

# PLANET EARTH'S ATMOSPHERE

CONSTITUENTS: N<sub>2</sub> (78%), O<sub>2</sub> (21%), Ar (~1%), H<sub>2</sub>O (0 - 4% varies greatly), C<sub>2</sub>O (0.04%)

PRESSURE: WEIGHT / AREA 15 lb/in<sup>2</sup> = 30" Hg = 1000 mBar = 1 Atmosphere  
VARIES WITH WEATHER CONDITIONS  
WITH HEIGHT ABOVE EARTH'S SURFACE

TEMPERATURE: ~290 K at surface  
VARIES WITH WEATHER CONDITIONS  
WITH HEIGHT ABOVE EARTH'S SURFACE

PROFILES → LAYERING IN THE ATMOSPHERE

WEATHER: DIFFERENCES IN SURFACE TEMPERATURE → WINDS  
VERTICAL & HORIZONTAL

VERTICAL: RISING AIR → LOW PRESSURE → CLOUDS & PRECIPITATION  
FALLING AIR → HIGH PRESSURE → FAIR, DRY WEATHER

HORIZONTAL: [CORIOLIS EFFECT](#) "STEERS" WIND  
TO RIGHT IN NORTHERN HEMISPHERE  
& TO THE LEFT IN SOUTHERN HEMISPHERE

→ CLOCKWISE CIRCULATION AROUND HIGH PRESSURE  
→ COUNTERCLOCKWISE CIRCULATION AROUND LOW PRESSURE

→ PUSHES AIR MASSES OF DIFFERING TEMPERATURE TO  
COLLIDE WITH EACH OTHER: [THE WEATHER CHANNEL](#)

FRONTS:

COLD FRONT: COLD AIR ADVANCES INTO WARMER AIR

WARM FRONT: WARM AIR ADVANCES INTO COLDER AIR

→ WINDS GENERALLY MOVE ALONG ISOBARS

GLOBAL CIRCULATION      PRECIPITATION

[EVOLUTION:](#) WHY STAY? WHY GO?

1) ESCAPE SPEED OF THE PLANET

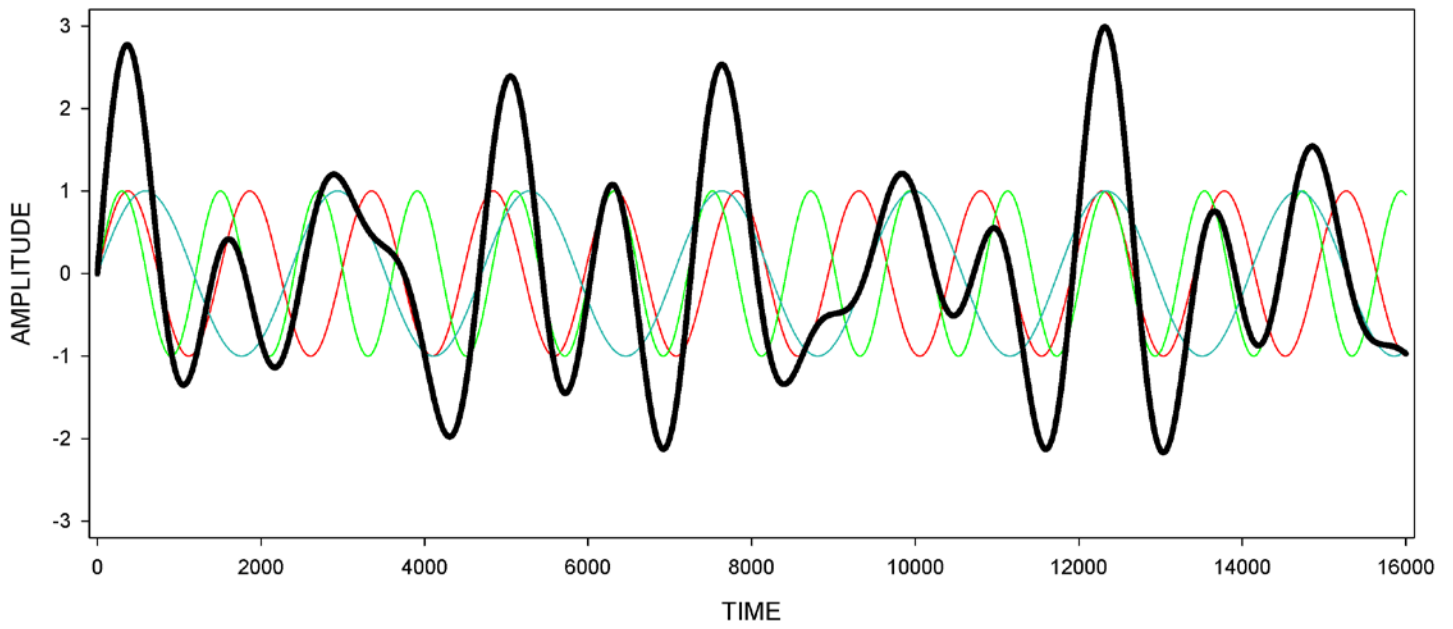
$$v_{\text{escape}} = \sqrt{\frac{2GM}{R}}$$

2) SPEED OF THE MOLECULE

$$v_{\text{molecule}} = \sqrt{\frac{3RT}{m}}$$

WHY CHANGE: CONTINENTAL DRIFT  
UPLIFT OF CONTINENTAL BLOCKS  
CHANGE IN "GREENHOUSE" GASSES  
CHANGE IN OZONE CONCENTRATION  
CHANGES IN EARTH'S ORBIT - THE MILANKOVITCH EFFECT

# INTERFERENCE PATTERN



## Milankovitch Cycles and Temperature from Vostok Ice-core

