Focusing interdisciplinary study of exhumed terranes through sample and data management

ExTerra: Understanding Convergent Margin Processes Through Studies of Exhumed Terranes

NSF GeoPRISMS Mini-workshop

December 7, 2011 San Francisco

Maureen Feineman

Pennsylvania State University

Note: the ideas contained herein are not necessarily those of GeoPRISMS

- This is intended to be a brainstorming session to determine where we would like to go with the study of exhumed terranes in the context of GeoPRISMS SCD over the next 10 years.
- None of the ideas presented here are officially sanctioned by GeoPRISMS or NSF at this time. The purpose of this workshop is to begin forging the model of what we would like to become.

Site-based research

- Focuses interdisciplinary research around a point of common interest
- Enables a deeper understanding of the processes at work in a particular subduction zone than would otherwise be achieved
- Allows us to explore the similarities and differences between different subduction zones
- Logistics of field work may be simplified by all working more or less in one place

Does site-based research make sense for study of exhumed terranes?

- Perhaps, but…
  - The best sites for studying exhumed terranes are unlikely to coincide with active subduction zones
  - Exhumed terranes tend to be limited in extent, so many sites may be needed to represent the entire subduction zone subsurface
  - Relatively limited exposure at any given site may make it difficult to launch a large-scale, collaborative attack

What are other options for organizing research around a common theme?

- Collaborative, interdisciplinary field campaigns at a few selected sites worldwide
- Interactive digital sample and data management
- Sample repository or request system

Collaborative field campaigns

- Are there specific sites we can identify that provide optimal exposure of relevant rocks/faults/contacts?
- Group field campaigns to a limited number of key sites may be more efficient logistically
- Will foster interdisciplinary communication and collaboration
- Samples can be made available to ExTerra community (with priority given to those who have participated in collection, perhaps following the IODP one year priority model?)

Encouraging collaboration through sample sharing

- By making relevant samples available to others in the community, we can encourage interdisciplinary study and collaboration in the absence of designated focus sites
- Samples may be from existing collections, group field campaigns, or individual GeoPRISMS-funded field work
- Samples may or may not be associated with already-published data

Sample registration

- Encourage all researchers to register samples using the System for Earth Sample Registration (SESAR)
- International Geo Sample Number (IGSN) is a 9-digit alphanumeric code that uniquely identifies samples of Earth materials
- Samples can be identified as belonging to an ExTerra campaign, allowing users to search all “available” ExTerra samples
- Parent and daughter samples can be correlated, allowing us to trace sample splits as they make their way from lab to lab

Metadata fields currently available and recommended by SESAR

- Latitude
- Longitude
- Elevation (or water depth)
- Material
- Classification (if applicable)
- Age
- Field Program (cruise or land-based expedition)
- Collection date
- Parent IGSN (if applicable)

Custom metadata fields

- We can also add custom fields
- What additional metadata is important?
  - Photos
  - Field notes
  - Maps
  - Sample orientation
  - Strike and dip
  - PT conditions / metamorphic facies
  - Modes
  - ?

MetPetDB

- Much of the enhanced metadata functionality we might want (facies, modes, image upload capability, chemical analysis data) is already available using MetPetDB, and more possibilities are under development (i.e., P-T conditions)
- Data / metadata can be designated as public or private, allowing us to share data with other ExTerra researchers without making it available to the general public
- Data can be exported in customizable spreadsheet form or viewed in Google Earth

MetPetDB Sample Data Fields

- Sample number
- Rock type
- Latitude
- Longitude
- Location error
- IGSN
- Region
- Country
- Alias
- Collector
- Date of Collection
- Present Location
- Metamorphic grade
- Reference
- Comment
- Minerals present
- Mineral modes
-

MetPetDB Chemical Analysis Fields

- Sample number
- Subsample
- Point number
- Mineral
- Method
- Subsample type
- Analytical facility
- Analysis date
- Reference image
- X reference
- Y reference
- X stage
- Y stage
- Element/Species
- Precision
- Weight percent total
- Comment
-

GeoPRISMS Data Portal

- SESAR will interface directly with the GeoPRISMS Data Portal
- Presumably MetPetDB could as well if we so desire?
- Will handle both “public” (published and “private” (unpublished, in-progress) data
  - Release date can be set for private data
  - Password-protected access will enable private data to be shared among collaborators (?)

Broader impacts

- Can also be handled in a collaborative fashion
- i.e., undergraduate, community college, or K-12 teacher involvement in field campaigns
- Development of laboratory/classroom exercises that can be made available through SERC/Cutting Edge website
- Modal analysis could make a good REU?
- Collaborative field work and publicly available samples allow a broader segment of the population to participate in sample-based research

In Summary

- GeoPRISMS is not a huge program, and ExTerra is a small part of that program
- A time will come when we need to be practical
- Right now, we need to think big – what would we do if we could do what we wanted?
- This is a group-led experiment. We need your input. How much should ExTerra try to do? Does there need to be an ExTerra, or are we all happy doing what we do the way we now do it?

Thank you for being here!

- Get involved – stay involved
- We will have an online discussion forum open for comments after the meeting – please give us your feedback!
- You can also email or call any of us individually
- The ideas and opinions expressed here tonight and on the online forum will be incorporated into a white paper to be presented to GeoPRISMS on behalf of ExTerra