

# Miocene Aged Antarctic Ash

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# Purpose

To compare and correlate 5 ash samples to one another and other known volcanic ash deposits

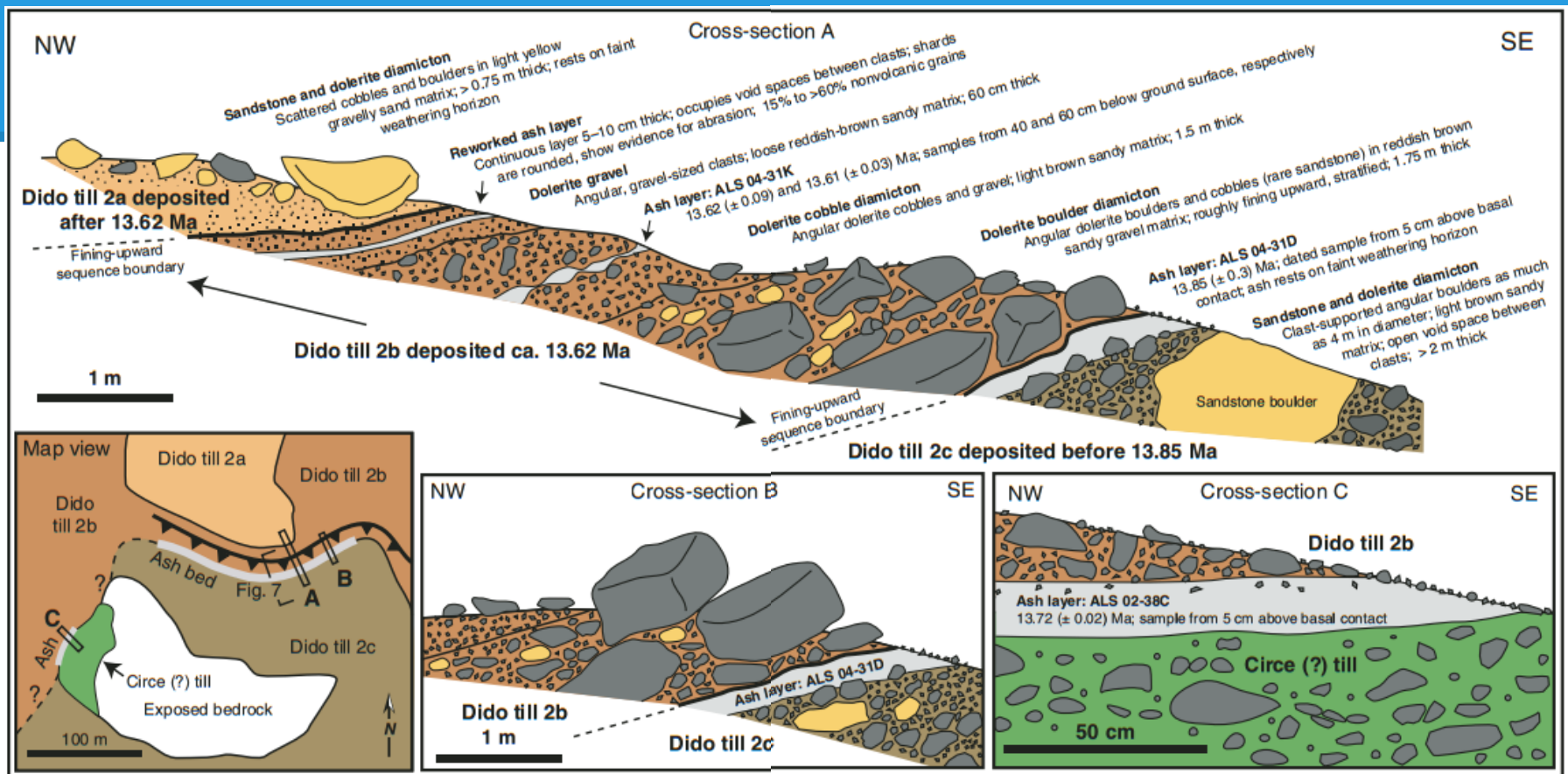
**Samples:**

04-31d	13.85 MA	In a Section
04-31k	13.62 MA	100 m to South
02-38c	13.72 MA	1km North: large error possible in date
00-30	13.94 MA	
05-55	14.07 MA	15 km East

# Setting



McMurdo dry  
valleys



(Lewis 2007)

# Sample Preservation



large glass shards, sample 00-30  
(Lewis 2007)

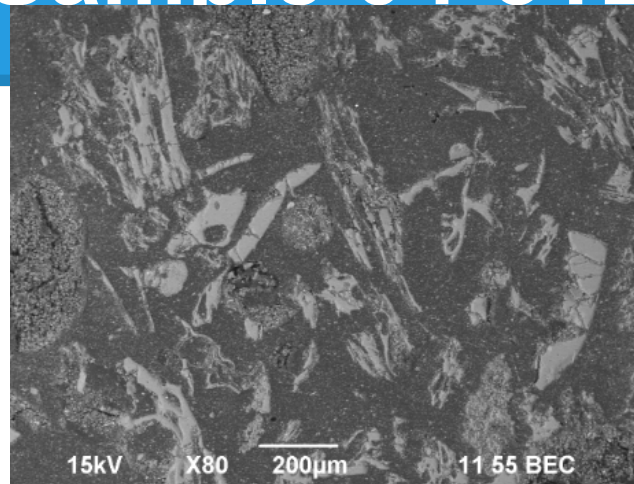
Minimal evidence of  
hydration cracking  
Very minimal reworking  
Very little clay formation

# Methods

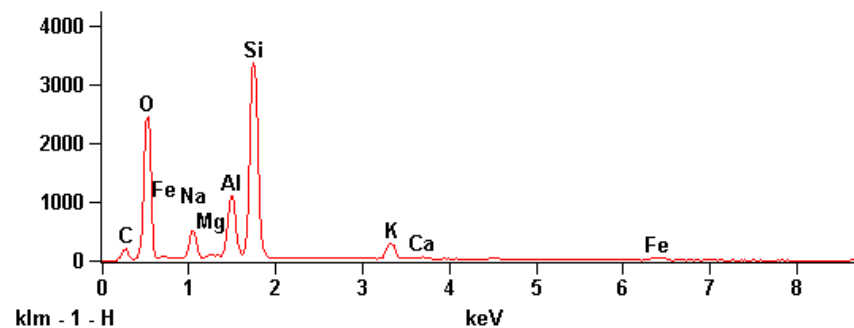
Data was acquired by adhering ash samples to an aluminum blank and performing an SEM analysis



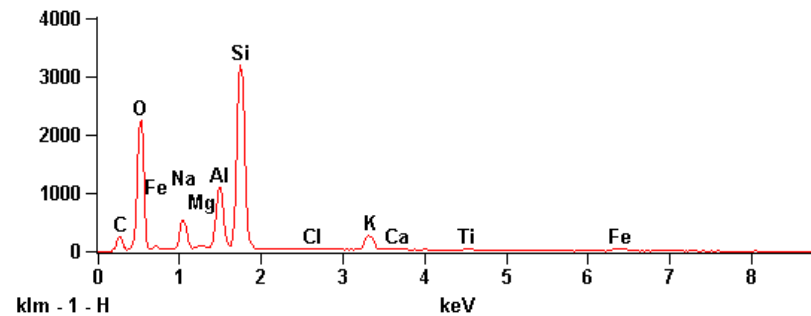
# Sample 04-31D



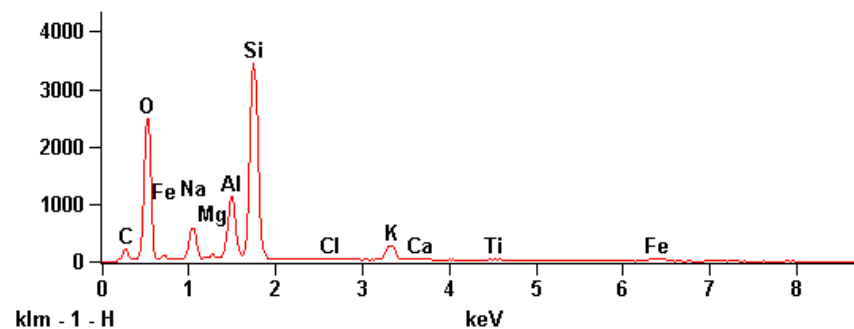
Full scale counts: 3376 147264 ANTARCTIC ASH 31D(1)\_pt3



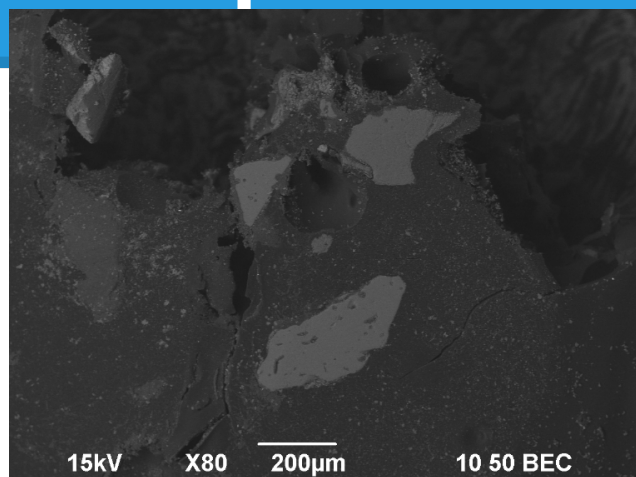
Full scale counts: 3200 147264 ANTARCTIC ASH 31D(1)\_pt2



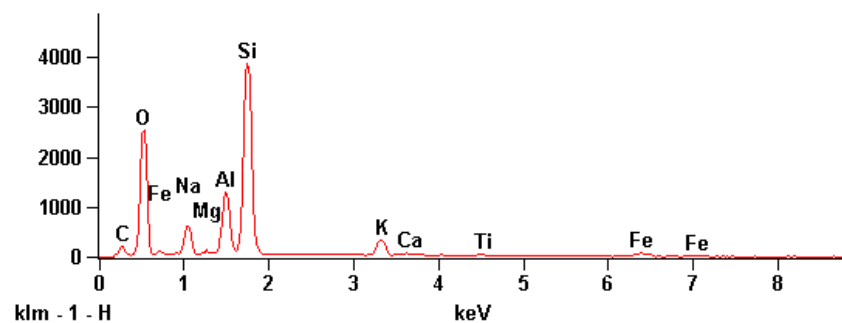
Full scale counts: 3449 147264 ANTARCTIC ASH 31D(1)\_pt4



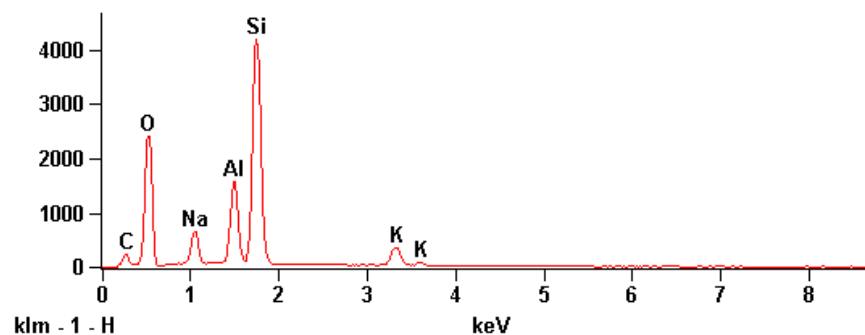
# Sample 04-31K



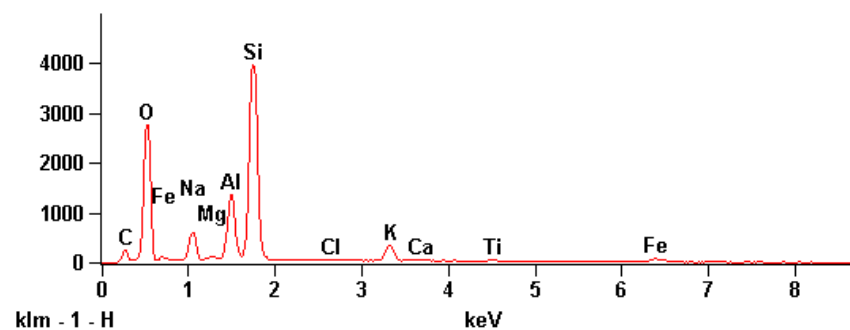
Full scale counts: 3848 147265 ANTARCTIC ASH 31K(1)\_pt1



Full scale counts: 4180 147265 ANTARCTIC ASH 31K(1)\_pt2

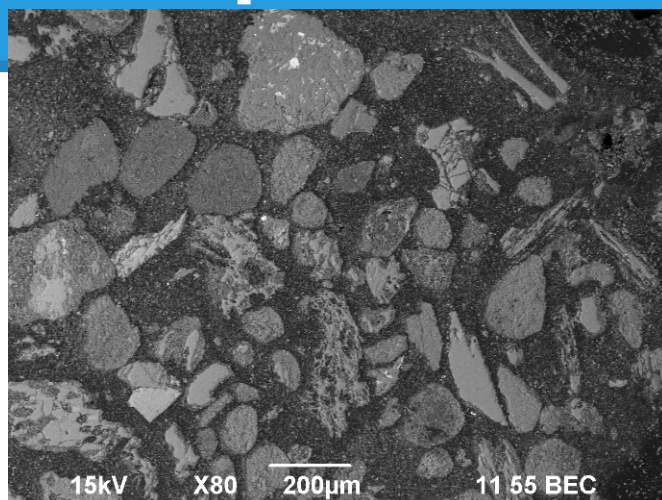


Full scale counts: 3952 147265 ANTARCTIC ASH 31K(1)\_pt3

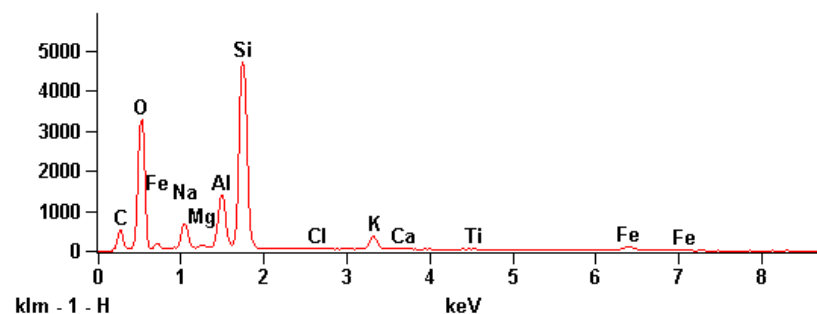




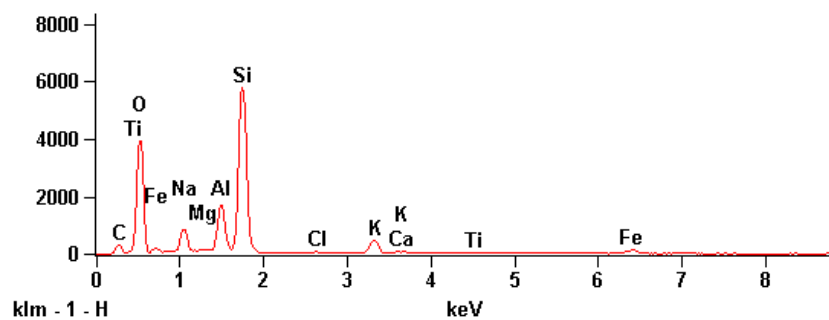
# Sample 02-38c



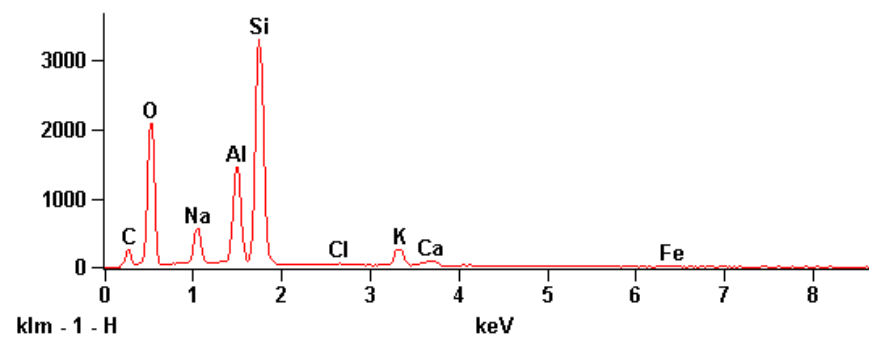
Full scale counts: 4702 147263 ANTARCTIC ASH 38C(1)\_pt2



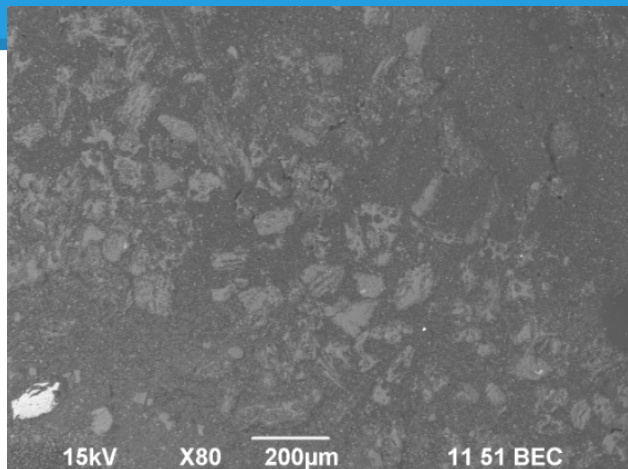
Full scale counts: 5785 147263 ANTARCTIC ASH 38C(1)\_pt1



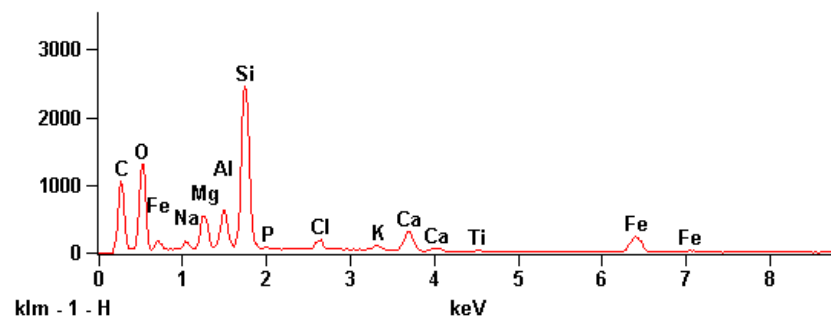
Full scale counts: 3286 147263 ANTARCTIC ASH 38C(1)\_pt5



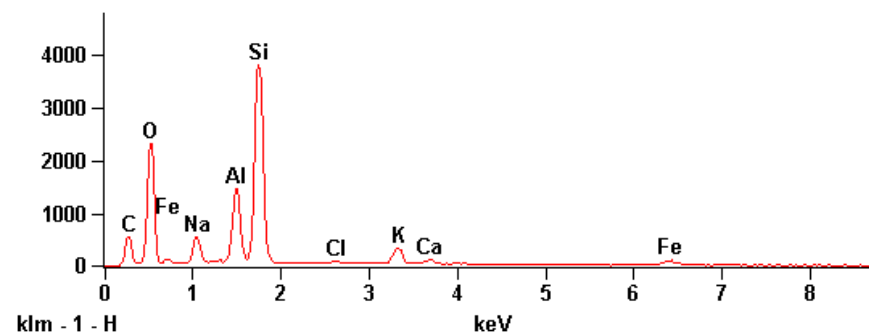
# Sample 00-30



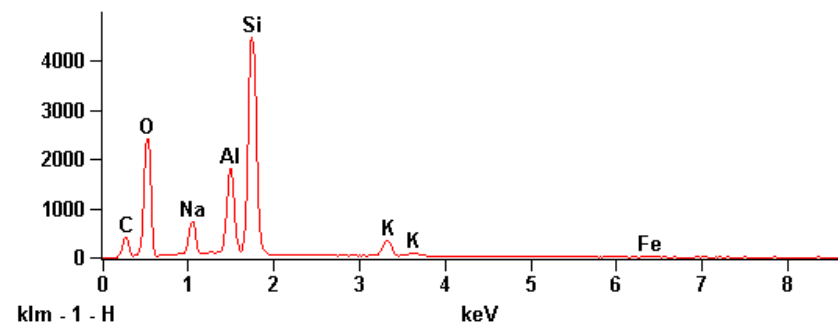
Full scale counts: 2457 147266 ANTARCTIC ASH 30(1)\_pt3



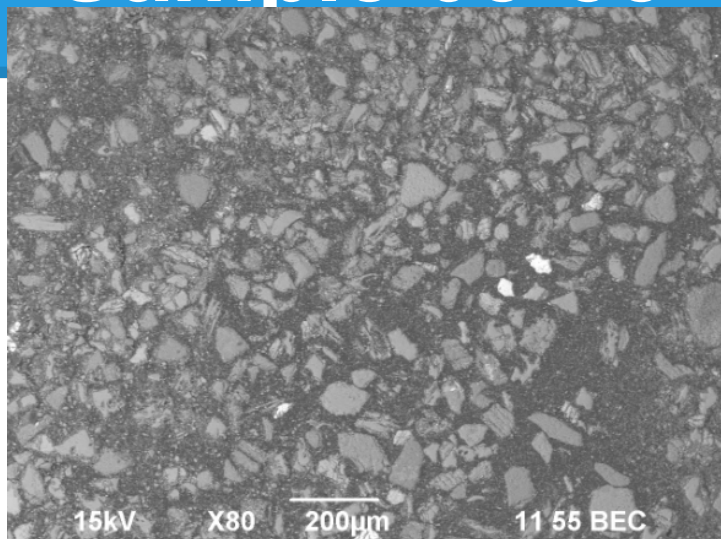
Full scale counts: 3806 147266 ANTARCTIC ASH 30(1)\_pt4



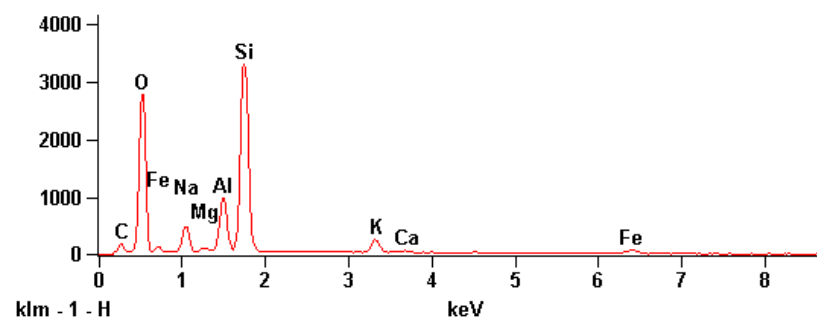
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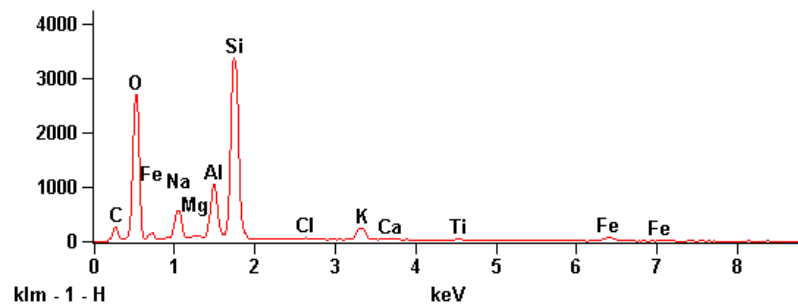
# Sample 05-55



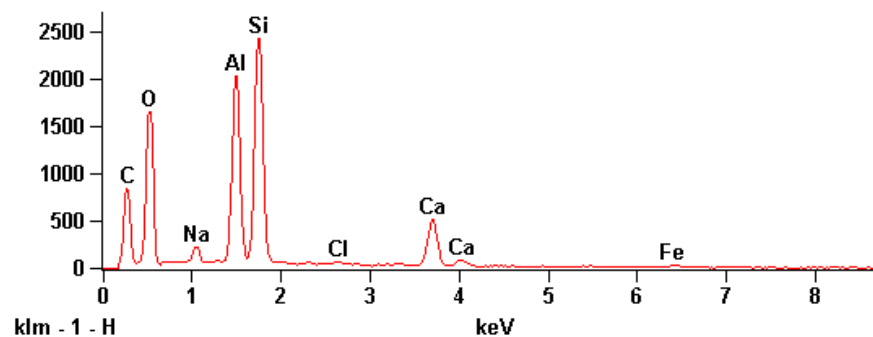
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Full scale counts: 3376 147267 ANTARCTIC ASH 55(1)\_pt3

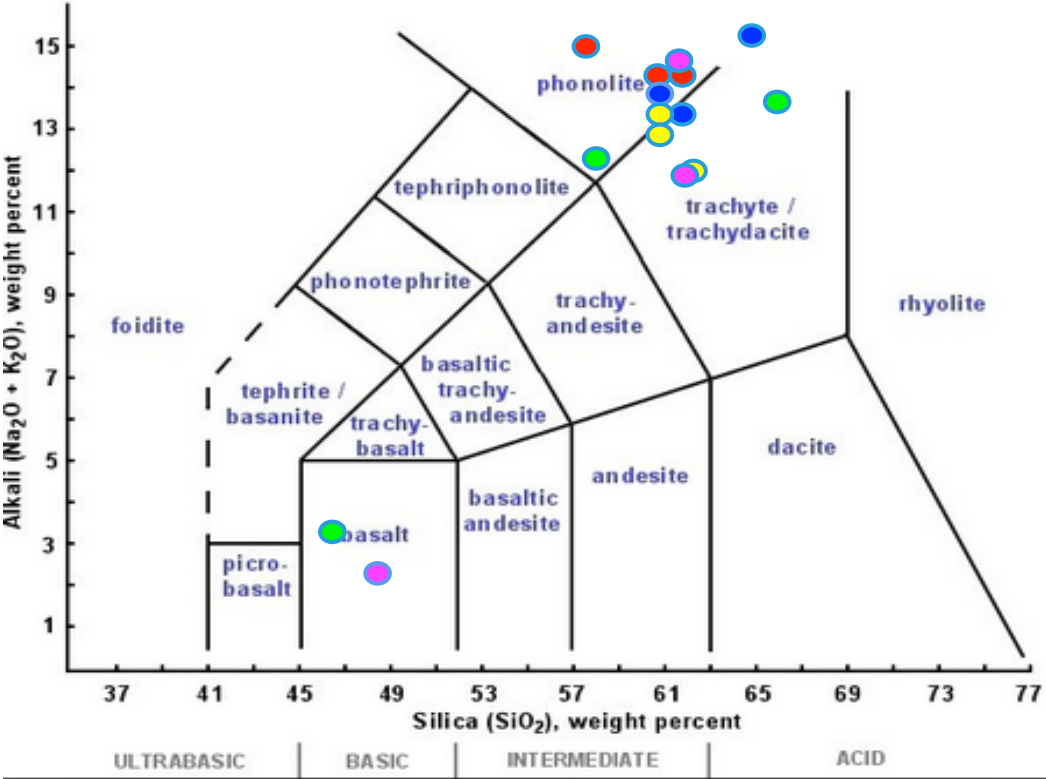


Full scale counts: 2415 147267 ANTARCTIC ASH 55(1)\_pt5

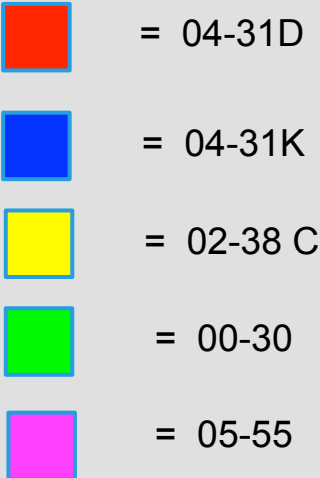


## Results on TAS Diagram

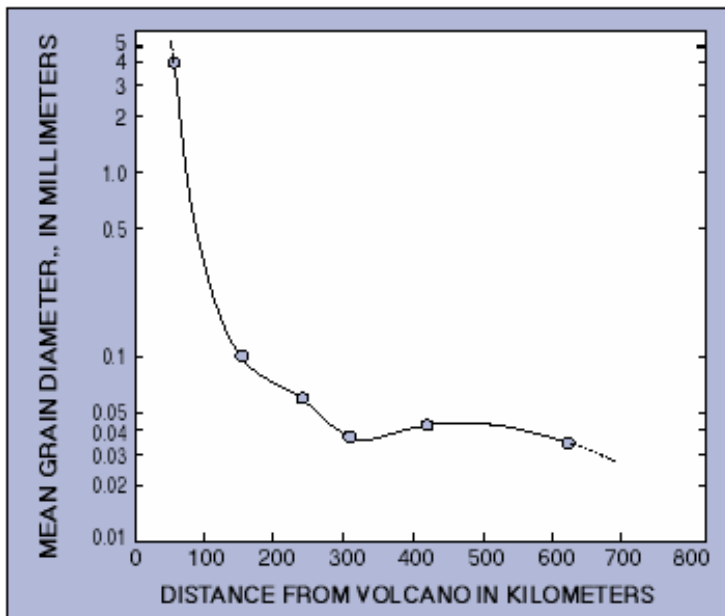
## VOLCANIC ROCK TYPES



## Legend



# Results



(Sarna-Wojcicki 1981)

While Phonolites and Trachytes are uncommon the case is not so in a more isolated area like Antarctica

The ash layers are of fairly similar composition and lead to the conclusion that the ash layers come from a similar source and most likely the same volcano.

There is however a great variance in grain size, leading to a few possibilities, a change in long term paleo winds, or a large range in the violence of volcanic explosions.

# Cause of Variance

With evidence of major climate change in this time period, when the polar climate became established (Lewis et al.), and the fact that most volcanoes will have great variations in both volume of material and violence of eruptions throughout their lifetime leaves this an open ended question.

# Conclusion

With very little difference in chemical composition between samples, there are still things that can be determined from the varying grain sizes of these samples, and may possibly hold some information to a vastly changing time in paleo climate.

# References

- Lewis, A.R., Marchant, D.R., Ashworth, A.C., Hemming, S.R., Machlus, M.L.,  
Major middle Miocene global climate change: Evidence from  
East Antarctica and the Transantarctic Mountains. Geological Society of  
America, November/December 2007, 1449-1461
- Wojcicki et al., Ash Properties and dispersal by wind. USGS. 2004.