depth of 15 km occurred on 8 July, with a location near Millom, Cumbria. The epicentre is approximately 30 km southeast of Sellafield and approximately 90 km south of Chapelcross.

A magnitude 2.6 ML earthquake occurred on 17 July, with an epicentre about 5 km northwest of Melton Mowbray, Leicestershire. The BGS received a single report from a resident of Kirkby Bellars (3 km south of the epicentre) describing, “a deep roaring noise, immediately followed by the house shaking and the windows rattling”. It locates 8 km WSW of the magnitude 4.1 ML Melton Mowbray earthquake of 28 October 2001 which was widely felt in the region with a maximum intensity of 5 EMS.

Between 10 and 30 August, six earthquakes were detected in the Manchester area with magnitudes ranging between 1.4 and 2.5 ML. The BGS received reports for all six events via the Media and from residents in the Manchester and Stockport which typically described “the whole house shook and vibrated for a few seconds”, “there was a sudden jolt”, “the building shook violently” and “some people ran into the streets” indicating intensities of between 3 and 4 EMS. They were located in the same region as a series of around 150 events which occurred between October 2002 and January 2003. The largest event in that series, with a magnitude of 3.9 ML, occurred on 21 October 2003 and was felt throughout the region with intensities of at least 5 EMS.

On 17 September, an earthquake with a magnitude of 3.0 ML was detected 4 km southwest of the settlement of Craighouse, on the southern tip of the Isle of Jura, Argyll. The BGS received information from the local Media that it was felt on the Isle of Islay and on southern Jura. It locates 28 km south of a magnitude 3.5 ML earthquake on 3 May 1998, which was felt with intensities of 4 EMS in the area.

Two earthquakes, both with magnitudes of 2.3 ML, occurred in the Penicuik area of Midlothian on 30 November and 9 December. The BGS received several reports from residents in the area that described “the building shook violently”, “we noticed a strong thump from beneath the floor” and “felt a rumbling which lasted no more than a second or two” indicating an intensity of at least 3 EMS. These are the largest earthquakes in the region since a similar magnitude 2.3 ML event, near Rosewell, on 21 December 1986, which was felt with intensities of 4 EMS.

On 30 November, a magnitude 2.9 ML earthquake occurred in the Llangollen region of North Wales. The BGS received many reports from as far away as Shrewsbury, 40 km to the southeast and from Ffestiniog, 45 km to the west-northwest, describing “a moderate shaking, enough to make windows rattle” and “we felt and heard a faint rumbling”. An intensity of 4 EMS was assigned to the earthquake. It is located in the same general region (within 20 km) as a magnitude 3.5 ML earthquake that occurred on 23 January 1974 near Bala, Gwynedd.

Acknowledgements

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Scottish Power

Scottish Water

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Atomic Weapons Establishment (Blacknest, UK)

Centre Seismologique Euro-Mediterranean (Bruyères-le-Châtel, France)

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GEUS (Geological Survey of Denmark and Greenland)

Institute de Physique du Globe (Paris, France)

Koninklijk Nederlands Meteorologisch Instituut (Ae de Bilt, Netherlands)

Laboratoire de Detection et de Geophysique (Bruyères-le-Châtel, France)

NORSAR (Oslo, Norway)

University of Bergen (Bergen, Norway)

University of Keele (Keele, UK)

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Richter, C., 1935. An instrumental earthquake magnitude scale, *Bull.Seism. Soc.Am.*,**25**, 1-32.

Utheim, T. and Havskov, J., 1993. The SEISLOG Data-Acquisition System. Guide to installation, maintenance and daily operation of the system, Version 5.0, last updated September 1993. University of Bergen, Institute of Solid Earth Physics, Seismological Observatory. Allegaten 41, 5007 Bergen, Norway.



Figure 1. Epicentre map of earthquakes in 2007 as listed in Table 1.

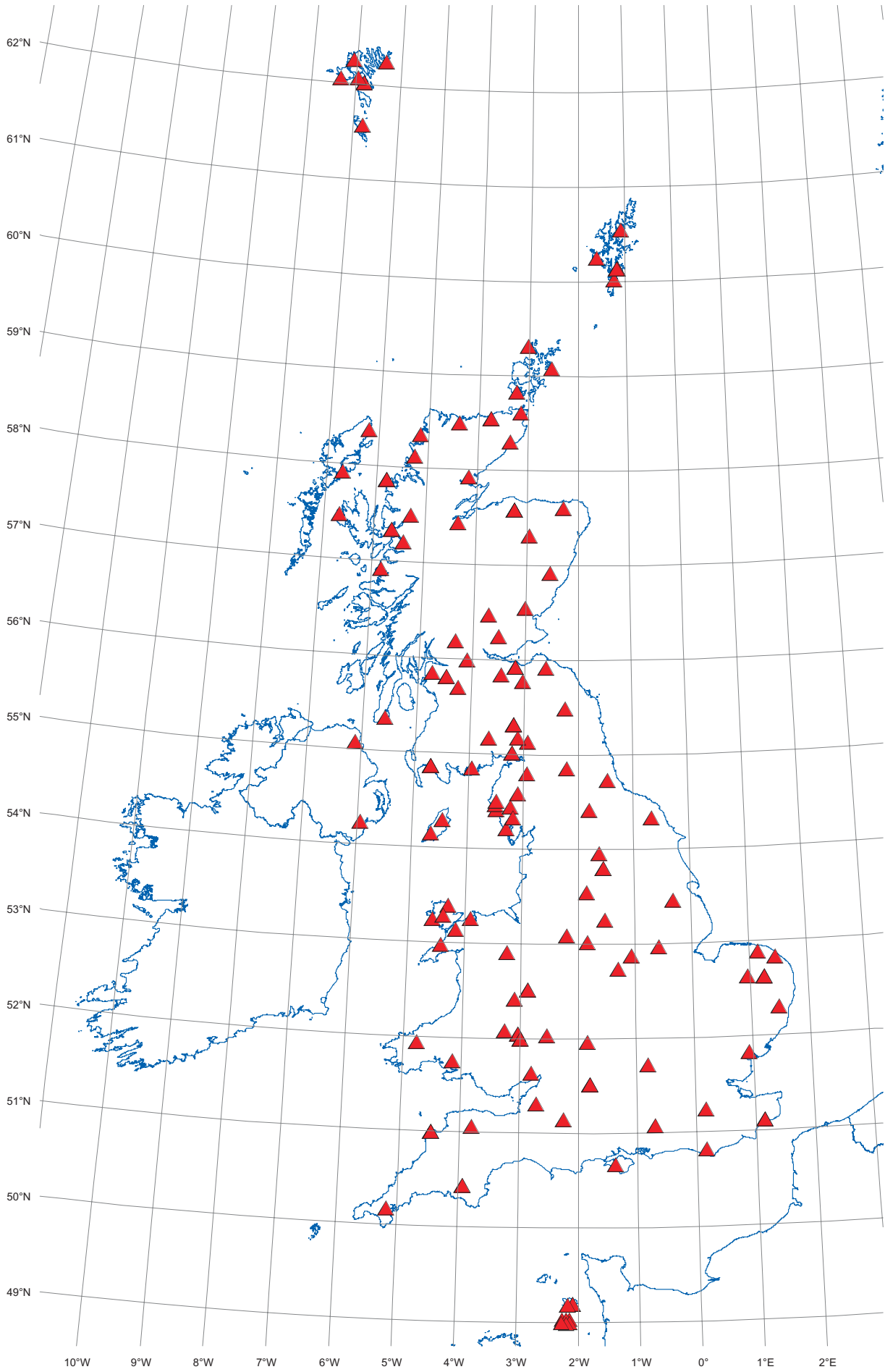


Figure 2. Seismograph network operational in December 2007.

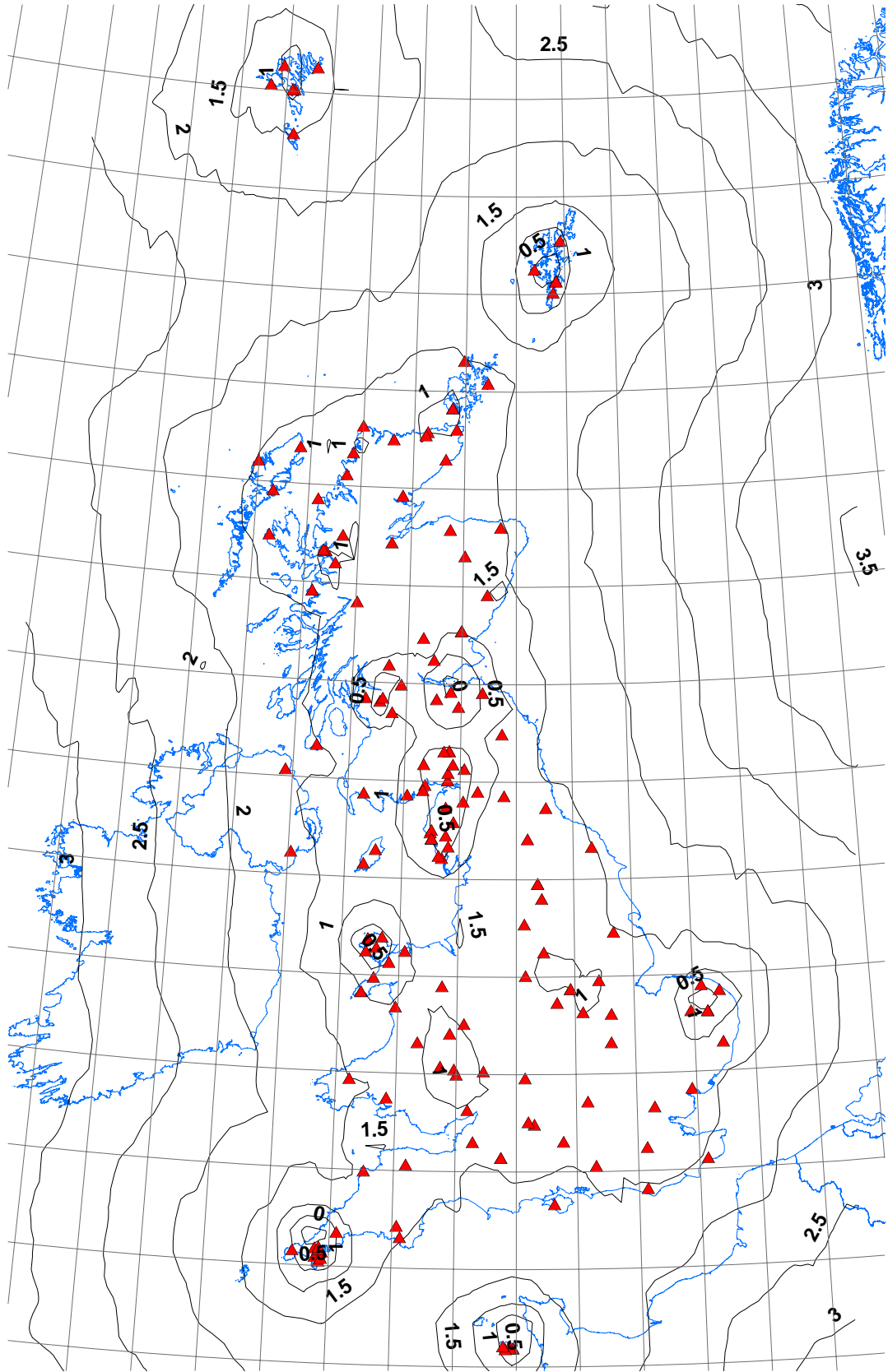


Figure3. Earthquake detection capability in December 2007. Contour values are for Richter local magnitude (ML) calculated for average background noise conditions (4nm) where the detection criterion is that the signal has to exceed 4nm at 10Hz at 4 stations.

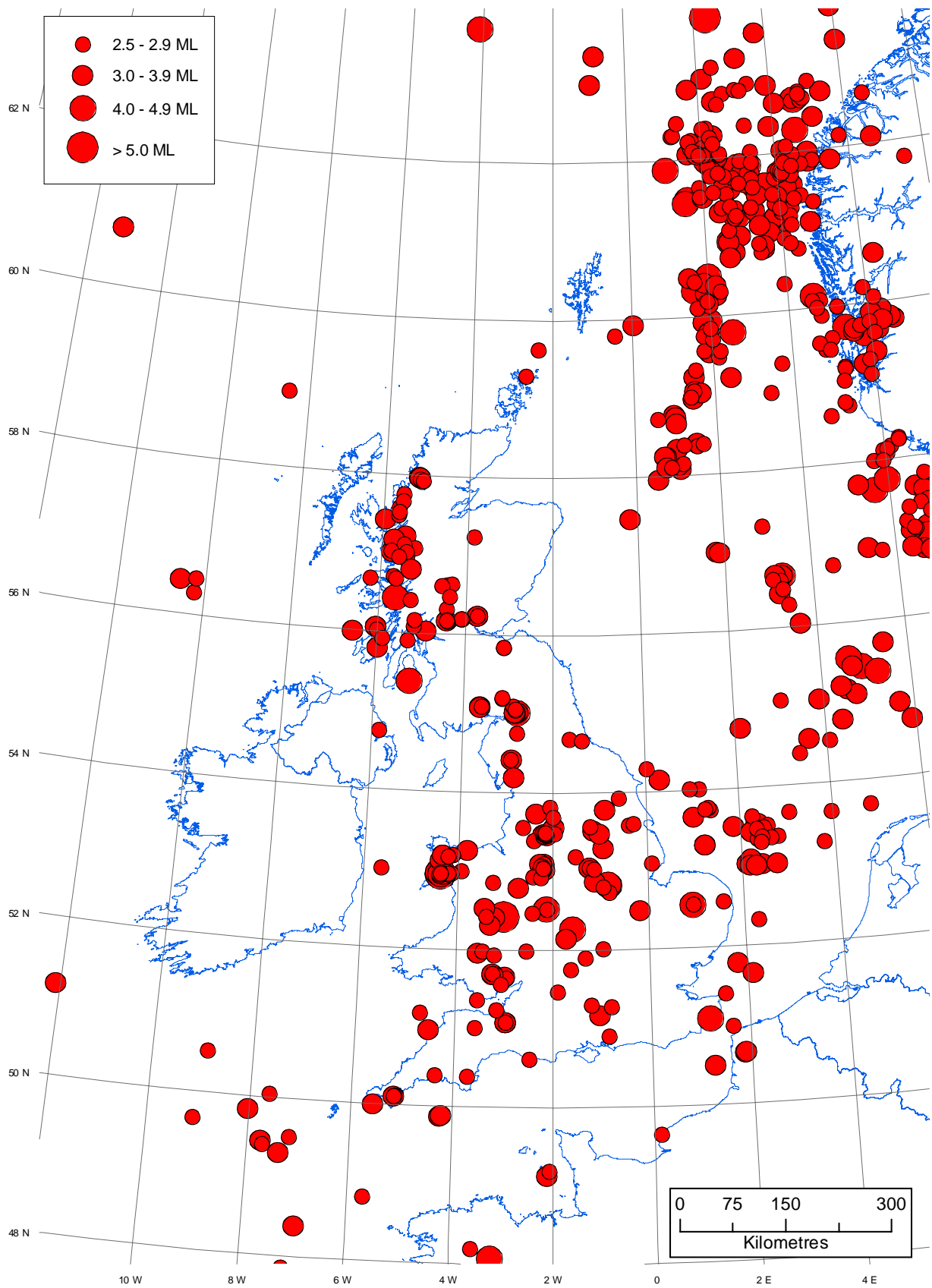


Figure 4. Epicentres of earthquakes with magnitudes of 2.5 ML and above, in the period 1979 to 2007.

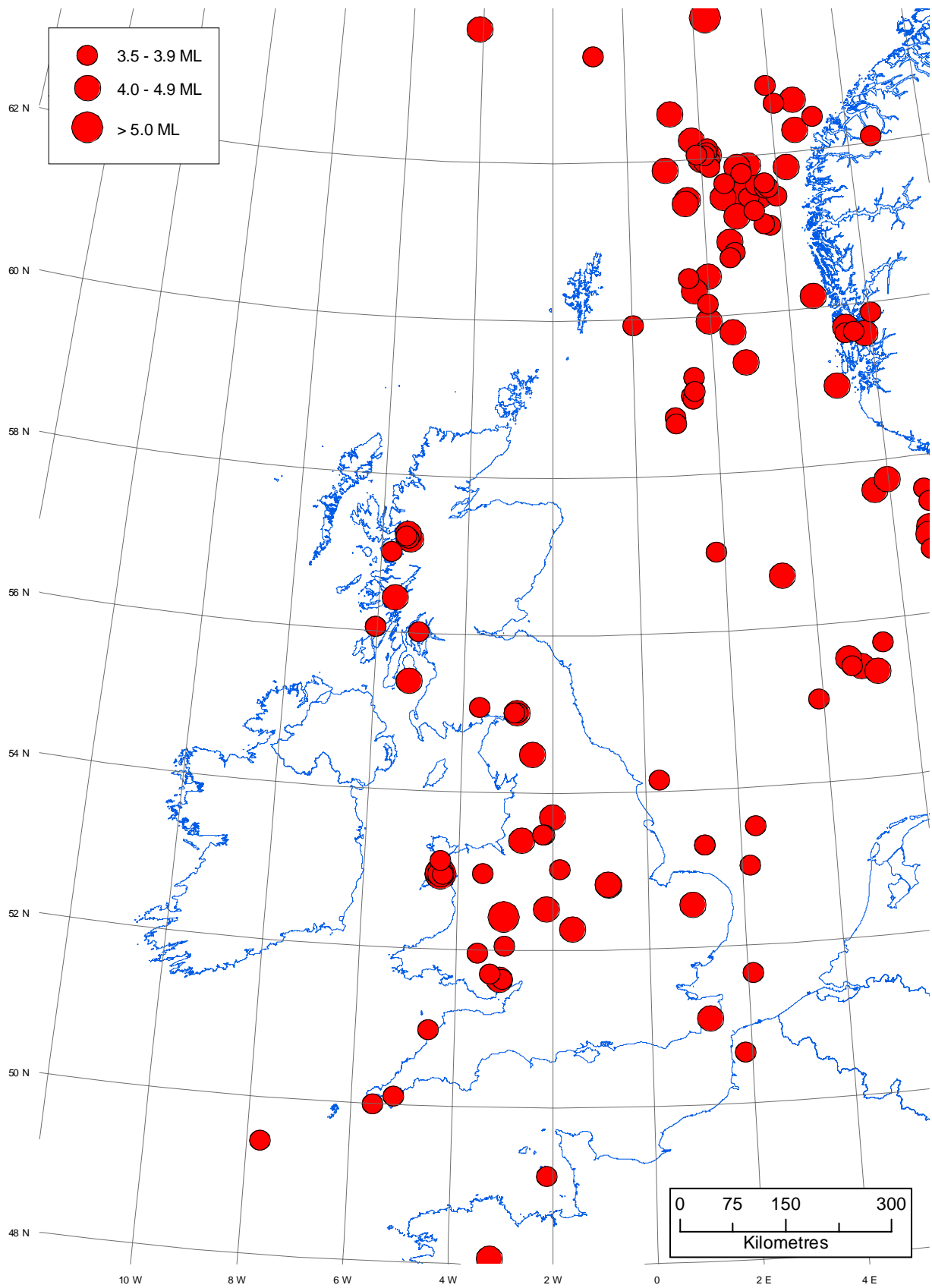


Figure 5. Epicentres of earthquakes with magnitudes of 3.5 ML and above, in the period 1970 - 2007.

Folkestone, Kent 28 April 2007

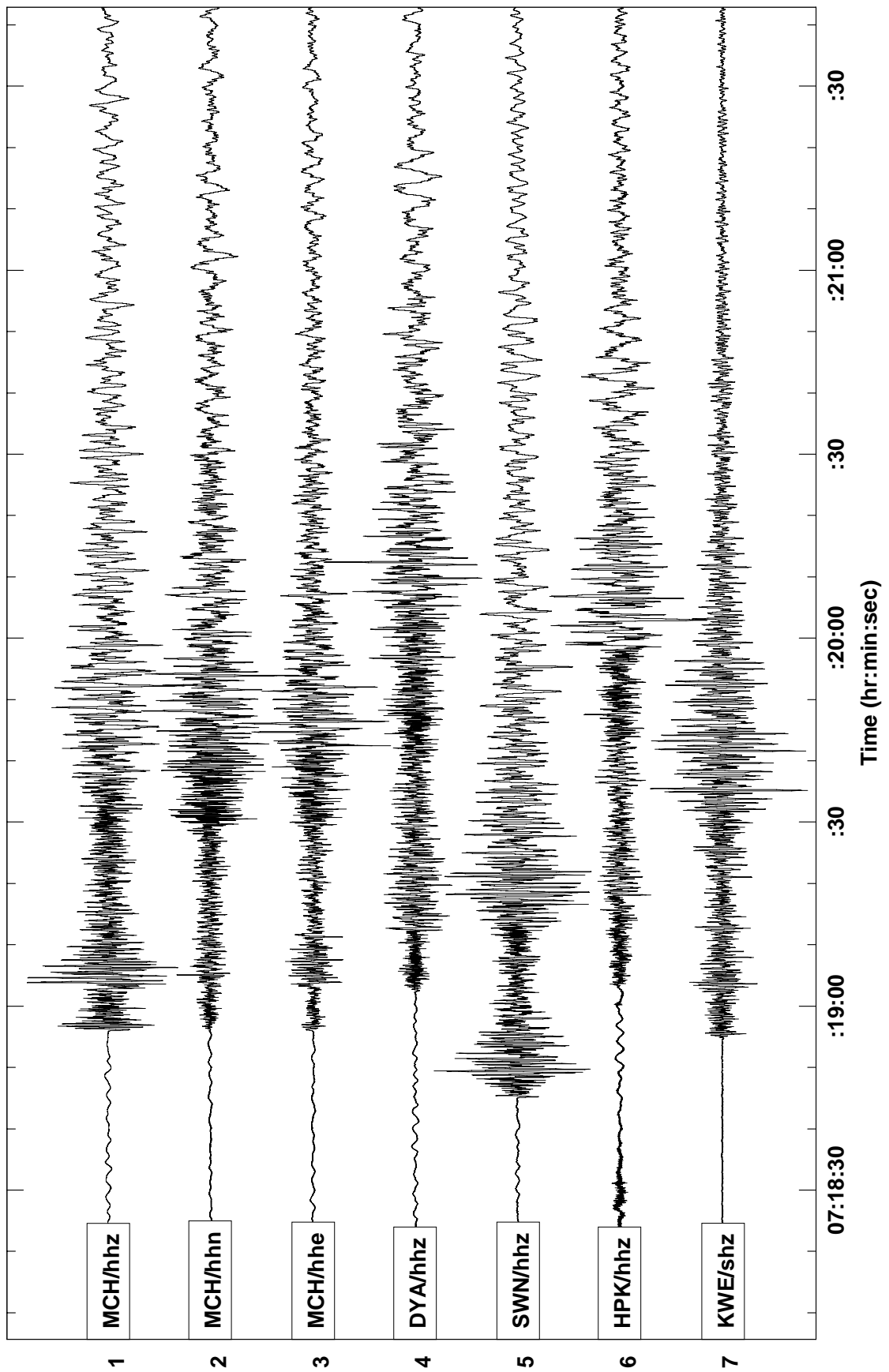


Figure 6. Seismograms of the ground displacement from the Folkestone earthquake, 28 April 2007, recorded by BGS seismograph stations.

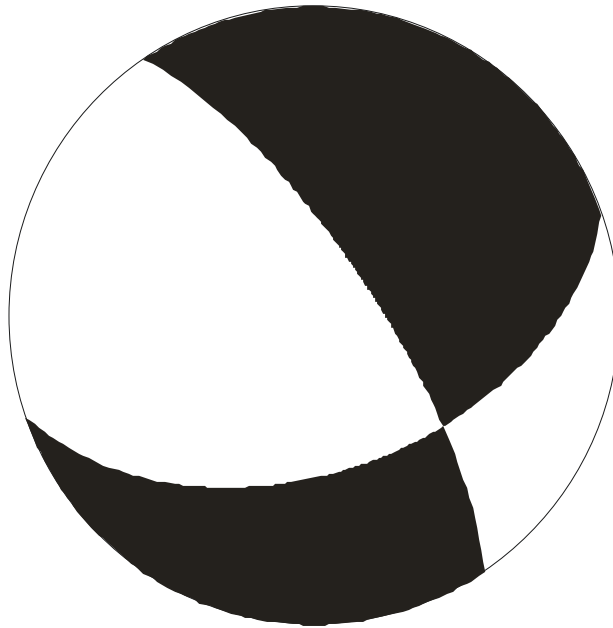


Figure 7. Focal mechanism for the Folkestone earthquake.

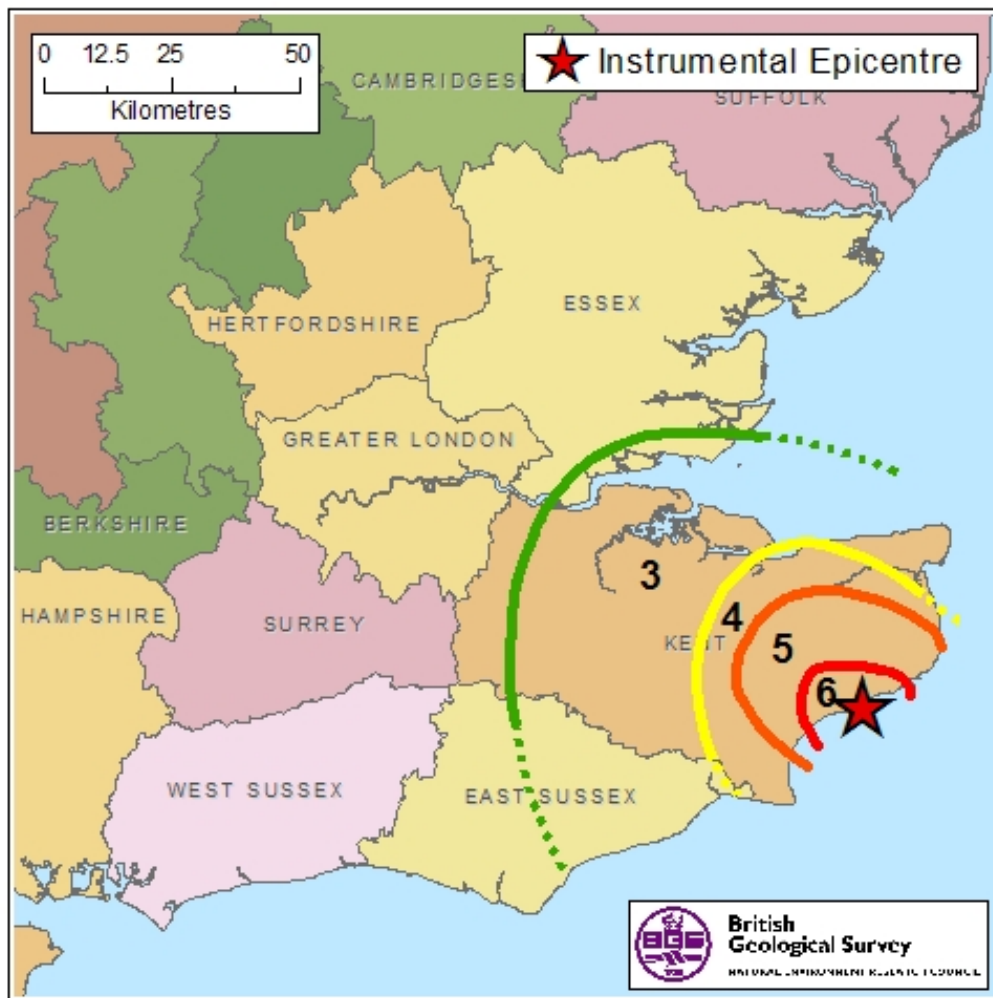


Figure 8. Isoseismal map for the Folkestone earthquake.

Norwegian Sea 7 January 2007

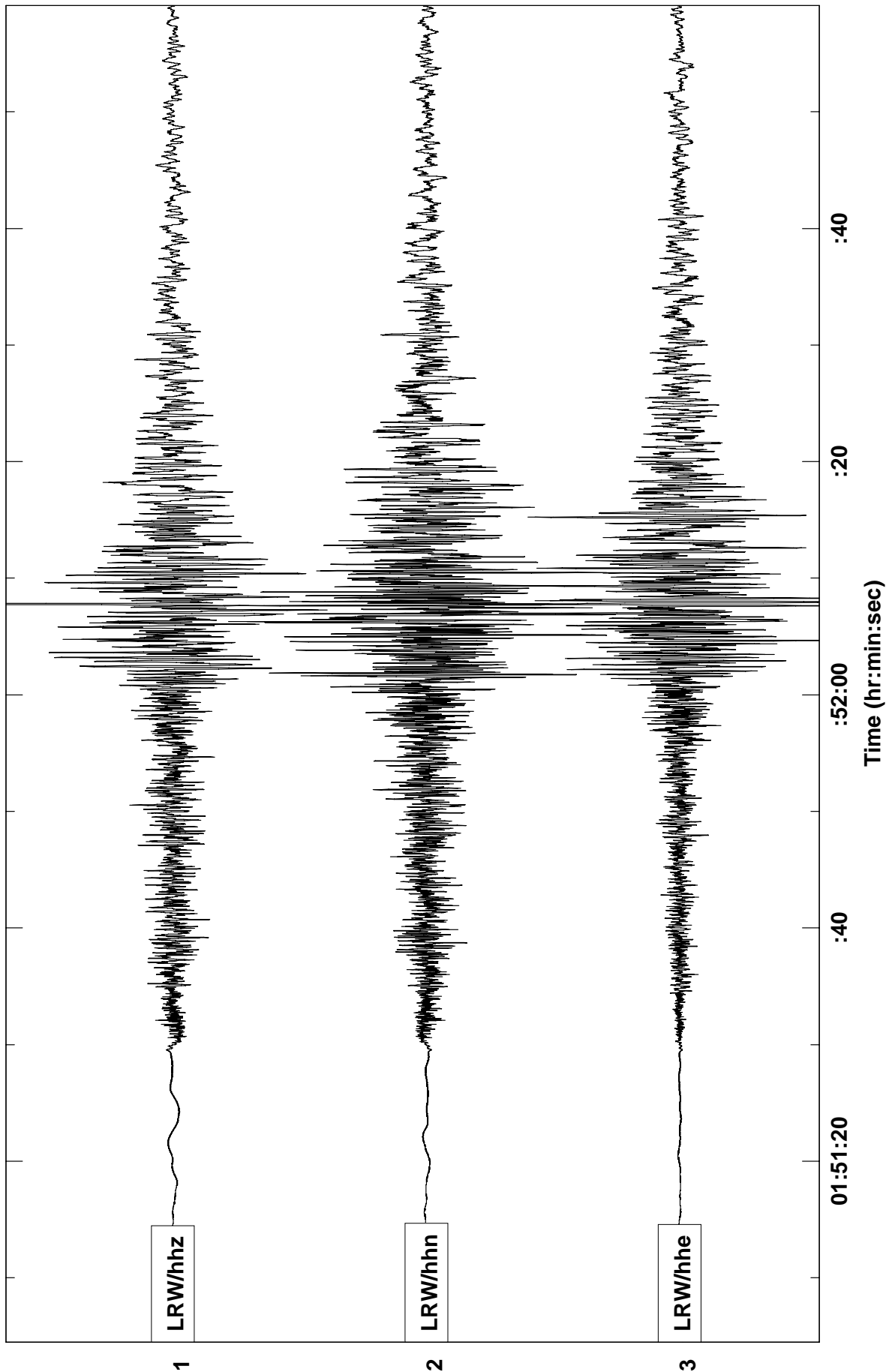


Figure 9. Seismograms of the ground displacement from the Norwegian Sea earthquake, 7 January 2007, recorded by BGS seismograph stations.

Jura, Strathclyde 17 September 2007

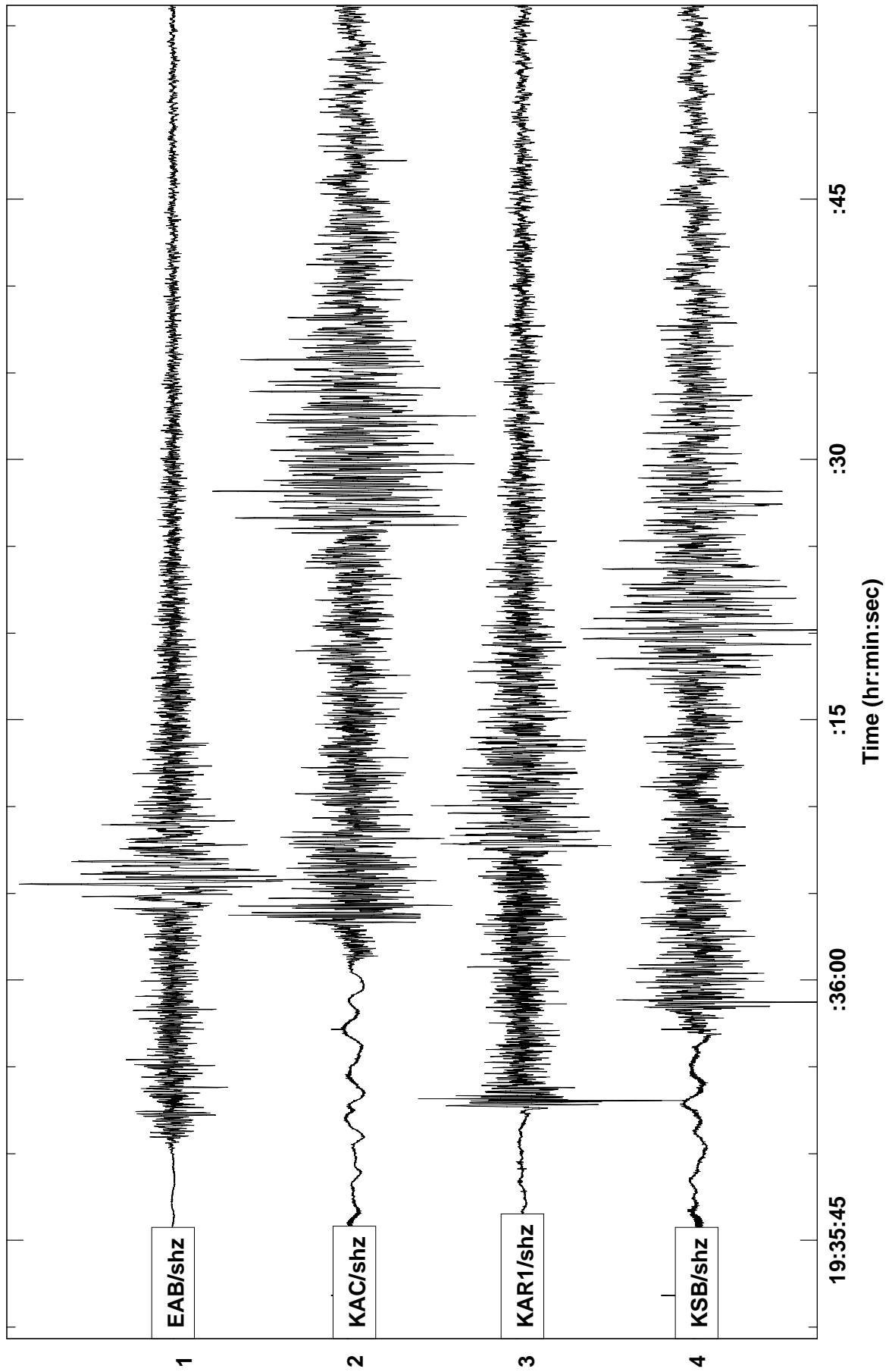


Figure 10. Seismograms of the ground displacement from the Jura earthquake, 17 September 2007, recorded by BGS seismograph stations.

Llangollen, North Wales 30 November 2007

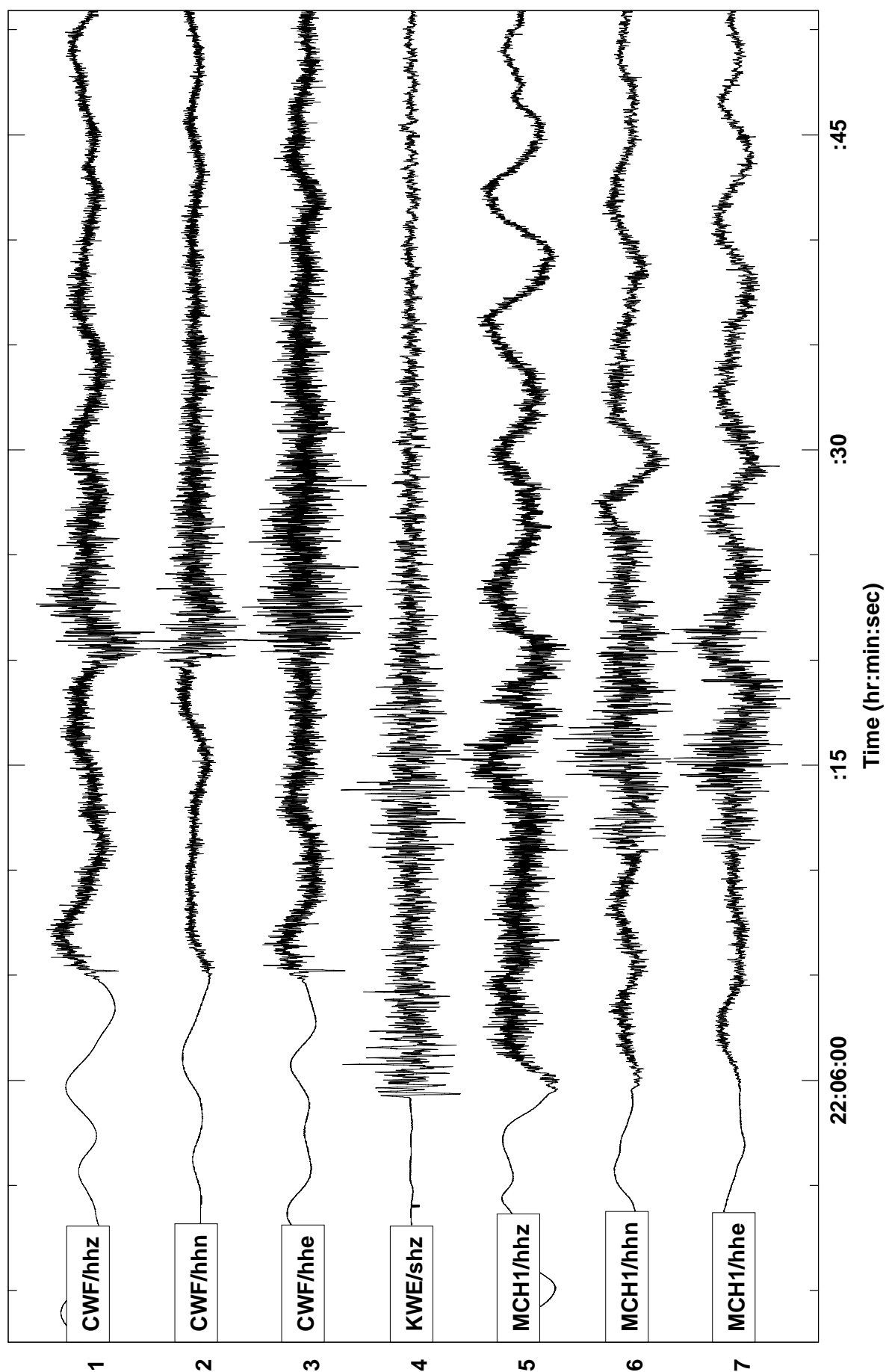


Figure 11. Seismograms of the ground displacement from the Llangollen earthquake, 30 November 2007, recorded by BGS seismograph stations.

TABLE 1 : CATALOGUE OF EVENTS : 2007

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No Gap	RMS	ERH	ERZ	Comments	
20070107	015055.1	61.89	1.01	558.1	1338.1	10.0	4.8	NORWEGIAN SEA	3	49	159	1.00	13.87	0.00	FELT SHETLAND,NORWAY
20070117	004704.0	56.95	-5.61	180.6	789.6	5.3	1.4	LOCH MORAR,HIGHLAND	2	12	107	0.30	6.11	7.40	FELT LOCHAILORT
20070123	173254.6	51.66	2.10	683.7	203.2	15.0	3.5	SOUTHERN NORTH SEA	4	0	247	0.30	60.26	0.00	65KM OFFSHORE
20070125	215932.4	57.41	-5.69	178.1	841.3	7.0	2.4	APPLECROSS,HIGHLAND	16	88	0.30	4.31	2.90		
20070128	103055.7	57.75	5.96	872.8	901.3	19.7	4.4	EASTERN NORTH SEA	3	26	265	0.40	28.31	21.10	FELT SOUTHERN NORWAY
20070207	152959.1							SONIC-IRISH SEA	2						FELT ISLE OF MAN
20070214	212657.1	53.18	-4.37	242.0	367.2	8.8	0.2	CAERNARFON,GWYNEDD	5	117	0.10	1.66	4.80	7KM NW OF CAERNARFON	
20070218	201003.3	56.18	-4.93	218.2	702.2	5.0	2.0	LOCHGOILHEAD,S'CLYDE	3	16	152	0.30	5.16	0.00	FELT LOCHGOILHEAD
20070218	201014.9	56.18	-4.94	217.3	702.3	5.0	2.3	LOCHGOILHEAD,S'CLYDE	3	17	115	0.40	6.46	0.00	FELT LOCHGOILHEAD
20070221	000552.6	63.70	-4.12	295.2	1537.2	10.0	4.0	NORWEGIAN SEA	19	300	0.40	23.60	0.00	230KM NE OF FAROES	
20070302	014137.1	51.67	2.08	682.4	204.8	15.0	2.0	SOUTHERN NORTH SEA	6	252	0.50	34.43	0.00		
20070304	022137.7	57.88	-5.29	204.7	893.1	5.1	1.0	ULLAPOOL,HIGHLAND	10	84	0.20	3.35	5.30	8KM WEST OF ULLAPOOL	
20070304	201717.9	50.45	-2.09	393.3	61.4	5.2	2.0	OFFSHORE SWANAGE	6	304	0.40	8.69	8.60		
20070306	114117.5	52.02	-3.06	327.2	235.8	23.7	1.4	HAY-ON-WYE,HER & WOR	6	139	0.30	12.11	4.40	10KM SE OF HAY-ON-WYE	
20070307	053631.0	53.45	-1.22	451.8	394.8	2.6	1.7	MALTBY,S YORKSHIRE	2	18	133	0.40	12.53	5.70	C/F,FELT MALTBY AREA
20070308	023117.2	53.45	-1.24	450.6	395.8	1.0	1.7	MALTBY,S YORKSHIRE	2	25	132	0.50	12.75	5.80	C/F,FELT MALTBY AREA
20070309	160022.6	53.45	-1.21	452.2	394.8	2.5	1.6	MALTBY,S YORKSHIRE	2	15	207	0.60	18.87	12.00	C/F,FELT MALTBY AREA
20070314	165413.9	53.46	-1.25	449.5	396.0	1.3	1.7	MALTBY,S YORKSHIRE	2	8	204	0.30	11.28	4.50	C/F,FELT MALTBY AREA
20070317	015607.5	53.46	-1.19	453.6	395.8	2.6	1.6	MALTBY,S YORKSHIRE	2	14	212	0.40	18.92	10.70	C/F,FELT MALTBY AREA
20070319	053129.2	53.46	-1.20	453.4	395.8	2.3	1.5	MALTBY,S YORKSHIRE	2	11	223	0.60	19.42	11.10	C/F,FELT MALTBY AREA
20070320	130343.8	53.46	-1.25	449.9	396.3	1.6	1.4	MALTBY,S YORKSHIRE	2	6	260	0.00	5.72	3.50	C/F,FELT MALTBY AREA
20070321	092633.9	53.45	-1.23	451.5	395.4	1.7	1.7	MALTBY,S YORKSHIRE	2	15	209	0.30	15.34	6.10	C/F,FELT MALTBY AREA
20070322	020542.8	53.46	-1.24	450.5	396.3	2.6	1.2	MALTBY,S YORKSHIRE	2	9	208	0.30	12.08	4.80	C/F,FELT MALTBY AREA
20070322	022314.3	59.63	-2.37	379.1	1082.9	15.5	2.7	OFFSHORE ORKNEY ISLES	2	13	173	0.80	39.88	45.90	80KM NNE OF KIRKWALL
20070323	013759.0	53.46	-1.23	451.1	396.2	2.6	1.6	MALTBY,S YORKSHIRE	2	16	206	0.40	18.18	7.40	C/F,FELT MALTBY AREA
20070323	085042.8	50.54	-4.10	251.5	73.7	5.2	1.2	TAVISTOCK,DEVON	7	111	0.50	20.12	33.90		
20070327	153737.9	53.48	-1.21	452.3	398.0	1.9	1.3	MALTBY,S YORKSHIRE	2	7	211	0.60	26.28	12.80	C/F,FELT MALTBY AREA
20070329	225915.0	53.45	-1.22	451.6	395.4	2.6	1.4	MALTBY,S YORKSHIRE	2	12	209	0.50	15.36	6.00	C/F,FELT MALTBY AREA
20070330	081558.0	53.76	1.17	608.9	434.3	9.5	2.3	SOUTHERN NORTH SEA	13	227	0.40	24.86	17.60		
20070404	010858.2	53.46	-1.27	448.2	396.1	2.3	1.0	MALTBY,S YORKSHIRE	2	11	203	0.30	10.67	4.50	C/F,FELT MALTBY AREA
20070405	130940.5	53.46	-1.27	448.6	396.2	2.6	1.1	MALTBY,S YORKSHIRE	2	12	203	0.50	19.30	8.10	C/F,FELT MALTBY AREA
20070412	232243.3	53.46	-1.26	448.9	396.5	2.3	1.1	MALTBY,S YORKSHIRE	2	11	203	0.30	14.32	5.90	C/F,FELT MALTBY AREA
20070419	101828.0	53.47	-1.26	449.3	397.8	2.6	1.4	MALTBY,S YORKSHIRE	2	6	194	0.30	11.16	6.90	C/F,FELT MALTBY AREA
20070423	005813.0	58.63	-5.48	198.1	976.2	8.0	0.9	THE MINCH	5	273	0.30	28.29	65.20	25KM W OF CAPE WRATH	
20070423	095140.2	57.03	-5.79	170.0	799.4	2.6	1.1	MALLAIG,HIGHLAND	10	121	0.50	10.43	6.10		
20070424	040806.2	54.00	-3.47	303.9	457.3	5.0	1.5	IRISH SEA	14	64	0.30	3.14	0.00		
20070428	071812.5	51.10	1.17	621.8	138.5	5.3	4.3	FOLKESTONE,KENT	6	124	86	0.70	10.80	0.00	FELT THROUGHOUT KENT
20070428	072055.6	51.10	1.17	621.8	138.5	5.3	1.7	FOLKESTONE,KENT	2	347	8.20	0.00	0.00		
20070428	072401.9	51.10	1.17	621.8	138.5	5.3	1.1	FOLKESTONE,KENT	2	304	5.60	0.00	0.00		
20070428	084052.4	51.10	1.17	621.8	138.5	5.3	1.0	FOLKESTONE,KENT	1	360	0.10	0.00	0.00		

TABLE 1 : CATALOGUE OF EVENTS : 2007

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No Gap	RMS	ERH	ERZ	Comments	
20070428	111100.7	51.10	1.17	621.8	138.5	5.3	1.7	FOLKESTONE, KENT		2	304	5.50	0.00	0.00	
20070428	152830.6	51.10	1.17	621.8	138.5	5.3	0.9	FOLKESTONE, KENT		1	360	0.00	0.00	0.00	
20070429	065105.5	51.10	1.17	621.8	138.5	5.3	1.4	FOLKESTONE, KENT		2	304	5.60	0.00	0.00	
20070429	131717.6	51.10	1.17	621.8	138.5	5.3	0.8	FOLKESTONE, KENT		1	360	0.00	0.00	0.00	
20070501	073614.9	51.10	1.17	621.8	138.5	5.3	1.4	FOLKESTONE, KENT		1	360	0.10	0.00	0.00	
20070502	215014.9	51.10	1.17	621.8	138.5	5.3	1.5	FOLKESTONE, KENT		1	360	0.10	0.00	0.00	
20070502	215108.2	51.10	1.17	621.8	138.5	5.3	1.4	FOLKESTONE, KENT		1	360	0.10	0.00	0.00	
20070504	014740.3	55.14	-3.19	324.3	583.6	2.6	0.9	LOCKERBIE, D & G		9	292	0.30	27.38	22.40	8KM EAST OF LOCKERBIE
20070504	070123.5	51.10	1.17	621.8	138.5	5.3	1.3	FOLKESTONE, KENT		2	304	5.60	0.00	0.00	
20070505	050918.9	51.10	1.17	621.8	138.5	5.3	1.2	FOLKESTONE, KENT		3	310	0.30	0.00	0.00	
20070528	052707.8	53.37	2.44	695.6	395.3	5.0	2.5	SOUTHERN NORTH SEA		7	300	0.40	27.30	0.00	FELT NORTH SEA OILRIG
20070604	173445.9	57.01	1.81	631.2	797.4	5.0	3.9	CENTRAL NORTH SEA	3	74	45	0.60	4.84	0.00	FELT NORTH SEA OILRIG
20070609	130307.3	56.28	-5.01	213.6	713.8	8.7	1.6	INVERARAY, STRATHCLYDE		12	152	0.40	10.24	8.30	160KM NW OF IRELAND
20070617	220639.7	56.18	-10.34	-116.9	729.8	15.0	2.2	NORTHERN ATLANTIC		12	287	0.40	37.88	10.00	160KM NW OF IRELAND
20070630	000613.2	53.41	-2.69	354.4	391.0	11.0	1.6	ST HELENS, MERSEYSIDE		13	107	0.60	8.50	8.80	10KM EAST OF LUDLOW
20070630	014918.6	51.73	-3.42	302.0	204.3	7.5	1.3	ABERDARE, MID GLAMORGAN		10	142	0.30	5.82	10.70	10KM EAST OF LUDLOW
20070704	173422.1	52.40	-2.58	360.5	278.2	12.7	1.5	LUDLOW, SHROPSHIRE		11	70	0.40	6.69	6.20	10KM EAST OF LUDLOW
20070708	200428.2	54.21	-3.26	318.0	480.4	16.6	2.0	MILLOM, CUMBRIA		16	92	0.40	5.85	8.00	7KM SW OF WYMONDHAM
20070709	035633.0	52.55	1.19	616.2	300.1	8.4	1.5	WYMONDHAM, NORFOLK		4	210	0.30	22.11	5.30	7KM SW OF WYMONDHAM
20070710	062948.1	55.60	-4.82	222.7	638.2	11.8	1.2	FIRTH OF CLYDE		10	209	0.40	12.37	8.00	8KM WEST OF IRVINE
20070715	141000.1	53.12	-1.06	462.9	359.1	2.3	1.3	BILSTHORPE, NOTTS		10	249	0.20	16.42	8.50	180KM EAST OF HULL
20070715	143005.8	53.14	-1.09	460.7	361.0	2.9	1.1	BILSTHORPE, NOTTS	3	16	116	0.30	3.71	3.10	FELT KIRKBY BELLARS
20070716	052731.3	53.46	2.32	686.9	404.4	10.0	3.0	SOUTHERN NORTH SEA		25	245	0.90	21.88	0.00	180KM EAST OF HULL
20070717	171744.6	52.80	-0.96	470.3	323.2	2.6	2.6	MELTON MOWBRAY, LEICS		15	108	0.30	5.87	4.80	FELT KIRKBY BELLARS
20070718	003032.9	56.88	-5.14	208.5	780.9	2.3	1.3	FORT WILLIAM, HIGHLAND		15	108	0.30	5.87	4.80	160KM NW OF IRELAND
20070719	180727.1	55.31	-2.46	371.1	601.4	2.3	0.7	BYRNES, NORTHUMBRIA		27	276	0.40	10.47	0.00	160KM NW OF IRELAND
20070721	064046.6	56.47	-10.23	-106.2	761.2	10.0	2.7	NORTHERN ATLANTIC		20	230	0.60	12.54	0.00	CENTRAL GRABEN
20070724	010119.0	57.00	1.88	635.5	797.0	5.0	3.2	CENTRAL NORTH SEA		51	146	0.50	6.52	0.00	CENTRAL GRABEN
20070724	131109.3	52.85	-1.41	439.5	327.9	4.9	1.6	MELBOURNE, DERBYSHIRE		8	159	0.30	6.89	8.00	8KM SSE OF DERBY
20070724	204727.5	57.42	-5.71	177.1	842.7	7.0	1.1	APPLECROSS, HIGHLAND		6	156	0.20	7.84	5.30	20KM SW OF INVERNESS
20070727	032813.5	57.29	-4.37	257.3	824.2	4.3	1.5	ERROGIE, HIGHLAND		8	84	0.40	7.00	12.10	20KM SW OF INVERNESS
20070801	041343.8	56.46	-6.53	120.9	739.3	12.2	1.4	OFF ISLE OF MULL		8	270	0.40	29.68	12.40	20KM SW OF INVERNESS
20070801	203149.7	49.65	0.13	553.9	-25.9	5.0	2.6	NORTHERN FRANCE		20	230	0.60	12.54	0.00	20KM SW OF INVERNESS
20070810	105011.0	53.49	-2.17	388.4	399.9	4.0	2.5	MANCHESTER	4	20	100	0.30	4.56	7.80	FELT MANCHESTER...
20070810	122559.0	53.50	-2.12	391.9	400.2	5.4	1.6	MANCHESTER	3	11	128	0.40	8.07	9.70	FELT MANCHESTER
20070823	013510.4	53.49	-2.20	387.0	399.3	3.6	1.7	MANCHESTER	3	12	129	0.30	4.60	4.20	FELT MANCHESTER
20070823	052626.1	53.49	-2.17	388.4	398.9	3.2	1.8	MANCHESTER	3	13	92	0.20	3.05	4.90	FELT MANCHESTER
20070823	053448.2	53.48	-2.18	387.9	397.9	3.4	1.4	MANCHESTER	3	7	132	0.40	8.10	7.90	FELT MANCHESTER
20070826	135436.6	56.38	-3.95	279.7	722.6	2.6	1.4	CRIEFF, TAYSIDE	2	13	70	0.30	4.47	4.50	FELT COMRIE
20070828	025748.1	56.24	-3.77	290.3	706.9	4.9	1.5	BLACKFORD, TAYSIDE	2	13	84	0.20	3.88	6.20	FELT GLENDEVON
20070830	044635.5	53.48	-2.18	388.2	398.4	4.5	2.2	MANCHESTER	3	17	99	0.30	3.14	5.30	FELT MANCHESTER
20070830	190259.6	48.44	-3.46	291.8	-161.7	10.0	2.1	NORTHERN FRANCE		5	317	0.20	5.74	0.00	FELT MANCHESTER
20070830	222430.5	52.86	2.10	676.2	336.9	5.0	2.0	SOUTHERN NORTH SEA		6	318	0.50	24.99	0.00	FELT MANCHESTER

TABLE 1 : CATALOGUE OF EVENTS : 2007

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No Gap	RMS	ERH	ERZ	Comments
20070905	094500.0							SONIC-EAST KENT	2	4				FELT EAST KENT
20070912	064450.7	56.38	-5.71	171.1	727.4	5.5	1.3	MULL, STRATHCLYDE		9	229	0.30	14.34	10.10
20070917	153902.7	52.89	-1.12	458.9	333.1	10.5	1.9	KEYWORTH, NOTTS		15	105	0.40	6.36	3.10
20070917	193532.3	55.80	-5.99	149.8	663.8	19.4	3.0	JURA, STRATHCLYDE	3	28	168	0.50	9.09	7.50
20070919	223447.2	52.78	0.65	579.0	323.7	7.8	1.4	SWAFFHAM, EAST ANGLIA		5	154	0.20	9.69	19.10
20070926	183349.8	53.45	2.23	680.6	402.6	10.0	3.3	SOUTHERN NORTH SEA		18	272	0.50	22.72	0.00
20070928	050834.7	53.31	2.43	695.0	388.6	10.0	2.7	SOUTHERN NORTH SEA		12	300	0.40	20.21	0.00
20070929	212941.4	56.03	-5.93	155.0	689.2	7.5	1.4	JURA, STRATHCLYDE		7	218	0.30	7.22	7.30
20071001	090510.4	54.46	-2.48	368.7	507.3	7.8	1.0	ORTON, CUMBRIA		5	312	0.30	22.08	0.00
20071004	023925.0	56.29	-4.96	216.6	714.4	7.1	1.6	INVERARAY, STRATHCLYDE		20	149	0.40	5.64	5.30
20071005	073301.3	53.02	2.29	687.5	355.6	10.0	3.4	SOUTHERN NORTH SEA		30	243	1.00	19.54	0.00
20071008	035026.1	48.20	-3.60	281.2	-188.0	10.0	2.6	NORTHERN FRANCE		11	287	0.20	5.08	0.00
20071009	035805.1	48.50	-3.68	275.9	-154.0	10.0	2.0	NORTHERN FRANCE		6	299	0.40	15.81	0.00
20071012	093415.7	51.40	1.40	636.7	172.7	0.0	2.3	EXPL-MARGATE, KENT	2	10	215	0.40	22.42	0.00
20071014	232130.3	48.55	-3.78	268.4	-148.6	10.0	2.0	NORTHERN FRANCE		6	357	0.30	144.25	0.00
20071014	233305.3	48.42	-3.71	273.4	-163.1	10.0	2.2	NORTHERN FRANCE		6	302	0.40	18.64	0.00
20071023	171511.9	55.22	-3.48	305.8	593.0	5.0	1.1	JOHNSTONEBRIDGE, D & G		13	113	0.40	5.56	7.30
20071027	063056.2	62.89	1.72	589.0	1451.6	8.5	3.1	NORTHERN NORTH SEA		6	238	0.70	33.45	23.30
20071028	032743.9	58.47	-4.96	227.6	957.1	4.7	1.7	KINLOCHBERVIE, HIGHLAND		11	221	0.40	10.37	8.50
20071031	141825.1	55.51	-3.94	277.8	625.2	6.7	1.1	DOUGLAS, STRATHCLYDE		11	100	0.30	4.03	11.70
20071102	100303.8	56.01	-3.97	277.1	681.5	2.1	1.0	DENNY, CENTRAL		10	76	0.20	4.00	7.40
20071103	122326.8	51.40	1.42	637.5	172.3	0.0	2.3	EXPL-MARGATE, KENT	2	20	217	0.90	39.17	0.00
20071109	091435.2	58.13	-3.04	338.9	916.1	8.2	1.7	MORAY FIRTH		7	236	0.40	26.48	0.00
20071114	170837.4	58.12	-3.12	333.8	915.6	5.0	2.4	MORAY FIRTH		16	147	0.50	10.66	0.00
20071114	193512.4	58.12	-3.15	332.5	915.5	7.0	1.0	MORAY FIRTH		3	218	0.20	11.44	0.00
20071124	144131.6	53.13	-4.54	230.0	361.9	5.2	1.9	CAERNARFON BAY		16	196	0.30	6.87	3.50
20071124	214414.4	50.97	-5.36	164.3	124.5	11.1	1.5	OFF HARTLAND POINT		5	294	0.30	16.34	11.00
20071130	170856.7	55.80	-3.20	324.7	657.3	5.9	2.3	PENICUIK, MIDDLETHIAN	3	15	69	0.30	3.62	3.10
20071130	220543.5	52.87	-3.28	314.0	330.6	12.0	2.9	LLANGOLLEN, N WALES	4	25	100	0.30	3.58	3.60
20071209	155957.2	55.79	-3.22	323.4	655.6	4.7	2.3	PENICUIK, MIDDLETHIAN	3	13	92	0.40	5.49	7.00
20071218	150639.8	48.46	-1.40	444.5	-160.3	7.4	1.9	NORTHERN FRANCE		5	355	0.10	0.00	0.00
20071222	055148.1	54.90	-2.64	359.1	555.8	5.8	1.1	BRAMPTON, CUMBRIA		7	122	0.40	6.45	9.50

TABLE 2 : PHASE DATA

January 7 2007 Time: 01:50 55.1 UTC Magnitude: 4.8 ML
Lat: 61.891N Lon: 1.008W Depth: 10.0 km
Grid Ref: 558.06 kmE 1338.11 kmN RMS: 1.00 secs
Locality: NORWEGIAN SEA

Table with columns: STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI, RES. Includes data for stations like FOO, SUE, LRW, etc.

RRH SZ 126.0 EP 00:47 24.48 -0.16
REB SZ 132.0 EP 00:47 25.60 0.12
MVH SZ 139.0 EP 00:47 26.63 0.20
PGB HZ 144.0 EP 00:47 27.84 0.61
PGB HN 144.0 ES 00:47 43.78 -0.37
PGB HN 144.0 AML 00:47 46.71 8 0.74
PGB HE 144.0 AML 00:47 46.76 5 0.56
MCD SZ 159.0 EP 00:47 30.29 0.96
MCD SN 159.0 AML 00:47 49.96 7 0.42
MCD SE 159.0 AML 00:47 52.01 10 0.58

January 23 2007 Time: 17:32 54.6 UTC Magnitude: 3.5 ML
Lat: 51.655N Lon: 2.102W Depth: 15.0 km
Grid Ref: 683.68 kmE 203.16 kmN RMS: 0.30 secs
Locality: SOUTHERN NORTH SEA

Table with columns: STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI, RES. Includes data for stations like APA, AEU, AWI, etc.

January 25 2007 Time: 21:59 32.4 UTC Magnitude: 2.4 ML
Lat: 57.408N Lon: -5.694W Depth: 7.0 km
Grid Ref: 178.14 kmE 841.29 kmN RMS: 0.30 secs
Locality: APPLECROSS, HIGHLAND

Table with columns: STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI, RES. Includes data for stations like KPL, RRR, MDO, etc.

January 17 2007 Time: 00:47 04.0 UTC Magnitude: 1.4 ML
Lat: 56.946N Lon: -5.608W Depth: 5.3 km
Grid Ref: 180.58 kmE 789.63 kmN RMS: 0.30 secs
Locality: LOCH MORAR, HIGHLAND

Table with columns: STAT, CO, DIST, PHAS, WT, P, HrMn, SECS, AMPL, PERI, RES. Includes data for stations like KAR, KPL, KAC, etc.

TABLE 2 : PHASE DATA

<p> March 17 2007 Time: 01:56 07.5 UTC Magnitude: 1.6 ML Lat: 53.456N Lon: -1.192W Depth: 2.6 km Grid Ref: 453.65 kmE 395.80 kmN RMS: 0.40 secs Locality: MALTBYS, YORKSHIRE Velocity model: Lownet Xnear: 100.0 Xfar: 200.0 Comment: C/F,FELT MALTBYS AREA Intensity: 2 </p>	<p> CWF HZ 80.1 EP 16:54 27.52 -0.26 KWE SZ 62.9 EP 16:54 25.14 0.02 HPK HN 60.8 AML 16:54 39.86 19 0.21 HPK HE 60.8 ES 16:54 32.60 -0.14 HPK HZ 60.8 EP 16:54 24.90 0.12 LHO SZ 41.0 EP 16:54 21.60 -0.02 KBI SZ 29.1 EP 16:54 19.58 0.02 </p>	<p> GAL HE 277.0 AML 09:27 22.64 2 0.48 GAL HN 277.0 AML 09:27 41.53 4 0.72 LHO SZ 43.0 EP C 09:26 41.64 -0.26 CWF HE 79.7 AML 09:26 59.19 26 0.14 HAE SZ 181.0 EP 09:27 03.58 0.93 KBI SZ 29.9 EP 09:26 39.55 -0.09 HPK HZ 62.1 EP 09:26 45.12 0.20 HPK HN 62.1 ES 09:26 52.88 -0.09 HPK HE 62.1 AML 09:26 59.50 10 0.24 HPK HN 62.1 AML 09:27 00.03 9 0.17 CWF HZ 79.7 EP 09:26 47.38 -0.26 CWF HE 79.7 ES 09:26 57.71 0.03 CWF HN 79.7 AML 09:27 02.25 18 0.16 SBD SZ 149.0 EP 09:26 58.90 0.65 HLM SZ 152.0 EP 09:26 59.55 0.84 BBO SN 195.0 AML 09:27 32.02 4 0.28 BBO SE 195.0 AML 09:27 32.76 4 0.20 MCH HZ 201.0 EP 09:27 05.64 0.44 KWE SZ 63.7 EP 09:26 45.25 0.07 </p>
<p> March 19 2007 Time: 05:31 29.2 UTC Magnitude: 1.5 ML Lat: 53.456N Lon: -1.195W Depth: 2.3 km Grid Ref: 453.45 kmE 395.80 kmN RMS: 0.60 secs Locality: MALTBYS, YORKSHIRE Velocity model: Lownet Xnear: 100.0 Xfar: 200.0 Comment: C/F,FELT MALTBYS AREA Intensity: 2 </p>	<p> LHO SZ 45.1 EP 01:56 15.35 -0.33 HPK HZ 62.7 EP 01:56 18.69 0.25 HPK HE 62.7 ES 01:56 26.22 -0.21 HPK HE 62.7 AML 01:56 33.22 13 0.18 HPK HN 62.7 AML 01:56 33.79 12 0.16 KWE SZ 65.3 EP 01:56 19.00 0.14 CWF HZ 80.2 EP 01:56 21.23 0.09 CWF HE 80.2 ES 01:56 30.74 -0.37 CWF HN 80.2 AML 01:56 36.08 21 0.14 CWF HE 80.2 AML 01:56 36.23 27 0.22 SBD SZ 151.0 EP 01:56 32.78 0.82 HLM SZ 154.0 EP 01:56 32.92 0.54 CKE SZ 178.0 EP 01:56 36.75 1.10 HAE SZ 182.0 EP 01:56 37.56 1.34 MCH HZ 203.0 EP 01:56 39.47 0.68 MCH HN 203.0 ES 01:57 04.15 2.51 MCH HN 203.0 AML 01:57 06.01 16 0.44 MCH HE 203.0 AML 01:57 07.25 18 0.46 HTR SZ 208.0 EP 01:56 40.42 1.03 HGH SZ 230.0 EP 01:56 43.42 1.26 ESK HZ 245.0 EP 01:56 45.42 1.39 ESK HN 245.0 AML 01:57 19.38 4 0.22 ESK HE 245.0 AML 01:57 23.09 7 0.48 GAL HZ 278.0 EP 01:56 47.85 -0.33 KBI SZ 31.7 EP 01:56 13.40 0.03 </p>	<p> March 22 2007 Time: 02:05 42.8 UTC Magnitude: 1.2 ML Lat: 53.461N Lon: -1.239W Depth: 2.6 km Grid Ref: 450.52 kmE 396.33 kmN RMS: 0.30 secs Locality: MALTBYS, YORKSHIRE Velocity model: Lownet Xnear: 100.0 Xfar: 200.0 Comment: C/F,FELT MALTBYS AREA Intensity: 2 </p>
<p> March 21 2007 Time: 09:26 33.9 UTC Magnitude: 1.7 ML Lat: 53.453N Lon: -1.225W Depth: 1.7 km Grid Ref: 451.46 kmE 395.45 kmN RMS: 0.30 secs Locality: MALTBYS, YORKSHIRE Velocity model: Lownet Xnear: 100.0 Xfar: 200.0 Comment: C/F,FELT MALTBYS AREA Intensity: 2 </p>	<p> KBI SZ 27.1 EP 05:31 33.78 -0.34 LHO SZ 33.9 EP 05:31 35.13 -0.17 HPK HZ 56.5 EP 05:31 39.13 0.15 HPK HN 56.5 ES 05:31 45.93 -0.16 HPK HE 56.5 AML 05:31 53.63 8 0.16 HPK HN 56.5 AML 05:31 54.13 8 0.16 KWE SZ 60.4 EP 05:31 39.50 -0.11 SBD SZ 142.0 EP 05:31 53.40 1.23 HLM SZ 148.0 EP 05:31 52.95 -0.01 XAL SZ 164.0 EP 05:31 56.95 1.63 HAE SZ 179.0 EP 05:31 57.46 0.17 MCH HZ 198.0 EP 05:32 00.12 0.43 MCH HN 198.0 ES 05:32 24.56 2.63 MCH HN 198.0 AML 05:32 26.64 10 0.24 MCH HE 198.0 AML 05:32 27.65 12 0.44 HTR SZ 202.0 EP 05:32 00.34 0.17 ESK HN 237.0 AML 05:32 39.28 4 0.32 ESK HE 237.0 AML 05:32 43.46 6 0.50 </p>	<p> STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES LHO SZ 45.1 EP 01:56 15.35 -0.33 HPK HZ 62.7 EP 01:56 18.69 0.25 HPK HE 62.7 ES 01:56 26.22 -0.21 HPK HE 62.7 AML 01:56 33.22 13 0.18 HPK HN 62.7 AML 01:56 33.79 12 0.16 KWE SZ 65.3 EP 01:56 19.00 0.14 CWF HZ 80.2 EP 01:56 21.23 0.09 CWF HE 80.2 ES 01:56 30.74 -0.37 CWF HN 80.2 AML 01:56 36.08 21 0.14 CWF HE 80.2 AML 01:56 36.23 27 0.22 SBD SZ 151.0 EP 01:56 32.78 0.82 HLM SZ 154.0 EP 01:56 32.92 0.54 CKE SZ 178.0 EP 01:56 36.75 1.10 HAE SZ 182.0 EP 01:56 37.56 1.34 MCH HZ 203.0 EP 01:56 39.47 0.68 MCH HN 203.0 ES 01:57 04.15 2.51 MCH HN 203.0 AML 01:57 06.01 16 0.44 MCH HE 203.0 AML 01:57 07.25 18 0.46 HTR SZ 208.0 EP 01:56 40.42 1.03 HGH SZ 230.0 EP 01:56 43.42 1.26 ESK HZ 245.0 EP 01:56 45.42 1.39 ESK HN 245.0 AML 01:57 19.38 4 0.22 ESK HE 245.0 AML 01:57 23.09 7 0.48 GAL HZ 278.0 EP 01:56 47.85 -0.33 KBI SZ 31.7 EP 01:56 13.40 0.03 </p>
<p> March 20 2007 Time: 13:03 43.8 UTC Magnitude: 1.4 ML Lat: 53.461N Lon: -1.248W Depth: 1.6 km Grid Ref: 449.92 kmE 396.32 kmN RMS: 0.00 secs Locality: MALTBYS, YORKSHIRE Velocity model: Lownet Xnear: 100.0 Xfar: 200.0 Comment: C/F,FELT MALTBYS AREA Intensity: 2 </p>	<p> KBI SZ 27.1 EP 05:31 33.78 -0.34 LHO SZ 33.9 EP 05:31 35.13 -0.17 HPK HZ 56.5 EP 05:31 39.13 0.15 HPK HN 56.5 ES 05:31 45.93 -0.16 HPK HE 56.5 AML 05:31 53.63 8 0.16 HPK HN 56.5 AML 05:31 54.13 8 0.16 KWE SZ 60.4 EP 05:31 39.50 -0.11 SBD SZ 142.0 EP 05:31 53.40 1.23 HLM SZ 148.0 EP 05:31 52.95 -0.01 XAL SZ 164.0 EP 05:31 56.95 1.63 HAE SZ 179.0 EP 05:31 57.46 0.17 MCH HZ 198.0 EP 05:32 00.12 0.43 MCH HN 198.0 ES 05:32 24.56 2.63 MCH HN 198.0 AML 05:32 26.64 10 0.24 MCH HE 198.0 AML 05:32 27.65 12 0.44 HTR SZ 202.0 EP 05:32 00.34 0.17 ESK HN 237.0 AML 05:32 39.28 4 0.32 ESK HE 237.0 AML 05:32 43.46 6 0.50 </p>	<p> March 23 2007 Time: 01:37 59.0 UTC Magnitude: 1.6 ML Lat: 53.460N Lon: -1.230W Depth: 2.6 km Grid Ref: 451.12 kmE 396.22 kmN RMS: 0.40 secs Locality: MALTBYS, YORKSHIRE Velocity model: Lownet Xnear: 100.0 Xfar: 200.0 Comment: C/F,FELT MALTBYS AREA Intensity: 2 </p>
<p> March 22 2007 Time: 02:23 14.3 UTC Magnitude: 2.7 ML Lat: 59.632N Lon: -2.370W Depth: 15.5 km Grid Ref: 379.14 kmE 1082.93 kmN RMS: 0.80 secs Locality: OFFSHORE ORKNEY ISLES Velocity model: North Sea Xnear: 300.0 Xfar: 600.0 Comment: 80KM NNE OF KIRKWALL </p>	<p> KPL HE 319.0 AML 02:24 45.17 38 0.66 PGB HZ 444.0 EP 02:24 13.67 0.26 MCD SN 234.0 ES 02:24 12.01 0.50 KPL HN 319.0 AML 02:24 45.49 30 0.36 EDI HZ 416.0 EP 02:24 10.75 0.81 EDI HN 416.0 ES 02:24 50.02 -0.55 EDI HN 416.0 AML 02:25 14.03 12 0.44 EDI HE 416.0 AML 02:25 15.76 26 0.74 ESK HN 483.0 AML 02:25 10.53 11 0.78 PGB HN 444.0 AML 02:25 21.17 10 0.80 PGB HE 444.0 AML 02:25 23.20 7 0.66 ESK HZ 483.0 EP 02:24 17.92 -0.40 ESK HE 483.0 ES 02:25 02.86 -2.19 ESK HE 483.0 AML 02:25 29.23 12 0.74 KPL HZ 319.0 EP 02:23 57.55 -0.37 WAL SZ 81.3 IP D 02:23 27.81 0.40 WAL SZ 81.3 ES 02:23 36.73 -0.25 LRW HZ 87.2 IP D 02:23 28.48 0.16 LRW HN 87.2 ES 02:23 38.47 -0.08 </p>	<p> STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES LHO SZ 42.5 EP C 01:38 06.28 -0.21 HPK HZ 61.2 EP 01:38 09.79 0.35 HPK HE 61.2 ES 01:38 16.93 -0.16 HPK HE 61.2 AML 01:38 24.07 8 0.16 HPK HN 61.2 AML 01:38 24.59 8 0.16 KWE SZ 64.1 EP 01:38 09.83 -0.07 CWF HZ 80.5 EP 01:38 11.99 -0.43 CWF HN 80.5 ES 01:38 22.50 0.25 CWF HE 80.5 AML 01:38 23.86 20 0.14 CWF HN 80.5 AML 01:38 26.91 15 0.16 SBD SZ 149.0 EP 01:38 23.68 0.79 HLM SZ 153.0 EP 01:38 24.13 0.74 XAL SZ 169.0 EP 01:38 26.32 0.61 </p>

TABLE 2 : PHASE DATA

Velocity model: Lownet Xnear: 300.0 Xfar: 600.0 Comment: 160KM NW OF IRELAND										CWF HE 94.1 AML 17:34 52.80 6 0.09 KBI1 SZ 119.0 EP 17:34 41.47 0.07 HPK HZ 185.0 EP 17:34 51.08 0.59 HPK HE 185.0 ES 17:35 11.11 0.20 HPK HE 185.0 AML 17:35 13.52 14 0.30 HPK HN 185.0 AML 17:35 13.53 14 0.70 HBL2 N 49.9 ES 17:34 37.13 -0.08 HGH SZ 86.3 IP C 17:34 36.72 0.18 HLM1 SZ 24.3 EP 17:34 27.15 0.29 HLM1 SZ 24.3 ES 17:34 30.10 -0.16 HTR SZ 59.1 IP C 17:34 32.29 -0.09 SBD1 SZ 72.6 EP 17:34 35.01 0.50
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES RRR SE 333.0 ES 22:07 59.33 -0.37 RRR SN 333.0 AML 22:08 02.50 6 0.17 RRR SZ 333.0 EP 22:07 25.95 -0.01 KSB SZ 322.0 EP 22:07 25.07 0.33 KPL HN 314.0 AML 22:08 00.52 8 0.13 KAR1 SZ 289.0 EP 22:07 20.96 0.40 KPL HE 314.0 AML 22:07 59.56 7 0.23 KPL HZ 314.0 EP 22:07 23.37 -0.28 GMK SZ 312.0 EP 22:07 23.25 -0.14 GCL SZ 292.0 EP 22:07 20.67 -0.28 PGB1 HE 368.0 AML 22:08 11.21 6 0.21 PGB1 HZ 368.0 EP 22:07 30.51 0.16 KAC SZ 341.0 EP 22:07 27.53 0.52 PMS1 SZ 351.0 EP 22:07 28.66 0.38 RRR SE 333.0 AML 22:08 02.43 4 0.12 KPL HE 314.0 ES 22:07 55.23 -0.49 GAL1 HE 384.0 AML 22:08 12.81 4 0.18 GAL1 HE 384.0 ES 22:08 10.96 0.10 GAL1 HZ 384.0 EP 22:07 31.92 -0.49 GAL1 HN 384.0 AML 22:08 12.98 6 0.23 REB SZ 375.0 EP 22:07 31.34 0.13 PGB1 HN 368.0 AML 22:08 10.11 7 0.21 PGB1 HE 368.0 ES 22:08 08.00 0.70 GMM SZ 353.0 EP 22:07 28.09 -0.45	July 8 2007 Time: 20:04 28.2 UTC Magnitude: 2.0 ML Lat: 54.213N Lon: -3.257W Depth: 16.6 km Grid Ref: 318.04 kmE 480.44 kmN RMS: 0.40 secs Locality: MILLOM, CUMBRIA Velocity model: Borders Xnear: 150.0 Xfar: 300.0 STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES GAL1 HE 119.0 ES 20:05 00.67 -0.51 GAL1 HN 119.0 AML 20:05 03.13 25 0.16 GAL1 HE 119.0 AML 20:05 03.91 14 0.18 ESK HZ 123.0 EP 20:04 47.68 -0.34 ESK HE 123.0 ES 20:05 02.51 0.44 ESK HE 123.0 AML 20:05 03.87 21 0.31 ESK HN 123.0 AML 20:05 04.68 12 0.21 MCH1 HE 247.0 AML 20:05 36.04 5 0.36 SBD1 SZ 146.0 EP 20:04 50.54 -0.36 KBI1 SZ 156.0 EP 20:04 52.73 0.54 XSO SZ 156.0 EP C 20:04 51.83 -0.43 GMM SZ 176.0 EP 20:04 55.81 1.21 EAU SZ 182.0 EP 20:04 55.48 0.03 MCH1 HN 247.0 AML 20:05 35.42 6 0.24 GIM SZ 79.4 IP C 20:04 41.82 0.04 ECK SZ 108.0 EP 20:04 45.76 -0.37 BDL SZ 68.8 EP 20:04 40.11 -0.04 GIM SE 79.4 ES 20:04 51.26 -0.15 GIM SN 79.4 AML 20:04 52.77 104 0.28 GIM SE 79.4 AML 20:04 52.81 108 0.22 GCD SZ 84.8 EP 20:04 42.78 0.21 BHH SZ 98.0 EP 20:04 45.14 0.56 BHH SN 98.0 ES 20:04 56.28 0.09 XAL SZ 98.8 EP 20:04 44.37 -0.38 BWH SZ 110.0 EP 20:04 46.85 0.41 HPK HZ 111.0 EP 20:04 46.16 -0.32 HPK HE 111.0 ES 20:04 59.58 0.15 HPK HN 111.0 AML 20:05 00.66 118 0.38 HPK HE 111.0 AML 20:05 01.05 84 0.20 GAL1 HZ 119.0 EP 20:04 47.12 -0.38									
June 30 2007 Time: 00:06 13.2 UTC Magnitude: 1.6 ML Lat: 53.414N Lon: -2.686W Depth: 11.0 km Grid Ref: 354.41 kmE 391.05 kmN RMS: 0.60 secs Locality: ST HELENS, MERSEYSIDE Velocity model: Lownet Xnear: 100.0 Xfar: 250.0 STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES MCH1 HZ 159.0 EP 00:06 38.75 0.68 MCH1 SZ 159.0 EP 00:06 38.98 MCH1 SN 159.0 ES 00:06 56.89 0.64 MCH1 SE 159.0 AML 00:06 58.44 9 0.18 MCH1 SN 159.0 AML 00:06 59.62 9 0.26 GAL1 HZ 209.0 EP 00:06 43.42 -0.88 ESK HE 214.0 ES 00:07 06.61 -1.67 GAL1 HE 209.0 ES 00:07 05.03 -2.00 GAL1 HN 209.0 AML 00:07 05.08 8 0.56 GAL1 HE 209.0 AML 00:07 05.60 2 0.26 ESK HE 214.0 AML 00:07 07.10 4 0.34 ESK HN 214.0 AML 00:07 17.73 5 0.60 CWF HZ 119.0 EP 00:06 32.28 -0.07 HLM1 SZ 101.0 ES 00:06 41.09 -0.66 CWF HE 119.0 AML 00:06 49.32 10 0.12 HTR SZ 154.0 EP 00:06 38.11 0.78 HAE SZ 154.0 EP 00:06 37.79 0.50 HBL2 E 154.0 ES 00:06 55.71 0.74 CWF HN 119.0 AML 00:06 49.24 10 0.14 CWF HE 119.0 ES 00:06 45.99 -0.37 HPK HN 92.6 AML 00:06 41.06 30 0.16 HPK HE 92.6 AML 00:06 40.51 29 0.22 HPK HN 92.6 ES 00:06 39.52 -0.04 HPK HZ 92.6 EP 00:06 28.58 0.16 KBI1 SZ 79.2 EP 00:06 26.50 0.16 KWE SZ 71.7 EP 00:06 25.24 0.04 SBD1 SZ 68.4 EP 00:06 24.52 -0.19 LHO SZ 57.1 EP 00:06 22.83 -0.13										July 9 2007 Time: 03:56 33.0 UTC Magnitude: 1.5 ML Lat: 52.555N Lon: 1.189W Depth: 8.4 km Grid Ref: 616.16 kmE 300.06 kmN RMS: 0.30 secs Locality: WYMONDHAM, NORFOLK Velocity model: Lownet Xnear: 40.0 Xfar: 60.0 Comment: 7KM SW OF WYMONDHAM STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES AW11 SZ 35.3 EP 03:56 39.55 0.08 APAE SZ 34.5 EP D 03:56 39.22 -0.13 ABA1 SZ 37.1 EP 03:56 39.54 -0.21 AEU SE 7.8 ES 03:56 37.56 -0.25 AEU SE 7.8 AML 03:56 37.84 249 0.06 AEU SN 7.8 AML 03:56 37.96 116 0.14 AEU SZ 7.8 IP D 03:56 36.30 0.51
June 30 2007 Time: 01:49 18.6 UTC Magnitude: 1.3 ML Lat: 51.728N Lon: -3.419W Depth: 7.5 km Grid Ref: 302.01 kmE 204.26 kmN RMS: 0.30 secs Locality: ABERDARE, MID GLAMORGAN Velocity model: Lownet Xnear: 100.0 Xfar: 200.0 STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES HTL HN 110.0 AML 01:49 50.08 21 0.54 SSW SZ 111.0 EP 01:49 37.33 0.58 SBD1 SZ 131.0 EP 01:49 40.40 0.58 DYA HE 148.0 ES 01:49 59.28 -0.11 DYA HN 148.0 AML 01:49 59.86 8 0.20 CWF HN 183.0 AML 01:50 08.87 3 0.32 DYA HE 148.0 AML 01:50 00.14 5 0.23 CWF HN 183.0 ES 01:50 08.31 0.89 CWF HE 183.0 AML 01:50 09.42 3 0.13 MCH1 HE 41.7 AML 01:49 31.36 10 0.20 HEX SZ 78.3 ES 01:49 40.94 -0.20 HTL HE 110.0 AML 01:49 49.56 12 0.68 HTL HN 110.0 ES 01:49 49.55 -0.13 HTL HZ 110.0 EP 01:49 36.76 0.20 HEX SZ 78.3 IP C 01:49 31.72 0.10 HBL2 N 44.4 ES 01:49 31.89 -0.23 HGH SZ 43.6 IP D 01:49 26.17 -0.06 MCH1 HN 41.7 AML 01:49 31.41 20 0.24 MCH1 HE 41.7 ES 01:49 31.14 -0.16 MCH1 HZ 41.7 IP C 01:49 25.79 -0.15 HTR SZ 40.3 IP C 01:49 25.68 -0.08										July 10 2007 Time: 06:29 48.1 UTC Magnitude: 1.2 ML Lat: 55.605N Lon: -4.815W Depth: 11.8 km Grid Ref: 222.69 kmE 638.19 kmN RMS: 0.40 secs Locality: FIRTH OF CLYDE Velocity model: Lownet Xnear: 100.0 Xfar: 200.0 Comment: 8KM WEST OF IRVINE STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES ESK HN 107.0 AML 06:30 20.76 8 0.20 EDI HZ 108.0 EP 06:30 05.37 -0.25 EDI HN 108.0 ES 06:30 18.14 -0.30 EDI HN 108.0 AML 06:30 20.86 11 0.30 EDI HE 108.0 AML 06:30 20.99 6 0.31 EBL SZ 113.0 EP 06:30 06.38 0.02 EBH SZ 109.0 EP 06:30 05.96 0.22 ECK SZ 117.0 EP 06:30 07.35 0.45 ELO SZ 118.0 EP 06:30 07.03 -0.14 EAB SZ 71.5 EP 06:29 59.64 -0.43 GAL1 HN 82.5 AML 06:30 12.12 7 0.26 ESK HE 107.0 ES 06:30 17.99 -0.16 ESK HE 107.0 AML 06:30 20.69 7 0.12 ESK HZ 107.0 EP 06:30 05.83 0.38 EAU SZ 90.0 EP 06:30 03.32 0.38 GAL1 HE 82.5 AML 06:30 11.23 8 0.24 GAL1 HE 82.5 ES 06:30 11.03 -0.68 GAL1 HZ 82.5 EP 06:30 02.32 0.59 PGB1 HN 31.0 AML 06:29 58.52 37 0.20 PGB1 HE 31.0 AML 06:29 58.51 32 0.30 PGB1 HN 31.0 ES 06:29 58.02 -0.01 PGB1 HZ 31.0 EP 06:29 53.83 0.00
July 4 2007 Time: 17:34 22.1 UTC Magnitude: 1.5 ML Lat: 52.400N Lon: -2.580W Depth: 12.7 km Grid Ref: 360.54 kmE 278.20 kmN RMS: 0.40 secs Locality: LUDLOW, SHROPSHIRE Velocity model: Mid Wales Xnear: 80.0 Xfar: 200.0 Comment: 10KM EAST OF LUDLOW STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES MCH1 HZ 53.2 EP C 17:34 31.28 -0.13 MCH1 HE 53.2 ES 17:34 37.50 -0.58 MCH1 HN 53.2 AML 17:34 38.10 34 0.18 MCH1 HE 53.2 AML 17:34 38.25 32 0.22 SSW SZ 69.4 EP 17:34 34.77 0.76 KWE SZ 84.8 EP C 17:34 35.73 -0.60 CWF HZ 94.1 EP 17:34 37.75 0.04 CWF HN 94.1 ES 17:34 48.66 -0.27 CWF HN 94.1 AML 17:34 51.31 8 0.09										July 15 2007 Time: 14:10 00.1 UTC Magnitude: 1.3 ML Lat: 53.125N Lon: -1.060W Depth: 2.3 km Grid Ref: 462.89 kmE 359.09 kmN RMS: 0.20 secs Locality: BILSTHORPE, NOTTS Velocity model: Lownet Xnear: 50.0 Xfar: 100.0 STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KBI1 SZ 34.4 EP 14:10 06.45 0.01 KBI1 SZ 34.4 ES 14:10 10.92 -0.18 CWF HZ 46.2 EP 14:10 08.25 -0.18 CWF HE 46.2 ES 14:10 14.57 0.04 CWF HN 46.2 AML 14:10 18.27 5 0.30 CWF HE 46.2 AML 14:10 22.48 6 0.32

TABLE 2 : PHASE DATA

Lat: 55.788N				Lon: -3.221W				Depth: 4.7 km				JRS	SE	96.4	ES	15:07	07.00				-0.17	
Grid Ref: 323.44 kmE				655.64 kmN				RMS: 0.40 secs				JRS	SE	96.4	AML	15:07	07.79	39	0.12			
Locality: PENICUIK,MIDLOTHIAN												JSA	HZ	99.2	IP	C	15:06	56.07				0.01
Velocity model: Lownet Xnear: 50.0 Xfar: 100.0												JSA	SZ	99.2	IP	C	15:06	56.08				0.02
Comment: FELT PENICUIK												JSA	HE	99.2	ES		15:07	07.84				-0.08
Intensity: 3												JSA	SZ	99.2	ES		15:07	08.07				0.15
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	RES	JSA	HN	99.2	AML	15:07	09.63	31	0.20				
EBL	SZ	11.2	EP			15:59	59.47			-0.23	JSA	HE	99.2	AML	15:07	10.11	43	0.30				
EBL	SZ	11.2	ES			16:00	01.34			-0.18	JLP	SZ	102.0	IP	C	15:06	56.48				-0.06	
EAU	SZ	15.6	IP			16:00	00.17			-0.24	JLP	SZ	102.0	ES		15:07	08.84				0.09	
EAU	SZ	15.6	ES			16:00	02.48			-0.27	JVM	SZ	103.0	EP		15:06	56.66				-0.04	
ESY	SZ	40.6	EP			16:00	04.05			-0.57												
ESK	HZ	52.5	EP			16:00	06.64			0.20												
ESK	HE	52.5	ES			16:00	13.05			-0.12												
ESK	HE	52.5	AML			16:00	13.39	92	0.26													
ESK	HN	52.5	AML			16:00	13.71	67	0.23													
EBH	SZ	54.2	EP			16:00	06.37			-0.36												
XSO	SZ	69.4	IP	C		16:00	09.61			0.50												
BWH	SZ	73.5	EP			16:00	10.34			0.65												
BHH	SZ	77.3	EP			16:00	11.30			1.02												
BHH	SE	77.3	ES			16:00	20.51			0.68												
EAB	SZ	82.7	EP			16:00	11.06			-0.07												
BDL	SZ	111.0	EP			16:00	17.33			1.82												
XAL	SZ	121.0	EP			16:00	18.59			1.45												
GAL1	HZ	140.0	EP			16:00	19.97			0.19												
GAL1	HE	140.0	ES			16:00	37.08			0.83												
GAL1	HN	140.0	AML			16:00	38.97	144	0.15													
GAL1	HE	140.0	AML			16:00	39.00	109	0.27													
December 18 2007												Time: 15:06 39.8 UTC				Magnitude: 1.9 ML						
Lat: 48.456N				Lon: -1.398W				Depth: 7.4 km				RMS: 0.10 secs										
Grid Ref: 444.50 kmE												-160.29 kmN										
Locality: NORTHERN FRANCE																						
Velocity model: Lownet Xnear: 300.0 Xfar: 600.0																						
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	RES	JQE	SZ	95.2	IP	C	15:06	55.52				0.09	
JRS	SZ	96.4	EP			15:06	55.61			-0.02												

TABLE 3

GEOGRAPHIC COORDINATES OF SEISMOGRAPH STATIONS, 2007

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Comp
ABA1	BACONSTHORPE	52.8884	1.1453	611.58	337.00	74	1R
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	SMR
APAE	PACKWAY	52.3006	1.4782	637.12	272.68	58	1R
AWH	WHINBURGH	52.6297	0.9507	599.67	307.68	64	1R
AWI1	WITTON	52.8319	1.4471	632.17	331.65	46	1R
BBH	BRUNTSHEIL	55.1333	-2.9299	340.72	582.50	216	1R
BBO1	BOTHEL	54.7367	-3.2464	319.76	538.69	209	3R
BCC1	CHAPELCROSS	55.0153	-3.2201	321.99	569.66	138	1SMR
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	1R
BHH	HOWATS HILL	55.0931	-3.2181	322.27	578.31	216	3R
BNA	NEW ABBEY	54.9658	-3.6242	296.03	564.68	28	1R
BTA	TALKIN	54.9057	-2.6844	356.12	557.00	279	3R
BWH	WARDLAW	55.1758	-3.6549	294.62	588.09	269	1R
CBW1	BUDOCK WATER	50.1482	-5.1144	177.53	32.29	94	1R
CCA1	CARNMENELLIS	50.1866	-5.2277	169.62	36.90	210	1R
CCO1	CONSTANTINE	50.1357	-5.1957	171.66	31.14	168	1R
CDU1	DUNNERDALE	54.3362	-3.1952	322.30	494.08	355	1R
CGH1	GOONHILLY	50.0507	-5.1649	173.46	21.60	97	1R
CGW	GWEEK	50.1006	-5.2228	169.56	27.32	9	1R
CKE	KESWICK	54.5877	-3.1059	328.54	521.96	304	1R
CMA1	MANACCAN	50.0821	-5.1274	176.29	24.98	42	1R
CPZ	PENZANCE	50.1566	-5.5828	144.12	34.72	199	1R
CRQ	ROSEMANOWES	50.1672	-5.1726	173.46	34.57	156	SMR
CRQ2	ROSEMANOWES2	50.1667	-5.1687	173.74	34.51	143	3R
CSA1	ST AUSTELL	50.3527	-4.8919	194.30	54.38	112	1R
CSF	SCAFELL	54.4478	-3.2430	319.41	506.55	540	1R
CSM	SELLAFIELD MIC	54.4183	-3.4913	303.24	503.58	50	M
CST1	STITHIANS	50.1952	-5.1635	174.24	37.66	141	1R
CWF	CHARNWOOD FST	52.7385	-1.3076	446.74	315.91	203	BBR
CWS	WINDSCALE FARM						
DCO	COMBE FARM	50.3201	-3.8721	266.74	48.43	117	1R
DYA	YADSWORTHY	50.4353	-3.9310	262.88	61.34	292	3MLGBBR
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	BBR
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	3MLGBBR
ESY	STONEYPATH	55.9175	-2.6141	361.62	669.55	337	1R
FHV	HALDARSVIK	62.2597	-7.0984			380	1R
FSD	SUDUROY	61.5701	-6.7884			480	1R
FSV	SVINOY	62.2598	-6.3550			430	1R
FTO	TORSHAVN	62.0199	-6.8274			325	3R
FVA	VAGAR	62.0575	-7.3520			430	1R
GAL1	GALLOWAY	54.8664	-4.7114	226.02	555.78	117	3MLGBBR
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	SMR

TABLE 3

GEOGRAPHIC COORDINATES OF SEISMOGRAPH STATIONS, 2007

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Comp
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
HGH	GRAY HILL	51.6379	-2.8057	344.25	193.59	223	1R
HLM1	LONG MYND	52.5184	-2.8807	340.25	291.57	429	1R
HPE	PEMBROKE	51.9372	-4.7746	209.29	230.21	349	1R
HPK	HAVERAH PARK	53.9581	-1.6241	424.66	451.42	233	3BBR
HSA	SWANSEA	51.7500	-4.1532	251.38	207.94	293	1R
HTL	HARTLAND	50.9943	-4.4849	225.64	124.66	86	3MLGSMBBR
HTR	TREWERN HILL	52.0785	-3.2679	313.12	243.04	337	1R
JDC	DAM (CREST)	49.1947	-2.0469			39	SMR
JDG	DAM (GALLERY)	49.1947	-2.0469			7	SMR
JLP	LES PLATONS	49.2486	-2.1039			129	1R
JQE	QUEENS EAST	49.2000	-2.0383			58	1R
JRS	MAISON ST LOUIS	49.1922	-2.0922			56	3LGR
JSA	ST AUBINS	49.1878	-2.1717			39	1BBR
JVM	VALLE D.L.MARE	49.2169	-2.2067			64	1R
KAC	ACHNASHELLACH	57.4989	-5.2988	202.36	850.19	206	1R
KAR1	ARISAIG	56.9188	-5.8290	166.98	787.34	186	1R
KBI1	BIRLEY GRANGE	53.2543	-1.5279	431.49	373.17	272	1R
KEY1	KEYWORTH	52.8779	-1.0757	462.20	331.59	59	LGR
KEY2	KEYWORTH	52.8790	-1.0770	462.13	331.73	76	SMR
KNR1	NEVIS RANGE	56.8219	-4.9714	218.68	773.97	1147	1R
KPL	PLOCKTON	57.3391	-5.6527	180.21	833.50	13	3LGSMBBR
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
KTG1	TILBROOK GRNGE	52.3264	-0.4019	508.90	271.06	83	1R
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	MLGSMR
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	3MLGBBR
LRWS	LERWICK	60.1397	-1.1831	445.37	1139.67	80	SMR
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	3MLGSMR
MCH1	MICHAELCHURCH	51.9974	-2.9983	331.47	233.74	219	SMBBR
MDO	DOCHFOUR	57.4409	-4.3633	258.17	841.39	415	1R
MFI	FISHRIE	57.6119	-2.2956	382.34	858.00	232	1R
MLA1	LATHERON	58.3055	-3.3627	320.15	935.98	188	1R
MME1	MEIKLE CAIRN	57.3149	-2.9647	341.90	825.32	475	1R
MVH1	ACHVAICH	57.9250	-4.1825	270.75	894.90	185	1R
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	3MLGR
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
PCA1	CARROT	55.7007	-4.2550	258.30	647.55	302	1R
PCO1	CORRIE	55.9880	-4.1002	269.00	679.21	267	1R
PGB1	GLENIFFERBRAES	55.8115	-4.4837	244.38	660.37	199	3BBR
PMS1	MUIRSHIEL	55.8459	-4.7452	228.15	664.82	351	1R
POB1	OBSERVATORY	55.8458	-44299	247.88	664.06	34	MLGR
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

TABLE 3

GEOGRAPHIC COORDINATES OF SEISMOGRAPH STATIONS, 2007

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Comp
RFO	FORSNAVAL	58.2133	-7.0052	106.10	935.83	195	1R
RRH	RHENIGDALE	57.9197	-6.6881	122.43	901.86	103	1R
RRR	RUBHA REIDH	57.8577	-5.8067	174.19	891.68	61	3MLGSMR
RSC	SCOURIE	58.3485	-5.1683	214.61	944.33	60	1R
RTO	TOLSTA	58.3778	-6.2092	153.95	950.93	74	1R
SAN1	SANDWICK	60.0179	-1.2392	442.41	1126.08	150	1R
SBD1	BRYN DU	52.9055	-3.2585	315.37	335.01	489	1R
SFH	HASELMERE	51.0604	-0.6912	491.71	129.88	260	1R
SIW	ISLE OF WHITE	50.6711	-1.3747	444.18	85.97	162	1R
SKP1	KOPHILL	51.7218	-0.8096	482.22	203.29	212	1R
SMD	MENDIPS	51.3083	-2.7170	350.03	156.88	310	1R
SOFL	SORNFELLI	62.0689	-6.9658			721	BBR
SSP1	STONE POUND	52.4177	-3.1119	324.39	280.59	428	3R
SSW	STOW-ON-WOLD	51.9667	-1.8499	410.31	229.86	291	1R
STNC	STOKE	53.0913	-2.2062	354.95	386.19	234	BBR
SWK	WARMINSTER	51.1483	-2.2471	382.72	138.87	266	1R
SWN1	SWINDON	51.5137	-1.8007	413.83	179.49	192	3MLGSMBBR
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
TFO1	FOLKESTONE	51.1135	1.1409	619.81	139.66	202	3MLGSMR
TSA1	SEVENOAKS	51.2426	0.1561	550.48	151.53	177	1R
WAL1	WALLS	60.2564	-1.6173	421.18	1152.46	167	1R
WCB1	CHURCH BAY	53.3782	-4.5467	230.62	389.87	139	3MSMR
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
WLF1	LLYNFAES	53.2894	-4.3966	240.27	379.65	58	1BBR
WME	MYNDD EILIAN	53.3969	-4.3032	246.88	391.40	129	1R
WPM1	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
YEL1	YELL	60.5509	-1.0830	450.29	1185.55	203	1R
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
- LG Single low-gain vertical seismometer
- SM Strong motion seismometers
- BB Broadband Instrument
- R Station coordinates registered with the International Seismological Centre (ISC), England and the National Earthquake Information Centre (NEIC), USA

TABLE 4**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	

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, positive longitude indicates east.
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.
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.

Locality abbreviations

Sonic	Sonic boom	S'Clyde	Strathclyde
Expl	Explosion	Notts	Nottinghamshire
D & G	Dumfries and Galloway	Leics	Leicestershire
Her & Wor	Hereford & Worcester	N Wales	North Wales
S Yorkshire	South Yorkshire		

Comments abbreviations

...	and felt elsewhere
C/F	coalfield Type event

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.
RMS	Root Mean Square of the travel time residuals in seconds.
Velocity Model	Velocity model used in location.
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. AML
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
RES	Station residual

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.