

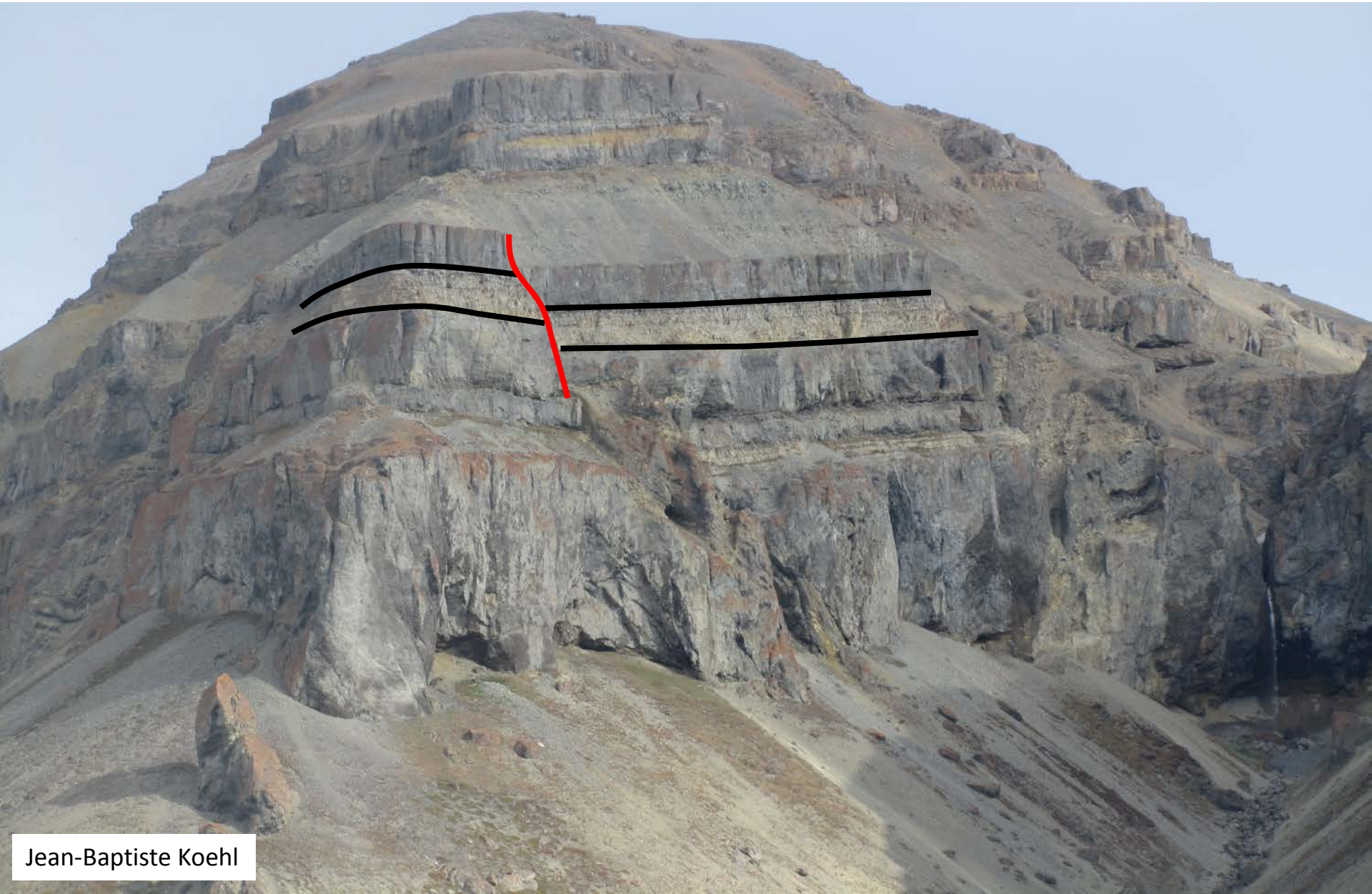
# Impact of Timanian thrusts on the Phanerozoic tectonic history of Svalbard



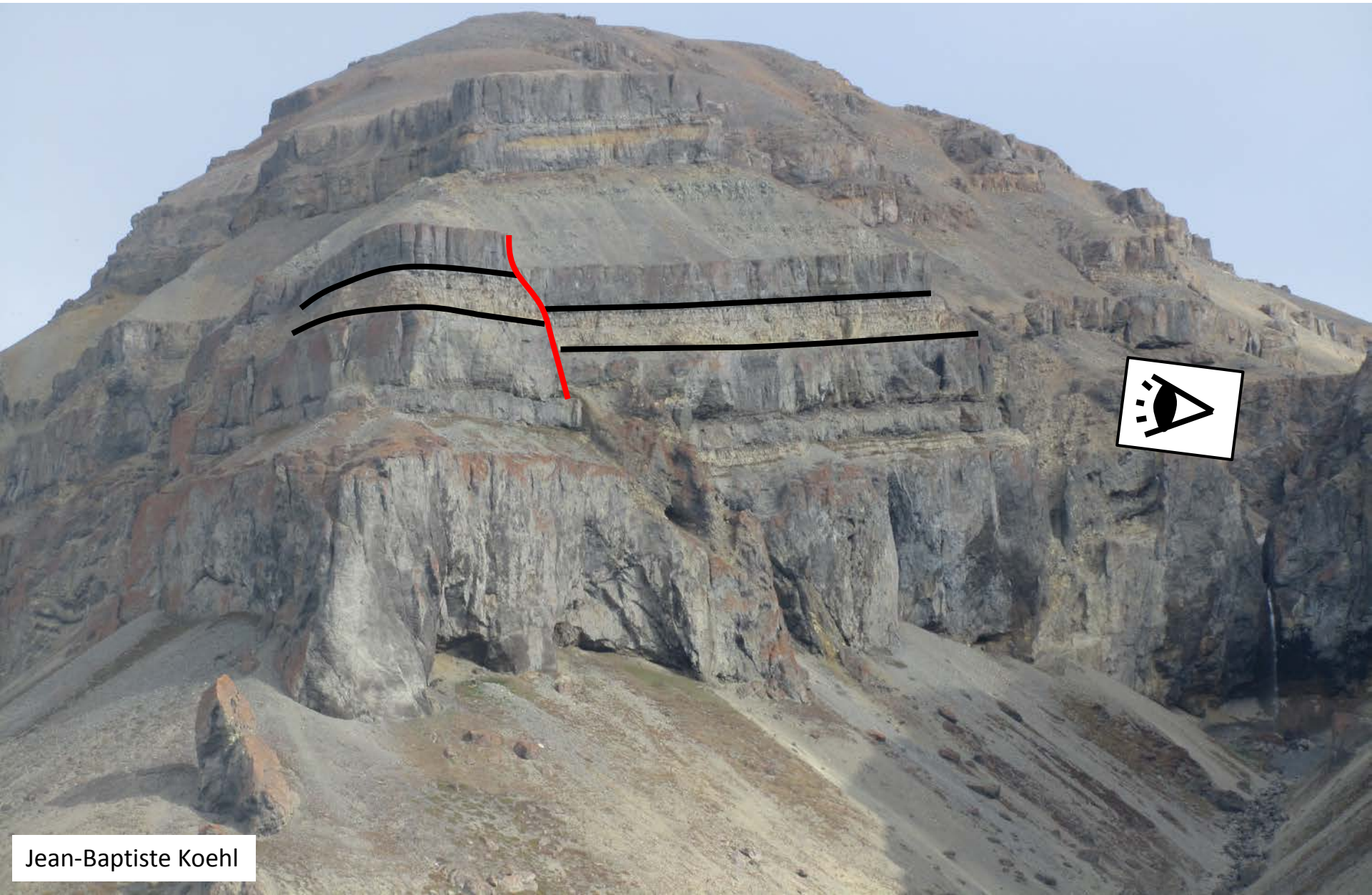
# Impact of Timanian thrusts on the Phanerozoic tectonic history of Svalbard



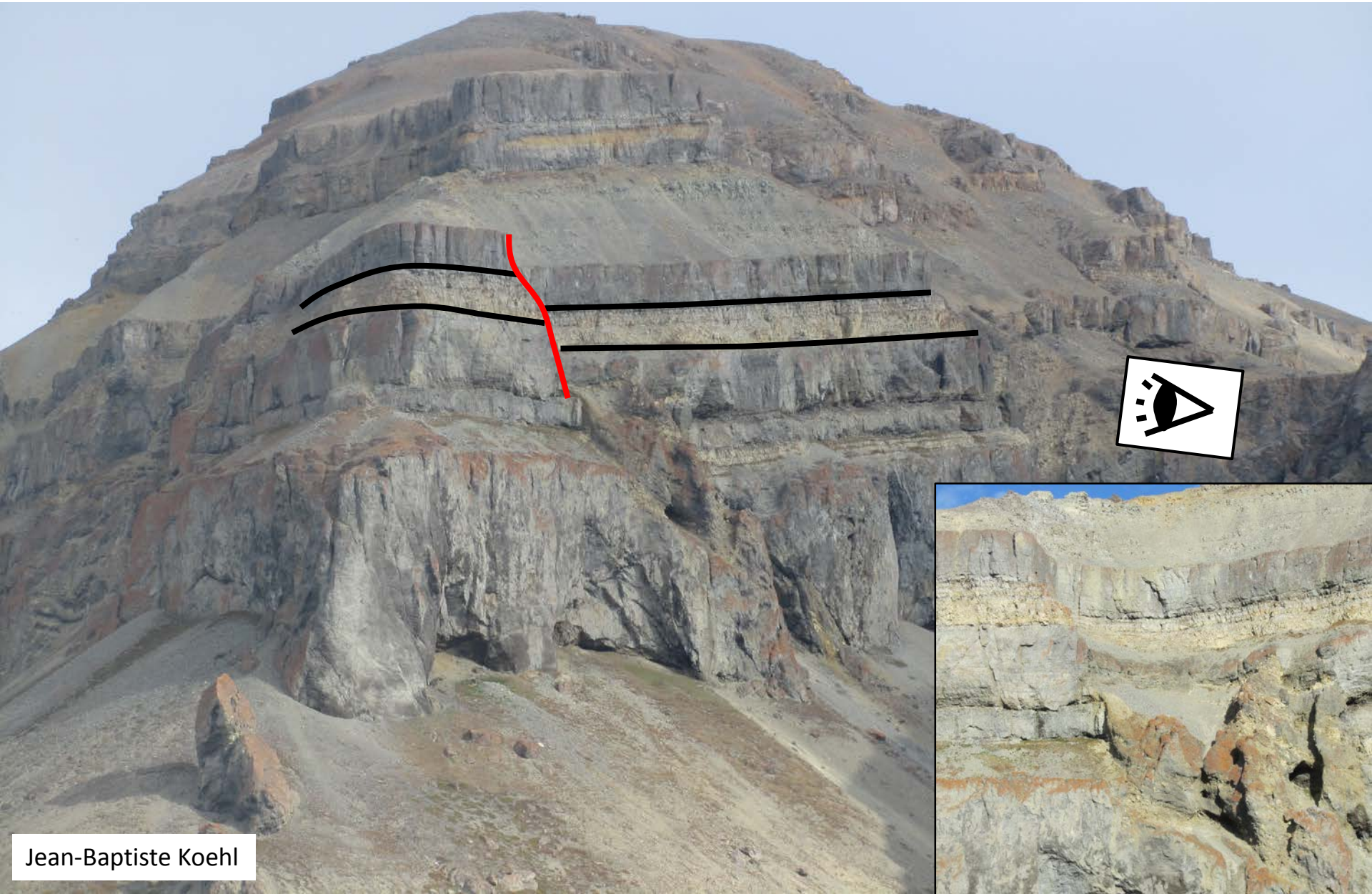
# Impact of Timanian thrusts on the Phanerozoic tectonic history of Svalbard



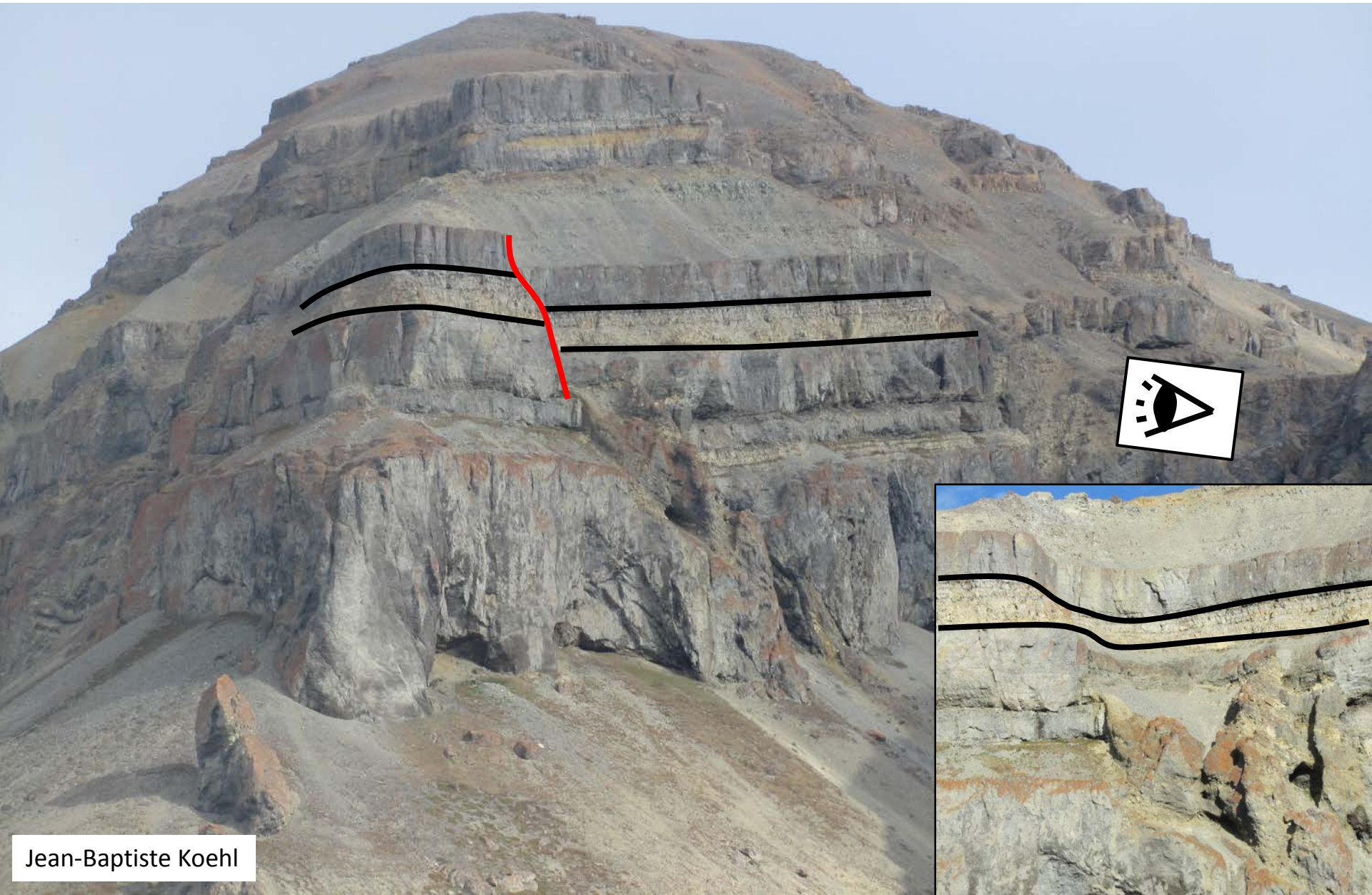
# Impact of Timanian thrusts on the Phanerozoic tectonic history of Svalbard



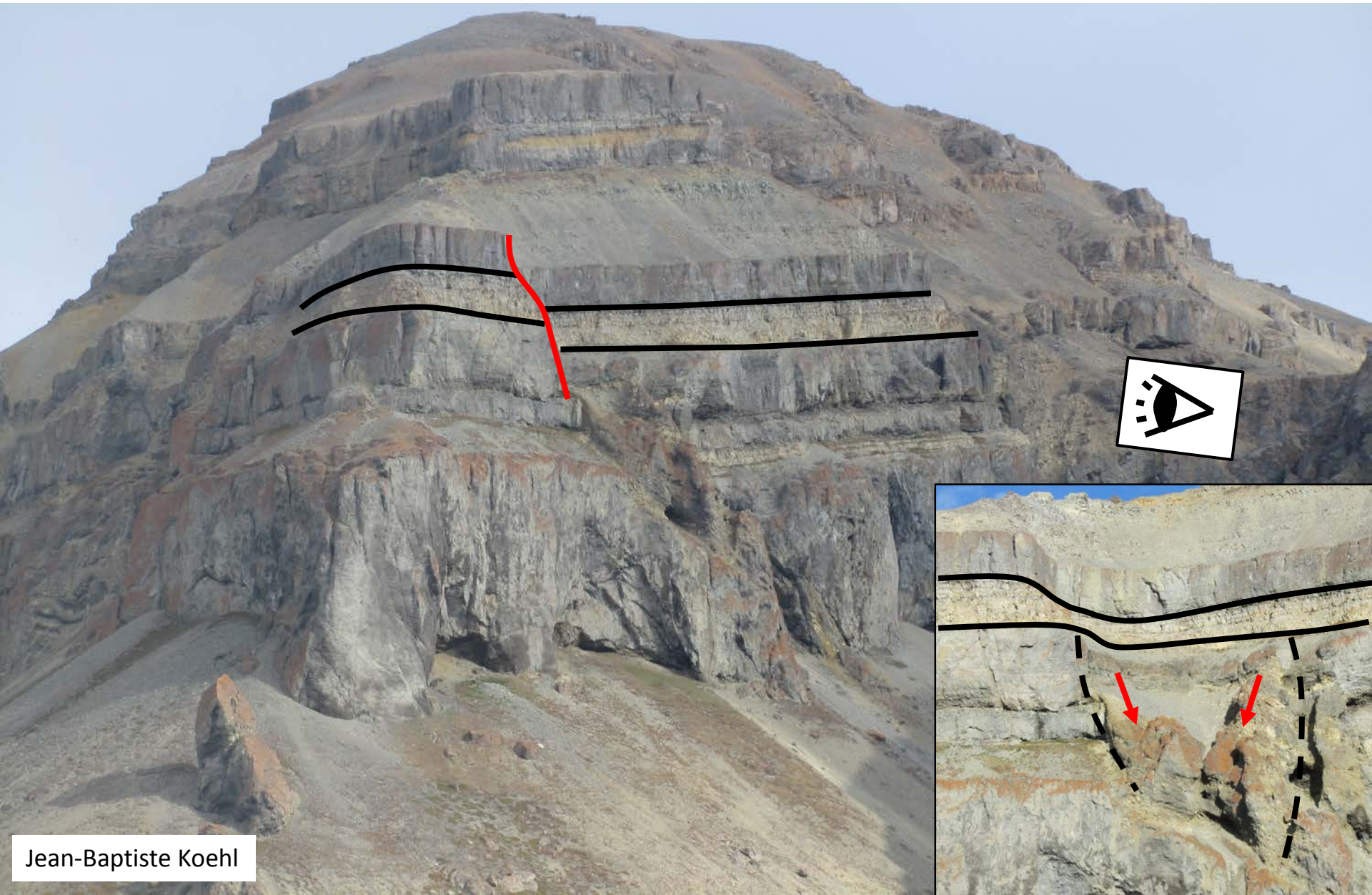
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# Impact of Timanian thrusts on the Phanerozoic tectonic history of Svalbard



# Impact of Timanian thrusts on the Phanerozoic tectonic history of Svalbard











# Goals



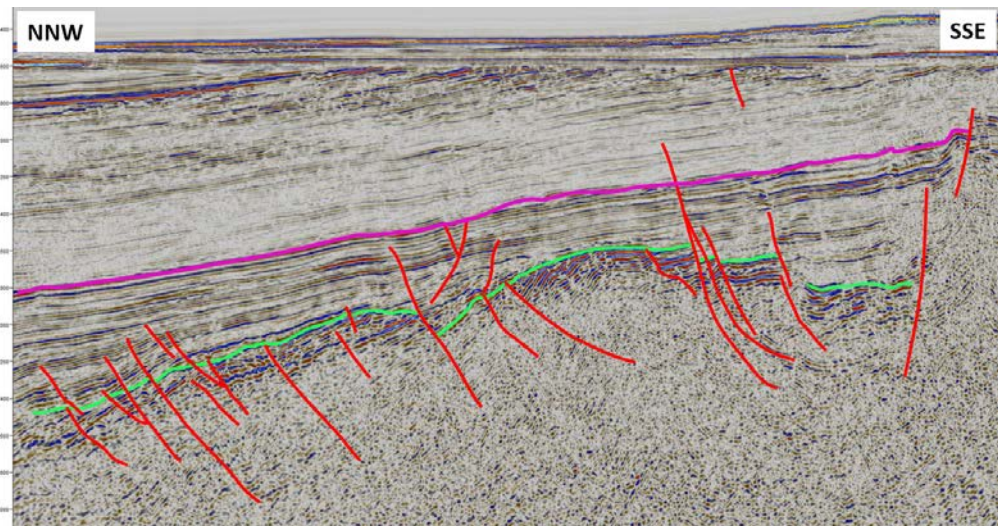
# Goals



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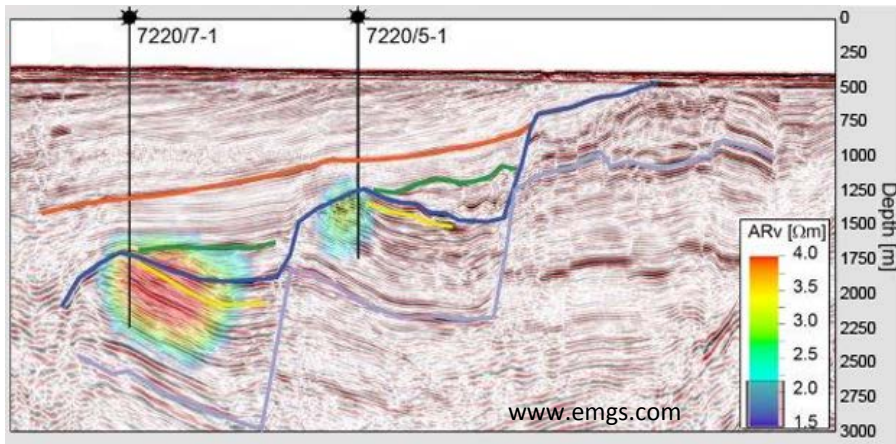
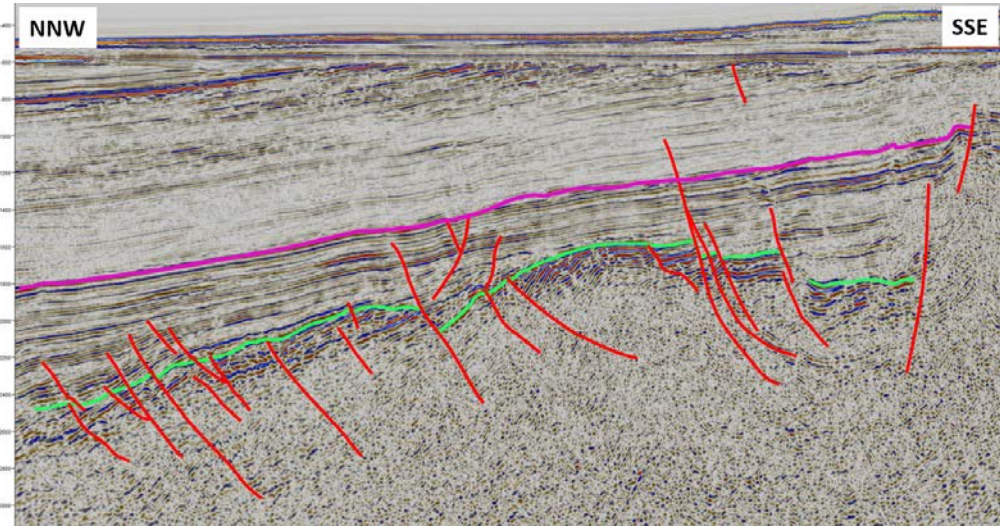
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# Goals



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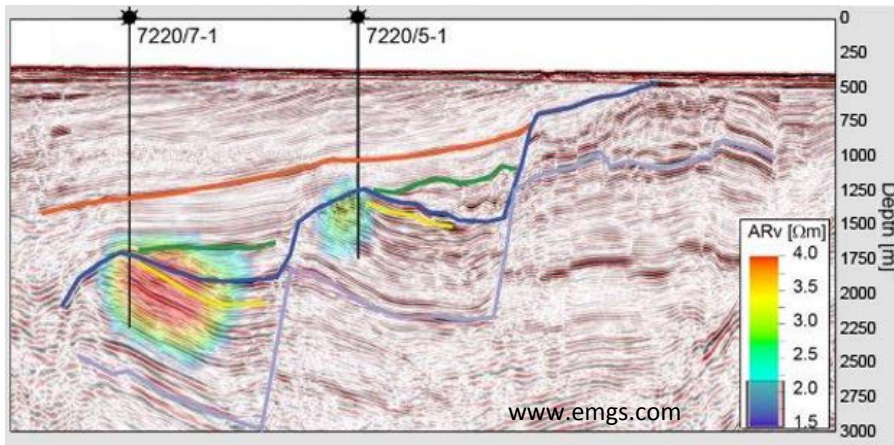
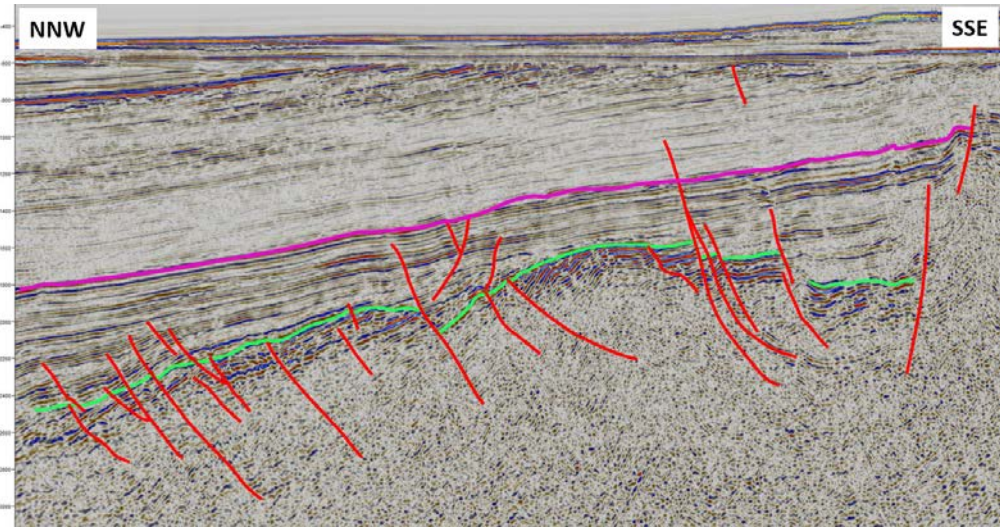


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# Goals



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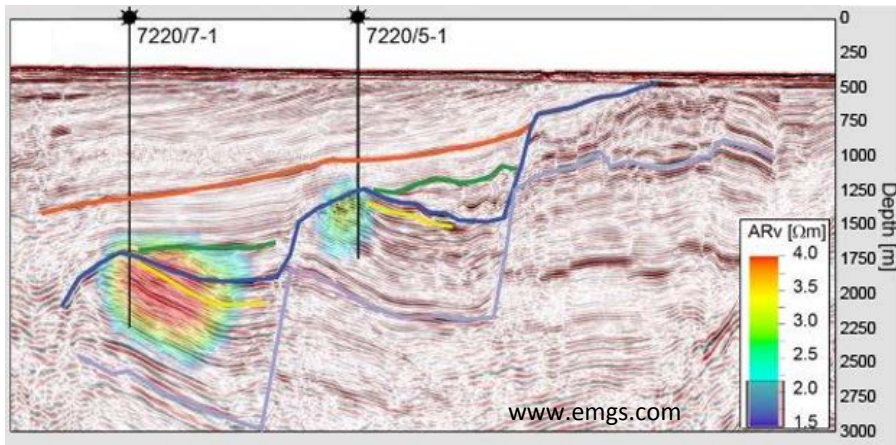
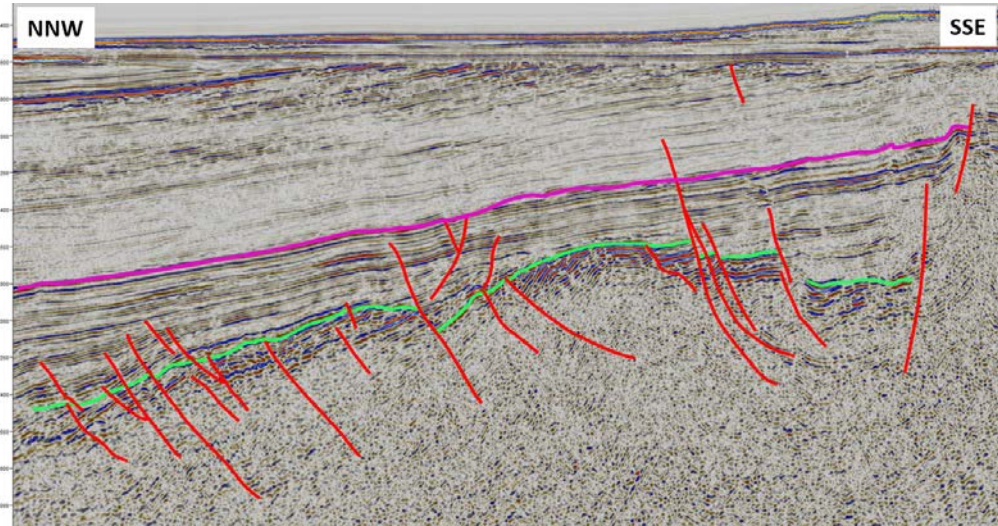


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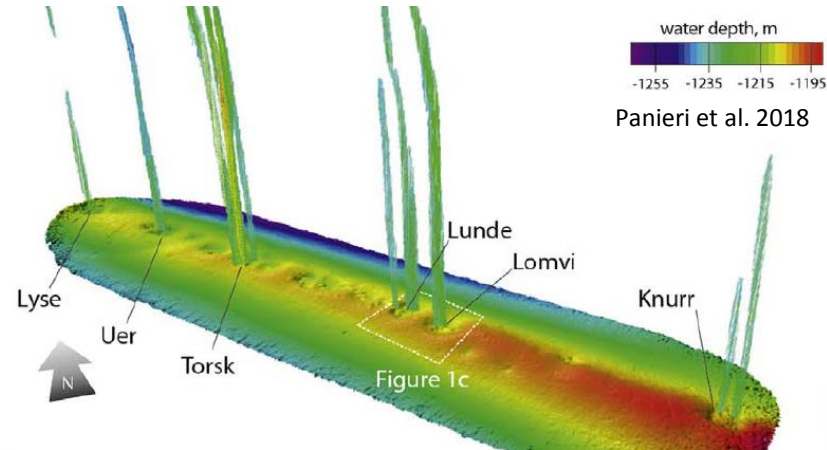
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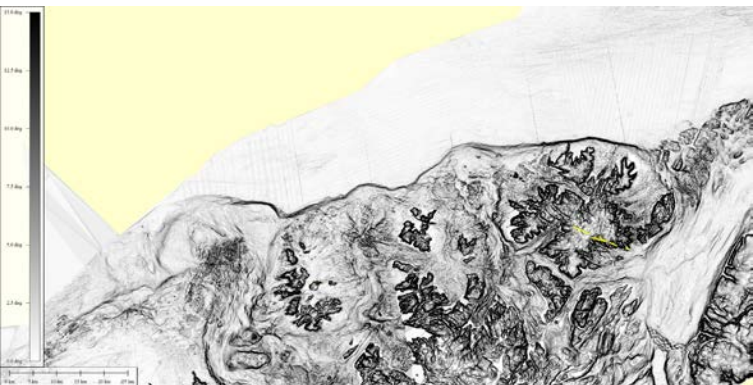
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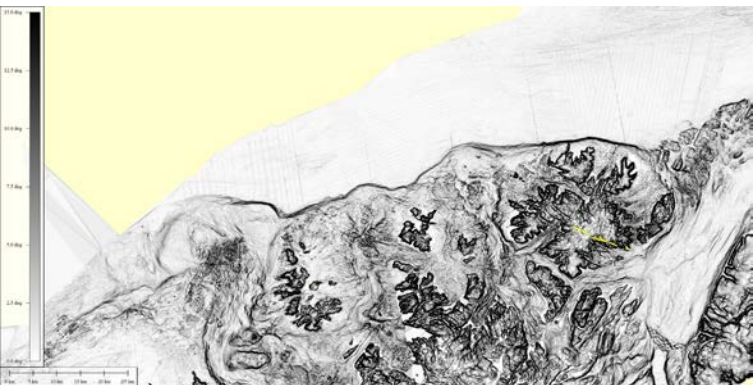




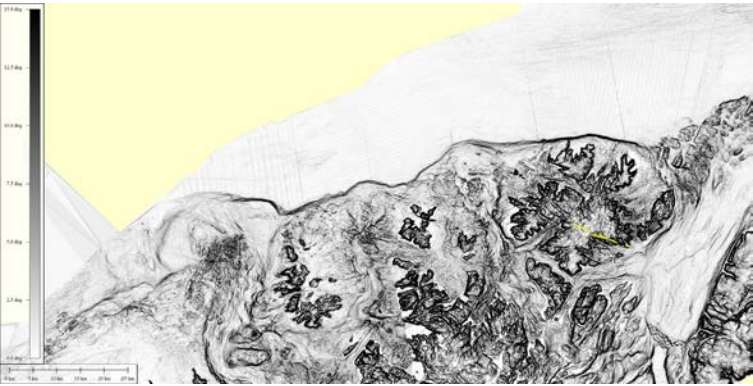
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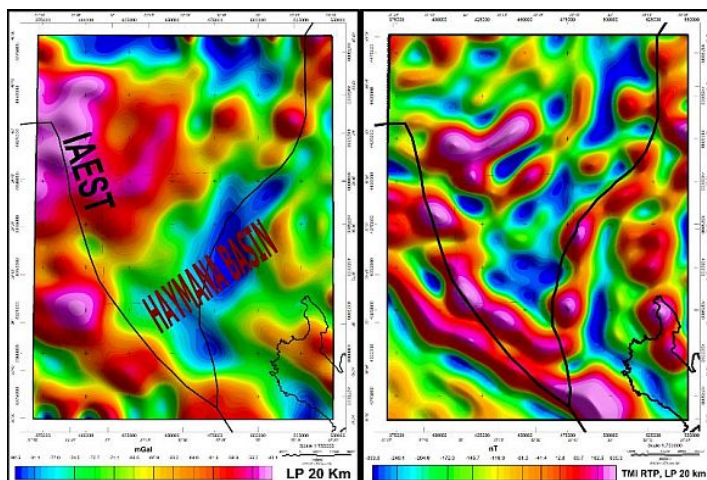
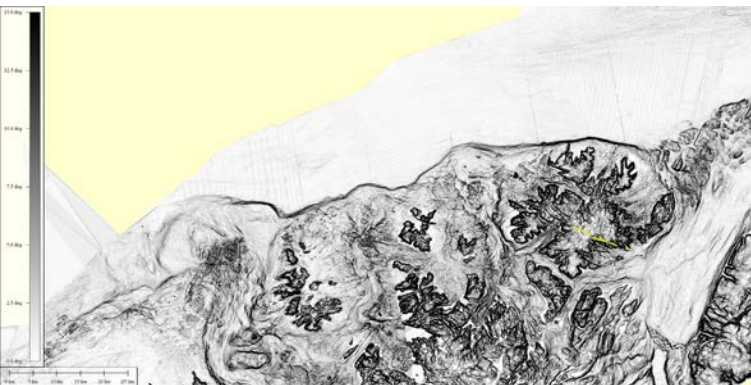
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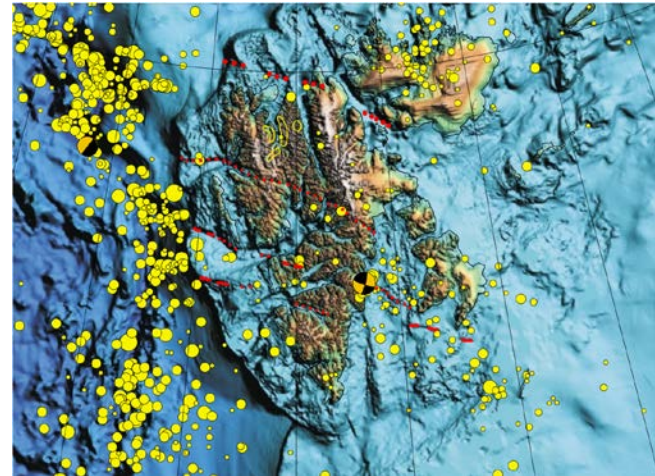
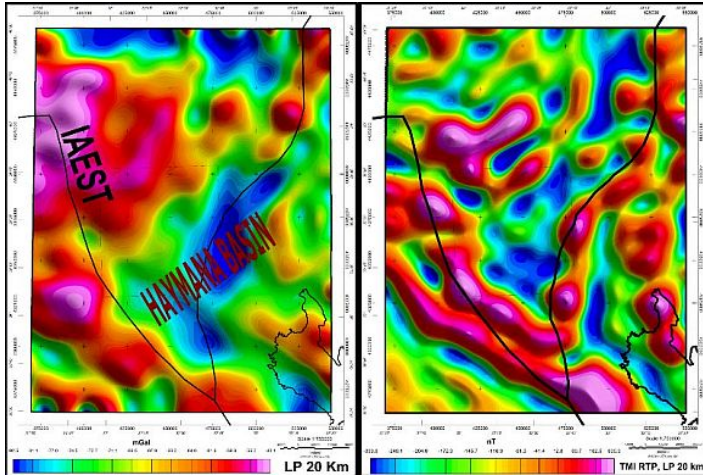
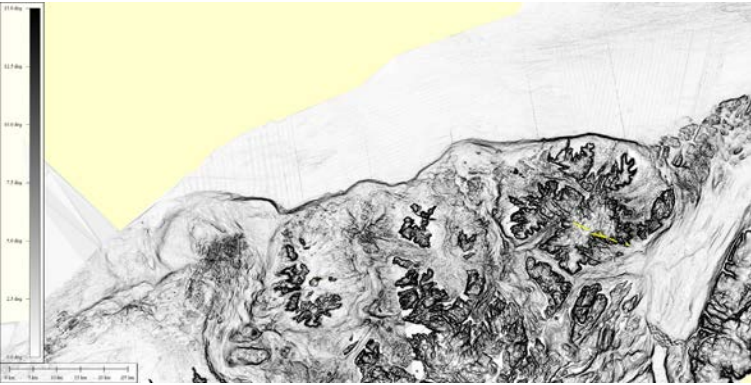
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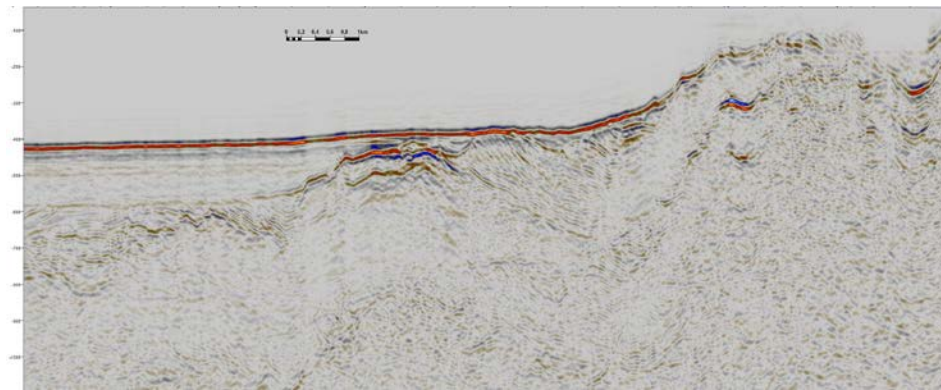
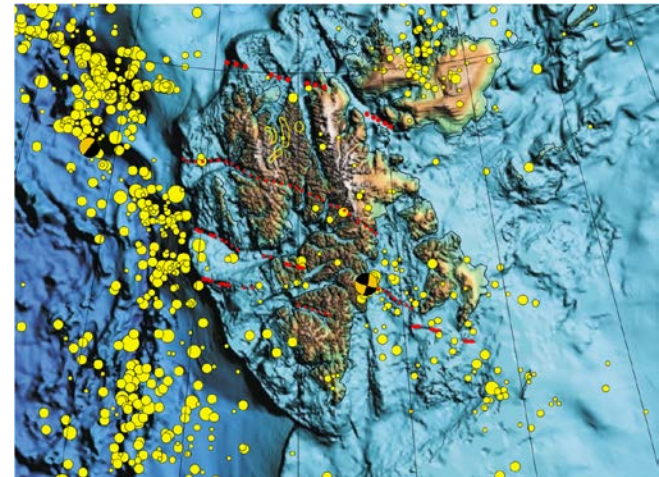
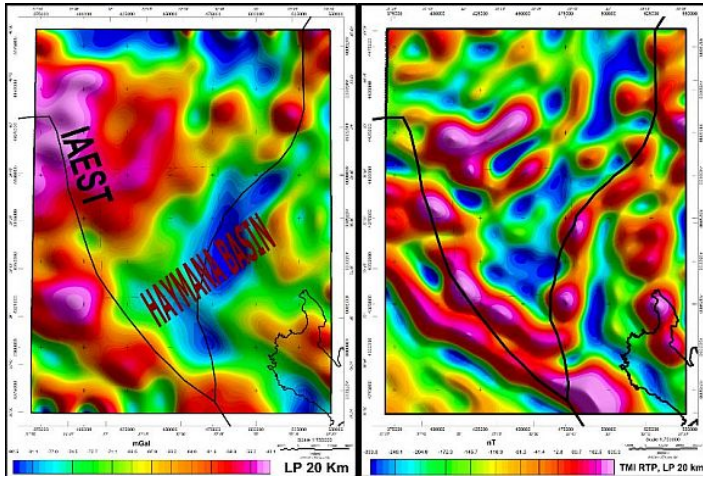
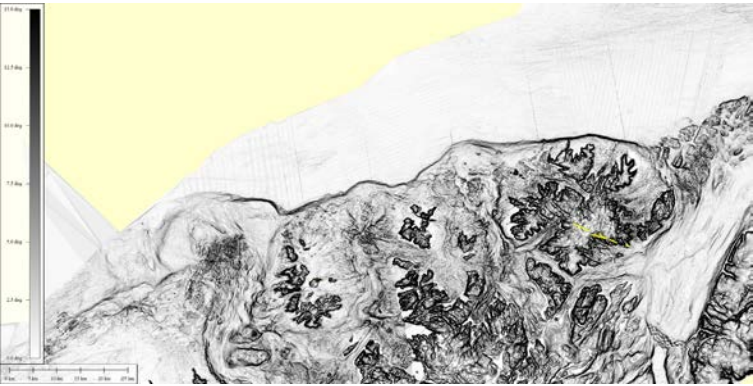
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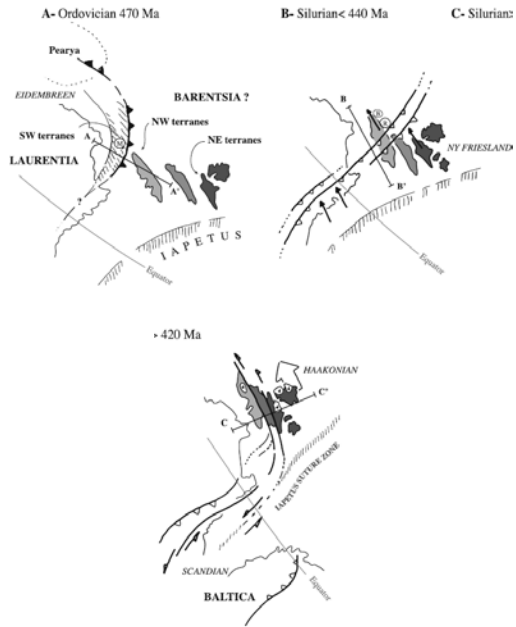


# Datasets



# Outline

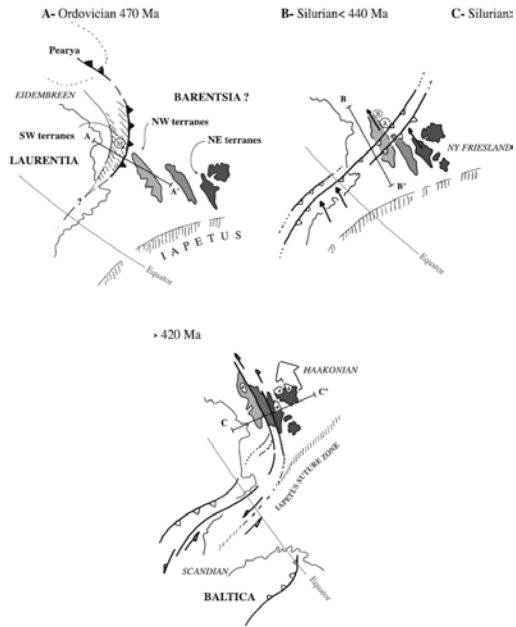
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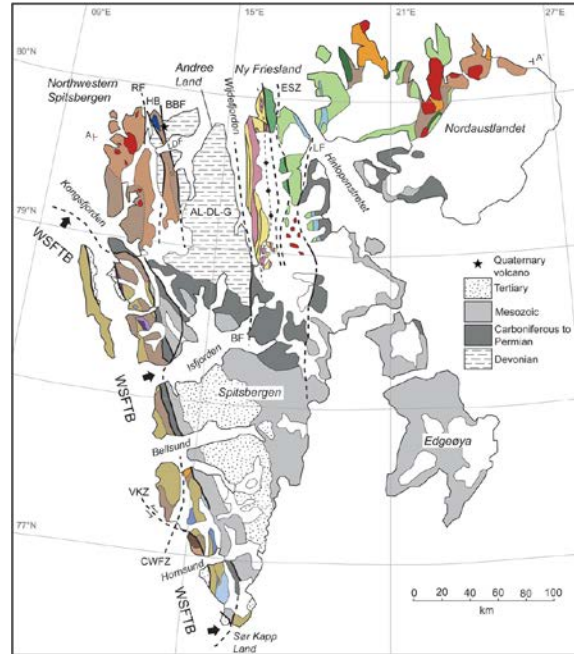


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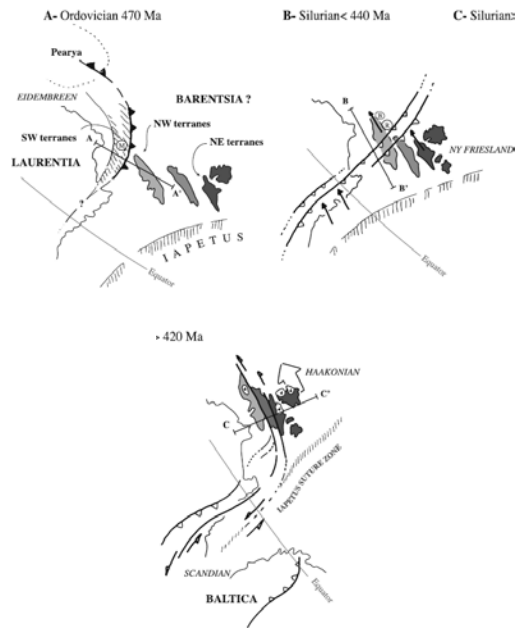


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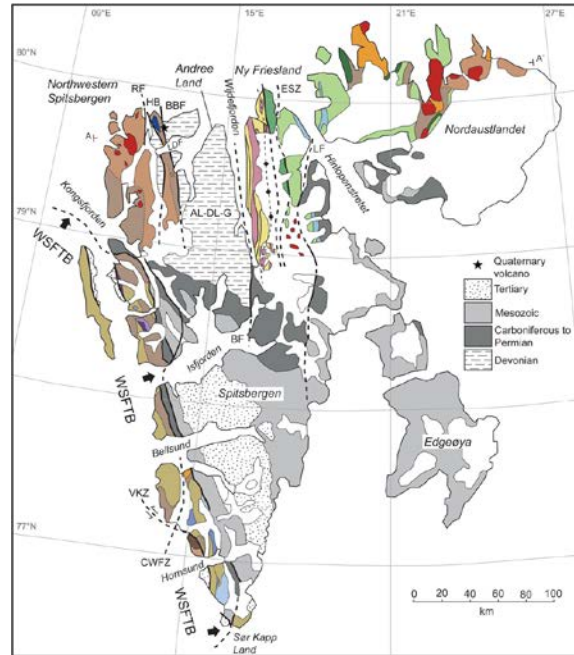


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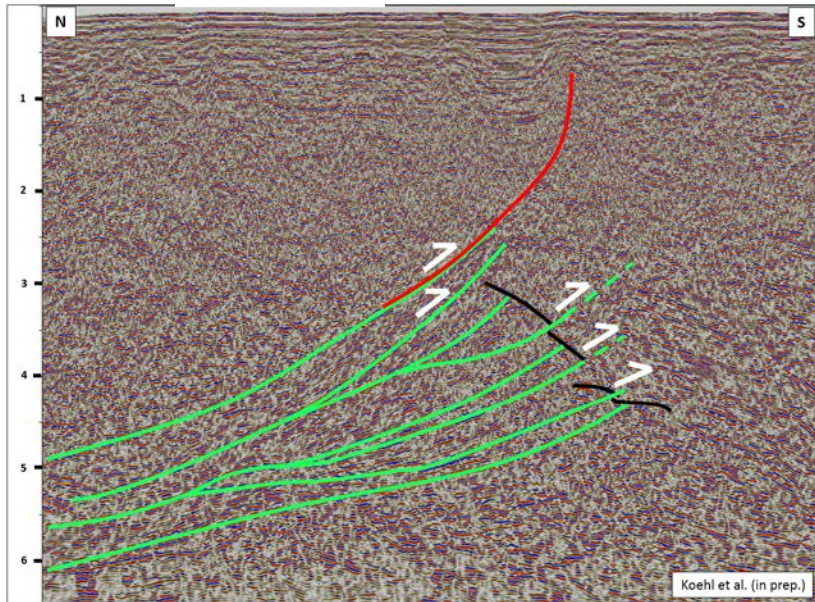
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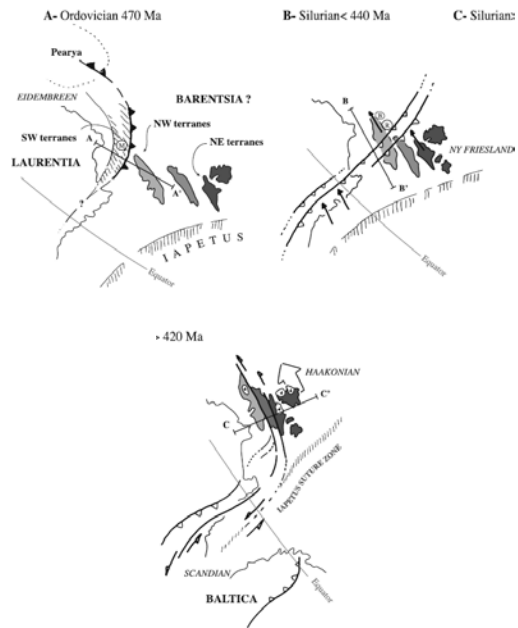


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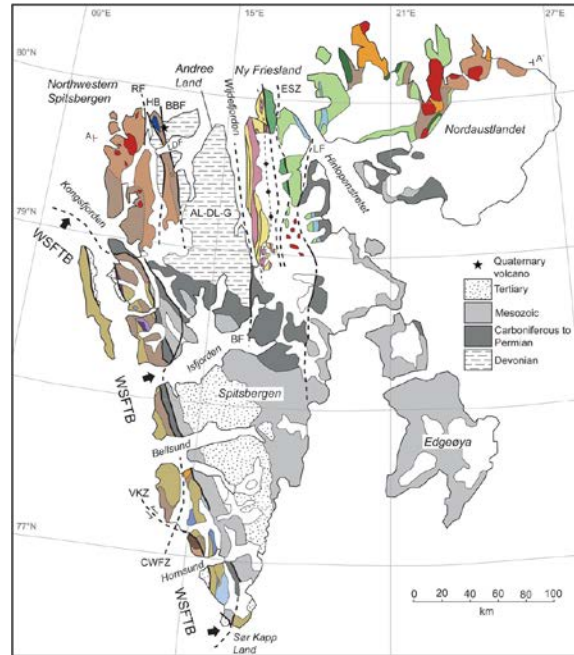


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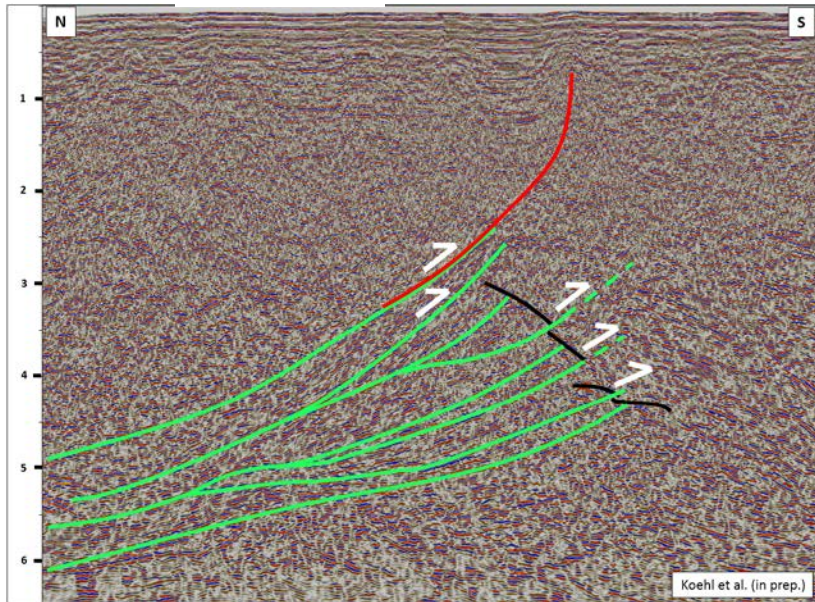
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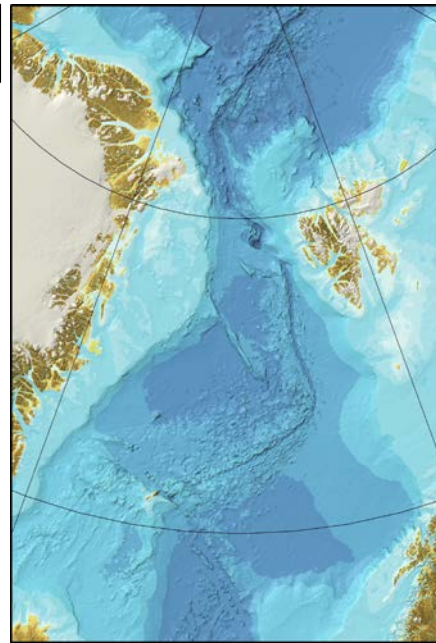
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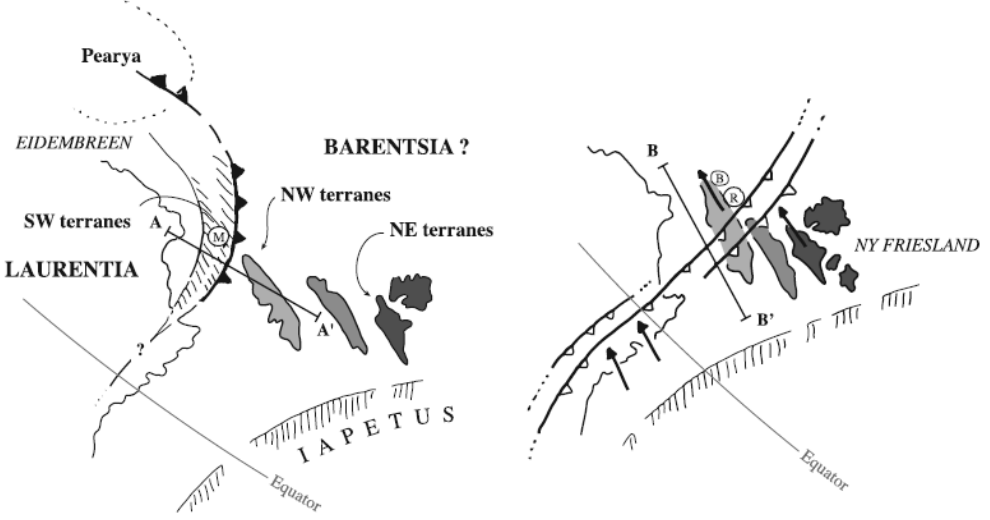


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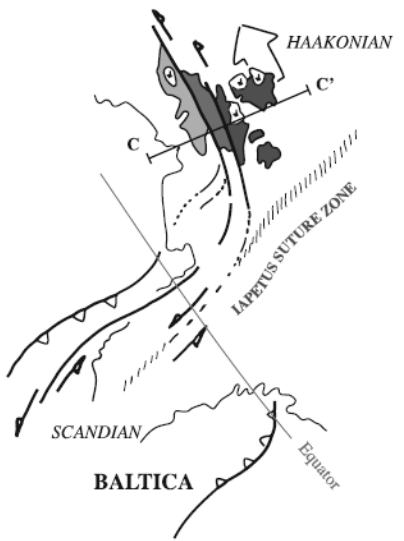
# The Svalbard Archipelago is made of three terranes accreted together during the Caledonian Orogeny showing dominantly N–S-trending fabrics, folds and faults.

A- Ordovician 470 Ma

B- Silurian < 440 Ma



> 420 Ma

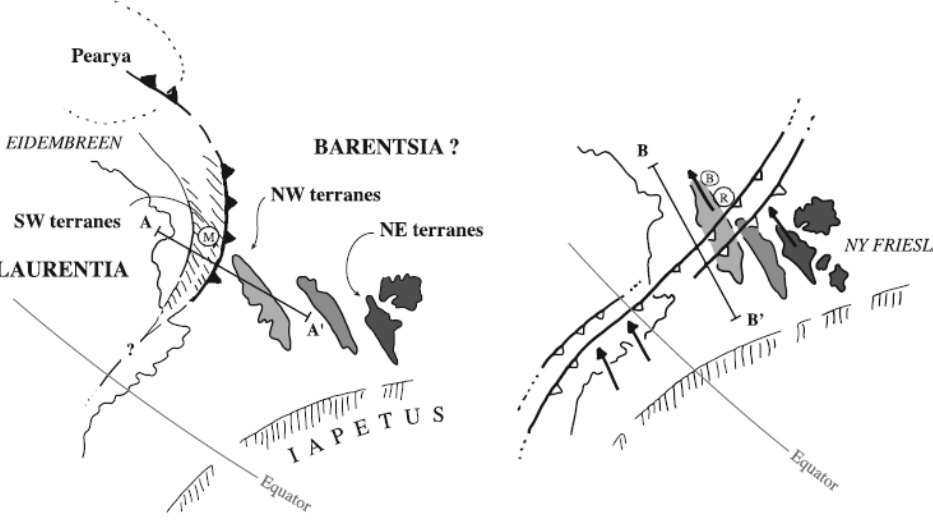


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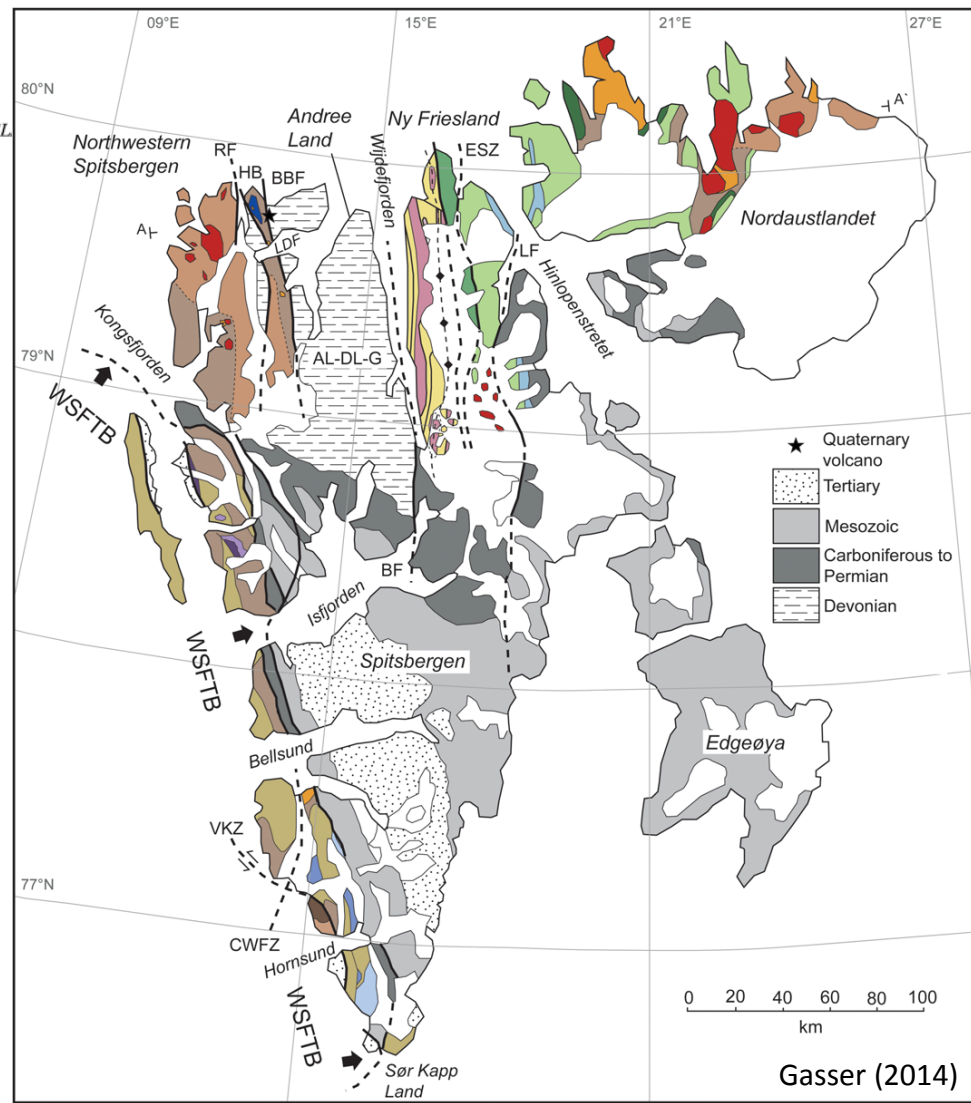
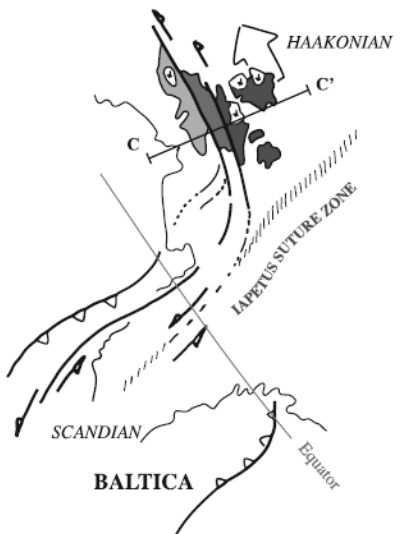
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Labrousse et al. (2008)

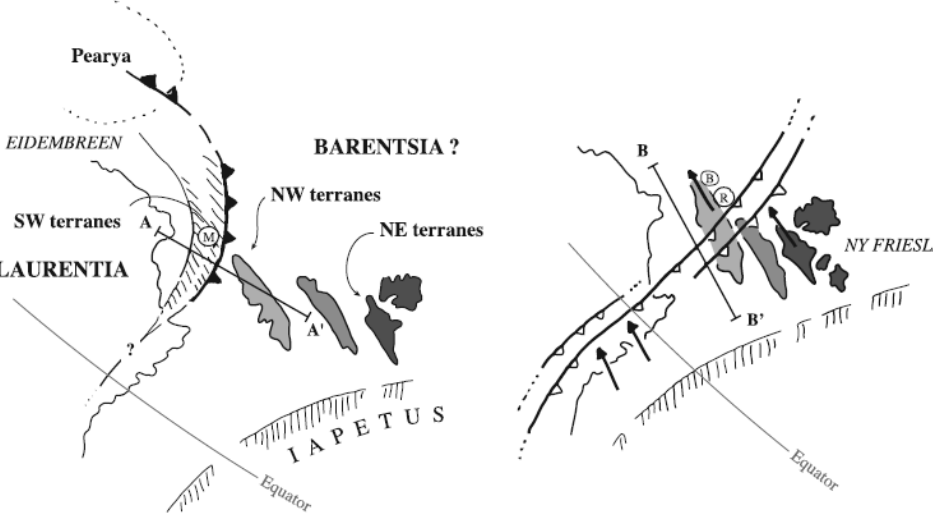
Gasser (2014)

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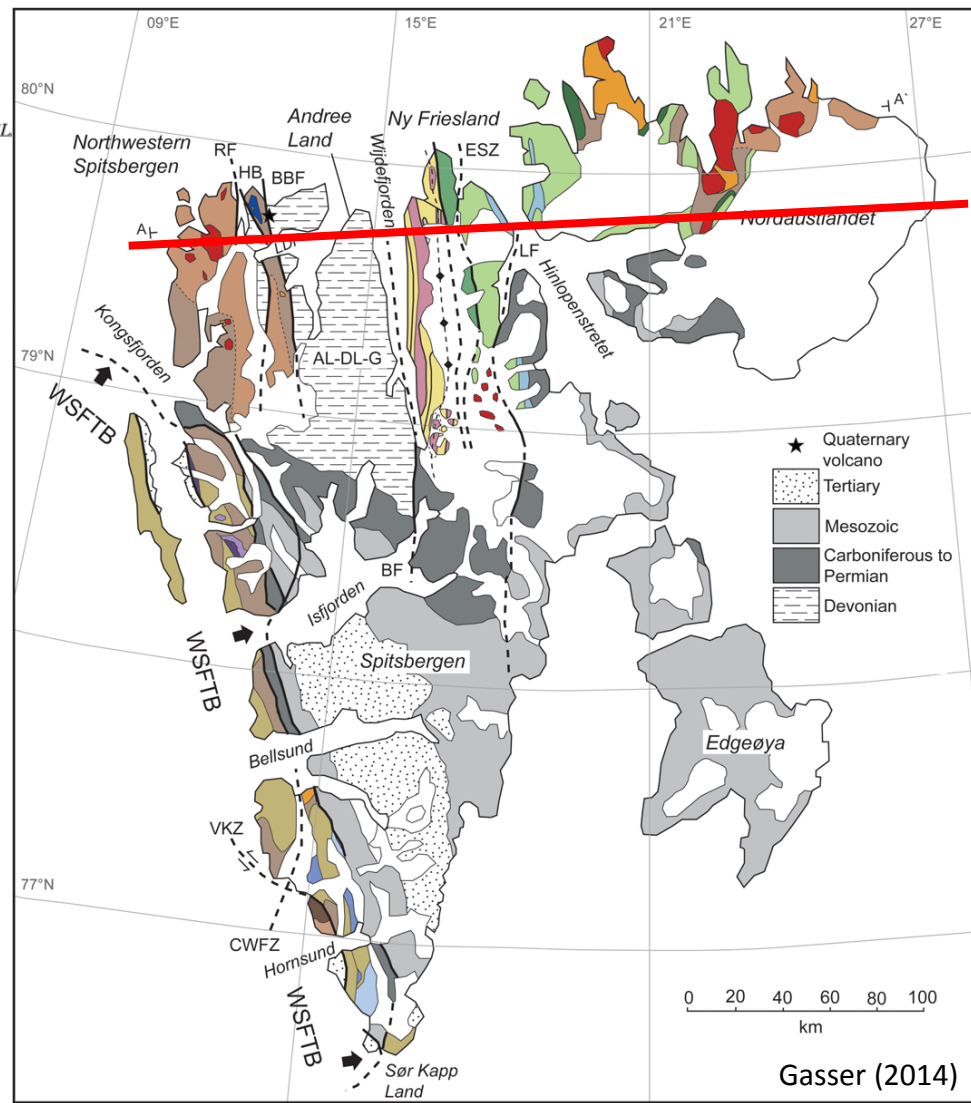
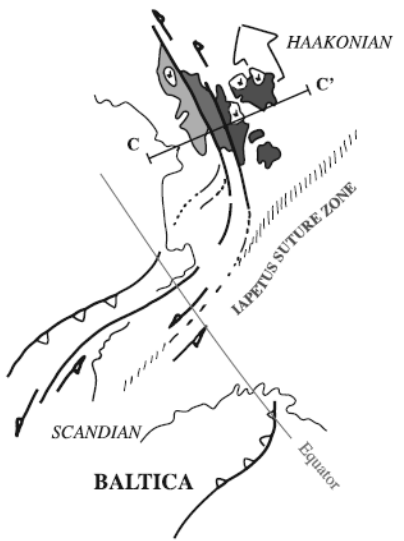
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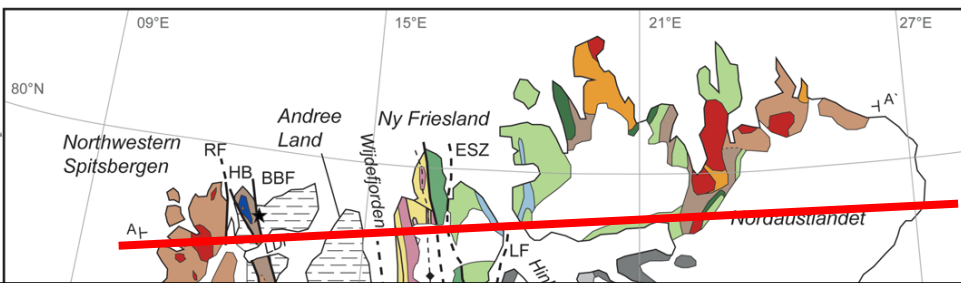
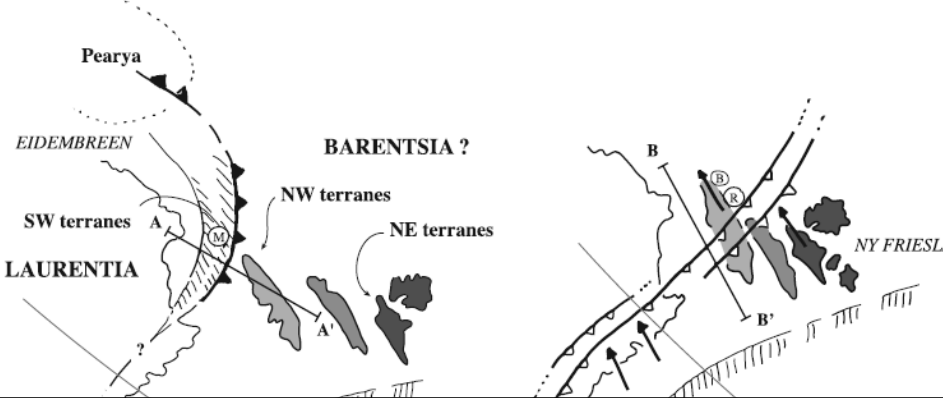
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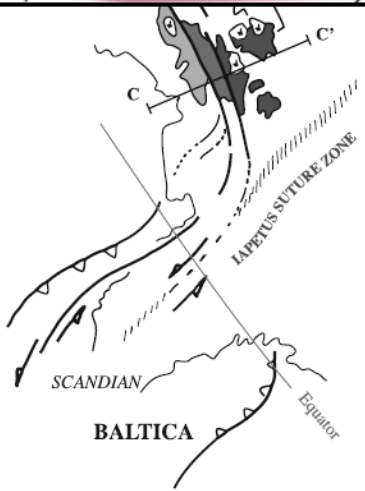
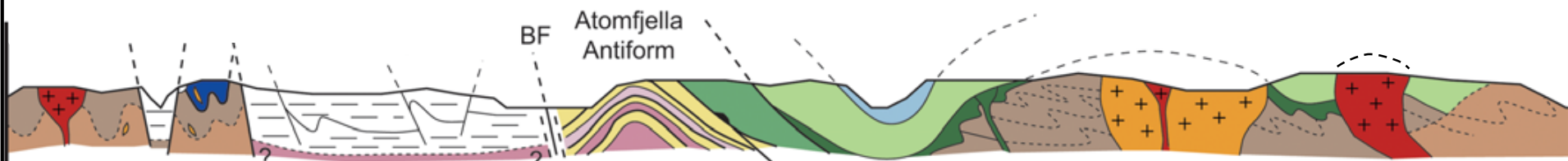


northwestern Spitsbergen

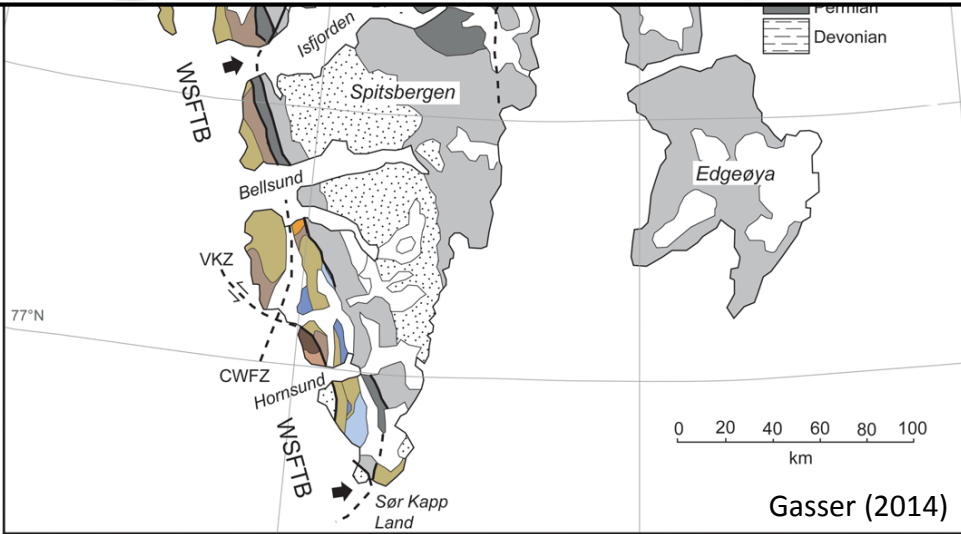
Ny Friesland

Nordaustlandet

Gasser (2014)



Labrousse et al. (2008)



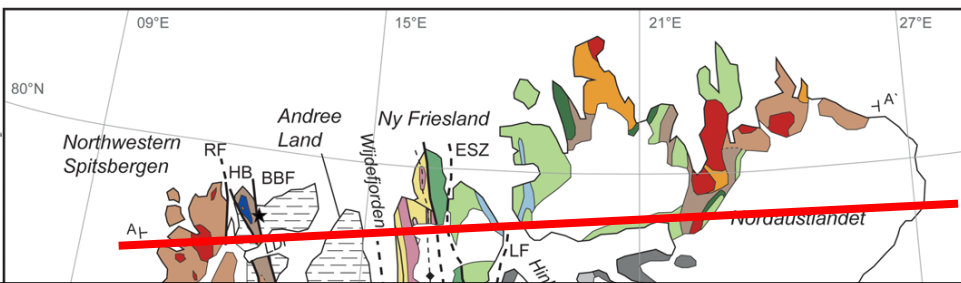
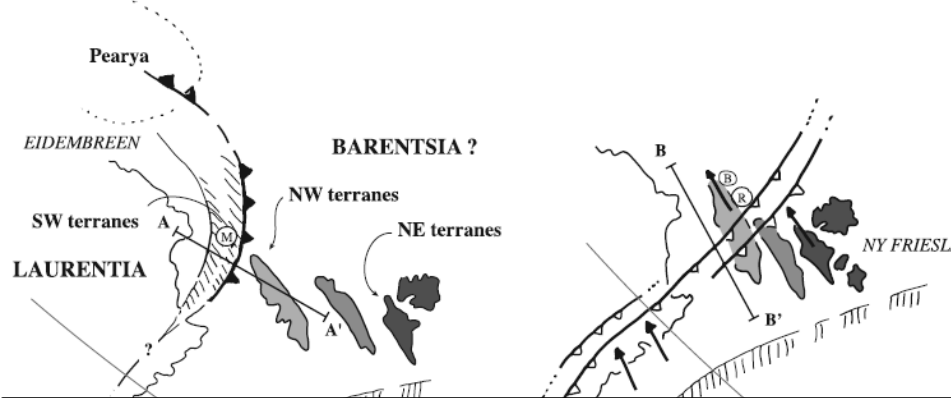
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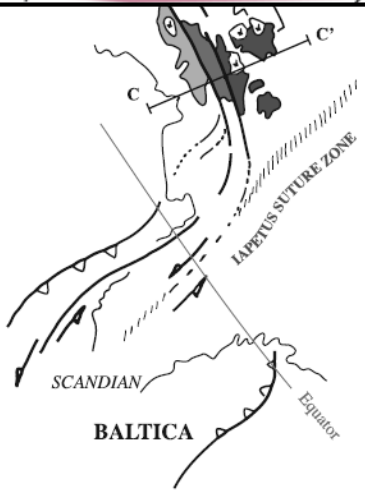
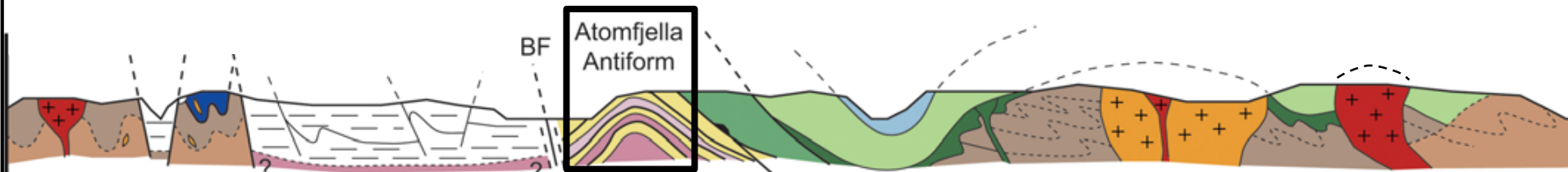


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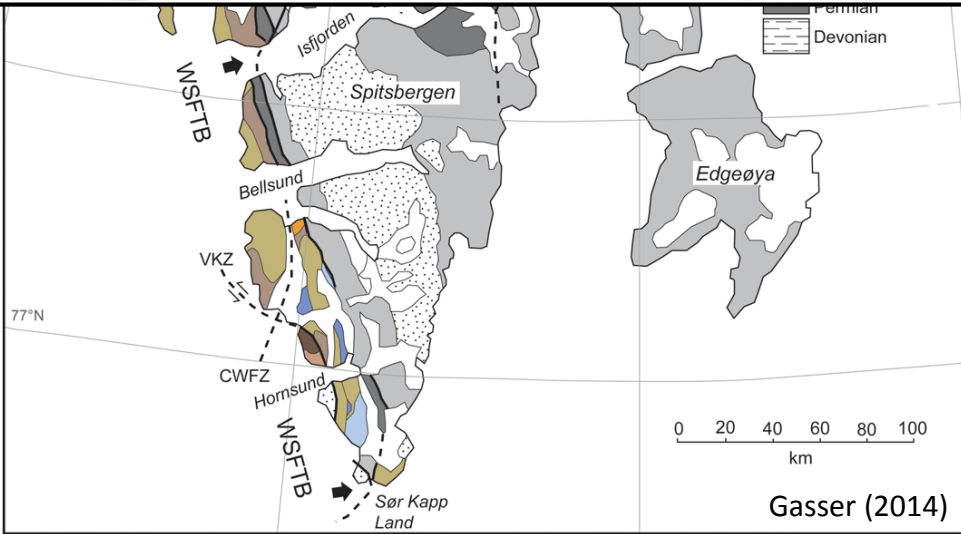
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Labrousse et al. (2008)



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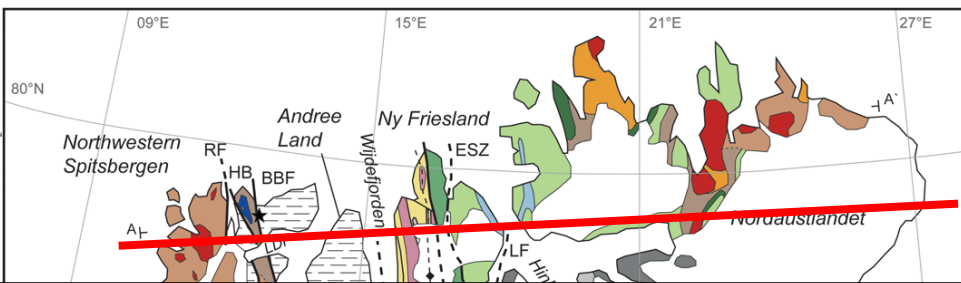
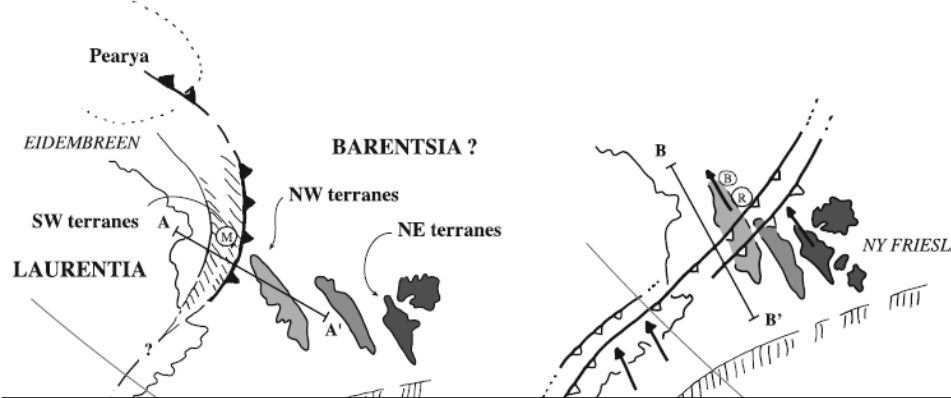


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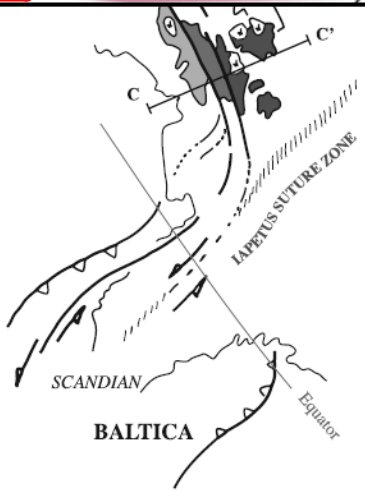
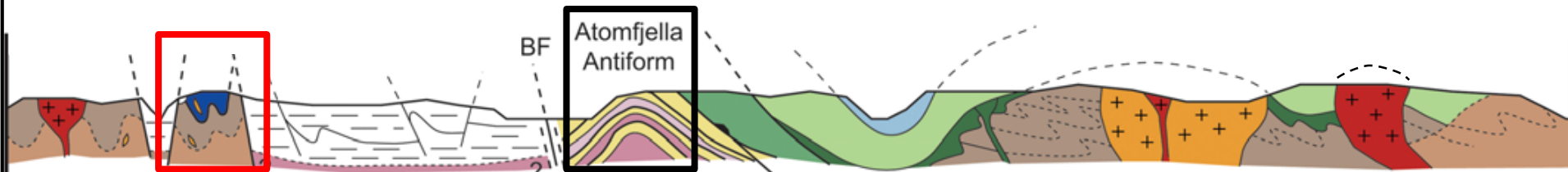


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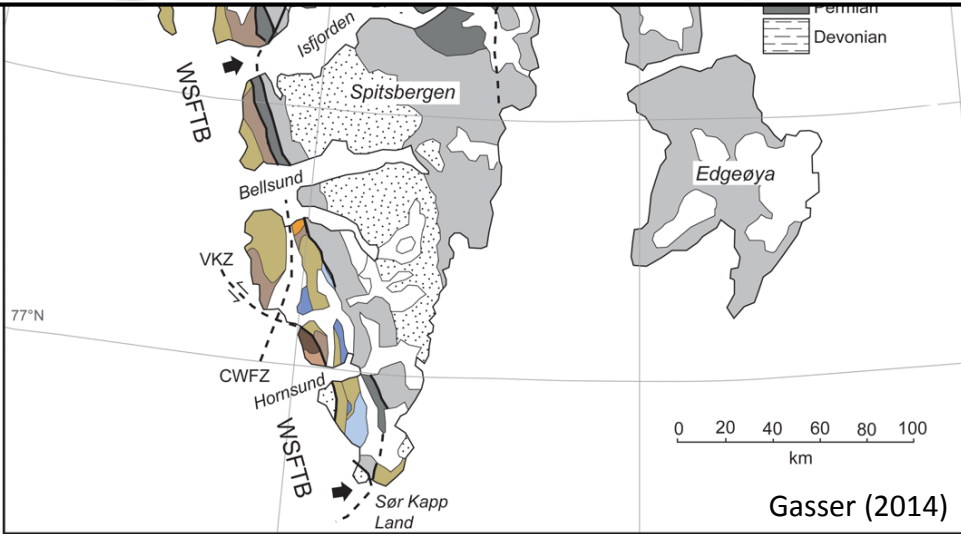
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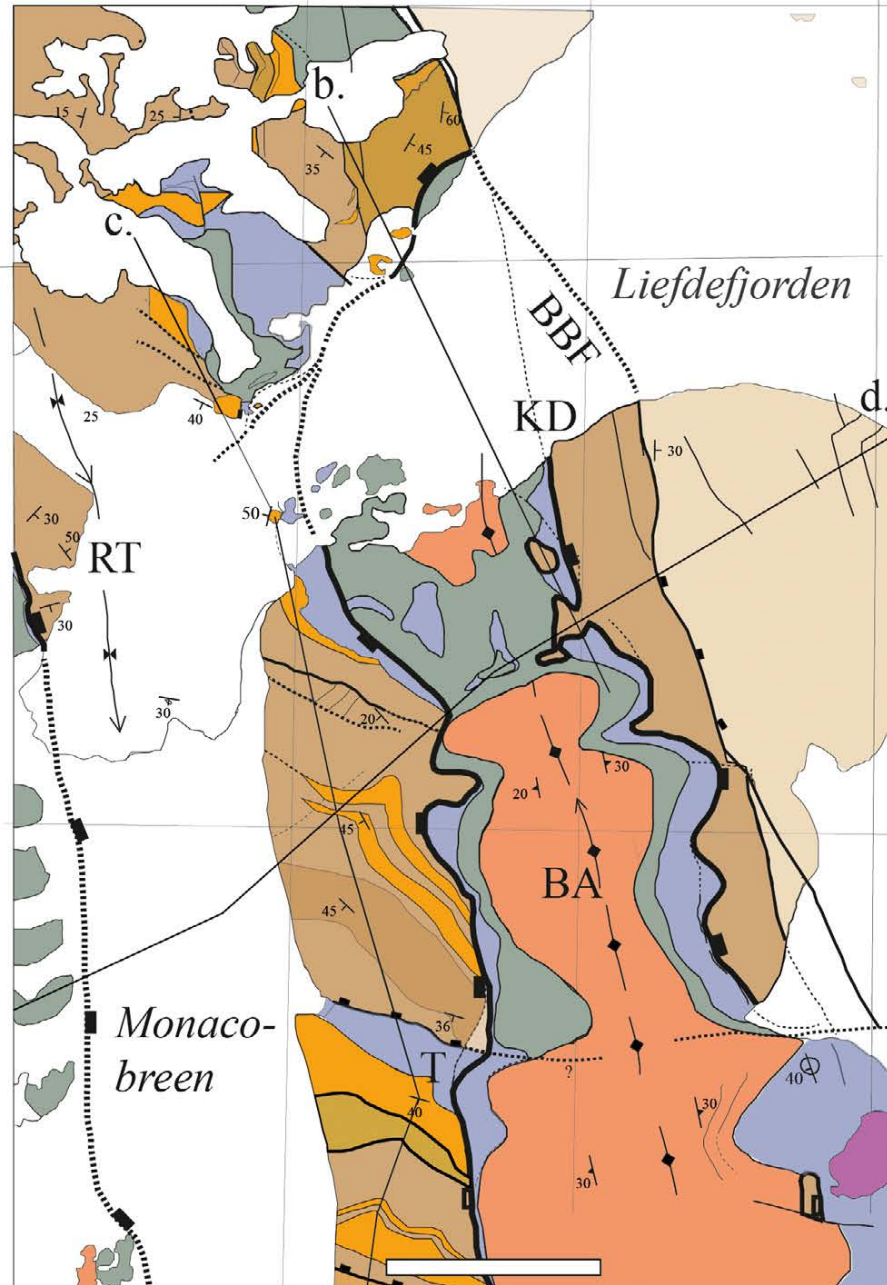
Labrousse et al. (2008)



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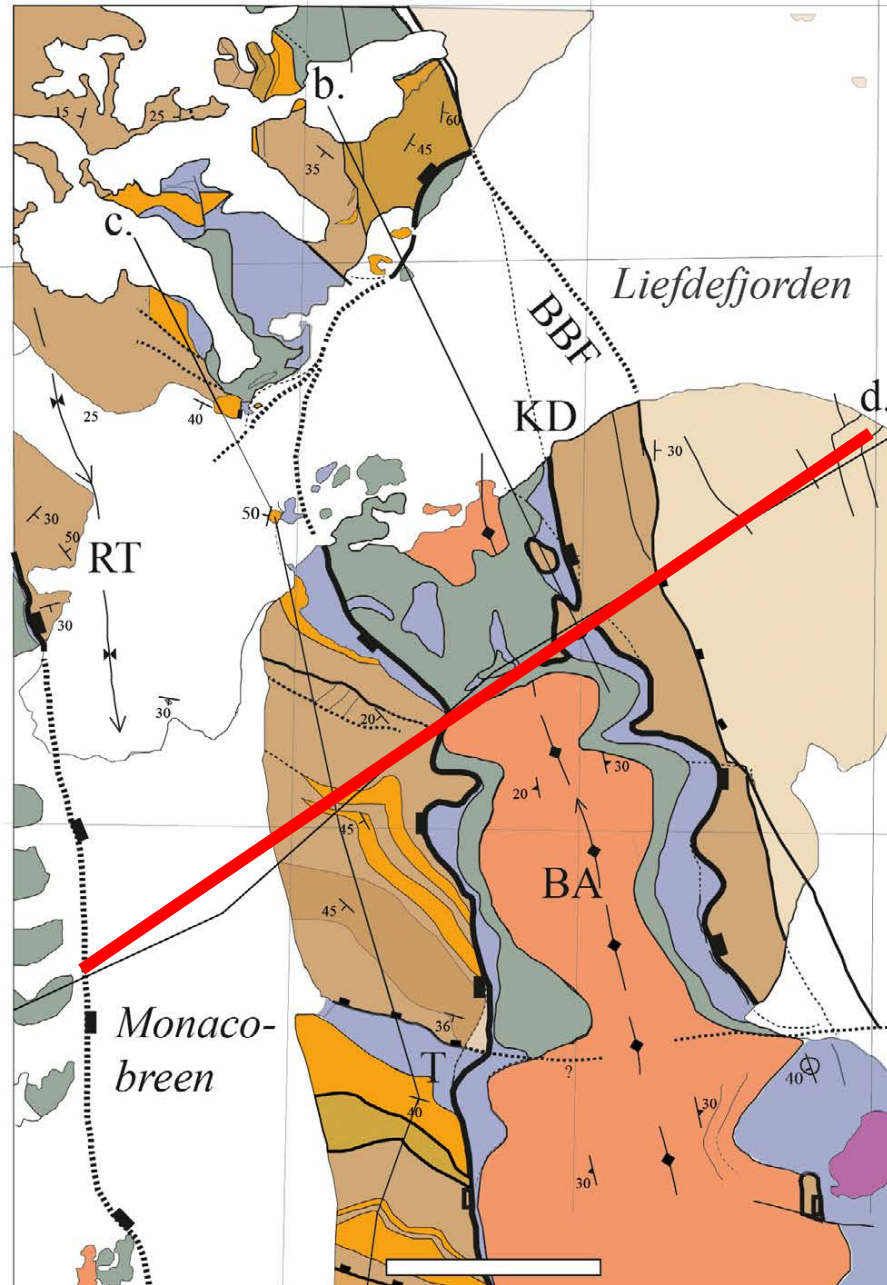
**0** Core complexes exhumed in the late Silurian–Devonian due to normal top-north, top-west and top-east movements along bowed shear zones.

Braathen et al. (2018)

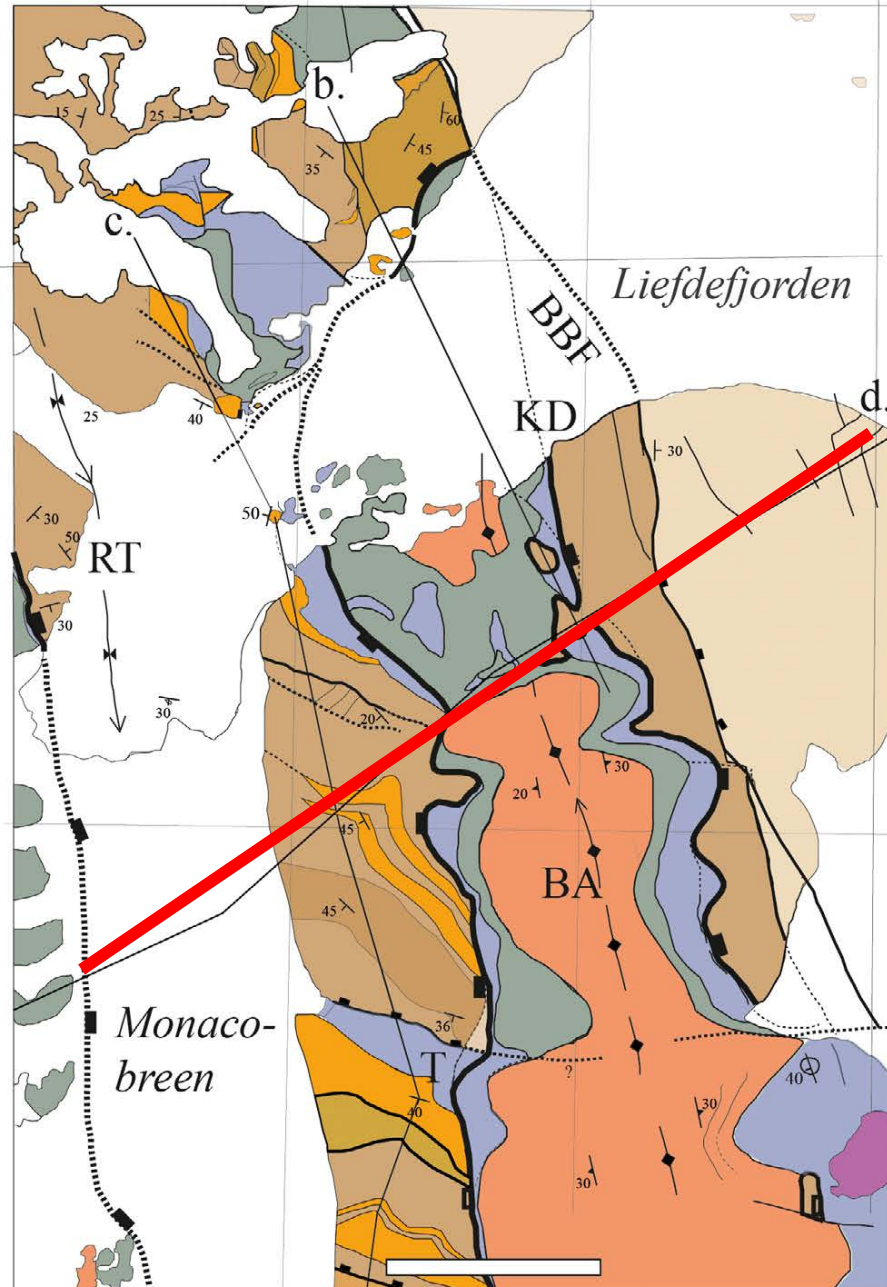


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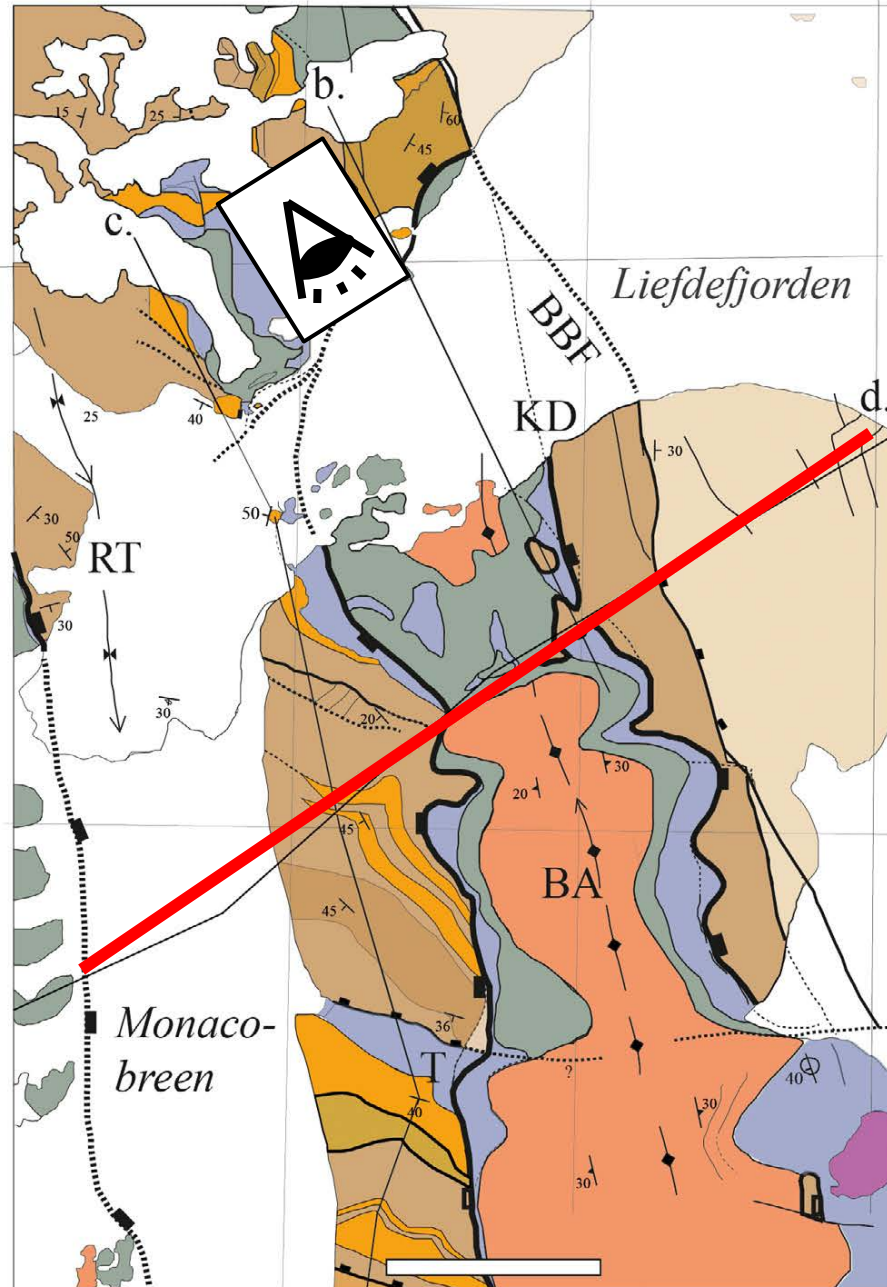
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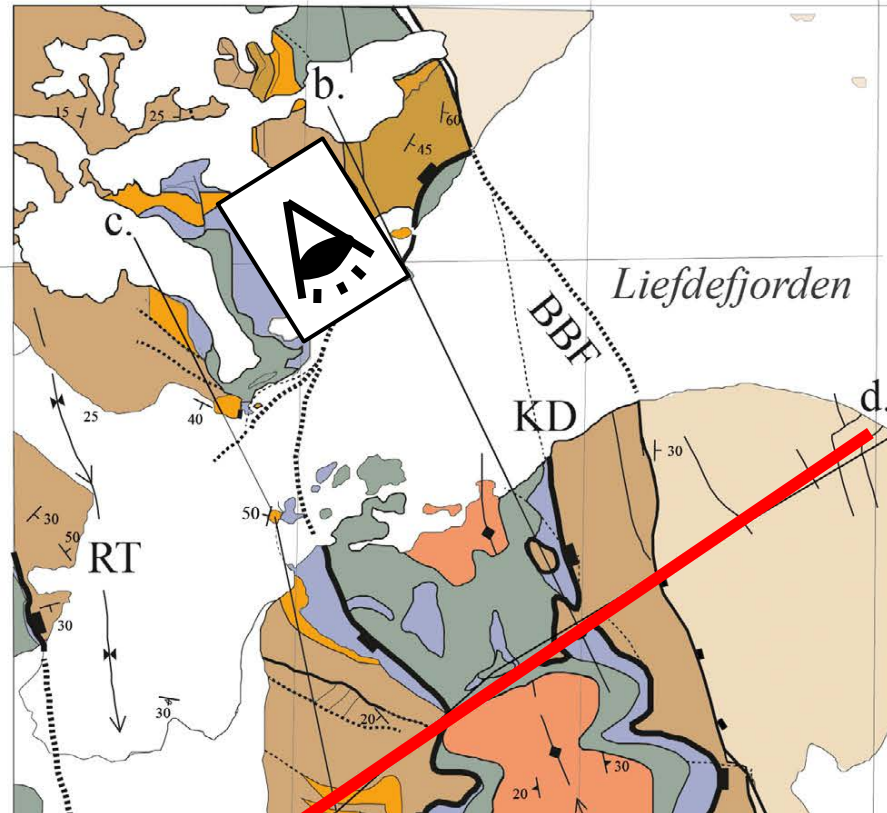
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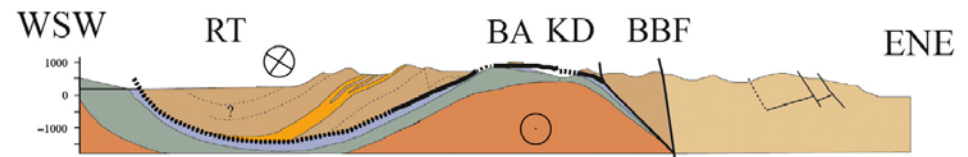
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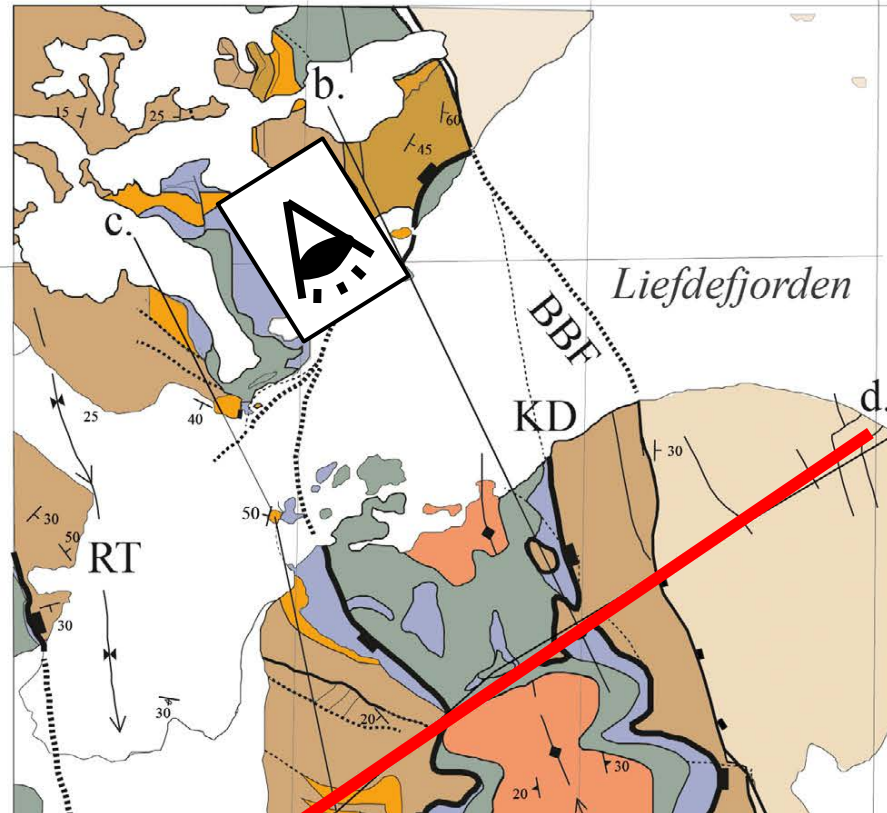
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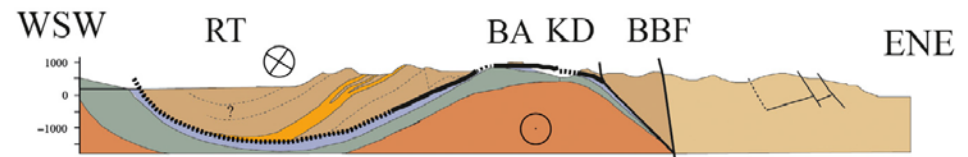
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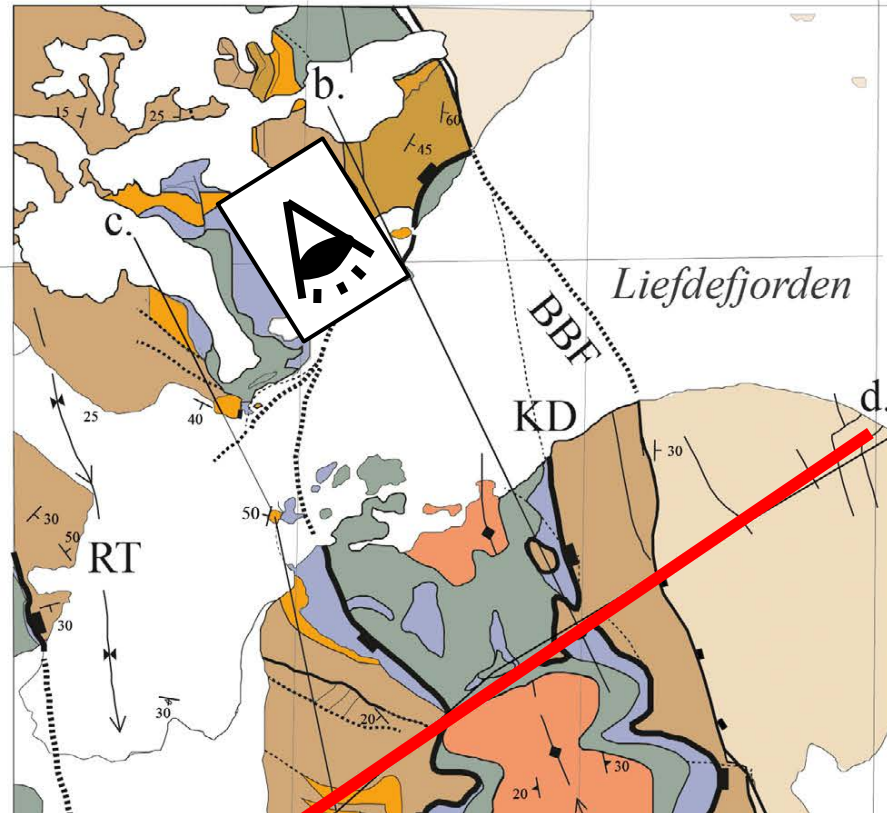
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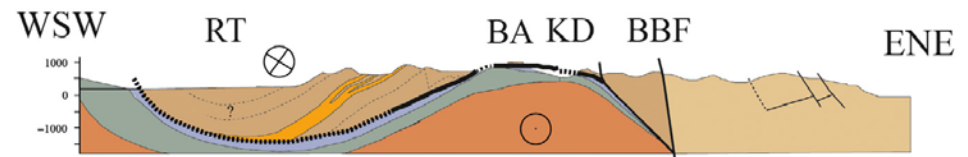
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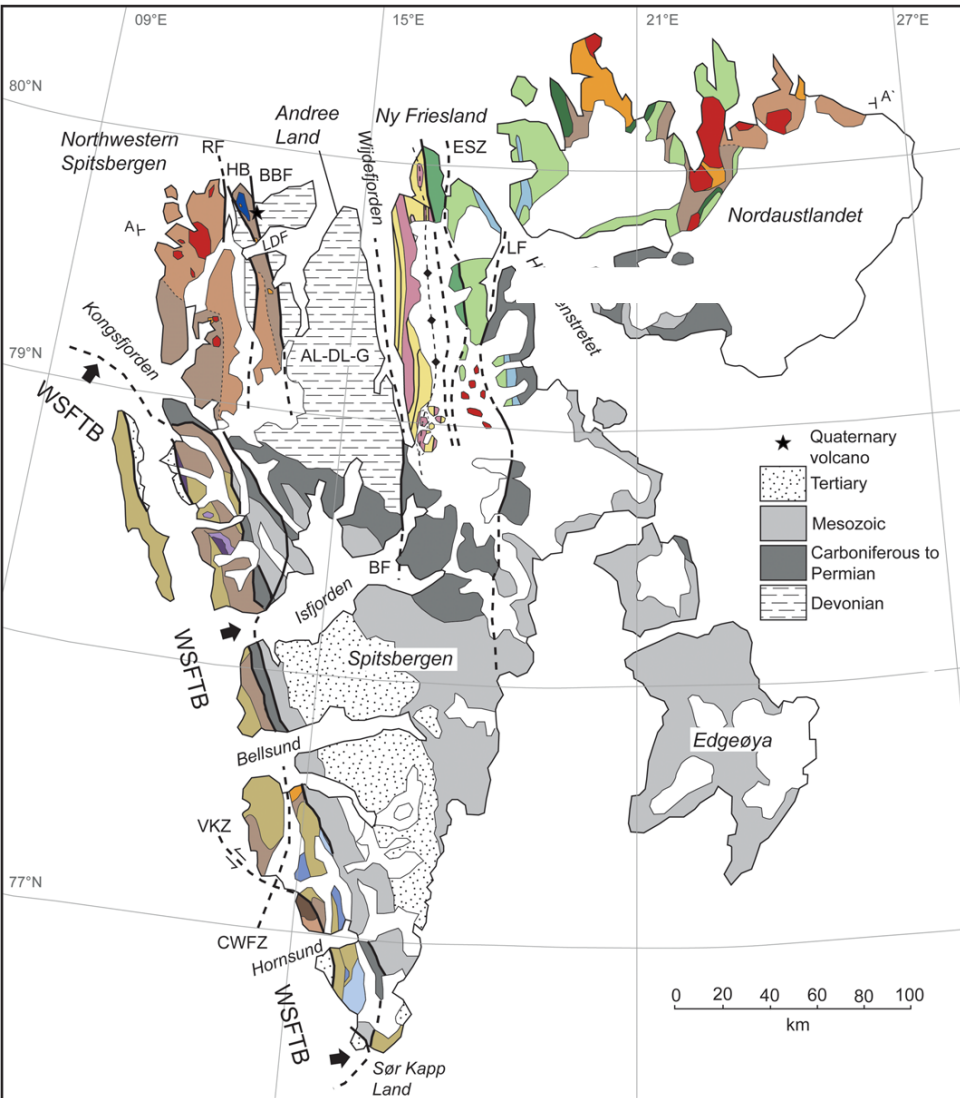


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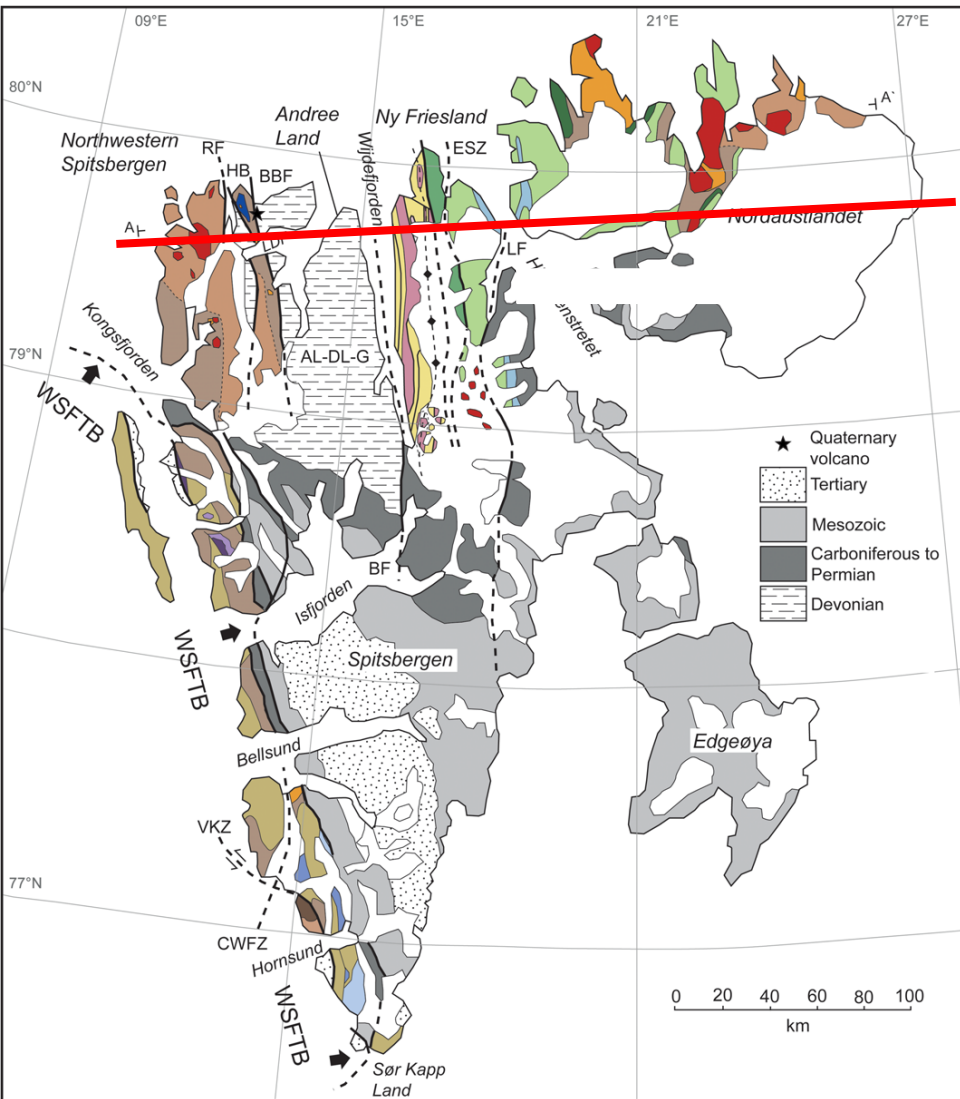


**0 In Svalbard, Pennsylvanian rifting led to the formation of thick N–S-trending sedimentary basins like the Billefjorden Trough, which parallel dominant Caledonian fabrics.**



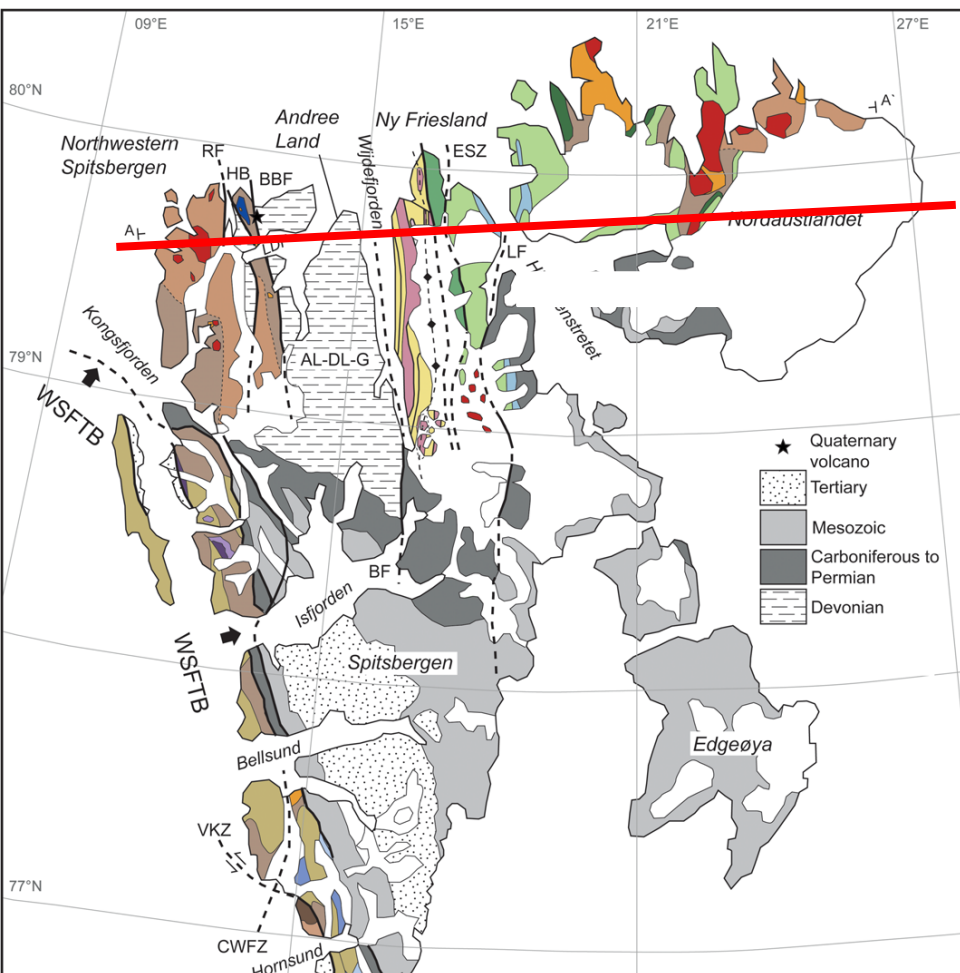
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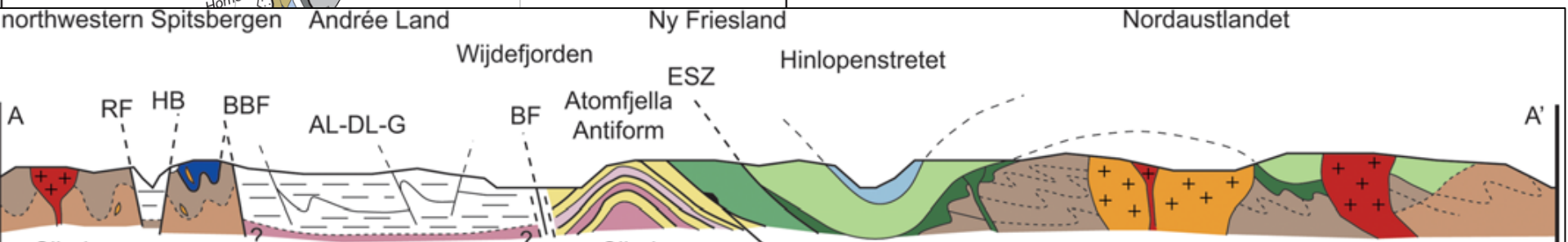


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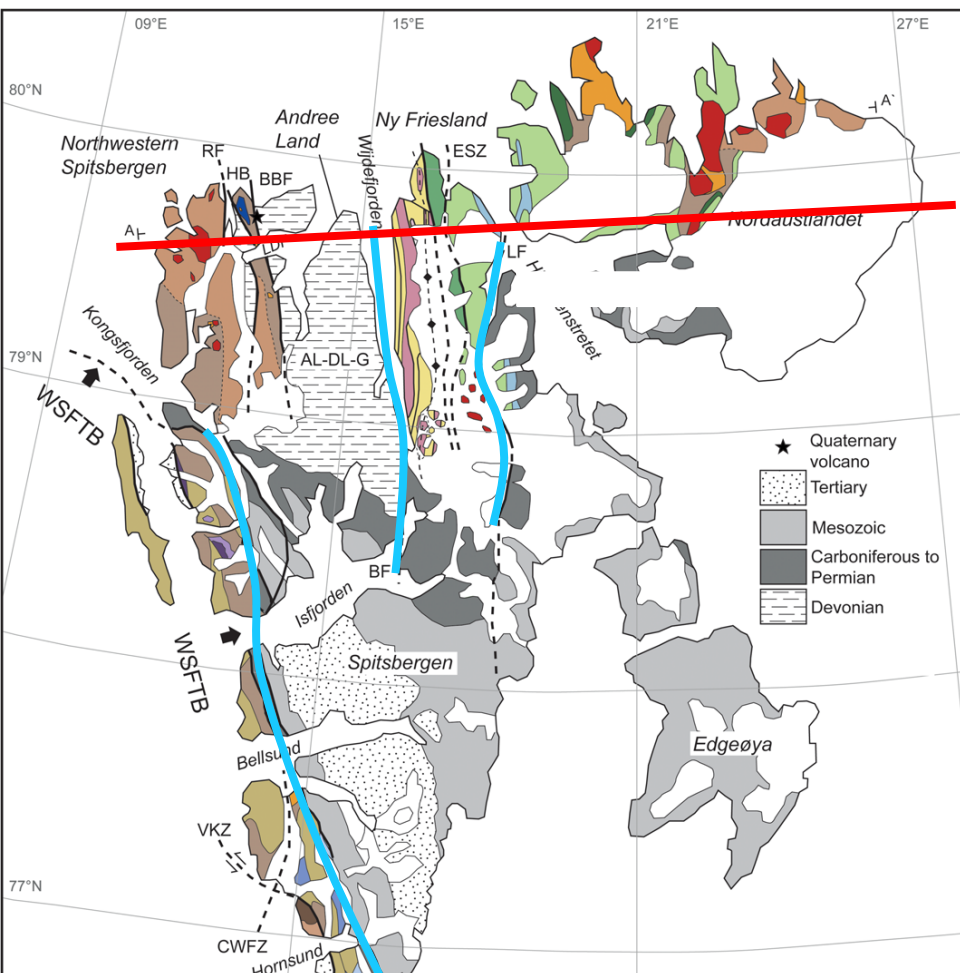
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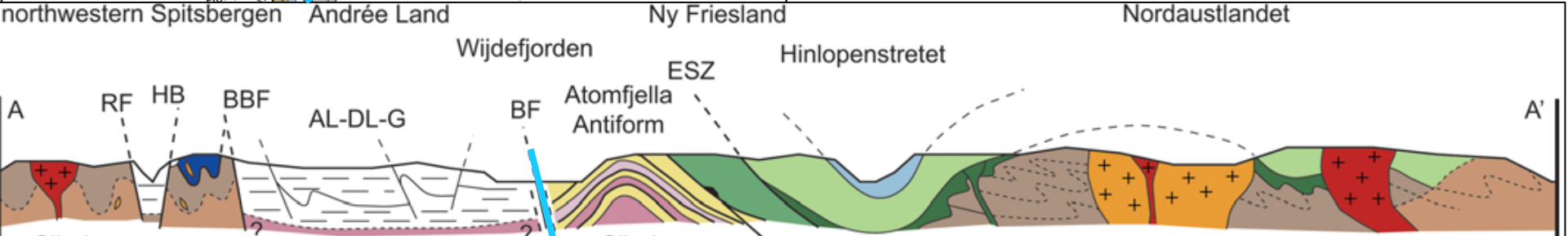
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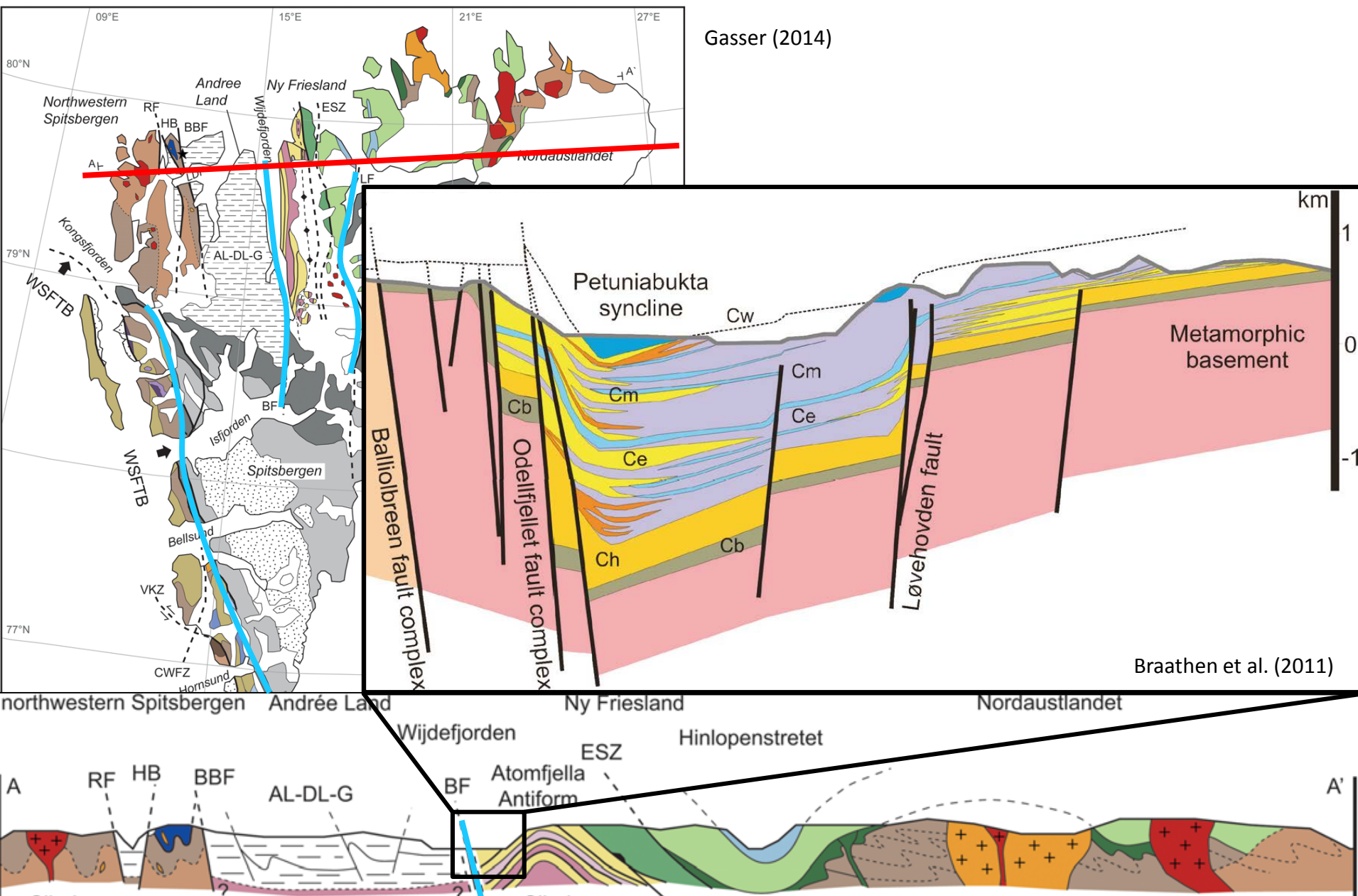
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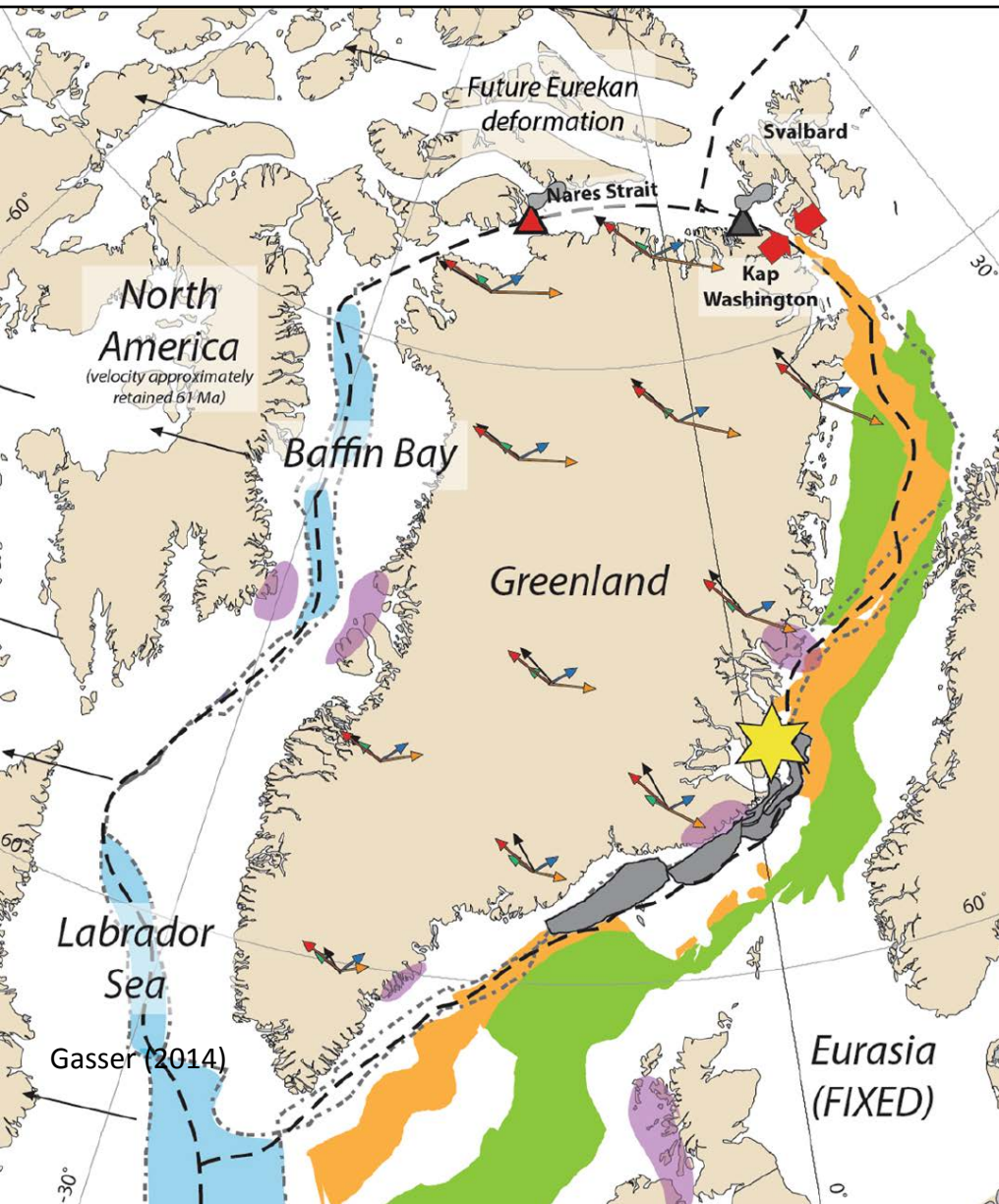
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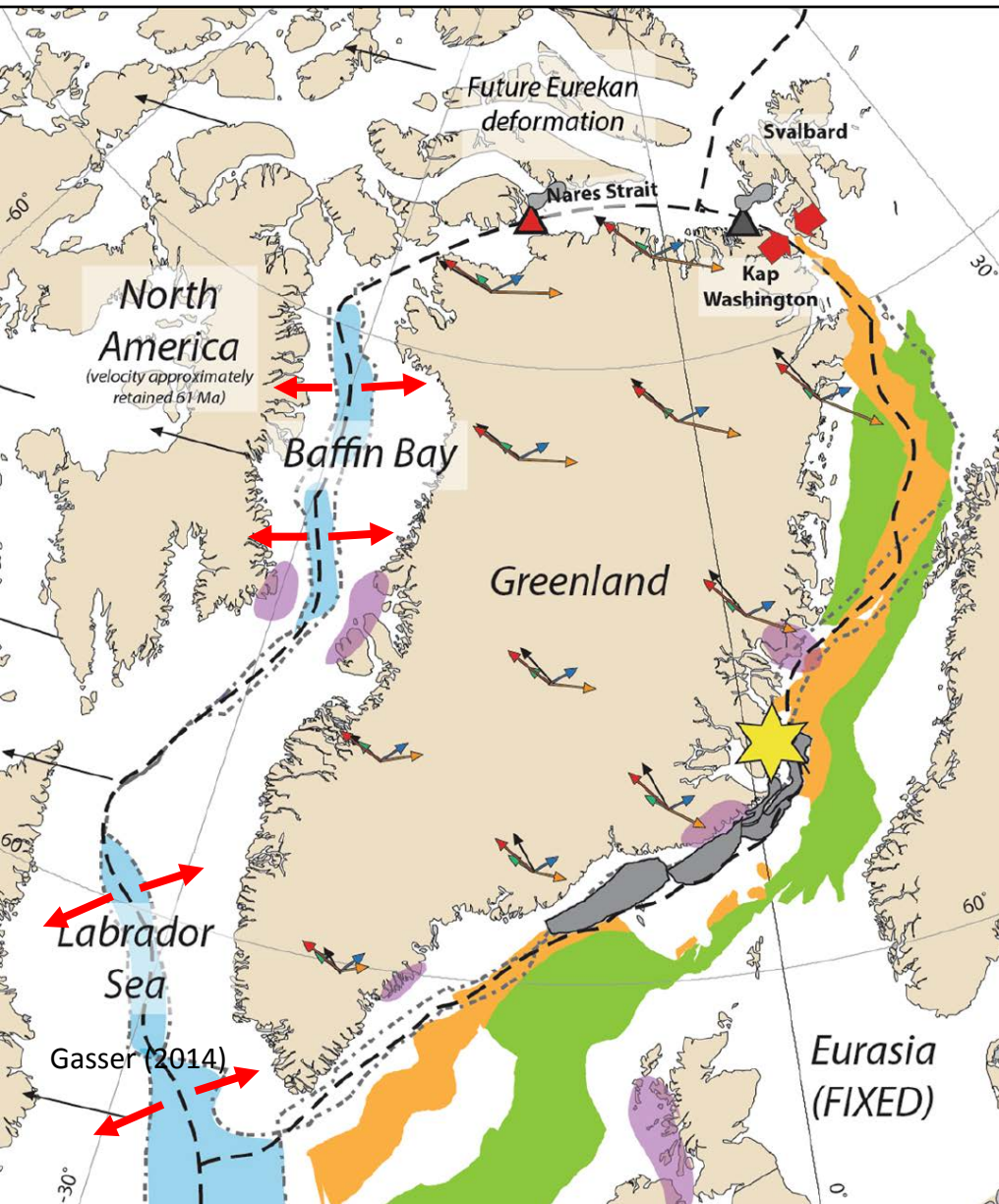
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**0** In the Cenozoic, opening of the Labrador Sea and Baffin Bay led to transpression and the formation of the West Spitsbergen Fold-and-Thrust Belt in western Svalbard.

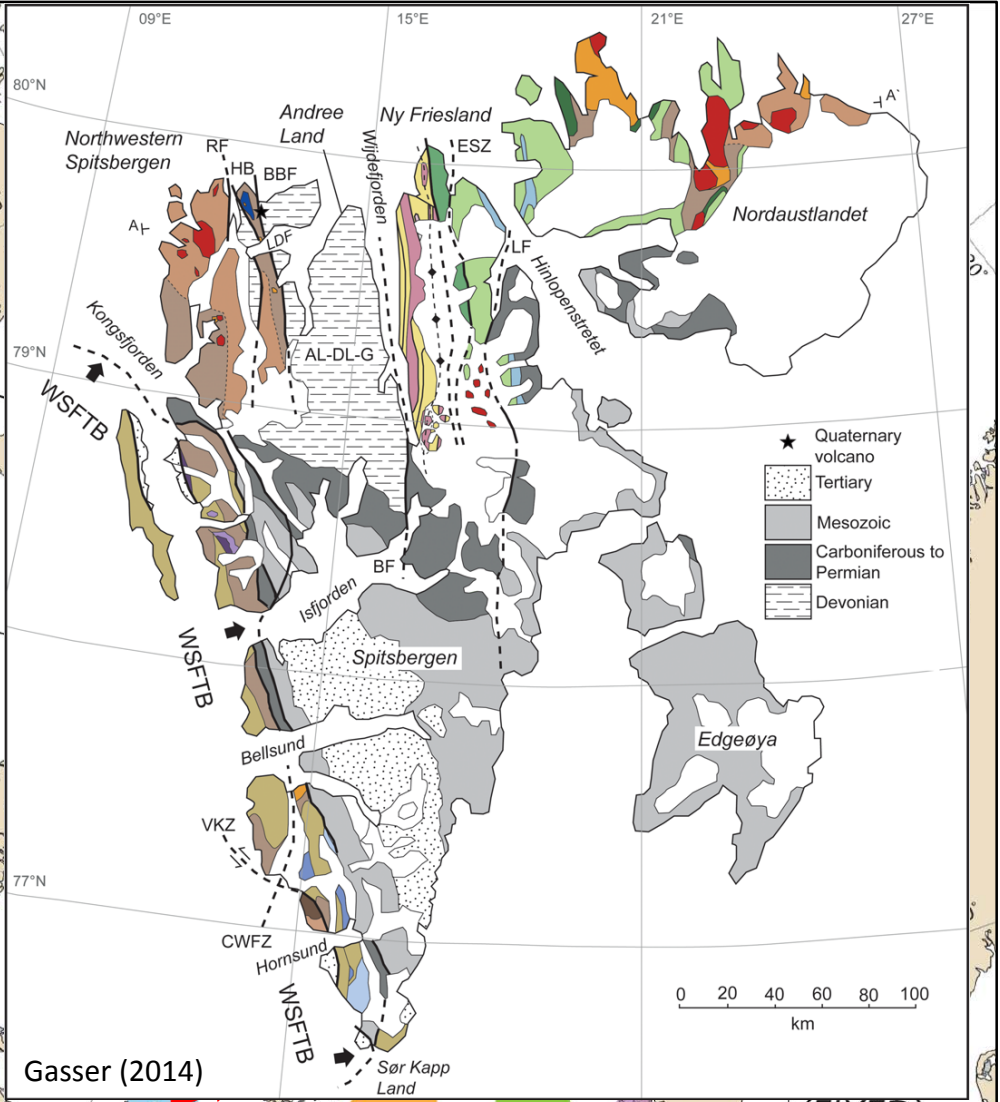


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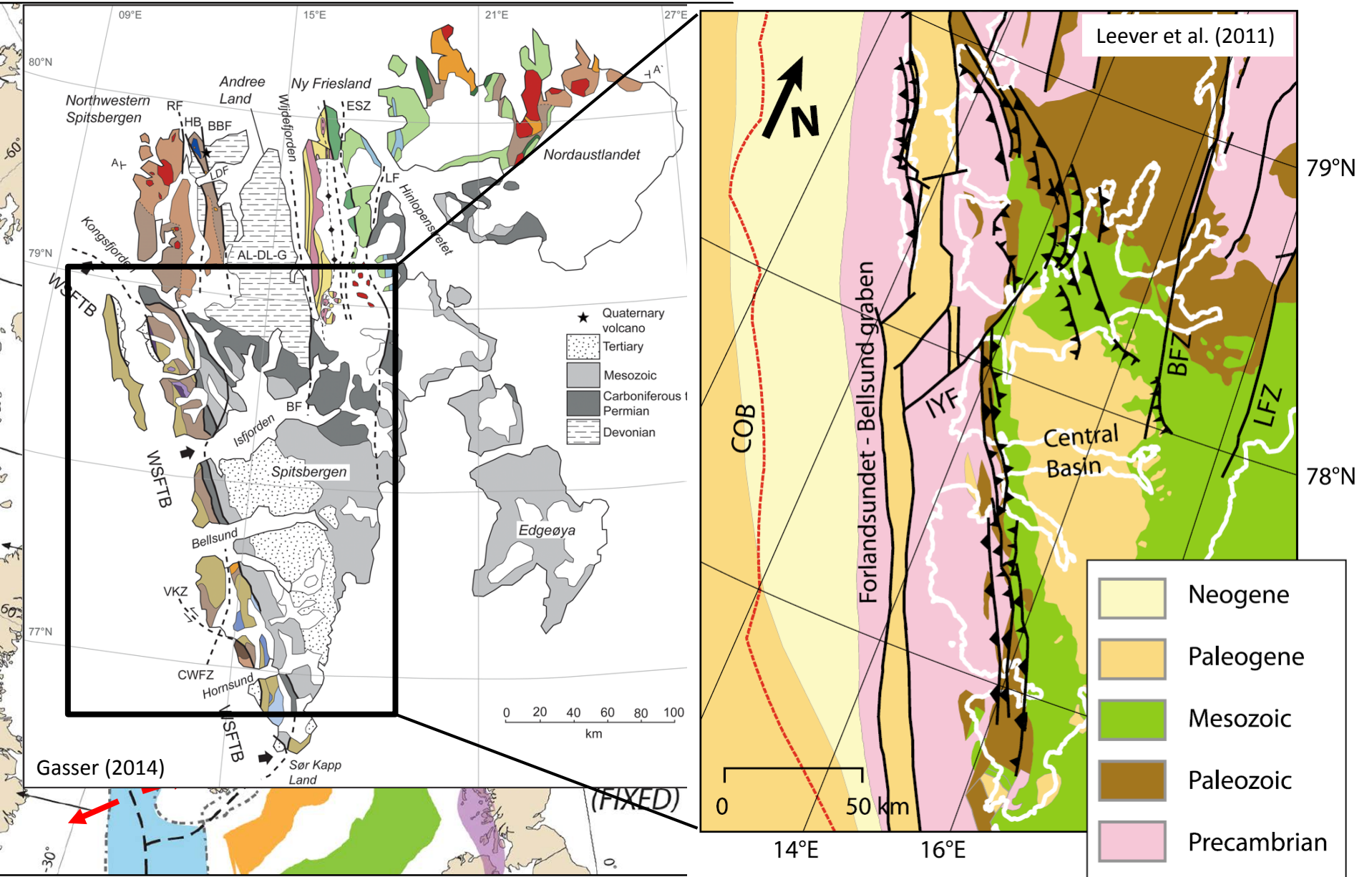
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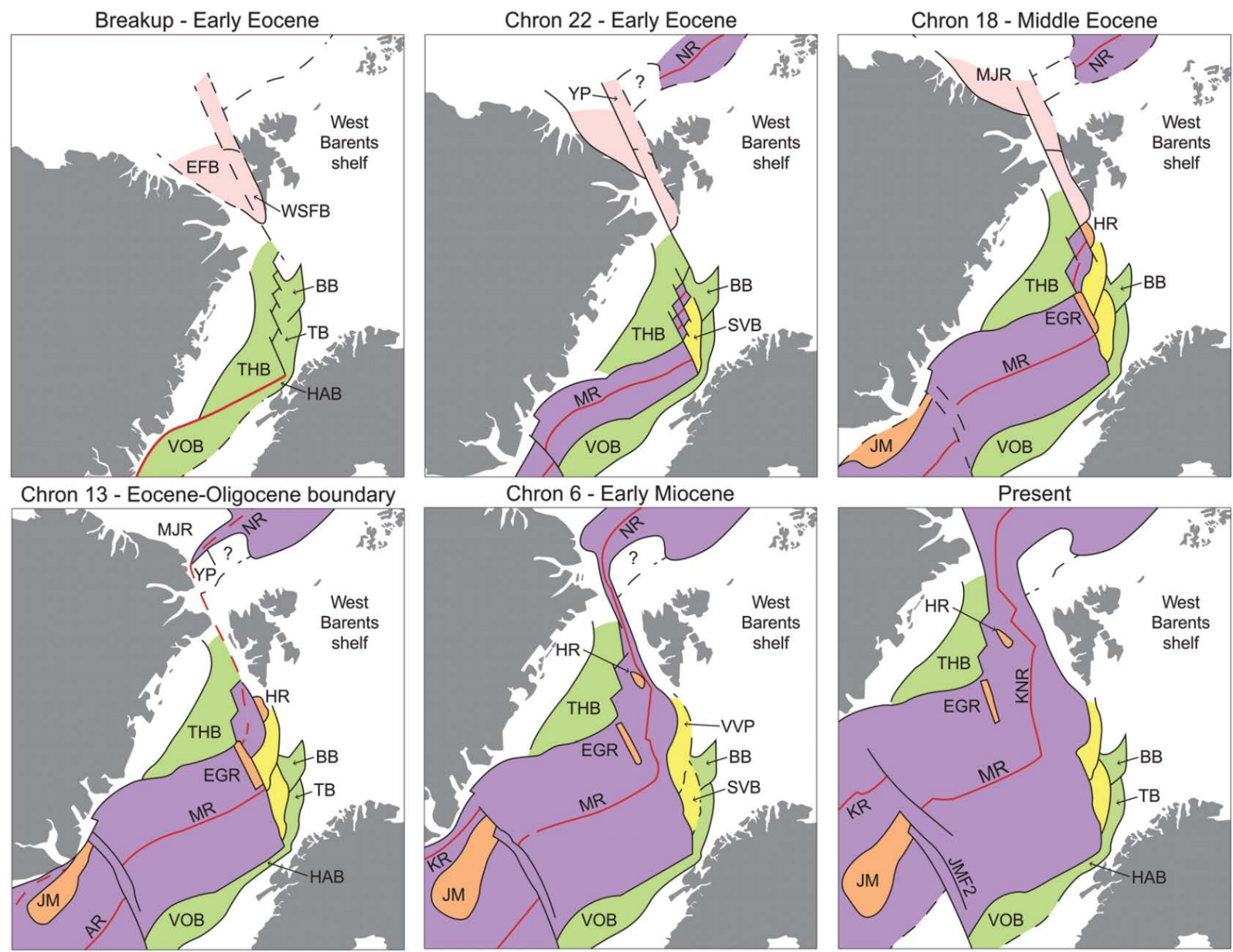
(FIXED)



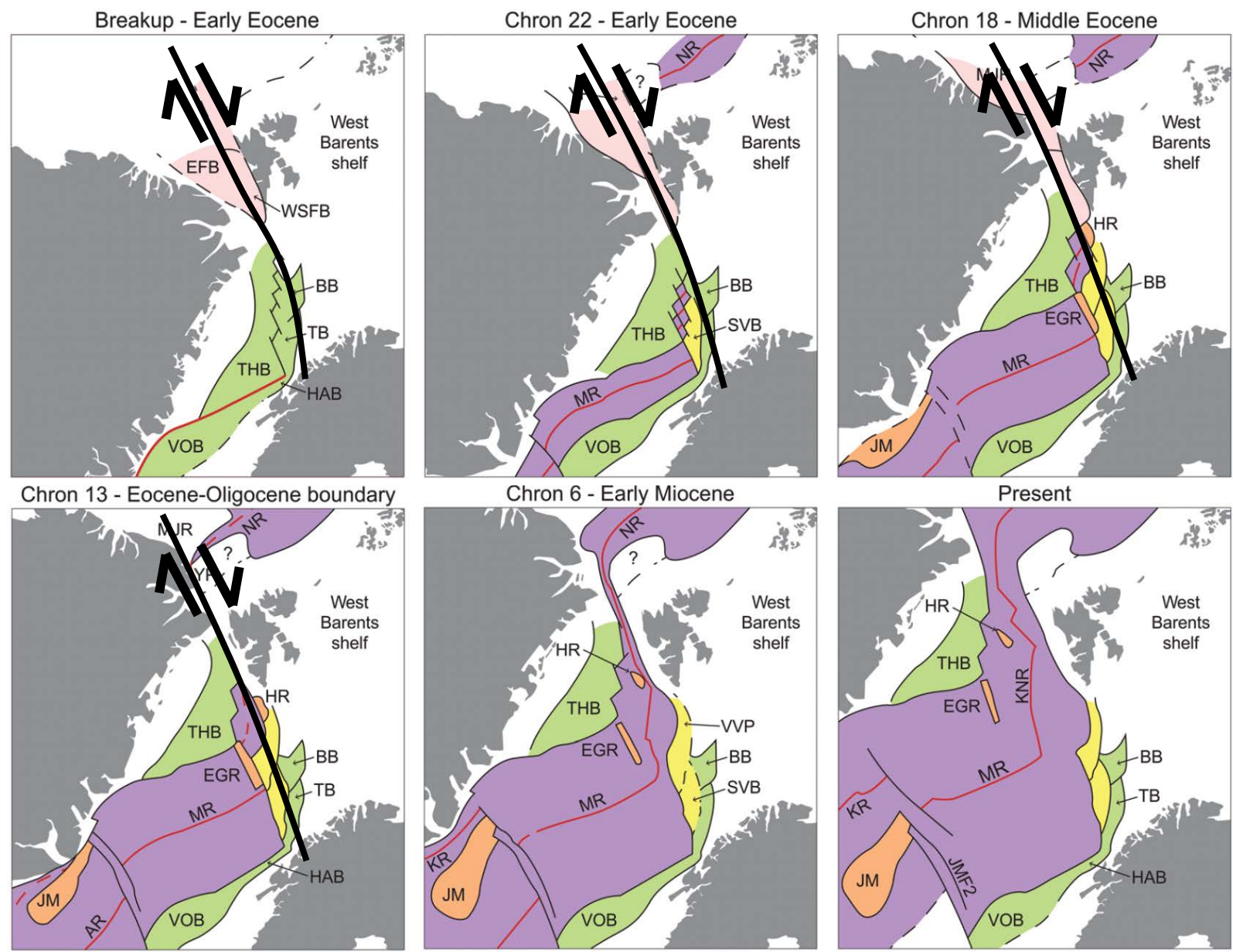
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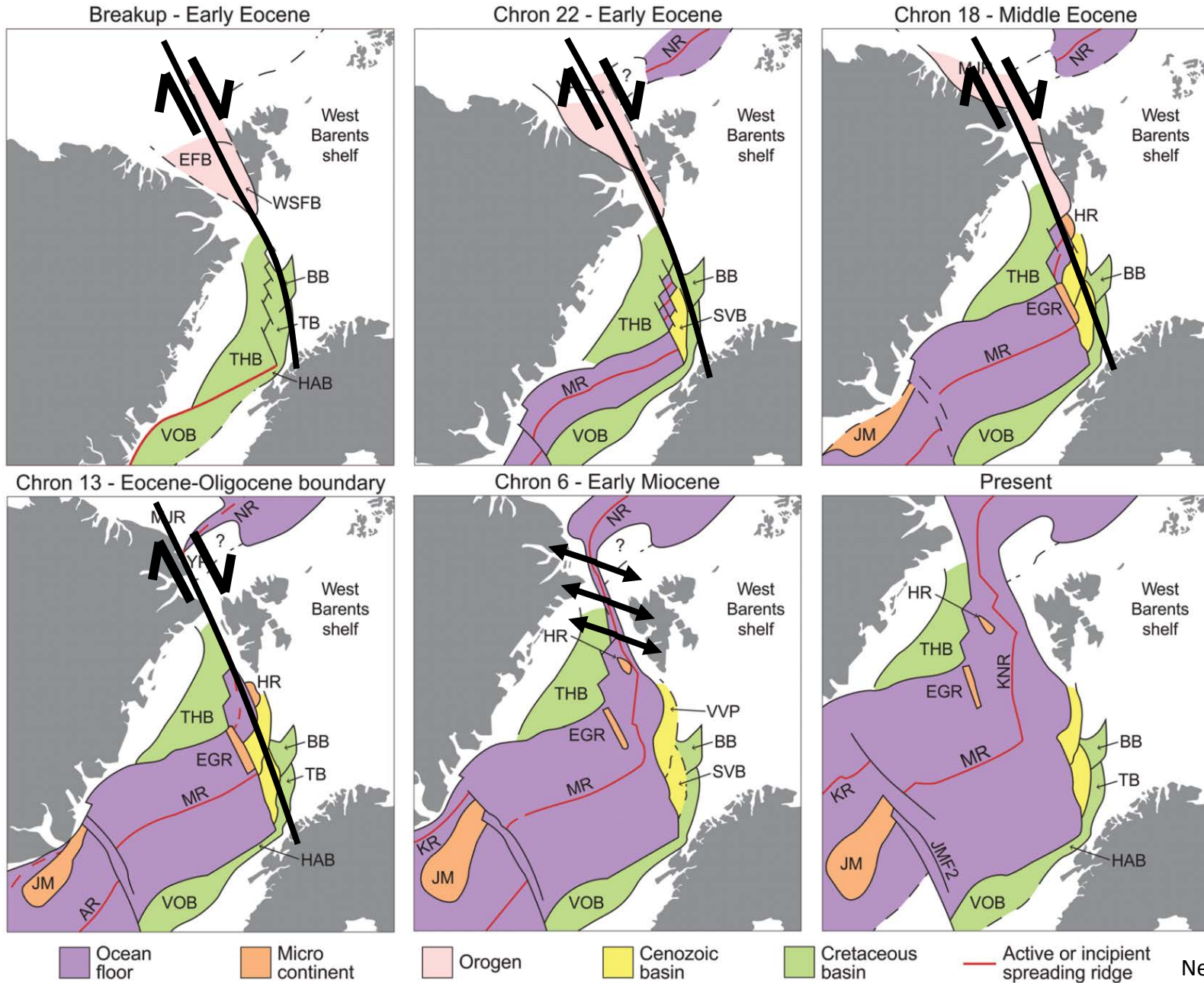
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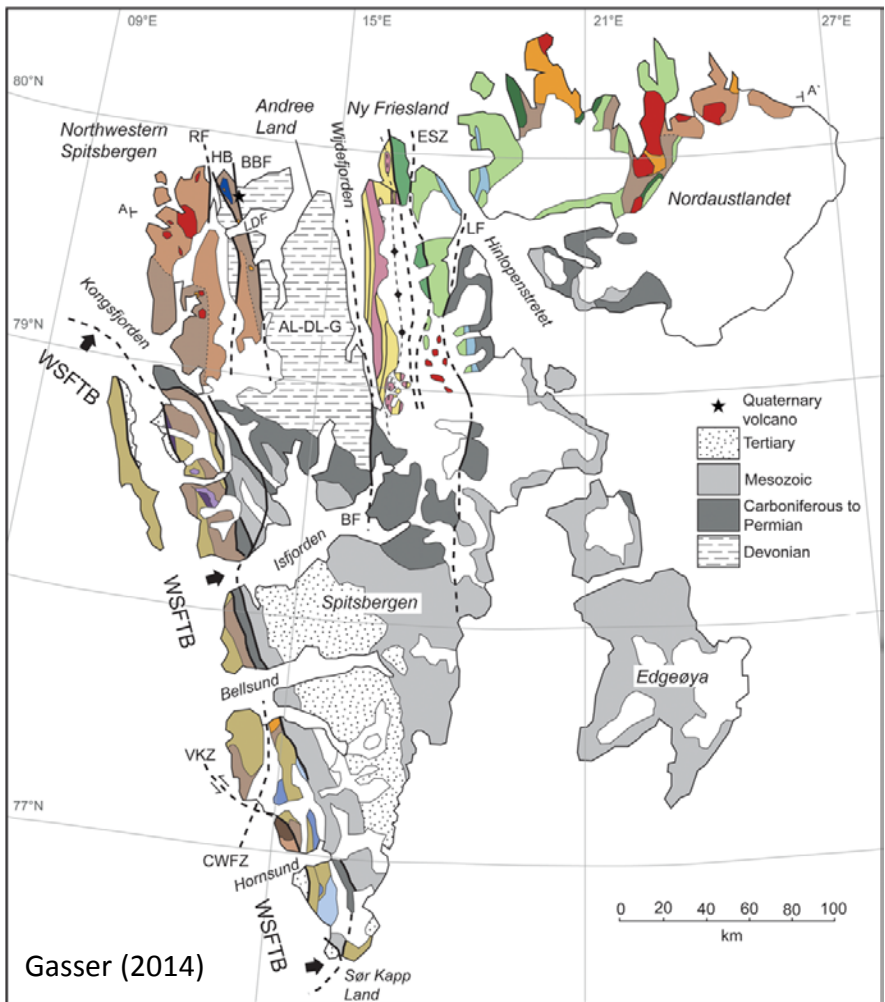
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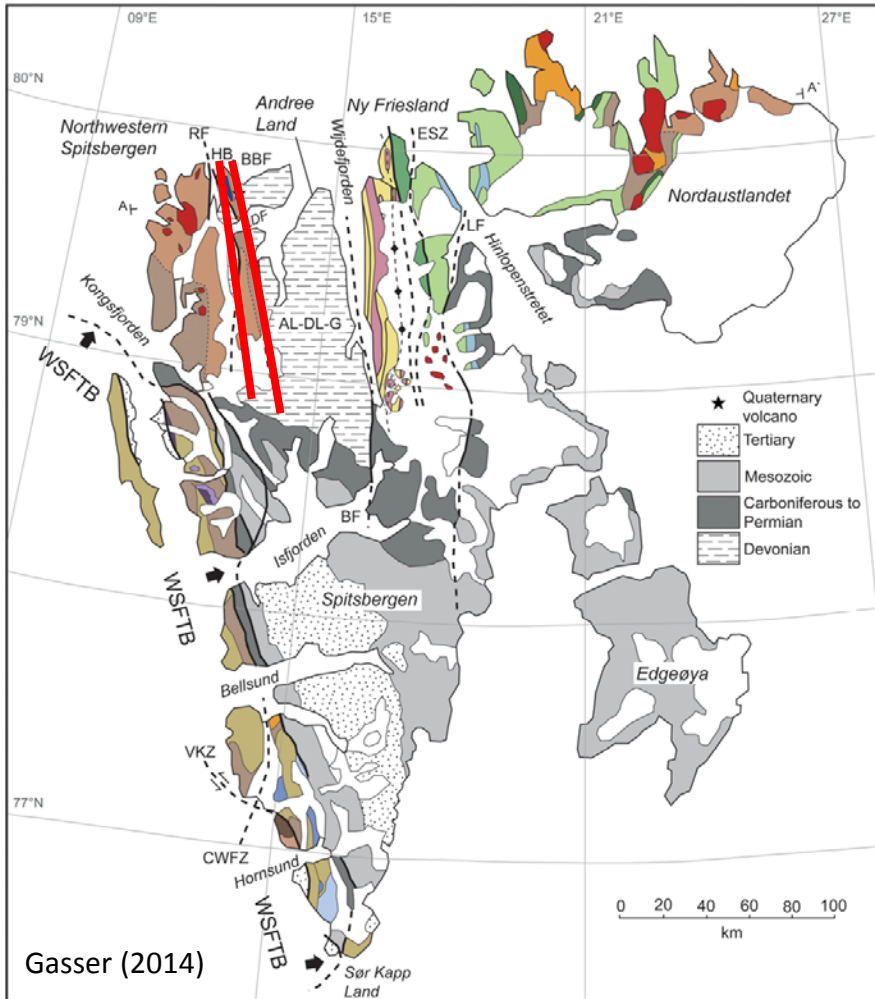
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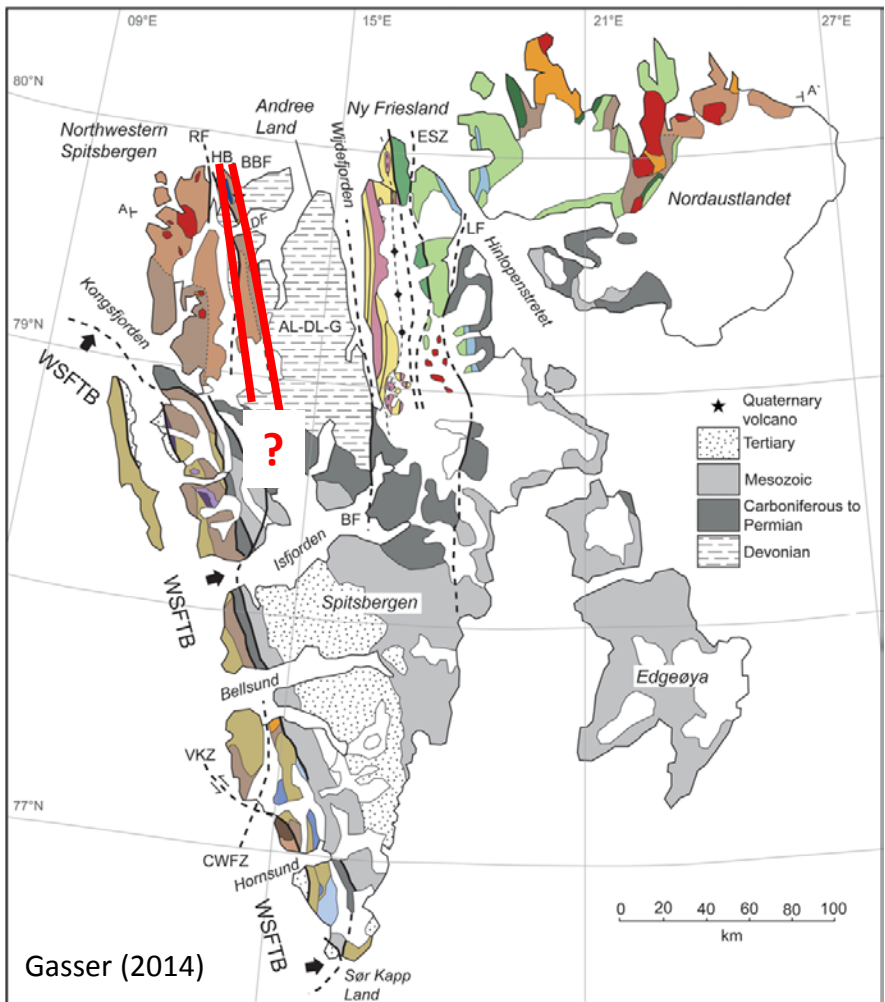
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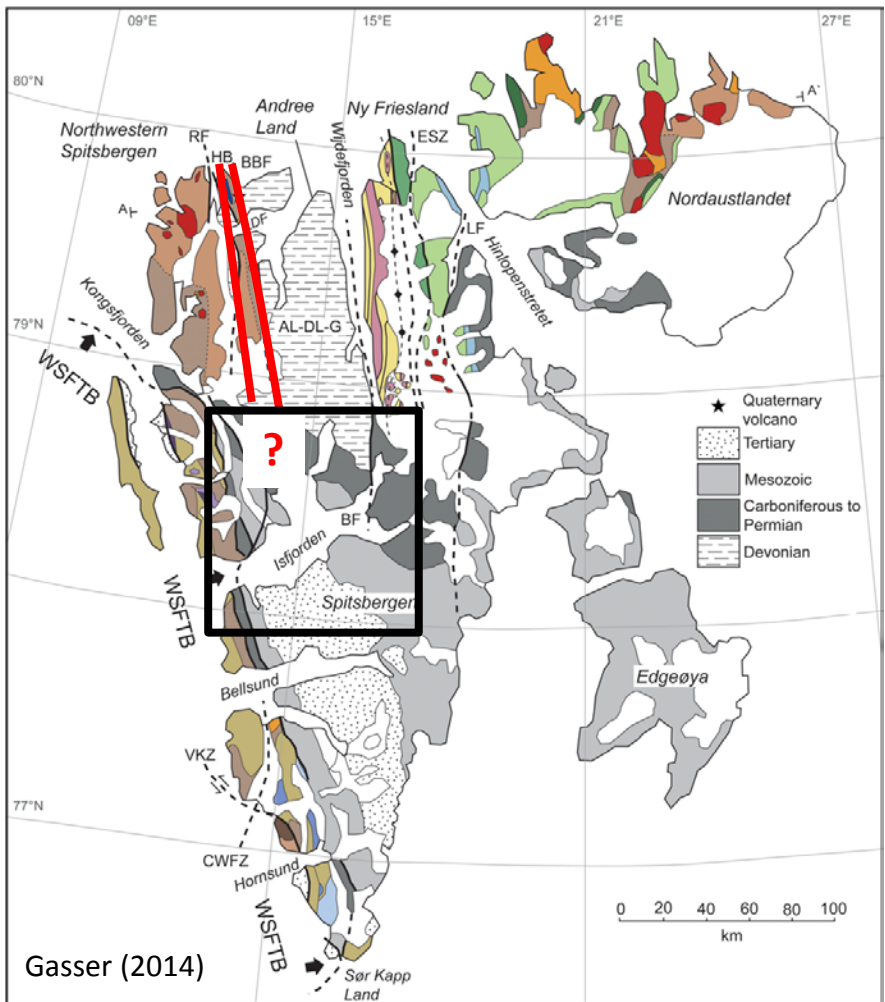


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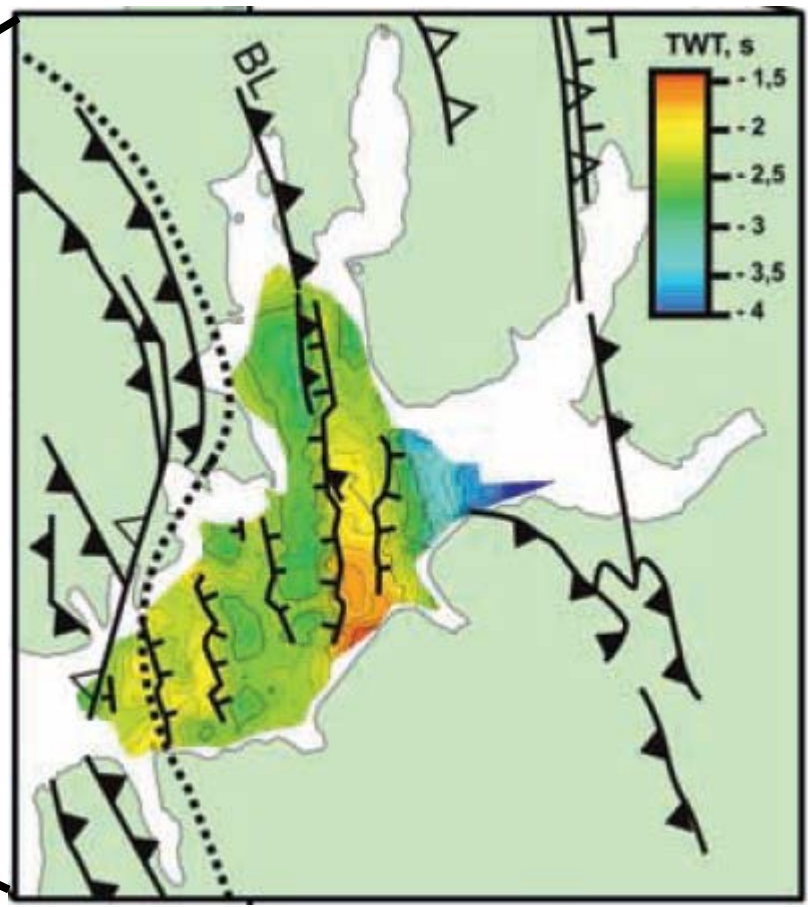
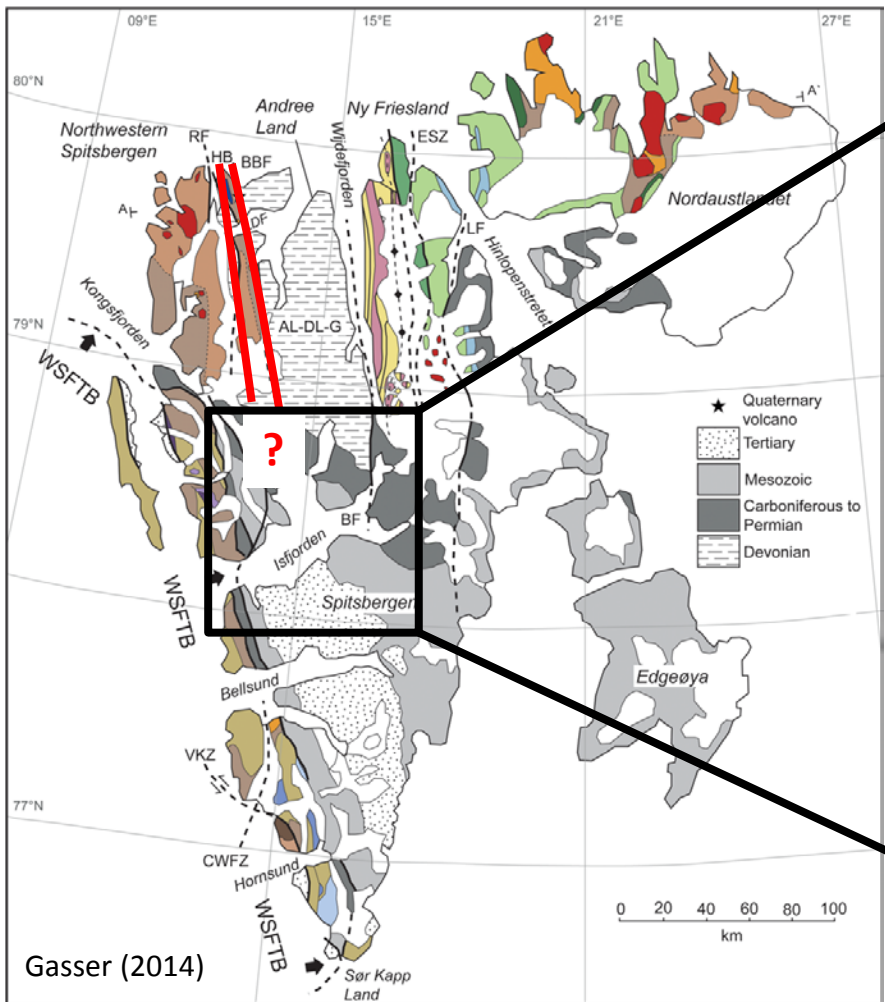
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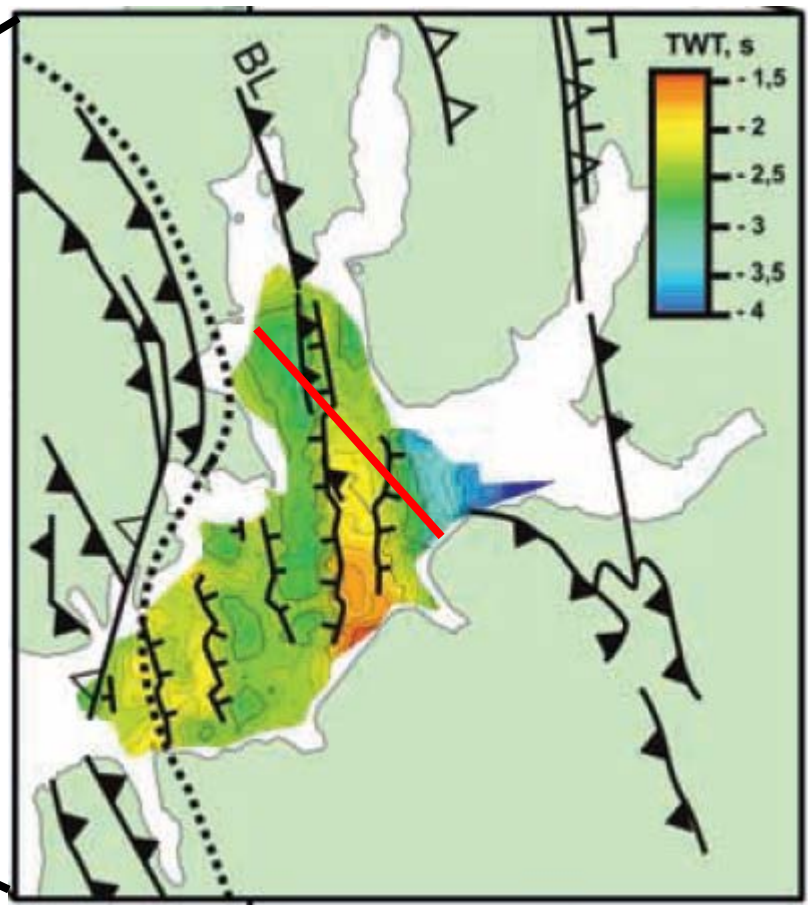
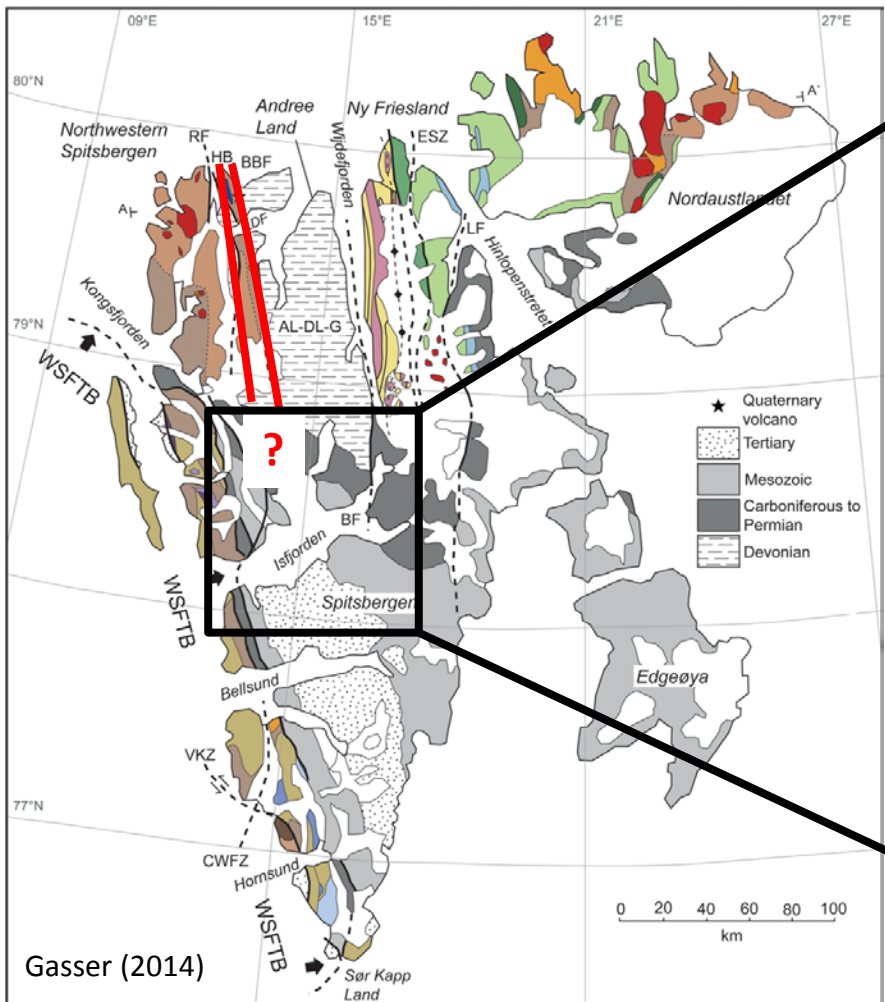
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Blinova et al. (2013)

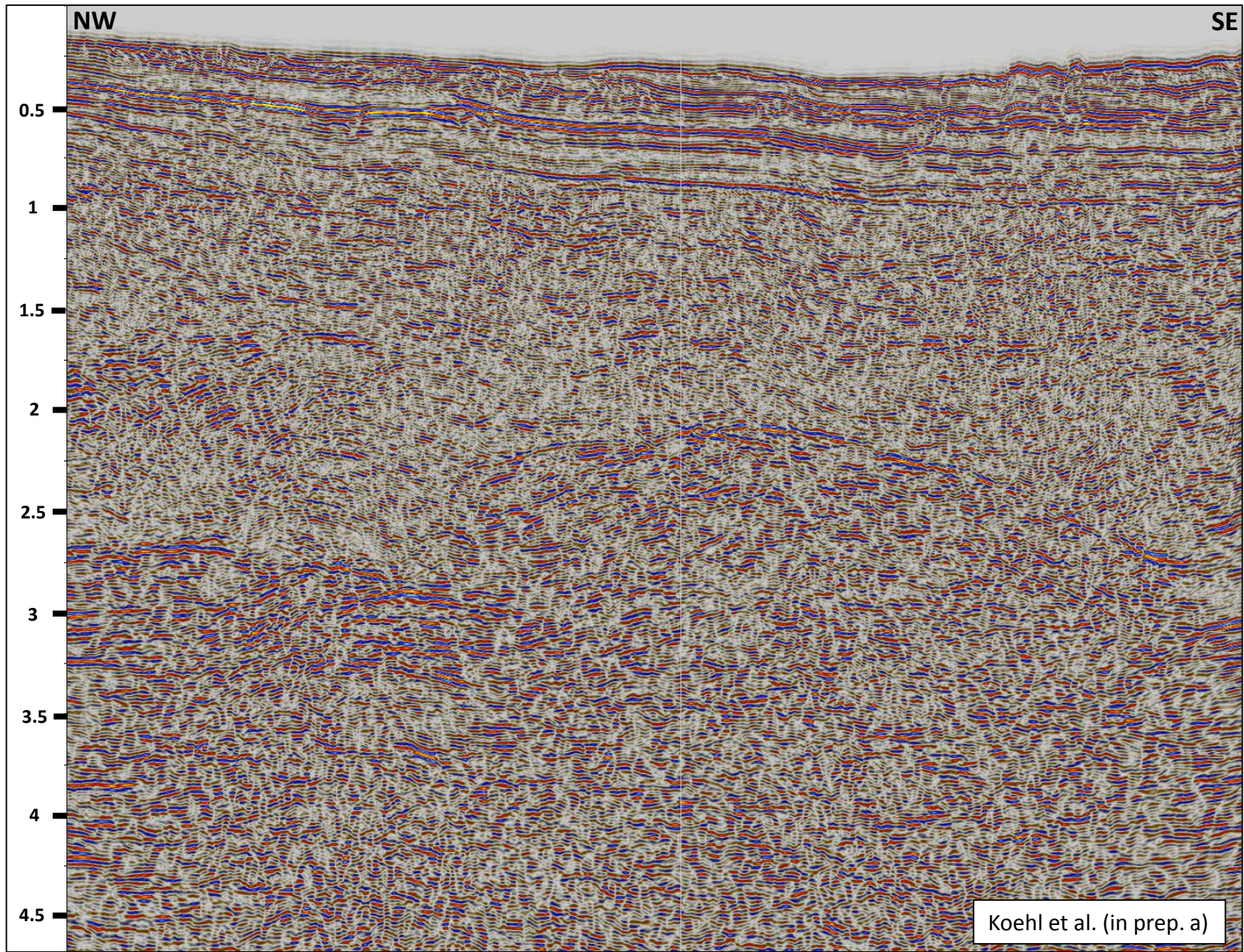
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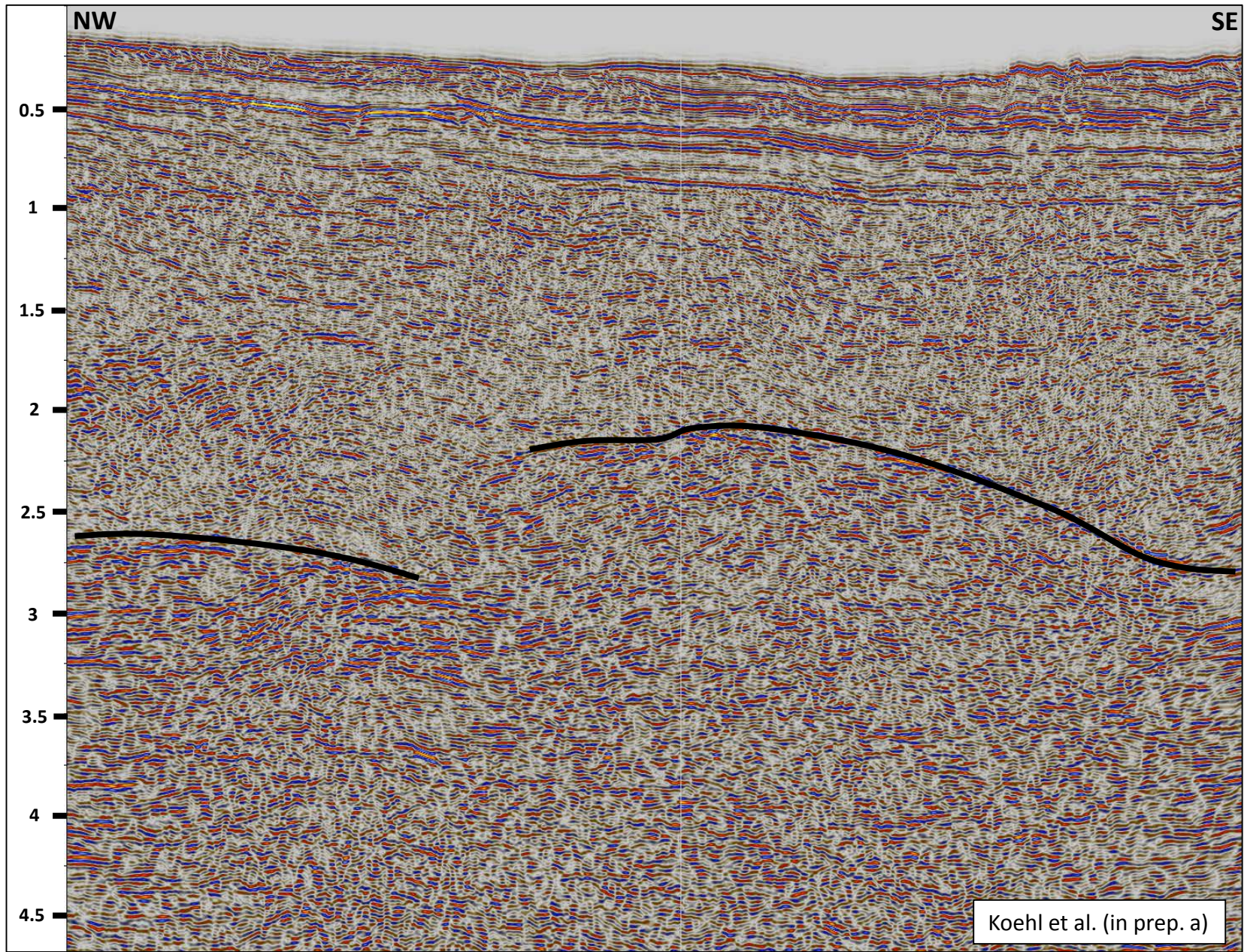
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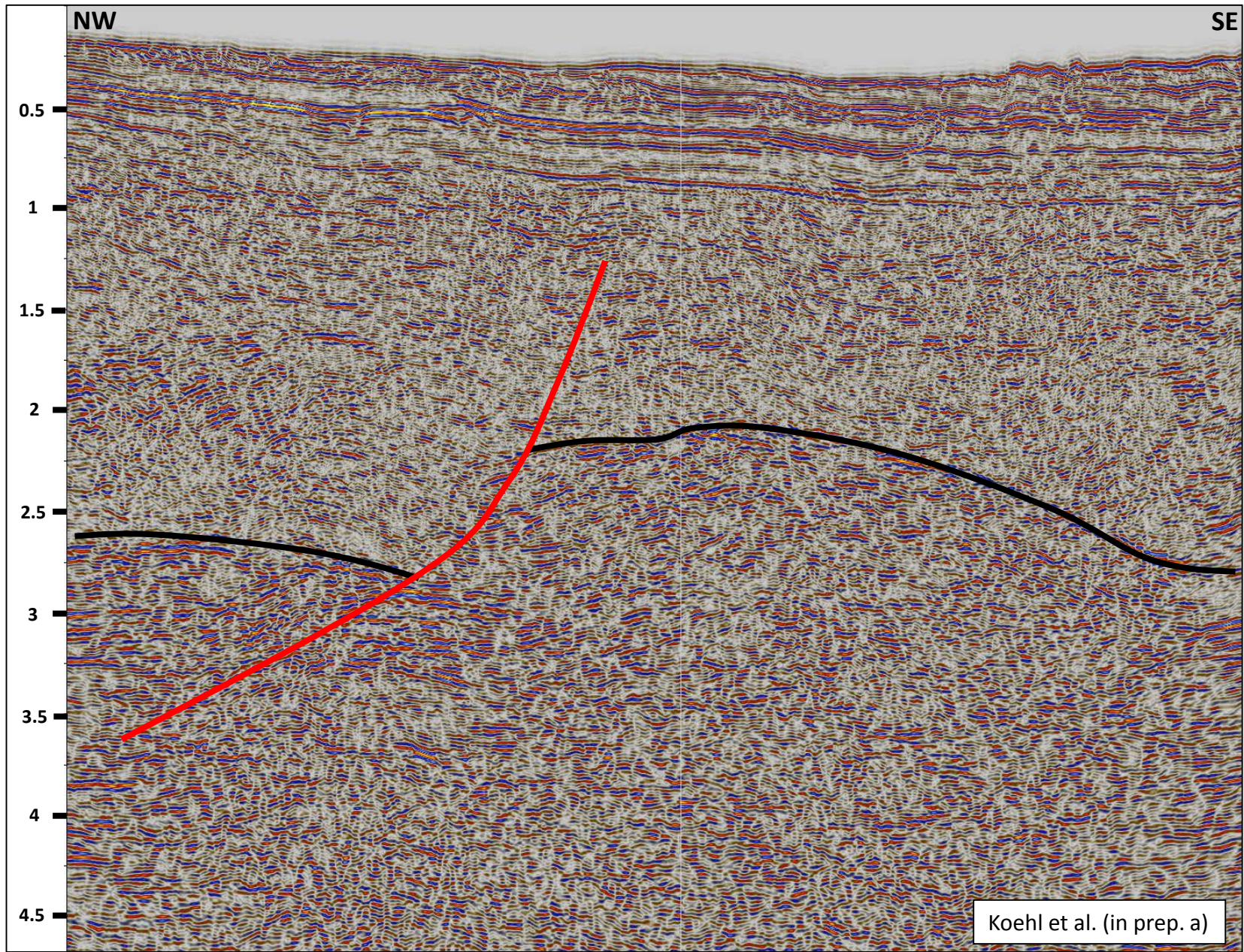
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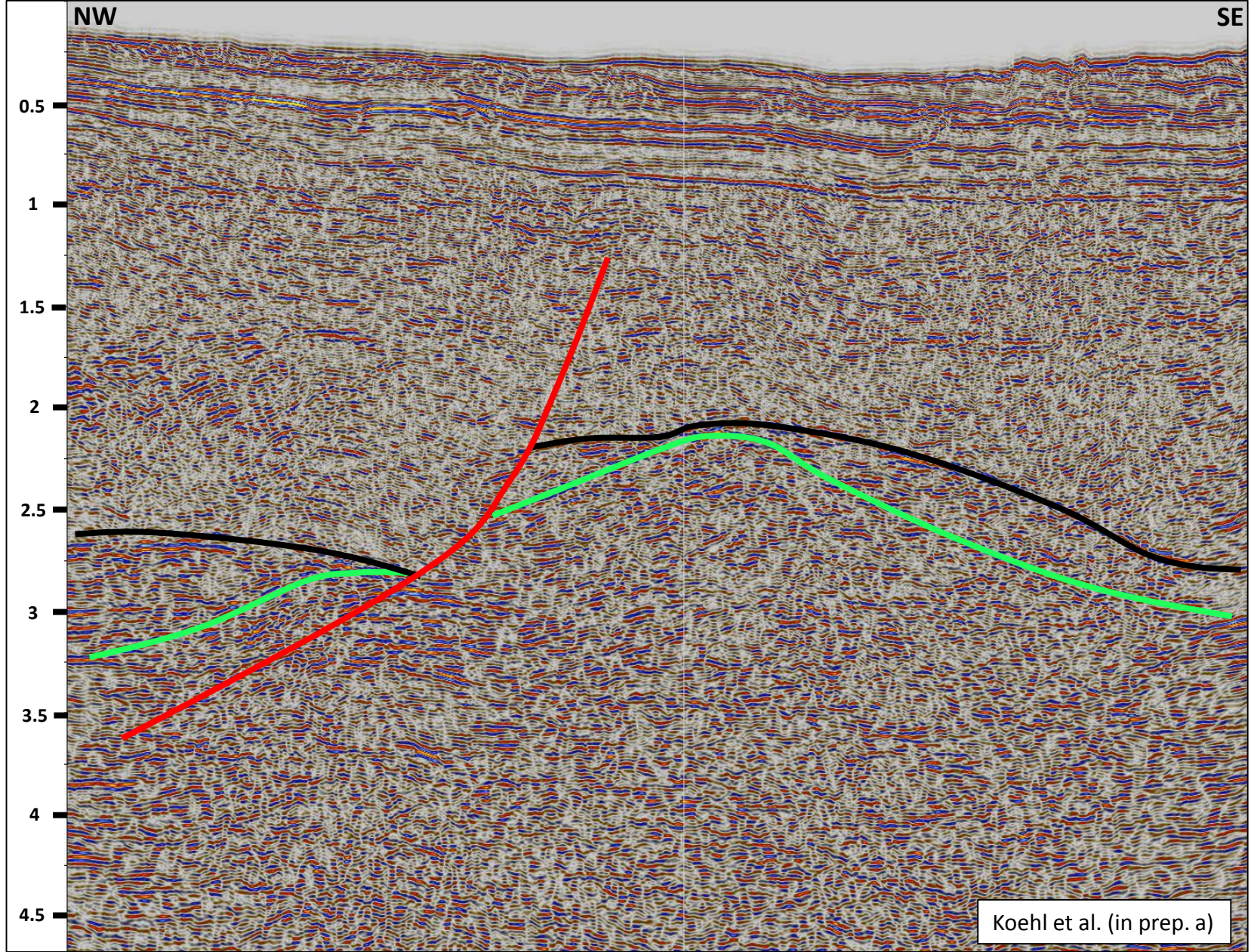
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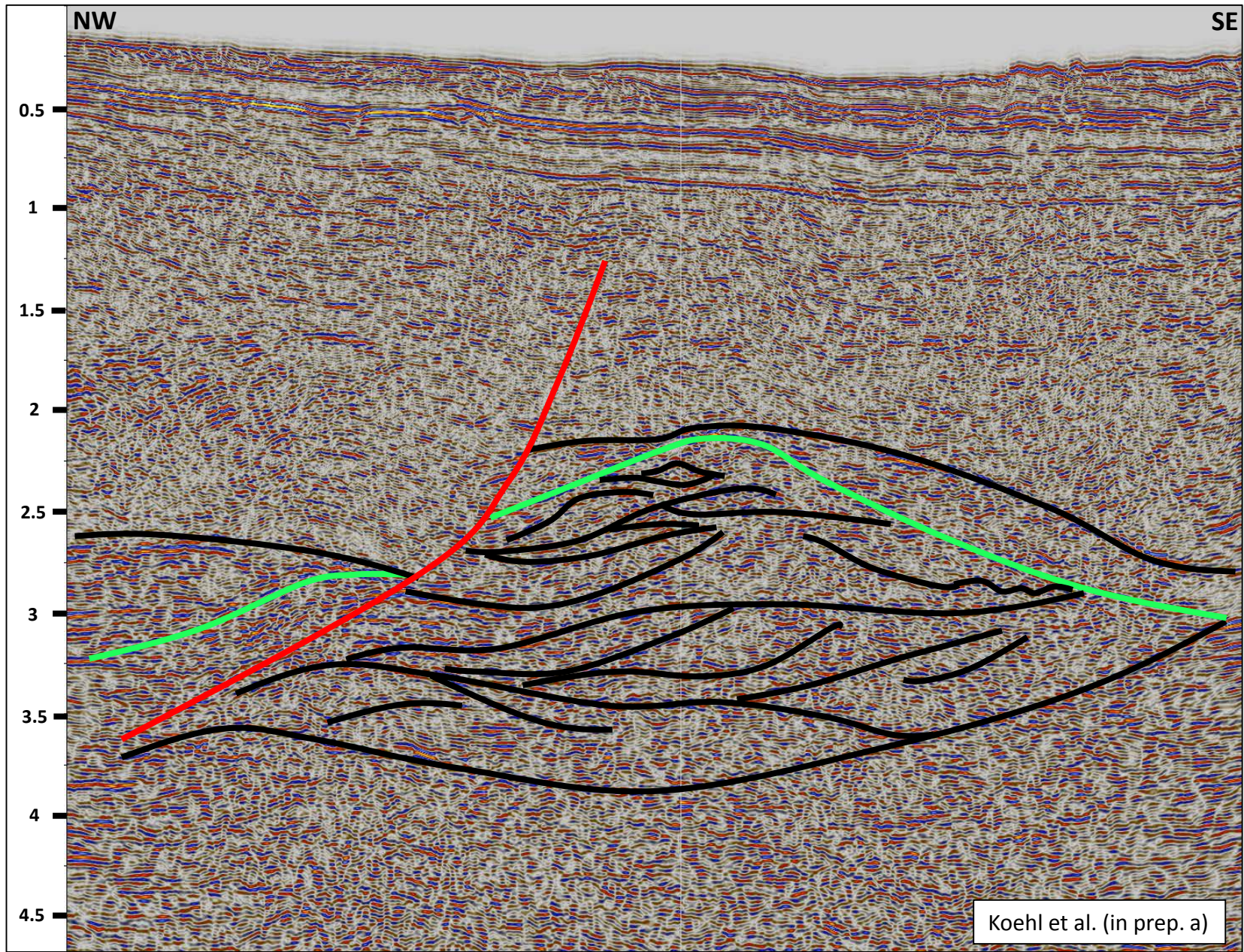
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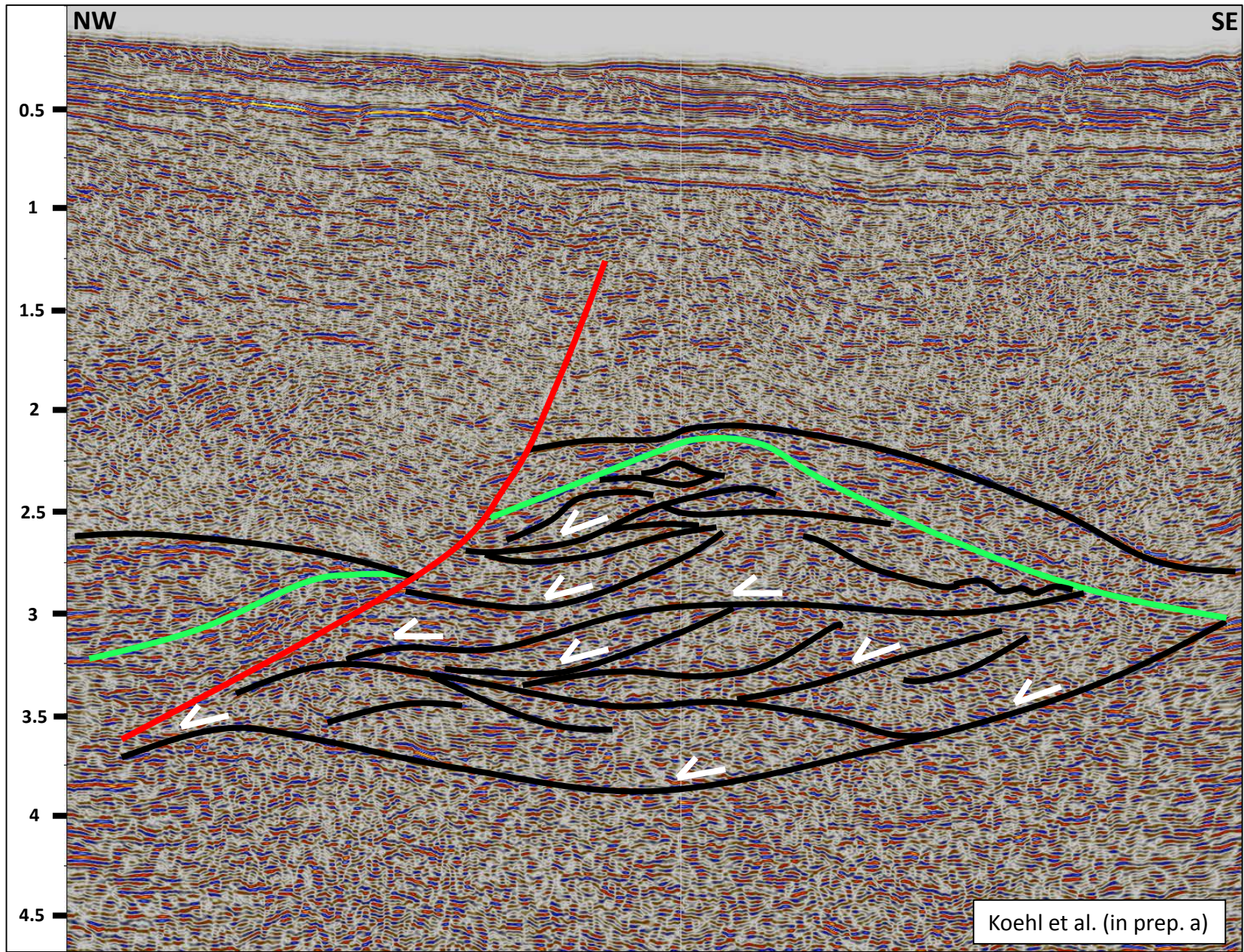
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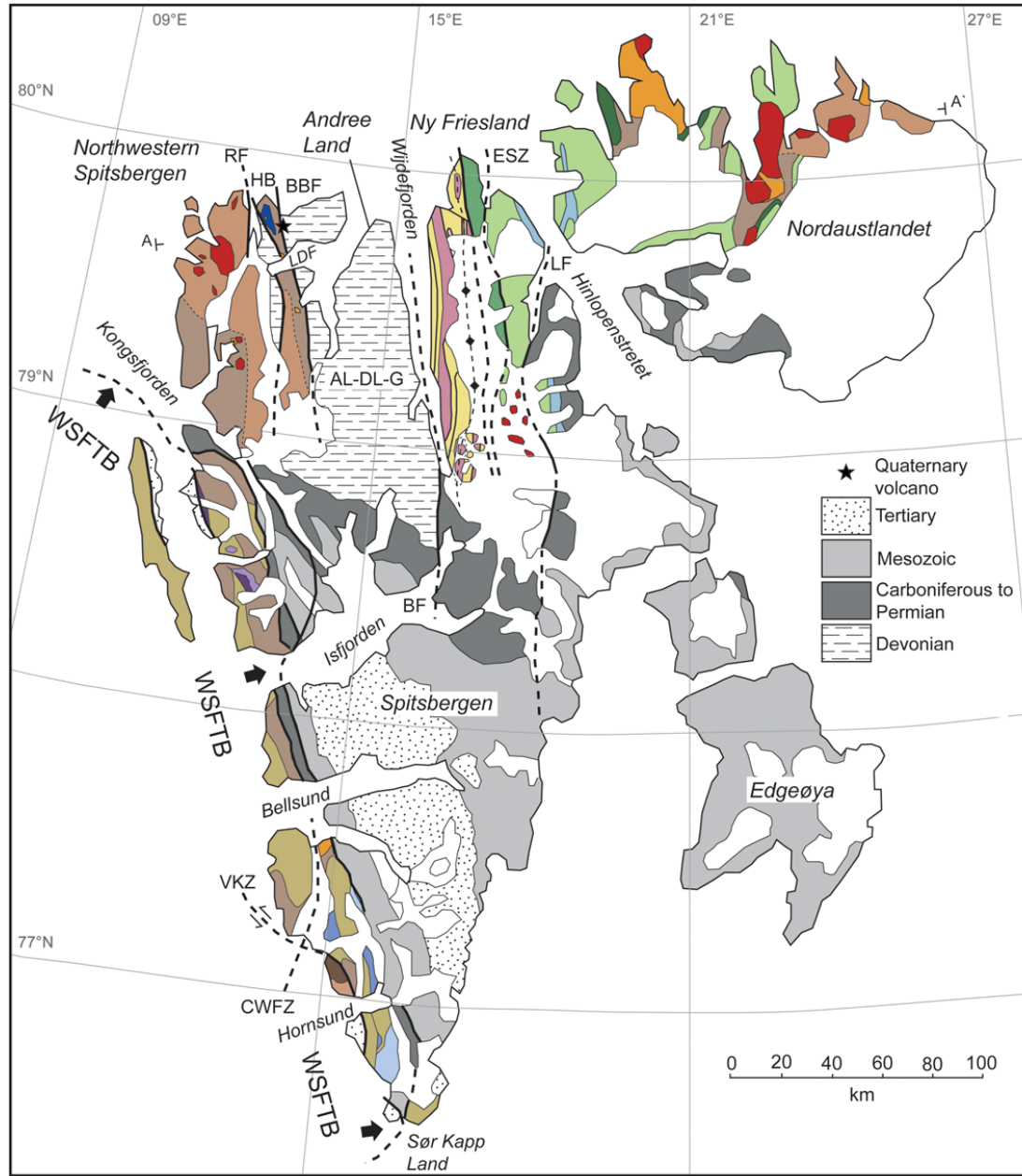


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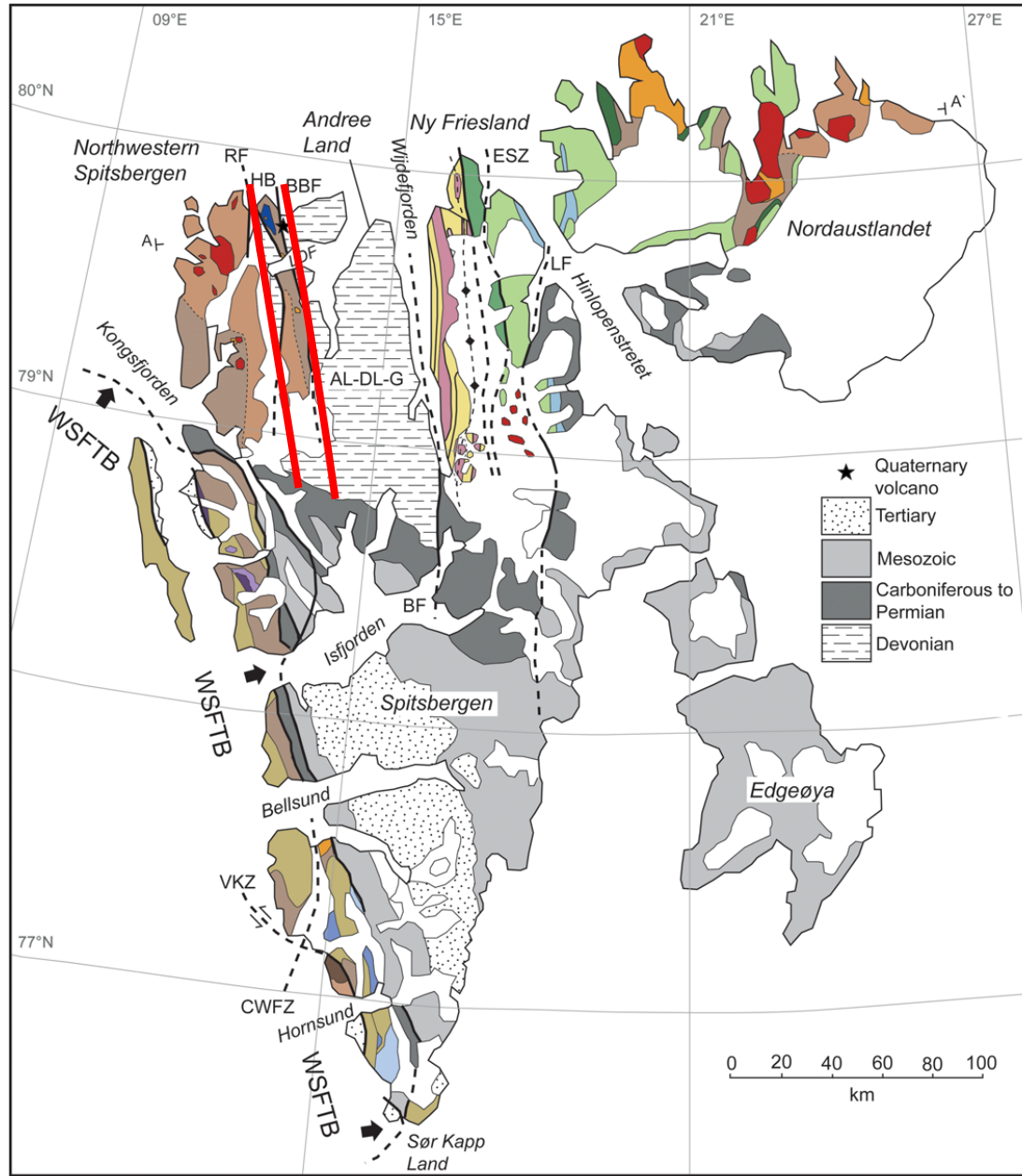




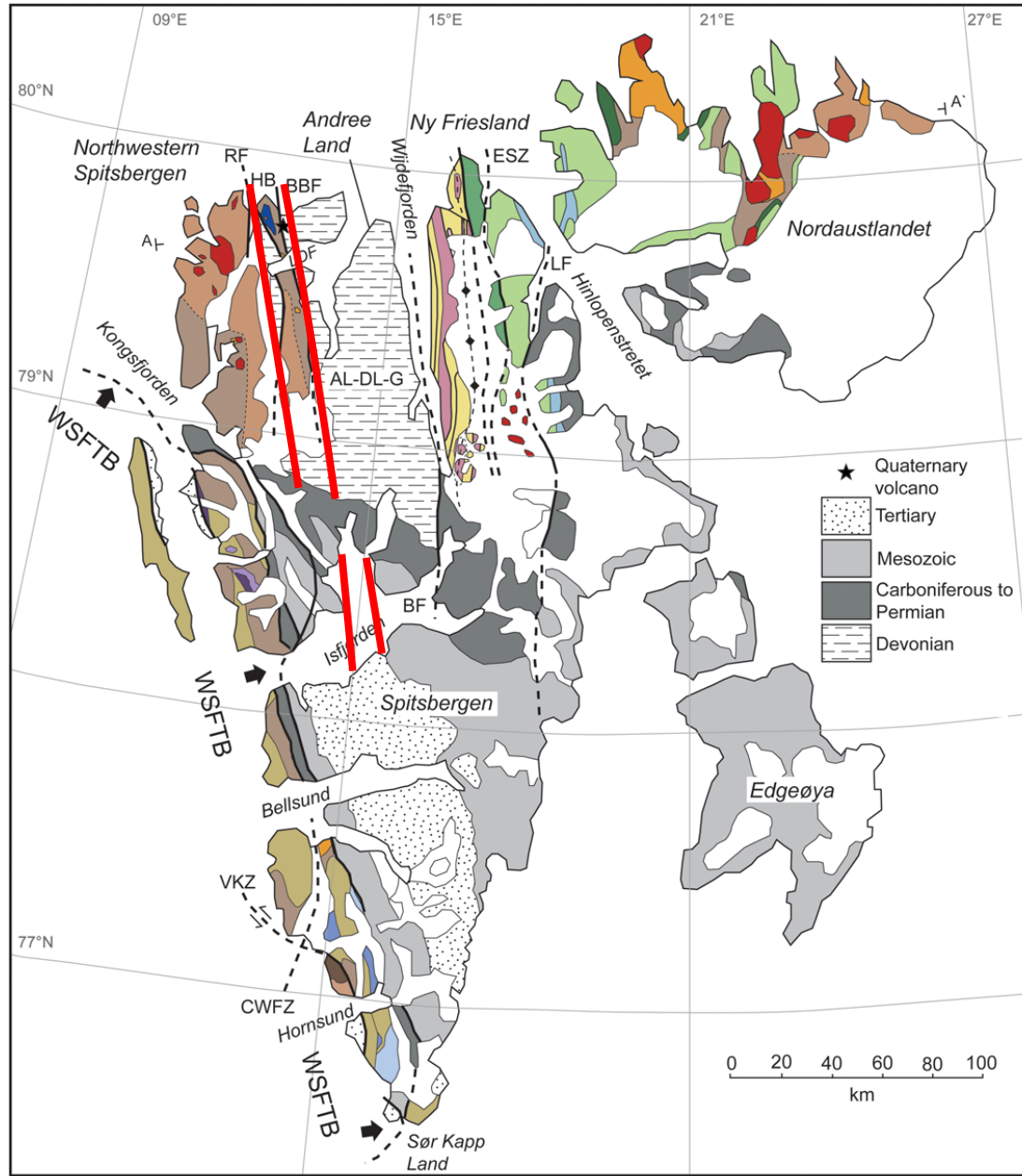
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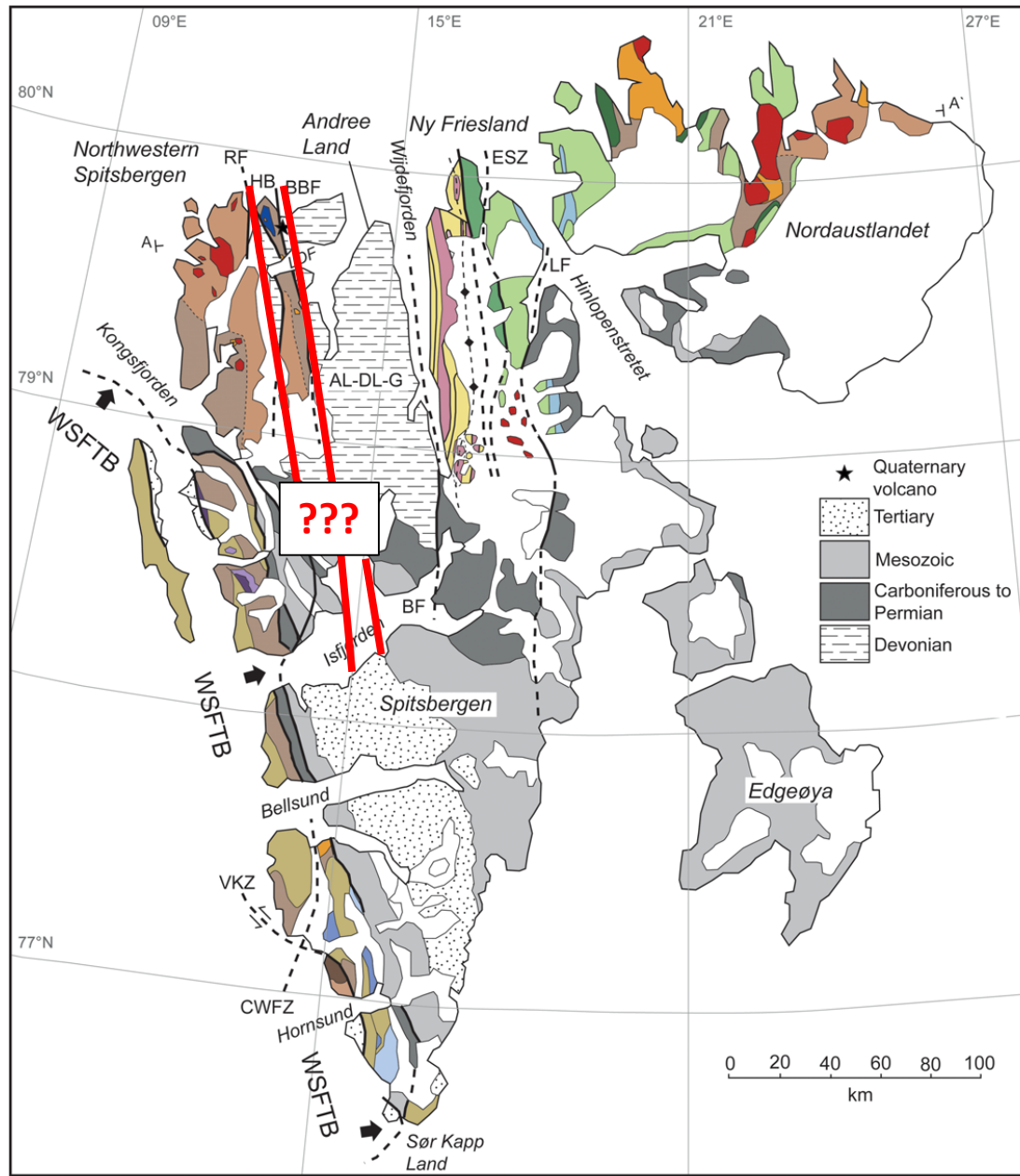
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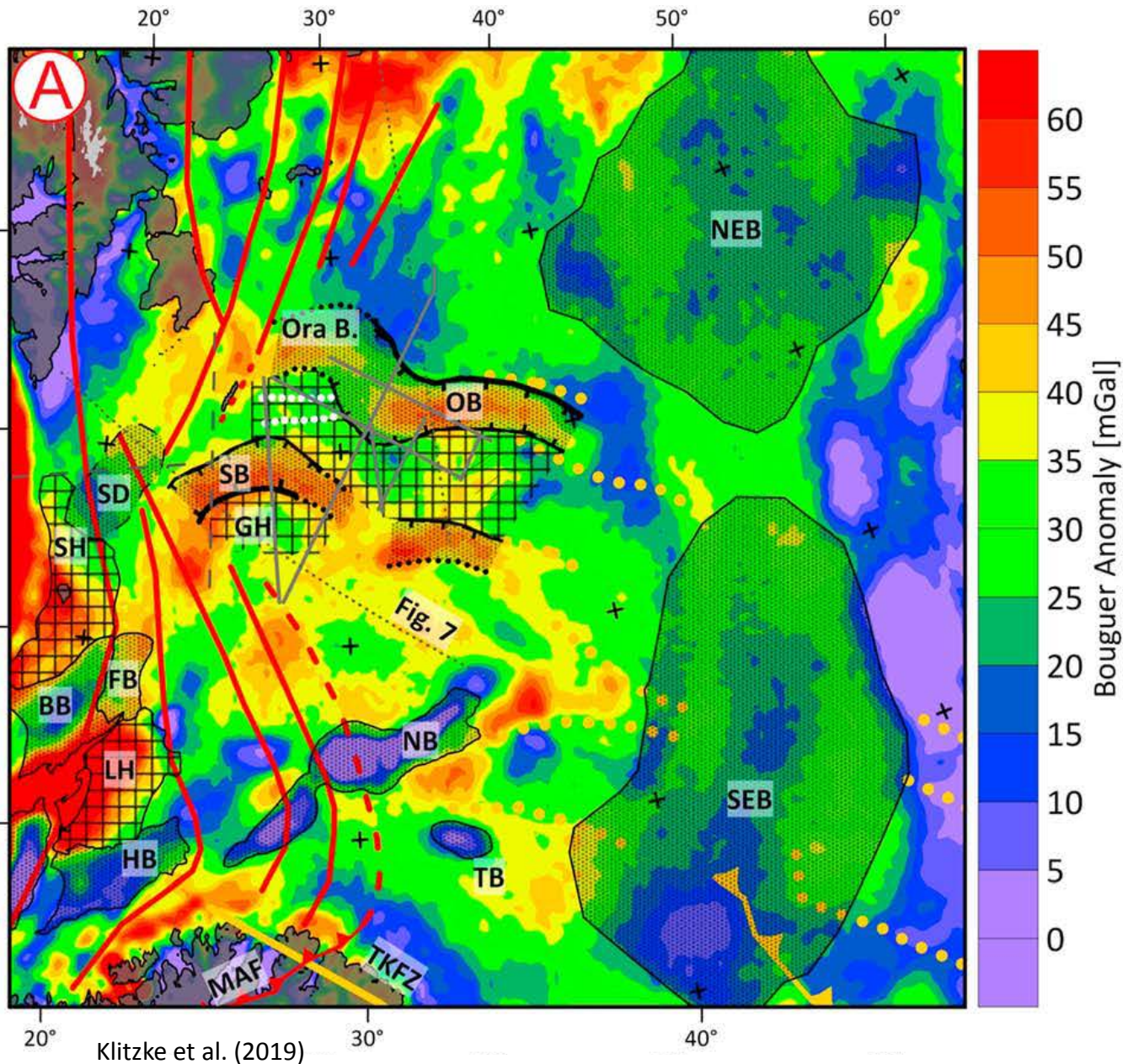
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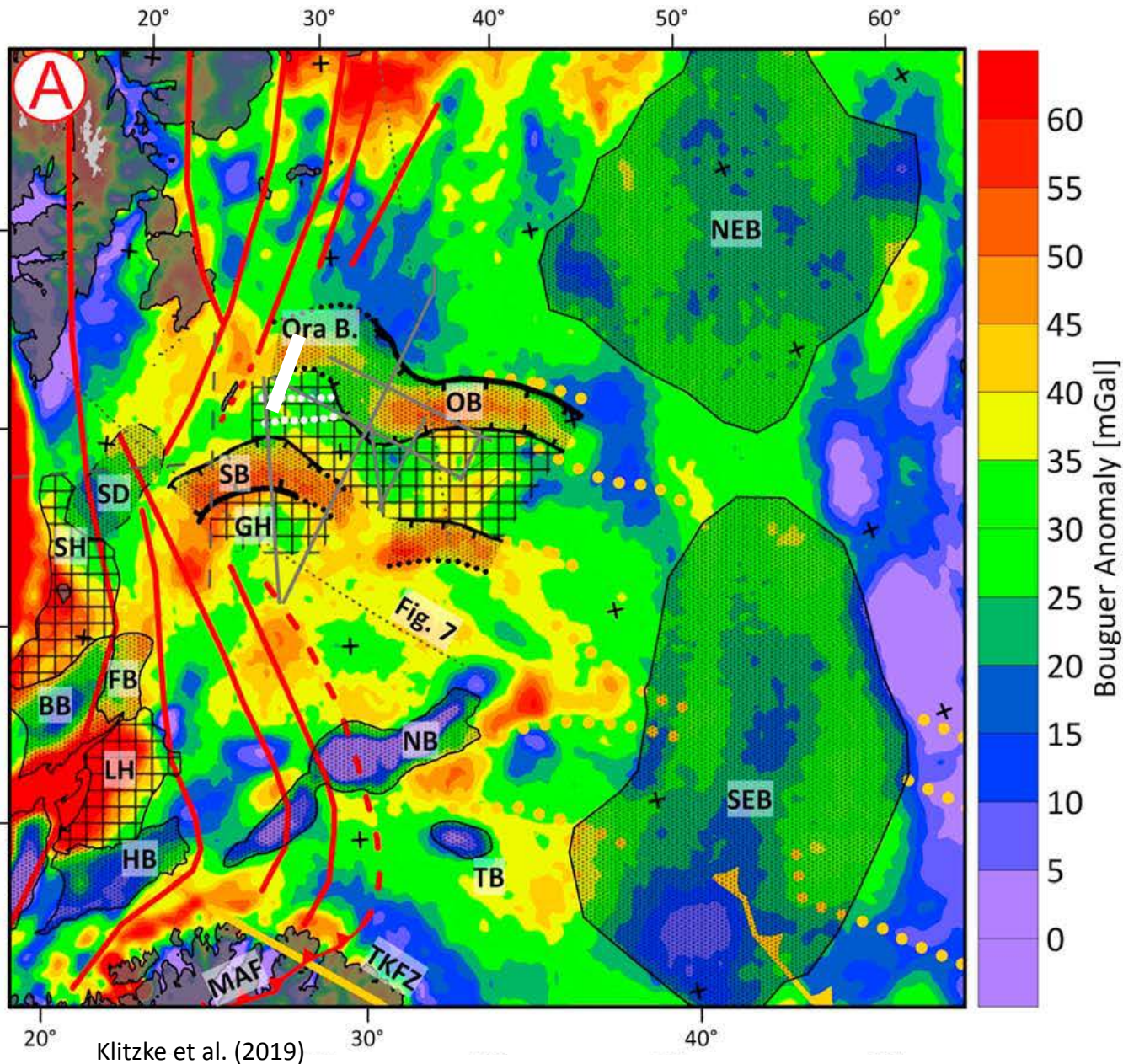
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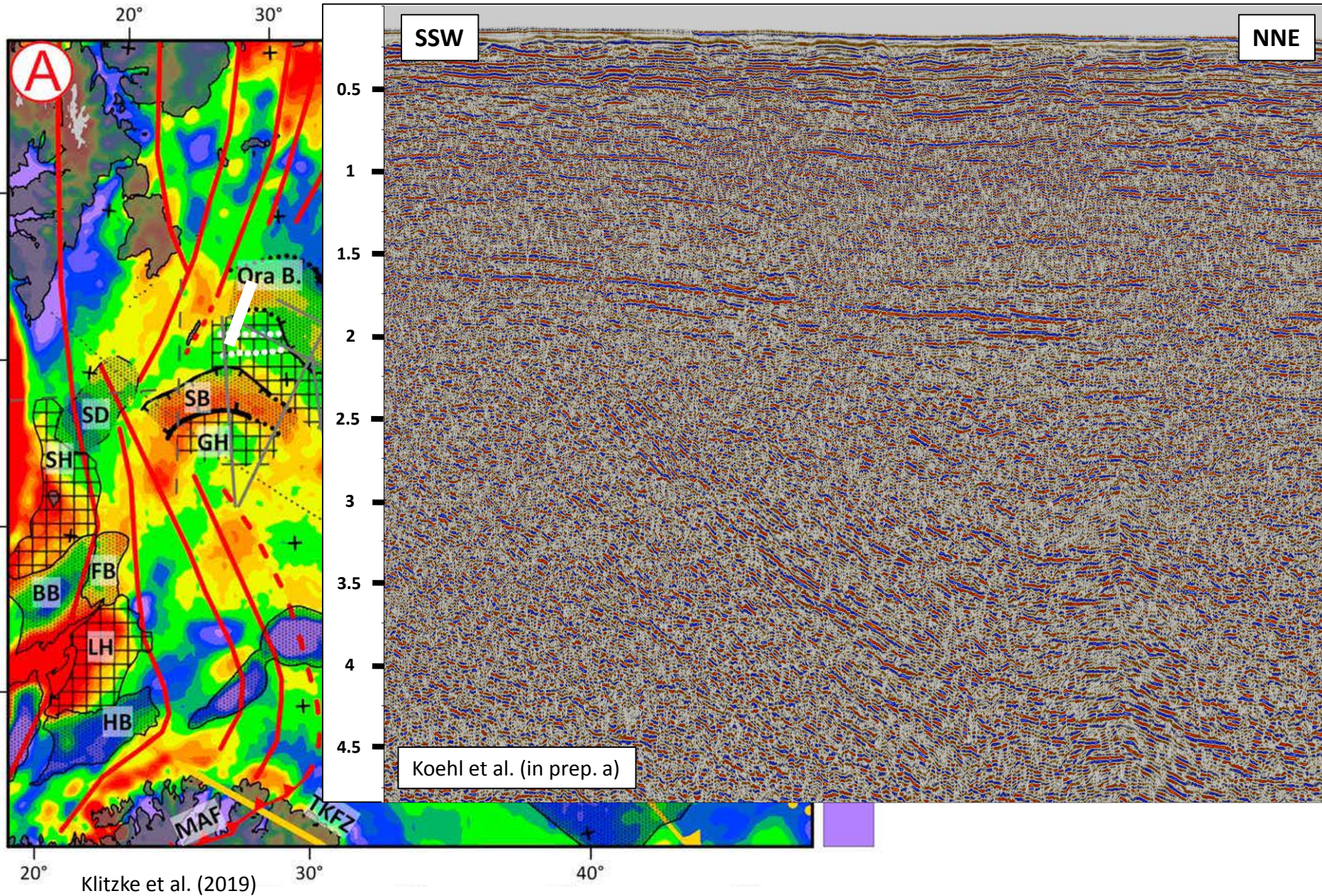
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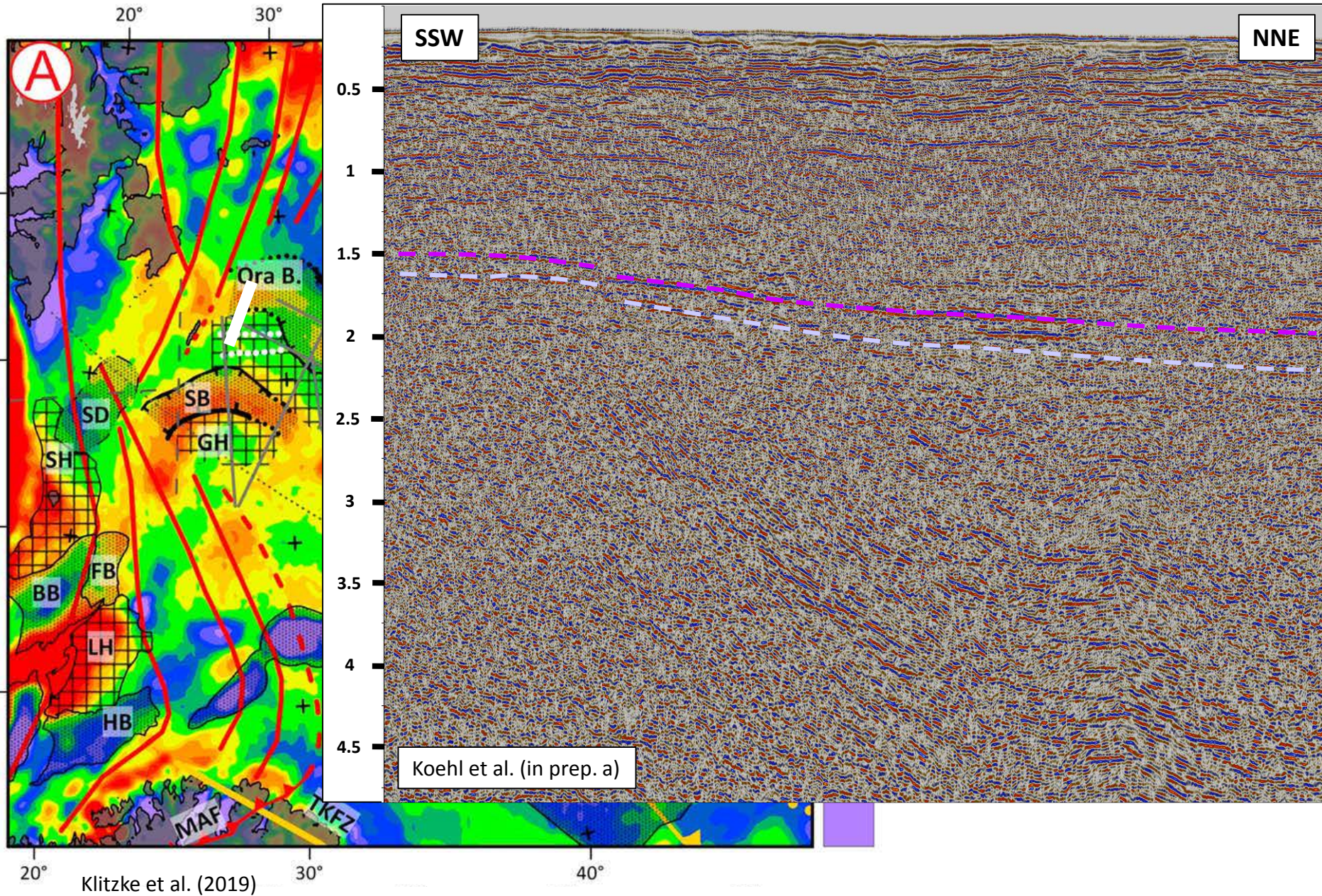
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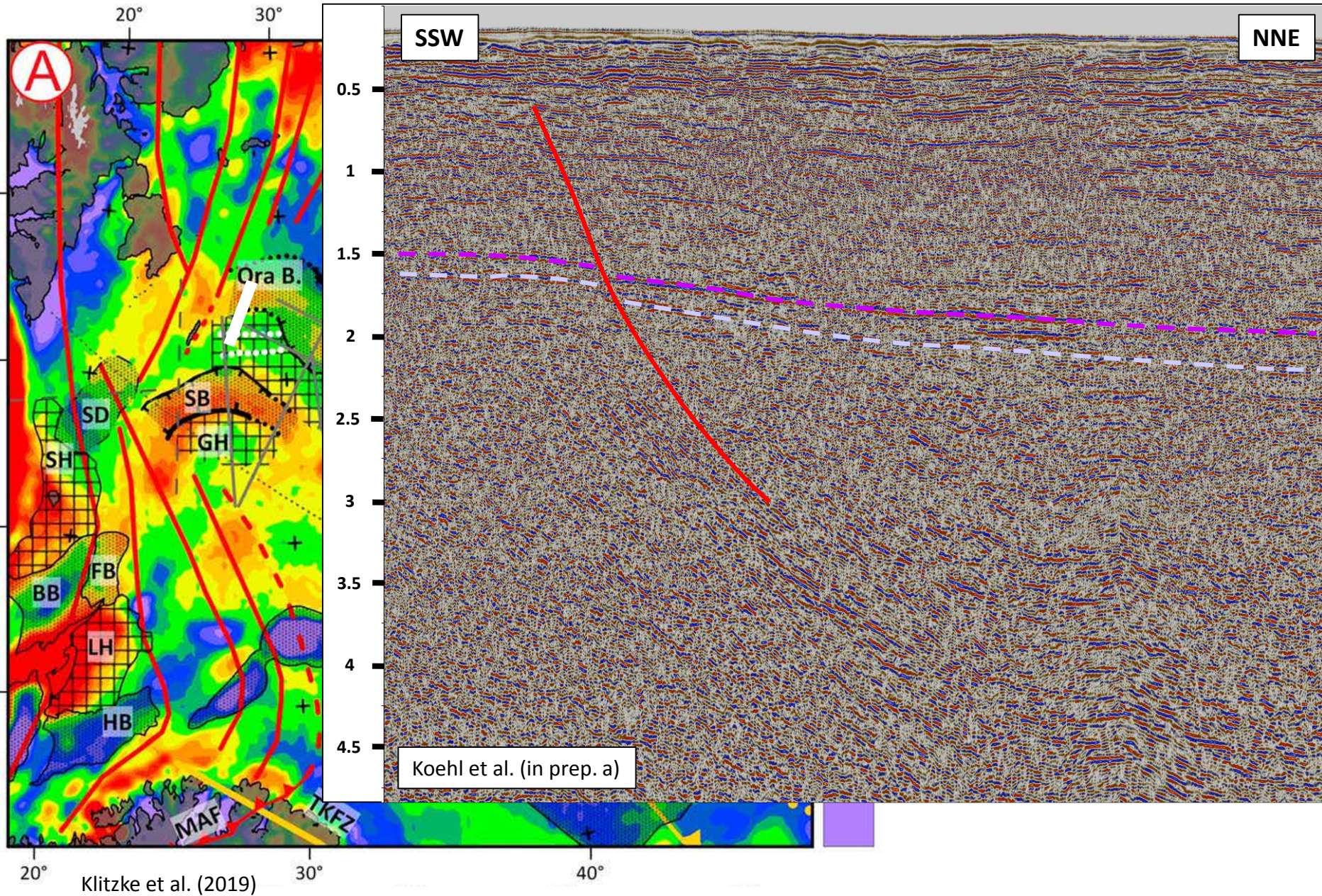


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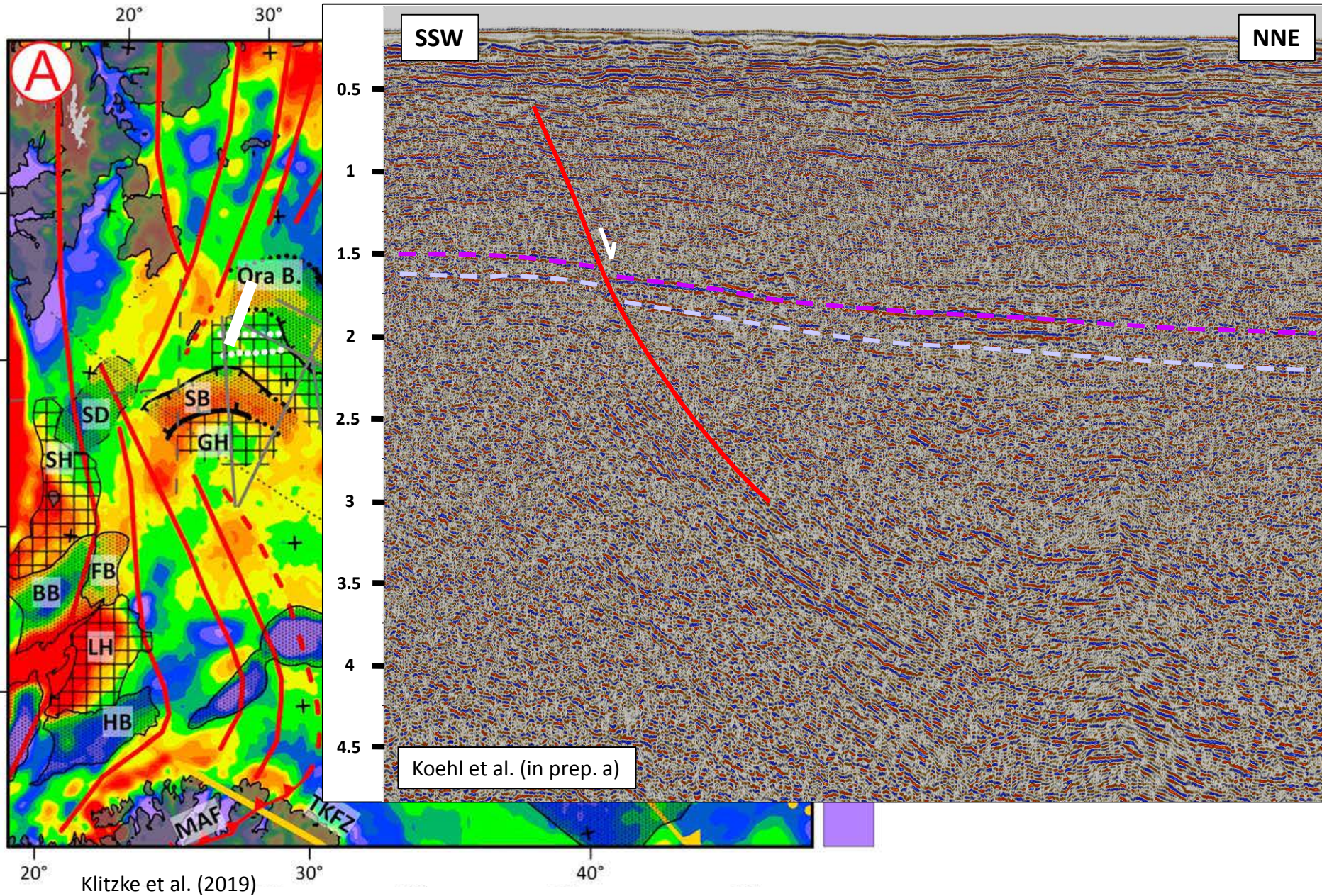




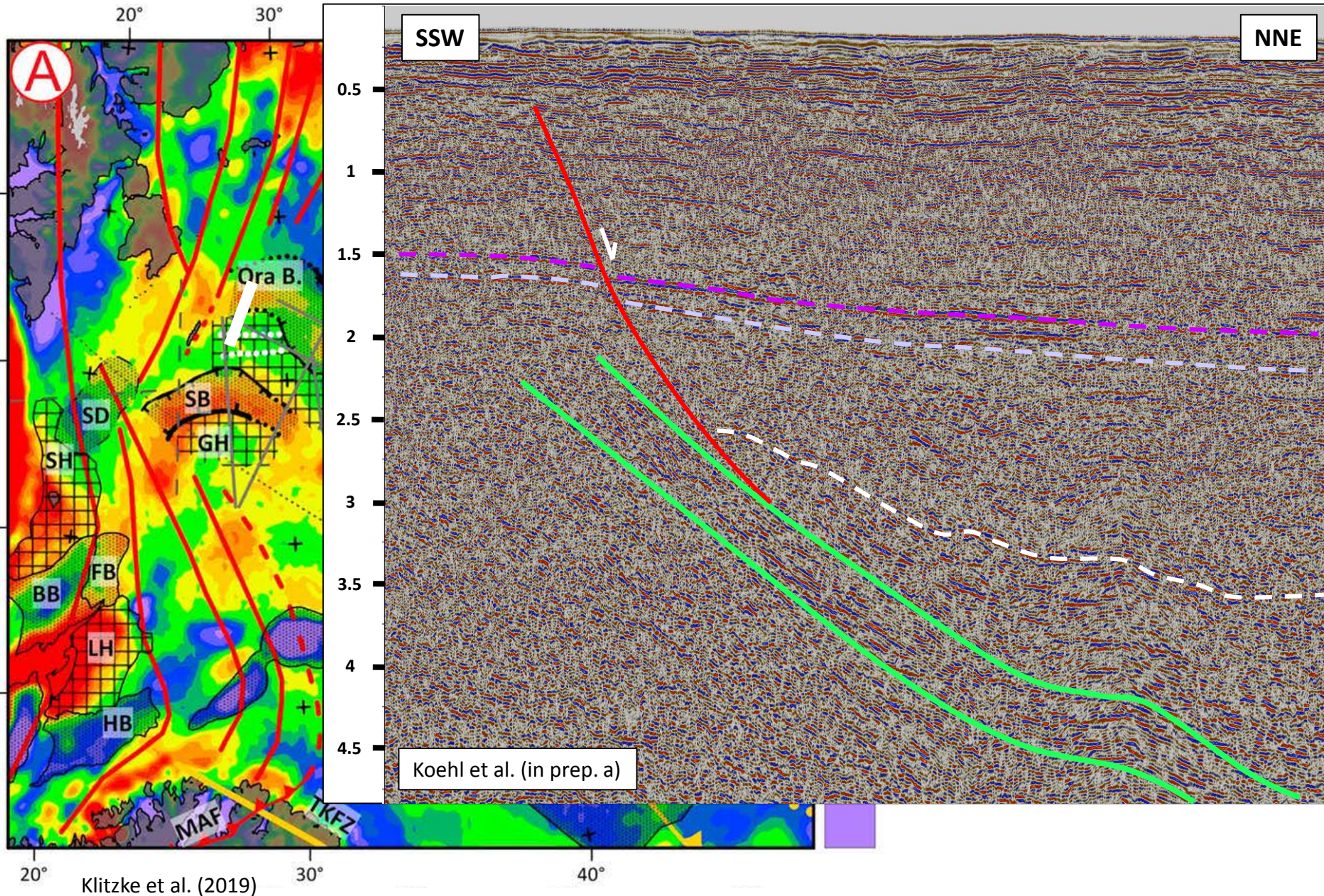
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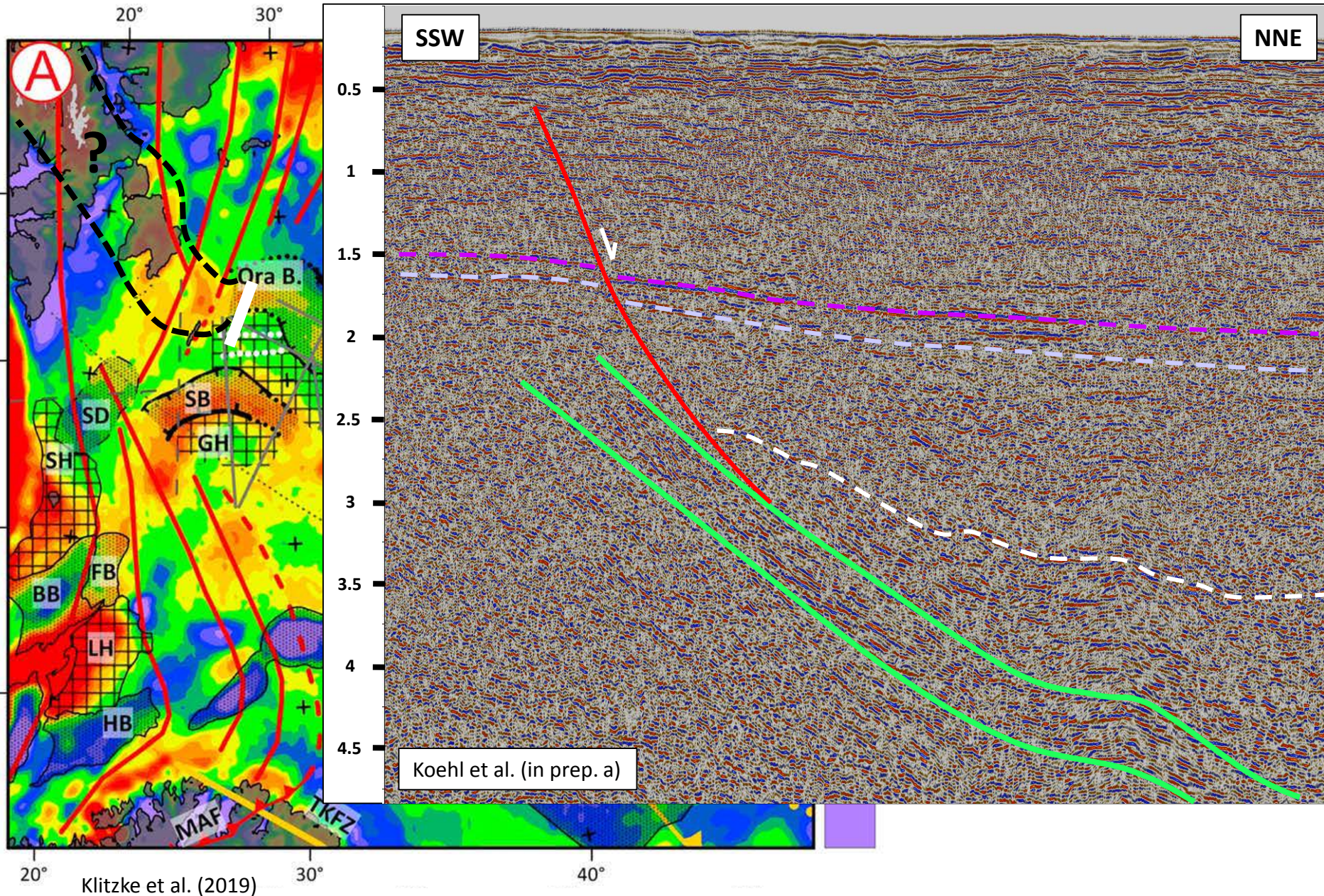
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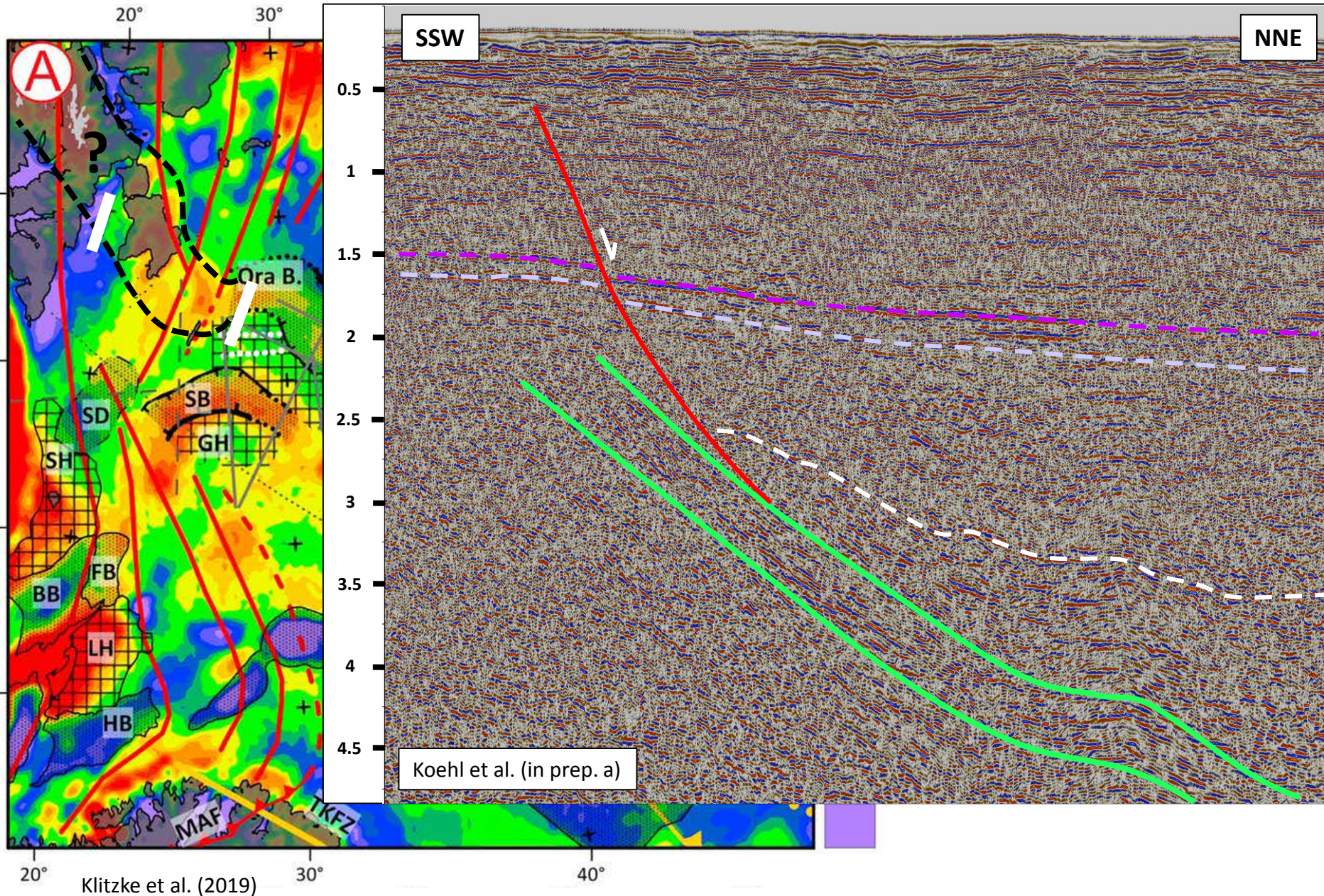
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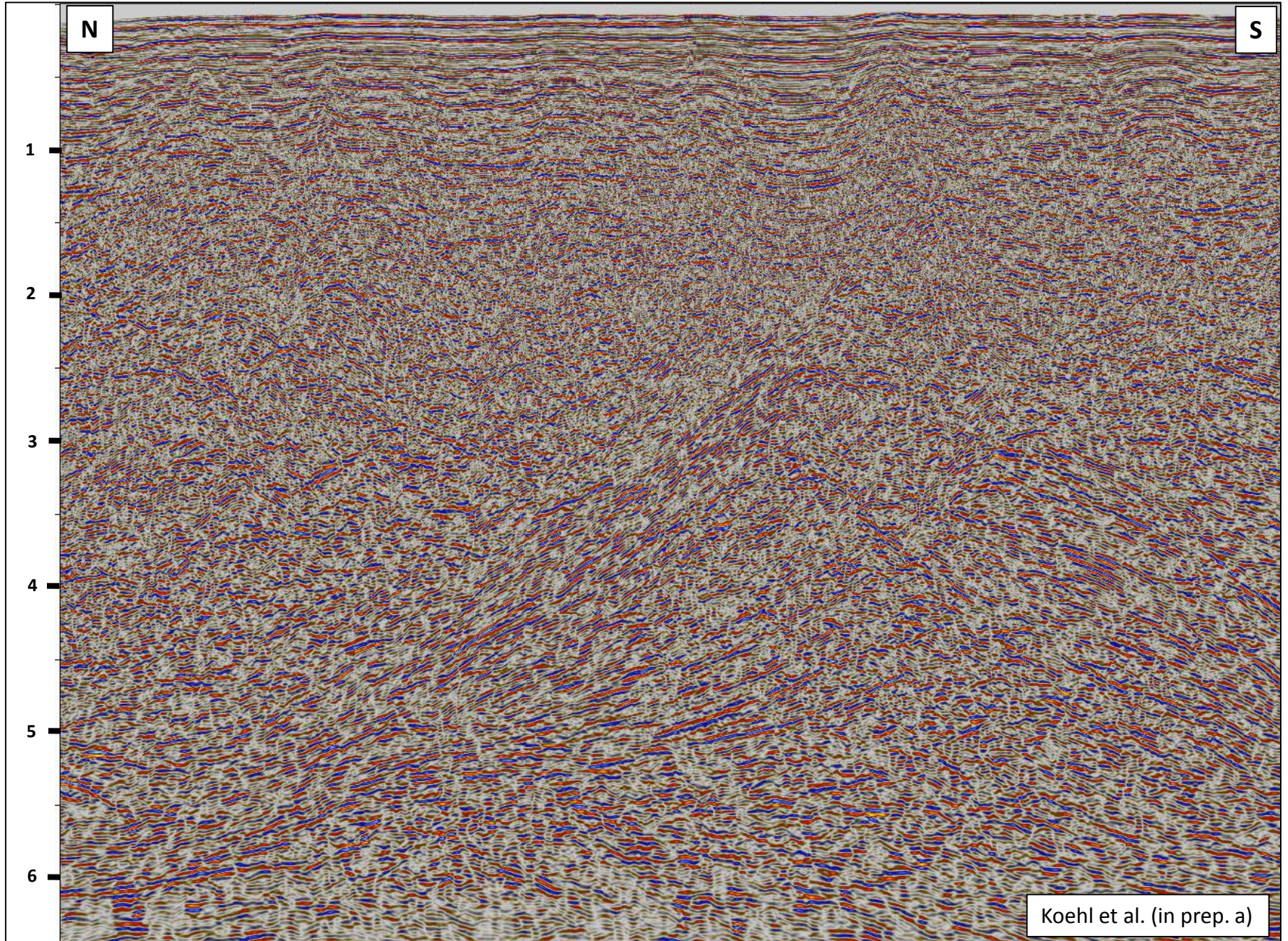
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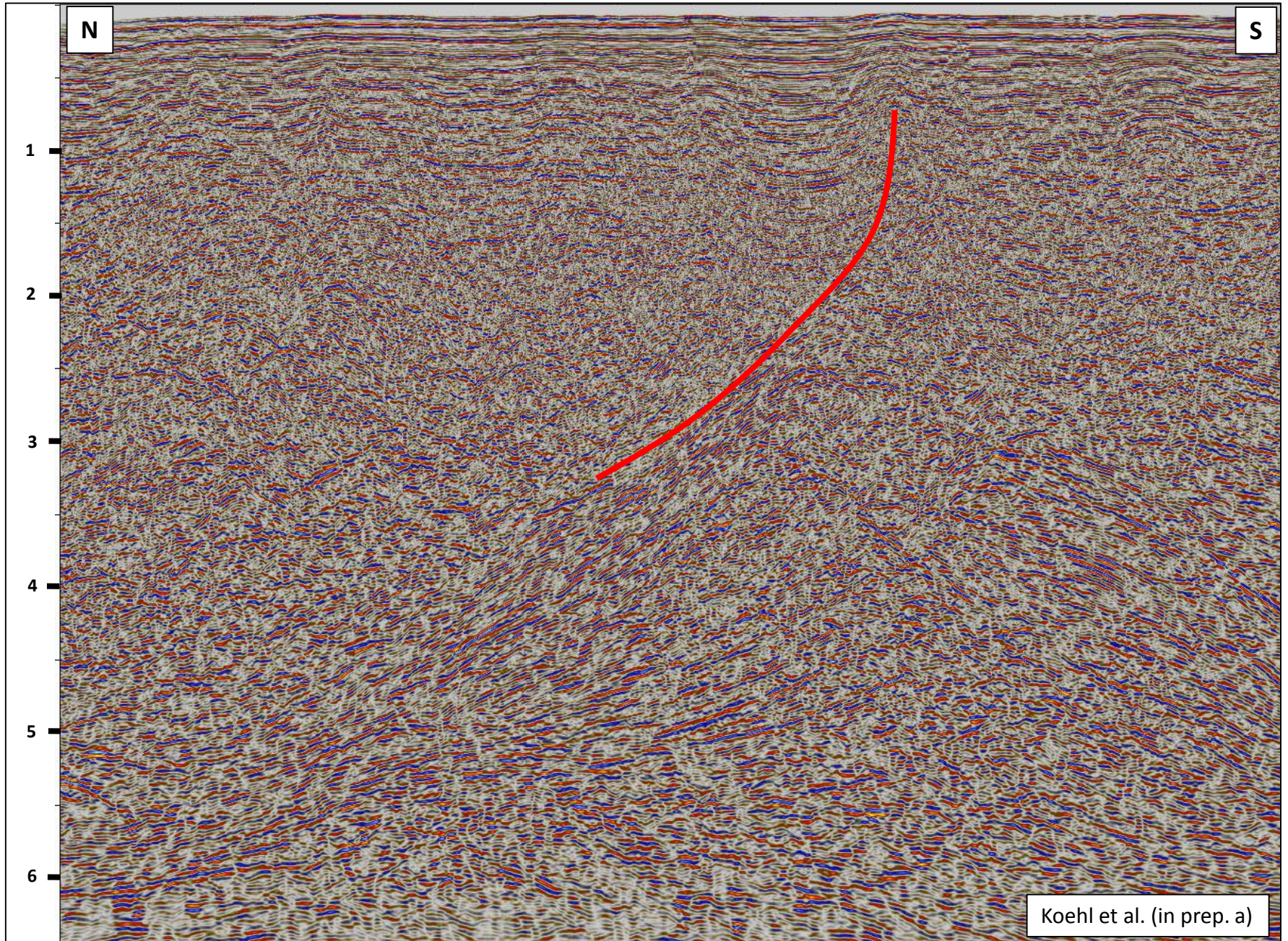
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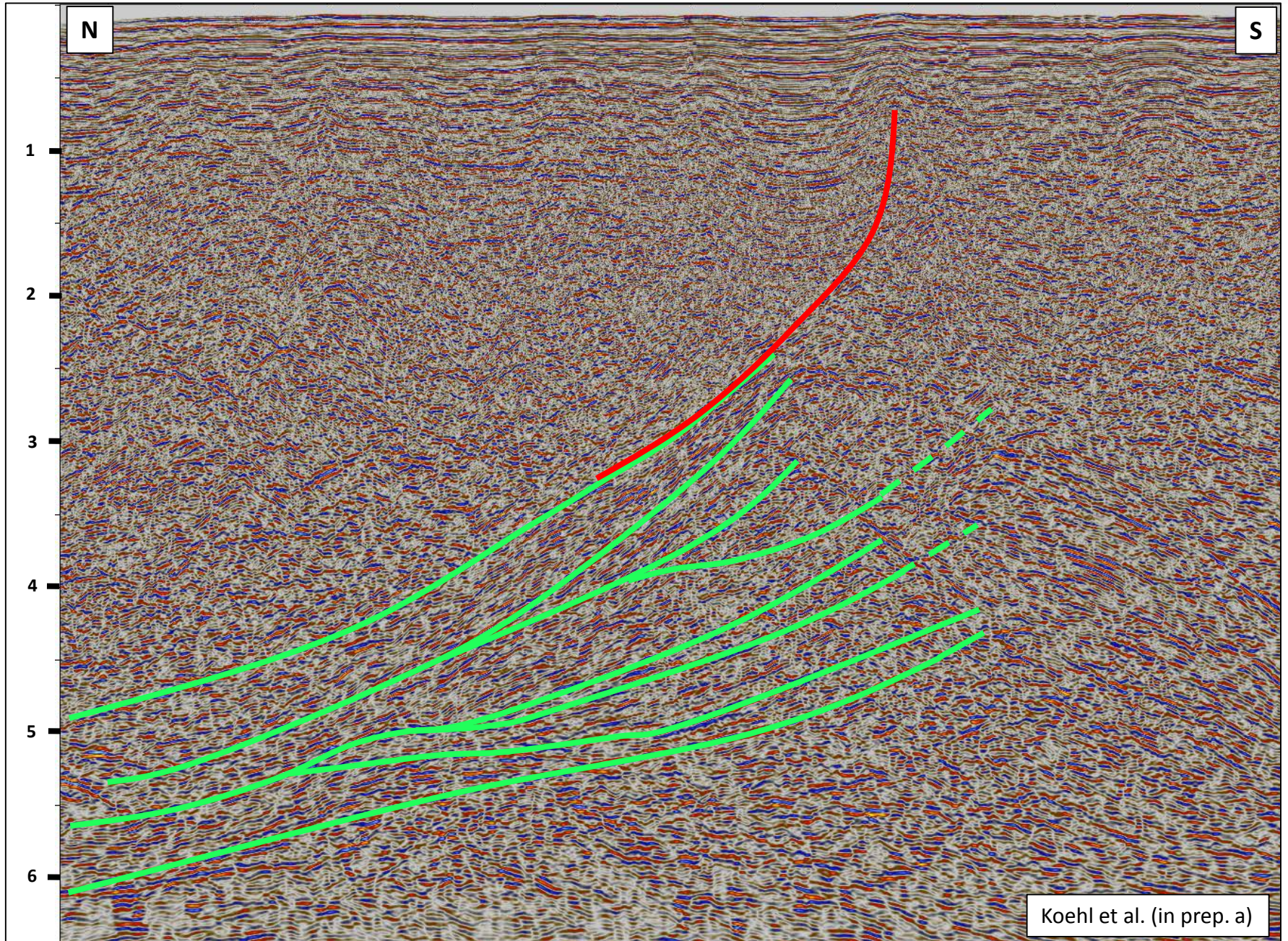
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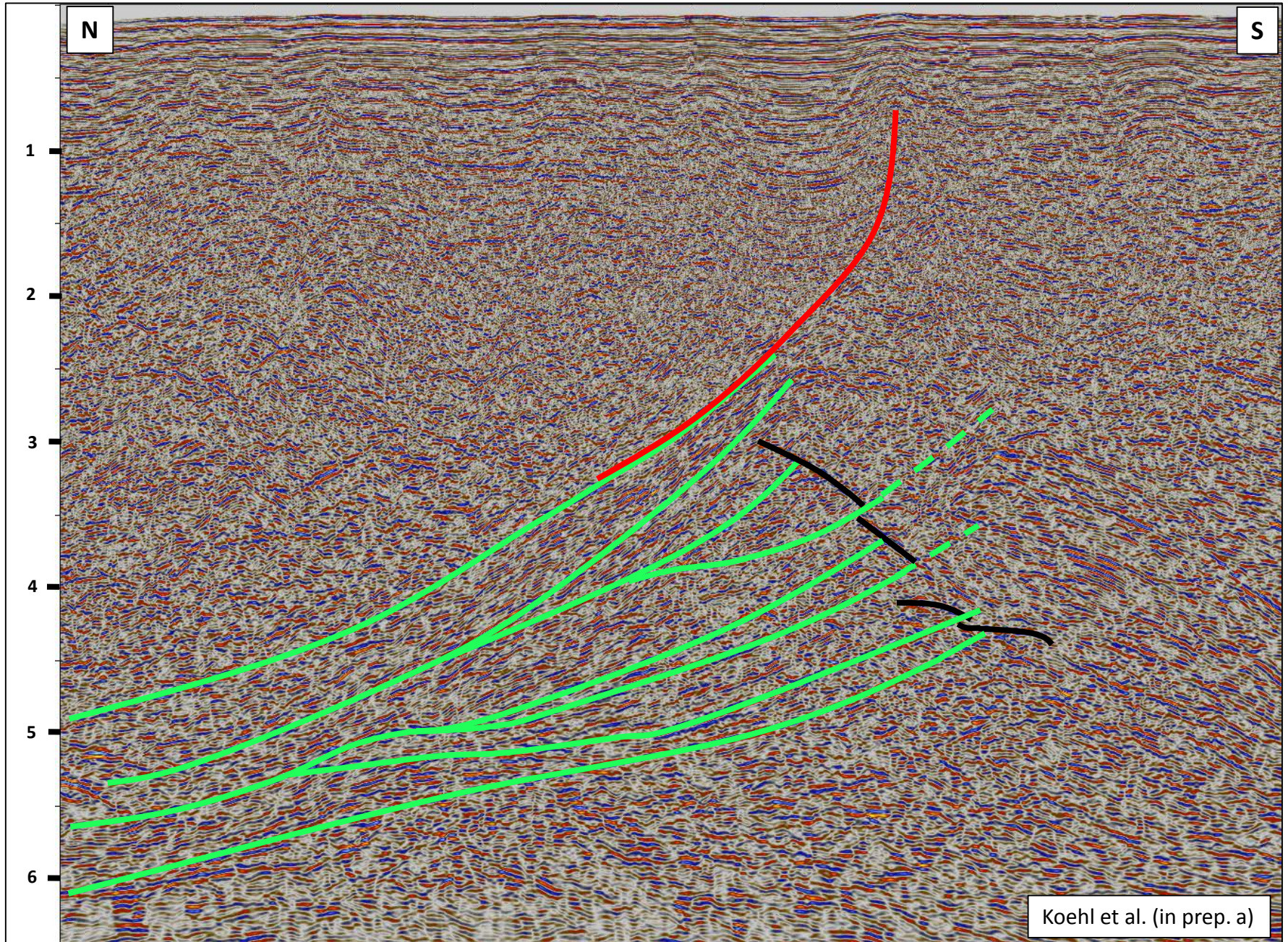


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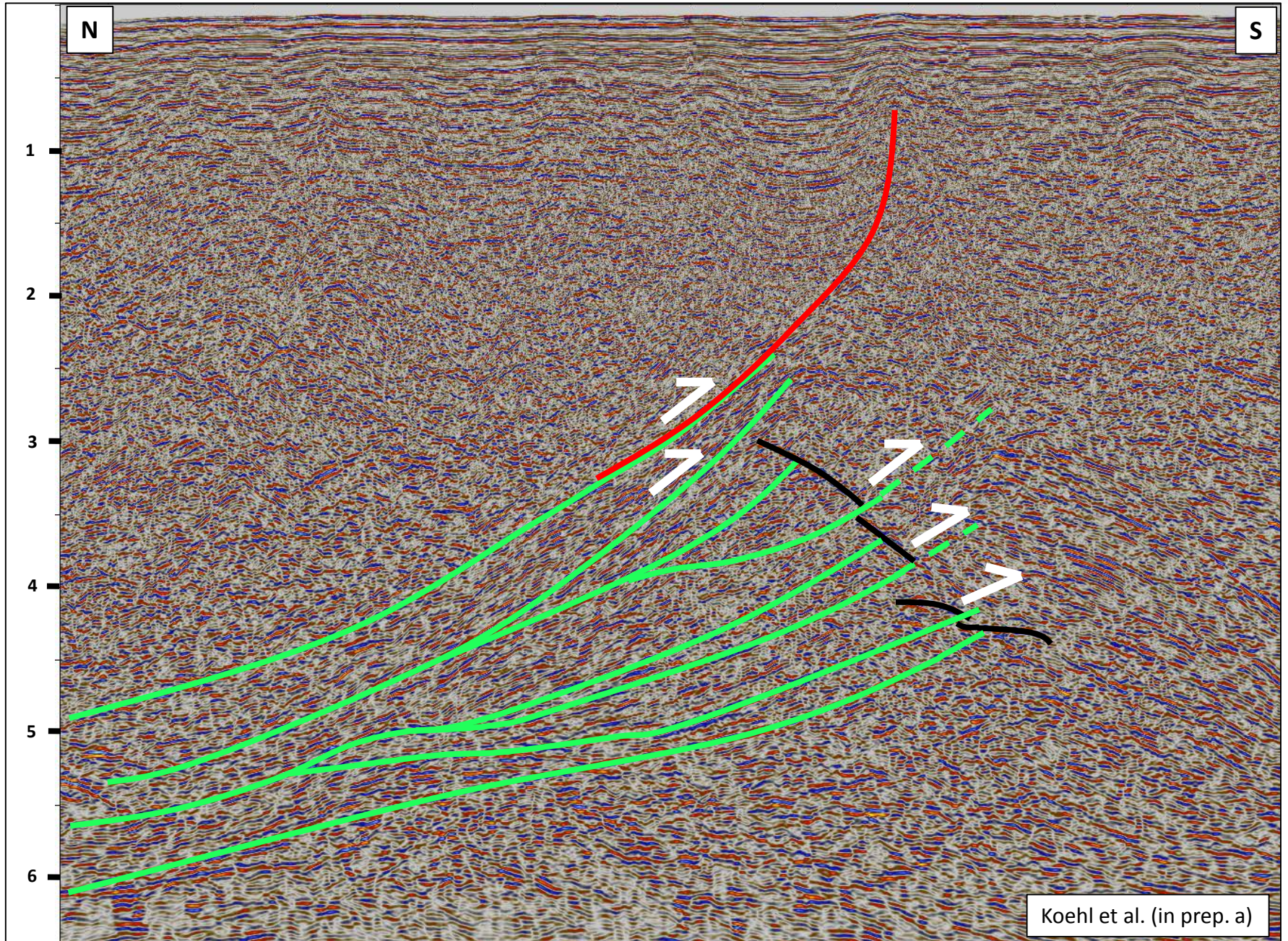




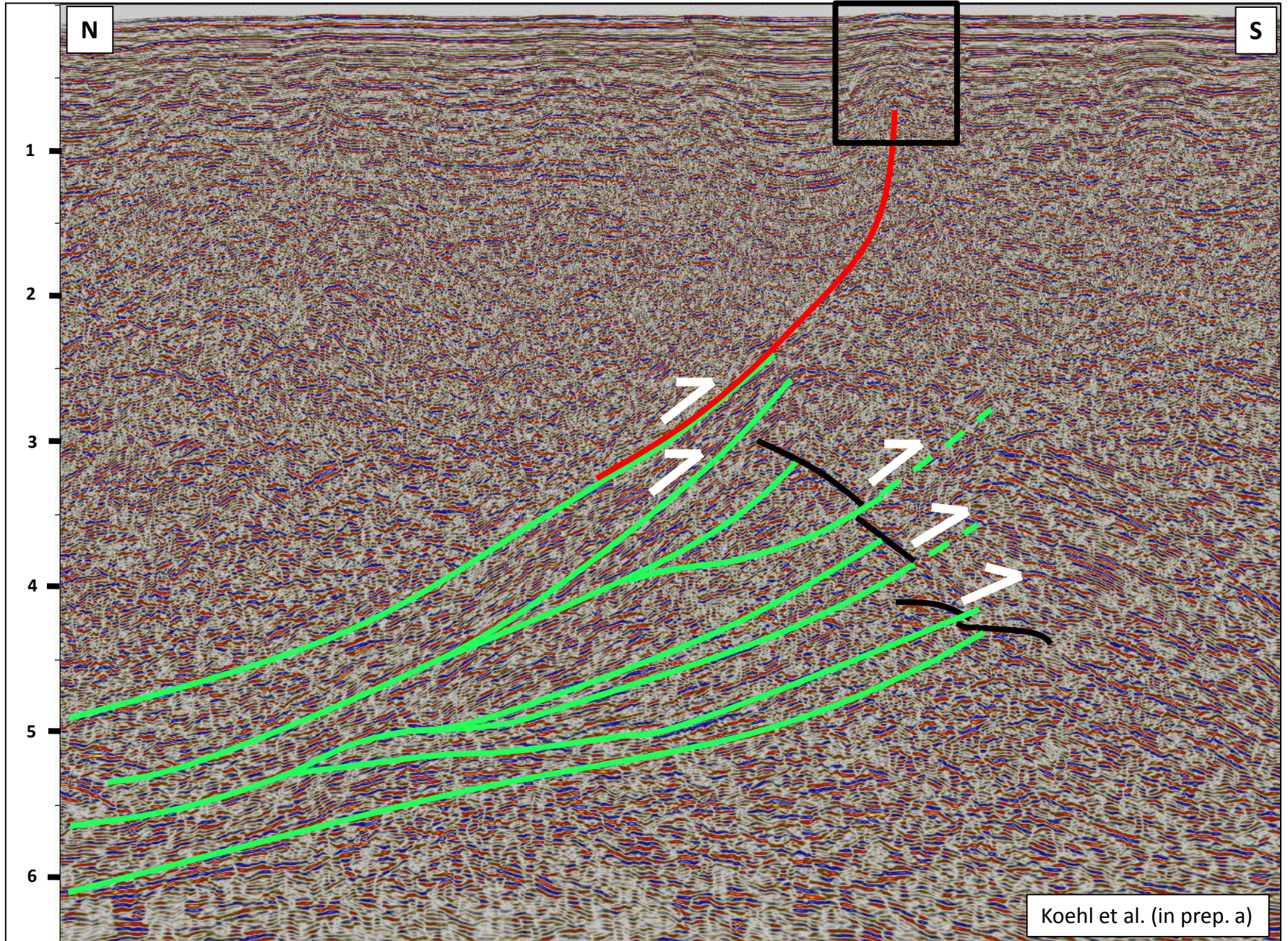
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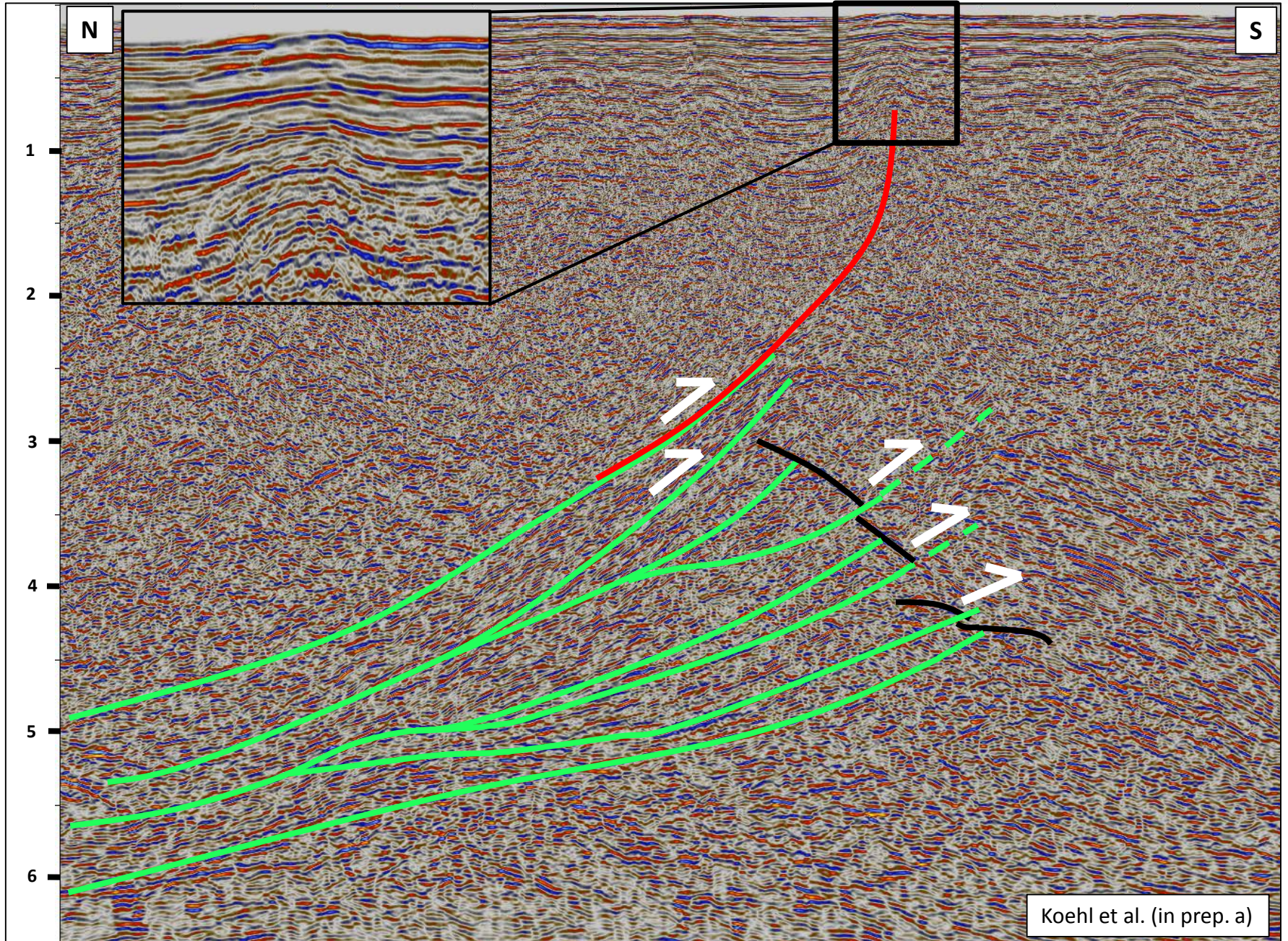
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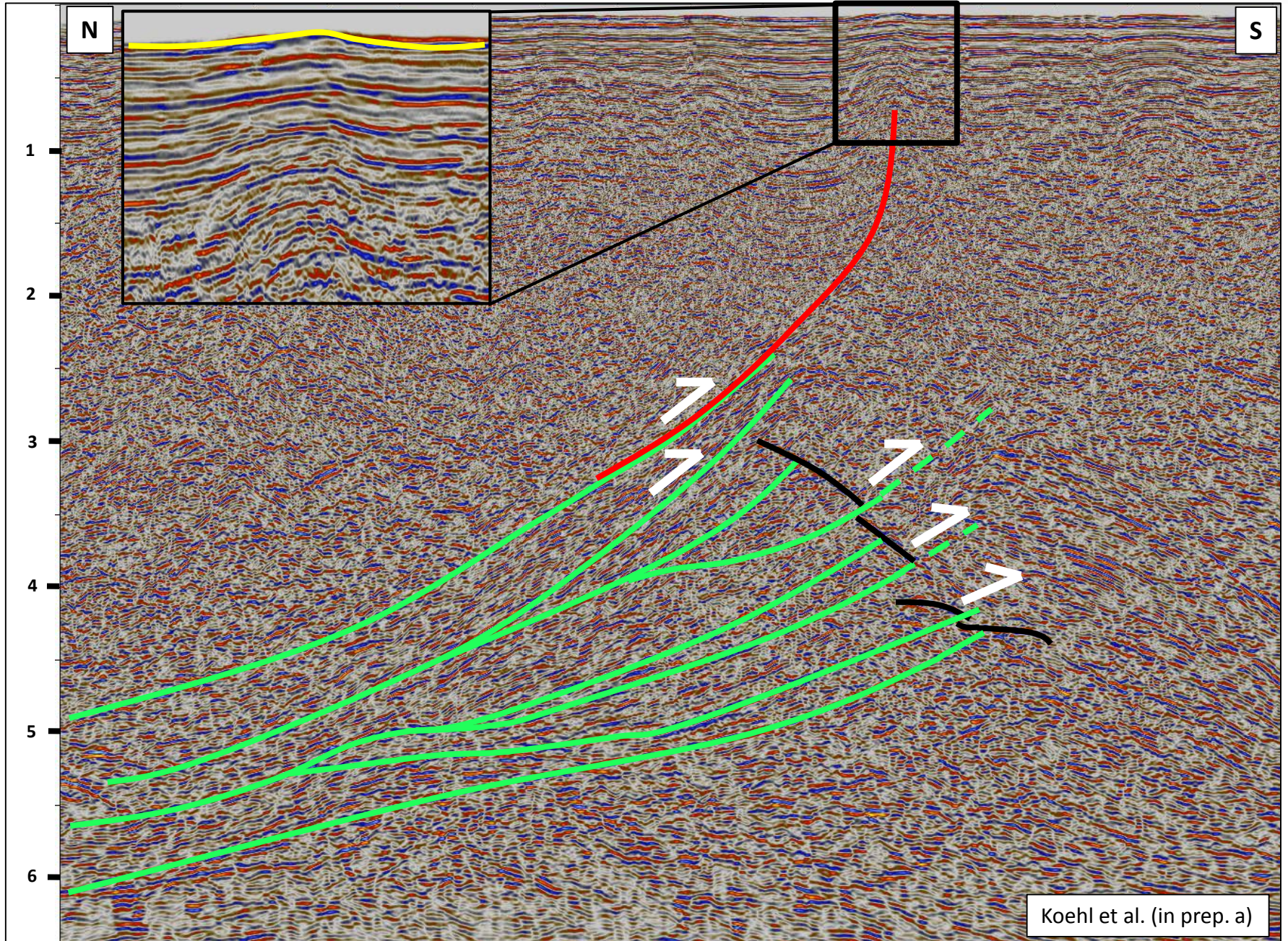
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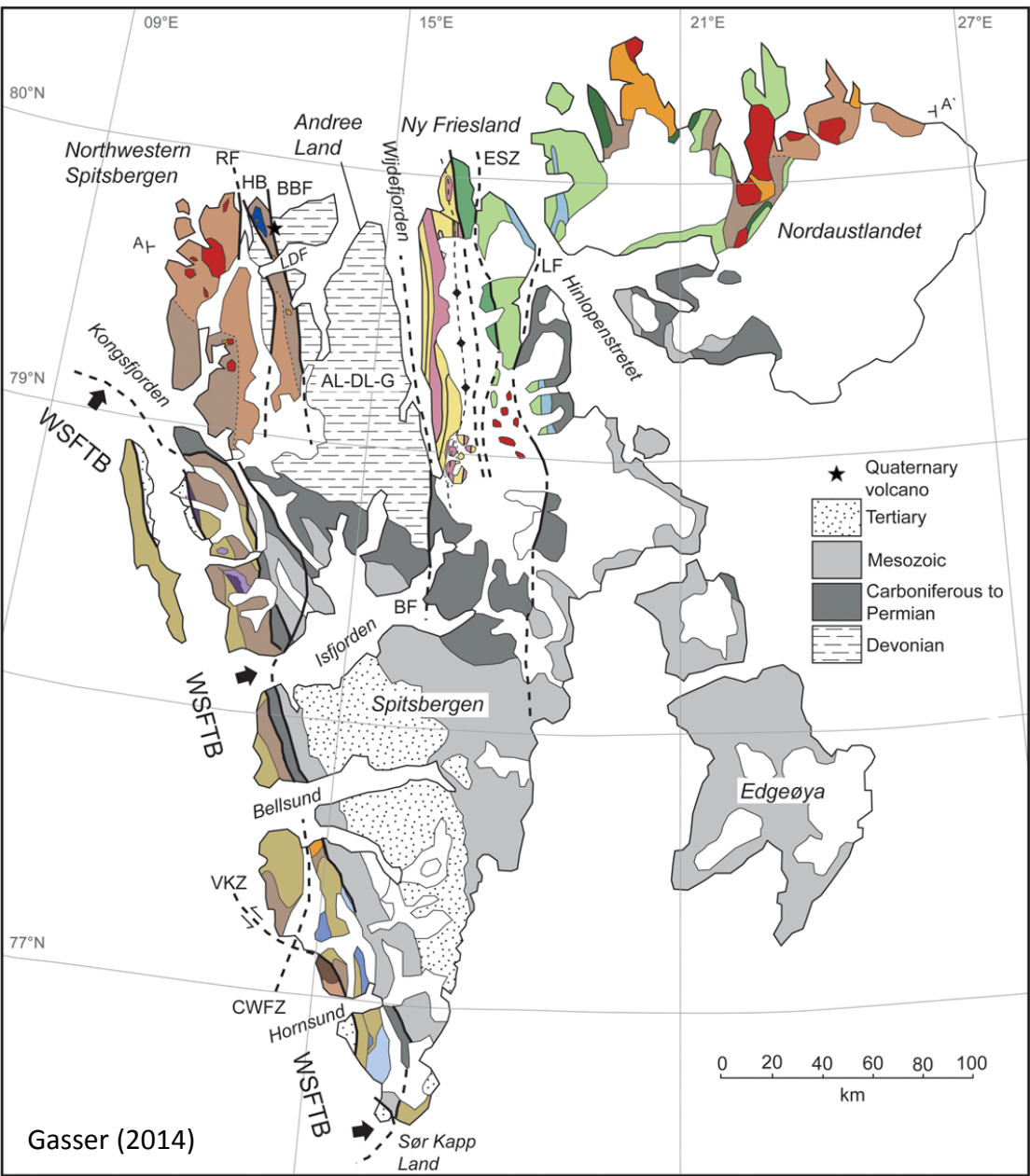
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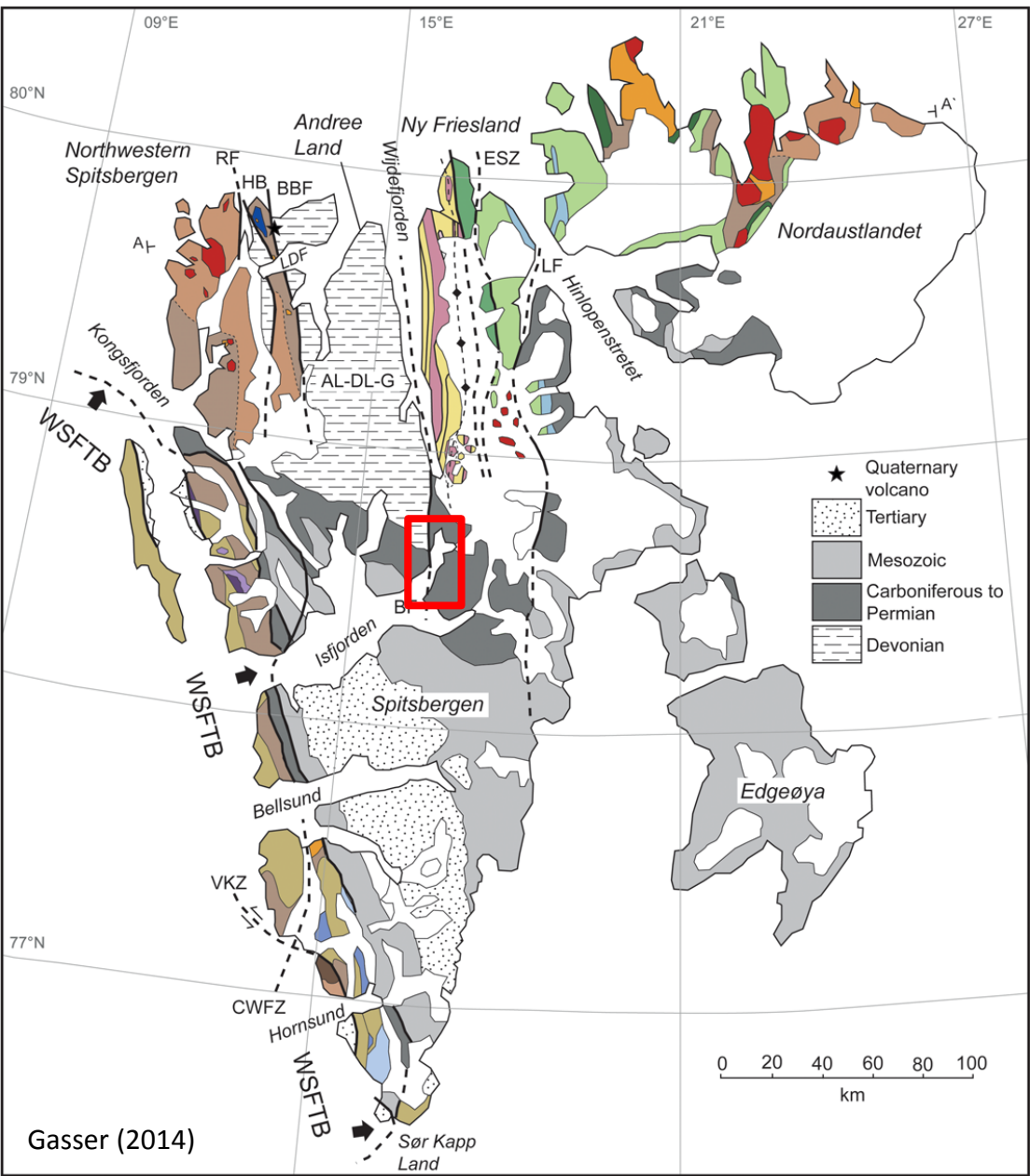
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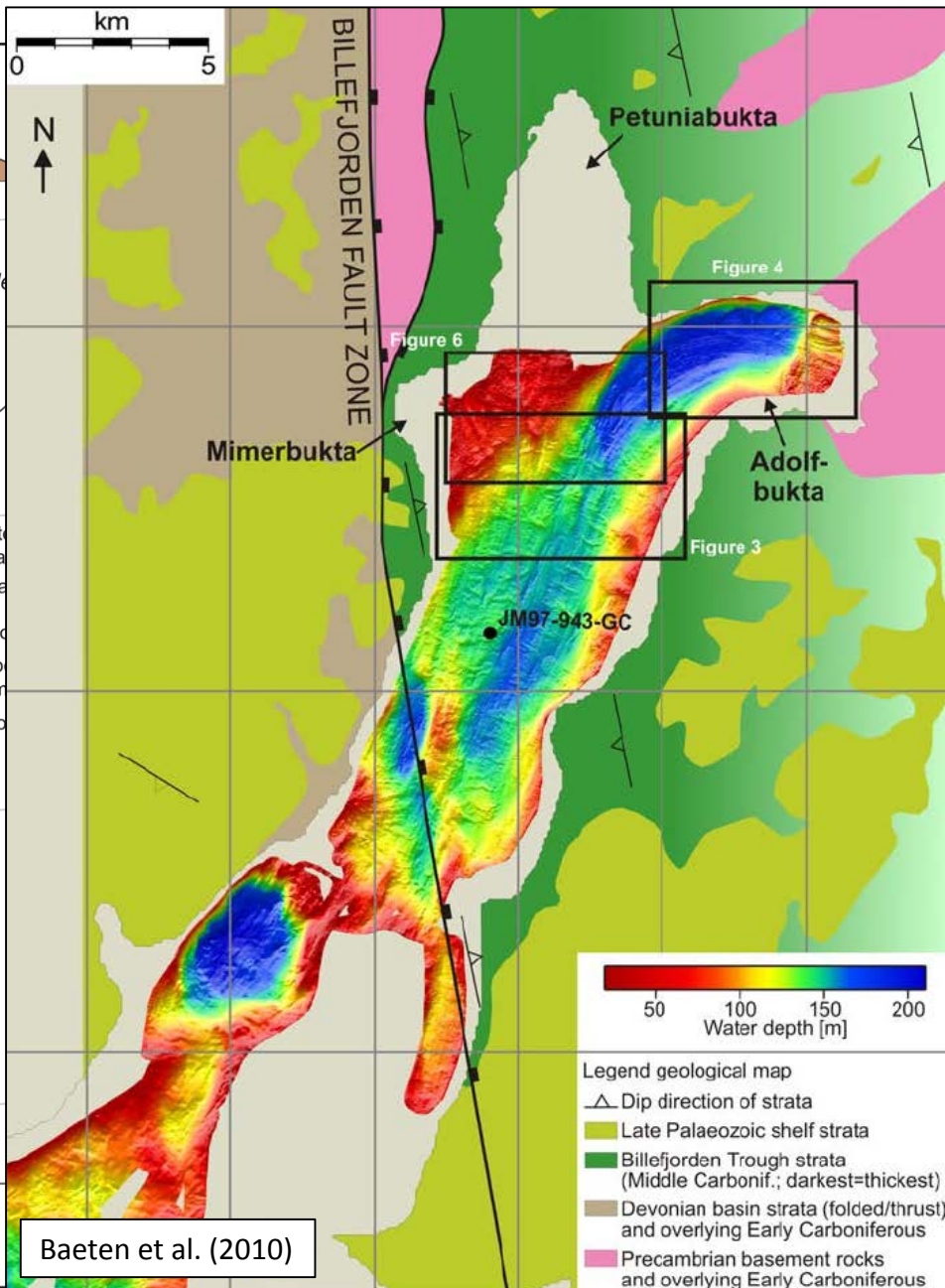
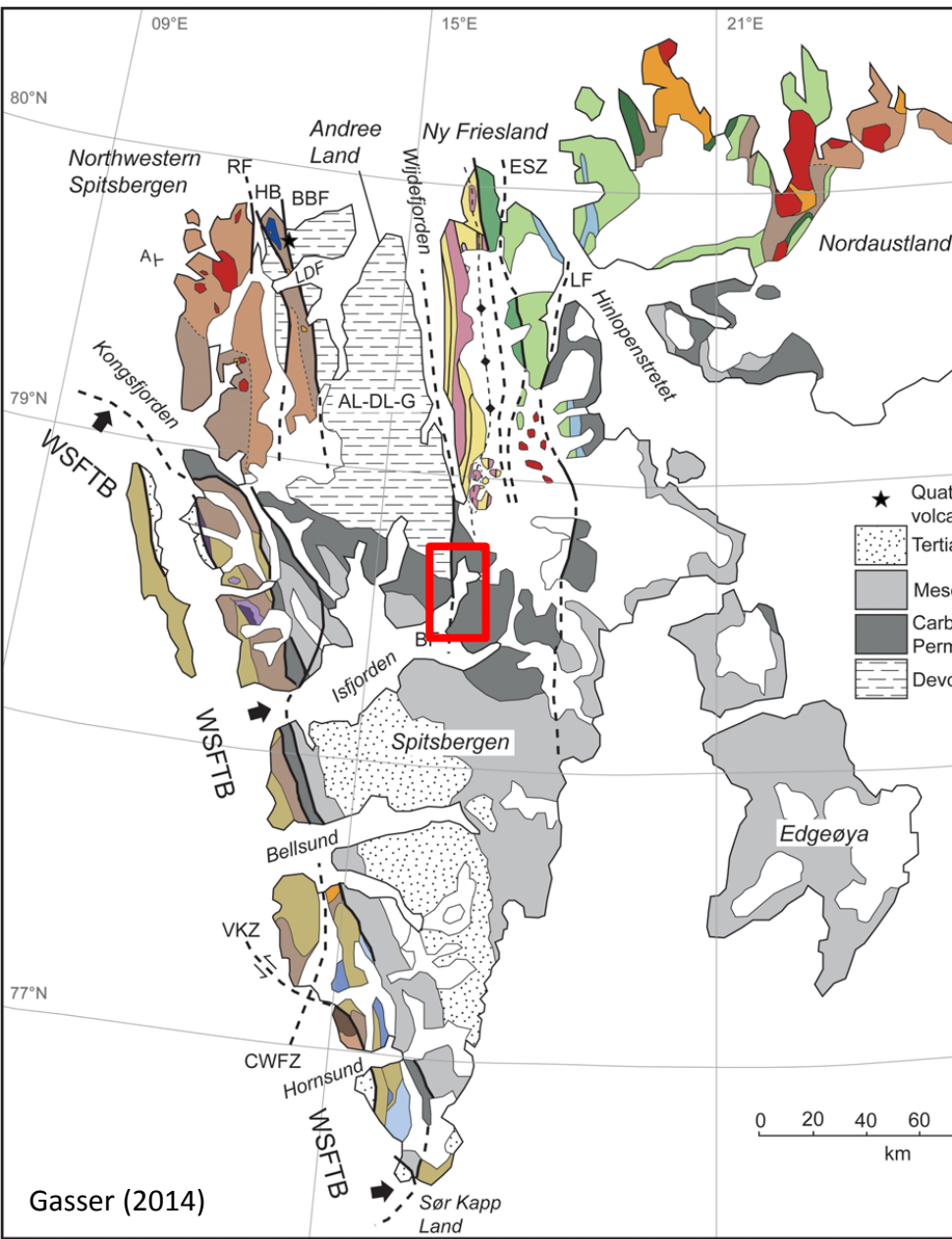
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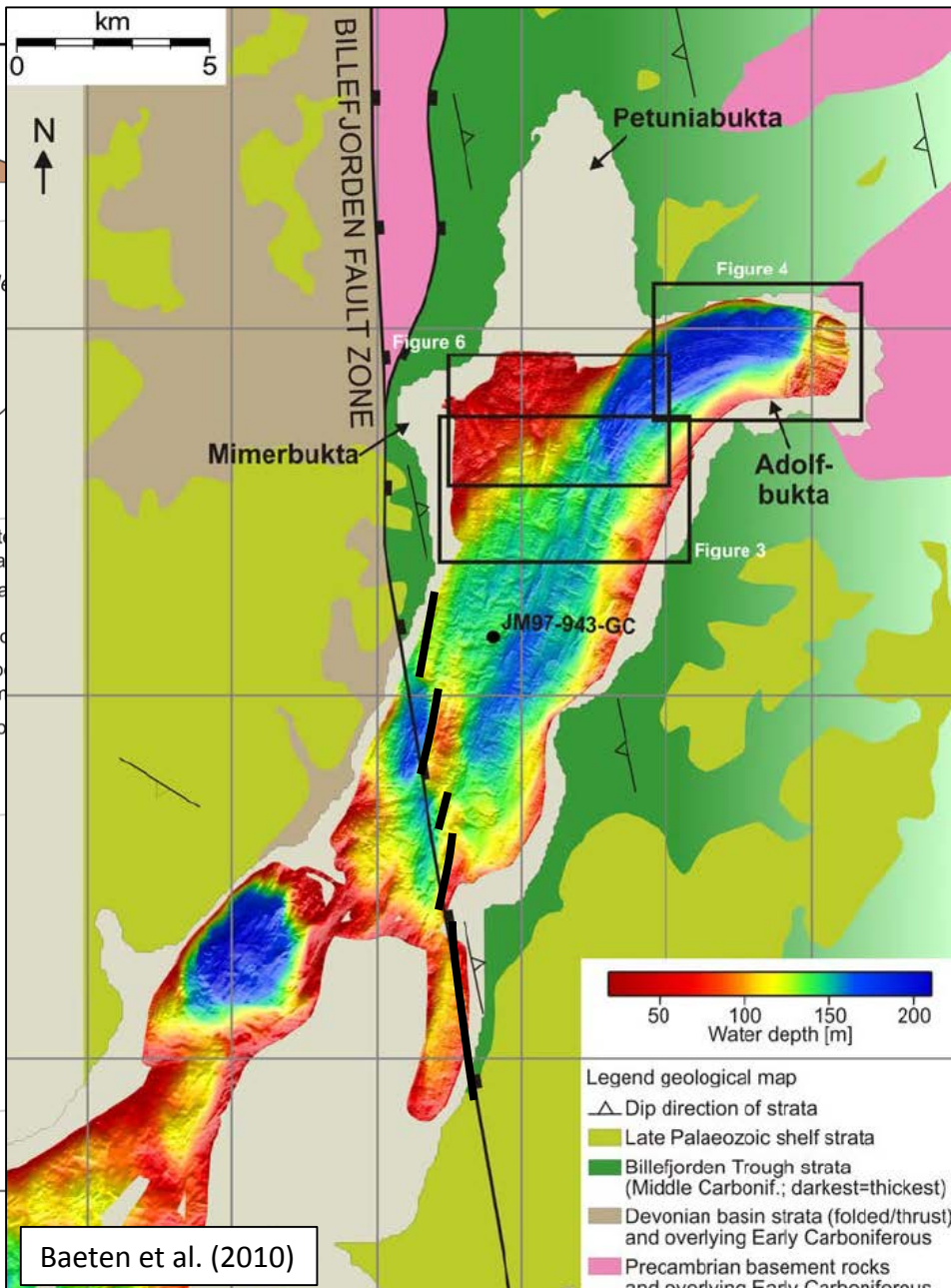
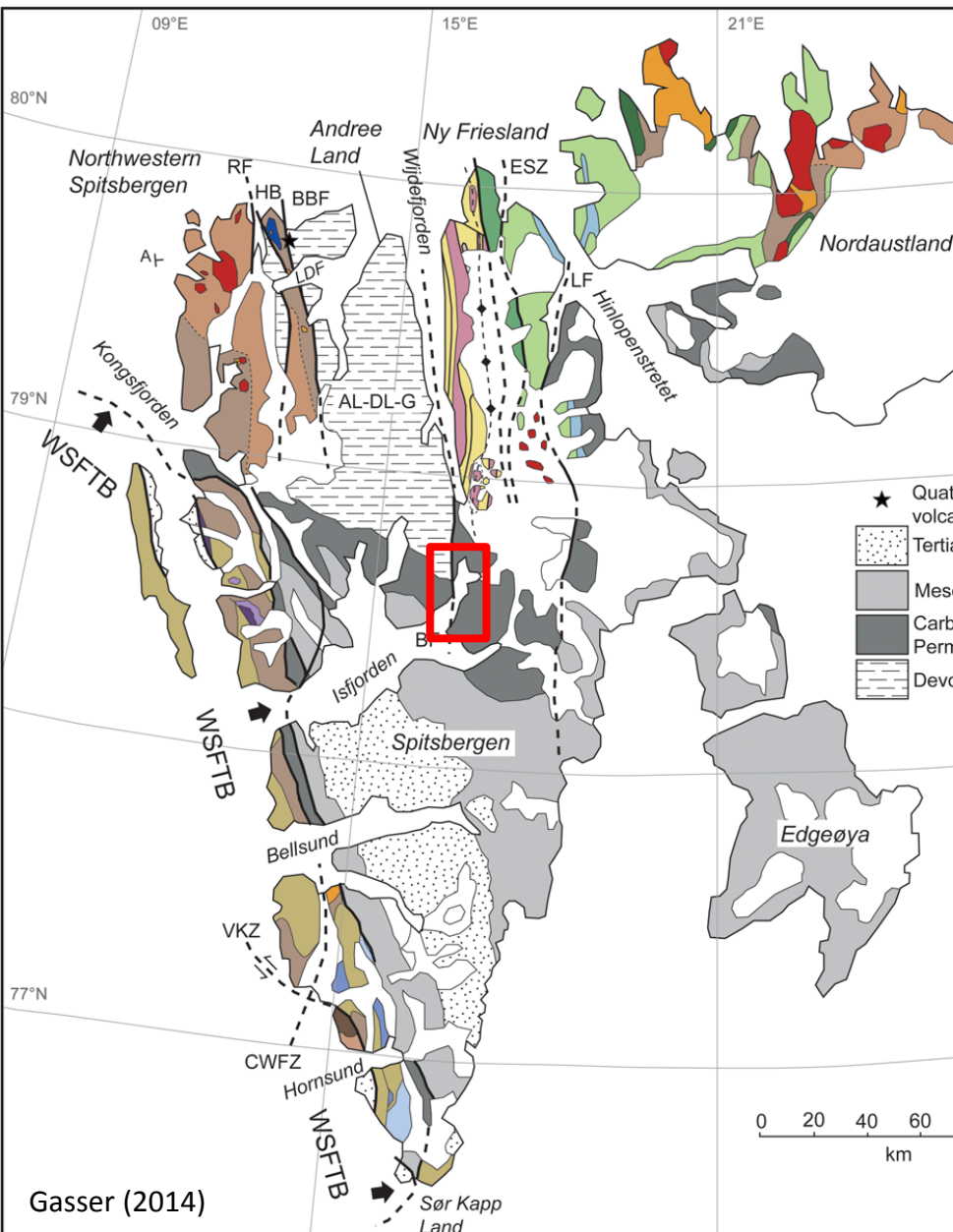


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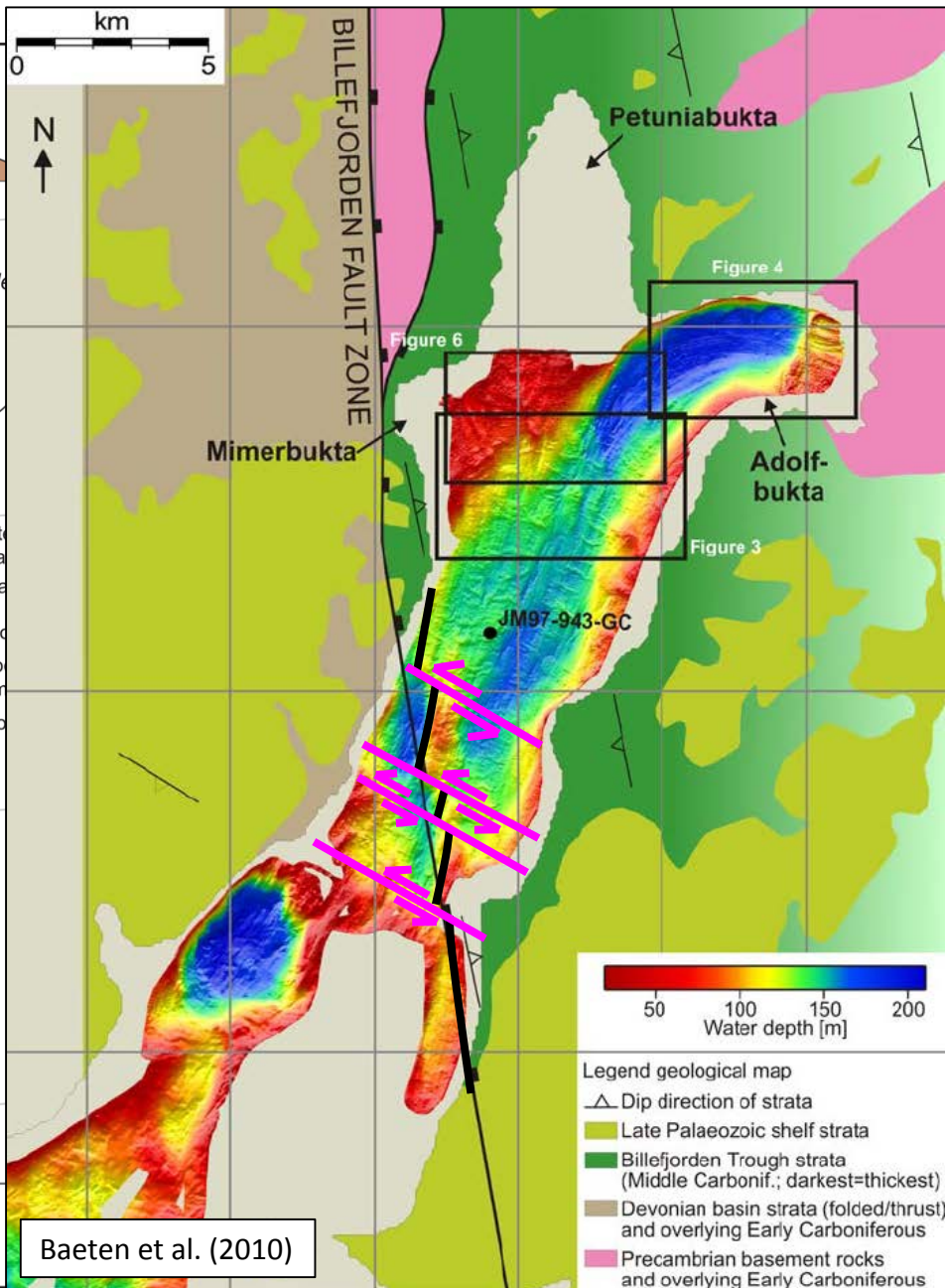
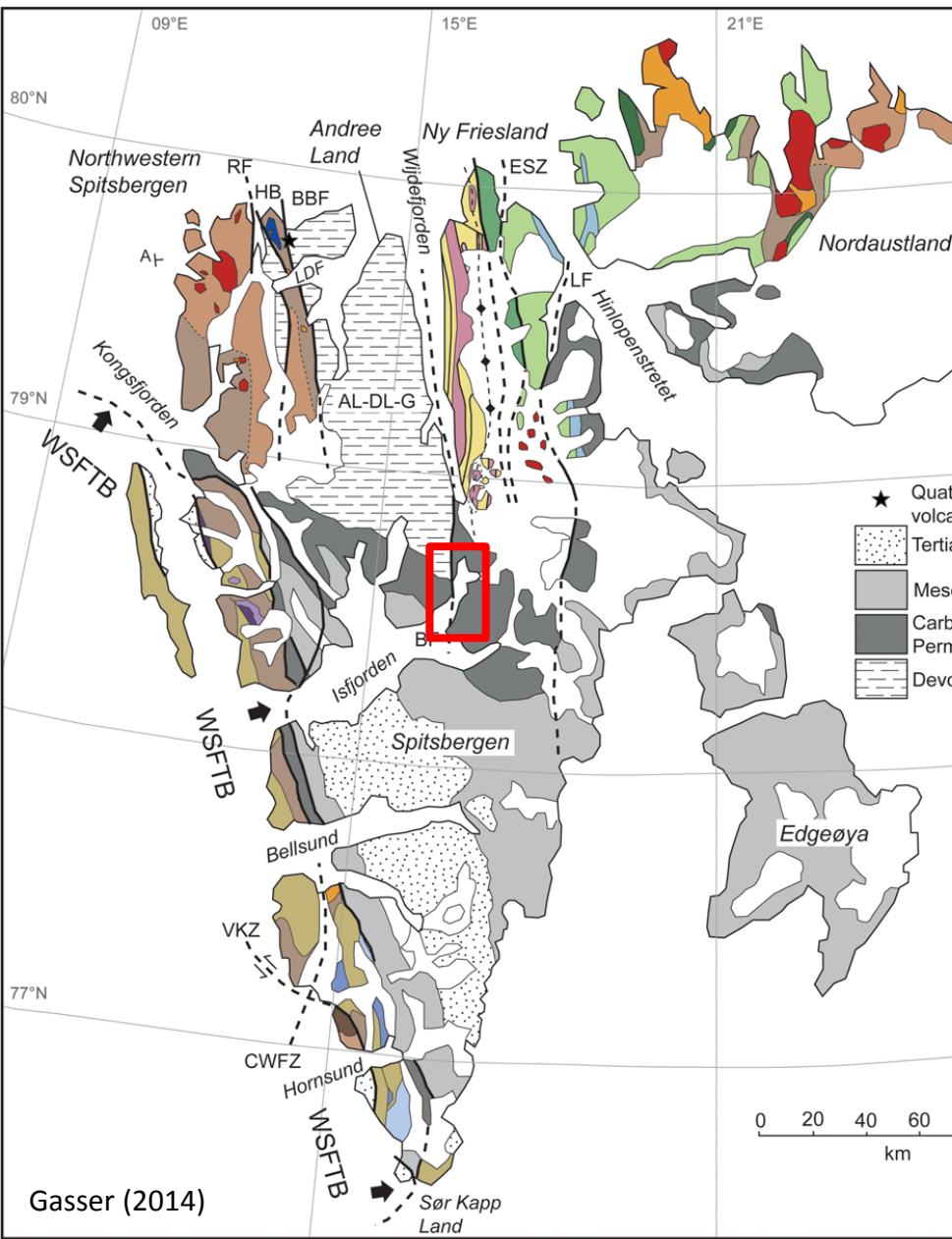




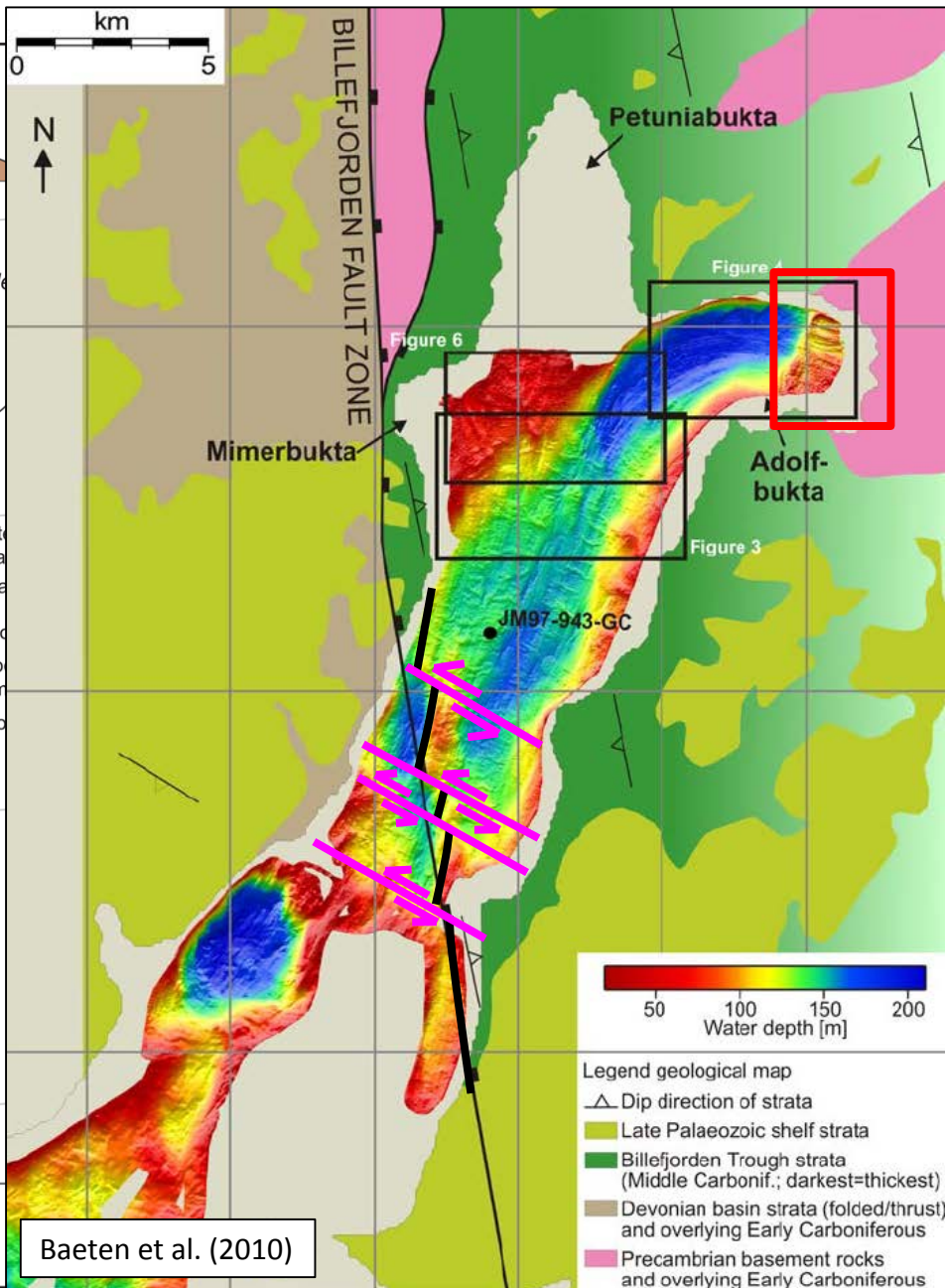
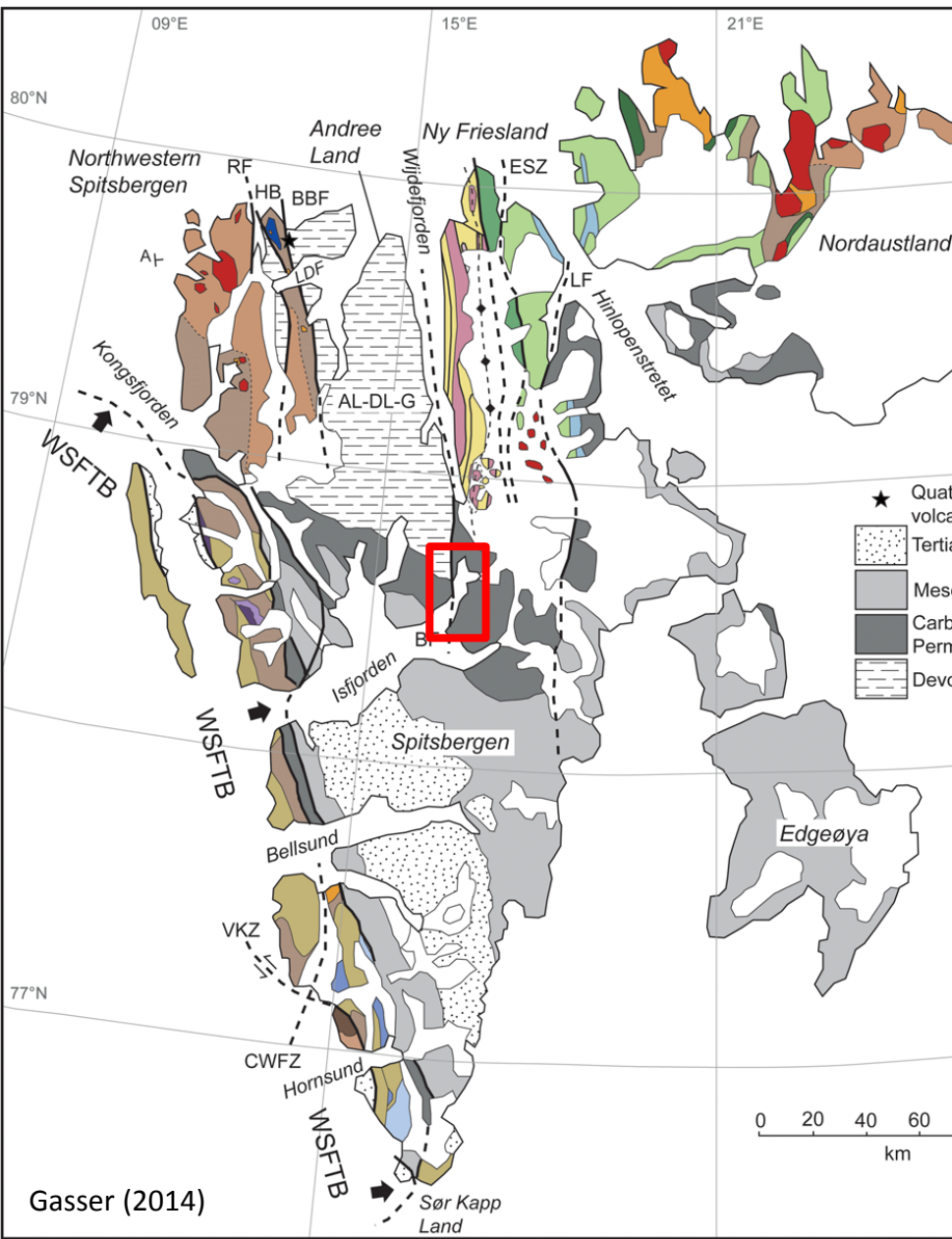
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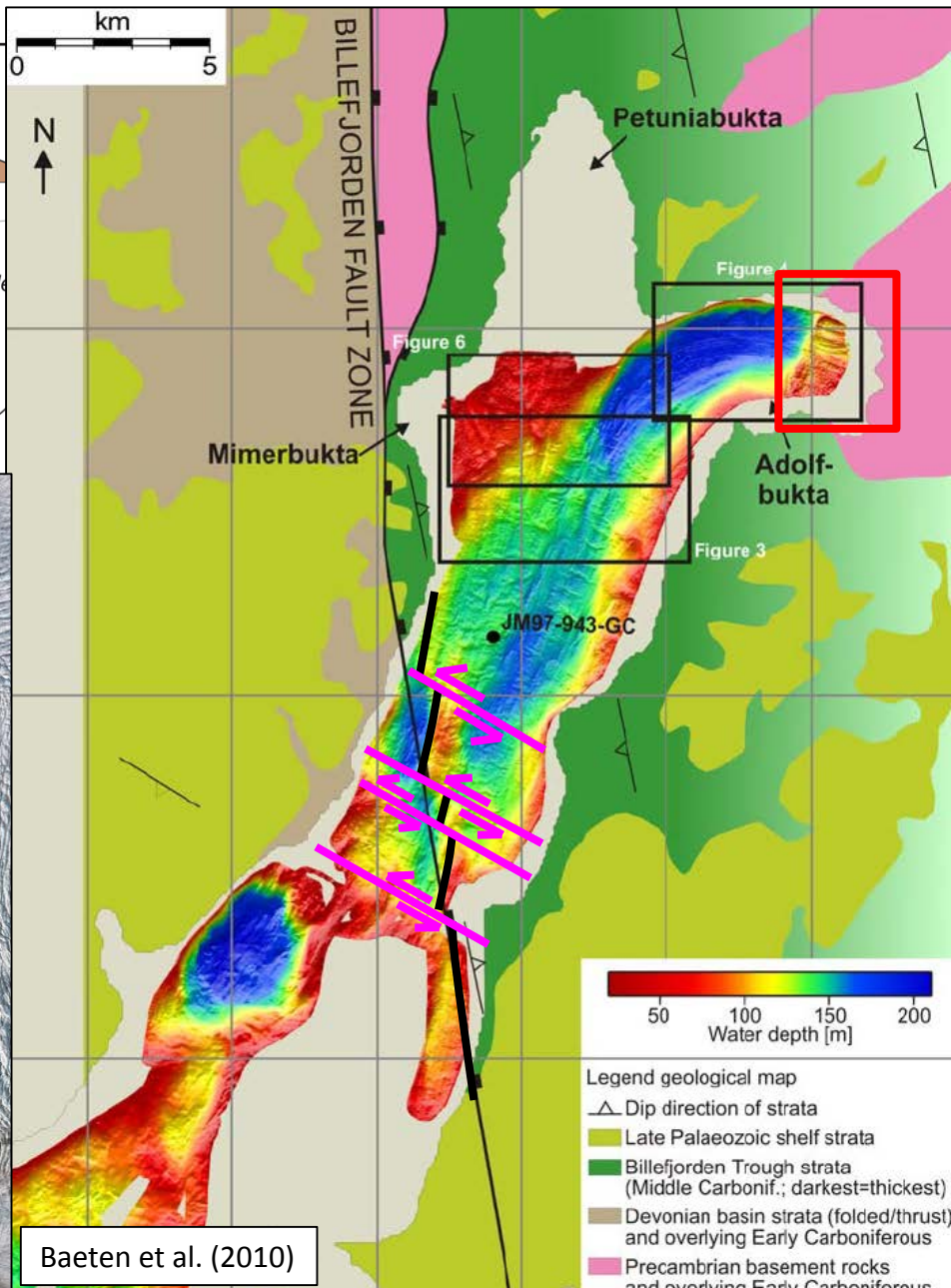
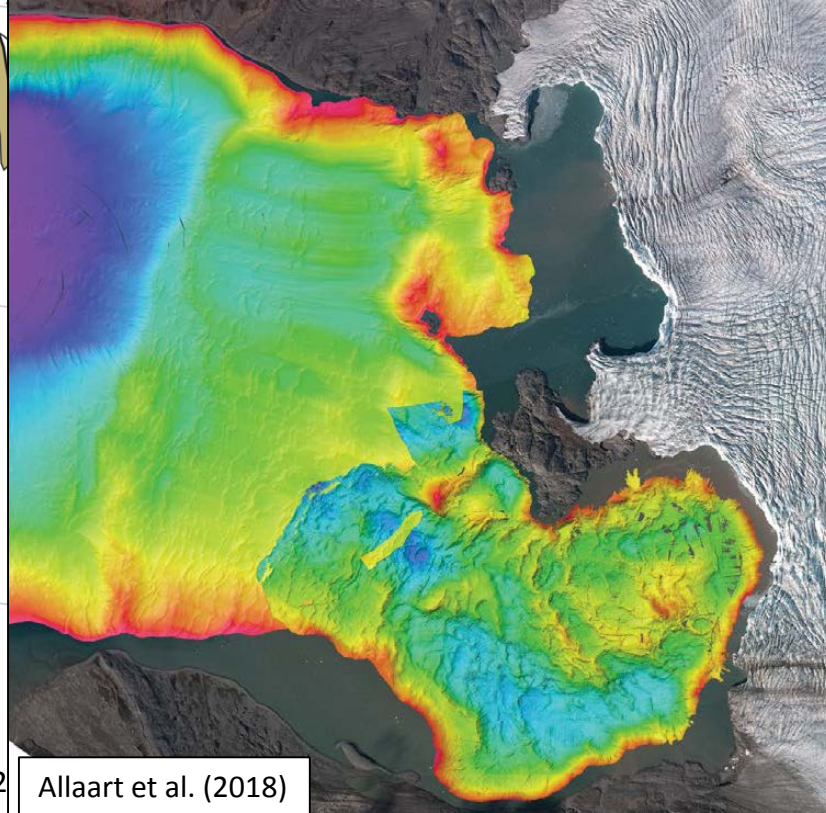
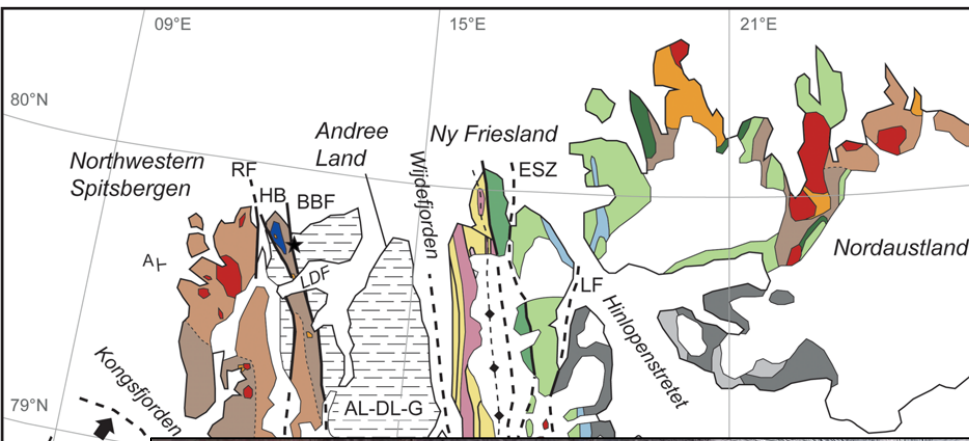
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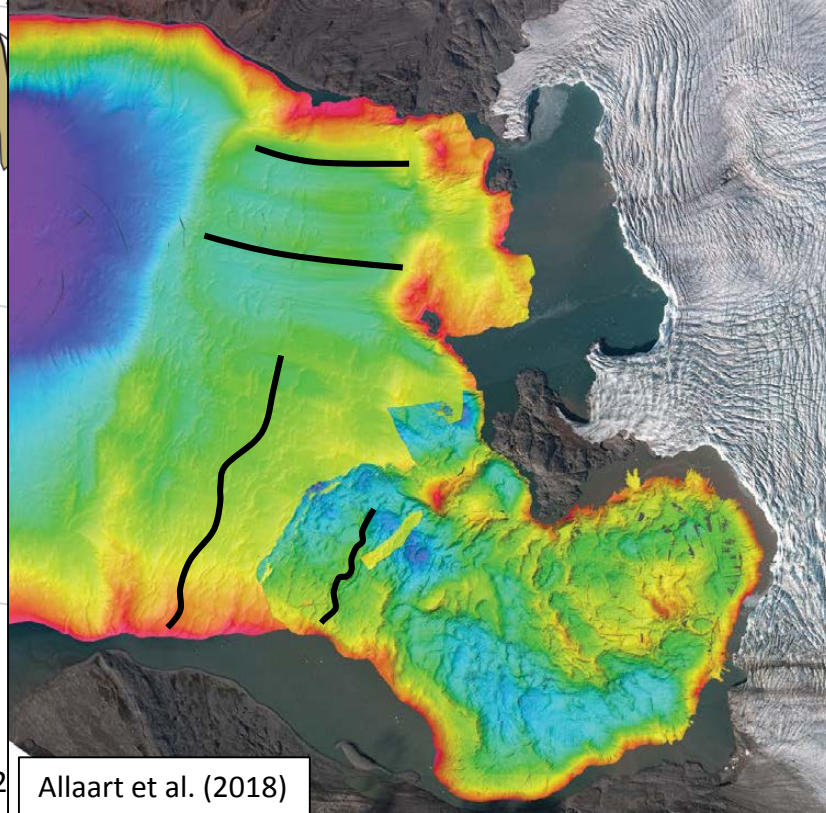
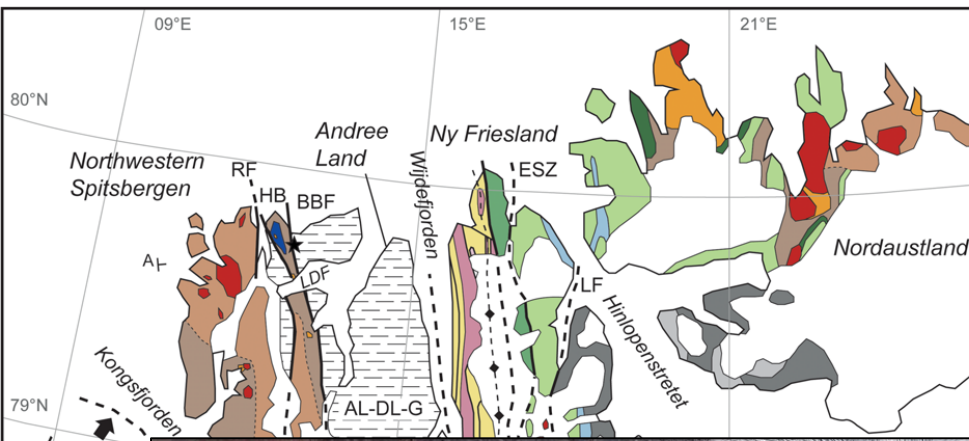
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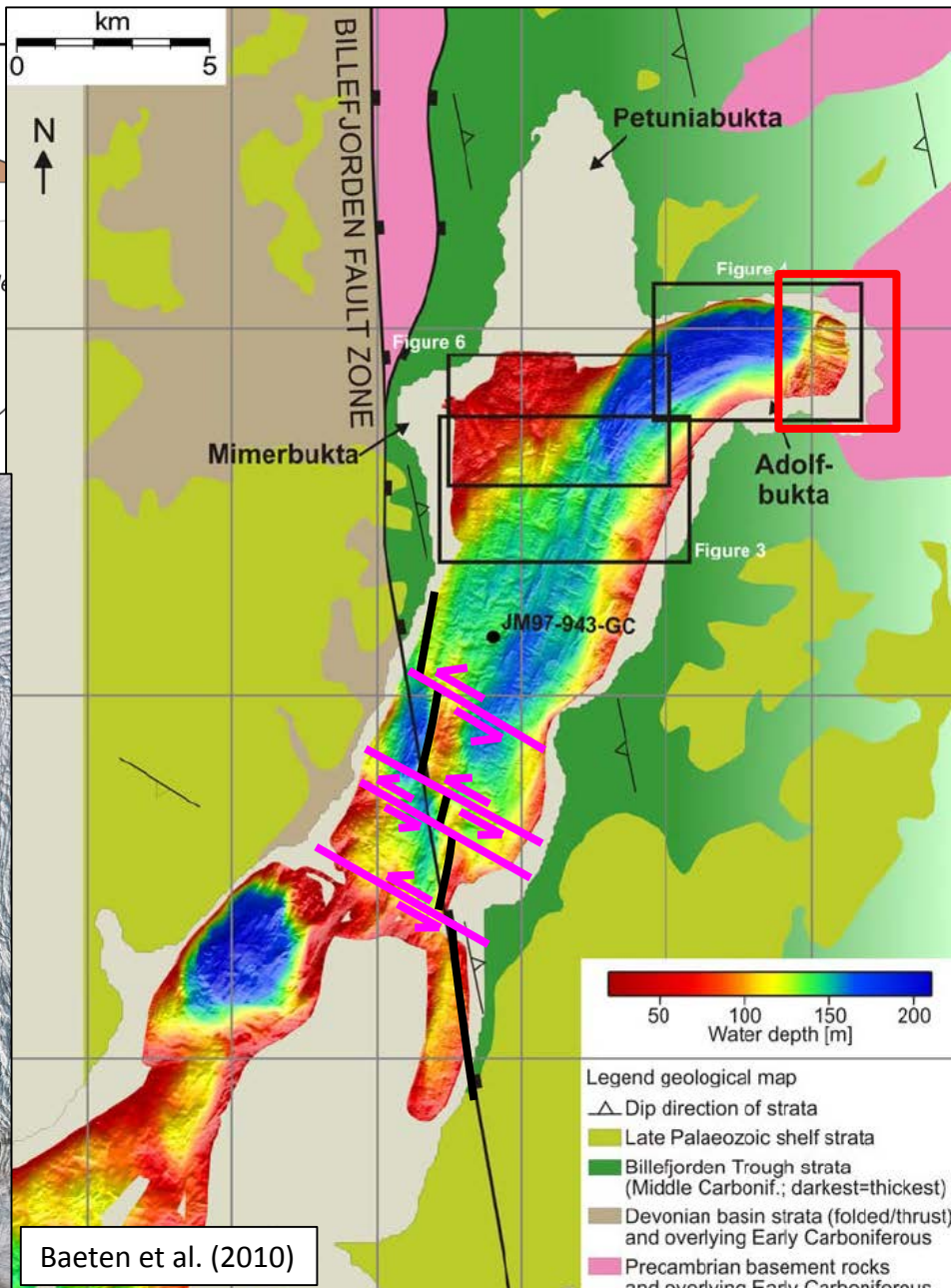
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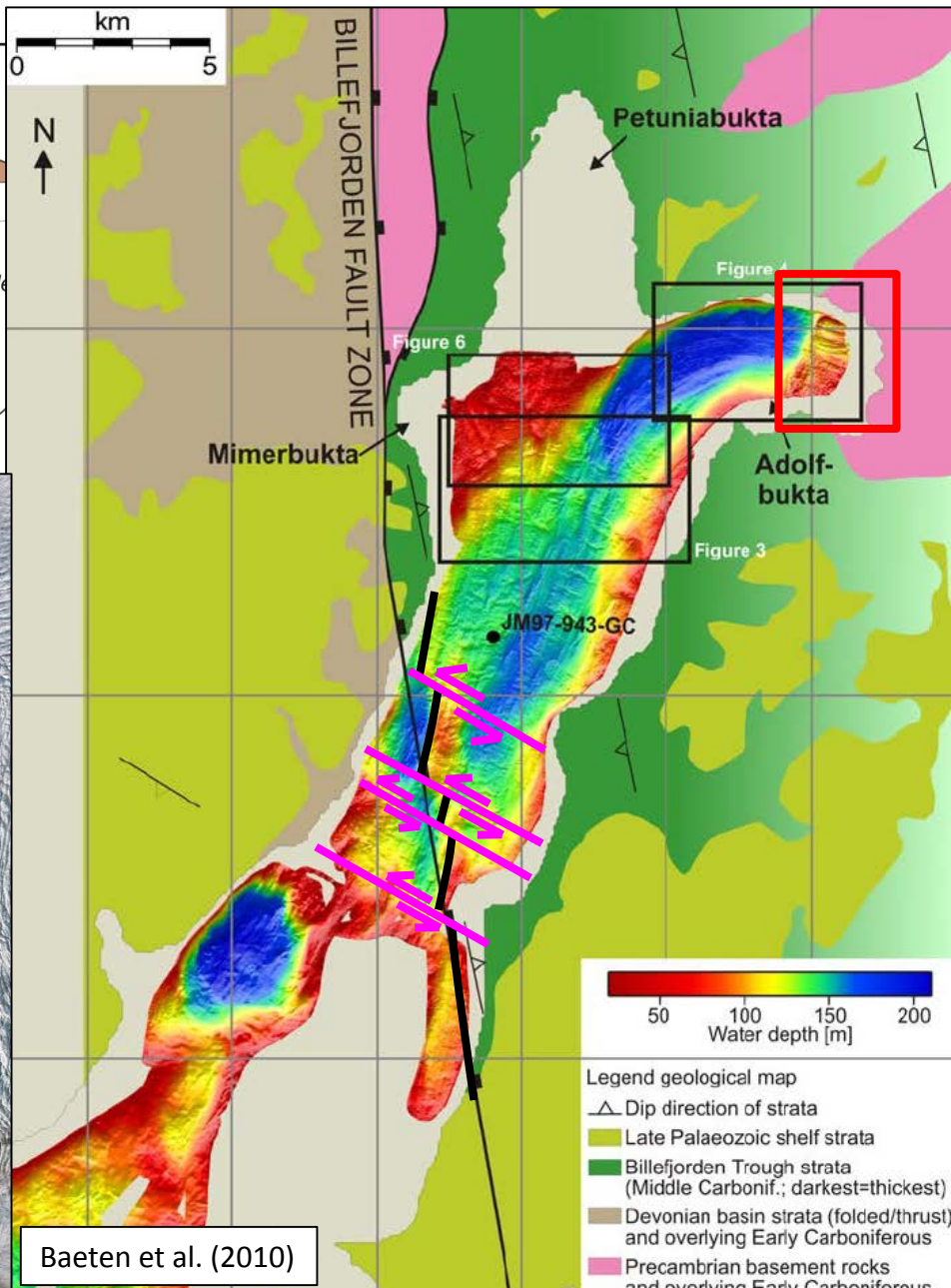
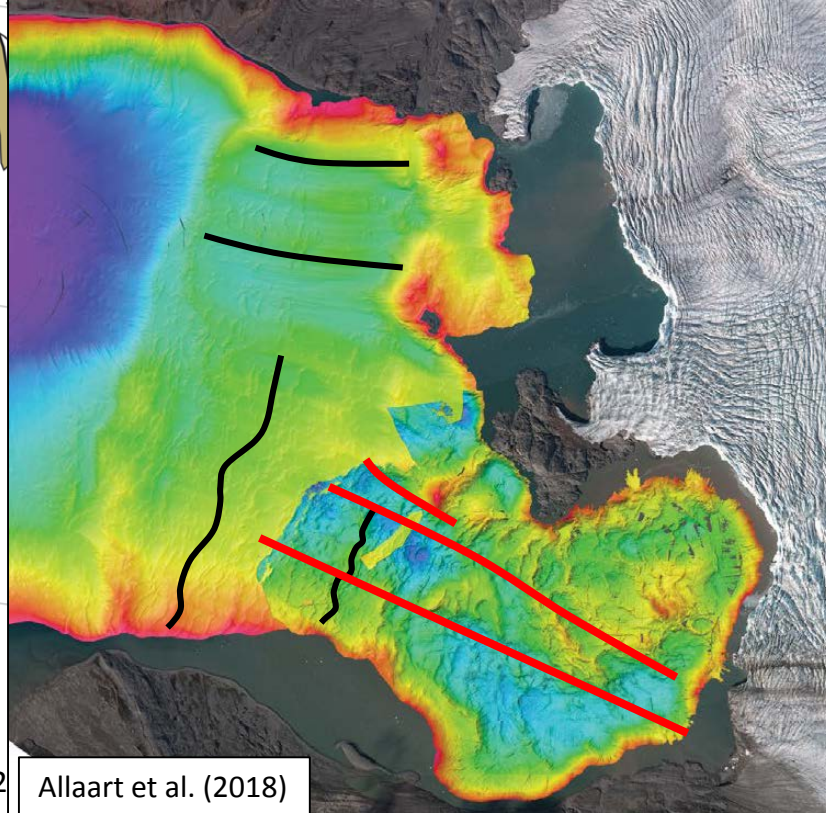
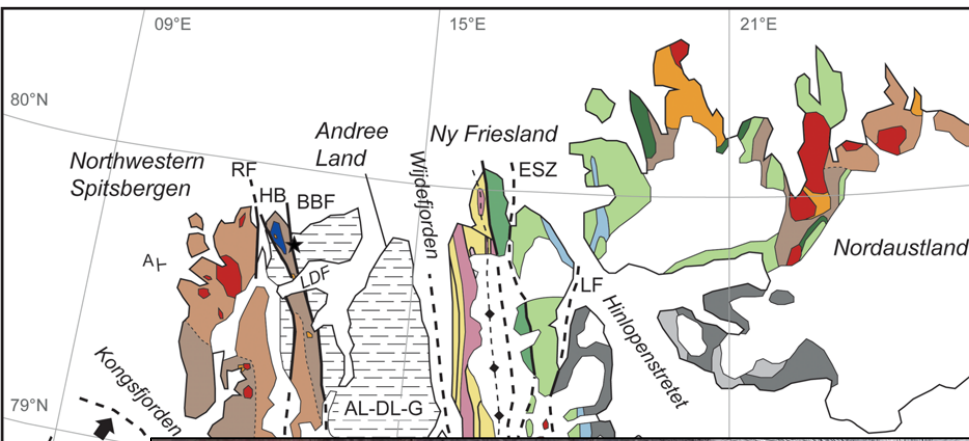


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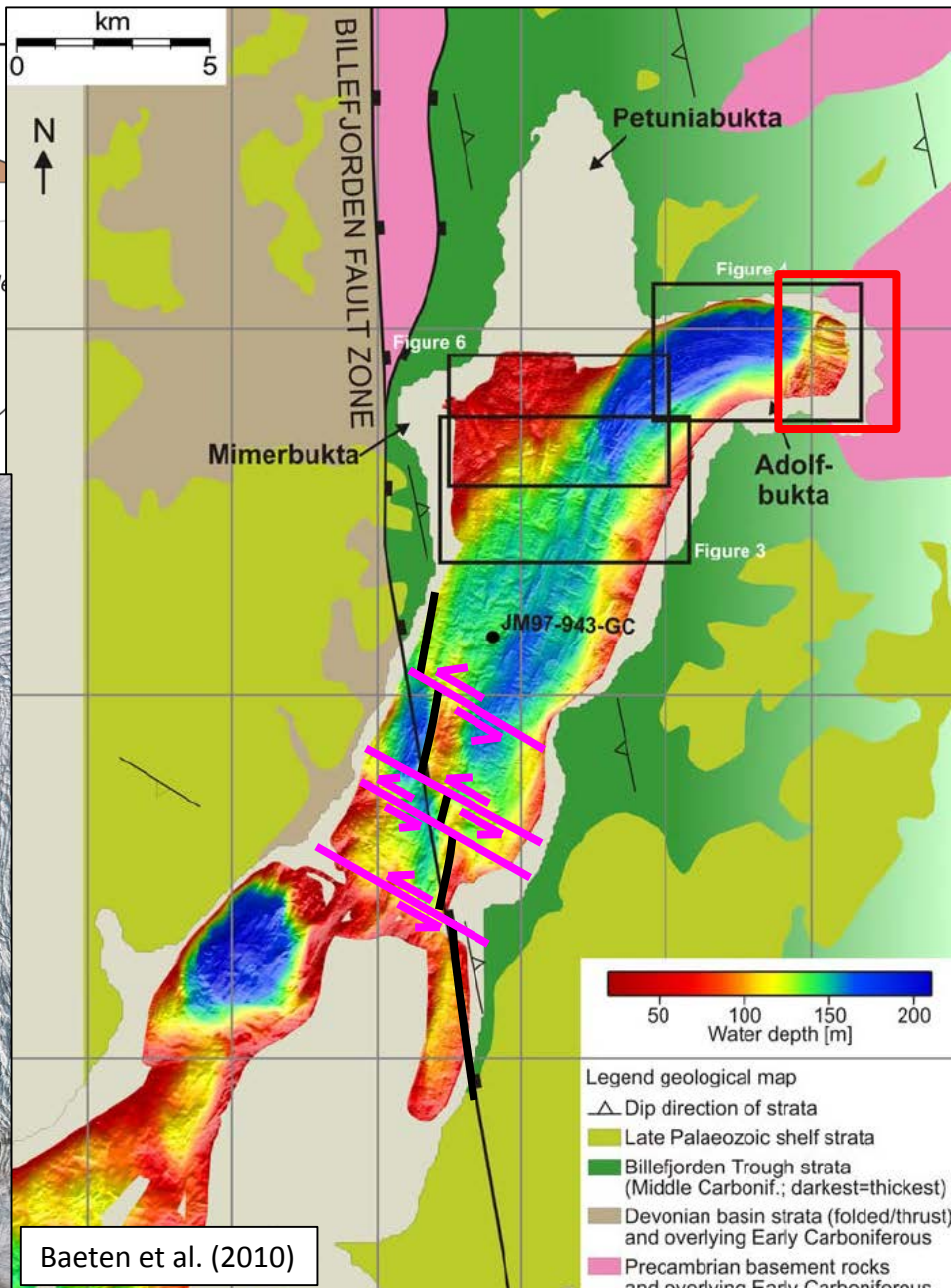
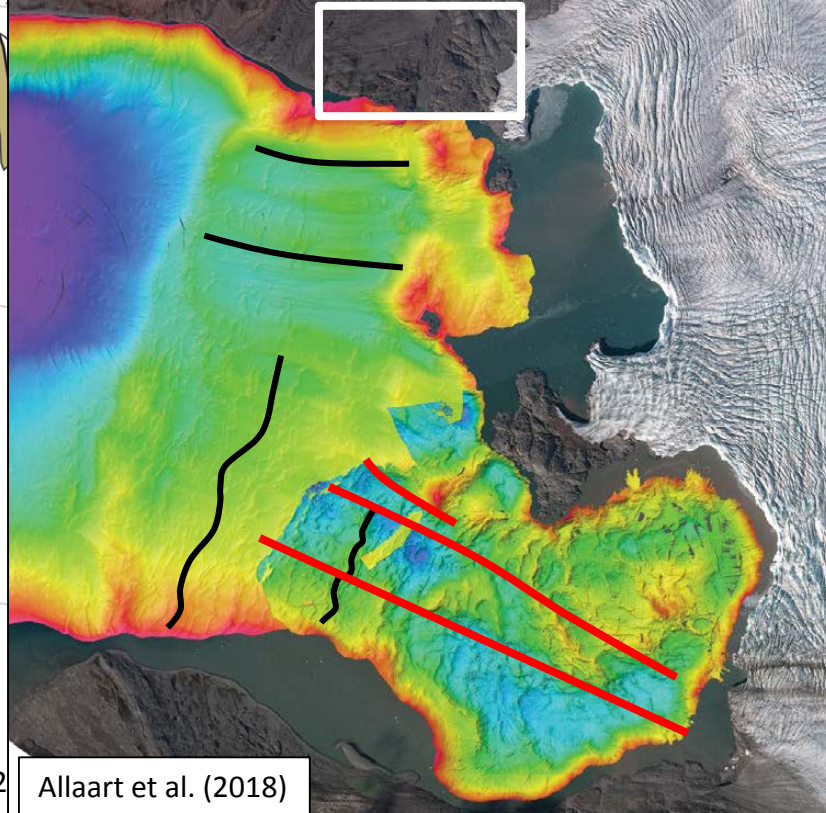
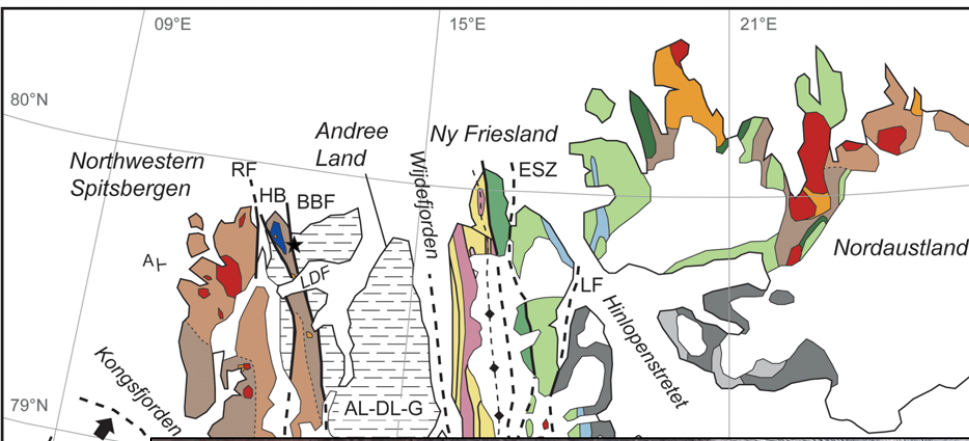
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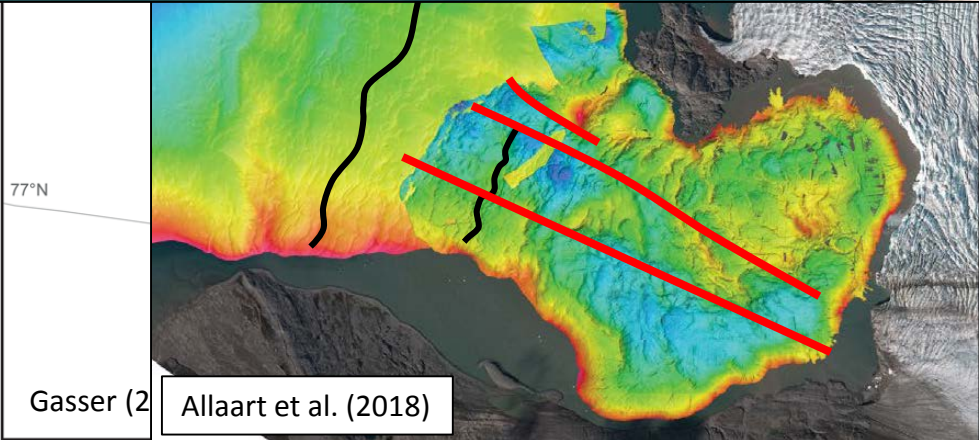
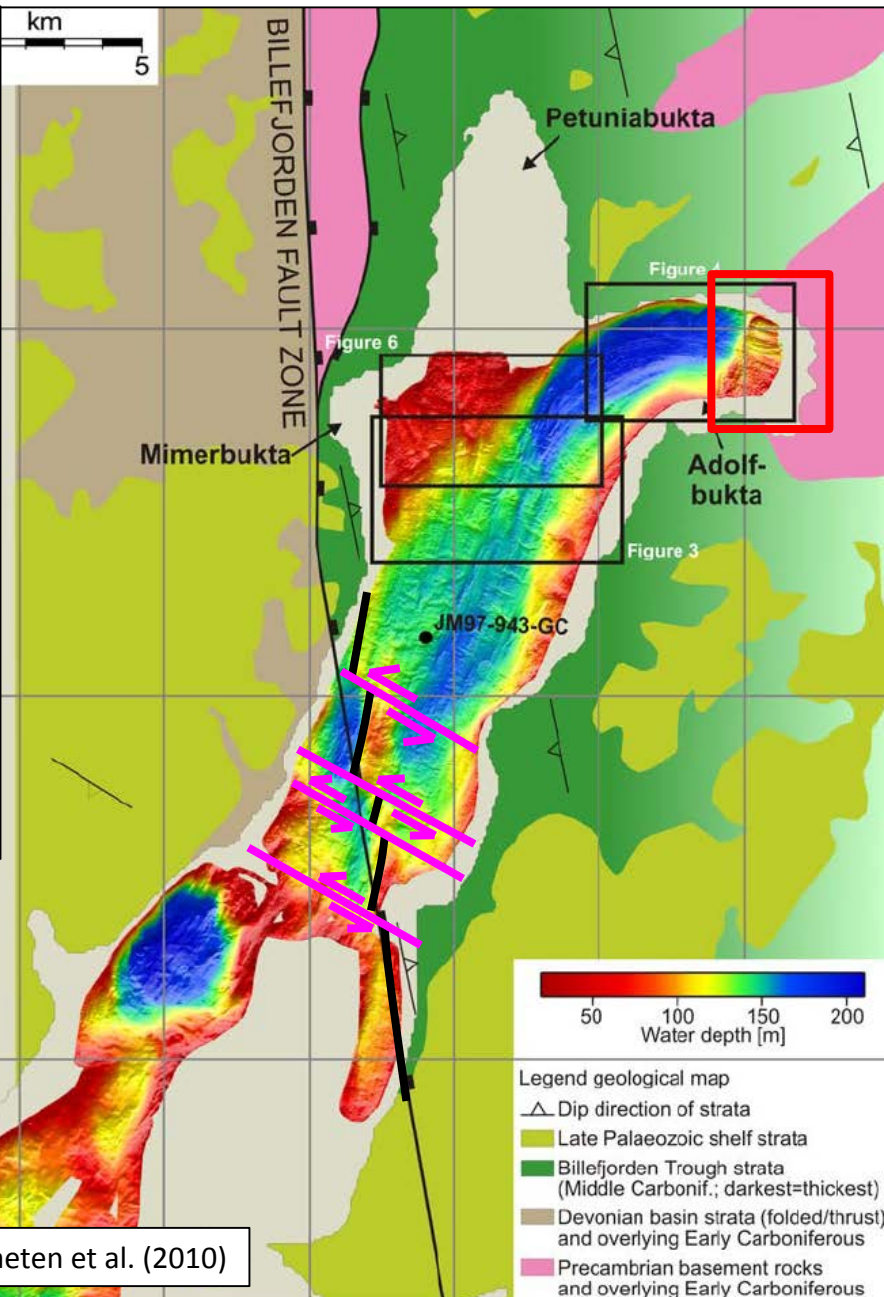
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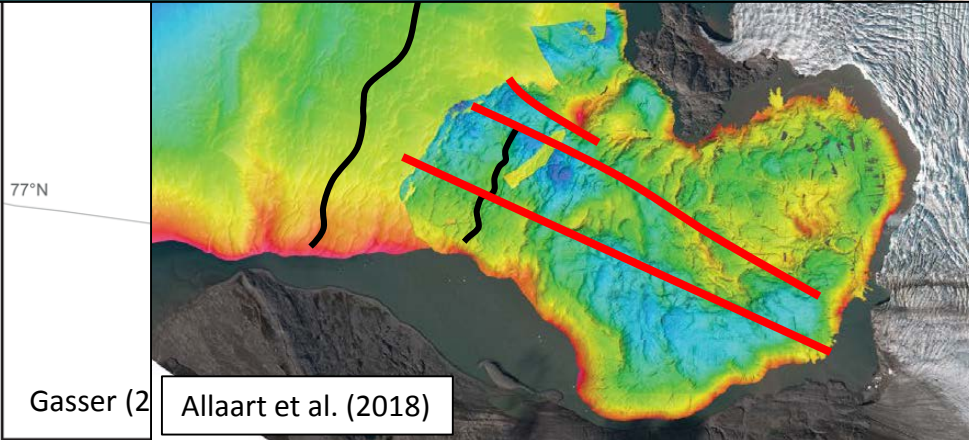
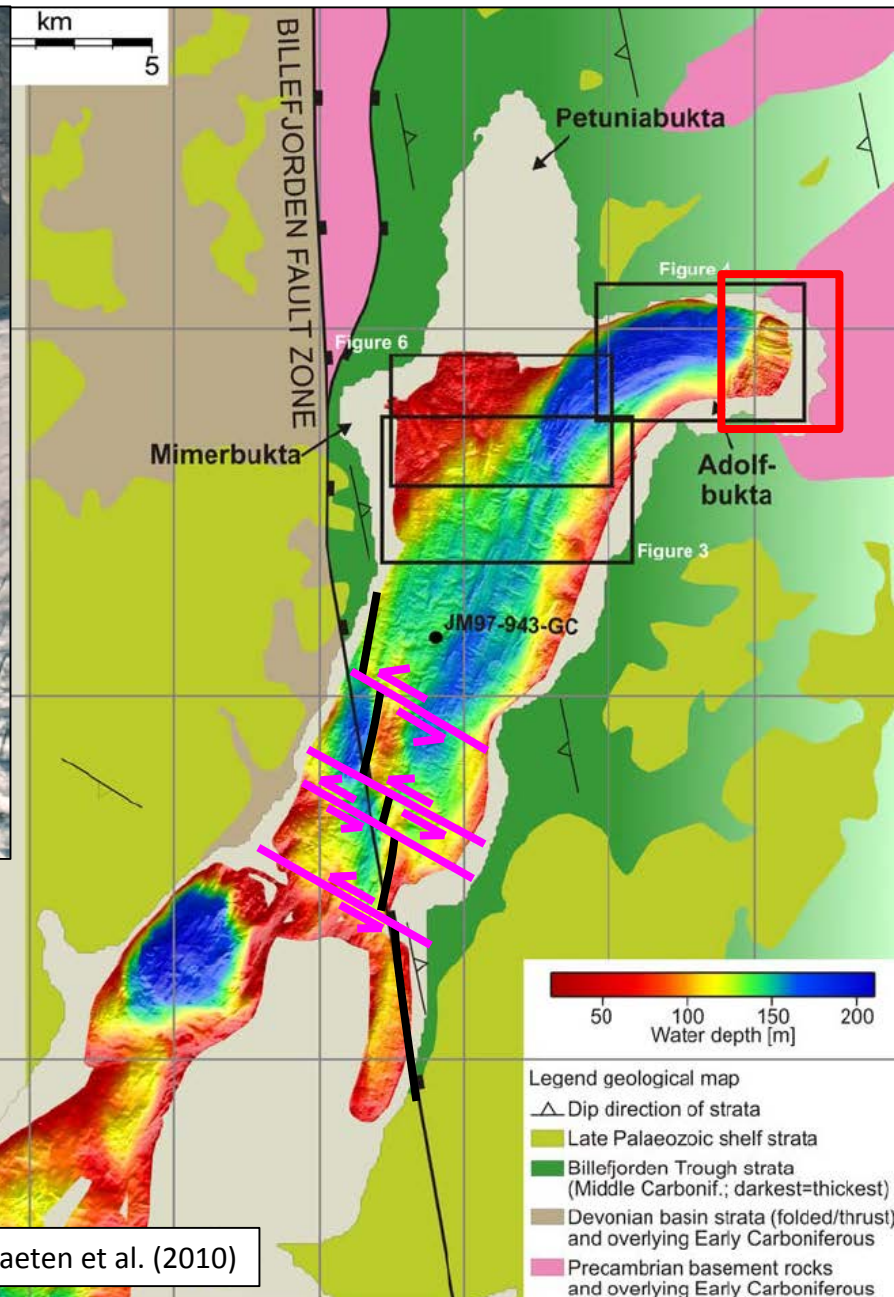
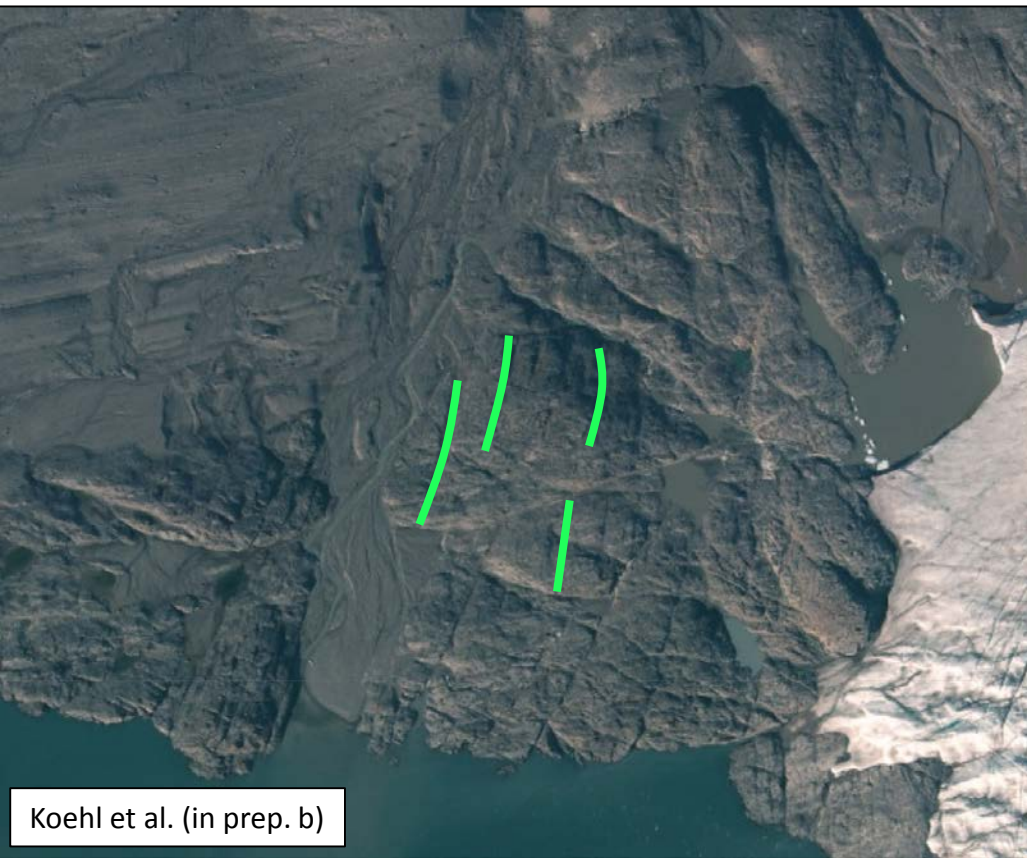
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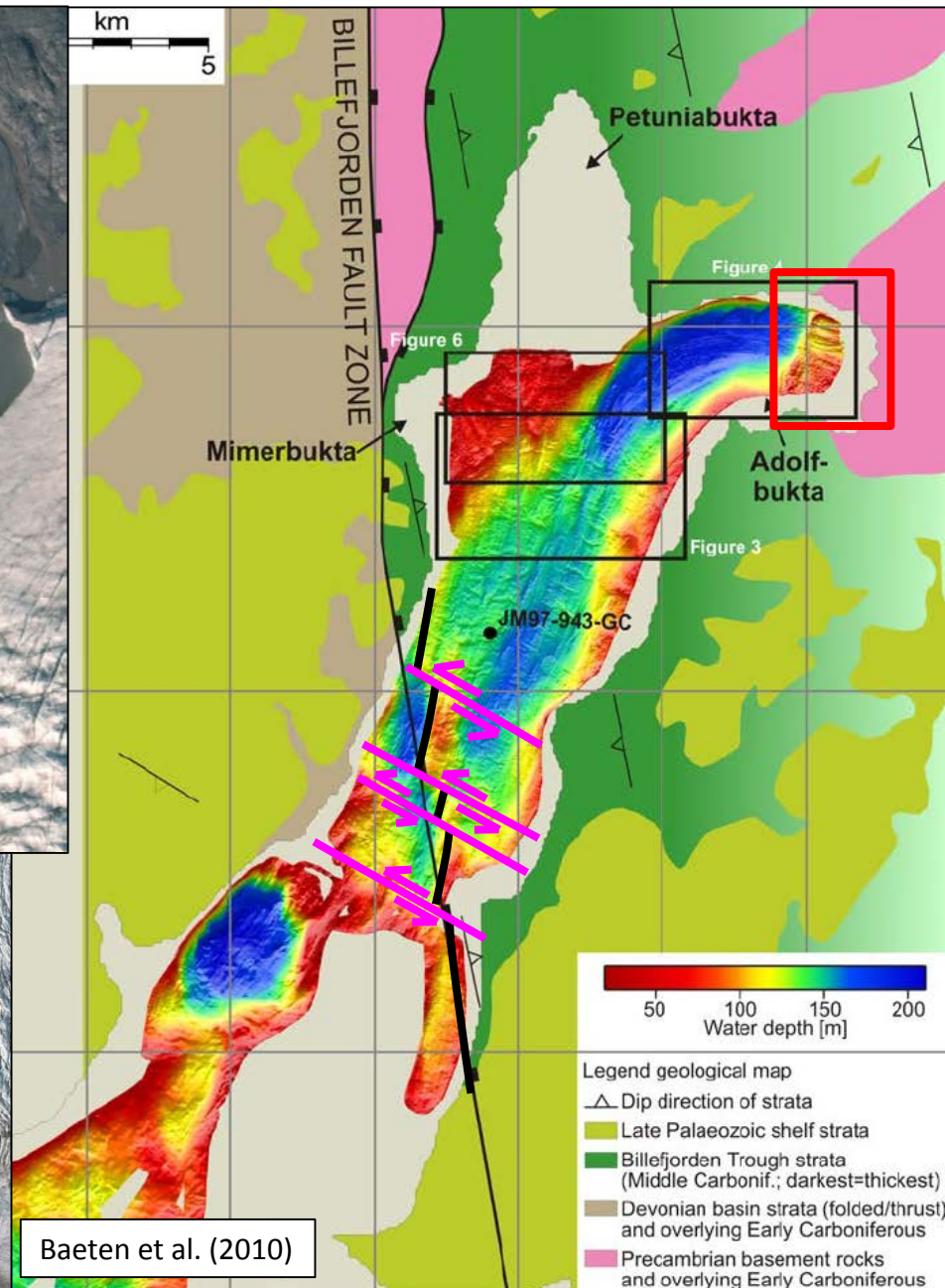
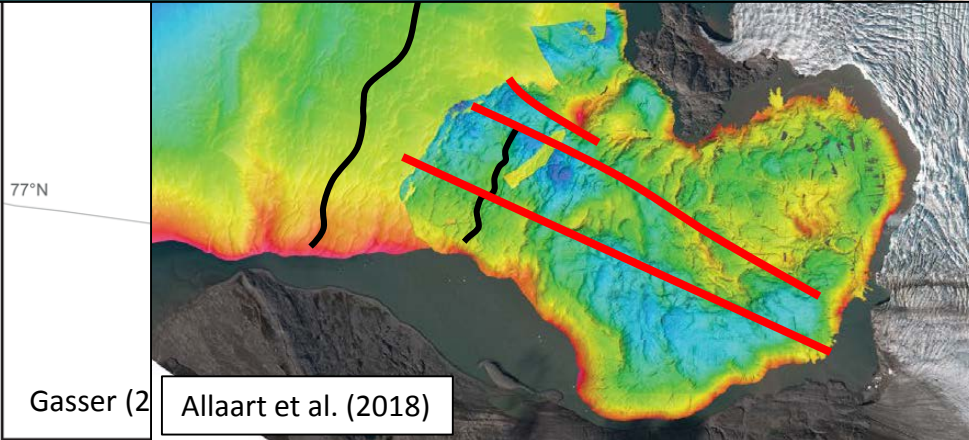
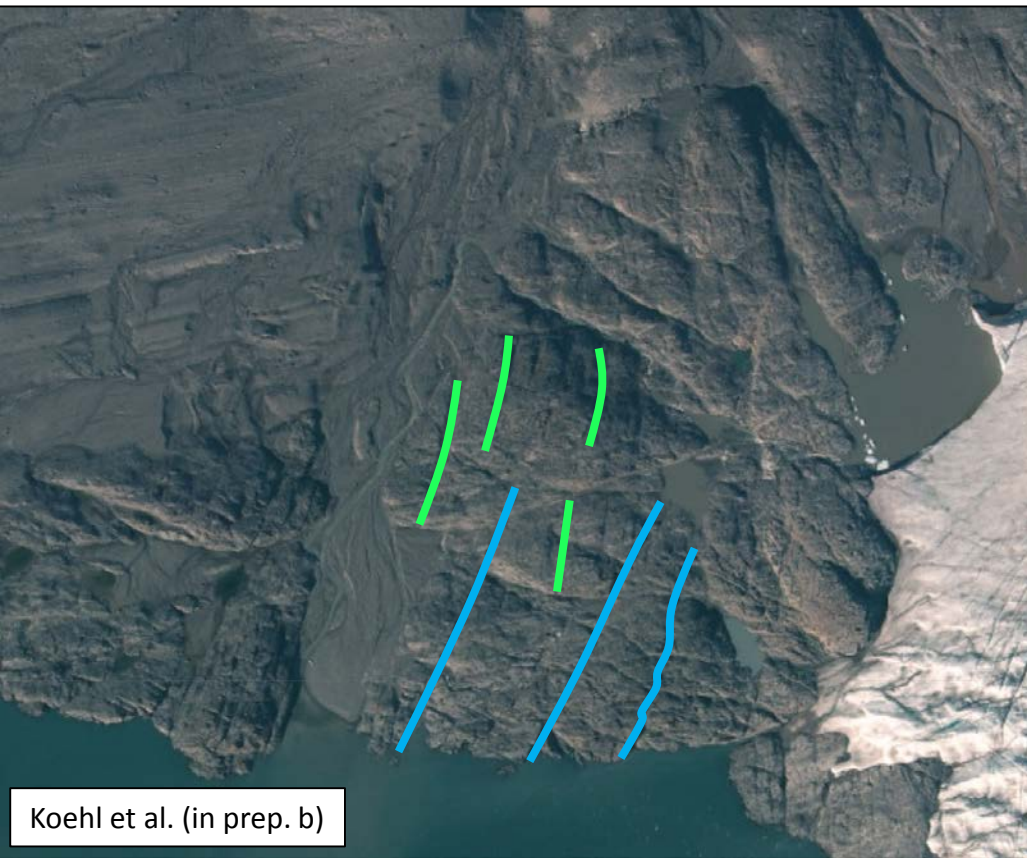




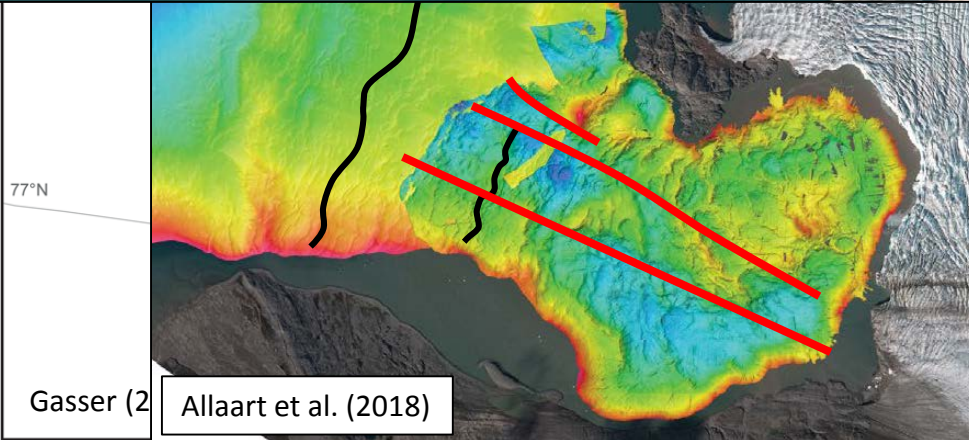
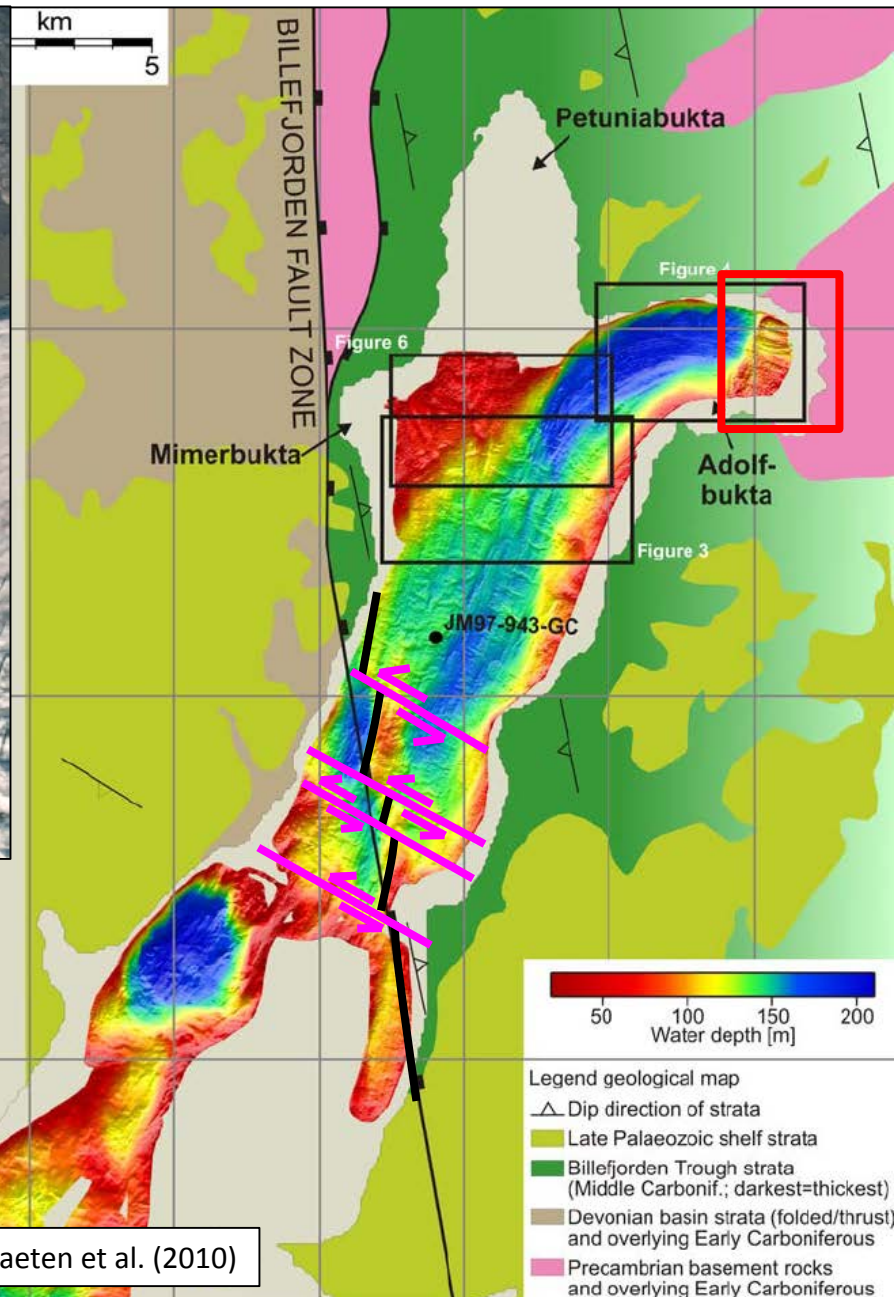
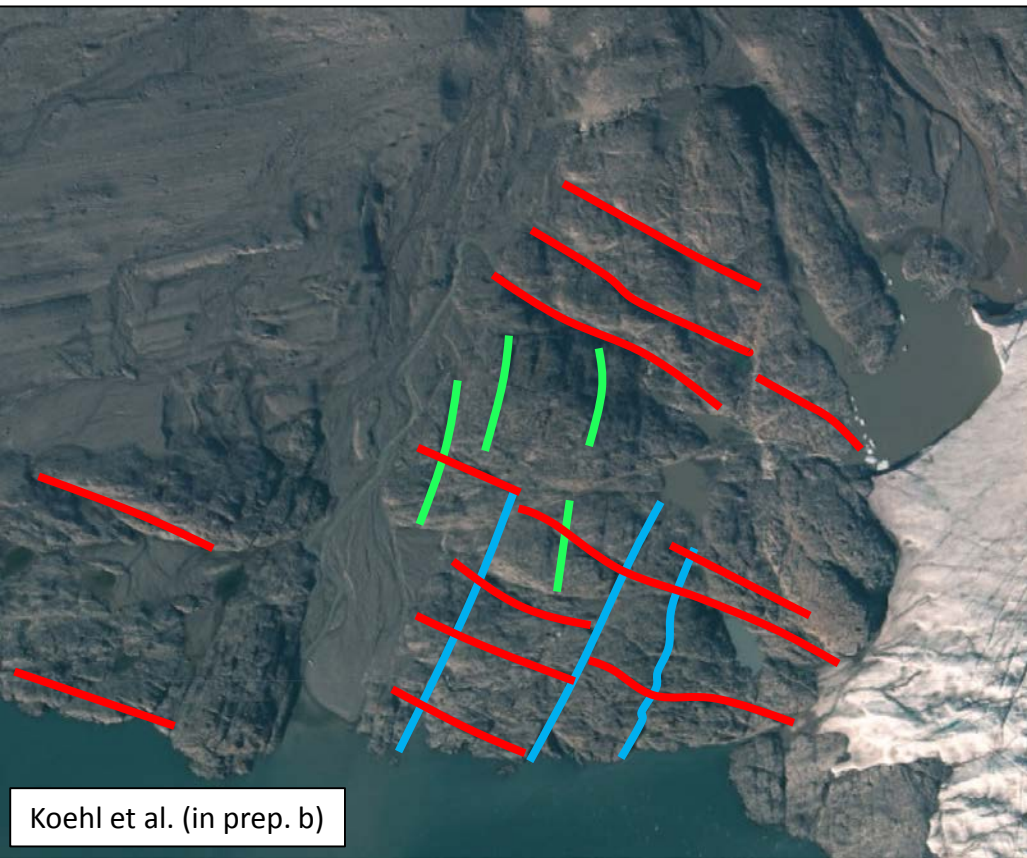
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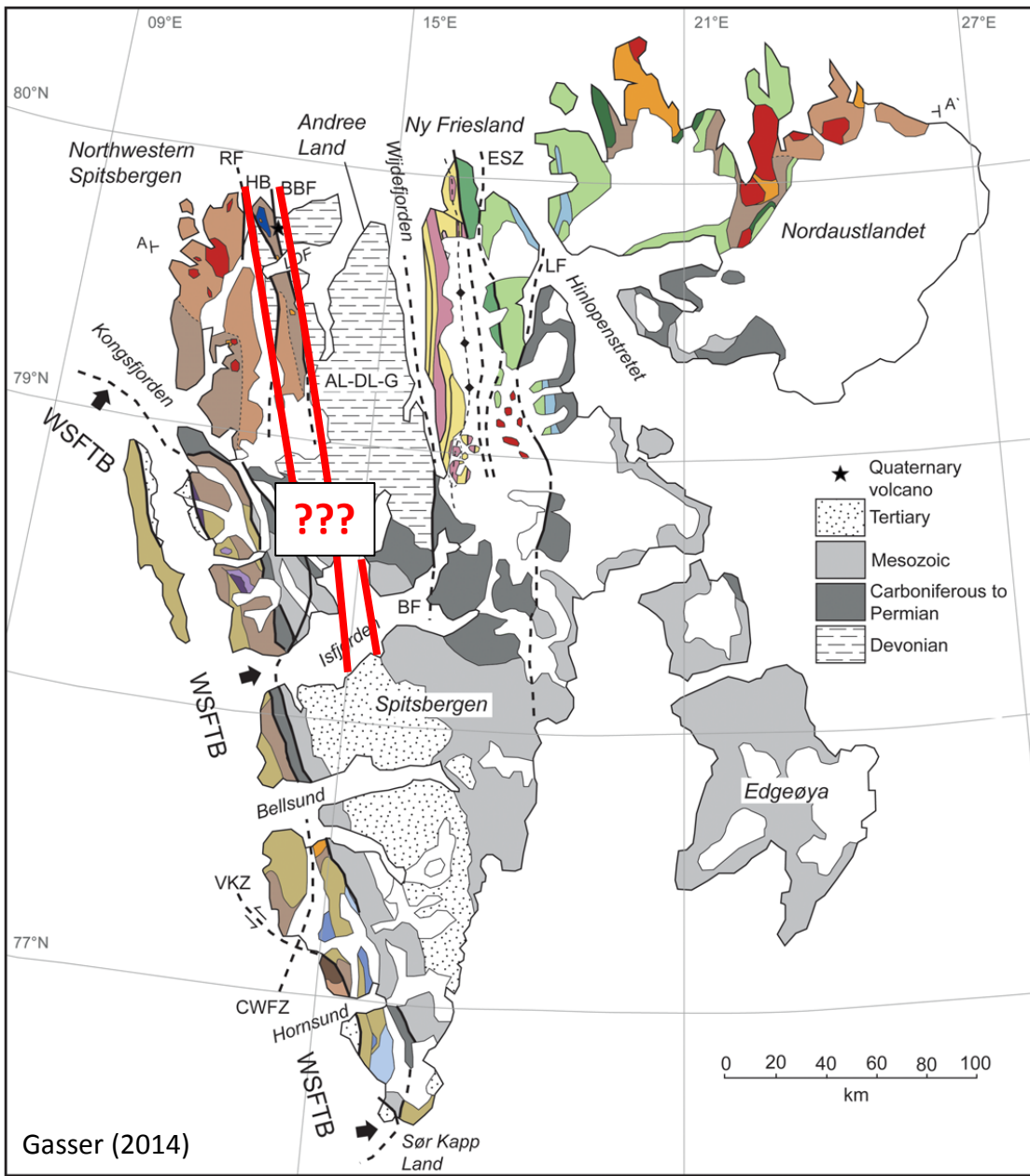
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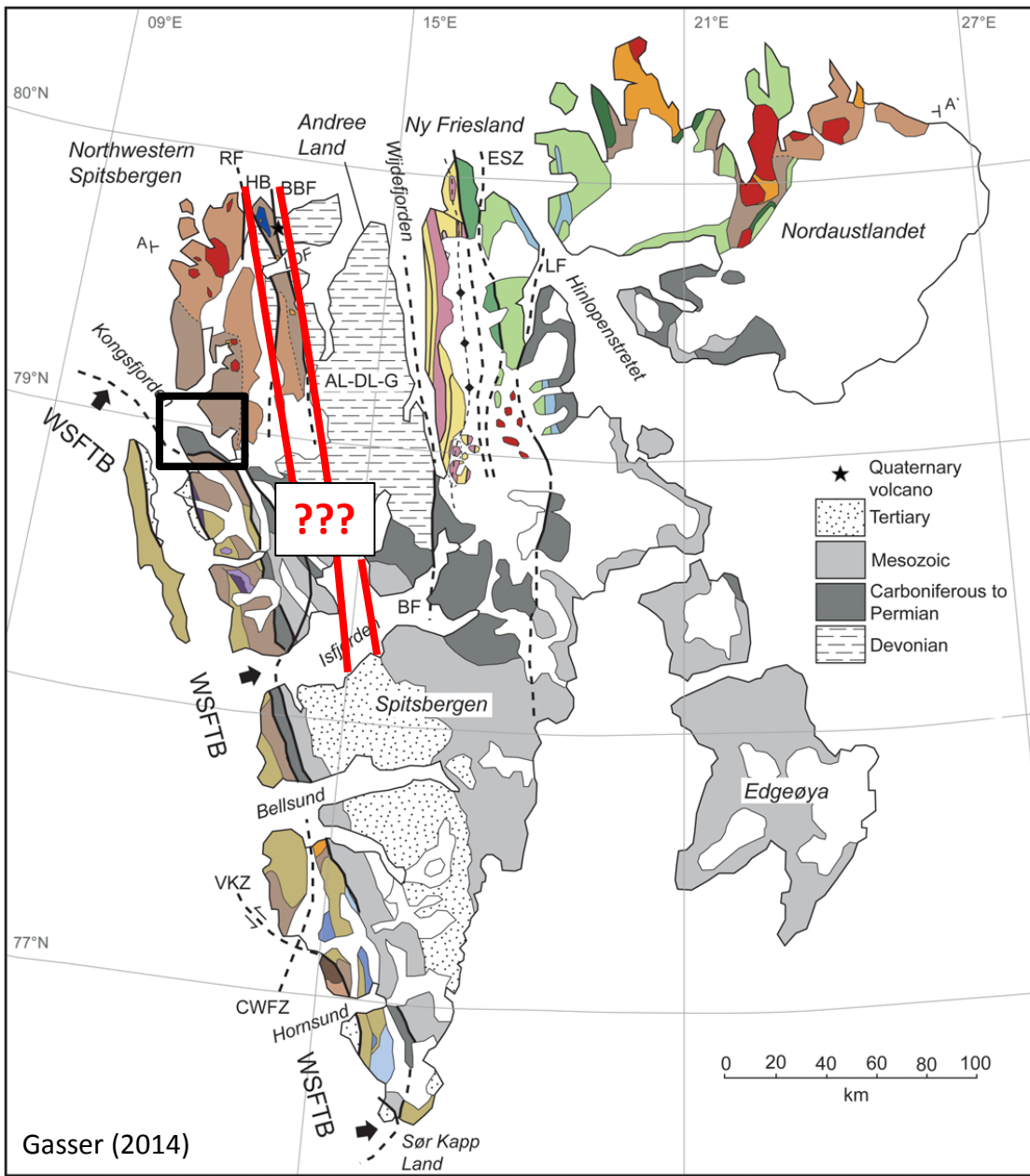
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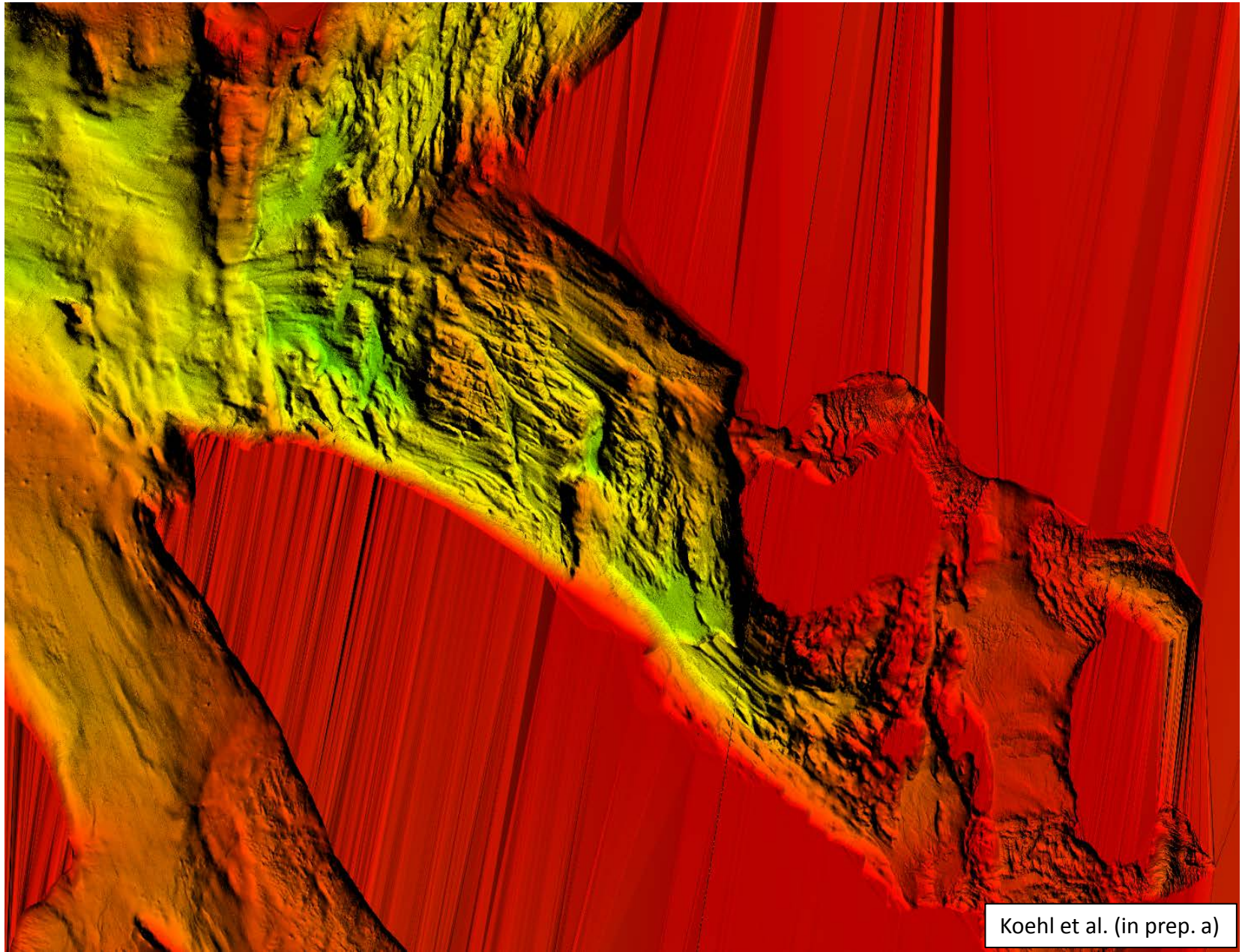


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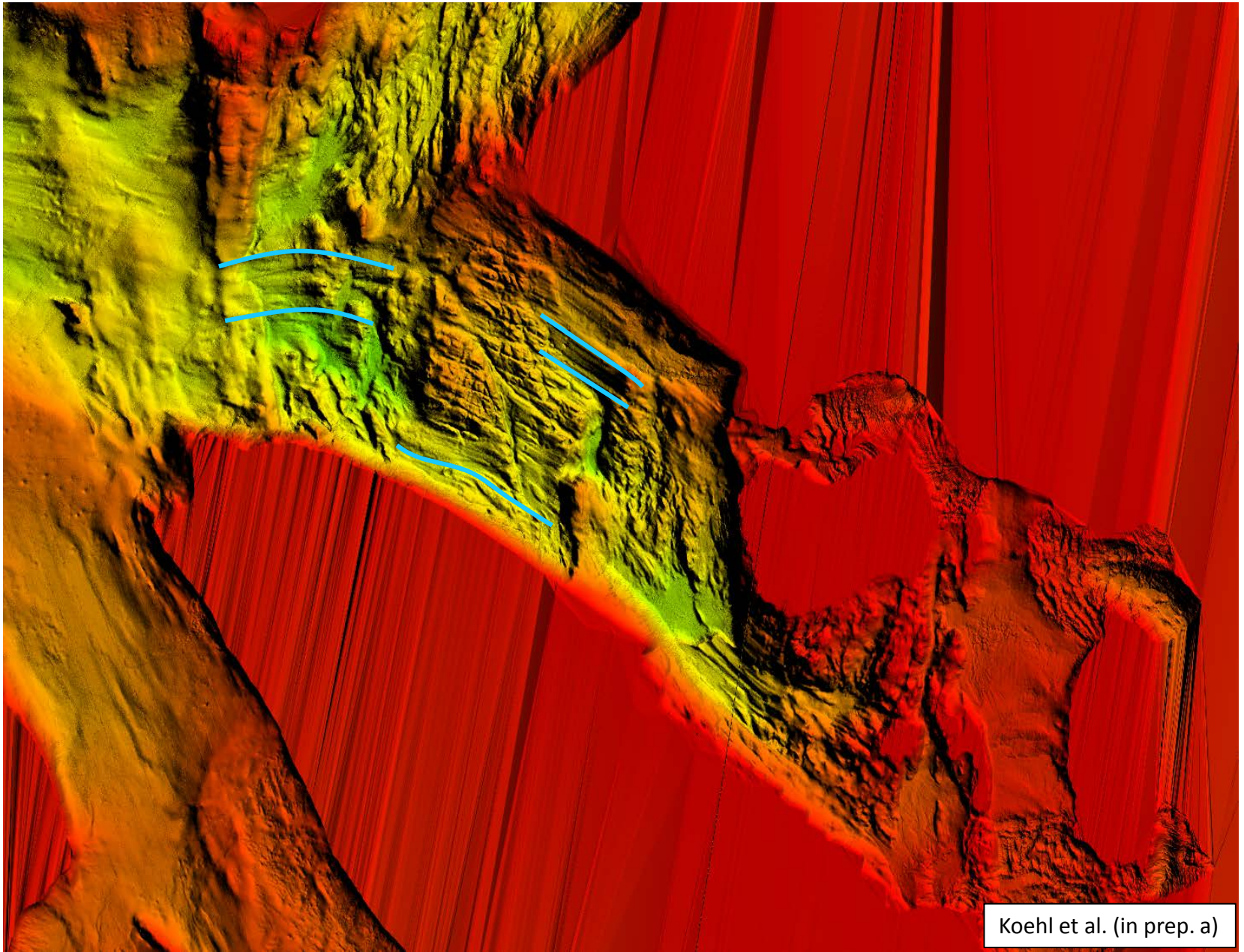


Gasser (2014)

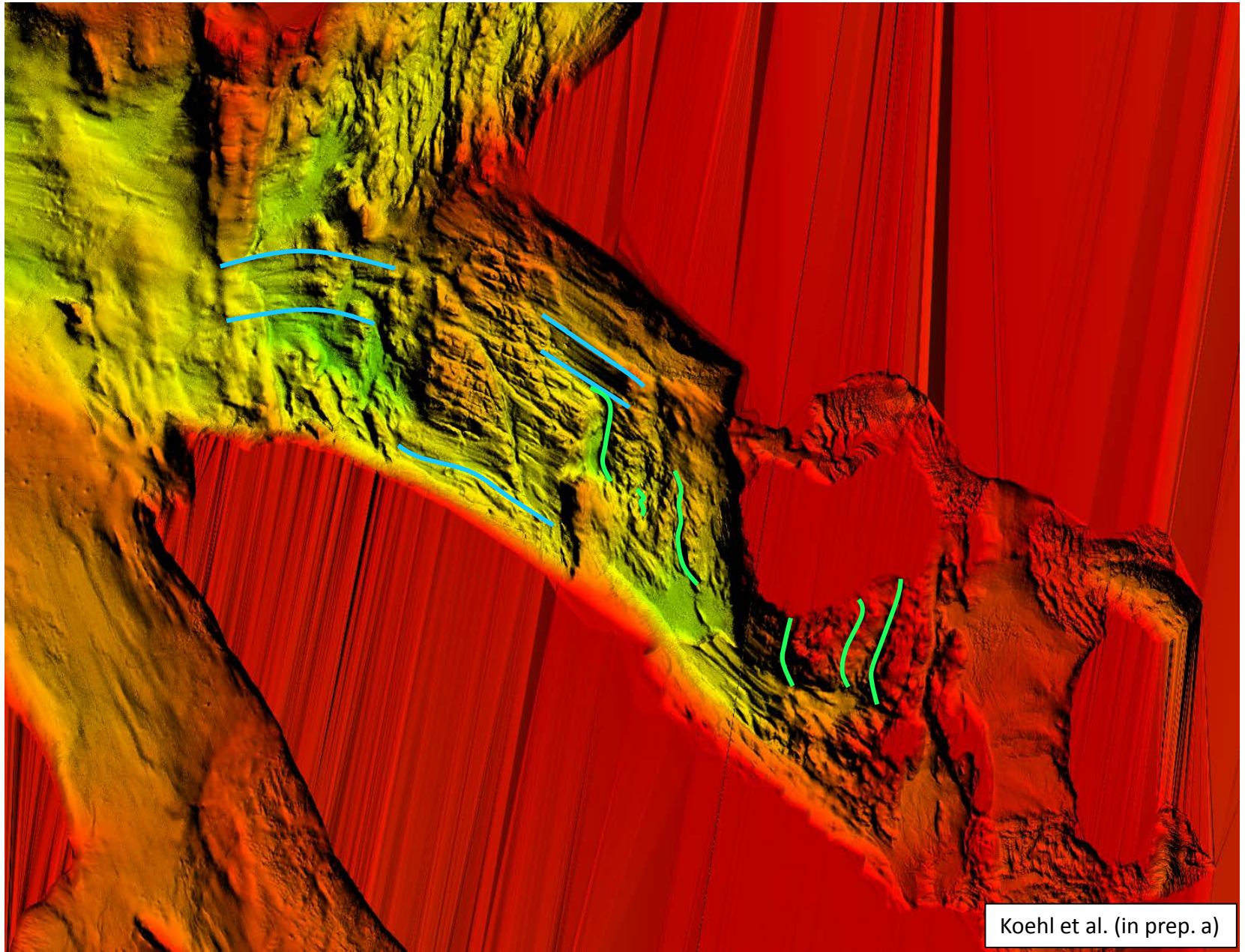
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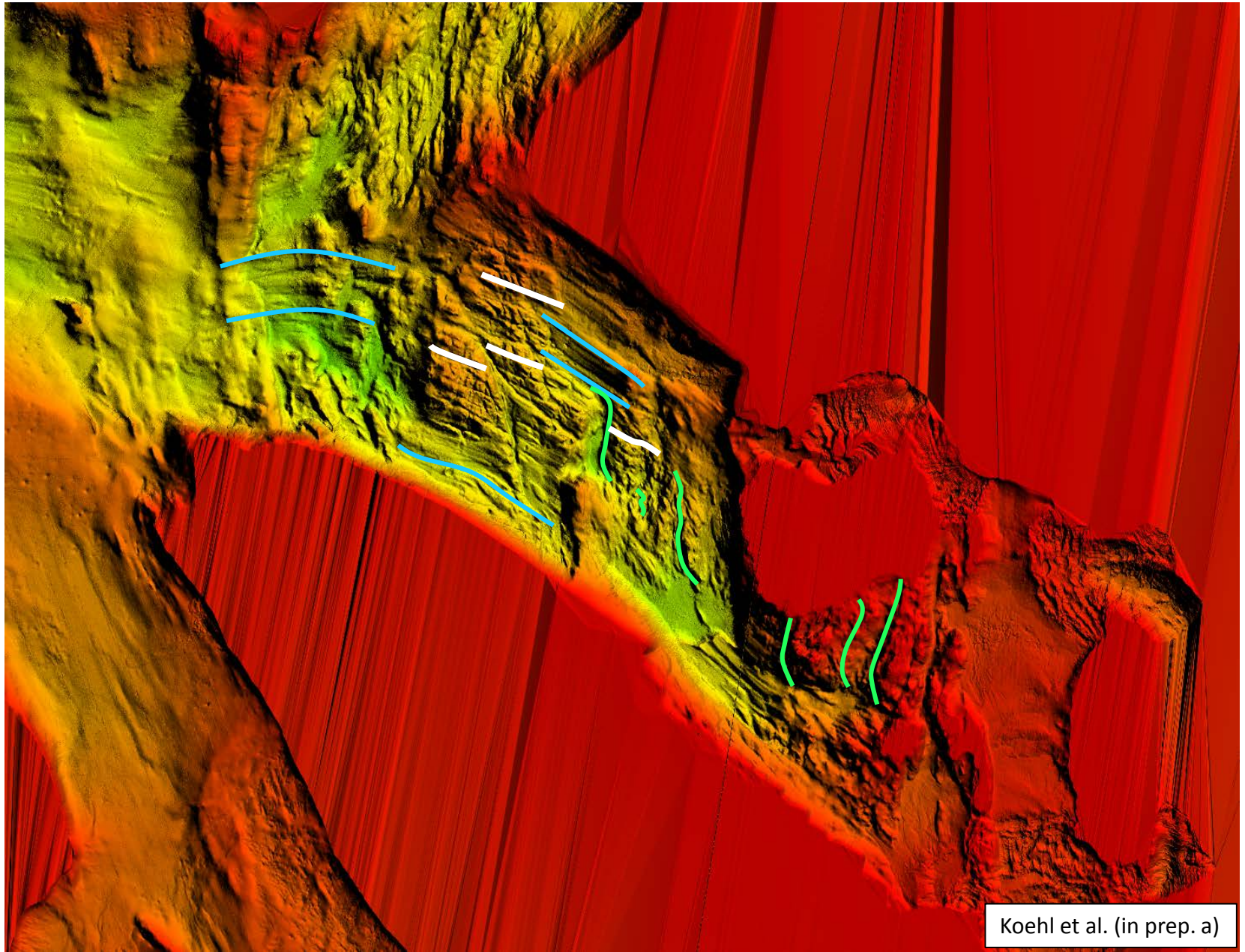


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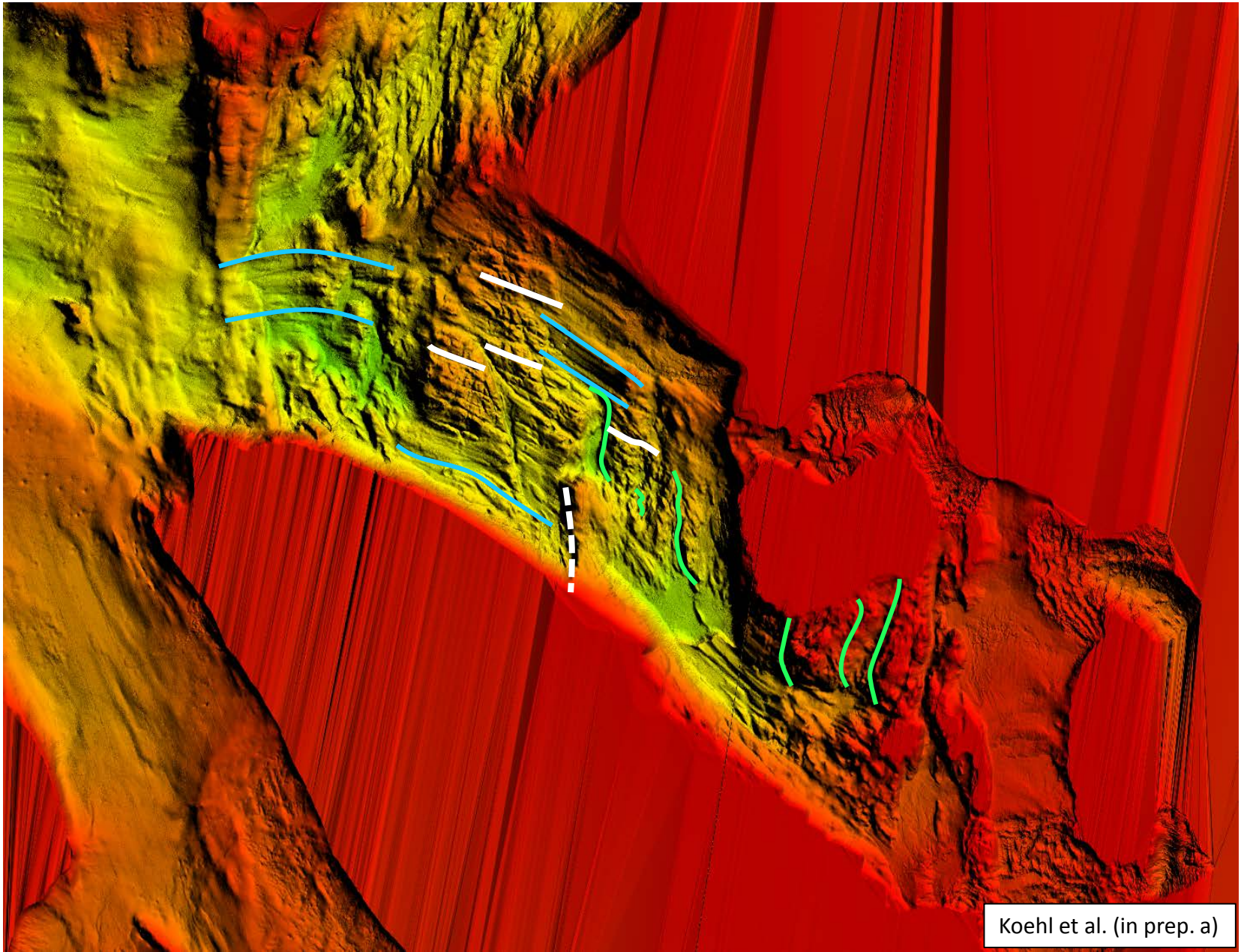




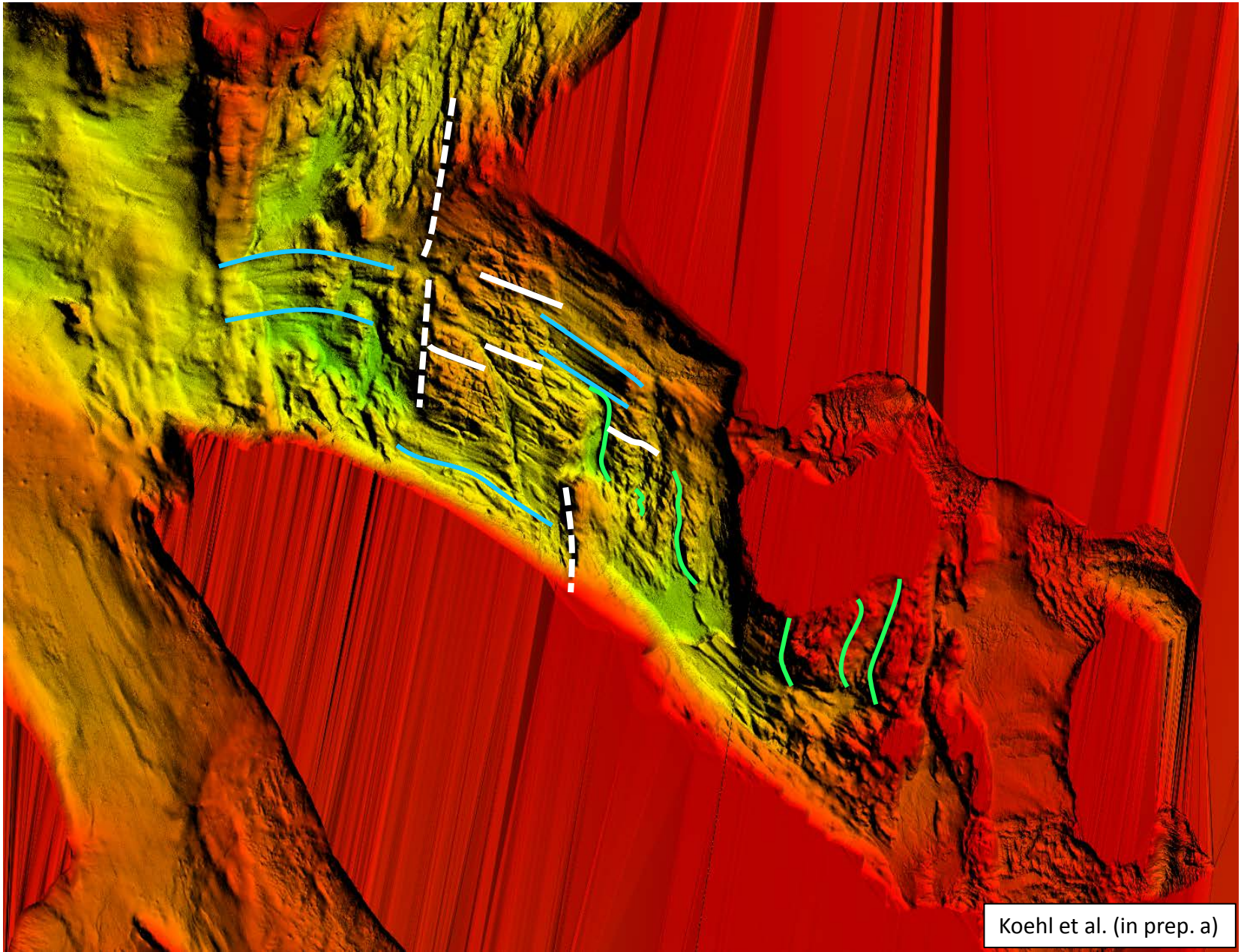
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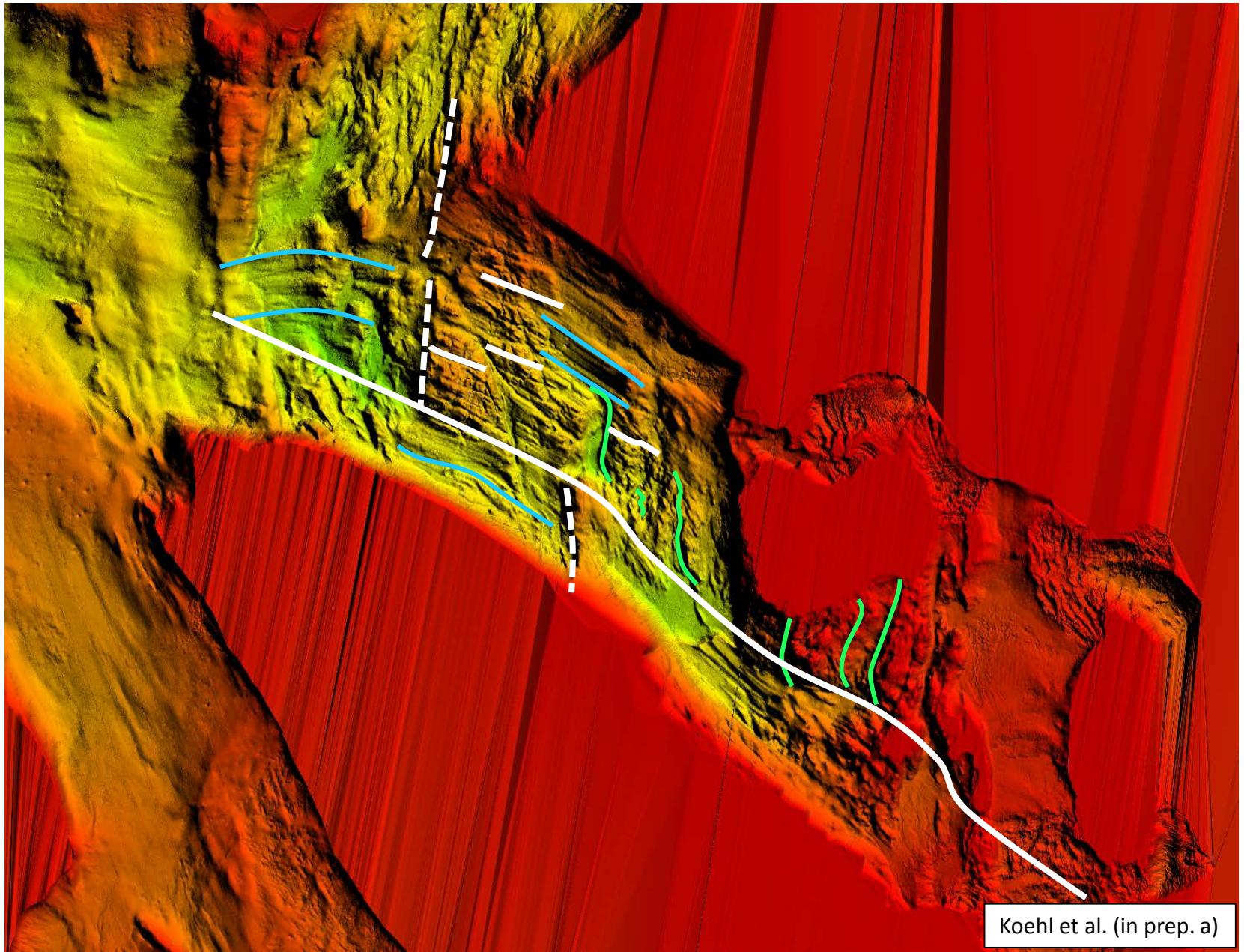
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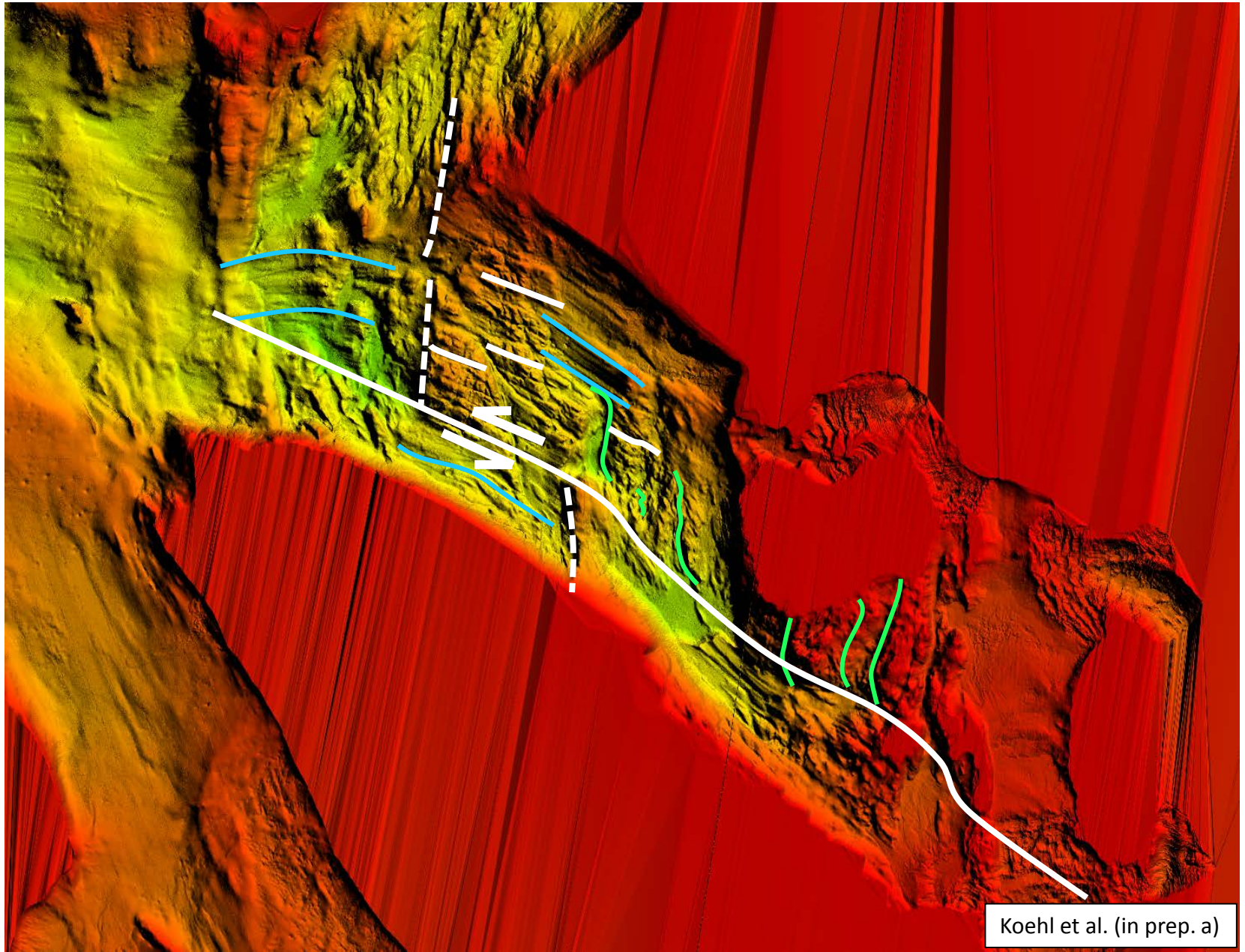
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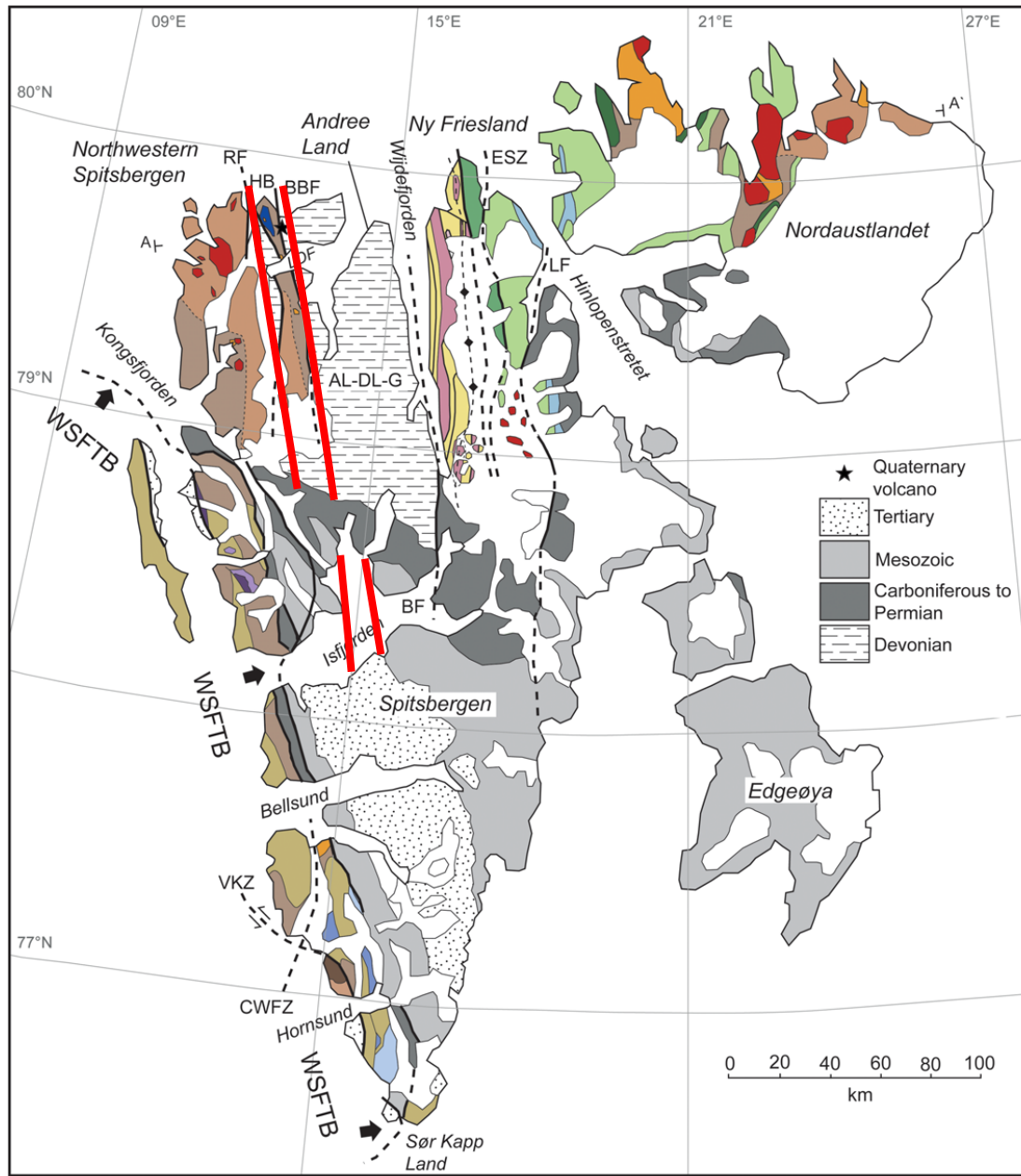
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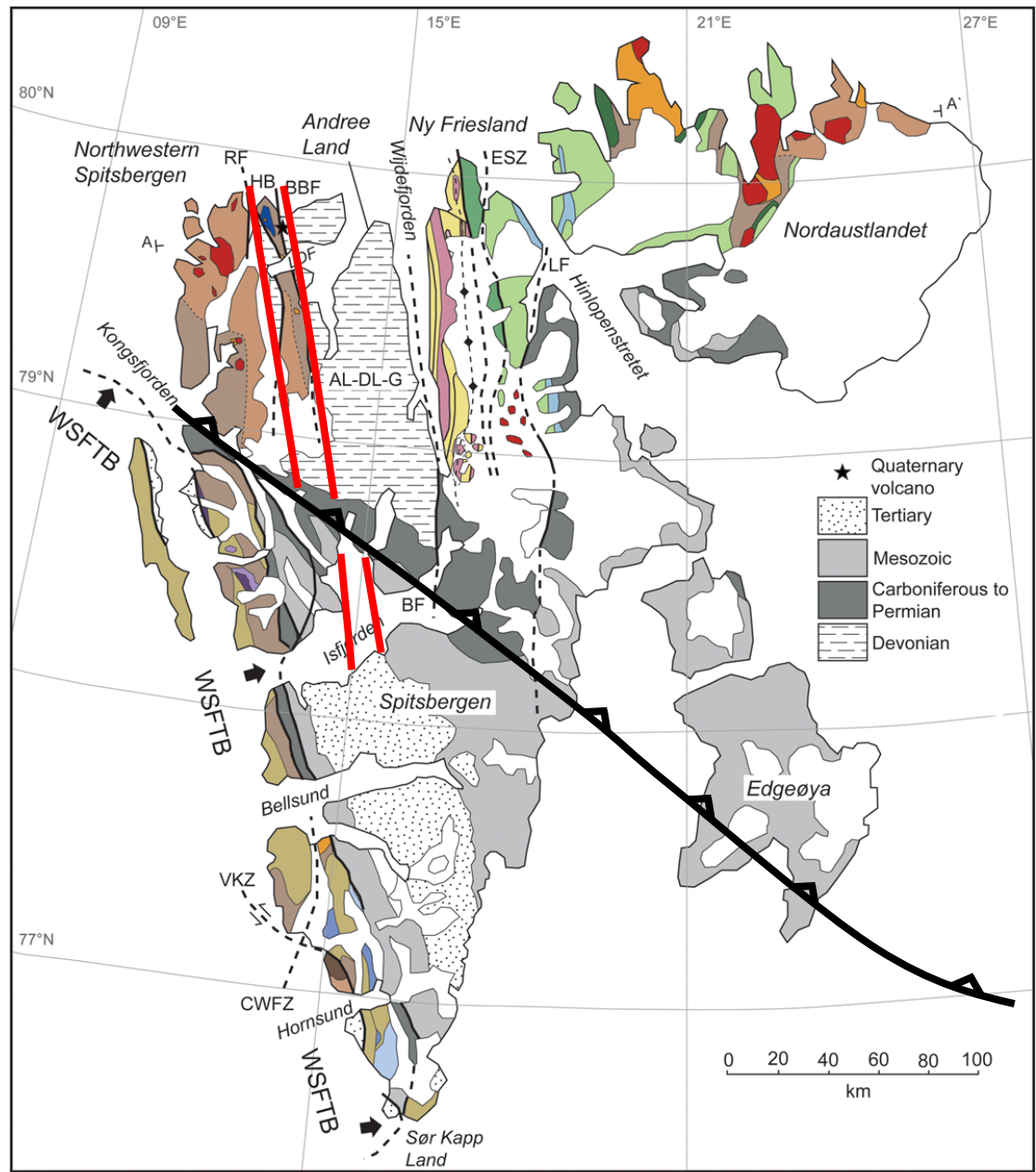
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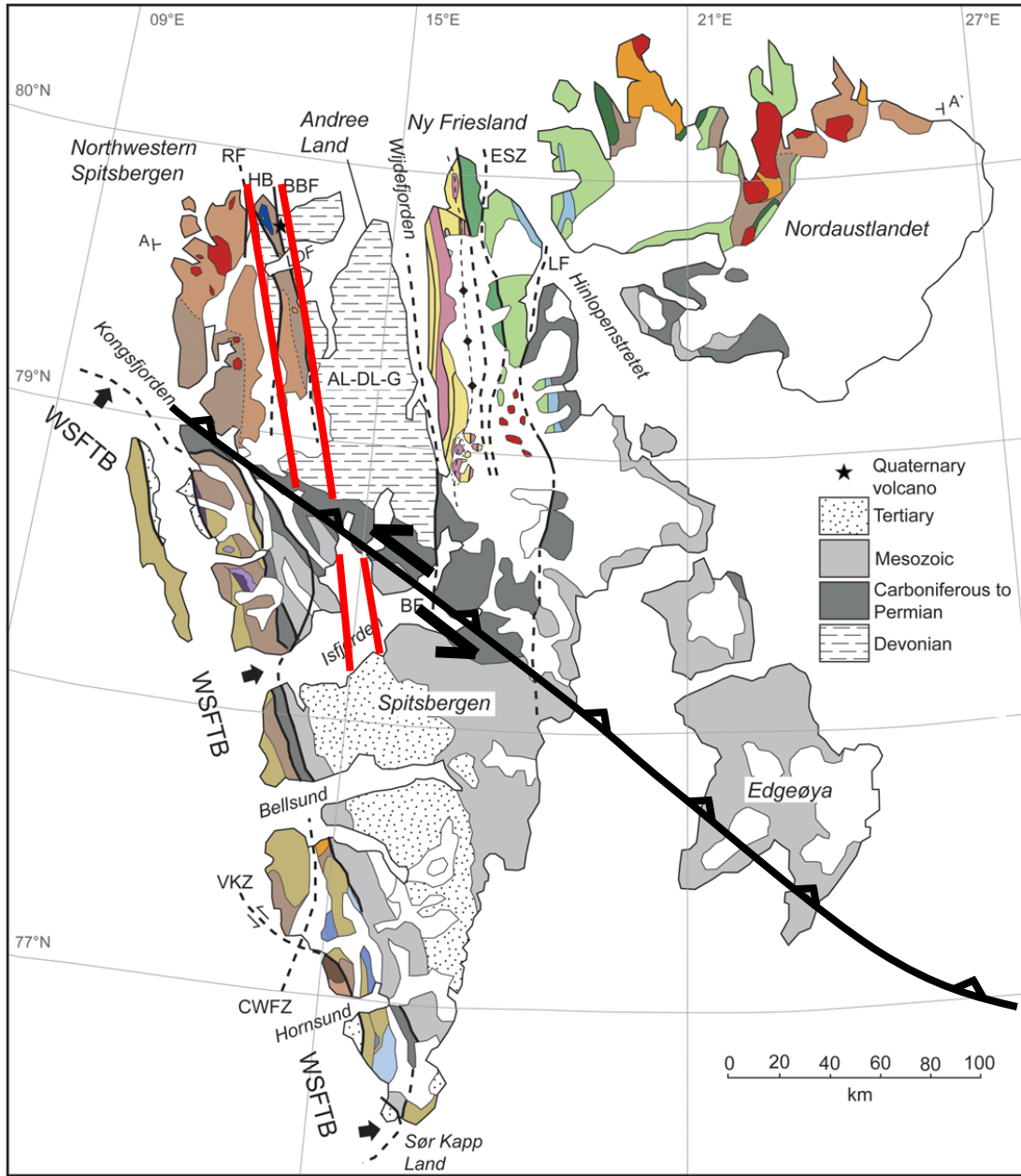
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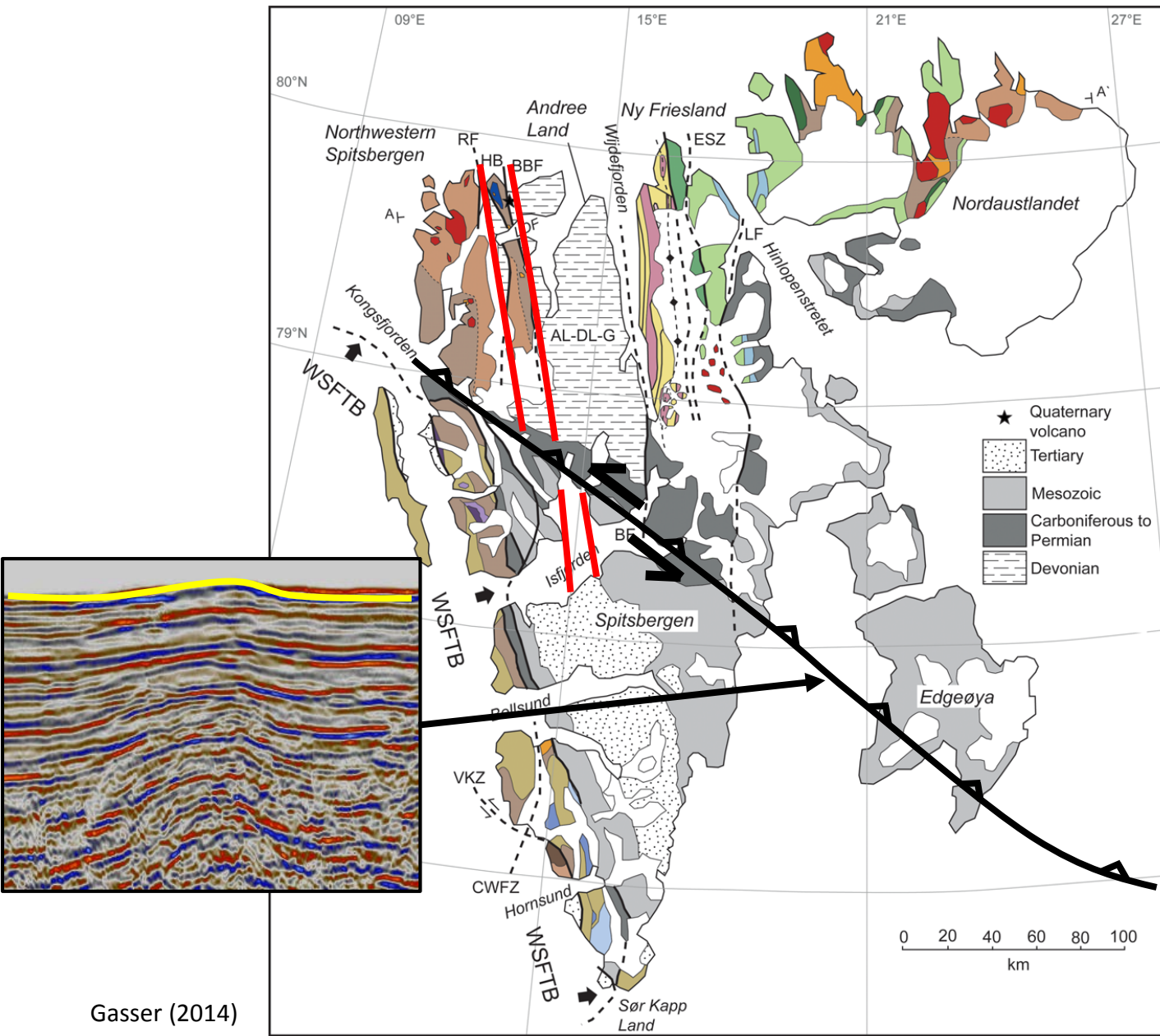


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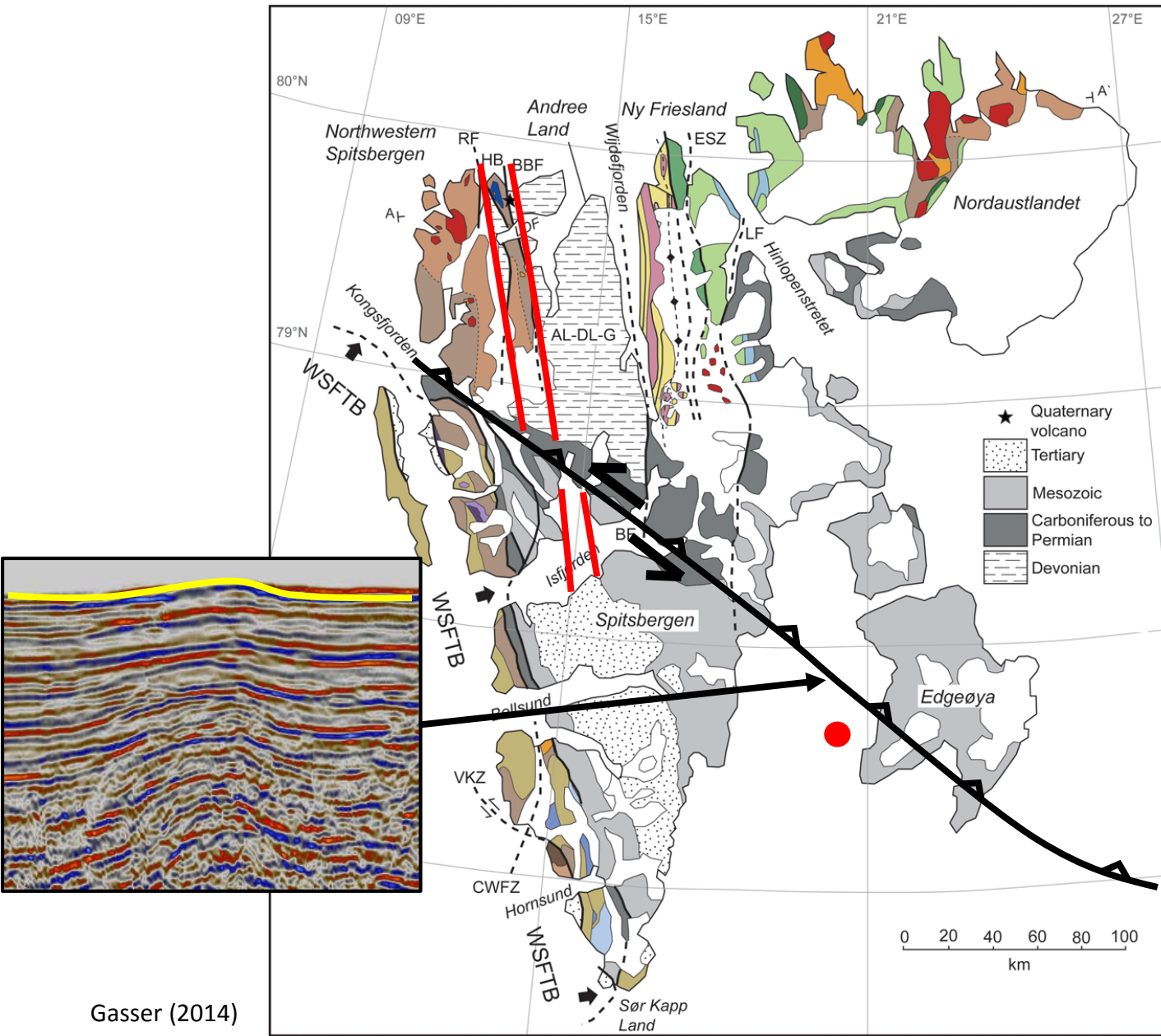




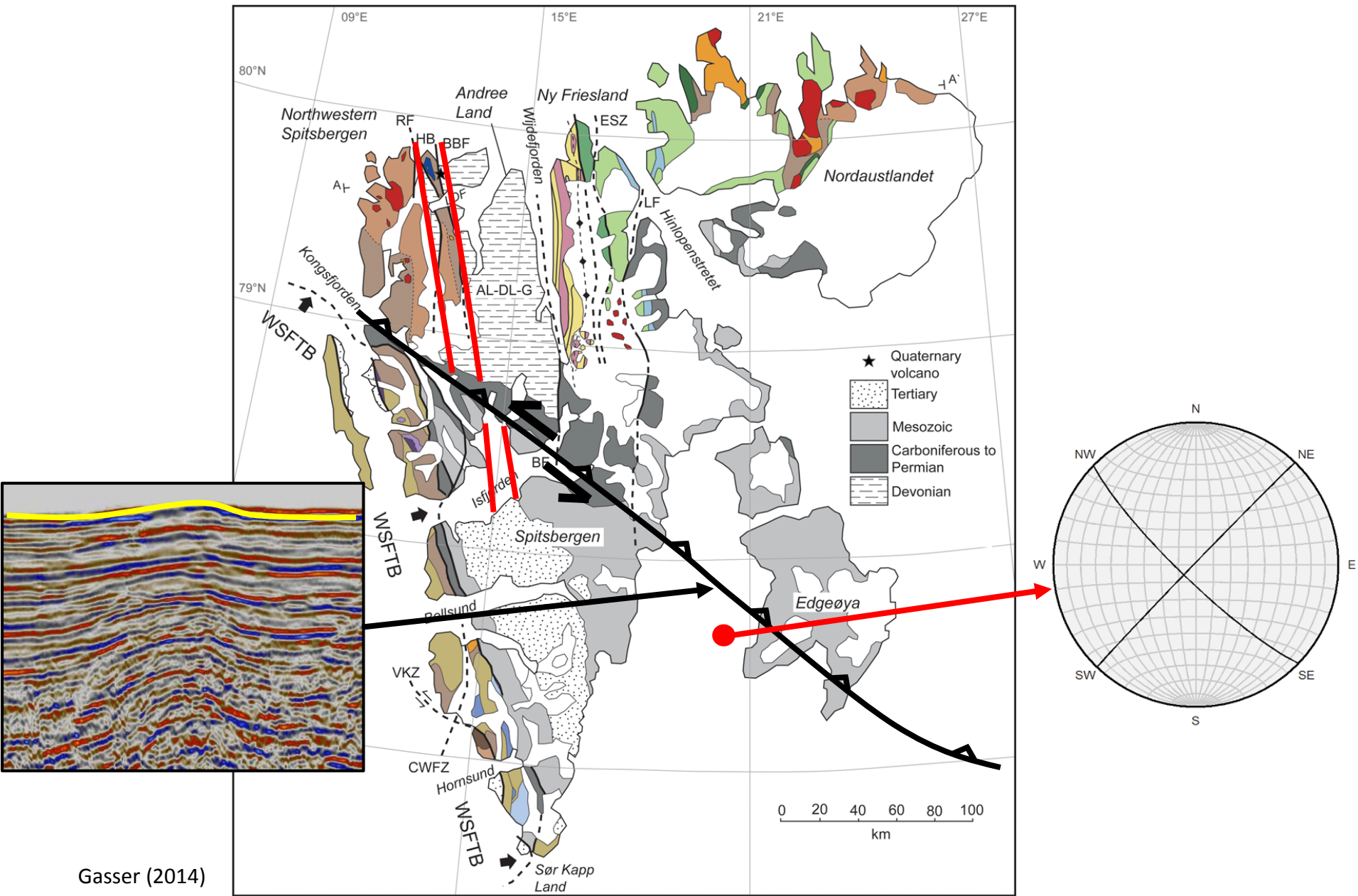
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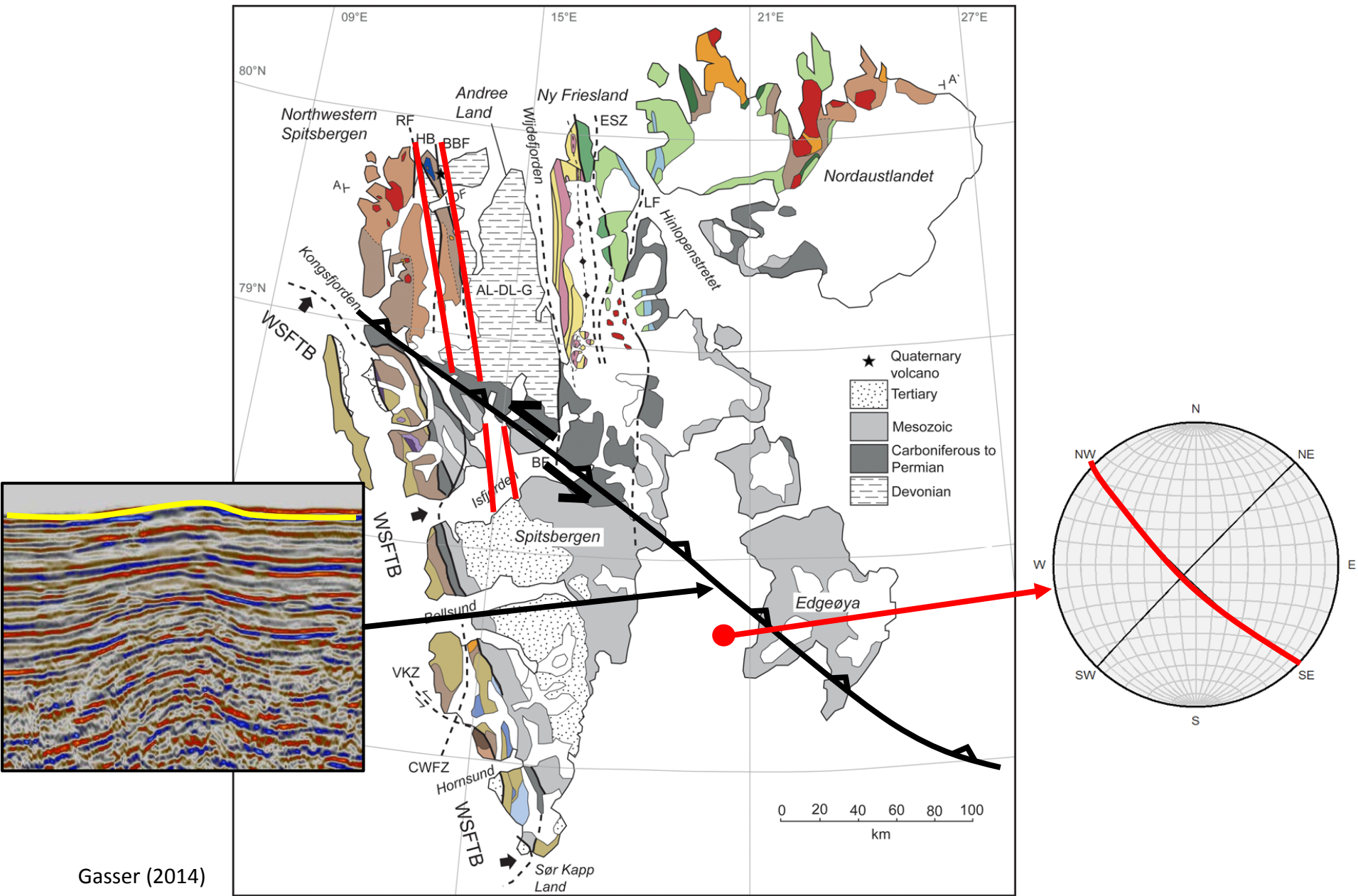
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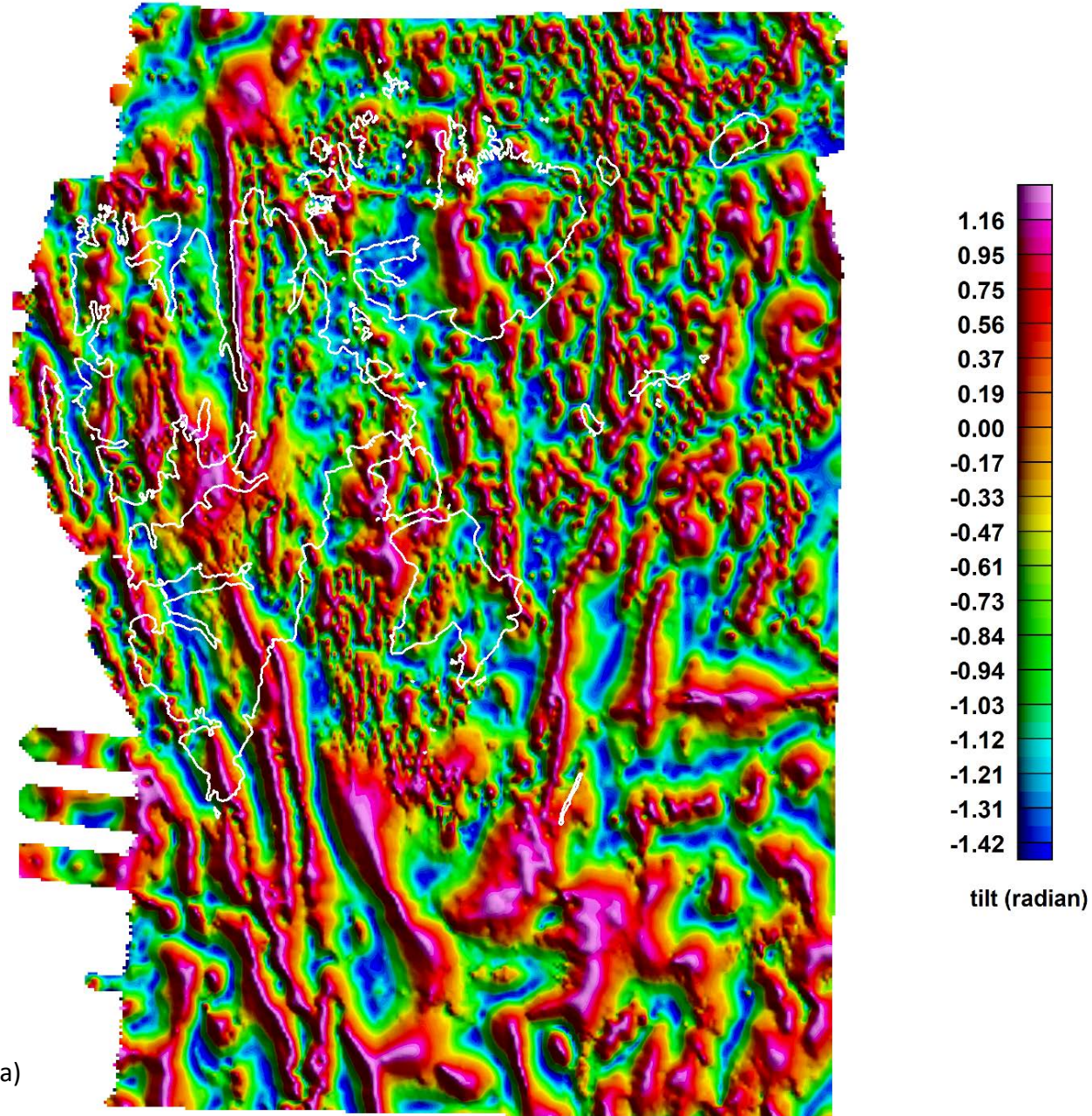
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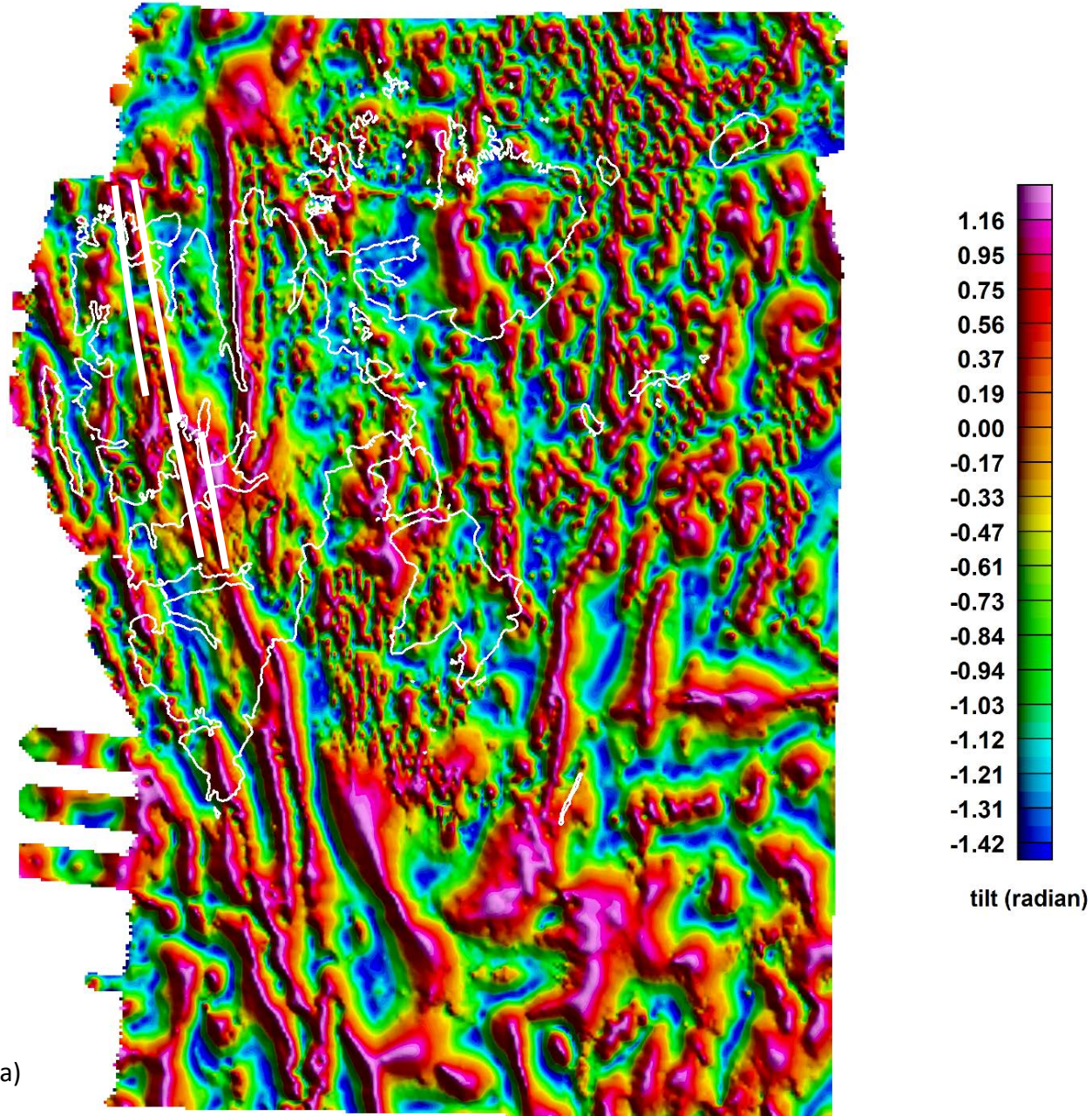
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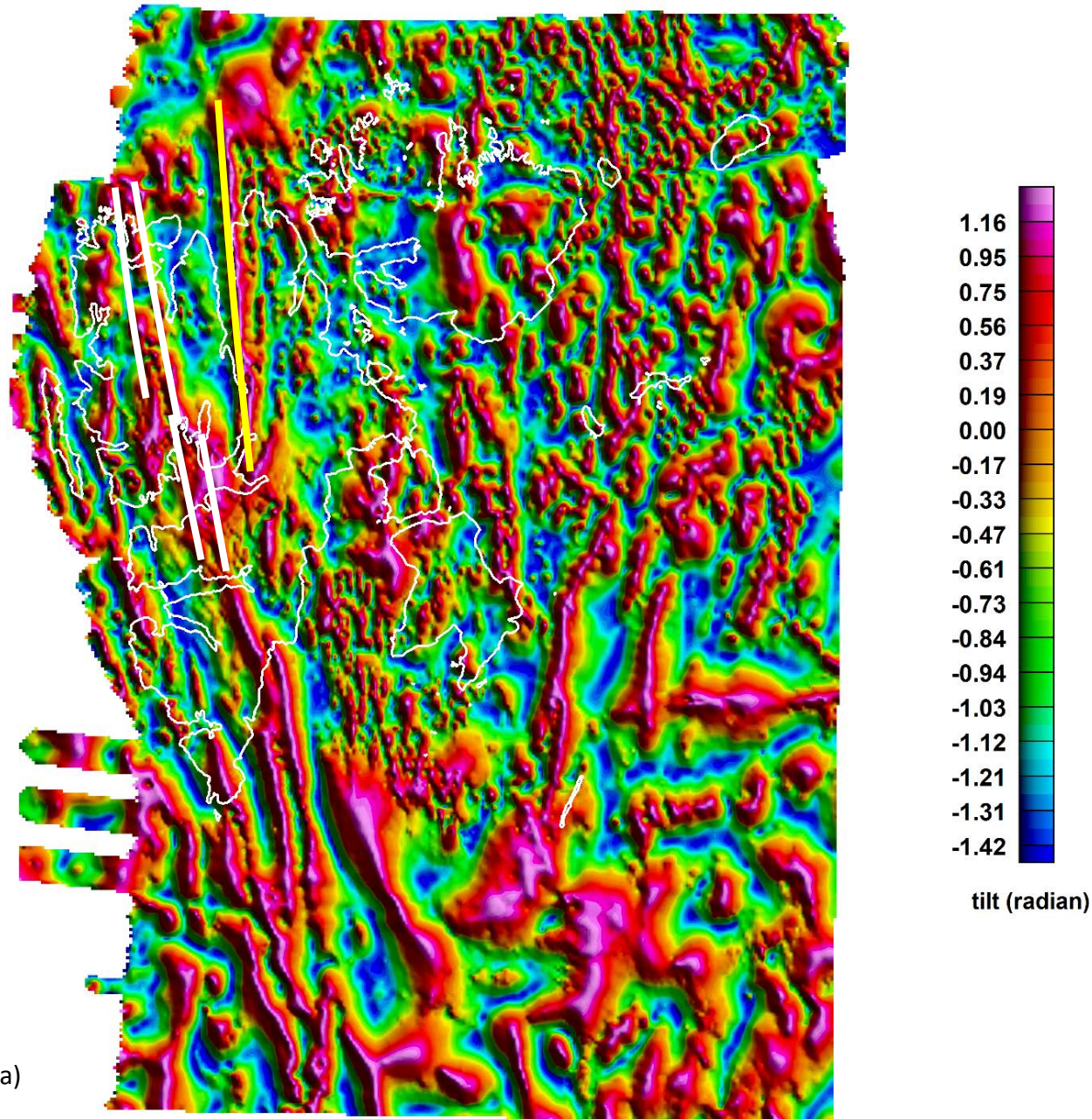
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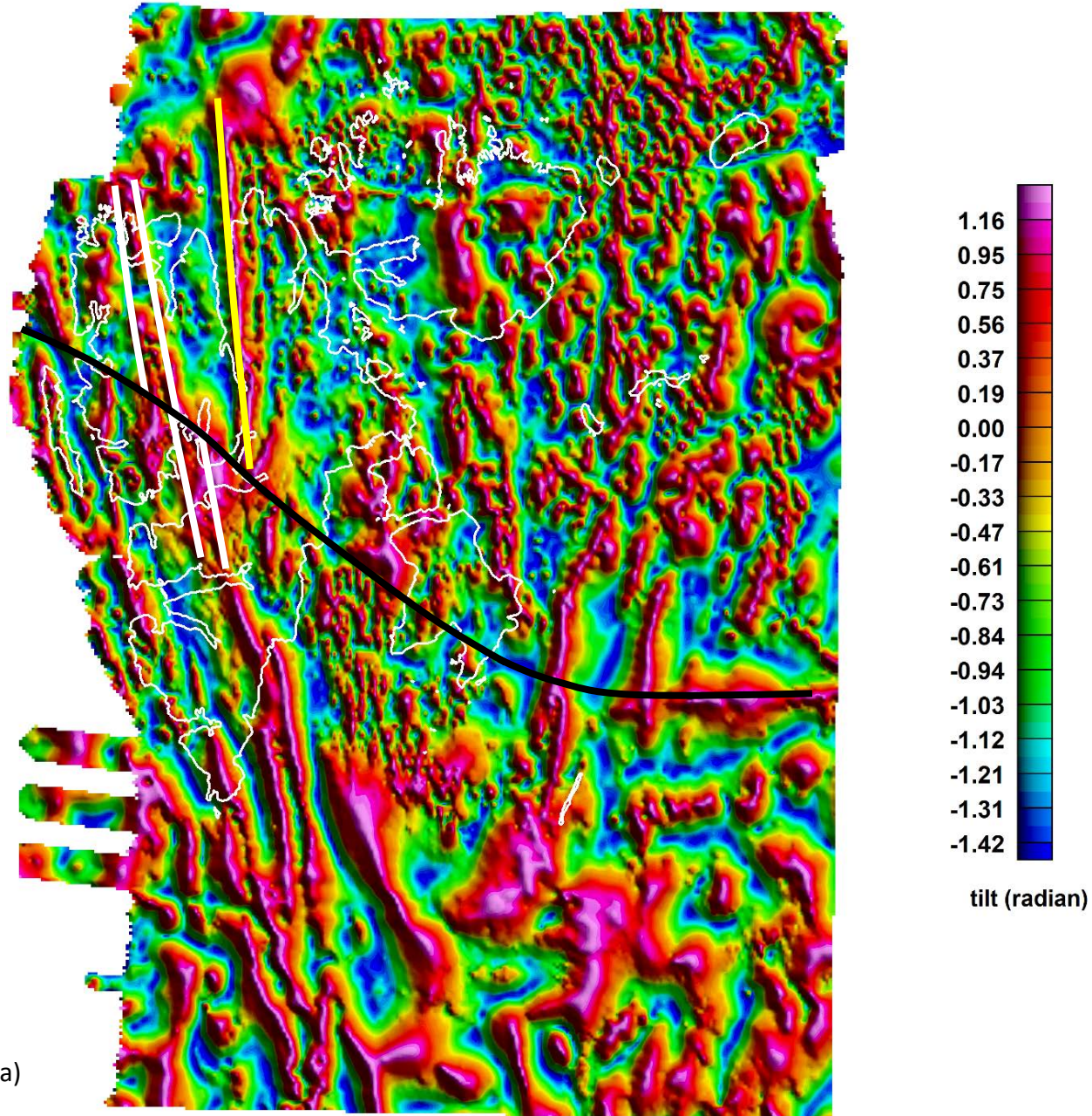
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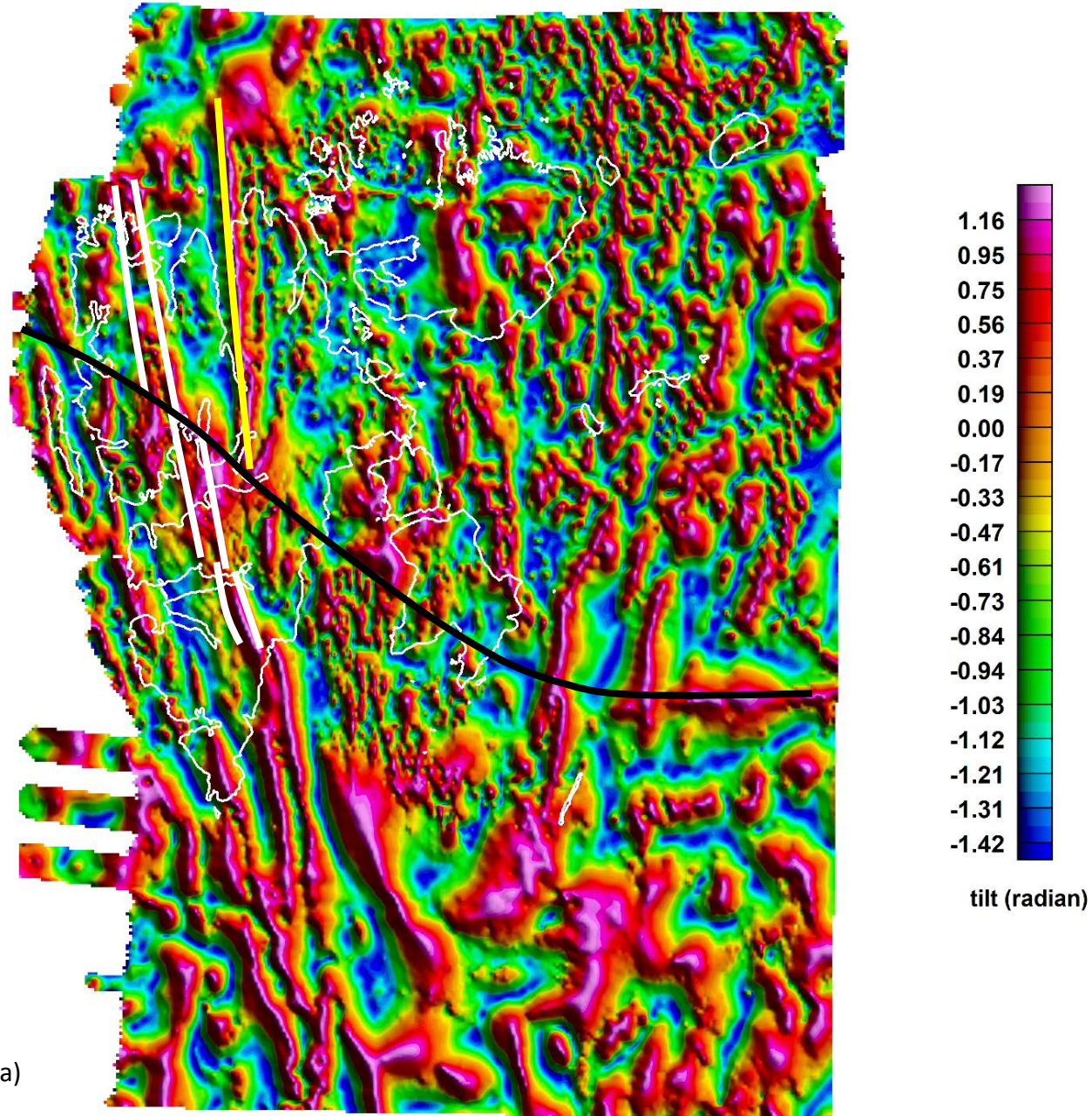


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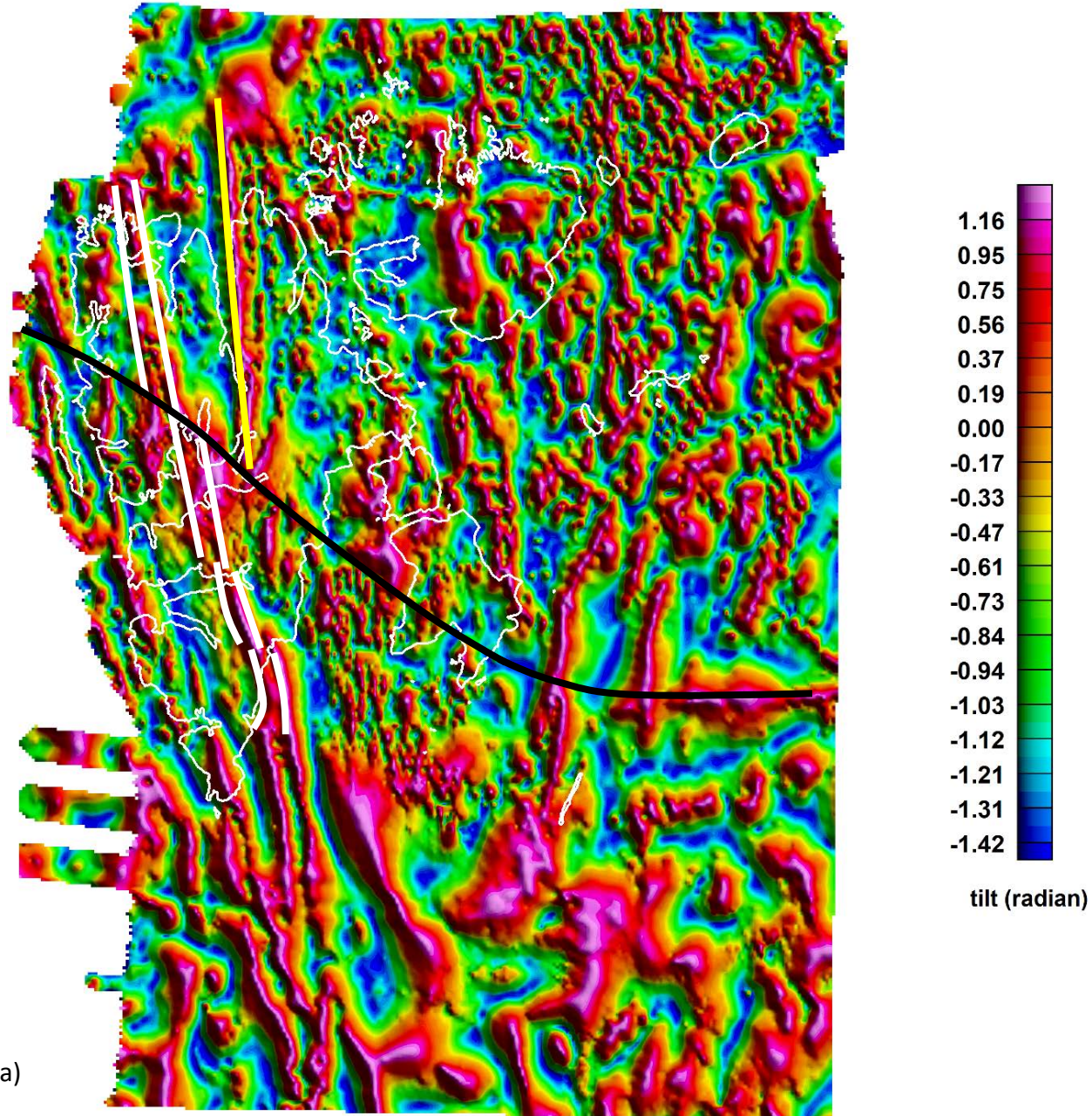




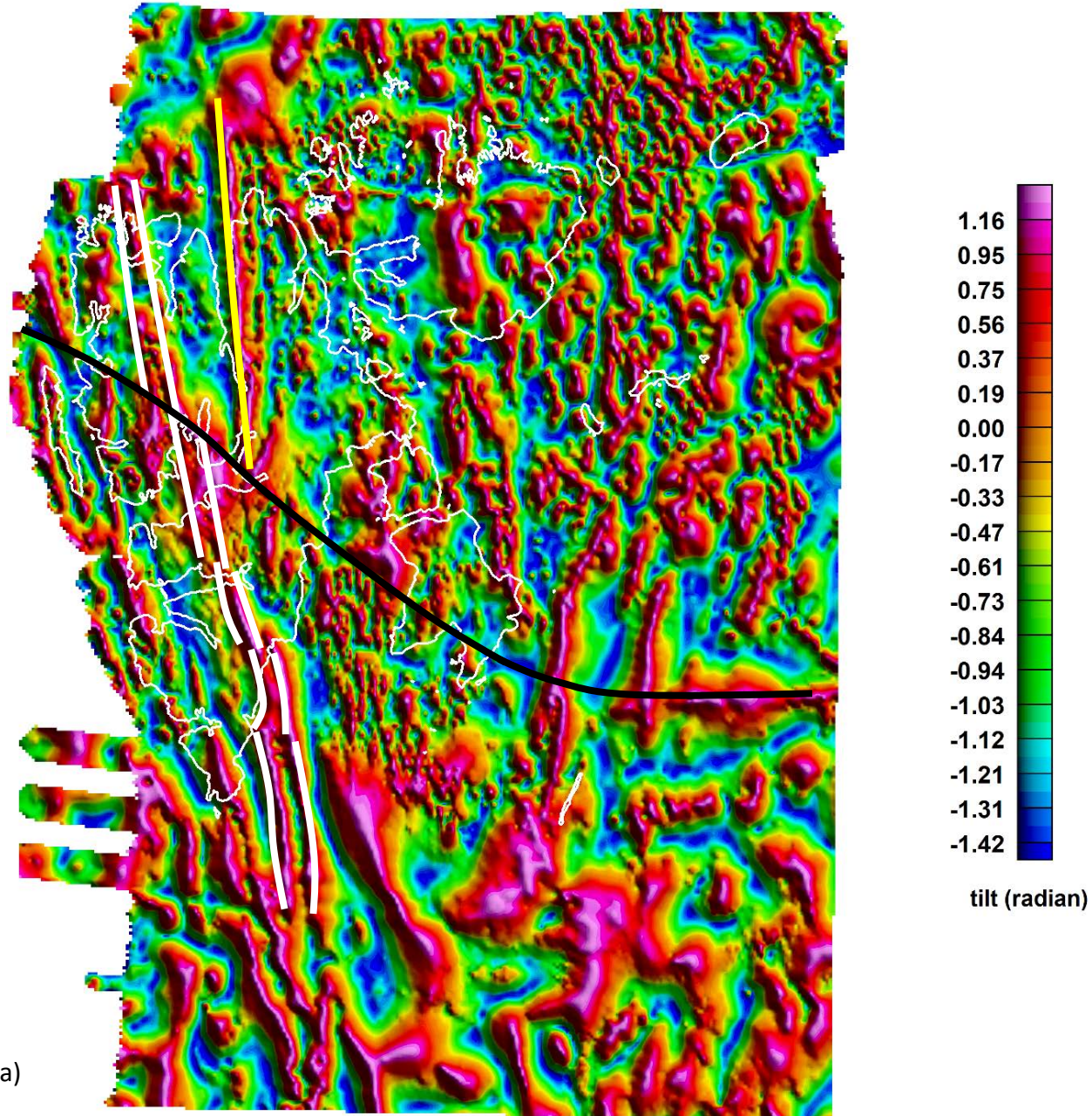
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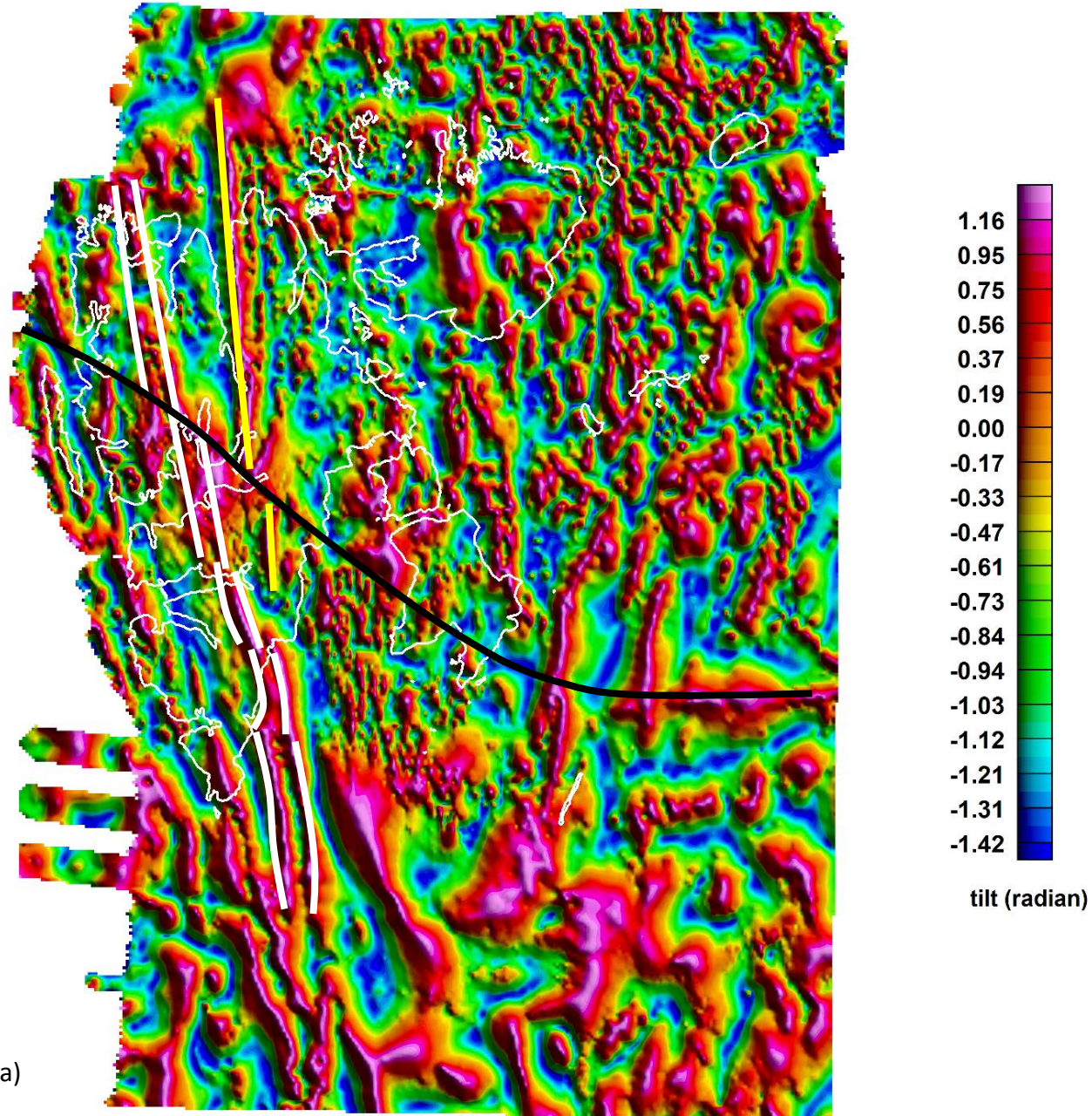
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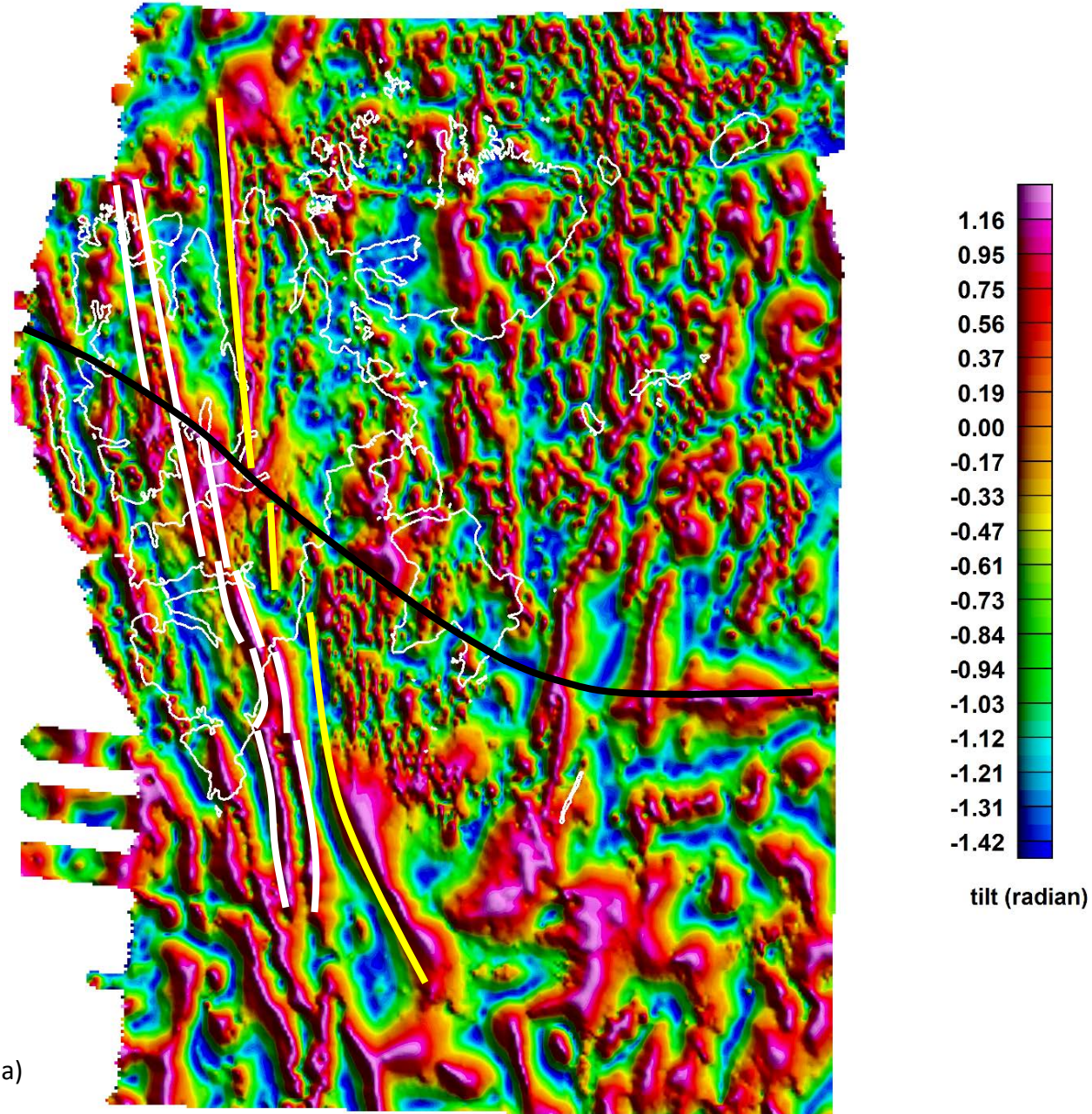
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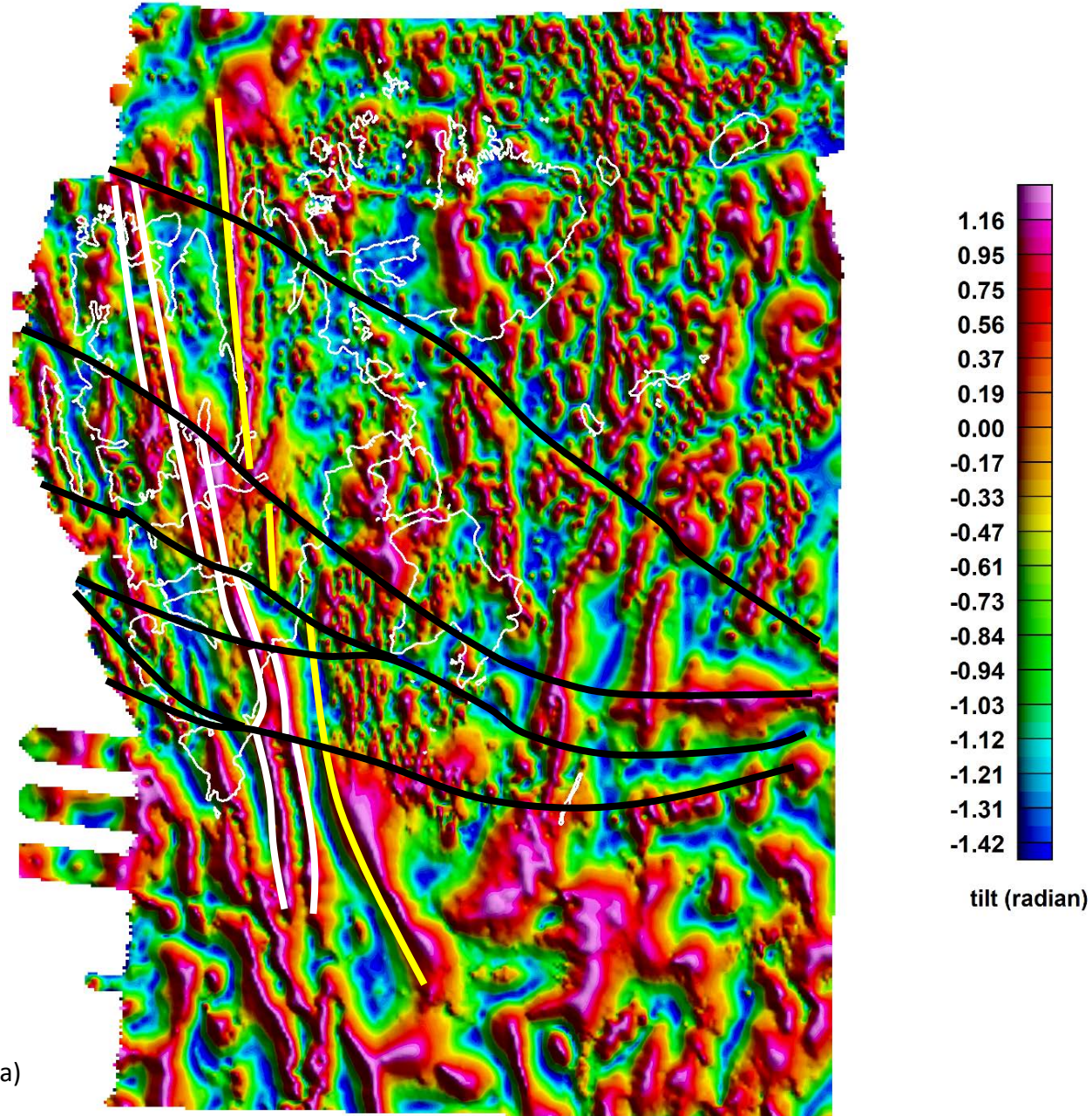
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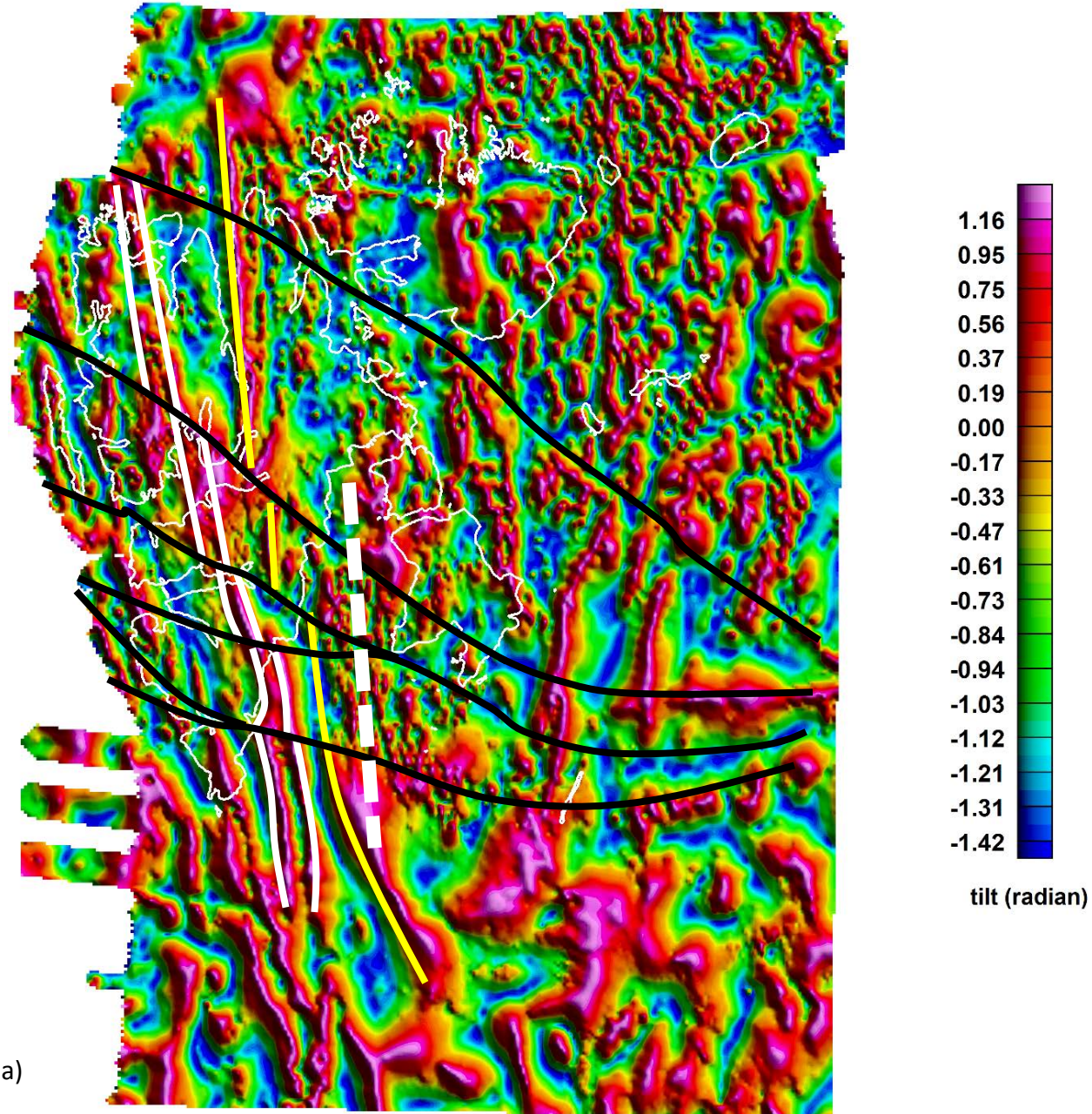
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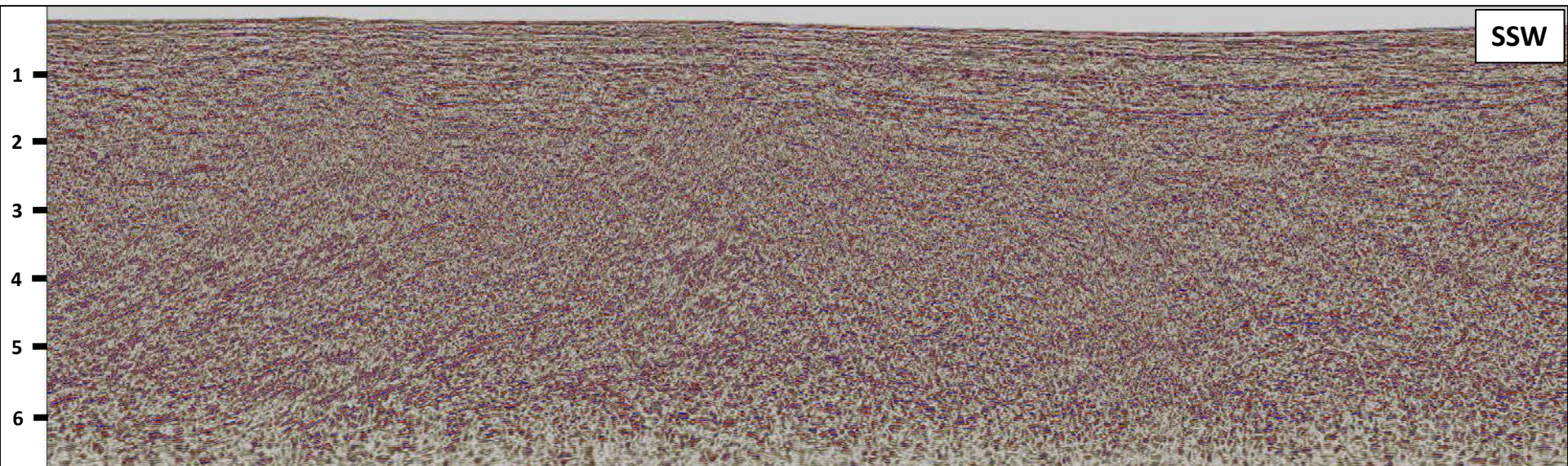
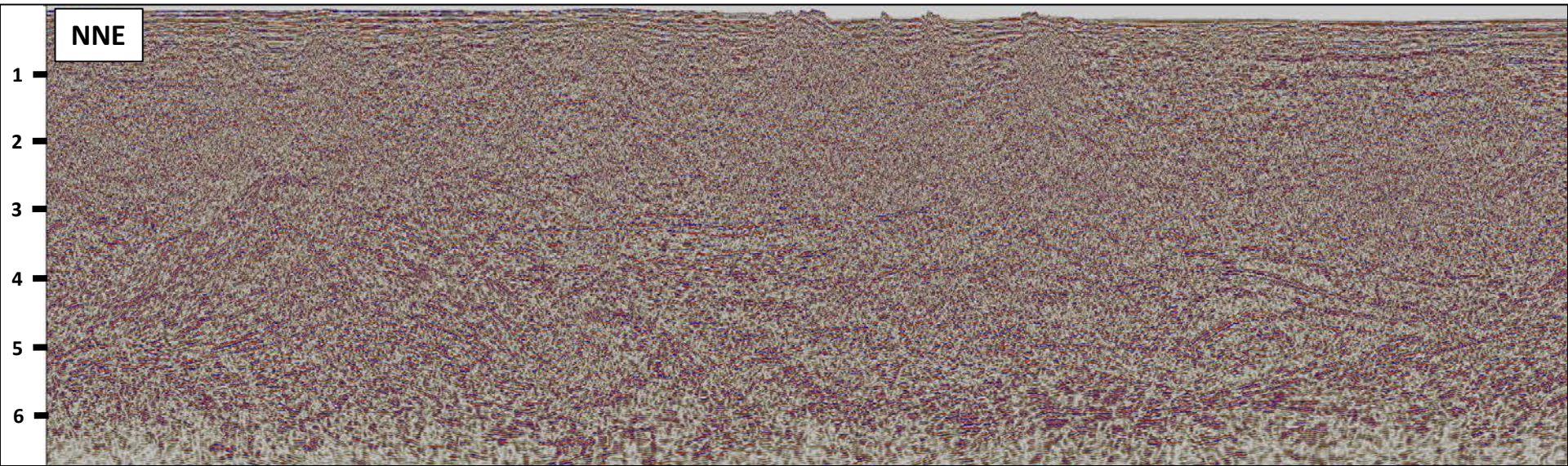
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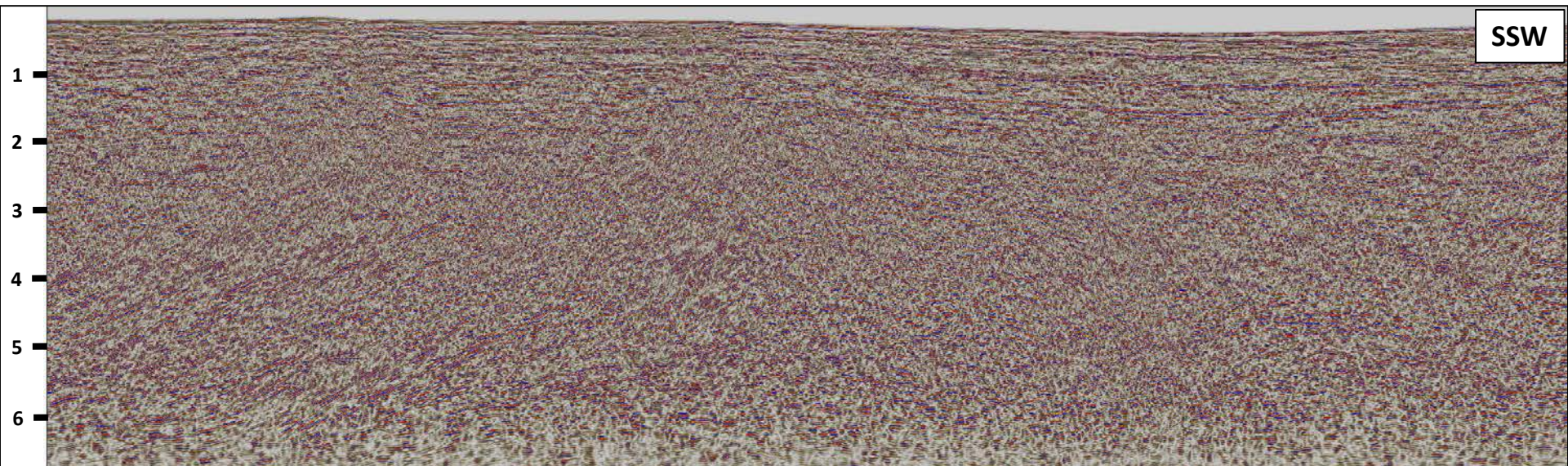
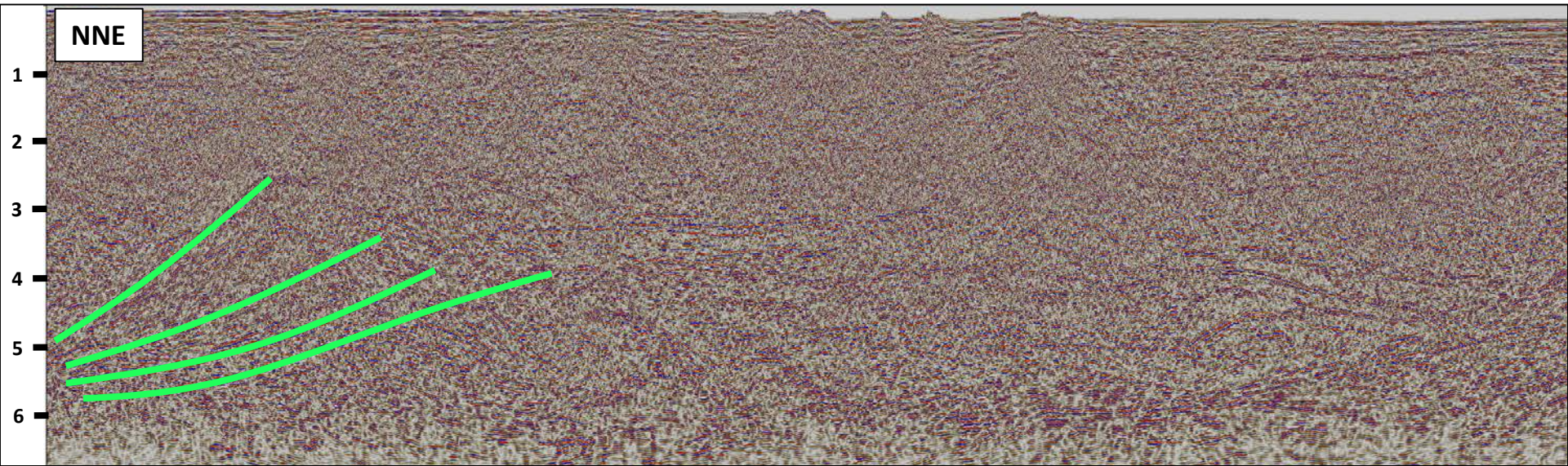


**2** Seismic data in Storfjorden show a series of possibly Timanian thrust sequences verging to the SSW.

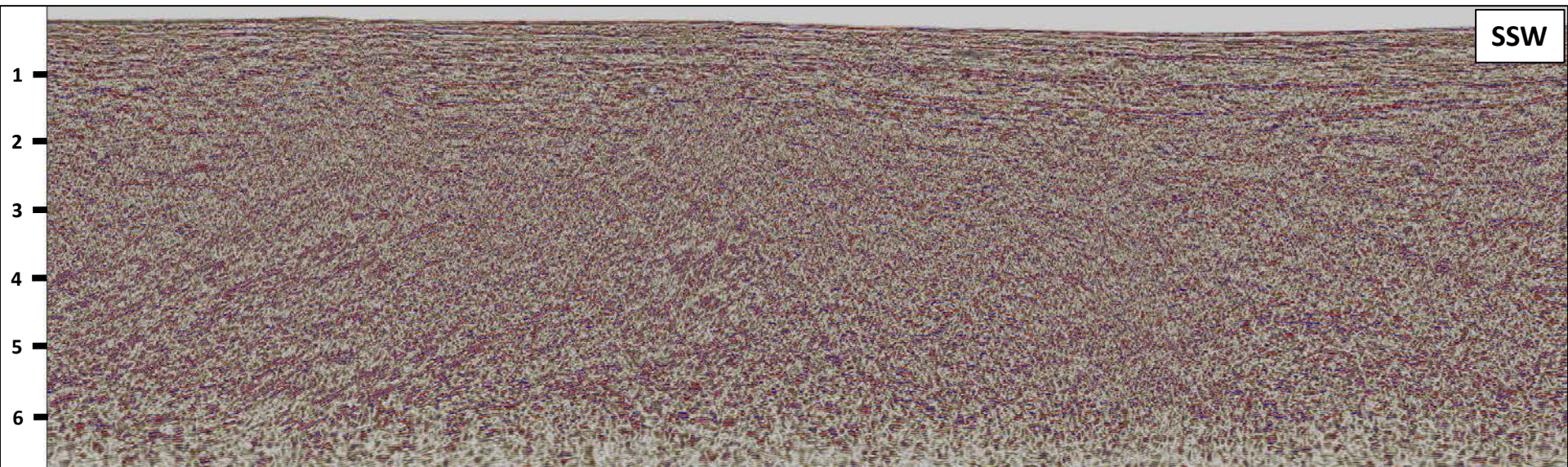
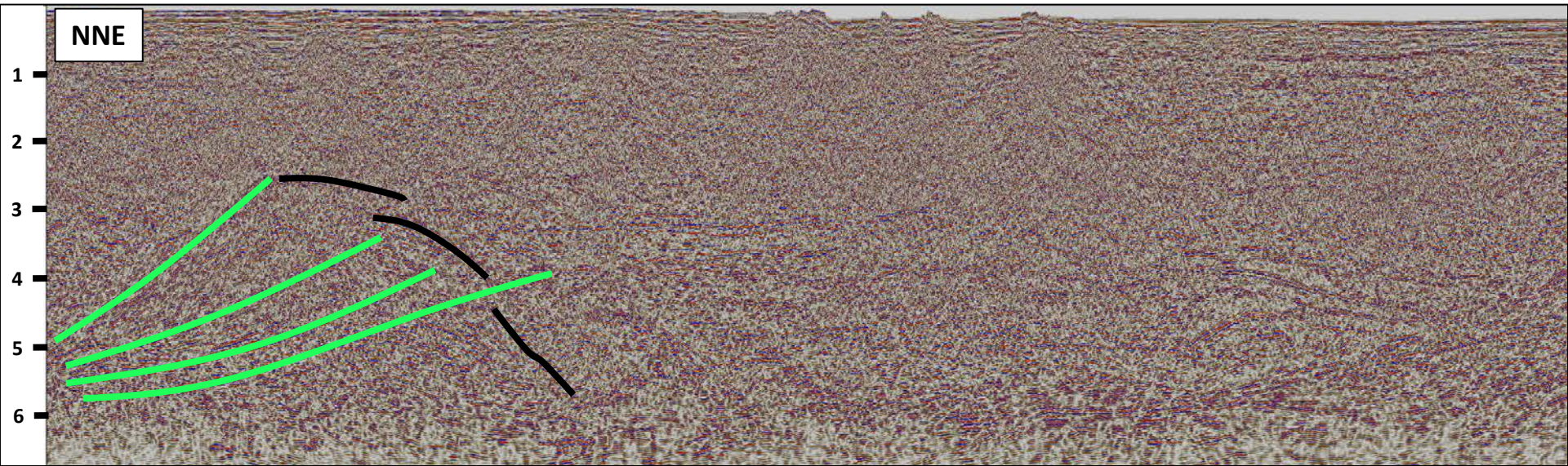




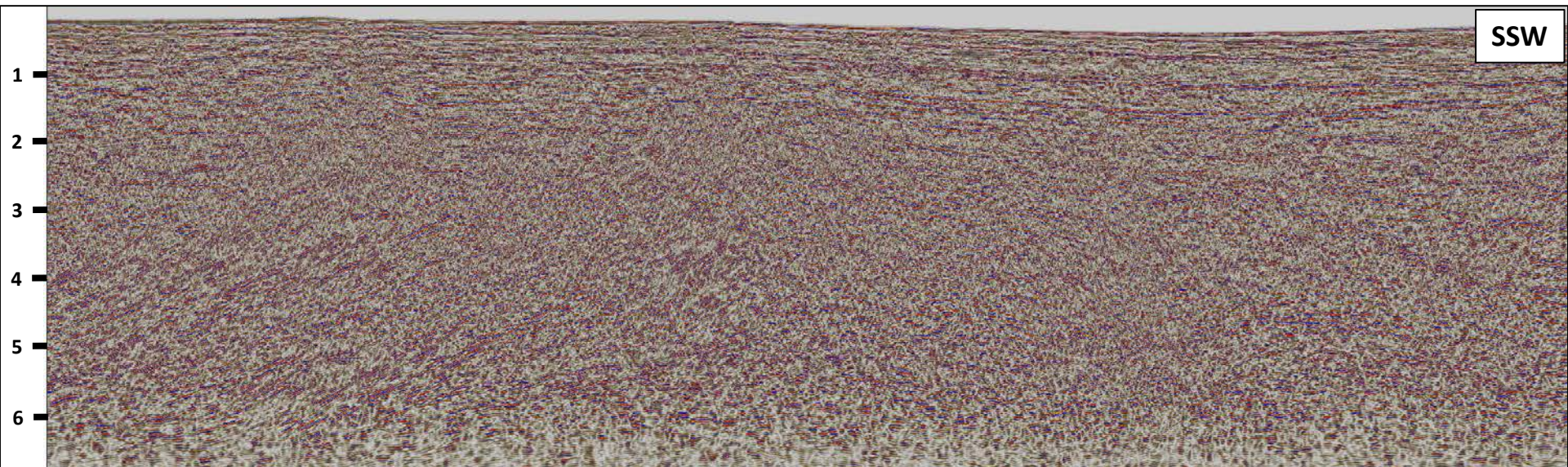
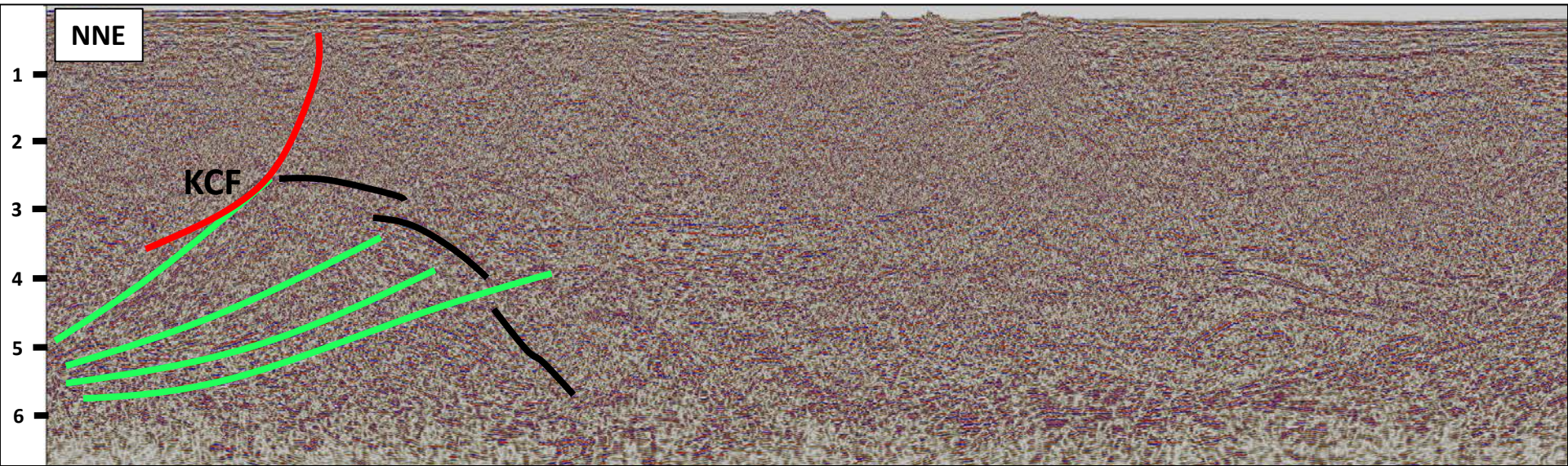
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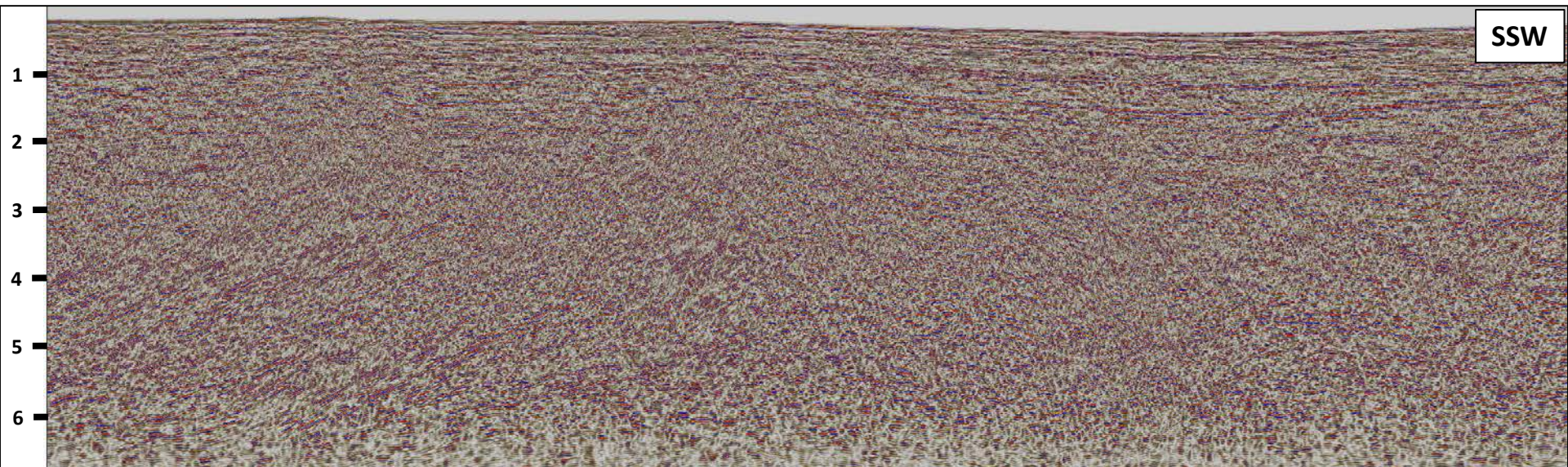
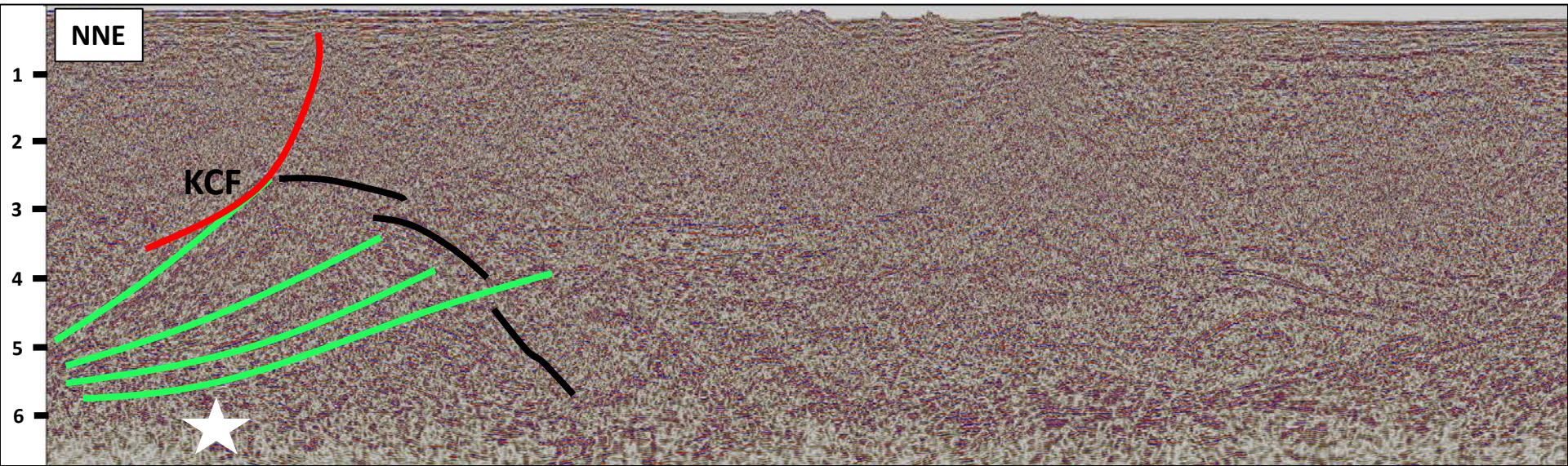
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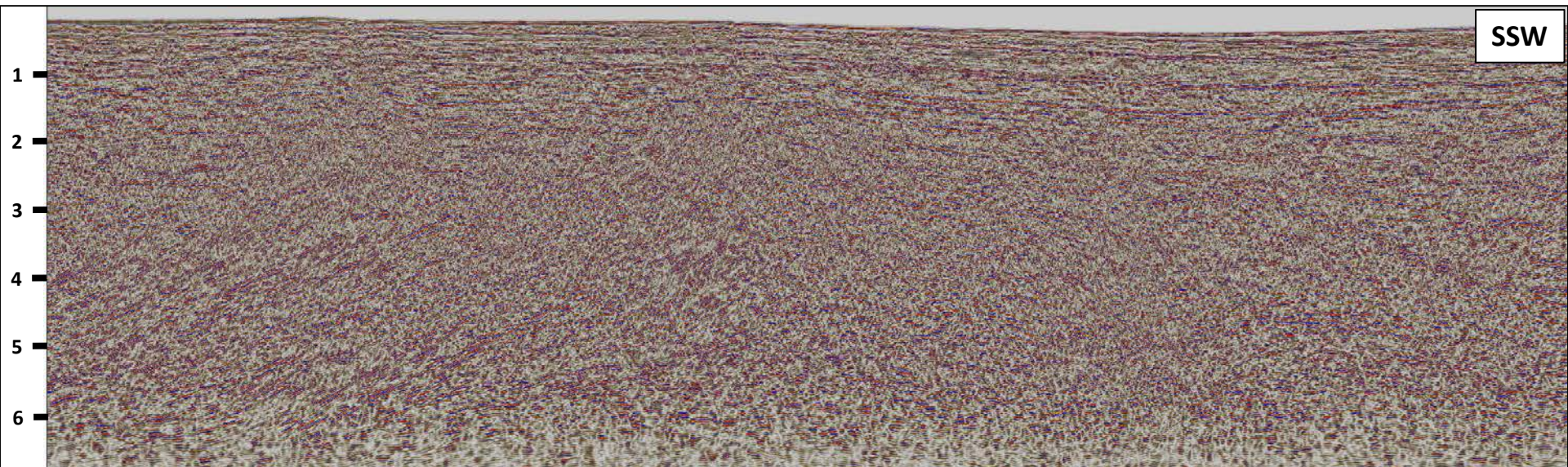
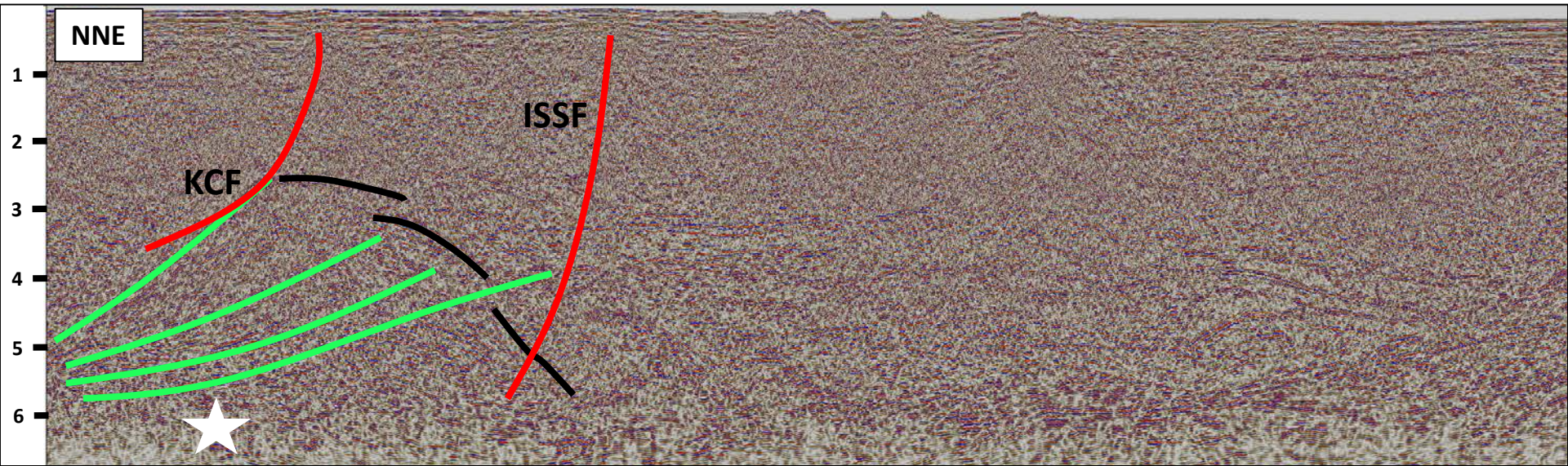
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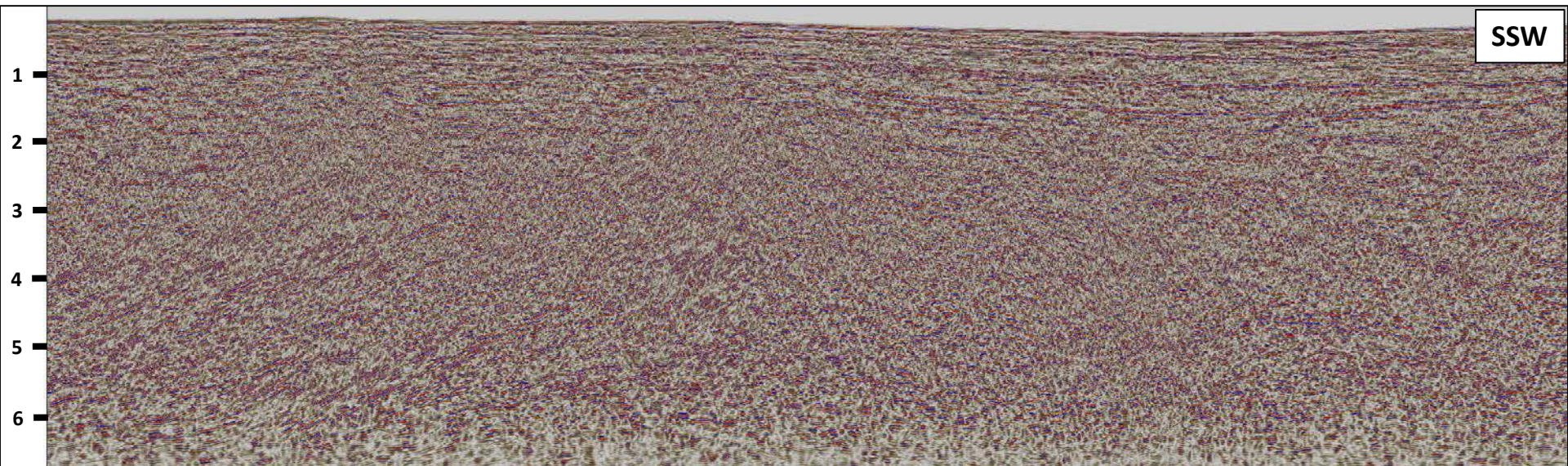
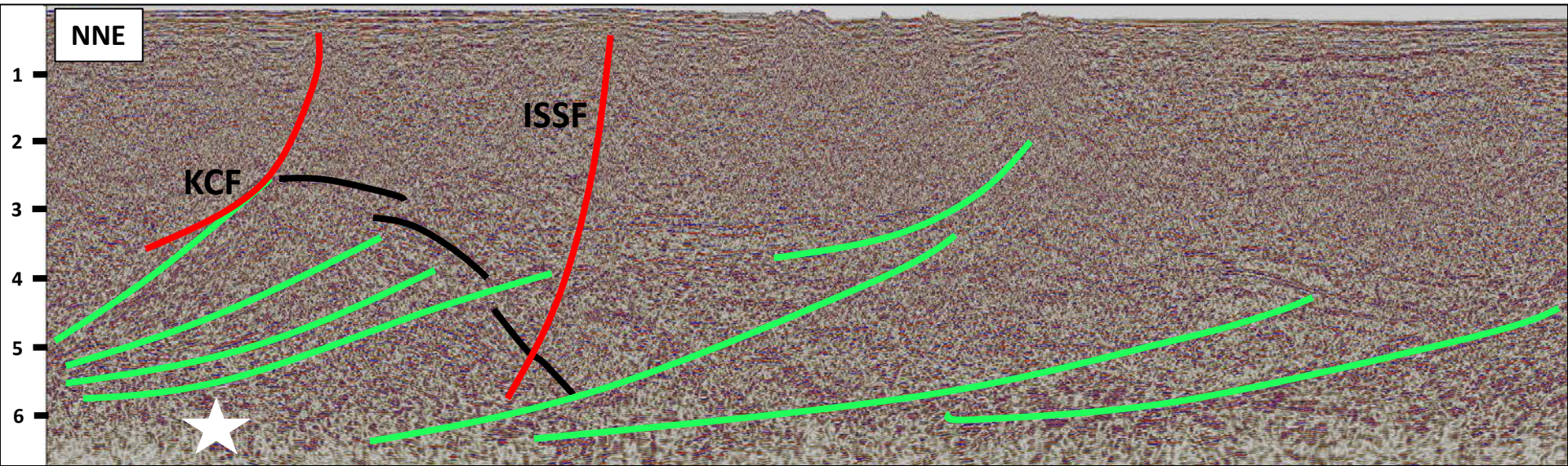
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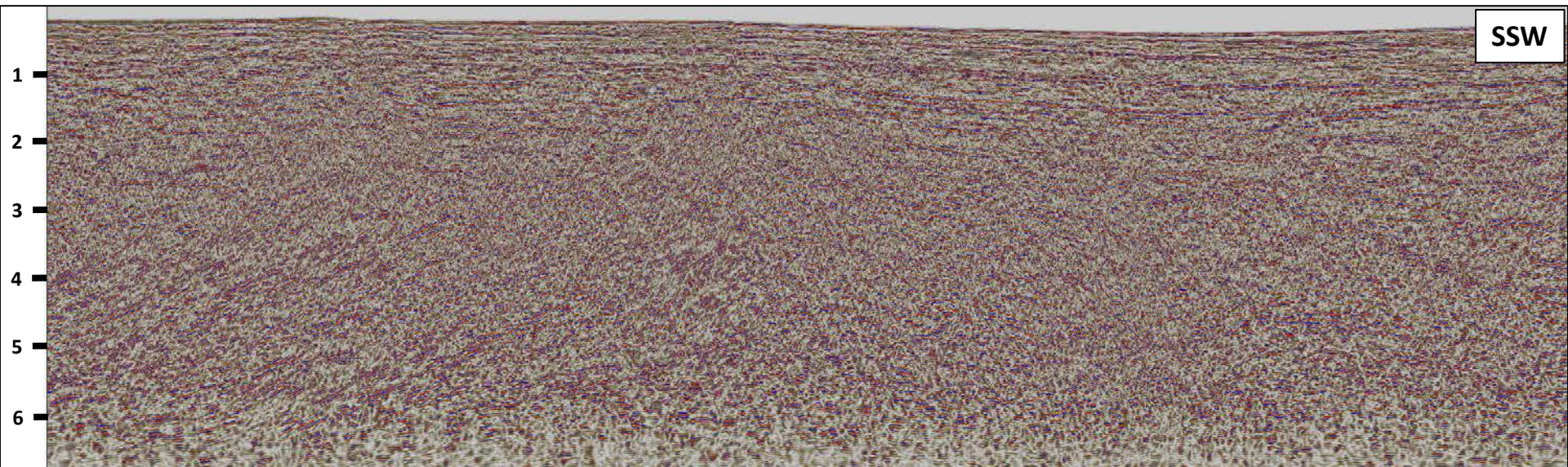
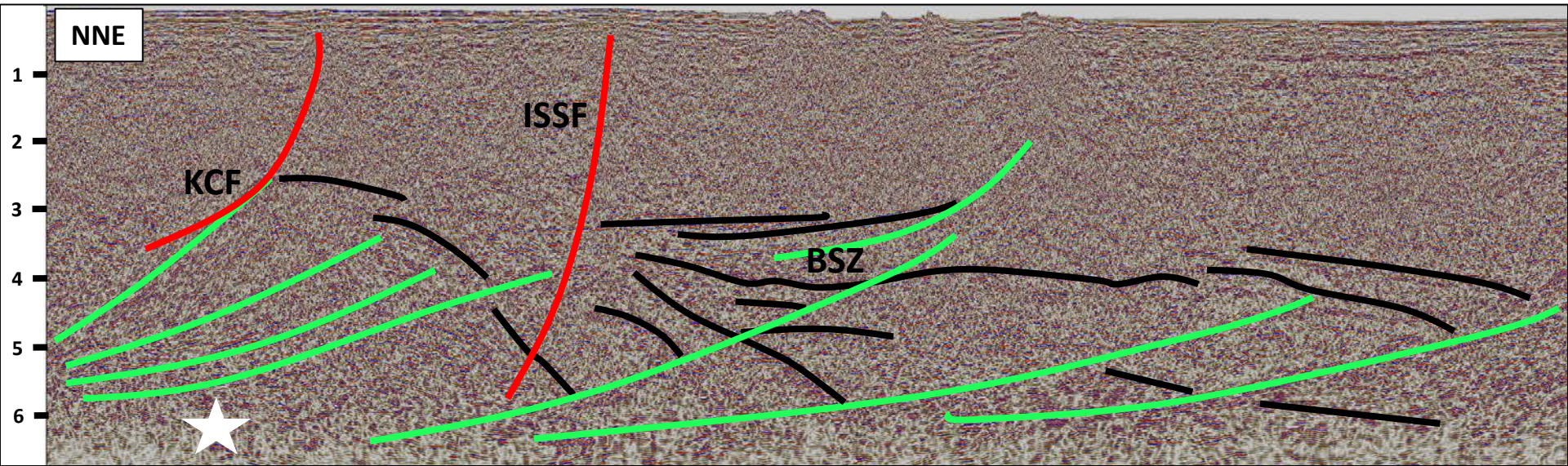
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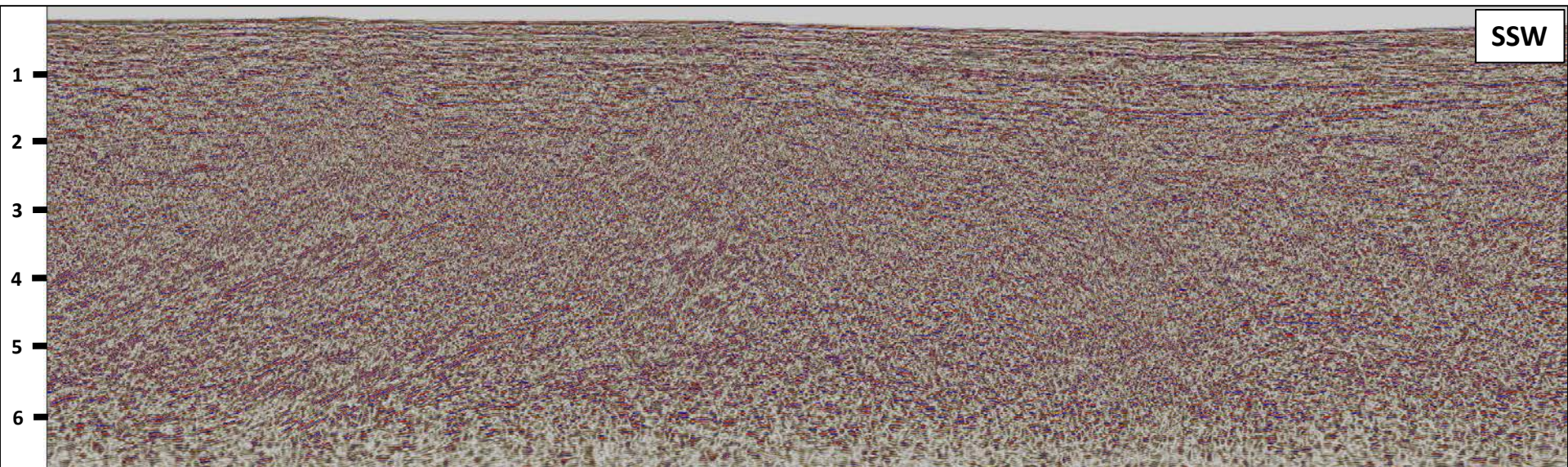
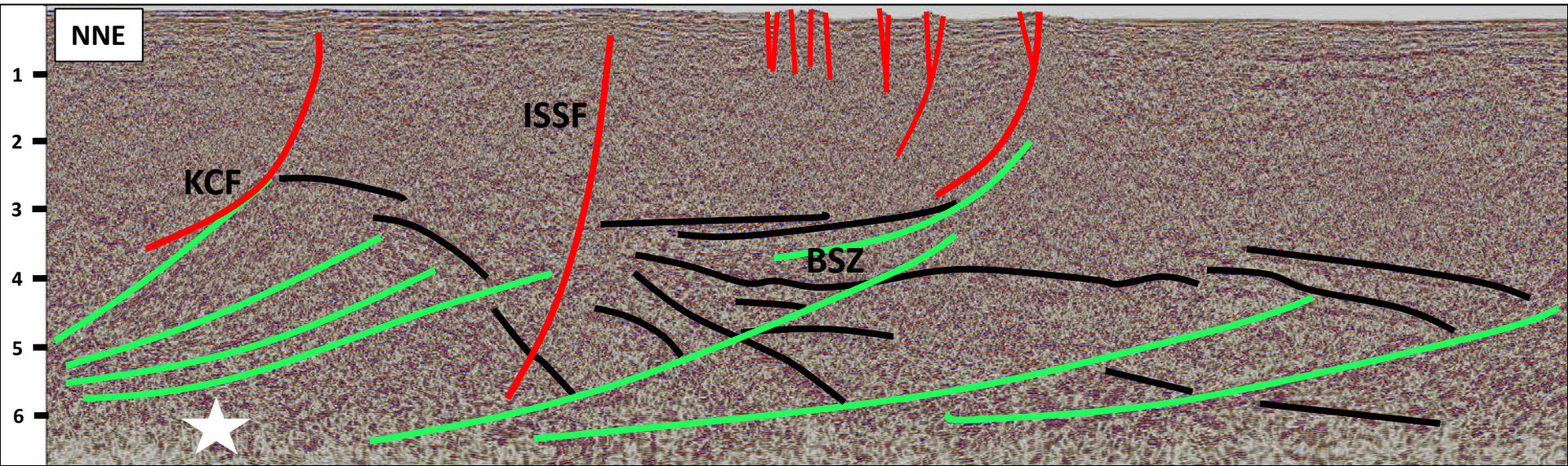
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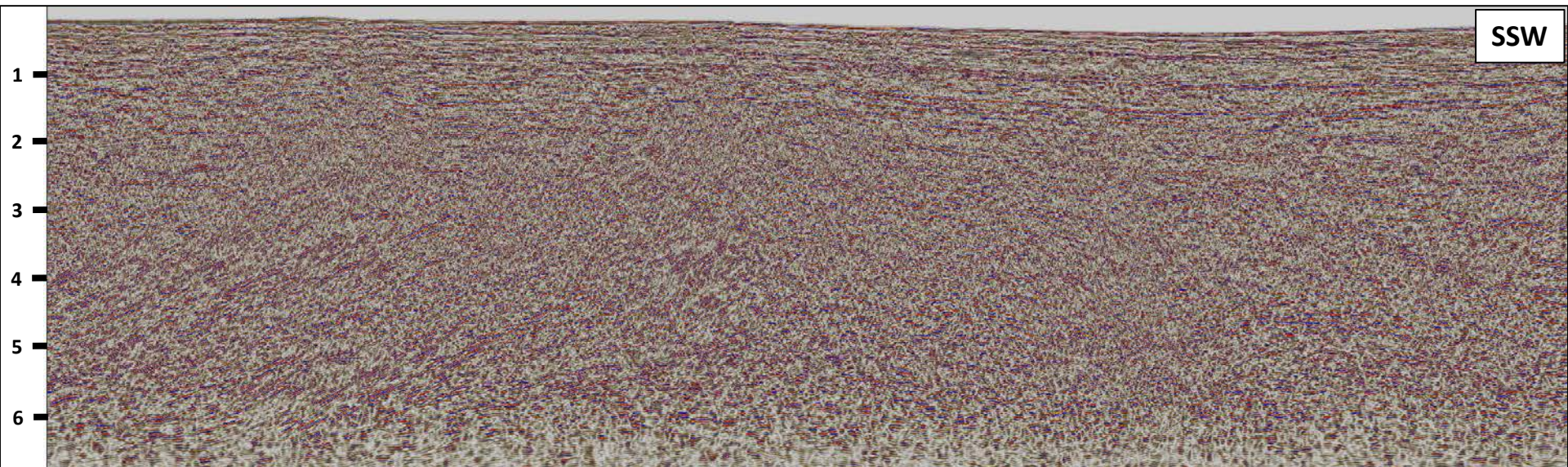
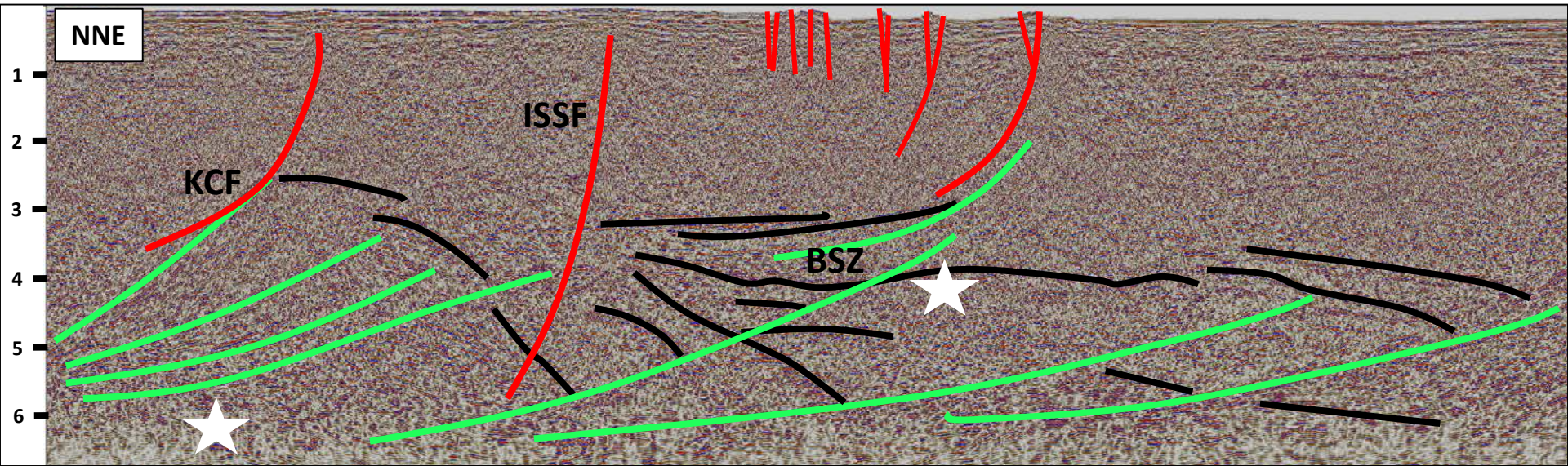


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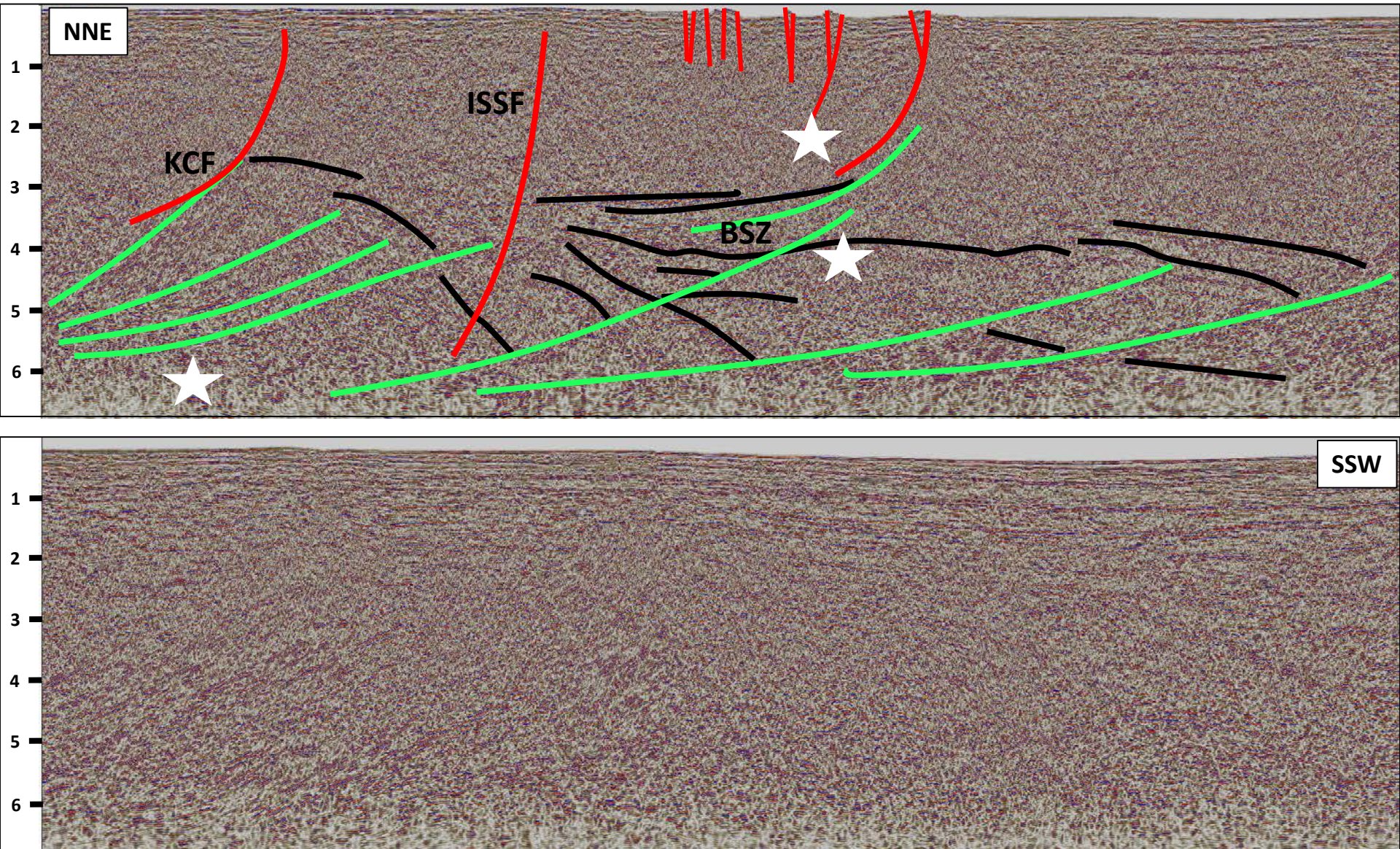




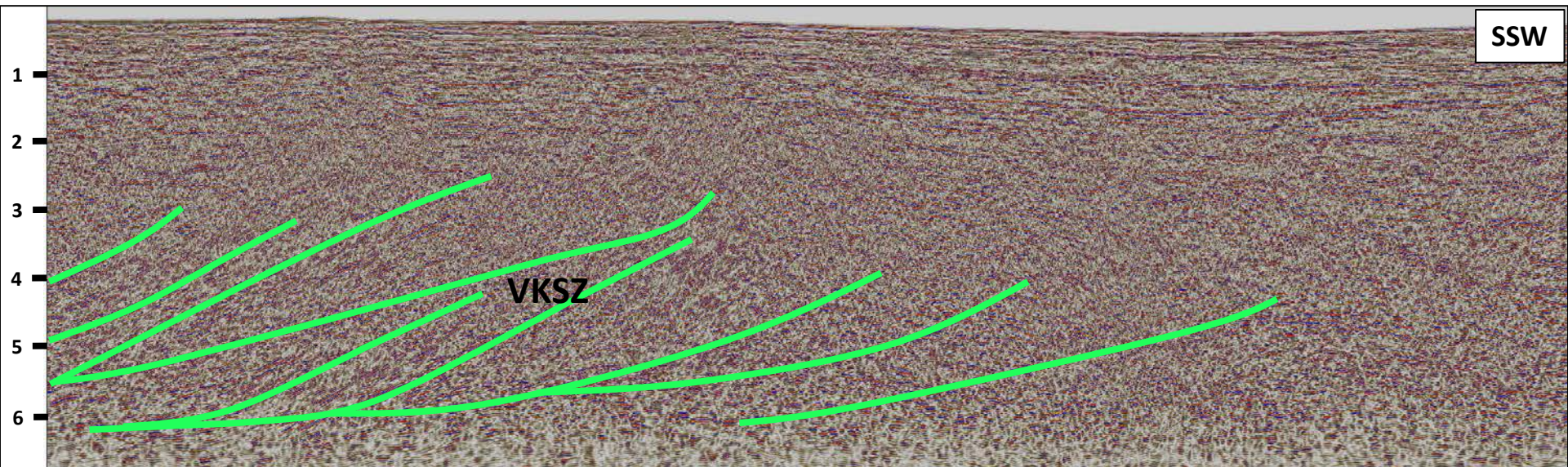
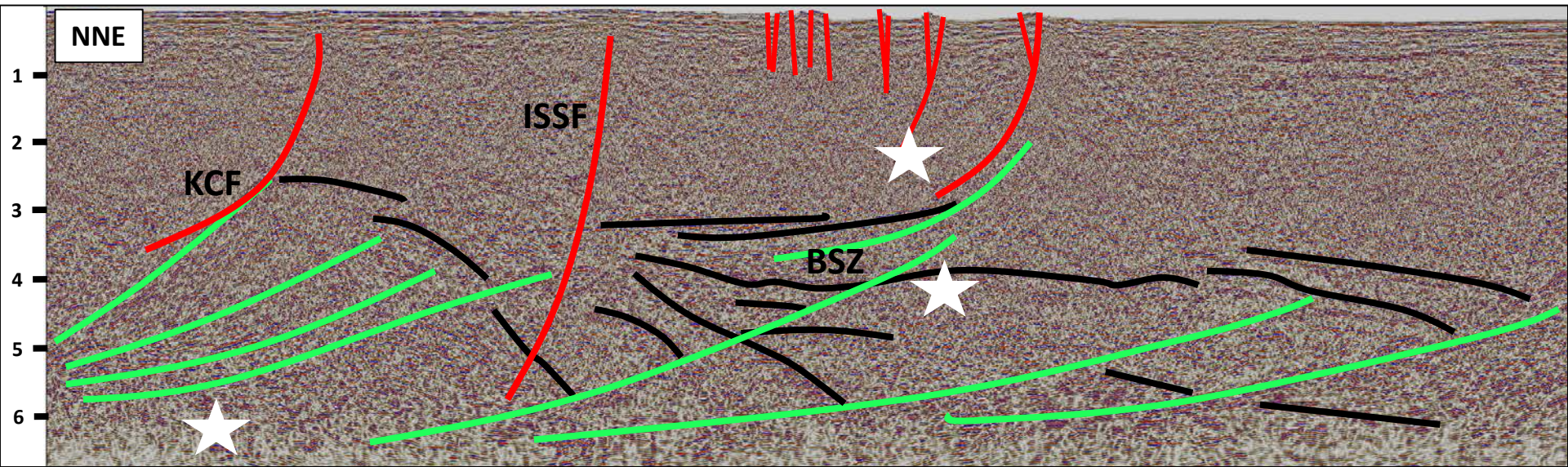
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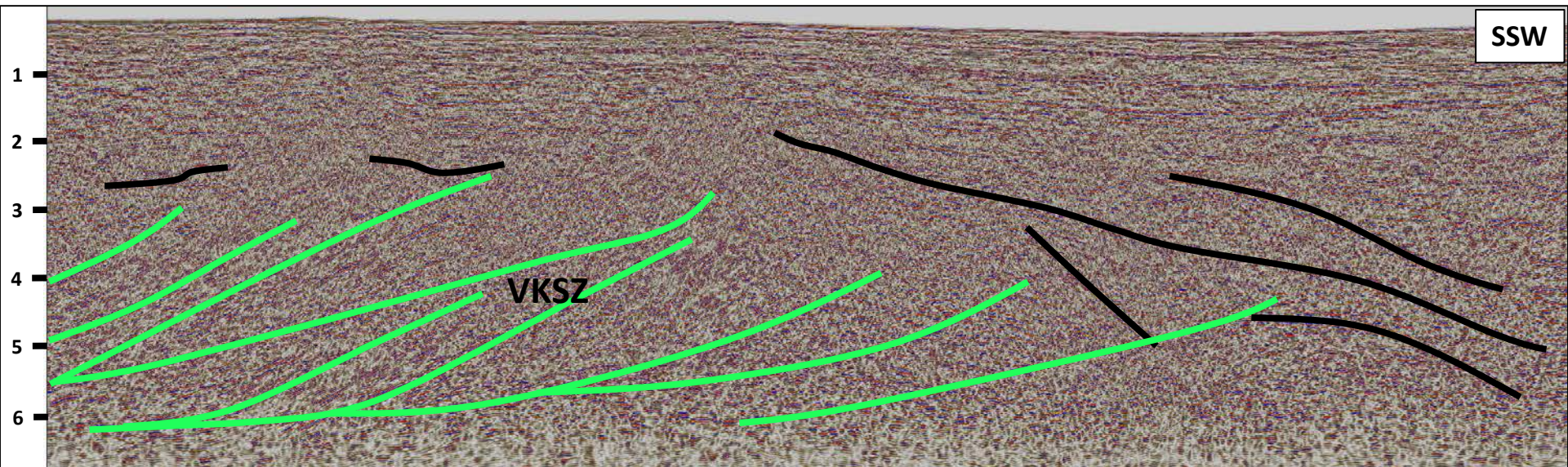
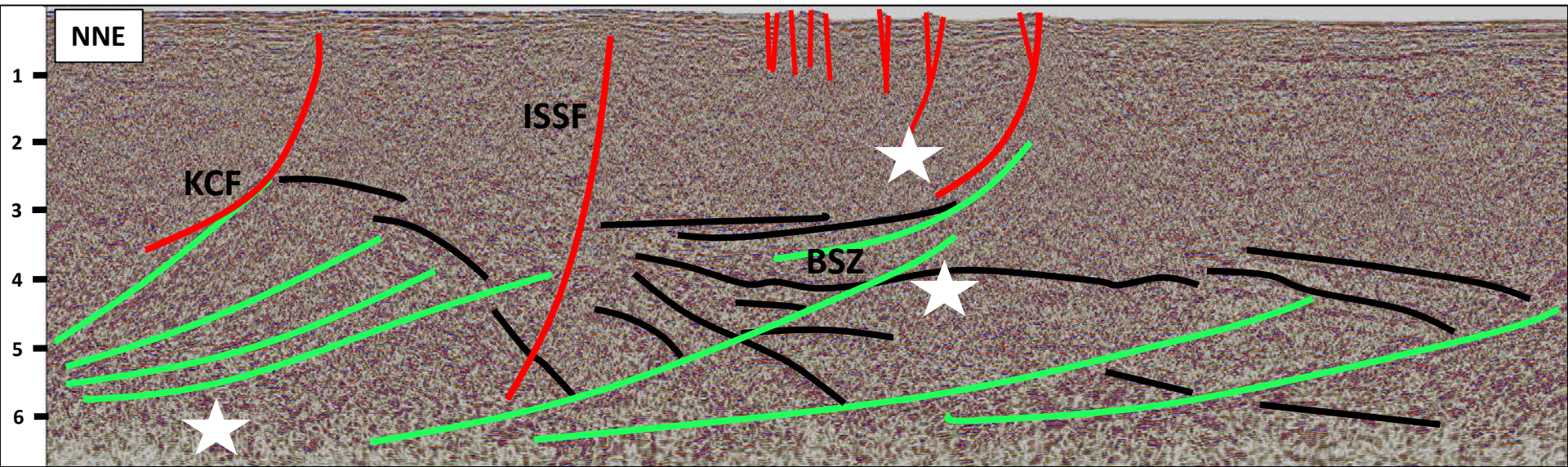
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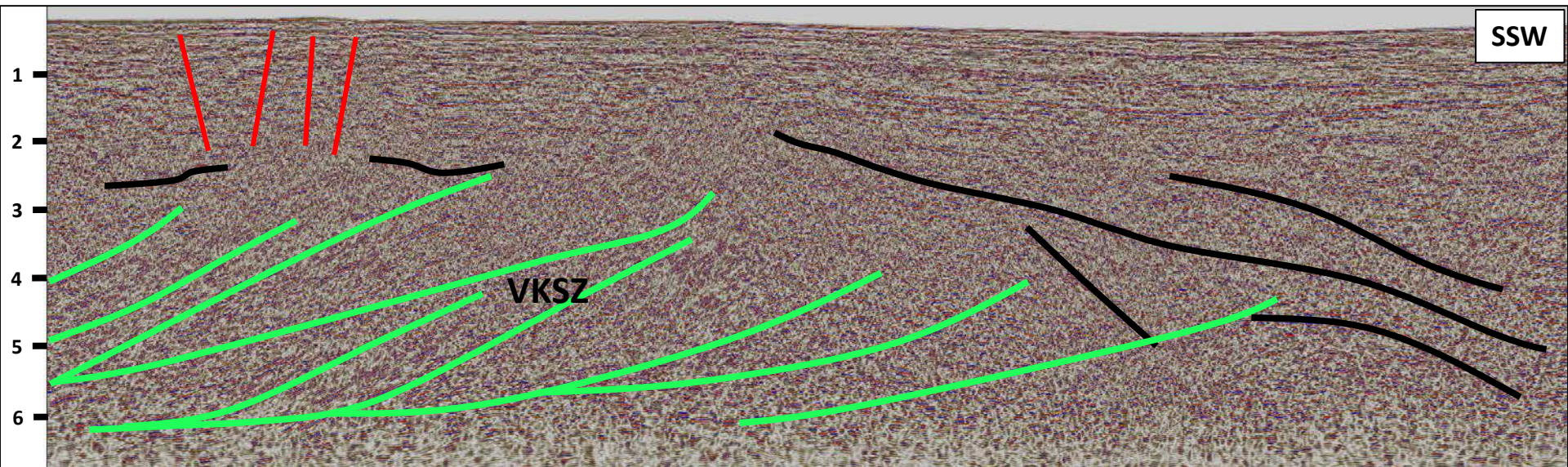
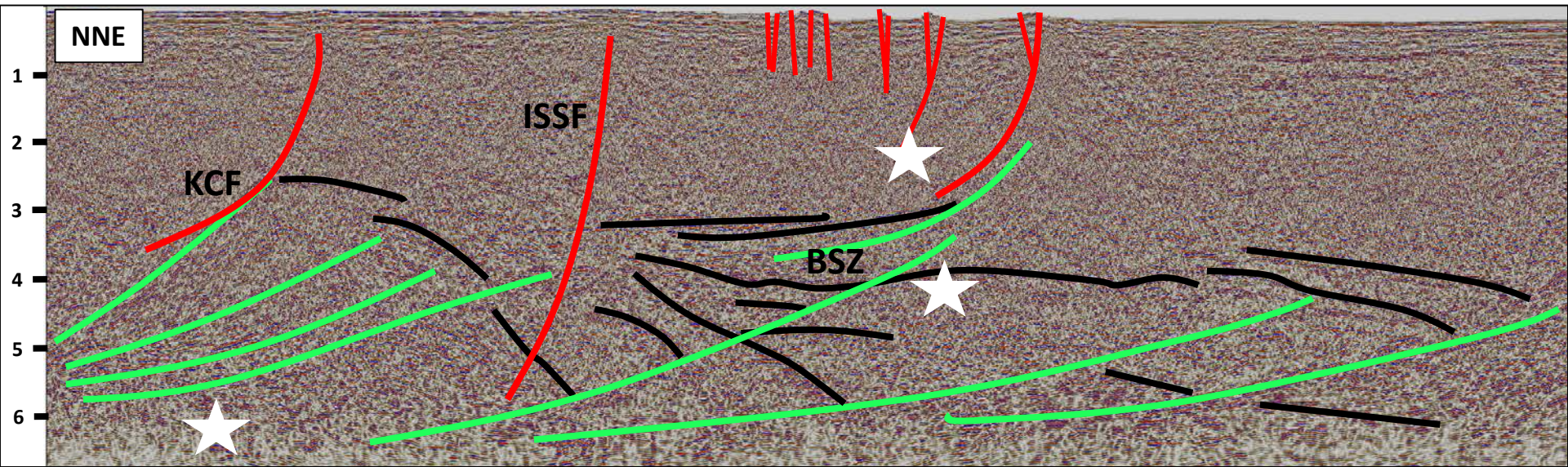
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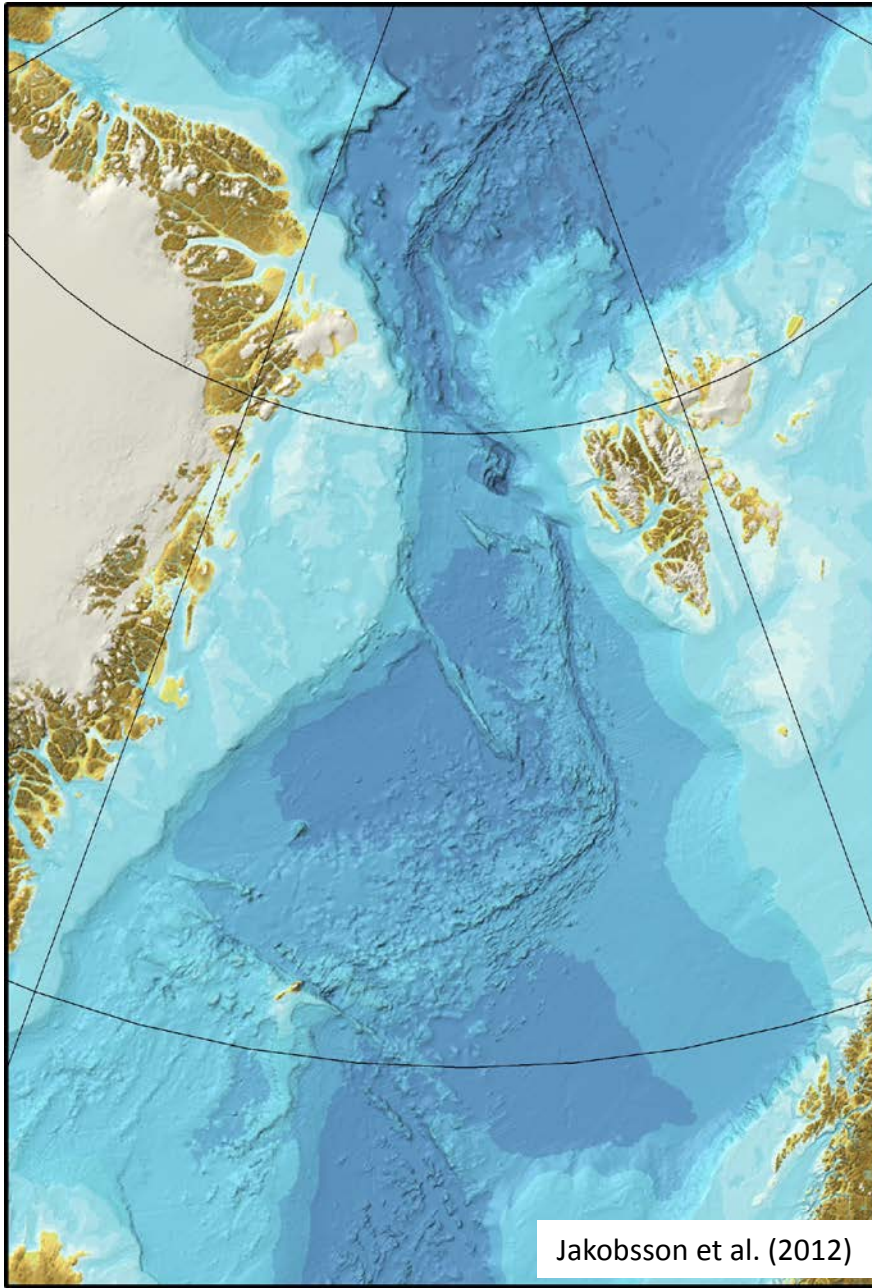
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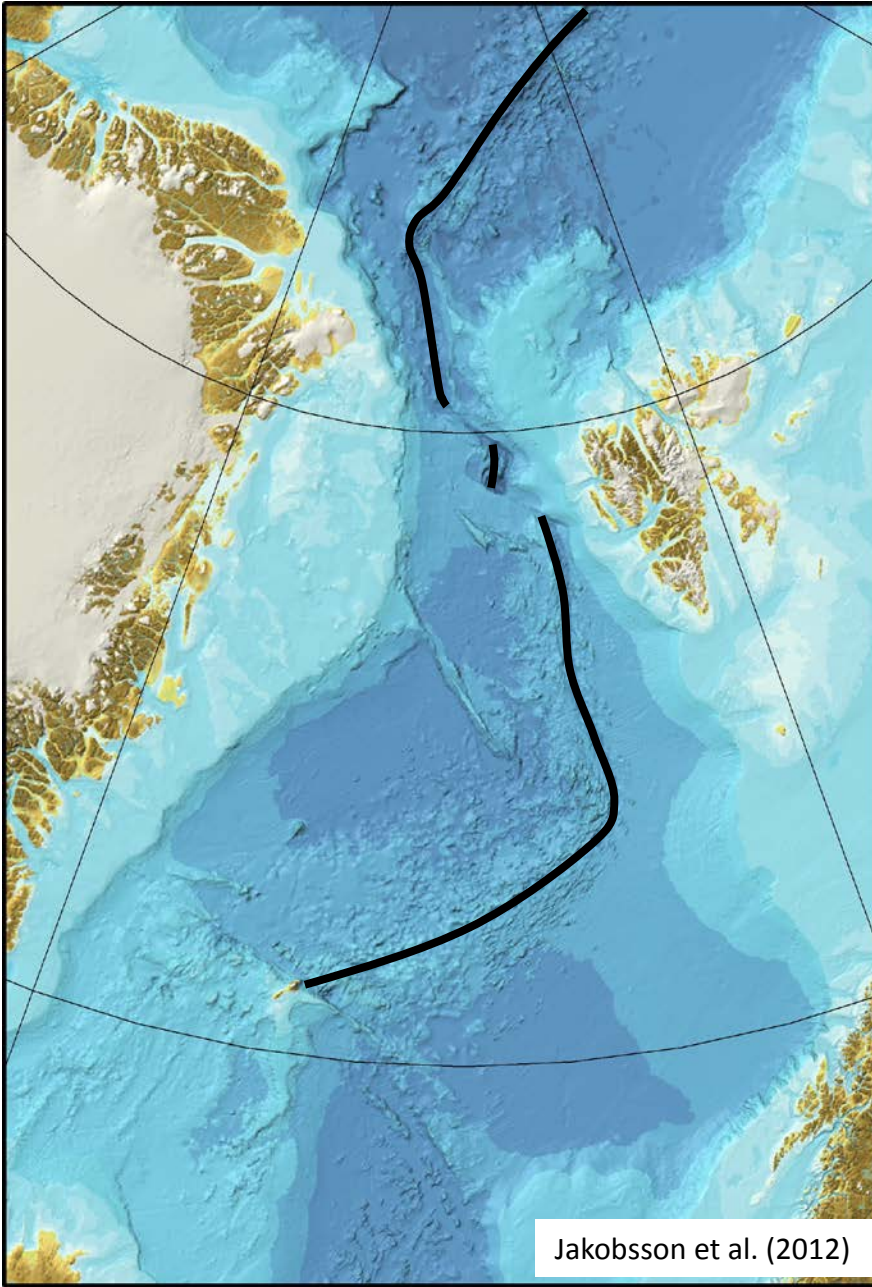
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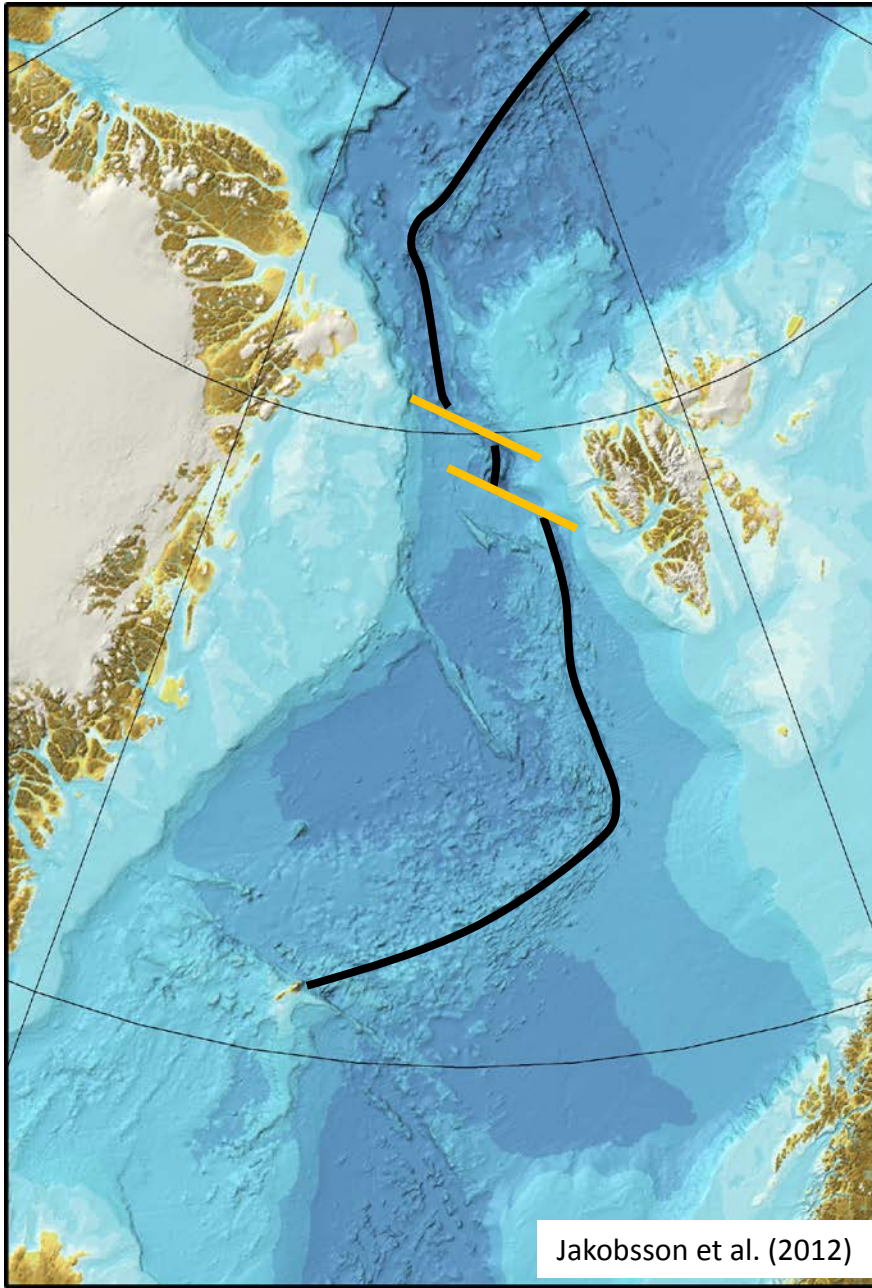
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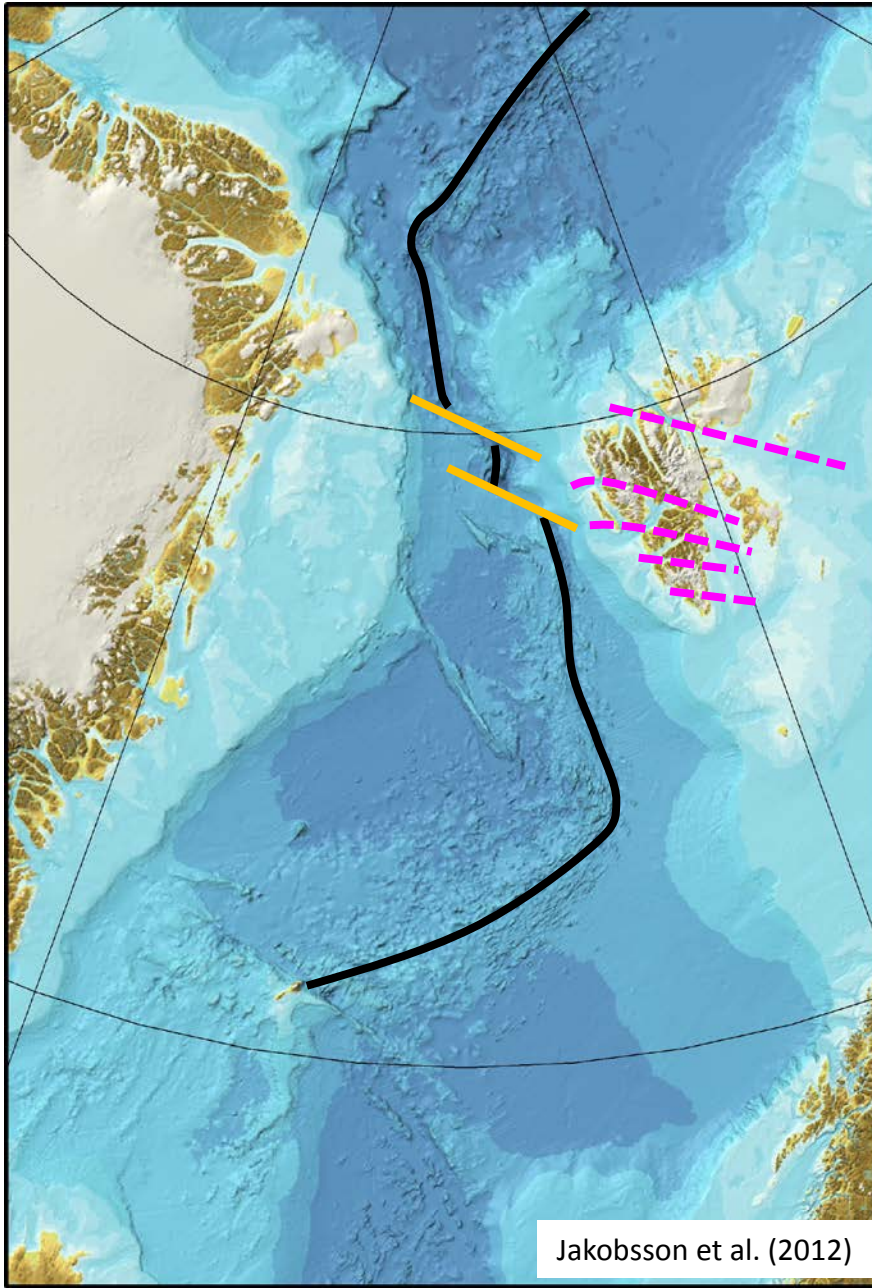


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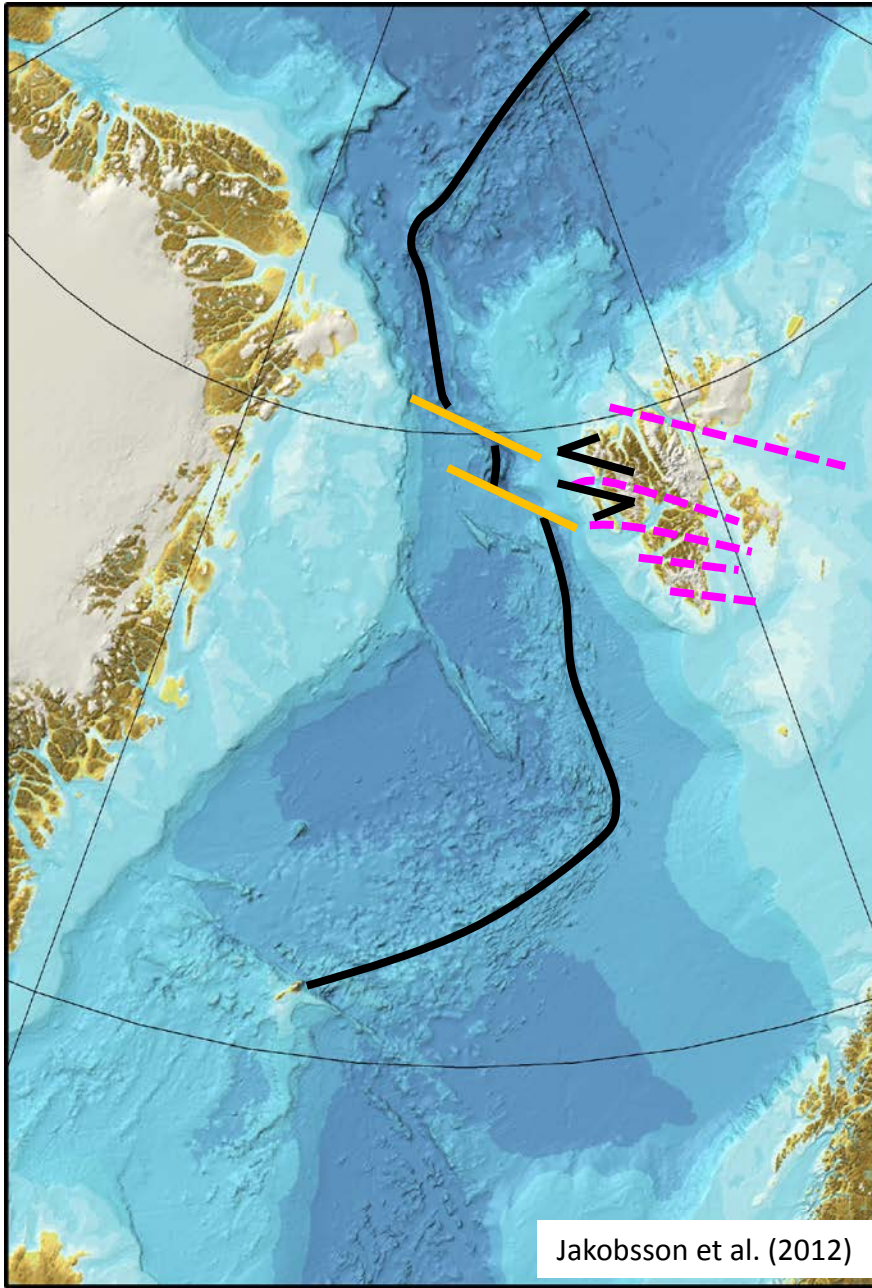




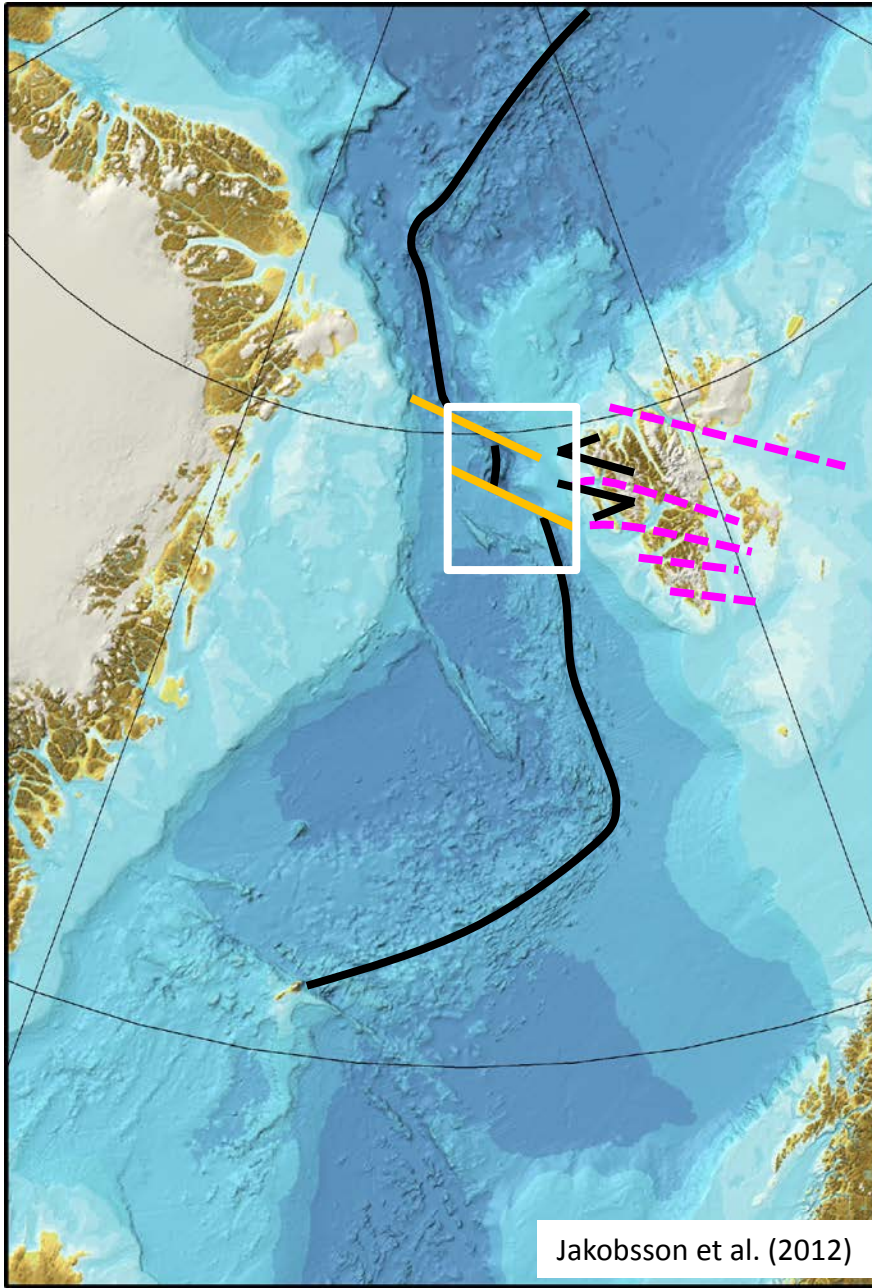
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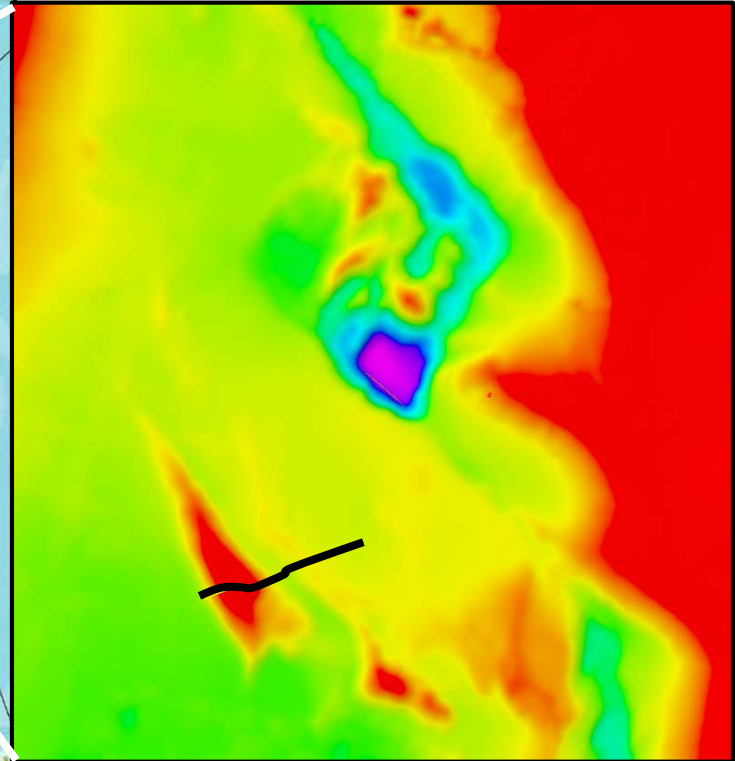
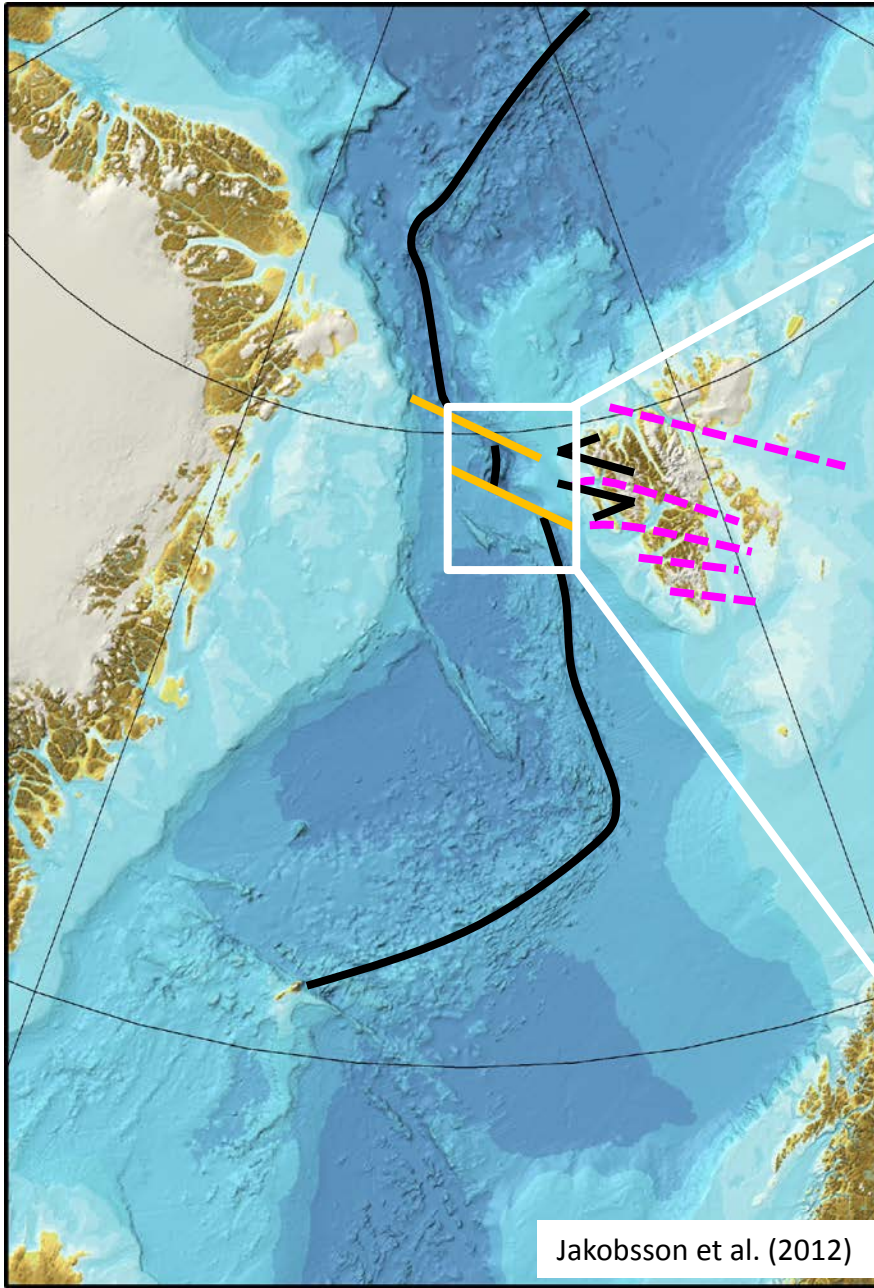
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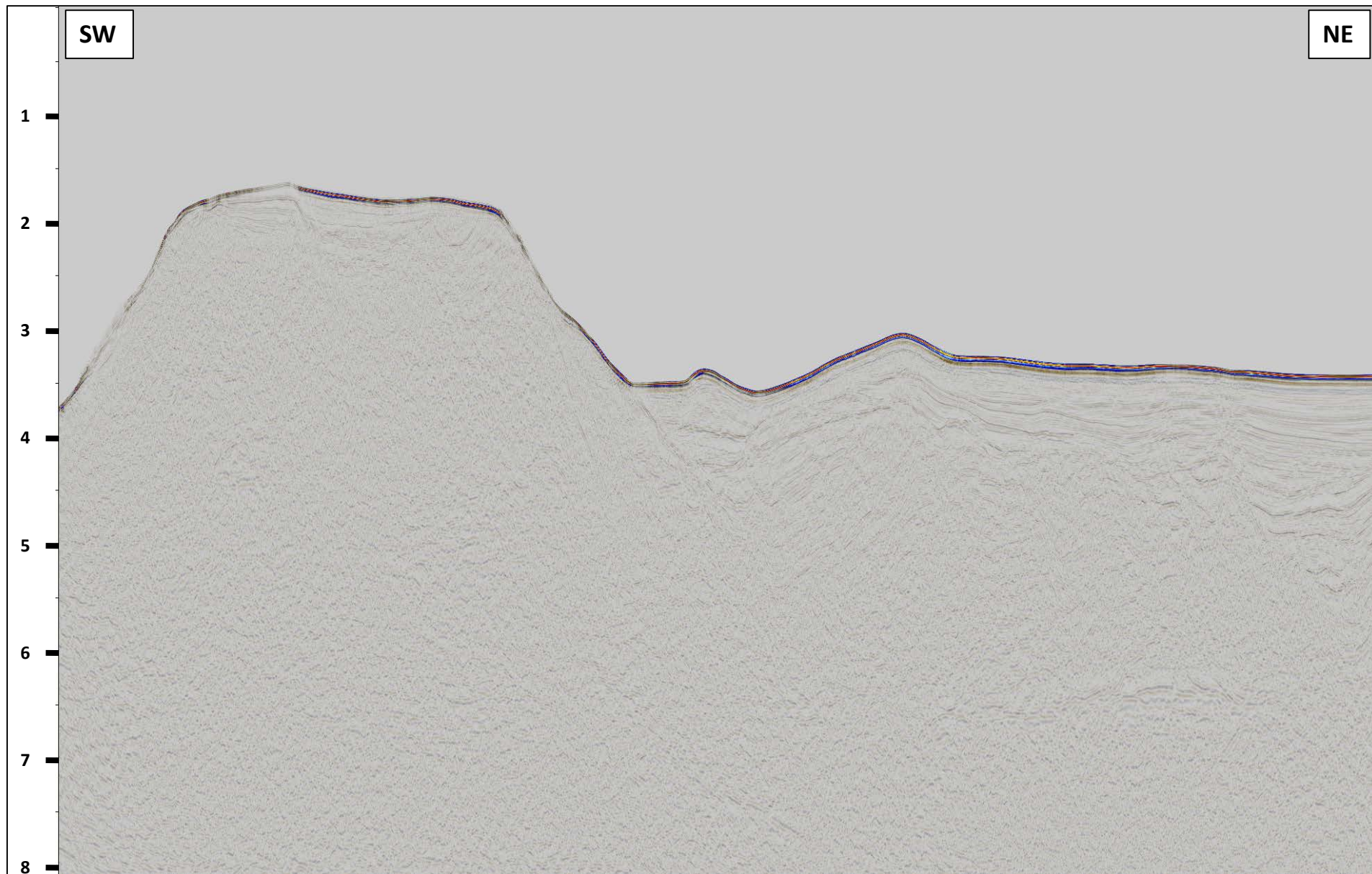
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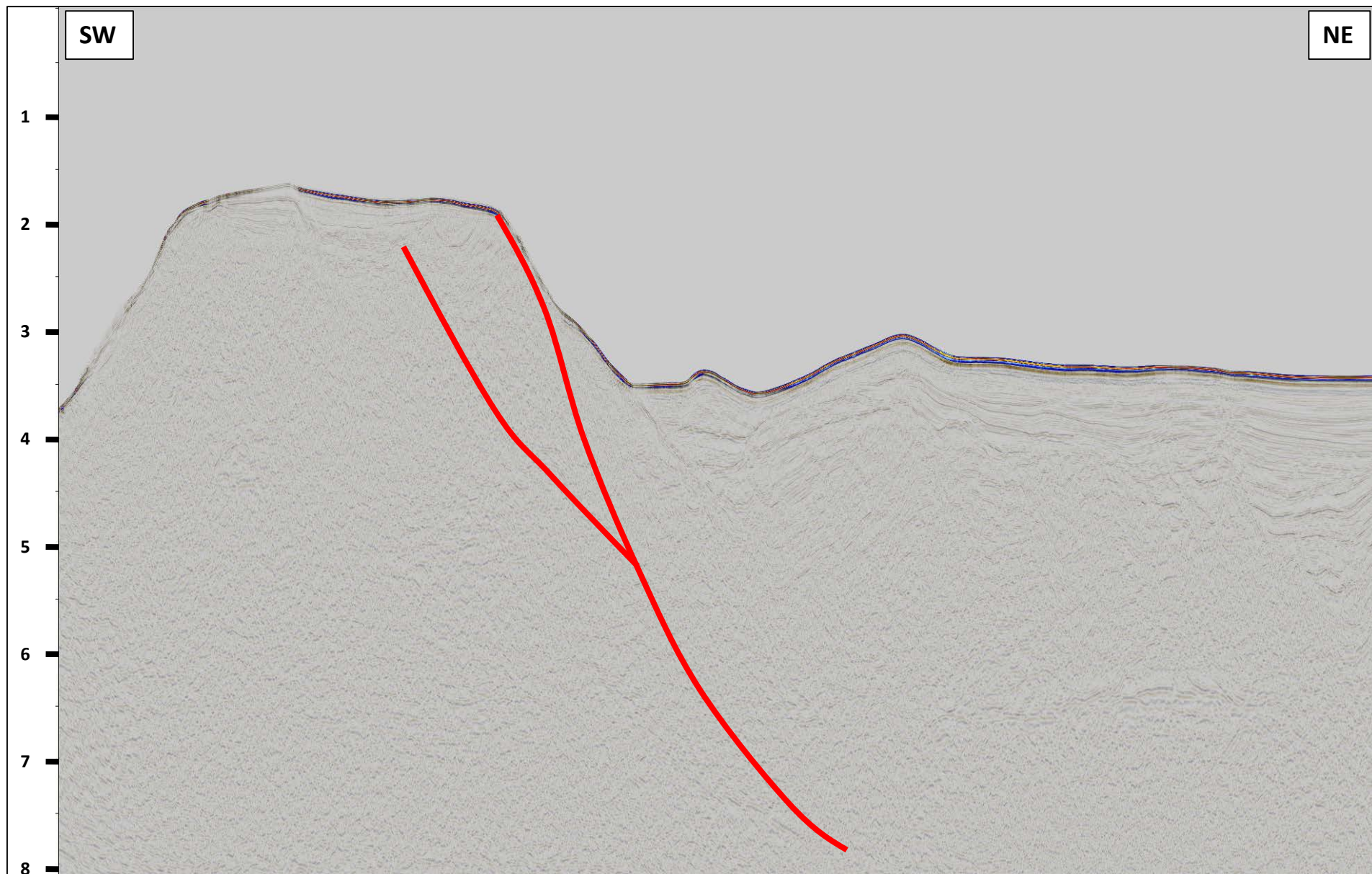
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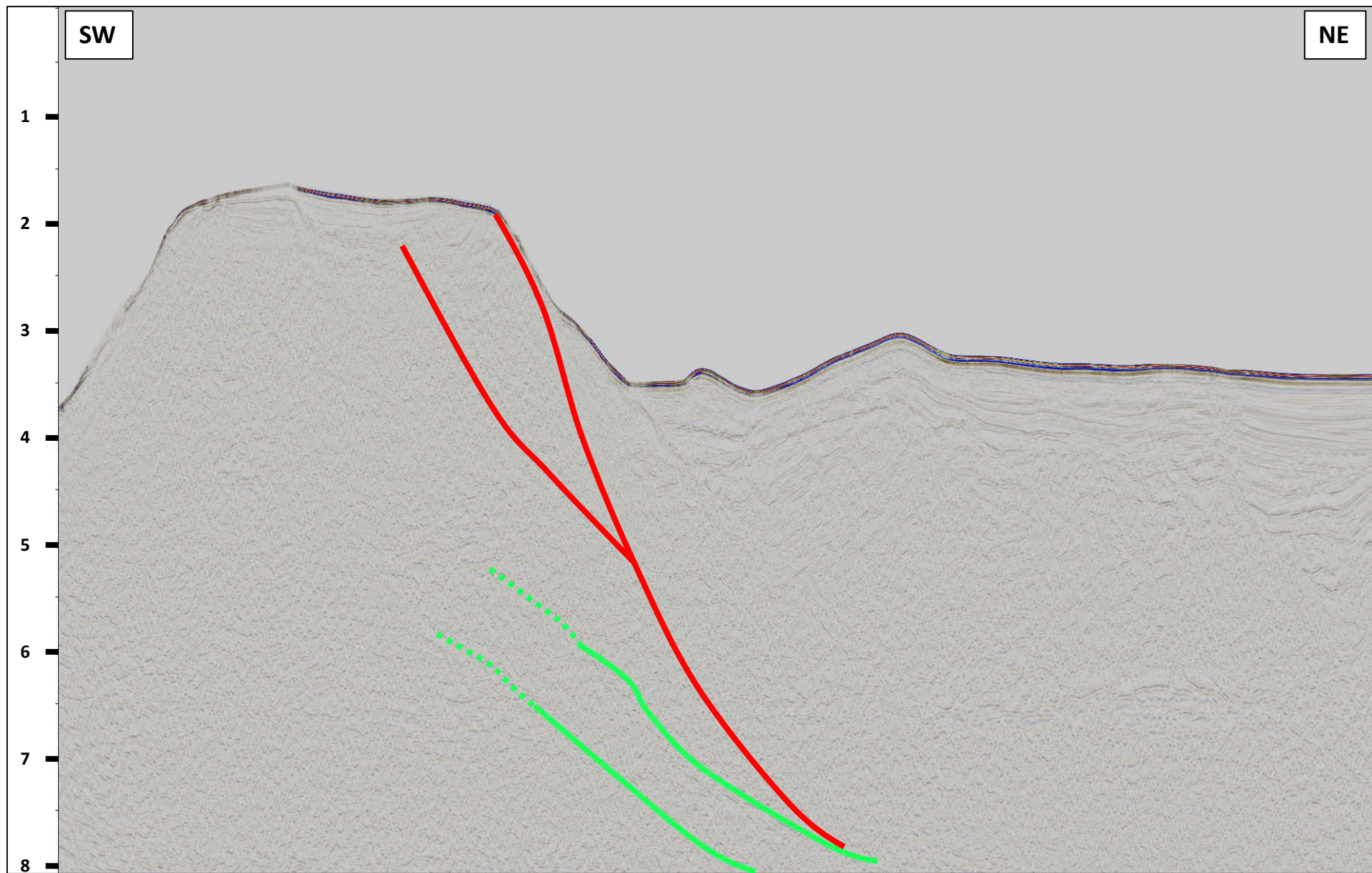
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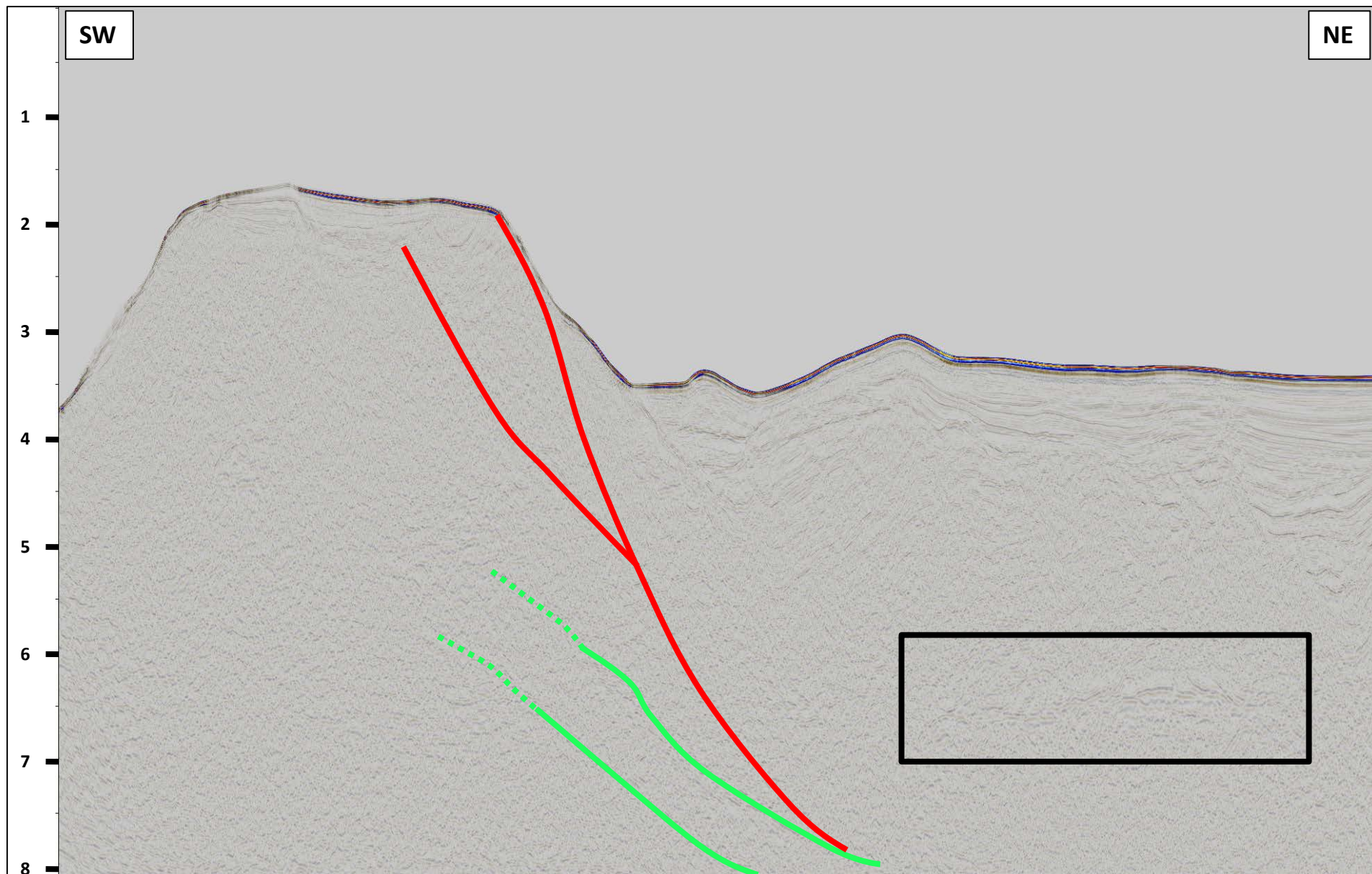
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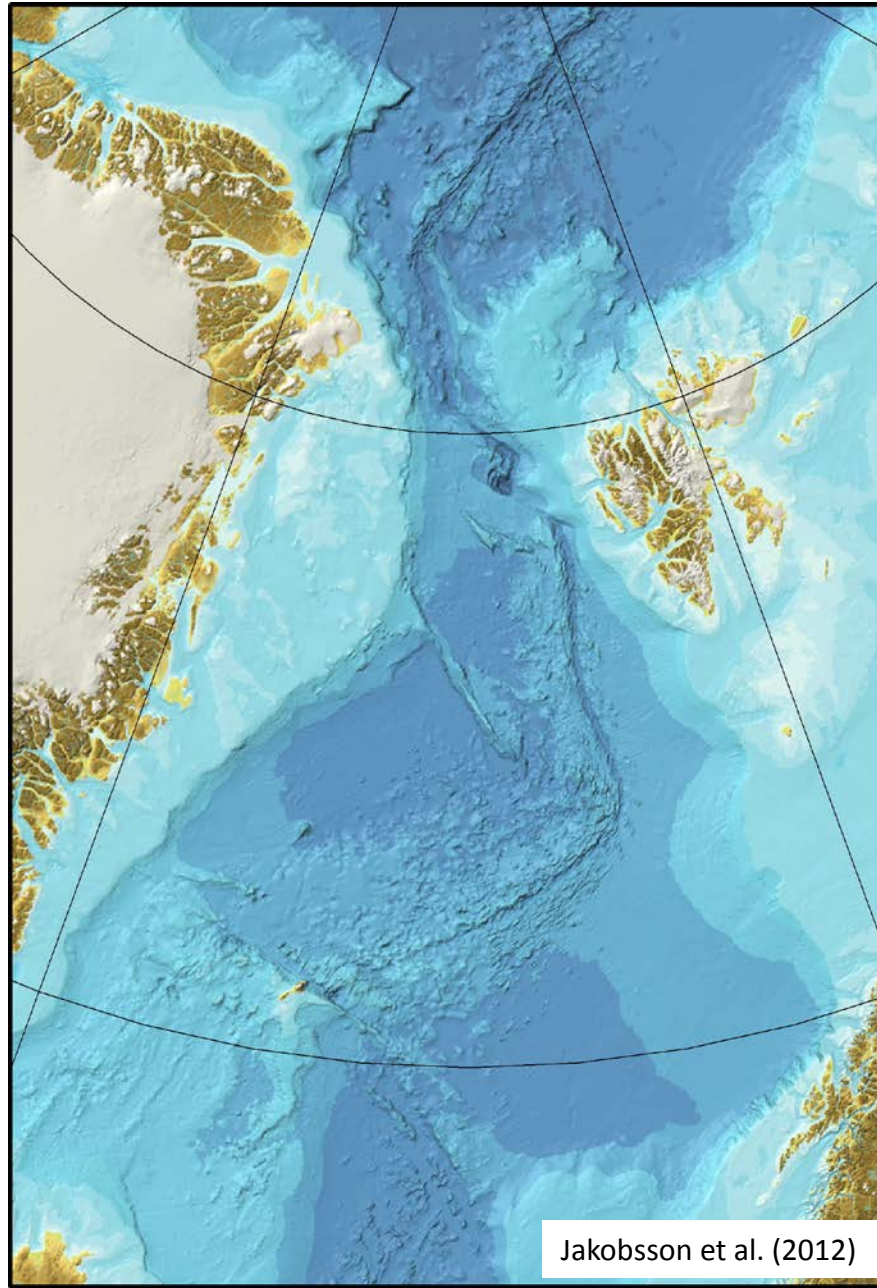


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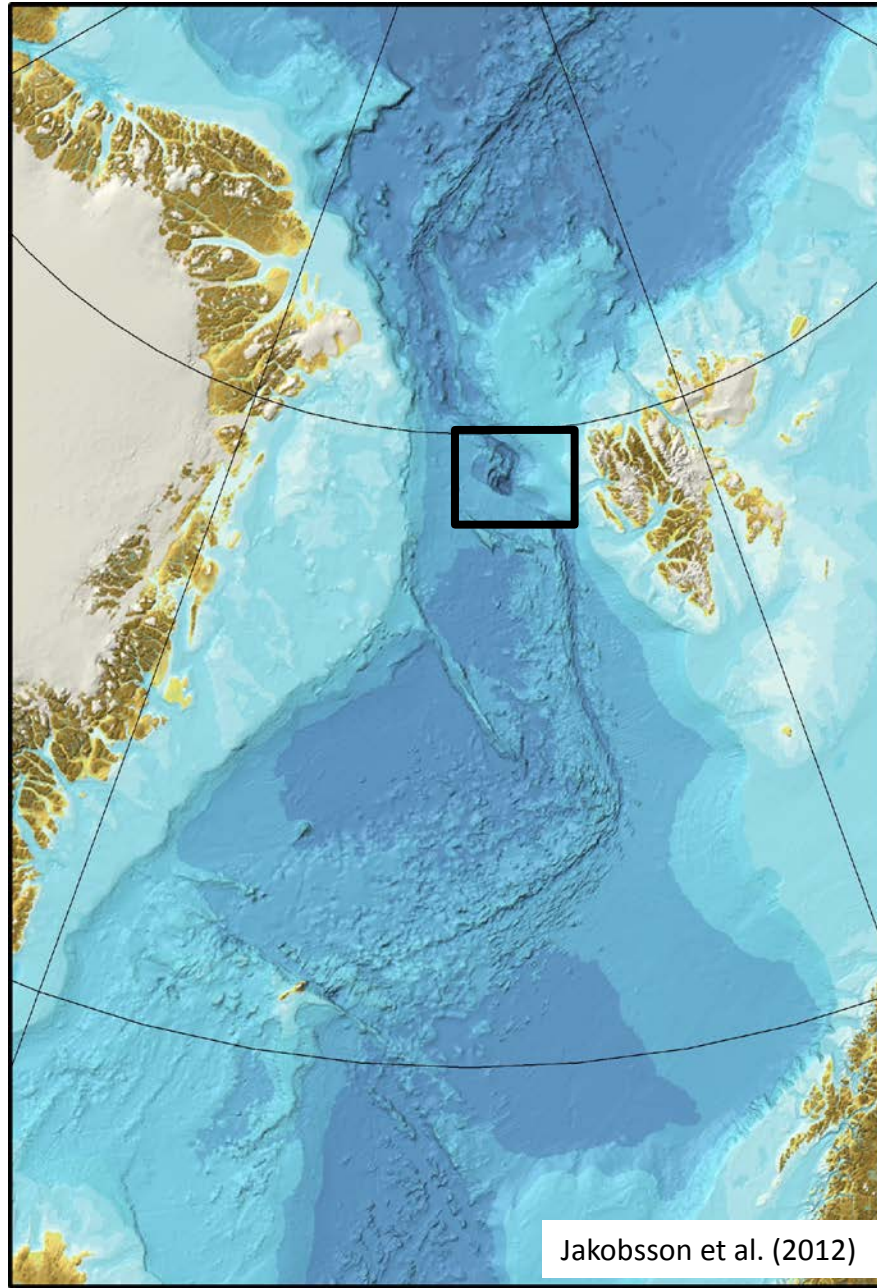




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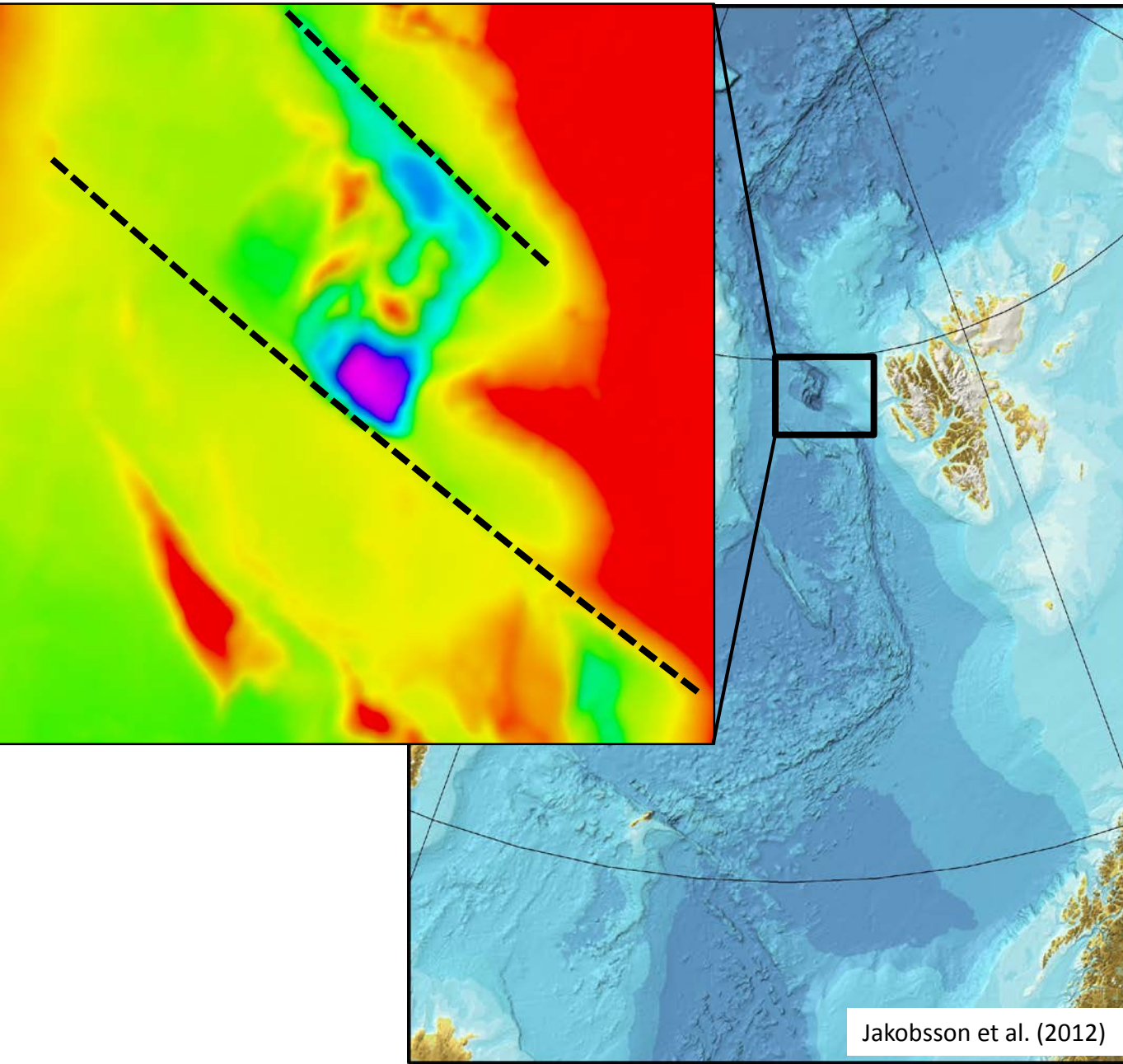


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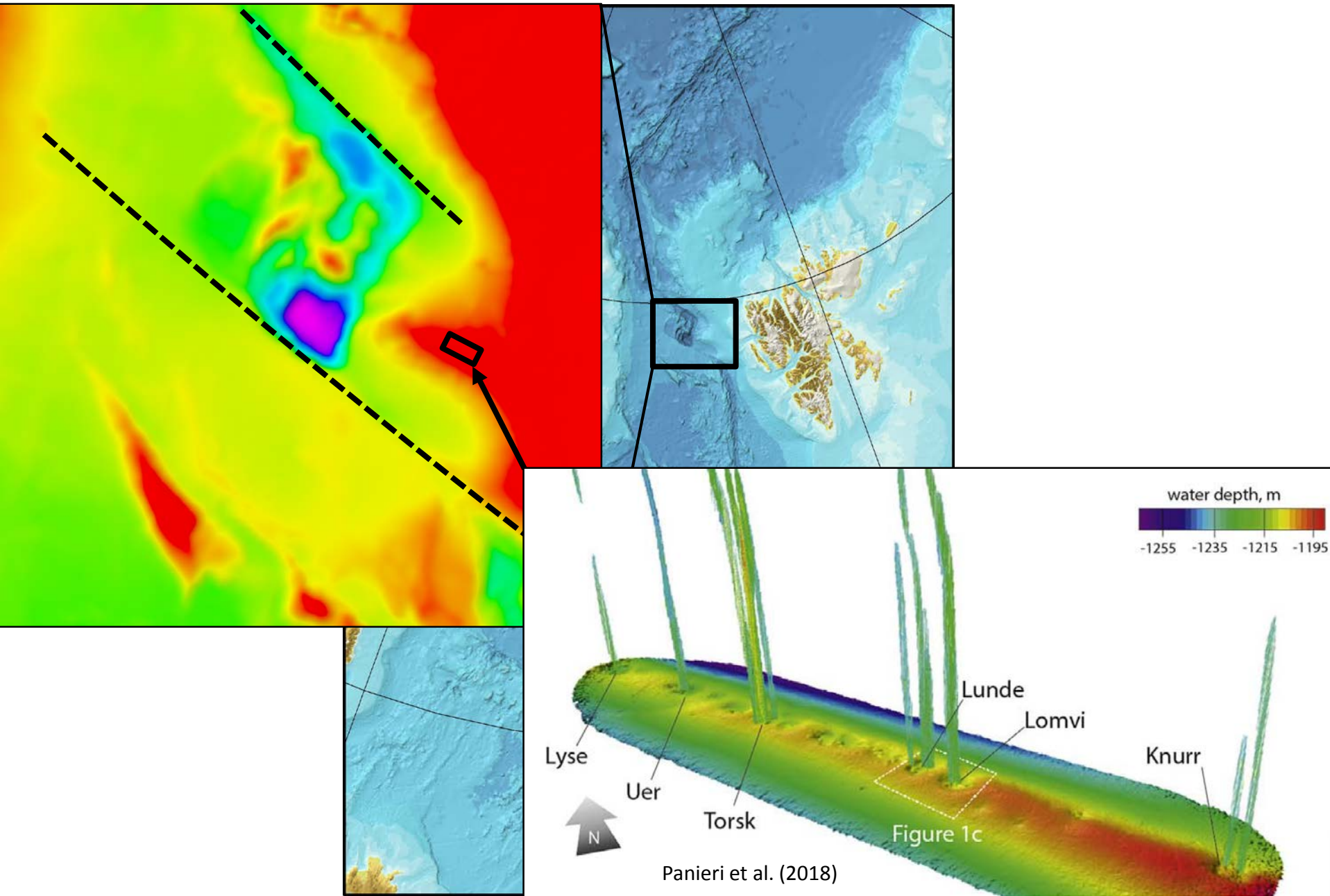


Jakobsson et al. (2012)

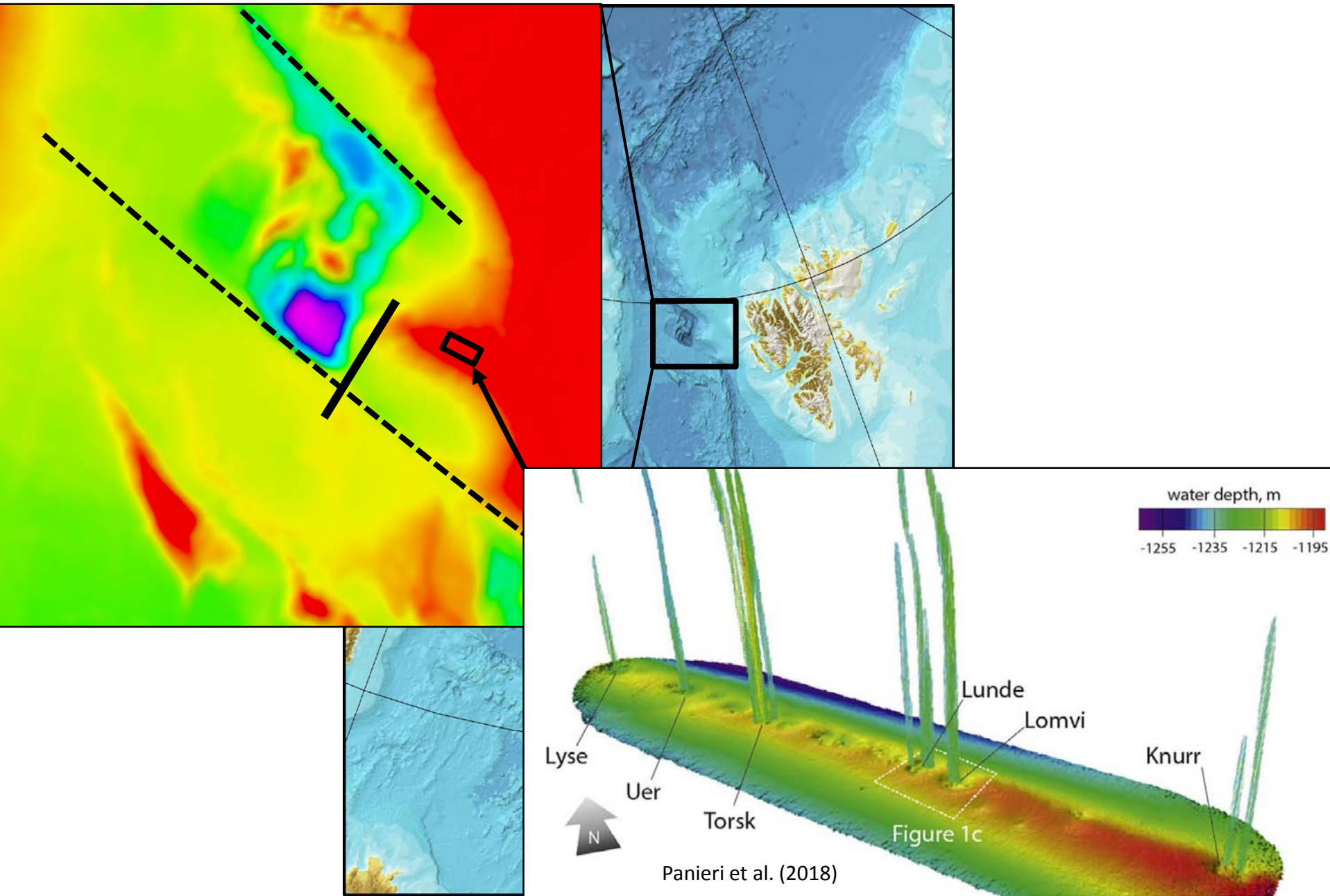
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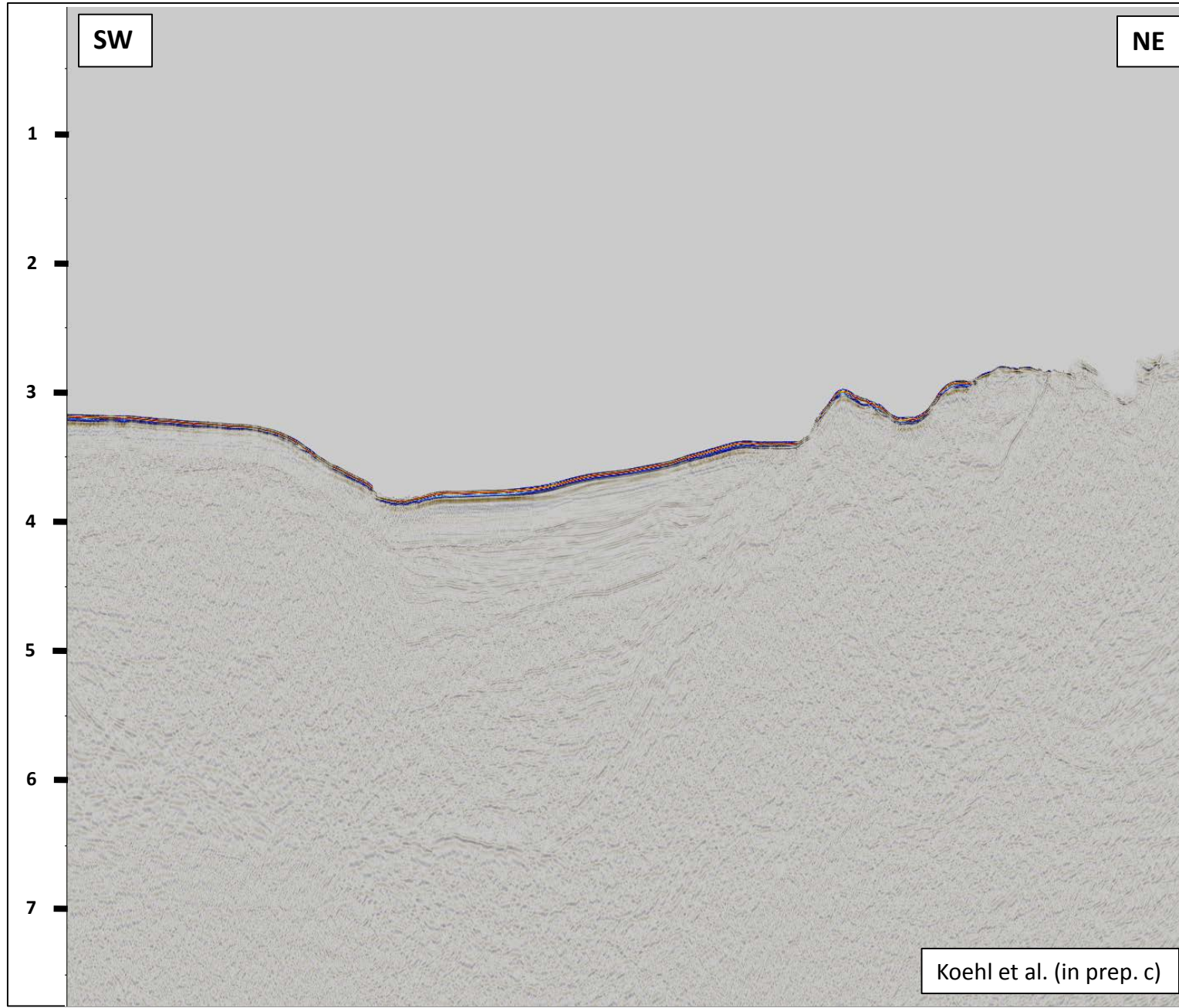
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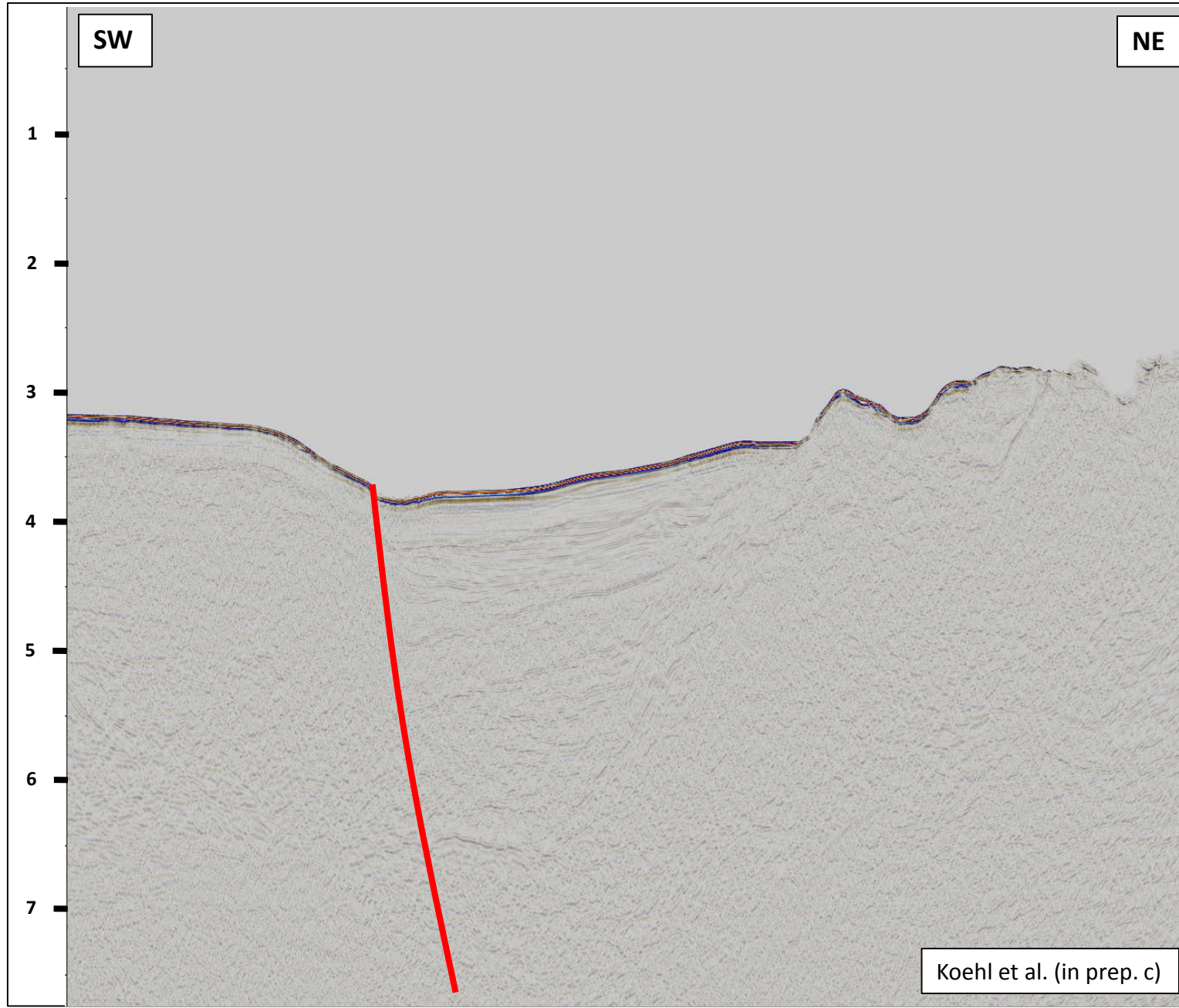
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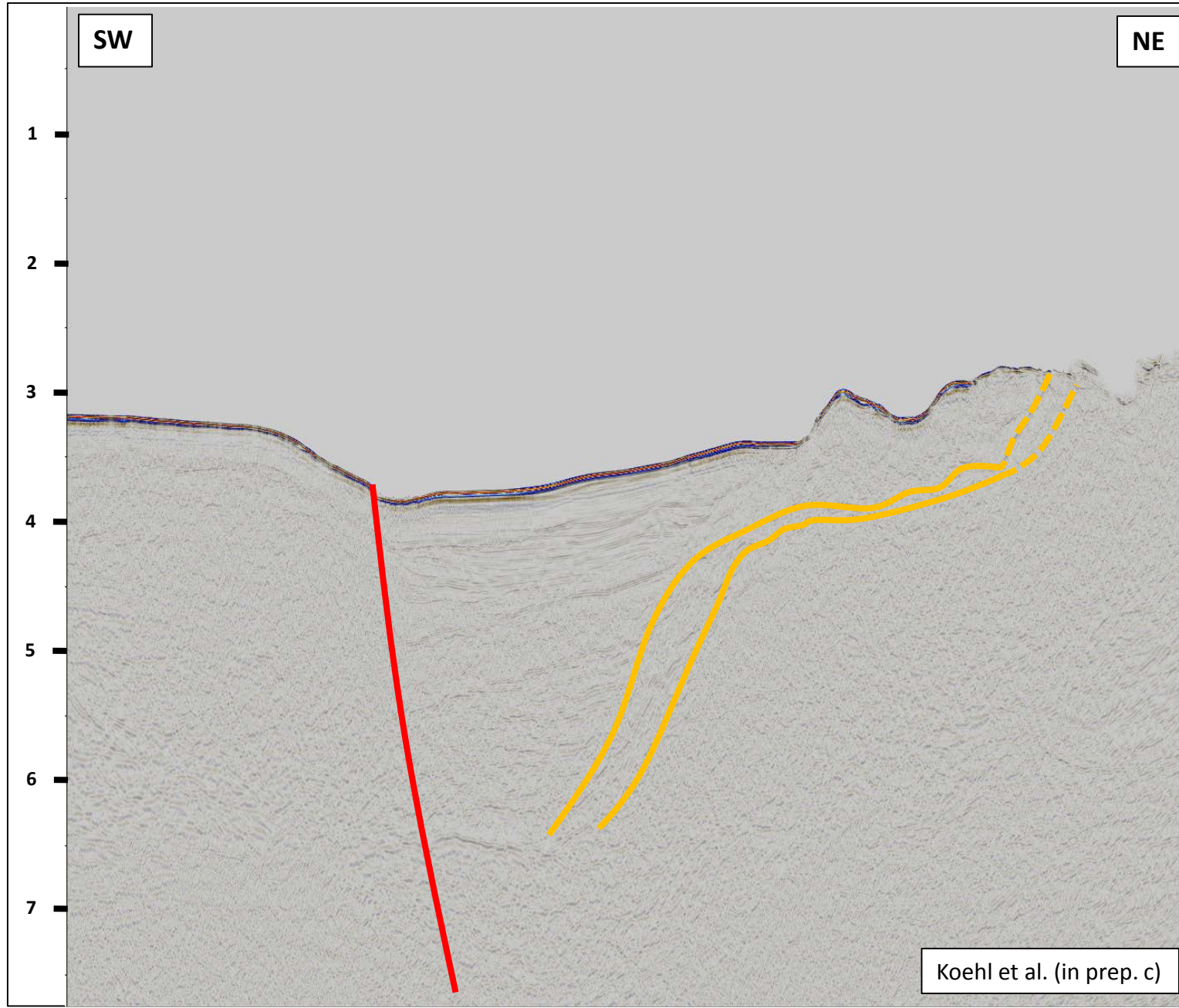
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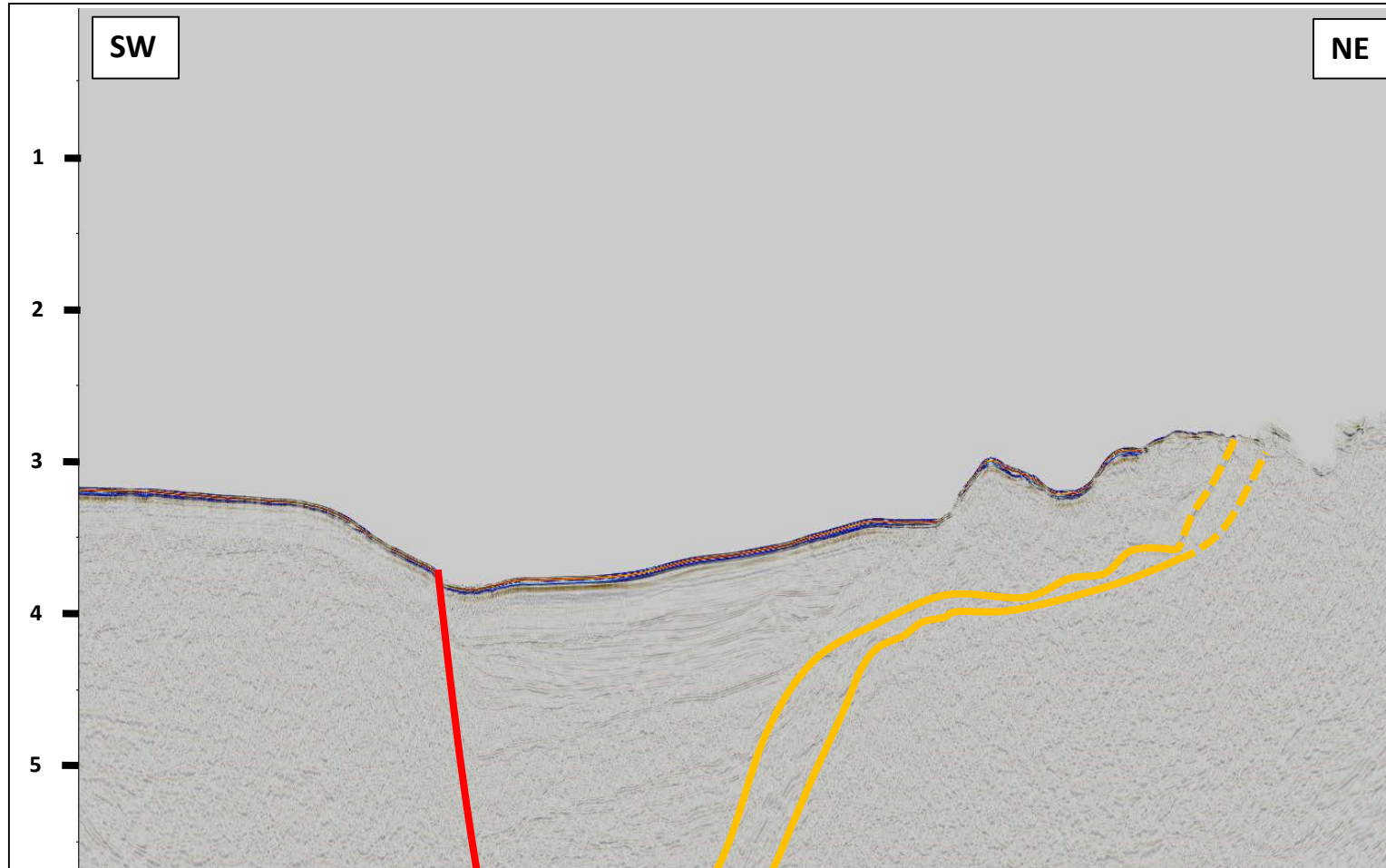


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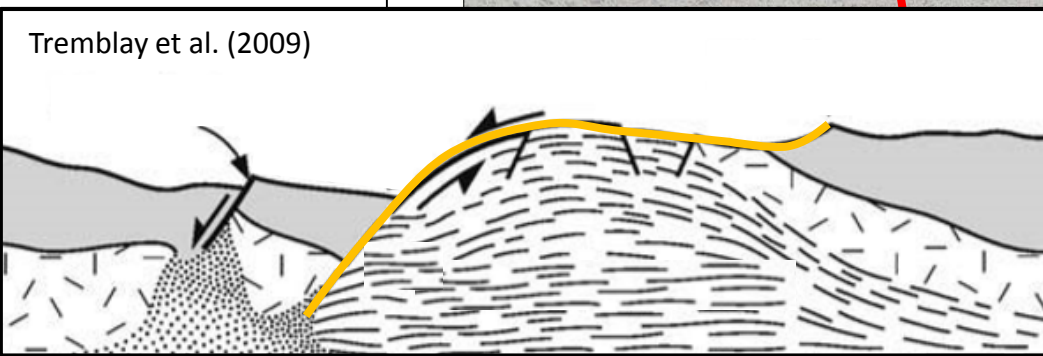
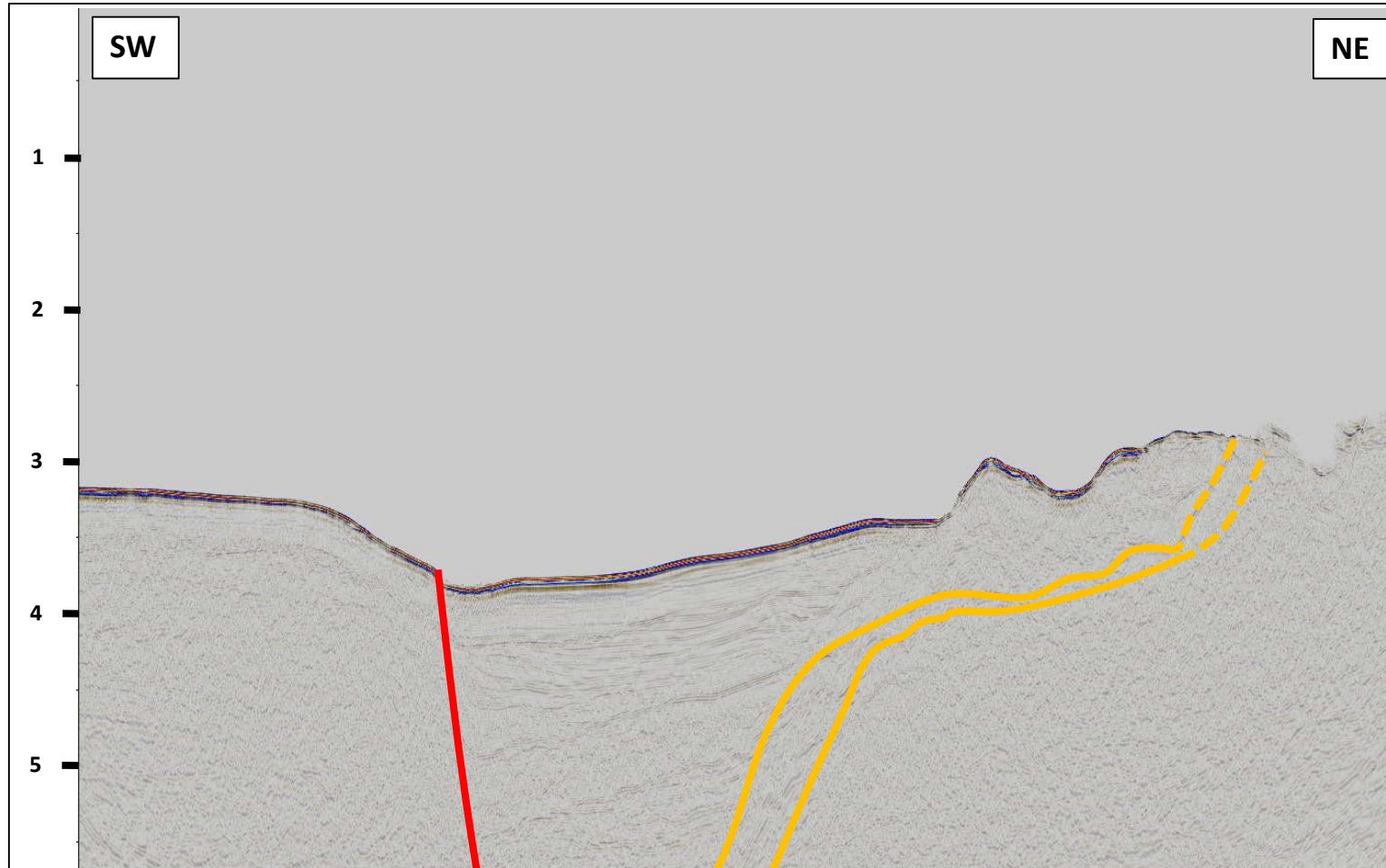


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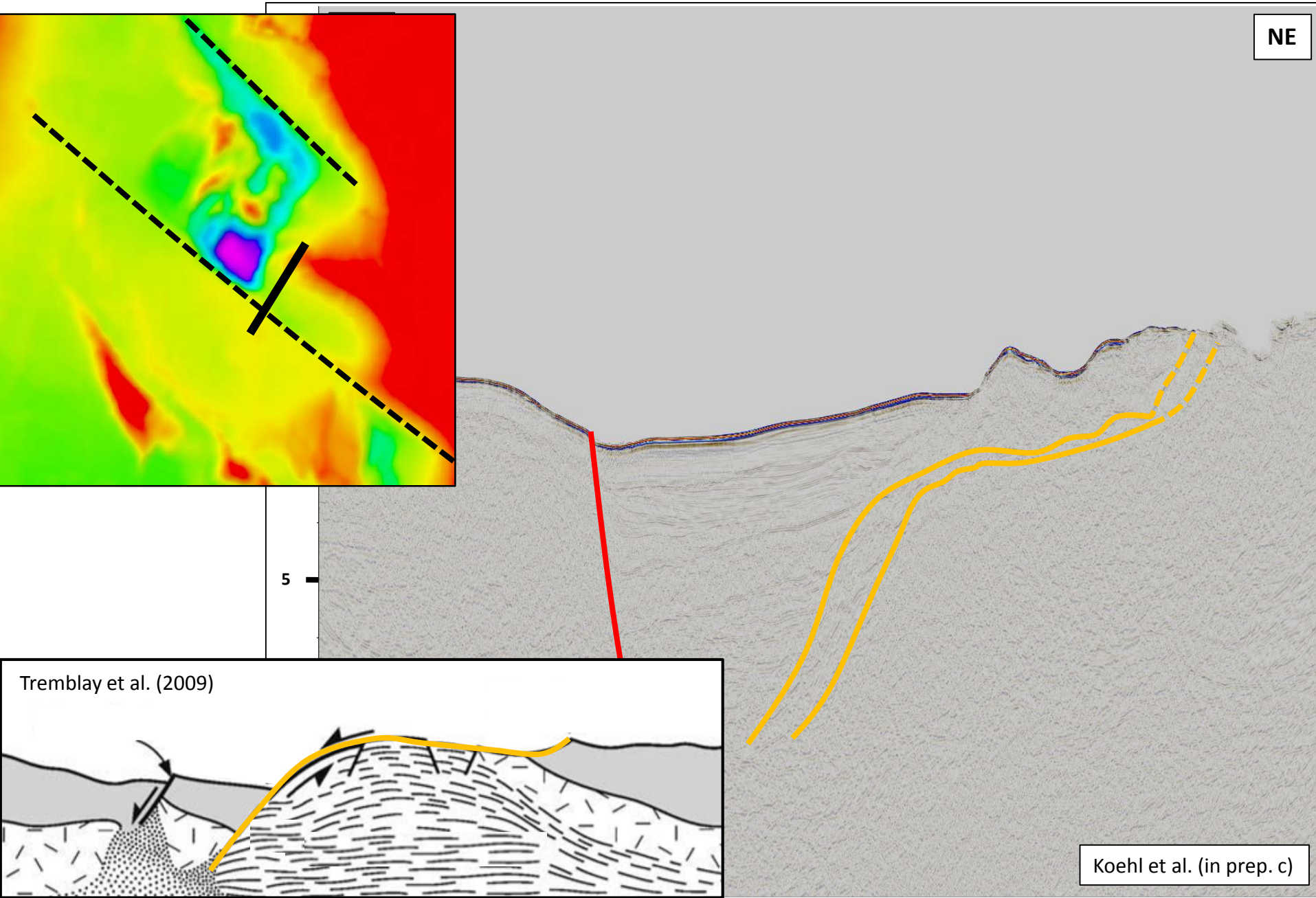
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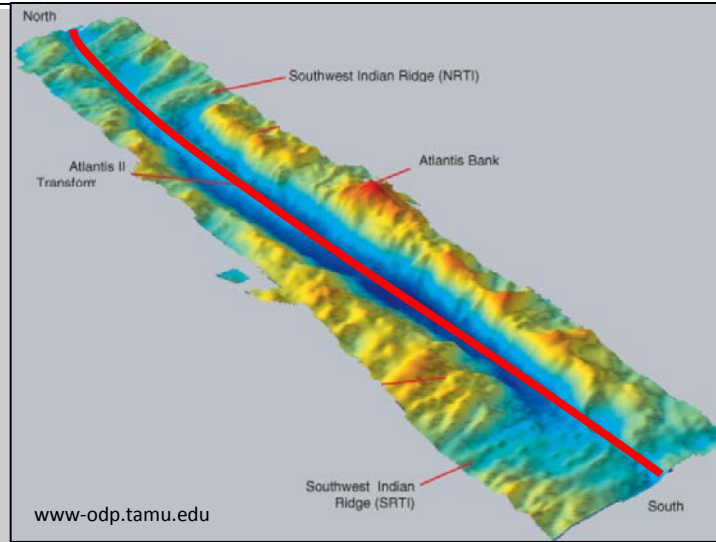
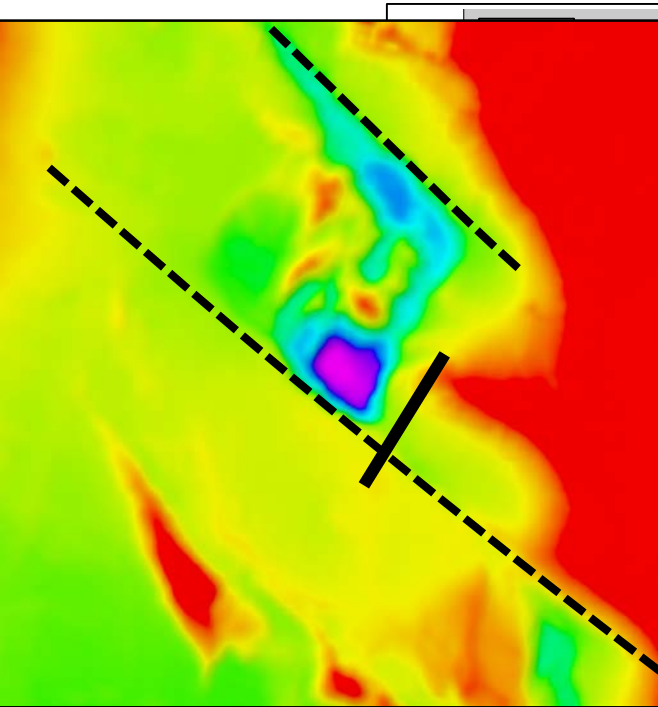


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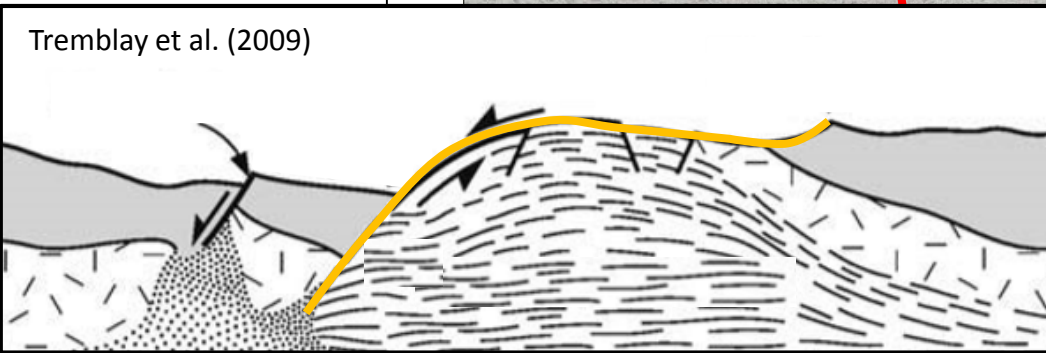
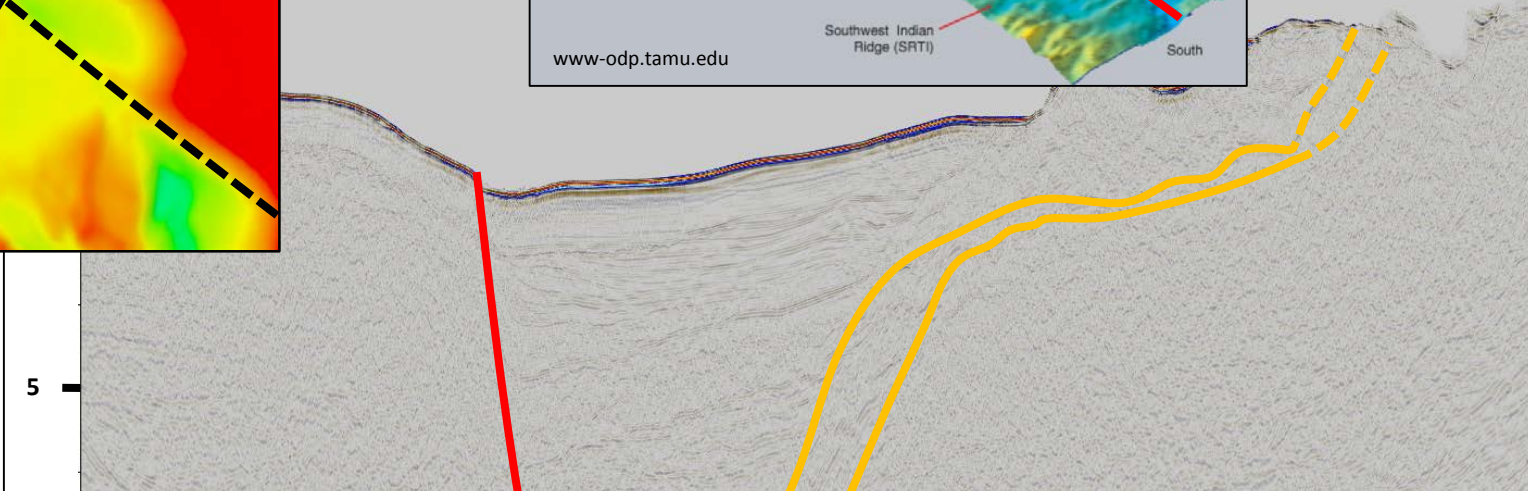
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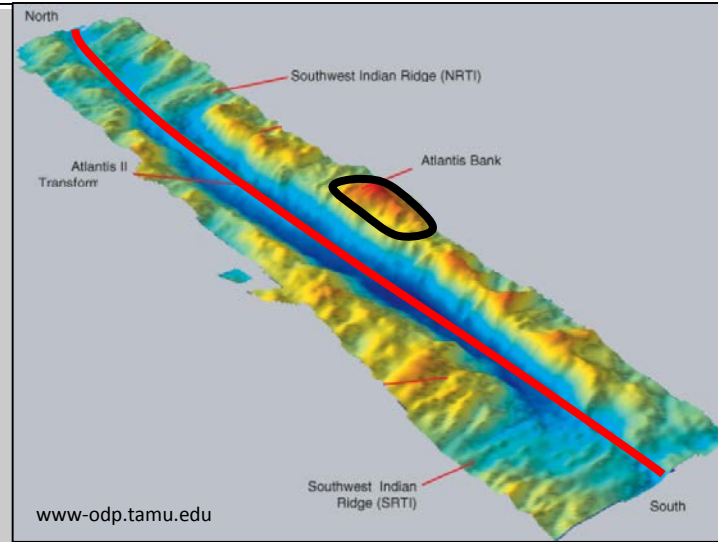
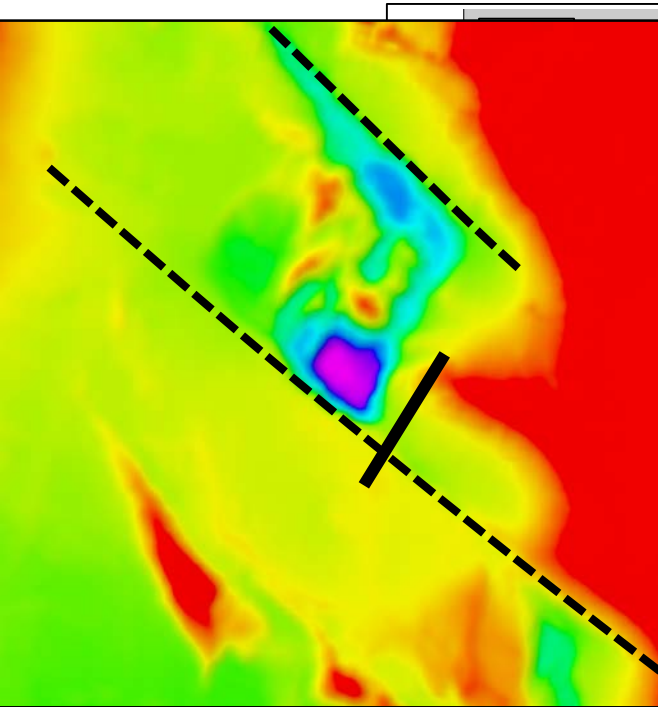


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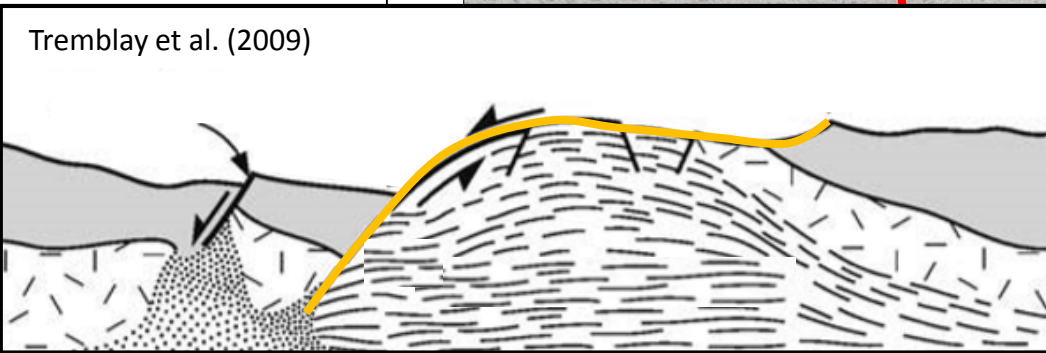
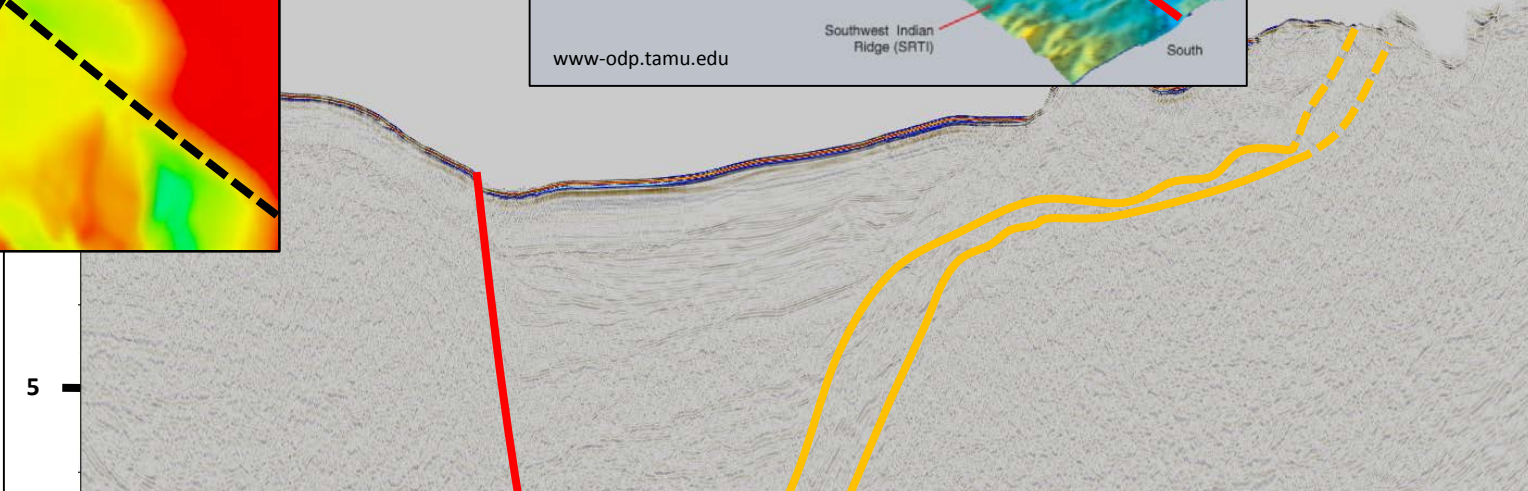


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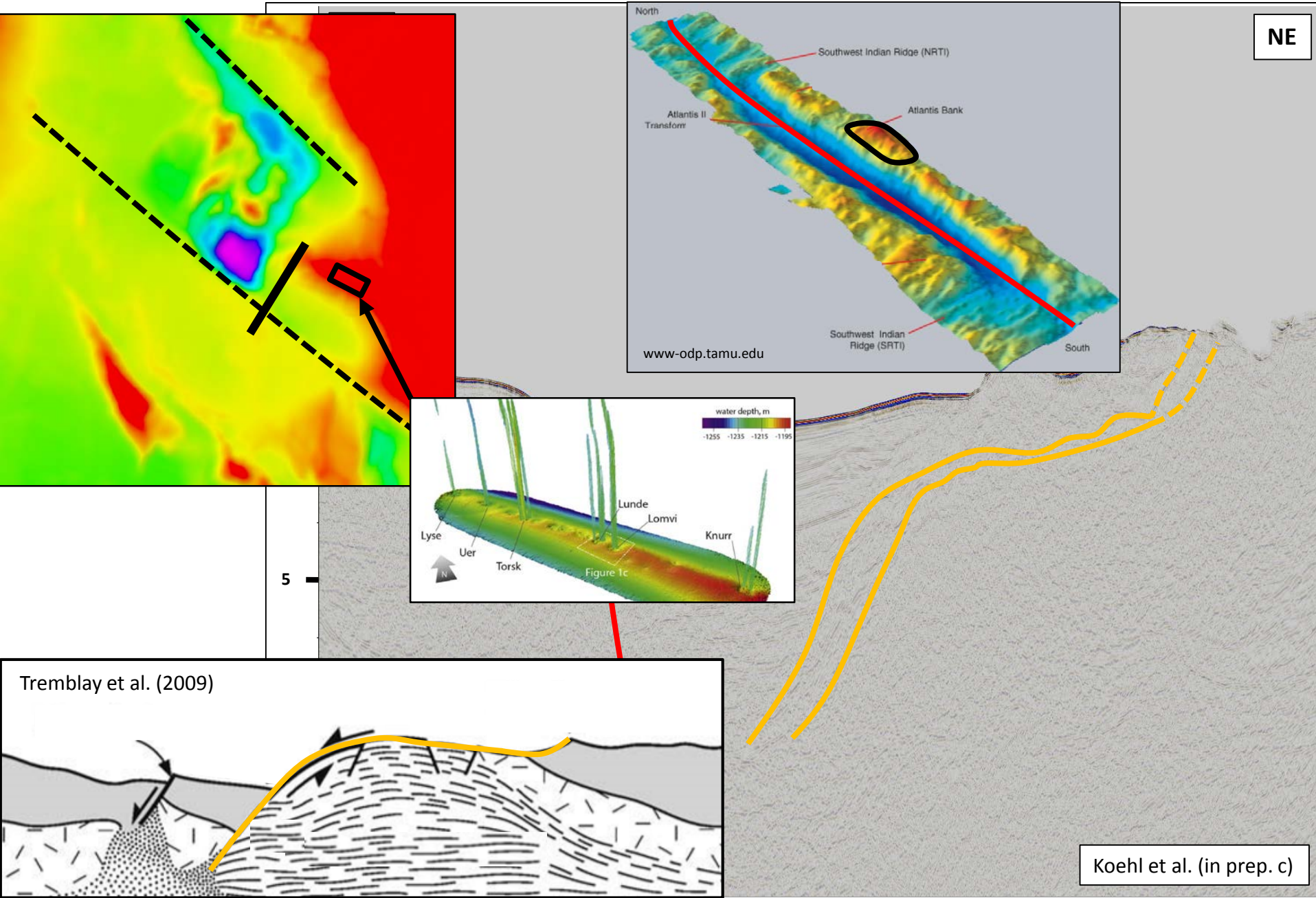


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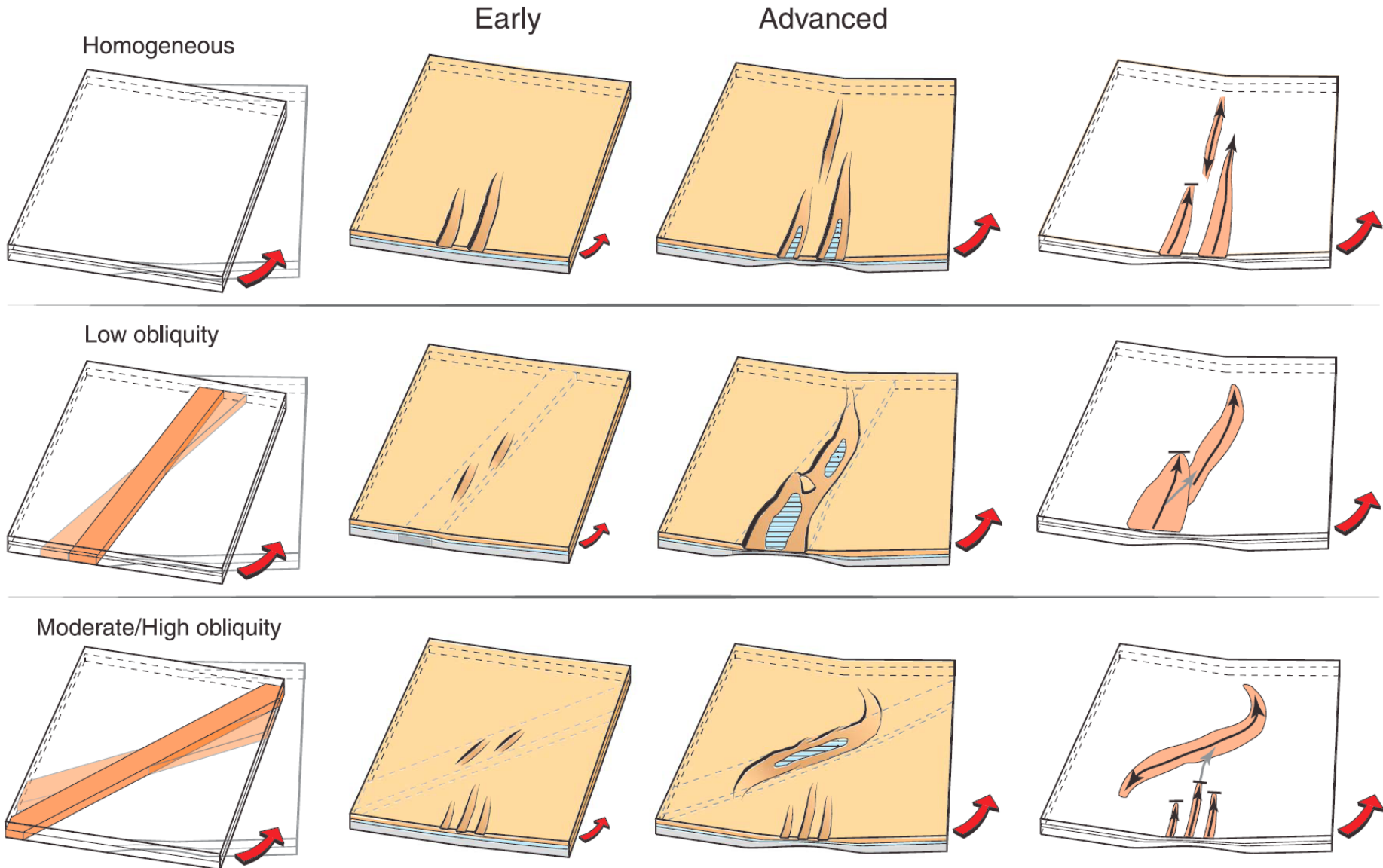


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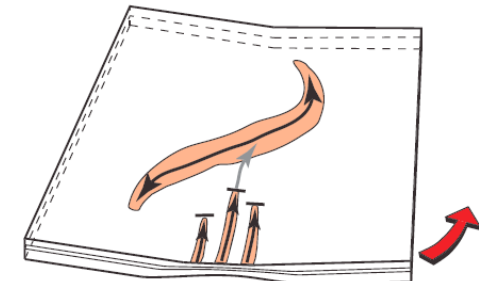
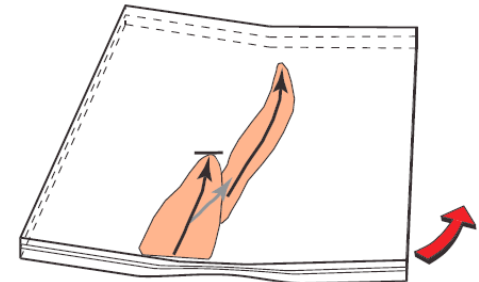
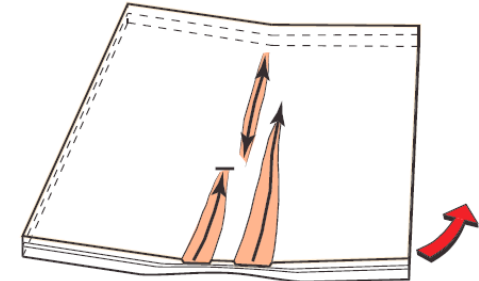
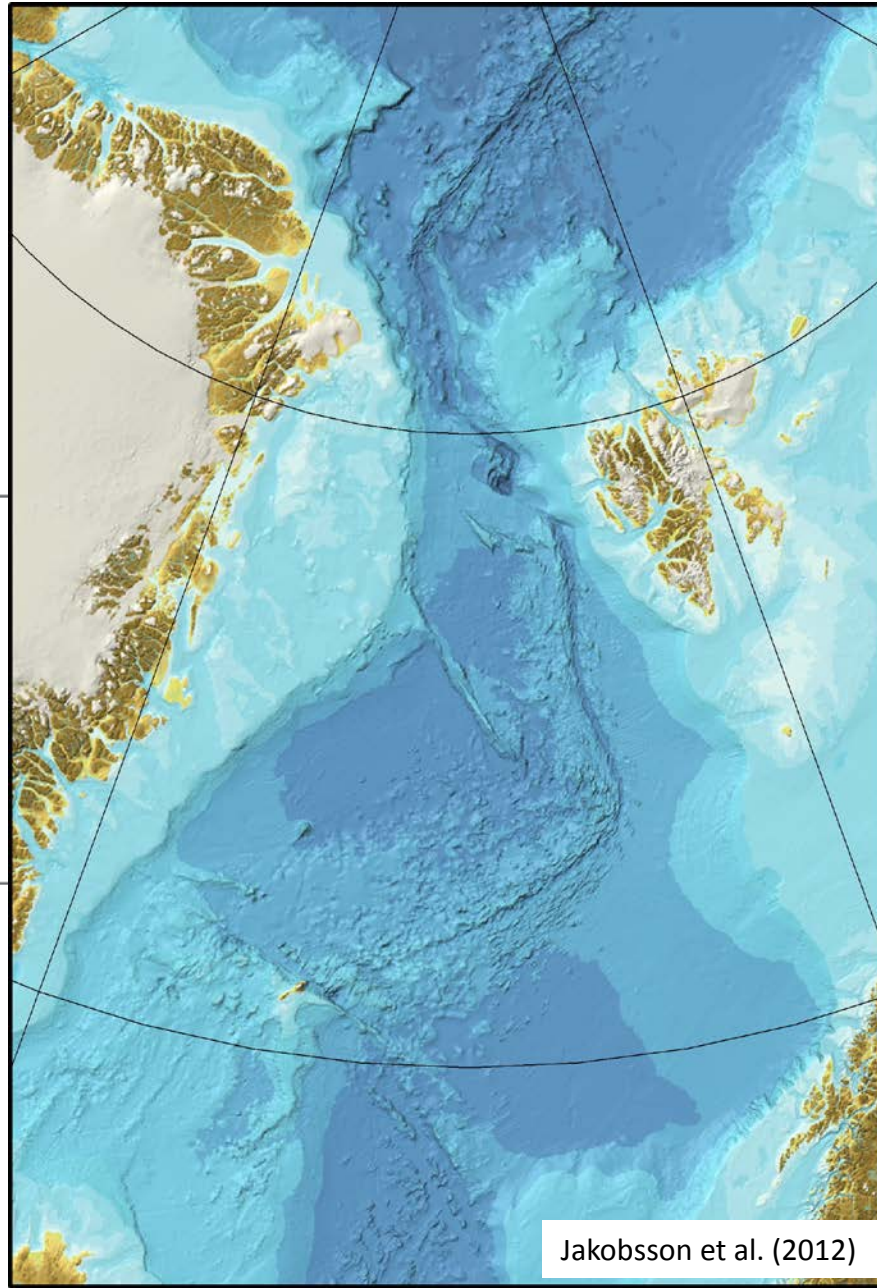
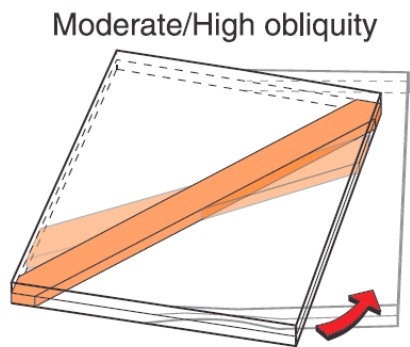
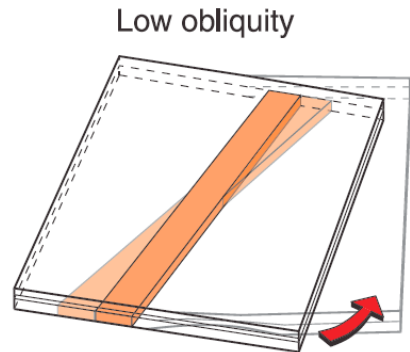
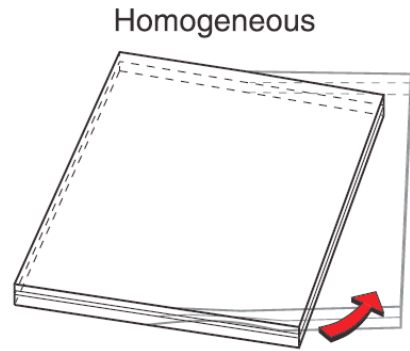
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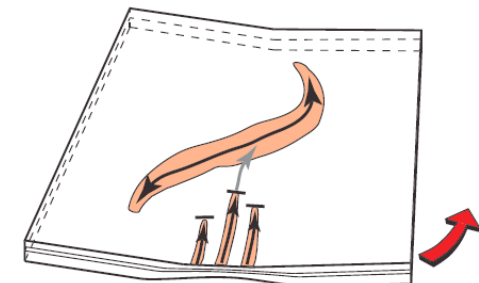
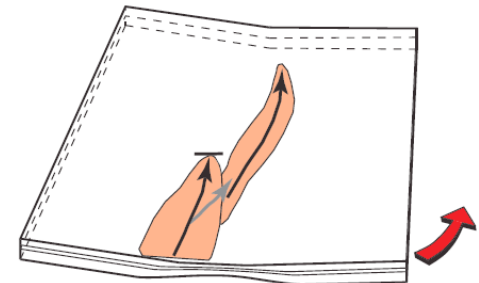
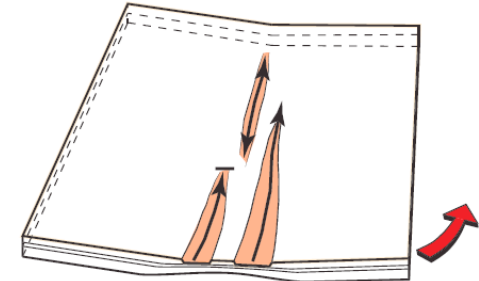
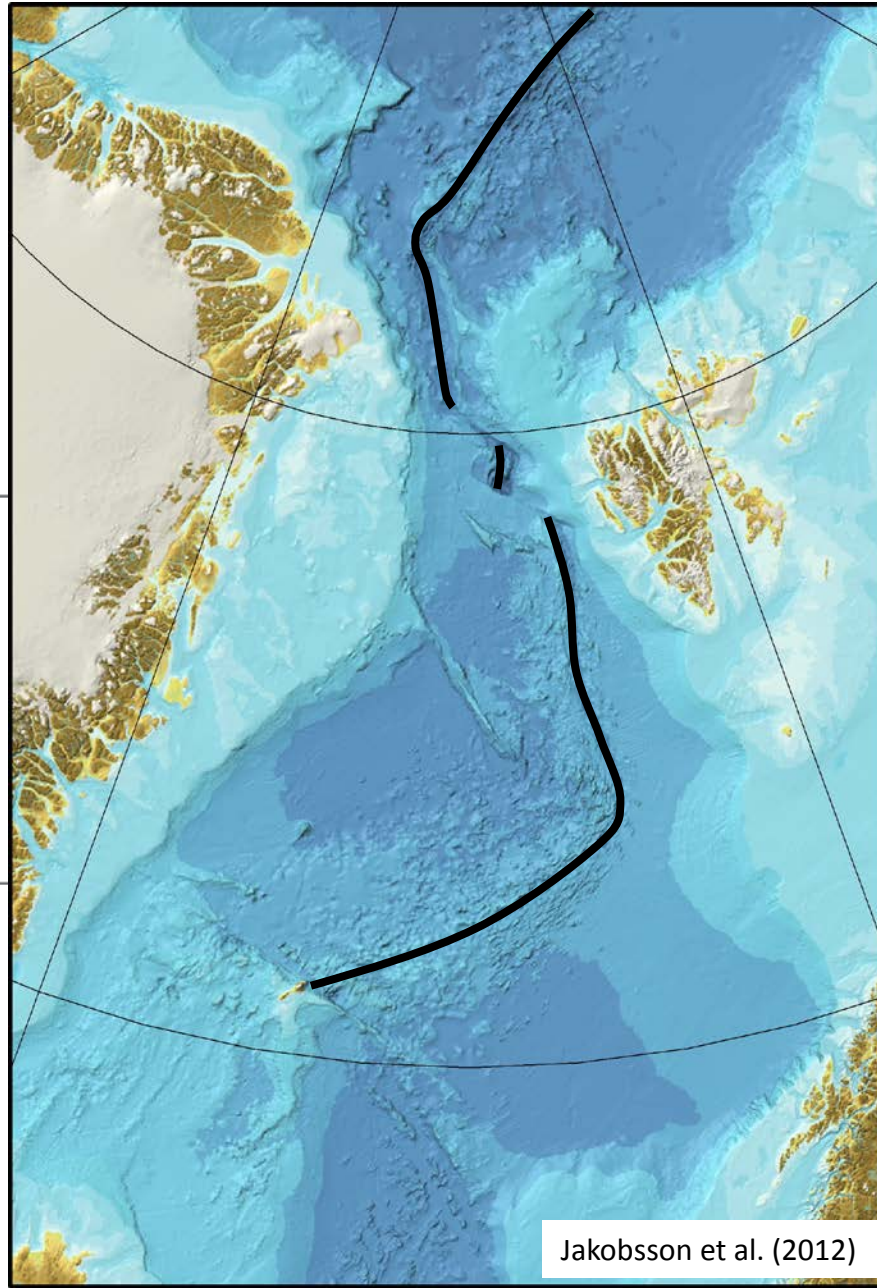
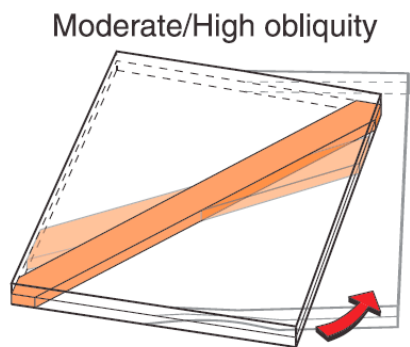
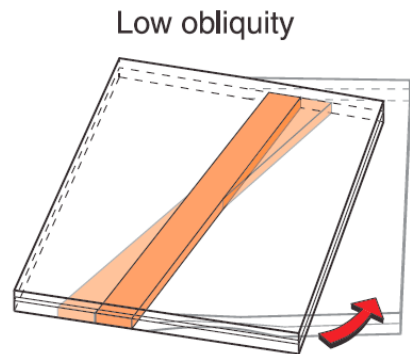
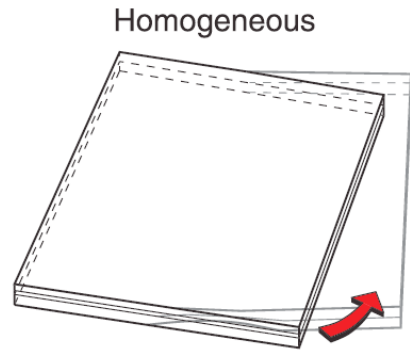


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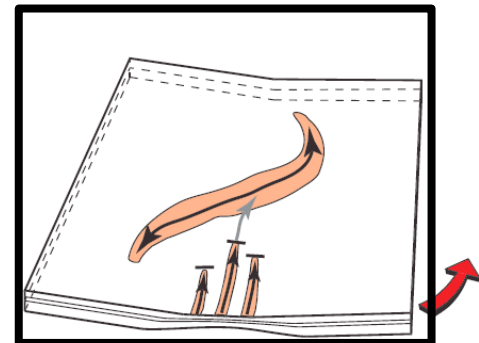
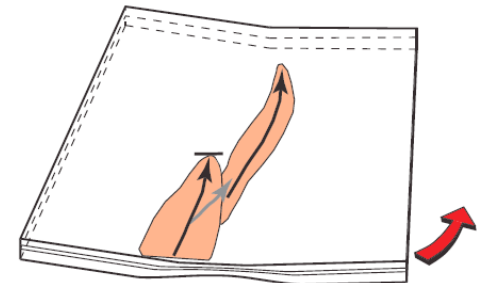
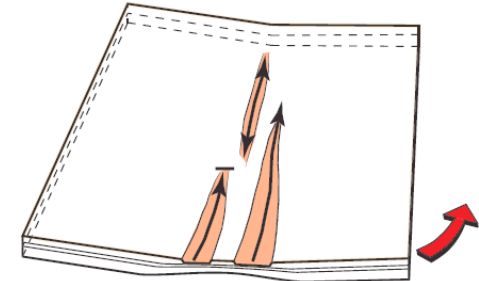
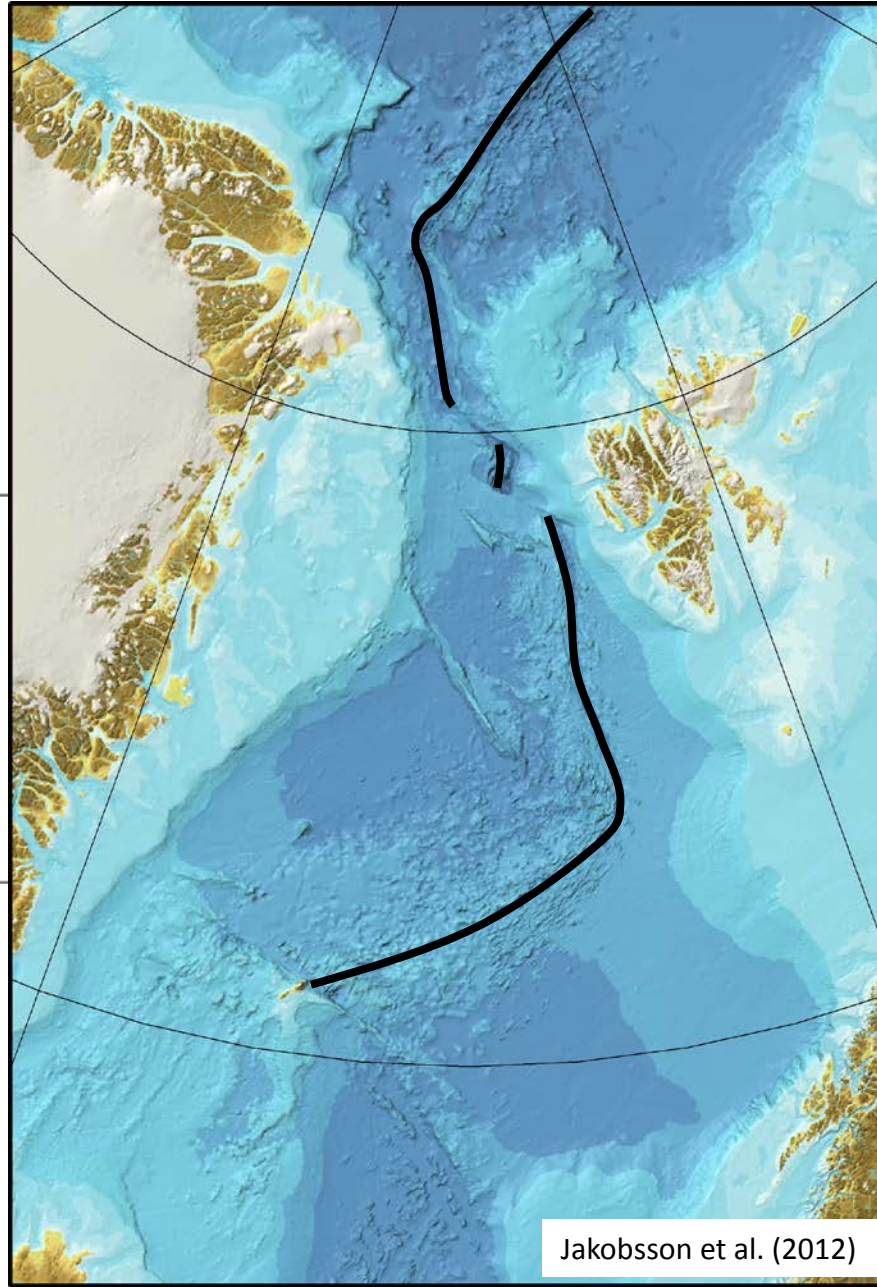
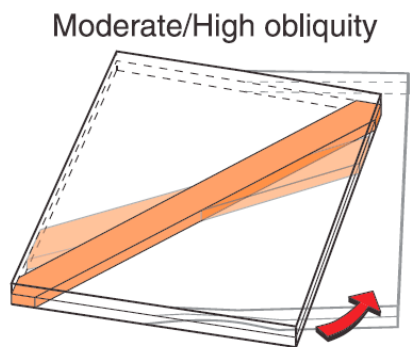
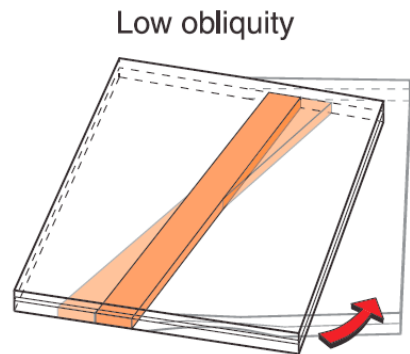
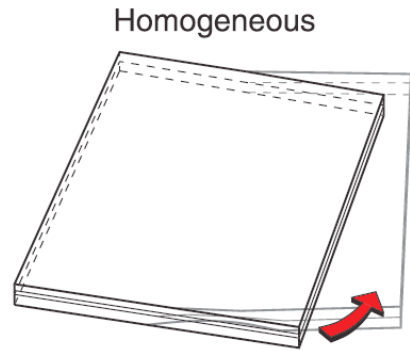


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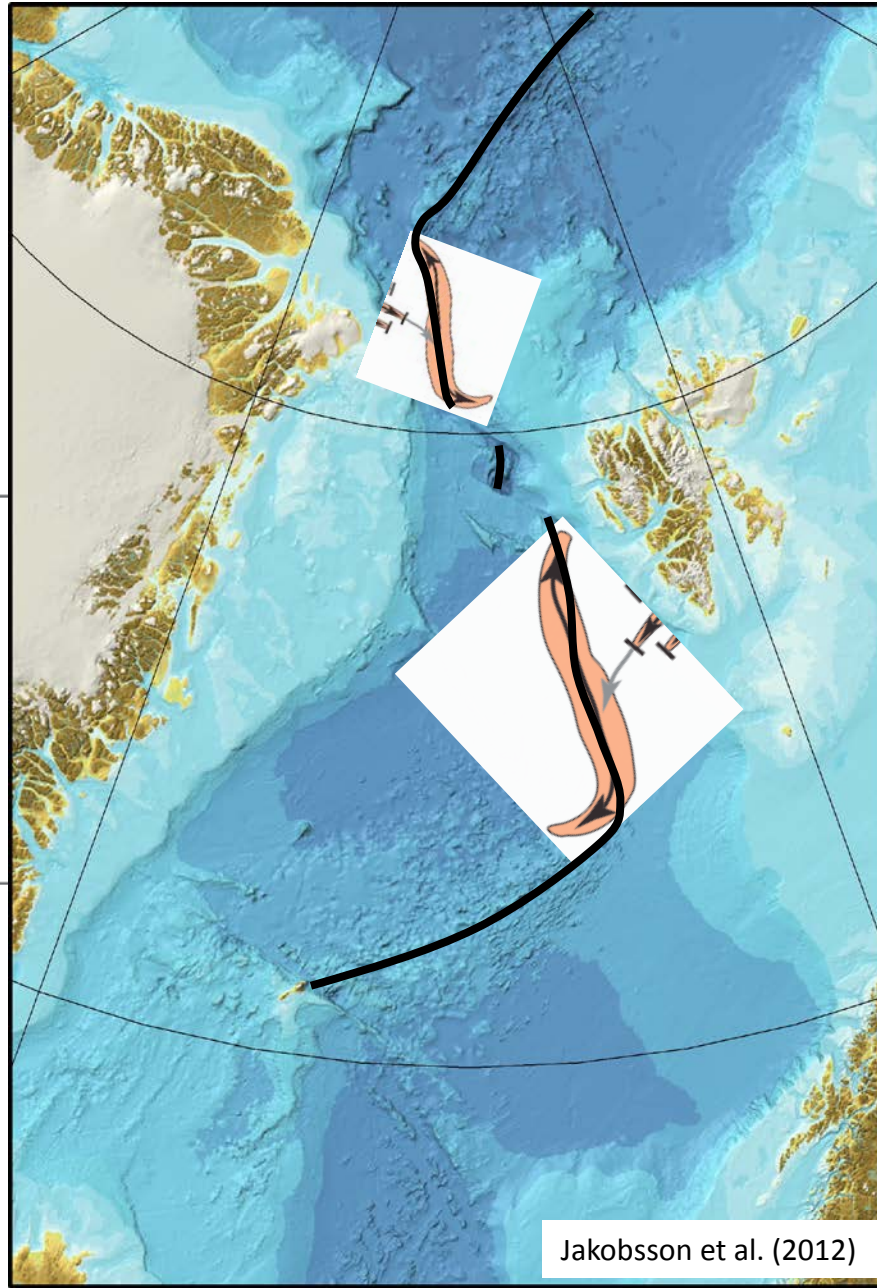
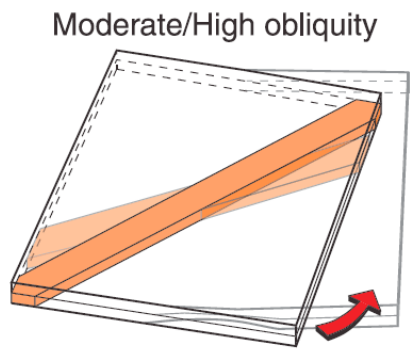
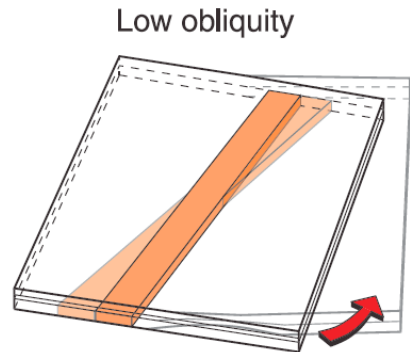
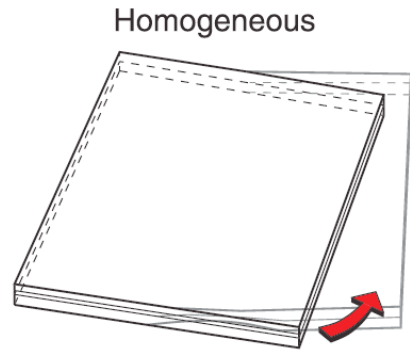
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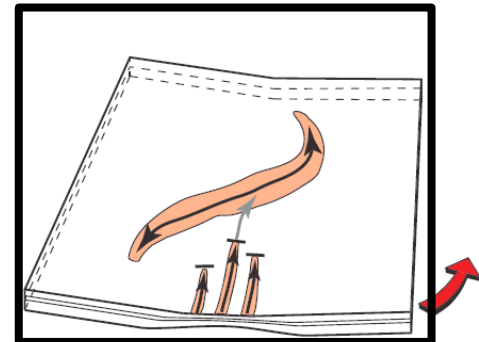
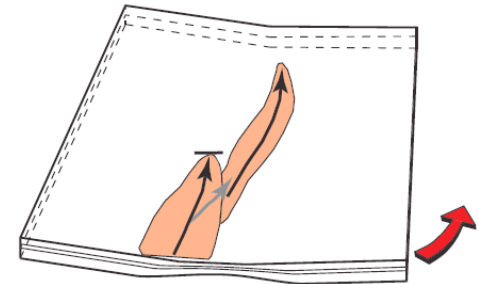
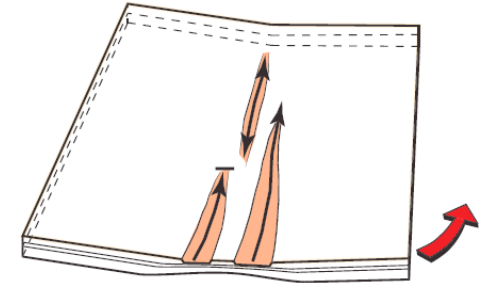
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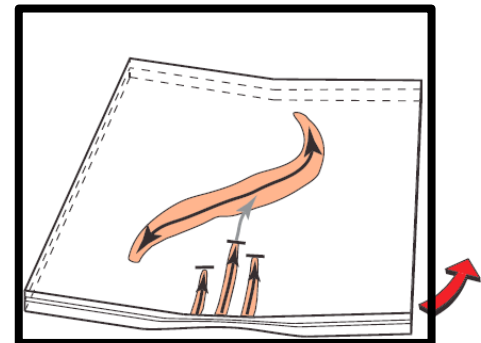
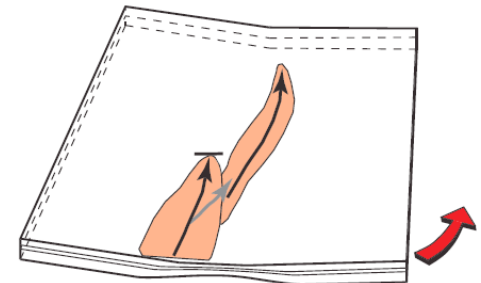
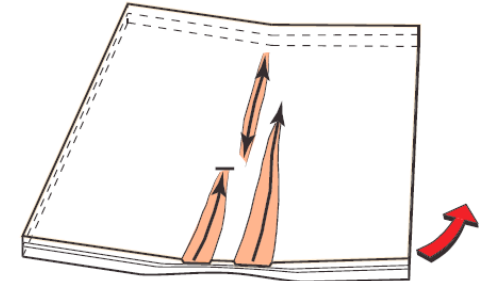
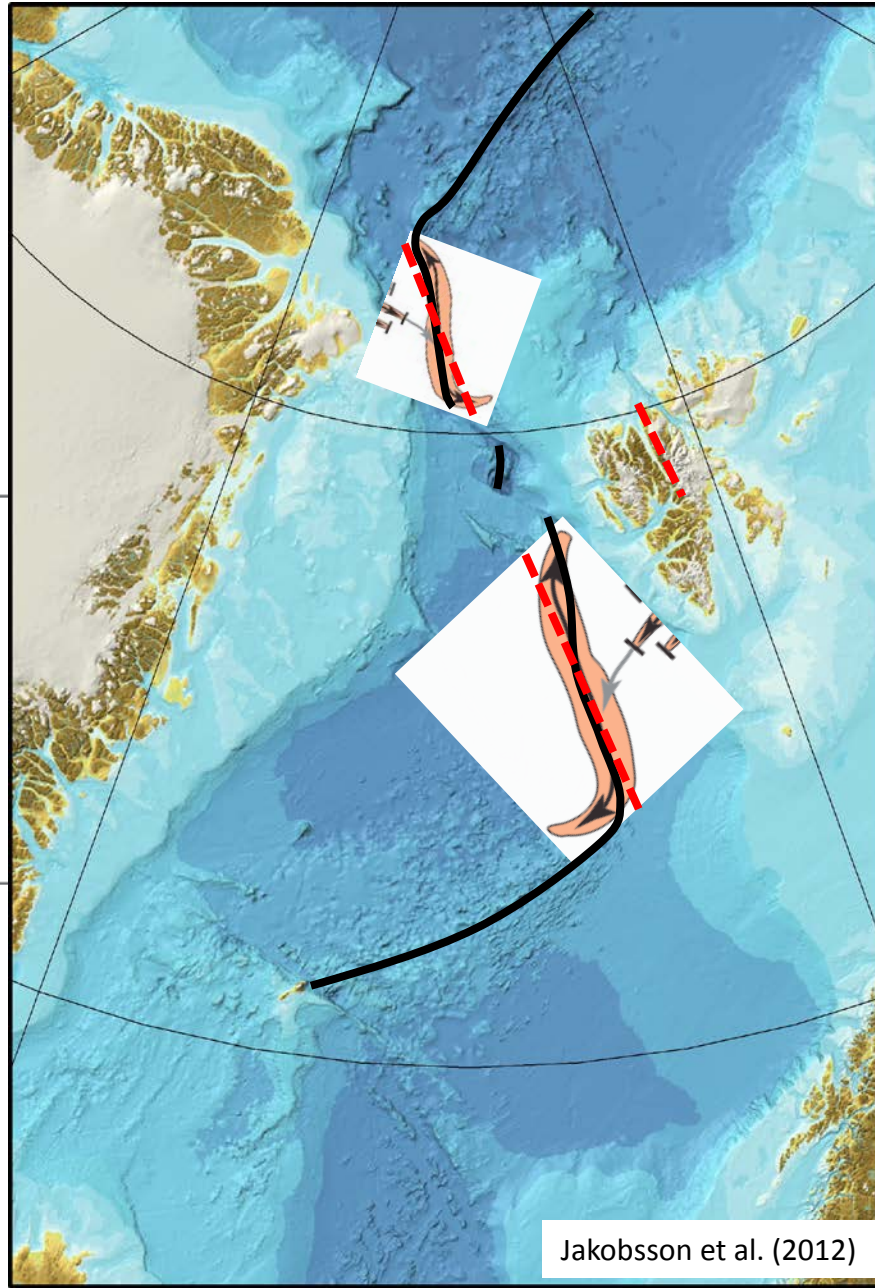
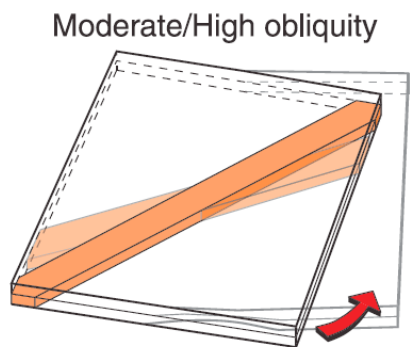
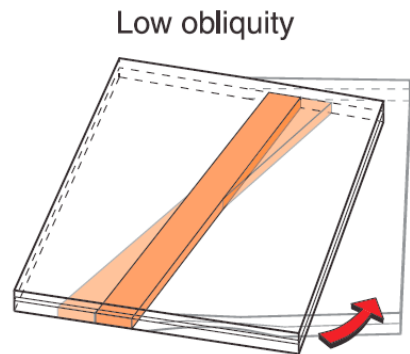
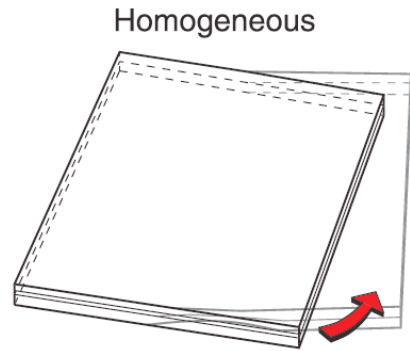


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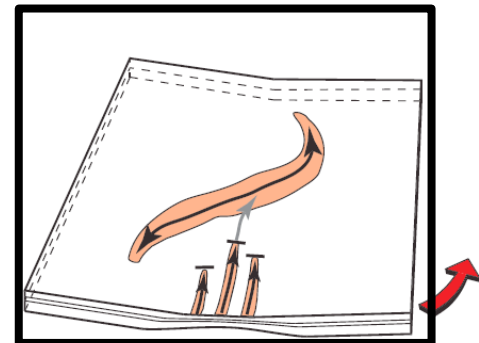
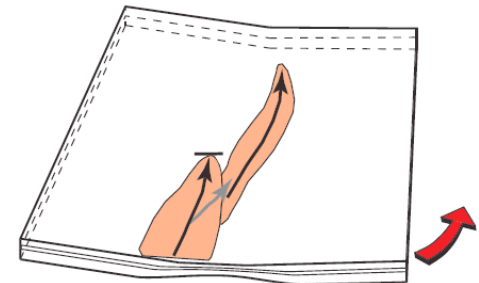
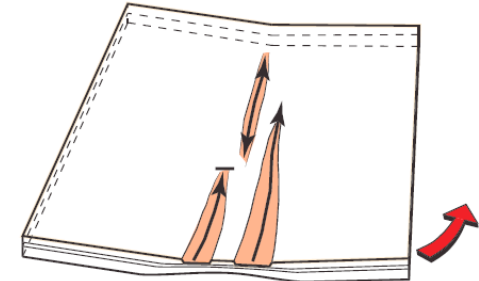
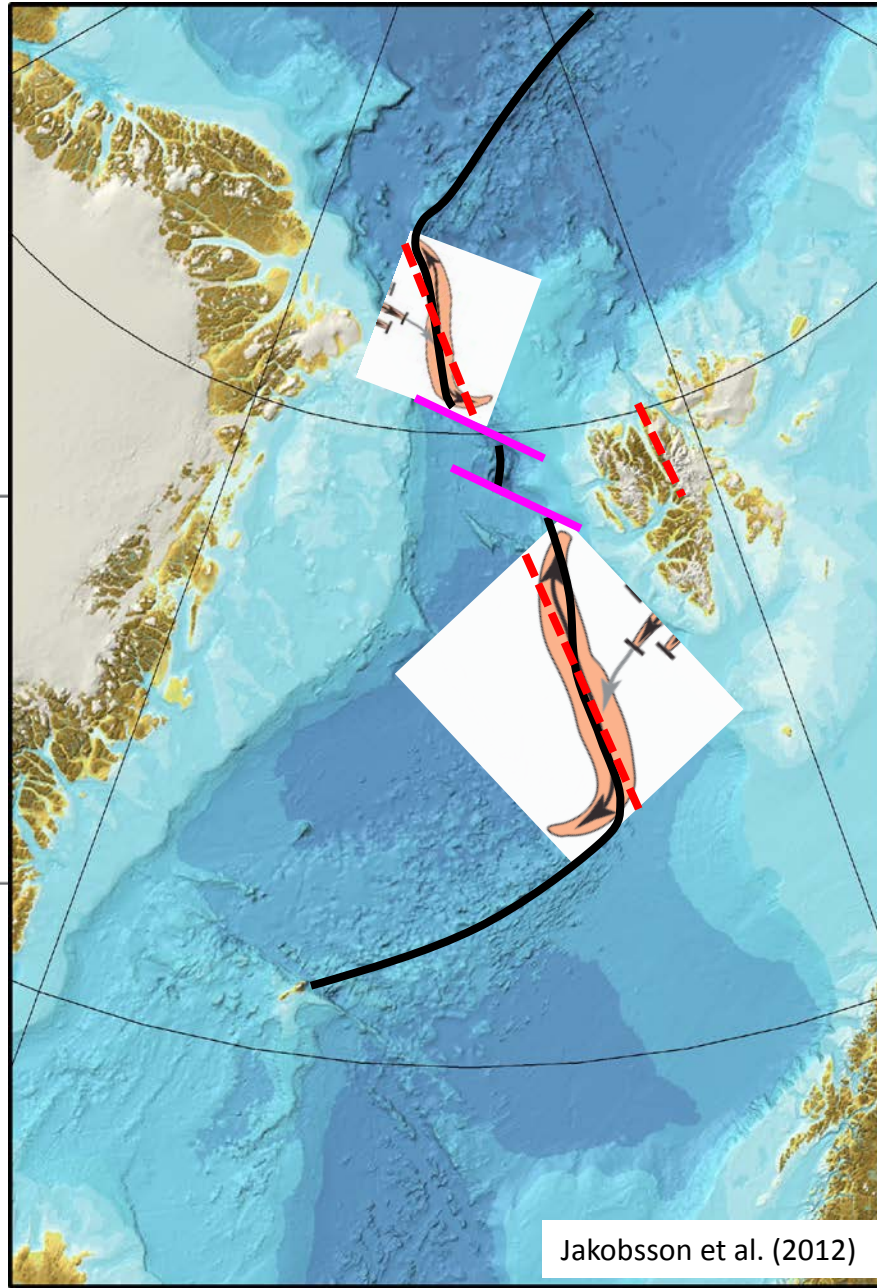
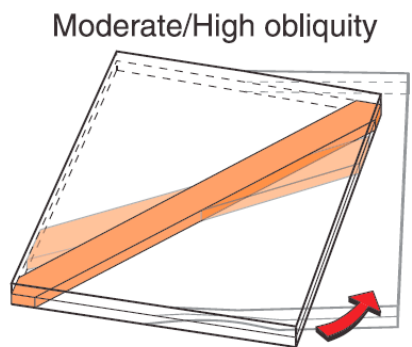
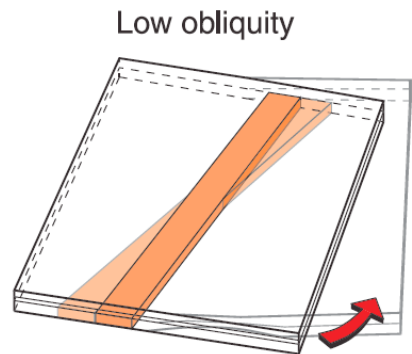
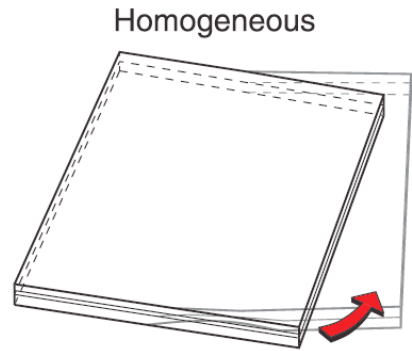
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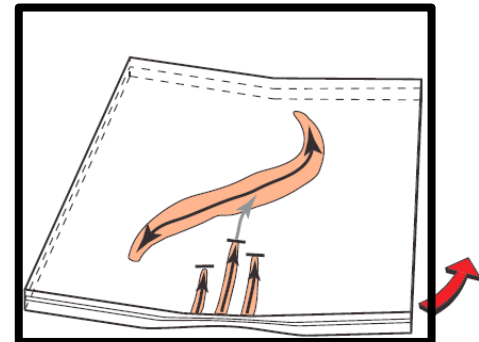
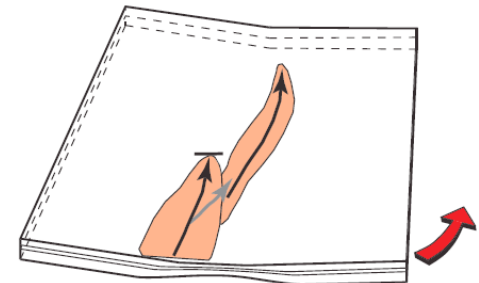
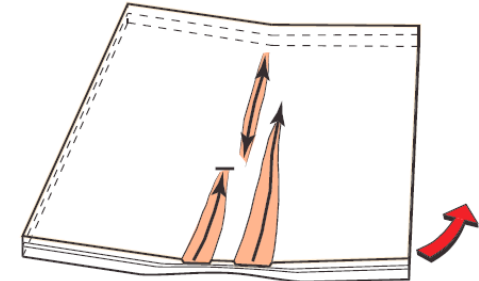
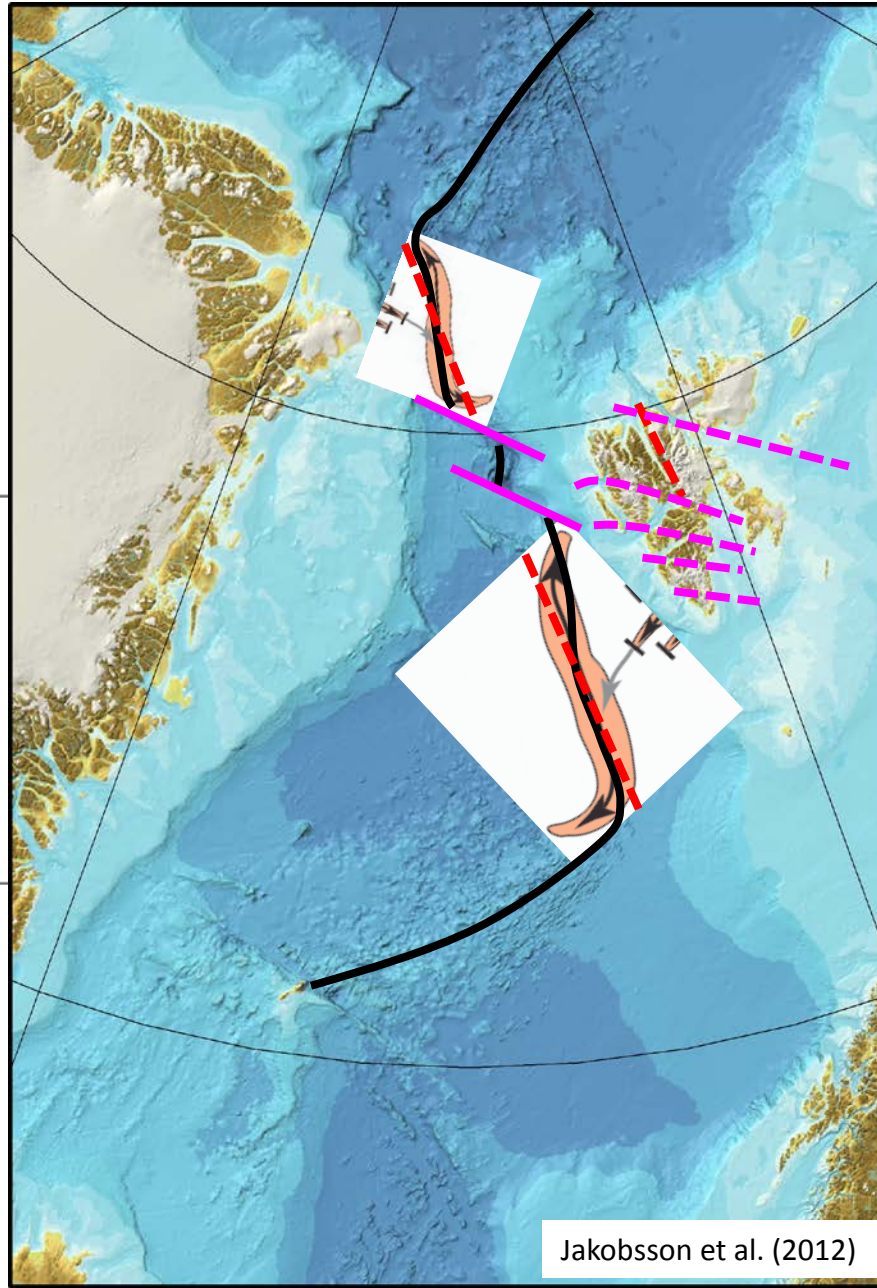
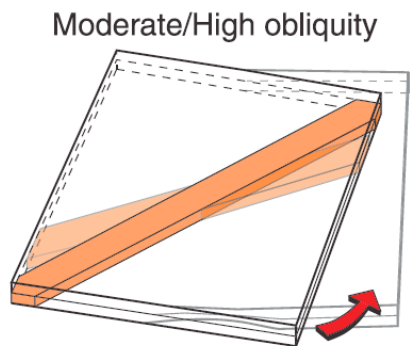
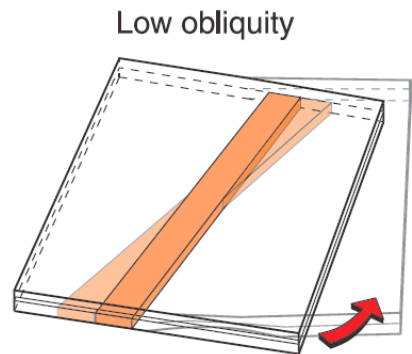
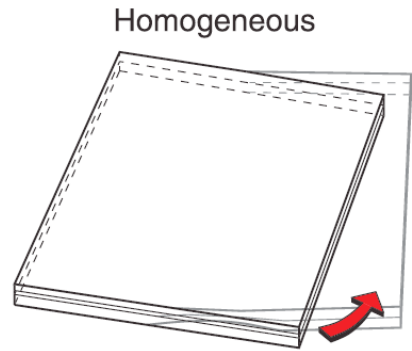
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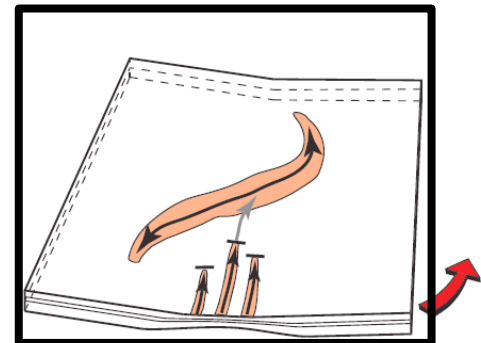
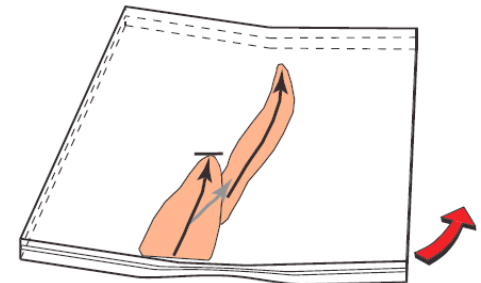
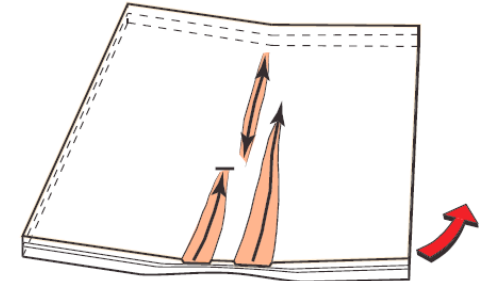
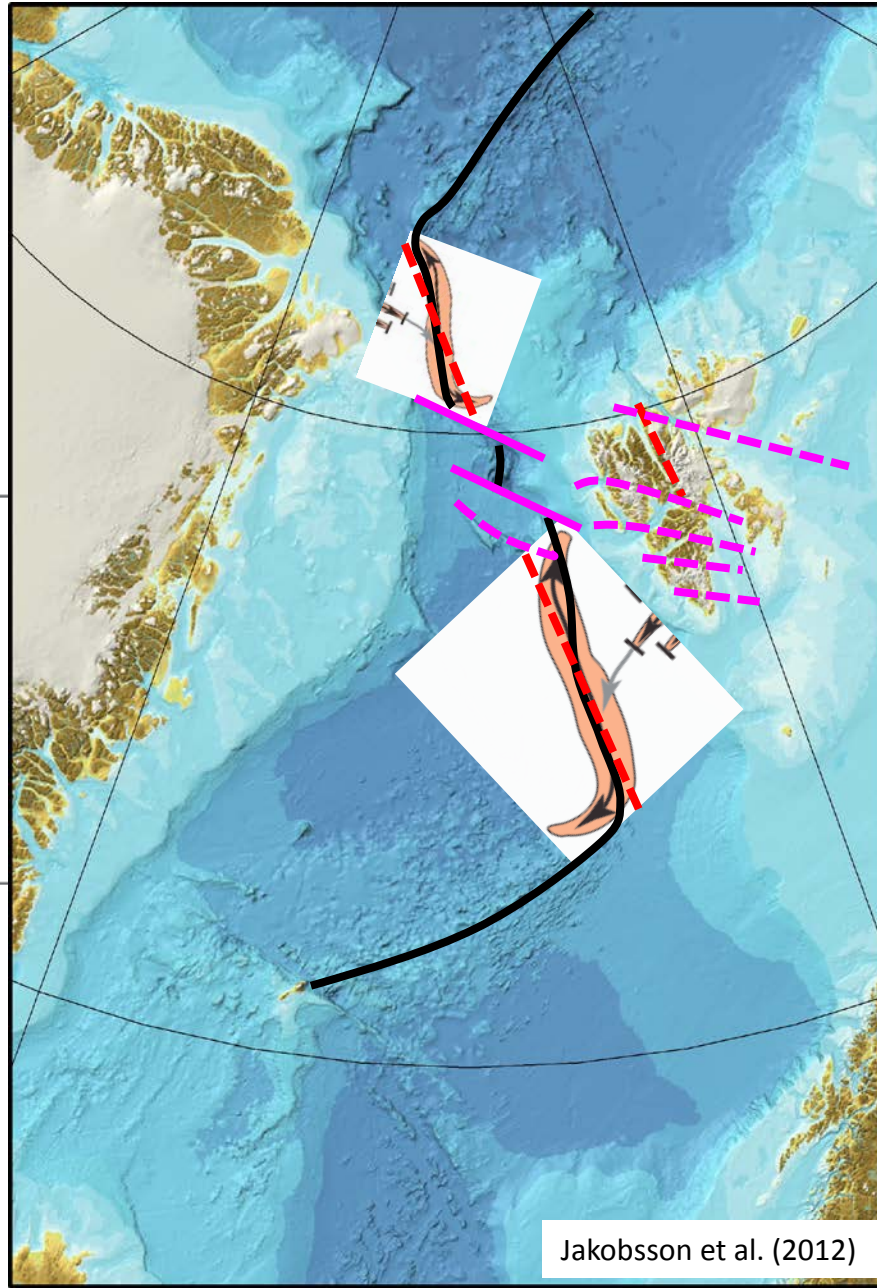
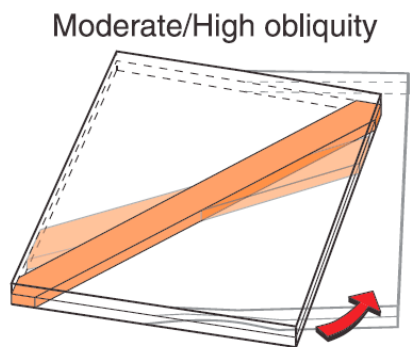
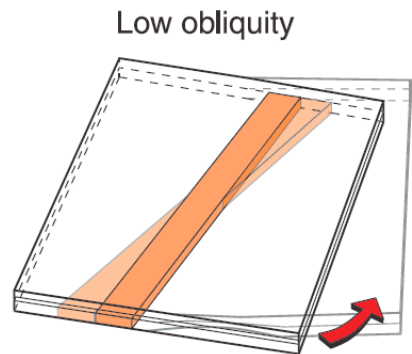
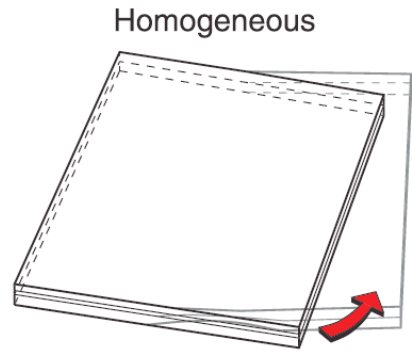
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Molnar et al. (2017)

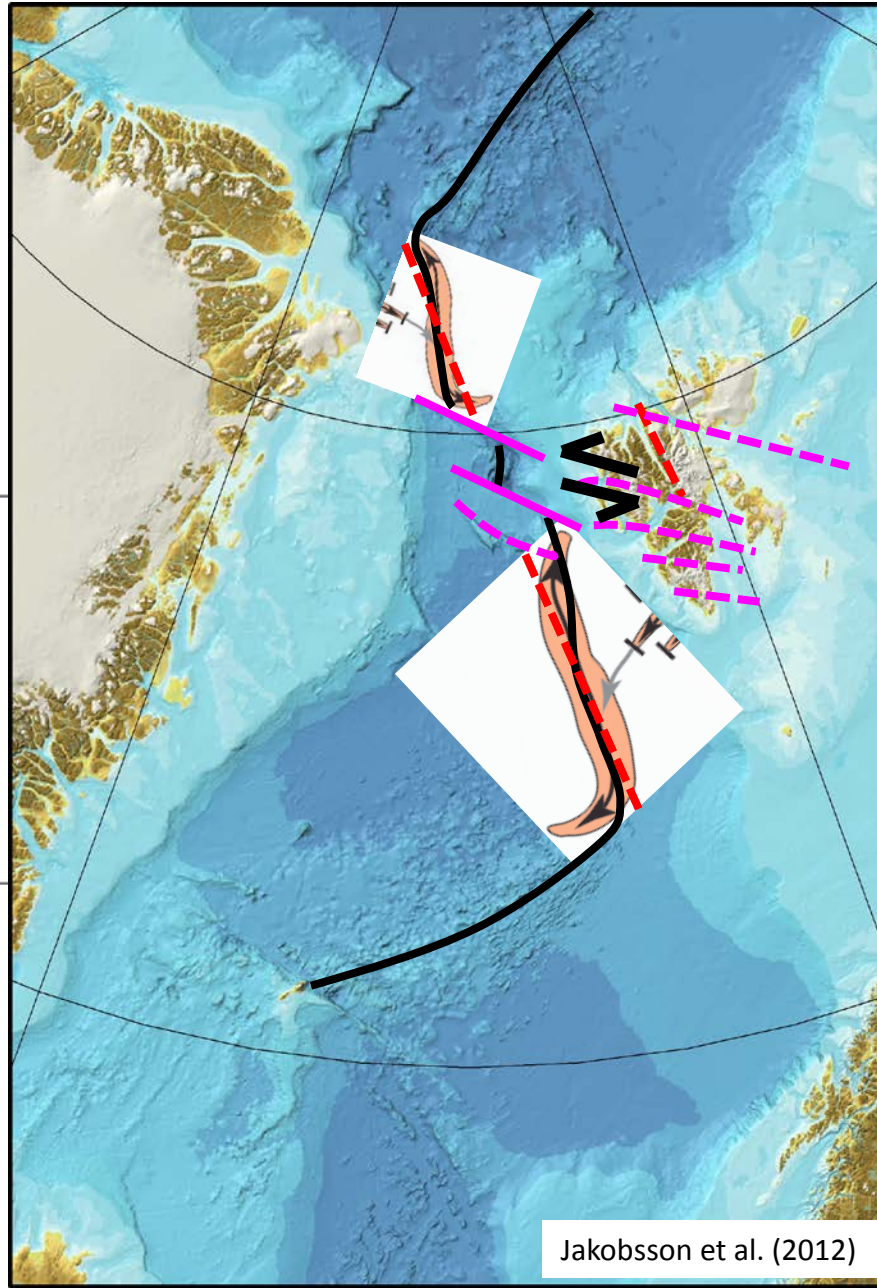
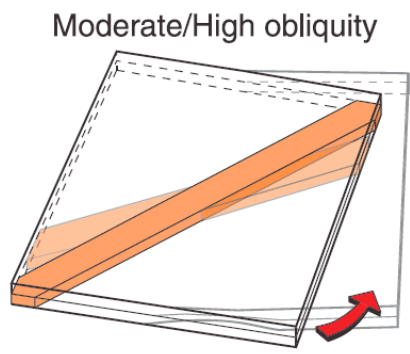
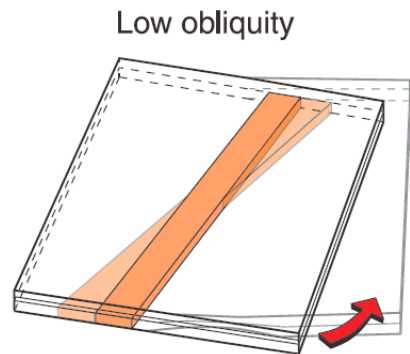
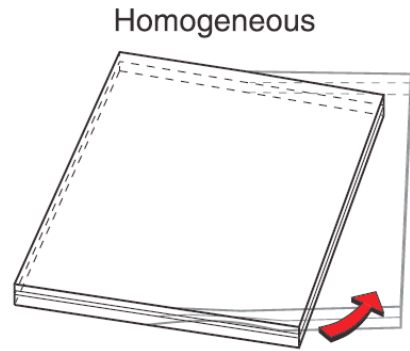
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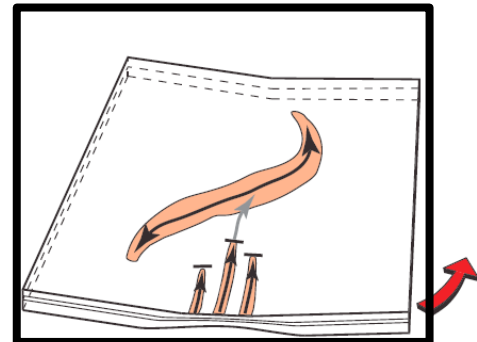
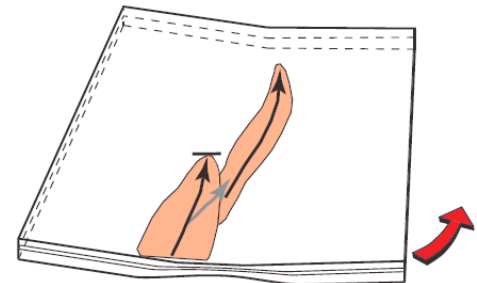
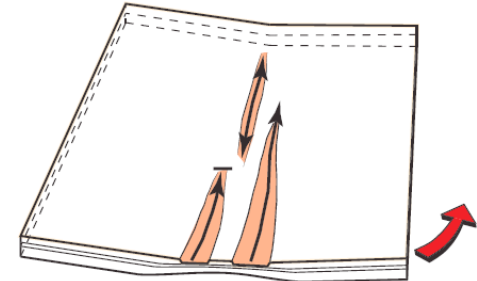
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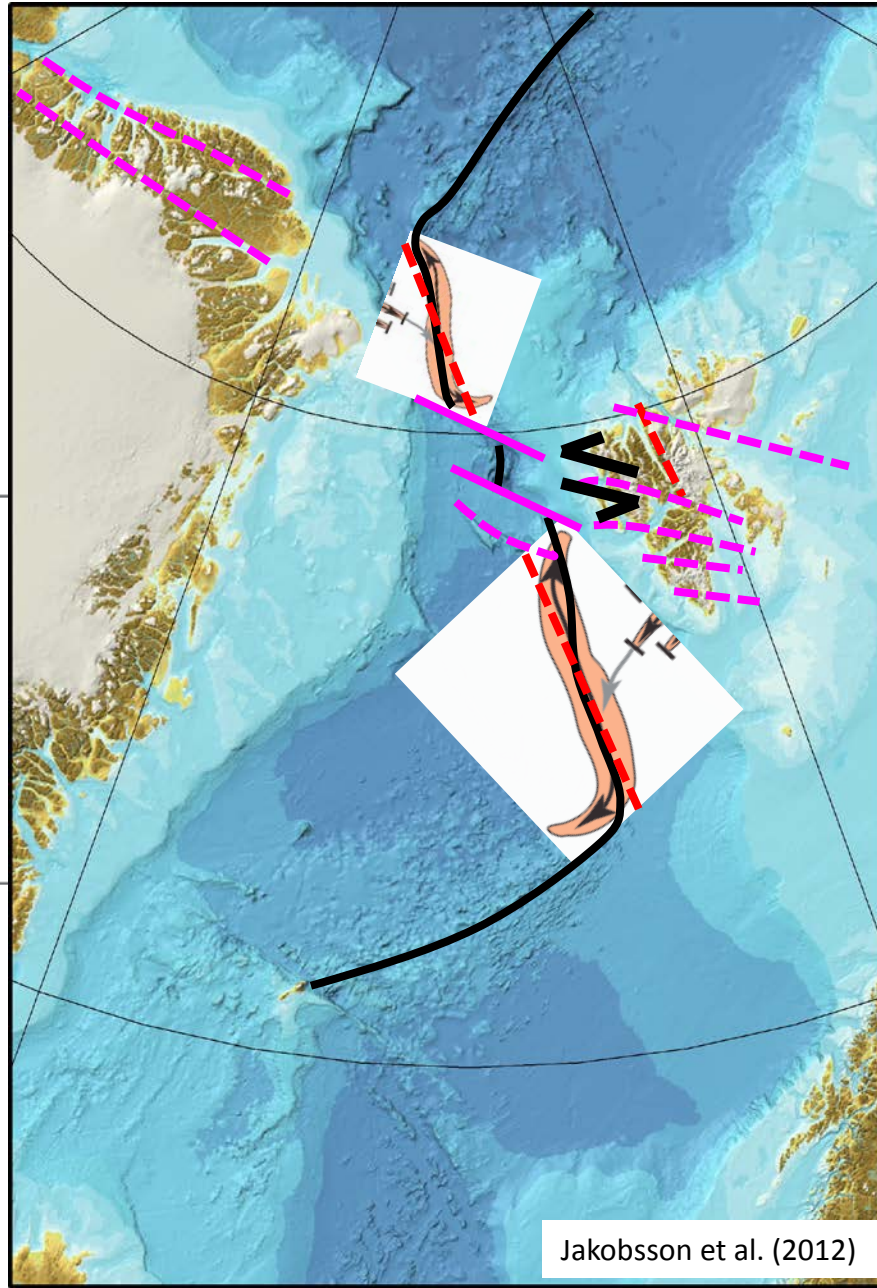
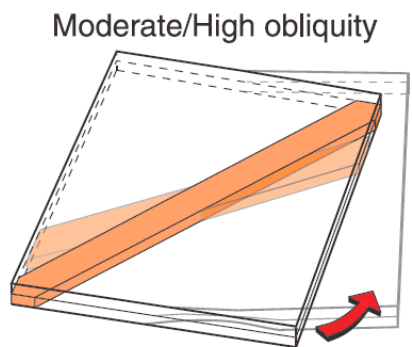
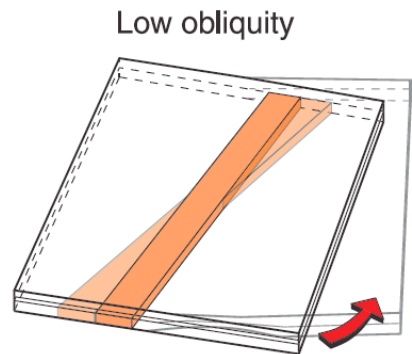
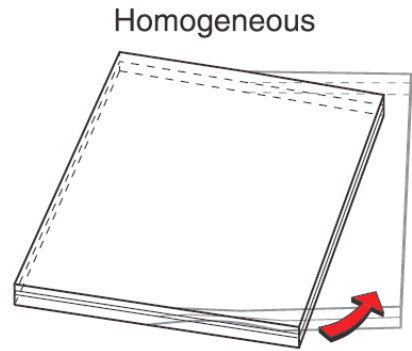
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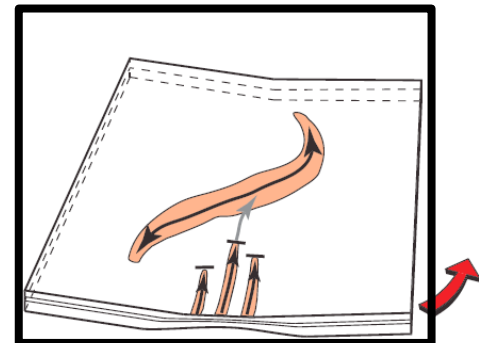
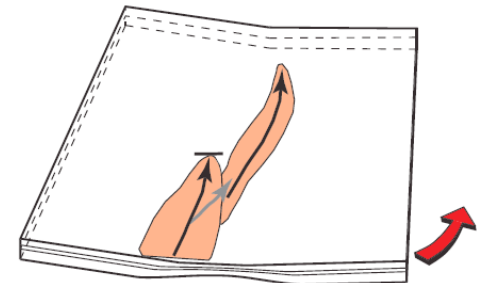
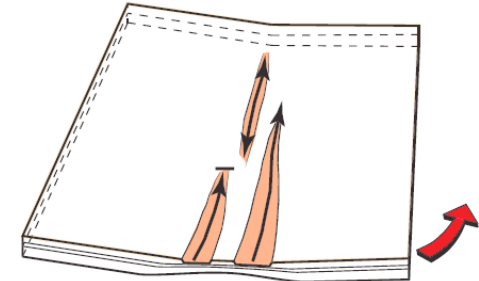
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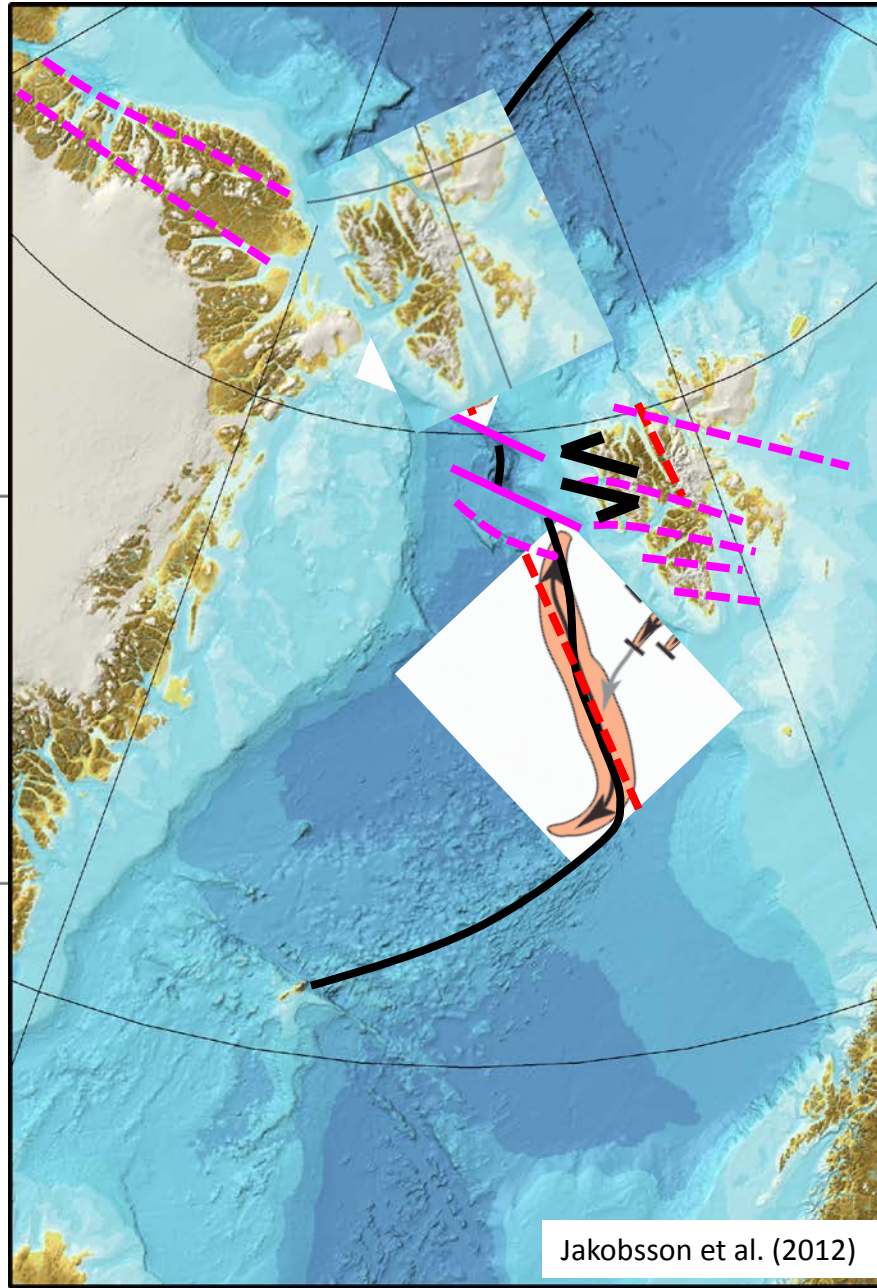
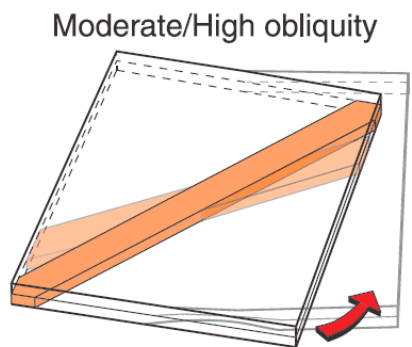
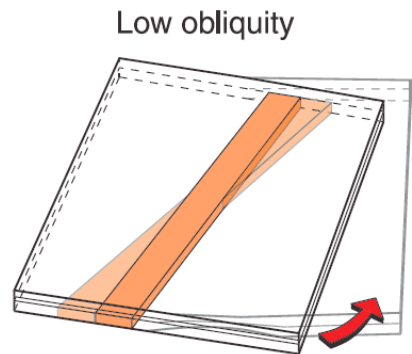
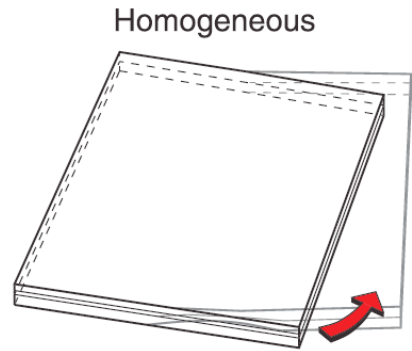


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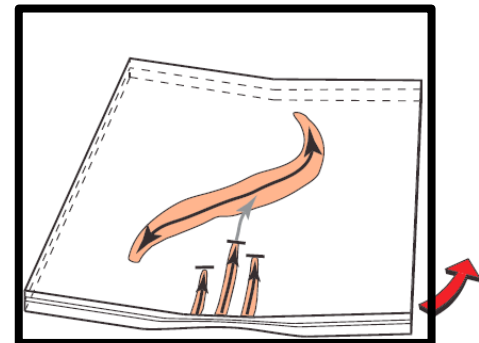
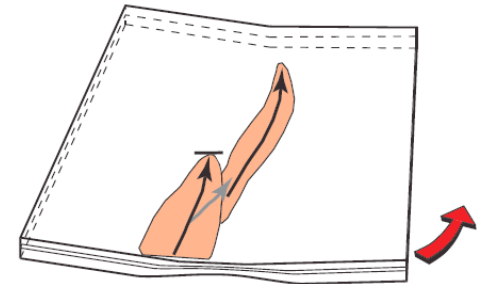
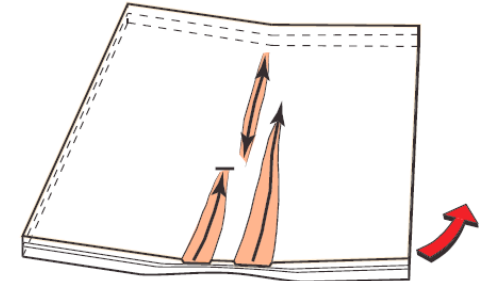


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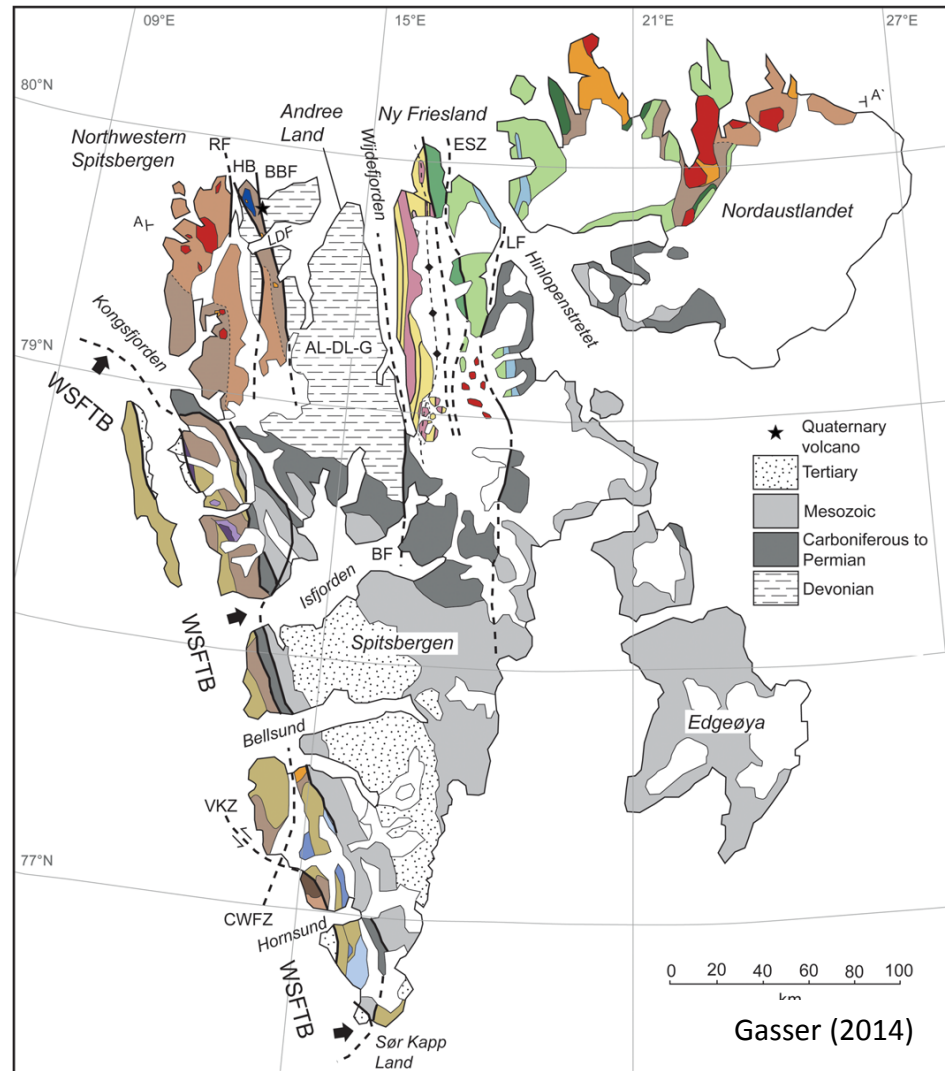


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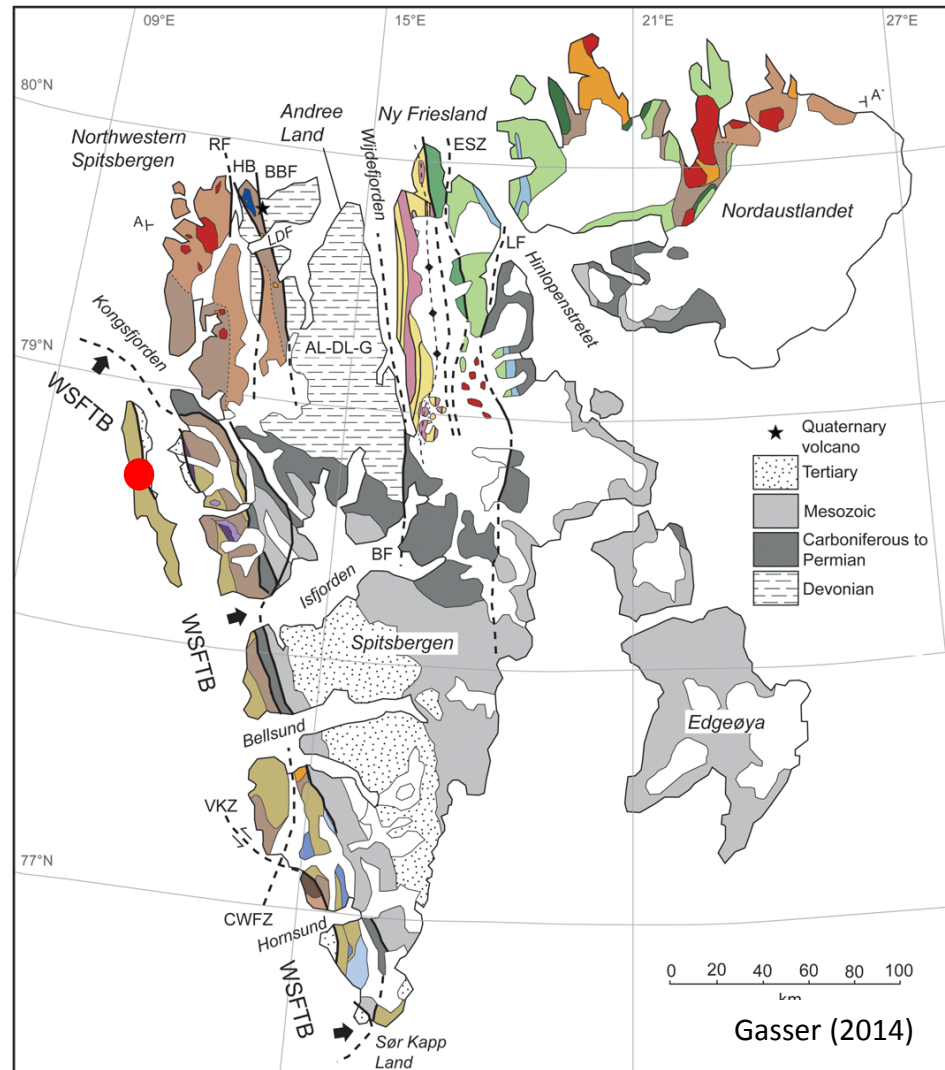


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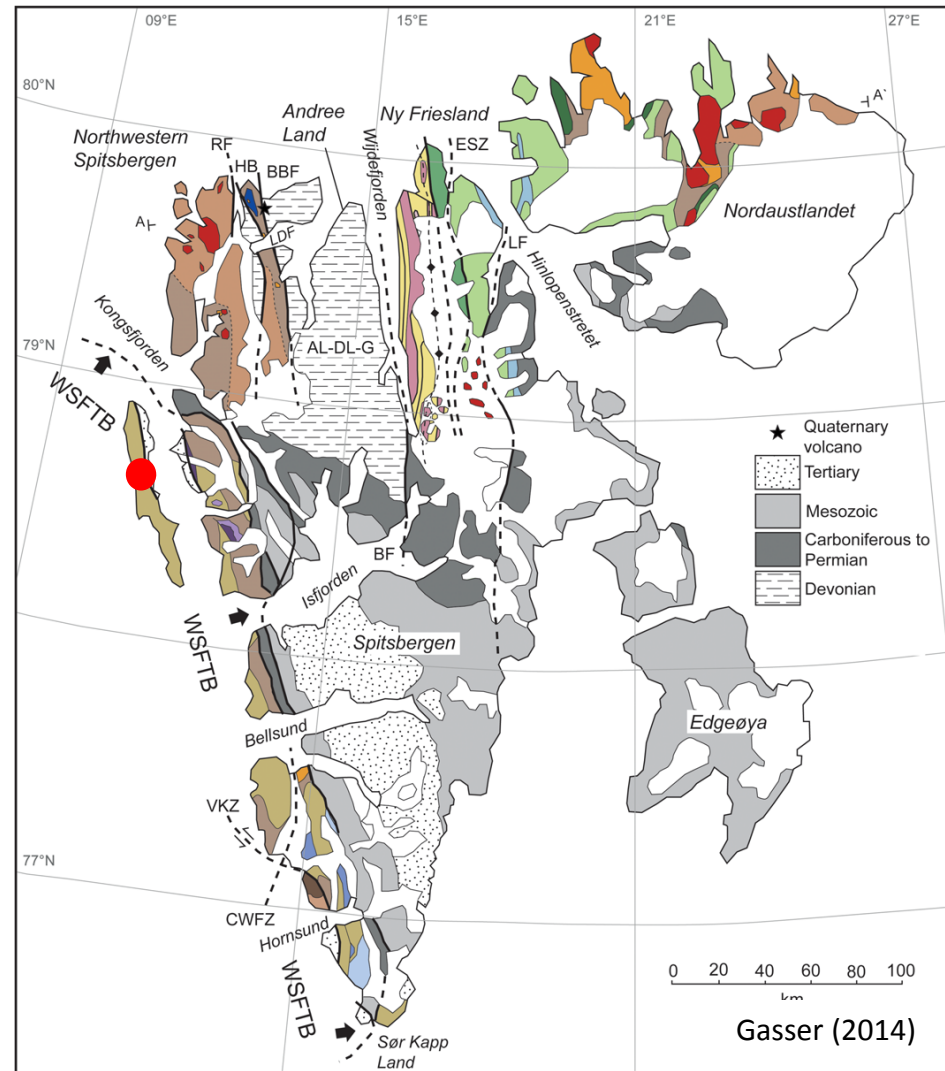
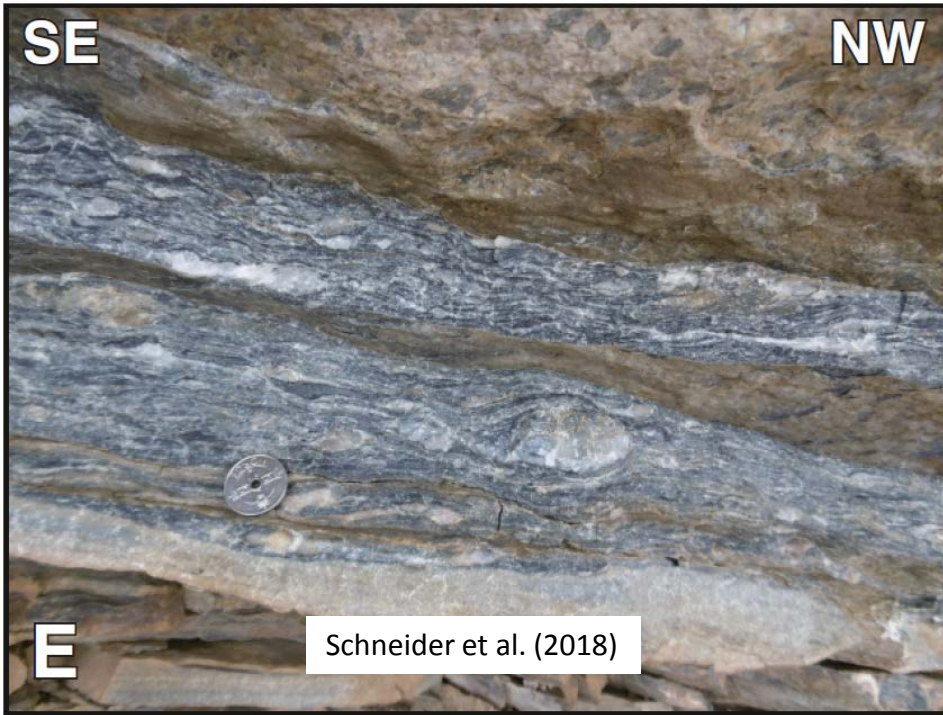
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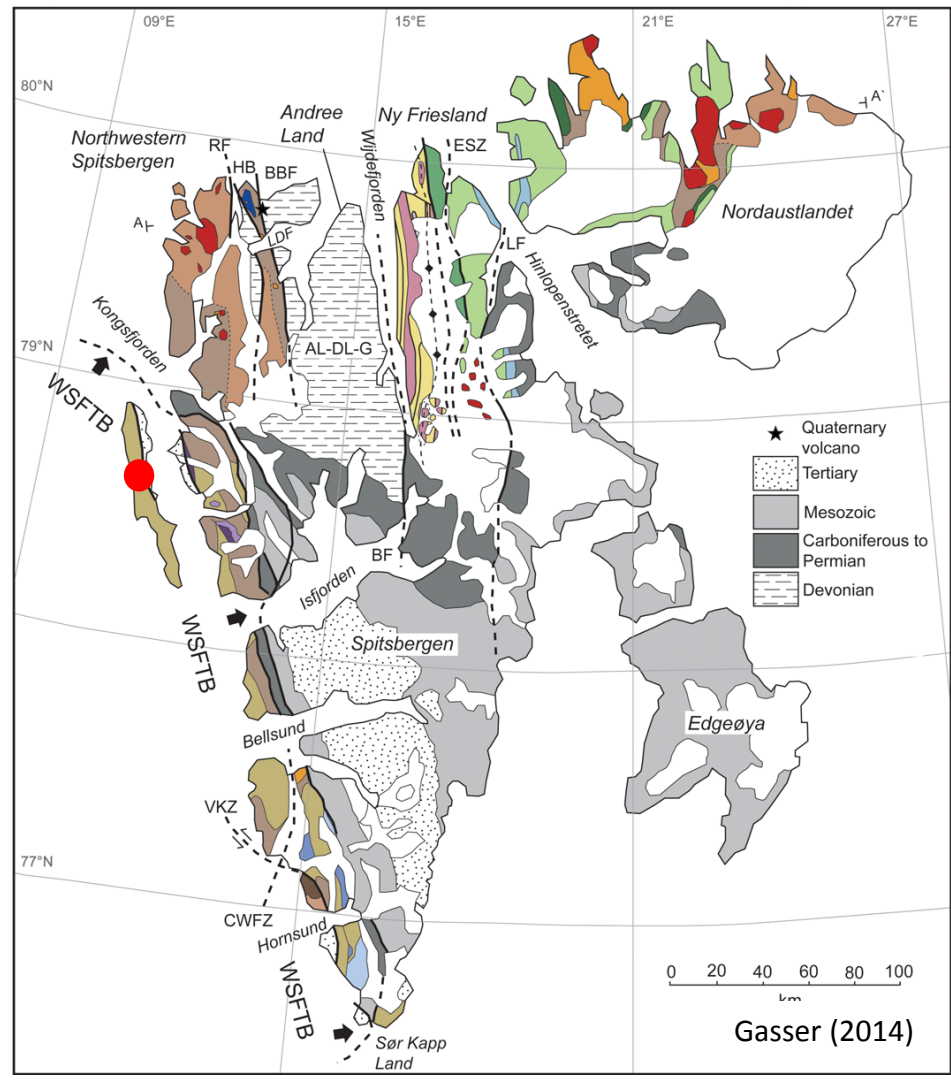
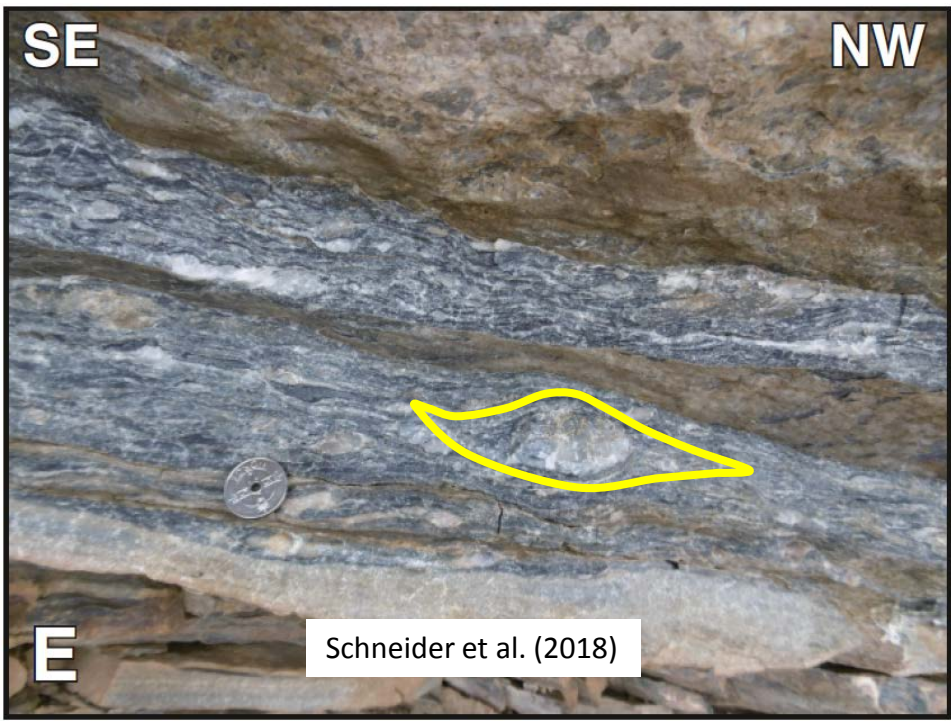
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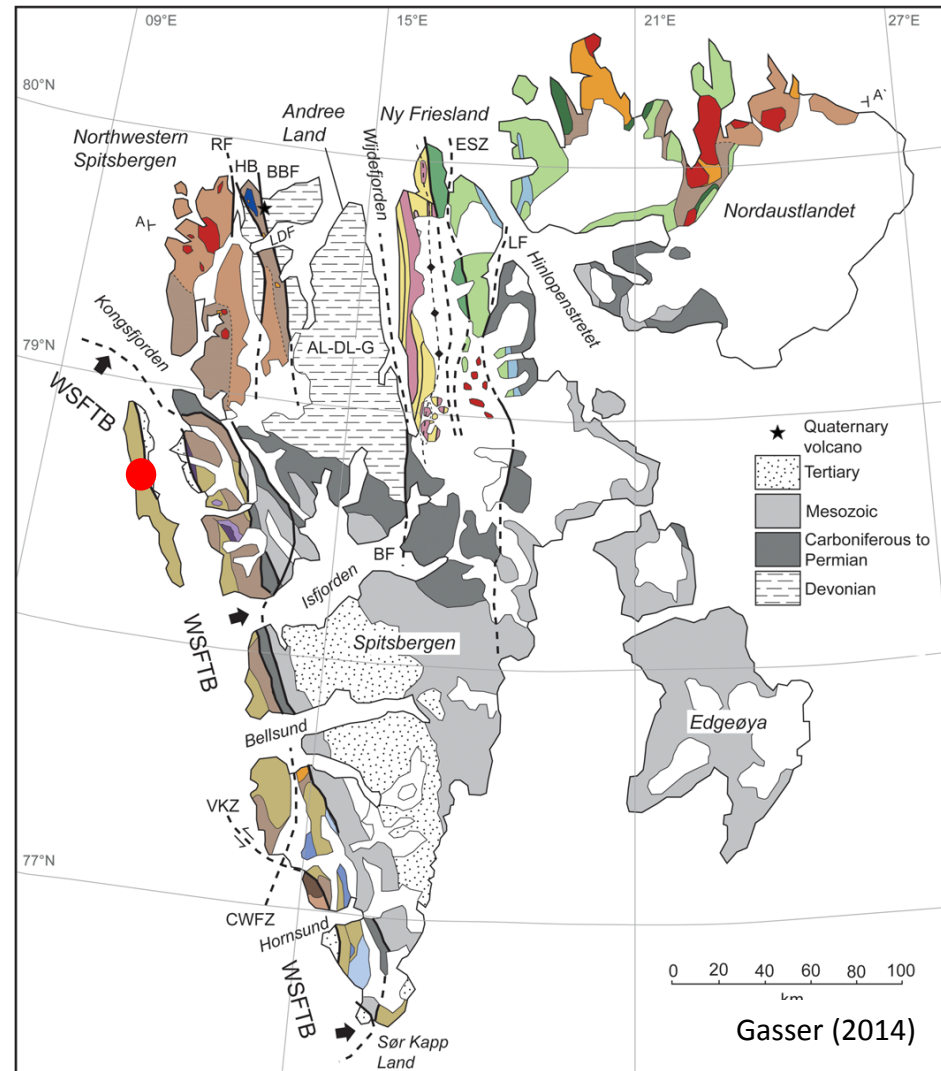
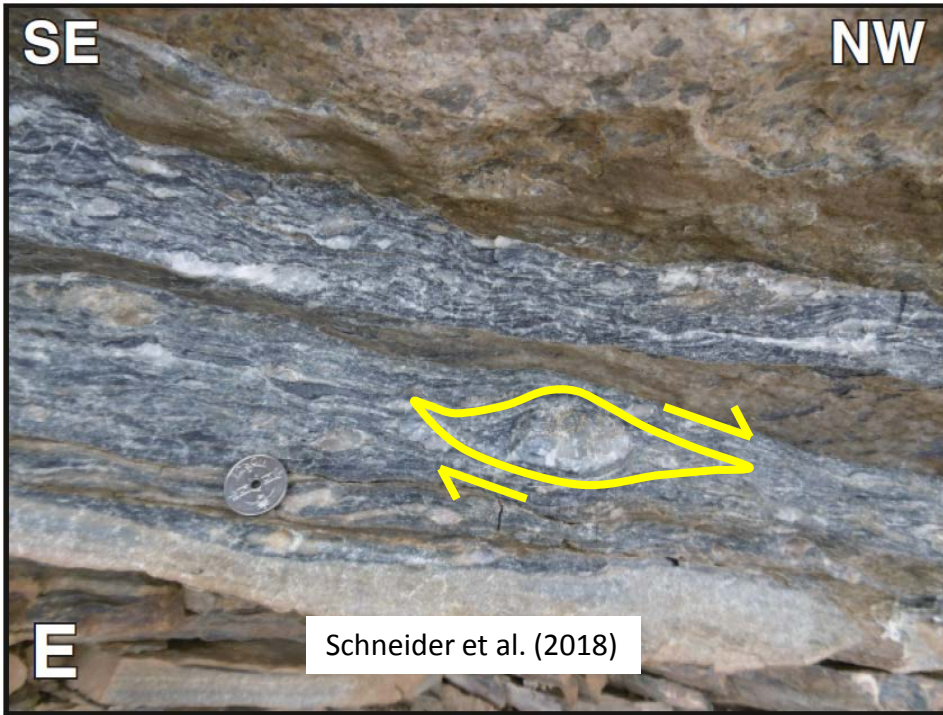
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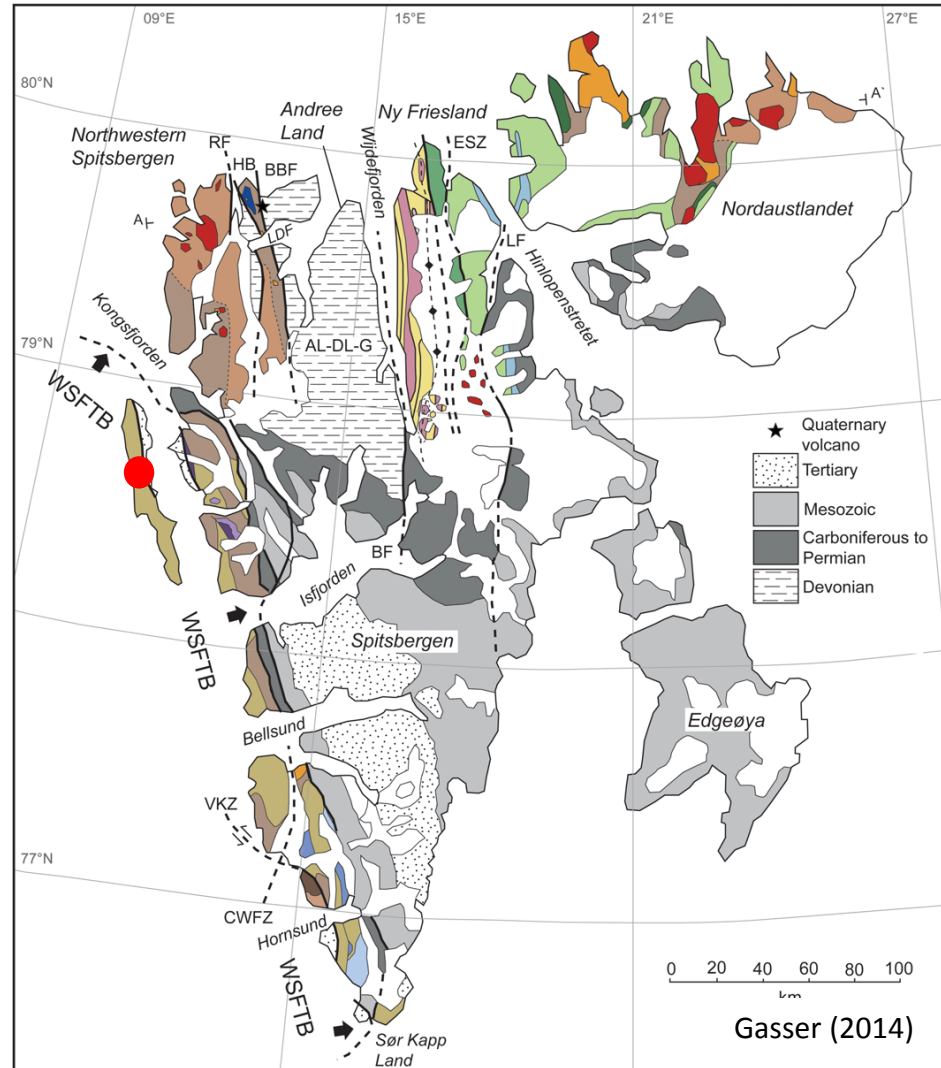
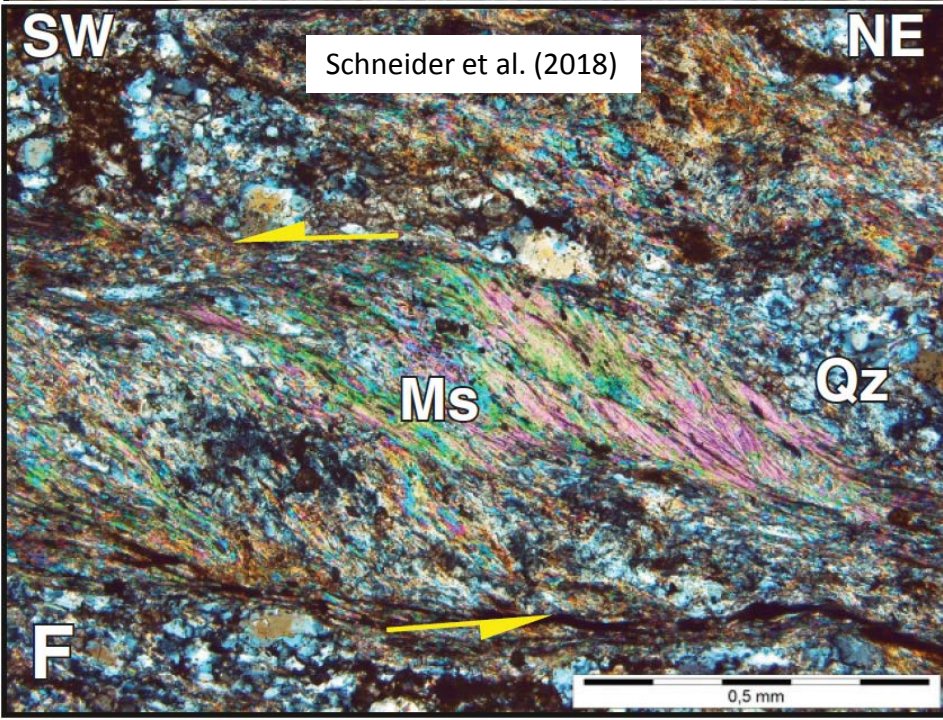
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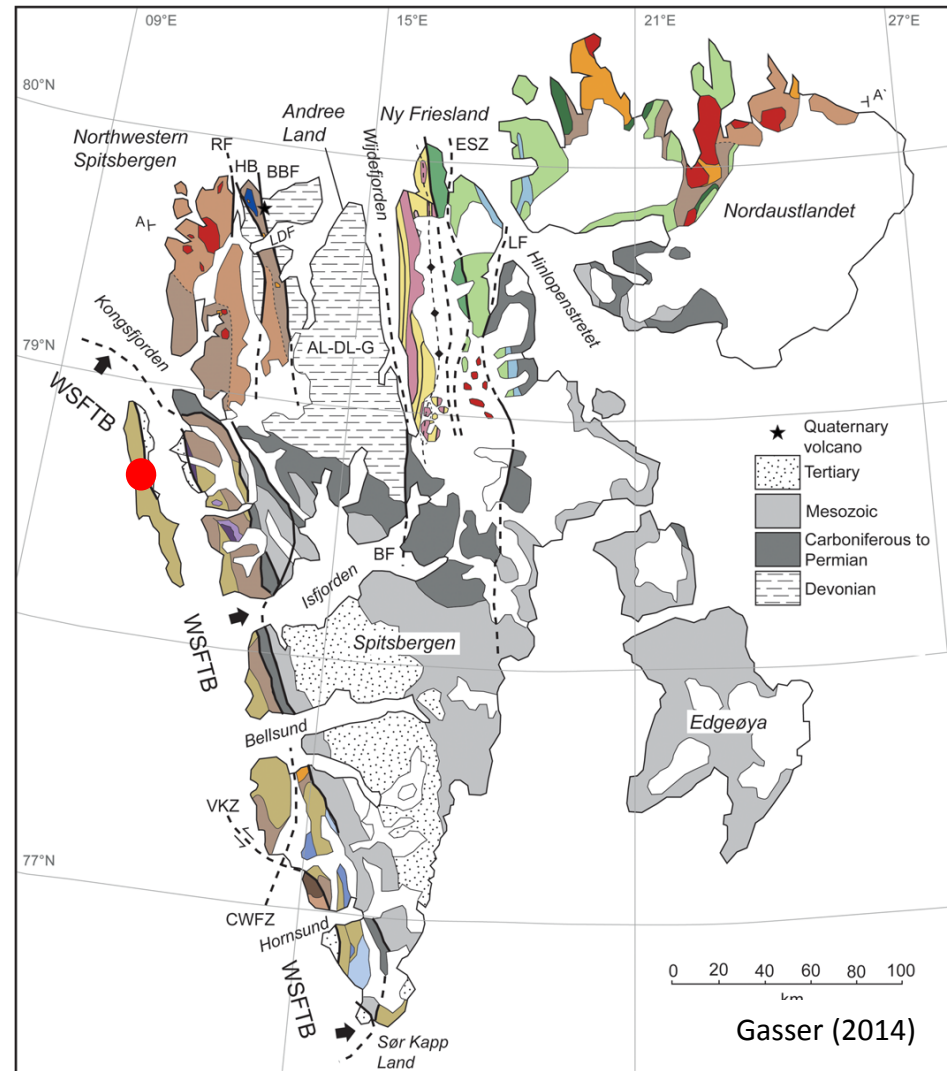
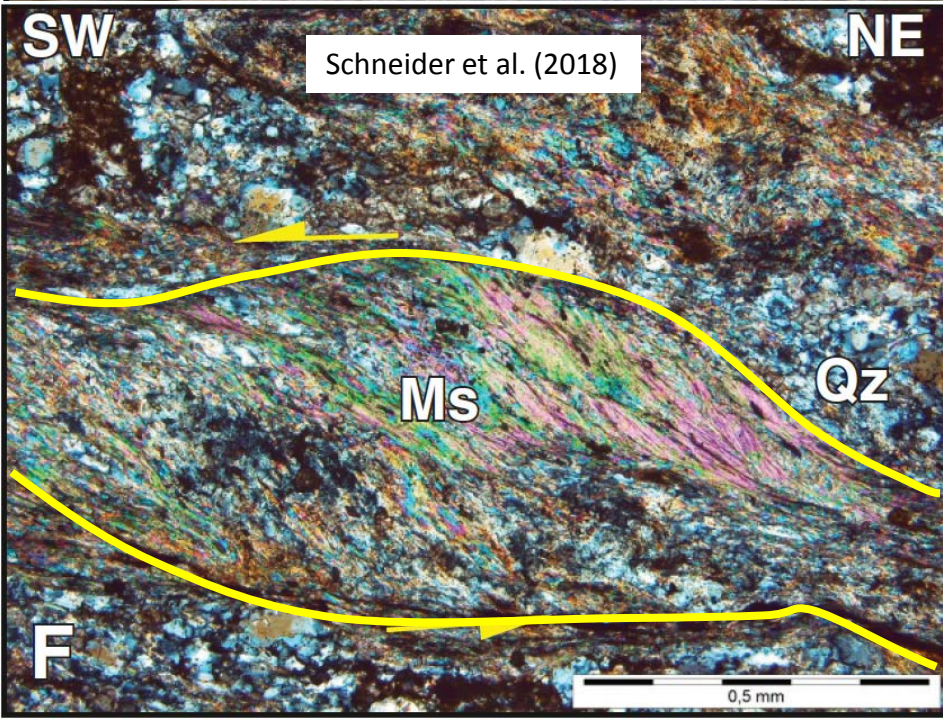


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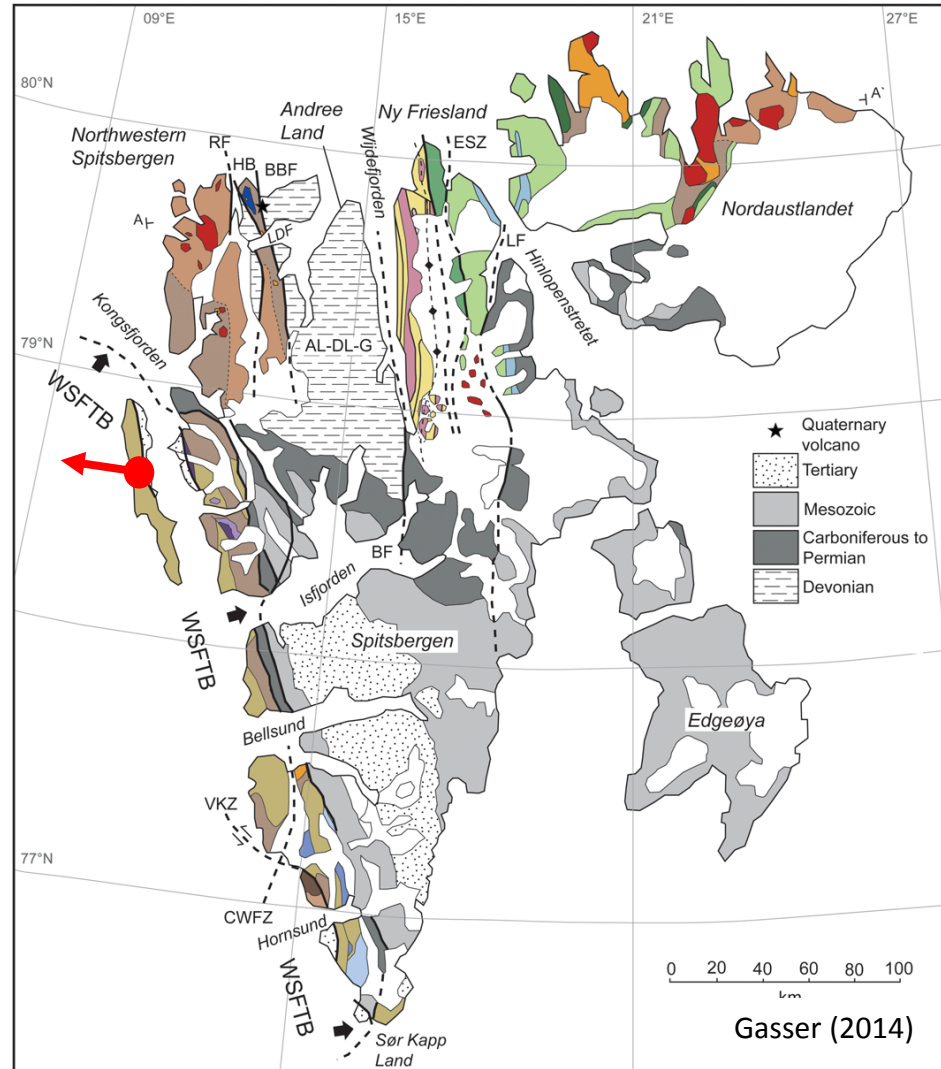
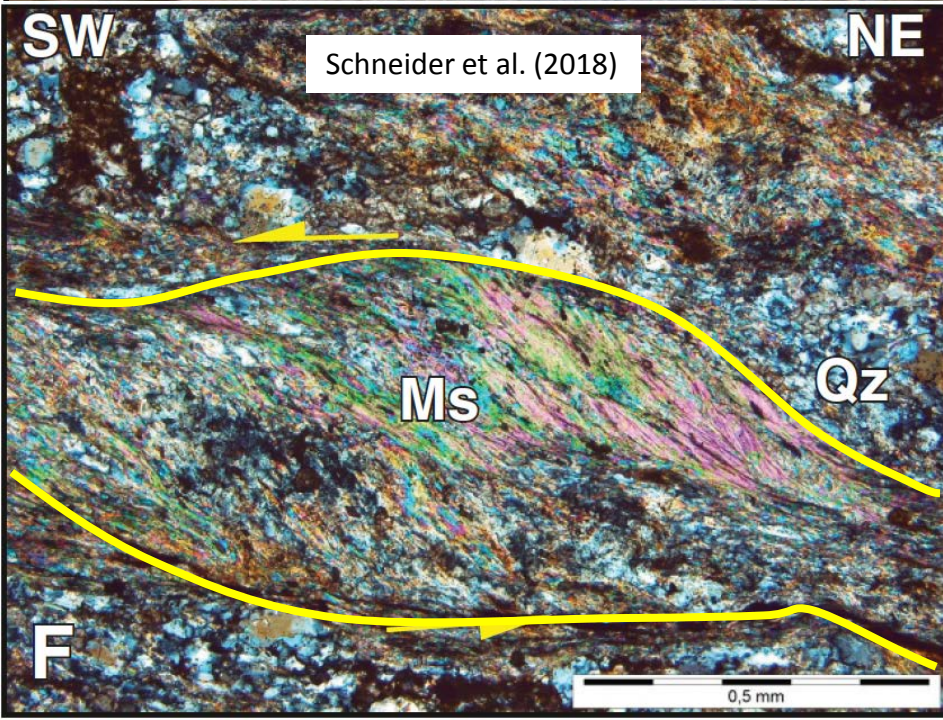




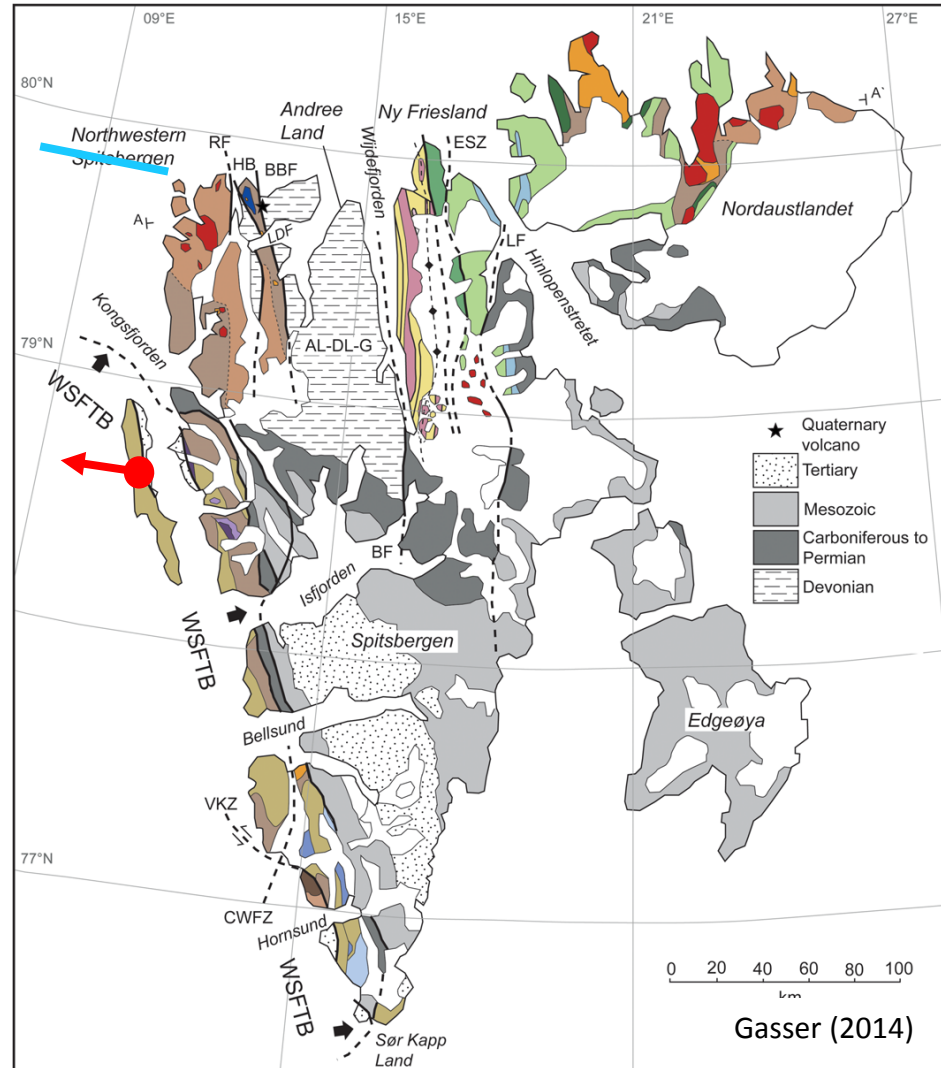
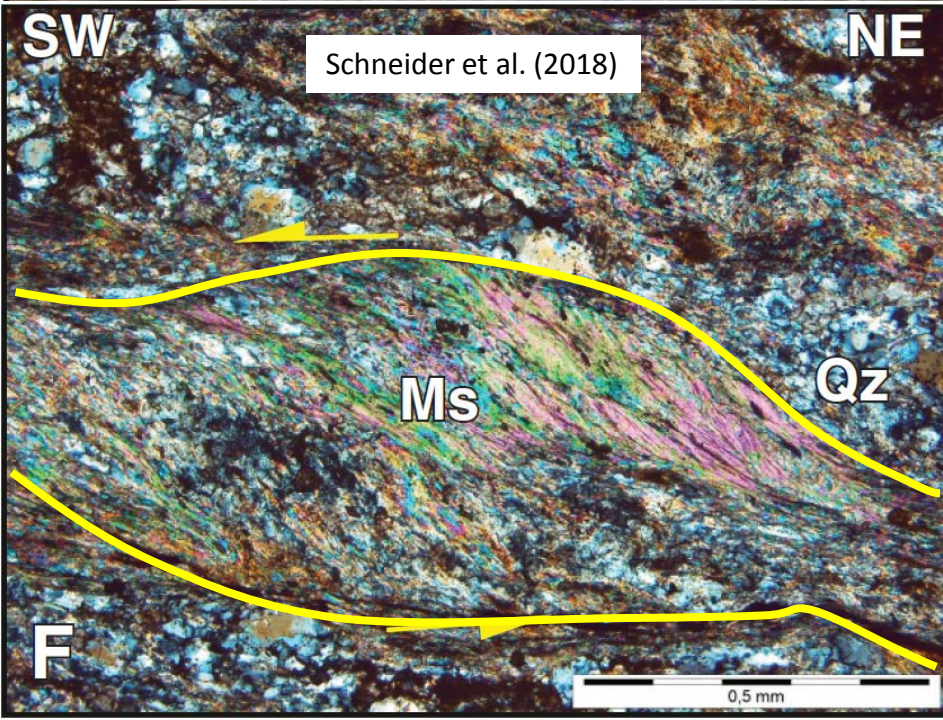
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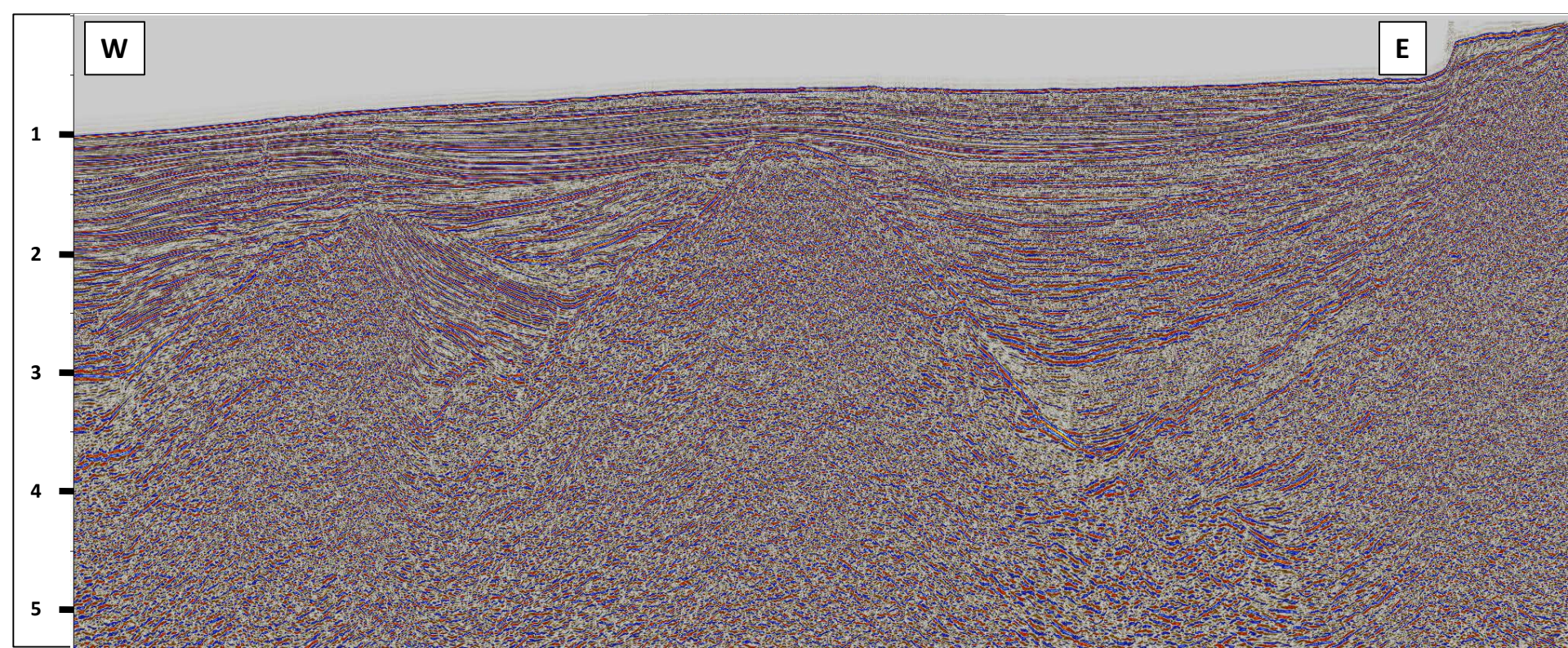
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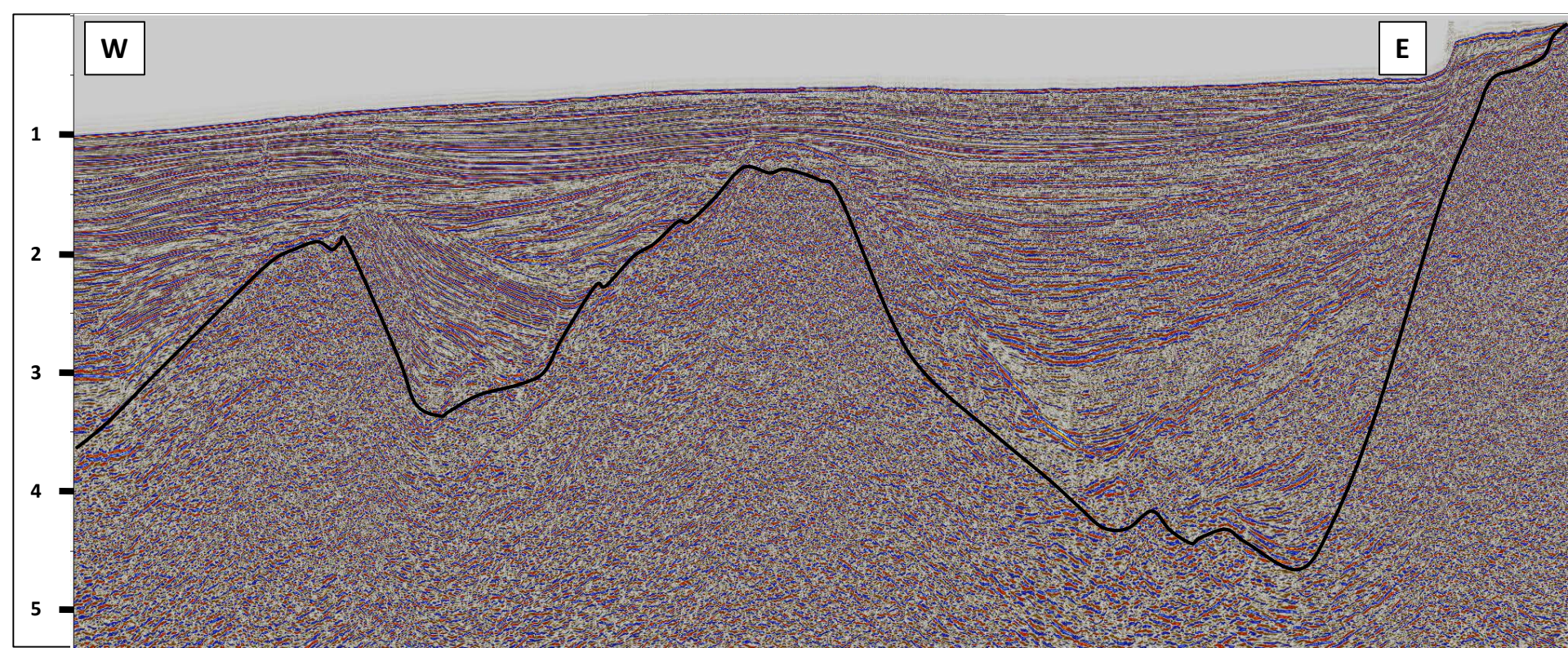
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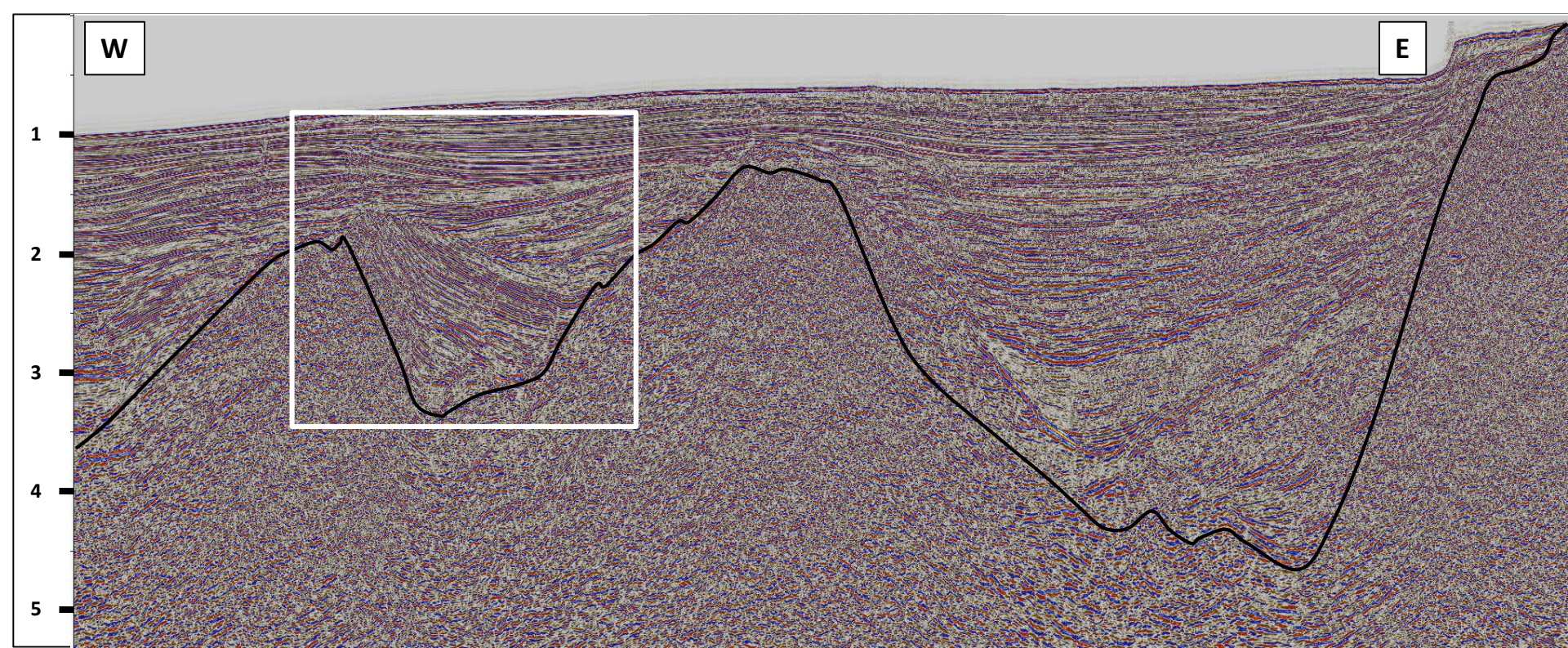
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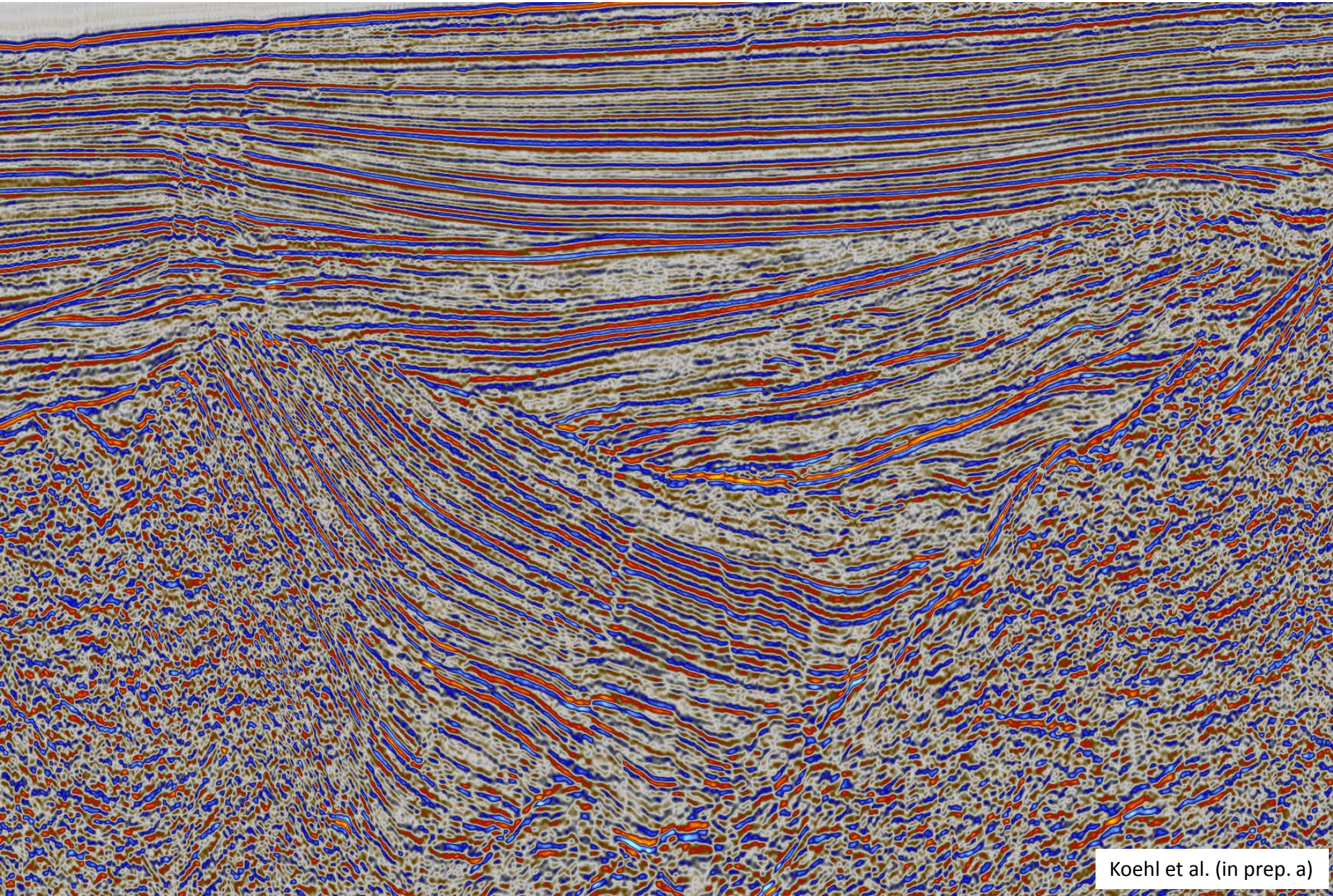
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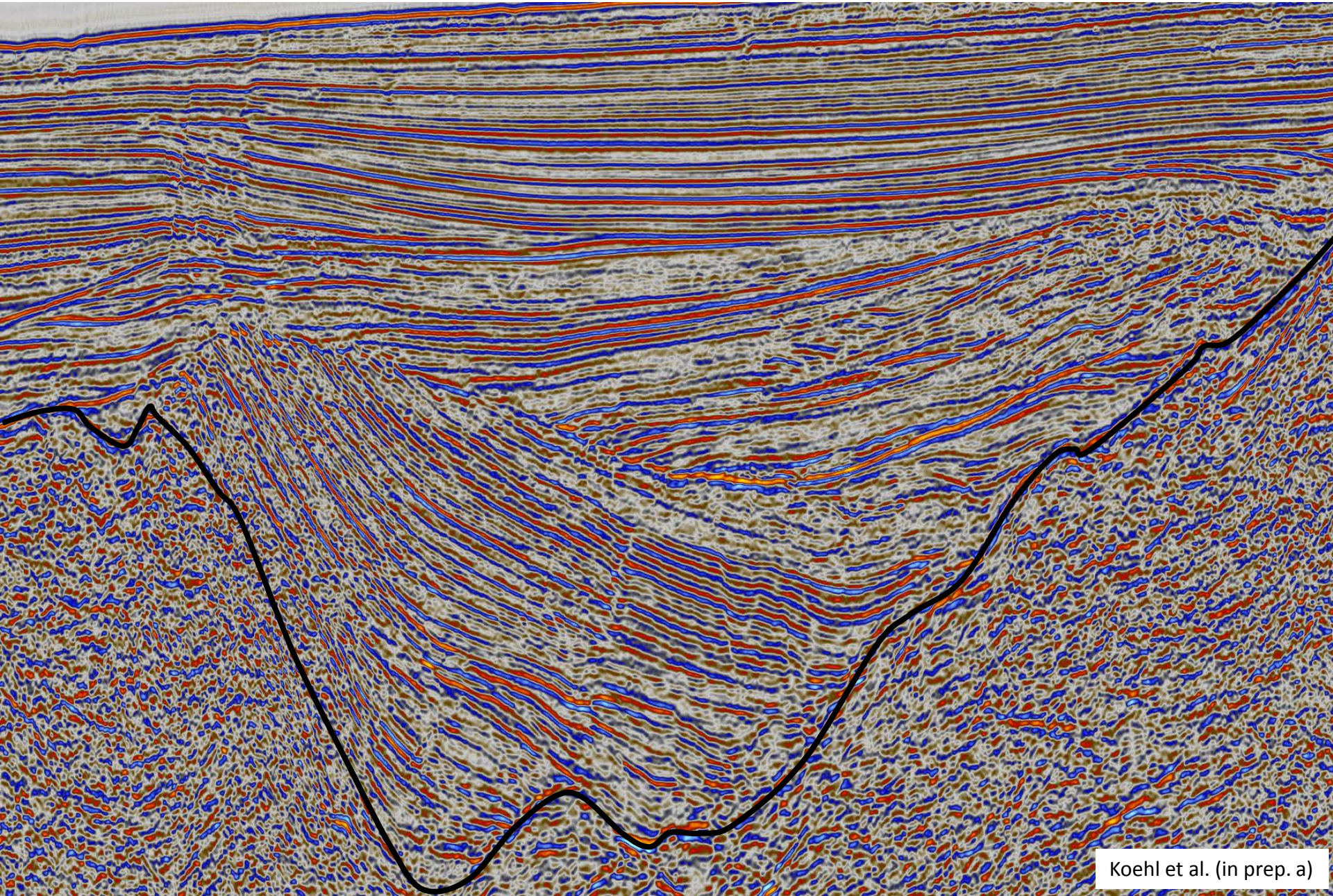
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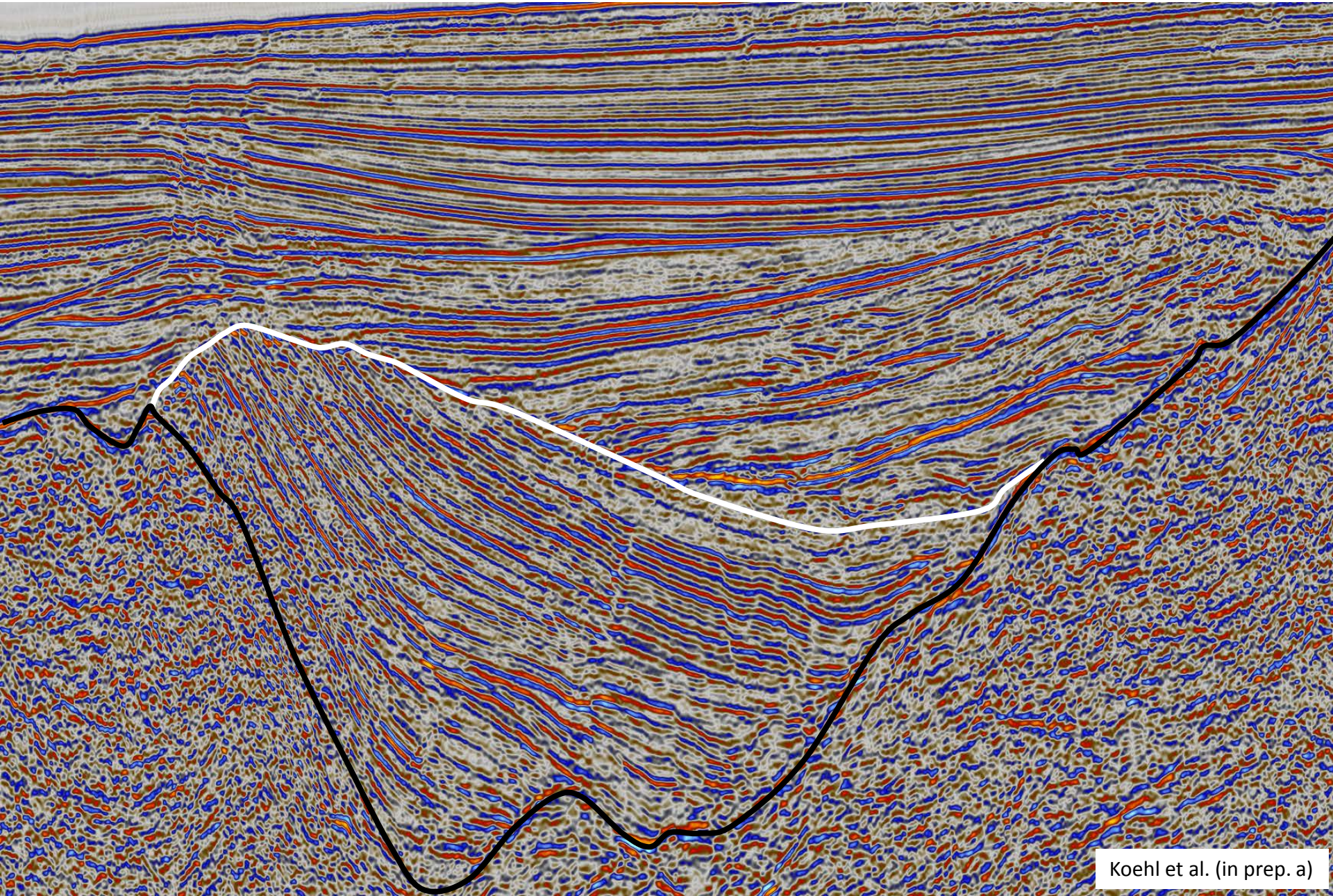


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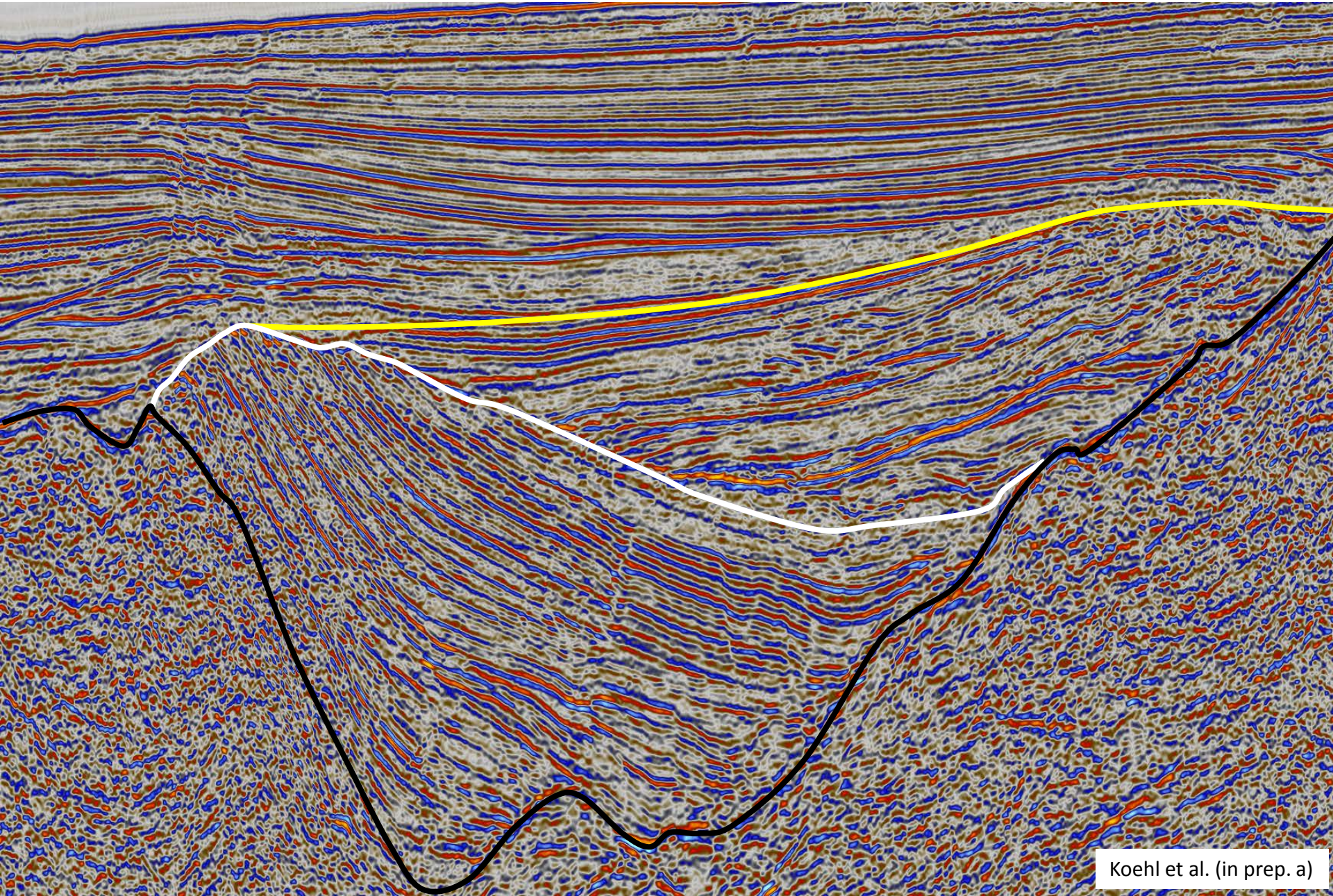




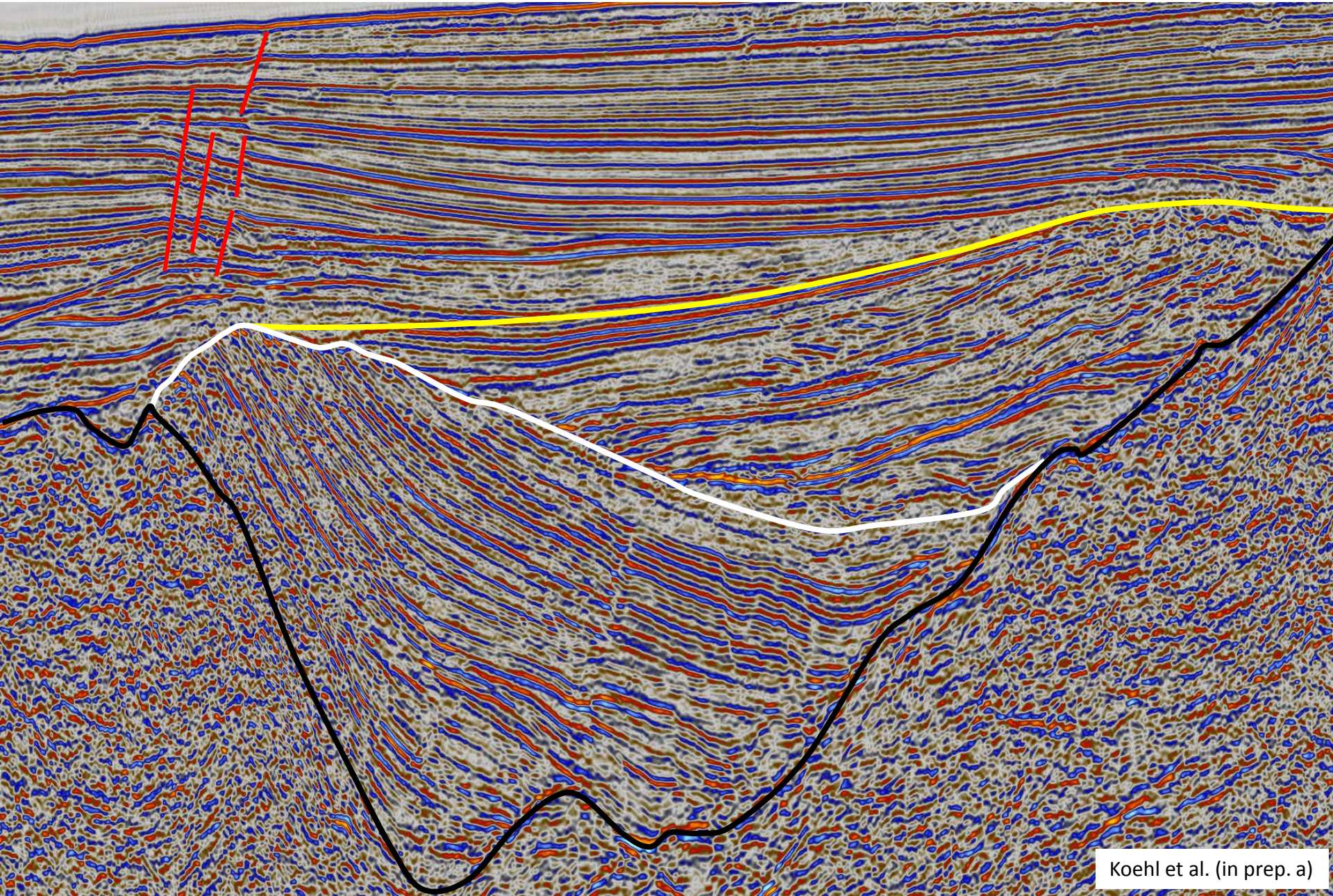
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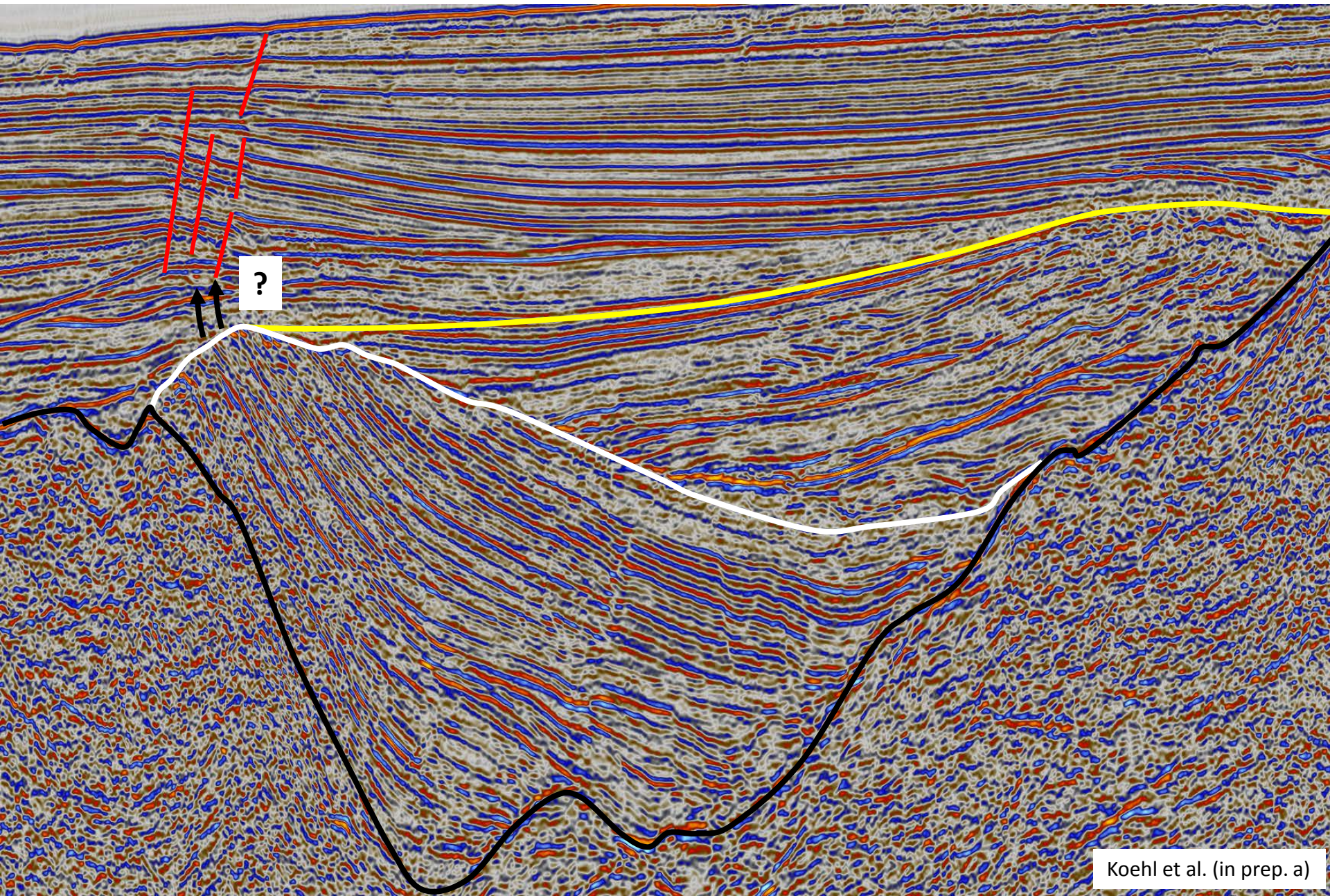
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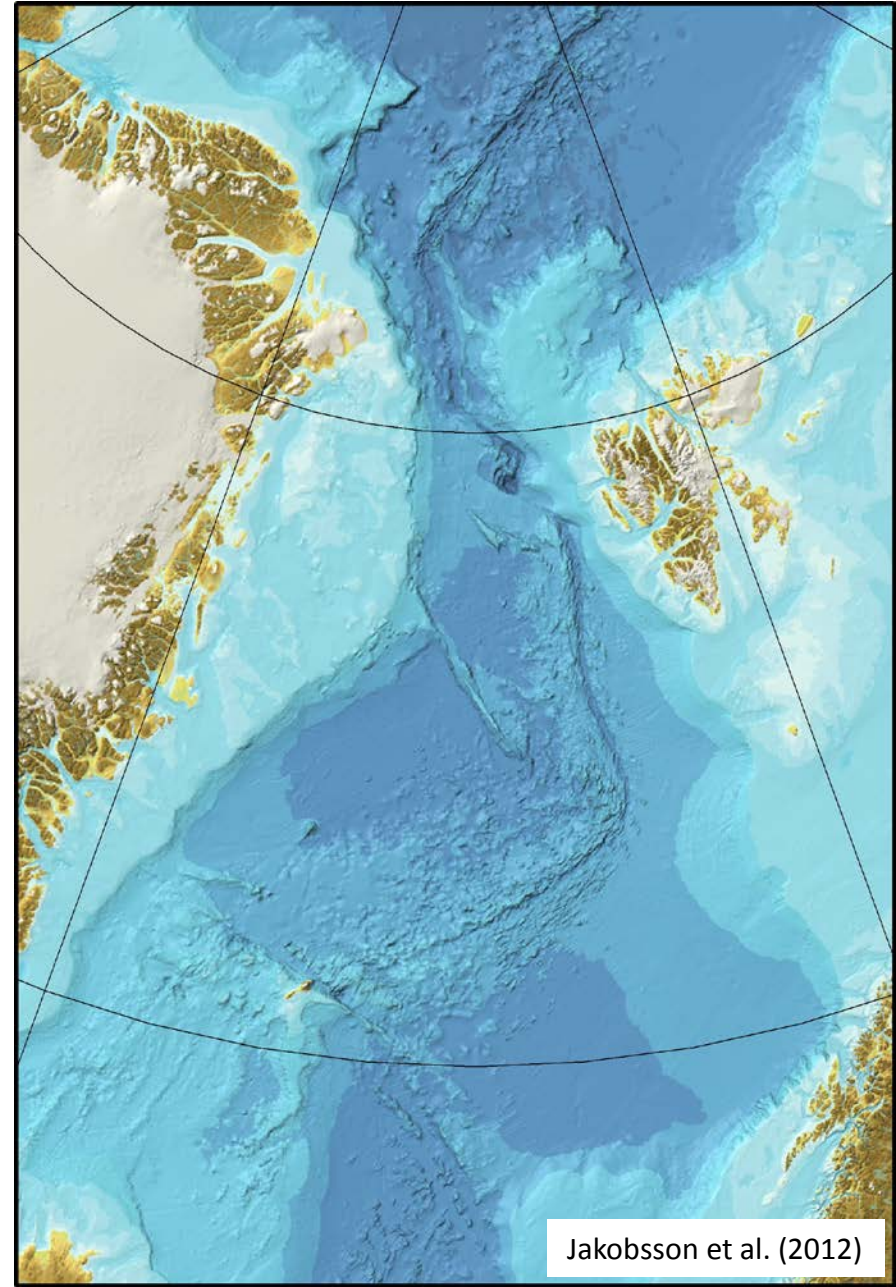
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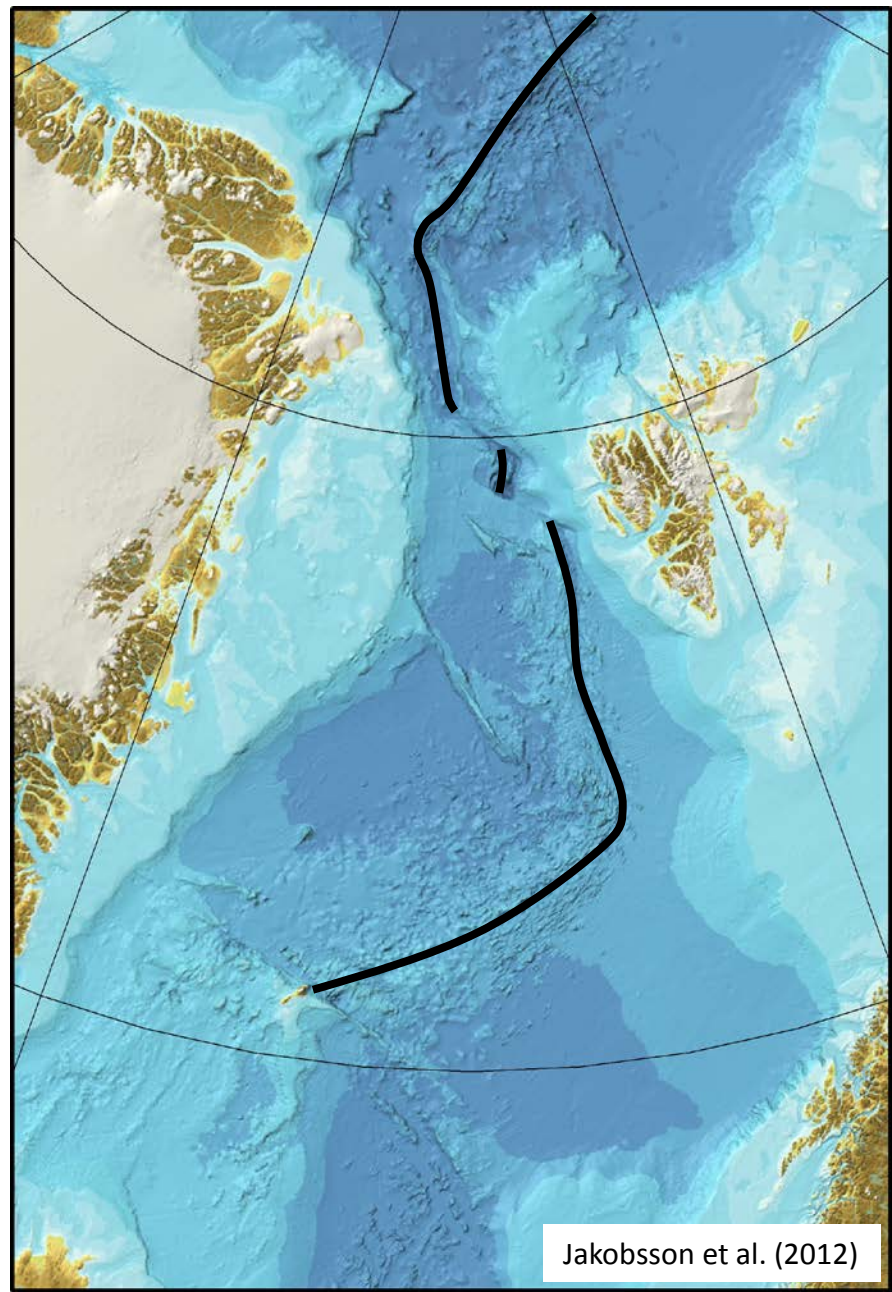
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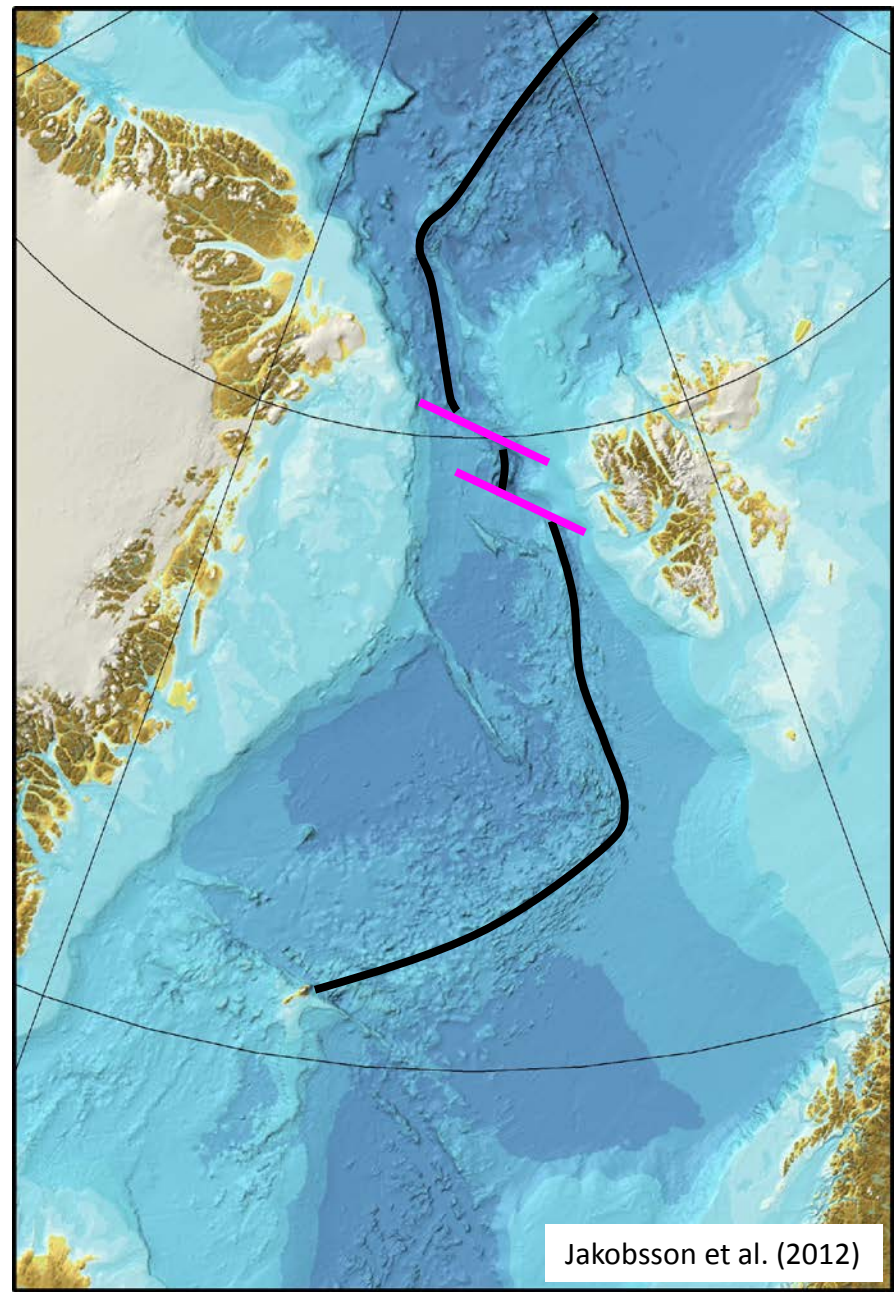
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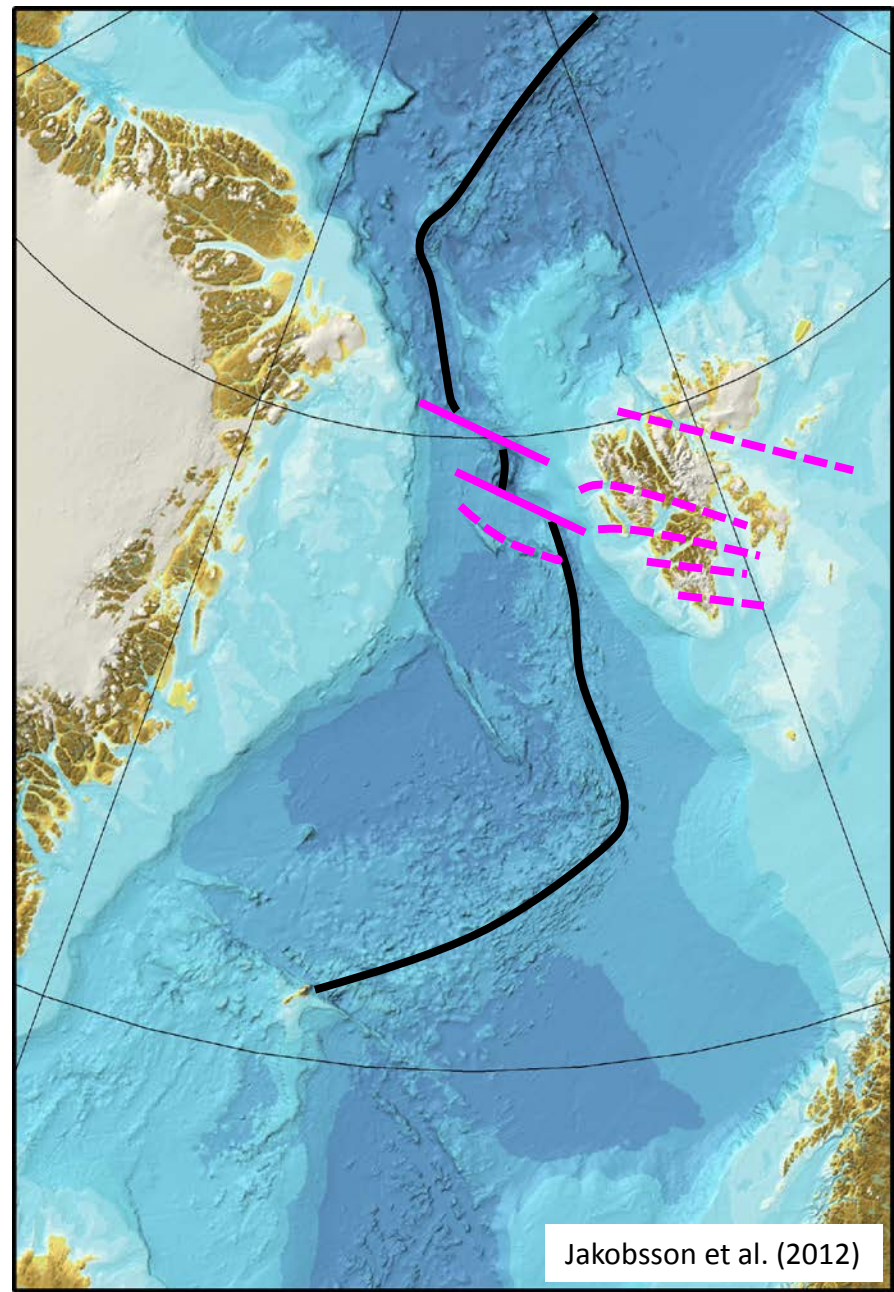
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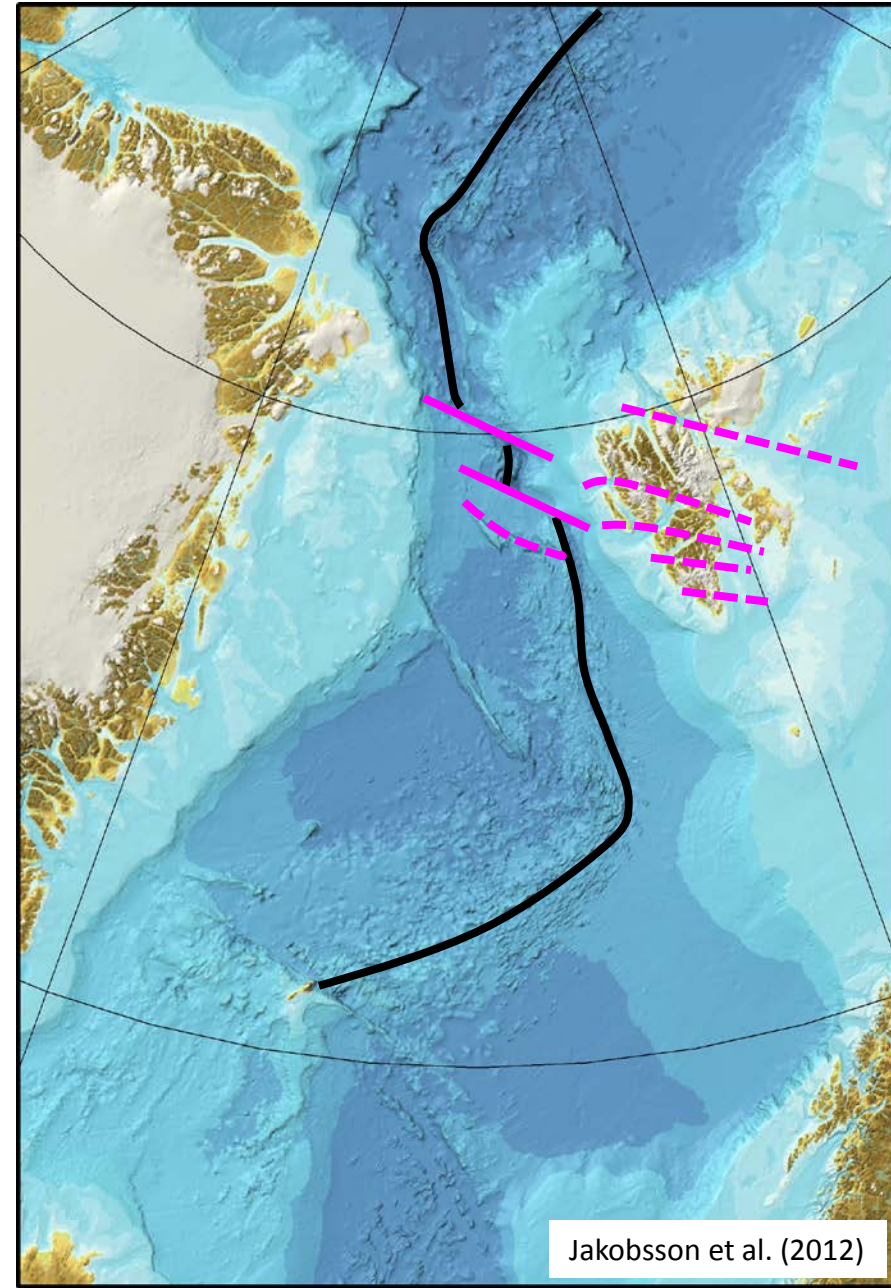
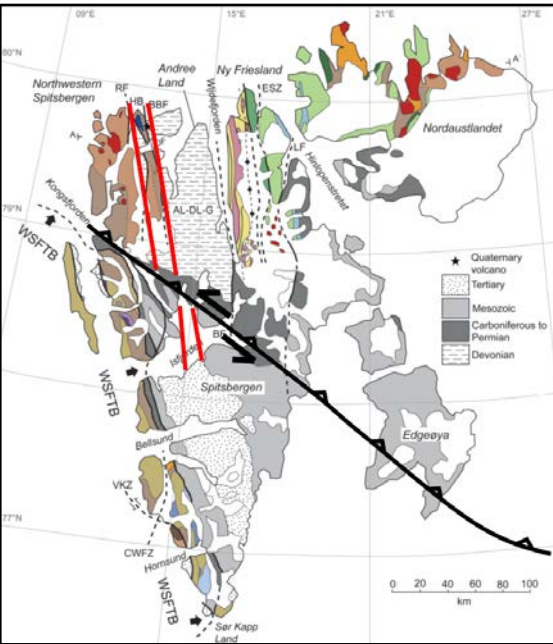


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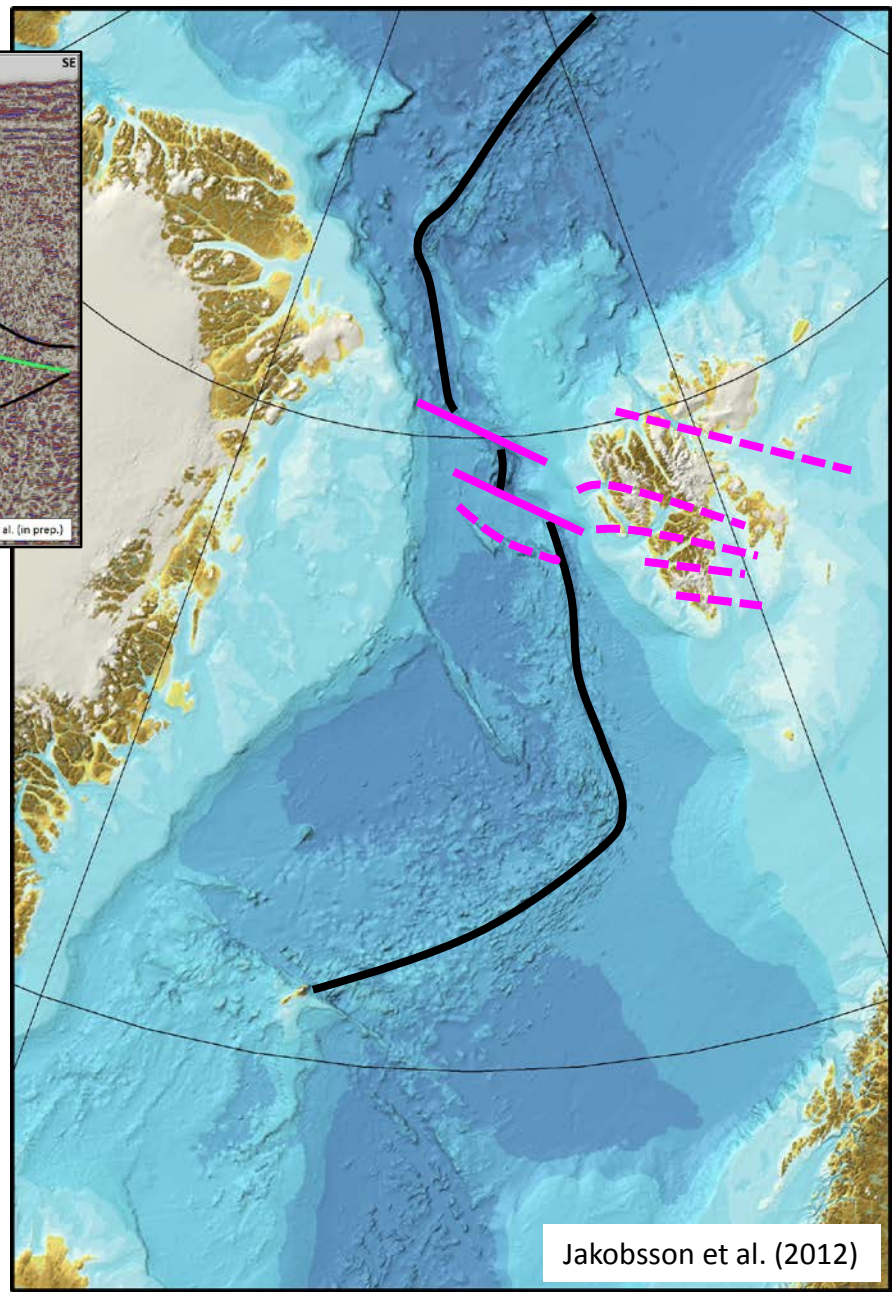
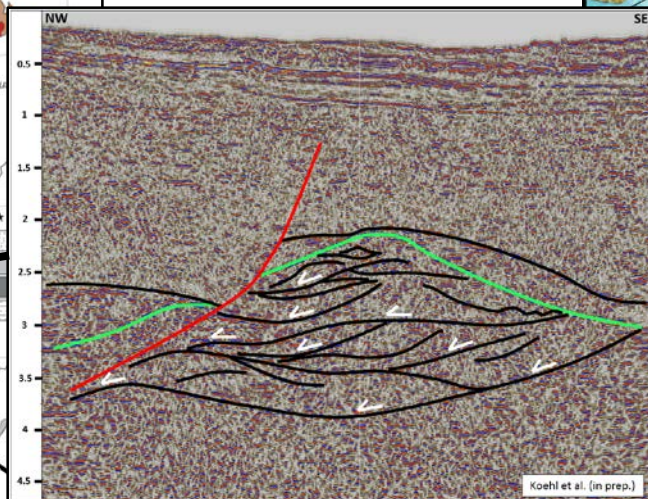
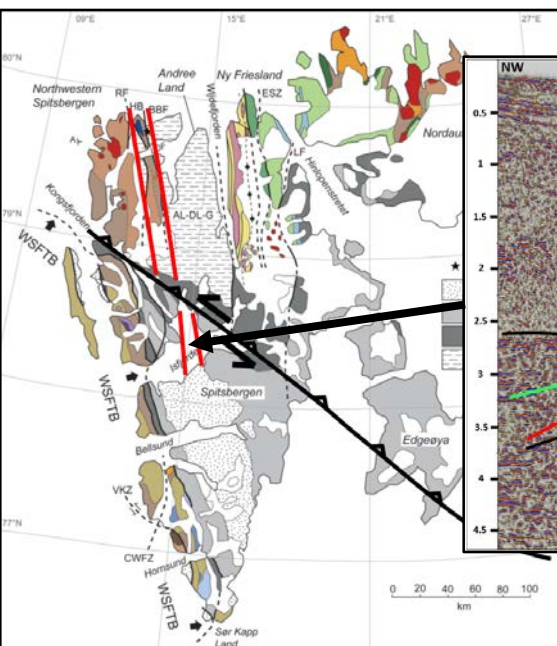




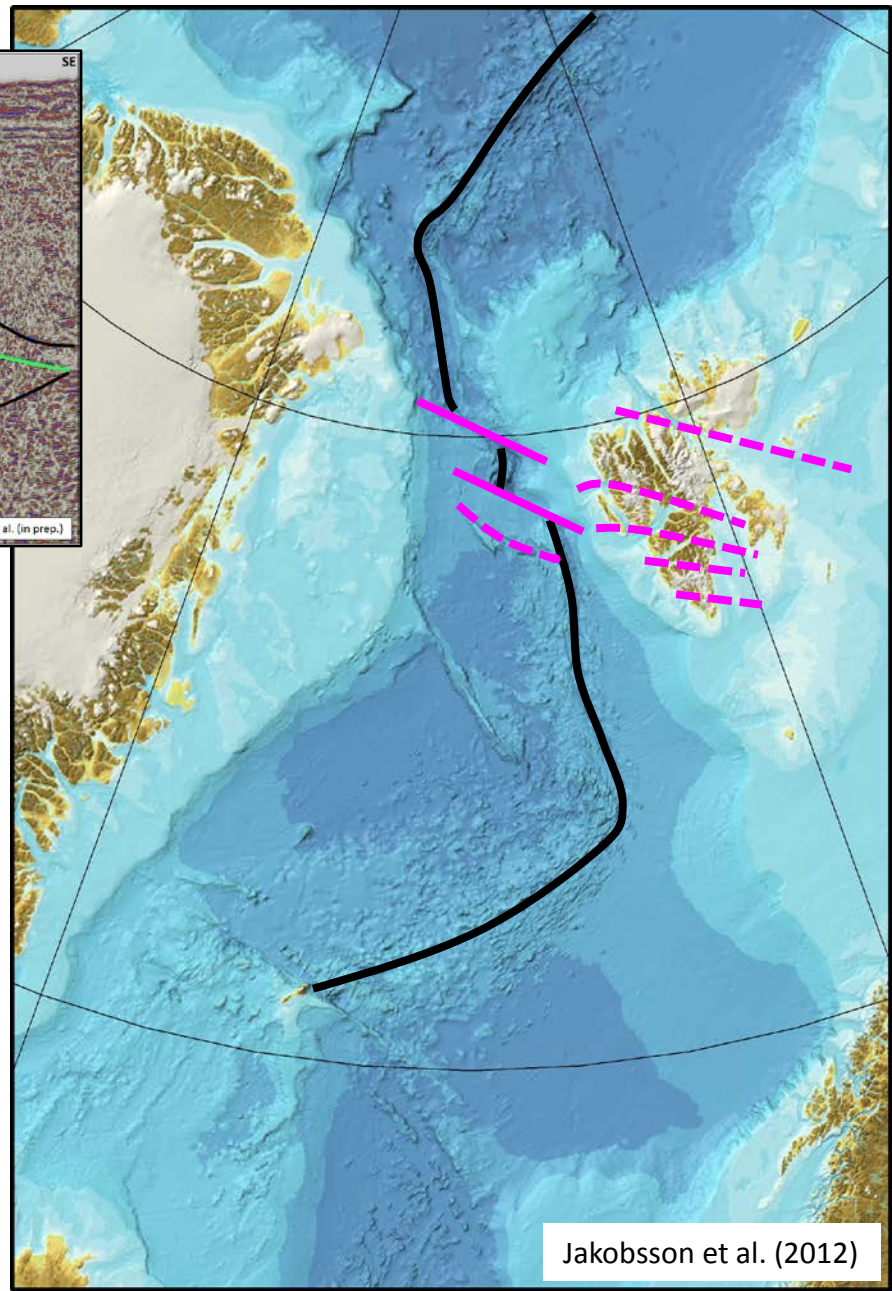
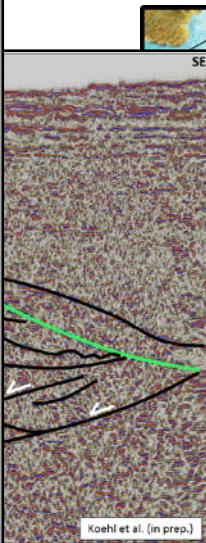
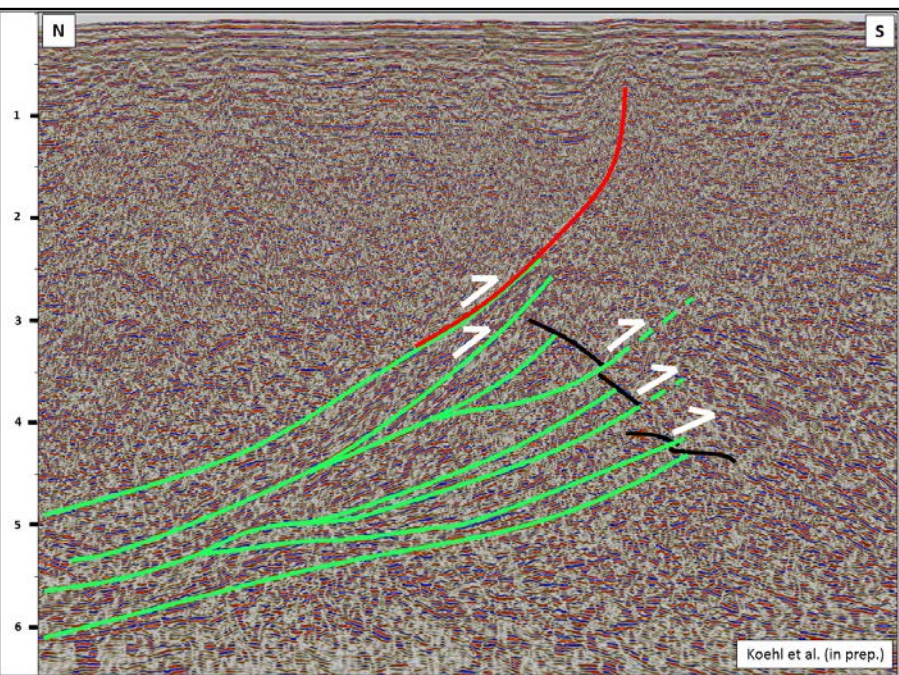
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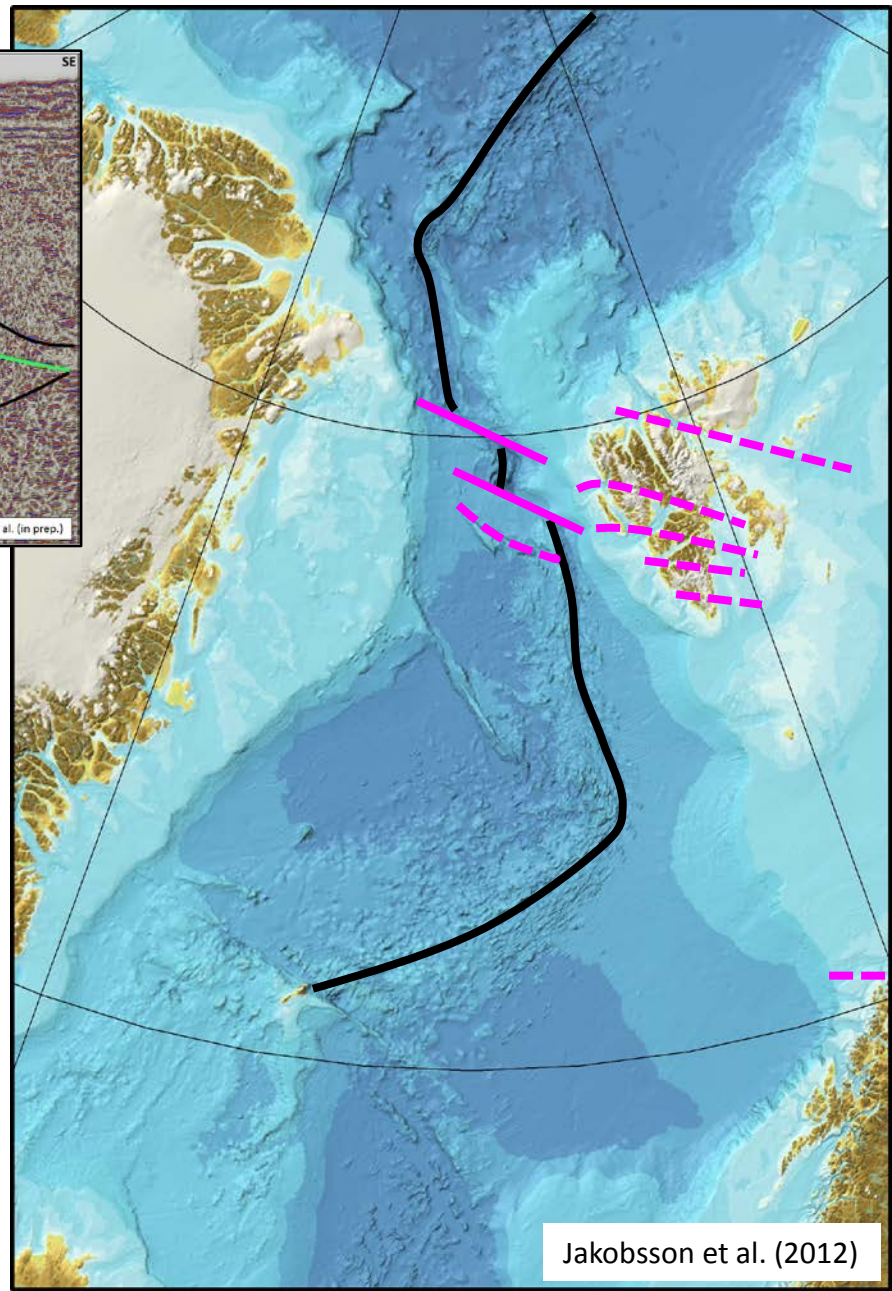
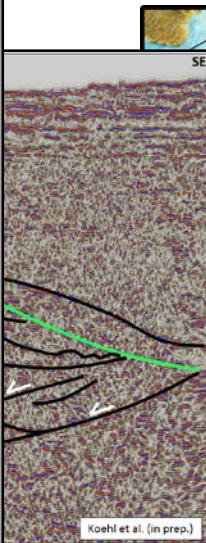
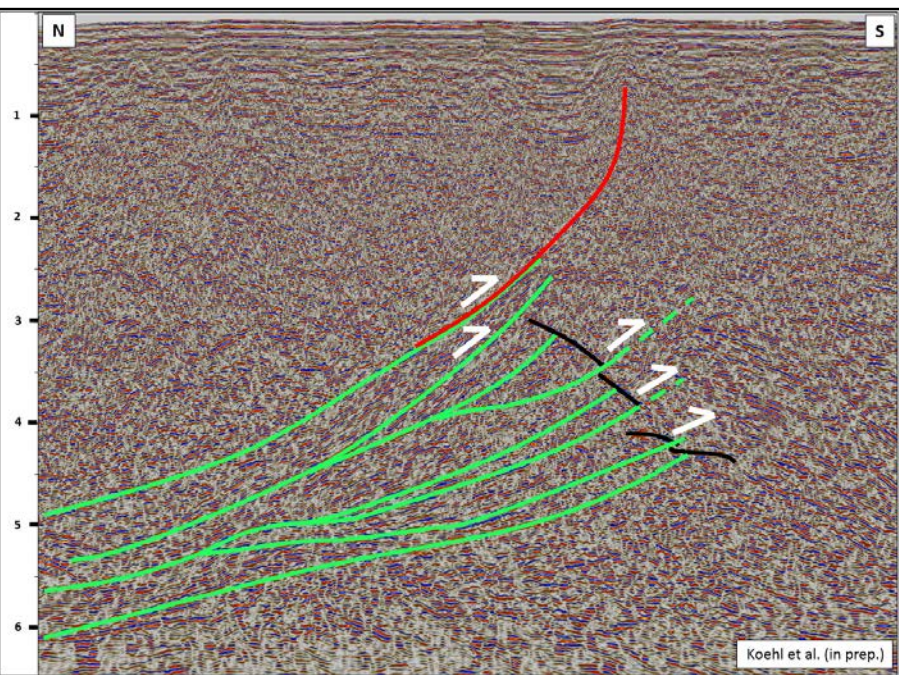
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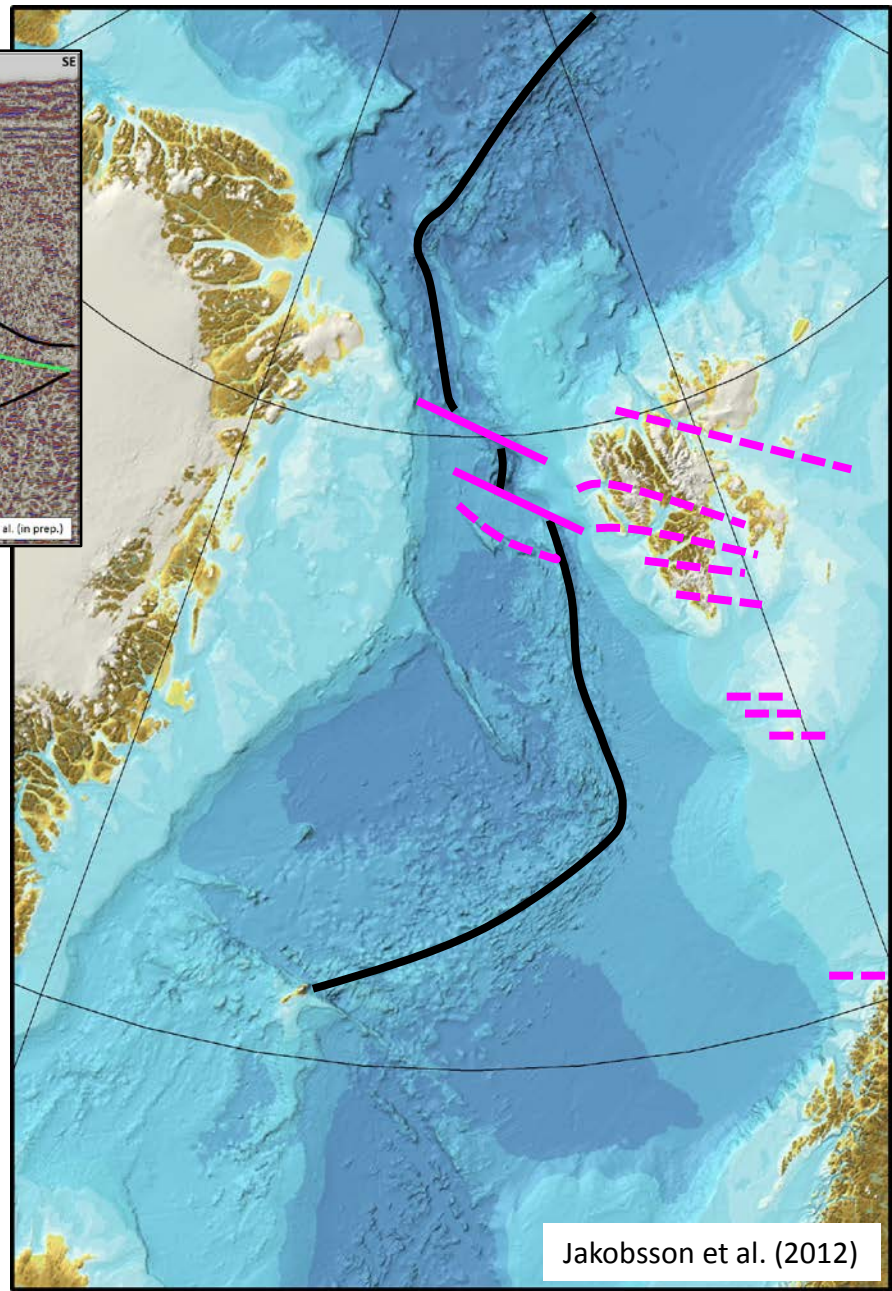
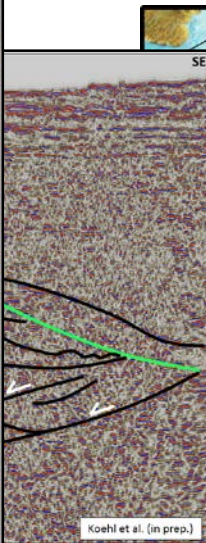
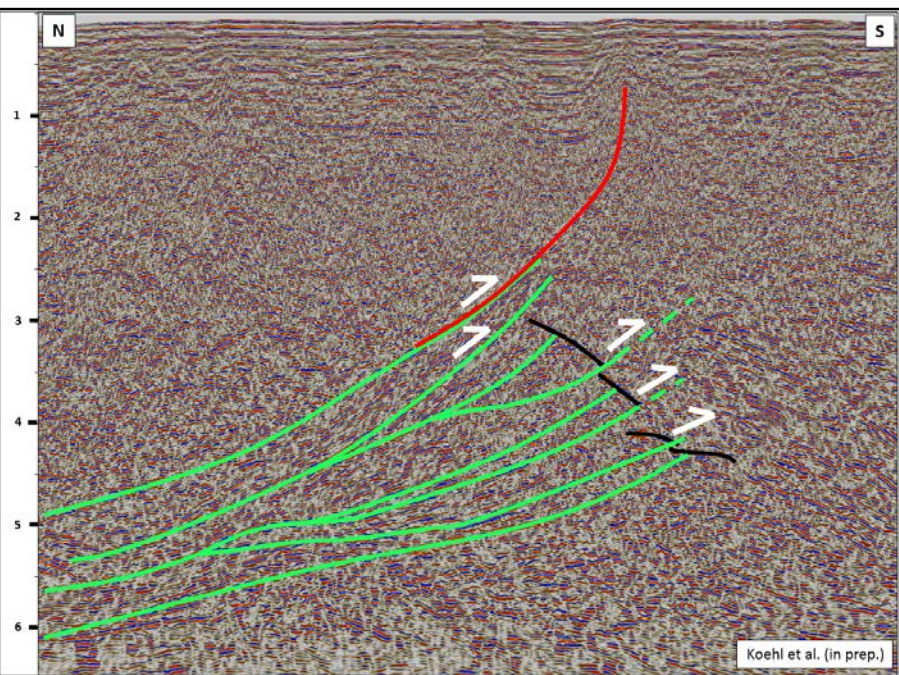
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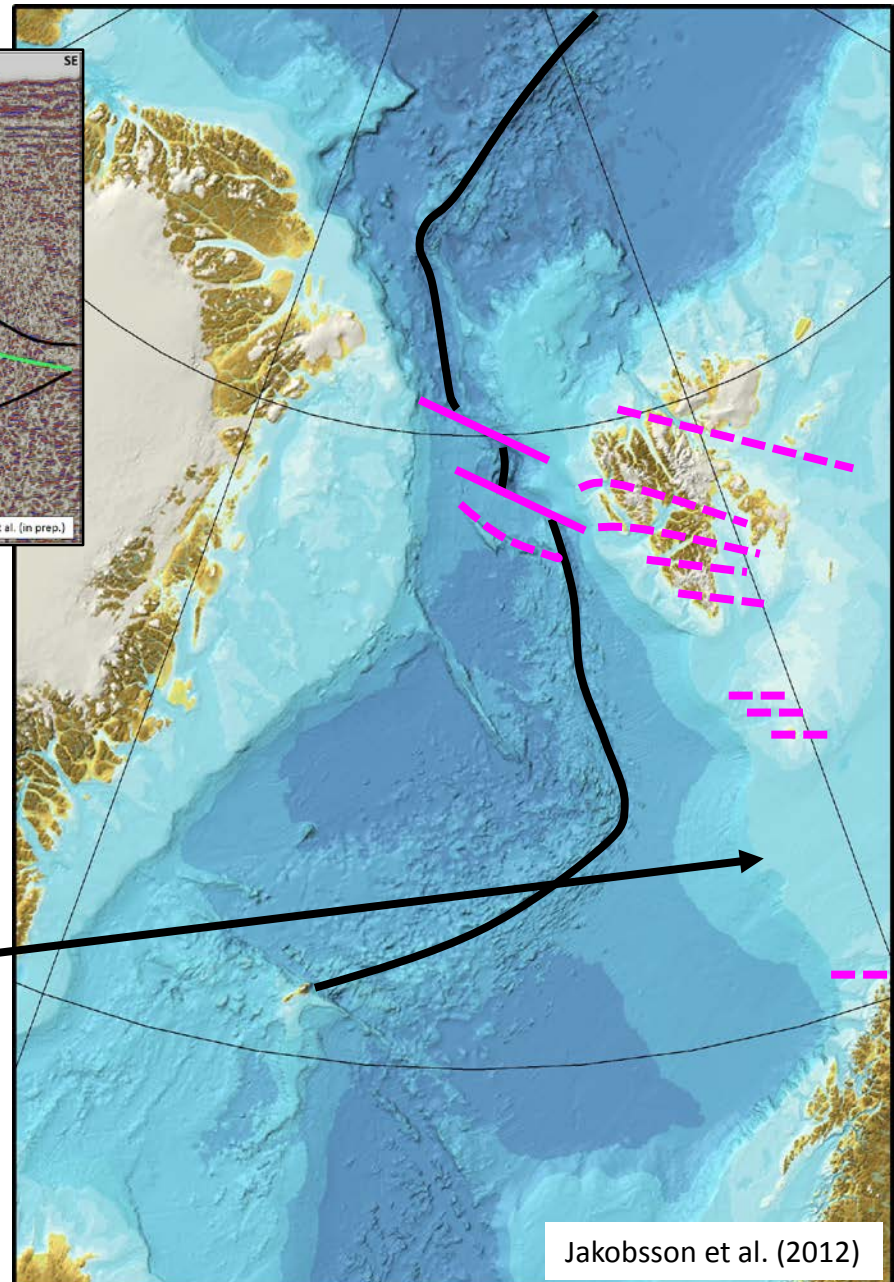
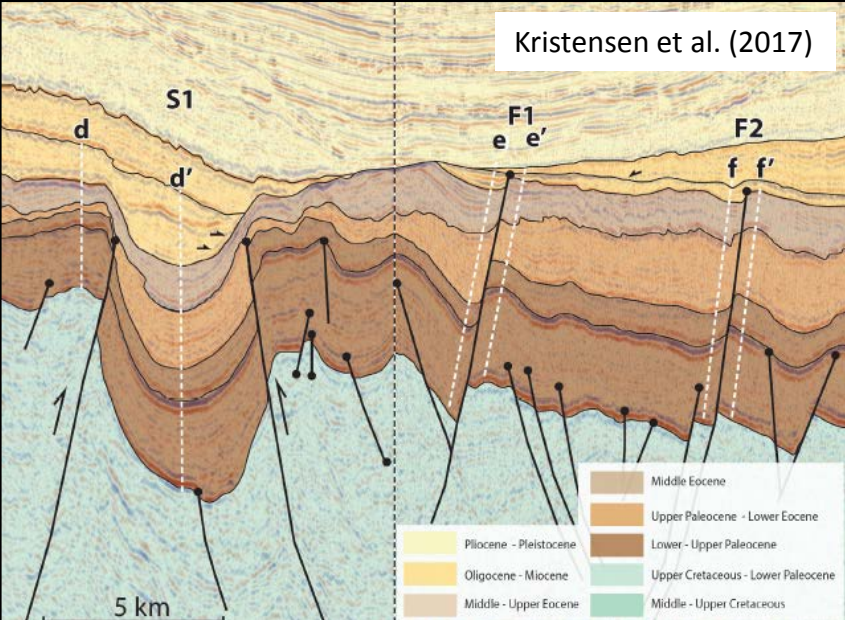
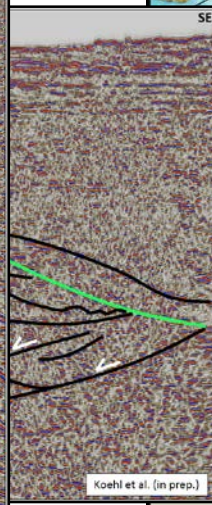
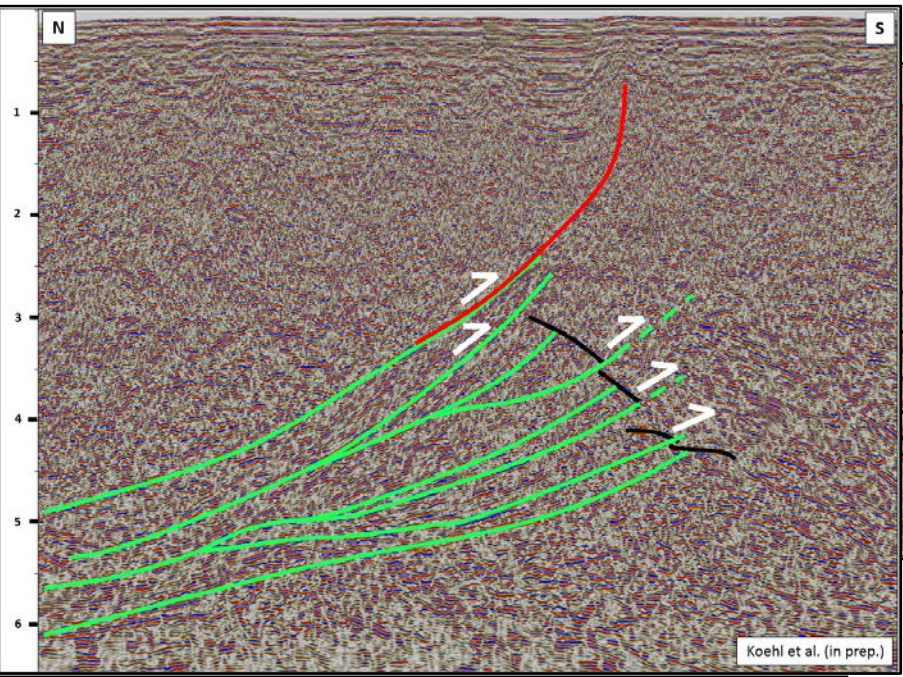
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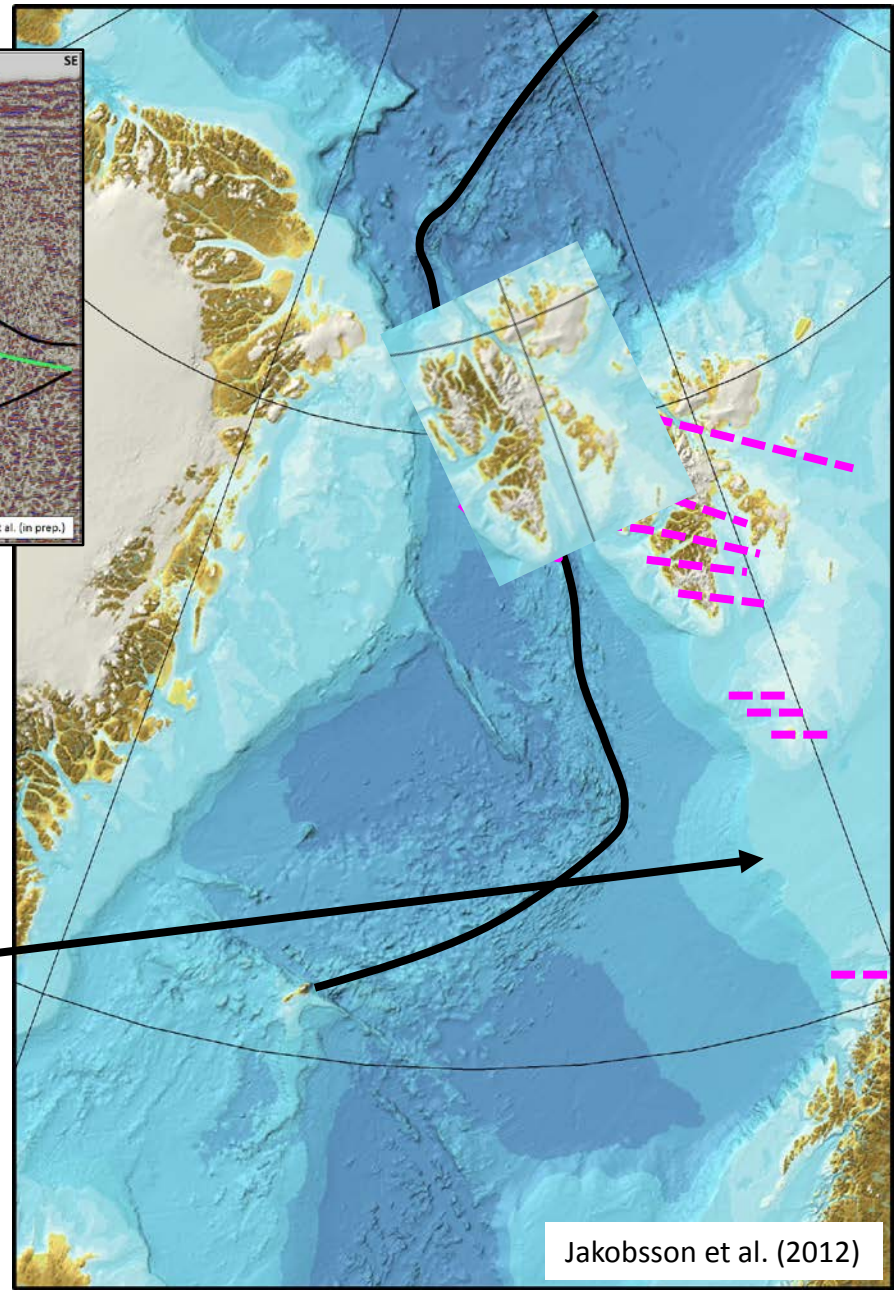
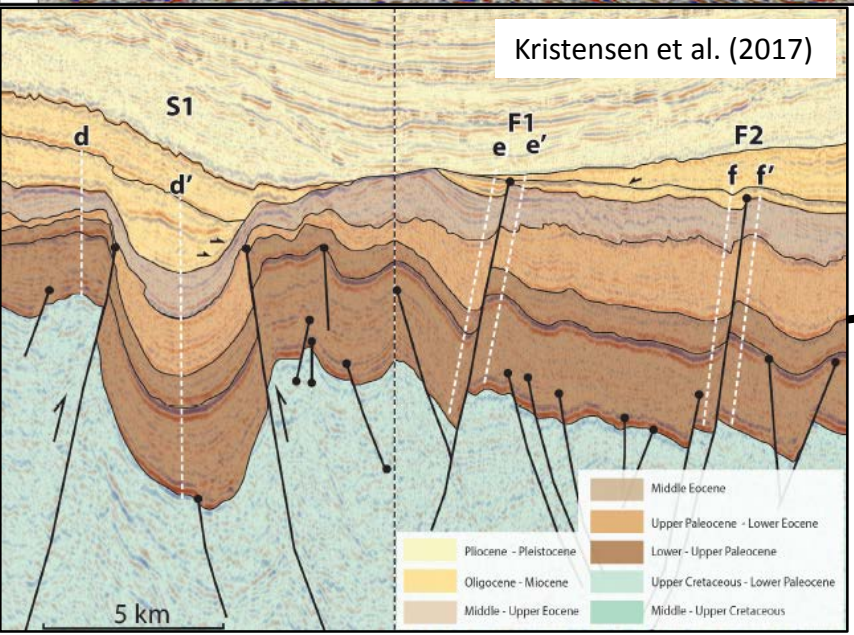
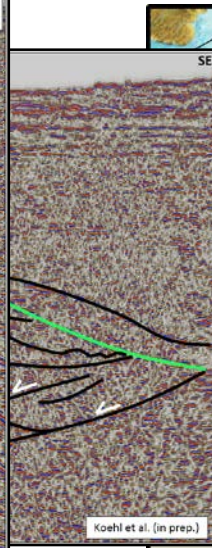
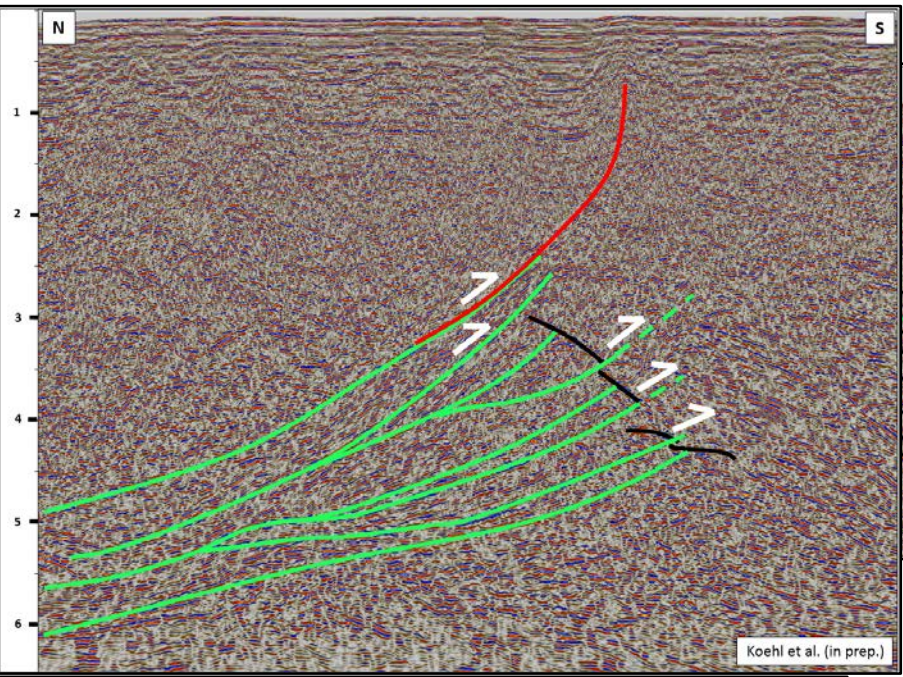
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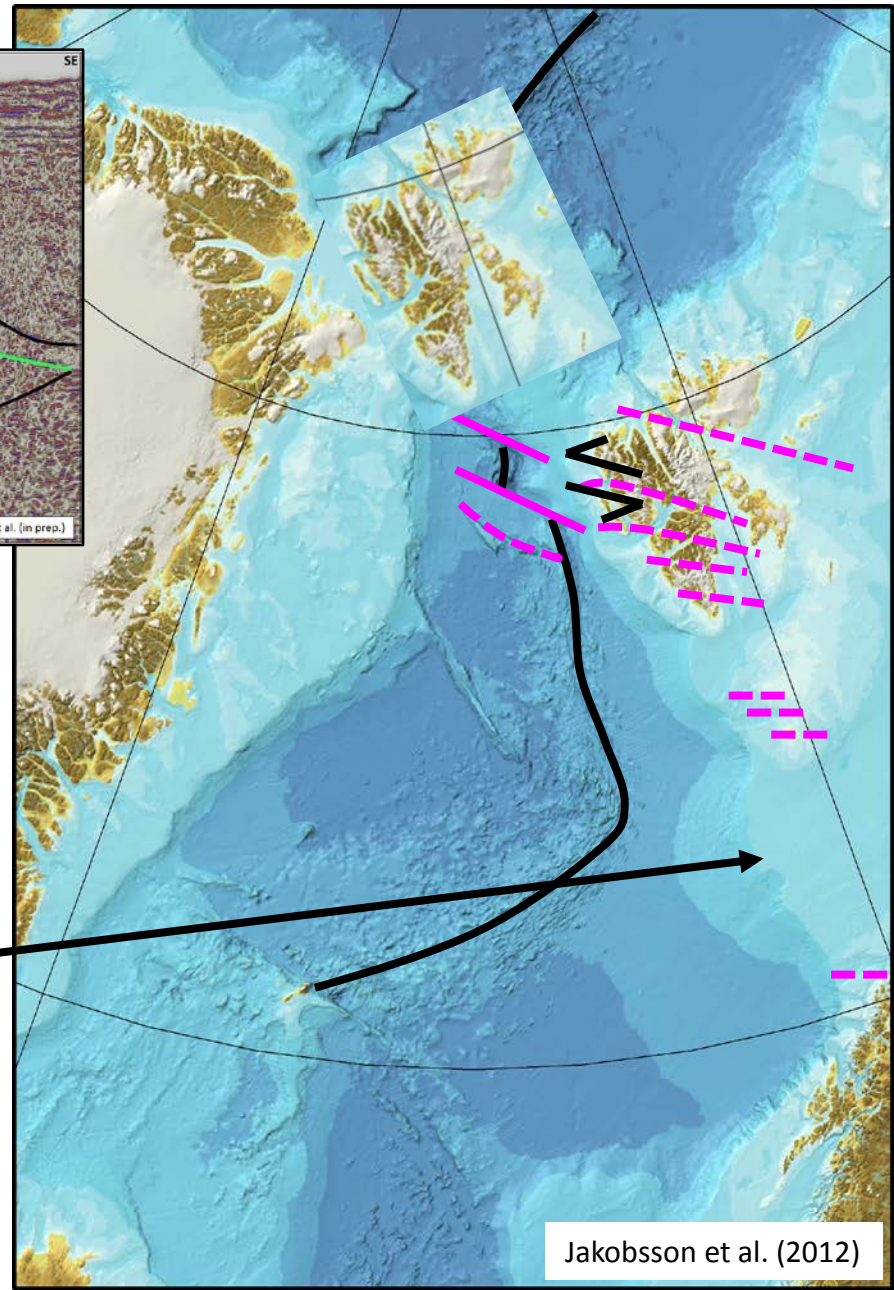
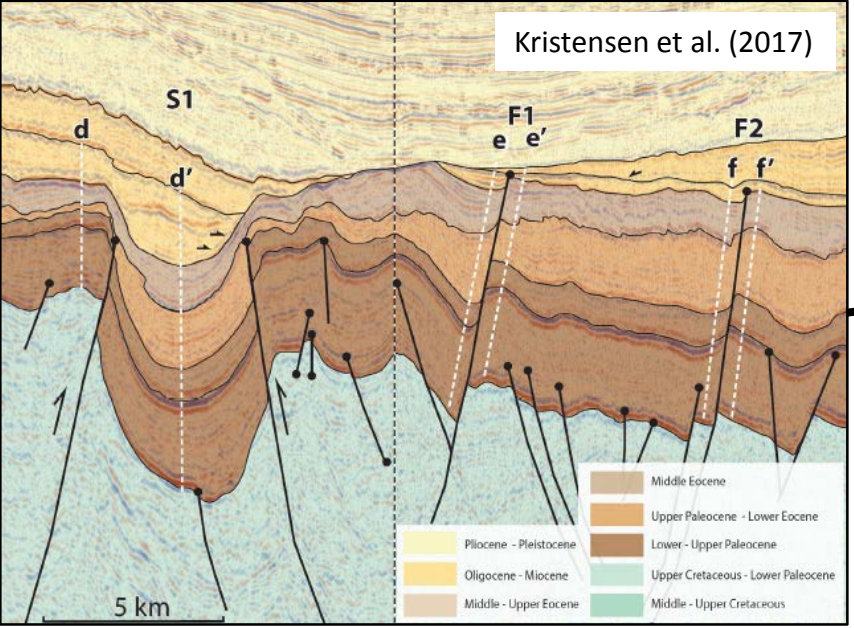
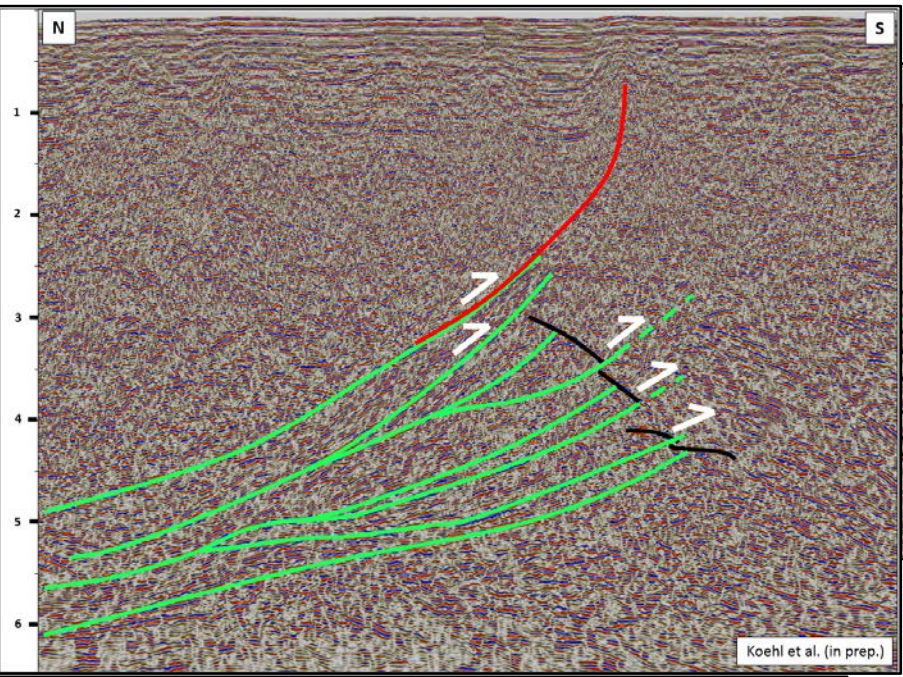


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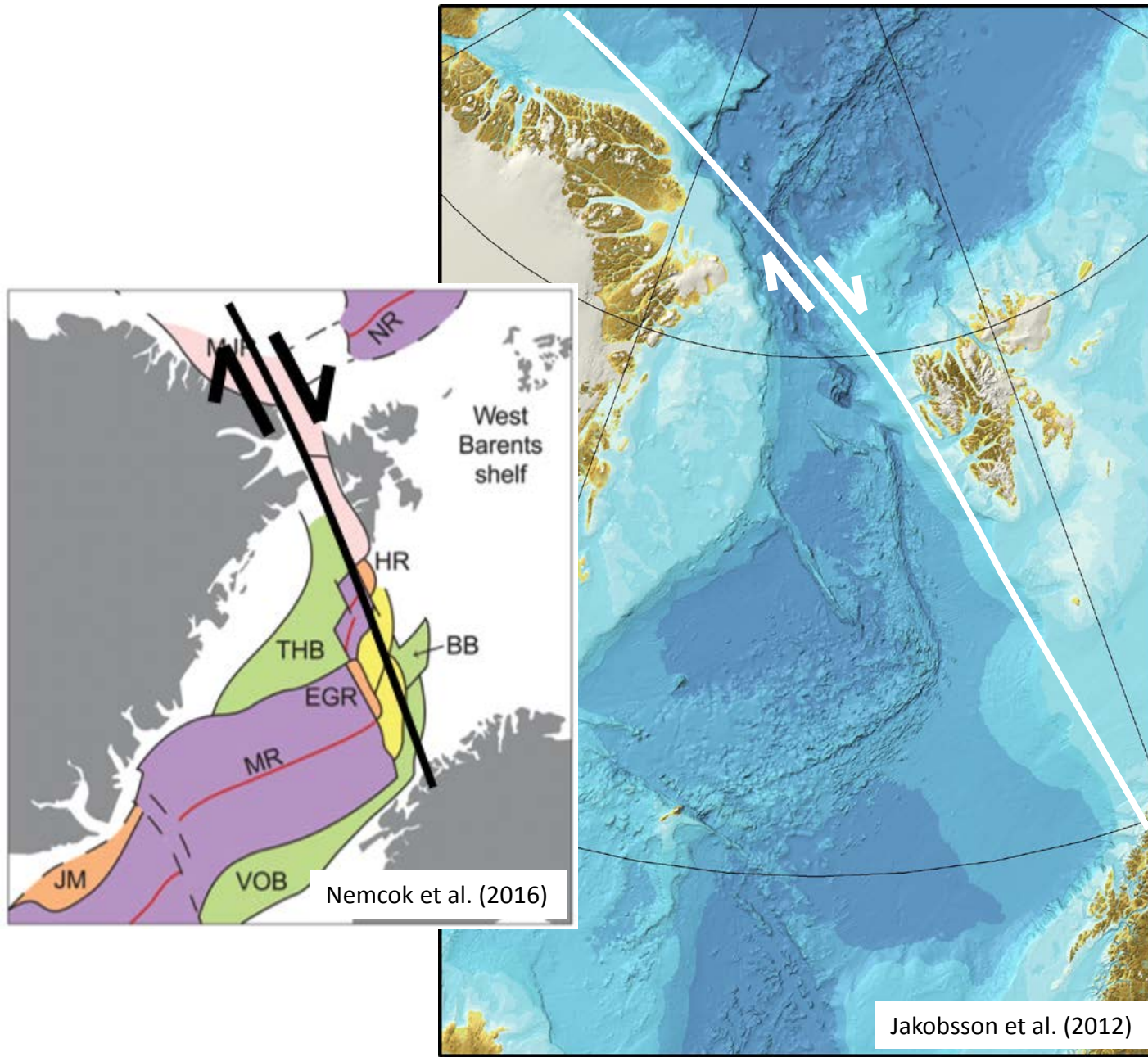
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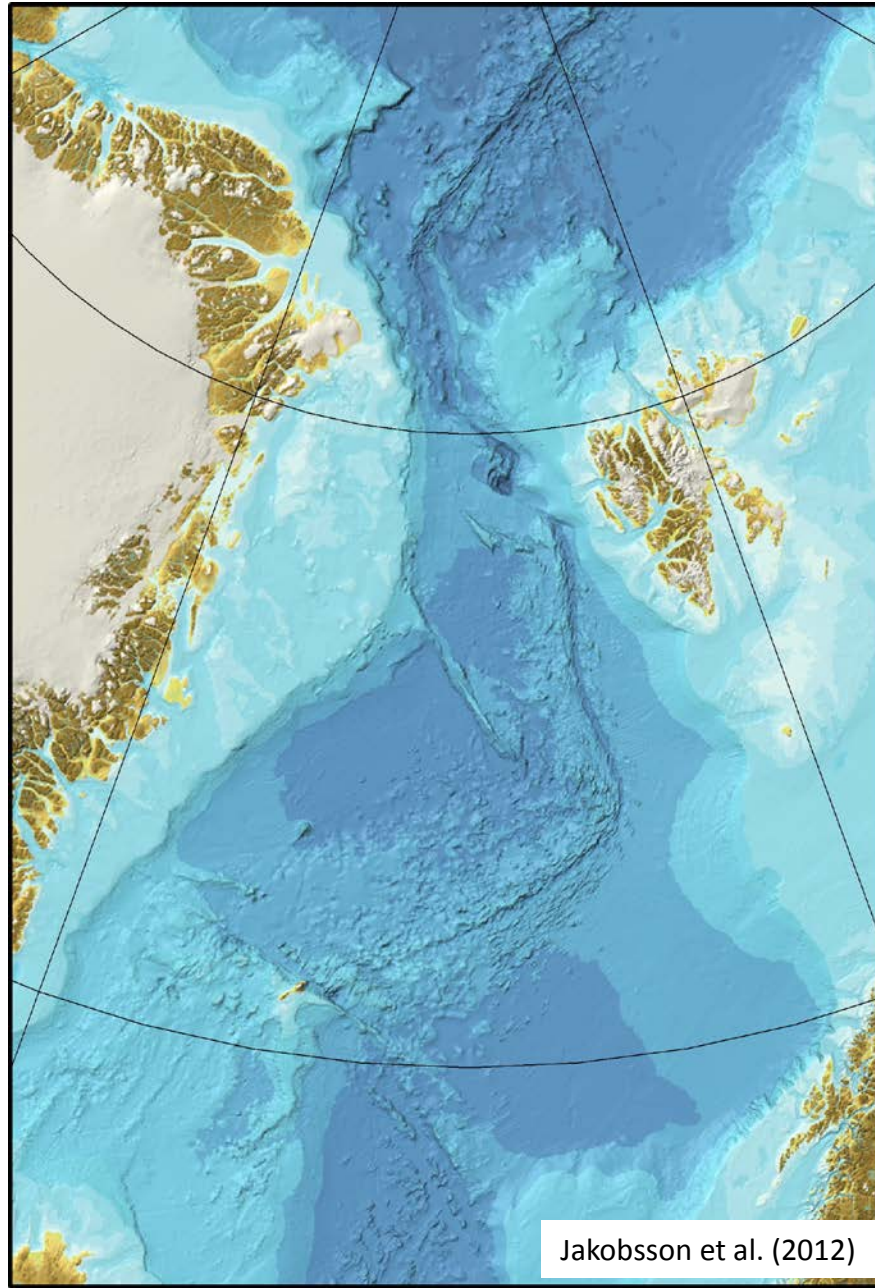




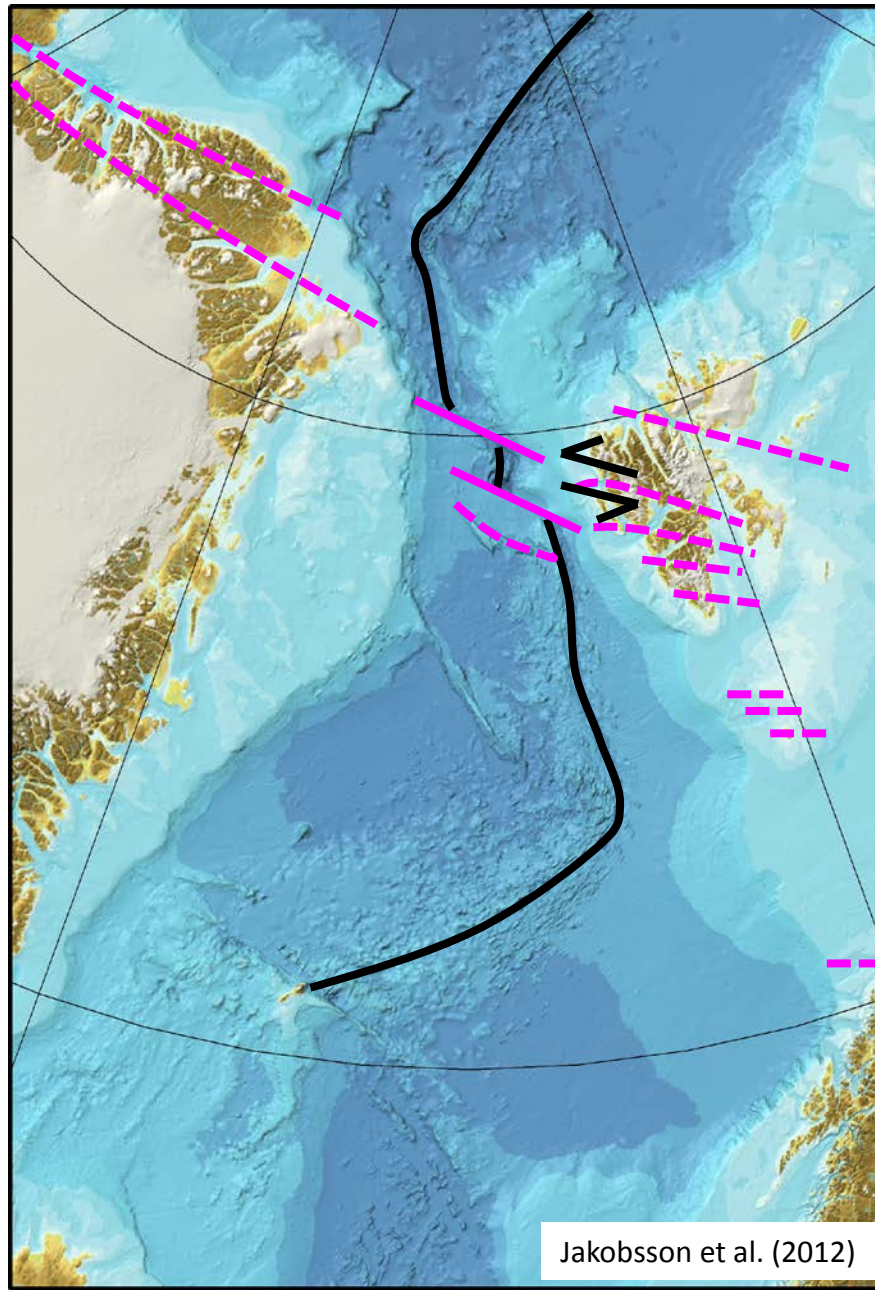
- 3 Hundreds-of-kilometer dextral displacement along N–S-striking faults (e.g., De Geer Zone) are not required to explain Svalbard’s southward motion of c. 400 km in the Cenozoic.



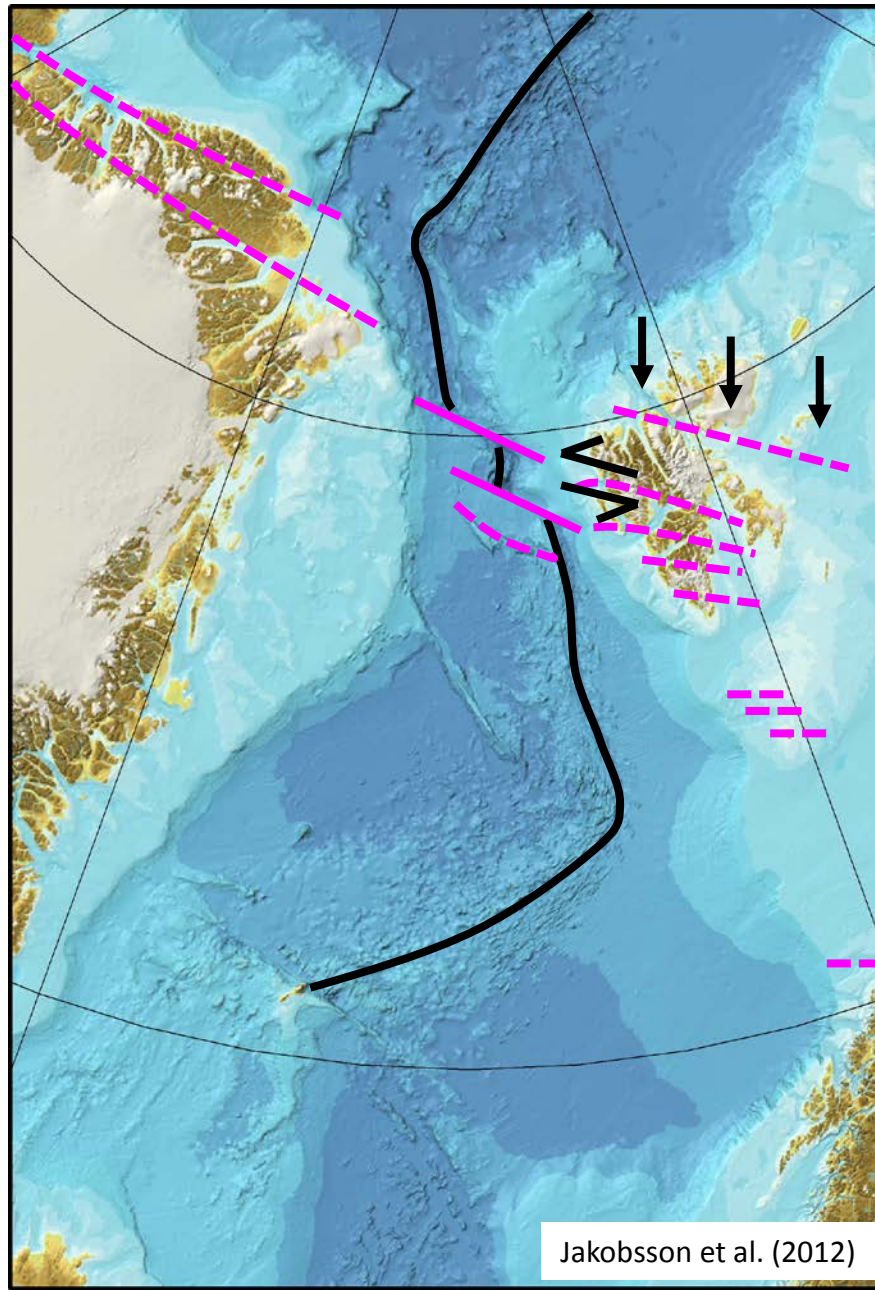
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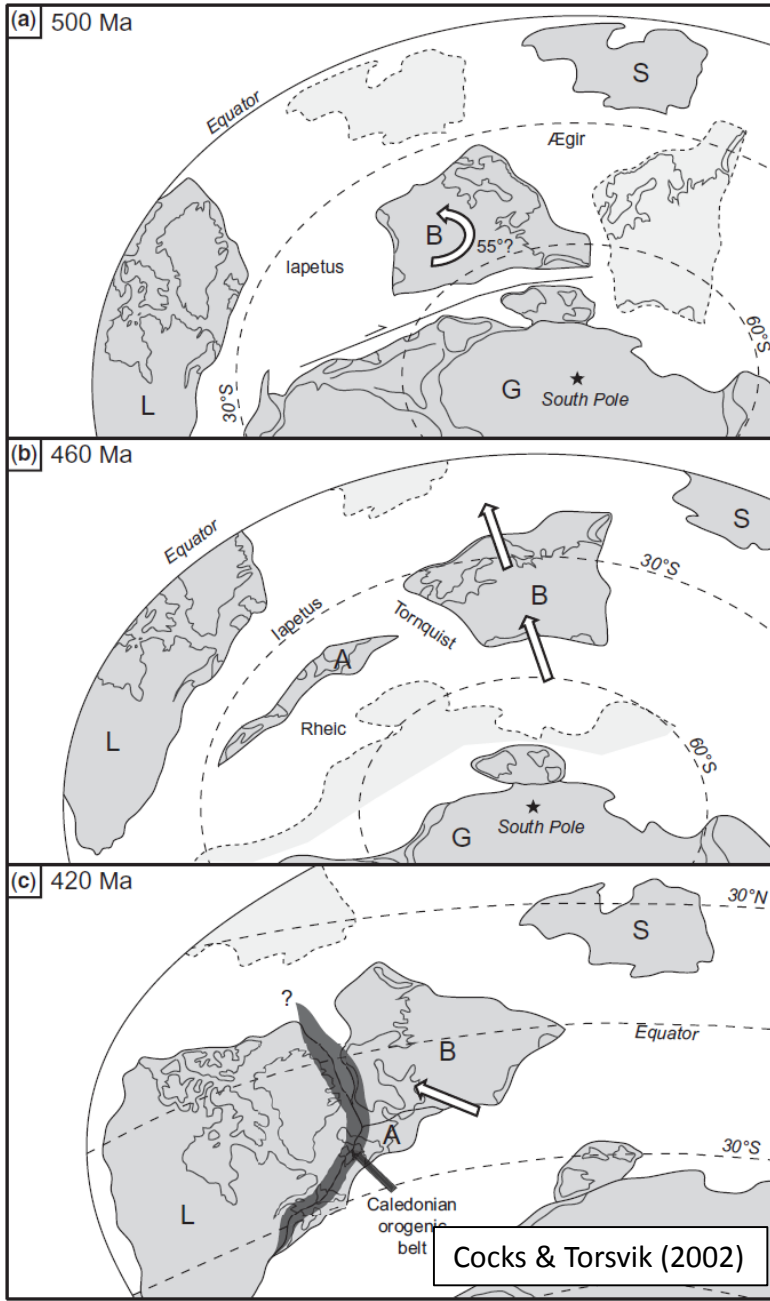
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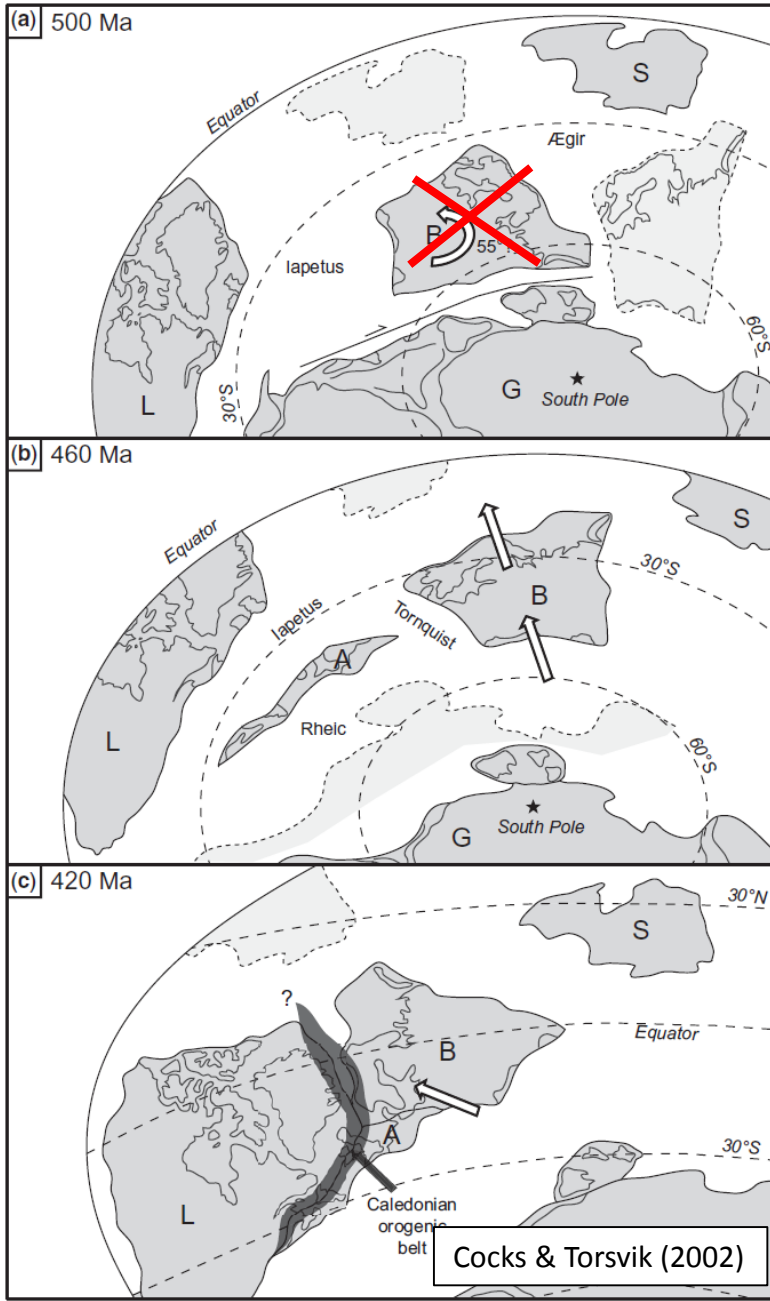
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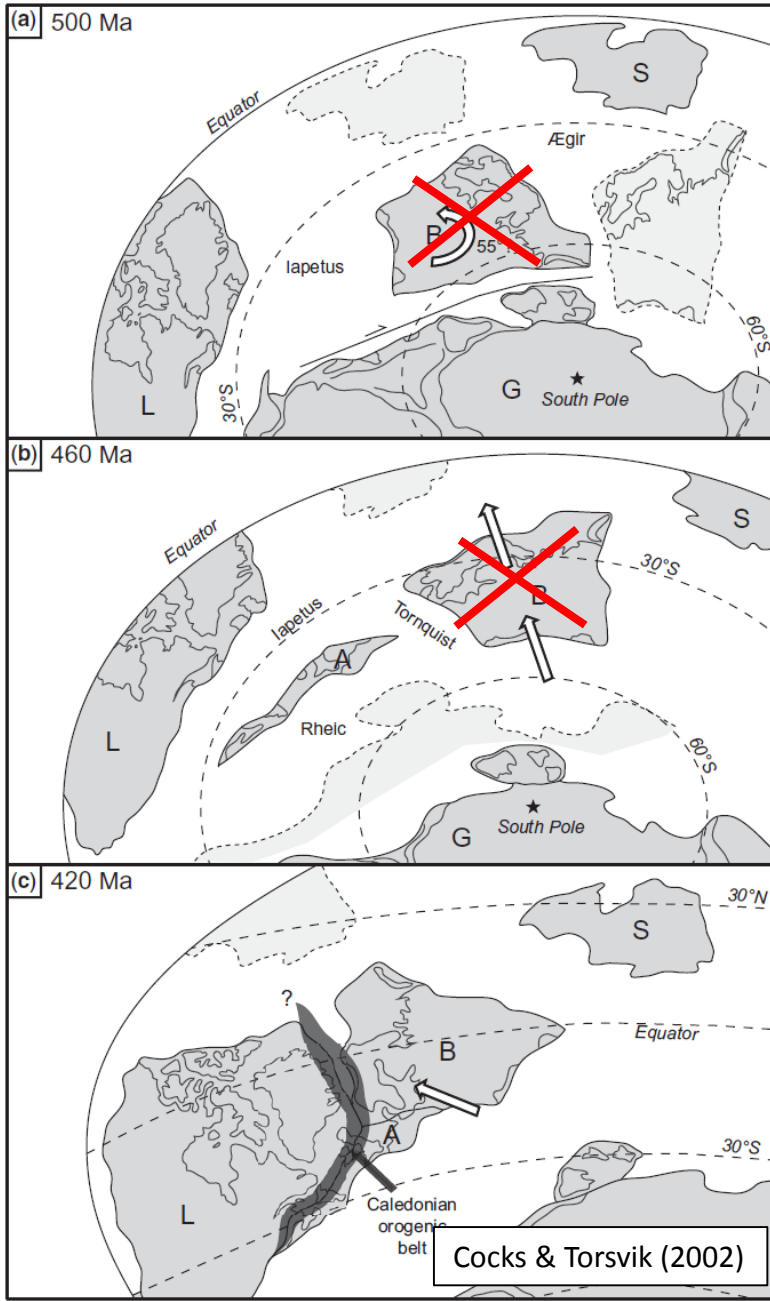
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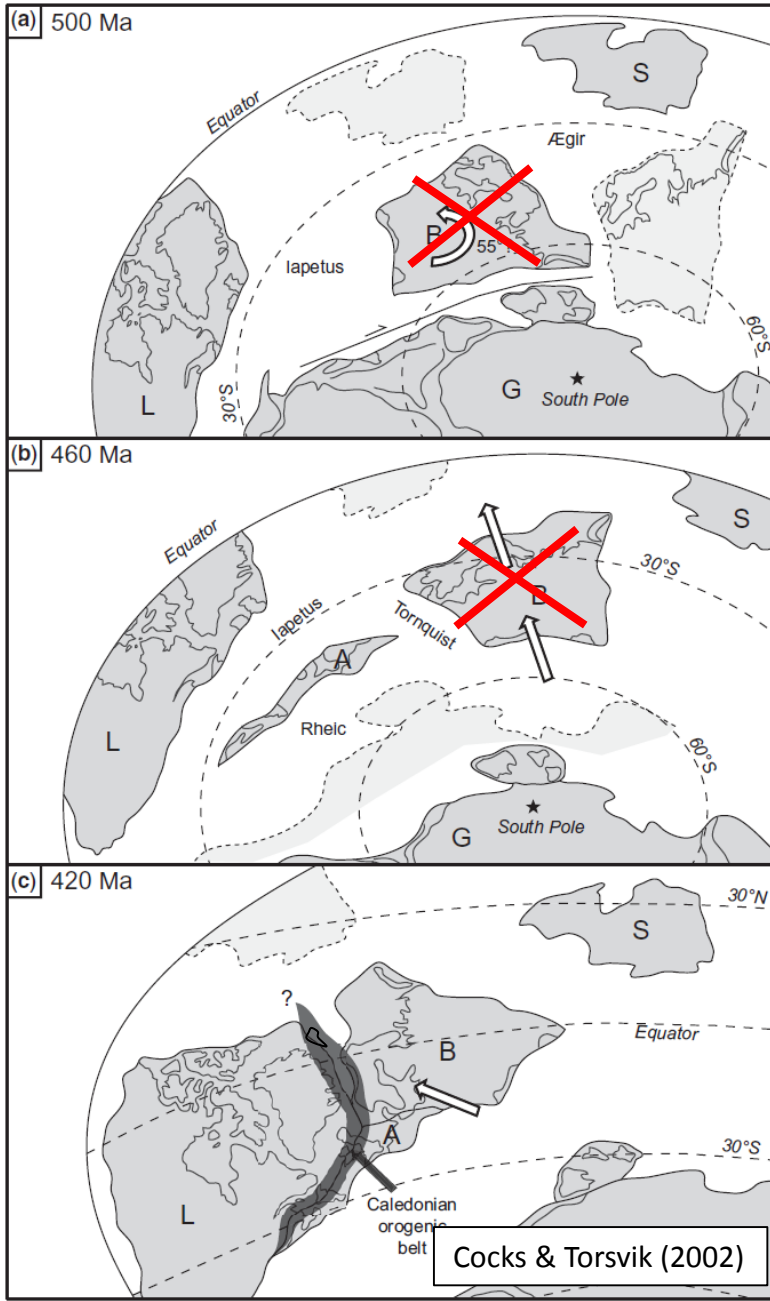
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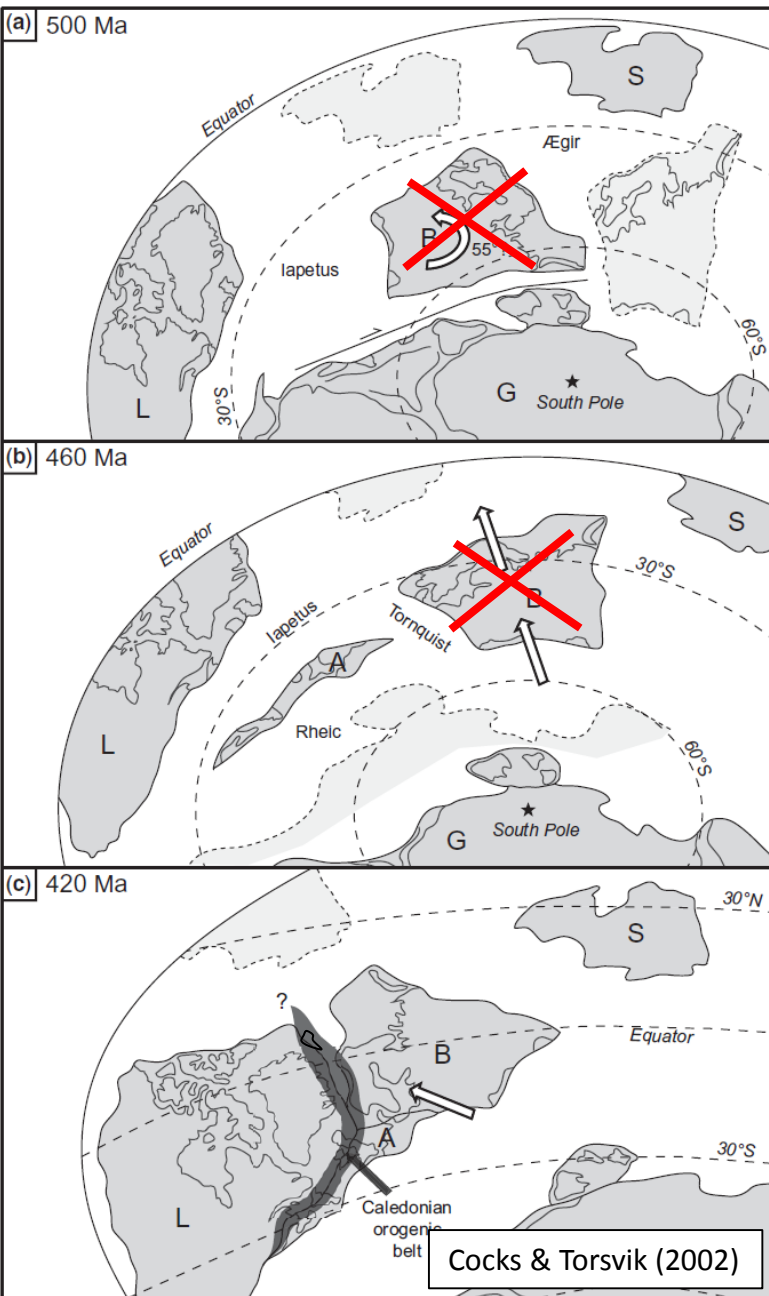


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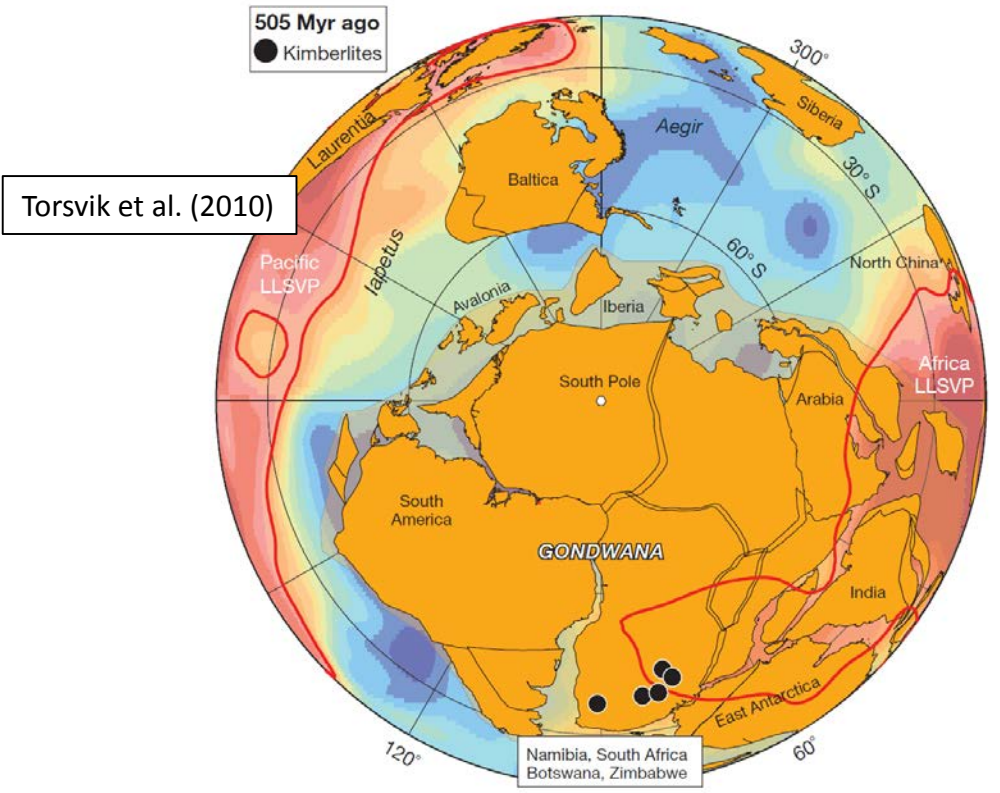




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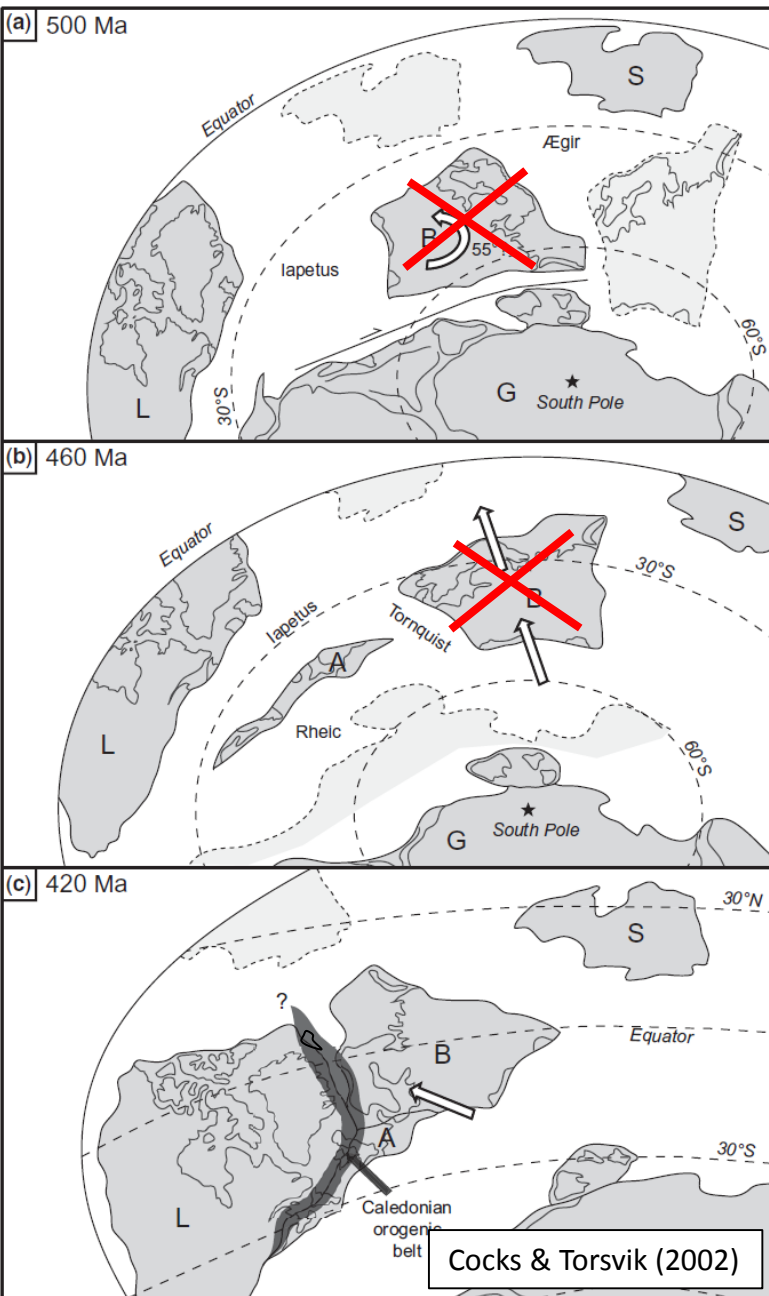


Cocks & Torsvik (2002)

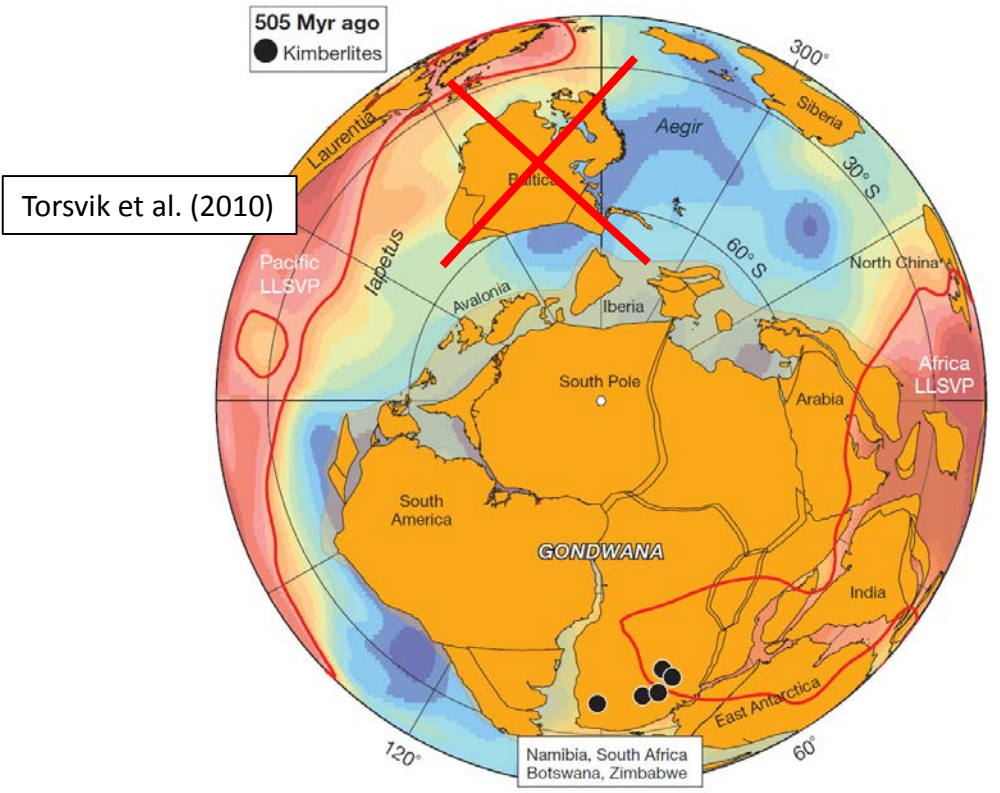


Namibia, South Africa  
Botswana, Zimbabwe

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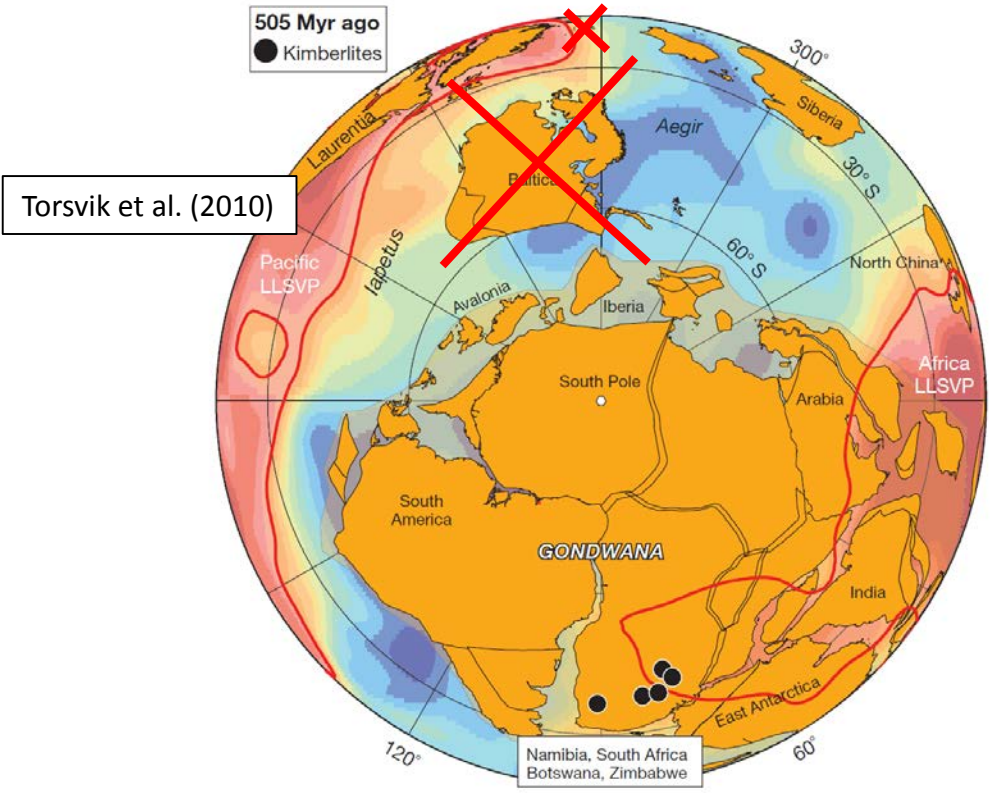
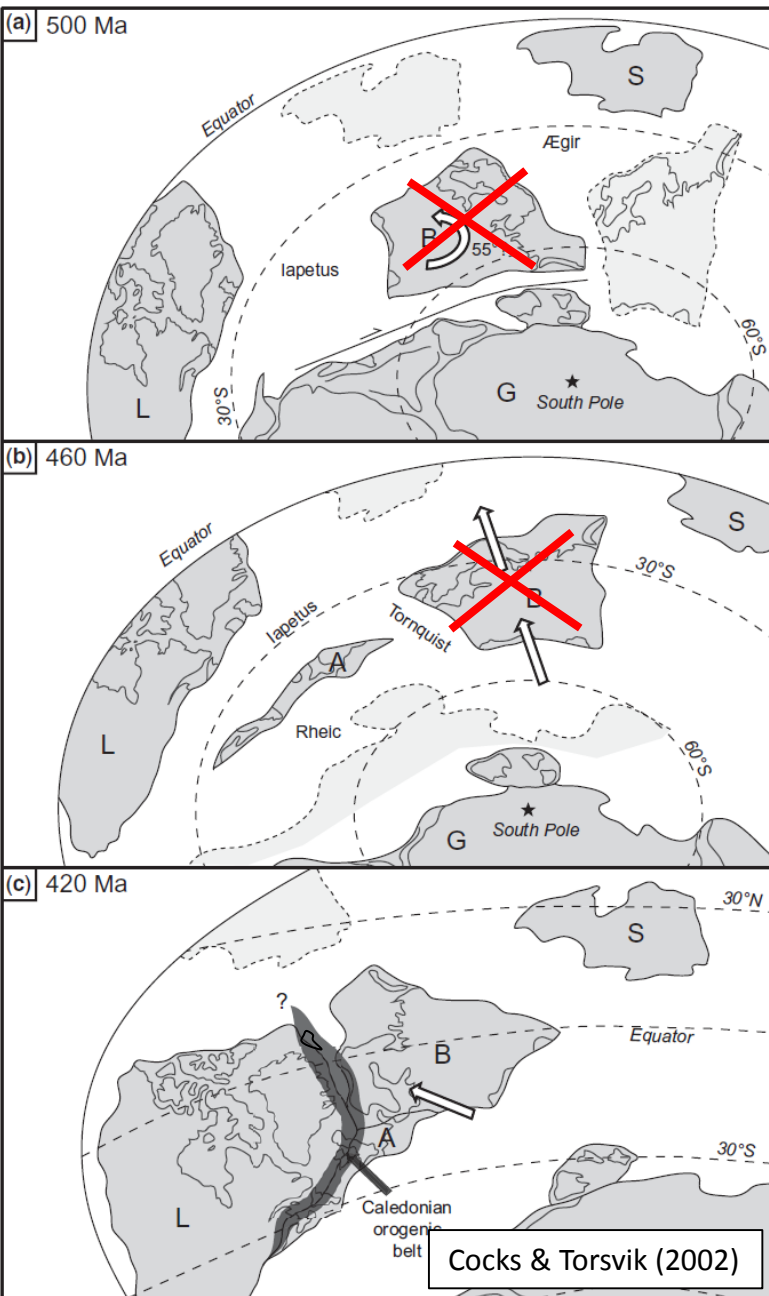


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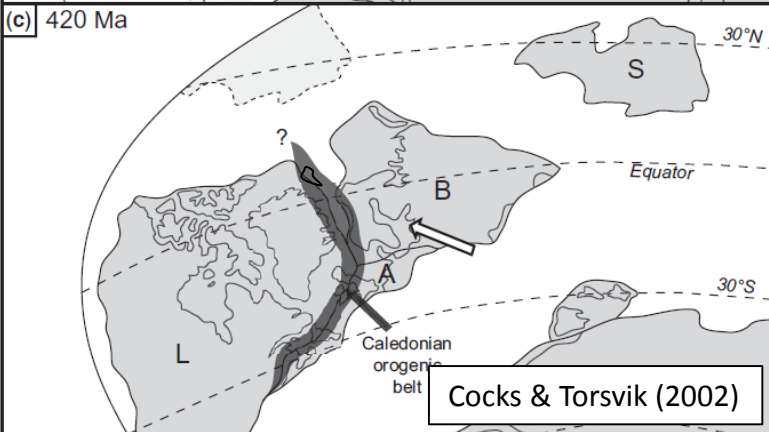
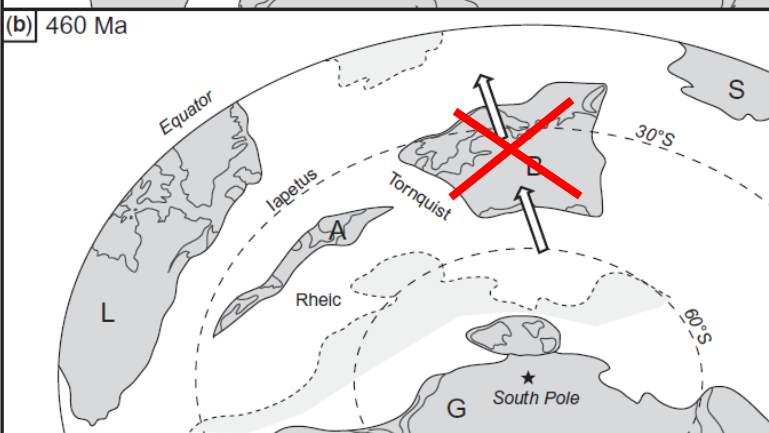
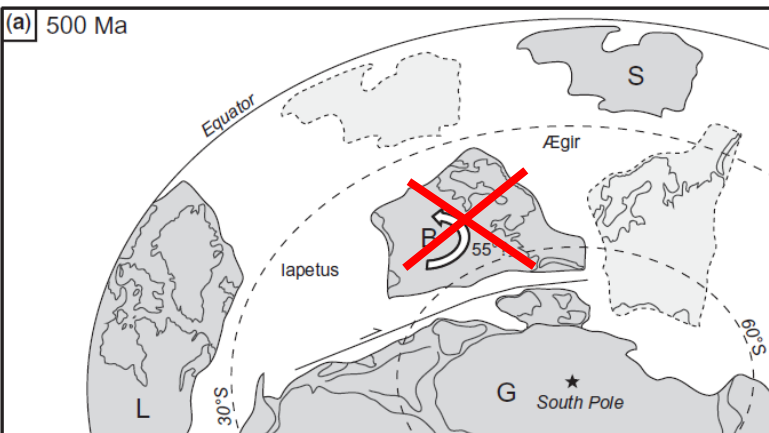


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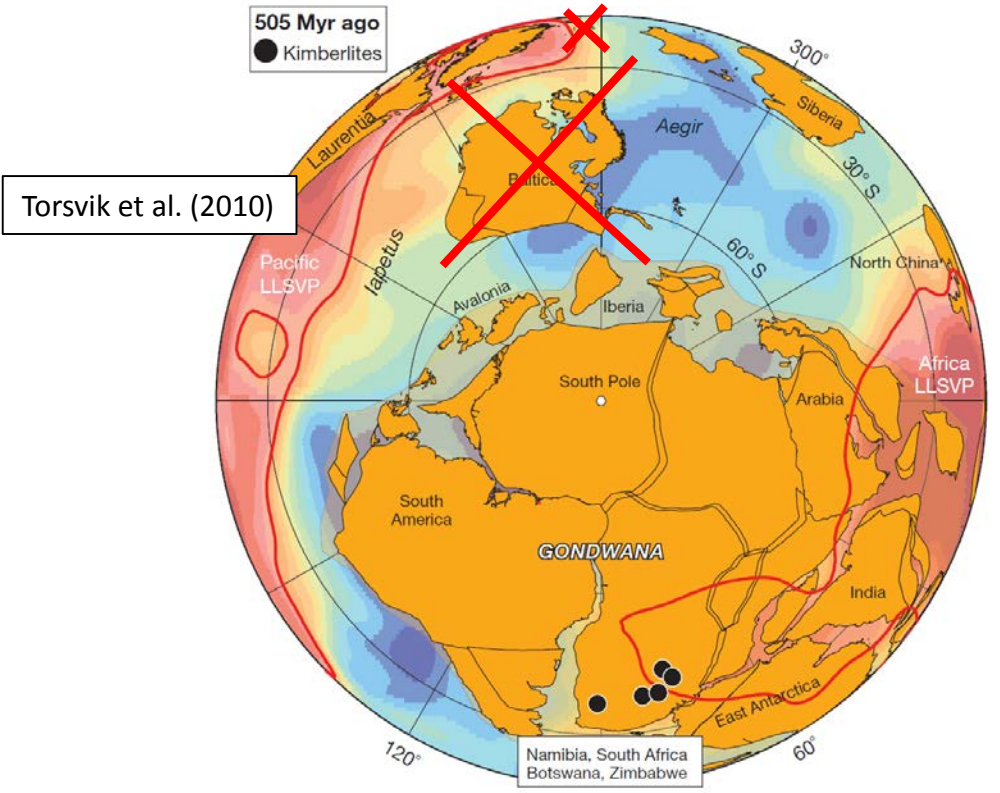
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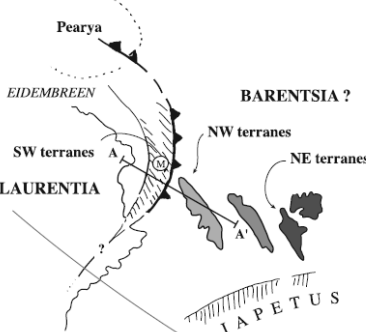
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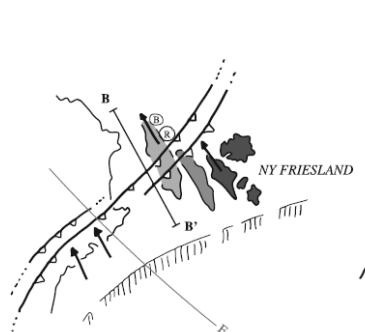


A- Ordovician 470 Ma

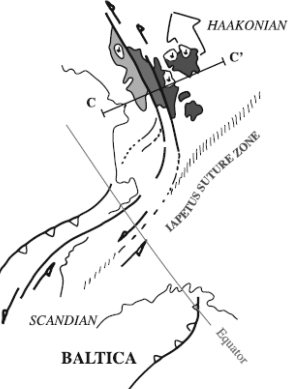


Labrousse et al. (2008)

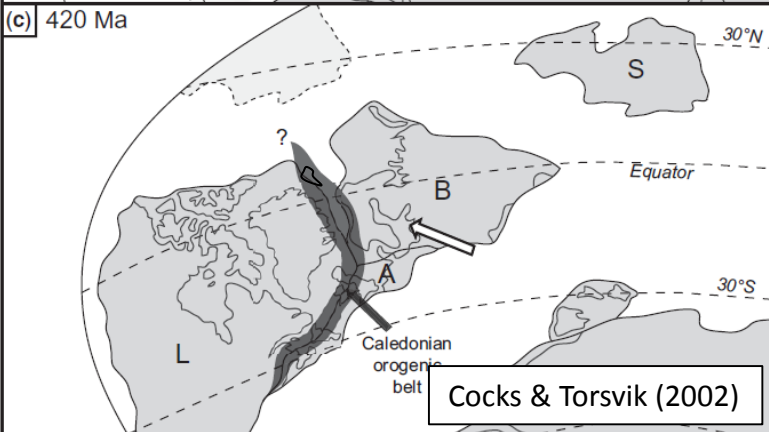
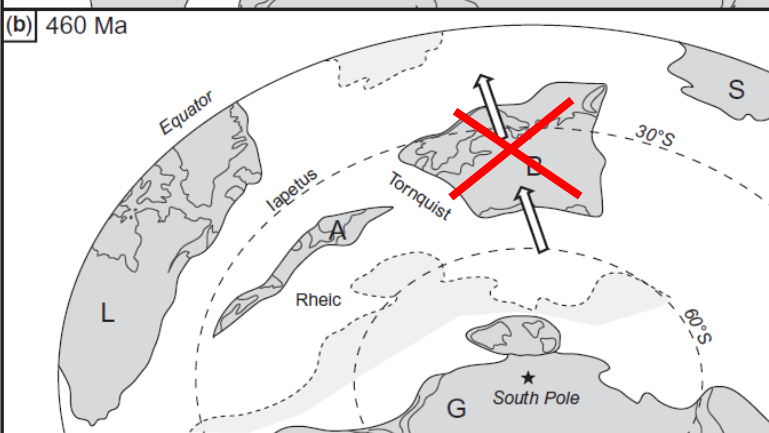
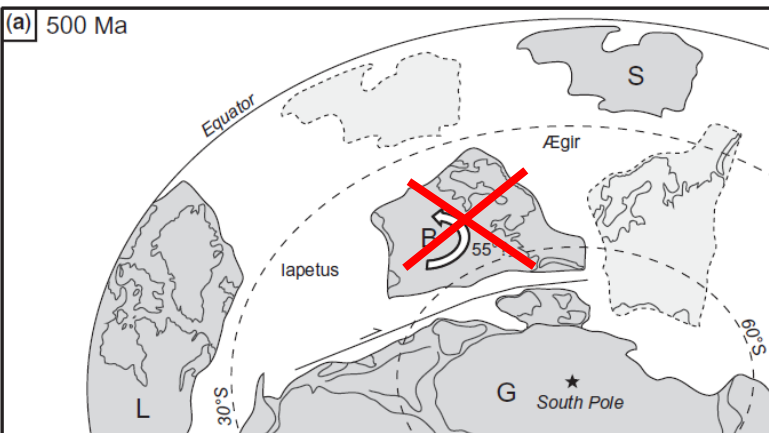
B- Silurian < 440 Ma



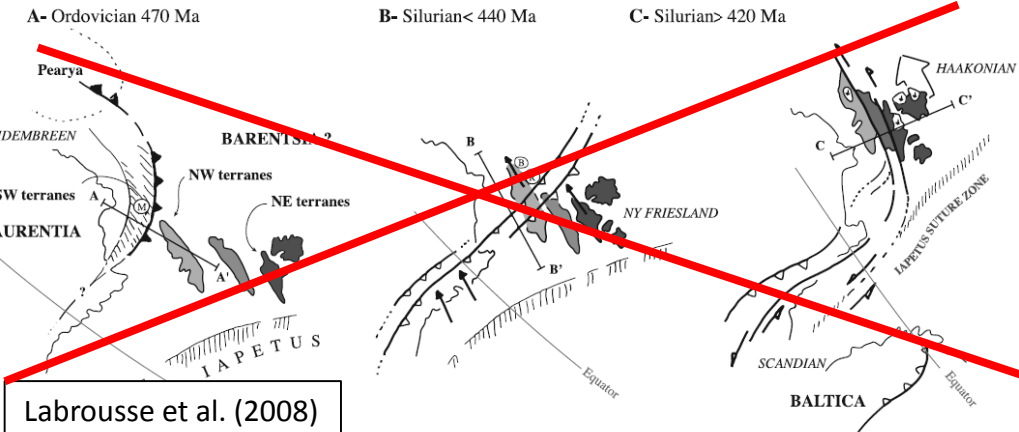
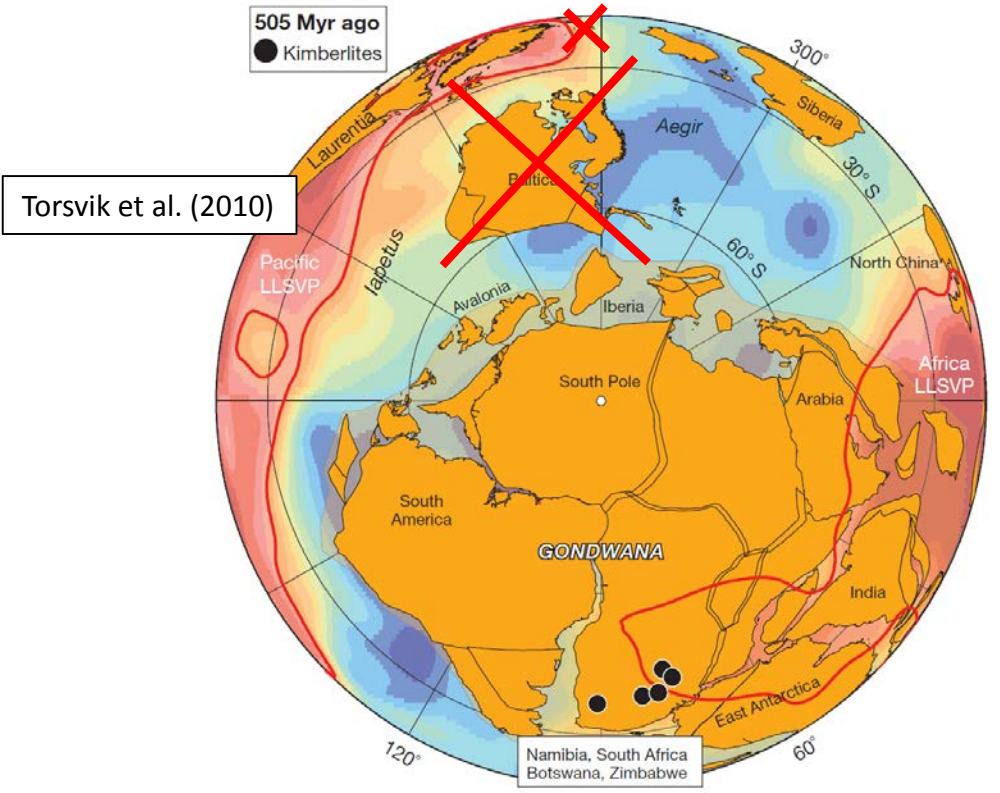
C- Silurian > 420 Ma



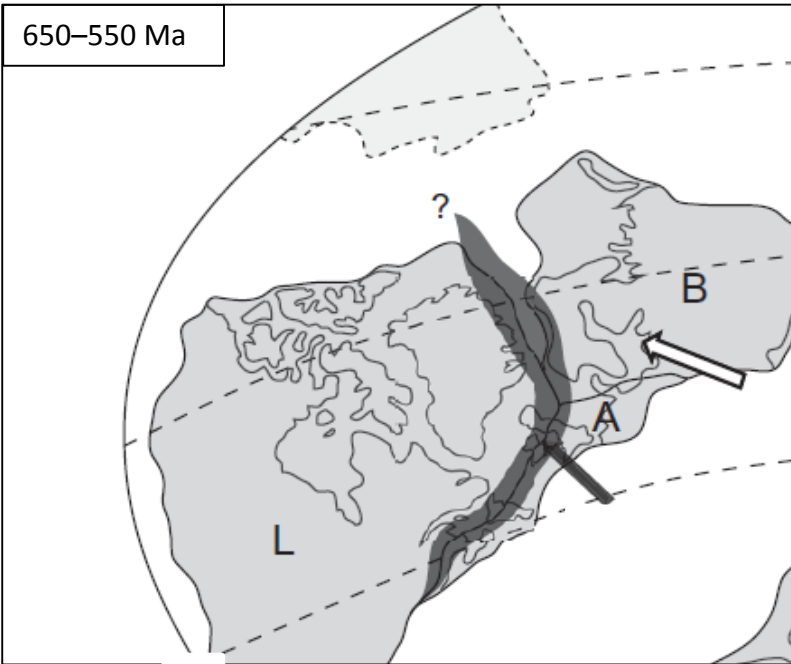
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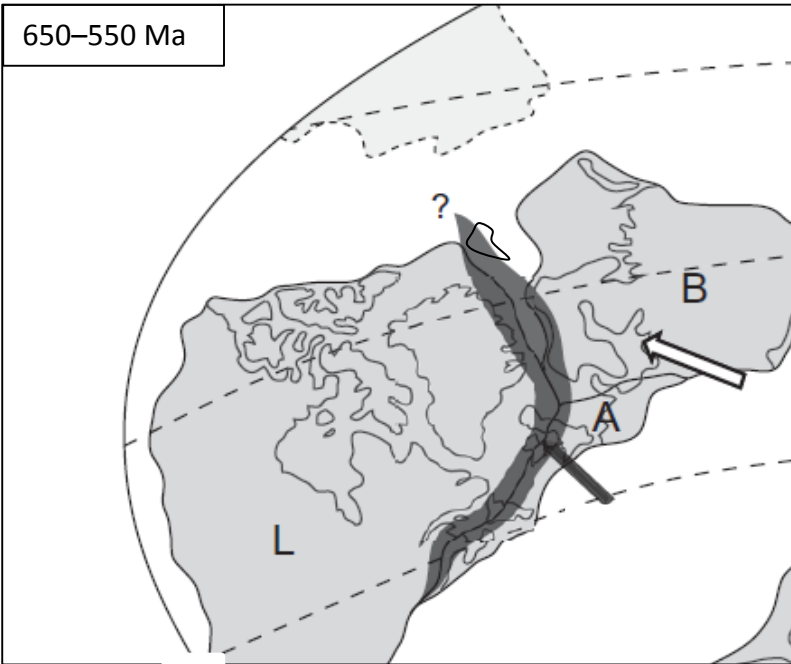
Cocks & Torsvik (2002)



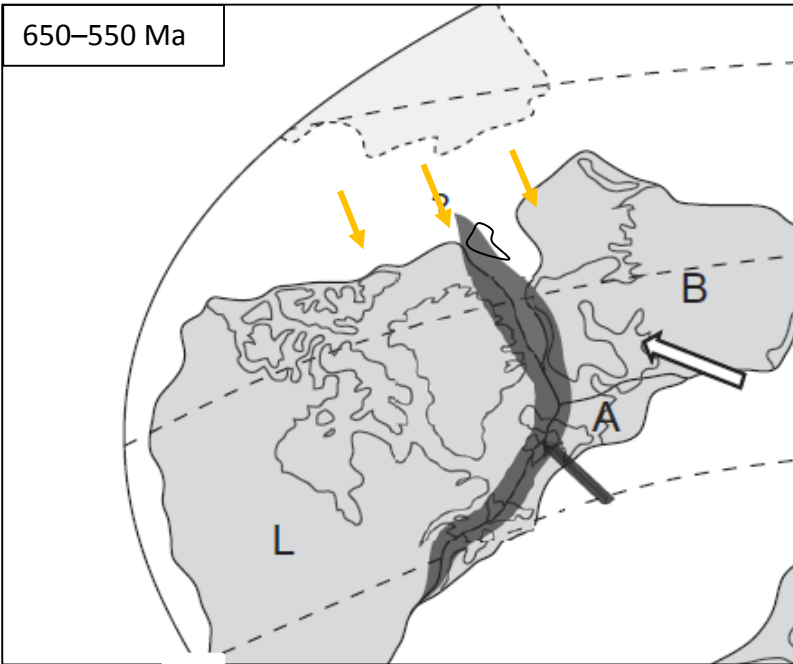
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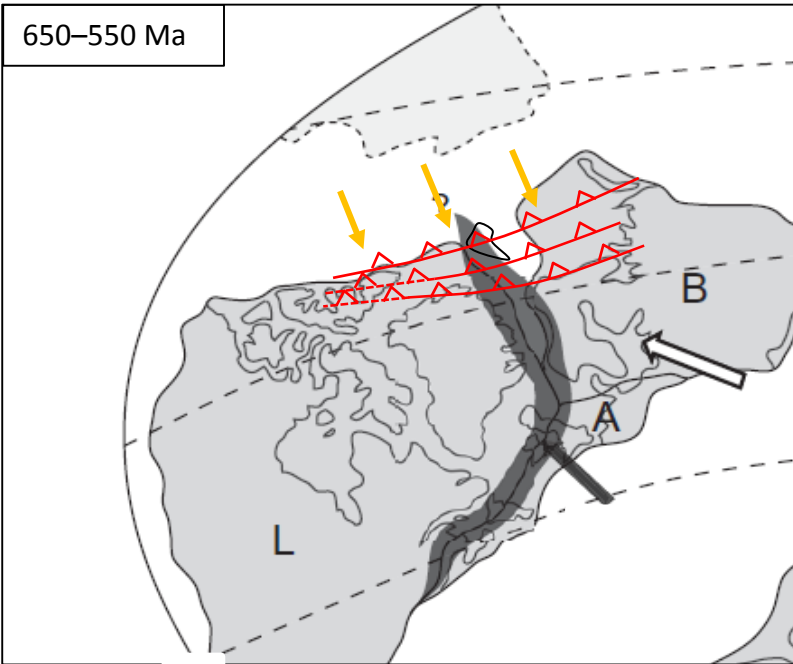


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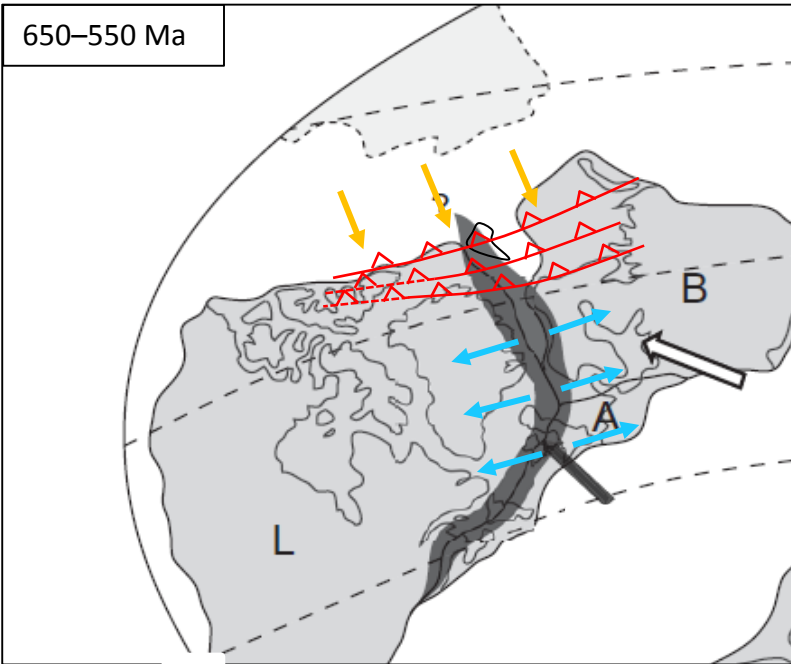




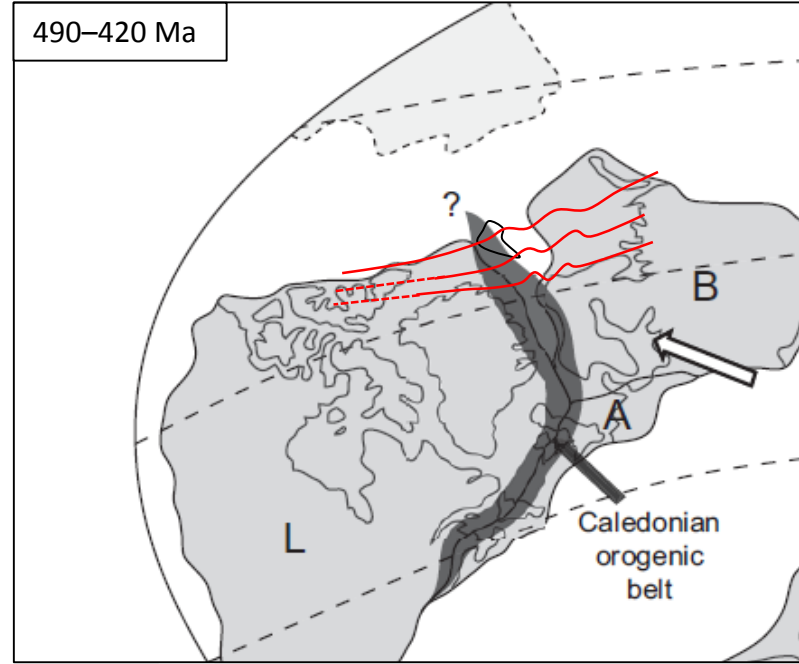
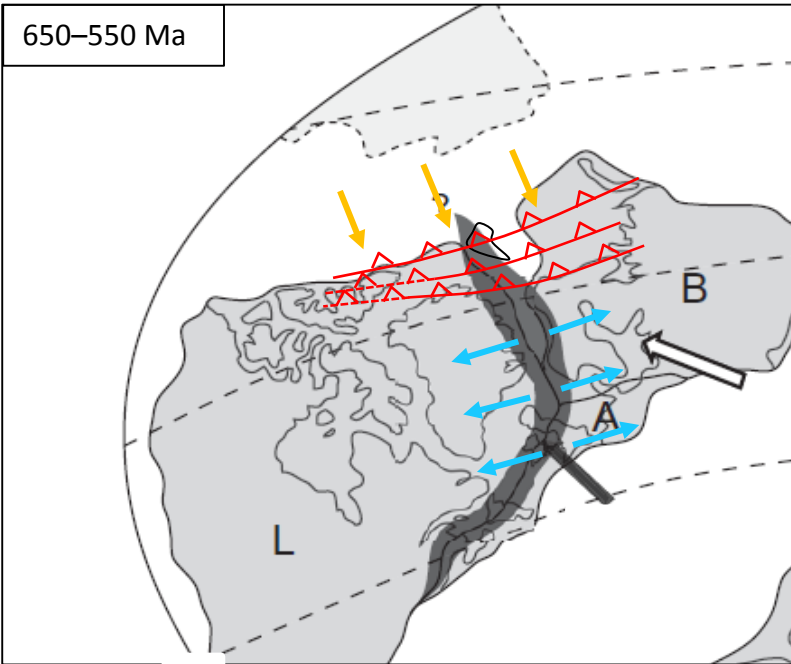
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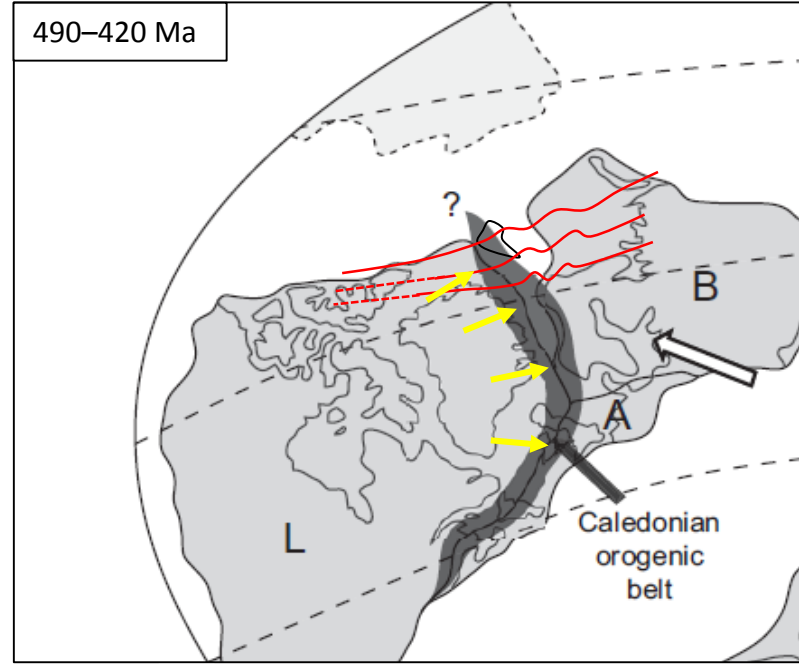
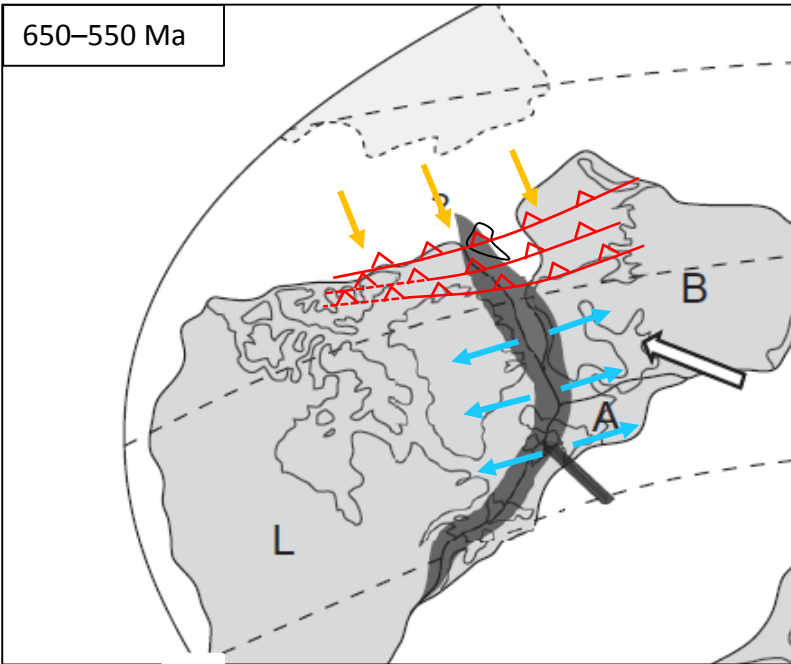
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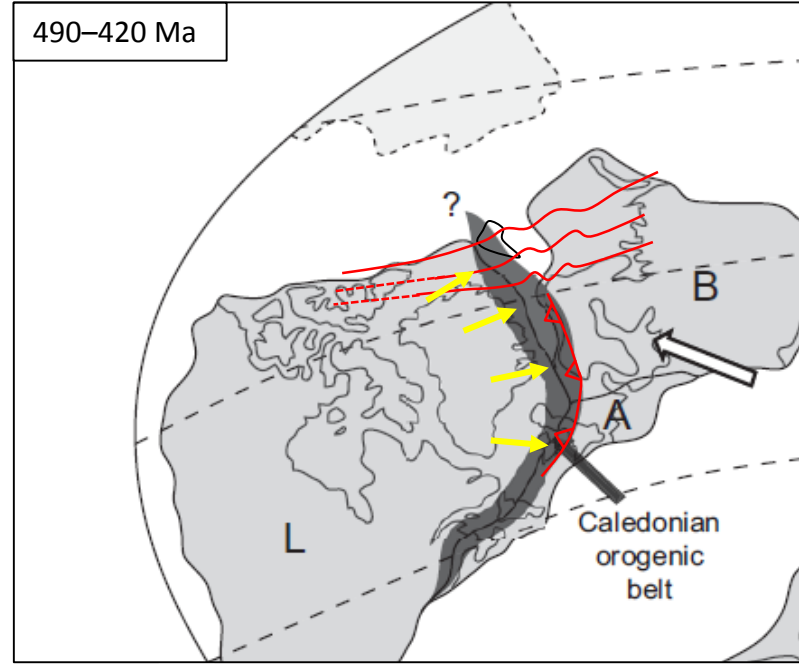
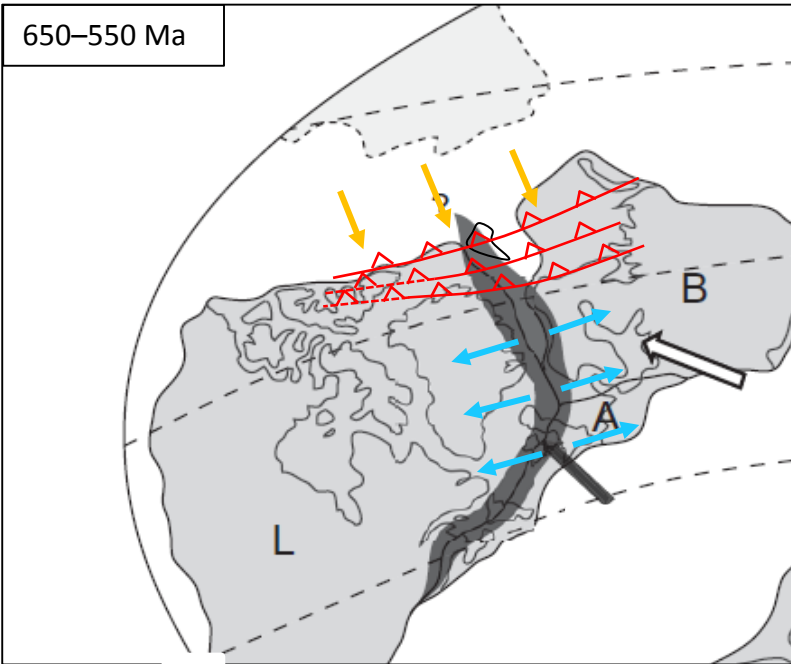
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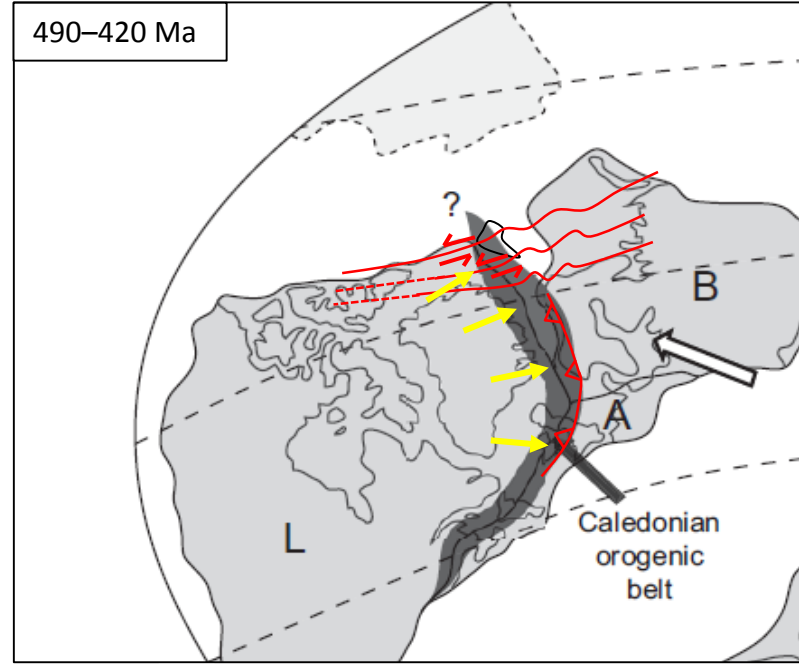
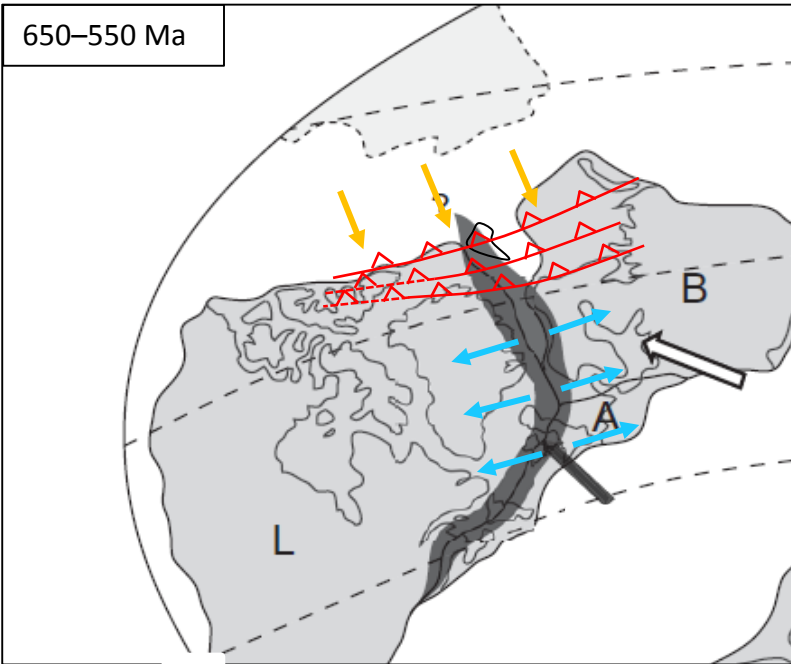
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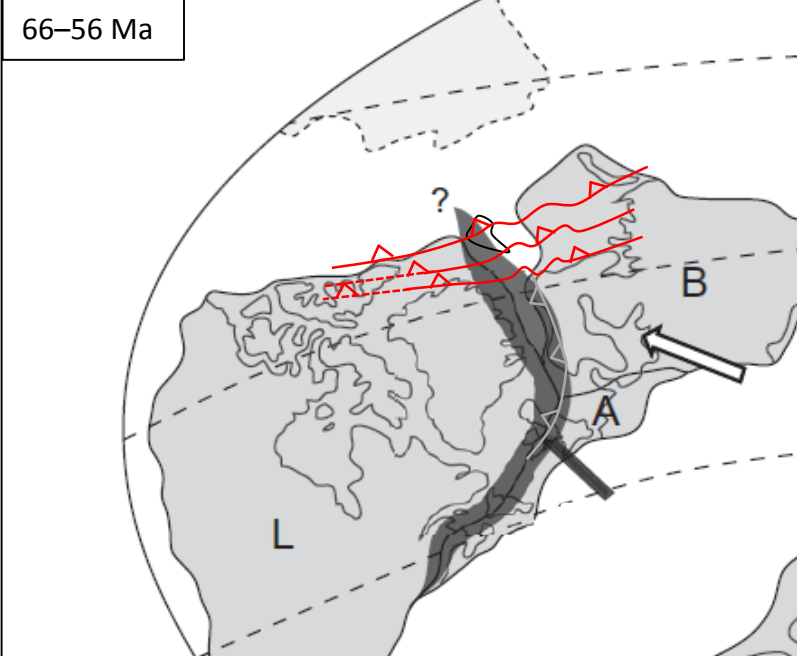
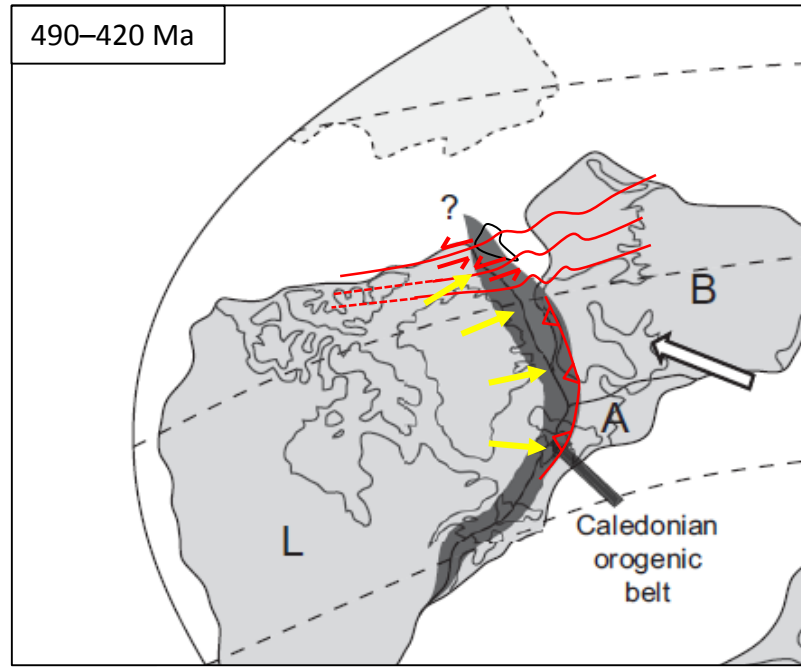
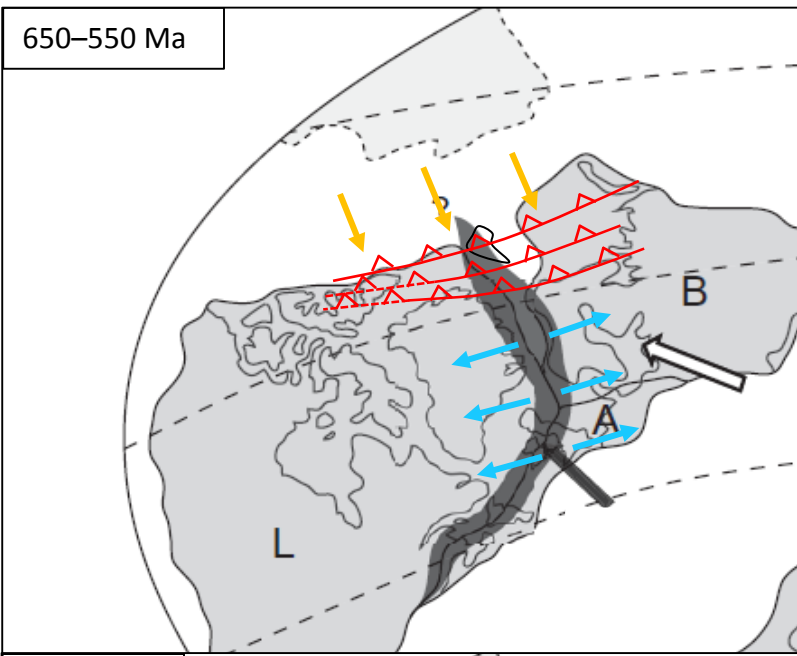
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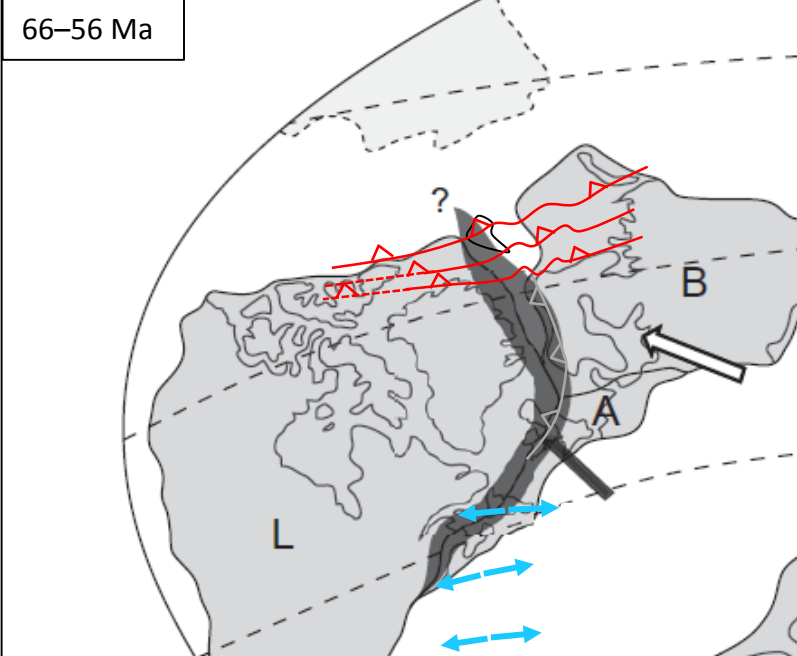
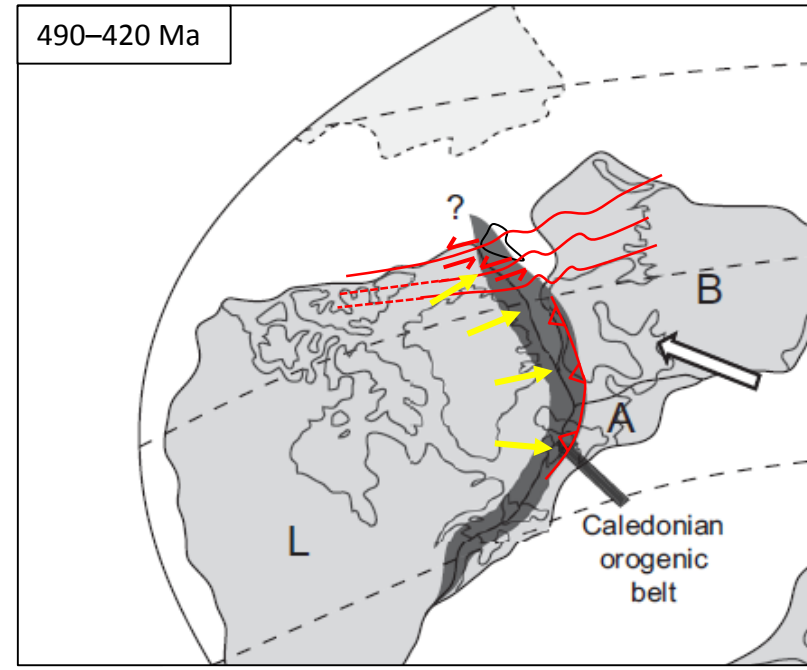
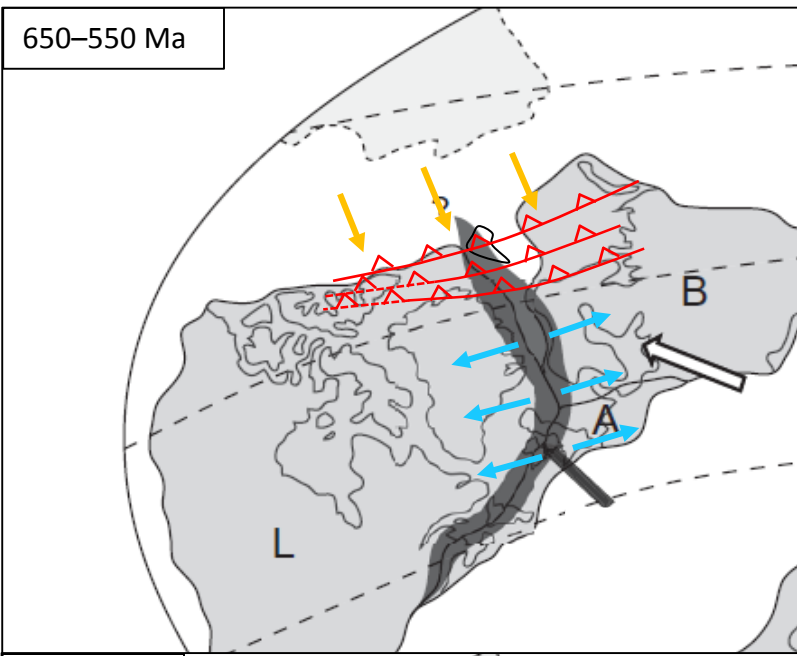
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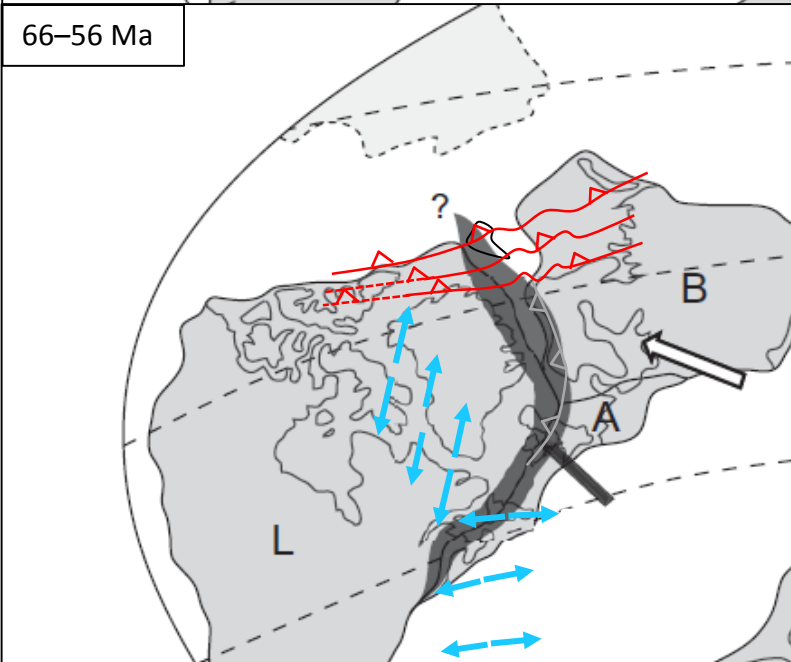
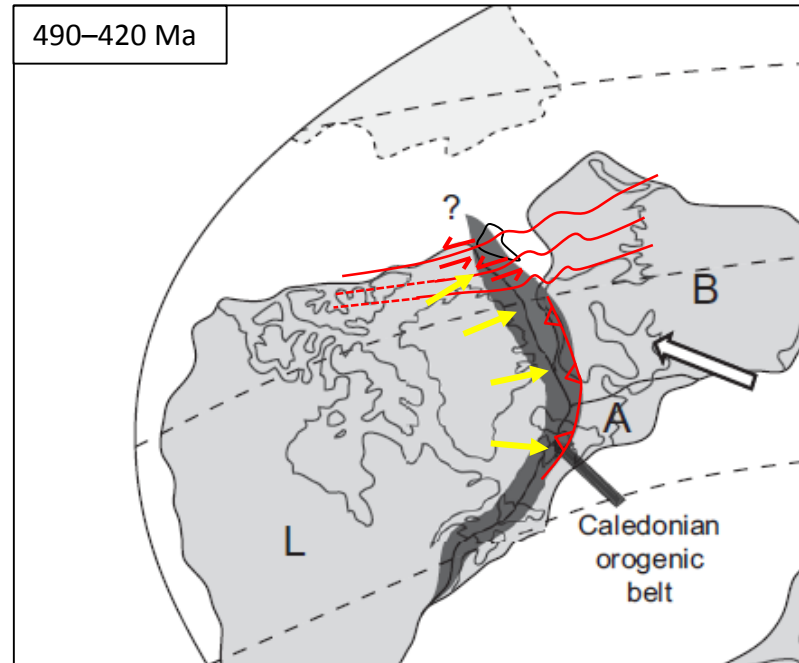
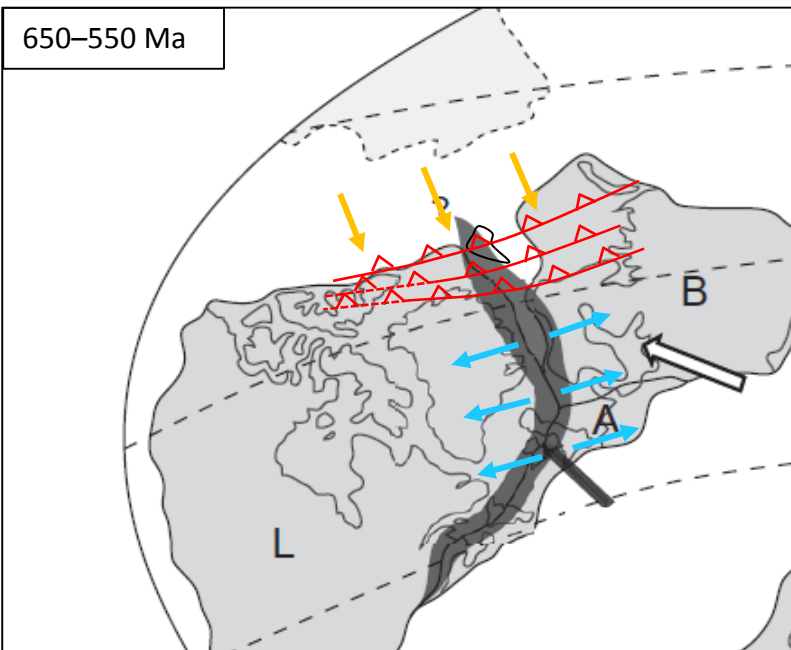


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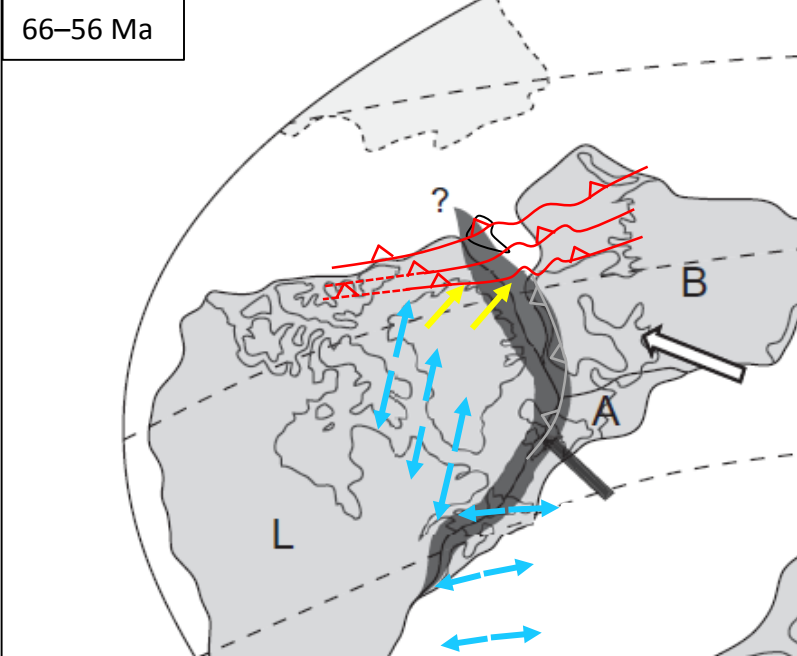
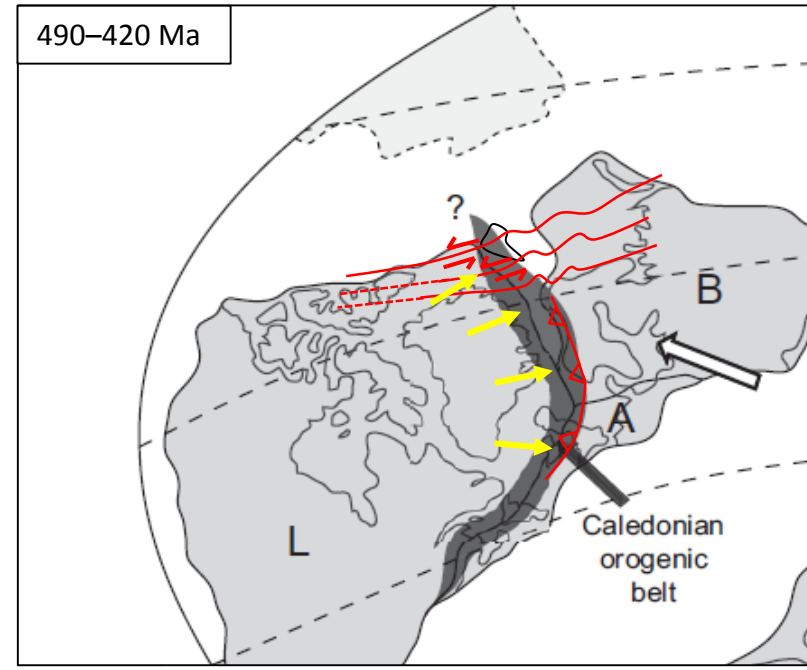
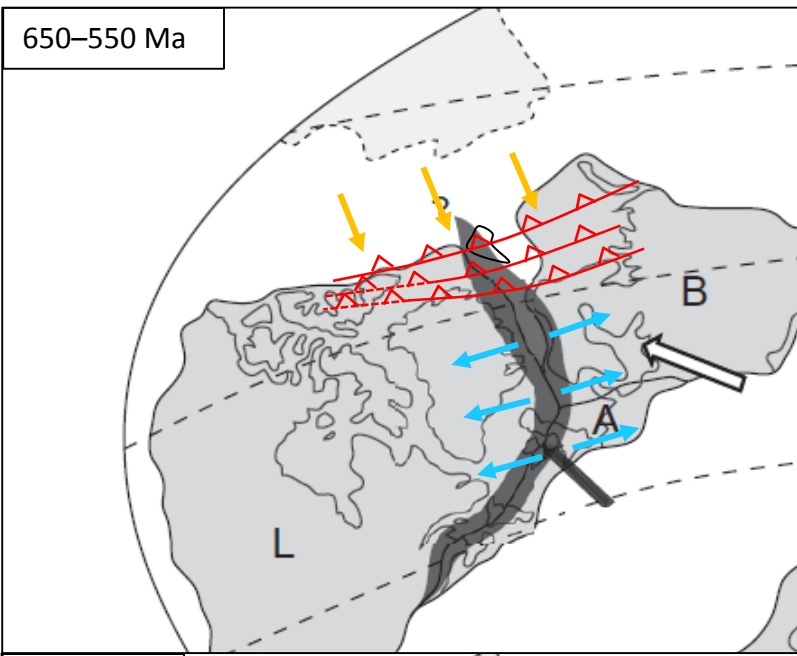




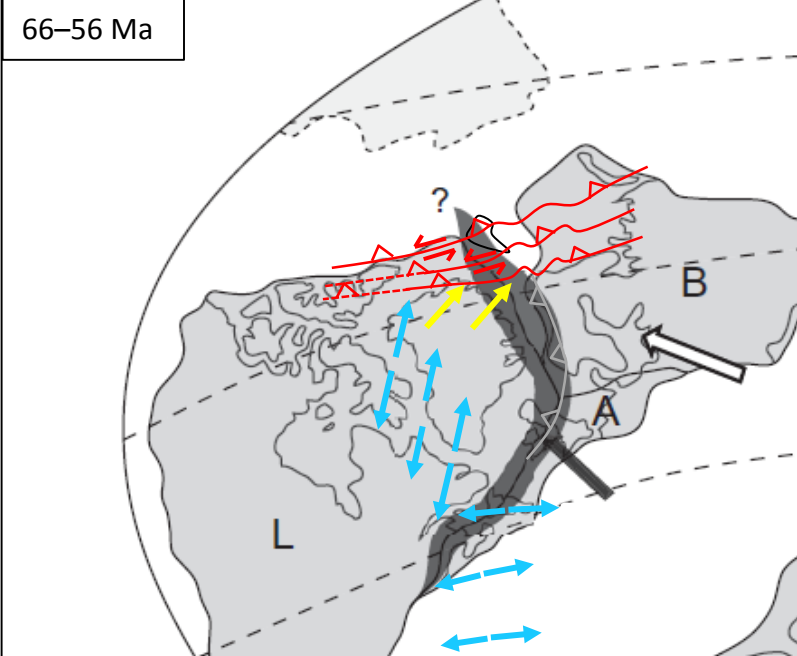
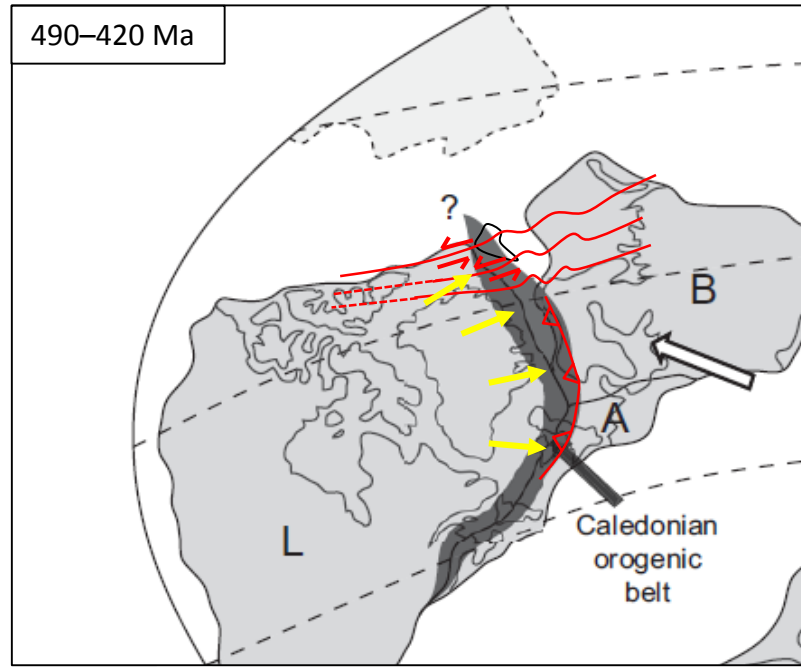
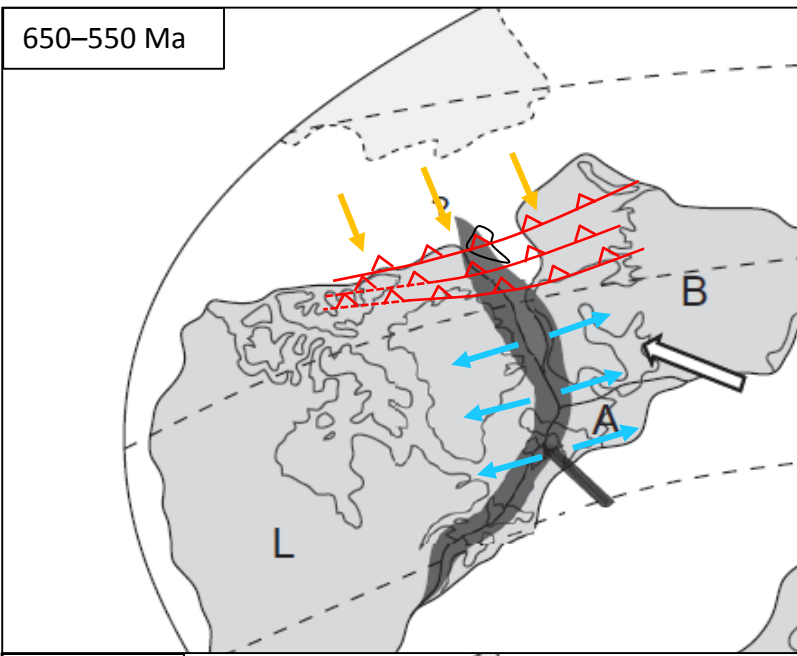
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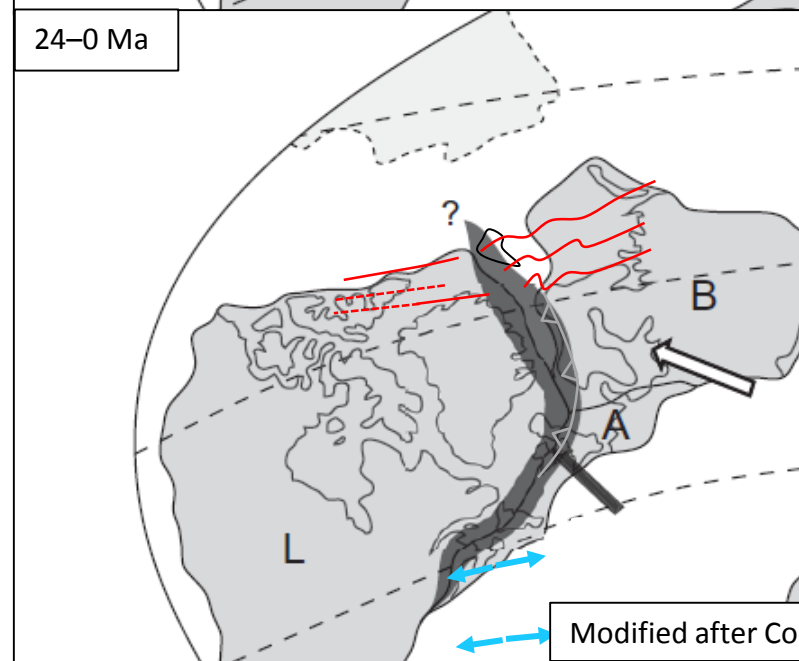
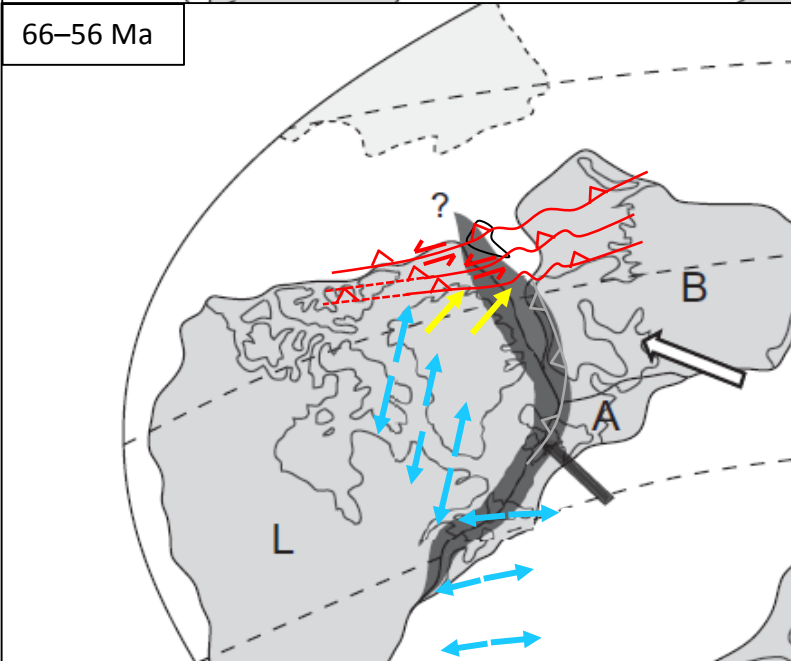
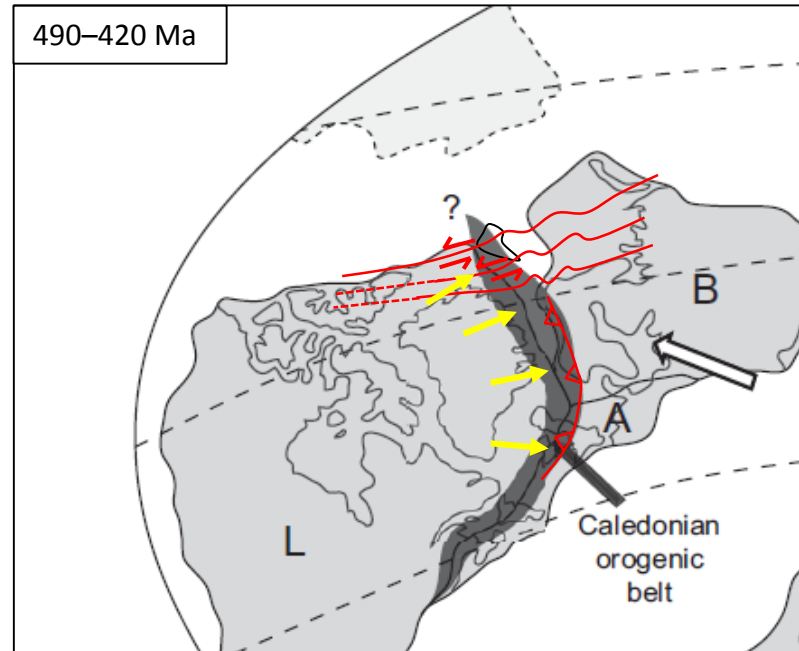
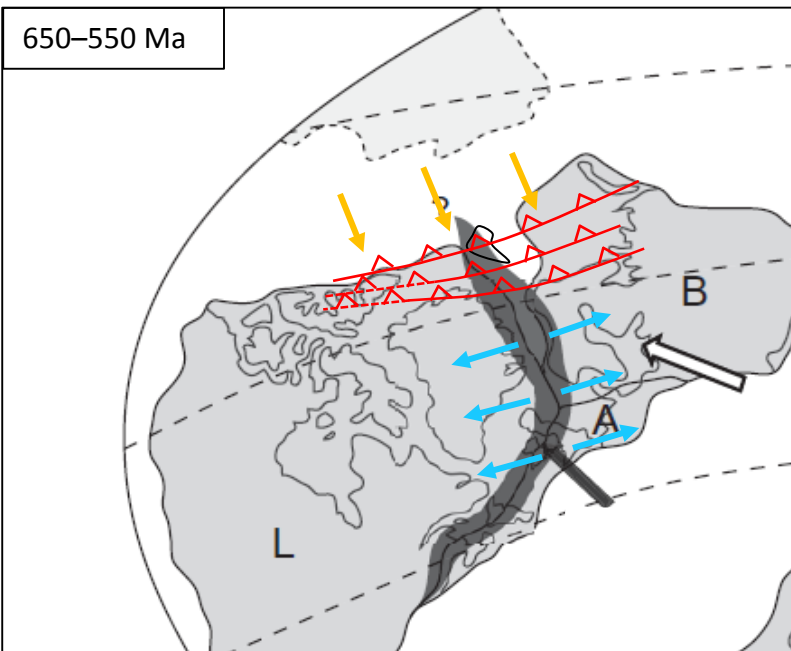
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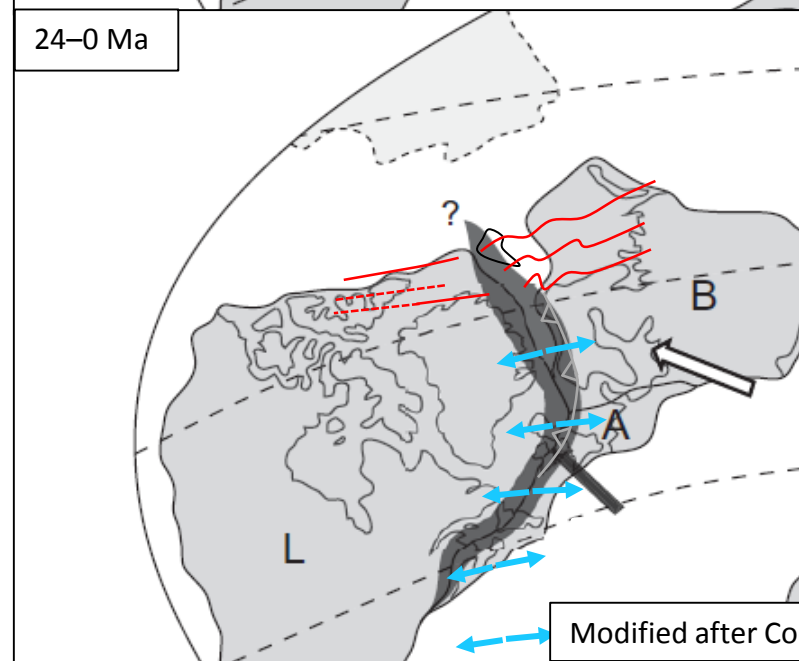
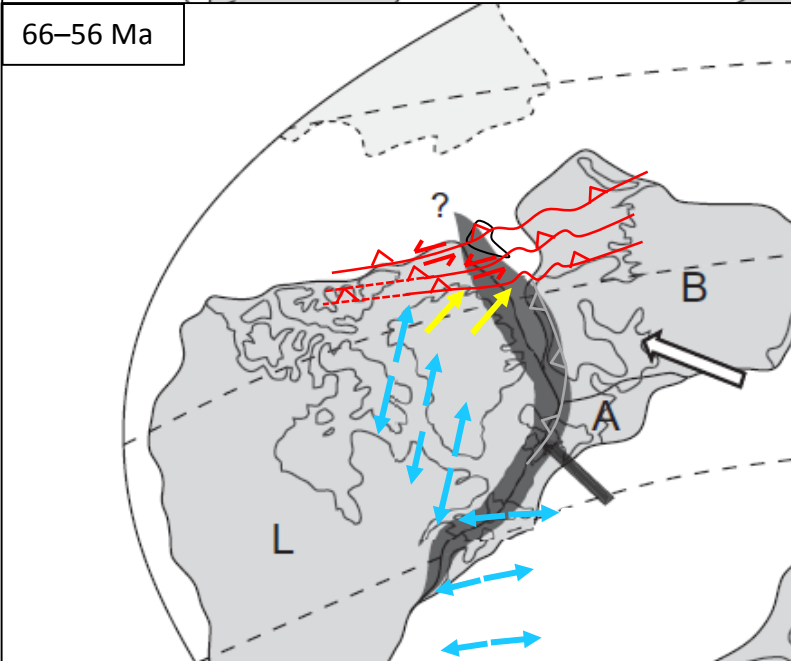
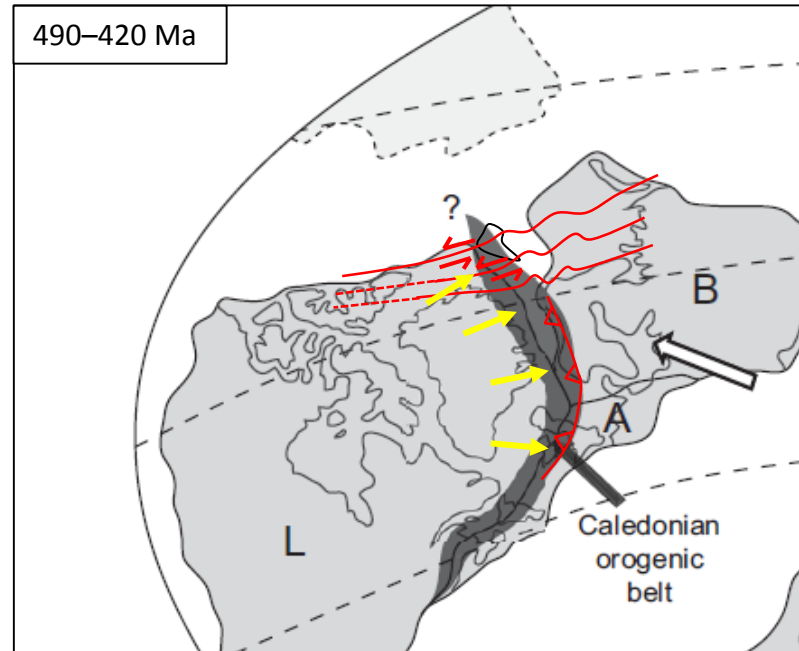
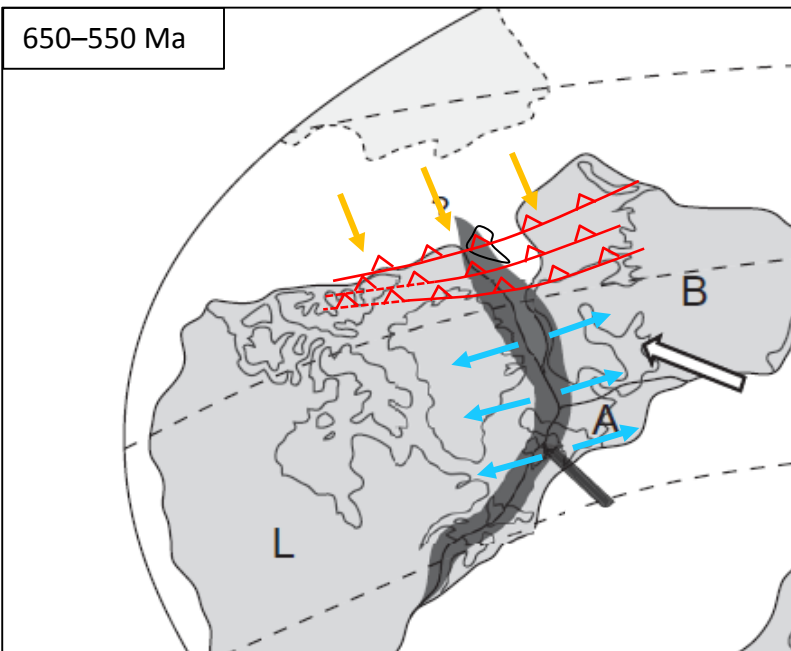


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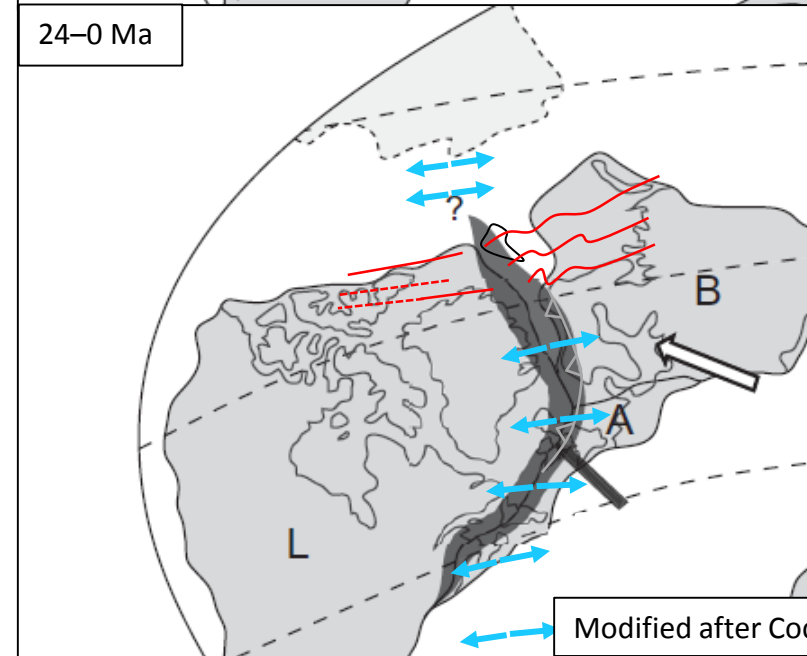
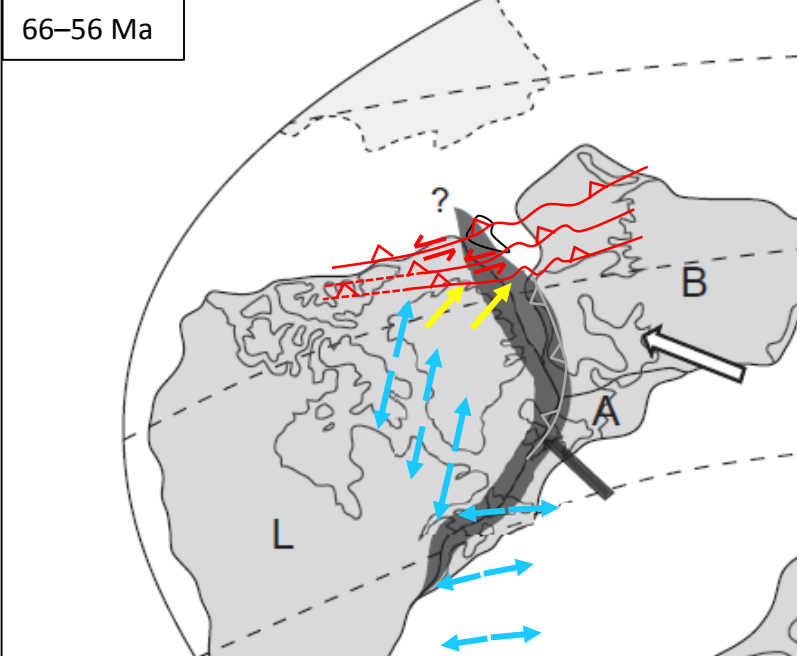
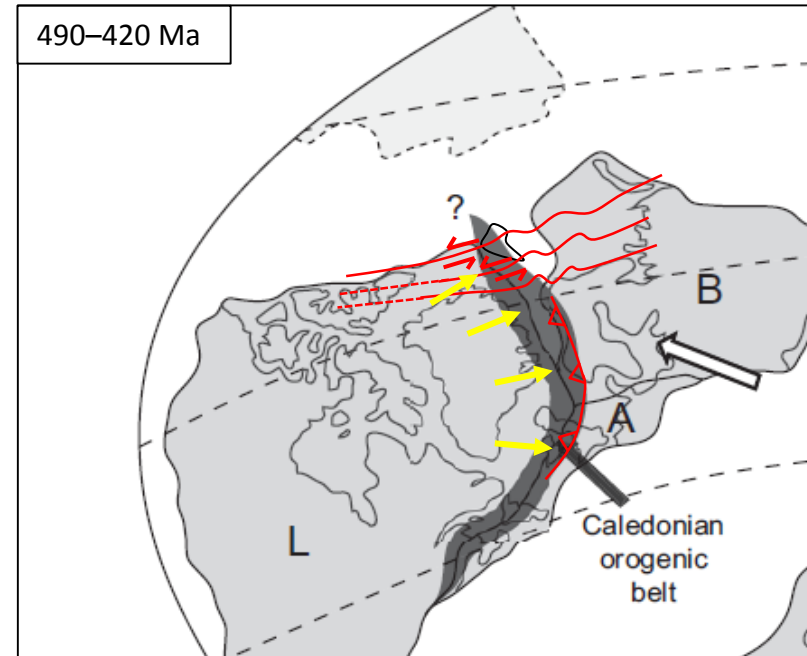
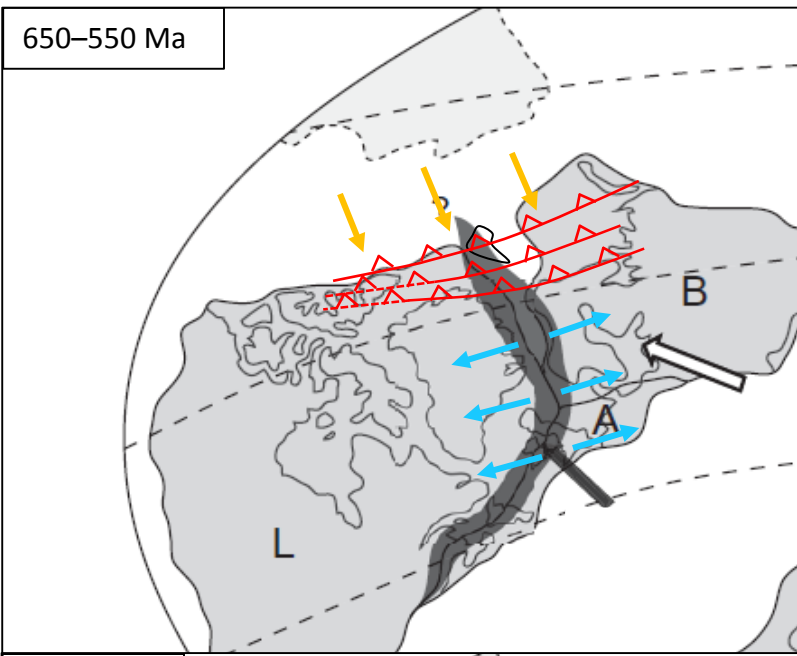
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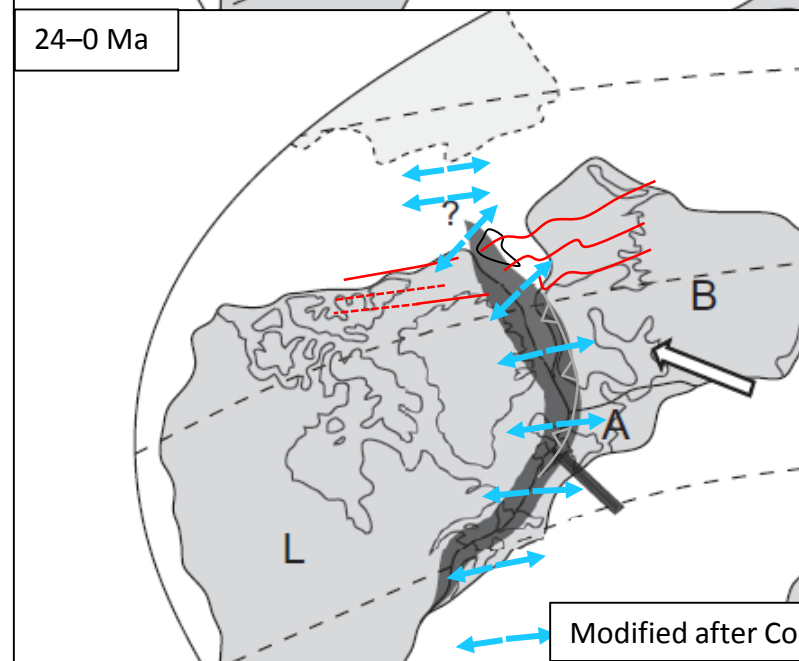
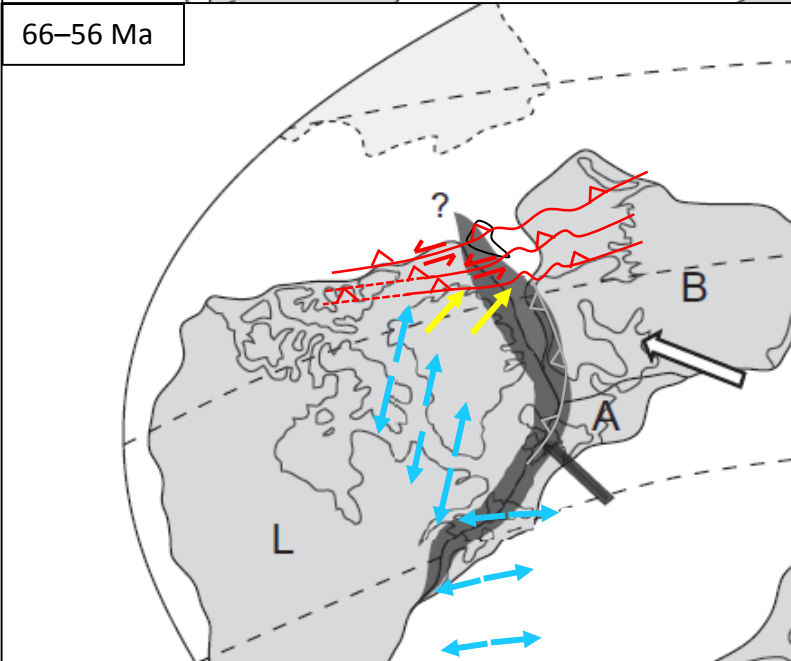
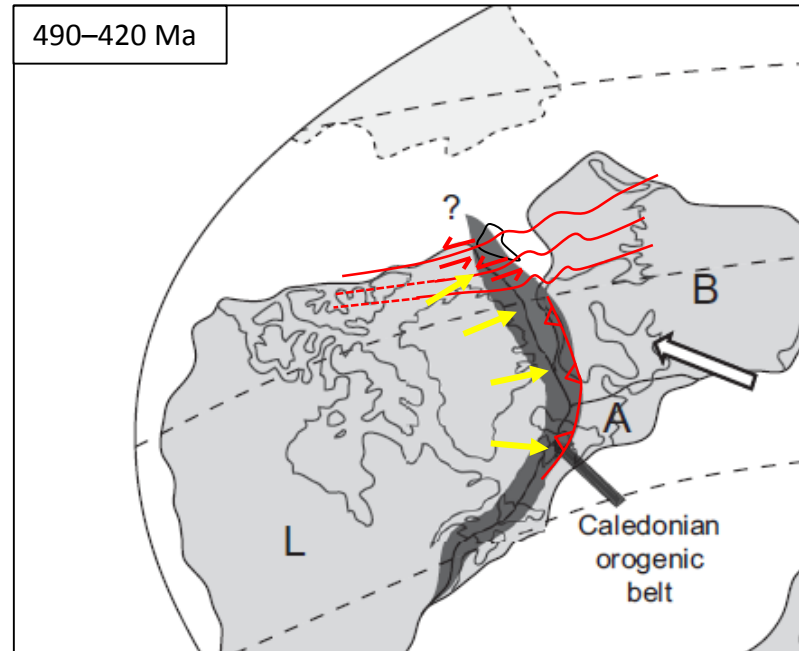
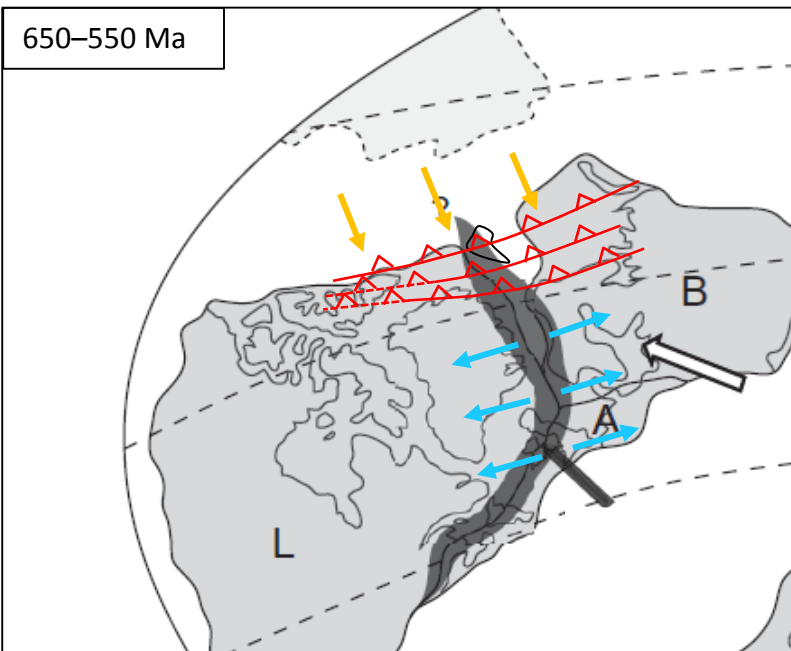
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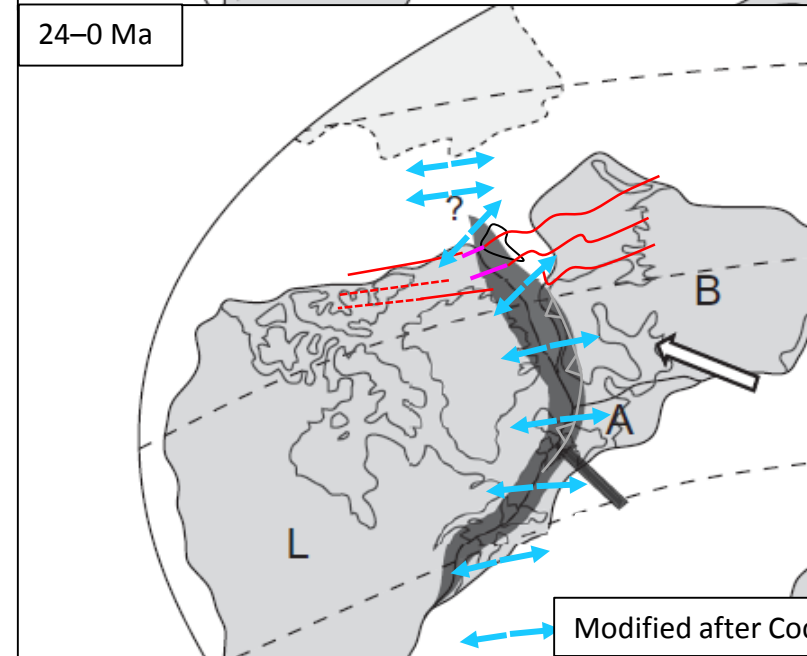
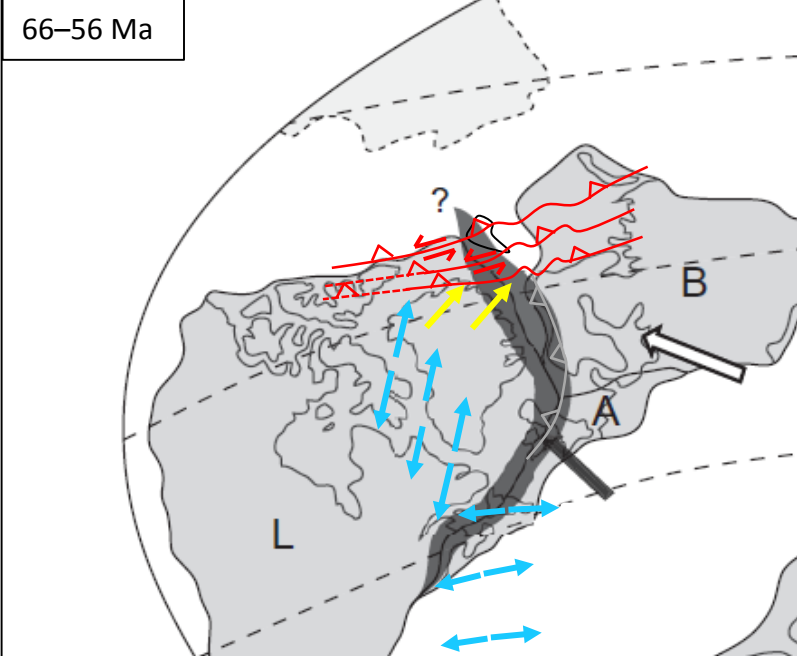
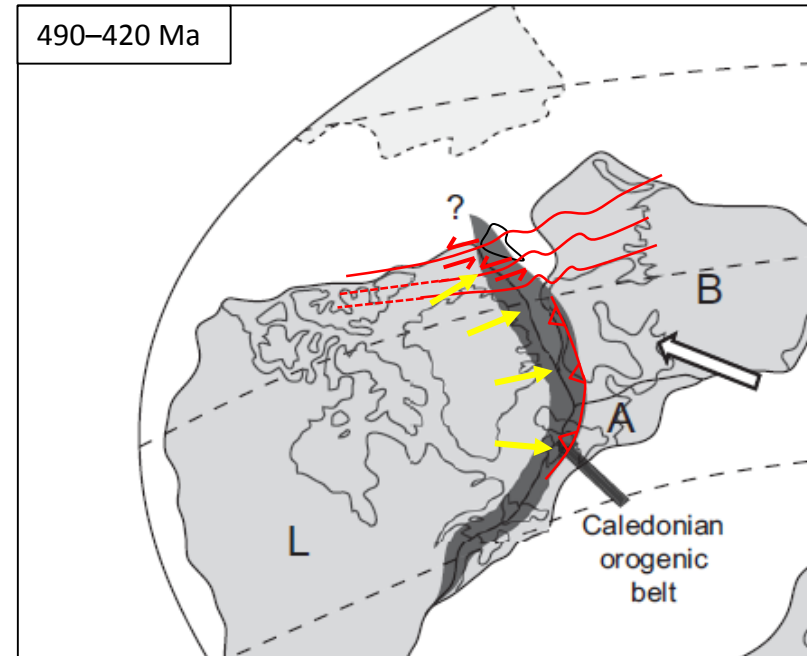
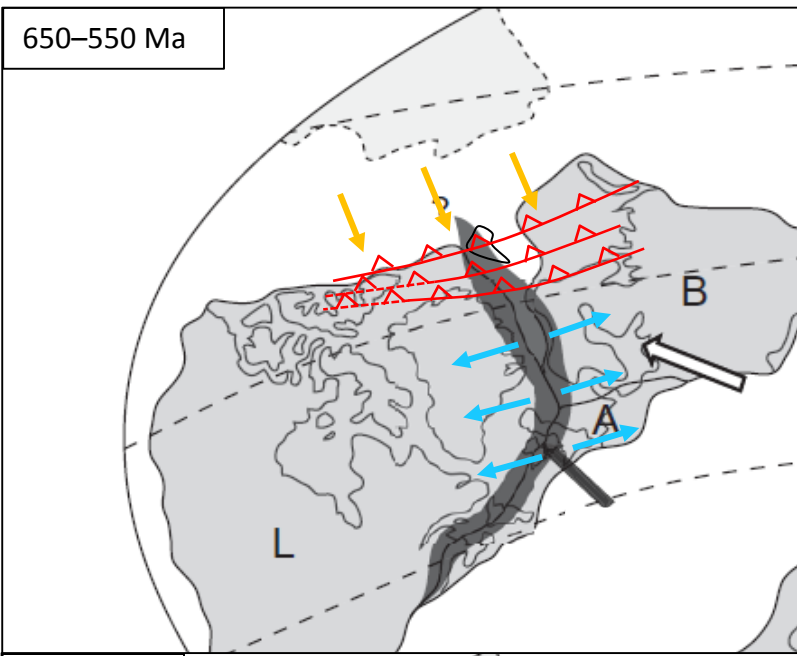
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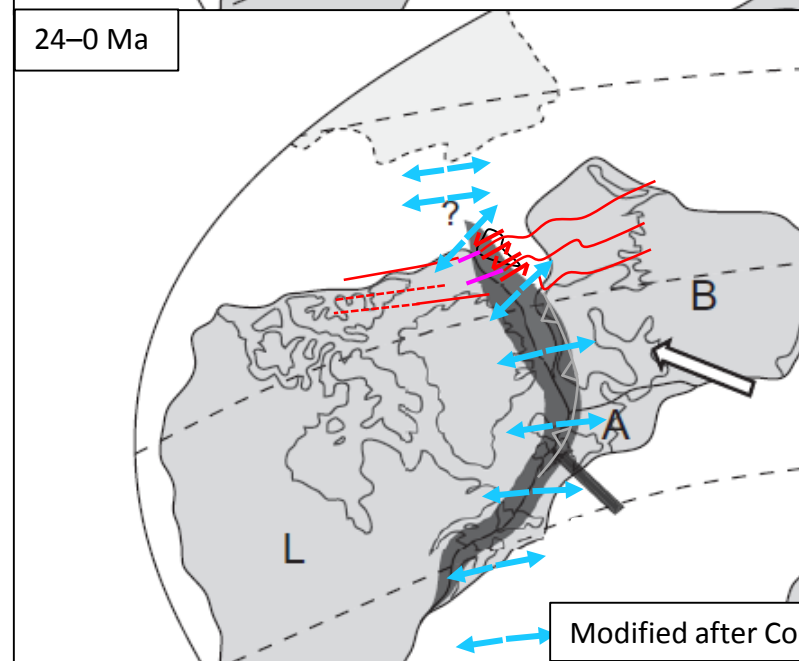
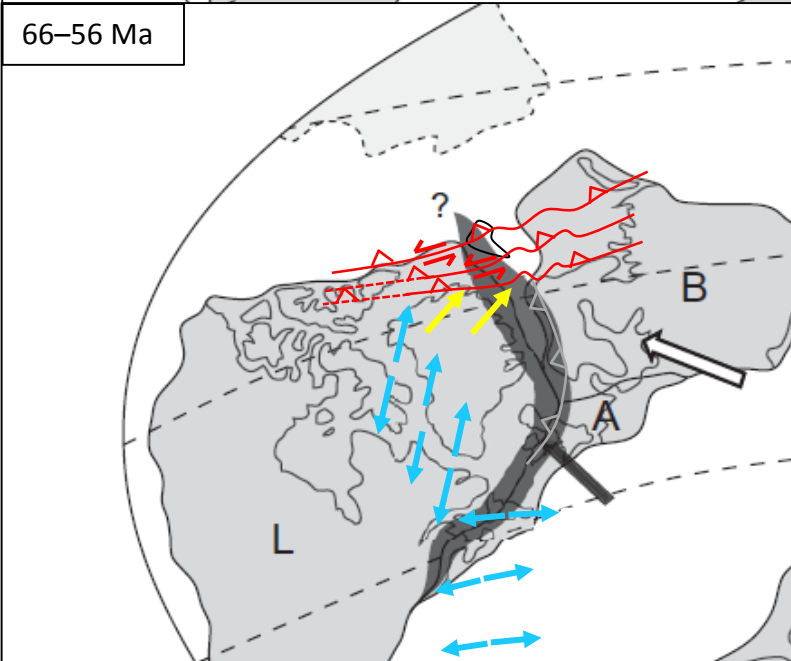
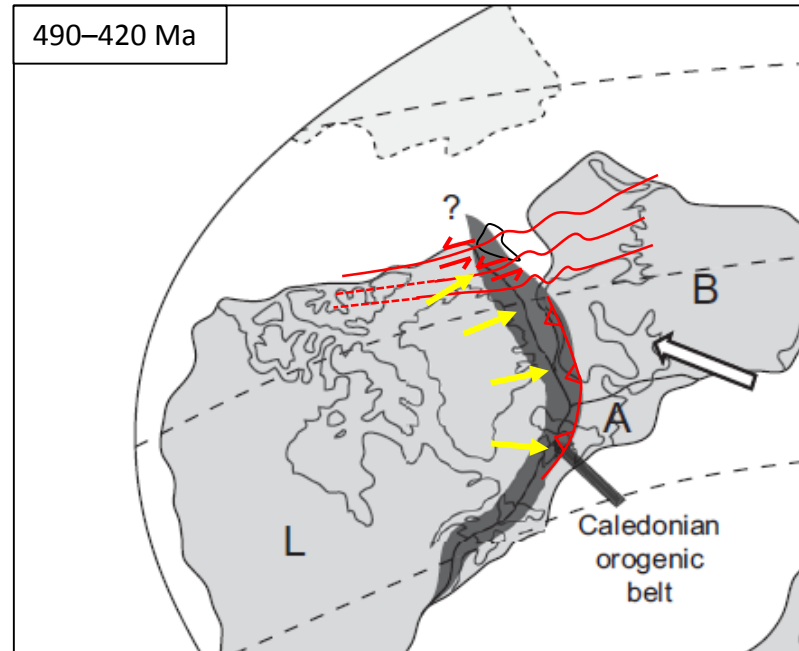
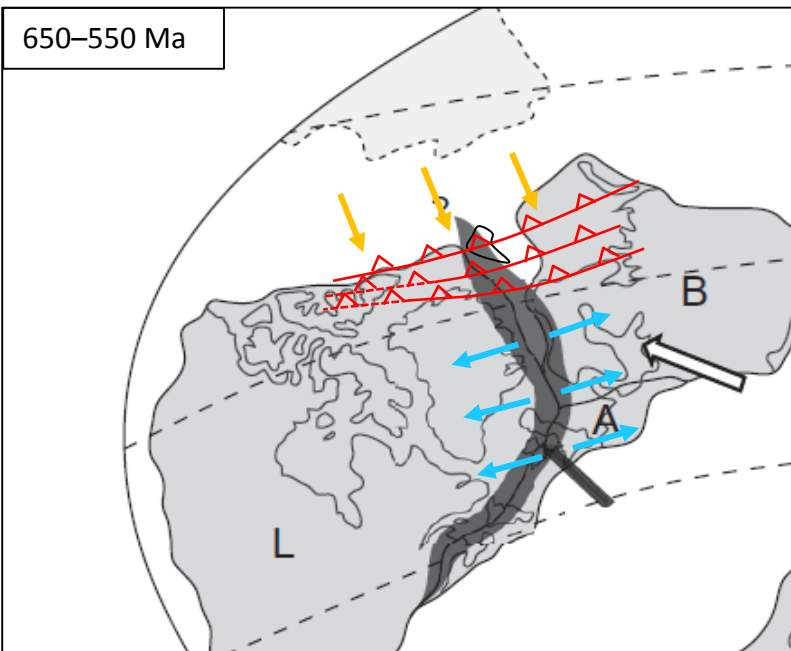
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Modified after Cocks & Torsvik (2002)



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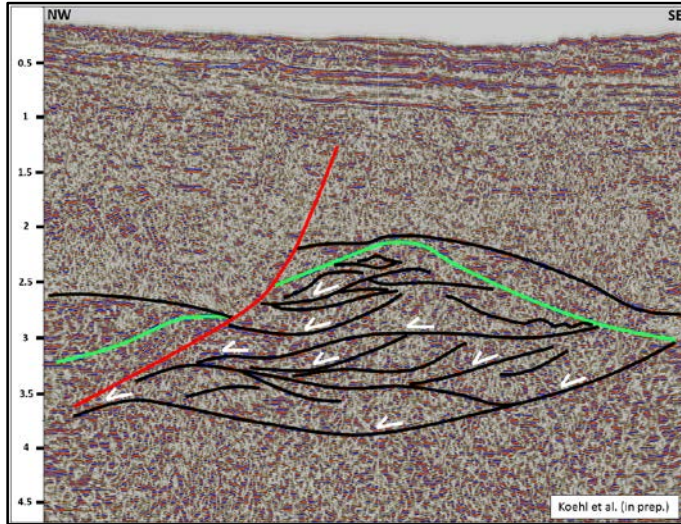
# Conclusion

**Timanian faults provided preexisting zones of weakness that localized the formation of faults and basins, oceanic core complexes, transform faults and breakup in the NE Atlantic.**

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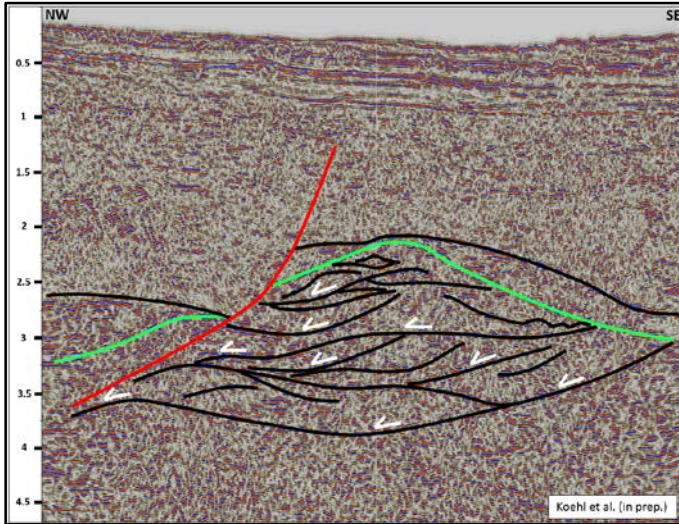
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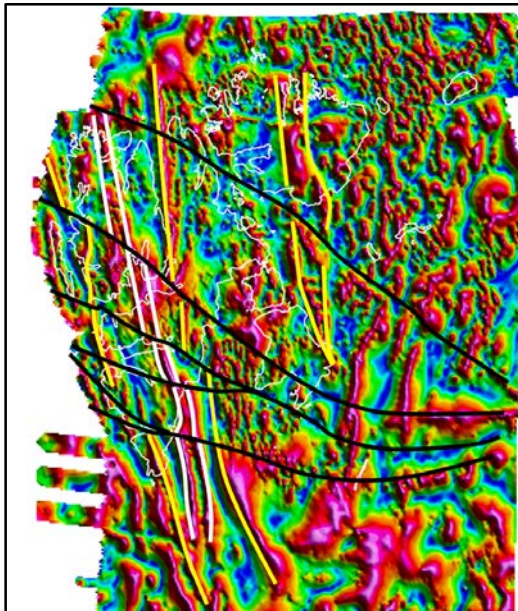
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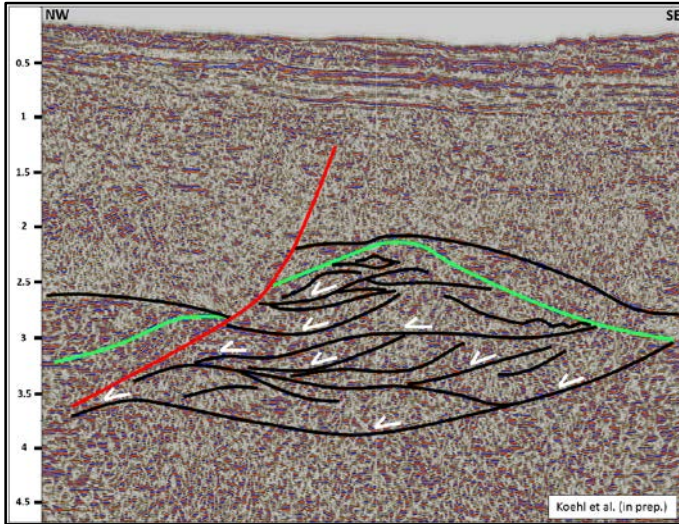
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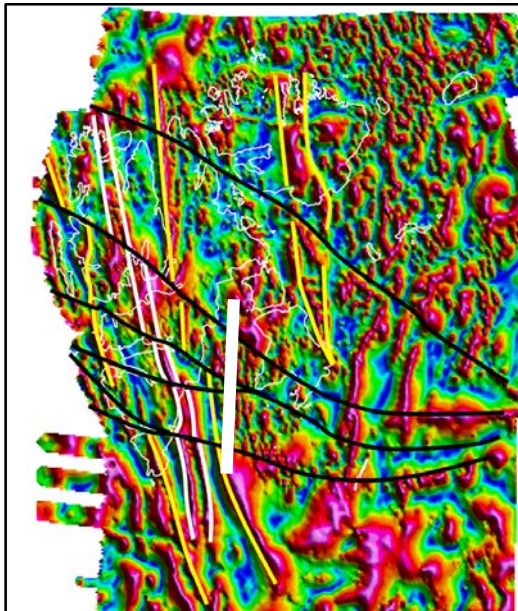
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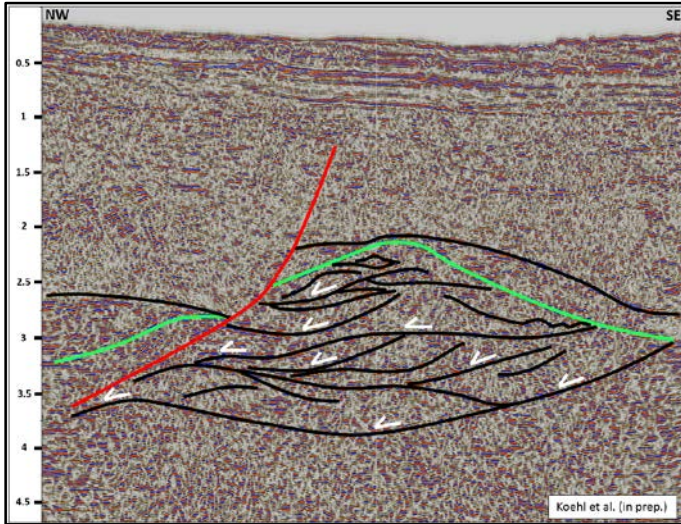
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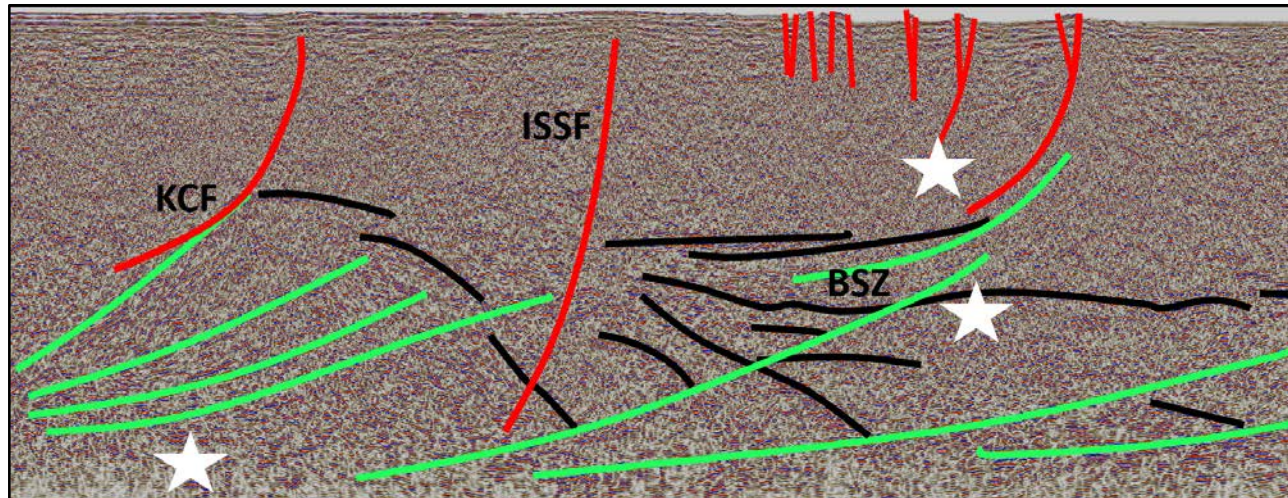
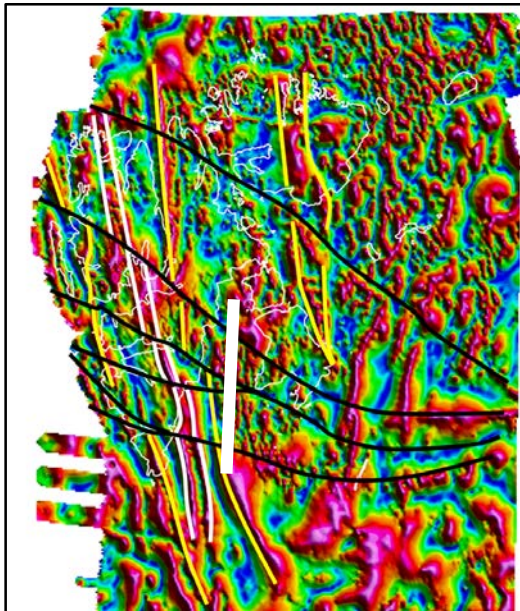
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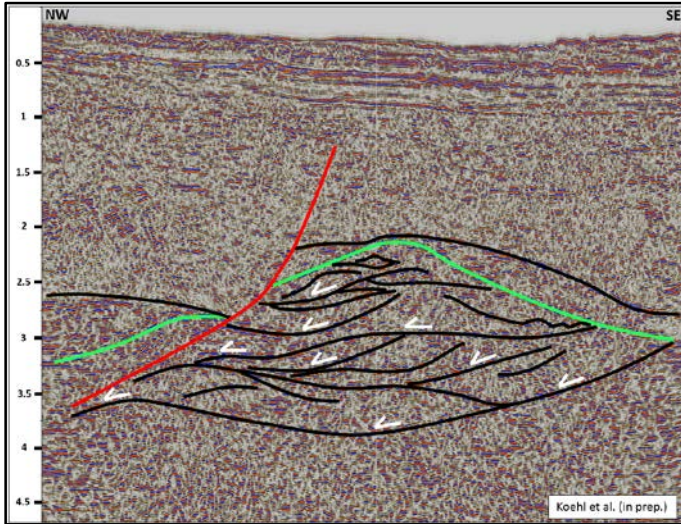
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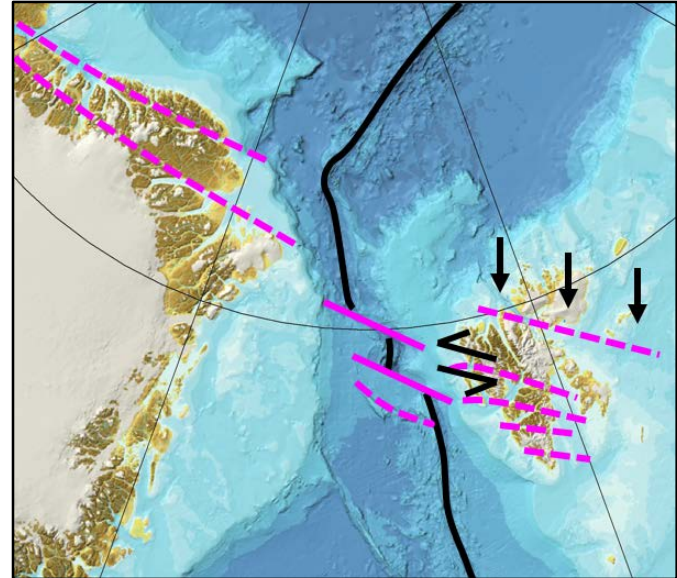
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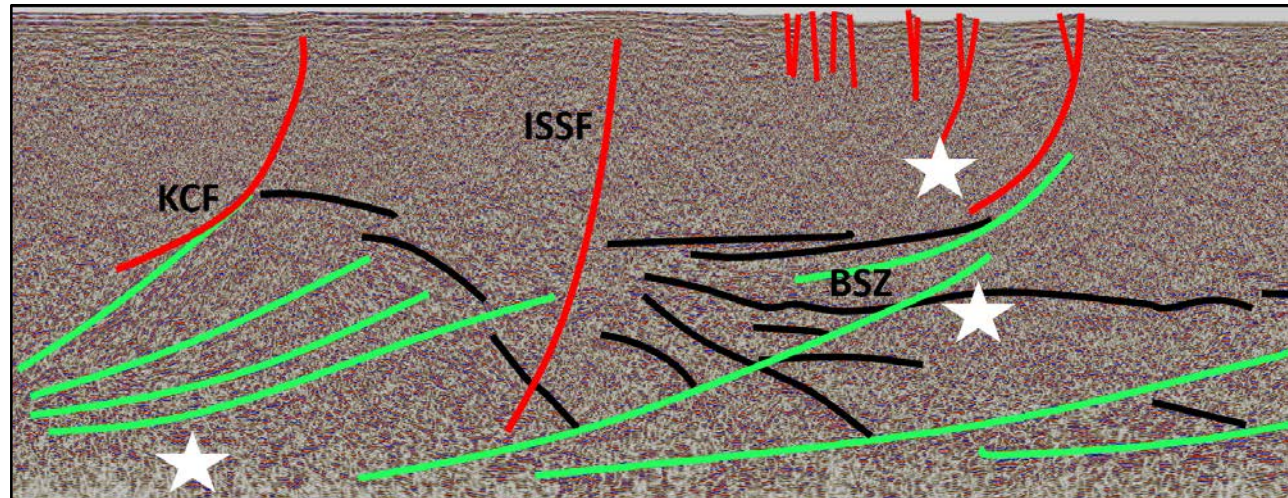
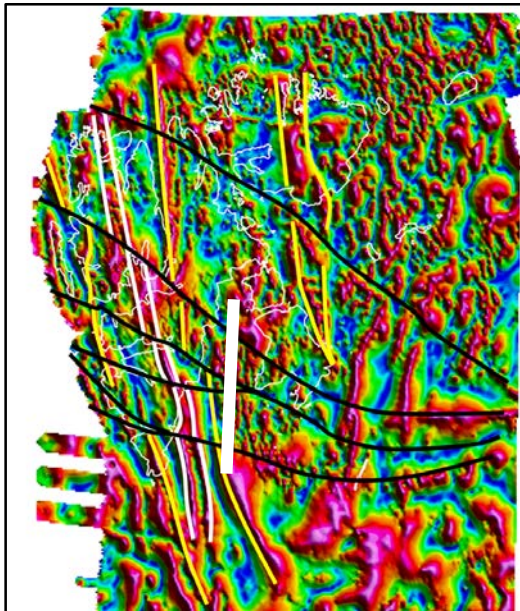
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3



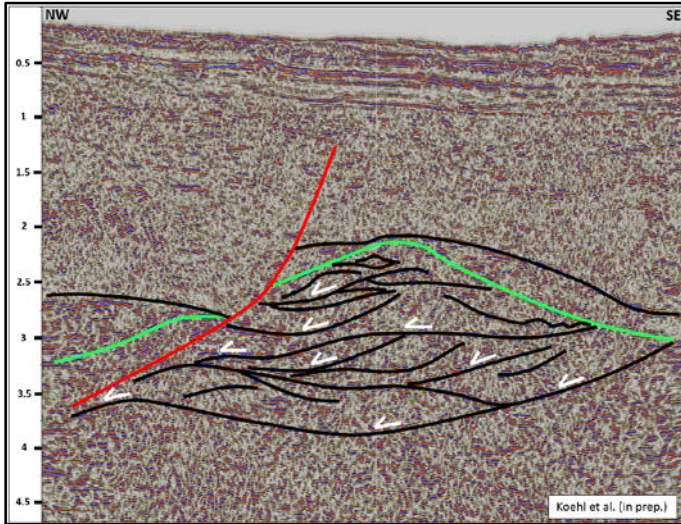
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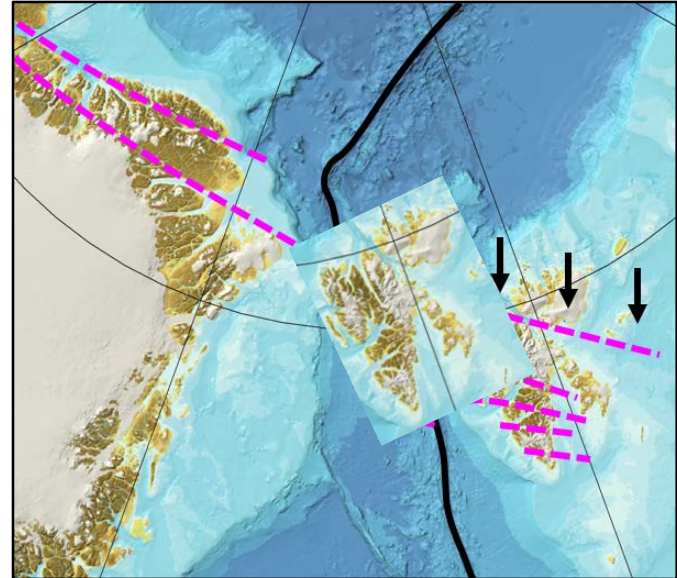
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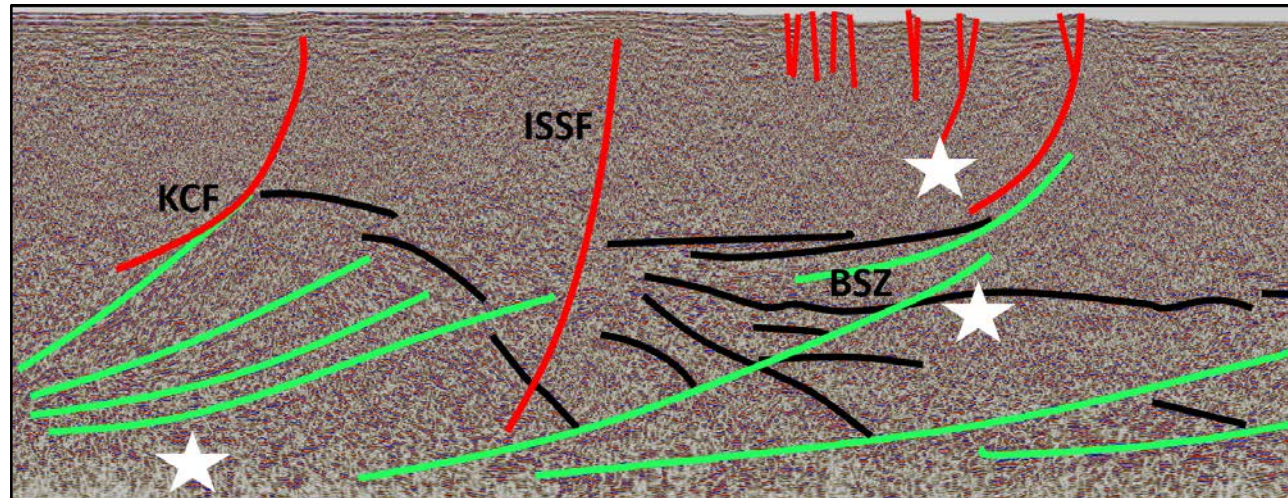
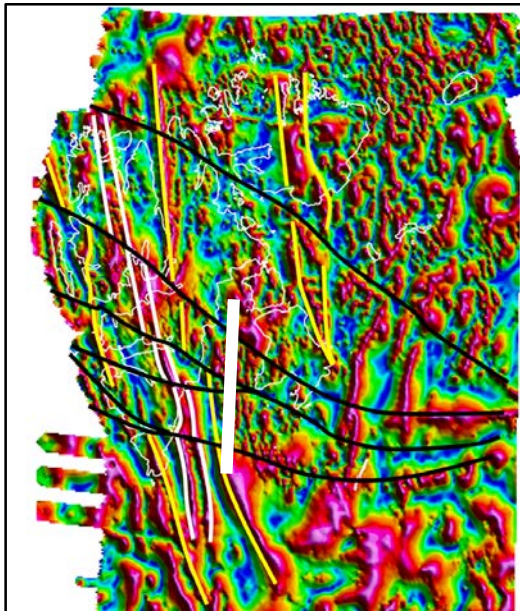
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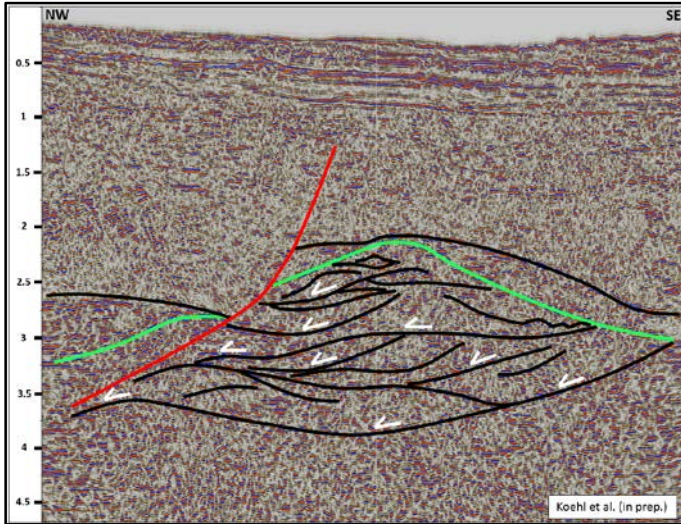




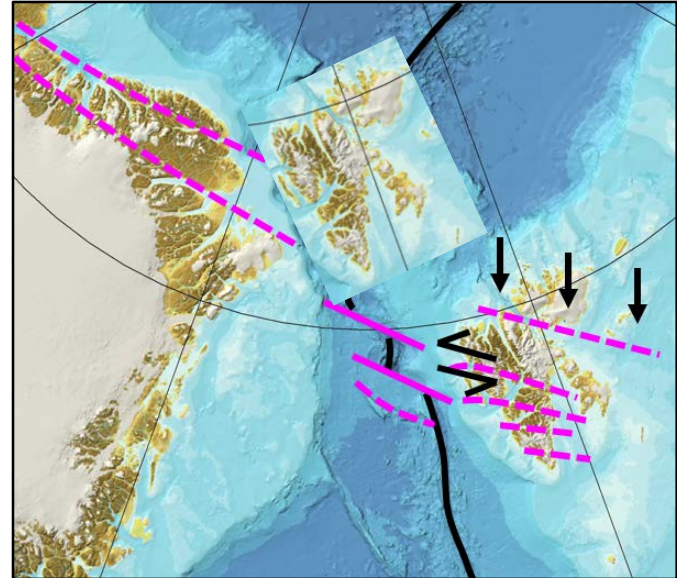
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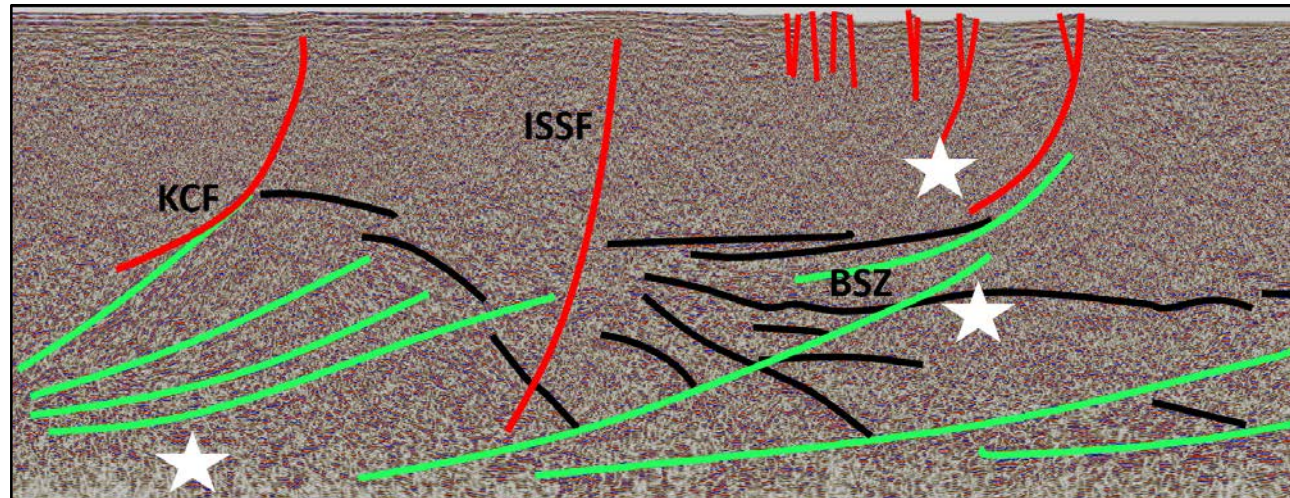
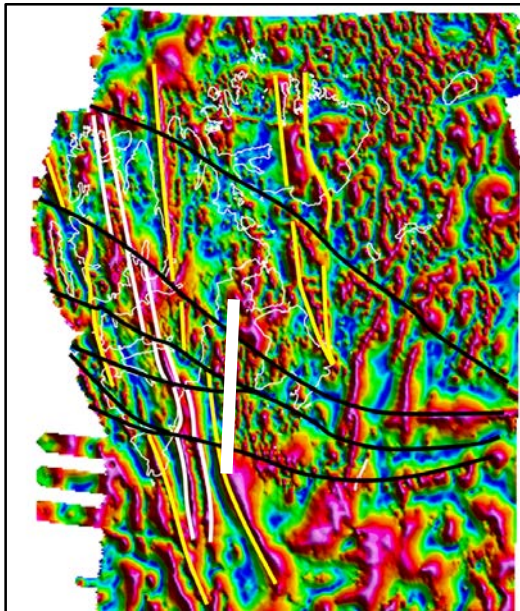
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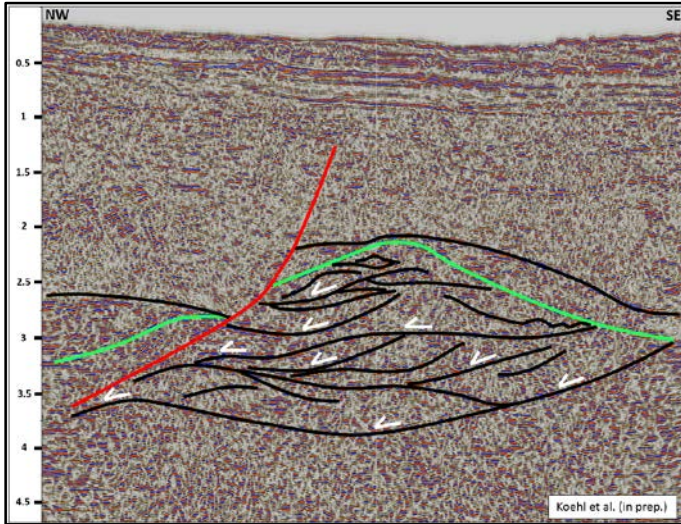
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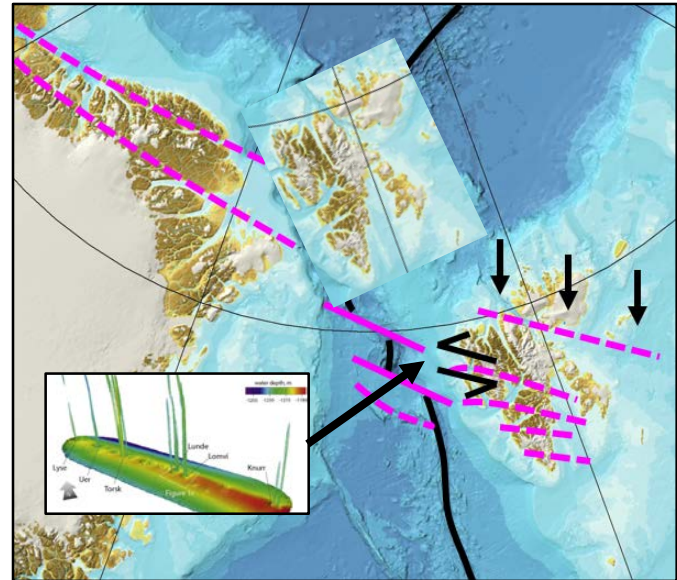
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1



3



2

