Frequency and Characteristics of Volcanic Ash and Dust Suspension Events in Iceland

M. K. Butwin, S. von Löwis, M. A. Pfeffer, Th. Thorsteinsson

UNIVERSITY OF ICELAND
INSTITUTE OF EARTH SCIENCES
Icelandic Met Office
rannís

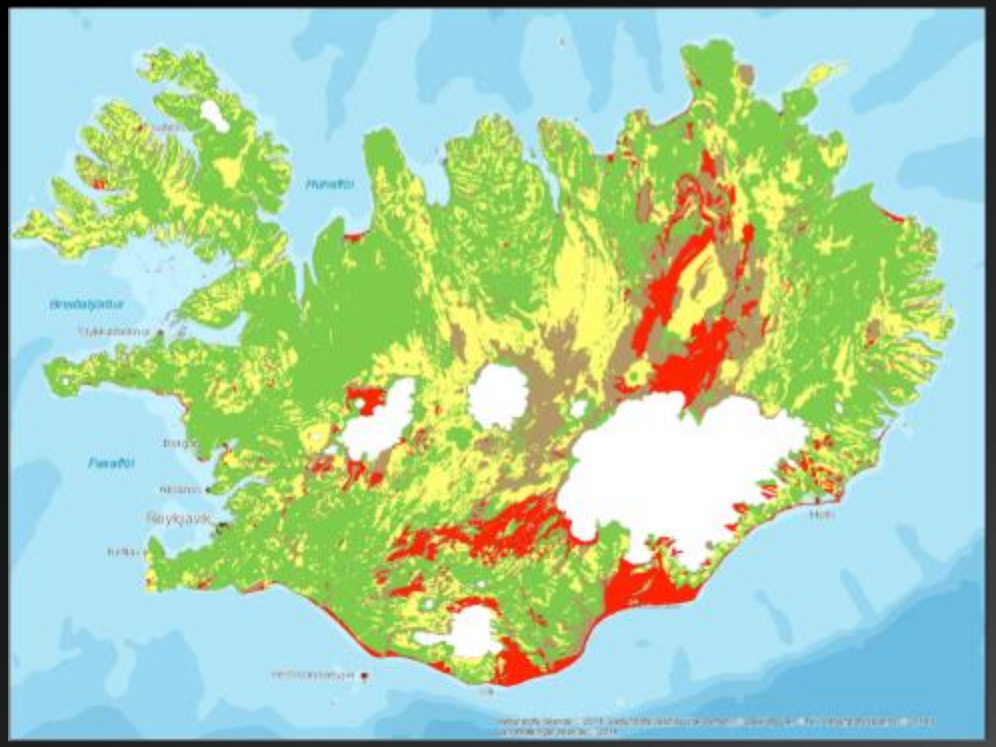
Effect of eruptions?

- How do explosive eruptions effect frequency of suspended material?
- What type of material is suspended?

New Holuhraun Lava Field, Icelandic Highlands

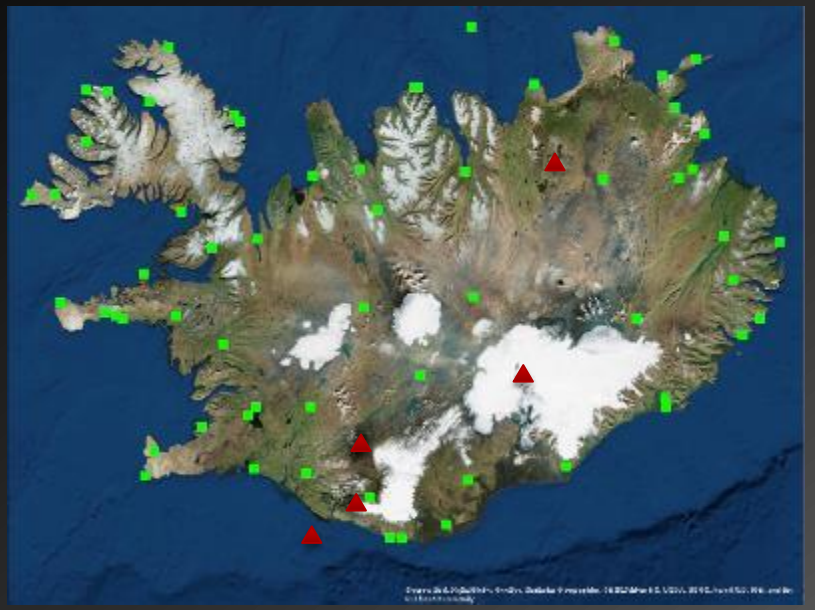
Sources in Iceland

- 20% of Iceland is covered in desert
- Originating from glacial sediment and volcanic eruptions
- Frequently windy conditions
- PM size dependent on source
- 135 days/year



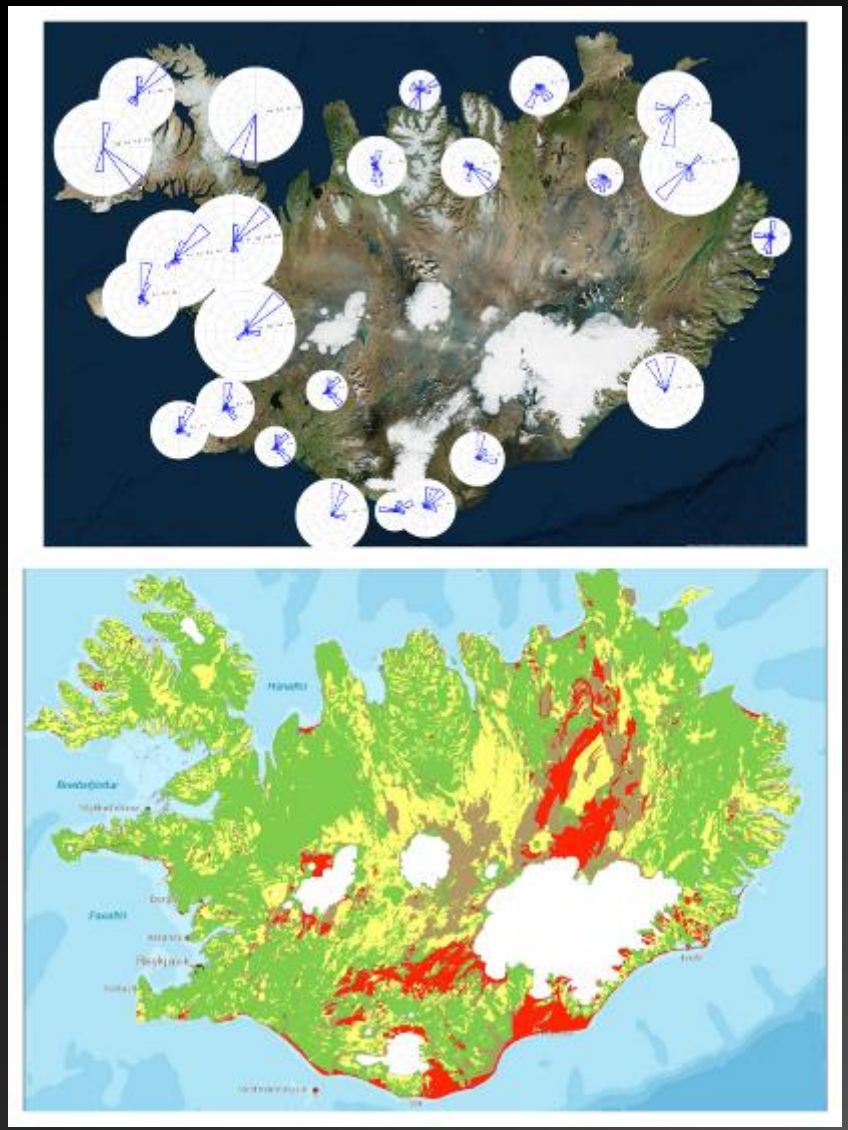
Data and Methods

- Weather observations of PM over 50 year period
  - Look for seasonal and spatial differences
  - Changes in frequency immediately following explosive eruption
  - Source area of PM
- Surface sample examination
  - Fresh ash vs. current material

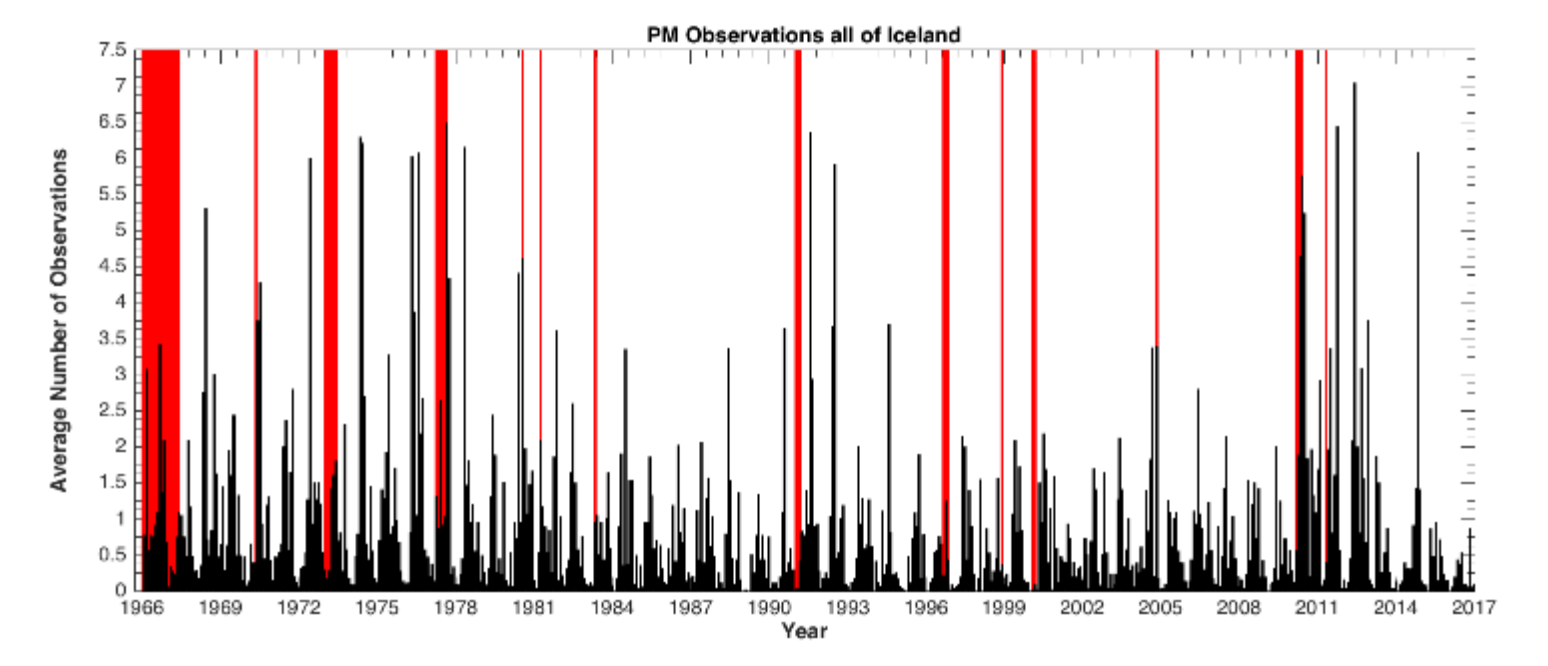


Is PM coming from Source Area?

- Plotted wind direction when PM was observed
- Most PM was observed when wind was coming from large source area



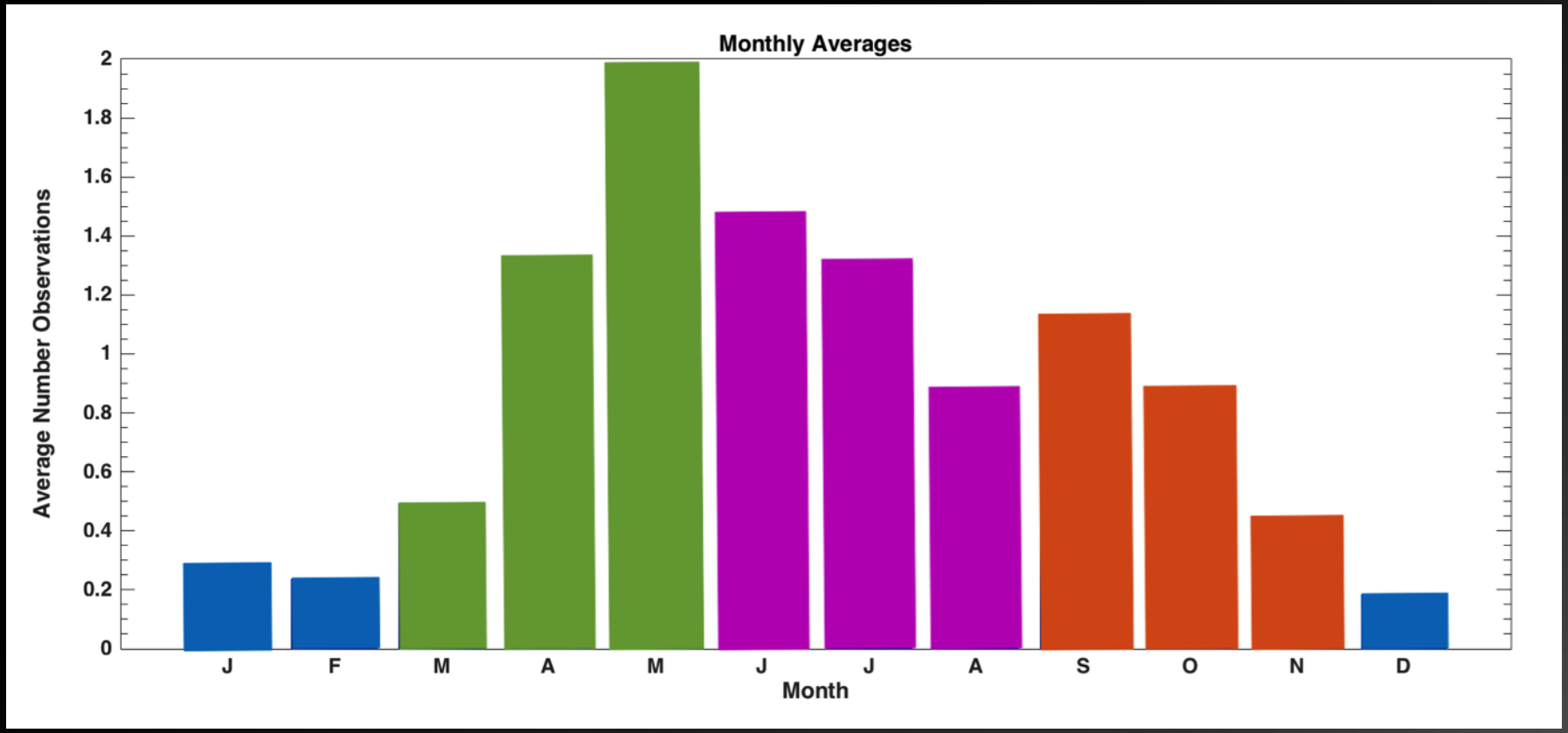
Annual Observations



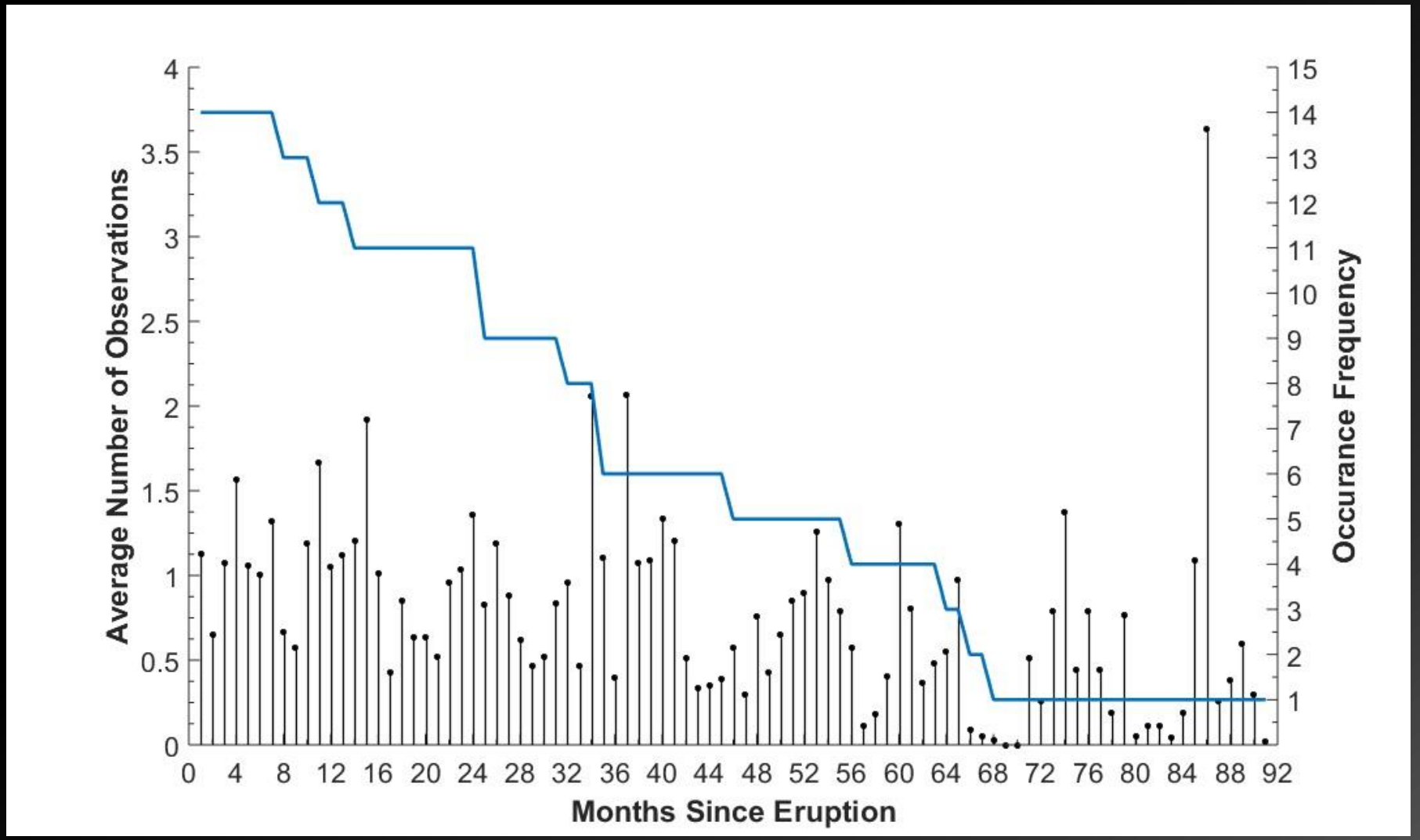
- No noticeable decrease in number of observations after eruptions
- Highest frequency occurring every spring

Seasonality

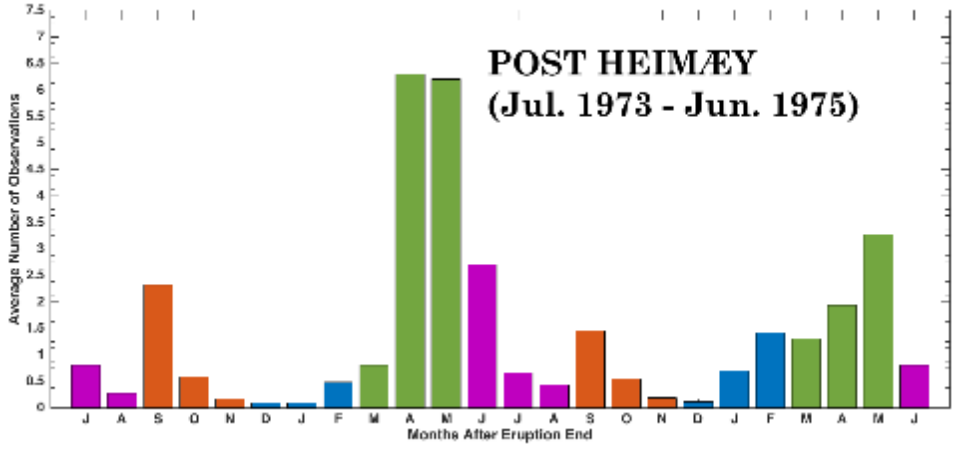
Average number of PM observations for every month

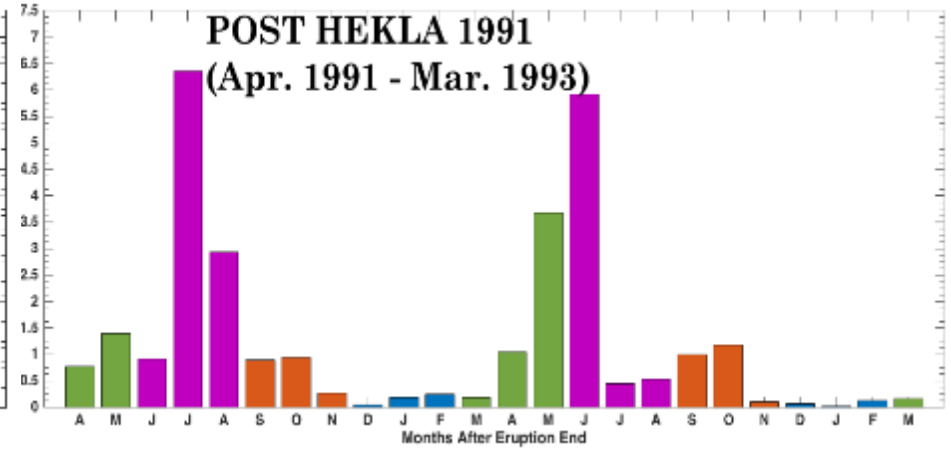


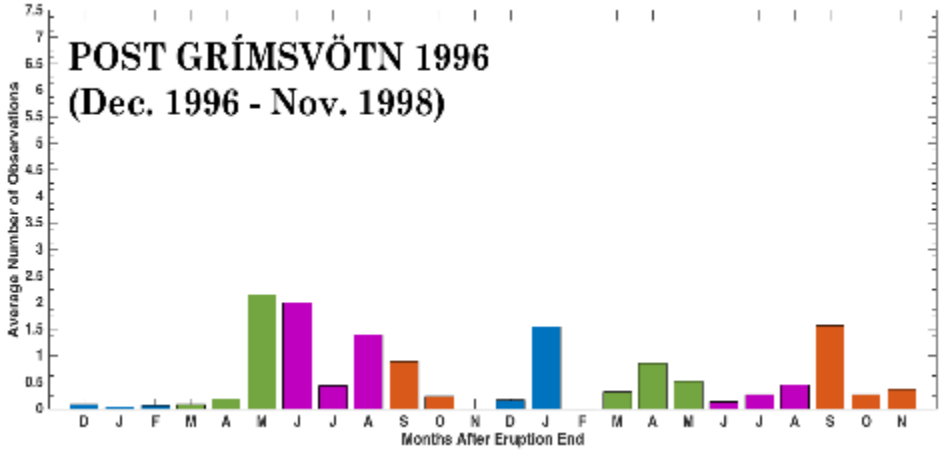
Frequency Following Eruptions

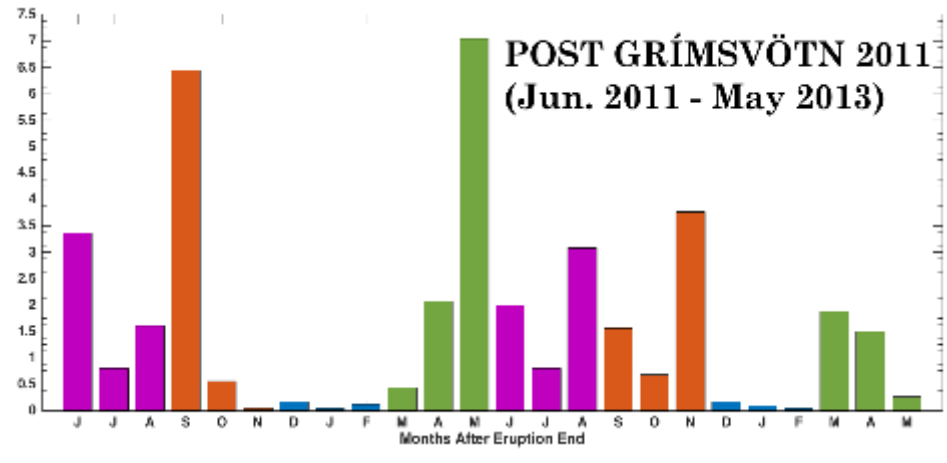


A Closer Look – 2 years post Eruption

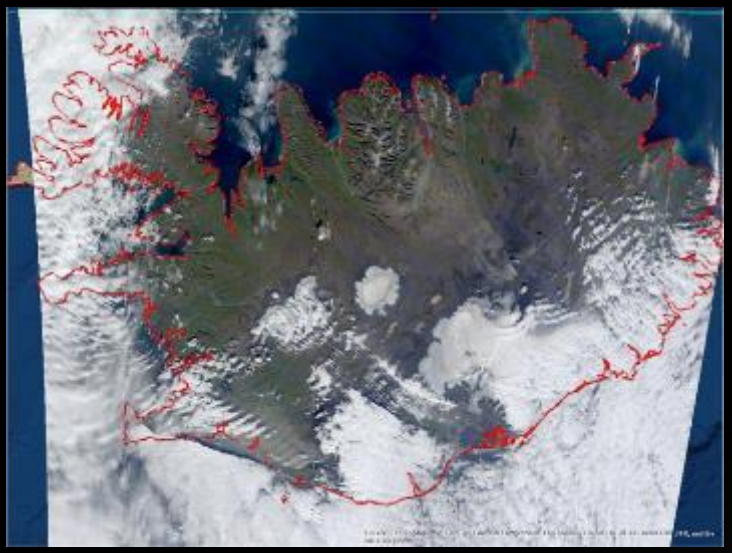








Confirmation via Satellite

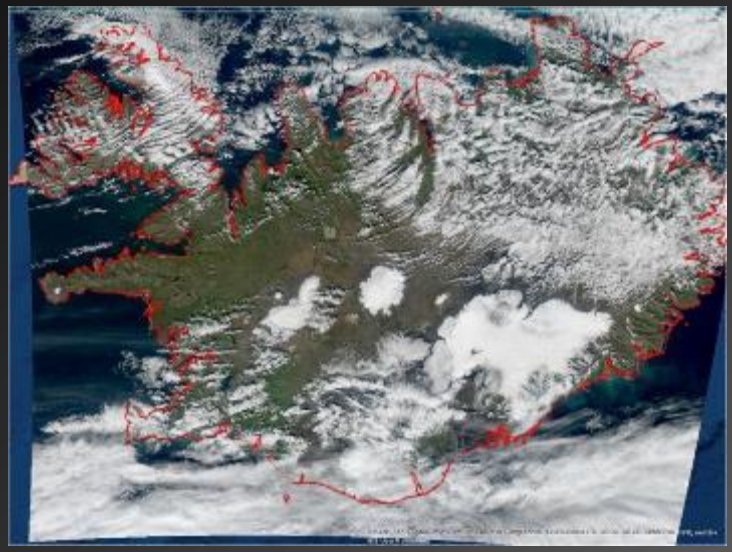


September 2010

May 2011

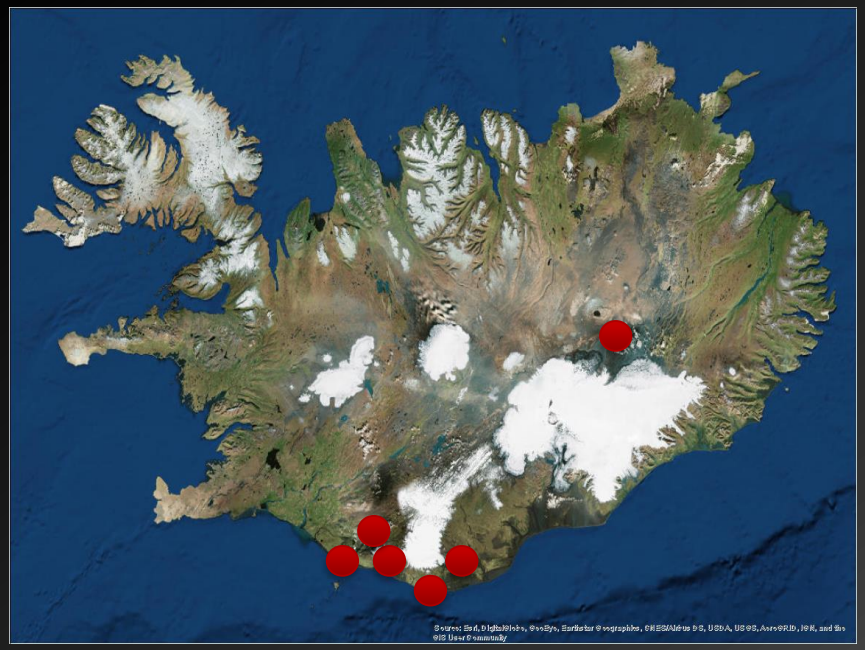
October 2011

August 2012

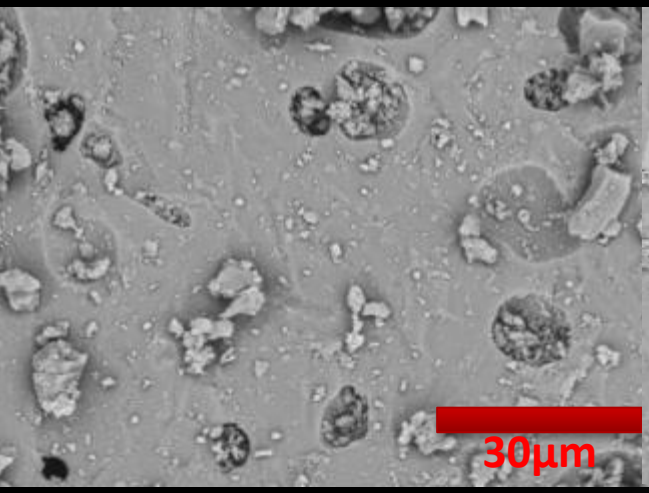


Type of Material Suspended

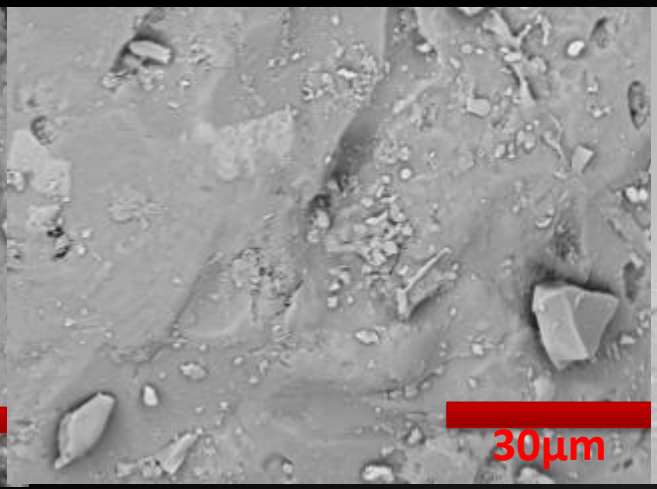
- Surface samples taken
  - During Eyjafjallajökull and Grímsvötn 2011
  - South coast and Highlands



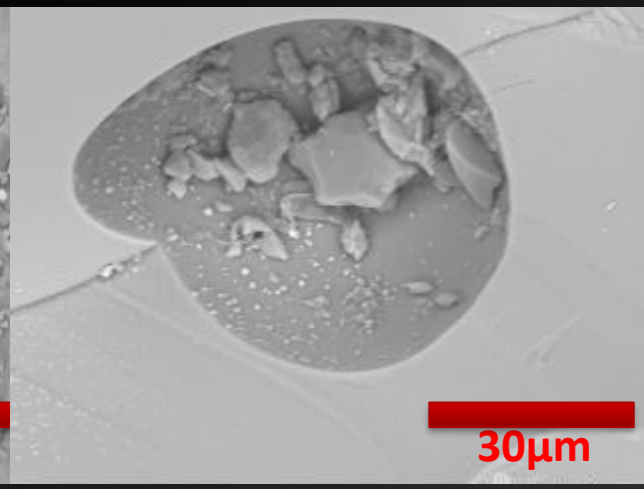
Physical Characteristics



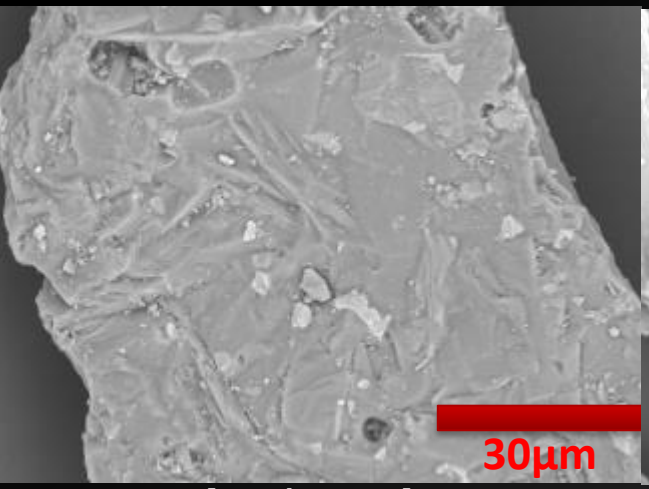
Vík, 2010



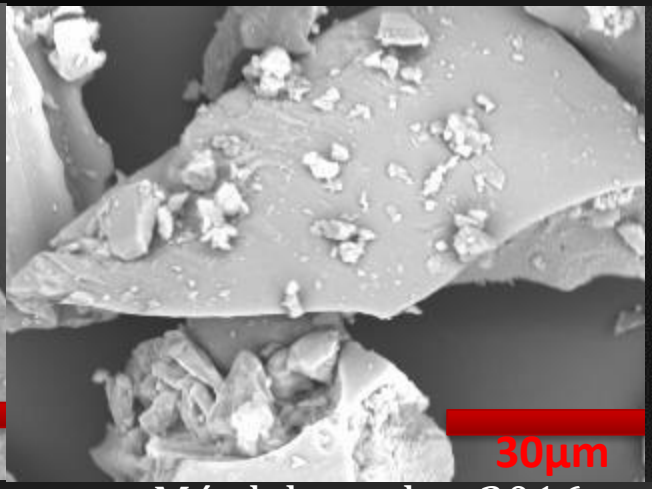
Skógarfoss, 2017



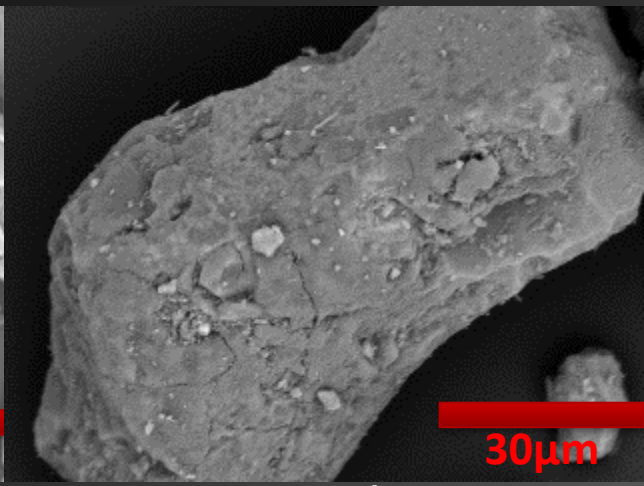
Landeyjasandur, 2017



Markarársandur, 2016



Mýrdalssandur, 2016



Svartá, 2017

Summary and Conclusions

- Explosive eruptions do not significantly change the frequency of observed PM in Iceland
  - Increase in observations only seen during and shortly after eruption
  - Evidence of new ash deposits only seen on the glaciers
- Seasonality shows spring to autumn producing the most dust events
- Only areas with vegetation seem to have particles similar to fresh ash
  - Aeolian and water erosion seem to dominate exposed surface samples, no ash found

Dust devil, S. Iceland *by L. Lehnert*