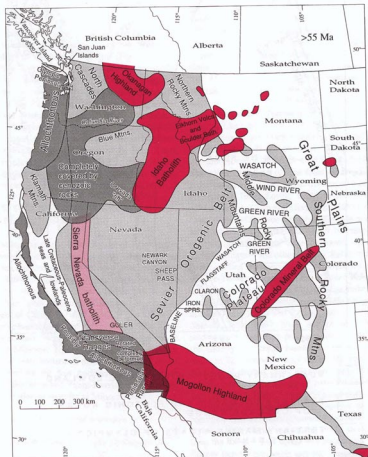


## Early Tertiary Sedimentation and Tectonics

Reading:

DNAG volume G3, Ch. 7, pp. 261-294



### Klamath Mountains to Canadian Border

- Underlain by oceanic crust
- Older ages toward the south
- Form a composite allochthonous terrane
- Final emplacement in middle Eocene

## Conditions at End of Laramide

- Contraction in Pacific NW
- California
  - Complex geology
  - Forearc thrusting
  - Accretion
  - Shelf sedimentation

### Pacific NW

- Accretion of exotic terranes
  - San Juan Islands
  - Northern Cascade Range
  - Klamath Mountains
  - Blue Mountains
- Strike-slip faulting was active during accretion

### Coastal Klamath and Franciscan Terranes

- Gold Beach Terrane
- Upper Jurassic and Upper Cretaceous seds
- Fault contact with previously accreted terrane



## Pacific NW in Late Eocene

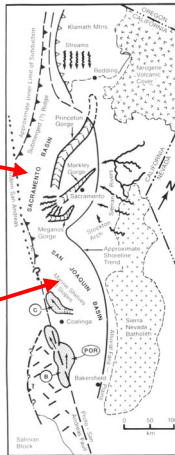
- Continued underthrusting caused uplift of the pre-Tertiary terranes
- Large proximal fans and channel deposits
  - Formed adjacent to the uplifted areas
  - Thick deposits of arkosic sediment
  - Some coal-bearing beds in swampy areas
- Uplift caused a regional unconformity at the base of the uppermost Eocene strata

## Great Valley Basin Sequence

- Eastern part
  - Prograding deltaic complexes
  - Fed by the ancestral Sierra Nevada
- Sacramento Basin
- San Joaquin Basin

## California Sedimentation

- Sacramento Basin
  - Major submarine valleys or gorges
  - Tied to periods of erosion
  - Mainly deep-water shales and shelf sandstones
- San Joaquin Basin
  - Deep marine basin filled with submarine fans



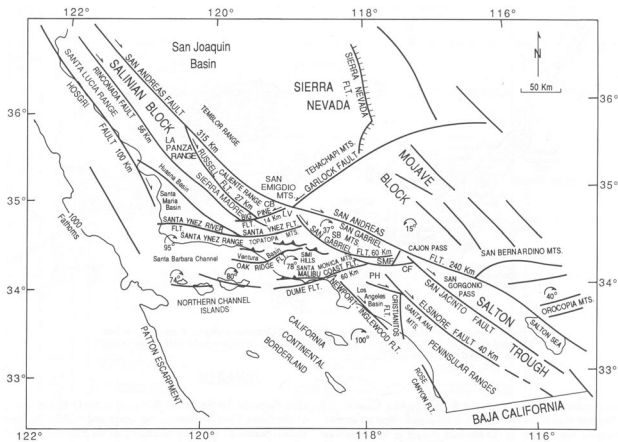
## California Sedimentation

- Continental borderland and Peninsular Ranges
- Sediments accumulated along the western margin
- Turbidite fans and non-marine sediments including conglomerates
- Severely disrupted by subsequent large-scale strike-slip faults



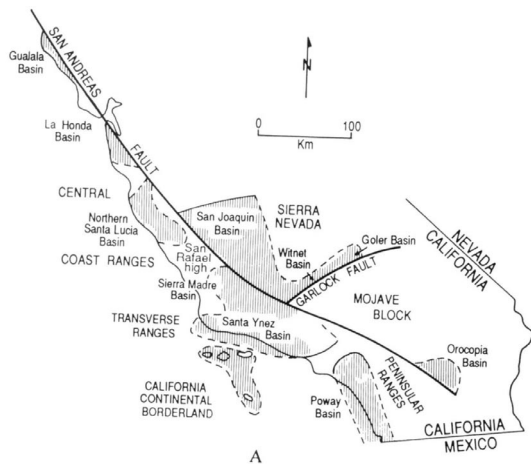
## California Borderland Sequences

- Central Coast Range
- Characterized by several borderland basins
- Strongly effected by later deformation
- Accretion of the Salinian block



## Other Borderland Sequences

- Transverse Range
- Local basins and transgressive sequences
- Non-marine faulted basins of southern California
  - Many faulted blocks formed half grabens and filled by continental red-beds



## Continental Features

- Erosion, sedimentation, and extension
- Laramide setting of continental interior
- Post-orogenic erosion and deposition
- Plains of the volcanic plateau Region
- Development of metamorphic core complexes

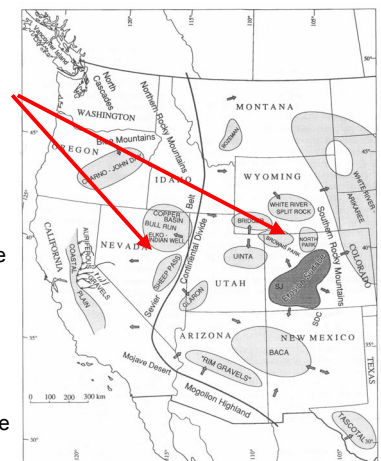
## Pacific Northwest

- Continuous lowland developed
- Deposits mainly in the Clarno Fm.
- Volcaniclastic sediments
- Later John Day Fm above Clarno



## Volcanic Plateau Region

- Mostly volcaniclastic deposits
- Drainage basins in the mountain Regions
- Younger deposits merge onto aggradational plains
- Sediments rich in volcaniclastic components
- Tectonic extension in the Cordilleran interior

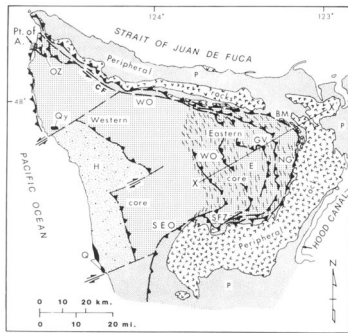


## Early Tertiary Tectonics

- Coastal collision and accretion in Olympic Mountains
- Accreted terrane in California
- Tectonic extension in the interior
- Development of Metamorphic Core Complexes in the Rocky Mountain region

### Olympic Core Rocks

- Complex melanges
- Turbidite fan sequences
- Faulted and folded
- Imbricate west-vergent thrust faults
- Horse-shoe shaped ring of oceanic basalts



## Pacific NW Middle Eocene Tectonics

- To the west is a subduction complex in the Olympic Mountains
- Northern margin of basin is a pull-apart structure floored by accreted oceanic crust
- Episodes of igneous activity follow suturing of the basaltic crust at ~ 44 Ma

### California Accreted Terrane

- Franciscan terrane
- Salinian Block
- Southern California terrane



## Salinian Block and Southern California

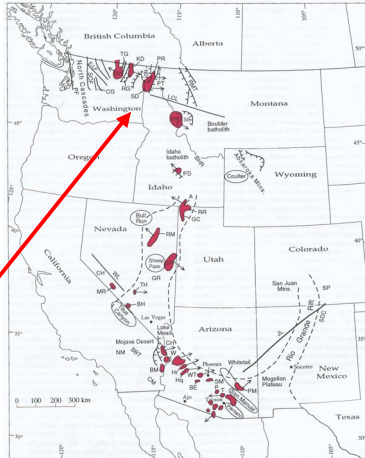
- Two composite allochthons
  - Santa Lucia
  - Orocochia allochthon

## Post-Laramide Continental Interior

- Localized tectonic extension
  - Developed in the continental interior
  - Immediately after Laramide times
- Elsewhere it was relatively quiet
- Magmatism migrated but declined
- Post-orogenic erosion and deposition

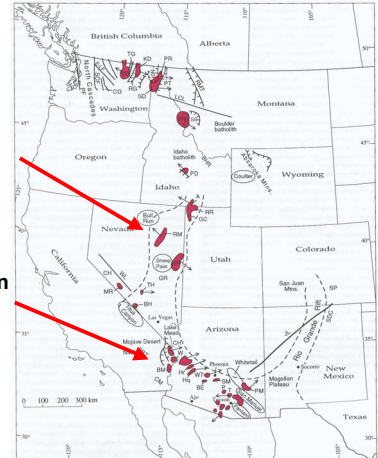
## Metamorphic Core Complexes

- Mid-crustal metamorphic rocks in fault contact with stratified cover
- Washington to Idaho



## Rocky Mountain Core Complexes

- Sierra Wasatch Region
- Major zone of metamorphic core complexes
- Mojave-Sonoran Region
- Another zone of metamorphic core complexes



## Rocky Mountain Tectonics

- North Cascades still undergoing crustal shortening
- Mexican Highlands & Southern Rocky Mountain Region
  - Change from constructional volcanic plateaus to broad shallow basins