

GRANT-REEVES PROJECT

NORTHERN CANNING BASIN

The Upper Carboniferous – Lower Permian pre-glacial Reeves Formation and deglacial Grant Group

Introduction

This project updates ages and correlations of the Reeves Formation and Grant Group along the northern depocentres and adjacent sub-basins in the Canning Basin previously reviewed based on provisional palynological results. The revised palynology is provided by John Backhouse (Backhouse Biostrat).

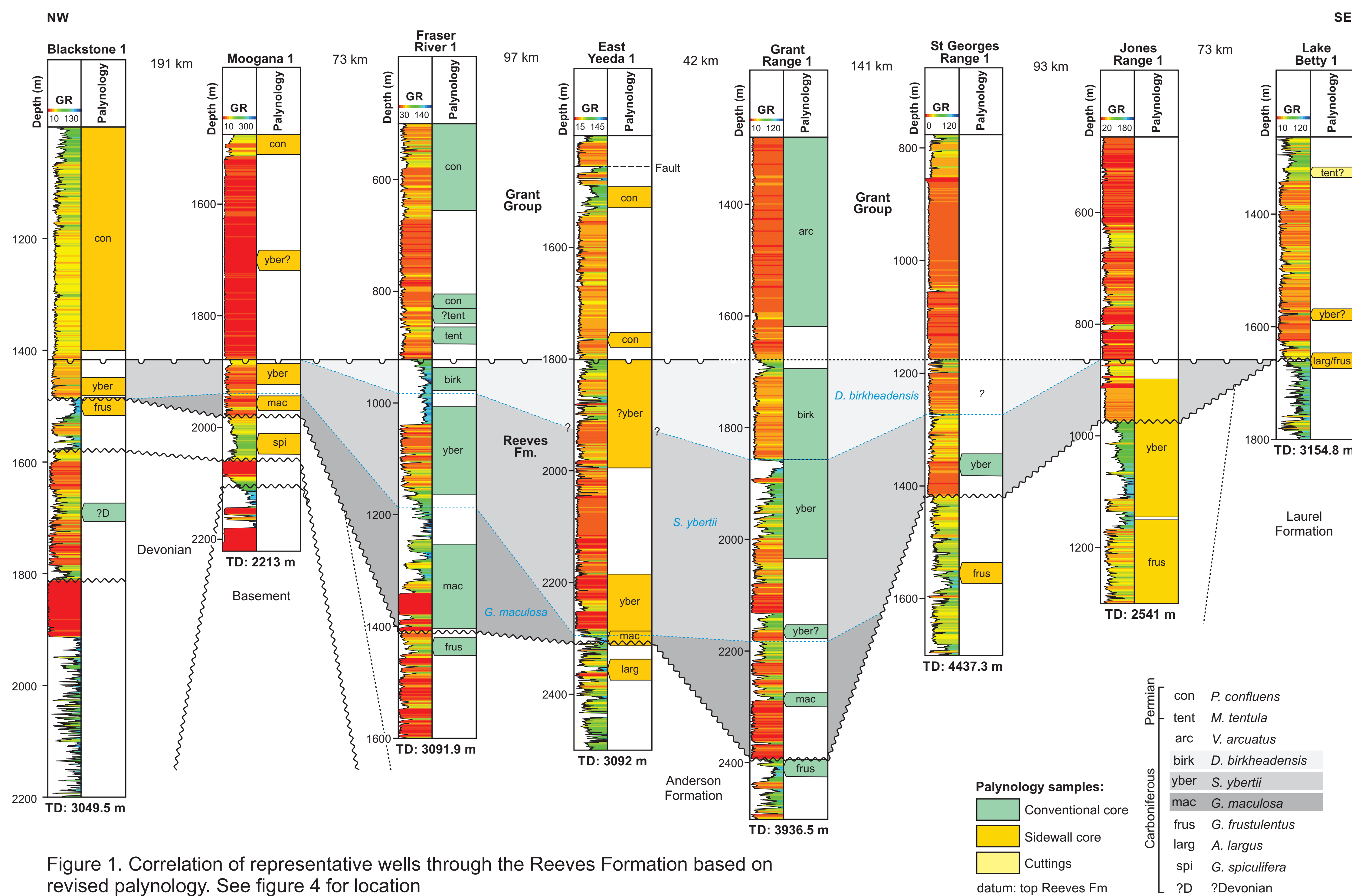


Figure 1. Correlation of representative wells through the Reeves Formation based on revised palynology. See figure 4 for location

Reeves Formation

Revisions to the biostratigraphy indicate a late Visean to ?Moscovian age, although there are no independent constraints to the uppermost zone within this succession (*Diatomozonotriteles birkheadensis* Zone). The age revision in turn points to a restricted distribution of the unit entirely within the northern Canning Basin (Fitzroy Trough, Pender Terrace and Lennard Shelf). The maximum known thickness is 715 m in Grant Range 1. Thinning to the north and south is due to a combination of basal onlap, and erosion or nondeposition of the uppermost beds (Fig. 1). The unit appears to be dominantly fluvial in origin. Whereas thin diamictite beds are present in two wells (Grant Range 1 and Fraser River 1), it is unclear if these beds are glacial or not as there are no other glacial indicators in the limited core cut in this formation (140 m).

Grant Group

The group extends across the entire basin with a maximum thickness of about 2000 m at Grant Range (1600 m in Grant Range 1 plus 400 m in the surrounding outcrop). Correlation based on palynology indicates significant onlap onto the Reeves Formation (and older units), thereby pointing to a significant time break at the base of the Group (Fig. 2). Over 7000 m of core cut through the group shows abundant glacial features.

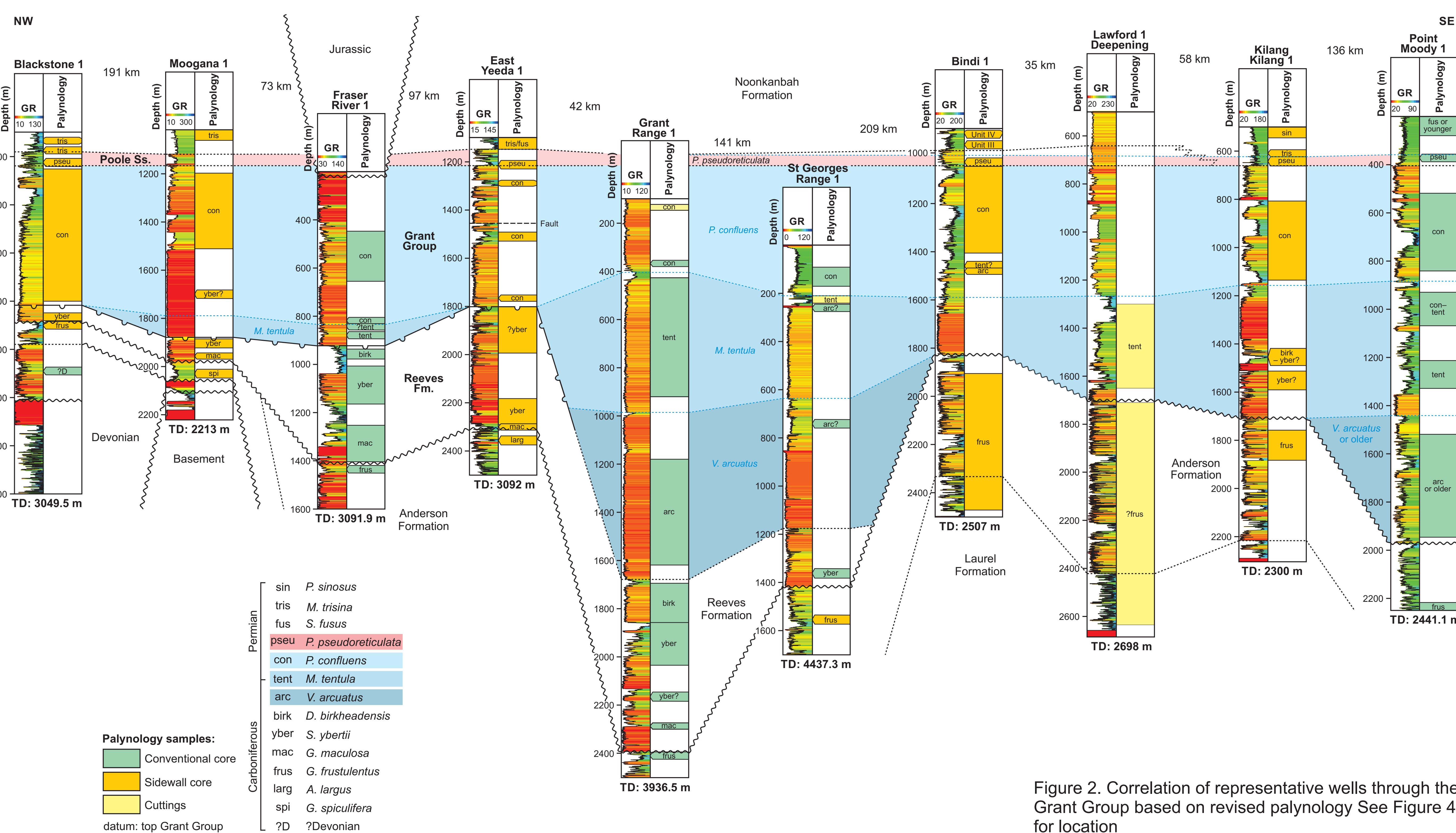


Figure 2. Correlation of representative wells through the Grant Group based on revised palynology See Figure 4 for location

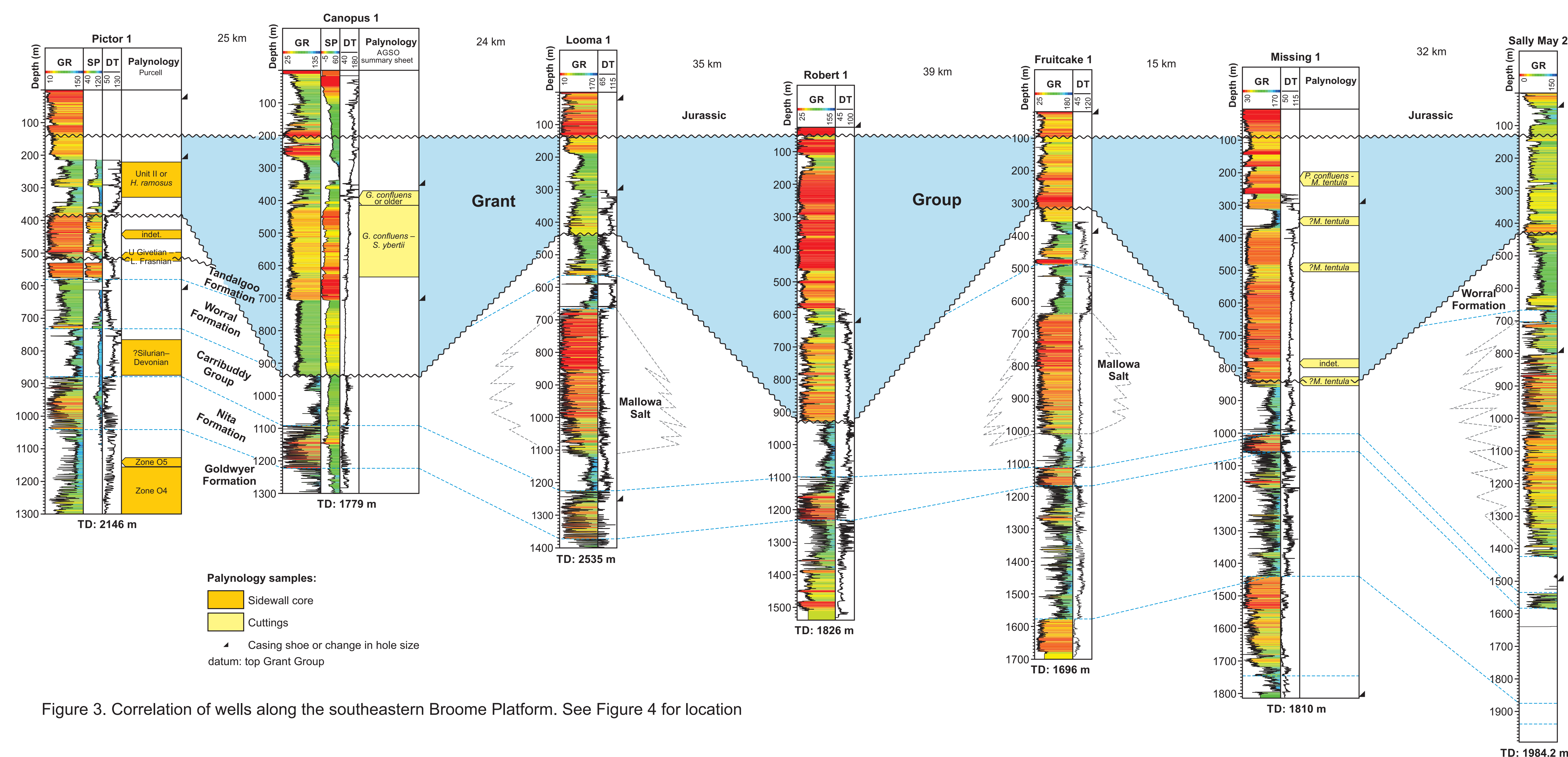


Figure 3. Correlation of wells along the southeastern Broome Platform. See Figure 4 for location

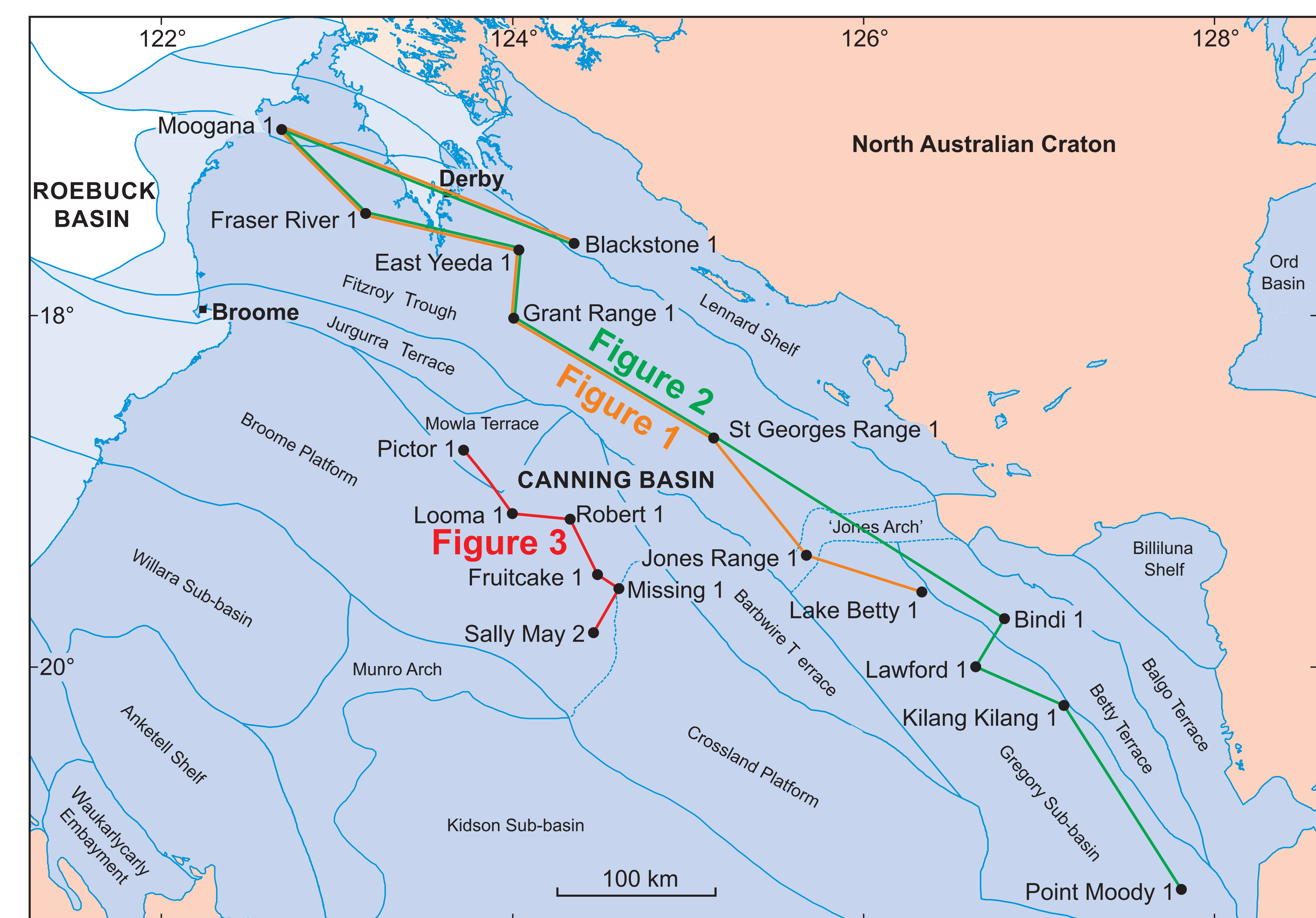


Figure 4. Location of well correlations within the northern Canning Basin

Extent and age of the ice sheet

There is no direct evidence for the extent and age of a Late Paleozoic ice sheet in Western Australia. However, wells on the southeastern Broome Platform alternate such that Ordovician salt is either thick or absent, and the Lower Permian Grant Group is either thin (up to 300 m) or thick (at least 700 m), respectively (Fig. 3). This alternation points to an irregular northern extent for an ice sheet below which salt migrated away from where the ice was thickest on the southeastern Broome Platform. As the ice melted in the latest Carboniferous, the thickest deglacial deposits accumulated where the ice had been thickest. By comparison, on the adjacent Crossland Platform to the southeast, there appears to be no relationship between the thickness of the Ordovician salt and the Permian Grant Group. Thus, it is likely that the distribution of ice in the Late Carboniferous only had a local influence on salt movement in the basin.

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