



Identifying Glacial Movement Through Fluvial Sediment Analysis

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Objective

Analyze sediments in terms of composition and texture. Identify trends through time and space. Interpret the significance of those trends in regards to glacial movement and river dynamics.

Methods

Roundness

Sediments were analyzed and identified according to their degree of roundness. This is a good indicator of distance traveled over time.

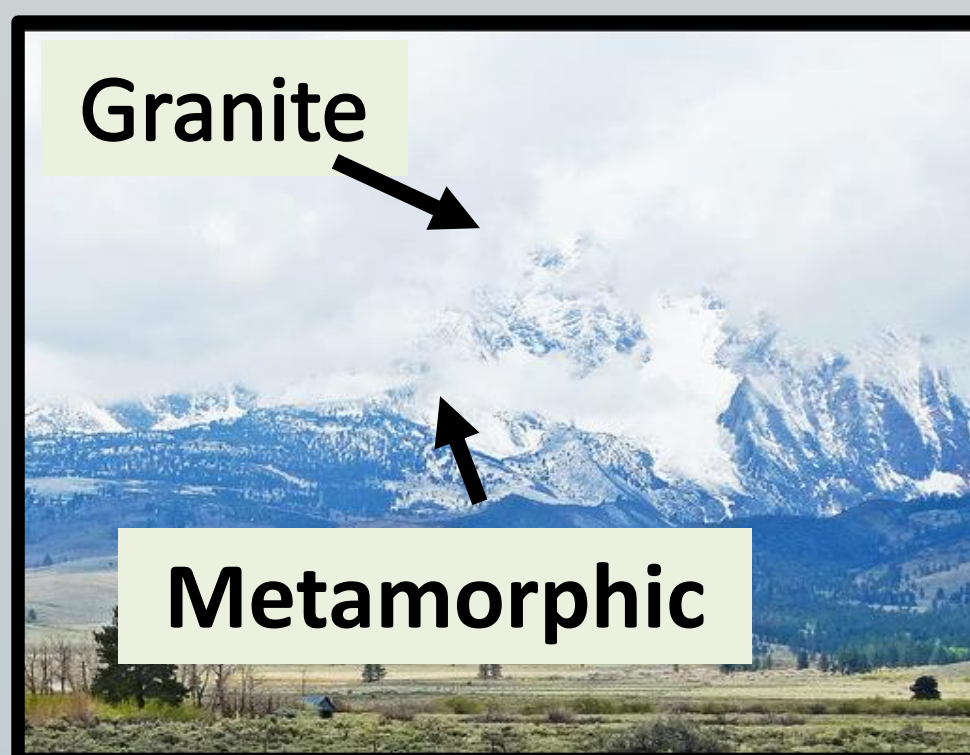
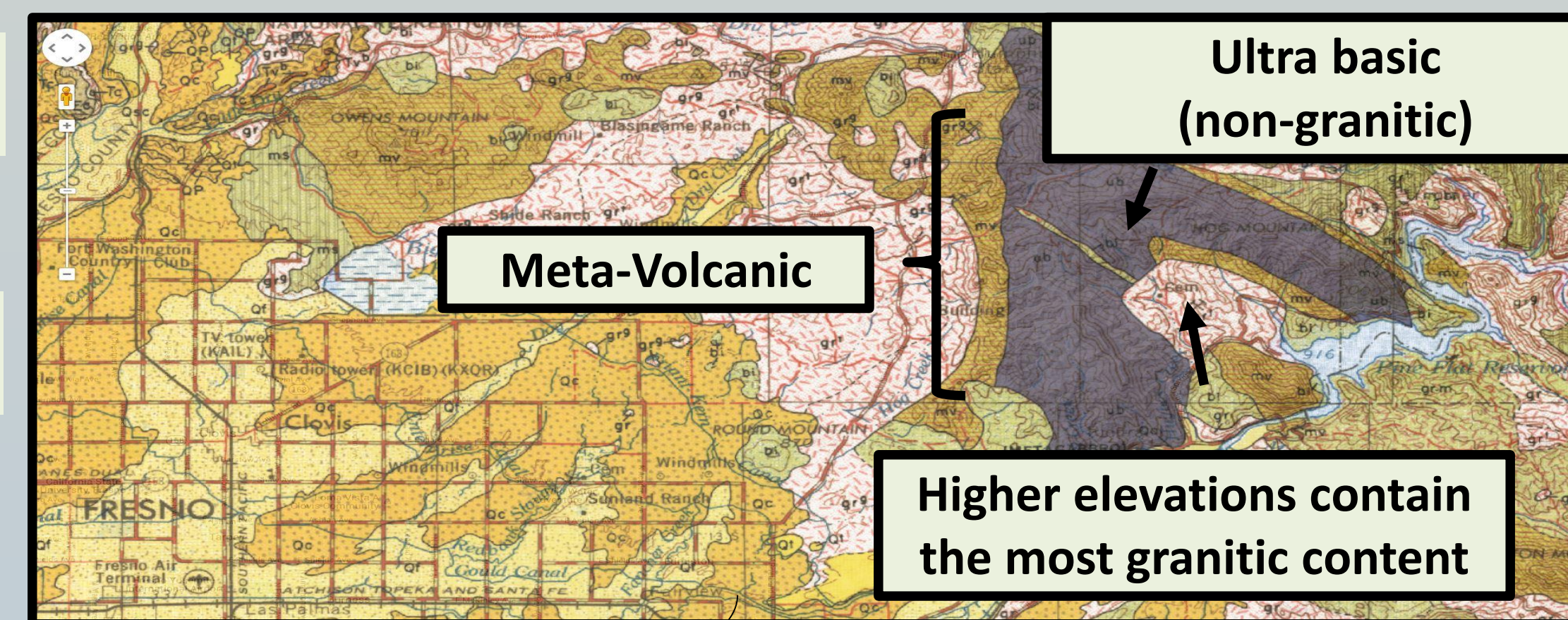


Fig.1
Granite sample

Fig. 2
Meta sample

Composition

All samples were identified as either granitic or metamorphic. This aides in determining the source of these sediments, which will also help identify the particular glaciation phase that may have taken place over a period of time.



Stratigraphic Columns

Outcrops were examined and broken down per unit. Units are determined by changes in characteristics such as: color, grain size, and composition. This particular breakdown is referred to as a stratigraphic column. These columns help distinguish patterns over time.

Grain Size

D50 is the mode, in terms of grain size. Samples were pulled from various units of each outcrop and sieved by size (all samples are measured in Φ .) After samples are categorized by size, each sampled unit is graphed to find the mode, also known as D50. Identifying the D50 in each unit helps identify grain size trends through time.

Results and Interpretation

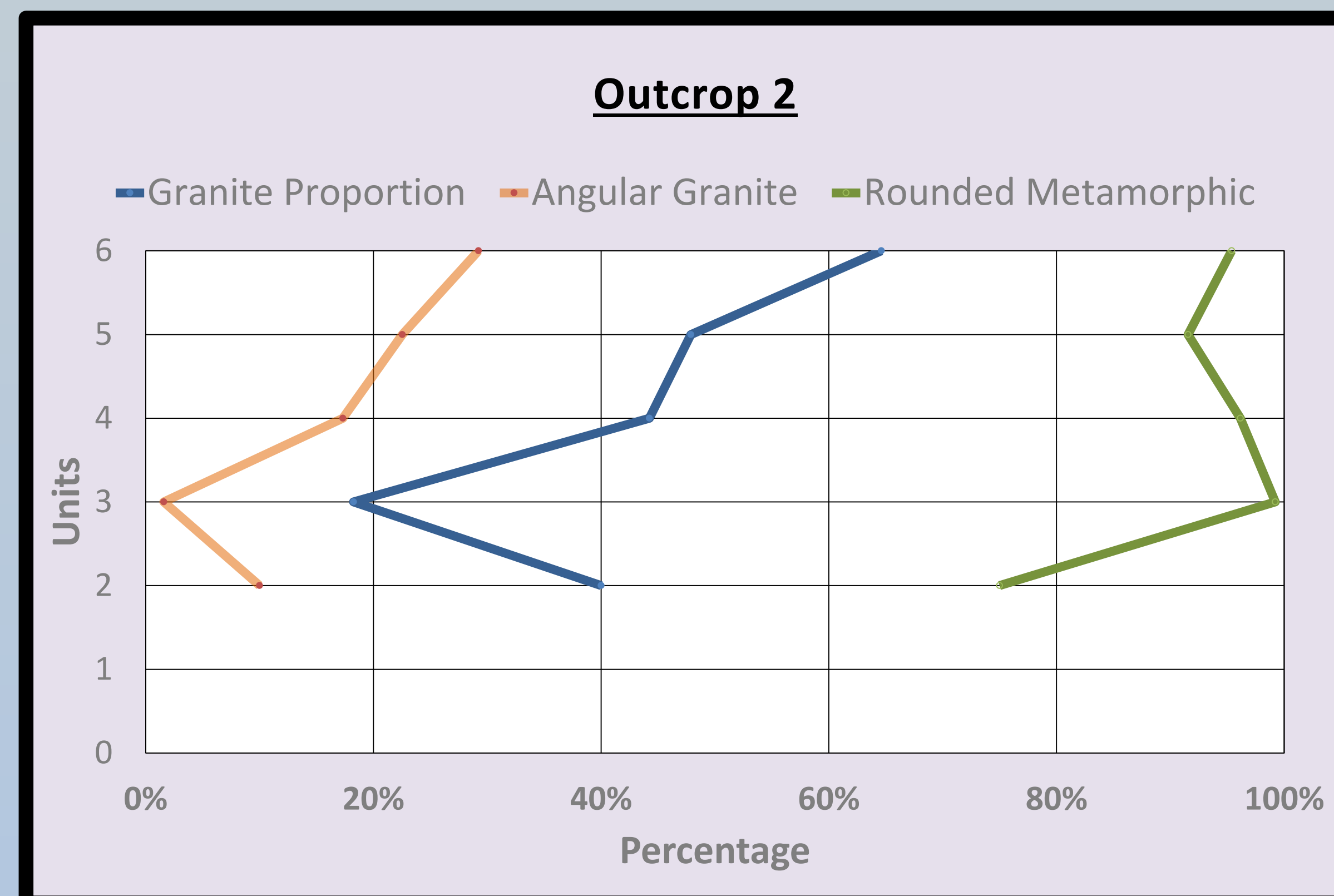
| Unit 2 | | | |
|---------|---------|---------|------|
| | Angular | Rounded | SUM |
| Granite | 10% | 30% | 40% |
| Meta | 25% | 35% | 60% |
| SUM | 35% | 65% | 100% |

| Unit 3 | | | |
|---------|---------|---------|------|
| | Angular | Rounded | SUM |
| Granite | 2% | 17% | 18% |
| Meta | 1% | 81% | 82% |
| SUM | 2% | 98% | 100% |

| Unit 4 | | | |
|---------|---------|---------|------|
| | Angular | Rounded | SUM |
| Granite | 17% | 27% | 44% |
| Meta | 4% | 52% | 56% |
| SUM | 21% | 79% | 100% |

| Unit 5 | | | |
|---------|---------|---------|------|
| | Angular | Rounded | SUM |
| Granite | 23% | 25% | 48% |
| Meta | 8% | 44% | 52% |
| SUM | 31% | 69% | 100% |

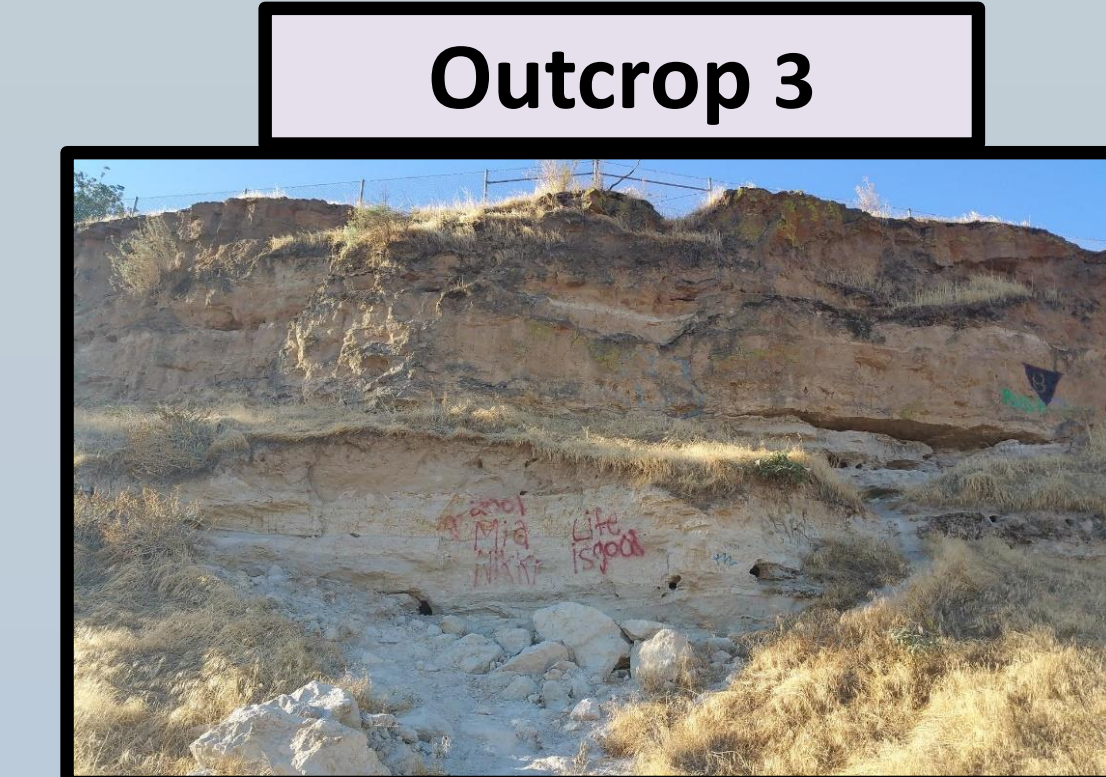
| Unit 6 | | | |
|---------|---------|---------|------|
| | Angular | Rounded | SUM |
| Granite | 29% | 35% | 65% |
| Meta | 5% | 31% | 35% |
| SUM | 34% | 66% | 100% |



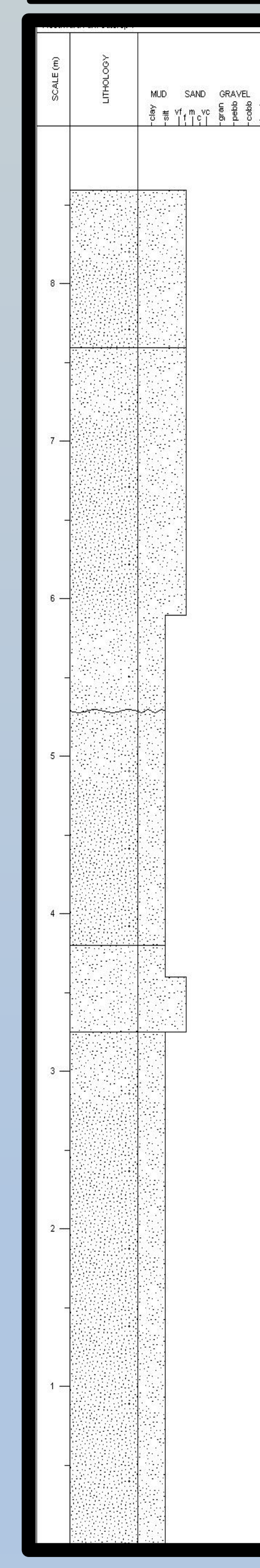
Observation: The decrease followed by an increase in granitic proportion is correlated with the angular granite trend. These trends are related, and should be noted as significant.

Interpretation: A correlation between angular granite and granite proportion support the idea that a glacier is responsible for the increase in granitic sediments. This would suggest that the sediment supply and discharge of a river are greatly influenced by the onset of a glacier. It can be assumed that a great deal of the discharged sediments are a direct consequence of plucking, discharge from abrasion, and or interaction with glaciers.

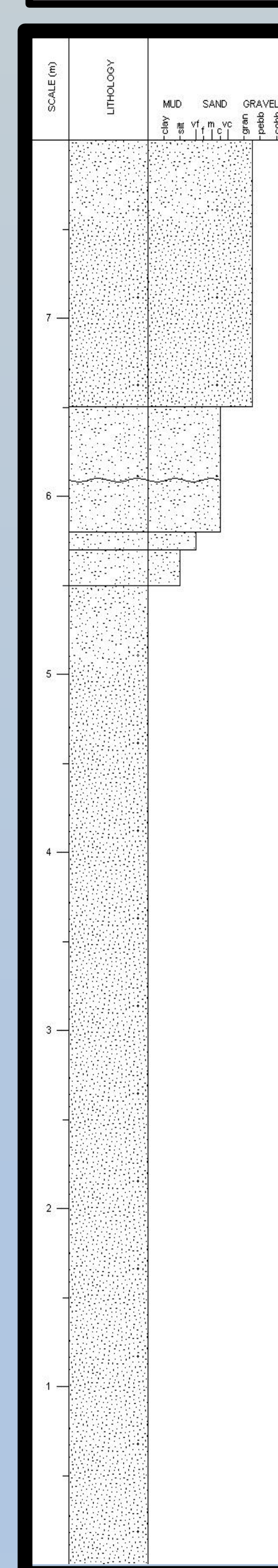
Outcrop Photos



Outcrop 3



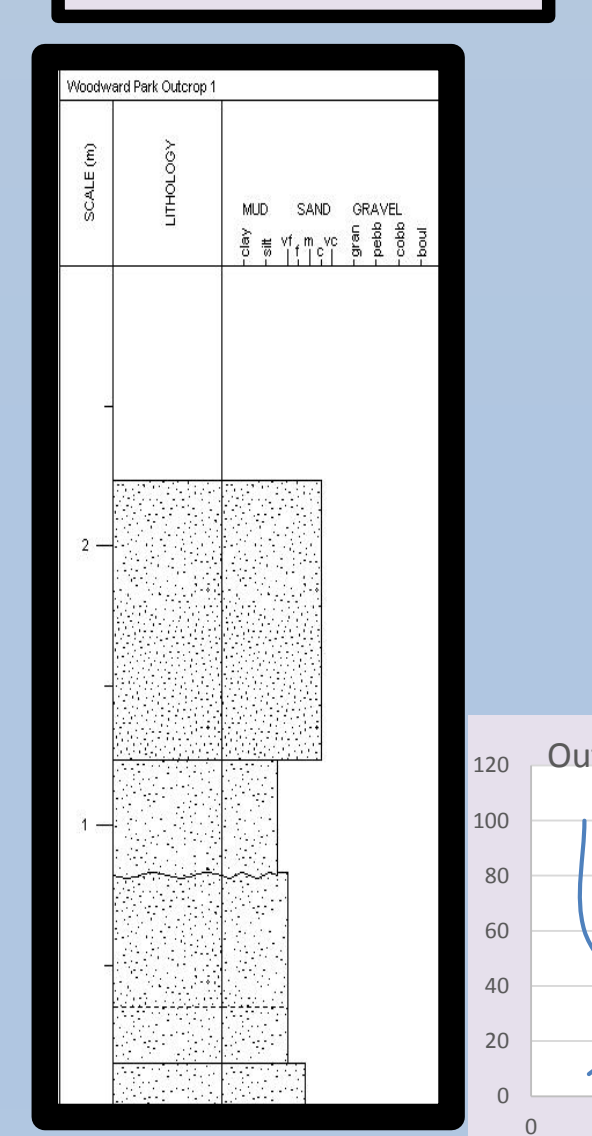
Outcrop 2



Observation: Each outcrop shows a different trend. Outcrop 1 shows a sudden increase followed by a decrease over time. Conversely outcrop 3 shows a decrease followed by an increase in grain size. While outcrop 2 shows consistency over time, in regards to grain size.

Interpretation: The trends present in grain size for each outcrop represents something different. For example, Outcrop 1 and 3 suggest a change in energy flow. While outcrop 2 shows a trend that may suggest consistent energy over time. When grain sizes are small and accompanied by larger rock discharge, we can assume the energy of the river is stronger than that of the river when grain sizes are large and discharged rocks are smaller.

Outcrop 1



Conclusion

The results of this study support the idea that the onset of a glacier is most likely responsible for the increase in granitic sediment supply. The correlation between angular granite and granite proportion also supports the idea that a glacier onset is most effective in the transport of these sediments. While a trend in granitic sediments helps support the idea of a glacial onset, it would be ideal for future studies to observe trends through time to see if we can identify a consistent pattern. In addition, the trends displayed through the D50 graphs support the idea that the river system is very complex. In that, there were no specific patterns laterally, which further supports the idea that trends seen, are indicative of that particular outcrop only. Consideration of collecting additional samples from the non sampled units is highly recommended to try and see if there are patterns that are not seen in this particular study.