

PLATE KINEMATIC ORIGINS OF CARBONIFEROUS AND OFFSHORE BASINS OF
EASTERN CANADA, WITH IMPLICATIONS FOR TACONIAN AND LATER MOTIONS

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The configuration of basins developed by restricted plate separations in the course of orogen evolution offer a potentially powerful, and so far little used, source of evidence on the plate kinematic history of the orogen. Sea-floor spreading principles imply no obstacle to the separative detachment, and incorporation into the basin floor, of quite tiny fragments of pre-existing continental lithosphere. Vigorous contemporaneous sedimentation, however, will probably result in a predominantly gabbroic igneous construction of the basin's lower crust. Minor compression of such basins cannot erase their proneness to prolonged subsidence, and sedimentation (+ volcanism) will eventually result in a crustal thickness exceeding 26 km, depending on the incidence of burial metamorphism.

Much of the complex basin system extending from Chaleur Bay eastward to beyond the Miquelons and southward to the Orpheus Graben and the northern Bay of Fundy can be explained as follows. The 250-450 km westward offset of tectonic elements in the mainland Maritimes relative to those in Newfoundland is mainly due to subduction and compression along the Gaspé-Connecticut Valley Synclinorium in two stages; 195 km Taconian (O₂) and 130 km Acadian (D₂). Five well-constrained partly-separative along-the-belt plate motions were also involved, as was a late Carboniferous westward compression in the SE of the region. The Cape Ray and Fredericton Faults are accepted as lines of substantial closure.

At the start of these motions, the Maquereau Dome was in contact with the Port au Port Peninsula, while the Springdale-to-Cape Ray strip of crust had not yet been juxtaposed with the Long Range Peninsula. The Port aux Basques-to-Hermitage Bay rocks, on the other hand, lay immediately east of the Caledonia Highlands inlier, extending along the north of the Cobequid block to Cape North on a southwestward-restored (see below) Cape Breton Island (CBI). The Sydney area was occupied by Petit Miquelon (Langlade) and St. Pierre. During Llandovery time, northeastward separations by the eastern half of Newfoundland caused extensive partly-transcurrent movements and volcanism in coastal Maine and New Brunswick, extracted the now-buried Westmorland block from the Sussex Basin, complexly disrupted elements of CBI and extracted both it and the Antigonish block from the basins on the northwest side of the Meguma block (which at that time lay sufficiently further east than now).

Early Acadian (Ludlovian?) dextral drag, between the west-moving Meguma block and southern Newfoundland, moved the intervening CBI, Antigonish, and Cobequid blocks (*inter alia*) 250 km westward relative to the latter. Shortly prior to final (D₂) closure of the Cape Ray-Fredericton suture, E Newfoundland plus CBI and the Meguma moved NNE relative to Cobequid to form the basin W of the Hollow Fault.

The palinspastic position of CBI lies wholly SE of any possible extension of the Dover-Hermitage Fault, which is inferred to be a major suture of Wenlock age and probably joined the Fredericton closure zone via the Hermitage "Flexure" and Cape Ray. Perhaps that is where most of Iapetus disappeared.

The Cabot Fault "system", by contrast, appears to have disjoint origins.