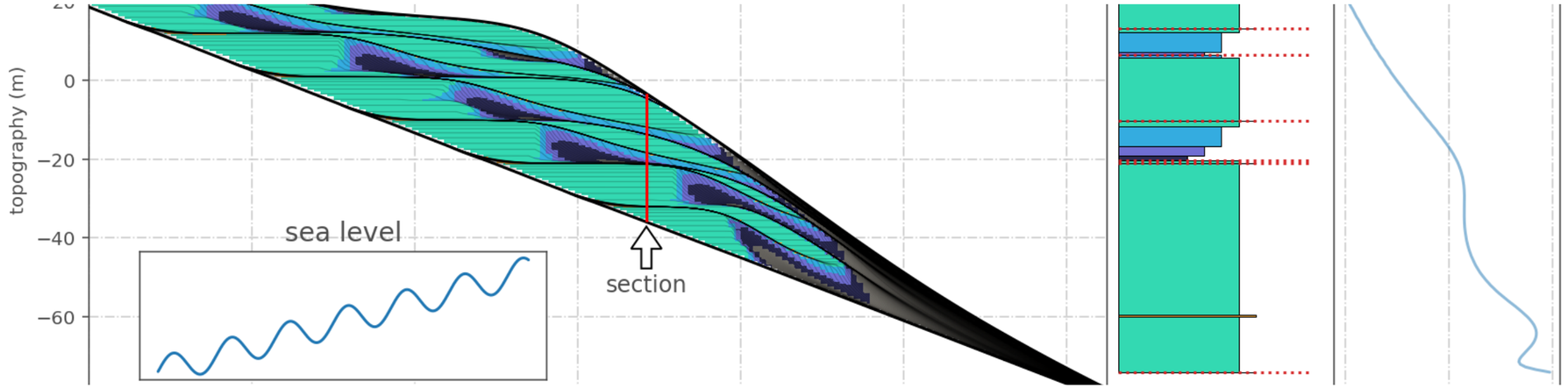
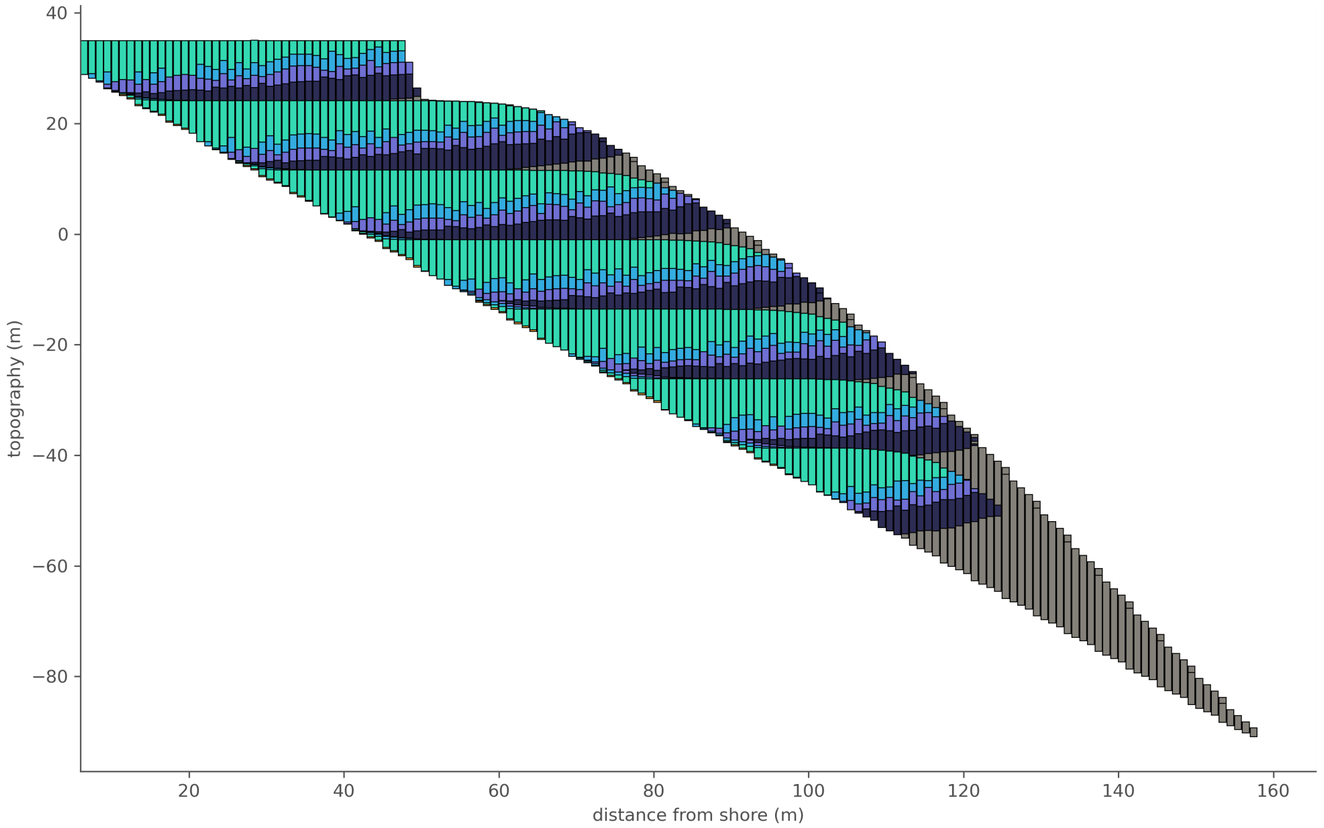


Lecture 9: Stratigraphic time part II

1. Correlative surfaces
    A. Chronostratigraphy (Wheeler diagrams)
2. Time in the rock record
    A. Sadler effect
3. Cyclostratigraphy

We acknowledge and respect the lək^{w}əŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

On/Off sediment supply with constant subsidence: time vs topography



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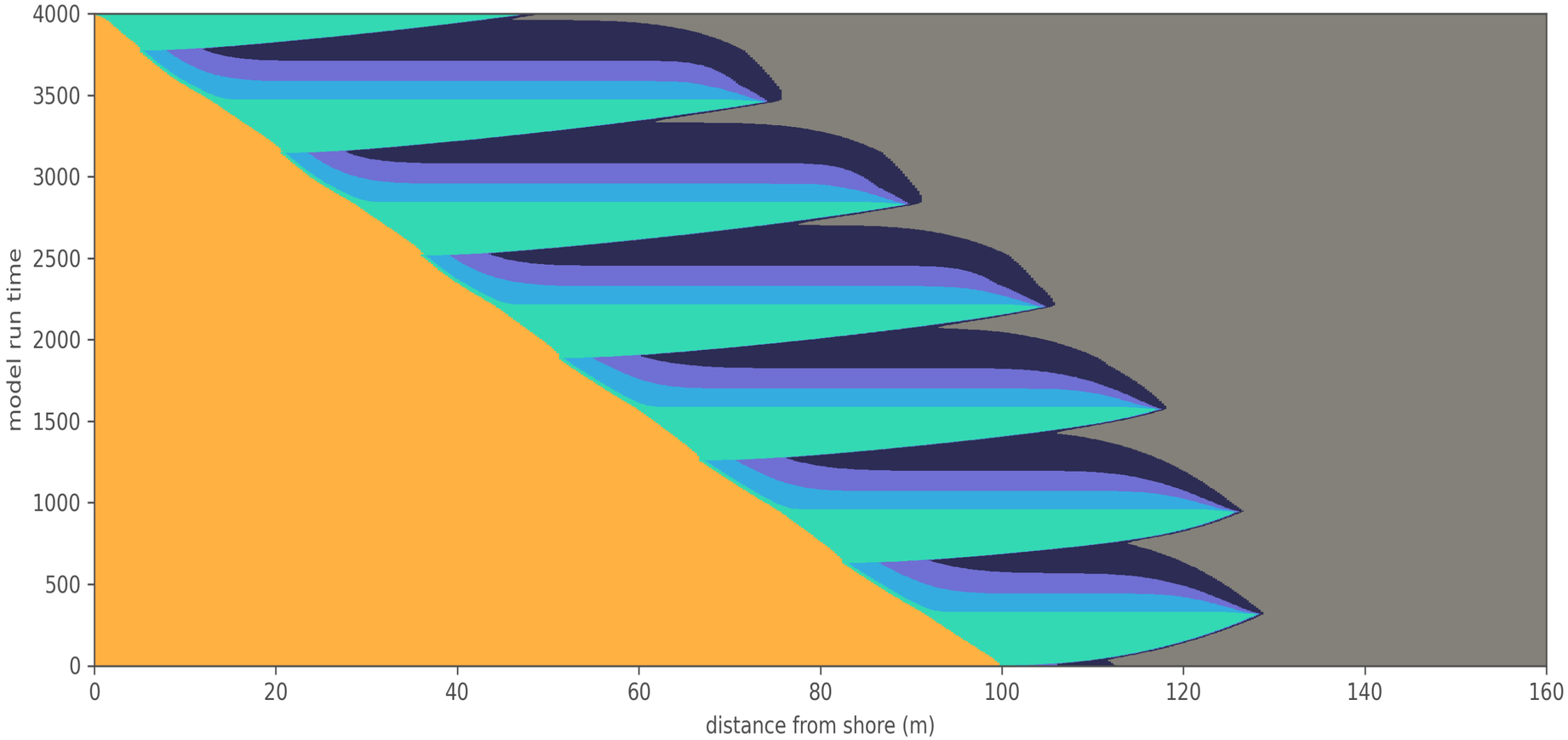
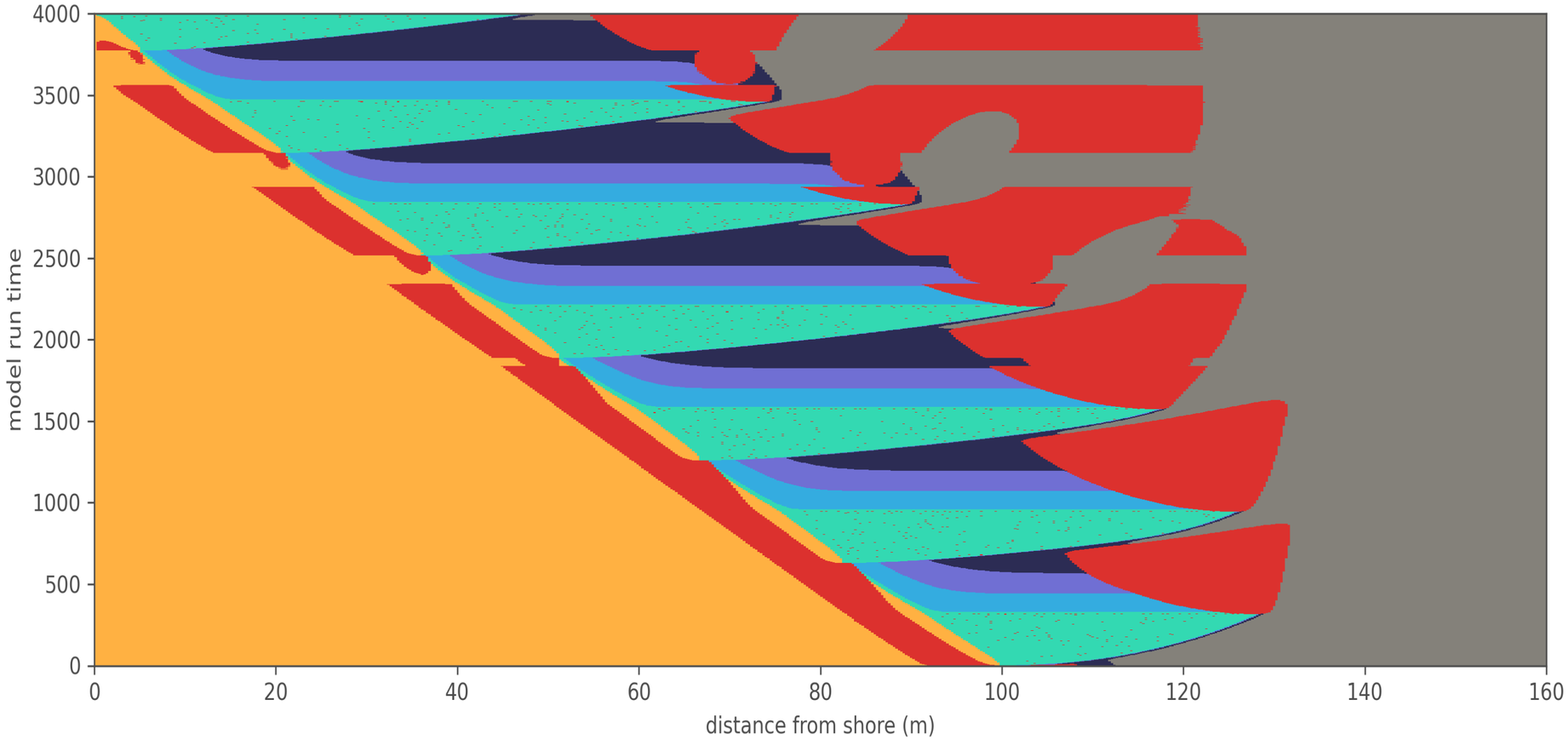
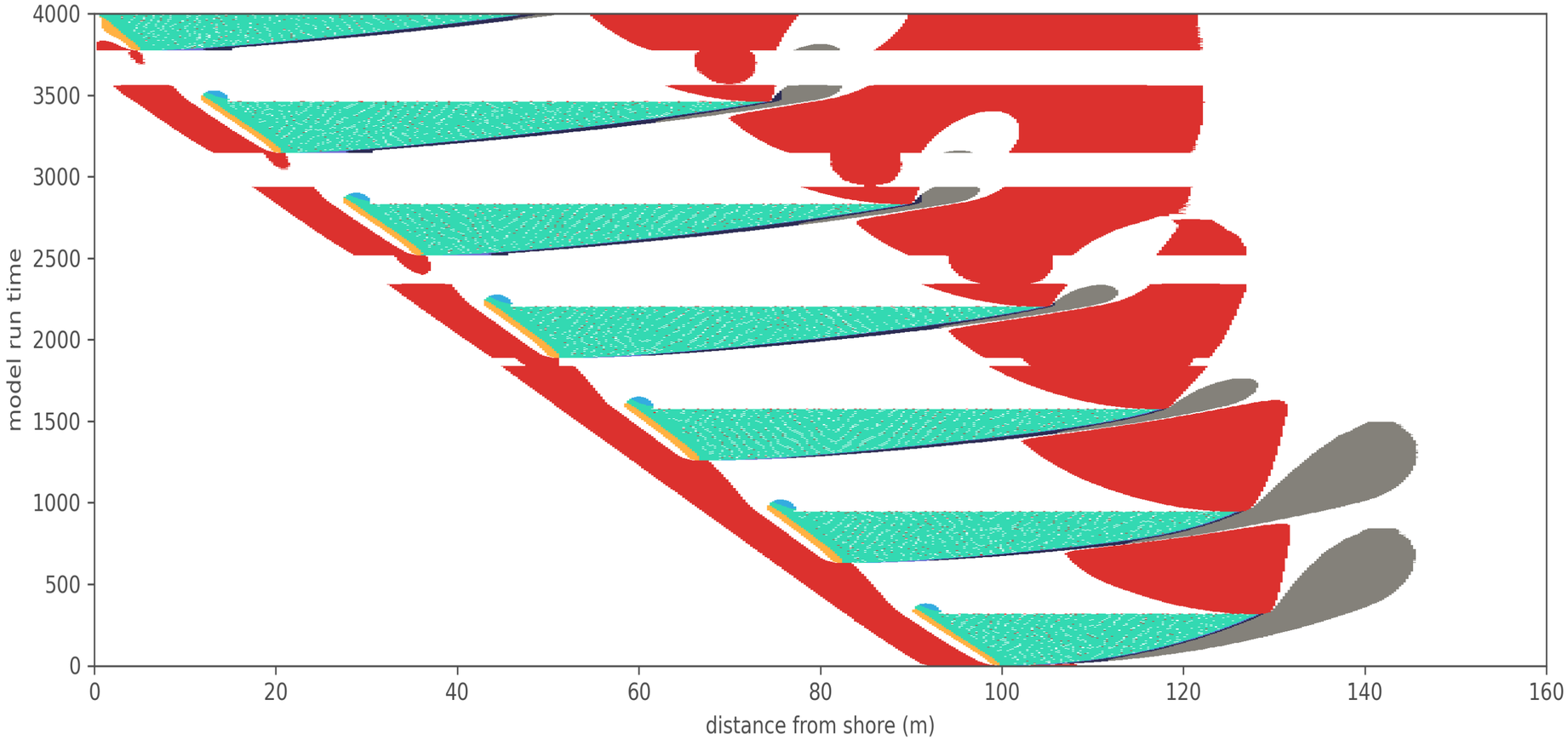


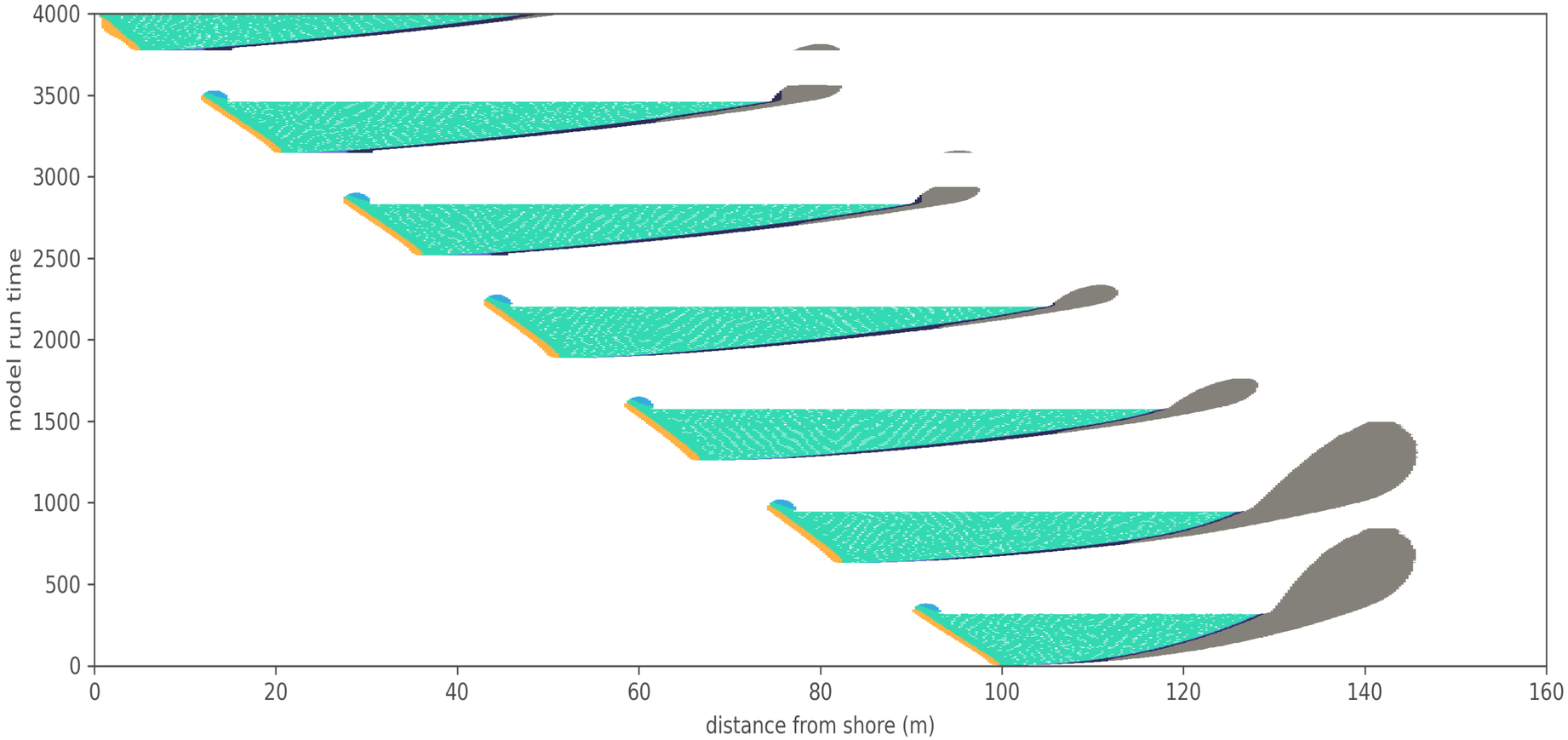
On/Off sediment supply with constant subsidence: time vs topography (erosion)



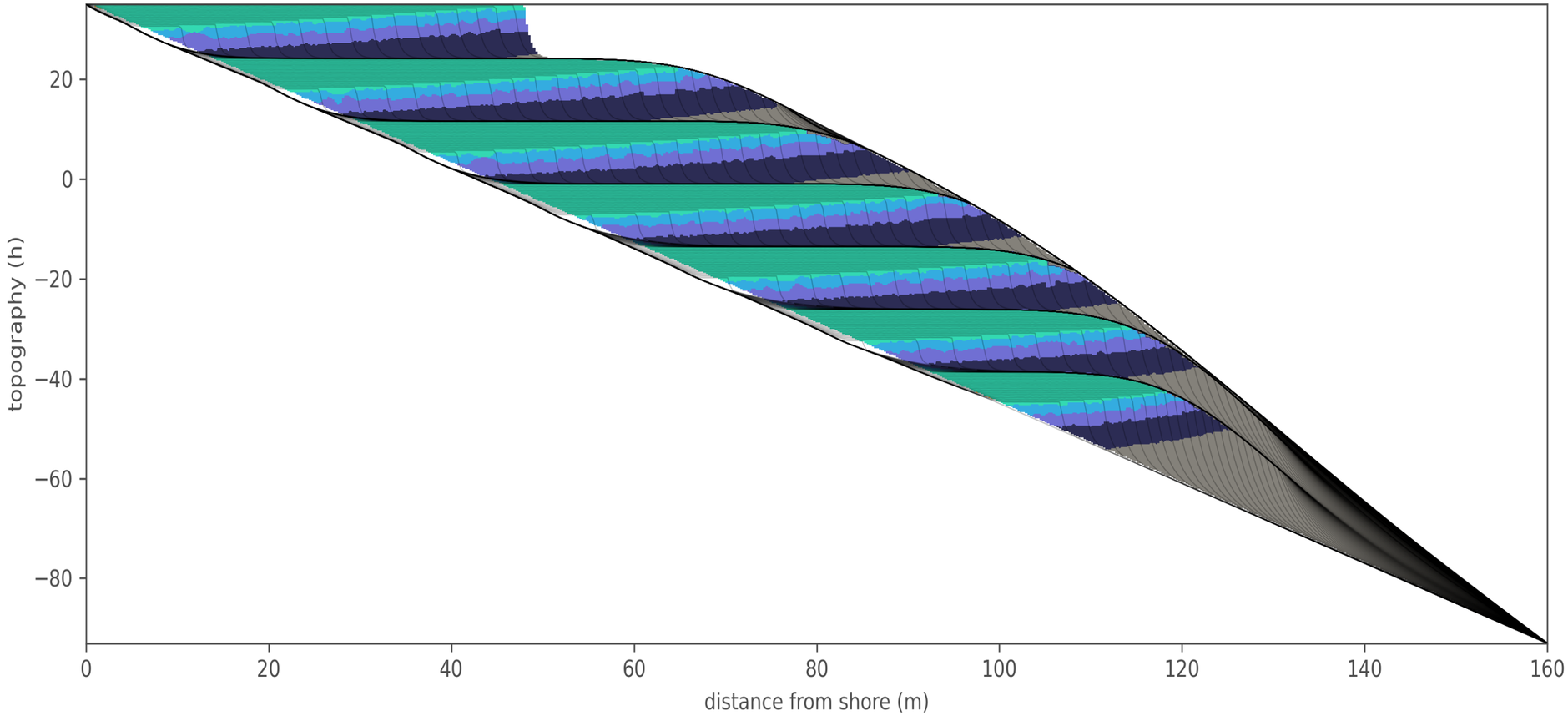
On/Off sediment supply with constant subsidence: time vs topography (erosion and hiatus)



On/Off sediment supply with constant subsidence: *Wheeler* diagram



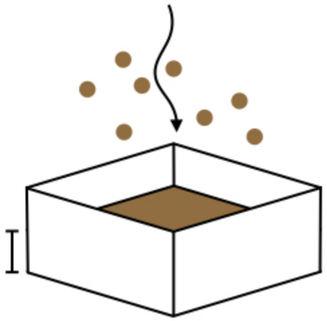
On/Off sediment supply with constant subsidence: stratigraphic profile



Time in the rock record

- ~100 m thick, inner shelf
- rates of sedimentation for inner shelf (measured from sediment traps) = 10 mm/yr
- Calculate duration of deposition = 100 m / (0.01 m per year) = 10,000 yrs.

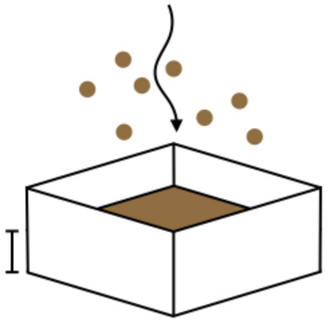
$$\frac{\Delta h}{\Delta t} = \text{sed. rate}$$



Time in the rock record

- ~100 m thick, inner shelf
- rates of sedimentation for inner shelf (measured from sediment traps) = 10 mm/yr
- Calculate duration of deposition = 100 m / (0.01 m per year) = 10,000 yrs.
- Actual duration, from radiometric dates = 10 Myr.

$$\frac{\Delta h}{\Delta t} = \text{sed. rate}$$



Time in the rock record

Sadler effect: measured sediment accumulation rate **decreases** as the duration of measurement **increases**

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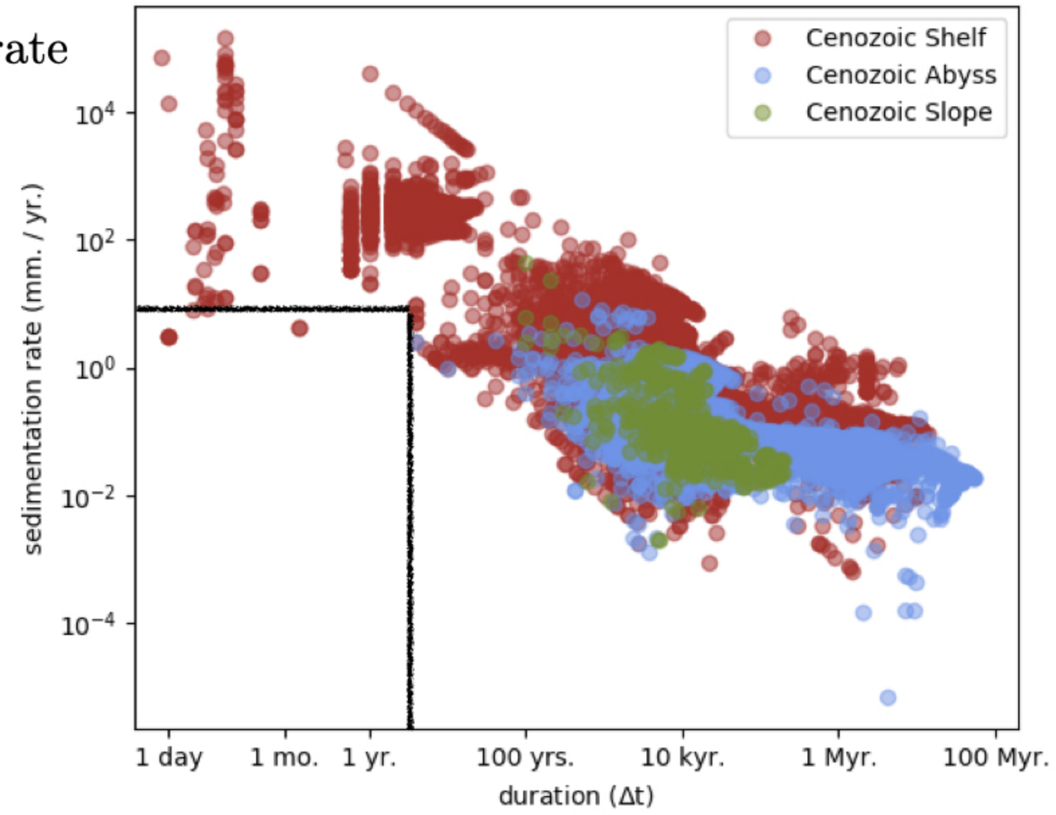

Partin and Sadler, 2016

Time in the rock record

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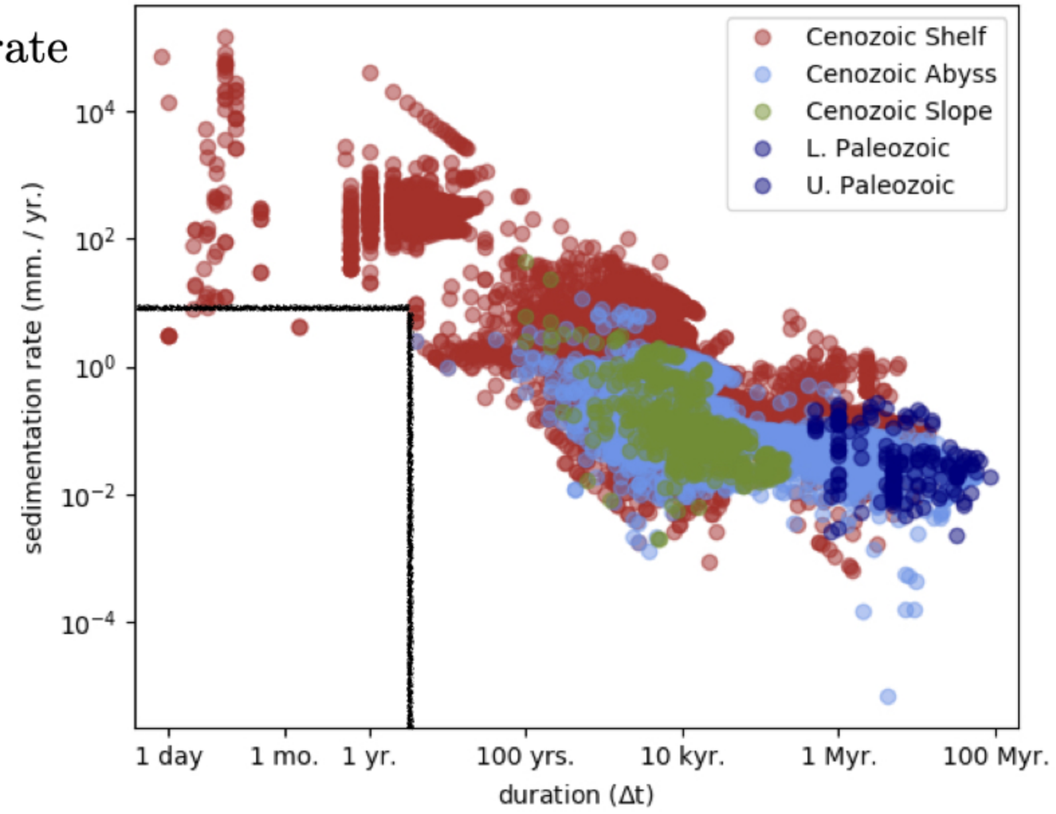
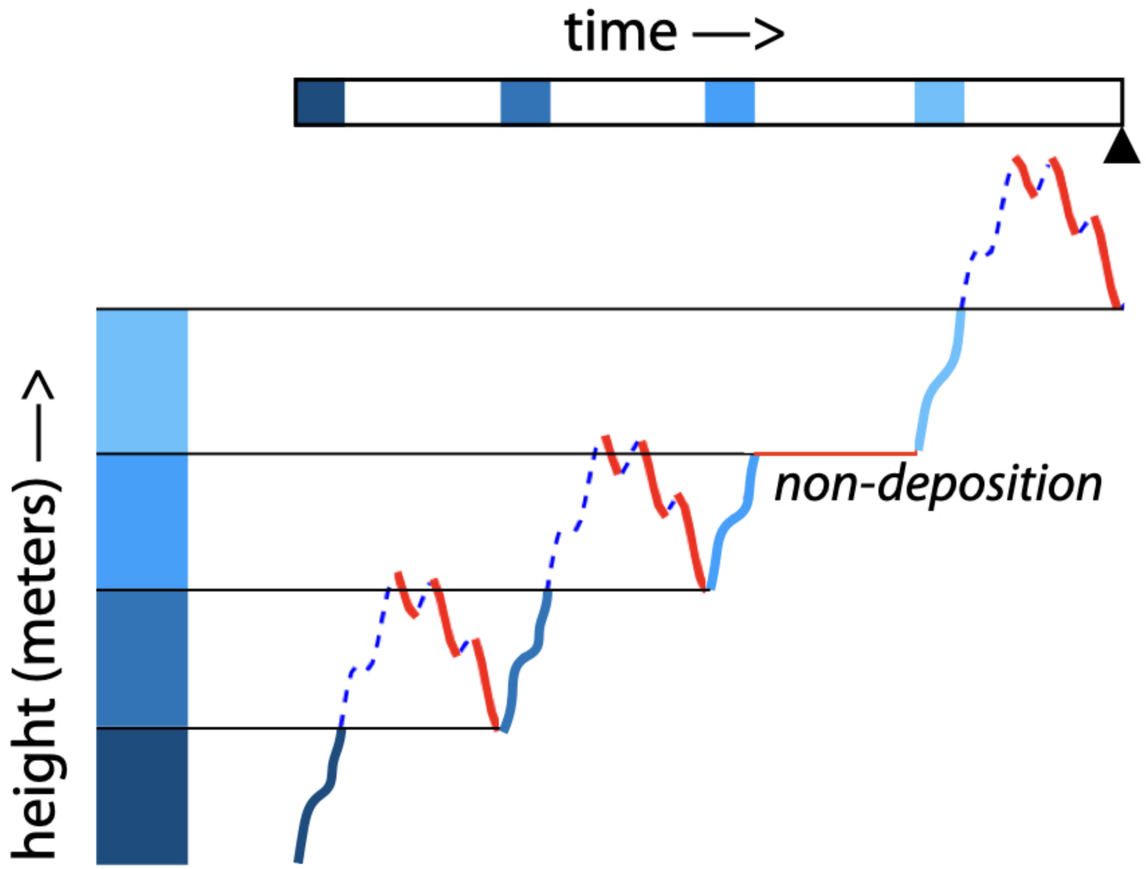
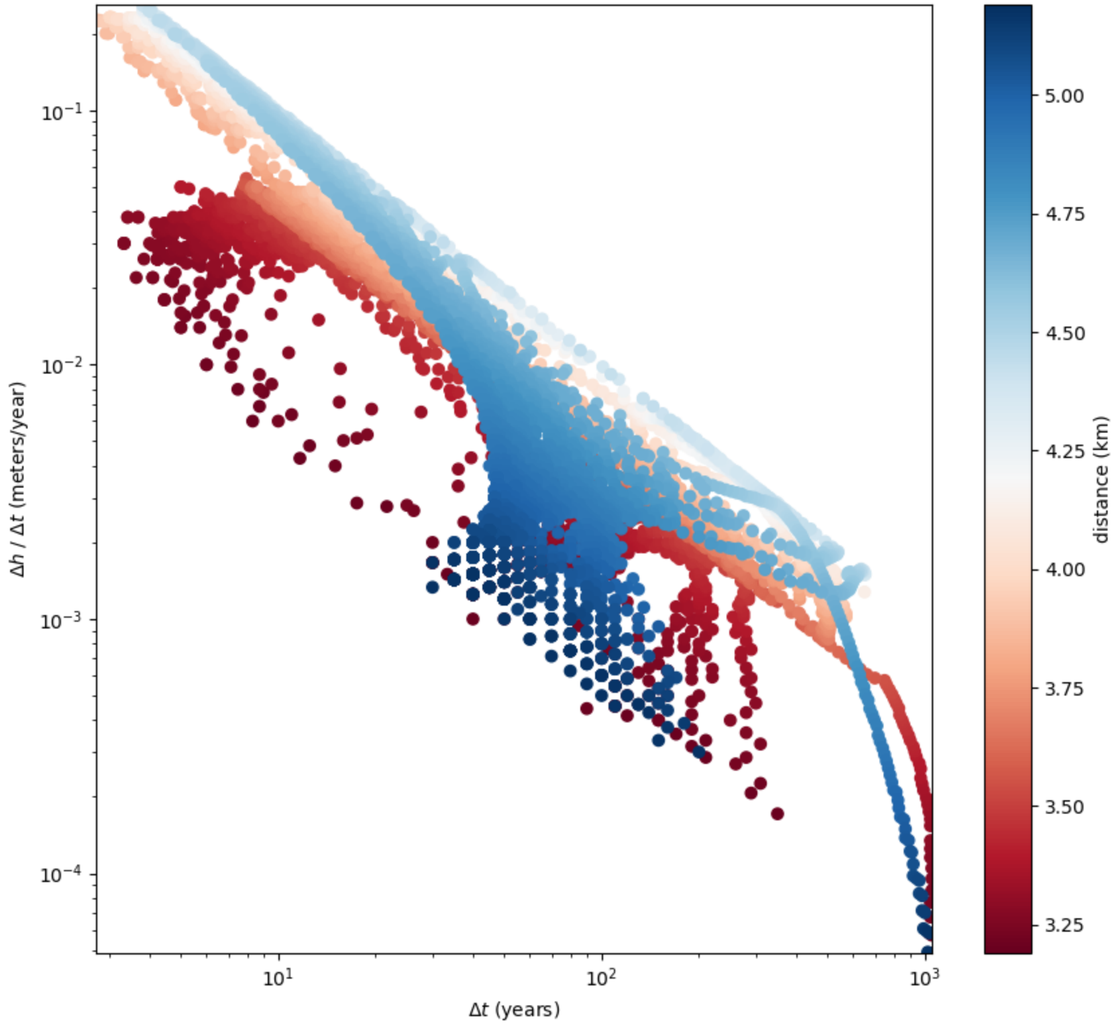


Partin and Sadler, 2016

Why is this happening?



Time in our rock record



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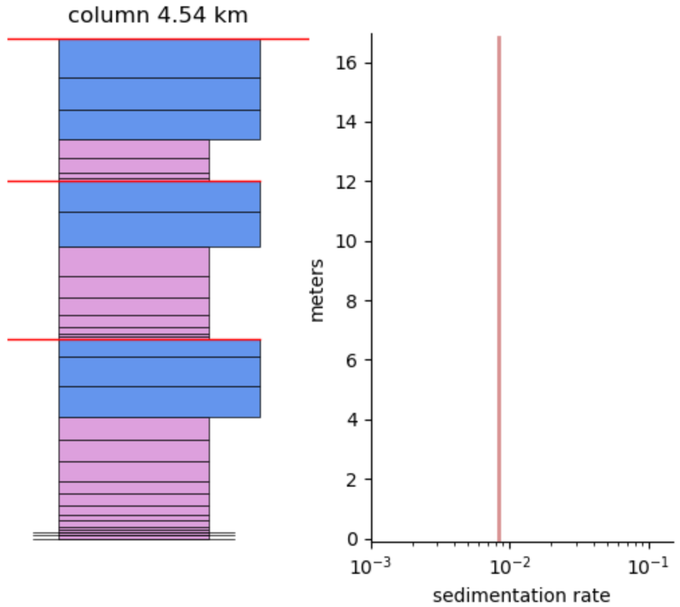

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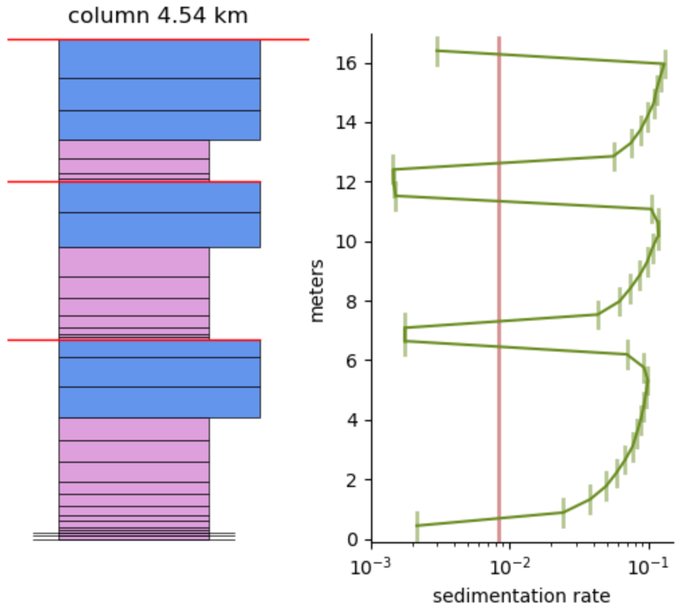
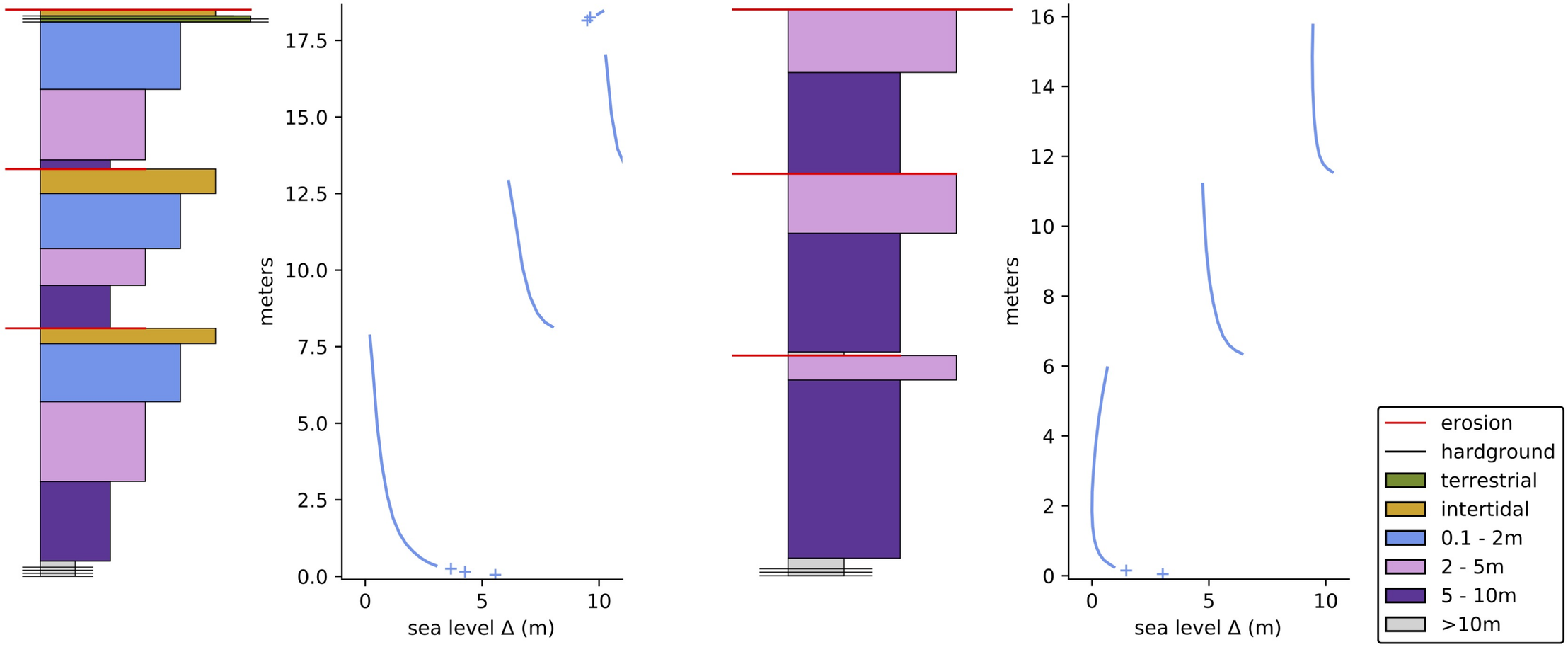


Correlating sequences: an example from our model



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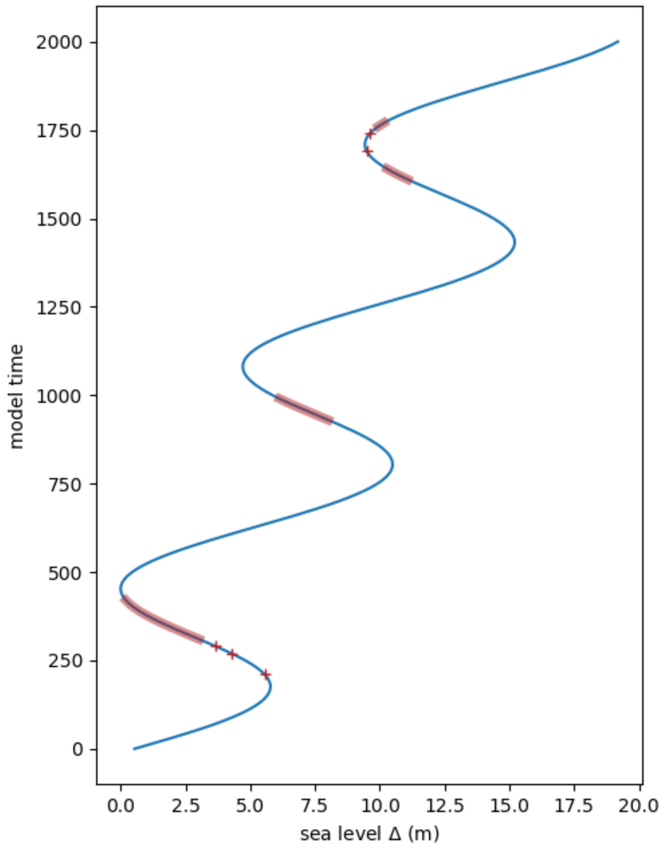

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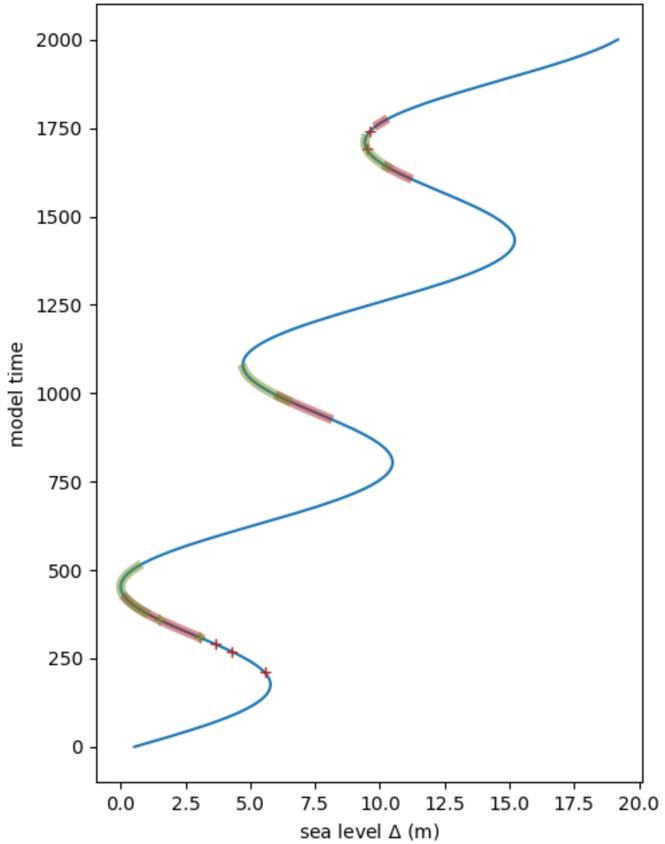
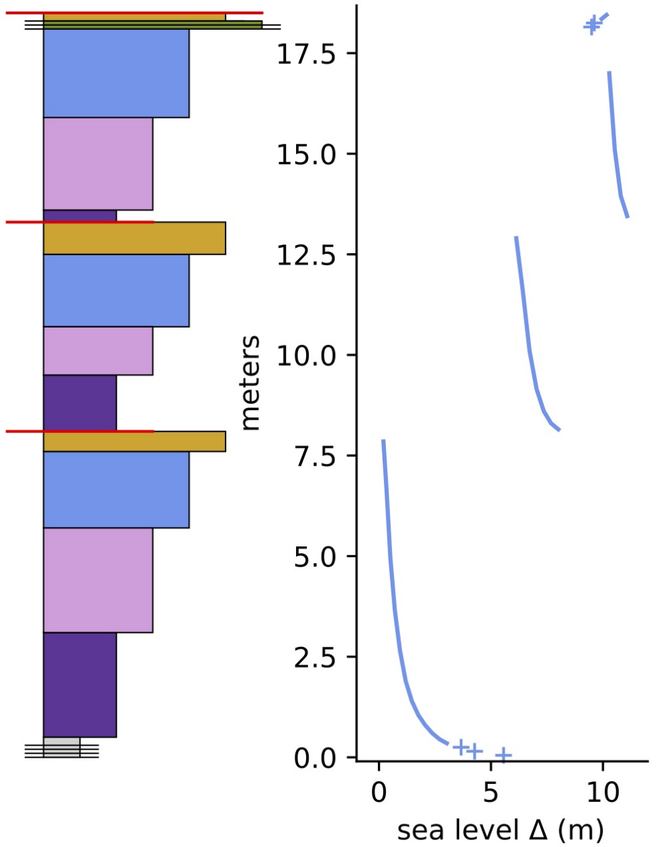
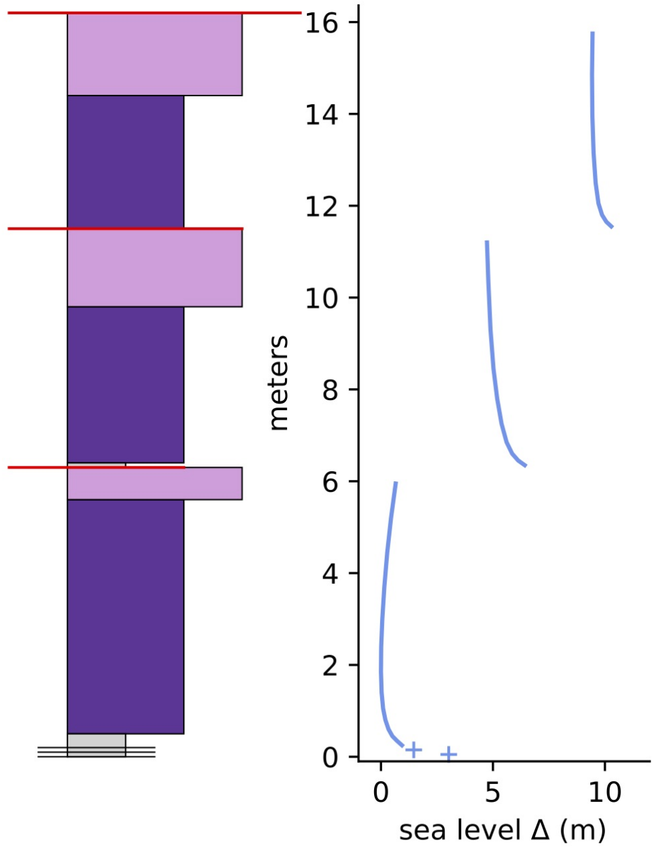


Why do the sea-level cycles look funny?





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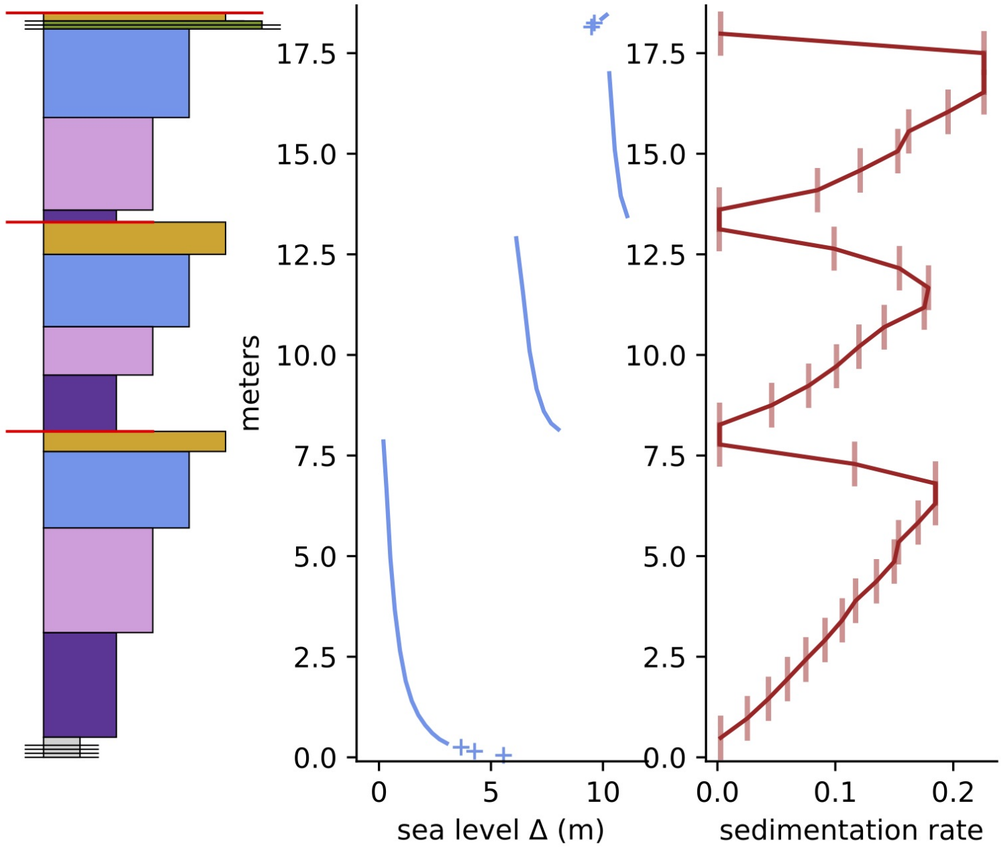
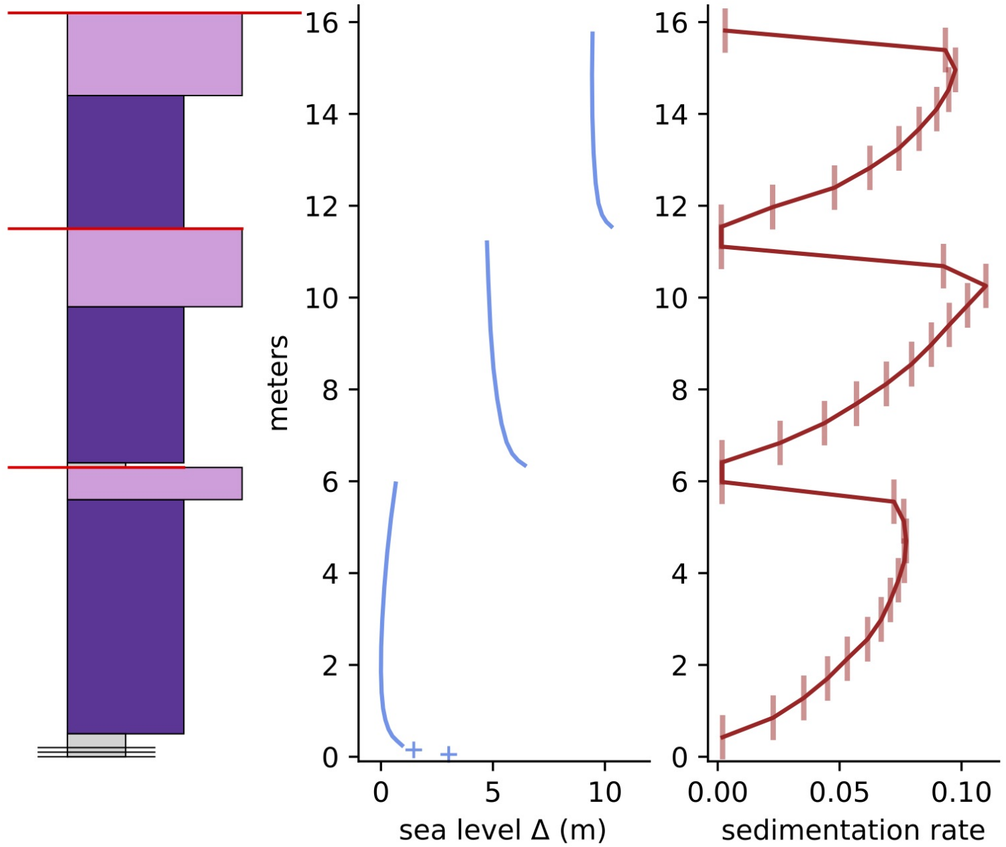
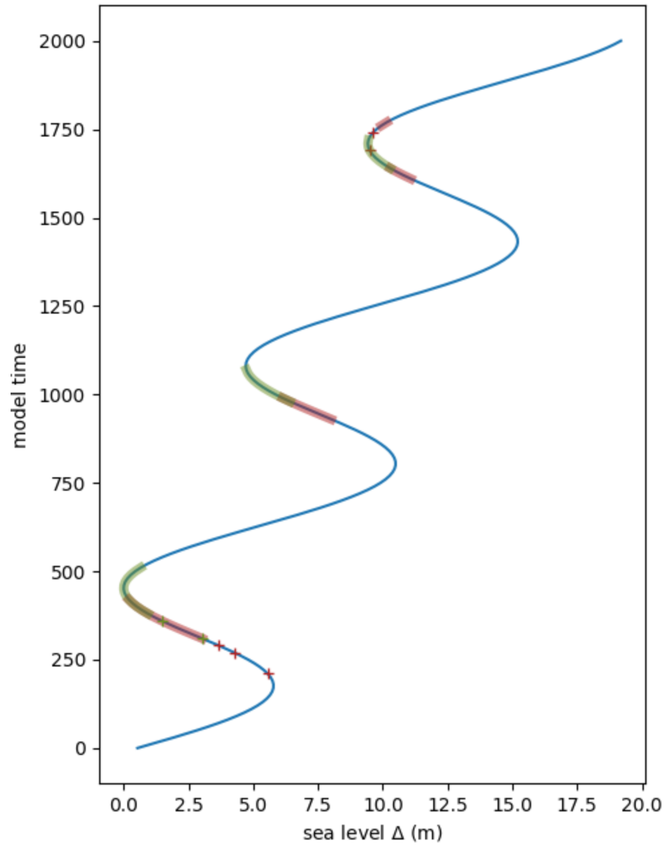




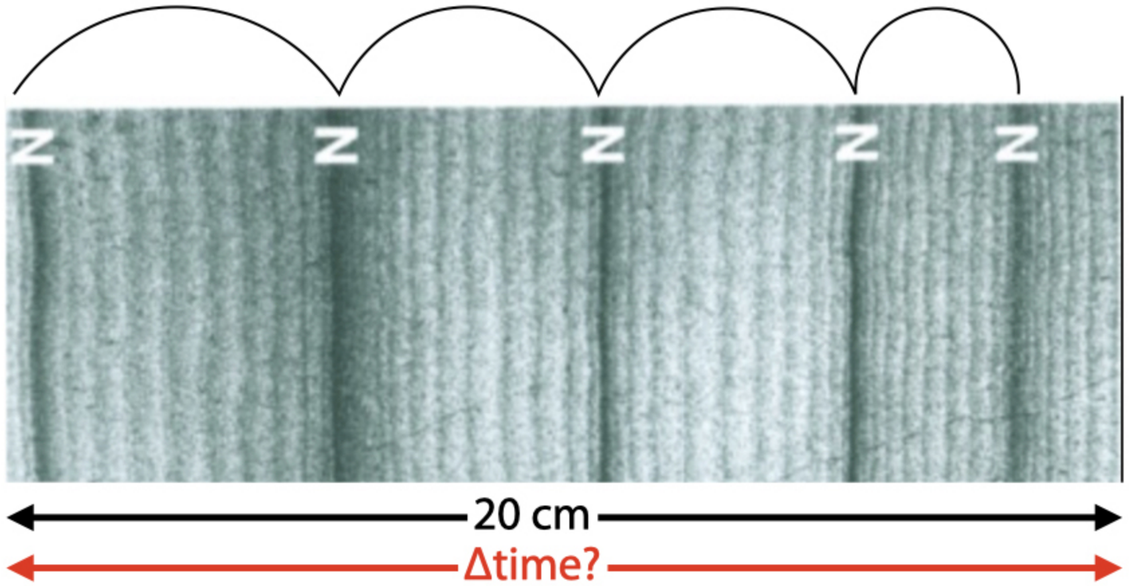
Correlating sequences

- an amazing key would be detecting this sea level signal
- how could this be done?



Cyclostratigraphy

- **Cyclostratigraphy** is a sub-discipline of stratigraphy that seeks to identify, characterize and interpret cyclic variations in the stratigraphic record
    - identify cycles → interpret timing of cycles → age models and correlations
    - fundamentally, it is about explaining the processes *behind* a record



Information can be described as an infinite series of sin and cos waves of differing frequencies and magnitudes.

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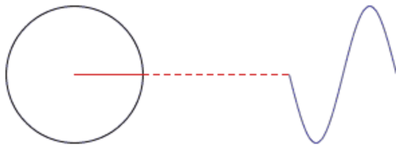

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