



Contribution ID: 1

Type: **Presentation**

Thermochronology - Short Course Outline

Tuesday, 13 August 2013 14:00 (3 hours)

AEON Earth Stewardship Science – Short Course, 13-14 August 2013

Thermochronology Short Course Outline

Organizers: Becky Flowers and Jessica Stanley, University of Colorado Boulder

Tuesday, 13 August 2013 (0.5 day)

Low temperature thermochronology: General background and technique (0.5 day = 4 hrs)

13:00 – 13:50 Fundamentals of thermochronology

Topics will include radioactivity and decay, diffusion, closure temperatures, partial retention, and the thermal structure of the lithosphere

14:00 – 14:50 Development and fundamentals of (U-Th)/He thermochronology

Historical view of He thermochronology, highlighting recent milestones of the last two decades. Details of the (U-Th)/He method, how to do analyses, reproducibility, uncertainties, and the effects of radiation damage, parent zonation, and inclusions on He dates

15:00 – 15:50 Interpreting He dates – classic examples

Examples of published and ongoing studies that have taken advantage of He thermochronology to constrain a variety of geologic and tectonic processes. Topics may include the use of He thermochronology in convergent and divergent orogens, landscape evolution, the thermal history of sedimentary basins and implications for hydrocarbon exploration, detrital thermochronology, and spatial and temporal patterns of erosion

16:00 - 16:50 General discussion and HeFTy software downloads/organization.

Wednesday, 14 August 2013 (0.75 day)

Low temperature thermochronology: Applications and case studies (0.75 day = 6 hrs)

08:00 – 09:10 Case study: Southern African Plateau

09:25 – 10:35 Tutorial #1: Modeling He dates, the basics

Hands-on exercise using freely available software (HeFTy) to create thermal models using He data

10:50 – 12:00 Case study: North American interior

13:00 - 13:30 The Future of He thermochronology

Discussion of where He thermochronology is headed, highlighting recent work on applying and interpreting He datasets, including an emphasis on minerals other than apatite and zircon. Examples may include wildfire thermochronology, clinker dating, double-dating, and more sophisticated modeling approaches

13:30 – 14:00 Brainstorming and discussion of ideas for He work on problems in Africa

14:00 – 15:00 Tutorial #2: More complex examples

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Track Classification: Workshop Programme