NOTES FROM BREAKOUT SESSIONS - December 12, 2008

Session 1: Unresolved issues in Blue Ridge Geology

General Outcomes:

1. Participants would like to see this as a start to a new state geologic map for 2015.
2. Participants would like have follow-up workshops to deal with these issues in more detail.
3. Participants would like to research needs proposals developed on these key topics.

Specific Issues:

1. Ramp separating the Cambro-Ordovician carbonates from the rock of the Blue Ridge

a. What is the position?
b. Is it "thick" skinned?
c. Can field work resolve this?
d. What is the age?

How might this question be resolved?

1. Detailed geologic mapping at 1:24,000 scale across the Blue Ridge/Valley and Ridge transition
2. Applying geophysical techniques such as
    a. Seismic reflection
    b. Gravity studies
    c. Reprocessing old data and reassessing old interpretations
3. LIDAR

2. Working out the problems with the Blue Ridge nomenclature and unit and fault correlations

a. Issues with variability in terminology and correlations across Virginia and between Virginia and North Carolina.
b. Map distribution of faults along the Blue Ridge – need to correlate their timing and extents

How might this question be resolved?

1. Detailed geologic mapping at 1:24,000 scale along the Blue Ridge (NS) and across the Blue Ridge (EW).
2. Models for the Blue Ridge need to be presented, discussed and synthesized.
3. Developing a basement "tool kit" for Late Proterozoic rocks: Since we can't afford to date every rock, there is a need for key characteristics for each unit to be agreed upon and applied in the field.
4. Expunge archaic terms and agree upon an appropriate vocabulary.
5. Regular focus group meetings and field meetings are necessary to resolve these issues.

3. When did the Blue Ridge develop its topographic relief?

a. Timing?

b. Is it in a steady state?
c. What is the history of the various erosional surfaces throughout the evolution of the Blue Ridge?
d. How does this correlate with the other physiographic provinces?

How might this question be resolved?

1. Detailed geologic mapping at 1:24,000.
2. Utilize low temperature chronometers such as U/Th/He at a detailed spatial scale.

4. Role of the Mesozoic system in the Blue Ridge story and geometry.

How might this question be resolved?

1. Detailed geologic mapping at 1:24,000.
2. Need more geophysical studies.
3. Examine the effects/association of these fractures with water
4. Examine the relationship between these features and mineral resource deposits
5. More detailed fracture studies are needed
6. Need to compare and contrast the Mesozoic rifting with previous rifting cycles
7. A seismic risk assessment needs to be done.

5. Mylonites in the Blue Ridge
a. Triclinic deformation
b. Palinspastic restoration of the Blue Ridge in 3 dimensions.
c. Oblique convergence in Thornton Gap area.

6. Is there an unconformity between the Catoctin and the overlying sedimentary units?

7. New mica ages and their implications for deformation timing
a. Is this related to thrusting sequence?
b. Ages in the Swift Run and Weverton ages were likely the maximum temperature. Deeper rocks likely represent cooling ages.

8. Issue with the cover sequence west of the Blue Ridge – just where is the PreCambrian/Cambrian boundary?
a. Middle of the Chilhowee group?
b. Is all of the Chilhowee group Cambrian in age?
c. Is it in the Lynchburg formation?

9. Is there any Ediacaran fauna in any of the Neoproterozoic sediments?

10. There is a need to reconstruct paleoenvironments in the Blue Ridge
i.e. Mt. Rogers…glacial deposists, etc.

11. Paragneiss story

a. What is the time/temperature path these rocks took?

Session 2: Unresolved Issues in Valley and Ridge Geology

In general, the consensus was that continued support for detailed geologic mapping is needed, which provides essential information for a number of major issues that need to be resolved. Major issues discussed during the Breakout Session generally fell into one or more (much overlap) of the following categories:

Geologic Framework:

- Need to find better ways to communicate the value of geologic mapping (e.g. beyond the anticipated development along the I-81 Corridor).
- Better communication between geologists working in the BR and VR regarding the timing and influence of major tectonic events; presently somewhat disconnected.
- Evaluate the influence of basement normal faults.
- Better understanding of the sequencing of thrust faults in the VR.
- Better understanding of the transition between brittle and ductile fracturing in the VR.
- Influence of the Rome Trough on VR structural framework.
- Better understand the link between Allegheny Front and BR overthrust.
- Better define stratigraphic units with economic and geohazard potential that are currently lumped (e.g. SDu, Ols, etc).
- More focus on deep stratigraphy, where there is potential for deep saline aquifers that may provide geologic storage of CO2.

Geologic Hazards:

- Identify, evaluate, and prioritize geologic hazards in VR.
- Karst/sinkhole digital database; better understanding of the interplay between geologic controls and land use.
- Large block slides, recognizing risk areas.
- Better understand the nature of brittle on ductile fractures in context of subsidence risk along the western margin of the Blue Ridge
- Quaternary history (e.g. evaluation of flood risks)

Economic:

- Better understand the distribution of high-Ca limestones; not just limited to the middle-Ordovician units.
- Stratigraphic relationships between Devonian shale units (e.g. Millboro, Marcellus)
- Evaluate occurrences and distribution of non-polishing aggregate resources.
- Evaluate occurrences and distribution of high purity silica (glass sands); (e.g. depositional character of the Oriskany).

Other:

- Source and structural implications of Eocene-age igneous rocks (Highland Co) and alkaline dikes (August Co).
- Need for improved educational outreach.

Session 3: Integrating Geologic and Hydrologic studies - Benefits and Challenges

The group was divided into geologic information providers, hydrologic information providers, and hydrogeologic information users. The provider groups developed a list of the most important types of information they provide. The User group developed a list of the most important types of information they need. Based on the results of this exercise and the interest of the group, the remainder of the meeting focused on addressing gaps in available information for end users.

Geologic data providers provide:
Geologic formation information- descriptions, structure data, "cover" materials
Fracture/joint data and analysis
Detailed and regional maps
Ground truth on karst features

Hydrologic data providers provide:
Well data – location, yield, logs, geochemistry
Spring data – location, discharge, geochemistry, dye trace results
Water use information – ground water and surface water
Technical /Assistance
Hydrographs

Users of hydrogeologic information need:
Geologic maps at an appropriate scale.
Water well data – yield, depth to water table, etc.
Hydrographs

Users noted the following characteristics of information would be helpful:
Widely available and accessible information (Internet)
Standardized – uniformity of format and methodology (example pumping tests) on at least a statewide basis
Geologic descriptions and maps could include a characterization of saprolite.

Providers and users believed there was good agreement between the type of information that is being provided and that which is needed. The clear problem was recognized to be a lack of data in many places and the lack of easily accessible information (digital format, available on internet)

To address this problem, it was suggested the users of hydrogeologic information may be able to provide some assistance, such as:

Well data – construction characteristics, yield, drawdown, geochemistry over time

Soil data – maps, field notes
GIS Capabilities and data processing - especially county governments.

An identified issue:

Disconnect in some cases between geologists and soil scientists

Next Steps:
Water for America initiative may be an opportunity for geologic and hydrologic data providers to work together at the state level and provide hydrogeologic information to end users.

Based on USGS efforts in Northern Shenandoah Valley, integrated studies have both benefits and challenges. A future meeting to highlight these may be helpful to state level geologists and hydrologists.