'Rock clock' survey helps Tristan da Cunha residents prepare for next volcanic eruption

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Scientists at the University of Glasgow, the University of East Anglia (UEA) and the British Geological Survey (Edinburgh) have used an advanced rock-dating technique to help residents of the remote volcanic island of Tristan da Cunha make better plans to evacuate in the event of an eruption.

Tristan da Cunha, a British Overseas Territory, located in the South Atlantic Ocean more than 2,800 kilometres from its nearest city Cape Town, is the tip of an undersea volcano with a landmass of 78 square kilometres. It is home to the most remote community in the world, and all 261 islanders reside in one village called Edinburgh of the Seven Seas.

The first permanent settler on Tristan da Cunha was a Scot called William Glass. Glass - who was originally from Kelso - decided to create an 'ideal' community where everything was shared. Since the community was founded in 1817, others joined the growing settlement, despite the challenges of isolation and harsh weather.

In 1961, a volcanic eruption led to the total evacuation of the island, with residents moved to temporary accommodation in the UK. Most families chose to return in 1963. However, the volcano is still active and as recently as 2004 an undersea eruption washed volcanic rock onto the island's shores.

A new paper published in the journal *Geology* details how a technique

known as argon-argon dating has helped the islanders understand the past behaviour of the volcano and develop their contingency plans in the event of another eruption.

Dr Darren Mark, of the University of Glasgow at the Scottish Universities Environmental Research Centre (SUERC), said: "Determining exactly when eruptions happened on Tristan da Cunha in the past and how frequently they occurred gives us vital information we can use to help the islanders plan for the future.

"Argon-argon dating gives us a way to use volcanic rock from the island as a very slow clock which can tell us how long ago eruptions occurred. By examining rock samples in a mass spectrometer, we can measure its ratio of radioactive potassium to argon, its decay product. We know that the half-life of this decay process is 1.25 billion years, so basically the older a rock is, the more argon we'll find.

"We dated 15 new samples taken from across the island from as long ago as around 118,000 years to as recently as 3,000 years and we have found that eruptions are much more frequent and recent than previously suspected. There is also ample evidence of eruptions all over the island, which adds to the challenge facing the island's residents of safe evacuation."

Anna Hicks, of UEA's School of Environmental Sciences, said: "Previous researchers suggested that the last eruption of the summit happened more than 15,000 years ago, but we've been able to show that it has been active just 5,000 years ago and that several eruptions on the flanks of the volcano and coastal areas have occurred during the last 16,000 years."

"Although it's impossible to say when the next eruption will happen, the evidence we've uncovered has made islanders more aware of the risk

from future eruptions, and as a result, they have reviewed their disaster management plan, and conducted their first-ever evacuation drill."

Dr Jenni Barclay, of UEA's School of Environmental Sciences said:"It is nice to see science in action. Darren made the measurements in Scotland, Anna fed the data directly to the islanders, and immediately they have assessed a variety of evacuation scenarios."

More information: The *Geology* paper, entitled 'Tristan da Cunha: Constraining eruptive behaviour using the 40Ar/39Ar dating technique', is available online at geology.gsapubs.org/content/ea … 15/G33059.1.abstract

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