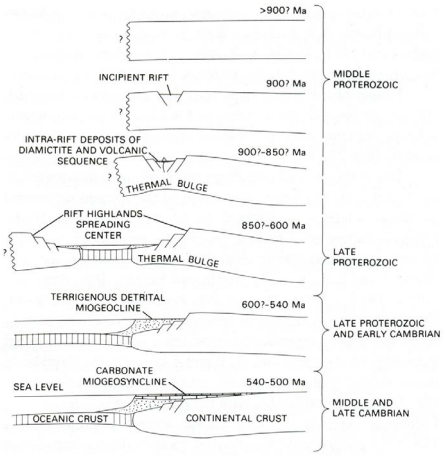
Cordilleran Passive Margin

Reading:
GNAM v-A: Ch. 1 Figs. 1, 15, & 16
Ch 8 pp. 139-163, Figs. 1, 2, 3, 5, 6, 7 & 8
Ch. 12 pp. 397-412 & Figs. 1, 2, 4 & 5

Tectonic Model of Proterozoic to Cambrian development



Passive Margin History

- Precambrian
  - Oblique distribution to present plate margin
- Cambrian to Devonian
  - Passive margin sedimentation

Middle & Upper Proterozoic

- < 1.7 Ga Age
- Thick Section of Red Bed Clastics
- Marine to Non-marine Origin
- Belt and Purcell Supergroups
- Tectonic Environment Unclear

Late Proterozoic Rifting

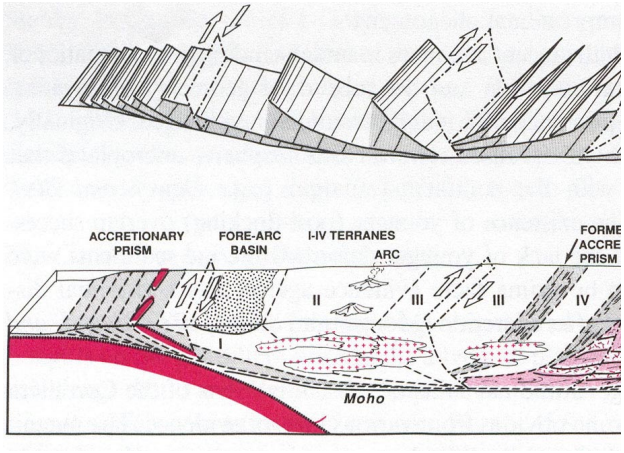
- Renewed rifting 780-730 Ma
  - Along whole length of Canadian Cordillera
- Deposition of Windemere Supergroup
  - 780-570 Ma rift-phase clastics

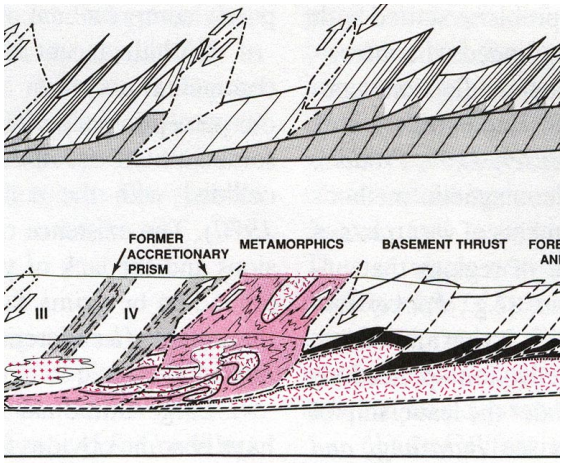
Cambrian/Silurian

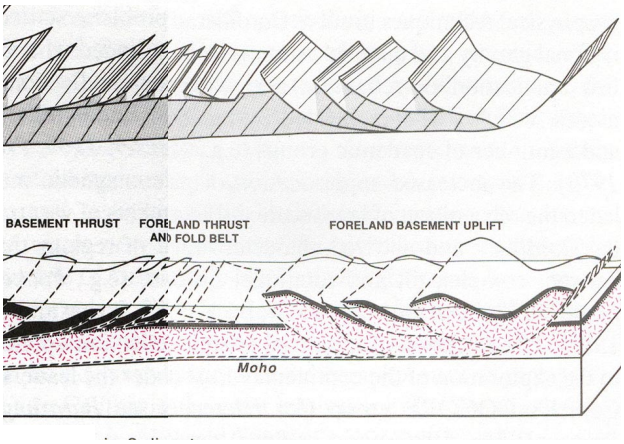
- Passive margin deposits
  - Carbonates
  - Local thick deposits
- Broad zone of sedimentation
  - Extends from well upon the craton out to shelf edge

Cordilleran-Type Orogen

- Accretionary prism
- Fore arc basin
- Arc
- Old accretionary prisms
- Basement thrusts
- Foreland thrust & fold belt
- Foreland basement uplift







Oblique Convergence

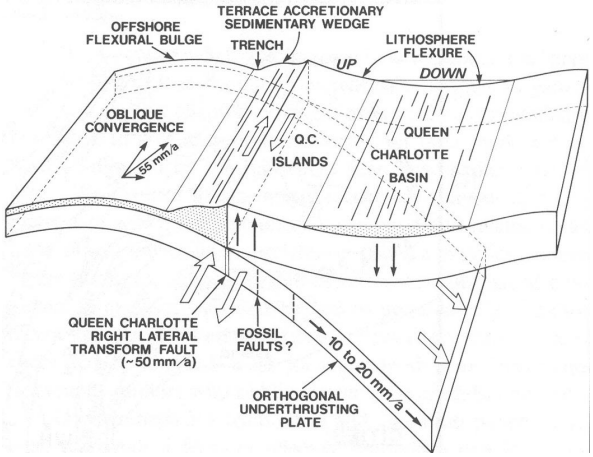
Components

Dip-slip

Strike-slip

Common Cordilleran feature

Offshore British Colombia



Structural Regions

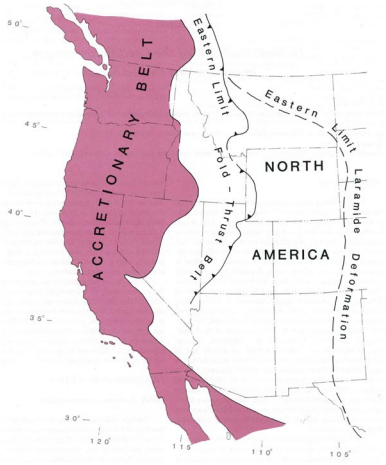
- Provenance and trends
- Oblique strike of Precambrian units to Cordilleran System

First-order Subdivisions

Accretionary belt

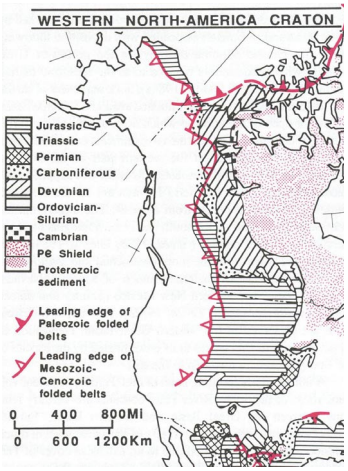
Fold and thrust belt

Laramide deformation



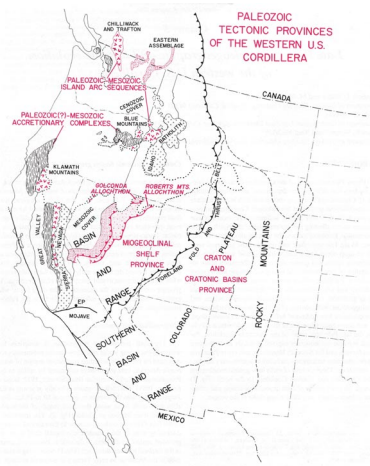
Foreland Stratigraphy

- Canada
  - Narrow sub outcrop bands
  - Mainly Paleozoic
- USA
  - Broad platform
  - Mainly Mesozoic



Tectonic Provinces

- Craton & basins
- Miogeoclinal shelf
- Allochthons
- Accretionary complexes
- Island arc complexes

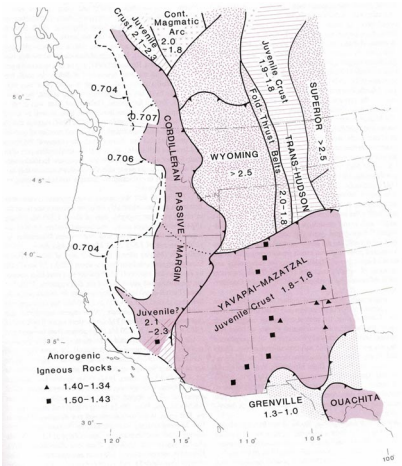


Basement Province

- Constitutes western edge of craton
- Located west of > 1.7 Ga crust
  - Juvenile crust added to continent
- Structural discontinuity
  - Basement and Cordilleran system

Precambrian Belts

- Yavapai
- Wyoming
- Trans-Hudson
- Superior

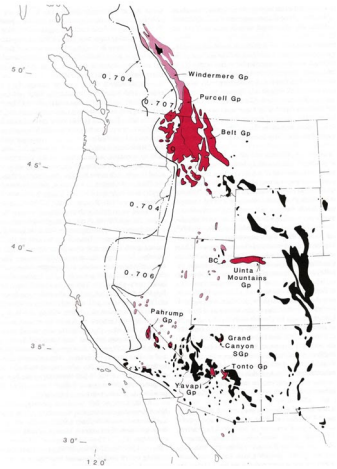


Precambrian within the Cordillera

Crystalline rocks (black)

Sedimentary rocks (red)

Sr lines (0.704 & 0.706)

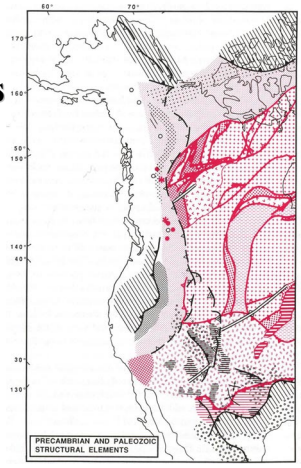


Precambrian & Paleozoic Elements

Undeformed Proterozoic

Concordant with Precambrian in North

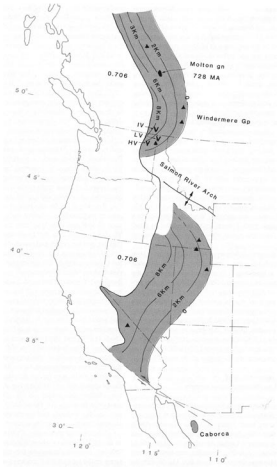
Discordant Precambrian with Precambrian in south



Late Proterozoic and Cambrian

Terrigeneous rocks

Prism thickens to the west

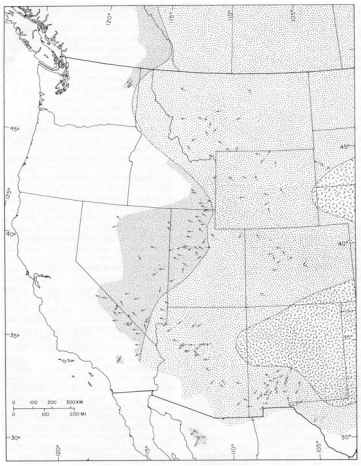


Late Proterozoic Early Cambrian

Cratonic sediments

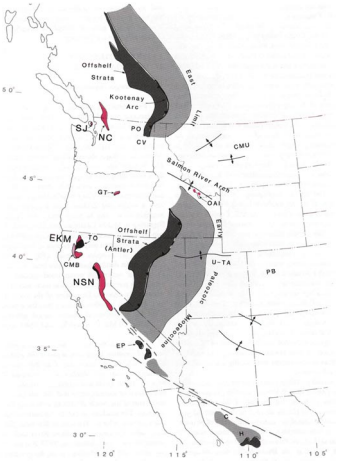
Miogeoclinal sediments

Current directions suggest shallow tidal currents



Cambrian to Late Devonian

- Allochthonous off-shelf units
- Passive margin
- Metamorphic belt



Paleozoic Lithology

- Lower Paleozoic
  - Carbonates
  - Shale
  - Orogenic terranes
- Upper Paleozoic
  - Rift basins
  - Island Arcs
  - Subduction complexes