

GEOOL 335 Field Methods II

Spring 2016

Field Exercise #1:

Taking attitude measurements, sketching and describing exposures

Field Trip Objectives:

1. Learn how to measure and plot strike and dip of planar structures
2. Develop field note-taking and data-collection skills
3. Learn how to sketch outcrops and carefully describe lithology
4. Be able to write a short summary of your interpretations of the local geologic history

Location:

Bluffs north and west of Agate Beach Trail, Patrick's Point State Park

Equipment needed:

- Brunton compass
- Hand lens
- Protractor-ruler
- Pencils/pens
- Field Notebook
- Colored Pencils

Background:

The bluffs on the north side of the Agate Beach trail expose a thick section of Quaternary deposits overlying Franciscan rocks of the Patrick's Point unit. Ken Aalto published that the Quaternary units -- which extend all the way north to Big Lagoon -- have an aggregate thickness of about 350 m. Due to tilting and erosion, they thin to a little over 60 m in our area. South of the Agate Beach trail, the Franciscan rocks of the Patrick's Point Unit are increasingly exposed in the base of the cliffs as you walk southwest along the beach. I have posted Aalto's paper online, but you need to write your own lithologic descriptions.

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PART I: Van Matre Hall, Humboldt State University Campus

In Classroom Tasks:

1. Check out a Brunton compass from the stockroom. Acquaint yourself with how to open it, and all of its various features. Read chapter 2 in your copy of Geological Field Techniques.
2. Get your notebook out and make sure it has your name, address, phone number and affiliation on or in it, somewhere. If it is brand new, you might want to leave the first 3-4 pages blank, so that you can come back and make a table of contents. Number the first 25 pages or so, in the lower corners of each page (if they do not come numbered). Determine where you are going to start using your notebook for today's exercise and draw a line 2cm from the left side of the paper. Leave this 2cm strip blank (you will use it to number the activities today). Give each activity we do today a title and underline your title. Make your notes easy to read, and describe exactly where you were, what you did, and what you saw. These are your observations, and they should be objective, without interpretation. Any interpretations come after your observations. Some people write the following on the cover: "reward if returned to: _____."
3. Practice taking strike and dip measurements on the various practice items around the room. Note their number on the yellow sticky-note. Make a data table in your field notebook (see the example on the chalkboard on how to make this table), and record the attitude measurements you make in your field notebook, making sure to keep them numbered, neat and organized. Check your measurements with your instructor's. If you make any errors, go back and re-take the measurement. See page 309 in your copy of Geological Field Techniques for the symbol used for strike and dip.
4. Practice an outcrop sketch from the photograph on the projector screen. An outcrop sketch is not necessarily a work of art, it is an informational sketch that conveys the most important data (bedding thickness, jointing, faulting, contact location and type, clast size). See chapters 3 and 6 in your copy of Geological Field Techniques for ideas about how to make outcrop sketches. Label and include this sketch in your fieldbook.
5. Practice identifying, describing, and interpreting lithologies from various samples around the room. Include these descriptions in your field notebook. Label what rock number (see sticky note) you are describing. AFTER each description of the rock hand sample, determine possible environments of formation and/or deposition of that rock sample. Without any other information, this task has many possible "answers;" your job is to come up with something plausible. Chapter 3 in your copy of Geological Field Techniques describes how to describe rock samples. Chapter 6 has information about sedimentary rocks, chapter 7 includes information about igneous rocks, and chapter 9 has information about metamorphic rocks.
6. Plot the strike and dip data on a stereonet. Plot planes and poles to planes for each data point. We will do one of these together, but you will do the rest on your own. You will be provided with a stereonet and some tracing paper.

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PART II: Agate Beach, Patrick's Point State Park, Trinidad, CA

RULES: Before we get into the geology, here is a list of safety concerns and rules for doing field work at Agate Beach.

1. No rock climbing on the rock outcrops. We realize you might want to check out the upper units of the outcrops, however, it is unnecessary to climb the face of the rock to see them, due to the tilted bedding.
2. Do not go near the shoreline. This is a dangerous beach, and we are beginning our exercise at medium tide. Be watchful and careful of sneaker waves.
3. This is a class trip, we are in class. Treat your fellow students with respect. You are representing HSU, so be on your best behavior.
4. Do not wander off out of sight of your group members.
5. Tell someone if you go up the trail to use the restroom.

Field Location Tasks:

(Again, you are not required to do these tasks in the order presented here)

1. Outcrop sketches and locations. There are three outcrops, marked with stakes and ribbon in the ground (they are called A, B, and C on the ribbons). First, locate the outcrop on the topo map provided (with A, B or C denoted). Then, sketch the outcrop in your field book. Remember to put a scale on your outcrop sketch and follow the procedure outlined above.
2. Strike and Dip measurements. Take ~6-9 strike and dip measurements at each of the 3 outcrops. Take strike and dip of bedding and foliations, depending upon what is present at the outcrop. Please ask if you don't know what you should be measuring. Include these measurements in your data table in your field notebook. Describe what feature of what rock (bedding/foliation of sandstone/schist, etc.) that you measured and where these measurements were taken ("within outcrop A," "10 meters south of outcrop B," etc.)
3. Lithology descriptions. You will provide detailed descriptions of several rock types in your field notebook. See above for instructions on how to write a rock description (chapter 6, 7, and 9). You will type these up later to hand them in.

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PART III: Final Field Report

You will turn in two components: (1) hard copies of your field notes and (2) a digital report:

1. **Hard Copies**, stapled in this order (with your name):
 - a. A photocopy of ALL office and field notes taken, outcrop sketches, and data tables. Use the copier in FH 7 to copy your notes. Make sure you are copying each page and that the clarity is decent enough to read.
 - b. Your topo map, with the three outcrop locations labeled.
 - c. Your rock descriptions, typed.
 - d. The grading rubric included in the packet, with your name at the top.
2. **Digital Report**: Write a geologic report that includes the following components:
 - a. A geologic history of the field area. Provide a plausible geologic history of how these rock units formed, their ages, and the geologic processes that resulted in their present location and position. You will briefly describe your outcrop sketches (see below) and use these descriptions to support your interpretation of the geologic history. The report will be double spaced, font size 12, Times New Roman and be 5-10 pages long. The report must include at least 3 pages of written text. Include a cover page with the title of your report and your name. This will not count towards the page count. IF you use outside resources (which is not required), you must cite them in the text and include a list of citations at the end of the document. Citations will not count towards the page count. Refer to the research paper guide on the course website for formatting and paper writing advice. There is also a style guide linked to that webpage.
 - b. Strike and Dip Data: Prepare a table of your strike and dip data and number the observations (e.g. 1 through 6) for each outcrop. The table will be included within the text of your report, along with a caption that describes the table. Plot on a Schmidt Stereonet the strike and dip data, as planes and poles to planes, for the three outcrops onto a single stereonet (use tracing paper and colored pencils with a different color for each outcrop). Label the plots for which observation # that they are in the table (one should be able to look at the plot and tell which data are from which observation in the table). Label your completed plot with marks for N-S-E-W along the boundary of the stereonet. Scan the stereonet (tracing paper) and include as an appendix to your report. Write figure captions for your stereonet. The stereonet does not count towards the page count, but the table does.
 - c. Outcrop Sketches: Include scans of your outcrop sketches as figures in your report. Write figure captions for these sketches. There is a scanner in the geology club room. The copier in FH 6 also can scan documents, but ask Laurie Marx to help you. The figure captions should describe the key parts of the sketches that you will mention in the report. The outcrop sketches count towards the page count.

Due before Saturday 3/2/16. Submit the digital report to my email Jason.Patton@humboldt.edu and submit the hard copies to my mailbox in the department office or hand it to me personally (my schedule is posted on the course website). If your report is too large to email, please share it with me on google docs.

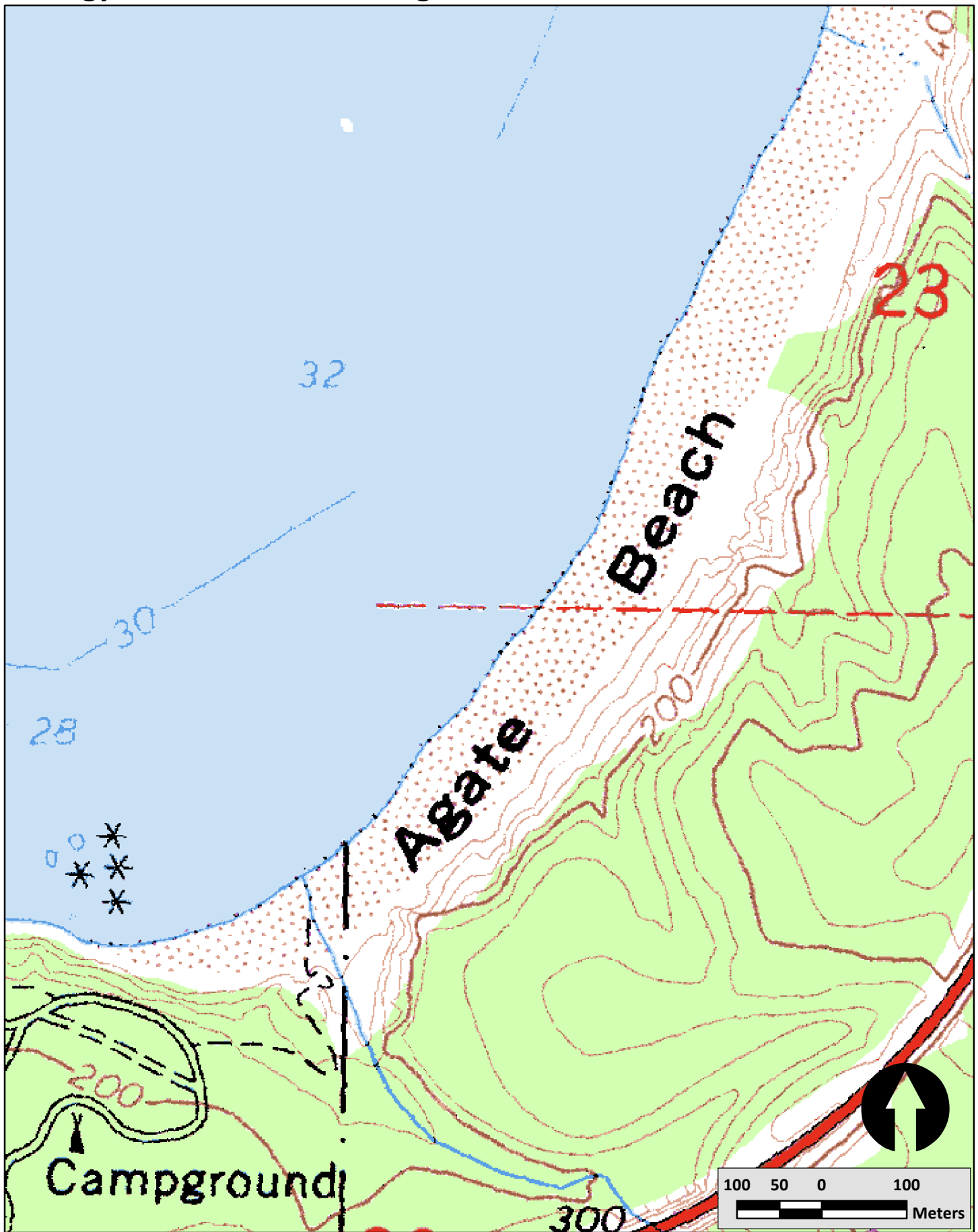
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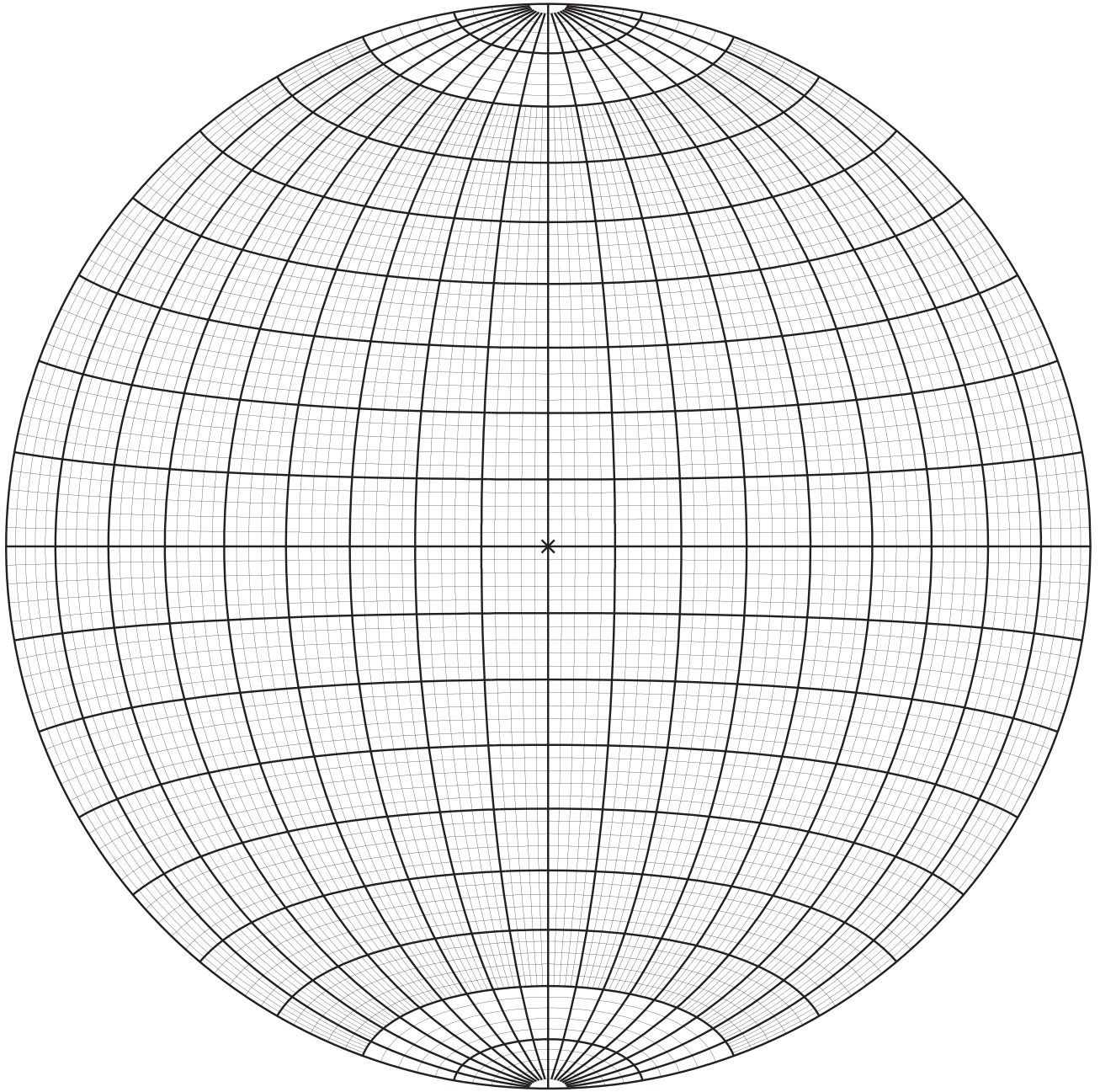
Grading Rubric for Field Exercise #1 Name: _____

Item	Points
Field Notebook (Overall neatness, completeness and organization) including classroom work.	_____/75
Field Sketches in your field notebook (A,B,C)	_____/75
Data Tables in your field notebook: correctness	_____/25
Topo map (locations)	_____/25
Lithology descriptions	_____/100
Geologic Summary (text 100, table 25, stereonet 50, sketches 25)	_____/200

TOTAL ____/500

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