

Hopedale Basin

The largest mapped occurrence of Lower Cretaceous Alexis Volcanics occurs in the Hopedale Basin, with some smaller isolated occurrences in the South Hopedale Basin (Figure 1).

Similarly, the amagmatic western branch of the EARS contains only four isolated volcanic centres (e.g Ebinger, 1989), one of which is the Rungwe Volcanic Province to the northwest of Lake Malawi (Borrego et al., 2018).

This analogy implies that initial Lower Cretaceous continental rifting on the Labrador Margin was largely amagmatic and extension during that phase was accommodated by faulting.

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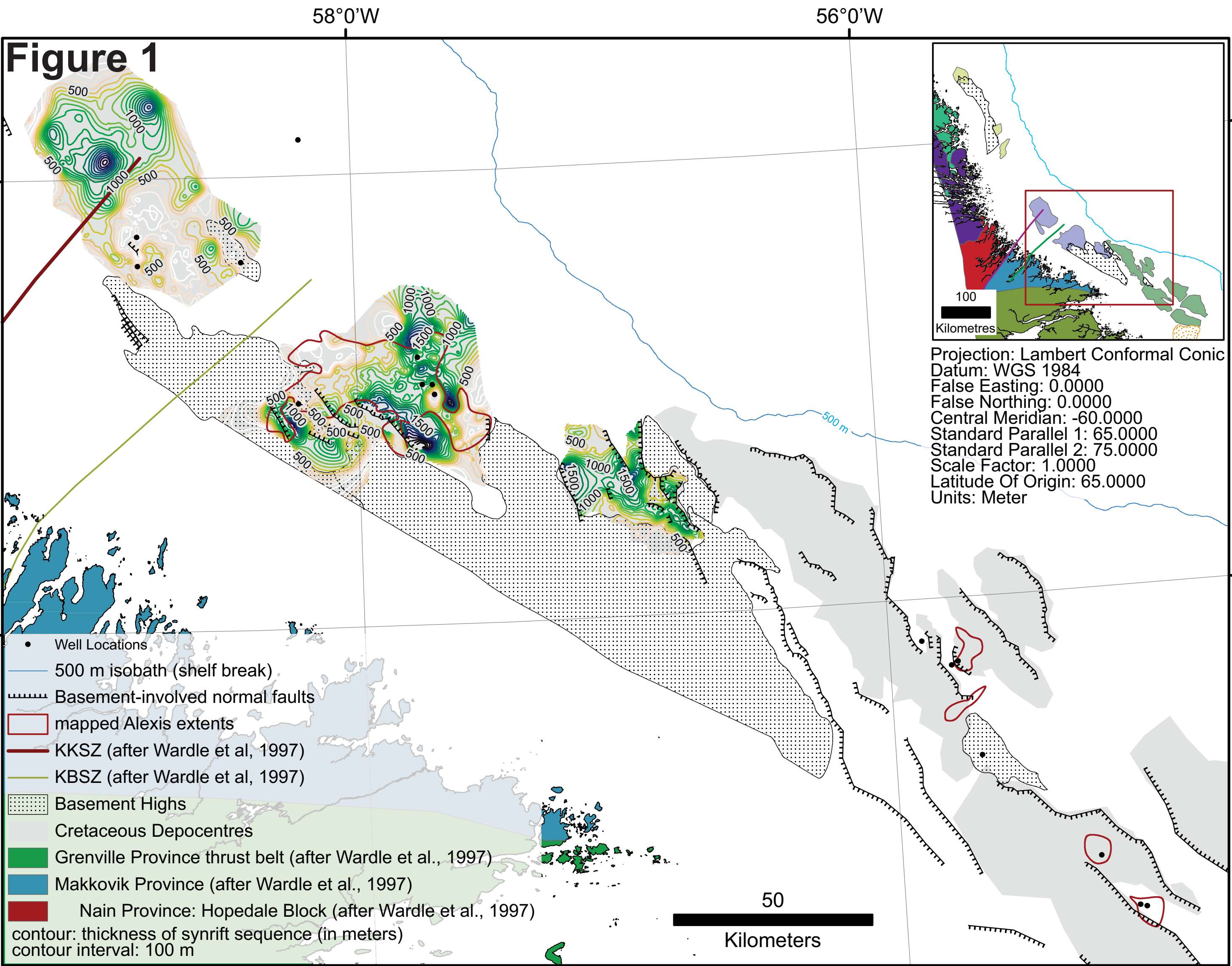
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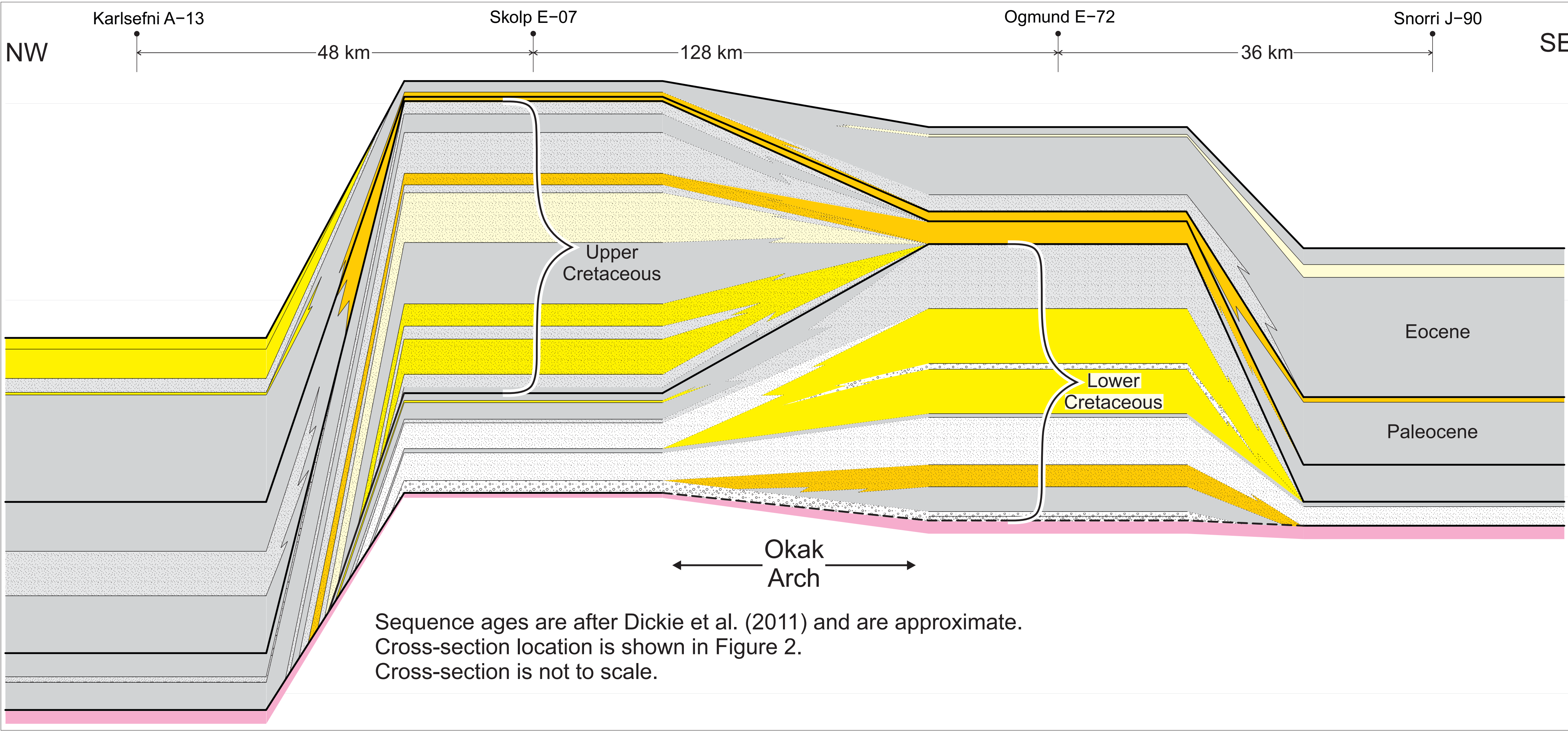
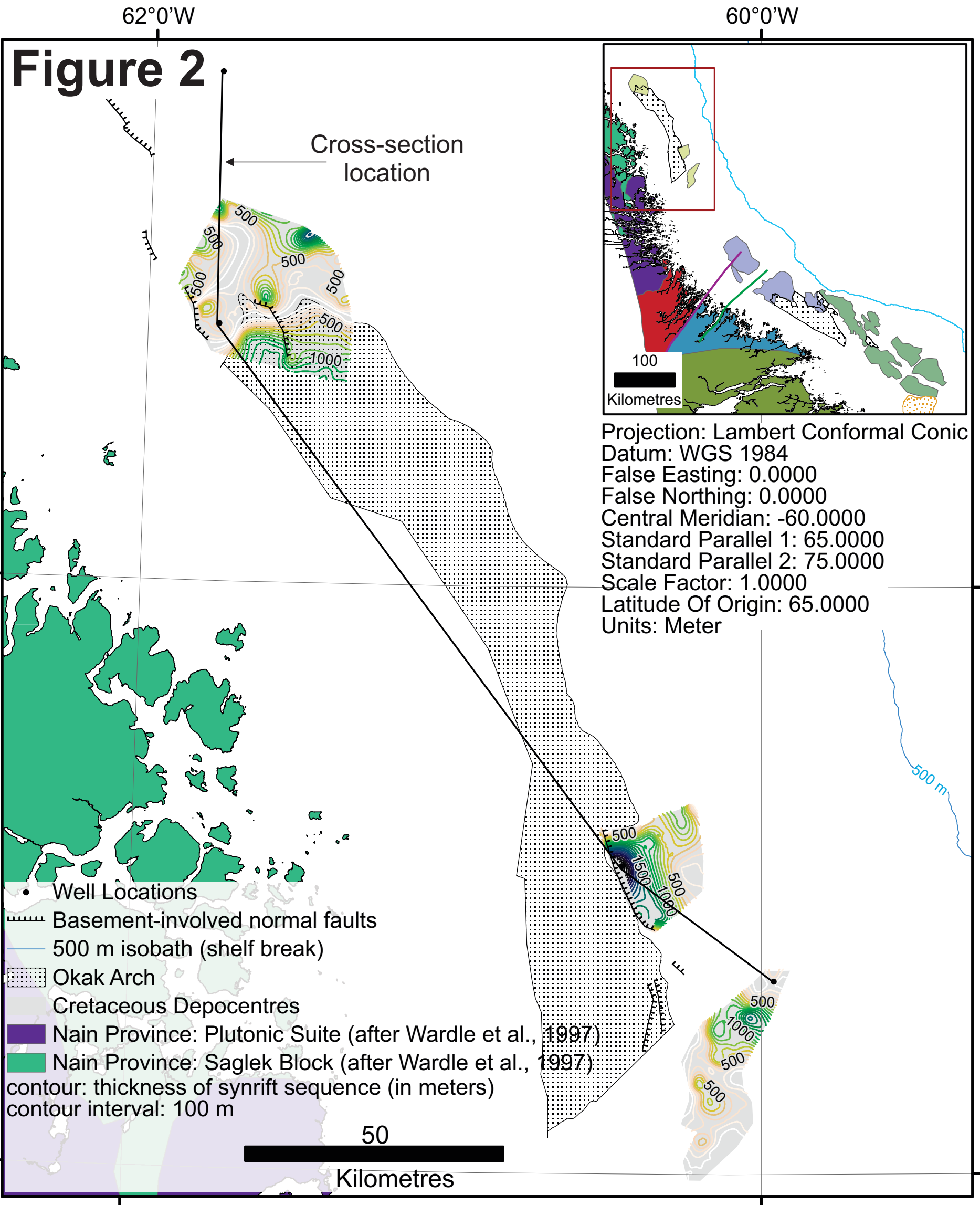
Okak Arch

Lithofacies at exploration well locations were identified using the D'Eon Miller grain size column published in Wielens and Williams (2009). Lithofacies in the depocentres flanking the Okak Arch (Figure 3) correlate across the Arch even though they cannot be continuously mapped with available seismic data.

Thrane's (2014) detrital zircon provenance study identifies the same source for the Lower Cretaceous rocks in the two wells separated by the Okak Arch: Skolp E-07 and Ogmund E-72, again suggesting they were not separated by a structural high at the time of deposition.

The Lower Cretaceous at Ogmund E-72 and the Upper Cretaceous at Skolp E-07 are the thickest sequences at these wells. Overall, the Skolp E-07 and Ogmund E-72 wells are sandier than the wells to the northwest and southeast, respectively (Figure 3), as if they are closer to the sediment source.

One untested hypothesis is that the Okak Arch has had an episodic uplift history, similar to the Peace River Arch/Embayment in Western Canada (O'Connell 1994) and the Cretaceous marks a period of uplift which caused a depocentre shift from the south side of the arch to the north.



Sequence ages are after Dickie et al. (2011) and are approximate. Cross-section location is shown in Figure 2. Cross-section is not to scale.

Figure 3

- very fine- to fine-grained sandstone
 - fine-grained sandstone with mud and silt interbeds
 - medium- to coarse-grained sandstone
 - fine- to coarse-grained sandstone with mud and silt interbeds
 - coarse-grained sandstone
 - coarse-grained sandstone with mud and silt interbeds
 - conglomerate
 - coaly fine- to coarse-grained sandstone with mud and/or silt interbeds
 - mudstone
 - interbedded sandstone, mudstone, siltstone
 - crystalline basement
- sequence boundary
- interpreted sequence boundary (beyond total depth of well)
- mapped contact
- structurally separated contact (possible post-depositional deformation)