2021 Fagradalsfjall Eruption

Relationship between Effusion Rate, Flow Emplacement and Spatter Deposit

Questions

? How does the effusion rate relate to the style of flow emplacement?

? Is there is a connection between the effusion rate and the frequency of spatter deposits?

Location of Eruption

Importance

These timelines will allow me to determine any relationships graphically and qualitatively between the effusion rate, style of flow, and the frequency of spatter deposits which may help eruption forecasting based on vent behavior in the future.

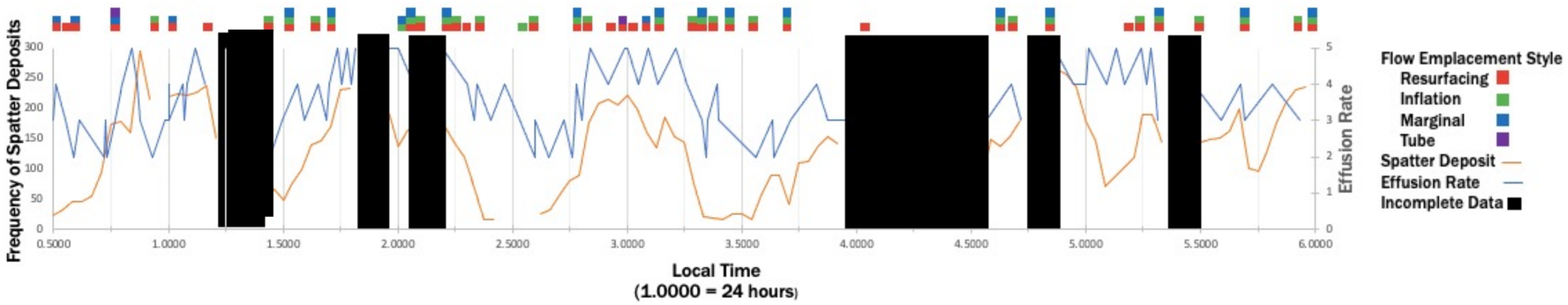
Methods

1. Flow Emplacement Styes were determined by screenshots and footage of March 19th at 12:00 to March 25th at 23:59 provided by the citied YouTube video.

2. Effusion rates where quantified using a numbering system, one through five, with one being the slowest and five being the fastest. This was determined by the percentage of lava field covered.

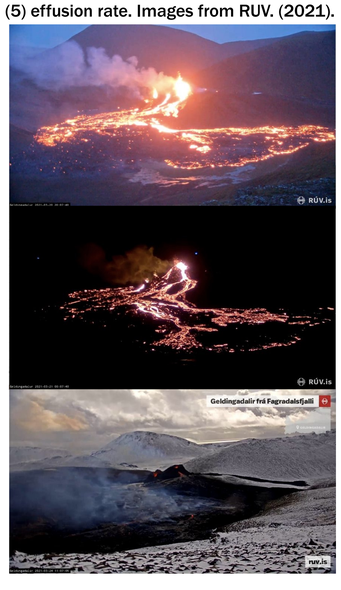
3. Spatter Deposit Frequency counts were calculated by reviewing the live stream footage at 0.25 speed and using a counter app to mark when spatter was deposited. Due to this method of calculation human reaction time allowed for a large possible error. To help account for this a standard deviation of 37.52 was calculated.

Spatter Deposit VS Effusion Rate



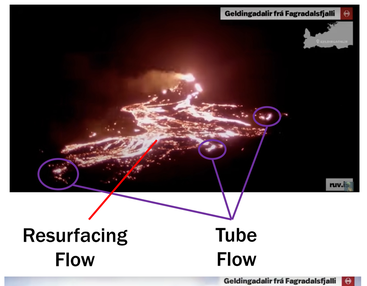
Effusion Rate

Examples of slow (1), medium (3), and fast (5) effusion rate. Images from RUV. (2021).



Spatter Deposit

Example of Spatter Deposit. Actively cooling magma is being thrown into the air and being deposited on the outside of the open vent. Image from RUV. (2021).



Emplacement Flow

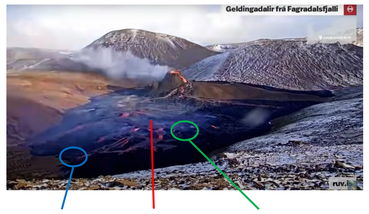
Resurfacing flow is identified when a there is new lava flowing on top of a previous flow.

Marginal flow is identified when the flow is occurring at the edge of the lava field.

Inflation flow is when the crust is not moving laterally but is moving vertically.

Tube flow consists of crusted over channelized regions that continue to transport lava.

RUV. (2021).



Discussion

To answer our first question, we are looking for any possible relationships between effusion rates and the flow emplacement style. There are two main observations that were made, one of which is that when we see an increase or decrease in effusion rate there is a noted change in flow emplacement style. The other observation that can be seen is when there is a high effusion rate there is marginal flow style present.

When investigating our second question, we are looking at any possible relationships between effusion rates and the frequency of spatter deposits. There is a clear trend found in the data, this trend is that when the effusion rate increases there is an increase in spatter deposit frequency. When there is a decrease in effusion rate there is also a decrease in spatter deposit frequency.

Acknowledgements

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Citations

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