Introduction

In the Yellowstone Volcanic Field, the Green Canyon Flow is one of several effusive lavas comprising the Big Bend Ridge Rhyolites that erupted between two caldera-forming eruptions: the Huckleberry Ridge and Mesa Falls Tuffs. The flow straddles the rim of Henry’s Fork Caldera, which was generated from the eruption of the Mesa Falls Tuff(1).

Objectives:
1) Determine a more accurate and precise $^{40}$Ar/$^{39}$Ar age for the Green Canyon Flow.
2) Establish the stratigraphic relationship of the Green Canyon Flow relative to the Mesa Falls Tuff.
3) Refine the volcanic stratigraphy of the flow in relation to the Big Bend Ridge Rhyolites.

Volcanic stratigraphy

1.30 Ma Mesa Falls Tuff caldera-forming eruption(3)

1.29 Ma Huckleberry Ridge Tuff caldera-forming eruption(4)

2.08 Ma Huckleberry Ridge Tuff caldera-forming eruption

Interpretations

- As determined by $^{40}$Ar/$^{39}$Ar dating, the Green Canyon Flow erupted at 1.2989 ± 0.0009 Ma.
- This places the flow in close temporal proximity to the Mesa Falls Tuff caldera forming eruption with an $^{40}$Ar/$^{39}$Ar age of 1.3001 ± 0.0006 Ma(3).
- This age also suggests the flow erupted ~150 ka after the Bishop Mountain Flow(6) and Lyle Spring Tuff(9), making it the youngest of the Big Bend Ridge Rhyolites.

Conclusions

- The Green Canyon Flow is the youngest of the Big Bend Ridge Rhyolites, but is indistinguishable from the eruption age of the caldera-forming Mesa Falls Tuff.
- Additional field mapping will assist in resolving the sequence of eruption events at this time.
- To better constrain the connection between small volume rhyolite flows and caldera-forming eruptions, future work on the Green Canyon Flow will examine zircon grain morphology and zoning patterns, trace element geochemistry, and U-Pb dating.

References

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