

Environmental Engineering

1st Course

2nd Year

Water Resources Engineering Department
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by

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Environment

The natural environment encompasses all living and non-living things occurring naturally, meaning in this case not artificial. The term is most often applied to the Earth or some parts of Earth. This environment encompasses the interaction of all living species, climate, weather and natural resources that affect human survival and economic activity.

Environment consist of:

- **BIOTIC FACTORS** = living components in an environment
- **ABIOTIC FACTORS** = non-living components in an environment
- **Biotic factors** and **Abiotic factors** that surround us and with which we interact.
- These biotic and abiotic components are in **dynamic state**; they constantly affect each other and cannot be isolated from each other.

Biotic Factors

All living organisms

Plants

Animals

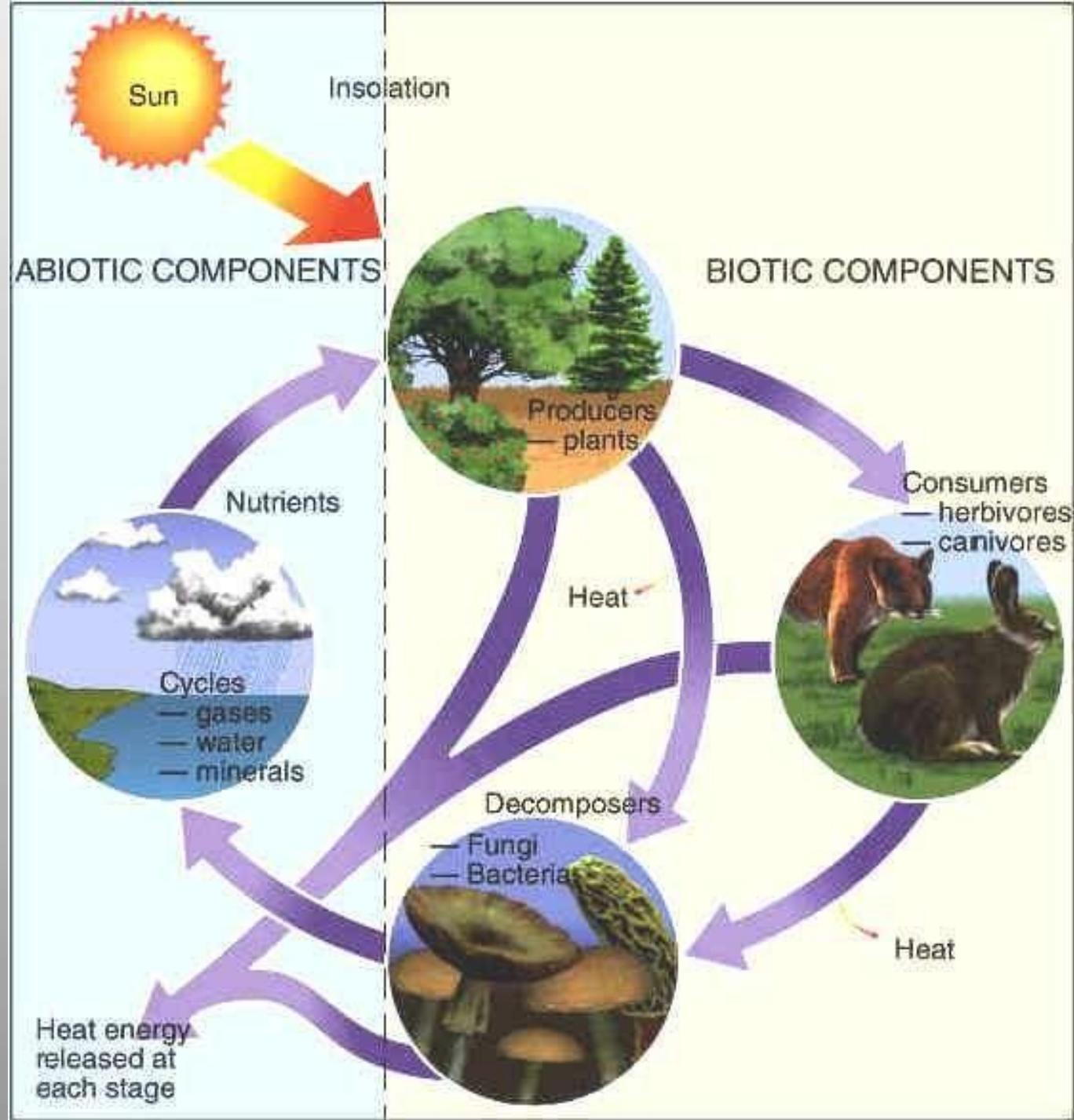
Microorganisms

Abiotic Factors

Water, soil, minerals, gases

Temperature, humidity, wind

Light, nutrients (C, O, P, N, etc.)



Environment Spheres

It is the entirety of earth minus the set of human activities. It includes various interacting systems called "spheres". The spheres are:

1. Atmosphere
2. Hydrosphere
3. Lithosphere
4. Biosphere
5. Cryosphere
6. Anthroposphere

1. Atmosphere

It is the mixture of various gases, water vapor and subatomic particles that entirely covers the earth extending outward several thousand kilometers.

Composition of the Atmosphere

Gas	Mole Fraction
N ₂	0.7808
O ₂	0.2095
Ar	0.00934
CO ₂	0.00033
Ne	1.8×10^{-5}
He	5.2×10^{-6}
Kr	1.1×10^{-6}
Xe	8.7×10^{-8}
Pollutants	(O ₃ , SO ₂ , NO ₂ , CH ₄ , CO)

Chemical
Oceanography

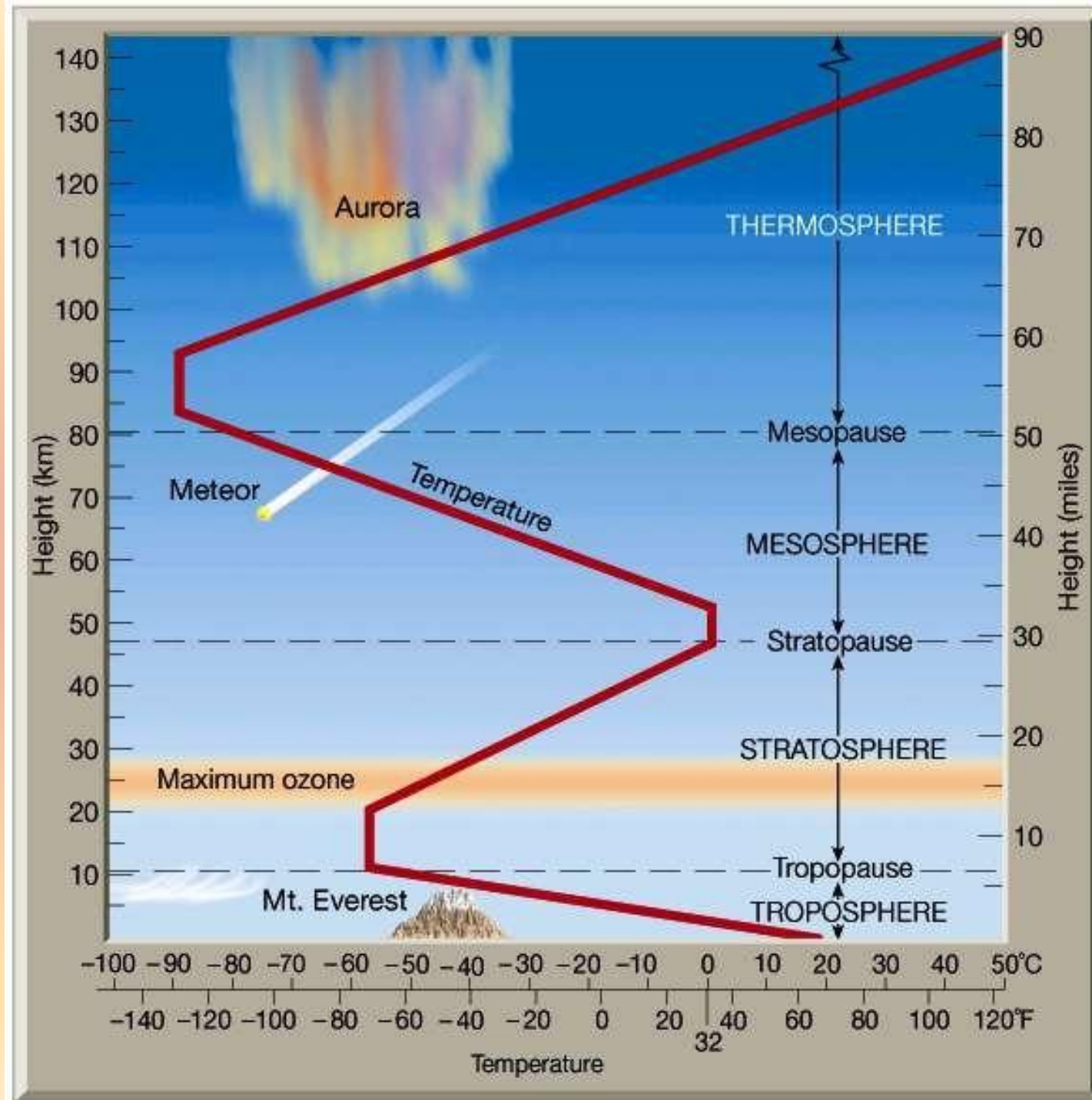
Structure of atmosphere

Troposphere

Mesosphere

Thermosphere

Exosphere



2.Hydrosphere

About 70% of earth is covered by water. Water is available in seas, oceans, lakes, river, glaciers etc.

97% is in the oceans and seas, 2% in glaciers & ice caps, 1% is fresh water available for human consumption.

3. Lithosphere:

- Outer **soil crust** of the earth is lithosphere
- Living organisms, plant vegetation are supported by the lithosphere.
- It contains **resources** like minerals, organic and inorganic matter, some extent air and water.
- Role of lithosphere:
 - Produces food for human beings and animals.
 - Soil is the site of decomposition of organic wastes.

4. Biosphere:

- Thin outer crust of the earth which includes all the living organisms and their environment.
- It extends from the lowest sea bed level to about 24 km of the atmosphere.
- Life supporting resources are available from the biosphere.
- It is that part of earth where living (biotic) organism exist and interact with each other and also with non-living (abiotic) components.