Geophysical Research Abstracts
Vol. 19, EGU2017-15387, 2017
EGU General Assembly 2017

Geothermal prospection in the Greater Geneva Basin (Switzerland and France): Architecture of the new Information System

Stéphanie Favre (1), Maud Brentini (2), Gregory Giuliani (1), and Anthony Lehmann (1)

(1) Institute for Environmental Sciences, University of Geneva, Geneva, Switzerland (stephanie.favre@unige.ch), (2) Department of Earth Sciences, University of Geneva, Geneva, Switzerland

Growing interests on the subsurface resources can be noted while issues concerning sustainable territorial development are rising too (Blunier et al. 2007). Among these resources, geothermal energy is developing in Geneva and regions and asks questions on subsurface resources management especially in terms of data. The GEothermie 2020 program offers the possibility to reprocess old data (Rusillon et al., 2017; Clerc et al., 2016) and collect new ones in order to increase geological knowledge on the Greater Geneva Basin. To better valorize these data, an Information System (IS) is required for the geological survey of Geneva (GESDEC). However, existing IT infrastructures are not able to meet all their needs.

This research aims to develop a geological IS for 2D and 3D data. To fit to the needs of the GESDEC, three aspects will be studied: 1) architecture, 2) tools and 3) data workflow. A case study will validate the Information System designed.

The first step of this study was to establish the state of the art on the current geological data management practices in Europe, Switzerland and in Geneva. To evaluate IS, short structured questions have been sent to all European geological surveys as well as an adapted version for the cantonal and federal Swiss institutes. Concerning the database and GIS development aspects, an analysis of the GESDEC's needs and constraints allowed expanding the existing data model (Brentini and Favre 2014). Different database and GIS tools were compared and tested. Possibilities for these tools to communicate with GST, a 3D data viewer and manager (Gabriel et al. 2015), were also taken in account. These developments took place in parallel with discussions with stakeholders involved and various experts in the field of information management, geology and geothermal energy to support reflexions on the data workflows.

Questionnaire results showed that the development of a geological IS differs largely from a country to another although their objectives and needs are similar. Concerning the architecture, the data model was developed according to the following themes: geology, hydrogeology, geophysics and geothermal energy. Each theme contains features that are characterized by a geometric shape (point, line or polygon), attribute tables and relations. The data model was designed to allow crossed requests between features though unique identifier (ID) attributes. PostgreSQL, an open-source database management system, was chosen to ensure a wide range of compatible GIS tools. This solution helps keeping the link between 2D and 3D geological data, especially through the cantonal platform (ge.ch/sitg/geologie3d) that stores and displays 3D models.

To ensure the development of a geological IS, these aspects have been considered: 1) having a robust and scalable architecture 2) selecting adapted IT tools and 3) defining coherent data workflows. The future system should be able to answer queries to produce of maps, models and define protection zones, which assist an optimal management of the subsurface resources for the State of Geneva.

REFERENCES

Blunier, P., Tacher, L. and Parriaux, A. 2007: Systemic Approach of Urban Underground Resources Exploitation. 11th ACUUS Conference: Underground Space: Expanding the Frontiers. Athens , Greece.

Brentini, M. and Favre, S. 2014: Développement d'une base de données du sous-sol dans le cadre de GEothermie 2020: intégration des forages et lignes sismiques à Genève. Internship thesis, University of Geneva, 90p.

Clerc, N., Rusillon, E., Cardello, L., Moscariello, A. and Renard, P., 2016. Structural Modeling of the Geneva Basin for Geothermal Ressource Assessment. Abstract, 14th Swiss Geoscience Meeting, Geneva, Switzerland.

Gabriel, P., Gietzel, J., Le, H., H., and Schaeben, H. 2015: GST: A Network Based Datastore for Geoscience Data and Geomodels and Its Implementation - ProMine's Contribution Towards Interoperability. Springer International

Publishing Switzerland, 59-71.

Rusillon, E., Clerc, N., Makhloufi, M., Brentini and M., Moscariello, A., 2017. Geothermal prospection in the Greater Geneva Basin (Switzerland and France): structural and reservoir quality assessment. Abstract, EGU General Assembly 2017, Vienna, Austria.