

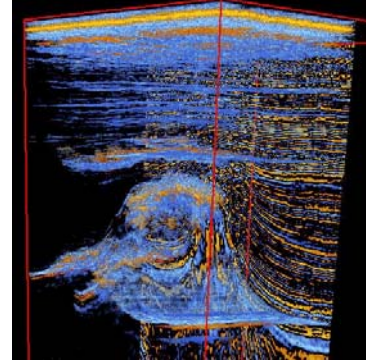
Seismic Reflection Interpretation

Geology 556/764 – Fall 2011

This course is for graduate students and upper level undergraduate students in geophysics, geology, and marine sciences interested in exploration seismic interpretation. (3 Credit Hours)

Instructor: Jim Kellogg (7-4501) E-mail: kellogg@sc.edu

Goals and Content of Course: Students will learn seismic interpretation skills through hands-on mapping of 2-D seismic data. Exercises will involve recognition of pitfalls in seismic interpretation, and the correlation of synthetic seismograms and well log data with seismic sections. Laboratory exercises will include application of the “kink method” of interpretation to extensional and compressional structures and the interpretation of the evolution of salt structures. Several classes will introduce seismic sequence stratigraphy: the first steps that need to be taken to make a seismic stratigraphy interpretation and the definition and illustration of genetic reflection packages that envelope seismic sequences and systems tracts. The course will introduce the use of seismic attributes for reservoir characterization and the interpretation of 3-D seismic data. For the final project, students will generate and integrate fault and horizon maps, methods important for the location of exploration and development prospects and wells.



Learning Outcomes:

1. Knowledge of common mistakes in velocity, geometric, and processing interpretations
2. The basics to tie well log data to seismic sections and correlate synthetics with seismic data to establish geologic horizons.
3. Recognize and interpret compressional (fault-bend folds and fault propagation folds) and extensional structures (roll over anticlines).
4. Interpret seismic data for salt structures.
5. Learn the basic principals of seismic sequence stratigraphy.
6. Generate time and depth structure maps from seismic data

Lab Exercises: Exercises will be prepared in the lab and will be discussed and handed in during the next class. Most exercises will use 2-D paper seismic profiles, but they may also require *Kingdom Suite* for 3D seismic interpretation and *Geosec 2.5D* for volume-balanced structural interpretations.

Grades: Lab Exercises 50%, Two Projects 50%. Graduate students will be required to write an additional research paper.

Readings: Current papers on the subjects dealt with in class and assignments will be made available to the students.

Blackboard: All assignments and lectures will be posted on Blackboard.

Recommended Textbooks: Practical Seismic Interpretation by Michael E. Badley, published by IHRDC, Boston, 1985, out of print, AAPG Mem 26 Seismic Stratigraphy, and Structural Styles in Petroleum Exploration by James D. Lowell.

Course Schedule: There will be 3 hours of lecture and supervised laboratory per week scheduled at the first organizational meeting. Geology 556 and Geology 764 meet concurrently.

CLASS SCHEDULE

1. **Introduction. Seismic Acquisition and Processing.** Exercise: Well synthetic wiggle trace tied to seismic to establish regional stratigraphy of Williston Basin.
2. **Seismic Interpretation Pitfalls.** Exercise: Parry Islands Fold Belt
3. **Seismic Sequence Stratigraphy.** Exercise: Offshore South Africa
4. **Seismic Sequence Analysis.** Exercise: National Petroleum Reserve of Alaska
5. **Kink Method. Compressional Structures.** Exercise: Ucayali Basin Peru.
6. **Extensional Structures.** Exercise: Brazos Ridge Field.
7. **Salt Tectonics.** Exercise: Southern North Sea.
8. **3D Seismic Data Acquisition and Interpretation.** Exercise: Brown, Turbidite Sand.
9. **Seismic Attributes for Reservoir Characterization.** Exercise: Tiger Shoal Louisiana.
10. **Final Exercise: Cooper-Eromanga Basin, Australia.**

