

*Field Course on Outcropping Analogs*

**RESERVOIR ARCHITECTURE OF  
A TRIASSIC OUTCROP ANALOG**



**ORGANIZED BY:** **SEDREGROUP**  
Sedimentary Reservoirs Workgroup

**DEPARTMENT of  
STRATIGRAPHY AND PALAEOLOGY**  
Universidad de Granada



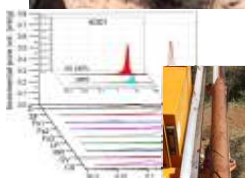
## SUMMARY

This short course offers a training experience especially interesting for petroleum industry professionals working in TAGI (Trias Argilo-Greseux Inferieur) reservoir (Algeria).

Course is focused on the combination of subsurface and outcrop data to set up a detailed database of an excellent outcrop analog from southern Spain: the TIBEM (Triassic Red Beds of the Iberian Meseta). The accurate sedimentological characterization of the deposits of this analog will help geologists and engineers to build more robust models of the 3D reservoir architecture of the TAGI, providing an important input for development and Enhanced Oil Recovery performance in this reservoir.

Emphasis will address to:

- (1) fluvial sedimentology basis, which govern the formation of porous sandstone bodies embedded in mudstones;
- (2) geometry characterization of the deposits;
- (3) petrological and petrophysical study of the different fluvial subenvironments. Cores and wireline logs are available from some of the outcrops to visit, which will be compared with those similar from the TAGI. This work strategy perfectly fits exploration and development requirements, allowing participants to benefit.



## DESIGNED FOR

The course should be attended by exploration, reservoir and production geologists, geophysicists and petroleum engineers focused in subsurface data and who wish broaden and deepen their understanding of the stratigraphic architecture, lithofacies composition, geometry of sedimentary bodies and heterogeneities.



## DURATION

This is a six-day course, combining two days of theoretical and practical lessons in addition to three days of field trip. Last day morning is dedicated to closure acts and in the evening a guided visit is scheduled to the most representative arabic places of Granada.

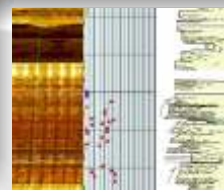
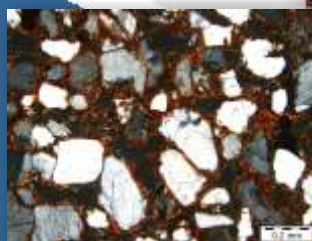
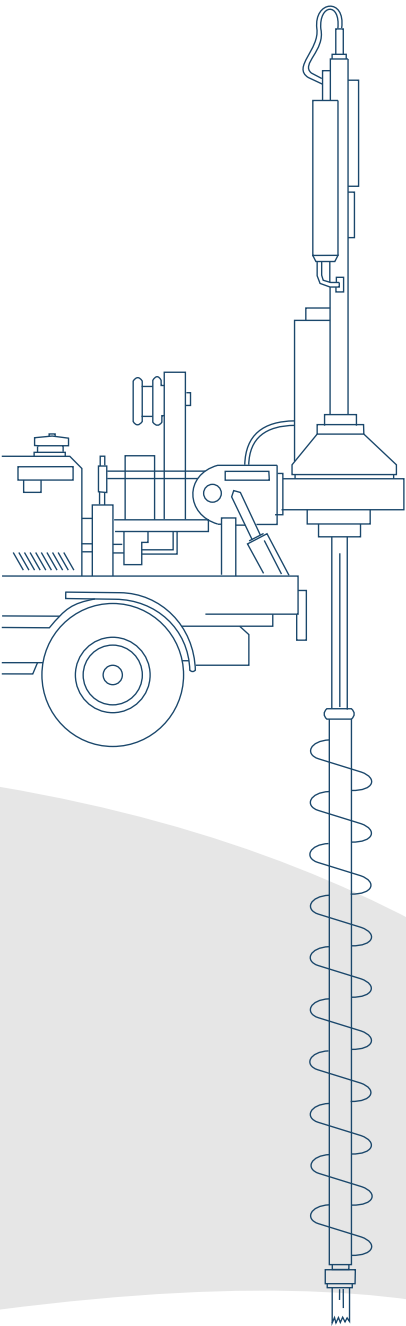


## LEARNING OUTCOMES

On completion of this course, participants will have acquired enough competencies to identify different porous sandstone bodies from subsurface data in order to design geologically-driven plans of exploration, appraisal and development within fluvial reservoirs.

Specifically, participants of this course will be able to:

- 1) Identify the fluvial facies in cores, wireline logs and outcrops
- 2) Recognize different fluvial architectural patterns depending on the base level situation
- 3) Identify vertical lithofacies successions characteristic of different type of channel and overbank fluvial sandstones
- 4) Determine sedimentary control on porosity and permeability
- 5) Predict reservoir size, shape and lateral and vertical connectivity
- 6) Assess exploration, appraisal and development strategies within fluvial reservoirs





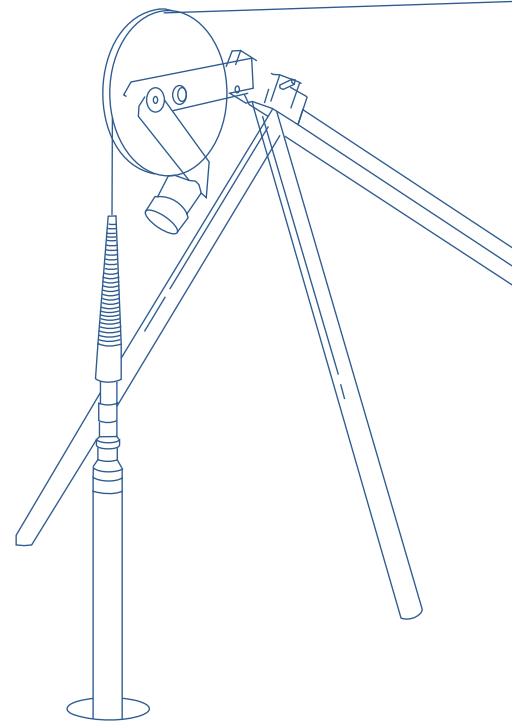
## ACADEMIC LEADERSHIP AND TUTORS

Cesar Viseras (Professor of Stratigraphy and Scientific Supervisor of the Drilling and Coring Rock Unit from the Scientific Instrumentation Centre of the UNIVERSITY OF GRANADA, Spain): viseras@ugr.es

Theoretical lessons and field trip will be addressed by Prof. Cesar Viseras, Prof. Juan Fernandez (clastic sedimentologists) and PhD. student Saturnina Henares (clastic petrologist and well logger) from the Stratigraphy and Paleontology department of the UNIVERSITY OF GRANADA, members also of SEDREGROUP - [Sedimentary Reservoirs Workgroup](http://www.sedregroup.com), [www.sedregroup.com](http://www.sedregroup.com)

SEDREGROUP is an international research team on outcrop analog characterization. Some of its members have more than two decades of experience in stratigraphy, sedimentology and petrology of reservoirs. They also have organized field trips for petroleum industry professionals and academic institutions in S Spain.

Recently, SEDREGROUP has worked in integration study of the Triassic red beds of the Iberian Meseta (TIBEM) as an outcrop analogue for the TAGI reservoir of Algeria. The available public information derived from this study will be applied in the course.



## TRAINING METHOD

Class and laboratory work as well as outcrop exercises will be linked with core examination and well log interpretation to enhance the applicability of this course.



## DIPLOMA

Participants will receive a diploma from the FUNDACION GENERAL UNIVERSIDAD DE GRANADA - EMPRESA, certifying the course attendance.

## TECHNICAL CONTENT

### DAY 0

#### ARRIVAL

Reception of participants at Granada airport, transfer to the city and accommodation.



### DAYS 1 AND 2

#### THEORETICAL AND PRACTICAL LESSONS AT THE UNIVERSITY OF GRANADA

Development during 1 ½ days at the Faculty of Sciences and the Scientific Instrumentation Centre of the University of Granada. Three main aspects will be addressed:

- Fluvial dynamics and generation of reservoir rocks
- Key petrological and petrophysical features of the fluvial sub-environments analyzed in the TIBEM, also recognized in the TAGI
- Characteristic lithofacies and well log identifying patterns of different types of fluvial reservoirs (using cores and wireline logs of TAGI and TIBEM)

Day 2 afternoon: Participants will travel to the field and will be introduced to the geological context of the region to visit.

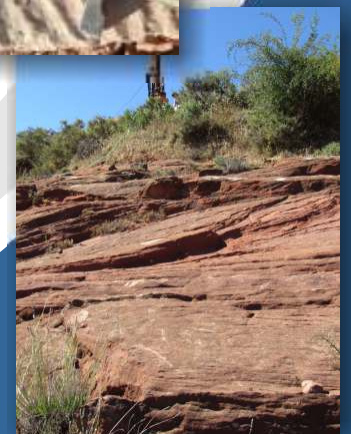


### DAYS 3 TO 5

#### FIELD TRIP

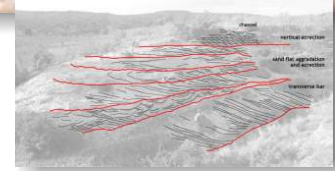
Field trip is closely related to the afore developed theory.

During three days of field work, we visit several well-studied outcrops in the TIBEM. These outcrops have been recently studied through continuous core drilling and wireline logging. Thus, tour is raised as an outcrop-behind outcrop characterization.



Following aspects will be treated:

- Variations in channels and other sand bodies geometry and their relations with seal rocks.
- Interconnectivity among sand bodies.
- Petrophysical properties and their variation patterns within sand bodies as well as the occurrence of heterogeneities responsible for reservoir compartmentation.
- Assessment of reservoir size, shape, trend and quality combining subsurface and corresponding outcrop data.



The afternoon of Day 5 is used to return to Granada.

## DAY 6

### COURSE SUMMATION

Last day morning is dedicated to closure acts and, in the evening, a guided visit is scheduled to the Alhambra and other representative arabic places of Granada.



## DAY 7

### DEPARTURE

Transfer to Granada airport.



## SCHEDULE

Groups interested should contact the Academic Director (Prof. Cesar Viseras, [viseras@ugr.es](mailto:viseras@ugr.es)) to fix the date of course performance. Preferably be held during **May-June** and/or **September-October**



## TUITION

€4.500,00/person, that includes:

- All the scheduled displacements, from the arrival to the departure from Granada
- 4-night accommodation in a single room in Granada as well as the accommodation during the field trip
- Breakfasts, lunches and dinners
- Closure act social dinner
- Theoretical and practical lessons at the University
- Field trip guide
- Guided tour to the Alhambra
- Accident insurance
- Diploma

*Displacement between city of origin and Granada is not covered*



## PHYSICAL DEMAND

A moderate physical demand for the field trip is required. Most of the outcrops are less than 1 km far by walking. The longest walk is approximately 3 km with a 100 m ascent.



## PRE-REQUISITES

Minimum of 3 years related oil industry experience.

Not thorough background on fluvial sedimentology is required. Course initiates with the basic principles of spatially and temporally sediment distribution.

Minimum and maximum number of participants required: 15-20.

Special dietary needs should be communicated in advance

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Departamento de Estratigrafía  
y Paleontología



## INFORMATION AND ENROLLMENT

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## ACADEMIC INFORMATION

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