

- I. READING: Marchand *Preface*; Molles, pages 14-18; 83-86
- II. PRINCIPLE: Organisms are continually exchanging energy and matter with the ENVIRONMENT
- A. Recap of Assignment 02 – Review your notes and the “interview articles” and complete the following related to the concepts of *organism* and *environment*:
1. Refine and express your definition of *environment* (use blank side of previous notes page)
  2. Under #1. list as many “environmental factors” as you can.
  3. In what ways do organisms utilize these factors for life processes?
- B. Extended list of environmental factors – See p. 1-2 of *HANDOUT* provided when you arrive.
- III. SOLAR RADIATION IS MAJOR PART OF THE "ENVIRONMENT"
- A. SOURCE of SOLAR RADIATION IS \_\_\_\_\_
- H  $\longrightarrow$  He
- B. PATHS OF SOLAR FLUX
1. SOLAR CONSTANT -- FIG 1a of Lecture Slides
  2. PATHS THROUGH ATMOSPHERE – influences quantity and quality (p.3.2) via
    - a. Reflection (clouds)
    - b. Diffuse Scattering
    - c. Absorption (*e.g.* CO<sub>2</sub>, , H<sub>2</sub>O, O<sub>3</sub>)
  3. NET RADIATION (Q) = radiation actually absorbed
 

> DESTINATIONS for energy that has been absorbed:

    - a. Conduction (to air or soil) (C) – direct transfer of heat from particle to particle
    - b. Convection (L) – transfer of heat by circulation of fluids, gaseous or liquid
    - c. Vaporization (V) – transfer of heat through change of state from liquid to gas
    - d. Radiation (thermal) (IR) – transfer of energy by propagation of infrared rays
- C. WHAT PHYSICAL FACTORS OF THE EARTH INFLUENCE "Q" AT A GIVEN POINT ON THE EARTH? [This Outline will be expanded in lecture.]
- 1.
  - 2.
  - 3.
  - 4.

## SOLAR RADIATION

### ATMOSPHERIC EFFECTS

1. REFLECTING - by \_\_\_\_\_
2. FILTERING - e.g. \_\_\_\_\_
3. BLANKETING - e.g. \_\_\_\_\_
4. TRANSPORTING - BY AIR MOVEMENTS:
  - a. VERTICAL - \_\_\_\_\_
  - b. LONGITUDINAL - \_\_\_\_\_
  - c. CIRCULATION - \_\_\_\_\_

### RESULTING IN TRANSPORT OF:

1. MOISTURE, FROM - SALT WATER TO \_\_\_\_\_  
 ...AND EQUATORIAL TO \_\_\_\_\_
2. HEAT ENERGY TO HIGHER LATITUDES VIA:
  - a. WARM AIR (D.2.)
  - b. WATER VAPOR [VAPORIZATION --> CONDENSATION + \_\_\_\_\_
  - c. LIQUID WATER - OCEAN CURRENTS

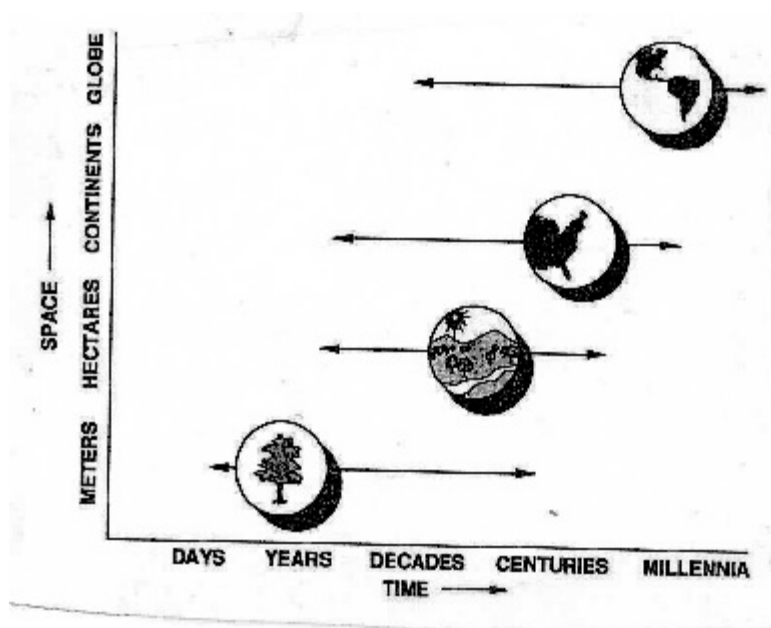
### LOCAL ATMOSPHERIC EFFECTS

1. LOCAL WINDS      -- CITY <-> COUNTRYSIDE  
                               -- COASTAL LAND <-> SEA BREEZES
2. INVERSIONS -- COOL AIR TRAPPED UNDER WARM -- TWO TYPES:
  - a. RADIATION - IN VALLEYS
  - b. SUBSIDENCE - HIGH PRESSURE STAGNATION

## MICROCLIMATE

DEFINITION: CLIMATE ON A LOCAL *SCALE* WHICH DIFFERS FROM THE GENERAL CLIMATE OF THE REGION

SCALE: PART OF A HIERARCHY OF DIMENSIONS OF *SPACE* AND *TIME*



From: Graham, *et al.* 1990 *Bioscience* 40(8): 575-587.

MICROCLIMATE FACTORS:

1. HEIGHT ABOVE GROUND
2. LARGE OBSTRUCTIONS -- trees, buildings, etc.
3. TOPOGRAPHY -- North- and South-facing Slopes