Heat from the bowels of the earth: a political geology approach to the energy transition

Justin Missaghieh–Poncet

La chaleur des entrailles de la terre : aborder la transition énergétique sous l'angle de la *political geology*

Heat from the bowels of the earth: a political geology approach to the energy transition

Justin Missaghieh--Poncet

Université de Pau et des Pays de l'Adour, E2S UPPA, CNRS, TREE, Pau, France

UGI Paris 2022

19 juillet 2022

Introduction: the energy transition, a driver for the relocation of energy

- The energy transition **relocates energy**
- It **mobilizes the subsurface** to produce decarbonized energy: i.e. deep geothermal energy
- But there is a **disruption of the power relationships** between the different actors:
  - Residents and energy: relocation of energy production with its externalities
  - Industrialists and territories: creation of **new risks** (seismic)
  - Political actors must position or **assume risks and govern technology** (Callon, Lascoumes, Barthe, 2001)
  - Industrialists and the government: the latter is required to **finance the advancement of an expensive technology.**

Introduction: Problematic and plan

How does deep geothermal energy allow us to think about vertical territories?

I) *Political Geology*: when the subsurface becomes a political object

II) History and principle of geothermal energy

III) Field studies and methods

IV) The construction of a vertical territory

Conclusion

I.A) *Political Geology*: when the subsurface becomes a political object

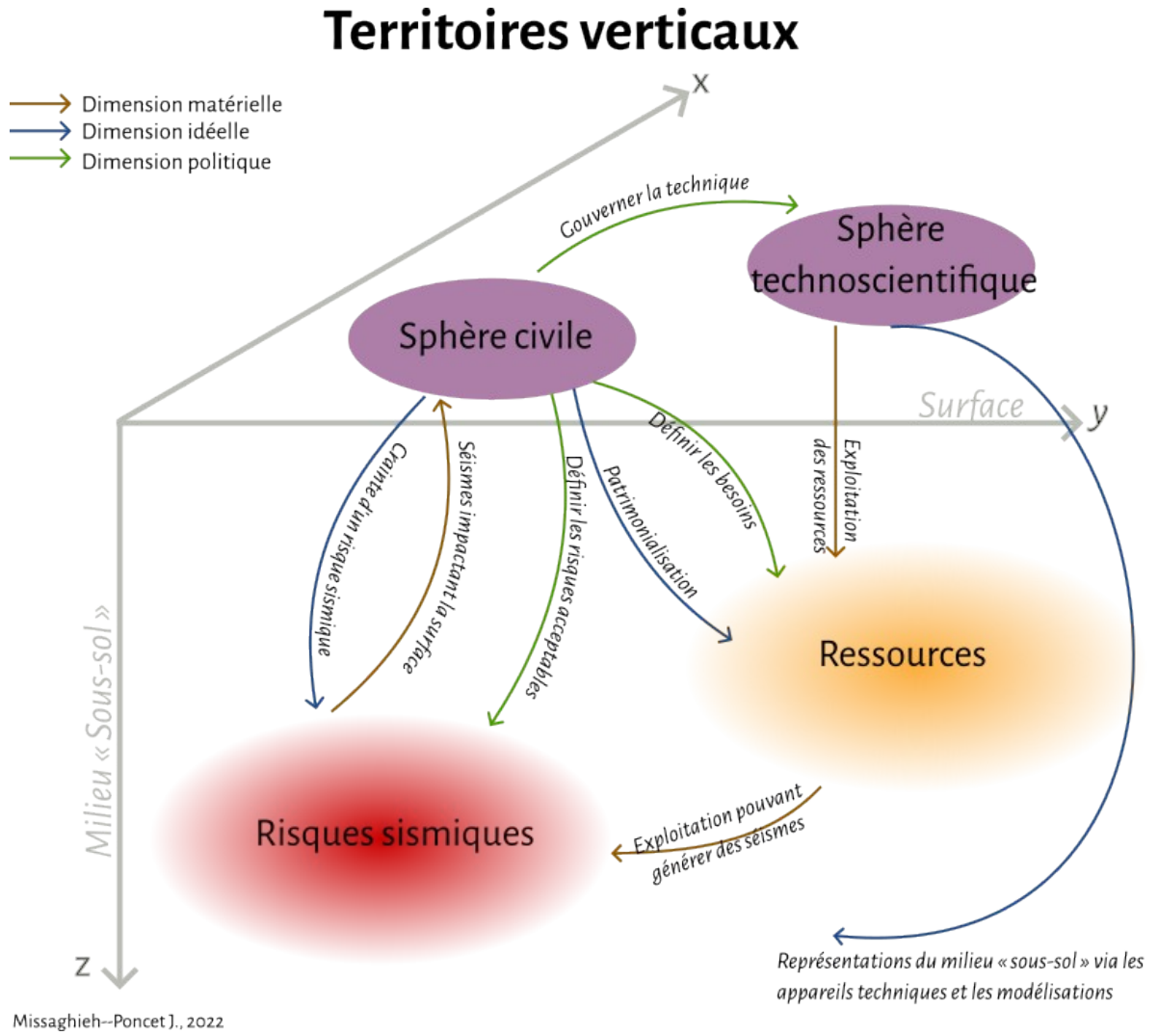
Addressing the **subsurface/political interaction** from the perspective of *political geology* (Bobette, Donovan 2019; Arnauld de Sartre, Chailleux, 2021)

- This interaction manifests itself through the **mobilization of geological layers**, their exploitation, transformation and destruction.
- Proposals of an approach linking the **material dimension of the subsurface and the social dimension** (public policies, production of knowledge, socio-technical construction):
- Material dimension: scientific knowledge marked by **uncertainty and use** of **technical equipment** to see and use the resources
- Ideal dimension: perceptions and **representations**, as well as **power games** around the subsurface.

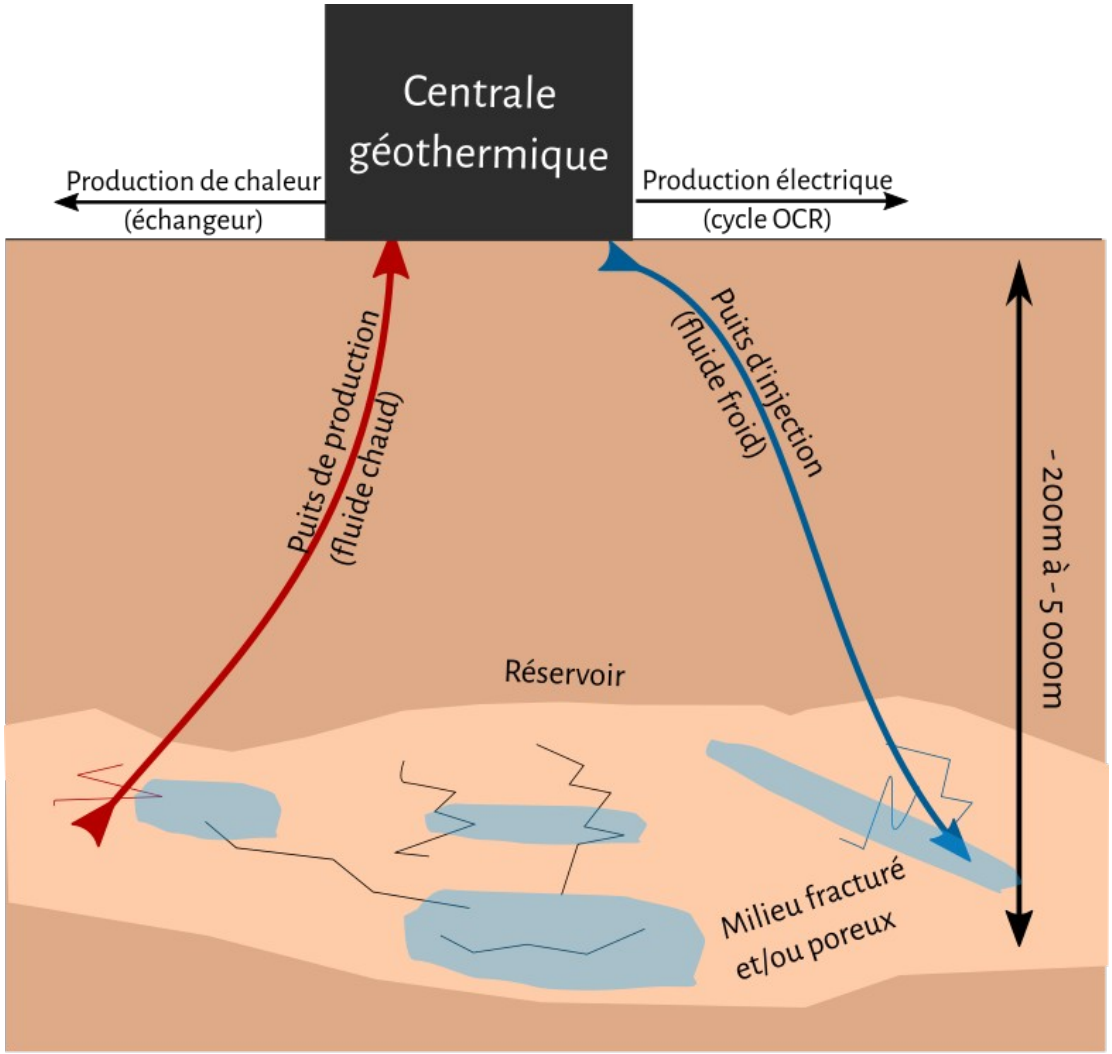
I.B) Geographisation of the field: the question of the verticalization of territories

"**Vertical territory**" (Braun 2000 ; Elden 2013, Bobbette, Donovan 2019): **tilting the territory into three dimensions**, notably through the "securitization of volumes" (*ibid*, p. 119) → the strata and artefacts of the underground will influence the surface.

- Proposals to study these vertical territories according to Guy Di Méo's (1998) and Raffestin (2019) approach:
  - **Material**: the concrete reality, the materiality of the territory: the geological layers
  - **Ideal**: the representations that the different actors have
  - **Political**: how is the subsurface controlled and governed?



II.A) Operating principle of deep geothermal energy



Missaghieh--Poncet J., 2021

1. A first "production" well will **extract** a fluid at depth (2000-5000m), naturally heated by the subsurface.

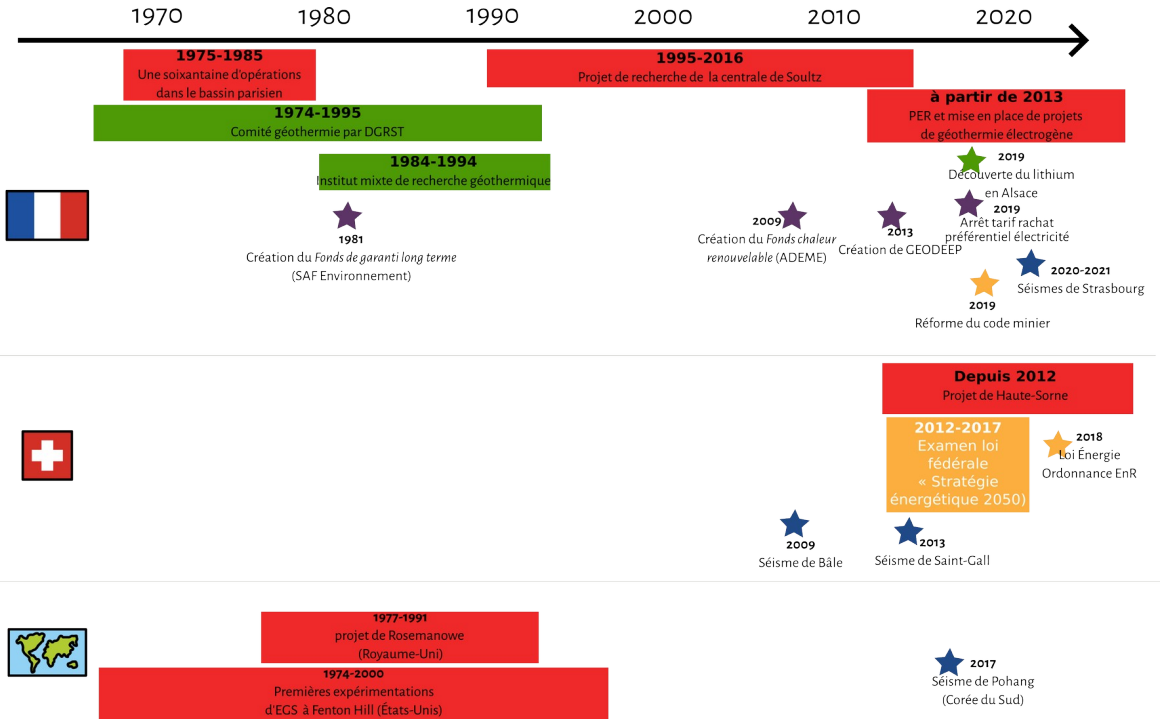
2. This fluid will be used at the surface, via **heat exchangers**, to produce heat and electricity;

3. This fluid will then be **reinjected** into the subsurface through a second "injection" well

II.B) History of its deployment in France and Switzerland

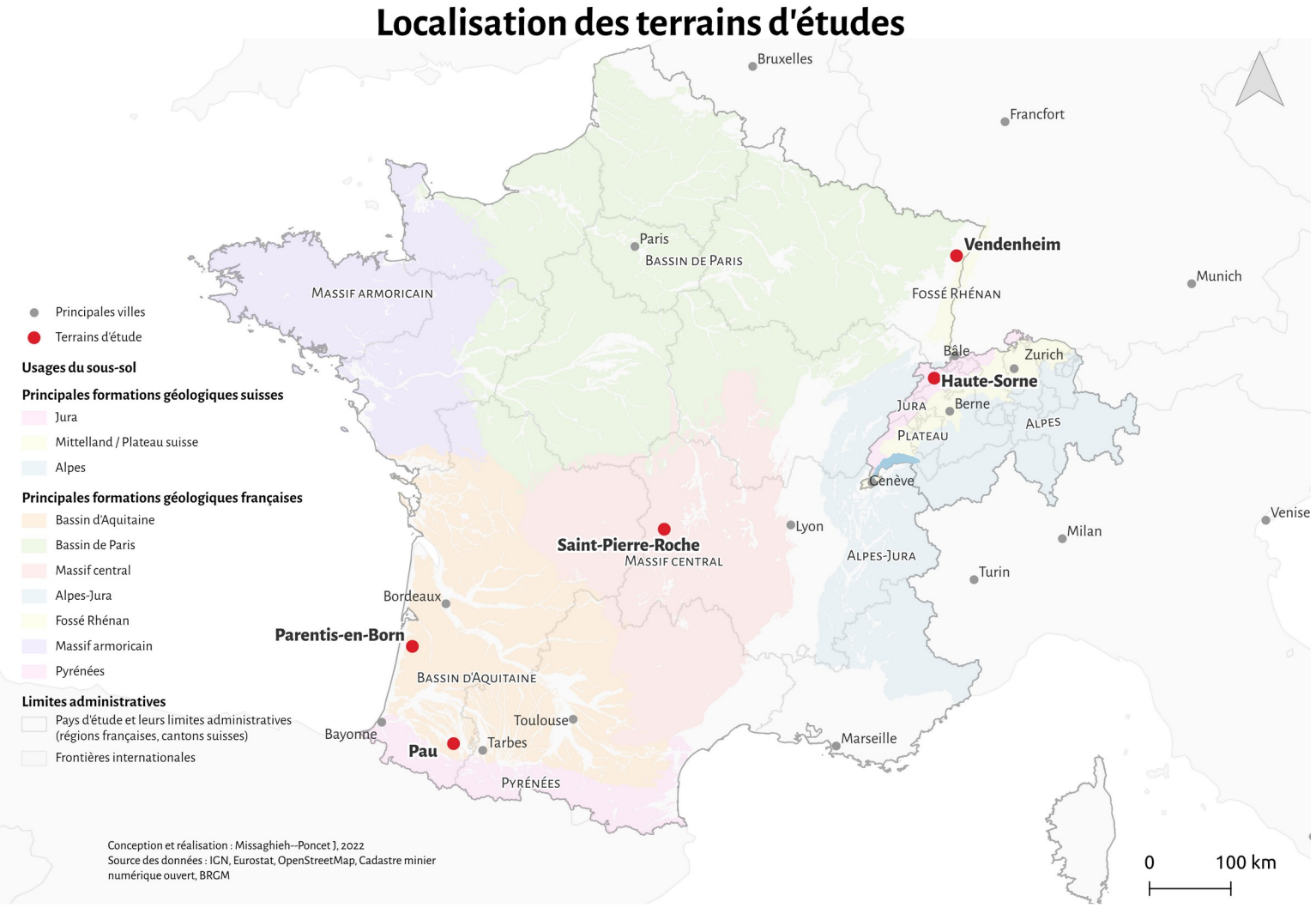
France:

- Development of geothermal energy in the **1970s** in the Paris Basin for **heating** purposes
- Return of the technology in **2013**, for **electricity production** (*Permis exclusif de recherche* granted)
- In **2019**, discovery of **lithium** in Alsace, reorienting industrial strategies



- Switzerland:
  - Willingness to change the energy mix, notably by **moving away from nuclear energy**, through the *Stratégie Énergétique 2050* in 2018
  - **Financial support** from the federal government to **develop industrial pilots**

III) Field studies: geothermal energy, revealing the construction of a vertical territory



- Studying the development of geothermal energy **outside the Paris Basin**
- Saint-Pierre-Roche: context of crustal faults
- Vendenheim: faulted network of the Rhine basin
- Pau: closed loop pilot
- Haute-Sorne: horizontal wells
- Parentis-en-Born: covalorisation of heat from an oil exploitation
- Supported by new industrial operators or historical operators

III) Methods: The choice of a qualitative approach

- Analysis of a local and national press review
- 35 Semi-structured interviews
  - **Industrials** (ÉS Géothermie, TLS Geothermics, Vermillon, Tom d'Aqui, Lithium de France, GeoEnergie, AFPG, Pôle Avenia)
  - **Public stakeholders** (New-Aquitaine Region, Pau Agglomeration, ADEME, DGEC, DGEC, IFPEN, BRGM, OFEN, Canton of Jura)
  - **Local representatives** (Eurométropole de Strasbourg)
  - **Academics** (UPPA, Swiss academic, EOST)
  - **Environmental and residents' associations** (Auvergne, Alsace)

IV.A) The construction of a physical territory: the 'securing' of a seismic risk

➔Fear of a seismic risk leading to projects being stopped

- Awareness of the **need to "secure" the surface against an underground risk** by the inhabitants of a territory: petition to ban geothermal energy, setting up of dialogue bodies

➔Awareness of physical risks allows an awareness of the existence of the subsurface: it is not an inert medium, but a milieu with its own dynamics **influencing the surface**.

➔This awareness of the subsurface makes the relocation of energy tangible

Location	Year	Magnitude
Bâle (Switzerland)	2006	3,4
Saint-Gall (Switzerland)	2013	3,6
Pohang (South Korea)	2017	5,4
Strasbourg (France)	2020 2021	2 to 3,5

IV.B) The construction of an ideal territory: the defence of a subsurface 'common good'

Parentis oil pumping station.
© Plbcr / Wikimedia Commons, GFDL

➔ Territorialization also involves an ideal perception of the subsurface, through the construction of a discourse showing the subsurface as a "**common good**" or a "**heritage**".

➔In Alsace, the opposition to geothermal energy was a reaction to **protect a "local common good",** the largest water table in Europe, from the risks of pollution

➔In Parentis, oil exploitation dates back to the 1950s (Di Méo, Houtmann 1973; Enjalbert 1957), and **presented as a heritage object** by the oil operator

➔Beyond a material territory, **the representations and the patrimonialization of the subsurface territorialize the subsurface** environment.

IV.C) The construction of a political territory: the dissemination of knowledge in the political and civic spheres and for a governance of the subsurface

➔ Positioning of elected representatives and citizens to **define an acceptable risk and govern the technique** (Callon, Lascoumes, Barthe 2001)

➔ Setting up of a commission in Alsace following the earthquakes, in order to define the types of geothermal energy that are acceptable, with **regard to the challenges of energy transition**

➔ The issue of **disseminating knowledge** about the subsurface in order to understand how it works also came up. Some spoke of "**citizen counter-expertise**".

➔ There is a desire to **"govern" the subsurface** through the issue of risk management and to define acceptable risks

Conclusion: for a geography in volume

→ *Political Geology* **redefines the relationship of a territory with its subsurface**, through material, ideal and political dimensions

→ The relocation of energy is **raising awareness of the risks** among the population

→**Multiscale reconfiguration**: what acceptable risks, what governance, what financing, what uses of the subsurface?

Thank you for your attention

justin.missaghieh-poncet@univ-pau.fr