

1.3: CLIMATE GEOGRAPHY

pgs. 76 - 89

INTRODUCTION

WEATHER:

- Is the combination of temperature, precipitation, cloud cover and wind that we experience **EACH DAY**.
- Example: 22⁰C and clear skies.

CLIMATE:

- The **LONG TERM PATTERNS** of weather conditions. (Temperature, Moisture & Air pressure)
- Example: Vancouver has an annual frost-free period of 233 days.

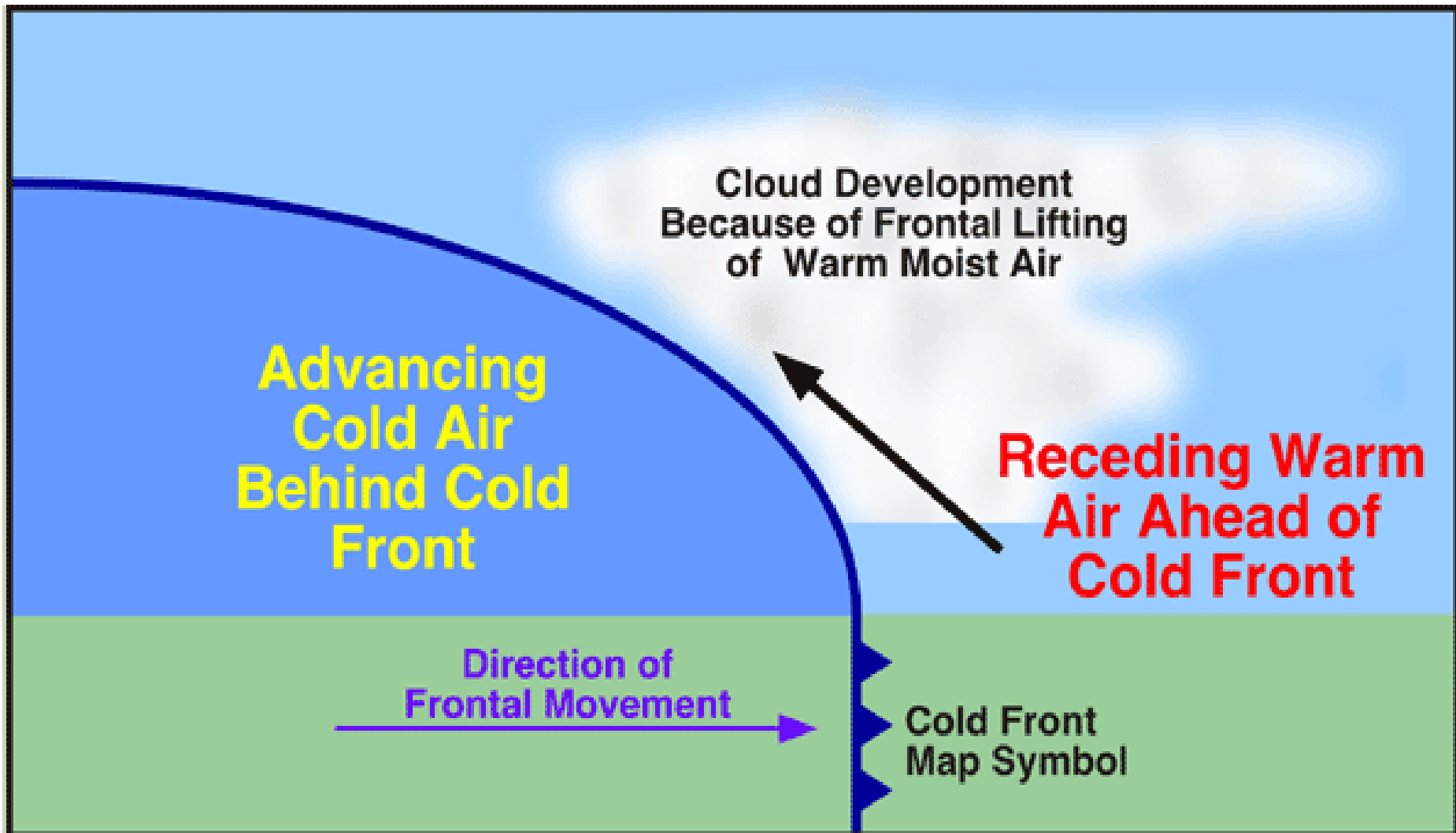
3 TYPES OF PRECIPITATION



1. CYCLONIC OR FRONTAL

- Results when the leading edge (**FRONT**) of a warm air mass meets a cool air mass.
- The warmer air mass is forced up over the cool air.
- As it rises the warm air cools, moisture in the air condenses, clouds and precipitation result.
- This precipitation is common in Atlantic Canada.

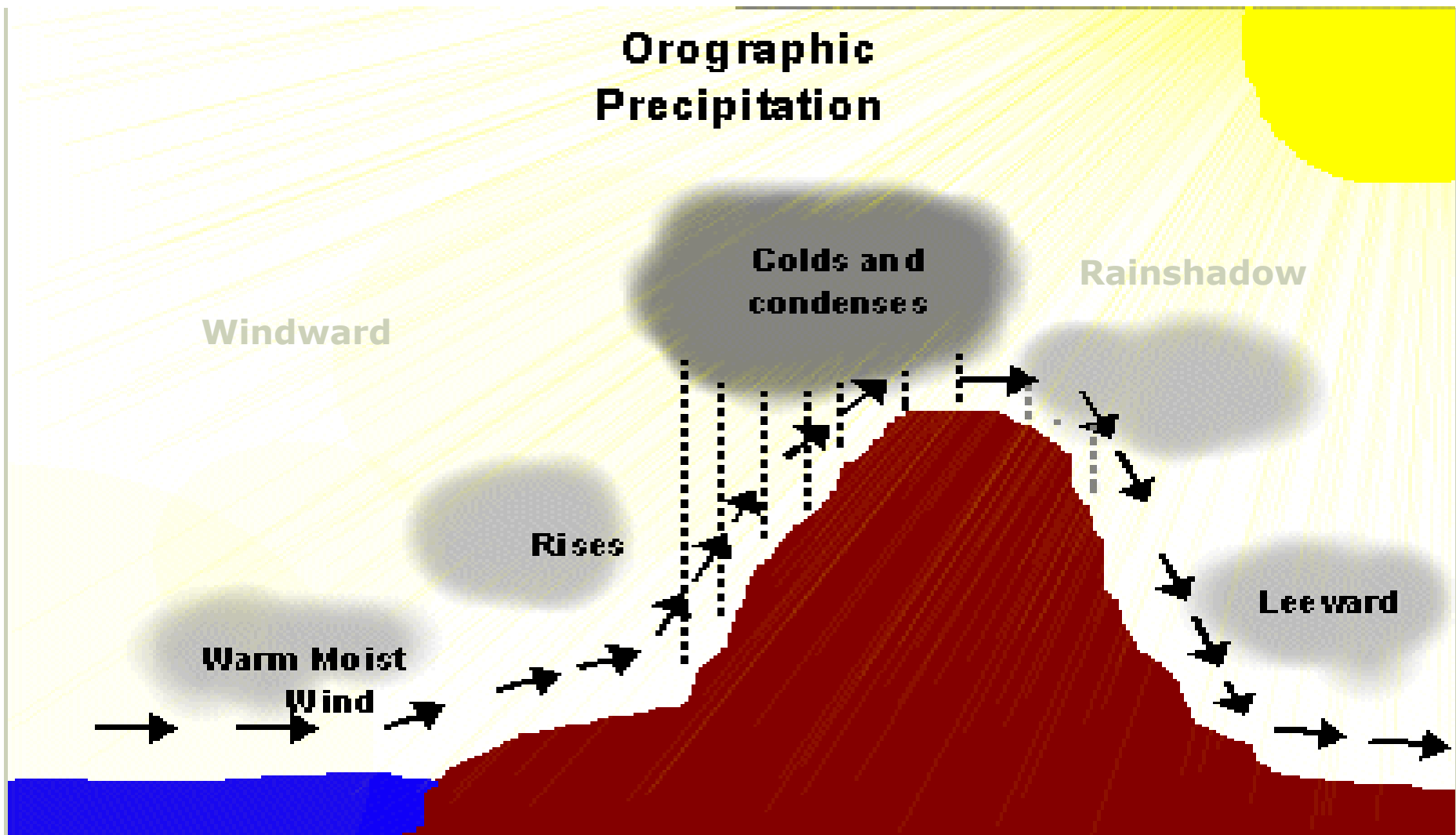
EXAMPLE



2. OROGRAPHIC OR RELIEF

- Results when warm moist air of the ocean is forced to rise by large **MOUNTAINS**.
- As the air rises it cools, moisture in the air condenses and clouds and precipitation result on the **WINDWARD** side of the mountain while the **LEEWARD** side receives very little.
- This is common in British Columbia.

EXAMPLE



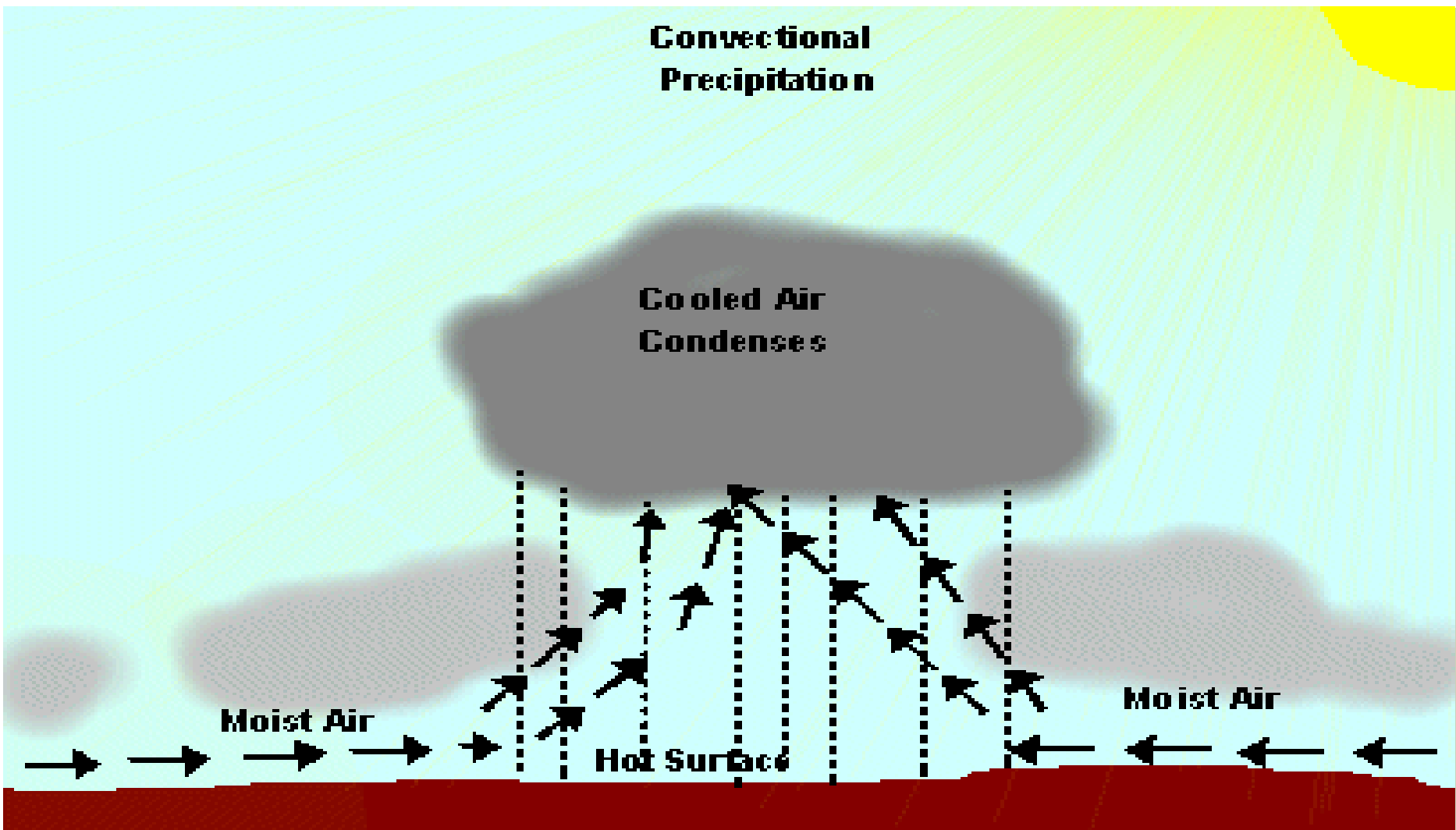
3. CONVECTIONAL

- Results from the heating of the earth's surface that causes air to rise **RAPIDLY**.
- Occurs more **INLAND**. (Continental Climates)
- Usually occurs on hot summer afternoons and evenings.
- As the air rises, it cools and moisture condenses into clouds and precipitation.
- This type of precipitation is common in the Prairie provinces.

HOW IT HAPPENS:

1. The sun heats the ground (**QUICKLY**), and warm air rises.
2. As the air rises it cools (**RAPIDLY**), and water vapour condenses to form clouds.
3. When the condensation point is reached, large **CUMULONIMBUS CLOUDS** are formed.
4. **HEAVY** rains occur. These usually include thunder and lightening due to the electrical charge created by unstable conditions.

EXAMPLE



ALSO CREATES:

1. HAILSTONES:

- An ice pellet formed when a frozen raindrop is caught in violent updrafts in the atmosphere.



2. HURRICANES:

- A massive storm that produces heavy rainfall and winds exceeding 120 km/h.



3. TORNADOES:

- A destructive, rotating storm under a funnel-shaped cloud that advances across land at speeds of 50-100 km/h.



FACTORS THAT AFFECT CLIMATE

1. ELEVATION (ALTITUDE)

- The higher it is from sea level the cooler the temperature.
- Affects both temperature and precipitation.
- As elevation increases, the air becomes less dense.
- Less dense air cannot hold as much heat as dense air, meaning as **elevation increases, temperature decreases.**

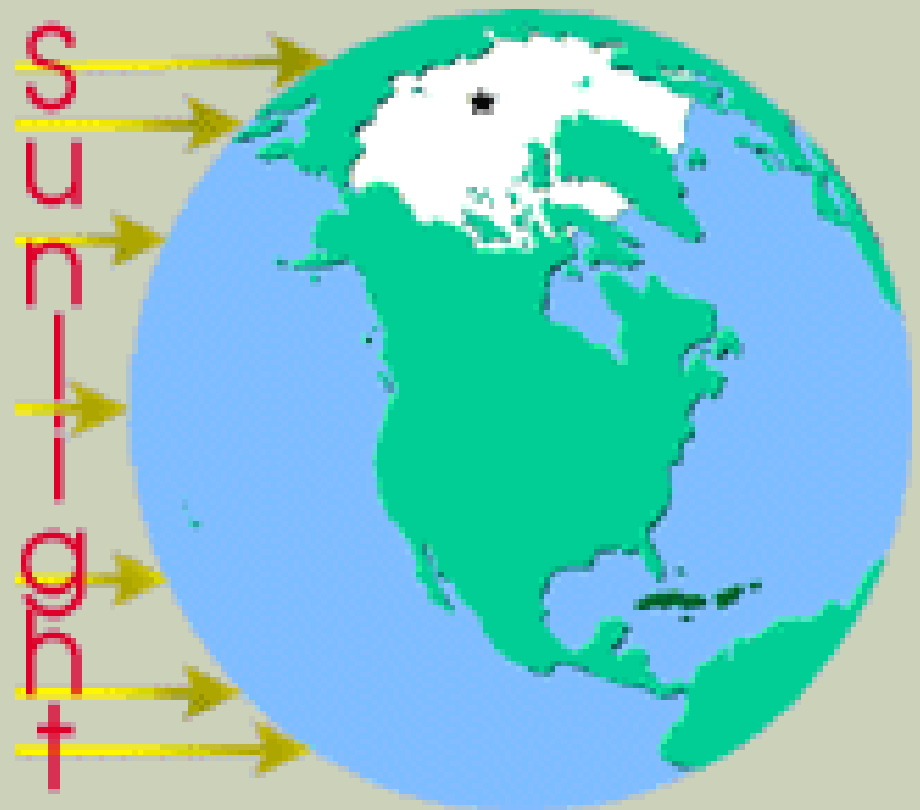
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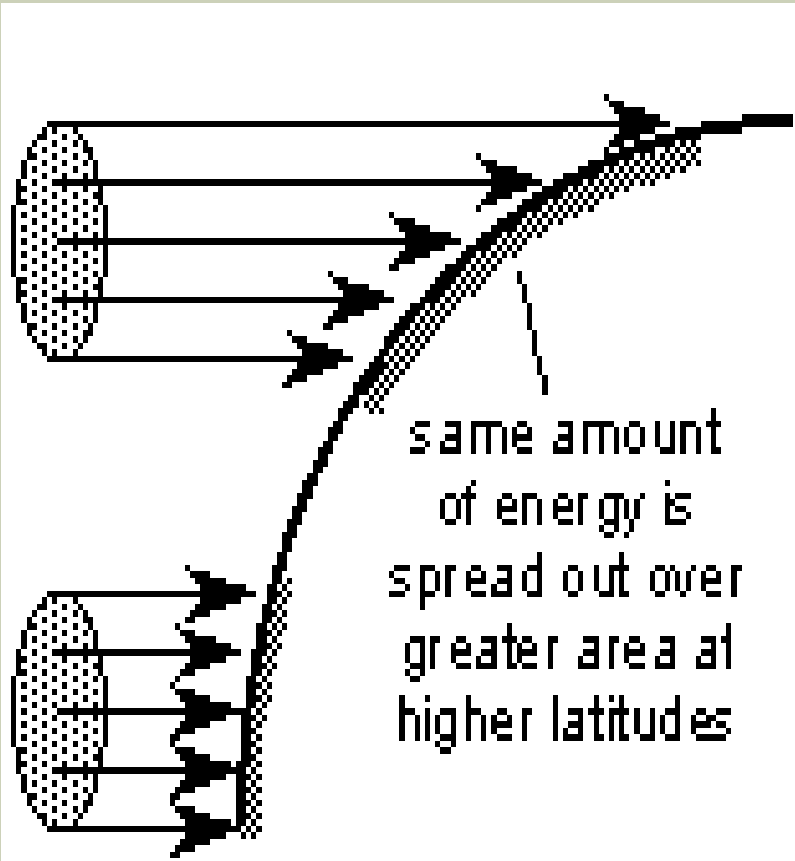
- Is a warm wind that flows from the Rocky Mountains across the foothills of Alberta during the winter time.
- They are a warm west wind.
- Along the eastern slopes of the Rockies, the Chinook wind provides a welcome respite from the long winter chill.

2.LATITUDE

- How far north or south a region is from the Equator (hottest place on Earth) influence how cold or warm it is.
- How so?
- The amount of heat energy, or **RADIATION**, that the Earth receives depends on the angle of the sun's rays.

- This is because the sun's rays are dispersed over a larger area of land as you move away from the equator.
- This is due to the curved surface of the earth.
- In addition, polar regions are colder because the sun's rays have further to travel compared to places on the equator.





- Regions close to the equator receive direct rays of the sun and therefore receive more radiant energy and are warmer.
- At the areas closer to the poles, the sun's rays are at an angle so these areas receive less radiant energy and are cooler.

NOTE:

- When the sun's rays pass through the atmosphere, it absorbs up to **15%** of the radiation.
- Heat energy is also reflected back into the atmosphere as light.
- This reflectivity is called **ALBEDO**.

3. AIR MASSES

- Is a large body of air with a uniform moisture and temperature content.
- Whether an air mass is **WARM** or **COLD** depends on where it **ORIGINATES**.
- Refer to figure 2.33, on page 81.

■ Moisture

- Maritime (m):formed over water and therefore containing moisture.
- Continental (c):formed over land and as a result is dry

■ Temperature

- Tropical (T):formed near the tropic (latitudes closer to the equator). Warm
- Polar (P):formed between latitudes of 55° and 66°N. Cold
- Arctic (A):formed over the Arctic. Very cold

EXAMPLE

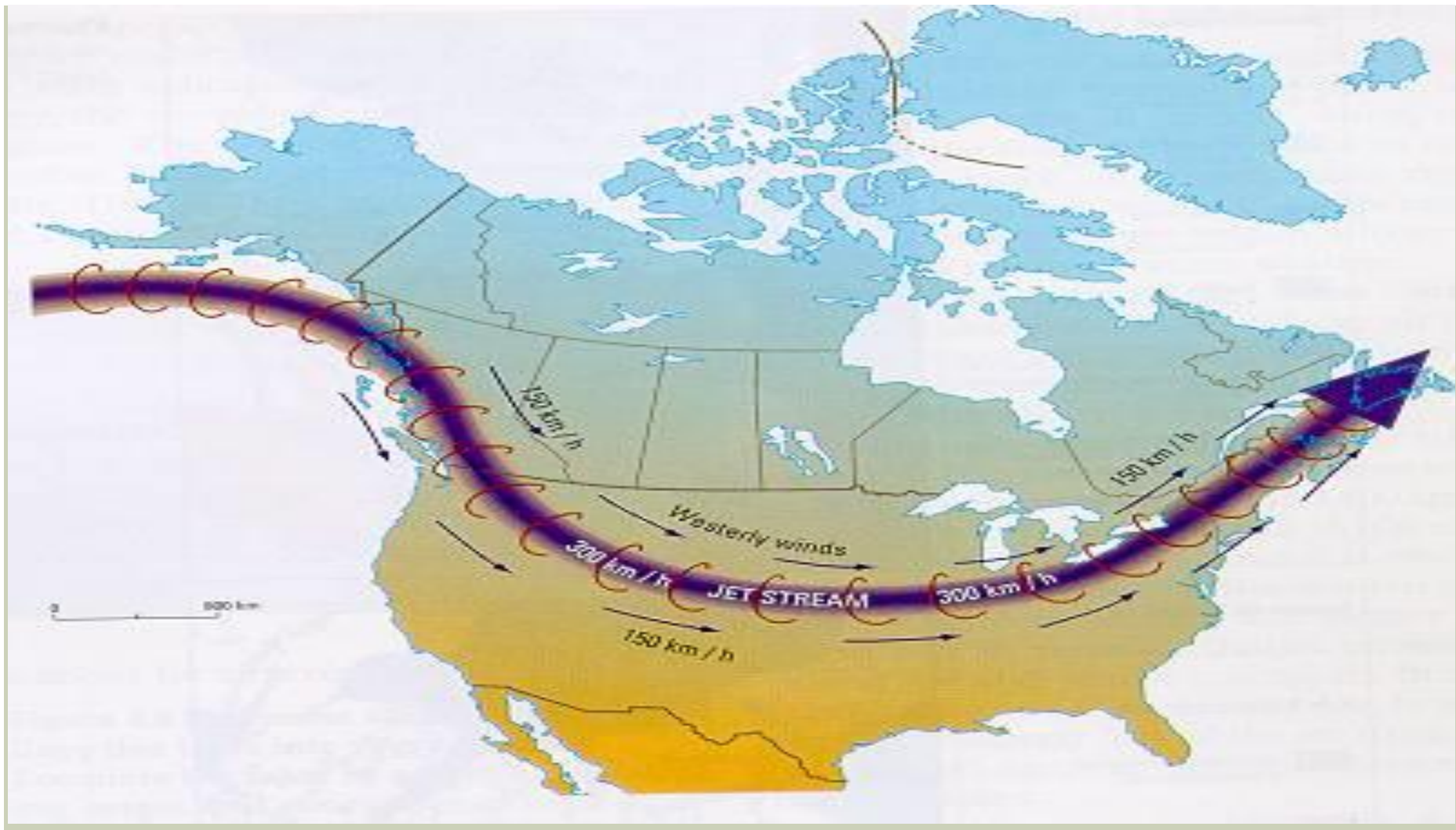
- One letter from each category is combined to get a complete picture of each air mass. i.e.: **mT** (maritime Tropical) meaning wet and warm.



JET STREAM

- Is a river of air that moves from **WEST** to **EAST** at speeds between 300 - 400km/h, and at an altitude between 8000 – 15 000 m.
- Most of the winds in Canada are called **WESTERLIES** because they flow from the **WEST** to **EAST**.

EXAMPLE



4. NEARNESS TO WATER

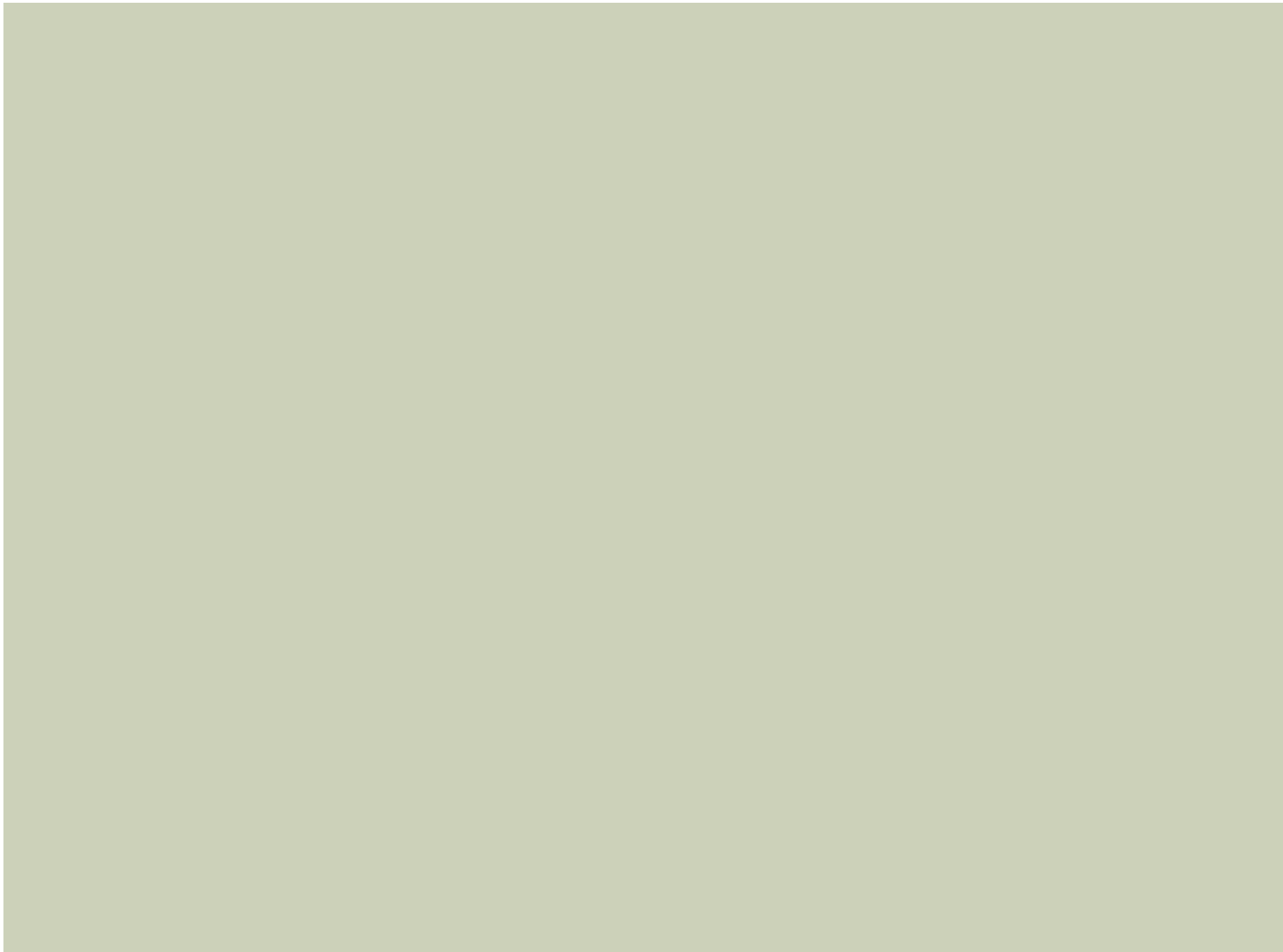
- Large bodies of water have ***moderating*** effect on temperature.
- Water is slower to warm or cool than landforms.
- This means cooler summers and milder winters.
- Less of a temperature range.

- This is called a **MODERATED TEMPERATURE.**
- Large bodies of water can also influence climate.
- Water heats up and cools down more slowly than land.

- Thus during winter the water is **WARMER** than summer in some areas.
- Acts like a thermostat.
- Its a climate created by the proximity of water, that makes land temperature **MILDER** in the **WINTER**, and **COOLER** in **SUMMER**.

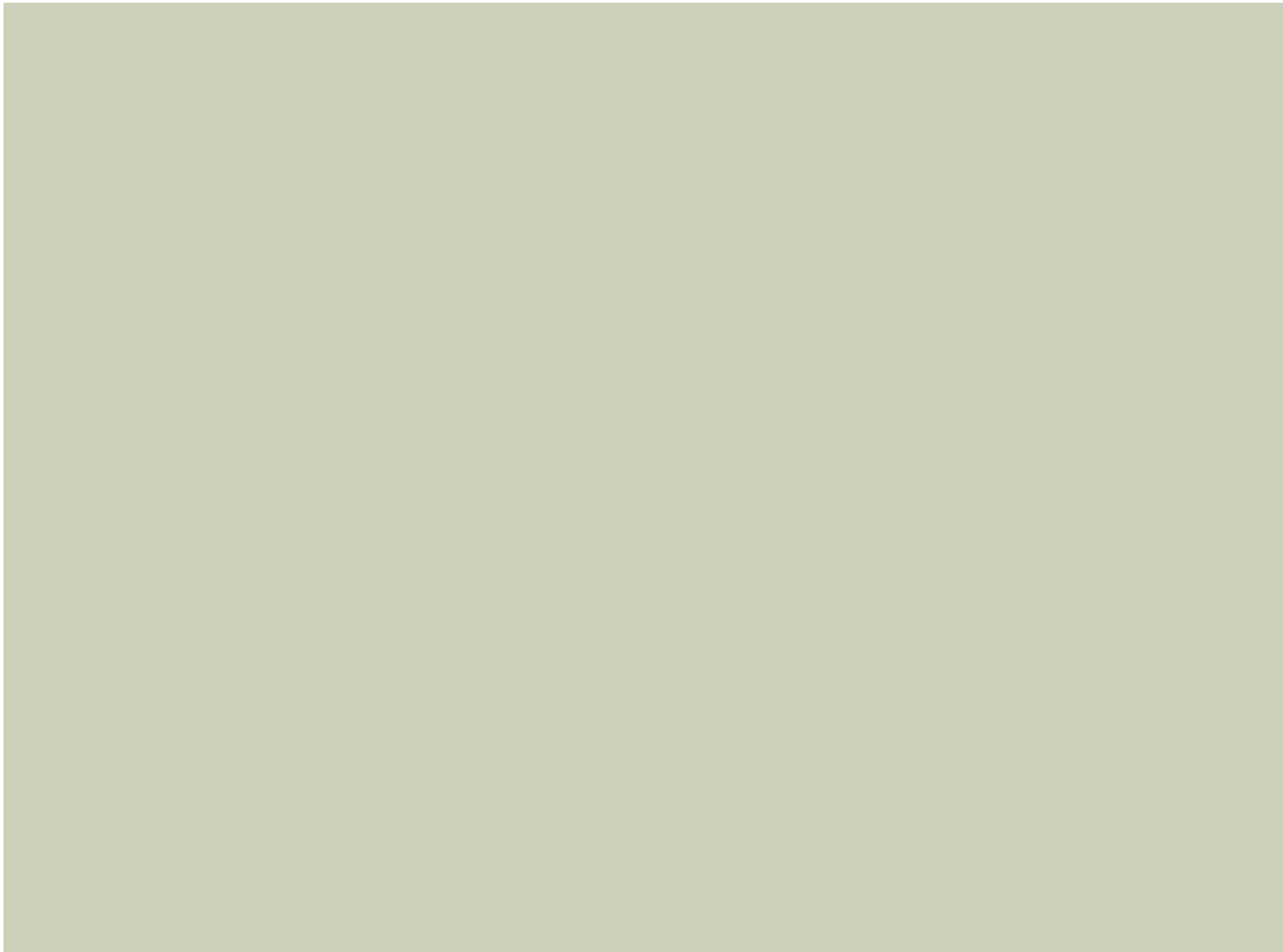
LAND BREEZES

- During the **Night**, air cools, descends and moves seaward.
- Then the air above the water rises.



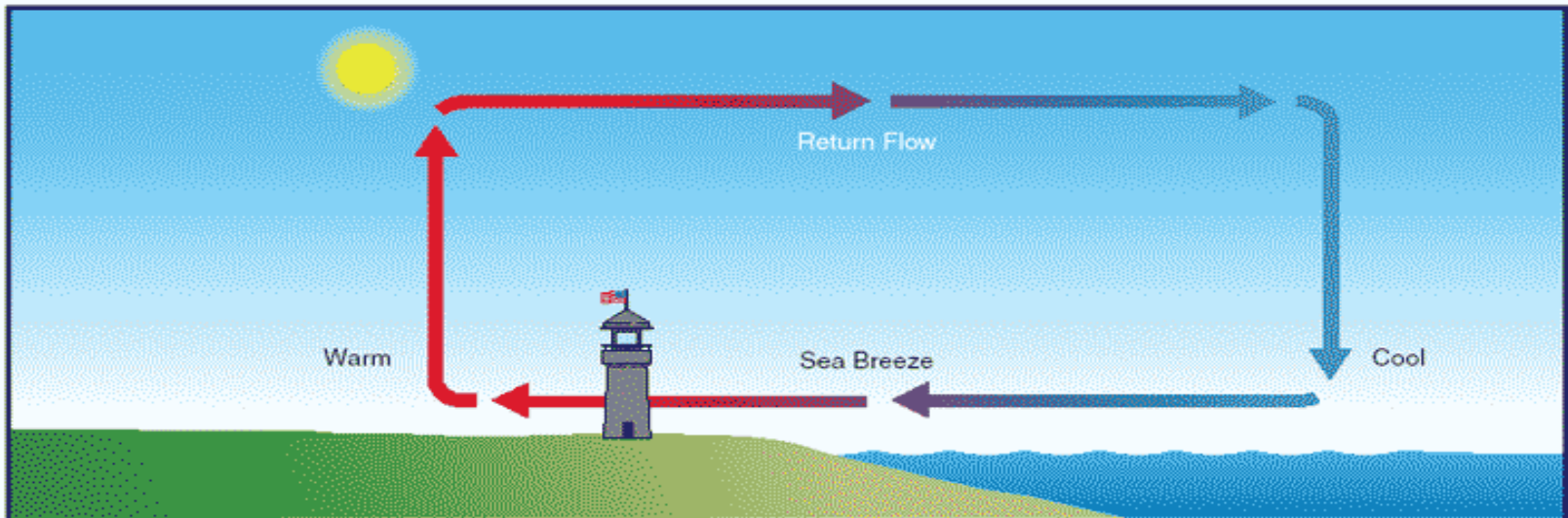
SEA BREEZES

- The air is cooling, descends and moves **landward**.
- The air is then heated over the land and rises.

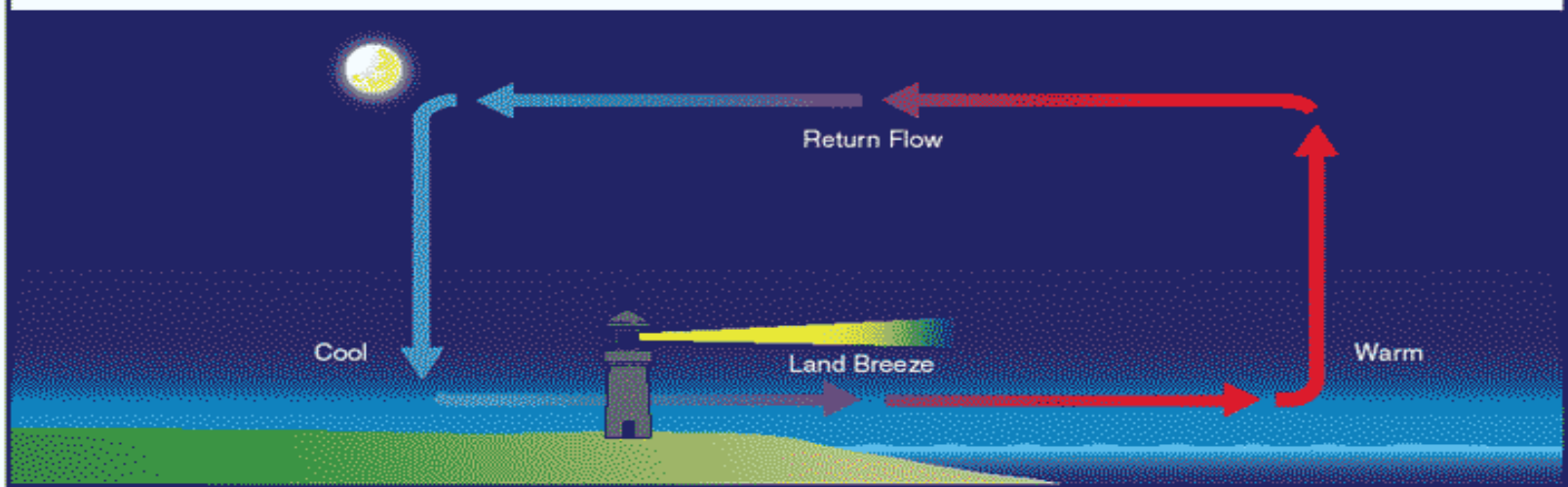


EXAMPLE

Sea Breeze



Land Breeze



5. LANDFORMS

- Landforms also affect patterns of precipitation.
- Example:
- The large mountains on the West Coast of Canada act as a barrier and produce some of the highest amounts of precipitation (rain and snow) in Canada.

6. OCEAN CURRENTS

- Is the continuous, horizontal movement of cold or warm surface water of the oceans, to a depth of about 100 meters.
- These currents are created whenever water flows from one place to another.
- They have a clear effect on temperatures throughout the world.

THE MAIN CAUSES OF OCEAN CURRENTS

- **Prevailing Winds** - dragging on ocean surfaces. (i.e. Prevailing winds are the most dominant winds in a particular region)
- Rotation of the earth on its axis. (this gives rise to the **Corollis Effect**)

THE OCEAN CURRENTS WHICH AFFECT THE CLIMATE OF CANADA ARE:

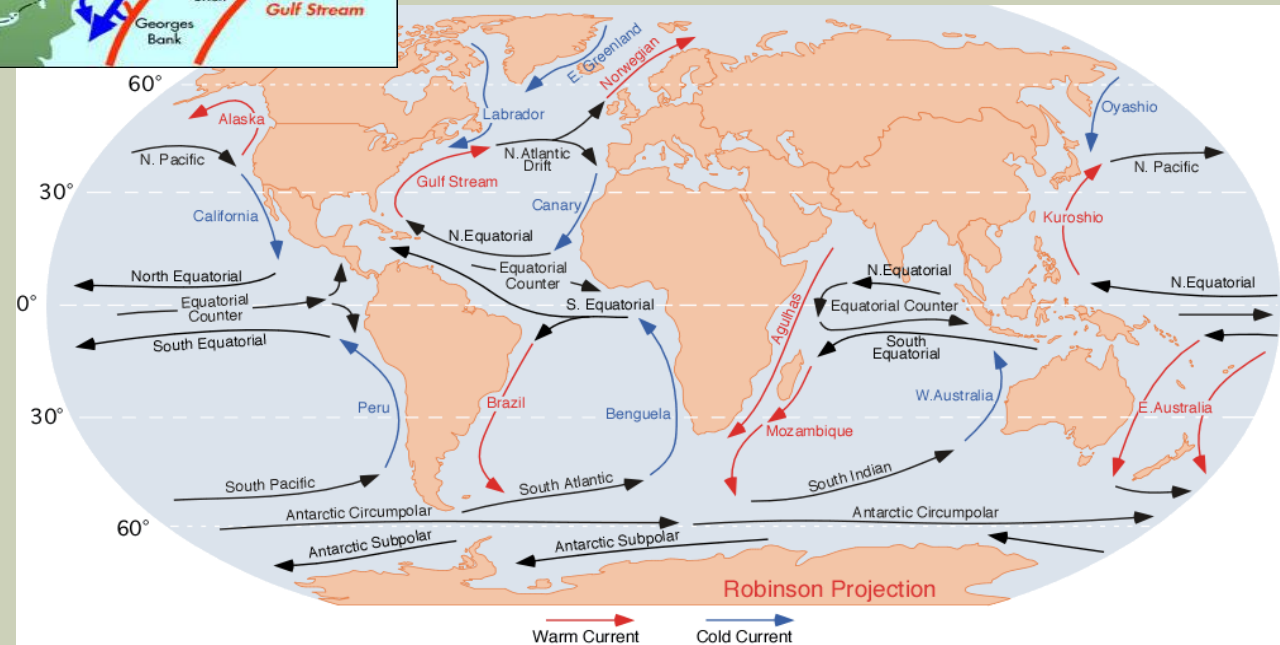
- **North Pacific Drift** (mostly on the west Coast)
- **Gulf Stream**
- **Labrador Current**

EXAMPLE



Canadian Currents

World Currents



VIDEO TIME:

- [What is Climate?](#) (2:51)
- [Five Factors that Affect Climate](#) (5:22)
- [What are Air Masses?](#) (4:36)

EXTRAS

TEMPERATURE RANGE:

- Is a calculation made by **SUBTRACTING** the coldest temperature from the warmest temperature.
- Example:
- Highest: 22⁰C
- Lowest: -18⁰C
- **22 - (-18) = 22 + 18 = 40⁰C**

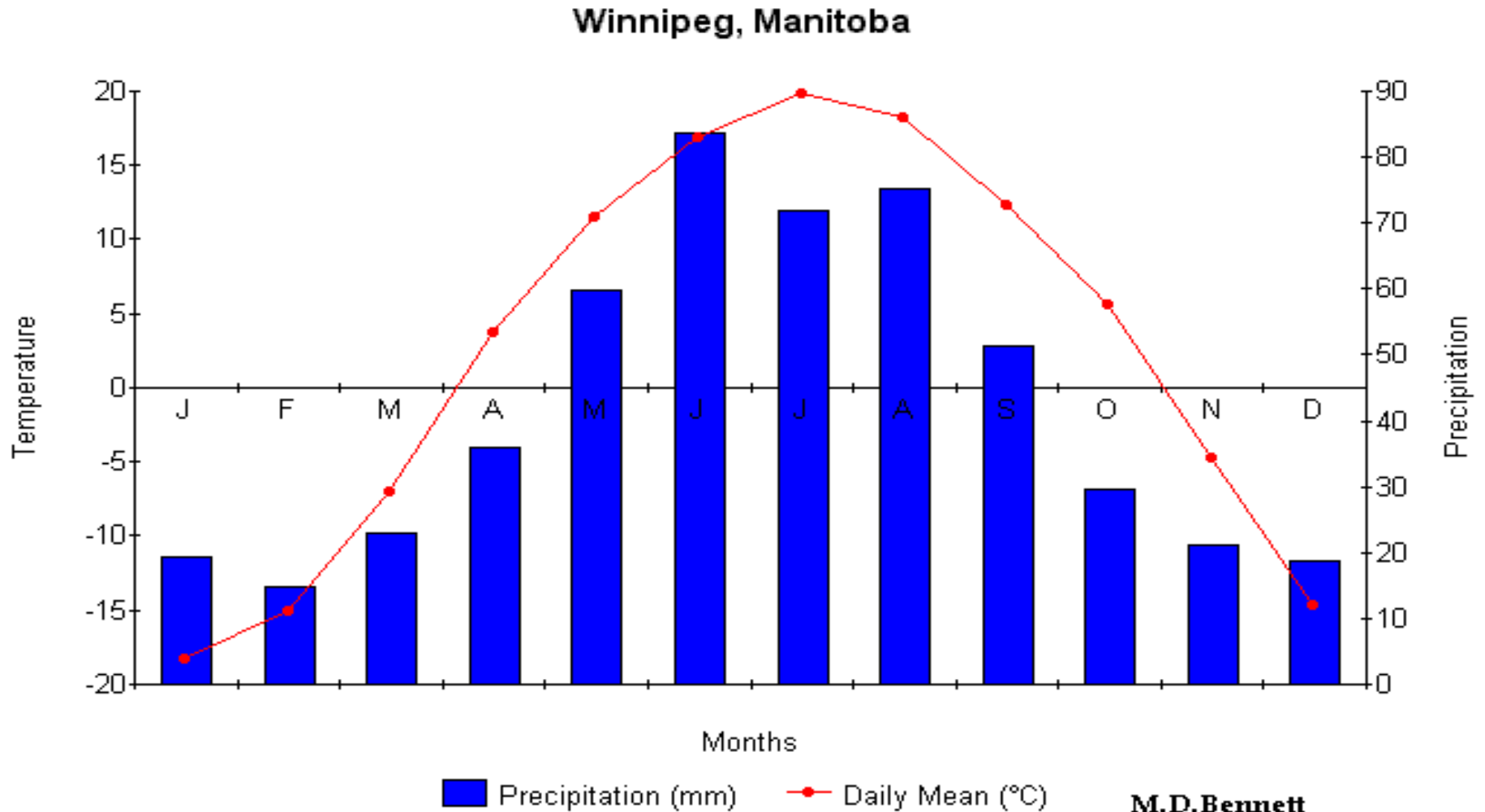
FEATURES OF A CONTINENTAL CLIMATE:

- Climate type that develops away from the influence of a body of water, such as an ocean.
- Annual temp. range tends to be **LARGE**, (25° - 50°C)
- Annual precipitation is **LOW**, (200 - 1000 mm)
- **Regions that have continental climates tend to have warm to hot summers and cold winters**

FEATURES OF A MARITIME CLIMATE:

- Climate type that is strongly influenced by the closeness of a large body of water, such as an ocean.
- Annual temp. range tends to be **SMALL**, (10° - 30°C)
- Annual precipitation is **HIGH**, (1000 - 2500 mm)
- **Regions that have a maritime climate usually have cool to warm summers and cool winters**

MARITIME OR CONTINENTAL??



ANSWER!!

- **Continental Climate**
- **WHY????**
- **Temp range is 38.1 °C**
- **Annual precipitation is low (only 504.4 mm/year)**
- **Warm to hot summers**
- **Cold winters**