Carbon Dioxide Fluxes in the Amazon Rainforest

Read, annotate, and complete each section.

Carbon cycling in rain forests, especially in South America's Amazon, has received considerable research attention since the recognition that deforestation for farming is an important source of greenhouse gases to the atmosphere. The amount of carbon in Amazon rainforest is well studied. However, carbon fluxes, or changes, from soil to the atmosphere are poorly understood. In particular, there is a need to understand seasonal variation and of amounts of carbon respired in different types of land. Scientist conducted an experiment to answer the following question: What is the seasonal pattern in CO_2 flux from soil to atmosphere and how does that 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: _____

variation: _____

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

_____

_____

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 3-7.

3. (IOD 202) How many data points are on this graph?
    a. 6   c. 8
    b. 7   d. 15

4. (IOD 201) Which data point has the least amount of water filled pore space?
    a. V   c. W
    b. U   d. Z

5. (IOD 301) Which of the following data points represents 75% water filled pore space and 350 units of CO_2 flux?
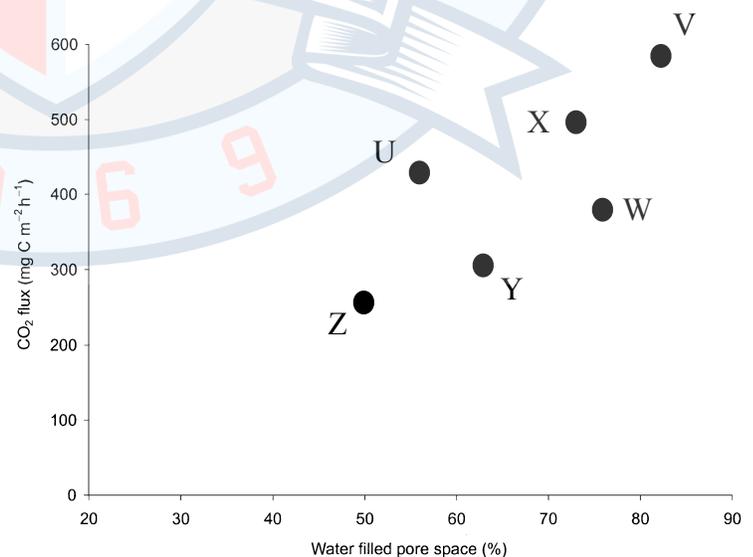   a. W   c. Y
    b. X   d. Z

Figure 1

6. (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.

7. (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
   b. Z, U, Y
   c. V, X, U
   d. Z, Y, U

Figure 2 illustrates carbon dioxide flux in different types of land cover as a function of soil temperature. Use Figure 2 to answer question 8.
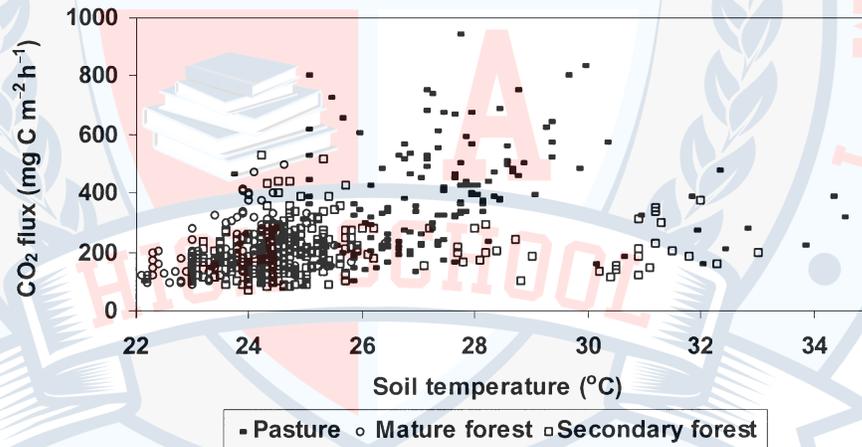

Figure 2

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). 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