

# Leveraging International Earth Science Standards to Enhance Mineral Exploration Success in British Columbia



STANDARDS

### Piloting EarthResourceML Applications in BC

Setting Standards for the 21<sup>st</sup> Century – using them for better science

Information Model for Exchange

Approach: interoperability

Geoscience BC

Canada

Australia (Federal and State agencies)

### Vocabulary Standards and Exploration: Geochemistry

Lithological Classification (problematic) of Stream Sed Geochemistry

BC Rocks to Rocks Project: Thresholds for "Elemental/oxide" Status (95th Percentile)

NOT INTERFERABLE

### OneGeology British Columbia

The BC "Table is Laid" - we now need to take the next step

Ministry of Energy and Mines

The MapPlace Use WMS Viewer

### Example Application of Standards: MineMatch

Computer-generated Exploration Targets dependent on Standards

The Creation and Use of the WWW.YUKONMINERALTARGETS.COM Website

More than 90 Target Maps

Target Rankings Explained

### Challenges Rewards of Aristotelian Reasoning

Properties are what make maps useful

Science Languages are difficult to design

DEVELOPED FOR USE BY COMPUTER EXPERTS

### BC Geology Map Rock Classification

NOT INTERFERABLE

To View: [www.similar2.com/RockClassifications](http://www.similar2.com/RockClassifications)

### Piloting EarthResourceML Applications in BC

GOALS AND DELIVERABLES

D1: A static mapping in Excel between all lithological terms used in 1 to 4 below and their GeoSciML closest equivalents

D2: An Internet page for dynamically exploring GeoSciML "Simple Lithology" vocab.

D3: An Internet page serving the lithological components of the geological Units of the 1:1,000,000 geological map of BC in a GeoSciML-compliant WFS layer

D4: A report explaining these

NOT INTERFERABLE

### Vocabulary Standards and Exploration: MINFILE

Lithological Classification (problematic) of Mineral Occurrences

NOT INTERFERABLE

### OneGeology Portal

Making Geological Map Data for the Earth Accessible

NOT INTERFERABLE

### GeoSciML SimpleLithology201001 displayed in XML

Not practical for Human Beings

4.3 Controlled Concepts and Vocabularies

4.3.1 Mapping your own vocabularies

DEVELOPED FOR USE BY COMPUTER EXPERTS

### MINFILE Rock Classification

NOT INTERFERABLE

To View: [www.similar2.com/RockClassifications](http://www.similar2.com/RockClassifications)

### Introduction to EarthResourceML

Born in Australia - Growing up in Europe

Information Model for Exchange

Approach: interoperability

Geoscience BC

Canada

Australia (Federal and State agencies)

### Vocabulary Standards and Exploration: Deposit Models

Host Rock (problematic) Associations of Deposit Models

BC is one of the very few jurisdictions in the world to have published a comprehensive list of proto-typical mineral deposit models, which are very important to effective mineral exploration.

NOT INTERFERABLE

### OneGeology British Columbia

BC WMS geology in Google Earth

NOT INTERFERABLE

### GeoSciML SimpleLithology201001 displayed in TopBraid Composer

Not practical for Domain Experts (geologists, mineralogists, etc)

Composer infers this hierarchy from these attributes by referring to these hierarchies

DEVELOPED FOR USE BY KNOWLEDGE ENGINEERING EXPERTS

### RPDS Common Rock Names

NOT INTERFERABLE

To View: [www.similar2.com/RockClassifications](http://www.similar2.com/RockClassifications)

### Standardised Vocabulary & Taxonomy is Critical

Necessary for data interpretation and accurate predictive science.

NOT INTERFERABLE

### Vocabulary Standards and Exploration: Geology

Lithological Classification (problematic) of Geological Map Units

NOT INTERFERABLE

### OneGeology British Columbia

BC WMS geology in Google Earth

NOT INTERFERABLE

### The Aristotelian Approach to Taxonomy

A Necessary Pre-requisite for Intelligent Systems

"Make Properties Explicit in Every Taxonomy"

### GeoSciML SimpleLithology201001 displayed in ACE

ACE interface is English or French; Taxonomies can be Multi-Lingual

DEVELOPED FOR USE BY DOMAIN EXPERTS (like geologists)

### OneGeology Rock Classification

NOT INTERFERABLE

To View: [www.similar2.com/RockClassifications](http://www.similar2.com/RockClassifications)

### Vocabulary Standards and Exploration: Geophysics

Lithological Classification (problematic) of Rock Properties Database

NOT INTERFERABLE

### Potential EarthResourceML Phase II Project

Develop applications\*\* which deliver BC exploration-relevant data interoperable\*\* with other GeoSciML-compliant data

\* As already being done for the Canadian Groundwater Information Network

\*\* Using EarthResourceML

NOT INTERFERABLE

### British Columbia in OneGeology

We want to show BC geology here, and as WFS, not simple WMS

NOT INTERFERABLE

### Aristotelian Reasoning

Needs access to All Properties Inferred by a Concept Name when Reasoning

[\* including responding to a database/GIS query]

NOT INTERFERABLE

### GeoSciML SimpleLithology201001b: Excel Workflow\*

\* Constituents' column was broken out to 16 independent "dimensions"

DEVELOPED FOR USE BY DOMAIN EXPERTS (like geologists)

### OneGeology Rock Classification

NOT INTERFERABLE

To View: [www.similar2.com/RockClassifications](http://www.similar2.com/RockClassifications)