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Browsing and Visualization of Linked Environmental Data

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Linked environmental data has started to appear on the Web as environmental researchers make use of technologies such as ontologies, RDF, and SPARQL. Many of these datasets have an important geospatial and temporal dimension. The same is true also for the Web of data that is being rapidly populated not only with geospatial information, but also with temporal information. As the real-world entities represented in linked geospatial datasets evolve over time, the datasets themselves get updated and both the spatial and the temporal dimension of data become significant for users. For example, in the Earth Observation and Environment domains, data is constantly produced by satellite sensors and is associated with metadata containing, among others, temporal attributes, such as the time that an image was acquired. In addition, the acquisitions are considered to be valid for specific periods of time, for example until they get updated by new acquisitions. Satellite acquisitions might be utilized in applications such as the CORINE Land Cover programme operated by the European Environment Agency that makes available as a cartographic product the land cover of European areas. Periodically CORINE publishes the changes in the land cover of these areas in the form of changesets.

Tools for exploiting the abundance of geospatial information have also started to emerge. However, these tools are designed for browsing a single data source, while in addition they cannot represent the temporal dimension. This is for two reasons: a) the lack of an implementation of a data model and a query language with temporal features covering the various semantics associated with the representation of time (e.g., valid and user-defined), and b) the lack of a standard temporal extension of RDF that would allow practitioners to utilize when publishing RDF data.
Recently, we presented the temporal features of the data model stRDF, the query language stSPARQL, and their implementation in the geospatial RDF store Strabon (http://www.strabon.di.uoa.gr/) which, apart from querying geospatial information, can also be used to query both the valid time of a triple and user-defined time.

With the aim of filling the aforementioned gaps and going beyond data exploration to map creation and sharing, we have designed and developed SexTant (http://sextant.di.uoa.gr/). SexTant can be used to produce thematic maps by layering spatiotemporal information which exists in a number of data sources ranging from standard SPARQL endpoints, to SPARQL endpoints following the standard GeoSPARQL defined by the Open Geospatial Consortium (OGC) for the modelling and querying of geospatial information, and other well-adopted geospatial file formats, such as KML and GeoJSON.

In this work, we pick some real use cases from the environment domain to showcase the usefulness of SexTant to the environmental studies of a domain expert by presenting its browsing and visualization capabilities using a

number of environmental datasets that we have published as linked data and also other geospatial data sources publicly available on the Web, such as KML files.