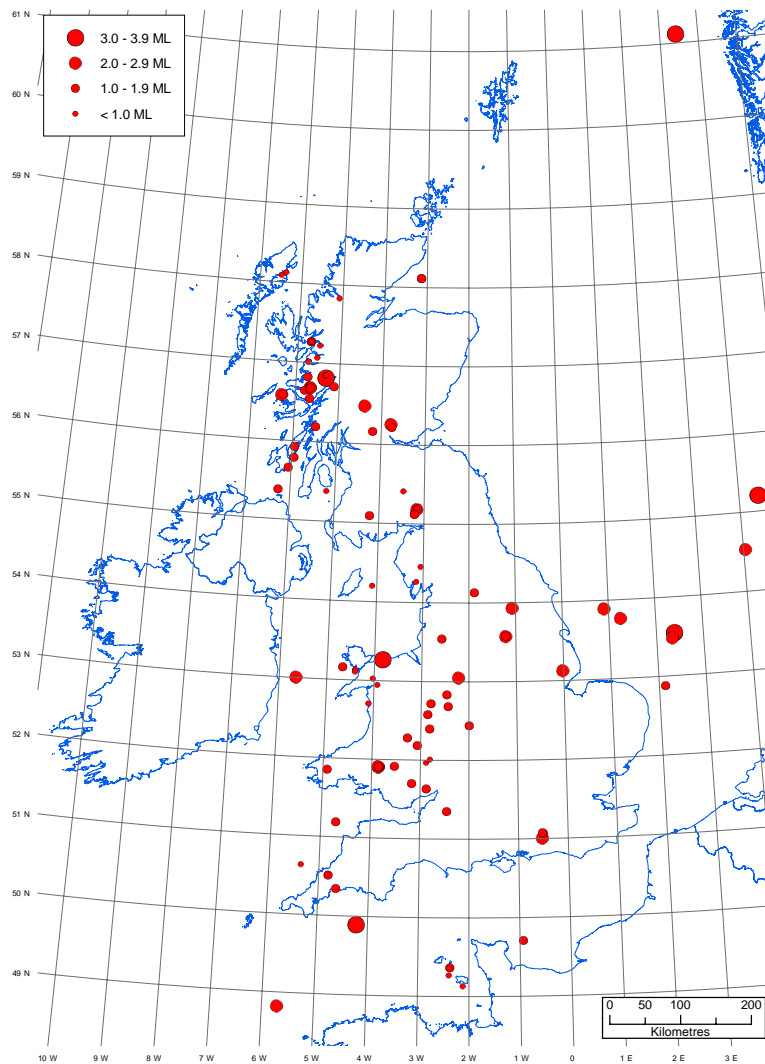


Bulletin of British Earthquakes 2005

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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). 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 BGS during 2005, listed in Tables 1 and 2. Maps showing seismic activity in 2005 (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 800 kmE and 1500 kmN.

All events believed to be of true tectonic origin are included. Coalfield events are also included. These are small events occurring near coal workings that are believed to be caused by the extraction of coal and, in some cases by collapse in old workings. They are indicated by C/F in the comments column of Tables 1 and 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 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, 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. A number of broadband seismic stations provide data with a larger dynamic range and over a wider frequency band. Operational seismograph stations in December 2005 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 2005. 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 2005. The data set is considered complete for these magnitudes in all localities onshore. Seismicity for the period 1970 to 2005 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.

HYPOCENTER uses a 1-dimensional (1-D) velocity-depth model to calculate theoretical arrival times for different trial locations. BGS uses different 1-D seismic velocity models depending on which part of the UK the seismic event is located (Table 4). These models have been derived from interpretation of data from large-scale seismic refraction and wide-angle reflection surveys carried out by various institutions. For further details see Bamford *et al* (1976 and 1978), Assumpção and Bamford (1978), and Bott *et al* (1985).

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, 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 2005 Seismicity

There were 112 earthquakes located by the monitoring network during the year, with 27 having magnitudes of 2.0 ML or greater and six having magnitudes of 3.0 ML or greater. Twelve of the events with a magnitude of 2.0 ML or greater were reported felt, together with a further three smaller ones, bringing the total to fifteen felt earthquakes in 2005.

The largest onshore earthquake had a magnitude of 3.3 ML and occurred at Conwy, Gwynedd, North Wales, on 14 February, at a depth of 10.7 km. Several reports were received by the BGS, via the North Wales Police and a number of residents in the Llandudno, Betwys-y-Coed, Bethel, Abergele and Conwy areas of North Wales which described, "we heard a loud bang and all the windows shook" and "it sounded like a massive explosion and the whole house shook" indicating an intensity of at least 4 EMS.

The largest offshore earthquakes occurred in the northern North Sea on 27 June and in the central North Sea on 7 September, both with a magnitude of 3.2 ML. The northern North Sea event was located approximately 270 km east northeast of Lerwick, Shetland Islands, and the central North Sea event was located approximately 390 km east of Newcastle, Tyne and Wear. A further nine events occurred in the North Sea and surrounding waters during the year, with magnitudes ranging between 1.2 and 3.0 ML.

An earthquake with a magnitude of 2.8 ML occurred on 19 January, near Doncaster, South Yorkshire. No reports of this event being felt were received by the BGS. The earthquake was the largest event in the area since a magnitude 3.1 ML event on 19 August 2003, which was felt with intensities of 3 EMS in the Retford area of South Yorkshire.

The following day, on 20 January, a magnitude 2.7 ML earthquake occurred in Killin, Central region. The BGS received a number of reports, via the Central Police, the Fire Service and local residents in Killin and Kenmore, which described, “we heard a loud noise and the windows shook” and “it sounded like an explosion which got me out of bed”, indicating an intensity of at least 4 EMS.

On 28 and 29 April, two earthquakes, with magnitudes of 2.0 and 2.1 ML, respectively, occurred near Eskdalemuir, Dumfries and Galloway. A few residents in Eskdalemuir, Wester Kirk and Langholm reported both events to the BGS. Their reports described, “gradually increasing rumble”, “the whole house shook” and “all glasses in a cabinet rattled” indicating intensities of at least 3 EMS for both events. A swarm of 39 earthquakes was recorded in the same area between 13 October and 30 December 2004 and these two events (April 28 and 29) showed characteristics similar to the swarm of 2004. The two largest events in the 2004 swarm occurred on 3 and 28 November, with magnitudes of 2.7 and 2.9 ML, respectively.

An earthquake with a magnitude of 2.6 ML occurred on 8 June near Stoke-on-Trent, Staffordshire. The BGS received several reports from residents in the Stoke-on-Trent area which described, “the windows and house shook” and “we could feel the movement beneath our feet” indicating an intensity of 4 EMS. The event was located within a kilometre of the magnitude 2.8 ML Stoke-on-Trent earthquake on 6 May 1996, which was also felt with intensities of 4 EMS in the epicentral area.

On 18 and 19 June, and again on 16 July, three earthquakes occurred near Billingham, West Sussex with magnitudes of 1.4, 1.6 and 2.2 ML. These are the first events to be detected in the area since a series of high-intensity events that took place in the Chichester region between 1833 and 1835. The largest of these events, with a magnitude of 3.3 ML, occurred on 27 August 1834, and caused severe damage in the area, when many chimneys and chimney pots fell down and numerous windows were broken. Another event in the series, on 18 September 1833 was reported to have collapsed a few chimneys in Chichester and caused a fall in a chalk pit at Cocking, killing a man who was working there.

An earthquake, with a magnitude of 3.0 ML, occurred in the English Channel, approximately 50 km south of Plymouth, Devon on 24 August. Residents in south Devon reported “ornaments moved and the whole house shook” and “sitting at a desk which began to move” indicating an intensity of 3 EMS. A magnitude 2.7 ML earthquake also occurred in the English Channel, about 100 km south of Penzance, Cornwall earlier in the year on 28 March.

On 10 December, a magnitude 3.0 ML earthquake occurred near Fort William, Highland, at a depth of 10.8 km. The BGS received many reports from residents in Fort William and the surrounding area who felt the event. A macroseismic survey was launched on the BGS ‘Earthquakes’ web site and 210 responses were received. The highest intensity experienced was 5 EMS, which was observed over an area extending approximately 14 kilometres to the northeast and southeast of the epicentre. The total felt area was over 7,300 km². Comments included descriptions of the effects made by the earthquake as sounding like a heavy clap of thunder, a gust of wind, or even a quarry blast.

A magnitude 2.8 ML earthquake occurred on 14 December, with an epicentre in the Irish Sea. A single report was received for this event from Greystones, a coastal town in County Wicklow, Ireland describing, “we were awoken from sleep”, “the whole house rattled, pictures moved and lights swayed” indicating an intensity of 4 EMS. This is the largest event in the area since a magnitude 3.7 ML earthquake on 11 January 1951, which was felt with intensities of around 5 EMS in southeast Ireland.

Two earthquakes, within 90 minutes of each other, were detected on 23 December in the Sunart area of the Highlands. They occurred at 03:25 and 04:58 UTC with magnitudes of 2.7 and 2.4 ML, respectively. Several reports were received from residents in the epicentral area who described, “a rumbling noise as if a severe gust of wind had hit the house” and “the bedside table vibrated” indicating intensities of at least 3 EMS.

The final earthquake of the year, with a magnitude of 2.5 ML, occurred on 31 December in Blackford, Tayside. Reports, received by the BGS described “shaking similar to a heavy lorry passing by” and “all the windows rattled”, indicating an intensity of 4 EMS. Blackford is an area that has continued to be active in recent years, the most active year being 1997 when 50 events, of which five were felt, were located in the area. All these events are in the same general area as the magnitude 3.2 ML Ochil Hills earthquake in 1979, which had a maximum intensity of 5 EMS.

Another notable event during the year was the explosion at the Buncefield fuel depot, near Hemel Hempstead on 11 December at 06:01:31.45 UTC. The explosion was felt throughout a large part of England, with the most distant reports coming from as far north as Lancashire, West Yorkshire and Humberside, and as far west as Powys, Mid Glamorgan and Somerset.

Most reports of damage to property came from within a radius of 7 km from the blast site. Examples of damage included ‘three windows smashed’, ‘French-windows were blown in’, ‘loft-hatch made of glass shattered’, ‘roof tiles dislodged’ and ‘many windows shattered’. Numerous comments were received from people about the effects they felt. These included reports of car alarms being triggered, doors swinging open and closing, guttering and drainpipes rattling, banging noises, windows rattling, loft hatches being blown open and items of furniture being moved.

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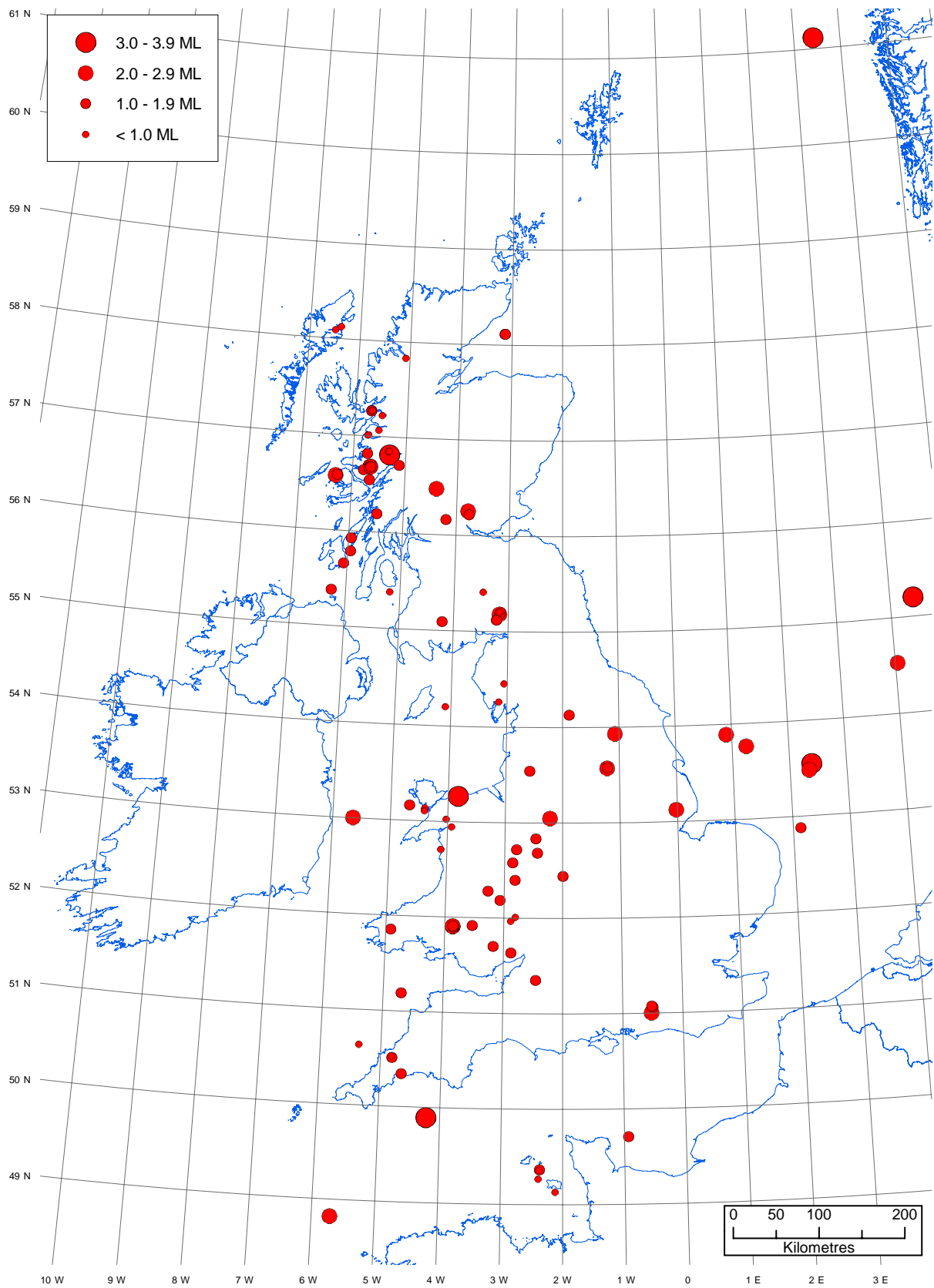


Figure 1. Epicentre map of earthquakes in 2005 as listed in Table 1.

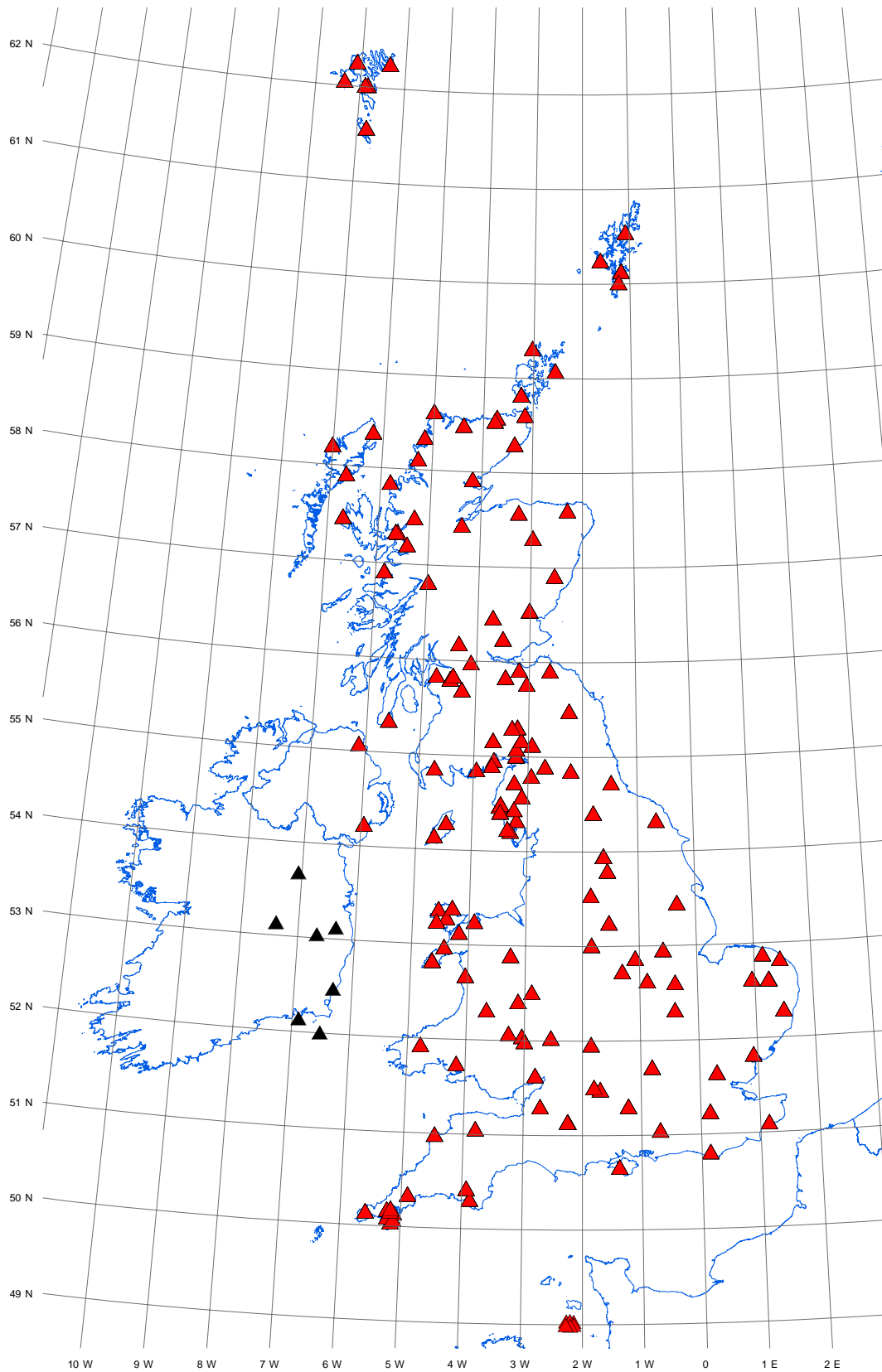


Figure 2. Seismograph network operational in December 2005. Red triangles indicate BGS stations: black triangles indicate stations operated by the Dublin Institute of Advanced Studies (DIAS).

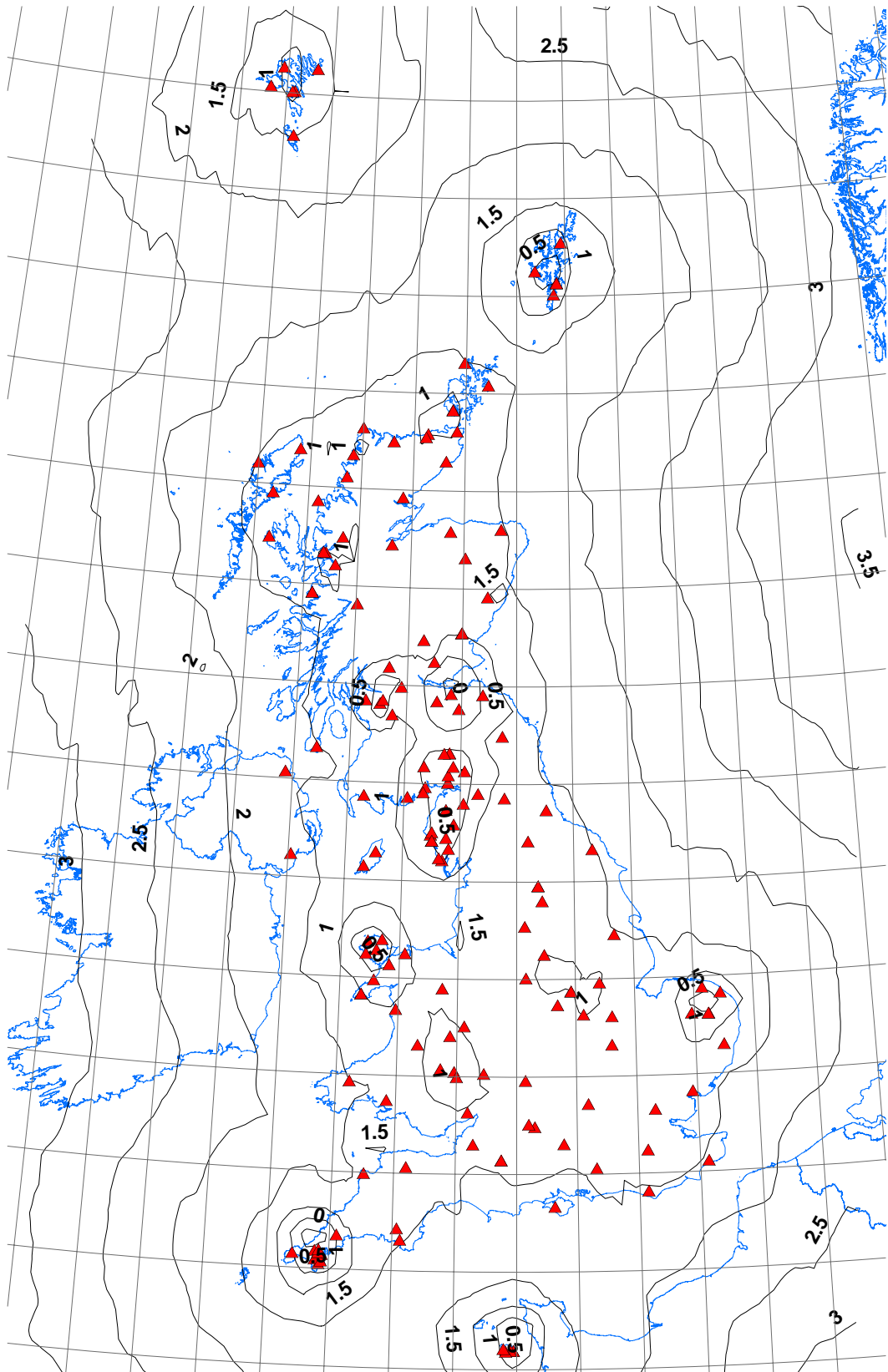


Figure 3. Earthquake detection capability in December 2005. Contour values are for Richter local magnitude (ML) calculated for average background noise conditions (4nm) where the detection criterion is that the signal has to exceed 4nm at 10Hz at 4 stations.

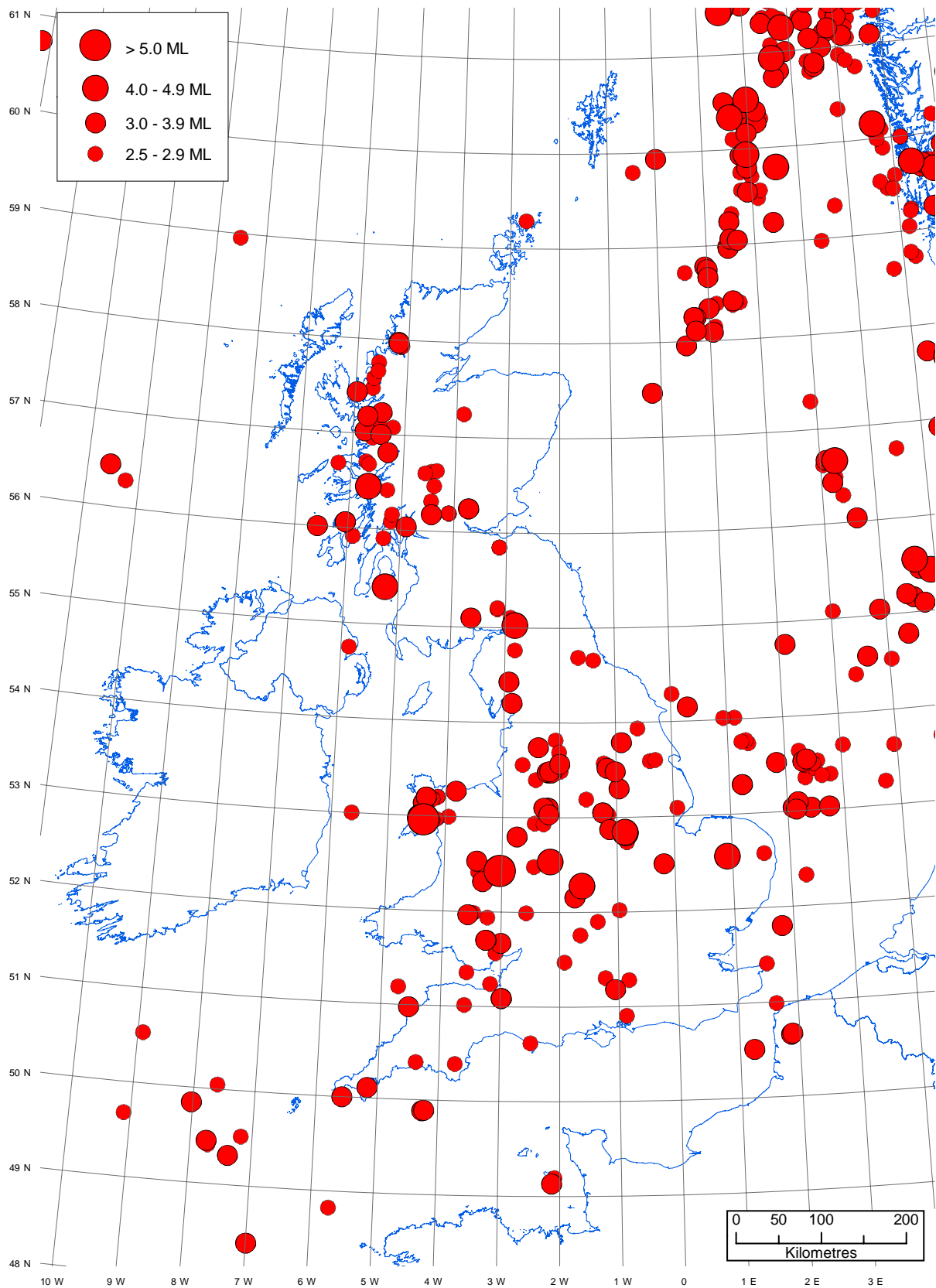


Figure 4. Epicentres of earthquakes with magnitudes of 2.5 ML and above, in the period 1979 to 2005.

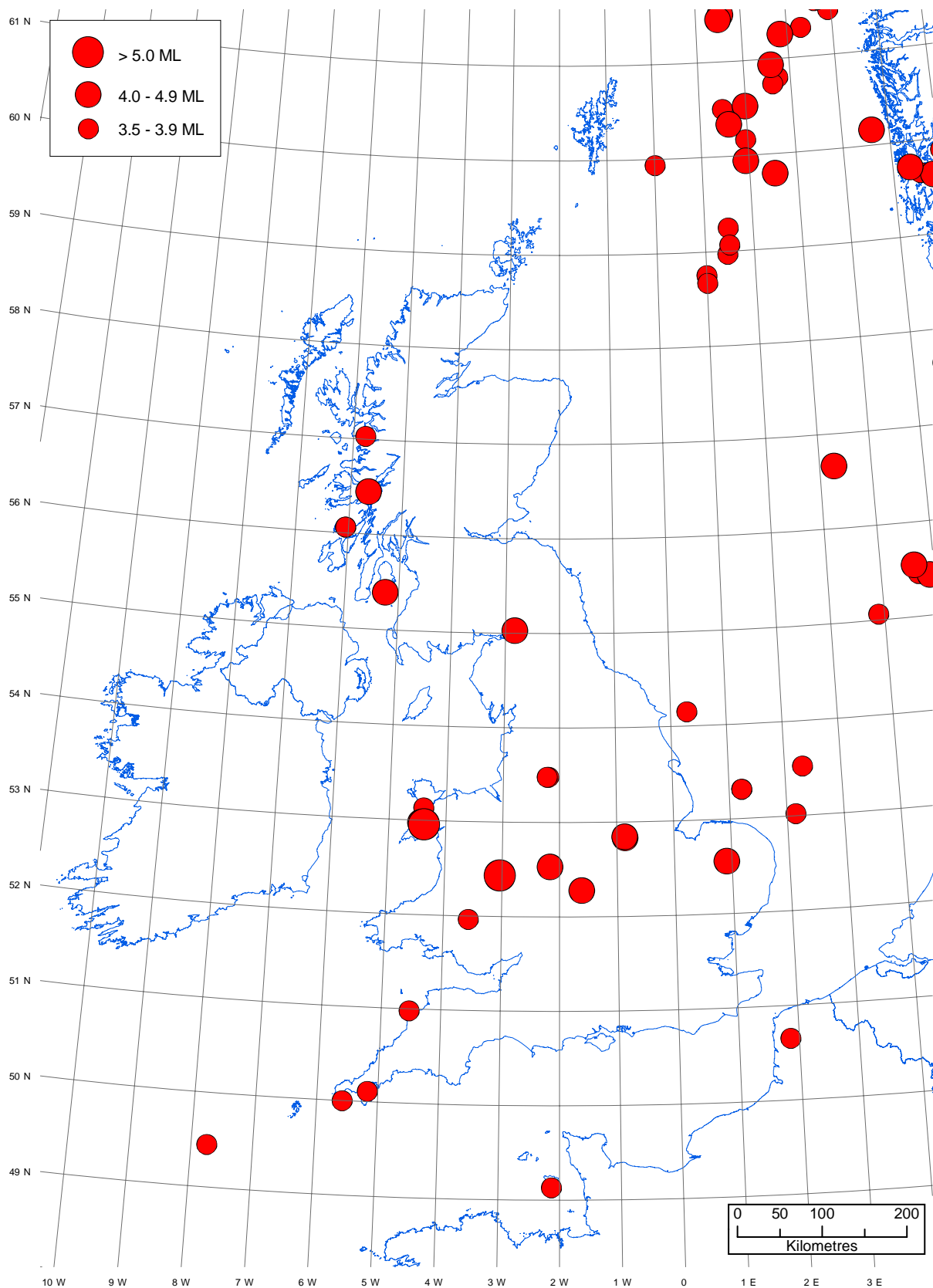


Figure 5. Epicentres of earthquakes with magnitudes of 3.5 ML and above, in the period 1970 - 2005.

TABLE 1 : CATALOGUE OF EVENTS : 2005

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	Gap	RMS	ERH	ERZ	Comments
20050118	031700.0							SONIC-CORNWALL	F	1					FELT TRURO...
20050119	224108.4	53.57	-1.21	452.2	408.7	15.0	2.8	DONCASTER, S YORKSHIRE		12	109	0.60	19.68	9.70	
20050120	221322.9	56.48	-4.39	253.0	734.6	3.8	2.7	KILLIN, CENTRAL	4	13	145	0.40	7.64	5.80	FELT KILLIN...
20050124	025618.7	52.68	-2.44	370.5	309.6	7.7	1.4	TELFORD, SHROPSHIRE		9	242	0.10	6.24	10.00	
20050125	231916.7	56.19	-5.50	183.1	705.3	7.2	1.9	KILMELFORD, STRATHCLYDE	2	10	188	0.20	9.22	9.50	FELT MAOLACHY...
20050129	013230.0	56.82	-5.73	172.3	775.9	2.1	1.6	MODART, HIGHLAND		7	178	0.30	8.69	10.80	
20050130	230953.3	54.13	-1.89	407.4	470.7	5.0	1.8	RIPON, NORTH YORKSHIRE		11	99	0.20	2.46	3.10	
20050202	230037.0	55.41	-3.46	307.7	613.9	0.4	0.9	MOFFAT, D & G		6	277	0.20	9.93	6.40	10KM NW OF MOFFAT
20050214	001916.0	50.34	-4.65	211.7	52.8	0.5	1.6	FOWEY, CORNWALL		8	165	0.30	10.60	7.30	
20050214	184401.4	53.27	-3.82	278.4	376.0	10.7	3.3	CONWY, GWYNEDD	4	51	32	0.40	3.05	2.10	FELT CONWY...
20050215	114718.2	52.72	-2.80	346.1	313.6	11.5	1.4	SHREWSBURY, SHROPSHIRE		11	218	0.10	4.05	1.20	
20050220	025112.9	51.35	-2.46	368.2	161.5	13.8	1.5	BATH, AVON		10	108	0.10	3.02	2.20	6KM SW OF BATH
20050221	202217.6	53.58	-1.21	452.2	409.1	10.7	1.9	DONCASTER, S YORKSHIRE		6	135	0.10	3.59	8.40	
20050227	221201.1	55.79	-5.95	152.2	662.3	4.2	1.2	SOUND OF JURA, HIGHLAND		5	257	0.30	14.23	24.00	
20050228	170559.3	57.70	-3.39	317.0	868.6	0.0	1.0	EXPL-HOPEMAN, GRAMPIAN	F	5	146	0.20	6.39	0.00	FELT HOPEMAN
20050228	173434.9	57.67	-3.42	315.2	865.1	0.0	1.0	EXPL-HOPEMAN, GRAMPIAN	F	4	191	0.20	9.06	0.00	FELT HOPEMAN
20050303	083152.5	53.12	-4.41	239.0	361.2	13.8	0.1	CAERNARFON BAY		6	137	0.10	1.71	2.80	
20050308	001600.3	50.53	-4.83	199.7	73.7	9.9	0.5	WADEBRIDGE, CORNWALL		11	152	0.10	2.72	1.60	
20050323	162600.0							SONIC-CUMBRIA	F	1					FELT SELLAFIELD...
20050328	014758.1	48.82	-5.71	128.0	-112.9	12.7	2.7	ENGLISH CHANNEL		11	284	0.40	89.90	78.00	100KM S OF PENZANCE
20050328	080450.0	53.90	0.91	591.1	448.3	24.2	2.0	SOUTHERN NORTH SEA		4	344	0.20	30.37	5.20	
20050329	023839.7	53.76	1.25	614.3	434.6	5.0	2.5	SOUTHERN NORTH SEA		11	230	0.60	17.49	0.00	
20050408	035429.7	53.13	-4.40	239.4	362.4	6.6	0.3	CAERNARFON BAY		5	133	0.10	1.80	6.40	
20050410	162425.4	53.11	-4.41	238.9	359.3	5.6	0.0	CAERNARFON BAY		5	140	0.10	3.07	15.30	
20050411	032758.6	54.45	-3.05	331.9	507.1	5.0	0.7	AMBLESIDE, CUMBRIA		6	309	0.30	10.98	0.00	5KM W OF AMBLESIDE
20050414	150150.7	52.28	-3.27	313.1	265.5	18.6	1.4	LLANDRINDOD WELLS		7	182	0.10	4.00	2.60	LLANDRINDOD WELLS, POWYS
20050427	063736.3	55.12	-3.21	322.8	581.5	4.0	1.3	LOCKERBIE, D & G		7	164	0.10	1.56	1.70	
20050428	092736.6	55.19	-3.15	327.0	588.9	2.6	1.9	ESKDALEMUIR, D & G	3	13	109	0.30	4.37	3.30	FELT ESKDALEMUIR...
20050429	112319.6	55.18	-3.15	326.5	588.2	2.6	2.1	ESKDALEMUIR, D & G	3	13	112	0.30	4.49	5.90	FELT ESKDALEMUIR...
20050501	132451.9	55.20	-3.16	326.2	589.6	5.0	0.9	ESKDALEMUIR, D & G		7	127	0.20	3.18	2.50	
20050502	052857.3	56.85	-5.32	197.5	778.2	7.4	0.9	LOCH EIL, HIGHLAND		4	283	0.30	15.27	0.00	
20050503	075912.6	56.85	-5.33	197.3	778.2	7.0	0.8	LOCH EIL, HIGHLAND		4	283	0.40	20.43	0.00	
20050508	164725.7	56.85	-5.32	197.9	778.4	7.0	0.9	LOCH EIL, HIGHLAND		4	283	0.40	21.47	0.00	
20050511	192021.3	54.26	-3.14	325.6	486.0	8.3	0.7	GRIZEBECK, CUMBRIA		6	209	0.30	28.58	92.20	
20050512	122615.5	51.91	-3.86	272.1	224.7	9.2	2.3	LLANDEILO, DYFED		21	69	0.30	2.70	2.90	9KM E OF LLANDEILO
20050512	200606.8	51.91	-3.86	271.9	224.8	10.2	2.1	LLANDEILO, DYFED		22	69	0.30	2.72	2.90	9KM E OF LLANDEILO
20050520	052808.1	51.92	-3.54	294.2	225.3	17.6	1.0	SENNYBRIDGE, POWYS		5	168	0.10	3.26	4.70	
20050520	111947.0	51.90	-3.84	273.2	223.6	10.9	1.3	LLANDEILO, DYFED		8	146	0.10	2.88	2.50	9KM E OF LLANDEILO
20050521	180156.6	51.90	-3.86	272.3	223.8	10.0	1.2	LLANDEILO, DYFED		10	105	0.20	3.44	3.40	9KM E OF LLANDEILO
20050521	201721.0	51.91	-3.86	271.9	224.9	11.2	1.4	LLANDEILO, DYFED		10	107	0.20	2.91	2.40	9KM E OF LLANDEILO
20050521	232108.9	49.13	-2.12	391.2	-85.4	9.2	0.7	OFFSHORE JERSEY		5	289	0.00	0.78	0.50	
20050522	055849.2	57.83	-5.07	217.6	886.6	1.4	0.9	ULLAPOOL, HIGHLAND		6	124	0.40	6.49	7.50	7KM SE OF ULLAPOOL
20050523	131710.0	50.51	-4.81	200.9	71.9	6.2	1.2	WADEBRIDGE, CORNWALL		9	223	0.10	3.52	2.30	
20050526	141121.9	58.09	-6.49	135.4	919.9	2.6	0.9	LEWIS, WESTERN ISLES		6	175	0.20	5.60	8.70	
20050530	031923.7	51.19	-4.70	211.3	147.1	22.3	1.7	LUNDY ISLAND, DEVON		14	148	0.30	6.05	5.20	BRISTOL CHANNEL AREA
20050531	233634.0	55.93	-5.95	153.2	677.5	5.0	1.8	ISLE OF JURA, HIGHLAND		7	177	0.30	6.17	0.00	

TABLE 1 : CATALOGUE OF EVENTS : 2005

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	Gap	RMS	ERH	ERZ	Comments
20050605	130117.7	51.97	-2.88	339.7	230.5	11.2	0.8	HEREFORD,HEREFORDSHIRE		9	101	0.20	4.79	2.40	12KM SW OF HEREFORD
20050606	100430.0	55.12	-3.21	322.7	581.5	4.6	1.2	LOCKERBIE,D & G		9	96	0.20	2.15	2.80	
20050607	004650.2	55.09	-4.20	259.4	579.6	1.9	1.4	NEW GALLOWAY,D & G		12	84	0.30	4.69	6.00	
20050608	004950.0	53.93	-1.07	461.3	449.0	7.7	2.4	YORK,NORTH YORKSHIRE	2	10	107	0.20	3.53	6.40	FELT YORK
20050608	012123.3	53.05	-2.21	385.6	350.1	1.5	2.6	STOKE-ON-TRENT,STAFFS	4	29	49	0.60	4.58	6.00	FELT STOKE-ON-TRENT
20050618	075055.8	51.06	-0.50	505.4	130.5	5.0	1.4	BILLINGHURST, W SUSSEX		4	137	0.70	11.26	0.00	5KM NW OF BILLINGHURST
20050619	114934.3	51.07	-0.51	504.1	131.5	5.0	1.6	BILLINGHURST, W SUSSEX		10	149	0.50	10.72	0.00	5KM NW OF BILLINGHURST
20050625	095201.5	58.13	-6.38	141.9	923.6	4.0	0.6	LEWIS,WESTERN ISLES		4	162	0.10	85.30	112.00	
20050627	184636.5	61.12	3.42	691.9	1260.4	12.7	3.2	NORTHERN NORTH SEA		25	169	0.40	8.23	7.40	
20050716	182910.4	51.01	-0.52	504.1	124.0	5.0	2.1	BILLINGHURST, W SUSSEX		12	249	0.70	16.79	0.00	
20050717	013559.8	52.40	-2.81	344.6	278.0	14.5	1.1	LUDLOW,SHROPSHIRE		7	112	0.10	3.38	3.40	5KM NW OF LUDLOW
20050723	170541.6	57.11	6.46	911.7	834.0	15.0	2.9	SKAGERRAK		16	286	0.40	12.61	0.00	
20050729	020709.2	58.11	-3.14	332.7	914.4	6.7	1.5	MORAY FIRTH AREA		11	156	0.10	2.47	7.00	
20050729	021113.0	58.12	-3.13	333.3	914.6	7.7	1.2	MORAY FIRTH AREA		9	156	0.20	5.51	9.70	
20050729	191258.7	51.85	-4.91	199.5	221.4	4.4	1.6	HAVERFORDWEST,DYFED		11	212	0.10	3.35	6.10	5KM NE OF HAVERFORDWEST
20050730	111942.4	52.58	-2.86	341.5	298.3	15.6	1.0	SHREWSBURY,SHROPSHIRE		7	106	0.00	1.21	1.10	10KM SW OF SHREWSBURY
20050801	211156.2	51.70	-3.17	319.0	201.3	2.0	1.2	BLACKWOOD,GWENT		8	106	0.10	2.15	3.20	
20050802	221138.7	54.53	4.05	791.2	532.1	15.0	2.8	CENTRAL NORTH SEA		13	286	0.20	23.78	21.10	
20050808	033431.9	50.64	-5.36	162.6	87.3	15.0	0.9	TREVOSE HEAD,CORNWALL		7	297	0.10	10.22	15.30	25KM NW TREVOSE HEAD
20050809	182801.8	54.20	-4.09	263.4	480.6	15.0	0.6	IRISH SEA		5	217	0.20	9.01	4.90	
20050811	040212.7	52.88	2.13	677.8	339.6	5.0	1.8	SOUTHERN NORTH SEA		8	282	0.30	15.21	0.00	
20050812	080510.2	53.54	2.38	690.4	414.1	5.0	3.0	SOUTHERN NORTH SEA		12	258	0.30	15.69	0.00	
20050813	014910.6	55.66	-6.07	144.4	648.2	5.0	1.2	ISLAY,INNER HEBRIDES		4	312	0.10	10.90	0.00	
20050824	143215.5	49.89	-4.23	240.1	1.3	12.2	3.0	ENGLISH CHANNEL	3	24	168	0.40	5.19	5.70	FELT SOUTH DEVON
20050826	000447.2	49.27	-2.39	371.6	-70.2	10.6	0.9	OFFSHORE JERSEY		4	337	0.00	1.42	1.70	
20050827	220301.0	53.48	2.34	688.0	406.9	8.6	2.7	SOUTHERN NORTH SEA		11	267	0.40	30.75	12.50	
20050828	013520.4	49.36	-2.38	372.5	-59.9	11.9	0.3	OFFSHORE JERSEY		4	340	0.00	2.48	3.90	
20050828	180135.8	52.83	-2.46	368.9	326.3	6.4	1.8	MARKET DRAYTON,SALOP		12	120	0.20	3.94	10.60	8KM S OF MARKET DRAYTON
20050828	193846.0	52.18	-3.07	327.0	254.6	11.9	1.6	KINGTON,HEREFORDSHIRE		10	113	0.40	7.37	4.60	5KM SW OF KINGTON
20050901	001321.0	57.27	-5.70	177.1	825.6	2.9	1.1	LOCH ALSH,HIGHLAND		9	99	0.50	10.09	6.10	
20050901	014201.2	57.26	-5.69	177.6	825.3	0.3	0.6	LOCH ALSH,HIGHLAND		7	98	0.50	11.89	7.40	
20050903	003658.9	57.01	-5.74	172.8	797.4	2.5	0.1	MALLAIG,HIGHLAND		4	166	0.00	1.68	1.30	
20050903	013944.5	57.01	-5.73	173.7	797.1	2.5	0.4	MALLAIG,HIGHLAND		4	172	0.00	1.58	1.30	
20050903	041433.2	57.27	-5.67	178.6	825.5	2.6	0.2	LOCH ALSH,HIGHLAND		3	256	0.10	86.14	31.90	
20050907	173236.0	55.20	4.42	808.5	608.4	0.4	3.2	CENTRAL NORTH SEA		16	271	0.40	44.35	33.30	
20050909	102719.6	49.37	-2.38	372.8	-59.4	7.7	1.2	OFFSHORE JERSEY		4	340	0.00	1.35	27.30	
20050909	152407.6	52.01	-2.80	345.0	234.9	13.8	0.8	HEREFORD,HEREFORDSHIRE		5	105	0.00	0.86	0.90	5KM SW OF HEREFORD
20050912	005708.5	57.26	-5.70	177.0	825.1	2.6	0.6	LOCH ALSH,HIGHLAND		4	186	0.10	2.82	2.20	
20050912	133639.6	57.27	-5.68	178.3	825.6	2.7	-0.1	LOCH ALSH,HIGHLAND		3	258	0.20	39.94	11.90	
20050917	023749.2	56.57	-6.31	135.5	750.7	5.0	2.2	ISLE OF MULL,HIGHLAND		11	217	0.20	9.22	0.00	
20050917	023951.8	56.58	-6.28	137.1	751.3	5.0	1.6	ISLE OF MULL,HIGHLAND		9	231	0.30	11.68	0.00	
20050925	094600.4	53.54	-2.58	361.7	405.4	8.7	1.4	WIGAN,GTR MANCHESTER		12	86	0.30	4.83	7.60	
20051004	153706.7	51.64	-2.88	339.3	193.4	16.2	1.5	NEWPORT,GWENT		6	138	0.10	6.06	2.70	8KM NE OF NEWPORT
20051008	214603.0	52.44	-1.99	400.4	282.8	14.5	1.7	BIRMINGHAM, W MIDLANDS		11	115	0.40	6.40	31.20	
20051011	180200.4	52.71	-4.10	258.1	314.4	8.6	0.6	BARMOUTH,GWYNEDD		10	188	0.30	9.57	11.40	
20051021	201838.3	53.03	-4.03	264.1	349.6	16.6	0.5	BLAENAU FFESTINIOG		6	242	0.10	3.69	4.00	BLAENAU FFESTINIOG,GWYNEDD
20051024	055133.7	49.71	-0.93	476.9	-20.8	5.0	1.9	CHERBOURG PENINSULA		6	265	0.30	34.57	0.00	OFFSHORE LOCATION
20051030	205506.5	56.54	-5.67	174.5	744.9	0.0	1.6	SOUND OF MULL,HIGHLAND		5	335	0.30	253.76	165.40	

TABLE 1 : CATALOGUE OF EVENTS : 2005

YearMoDy	HrMnSecs	Lat	Lon	kmE	kmN	Dep	Mag	Locality	Int	No	Gap	RMS	ERH	ERZ	Comments
20051101	235145.9	56.68	-5.69	173.9	760.1	5.0	1.7	LOCH SUNART,HIGHLAND		9	165	0.40	14.60	0.00	
20051102	210734.7	56.65	-5.79	167.5	756.8	5.0	1.9	LOCH SUNART,HIGHLAND		11	181	0.50	13.51	0.00	
20051102	213918.5	56.67	-5.69	174.0	758.8	5.0	1.4	LOCH SUNART,HIGHLAND		7	216	0.30	12.98	0.00	
20051103	113804.7	56.68	-5.66	175.7	759.8	5.0	1.3	LOCH SUNART,HIGHLAND		7	191	0.20	8.74	0.00	
20051108	210625.5	55.22	-3.12	329.1	592.1	3.3	0.7	LANGHOLM,D & G	2	23	173	0.10	2.85	2.50	FELT LANGHOLM
20051109	040651.9	52.95	-3.93	270.6	340.4	15.7	0.4	FFESTINIOG,GWYNEDD		6	141	0.10	2.42	7.80	
20051109	045345.8	56.71	-5.12	209.2	761.9	6.2	1.3	BALLACHULISH,HIGHLAND		7	157	0.30	13.37	29.40	5KM NE OF BALLACHULISH
20051110	205228.1	57.26	-5.69	177.3	825.3	2.6	1.2	LOCH ALSH,HIGHLAND		5	99	0.10	1.34	2.80	
20051115	143825.4	55.21	-3.16	326.3	591.0	2.1	0.8	ESKDALEMUIR,D & G		3	198	0.10	150.72	81.00	
20051115	201324.5	57.06	-5.54	185.6	802.6	2.5	0.4	LOCH HOURN,HIGHLAND		4	204	0.10	4.59	3.60	
20051120	172703.0	57.22	-5.49	189.6	819.9	1.7	0.4	SHIEL BRIDGE,HIGHLAND		4	110	0.10	1.36	0.70	
20051124	080131.4	53.16	-4.67	221.2	366.1	0.4	1.3	CAERNARFON BAY		10	135	0.30	5.87	5.90	
20051204	190403.5	55.38	-6.26	130.1	617.5	5.0	1.6	NORTH CHANNEL		5	241	0.30	12.71	0.00	
20051206	172915.3	55.38	-5.18	198.3	614.5	2.5	0.5	ARRAN,STRATHCLYDE		3	251	0.10	5.38	2.80	SOUTH OF ARRAN
20051210	232129.7	56.81	-5.31	197.9	773.9	10.8	3.0	FORT WILLIAM,HIGHLAND	5	16	96	0.60	11.77	13.00	FELT FORT WILLIAM...
20051211	060131.4	51.77	-0.43	508.5	208.7	0.0	2.3	EXPL-HEMEL HEMPSTEAD	F	32	64	0.40	9.55	0.00	FELT SE ENGLAND...
20051211	231407.7	53.13	-0.01	533.0	360.6	21.4	2.0	BOSTON,LINCS		9	156	0.20	7.93	10.70	11KM N OF BOSTON
20051212	000321.4	56.16	-4.20	263.6	698.9	3.2	1.4	THORNHILL,CENTRAL		8	184	0.20	7.91	7.50	
20051214	033025.4	53.01	-5.64	155.5	351.5	8.8	2.8	IRISH SEA	3	19	139	0.40	5.66	6.20	FELT COAST OF WICKLOW
20051223	032551.8	56.69	-5.66	176.0	760.8	4.8	2.7	LOCH SUNART,HIGHLAND	3	16	135	0.50	11.20	11.70	FELT STRONTIAN
20051223	045821.6	56.68	-5.66	175.6	759.9	7.5	2.4	LOCH SUNART,HIGHLAND	3	16	135	0.40	8.54	10.20	FELT STRONTIAN
20051229	044029.7	56.22	-3.76	290.7	704.0	7.5	1.2	GLENDEVON,CENTRAL	3	7	121	0.20	6.41	19.40	FELT GLENDEVON
20051231	224005.8	56.26	-3.77	290.1	708.7	3.5	2.4	BLACKFORD,TAYSIDE	4	11	196	0.30	10.78	11.10	FELT BLACKFORD...

TABLE 2 : PHASE DATA

January 18 2005 Time: 03:17 00.0 UTC Lat: Lon: Grid Ref: Locality: SONIC-CORNWALL Comment: FELT TRURO...										Depth: RMS:		GAL SZ 156.0 EP 2 23:19 41.44 0.14 GAL SE 156.0 ES 23:19 59.24 -0.03 GAL SE 156.0 AML 23:20 02.40 14 0.18 GAL SN 156.0 AML 23:20 02.70 12 0.19 MCD SZ 207.0 EP 4 23:19 48.39 0.48 MCD SN 207.0 AML 23:20 17.15 15 0.21 MCD SE 207.0 AML 23:20 17.63 12 0.22									
January 19 2005 Time: 22:41 08.4 UTC Lat: 53.572N Lon: -1.211W Grid Ref: 452.24 kmE 408.69 kmN Locality: DONCASTER,S YORKSHIRE Velocity model: Lownet										Intensity: F AMPL PERI RES		January 29 2005 Time: 01:32 30.0 UTC Lat: 56.819N Lon: -5.731W Grid Ref: 172.34 kmE 775.91 kmN Locality: MOIDART,HIGHLAND Velocity model: Lownet									
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES LDU SZ 34.5 IP D 22:41 14.98 0.24 KBI SZ 41.1 EP 2 22:41 16.03 0.27 LHO SZ 42.7 IP C 22:41 16.19 0.14 HPK SZ 50.9 IP D 22:41 17.35 0.11 HPK SN 50.9 ES 2 22:41 23.24 -0.49 LMK SZ 60.1 EP 3 22:41 18.69 0.06 KWE SZ 74.7 EP 2 22:41 21.02 0.11 LWH SZ 91.9 EP 2 22:41 23.59 0.16 LCP SZ 131.0 EP 2 22:41 29.18 0.21 SBD SZ 155.0 IP D 22:41 31.50 -1.02 HLM SZ 162.0 EP 3 22:41 32.95 -0.38 SSP SZ 181.0 EP 2 22:41 35.85 0.15 SSP SN 181.0 ES 2 22:41 57.50 1.84 SSP SN 181.0 AML 22:41 59.33 71 0.25 SSP SE 181.0 AML 22:41 59.58 83 0.22 MCH SE 213.0 ES 4 22:42 02.65 0.23 MCH SE 213.0 AML 22:42 06.77 92 0.15 MCH SN 213.0 AML 22:42 07.38 89 0.18										Magnitude: 2.8 ML Depth: 15.0 km RMS: 0.60 secs		STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KSB SE 47.4 EP 1 01:32 38.52 0.16 KSK SZ 92.9 EP 1 D 01:32 45.83 0.08 MDO SZ 108.0 EP 2 01:32 48.23 0.12 EAB SZ 111.0 EP 2 01:32 48.39 -0.14 EAB SZ 111.0 ES 3 01:33 02.06 0.02 EAB SZ 111.0 AML 01:33 03.70 11 0.26 PCO SZ 137.0 IP 1 C 01:32 52.73 0.23 PCO SZ 137.0 ES 3 01:33 08.70 -0.20 PCO SZ 137.0 AML 01:33 11.06 12 0.21 EBH SZ 151.0 EP 2 01:32 54.96 0.43 EBH SZ 151.0 AML 01:33 15.03 10 0.15 PCA SZ 154.0 EP 2 01:32 54.35 -0.69 PCA SZ 154.0 AML 01:33 16.09 16 0.53									
January 20 2005 Time: 22:13 22.9 UTC Lat: 56.481N Lon: -4.388W Grid Ref: 252.95 kmE 734.64 kmN Locality: KILLIN,CENTRAL Velocity model: Lownet Comment: FELT KILLIN...										Intensity: 4 AMPL PERI RES		January 30 2005 Time: 23:09 53.3 UTC Lat: 54.132N Lon: -1.887W Grid Ref: 407.38 kmE 470.71 kmN Locality: RIPON,NORTH YORKSHIRE Velocity model: Borders									
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES EAB SZ 32.7 IP C 22:13 29.02 0.07 EAB SZ 32.7 ES 2 22:13 32.47 -0.90 PCO SZ 57.7 IP C 22:13 33.23 0.25 PCO SZ 57.7 ES 3 22:13 40.43 0.08 POB SZ 70.8 EP 3 22:13 35.62 0.66 EDU SZ 85.1 EP 2 22:13 36.86 -0.40 EAU SZ 91.8 EP 2 22:13 38.27 -0.01 EDI HZ 97.0 EP 22:13 38.90 -0.14 EDI HN 97.0 ES 2 22:13 51.32 0.48 EDI HE 97.0 AML 22:13 54.83 278 0.33 EDI HN 97.0 AML 22:13 54.93 579 0.33 MDO SZ 107.0 IP C 22:13 40.56 -0.08 MME SZ 127.0 EP 2 22:13 43.46 -0.32 MCD SZ 141.0 EP 22:13 46.06 0.33 MCD SN 141.0 ES 2 22:14 01.83 -0.57 MCD SE 141.0 AML 22:14 07.45 141 0.29 MCD SN 141.0 AML 22:14 07.78 135 0.41 GMK SZ 147.0 EP 2 22:13 47.04 0.41 RRR SZ 176.0 EP 4 22:13 50.66 0.05 RRR SN 176.0 AML 22:14 15.69 88 0.28 RRR SE 176.0 AML 22:14 15.99 104 0.41 GAL SZ 181.0 IP C 22:13 51.40 0.13 GAL SN 181.0 ES 2 22:14 11.51 -0.47 GAL SE 181.0 AML 22:14 15.65 93 0.23 GAL SN 181.0 AML 22:14 16.75 60 0.19 GCL SZ 190.0 EP 2 22:13 51.89 -0.61										Magnitude: 2.7 ML Depth: 3.8 km RMS: 0.40 secs		STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES HPK SZ 25.9 IP D 23:09 58.11 0.05 HPK SE 25.9 ES 2 23:10 01.69 0.06 LHO SZ 65.4 EP 1 C 23:10 04.53 -0.08 LCP SZ 72.4 EP 2 23:10 05.59 -0.11 LWH SZ 82.4 EP 1 C 23:10 07.29 -0.05 LMI SZ 93.2 EP 3 23:10 09.13 0.06 LMI SE 93.2 ES 3 23:10 19.79 -0.51 LMI SE 93.2 AML 23:10 20.89 20 0.48 LMI SN 93.2 AML 23:10 22.99 22 0.23 BTA SZ 100.0 EP 1 D 23:10 10.37 0.11 BTA SE 100.0 ES 3 23:10 21.76 -0.57 BTA SN 100.0 AML 23:10 23.73 16 0.23 BTA SE 100.0 AML 23:10 24.87 20 0.24 BDL SZ 101.0 EP 2 23:10 10.61 0.25 BBO SZ 111.0 EP 2 23:10 11.97 0.01 BBO SE 111.0 ES 3 23:10 25.27 0.03 BBO SE 111.0 AML 23:10 26.18 42 0.18 BBO SN 111.0 AML 23:10 26.61 52 0.29 LMK SZ 127.0 EP 3 23:10 14.99 0.35 BBH SZ 130.0 EP 2 23:10 15.04 -0.06 BHH SZ 137.0 EP 1 C 23:10 16.18 0.13 BHH SE 137.0 ES 3 23:10 32.02 -0.21 BHH SN 137.0 AML 23:10 32.82 28 0.44 BHH SE 137.0 AML 23:10 34.05 27 0.26									
January 24 2005 Time: 02:56 18.7 UTC Lat: 52.683N Lon: -2.436W Grid Ref: 370.53 kmE 309.61 kmN Locality: TELFORD,SHROPSHIRE Velocity model: Lownet										Intensity: 2 AMPL PERI RES		February 2 2005 Time: 23:00 37.0 UTC Lat: 55.410N Lon: -3.458W Grid Ref: 307.70 kmE 613.87 kmN Locality: MOFFAT,D & G Velocity model: Lownet Comment: 10KM NW OF MOFFAT									
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES HLM SZ 35.3 IP 1 C 02:56 25.07 -0.07 HLM SZ 35.3 ES 3 02:56 29.83 0.03 SSP SZ 54.5 EP 1 C 02:56 28.07 -0.05 SSP SN 54.5 ES 2 02:56 35.26 0.29 SSP SN 54.5 AML 02:56 35.86 18 0.14 SSP SE 54.5 AML 02:56 36.07 20 0.15 SBD SZ 60.8 IP 1 C 02:56 29.12 0.02 HAE SZ 72.2 EP 2 02:56 30.96 0.12 MCH SZ 85.4 EP 1 C 02:56 32.76 -0.10 MCH SN 85.4 ES 2 02:56 42.96 -0.21 MCH SE 85.4 AML 02:56 43.73 18 0.19 MCH SN 85.4 AML 02:56 44.21 20 0.20 HTR SZ 87.9 EP 2 02:56 33.29 0.01 WPM SZ 118.0 EP 2 02:56 38.02 0.13 HGH SZ 119.0 EP 2 02:56 38.39 0.31 YRE SZ 138.0 EP 1 C 02:56 40.76 -0.09										Magnitude: 1.4 ML Depth: 7.7 km RMS: 0.10 secs		STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES ESK1 BZ 19.1 EP 2 23:00 41.03 -0.16 ESK1 BE 19.1 ES 2 23:00 43.73 -0.48 BWH SZ 28.9 IP D 23:00 42.83 -0.03 BWH SZ 28.9 ES 3 23:00 46.71 -0.39 BHH SZ 38.4 IP D 23:00 44.53 0.07 BHH SN 38.4 ES 2 23:00 49.64 -0.22 BHH SE 38.4 AML 23:00 49.69 18 0.24 BHH SN 38.4 AML 23:00 49.71 30 0.21 BBH SZ 45.5 EP 2 23:00 45.60 -0.06 BTA SZ 74.7 EP 2 23:00 50.39 0.10 BTA SN 74.7 ES 23:01 00.12 0.17 BTA SE 74.7 AML 23:01 00.73 9 0.17 BTA SN 74.7 AML 23:01 00.76 8 0.13 BBO SZ 76.2 EP 3 23:00 50.69 0.19 BBO SN 76.2 AML 23:01 02.01 3 0.14 BBO SE 76.2 AML 23:01 03.20 3 0.22									
January 25 2005 Time: 23:19 16.7 UTC Lat: 56.191N Lon: -5.496W Grid Ref: 183.11 kmE 705.31 kmN Locality: KILMELFORD,STRATHCLYDE Velocity model: Lownet Comment: FELT MAOLACHY...										Intensity: 2 AMPL PERI RES		February 14 2005 Time: 00:19 16.0 UTC Lat: 50.344N Lon: -4.647W Grid Ref: 211.68 kmE 52.76 kmN Locality: FOWEY,CORNWALL Velocity model: Cornwall									
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES PMS SZ 60.6 EP 3 23:19 27.11 0.11 EAB SZ 71.9 IP C 23:19 28.55 -0.19 PCO SZ 89.8 IP 1 C 23:19 31.71 0.21 GMK SZ 94.3 EP 2 23:19 32.14 -0.06 GCL SZ 130.0 EP 3 23:19 37.56 -0.13 EAU SZ 133.0 EP 2 23:19 38.51 0.33 EDI EZ 147.0 EP 3 23:19 40.04 -0.01 MDO SZ 155.0 EP 3 23:19 41.42 0.10										Magnitude: 1.9 ML Depth: 7.2 km RMS: 0.20 secs		STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES CSA SZ 17.4 IP C 00:19 19.23 0.15 CSA SZ 17.4 ES 2 00:19 21.26 -0.17 CR2 SZ 42.0 IP C 00:19 23.44 0.08 CR2 SN 42.0 ES 2 00:19 28.53 -0.47 CR2 SE 42.0 AML 00:19 28.99 67 0.13 CR2 SN 42.0 AML 00:19 29.08 70 0.09 CCA SZ 44.9 IP C 00:19 23.84 -0.01 CCA SZ 44.9 ES 2 00:19 29.32 -0.56 CMA SZ 44.9 EP 2 00:19 24.15 0.30 CGW SZ 49.1 IP C 00:19 24.74 0.16 CGH SZ 49.2 EP 2 00:19 24.83 0.23 DYA SZ 52.0 EP 2 00:19 24.60 -0.48 CPZ SZ 69.9 IP 1 C 00:19 28.02 -0.17									
January 25 2005 Time: 18:44 01.4 UTC Lat: 53.267N Lon: -3.824W Grid Ref: 278.36 kmE 376.03 kmN Locality: CONWY,GWYNEDD										Intensity: 2 AMPL PERI RES		February 14 2005 Time: 18:44 01.4 UTC Lat: 53.267N Lon: -3.824W Grid Ref: 278.36 kmE 376.03 kmN Locality: CONWY,GWYNEDD									

TABLE 2 : PHASE DATA

July 29 2005 Time: 19:12 58.7 UTC Magnitude: 1.6 ML Lat: 51.855N Lon: -4.912W Depth: 4.4 km Grid Ref: 199.48 kmE 221.44 kmN RMS: 0.10 secs Locality: HAVERFORDWEST,DYFED Velocity model: Lownet Comment: 5KM NE OF HAVERFORDWEST										
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	RES
HSA	SZ	53.6	IP		C	19:13	08.09			-0.02
HTL	HZ	100.0	EP			19:13	15.32			0.02
HTL	HN	100.0	ES	2		19:13	27.11			-0.31
HTL	HN	100.0	AML			19:13	28.08	18	0.21	
HTL	HE	100.0	AML			19:13	28.25	17	0.30	
HTR	SZ	116.0	EP			19:13	17.71			-0.04
HEX	SZ	117.0	IP		C	19:13	17.96			0.07
YRE	SZ	130.0	EP			19:13	19.88			0.00
MCH	HZ	133.0	IP		D	19:13	20.15			-0.15
MCH	HN	133.0	ES	2		19:13	36.04			-0.03
MCH	HN	133.0	AML			19:13	37.75	7	0.16	
MCH	HE	133.0	AML			19:13	38.09	9	0.11	
SSP	SZ	138.0	EP			19:13	21.21			0.06
SSP	SN	138.0	ES	3		19:13	38.04			0.49
SSP	SN	138.0	AML			19:13	39.09	26	0.17	
SSP	SE	138.0	AML			19:13	40.42	18	0.10	
HGH	SZ	147.0	EP			19:13	22.62			0.20
YLL	SZ	152.0	EP			19:13	23.02			0.00
SBD	SZ	162.0	EP			19:13	24.46			-0.15
WPM	SZ	170.0	EP			19:13	25.81			0.07
August 9 2005 Time: 18:28 01.8 UTC Magnitude: 0.6 ML Lat: 54.203N Lon: -4.094W Depth: 15.0 km Grid Ref: 263.43 kmE 480.63 kmN RMS: 0.20 secs Locality: IRISH SEA Velocity model: Lownet										
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	RES
WIM	SZ	38.4	IP		C	18:28	08.82			-0.01
WIM	SZ	38.4	ES	3		18:28	14.30			0.34
GAL	SZ	83.9	IP		D	18:28	15.62			-0.09
GAL	SN	83.9	ES	2		18:28	26.06			0.20
GAL	SE	83.9	AML			18:28	27.26	3	0.16	
GAL	SN	83.9	AML			18:28	27.45	2	0.13	
WCB	SZ	96.5	EP			18:28	17.41			-0.10
WCB	SE	96.5	ES	2		18:28	28.79			-0.19
WLF	SZ	104.0	EP		2	18:28	18.36			-0.15
YRE	SZ	138.0	EP			18:28	23.62			0.21
August 11 2005 Time: 04:02 12.7 UTC Magnitude: 1.8 ML Lat: 52.882N Lon: 2.129W Depth: 5.0 km Grid Ref: 677.76 kmE 339.64 kmN RMS: 0.30 secs Locality: SOUTHERN NORTH SEA Velocity model: Lownet										
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	RES
AWI	SZ	46.2	EP			04:02	20.36			-0.50
ABA	SZ	66.2	EP			04:02	23.65			-0.31
AEU	SZ	67.0	EP			04:02	24.55			0.47
AEU	SN	67.0	ES	2		04:02	32.82			0.42
AEU	SN	67.0	AML			04:02	33.60	61	0.37	
AEU	SE	67.0	AML			04:02	36.05	43	0.12	
APA	SZ	78.2	EP			04:02	25.68			-0.14
AWH	SZ	84.3	EP			04:02	26.70			-0.07
AWH	SZ	84.3	ES	3		04:02	37.26			0.20
LMK	SZ	176.0	EP			04:02	40.75			0.42
KBI	SZ	249.0	EP			04:02	49.69			0.29
LHO	SZ	276.0	EP			04:02	52.61			-0.28
August 12 2005 Time: 08:05 10.2 UTC Magnitude: 3.0 ML Lat: 53.543N Lon: 2.384W Depth: 5.0 km Grid Ref: 690.40 kmE 414.12 kmN RMS: 0.30 secs Locality: SOUTHERN NORTH SEA Velocity model: North Sea										
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	RES
AWI	SZ	101.0	IP		C	08:05	26.62			0.12
ABA	SZ	110.0	IP		C	08:05	27.87			-0.13
ABA	SZ	110.0	ES	3		08:05	41.20			0.21
AEU	SZ	128.0	EP			08:05	30.81			-0.06
AEU	SN	128.0	ES	2		08:05	46.25			0.29
AEU	SE	128.0	AML			08:05	47.75	319	0.39	
AEU	SN	128.0	AML			08:05	48.22	295	0.32	
AWH	SZ	140.0	IP		D	08:05	32.32			-0.27
APA	SZ	151.0	EP			08:05	34.25			0.27
APA	SZ	151.0	ES	3		08:05	51.70			0.35
LMK	SZ	180.0	EP			08:05	38.31			0.71
LWH	SZ	219.0	EP			08:05	42.74			0.28
KBI	SZ	262.0	EP			08:05	47.88			0.07
LHO	SZ	281.0	EP			08:05	49.94			-0.22
KWE	SZ	288.0	EP			08:05	50.83			-0.17
MCH	HZ	402.0	EP			08:06	04.62			-0.53
MCH	HE	402.0	AML			08:07	05.64	24	0.51	
MCH	HN	402.0	AML			08:07	09.48	29	0.58	
EAU	SZ	455.0	EP			08:06	11.56			-0.19
August 13 2005 Time: 01:49 10.6 UTC Magnitude: 1.2 ML Lat: 55.660N Lon: -6.065W Depth: 5.0 km Grid Ref: 144.36 kmE 648.21 kmN RMS: 0.10 secs Locality: ISLAY, INNER HEBRIDES Velocity model: Lownet										
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	RES
GMK	SZ	45.9	IP		C	01:49	18.59			-0.17
GCL	SZ	64.9	EP			01:49	21.74			0.02
GAL	SZ	123.0	EP			01:49	30.90			0.15
GAL	SE	123.0	ES	3		01:49	45.57			0.11
GAL	SE	123.0	AML			01:49	47.91	6	0.22	
GMM	SZ	158.0	EP		3	01:49	35.76			-0.08
August 24 2005 Time: 14:32 15.5 UTC Magnitude: 3.0 ML Lat: 49.890N Lon: -4.226W Depth: 12.2 km Grid Ref: 240.13 kmE 1.31 kmN RMS: 0.40 secs Locality: ENGLISH CHANNEL Velocity model: Lownet Comment: FELT SOUTH DEVON										
STAT	CO	DIST	PHAS	WT	P	HrMn	SECS	AMPL	PERI	RES
DCO	SZ	54.1	IP		D	14:32	24.95			0.16
DYA	EZ	64.2	IP		D	14:32	26.65			0.27
DYA	EE	64.2	ES	1		14:32	33.83			-0.50
CMA	SZ	68.1	EP			14:32	26.92			-0.01
CGH	SZ	69.7	EP			14:32	27.18			-0.01
CSA	SZ	70.1	IP		D	14:32	27.24			-0.02
CR2	SZ	74.2	IP		C	14:32	27.79			-0.11
CR2	SE	74.2	ES	2		14:32	36.38			-0.57
CGW	SZ	75.2	EP			14:32	28.02			-0.01
CCA	SZ	79.0	EP			14:32	28.58			-0.07
CPZ	SZ	102.0	EP			14:32	32.58			0.46
HTL	HZ	124.0	EP			14:32	35.48			0.16
August 8 2005 Time: 03:34 31.9 UTC Magnitude: 0.9 ML Lat: 50.636N Lon: -5.358W Depth: 15.0 km Grid Ref: 162.58 kmE 87.26 kmN RMS: 0.10 secs Locality: TREVOSE HEAD, CORNWALL Velocity model: Cornwall										

TABLE 2 : PHASE DATA

September 7 2005 Time: 17:32 36.0 UTC Magnitude: 3.2 ML Lat: 55.200N Lon: 4.423W Depth: 0.4 km Grid Ref: 808.48 kmE 608.36 kmN RMS: 0.40 secs Locality: CENTRAL NORTH SEA Velocity model: North Sea										RRR SZ 146.0 EP 02:38 12.80 0.10 RRR SN 146.0 ES 2 02:38 30.18 0.36 RRR SE 146.0 AML 02:38 31.11 49 0.23 RRR SN 146.0 AML 02:38 33.59 42 0.21 PCO SZ 151.0 EP 02:38 13.27 -0.23 EAU SZ 195.0 EP 02:38 19.39 0.08 EDI HZ 206.0 EP 02:38 21.26 0.58 EDI HE 206.0 ES 2 02:38 43.60 -0.03 EDI HN 206.0 AML 02:38 49.33 27 0.28 EDI HE 206.0 AML 02:38 50.51 15 0.30
September 7 2005 Time: 17:33 23.89 AMPL PERI RES ABA SZ 335.0 EP 17:33 23.89 0.80 LWH SZ 342.0 EP 17:33 24.79 0.85 AWH SZ 366.0 EP 17:33 26.64 -0.28 HPK SN 415.0 ES 2 17:34 14.65 0.04 LHO SZ 447.0 EP 17:33 36.84 -0.25 EBL SZ 476.0 EP 17:33 40.61 -0.05 KWE SZ 476.0 EP 17:33 40.26 -0.38 ECK SZ 481.0 EP 17:33 40.69 -0.53 EAU SZ 502.0 EP 17:33 44.60 0.74 MME SZ 515.0 EP 17:33 45.56 0.13 SBD SZ 564.0 EP 17:33 51.21 -0.34 HAE SZ 580.0 EP 17:33 53.54 0.05 SSP SZ 585.0 EP 17:33 54.16 0.04 SSP SN 585.0 ES 17:34 51.25 0.08 MLA SZ 588.0 EP 17:33 54.21 -0.32 MCH SZ 606.0 EP 17:33 56.46 -0.36 MCH HZ 606.0 EP 17:33 56.55 0.00 MCH HE 606.0 ES 2 17:34 55.48 -0.36 MCH HN 606.0 AML 17:34 58.71 15 0.16 MCH HE 606.0 AML 17:34 58.86 8 0.05 HTR SZ 615.0 EP 17:33 57.85 -0.10										September 17 2005 Time: 02:39 51.8 UTC Magnitude: 1.6 ML Lat: 56.580N Lon: -6.281W Depth: 5.0 km Grid Ref: 137.14 kmE 751.31 kmN RMS: 0.30 secs Locality: ISLE OF MULL, HIGHLAND Velocity model: Lownet
September 9 2005 Time: 10:27 19.6 UTC Magnitude: 1.2 ML Lat: 49.365N Lon: -2.375W Depth: 7.7 km Grid Ref: 372.78 kmE -59.36 kmN RMS: 0.00 secs Locality: OFFSHORE JERSEY Velocity model: Lownet										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KAR SZ 46.8 EP 02:39 59.94 -0.14 KSB SZ 87.5 IP C 02:40 06.30 -0.14 KPL SZ 92.8 IP C 02:40 06.76 -0.42 KPL SN 92.8 ES 2 02:40 19.13 0.71 KPL SN 92.8 AML 02:40 22.66 11 0.19 KPL SE 92.8 AML 02:40 24.57 16 0.30 KSK SZ 102.0 EP 02:40 08.66 0.02 KAC SZ 118.0 EP 02:40 11.19 0.00 EAB SZ 128.0 EP 02:40 12.48 -0.16 RRR SE 145.0 ES 2 02:40 32.86 0.74 RRR SN 145.0 AML 02:40 33.39 12 0.34 RRR SE 145.0 AML 02:40 33.56 17 0.34 PCO SZ 150.0 EP 02:40 15.86 -0.01 EDI HZ 205.0 EP 02:40 23.52 0.47
September 9 2005 Time: 15:24 07.6 UTC Magnitude: 0.8 ML Lat: 52.009N Lon: -2.801W Depth: 13.8 km Grid Ref: 345.03 kmE 234.86 kmN RMS: 0.00 secs Locality: HEREFORD, HEREFORDSHIRE Velocity model: Mid Wales Comment: 5KM SW OF HEREFORD										September 25 2005 Time: 09:46 00.4 UTC Magnitude: 1.4 ML Lat: 53.544N Lon: -2.578W Depth: 8.7 km Grid Ref: 361.70 kmE 405.44 kmN RMS: 0.30 secs Locality: WIGAN, GTR MANCHESTER Velocity model: Lownet
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES JVM SZ 20.5 IP D 10:27 23.66 0.00 JLP SZ 23.6 IP D 10:27 24.15 0.00 JLP SZ 23.6 ES 3 10:27 27.45 0.00 JSA SZ 24.6 IP D 10:27 24.30 0.00 JRS SZ 28.1 IP D 10:27 24.85 0.00 JRS SE 28.1 ES 3 10:27 28.63 -0.02 JRS SE 28.1 AML 10:27 28.86 41 0.18										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES LHO SZ 47.9 IP C 09:46 08.51 -0.24 KWE SZ 76.6 EP 09:46 13.30 0.14 HPK SN 78.0 ES 2 09:46 22.14 -0.70 SBD SZ 84.3 EP 09:46 14.49 0.09 WPM SZ 93.8 EP 09:46 16.07 0.23 LRN SZ 110.0 EP 09:46 18.61 0.32 YLL SZ 115.0 EP 09:46 19.08 -0.03 HLM SZ 116.0 EP 09:46 19.17 -0.11 CKE SZ 121.0 EP 09:46 20.32 0.29 WLF SZ 124.0 EP 09:46 19.96 -0.45 SSP SZ 130.0 EP 09:46 21.50 0.13 SSP SE 130.0 ES 2 09:46 37.22 0.53 SSP SN 130.0 AML 09:46 38.11 7 0.22 SSP SE 130.0 AML 09:46 39.59 10 0.17 YRE SZ 138.0 EP 09:46 22.11 -0.34
MCH SN 13.6 IP C 15:24 10.97 0.04 MCH SN 13.6 ES 15:24 13.32 -0.01 MCH SN 13.6 AML 15:24 13.43 209 0.09 MCH SE 13.6 AML 15:24 13.44 86 0.08 HAE SZ 18.0 IP C 15:24 11.48 -0.01 HTR SZ 32.9 EP 15:24 13.66 -0.03 HGH SZ 41.2 EP 15:24 14.98 -0.01 SSP SZ 50.2 EP 15:24 16.49 0.05 SSP SN 50.2 ES 2 15:24 22.71 -0.10 SSP SN 50.2 AML 15:24 23.03 2 0.10 SSP SE 50.2 AML 15:24 23.50 1 0.19										October 4 2005 Time: 15:37 06.7 UTC Magnitude: 1.5 ML Lat: 51.636N Lon: -2.877W Depth: 16.2 km Grid Ref: 339.31 kmE 193.44 kmN RMS: 0.10 secs Locality: NEWPORT, GWENT Velocity model: Lownet Comment: 8KM NE OF NEWPORT
September 12 2005 Time: 00:57 08.5 UTC Magnitude: 0.6 ML Lat: 57.262N Lon: -5.699W Depth: 2.6 km Grid Ref: 176.96 kmE 825.07 kmN RMS: 0.10 secs Locality: LOCH ALSH, HIGHLAND Velocity model: Lownet										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES HGH SZ 5.0 IP D 15:37 09.78 0.07 MCH SZ 41.0 IP C 15:37 14.14 -0.02 MCH SE 41.0 ES 1 15:37 19.74 0.15 MCH SE 41.0 AML 15:37 20.00 152 0.13 MCH SN 41.0 AML 15:37 20.03 50 0.08 HTR SZ 56.1 EP 15:37 16.20 -0.25 SSP SZ 88.4 EP 15:37 21.25 0.00 SSP SE 88.4 ES 2 15:37 31.95 0.08 SSP SN 88.4 AML 15:37 32.97 16 0.18 SSP SE 88.4 AML 15:37 33.05 10 0.18 HSA SZ 89.1 EP 15:37 21.49 0.16 HEX SZ 90.4 EP 15:37 21.43 -0.06
KPL SZ 9.1 IP C 00:57 10.27 0.03 KPL SE 9.1 ES 00:57 11.43 -0.10 KPL SN 9.1 AML 00:57 11.70 33 0.19 KPL SE 9.1 AML 00:57 11.72 41 0.22 KSB SZ 17.7 IP C 00:57 11.79 0.00 KSB SZ 17.7 ES 3 00:57 13.86 -0.35 KAC SZ 35.7 EP 00:57 14.91 0.12 KAR SZ 39.0 EP 00:57 15.32 -0.03										October 8 2005 Time: 21:46 03.0 UTC Magnitude: 1.7 ML Lat: 52.443N Lon: -1.994W Depth: 14.5 km Grid Ref: 400.41 kmE 282.82 kmN RMS: 0.40 secs Locality: BIRMINGHAM, W MIDLANDS Velocity model: Mid Wales
September 12 2005 Time: 13:36 39.6 UTC Magnitude: -0.1 ML Lat: 57.267N Lon: -5.678W Depth: 2.7 km Grid Ref: 178.26 kmE 825.56 kmN RMS: 0.20 secs Locality: LOCH ALSH, HIGHLAND Velocity model: Lownet										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES HLM SZ 60.8 IP C 21:46 13.29 -0.22 KWE SZ 64.6 IP C 21:46 13.80 -0.27 SSP SZ 76.1 IP C 21:46 15.85 0.05 SSP SE 76.1 ES 2 21:46 25.20 0.21 SSP SN 76.1 AML 21:46 25.37 49 0.22 SSP SE 76.1 AML 21:46 25.39 34 0.24 MCH SZ 84.7 IP C 21:46 16.76 -0.31 MCH SE 84.7 ES 2 21:46 26.87 -0.30 MCH SN 84.7 AML 21:46 27.50 23 0.11 MCH SE 84.7 AML 21:46 27.59 28 0.10 KBI SZ 95.6 EP 21:46 18.83 0.11 HTR SZ 95.9 IP C 21:46 18.44 -0.34 SBD SZ 99.8 EP 21:46 20.00 0.62 SWN SZ 104.0 EP 21:46 20.18 0.16 SWN SE 104.0 ES 3 21:46 32.63 0.38 SWN SN 104.0 AML 21:46 33.04 30 0.28 SWN SE 104.0 AML 21:46 33.31 26 0.41 HGH SZ 105.0 EP 21:46 20.00 -0.20 SKP SZ 114.0 EP 21:46 21.16 -0.34 SWK SZ 145.0 EP 21:46 26.90 0.74
KPL SN 8.2 IP D 13:36 41.39 -0.03 KPL SN 8.2 ES 2 13:36 42.41 -0.37 KPL SE 8.2 AML 13:36 42.88 7 0.10 KPL SN 8.2 AML 13:36 43.01 8 0.17 KSB SZ 16.7 IP C 13:36 42.90 -0.03 KSB SZ 16.7 ES 3 13:36 44.98 -0.41 KAC SZ 34.5 EP 13:36 46.08 0.18										October 11 2005 Time: 18:02 00.4 UTC Magnitude: 0.6 ML Lat: 52.708N Lon: -4.101W Depth: 8.6 km Grid Ref: 258.07 kmE 314.37 kmN RMS: 0.30 secs Locality: BARMOUTH, GWYNEDD Velocity model: Lleyn
September 17 2005 Time: 02:37 49.2 UTC Magnitude: 2.2 ML Lat: 56.574N Lon: -6.307W Depth: 5.0 km Grid Ref: 135.50 kmE 750.74 kmN RMS: 0.20 secs Locality: ISLE OF MULL, HIGHLAND Velocity model: Lownet										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KAR SZ 48.2 EP 02:37 57.67 -0.10 KSB SZ 89.0 IP C 02:38 04.01 -0.12 KPL SZ 94.0 EP 02:38 04.47 -0.36 KPL SE 94.0 ES 2 02:38 16.67 0.45 KPL SE 94.0 AML 02:38 22.31 75 0.32 KPL SN 94.0 AML 02:38 23.25 43 0.32 KSK SZ 102.0 EP 02:38 06.14 0.00 KAC SZ 120.0 IP C 02:38 08.95 -0.09 PMS SZ 126.0 EP 02:38 09.78 -0.13 EAB SZ 129.0 EP 02:38 10.20 -0.10

TABLE 2 : PHASE DATA

November 9 2005 Time: 04:53 45.8 UTC Magnitude: 1.3 ML Lat: 56.710N Lon: -5.118W Depth: 6.2 km Grid Ref: 209.17 kmE 761.92 kmN RMS: 0.30 secs Locality: BALLACHULISH, HIGHLAND Velocity model: Lownet Comment: 5KM NE OF BALLACHULISH										Velocity model: Lownet STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES GCL SZ 34.3 IP D 19:04 09.55 -0.32 GCL SZ 34.3 ES 3 19:04 14.26 -0.25 GMK SZ 42.5 IP C 19:04 10.75 -0.40 GALL SZ 114.0 IP D 19:04 22.68 0.45 GAL SE 114.0 ES 3 19:04 36.21 0.31 GAL SE 114.0 AML 19:04 38.82 16 0.24 GAL SN 114.0 AML 19:04 38.83 17 0.24 GMM SZ 128.0 EP 19:04 24.67 0.21 EAB SZ 151.0 EP 19:04 27.74 0.06									
November 10 2005 Time: 20:52 28.1 UTC Magnitude: 1.2 ML Lat: 57.264N Lon: -5.693W Depth: 2.6 km Grid Ref: 177.33 kmE 825.28 kmN RMS: 0.10 secs Locality: LOCH ALSH, HIGHLAND Velocity model: Lownet										December 6 2005 Time: 17:29 15.3 UTC Magnitude: 0.5 ML Lat: 55.383N Lon: -5.185W Depth: 2.5 km Grid Ref: 198.26 kmE 614.51 kmN RMS: 0.10 secs Locality: ARRAN, STRATHCLYDE Velocity model: Lownet Comment: SOUTH OF ARRAN									
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KAR SZ 49.3 IP C 04:53 54.68 0.26 KSB SZ 58.7 EP 04:53 55.69 -0.23 EAB SZ 75.4 EP 04:53 58.03 -0.45 KPL SZ 77.3 IP C 04:53 58.55 -0.17 KPL SE 77.3 ES 2 04:54 07.45 -0.70 KPL SE 77.3 AML 04:54 12.97 17 0.35 KPL SN 77.3 AML 04:54 13.05 11 0.10 KAC SZ 88.6 EP 04:54 00.88 0.37 PCO SZ 102.0 EP 04:54 02.61 0.00 EDI EZ 148.0 EP 04:54 09.83 0.38										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES GMK SZ 26.2 IP C 17:29 20.28 0.08 GMK SZ 26.2 ES 17:29 23.75 -0.06 GAL SZ 64.9 EP 17:29 26.58 0.03 GAL SE 64.9 ES 17:29 34.76 -0.02 GAL SE 64.9 AML 17:29 34.83 3 0.10 GAL SN 64.9 AML 17:29 35.76 2 0.37 GCL SZ 68.8 EP 17:29 27.08 -0.09 GCL SZ 68.8 ES 17:29 35.93 0.06									
November 15 2005 Time: 14:38 25.4 UTC Magnitude: 0.8 ML Lat: 55.208N Lon: -3.158W Depth: 2.1 km Grid Ref: 326.32 kmE 591.03 kmN RMS: 0.10 secs Locality: ESKDALEMUIR, D & G Velocity model: Lownet										December 10 2005 Time: 23:21 29.7 UTC Magnitude: 3.0 ML Lat: 56.813N Lon: -5.312W Depth: 10.8 km Grid Ref: 197.86 kmE 773.93 kmN RMS: 0.60 secs Locality: FORT WILLIAM, HIGHLAND Velocity model: Lownet Comment: FELT FORT WILLIAM...									
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES ECK SZ 3.6 IP D 14:38 26.46 -0.02 ESK EZ 12.4 IP C 14:38 28.16 0.07 ESK EN 12.4 ES 14:38 30.00 -0.06 ESK EE 12.4 AML 14:38 30.21 31 0.10 ESK EN 12.4 AML 14:38 30.25 16 0.13 EDI EE 79.6 ES 3 14:38 49.12 0.13 EDI EE 79.6 AML 14:38 49.54 11 0.32 EDI EN 79.6 AML 14:38 50.19 9 0.19										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KAR SZ 33.6 IP C 23:21 36.59 0.78 KSB SZ 44.7 IP D 23:21 37.44 -0.12 KPL SZ 62.1 IP D 23:21 40.26 0.09 KPL SE 62.1 ES 2 23:21 47.47 -0.36 KPL SE 62.1 AML 23:21 48.49 331 0.12 KPL SN 62.1 AML 23:21 51.51 380 0.09 KAC SZ 76.4 EP 23:21 42.29 -0.13 MDO SZ 90.5 EP 23:21 43.83 -0.82 EAB SZ 91.8 IP C 23:21 44.86 0.03 KSK SZ 111.0 EP 23:21 48.74 0.99 MVH SZ 141.0 IP D 23:21 51.16 -0.89 MCD SZ 151.0 EP 23:21 53.57 0.10 MCD SE 151.0 ES 23:22 10.94 0.10 MCD SN 151.0 AML 23:22 12.91 552 0.24 MCD SE 151.0 AML 23:22 12.95 740 0.23 EAU SZ 158.0 EP 23:21 55.21 0.76 EDI HZ 164.0 IP C 23:21 55.94 0.66 EDI HN 164.0 ES 2 23:22 14.91 0.94 EDI HE 164.0 AML 23:22 15.84 327 0.28 EDI HN 164.0 AML 23:22 15.88 491 0.34 GMK SZ 164.0 EP 23:21 54.50 -0.77 EBL SZ 182.0 EP 23:21 58.57 1.02 GCL SZ 200.0 EP 23:21 59.01 -0.71 GAL SZ 220.0 EP 23:22 01.51 -0.71 GAL SN 220.0 AML 23:22 33.90 38 0.31 GAL SE 220.0 AML 23:22 34.16 75 0.23 GMM SZ 289.0 EP 23:22 10.37 -0.55									
November 15 2005 Time: 20:13 24.5 UTC Magnitude: 0.4 ML Lat: 57.065N Lon: -5.537W Depth: 2.5 km Grid Ref: 185.59 kmE 802.64 kmN RMS: 0.10 secs Locality: LOCH HOURN, HIGHLAND Velocity model: Lownet										December 11 2005 Time: 06:01 31.4 UTC Magnitude: 2.3 ML Lat: 51.766N Lon: -0.427W Depth: 0.0 km Grid Ref: 508.54 kmE 208.70 kmN RMS: 0.40 secs Locality: EXPL-HEMEL HEMPSSTEAD Comment: FELT SE ENGLAND...									
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KSB SZ 17.5 IP D 20:13 27.73 -0.08 KAR SZ 24.1 IP C 20:13 28.86 -0.03 KPL SZ 31.3 EP 20:13 30.17 0.10 KPL SE 31.3 ES 20:13 34.06 -0.05 KPL SE 31.3 AML 20:13 34.63 9 0.27 KPL SN 31.3 AML 20:13 39.26 4 0.33 KAC SZ 50.3 IP C 20:13 33.38 0.06										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES SKP SZ 26.9 IP C 06:01 06.39 -0.54 HHUK E 28.5 EP 9 06:01 07.83 0.66 TSA SZ 70.9 EP 06:01 04.14 0.02 TSA SZ 70.9 AMP 06:01 06.66 164 0.51 WOL BZ 74.8 EP 06:01 04.18 -0.53 WOL BZ 74.8 AMP 06:01 06.23 139 0.66 TCR SZ 93.3 EP 4 06:01 06.80 -0.76 TCR SZ 93.3 AMP 06:01 07.94 53 0.16 SWN SZ 99.1 EP 06:01 08.70 0.20 SWN SZ 99.1 AMP 06:01 09.24 166 0.19 SSW SZ 101.0 IP C 06:01 08.71 -0.02 SSW SZ 101.0 AMP 06:01 06.00 108 0.57 TFO EZ 131.0 EP 06:01 03.65 0.22 TFO EZ 131.0 AMP 06:01 03.86 95 0.22 AWH SZ 135.0 EP 06:01 04.29 0.33 AWH SZ 135.0 AMP 06:01 04.47 67 0.32 SIW SZ 139.0 EP 06:01 04.80 0.24 SIW SZ 139.0 AMP 06:01 06.13 110 0.28 SWK SZ 144.0 EP 06:01 05.76 0.41 SWK SZ 144.0 AMP 06:01 06.99 96 0.29 APA SZ 144.0 EP 06:01 05.76 0.50 APA SZ 144.0 AMP 06:01 06.61 73 0.23 AEU SZ 148.0 EP 06:01 06.44 0.55 AEU SZ 148.0 AMP 06:01 06.61 13 0.26 STED BZ 157.0 EP 9 06:01 07.58 0.44 HGH SZ 165.0 EP 06:01 08.54 0.19 HGH SZ 165.0 AMP 06:01 09.46 44 0.24 ABA SZ 165.0 EP 06:01 08.53 0.28 ABA SZ 165.0 AMP 06:01 09.19 47 0.29 KWE SZ 169.0 EP 06:01 08.93 -0.03 KWE SZ 169.0 AMP 06:02 00.45 32 0.49 AWI SZ 174.0 EP 06:02 00.19 0.55 AWI SZ 174.0 AMP 06:02 00.77 135 0.23 MCH HZ 179.0 IP C 06:02 00.32 0.07 MCH HZ 179.0 AMP 06:02 01.03 16 0.35 KBI SZ 182.0 EP 06:02 00.50 -0.11 KBI SZ 182.0 AMP 06:02 02.30 60 0.58 HLM SZ 188.0 EP 06:02 01.76 0.37									
November 20 2005 Time: 17:27 03.0 UTC Magnitude: 0.4 ML Lat: 57.222N Lon: -5.485W Depth: 1.7 km Grid Ref: 189.63 kmE 819.94 kmN RMS: 0.10 secs Locality: SHIEL BRIDGE, HIGHLAND Velocity model: Lownet										November 24 2005 Time: 08:01 31.4 UTC Magnitude: 1.3 ML Lat: 53.162N Lon: -4.675W Depth: 0.4 km Grid Ref: 221.19 kmE 366.14 kmN RMS: 0.30 secs Locality: CAERNARFON BAY Velocity model: Lleylly									
STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KSB SZ 4.1 IP C 17:27 04.15 -0.01 KPL SZ 16.5 IP D 17:27 06.41 0.01 KPL SE 16.5 ES 3 17:27 08.67 -0.21 KPL SE 16.5 AML 17:27 09.21 10 0.10 KPL SN 16.5 AML 17:27 09.22 17 0.32 KAC SZ 32.8 IP D 17:27 09.20 0.01 KAR SZ 39.7 EP 17:27 10.37 0.00										STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES YRC SZ 11.9 IP C 08:01 34.00 0.36 WLF SZ 23.4 IP C 08:01 35.51 -0.10 WCB SZ 25.5 IP C 08:01 36.05 0.08 WCB SE 25.5 ES 2 08:01 38.89 -0.16 WCB SE 25.5 AML 08:01 39.11 64 0.10 WCB SN 25.5 AML 08:01 39.20 78 0.16 YRE SZ 26.2 IP D 08:01 36.15 0.06 YLL SZ 33.9 EP 08:01 37.29 -0.06 WME SZ 36.0 IP C 08:01 37.55 -0.15 WPM SZ 52.6 EP 08:01 40.43 -0.03 DSB BN 114.0 ES 2 08:02 03.55 -0.06 DSB BN 114.0 AML 08:02 05.53 7 0.23 DSB BZ 114.0 AML 08:02 05.91 6 0.23 SSP SZ 134.0 EP 08:01 53.72 -0.10 SSP SE 134.0 AML 08:02 11.17 9 0.16 SSP SN 134.0 AML 08:02 11.34 8 0.17 MCH HZ 172.0 EP 08:01 59.19 -0.25 MCH HN 172.0 ES 2 08:02 19.42 0.94 MCH HE 172.0 AML 08:02 20.12 2 0.19 MCH HN 172.0 AML 08:02 20.83 5 0.33									
December 4 2005 Time: 19:04 03.5 UTC Magnitude: 1.6 ML Lat: 55.377N Lon: -6.261W Depth: 5.0 km Grid Ref: 130.11 kmE 617.49 kmN RMS: 0.30 secs Locality: NORTH CHANNEL																			

TABLE 2 : PHASE DATA

<p>HLM SZ 188.0 AMP 06:02 02.39 41 0.35 SSP SZ 198.0 EP 06:02 03.09 0.44 SSP SZ 198.0 AMP 06:02 04.13 85 0.57 HTR SZ 199.0 EP 06:02 02.59 -0.14 HTR SZ 199.0 AMP 06:02 04.01 21 0.34 LHO SZ 220.0 EP 4 06:02 06.36 0.88 LHO SZ 220.0 AMP 06:02 08.68 19 0.61 SBD SZ 231.0 EP 06:02 08.40 1.59 SBD SZ 231.0 AMP 06:02 09.25 10 0.48 HEX SZ 247.0 EP 06:02 09.08 0.27 HEX SZ 247.0 AMP 06:02 04.40 14 0.37 HSA SZ 257.0 EP 06:02 02.59 2.52 HSA SZ 257.0 AMP 06:02 04.28 9 0.49 DYA EZ 287.0 EP 4 06:02 03.70 -0.03 DYA EZ 287.0 AMP 06:02 02.59 1.2 0.53 WPM SZ 289.0 EP 4 06:02 03.71 -0.28 HTL HZ 295.0 EP 4 06:02 04.83 0.07 HTL HZ 295.0 AMP 06:02 07.25 4 0.87 YRE SZ 304.0 EP 4 06:02 06.31 0.43 EKRI SZ 437.0 EP 4 06:02 01.72 -0.85 EKRI SZ 437.0 AMP 06:02 05.50 4 0.98 HGN BZ 457.0 EP 4 06:02 04.69 -0.36 HGN BZ 457.0 AMP 06:02 05.46 2 0.15</p>	<p>Lat: 56.685N Lon: -5.658W Grid Ref: 175.99 kmE 760.77 kmN Locality: LOCH SUNART,HIGHLAND Velocity model: Lownet Comment: FELT STRONTIAN</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KAR SZ 28.0 IP C 03:25 56.93 KSB SZ 60.2 IP C 03:26 02.03 KPL SZ 72.8 IP C 03:26 03.96 KPL SE 72.8 ES 2 03:26 12.52 KPL SN 72.8 AML 03:26 17.19 370 0.24 KPL SE 72.8 AML 03:26 17.39 484 0.28 KAC SZ 93.2 IP C 03:26 07.69 EAB SZ 98.4 IP C 03:26 07.68 KSK SZ 108.0 EP 03:26 10.24 MDO SZ 115.0 EP 03:26 10.67 POB S 121.0 EP 03:26 11.50 PCO SZ 124.0 IP C 03:26 11.96 GMK SZ 149.0 EP 03:26 15.18 EAU SZ 166.0 IP C 03:26 18.51 EDI HZ 175.0 EP 03:26 19.86 EDI HN 175.0 AML 03:26 42.50 115 0.24 EDI HE 175.0 AML 03:26 42.90 95 0.33 MCD SZ 177.0 EP 03:26 18.94 MCD SE 177.0 ES 2 03:26 39.00 MCD SE 177.0 AML 03:26 43.55 114 0.25 MCD SN 177.0 AML 03:26 44.63 126 0.26 GCL SZ 181.0 EP 03:26 19.66 EBL SZ 191.0 EP 03:26 22.45 1.03 GAL SZ 211.0 EP 03:26 23.89 0.07 GAL SE 211.0 AML 03:26 50.50 41 0.24 GAL SN 211.0 AML 03:26 52.44 23 0.33</p> <p>Intensity: 3 AMPL PERI RES</p>
<p>December 11 2005 Time: 23:14 07.7 UTC Lat: 53.126N Lon: -0.012W Grid Ref: 533.01 kmE 360.64 kmN Locality: BOSTON,LINCS Velocity model: Lownet Comment: 11KM N OF BOSTON</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES ABA SZ 82.1 EP 23:14 20.93 -0.18 AWH SZ 85.2 IP C 23:14 21.25 -0.30 AEU SZ 101.0 EP 23:14 24.11 0.30 AEU SN 101.0 ES 2 23:14 35.14 -0.43 AEU SN 101.0 AML 23:14 37.44 42 0.17 AEU SE 101.0 AML 23:14 38.48 50 0.15 KBI SZ 102.0 EP 23:14 24.08 0.05 AWI SZ 103.0 EP 23:14 24.35 0.21 KWE SZ 123.0 EP 23:14 27.07 0.05 LHO SZ 131.0 EP 23:14 28.09 -0.12 APA SZ 136.0 EP 23:14 28.94 0.10 HPK SN 141.0 ES 2 23:14 45.37 -0.07</p>	<p>December 11 2005 Time: 23:14 07.7 UTC Lat: 53.126N Lon: -0.012W Grid Ref: 533.01 kmE 360.64 kmN Locality: BOSTON,LINCS Velocity model: Lownet Comment: 11KM N OF BOSTON</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES KAR SZ 28.8 IP C 04:58 26.61 KSB SZ 61.2 EP 04:58 31.69 KPL SZ 73.8 EP 04:58 33.36 KPL SE 73.8 ES 2 04:58 42.21 KPL SN 73.8 AML 04:58 46.77 259 0.22 KPL SE 73.8 AML 04:58 47.12 271 0.24 KAC SZ 94.2 EP 04:58 37.25 0.18 EAB SZ 98.2 EP 04:58 37.37 -0.34 KSK SZ 108.0 EP 04:58 39.86 0.64 MDO SZ 116.0 EP 04:58 40.34 -0.16 PCO SZ 123.0 EP 04:58 41.65 0.04 GMK SZ 148.0 EP 04:58 44.95 -0.19 MVH SZ 165.0 EP 04:58 48.08 0.51 EAU SZ 166.0 EP 04:58 48.13 0.47 EDI HZ 175.0 EP 04:58 49.05 0.28 EDI EN 175.0 ES 04:59 08.24 -0.38 EDI EE 175.0 AML 04:59 11.43 49 0.55 EDI EN 175.0 AML 04:59 12.09 58 0.26 MCD SZ 177.0 EP 04:58 48.91 -0.23 MME SZ 179.0 EP 04:58 49.80 0.45 GCL SZ 180.0 EP 04:58 49.05 -0.44 GAL SZ 210.0 EP 04:58 53.62 0.42 GAL SN 210.0 AML 04:59 21.91 15 0.56 GAL SE 210.0 AML 04:59 22.02 19 0.38</p> <p>Intensity: 3 AMPL PERI RES</p>
<p>December 12 2005 Time: 00:03 21.4 UTC Lat: 56.163N Lon: -4.197W Grid Ref: 263.58 kmE 698.87 kmN Locality: THORNHILL,CENTRAL Velocity model: Lownet</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES EAB SZ 9.2 IP C 00:03 23.31 -0.12 PCO SZ 20.4 IP D 00:03 25.06 -0.27 PMS SZ 49.1 EP 00:03 29.88 -0.30 EAU SZ 58.6 EP 00:03 31.62 -0.03 EDI HZ 68.3 EP 00:03 33.20 0.09 EDI HE 68.3 ES 2 00:03 41.26 -0.44 EDI HN 68.3 AML 00:03 41.69 22 0.25 EDI HE 68.3 AML 00:03 41.75 27 0.18 EBL SZ 84.1 EP 00:03 35.81 0.19 GMK SZ 126.0 EP 00:03 42.47 0.36 GAL SZ 148.0 EP 00:03 45.43 0.18 GAL SE 148.0 ES 3 00:04 03.11 0.41 GAL SE 148.0 AML 00:04 04.51 6 0.37 GAL SN 148.0 AML 00:04 05.37 6 0.25</p>	<p>December 12 2005 Time: 00:03 21.4 UTC Lat: 56.163N Lon: -4.197W Grid Ref: 263.58 kmE 698.87 kmN Locality: THORNHILL,CENTRAL Velocity model: Lownet</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES PCO SZ 33.0 IP C 04:40 35.83 EAB SZ 35.9 IP C 04:40 36.02 -0.11 EAB SZ 35.9 ES 04:40 40.72 -0.12 EAU SZ 45.7 EP 04:40 37.66 -0.01 EDI HZ 48.4 EP 04:40 37.88 -0.16 EDI HN 48.4 ES 04:40 44.08 -0.07 EDI HN 48.4 AML 04:40 44.30 20 0.09 EDI HE 48.4 AML 04:40 44.46 26 0.33 EBL SZ 66.7 EP 04:40 41.13 0.19 MDO SZ 141.0 EP 04:40 52.59 0.31 MCD SZ 155.0 EP 04:40 54.27 0.01 MCD SN 155.0 ES 04:41 12.03 -0.18</p> <p>Intensity: 3 AMPL PERI RES</p>
<p>December 14 2005 Time: 03:30 25.4 UTC Lat: 53.005N Lon: -5.644W Grid Ref: 155.55 kmE 351.54 kmN Locality: IRISH SEA Velocity model: Llleyn Comment: FELT COAST OF WICKLOW</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES DSB BE 55.8 EP 03:30 34.98 0.14 DSB BN 55.8 ES 2 03:30 41.82 0.54 DSB BN 55.8 AML 03:30 42.58 951 0.39 DSB BZ 55.8 AML 03:30 42.77 549 0.18 YRC SZ 76.6 IP C 03:30 38.38 0.12 YRE SZ 81.9 EP 03:30 38.93 -0.18 WCB SZ 84.3 IP C 03:30 39.61 0.13 WCB SE 84.3 ES 2 03:30 48.92 -0.16 WCB SN 84.3 AML 03:30 50.01 502 0.39 WCB SE 84.3 AML 03:30 51.14 599 0.41 WLF SZ 89.3 IP C 03:30 40.29 0.05 WME SZ 99.6 EP 2 03:30 42.01 0.17 YLL SZ 99.9 EP 03:30 42.00 0.11 WPM SZ 120.0 EP 03:30 44.96 0.00 WIM SZ 142.0 EP 03:30 48.41 -0.05 SBD SZ 161.0 IP D 03:30 50.59 -0.40 GIM SZ 163.0 EP 03:30 50.99 -0.28 HSA SZ 173.0 EP 03:30 52.18 -0.28 SSP SZ 183.0 EP 03:30 53.79 0.00 SSP SN 183.0 ES 2 03:31 14.73 1.61 SSP SN 183.0 AML 03:31 16.66 190 0.30 SSP SE 183.0 AML 03:31 16.87 308 0.43 HTR SZ 191.0 EP 03:30 54.59 -0.21 HLM SZ 194.0 EP 03:30 55.18 0.00 MCH HZ 212.0 EP 03:30 57.35 0.01 MCH HN 212.0 ES 2 03:31 20.33 1.26 MCH HN 212.0 AML 03:31 24.29 34 0.35 MCH HE 212.0 AML 03:31 28.73 41 0.41 HTL HZ 237.0 EP 03:31 00.45 -0.08 HTL HN 237.0 AML 03:31 32.24 36 0.51 HTL HE 237.0 AML 03:31 32.91 43 0.39 HGH SZ 246.0 EP 03:31 01.76 0.13 HEX SZ 250.0 EP 03:31 02.04 -0.07</p>	<p>December 14 2005 Time: 03:30 25.4 UTC Lat: 53.005N Lon: -5.644W Grid Ref: 155.55 kmE 351.54 kmN Locality: IRISH SEA Velocity model: Llleyn Comment: FELT COAST OF WICKLOW</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES PCO SZ 33.0 IP C 04:40 35.83 EAB SZ 35.9 IP C 04:40 36.02 -0.11 EAB SZ 35.9 ES 04:40 40.72 -0.12 EAU SZ 45.7 EP 04:40 37.66 -0.01 EDI HZ 48.4 EP 04:40 37.88 -0.16 EDI HN 48.4 ES 04:40 44.08 -0.07 EDI HN 48.4 AML 04:40 44.30 20 0.09 EDI HE 48.4 AML 04:40 44.46 26 0.33 EBL SZ 66.7 EP 04:40 41.13 0.19 MDO SZ 141.0 EP 04:40 52.59 0.31 MCD SZ 155.0 EP 04:40 54.27 0.01 MCD SN 155.0 ES 04:41 12.03 -0.18</p> <p>Intensity: 3 AMPL PERI RES</p>
<p>December 23 2005 Time: 03:25 51.8 UTC Magnitude: 2.7 ML</p>	<p>December 29 2005 Time: 04:40 29.7 UTC Lat: 56.216N Lon: -3.762W Grid Ref: 290.74 kmE 703.99 kmN Locality: GLENDEVON,CENTRAL Velocity model: Lownet Comment: FELT GLENDEVON</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES PCO SZ 33.0 IP C 04:40 35.83 EAB SZ 35.9 IP C 04:40 36.02 -0.11 EAB SZ 35.9 ES 04:40 40.72 -0.12 EAU SZ 45.7 EP 04:40 37.66 -0.01 EDI HZ 48.4 EP 04:40 37.88 -0.16 EDI HN 48.4 ES 04:40 44.08 -0.07 EDI HN 48.4 AML 04:40 44.30 20 0.09 EDI HE 48.4 AML 04:40 44.46 26 0.33 EBL SZ 66.7 EP 04:40 41.13 0.19 MDO SZ 141.0 EP 04:40 52.59 0.31 MCD SZ 155.0 EP 04:40 54.27 0.01 MCD SN 155.0 ES 04:41 12.03 -0.18</p> <p>Intensity: 3 AMPL PERI RES</p>
<p>December 29 2005 Time: 04:40 29.7 UTC Lat: 56.216N Lon: -3.762W Grid Ref: 290.74 kmE 703.99 kmN Locality: GLENDEVON,CENTRAL Velocity model: Lownet Comment: FELT GLENDEVON</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES PCO SZ 33.0 IP C 04:40 35.83 EAB SZ 35.9 IP C 04:40 36.02 -0.11 EAB SZ 35.9 ES 04:40 40.72 -0.12 EAU SZ 45.7 EP 04:40 37.66 -0.01 EDI HZ 48.4 EP 04:40 37.88 -0.16 EDI HN 48.4 ES 04:40 44.08 -0.07 EDI HN 48.4 AML 04:40 44.30 20 0.09 EDI HE 48.4 AML 04:40 44.46 26 0.33 EBL SZ 66.7 EP 04:40 41.13 0.19 MDO SZ 141.0 EP 04:40 52.59 0.31 MCD SZ 155.0 EP 04:40 54.27 0.01 MCD SN 155.0 ES 04:41 12.03 -0.18</p> <p>Intensity: 3 AMPL PERI RES</p>	<p>December 31 2005 Time: 22:40 05.8 UTC Lat: 56.258N Lon: -3.775W Grid Ref: 290.05 kmE 708.68 kmN Locality: BLACKFORD,TAYSIDE Velocity model: Lownet Comment: FELT BLACKFORD...</p> <p>STAT CO DIST PHAS WT P HrMn SECS AMPL PERI RES EBH SZ 16.5 EP 22:40 08.99 -0.19 EAB SZ 35.7 IP C 22:40 12.47 0.06 PCO SZ 36.2 IP C 22:40 12.48 0.00 EAU SZ 50.2 EP 22:40 14.72 -0.09 EDI EZ 52.2 EP 22:40 14.88 -0.18 EDI EE 52.2 ES 2 22:40 21.29 -0.51 EDI EN 52.2 AML 22:40 21.68 111 0.21 EDI EE 52.2 AML 22:40 23.62 179 0.32 PGB HZ 66.5 EP 22:40 17.08 -0.21 PGB HN 66.5 ES 22:40 25.30 -0.36 EBL SZ 70.7 EP 22:40 18.00 0.01 ESK EZ 111.0 EP 22:40 24.96 0.80 ESK EE 111.0 AML 22:40 42.08 179 0.26 ESK EN 111.0 AML 22:40 42.90 94 0.28 KSB SZ 146.0 EP 9 22:40 30.38 0.86</p> <p>Intensity: 4 AMPL PERI RES</p>

TABLE 2 : PHASE DATA

KAR	SZ	146.0	EP	9	22:40	30.63		1.18	GAL	SZ	166.0	EP		22:40	32.11		-0.14
GMK	SZ	153.0	EP		22:40	30.71		0.33	GAL	SN	166.0	ES	2	22:40	51.95		0.42
KPL	SZ	166.0	EP	9	22:40	33.48		1.17	GAL	SN	166.0	AML		22:40	52.65	85	0.33
KPL	SZ	166.0	ES	9	22:40	52.80		-0.01	GAL	SE	166.0	AML		22:40	52.93	100	0.47
KPL	SN	166.0	AML		22:40	54.44	74	0.43	KAC	SZ	167.0	EP	9	22:40	33.64		
KPL	SE	166.0	AML		22:40	54.48	74	0.41									

TABLE 3

GEOGRAPHIC COORDINATES OF SEISMOGRAPH STATIONS, 2005

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	CARNMENELLIS	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	3RMBB
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

GEOGRAPHIC COORDINATES OF SEISMOGRAPH STATIONS, 2005

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	BBMSM
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	BBSM
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	3RMLGSM
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	BB
PMS	MUIRSHIEL	55.8459	-4.7452	228.15	664.82	351	1
POB	OBSERVATORY	55.8458	-44299	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	RHENIGDALE	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

TABLE 3

GEOGRAPHIC COORDINATES OF SEISMOGRAPH STATIONS, 2005

Code	Name	Lat	Lon	KmE (km)	KmN (km)	Ht (m)	Comp
SAN	SANDWICK	60.0179	-1.2392	442.41	1126.08	150	1
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
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	STONECY POUND	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	3MLGSMBB
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

TABLE 4**Depth/crustal velocity models used in earthquake locations**

Structural area	Depth to top of layer (km)	P-wave velocity (km/s)	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	N Yorkshire	North Yorkshire
Expl	Explosion	Staffs	Staffordshire
D & G	Dumfries and Galloway	W Midlands	West Midlands
Gtr	Greater	Salop	Shropshire
S Yorkshire	South Yorkshire	W Sussex	West Sussex

Comments abbreviations

... 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.
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.
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.

Appendix 4 Significant events in 2005

CONWY, 14 FEBRUARY 2005, 3.3 ML

When an earthquake (Figure 6) was felt in North Wales, at 18:44 (UTC) on 14 February, with a maximum intensity of 4 EMS significant media and public interest was created. The earthquake was located about 5 km south of Conwy with a magnitude of 3.3 ML.

The earthquake location was well determined, with horizontal errors of 1.8 and 2.5 km in the north-south and east-west directions respectively. The RMS error in the travel-time residuals was 0.4s and the azimuthal gap in the stations used for locating the earthquake was 32°. The depth was calculated at 10.7 km with an error of ± 2.1 km.

A source mechanism for the earthquake was determined from first motion polarities (Figure 7). The grid search method of Snoke *et al.* (1984) was used to determine the best-fitting fault plane solutions, with a grid spacing of 2°. Sixty-six possible solutions were found to fit the observed polarity data, which all showed very similar fault motion. The solutions show either left lateral strike-slip motion on a north-south fault dipping slightly to the west, or right lateral strike-slip motion on an east-west fault dipping slightly to the north. The *P*-axis orientations agree well with the regional tectonic model, which predicts northwest compression.

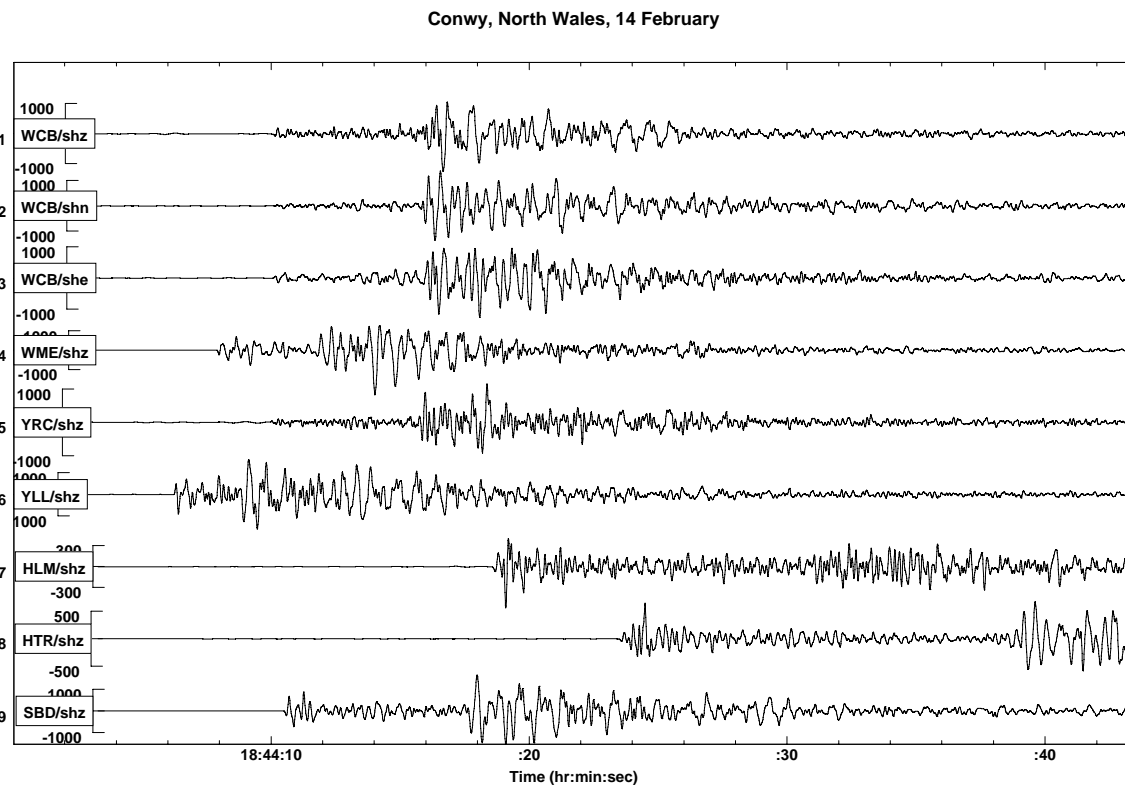


Figure 6. Seismograms of the ground displacement from the Conwy earthquake, 14 February 2005, recorded by BGS seismograph stations.

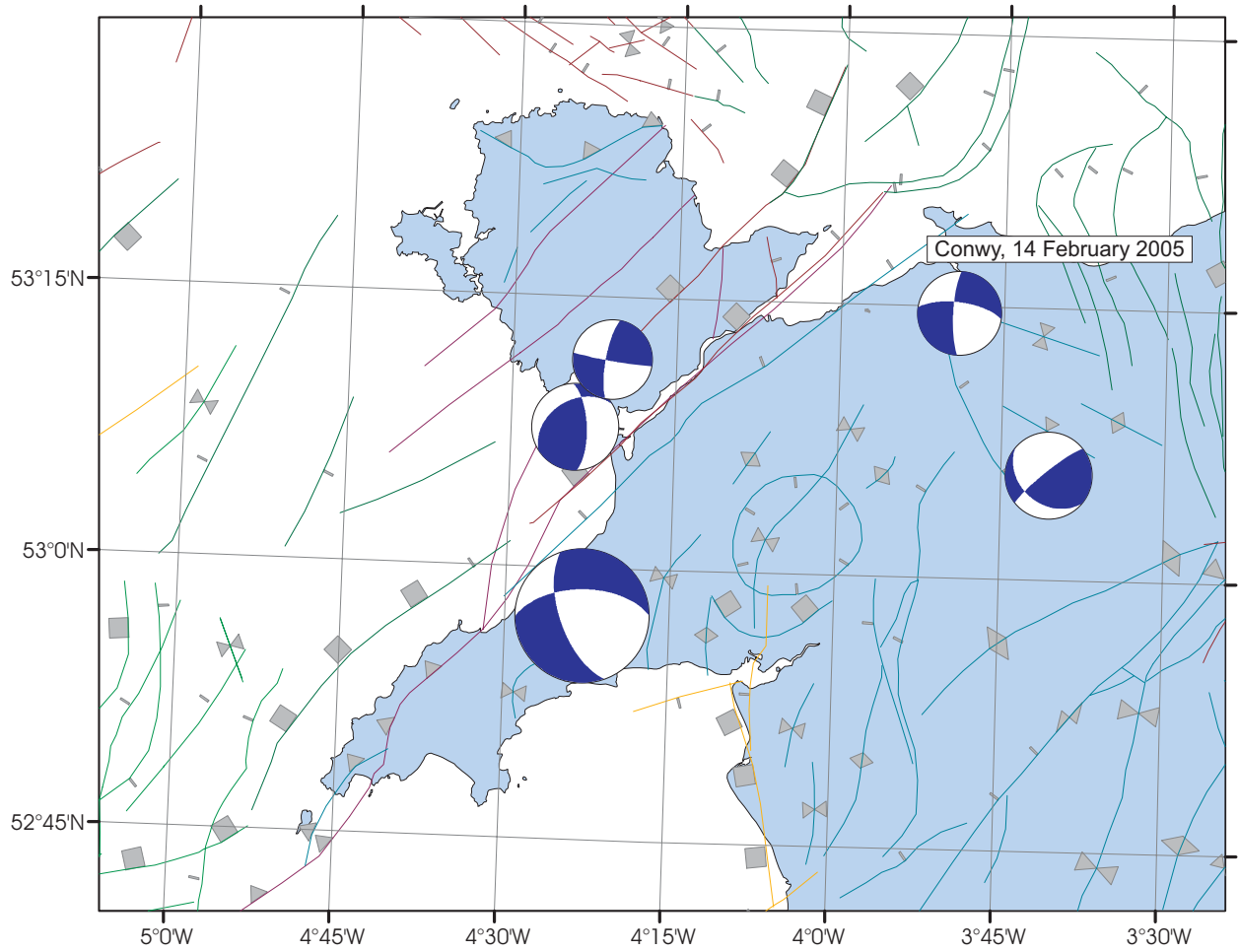


Figure 7. Focal mechanism for the Conwy earthquake showing the observed surface faulting in the region and focal mechanisms for other earthquakes in North Wales.

FORT WILLIAM, 10 DECEMBER 2005, 3.0 ML

This earthquake (Figure 8) occurred on 10 December 2005 at 23:21 UTC, with an epicentre approximately 8 kilometres west of Fort William. The instrumental magnitude was determined at 3.0 ML, and initial reports suggested that the earthquake had been felt throughout Lochaber. A macroseismic survey was launched on the BGS 'Earthquakes' web site and 210 responses were received.

The highest intensity experienced was 5 EMS, which was observed over an area extending approximately 14 kilometres to the northeast and southeast of the epicentre. The greatest number of replies came from Fort William.

Comments received included descriptions of the noise made by the earthquake as sounding like a heavy clap of thunder, a gust of wind, or even a quarry blast. Most of the people who felt the event described the shaking as weak to moderate. A few people reported objects falling over or coming off their wall fixing. In several reports it was stated that domestic animals were alarmed. There were no reports of damage to property. The most distant report was from Mull, 75 km to the southwest. The total felt area was over 7,300 km² (Figure 9). The areas within each isoseismal (rounded to the nearest 100 km²) were as follows: 1,100 km² (isoseismal 4) and 200 km² (isoseismal 5).

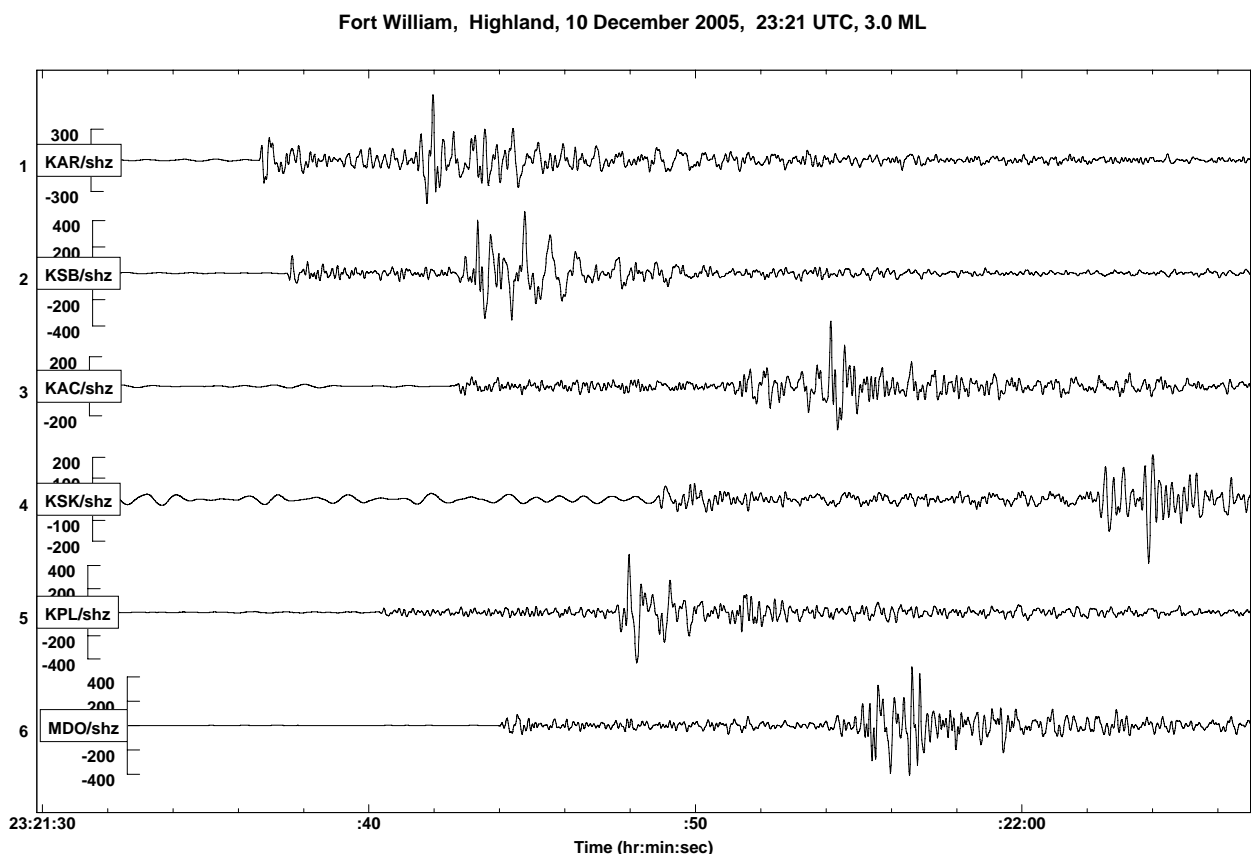


Figure 8. Seismograms of the ground displacement from the Fort William earthquake, 10 December 2005, recorded by BGS seismograph stations.

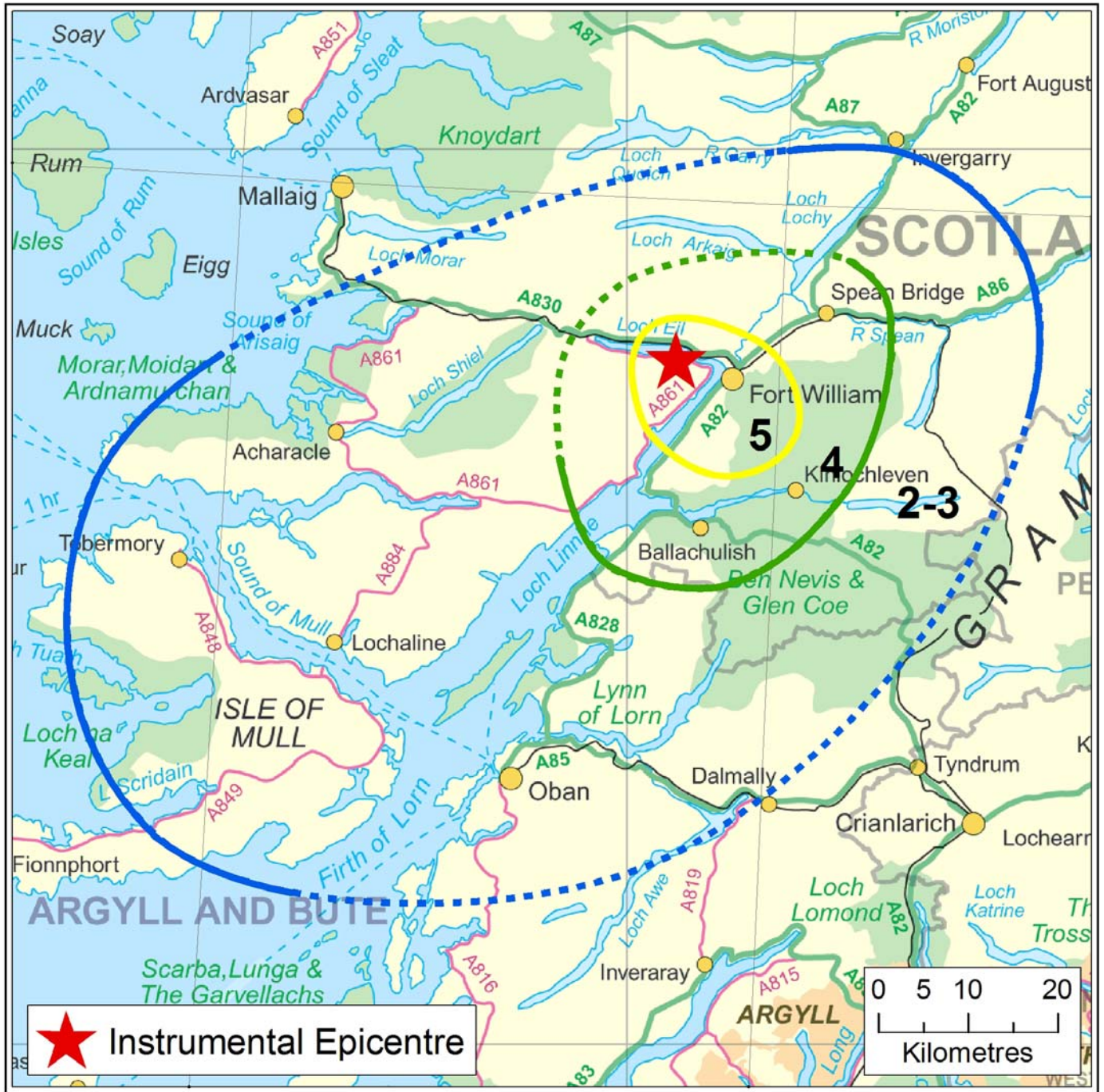


Figure 9. Isoseismal map for the Fort William earthquake.

BUNCEFIELD EXPLOSION, 11 DECEMBER 2005

The main explosion at the Buncefield fuel depot on 11 December 2005 was detected at more than 30 seismic stations in the UK, and also on stations in the Netherlands. Signals from both seismic and acoustic waves were recorded. Smaller explosions reported to have occurred after the main explosion, were not detected at the seismic stations, indicating that these were significantly smaller than the main explosion. The seismograms (Figure 10) were analysed to identify P-wave arrival times, which were then used to compute the origin time. The explosion source location and depth in this procedure were fixed to the known location of the fuel depot (51.766°N and 0.427°W). The origin time was determined to have been 06:01:31.45 UTC with a robust uncertainty of 0.5 sec. This result was obtained based on a velocity model derived for Mid Wales, in the absence of a specific model for central England. However, the Mid Wales model provides a good match between observed and calculated travel times. Inversion for location, in addition to origin time, resulted in a shift of only 1.4 km from the known location and a shift in origin time of 0.1 sec. The origin time was also found to be consistent with the arrival times of the acoustic waves that were observed on the seismograms. The magnitude (2.3 ML) was computed based on S-wave amplitudes, which underestimates the true energy release for two reasons. First, S-wave amplitudes are less for explosions compared to earthquakes and second, the explosion was above ground and, therefore, not well coupled to the ground.

To study the felt effects of the explosion a survey was carried out. Members of the public were invited to complete the questionnaire on the BGS "Earthquakes" web site. The results (Figure 11) confirmed that the explosion was felt throughout a large part of England, with the most distant reports coming from as far north as Lancashire, West Yorkshire and Humberside, and as far west as Powys, Mid Glamorgan and Somerset.

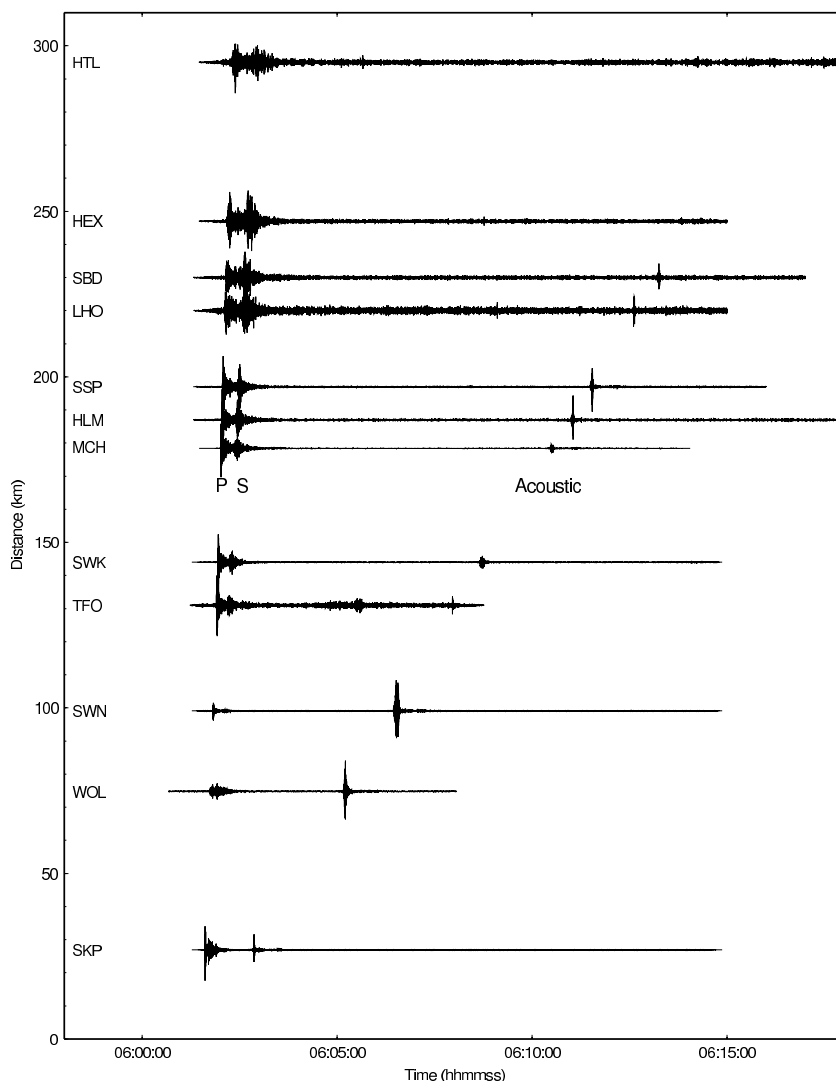


Figure 10. Seismogram of the Buncefield explosion, 11 December 2005, recorded on BGS seismograph network stations.

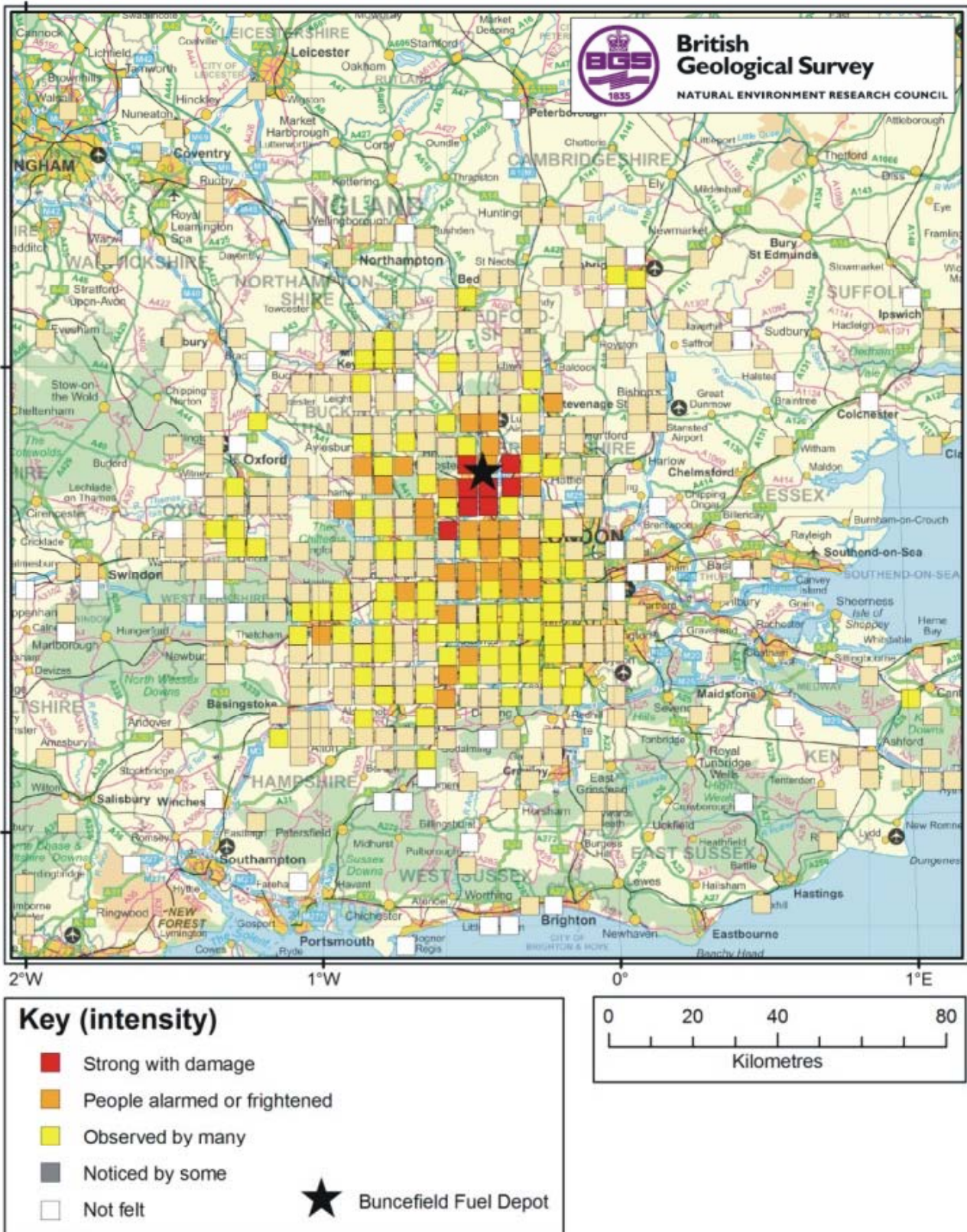


Figure 11. Strength of shaking from the explosion determined for 5 x 5 km grid squares.