Is it possible to have interoperable geological data and avoid information loss?

Katarzyna Jóźwik katarzyna.jozwik@pgi.gov.pl, Urszula Stępień urszula.stepien@pgi.gov.pl, Waldemar Gogołek waldemar.gogolek@pgi.gov.pl, Katarzyna Sadłowska katarzyna.sadlowska@pgi.gov.pl, Marcin Słodkowski marcin.slodkowski@pgi.gov.pl

90% of Poland is covered by the Quaternary deposits, mostly glacial ones, with thickness reaching up to 200 meters. Many areas associated with these rocks are key for the national policy concerning e.g. building and road construction, potable water supply, mineral deposits etc.

GeoSciML/CGI vocabularies turn out to be insufficient for the description of glacial geological units. Wider INSPIRE codelists appear to be more suitable for that purpose, still they are too general when it comes to large scale compilations (e.g. 1:200k). Additionally, although INSPIRE recommends the usage of GeoSciML, in case of the Geology theme there are some inconsistencies between them, not only in terms of dictonaries but also in schemas. Therefore, it remains unclear how we shall provide data interoperability on both European and global level and do not lose some information during the harmonization process.

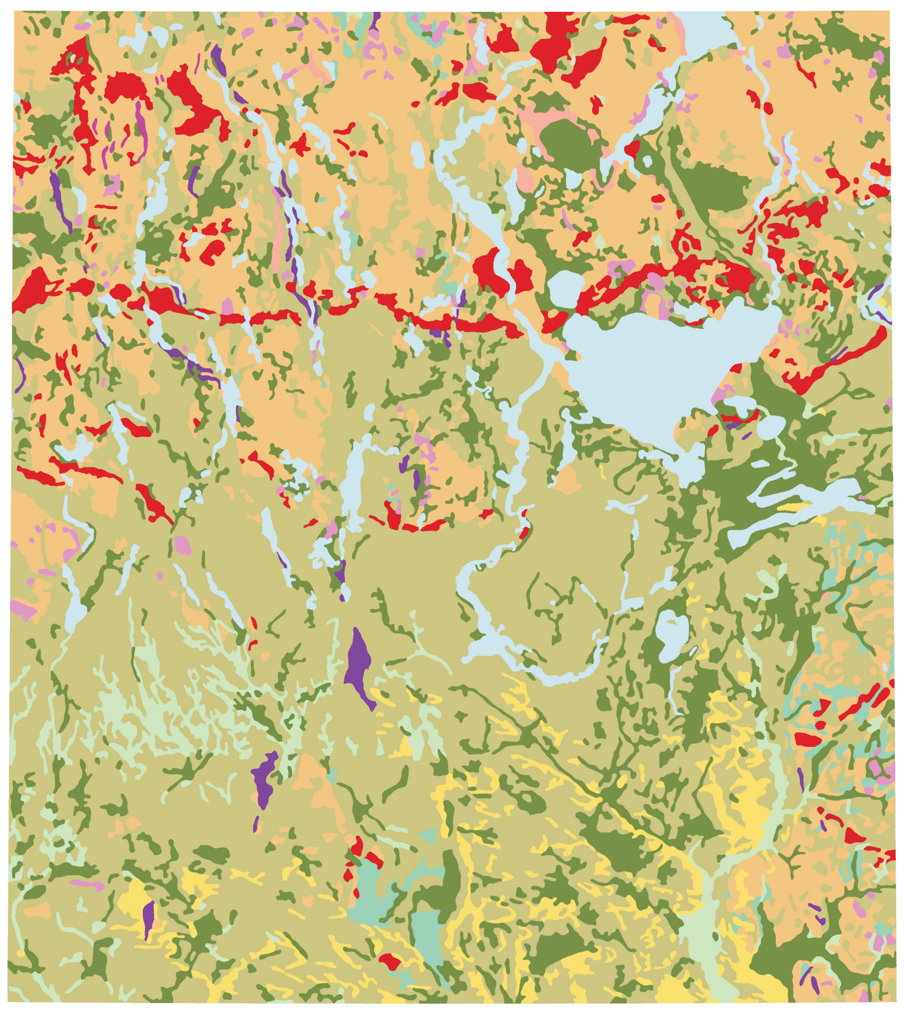
QR Code

Genesis of Quaternary geological units: national/customary terms vs INSPIRE and GeoSciML/CGI vocabularies – based on the results of preliminary works on the Polish contribution to the International Quaternary Map of Europe (IQUAME) as well as on the outcomes of the OneGeology initiative

EUROPEAN LEVEL

IQUAME

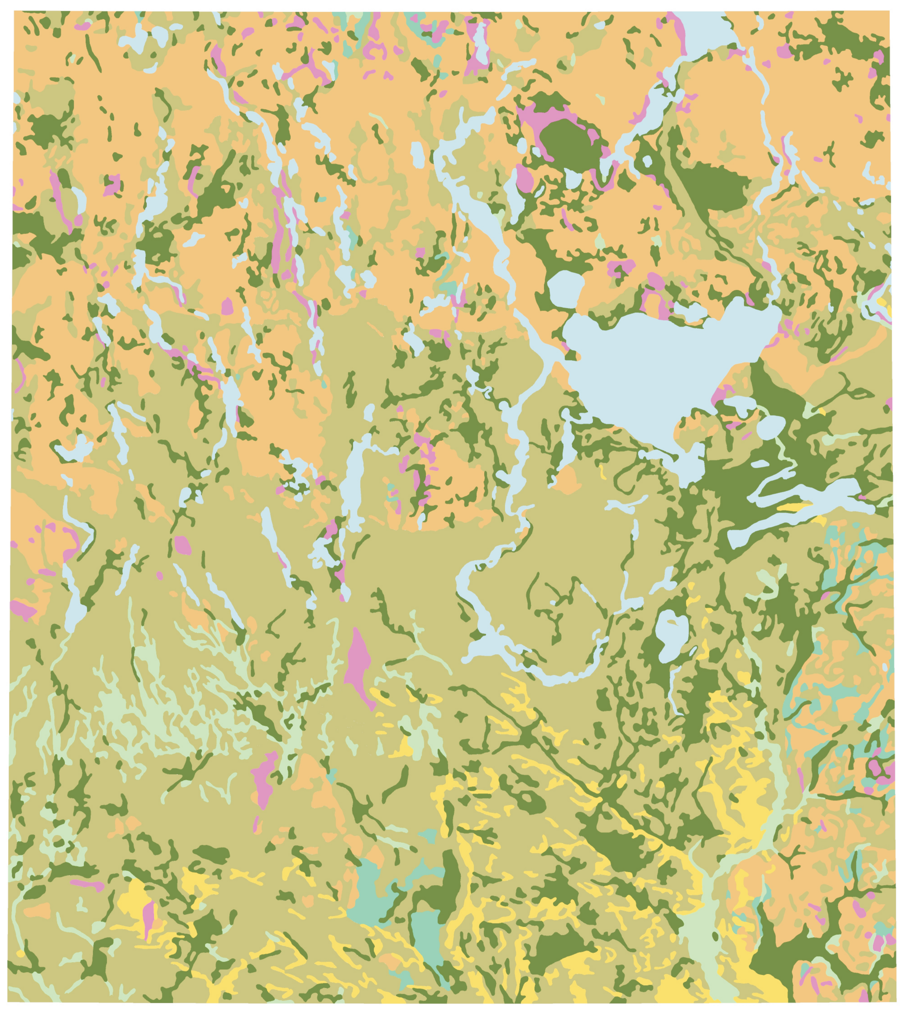
A chosen map sheet of the Geological Map of Poland 1:200k (here reduced to 1:400k) after a preliminary generalization for the purposes of the IQUAME project; surficial geological units symbolised according to the customary genesis of deposits together with the glaciogenetic landforms. IQUAME uses INSPIRE vocabularies for lithology, stratigraphy and genesis. Apart from combined INSPIRE genesis, it also includes traditionally used terms and enables distinction of glaciogenetic forms with descriptive values derived from a preprepared dictionary. Here end moraines clearly delineate (red colour) the extent of the Pomeranian phase of the Weichselian glaciation.



- glacial till, sand and gravel
- end moraines
- drumlins
- osers
- kames
- stepped terraces
- glaciofluvial deposits
- glaciolacustrine deposits
- eolian deposits
- fluvial deposits
- lacustrine deposits
- water

INSPIRE

The same map sheet with units symbolisation based on the INSPIRE combined genesis (codelists **EventEnvironment** and **EventProcess**). The overall picture is similar but the information on glaciogenetic forms (together with the delineated extent of the glaciation) is lost.

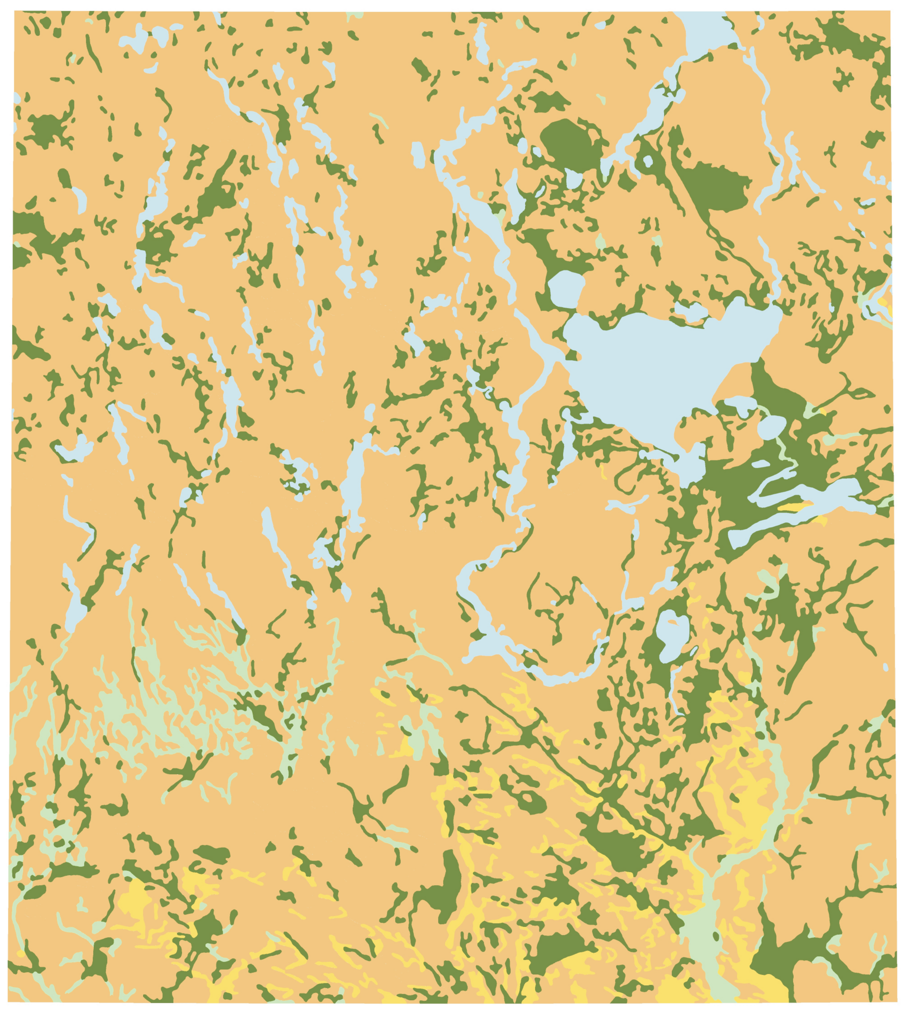


- glacier related setting, deposition by or from moving ice
- glacier related setting, deposition from water
- glaciofluvial setting, deposition from water
- glaciolacustrine setting, deposition
- dust accumulation setting, deposition from air
- river plain system setting, deposition from water
- lacustrine setting, sedimentary process
- water

GLOBAL LEVEL

GeoSciML

The same map sheet with units symbolisation based on the corresponding GeoSciML/CGI vocabularies (**Event-Environment** and **EventProcess**). These vocabularies are narrower than the INSPIRE ones and place all glacier related deposits in the same category. Thus the derived picture provides a poor insight into the real nature of the deposits.

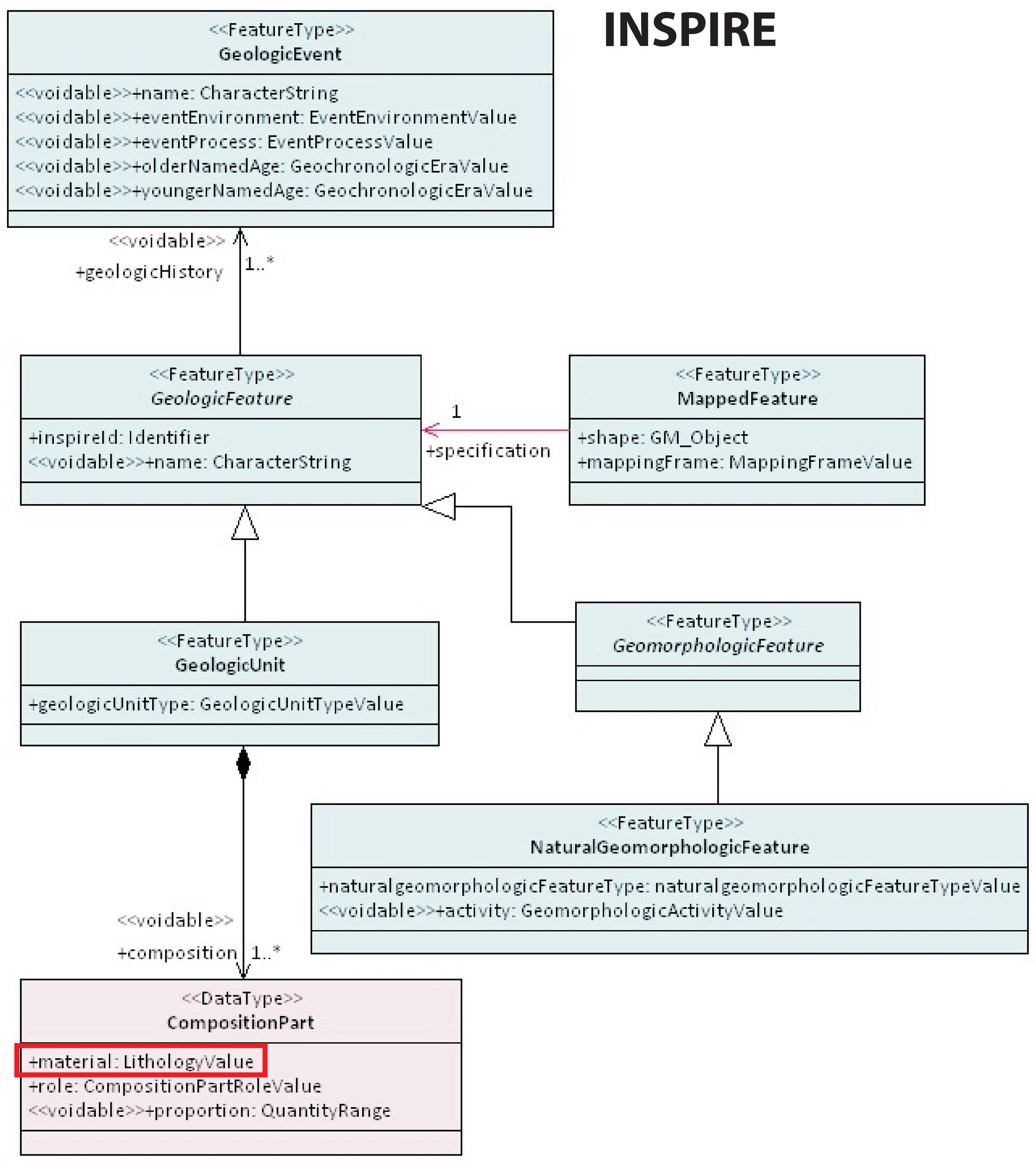


- glacier related setting, deposition
- dust accumulation setting, deposition
- river plain system setting, deposition
- lacustrine setting, sedimentary process
- water

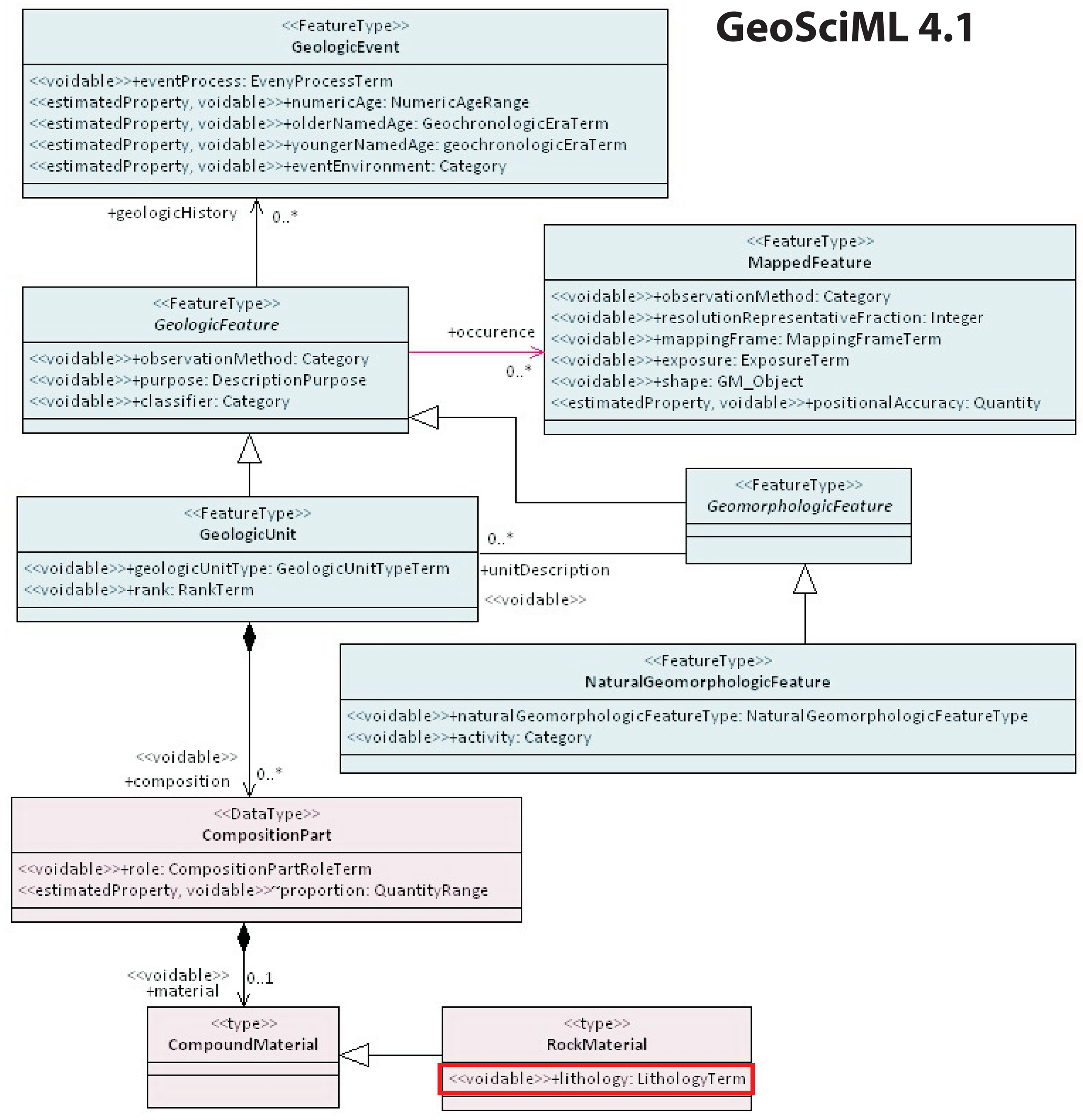
Both INSPIRE and GeoSciML models contain a **NaturalGeomorphologicFeature** element but in the corresponding codelists all glacier related deposits are placed under the one single label: „glacial, glaciofluvial, glaciolacustrine and glaciomarine" so there is still no accurate information on the glacial landforms

Chosen elements of geological data models with their attributes and relations: INSPIRE vs GeoSciML

INSPIRE



GeoSciML 4.1



CONCLUSIONS

1. Terms describing representative forms of glaciogenetic lowland landscape (end moraines, drumlins etc.) should be added to the INSPIRE codelist for the **Natural-GeomorphologicFeature**. Glaciation epoch (Pleistocene) is an important part of the latest geological history for North and Central Europe and a subject of many current national and international researches.

2. Generally GeoSciML/CGI terminology focuses on mountain glaciers and is lacking vocabulary for the description of continental glaciers (ice sheets).

3. GeoSciML/CGI vocabularies for the **EventEnvironment** and **EventProcess** should be made more accurate in case of terms describing the genesis of glaciogenetic features. The genesis of deposits predestines their behaviour and characteristics, thus is extremely important, e.g. from the spatial planning or military point of view, also when a global scale is considered.

4. Basically INSPIRE geological data model corresponds with the GeoSciML one. Nevertheless it is simplified, some of the original GeoSciML elements have been dropped and the chosen attributes of theirs incorporated into the other INSPIRE model elements (e.g. **RockMaterial** and lithologic description). There are also some discrepancies in case of relations between the elements. The models should be unified to facilitate the data interoperability and prevent information loss.

Polish Geological Institute
National Research Institute
4, Rakowiecka Street
00-975 Warsaw, Poland
Tel. 48 22 45 92 000, Fax 48 22 45 92 001
biuro@pgi.gov.pl

Projects:
"Compilation of a new edition of the International Quaternary Map of Europe to a scale of 1:2 500 000 - Polish part",
"Cooperation of the Polish Geological Survey in the frame of the OneGeology International Initiative of Geological Surveys",
Financed by the National Fund for Environmental Protection and Water Management

www.pgi.gov.pl