Making METPETDB a Tool for Reconnaissance Studies of Metamorphism and Metamorphic Rocks

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ABSTRACT

Recent data-mining efforts have significantly increased the coverage and quantity of published data that form the foundation of the Geosciences. For Metamorphic Petrology, combined mineralogic, metamorphic grade, geochemical mineral and textural analyses, and image data from over 400 publications have been collected and uploaded, with focus on a number of particularly well-developed metamorphic belts of regional concern. As a result, the data pool continues to grow, and MetPetDB now contains data for over 100,000 samples, over 3,000,000 mineral and whole rock major (or trace element) analyses, and over 20,000 images and imaging maps. This allows unique search parameters, such as text searches, and X-ray map overlays. These data are available for searching and downloading, searchable in spreadsheets and/or as placemarker layers in a Google Earth file. Each Google Earth placemark contains a link to the full data available through METPETDB’s web interface. The improved spatial coverage provides a starting point for a geochemist to rapidly gather sample and geochemical data for a growing inventory of distinct metamorphic belts. Regional searches can be performed by choosing a search defined bounding box, or by any of a number of bounding polygons that designate distinct metamorphic belts, such as the Greenbrier Fold Belt, the Black Mountain, or the Black Mountain Fault Belt. METPETDB is a tool for researchers to share, organize, and explore sample, mineral, and geochemical information, both published and unpublished, enabling production of a co-visible GIS in-situ planning, field work, producing geologic maps, or making inventory of geochemical data for metamorphic rocks.

In addition to regional queries, published metamorphic rock samples with non-spatial commonalities may be queried and compiled to create a tool for reconnaissance studies of particular metamorphic belts, such as the Greenland Caledonides, or the Bohemian Massif. METPETDB is a tool for researchers to share, organize, and mine datasets to create a tool for reconnaissance studies of particular metamorphic belts. METPETDB is being built to integrate with other Semantic Web Technologies to enable interoperability and will allow data mining team members to share groups of samples to be compiled/edited/viewed by lists of group members.

METPETDB IS DIFFERENT

• Images, allows users to view and share textual and zoning data and context information for in situ geochemical analyses.

PROJECT ORGANIZATION

• Project management system: MetPetDB can be used for organizing groups of samples to be compiled/edited/viewed by lists of group members.

HOW CAN YOU USE METPETDB?

Prep up the data
- Search METPETDB for existing public data
- Upload your own data collection
- Use linked .xml exports to build a GIS with geologic maps

Ongoing studies...
- Share data with your collaborators
- Use METPETDB to combine sample information with geologic map data

Which samples are from below the main shear zone?
- K-Ar age dates
- EMP - spots

Published Samples of the northern Eastern Humboldt Range, Nevada

A powerful tool for querying, compiling, organizing, and sharing data in new and ongoing studies of metamorphic rocks.

Mining the Literature

Data Mining: A Regional Approach
- Search for available approximate articles for a metamorphic region
- Students given a metamorphic region as a project and asked to:
  - Find appropriate articles (presenting initial article databases, MetPetDB)
  - Mine and compile all data in spreadsheets, and .kml files

Published sample coverage in the Alps. Black red box shows approximate extent of map shown below

Please submit your data collections as spreadsheets...

The MetPetDB data mining team consists of RPI and local high school students: Molly Antalis, Dan Boskin, Sam Broadaway, Julia Cosgrove, Matt Crescimanno, Bea Daguison, Greg Desmond, Barbara Firebaugh, Jeff Ford, Alex Melnik, and Savannah Moed. The MetPetDB data mining team consists of RPI and local high school students: Molly Antalis, Dan Boskin, Sam Broadaway, Julia Cosgrove, Matt Crescimanno, Bea Daguison, Greg Desmond, Barbara Firebaugh, Jeff Ford, Alex Melnik, and Savannah Moed.

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Semantic Web Technology: METPETDB is being built to integrate with other earth science web databases for the next generation of geoscientists. Full semantic web capabilities will allow MetPetDB to query discovery in a wide range of web portals, enabling new interdisciplinary research.

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