Katla: Iceland's sleeping giant

(answers in red)

Setting the scene

The volcano Katla last erupted in 1918 and many people believe that its next eruption is overdue. Katla is one of a line of volcanoes that mark the constructive (divergent) plate boundary that stretches through central Iceland (Figure 1).

Figure 1

The constructive (divergent) plate margin and active volcanoes in Iceland

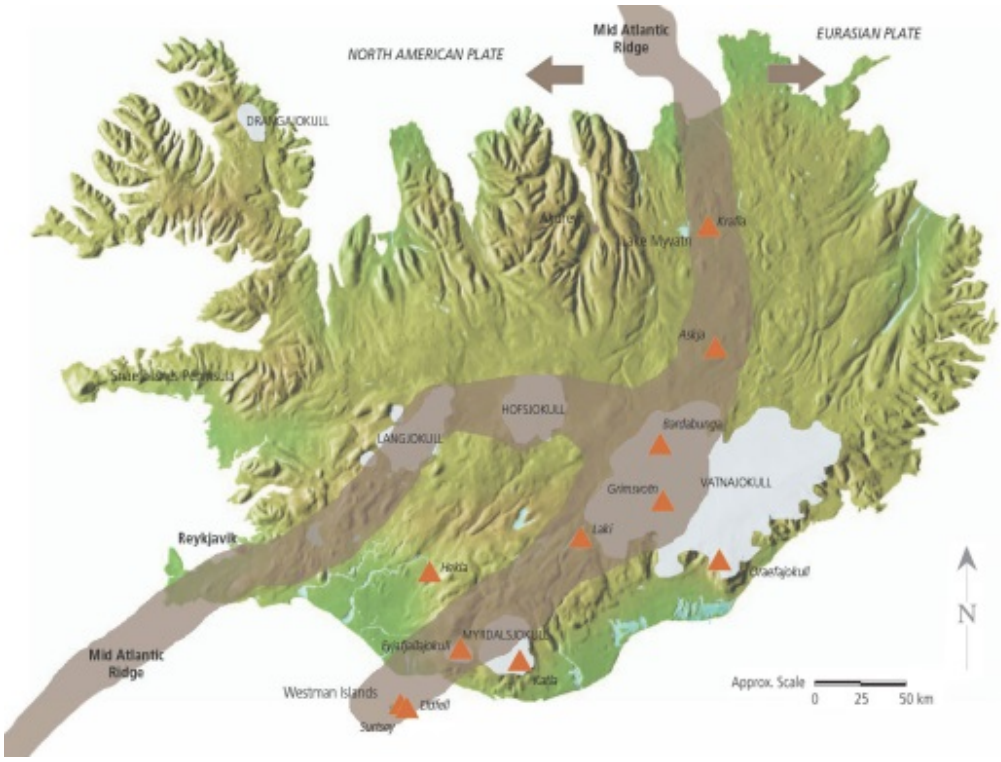

Figure 2

The location of the Katla caldera in southern Iceland

Look at Figure 2. Notice that Katla lies beneath the Mýrdalsjökull ice cap. This means that in some respects an eruption will be similar to that of Eyjafjallajökull in 2010, which also erupted beneath ice. Notice too that Katla is marked by the presence of a caldera, a vast collapsed crater formed when the sides of a volcanic crater collapse in on itself after an eruption has occurred.

Activities

1. Study Figure 1. Describe the location of the volcano Katla in Iceland. (Katla is located beneath the Mýrdalsjökull ice cap in the far south of Iceland about 20km from the coast)

2. Study Figure 2.

   (a) What is the name of the nearest town? (Vik)

   (b) Describe the pattern of drainage in the area. (lots of rivers flowing out of the glacier – a redial pattern of drainage)

   (c) Given the pattern of drainage, what are the implications of an eruption for people and human activity to the south? (several large rivers draining to the south could carry floodwaters after an eruption threatening settlements, farmland and roads)

Internet Investigation

Find out more about volcanic calderas and how they are formed. Include a diagram and a labelled photo.

Katla eruption 1918

Katla last erupted on 12 October 1918 (Figure 3). The explosive eruption sent a column of steam and ash high into the atmosphere. Measuring 4 on the VEI scale, it was slightly more explosive that the eruption of Eyjafjallajökull in 2010. Whilst the ash created little more than an inconvenience, the major impact was the glacial flood resulting from the melting of the ice above the caldera. Water poured across the flat outwash plains to the south, carrying vast amounts of sediment and extending the coastline by 5km!

Figure 3

The Katla eruption, 1918

Internet Investigation

Find out more about the eruption of Katla in 1918. Were there any warning signs and what were the impacts on people? Include photos and maps to support your investigation.

Katla – the next eruption

Scientists believe that its next eruption is long overdue and the volcano is being monitored very carefully for signs of a fresh eruption. Monitoring includes the use of seismometers to measure earthquakes and hydrological studies in local rivers to detect the release of geothermal chemicals such as hydrogen sulphide.

Whilst there have been some indications of activity in recent years – particularly in the form of earthquakes – it has been short-lived. The main concerns are of flooding, with settlements, farms and roads at risk of serious damage. A repeat of the flooding in 1918 would create major problems in this part of Iceland and many people would need to be evacuated to safety.

Activities

3. Draw a graph to represent the information in Figure 4. Represent time along the horizontal axis and the VEI (Volcanic Explosivity Index) along the vertical axis. At the date for each eruption draw a vertical bar to show the VEI.

Figure 4

The last ten eruptions of Katla

Date	VEI
1918	4
1860	4
1823	3
1755	5
1721	5
1660	4
1625	5
1612	4
1580	4
1550	4

http://volcano.si.edu/volcano.cfm?vn=372030

(a) Describe the pattern of your graph. Do eruptions occur at regular intervals? (eruptions have occurred quite regularly although they are slightly clustered - late 1500s and 1600s - and there have been some extended periods of inactivity, such as 1755-1823 and 1918 to the present day)

(b) Calculate the average frequency of volcanic eruptions. (about one every 36 years between 1550 and 1918)

(c) Assess the evidence that Katla is overdue to erupt. (the period from 1918 to the present day represents the longest period of inactivity between eruptions since 1550, so it could be said to be overdue!)

Internet Investigation

Find out more about the past eruptions of Katla and extend your study to the last 20 volcanic eruptions. You can access the data at http://volcano.si.edu/volcano.cfm?vn=372030 . See if the frequency of eruptions is much the same as you calculated for the last ten eruptions. Consider the importance of large data sets when making calculations of this sort.

Internet Investigation

Find out about the current status of Katla by accessing the Icelandic Meteorological Office website at http://en.vedur.is/ . Click ‘earthquakes’ on the top bar to reveal the latest earthquakes. See if there have been any recent earthquakes beneath Mýrdalsjökul. You will find up-to-date reports on the status of Katla on this website.