GEOLOGICAL FIELD TRIP

General:

Discipline: Geology, Geophysics, Petrophysics, Reservoir and Production Eng.
Level: Basic/Intermediate
Duration:5 days
Instructor(s): Gonzalo Ruiz, Javier Prieto, Jesús Sotomayor

Purpose:

Our fieldtrips are focused on reservoir geology of fluvial transition deposits, concentrating on those aspects and features that relate to fluid flow in the sub-surface, specifically to evaluate Ayoluengo Oil and Gas Field, in the Cantabrian Basin of Spain. The field trip is oriented in depositional environments that relate directly to the reservoir geological knowledge and experience. It is an introduction to exploration geology, petroleum systems and petroleum geology. The objectives are to introduce the concepts and principles for the petroleum geology from exploration, appraisal basis knowledge for the best reservoir development in the development of a geostatistical model. It will be address on how to apply the information recorded in the field trip in a real geological mode, by the comparison between the reality with the computer geological model. It is important to understand the limitation of the capabilities of the computer models results and the real geology and how we can obtain the best value by integrating the outcrops information and the facies and properties distribution in the models.

Designed for:

Beginners geoscientists, geophysics, geology, petrophysics, engineers, reservoir, production.

You Will Learn:

How to:

- Understand the basic review of the regional setting of the Basque-Cantabrian
- Key Basin Petroleum System
  - Regional Stratigraphy.
  - Tectono-sedimentary evolution.
  - Basque-Cantabrian Basin Petroleum System. 1d. Hydrocarbon discoveries and play concepts
- Understand the basic concepts of petroleum system on the analysis of outcrop observation and subsurface data of the Basque-Cantabrian Basin.
  - Outcrop recognition of the Basque-Cantabrian Basin Stratigraphy.
  - Understands the regional structure: Extensional and compressional features. Salt tectonics.
  - Understands the subsurface data (wells, seismic, geo-chemistry, etc) with outcrops analogues.
  - Characterisation of Source rocks, Reservoirs, and Seals.
  - Characterisation of Traps and Structures. Review concept of timing
  - Hydrocarbon generation, migration and preservation processes.

  - Ayoluengo Oil Field.
- How to integrated all the information in a computer geological model to improve the results.

Course Content:

Characterisation of source rocks for gas and oil, reservoirs and seals.

- Bunt Play, Duero Basin Play and Ayoluengo Field source rock.
- Structure analysis and complex salt tectonics areas.
- Age of structures and time of hydrocarbon generation. Ayoluengo Field reservoir, Ayoluengo Play, Stratigraphic Play and Aptian Albian gas play (Duero Basin Play).
- Analysis of the basin margin section in comparison with a subsiding though.

Structural analysis of the Montorio Folded Belt. Hontomin Play.

- Carboniferous and Mesozoic source rock-reservoir-seal relationships, characterisation of traps and structures, analysis of hydrocarbon generation and migration processes, age of structures and time of generation, play concepts.
- The stops will provide a good mix of panorama overlooks, detail outcrop analogues, and examination of seismic records and well logs data.
- Source Rock
- Conditions and analogues

Migration, reservoir rock and seal

- Review data
- Review analogues
- Develop a conceptual model

Trap

- Review structural and stratigraphic traps
- Review analogues
- Develop a structural model

Field trip sites

- Conceptualise field sites to reservoir size, characteristics
- Conceptualise structural styles and trap mechanism
- Conceptualize reservoir quality and distribution

Field trip stops:

- Horseback front in San Martín de Ubierna
- Ayoluengo Field
- Source rock in Basconsillos del Tozo
- Recognition of Fluvial reservoir rock and alluvial/fluvial seal rocks in Valle de Valderredoble
- Migration paths (faults) in Bárcenas de Ebro
- Source rock in Santiurde de Reinosa
- Stratigraphic column in Santiurde de Reinosa
- Structural styles in Humada
- Reservoir fluvial sediment in Embalse de Aguilar
- Reservoir fluvial channels and bar in Olleros de Pisuerga
- Rock hermitage excavated in a sandstone of lower Cretaceous river origin in Olleros

de Pisuerga

Software applications:

- Microsoft Office

Text and consulting books:

- ALVAREZ DE BUERGO, E. & GARCIA, A. (1996): Calculo de reservas remanentes de hidrocarburos en zonas estructuralmente complejas: aplicación al campo de “Ayoluengo" (1ª Parte. Geogaceta N° 20, 161-164) (2a Parte. Geogaceta N° 20,165-168)
- ARNAIZ, J., ROBLES, S. & PUJALTE, V. (1991): Correlacion entre registros de sondeos y series de superficie del Aptiense-Albiense continental del extremo SW de la Cuenca Vasco¬Cantabrica y su aplicación a la identificación de zonas lignigíferas. Geogaceta, 10: 65-68.
- FLOQUET, M. (1992): Outcrop sequence stratigraphy in a ramp setting: the late Cretaceous-early Palaeogene deposits of the Castilian Ramp (Spain). A field trip guide book in conjunction with the international symposium “Sequence stratigraphy of Mesozoic¬Cenozoic European basins” 131 pp.
- GARCIA-MONDEJAR, J. (1990): The Aptian-Albian carbonate episode of the Basque¬Cantabrian Basin (northern Spain): general characteristics, controls and evolution. Spec. Pubis. Int. Ass. Sediment. N° 9,257-290.
- GARCIA-MONDEJAR, J., PUJALTE, V. & ROBLES, S. (1986): Caracterfsticas sedimentologica, secuenciales y tectoestratigraticas del Triasico de Cantabria y norte de Palencia. Cuadernos de Geologfa Iberica, 10: 151-172.
- HERNAIZ, P.P., SERRANO, A., MALAGON, J. & RODRIGUEZ CANAS, C. (1994): Evolucion estructural del margen SO de la Cuenca Vasco Cantabrica. Geogaceta N° 15,143-146.