Evolution of a clastic source-to-sink system through the Permian-Triassic transition: Provenance and petrography of the Havert Formation on Finnmark Platform, Barents Sea, Norway

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- Almost 1.5 years into the PhD
- Presentation of preliminary results

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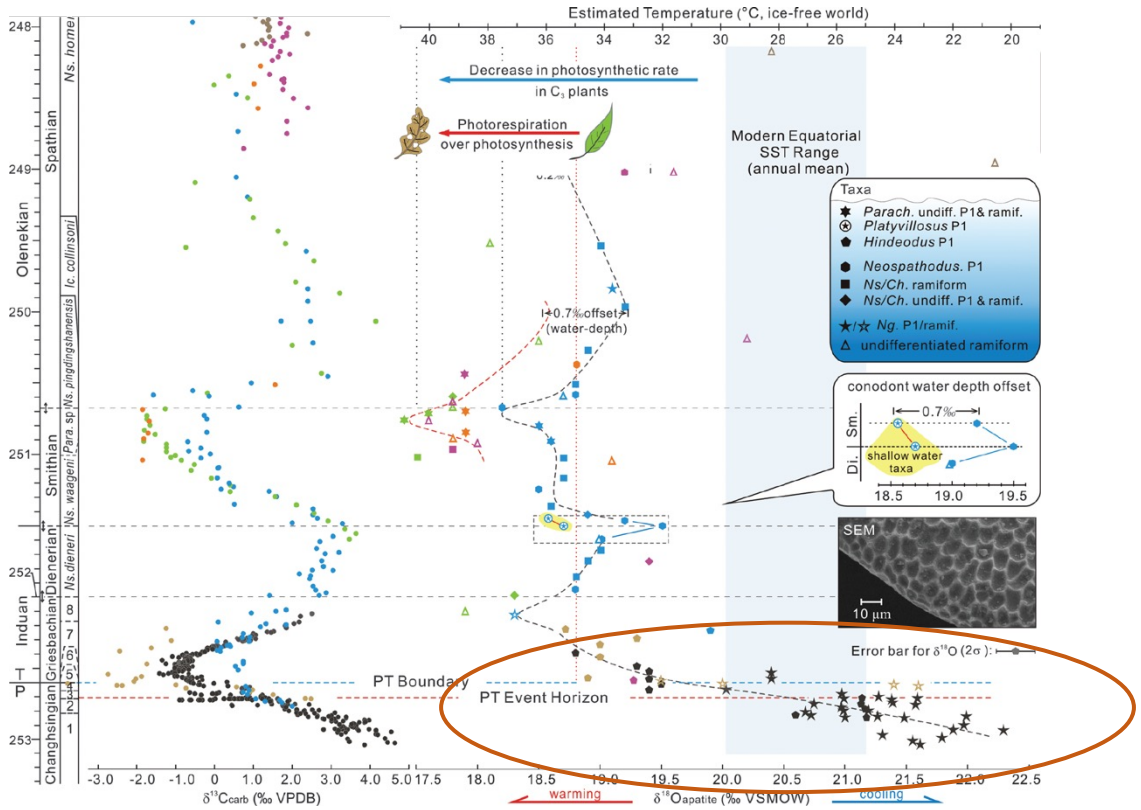
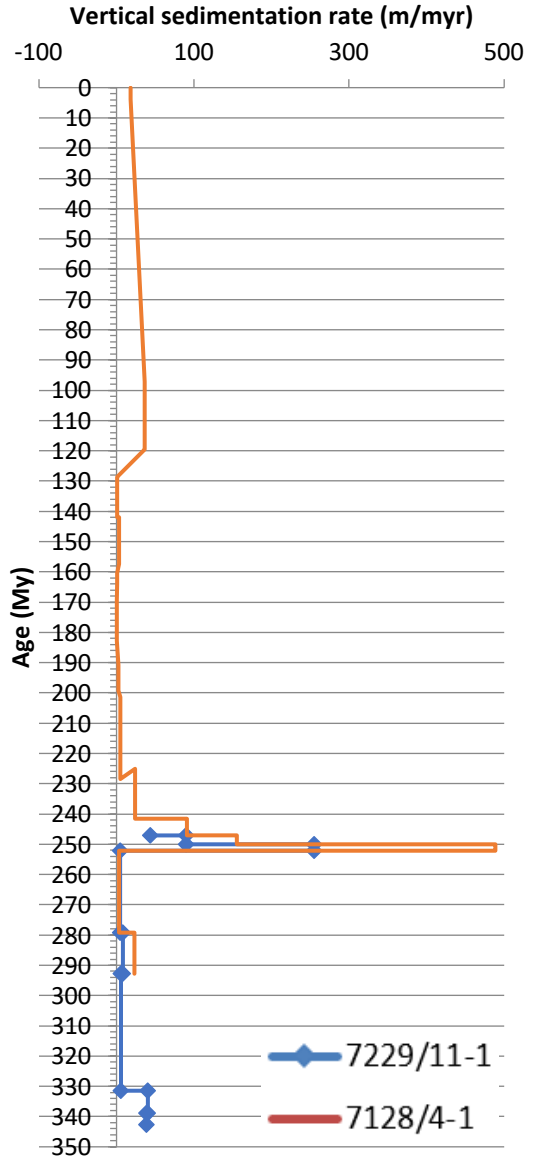
The project has received funding from the European Union's Horizon 2020 research and innovation program under the Marie Sklodowska-Curie grant agreement No 860383.

Introduction: Climate change at Permian Triassic transition



Sun et al., 2012

- Global 7-times increase in sedimentation rate at PT transition (Algeo and Twitchett, 2010)
- Traditional model: sediment increase due to death of vegetation
- Increase of sedimentation rate in Barents Sea: in cores 50–150-times



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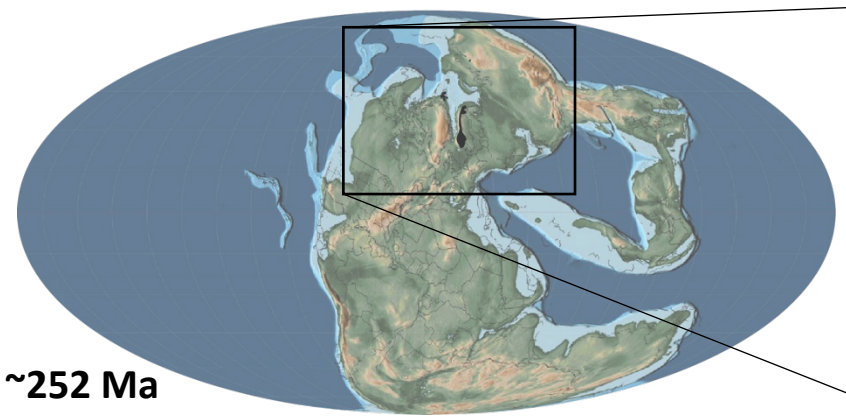
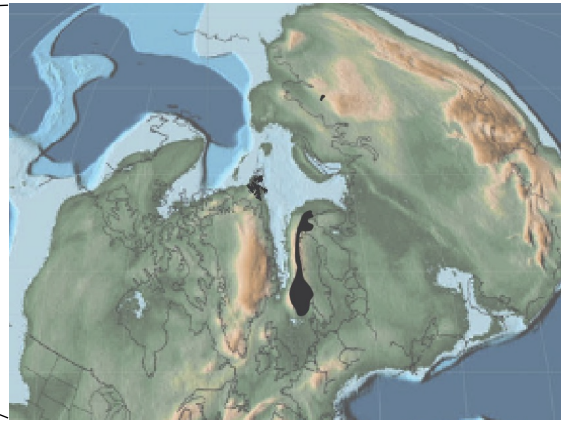
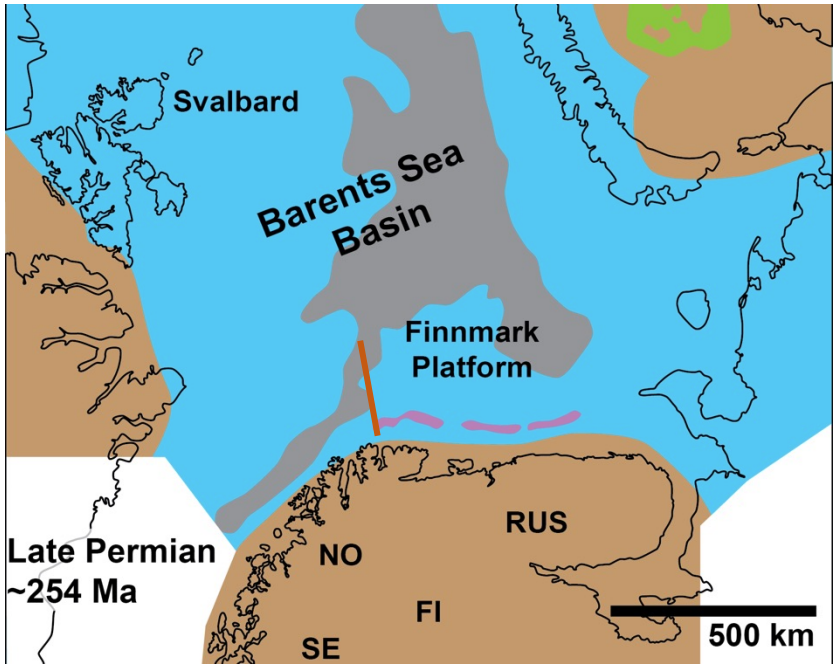
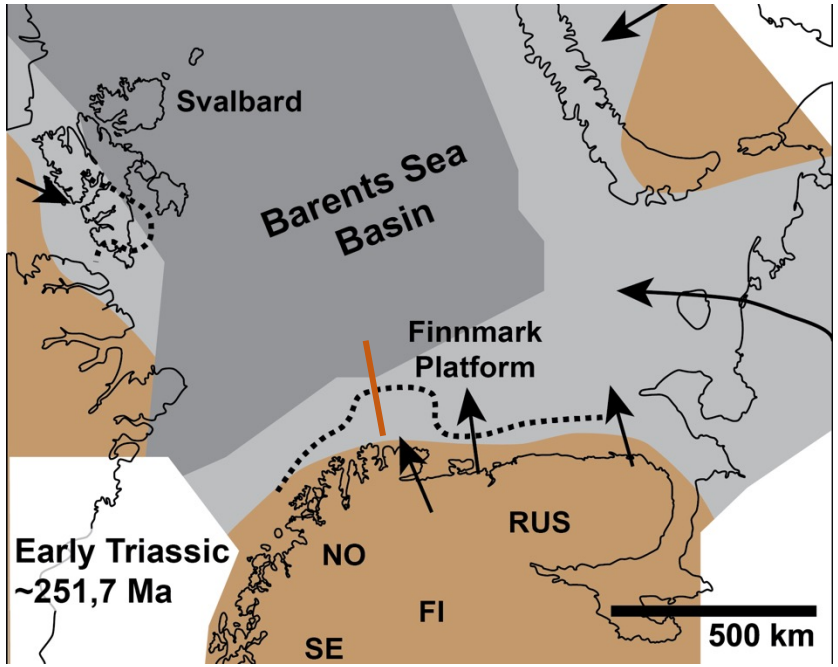
Introduction

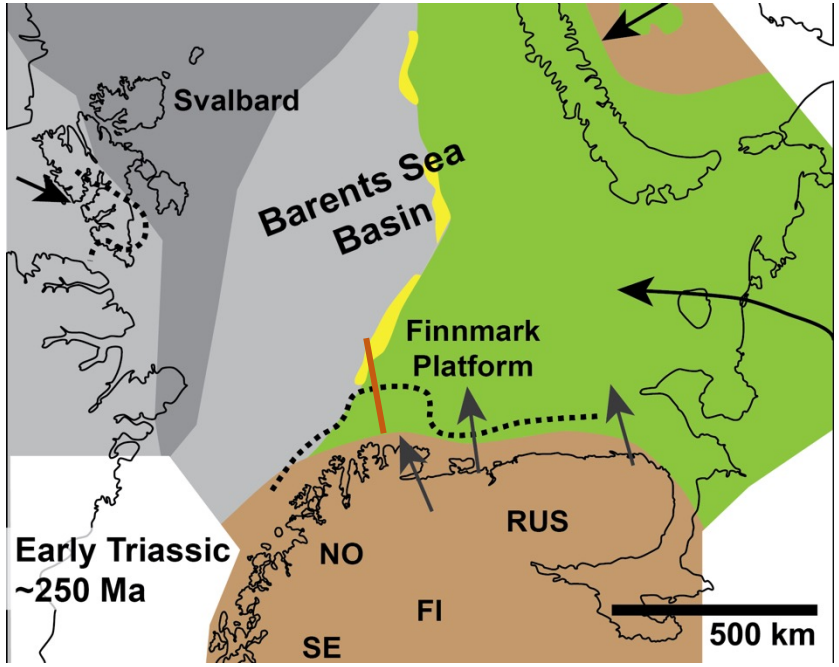




Modified from Scotese, 2016.







Modified from Henriksen et al, 2011 and Eide et al., 2018.

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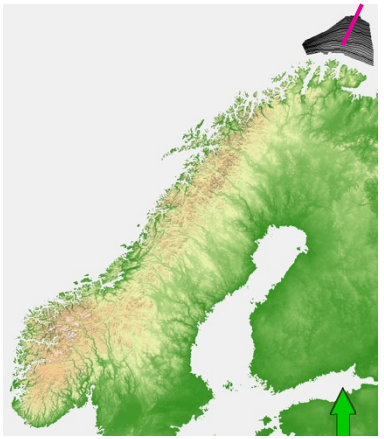
Seismic line on Finnmark Platform



7128/12-U-01
7129/10-U-01
7128/9-U-01

7130/4-1

7229/11-1

quaternary erosion

Triassic

Permian

Triassic H1 (top)

Permian-Triassic transition

Permian Tempelfjorden Gp. (base)

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Depositional environments on Finnmark Platform

H1

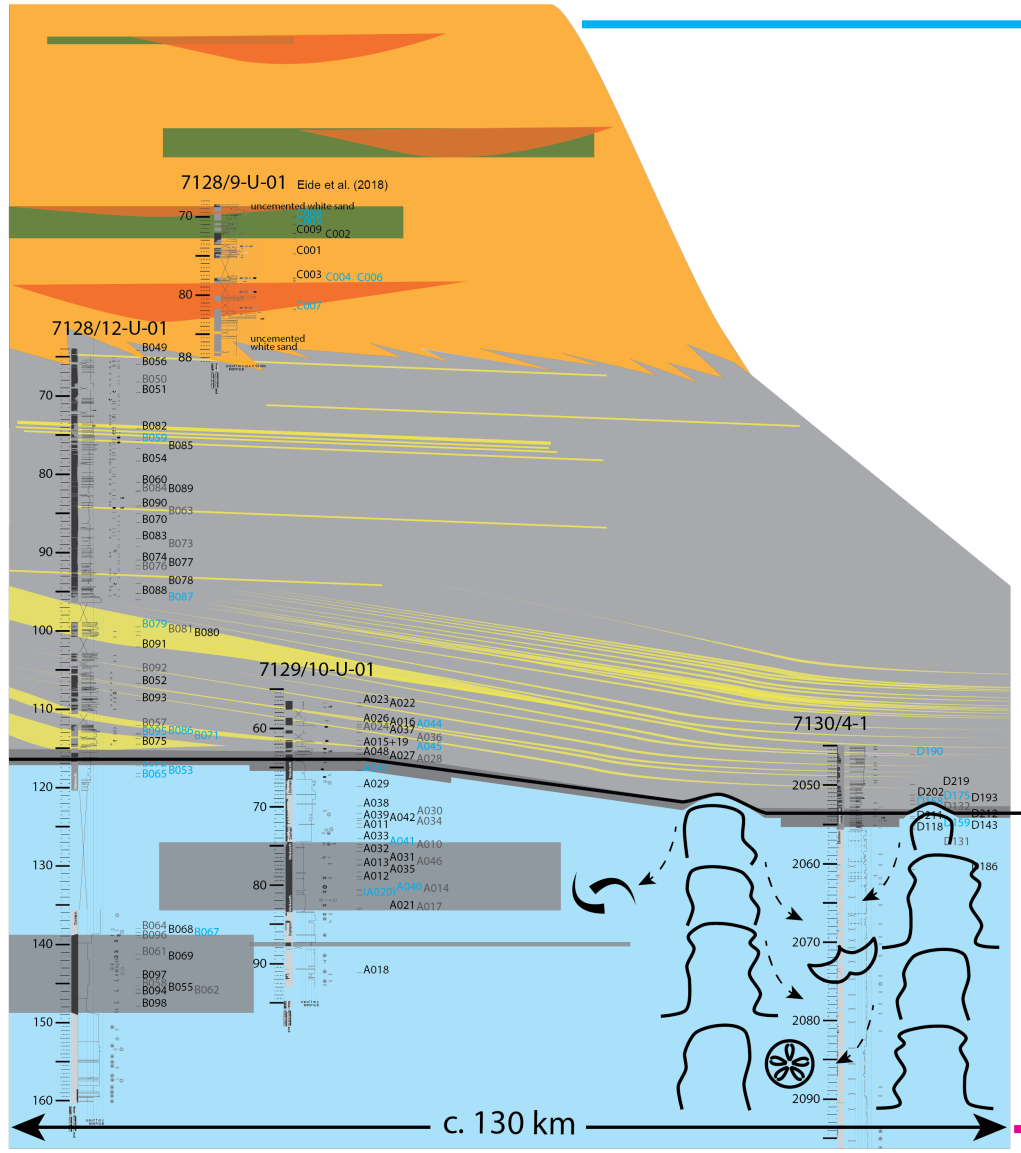
Tempelfjorden Gp.

c. 540 ka

c. 18 Ma

c. 100–200 m

c. 100–200 m



Fluvial delta plain with riverbanks and paleosoils

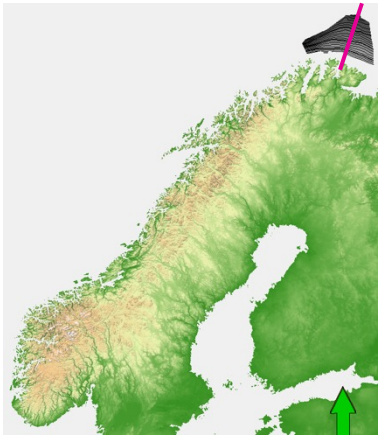
Shore face

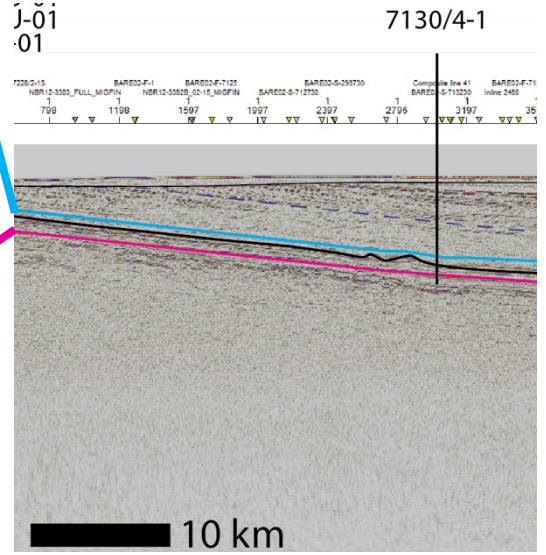
Mudstone-rich shelf

Turbidites

Pyrite and organic rich mudstone

Various carbonates partly organic-rich





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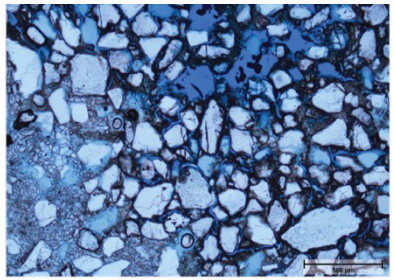
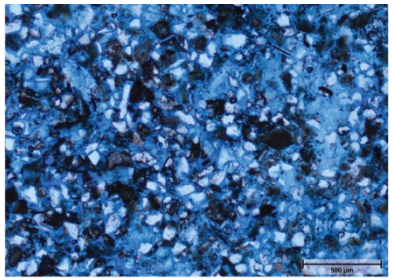
Sandstone samples – trends in thin sections

H1

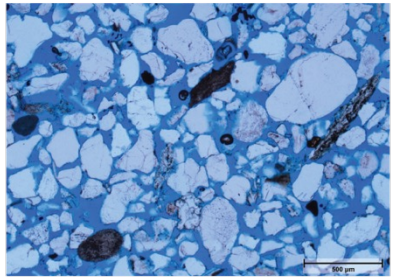
sandy soil



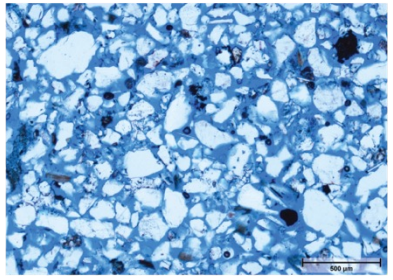
fluvial channel

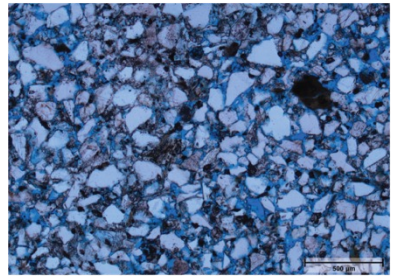


shore face

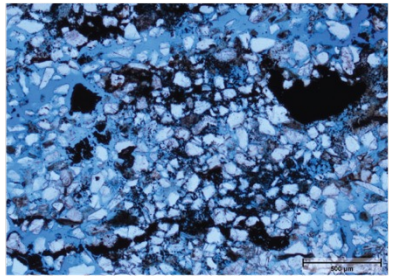


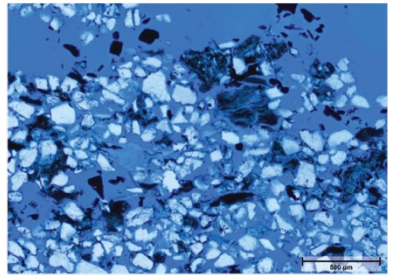
turbidite fan

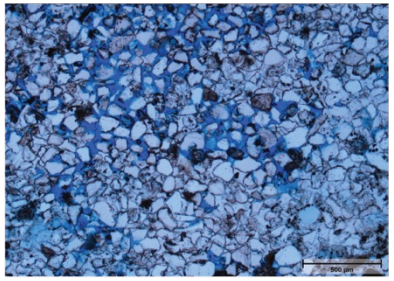




prodelta turbidites



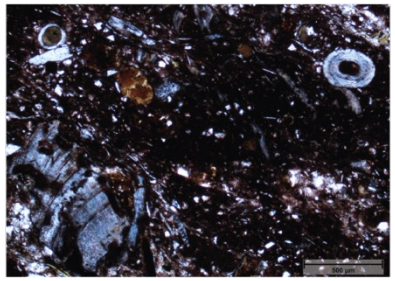


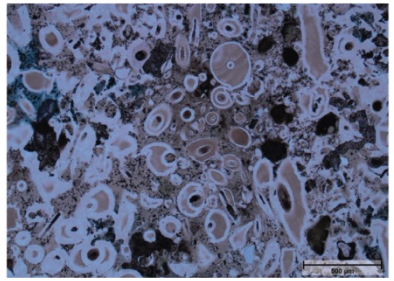


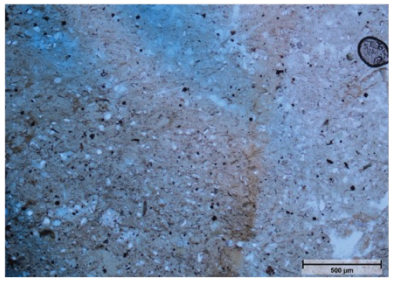
0,5 cm

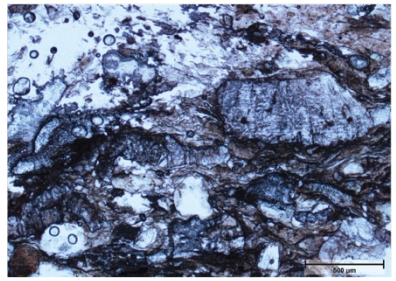
Temp. Gp.

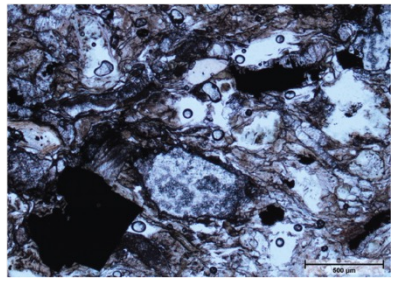
shallow-marine carbonate shelf











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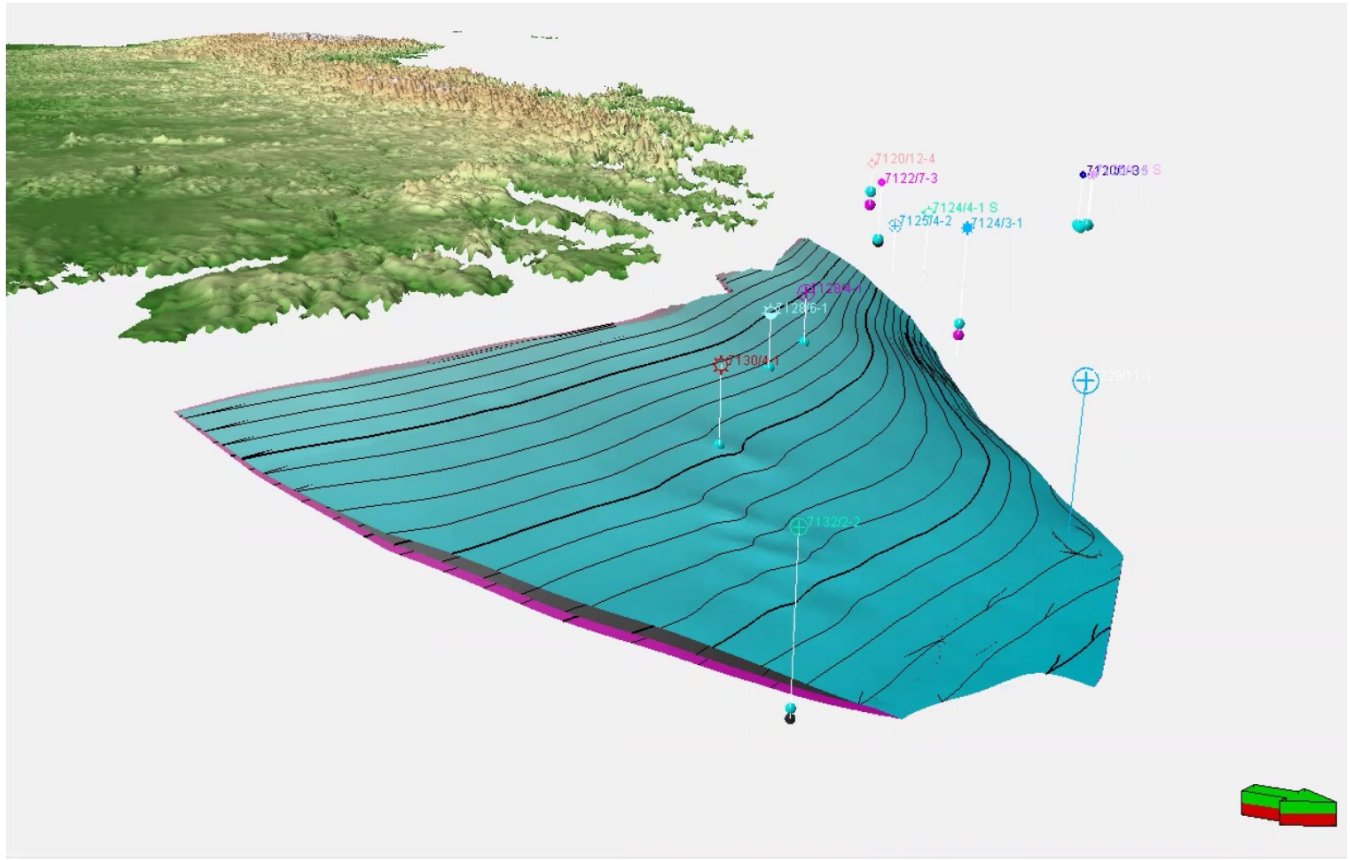
Calculating the sediment volume with structural model

Photography not allowed

130 km wide and 250 km long

Area 23 667 km²



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	Permian Temp. Gp.	Triassic H1
Volume	3 826 km³	3 742 km³
Clastic content	<25%	95%
Time span	18 000 ka	540 ka
Sedimentation rate	$1.4*10^9$ t/ka	$148*10^9$ t/ka

Increasing sedimentation rate of 135 (+70/-25) times!

Triassic H1 (top)

Permian-Triassic transition

Permian Tempelfjorden Gp. (base)

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Thank you for your attention

Summary

- Shift in depositional environment due to prograding delta
- Sedimentation rate increases by at least 135 (+70/-15) times
- Sandstone parameters remain stable > presumably no change in provenance

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