

- I. READING: Marchand *Preface*; Smith, Chapter 2, pp. 20-23, skim pp.25-31; Read p. 31-40.
- 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 general 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.* CO₂, , H₂O, O₃)
 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

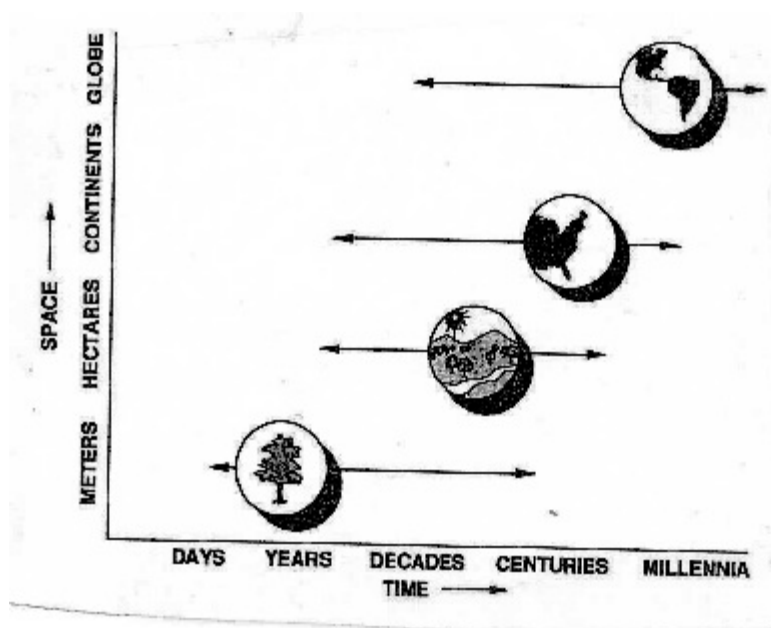
LOCAL ATMOSPHERIC EFFECTS

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