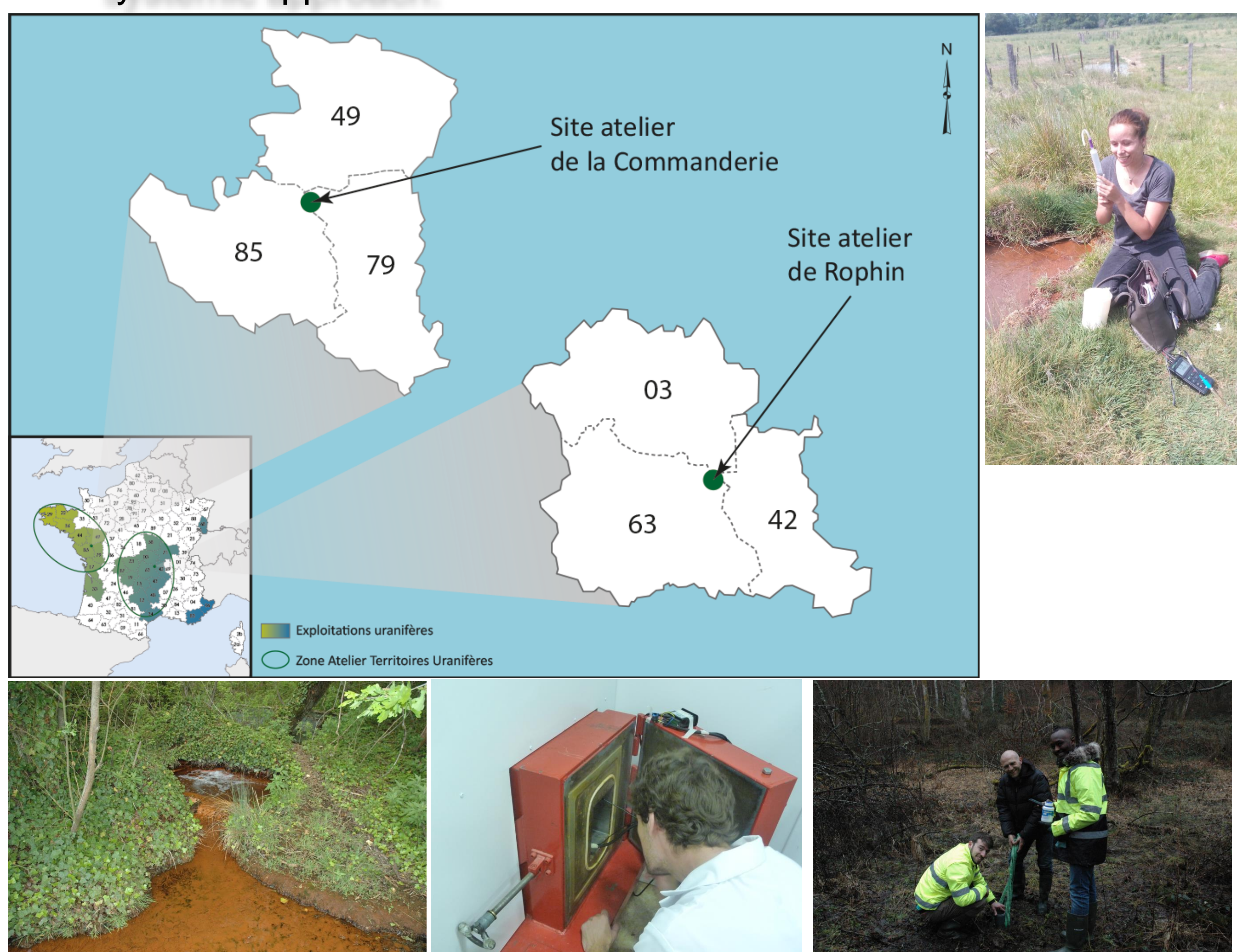


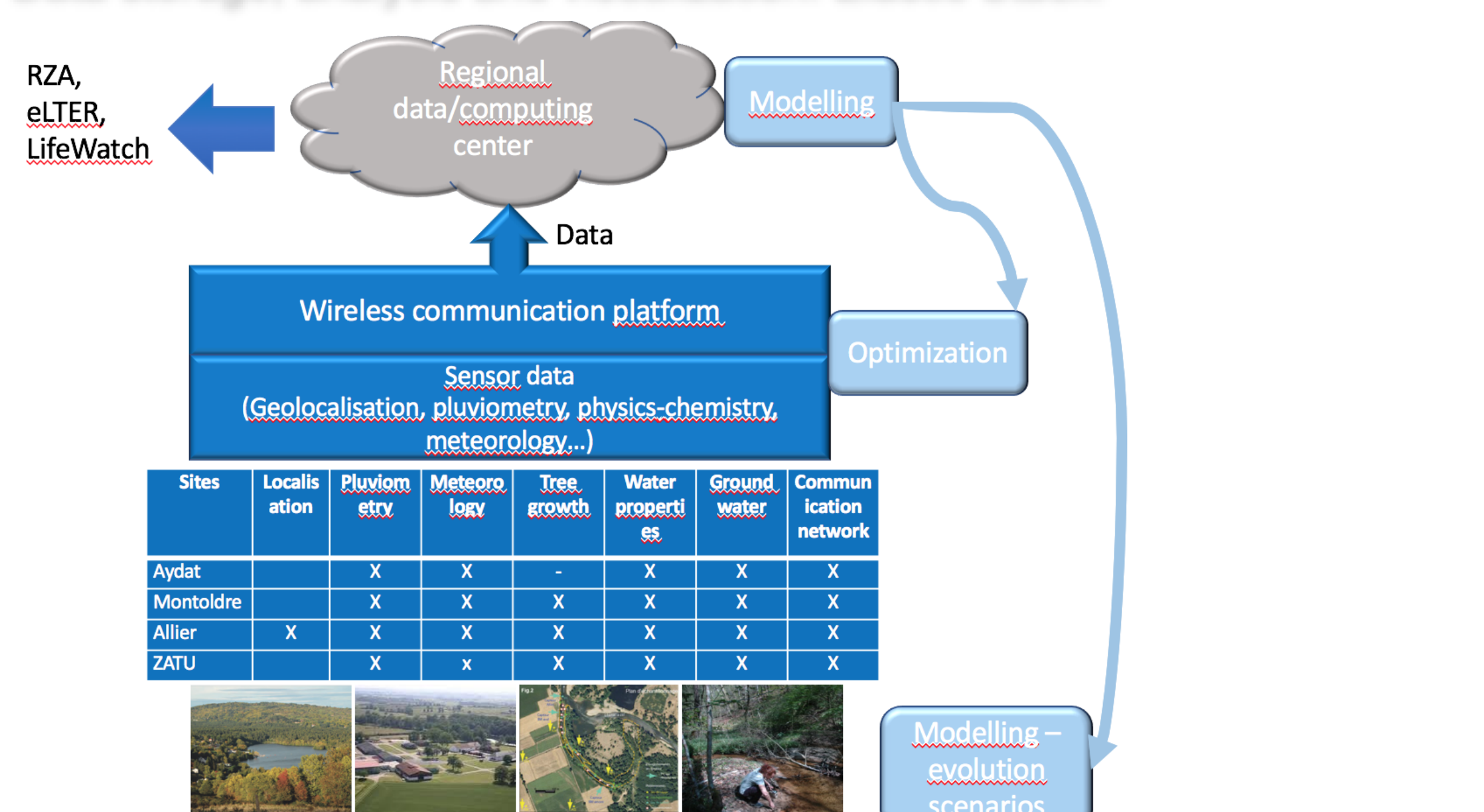
## Zone Atelier "Territoires Uranifères"

- Zone Atelier "Territoires Uranifères" ("Uranium-rich Territories" LTER, <http://zatu.org>) dedicated to life in environments characterized by chronic natural or enhanced natural radiation.
- Research program centred on human and social sciences, radiochemistry and biology
- Long Term Ecological Research observatory (site-atelier de Rophin) located in Auvergne with a former uranium mine and radioactive hydrothermal sources
- Need for LTER multidisciplinary, multiparametric and continuous monitoring for developing truly interdisciplinary projects with a systemic approach.

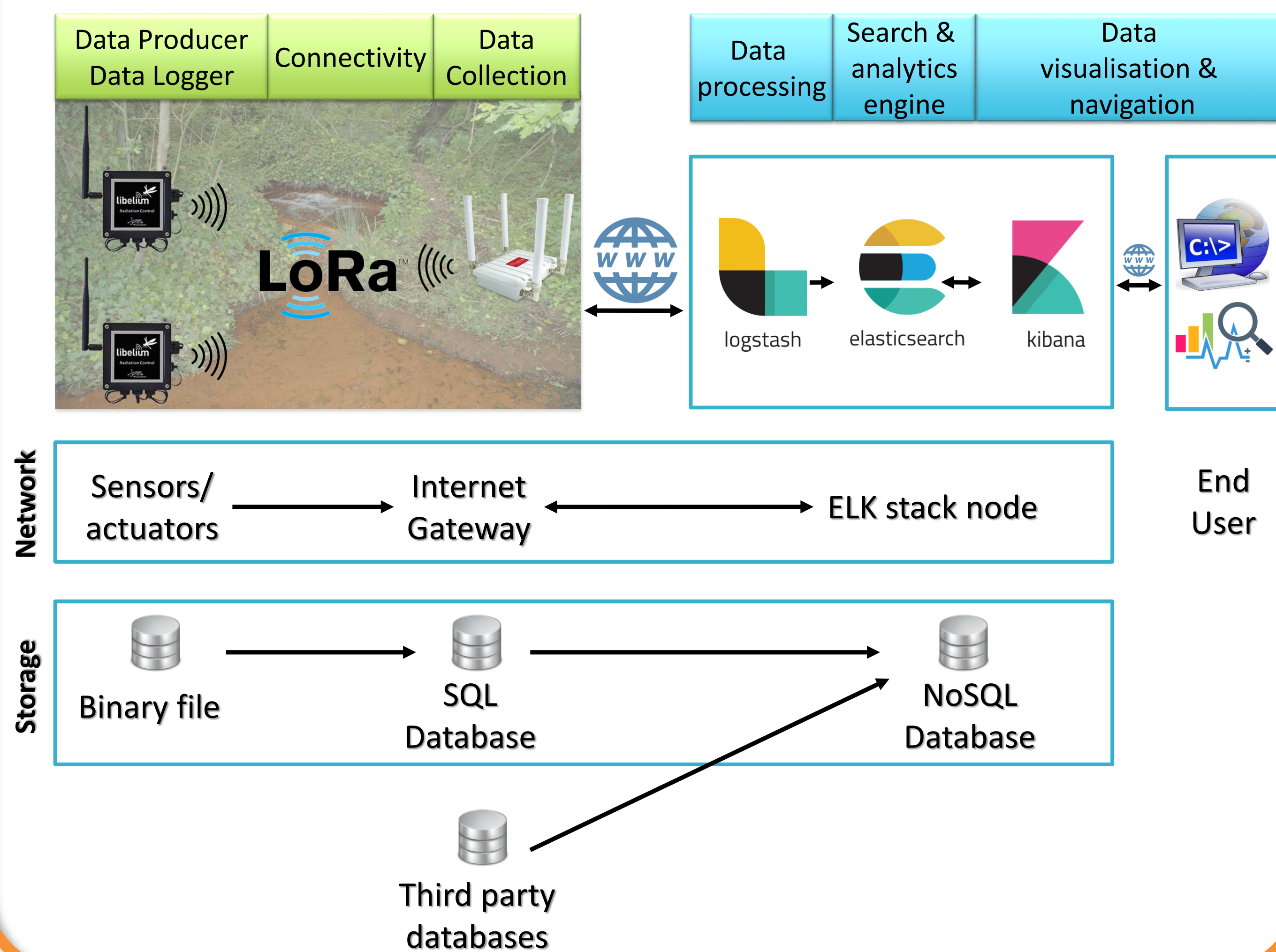


## Large scale multidisciplinary initiative **Sonnec** **ens**

- An academic initiative to **develop** and **deploy wireless sensor networks in agroecosystems** in Auvergne
  - A complete pipeline from sensors to the regional computing center
  - 4 experimental sites: a lake, an agricultural field, a river and the ZATU
  - 3 PhD started in october 2016 to address fundamentals issues
  - Development of a specific wireless node using **LoRa** technology.
  - Budget of 900k€ (CPER 2016)
- Milestones:
  - Summer 2017: proof of concept
  - Fall 2017: test of new generation sensor nodes
  - Spring 2018: deployment of LoRA wireless sensor on UCA campus des Cézeaux
- List of requirements for technological choices
  - Open source software from sensor to cloud
  - Expertise widely spread in academic community
  - Scalability
- Proposed implementation
  - Data collection: programmable sensors (Arduino)
  - Data transfer: nodes communicating to commercial gateways using **LoRa**
  - Data storage, analysis and visualization: Elastic Stack.

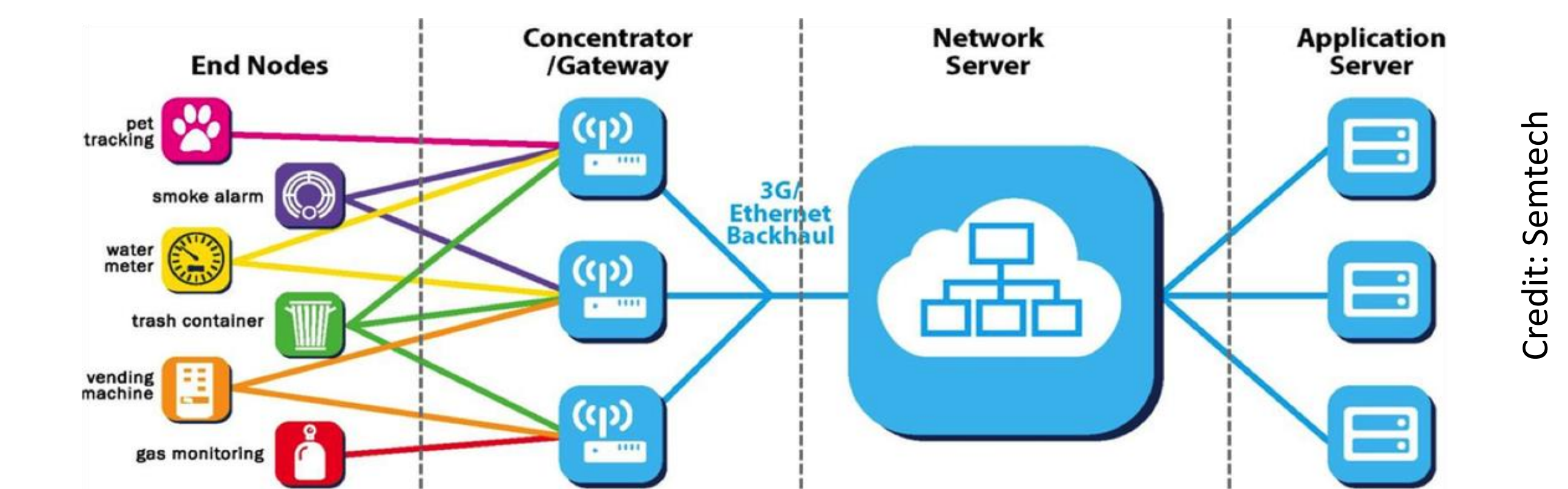


## Technical view



## Long Range Wireless technologies: high potential for environmental issues

- Boosted by the **Internet of Things** market
- Long **range**, low **power**, low **cost** technology now available
- Range up to 30 km (line of sight)
- Autonomy up to months
- Complete platform affordable for less than 100€
- **Limitation: data rate limited (22 kbps max with LoRa technology)**
- Open source platform for specific application (LoRa)



Internet of Things network architecture

Prototype of a beacon radiation sensor developed at LPC, using the LoRa technology



Credit: Semtech