



MIAMI UNIVERSITY GEOLOGY FIELD STATION - 2010

FIELD GEOLOGY, GLG 411/511

PRELIMINARY SCHEDULE AND ACTIVITIES

WEEK 1 – This traveling week is designed to introduce students to the regional geology, tectonics and physical volcanology of the central to eastern Snake River Plain and transition to the Rocky Mountains, and to provide hands-on experience with various field techniques. Issues explored in the field and in evening discussions include:

- ◆ Tectonic development of the western Cordillera and continental within-plate volcanism
- ◆ Identification and characteristics of effusive vs. explosive volcanism and volcanic products
- ◆ Stratigraphy and depositional environments
- ◆ Structural geology – folds and faults
- ◆ Landscape evolution – from catastrophic regional events (e.g., Bonneville Flood, Yellowstone Caldera) to local phenomena (e.g., landslides, geothermal activity).
- ◆ Interpreting topographic and geologic maps and satellite imagery, use of compasses and GPS technology

6/05 S Rendezvous in Jackson, WY at 3:00 pm – Logistics and introductory comments.

6/06 S Jackson, WY to Craters of the Moon National Monument, ID – Overview of Wyoming-Idaho Thrust belt, eastern-central Snake River Plain stratigraphy, and basalt physical volcanology.

6/07 M Craters of the Moon National Monument area – Physical volcanology and lithostratigraphic relationships along the northern margin of the Snake River Plain.

Formal Exercise: One-day mapping exercise in Quaternary basalts and underlying units. Work in groups of two and individually turn in final field drafted geologic map at the end of the field day.

6/08 T Craters of the Moon to Yellowstone National Park, WY – Regional tectonics, Eastern Snake River Plain physical volcanology and the calderas of the first two cycles of Yellowstone area volcanism.

6/09 W Yellowstone National Park – Stratigraphy of the Yellowstone Plateau, physical volcanology, thermal features.

Formal Participation: Students are asked to lead discussions on the volcanology and eruptive history of the eastern Snake River Plain and Yellowstone Plateau volcanic field during the 6/8 and 6/9 transects.

6/10 R Yellowstone to Jefferson Canyon (Lewis & Clark Caverns) area, MT – Regional tectonics and the transition from the Snake River Plain to the Rocky Mountains.

6/11 F Lewis and Clark Caverns area, MT – sedimentary stratigraphy and depositional environments, effects of Laramide/Sevier compressional tectonics, limestone cavern formation

Formal Exercise: Construct a geologic map of a portion of Lewis & Clark Caverns State Park. Work in groups of two and turn in final field drafted map (one per group).

WEEK 2 – This traveling week is designed to introduce students to the regional geology, tectonics and glacial features of the northern Rocky Mountains. Issues explored in the field and in evening discussions include:

- ◆ Tectonic development of the western Cordillera
- ◆ Stratigraphy and depositional environments
- ◆ Structural geology – folds and faults
- ◆ Alpine glacial features and global climate change
- ◆ Landscape evolution – from regional crustal deformation to local glacial features and deposits
- ◆ Interpreting topographic and geologic maps and satellite imagery, use of compasses and GPS technology

- 6/12 S** Lewis and Clark Caverns to Sun Canyon/Gibson Reservoir area – compressional tectonics and thrust faulting, effects of Laramide/Sevier compressional tectonics.
- 6/13 S** Sun Canyon/Gibson Reservoir area – compressional tectonics and thrust faulting, effects of Laramide/Sevier compressional tectonics.

Formal Exercise: Construct a generalized geologic strip map through multiple thrust sheets. Work in groups of two and turn in final field drafted map (one per group).

- 6/14 M** Sun Canyon to Calgary, AB – sedimentary stratigraphy and depositional environments, compressional tectonics, active alpine glaciation.
- 6/15 T** Calgary to Banff National Park, AB – sedimentary stratigraphy and depositional environments, compressional tectonics; Canadian Rockies transect part 1.
- 6/16 W** Banff/Yoho National Parks, AB/BC – sedimentary stratigraphy and depositional environments, compressional tectonics; Canadian Rockies transect part 2.

Formal Participation: Students are asked to lead discussions on the geologic and structural development of the Canadian Rockies during the 6/16 and 6/17 transects.

- 6/17 R** Banff/Jasper National Parks, AB – sedimentary stratigraphy and depositional environments, compressional tectonics, active alpine glaciation of the Columbia Icefields.

Formal Project: Construct a generalized geologic cross-section of the Canadian Rockies from Banff through the Western Main Ranges based on field observations and published geologic maps. Turn in final field drafted cross-section and accompanying information (individual).

- 6/18 F** Banff National Park to Livingston, MT – a long travel day.

WEEK 3 – This week brings to a close the traveling portion of the program and will initiate the portion of the curriculum designed to provide students with in-depth field mapping and interpretation exercises in the greater Dubois, WY area. Issues to be explored in the field and in evening discussions include:

- ◆ Tectonic features of the Laramide Orogeny
 - ◆ Stratigraphy and depositional environments
 - ◆ Structural geology – folds and faults
 - ◆ Interpreting topographic and geologic maps, use of compasses and GPS technology
 - ◆ Interpreting aerial photographs and satellite imagery
 - ◆ Construction of geologic maps and cross-sections – from field sketches to computer generated maps (GIS technology)
- 6/19 S** Livingston, MT to Timberline Ranch, Dubois, WY via Yellowstone and Grand Teton National Parks – Yellowstone Plateau thermal features and greater Yellowstone-Teton area glacial features. **Arrive at Miami University Field Station, Timberline Ranch, 4127 US Highway 26, Dubois, WY 82513, phone (307) 455-2513.**

Note: The remainder of course will be based out of Timberline Ranch. Day sessions in the field will begin at 8 am and end at approximately 5 pm. Evening lecture/discussion sessions, followed by work sessions, will be held four or five nights per week.

6/20 S Transition/Logistics day; mandatory 7 pm evening session.

6/21 M Dubois area stratigraphy and structure – Paleozoic through Cenozoic formations.

Formal Exercise: Describe and interpret stratigraphy and geology. Work in two large groups and turn in final field drafted geologic map at the end of the field day (individual).

6/22 T Torrey Canyon – Precambrian crystalline basement and overlying Paleozoic strata.

6/23 W Torrey Canyon – Geologic mapping in Paleozoic formations.

6/24 R Torrey Canyon – Geologic mapping in Paleozoic formations.

6/25 F Torrey Canyon – Geologic mapping in Paleozoic formations.

Formal Project: Measure, describe, and interpret stratigraphy and geology in Torrey Canyon mapping area. Work in groups of two and turn in final drafted geologic map and cross-section (one per group).

WEEK 4 – Continuation of general Week 3 themes.

6/26 S Spring Mountain – Introduction to lithologies and GPS assisted mapping.

6/27 S **No day activities scheduled; mandatory 7 pm evening session.**

6/28 M Spring Mountain – Geologic mapping in Paleozoic formations.

6/29 T Spring Mountain – Geologic mapping in Paleozoic formations.

7/30 W Spring Mountain – Geologic mapping in Paleozoic formations.

7/01 R Spring Mountain – Geologic mapping in Paleozoic formations.

Formal Project: Describe and interpret stratigraphy and geology in Spring Mtn. mapping area. Work in groups of two and turn in [1] final drafted geologic map (one per group), and [2] final drafted cross-sections (two per group).

7/02 F Windy Gap one-day mapping project.

Formal Exercise: Describe and interpret stratigraphy and geology. Work alone and turn in final field drafted geologic map at the end of the field day.

WEEK 5 – Continuation of general Week 3 & 4 themes.

7/03 S Windy Gap synthesis and review.

7/04 S **JULY 4 HOLIDAY - No activities scheduled.**

7/05 M Little Horse Creek – Geologic mapping in Mesozoic and Cenozoic formations.

7/06 T Little Horse Creek – Geologic mapping in Mesozoic and Cenozoic formations.

7/07 W Little Horse Creek – Geologic mapping in Mesozoic and Cenozoic formations.

7/08 R Little Horse Creek – Introduction to lithologies and complex structures.

7/09 F Final discussions, Complete Little Horse Creek map/project, Pack-up camp.

Formal Project: Describe and interpret stratigraphy and geology in Little Horse Cr. mapping area. Work in groups of two and turn in [1] final drafted geologic map (individual), and [2] final drafted cross-section and interpretation (individual).

7/10 S Bon Voyage