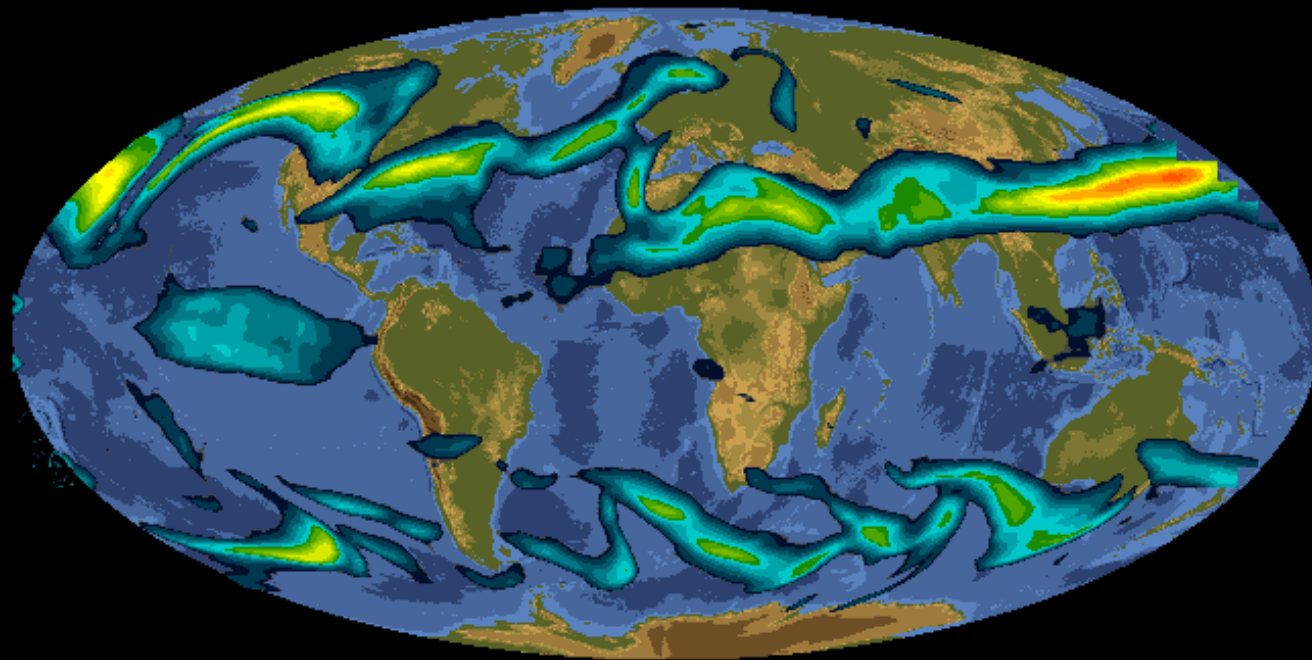


FWFC – JET STREAMS

Lyndon State College
Jet Stream Winds (kt)



THERMAL WIND

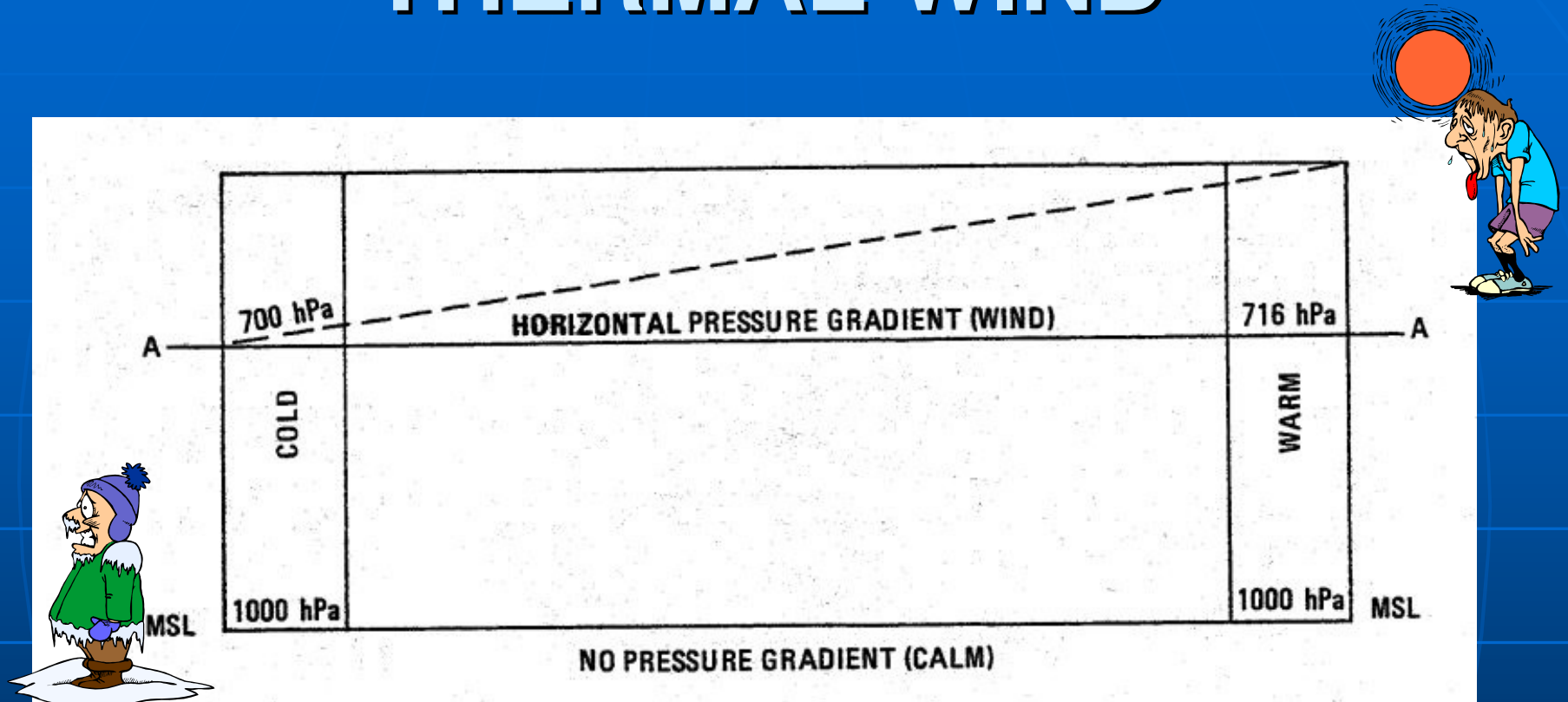


Figure 12-5 Development of Pressure Difference with Height

THERMAL WIND

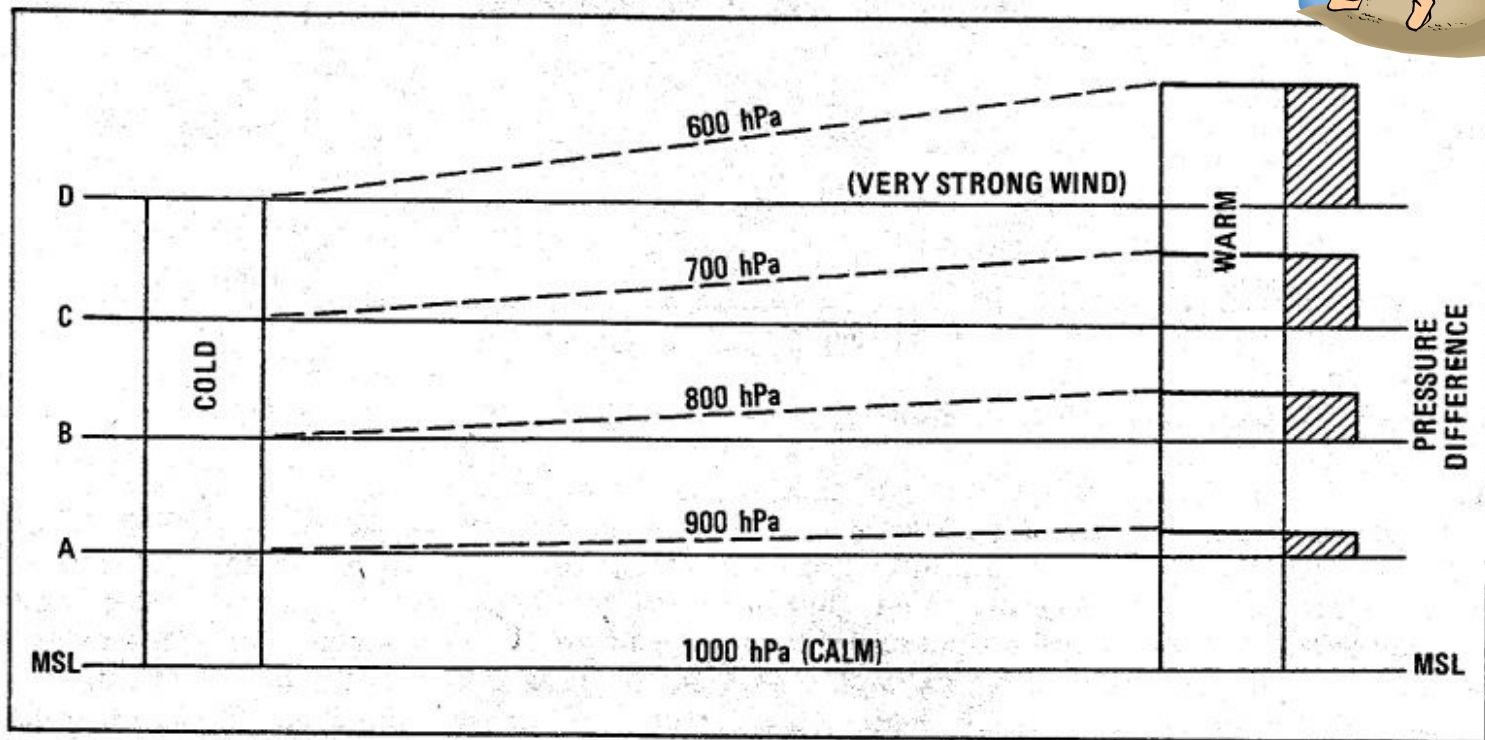
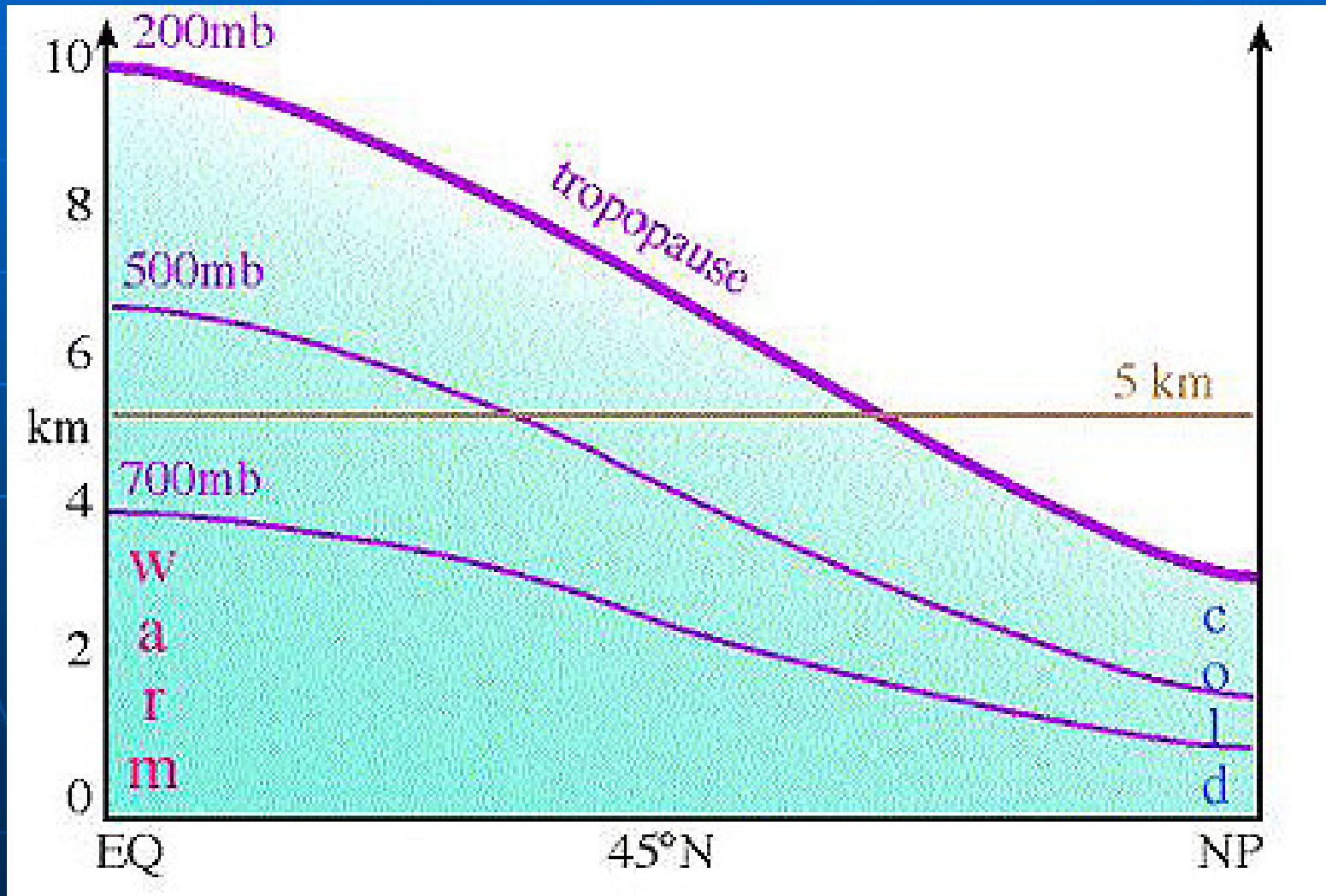
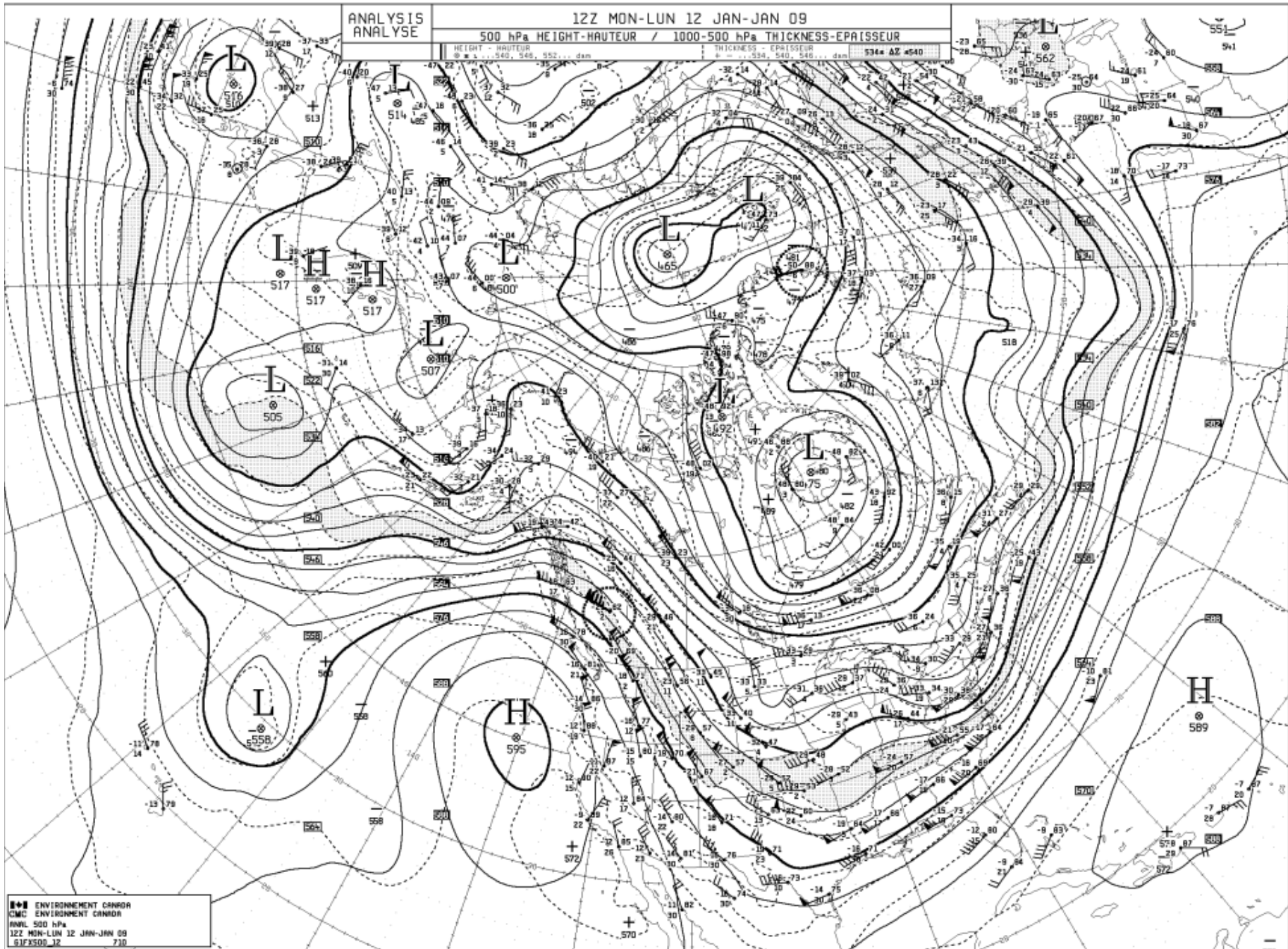


Figure 12-7 Pressure Distribution at a Level

HORIZONTAL PRESSURE DIFFERENCES





500 hPa Analysis Chart – different altitudes 500 hPa is found at

WINDS IN THE TROPOSPHERE

- In the troposphere cold air lies over the polar regions and warm air over the tropics
- The thermal wind blows with cold air to the left; result westerly winds that increase with height
- In reality temperature does not decrease uniformly with latitude thus winds tend to meander north and south

MEANDERING WIND AXIS

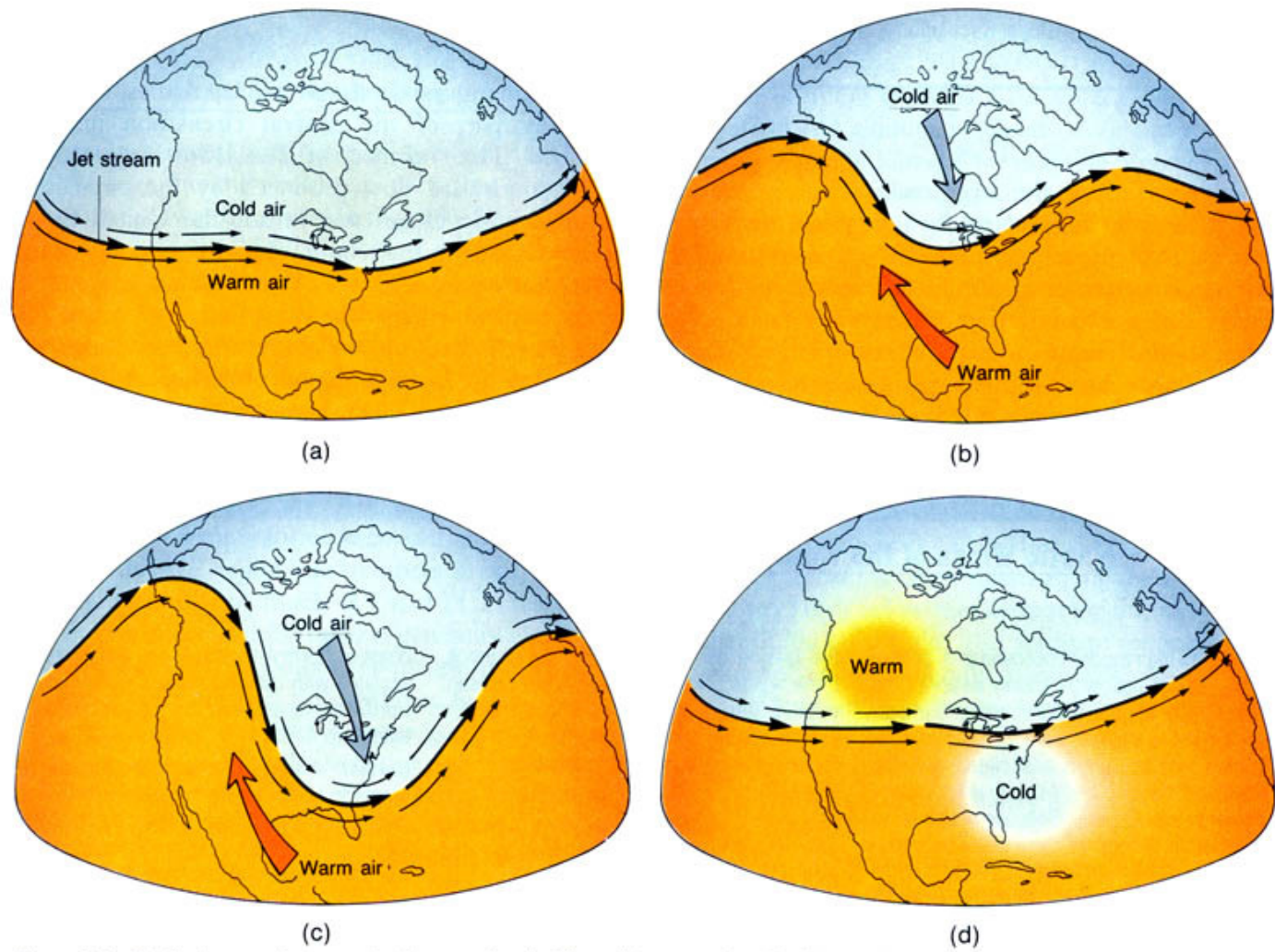
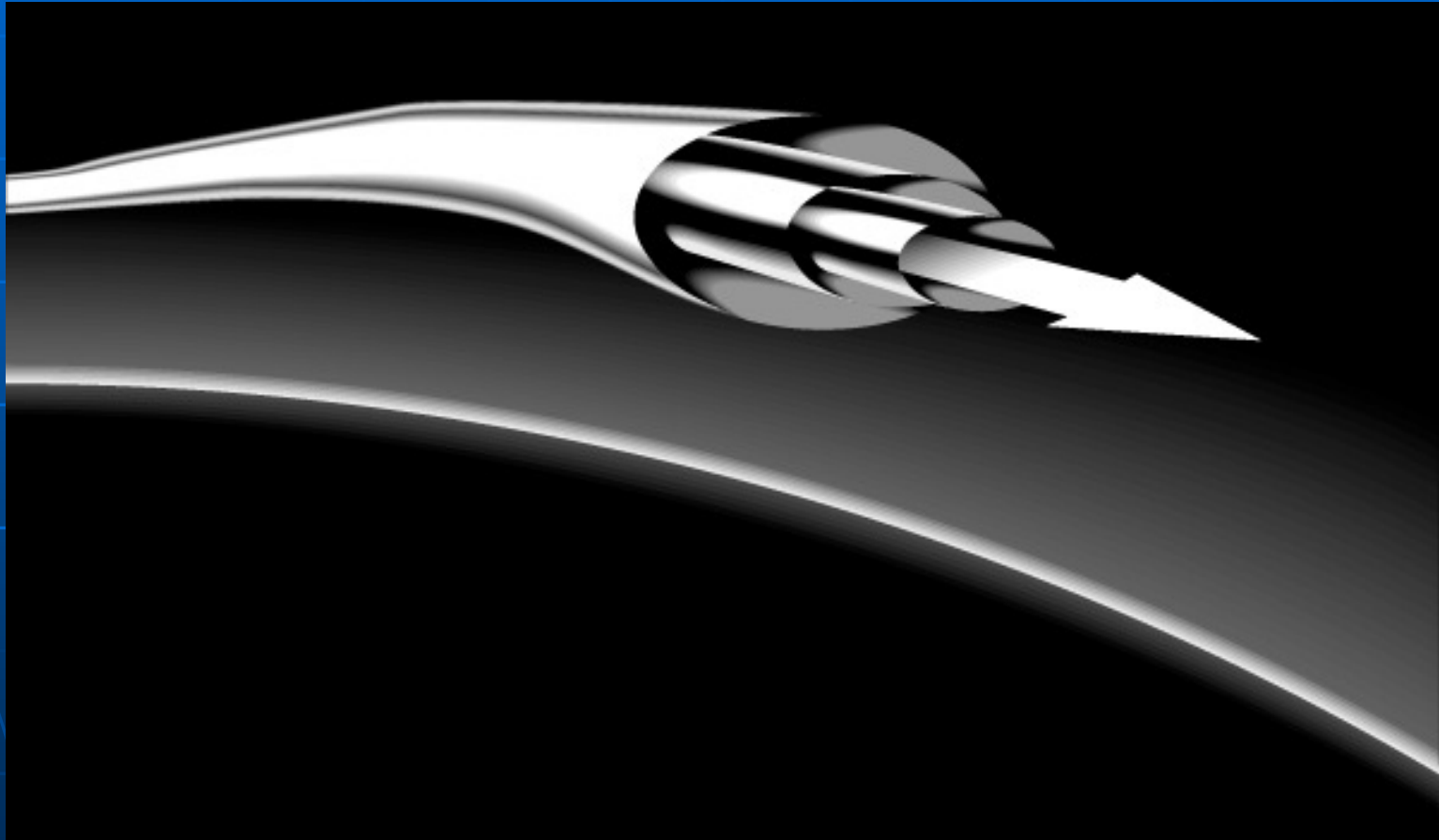


Figure 8•9 Cyclic changes that occur in the upper-level airflow of the westerlies. The flow, which has the jet stream as its axis, starts out nearly straight and then develops meanders that are eventually cut off. (After J. Namias, NOAA)

JET STREAMS



JET STREAMS

- Narrow, rapidly flowing, ribbon-like streams of air embedded in the main flow (≥ 60 knots)
- Tend to be thousands of miles long, a few hundred miles wide and a few thousand feet thick

JET STREAM CIRRRUS



FRONTAL JET STREAMS

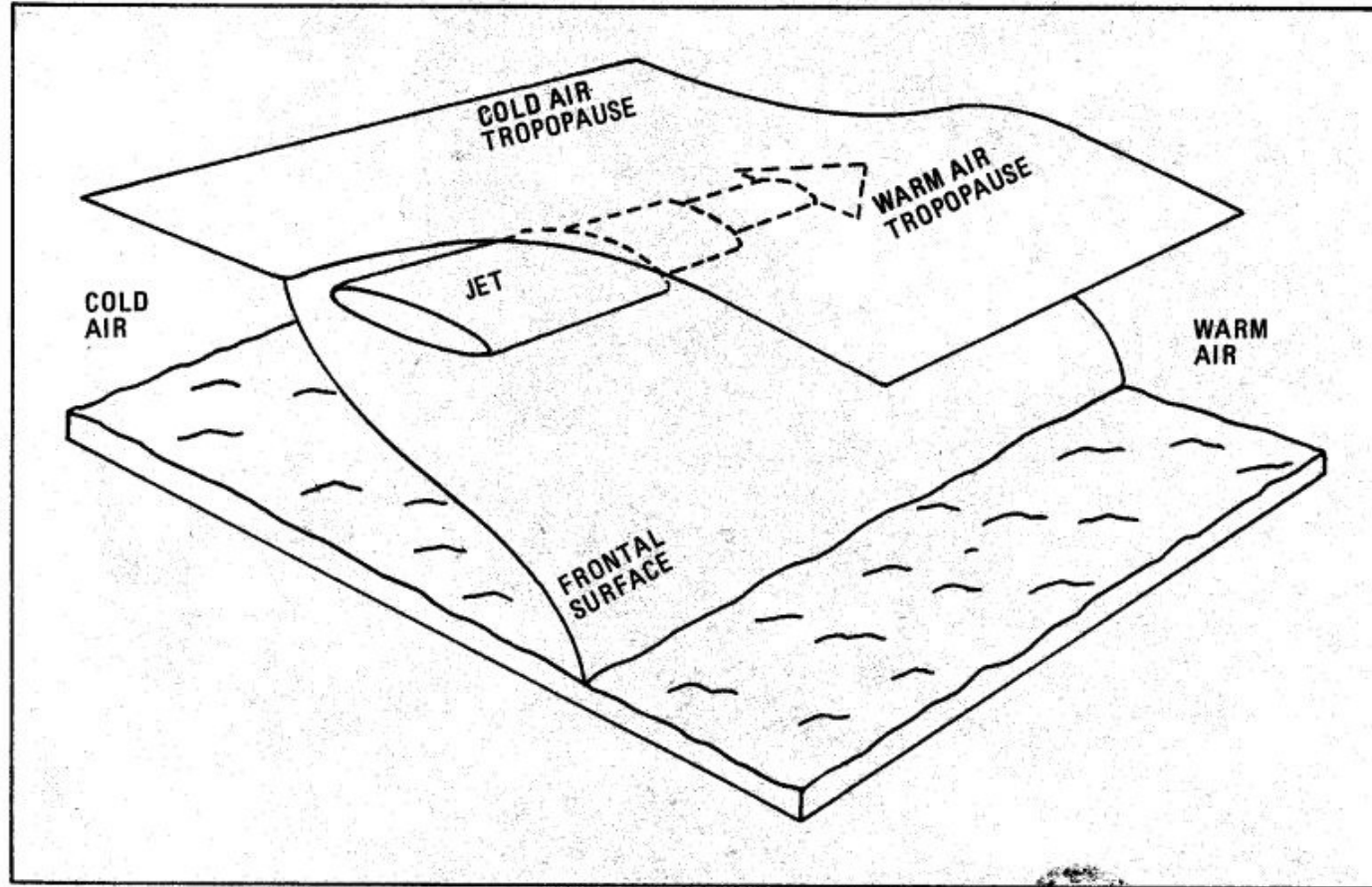


Figure 12-17 Jet in Relation to a Frontal Surface

FRONTAL JET STREAMS

The thermal ribbon associated with a front is ideal for generating jet streams

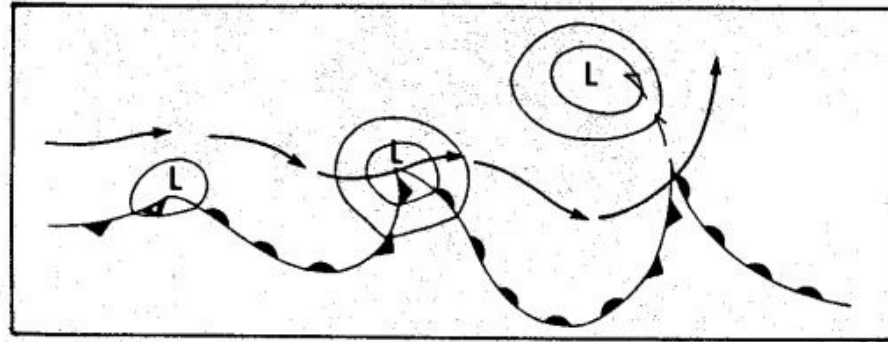


Figure 12-16 Jet in Relation to a Frontal System

FRONTAL JET STREAMS

- the jet stream is named after the frontal system that created it
- jet stream height varies according to the front and season. It can also meander vertically up and down along its length at any particular time
- Polar jet – 11,300 m *all are average values
Maritime Jet - 10,000 m
Arctic Jet – 8500 m

SEASONAL CHANGES

- Jet streams in winter are:
 - stronger in speed
 - further south in latitude
 - lower in altitude

than in summer

WIND SPEEDS IN A JET STREAM

- speeds vary along a jet stream depending the alignment of the thermal winds below the jet axis
- Jet maximas tend to propagate downstream

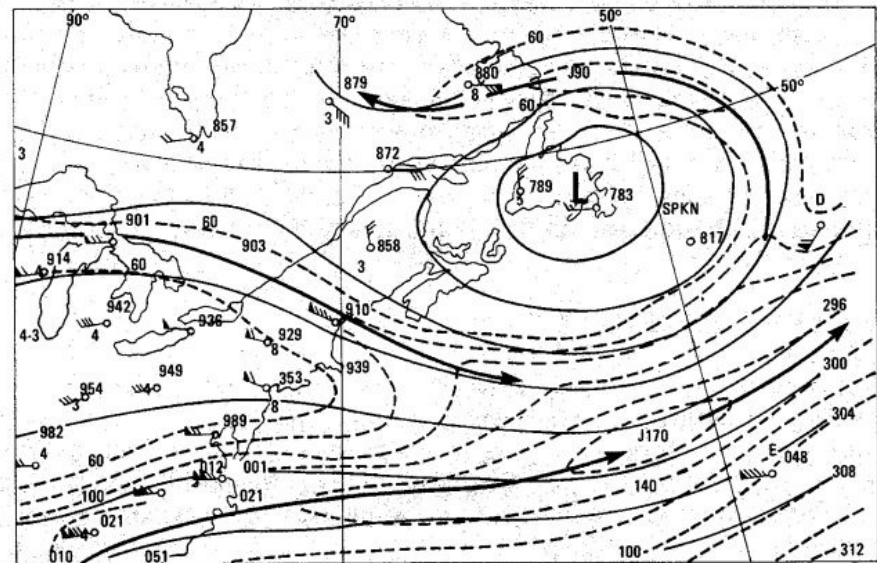
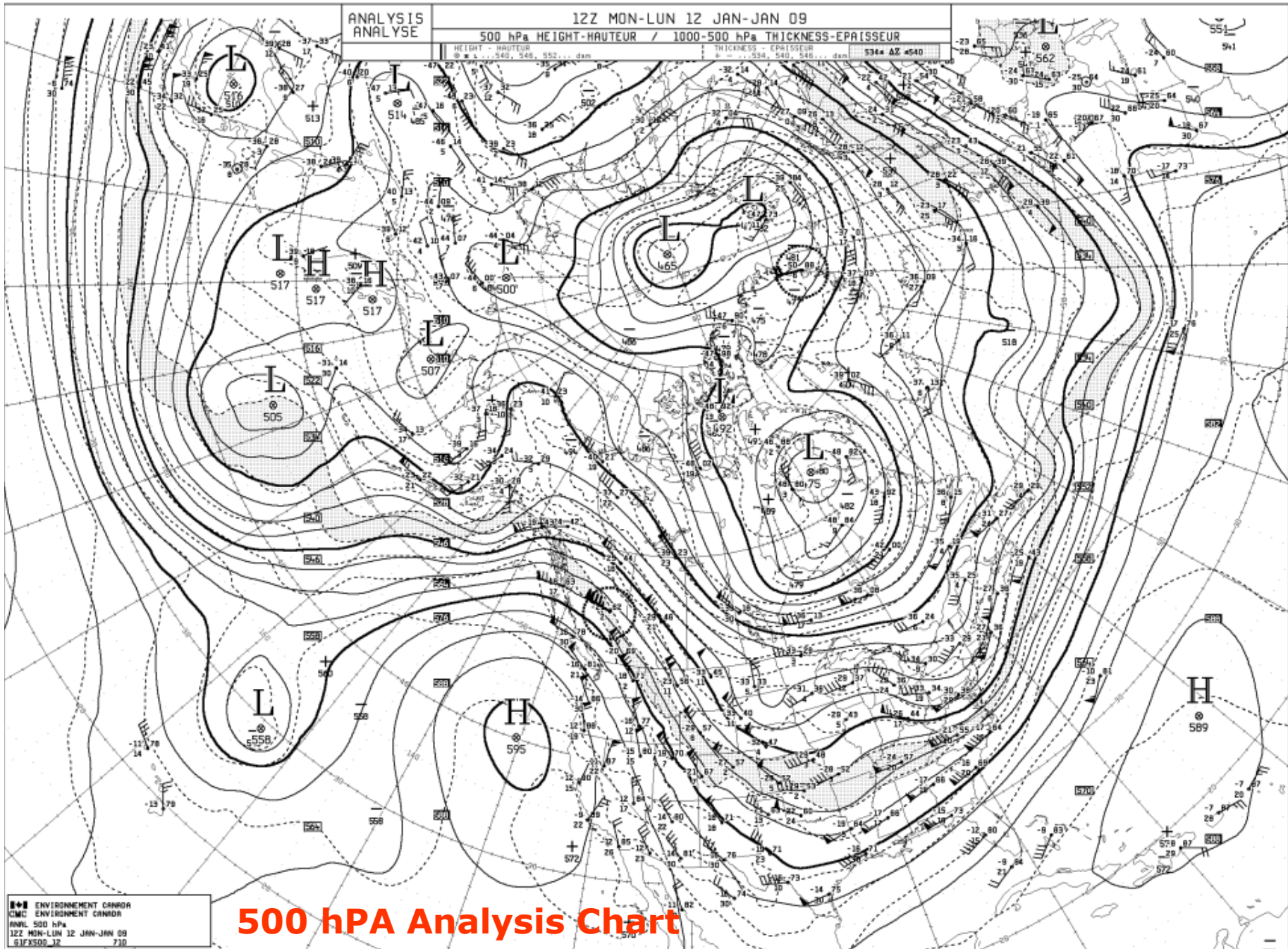


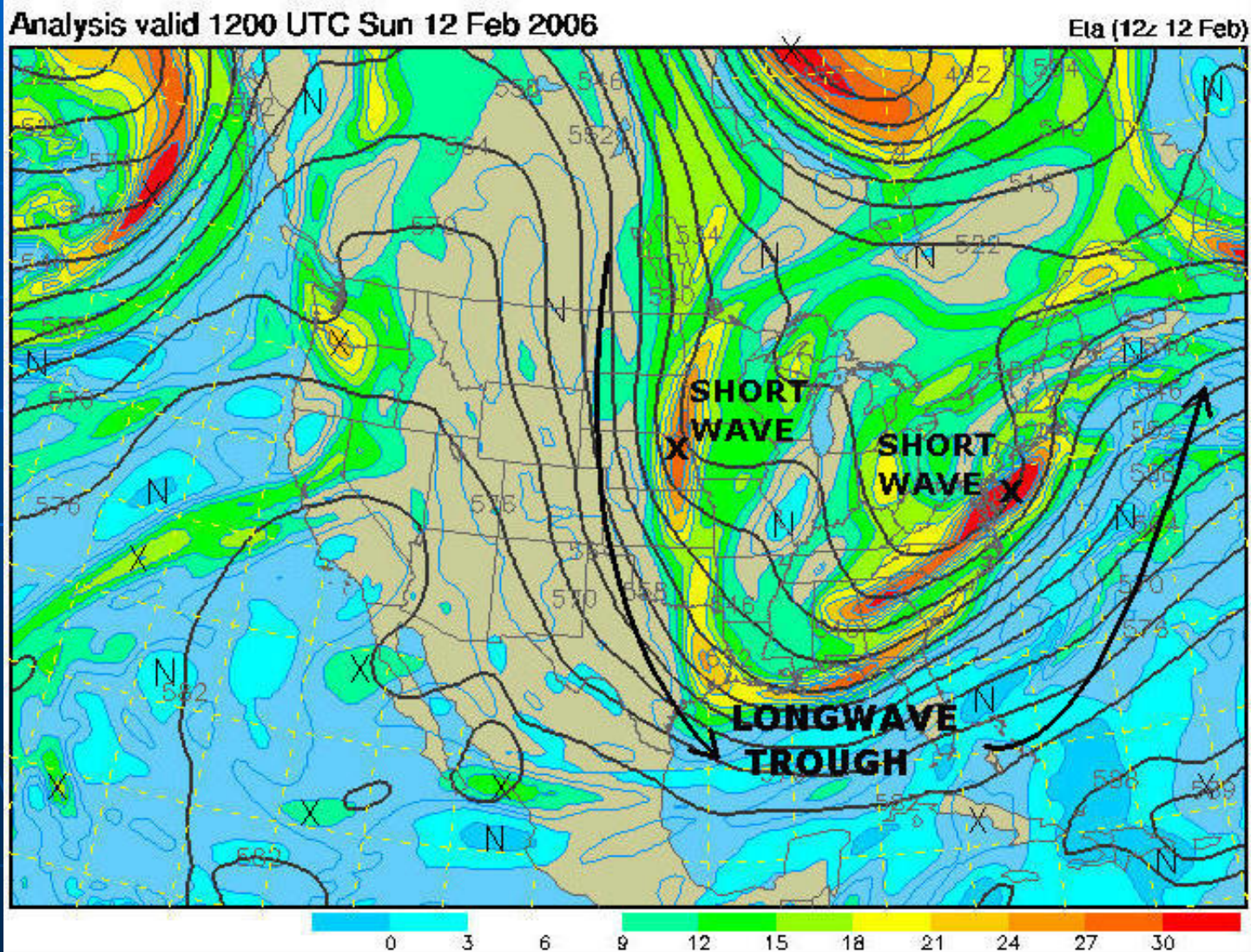
Figure 12-20 Jet Streams

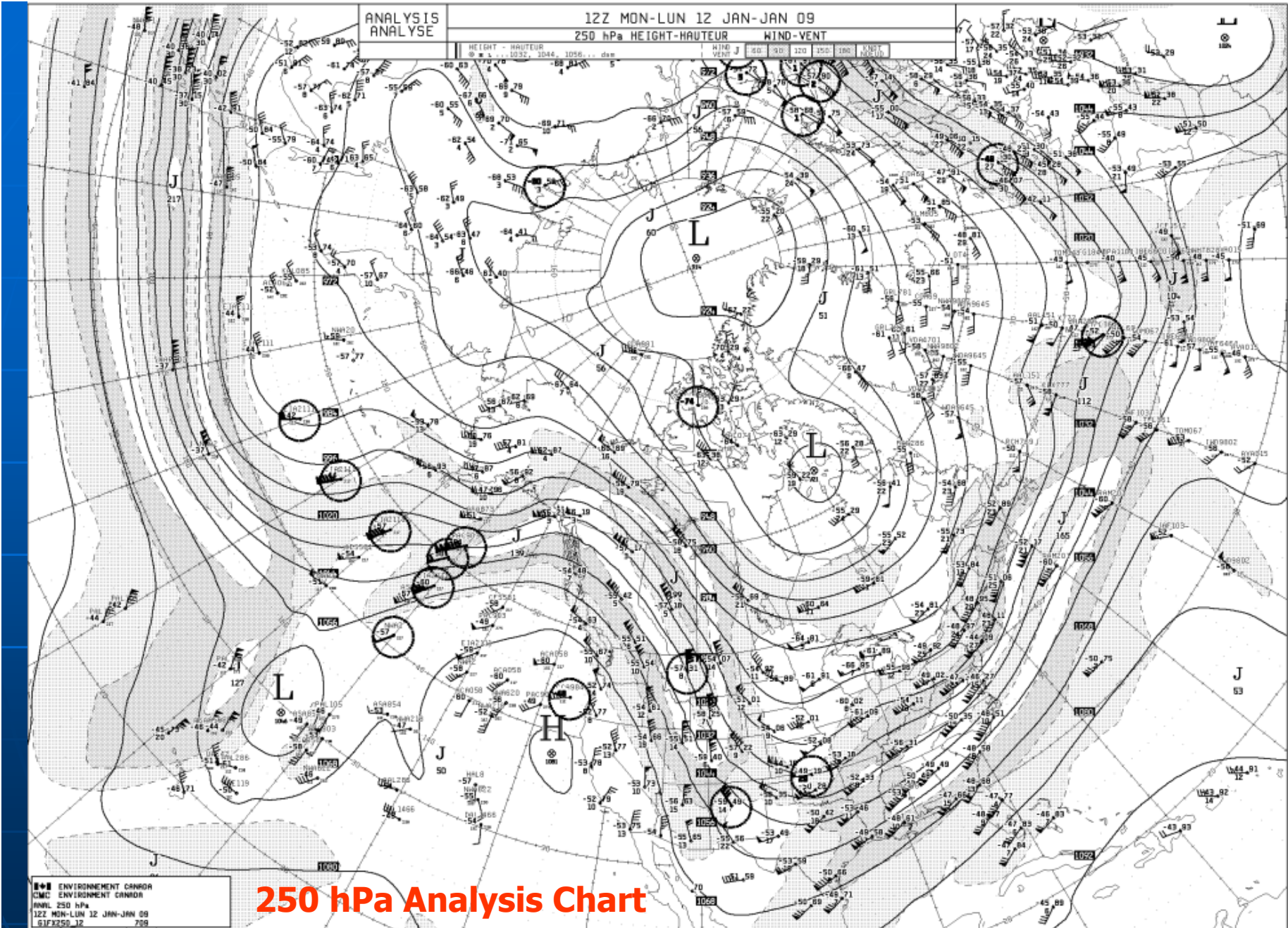


500 hPa Analysis Chart

Note the long-wave features

SHORT WAVES ON LONG WAVES

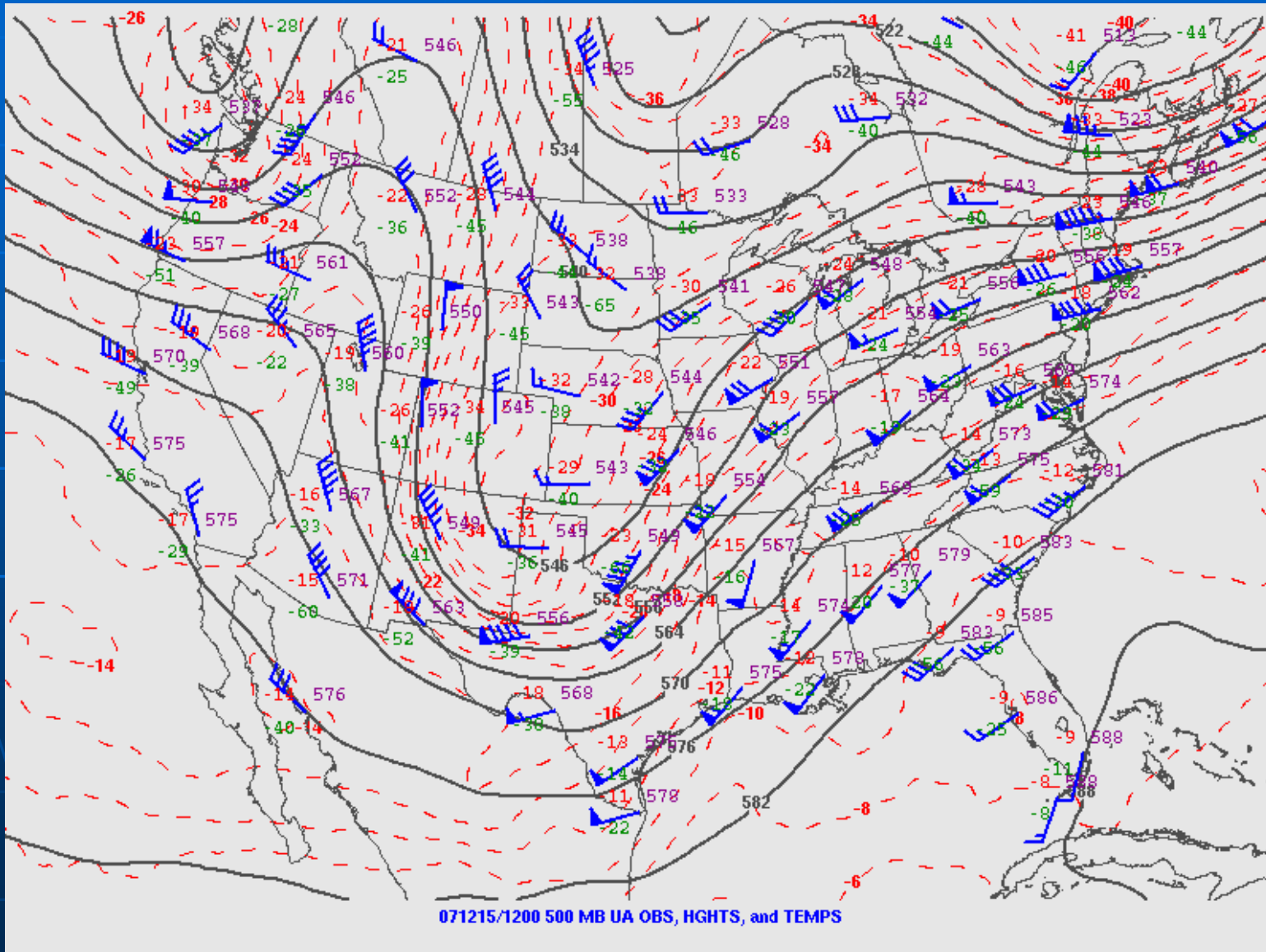




250 hPa Analysis Chart

Frontal Jet Streams are vertically above the front at 500 hPa

THE PATTERN IS PROGRESSIVE



STEERING FLOW

- The wind pattern at 500 hPA is considered to be the steering flow for weather systems
- The jet stream is linked with the 500 hPA
- The changing movement of the jet stream also gives the movement of the weather features – a favourite on TV!

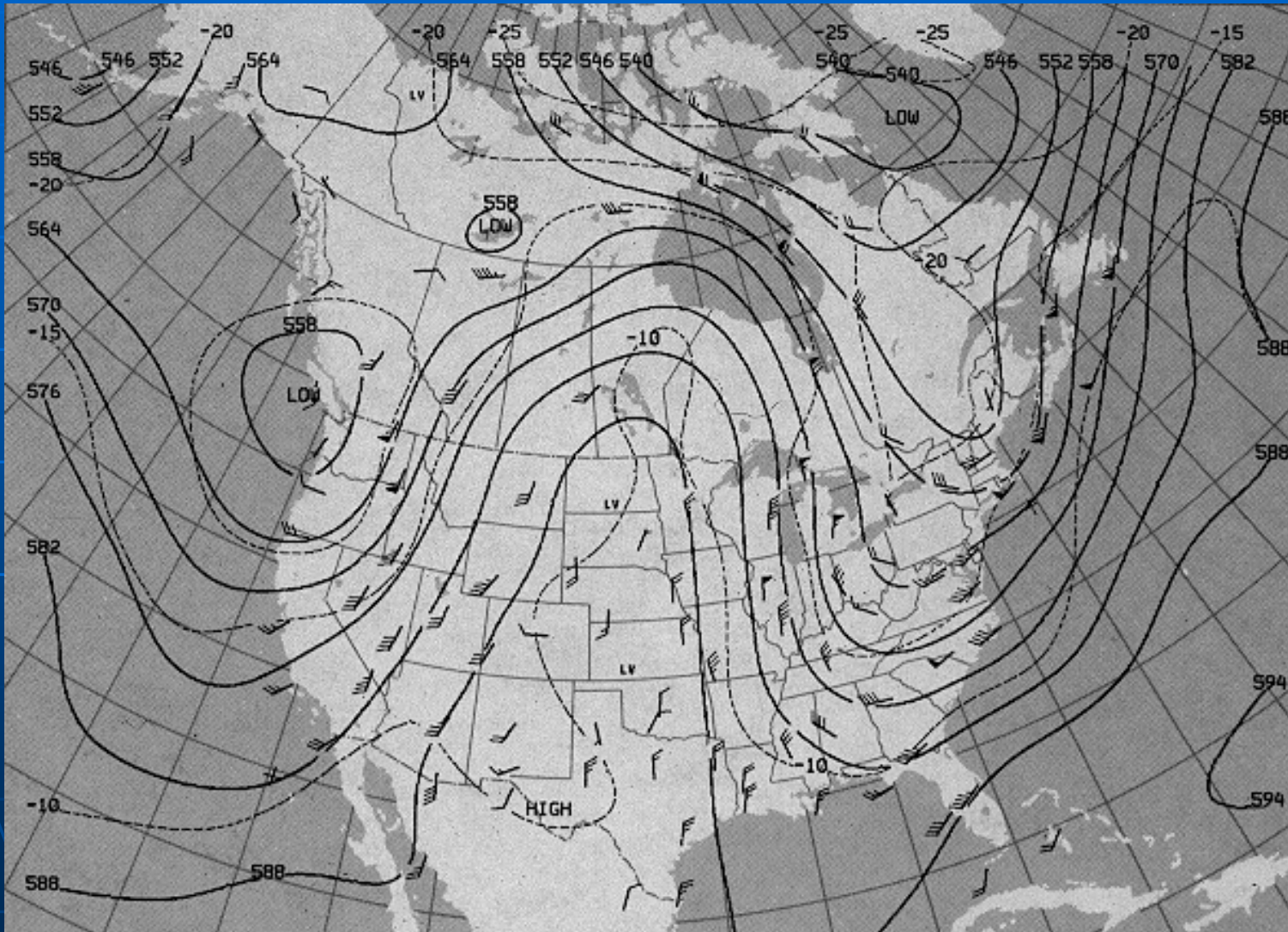
USES OF JET STREAMS

- In an west to east jet stream (zonal) the cold air lies to the north of the jet with warm air to the south
- A southward moving jet tends to bring colder air down with it
- A northward moving jet tends to bring warmer, possibly moister air with it
- In the summer this can have significant effects on the cloud cover, type and stability

BLOCKS

- **Blocks** are large scale patterns that are nearly stationary, effectively "blocking" or redirecting migratory lows. These blocks can remain in place for several days or even weeks, causing the areas affected by them to have the same kind of weather for an **extended period of time**

OMEGA BLOCK



**HIS LIPS ARE MOVING BUT ALL I
HEAR IS YADDA YADDA YADDA!**

