**Sequence Stratigraphy, Facies Architecture, and Growth Faults of fluvial and deltaic deposits in the Cretaceous Ferron Notom Delta, Capitol Reef, Utah**

*University of Houston Quantitative Sedimentology Research Consortium Field Trip, Sunday August 9th – Friday August14th.*

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## Purpose of Trip

This trip will provide an overview of fluvial deltaic systems in the superb Ferron Notom Delta in Central Utah. The trip will show examples of fluvial, storm and wave-influenced deltaic and shoreline systems and the associated feeding fluvial deposits. We will show examples of incised valleys and discuss how they differ from distributary channels. The trip will also examine the interaction of sedimentary processes and the generation of growth faults. This trip will showcase recent results from our ongoing research program on the Ferron "Notom" Delta near Capitol Reef, Utah.

Field photo of Ferron Sandstone, Coalmine Wash, Utah

## Getting There

You should plan to arrive in Salt Lake City Sunday mid-afternoon. Each participant is responsible for transportation to The Best Western. I recommend that you vehicle pool, 4WD vehicles are recommended. The fastest way to get to Salina is to take Highway 15 south to Salina and from Salina through I70 to Highway 24. It will take about 4 hours (see instructions at the back of this document).

The field trip will officially leave at 8am Monday Morning from the Best Western parking lot. The field trip will end at about 5pm, Thursday August 13th near Hanksville. The plan is to overnight in Torrey and then drive to Salt Lake City the next day (Friday,

August 14th). It is about a 4 hour drive to Salt Lake City from Torrey (see directions at end).

## Hotel

**Book Your Rooms Before July 9th!**
I have reserved 40 rooms at the Best Western, Capitol Reef Resort. To book your rooms call the number below and advise them that you are with the University of Houston Group. The rooms are being held until July 9th so please book by July 9th.

***Best Western Capitol Reef Resort (August 9th-13th)***
2600 E Highway 24, Torrey, UT, 84775
Phone: (435)425-3761
**Toll Free: 1-800-780-7234**

# RECOMMENDED FIELD EQUIPMENT

Here is a list of suggested equipment and supplies that will be needed for the field trip. Note that we will be working in a desert. Expect temperatures to be 85-110°F during the day and 50 - 80°F at night. Clothing worn during the day should be light-colored, loose fitting, and cover as much of your body as is comfortable to reduce exposure

## Clothing

- Pants – We recommend wearing pants rather than shorts, because the desert environment is replete with a variety of thorny plants, cacti, and trees
- Hiking boots (essential)
- Hat – Wide-brimmed (e.g. Army booney hat) to shade neck and face.
- Light weight rain jacket

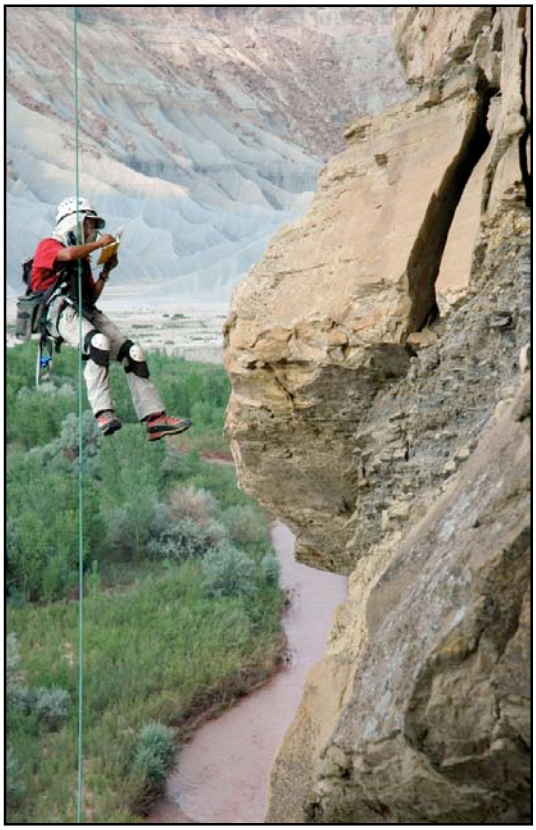
## Gear

- Backpack or waistpack for carrying raingear, water bottle, field guide
- Sunglasses –The desert sun is intense and can potentially lead to sun-blindness over long periods of exposure.
- Sunscreen – high SPF (e.g. 30) is recommended
- Lip balm with sunscreen
- Insect repellent (gnats can be bothersome)
- Canteen or hydration pack (e.g. Camelback®)
- Camera
- Rock Hammer (useful to cut footholds on steep shale slopes)
- Hand Lens

## SAFETY AND FIRST AID

You may wish to carry a small first aid kit, although we will have them available, and BP HSC personnel will also have safety gear. Some safety information is provided at the end of this document. The main safety considerations are:

- Road safety (practice safe driving).
- Road field stops (take care crossing roads and keep off pavement)
- Dehydration and Heat Exhaustion and Heat Stroke (keep hydrated!)
- Sunburn (wear hat, lipbalm, and suncreen).
- Loose Rocks, Steep Cliffs and Overhangs (watch for falling rocks, wear appropriate safety gear near cliffs, good boots help).
- Snakebite (very unlikely, but there are Black Widows and Rattlesnakes in the field area).



# Itinerary

**Day 1. Sunday, August 9th[th] Day 1. Arrive Salt Lake City, Drive to Torrey Utah**

Check into Best Western, Capitol Reef Resort.

Supper on your own. Recommended Restaurant– Café Diablo, best Western or RimRock Restaurant and several other decent places in Torrey.

**Day 2. Monday, August 10[th]: Ferron Sandstone, Notom Delta**

*Stop 1. Introduction to Ferron, Notom delta, Caineville, Utah (Yijie Zhu).*

- Introduce parasequence stratigraphy in proximal part of system.
- Examine fluvio-deltaic transition.
- Examine non-marine facies

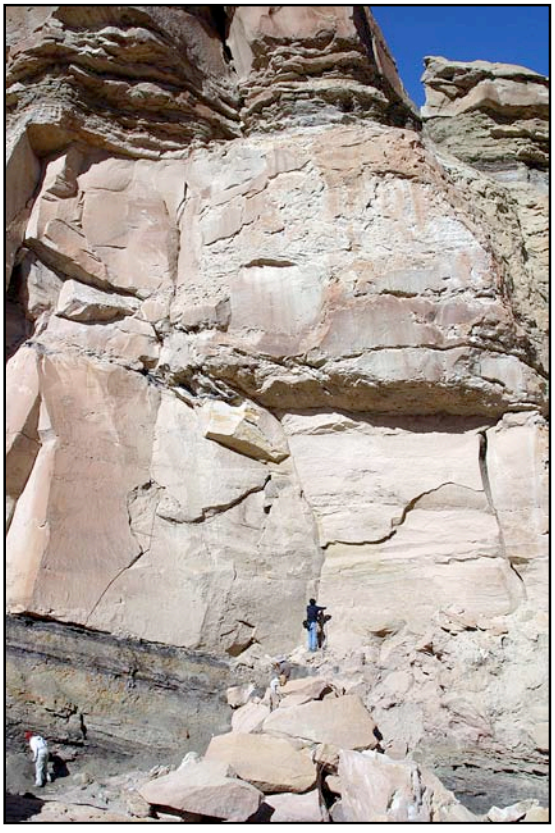
Prodelta to delta front transition, Caineville South.

*Stop 2. Middle Caineville (Yijie Zhu/Milly Wright)*

- Hyperpycnnal prodelta mudstones
- Rooted Floodplain mudstones
- Possible incised valleys

*Stop 3. Caineville North (Yijie Zhu)*

- Prodelta shales and bentonites
- Storm-flood-dominated delta front
- Distributary-channels
- Shorefaces
- Transgressive lag facies
- Ferron-Blue Gate contact



Multi-storey valley fill overlying rooted floodplain, Middle Caineville.

**Day 3. Tuesday, August 11th**

*Stop 1. Steamboat (Weiguo Li)*

- Distal parasequence architecture
- Ichnology
- Distributary channels
- Shoreface deposits
- Transgressive lag

*Stop 2. Compound Incised valleys, Neilson Wash, Factory Butte Road (Weiguo Li/Chris Campbell)*

- Various stops along canyon
- Top of marine parasequences
- Tidally influenced valleys
- Channel lag facies
- Paleohydraulics and facies architecture

Exhumed valley erosion surface with overlying floodplain and laterally accreting point bar, Nielsen Wash.

*Stop 3. Fremont River Section (Weiguo Li)*

- Valley fill facies and facies architecture.

Incised valley exposed along banks of the Fremont River.

**Day 4. Wednesday, August 12th**

*Stop 1. Coalmine Wash (Main Gully)*

- Distributary Channels and Mouth Bars in fluvial dominated deltas.
- Incised valley margin.

Distributary channels and mouth bars, Coalmine Wash

*Stop 2. Coalmine Wash (Dan Garza's area).*

- Mouth Bars.
- Clinoforms.
- Anemone Burrow.
- Climbing Ripples.
- Soft-sediment deformation.

Sea anemone burrows, Coalmine Wash.

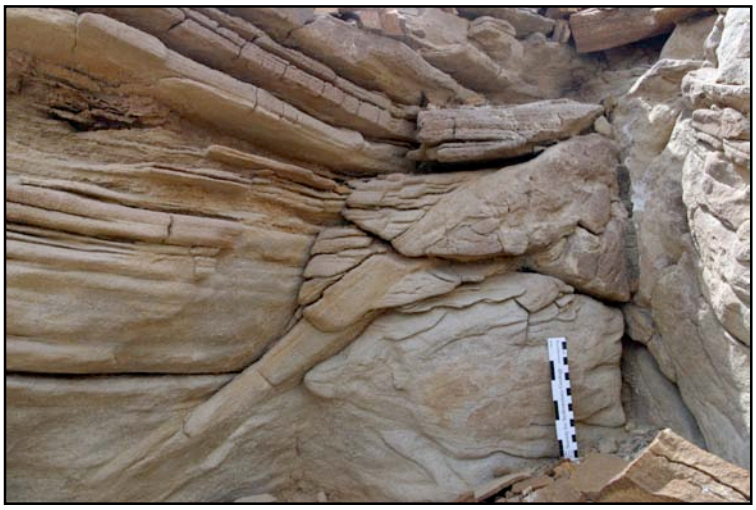
*Stop 3. Coalmine*

- Estuary-lagoonal facies.
- Transgressive Surface of Erosion.

## Day 5. Thursday August 13th, Growth Faults

*Stop 1. Growth faults (Eric Blankenship)*

- Pre-growth prodelta mudstones.
- Upper flow regime mouth bars.
- Mud diapirs and ridges.
- Fault geometry and linkage.
- Sedimentological controls on growth faults.



Growth-faulted sandstone, South Skyline Rim.

*Stop 2. Factory Butte Mudstones and Clastic Dyke (Yijie Zhu)*

- Prodelta hyperpycnites
- Clastic dykes

View north of Tununk shale prodelta deposits, Skyline Rim.

**Optional stops on evening drives back to Torrey**

Stop A. Morrison Formation
Stop B. Dakota Formation
Stop C. Navajo sst.
Stop D. Goosenecks/Capitol Reef

**Day 6. , Friday, August 14th.**

## Drive to Salt Lake City, fly home.

# Safety Considerations

The matter of safety in the field deals with both personal safety and safety associated with the larger group. The most dangerous implement is the rock hammer. Bruised toes and fingers as well as lacerations that result from rock and steel chips produced on impact are common. Of serious concern is the impact of one of these chips in an individual's eye. These problems can be minimized by wearing protective goggles and practicing good common sense while recovering a fresh rock sample.

Be certain that no one else is within 10-15 feet of the point where rock chips may be produced. It is also worth making sure that people are not facing toward the impact site. Care should always be exercised when freeing a sample. You may place your boot over the sample site to catch any rock and flying chips. Do not use your fingers. A single well-placed blow should be sufficient. Particularly hard and brittle rocks like quartzite make difficult specimens from which to extract samples. A single, well-placed blow on a fractured corner is more likely to produce an adequate specimen than pounding upon on a large rounded surface.

A second area of concern dealing with safety in the field pertains to steep canyon walls, road cuts, and other natural exposures. Canyon walls are can be very steep with precarious overhanging projections. Use caution around such over hangs. On steep climbable slopes care should be exercised while attempting to reach the Rosetta stone. Dislodged rocks pose a serious threat to persons at the base of the slope below the climber. Observation is far more a powerful tool than climbing to solve problems. Injury is more likely going down than going up to the site. We have all had structural geology, so be sure and remember your Mohr's circle and Coulomb's fracture criteria for maintaining solid footing on slopes.

When you are at the top of a steep slope, the obvious problem of falling should not be ignored. Eroded cliff faces may be unstable or changes of wind speed and direction pose problems. It is simply best to stay away from such hazards. Some individuals have the urge to throw rocks. This is a potential hazard for people at the bottom of the slope. In wilderness areas where there are not likely to be people, there is always the real danger of striking wildlife or livestock.

Wet lichen or moss-covered rocks provide precarious footing. Fences should be avoided. Where possible, gates should be used. Gates are always left in the exact manner they were found. Barbed wire fences are best crossed in groups with one or more persons spreading the wires apart, and others passing through the opening provided. Never step on the wire. Look for an opening that will allow you to crawl under. Streams and irrigation ditches should be treated with caution. A bad landing after a broad jump may result in a broken or twisted ankle. Instead, look for natural bridges or shallow fords.

Livestock, snakes, bears and other forms of wildlife should be avoided. When wildlife is encountered in the field, keep in mind that geologists do geologist things, snakes do snake things, that badgers do badger things and so on. Teasing or catching potentially dangerous animals, particularly in a group, is foolhardy. Animals will usually evacuate the area and pose no threat. Do not reach into any crevasse or place your hand on an overhanging ledge without looking and checking for danger first. If someone were

to be bitten by a snake, remain calm and treat the victim for shock. In most cases, the individual is not at risk from the bite; although, medical attention is required.

Perhaps the most serious threat to field participants is the danger associated with traffic along roadways. When crossing a road, it is important, especially in large groups that all participants cross together. Needless shifting from one side to the other should be avoided in all circumstances. Observations or discussions should never be attempted from any part of the roadway. It is probable that more persons are injured on highways than in any other manner associated with geological field trips.

Fair-skinned participants should use sun-screen and wide brimmed hat. At five to six thousand feet above sea-level the atmosphere is not as effective at blocking out the Sun's harmful rays. SPF 30 or more is recommended. Plenty of drinking water should be carried. Each participant should be aware of his or her fluid requirements. Insect repellant should be used when needed. Although we do not anticipate rain, afternoon thunderstorms can develop. Each participant should bring wet weather gear.