

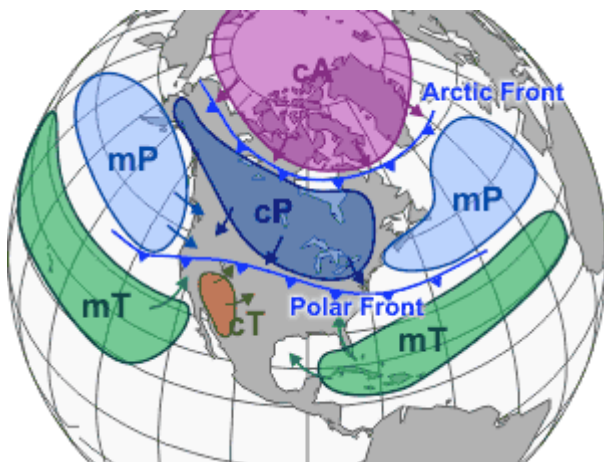
WHAT IS AN AIR MASS?



The purpose of this module:

You will be able to describe from where *AIR MASSES* originate and some basic properties about each air mass affecting the United States. Not all air masses are the same. When two different types of air masses collide with each other, different types of weather related events might occur.

Just as any country or state has boundaries, so do air masses. The boundaries of an air mass are called a *front*. This module examines air masses, the next module examines fronts, with detailed explanations about cold fronts and warm fronts.



Air Masses = Uniform bodies of air

DEFINITION: An air mass is a large body of air that has similar temperature and moisture properties throughout. Air masses are extremely large. Judging from the picture below, an air mass can easily encompass 10 or even more entire states! An air mass takes on the temperature and humidity content (moisture level) of the area in which it forms. Thus, an air mass over an ocean area would probably be moister than an air mass formed over a desert.

Likewise, an air mass formed over Canada would probably be a cold air mass, whereas an air mass formed over Mexico would likely be a warm (and dry) air mass.

REVIEW:

Air masses are classified by two characteristics: **Temperature and Moisture**

- An air mass that forms over a warm region is a warm air mass.
- An air mass is cold if it forms over a cold region.
- An air mass is dry if it forms over a dry region.
- An air mass is moist if it forms over a “water” region (ocean).

Air Masses and Air Pressure

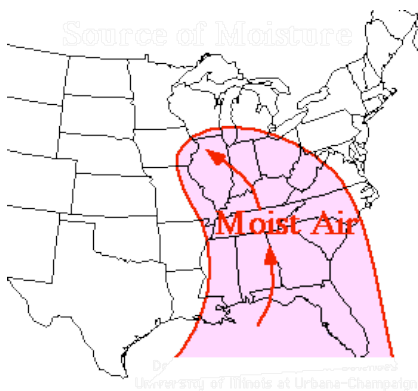
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THE ROLE OF AIR PRESSURE:

- Warm air masses usually have low air pressure (unstable weather)
- Cold air masses usually have high air pressure (stable weather)
- Low pressure systems are usually cloudy, windy, and rainy
- High pressure systems bring clear skies and bright sunny days

THE ROLE OF THE JET STREAM & AIR MASS TYPES:

- The fast moving Jet Streams move air masses from **west to east**.



Maritime Tropical Air Masses

The maritime tropical air masses originate over the warm waters of the tropics and Gulf of Mexico. Here the heat and moisture of waters below are transferred to overlying air above. The northward movement of tropical air masses transports warm moist air into the United States, increasing the potential for precipitation.

Continental Polar Air Masses = Cold temperatures; little moisture



In contrast, continental polar air masses (cP), originate over the northern plains of Canada. These air masses are typically transported in a south or southeast direction. Air masses formed over Canada are obviously cold. Those who live in northern portions of the United States expect cold weather during the winter months. These conditions usually result from the invasion of cold arctic air masses that originate from

the snow-covered regions of northern Canada. However since there are no large oceans, or seas in Canada, these air masses are also considered to be dry air masses, too. When a cold dry air mass meets a warm humid air mass the result is a lot of rain, snow, or even tornadoes!

Once an air mass moves out of its source region, it is modified as it encounters surface conditions different than those found in the source region. For example, as a polar air mass moves southward, it encounters warmer landmasses and consequently, is heated by the ground below. Air masses typically clash in the middle latitudes (the United States), producing some very interesting weather – thunderstorms and tornadoes.

Since the terrain is generally flat in the central United States with no large mountain ranges, arctic air masses entering the United States can easily slide all the way to Texas and Florida!

Air Masses and Air Pressure

Name: _____

Continental Arctic (cA):

- Extremely cold temperatures and very little moisture.
- Originate north of the Arctic Circle.
- Such air masses often plunge south across Canada and the USA during winter, but very rarely form during the summer because the Sun warms the Arctic.

Continental Polar (cP):

- Cold and dry, but not as cold as Arctic air masses.
- Often dominate the weather picture across the USA during winter.
- During the summer, usually influence only the northern USA.
- These air masses are the ones responsible for bringing clear and pleasant weather during the summer to the North.

Maritime Polar (mP):

- Cool and moist. They usually bring cloudy, damp weather to the USA.
- Maritime polar air masses form over the northern Atlantic and northern Pacific. They most often influence the Pacific Northwest and the Northeast.
- Can form and are usually not as cold as continental polar air masses.

Maritime Tropical (mT):

- Warm temperatures with a lot of moisture.
- Maritime tropical air masses are most common across the eastern USA and originate over the warm waters of the southern Atlantic Ocean and the Gulf of Mexico.
- These air masses can form year round, but they are most prevalent across the USA during Summer.
- Maritime tropical air masses are responsible for the hot, humid days of summer across the South and the East.

Continental Tropical (cT):

- Hot and very dry. They usually form over the Desert Southwest and northern Mexico during summer.
- They can bring record heat to the Plains and the Mississippi Valley during summer, but they usually do not make it to the East and the Southeast.
- As they move eastward, moisture evaporates into the air, making the air mass more like a maritime tropical air mass.

Air Masses and Air Pressure

Name: _____

* Complete the following table below:

<i>Air Mass Type</i>	<i>Abbrev. Symbol</i>	<i>Moisture Content</i>	<i>Description of Temp.</i>	<i>Where Did It Form?</i>	<i>Pressure Center (High/Low)</i>	<i>Type of Weather</i>	<i>Time of Year</i>
<i>Continental Arctic</i>							
<i>Continental Antarctic</i>							
<i>Continental Polar</i>							
<i>Continental Tropical</i>							
<i>Maritime Polar</i>							
<i>Maritime Tropical</i>							

* Label the following air masses below:

