The Planet Earth:

Movements & Composition of the Atmosphere

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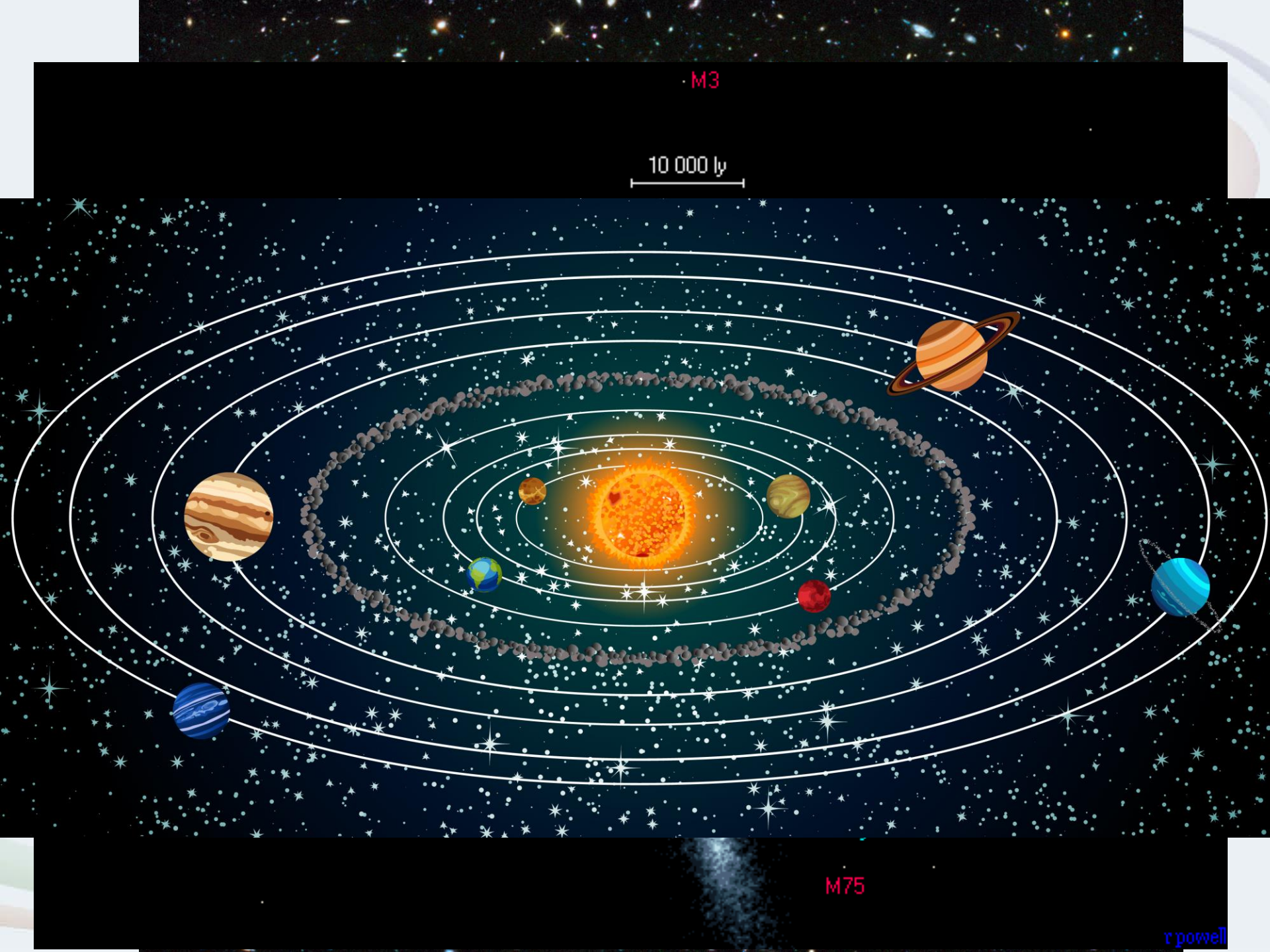
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Movements of the Earth

1) The rotation of the earth about its own axis: day and night

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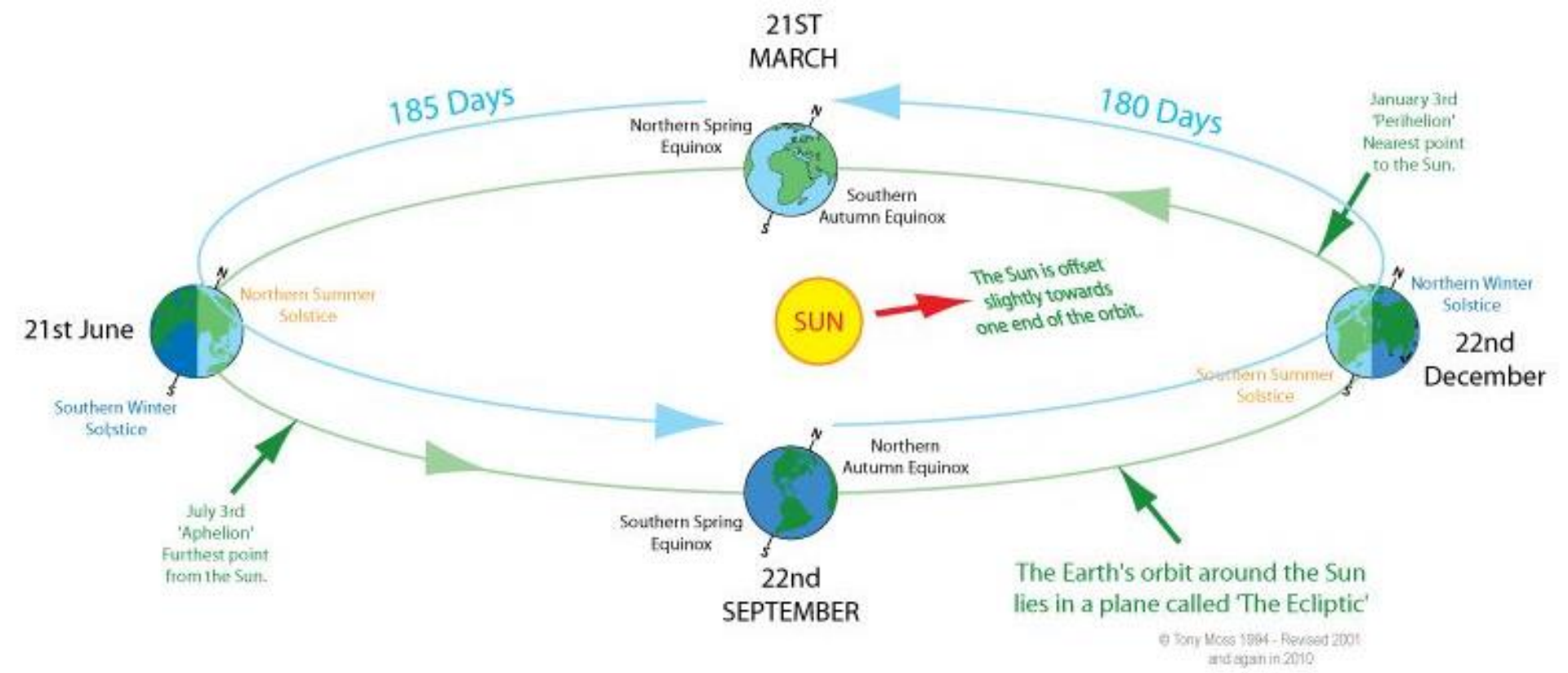
Movements of the Earth Cont.

2) The revolution of the earth around the Sun



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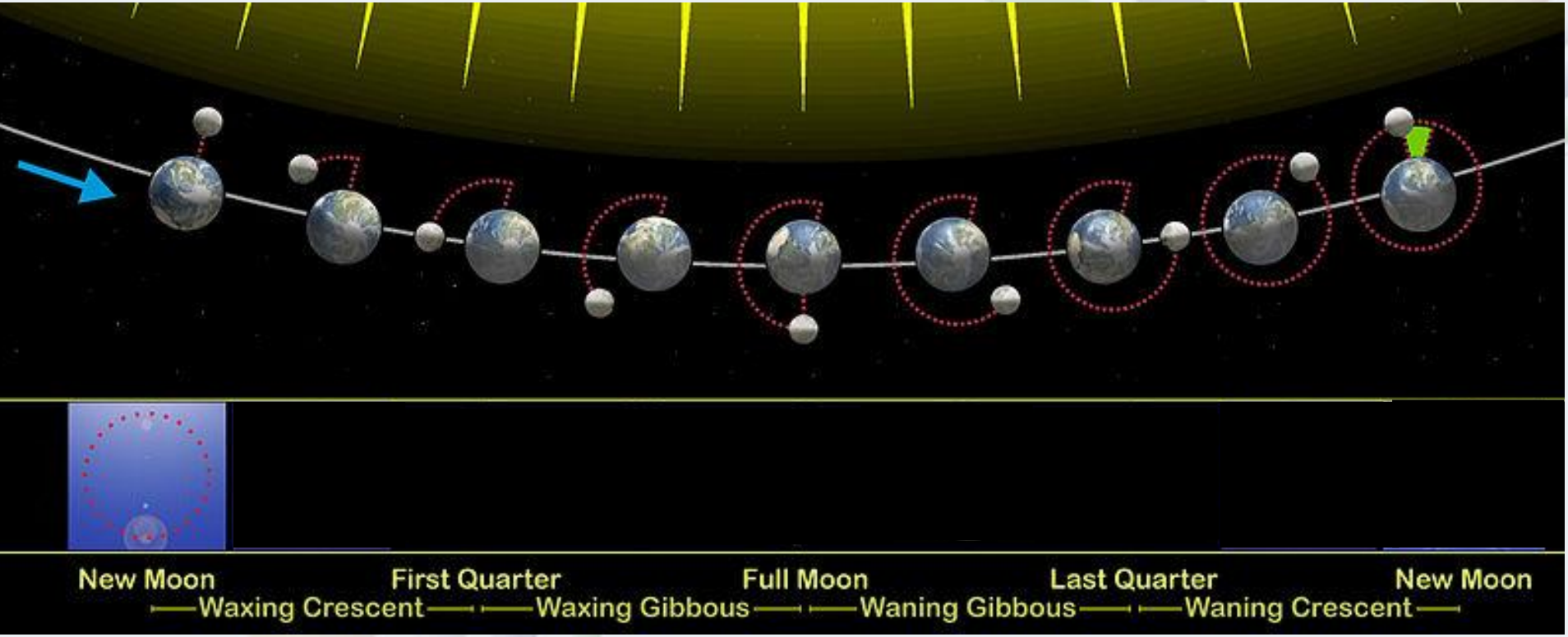
Earth-Moon Interaction



The gravitation pull on the fluid portion of the earth's surface results in what we observe as ocean **tides**

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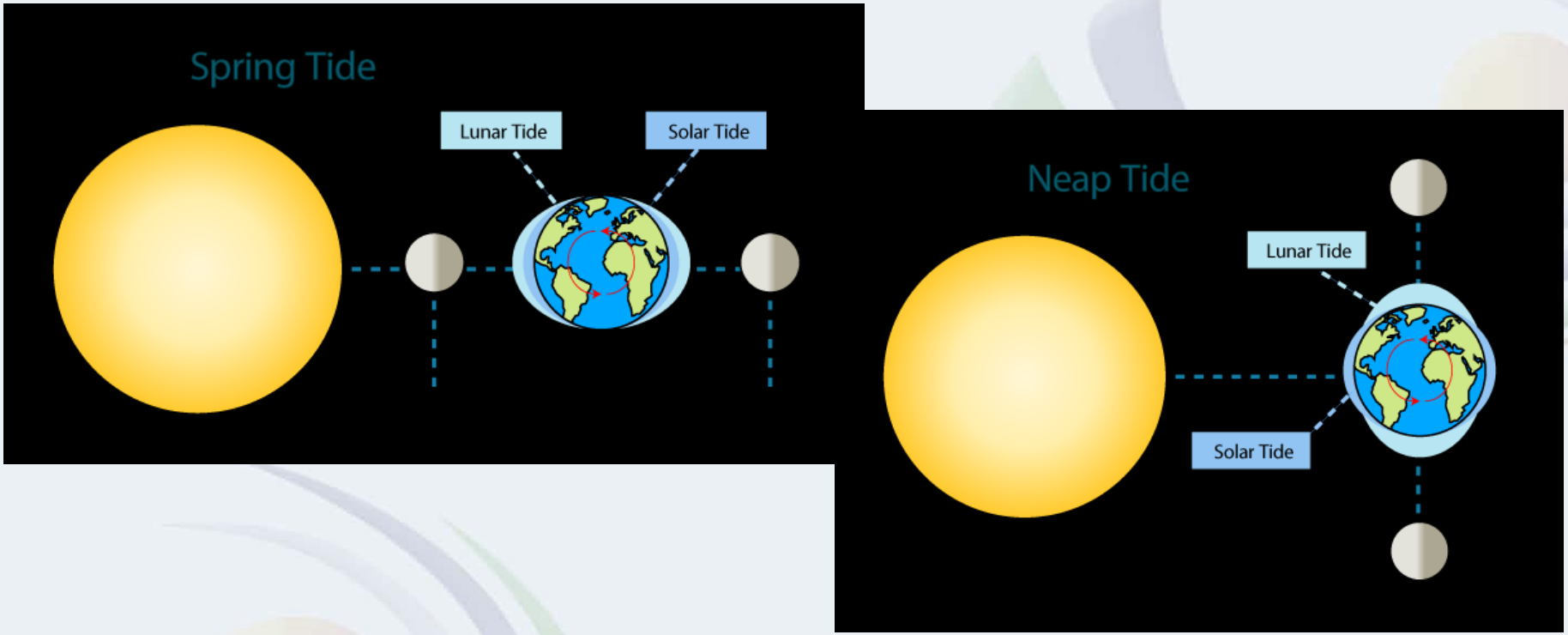
Earth-Moon Interaction Cont.



- At full and new moon, the gravitational force of the sun and moon are combined causing a higher high tide (and lower low tide). Maximum tides = **spring tide**
- At first & last quarter, the sun's gravitational pull is perpendicular to the moon's, resulting in lower than average tides. Moderate tides = **neap tides**

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Tidal Effects

Storm surge occurs near high tide

Storm surge occurs near low tide

Our Atmosphere

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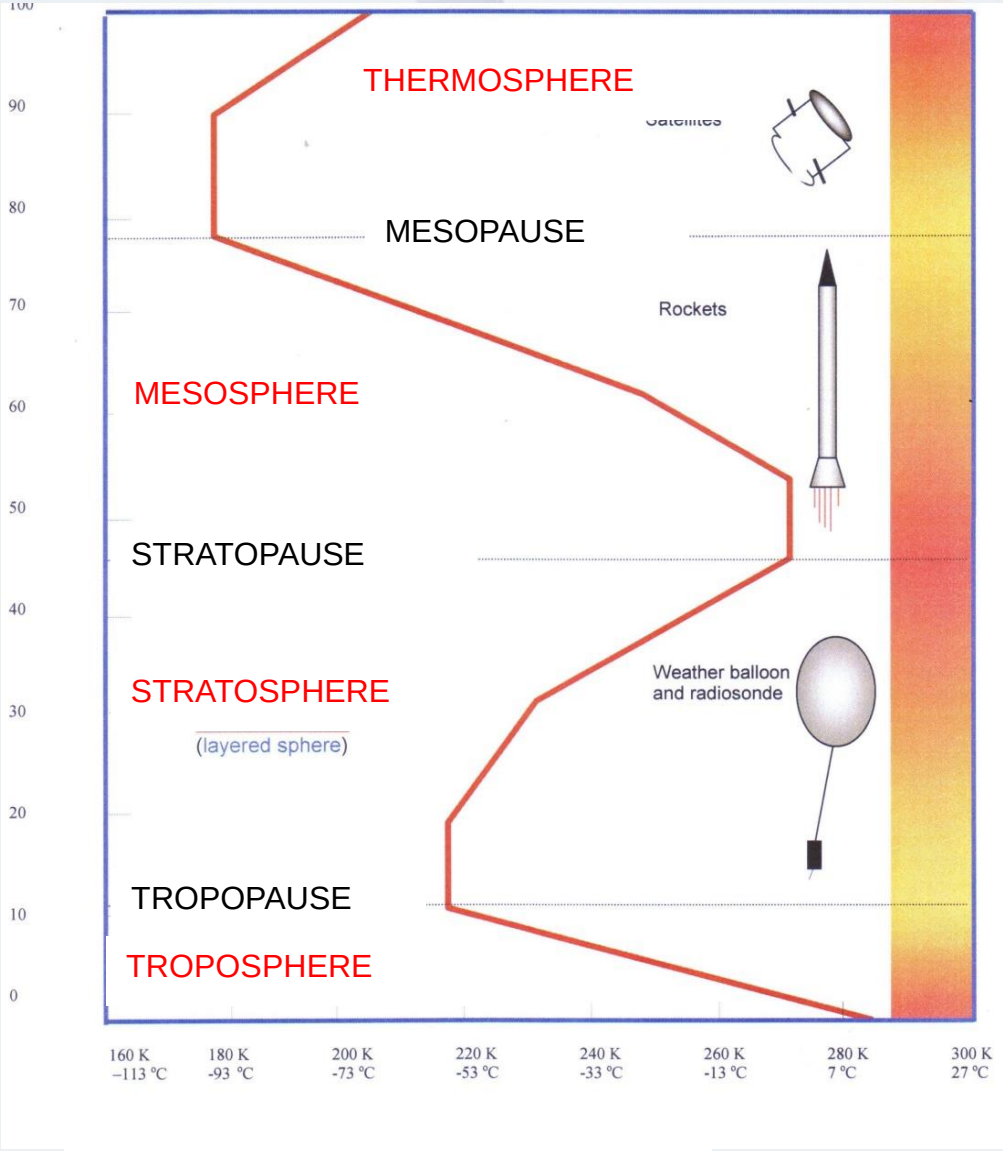
Vertical Structure

- Four regions
  - Troposphere,
  - Stratosphere,
  - Mesosphere
  - Thermosphere
  - Ionosphere and Exosphere

- Higher temperatures occur near the earth's **surface**, in the vicinity of the **stratopause** and **thermosphere**.

- Temperature lapse rate - an average value of 6.5 °C/km.

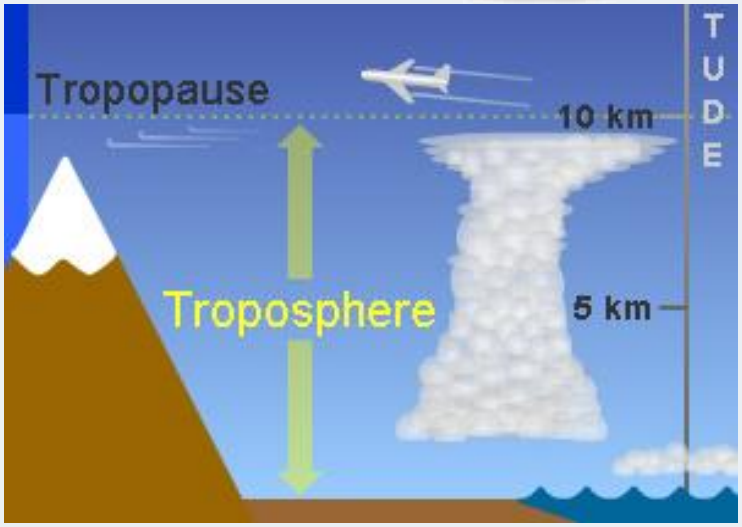


Troposphere

- The **troposphere** contains the greater part of the mass of the atmosphere
  - marked by vertical motions
  - high water-vapour content
  - *cloud and weather*. As a result, it is of great concern to meteorologists.

- Generally, the temperature dereases with height. However, layer(s) in which the temperature increases with height occur: **temperature inversion layer**.

- Its upper boundary is the **Tropopause**. Its altitude varies over the earth



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Composition of Dry Air

- Atmosphere is composed of a mechanical mixture (not compound) of gases and impurities
- The distribution of these components varies over time
- Major Gases: Nitrogen and Oxygen (about 99%)

Permanent Gases			Variable Gases			
Gas	*Symbol*	*Percent (by Volume) Dry Air*	*Gas (and Particles)*	*Symbol*	*Percent (by Volume)*	*Parts per Million (ppm)**
Nitrogen	N_2	78.08	Water vapor	H_2O	0 to 4	
Oxygen	O_2	20.95	Carbon dioxide	CO_2	0.037	368*
Argon	Ar	0.93	Methane	CH_4	0.00017	1.7
Neon	Ne	0.0018	Nitrous oxide	N_2O	0.00003	0.3
Helium	He	0.0005	Ozone	O_3	0.000004	0.04†
Hydrogen	H_2	0.00006	Particles (dust, soot, etc.)		0.000001	0.01–0.15
Xenon	Xe	0.000009	Chlorofluorocarbons (CFCs)		0.00000002	0.0002

- Green-House Gases (GHG) in high concentrations affect temperatures we experience on the surface

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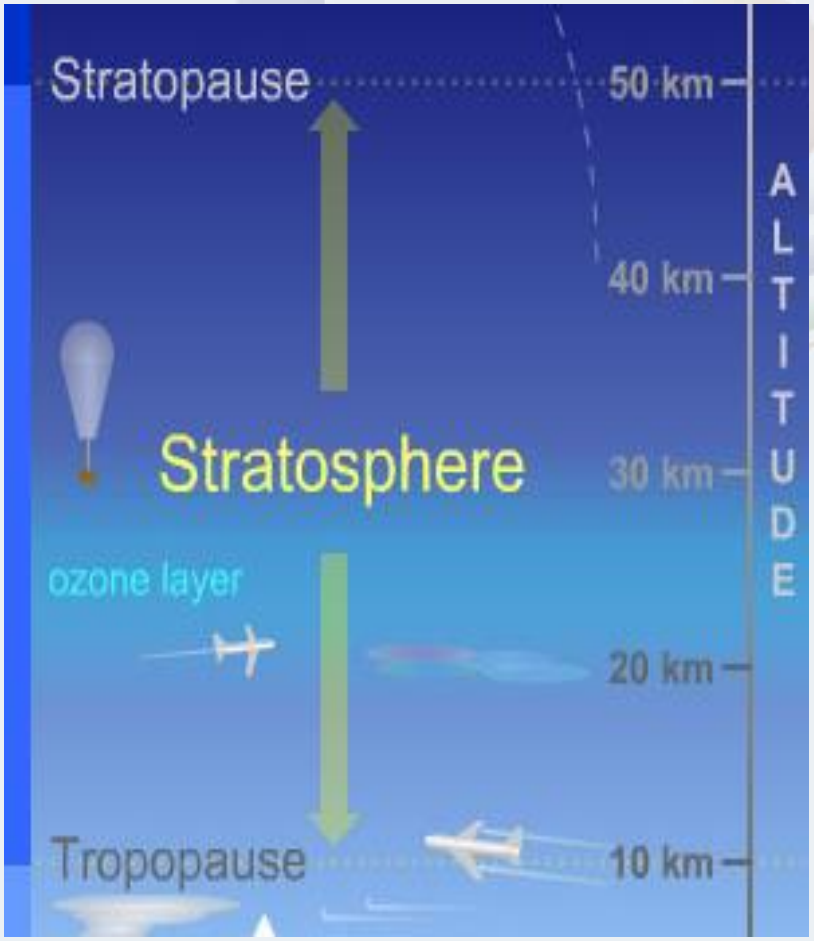
Stratosphere

- Extends from the Tropopause up to 50 km.
- Temperature characteristics are:
  - It generally remains constant up to about 20 km: referred to as the **isothermal layer**
  - then it increases (at different rates) above that.
  - In the upper parts, the temperatures are similar to those near the Earth's surface owing to the effects of Ozone
- Stratospheric ozone absorbs much of the lethal **ultraviolet radiation (UV)** from the Sun, making the Earth's surface safely habitable for human life



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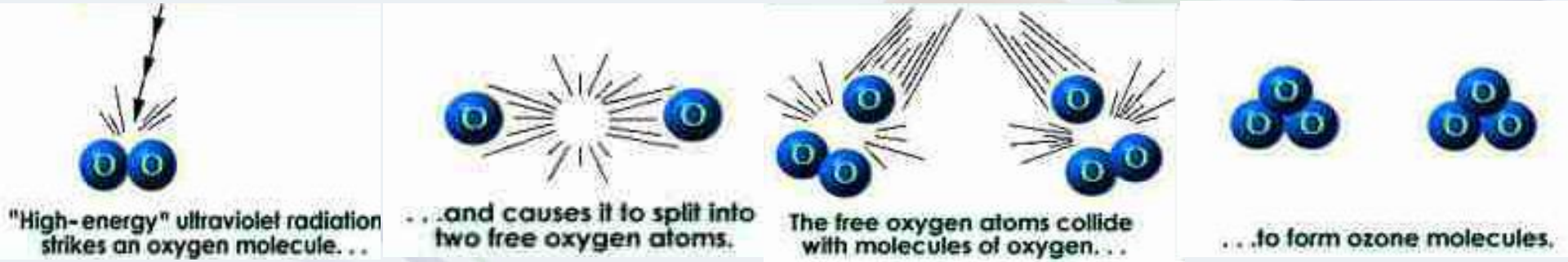
Ozone

- Most ozone forms in the upper stratosphere as a result of a process that involves the absorption of UV radiation.



- High atmospheric ozone concentrations occur at levels from 10 up to 25km
- Ozone concentrations vary with: altitude, Seasons

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The End….

Time for further clarity if needed

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