

Semantic Tools: Using Observation Ontologies for Data Discovery and Integration M. Jones¹, S. Bowers², B. Leinfelder¹, M. O' Brien³, M. Schildhauer¹, C. Jones¹

Why Use Ontologies?

Metadata languages in the environmental sciences have traditionally focused on high-level and human-readable descriptions of data sets and their syntactic properties, but often lack semantic information needed to fully identify and align heterogeneous data. Rich semantic information describing the content, structure, and relationships of environmental data can be used to build effective tools for discovery and integration of disparate data.

Software Tools

We have developed software tools within the Semtools project that use formal annotations on environmental data to link domainspecific ontology terms from the Extensible Observation Ontology (OBOE) to particular facets of environmental data sets. This annotation approach allows us to maintain data in traditional scientific formats (e.g., CSV text, NetCDF) while still establishing formal semantics for the data. The annotations can then be used to materialize a full knowledge model of the data (e.g., an RDF graph compatible with Linked Open Data conventions), which in turn drives discovery and integration tools.

We enable this through extensions to the Metacat data repository system that can be used for semantic search and semantic data subsetting for heterogeneous environmental data. The Metacat software uses the Ecological Metadata Language (EML) Data Manager Library for loading EML-described data, and incorporates the Semtools Semantic Mediation System (SMS) Java Library to enable query term expansion, semantic data subsetting, and data integration.

- ¹ National Center for Ecological Analysis and Synthesis, **University of California, Santa Barbara**
- ² Deptartment of Computer Science, Gonzaga University
- ³ Marine Science Institute, Univ. of California, Santa Barbara

This work was supported by the National Science Foundation under awards 0743429 and 0753144, and by Ecotrust.

Contact: jones@nceas.ucsb.edu

http://semtools.ecoinformatics.org

