Modeling Geological Objects in 3D
An Exploration Tool for Natural Resources Appraisal

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This paper aims at presenting the general methodology used to integrate geological and geophysical data together with deposit modelling and 3D modelling databases developed for hard rock resources in the gOcad environment. It is articulated around an advanced interoperability data base model (SFA structures to handle solids, Sgrid, Voxet) and software architecture (Communication using on OGC standards GML, GeoSciML; WFS Client such as Gocad-plugin; and database e.g. PostgreSQL+ PostGIS). One of the main issues is the format and structure compatibility between various modelling software systems used in the mineral industry.

Dataset are collected from various sources including public databases, such as those published by Geological Surveys, GIS 2D mapping systems, geophysical exploration surveys acquired by public institutes or the industry, underground works, wells and surface sampling. One of the main issues is to integrate this heterogeneous, imprecise, multiscale data into a comprehensive operational data model. Data standards must be defined to insure interoperability between the various databases. Once validated, the integrated 3D model can be used as a predictive tool to derive occurrence 3D maps of mineralized potential targets.

3D-models case studies chosen among selected geological belts in Europe and Canada will be presented to illustrate the methodology..

Key-words: geomodeling, exploration, Gocad, geology, natural resources, database, 3 &4D models, deep subsurface mineral resources.