Report from the eruption site, JAN 27-29 February 2, 2015

Overall assessment: Within the limits of ground based observations alone, the general assessment is that the eruption continues with similar intensity and style of activity since early-mid JAN 2015. When possible to observe the eruption column, its maximum height was estimated to be 1300-1500 above Dyngjusandur (2-2.2 km a.s.l.). The closed lava pathways feeding sectors of the lava field to the NE and E remain active, with the predominant mode of emplacement being by inflation and sideways basal breakouts (both to the south and north for the pathway to the east). A new frontal breakout on Dyngjusandur from the closed channel leading NE (6.5 km NE of vent) was observed on the evening of 27 JAN. An additional lobe formed in the same area on 29 JAN, and the total width of these lobes amounts to ~1100 m.

Vent site: The style of activity at the vent is at present not visible from the ground, seemingly modest bursting bubble activities as observed from aerial surveillance flights during mid JAN. The greatest heat flux at the vent is from the central portion of the rampart. Poor weather and visibility influenced the monitoring efforts during 29 JAN. It was very difficult, if not at times impossible, to observe the plume, and snow fall rendered thermal imaging of the vent impossible.

Plume: The maximum height of the eruption column was at noon estimated to ~1300 m above Dyngjusandur on JAN 27, and ~1500 m on 28 JAN. During 27 JAN the plume shifted direction from ESE in the morning to NNW after noon. During the rest of the week the plume bearing was easterly to southwesterly.

Gas: While driving under the plume at noon, gas sensors measured 2-3 ppm SO2 on 27 JAN. No detection of SO2 at any fixed observation points during the rest of the week. The team was exposed to 0.3-0.4 ppm SO2 while working on top of lava crust downwind from an active breakout.

Lava field: The closed lava pathways feeding sectors of the lava field to the NE and E remain active, with the predominant mode of emplacement being by inflation and sideways basal breakouts (both to the south and north for the pathway to the east). Pronounced escarpments are under development up on the lava field as it continues to inflate. The flux of lava (effusion rate) being delivered into the channel system remains capable to sustain active breakouts by Jökulsá 16-17 km ENE of the vent. Here, inflating spiny pahoehoe breaks from the top, feeding narrow rubbly pahoehoe streams down onto an old channel of Jökulsá. Max. temp. measured here was 1130-35 degrees C. A new frontal breakout on Dyngjusandur from the closed channel leading NE (6.5 km NE of vent) was observed on the evening of 27 JAN. On 28 JAN the front was a ~500 m wide spiny pahoehoe lobe (max. temp. 1170-90C). By comparison a rough estimate would suggest that the heat loss corresponds to a 50C temp. decrease over 10 km. The measurements were made on breakouts fed by two separate channels, but provides an idea of how well insulated the closed pathways are. Small steam explosions were observed following buildup of pressure when the lava overran small ice sheets. The explosions were modest and did not produce spatter as

observed on 26 NOV 2014. An additional spiny pahoehoe lobe formed in the same area on 29 JAN, and the total width of these lobes amounted to ~1100 m on 29 JAN. These lobes overlap Thorvaldshraun. Spiny pahoehoe appears now to be the predominant morphologic type of lava produced in frontal breakouts fed by closed pathways.

Measurements/activities: 1) observations of vent and eruption column, FLIR imaging at vent, 2) GPS tracking along aerial radar profiles (3) into the lava field, with purpose of comparison and improvement of lava thickness estimations, 3) observations of active breakouts by Jökulsá and on Dyngjusandur, including GPS tracking along the active section, photo documentation and thermal imaging, 4) GPS tracking along escarpment identified in the lava field, with purpose improving and relating observations and mapping from satellites images to field relations, 5) sampling of active and recent (DEC-JAN) lava (n = 6), with the purpose of eliminating temporal gaps in the sample archive during periods with no presence from IES on ground, 6) collection of video footage for public outreach conducted in collaboration with Discovery Channel Canada (Daily Planet) illustrating field monitoring of a volcanic eruption.

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Photos (16:30 27-01-15, MSR) from the frontal breakout advancing onto the Jökulsá river plain, the far east front of the closed pathway transporting lava 16-17 km ENE from the vent. The flow front is a spiny pahoehoe lobe that has been inflating, and now leaking from the top sending narrow rubbly phh streams down over the very front.

Photos (10:25 28-01-15, MSR) from the frontal breakout advancing onto Dyngjusandur, the northeast front of the closed pathway transporting lava 6-7 km NE from the vent. The flow front is a spiny pahoehoe lobe that has been inflating and breaking in various

locations during JAN. The present frontal breakout of spiny pahoehoe is fed by a stream emanating from clefts in the tumuli (mound) seen in central background on photograph to the left. Modest steam explosions through the lava tongues were occasionally observed. Spiny pahoehoe advances slowly and hence most of the water vapour escapes passively at the front rather than violently through the lava. In comparison, when steam explosion were observed on 26 NOV, the active streams 'cascaded' down older and steep flow fronts and quickly blanketing ice sheets thereby putting the 'lid' on and causing more violent spatter-generating steam explosions.

Photo to the left (18:01 28-01-15, MSR) reveals the entire length of the closed channel transporting lava 6-7 km NE from the vent. The vent is visible to the far left while the frontal breakout (in the picture on previous page) is visible to the far right. By close inspection one should be able to identify several sections glowing (flank breakouts), together delineating the base of the escarpment on the lava field relating to this closed channel. The photo to the right (17:03 27-01-15, MSR) illustrates such a flank breakout. In this case from on top of the lava field out by Jökulsá.