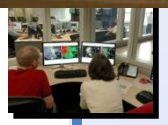
NOAA'S National Weather Service

Benjamin Rock WX9TOR
May 2009 Texas
Scary Looking Cloud (Updraft base)

Intermediate Concepts of *Severe Storm Spotting*

2012 – Rusty Kapela
Milwaukee/Sullivan
Weather.gov/milwaukee



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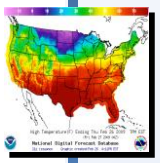
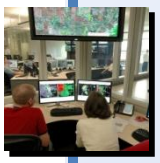
Protecting Lives and Property

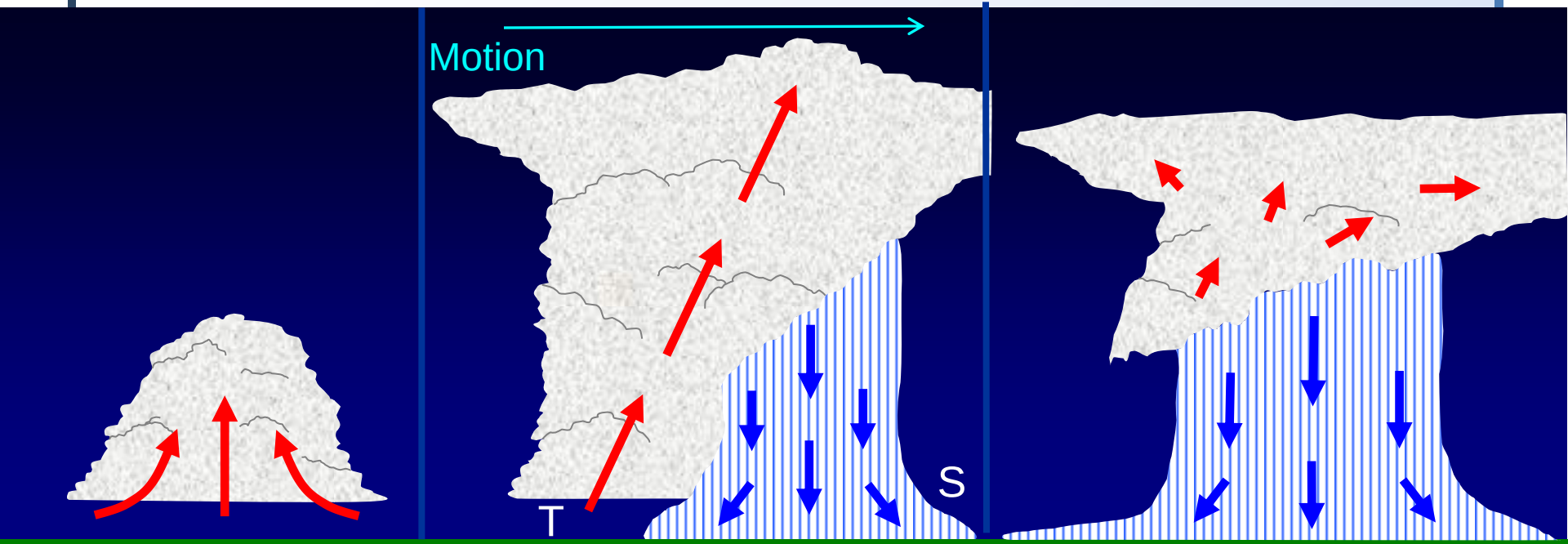
Class Outline

- **Thunderstorm (T'storm)**
  - *Life Cycle*
  - *Structure*
    - **Updraft & Downdraft**
    - **Shelf Cloud & Wall cloud**
- **Squall Lines**
  - *Cross Section*



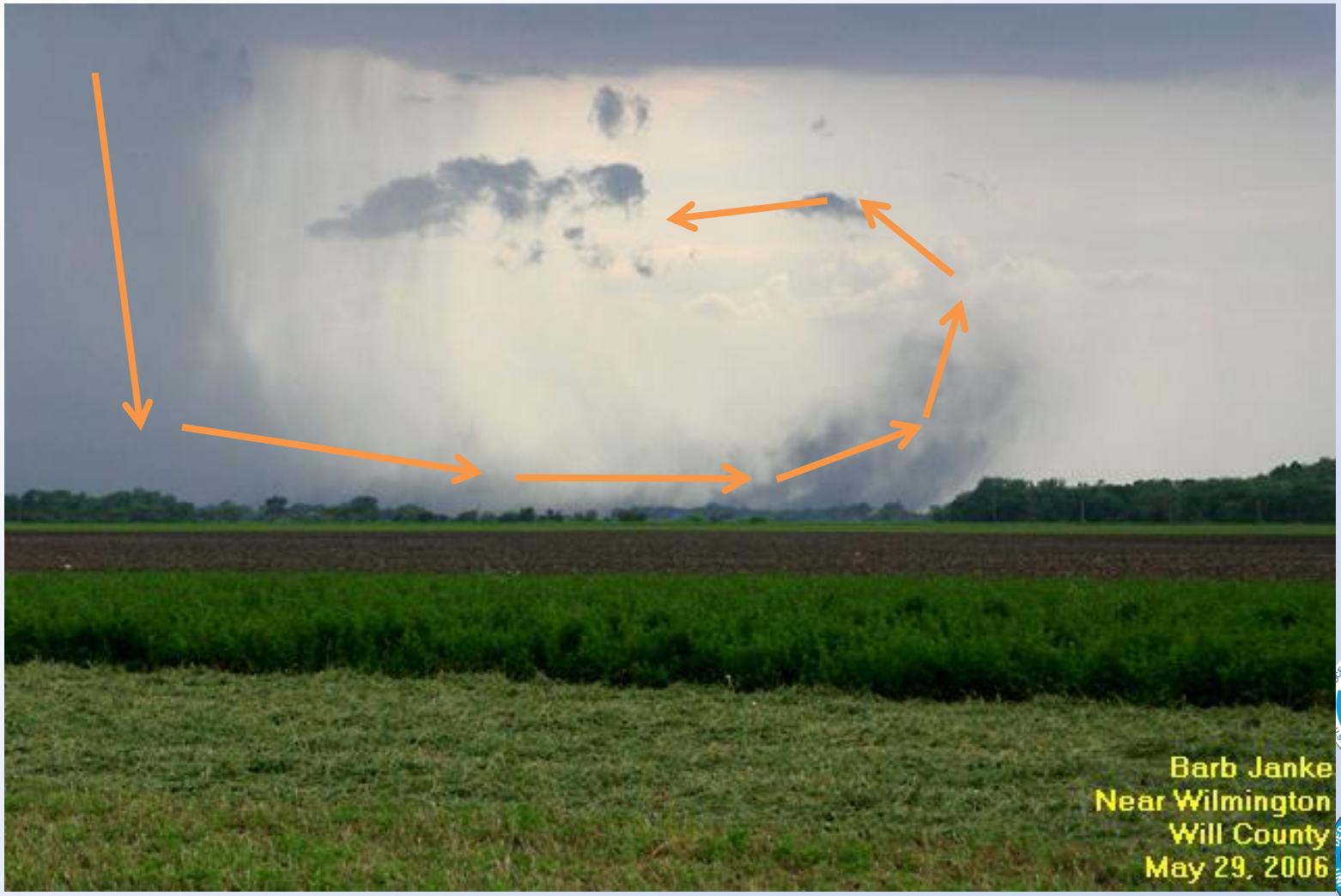


Thunderstorm Life Cycle



Cumulus Stage | Mature Stage (Cell) | Dissipation Stage

Downdraft - Downburst



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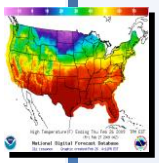
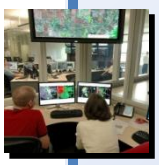




Thunderstorm Structure

- **Are you good enough to recognize them?**

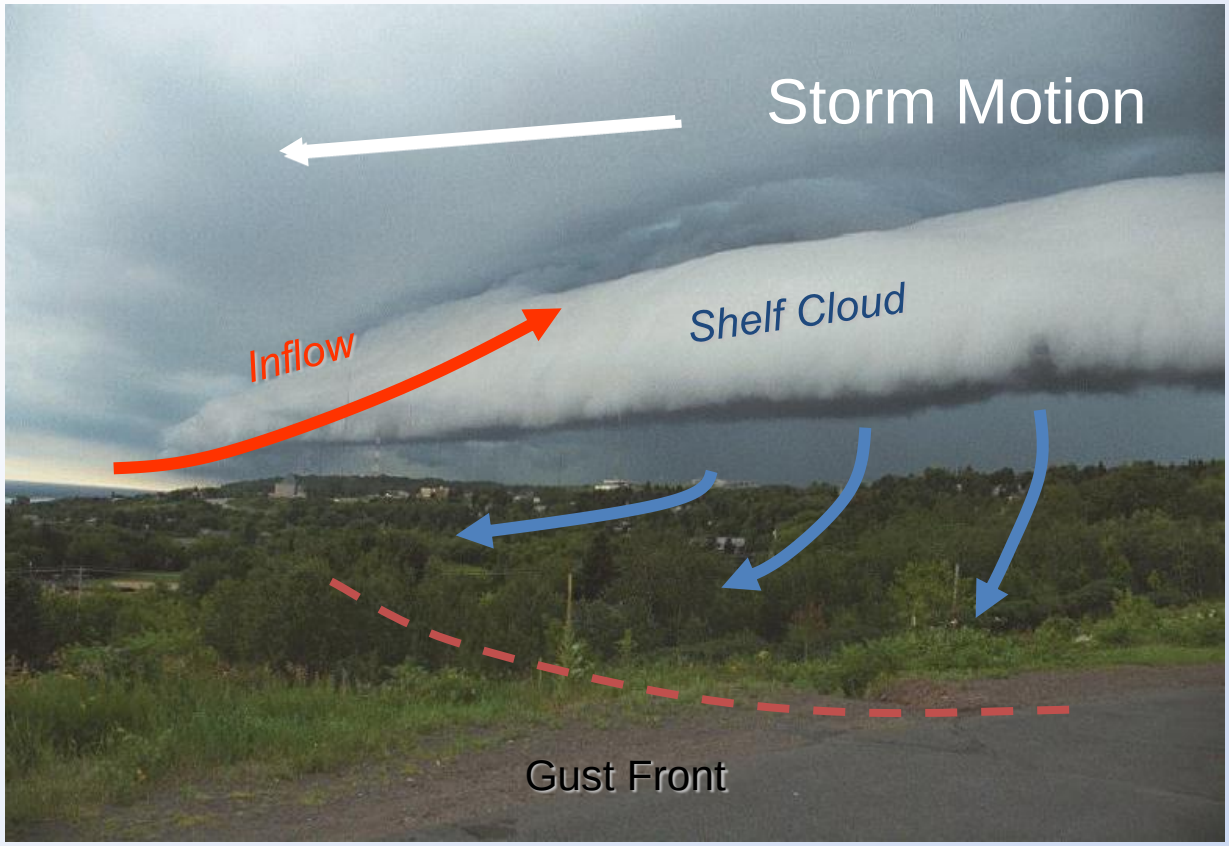
Shelf Cloud

Rain, Hail, Downburst winds

Rotating Wall Cloud

Tornadoes & Funnel Clouds

Squall Line Shelf Cloud



- Shelf Cloud “marker” is at leading edge (front side).
- Behind shelf cloud - strong downburst winds, large hail and heavy rains.
- Tornadoes uncommon in shelf cloud region

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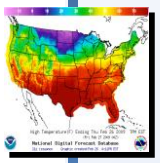

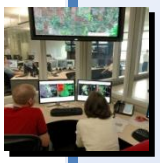

Squall Line

* ***Squall Line*** – any organized line or narrow band of thunderstorms.

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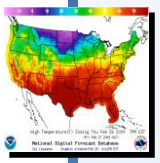
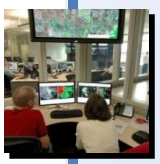
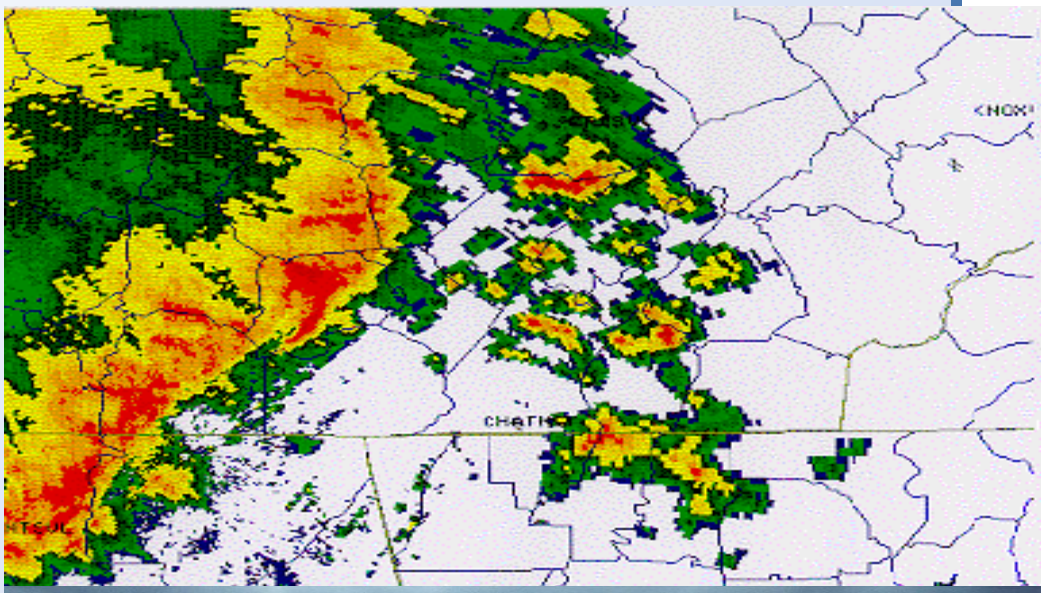
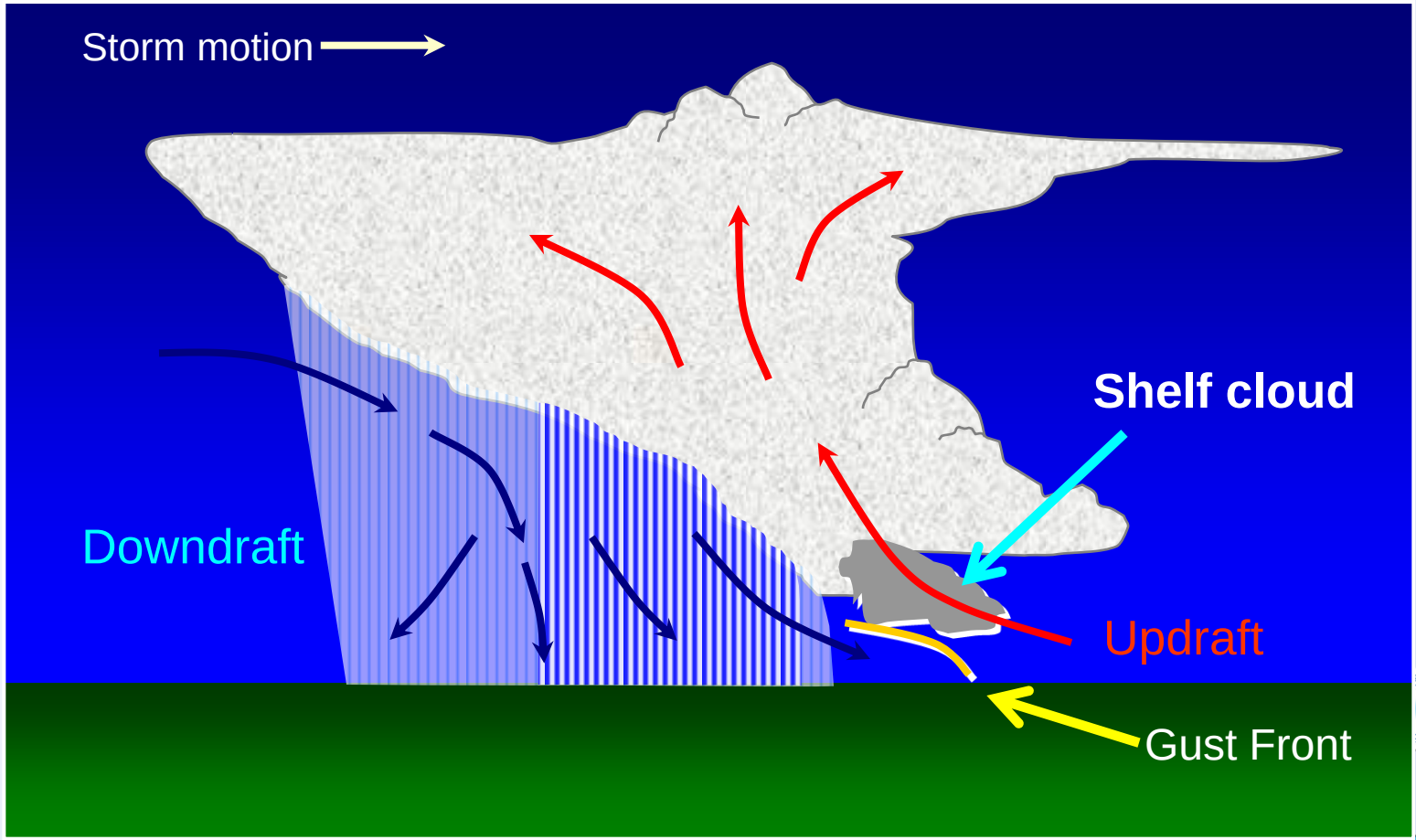




- Main feature is the **Shelf Cloud**
- Line can move at 60 mph+
- Line can span over 100 miles.
- Do not report Shelf Cloud!



Cross-section of Squall Line



Non-tornadic line of storms

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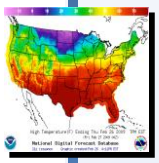

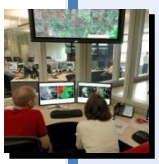

Bow Echoes

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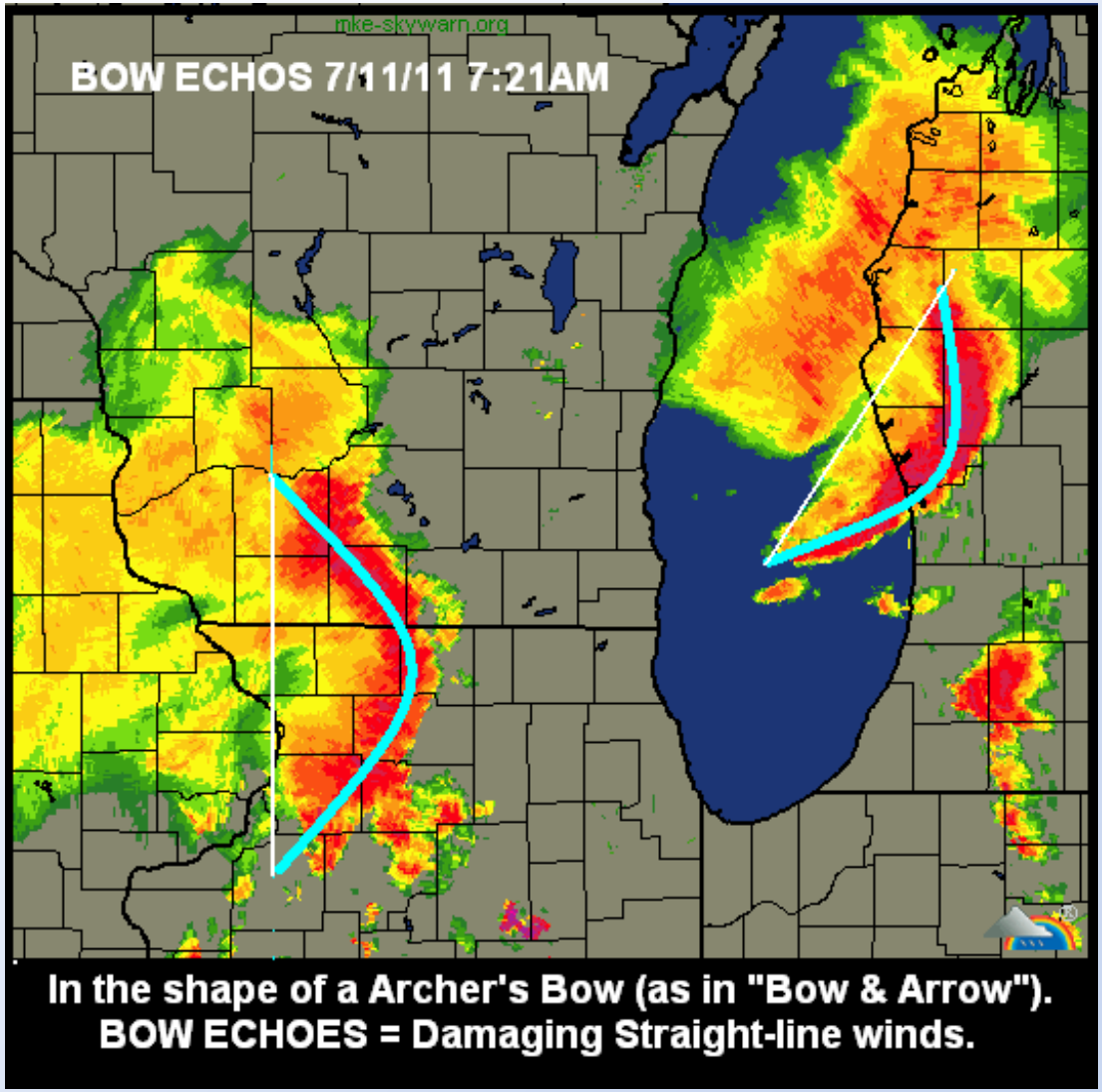
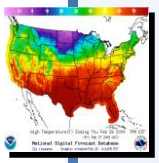
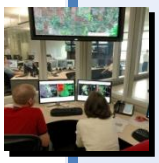
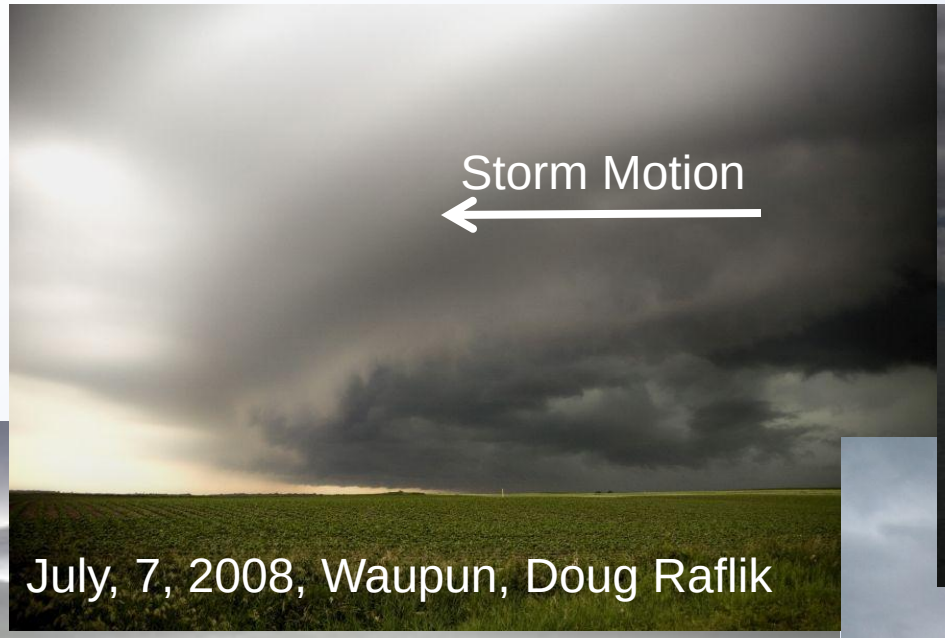






Shelf Cloud

- A low, horizontal wedge-shaped arcus cloud, associated with a thunderstorm gust front.



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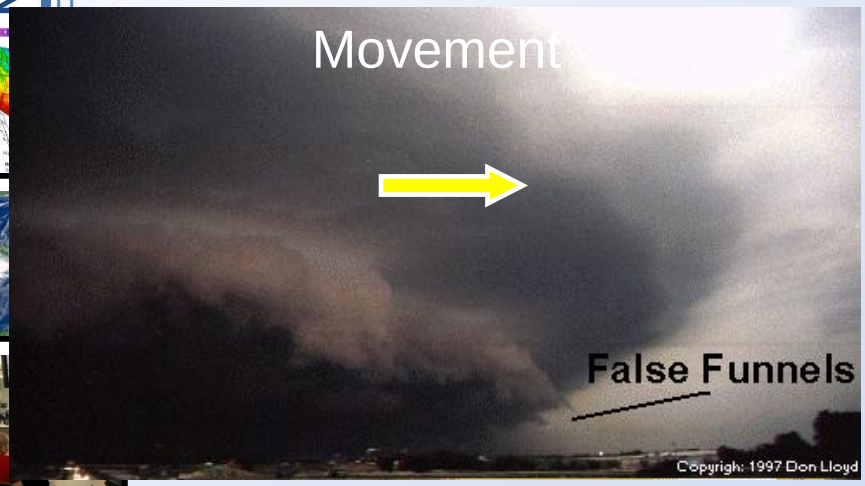
Shelf Cloud - Outflow



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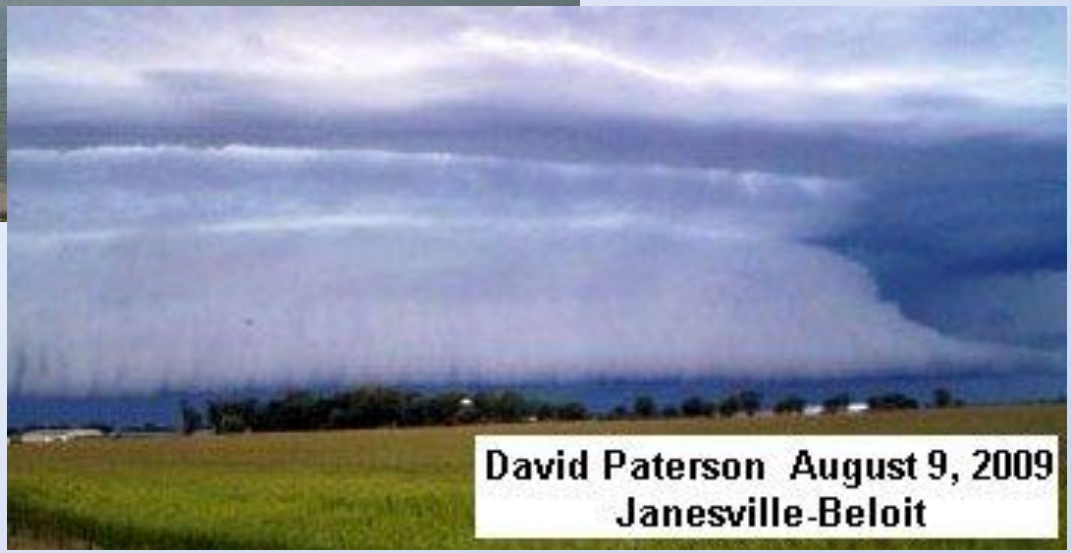
Shelf Clouds



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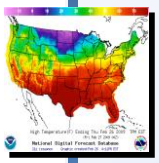
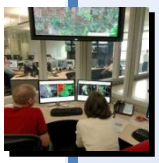
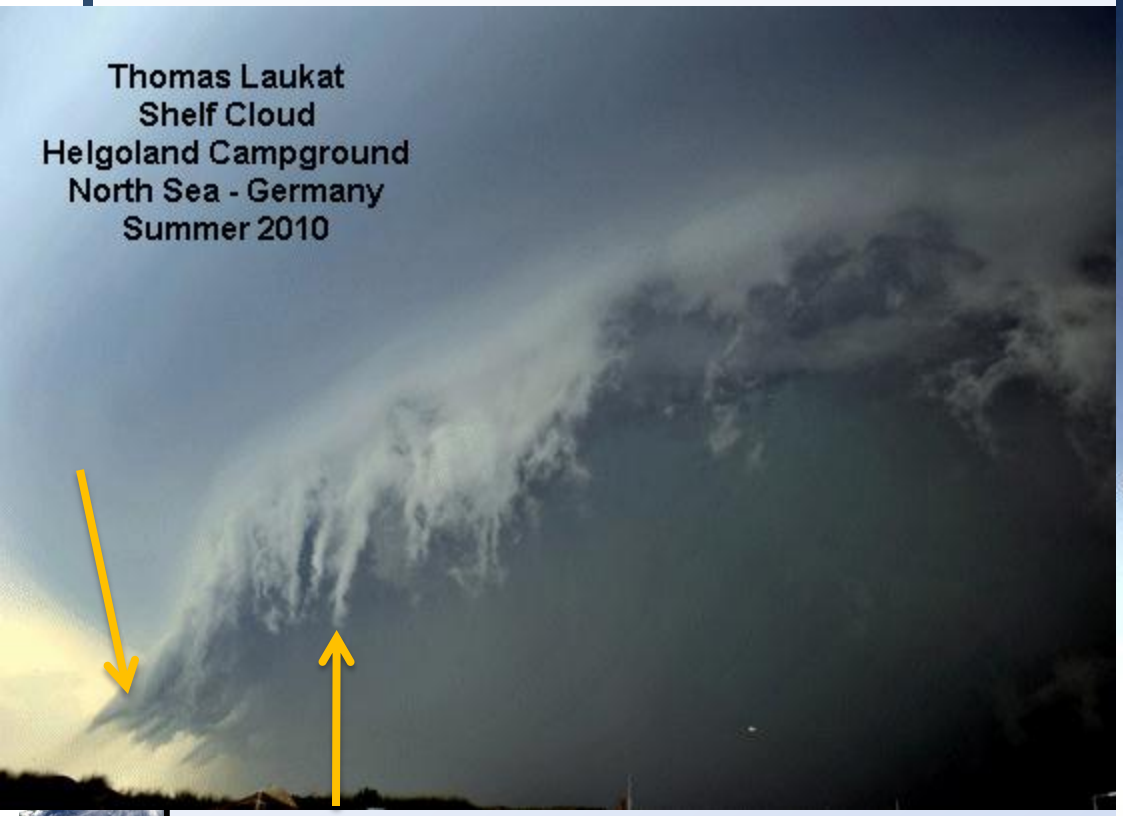
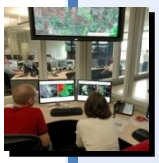


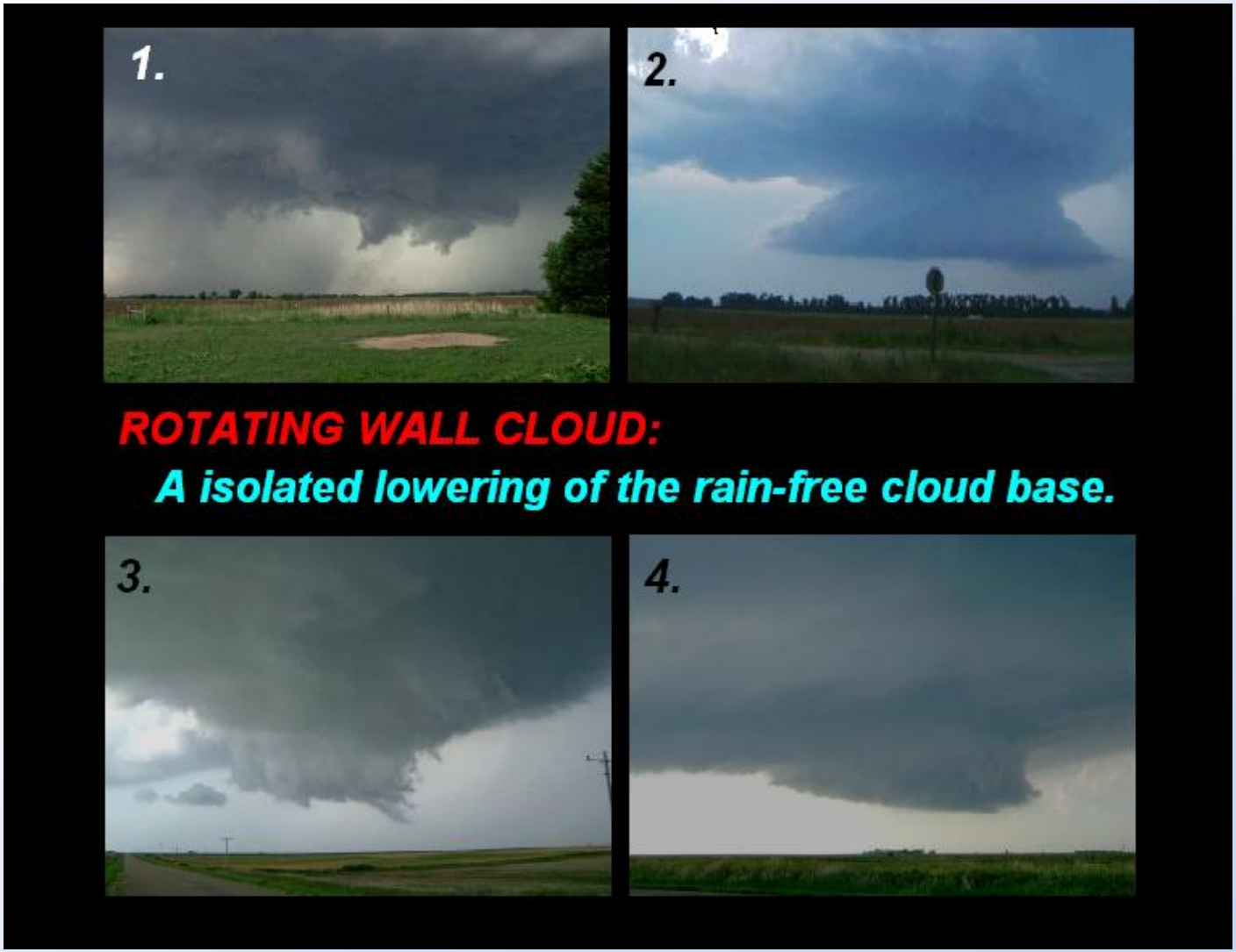


SLC's on Shelf Cloud





Rotating Wall Clouds



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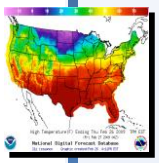

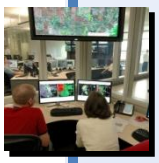

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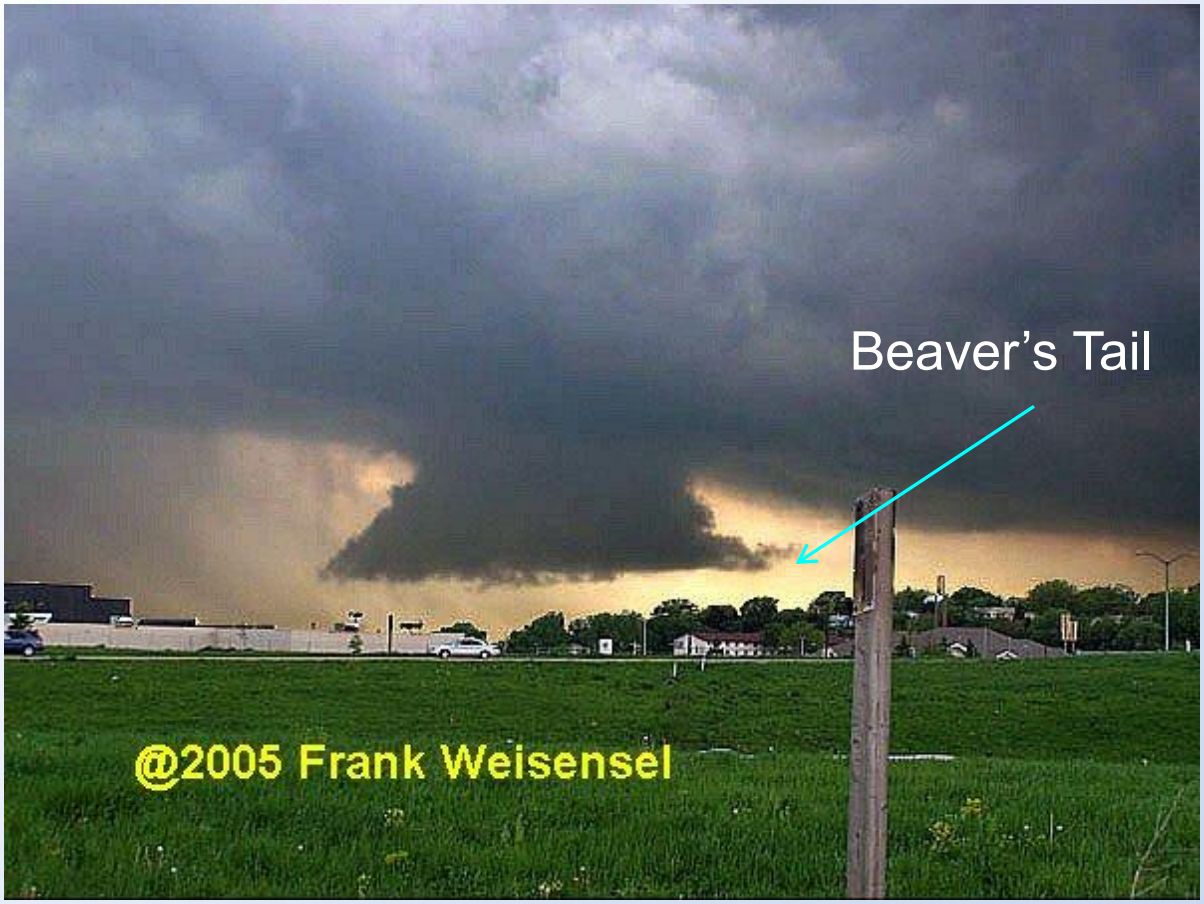

A good number of, but not all, tornadoes develop underneath or near a rotating wall cloud

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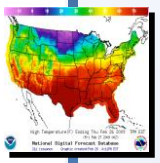

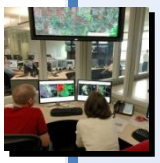

Rotating Wall Clouds

Kinney Adams

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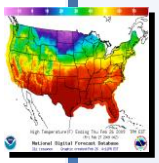

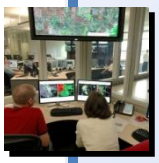

Shelf Clouds vs. Wall Clouds

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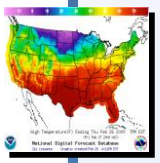
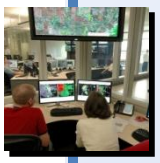




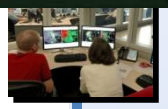
Shelf Clouds

- Appear on front side of thunderstorm cells just ahead of the downdraft.
- Can extend for 10 to 50+ miles and have cloud fragments that *briefly resemble funnel clouds – Scary-Looking Clouds*
- Often resemble a “snow plow” since the colder air with the downdraft undercuts warmer air found out ahead of the storm.

Wall Clouds

- Appear on backside of potentially tornadic thunderstorm
- Will change their shape, size and color with time. Width typically ½ mile to 2 miles
- They can be/become fragmented or look like a beer barrel

Rotating Wall Clouds



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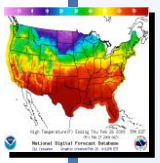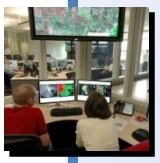
End of Intermediate Class!