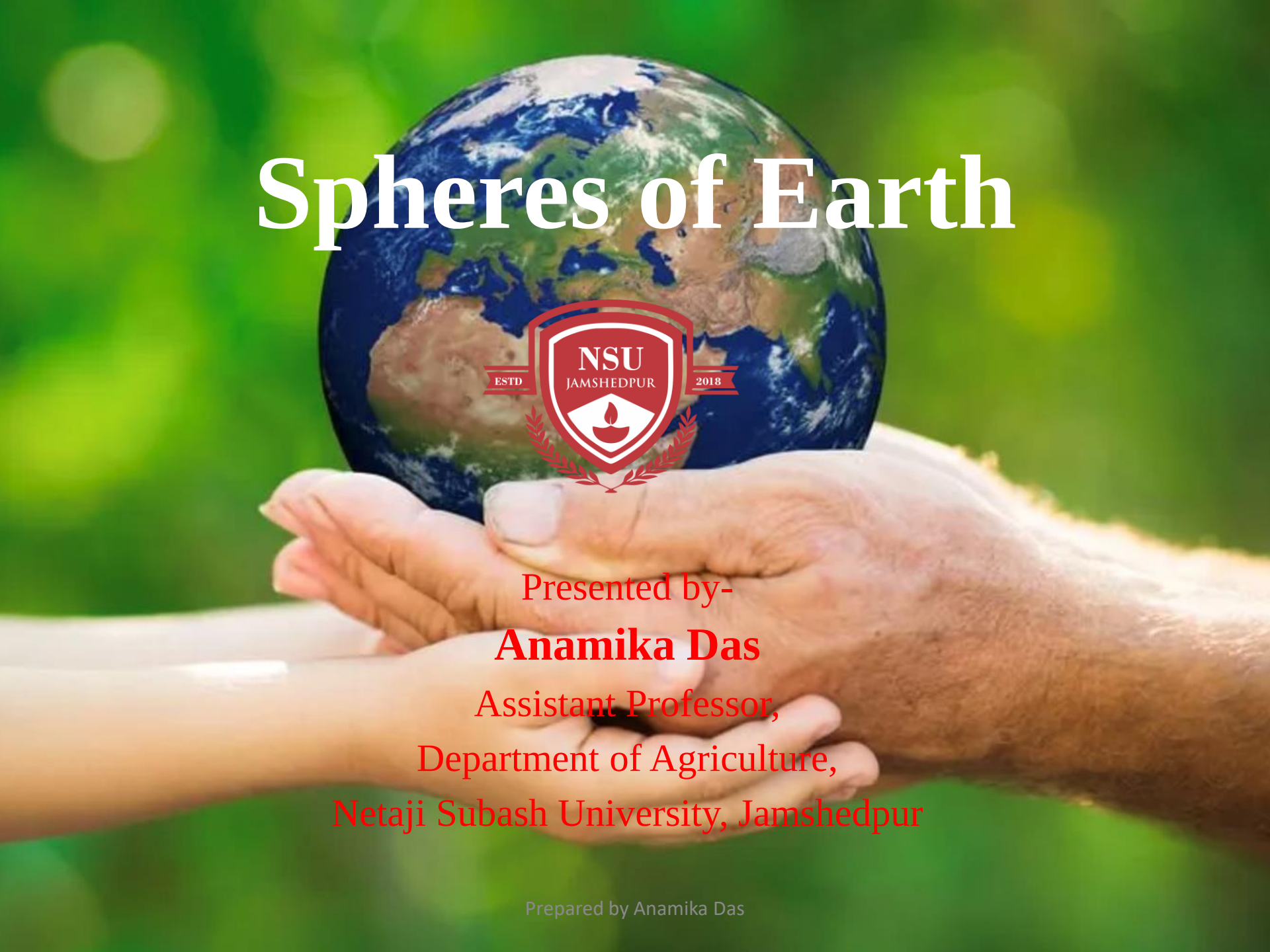
Spheres of Earth



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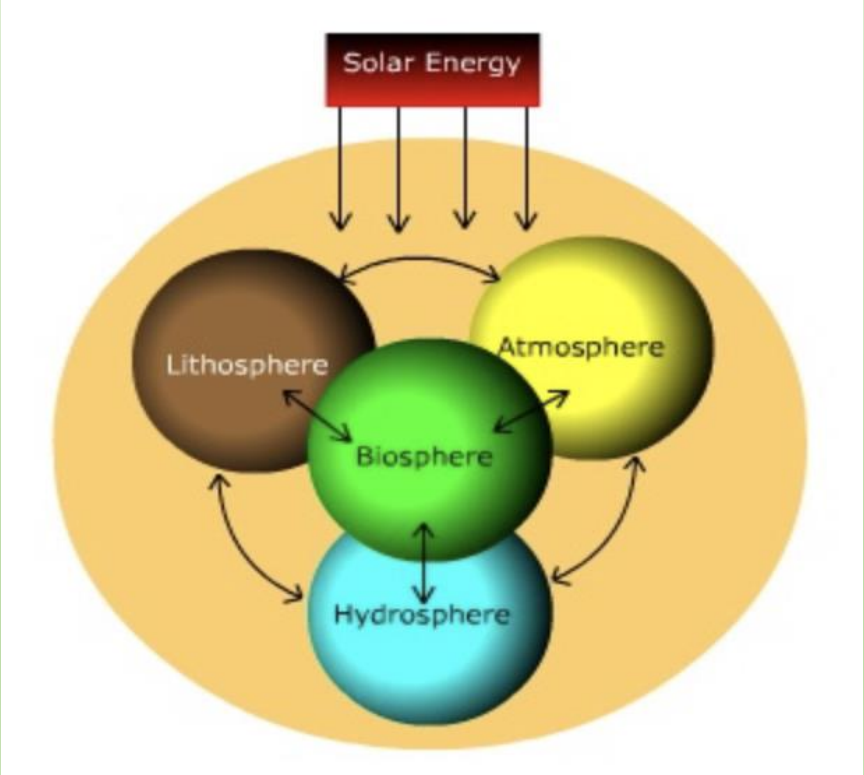
Components of the Earth System

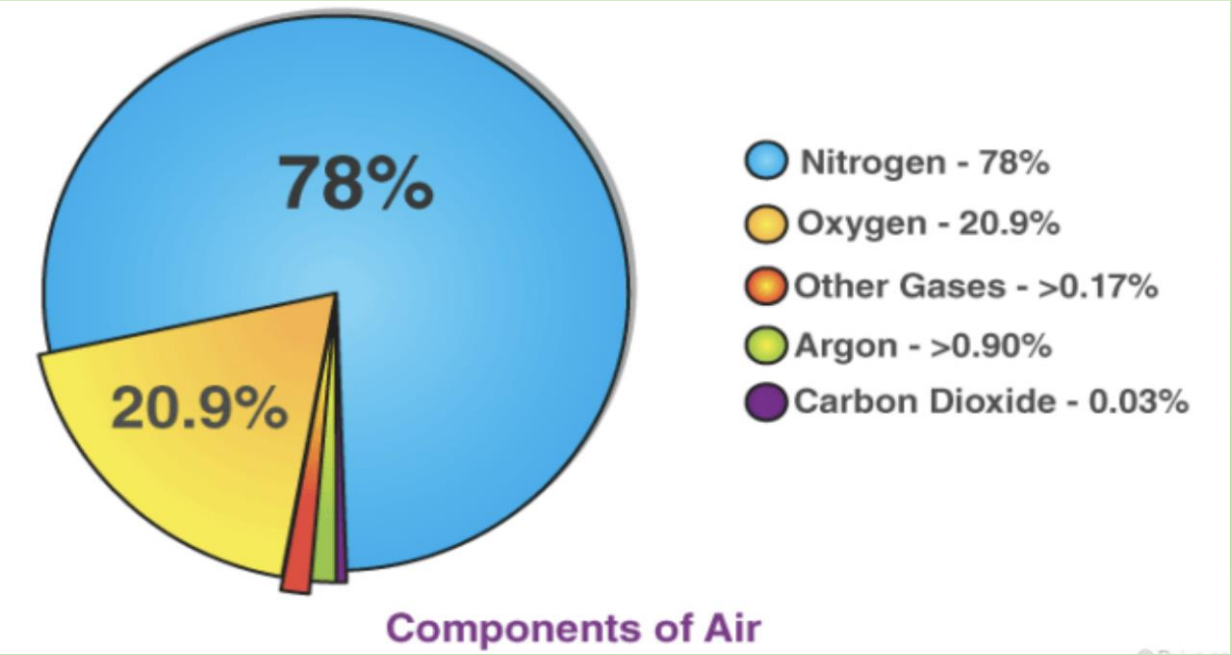
- The **Earth system** is a complex functioning system that includes all the components of the various "spheres".
- Can be categorised as

1) Physical components
   a. Atmosphere
   b. Hydrosphere
   c. Lithosphere
2) Biological components (Biosphere)



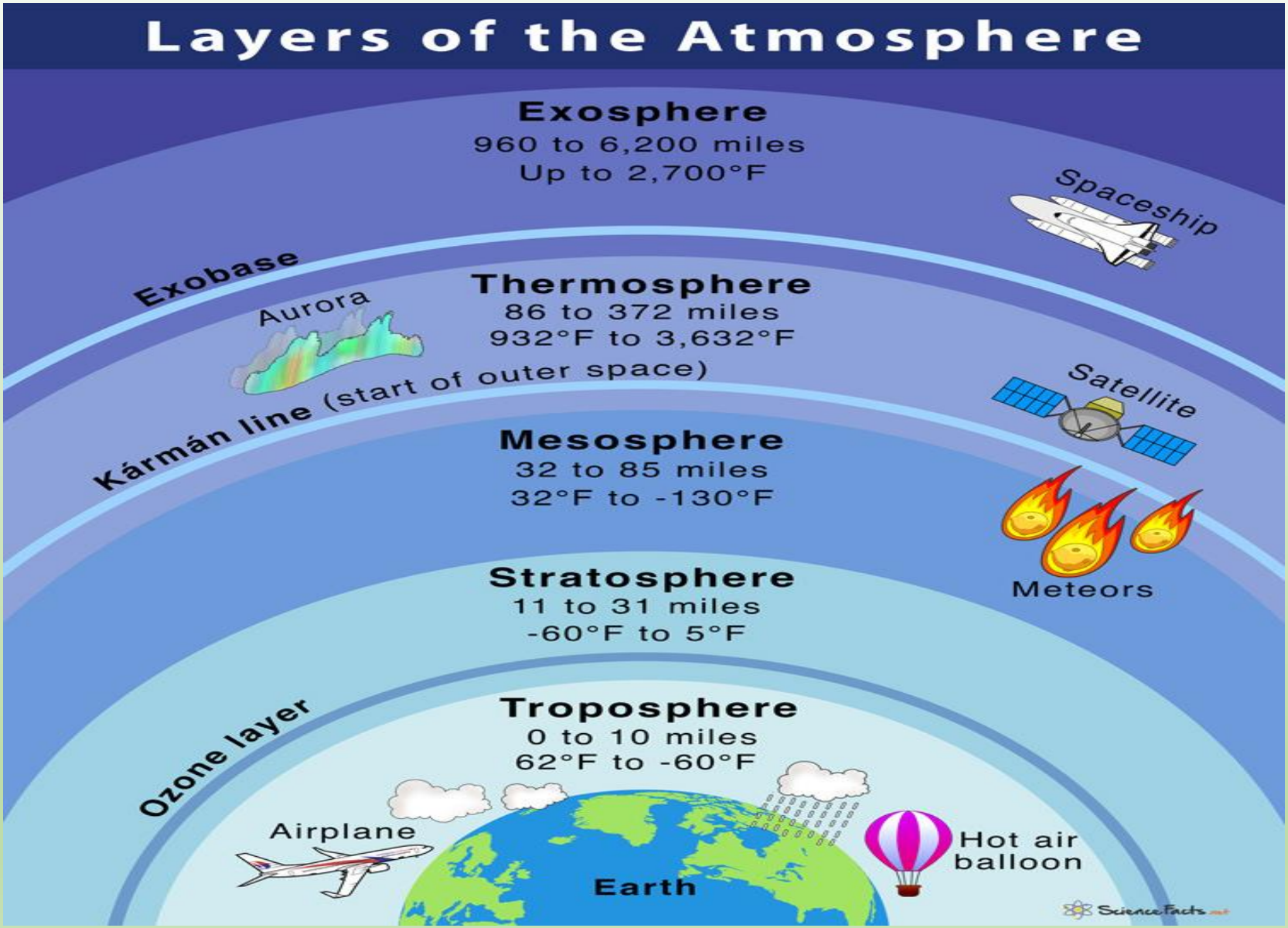
1. Atmosphere

- Thick gaseous envelope surrounding the Earth
- Present up to a height of approx. 300 km above the surface of the Earth
- Mixture of various gases in specific proportions- up to 20 km



Zones/ Layers of Atmosphere

1. **Troposphere** (up to 12-17 km) - contains most of the gases, warm enough for life, all weather phenomenon
2. **Stratosphere** (17-50 km) – Most of the oxygen, sulphates, ozone layer
3. **Mesosphere** (50-90km) – coldest region, protects from meteors
4. **Thermosphere** (90-800 km) – Hottest region, radio, tv and satellite communications
5. **Exosphere** (800-3000 km) – outermost layer

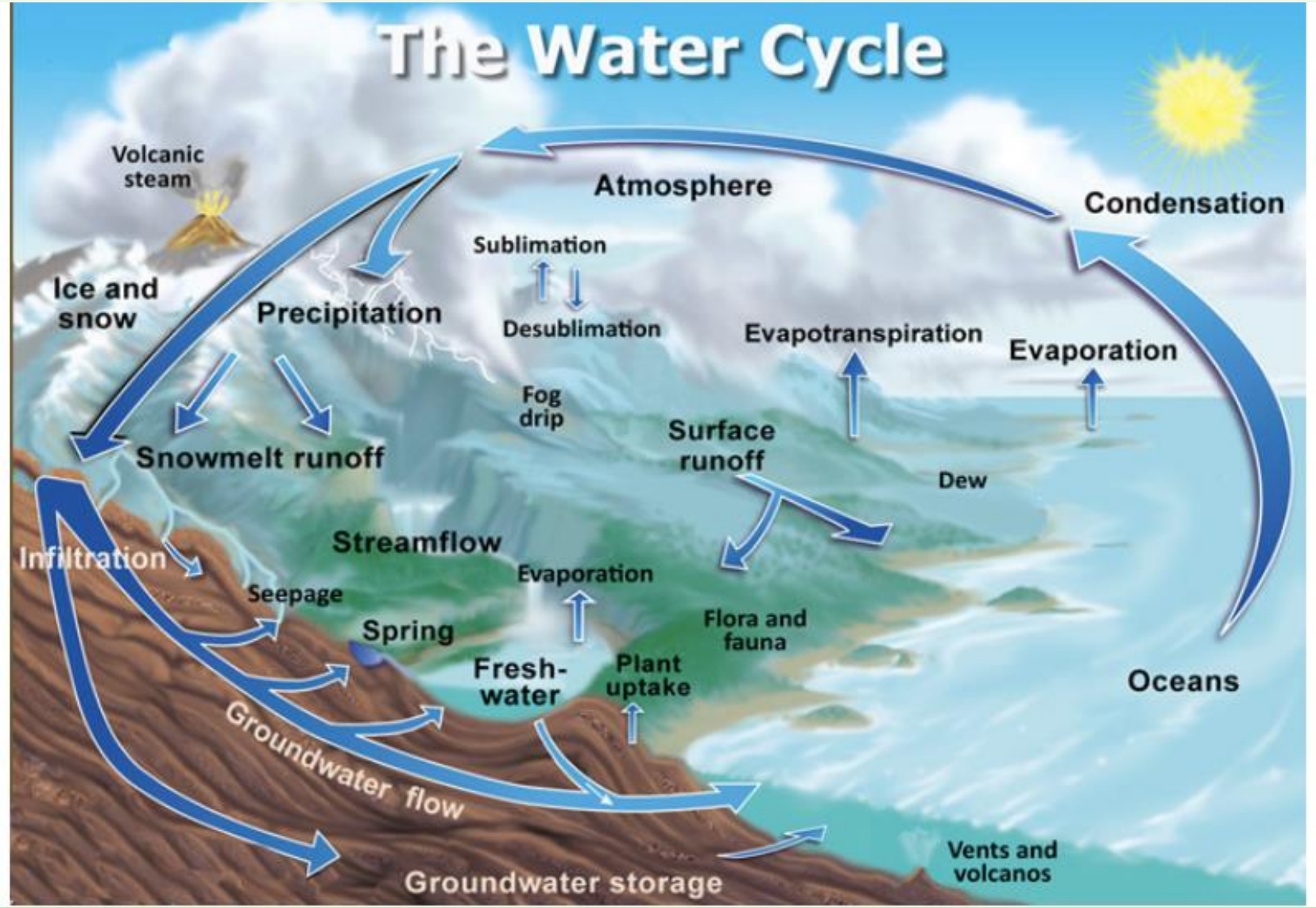

Layers of the Atmosphere
Exosphere
960 to 6,200 miles
Up to 2,700°F
Spaceship
Exobase
Aurora
Thermosphere
86 to 372 miles
932°F to 3,632°F
Kármán line (start of outer space)
Satellite
Mesosphere
32 to 85 miles
32°F to -130°F
Meteors
Stratosphere
11 to 31 miles
-60°F to 5°F
Ozone layer
Troposphere
0 to 10 miles
62°F to -60°F
Airplane
Earth
Hot air balloon
ScienceFacts.net

Concerns associated with the atmosphere

- Increasing concentration of CO_2 leads to global warming and climate change.
- Ozone layer depletion
- Air pollution leading to respiratory diseases

2. Hydrosphere

- Part of the earth (70%) that is covered with water
- Water- essential resource for the life processes (drinking, growth and development ,waste removal, thermoregulation, food production)
  - Living cells-3 to 95% water.
  - As a solvent for various substance
  - carries food and essential nutrients
  - elimination of toxic substances
  - habitat for many organisms
- Water can take different forms within the hydrosphere and move from one sphere to the other, which is known as hydrological cycle or global water cycle.


The Water Cycle
Volcanic steam
Atmosphere
Condensation
Sublimation
Ice and snow
Precipitation
Desublimation
Evapotranspiration
Evaporation
Fog drip
Surface runoff
Snowmelt runoff
Dew
Streamflow
Infiltration
Evaporation
Seepage
Flora and fauna
Spring
Fresh-water
Plant uptake
Oceans
Groundwater flow
Vents and volcanos
Groundwater storage

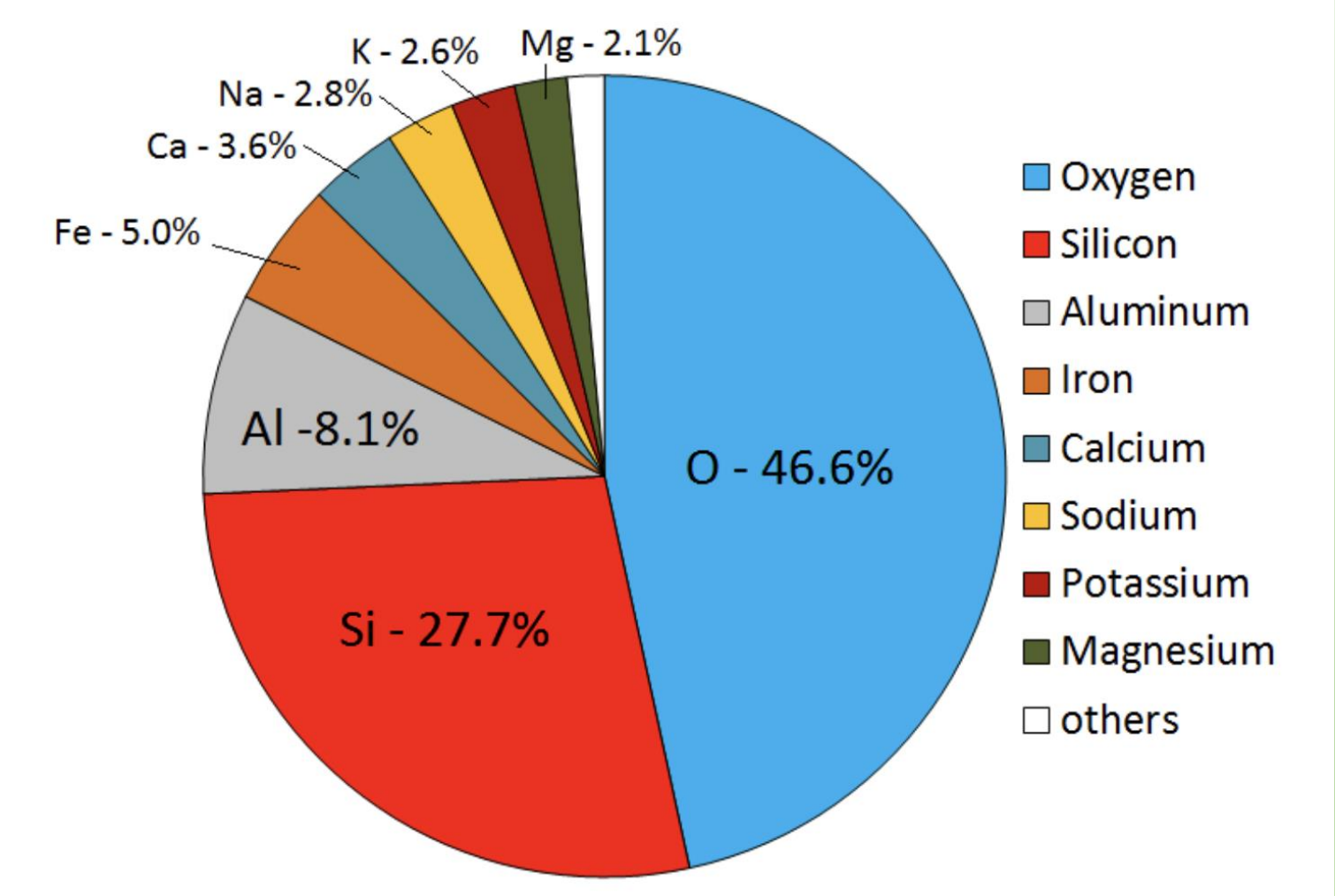
Concerns associated with hydrosphere

- Scarcity of water due to mismanagement and unplanned urbanization and economic factors governing water supply.
- Contamination of water bodies (soil erosion leading to washing away of soil in water bodies), effluent released from industries and sewage from households, fertilizer manure, and insecticide used in agriculture.
- Water pollution has severe implications for public health leading to serious diseases (typhoid, diarrhoea, etc).

3. Lithosphere

- It refers to the outermost layer of the earth and includes rocks, various landforms such as mountains, valleys, plateau and plains and soil on the Earth's surface.
- Contains soil thickness of a few millimetres to 3 to 4 m.
- Soil-natural habitat for microorganisms, plants and animals, provides minerals and nutrition to plants.
- Stone and sand are used as construction materials.
- Various fuel resources such as oil, gas, coal, are extracted from underground.

Composition of lithosphere

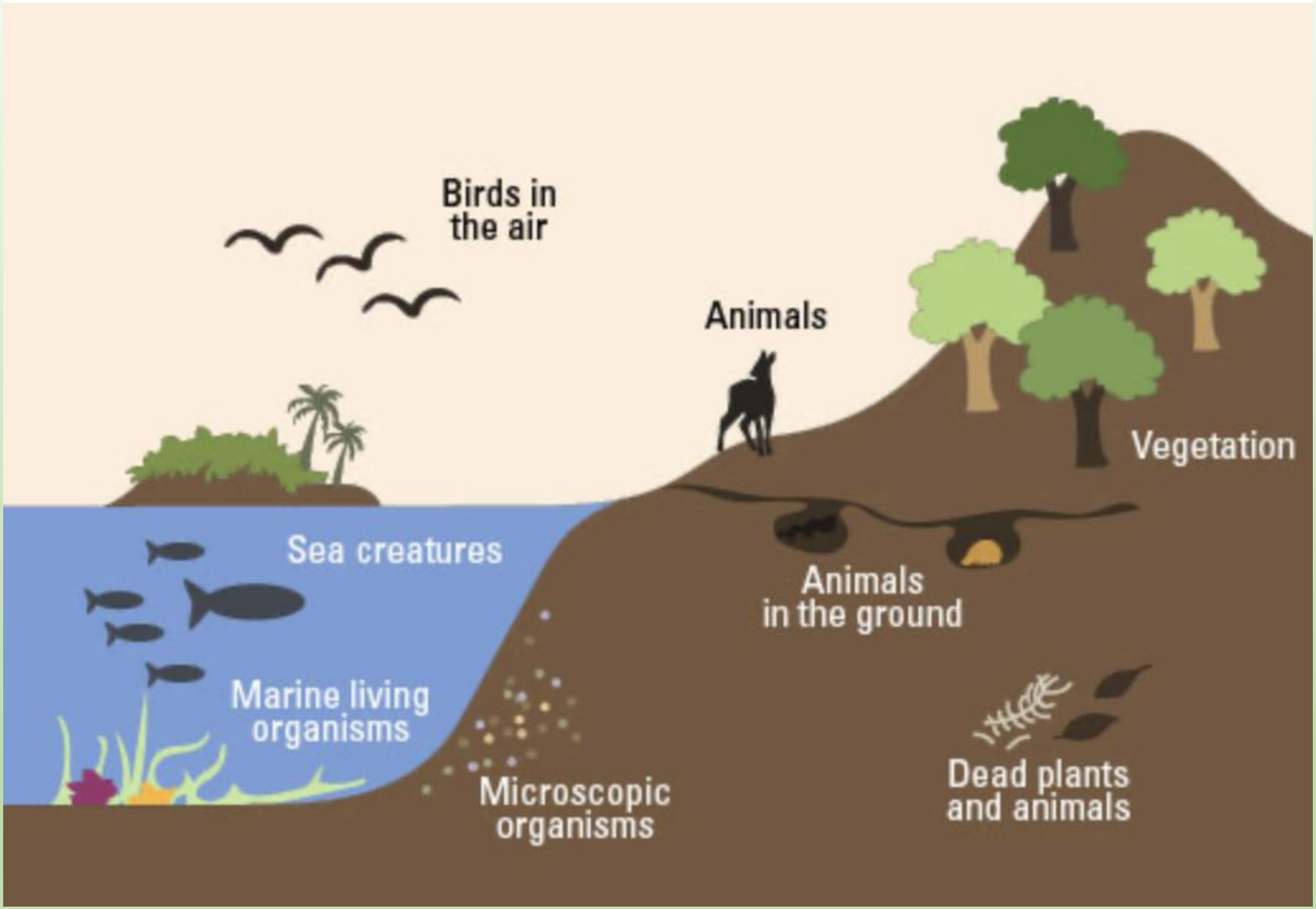


Concerns associated with lithosphere

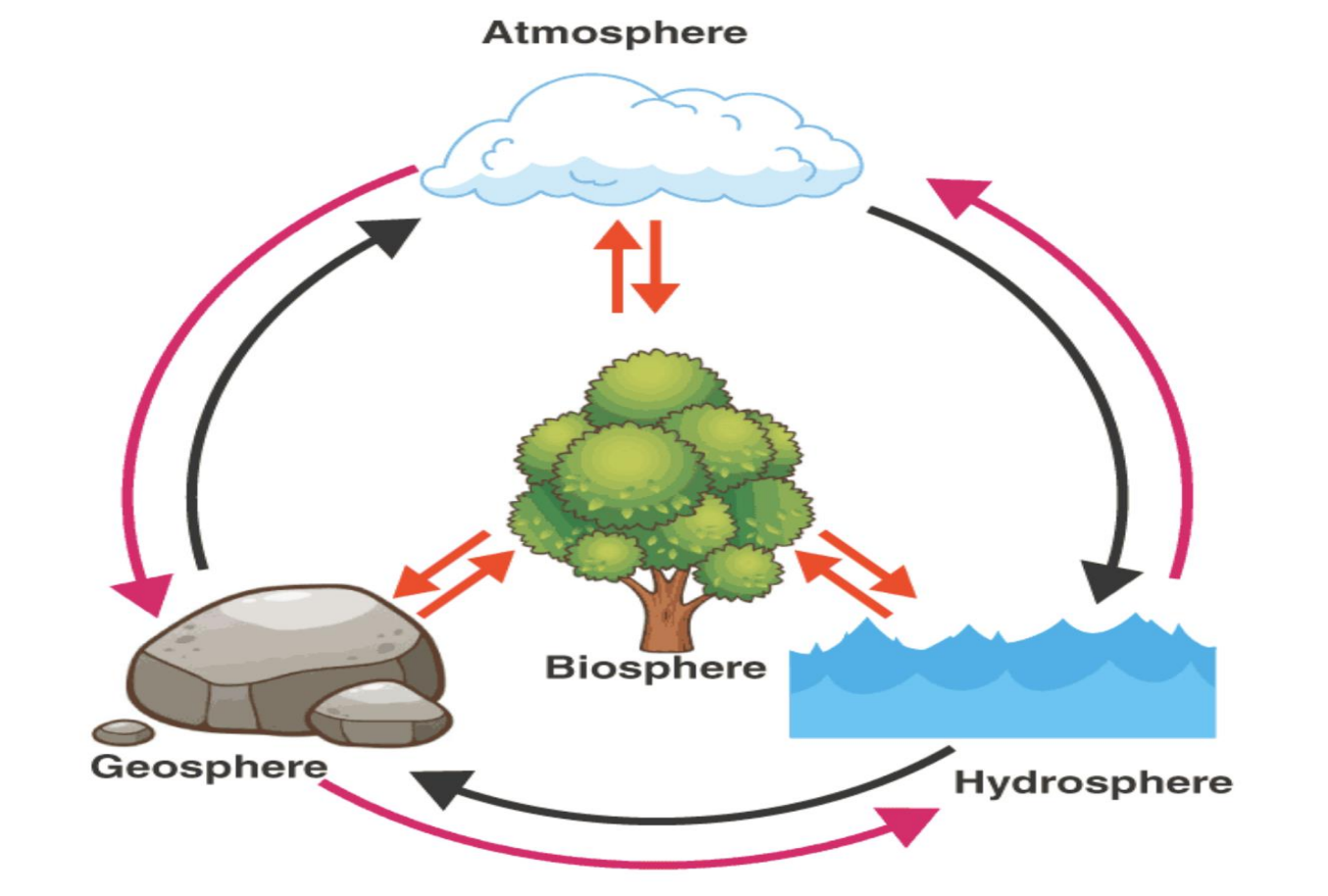
- Human activities such as agricultural practices, industrial technologies, and mining contribute to soil pollution.
- Soil pollution eventually leads to serious diseases in many organisms including human.

4. Biosphere

- The biosphere is the zone of life on Earth.
- Usually in the zone of the confluence of the three spheres (lithosphere, atmosphere and hydrosphere), but may also be exclusively found in only one of the spheres.
- The biosphere is a global living system, composed of living organisms and non-living factors from which they derive energy and nutrients.
- A group of organisms supported by the biosphere is known as the biological diversity or biodiversity of the planet.


Birds in the air
Animals
Vegetation
Sea creatures
Animals in the ground
Marine living organisms
Microscopic organisms
Dead plants and animals

Relationship between the four spheres



Thank you