Writing Analysis Activity, Answers and Discussion

There is ambiguity in which category a sentence should be placed. The closest categories have been marked for each sentence. We suggest that you do this activity as an in-class group activity and hold a discussion of students' classifications afterward. This provides good discussion material, as this argument category scheme provides guidelines and broad categories only.

There are more comments at the end of this document.

Paper 1:

Introduction
The area of study is the Kurile trench, identified as a small area on the class CDROM (Fig. 1). This area corresponds to a plate boundary thought to exist by geologists between the Pacific plate and the Indo-Australian plate (Segar, p.62). The data collected supports the theory of plate tectonics at a convergent plate boundary.

Methods
The data includes topographical profiles created through the ETOP05 elevation dataset which consists of digital elevation data of sea floor and land. The sources for this data come from: Ocean Areas—US Naval Oceanographic Office; USA, W. Europe, Japan, Korea, US Defense Mapping Agency; Australia: Bureau of Mineral Resources; New Zealand: Department of Industrial and Scientific Research; US Navy Fleet Numerical Oceanographic Center. Gridded data varies in resolution from 5 minutes latitude/longitude to 1 degree. Earthquakes are from USGS preliminary determination of epicenters and volcano data are from the Smithsonian Institution Volcano database.

Observations
(O-1) (category #:_2_)Three profiles taken along the coastal region of the Kamchatka Peninsula display the topographic features of an oceanic trench (see Fig. 2 for profile locations). (O-2)(category #:_3,4_) Thousands of volcanoes exist parallel to the trench and 200-400 km inland (Fig. 2). (O-3)(category #:_3,4_) The trench lies at 60 degrees N latitude and 160 degrees E longitude and extends for 2,200 km in length along this coast. (O-4)(category #:_1,2_) One profile displays the gentle upward slope of the Pacific Ocean Basin which then becomes drastically altered by the sudden drop-off of the trench (Fig. 3). (O-5)(category #:_1_) Following the trench, a virtual linear rise occurs as the profile moves northwest and inland. (O-6)(category #:_2_) A second profile confirmed the presence of the trench 500 km to the south of the first profile, but showed a 400 km long basin located behind the vertical rise of the volcanoes. (O-7)(category #:_3_) The basin dips 3,000 m below sea level (Fig. 4).

(O-8)(category #:_2_) A third profile shows both the existence of the trench another 250 km to the south and the land features described by the first two profiles (Fig. 5).

(O-9)(category #:_1_) Earthquakes' foci were also plotted along the same path as the middle topographic profile of the Kamchatka coast. (O-10)(category #:_4_) The plot shows earthquakes occur consistently along this trench (Fig. 6). (O-11)(category #:_1_) A cross section of earthquake activity along the middle profile shows a descending pattern of earthquakes to depths of 600 km (Fig. 7).

Interpretations

(I-1)(category #:_6_) Areas such as the Kurile Trench along the Kamchatka coast show the characteristic patterns of a continental convergent margin between two plates. (I-2)(category #:_5_) In this scenario, a plate containing oceanic crust collides with a plate made of continental crust. (I-3)(category #:_5_) One of the plates descends beneath another, into the Earth's asthenosphere (Figure 8). (I-4)(category #:_5_) A topographic trench is formed where one of the plates begins its descent. (I-5)(category #:_5_) This process is called subduction. (I-6)(category #:_5_) The sinking plate causes a corresponding pattern of deep earthquakes along its boundary. (I-7)(category #:_5_) Melting magma along the upper edge of the plate rises to the surface, creating volcanoes. (I-8)(category #:_6_) Figure 9 shows a cross-section diagram across the middle profile, showing the subduction model and observations of topography, quakes, and volcanoes that occur in agreement with the model.

Paper 2

Introduction
I will discuss the motions of the plates and their effecting result on the sea floor and the Earth. At the center of my discussion will be the Mid-Atlantic Ridge and why it has formed into an S shape. It is an underwater mountain range, also known as an oceanic divergent margin.

Observations
(O-1)(category #:_?_) The Mid-Atlantic Ridge is a very interesting part of our Earth. (O-2)(category #:_5_) It is an underwater mountain range, also known as an oceanic divergent margin. (O-3(category #:_2_)) This ridge runs north to south down the center of the Atlantic from the North Pole to Antarctica.
(O-4)(category #:_5_) Many different plates meet at the ridge including the North American, the Eurasian, the South American, and the African Plate. (O-5)(category #:_3_) The ridge extends at one point as deep as 5,625 m below sea level. (O-6)(category #:_3_) It stretches east to west from Europe and Africa to the east coast of the Americas, 2,547 km. (O-7)(category #:_1_) This is evident in Fig. 1.

(O-8)(category #:_5_) An oceanic divergent margin means that the plates, which form the Earth, meet and disperse in opposite directions. (O-9)(category #:_5_) The resultant gap from these diverging plates is filled up with uprooted, low density magma. (O-10)(category #:_5_) This process leads to the series of volcanoes which form into a ridge in the gap left by the plates. (O-11)(category #:_5_) This process is known as sea floor spreading. (O-12)(category #:_1?,5?_) This is also illustrated in Fig. 1. (O-13)(category #:_5_) The aging crust then sinks steadily down, while the mountains in the ridge slowly move outward while new ones fill in their place.(O-14)(category #:_5_) The mountains move in the direction of the plate. (O-15)(category #:_6_)This part of the process, combined with narrowness of the Atlantic and the shape of the continents, leads to the S shape formed by the ridge.

Interpretations
(I-1)(category #:_6_) My study shows the Mid-Atlantic Ridge is an oceanic divergent margin that is formed in an S shape due to many different factors including ocean size, plate motion, volcanic activity, and sea floor spreading. (I-2)(category #:_6_) This is proven by the data gathered from the map program and is reinforced by the area's topography, which includes volcanoes and earthquakes.

Paper 1 is the better paper of the two. It has a clear separation between Observations and Interpretations. No category 5 or 6 sentences are found in the Observations section, indicating that the student knows that discussions of Plate Tectonics do not belong there. The student also makes an effort of quantifying the observations, giving length, height and width of the geologic and geographic features.

In the Interpretations section of Paper 1 the student refers to the quantitative observations made and explains them in light of the Plate Tectonics theory.

Paper 2 has no Methods section. The Interpretations section is much shorter than the Observations section—not a good sign for a balanced science paper.

The student who wrote this second paper does not know the difference between interpretations and observations. There are many sentences of categories 5 and 6 in the Observations section which do not belong here but rather in the Interpretations section. As a result, there is no substantial information in the Interpretations section—it reads like a conclusion of the paper.

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