



Meteorology




5.02 Pressure

References:
FTGU pages 127
Air Command Weather Manual



5.02 Pressure

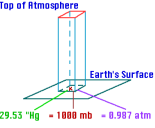
- MTPs:
 - Pressure
 - Sea Level vs Station Level
 - Isobars
 - Pressure Changes
 - Pressure Systems
 - Convergence and Divergence
 - Troughs, Ridges, and Cols
 - Altimeter Settings and Transitions



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)

Surface Pressure
Pressure at a point that lies on the Earth's surface




29.55 "Hg = 1000 mb = 0.987 atm

Open School of Atmospheric Sciences
University of British Columbia



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

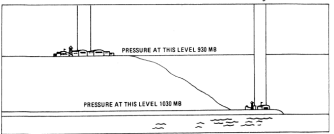


Figure 5-3 Difference in Station Pressure Due to Difference in Station Elevation

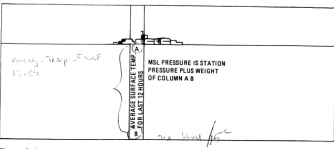

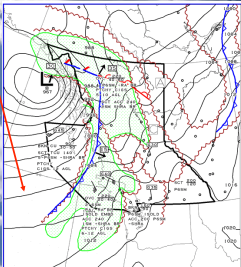



Figure 5-4 Mean Sea Level Pressure



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



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

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

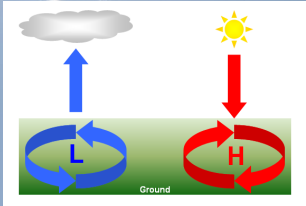
- Flying from a region of higher pressure to a region of lower pressure, altimeter will read higher than your actual altitude.

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


- Explain the following phenomena




Ground

 Confirmation

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



 Pressure Barometer

