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GSA Annual Meeting in Denver, Colorado, USA - 2016

Paper No. 196-14

Presentation Time: 11:30 AM

ILLUSTRATING MINERAL EQUILIBRIA WITH INTERACTIVE, WEB-BASED TOOLS

BRADY, John B.¹, **SPEAR, Frank**² and **HAMELIN, Clémentine**¹, (1)Department of Geosciences, Smith College, Northampton, MA 01063, (2)Earth and Environmental Sciences, Rensselaer Polytechnic Institute, 110 8th St, Troy, NY 12180, jbrady@smith.edu

We have developed a collection of interactive, web-based diagrams as part of an online textbook project that we believe will make petrologic data, concepts, and processes easier to learn. The diagrams are based on standard Internet technologies and coded in HTML5 with Canvas, SVG graphics, and JavaScript to produce new tools that animate data and models in ways that enhance understanding. With this technology, calculations can be made and illustrated online as fast as a mouse can move, and diagrams can be exchanged by a web browser at speeds that bring life to inanimate features. The dynamic nature of the diagrams makes them especially engaging and enable even experienced petrologists to see new things. One module dynamically superimposes photomicrographs, SEM images, X-ray maps, and phase identification diagrams to illustrate relations among rock textures, mineralogy, and chemistry. In another module, phase diagram interpretation is augmented through the display of additional information at every coordinate or by using time to add another dimension. If there are 3 independent variables, such as T, P, and X(CO₂), two can be plotted and the third can be changed continuously by the user. In a third module, multiple approaches to representing and understanding mineral equilibria are simultaneously displayed and manipulated in real time. For example, petrogenetic grids (PGs) and AFM diagrams display all possible phase relations for a metapelite, but it can be difficult to translate these into the mineralogical assemblages that will be produced by a specific bulk composition. Mineral assemblage diagrams (MADs) display phase compatibilities for specific rocks, but obfuscate other possible phase relations. This module links the PG and associated AFM diagram, the MAD, and the modal mineralogy across P-T space to enable the student to readily comprehend the relationships among these four types of information. We will show how these new, user-activated illustrations can help petrologists learn and think about interesting problems, such as the evolution of metamorphic fluids.

Session No. 196

[T157. Mineral Equilibria, Fluid Flow and Metamorphism: A Celebration of John Ferry's Career](#)

Tuesday, 27 September 2016: 8:00 AM-12:00 PM

Room 205 (Colorado Convention Center)

Geological Society of America *Abstracts with Programs*. Vol. 48, No. 7
doi: 10.1130/abs/2016AM-286085

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