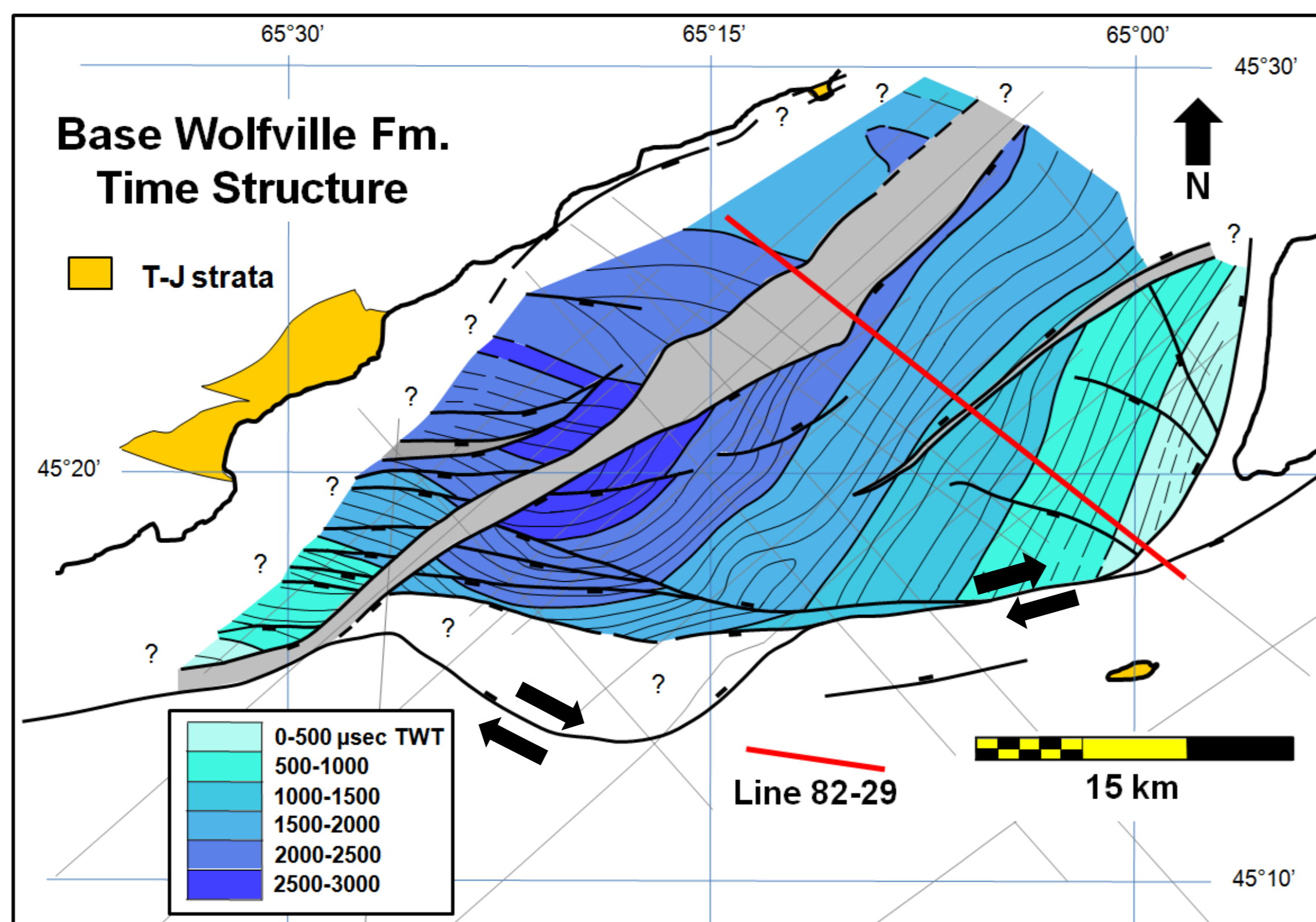
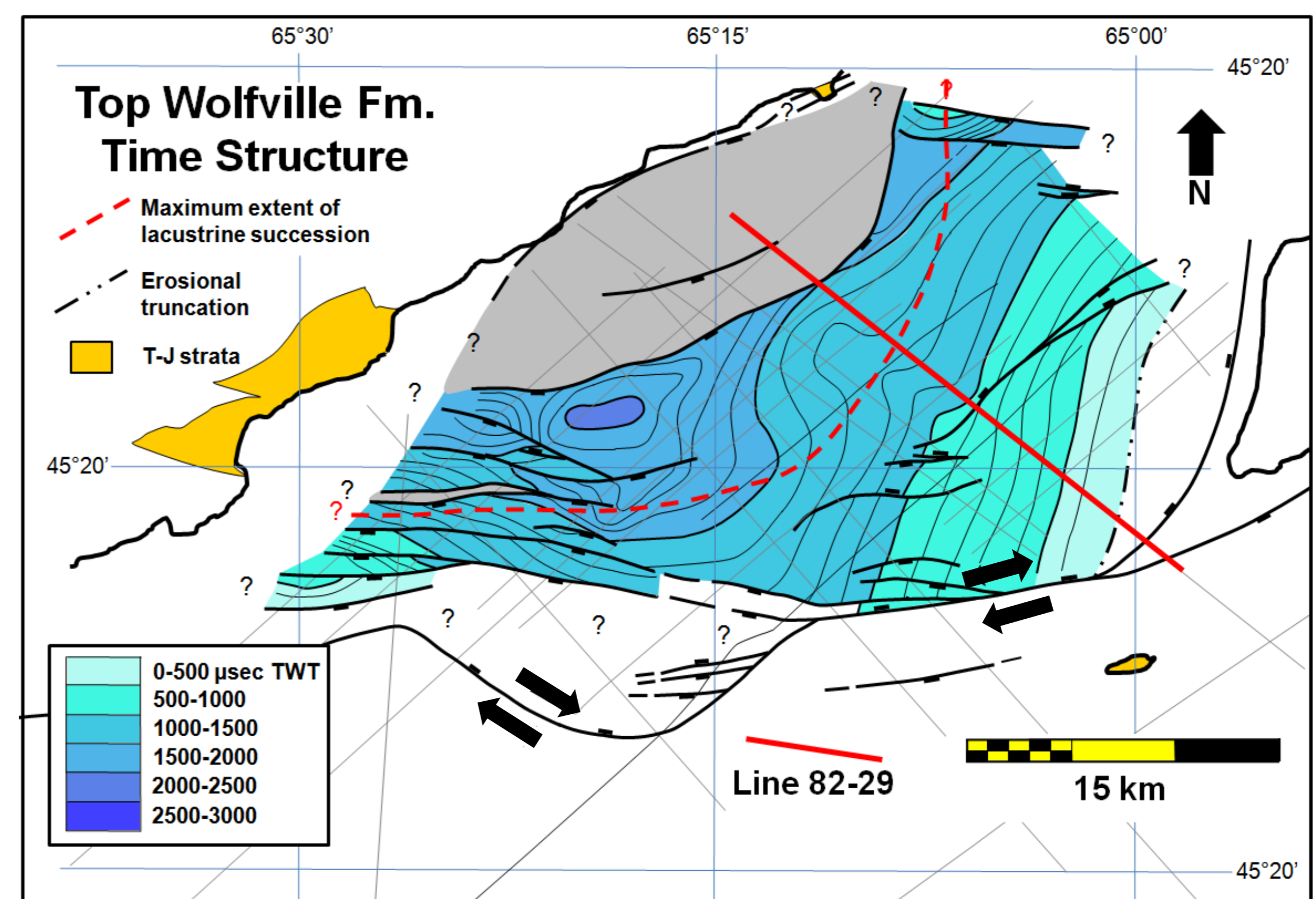


Within the Chignecto Subbasin, the Wolfville succession rests unconformably on interpreted Late Carboniferous coal measures of the Cumberland and Riversdale groups that are exposed along the Nova Scotia to the northeast (Figure 9). The estimated aerial extent of the interpreted lacustrine succession is approximately 400 km<sup>2</sup>, with a maximum thickness of about 2700 m (estimate derived from the Chinampas N-37 well velocity survey), and hence a volume of about 1080 km<sup>3</sup> (Figure 10). Note the proximity of the basin's depocentre to an extensional releasing bend of the adjacent Glooscap-Chedabucto strike-slip fault.



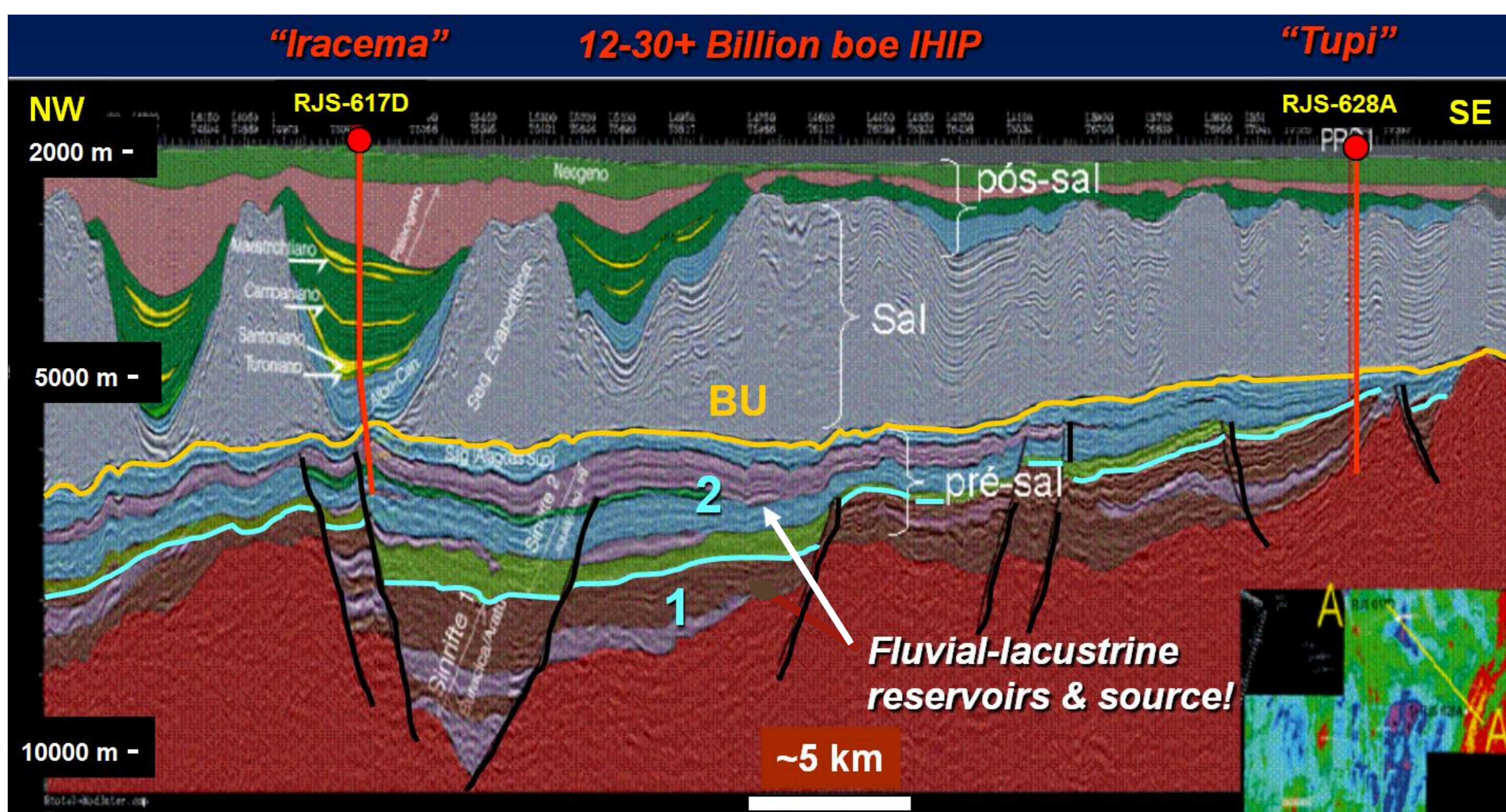
**Figure 9:** Time structure map for the base of the Wolfville Formation / top basal rift onset unconformity. The transverse fault is the terrane-bounding Glooscap-Chedabucto fault with motion that was dextral in the Devonian-Carboniferous (transpressional), sinistral in the Middle Triassic to Early Jurassic (extensional), and dextral (transpressional) sometime in the Middle Jurassic.



**Figure 10:** Time structure map for the top of the Wolfville Formation (base Blomidon). The grey area is the plane of the highest detachment fault that over-rides lacustrine strata closest to the assumed near vertical main border fault (Harvey-Hopewell fault; a reactivated middle Paleozoic (Devonian Acadian orogeny) transpressional feature).

## CONCLUSIONS

- Seismic profiles in the Newark and Fundy-Chignecto basins reveal near-identical structural geometries and tectonostratigraphic architectures reflecting the influences of tectonism and climate.
- Late Triassic (Carnian-Norian) TS III lacustrine / playa successions were deposited when both basins were located adjacent to / north of the equatorial humid tropic zone, with Blomidon Fm. facies in the more northern Fundy-Chignecto reflecting increasing aridity as Pangea drifted northwards.
- Older Middle to Late (Anisian-Carnian) TS II fluvial successions reveal similar laterally equivalent, high amplitude reflections in the Fundy (Wolfville Fm.) and Newark (Stockton Fm.) basin centres that are interpreted as lacustrine sequences.
- This infers that the basins had significant tectonic extension from their inception, lakes formed immediately, and thus were hydrologically balanced and closed.
- Repositioning of the basins for the depositional period of TS II fluvial-lacustrine successions moves them into the tropical to near tropical climate zones.
- These humid-tropical climate conditions would be conducive to the creation and preservation of organic matter as demonstrated by lacustrine successions other southern Newark Supergroup basins.
- Similar subsalt, syn-rift half-grabens exist offshore Eastern North America and Northwest Africa / Iberia, and may contain organic-rich continental lacustrine source rock successions that could be significant contributors to their petroleum systems.



**Figure 11:** Well known seismic depth profile of the Tupi-Iracema complex in the Santos Basin (Formigli 2007). Post-breakup salt overlies the half grabens with possibly four tectonostratigraphic units separated by unconformities (two in each "Syn-rifte" unit). The lower unit 1 – Aratu Sequence – is composed of fluvial sandstones, conglomerates, playa mudstones and volcanics, and represents the initial syn-rift succession. The upper unit 2 – Aratu / Buracica / Jiquia Sequence – is composed interbedded lacustrine siliciclastic and limestone coquina reservoirs and organic-rich source rock shales representing dominantly lacustrine deposition. The post-rift Sag – Alagoas Sequence – directly underlies the salt and represents deposition of shales, shaly limestones and microbialites (reservoir) under lacustrine to hypersaline transitional marine conditions. The Iracema and Tupi discoveries are believed to be a single accumulation containing 12-30+ billion Boe initial hydrocarbons in place (IHIP). The pre-salt section shares geometric and stratigraphic similarities with those of the Fundy-Chignecto and Newark basins, however, these basins are inboard of the main rift axis and salt basin. Similar half grabens exist under the thick salt of the Hettangian Argo Formation in the offshore Scotian Basin, though the salts are considered pre-breakup (sag phase). Modified after Formigli (2007).

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