Multi-proxy evidence for the denudation of Taiwan

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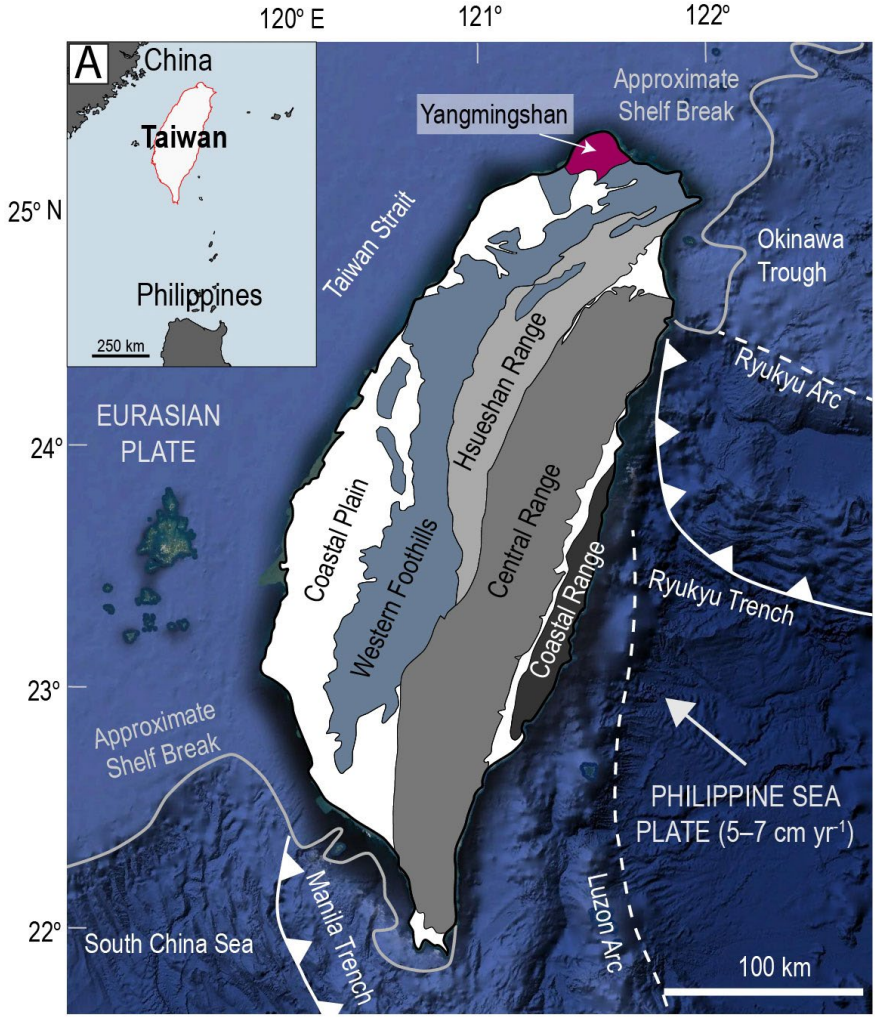
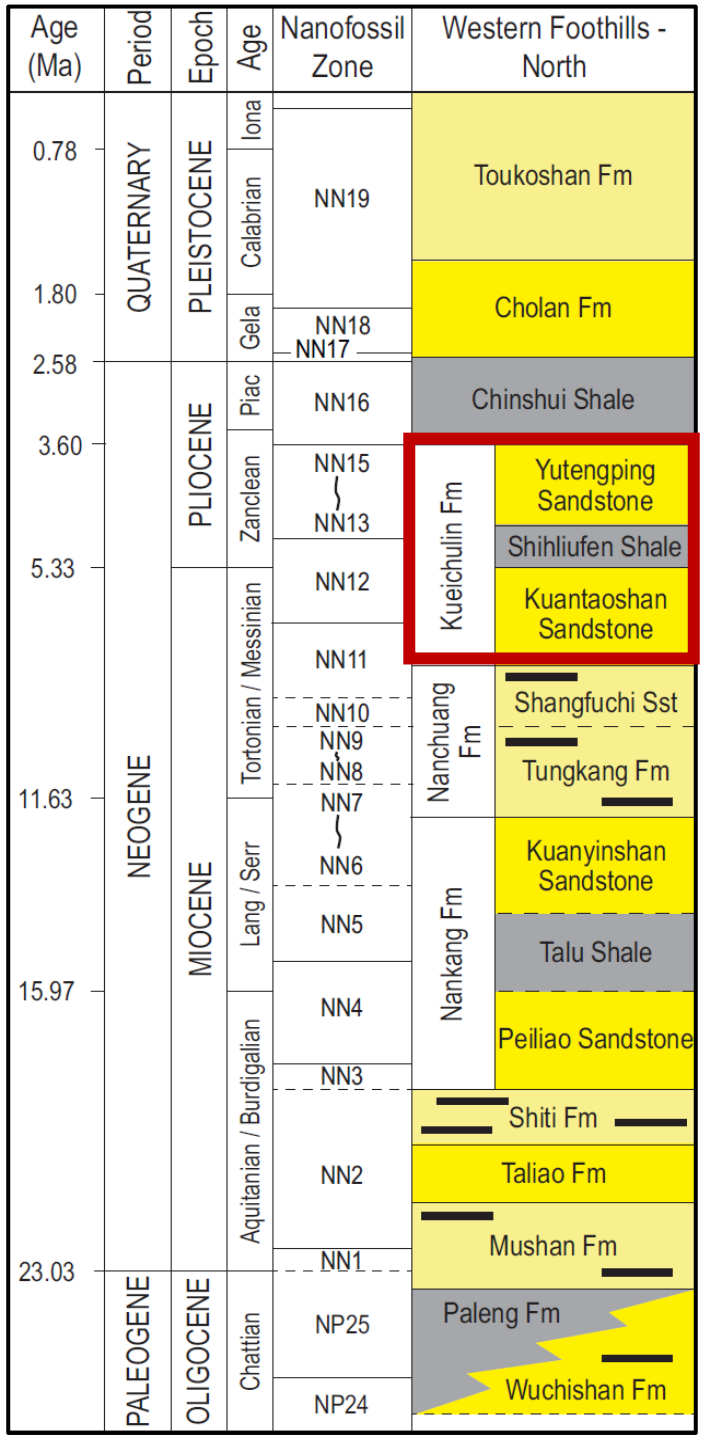
Taiwan Geology

Located at boundary between Philippine Sea Plate and Eurasian Plate



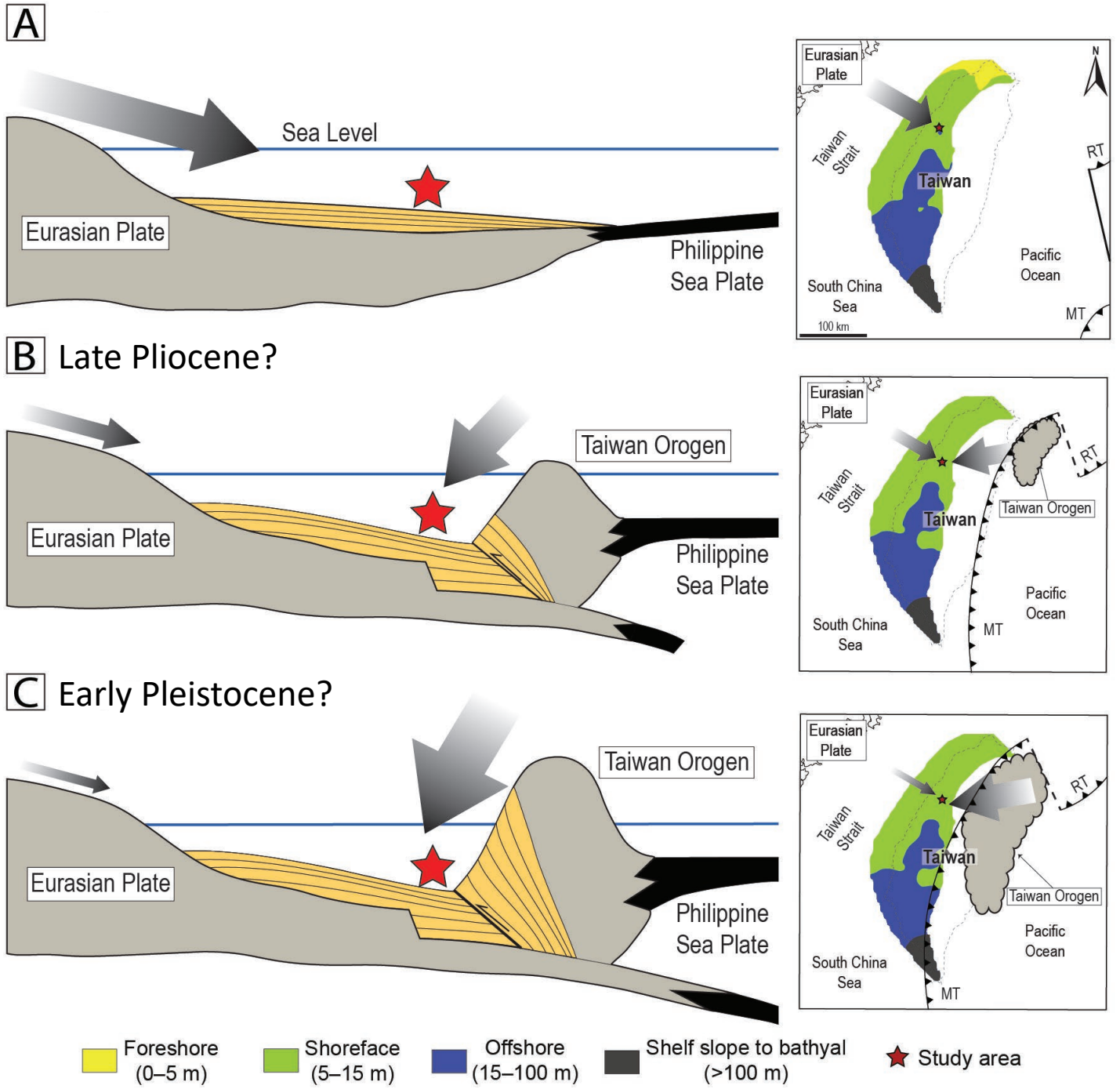
(Hsieh et al., in prep, after Dashtgard et al., 2020)



Objective

To determine the denudation of Taiwan using the sedimentary record

- Clay mineralogy
- C & N geochemistry
- Rock magnetic susceptibility

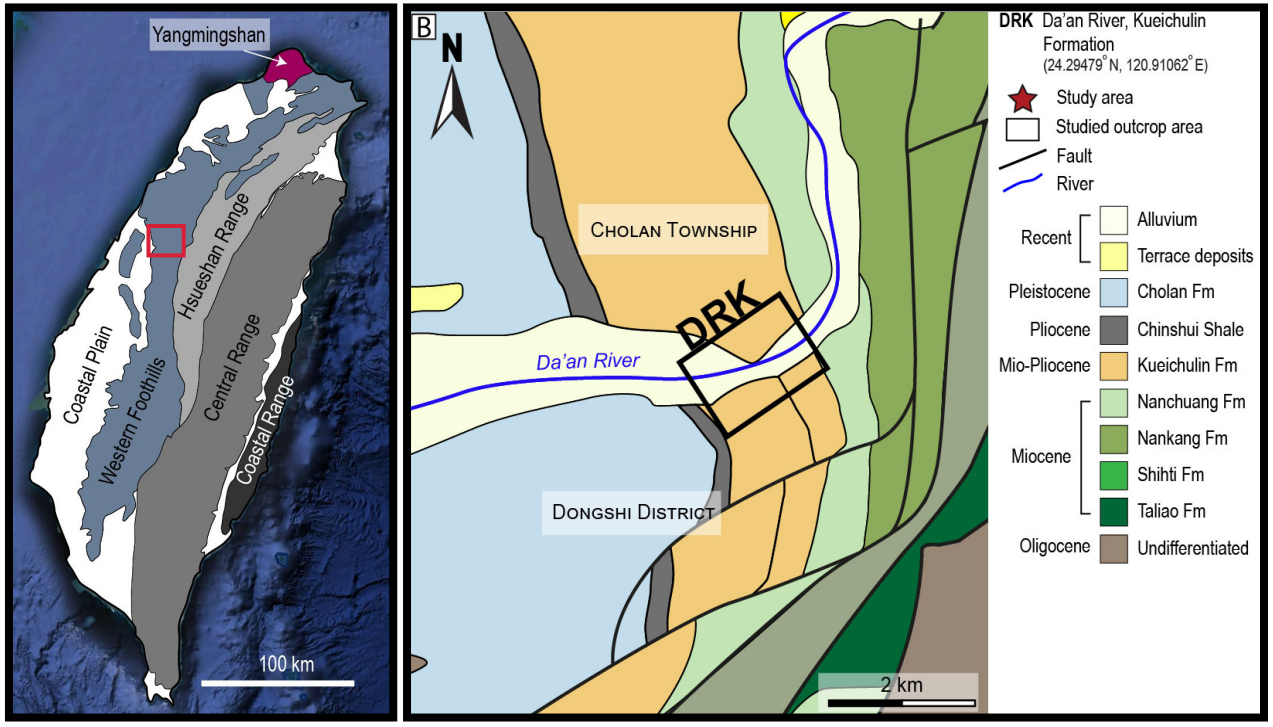


(Hsieh et al., in prep, after Dashtgard et al., 2020)

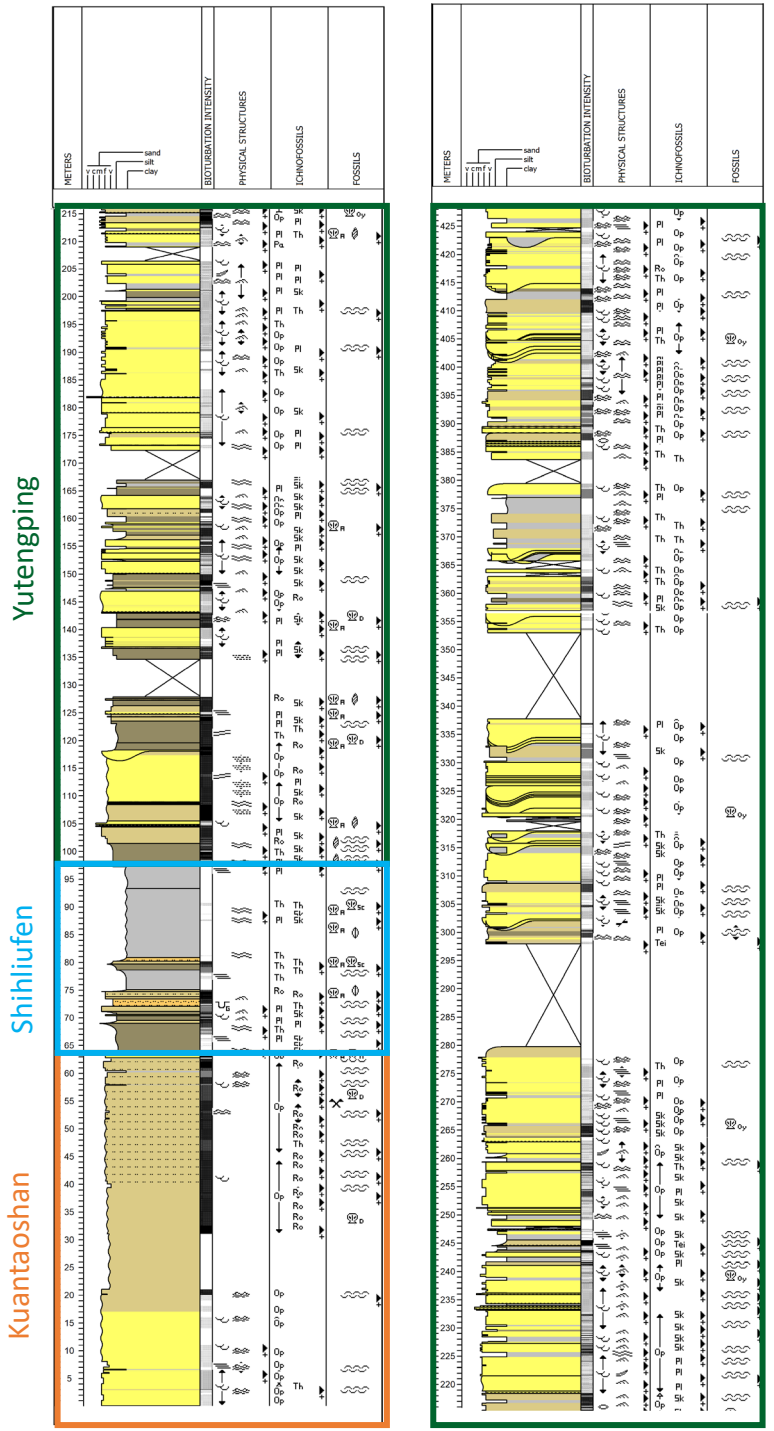
Sediment Sources

Log outcrops of the Kueichulin Formation at Da'an River

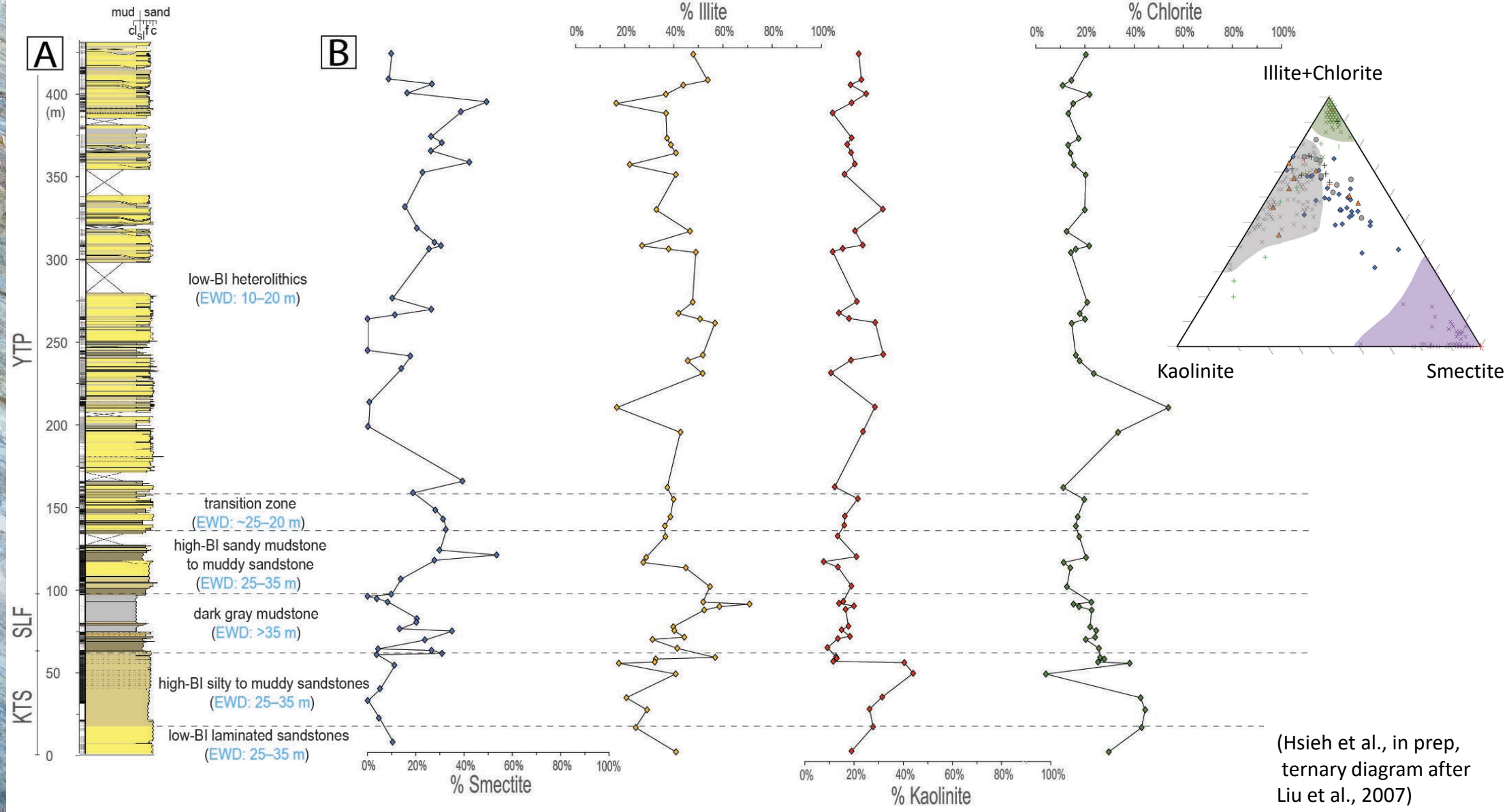
- 430-m section
- Clay mineralogy: 52 samples
- $\delta^{13}C_{org}$ and C/N: 272 samples
- Rock magnetic susceptibility: 66 samples



(Hsieh et al., in prep, after Dashtgard et al., 2020, 2021)



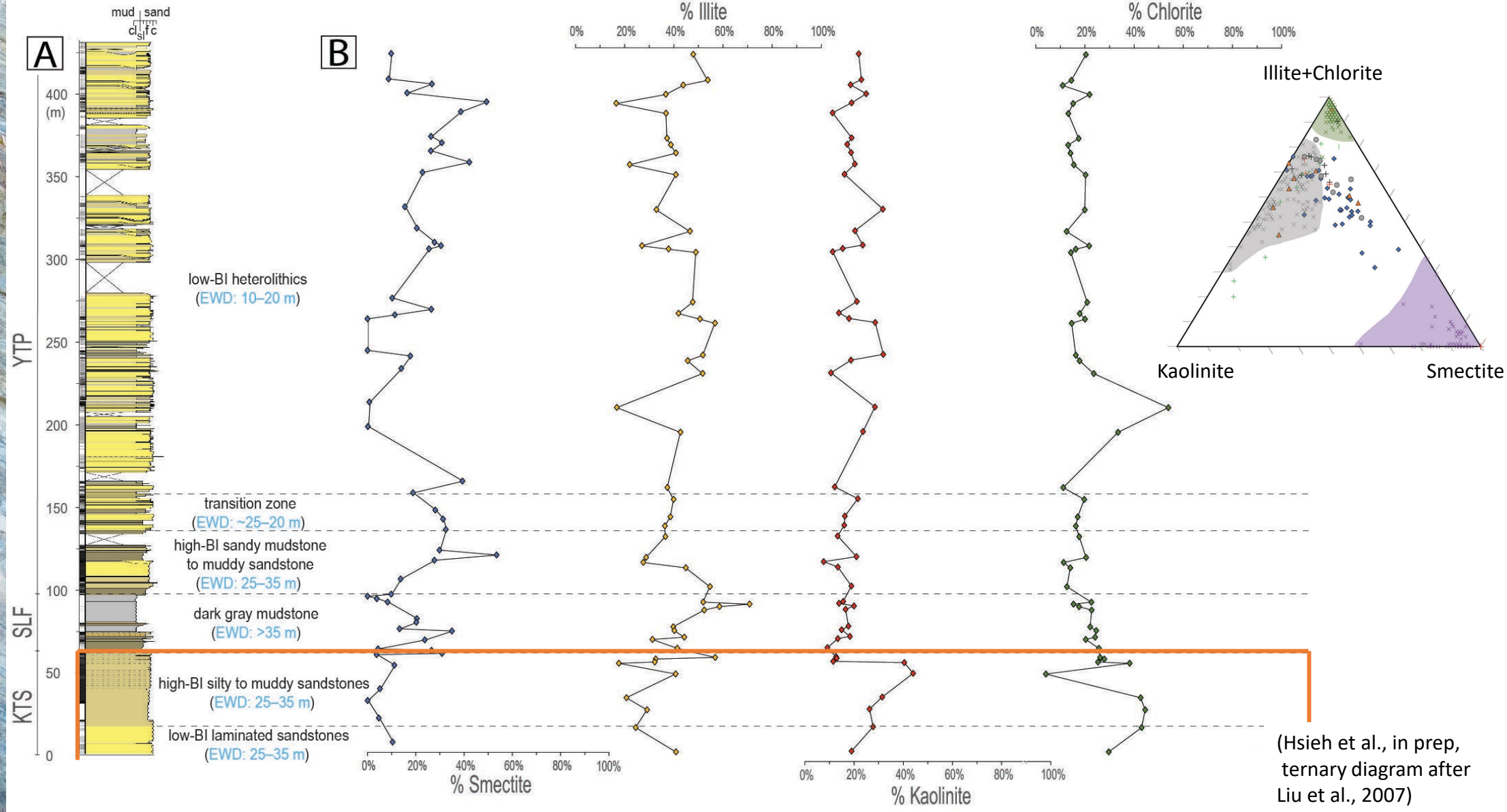
Results



(Hsieh et al., in prep, ternary diagram after Liu et al., 2007)

Results

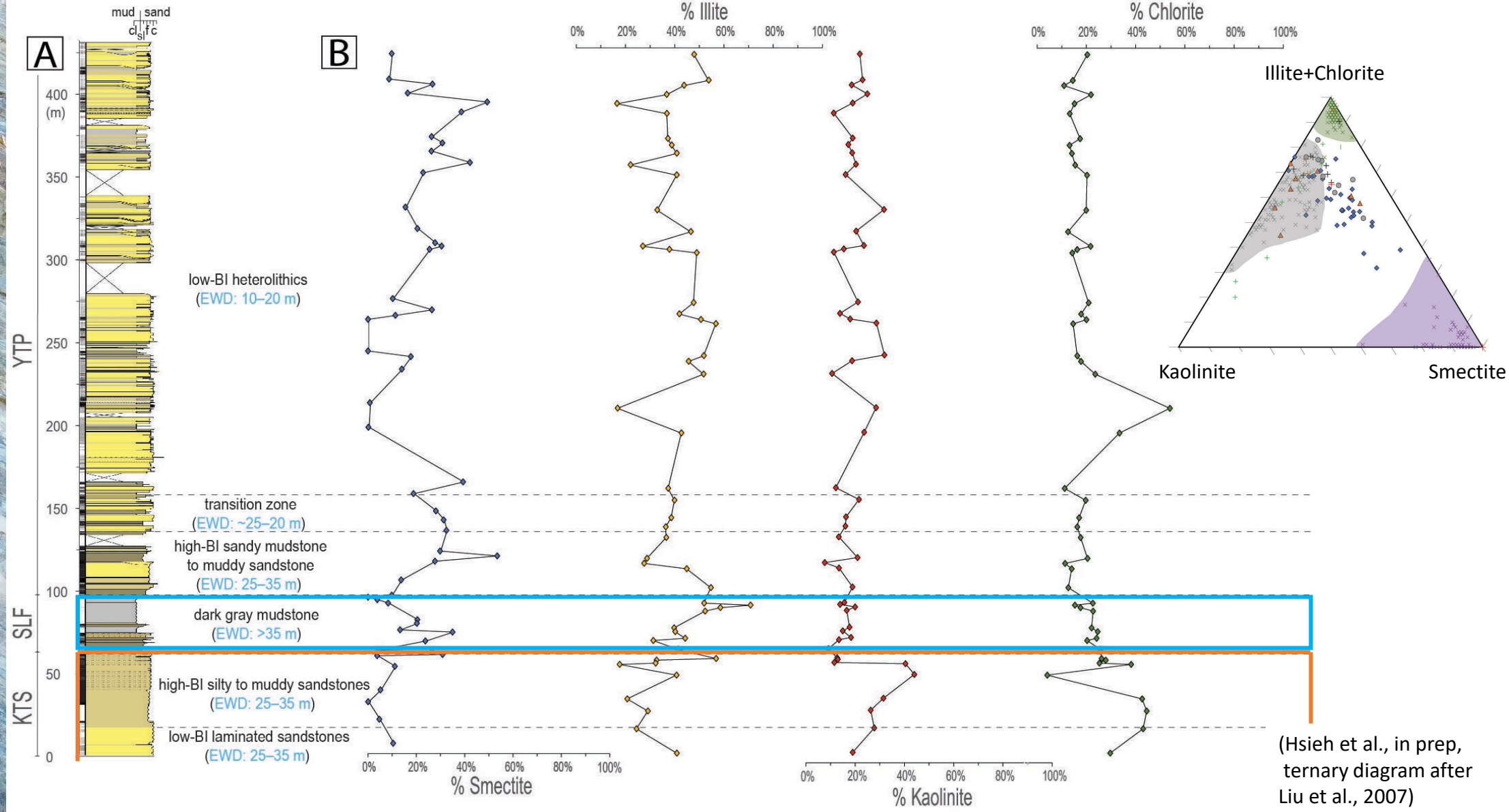
Smectite (%)	Illite (%)	Kaolinite (%)	Chlorite (%)
11.6 ± 11.2 (8)	29.8 ± 8.6 (8)	26.7 ± 11.9 (8)	31.9 ± 13.5 (8)



(Hsieh et al., in prep, ternary diagram after Liu et al., 2007)

Results

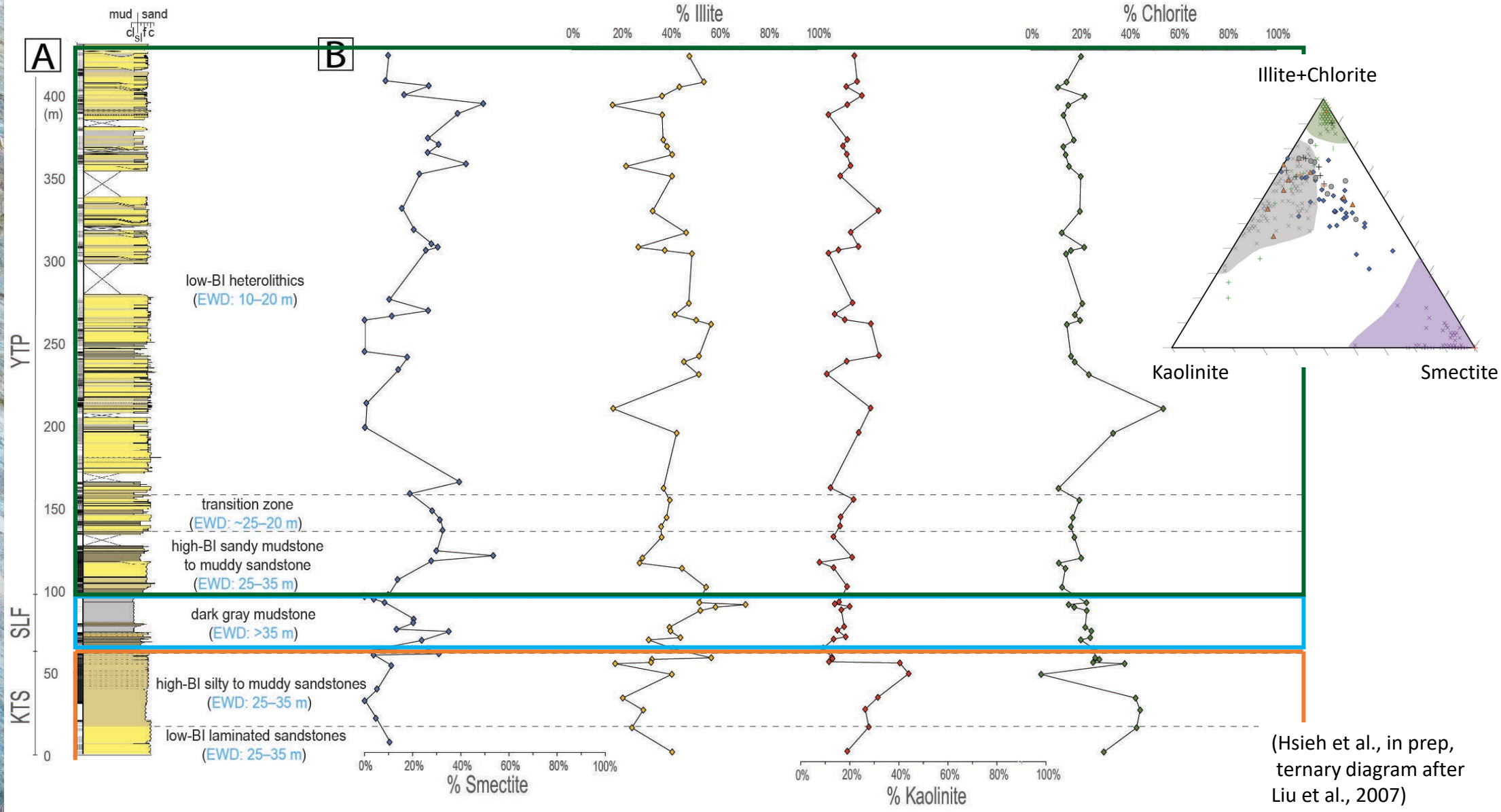
Smectite (%)	Illite (%)	Kaolinite (%)	Chlorite (%)
13.9 ± 10.8 (10)	48.7 ± 11.6 (10)	15.2 ± 3.1 (10)	22.1 ± 3.5 (10)
11.6 ± 11.2 (8)	29.8 ± 8.6 (8)	26.7 ± 11.9 (8)	31.9 ± 13.5 (8)



(Hsieh et al., in prep, ternary diagram after Liu et al., 2007)

Results

Smectite (%)	Illite (%)	Kaolinite (%)	Chlorite (%)
22.7 ± 13.5 (34)	40 ± 10.1 (34)	19.4 ± 5.8 (34)	18.2 ± 7.7 (34)
13.9 ± 10.8 (10)	48.7 ± 11.6 (10)	15.2 ± 3.1 (10)	22.1 ± 3.5 (10)
11.6 ± 11.2 (8)	29.8 ± 8.6 (8)	26.7 ± 11.9 (8)	31.9 ± 13.5 (8)



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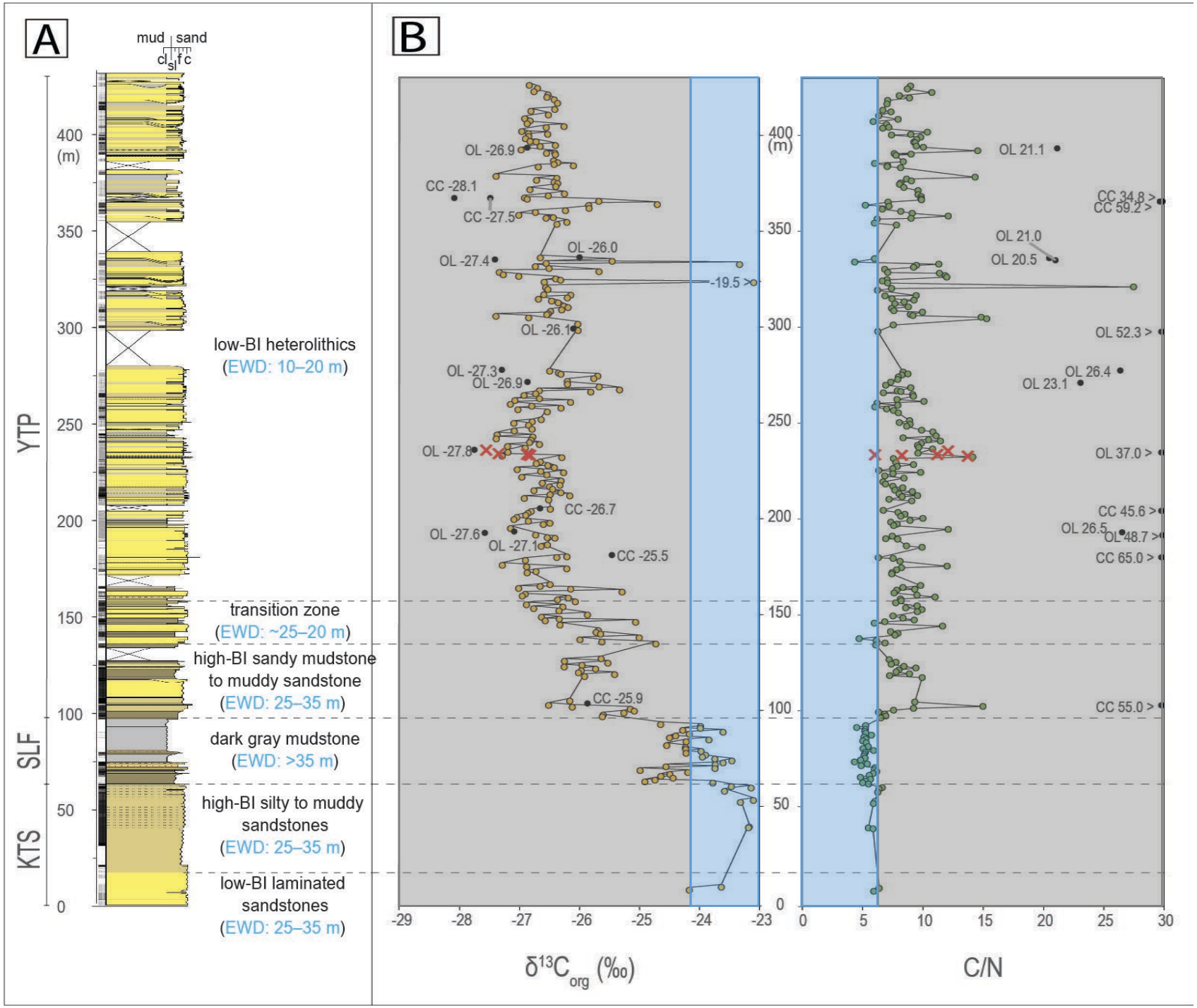

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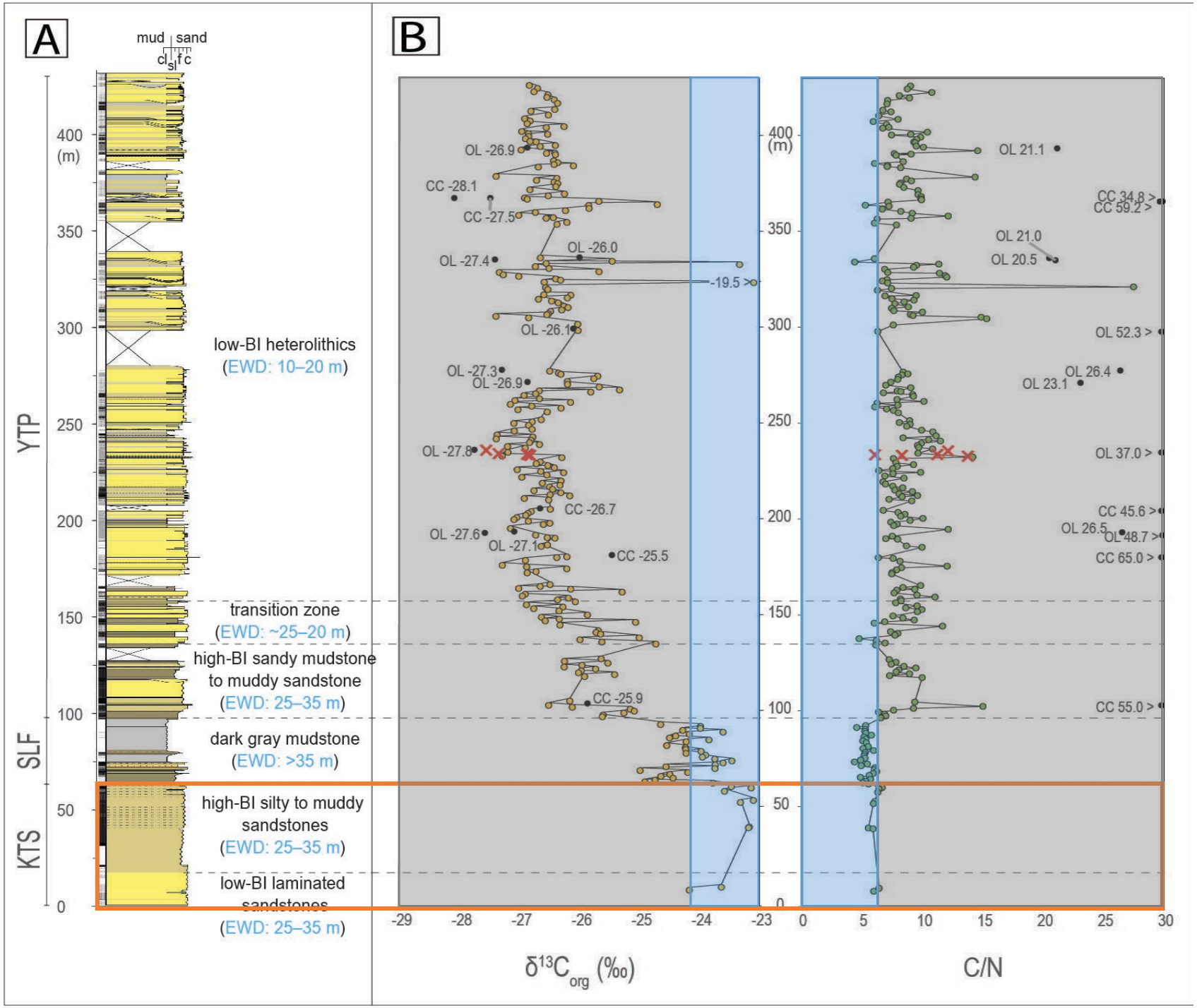

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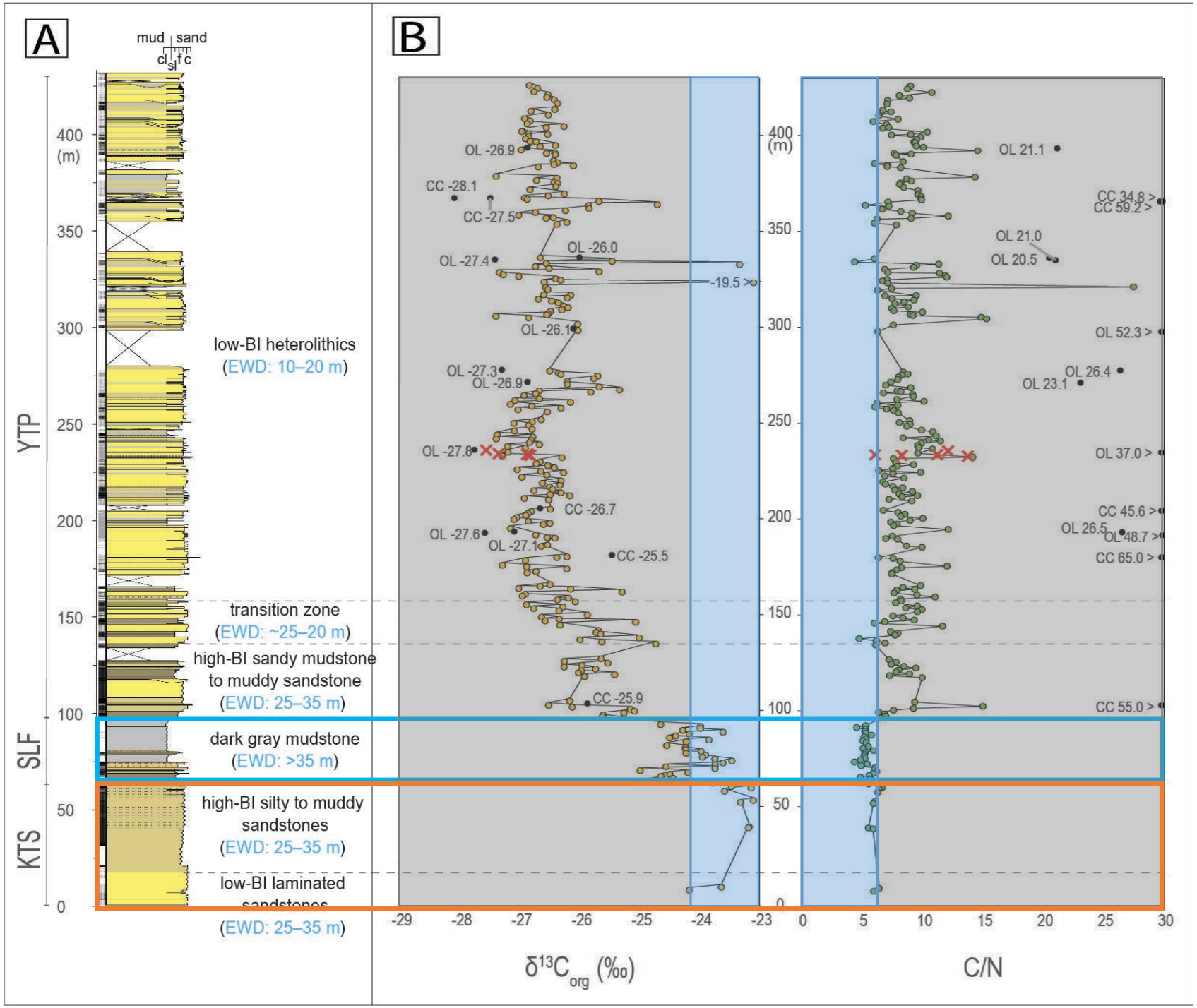

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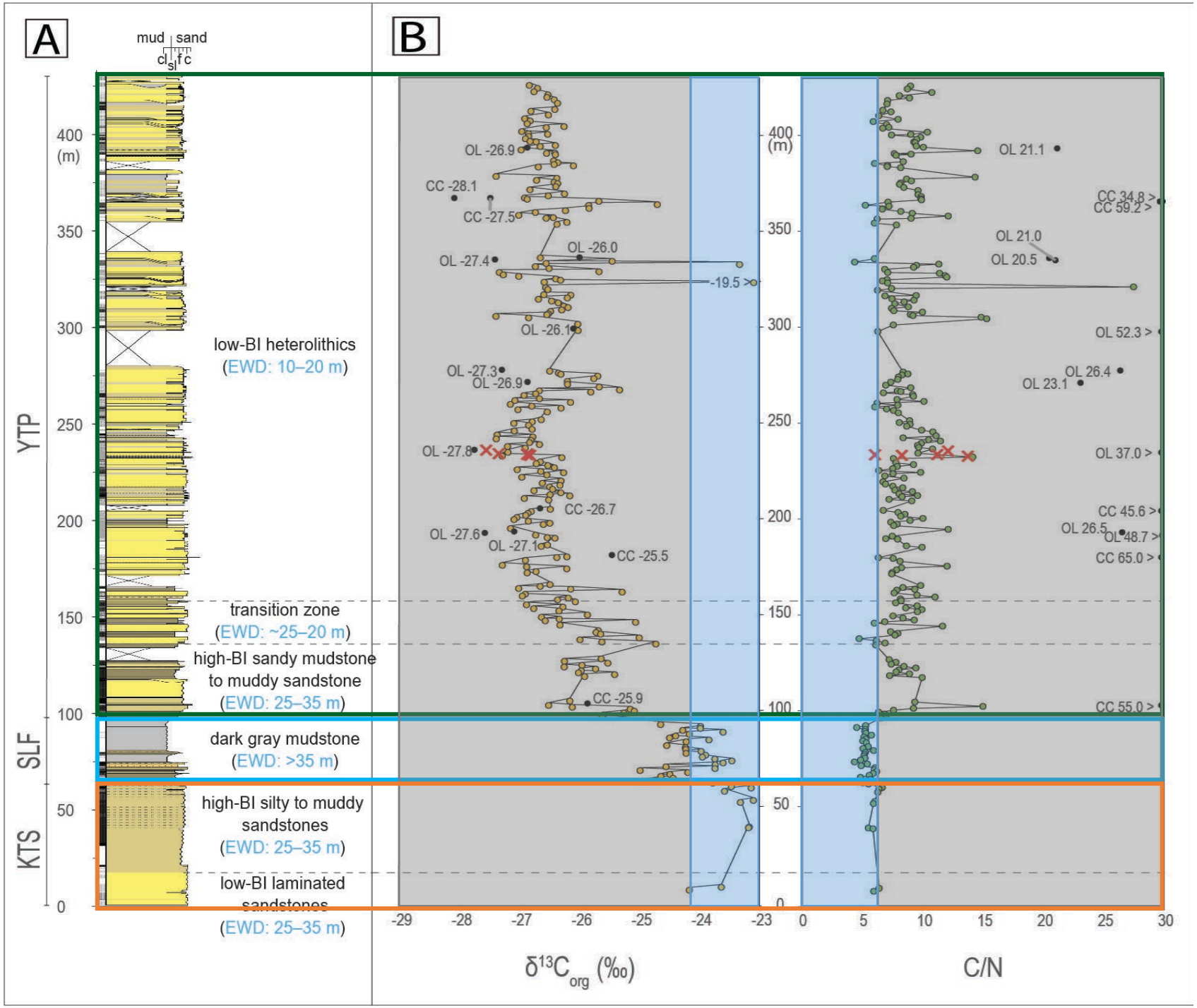

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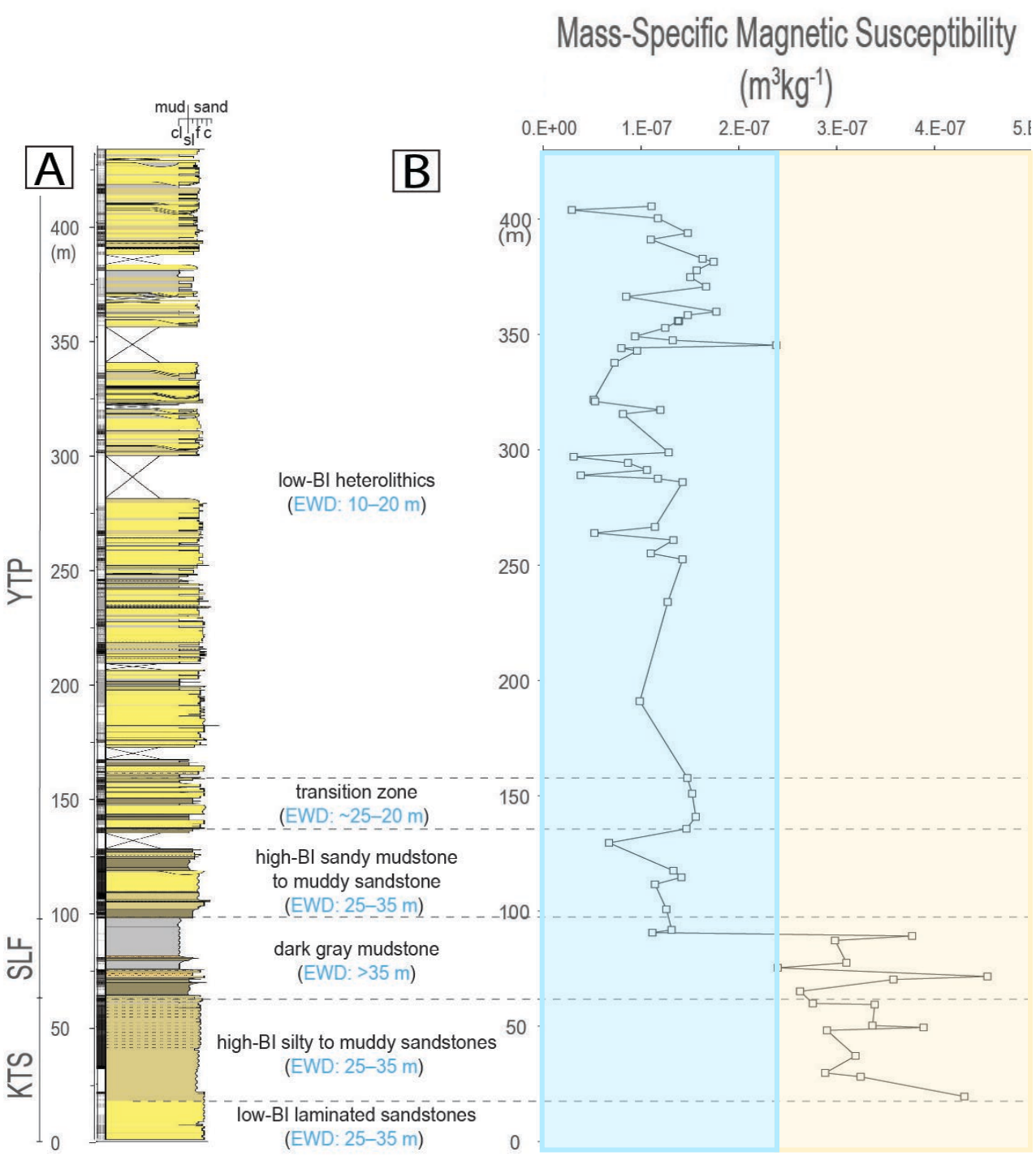
Results



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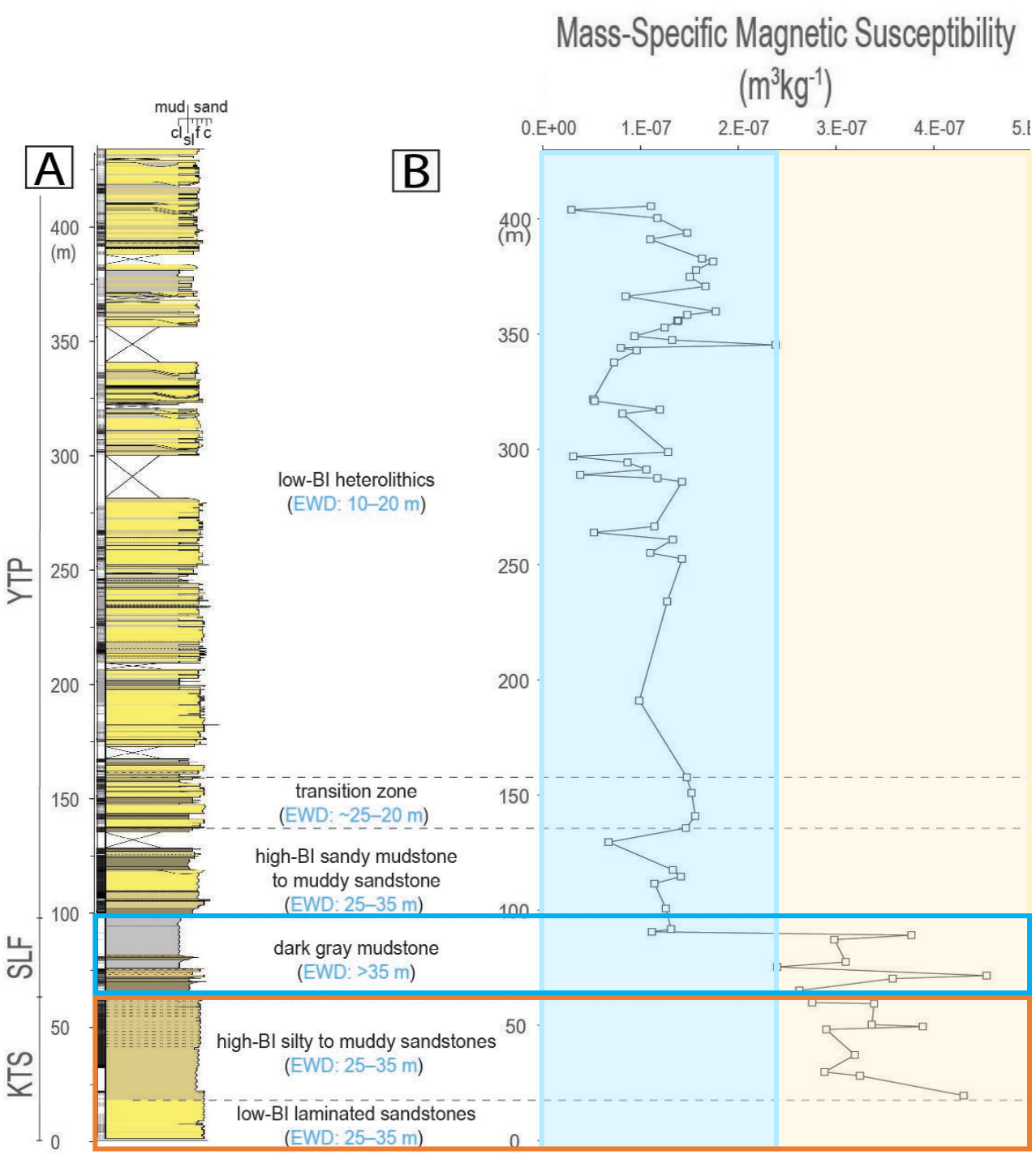

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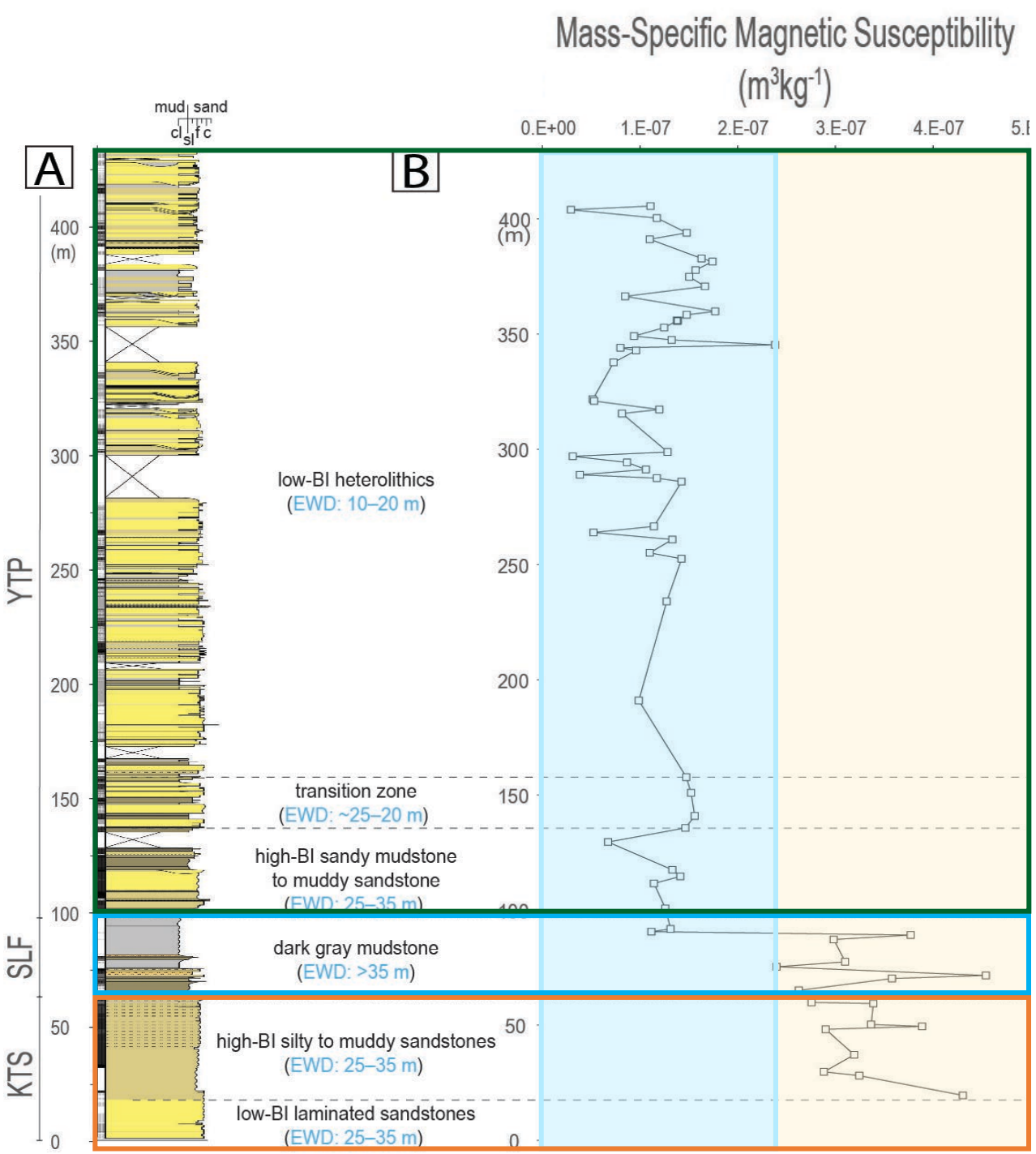
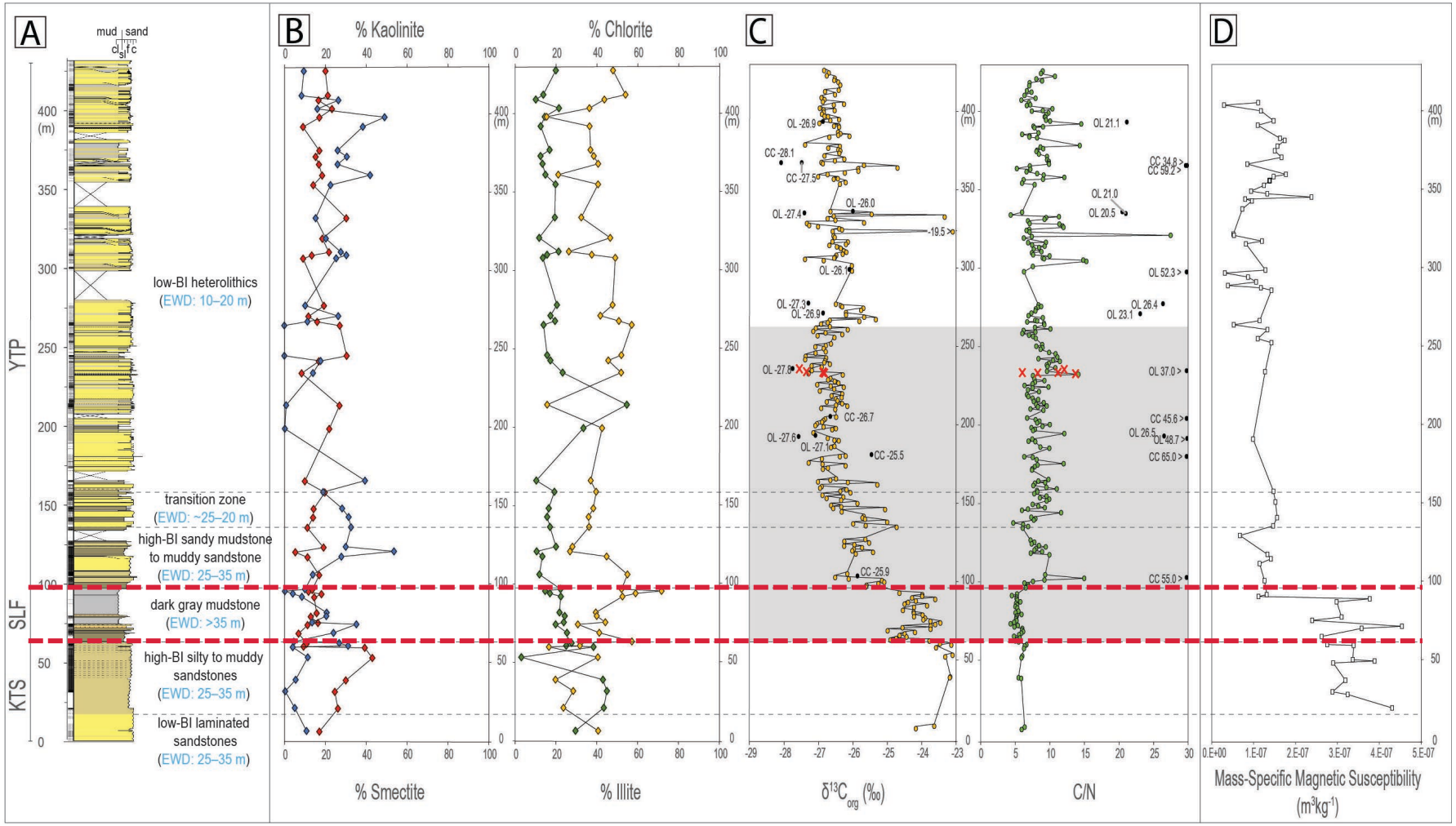


(Hsieh et al., in prep)

Results Summary



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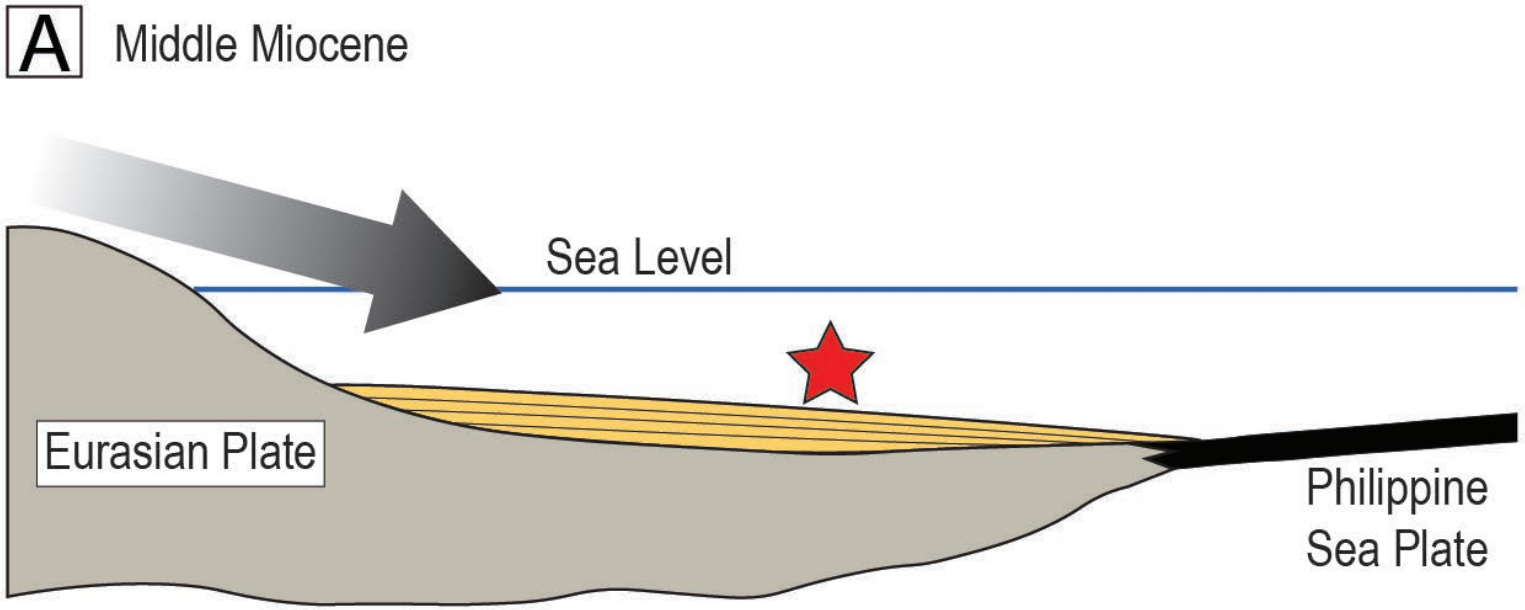
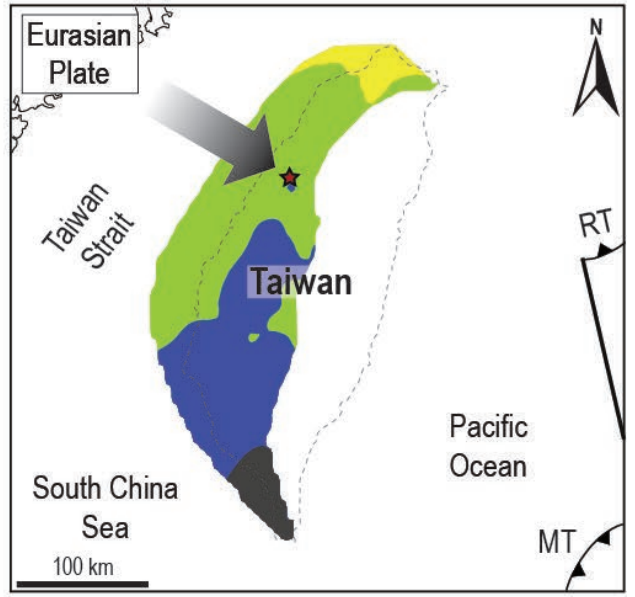
Discussion





(Hsieh et al., in prep, after Nagel et al., 2013)

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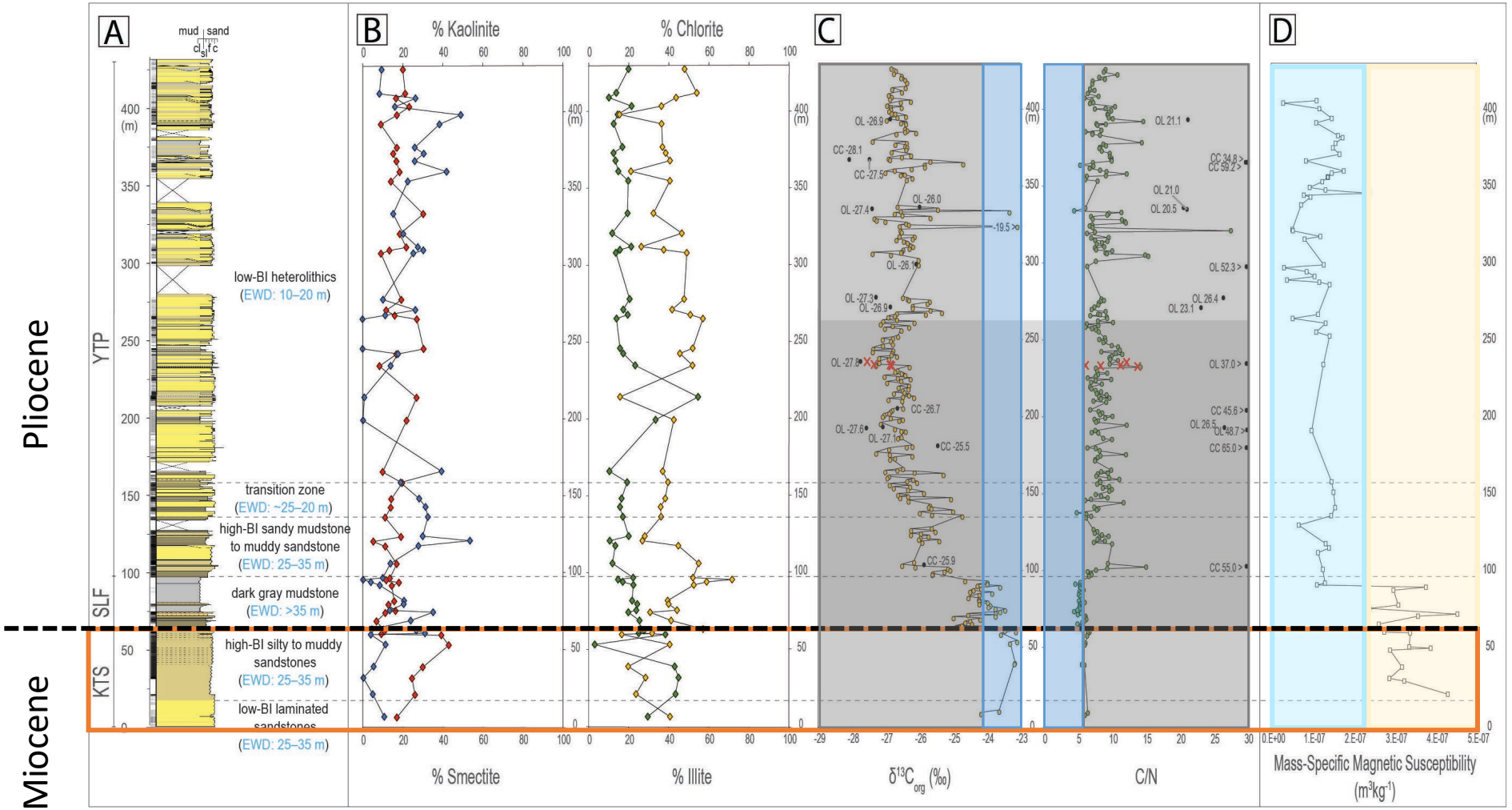

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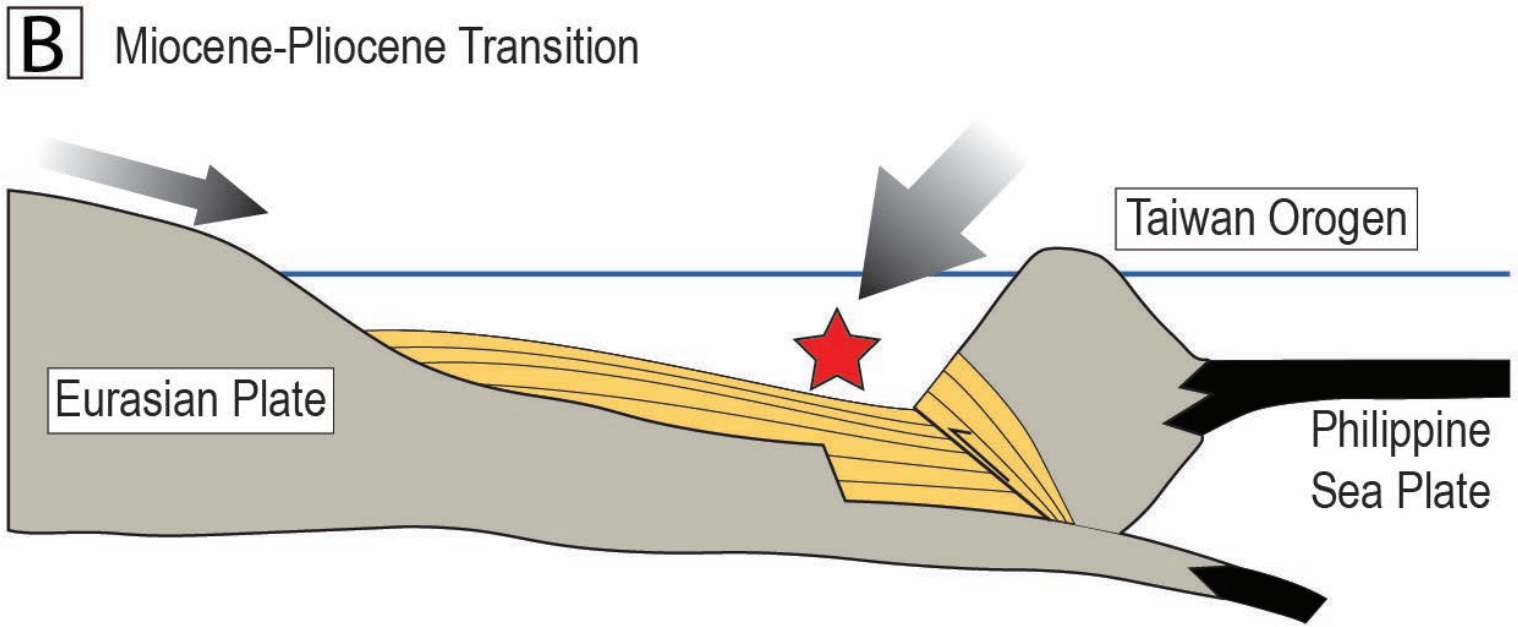
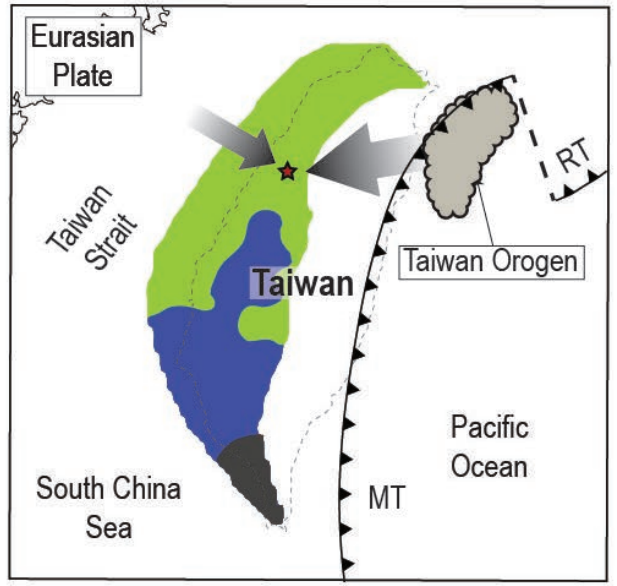
Discussion





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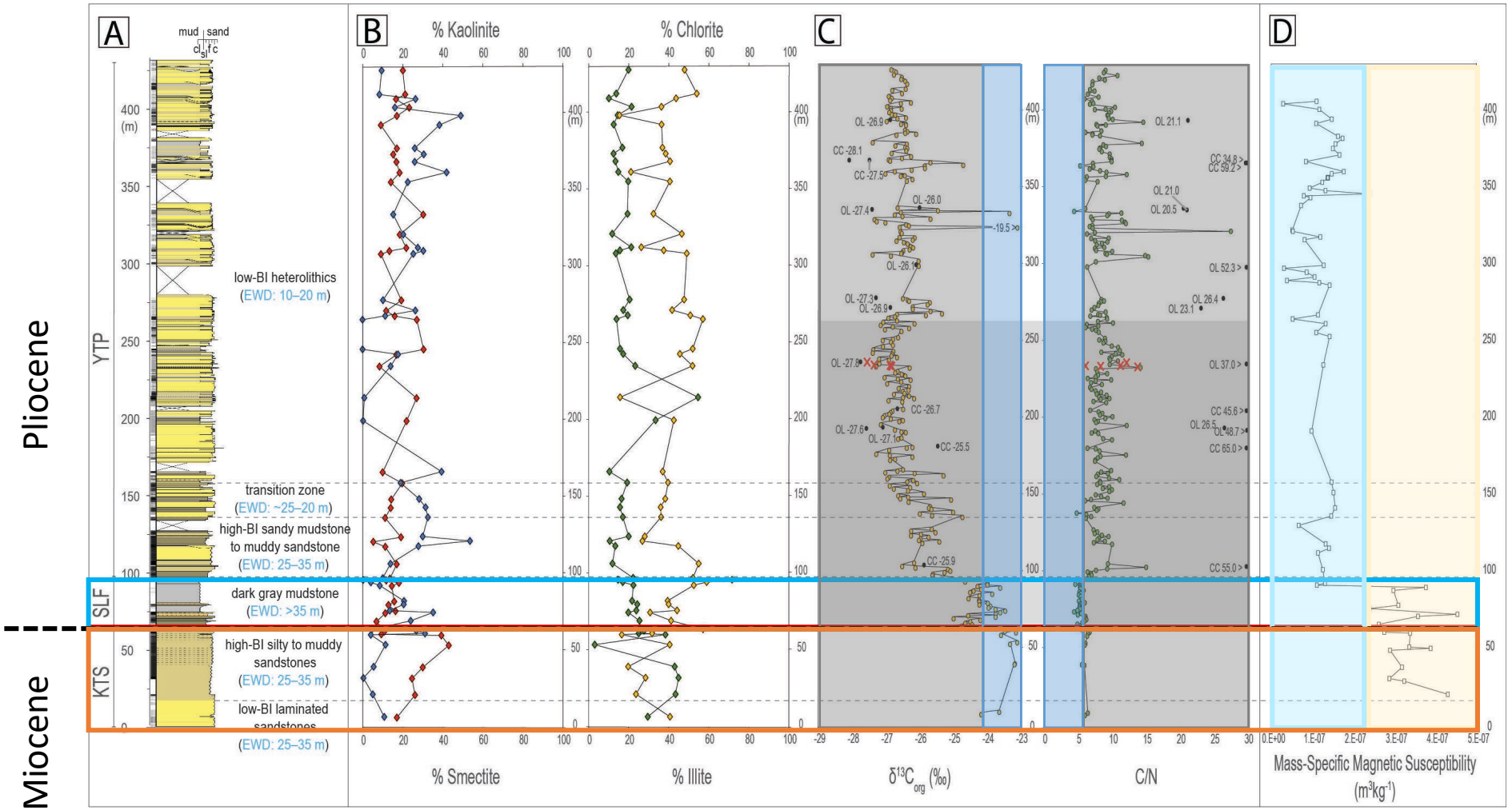
Discussion



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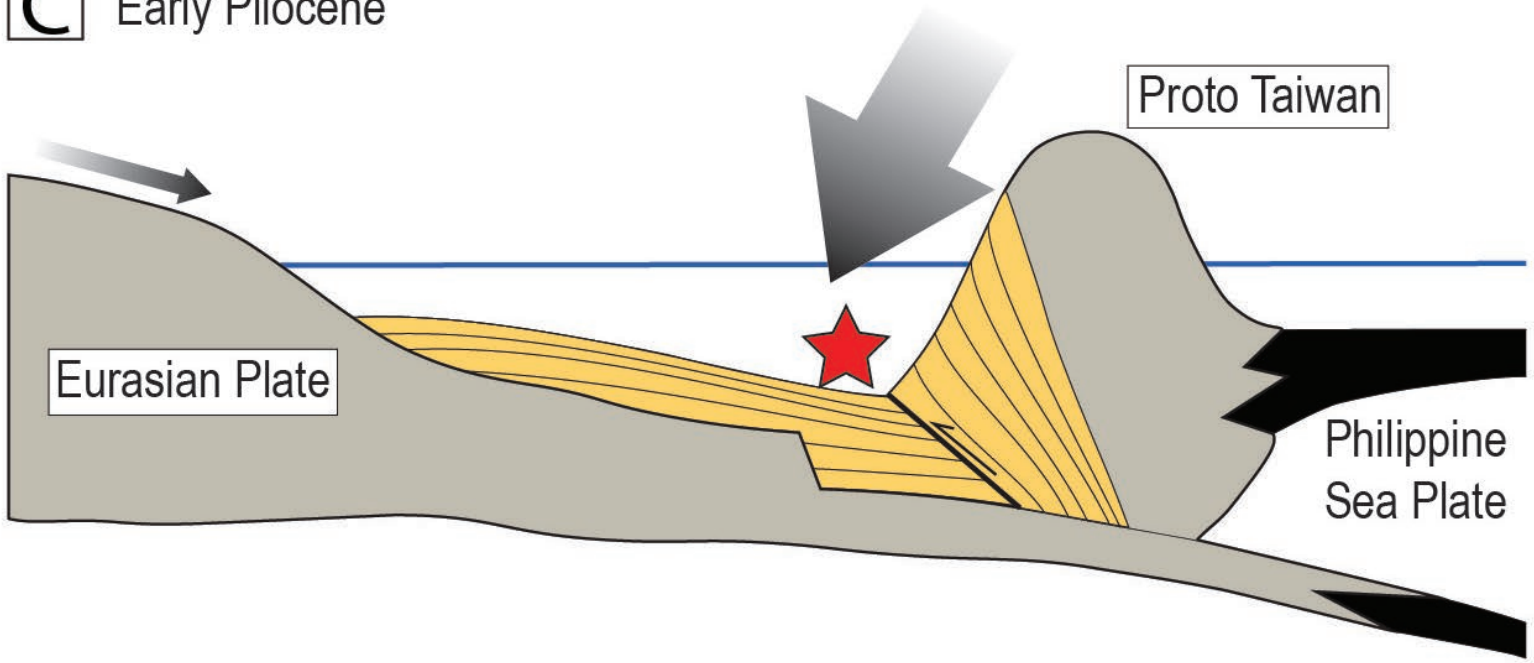
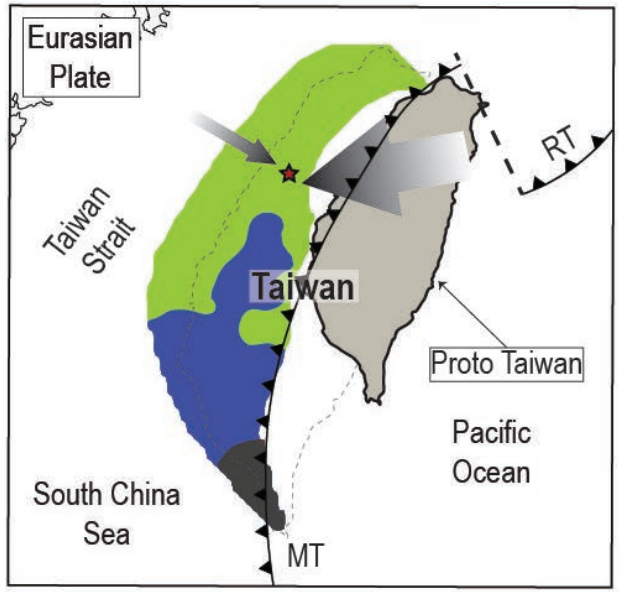
Discussion

C Early Pliocene





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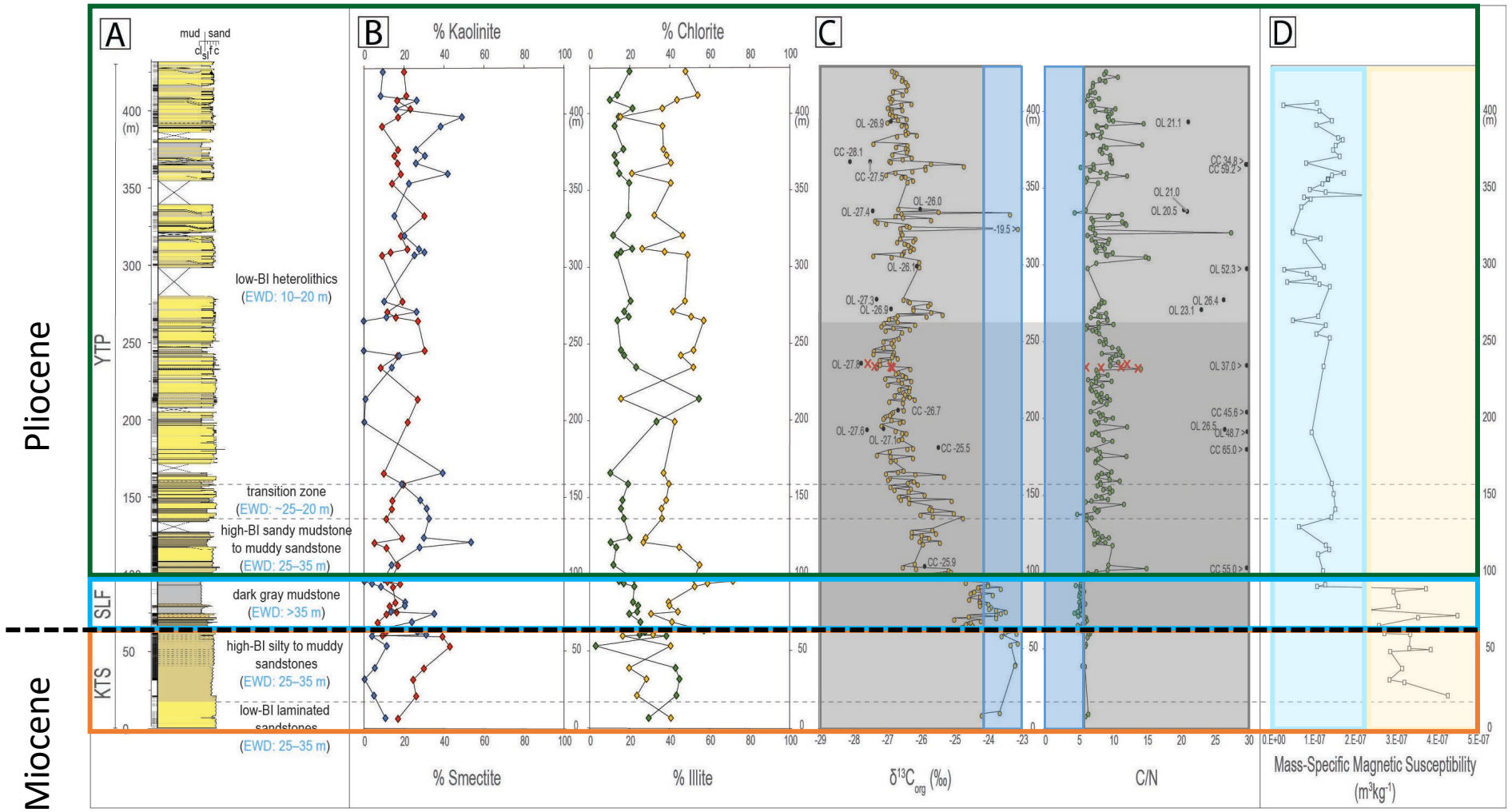
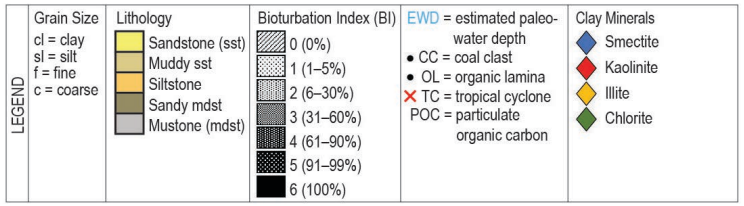
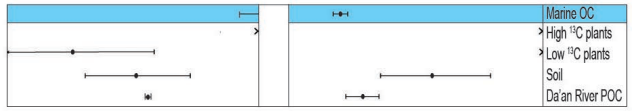




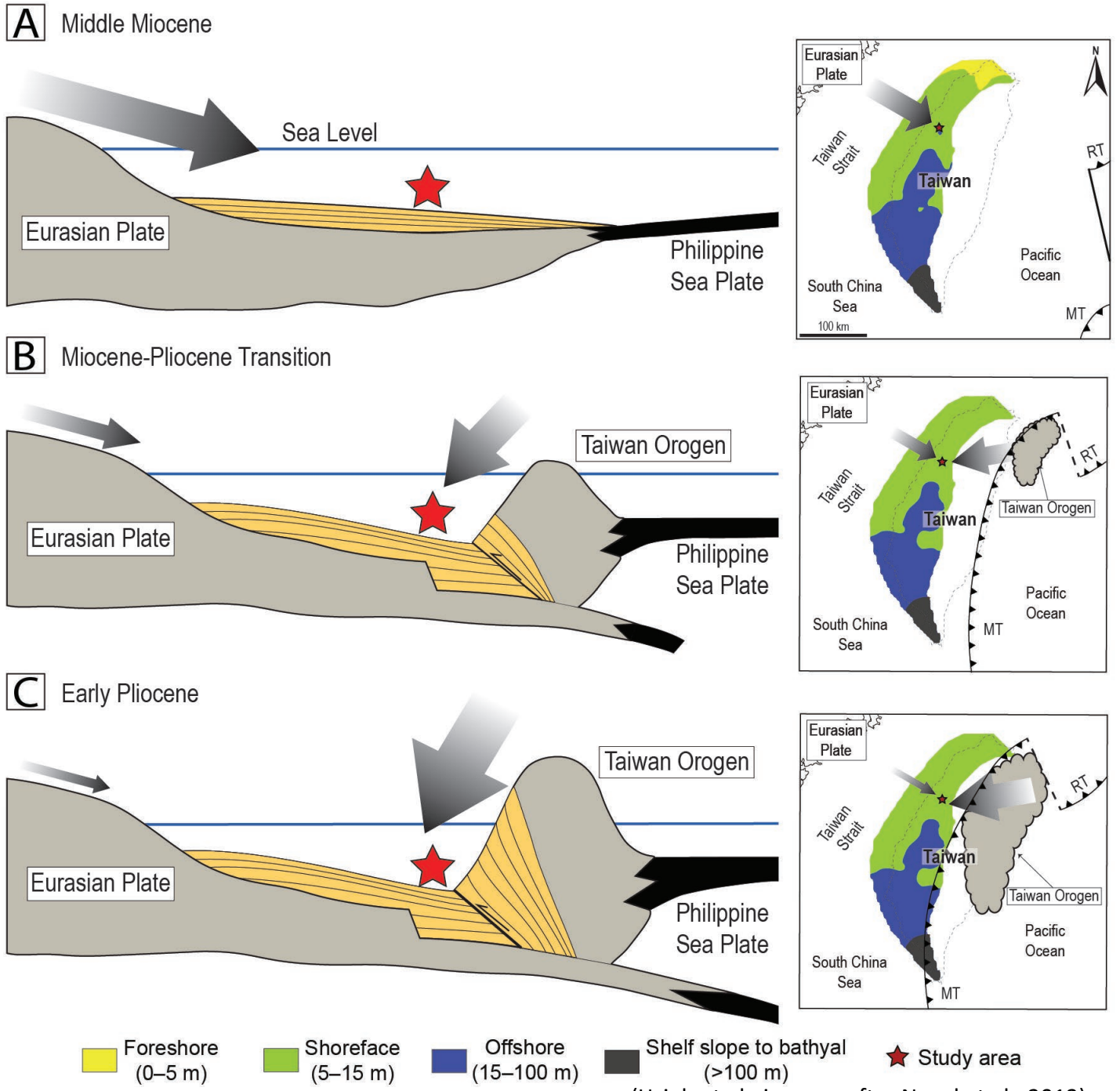


(Hsieh et al., in prep)

Conclusion

Onset of sedimentation from Taiwan in the late Miocene → ~2 Myr earlier than previously thought!

Taiwan became the dominant sediment source in the early Pliocene → Transition of sources happened in < 1 Myr!



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Conclusion

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Taiwan became the dominant sediment source in the early Pliocene → Transition of sources happened in < 1 Myr!

Thank You!

科技部 Ministry of Science and Technology
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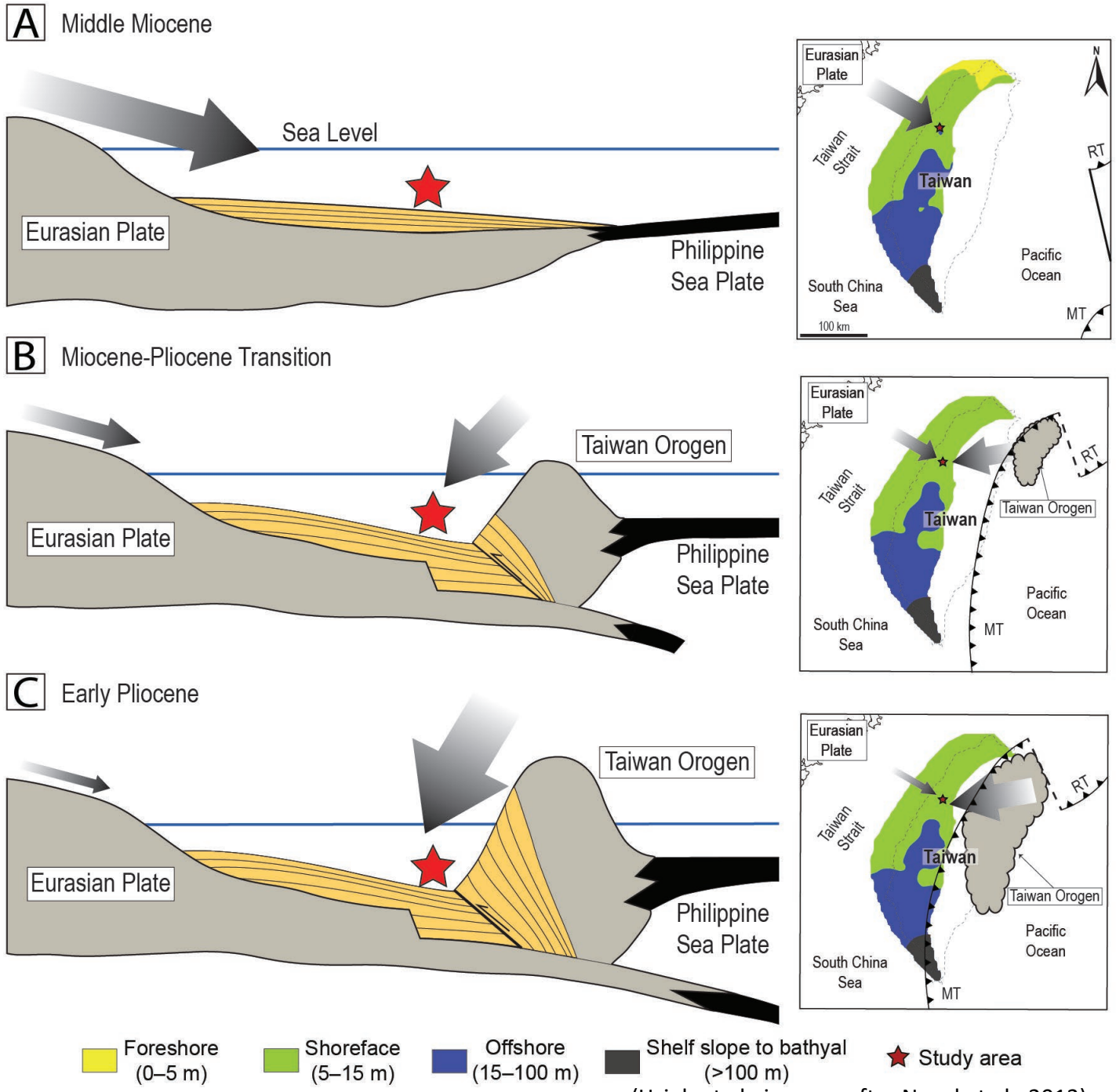

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