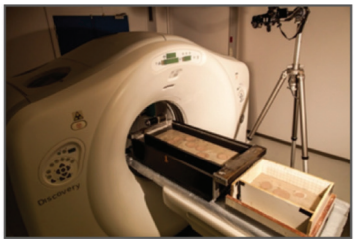
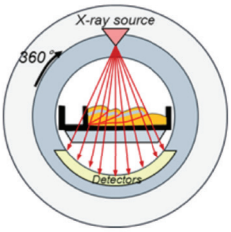
GeoAnalog

The sandbox analog modeling database

Do you need to reduce risks and limit uncertainties related to the exploration of complex structural areas?
Do you want to gain a better understanding of the kinematics of deformation over time of a specific area?
What about the structural interpretation of seismic data?





Building on its expertise in basin modeling, IFP Energies nouvelles uses sandbox analog modeling to simulate deformation at basin scale and mimic the kinematic evolution of a geological system. This modern imaging technology represents a powerful and non-destructive tool for observing internal structures of each model throughout the deformation period.

IFPEN specificities

IFPEN develops and applies a broad range of basin analysis and modeling methods using multidisciplinary teams of specialists.

IFPEN has been performing sandbox analog experiments to study oil and gas issues since the late 1980s.

Using an integrated approach, IFPEN is now developing analog modeling to improve the understanding of geological processes and structures. Analog models are acquired using a medical scanner. This imaging technique enables non-destructive observation of the internal structure of each model throughout the deformation period.
4D numerical models are produced to follow the kinematic evolution of structural deformation.

IFPEN analog modeling process

Several motorized deformation boxes are used at IFPEN, leading to different types of deformation:

- compression,
- extension,
- strike slip movement,
- tilting.

These deformations can be combined and thin or thick-skinned deformation is thus performed.

Brittle deformation is simulated using granular material (sand, corundum and pyrex), while ductile deformation is created using a silicone putty.

Main structural configurations modeled

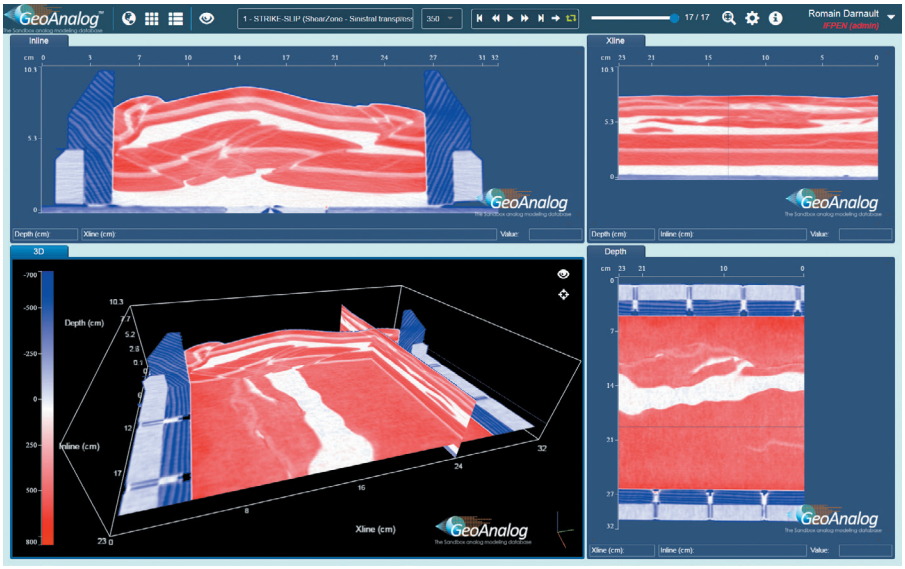
IFPEN sandbox experiment database consists of numerous examples with a range of different structural configurations:

- extension,
- compression,
- strike slip,
- inversion,
- salt tectonic.

Videos showing deformation and 4D numerical blocks are available for each experiment in the database.

GeoAnalog: the new Plug-and-Play web service

With its user-friendly interface, this innovative and intuitive web-based application allows users to easily access, visualize and interact with a centralized analog model database *via* the Internet. Thanks to HTML5 and CSS3 technologies with specific viewers, users can work in both desktop and mobile environments, using a powerful and user-friendly environment.



The GeoAnalog web-based application is hinged on rapid data access solutions:

- discovery portal, with a metadata catalog of analog modeling experiments, including public consultation of a number of existing analog models;
- option for authorized users to browse a full catalog of paid-for analog models.

The full catalog provides access to:

- a range of hundreds analog experiments in several geological contexts,
- the setup for each experiment,
- a collection of 2D videos making it possible to observe structural deformations over time,
- a 3D viewer showing the internal structures through a 3D block available at each deformation step (4D),
- a description of experiments and results.

Value for customers

Understanding and analyzing

Validation of a structural interpretation can be performed *via* the exploration and analysis of analog experiments with advanced and interactive visualization capabilities (2D/3D/4D). With an educational and flexible approach, an image can be uploaded in order to search for a model that matches it more closely among those that already exist in the database. Users will have the opportunity to belong to a customer community and to create an ecosystem with recognized experts in the field of structural geology

Access to the analog model database

Customers will have the opportunity to try out this innovative solution from anywhere, enabling them to visualize hundreds analog models available in the GeoAnalog web-based application. Prepared data are organized on the basis of 5 geological structural contexts and a full description of each experiment is provided (sketch, boundary conditions, material properties). Accessible remotely, data are centralized within a secure environment. Each customer can upload content (seismic images or text description) under their account and share it with their group through the GeoAnalog web application.

Contact:
Project Leader
Sylvie Schueller
sylvie.schueller@ifpen.fr
Tel.: +33 1 47 52 51 91

IFP Energies nouvelles – Energy Resources Business Unit
resources@ifpen.fr

IFP Energies nouvelles
1 et 4, avenue de Bois-Préau
92852 Rueil-Malmaison Cedex – France
Tel.: +33 1 47 52 60 00

IFP Energies nouvelles-Lyon
Rond-point de l'échangeur de Solaize
BP 3 – 69360 Solaize – France
Tel.: +33 4 37 70 20 00

www.ifpenergiesnouvelles.com