High-resolution Stratigraphic Correlation by Using Global Sea-level Curve

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Outline

- Sequence stratigraphy
- Application to well-log correlation
- Eustacy
- Eustacy and well-logs from western Taiwan
- Method
- Result
- Discussion
- Conclusion
- Acknowledgements
- Reference
Sequence stratigraphy

- Highstand Systems Tract
- Lowstand Systems Tract
  - Lowstand Fan
  - Lowstand Wedge
- Transgressive Systems Tract
Highstand Systems Tract

LATE HIGHSTAND (PREDOMINANTLY PROGRADATIONAL)
EARLY HIGHSTAND (PREDOMINANTLY AGGRADATIONAL)

EUSTACY
HIGH
TIME
LOW

SEA LEVEL

- 200 m
- 400 m
- 600 m
- 800 m

ALLUVIAL PLAIN
SHELF
HIGHLAND SYSTEMS TRACT
BASIN
Lowstand Fan
Lowstand Wedge

- **SEa Level**
- **Lowstand Fan**
- **Basin**
- **Exposed Shelf**
- **FLuvial Coastal Plain**
- **SHElf**
- **Lowstand Wedge Systems Tract**

**Eustacy**
- **High**
- **Low**
- **Time**
Transgressive Systems Tract
Application to well-log correlation

- A good indicator
- Record depth and data
- The most basic study inside the earth
- So many methods
- Spontaneous potential
- Resistivity log
- Gamma-ray log
- Sonic log
- Porosity logs
- Caliper log
- Dipmeter log
Gamma-ray log

- Which is discharge $\gamma$-ray naturally.
- Potassium exists in clay mineral usually.
- Distinguish shaliness and cleanness.
- The concentration of radioelement is getting higher with compaction.
Eustacy (Miller et al.)

- Global sea level
- Estimate from the centre of earth
- A fluctuation with $\delta^{18}O$

C. G. St. C. Kendall 2006 (After Emery, 1995)
Eustacy and well-logs from western Taiwan

• A region and global
• The same or different
• And why…
Method

- Detect the wells
- Shaliness contrasts high sea-level
- Correlate with Miller’s eustacy
- Discover the different and think about it
Result

- Southern cross section
- North-South section
- Sedimentation rate
Southern cross section

- CET well
- Cited: 23°32'5" N, 119°48'2" E
- Sedimentation rate
Southern cross section

- CEP well
- Eastern of CET
Southern cross section

- CEC well
- Centre of crisscross
Southern cross section

- CEJ well
- Out of Pajhang river
- Cited: 23°14’18.175” N
  119°58’16.846” E
Southern cross section
North-South section

- CBE, CEC, CEY, CFC wells
- Off western Taiwan
- From Houlong River to southern Taiwan
- Sedimentation rate
North-South section
Discussion

- Orogeny? Global climate? Sediment supply?
- South China sea rift
- North to South and East to West
Why it’s correlation?

• If it’s orogeny…
• If it’s sediment supply change…
• If it’s climate…
Connected to Chinese offshore

• Taiwan Strait near South China Sea
• CBE to CEC cross Penghu channel
• According wells’ data…
Variation with crisscross

- The sedimentation rate
- Sequence stratigraphy
- And it implicate…
Conclusion

• The wells’ data can correlate well with the eustacy. It should be attributed to the climate.
• There is a basin in the Taiwan Strait; it can attribute that from South China Sea.
• In N-S section, the sedimentation rates of wells are constant, because they are almost on the same distance to Taiwan.
• The Taiwan basin comes into being with Taiwan Orogeny. And it also correlated with South China Sea.
① Global importance
② Cyclic nature (predictability)
③ Applicability to terrestrial deposits?
Forecast

• Finding what effect these different
• Correlate the subaerial wells
• Having a theory with this discovery
Acknowledgements

- NTNU Earth Science
- Dr. Tung-Yi Lee
- J. Bruce H. Shyu
- All my friends
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Thanks for listening