

# EASY ATPL

*written by*  
**Matteo Sonogo**

## GENERAL NAVIGATION

**Subject 1**



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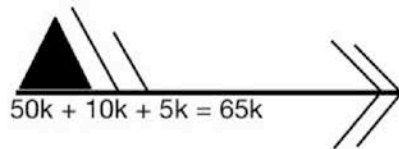
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# Winds

Wind is caused by difference in temperature / horizontal pressure difference and it goes always **from the High pressure to the Low pressure**.

Surface wind is measured with an anemometer, **8 - 10 m** above airdrome level.

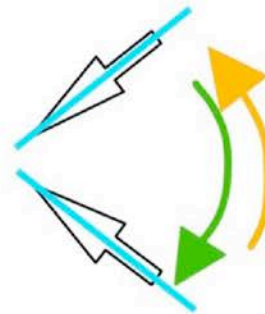
[ kts x 1,8 = km ] [ km/h : 3,6 = m/s ]



Low pressure is on the side where flags are placed

VEERING is a CLOCKWISE change of wind direction

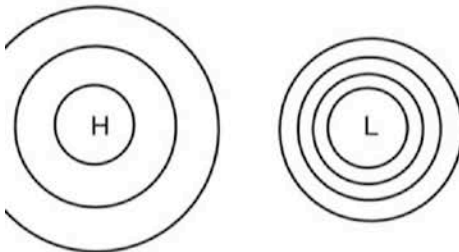
BACKING is an ANTICLOCKWISE change in wind direction



## Pressure Gradient Force (PGF)

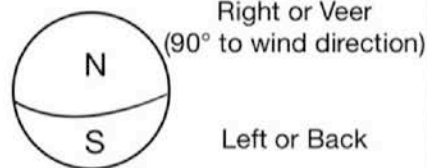
Is said to act when 2 points at the same level have a difference in atmospheric pressure.

Acts **perpendicular to the isobars**



Closely spaced isobars indicate large pressure gradient

## Coriolis Force (CF)



Max at Poles and min at Equator  
(At Equator, horizontal motion do not induce any Coriolis Force)  
In fact, it can be neglected from 0° to 10° N/S

$$CF = 2 \Omega \sin \theta V$$

Latitude

## Geostrophic Wind

Blows parallel to straight isobars and no friction is involved.

PGF and CF must working opposite each other and in balance.

Perpendicular to PGF



$$V = \frac{PGF}{2 \Omega \sin \theta}$$

Magnitude of geostrophic wind increases with increase in wind speed / PGF

Condition necessary for the wind to be **Geostrophic**:

- above friction layer



Of the forces that act on Low level winds: the pressure gradient force acts across the isobars and the geostrophic wind acts at right angles to the wind vector.

With two pressure system at different latitudes, but with the same isobar spacing, it would possible to have the same gradient wind speed: a low al low latitude and a high at high latitude.

Stability of the friction layer depends primarily on: stability, wind speed, roughness of surface.

A stationary observer in the N Hemisphere is situated in front of a depression. The center of the depresssio passes from west to east and **North/South** of the observer. For this observer the wind direction is: **veering/backing**.

