

# EXTENDED GEOLOGICAL THEMATIC DATA FOR MANAGING GEOLOGICAL AND MINING HAZARDS

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**KEY WORDS:** karst, landslides, rock falls, mine, shaft, gallery, quarries, WebGIS, Wallonia.

## CONTEXT

The geology of Wallonia, although its small superficiality, is quite complex, including formations from late Cambrian to Carboniferous, some triassic and Jurassic deposits, and a cover of upper Cretaceous, Eocen and Miocen tabular deposits in center and north. Nearly all the north is covered by Holocen deposits, often quite thick. The Paleozoic bed-rock is intensively folded and faulted, as a consequence of the Variscan orogeny. So, on the field, the geology is changing quickly.

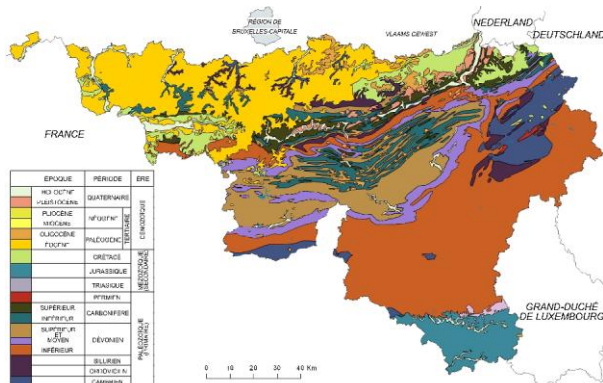


Figure 1 – Synthetic geological map of Wallonia.

The population density in Wallonia is about of 204 inhabitants/km<sup>2</sup> (to 1.000 in the central zones).

Geological mapping in such conditions needs to be realised on an appropriate scale. The new Geological Map of Wallonia has chosen the 1/10.000 scale (1/25.000 for the published maps).

At this scale, it is important to add thematic items related with geology, to be complete and to stick to the demands of the users (geological, geomorphological, geotechnical and old exploitations items).

The geological mapping program started in 1990 and should be achieved in 2018 for the mapping itself and in 2024 for the publication. The gathering of the thematic items has begun in 1994. All should be done for 2014. All these programs are organised by the Public Service of Wallonia.

The geological map is published on a paper support and on a WebGIS platform (<http://carto1.wallonie.be/geologie>). Another WebGIS service is dedicated to the thematic items (<http://carto1.wallonie.be/soussol>). A website comes with them since March 2012.

## OUTCROPS AND BORINGS OF THE GEOLOGICAL MAP OF WALLONIA

In order to draw the geological map, ten geologists of five institutions are collecting new data on the field and are reviewing the old data kept by the Geological Survey of Belgium.

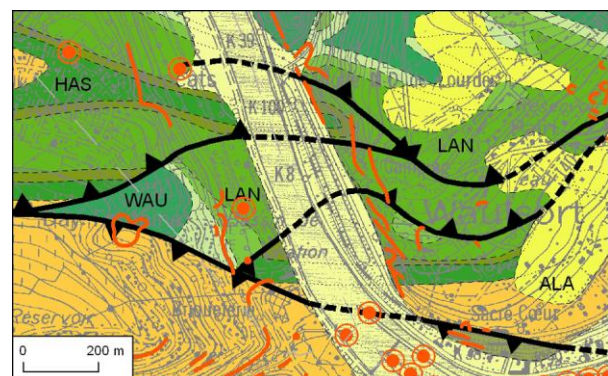


Figure 2 – Outcrops and borings of the Geological Map of Wallonia.

More than 110.000 outcrops and borings (60.000 descriptions) are now recorded in a data base, for 92 maps on 142. The next step is to include about 200.000 descriptions of old points and the future data, to update the geological map.

## GEOLOGICAL ITEMS

Some others geological items have been gathered and localised, on the basis of mine files and maps and scientific and historic descriptions :

- metallic ore deposits, by Th. Martin from University of Mons (1.200 objects – scale between 1/1.000 and 1/40.000);
- iron ore deposits and layers, by J. Denayer of University of Liège (3.300 objects – scale between 1/1.000 and 1/40.000);

Geochemical data, collected on the field, are also available (about 9.900 spots).

## GEOMORPHOLOGICAL ITEMS

The Thematic application is aimed not only to show the objects and their localisation, but also to inform about the administrative requirements for construction or industry, linked to these objects.

Three items and their relative requirements are showed on the Thematics WebGIS service :

- the Atlas of Walloon Karst (8.000 objects);
- landslides in the western and eastern parts;
- zones of falling rocks.

The two last thematics have been collected by University of Liège, on an initiative of DGO4 - General Direction of Urbanism, Territorial Management, Patrimony and Energy. The Atlas of Walloon Karst is based on an initiative of DGO3 - General Direction of Agriculture, Natural Ressources and Environment, and done by the Walloon Commission for Study and Protection of Underground Sites (CWEPSS), in collaboration with DGO4. The scale of these items is 1/10.000.

## MINES AND ANCIENT EXPLOITATIONS ITEMS

Wallonia has a 8 centuries old mining and quarrying history, on various rocks and ores, with a noticeably development of underground works.

The gathering of data has begun in 1997, for the prevention of mining hazards. It was quickly completed by the collect of data on non strict "mines" items. The work is to be achieved in 2014. These items comprise :

- the last perimeter of 354 mining concessions, kept or created after 1793 - scale 1/10.000;
- 12.000 mine shafts or gallery exits (30.000 occurrences) - average scale : 1/2.500;
- mine drainage galleries - average scale 1/10.000;
- underground exploitations of coal - scale 1/10.000;
- maps of past soil subsidence (coal mines);

- 5.000 underground quarries, on a base of cadastral plots, and for less than 300 quarries, with plans - scale 1/1.000 to 1/5.000;
- about 1.500 iron ore exploitations (mostly superficial) – scale 1/1.000 to 1/40.000;
- more than 800 slag heaps of collieries;
- zones of recommended consultation of the Direction of Industrial, Geological and Mining Hazards, because of the presence of underground exploitations;
- zones of administrative and geotechnical requirements linked to mine works *sensu stricto*.

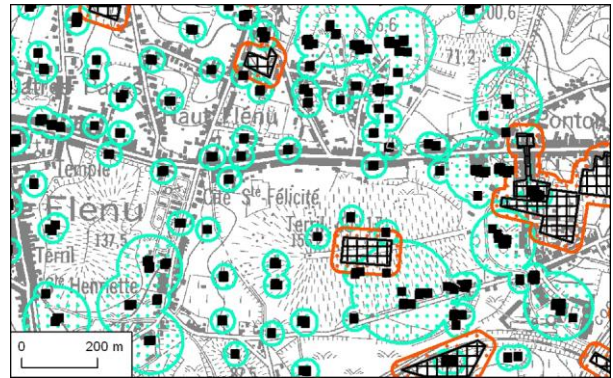


Figure 3 – Mine shafts and underground quarries near Mons.

## PERSPECTIVES

A "Certificate of Underground State" will be developed in order to integrate all these data in a document to join to application forms for permits or to real estate transactions. It will also serve data on seismicity and radon hazards

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