Canyonlands, Arches and Mesa Verde National Parks

- All on Colorado Plateau
- Canyonlands = confluence of Green and Colorado Rivers

Geologic History

- Recall: Colorado Plateau records multiple transgressions and regressions of the coast over the continent
- For Example: Grand Canyon stratigraphy
  - shales over sands, Limestone over shale = transgression
  - Shale over limestone = regression
- This pattern continues in Zion and Bryce…
Zion

- Coast has regressed, leaving big desert (Navajo SS).
- Then coast begins transgression (Carmel Limestone)

Bryce

- Cretaceous sea way transgresses depositing Dakota sandstone (beach) and Tropic Shale (deeper water)
- These sediments are covered in Bryce by Claron Formation (~50 Ma Eocene Lake deposits)
Canyonlands and Arches record the same transgressions and regressions

- Rocks here are a little different because it is further to the east.
- Most formations are the same
- e.g. Moenkopi - we saw it at Zion
  - Lower Triassic shales
  - Overlie the Permian Kaibab L.S (Grand Canyon)
  - Regression of Permian Sea
- Here it overlies Permian Sandstone (beach)

Mesa Verde is even further east

- Dakota SS is at the base (not visible)
- Beach of transgressing Cretaceous sea
- Mancos Shale
- Mesa Verde Group (sands and shales)
  - This indicates the shoreline of the Cretaceous sea was nearby and shifting around
Some new things we haven’t seen yet:

- Paradox Formation (not visible in Canyonlands)
  - Pennsylvanian (~300 Ma)
  - Evaporite deposits
- Regressing Penn. Sea (remember Supai, Hermit Shale and Coconino SS of Grand Canyon)
- Uncompahgre Uplift results in Uncomp. Mts and restricted basins
- Penn. Sea fills the basins and evaporates leaving thick (5000’) Paradox (salt)

Salt Domes

- Evaporites (salts) become mobile at depth (flow like putty)
- Salt diapir from Paradox Fm lifts overlying strata
  - Dome
  - Brittle opening of overlying rocks = pathway for fluids and enhanced weathering
  - Rocks from center of dome removed leaving this beauty...Upheaval Dome
More salt structures

- Fins = opening of joints resulting of uplift by rising salt dome
- Graben (valley) = salt dissolved and overlying rocks are sinking

Stream Rejuvenation

- Rivers down-cut to base level (elevation of the lake or sea they flow into)
- Then they begin to meander around (e.g. Mississippi River)
- If base level drops (either sea level drops or continent rises tectonically), then river cuts down again.
- Results in incised meanders such as these.
Why did Anasazi build dwellings here?

- Partly because they could get water year-round

Aquifer
Mesa Verde Group

Aquiclude (Mancos Shale)

Draw Aquifer-aquiclude & spring