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News

Fundamental Research

Geosciences

Geology - Sedimentology

Analysis and characterization

Structural analysis and Imaging

Source rocks are some of the most widely distributed geological reservoirs on the earth's surface. While they are primarily known for the hydrocarbon resources they contain, they are less so for their significant storage potential. A PhD student at IFPEN has developed innovative methods for characterizing the organic porosity of these rocks, related to their retention capacity.

## Understanding the transport and storage properties of source rocks

The materials making up source rocks are described as a heterogeneous (minerals/organic matter/pores) anisotropic and complex medium. Scientists are currently seeking to understand **the transport and storage properties of these rocks**, by studying the porous medium – distributed between macropores (> 50 nm), mesopores (between 50 and 2 nm) and micropores (< 2 nm) – and organic matter.

The aim of Gaël Cherfallot's thesis, entitled "The Development of Innovative Methods for Characterizing Source Rock Porosity", was to determine, firstly, **the connectivity of the organic fields** useful for the evaluation of transport properties and, secondly, **the pore size distribution** in order to estimate the storage capacity of these rocks.

## A multi-technique approach for new flow models

The PhD researcher developed an original multi-technique approach based on scale **complementarity and contrasts** via transmission X-ray microscopy and radiation scattering. It enabled him to access key parameters, such as the distribution of the organic fields, pore size, their volume fractions and the nature of the fluid present.

This thesis was defended on 17 July 2020 before a jury made up of:

- Sylvie Derenne (President, Research Director CNRS),
- Guillaume Galliero (Rapporteur, University Professor UPPA),
- Sandrine Lyonnard (Rapporteur, Research Engineer CEA),
- Éric Ferrage (Examiner, Research Director CNRS),
- Ovidiu Ersen (Examiner, University Professor UNISTRA),
- Pierre Levitz (PhD Director, Research Director CNRS).

This research was conducted within the framework of a partnership between Sorbonne University and IFP Energies Nouvelles, under the supervision of:

- Pierre Levitz (PhD Director, PHENIX laboratory),
- Loïc Barré (Principal sponsor IFPEN, research engineer),
- Pauline Michel (Co-sponsor IFPEN, research engineer),
- Éric Kohler (Co-sponsor IFPEN, research engineer).

>> Watch [video](#) (in French) presenting the PhD research

>> Access the [publication](#)

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