Constructing a Stratigraphic Column

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Sideling Hill Road Cut

syncline

Photo by Huan Cui
- Lithology symbols
- SedStructure symbols
- Width of the symbols
- Scales/Height
- Names of each unit
沉积相综合柱状图

嘉二3

局限-蒸发泻湖
砂屑滩夹滩间海

嘉二2 C

海侵

嘉二2 B

海退

嘉二2 A

海侵

嘉二1

海退

蒸发泻湖
局限泻湖
<table>
<thead>
<tr>
<th>地层</th>
<th>系统</th>
<th>GR 150</th>
<th>DEN</th>
<th>AC</th>
<th>深度 (m)</th>
<th>岩性 结构 剖面</th>
</tr>
</thead>
<tbody>
<tr>
<td>组</td>
<td>段</td>
<td>亚层</td>
<td>二 1</td>
<td>嘉</td>
<td>3100</td>
<td></td>
</tr>
<tr>
<td>江</td>
<td>二</td>
<td>C</td>
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<td>组</td>
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<td>二 1</td>
<td>嘉</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pay attention to the width of the lithology symbols.

Unit names:
- Central (Bay of Islands) Section
- Lorrain Formation
- cycle D
- Eastern (Iroquois Bay) Section
- cycle C
- cycle B
- cycle A
- Lower Gowganda Formation

Scale:
- 0-200m

Lithology legend:
- coarse-grained to pebbly sandstone
- fine-grained sandstone
- medium-grained sandstone
- silty argillite and argillite
- argillite
- diamicite

SedStructure legend:
- rip-up clasts
- basement clasts
- erosional surface
- plane parallel lamination
- wavy lamination, bedding
- contorted bedding
- sandstone balls
- ball and pillow structures
- scour surface
- channel
- symmetrical ripples
- ripple cross-lamination
- trough crossbedding
- planar crossbedding
- graded bedding

Structures alongside:
- Pay attention to the width of the lithology symbols.
Section Measurement

1. Make careful notes and measurements on the outcrop.
2. Add up the total section thickness.
3. Choose a suitable scale (at least 2cm to the metre).
4. Draw the cross section on graph paper. Remember to make the column width correspond to how recessive (narrow column) or resistant (wide column) to weathering, the various rock types appear in the measured section.

Some Lithologic Symbols (with suggested relative widths for the stratigraphic column)

- limestone, parallel, wavy bedding
- dolostone, parallel, wavy bedding
- shaly limestone, parallel bedding
- sandy limestone, parallel bedding
- sandy dolomitic oligomictic conglomerate
- sandy oligomictic breccia
- polymictic paraconglomerate (diamictite)
- sandstone
- siltstone
- mudstone

Sedimentary Structures

- parallel bedding
- wavy bedding
- lenticular bedding
- desiccation cracks
- wave ripples
- current ripples
- cross bedding
- graded bedding
- bai and pillow structures
- karsted, hematite-coated surface

Symbols for some of the fossils present in the section

- vertical burrows
- horizontal burrows
- cryptalgal lamination
- orthocone cephalopods
- gastropods
- brachiopods
- bivalves (pelecypods)
- solitary corals
- colonial corals
- crinoid ossicles
- trilobites
- bryozoans
### Lithotypes and Sedimentary Structures

<table>
<thead>
<tr>
<th>Lithotypes</th>
<th>Sedimentary Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>conglomerate (cgl)</td>
<td>erosional flutes</td>
</tr>
<tr>
<td>sandstone (snt)</td>
<td></td>
</tr>
<tr>
<td>siltstone (silt)</td>
<td></td>
</tr>
<tr>
<td>mudstone (md)</td>
<td></td>
</tr>
<tr>
<td>claystone (clay)</td>
<td></td>
</tr>
<tr>
<td>limestone (limestone)</td>
<td></td>
</tr>
<tr>
<td>dolomite (dol)</td>
<td></td>
</tr>
<tr>
<td>chert (cht)</td>
<td></td>
</tr>
</tbody>
</table>
| coal (cl) | | inclined bedding/lam. cross bedding/lam. (tab = tabular)
| halite (hal) | | biogenic bioturbation minor (0-30%) bioturbation moderate (30-60%) bioturbation intense (>60%) |
| gypsum, anhydrite | | flute cast convolute lamination |
| volcaniclastite | | lenticular bedding/lam. wedge-like bedding/lam. reverse grading |
| closely interbedded lithotypes: width of ornament indicates proportion of each |

#### Qualifiers
- pebbly
- sandy
- silty
- muddy
- calcareous (calc.)
- dolomitic
- cherty
- carboniferous
- saliferous
- gypsumiferous
- tuffaceous
- fossiliferous

#### Fossils
- fossils (undifferentiated)
- fossils - broken
- ammonoids
- belemnites
- bivalves
- brachiopods
- bryozoan
- coral - solitary
- coral - compound
- crinoids
- echinoids
- gastropods

#### Selected Geological Symbols for Mapping
- 25° dip and strike of beds vertical horizontal
- 30° dip/strike of foliation, cleavage, schistosity
- 42° dip/strike of jointing: lineation and plunge observed inferred fault thrust strike slip
- contact observed inferred uncertain

### Lithology

<table>
<thead>
<tr>
<th>Siliciclastic Sediments</th>
<th>Carbonates</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>clay, mudstone</td>
<td>litharenite</td>
<td>chert</td>
</tr>
<tr>
<td>shale</td>
<td>greywacke</td>
<td>peat</td>
</tr>
<tr>
<td>marl</td>
<td>clayey sandstone</td>
<td>brown coal</td>
</tr>
<tr>
<td>sandstone</td>
<td>calcareous sandstone</td>
<td>hard coal</td>
</tr>
<tr>
<td>sandstone</td>
<td>alternating strata sandstone/shale</td>
<td>halite</td>
</tr>
<tr>
<td>sandstone</td>
<td>pebble-supported conglomerate</td>
<td>gyspsum-anhydrite</td>
</tr>
<tr>
<td>arenite</td>
<td>matrix-supported conglomerate</td>
<td>volcanioclastic sediment</td>
</tr>
</tbody>
</table>

#### Sedimentary Structures

- flute cast parallellamina tion wave-ripple lamination stromatolites
- [groove cast] cross-lamination normal graded slight bioturbation
- [tool marks] cross-bedding planar reversed bedding intense bioturbation
- [load casts] cross-bedding - trough imbrication bed contacts:
- [shrinkage cracks] cross-bedding herring-bone slumped structures sharp, planar
- [stratifications/lineations] cross-bedding low angle convolute bedding - sharp, irregular
- [symmetrical ripples] flaser bedding nodules palaeocurrents:
- [asymmetrical ripples] lenticular bedding stylolites azimuth

#### Fossils

- fossils (undifferentiated)
- brachiopods
- echinoids
calyxalgae
- plant fragments
- roots
- burrows
- bivalves
crinoids
- belemnites
- graptolites
- stromatoporoids
- trilobites
- devise others when needed
Steps when constructing a stratigraphic column

1. Divide different units according to the lithology
2. Estimate the thickness of the unit
3. Recognize characteristic sedimentary structures in each unit
4. Use appropriate symbols when drawing the stratigraphic column
Facies model and vertical sequence of a carbonate submarine fan from the Upper Jurassic at Peniche, Portugal
Proximal-distal changes in turbidites: downcurrent decrease in bed thickness, grain size and sand/mud ratio, and lateral changes in internal structures.
Steps when drawing a stratigraphic column

1. Divide different units according to the lithology.
2. Estimate the thickness of the unit.
3. Recognize characteristic sedimentary structures in each unit.
4. Use appropriate symbols when drawing the stratigraphic column.

Photo by Huan Cui
Checklist

✓ Scale/Meters
✓ Name of each unit (Group, Formation, Member)
✓ Lithology symbols with appropriate width
✓ Sedimentary structures symbols marked alongside the lithology column
✓ Legend for all the symbols you used
Reference and Recommended Reading Materials

Sedimentary Rocks in the Field
A Color Guide
Dorrik A.V. Stow

Sedimentary Rocks in the Field
A Practical Guide
Fourth Edition
Maurice E. Tucker

Edited by
ANGELA L. COE

GEOLICAL
FIELD TECHNIQUES
Feel free to ask me questions!

:-)

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