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The 20 March to 12 April basaltic Fimmvörðuháls flank eruption at Eyjafjallajökull volcano, Iceland: course of events

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At 11:30 PM on March 20, reports were received of an eruption in the region of the Fimmvörðuháls pass between the glaciers of Eyjafjallajökull and Mýrdalsjökull. A surveillance flight at daybreak on 21 March showed that a basaltic eruption was underway on a radial fissure on the east flank of the Eyjafjallajökull volcano, featuring a 300 meter-long curtain of lava fountains feeding small lava streams. The onset of the eruption was unusually calm. Seismicity did not intensify immediately prior to the eruption despite the fact that in the week leading to the eruption, an earthquake swarm migrated towards the surface from depth of more than14 km indicating rise of magma from depth. Only very weak seismic tremor was detected around 10:30 PM on 20 March, gently increasing through the night.

At the beginning the eruption featured as many as 15 lava fountains with maximum height of 150 meters. On 24 March only four vents where active with fountains reaching to heights of 100 meters. On March 31 and April 1, the activity was characterized by relatively weak fountaining through a forcefully stirring pool of lava. The vents were surrounded by 60-80 meters high ramparts and the level of lava stood at approximately 40 meters. This high stand led to opening of a new fissure trending northwest from the central segment of the original fissure. As activity on the new fissure intensified, the discharge from the original fissure declined and stopped on April 7.

The intensity of the lava fountains varied significantly on the time scale of hours and was strongly influenced by the level of the lava pond in the vents, producing narrow, gas-charged, piston-like fountains during periods of low lava levels, but spray-like fountains when the lava level was high and dampened the rate of atmospheric venting of volatiles.

The eruption produced a fountain-fed lava flow field with an area of about 1.3 square km. Initially (20-25 March), the lava advanced towards northeast, but on 26 March the lava began advancing to the west and northwest, especially after 1 April when the activity became concentrated on the new fissure. The flow field morphology is dominantly a'a, but domains of pahoehoe and slabby pahoehoe are present, particularly in the western sector of the flow field. The advance of the lava from the vents was episodic; when the lava pond stood high the lava surged out of the vents, but at low stand there was a lull in the advance. The lava discharged from the vents through open channels as well as internal pathways. The open channels were the most visible part of the transport system, feeding lava to active a'a flow fronts and producing spectacular lava falls when cascading into deep gullies just north of the vents. The role of internal pathways was much less noticeable, yet an important contribution to the overall growth of the flow field as it fed significant surface breakouts emerging on the surface of what otherwise looked like stagnant lava. When activity stopped on April 12 the fissure had issued about 0.025 cubic km of magma, giving a mean discharge of 13 cubic meters per second.