A magnitude 3.8 earthquake occurred in the Lleyn Peninsula region of Wales on 29 May 2013. Its epicentre was approximately 13 km NW of Abersoch, Gwynedd. The earthquake occurred at a depth of 8 km (5 miles). An earthquake of this size occurs roughly once every two years in the UK.

The earthquake was located approximately 21 km WSW of the magnitude 5.4 earthquake that occurred on 19\textsuperscript{th} July 1984.

The earthquake was felt most strongly in the towns of Abersoch, Caernarfon, Bangor, Holyhead, and surrounding villages.
Magnitude 3.8 LLEYN PENINSULA, WALES, UK
Wednesday, 29 May, 2013 at 03:16:29 UTC

Where was it felt?

Most shaking was felt within a 50 km radius of the epicentre. Maximum recorded intensity of IV (moderate shaking) in surrounding settlements of Abersoch and Caernarfon. Weak shaking was felt as far away as Conwy, Rhyl, Southport (Merseyside) and on the Isle of Man.

I. Instrumental
Not felt by many people unless in favourable conditions.

II. Weak
Felt only by a few people at best, especially on the upper floors of buildings. Delicately suspended objects may swing.

III. Slight
Felt quite noticeably by people indoors, especially on the upper floors of buildings. Many do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.

IV. Moderate
Felt indoors by many people, outdoors by a few people during the day. At night, some awakened.

V. Rather Strong
Felt outdoors by most, may not be felt by some people in non-favourable conditions. Dishes and windows may break and large bells will ring. Vibrations like train passing close to house.

VI. Strong
Felt by all; many frightened and run outdoors, walk unsteadily. Windows, dishes, glassware broken; books fall off shelves; some heavy furniture moved or overturned; a few instances of fallen plaster. Damage slight.

VII. Very Strong
Difficult to stand; furniture broken; damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by people driving motor cars.

VIII. Destructive
Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, walls. Heavy furniture moved.

IX. Violent
Damage considerable in poorly designed structures, well designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

X. Intense
Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundation. Rails bent.

XI. Extreme
Few, if any masonry structures remain standing. Bridges destroyed. Rails bent greatly.

XII. Cataclysmic
Total destruction – everything is destroyed. Lines of sight and level distorted. Objects thrown into the air. The ground moves in waves or ripples. Large amounts of rock move position. Landscape altered, or levelled by several meters. In some cases, even the routes of rivers are changed.

Modified Mercalli Intensity Scale

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Wednesday, 29 May, 2013 at 03:16:29 UTC

Earthquake and historic seismicity

The earthquake epicentre (red star) is plotted on the map with regional historic seismicity.

Small earthquakes in this region of the UK are not unusual. The largest recorded earthquake in this region of the UK was a magnitude 5.4 event that occurred on 19th July 1984; its epicentre was located around 20km ENE of the M3.8 May 2013 earthquake.

Historic recorded seismicity of the British Isles
Tectonic interpretation

Although the UK does not lie on an active tectonic plate boundary (one of its nearest plate boundaries being the Mid-Atlantic Ridge – located some 2000 km to the west), stress within the plate is released along pre-existing faults within the crust. Some of these ancient faults are generally not exposed at the surface (these are known as ‘blind faults’) and in areas of low seismicity, such as the British Isles, it is difficult to identify the causative fault. Furthermore, with such low-magnitude events, it is not possible to determine the earthquake’s precise mechanism.
Magnitude 3.8 LLEYN PENINSULA, WALES, UK

Wednesday, 29 May, 2013 at 03:16:29 UTC

Seismogram recordings from BGS network and locating the earthquake

By finding the difference in arrival times between the P- and S-wave arrivals at different seismic stations, we can calculate the distance of the earthquake from each receiver (circles). If we do this for several stations (triangles), we can determine the approximate epicentre of the earthquake (orange star) by finding the common intersection point of these radii.

You can plot seismograms like these yourself at www.iris.edu/wilber
Magnitude 3.8 LLEYN PENINSULA, WALES, UK

Wednesday, 29 May, 2013 at 03:16:29 UTC

Seismogram recordings from the UK School Seismometer Network

DEOS (University of Liverpool)

AGSB (Altrincham Grammar School for Boys), Greater Manchester
Aftershocks
So far, only one aftershock has been recorded. This event with magnitude 1.7 (orange circle) occurred just 4 minutes after the mainshock (red star), and was located a few kilometers to the southwest.

Further small aftershocks may be expected in the coming days and weeks.
Magnitude 3.8 LLEYN PENINSULA, WALES, UK
Wednesday, 29 May, 2013 at 03:16:29 UTC

Find out more...

- BGS (British Geological Survey) – seismology and earthquakes – frequently asked questions
  [http://www.earthquakes.bgs.ac.uk/education/faqs/faq_index.html](http://www.earthquakes.bgs.ac.uk/education/faqs/faq_index.html)

- IRIS (Incorporated Research Institutions for Seismology) – learning about earthquakes
  [http://www.iris.edu/hq/programs/education_and_outreach/students](http://www.iris.edu/hq/programs/education_and_outreach/students)

- UK School Seismology Project – classroom activities, videos and support documents
  [http://www.bgs.ac.uk/schoolseismology/home.html](http://www.bgs.ac.uk/schoolseismology/home.html)

- USGS (United States Geological Survey) – FAQs, glossary, posters, animations

- EMSC (European Mediterranean Seismological Centre)