SmartAnALOG
All Automated digital Outcrop Geomodelling

Enhancing reservoir characterization & modeling with outcrop reservoir analogues

Background
In recent years, the use of digital outcrop models (DOM) in reservoir analogue studies has widely spread out. Two approaches are generally proposed for digital outcrop modeling: LIDAR and PHOTOGRAMMETRY. The latter has been successfully tested and optimized by IFPEN to fit with the inherent constraints due to field acquisition. It makes it possible to build 3D geomodels at the reservoir scale that can be used to evaluate the potential of similar subsurface formations. Such models are populated with facies, then petrophysical and petroacoustic properties. They can be considered as inputs to compute seismic or fluid flow responses and discriminate distinct scenarios. The detailed 3D models are also used to test new simulation techniques for reservoir modeling based either on geostatistical or physical (process-based) simulation principles.

Objectives
The main goal of the SmartAnALOG user group consists in improving reservoir characterization & modeling using outcrop analogues.

To reach this objective, IFP Energies nouvelles has developed a comprehensive workflow including all steps from from pictures acquisition to reservoir modeling as illustrated below.
In order to create a real 3D geological interpretation, IFPEN is designing the **Virtuoso** interactive tool (VIRTUal Outcrop analySis), with the functionalities illustrated hereafter.

**Horizons/fractures picking**
- Facies painting

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**Strike/dip measurement**

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**Large models management**

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**L.O.D. (Level Of Detail) management**

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**Digital outcrop**

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**DEM & Aerial map**

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**Field data integration (sedimentological log - gamma ray log)**

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**GIS data integration**

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All the interpretations can be exported to geomodeling tools such as Petrel or Gocad

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**Program & Deliverables**

The SmartAnalog user group is planned over two years and includes 3 work packages.

**Work package 1 : acquisition, interpretation and modeling of outcrops**

**Objectives:** to collect, model and interpret a 3D outcrops.

**Deliverables:** interpreted 3D modeled outcrops for each partner of the usergroup.

**Work Package 2 : design of a VIRTUOSO virtual field notebook prototype**

**Objectives:** to integrate the whole set of outcrop data (logs, fractures, measurements, detail pictures...) in the 3D outcrop model.

**Deliverables:** prototype software after each development phase.

**Work package 3 : design of a VIRTUOSO advanced interpretation tool**

**Objectives:** to interpret (semi)-automatically geological features (surfaces, fractures, properties) on the 3D outcrops, identify the geological objects, compute statistics and determine the basic geostatistical parameters (variograms, proportion curves) characterizing these objects.

**Deliverables:** Prototype software after each development phase.

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The information contained in this document is not contractual

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