



A virtual petrological microscope for teaching and outreach

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Learning to use microscopes for geoscience or life science applications is a crucial part of the practical training offered in many science degrees, but the opportunities to study are often constrained by available laboratory space and time, and sometimes constrained by the number of high quality microscopes available. The alternative, although not replacing physical microscopes, offers the opportunity for enhancement and enrichment of laboratory experience in geoscience. An on-line microscope can also be used to engage the public with access to rare rocks such as meteorites and lunar samples.

The focus of petrological microscope study in higher education is not primarily related to learning facts but is concerned with learning how to discriminate and classify within the paradigms of the discipline. In this case, the recognition and measurement of key features in rock samples in hand specimen and thin section. Whilst undertaking the practical exercise of recognition and naming of rock samples students are really being required to develop an understanding of the rock cycle as a model representing the relationship between rock categories and the process of their formation. The problems of teaching with complex visual materials, in effect of teaching learners 'how to see' from the scientific perspective of a particular discipline, are quite general. It could reasonably be expected that lessons learnt from the implementation and detailed evaluation of the proposed web-based system will generalise to many other topics in science education. Thus we focussed on the thin section images rather than reproducing a system that resembled a physical microscope.

The virtual petrological microscope developed for a course at the Open University UK enables student acquisition of skills such as mineral and rock recognition using a browser window to explore thin sections of rocks as if they were using a laboratory microscope. The microscope allows students to pan around the thin sections (held as 1GB files on a remote server); zoom in and out, change from plane polarised light to cross polarised light conditions, and study the changing mineral pleochroism and birefringence in rotating view 'hot spots'. The microscope also includes tools such as hyper-linked descriptive teaching text, labels on the slide, XY coordinates and measurement tools. The fully developed system is for individual users each accessing the slides via a browser window, but we are also developing mobile version and exploring a shared version which will allow students and tutors to collaborate at distance.