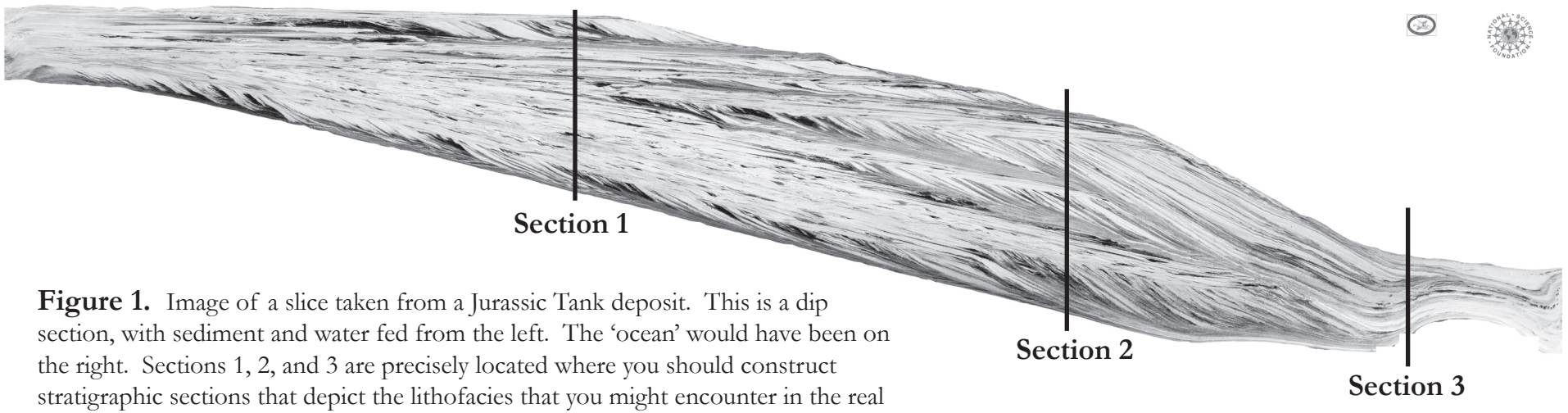

Figure 1. Image of a slice taken from a Jurassic Tank deposit. This is a dip section, with sediment and water fed from the left. The 'ocean' would have been on the right. Sections 1, 2, and 3 are precisely located where you should construct stratigraphic sections that depict the lithofacies that you might encounter in the real world, based on your intepretation of the depositional environments.

Basin-scale stratigraphy and stratigraphic architecture: using Jurassic Tank to understand large-scale stratigraphic controls

Goals

By the end of this project, you should be able to:

• explain how Jurassic Tank works, why it was built, and how it can be used to link the real world (outcrops and subsurface, well data) with sequence stratigraphic models of basin-scale sedimentation.

• interpret a cross section diagram, like figure 1 (which is very similar to a 2D seismic line), in terms of changes in base level, subsidence, or sediment supply.

• link specific, real-world depositional environments to parts of figure 1 and understand how they respond to changes in base level, subsidence, or sediment supply.

• apply sequence stratigraphic concepts and terminology to the cross section diagram (figure 1).

The project

By now you have read the Paola et al. (2001) article, gained an idea of how Jurassic Tank works, played with the desktop delta, and you understand how images like figure 1 are made. For this project, you should consider figure 1 as your outcrop or analogous to a seismic line. You can find a high resolution version of figure 1 online. For this project, you should place all of your interpretations on this image, using Adobe Illustrator or a similar drawing program. Do not use the very high resolution image for your drawing because it is GIANT and will be too big for your poster. No line drawings overlain on a paper copy will be accepted; you must make your interpretations and other illustrations using computer graphics software.

The final product for this project is a poster, created in Adobe Illustrator, with the following dimensions: 36" tall by 60" wide. We may print these posters out at full scale. You should save them as Adobe Acrobat .pdf files and make a small (11" X 17") print out to hand in along with the digital .pdf document. Poster specifications will be outlined below. The poster will be an integrated interpretation of the cross section above.

Parts of the poster (you may not want to do them in this precise order):

Interpreting depositional environments

What real-world depositional environments might JT effectively emulate? In other words, JT can be viewed as an analog for several different, real-world environments (laterally linked and vertically stacked via Walther's Law). On a digital version of figure 1, label these different environments by outlining their deposits in different colors, giving them transparent overlays, and provide images of these environments (you can download images from the web or scan them in using the scanner in the back of the room) so that the viewer has an idea of what these analogous environments look like in the real world.

Stratigraphic sections

On figure 1 you will see the location of three sections (sections 1 through 3). What would measured sections look like at these locations and what would a correlation diagram look like? Your measured sections should embody the real-world depositional environments you outlined above. What this means is that your stratigraphic sections shouldn't just be coal and sand, but should take into account the actual features you might expect to find in the depositional environments that they cross. You should also show coarsening and fining upward trends and how this would be reflected in the details of the stratigraphic section(s). The correlation diagram should show how different lithologic units are correlated laterally, based on what you know about the cross section. THIS MEANS THAT YOU WILL HAVE TO COMPLETE PART OF THE NEXT STEP IN ORDER DO COMPLETE THIS CORRELATION. You should put in both lines of lithostratigraphic correlation and chronostraitgraphic correlations (i.e. timelines); these should be in different colors.

Interpreting the overall architecture of figure 1

As you know, one of the great advantages of Jurassic Tank is that we can precisely control the main parameters that affect the geometry (architecture) of a stratigraphic section or sedimentary basin fill. In a well-designed experiment, we would only change one parameter and see how this one parameter affects the stratigraphic architecture. This is what was done to produce the stratigraphy you see in figure 1. One parameter was changed and all else remained constant. The final part of your poster should be an interpretation of figure 1 that answers the following question: "what parameter was changed to create the stratigraphy of figure 1 and how was that parameter changed through time?" This interpretation should follow a sequence stratigraphic framework (ch. 15 in Boggs), looking for sequence boundaries, maximum flooding surfaces, etc. These important stratigraphic markers should be placed on the diagram on your poster. You should incorporate a short write-up that explains your interpretation. Although in reality only one thing was changed, there is more than one right answer and interpretation here; you just need to support your interpretation effectively.

Some hints:

1. Some students have found it easier to start with the sequence stratigraphic interpretation (part 3 above) before completing the first two parts, but this really depends on you.
2. Some students found it helpful to work on all three components at once, building up an overall interpretation from the bottom up.
3. Do not put this project off until the last minute. Creating a quality poster will take time and revision.

Poster format

- 32" tall by 50" wide (template available from course web site)
- Font: 36 point minimum
- The poster should have a descriptive title (72 pt) and your name
- All figures should be readable from a distance of 5 feet (view at 100% zoom and see if you can read the screen from 5 feet away)
- The final poster should be saved as a .pdf file and uploaded to your e-portfolio by the last official day of class (December 11) at the end of lab time.