Name: _____ Date: _____ Period: _____

CO_2 flux from soil in pastures and forests in the Amazon Wk #: _____

Read, annotate, and complete each section.

Carbon cycling in the tropics, especially in South America's Amazon basin, has received considerable research attention since the recognition that deforestation for cattle ranching and other agricultural uses is an important source of greenhouse gases to the atmosphere. Carbon stocks in Amazon rainforest biomass and in soils are well studied. On the other hand, carbon fluxes from soil to the atmosphere are still poorly understood, in terms of seasonal variation and of amounts of carbon respired in different land covers. In search of a better understanding of patterns in CO_2 fluxes from soils, an experiment was conducted to answer the following question: What is the seasonal pattern in CO_2 flux from soil to atmosphere and how does that seasonality relate to patterns of precipitation and temperature?

1. (RST.9-10.4.) Explain the meaning of these words using context clues and prefixes/suffixes.

   deforestation: _____

   stocks: _____

   fluxes: _____

   respired: _____

2. (RST.9-10.2) What is the purpose of scientists conducting this experiment in the Amazon basin?

   _____

   _____

Figure 1 illustrates carbon dioxide flux from soil as a function of water filled pore space (%). Wet and dry season data were sampled. Use Figure 1 to answer questions 3-5.

3. (IOD 401) Which of the following is true of the data point labeled X?
   a. X has less carbon dioxide flux than any data point from the dry season.
   b. X has more carbon dioxide flux than any data point from the wet season.
   c. X has less carbon dioxide flux than any data point from the wet season.
   d. X has more carbon dioxide flux than any data point from the dry season.

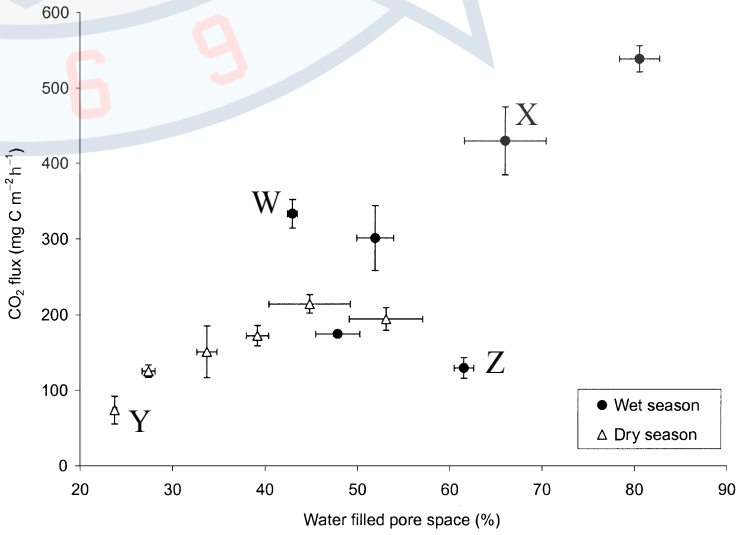

Figure 1

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4. (IOD 401) Which of the following places the data points in order from the most amount of carbon dioxide flux to the least amount of carbon dioxide flux?
   a. Y, Z, W, X
   b. Z, X, W, Y
   c. X, W, Z, Y
   d. Y, W, X, Z

5. (EMI 401) Which of the following conclusions is supported by the data in Figure 1?
   a. Fluxes were equal during the wet season and dry season.
   b. Fluxes were greatest during the dry seasons and declined during the dry season.
   c. Fluxes were greatest during the wet season and declined during the dry season.
   d. There is no relationship between fluxes during the wet and dry season.

Figure 2 illustrates carbon dioxide flux in different types of land cover as a function of soil temperature. Use Figure 2 to answer questions 6-7.

6. (IOD 401) What is the highest temperature recorded for soil in a secondary forest?
   a. 34°C
   b. 33°C
   c. 35°C
   d. 32°C

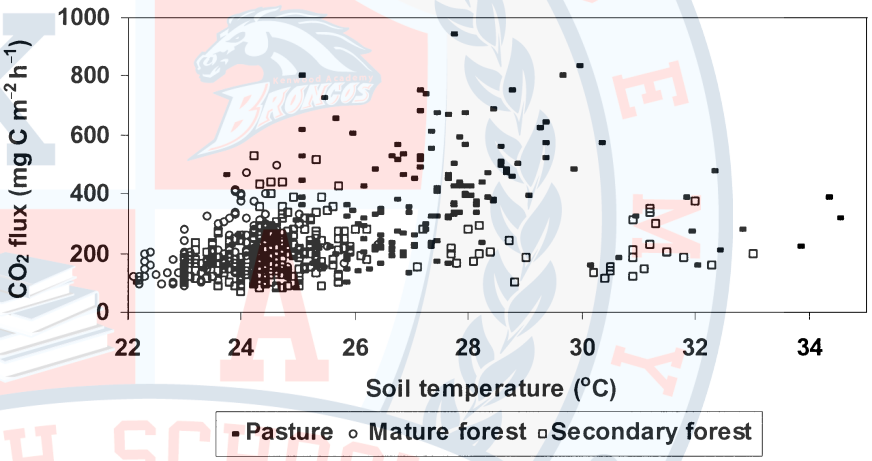

Figure 2

7. (EMI 401) Which of the followings conclusions is supported by the data in Figure 2?
   a. Fluxes are higher in secondary forests compared to mature forests.
   b. Fluxes are higher in pastures when compared to mature and secondary forests.
   c. Fluxes are equal between all three types of land cover.
   d. There is not relationship between fluxes during the wet and dry season.

8. (EMI 501) Which of the following statements is supported by Figure 1 and Figure 2?
   a. Carbon dioxide flux is more significantly correlated with temperature than soil water-filled pore space.
   b. Carbon dioxide flux is significantly correlated to both soil water-filled pore space and temperature.
   c. Carbon dioxide flux is more significantly correlated with soil water-filled pore than temperature.
   d. There is no correlation between carbon dioxide flux, soil water-filled pore space, or temperature.

Adapted from:
Salimon, Davidson, & Melo. (2004). CO2 flux from soil in pastures and forests in southwestern Amazonia. Global Change Biology, 10(5), 833-843. doi:10.1111/j.1529-8817.2003.00776.x