

Geological Information System for Managing Geothermal Project in Geneva

Dr. Stéphanie FAVRE

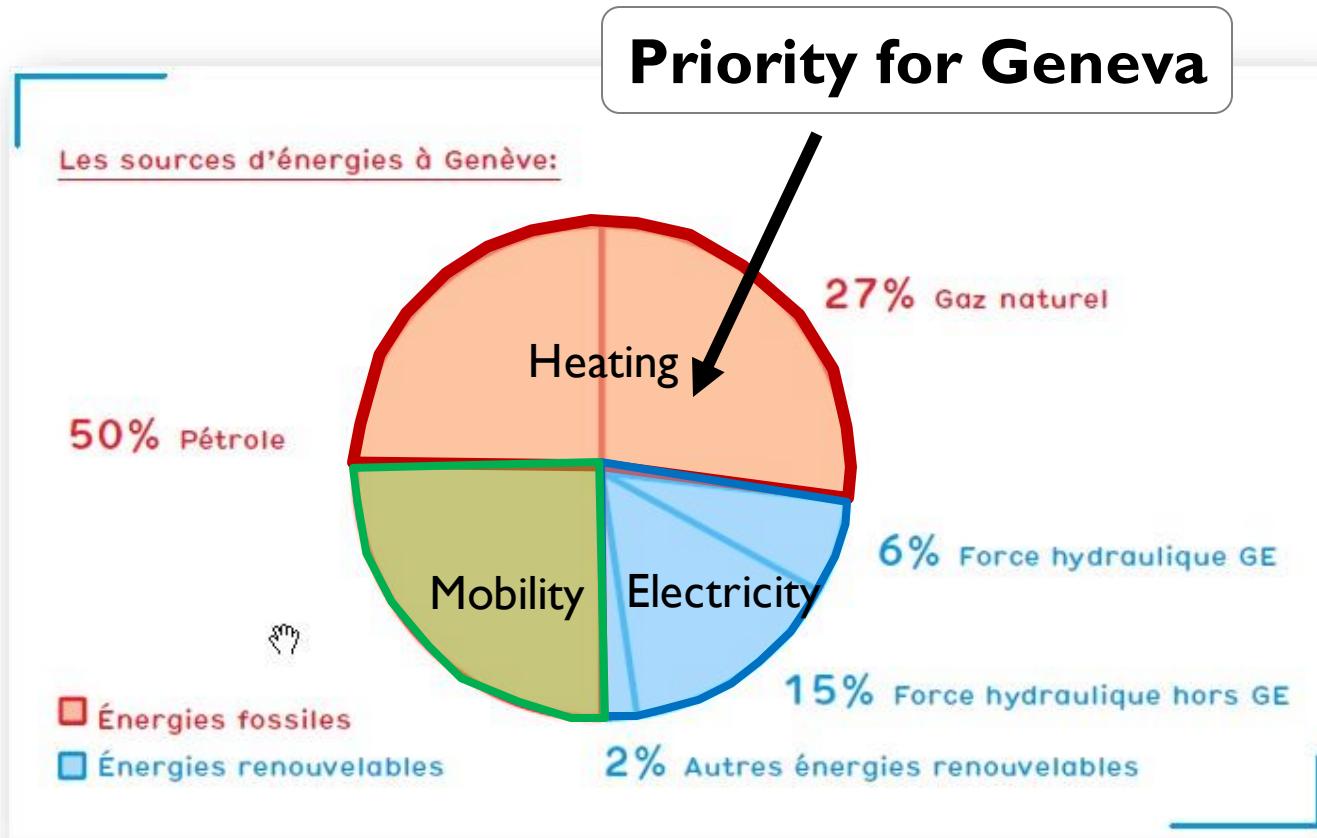
Workshop on the role of big data and geospatial data in energy transition

Ninth International Forum on Energy for Sustainable Development, Kiev, Ukraine

14th of November 2018

WHY A GEOLOGICAL INFORMATION SYSTEM ?

Energy situation in Geneva



WHY A GEOLOGICAL INFORMATION SYSTEM ?

GEothermie 2020 Program



- 1 – Prospection**
- 2 – Exploration**
- 3 – Exploitation**



GEothermie 2020, 2018



GEothermie 2020, 2018



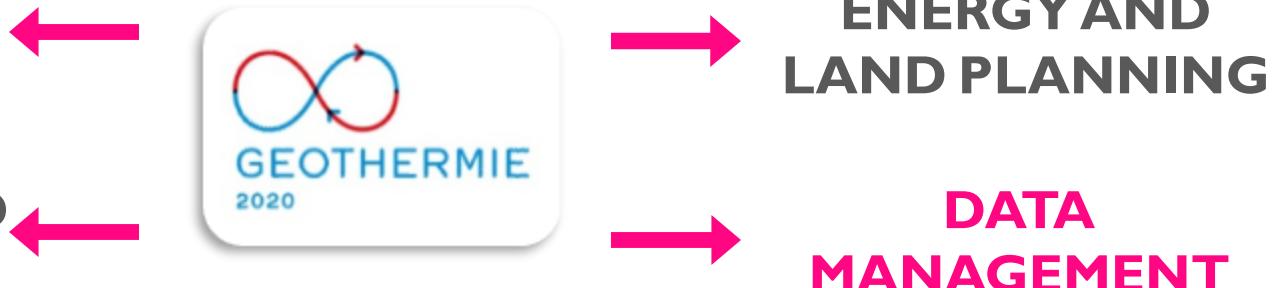
Tribune de Genève, 2014

WHY A GEOLOGICAL INFORMATION SYSTEM ?

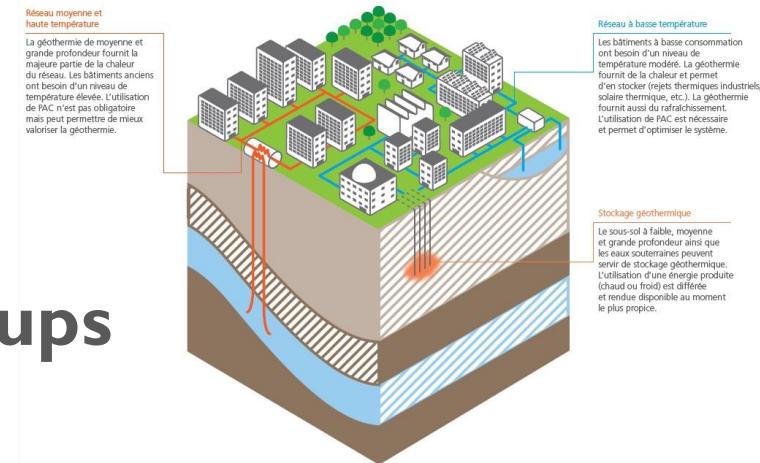
GEothermie 2020 Program



Working groups



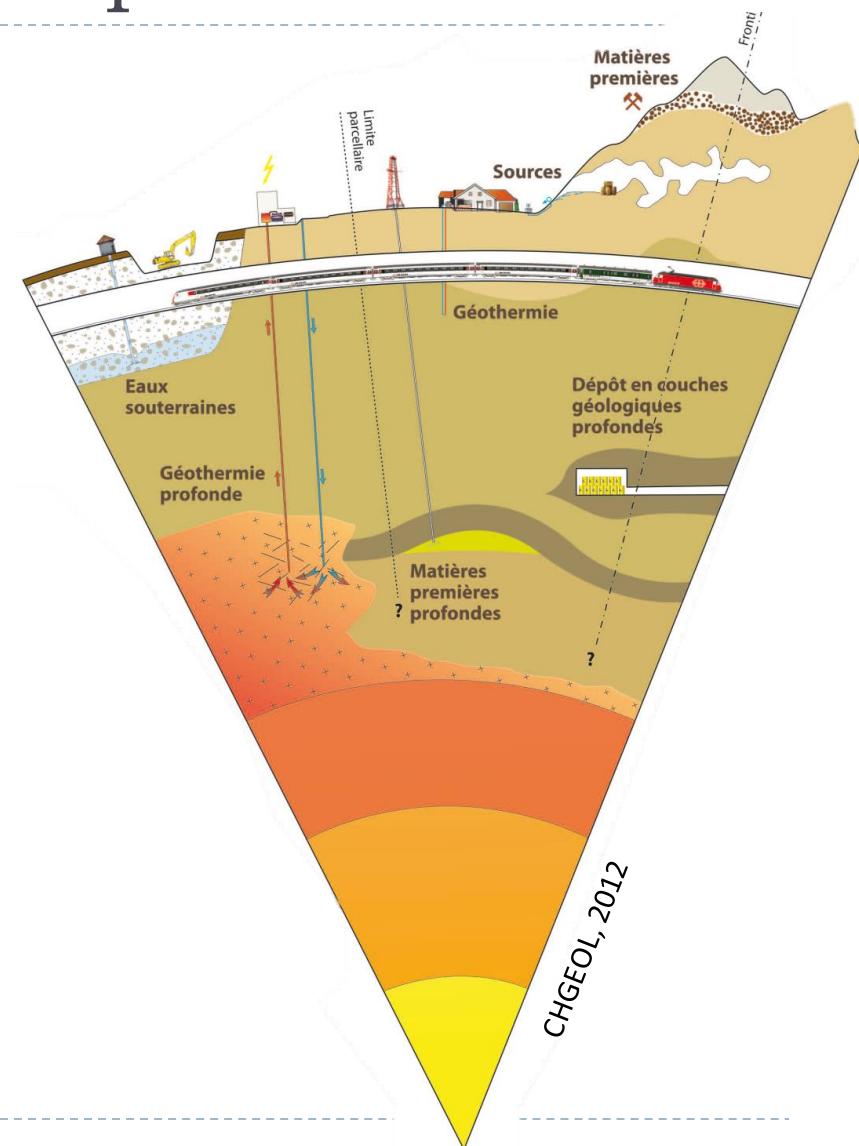
[Objective: developing geothermal industry]



WHY A GEOLOGICAL INFORMATION SYSTEM ?

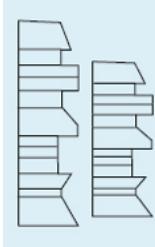
Subsurface resources exploitation

- ▶ Geothermal Energy
- ▶ Water and mineral resources
 - ❖ Phreatic resources
 - ❖ Hydrocarbons
 - ❖ Salt and others minerals
- ▶ Space
 - ❖ Transport structures and pipelines for electricity, gaz and water supply
 - ❖ CO₂ and nuclear waste storage
 - ❖ Heat storage



WHY A GEOLOGICAL INFORMATION SYSTEM ?

Thesis projects on data management



Brentini, M. (2018)

Geological classification and
harmonizing regional data



UNIVERSITÉ
DE GENÈVE

INSTITUT DES SCIENCES
DE L'ENVIRONNEMENT



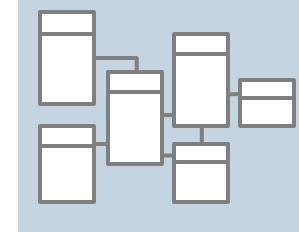
UNIVERSITÉ
DE GENÈVE

FACULTY OF SCIENCE
Department of Earth Sciences



REPUBLIQUE
ET CANTON
DE GENEVE

POST TENEBRAS LUX



Favre, S. (2018)

Data model and information
system architecture

CONCEPTION OF A
GEOLOGICAL
INFORMATION SYSTEM
FOR THE CANTON

HOW TO MANAGE GEOLOGICAL DATA ?

Information system (IS) and interoperability

Assessment of the IS

RESEARCH QUESTIONS

What are the data types, formats and tools used?

What are the geological and broader domains of applications?

What are the legal framework in place?

What are the human and financial resources mobilized?

SURVEY THEMATICS

IT infrastructure

Geological data

IS applications

Policy and legal framework

Cross-border collaboration

Human and financial resources

CHALLENGES

TECHNICAL

SEMANTIC

LEGAL

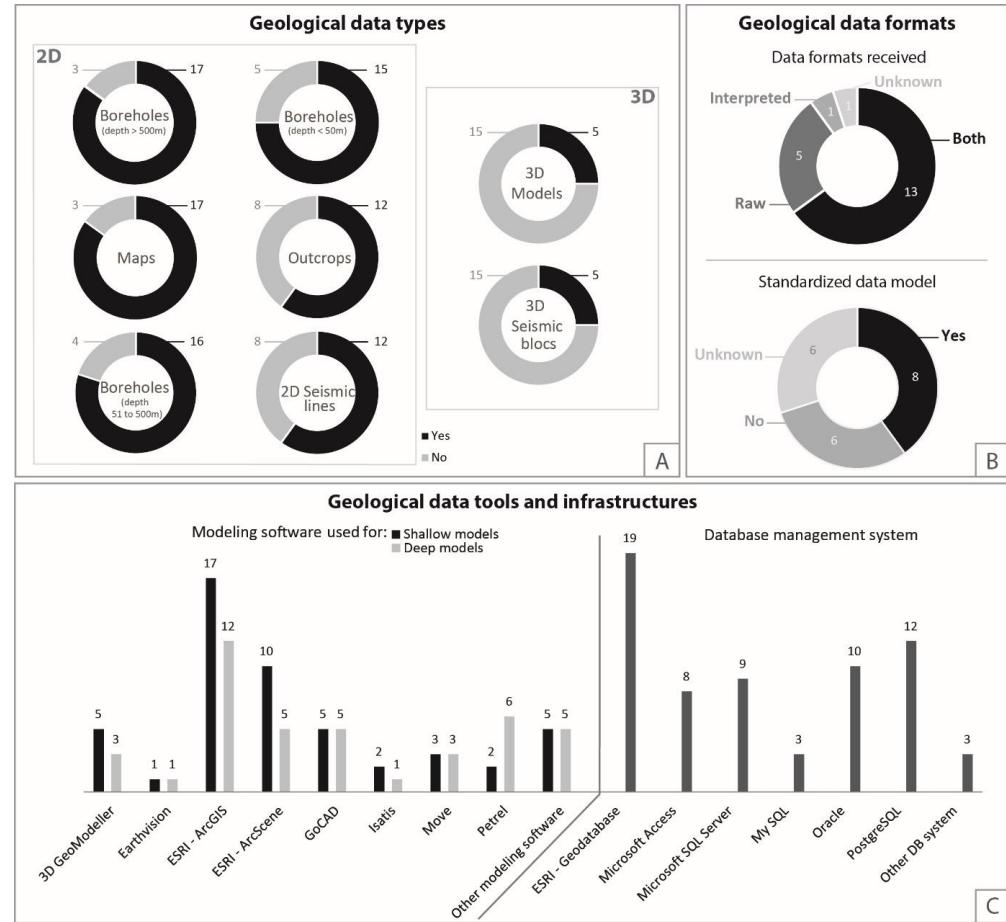
HUMAN

INTEROPERABILITY

HOW TO MANAGE GEOLOGICAL DATA ?

Geological data management in EU

- **Heterogeneous data**
- **Low integration of 3D data**
- **Raw and interpreted geological data managed**
- **Data models not always used**
- **No unique technical solution**

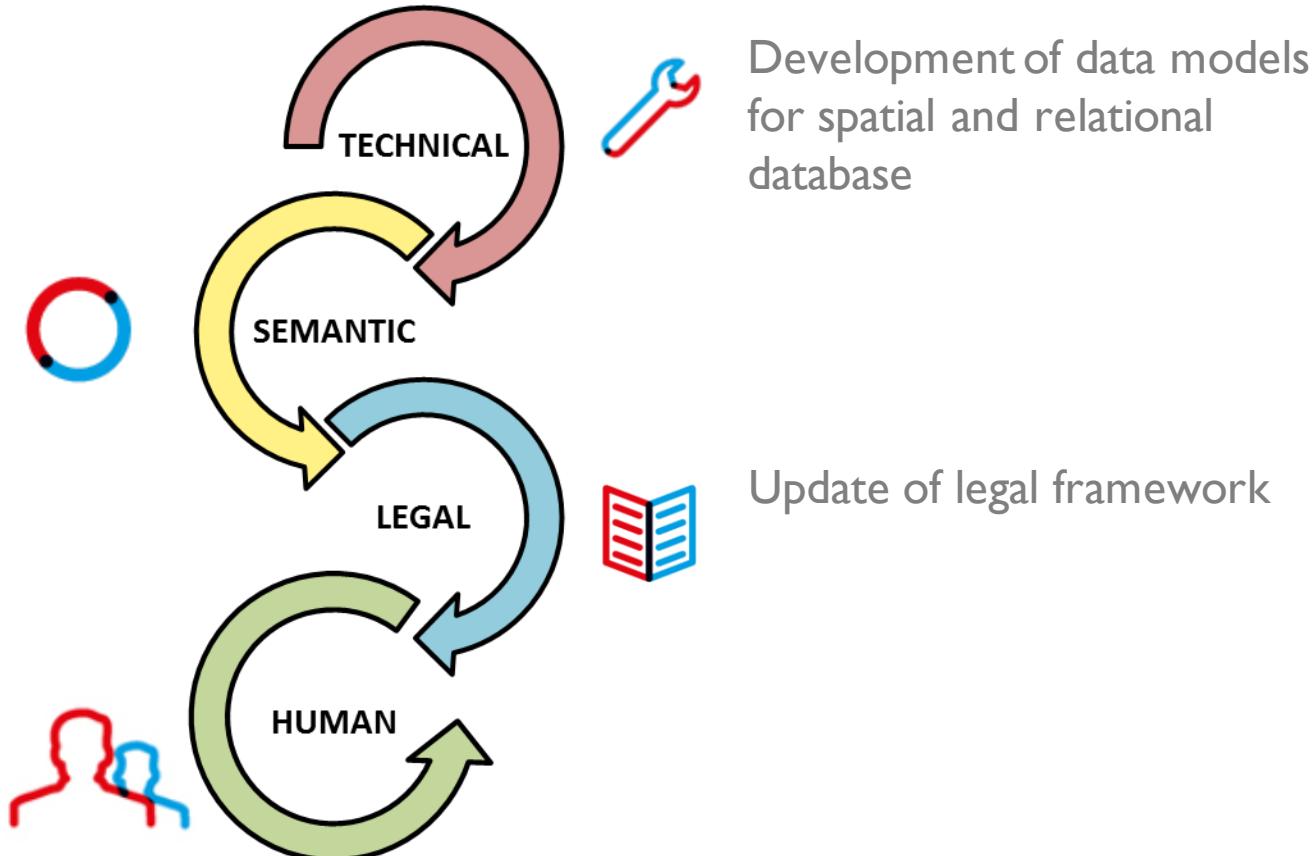


HOW TO MANAGE GEOLOGICAL DATA ?

Role of utilities in the Geneva context

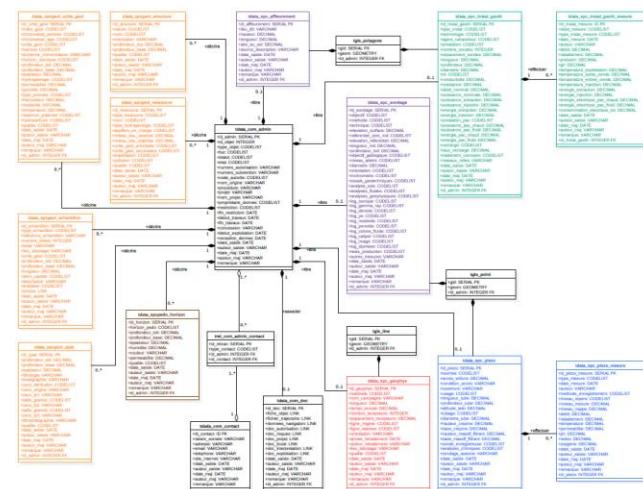
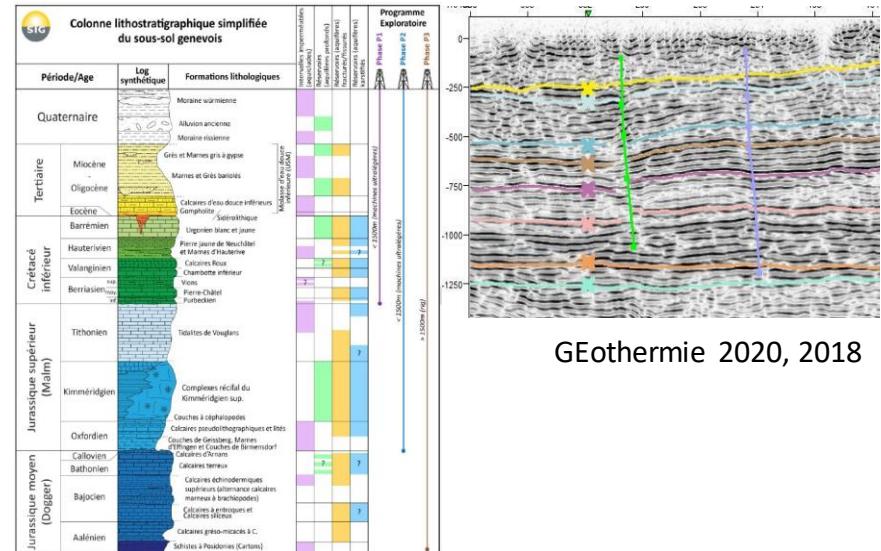
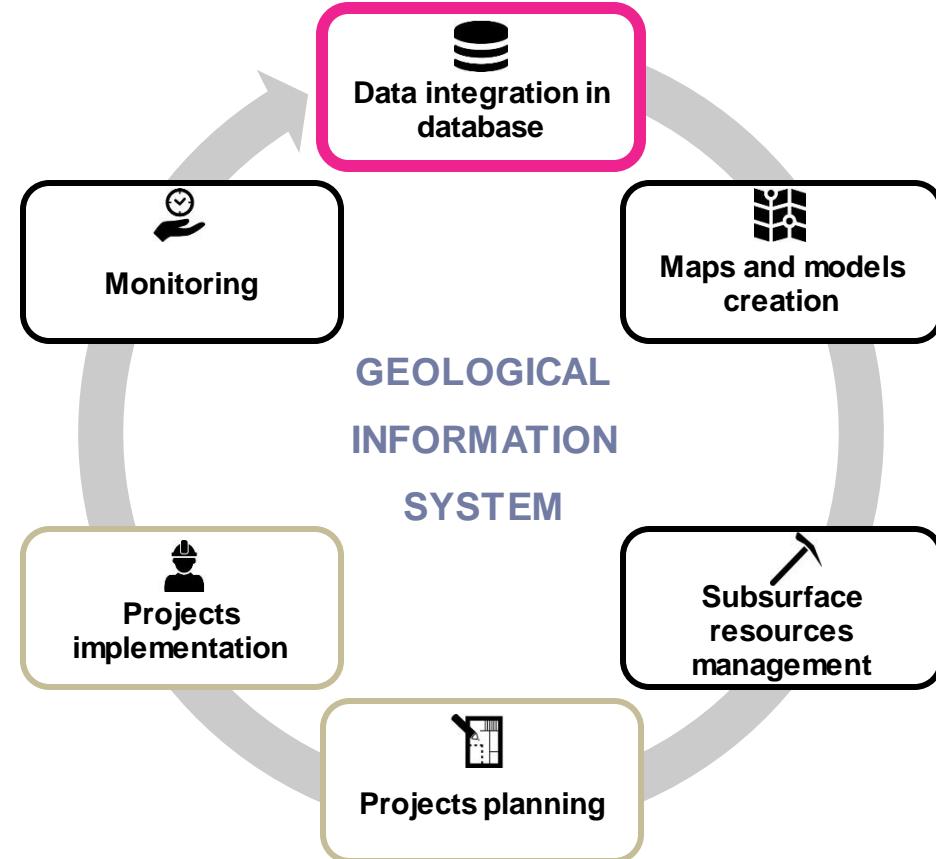


Interoperability guide lines



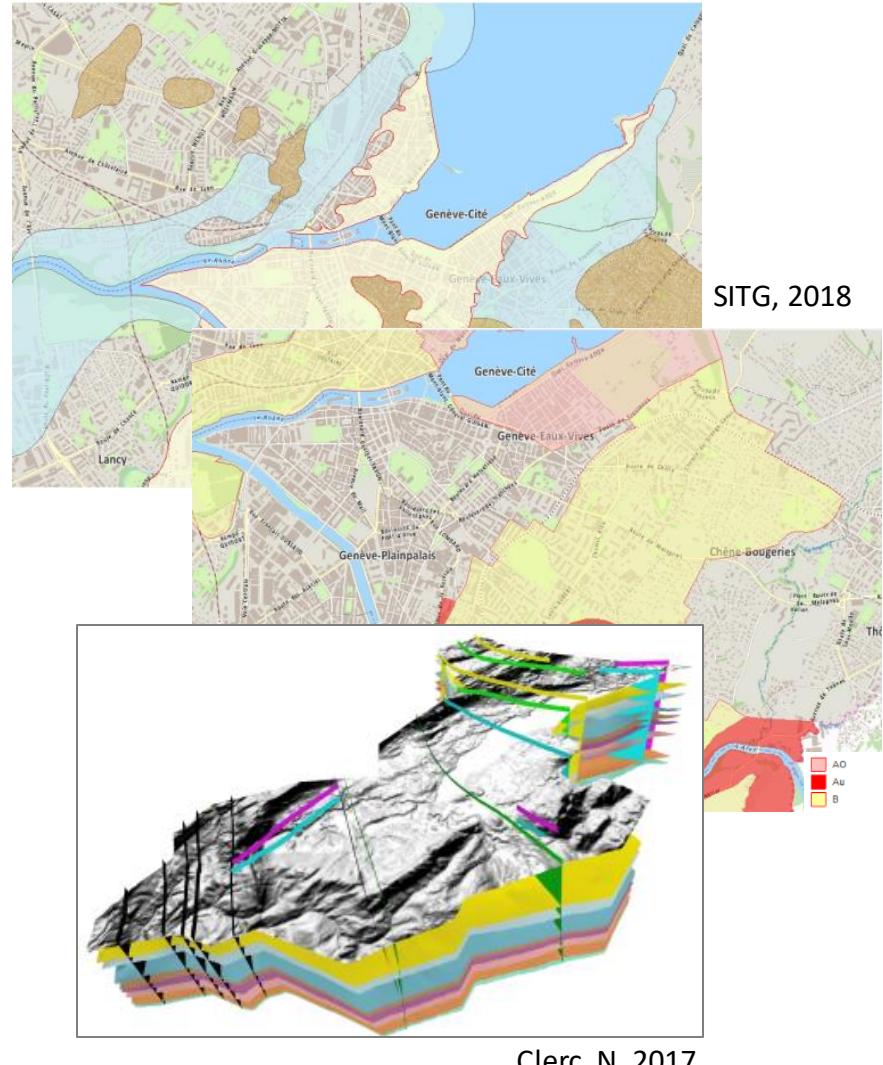
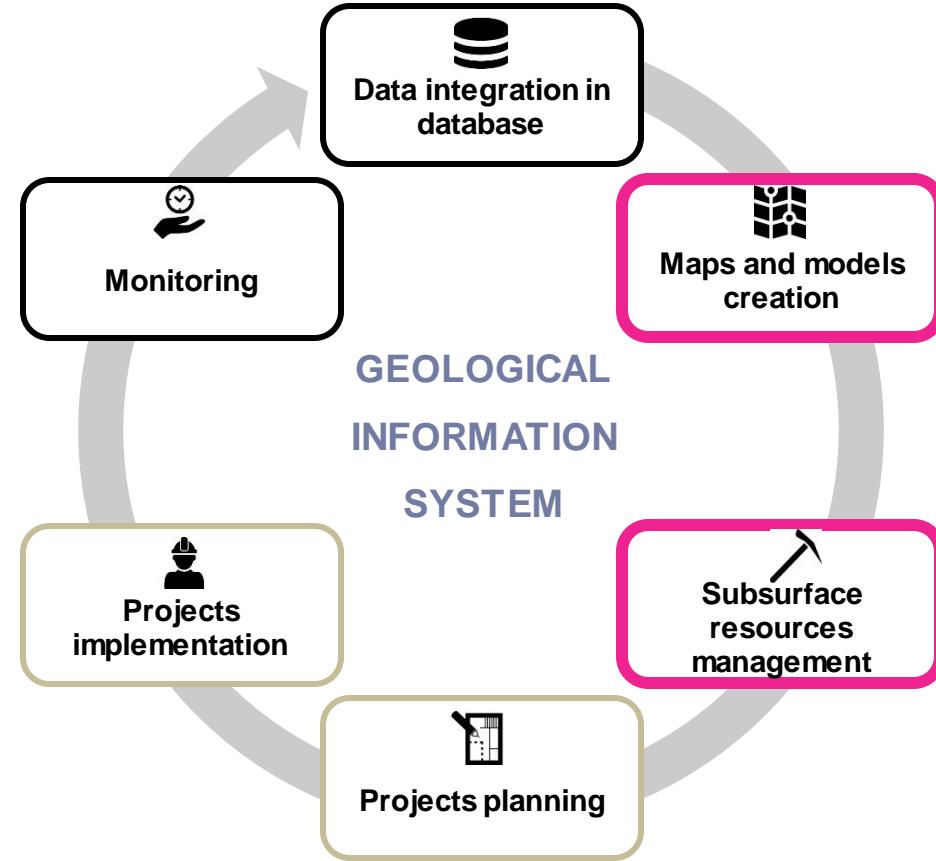
HOW TO MANAGE GEOLOGICAL DATA ?

Geological data journey



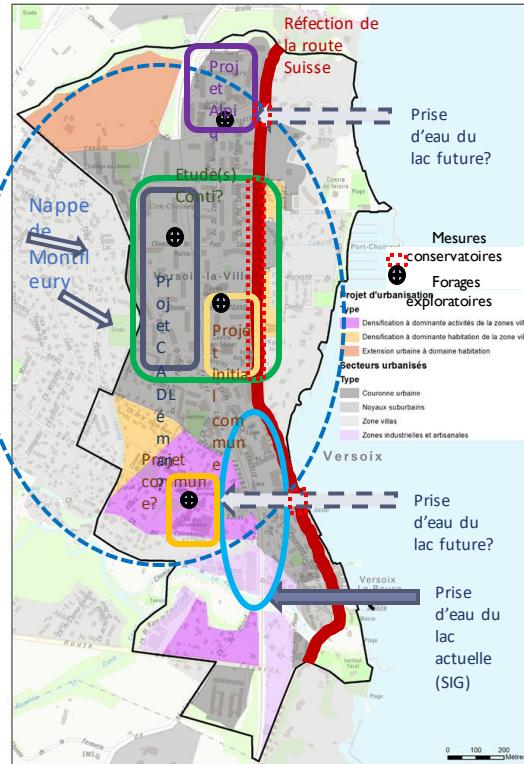
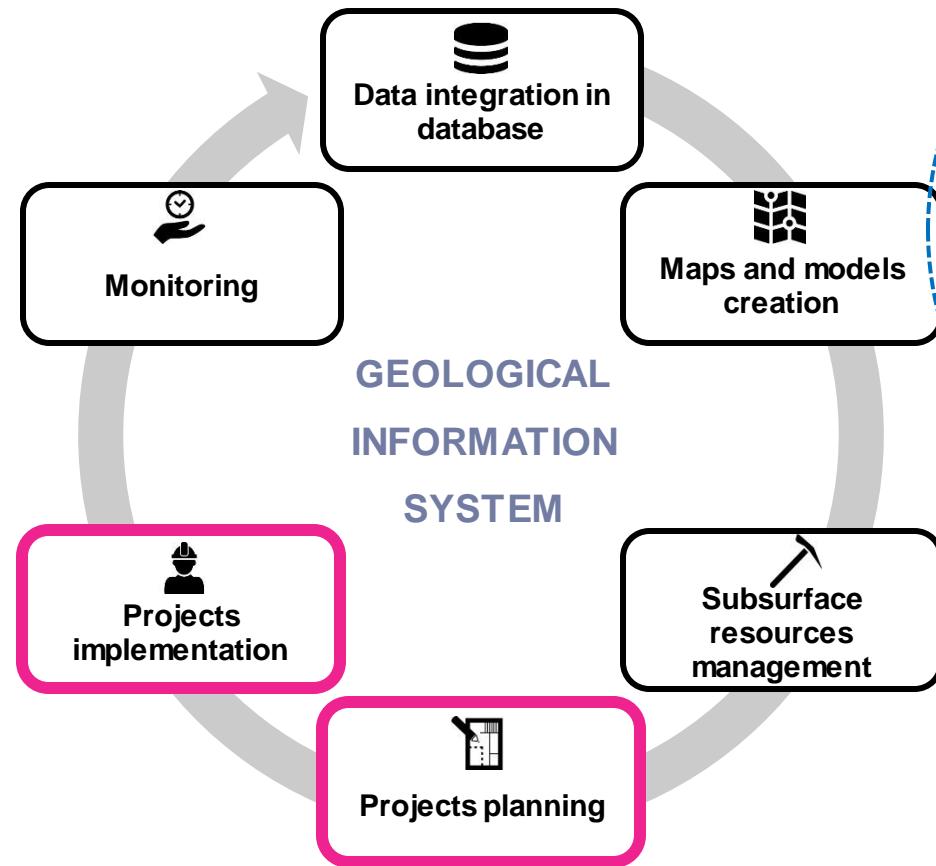
HOW TO MANAGE GEOLOGICAL DATA ?

Geological data journey



HOW TO MANAGE GEOLOGICAL DATA ?

Geological data journey

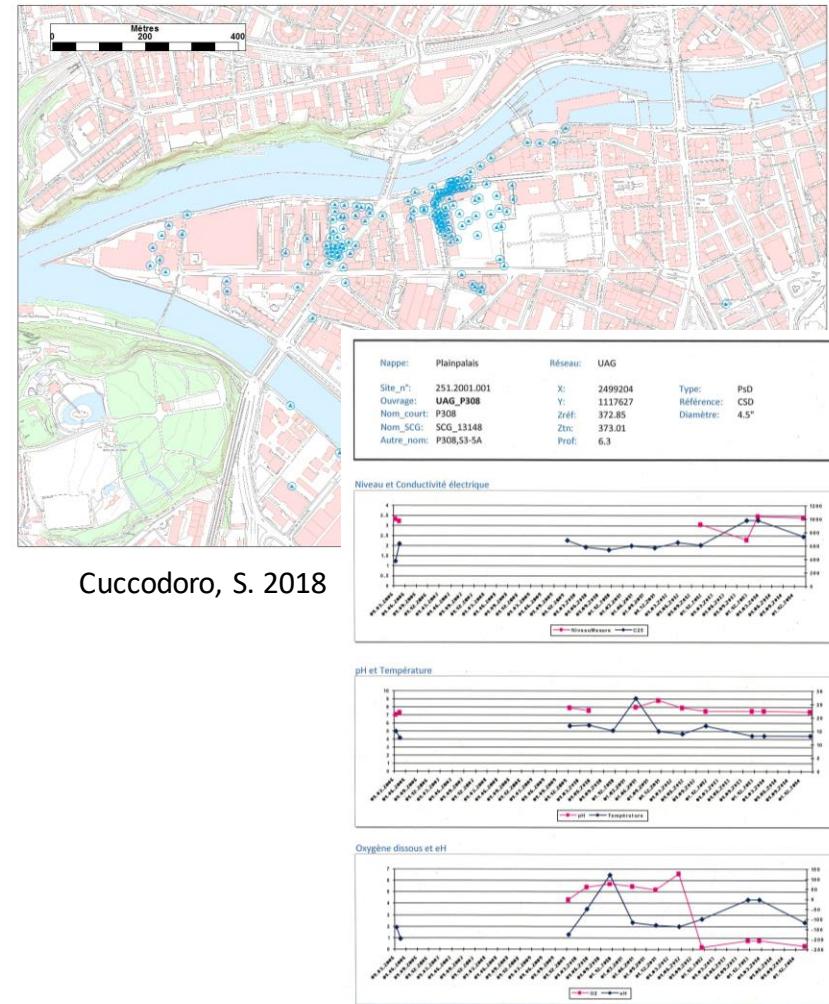
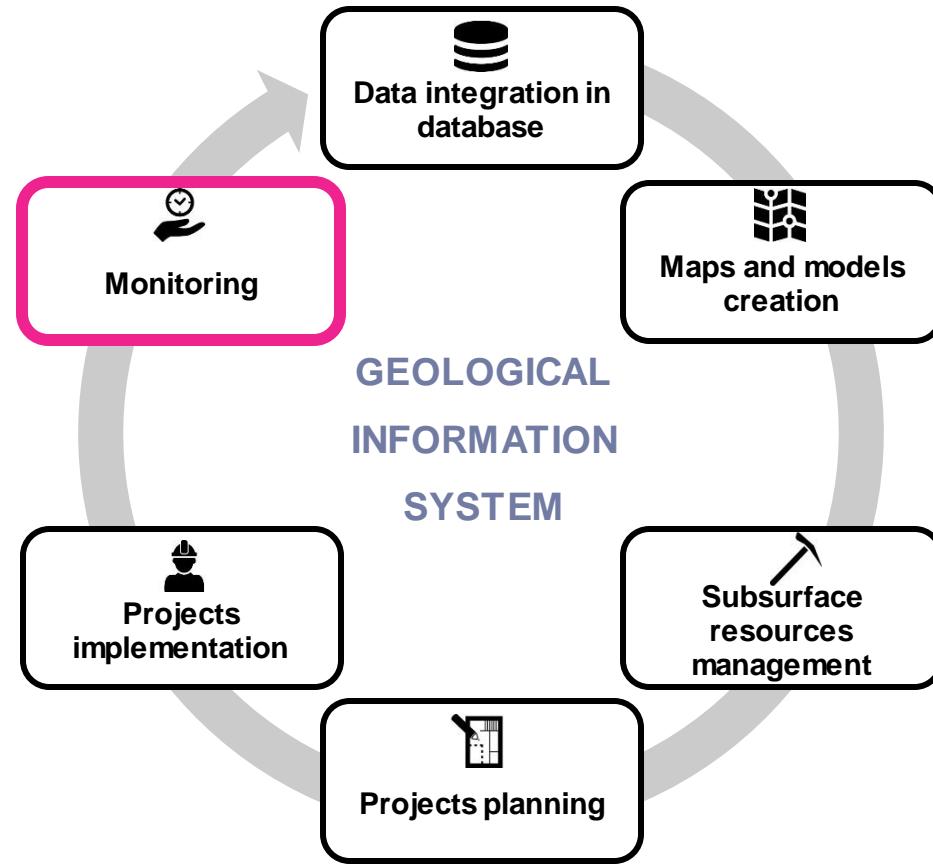


GEothermie 2020, 2018



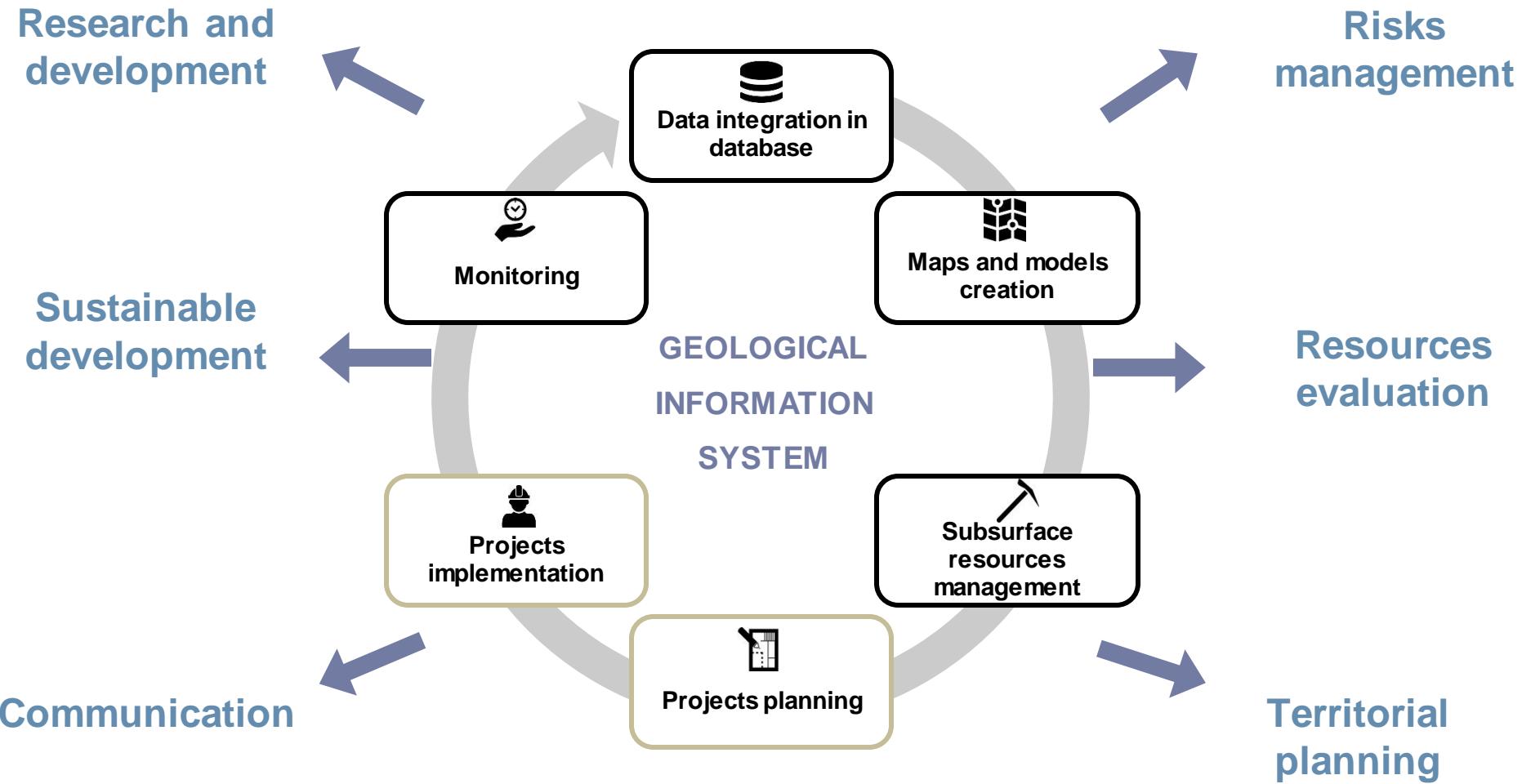
HOW TO MANAGE GEOLOGICAL DATA ?

Geological data journey

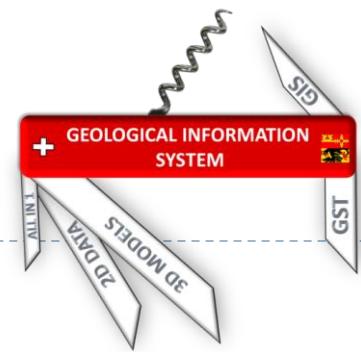


HOW TO MANAGE GEOLOGICAL DATA ?

Central role of the information system



Take home messages



- ▶ **Geothermal energy development** implies an **interdisciplinary work**
- ▶ **Information systems (IS)** are essential tools to provide a **systemic approach**
- ▶ **Interoperability concept** can be seen as guidelines
- ▶ Importance to **share experiences** and to **fit with global strategies** (CH and EU)

Questions ?

Thank you !

REFERENCES

- ▶ FAVRE S., 2018. *Systèmes d'information pour les données géologiques 2D et 3D; Perspectives et limites pour l'analyse du sous-sol genevois et ses ressources.* PhD Thesis, University of Geneva <https://archive-ouverte.unige.ch/unige:102945>
- ▶ GEothermie 2020 Program, website: <http://geothermie2020.ch>
- ▶ GEothermie 2020, short movie: <https://www.youtube.com/watch?v=y4Xh6cleLiw>
- ▶ Système d'Information du Territoire Genevois – SITG, <https://ge.ch/sitg/>



stephanie.favre@geodata-concept.ch



linkedin.com/in/favrestefanie