

**Salahaddin University
College Of Science
Department of Earth Sciences and Petroleum**

Course Book of Advanced Stratigraphy : MSc Students

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SEQUENCE STRATIGRAPHY

***Fundamental Principles**

***Fundamental Units of Sequence Stratigraphy**

***System Tracts**

Highstand System Tracts

Falling-Stage System Tracts

Lowstand System Tracts

***Methods and Applications of Sequence Stratigraphy**

Environmental Applications

Global Sea-Level Analysis

General Principles

Reliability of Sea-Level Analysis from Sequence-Stratigraphy Data

Summary Remarks

Magnetostratigraphy

***General Principles**

Sampling, Measuring, and Displaying Remnant Magnetism

Magnetic Polarity Time Scales

***Terminology in Magnetostratigraphy**

***Applications of Magnetostratigraphy and Paleomagnetism**

Correlation

Geochronology

Paleoclimatology

Study of Displaced Terranes

Other Applications of Paleomagnetism

SEISMIC STRATIGRAPHY

- *Early Development of Seismic Methods**
 - *Principles of Reflection Seismic Methods**
 - On-Land Surveying**
 - Marine Seismic Surveying**
 - Parameters Used in Seismic Stratigraphic Interpretation**
 - Reflection Configuration**
 - Reflection Continuity**
 - Other Reflection Parameters**
 - Interval Velocity**
 - *Procedures in Seismic Stratigraphic Analysis**
 - *Seismic Sequence Analysis**
 - Internal Relationships**
 - Identification of Depositional Sequences**
 - *Seismic Facies Analysis**
 - Procedures for interpreting Seismic Facies**
 - *Interpretation of Lithofacies and Depositional Environments**

CHRONOSTRATIGRAPHY AND GEOLOGIC TIME

- *Introduction**
- *Geologic Time Units**
- *The Geologic Time Scale**
 - Development of the Geologic Time Scale**
 - Chronostratigraphic Scale**
 - Geochronologic (Time) Scale**
- *Calibrating the Geologic Time Scale by use of Fossils :**
 - BioChronology**
 - Application to Dating Sedimentary Rocks**
 - Finding Ages of Sedimentary Rocks by Analysis of Interbedded Contemporaneous Volcanic Rocks**

**Bracketed Ages from Associated Igneous or
Metamorphic Rocks**

***Calibrating by Absolute Ages : Radiochronology**

General Principles

Radiometric Methods

***Direct Radiochronology of Seimentary Rocks**

Carbon-14 Method

Radiochronology of Glauconites by Use of

Potassium-40 and Rubidium-87/Strontium-87

Estimating Ages of Sedimentary Rocks by Use of

Other Authigenic Minerals

Thorium-230 and Thorium-230/Protactinium-231

Methods for Estimating Ages of Recent

Sediments

CHRONOCORRELATION

***Event Correlation and Event Stratigraphy**

Correlation by Short-Term Depositional Events

Event Correlation Based on Transgressive-Regressive

Events

***Correlation by Stable Isotope Events**

Oxygen Isotopes

Carbon Isotopes

Sulfur Isotopes

Strontium Isotopes

***Problems with Isotopic Chronocorrelation**

Carbonate Diagenesis*

Diagenetic Environments

Classification of Diagenetic Processes

Carbonate Destruction

Cementation

Sparite and Microsparite Terminology

Differentiation of Orthosparite and Pseudospirite

Lithification of Lime Mud

Compaction

Stylolites

***Microfacies Characteristics**

Groundmass and Particles

Micrite

Modes of Origin of Micrite

Limestone Particles

Skeletal Grains

Non-skeletal Grains

***Fossils in Thin Sections**

Key to Identification

***Classification of Carbonate Rocks**

Principles of Classification

Systems of Classification

Folk Classification 1959,1962

**Dunham Classification 1962 expanded by Embry
and Klovan,1972**

***Standard Microfacies Types**

Principles

SMF Types

***SMF types and Facies Belts (Zones)**