



Web-Based Interactive Visualization Of A High Resolution Global Lithological Map

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The Lithological Map Viewer is a tool to study the distribution of mapped lithological units, and which allows to zoom into areas of interest. The underlying data is based on globally high resolution information, derived from the Global Lithological Map database GLiM v1.1. That database presents by now the most accurate globally available picture of the lithological characteristics of the Earth's crust beneath the soil. Rock type information from more than 90 regional maps and additional literature sources was translated into 16 lithological classes and numerous subclasses. The map database has been used by various disciplines ranging from geochemistry over hydrology to ecology.

New techniques have been used to make this information available in an easy to use fashion for spatial, visual analysis. Built upon the emerging graphics language WebGL, the Lithological Map Viewer has the advantage of being seamlessly integrated into standard Web browsers, eliminating the need to install additional plugins before data viewing. Moreover, WebGL offers the possibility of graphics hardware accelerated data rendering. The high resolution of the global lithological map translates to a considerable amount of data: over 200 million points were stored for our visualization in a point cloud format. In order to achieve the interactive rendering of millions of points in a web browser, a visualization strategy was adopted that decreases the rendered data volume while increasing rendering and data transfer speed at the same time. Thus, the data set was pre-partitioned spatially with the help of an out-of-core algorithm that stores various levels of detail of the original model in a hierarchical octree data structure. We combined this data structure with a view-dependent rendering technique based on the principle that the greater the distance from the viewing point, the fewer details will need to be displayed.

Future directions: The Lithological Map Viewer can be extended to enable data visualization for other Earth Science domains, such as oceanography, hydrology, meteorology or climate science.