

Major air masses of the world

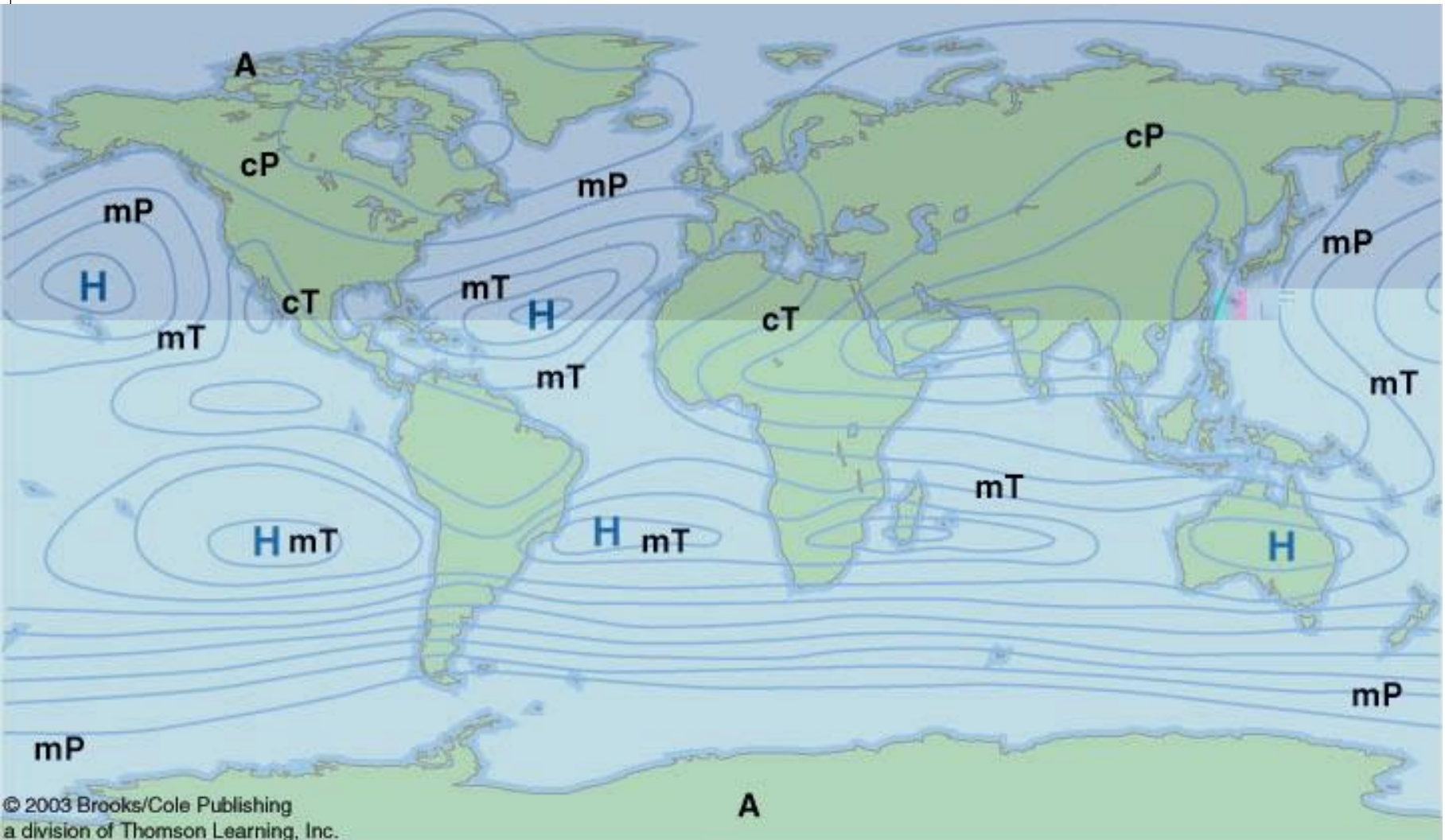


Fig. 9.3

CLASSIFICATION

- **FOUR BASIC CATEGORIES OF AIR MASSES:**
- **POLAR - P**
- **ARCTIC - A**
- **TROPICAL - T**
- **EQUATORIAL - E**
- **TWO DESIGNATIONS OF SURFACE IN SOURCE REGION**
- **MARITIME - m**
- **CONTINENTAL - c**

CLASSIFICATION

- **THUS WE GET:**
- **cA - CONTINENTAL ARCTIC**
- **P - CONTINENTAL POLAR**
- **T - CONTINENTAL TROPICAL**
- **mT - MARITIME TROPICAL**
- **mP - MARITIME POLAR**
- **mE - MARITIME EQUATORIAL**

- **http://www.youtube.com/watch?v=kzNR_tjKE_xU**

AIR MASS

- **AN AIR MASS IS A BODY OF AIR 1500 KM OR MORE ACROSS AND SEVERAL KM THICK**
- **AS THE AIR MASS MOVES IT CARRIES ITS TEMPERATURE AND MOISTURE CONDITIONS WITH IT.**
- **CAN TAKE SEVERAL DAYS FOR AN AIR MASS TO TRAVERSE AN AREA.**
- **SOURCE REGIONS ARE THE AREAS OVER WHICH AN AIR MASS GETS ITS CHARACTERISTIC PROPERTIES OF TEMPERATURE AND MOISTURE.**

Major air masses that affect North American weather

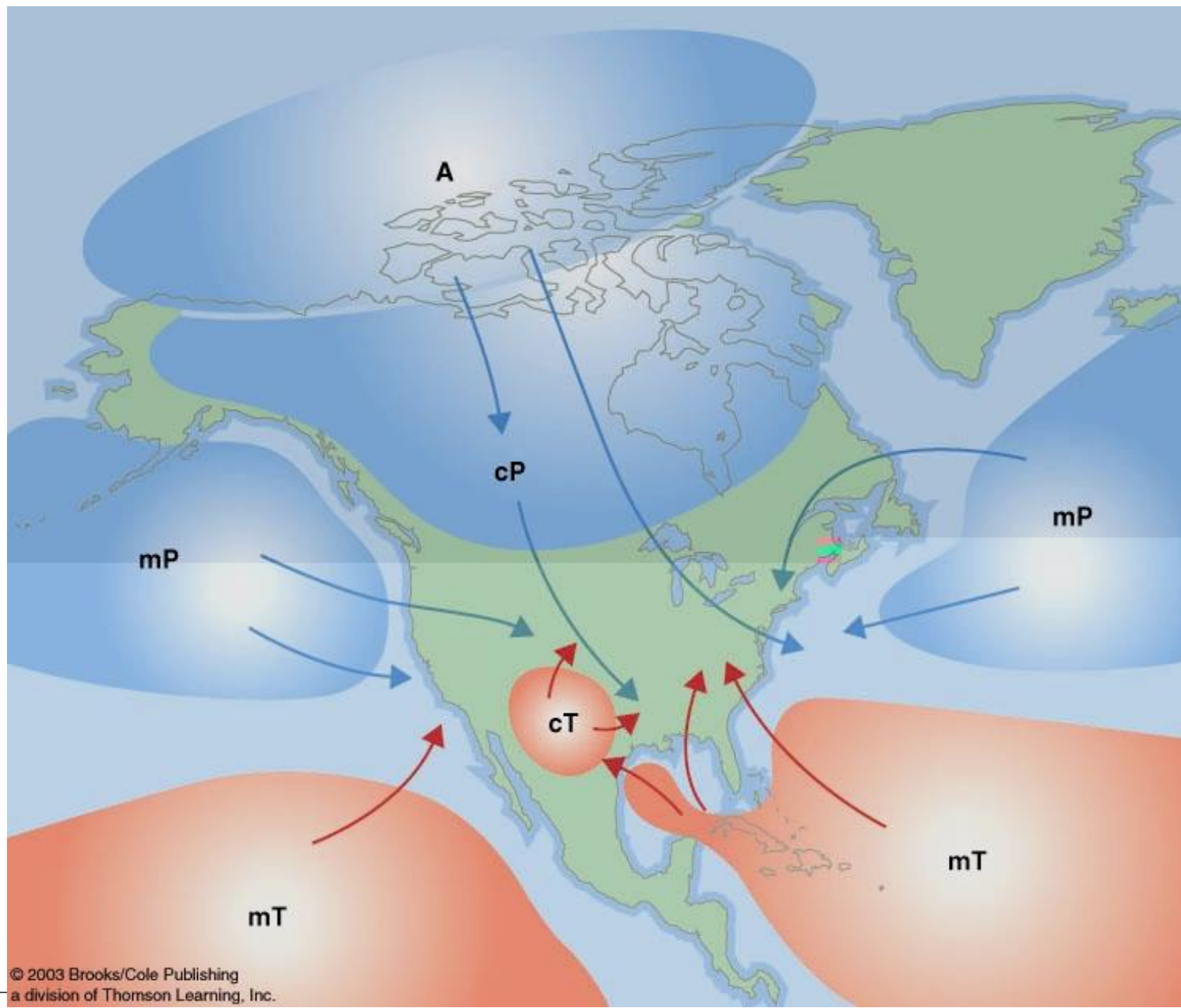
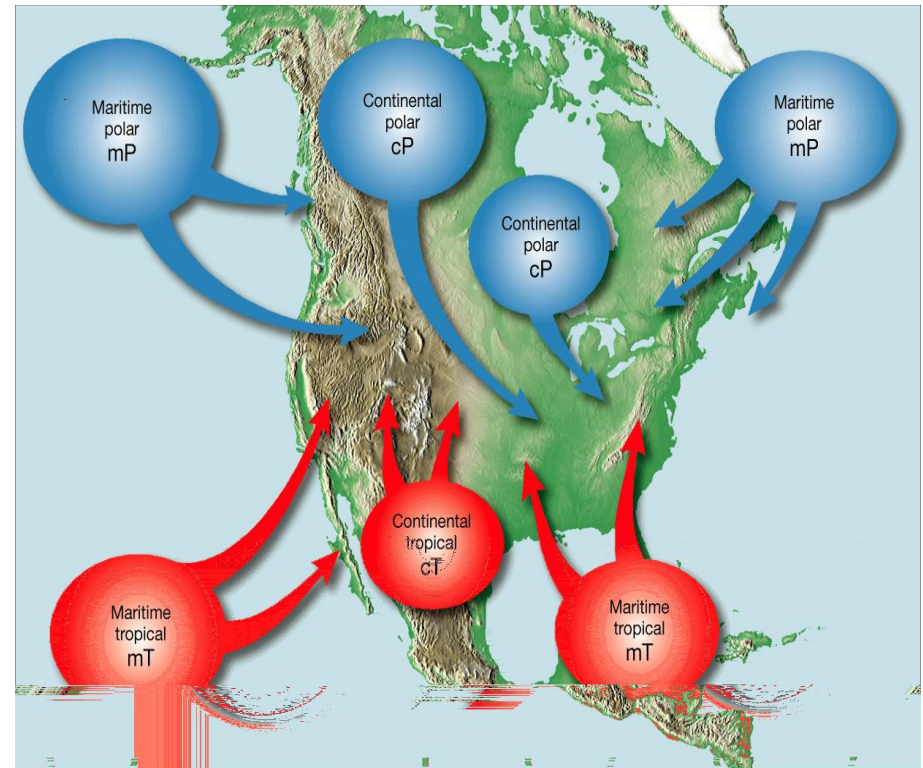


Fig. 9.4

Air Masses

Weather in North America

- ◆ Much of the weather in North America, especially weather east of the Rocky Mountains, is influenced by continental polar (cP) and maritime tropical (mT) air masses.



Air Masses and Weather



Air Masses

Weather in North America

- ◆ Continental Polar Air Masses (cP)
 - Uniformly cold and dry in winter and cool and dry in summer.
 - Air comes from pole ward of the 50th parallel.
 - Continental Arctic Air (cA) comes from over the arctic basin and the Greenland ice cap.

Winter Continental Polar air mass over a warmer body of water



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Fig. 9.12



Ice in Florida orange grove as a result of an arctic air mass coming from Canada.

Fig. 9.6

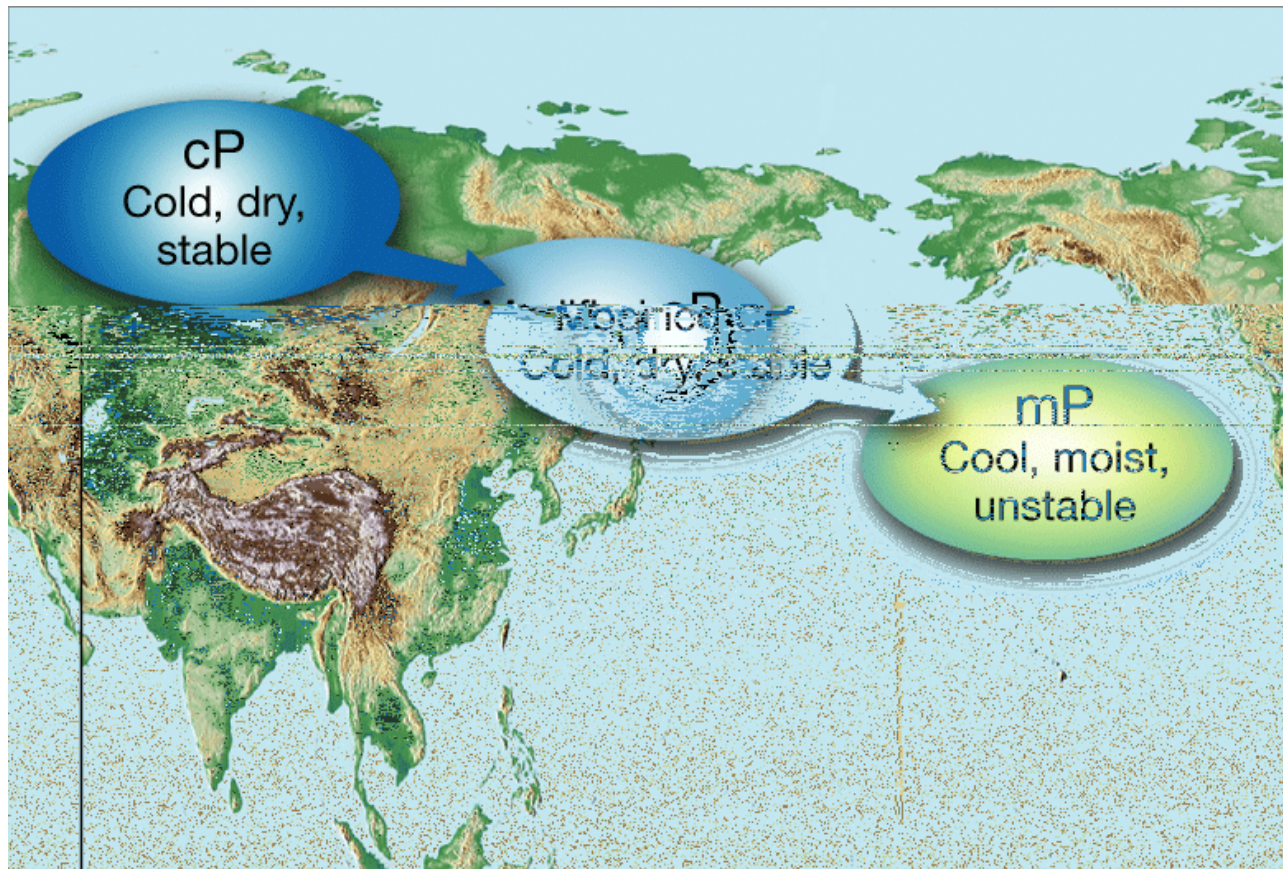
Maritime Tropical Air Masses (mT)

- Warm air masses, loaded with moisture, and usually unstable.
- The source of much, if not most, of the precipitation received in the eastern two-thirds of the United States.
- These air masses originate from the Gulf of Mexico, The Caribbean Sea or the adjacent Western Atlantic Ocean.

Maritime Polar Air Masses (mP)

- Form over oceans at high latitudes
- The cold, dry continental polar air changes into relatively mild, humid, unstable maritime polar air during its long journey across the North Pacific.
- During winter, mP from the Pacific usually begins as cP from Siberia.
- Maritime polar air masses also originate in the North Atlantic off the coast of eastern Canada.
- For the US the important regions are N. Pacific and NW Atlantic
- Can bring a Nor'Easter

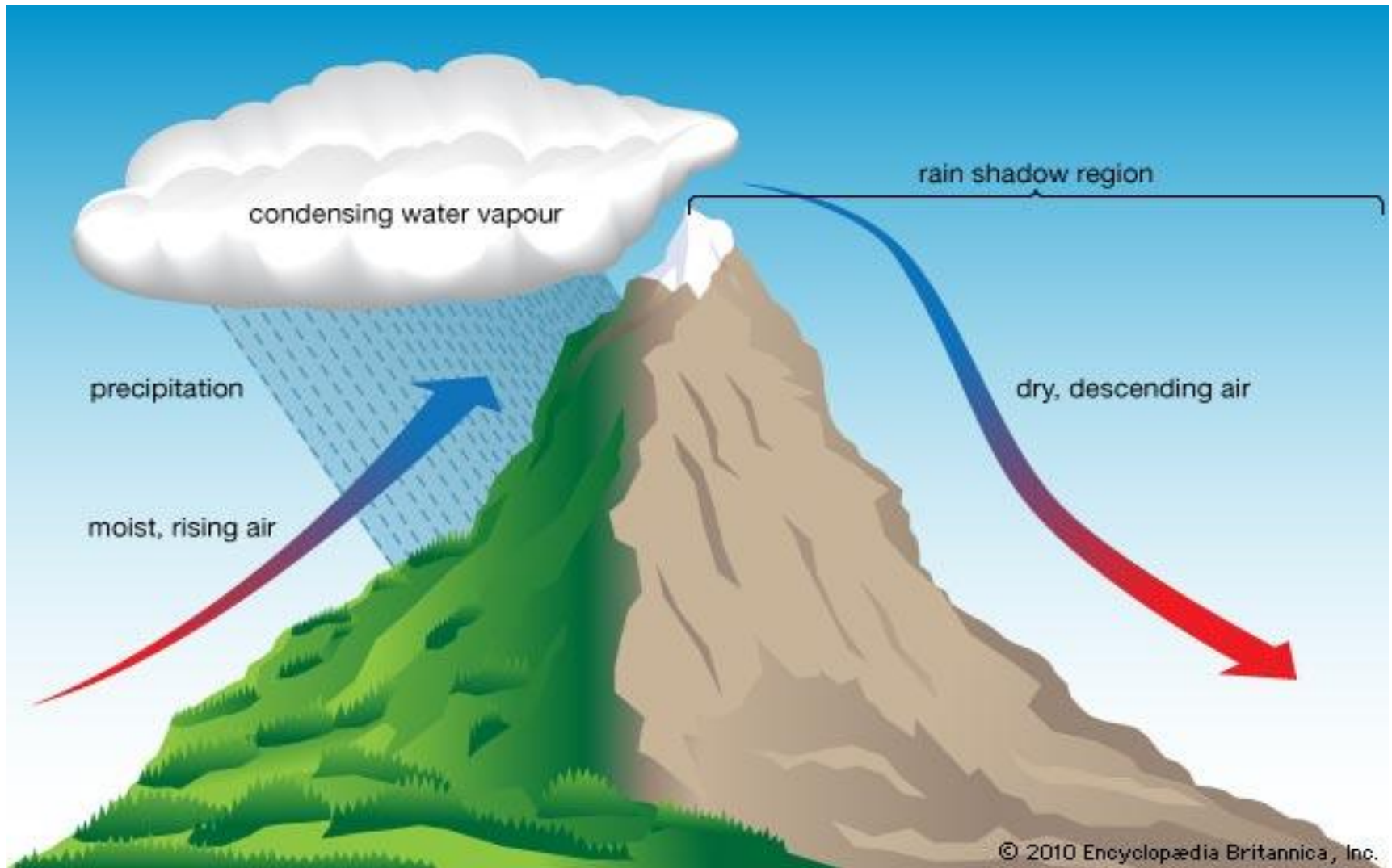
Maritime Polar Air Masses



Continental Tropical Air Masses (cT)

- North America narrows as it extends southward
- In the summer cT air mass causes extremely hot, drought like conditions in the Great Plains.
- Movements in the fall result in mild weather in the Great Lakes region, often called Indian summer.
- Brings hot, dry air

Rain Shadow

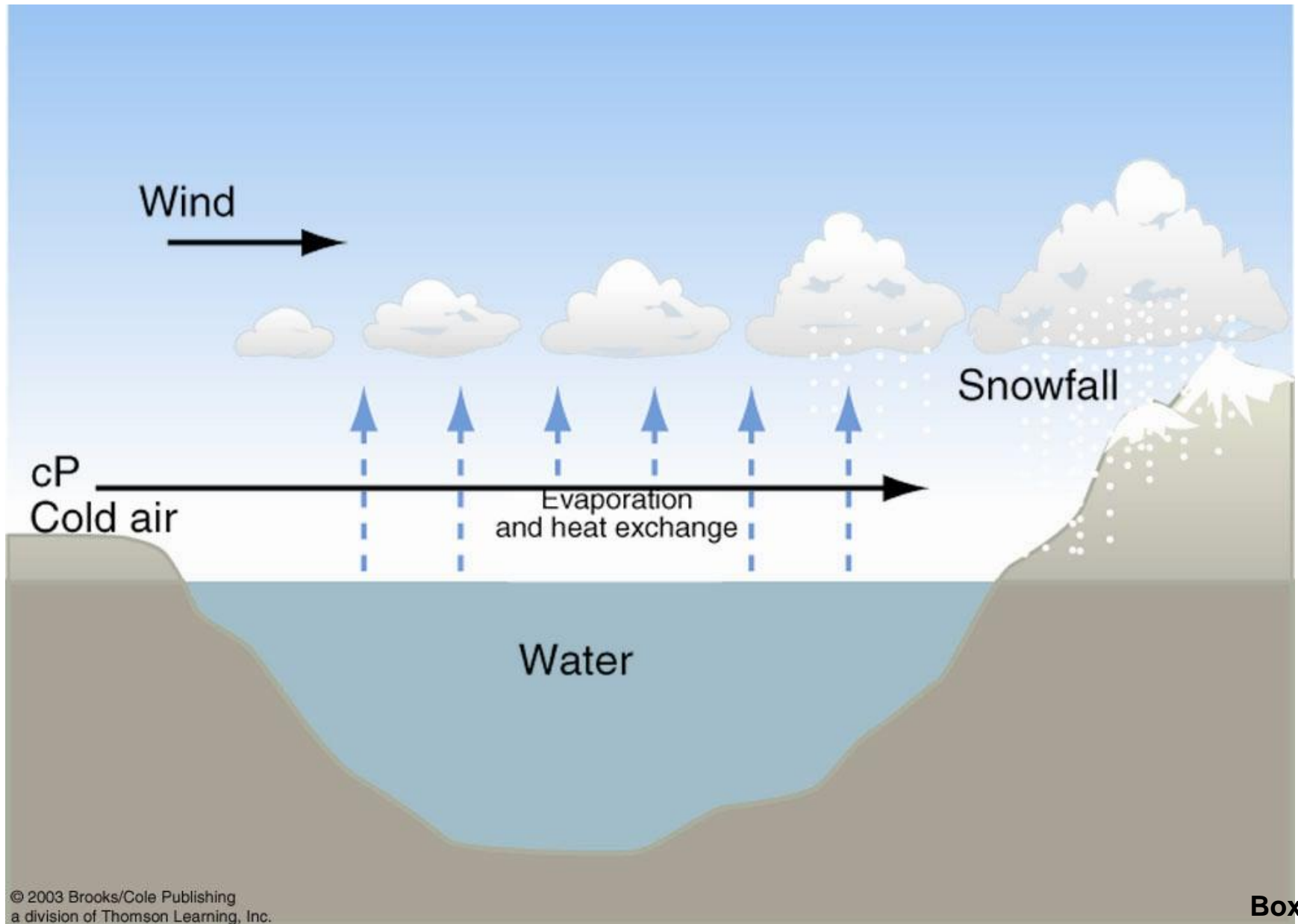


<http://www.mrphome.net/mrp/rainshadow.swf>

Rain Shadows:

- Some examples of rain shadow deserts in North America include:
 - The dry basins east of the Cascade Range in Washington and Oregon
 - The Great Basin of Nevada and Utah, east of the Sierra Nevada mountain range
 - The Colorado Front Range, east of the Rocky Mountains

Formation of Lake Effect snowfall



Fronts

- Warm Front
- Cold Front
- Occluded Front
- Stationary

Fronts

Types of Fronts

◆ Warm Fronts

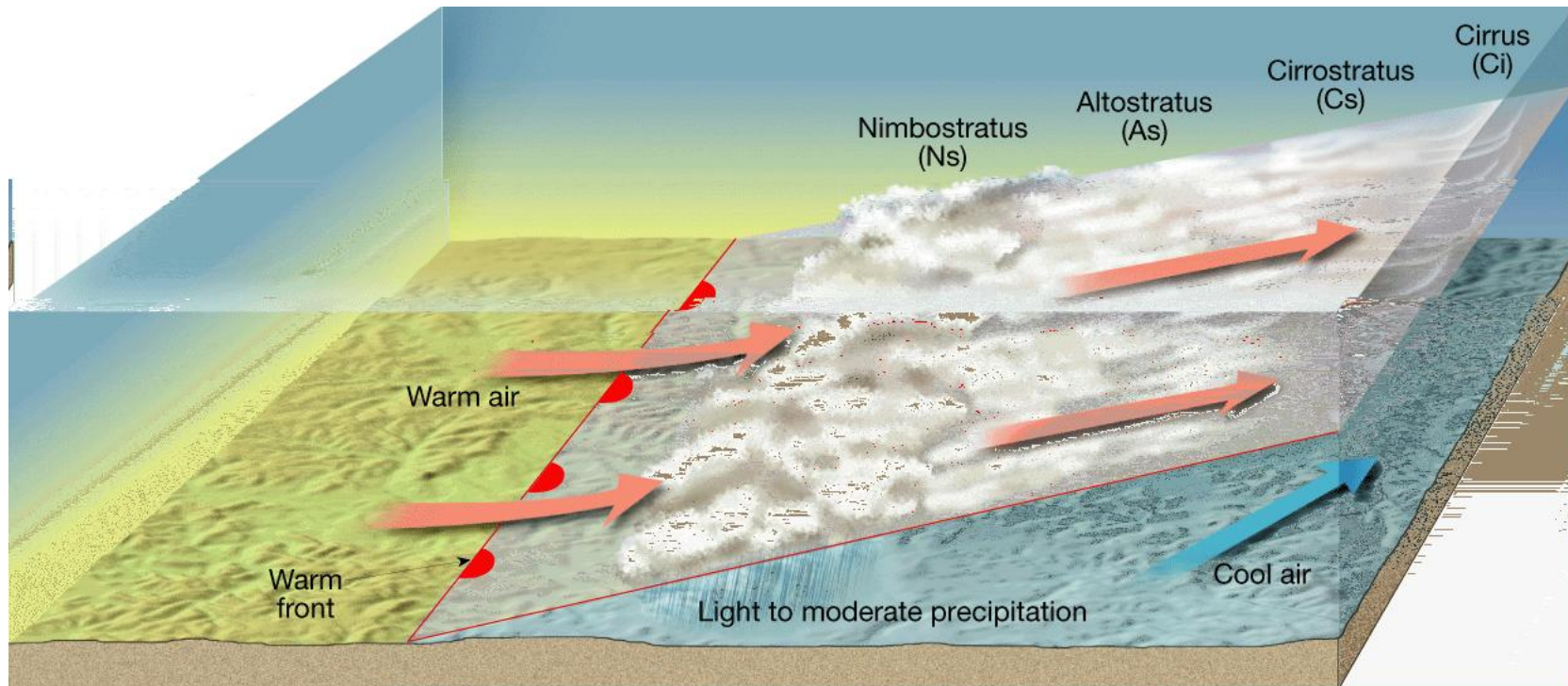
- A **warm front** forms when warm air moves into an area formerly covered by cooler air.

◆ Cold Fronts

- A **cold front** forms when cold, dense air moves into a region occupied by warmer air.

[VIDEO: Creating a weather front](#)

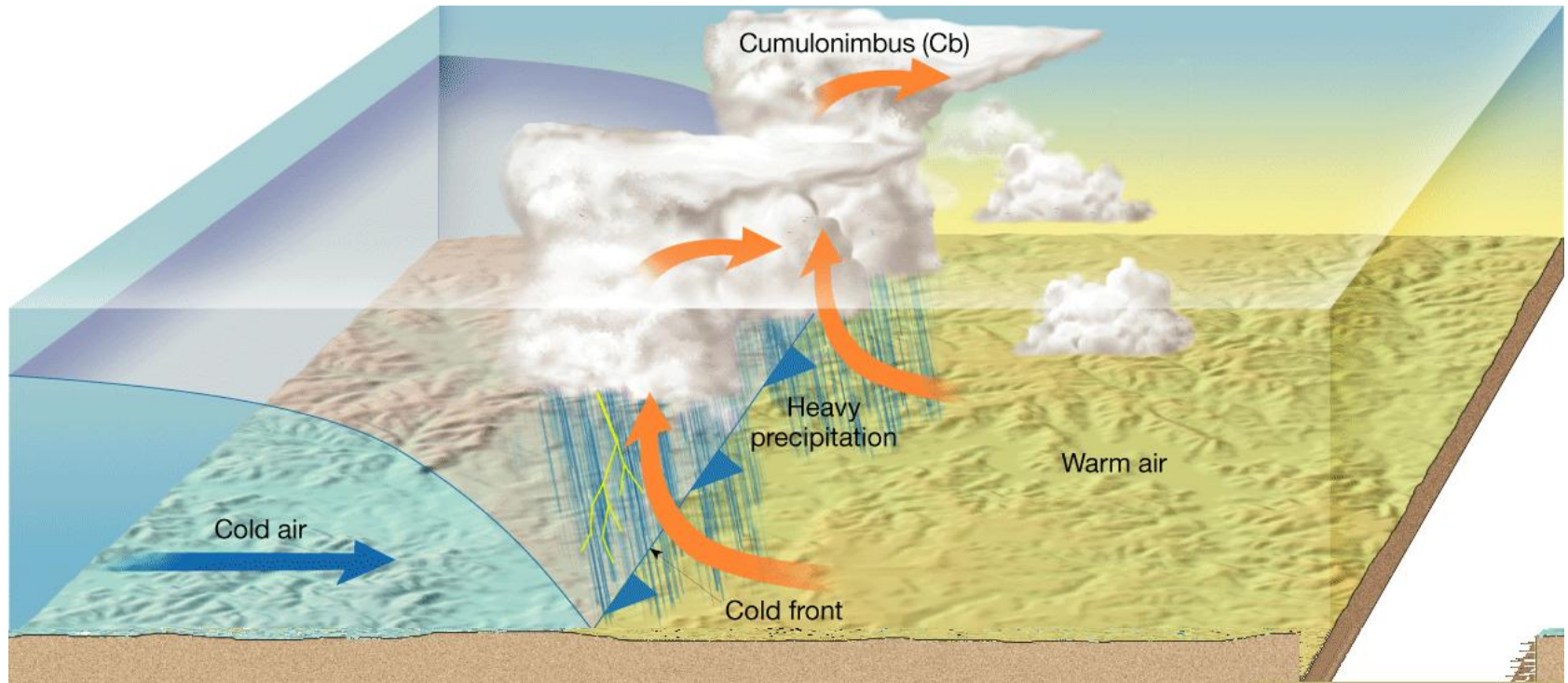
Formation of a Warm Front



Warm and cold air masses move in the same direction



Formation of a Cold Front



Warm and cold air masses collide



Create these 2 boxes on the back page of your notes AND complete!

Please draw and describe a warm
Front.

Provide meteorological symbol

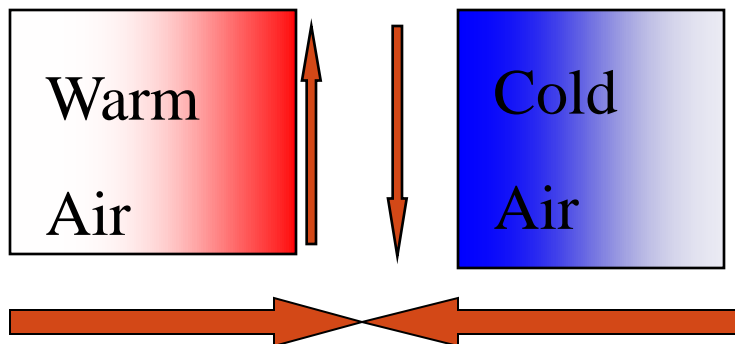
Please draw and describe a cold
front.

Provide meteorological symbol

Fronts

Types of Fronts

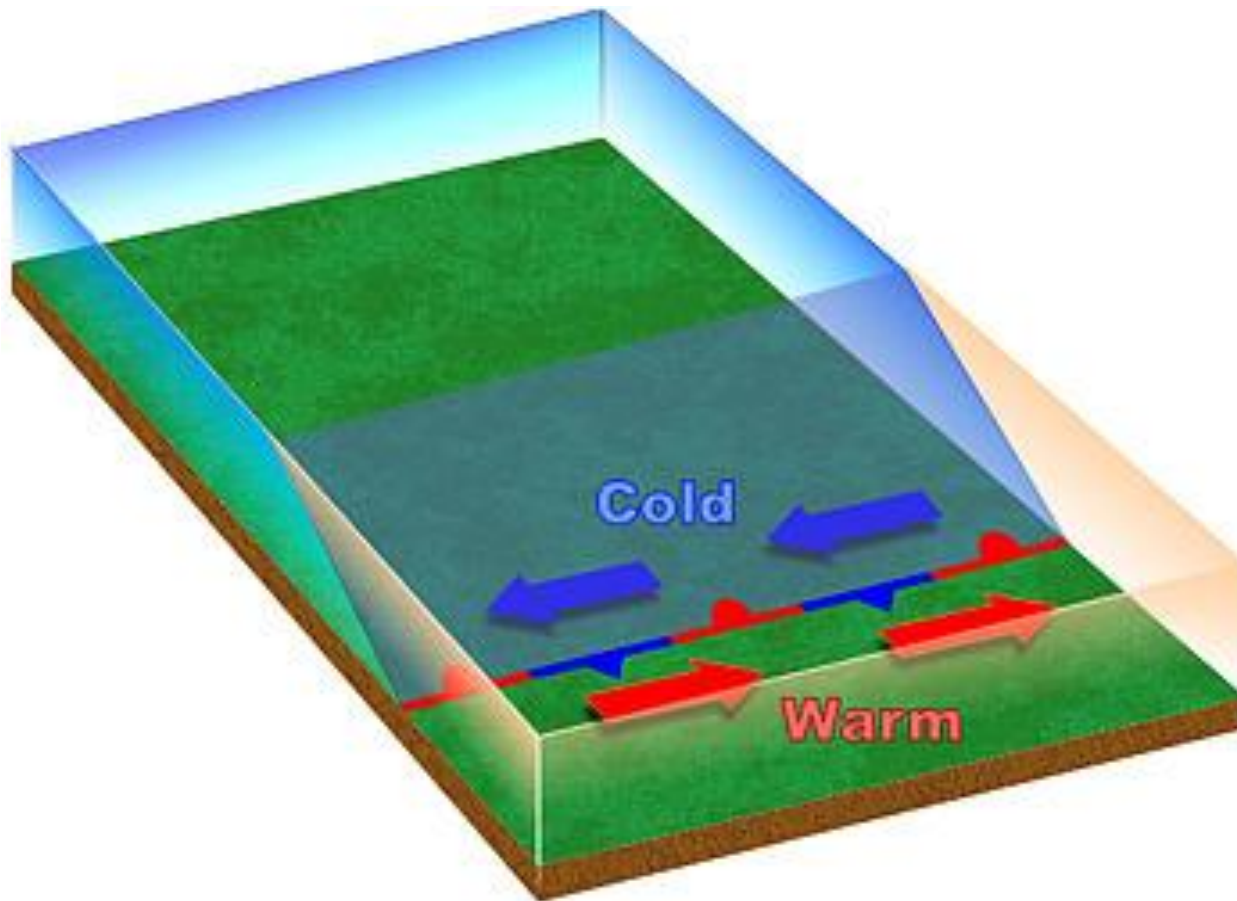
- Occasionally, the flow of air on either side of a front is neither toward the cold air mass nor toward the warm air mass, but almost parallel to the line of the front.
- In such cases, the surface position of the front does not move, and a **stationary front** forms.



**Stationary
Front**

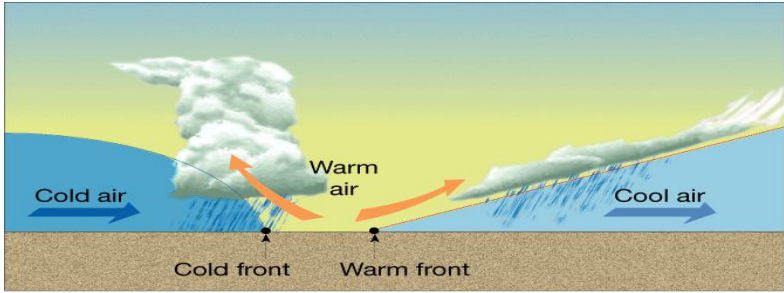
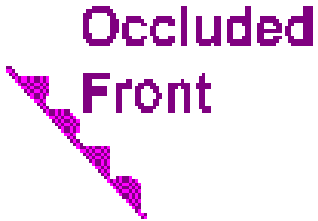
The weather map symbol for a stationary front is shown below the text. It consists of a horizontal line with alternating red and blue triangles pointing towards each other, representing the boundary between the warm and cold air masses.

Stationary Front Air Movement

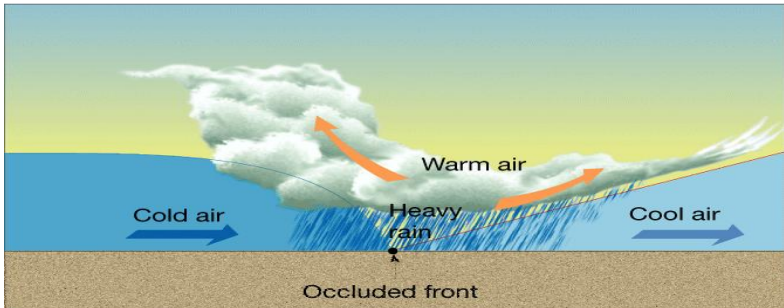


Formation of an Occluded Front

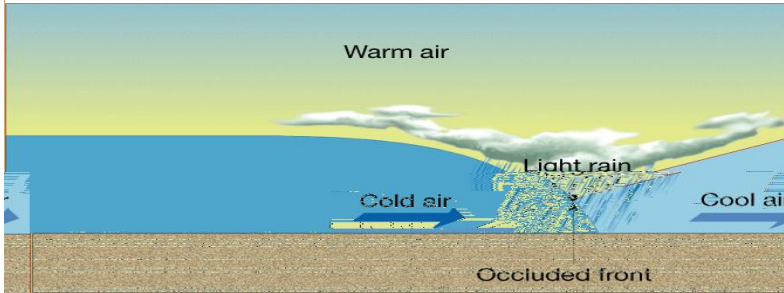
When an active cold front overtakes a warm front, an occluded front forms.



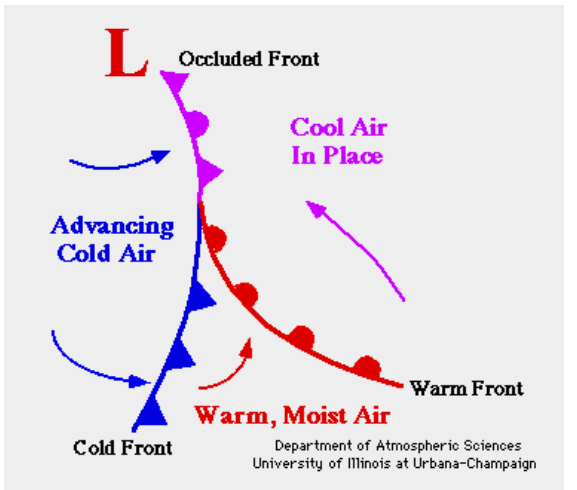
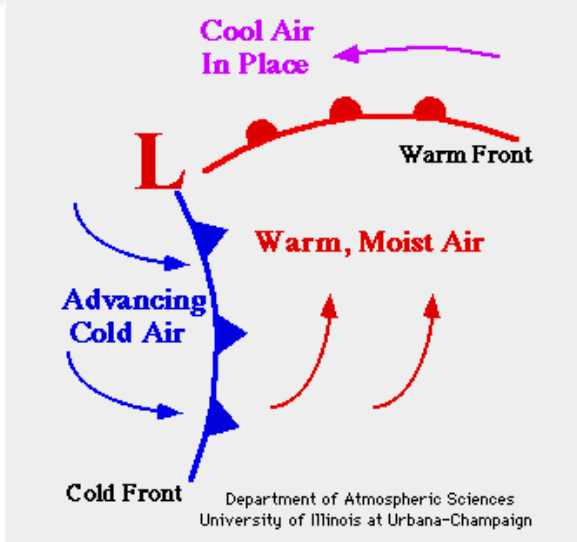
A cold front moves toward a warm front, forcing warm air aloft.



A cold front merges with the warm front to form an occluded front that drops heavy rains.



Because occluded fronts often move slowly, light precipitation can fall for several days.



Pressure Centers and Winds

Highs and Lows

- ◆ **Cyclones** are centers of low pressure.
- ◆ **Anticyclones** are centers of high pressure.
- ◆ In cyclones, the pressure decreases from the outer isobars toward the center.
- ◆ In anticyclones, just the opposite is the case—the values of the isobars increase from the outside toward the center.