Teaching Petrology in the 21st Century: A Workshop Report and Call to Action

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Petrology plays an important role in the upper division geology curriculum, introducing students to the skills needed to investigate and interpret igneous and metamorphic rocks that form the bulk of the earth's interior. Central concepts in petrology courses typically include chemical differentiation of Earth, the role of igneous and metamorphic processes in the Earth system, and the occurrences and distribution of rocks and in a variety of tectonic settings. Seventy-nine geoscientists who teach (or plan to teach) petrology in the undergraduate curriculum gathered for a week at Montana State University this past summer to discuss best practices and how petrology should be integrated into the geology curriculum of the 21st century. The first three days of the workshop were devoted to visiting some of the classic geological field locations in Montana and Wyoming to discuss the role of fieldwork in teaching petrologic concepts. The following four days were spent on the MSU campus in a mixture of large group discussions, smaller topical working group meetings, and demonstration sessions where faculty presented exercises, laboratory activities, or moderated small group discussions on pedagogy and assessment. One of the main outcomes of the workshop was the development of a web site for sharing teaching materials

(http://serc.carleton.edu/NAGTWorkshops/petrology03). This site contains a complete record of workshop activities. A collection of over 200 digital resources that support teaching petrology is now available, including over 30 new instructional activities contributed by workshop participants. Each activity contains 1) a brief introduction to the activity; 2) the activity itself along with supporting documents such as teaching notes and an answer key; and 3) a place for comments by users to give feedback to the author and to those who might be interested in using the activity. A formal review process of these resources will be initiated in the coming year. Another important outcome of the workshop was the formation of working groups around five areas: development of rock suites, modeling and databases, experiments in petrology, phase equilibria, and geodynamic petrology. These working groups began the process of organizing existing resources for dissemination, identifying important gaps in coverage, and developing plans to create new resources in these areas for educators. Overall, workshop participants advocated the need to establish stronger ties between petrology and the larger geology curriculum, to better articulate the contributions of petrology in understanding the Earth system, and to develop better activities and strategies to motivate students to learn petrology. The goal of the workshop and of this session is to learn from each other the best practices in teaching petrology, to expand the participation in these activities, and to call for help in the development of new resources and methods for teaching petrology throughout the geoscience curriculum. Contributions to the Teaching Petrology website and participation in the workshop series, and was supported by funds from the NSF CCLI-ND program.

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