

GEOMORPHOLOGY AND SURFICIAL GEOLOGY

Earth & Planetary Sciences 481/581 and Laboratory, FALL 2009

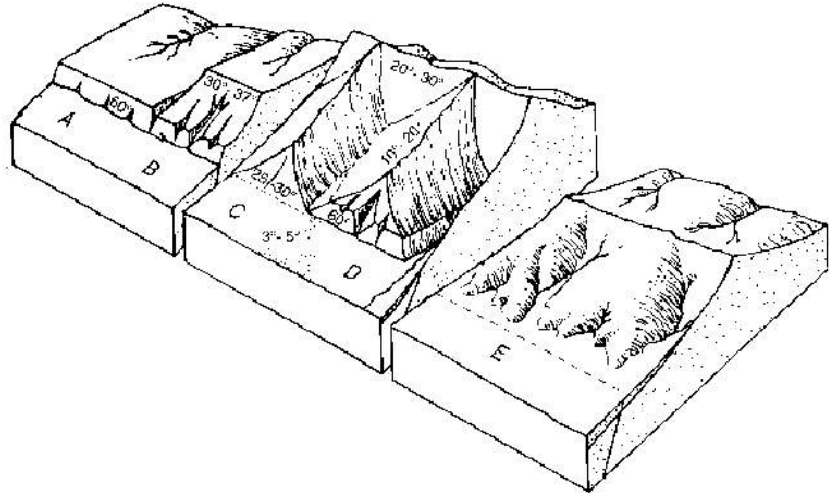
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LAB: Tues 1-5 pm Field lab or Northrop 115

TA:

WEB CT Class Site: vista.unm.edu

Evolutionary scheme for normal-faulted Basin and Range mountains developed by “space-for-time substitution”. This is a standard geomorphic research technique used where landforms change over timescales too long to observe directly. Here, mountain fronts in different stages of faulting and erosion are studied at different locations, but these could represent snapshots in time during evolution of a single mountain front. From Wallace (1978).



Geomorphology is the **study of landforms**. This class emphasizes the physical, chemical, and biological **processes** that create and modify landforms. Understanding the **history** of landform evolution and climatic and tectonic conditions that it is also essential to understanding the Earth surface environment.

TEXT: Ritter, D.F., Kochel, R.C., and Miller, J.R., 2002, **Process Geomorphology** (4th ed.): Waveland Press, Inc., 560 p.

READING: Reading is a crucial part of the course - it is essential to complete the assignments as scheduled and come to class with any questions that arise. The textbook assumes that you’ve had a thorough introduction to physical geology, so be sure to ask about any jargon or concepts that are unclear, and/or consult an intro geology text. Lectures will complement readings in the text, with additional perspectives, field examples, case studies, and homework exercises.

LABORATORY: The lab is an integral and important part of the course (see Grading section) and will involve field trips to local areas during most lab periods through mid-November. **NOTE: Wearing of seat belts is mandatory at all times while the vehicles are moving.** Exercises will be handed out prior to the lab - review them so that you will be prepared. We will gain an understanding of geomorphic processes and the evolution of the New Mexico landscape through detailed field observations; quantitative measurements of landforms, surficial deposits, and active processes such as streamflow; and in-lab research involving map, air photo, and modeling analyses. A *field notebook* (water-resistant) is required. Taking clear, informative field notes is important, and **I will ask for field notebooks to be turned in at the end of the term.** A hand lens, camera, soils knife, and rock hammer are optional, but bring ‘em if you’ve got ‘em, and of course a hat, sunscreen, and adequate food and water make it easier to focus on geomorphology. **NOTE: WEB info, links, etc. for labs may be updated the week of the lab.**

EPS 481/581 Syllabus

LAB WRITE-UPS: Three major lab projects will require complete reports on your findings from one or more field and laboratory sessions. These are the weathering, fluvial, and glacial projects; the fluvial project is the most extensive and is worth about twice the points of the other two. All, and especially the fluvial lab, require work over a few to several weeks (they can't be done a day before the due date!!!).

Write-ups in standard scientific journal style are required, with section headings similar to the following:

Abstract: A paragraph that concisely summarizes the entire report.

Introduction: Statement of the problem or question addressed; description of location and pertinent aspects of the field area.

Methods: A concise description of methods and instruments used. Simple and obvious techniques need not be included.

Results: This section includes both qualitative and quantitative field observations and data analysis and presentation (graphs and tables).

Discussion: Interpretation of data and observations, in relation to what was previously understood about the problem (from the textbook and/or scientific literature; 581 students will be expected to provide more complete and sophisticated background information).

Conclusions: A summary of the most important findings from the work.

References Cited: This section includes full references for all cited publications; see papers in the Geological Society of America *Bulletin* for style - **this format must be used**.

****NOTE:** It is not necessary to include all of the raw data we collect in the field in your reports - you will analyze the raw data and construct summary data tables showing the results - and only these summary tables need be included in write-ups. This will save both your time and a lot of paper!

All reports must include **figures** (e.g. graphs or photos) numbered in order of their citation in the text, with captions below that briefly explain them; and **tables** for organizing numerical or simple textual information, with titles above, numbered separately from the figures. Any information you obtain from published sources must be cited in the text following that information.

A few other lab exercises will require field materials to be turned in with no formal write-up (e.g. Tijeras Canyon soils and surficial geology exercise). For these, specific instructions will be given on assignment.

EXAMS AND GRADING: Exams will be designed to test your understanding of concepts and your ability to apply your knowledge of geomorphology. Some memorization of landform terminology and other geo-jargon is necessary, but will not be the focus of exams. Grading will be weighted as below; obviously, completion of lab work is essential to your success. A penalty of 15% of the total possible points will be deducted for each day after the deadline for work turned in late.

	<i>Midterm:</i>	25%
<i>Weighting of</i>	<i>Final Exam:</i>	25%
<i>Class Elements:</i>	<i>Labs, Problems:</i>	45%
	<i>(incl. <u>field notebooks</u> = 10% of lab-problem points)</i>	
	<i>Participation:</i>	5%

(note that participation is not determined by the number of questions you answer or comments you make in class – it is your overall involvement in the course).

Undergraduate and Graduate Expectations: Students in 481 and 581 are graded separately. Those in 581 are expected to help instruct less experienced students in lab research projects and complete more thorough and sophisticated lab reports. Other specific differences will be detailed on assignment.

References Cited:

Wallace, R.E., 1978, Geometry and rates of change of fault-generated mountain fronts in north-central Nevada: U.S. Geological Survey Journal of Research, v. 6, p. 637-650.