

Course Code

GE06

Course Title

Principles of Stratigraphy and Use in Petroleum Geology

Instructor

Dr. Demir Altiner and Dr. Kadir Gürgey



Professional Career

Demir Altiner is professor of paleontology and stratigraphy in the Geological Engineering Department of the Middle East Technical University (METU), Ankara, Turkey. He is a graduate of METU (B.S. and M.S.) and the Geology and Paleontology Department of University of Geneva, Switzerland (Ph.D). After finishing his Ph.D in 1981, Dr. Altiner joined the Middle East Technical University where he teaches several courses in graduate and undergraduate level including principles of stratigraphy, sequence stratigraphy, applications of stratigraphy and paleontology in exploration, historical geology and paleontology, biostratigraphy etc. In research, his interests are primarily on sequence stratigraphy and cyclostratigraphy and their applications in exploration, biotic events related to sea level fluctuations, taxonomy and evolution of Paleozoic and Mesozoic foraminifera and foraminiferal recovery from mass extinctions.

Dr. Altiner has carried out innumerable well and field sample analyses since 1982 for American and Turkish petroleum companies that worked on oil exploration in Turkey such as ESSO, MOBIL, ARCO, HUFFCO, TPAO etc. Most of this work has been presented to the companies in form of graphs, tables and reports.

Dr. Altiner was invited by the National Petroleum Company of Brazil, PETROBRAS (Rio de Janeiro) in the years 1988, 1990 and 1991 in order to carry out a stratigraphic and paleontologic research on Amazonas and Solimões Basins in North Brazil. He studied more than 80 boreholes in these basins, calibrated the chronostratigraphic position of reservoir rocks and correlated them all over the North Brazil.

Dr. Altiner acted as the head of the Earth Marine and Atmospheric Sciences Group of the National Science Foundation in Turkey and a core group member of one of the research groups of the European Science Foundation in the years of 2000. He recently visited the Department of Geological and Environmental Sciences of the Stanford University (USA) as an invited professor. He gave courses on Triassic paleontology to graduate students and carried out a research on the correlation between the Chinese Triassic foraminiferal biostratigraphy and isotope stratigraphy in collaboration with Dr. J. Payne from Stanford.

Payne from Stanford.

Dr. Gürgey is an emeritus Professor of Petroleum Geochemistry from the University of Pamukkale in 2009 where he used to teach several petroleum and natural gas related courses. He gained his main experience while he was working for TPAO between 1986 and 2004 in various localities in Turkey (SE Turkey, Thrace and Alasehir Graben basins), Kazakistan (Pre- Caspian basin), Azerbaijan (South Caspian Basin), Cuba, Spain (Galicia Basin) and South Korea (Songlia Basin). His research area basically covers geochemistry of crude oil, natural, condensate and source rocks. He has a number of published papers and presentations in national and international journals and meetings in addition to giving several seminars for oil companies and universities. Dr. Gürgey, currently, is working for Merty Energy as a coordinator involving mainly petroleum geochemistry and training and education related studies.

Course Objective and Description

This course deals with the subjects related to depositional processes and classification of depositional environments, stratification, unconformities, facies concepts, fundamentals of stratigraphic nomenclature, lithostratigraphic, biostratigraphic, chronostratigraphic and geochronologic units and application of geological principles to petroleum geology covering origin, migration and accumulation of petroleum.

The course is designed to provide participants with the basic knowledge of formation of sedimentary rock packages, their relation and nomenclature, the essentials of sedimentary environments, source rocks and reservoir rocks, and how petroleum migrates and accumulates; teach how to seek information about stratigraphic data and their classification into meaningful categories; teach participants recognition of fundamental sedimentary rock packages and their lateral and vertical relations, porosity and permeability distribution; teach how to combine stratigraphic data to see and interpret the natural processes as a whole; to create opportunity for the participants to work on stratigraphic problems by himself/herself in order to increase his/her confidence in approaching geological problems.

Who Should Attend

Non-geologists (Petroleum industry personnel who needs basic training in Stratigraphy and its use in petroleum geology, including engineering and geophysical personnel and managers) who are interested in an introduction or review of the principles of stratigraphy and its use in petroleum geology.

Prerequisite

None

Learning Level

Basic

Duration

5 days

Course Material

Handouts and course slides

Course Outline

Day One

- Introduction to Earth materials
 - o Rocks and minerals
- Introduction sedimentology and stratigraphy
 - o Phases of stratigraphy
 - o Value of stratigraphy
 - o Sedimentary processes
 - o Surface processes
 - o Erosion and transportation

Day Two

- Introduction sedimentology and stratigraphy
 - o Changes after deposition
 - o Packing, sorting, fracturing, and diagenesis
 - o Porosity and permeability growth
- Stratification
 - o Recognition of stratification
 - o Bedding and bedding types
 - o Breaks in record-unconformities
 - o Types of unconformities
 - o Evidence used to recognize unconformities

Day Three

- Plate tectonics and structures
 - o Types of plate boundaries
 - o Strike, dip, folds and faults
- Depositional environments-interpretations and classification
- Non-marine environments/deposits and their importance in petroleum exploration
 - o Fluvial environments (Meandering river deposits, braided river deposits, and alluvial fan deposits)
 - o Desert environment
 - o Lake/lacustrine environment
- Marine environments/deposits and their importance in petroleum exploration
 - o Neritic (Continental-shelf) environment
 - o Oceanic (pelagic) environment

Day Four

- Mixed environments/deposits and their importance in petroleum exploration
 - o Beach (low-open shore) environment
 - o Shore-Lagoon environment
 - o Delta environment
 - o Reef environment
- Sedimentary facies -recognition and interpretation of facies change
 - o Vertical and lateral successions of strata
- Stratigraphic nomenclature
 - o Lithostratigraphic, biostratigraphic, chronostratigraphic and geochronologic units
 - o Oceanic (pelagic) environment

Day Five

- Components of a petroleum system: source, reservoir and seal rocks
 - o Origin of source rocks, factors and conditions controlling deposition and distribution of source rocks
 - o Reservoir and seal rocks, their depositional environments and porosity-permeability distribution
 - o Fundamentals of rock formation and deformation and trap types
 - o Maturation, generation and expulsion
 - o Migration and accumulation

Antalya, Turkey
29 Mar - 2 Apr
US\$ 2,950

Istanbul, Turkey
20-24 Sep
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