

**Course Code**

GE04

**Course Name****Sequence Stratigraphical Analyses in Petroleum Exploration Boreholes****Instructor**

Dr. Demir Altuner

**Professional Career**

Demir Altuner 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. Altuner 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. Demir Altuner 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. Demir Altuner 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. Demir Altuner 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.

**Course Objectives and Description**

This course is designed to give well-site and exploration geologists, paleontologists and sedimentologists based in a petroleum company the fundamental knowledge and methods in processing the subsurface sequence stratigraphic data. Sequence stratigraphical analysis is essential in any geological exploration work, particularly in petroleum exploration and such a course introduces students to one of the applied aspects of the stratigraphy. In the first two days of the course, the background information will be given linking the classical stratigraphy to sequence stratigraphy, via seismic stratigraphy. The third day will concentrate on borehole analysis describing the construction of meter-scale cycles and the higher hierarchies in sequence stratigraphy. Discussions will be given on how to match the observed data with well log and seismic data. In the fourth day, examples from boreholes and outcrops, yielding very similar data to subsurface, will be studied by using microscope or hand-lense. Possible prediction methods will be discussed by using cycle charts and models. In the fifth day, the field work is optional. Outcrops of marine deposits displaying meter-scale cyclicity and the stacking patterns of cycles will be visited in the field.

**Who Should Attend**

Well-site and exploration geologists, paleontologists and sedimentologists

**Prerequisite**

Geology and geophysists degrees

**Learning Level**

Graduate with a good stratigraphy background.

**Duration**

5 days

**Course Material**

Handouts, thin sections, rock samples

**Course Outline**

*Day One*

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- From lithostratigraphy to sequence stratigraphy
  - o Stratigraphic contacts
  - o Vertical successions of strata
  - o Lateral successions of strata
  - o Combined vertical and lateral stratigraphic relations
  - o Relative sea level rise and fall concepts
  - o Depositional sequences

*Day Two*

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- Evolved sequence stratigraphy concepts
  - o Sequence (Type 1 and Type 2)
  - o Systems tracts
  - o Parasequence sets and parasequences
  - o Sea-level cycle charts

*Day Three*

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- Borehole analysis
  - o Cuttings and core samples
  - o Microfacies and micropaleontological analyses
  - o Meter-scale cycles (parasequences)
  - o Responses of organisms to cyclicityo Stacking patterns of parasequences
  - o Detection of higher order hierarchies (systems tracts, third-order sequences)
  - o Matching of findings with well log and seismic stratigraphic data

Day Four

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- Applications
  - o Examples from borehole and outcrop data
  - o Predictions in sequence stratigraphic analysis

Day Five (optional)

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- Field work
  - o Outcrop sequence stratigraph

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Antalya, Turkey  
22-26 Mar  
US\$ 2,950

Istanbul, Turkey  
13-17 Sep  
US\$ 2,950

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