



The Possible Impact of the Icelandic Volcanoes on Energy Production

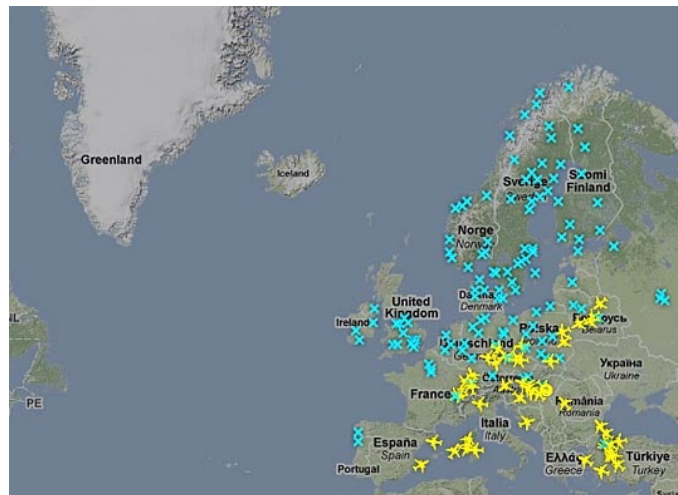
Posted by [Heading Out](#) on April 18, 2010 - 10:54am

Topic: [Miscellaneous](#)

Tags: [canola](#), [eyjafjallajokull](#), [iceland](#), [icelandic volcanoes](#), [katla](#), [laki](#), [rapeseed](#), [volcanic dust](#), [wind turbines](#) [[list all tags](#)]

While it is early in the morning in Europe the [following picture](#) shows the impact of the volcano in Iceland on European air traffic (as of Thursday), if you compare Northern (none) and Southern (60) European flights. The blue crosses are airports. The volcano has already had a stunning impact on Europe, although articles [about it](#) are already dropping below the [lead headlines](#).

There is a thought that the plume may last another five days, and even though the cloud is largely invisible to those who are being impacted by it, the damage by neglecting these precautions could be severe. And given that the British election is on May 6th, the impact of a sustained eruption on the debates in the UK, and the result may go beyond just [limiting the travel](#) of those who would campaign, to become more dominant with the length of the flight curtailments and the responses to help resolve what are likely to be [growing transportation problems](#).



Status of flights over Europe on April 15 ([flight radar 24](#)).

The presence of [sulphur dioxide](#) is already obvious to local residents, though there don't appear to be any concerns over its toxicity. This is the toxicity information given by [gasdetection.com](#):

WITH ACUTE EXPOSURE, 5 PPM CAUSES DRYNESS OF NOSE & THROAT AND A MEASUREABLE INCR IN RESISTANCE TO BRONCHIAL AIR FLOW; 6 TO 8 PPM CAUSES A DECR IN TIDAL RESP VOLUME. SNEEZING, COUGH & EYE IRRITATION OCCUR AT 10 PPM; 20 PPM CAUSED BRONCHOSPASM; 50 PPM

CAUSES EXTREME DISCOMFORT BUT NO INJURY IN LESS THAN A 30-MIN EXPOSURE ... 1000 PPM CAUSES DEATH IN FROM 10 MIN TO SEVERAL HR BY RESP DEPRESSION.

The larger eruptions of Katla, have ejected up to 1.5×10^9 cu m of material with a Volcanic Explosivity Index (VEI) of up to 5. For comparison [Mt Pinatubo in 1991](#) ejected 1.1×10^{10} cu m with a VEI of 6.

The Times has an [interesting graphic](#) that shows some of the concerns and I am going to use a bit of it to show that the problem may be a little bigger than even the article suggests.

To begin with recognize that Iceland is at the intersection of different plates that together form the shell of the planet. Whereas in some parts of the world these plates are pushing together and riding over each other, in this part of the world they are tending more to separate, so that the magma, on which the plates ride, can make its way up along the joint planes and erupt at the surface.



Map of Iceland showing major volcanoes (The [Times of London](#))

Now what the picture is concerned about is that generally when Eyjafjallajökull erupts so does Katla, which is right next door. But Katla is a larger system and the eruption is generally much more severe.

Unfortunately what has also to be considered is that there are a whole line of craters, not shown on this map, between [Katla](#) and Vatnajökull, which are also a worry. [Laki](#), an even greater threat than Katla, lies along this line.

Iceland's Laki volcano erupted in 1783, freeing gases that turned into smog. The smog floated across the Jet Stream, changing weather patterns. Many died from gas poisoning in the British Isles. Crop production fell in western Europe. Famine spread.

The winter of 1784 was also one of the longest and coldest on record in North America. New England reported a record stretch of below-zero temperatures and New Jersey reported record snow accumulation. The Mississippi River also reportedly froze in New Orleans.

It is at the orange flag in this picture.



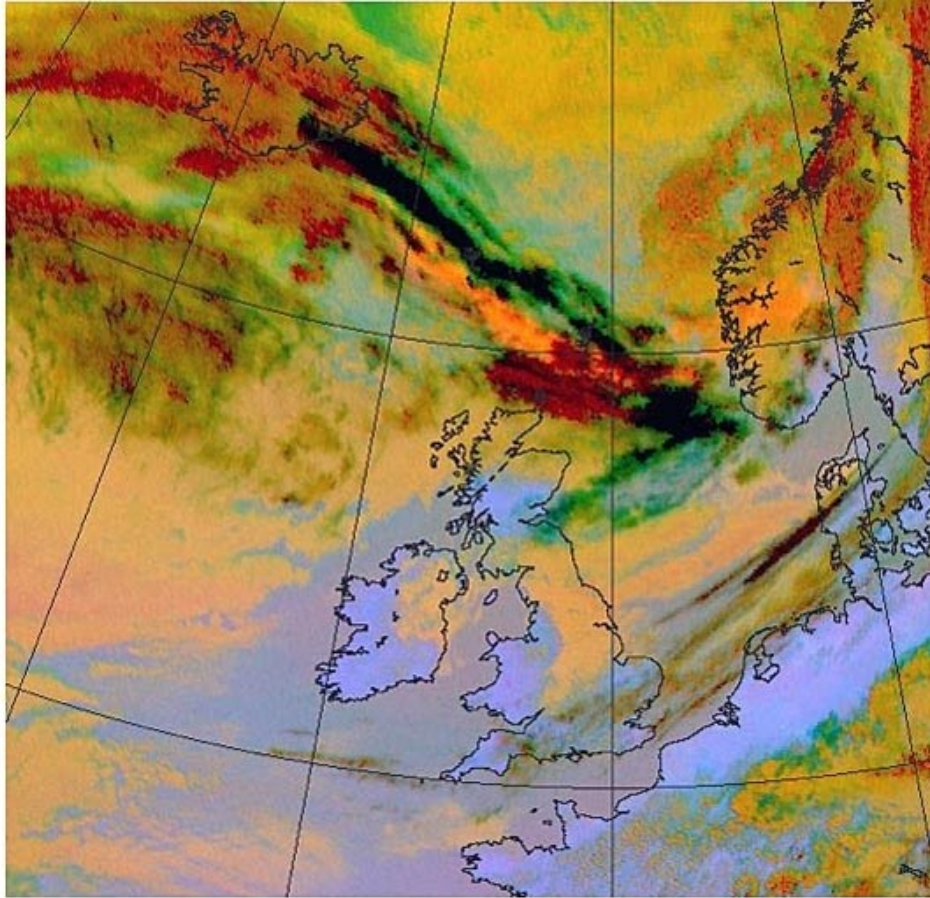
(Google Earth)

There is a line of eruption calderas from Katla up to Laki, which is up around Skaftareldar.

The 3.5 earthquake I wrote about on [Bit Tooth Energy](#) lies beyond Laki on the line from Eyjafllajokull, and was centered further north in the Vatnajokull. Some have blamed the weather created by the [eight-month eruption of Laki](#) as a possible contributory cause to the French Revolution.

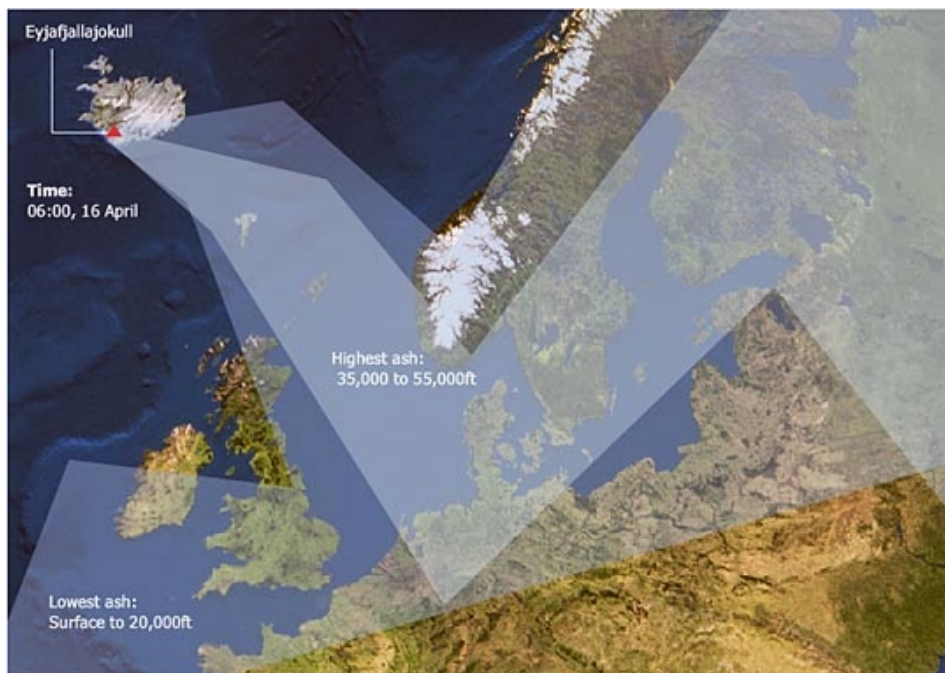
An eruption of that length, ejecting as much material as it may into the atmosphere, would have consequences that go beyond just the ability to survive the noxious gaseous clouds.

The impact of the dust is shown in this picture from the British Met Office, which shows that plume reaching down past Scotland:



Dust cloud passing Scotland ([Met Office](#))

And the consequent distribution at different levels of the atmosphere.



High and low level ash distribution (Met Office via [the Guardian](#))

The agriculture of Europe would be damaged by a prolonged eruption with this distribution, and with it the possible production of biodiesel. Consider that the growth of rapeseed (canola) around the world has been [steadily rising](#) over the past few years.

1950s	3.5
1965	5.2
1975	8.8
1985	19.2
1995	34.2
2006	47.0

With European countries sitting just behind the leaders.

China	12.2
Canada	9.1
India	6.0
Germany	5.3
France	4.1
United Kingdom	1.9
Poland	1.6
Australia	0.5
World Total	47.0

Somewhere over 4 million metric tons of the crop currently goes to producing biodiesel, mainly in Europe. (Heading up towards 100,000 bd). Losing a year of that crop (and large scale volcanic activity can have an impact for over four years on the climate and the ground chemistry), particularly given the current possible approach of the peaking of conventional oil production, could have an unanticipated impact on overall liquid fuel availability and price.

Unfortunately rapeseed is only one of the crops that will be affected, and the significant drop in crop yields does not appear to be getting much attention yet.

Beyond that, there should be a little concern for the wind turbines that are now dotted over the horizon. The concern is with the speed at which [the tips travel through the air](#). The air, that looks clean, will contain small particles of very sharp glass and other volcanic ejecta, that are the primary cause for the grounding of aircraft across Europe. While the aircraft can see very sudden loss in engine power, because of the high speeds with which they encounter the clouds, and the volumes of debris sucked into engines [that then fail](#). (There are also [video explanations](#).)

Wind wing tip speeds have been projected to be in the range from [264 ft/sec to 326 ft/sec](#). At impact speeds over 120 ft/sec the particles from the eruption will start to erode the blades of the turbine. If the eruption continues for weeks, and the turbines rotate in that atmosphere (which looks clear to normal vision) then they will lose surface quality, and perhaps the particles will enter into the generators (as they do on aircraft) doing significant damage.

Thus, beyond the initial inconvenience of the loss of a way to fly (bearing in mind I am supposed to fly to Europe myself soon), there are the longer concerns over both the crops this summer and for the next four, and for the longer term health of the turbines. All in all it is a reminder that there is never a time that Nature, with a little nudge, cannot remind us of the risks of complacency.



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