Mesoscale Organization of Convection

Squall Line

- Is a set of individual intense thunderstorm cells arranged in a line.
- Thy occur along a boundary of unstable air – e.g. a cold front.
- Strong environmental wind shear causes the updraft to be tilted and separated from the downdraft.
- The dense cold air of the downdraft forms a ‘gust front’.

Squall line from Space

Image courtesy of http://cnls.lanl.gov.

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Please see:
http://www.floridalightning.com/Hurricane_Wilma.html

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Mesoscale Convective Complex

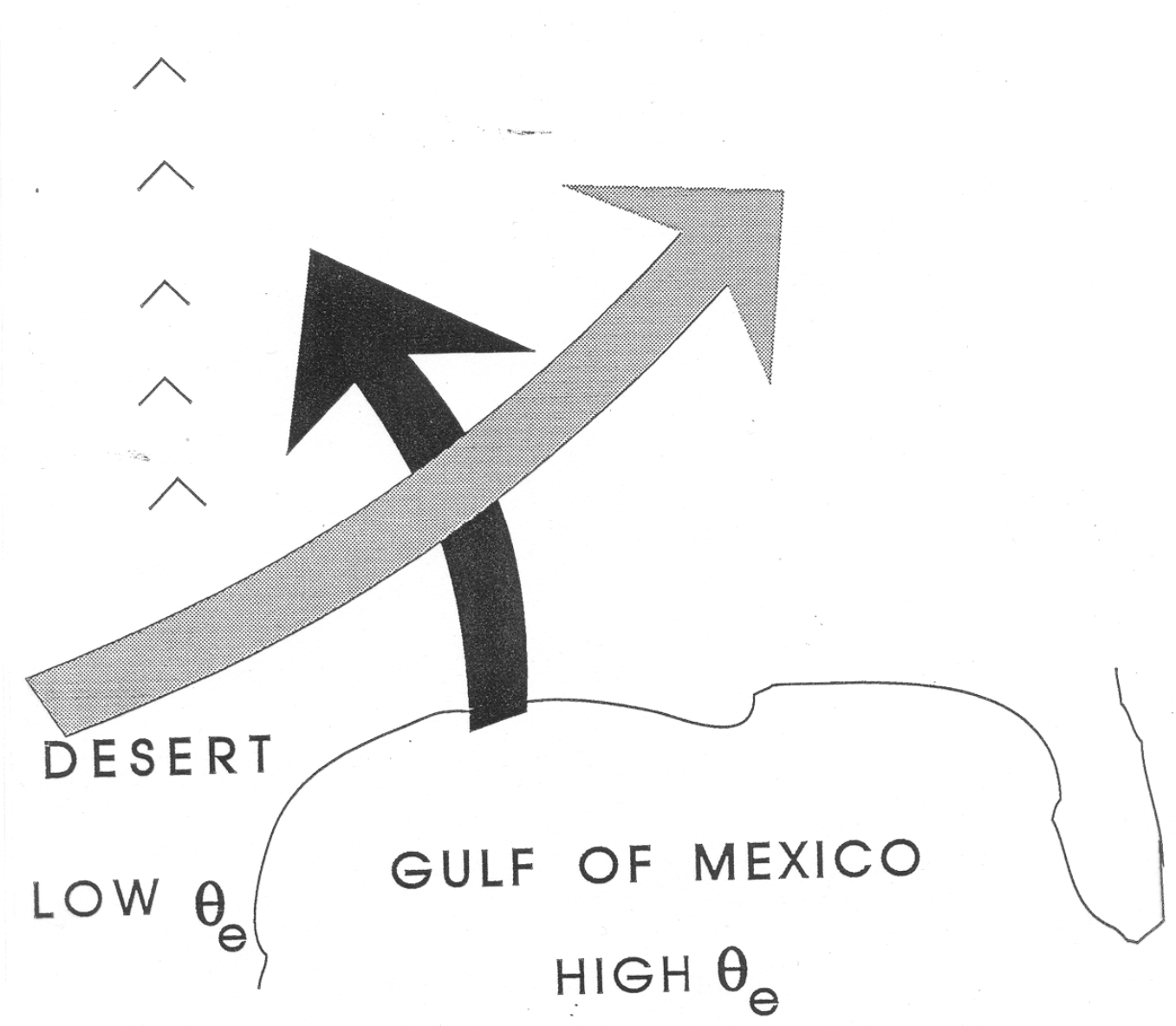
- A Mesoscale Convective Complex is composed of multiple single-cell storms in different stages of development.
- The individual thunderstorms must support the formation of other convective cells
- In order to last a long time, a good supply of moisture is required at low levels in te atmosphere.

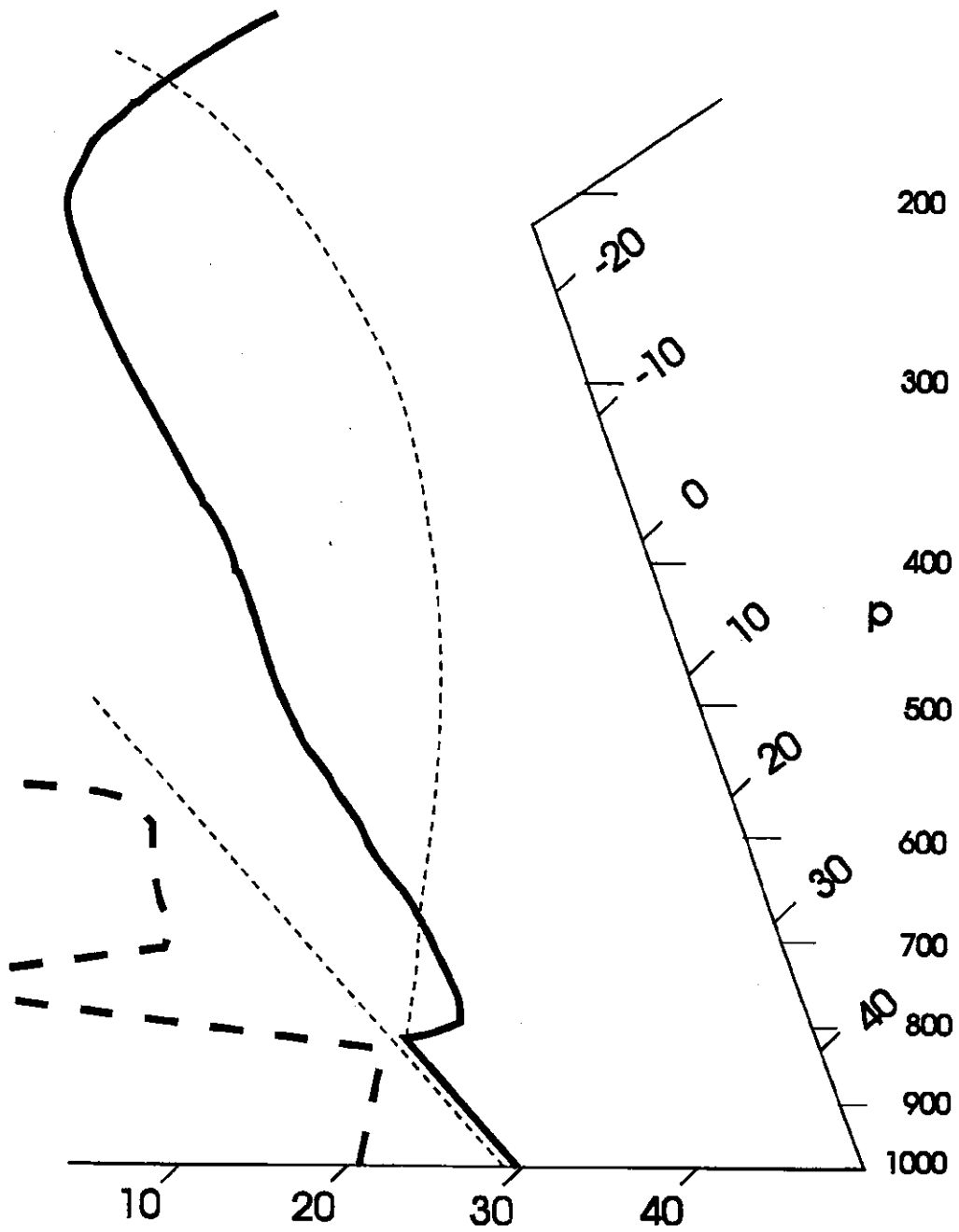
Infrared image of a mesoscale convective complex over Kansas, July 8 1997.

TYPES OF THUNDERSTORM

- SINGLE-CELL THUNDERSTORM
- MULTICELL THUNDERSTORM
- MESOSCALE CONVECTIVE C0MPLEX
- SUPERCELL THUNDERSTORM

Non-equilibrium Convection

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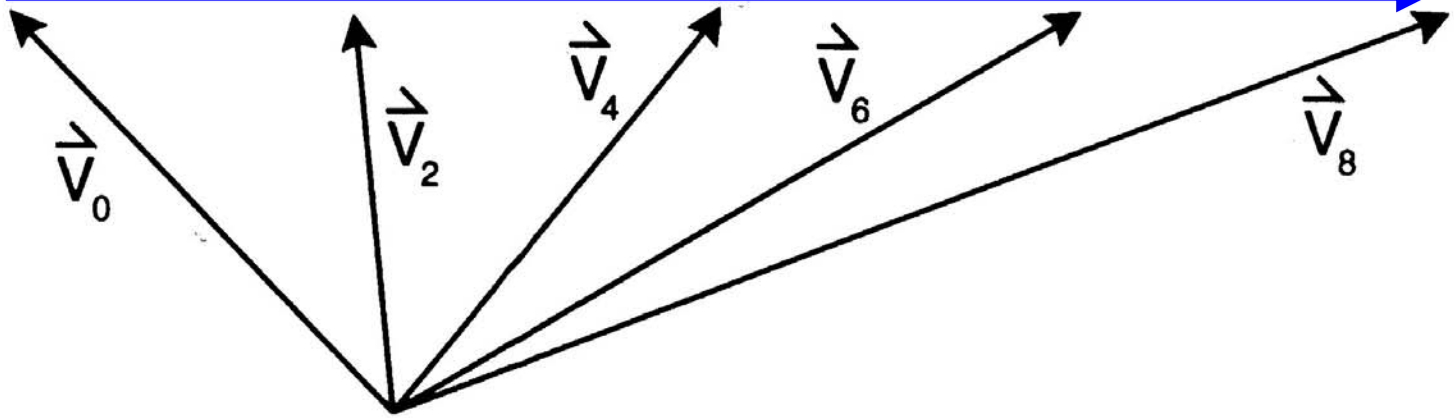
SUPERCELL THUNDERSTORMS

- SINGLE CELL THUNDERSTORM THAT PRODUCES DANGEROUS WEATHER
- REQUIRES A VERY UNSTABLE ATMOSPHERE AND STRONG VERTICAL WIND SHEAR - BOTH SPEED AND DIRECTION
- UNDER THE INFLUENCE OF THE STRONG WIND SHEAR MUCH OF THE THUNDERSTORM ROTATES
- FAVORED IN THE SOUTHERN GREAT PLAINS IN THE SPRING

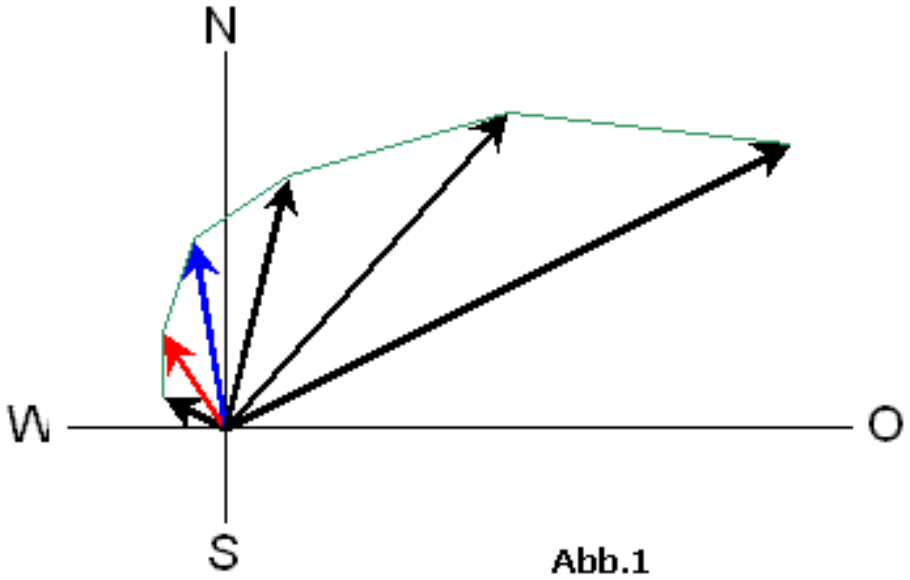
North

Wind Shear

Shear Vector



Hodograph



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Visible image of a supercell thunderstorm

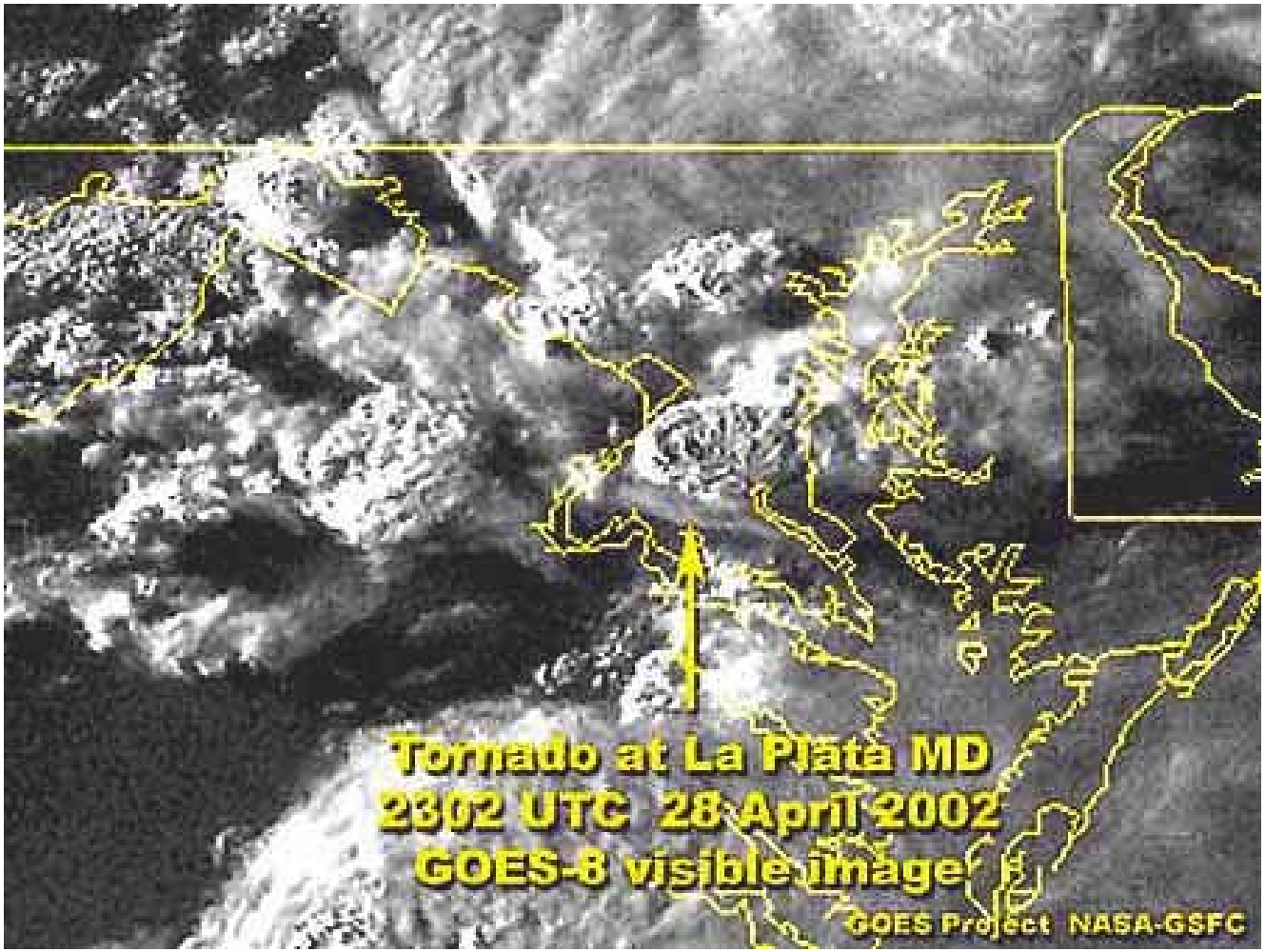

Image courtesy of NASA.

Infra-red image of a supercell thunderstorm

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Supercell Skematic

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Northeast

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