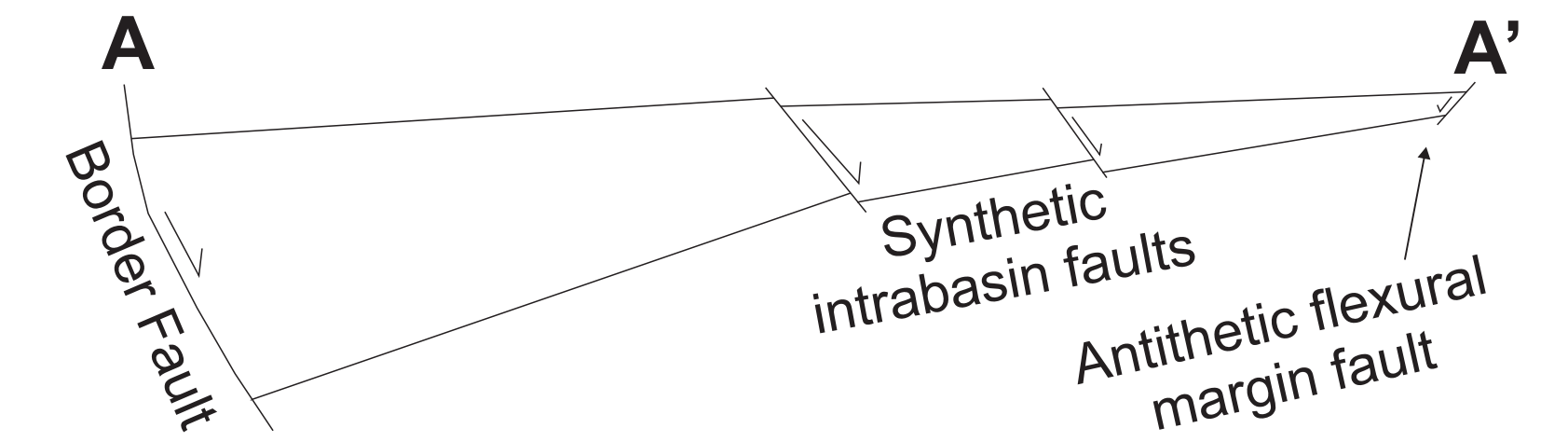


South Hopedale Basin

The Cretaceous interval in the South Hopedale basin (Figure 1) contains examples of internally deformed half-grabens, accommodation zones, relay ramps, and faults that grow through linkage of smaller fault segments. Similar structures are found in the Malawi Rift (Figure 2), and in fact these structures are typical of continental extensional (i.e. rift) basins (Fossen and Rotevatn, 2016).

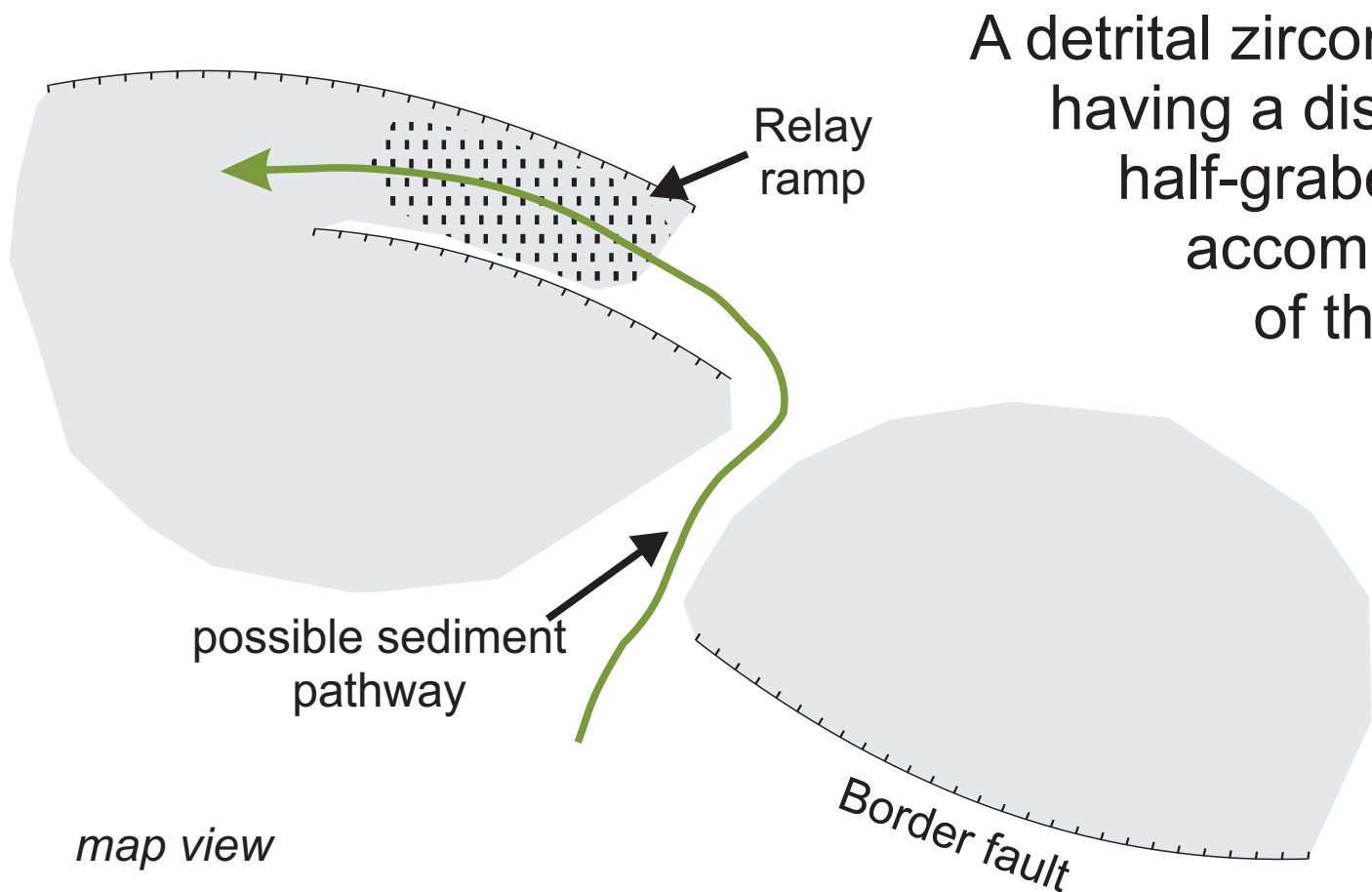
Synrift sediments deposited in a half-graben form a wedge-shaped stratal pattern that thickens towards the border fault (Figure 1).

Internal Deformation: Half-grabens can be internally deformed (e.g. McCartney and Scholz, 2016). Cross-section A-A' is a schematic illustration of the geometry of the southernmost half-graben in the South Hopedale Basin (Figure 1). The wedge-shaped pattern is indicative of a single half-graben with internal deformation, similar to the deformation described by McCartney and Scholz (2016) in the central basin of Lake Malawi (Figure 2).



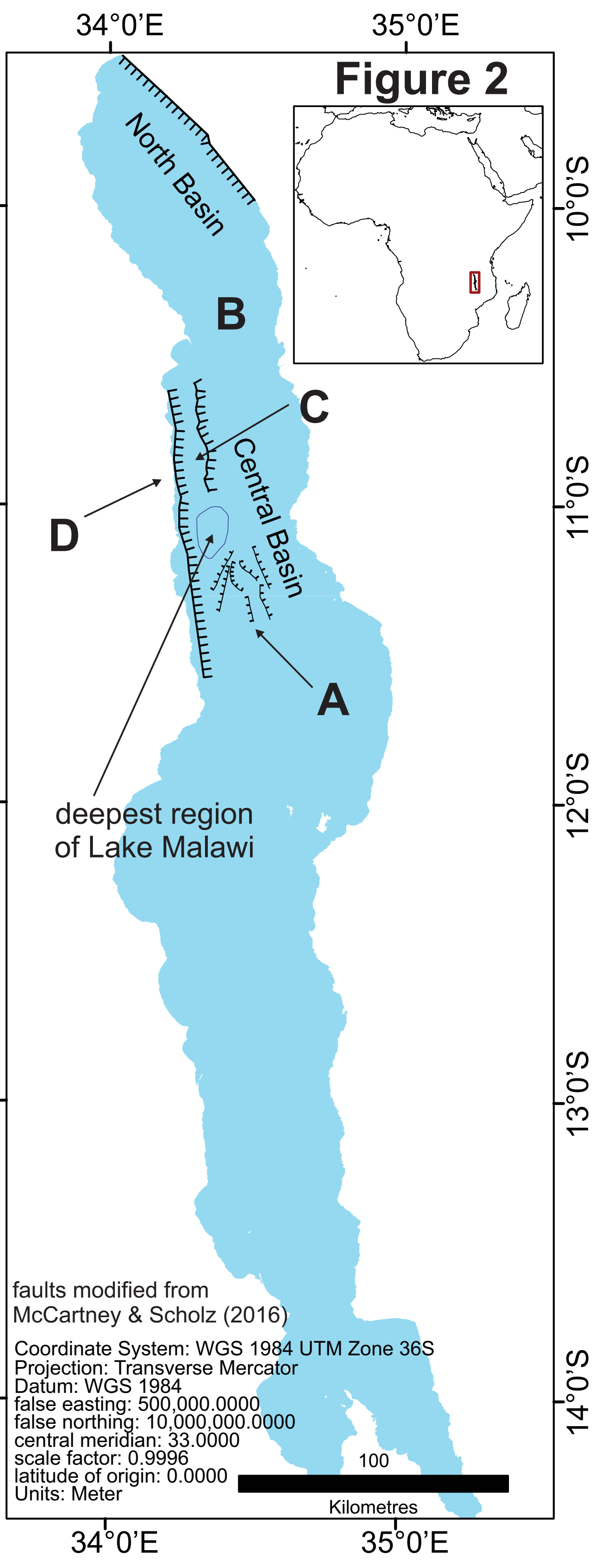
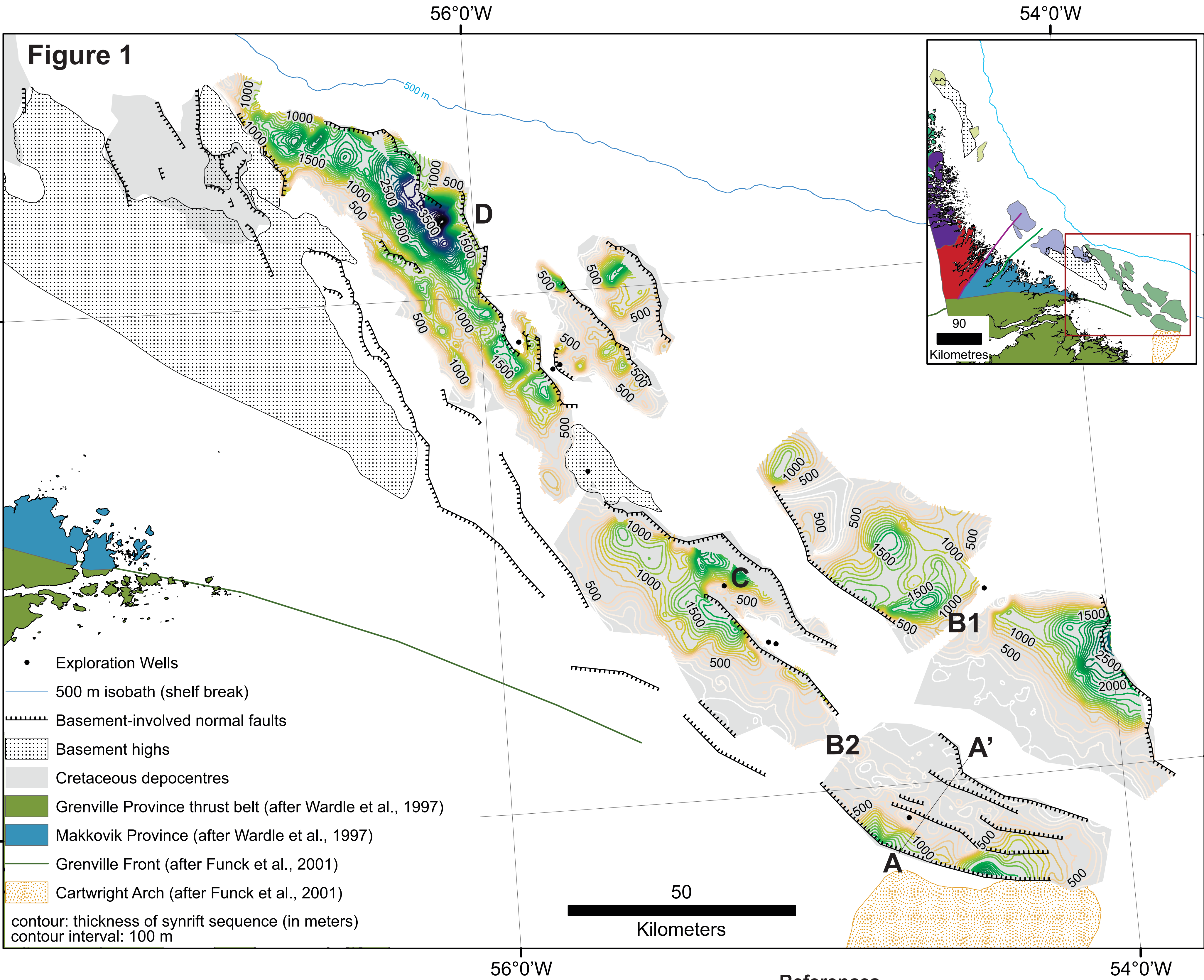
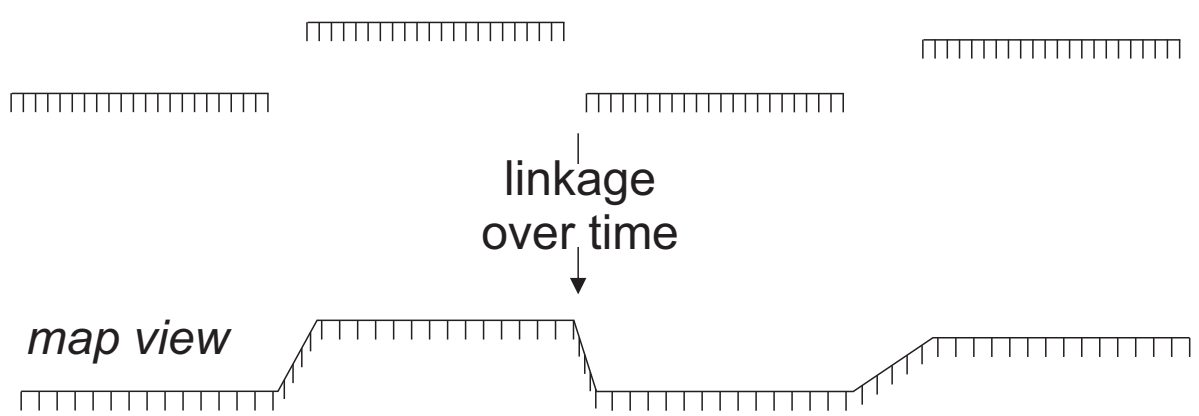
Accommodation Zone: Border faults in adjacent half-grabens that dip in opposite directions are separated by an accommodation zone (Peacock et al., 2000). Examples are found in the South Hopedale rift segment at locations B1 and B2 (Figure 1) and in Lake Malawi (Figure 2).

Relay Ramp: When a half-graben border fault consists of several fault segments that act as a single border fault (i.e. a border fault system), the overlapping segments are separated by relay ramps (Peacock et al., 2000) that focus sediment into the depocentre, which becomes a sink for coarse-grained sediments (e.g. Athmer and Luthi, 2011). In Lake Malawi, a relay ramp between border fault segments acts as sediment pathway to deepest part of Lake Malawi (Figure 2 Location C).



A detrital zircon study (Thrane, 2014) interpreted the source of the Lower Cretaceous strata at location C (Figure 1) as having a distal, Grenville Province, source. This well is at the deep end of a relay ramp between two segments of the half-graben border fault system. Sediment from the Grenville Province to the south was transported along accommodation zone B2 (Figure 1) between the two half-grabens then down the relay ramp into the depocentre of this half-graben.

Fault growth by segment linkage: Faults that grow by segment linkage, rather than radial propagation (e.g. Cartwright et al, 1995) are often characterized by their non-linear profile in map view, for example at locations D (Figures 1 and 2).



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