

Untangling the synrift and early post-rift development of the central Scotian margin, eastern Canada

MARK E. DEPTUCK

Canada-Nova Scotia Offshore Petroleum Board, 1791 Barrington Street, Halifax, Nova Scotia B3J 3K9, Canada

<mdeptuck@cnsopb.ns.ca>

Much of our knowledge about the synrift stratigraphic and structural development of the Scotian margin comes from the well-studied Fundy Basin, a large and deep eastern North American rift basin that underlies, and crops out along, the Bay of Fundy, Minas Basin, and Chignecto Bay, more than 450 km landward of where the continental crust ruptured and oceanic crust was emplaced. A number of lesser known rift basins are preserved more than 175 km seaward of Fundy Basin, beneath the central Scotian Shelf and Slope. Correlation of a Moho reflection, as well as a complex array of mid-crustal shear zones and dominantly landward dipping border faults, coupled with improved mapping of the top of basement, helps constrain crustal thickness and provides information about how the crust beneath the shelf and slope accommodated extension. Synrift strata in these basins record a complex but poorly-calibrated multi-phase extensional history with seismic data indicating at least two important breaks in the stratigraphic record and one period of widespread folding that predate the postrift unconformity. More than 3 km of heavily faulted and unpenetrated early synrift strata in the Naskapi, Mohican, Acadia, and Oneida grabens pass upsection across a disconformity into a ~1 km thick Upper Triassic layered succession of halite and red dolomitic shale and siltstone capped by CAMP-related lava flows. These rocks in turn are conformably overlain by up to 800 m of unpenetrated strata presumed to have accumulated in the Early Jurassic. Subsequent Early(?) Jurassic folding of this Upper Triassic and Lower Jurassic synrift succession produced a number of distinctive narrow, NE-trending longitudinal folds with axes that parallel active landward-dipping border faults. Erosion of the fold crests produced a prominent angular unconformity which, along with underlying Lower Jurassic strata, are best preserved along fold synclines and where continued basement extension generated additional hanging wall rift accommodation adjacent to more elevated basement elements (footwall). Careful study of these basins provides new insight into the synrift and early postrift margin development closer to where the crust ruptured and far removed from sinistral strike-slip motion along the Cobequid-Chedabucto fault systems that apparently inverted Triassic and Lower Jurassic strata in the Fundy Basin.