Meteorology

5.02 Pressure

References:

FTGU pages 127

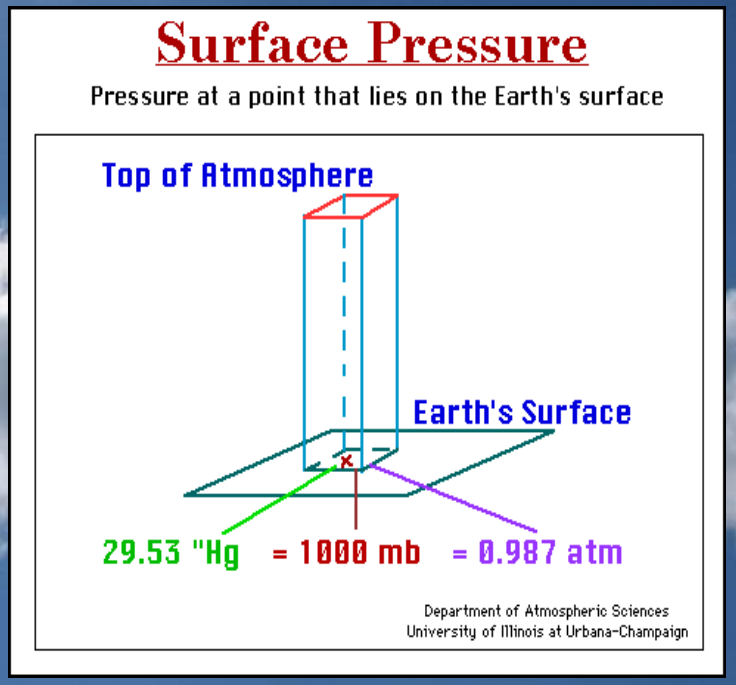
Air Command Weather Manual

5.02 Pressure

- MTPs:
  - Pressure
  - Sea Level vs Station Level
  - Isobars
  - Pressure Changes
  - Pressure Systems
  - Convergence and Divergence
  - Troughs, Ridges, and Cols
  - Altimeter Settings and Transitions

Pressure

- Pressure
  - *“The pressure at any given point is due to the weight of the overlying air.”*
- Barometers measure weight of the air above
  - Recorded in terms of pressure
- Units of measurement include:
  - Inches of Mercury (“Hg)
  - Hectopascals (hPa)



Station Level vs Sea Level

- Station Pressure:
  - The *actual* weight of the atmosphere above the reporting station
- Mean Sea Level Pressure (MSL):
  - Station pressure corrected for elevation
  - “Imaginary” column of air down from the station to MSL
  - Expressed in hectopascals
  - Local temperature taken into account
  - Gives information on what the pressure is like in reference to sea level

Station Level vs Sea Level

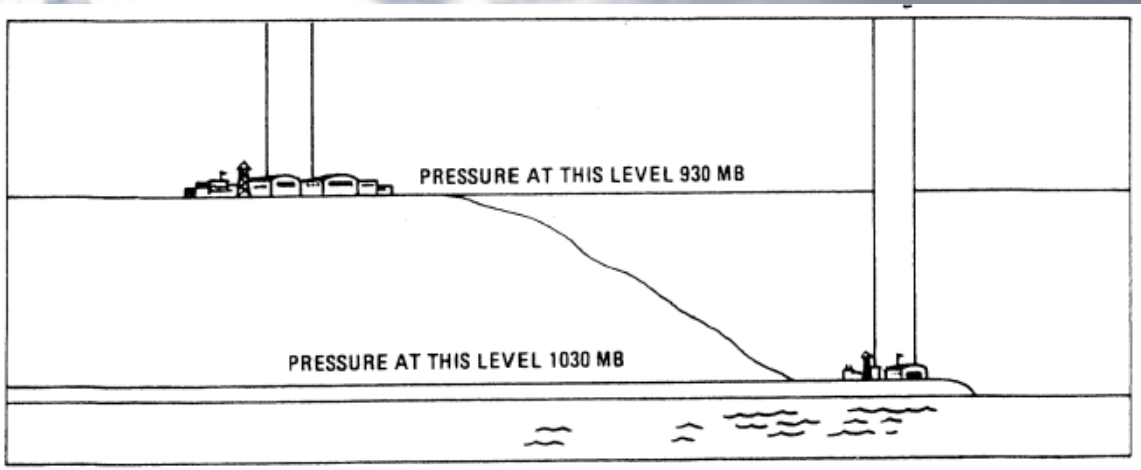


Figure 5-3 Difference in Station Pressure Due to Difference in Station Elevation

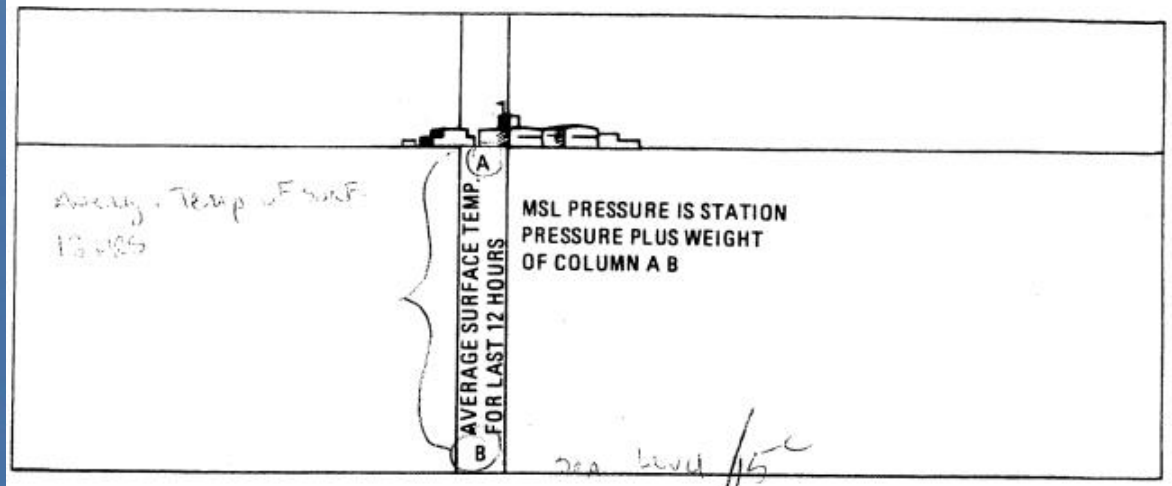
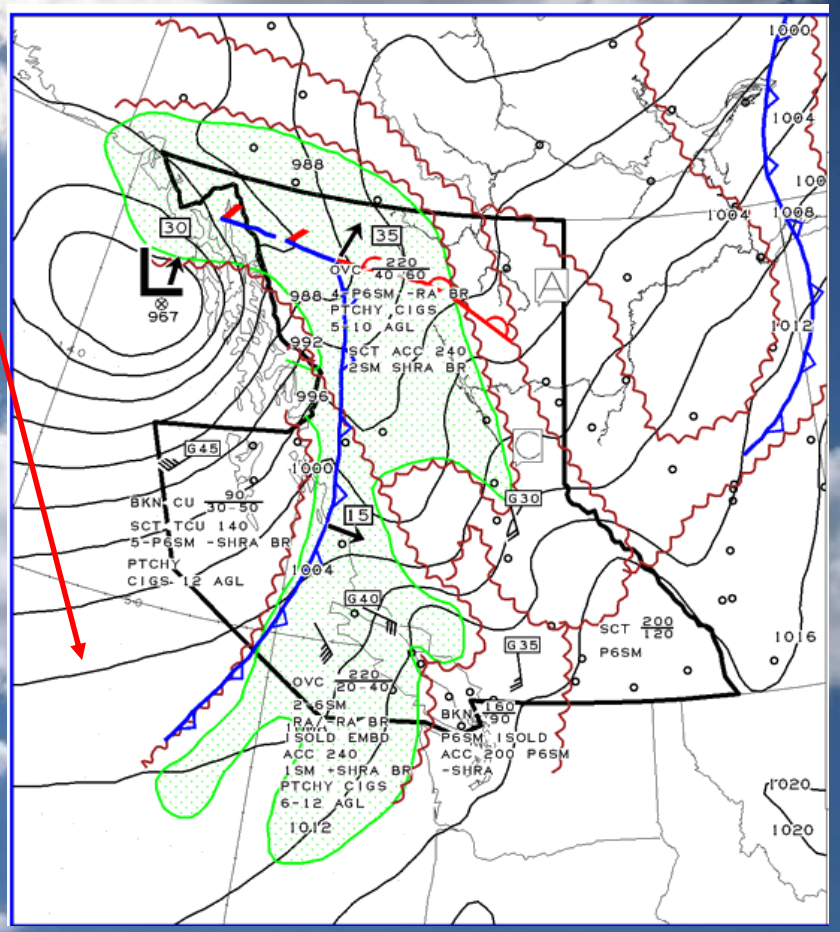


Figure 5-4 Mean Sea Level Pressure

Isobars

- Lines joining places of equal barometric pressure
- Depict how deep or concentrated a pressure system is
- “Iso” is latin for “same” or “equal”
- “bar” is latin for pressure



Pressure Changes

- Pressure observations are usually made hourly
- Weather maps are prepared 4 times daily
- The differences in these readings creates a trend of either rising or falling pressure, which is referred to as the pressure tendency
  - This assists in forecasting weather

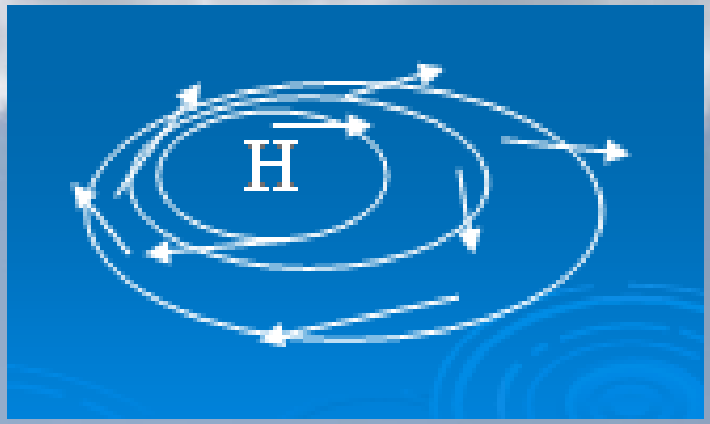
Pressure Systems

- Low Pressure Systems
  - Also called “cyclones”
  - Areas of relatively low pressure with the lowest pressure at the center
  - Wind flows counter-clockwise and inward
  - Secondary lows also exist
    - Smaller disturbances within the low pressure region
    - Generally produce thunderstorms or heavy precipitation

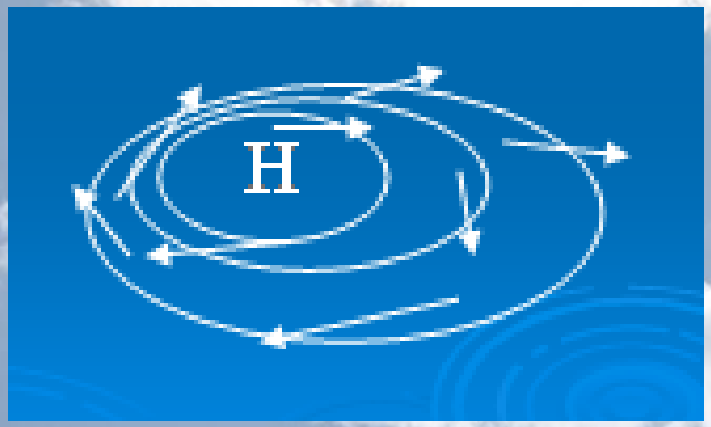
- Buy Ballot’s Law: *“If the wind is at your back, the low is to your left!”*
  - Northern hemisphere only, opposite for the southern.

Pressure Systems

- High Pressure Systems
  - Also known as “anti-cyclones”, areas of relatively high pressure with the highest pressure at the center
  - Wind flows clockwise and outward
  - Tend to travel slower than lows, or remain stationary



Pressure Systems



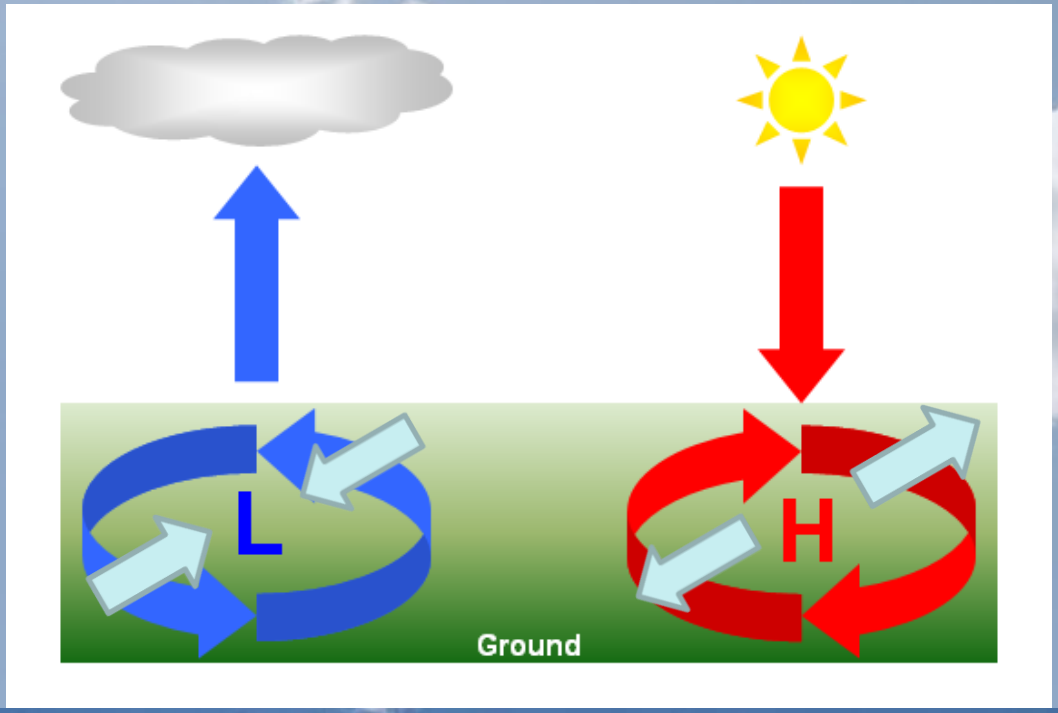
Convergence and Divergence

– Convergence

- Air flowing inwards towards a low
- Produces rising air where it meets in the centre of the low

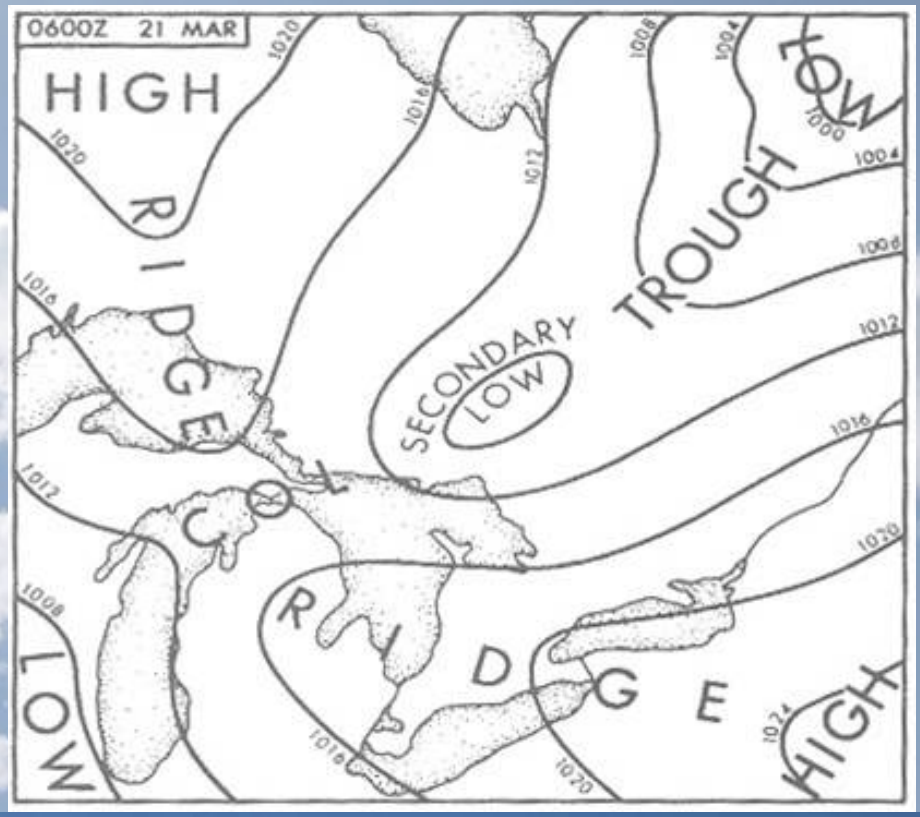
– Divergence

- Air flowing outwards from a high
- Produces sinking air to replace the air in the centre of the high



Troughs, Ridges, and Cols

- Troughs
  - Elongated low with higher pressure on both sides
  - “u” or “v” shaped
- Ridges
  - Areas of high pressure with lower pressure on both sides
  - “v” shaped
- Col
  - Region between two highs and two lows



Altimeter Settings and Transitions

- Altimeters operate based on pressure
- Without updating the barometric scale on the altimeter (the inner set of numbers), it will not read accurately
- High pressure value = more weight of air above you

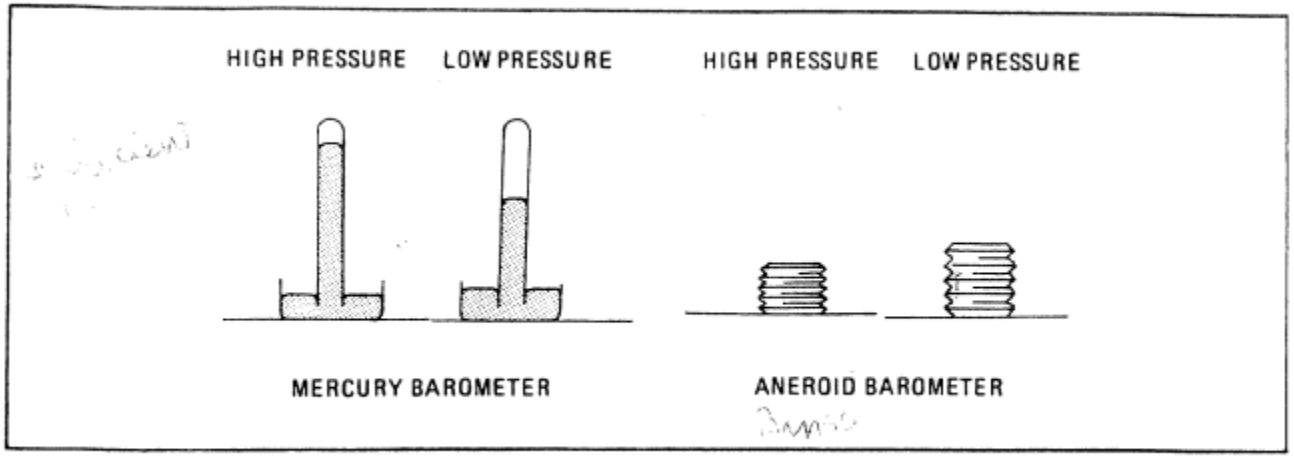
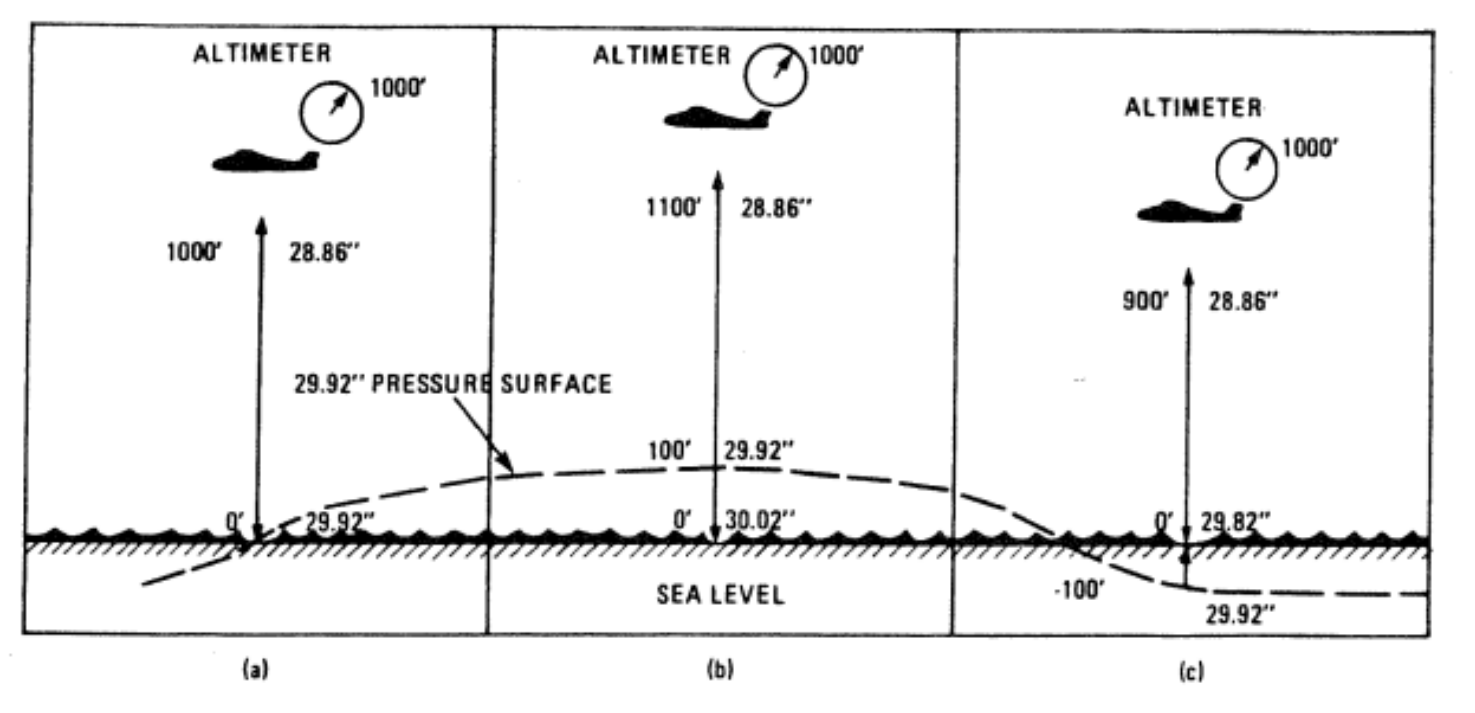


Figure 5-2 Mercury and Aneroid Barometers

Altimeter Settings and Transitions

- As we fly the pressure changes from place to place. This will change how our altimeter is able to read



Altimeter Setting and Transitions

- Flying from a region of higher pressure to a region of lower pressure, altimeter will read higher than your actual altitude.

Altimeter Setting and Transitions

- Flying from a region of lower pressure to a region of higher pressure, altimeter will read lower than your actual altitude.

Confirmation

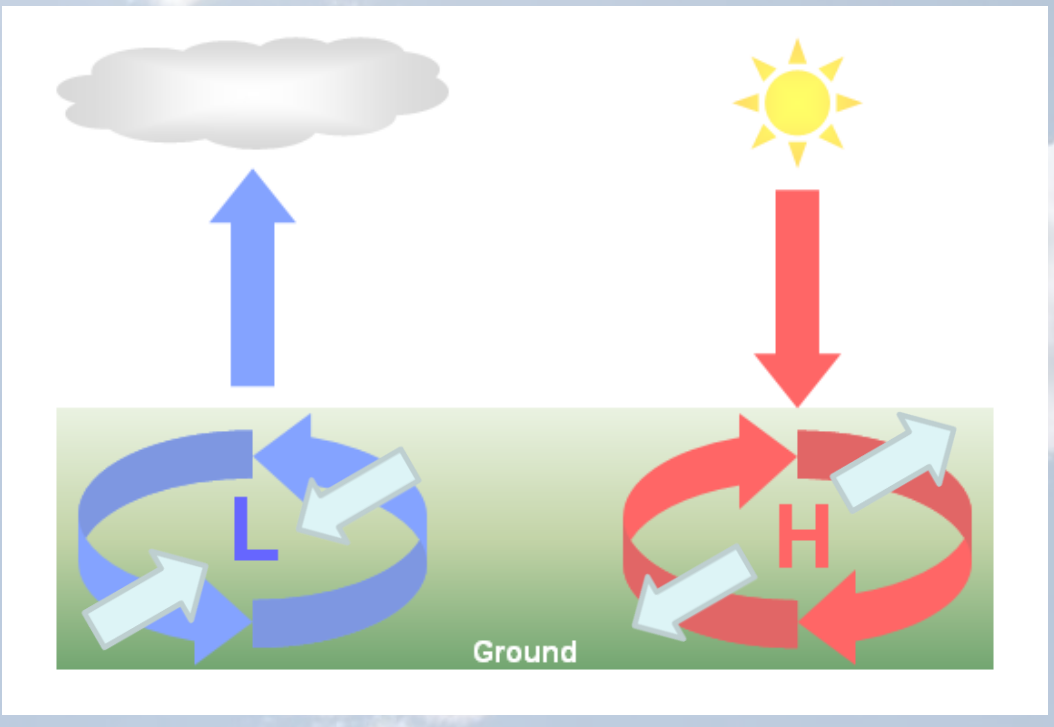
- Explaining the following phenomena

– Convergence

- Air flowing inwards towards a low
- Produces rising air where it meets in the centre of the low

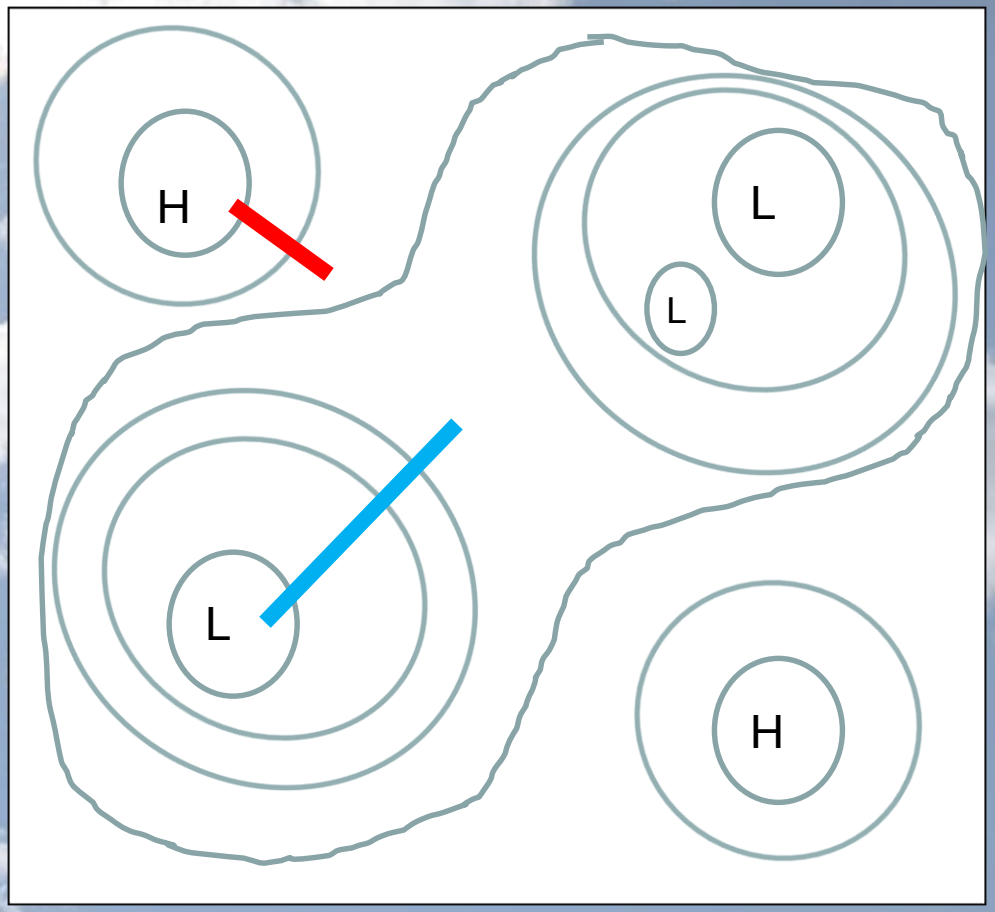
– Divergence

- Air flowing outwards from a high
- Produces sinking air to replace the air in the centre of the high



Confirmation

- Draw a series of isobars showing
  - A trough
  - A ridge
  - A secondary low



Pressure Barometer