ADVANCED STRUCTURAL GEOLOGY

VOLUME-BALANCED CROSS SECTION CONSTRUCTION

Geology 819 Seminar in Tectonophysics

Fall 2013 (2 credit hours)

Instructor: James Kellogg (7-4501), kellogg@sc.edu

Course Schedule: There will be 2 hours of lecture and supervised laboratory per week arranged to fit student schedules. Part of course may be taught as a two day weekend workshop.

Course Objectives:

This Advanced Structural Geology course is useful for exploration geologists and geophysicists. The conservation of rock volume can be an important constraint in evaluating the feasibility of a geological interpretation. Volume-balanced cross sections are especially useful in structurally complex areas. Learn to evaluate common mistakes in structural interpretations. Construct balanced cross sections in a “hands on” workshop emphasizing the kink-bend model, fault-bend folding, and fault-propagation folding. Exercises will involve the use of Midland Valley Move computer software for forward modeling.

Learning Outcomes:

1. learn to evaluate the feasibility of geologic models.
2. Learn how to construct models of fault-bend
3. construct “volume-balanced” cross sections.
4. apply kink method to seismic interpretation.
5. Exercises may involve the use of Move geologic modeling software.
**Grades:** Based on class participation and laboratory exercises.

**Readings:** Students will read selected journal articles.

**Schedule of Course Topics:**

1. **Introduction and Geometric Methods**
   a. Introduction
   b. Evaluation of balanced cross sections
      i. Kink-bend method
      ii. Fault-bend folds
   c. Evaluation of balanced cross sections
      i. Fault propagation folds
      ii. Imbricate duplex structures

2. **Balanced Cross Sections**
   a. Construction of balanced cross section
   b. Evaluation of balanced cross sections
      i. Construction of retrodeformed section

3. **Seismic Interpretation**
   a. Seismic interpretation with kink method
   b. Interpretation of gravity data