GSA Research Grants - Steps to Success

29 Nov. 2018, 12:00 - 1:00 p.m. (MST)
18 Dec. 2018, 10:30 – 11:30 a.m. (MST)
Presented by Alex Isern & Ian Ridley
Moderated by Matt Dawson

THE GEOLOGICAL SOCIETY OF AMERICA®

Webinar Overview

Goal:

- Attendees will be able to write a successful proposal for a **GSA Graduate Student Research Grant** (or other similar grant)

Format:

- Overview of GSA's grants programs
- Overview of the application process
- Walk through individual steps of the application
- Discuss what happens after you apply (review process, follow-up)
- Conclusion
- Survey
- Recording sent

GSA Graduate Grants Overview

Goal: Provide partial support of master's and doctoral thesis research in the geological sciences for graduate students enrolled in universities in the United States, Canada, Mexico and Central America.

Facts:
~800 students apply
~400 funded (50%)
Avg. grant = $2,044
Range = $500 - $2,500

Specialized Awards
- ExxonMobil
- Subject Matter
- Geographic Area
- Demographics
- Divisions
- Sections

Other Grants/Awards
- AGeS (Geochronology Grants)
- Undergraduate Research Grants (Sections)
- Division Awards
- Farouk El-Baz (Desert Research)

Follow the Instructions

Read through the website thoroughly and utilize available resources

Your proposal must reflect your own original work (the research & the writing)

Ensure your Eligibility

- GSA Member ("Student Member")
- Graduate Student
- Currently enrolled in an institution in North America or Central America
    - International students are eligible
- Can receive up to two grad grants

Meet the Deadlines

- Student application due 1 Feb. 2019, 5:00 p.m. (MST)
- Advisor appraisal due 3 Feb. 2019, 5:00 p.m. (MST)
- Start early! (*System opens 1 Dec.*)
- Allow your advisor ample time to submit appraisal

Parts of the Application (& Criteria)

Problem, HYPOTHESIS, overall objectives
- **Clearly defined?**

Scientific & Societal Significance
- **Clearly stated & convincingly significant**

Research plan; how it will test the HYPOTHESIS
- **Clearly stated, well-conceived, and success likely**

Budget, Budget Justification, Available Funds
- **Budget well-justified**

Relevant Figure
- **Well presented - helpful**

Personal & Academic Information

Resume/CV

References

Progress Report (from past GSA grant)

Advisor Appraisal Letter

Overall Quality of Proposal
- **Well presented, organized, clear**

Hypothesis - Must be Crystal Clear

Introduce your project with disciplinary and regional context.

- Capture the reviewer's attention early.

Describe the **problem** you are addressing and the **hypothesis** you plan to test

- Use the words **problem** and **hypothesis**; make it very clear

May test competing hypotheses to address a broader problem/question

- Your test can simply set out to support a hypothesis; it doesn't need to solve it completely

Connect the hypothesis clearly and logically to the research plan

- Do not leave it to the reviewer to connect the dots
- Example: Hypothesis X predicts that Y will happen because…
    - Therefore, it follows that test Z could be applied to learn if Y actually happened.

Scientific & Societal Significance

Ask this: "If I am successful in doing everything I describe, how many scientists would want to hear the results?"

- If answer is “not many”:
  - Rethink why you chose the project an
  - Explain its importance more clearly and convincingly

Your project need not tackle the largest or most pressing problem

- But show how your results can contribute to the bigger picture
- Avoid “forcing” a societal significance

Put your project in a broader context for the reviewer

- Show you have done your homework
- Cite relevant publications

Example of Scientific & Societal Significance

Topic: Paleoseismology of Rose Canyon Fault

Not: “The seismic history of Rose Canyon Fault has not been studied previously”

Instead: “The seismic history of fault zones are critical to developing accurate hazard assessments. The magnitudes of prehistoric earthquakes, their timing, and their recurrence intervals are significant in developing such assessments.”

Research Plan - Describe what You Will Actually Do

Explain clearly how these steps will lead you to answers to the questions you describedConnect back to the problem/hypothesis

Be specific

- If mapping: What features? Where? What scale?
- If collecting or analyzing samples: What? How many? With what methods or equipment?
    - *Get involved in sample analysis if possible; make it an educational experience*

Show that the plan is carefully thought out

- Is the problem well-constrained and feasible?
- Will you be able to collect the data you need?
- Is the scope of work reasonable for the given time frame?
- Are the techniques appropriate to the questions asked? Will they address the problem?

Budget - Provide Details, Follow Rules

You may request up to $2,500

Your granted amount depends on:

- Your ranking: Top-tier proposals receive 100% of the requested amounts, 2nd tier receives ~80%, and so on
- Whether your budget items are allowable

If your project > $2,500, explain how you will fund the remainder

Your project must be distinct from larger projects already funded by another source

Funds cannot already have been spent for this exact project

Funds may not be requested for work already completed

Allowable Budget Items

- Travel costs to the research area
- Travel in the field
- Per diem (during research-related travel)
- Room and board (during research-related travel)
- Services of a technician or field assistant
- Funding of chemical and isotopic analyses
- Specialized equipment not normally available to the student
- Internal university research expenses
    - equipment usage, rental of university equipment, film, supplies, computer time, software, thin sections and in-house charges for analytical instruments
- External university research expenses
    - expenses for equipment, expendable supplies, and machine charges will be considered by the committee if fully justified and not available from other sources

Disallowed Budget Items

- Salary/stipend (for student or advisor)
- Advisor participation
- Maintenance of the families of the grantees and their assistants
- Tuition costs (for normal coursework)
- Ordinary field equipment (cameras, GPS, basic software)
- The purchase of some services to conduct research
- Travel, registration, or presentation for professional meetings
- Reimbursement for work already accomplished
- Publication costs
- Institutional overhead, or “indirect” costs

Budget Justification

Clearly explain what each item is and justify why it is needed

Explicitly tie the budget items to the research you outline in your proposal

Explain how much each item costs, and how you know the cost

Provide accurate prices for each item and sum them all properly (check your math)

Give a specific breakdown for each cost

- “Food in the field for 10 days at $12/day, total $120”

List budget items in decreasing order of priority

- 1st item = most important

Show other funding you already have or are requesting from other sources

Example Budget Justification

Flight		$817
Ride share	2@ $30	$60
Lodging	7@ $137	$959
Per Diem	8@$59	$472
Lab supplies and hourly use fee		$150
Total		**$2,458**

Justification:
7 days instrument time (Stanford-USGS SHRIMP lab) scheduled February 3-10, 2016

Alaska Airlines FAI SFO FAI (only carrier servicing FAI, priced 10-20-2015)

Eco-lodge ($137 per night) cheapest option available within walking distance of SHRIMP and several restaurants, meaning no rental car is necessary.

SHRIMP lab requires users purchase their own epoxy for mounting grains ($30) and use of heavy liquid separation lab (~4 hrs @ $30/ hr).

More Budget Justification Examples

Hertz Rental Car: 9 days at $89. Pickup with 4WD is required to carry field equipment and reach remote mountain field sites.

Gas: 357 miles Denver to Gunnison (357 x 2), 50 miles per day to field site (50 x 8).
1,114 miles x gal/18 mi x $4.15/ gal= $257

Samples must remain frozen prior to analysis, requiring storage in dry ice (30 lbs @ $5.00/lb) and overnight shipping (3 coolers at $45 ea).

WD-XRF 12 samples @ $16 at Activation laboratories

Shipping to Activation laboratories via Fed-Ex $35

Arizona Laboratory for Emerging Contaminants: 55 element ICP-MS 12 samples @ $37

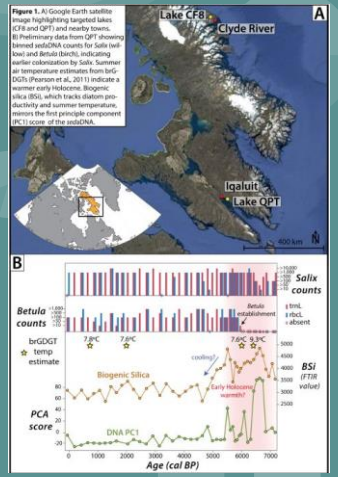
Acme labs: Radiogenic nuclides 12 samples @ $150

An Effective Figure Helps Explain your Research

Required: A pertinent figure that **enhances the proposal** (1-page PDF < 5MB)

1. Purpose of the figure:
    a. Explain some complexity in your research; save text
    b. Illustrate concepts to be tested in your research; may also include location, data results, etc.
    c. Highlight impact of your research
    d. Attract reviewer's attention; build interest

2. Appropriate figure types:
    a. Image - photo, cartoon, schematic
    b. Map
    c. Graph/chart
    d. Conceptual model
    e. Flow chart of research plan



Elements of an Effective Figure

- Adds to & extends the proposal
  - Doesn't just restate information
- Visually appealing & interesting
- Focused, clear, free of clutter & complexity
- Clear title--orient the audience
- Legend, scale bars
- Good, descriptive caption--explains why figure is useful
- Annotated to highlight key elements
- Text is easy to read at screen resolution; images are high resolution
- Use colors to make understanding intuitive
- May have multiple parts (boxes, sections)
- Originality--not cut & pasted from elsewhere; created specifically for this proposal
- Cite references, if appropriate
- Discussed and explained in the proposal text

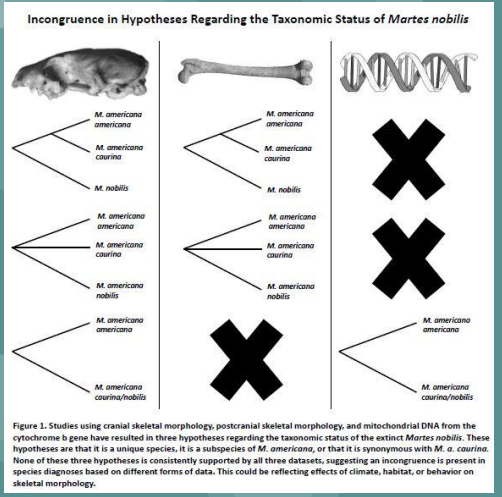


Figure 1. Studies using cranial skeletal morphology, postcranial skeletal morphology, and mitochondrial DNA from the cytochrome b gene have resulted in three hypotheses regarding the taxonomic status of the extinct *Martes nobilis*. These hypotheses are that it is a unique species, it is a subspecies of *M. americana*, or that it is synonymous with *M. a. caurina*. None of these three hypotheses is consistently supported by all three datasets, suggesting an incongruence is present in species diagnoses based on different forms of data. This could be reflecting effects of climate, habitat, or behavior on skeletal morphology.

"A picture is worth a thousand words"

Get a Strong Advisor Appraisal

Purpose: To evaluate the student's ability to conduct the research and the validity of the proposal.

- NOT to simply further explain the proposal.)

From your primary research advisor

Advisors: Do not need to be GSA members
Do not need to be at the same institution as the student

Submit the request to your advisor early

Follow-up to ensure they submit on time

Make sure they have read your proposal

References - Cite your Sources

Properly cite the work of others upon which your research is built

Demonstrate that you have read the literature that is pertinent to your research

- Include both recent and older references (beyond 1-2 years old)
- Include at least one “general” reference
    - Helpful to non-experts

Number the references to connect them to your proposal text

Use formats given in GSA’s Reference Guidelines and Examples

- https://www.geosociety.org/documents/gsa/pubs/GSA_RefGuide_Examples.pdf

Writing Quality & Style

Describe an important problem, then explain how you intend to solve it.

Writing is an important skill of a scientist

- Requires practice

Thoroughly address the questions asked in each section.

- Connect them logically to one another.

Proofread for spelling, grammar, flow

- Ask others to review your writing
  - **Advisor** (important)
  - Peers (including those **outside** your subject area)

Impress & Excite the Reviewer

Consider your audience: professional geoscientists who may or may not be in your field

Re-read your proposal from the perspective of a reviewer; you should not be left wondering:

- "So what? Why is this important?"
- "What's the problem being addressed?"
- "Can these objectives be achieved by this student, using these techniques?"

Capture the reviewer's interest

- Start paragraphs with strong topic sentences
  - Keep rest of the paragraph on topic
- Remove unnecessary words
  - Short sentences
- Sentences of varied length

Make the reviewer excited to discuss your proposal with the Committee!

Understand the Review Process

Managed by GSA Research Grants Committee; supported by GSA Staff

Begins ~10 Feb. (online) & ends ~ 10 Apr. (face-to-face meeting at GSA)

2 reviewers per proposal

- Your total score = avg. of the two reviewer scores (normalized)

Reviewers assigned by subject matter--but not always, so:

- Avoid jargon
- Minimize & explain acronyms

Each reviewer may review 40+ proposals, so:

- Make your writing clear and to the point
- Grab their attention! (Strong hypothesis, convincing importance, attractive figure)

Criteria: **Scientific merits**, the practicability of each project, the qualifications of the applicant for the proposed investigation, the reasonableness of the budget

Maximize your Opportunities

Select up to 3 appropriate Specialized Awards

Apply for the Southeastern Section Grad Grant (if applicable)

Search for other GSA grant/award opportunities (AGeS, El-Baz, etc.)

After You Apply

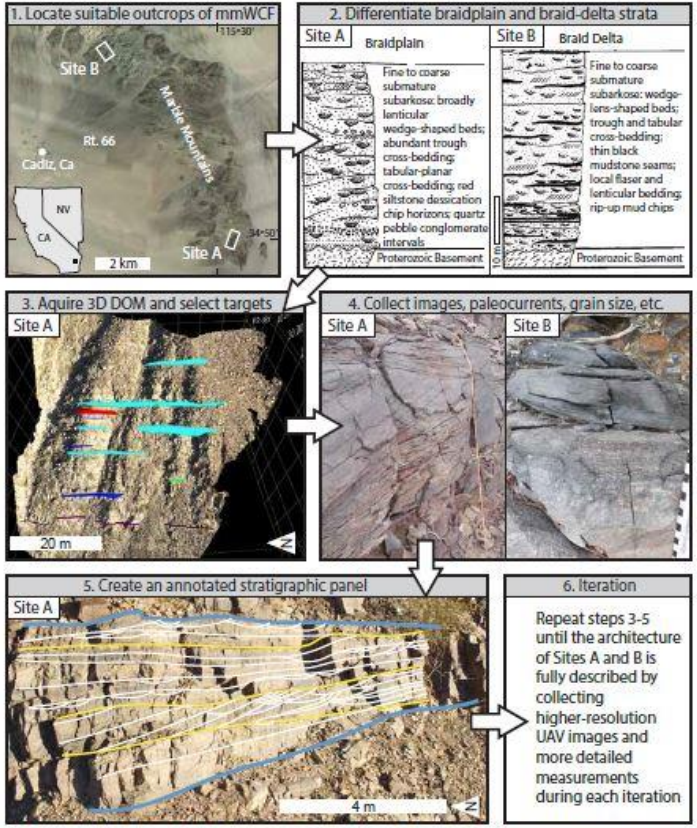
- Watch for an e-mail announcing results (late April)
  - Make sure you are receiving GSA e-mails
  - Read comments from the reviewers
- If awarded a grant, respond promptly to confirm your information
- Please be patient while GSA processes and mails checks (late May/early June)
- Let your advisor and university know about your achievement
- Use the funds as intended and in a timely manner
  - If a problem arises, alert GSA ASAP
- Present your results at a GSA meeting, or submit them to a GSA publication
- Notify GSA of address changes (to receive your 1099 tax form)
- Take photos of yourself engaged in your research
- Submit your progress report on time (1 Feb. the following year)

GOOD LUCK & THANK YOU FOR ATTENDING!

www.geosociety.org/grants
researchgrants@geosociety.org
303-357-1025
Matt Dawson, Education Programs Manager

THE GEOLOGICAL SOCIETY OF AMERICA®

Additional Figure Examples



Figures 1-6: 1) Aerial view of Marble Mountains range showing locations of the stratigraphy to be investigated. 2) Stratigraphic columns for the mmWCF braidplain and braid delta measured within the proposed sites, from Fedo and Cooper (1990). 3) A partial section of the DOM created using UAV imagery from Site A, with shapefiles marking areas to investigate in detail. 4) Field images of Sites A and B collected during preliminary work in January 2017. Site A shows large-scale trough cross-bedded sandstone, whereas Site B contains cm-scale beds of laminated mudstone. 5) A stratigraphic panel overlay on UAV imagery created using information collected during preliminary work in January 2017. A channel bundle is bounded in blue, and 4 channels are bounded by yellow. White lines mark the scour surfaces of tabular and trough cross-bedding within the channels. Foresets are not included for clarity. 6) Description of iterative strategy that will be used to complete this study.

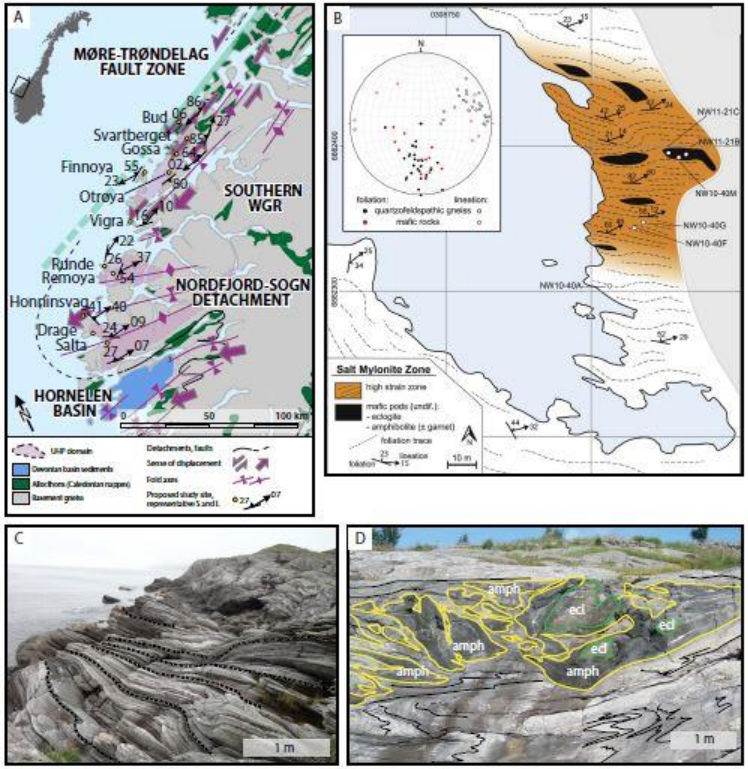


Figure 1. Context for proposed study of localized shear zones in Norway's Western Gneiss Region (WGR). A. Map of proposed study sites within the southern WGR. Representative foliations and lineations are included for each station. Proposed station locations and measurements from Renedo (2016). Generalized geology after Tucker et al. (2004). Structures and structural boundaries after Braathen et al. (2000), Hacker et al. (2010), and Fossen (2010). B. Outcrop-scale map of the Salt Mylonite Zone (SMZ). SMZ is located at the Salta field site (Fig. 1A). Stereonet inset represents parallelism between mineral stretching lineations in undifferentiated mafic pods and quartzofeldspathic host gneiss. C, D. Outcrop photographs of the SMZ showing well-developed mylonitic fabric in quartzofeldspathic host gneiss (C) and partially retrogressed, disaggregated eclogite pod within gneiss. Foliation trajectories traced with black and white lines. ecl—eclogite; amph—amphibolite. Scales are approximate. B from Renedo et al. (2015), C and D modified after Renedo et al. (2015).

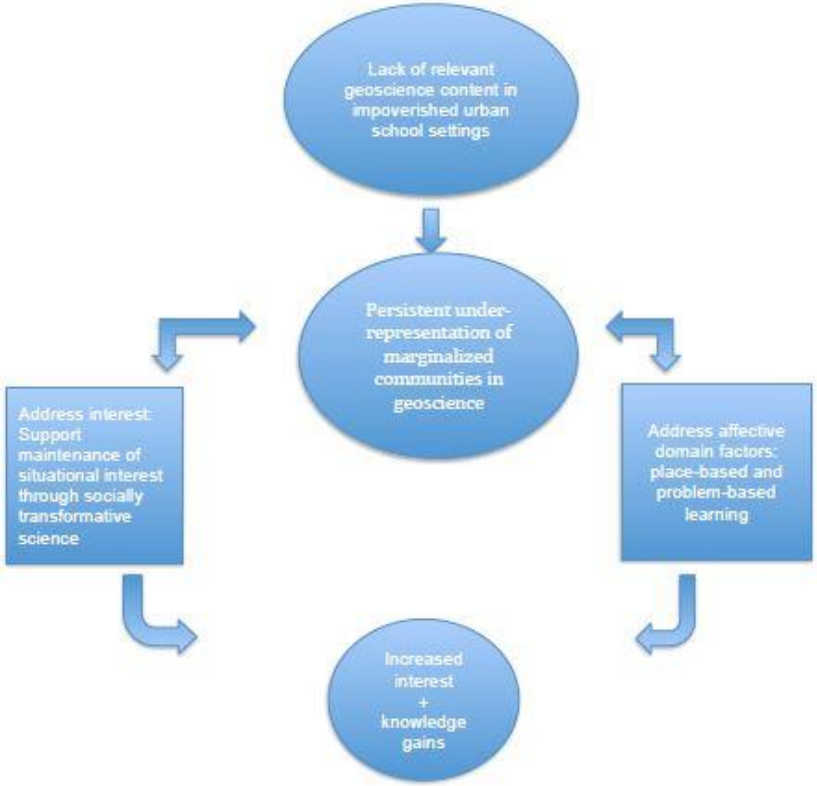
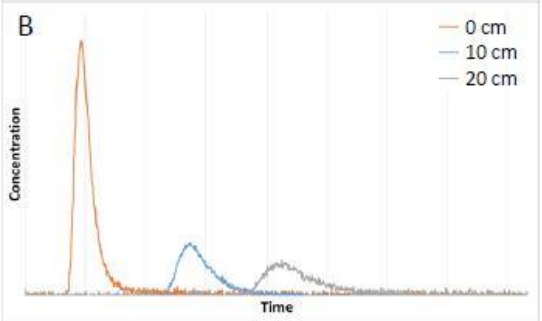
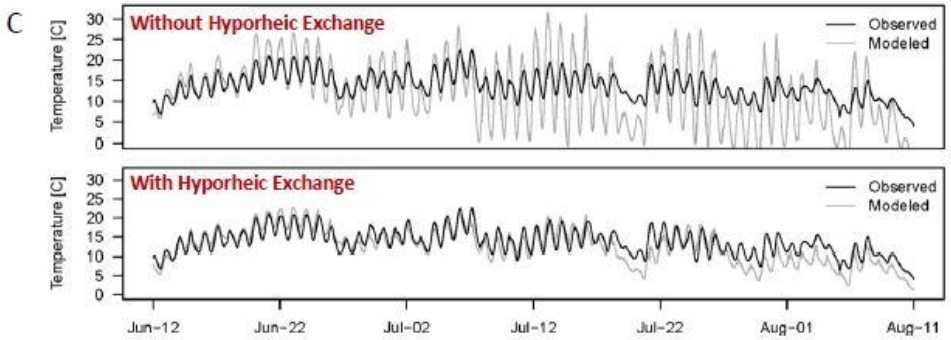


Figure 1. Conceptual representation. Transformative learning and interest development in the Earth sciences would lead to increased interest and knowledge gains.

To address the problem of lack of access of relevant geoscience content in an impoverished urban school in the Rust Belt city of Flint, Michigan. I propose a place-based, academic intervention that includes a transformative learning experience



A: Aerial photo of a rhodamine plume in the Kuparuk River from 2015 similar to what will be used in the proposed work. B: Simulated solute breakthrough curves at different depths within the hyporheic zone that will be used to calibrate hyporheic exchange parameters. C: Simulated river temperature for two months in 2015 showing the effects of including hyporheic exchange using calibrated hyporheic exchange parameter values.



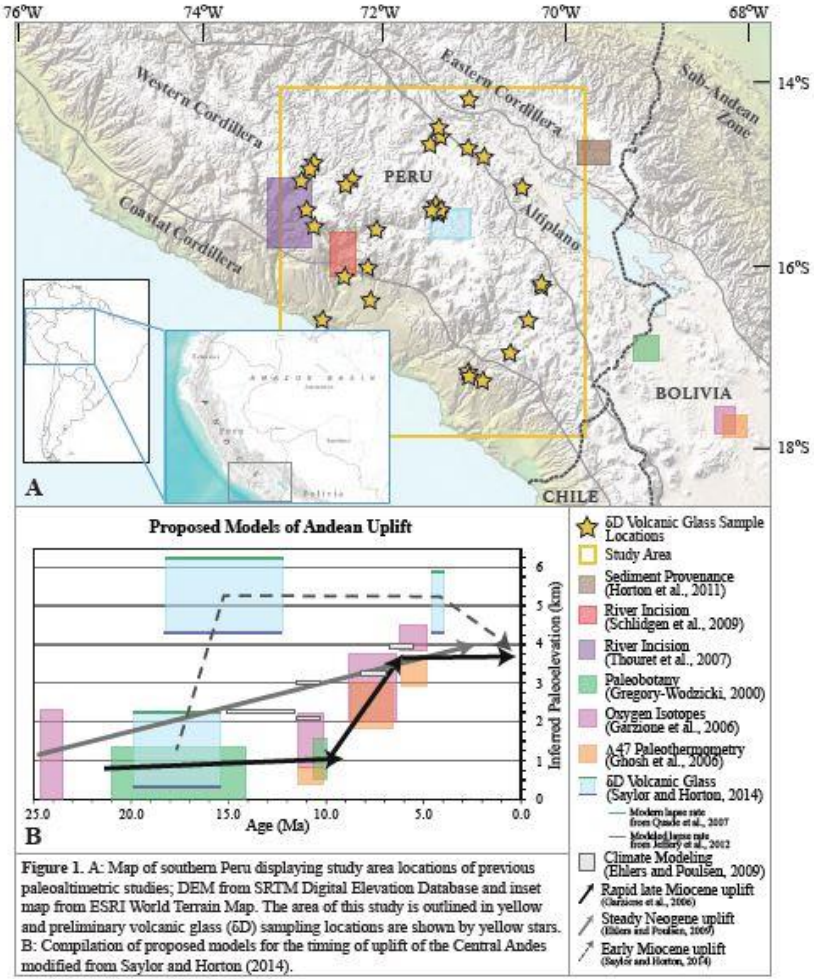


Figure 1. A: Map of southern Peru displaying study area locations of previous paleoaltimetric studies; DEM from SRTM Digital Elevation Database and inset map from ESRI World Terrain Map. The area of this study is outlined in yellow and preliminary volcanic glass (δD) sampling locations are shown by yellow stars. B: Compilation of proposed models for the timing of uplift of the Central Andes modified from Saylor and Horton (2014).

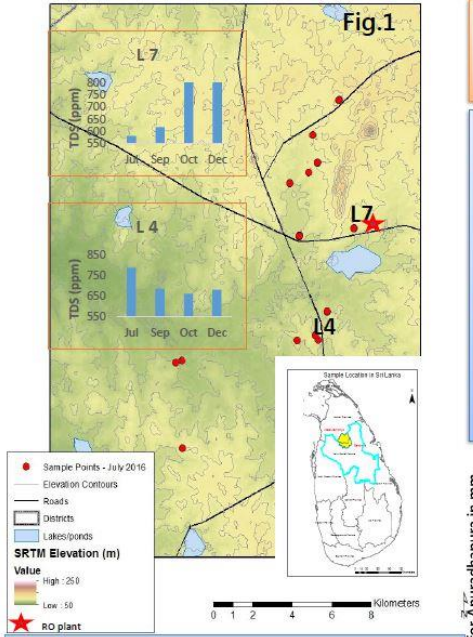


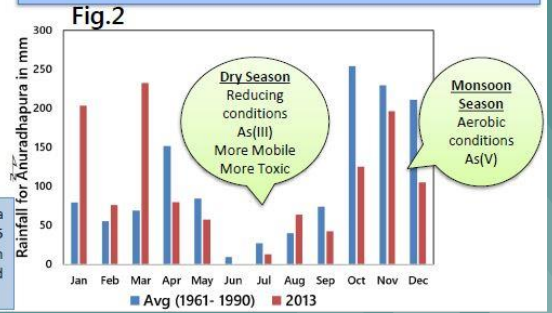
Fig.1 – North Central province highlighted in blue and study area in yellow. Two graphs shows extreme variations in TDS within 5 months in two selected sites. L7 is in close proximity to Ro which dispose RO waste water (TDS 949) at the ground surface and shows increasing trend in TDS.

Monitoring temporal variation of groundwater heavy metal concentration in Anuradhapura district, North Central Sri Lanka

Fig-1: Sites visited in July 2016 in Anuradhapura district, Sri Lanka where CKDu is highly prevalent (32% of total CKDu cases) . Yearly 1400 fall victim making CKDu an epidemic.

Hypothesis- Temporal variation in composition of groundwater masks an important source of the metals associated with CKDu

Fig-2: Rainfall data indicates two clear seasons .Cycling of subsurface redox state can be driven by extreme recharge variation between monsoon and dry season.
Ex-Dry season As(III) which is more toxic dominant under reducing condition and in monsoon As (V) dominant under aerobic condition.



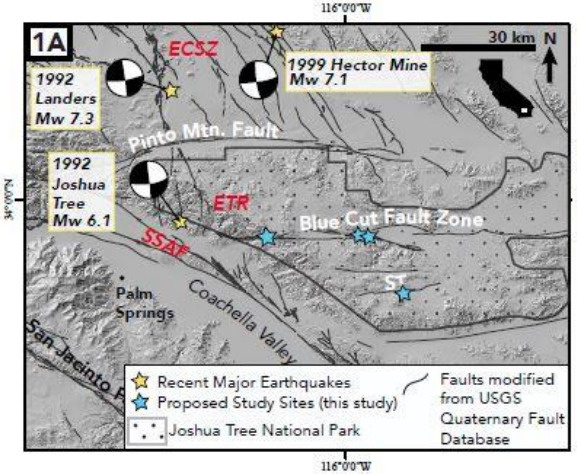


Figure 1A. Regional Map of the Eastern Transverse Ranges (ETR) and study site locations; Mapped faults of the Eastern Transverse Ranges (ETR) region between the Southern San Andreas Fault (SSAF) and the Eastern California Shear Zone (ECSZ), with most recent earthquake locations and their focal mechanisms; Currently three sites along the Blue Cut and one site along the Smoke Tree Wash Faults have been identified for further study.

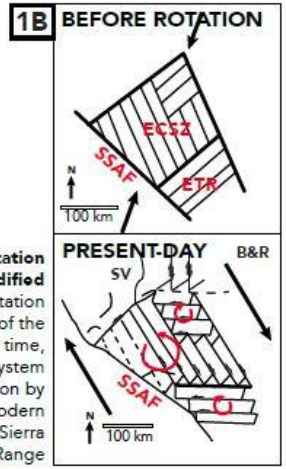


Figure 1B. Regional Schematic Block Rotation Model for ECSZ, SSAF, and the ETR, modified from Carter et al. (1987) [3], Fig. 7; Before rotation (top) shows approximately the fault geometry of the SSAF main trace, the ECSZ, and the ETR; over time, as rotation occurs, the faults in the entire system work to accommodate right lateral plate motion by rotating as small blocks, and eventually the modern plate geometry appears (bottom). SV=Sierra Nevada, B&R=Basin and Range

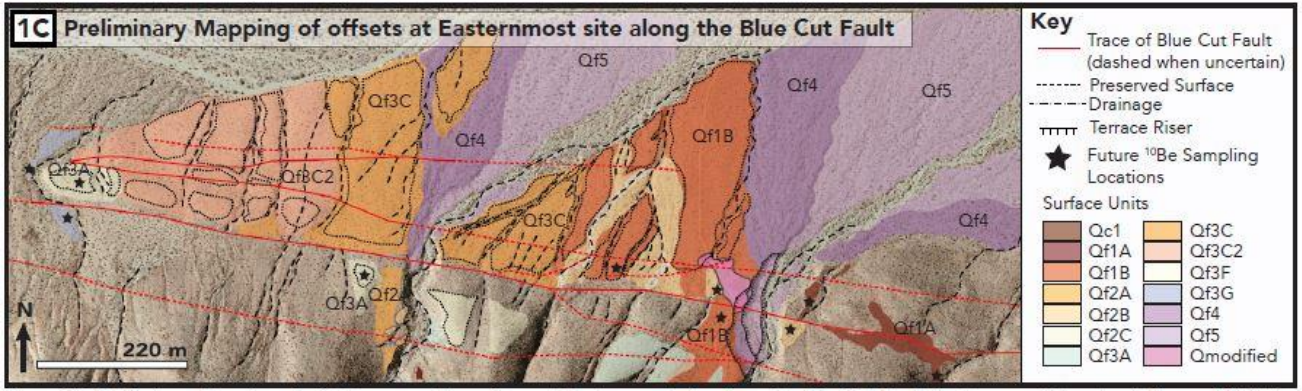


Figure 1C. Preliminary Mapping of offset geomorphic surfaces at Easternmost site along the Blue Cut Fault (easternmost blue star in Figure 1A); Units were classified and correlated based on alluvial surface characteristics including desert pavement formation, rubification of surface clasts, strength of desert varnish, preserved bar and swale topography or the lack thereof, angularity and lithology of surface clasts, and state of weathering of surface boulders. Sample sites were chosen from surfaces with the strongest correlation. Qc1 is the oldest colluvial unit (Qc), while Qf1A is the oldest alluvial fan unit (Qf) and the youngest is Qf5. Qmodified surfaces have been modified by mining activity in the 1940s and 50s. This mapping was completed during preliminary fieldwork in January 2017.