

## EARTHQUAKE CLASSROOM ACTIVITIES

# Identifying P- and S-waves on a seismogram

Students will learn to identify some features on real seismograms and/or use these seismograms to consider differences in arrival times of P- and S-waves at different stations.

### Teachers' notes

#### Resources

Each group will need:

- Activity: Identifying features of a seismogram (The Kent, April 2007, earthquake)

### Learning objectives

Students will:

- identify corresponding points on each of the seismograms for the arrival of the first P-wave and S-wave
- relate the difference in arrival times of different phases to the relative distances travelled

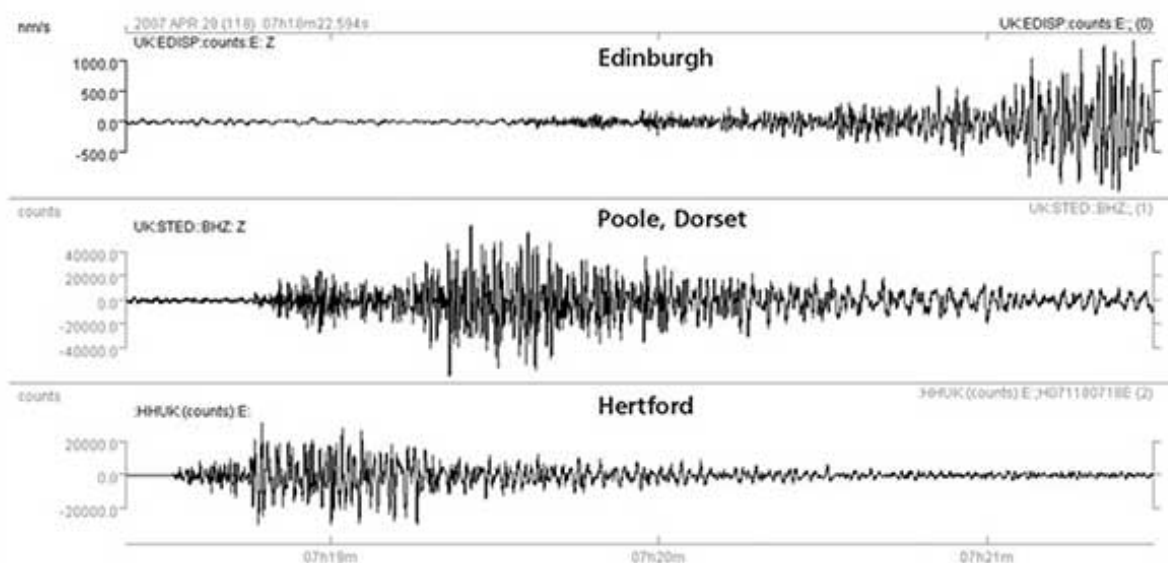


Figure 1 Seismograms from three stations, following the Kent earthquake in April 2007. BGS ©UKRI

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## Notes

This could be done as a whole class using a projector, as an individual or small group activity using printed versions of the pdf downloadable resource sheet.

One side of the resource sheet gives the three seismograms, unmarked, so that students can identify the arrival times of P-waves and S-waves for themselves.

You could ask students to use estimated arrival times and estimated distances to calculate approximate values for the speed of P-waves and S-waves. The values they arrive at will depend on which station they choose: you could use this to discuss the relative effects of errors in estimation for small time differences versus longer time differences, or perhaps to consider whether you would expect the speed of one type of wave to be constant over the three paths.

You might also go on to consider Looking at data from several stations, which show differences in P-wave and S-wave arrival time as a means of estimating distance.

## Task instructions

### Identifying some features of a seismogram

Using printed versions of the downloadable resource sheet.

- 1 Which station did the seismic waves reach first?
- 2 Find the location of the earthquake and of each of the monitoring stations on a UK map.
- 3 Estimate the distance from the earthquake source to each of the stations.
- 4 Which waves always arrive first?
- 5 How does the difference in arrival time of P-waves and S-waves change as the distance increases?

Station	Location	Latitude	Longitude	Sensor	Orientation	Bandwidth
EDISP	BGS offices Edinburgh	55.924	-3.179	SEP	East	15 sec-5 Hz
HHUK	Hailey Hall School, Hertford	51.778	0.015	SEP	East	15 sec-5 Hz
STED	St. Edward's School, Poole	50.74	-1.96	Guralp EDU	Vertical	30 sec-10 Hz

Event date	Time	Magnitude	Latitude	Longitude	Depth/km
28/04/07	07:18.08	4.3	51.1	0.9	2