AOSC200:
Weather and Climate Discussion

Sections 0101, 0102

TA: Agniv Sengupta

17 April, 2019

Group Project #2

Project #2: Weather and Climate Advisory Team

Please refer:

https://www.aosc.umd.edu/~asengupta/AOSC200/AOSC200.Project2.Directions.pdf

Project #2: Section 0101 Topics

1. Group 1: *California Wildfire and Air Quality (State/Federal govt. official)*
2. Group 2: *Prepare a realistic energy plan that maximizes economic benefit and minimizes health risks and environmental damage (CEO of Fortune 500 company)*
3. *Group 3: Coastal Restoration Methods (Government Official)*
4. Group 4: *Decline of Arctic Sea Ice and its Effects (Government Official)*
5. Group 5: *Carbon Taxation (UNEP Personnel)*
6. Group 6: *Chesapeake Bay: Impacts of Climate Change (Maryland State Official)*

Project #2: Section 0102 Topics

1. Group 1: *Impacts of Rising Sea Levels (large investor)*
2. Group 2: *Chesapeake Bay: Impacts of Climate Change (CEO of a seafood company)*
3. Group 3: *Carbon Taxation (Government Official)*
4. Group 4: *Impact from Hurricanes with Recommendations for Improvements (State/govt. official)*
5. Group 5: *Coastal Restoration Methods (State/Federal Official)*
6. Group 6: *California Wildfires and its Impact on Air Quality (Federal Official)*

Project#2: Important Dates

- Before Presentations
  - 4-17
    - Group Rough draft due (ELMS)
    - Individual Rough draft due (ELMS)
    - ½ way Peer Evaluations due (ELMS)

- Presentations
  - 5-1 (1st Day of Presentations)
    - All groups should be prepared; Final Group Paper containing Annotated Bibliography must be turned in BEFORE discussion.
  - 5-8 (2nd Day of Presentations)
    - Individual Write-ups due
    - Final Peer Reviews Due

Group Project #2

Individual Rough Draft- Due April 17th

- Individually you must submit a draft on your portion of the presentation, i.e., on the exact aspect of the broader group topic that you're working on.
- This document needs to have three reputable sources (peer-reviewed scientific journal, a government, or a University website). The document needs to have proper intext citations and a bibliography at the end.
- 1-page, font size 12, Times New Roman, 1" Margins.
- Paragraph form with proper grammar and spelling strongly encouraged.
- The bibliography at the end does not count towards the length of document.

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Group Rough Draft- Due April 17th

- Highlights only the main points of the presentation. This should be clear and concise. It is okay if some ideas are a work in progress but they should be written in complete sentences with proper grammar.
- This should be an abridged version of the individual draft and should only focus on the key points of the group presentation.
- Designate one member of the group to make sure all groupmates are in uniform format (indents, bullet type, font type and size, etc.)
- The document needs to have proper intext citations and a group bibliography at the end.

Group Project #2

Today you will:

1. Collaborate with your group members on your research topic.

2. Look for scientific resources for your sub-topics. Finalize your group draft; please ensure that the flow of your overall project topic is consistent while describing various sub-topics. Ensure the document formatting is consistent.

3. You have ~ 20 minutes of class time dedicated towards group work on your project.

4. Kindly let me know if you have any questions or concerns. I am happy to help you

Air Masses

- Large body of air whose temperature and humidity are the same in any horizontal direction
- Can cover huge areas (hundreds of thousands sq. miles)
- Influenced by the surface over which they form (source region)
- Air masses can be modified through lifting and heat exchange with the surface

Air Masses: Source Regions

- Two main surface categories:

Continental	Maritime
Formed over Land	Formed over ocean
Generally dry	Generally moist

- Three main location categories:

Arctic (A)	Polar (P)	Tropical (T)
Formed over Arctic	Formed Poleward of 60° latitude	Formed 30°S to 30°N
Very Cold	Cold or cool	Hot or warm

Air Mass Source Regions

TABLE 8.1 Air Mass Classification and Characteristics

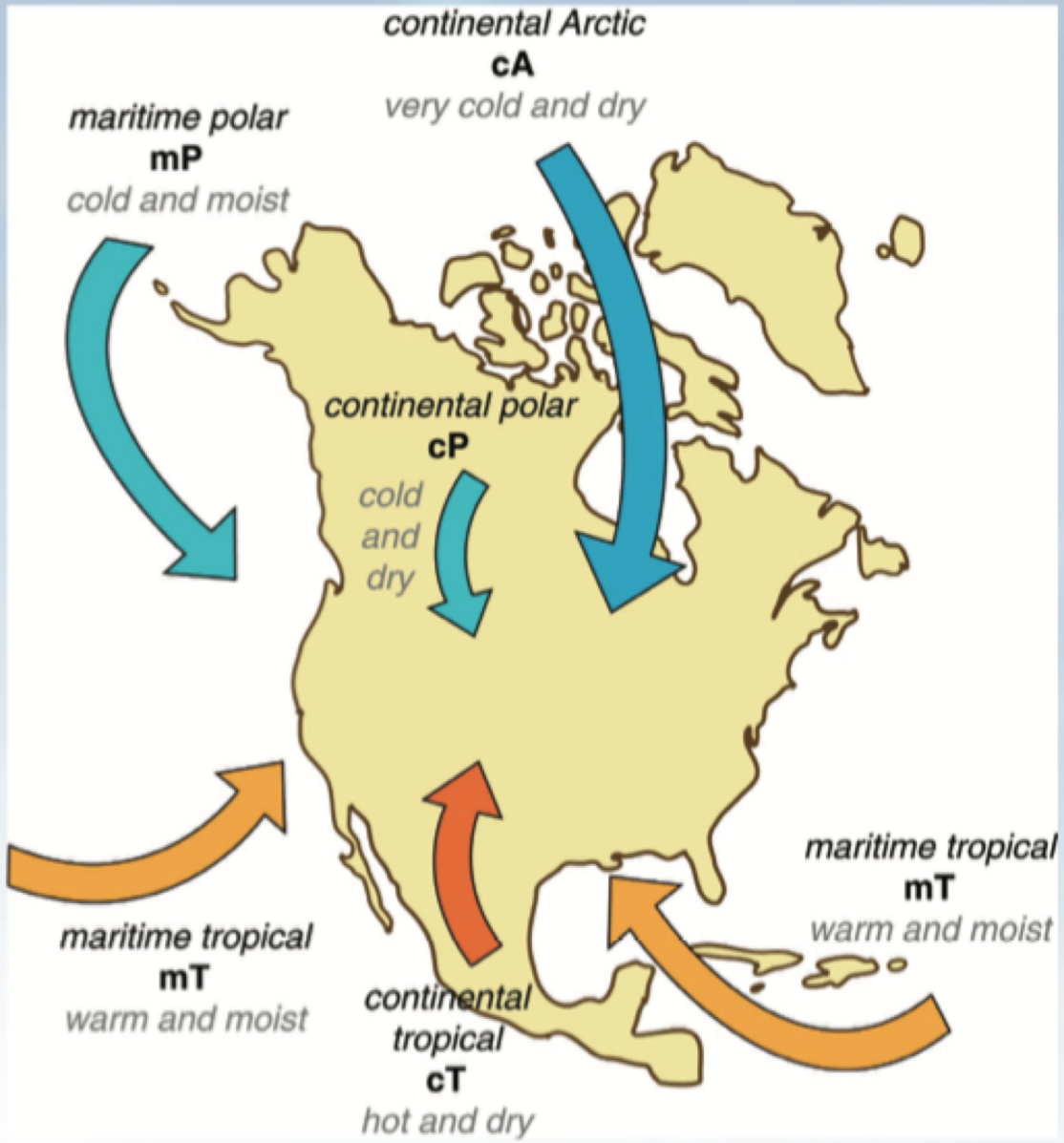
SOURCE REGION	ARCTIC REGION (A)	POLAR (P)	TROPICAL (T)
Land	*cA*	*cP*	*cT*
Continental (c)	extremely cold, dry, stable; ice- and snow-covered surface	cold, dry, stable	hot, dry, stable air aloft; unstable surface air
Water		*mP*	*mT*
Maritime (m)		cool, moist, unstable	warm, moist; usually unstable

Remember: Continental = dry
Maritime = moist

First letter: surface category
Second letter: location category

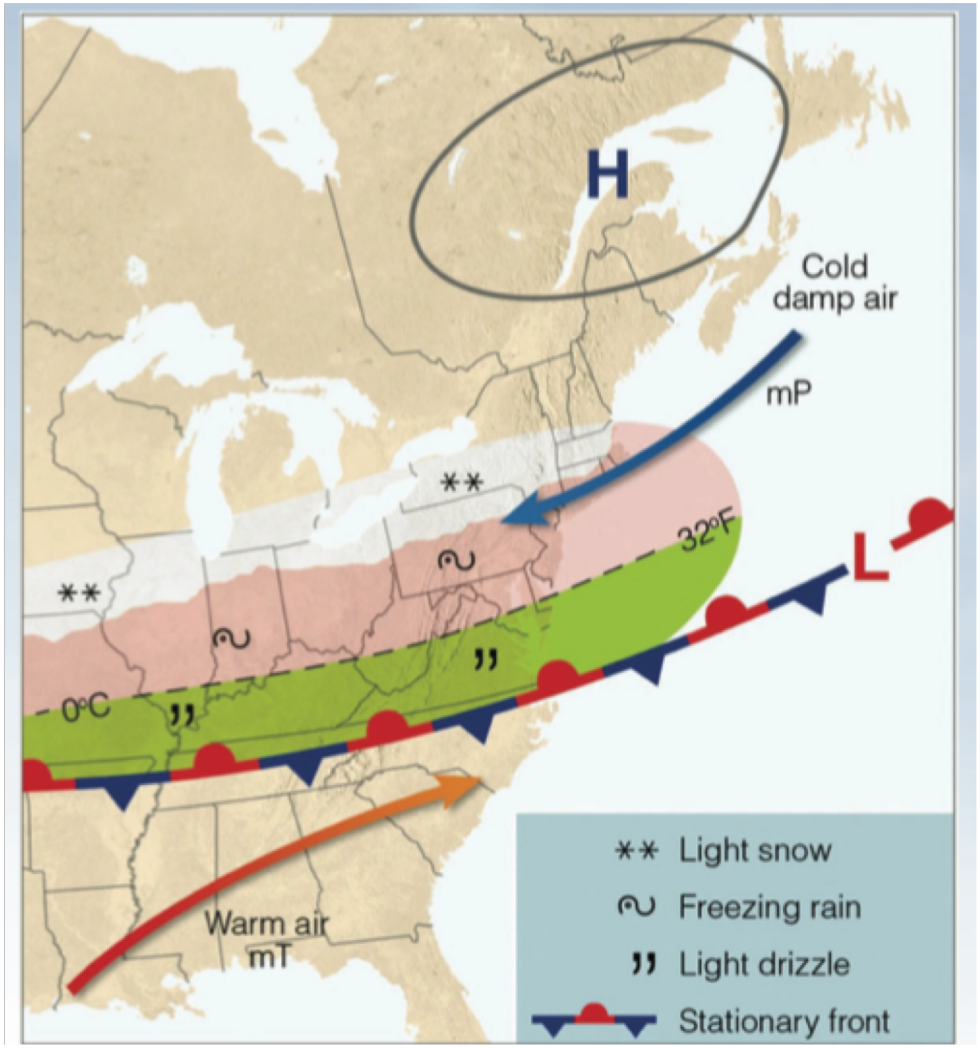
cT = *c*ontinental *T*ropical

Air Masses that Affect North America



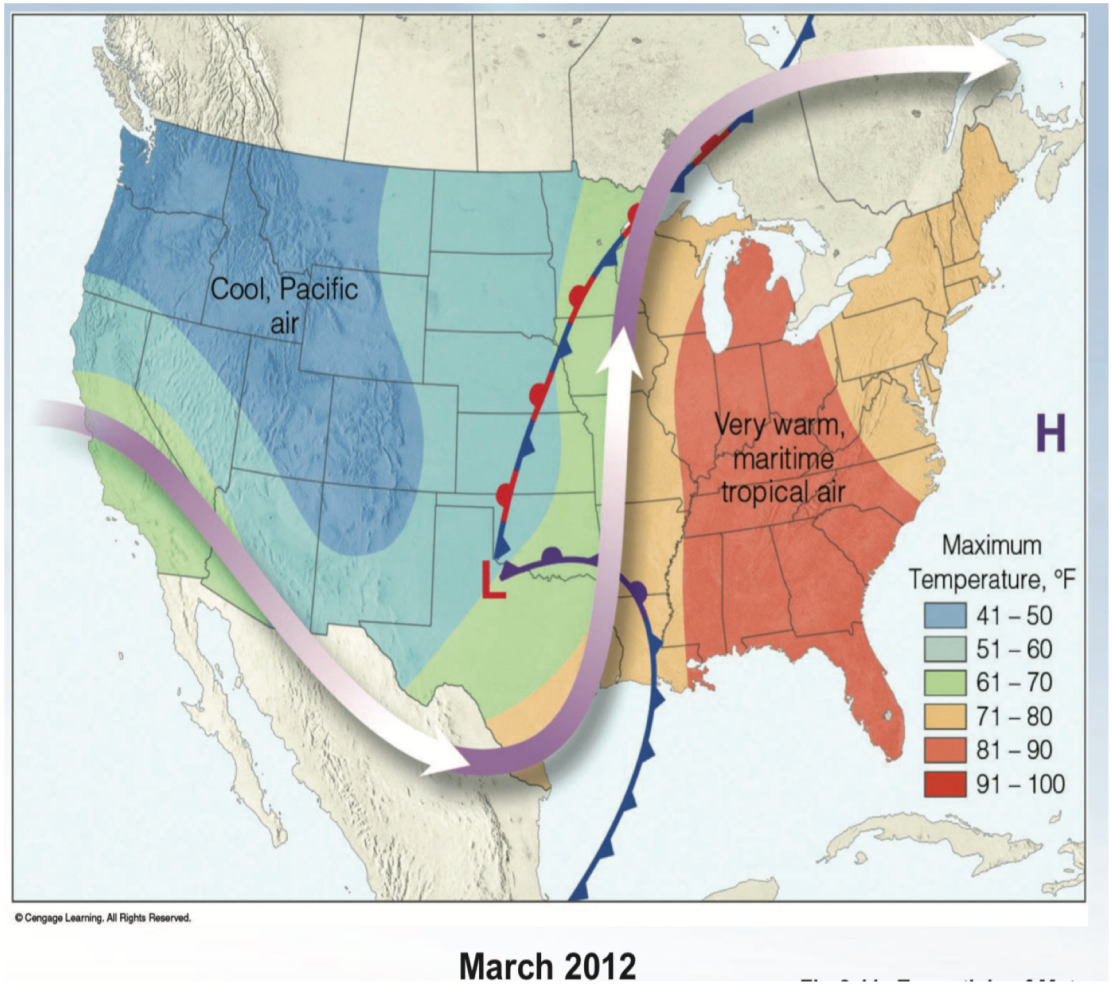
Arrows indicate general direction of air flow

Maritime Polar Air (mP)



- Form over oceans at high latitudes, cool to cold and humid
- In winter, mP from Pacific begin as cP from Siberia.
- These systems run into west coast mountains and dump lots of snow (orographic forcing).
- On East coast, mP brings in moist air from Atlantic over land where it meets with cP air.
- Can lead to large snowfalls.

Maritime Tropical (mT)

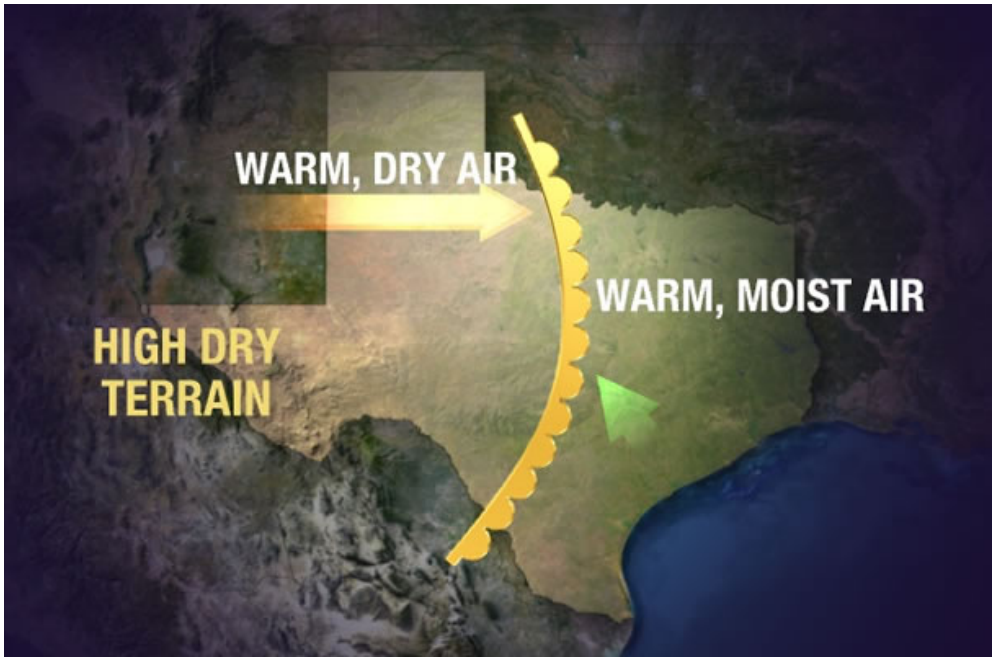


March 2012

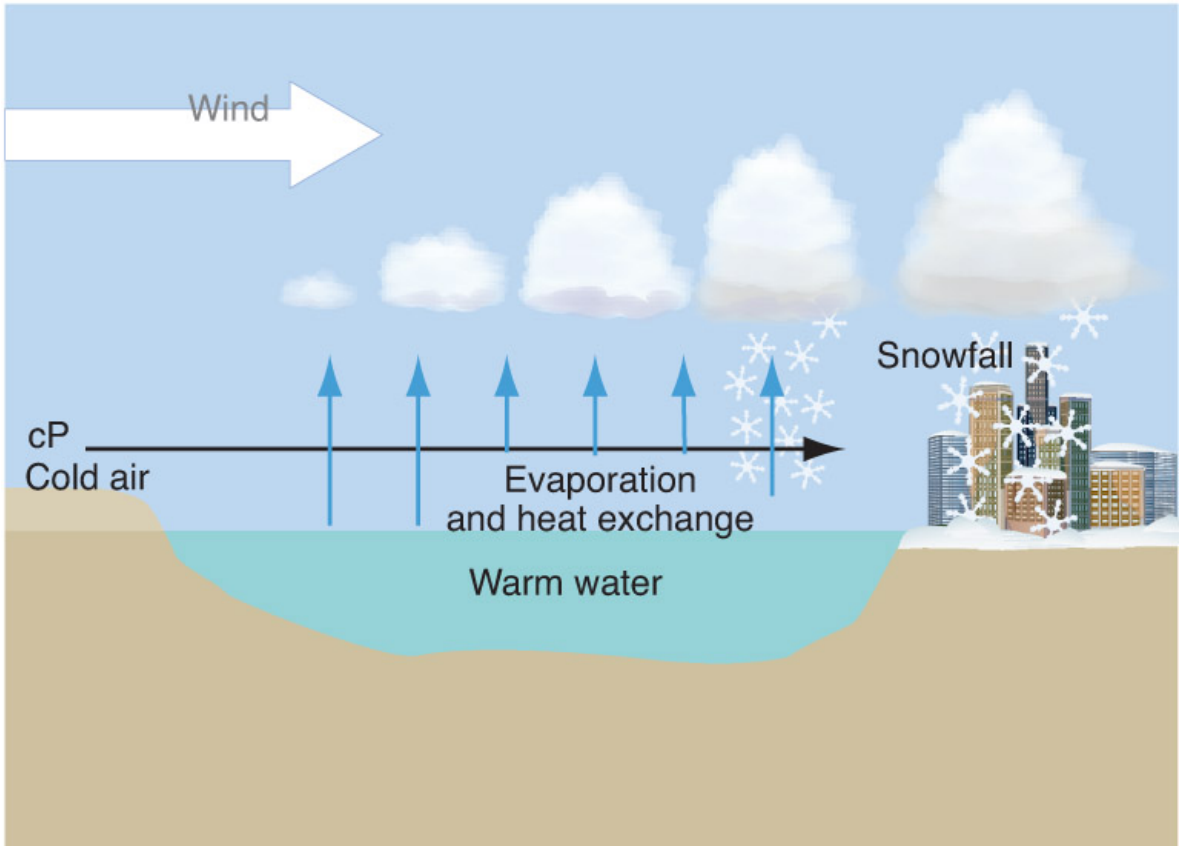
- Eastern U.S. strongly affected by mT air that forms over Gulf of Mexico, Caribbean Sea, and subtropical western Atlantic Ocean
- Stable air mass leads to oppressive heat wave
- Wintertime precipitation over Central and Eastern U.S. due to uplift of mT air over cold air masses

Continental Tropical (cT)

- Form over tropical and subtropical deserts and plateaus
- Air mass is hot and dry
- When cT and mT air meet, contrast between systems is called the "dry line"
- In summer, large, supercell storms often form at dry line, conducive to tornado development.



Lake Effect Snow



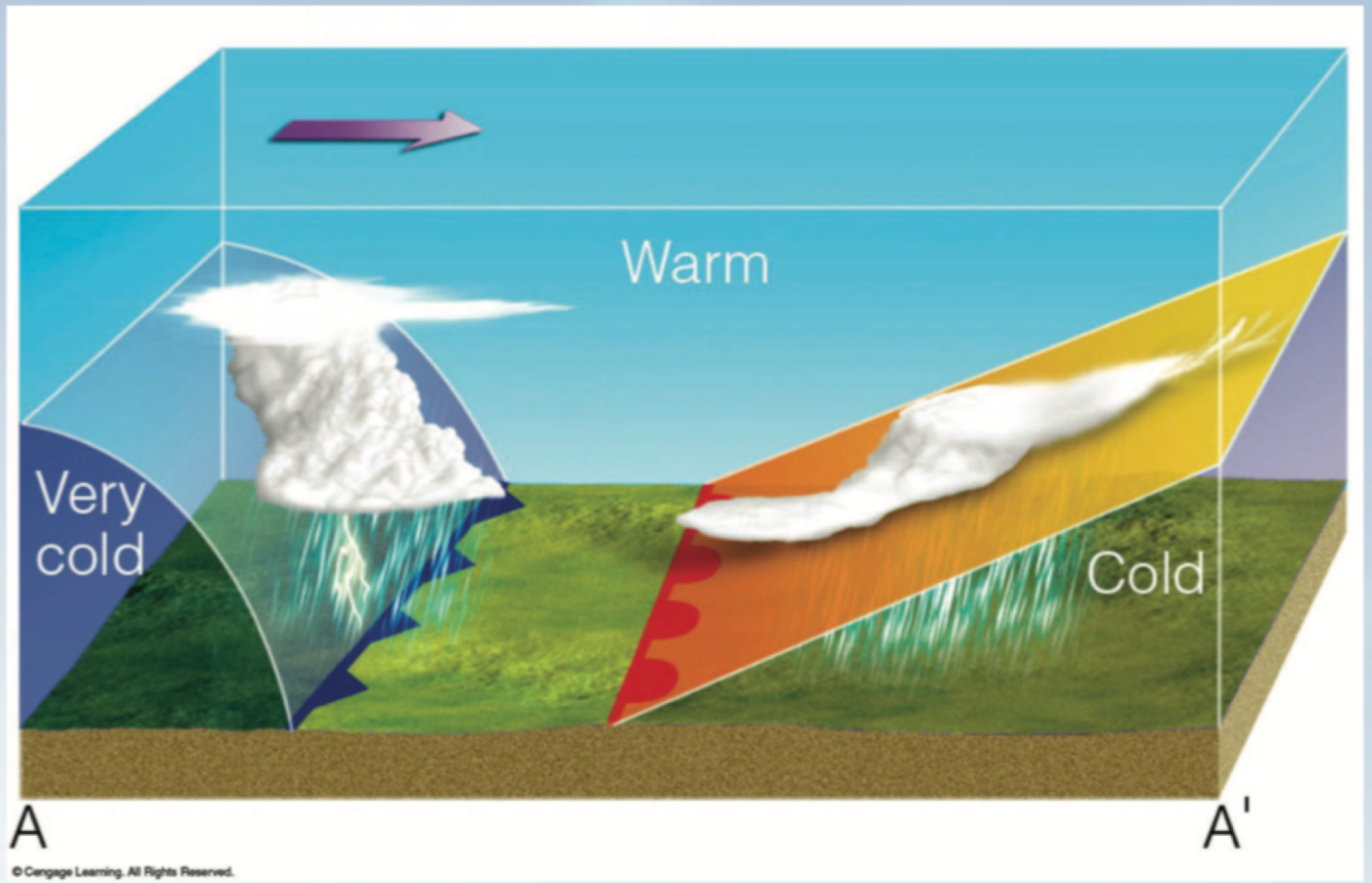
- Cold Polar or Arctic blows over warm water and picks up moisture and drops snow on downwind side of lake
- Snow can fall in distinct bands

Fronts…

Weather Variable	Cold Front		Warm Front	
	Before Passage	*After Passage*	*Before Passage*	*After Passage*
Temperature	Warm	Cooler	Slowly warming	Warm
Dew point temperature	High	Lower	Slowly rising	Higher
Sea-level pressure	Falling	Rising	Falling	Steady
Wind direction	Southerly	Westerly	Easterly	Southerly
Clouds	Cumulonimbus	Clearing, some stratocumulus	From cirrus to stratus	Cumulus
Precipitation	Heavy near front	Ending	Steady, moderate ahead of front	Ending

Occluded Fronts (cold type occlusion)

cP



mP

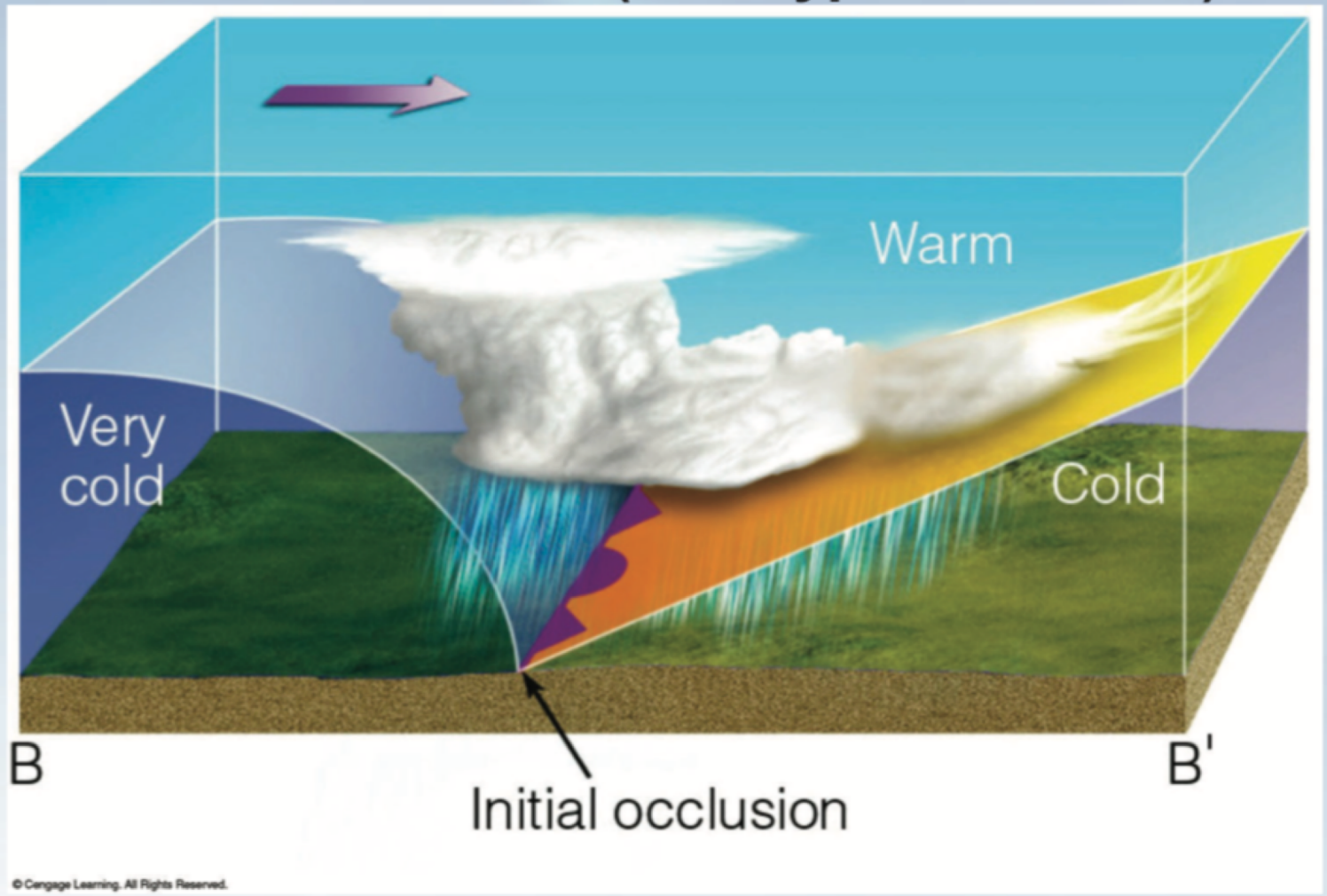
Cold front moves faster than warm front, may catch warm front

Warm air is forced up over both cold/very cold air masses

May have mix of clouds similar to both cold and warm fronts

Occluded Fronts (cold type occlusion)

cP



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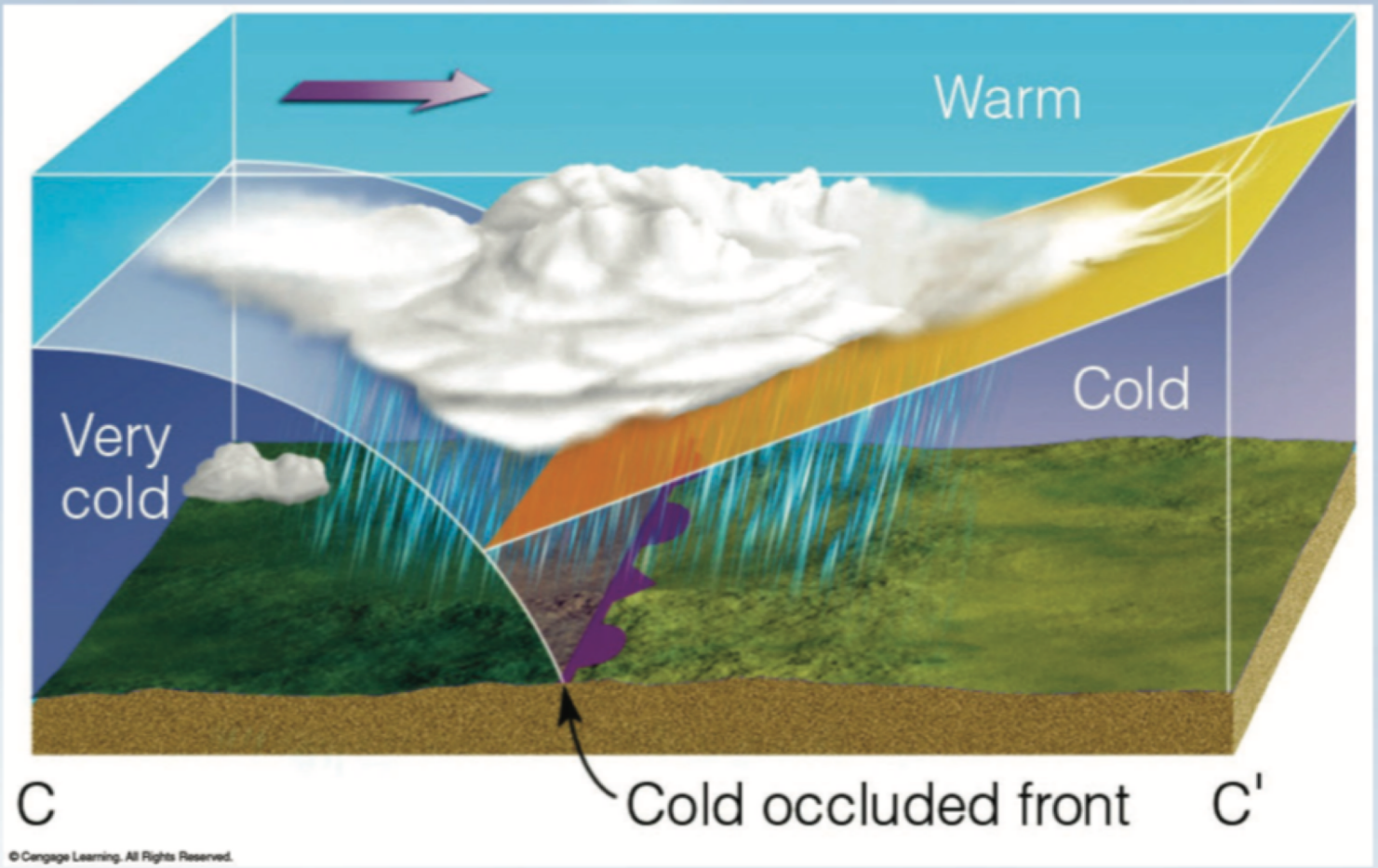

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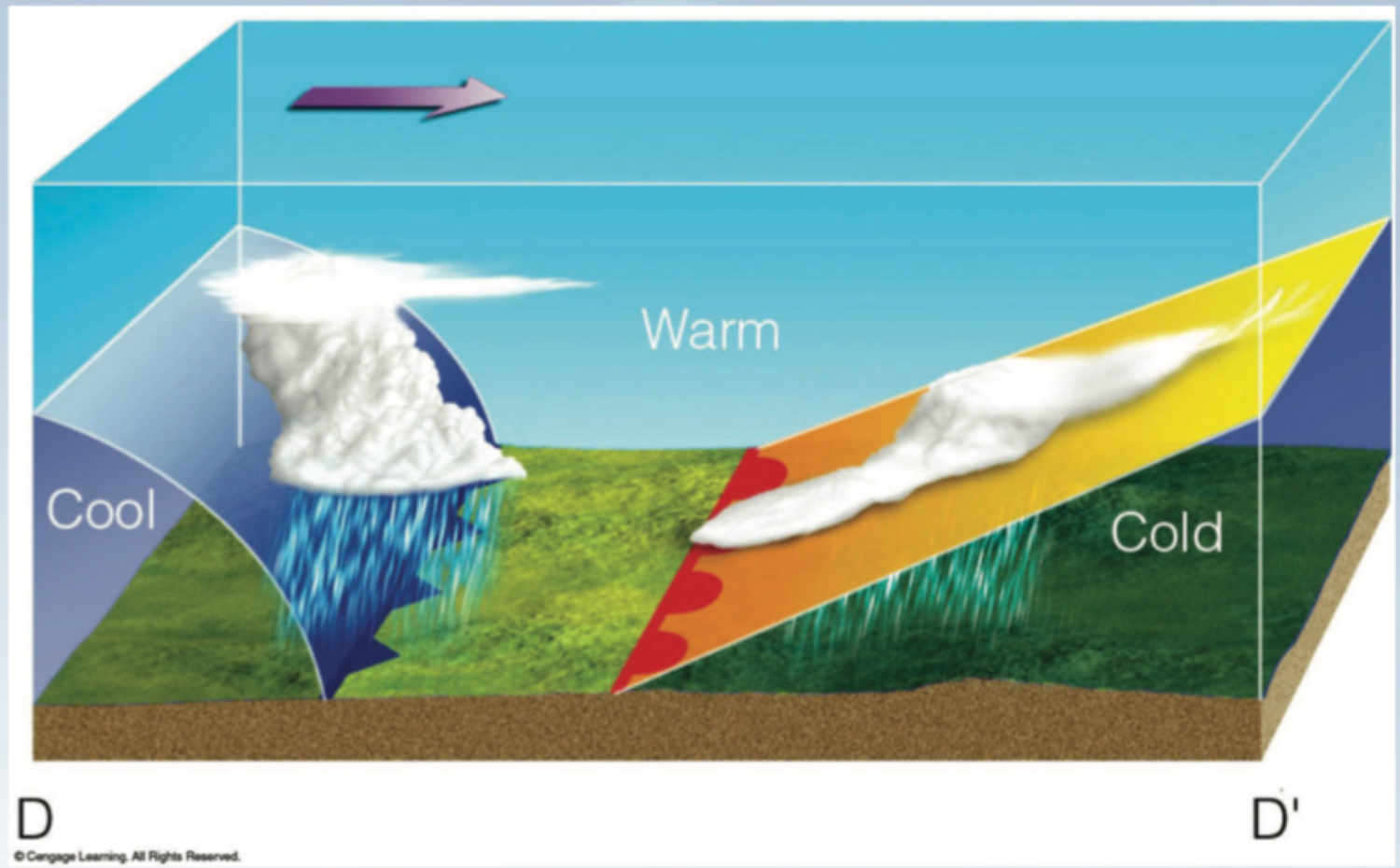


cP

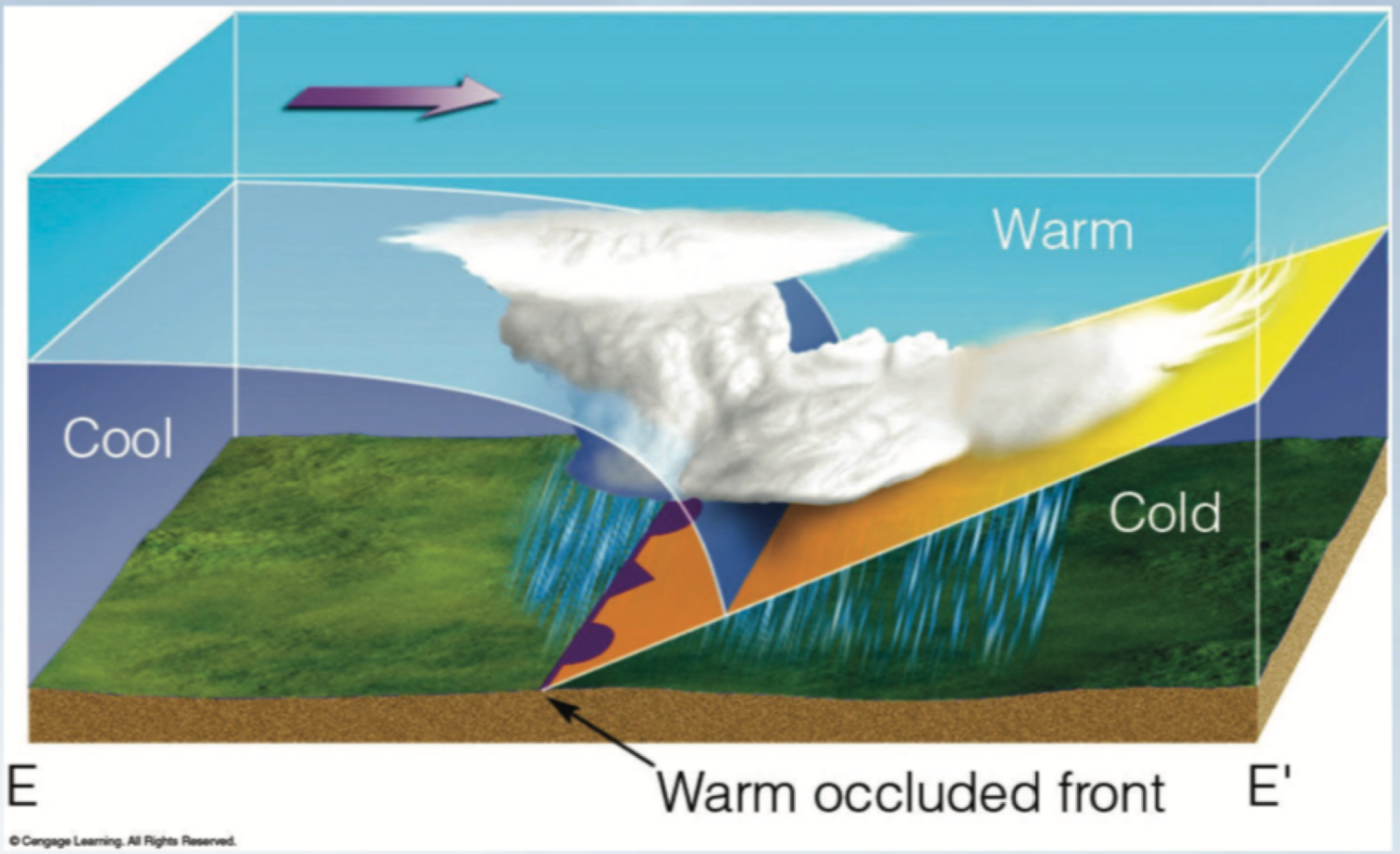
Cold front moves faster than warm front, may catch warm front

Cool air is forced up over cold air mass

May have mix of clouds similar to both cold and warm fronts

Occluded Fronts (warm type occlusion)

mP



cP

Cold front moves faster than warm front, may catch warm front

Cool air is forced up over cold air mass

May have mix of clouds similar to both cold and warm fronts

Questions ?

Email me: agnivs@umd.edu