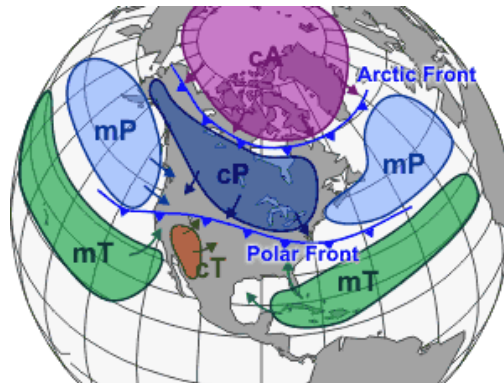


Chapter 8: Air Masses

Regional Formation

Movement: North America

Influence on Weather



Air Mass:

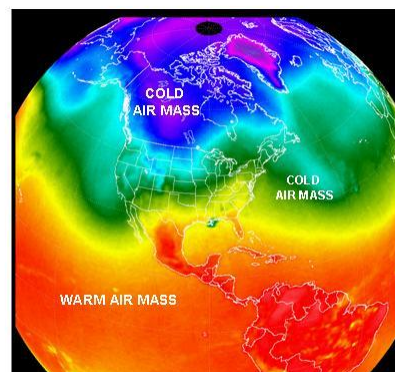
-immense body of air (1600km across, several km thick)

-homogeneous physical properties

temperature

moisture content

-migration & influence



Air Mass Weather:

- migration and regional influence
- conditions may exist for several days, consistent weather
- many disturbances, originate along air mass boundaries



Source Region: areas in which air mass originates

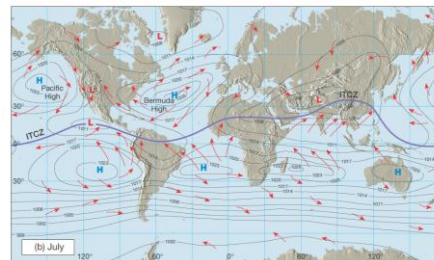
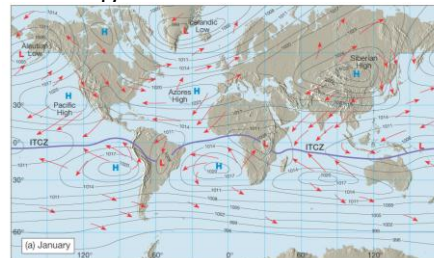
homogeneous surface

extensive geographic region

stagnant atmospheric circulation

attain equilibrium with the surface

slow moving anticyclones

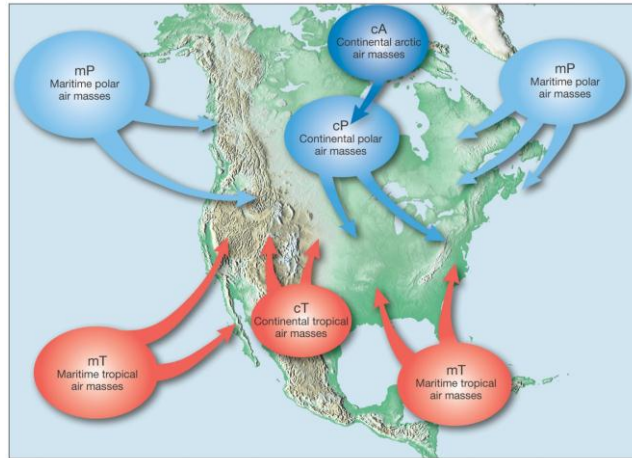


Low pressure systems are not good because surface convergence brings several unlike air masses together (mixing)

Source Regions for North American Air Masses

mT, cT : warm

mP, cP, cA: cold



mid latitudes are zones of classing air masses = stormy

Classifying Air Masses: influenced by **latitude** and **surface**

Temperature

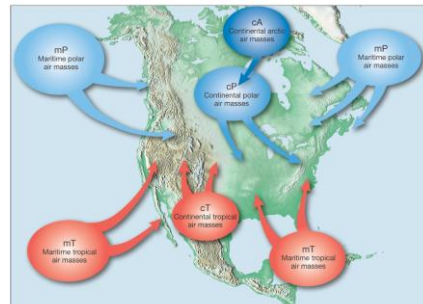
High latitude = cold, low latitude = warm

P -Polar
A -Arctic
T -Tropical

:similar to polar just colder

Humidity

m -Maritime -wet
c -Continental -dry



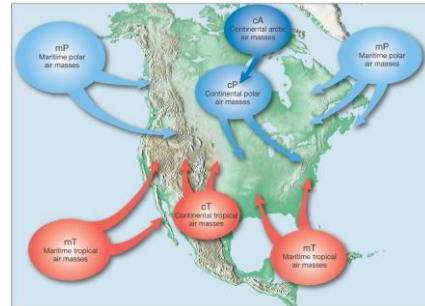
Air Mass Modification:

Ex. **cA**, **cP**: travel over ocean
 extract moisture, heated from below, overturn
 quickly change to **mP**

k-denotes air mass cooler than surrounding surface

w-denotes air mass warmer than surrounding surface

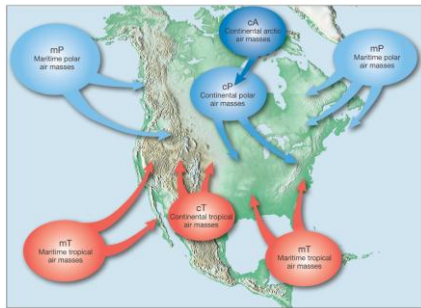
indicates **s**tability (**cPk**, **mTw**)



Properties of North American Air Masses

TABLE 8-1 Weather characteristics of North American air masses

Air Mass	Source Region	Temperature and Moisture Characteristics in Source Region	Stability in Source Region	Associated Weather
cA	Arctic basin and Greenland ice cap	Bitterly cold and very dry in winter	Stable	Cold waves in winter
cP	Interior Canada and Alaska	Very cold and dry in winter	Stable entire year	a. Cold waves in winter b. Modified to cPk in winter over Great Lakes bringing "lake-effect" snow to leeward shores



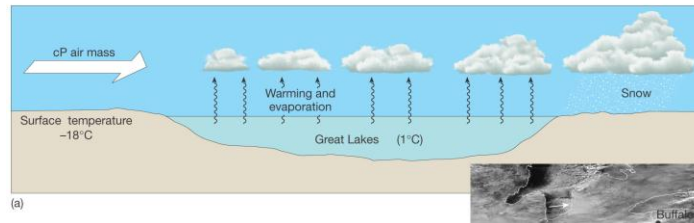
Intense radiation cooling

Enters between the Great Lakes and the Rocky Mnts.

Lake Effect Snow:

Intense snow storms associated with a lake

Influence extends 80-100 km downwind of the lake



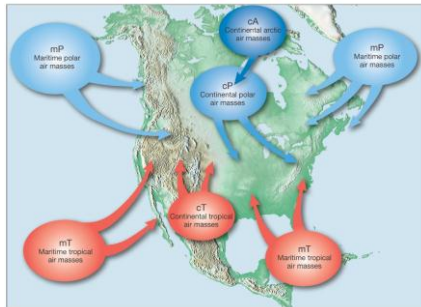
extract moisture and heat, convective overturning, Bergeron Process

Snow Belts:



Properties of North American Air Masses

mP	North Pacific	Mild (cool) and humid entire year	Unstable in winter Stable in summer	a. Low clouds and showers in winter b. Heavy orographic precipitation on windward side of western mountains in winter c. Low stratus and fog along coast in summer; modified to cP inland
mP	Northwestern Atlantic	Cold and humid in winter Cool and humid in summer	Unstable in winter Stable in summer	a. Occasional "nor'easter" in winter b. Occasional periods of clear, cool weather in summer

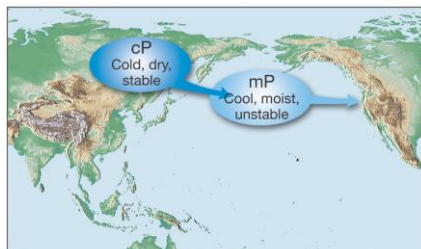


cool, humid air masses

formed at high latitudes over the ocean

mP North Pacific

mP	North Pacific	Mild (cool) and humid entire year	Unstable in winter Stable in summer	a. Low clouds and showers in winter b. Heavy orographic precipitation on windward side of western mountains in winter c. Low stratus and fog along coast in summer; modified to cP inland
mP	Northwestern Atlantic	Cold and humid in winter Cool and humid in summer	Unstable in winter Stable in summer	a. Occasional "nor'easter" in winter b. Occasional periods of clear, cool weather in summer

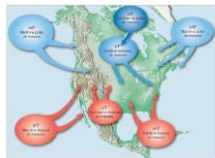


begins as cP air over Siberia

moves over Pacific, warmed, extract water

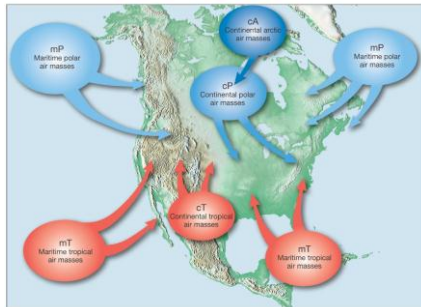
relatively unstable, low clouds, showers

Orographic effect



mP Western North Atlantic

mP	North Pacific	Mild (cool) and humid entire year	Unstable in winter Stable in summer	a. Low clouds and showers in winter b. Heavy orographic precipitation on windward side of western mountains in winter c. Low stratus and fog along coast in summer; modified to cP inland
mP	Northwestern Atlantic	Cold and humid in winter Cool and humid in summer	Unstable in winter Stable in summer	a. Occasional "nor'easter" in winter b. Occasional periods of clear, cool weather in summer



begins as cP air

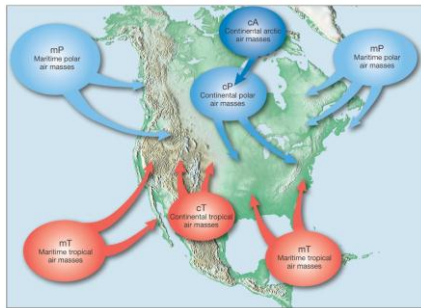
moves over Atlantic, warmed, extract water

drawn back over east coast during the passage of a low pressure system, **nor'easter**

surface convergence, rising, precipitation

Properties of North American Air Masses

mT	Gulf of Mexico, Caribbean Sea, western Atlantic	Warm and humid entire year	Unstable entire year	a. In winter it usually becomes mTw moving northward and brings occasional widespread precipitation or advection fog b. In summer, hot and humid conditions, frequent cumulus development and showers or thunderstorms
mT	Subtropical Pacific	Warm and humid entire year	Stable entire year	a. In winter it brings fog, drizzle, and occasional moderate precipitation to N.W. Mexico and S.W. United States b. In summer this air mass occasionally reaches the western United States and is a source of moisture for infrequent convective thunderstorms.



warm-hot, humid

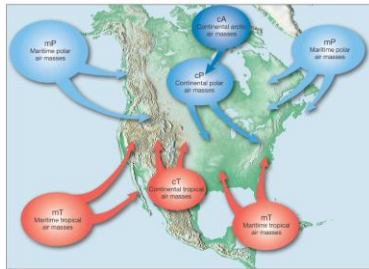
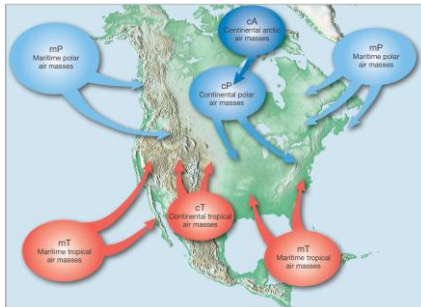
export heat, moisture

Gulf, Caribbean, Atlantic

influence weather east of Rockies

Winter: invasion **mTw**, advective fogs, light precipitation, absorbed into traveling cyclones

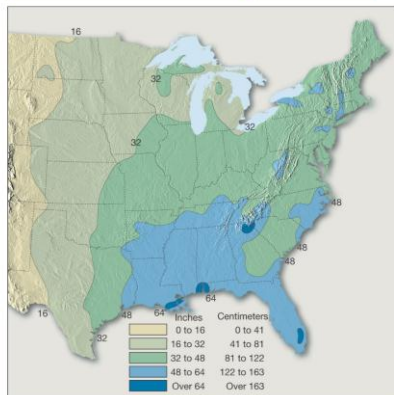
Summer: monsoonal effect, hazy, hot and humid
heating of surface sets up convective thunder storms

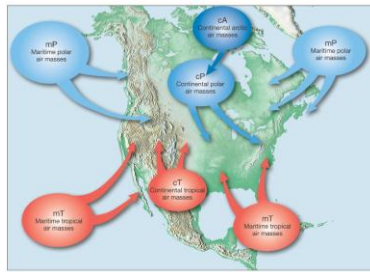


mT Gulf, Caribbean, Atlantic

provides most of the moisture for eastern 2/3 of US

mT Pacific orographic moisture loss

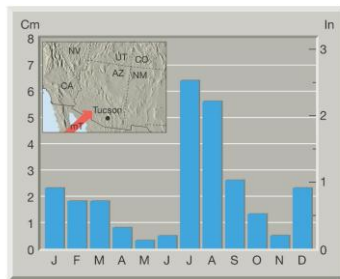




mT Pacific

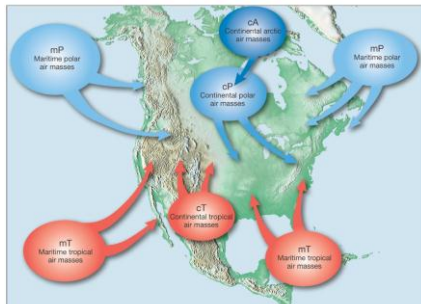
Winter: stable, precipitation associated with orographic uplift

Summer: associated with monsoonal effect in Mexico and southwest US



Properties of North American Air Masses

cT	Northern interior Mexico and southwestern U.S. (summer only)	Hot and dry	Unstable	a. Hot, dry, and cloudless, rarely influencing areas outside source region b. Occasional drought to southern Great Plains
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primarily influence source region