



Mount Paektu (also called Changbaishan), with its crater lake, straddles the China–North Korea border.

what it might unleash in the future.

In 2011, at the invitation of the North Korean government, Hammond went to the country with Clive Oppenheimer, a volcanologist at the University of Cambridge, UK. That meeting spawned an unprecedented collaboration to try to understand Paektu better from the Korean side³. With diplomatic support from the American Association for the Advancement of Science in Washington DC and the Royal Society in London, Hammond arranged to bring six state-of-the-art seismometers into North Korea.

It wasn't easy. It took years to sort out the proper import licences, and the team had to ditch plans to measure conductivity beneath the volcano because the required equipment has a second use in submarine detection. But in the end, Hammond and his colleagues deployed the seismometers in a 60-kilometre-long line east from Paektu's summit, deep into the countryside. "Every year, I would visit these families and they would look after our stations for us," says Hammond. "They clearly wanted to understand this volcano."

The seismometers remained in place from August 2013 to August 2015 (which meant that they were not present during any of North Korea's four nuclear-weapons tests). By analysing how seismic waves travelled beneath the volcano, the scientists found that a significant part of the crust must be at least partially molten. "Whether or not that melt is going to turn into an eruption is a bigger question," says Iacovino. "But at least we can now start to draw a picture of what's happening."

Previous studies have hinted at the presence of molten rock beneath the volcano, says Haibo Zou, a geoscientist at Auburn University in Alabama. But "any new serious research", he says, "is of interest".

Chinese and North Korean scientists monitor Paektu using their own seismic networks as well as gas samples collected from hot springs. But until geologists have a better understanding of what the volcano has done in the past, it will be hard to tell emergency officials how they should prepare for future eruptions, says Iacovino.

For instance, she has been mapping the geology of the ash, pumice and other rocks thrown outward in the AD 946 eruption. Enormous clouds of superheated gas and ash swept downhill, followed by destructive mudslides.

If Paektu were to erupt again, it might send torrents of water downhill from the summit lake, or clouds of ash skyward, which could interfere with aeroplane flights across Korea and Japan.

By studying rocks collected during a 2013 visit, Iacovino has found that the AD 946 eruption probably spewed much more sulfur dioxide into the atmosphere than earlier studies found⁴. That suggests that Paektu has the potential to alter the global climate.

Hammond will be in Pyongyang this week, working on proposals to expand studies of Paektu. "We'd really like to work together with the Chinese and North Koreans to study the volcano as a whole volcano, using instruments on both sides of the border," he says. "Ultimately, it's up to them to work together, and maybe we can be a part of it." ■

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INVESTMENT

EU innovation hub slammed

Audit picks out management and funding issues.

BY QUIRIN SCHIERMEIER

An ambitious initiative to fuel innovation in the European Union has swallowed up a vast amount of money, but has little to show for the investment, auditors say.

Backed with almost €3 billion (US\$3.4 billion) in EU cash, the European Institute of Innovation and Technology (EIT) was established in 2008 to stimulate economic growth by transferring research and innovation from academia to commercial applications. But the institute is a long way from achieving its goals, and is beset by management problems, ill-suited short-term grants and potential conflicts of interest, according to an audit report released on 14 April.

"Significant legislative and operational adjustments are required," says Alex Brenninkmeijer, the chair of the European Court of Auditors' team behind the report.

First conceived as a research powerhouse to rival the Massachusetts Institute of Technology (MIT) in Cambridge, the EIT ended up as a distributed network of academic and business partners that has failed to convince many experts. "Stimulating actual innovation by adding more bureaucracy where less is needed just doesn't work," says Helga Nowotny, a science-policy adviser to the Austrian government.

The institute operates through Knowledge Information Communities (KICs): groups of universities, research institutes and businesses working in specific technologies.

The three initial KICs set up in 2010 created 90 start-ups, 400 business ideas and 71 new or improved products, services or processes. And the EIT claims that every euro spent from its budget triggers four extra euros for innovation. But the auditors say that this is "undemonstrated and implausible" and that most of the KICs' claimed activities would have been carried out whether or not the EIT existed.

The failure to deliver has to some extent been the result of "limited leadership abilities" and high staff turnover, including at senior management level, the auditors say.

"We agree with this report's important finding and recommendations," says Martin Kern, the Budapest-based interim director of the EIT. "But we have moved on since, and we have already addressed many concerns." ■ [SEE EDITORIAL P.282](#)

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