In-sequence mid-crustal flow zones, in the core of the southeastern Cordillera, linked to Rocky Mountain thrust tectonics

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The ~ 400 km wide thrust belt of the southeastern Canadian Cordillera largely comprises four major composite thrust sheets that evolved and were emplaced "in sequence" in the Cretaceous to Eocene during the westward underthrusting of the North Amercian craton. In the Rocky Mountain external zone, each sheet is thin skinned and was carried by a thrust system that has a common basal thrust. In the internal zone, there is a westward increase, toward the core, in thickness and importance of ductile shear within each sheet. In the core, each sheet has an infrastructure of metamorphic and migmatitic rocks that includes interfolded cover and basement under a suprastructure of rocks that had been previously deformed and thrust into place. "Transport" (Couette) flow and ductile shear were important in the infrastructure of each sheet. That infrastructure had an eastern margin or "tip line" where the flow and shear, within each sheet, were transferred eastward into an external thrust system via transport on the basal thrust. This geometric – kinematic framework of great thrust sheets is based on the facts of stratigraphy, mapped geometry and geochronology, and can form the basis for dynamic modeling. Channel flow (Poiseuille) models, with or without extrusion, can be evaluated within this framework.



Flow zones – thrust system linkages

Malton (Ma) - Ptarmingan (Pt) – Snaring (Sn) Gwillim Creek Shear Zone (GCSZ) – Bourgeau-Lewis (Bo-Le) Monashee décollement (MOD) – McConnell (McC) Basal décollement (BAD) – Foothills thrusts

Figure 1. Schematic southwest - northeast cross section showing linkages between the internal and external zones of the southeastern Canadian Cordillera, and the location of successive Cretaceous to Eocene orogenic fronts. Four composite Early Cretaceous to Eocene "in-sequence" thrust sheets comprise mid-crustal flow zones in the core linked to thrust fault systems in the foreland. (FmC = Frenchman Cap dome; PA = Porcupine Creek Anticlinorium; Ru = Rundle thrust; St M. = Saint Mary fault; TO = Thor-Odin dome).