

EPSC350 - Winter 2014 - Test 2

Test 2 is worth 15% of your course grade. You have the option of completing this essay for 15%, OR writing the class test for 15%, OR doing both, in which case each will be weighted 7.5% for a total of 15%. Choose the option that best suits your abilities and time management habits to maximize your chances for success. You may not choose after the fact - whatever you submit on **April 10 by noon** will be graded. No late papers will be accepted. **NO LATE PAPERS WILL BE ACCEPTED.**

INSTRUCTIONS:

Accretionary complexes provide the geologic record of subduction - including the initiation of subduction zones, compressional and extensional deformation of the upper plate, the accretion of exotic terranes, and collision of continents. As such, the record of many events may be juxtaposed in the same rocks, complicating our understanding of past tectonics. Each of the Mesozoic-Cenozoic accretionary complexes listed below contains several belts of different ages, deformation states, and metamorphic grade. Each of the active subduction zones is currently forming and deforming rocks which might someday be preserved as an accretionary complex.

For this essay, pick one ancient accretionary complex and one modern subduction zone from the lists below. Research the metamorphic grade, thermal structure, rates and styles of deformation in both the modern and ancient subduction zones. You can use any and all resources at your disposal - books, journals, internet, people, each other - anything goes. You may include everything from the outer rise to the back arc, or may focus on a particular region within that range. In 1500-2500 words, including reference list, address all of the following questions (no limit on figures):

A. How does the thermal structure and active deformation in the subduction zone compare to the past dynamics of the accretionary complex?

B. Are there parts of the ancient belt which preserve similar conditions to the modern subduction zone? How is this recorded in the rock record? Conversely, what conditions recorded in the rocks of the ancient accretionary complex are not represented in the modern subduction zone?

C. Given the factors that control the temperature structure and distribution of deformation in modern subduction margins (covered in class and in the textbook), describe as much as you can about the ancient subduction zone which formed the accretionary complex and how it changed through time.

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| 1. Shimanto Belt (Japan) | A. Aleutians |
| 2. Franciscan Complex (California) | B. Costa Rica |
| 3. Kodiak - Chugach Complex (Alaska) | C. Cascadia |
| 4. the Apennines (Italy) | D. Kamchatka |

Marking criteria:

25% Balance between breadth and depth of geodynamic topics

25% Clear understanding of relationships between geodynamic topics and cause-effects

25% Scientific writing/presentation

25% Choice and use of reference materials, level of rigor