SPHERES OF EARTH

HYDROSPHERE

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OVERVIEW OF LECTURE

- What is Hydrosphere?
- Relationship among different spheres
- Structure of Hydrosphere
- Hydrological cycle
- Importance of Hydrological Cycle
- Processes of Hydrologic Cycle
- Impacts of human activities on Hydrological Cycle

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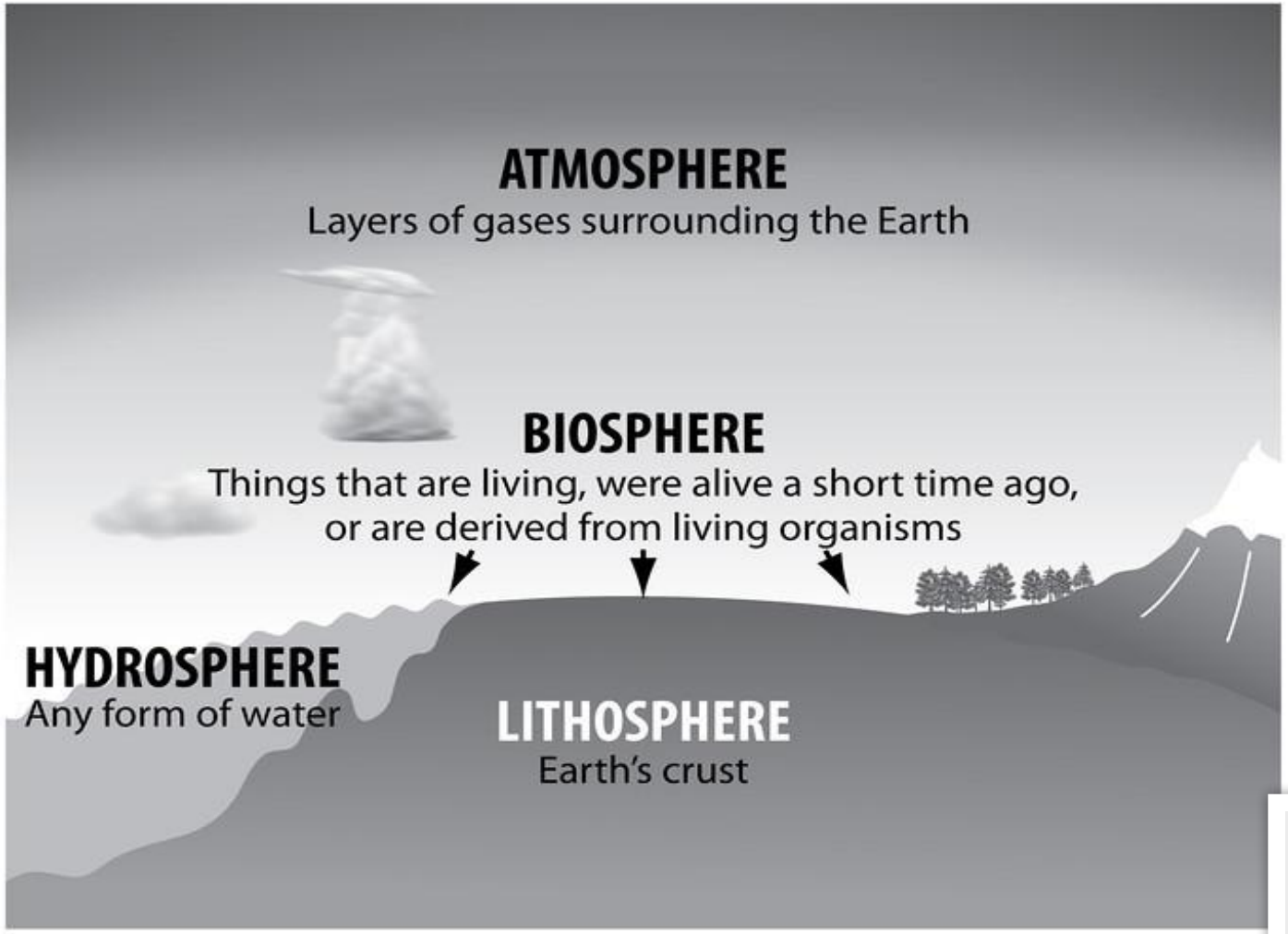
Spheres of the Earth



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Hydrosphere

HYDROSPHERE

- The hydrosphere describes the waters of the earth.
- About **71%** of the Earth's surface is covered by water.
- Water of the hydrosphere exists in **three** states: **liquid, solid** and **gaseous** (water vapor).
- Water occurs in two general chemical conditions, **fresh** and **salty**.
- It also occurs as **standing** water (in **oceans** and **lakes**) and **running** water (in **rivers** and **streams**).
- It consist of water in the oceans; lakes, streams, rivers, swamps on the surface of the land & under the ground (ground water).
- It also consists of water frozen as ice and snow-icebergs, glaciers, polar ice, on mountains and in the frozen layers of soil and as water vapor in the atmosphere.

THE STRUCTURE OF HYDROSPHERE

- Oceans and seas - 96.5 % of water
- Fresh water – 3.5 % of water

<u>Fresh water distribution:</u>

- Ice: 1.762%
- Groundwater: 1.7%
- Surface Fresh Water: 0.014%
- Atmosphere and Soil: 0.002%

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Solid forms of water (forms of ice):

Icebergs: a large piece of freshwater ice floating in open waters.

Glaciers: any large mass of ice that moves slowly over land.

Permafrost: ground that is permanently frozen.

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THE HYDROLOGIC CYCLE

Significance of the hydrologic cycle

- Water moves from one store to another by various processes and
- these movements take place between the atmosphere, lithosphere and biosphere and
- in this way the water cycle integrates most of the other important environmental systems.
- Earth is not the only planet to contain water but conditions on Earth are particularly suitable for the continuous cycling of water, which in turn drives many other important systems.

- The hydrologic cycle involves the continuous recycling of water between the atmosphere, land and oceans.

- It is the transfer of water from the oceans to the atmosphere, from the atmosphere to the land and back to the oceans. The processes involve evaporation of water from the oceans; precipitation on land; evaporation from land ; runoff from streams, river and subsurface groundwater.

- The hydrological cycle is driven by solar energy, which evaporates water from oceans, fresh water bodies, soils and vegetation.

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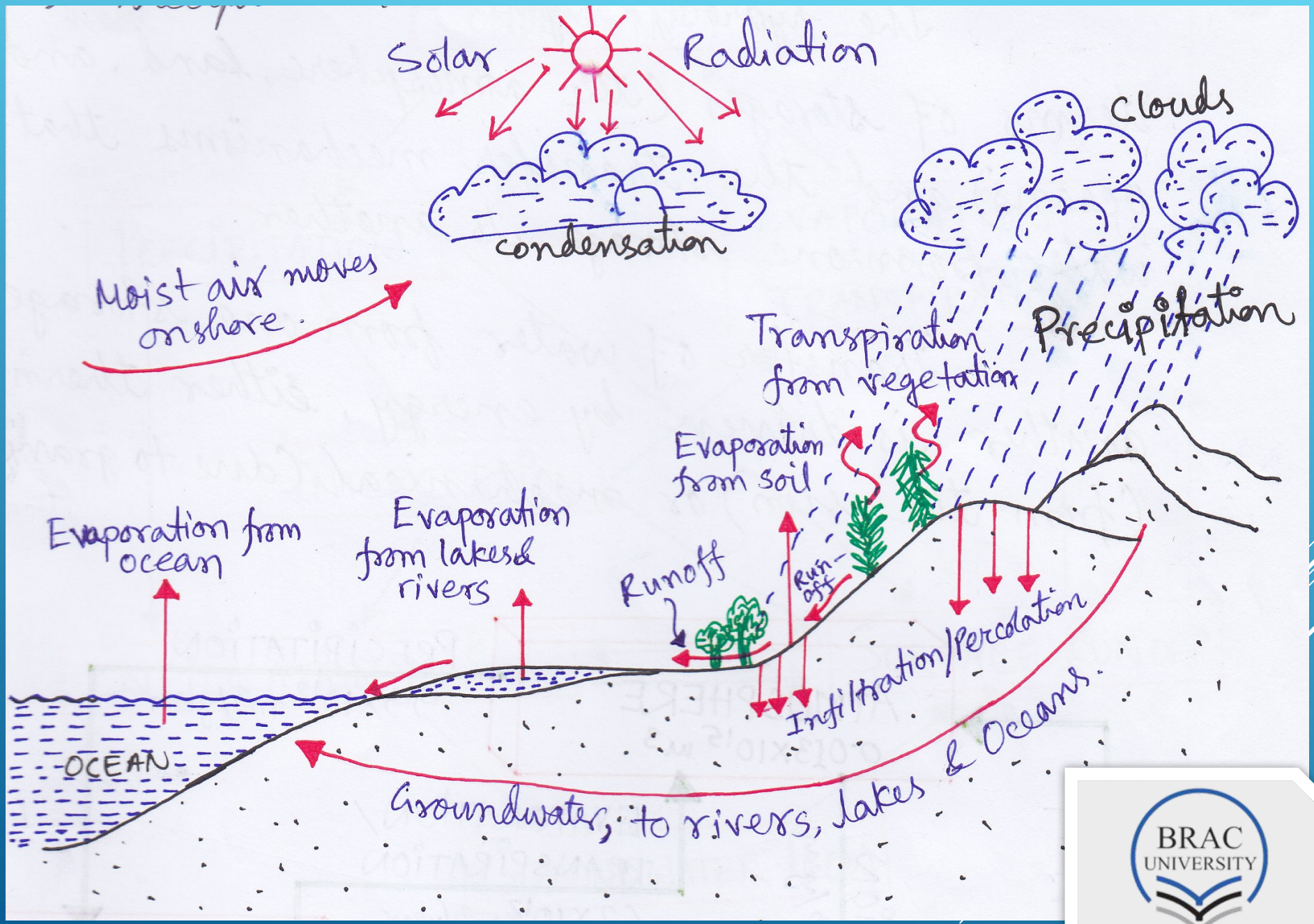

Different processes of the hydrologic cycle

Evaporation

It takes place due to heat. Water from oceans, seas and water surfaces on land, such as rivers, lakes etc. is changed from water droplets to water vapor in the atmosphere, which is known as evaporation.

Transpiration

Water lost from vegetation - trees and plants, mainly from their leaves is known as transpiration.

Evapo-transpiration

Evapo-transpiration (ET) is a term used to describe the sum of evaporation and plant transpiration from the Earth's land surface to atmosphere.

Condensation

Air temperature decreases with height. As water vapor is carried upwards by air it is cooled, leading to condensation. This is the process by which water vapor (gas) is turned to liquid or solid.

. Precipitation

~ is any product of the condensation of atmospheric water vapor that falls under gravity. Rain is the most common type but snow and hail are included as well

Interception

When precipitation occurs, some are prevented from falling directly on the ground by trees and plants which is known a interception.

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Run-off

Water flows over the ground surface, finding its way into rivers and streams, known as run-off.

Infiltration

Water that seeps into the ground. It depends on soil characteristics, land cover type, slope of the ground.

Groundwater flow

Storage of water at underground. After precipitation a certain portion of it seeps into the ground.

In general, the term groundwater or subsurface water refe
the water that occurs below the surface of the earth. The
source of groundwater is infiltration.

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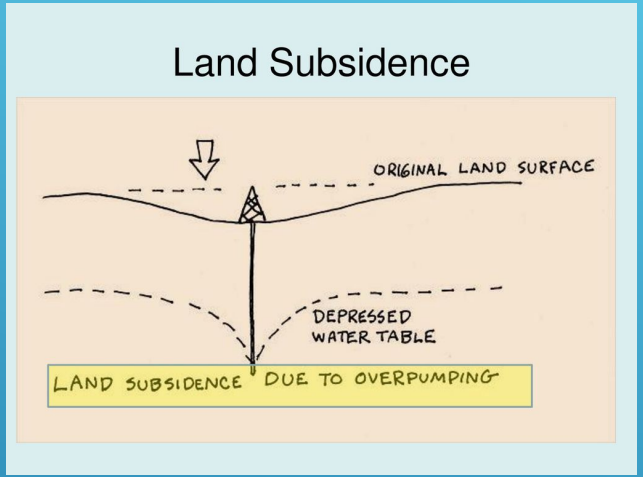
HOW PEOPLE ARE AFFECTING THE HYDROLOGICAL CYCLE?

- Withdrawing large amount of water from stream, lakes and underground sources.



Effects:

Groundwater depletion:

-land subsidence

Salt water intrusion:

- Water become unusable for domestic purpose
- Corrosion of industrial process
- Crop damage
- Ecosystem loss

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Deforestation

Clearing vegetation and urbanization.

- Increases in runoff
- Soil erosion
- Sedimentation in river: flooding

THANK YOU