

Research finds second source of potentially disruptive Icelandic volcanoes

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Astronaut photo of ash cloud from Mount Cleveland, Alaska, USA. Image: NASA

New research by The Open University and Lancaster University discovered another type of Icelandic volcanic eruption that could cause disruption. Published in *Geology* (February 2013), the team found magma that is twice as 'fizzy' as previously believed, which increases the likelihood of disruptive ash clouds from future eruptions.

Many of the largest explosive eruptions in Iceland involve a viscous, high-[silica](#) magma called rhyolite, and are driven by [volcanic gases](#) (mostly water and carbon dioxide). It is these gases that give a [volcanic eruption](#) its fizz. At depth these gases are dissolved within the magma, but as the magma rises towards the surface during an eruption, the gases expand dramatically, causing the magma to froth and accelerate upwards

as a foam. The viscous rhyolite foam breaks down into tiny ash fragments which form the [ash clouds](#).

Drs Jacqui Owen and Hugh Tuffen (Lancaster University) and Dave McGarvie (The Open University) analysed [pumice](#) and lava from an eruption at Iceland's Torfajökull [volcano](#) some seventy thousand years ago. Within these samples they found tiny pockets of magma, called melt inclusions, which trapped the original gas. By measuring how much gas was dissolved within the melt inclusions, they could determine how fizzy the magma was.

Previously scientists had thought that Icelandic [magma](#) was less fizzy than those from Pacific Ocean volcanoes and expected much less explosive eruptions by comparison. However, this new research suggests some Icelandic volcanoes could produce eruptions just as explosive as those in the Pacific Rim.

[PhD student](#) Jacqui Owen said: "I was amazed by what I found. I measured up to five per cent of water in the inclusions, more than double what was expected for Iceland, and similar in fact to the values for explosive eruptions in the Pacific 'Ring of Fire'. We knew the Torfajökull volcanic eruption was huge – almost 100 times bigger than recent eruptions in Iceland - but now we also know it was surprisingly gas-rich."

The finding helps explain why thin blankets of fine ash from older powerful Icelandic eruptions are found in peat bogs and lake beds across the UK and Europe. By accurately measuring the original gas content of Icelandic explosive eruptions for the first time, the research shows how Icelandic volcanoes have the power to generate the fine ash capable of being transported long distances and cause disruption to the UK and Europe.

Dr Dave McGarvie, Senior Lecturer, Volcano Dynamics Group at The Open University, said: "We know that large explosive eruptions have occurred at infamous volcanoes such as Hekla and Katla, but it is important also to appreciate that large explosive eruptions are also produced by less well-known Icelandic volcanoes such as Torfajökull and Öraefajökull."

Dr Hugh Tuffen, Royal Society University Research Fellow at Lancaster University, said: "The discovery is rather worrying, as it shows that Icelandic volcanoes have the potential to be even more explosive than anticipated. Added to this is the view of several eminent scientists that Iceland is entering a period of increased volcanic activity. Iceland's position close to mainland Europe and the north Atlantic flight corridors means air travel could be affected again."

More information: Paper:

geology.gsapubs.org/content/41/2/251.abstract

Lancaster Environment Centre: [www.lec.lancs.ac.uk/about/Volcano dynamics](http://www.lec.lancs.ac.uk/about/Volcano_dynamics), The Open University
[www3.open.ac.uk/study/research ... volcano dynamics.htm](http://www3.open.ac.uk/study/research...volcano_dynamics.htm)

Provided by The Open University

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