How clean is our laundry: Can we deliver the quantitative thermal histories that we promise?

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The state of our thermochron is strong!
How strong is the state of our thermochron?
The ternary system
thermochronologists-
geologists -
mineralogists
The ternary worldviews, thermochronologists-geologists-mineralogists
Temperature or Position

Time or Age(T)
Some Issues

- Intercomparison among systems
- Kinetics
- Success rate & skeletons
Multi-system approach is often best, but...

Systematic comparisons are few older mostly anecdotal haphazard
Kinetics

- Our database is spotty at best
- Practice in applied studies is uneven in...
  - error propagation
  - sample characterization
  - use of blanket parameters
- Sample-specific kinetics are...
  - time consuming, expensive
  - often hard to realize
  - essential

Shuster et al. 2006
Success rate

* Glass half full:
  - AFTA
  - $^4\text{He}/^3\text{He}$ apatite
  - $^40\text{Ar}/^{39}\text{Ar}$ K-feldspar

* Glass not-so-full:
  - all the other systems

Flowers et al. 2009
Unmentionables

- “Geologic” scatter
  Excess Ar in micas
  Bad-actor apatites

- Other laundry:
  error handling in general
  error handling for inversions
  kinetic standards & lab techniques
  your favorite here!
Unmentionables

• "Geologic" scatter, e.g., excess Ar in micas
  bad-actor apatites (outliers)

• Other laundry:
  error handling in general
  error handling for inversions
  kinetic standards & lab techniques
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Unmentionables

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Answers?

“Leader Maloop, the people yearn for real answers.”
Answers?
Possible Steps

- A community effort to...
  - develop kinetic standards
  - maintain open kinetic database
  - streamline analytical techniques
  - systematize techniques, data handling, and models