



Visualization of semantic relations in geosciences

Bernd Ritschel, Sabine Pfeiffer, and Vivien Mende
GFZ Potsdam, Data Center, Potsdam, Germany (rit@gfz-potsdam.de, +49 331 2881703)

The discovery of semantic relations related to the content and context of scientific geophysical and geodetic data and information is a fundamental concept for an integrated scientific approach for the research of multidisciplinary and complex questions of the permanent changing Earth system. Large high-quality and multi-domain geosciences datasets which are qualified by significant and standardized metadata describing the content and especially the context of the data are suitable for the search and discovery of semantic relations. Nowadays such data collections are ingested and provided by many national and international geoscientific data centers, such as e.g. the GFZ ISDC(1). Beside automatic and machine-based algorithm for the discovery of semantic relations, the graphical visualization of such relations are extremely capable for scientist in order to analyze complex datasets and to find sophisticated relations as well as for the public in order to understand the relations within geosciences and between geosciences and societal domains.

There are different tools for the visualization of relations, especially in the object-oriented based analysis and development of systems and software. The tool eyePlorer(2) is an awarded program for the visualization of multi-domain semantic relations in the public world of Wikipedia. The data and information for the visualization of keyword based terms and concepts within one domain or topic as well as the relations to other topics are mainly based on wiki content and appropriate structures. eyePlorer's main topics structured and combined in super topics are Health, Species and Life Sciences, Persons and Organisations, Work and Society, Science & Technology as well as Time and Places. Considering the domains or topics of the conceptual model of the GFZ ISDC's data collection, such topics as geosciences-related project, platform, instrument, product type, publication and institution as well as space and time are disjunct and complement sets or subsets or intersections of eyePlorer's topics. The introduction of new topics and the enhancement of the conceptual data model of the eyePlorer as well as the transformation of GFZ ISDC's metadata into a wiki structure or into eyePlorer's internal data format are necessary for the use in eyePlorer for the visualization of geosciences and societal relations based on both, the Wikipedia information collection and the GFZ ISDC metadata.

This paper deals with the analysis of eyePlorer's and GFZ ISDC's concepts for the creation of an integrated conceptual model. Furthermore, the transformation model for the conversion of ISDC's metadata into appropriate structures for the use of eyePlorer is described. Finally, the process of semantic visualization of geosciences and societal relations within eyePlorer and using eyePlorer's GUI are illustrated on a climate research related example which is capable to generate knowledge not only for geoscientists but also for the public.

(1) GFZ ISDC: GFZ Information System and Data Center, <http://isdc.gfz-potsdam.de>

(2) eyePlorer: <http://en.eyeplorer.com/show/>