

ROCKY MOUNTAIN FIELD SEMINARS

LEARN ♦ EXPLORE ♦ ADVENTURE

GEOLOGY OF TRAIL RIDGE ROAD

AUGUST 9, 2008 **COURSE #: 08-046**
FEE: \$85

INSTRUCTOR: DR. DAVID LINDSEY



PAGE 1 OF 2

LOCATION: **Rocky Mountain Field Seminar & Conference Center**
 1895 Fall River Road, Estes Park, Colorado

TIME: **8:00 AM – 5:00 AM**

COURSE DESCRIPTION: Become acquainted with the vastness of geologic time and the power of geologic processes through the study of rocks and physical features along one of the highest and most spectacular roads in North America. Look at the ancient metamorphic rocks and granites and learn how they formed. Examine geologically recent volcanic rocks along the road and picture the volcanoes that produced them. Learn to recognize features formed by glaciers that flowed through the Park as recently as a few thousand years ago. Join the instructor for panoramic views and discussions of the geology along Trail Ridge Road in Rocky Mountain National Park.

COURSE LEVEL: IV

Moderate hikes of more than five miles per day with elevation gain of less than 1,000 feet and/or significant course time spent at elevations exceeding 11,000 feet and/or overnight in the field

This course is rated Level IV because of time spent at elevations exceeding 11,000 feet. There will be no overnight in the field and no hike will exceed five miles or 1,000 feet of elevation gain.

BRIEF INSTRUCTOR BIOGRAPHY (additional information available at www.rmna.org):

David Lindsey earned a Ph.D. in Geology at Johns Hopkins University in 1967 and has served as research geologist and administrator at the U.S. Geological Survey for more than 30 years. He is currently Scientist Emeritus at the USGS, where he volunteers his time to help other scientists with research on the geology of mineral resources. He has published research on gold, uranium, beryllium and copper deposits; made geologic maps of various mountain ranges in the western U.S. including the Sangre de Cristo Mountains in southern Colorado; and studied the origin of ancient volcanic and sedimentary rock formations. For five years he supervised minerals research and surveys of public lands in the Rocky Mountains for the USGS. He enjoys teaching and has given class presentations and field trips for school children.

EXPECTATIONS: Professional conduct will be expected from participants at all times. Individual ideas will be respected. Except during course breaks, cellular phones, pagers, and personal entertainment devices are strictly prohibited in the classroom and during field sessions.

CAR-POOLING: Rocky Mountain Field seminars utilize car-pooling to limit vehicles traveling into the Park. Car-pooling makes it easier to keep the group together, reduces transit time, and allows courses greater access because fewer parking spaces are required at destinations. In addition, it provides an opportunity for participants to discuss course material in small groups during transit. Typically, a few participants from each course volunteer the use of their vehicles for car-pooling to course locations.

TENTATIVE COURSE SCHEDULE: After a brief introduction to the geology of the Park, geologic time, and the principal kinds of rocks, participants drive to Sheep Lakes and Horseshoe Park overlook for an introduction to the world of the last Ice Age. The instructor will identify terminal moraines that reveal the extent of the ice and lateral moraines that show the height of the ice on the valley walls. The course will view kettle lakes where stranded icebergs melted and we ponder a glacial erratic that came to rest on an outcrop and begin the study of igneous and metamorphic rocks. Moving on to the Iron Dike, study will shift from mafic dikes to crustal extension, plate tectonics, and the opening and closing of oceans. Continuing on Trail Ridge Road, at Many Parks and Rainbow curves, the participants will stop to get another perspective of the valleys carved by the rivers of ice and then examine Silver Plume quartz monzonite and discuss large igneous intrusions, the way joints weather this rock, and spheroidal weathering and exfoliation domes. At Rock Cut, participants will identify faults and slickensides and learn about permafrost features. At the Lava Cliffs, discussion will focus on glowing avalanches erupted from the Never Summer Mountains and on the cirque wall that is seen as part of a paleovalley filled with tuff. The course continues with discussion on Precambrian rocks, glacial erosion and igneous processes. By the end of the course, all participants will have an in-depth understanding of the processes that shaped the park and a sense of geologic time.

WHAT TO BRING:

- Sack lunch, snacks, energy bars, & **WATER**
- Notebook
- Binoculars may be useful
- Weatherproof jacket
- Pens/Pencils
- Hand lens may be useful
- Hat or cap
- Book by Raup (see Reading)
- Comfortable shoes (sneakers fine)
- See 10 below

REMEMBER TO BRING THE 10 ESSENTIALS:

Rocky Mountain National Park recommends that hikers always carry the 10 essentials in their daypacks.

- Raingear
- Sunglasses & sunscreen
- Pocketknife
- Sack lunch, snacks, & water
- Map & compass
- Candles
- First-aid kit
- Flashlight or headlamp
- Matches or other fire starter
- Extra layers of clothing

Note: Rocky Mountain Field Seminars recommends that participants for all courses dress in layers and wear comfortable, sturdy hiking boots/shoes. Participants should be prepared for sudden changes in temperature and weather conditions.

RECOMMENDED READING:

- Raup, O.B., 2005, *Geology along Trail Ridge Road: A self-guided tour for motorists* (2nd ed.): Estes Park, Colo., Rocky Mountain Nature Association, 78 p. (highly recommended)
- Braddock, W.A., and Cole, J.C., 1990, *Geologic Map of Rocky Mountain National Park and vicinity, Colorado: U.S. Geological Survey Miscellaneous Investigations Series Map I-1973.* (optional)
- Madole, R.F., VanSistine, D.P., and Michael, J.A., 1998, *Pleistocene glaciation in the upper Platte River drainage basin, Colorado, U.S. Geological Survey Geologic Investigations Series I-2644.* (optional)

TEACHER RECERTIFICATION CREDIT

All courses are eligible for teacher recertification credit through the Centennial Board of cooperative Education Services (BOCES). Fees range from \$10 for .5 units for a one-day seminar to \$45 for 3.0 units for a six-day seminar. Participants must pay for this credit with a check, made payable to BOCES, on the first day of a course.

[This seminar is one of three in Thread E.](#)

THIS COURSE IS NOT ELIGIBLE FOR CSU CREDIT.