

# Earth's Hydrosphere & Atmosphere

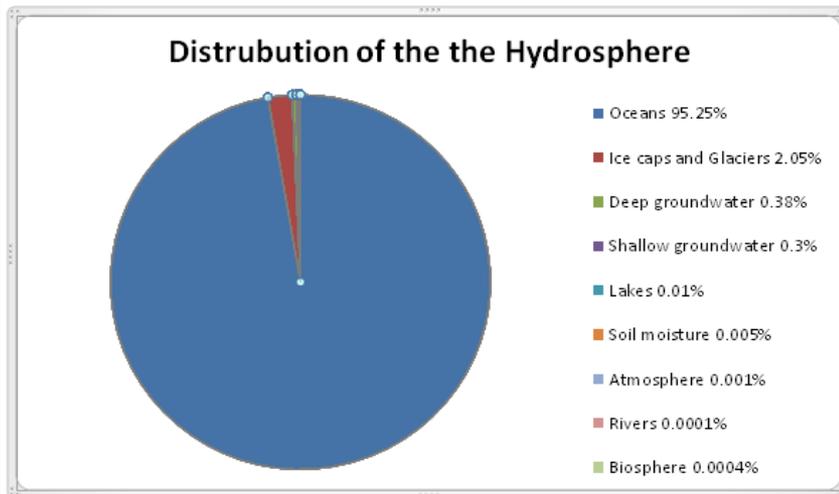
# Hydrosphere

- The hydrosphere is a global term meant to encompass all the Earth's **solid, liquid, and gaseous water**.
- The hydrosphere's water is free to transform itself from one state to another through the **water cycle**.

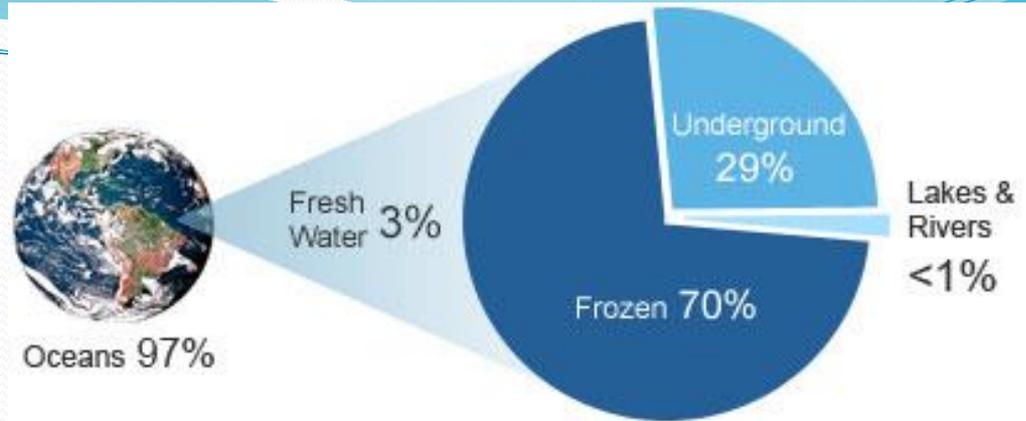


# Hydrosphere's Composition

- 95.5% of water in the hydrosphere is **salt water**
- 2.5% of water in the hydrosphere is **fresh water**
- The remainder of the hydrosphere is found in water vapour form.

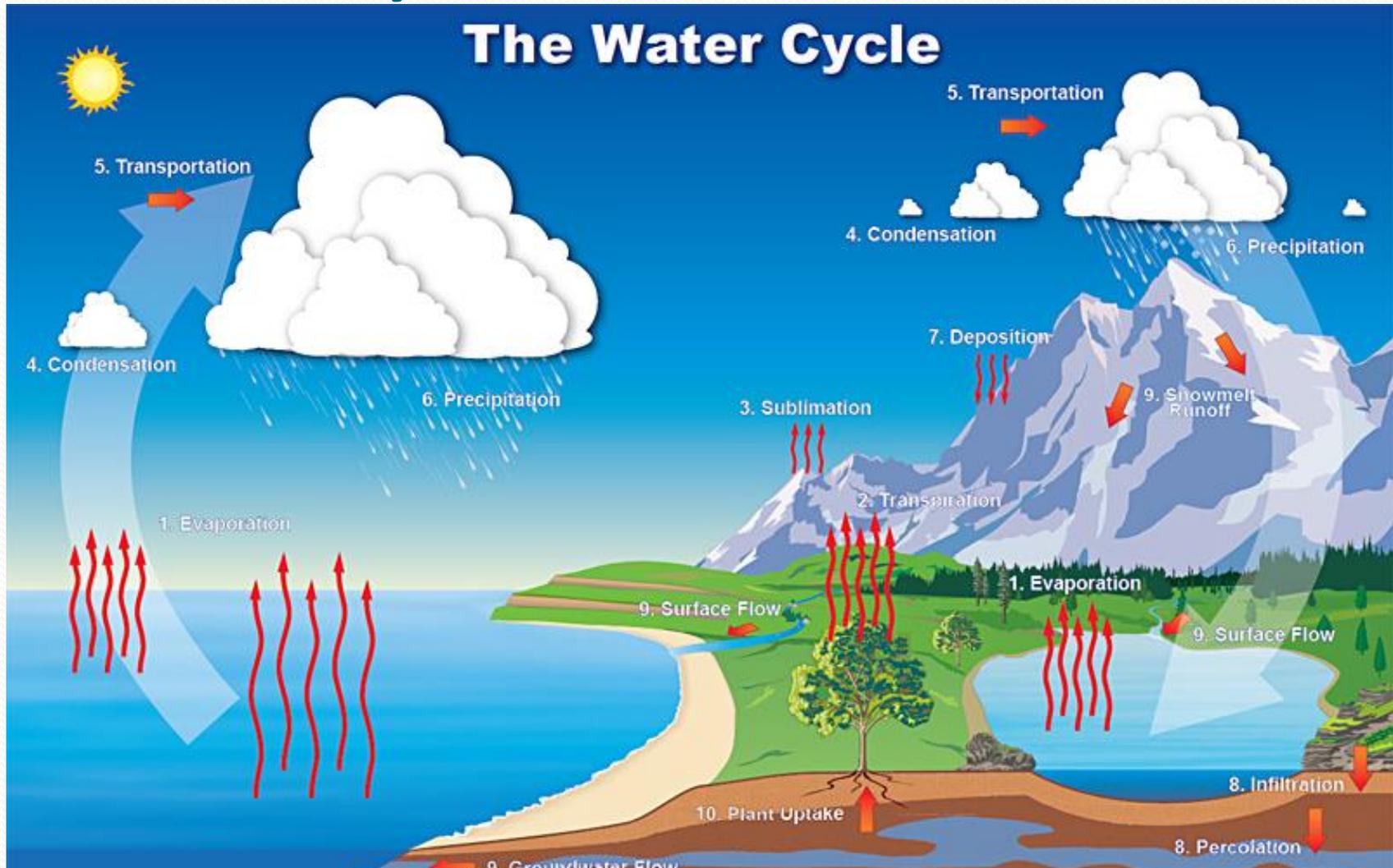


# Fresh Water



- The majority of fresh water is found in **glaciers and polar ice.**
- 12% of fresh water is found in **underground water.**
- 1% of the world's fresh water is found in **lakes and rivers.**

# Water Cycle



# Atmosphere

- It is no surprise that weather is highly dependent on the condition in the atmosphere (after all, that's where weather occurs!), but it also depends greatly on interaction with water in the hydrosphere.



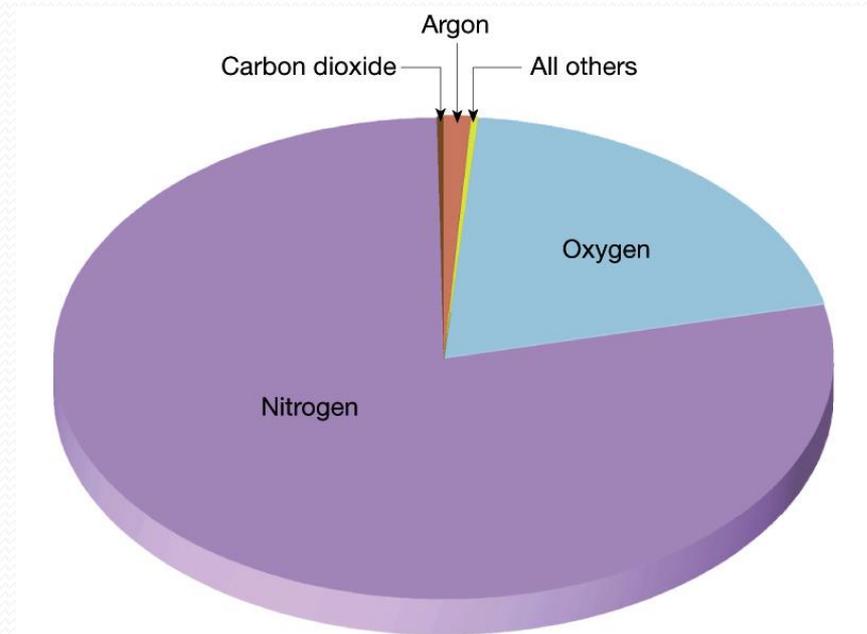
# Composition

- Air is composed of three components:
  - **Permanent gases**
  - **Variable gases**
  - **Solid-liquid particles**



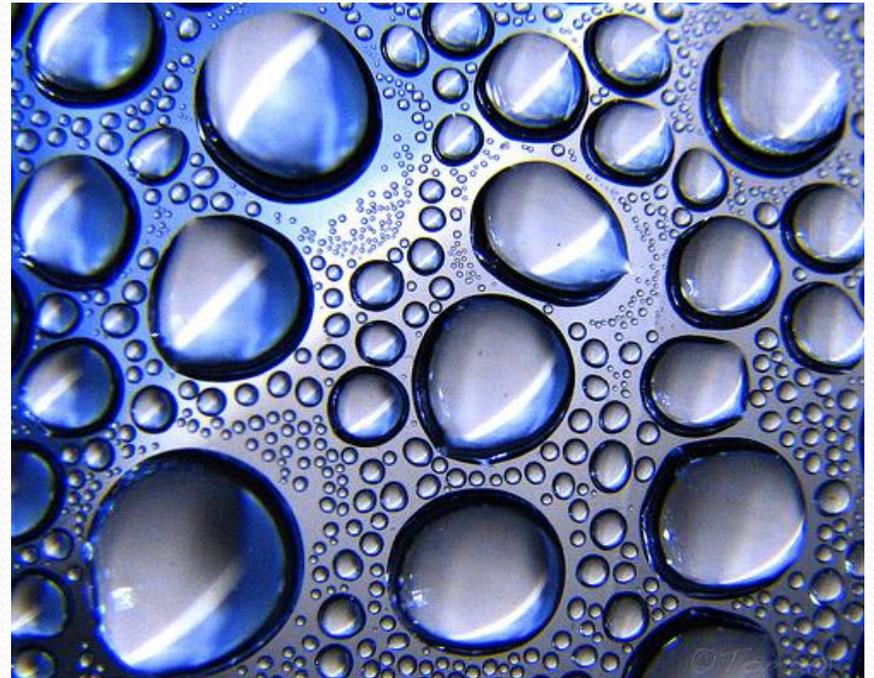
# Permanent Gases

- **N<sub>2</sub>** (78%), **O<sub>2</sub>** (21%), **Ar** (1%), **CO<sub>2</sub>** (0.035%) with minor amounts of Ne, Kr, Xe, He, H, methane (CH<sub>4</sub>), and ozone (O<sub>3</sub>)



# Variable Gases

- Gases that do not exist in fixed amounts over short periods of time, that is, that amounts of these gases constantly vary. The most important variable gas is **water vapour**. Other variable gases in the atmosphere occur as a result of various natural phenomena or human technology



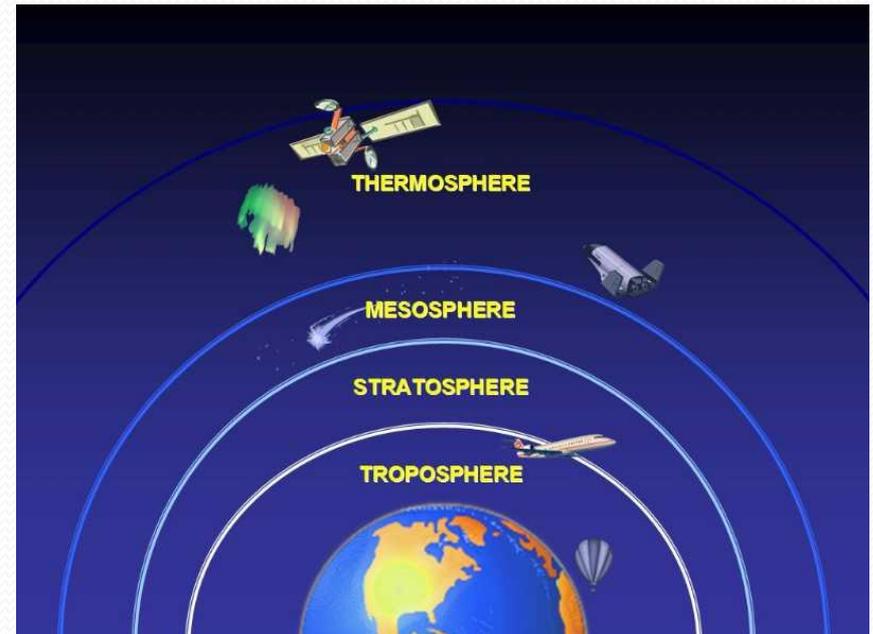
# Solid-liquid Particles

- These particles, sometimes called **aerosols**, are combined into the air by ocean waves (salts), volcanic eruptions (ash/ dust) and by plants (pollen). Smog is a mixture of polluting gases and aerosols.



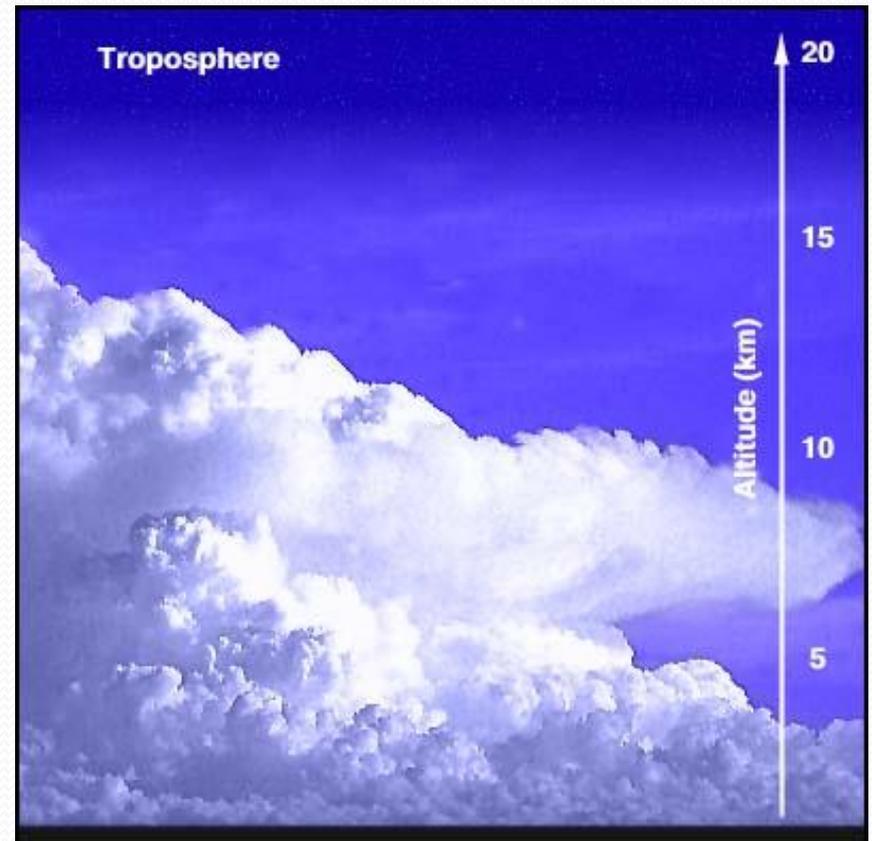
# Layers of the Atmosphere

- 1. Troposphere
- 2. Stratosphere
- 3. Mesosphere
- 4. Thermosphere
- 5. Exosphere



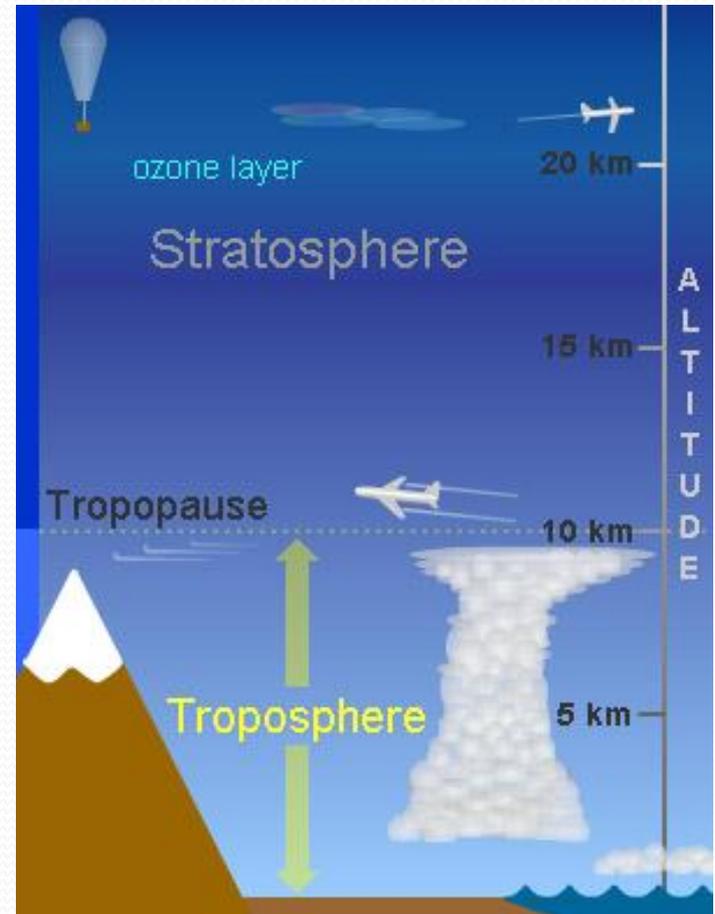
# Troposphere

- Layer closest to Earth
- **Weather** events occur mainly in this layer
- Temp varies from 17 to -52C
- Air pressure drops as you rise through this layer
- Contains 75% of the total air mass of Earth
- Shield from Sun's high energy radiation



# Stratosphere

- Dry layer beginning at 14 km to 50 km above the Earth's surface
- Temp increases from -52 to -3C
- Contains the **ozone layer** that shields Earth from UV radiation
- Highest clouds will occur in the lower stratosphere



# Mesosphere

- Extends from 50km to 85km above the Earth's surface
- Temp drops to  $-93^{\circ}\text{C}$
- Ionized layer that reflects radio waves sent from the ground
- **Meteors** are often observed burning up in the mesosphere



# Thermosphere

- Extends 85 km to 560 km above the Earth's surface
- Temp rises due to gamma radiation
- Space shuttle and ISS orbit in this layer
- **Aurora borealis** occur in the lower parts of the thermosphere



# Video time!!!

- <http://www.youtube.com/watch?v=WaikvaAw2nk>