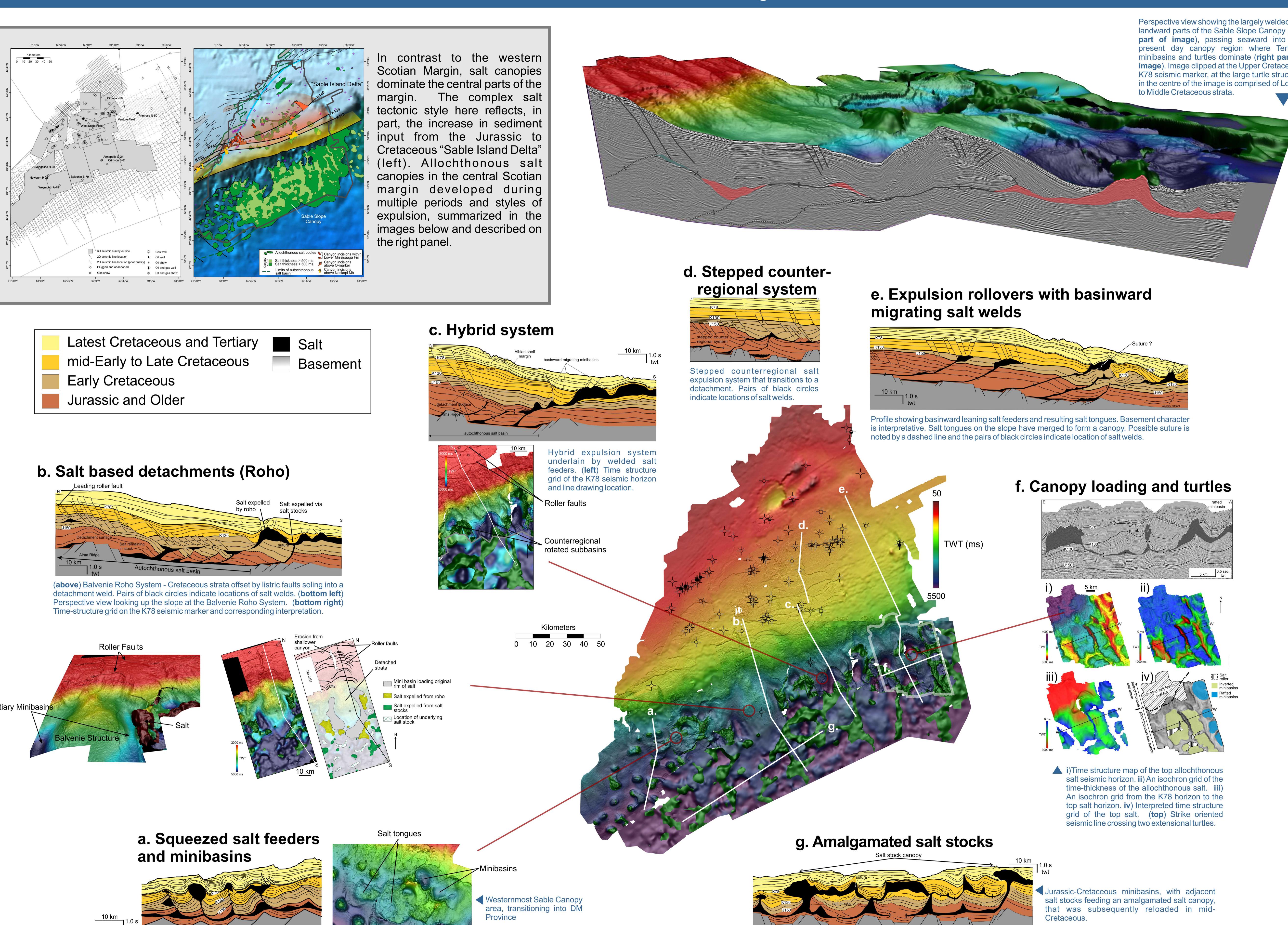
Contrasting salt tectonic styles on the western versus central parts of the Scotian Margin, offshore Nova Scotia - Part 2

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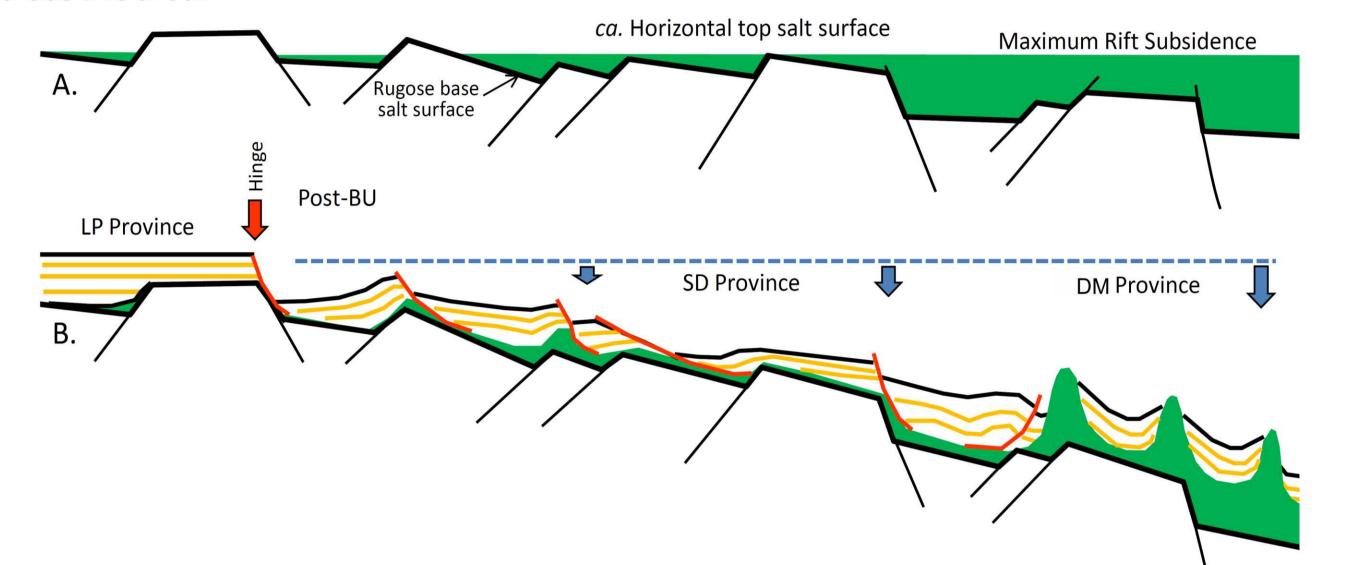
Central Scotian Margin



Western Margin - Summary

The **LP Province** for the most part formed a stable slowly subsiding continental platform that accommodated up to four km of Jurassic, Cretaceous and Cenozoic strata dominated by non-marine to outer neritic depositional environments. The northern parts of the autochthonous salt basin extend as narrow grabens onto the LaHave Platform, forming local depocentres dominated by Jurassic downbuilding and localized detachment towards the margin hinge zone (e.g. within the Mohican Graben Complex).

autochthonous salt basin to flex and tilt seaward of a prominent postrift hinge zone. The onset of postrift subsidence decoupled the deformation styles above and below the autochthonous salt layer. Widespread thin-skinned detachment (gravity gliding) of cover strata and associated raft tectonics are believed to be a product of this seaward tilt. Similarly, detachment folds, thrust propagation folds and reverse faults that are widely recognized in the landward parts of the DM Province, probably record down-slope shortening in response to up-slope thin skinned extension (Deptuck et al. 2009; Deptuck, 2010). Salt pillows, salt anticlines and salt rollers dominate the SD province and are all firmly rooted to the autochthonous salt layer. The increased density of taller salt stocks and walls in the DM Province could indicate that some salt flowed from the SD Province toward the DM Province, but ou preferred interpretation is that the SD Province is located along what was the tapered margin of the original salt basin (see below), and the lack of taller salt bodies instead reflects a generally thinner and patchier primary salf

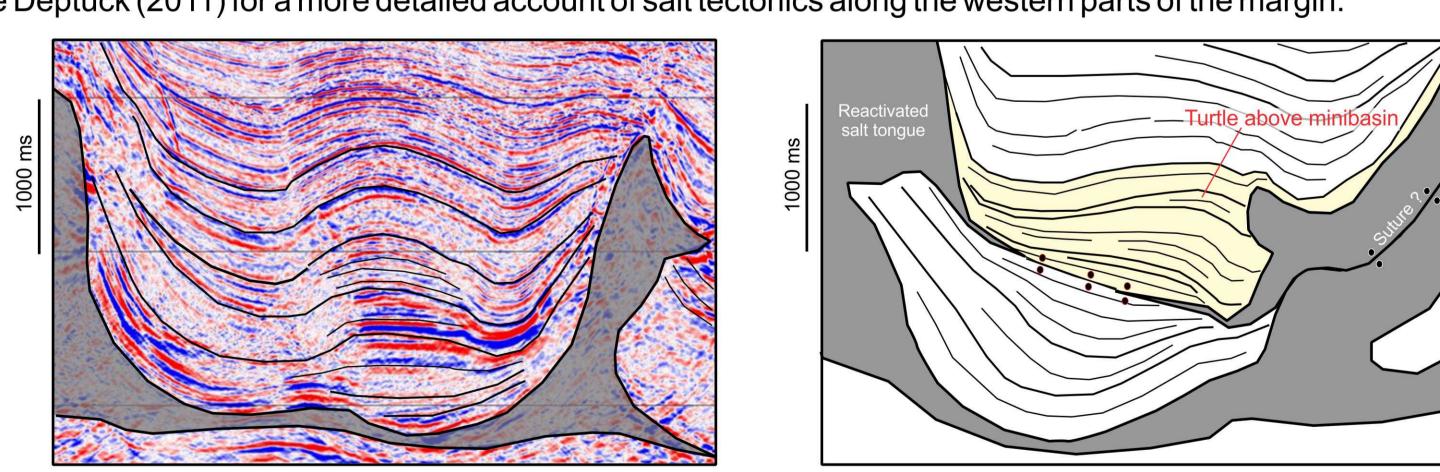


was tilted seaward during this time, whereas the DM Province may have subsided more uniformly. Contractional structures in the proximal parts of the DM province develop in response to up-slope extension driven by gravity gliding (Deptuck, 2011).

Postrift deformation in the DM Province was dominated by expulsion of salt stocks and wall, commonly with salt overhangs and locally forming salt tongues. Postrift subsidence probably took place relatively uniformly, such that down-building and passive loading of salt dominated the central parts of the province (Albertz et al. 2010), with variable amounts of shortening also recorded. A chain of sub-circular minibasins is present along the landward boundary of the DM province, and these are believed to approximately define the seaward transition into thicker autochthonous salt (see Area 1 on first panel). The most proximal salt bodies appear to have been expelled from these basins. Stepwise offsets from one minibasin to the next along the landward boundary of the DM Province, and similar offsets in the salt bodies expelled from them, may be associated with synrift transfer zones that segmented the primary salt basin. Coupled with the northeast oriented basement fabric (horsts and grabens), these transfer zones are interpreted to have controlled the landward limit of thickest salt and also strongly influenced the

The **Outer ECMA Province**, if it corresponds to subaerial volcanics, would define a terrestrial boundary on the seaward side of a newly formed shallow marine basin. In terms of salt tectonics, the outer ECMA province is a region where localized salt tongues overhang Jurassic and Cretaceous strata in the northeast and a more significant salt canopy (Shelburne Canopy) flowed across Jurassic strata to the southwest. Emplacement of subaerial volcanics is believed to have loaded the autochthonous salt layer along the seaward boundary of the DM Province as the original salt basin split apart. It is also possible that the short-term delay in subsidence caused by these subaerial volcanics could have allowed salt to continue accumulating for a short time after break-up (Jackson

See Deptuck (2011) for a more detailed account of salt tectonics along the western parts of the margin.



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Central Margin - Summary

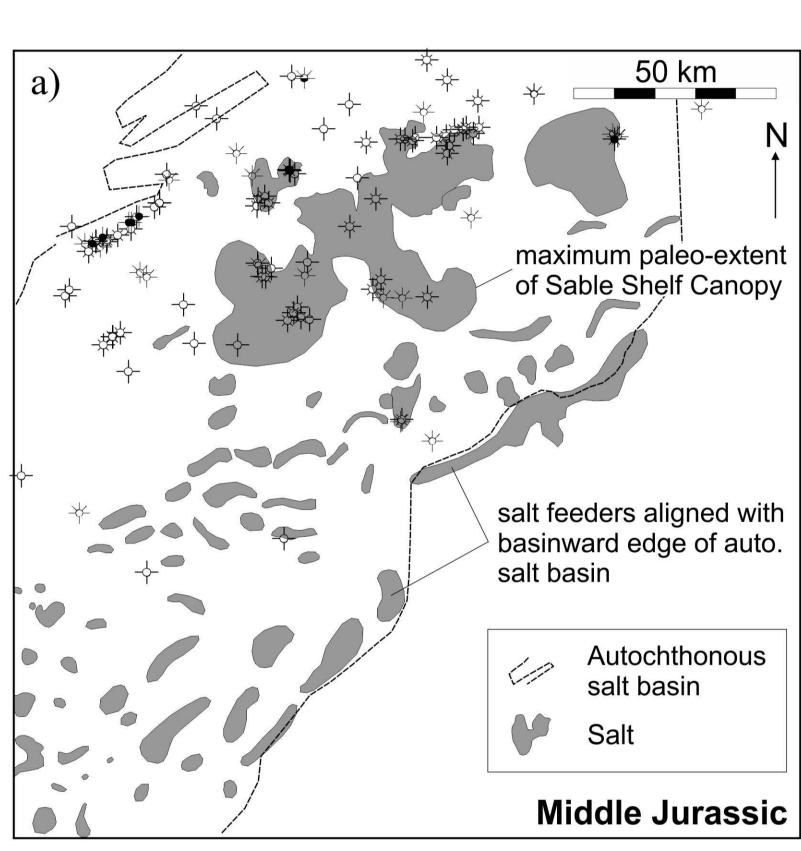
Unlike the western part of the margin, the thickest parts of the primary salt basin along the central margin were probably located beneath the modern shelf. Thick Jurassic and Cretaceous stratigraphic successions loaded the salt and

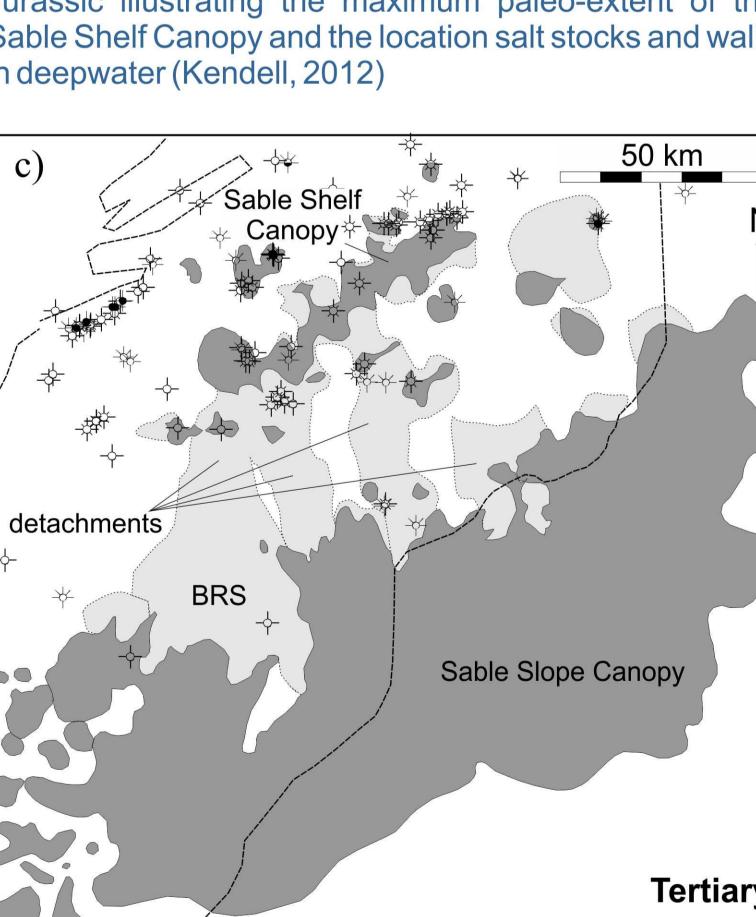
A broad range of salt expulsion styles are interpreted from the dense grid of 2D and 3D seismic surveys covering the These styles include counterregional systems, salt based detachments, hybrids of both counterregional and roho systems and amalgamation from numerous vertical salt stocks.

Variations in expulsion styles are responsible for forming two separate canopies on the central Scotian margin: the **Sable Shelf Canopy** and the **Sable Slope Canopy**. A third canopy system may also be present in the eastern portion of this study area where we suspect salt tongues merge, but data quality in this area is poor (below).

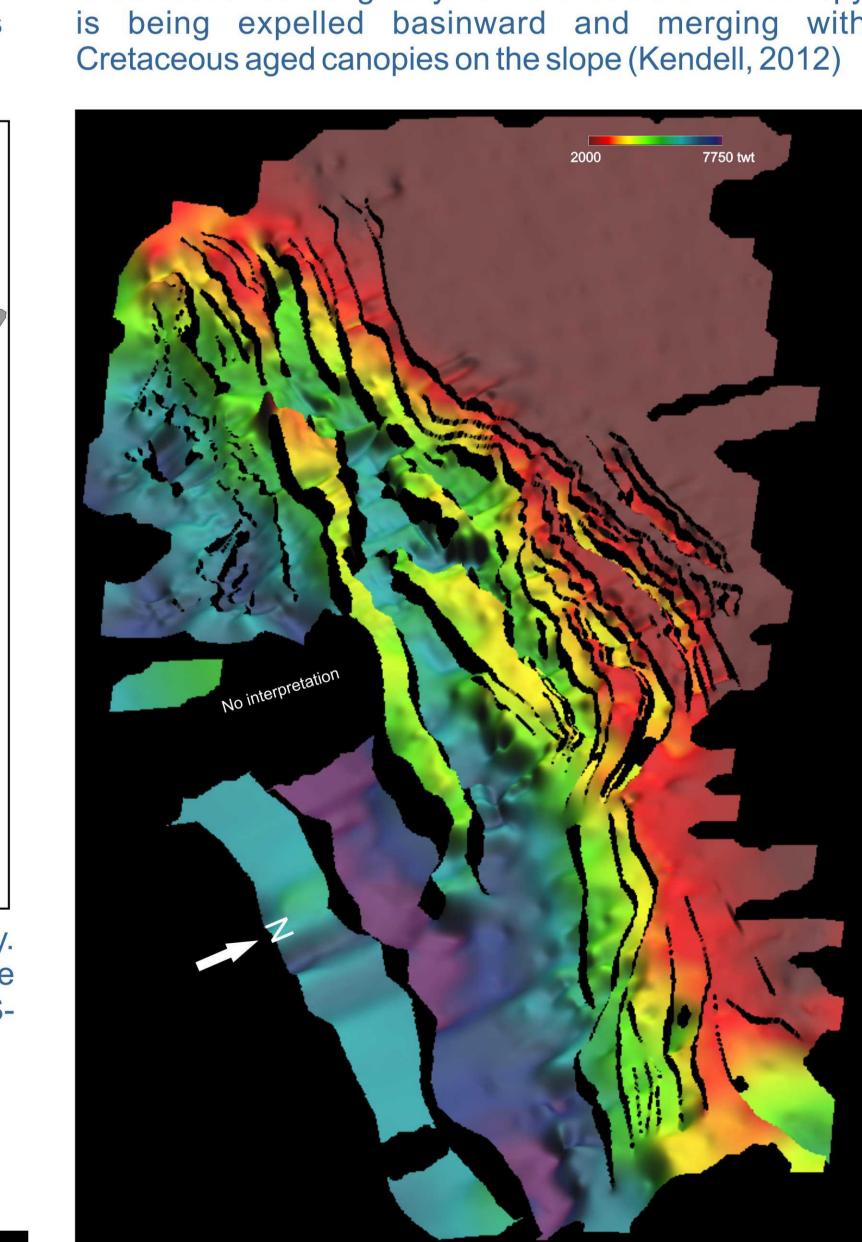
Counterregional systems are primarily responsible for expelling salt into the Sable Shelf Canopy. Basement architecture, and in particular a series of well-defined horsts, appear to have strongly influenced the location of salt feeders that supplied salt to the Sable Shelf Canopy (see map below). Allochthonous salt in the Sable Slope Canopy was derived from a number of sources, including amalgamated salt stocks, counterregional systems, rohos and hybrid forms. The two canopies are directly linked in multiple locations by salt detachment welds. These welds represent previous extensional detachment systems that initiated in the Sable Shelf Canopy and merged with allochthonous canopies developing downdip, resulting in large scale detachments up to 70 kilometers long.

The Sable Slope Canopy can be separated into an eastern region, where salt tongues were expelled and amalgamated orimarily from roho systems, counterregional systems and hybrids, and a **western region**, where salt was expelled and amalgamated from tightly spaced salt stocks or was derived from updip rohos.





Map view of basement structure



Early Cretaceous

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