

# Ice-volcano interactions in Eyjafjallajökull volcano, Iceland

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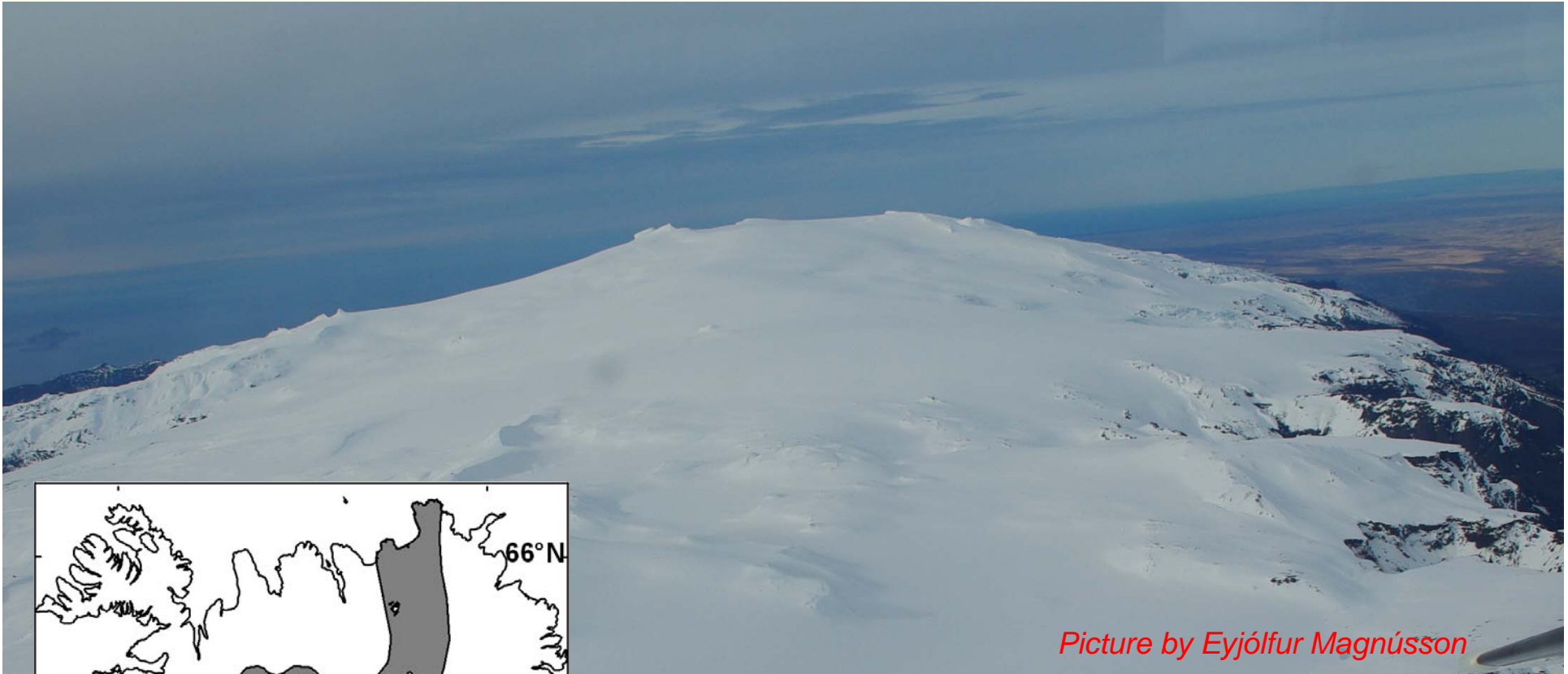
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- 2. Institute of Earth Sciences, University of Iceland, Reykjavík, Iceland*
- 3. Icelandic Coast Guard*



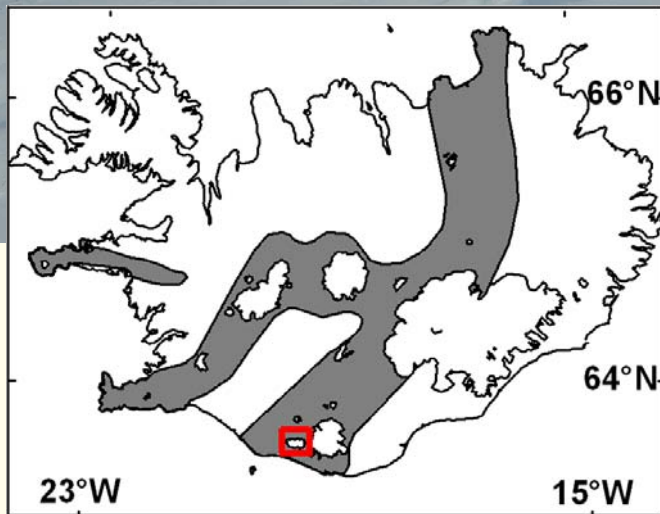
SPIRIT workshop 29&30 April 2010, Toulouse

*Picture by Eyjólfur Magnússon*

# Eyjafjallajökull 19 March 2010



*Picture by Eyjólfur Magnússon*



Gray shows volcanic zones

# Eyjafjallajökull 19 March 2010



Fissure opened 20 March 2010, 23:30 PM



*Picture by Eyjólfur Magnússon*

Fissure 21 March 2010 6:49 a.m.



*Picture by Eyjólfur Magnússon*



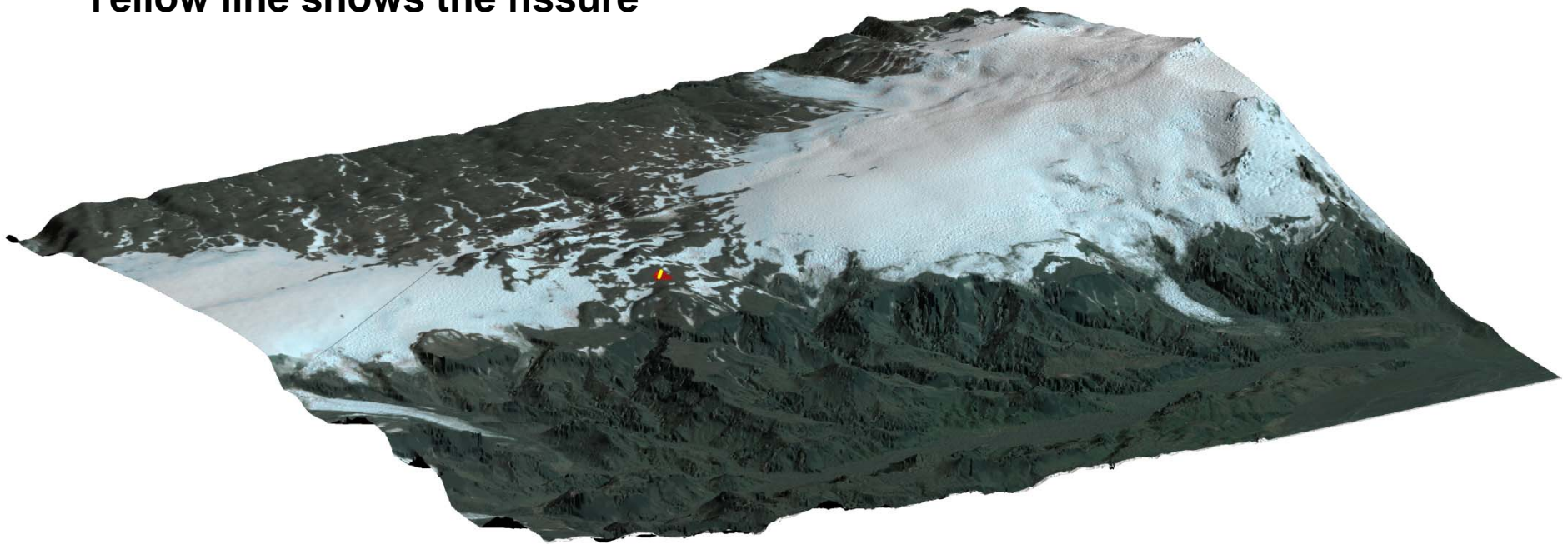
*Picture by Eyjólfur Magnússon*

# The eruption site from northeast

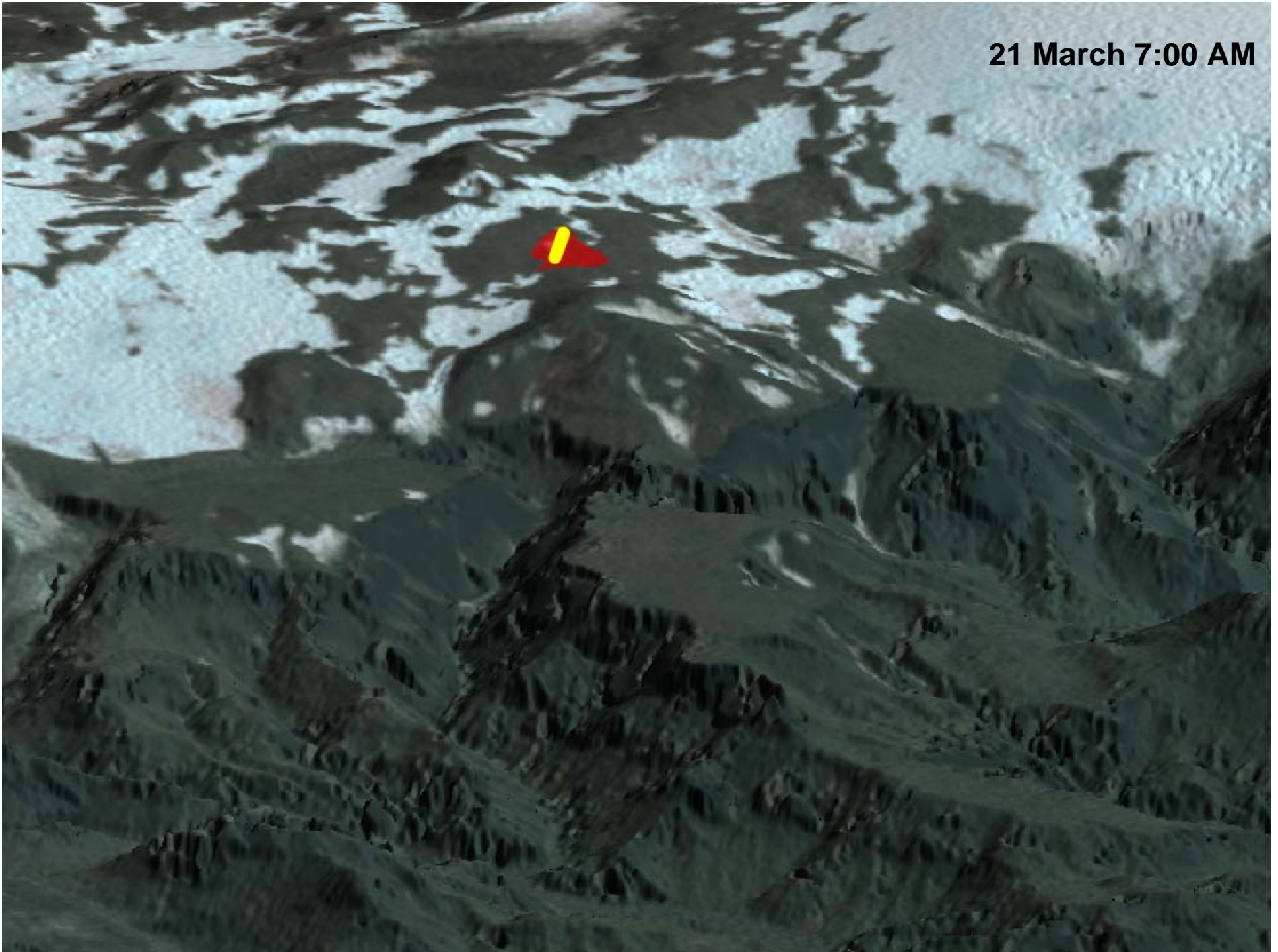
SPOT5 image from 2008 covering EMISAR DEM from 1998 (Spirit DEM used to fill up data gaps)

Red shows lava and scoria 21 March 7:00 AM based on SAR images from the Icelandic Coast Guard

Yellow line shows the fissure

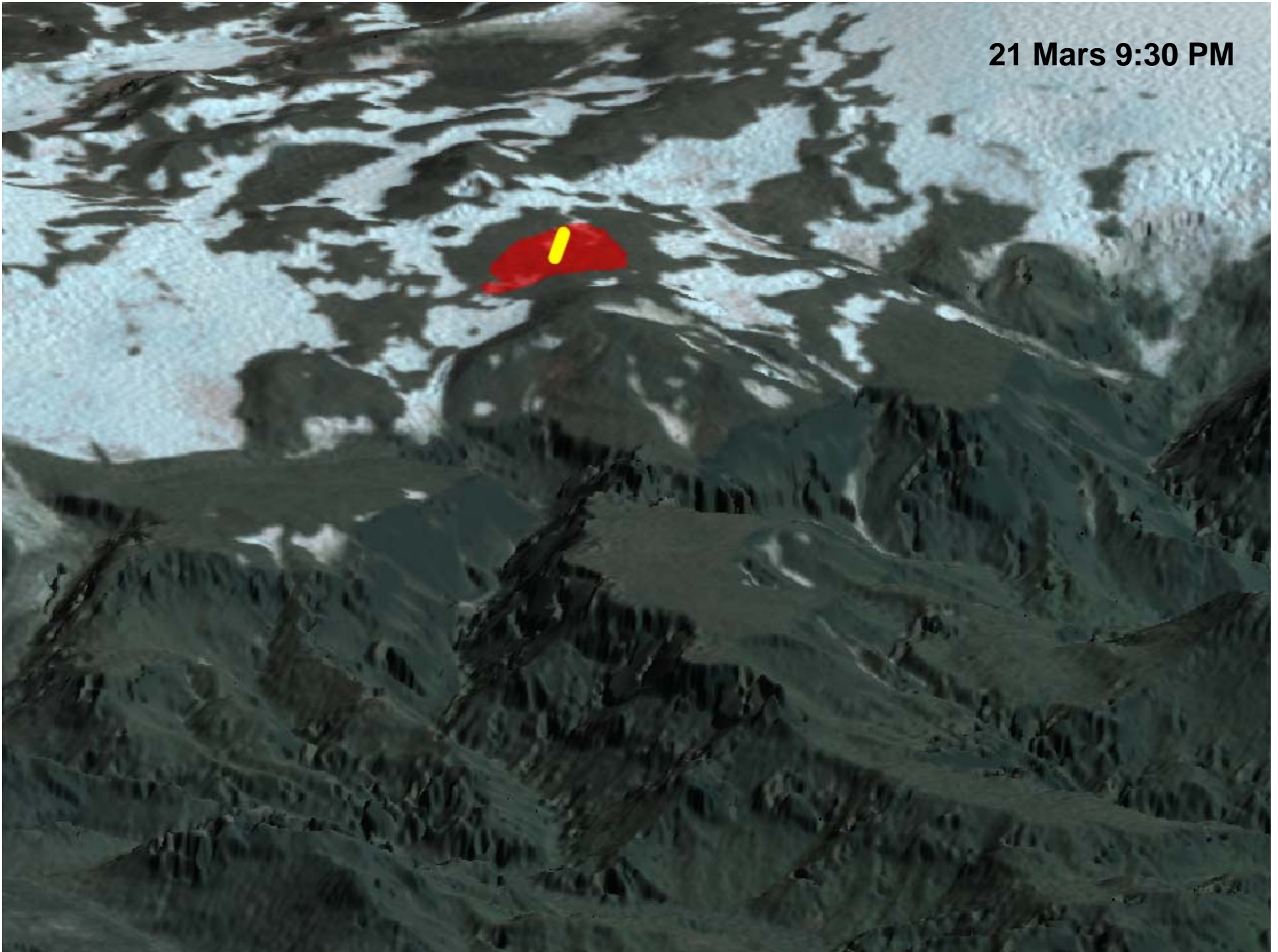


21 March 7:00 AM

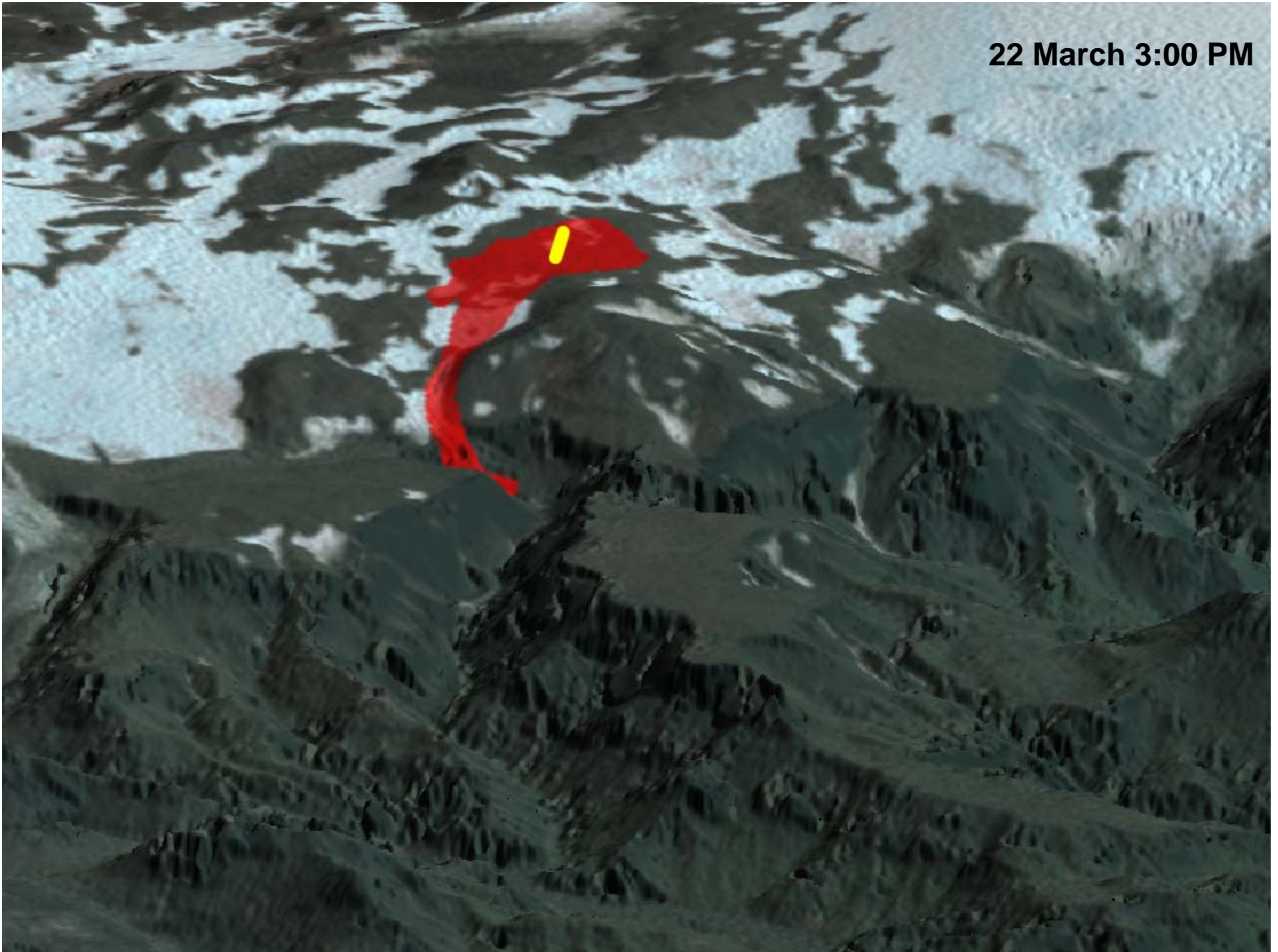




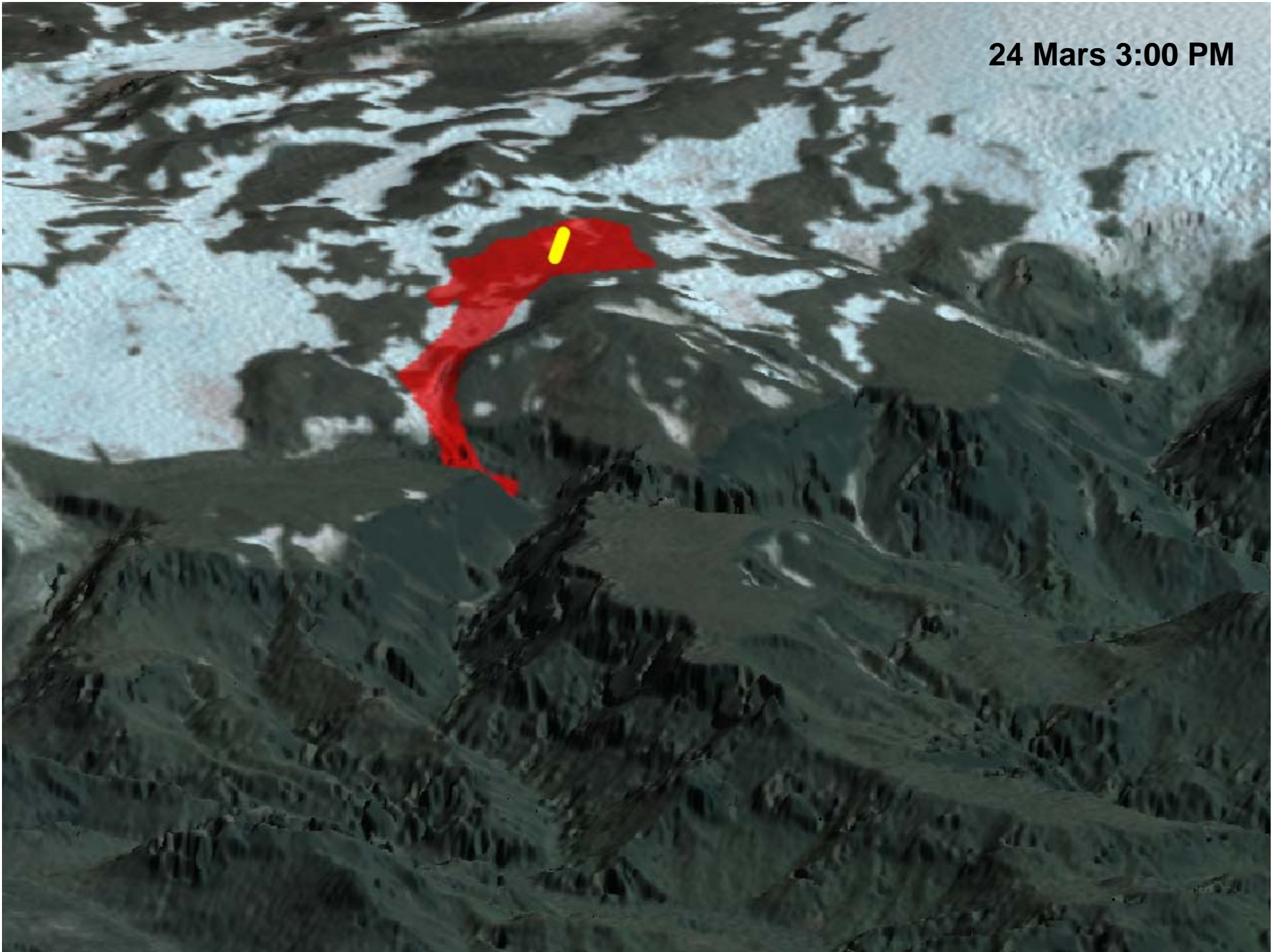
21 Mars 9:30 PM



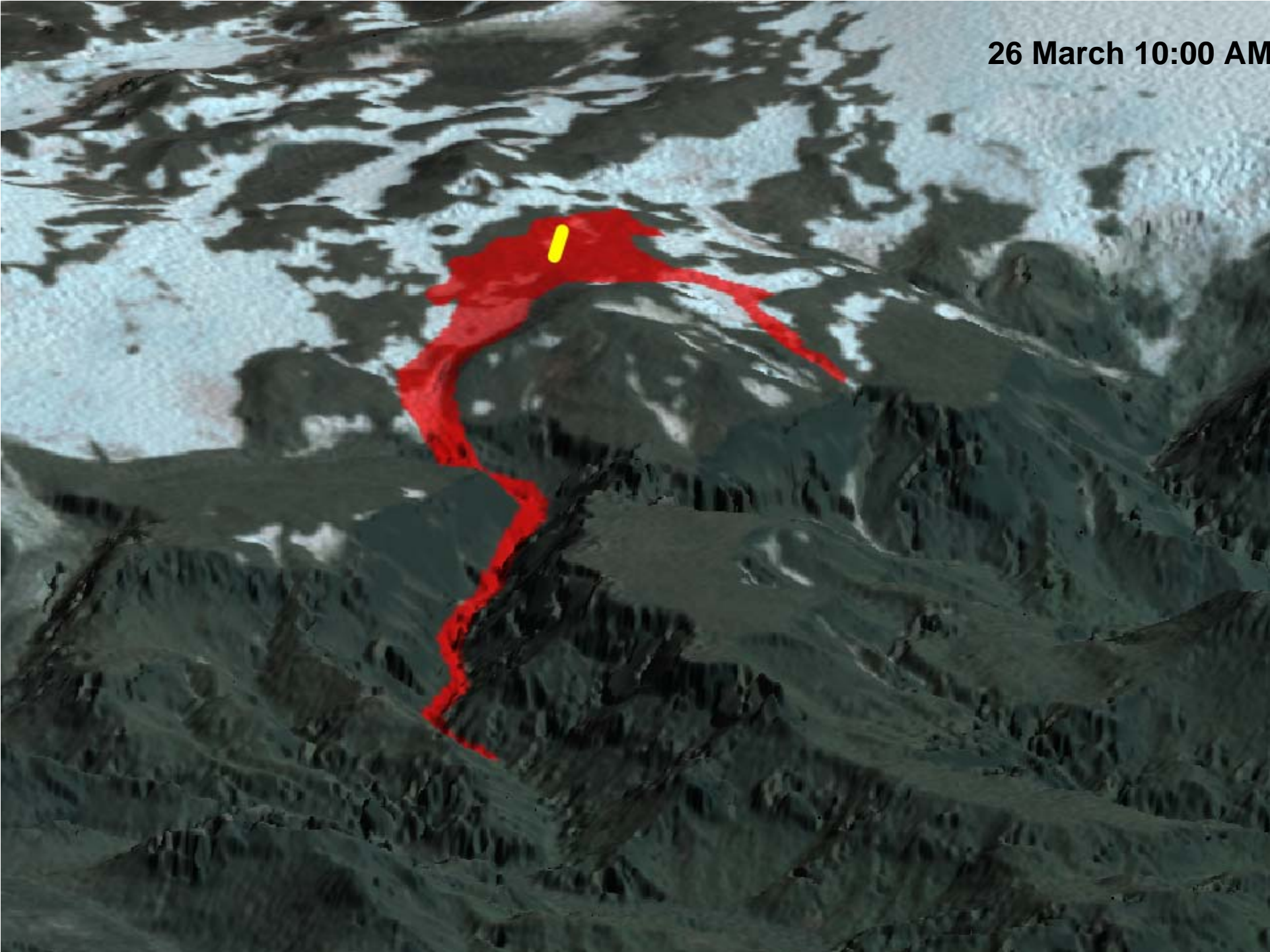
22 March 3:00 PM



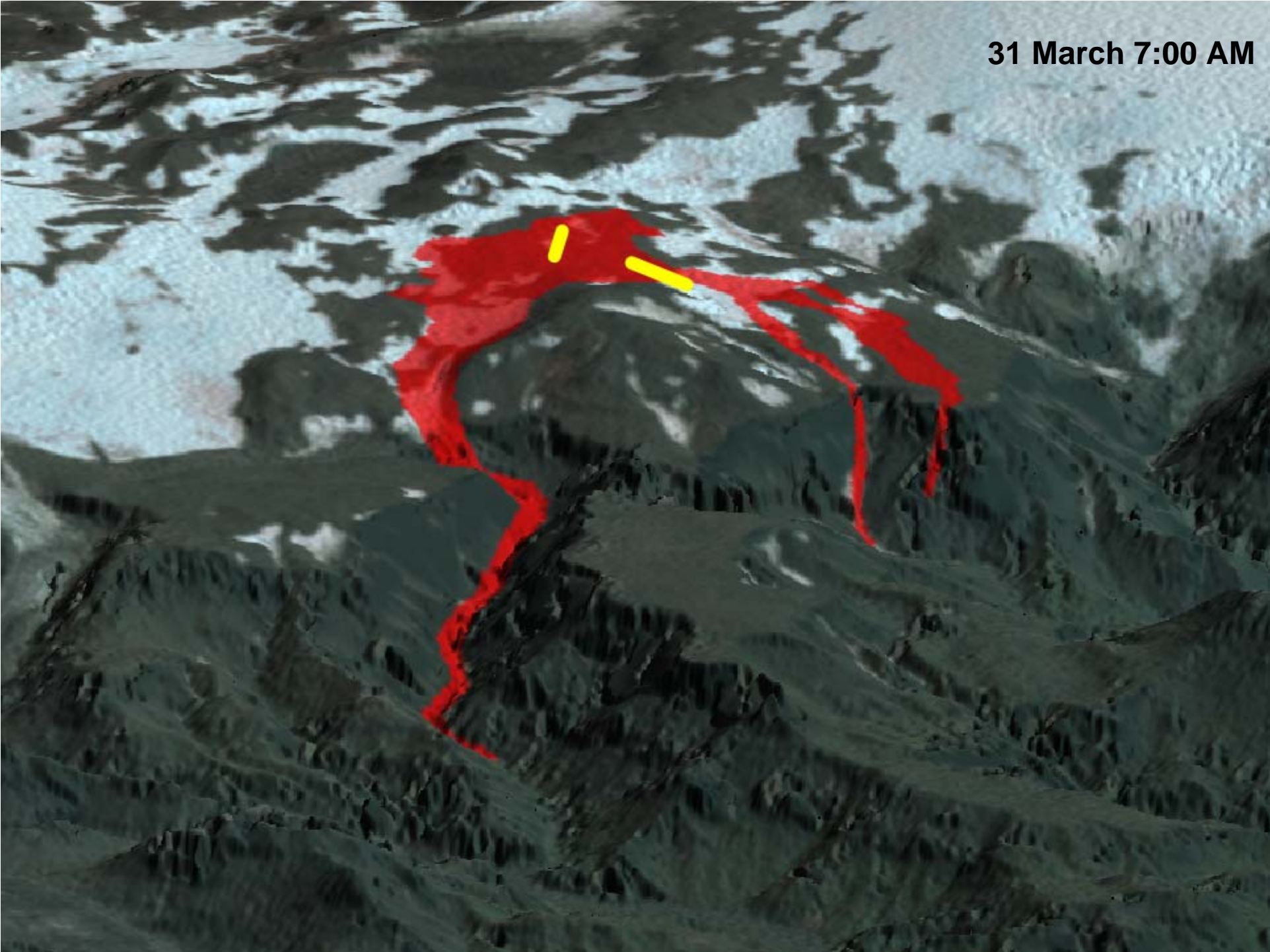
24 Mars 3:00 PM



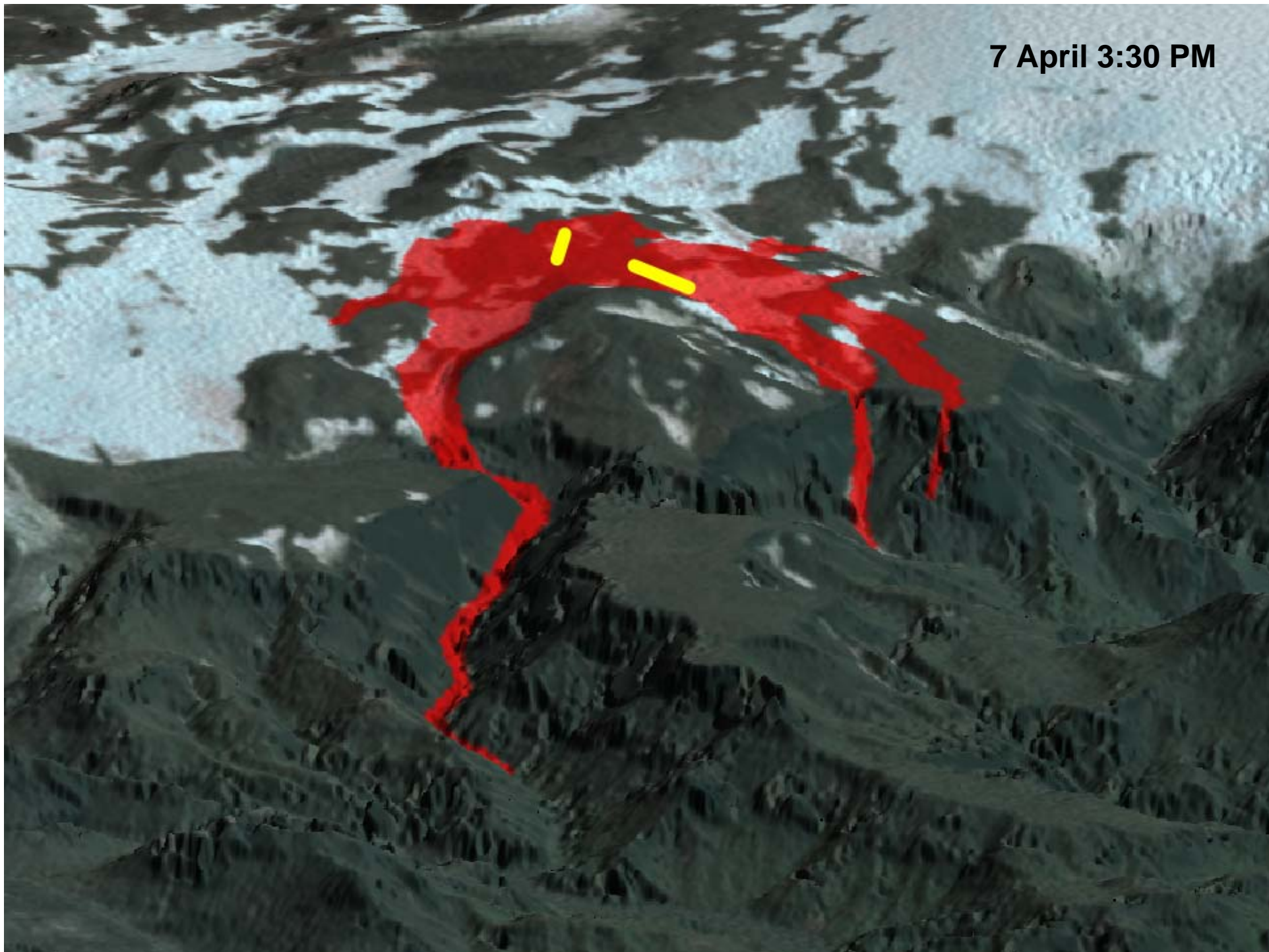
26 March 10:00 AM



31 March 7:00 AM



7 April 3:30 PM



## Some ice-volcano interactions...

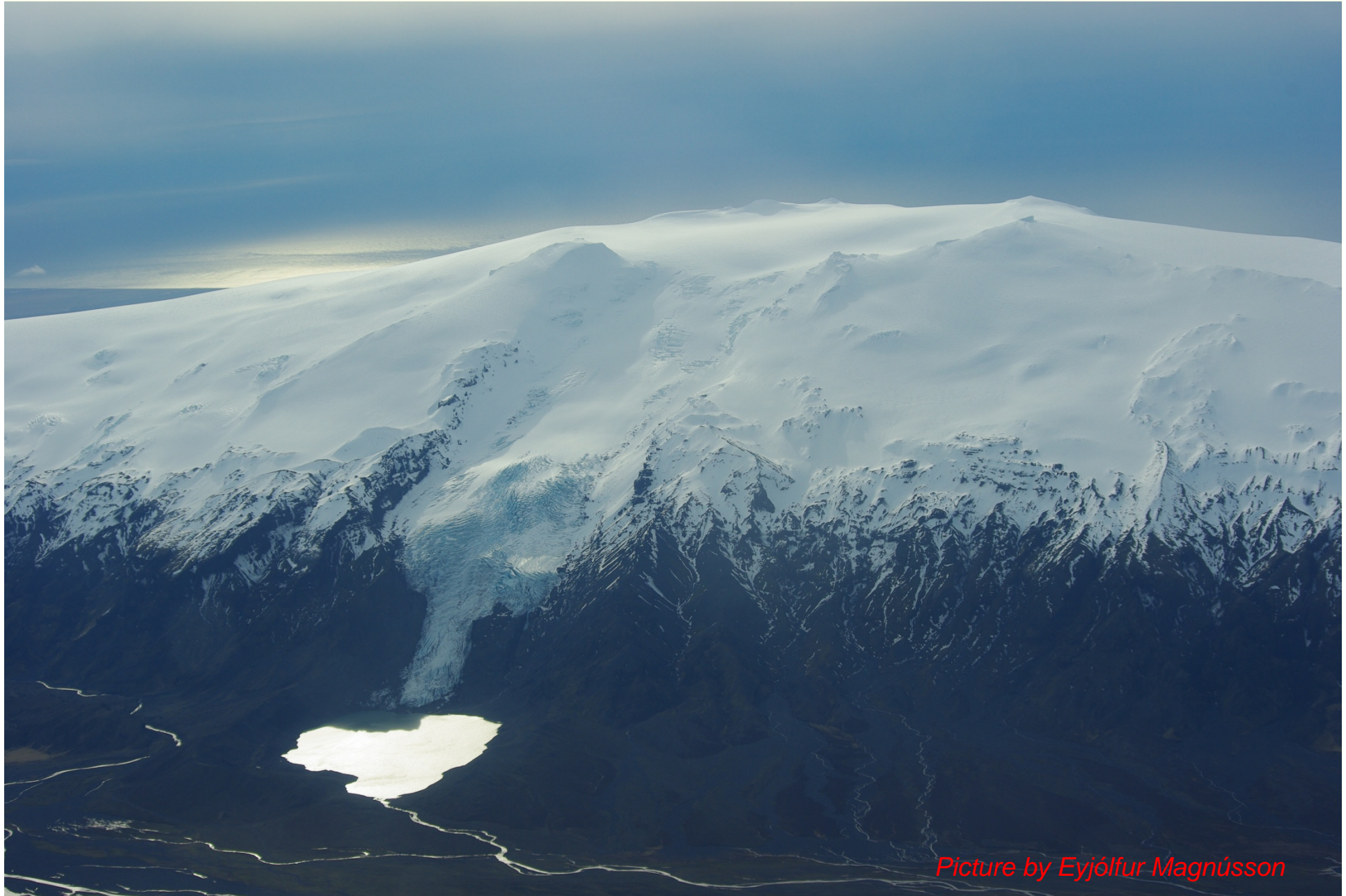




*Picture by Eyjólfur Magnússon*



# Eyjafjallajökull 19 March 2010



*Picture by Eyjólfur Magnússon*

**Gígjökull outlet glacier from Eyjafjallajökull ice cap 14 April 2010 8:28 AM**



*Picture by Eyjólfur Magnússon*

**Gígjökull 14 April 2010 8:38 AM**



*Picture by Eyjólfur Magnússon*

**Above the clouds 8:51 AM**



*Picture by Eyjólfur Magnússon*

**Gígjökull 9:43 AM**



*Picture by Eyjólfur Magnússon*

9:43 AM

GPS-station  
floating away



*Picture by Eyjólfur Magnússon*

# Gígjökull 9:45 AM



*Picture by Eyjólfur Magnússon*

**Svaðbælisá river south  
of Eyjafjallajökull at  
11:01 AM**

**Picture taken by  
Þórdís Högnadóttir**



*Picture by Þórdís Högnadóttir*



**Gígjökull 2:15 PM**



*Picture by Eyjólfur Magnússon*

**Flood plume at the south coast of Iceland 2:55 PM**



*Picture by Eyjólfur Magnússon*

**The eruption plume at 3:15 PM.**

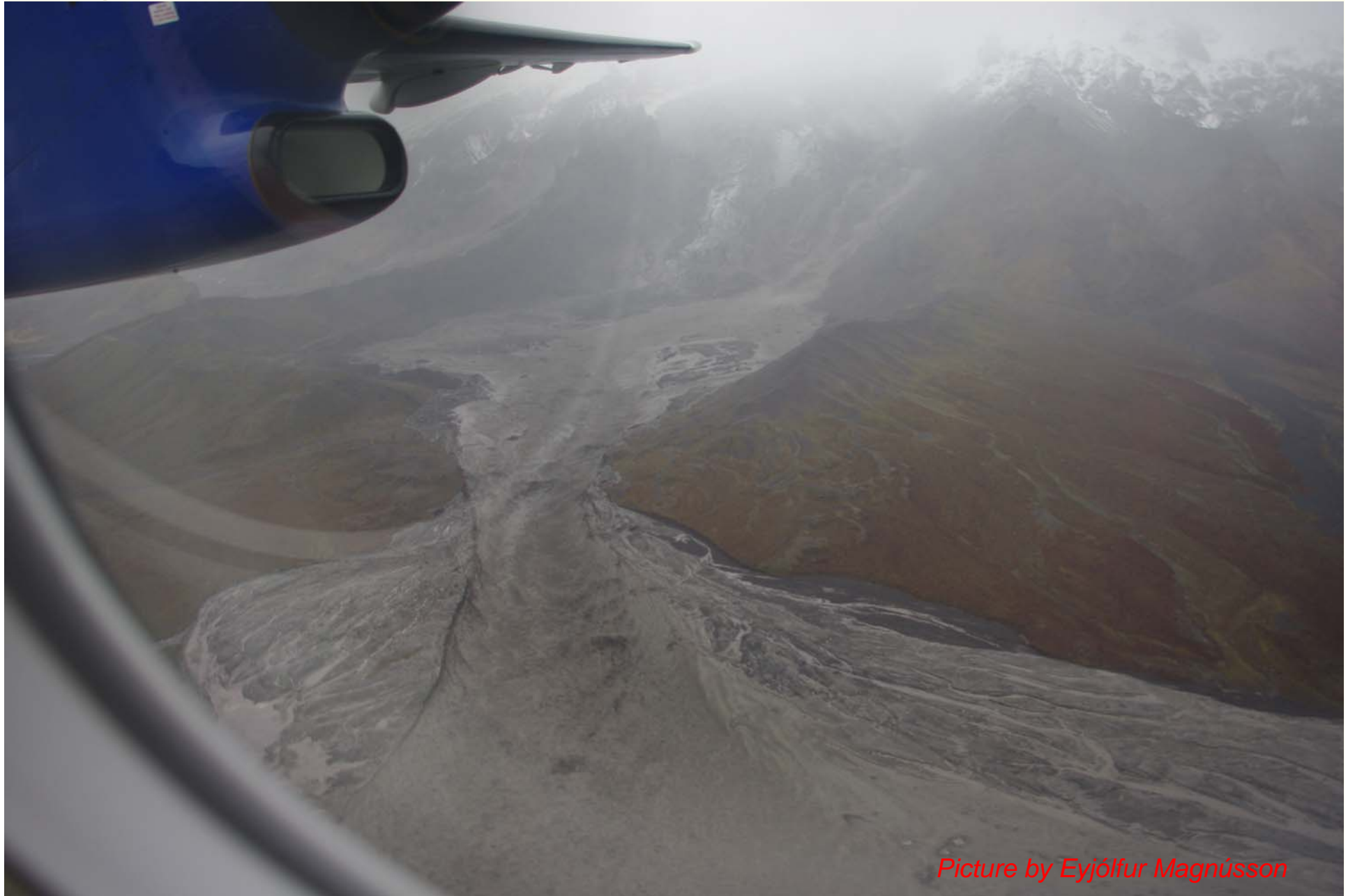


**Gígjökull 6:48 PM**



*Picture by Eyjólfur Magnússon*

**Gígjökull 6:56 PM**



*Picture by Eyjólfur Magnússon*

## The river plain west of Gígjökull 7:00 PM



*Picture by Eyjólfur Magnússon*

7:33 PM



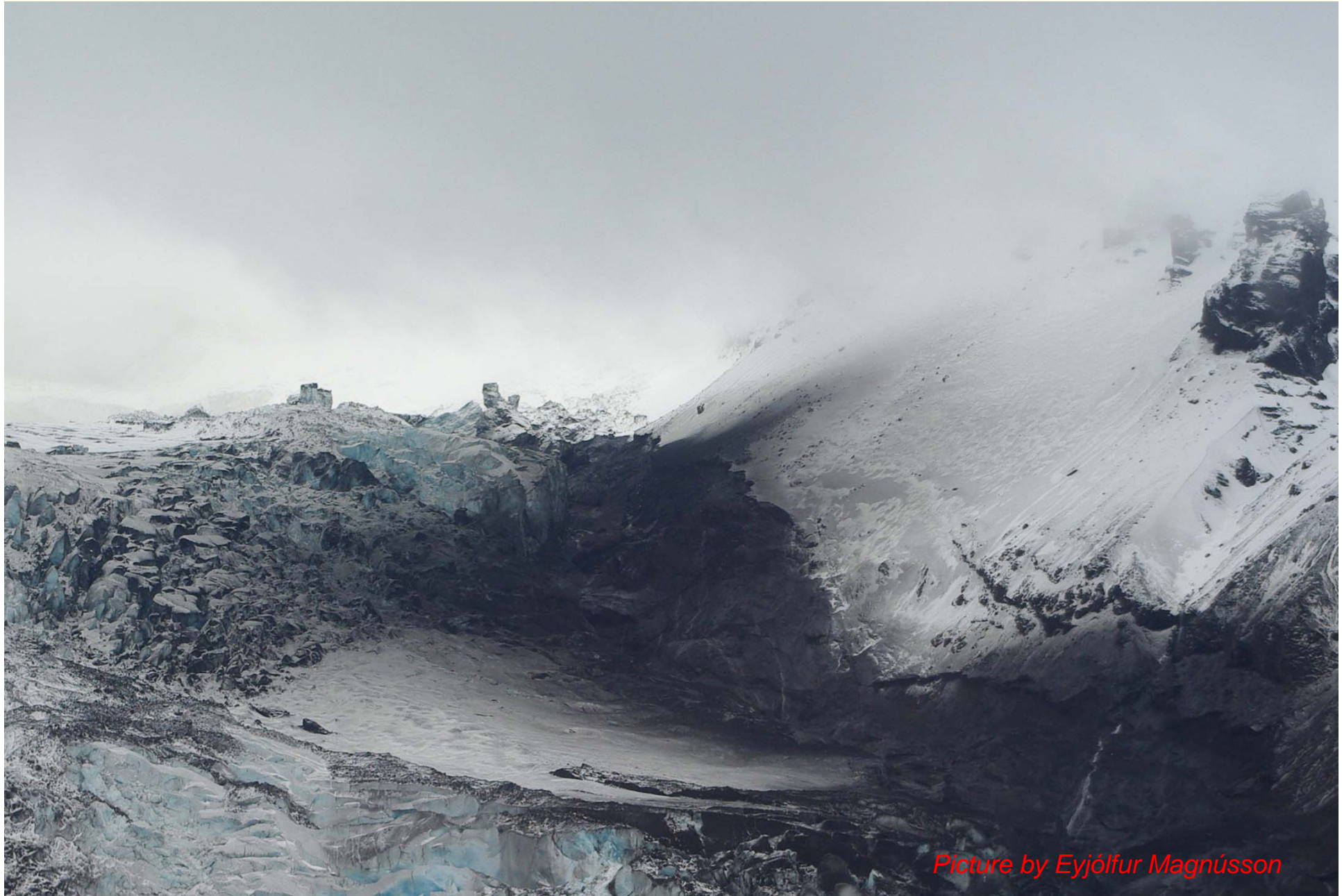
*Picture by Eyjólfur Magnússon*

**The day after...**





**In the course of the flood...**



*Picture by Eyjólfur Magnússon*

**First day of clear view, 17 april, massive ash plume**



*Picture by Eyjólfur Magnússon*

## The ash fall which the people living south of the volcano had to deal with



*Picture by Eyjólfur Magnússon*

**~ $10^7$  m<sup>3</sup> lake filled  
with sediments**

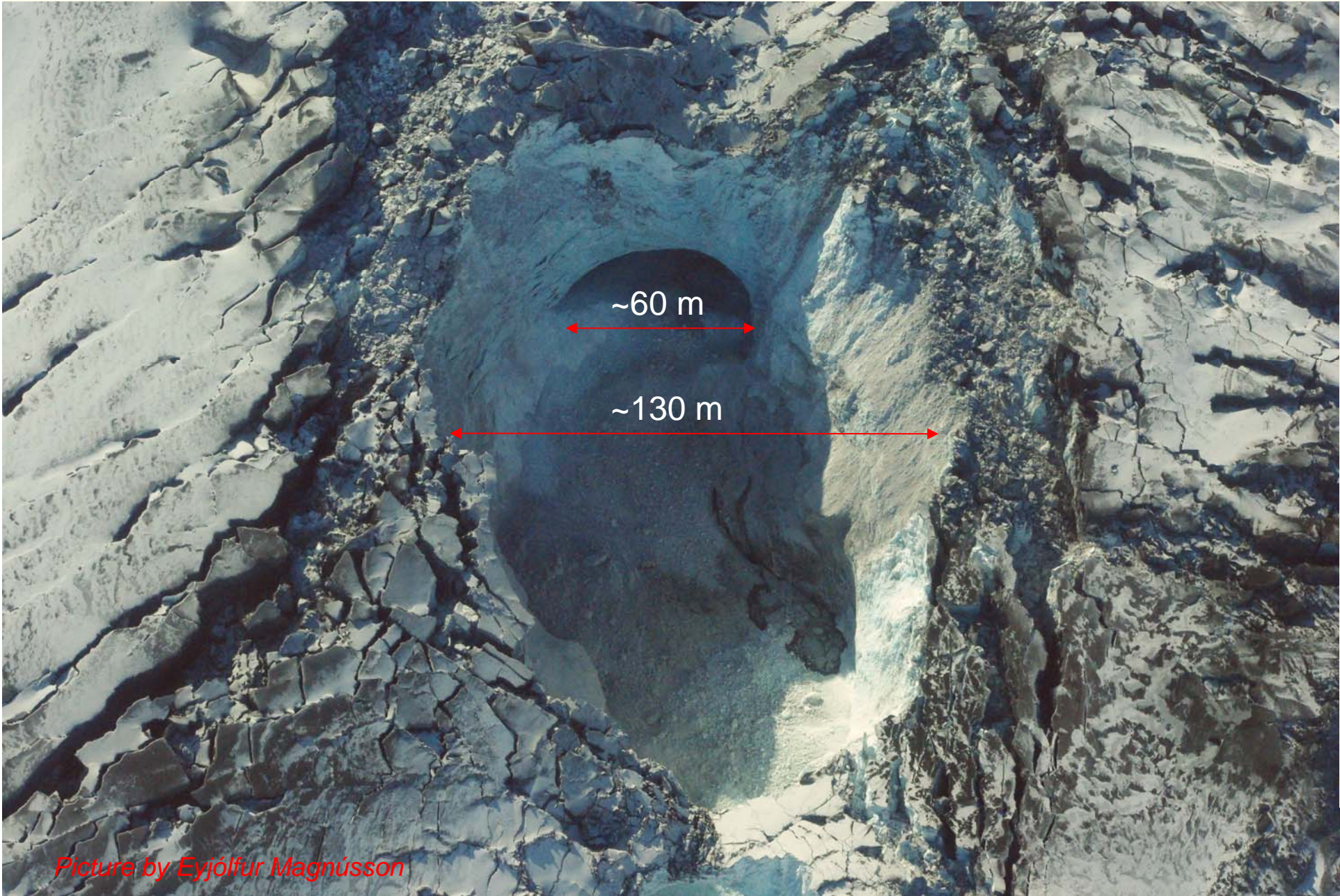


*Picture by Eyjólfur Magnússon*

## The cauldrons in the surface of Gígjökull



*Picture by Eyjólfur Magnússon*



*Picture by Eyjólfur Magnússon*

## 21 April. Melt water cauldron filled up



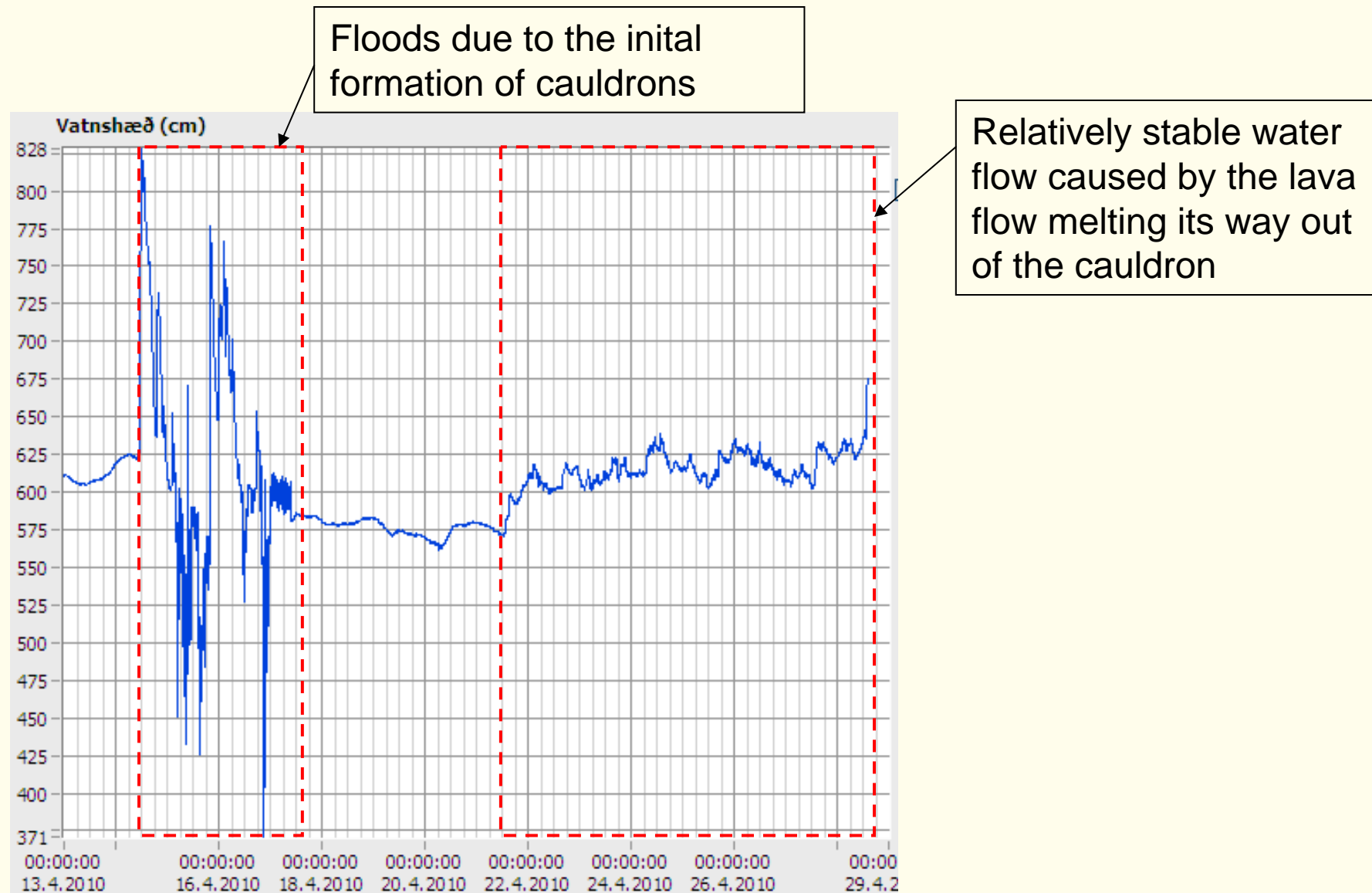
*Picture by Björn Oddsson*

## Lava erupting from the crater



*Picture by Þórdís Högnadóttir*





River water level data from the Icelandic Meteorological Office

<http://vmkerfi.vedur.is/vatn/Index.php>

**The ice within the area of the cauldrons ( $\sim 0.5 \text{ km}^2$ ) was  
 $\sim 200 \text{ m}$  (Sara M. Strachan, 2001)**

**$\approx 0.1 \text{ km}^3$  ice**

**$0.01\text{-}0.02 \text{ km}^3$**

**melted by the flood water from Gígjökull**

**$>0.01 \text{ km}^3$  from the southern site of site of  
Eyjafjallajökull**

**Crude estimates!**

**A new DEM of Eyjafjallajökull will be needed when the  
eruption is over**

# Is Eyjafjallajökull of interest for glaciological studies after the eruption?

- An ice-cap suddenly covered with ash layer, probably thick enough to insolate large part of the glacier. How will the glacier respond? The effects of current day climate on this glacier before the eruption is fairly well known (see Gudmundsson and others later today)
- Extremes in subglacial hydrology
- The recovery of the scars left by the eruption in the surface of Eyjafjallajökull of interest for ice-dynamic studies