EOSC 114 Fall term 2024

Storms section

Instructor: Doug McCollor

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List of class iClicker questions

Storms Lecture: Lightning

iClicker question #1:

In a lightning strike, what does the stepped ('step') leader do?

(A) It steps up the voltage like a transformer, to make the voltage large enough to reach the ground.

(B) It produces a flickering that you can see by eye.

(C) It is a luminescent sphere of plasma (electricity) that expands step by step.

(D) It is the part of the lightning that makes the bright flash and thunder.

(E) It makes the first electrical connection between the cloud and ground.

iClicker question #2:

The location of greatest lightning frequency in the world is:

(A) Alberta, Canada (just east of British Columbia)

(B) Oklahoma, (in central) USA

(C) Florida, (in southeast) USA

(D) Central Africa

(E) Southern China

iClicker question #3:

In a lightning storm, which is normally the safest option?

(A) Hide under a metal vehicle such as a truck or farm tractor.

(B) Walk to the middle of a large open area (farm field or athletic field) as far away from trees as possible.

(C) Hide under a tree and stoop down (get into the lightning crouch) to make yourself less of a target for lightning.

(D) Hide inside a metal vehicle such as a car or enclosed farm tractor.

(E) Hold up your umbrella to act like a lightning rod to dissipate electric charge into the air.

iClicker question #4:

Which statement is TRUE?

(A) Multicell storms don't usually have lightning.

(B) A multicell thunderstorm can contain 1 or more cells at the same time.

(C) In a multicell storm, the life-cycle of each cell is synchronized to the other cells.

(D) The cumulus stage of a thunderstorm is the stage mostly likely to have an overshooting top or dome.

(E) Under a multicell storm, you might be hit by violent weather while your friends across town under a different cell of the same storm might have mild conditions.

iClicker question #5:

Most of our storms happen in the:

(A) mesosphere

(B) stratopause

(C) stratosphere

(D) tropopause

(E) troposphere

Storms Lecture: Tornadoes

iClicker question #1:

Which of the following about strong tornadoes is FALSE? Strong tornadoes are:

(A) not always visible
(B) within the strongest downdraft region of the thunderstorm
(C) usually connected to supercell thunderstorms
(D) often under the updraft region of thunderstorms
(E) often associated with mesocyclones

iClicker question #2:

As a tornadic thunderstorm approaches you, the sequence of events you experience over your location (not far away) is:

(A) tornado, downpour, rainbow, lightning, anvil
(B) anvil, gust front, lightning, downpour, tornado
(C) downpour, gustfront, anvil, tornado, lightning
(D) supercell, tornado, mesocyclone, wall cloud, lightning
(E) (none of the above)

iClicker question #3:

Based on damage to the wood-frame house in the foreground of this image (in the region outlined in green), the Fujita tornado intensity is:

(A) EF1

(B) EF2

(C) EF3

(D) EF4

(E) EF5

iClicker question #4:

A particularly risky place to be, regarding tornadoes, is:

(A) under a rotating wall cloud

(B) in tornado alley

(C) in a car driving away from a tornado

(D) in a mobile home in a tornado

(E) in a basement or cellar under a tornado, due to falling debris

iClicker question #5:

Tornado outbreaks

(A) are extremely rare
(B) happen almost every day in North America
(C) happen almost every year in North America
(D) are usually caused by a single strong supercell storm
(E) often cause parallel damage tracks along the ground

iClicker question #6:

Which of these statements are TRUE?

(A) Tornadoes always move toward the northeast in N. America.
(B) Tornado warnings are issued 6 to 12 hours in advance.
(C) Mobile homes attract tornadoes.
(D) Tornado size and shape can be used to estimate tornado intensity.
(E) None of the above

Storms Lecture: Floods, Atmospheric Rivers

iClicker question #1:

Which statement is TRUE?

(A) If an object is already moving and you push opposite to its motion, the object will move faster.
(B) An object has initial speed V_{old} and final speed V_{new}. If you push on an object for a longer time to reach this final speed, it has a greater acceleration than if you push on it for a shorter time.
(C) If an object is coasting toward the East and you push on it toward the North, then its total speed increases.
(D) If an object is already moving, then pushing on it won't change its motion.
(E) (None of the above are true.)

iClicker question #2:

Which statement is TRUE?

(A) Buoyancy applies only to fluids, not to air.

(B) A larger buoyancy force implies a greater acceleration vertically.

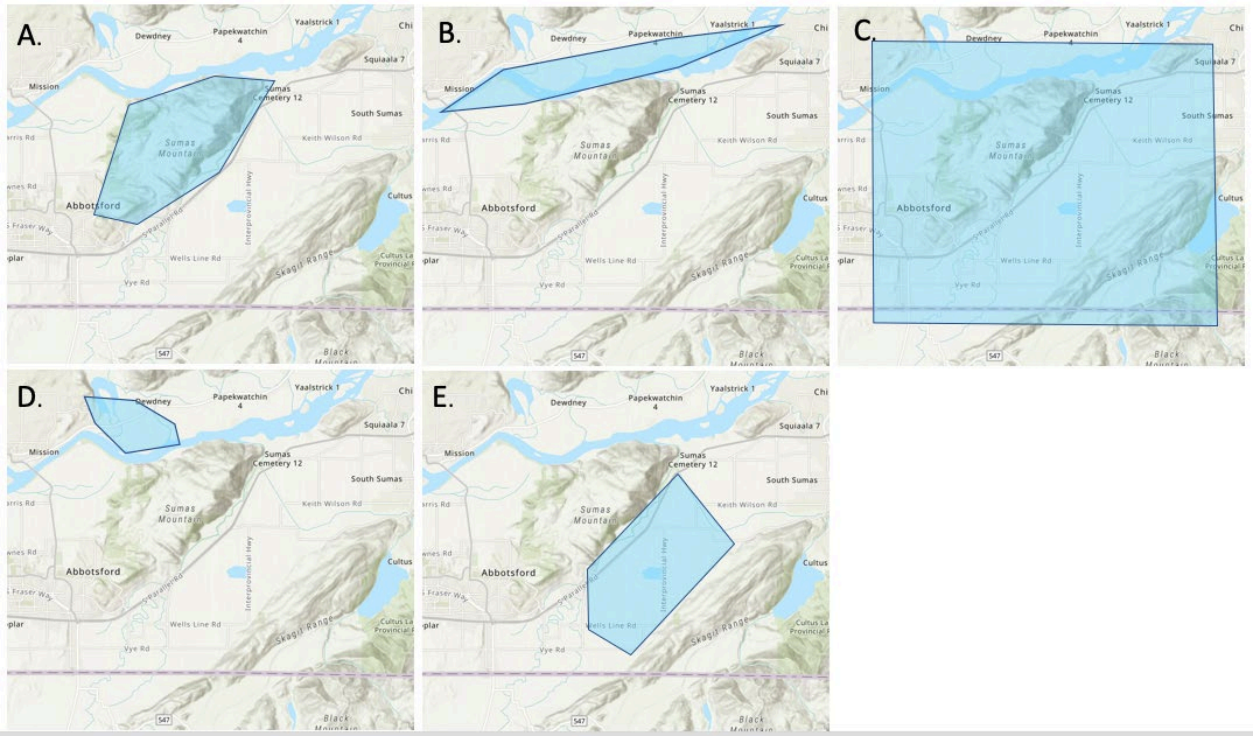
(C) Buoyancy force explains the formation of downbursts in thunderstorms.

(D) New Fall24: Buoyancy force only acts in vertical motions, not horizontal motions.

(E) A warm (35°C) air parcel will NOT want to rise if the surrounding air is warmer.

iClicker question #3:

Which land you think was most likely to flood during the 2021 atmospheric river flooding disaster?



(A)

(B)

(C)

(D)

(E)

iClicker question #4:

If you are outside when a supercell storm approaches, you should …

(A) Hide under a large branch of a tree, to avoid being hit by hail.

(B) Stay away from a tree, to avoid being hit by lightning.

(C) Stay out of ditches, to avoid flash floods.

(D) Get into a ditch, to avoid flying debris from tornadoes.

Storms lecture: Hurricanes

iClicker question #1:

The hurricane eye wall is

(A) a region of near-calm conditions at the center of the hurricane.

(B) a band of thunderstorms spiralling out away from the storm center.

(C) a circle of thunderstorms around the eye.

(D) a high ocean wave formed near the storm center.

(E) a region of strong winds and heavy rain.

iClicker question #2:

For a hurricane to fuel itself, it needs to

(A) add heat to the ocean.

(B) remove heat from the ocean.

(C) create strong winds that form high waves.

(D) move over a waveless ocean to avoid the extra friction (drag) caused by high waves.

(E) (none of the above)

iClicker question #3:

Hurricanes don't hit British Columbia because

(A) the midlatitude winds blow Pacific hurricanes westward, away from BC.

(B) the sea surface is too cold (below the 26°C that is needed).

(C) BC is too close to the equator, where the Coriolis effect is too small.

(D) the steep coast mountain range protects BC from hurricanes.

(E) they occasionally do hit BC, and are called "typhoons" in the E. Pacific.

iClicker Question #4

The storm surge …

(A) is caused near the eye because the inward-moving winds create inward-moving ocean currents.

(B) is often the greatest on the left side of the storm-center track in the Northern Hemisphere.

(C) is often the greatest on the right side of the storm-center track in the Northern Hemisphere.

(D) is a local rise of sea level as hurricane winds push ocean water and cause it to pile up against coastlines.

(E) is another name for the violent large wind-driven waves that break against the shore.