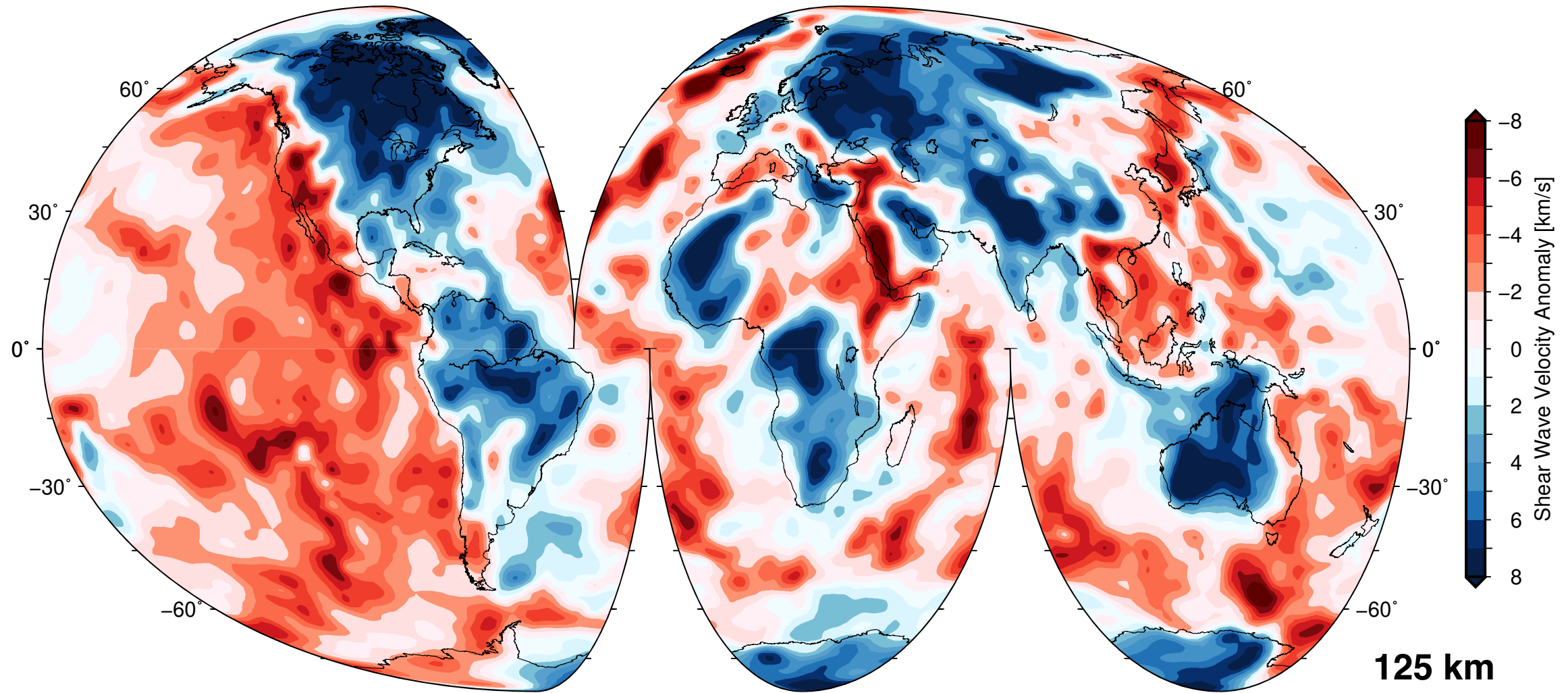
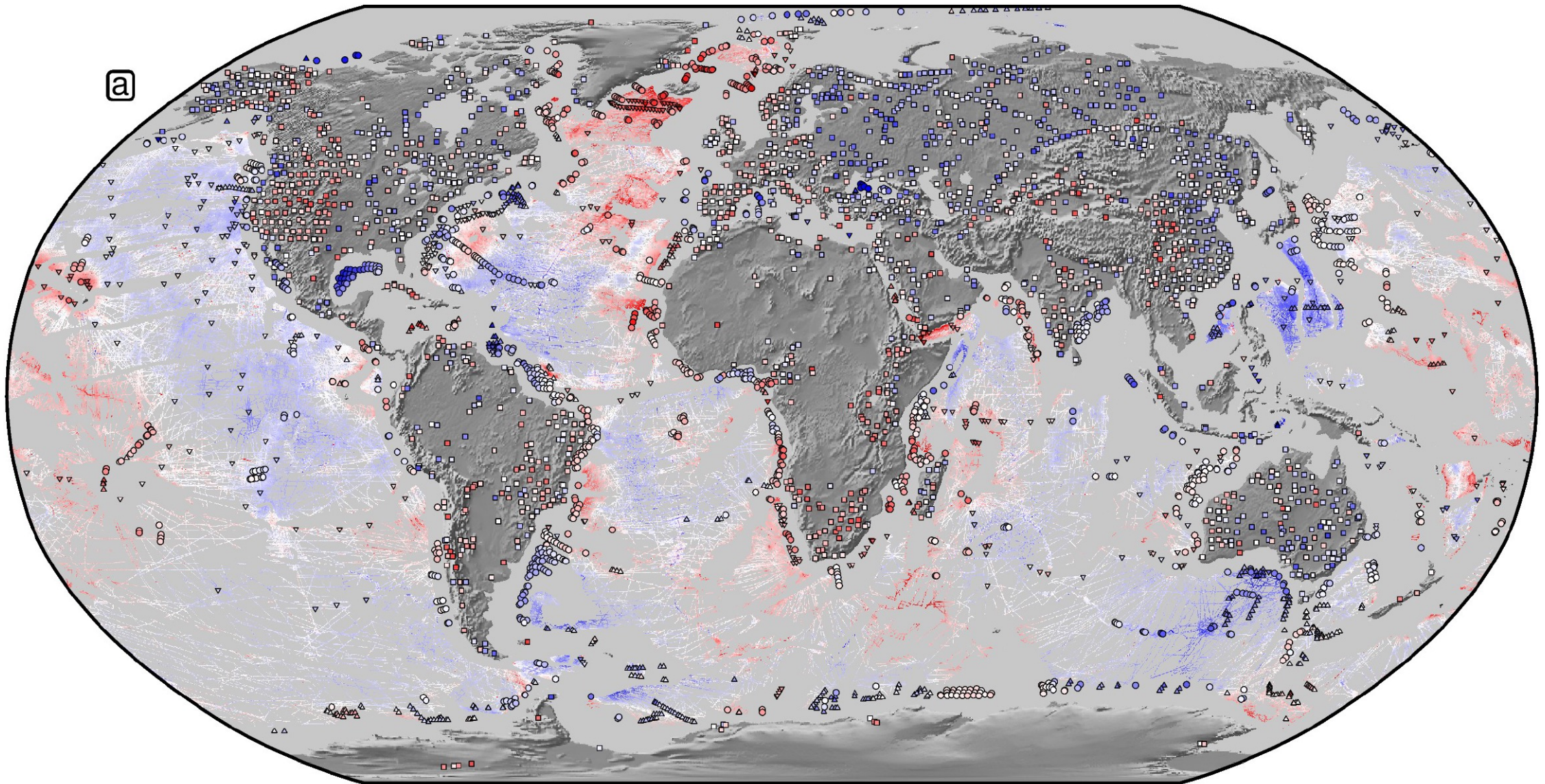


Global geologic and geomorphic observations of mantle convection

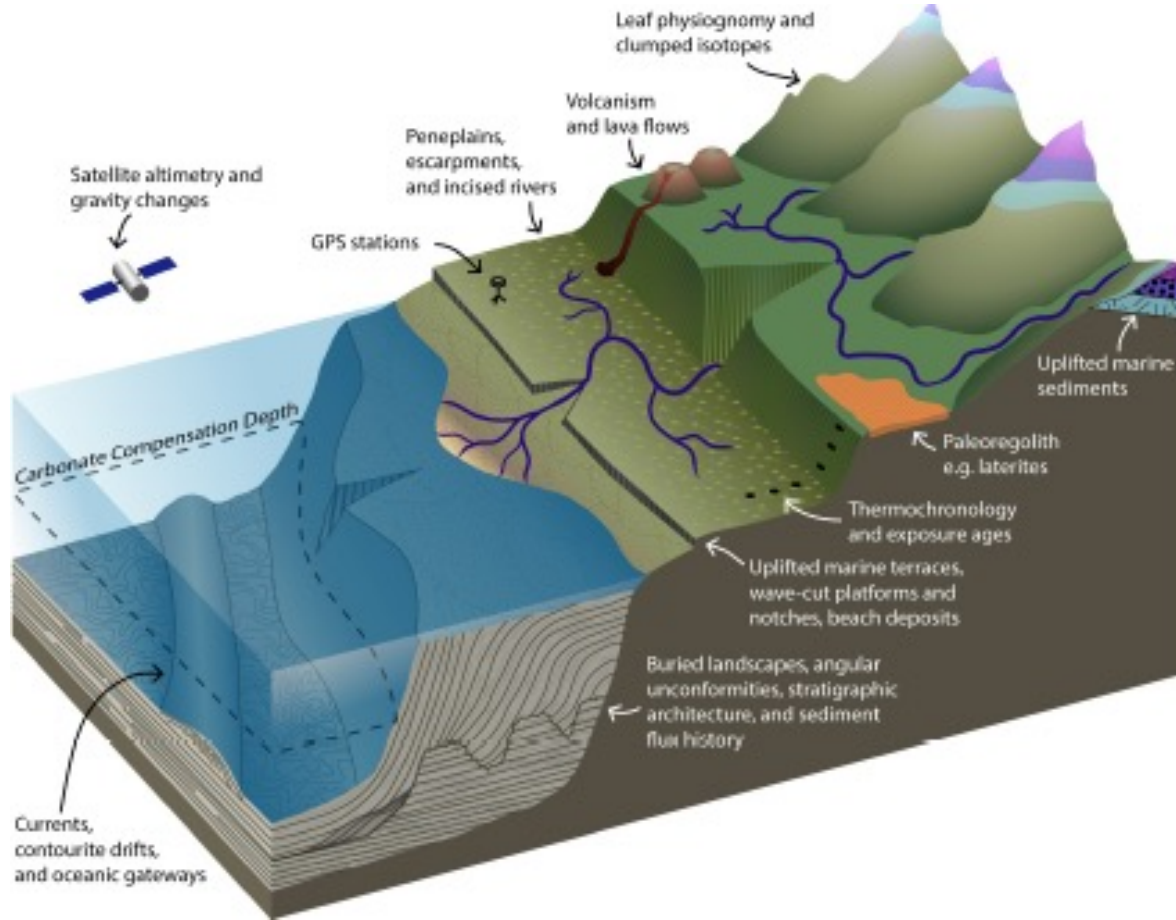
Motivation



Motivation



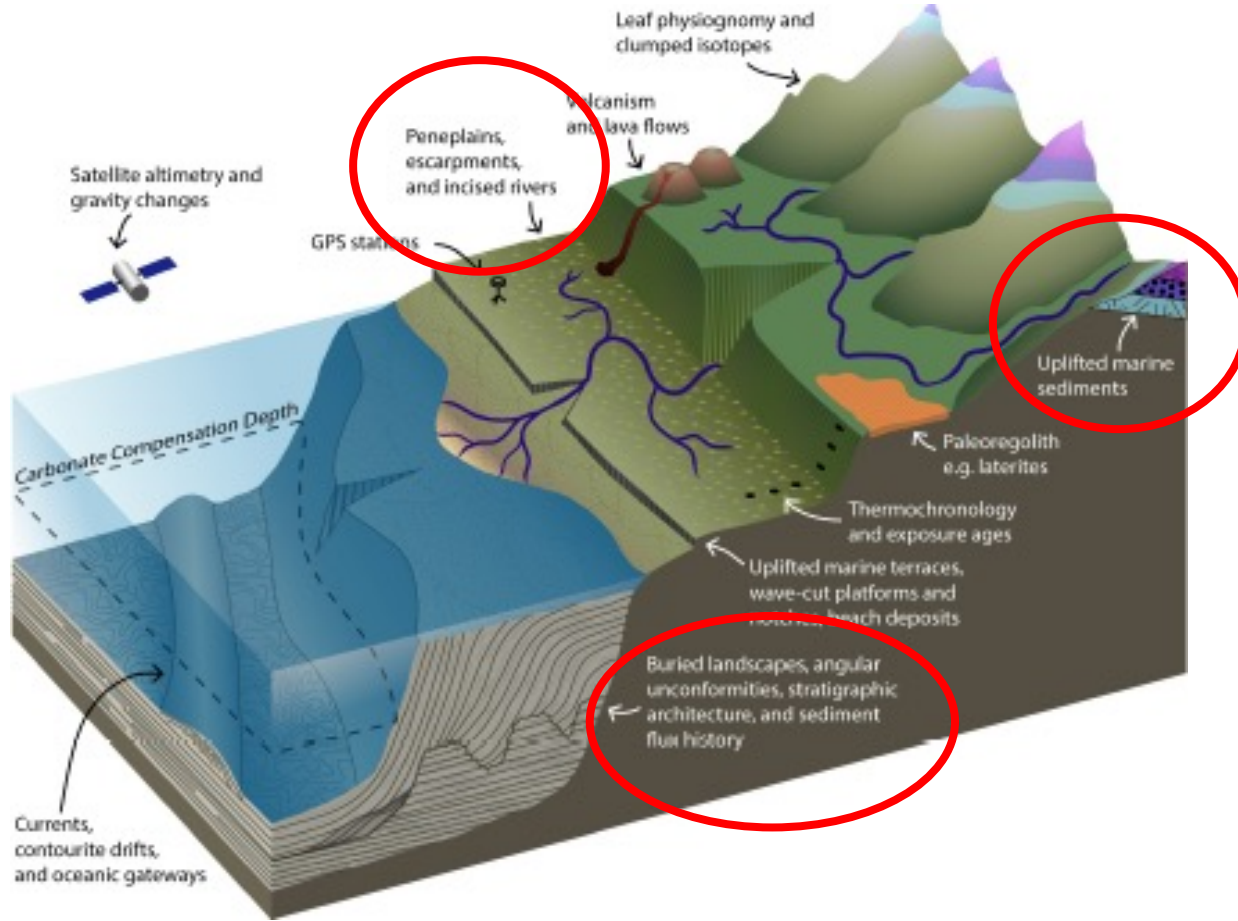
Motivation



from Hoggard et al., 2021

- Wide variety of diverse data that can be used to constrain vertical motions.
- Challenge of accurately constraining dynamic topography in deep time requires **identification** and **dating** of geological features that can track changes in elevation through time over a **sufficiently large scale**.
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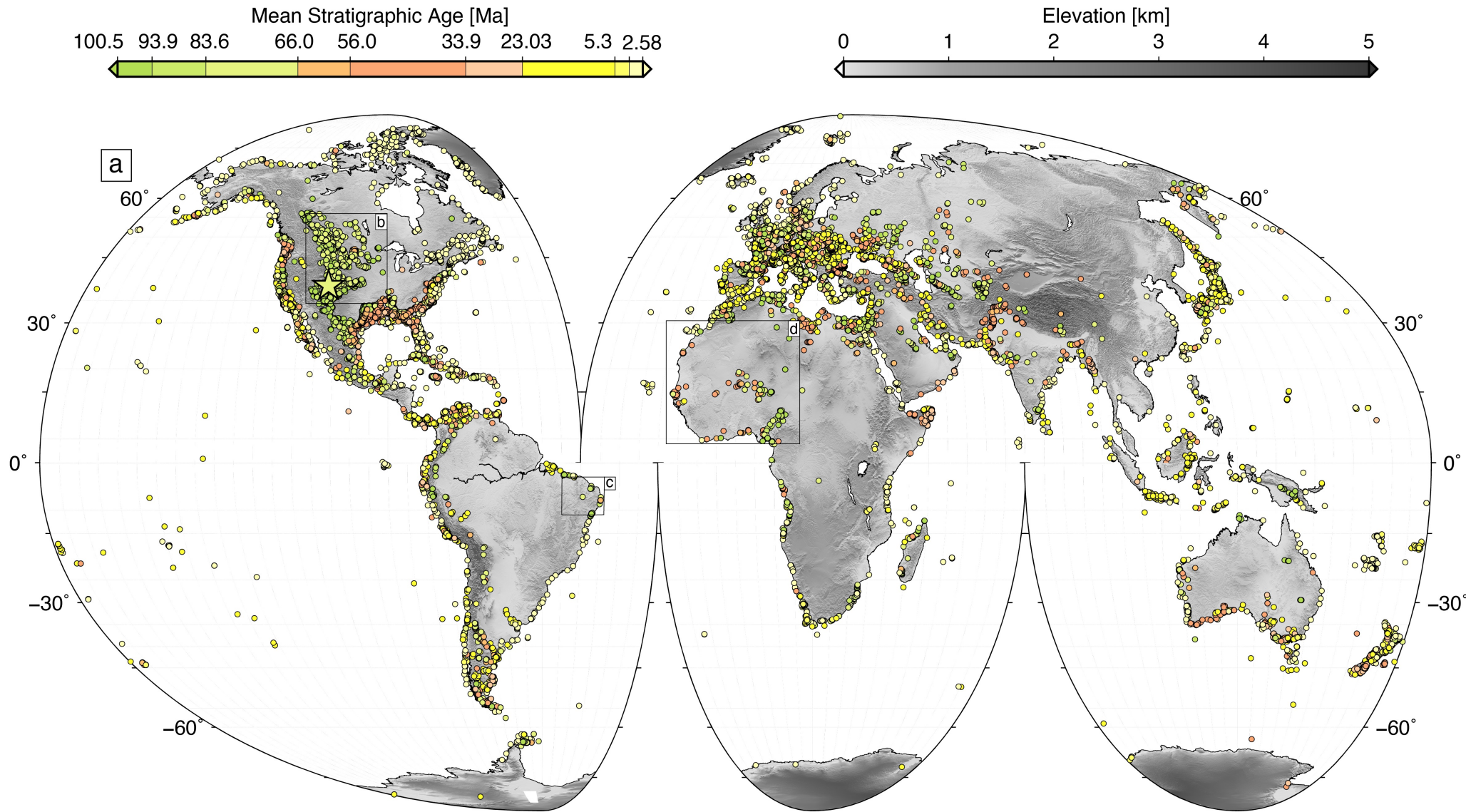
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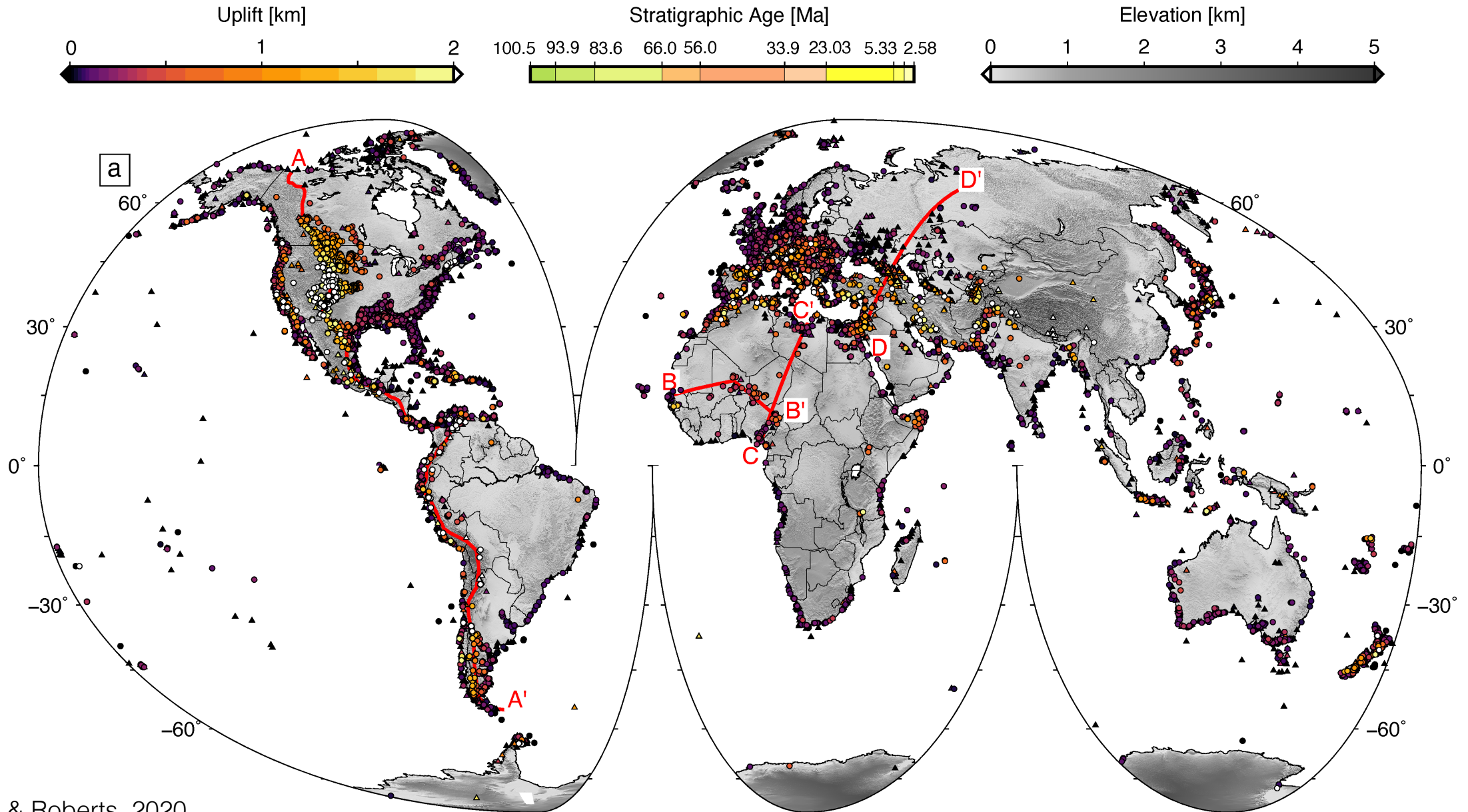
[1] Uplift from the present-day elevation of marine strata

- Cretaceous to Recent marine fossils from paleobiodb.org

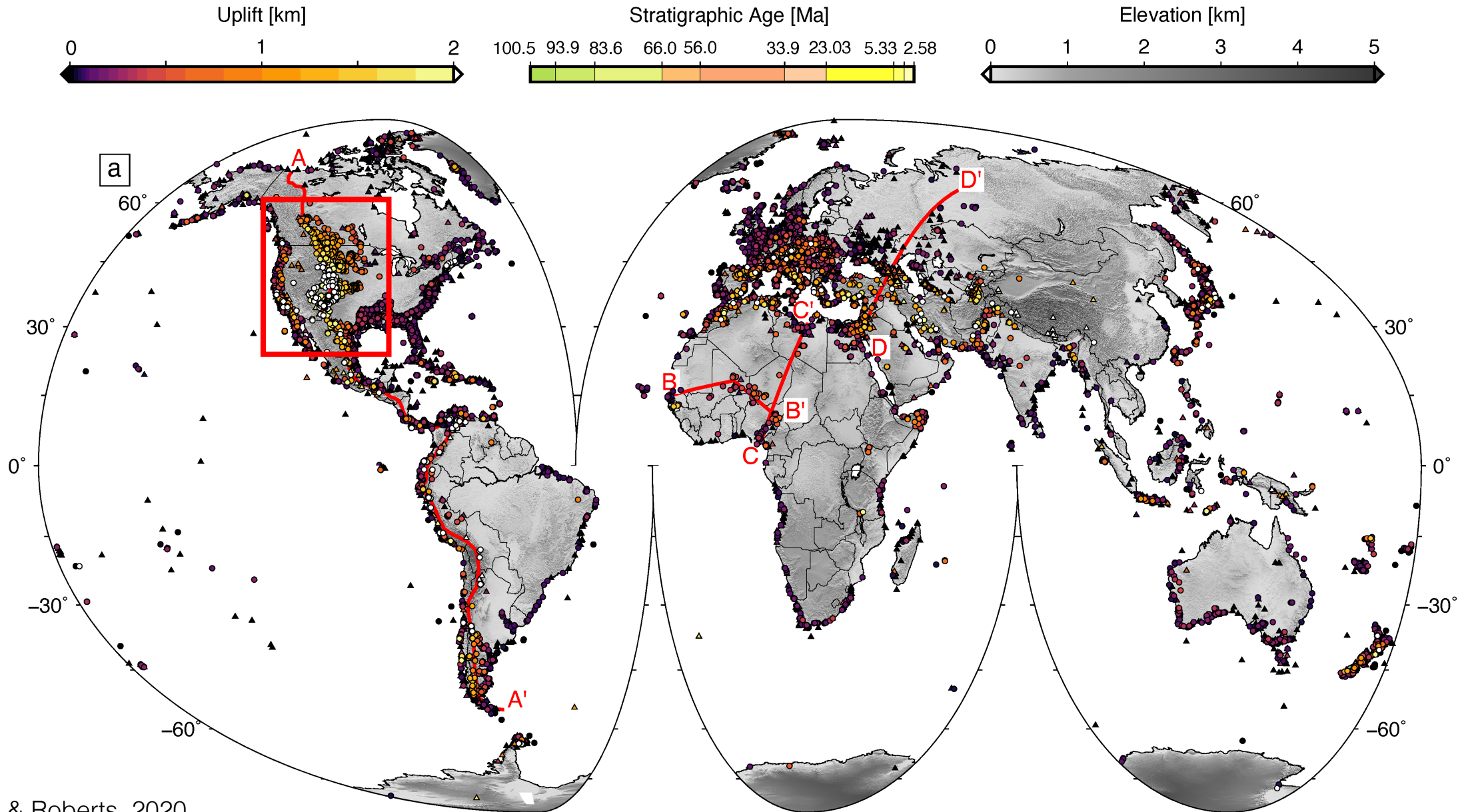
- 24,372 spot measurements of uplift



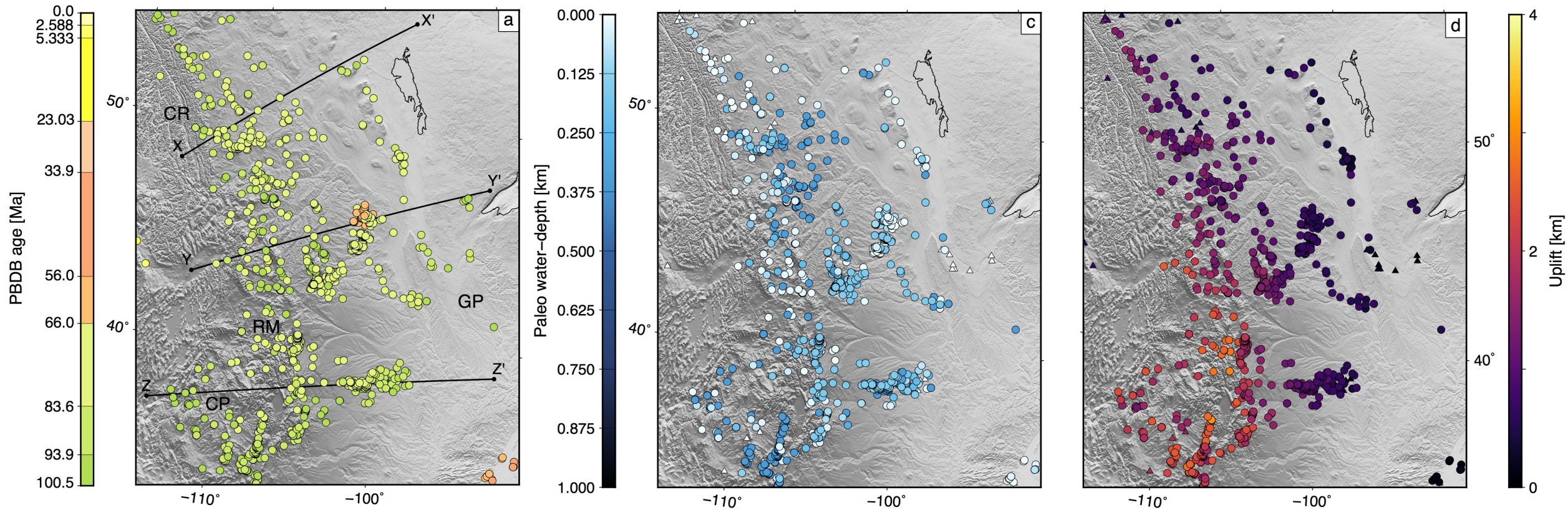
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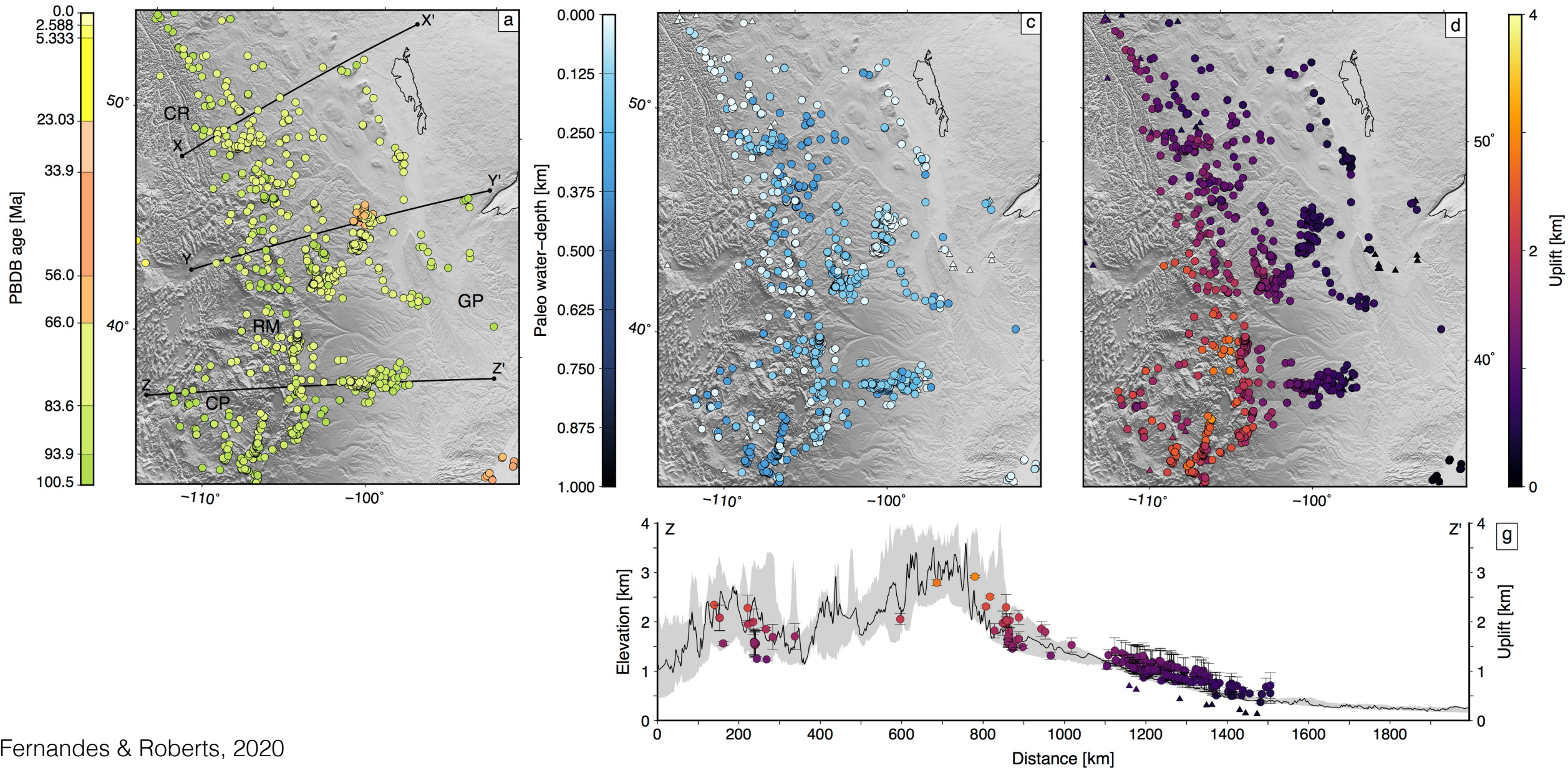
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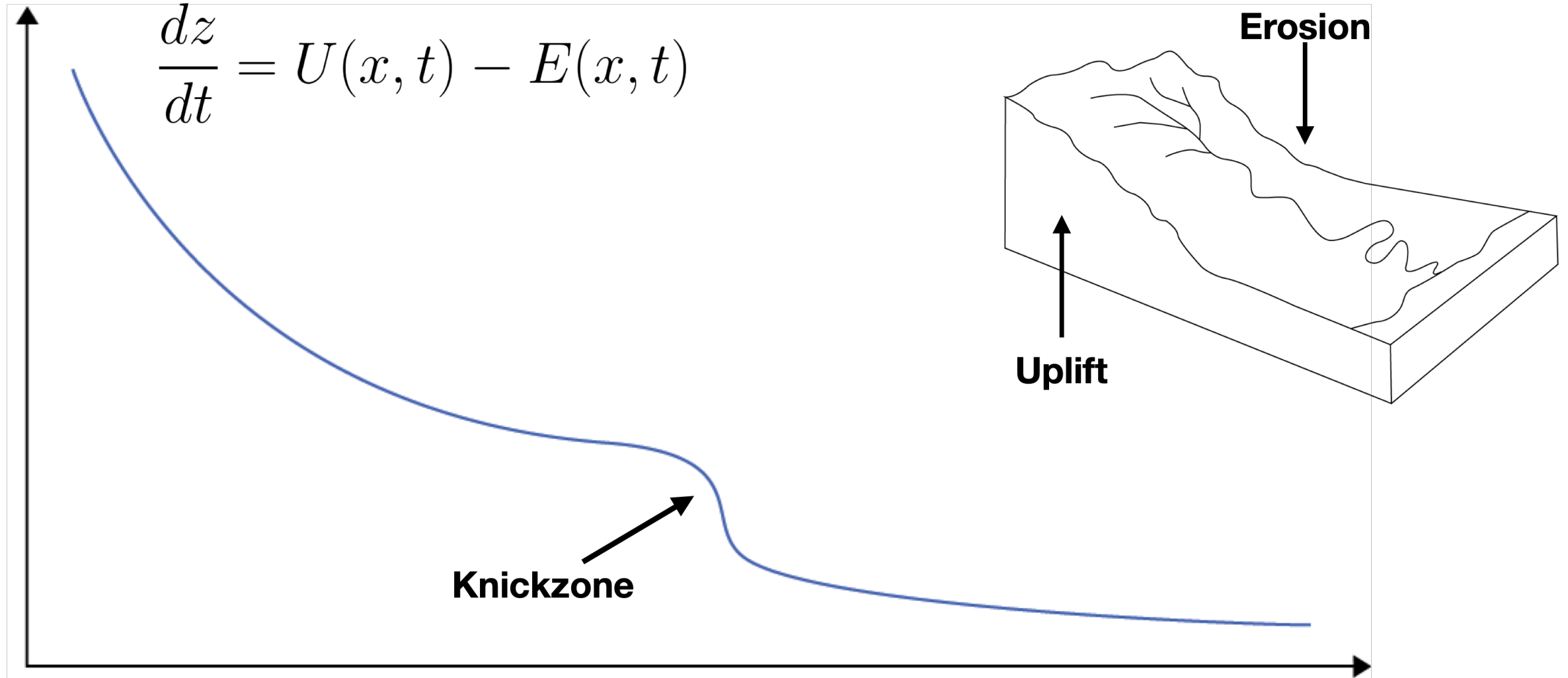
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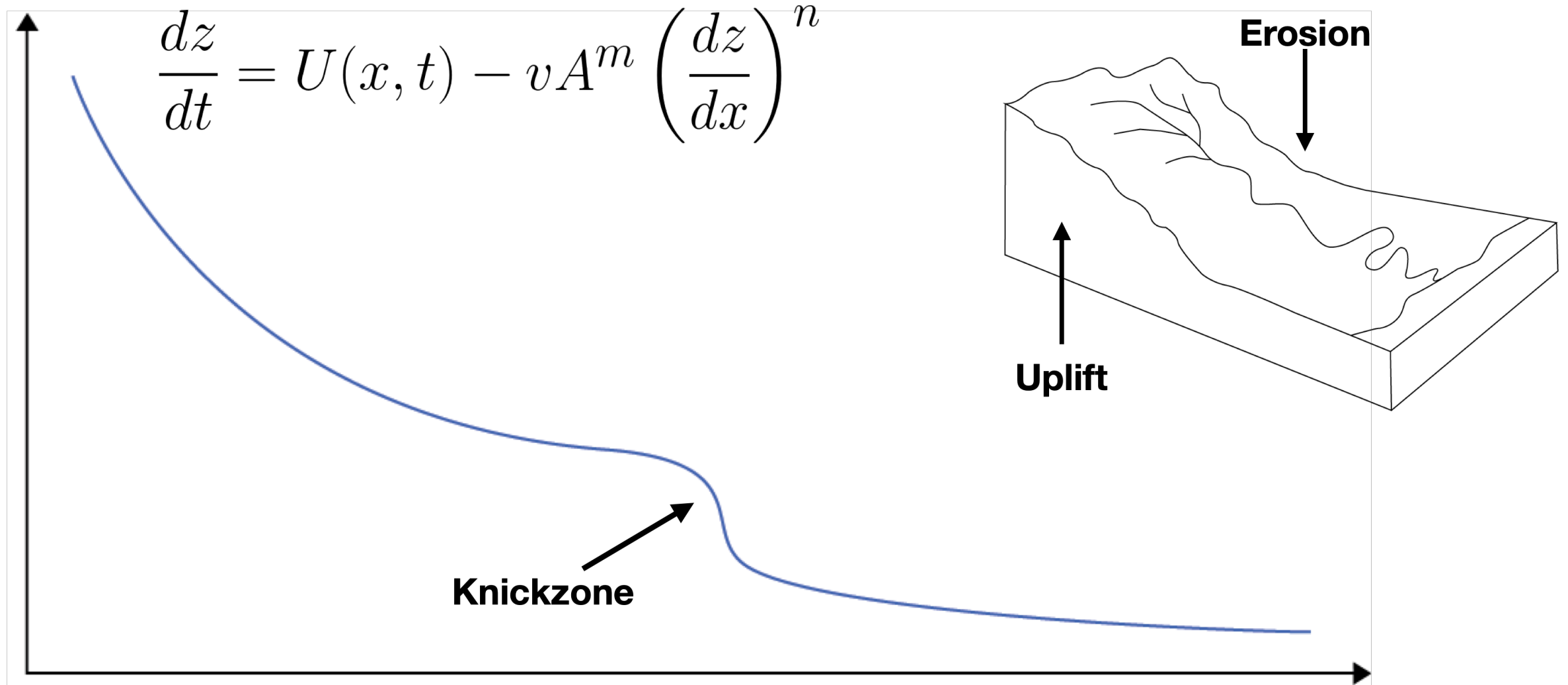
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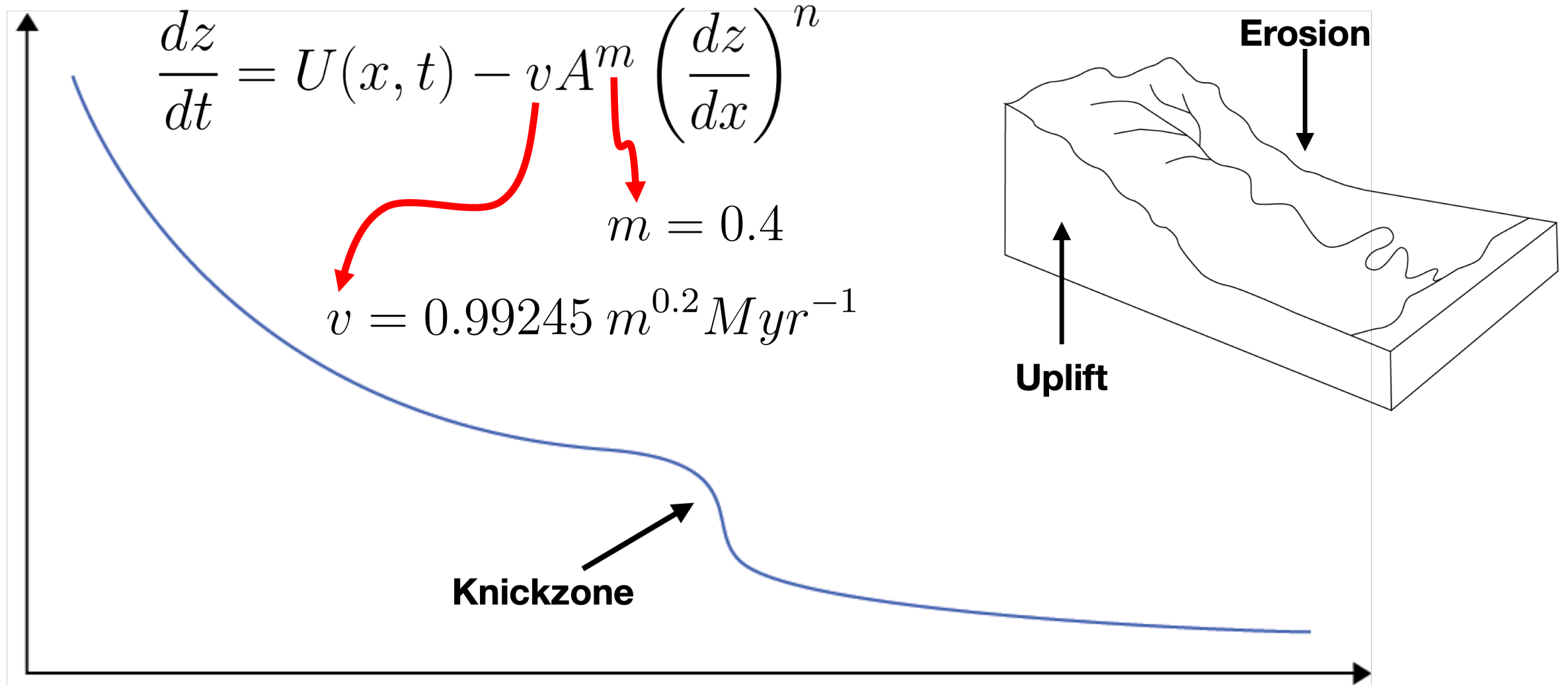
[2] Inverse modelling of continental drainage



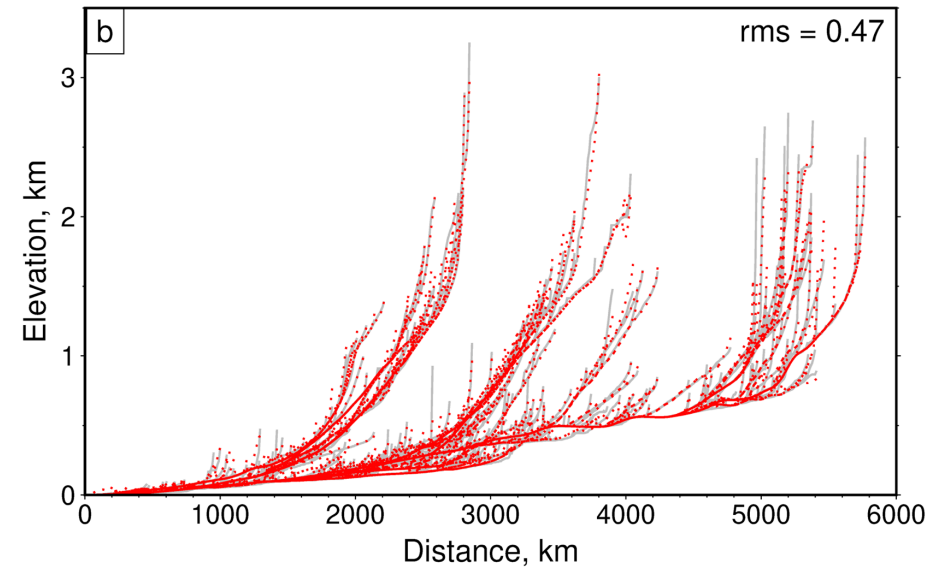
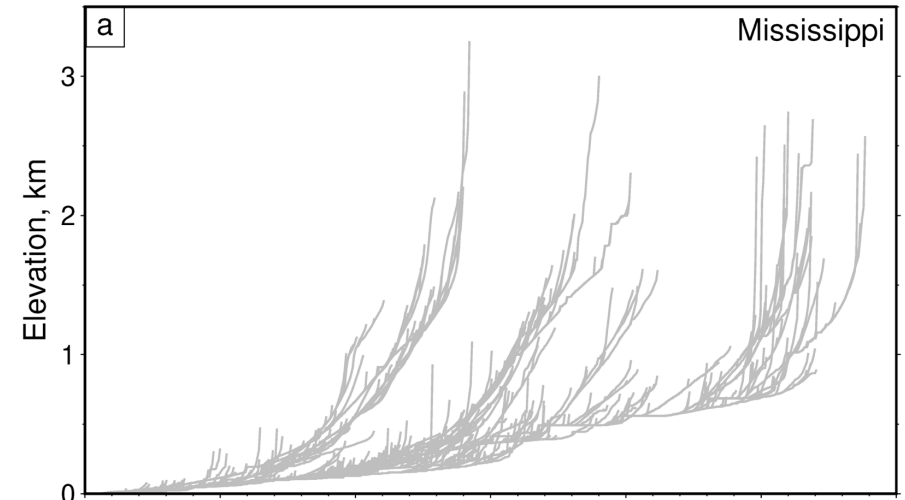
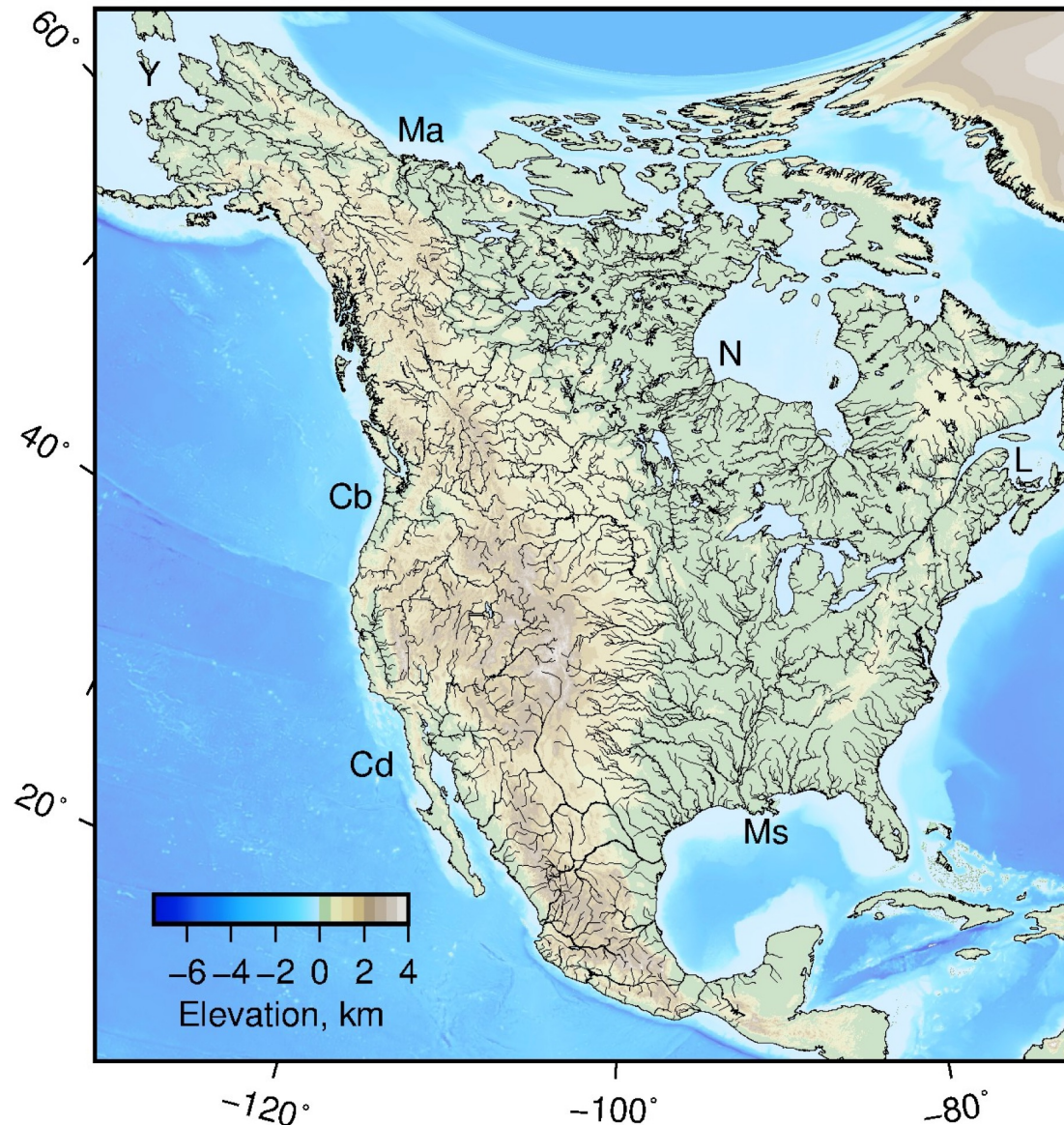
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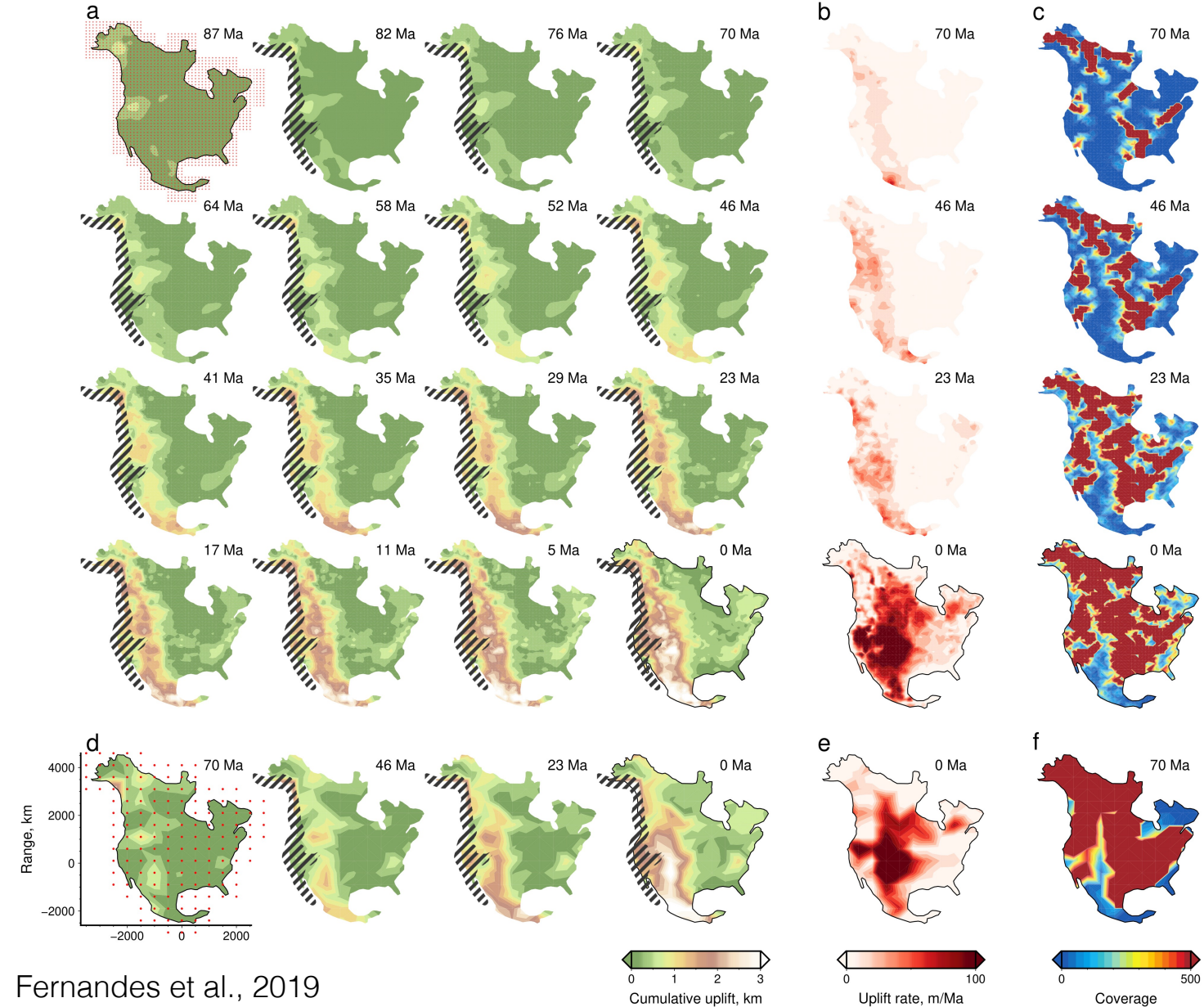
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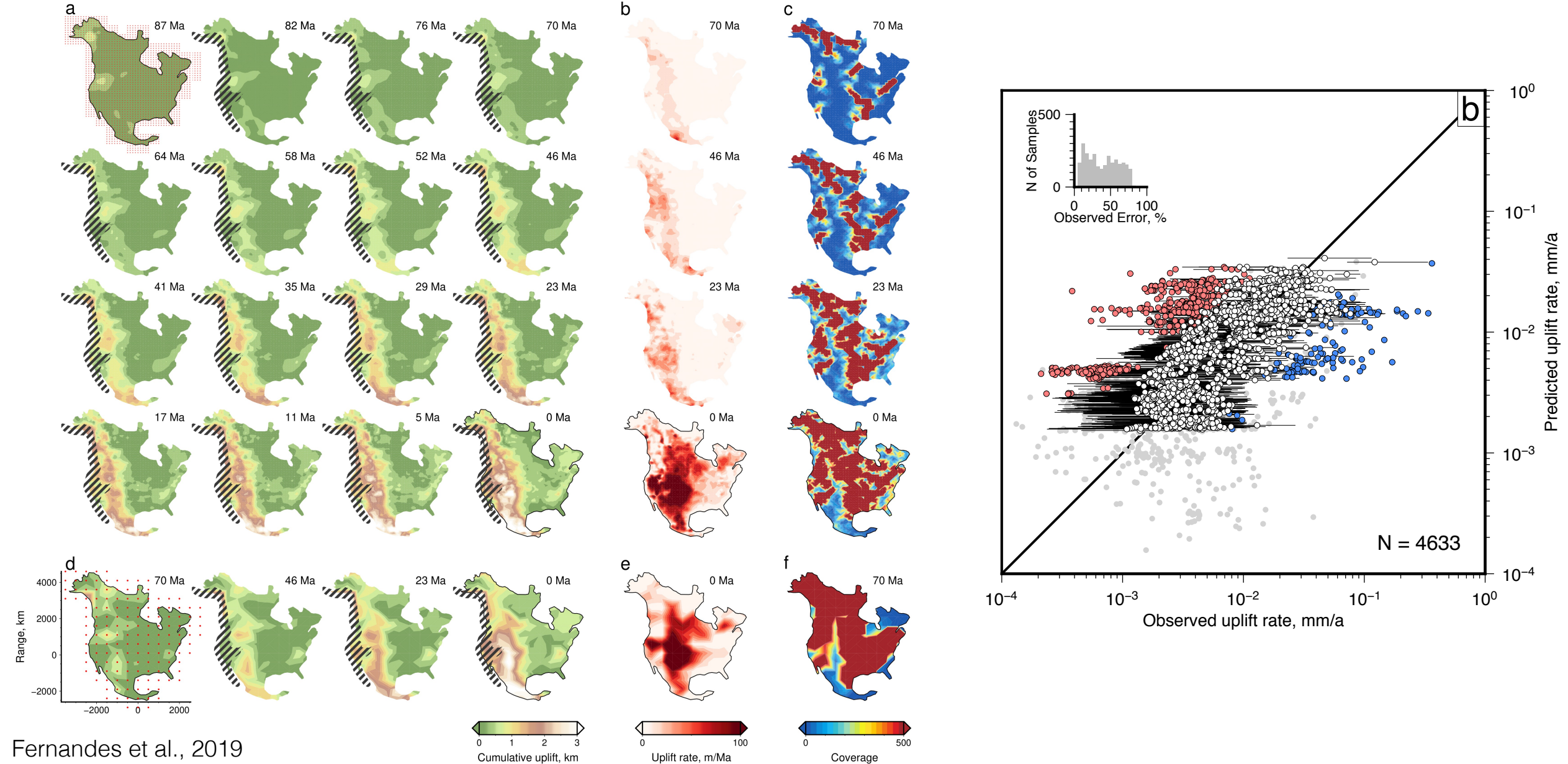
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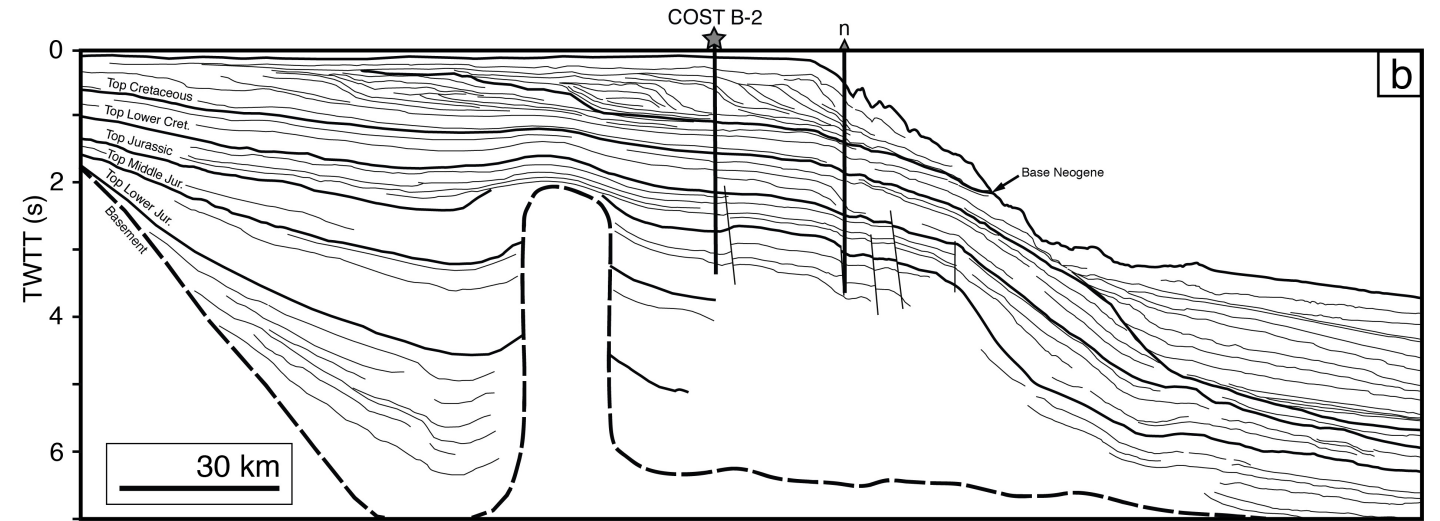
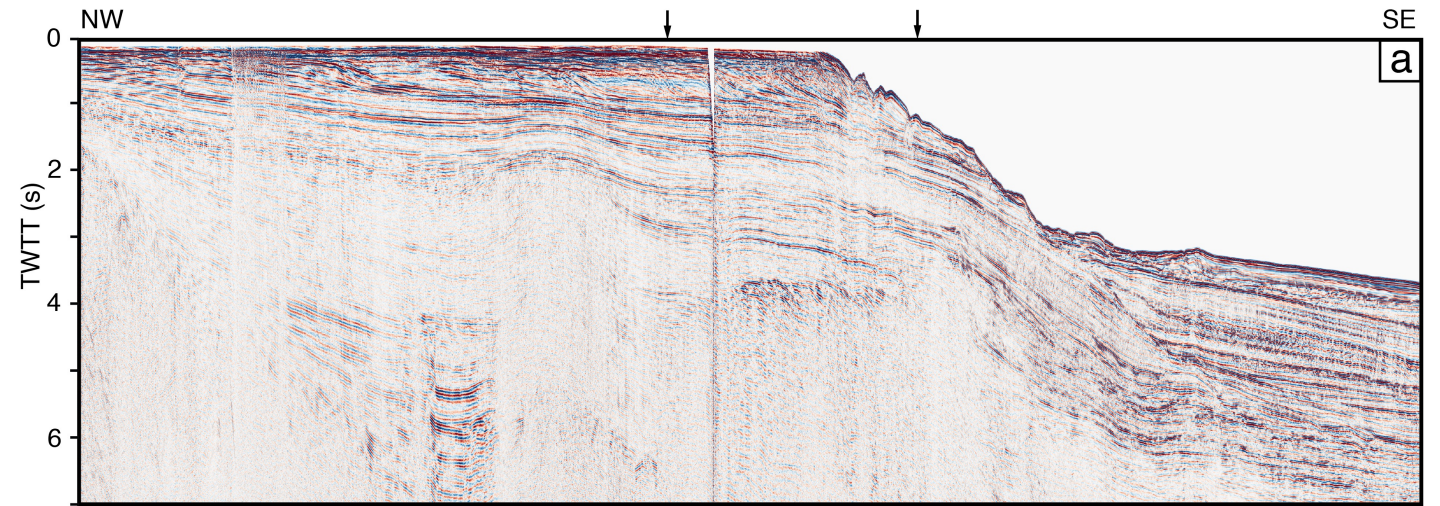
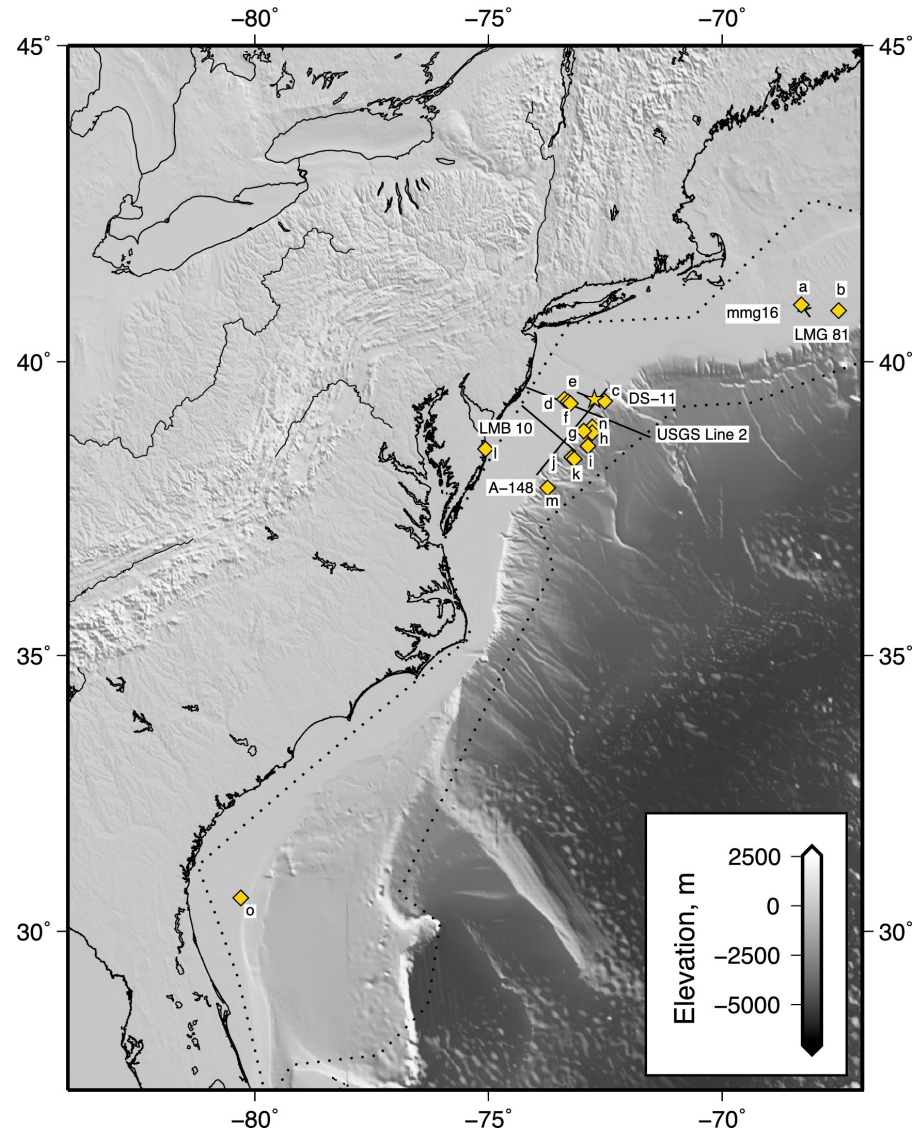
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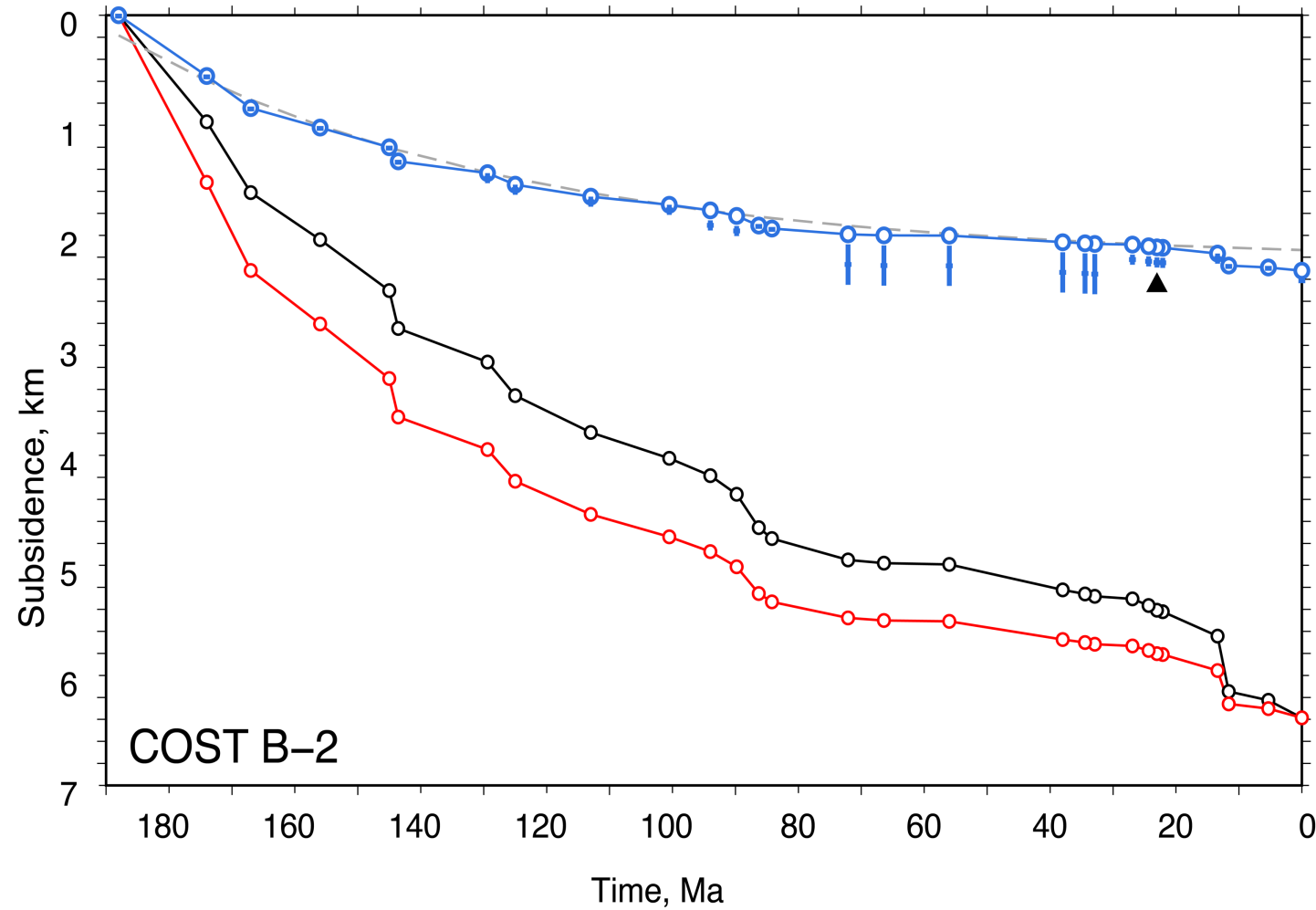
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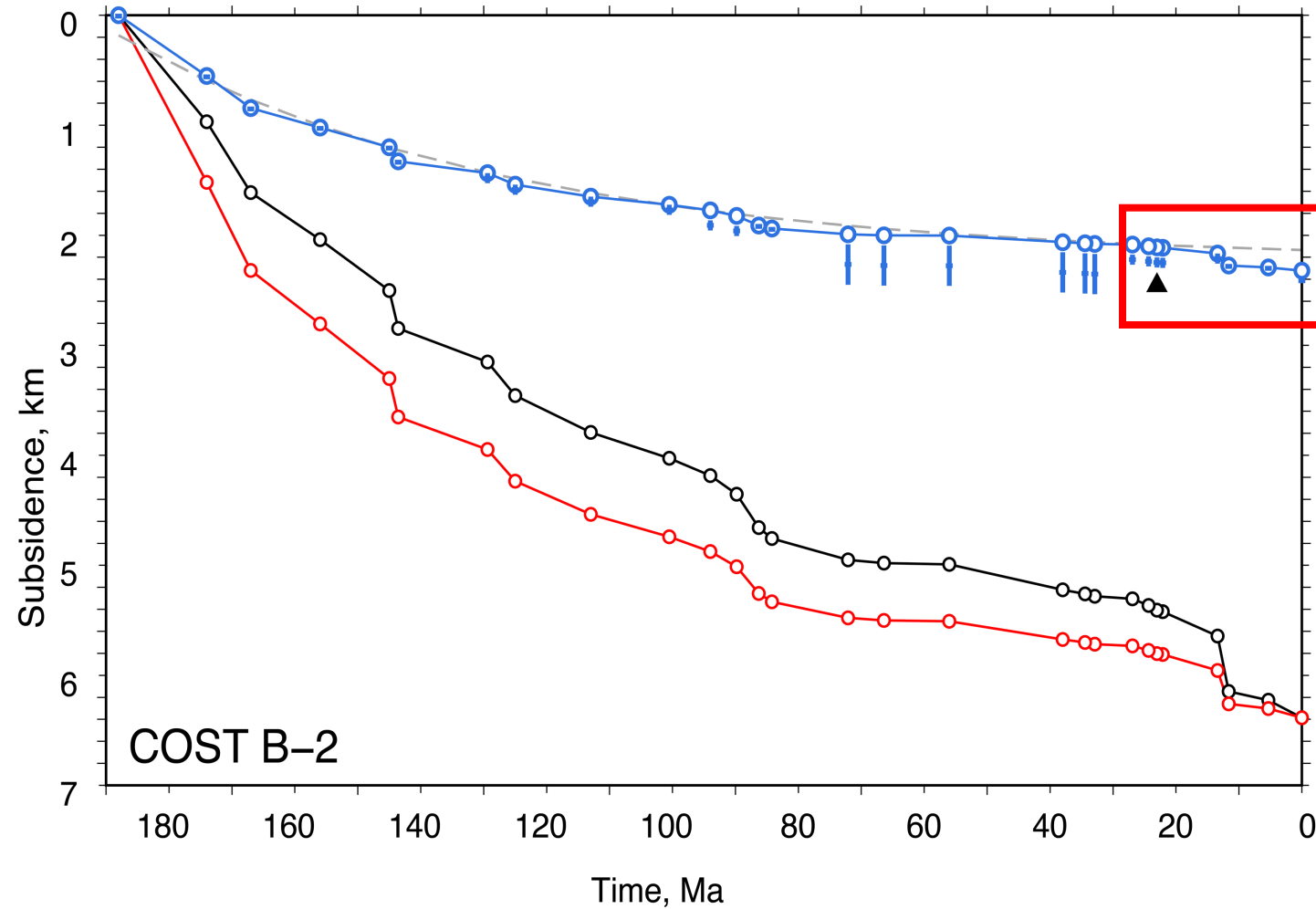
[3] Subsidence history of passive margins



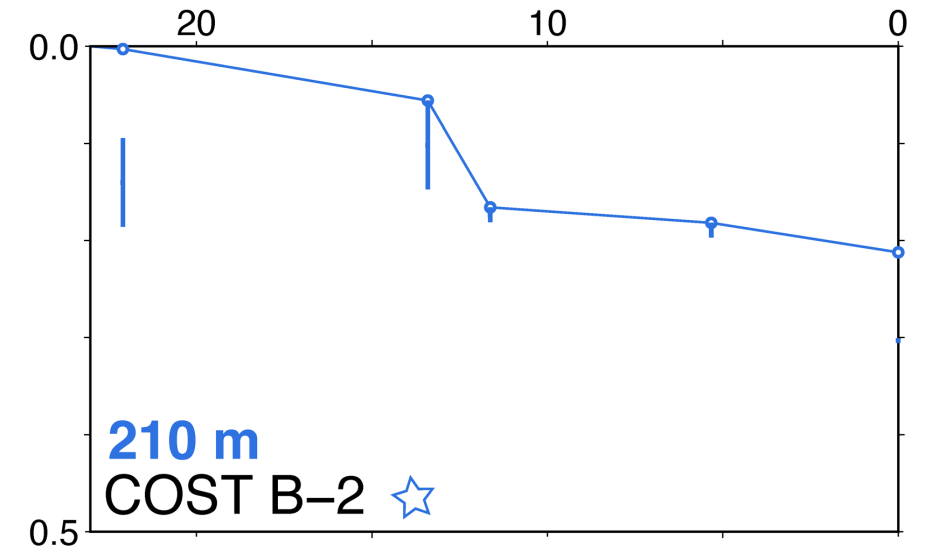
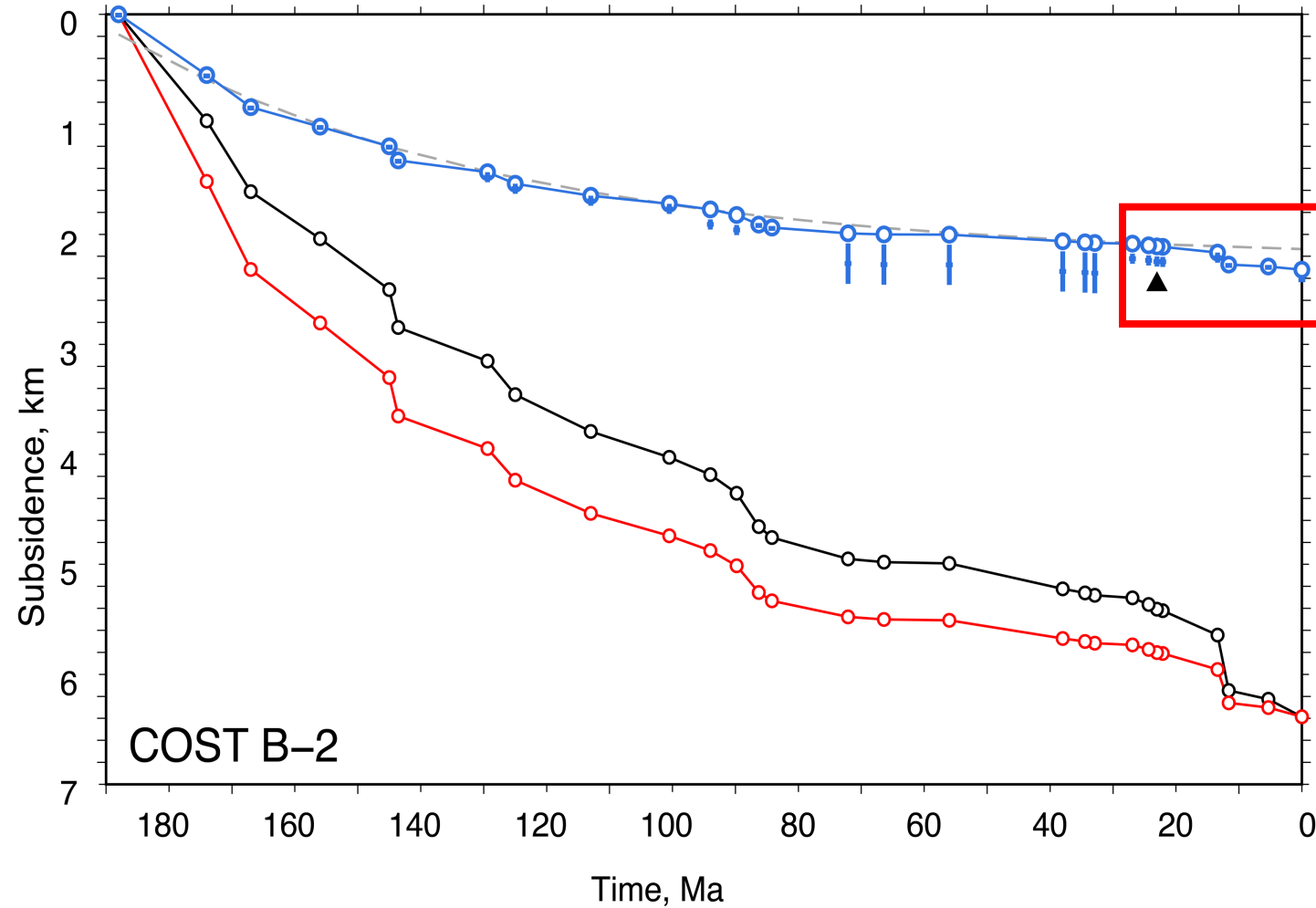
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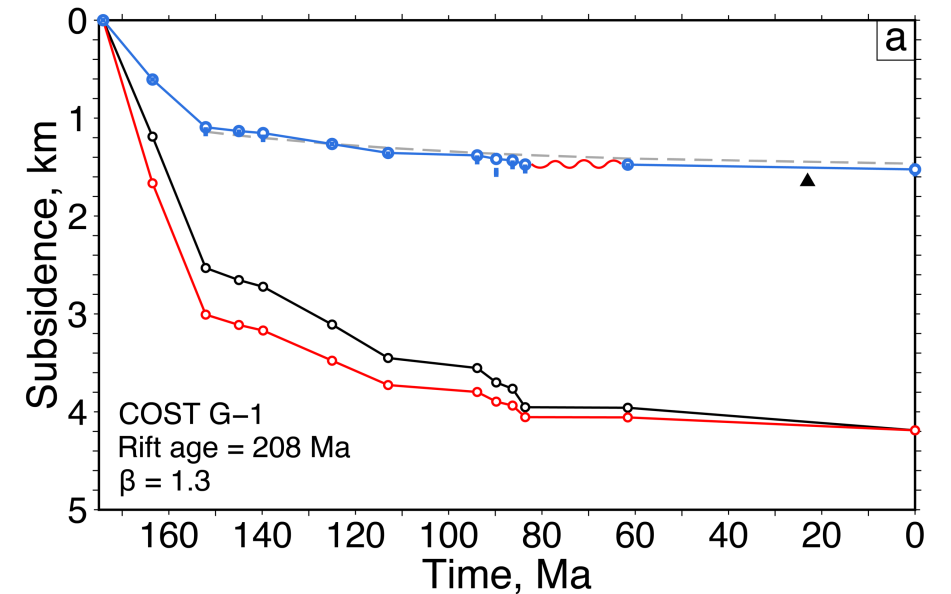
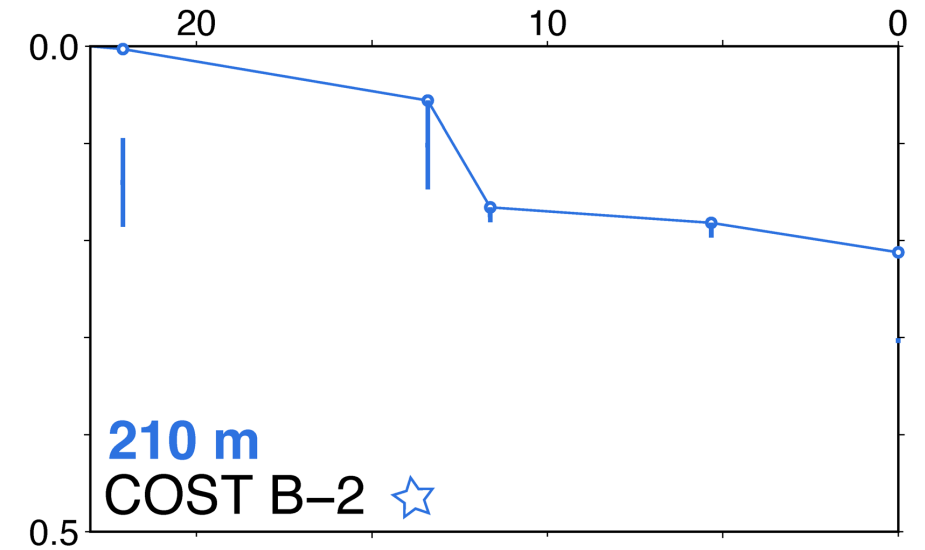
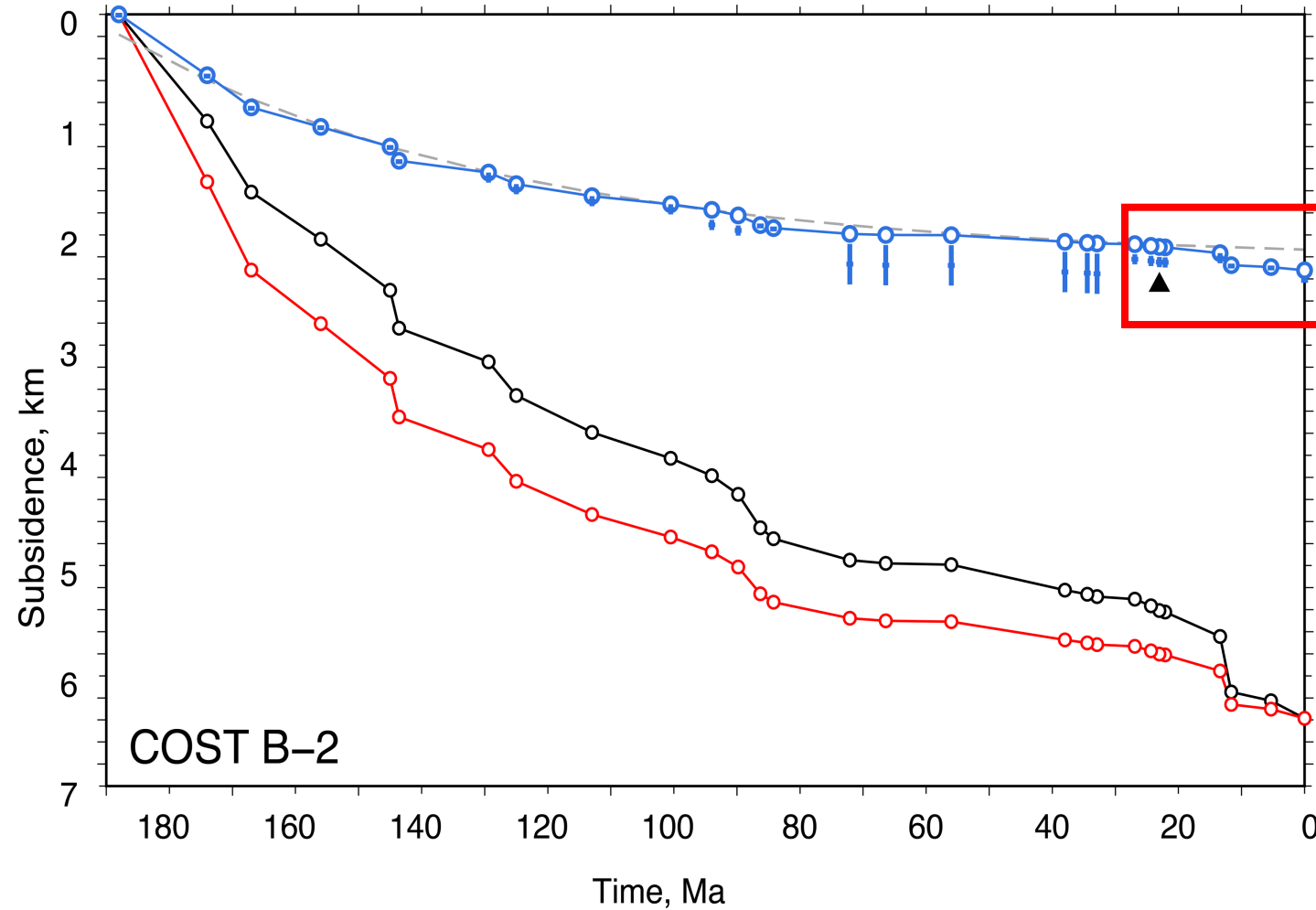
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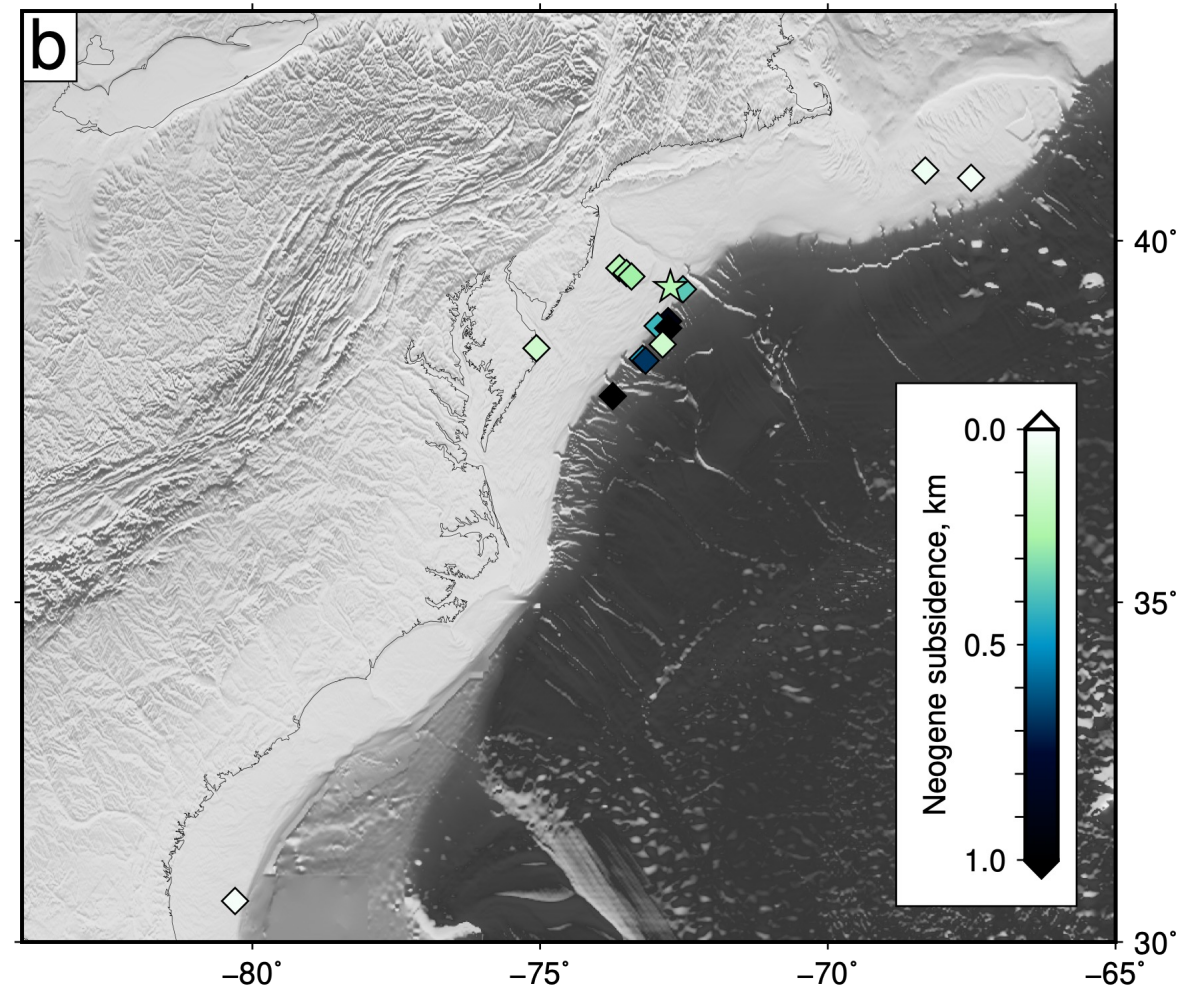
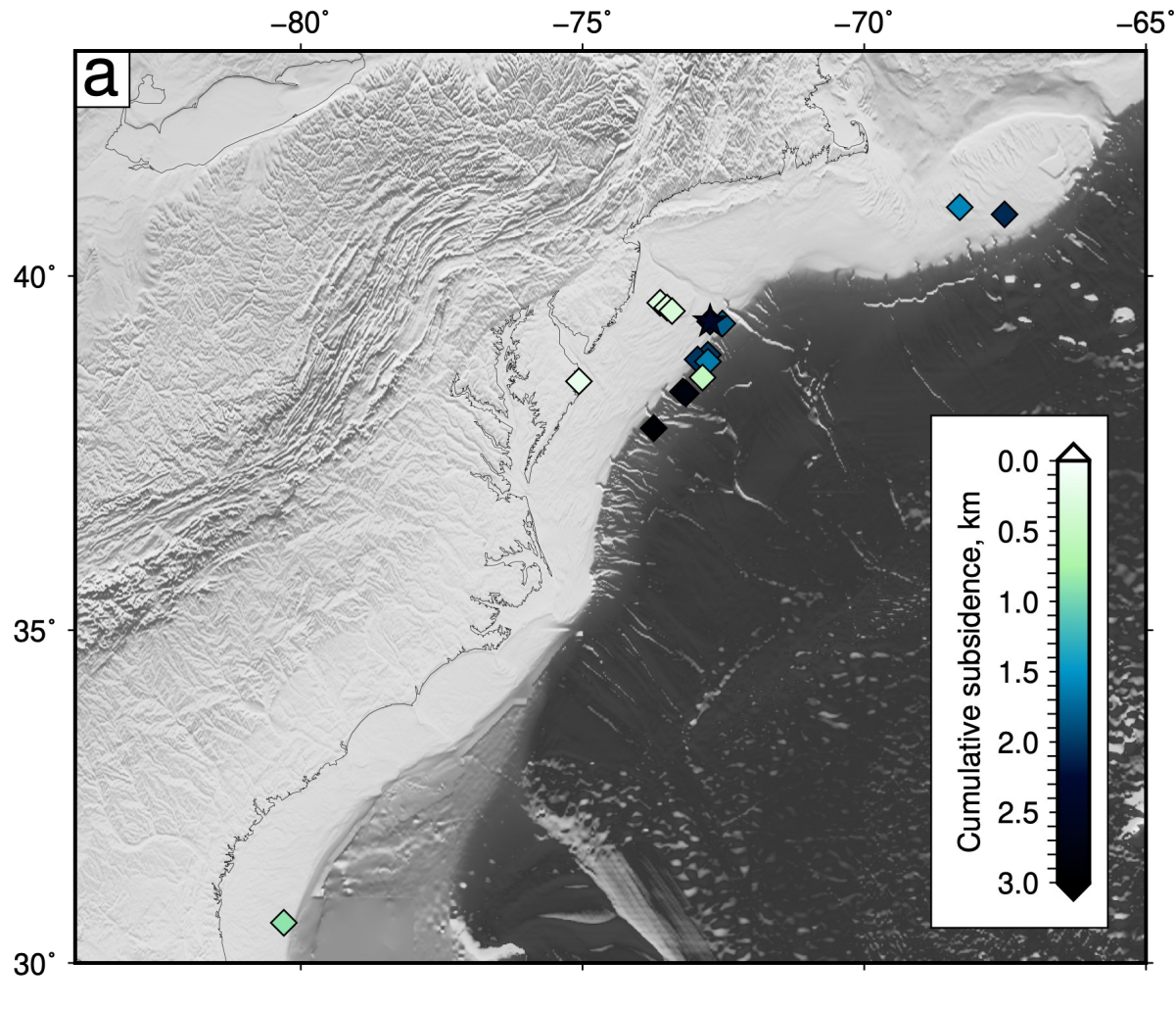
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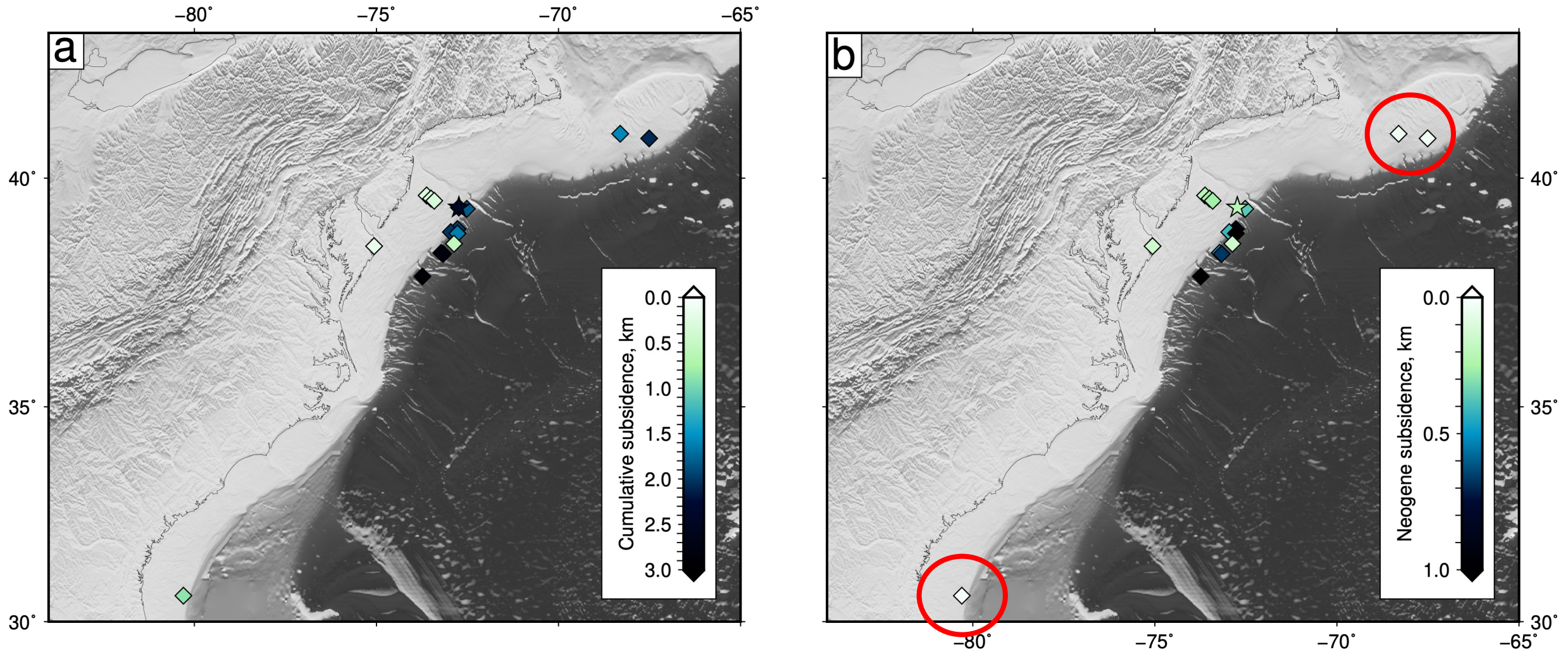
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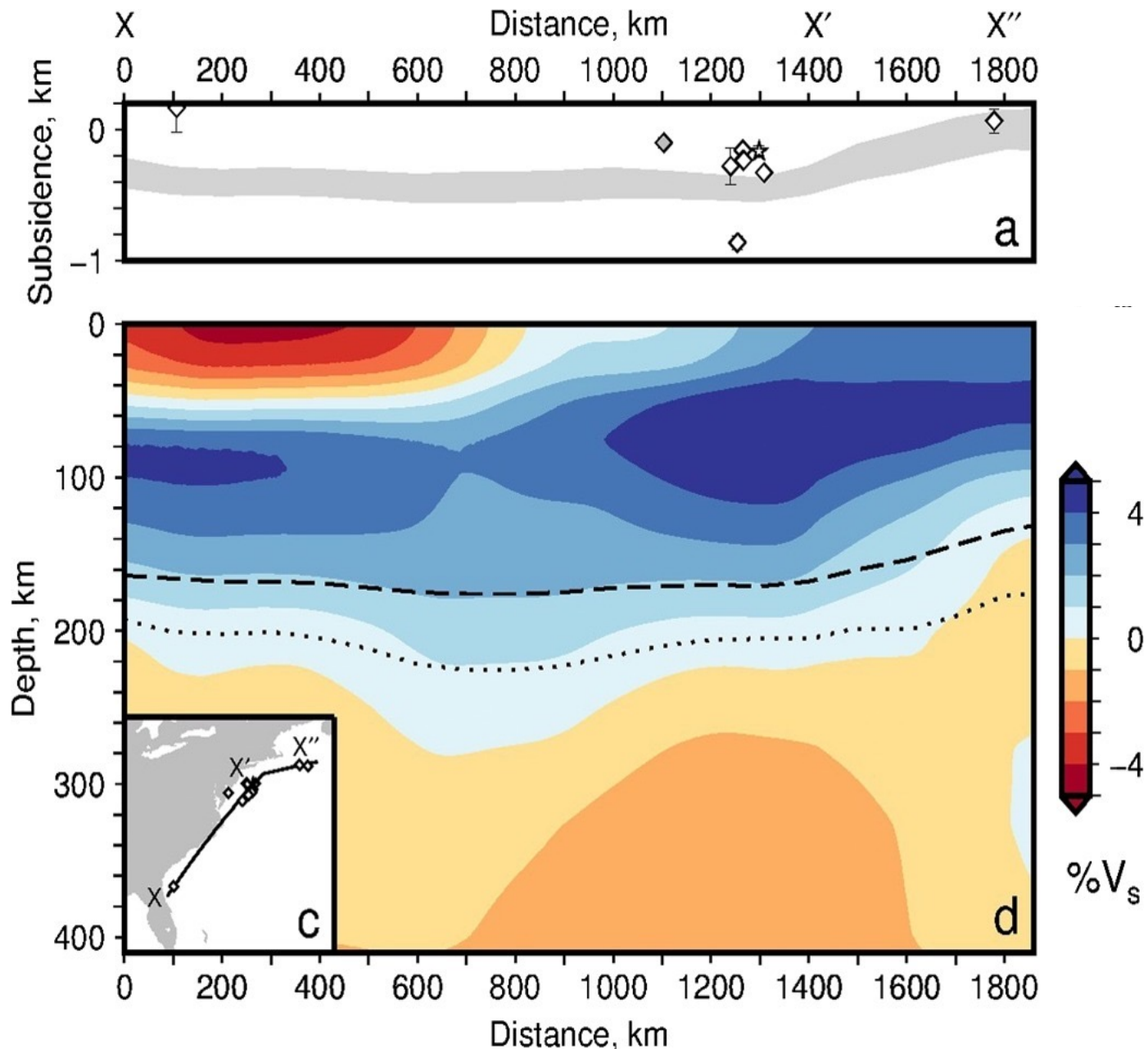
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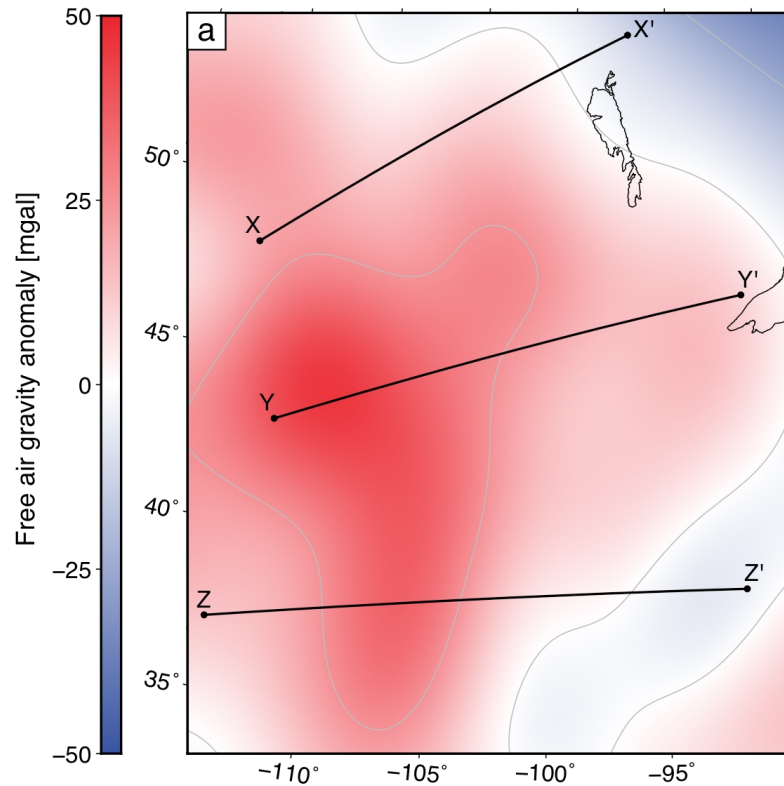
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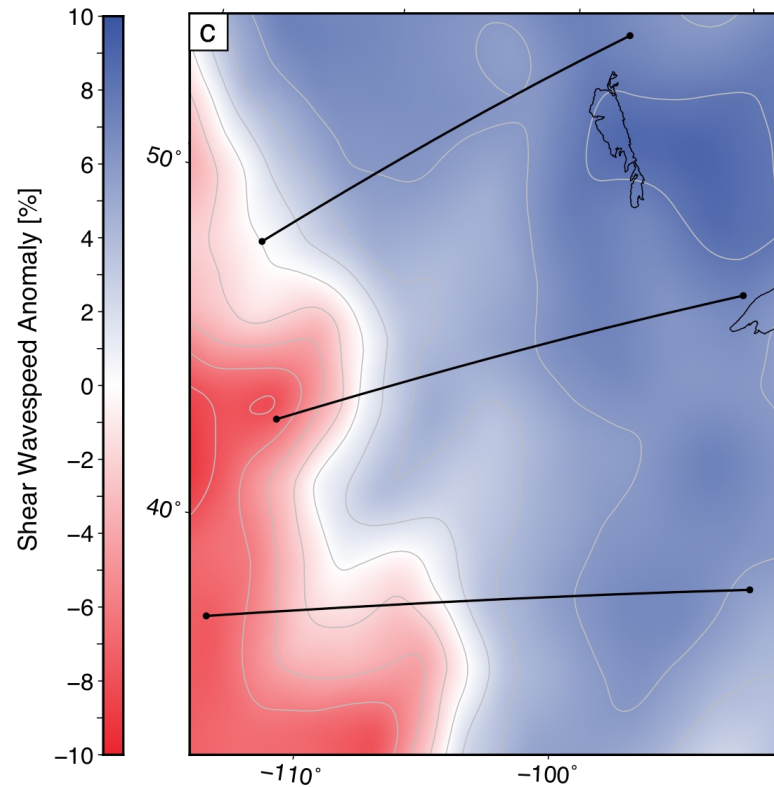
Geophysical data



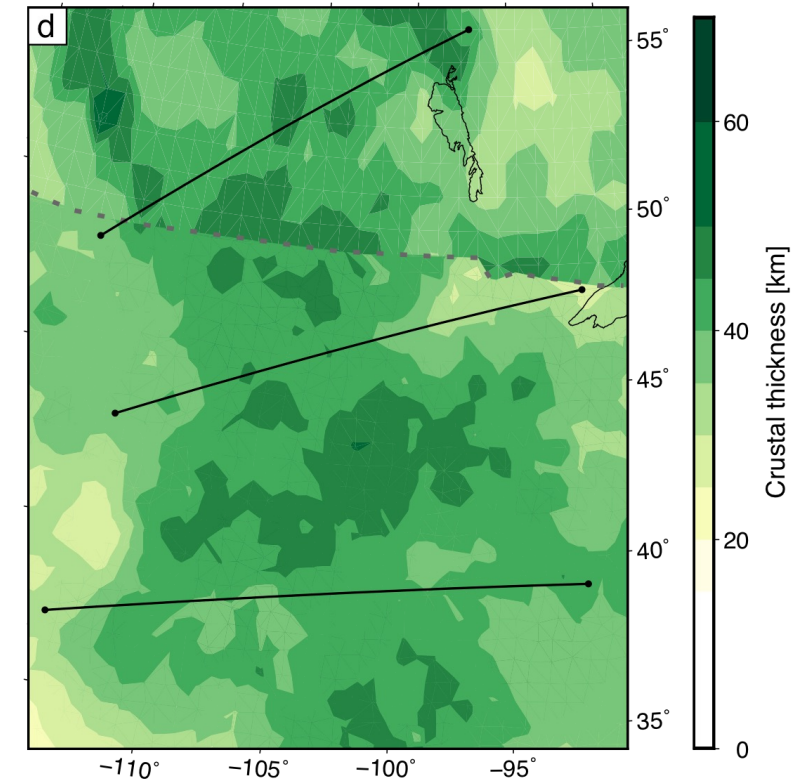
Geophysical data



GRACE 800-2500 km
Tapley et al., 2005)

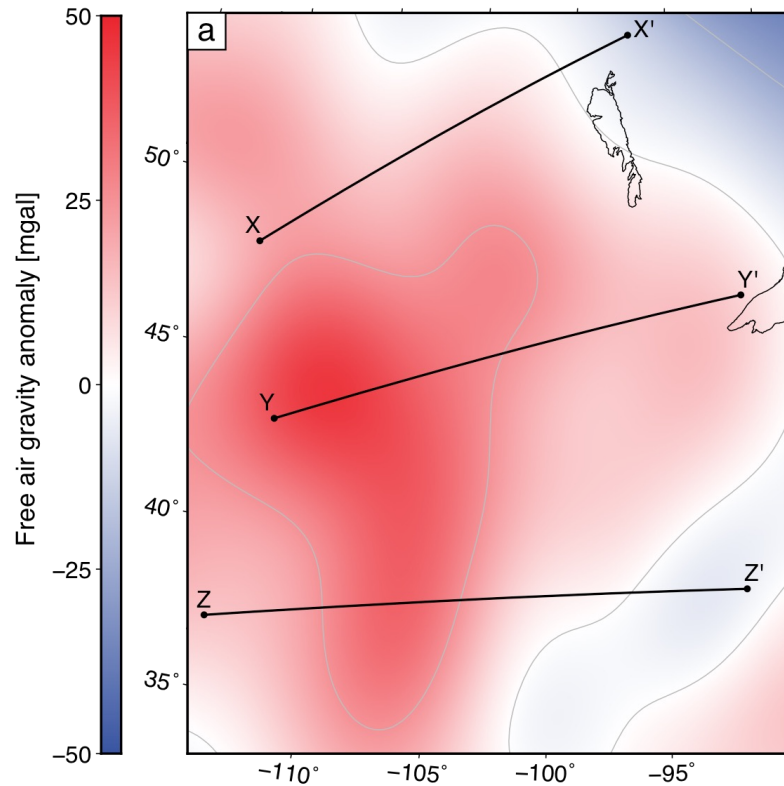


SL2013sv
Schaeffer & Lebedev (2013)

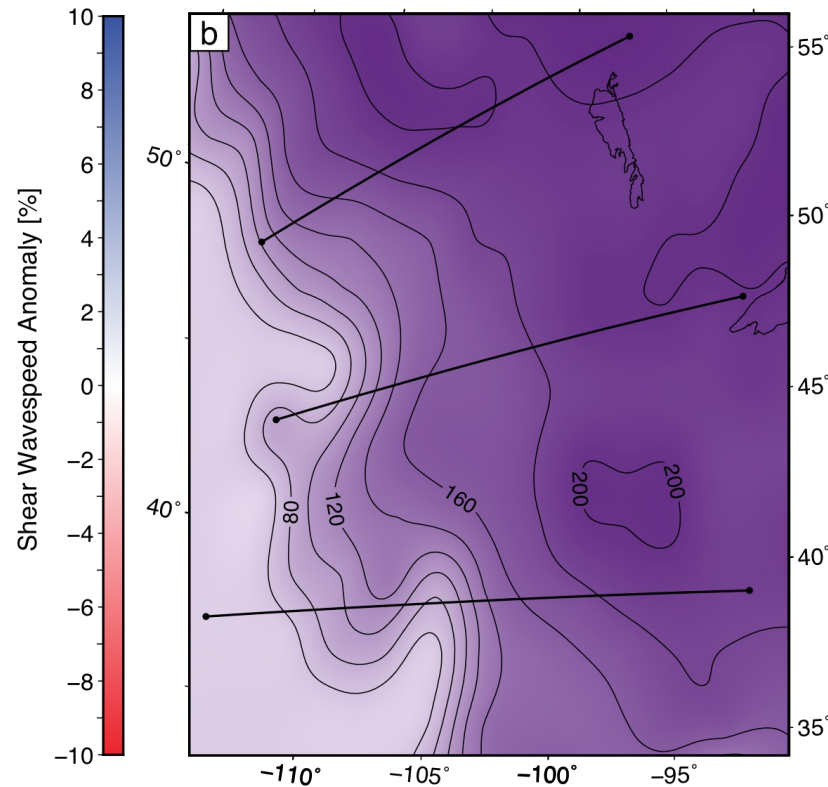


PnUS & CRUST1.0
Buehler & Shearer (2016)

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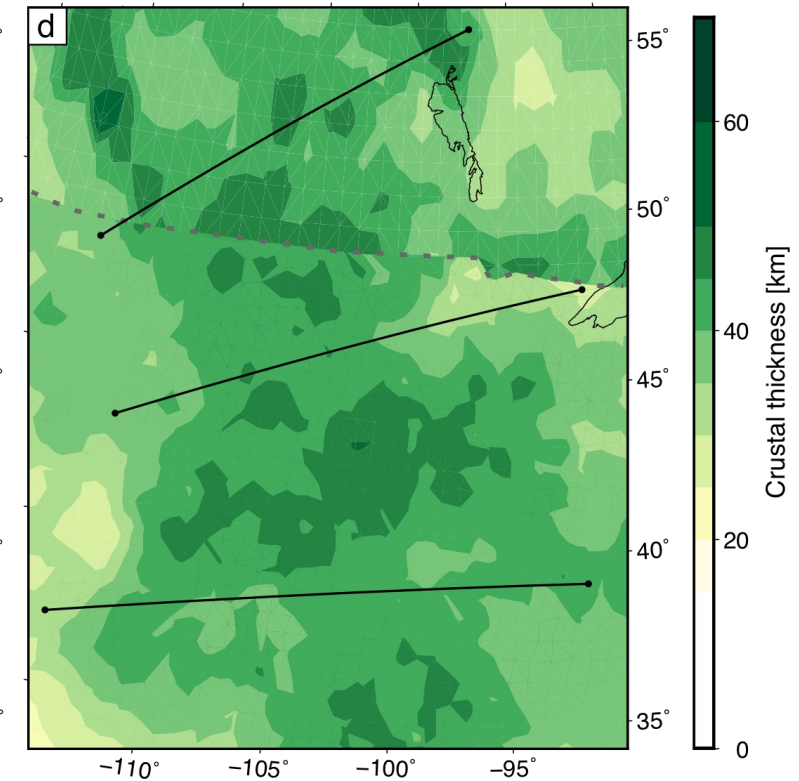


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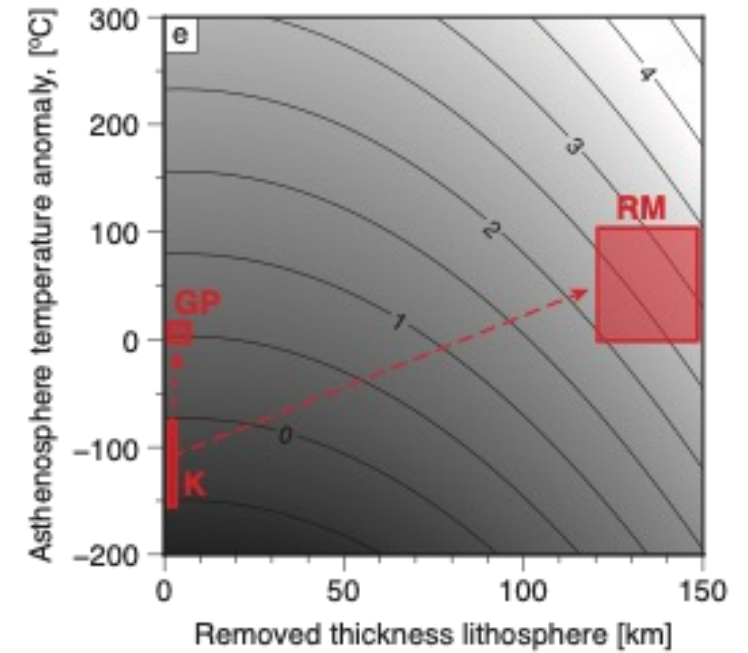
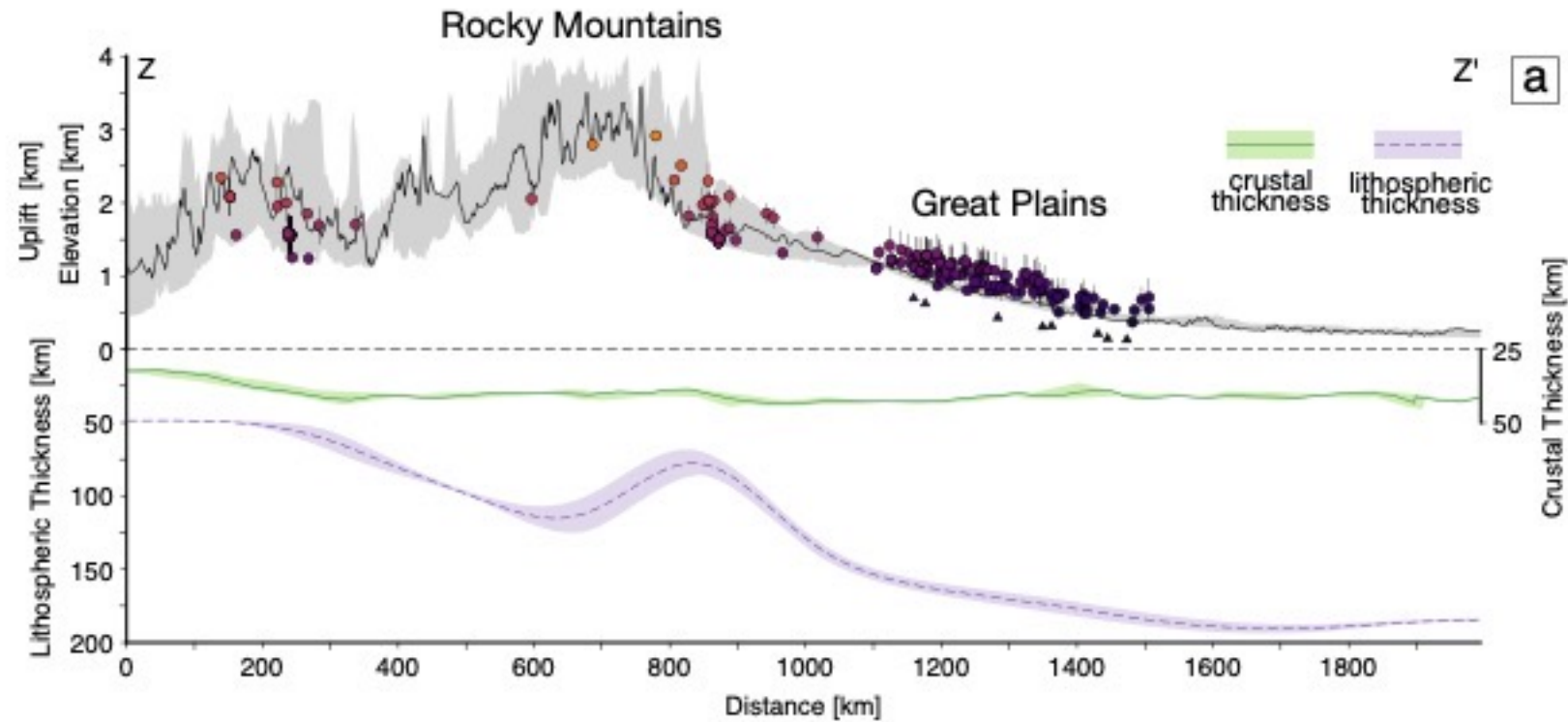
SL2013sv
Schaeffer & Lebedev (2013)

CAM2016
Priestley & McKenzie (2013)

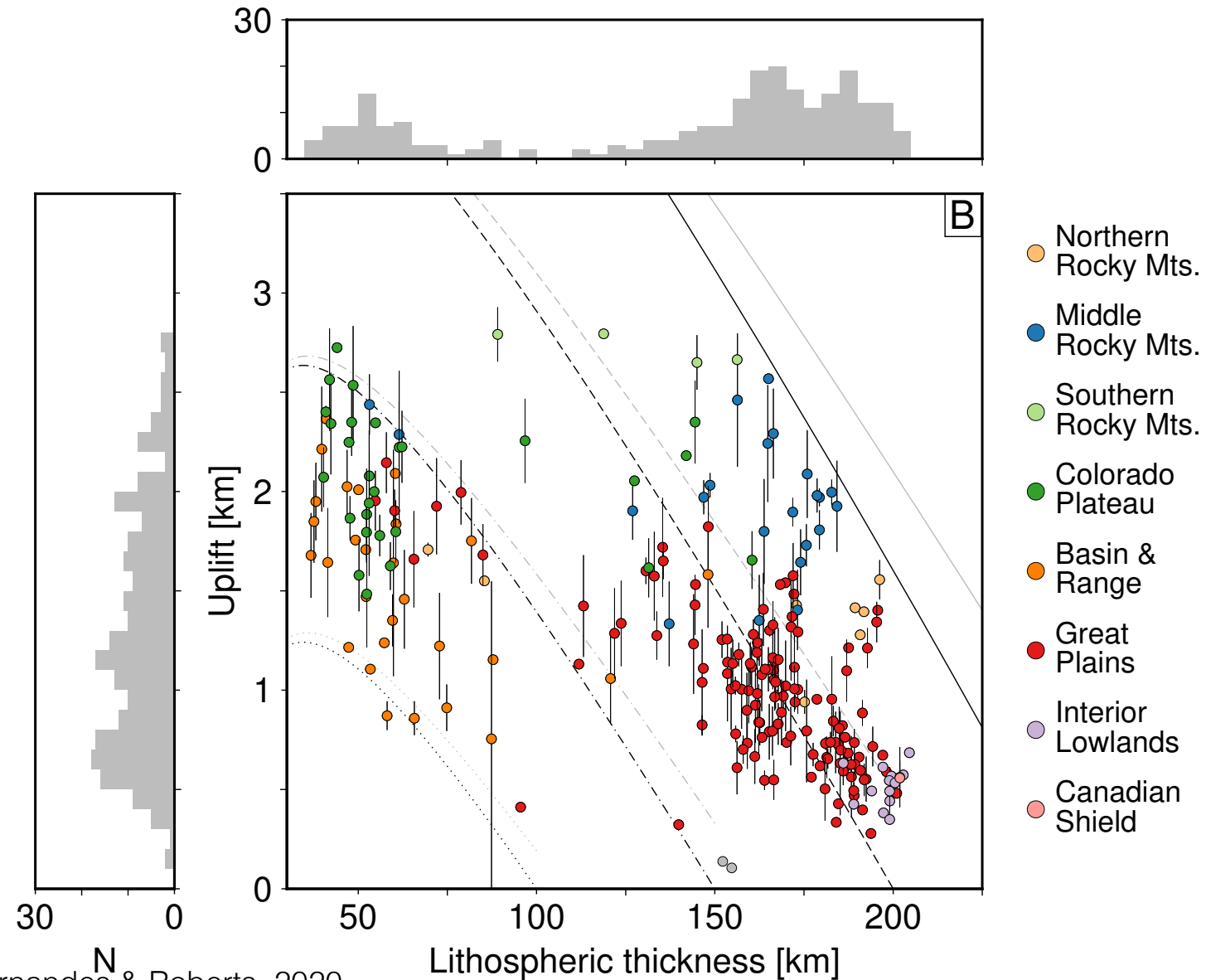


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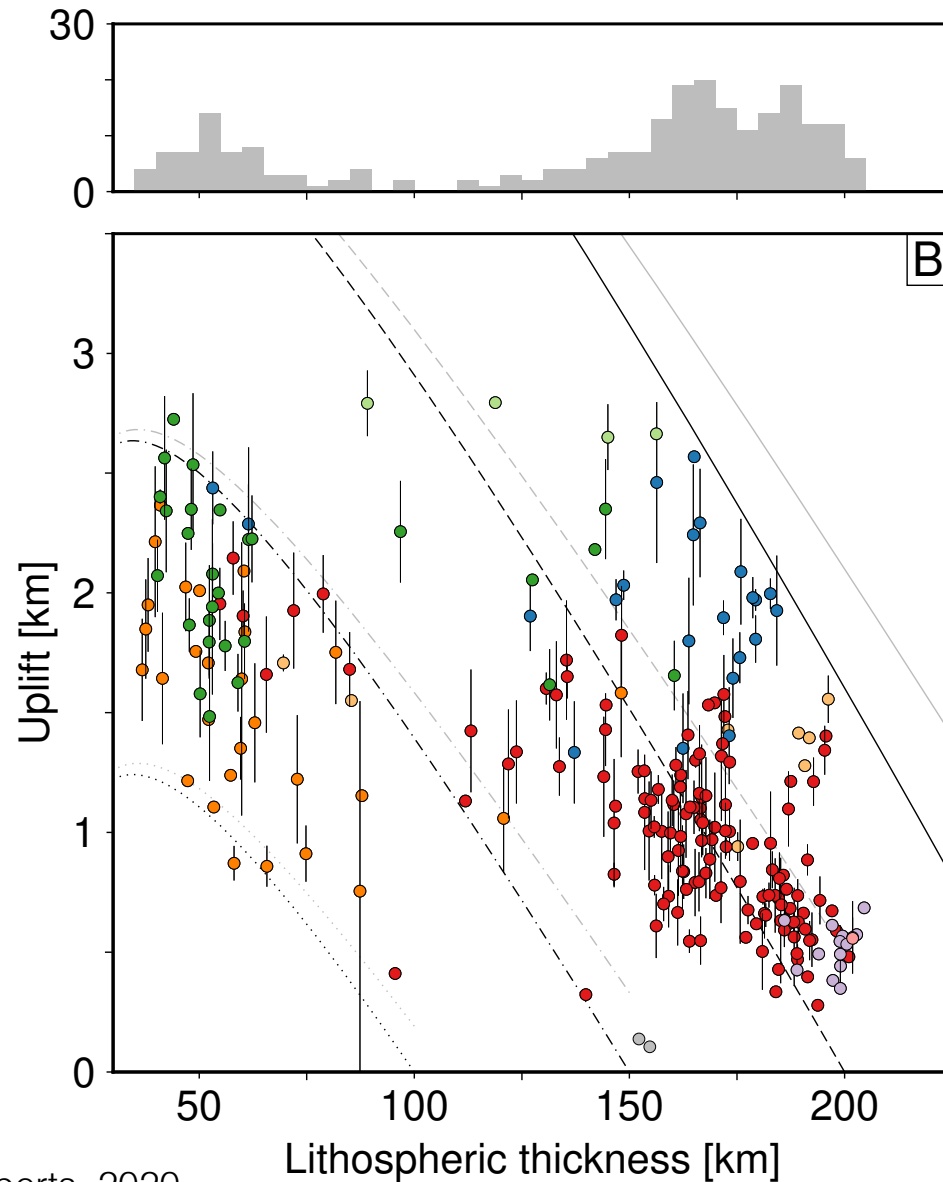
Drivers of Uplift



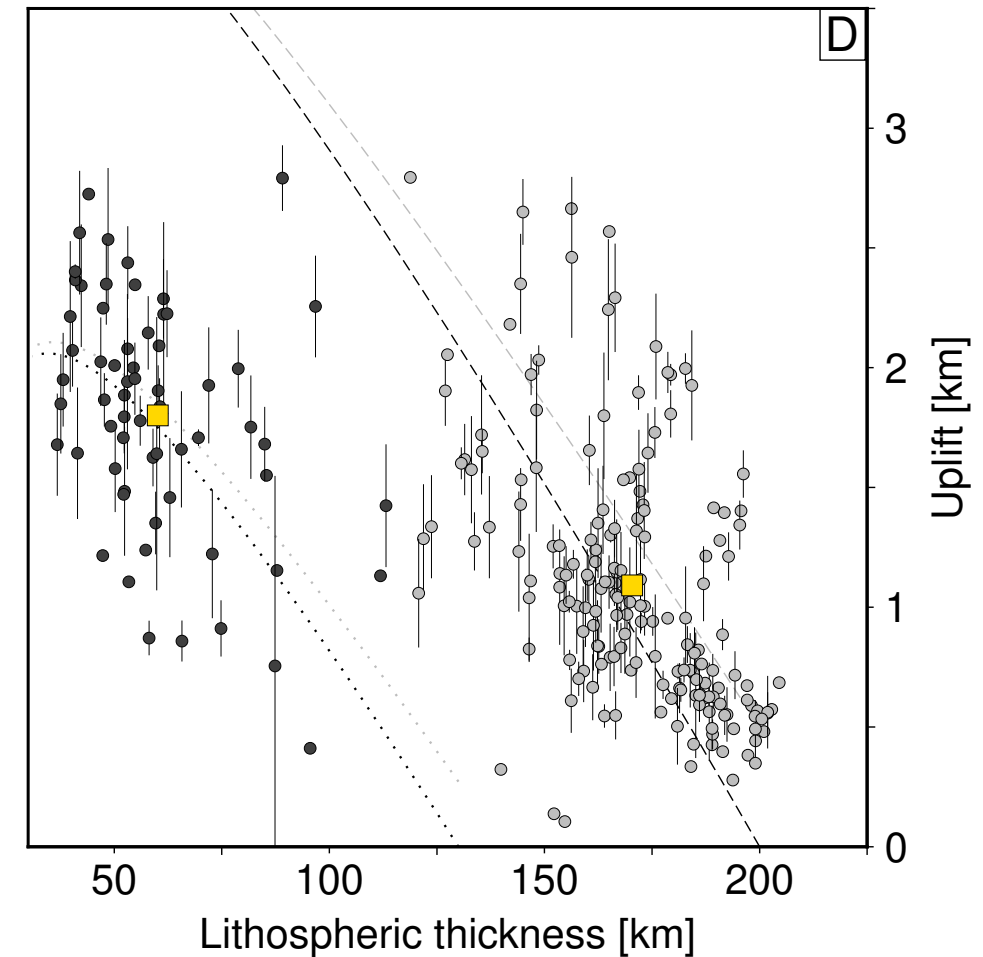
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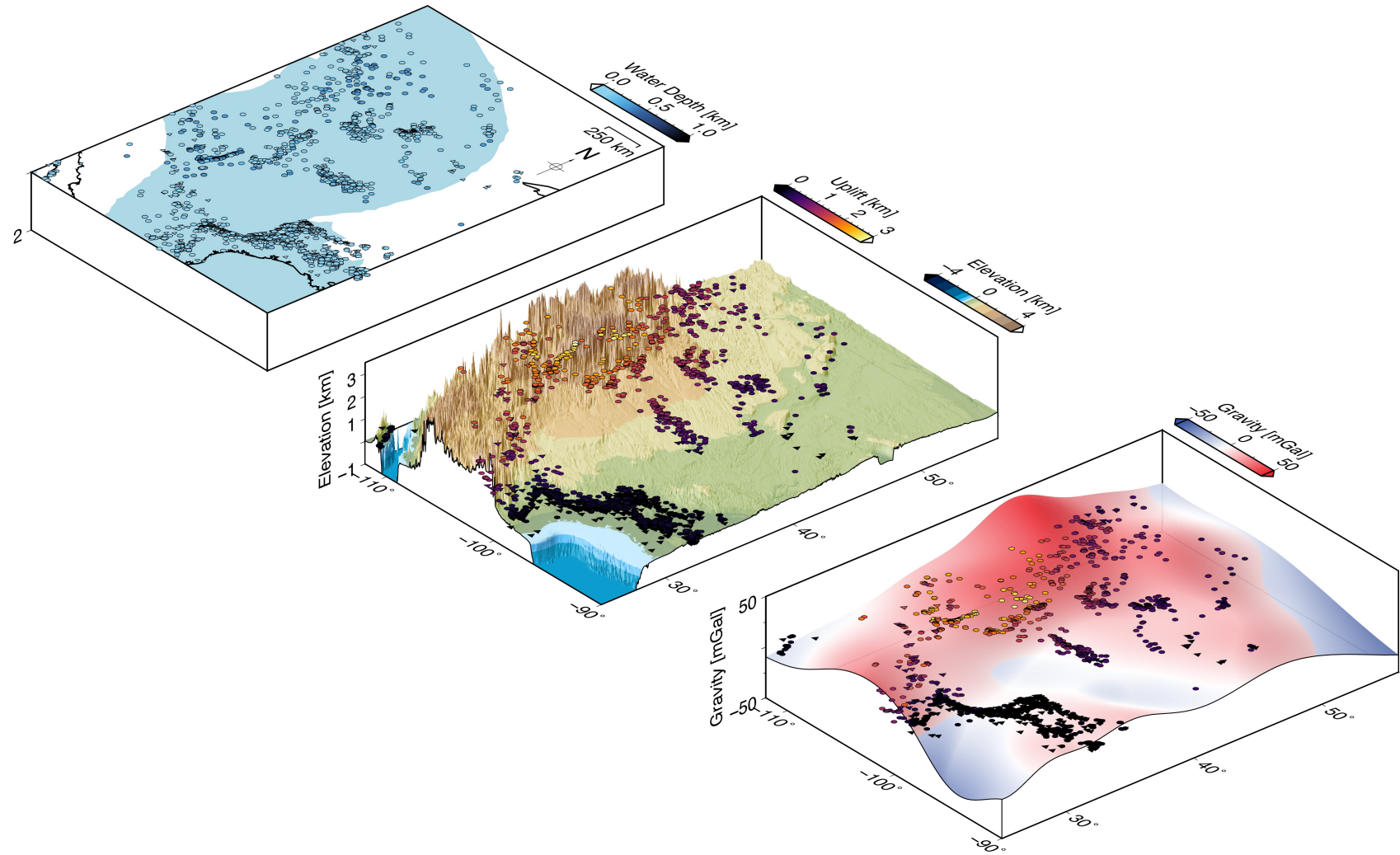


- Northern Rocky Mts.
- Middle Rocky Mts.
- Southern Rocky Mts.
- Colorado Plateau
- Basin & Range
- Great Plains
- Interior Lowlands
- Canadian Shield



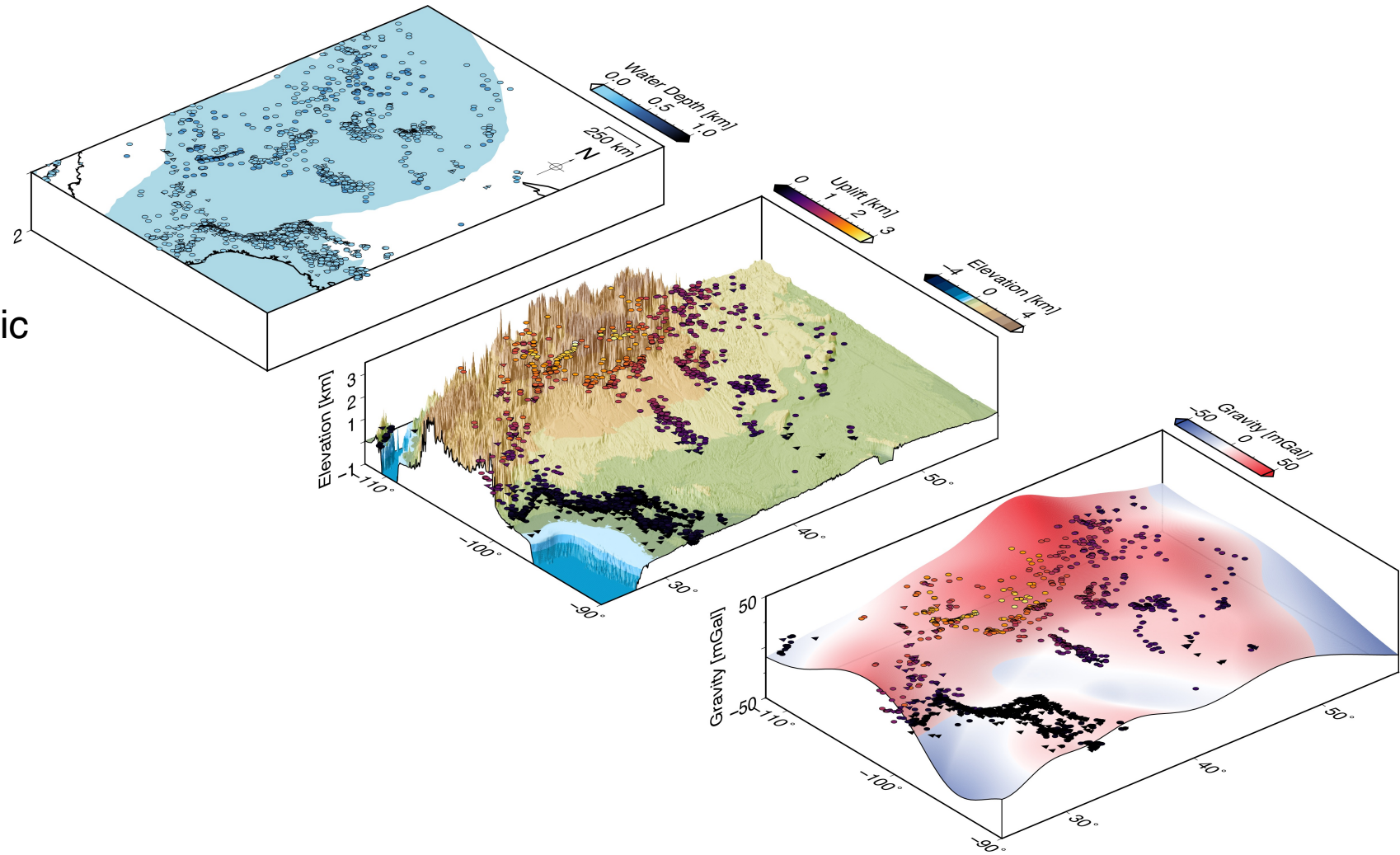
Summary

- Quantifying the amplitudes, length-scales and timing of changes in dynamic topography is a global problem.



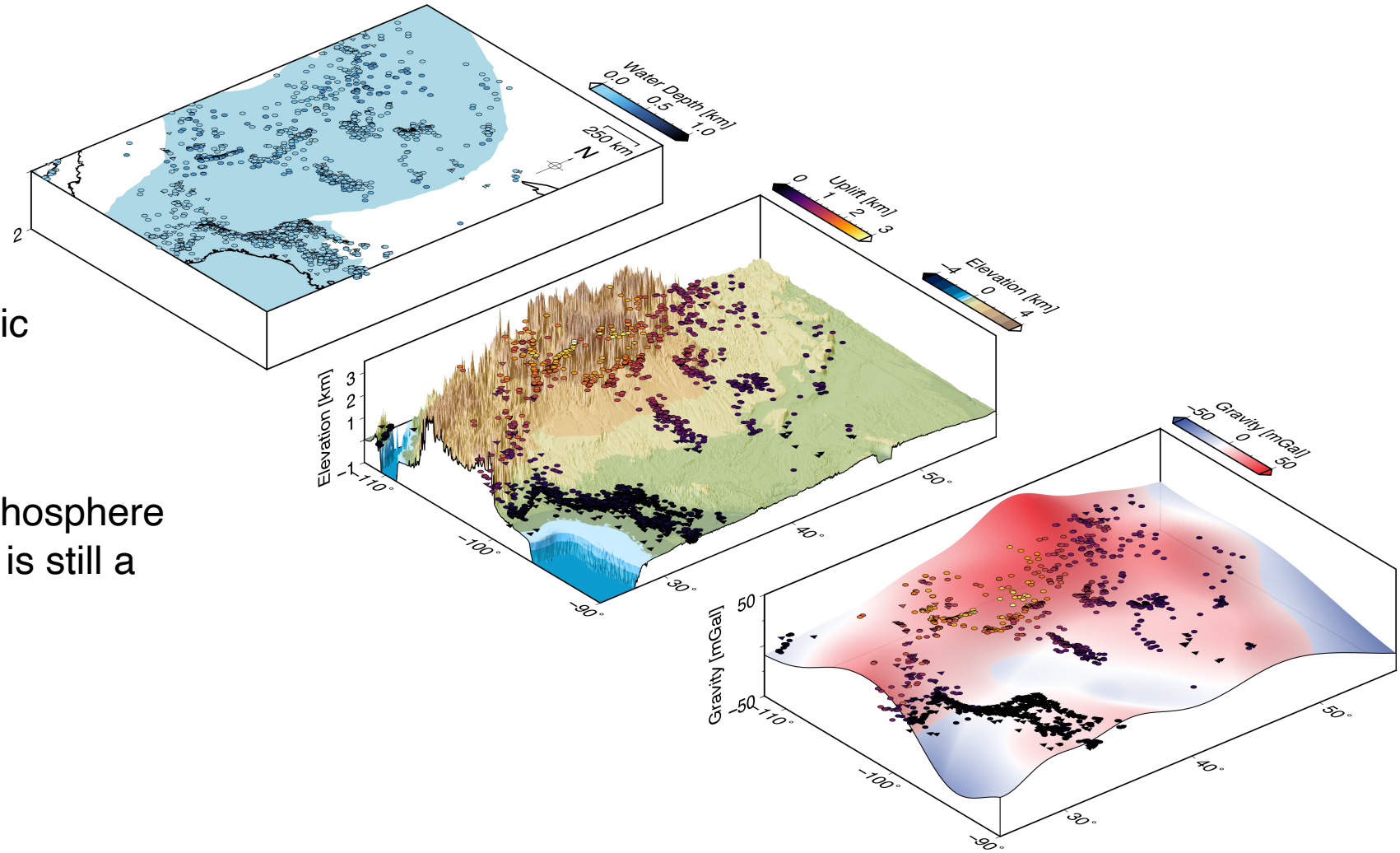
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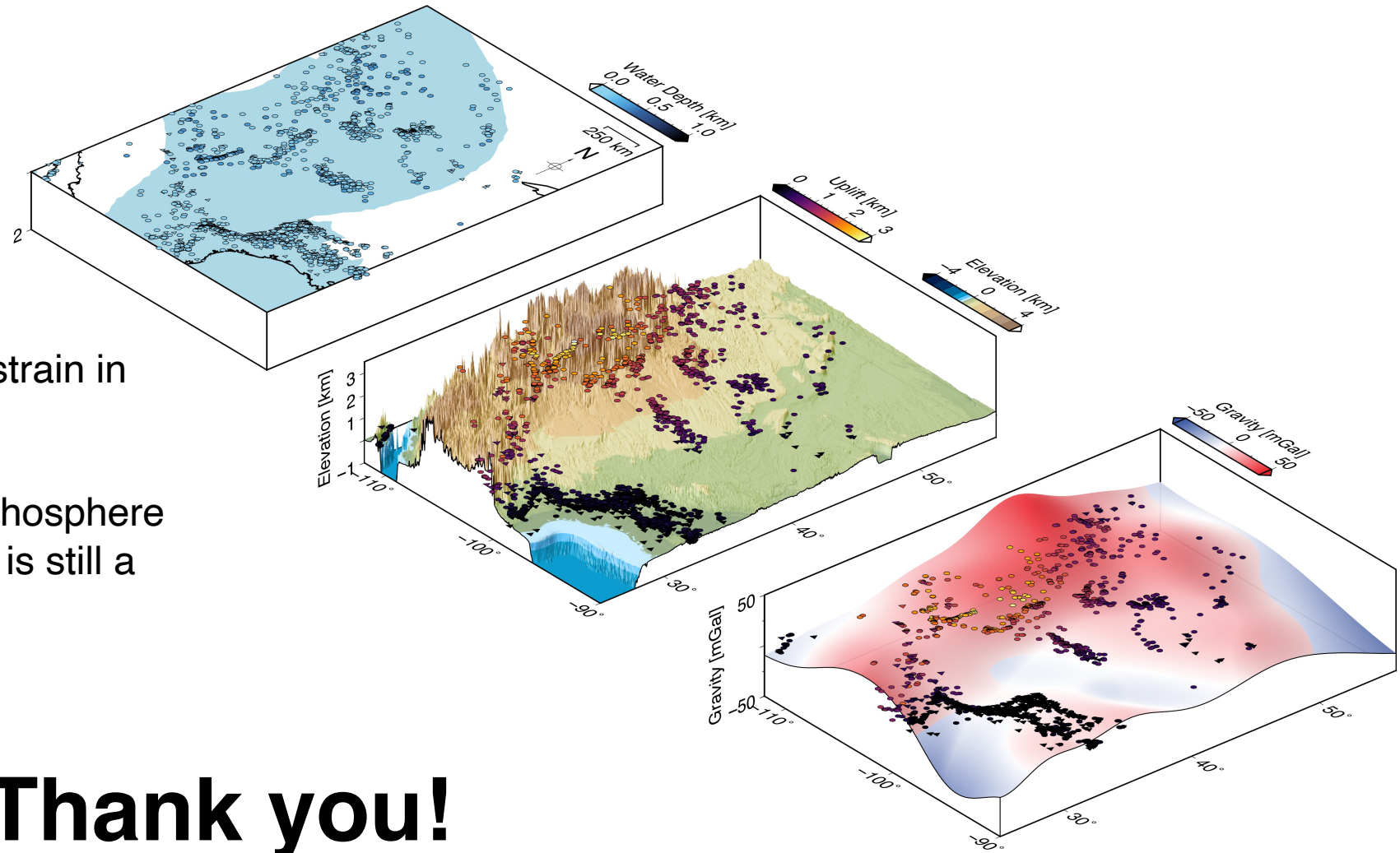
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Thank you!