

How is atmosphere coupled with oceans?

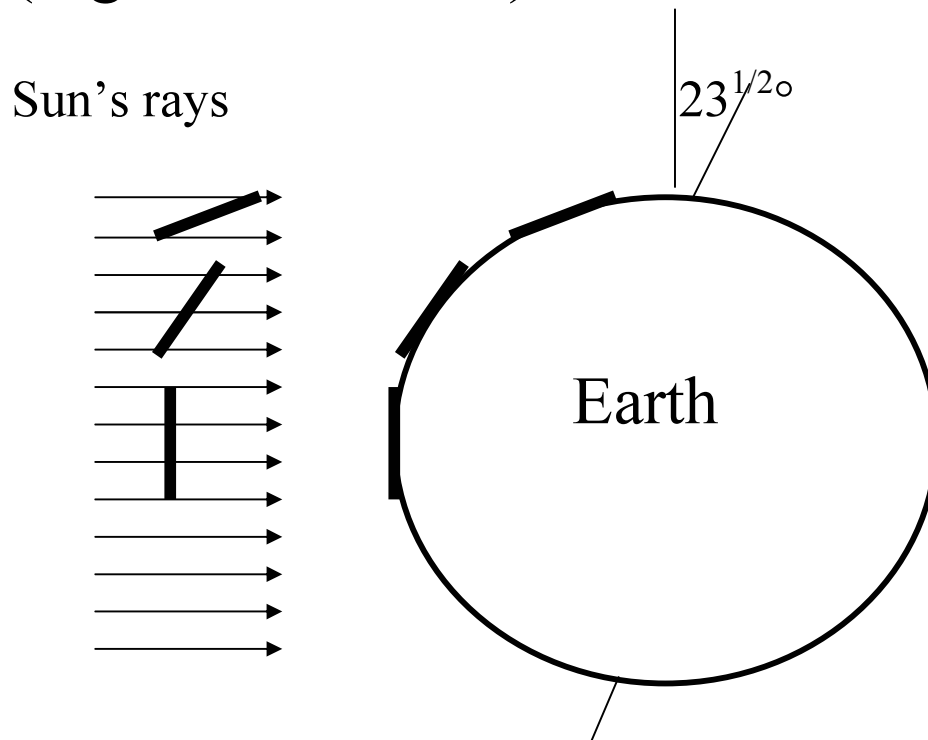
- Heat transfer between the ocean and the atmosphere.
- Heat driving the atmospheric circulation.

Earth's heat budget (Figure 8.2)

The total heat budget on Earth

- The Earth absorbs more heat than the atmosphere
- Heat transferred to the atmosphere by evaporation, conduction and re-radiation
- Heat liberated from the atmosphere by water vapor condensation

Latitudinal and seasonal differences in heat
(Figures 8.3 & 8.4)



On the average, more heat is gained at the equatorial latitudes than lost.

Heat transfer by air and water responsible for the Earth's present temperature patterns.

Seasonal cycle of heat changes at the middle and higher latitudes → summer / winter changes

The structure of the atmosphere

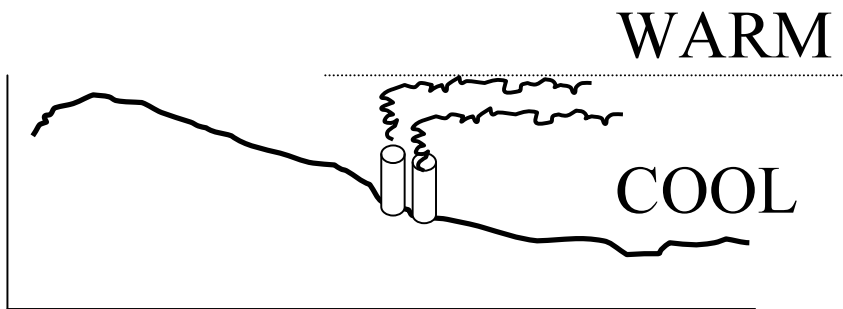
The composition of air

- 78% Nitrogen
- 21% Oxygen
- 0.9% Argon
- 0.03% Carbon dioxide
- Other gases + pollutants
- 0 to 4% water vapor

Atmospheric pressure

- force with which a column of overlying air presses on an area of the Earth's surface.

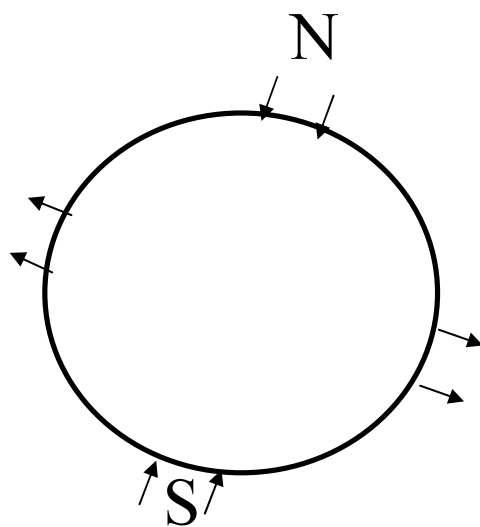
Local inversion layers (Transitory) guides smoke and fog layers



Air temperature ↑	Air density ↓
Air pressure ↓	Air density ↓
H₂O vapor content ↑	Air density ↓

AIR CIRCULATION

If the earth sits still and is all covered with water.



Geometric disparity

Seasonal disparity

Earth rotates, and has land and ocean!
What does it do to the air circulation?

ATMOSPHERIC CIRCULATION CELLS

1. Global atmospheric circulation

Earth's rotation → deflection of the moving air

Coriolis effect

Northern hemisphere
the deflection is to
the right.

Southern hemisphere
the deflection is to the left.
(See Figures 8.8 & 8.9)

