

# The Jet Stream, high and low pressure systems and fronts; Understanding the weather

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# Hurricane



Figure: Hurricane Ivan, Sept. 2004

# Polar low

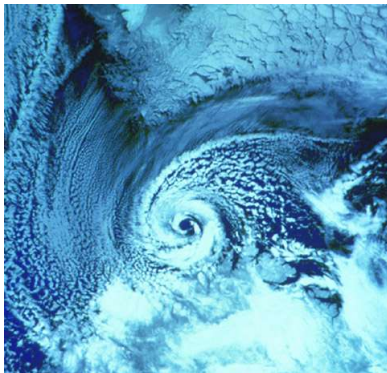


Figure: A polar low over the Barents Sea, 27 Feb., 1987

# Hurricane



Figure: Hurricane Katrina, Aug. 2005

# Flooding



Figure: Coastal flooding, England

# Snow



Figure: Chicago, 2009

8 Jan., 2010; www.yr.no

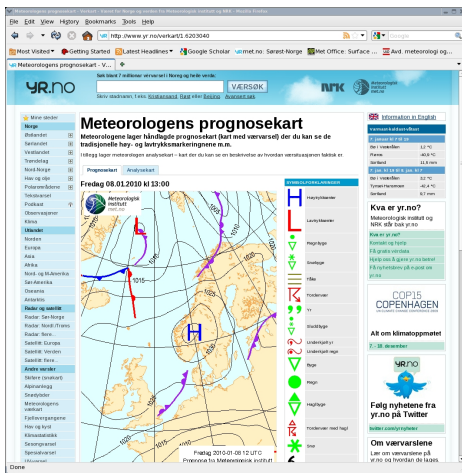
The screenshot shows the website yr.no with a search bar for 'VÆRSØK' and a search button. The main content area displays a weather forecast for Oslo, with a table showing conditions for Friday, Saturday, and Sunday. A map of Norway is shown with weather icons indicating conditions across different regions. The website also features a sidebar with navigation links, a 'Global oppvarming?' section with a photo of a couple on a beach, and a 'COP15 COPENHAGEN' banner.

Andre steder	Fredag	Lørdag	Søndag	
Oslo	Sol	10°	10°	10°
Bergen	Sol	12°	12°	12°
Stavanger	Sol	12°	12°	12°
Tromsø	Sol	22°	18°	18°
Tromsø	Tåke	2°	1°	1°
Kirkenes	Sol	1°	1°	1°
Stubbø	Sol	12°	12°	12°
Luleå	Sol	2°	1°	1°
Mer, tryk	1 013	1 013	1 013	

**Global oppvarming? I denne kulda?**  
 Kan man fyse bære av seg mang verdens Norge klimaforskere tør varmere?



8 Jan., 2010; www.yr.no



# Dynamics

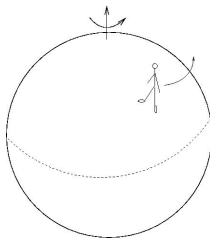
## Basic balances:

- Geostrophic balance
- Hydrostatic balance
- Thermal wind balance

## Phenomena:

- Pressure systems
- Jet Stream
- Fronts and precipitation

# Rotation



$$vel_{total} = vel_{person} + vel_{rotation}$$

SO:

$$vel_{person} = vel_{total} - vel_{rotation}$$

# Deflection

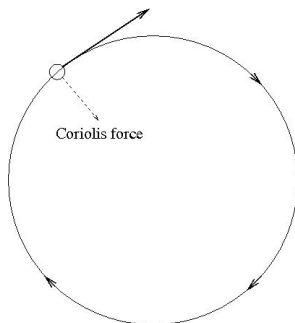
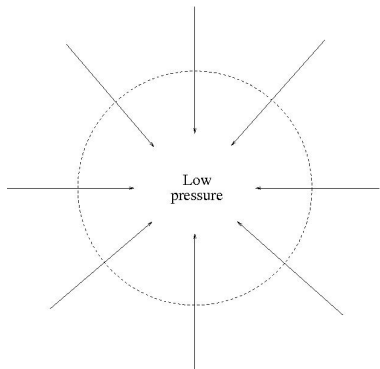
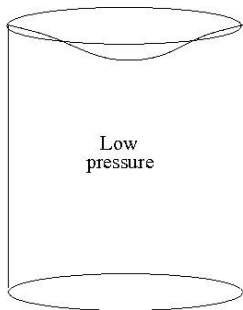
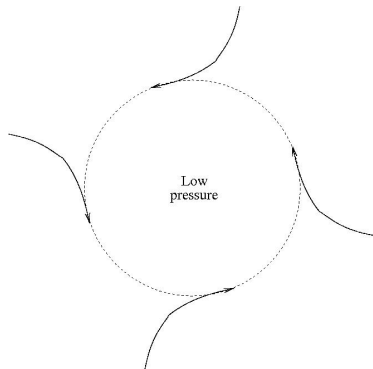
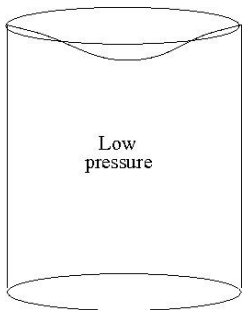


Figure: Deflection to the right in the Northern Hemisphere

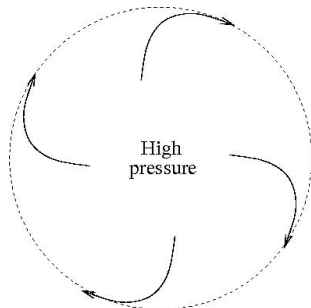
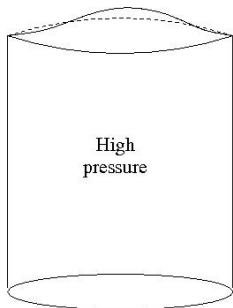
# Low pressure without rotation



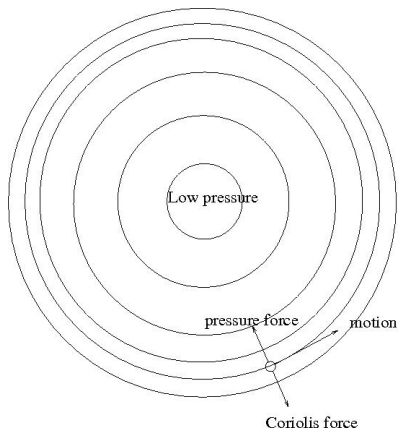
## Low pressure with rotation



# High pressure with rotation



# Geostrophic balance



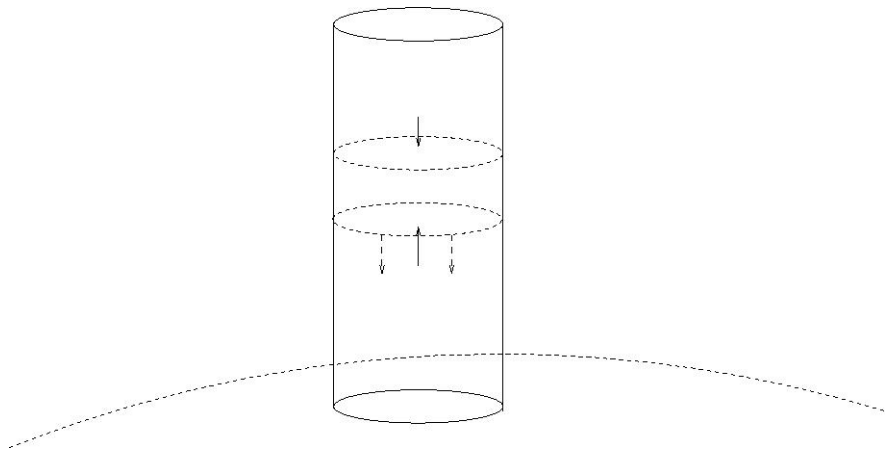


# Hurricane

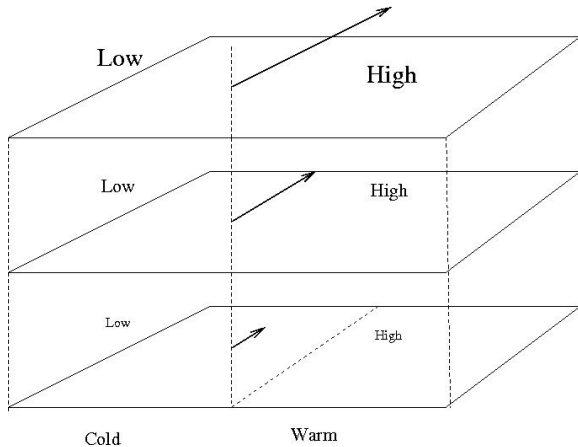


Figure: Hurricane Ivan

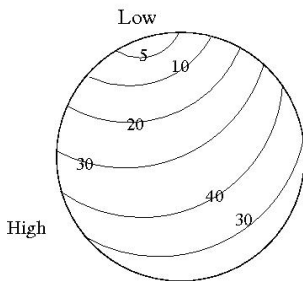
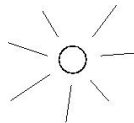
# Hydrostatic balance



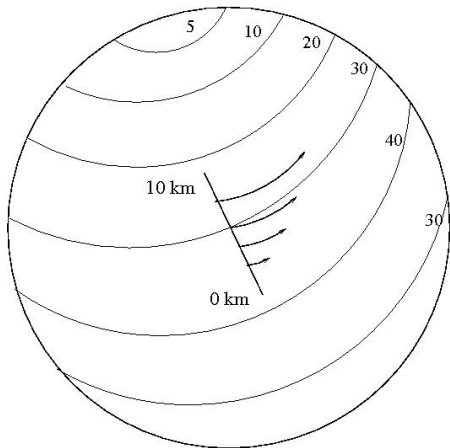
# Thermal wind



# Jet stream



# Jet stream



# Jet stream

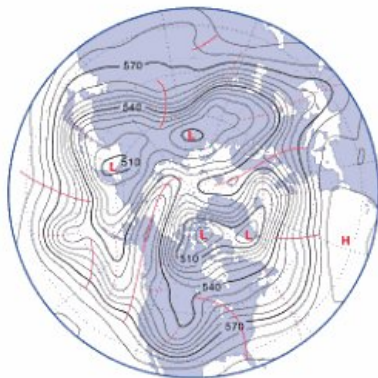


Figure: Wallace and Hobbs, 2006

# Instability and turbulence



# Jet stream

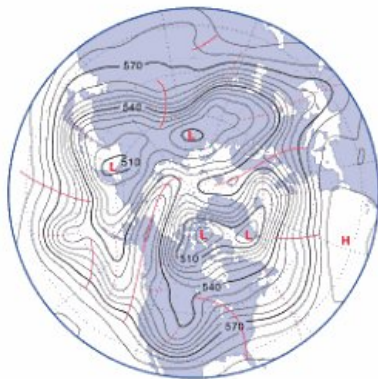
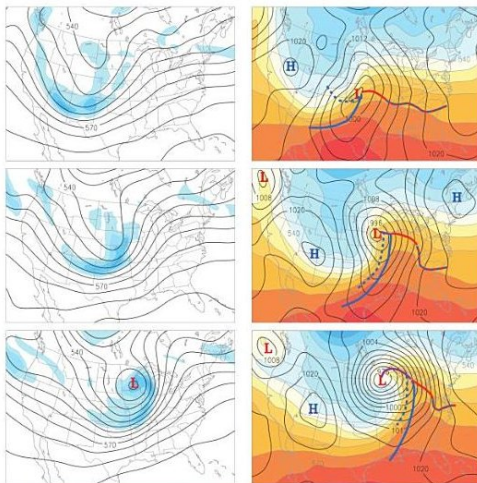


Figure: Wallace and Hobbs, 2006



# Storm formation



# Storm formation

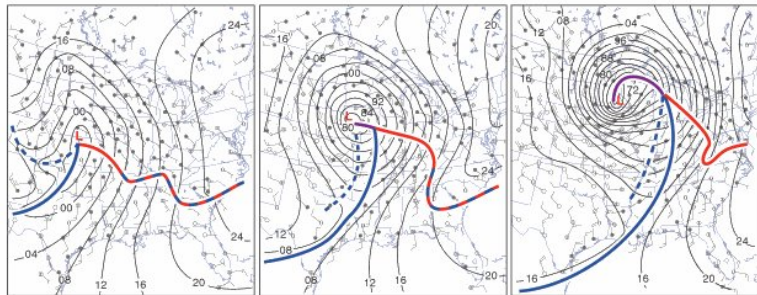
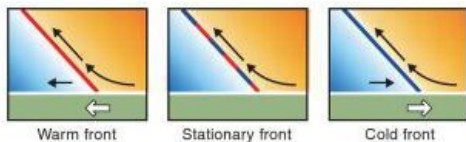


Figure: Wallace and Hobbs, 2006

# Fronts

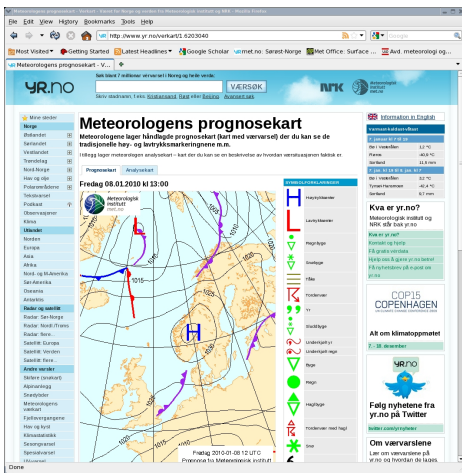


- Warm/cold fronts
- Vertical motion
- → *precipitation*

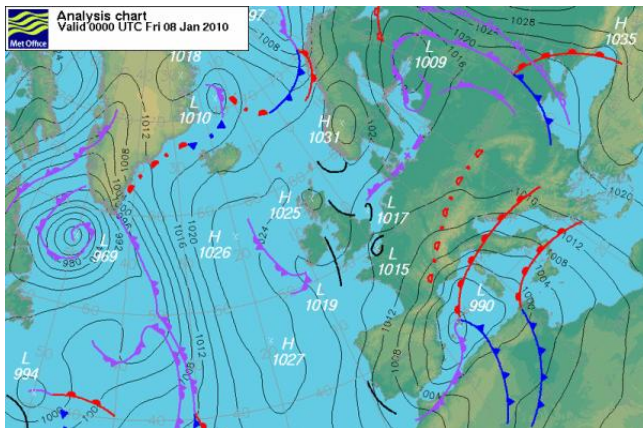
# Squall



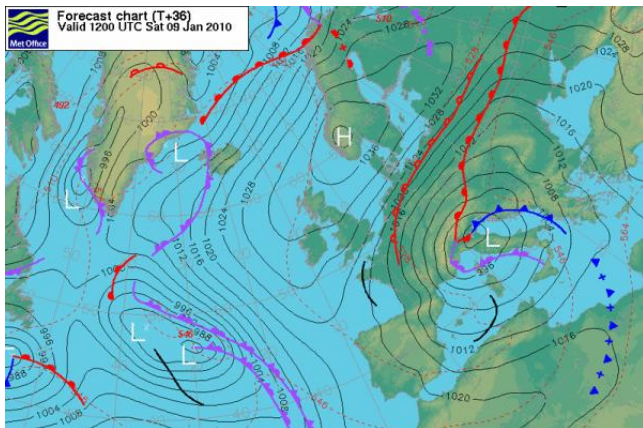
8 Jan., 2010; www.yr.no



8 Jan., 2010; UK Met Office



9 Jan., 2010; UK Met Office



25 Jan., 2010; UK Met Office

