

$$Q^* = [(S + D) - ((S + D) \times a)] + (L\downarrow - L\uparrow)$$

Time 1

$$S = 218 \text{ W/m}^2$$

$$D = 61 \text{ W/m}^2$$

$$a = 0.20$$

$$L\downarrow = 379 \text{ W/m}^2$$

$$L\uparrow = 408 \text{ W/m}^2$$

Time 2

$$S = 0 \text{ W/m}^2$$

$$D = 0 \text{ W/m}^2$$

$$a = 0.80$$

$$L\downarrow = 121 \text{ W/m}^2$$

$$L\uparrow = 97 \text{ W/m}^2$$

Time 3

$$S = 107 \text{ W/m}^2$$

$$D = 63 \text{ W/m}^2$$

$$a = 0.10$$

$$L\downarrow = 243 \text{ W/m}^2$$

$$L\uparrow = 291 \text{ W/m}^2$$

1. What is the net radiation for:
 - a. Time 1?
 - b. Time 2?
 - c. Time 3?
2. Which Time has the greatest amount of energy available to do work? What is (are) the source(s) of this energy? Can we tell from the information above how this energy is utilized? Why or why not?
3. What is the *total* incoming shortwave radiation for:
 - a. Time 1?
 - b. Time 2?
 - c. Time 3?
4. What is the *net* shortwave radiation for:
 - a. Time 1?
 - b. Time 2?
 - c. Time 3?
5. What is the net longwave radiation for:
 - a. Time 1?
 - b. Time 2?
 - c. Time 3?
6. What *percentage* of the total incoming shortwave radiation is *diffuse* for:
 - a. Time 1?
 - b. Time 2?
 - c. Time 3?
7. Which Time has the greatest percentage of diffuse radiation? What causes diffuse radiation? What is another name for diffuse radiation?
8. Which Time has the warmest air temperature? How do you know this?
9. Which Time has the warmest earth surface temperature? How do you know this?
10. What is the source of $L\uparrow$?
11. What types of surfaces could the albedos listed above represent?
12. Which Time most likely represents winter (December) conditions for some place located north of 66.5° N ? How did you decide this?
13. Which Time most likely represents summer conditions? What information did you use to decide this?

$$Q^* = H + G + LE$$

Location 1

$$H = 16 \text{ W/m}^2$$

$$LE = 75 \text{ W/m}^2$$

Location 2

$$H = 15 \text{ W/m}^2$$

$$LE = 24 \text{ W/m}^2$$

Location 3

$$H = 50 \text{ W/m}^2$$

$$LE = 15 \text{ W/m}^2$$

14. Describe the general temperature and moisture conditions at each location (hot/cold; wet/dry).

15. Which location most likely has the highest air temperature? How did you determine that?

16. Which location has the most water available for evaporation? How did you determine that?