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A Petrophysical Education: Learning Borehole Geology in a University Setting Using Web-based Technology

The teaching of petrophysics at universities is beginning to expand beyond hydrocarbon reservoir evaluation curricula in petroleum engineering schools to interpretative borehole geology courses in geoscience departments. A geological education has long included the use of electric logs for correlation and structural mapping in the subsurface, but the deployment of nuclear and borehole imaging tools has expanded dramatically the lithological information content of logs. At the same time, there is an accelerating increase in the availability of digital log data, both as raster (image) and vector (alphanumeric) files to supplant the cumbersome paper copies of the past. These and other factors encourage the use of a web-based medium as a core component of a course on petrophysical methods applied to subsurface geology. While it is highly debatable how effectively the rock studies of traditional geology can be migrated into an electronic teaching medium, logging measurements are intrinsically numerical and so can only benefit from computer methods of petrophysical data transmission, log display, and geological analysis. We have designed a course consisting of textual material on html pages linked with course libraries of log, core, and outcrop raster files, augmented by Java applets designed to engage students in interactive geological interpretation of petrophysical data. Central to the course is an applet which forward-models log suites from lithostratigraphic sequences generated by Markov chain simulations. Students learn to identify artificial lithostratigraphic sequences from their log responses as a precursor to the challenges of logs from real subsurface successions.