ADOnIS – An ontology-based information system providing seamless integration of structured and unstructured data

Alsayed Algergawy, Friederike Klan, Erik Faessler, Hamed Hamdy, Bernd Kampe, Birgitta König-Ries, Udo Hahn

The CRC AquaDiva is a large collaborative project spanning a variety of domains, such as biology, geology, chemistry, and computer science with the common goal to better understand the Earth's critical zone in particular how environmental conditions and surface properties shape the structure, properties, and functions of the subsurface. This necessitates the collection and integration of large volumes of heterogeneous data. Besides this structured data, knowledge is also encoded in an unstructured form in publications. Ideally, scientists should be able to seamlessly access both types of information.

To this end, we are developing the AquaDiva Ontology-based Information System, *ADOnIS*. This system gives scientists various ways to upload their datasets into a common repository based on the *BExIS* framework. To enhance the integration process and to resolve conflicts among heterogeneous datasets, we build a conceptual, ontology-based layer on top of the common repository. Finally, the system grants different mechanisms to search and look for a specific piece of information and/or knowledge, including *keyword search, semantic search*, and *interactive search*. In all cases, search results will contain structured data as well as publications obtained from PubMed by using SeMedico.

The normal search provides the possibility for a scientist to enter a keyword (or a set of keywords) looking for the existence of this keyword either in the set of available metadata or primary data applying an exact match technique. This kind of search completely ignores the semantics of keywords as well as their relationships. Therefore, *ADOnIS* also provides semantic search exploiting features introduced by the conceptual layer. Finally, interactive search offers a view covering all the geo-related datasets displayed on a map.