
POST-MEETING FIELD TRIP #4

GEOLOGICAL WALKING TOUR OF THE CACHE VALLEY HALF GRABEN, ARCHES NATIONAL PARK: A STRUCTURAL GEOLOGY CLASSROOM

DATES: September 17th (1 day).

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DESCRIPTION: The primary objective of this field trip is to observe and discuss fault structure and associated fault segmentation and linkage over a broad range of scales with emphasis on well exposed, flexure-related, normal faults in the Moab member (Jem) of the Entrada Formation (well-sorted, high porosity, quartz sandstone) and the overlying Tidwell member (Jmt) of the Morrison Formation. Fault structure reflects mechanics of fault formation and is an important control of fluid flow attributes of the faults. A secondary objective is to present the mesozoic-cenozoic, structural evolution of the half graben developed over the Cache Valley salt wall.



Oblique view of hanging wall of Cache Valley half graben (Delicate Arch region).

There are three stops, two of which entail on- and off-trail geological traverses.

- At Stop 1, a scenic overview, we'll briefly present the stratigraphical and structural big picture of the Cache Valley half graben.
- Stop 2 entails a two mile, geological traverse in association with the Delicate Arch trail and has four goals:
 - (1) show the detailed stratigraphy important for discerning faults in the Morrison Formation,
 - (2) observe in outcrop and detailed maps the structure of small and moderate displacement faults in the Jem,
 - (3) observe examples of the structure of two large displacement faults, and
 - (4) in outcrop and detailed maps observe fault networks in the Jem and their relationship to fault-fault interactions and implications on reservoir fluid flow.
- Stop 3 entails two geological traverses, each of approximately one mile. The first traverse provides:
 - (1) more examples of the structure of faults cutting the Jmt and Jem,
 - (2) cross sectional view of fault networks in the Moab and the underlying Slickrock member of the Entrada with a discussion of mechanical stratigraphy, and
 - (3) observe and discuss systematic bedding dip change (rollover) in hanging walls of larger faults.
- The second traverse has four goals:
 - (1) observe outcrop details of a late-stage, upward propagating, high angle fault and associated fold and abrupt bed steepening,
 - (2) walk a section of the Lower Cretaceous, Cedar Mountain Formation (Kcm), showing the detailed stratigraphy and its importance to mapping faults as well as discuss evidence for the influence of salt movement during deposition,
 - (3) observe within Cretaceous, interbedded sandstones and mudstones, an excellent example of a rotated, early formed, large displacement, normal fault and an exceptional exposure of its lateral fault tip, and
 - (4) an outcrop of Dakota Sandstone showing an example of early stage, bed parallel, strike-slip fault system.

As a wrap-up, we'll present a structural evolution of the Cache Valley half graben.

ITINERARY:

Wednesday, September 16th: Introductory pre-trip meeting in afternoon (location and time TBA).

Thursday, September 17th: Field trip departure at 6:00 AM from the Two Rivers Convention Center and return same day by 7:00 to 8:00 PM.

PARTICIPANT LIMIT: 20

FEE: TBD includes transportation (van), box lunch, healthy snacks, bottle water, and extensive fieldtrip guide.