

# Make a Facies Model: Linking Sedimentology and Geomorphology Using Google Earth



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### THE ASSIGNMENT


In this assignment students are asked to make an explicit link between specific settings on the Earth, geomorphic processes, depositional processes, and the sedimentary facies they produce. Rather than present facies models in a lecture format, it is my intent to teach students how to create facies models from real-world settings. This allows students to develop their own schema into which they can integrate their ideas of sedimentary facies and the interpretation of depositional environments. This assignment is used in a junior level sedimentology and stratigraphy course, about 2/3 of the way through the class. It takes about two lecture sections to run properly, as it is taught in an interactive activity/discussion format.

### WHAT A STUDENT SEES (ON BLACKBOARD)

**Build your own facies model**

**Google Earth file for the assignment**  
Attached Files:  MAKING FACIES MODELS.kmz (1.407 KB)

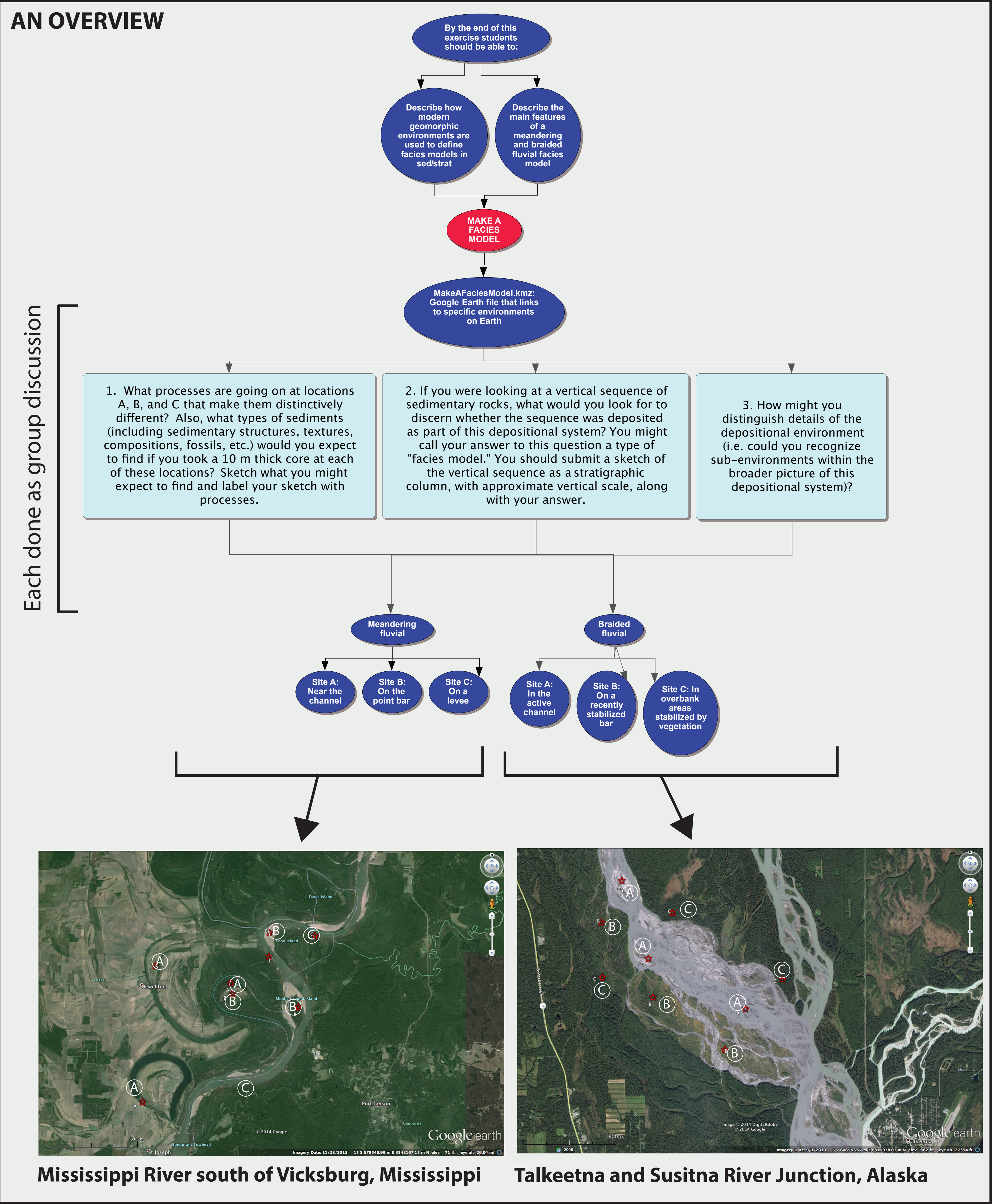
**Meandering fluvial systems**  
Download the linked google earth file above, that shows images of a meandering fluvial system with several points located on the images and marked as A, B, and C.  
On a separate sheet of paper, please respond to these questions:  
1. What processes are going on at locations A, B, and C that make them distinctively different? Also, what types of sediments (including sedimentary structures, textures, compositions, fossils, etc.) would you expect to find if you took a 10 m thick core at each of these locations? Sketch what you might expect to find and label your sketch with processes.  
2. If you were looking at a vertical sequence of sedimentary rocks, what would you look for to discern whether the sequence was deposited as part of this depositional system? You might call your answer to this question a type of "facies model." You should submit a sketch of the vertical sequence as a stratigraphic column, with approximate vertical scale, along with your answer.  
3. How might you distinguish details of the depositional environment (i.e. could you recognize sub-environments within the broader picture of this depositional system)?

**Alluvial Fan and Braided Rivers**  
Download the linked .kmz file above, that shows images of a braided river system with several points located on the images and marked as A, B, and C.  
On a separate sheet of paper, please respond to these questions:  
1. What processes are going on a locations A, B, and C that make them distinctively different? Also, what types of sediments (including sedimentary structures, textures, compositions, fossils, etc.) would you expect to find if you took a 10 m thick core at each of these locations? Sketch what you might expect to find and label your sketch with processes.  
2. If you were looking at a vertical sequence of sedimentary rocks, what would you look for to discern whether the sequence was deposited as part of this depositional system? You might call your answer to this question a type of "facies model." You should submit a sketch of the vertical sequence as a stratigraphic column, with approximate vertical scale, along with your answer.  
3. How might you distinguish details of the depositional environment (i.e. could you recognize sub-environments within the broader picture of this depositional system)?

### WHAT WE DO

This assignment is usually done over a couple of lecture sections. They are given the assignment and asked to brainstorm their answers to question 1 in groups. We then re-group as a class and have a discussion that summarizes their ideas and interjects key material that may have been missed. We then do the same for questions 2 and 3. In the end, we have created a solid facies model for meandering fluvial systems. The process is repeated for braided systems, with students playing a larger role after cutting their teeth on meandering systems.

### AN OVERVIEW



### SOME THOUGHTS AND COMMENTS

- 1) Unfortunately, I don't have student examples of work from this exercise. It is really meant to take the place of a set of lectures on depositional systems and facies models, so I generally do not collect student work.
- 2) My main motivation for moving to this model was a distinct distaste for the high altitude flyover of depositional environments that are in most sed/strat textbooks. I have always felt that this has left my students with a very broad, but very shallow understanding of dep systems. I wanted to give them the tools to link geomorphic systems to depositional systems for themselves and to see the thought processes that go into developing these models.
- 3) My over-arching goal for this course is to teach students how to interpret the sedimentary record in terms of small scale processes and larger scale depositional environments. This is what sedimentologists and stratigraphers actually do, so I feel I should teach my students to do this at an appropriate level. This exercise, I believe, gives them one of these tools.