

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

CO<sub>2</sub> 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. The amount of carbon in Amazon rainforest is well studied. On the other hand, carbon fluxes from soil to the atmosphere are still poorly understood. In particular, there is a need to understand seasonal variation and amounts of carbon respired in different land covers.

In search of a better understanding of patterns in CO<sub>2</sub> fluxes, an experiment was conducted to answer the following question: What is the seasonal pattern in CO<sub>2</sub> 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: \_\_\_\_\_

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 (%). Each data point represents data collected from the wet season. Use Figure 1 to answer questions 3-5.

3. (IOD 301) Which of the following data points represents 75% water filled pore space and 350 units of CO<sub>2</sub> flux?

a. W                      c. Y  
b. X                      d. Z

4. (IOD 301) Which of the following is true of the data point labeled X?

a. X has less carbon dioxide flux than U.  
b. X has more carbon dioxide flux than V.  
c. X has less carbon dioxide flux than W.  
d. X has more carbon dioxide flux than Y.

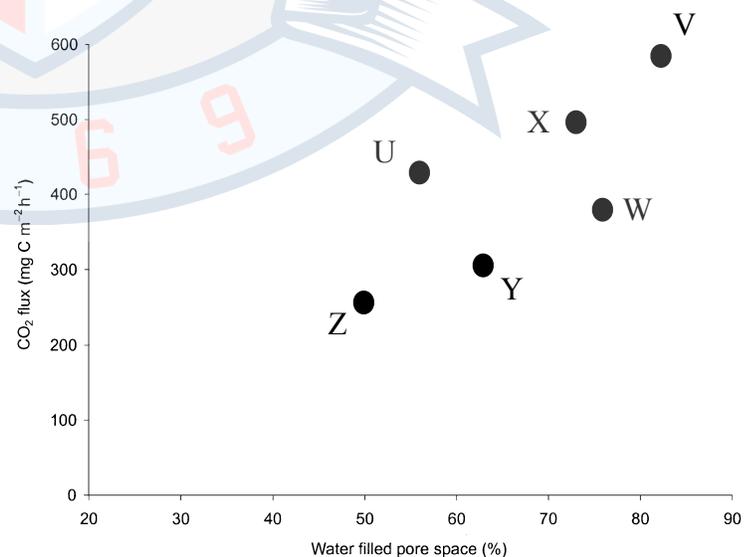


Figure 1

5. (IOD 301) Which of the following places the data points in order from the lowest percent of water filled pore space to the highest percent of water filled pore space?

- a. U, Z, Y, V, X, W
- b. Z, U, Y, X, W, V
- c. V, X, U, W, Y, Z
- d. Z, Y, W, U, X, V

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.

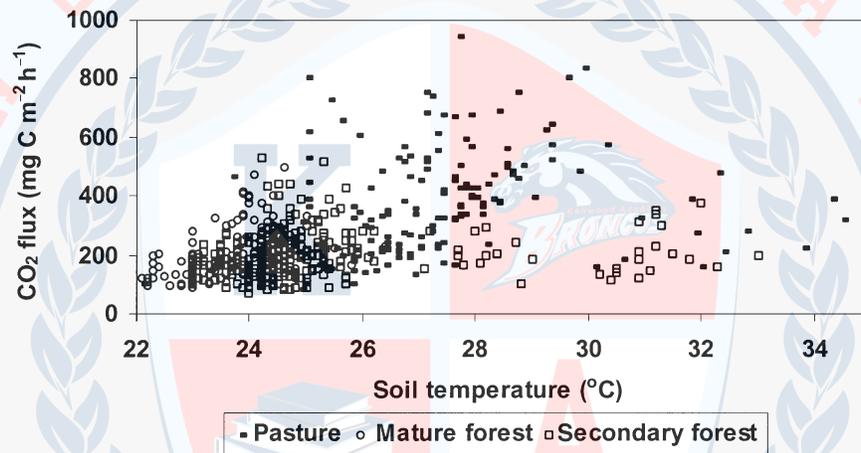


Figure 2

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

7. (IOD 401) Which of the following statements best describes the data points.

- a. The highest density of data points is between 30-34°C.
- b. The highest density of data points is between 600-800 units.
- c. The highest density of data points is between 22-26°C.
- d. The highest density of data points is between 400-600 units.

8. (EMI 401) Which of the followings conclusions is supported by the data in Figure 2?

- a. Fluxes are higher in secondary forests compared 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.

Adapted from:

Salimon, Davidson, & Melo. (2004). CO<sub>2</sub> 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