



## **GeoSciML v3.0 – a significant upgrade of the CGI-IUGS geoscience data model**

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GeoSciML version 3.0 (<http://www.geosciml.org>), released in late 2011, is the latest version of the CGI-IUGS\* Interoperability Working Group geoscience data interchange standard. The new version is a significant upgrade and refactoring of GeoSciML v2 which was released in 2008. GeoSciML v3 has already been adopted by several major international interoperability initiatives, including OneGeology, the EU INSPIRE program, and the US Geoscience Information Network, as their standard data exchange format for geoscience data.

GeoSciML v3 makes use of recently upgraded versions of several Open Geospatial Consortium (OGC) and ISO data transfer standards, including GML v3.2, SWE Common v2.0, and Observations and Measurements v2 (ISO 19156). The GeoSciML v3 data model has been refactored from a single large application schema with many packages, into a number of smaller, but related, application schema modules with individual namespaces. This refactoring allows the use and future development of modules of GeoSciML (eg; GeologicUnit, GeologicStructure, GeologicAge, Borehole) in smaller, more manageable units. As a result of this refactoring and the integration with new OGC and ISO standards, GeoSciML v3 is not backwardly compatible with previous GeoSciML versions.

The scope of GeoSciML has been extended in version 3.0 to include new models for geomorphological data (a Geomorphology application schema), and for geological specimens, geochronological interpretations, and metadata for geochemical and geochronological analyses (a LaboratoryAnalysis-Specimen application schema). In addition, there is better support for borehole data, and the PhysicalProperties model now supports a wider range of petrophysical measurements. The previously used CGI\_Value data type has been superseded in favour of externally governed data types provided by OGC's SWE Common v2 and GML v3.2 data standards. The GeoSciML v3 release includes worked examples of best practice in delivering geochemical analytical data using the Observations and Measurements (ISO19156) and SWE Common v2 models.

The GeoSciML v3 data model does not include vocabularies to support the data model. However, it does provide a standard pattern to reference controlled vocabulary concepts using HTTP-URIs. The international GeoSciML community has developed distributed RDF-based geoscience vocabularies that can be accessed by GeoSciML web services using the standard pattern recommended in GeoSciML v3.

GeoSciML v3 is the first version of GeoSciML that will be accompanied by web service validation tools using Schematron rules. For example, these validation tools may check for compliance of a web service to a particular profile of GeoSciML, or for logical consistency of data content that cannot be enforced by the application schemas. This validation process will support accreditation of GeoSciML services and a higher degree of semantic interoperability.

\* International Union of Geological Sciences Commission for Management and Application of Geoscience Information (CGI-IUGS)