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Geo. 420K
Spring, 1999

NOTES ON STRATIGRAPHY FOR GEO420K

TYPES OF STRATIGRAPHY

Lithostratigraphy - Lithostratigraphic unit
[Group, Formation, Member]
- Lithodemic unit (intrusives, etc.)

Pedostratigraphy - Pedostratigraphic unit

Biostratigraphy - Zones

Chronostratigraphy - Chronostratigraphic units
[Period, Epoch, Age]

Geochronostratigraphy - Geochronostratigraphic unit
[System, Series, Stage]

Magnetostratigraphy - Reversals, chrons

Chemostratigraphy - Isotope zones

Sequence Stratigraphy - Allostratigraphic units
[Unconformity-bounded units]

IMPORTANT SURFACES & TIME IMPLICATIONS

1) FAULTS, FRACTURES

2) UNCONFORMITIES = Buried erosion surfaces

Physical erosion
Biological erosion
Chemical erosion

Hiatus = amount of time record missing

Diastem = small amount of rock missing
Paraconformity " " " "

Non-conformity: sedimentary rocks on top of igneous or metamorphics
Disconformity: sediments conformable with sediments
Angular unconformity: angular discordance

3) BEDDING

Problem: how much time is represented by each bedding plane?

FACIES Definitions:

1) Aspects of a rock that characterize it (minerals, fossils, color, etc).

2) Mappable, areally restricted part of a lithostratigraphic body that differs from its coeval equivalents.

3) A distinctive rock type that is characteristic of a particular environment: black shale facies, bioherm facies, channel facies, turbidite facies.

4) A body of rock distinguished on the basis of its fossil content: *Ophiomorpha* facies, *Exogyra texana* facies.

BIOSTRATIGRAPHY

PROCEDURE: plot range of every fossil in a local section;
decide on practical biozone boundaries.

RANGE: [first to last occurrance]: vertical distribution of a taxa through time as indicated by its distribution in rocks of known age.

BIOZONES: various classes of zones.
Range zone: all strata that contain a local species
Teilzone: observed local range of given fossil

OPERATIONAL BIOZONES:
Interval: based on 2 taxa
Assemblage: based on 3 or more taxa
Abundance (peak or acme): relative abundance of certain taxa

FAD = first appearance datum
LAD = last appearance datum
LOD = last occurrence datum

GEO 420K: STRATIGRAPHIC TERMS TO KNOW

Transgression
Regression
Aggradation
Progradation
Isochronous
Diachronous
Hierarchy of rock units (lithostratigraphic units): supergroup, group, formation, member, tongue, lentil, bed
Heirarchy of time units (geochronometric units): era, period, series, stage
Heirarchy of time-rock units (chronostratigraphic units) : erathem, system, epoch, age
Allostratigraphic units
Sequence
Biozone
Formation
Lithostratigraphy
Biostratigraphy
Chronostratigraphy
Magnetostratigraphy
Chemostratigraphy
Sequence Stratigraphy
Chron
Polarity chron
FAD
LAD (LOD)
Law of Original Horizontality
Law of Lateral Continuity
Law of Law of Stratigraphic Succession (Superposition)
Law of Faunal Succession
McBride's Law
Wheeler diagram
Unconformity: diastem: disconformity: non-conformity; angular unconformity
Hiatus
Allocyclic
Autocyclic
Milankovitch cycles
1st, 2nd, 3rd, 4th order cycles
On lap; Off lap; Down lap; Top lap
Erosional truncation
Radiometric age
a, Ka, Ma, Ga (time before present)
y, Ky, My, By (time span)

STRATIGRAPHY = concerned with the 3-dimensional relations of rocks and their ages. It is the basis of reconstructing geologic history.

Lithic Units (Lithostratigraphy)
Group
- **Formation**: mappable rock unit, definable boundaries
  - Member
    - Lentil, tongue

Time Units (Chronostratigraphy)
Era
- Period
  - Epoch

Time-Rock Units (Geochronostratigraphy)
Erathem
- System
  - Series

Stratigraphic Sequence = body of rock bounded by unconformities and their correlative conformities.

Law of Superposition: oldest rocks at the base, youngest at the top.

Law of Faunal Succession: fossils of different types occur in rocks of different ages and in a logical progression; once a fossil disappears it does not recur at a younger level.

Correlation = determining that rocks at geographically distant places are either the same rock body or the same age.

Wheeler Diagram = diagram showing the lateral geographic distribution of rocks on the abscissa (a axis) and time on the ordinate.

Geologic Time Scale = Age of the Earth subdivided into named and dated intervals.