Science Media Centre Rapid Reaction

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Expert reaction to today's volcanic eruption in Iceland

Health Effects:

Professor Malcolm Green, British Lung Foundation spokesperson says:
"The ash cloud that is presently over Scotland is unlikely to pose a health hazard to our lungs. This is because the cloud is at present high up in the atmosphere and not at ground level. However we would recommend anyone living with a lung condition to carry their medication as a precaution. The British Lung Foundation's Helpline can also provide advice to anyone concerned about the ash cloud on 08458 50 50 20."

Prof Ken Donaldson, Professor of Respiratory Toxicology, University of Edinburgh, said:
"Volcanic ash is on the whole not a very harmful material and the ash is currently more than 10km up in the stratosphere, where aeroplanes fly. It will eventually dissipate by dilution in the huge air mass in the stratosphere. The risk to members of the UK public and the population of the world generally from these ash exposures is negligible. Even people who are in the plume of volcanoes where the ash comes to earth and they wade through it like snow, show very little adverse health effects."

Prof Frank Kelly, Professor of Environmental Health, King's College London, said:
"While it is unlikely that these emissions will be brought down to ground level over the UK, we are regularly checking our measurements for evidence of an effect of PM10 and PM2.5 concentrations."

Dr Dougal Jerram, Lecturer in Earth Sciences, University of Durham, said:
"Ash can cause serious health problems but the high altitude of the current plume above the UK means that it is air traffic and not humans on the ground that will suffer."

Effect on satellites:

John Yates, Chair of the Institution of Engineering and Technology (IET) Satellite Systems & Applications Network, said:
"The 1991 Mount Hudson volcano eruption - one of largest of the 20th century - affected satellite communications systems in Chile. The ash affected satellite communications in Los Antiguos, a town 120km from the volcano, in the same manner as a snow storm can disrupt satellite communications.

"Volcanic ash can also reduce the performance of satellite dishes. The degree to which ash affects the dishes depends on climatic conditions; wet conditions prior to ash falling will cause the ash to stick to satellite dishes - heavy rainfall afterwards will wash it off."

"The ash cloud is currently at high altitude, but if it was to come towards us and we experience rainfall beforehand, this could cause problems."

Effect on engines:

Dr Rob Howell, Department of Mechanical Engineering, University of Sheffield, said:
"There are a number of potential issues regarding engine contamination with volcanic ash. One occurs where ash builds up on some of the internal parts of the jet engine, specifically the

compressor and changes the aerodynamics of that compressor. It is possible, with enough contamination, for the engine to enter a condition called stall and eventually surge where the engine looses power and can also be damaged.

"Another problem, more often seen in industrial jet engines is where the turbine cooling holes become blocked. This will cause the turbine blades to increase in temperature and fail, potentially destroying the engine. A further problem area is the combustion systems of the engines which can become clogged and again the engine looses power."

Dr Tim Fox, Head of Energy and Environment at the Institution of Mechanical Engineers said:
“Modern jet engines are highly technological machines that work by sucking air in through a large fan and using it in a combustion process to generate thrust. If, for example, foreign objects such as the introduction of large amounts of grit or volcanic ash was to be sucked into the air, this would result in serious damage to the fan blades and internal surfaces of the engine. In turn this would interfere with combustion, ultimately resulting in engine failure.

“In the event of such a failure, which would likely occur to all engines, the aircraft would be forced to make an emergency descent. The best policy if large amounts of volcanic ash are known to be present in the air is clearly not to fly through it.”

Dr David Rothery, Dept of Earth & Environmental Sciences, The Open University, said:
"Ash melts inside the hot engine. This molten glass clogs nozzles and adheres to turbine blades. Pilots' manuals (revised after 1982 engine losses over Galungung, Indonesia and 1989 over Redoubt, Alaska) advise to throttle back and lose altitude in the event on unanticipated engine power loss. This allows the plan to drop below the cloud, and the cold air drawn into the engines usually shatters the glass and allows the engines to restart. (Previously, pilots would increase engine speed, which made the problem worse). Of course, it is better to avoid flying into an ash cloud in the first place."

Dr John Murray, Senior Research Fellow, Dept Earth Sciences, The Open University, said:
"The effect on plane engines can be drastic: a thick ash eruption once caused all four jet engines in an airliner to stop together, and on another occasion in Alaska, the windscreens were so abraded by ash and lapilli that they were like ground glass and nothing was visible. The pilots eventually had to land by opening the side windows and looking out."

Haydn Thompson, from the IET Aerospace Network, said:
”I have actually flown through a volcanic ash cloud over Mexico city when the volcano there unexpectedly erupted. I have also had to clean it off a car there.

“It is very hard and abrasive. It also conducts electricity when it is wet so there is a possibility of shorting out electrics.

“The main hazard though is that an engine may stall and shutdown. There is a very well documented case of an aircraft having its engines shut down after flying through a cloud of ash. Regulations were brought in so that aircraft now have to fly at a lower altitude if ash is present to allow for engine relight - which is what happened to me in Mexico.

“It is not advisable to fly through ash due to the excessive abrasion of materials within the engine.”

Dr David Rothery, Dept of Earth & Environmental Sciences, The Open University, said:
“This is not a dense cloud, and is unlikely to be noticed by people on the ground, though we may have a spectacularly red sunset this evening. However, air traffic restrictions have very properly

been applied, resulting in closure of airports and airspace. This is because if volcanic ash particles are ingested into a jet engine, they accumulate and clog the engines with molten glass. In 1982 British Airways and Singapore Airways jumbo jets lost all their engines when they flew into an ash cloud over Indonesia, and a KLM flight had a similar experience in 1989 over Alaska. On each occasion, the plane fell to within a few thousand feet of the ground before it was possible to restart the engines.

“As a result of those experiences, emergency procedure manuals for pilots were changed. Previously, when engines began to fail the standard practice had been to increase power. This just makes the ash problem worse. Nowadays, a pilot will throttle back and lose height so as to drop below the ash cloud as soon as possible. The inrush of cold, clean air is usually enough to shatter the glass and unclog the engines. Even so, the forward windows may have become so badly abraded by ash that they are useless, and the plane has to land on instruments.”

See http://www.metoffice.gov.uk/aviation/vaac/data/VAG_1271309704.png for forecasts of the ash cloud at 06:00, 12:00, 18:00 and 24:00 (midnight) today issued by the UK Volcanic Ash Advisory Centre (part of the Met Office).

Stewart John, a Fellow of the Royal Academy of Engineering and former President of the Royal Aeronautical Society, said:
"An erupting volcano can spew out a great mushroom cloud of ash that rises thousands of feet into the sky where the fine white ash poses a serious hazard to modern jet engines. It's like a very dense, abrasive talcum powder and within minutes of being ingested into an engine it will clog up the miniscule air cooling holes and stop the engine.

"No airline would run the risk of trying to fly in such conditions – a Boeing 747 was nearly lost over Indonesia in the 1980s after accidentally flying into an ash cloud, which stopped all four engines. Mercifully the pilot managed to restart one engine and land the plane."

Dr David Kerridge, Head of Earth Hazards at the British Geological Survey, said:
"Volcanic ash clouds are made up of small abrasive particles that can clog up jet engines and stop them working. Planes are either re-routed or grounded when there's a danger of flying into ash clouds to ensure the safety of passengers and avoid very costly damage."

Dr Michael Branney, Senior Lecturer in Volcanology, University of Leicester, said:
"Volcanic ash is not good to plane engines: firstly it is highly abrasive and can scour and damage moving parts; secondly, if it enters a jet engine the intense heat of the engine can fuse it to the interior of the engine with a caking of hot glass, which ultimately can cause the engine to cut out completely. Pilots are trained in how to deal with this emergency should it occur, but its best to avoid the encounter altogether, which is why flights crossing the path of the ash plume are being cancelled. This is a sensible precaution."

Past events:

Dr Dougal Jerram, Lecturer in Earth Sciences, University of Durham, said:
"Currently this is a relatively small eruption, with little health risks, but in the past Europe has been affected by plumes of ash from Iceland that have been very significant. An interesting fact is that one of the most influential eruptions in historic time was the 1783-1784 from Laki in Iceland where an estimated 120 mio. tons of sulfur dioxide were emitted: approximately equivalent to three times the total annual European industrial output in 2006. This outpouring of sulfur dioxide during unusual weather conditions caused a thick haze to spread across western Europe, resulting in many thousands of deaths throughout 1783 and the winter of 1784."

Prof Bill McGuire, Professor at the Aon Benfield UCL Hazard Research Centre, said:
“It is not particularly unusual for ash from Icelandic eruptions to reach the UK. The most notable occasion occurred in 1783, when a cloud of ash and sulphurous gases from the major Laki eruption lay across Europe from the summer of that year and into 1784. The cloud resulted in elevated summer temperatures and resulted in poor air quality that caused a significant increase in mortality in the UK and elsewhere in Europe. Such a large eruption occurring today would have the potential to severely affect air travel at high northern latitudes for six months or more. In relation to the current eruption, it is worth noting that the last eruption of Eyjafjöll lasted more than 12 months. If this eruption has a similar duration then ash could periodically present a problem in UK air space.”

Dr Colin Macpherson, Department of Earth Sciences, Durham University, said:
"Eyjafjallajökull has been active at least 12 times over the past 800,000 years, with the previous eruption lasting two years (1821-1823)."

Atmosphere:

1. What might be the impact on farming?
Dr. Thor Thordarson, Volcanologist, University of Edinburgh, said:
"The likelihood that this eruption has any impact on farming or the environment is negligible, mainly because the magma output from this eruption is so small."

2. Are there any plans by scientists to use shutdown to test air quality etc, like post 9/11?
Dr. Thor Thordarson, Volcanologist, University of Edinburgh, said:
"Someone else has to answer this one, but I wish it would be done especially since I like to get an ash sample from the plume."

3. How much material has been ejected by the volcano?
Dr. Thor Thordarson, Volcanologist, University of Edinburgh, said:
"Not known at this stage, but some remote sensing researchers may be able to provide an estimate from thermal images. Otherwise we will have to wait until we have mapped and sampled the tephra fall out."

Dr Clive Oppenheimer, Reader in Volcanology, University of Cambridge, said:
"There's 0.5 cm of ash on the ground in the farmland areas around the volcano and the access to the area is difficult because of the glacial floods that accompanied the eruption yesterday. As soon as ash samples reach Reykjavik they will be able to make some further assessments about the nature of the eruption and the risk the ash poses to farming and agriculture. One of the key concerns on the ground is the level of fluorine carried on the ash. Many livestock have died in previous Icelandic eruptions through fluorine poisoning."

(For graphics I would check the USGS volcanic hazards website - all their material is public domain)

Dr Michael Branney, Senior Lecturer in Volcanology, Department of Geology, University of Leicester, said:
"The level of the ash plume is currently between 6 and 11 km high and it has already advanced over northern Britain and across to Scandanavia (I do not know the mass or volume of today's eruption)."

Dr Sue Loughlin, Head of Volcanology at the British Geological Survey, said:
“Ash has been reported at 55000ft over northern Scotland. Where it goes now depends on wind speed and direction.

“This eruption on Eyjafjallajokull in Iceland began on 20th March 2010 on the NE flank where there is no ice and it was very small. The volcano is now erupting from the central crater which is under the ice cap. It is melting the ice causing significant flooding around the volcano.

“The last eruption was in 1821-1823 followed in 1823 by a much bigger eruption of Katla which is next to Eyjafjallajokull.”

1. **How long is it going to take this ash plume to disperse?**

Dr David Rothery, Dept of Earth & Environmental Sciences, The Open University, said:
"The London Volcanic Ash Advisory forecasts suggest that ash will drift south over England until at least midnight."
Dr John Murray, Senior Research Fellow, Dept Earth Sciences, The Open University, said:
"The truth is we don't know yet: it could all be over by tomorrow and have no serious effect, on the other hand if it's like the Laki fissure eruption it could be serious and continue for months."

2. **Is this a one-off injection of ash into the upper atmosphere or is it likely to continue disrupting air travel for weeks or months ahead? "**

Dr David Rothery, Dept of Earth & Environmental Sciences, The Open University, said:
Probably a one-off. The major explosive episode of the eruption appears to over, but a repeat cannot be ruled out."
Dr John Murray, Senior Research Fellow, Dept Earth Sciences, The Open University, said:
"The truth is we don't know yet: it could all be over by tomorrow and have no serious effect, on the other hand if it's like the Laki fissure eruption it could be serious and continue for months."

3. **Is there enough ash in the atmosphere to affect weather/climate?**

Dr David Rothery, Dept of Earth & Environmental Sciences, The Open University, said:
"No. The total volume is relatively small."
Dr John Murray, Senior Research Fellow, Dept Earth Sciences, The Open University, said:
"The truth is we don't know yet: it could all be over by tomorrow and have no serious effect, on the other hand if it's like the Laki fissure eruption it could be serious and continue for months."

4. **Is any of the ash going to reach the Earth's surface as dust?**

Dr David Rothery, Dept of Earth & Environmental Sciences, The Open University, said:
"Yes, or more likely washed down in rain. However, the density of ash-fall in UK and mainland Europe will probably be too slight to be noticed, excerpt that sunset/sunrise might look redder than usual because of ash in the sky.**"**

Dr John Murray, Senior Research Fellow, Dept Earth Sciences, The Open University, said:
"Some of the ash will reach the surface, the Met Office are predicting the cloud to start passing over southern England in an hour or two's time."

Dr Peter Abbott, School of Geography & Geosciences, University of St Andrews, said:
"An explosive volcanic eruption in the South of Iceland on Tuesday injected a large amount of ash high into the atmosphere and the prevailing wind conditions have transported it over northern Europe and caused significant disruption to air travel. A event of this nature is not a regular occurrence as it requires a combination of specific volcanic conditions in Iceland and atmospheric conditions over Europe. Our study of ash layers in the geological record shows that the transport of ash over the United Kingdom will occur approximately every century."

Anja Schmidt, School of Earth and Environment, University of Leeds, said:
"At the moment there is a north westerly air flow from Iceland into northern parts of the North Sea, thus most of the ash will be transported to Norway and central Sweden. Britain will be affected as well, though I don't expect it to be as strongly affected as Norway. The weather forecast indicates that the high pressure system over the Atlantic remains stationary so a north westerly flow will continue bringing fine volcanic ash into Norway, Britain and it might even affect Denmark and northern Germany [if the eruption continues].

"As with most volcanic eruptions it's hard to predict how long the eruption will last – from historical eruptions of Eyjafjallajokull we know that the previous one in 1821 lasted for more than a year. As long as magma continues melting its way through the glacier I'd expect further phreatic eruptions injecting steam and ash into upper parts of the atmosphere.

"If the eruption continues injecting fine ash and volcanic gases into the atmosphere over the coming months then it might affect weather or even climate. Whether the eruption has an effect on climate will depend on how long it is going to last and on the injection height of the gases and ash. At the moment the eruption cloud reaches around 22,000 feet which is high enough to affect aviation but is unlikely to be high enough to have a strong effect on the climate system. In terms of weather phenomena I'd expect some bright red sunsets during the next couple of days in Northern Europe.

"Most of the larger ash particles are settling out in and around southern Iceland, close to the eruption source. Only fine ash particles will be transported over great distances."

Dr Michael Branney, Senior Lecturer in Volcanology, University of Leicester, said:
How long is it going to take this ash plume to disperse?
"A volcanic ash plume can take days to months to disperse, depending on its size and height. If it's not too high in the atmosphere rainfall can help bring down the ash relatively quickly.

"Although the plume is already starting to disperse, how long it persists depends on how long the explosive eruption continues. In this case it's too early in the eruption to be sure how long ash will continue to be forced into the atmosphere. Volcanic eruptions can last anything from a few hours to several months, in rare instances they can last for years but this last scenario is the least likely."

Is this a one-off injection of ash into the upper atmosphere or is it likely to continue disrupting air travel for weeks or months ahead?
See answer to the above.

Is there enough ash in the atmosphere to affect weather/climate?
"Icelandic eruptions are capable of affecting weather. Historic Icelandinc eruption have affected the weather significantly across northern and central Europe, but in most cases the effects are more local."

Is any of the ash going to reach the Earth's surface as dust?
"Yes. Volcanic ash is made of tiny, abrasive particles of volcanic rock. It will all eventually fall back to the ground. Close to the volcano this look like a grey layer of dark sand, but further from Iceland it may appear as a thin layer of grey dust, rather like the dust you sometimes see on your car when the wind blows from the Sahara. Atmospheric moisture helps bring down the finer dust-sized particles."

Geoff Dollard, Knowledge Leader for Air Quality at energy and climate change consultancy AEA, said:

"Our current information tells us that the volcano's plume will not harm health in the UK. If the eruption continues then forecast meteorology indicates that the flight disruption could continue for up to another 24 hours. AEA's air pollution forecasting team have been watching the Eyjaföll volcano for some weeks. At a special forecasting team meeting convened this morning, forecasters studied satellite and model evidence from NASA, EUMETSAT and other source. This evidence indicates that the volcanic dust will not touch the ground, but remain at about 6km altitude, passing over the UK."

Volcanology:

Prof Steve Sparks FRS, Director Of The Bristol Environmental Risk Research Centre at the University of Bristol, said:

“The ash eruption seems to have started last night and the column height is about 4 to 6 km, which means around 100-200 cubic metres per second of ash erupted, because there is a well known relationship between heat flux and plume height. This in turn means 10 million cubic metres so far and about 3 billion kilograms of ash. My Icelandic colleagues think it may go on another 2 or 3 days and the activity should gradually die down. The injection height is in the troposphere.

“The volcano has been erupting for about a month but in the gap between the Eyjafjallajökull and Mýrdalsjökull ice caps. This has been mostly lava and mild explosive eruptions. This vent stopped yesterday and then the vent switched to under the western ice cap (Eyjafjallajökull). The eruption became much more explosive due to the eruption into ice. The ash is reported to be very fine even in Iceland. The reported sulphur dioxide (SO_2) fluxes have been about 3000 tons per day.”

Dr Mike Burton, Senior Volcanologist, Italian National Institute for Geophysics and Volcanology, said:
"The current activity on Eyjafjallajökull volcano, Iceland, is the second phase of an eruption that began on 21st March 2010. The first phase was focussed on the pass know as Fimmvörduháls, which lies between the glaciers covering the nearby volcanoes of Eyjafjallajökull and Katla. It was a lateral eruption of Eyjafjallajökull, and, thanks to its location between the glaciers, it produced a largely ash-free eruption, with abundant lava flows. I conducted measurements of the gas emissions from the Fimmvörduháls eruption on 1st and 2nd April, in collaboration with Icelandic scientists from the university of Reykjavik, and a report summarising our findings was published on their website: http://www2.norvol.hi.is/Apps/WebObjects/HI.woa/swdocument/1015769/Gas+report+-+Eyjafjallaj%C3%B6kull+2010.pdf

"After 9-10th April volcanic activity at Fimmvörduháls rapidly reduced, and probably stopped on 12th April. After a brief pause a new eruptive phase began around midnight on the night of 13th/14th April. This new phase was more powerful than the previous one and the highly pressurised magmatic intrusion punched up through the volcano to erupt close to the glacier-covered summit. The initial result of the eruption was a rapid flooding of the area around Eyjafjallajökull, as ice in proximity to the erupting magma melted. Today, on 15th April, the production of flood water has greatly reduced, probably because the eruption has melted most of the ice directly on top of the volcanic activity. With the ice cover removed magma is erupting into the atmosphere, and the abundant water that surrounds the eruptive site is interacting explosively with the magma to produce the abundant ash which poses a threat to air traffic in northern Europe. When the local supply of melt water runs dry the ash production may well be strongly reduced, even if the eruption continues. So, in terms of the affect on air traffic, the eruption will continue to be a threat due to voluminous ash production as long as there is magma-water interaction.

"As soon as the eruption develops into a pure magmatic phase we hope to return to the volcano to conduct further measurements of the gas release in collaboration with our Icelandic colleagues. These measurements will be of great interest, as we'll be able to compare the flux and composition of the gas emissions from the current summit eruption with those we collected in early April, and thereby gain insight into the nature of the magmatic systems powering both eruptive phases."

Dr Michael Branney, Senior Lecturer in Volcanology, Department of Geology, University of Leicester, said:
"As hot basalt magma (liquid rock and dissolved gases) rises to the Earth's surface, and the gases dissolved in it expand driving the upward flow even faster (like opening a giant Champagne bottle and it all spurting out), ultimately ripping the magma apart into a myriad of incandescent particles. This 'volcanic ash', entrained in hot gases may exit the volcano as an upwards-directed supersonic jet. Cold air from the surrounding atmosphere gets sucked into this rising jet, and the hot particles in the jet heat up the cool air, causing it to v. rapidly expand until the erupting mixture becomes less dense than the lower atmosphere - this causes the column to loft upwards through the atmosphere by buoyancy, a bit like a smoke plume above a huge bonfire. The atmosphere gets more rarefied upwards, and the volcanic ash plume eventually finds its level of neutral buoyancy, and then spreads out laterally. It is also blown by the strong winds at this height, in this case across the Shetland isles to the UK and Scandinavia."

Dr Dougal Jerram, Lecturer in Earth Sciences, University of Durham, said:
"Volcanic ash is made up of tiny particles that are created when bubbles break due to gasses in a volcanic eruption. Eruptions which are charged with gas start to froth and expand as they reach the surface which results in explosive eruptions and this fine ash being sent up into the atmosphere. If it is ejected high enough into the atmosphere, it can reach the high winds and be dispersed around the globe e.g. from Iceland to Europe. These high winds are exactly where the airplanes cruise and that is why they are not allowed to fly.

Prof Geoff Wadge, Environmental Systems Science Centre, University of Reading, said:
"Eyjafjoll last erupted in 1823 and continued for a year. That is not to say that it will do so again, but it is a possibility that future disruptive ash events will occur.

"Icelandic eruptions have produced ash that has affected aviation sevarl times in thepast - last in 2004 with the Grimvotn eruption.

"There are a series of Volcanic Ash Advisory Centres that cover the whole globe and the one that monitors the North Atlantic ad Iceland in particular is run by the Met Office based in London. Essentially they can track the location and density of the ash in the atmosphere using infrared sensors on satellites that give data every 15 minutes."

Dr David Rothery, Dept of Earth & Environmental Sciences, The Open University, said:
"The eruption of the Eyjafjoll volcano in southern Iceland, which climaxed yesterday with flooding and tall eruption column driven by expanding steam, distributed fine rock particles known as 'volcanic ash' as high as 11 km into the atmosphere. This ash cloud is now drifting with the high altitude winds. The main mass is over Scandinavia, but it is also over the north of Great Britain and is likely to spread south over the whole island by the end of the day.

Prof Bill McGuire, Professor at the Aon Benfield UCL Hazard Research Centre, said:
"The 1600m high Eyjafjöll volcano (also known as Eyjafjallajökull) is located in southern Iceland, immediately west of Katla volcano. Eyjafjöll is an elongated, ice-covered volcano topped by a 2.5 km

wide summit caldera. The volcano appears to have been relatively inactive over the last 10,000 years, and the sole historical eruption, prior to this year, occurred in 1821.

“The current eruption started on 20 March 2010. Following a pause in activity, a new vent opened on 13 April generating a column of ash several kilometres high and causing melting of overlying glacier ice. This resulted in the formation of glacial outburst floods that closed roads and caused some structural damage. 700 people were evacuated from the area as a precaution.

“The ash cloud generated by the ongoing eruption is currently to the north of Scotland, and heading south at a height of about 18 km. It is currently expected to move across Scotland and northern England by 13.00 BST. As of 10.00, Scottish and northern airports are closed and London’s airports are expected to close later in the day.”

“Volcanic ash is silica-based material and highly abrasive. It is capable of causing major damage to aircraft through clogging engines and causing them to flame out, and by scouring windscreens so as to make them opaque. Over the past few decades there have been more than 80 encounters between civil aircraft and ash clouds, resulting in a number of situations wherein crashes have only narrowly been avoided. Most notable was an encounter in 1982 between a BA 747 and an ash cloud from Galunggung volcano in Indonesia. Ash in the engines resulted in all four failing, causing the plane to fall 7,000 m before the engines could be restarted. Even then, landing was made extremely difficult by the fact that the windscreen had been scoured opaque by the ash.”

For a satellite image: http://oiswww.eumetsat.org/IPPS/html/MSG/RGB/ASH/ICELAND/

Dr. Thor Thordarson, Volcanologist, University of Edinburgh, said:
“Since the New Year, unrest in the form of seismic activity and inflation has intensified beneath the Eyjafjoll volcano in South Iceland and eruption(s) has been expected. The 20.03.2010 - 12.04.2010 event was a small basaltic fissure eruption on the lower east flanks of the Eyjafjoll volcano, whereas the one that began this morning emerged from fissures (vents) within the summit crater and extended just outside its southern rim.

“The associated seismic activity indicates that these two events came up through separate conduit systems. The current one was situated further west, directly beneath the volcano summit and most likely is erupting magma of more evolved composition (i.e. higher in silica) than its immediate predecessor. As the new eruption site is beneath the glacier that caps Eyjafjoll volcano this has resulted in substantial melting of ice. Earlier today fairly large flash floods cascaded down some of the outlet glaciers and the rivers that drain from them. Consequently, access to the volcano as well as nearby main roads (including Highway 1) and evacuation of residence has been implemented. The situation will be closely monitored and managed by the Civil Defence and associated authorities.”

Dr Dave McGarvie, Volcanologist, The Open University, said:
ñThis wasnôt unexpected because the eruption that took place last month between two ice caps has diverted off to the east and erupted again at the current site. It is essentially the same eruption which has found a new pathway to the surface. The eruption this time is coming through 150 metres of ice, melting it and pouring water down to the north ï the rivers will be carrying as much water as they would in the peak of a Spring melt.

ñThe eruption can now develop in three ways:

1. It will melt ice, go on for a time and then die out, and nothing more will happen.
2. It will stimulate a larger eruption which will release a new batch of magma ï this has happened in the past and is the worst case scenario. In this instance, the resulting ash cloud would disrupt international travel with flight paths being diverted.

3. It stimulates lava flow to come out which will melt a canyon in the ice to low lying regions. This previously happened in the ninth century.

ñIceland is extremely well prepared for all kinds of scenarios around this particular volcano.ò

Dr Andrew Bell, School of Geosciences, University of Edinburgh, said:
"In both a global and an Icelandic context, this is a relatively minor eruption, involving only small amounts of magma. This is a very typical eruption for Iceland, made slightly more notable by the location under the glacier, and the current meteorological conditions. As has happened during previous eruptions of Eyjafjöll, there is a possibility that the current eruption could evolve into a more explosive event, involving a different composition of magma, or could lead to activity at the neighbouring volcano, Katla. Both scenarios could result in further ash production and disruption to air traffic. It is very difficult to say how long the current eruption could last; it is quite possible that activity (and disruption) could continue for weeks or months."

Dr Colin Macpherson, Department of Earth Sciences, Durham University, said:
"Eyjafjallajökull is one of many volcanoes that pepper the boundary between the tectonic plates that move North American and Europe apart from one another at 2 centimetres per year. Most of these volcanoes lie 2-4 kilometres beneath sea-level but at Iceland the volcanoes have built land. Rock beneath the diverging tectonic plates melts slowly and builds up magma bodies over hundreds to thousands of years. When the magma rises to the surface in the boundary zone a volcano will erupt.

"Eyjafjallajökull has been active at least 12 times over the past 800,000 years, with the previous eruption lasting two years (1821-1823). Many Icelandic volcanoes, including Eyjafjallajökull, are covered by icecaps and the interaction between magma and lots of very cold water can lead to explosive eruptions and catastrophic floods. The rapidly chilled magma fractures into solid, glassy fragments that are carried upwards in the eruptive column and then dispersed according to the prevailing wind direction. This can lead to stark contrasts in the effects of the erupted ash on different sides of the volcano. The melted icecap pours off the flanks of the volcano causing floods that can transport large pieces of ice and rock."

Note to editors

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