



## Earth and Life

*Volcanoes: Effects of magma eruptions*

### Voice Over

In 1783 fourteen cubic kilometres of basaltic magma erupted from the Laki Fissure in Iceland to form the largest lava flow in recorded history.

### Caption: Haraldur Sigurdsson, University of Rhode Island

With such a large emission of magma there is of course a tremendous emission of volcanic gas and that is, that includes fluorine as well as of course a lot of carbon dioxide, water vapour, and sulphuric dioxide. When fluorine is emitted from a volcano of this type, the fluorine is absorbed onto ash particles and then forced to the ground, and contaminates vegetation, and particularly contaminates grazing land. And of course this grass and fluorine is ingested by the grazing livestock, and this leads to fluorosis and a number of diseases that then affect the livestock, including gout, teeth falling out and inability of these animals to survive, and that leads to decimation of the livestock. This actually brought about loss of about 75% of the livestock in Iceland because of this tremendous disaster. Consequence of that, of course, was that the Icelandic population was greatly affected. Over a period of a couple of years after the eruption there was a decrease in the population of Iceland by about 24%, the largest disaster that has occurred in Iceland in history was thus brought about by this tremendous eruption, and it was the effect of the, primarily of the volcanic gases that brought about this human disaster. In this industrial world the sulphur output from human activity is about three times the output from the great Laki eruption. But of course that is entirely into the troposphere; it is very short-lived in the atmosphere and therefore does not have global effects. The principle difference of course between an effusive or a lava eruption, and an explosive eruption, is that typically the effusive eruption is not associated with a very high eruption column; a few kilometres, as opposed to tens of kilometres in the case of an explosive eruption. If it was only within the troposphere, then the likely aerosol would have had short-lived and minor effects because it would have been essentially rained out or incorporated into the normal circulation in the weather.