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Pyrenees Imaging eXperience: an InternationaL network

The PIXIL Project

Proyecto financiado por el Fondo Europeo de Desarrollo Regional FEDER
Projet financé par le Fonds Européen de Développement Régional FEDER

Goals

- Establish a **transnational network** to improve **geothermal exploration** by means of **R&D**
- Use **Geophysics**, **Mathematics** and **Computation** as core technologies
- Help **sustainability** in the Interreg V-A region

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PIXIL DNA

- FEDER
- 1.3 MEUR budget (59% ESP + 41% FRA)
- 2 years
- 6 partners (3 ESP + 3 FRA)
- 3 original associate partners plus 5 newcomers (4 ESP + 4 FRA).

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PIXIL Partners

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Universitat de Barcelona

Inria
inventeurs du monde numérique

bcam
basque center for applied mathematics

avenia

realtimeseismic

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Industry and User Board

ingeo investigación geotérmica

Quali GEOTERMIA

ALB SISTEMAS

geoplat
PLATAFORMA ESPAÑOLA TECNOLÓGICA Y DE INNOVACIÓN EN GEOTERMIA

TLS GEOTHERMICS

SPOTLIGHT

Arverne Resources

Geode-solutions

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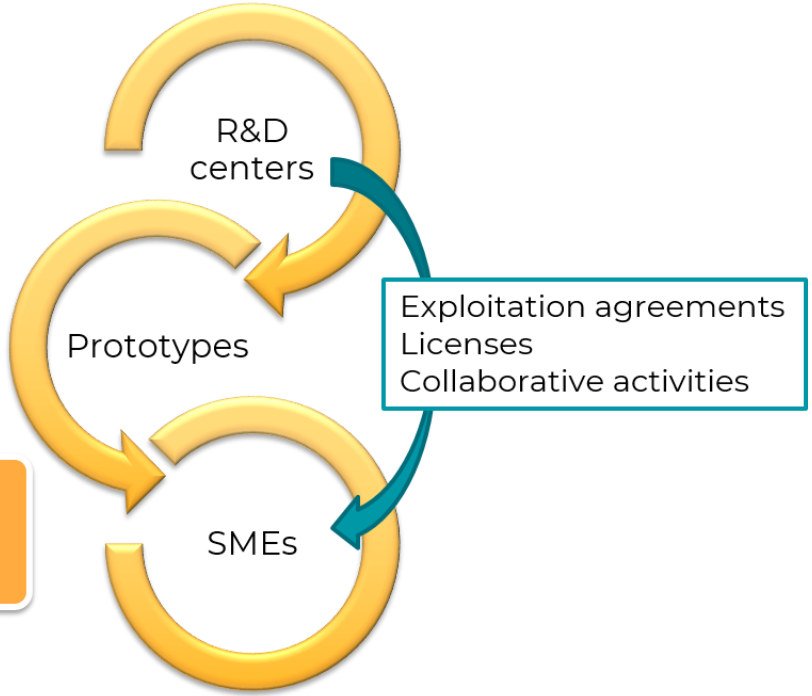
Seeding exploration technology

Tackle problems in GE

Innovate and use HPC

Evaluate tech



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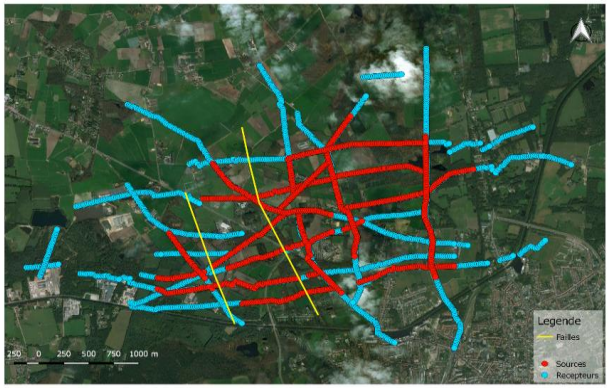
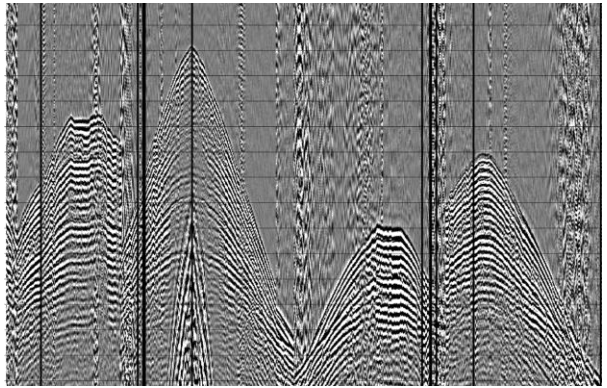
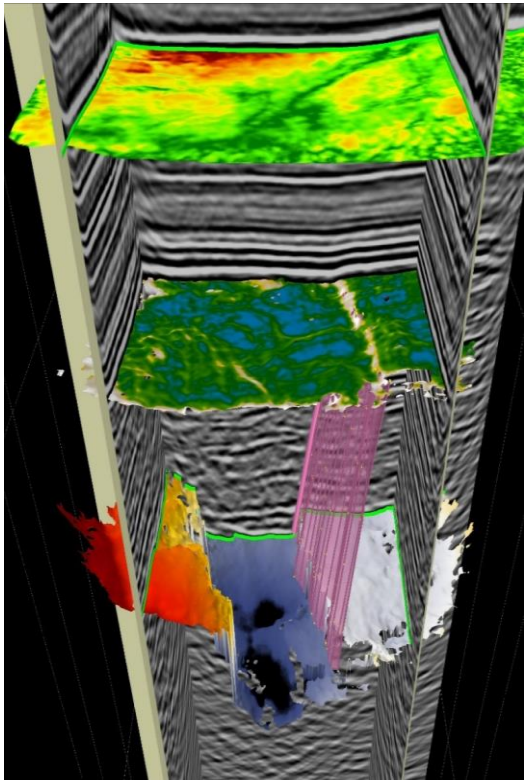
Savings in data acquisition and processing



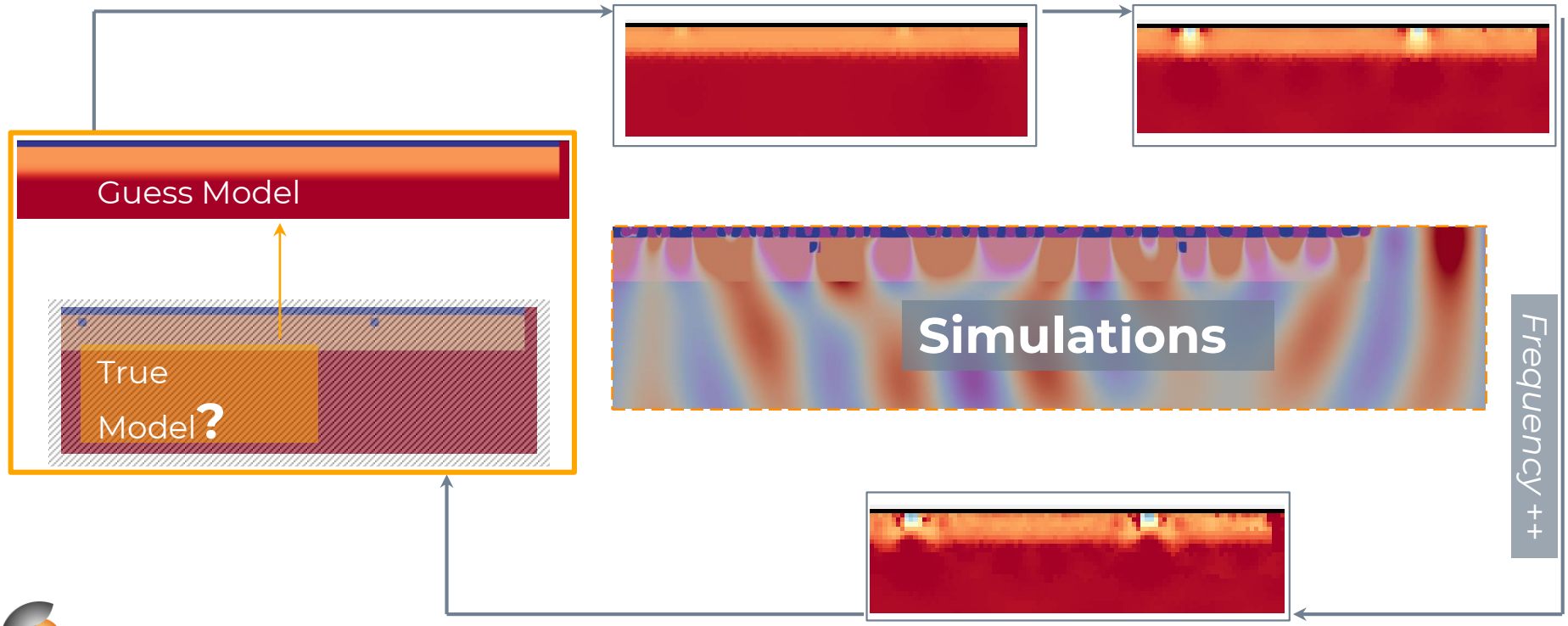
Less than 1000 Vps, with 2000 receivers





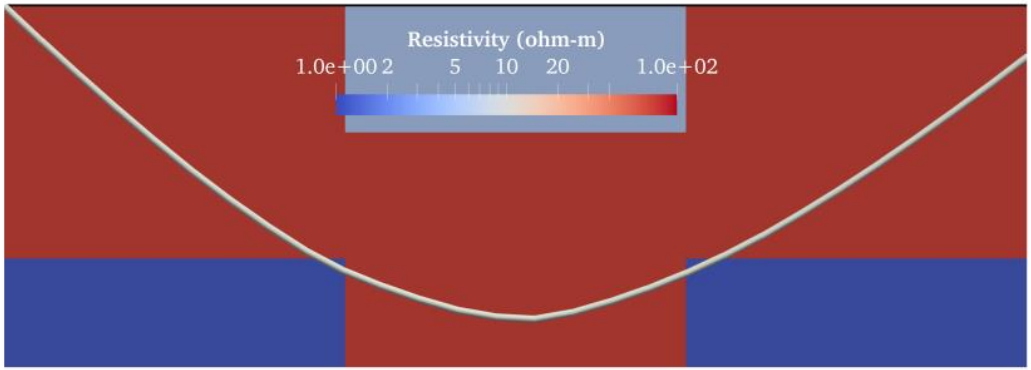
Courtesy of Hita n.v.

State-of-the-art Geophysical Imaging (FWI)

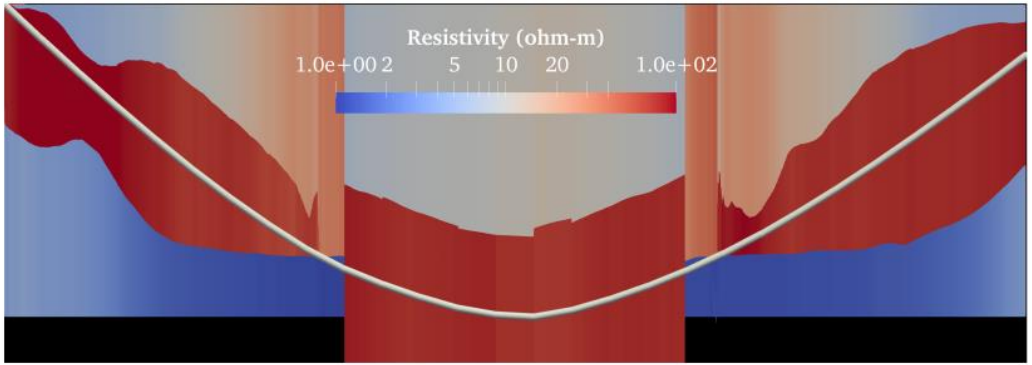


Deep Learning

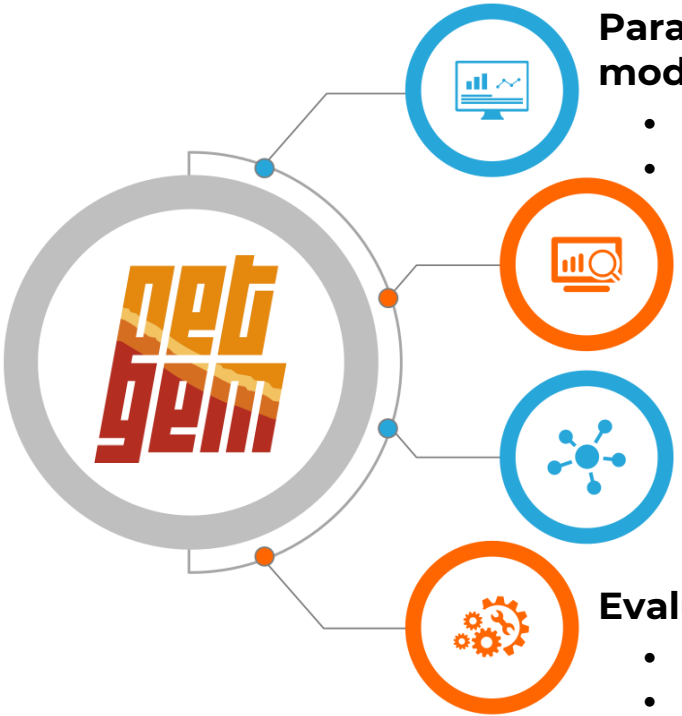
Original:



Inverted:



Developing and Transferring New Software



Parallel python code for geophysical electromagnetic (EM) modeling:

- Validated in different scenarios
- Accurate, flexible and free (open source)

Research to add new features:

- Magnetotelluric modeling
- EM inversion based on Markov chain Monte Carlo

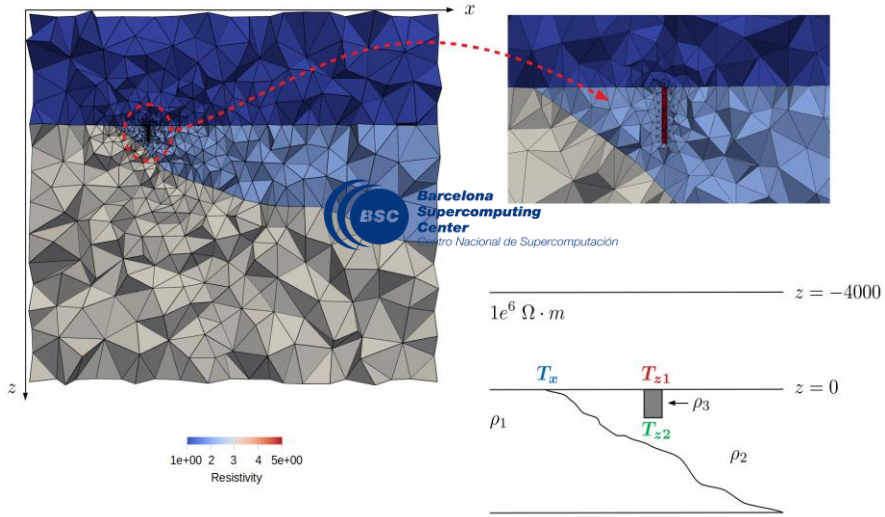
Networking:

- BSC and Geode solutions
- Expertise can be transferred (industry and academia)

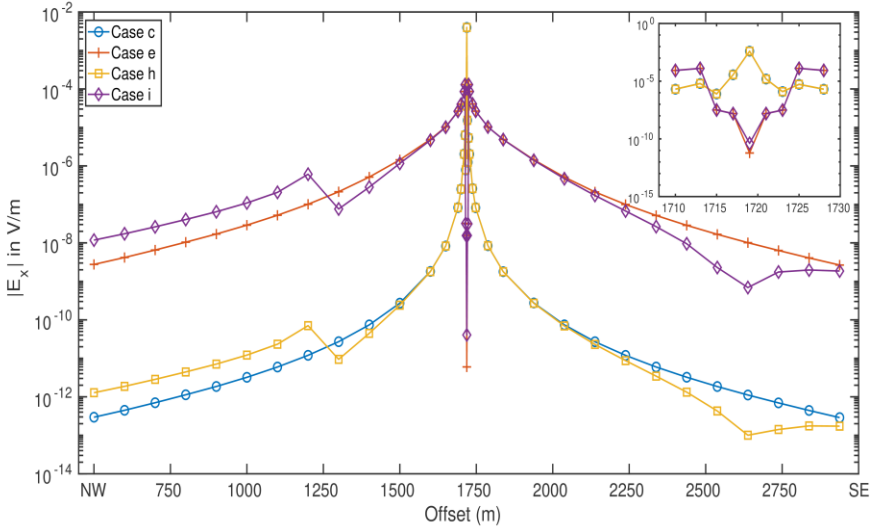
Evaluation and verification:

- EM modeling in a geothermal exploration context
- Crucial to exploring useful underground resources

Applying New Software to Real Geothermal Challenges



Input model



Synthetic results

Generating Knowledge: Models

Geophysical study

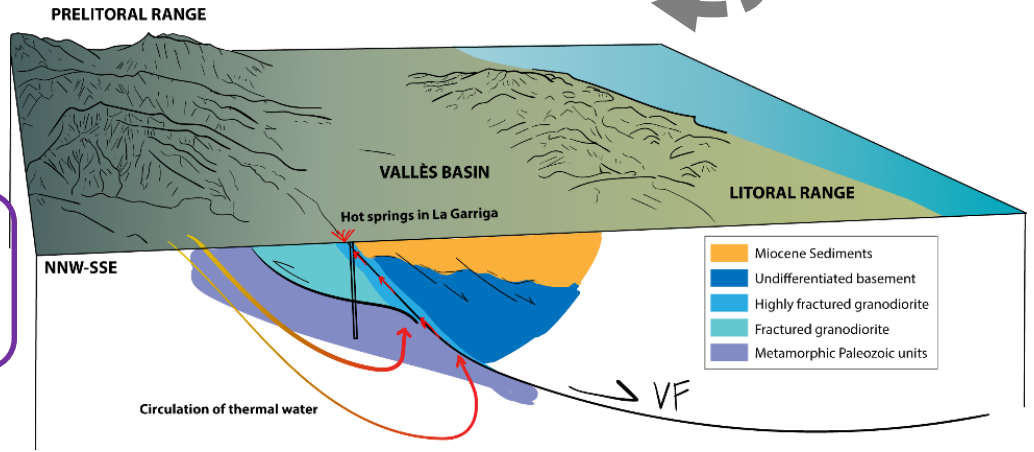
Geological study

Hydrogeological study

Geological model

Hydrogeological model

Geothermal model



Reference case study: Geothermal anomaly of La Garriga –Samalus

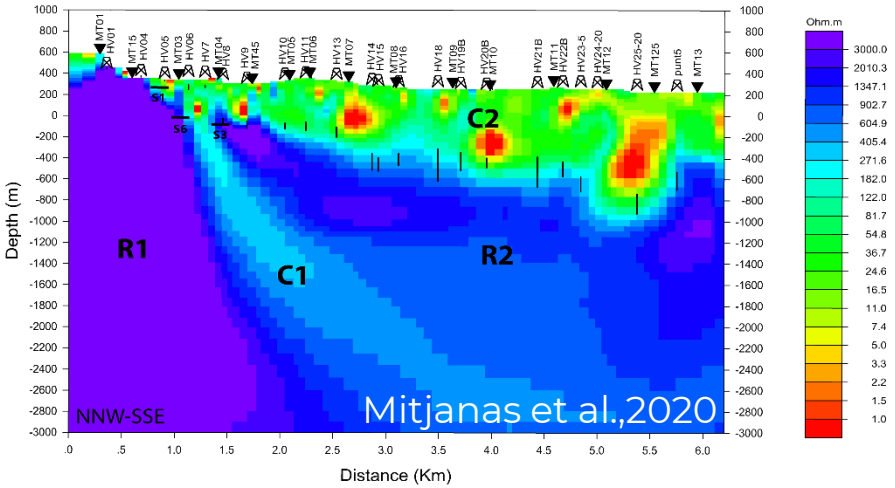
Conceptual Model

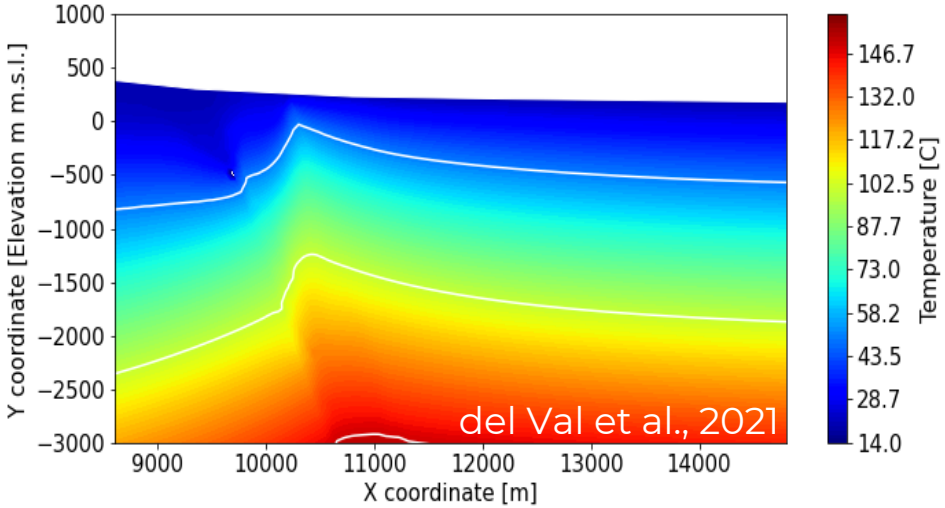
Test Models

Connecting Geophysics to Geothermy

Geophysical characterization

Geothermal model





Achievements

- Generated 3 software prototypes that can impact the geothermal exploration industry
- Technology transfer with 2 SMEs in the region
- Generated a virtual test for all present and future geophysical exploration tools
- Demonstrated savings in actual geophysical exploration operations
- Upheld principles of equality and sustainable development
- Collaborated with the local industry and European projects

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Communication Channels

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Enjoy the workshop!

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