



Combining ontology and data visualization techniques to generate interactive map legends for online geological maps

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Web Map Service (WMS) has been widely used in recent years for publishing geological maps online. Similar to the map legend on traditional maps, current WMS technologies also provide channels for retrieving the legend of a map layer (e.g., bed rock age) on a WMS server. A simple method is sending a “GetLegendGraphic” request to the WMS server, and then as a response the server will send an image back to the client, showing the map legend of the layer content like what one can see on a formal printed map. This method is easy for use in practice, however, the obtained result is a static image and further applications are limited. In this study we aim to develop interactive map legends of geological time scale for geological maps published on WMS servers. We edited an ontology of geological time scale by using the Web Ontology Language (OWL), in which the geological time scale terms, upper and lower age boundaries indicated by each term, filling colors of each term on maps, and hierarchical interrelationships between these terms, etc. are encoded. We then visualized the ontology as a sunburst tree by programming with Actionscript, and saved it as a Flash animation. In the applications, we developed a program for dynamic interactions between a WMS layer of bed rock age and the visualized ontology. For example, the developed program can request style information from the map layer and then use it to filter the sunburst tree of the ontology. If a term in the tree cannot be found in the map, then it will be hidden in the tree by using the Flash animation. As a result, the filtered tree reveals only geological time scale records that are included in the map layer. By clicking nodes on the filtered sunburst tree, the program can send queries to the WMS layer for showing polygons with records of corresponding bed rock ages. Because the sunburst tree is underpinned by the ontology, we are now developing a few new features in the program, by conducting inferences within the ontology, to enhance queries sent to the WMS map layer. This study shows that by using ontology and data visualization techniques, interactive map legends can be developed for map layers published on WMS servers.