



ORIGIN OF THE HARDEST SLATE ON EARTH:

Dynamic Retrograde Metamorphism of Schist to Slate

**Presented by Professor Dave Valentino
Department of Geology, SUNY Oswego**

November 19th, 2009

Sophistications Café, Syracuse, NY

Judged the hardest slate on Earth at the Royal Palace in London, 1885, and the first slate mined in North America the Peach Bottom slate (PBS), located in the Mid-Atlantic Piedmont of the Appalachians, is an ultraphyllonite, yet did not form as a typical low-grade metamorphic mudrock. The PBS is composed of ultrafine-grained muscovite and chlorite with distinctly larger, and likely relict, chloritoid, muscovite, quartz, and K-feldspar porphyroclasts. It is characterized by grain-size reduction textures, kinematically significant microporphyroclasts (<200 μm), and chemical homogeneity across the 0.75 -1.5 km wide belt. Compared to adjacent units, the PBS has undergone a ~15-20% volume loss and an ~8% increase in density likely related to the recrystallization of Fe-Mg bearing phases such as chlorite and/or biotite resulting in enrichment in Fe, Ti, and REEs and near total loss of alkalis, except K. Higher concentrations of water (LOI) and total carbon

in the PBS, also relative to local units, suggest selective channeling of fluids that likely mediated metamorphic reactions during deformation. The PBS and adjacent schist units (Octoraro (OS) and Peters Creek formations) were analyzed for Sm-Nd isotopic systematics, and the results show that all rock units are derived from Precambrian sources (TDM ages ranging from 1405 to 2805 Ma). The results indicate that PBS and OS have similar Sm-Nd systematics including high Nd concentrations, E_{psNdCHUR} values, and TDM ages (1737-1780 Ma PBS; 1809-1867 Ma OS). These similarities suggest that the PBS and OS share a common Paleoproterozoic source. The structural field relations, petrofabrics and geochemical data are consistent with formation of the PBS by processes including the recrystallization of upper greenschist facies schist, most likely OS, during dynamic retrograde recrystallization.

Dr. Dave Valentino is a Professor of Geology at SUNY Oswego. Dr. Valentino's area of special interest is the Tectonic evolution of the Proterozoic Adirondacks and Hudson Highlands, and the Paleozoic mid-Atlantic Piedmont. He teaches Tectonics, Geological Hazards, Structural Geology, and Petrology. He received a BS from Temple University, MS from Temple University, and a PhD from the Virginia Polytechnic Institute.

MEETING LOGISTICS: The meeting will take place on **Thursday, November 19th** at **Sophistications Cafe**, located at 441 S. Salina St (Inside the Galleries of Syracuse) in Syracuse, New York. Free parking is available in the Galleries Parking Garage located immediately adjacent to the Syracuse Galleries. A social gathering will be held from 5:30 p.m. to 6:00 p.m. and will be followed by dinner at 6:00 pm. The presentation by Dr. Valentino will begin at 6:30 p.m.

The cost of the dinner is \$20 for members, \$22 for non-members and \$15 for student members. CNYAPG will sponsor the cost for dinner for the first five students who register for this meeting. People may also attend the presentation only for a nominal fee of \$3. **Please RSVP by Monday, November 9, 2009** to Annette at Parratt-Wolff via e-mail at info@pwinc.com or (315) 437-1429.

