Severe Weather Spotter's Quick Reference Card

SURFACE FEATURES	
ASSOCIATION	**OBSERVATION**
Downburst	Rain Foot Dust Foot Dust Plume
Funnel on the Ground	Debris Cloud Dust Whirl Rotation
Inflow	Warm wind into the storm
Outflow	Cool wind from the storm Strong straight-line winds Gustnado

LOW LEVEL FEATURES	
ASSOCIATION	**OBSERVATION**
Inflow	Beaver Tail Inflow Bands

Updraft	Rain-free or Updraft Base
	Lowering (non-specific)
	Wall Cloud
	  Rotation
	  Tail Cloud
	  Collar
	Funnel in the Air
	Rising Scud
	Vertical Cloud Motion

Outflow	Gust Front
	Arcus
	  Shelf Cloud
	  Roll Cloud
	Lowering (non-specific)
	Scud or Fractus

Downdraft	Downburst Rear Flank Downdraft or Clear Slot
Precipitation	Rain Shaft

UPPER AND MID-LEVEL FEATURES
Tower Anvil Knuckles Overshooting Top Back-sheared Anvil Mammatus Banding Striations Circulation / Rotation

SYSTEM-LEVEL FEATURES
Cell / Supercell Multi-cell T-storm Back-building T-storm Flanking Line Squall Line Storm-scale Rotation or Circulation

WIND
Estimated speed and direction

HAIL
Size, duration, depth

LIGHTNING
Frequency, direction Cloud to Ground Cloud to Cloud

PRECIPITATION
Intensity, duration, amount

Remember:

1) Give your point number at the beginning and end of each report.
2) Keep your reports brief and specific.
3) EVERYONE is listening; behave professionally on and off the air.

WARNING: This reference card and the accompanying glossary ARE NOT a substitute for training!
No one should attempt storm spotting without first obtaining the proper training!

Gregory Brown, KTØK GBROWN1@UNL.EDU Spring 2006

These definitions of terms used in the Spotters Quick Reference Card are excerpted from NOAA Technical Memorandum NWS SR-145, **A Comprehensive Glossary of Weather Terms for Storm Spotters**, by Michael Branick, NOAA/NWSFO Norman. Full text of the glossary is available on-line at http://www.srh.noaa.gov/oun/severewx/glossary.php

Arcus - A low, horizontal cloud formation associated with the leading edge of thunderstorm outflow (i.e., the *gust front*). *Roll clouds* and *shelf clouds* both are types of arcus clouds.
Back-building Thunderstorm - A thunderstorm in which new development takes place on the upwind side (usually the west or southwest side), such that the storm seems to remain stationary or propagate in a backward direction.
Back-sheared Anvil - [Slang], a thunderstorm anvil which spreads upwind, against the flow aloft. A back-sheared anvil often implies a very strong updraft and a high severe weather potential.
Beaver('s) Tail - [Slang], a particular type of *inflow band* with a relatively broad, flat appearance suggestive of a beaver's tail. It is attached to a *supercell's* general *updraft* and is oriented roughly parallel to the *pseudo-warm front*, i.e., usually east to west or southeast to northwest. As with any inflow band, cloud elements move toward the updraft, i.e., toward the west or northwest. Its size and shape change as the strength of the inflow changes. See also *inflow stinger*.
Clear Slot - A local region of clearing skies or reduced cloud cover, indicating an intrusion of drier air; often seen as a bright area with higher cloud bases on the west or southwest side of a *wall cloud*. A clear slot is believed to be a visual indication of a *rear flank downdraft*.
Debris Cloud - A rotating "cloud" of dust or debris, near or on the ground, often appearing beneath a *condensation funnel* and surrounding the base of a *tornado*.
Downburst - A strong *downdraft* resulting in an outward burst of damaging winds on or near the ground. Downburst winds can produce damage similar to a strong *tornado*. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.
Downdraft - A small-scale column of air that rapidly sinks toward the ground, usually accompanied by precipitation as in a shower or thunderstorm. A *downburst* is the result of a strong downdraft.
Dust Plume - A non-rotating "cloud" of dust raised by *straight-line* winds. Often seen in a *microburst* or behind a *gust front*. If rotation is observed, then the term *dust whirl* or *debris cloud* should be used.
Dust Whirl - A rotating column of air rendered visible by dust. Similar to *debris cloud*.
Feeder Bands - Lines or bands of low-level clouds that move (feed) into the *updraft* region of a thunderstorm, usually from the east through south (i.e., parallel to the inflow). Same as *inflow bands*.
Flanking Line - A line of *cumulus* or *towering cumulus* clouds connected to and extending outward from the most active part of a *supercell*, normally on the southwest side. The line normally has a stair-step appearance, with the tallest clouds closest to the main storm.
Fractus - Ragged, detached cloud fragments; same as *scud*.
Funnel Cloud - A *condensation funnel* extending from the base of a *towering cumulus*, associated with a rotating column of air that is *not* in contact with the ground (and hence different from a tornado). A condensation funnel is a tornado if either a) it is in contact with the ground or b) a *debris cloud* or *dust whirl* is visible beneath it. [Note: Spotters in our area should avoid using the term “tornado” over the air. Use the term “funnel on the ground” instead.]
Gust Front - The leading edge of gusty surface winds from thunderstorm *downdrafts*; sometimes associated with a *shelf cloud* or *roll cloud*.
Gustnado (or Gustinado) - [Slang], gust front tornado. A small tornado, usually weak and short-lived, that occurs along the *gust front* of a thunderstorm. Often it is visible only as a *debris cloud* or *dust whirl* near the ground. Gustnadoes are not associated with *storm-scale* rotation (i.e. mesocyclones); they are more likely to be associated visually with a *shelf cloud* than with a *wall cloud*.
Inflow Bands (or **Feeder Bands**) - Bands of low clouds, arranged parallel to the low-level winds and moving into or toward a thunderstorm. They may indicate the strength of the inflow of moist air into the storm, and, hence, its

potential severity. Spotters should be especially wary of inflow bands that are curved in a manner suggesting cyclonic rotation; this pattern may indicate the presence of a *mesocyclone*.

Knuckles - [Slang], lumpy protrusions on the edges, and sometimes the underside, of a thunderstorm anvil. They usually appear on the upwind side of a *back-sheared anvil*, and indicate rapid expansion of the anvil due to the presence of a very strong updraft. They are not mammatus clouds.

Mammatus Clouds - Rounded, smooth, sack-like protrusions hanging from the underside of a cloud (usually a thunderstorm *anvil*). Mammatus clouds often accompany severe thunderstorms, but do not produce severe weather; they may accompany non-severe storms as well.

Multi-cell Thunderstorm - A thunderstorm consisting of two or more cells, of which most or all are often visible at a given time as distinct domes or towers in various stages of development.

Overshooting Top (or Penetrating Top) - A dome-like protrusion above a thunderstorm anvil, representing a very strong *updraft* and hence a higher potential for severe weather with that storm. A persistent and/or large overshooting top (anvil dome) often is present on a *supercell*. A short-lived overshooting top, or one that forms and dissipates in cycles, may indicate the presence of a *pulse storm* or a *cyclic storm*.

Rain Foot - [Slang], a horizontal bulging near the surface in a precipitation shaft, forming a foot-shaped prominence. It is a visual indication of a *wet microburst*.

Rain-free Base - A dark, horizontal cloud base with no visible precipitation beneath it. It typically marks the location of the thunderstorm *updraft*. Tornadoes may develop from *wall clouds* attached to the rain-free base, or from the rain-free base itself - especially when the rain-free base is on the south or southwest side of the main precipitation area. Note that the rain-free base may not actually be rain free; hail or large rain drops may be falling. For this reason, *updraft base* is more accurate.

Rear Flank Downdraft (or RFD) - A region of dry air subsiding on the back side of, and wrapping around, a *mesocyclone*. It often is visible as a *clear slot* wrapping around the wall cloud. Scattered large precipitation particles (rain and hail) at the interface between the clear slot and *wall cloud* may show up on radar as a *hook* or *pendant*; thus the presence of a hook or pendant may indicate the presence of an RFD.

Roll Cloud - A low, horizontal tube-shaped *arcus cloud* associated with a thunderstorm *gust front* (or sometimes with a cold front). Roll clouds are relatively rare; they are completely detached from the thunderstorm base or other cloud features, thus differentiating them from the more familiar *shelf clouds*. Roll clouds usually appear to be "rolling" about a horizontal axis, but should not be confused with funnel clouds.

Scud (or **Fractus**) - Small, ragged, low cloud fragments that are unattached to a larger cloud base and often seen with and behind cold fronts and thunderstorm *gust fronts*. Such clouds generally are associated with cool moist air, such as thunderstorm outflow.

Shelf Cloud - A low, horizontal wedge-shaped *arcus cloud*, associated with a thunderstorm *gust front* (or occasionally with a cold front, even in the absence of thunderstorms). Unlike the *roll cloud*, the shelf cloud is attached to the base of the parent cloud above it (usually a thunderstorm). Rising cloud motion often can be seen in the leading (outer) part of the shelf cloud, while the underside often appears turbulent, boiling, and wind-torn.

Squall Line - A solid or nearly solid line or band of active thunderstorms.

Tail Cloud - A horizontal, tail-shaped cloud (not a *funnel cloud*) at low levels extending from the precipitation cascade region of a *supercell* toward the *wall cloud* (i.e., it usually is observed extending from the wall cloud toward the north or northeast). The base of the tail cloud is about the same as that of the wall cloud. Cloud motion in the tail cloud is away from the precipitation and toward the wall cloud, with rapid upward motion often observed near the junction of the tail and wall clouds.

Wall Cloud - A localized, persistent, often abrupt lowering from a *rain-free base*. Wall clouds can range from a fraction of a mile up to nearly five miles in diameter, and normally are found on the south or southwest (inflow) side of the thunderstorm. When seen from within several miles, many wall clouds exhibit rapid upward motion and *cyclonic rotation*. However, not all wall clouds rotate. Rotating wall clouds usually develop before strong or violent tornadoes, by anywhere from a few minutes up to nearly an hour. Wall clouds should be monitored visually for signs of *persistent, sustained* rotation and/or rapid vertical motion.