The Front

May-June, 2002 National Weather Service Central Region Volume 1 Number 3

Convective Indices - Gauges for measuring the thunderstorm environment

Only three ingredients are needed by the atmosphere to spawn thunderstorms.

- Moisture
- Instability
- A lifting mechanism

Sounds pretty simple. Yeah, about as simple as saying flying is a balance of thrust versus drag, and lift versus gravity.

The atmosphere's performance is analogous to that of an aircraft. The performance of each aircraft has been thoroughly researched on computers, studied in wind tunnels, and tested in actual flight. The result is a performance envelope that helps the pilot predict performance as well the limits of safety. Too much weight and even maximum lift won't keep an aircraft aloft. Flap and slat settings, along with power settings, will help the pilot establish a beautiful approach.

Thunderstorms have a performance envelope which forecasters use on a daily or even hourly basis. It's a thermodynamic diagram or sounding chart called a SkewT-Log P, or simply SkewT. These tools are available on the web. They do take some training to use, but computers do much of the analysis and produce several convective indices.

Thunderstorm forecasting is a "what-if" game.

Much like a pilot studies the performance envelope of an aircraft to see what combination of settings influence the aircraft's performance, forecasters study computer-generated SkewT diagrams to see how the balance of moisture, instability, and wind shear, will influence thunderstorm growth and strength.

Moisture - The fuel for fireworks.

At any temperature, the air can hold a certain amount of moisture or water vapor. The dew point represents the amount that is present. Condensation of this moisture occurs when the air temperature cools to the dew point. Warmer air can hold more water vapor than cold air.

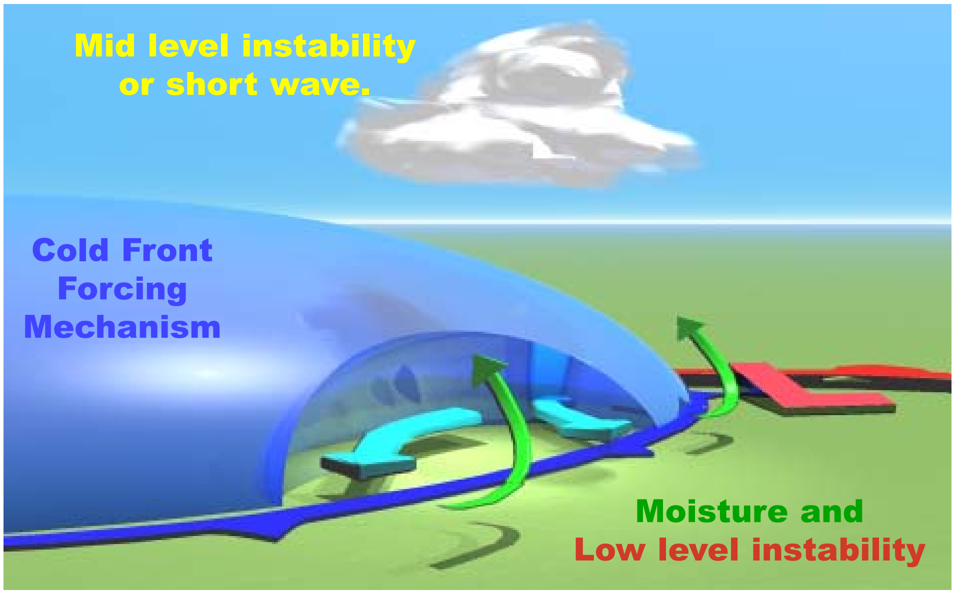


Figure 1. Many properties of the atmosphere come together to initiate or to enhance convection. Forecasters look for the areas where these properties overlap or are at a maximum. Here a cold front portion of a low pressure system acts as a forcing mechanism.

Mission Statement

To enhance aviation safety by increasing the pilots' knowledge of weather systems and processes and National Weather Service products and services.

When water vapor changes to liquid water, the latent heat stored in the water vapor is released. It is this latent heat that plays such a significant role in thunderstorm development.

Stable air or Unstable air? That is the question.

An invisible air parcel that is forced to rise, cools independantly from the surrounding atmosphere at the dry lapse rate of about -3 degrees C per 1000 feet. This is a thermodynamic principle. It does this in Orlando, Florida, Bessemer, Michigan, and Wichita Falls, Texas. The lapse rate of temperature in a layer of surrounding air will likely be, and usually is different than the dry rate. As a result, the parcel's temperature usually will be different than the surrounding air, and the parcel may be stable or unstable as shown. See Figure 2.

A key player in convection is latent heat stored in water vapor. To create water vapor, evaporation must first occur. A pan of water on the stove receives heat from the burner. This heat is stored in the water vapor as the water evaporates. This heat is not lost. It's just "stored" for later use in the water vapor molecules.

When water condenses back into visible cloud droplets, the latent heat that was stored in the molecules during evaporation is now released. This heat warms the independent air parcel, but it does not warm the surrounding air by any meaningful amount. See Figure 3. The parcel now cools at about -2 degrees C per 1000 feet. As a result, the parcel is potentially more buoyant than the surrounding air through which it moves. The parcel continues to rise until it reaches a level in the atmosphere where its temperature becomes the same or cooler than the surrounding air. Vertical motion stops at that point.

Upward motion will stop when the parcel temperature becomes equal to or cooler than the surrounding air. Temperature inversions which are layers of air where temperature increases with height do this very well. The tropopause, around 39,000 feet, is just such an inversion. The large volume of the rising air spreads out at the tropopause, and forms a fibrous anvil.

The Convective Outlook holds the buzz words for convection.

Forecasters use SkewT diagrams to determine the potential energy and buoy-

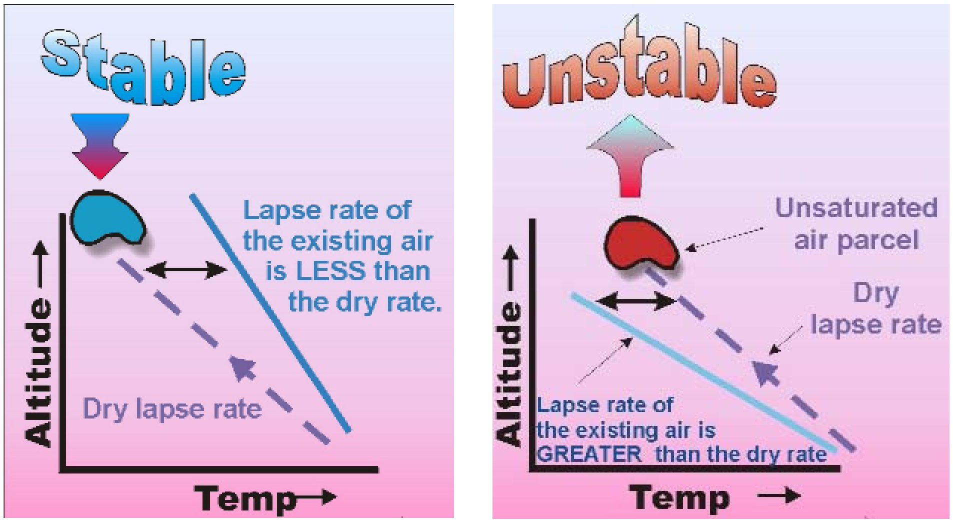


Figure 2. A rising parcel of air will become stable if it reaches a level in the atmosphere where it becomes colder than the surrounding air. Likewise, the atmosphere is considered unstable if a rising parcel becomes warmer than the surrounding air.

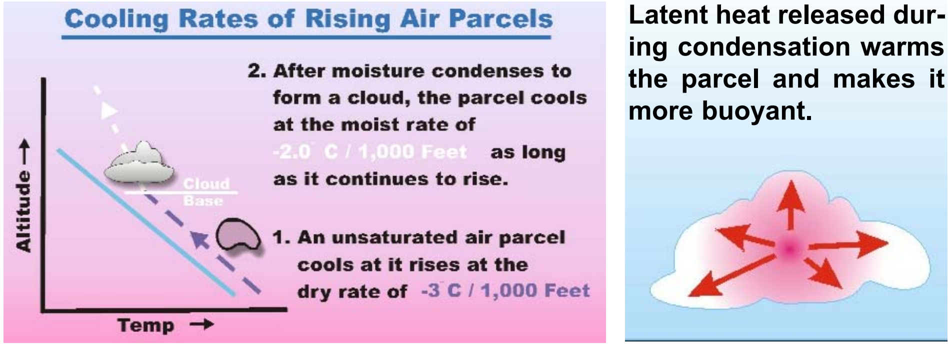


Figure 3. When clouds form latent heat stored in the the water vapor is released and warms the parcel. This makes it more buoyant than the air through which it moves.

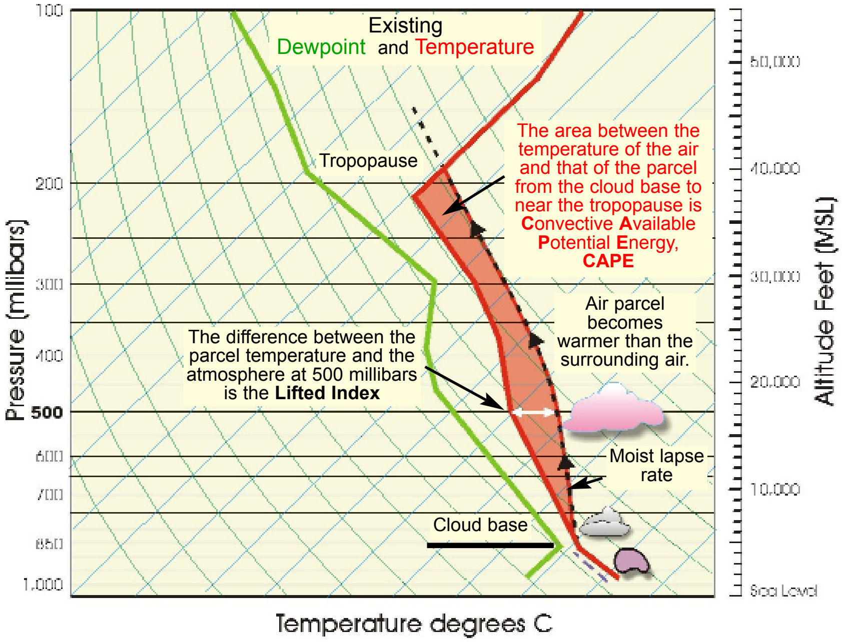


Figure 4. Plotting an air parcel's ascent through the existing atmosphere is like using the performance chart for an aircraft. Forecasters determine the convective performance of the atmosphere and derive a number of convective indices. These indices change as temperature, wind, and humidity in the atmosphere change.

ancy of air parcels and their possible evolution into thunderstorms. A number of indices derived from the SkewT are evaluated by forecasters at the SPC and are discussed in their Convective Outlook. See Figure 5. Three of the most popular indices for the pre-ignition stage of thunderstorms are LI, CAPE, and CIN.

The Lifted Index - Ole reliable

Figure 4 is an example of how storm development is studied using a SkewT.

An air parcel is assumed to be lifted by one of the forcing mechanisms such as strong heating, a cold front, or upper level disturbance. The air parcel obeys the laws of thermodynamcs and cools as it rises and expands. At 500 millibars, or about 18,000 feet the calculated parcel temperature is compared with that of the surrounding air. The difference between these two temperatures is the LI and is a measure of the buoyancy of an air parcel. A negative number implies that the surrounding air is cooler than the lifted parcel. In other words, the parcel would be warmer and more buoyant compared the the surrounding air.

LI was developed years ago and is still a very reliable index of instability. LIs are calculated hourly. They can be calculated using surface METAR reports and the 500 millibar temperature forecasted by the atmospheric models. Or LIs can be calculated using another level of the atmosphere as the starting point. The choice rests with the forecaster.

CAPE
The total package

CAPE, is related to LI, but is a more complete measure of the atmosphere's energy. CAPE reflects the strength of a thunderstorm updraft, and depicts the energy in the atmosphere from the point where clouds form and will be uninhibited by any inversion, up to the tropopause. The units for CAPE are Joules per kilogram or sometimes just mentioned as Joules in discussions from the Storm Prediction Center. CAPE is depicted by the red shaded area on the SkewT in Figure 4.

Area on a SkewT is equivalent to energy. The red shaded area representing convective energy in the atmosphere can be expanded in two ways. One is to cool the air aloft so that the red temperature line on the chart is displaced to the left. This can be done by a short wave trough or upper level disturbance bringing a pocket of cooler air into the region.

STORM PREDICTION CENTER...NWS/NCEP...NORMAN OK
DAY 1 CONVECTIVE OUTLOOK...REF AWIPS GRAPHIC PGWE46 KWNS.

VALID 111300Z - 121200Z

THERE IS A SLGT RISK OF SVR TSTMS TO THE RIGHT OF A LINE FROM DUA 50 SSW ADM 30 S SPS 50 SE CDS CDS 25 NNW GAG 40 NNW P28 SLN 35 NNE MHK 35 N STJ 35 NE MKC JLN MKO DUA.

GEN TSTMS ARE FCST TO THE RIGHT OF A LINE FROM 35 WSW ERI CAK ZZV LOZ CSV CHA RMG LGC CSG ABY MGR VLD 30 ENE GNV ORL AGR 60 S FMY...CONT... 40 ESE 7R4 HEZ GLH MEM EVV 45 SSW HUF MTO 45 NNW SLO BLV 55 N HOT 45 N TYR 30 NNE ACT BWD 50 NE BGS 25 WNW CDS 50 NE AMA 25 NNE CAO TAD 25 WNW PUB FCL CYS 40 SSW BFF SNY 35 SW IML 40 SW MCK 40 N HLC EAR BUB ANW PHP Y22 40 ENE DIK 65 WSW DVL JMS 45 NE ATY 40 NE RWF 40 NNW IWD.

--- SYNOPSIS ---
PROGRESSIVE UPPER AIR PATTERN FORECAST TO CONTINUE ACROSS CONUS. PRIMARY PERTURBATION WILL BE **SHORTWAVE TROUGH** NOW EVIDENT ON MOISTURE CHANNEL IMAGERY FROM NM NWD TO ERN MT...AND FORECAST TO DEAMPLIFY SLIGHTLY ON SRN END AS IT MOVES EWD ACROSS GREAT PLAINS TODAY. AT SURFACE...WAVY FRONT -- NOW ANALYZED FROM WRN WI SWWD ACROSS ERN NEB TO NEAR CO/OK BORDER -- IS FORECAST TO MOVE SLOWLY SWD ACROSS TX/OK PANHANDLES TODAY AND EWD OVER CENTRAL PLAINS/LOWER MO VALLEY. MEANWHILE...VERTICAL MIXING SHOULD SHIFT DRYLINE EWD ACROSS PANHANDLES TO NEAR 100W LONGITUDE...WITH **TRIPLE POINT** SOMEPLACE OVER NWRN OR FAR W-CENTRAL OK BY 00Z.

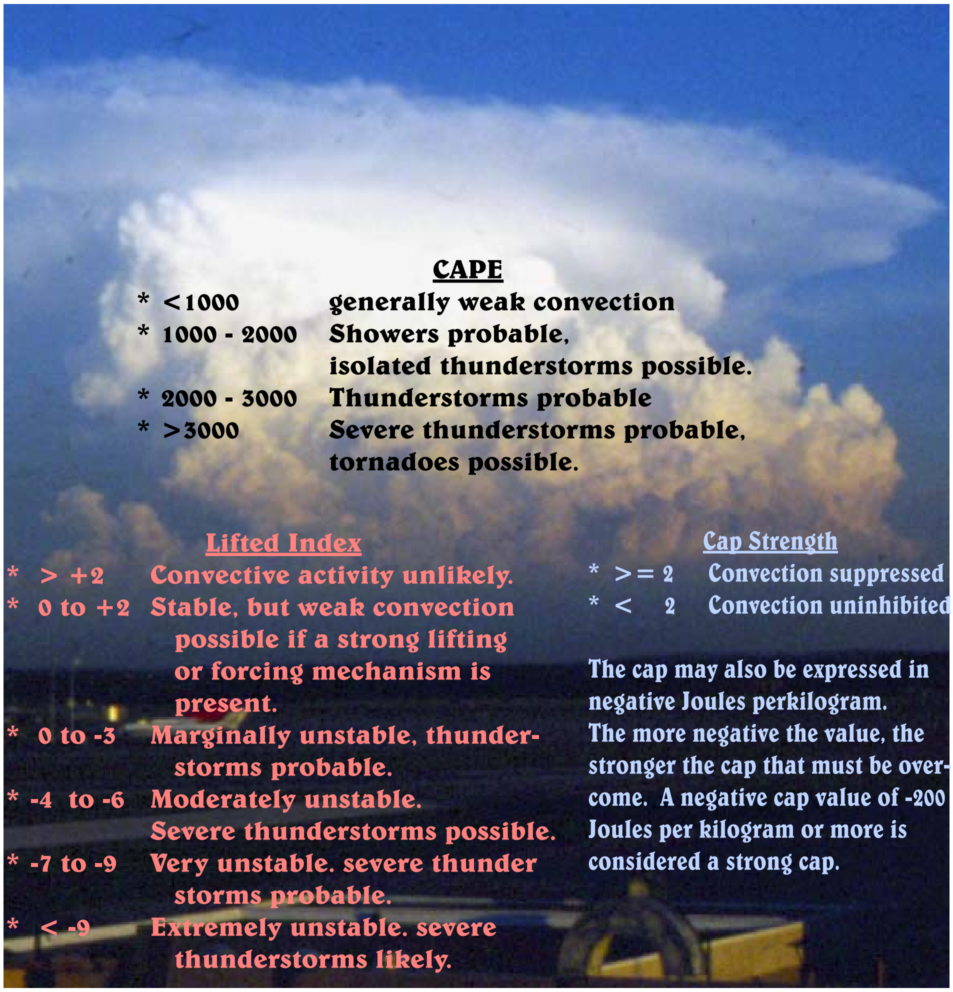
--- SRN PLAINS ---
WIDELY SCATTERED TO SCATTERED TSTMS POSSIBLE INVOF AND NE OF TRIPLE POINT BY 00Z...COVERAGE ISOLATED TO WIDELY SCATTERED FARTHER S ALONG/E OF **DRYLINE**. WITH PERSISTENT WLY MID LEVEL FLOW OVER REGION AND SEVERAL DAYS OF HEATING ALREADY GENERATING **ELEVATED/MIXED LAYER**...**CAPPING** IS A CONCERN S OF **TRIPLE POINT**. HOWEVER...PRIND WEAK COOLING IN **CAP LAYER**...
INCREASING DIABATIC HEATING AS W EDGE OF CIRROFORM CLOUD SHIELD PASSES EWD...AND **CONVERGENCE/LIFT** ALONG **FRONT** AND DRYLINE SHOULD BE SUFFICIENT FOR RISK OF TSTMS. GIVEN
PROGGED FAVORABLE VERTICAL SHEAR PROFILES...SEVERAL **SUPERCELLS** WITH LARGE HAIL AND SEVERE DOWNDRAFTS ARE FORECAST.

STEEP LAPSE RATES SHOULD BE MAINTAINED BY MERIDIONAL PLUME OF LARGE SCALE DPVA/ASCENT IN 18-00Z TIME FRAME -- AHEAD OF **TROUGH** LEAVING ROCKIES -- COMBINING WITH PRIMARILY MID-UPPER 50S SURFACE **DEW POINTS** TO YIELD **SBCAPE** APPROXIMATELY 2000 J/KG. VERTICAL SHEAR WILL BE FAVORABLE WITH 150-250 J/KG **SRH**...40-50 KT 0-6 KM VECTOR SHEAR...AND SR FLOWS GENERALLY AOA 15 KT THROUGHOUT TROPOSPHERE. HOWEVER...RELATIVELY HIGH CLOUD BASES EXPECTED INITIALLY FOR CELLS FROM **TRIPLE POINT** REGION SWD INVOF **DRYLINE**...GIVEN FORECAST SURFACE
DEW POINT DEPRESSIONS...CONTRIBUTING TO POTENTIAL FOR COLD STORM OUTFLOWS AND LOW TORNADO PROBABILITIES. TORNADO POTENTIAL MAY BE ENHANCED FOR ANY DISCRETE CELLS REMAINING 2-3 HOURS AFTER INITIAL DEVELOPMENT WHICH MOVE EWD INTO COOLER AND MORE MOISTURE-RICH LOW LEVEL AIR MASS...ESPECIALLY INVOF BOUNDARIES.

Figure 5. Convective outlooks from the Storm Prediction Center are the emerging method used by the Aviation Weather Center as the outlook for Convective SIGMETs. This ACUS01 KWNS product mentions the indices that forecasters are monitoring.

The other way is to make the temperature of the rising parcel warmer than the surrounding air. Condensing more water vapor from the parcel will add more heat and buoyancy for the parcel. Higher dew points represent that increased available water vapor. Forecasters look for high dewpoints on hourly surface charts and METAR reports because this is the gasoline thunderstorms guzzle as they prepare for battle with air traffic system. Terms like moisture plume or surface dew points are used by SPC to focus on this energy source. Injecting more moisture into a potential thunderstorm environment would cause the dashed path of the rising parcel in Figure 4 to move to the right and produce more CAPE.

CAPE can be calculated from any level. Surface based CAPE or SBCAPE uses hourly METAR temperatures, but can over estimate conditions. Mixed Layer CAPE or MLCAPE uses conditions in a shallow layer above the surface. MUCAPE or Most Unstable CAPE is a type that represents the worst case sce-



CAPE

* <1000	generally weak convection
* 1000 - 2000	Showers probable, isolated thunderstorms possible.
* 2000 - 3000	Thunderstorms probable
* >3000	Severe thunderstorms probable, tornadoes possible.

Lifted Index

* > +2	Convective activity unlikely.
* 0 to +2	Stable, but weak convection possible if a strong lifting or forcing mechanism is present.
* 0 to -3	Marginally unstable, thunderstorms probable.
* -4 to -6	Moderately unstable. Severe thunderstorms possible.
* -7 to -9	Very unstable. severe thunder storms probable.
* < -9	Extremely unstable. severe thunderstorms likely.

Cap Strength

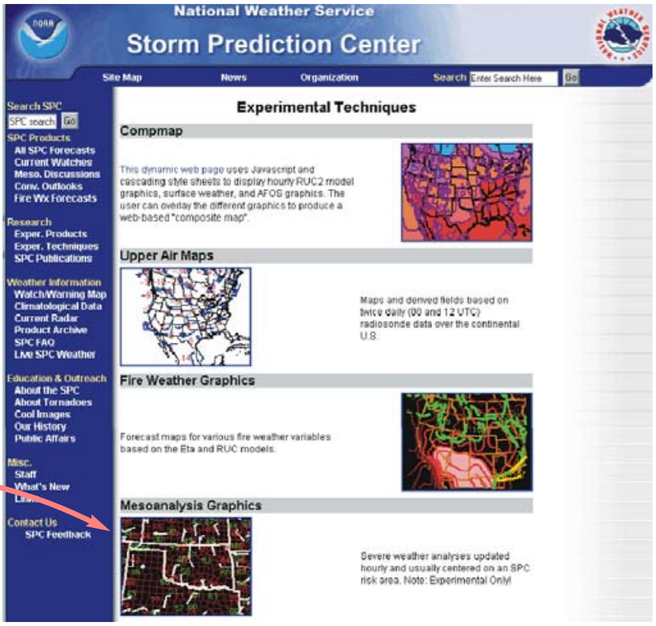
* >= 2	Convection suppressed
* < 2	Convection uninhibited

The cap may also be expressed in negative Joules perkilogram. The more negative the value, the stronger the cap that must be overcome. A negative cap value of -200 Joules per kilogram or more is considered a strong cap.

Figure 6. Thunderstorms develop as a result of the temperature structure or instability aloft. A number of indices, derived from that structure, are used by forecasters to determine the growth potential and severity of thunderstorms.

The Experimental Techniques option leads to this page.

Then click on the map here to go to a regionalized map showing various convective indices.



Experimental Techniques

Compmap

This dynamic web page uses Javascript and cascading style sheets to display hourly RUC2 model graphics, surface weather, and AFOS graphics. The user can overlay the different graphics to produce a web-based "composite map".

Upper Air Maps

Maps and derived fields based on twice daily (00 and 12 UTC) radiosonde data over the continental U.S.

Fire Weather Graphics

Forecast maps for various fire weather variables based on the Eta and RUC models.

Mesoanalysis Graphics

Severe weather analyses updated hourly and usually centered on an SPC risk area. Note: Experimental Only!

Figure 8. The Storm Prediction center has a number of links to hourly maps of the most often used indices. The Experimental Techniques page, specifically the experimental Mesoanalysis Graphics option links to a page with which you can monitor hourly trends in CAPE, Cap Strength and Lifted Index. The direct link is: www.spc.noaa.gov/exper/mesoanalysis/

nario. SPC forecasters select the appropriate type of CAPE for the day.

In a general sense, values of Lifted Index and CAPE have been associated with the severity of thunderstorms. Those general rankings are shown in Figure 6. It should be noted that these CAPE values cannot be applied the same throughout the country. They are most applicable to the central U.S. Low values of CAPE which would not lead to violent thunderstorms in the midwest may produce strong thunderstorms along the west coast or in higher terrain.

The Cap
Putting a lid on convection

Cap Strength is an inhibiting factor for thunderstorms. Some days the atmosphere is hot and muggy and just seems right for massive storms, but nothing happens. This may be due to a temperature inversion between 2000 and 5000 feet above ground level caused by warm air being brought into the area by the wind. The process is called warm air advection. Any air parcel rising into this inversion would become cooler than the surrounding layer of warm air and would sink or cease to rise. The cap can be expressed in degrees C or in negative Joules per kilogram of energy.

In Figure 7, an inversion is present. As the air parcel rises, it enters the warm layer and is now cooler than the surrounding air. The air parcel sinks. Convection caused by surface heating now ceases.

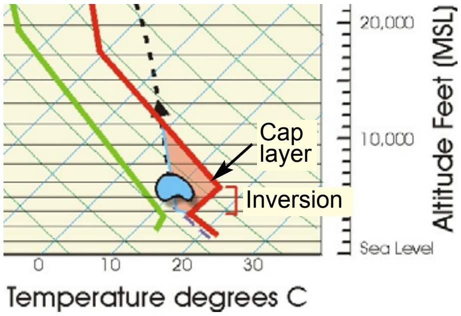


Figure 7. The Cap is a warm temperature inversion layer. A parcel rising into this inversion will be cooler than the surrounding air and will sink.

Convective Outlooks and Mesoscale Convective Discussions from the SPC may reference a cap when forecasting the onset of convection. Terms such as 'strong cap" or "a weakening cap" may also be used. A cap can be expressed as a temperature or as negative Joules per

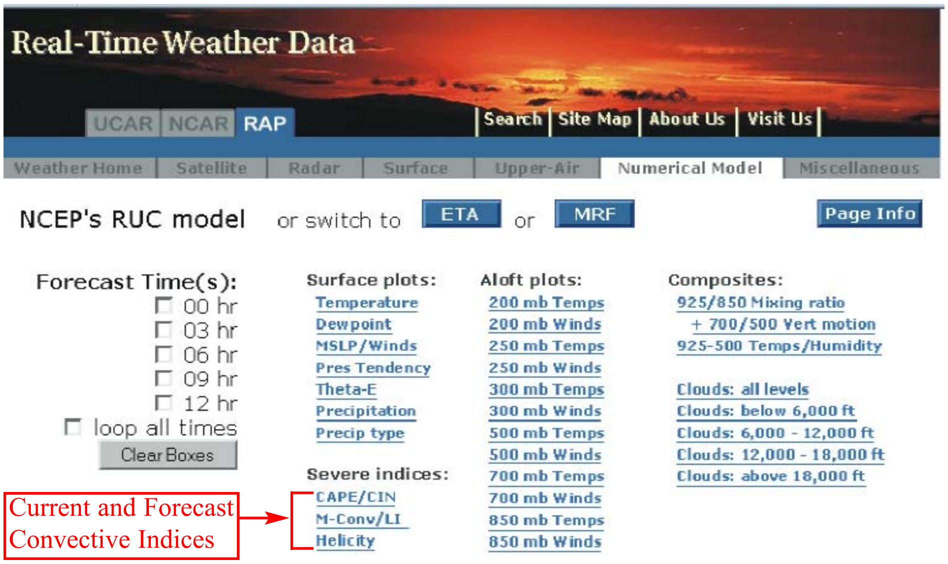
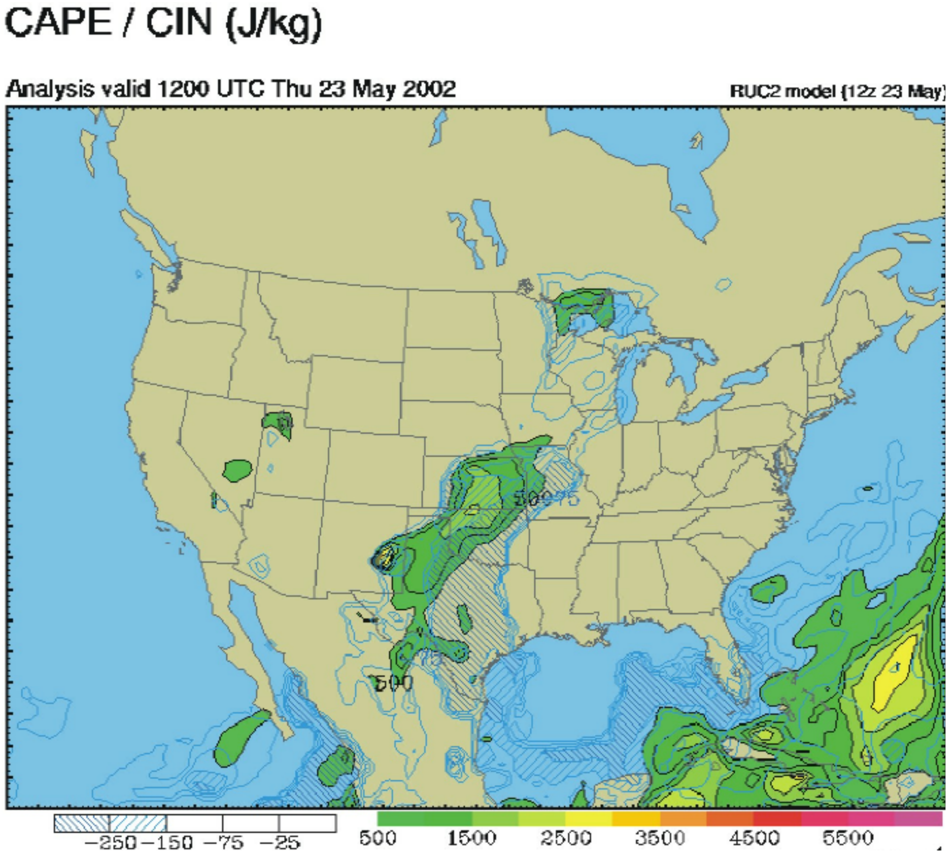


Figure 9. The SPC page links to the NOAA University Corporation for Atmospheric Research (UCAR), and the Realtime Analysis and Prediction (RAP) pages. Forecasts for CAPE, CIN, and Lifted Index are available at frequent intervals. For near term forecasts, out to 12 hours, use the RUC model. For longer term forecasts from 12 to 48 hours, the ETA model is a good choice.



Convective Inhibition, or CIN is indicated by blue-outlined clear or hatched areas. The more negative numbers imply capping.

Convective Available Potential Energy, or CAPE is a good indicator of buoyant energy of an air parcel which would strengthen the thunderstorm updraft.

Figure 10. Tracking CAPE and CIN hourly draws attention to potential thunderstorm development. It is these values, plus LI, that forecasters use often. CIN is important to monitor because the atmosphere may be unstable aloft, but low level stability inferred by CIN may delay or even prevent convection.

kilogram of energy needed to overcome it.

Lapse rates

Figure 2 showed how the temperature structure of the atmosphere, or lapse rate determines whether an air parcel is going to be stable or unstable relative to its surroundings. The rate at which the atmosphere cools with altitude is called the lapse rate. The SPC often mentions lapse rates in Convective Outlooks and Mesoscale Convective Discussions.

The term steep lapse rate indicates that temperature of the air decreases rapidly with height A parcel rising through a layer with a steep lapse rate would see the temperature of the surrounding air become rapidly cooler as the parcel rises. So the parcel would be much warmer and more buoyant.

As stated earlier, warm air advection in the lower layers of the atmosphere can create an inversion or cap aloft which inihibits surface based convection. However, just above that inversion steep lapse rates develop which are favorable for convection.

Forecasters may mention elevated convection in these situations. That means that strong or severe thunderstorms are possible if a forcing mechanism like a front or upper level disturbance moves through the region to lift the air to that elevated region that is unstable. So when the the atmosphere indicates high CAPE values, but is capped, strong convection is still possible if a forcing mechanism moves through.

Let me draw you a picture

Maps of computed indices are available every hour on the web. The SPC page tracks hourly values of Lifted Index, CAPE, amd cap strength, or Convective INhibition (CIN). See Figure 8. The page is available at:

www.spc.noaa.gov/exper/mesoanalysis/

The map zooms in on the portion of the country that is facing the greatest severe convective potential. Your particular part of the country may not be shown.

NOAA's UCAR RAP page shown in Figure 9 provides full national coverage of convective indices. That page is available at:

www.rap.ucar.edu/weather/model/

The Rapid Update Cycle, RUC,

model is good for near term, hourly tracking of convective indices. The RUC is run every hour using forecast model data but also uses hourly METAR reports to supply updates on surface conditions from which convection might start.

Another model choice on the UCAR RAP page is the ETA. This is an accurate atmospheric model widely used by forecasters.

The RAP page allows the pilot to build a set of forecast maps. Select the desired parameters, such as CAPE and dew point, and the number of hours in the future. Those hours are the valid times after the run time of the model. The ETA is run every 6 hours. So be sure to check the valid times in the map header to make sure when the forecast is valid.

Other valuable data for pilots is available on the UCAR RAP page in Figure 9. Color maps of temperatures and winds aloft are a click away using the list of options under the “Aloft Plots” header.

Even though the elite Storm Prediction Center is on top of the daily convection, it’s nice to have maps depicting the most-used convective indices so pilots and dispatchers can keep tabs on developing danger spots. Tie these in with AWC’s Collaborative Convective Forecast Product and SPC’s Convective Outlook, and Mesoscale Discussions, and you’ll be adequately equipped for what lies ahead.

Besides the immediate and obvious threat that thunderstorms pose, their rapid development can produce other unexpected hazards.

The following article is from Warren L Qualley, Manager of Weather Services at American Airlines. The opinions and suggestions reflect operating practices at American Airlines. Your company or agency policies may be different.

Turbulence and Thunderstorm Season!

Warren L. Qualley
Manager Weather Services
American Airlines

Most of us assume that turbulence is a wintertime phenomenon. And in the case of true clear air turbulence, or that caused by mountain waves, that's a pretty accurate statement. However, turbulence can and does occur every month of the year. In reviewing several years worth of turbulence reporting records in the commercial aviation industry, it turns out that the greatest number of incidents occur in April, followed by December, January, March and October.

Why April, March and October? Two reasons: first, the real clear air turbulence season is just ending (March and April) or just beginning (October) and, second, the main part of thunderstorm season gets into full swing in March (southern U.S. and Caribbean) and April, and is just ending in October.

The next question you might ask is "what do thunderstorms and clear air turbulence have to do with one another?". The answer to that is the bumpy air due to what we will call Convective-Induced Turbulence or CIT. Now every pilot knows that one of the by-products of thunderstorms is turbulence of varying intensities. But thunderstorms also produce gravity waves that spread outward, upward and downward from the thunderstorm cloud itself. There have been reports of turbulence encounters as high as 15,000 feet in the clear air above thunderstorm clouds and horizontally as far away as 100 miles from the storm. This turbulence can be amplified if it occurs near the tropopause level, since the trop traps the gravity wave as it spreads outward from the thunderstorm.

Before pilots start avoiding individual thunderstorms by the distances described above, they should know that turbulence doesn't occur in the same way or the same distance away from each thunderstorm. And unfortunately, there's no operational tool currently available that tactically measures and predicts any type of turbulence, including CIT.

Pilots should be particularly aware of their environment relative to thunderstorms by actively and aggressively using their on-board radar. Some of the more serious CIT encounters have occurred when a flight is in the clear on top of a cirrus cloud and a developing thunderstorm punches up from underneath. The experience in not unlike hitting a speed bump on a road while traveling at 60 mph.

Suffice it to say that when in a thunderstorm environment, even when not in clouds, there may be light to moderate, or even greater, turbulence due to Convective Induced Turbulence.

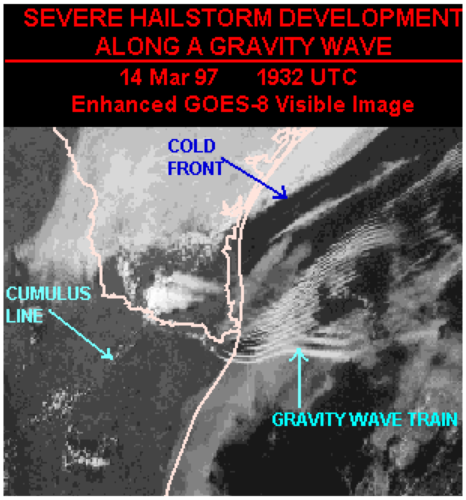


Figure 11. Gravity waves develop as a result of strong convection. The result is much like releasing an air bubble from the bottom of a calm container of water. The gravity waves produce turbulence, and they can sometimes be seen well on satellite imagery. They can even produce new convection where they intersect other existing boundaries. This gravity wave was documented by Roger Edwards of the Storm Prediction Center.

Coming up next time...

- **A visit to the FAA nerve center in Herndon Virginia.**
- **A message from Jack May, Director of the Aviation Weather Center.**
- **Terminal Aerodrome Forecast (TAF) verification program of the National Weather Service.**

The editors welcome comments andconcerns from our readers, and we will respond to any question or comment. Some responses may be delayed in order to ensure that the content of that response is consistent with government policy. Thank you.

We are pleased to announce the addition of our new associate editor, Jim Roets, Forecaster at the Aviation Weather Center. Jim brings a wealth of experience, talent and initiative, and qaulity focus.

Send comments and suggestions to:

craig.sanders@noaa.gov
sally.pavlow@noaa.gov
james.roets@noaa.gov

The Front is published bimonthly and is available on the NWS Central Region aviation page at:
www.crh.noaa.gov/crh/aviation/thefront.html

Appendix

Contractions used by the NWS and its national prediction centers.

The list contains most of the contractions used operationally in SPC's Convective Outlooks, Mesoscale Discussions, and by AWC's AIRMETs, SIGMETs, Convective SIGMETs, and Area Forecasts.

Contractions most commonly used by NWS national prediction centers

- A -

ABNDT	Abundant
ABNML	Abnormal
ABT	About
ABV	Above
AC	Convective Outlook
ACCAS	Altocumulus Castellanus
ACCUM	Accumulate
ACFT	Aircraft
ACLT	Accelerate
ACLTD	Accelerated
ACLTG	Accelerating
ACLTS	Accelerates
ACPY	Accompany
ACRS	Across
ACSL	Altocumulus Standing Lenticularus
ACTV	Active
ACTVTY	Activity
ACYC	Anticyclone
ADJ	Adjacent
ADL	Additional
ADQT	Adequate
ADQTLY	Adequately
ADRNDCK	Adirondack
ADVCT	Advect
ADVCTD	Advected
ADVCTG	Advecting
ADVCTN	Advection
ADVCTS	Advects
ADVN	Advance
ADVNG	Advancing
ADVY	Advisory
ADVYS	Advisories
AFCT	Affect
AFCTD	Affected
AFCTG	Affecting
AFDK	After dark
AFT	After
AFTN	Afternoon
AGL	Above ground level
AGN	Again
AGRD	Agreed
AGRS	Agrees
AGRMT	Agreement
AHD	Ahead
AK	Alaska
AL	Alabama
ALF	Aloft
ALG	Along
ALGHNY	Allegheny
ALQDS	All quadrants
ALSTG	Altimeter setting
ALTA	Alberta
ALTHO	Although
ALTM	Altimeter
ALUTN	Aleutian
AMD	Amend
AMDD	Amended
AMDG	Amending
AMDT	Amendment
AMP	Amplify
AMPG	Amplifying
AMPLTD	Amplitude
AMS	Air mass
AMT	Amount
ANLYS	Analysis
ANS	Answer
AOA	At or above
AOB	At or below
AP	Anomolous Propagation
APCH	Approach
APCHG	Approaching
APCHS	Approaches
APLCN	Appalachian
APLCNS	Appalachians
APPR	Appear
APPRG	Appearing
APPRS	Appears
APRNT	Apparent
APRNTLY	Apparently
APRX	Approximate
APRXLY	Approximately
AR	Arkansas
ARND	Around
ARPT	Airport
ASAP	As soon as possible
ASL	Above Sea Level
ASMD	As amended
ASOS	Automated Surface Observing System
ASSOCD	Associated
ASSOCN	Association
ATLC	Atlantic
ATTM	At this time
ATTN	Attention
AVBL	Available
AVG	Average
AVN	Aviation Model
AWIPS	Advanced Interactive Weather Processing System
AWOS	Automated Weather Observing System
AWT	Awaiting
AZ	Arizona
AZM	Azimuth

- B -

BACLIN	Baroclinic
BAJA	Baja California
BATROP	Barotropic
BC	Patches (METAR code)
BC	British Columbia
BCH	Beach
BCKG	Backing
BCM	Become
BCMG	Becoming
BCMS	Becomes
BD	Blowing dust
BDA	Bermuda
BDRY	Boundary
BFDK	Before dark
BFR	Before
BGN	Begin
BGNG	Beginning
BGNS	Begins
BHND	Behind
BINOVC	Breaks in overcast
BKN	Broken
BL	Blowing (METAR code)
BLD	Build
BLDG	Building
BLDS	Builds
BLDUP	Buildup
BLKHLS	Black Hills
BLKT	Blanket
BLKTG	Blanketing
BLKTS	Blankets
BLO	Below
BLZD	Blizzard
BN	Blowing sand
BND	Bound
BNDRY	Boundary
BNDRYS	Boundaries
BNTH	Beneath
BOOTHEEL	Bootheel
BR	Mist (>= 5/8 SM) (METAR code)
BR	Branch
BRG	Branching
BRS	Branches
BRF	Brief
BRK	Break
BRKG	Breaking
BRKHIC	Breaks in higher clouds
BRKS	Breaks
BRKSHR	Berkshire
BRKSHRS	Berkshires
BRM	Barometer
BS	Blowing snow
BTWN	Between
BYD	Beyond

- C -

C	Celsius
CA	California
CAA	Cold Air Advection

CARIB	Caribbean
CASCDS	Cascades
CAVOK	Ceiling and visibility OK
CAVU	Ceiling and visibility unlimited
CB	Cumulonimbus
CBS	Cumulonimbi
CC	Cirrocumulus
CCLDS	Clear of clouds
CCLKWS	Counter-clockwise
CCSL	Standing lenticular cirrocumulus
CDFNT	Cold front
CDFNTL	Cold frontal
CFP	Cold front passage
CG	Cloud-to-ground
CHC	Chance
CHCS	Chances
CHG	Change
CHG	Changed
CHGG	Changing
CHGS	Changes
CHSPK	Chesepeake
CI	Cirrus
CIG	Ceiling
CIGS	Ceilings
CLD	Cloud
CLDNS	Cloudiness
CLDS	Clouds
CLKWS	Clockwise
CLR	Clear
CLRG	Clearing
CLRS	Clears
CMPLX	Complex
CNCL	Cancel
CNCLD	Cancelled
CNCLG	Cancelling
CNCLS	Cancels
CNDN	Canadian
CNTR	Center
CNTRD	Centered
CNTRLN	Centerline
CNTRS	Centers
CNTRL	Central
CNTY	County
CNTYS	Counties
CNVG	Converge
CNVGG	Converging
CNVGNC	Convergence
CNVTN	Convection
CNVTV	Convective
CNVTVLY	Convectively
CNFDC	Confidence
CO	Colorado
COMPAR	Compare
COMPARG	Comparing
COMPARD	Compared
COMPARS	Compares
COND	Conditions
CONT	Continue
CONTD	Continued
CONTLY	Continually
CONTG	Continuing
CONTRAILS	Condensation Trails
CONTS	Continues
CONTDVD	Continental Divide
CONUS	Continental U.S.
COORD	Coordinate
COR	Correction
CPBL	Capable
CPC	Climate Prediction Center
CRC	Circle
CRCLC	Circulate
CRCLN	Circulation
CRNR	Corner
CRNRS	Corners
CRS	Course
CS	Cirrostratus
CSDR	Consider
CSDRBL	Considerable
CST	Coast
CSTL	Coastal
CT	Connecticut
CTGY	Category
CTSKLS	Catskills
CU	Cumulus
CUFRA	Cumulus Fractus
CVR	Cover
CVRD	Covered
CVRG	Covering
CVRS	Covers
CYC	Cyclonic
CYCLGN	Cyclogenesis

- D -

DABRK	Daybreak
DALGT	Day light
DBL	Double
DC	District of Columbia
DCR	Decrease
DCRD	Decreased
DCRG	Decreasing
DCRGLY	Decreasingly
DCRS	Decreases
DE	Delaware
DEG	Degree
DEGS	Degrees
DELMARVA	Delaware-Maryland-Virginia
DFCLT	Difficult
DFCLTY	Difficulty
DFNT	Definite
DFNTLY	Definitely
DFRS	Differs
DFUS	Diffuse
DGNL	Diagonal
DGNLLY	Diagonally
DIGG	Digging
DIR	Direction
DISC	Discontinue
DISCD	Discontinued
DISCG	Discontinuing
DISRE	Disregard
DISRED	Disregarded
DISREG	Disregarding
DKTS	Dakotas
DLA	Delay
DLAD	Delayed
DLT	Delete
DLTD	Deleted
DLTG	Deleting
DLY	Daily
DMG	Damage
DMGD	Damaged
DMGG	Damaging
DMNT	Dominant
DMSH	Diminish
DMSHD	Diminished
DMSHG	Diminishing
DMSHS	Diminishes
DNDFTS	Downdrafts
DNS	Dense
DNSLP	Downslope
DNSTRM	Downstream
DNWND	Down wind
DP	Deep
DPND	Deepened
DPNS	Deepens
DPR	Deeper
DPNG	Deepening
DPTH	Depth
DR	Drifting (METAR code)
DRFT	Drift
DRFTD	Drifted
DRFTG	Drifting
DRFTS	Drifts
DRZL	Drizzle
DS	Duststorm (METAR code)
DSCNT	Descent
DSIPT	Dissipate
DSIPTD	Dissipated
DSIPTG	Dissipating
DSIPTN	Dissipation
DSIPTS	Dissipates
DSND	Descend
DSNDG	Descending
DSNDS	Descends
DSNT	Distant
DSTBLZ	Destabilize
DSTBLZD	Destabilized
DSTBLZG	Destablizing
DSTBLZS	Destablizes
DSTBLZN	Destablization
DSTC	Distance
DTRT	Deteriorate
DTRTD	Deteriorated

DTRTG	Deteriorating
DTRTS	Deteriorates
DU	Widespread dust (METAR code)
DURG	During
DURN	Duration
DVLP	Develop
DVLPD	Developed
DVLPG	Developing
DVLPMT	Development
DVLPS	Develops
DVRG	Diverge
DVRGG	Diverging
DVRGNC	Divergence
DVRGS	Diverges
DVV	Downward vertical velocity
DWNDFTS	Downdrafts
DWPNT	Dewpoint
DWPNTS	Dewpoints
DX	Duplex
DZ	Drizzle (METAR code)

- E -

E	East
EBND	East bound
EFCT	Effect
ELNGT	Elongate
ELNGTD	Elongated
ELSW	Elsewhere
EMBDD	Embedded
EMERG	Emergency
ENCTR	Encounter
ENDG	Ending
ENE	East-northeast
ENELY	East-northeasterly
ENERN	East-northeastern
ENEWD	East-northeastward
ENHNC	Enhance
ENHNCD	Enhanced
ENHNCG	Enhancing
ENHNCS	Enhances
ENHNCMNT	Enhancement
ENTR	Entire
ERN	Eastern
ERY	Early
ERYR	Earlier
ESE	East-southeast
ESELY	East-southeasterly
ESERN	East-southeastern
ESEWD	East-southeastward
ESNTL	Essential
ESTAB	Establish
ESTS	Estimates
ETA	Eta model
ETC	Et cetera
ETIM	Elapsed time
EVE	Evening
EWD	Eastward
EXCLV	Exclusive
EXCLVLY	Exclusively
EXCP	Except
EXPC	Expect
EXPCD	Expected
EXPCG	Expecting
EXTD	Extend
EXTDD	Extended
EXTDG	Extending
EXTDS	Extends
EXTN	Extension
EXTRAP	Extrapolate
EXTRAPD	Extrapolated
EXTRM	Extreme
EXTRMLY	Extremely
EXTSV	Extensive

- F -

F	Farenheit
FA	Aviation area forecast
FAH	Farenheit
FAM	Familiar
FC	Funnel cloud (METAR code)
+FC	Tornado/waterspout (METAR code)
FCST	Forecast
FCSTD	Forecasted
FCSTG	Forecasting
FCSTR	Forecaster
FCSTS	Forecasts
FG	Fog (< 5/8SM) (METAR code)
FIG	Figure
FILG	Filling
FIRAV	First available
FL	Florida
FLG	Falling
FLRY	Flurry
FLRYS	Flurries
FLT	Flight
FLW	Follow
FLWG	Following
FM	From
FMT	Format
FNCTN	Function
FNT	Front
FNTL	Frontal
FNTS	Fronts
FNTGNS	Frontogenesis
FNTLYS	Frontolysis
FORNN	Forenoon
FPM	Feet per minute
FQT	Frequent
FQTLY	Frequently
FRM	Form
FRMG	Forming
FRMN	Formation
FROPA	Frontal passage
FROSFC	Frontal surface
FRST	Frost
FRWF	Forecast wind factor
FRZ	Freeze
FRZN	Frozen
FRZG	Freezing
FT	Feet
FT	Terminal forecast
FTHR	Further
FU	Smoke (METAR code)
FVRBL	Favorable
FWD	Forward
FYI	For your information
FZ	Freezing (METAR code)

- G -

G	Gust
GA	Georgia
GEN	General
GENLY	Generally
GEO	Geographic
GEOREF	Geographical reference
GF	Ground fog
GICG	Glaze icing
GLFALSK	Gulf of Alaska
GLFCAL	Gulf of California
GLFMEX	Gulf of Mexico
GLFSTLAWR	Gulf of St. Lawrence
GND	Ground
GNDFG	Ground fog
GOES	Geostationary Operational Evnironmental Satellite
GR	Hail (METAR code)
GRAD	Gradient
GRDL	Gradual
GRDLY	Gradually
GRT	Great
GRTLY	Greatly
GRTR	Greater
GRTST	Greatest
GRTLKS	Great Lakes
GS	Small hail/snow pellets (METAR code)
GSTS	Gusts
GSTY	Gusty
GV	Ground visibility

- H -

HAZ	Hazard
HCVIS	High clouds visible
HDFRZ	Hard freeze
HDSVLY	Hudson Valley
HDWND	Head wind

HGT	Height
HI	High
HIER	Higher
HIFOR	High level forecast
HLF	Half
HLTP	Hilltop
HLSTO	Hailstones
HLYR	Haze layer aloft
HND	Hundred
HPC	Hydrometeorological Prediction Center
HR	Hour
HRS	Hours
HRZN	Horizon
HTG	Heating
HURCN	Hurricane
HUREP	Hurricane report
HV	Have
HVY	Heavy
HVYR	Heavier
HVYST	Heaviest
HWVR	However
HWY	Highway
HZ	Haze (METAR code)

- I -

IA	Iowa
IC	Ice crystals (METAR code)
IC	Ice
ICG	Icing
ICGIC	Icing in clouds
ICGIP	Icing in precipitation
ID	Idaho
IL	Illinois
IMDT	Immediate
IMDTLY	Immediately
IMPL	Impulse
IMPLS	Impulses
IMPT	Important
INCL	Include
INCLD	Included
INCLG	Including
INCLS	Includes
INCR	Increase
INCRD	Increased
INCRG	Increasing
INCRGLY	Increasingly
INCRS	Increases
INDC	Indicate
INDCD	Indicated
INDCG	Indicating
INDCS	Indicates
INDEF	Indefinite
INFO	Information
INLD	Inland
INSTBY	Instability
INTCNTL	Intercontinental
INTL	International
INTMD	Intermediate
INTMT	Intermittent
INTMTLY	Intermittently
INTR	Interior
INTRMTRGN	Intermountain region
INTS	Intense
INTSFCN	Intensification
INTSFY	Intensify
INTSFYD	Intensified
INTSFY	Intensifying
INTSFYS	Intensifies
INTSTY	Intensity
INTVL	Interval
INVRN	Inversion
IOVC	In overcast
INVOF	In vicinity of
IP	Ice pellets
IPV	Improve
IPVG	Improving
IR	Infrared
ISOL	Isolate
ISOLD	Isolated

- J -

JCTN	Junction
JTSTR	Jet stream

- K -

KFRST	Killing frost
KLYR	Smoke layer aloft
KOCTY	Smoke over city
KS	Kansas
KT	Knots
KY	Kentucky

- L -

LA	Louisiana
LABRDR	Labrador
LAPS	Local Analysis and Prediction System
LAMP	Local AWIPS MOS Program
LAT	Latitude
LCL	Local
LCLY	Locally
LCTD	Located
LCTN	Location
LCTMP	Little change in temperature
LEVEL	Level
LFTG	Lifting
LGRNG	Long range
LGT	Light
LGTR	Lighter
LGWV	Long wave
LI	Lifted Index
LIS	Lifted indices
LK	Lake
LKS	Lakes
LKLY	Likely
LLJ	Low Level Jet
LLWS	Low Level Wind Shear
LLWAS	Low level wind shear alert system
LMTD	Limited
LMTG	Limiti6ng
LMTS	Limits
LN	Line
LNS	Lines
LO	Low
LONG	Longitude
LONGL	Longitudnal
LRG	Large
LRGLY	Largely
LRGR	Larger
LRGST	Largest
LST	Local standard time
LTD	Limited
LTG	Lightning
LTGCC	Lightning cloud-to-cloud
LTGCG	Lightning cloud-to-ground
LTGCCCG	Lightning cloud-to-cloud cloud-to-ground
LTGCW	Lightning cloud-to-water
LTGIC	Lightning in cloud
LTL	Little
LTLCG	Little change
LTR	Later
LTST	Latest
LV	Leaving
LVL	Level
LVLS	Levels
LWR	Lower
LWRD	Lowered
LWRG	Lowering
LYR	Layer
LYRD	Layered
LYRS	Layers

- M -

MA	Massachusetts
MAN	Manitoba
MAX	Maximum
MB	Millibars
MCD	Mesoscale discussion
MD	Maryland
MDFY	Modify
MDFYD	Modified

MDFYG	Modifying
MDL	Model
MDLS	Models
MDT	Moderate
MDTLY	Moderately
ME	Maine
MED	Medium
MEGG	Merging
MESO	Mesoscale
MET	Meteorological
METRO	Metropolitan
MEX	Mexico
MHKVLY	Mohawk Valley
MI	Shallow (METAR code)
MI	Michigan
MID	Middle
MIDN	Midnight
MIL	Military
MIN	Minimum
MISG	Missing
MLTLVL	Melting level
MN	Minnesota
MNLND	Mainland
MNLY	Mainly
MO	Missouri
MOGR	Moderate or greater
MOS	Model Output Statistics
MOV	Move
MOVD	Moved
MOVG	Moving
MOVMT	Movement
MOVS	Moves
MPH	Miles per hour
MRGL	Marginal
MRGLLY	Marginally
MRNG	Morning
MRTM	Maritime
MS	Mississippi
MSG	Message
MSL	Mean sea level
MST	Most
MSTLY	Mostly
MSTR	Moisture
MT	Montana
MTN	Mountain
MTNS	Mountains
MULT	Multiple
MULTILVL	Multi-level
MXD	Mixed

- N -

N	North
NAB	Not above
NAT	North Atlantic
NATL	National
NAV	Navigation
NB	New Brunswick
NBND	Northbound
NBRHD	Neighborhood
NC	North Carolina
NCEP	National Center for Environmental Prediction
NCWX	No change in weather
ND	North Dakota
NE	Northeast
NEB	Nebraska
NEC	Necessary
NEG	Negative
NEGLY	Negatively
NELY	Northeasterly
NERN	Northeastern
NEWD	Northeastward
NEW ENG	New England
NFLD	Newfoundland
NGM	Nested Grid Model
NGT	Night
NH	New Hampshire
NHC	National Hurricane Center
NIL	None
NJ	New Jersey
NL	No layers
NLT	Not later than
NLY	Northerly
NM	New Mexico
NMBR	Number
NMBRS	Numbers
NML	Normal
NMRS	Numerous
NNE	North-northeast
NNELY	North-northeasterly
NNERN	North-northeastern
NNEWD	North-northeastward
NNW	North-northwest
NNWLY	North-northwesterly
NNWRN	North-northwestern
NNWWD	North-northwestward
NNNN	End of message
NOAA	National Oceanic and Atmospheric Administration
NOPAC	Northern Pacific
NPRS	Nonpersistent
NR	Near
NRLY	Nearly
NRN	Northern
NRW	Narrow
NS	Nova Scotia
NTFY	Notify
NTFYD	Notified
NV	Nevada
NVA	Negative vorticity advection
NW	Northwest
NWD	Northward
NWLY	Northwesterly
NWRN	Northwestern
NWS	National Weather Service
NY	New York
NXT	Next

- O -

OAT	Outside Air Temperature
OBND	Outbound
OBS	Observation
OBSC	Obscure
OBSCD	Obscured
OBSCG	Obscuring
OCFNT	Occluded front
OCLD	Occlude
OCLDS	Occludes
OCLDD	Occluded
OCLDG	Occluding
OCLN	Occlusion
OCNL	Occasional
OCNLY	Occasionally
OCR	Occur
OCRD	Occurred
OCRG	Occurring
OCRS	Occurs
OFC	Office
OFP	Occluded frontal passage
OFSHR	Offshore
OH	Ohio
OK	Oklahoma
OMTNS	Over mountains
ONSHR	On shore
OR	Oregon
ORGPHC	Orographic
ORIG	Original
OSV	Ocean station vessel
OTLK	Outlook
OTP	On top
OTR	Other
OTRW	Otherwise
OUTFLO	Outflow
OVC	Overcast
OVNGT	Overnight
OVR	Over
OVRN	Overrun
OVRNG	Overrunning
OVTK	Overtake
OVTKG	Overtaking
OVTKS	Overtakes

- P -

PA	Pennsylvania
PAC	Pacific
PBL	Planetary boundary layer
PCPN	Precipitation

PD	Period
PDS	Periods
PDMT	Predominant
PEN	Peninsula
PERM	Permanent
PGTSND	Puget Sound
PHYS	Physical
PIBAL	Pilot balloon observation
PIBALS	Pilot balloon reports
PIREP	Pilot weather report
PIREPS	Pilot weather reports
PL	Ice pellets (METAR code)
PLNS	Plains
PLS	Please
PLTO	Plateau
PM	Post meridian
PNHDL	Panhandle
PO	Well developed dust/sand whirls (METAR code)
POS	Positive
POSLY	Positively
PPINE	PPI no echoes
PPSN	Present position
PR	Partial (METAR code)
PRBL	Probable
PRBLY	Probably
PRBLTY	Probability
PRECD	Precede
PRECDD	Preceded
PRECDG	Preceding
PRECDS	Precedes
PRES	Pressure
PRESFR	Pressure falling rapidly
PRESRR	Pressure rising rapidly
PRIM	Primary
PRIN	Principal
PRIND	Present indications are
PRJMP	Pressure jump
PROC	Procedure
PROD	Produce
PRODG	Producing
PROG	Forecast
PROGD	Forecasted
PROGS	Forecasts
PRSNT	Present
PRSNTLY	Presently
PRST	Persist
PRSTS	Persists
PRSTNC	Persistence
PRSTNT	Persistent
PRVD	Provide
PRVDD	Provided
PRVDG	Providing
PRVDS	Provides
PS	Plus
PSBL	Possible
PSBLY	Possibly
PSBLTY	Possiblity
PSG	Passage
PSN	Position
PSND	Positioned
PTCHY	Patchy
PTLY	Partly
PTNL	Potential
PTNLY	Potentially
PTNS	Portions
PUGET	Puget Sound
PVA	Positive vorticity advection
PVL	Prevail
PVLD	Prevailed
PVLG	Prevailing
PVLS	Prevails
PVLT	Prevalent
PWR	Power
PY	Spray (METAR code)

- Q -

QN	Question
QPFERD	NCEP excessive rainfall discussion
QPFHSD	NCEP heavy snow discussion
QPFSPD	NCEP special precipitation discussion
QSTNRY	Quasistationary
QUAD	Quadrant
QUE	Quebec

- R -

R	Rain
RA	Rain (METAR code)
RADAT	Radiosonde observation data
RAOB	Radiosonde observation
RAOBS	Radiosonde observations
RCH	Reach
RCHD	Reached
RCHG	Reaching
RCHS	Reaches
RCKY	Rocky
RCKYS	Rockies
RCMD	Recommend
RCMDD	Recommended
RCMDG	Recommending
RCMDS	Recommends
RCRD	Record
RCRDS	Records
RCV	Receive
RCV	Received
RCVG	Receiving
RCVS	Receives
RDC	Reduce
RDGG	Ridging
RDR	Radar
RDVLP	Redevelop
RDVLPG	Redeveloping
RDVLPMT	Redevelopment
RE	Regard
RECON	Reconnaissance
REF	Reference
RES	Reserve
RGN	Region
RGT	Right
RI	Rhode Island
RLBL	Reliable
REPL	Replace
REPLD	Replaced
REPLG	Replacing
REPLS	Replaces
REQ	Request
REQS	Requests
REQSTD	Requested
RESP	Response
RESTR	Restrict
RGD	Ragged
RGLR	Regular
RGN	Region
RGNS	Regions
RH	Relative Humidity
RIOGD	Rio Grande
RLTV	Relative
RLTVLY	Relativily
RMN	Remain
RMND	Remained
RMNDR	Remainder
RMNG	Remaining
RMNS	Remains
RNFL	Rainfall
ROT	Rotate
ROTD	Rotated
ROTG	Rotating
ROTS	Rotates
RPD	Rapid
RPDLY	Rapidly
RPLC	Replace
RPLCD	Replaced
RPLCG	Replacing
RPLCS	Replaces
RPRT	Report
RPRTD	Reported
RPRTG	Reporting
RPRTS	Reports
RPT	Repeat
RPTG	Repeating
RPTS	Repeats
RQR	Require
RQRD	Required
RQRG	Requiring
RQRS	Requires
RS	Receiver station

RSG	Rising
RSN	Reason
RSNG	Reasoning
RSNS	Reasons
RSTR	Restrict
RSTRD	Restricted
RSTRG	Restricting
RSTRS	Restricts
RTRN	Return
RTRND	Returned
RTRNG	Returning
RTRNS	Returns
RUC	Rapid Update Cycle
RUF	Rough
RUFLY	Roughly
RVS	Revise
RVSD	Revised
RVSG	Revising
RVSS	Revises
RW	Rain shower

- S -

S	South
SA	Sand (METAR code)
SA	Surface observation
SAO	Surface observation
SAOS	Surface observations
SASK	Saskatchewan
SATFY	Satisfactory
SBND	South bound
SBSD	Subside
SBSDD	Subsided
SBSDNC	Subsidence
SBSDS	Subsides
SC	South Carolina
SCND	Second
SCNDRY	Secondary
SCSL	Standing lenticular stratocumulus
SCT	Scatter
SCTD	Scattered
SCTR	Sector
SD	South Dakota
SE	Southeast
SEC	Second
SELY	Southeasterly
SEPN	Separation
SEQ	Sequence
SERN	Southeastern
SEWD	Southeastward
SFC	Surface
SFERICS	Atmospherics
SG	Snow grains
SGFNT	Significant
SGFNTLY	Significantly
SH	Showers (METAR code)
SHFT	Shift
SHFTD	Shifted
SHFTG	Shifting
SHFTS	Shifts
SHLD	Shield
SHLW	Shallow
SHRT	Short
SHRTLY	Shortly
SHRTWV	Shortwave
SHRTWVS	Shortwaves
SHUD	Should
SHWR	Shower
SHWRS	Showers
SIERNEV	Sierra Nevada
SIG	Signature
SIGMET	Significant meteorological information
SIMUL	Simultaneous
SKC	Sky clear
SKED	Schedule
SLD	Solid
SLGT	Slight
SLGTLY	Slightly
SLO	Slow
SLOLY	Slowly
SLOR	Slower
SLP	Slope
SLPG	Sloping
SLT	Sleet
SLY	Southerly
SM	Statute mile
SMK	Smoke
SML	Small
SMLR	Smaller
SMRY	Summary
SMS	Synchronus meteorological satellite
SMTH	Smooth
SMTHR	Smoother
SMTHST	Smoothest
SMTM	Sometime
SMWHT	Somewhat
SN	Snow (METAR code)
SNBNK	Snow bank
SND	Sand
SNFLK	Snow flake
SNGL	Single
SNOINC	Snow increase
SNOINCRG	Snow increasing
SNST	Sunset
SNW	Snow
SNWFL	Snowfall
SOP	Standard operating procedure
SP	Snow pellets
SPC	Storm Prediction Cent.
SPCLY	Especially
SPD	Speed
SPDS	Speeds
SPENES	Satellite precipitation estimate statement
SPKL	Sprinkle
SPKLS	Sprinkles
SPLNS	Southern Plains
SPRD	Spread
SPRDG	Spreading
SPRDS	Spreads
SPRL	Spiral
SQ	Squall (METAR code)
SQAL	Squall
SQLN	Squall line
SR	Sunrise
SRN	Southern
SRND	Surround
SRNDD	Surrounded
SRNDG	Surrounding
SRNDS	Surrounds
SS	Sandstorm (METAR code)
SS	Sunset
SSE	South-southeast
SSELY	South-southeasterly
SSERN	South-southeastern
SSEWD	South-southeastward
SSW	South-southwest
SSWLY	South-southwesterly
SSWRN	South-southwestern
SSWWD	South-southwestward
ST	Stratus
STAGN	Stagnation
STBL	Stable
STBLTY	Stability
STD	Standard
STDY	Steady
STFR	Stratus fractus
STFRM	Stratiform
STG	Strong
STGLY	Strongly
STGR	Stronger
STGST	Strongest
STLT	Satellite
STM	Storm
STMS	Storms
STN	Station
STNS	Stations
STNRY	Stationary
SUB	Substitute
SUBTRPCL	Subtropical
SUF	Sufficient
SUFLY	Sufficiently
SUG	Suggest
SUGG	Suggesting
SUGS	Suggests
SUP	Supply
SUPG	Supplying
SUPR	Superior
SUPS	Supplies
SUPSD	Supersede
SUPSDG	Superseding
SUPSDS	Supersedes

SVG	Serving
SVR	Severe
SVRL	Several
SW	Southwest
SWD	Southward
SWWD	Southwestward
SW-	Light snow shower
SW+	Heavy snow shower
SWLG	Swelling
SWLY	Southwesterly
SWODY1	SPC Severe Weather Outlook for Day 1
SWOMCD	SPC Mesoscale Discussion
SWRN	Southwestern
SX	Stability index
SXN	Section
SXNS	Sections
SYNOP	Synoptic
SYNS	Synopsis
SYS	System

- T -

T	Thunder
TCNTL	Transcontinental
TCU	Towering cumulus
TDA	Today
TEMP	Temperature
THD	Thunderhead
THDR	Thunder
THK	Thick
THKNG	Thickening
THKNS	Thickness
THKR	Thicker
THKST	Thickest
THN	Thin
THNG	Thinning
THNR	Thinner
THNST	Thinnest
THR	Threshold
THRFTR	Thereafter
THRU	Through
THRUT	Throughout
THSD	Thousand
THTN	Threaten
THTND	Threatened
THTNG	Threatening
THTNS	Threatens
TIL	Until
TMPRY	Temporary
TMPRYLY	Temporarilly
TMW	Tomorrow
TN	Tennessee
TNDCY	Tendency
TNDCYS	Tendencies
TNGT	Tonight
TNTV	Tentative
TNTVLY	Tentatively
TOPS	Tops
TOVC	Top of overcast
TPG	Topping
TRBL	Trouble
TRIB	Tributary
TRKG	Tracking
TRML	Terminal
TRMT	Terminate
TRMTD	Terminated
TRMTG	Terminating
TRMTS	Terminates
TRNSP	Transport
TRNSPG	Transporting
TROF	Trough
TROFS	Troughs
TROP	Tropopause
TRPCD	Tropical continental
TRPCL	Tropical
TRRN	Terrain
TRSN	Transition
TRW	Thunderstorm
TRW+	Thunderstorm with heavy rain shower
TS	Thunderstorm (METAR code)
TS	Thunderstorm with snow
TS+	Thunderstorm with heavy snow
TSFR	Transfer
TSFRD	Transfered
TSFRG	Transfering
TSFRS	Transfers
TSHWR	Thundershower
TSHWRS	Thundershowers
TSNT	Transient
TSQLS	Thundersqualls
TSTM	Thunderstorm
TSTMS	Thunderstorms
TSW	Thunderstorm with snow showers
TSW+	Thunderstorm with heavy snow showers
TURBC	Turbulence
TURBT	Turbulent
TWD	Toward
TWDS	Towards
TWI	Twilight
TWRG	Towering
TX	Texas

- U -

UDDF	Up and down drafts
UN	Unable
UNAVBL	Unavailable
UNEC	Unnecessary
UNKN	Unknown
UNL	Unlimited
UNRELBL	Unreliable
UNRSTD	Unrestricted
UNSATFY	Unsatisfactory
UNSBL	Unseasonable
UNSTBL	Unstable
UNSTDY	Unsteady
UNSTL	Unsettle
UNSTLD	Unsettled
UNUSBL	Unusable
UP	Unknown precipitation in automated observations (METAR code)
UPDFTS	Updrafts
UPR	Upper
UPSLP	Upslope
UPSTRM	Upstream
URG	Urgent
USBL	Usable
UT	Utah
UVV	Upward vertical velocity
UVVS	Upward vertical velocities
UWNDS	Upper winds

- V -

VA	Volcanic ash (METAR code)
VA	Virginia
VAD	Verlocity Azimuth Display
VARN	Variation
VC	Vicinity (METAR code)
VCNTY	Vicinity
VCOT	VFR conditions on top
VCTR	Vector
VCTS	Thunderstorms in the Vicinity
VDUC	VAS Data Utilization Center (NSSFC)
VFY	Verify
VFYD	Verified
VFYG	Verifying
VFYS	Verifies
VLCTY	Velocity
VLCTYS	Velocities
VLNT	Violent
VLNTLY	Violently
VLY	Valley
VLYS	Valleys
VMC	Visual meteorological conditions
VOL	Volume
VORT	Vorticity
VR	Veer
VRG	Veering
VRBL	Variable
VRISL	Vancouver Island, BC

VRS	Veers
VRT MOTN	Vertical Motion
VRY	Very
VSB	Visible
VSBY	Visibility
VSBYDR	Visibility decreasing rapidly
VSBYIR	Visibility increasing rapidly
VT	Vermont
VWP	VAD Wind Profiler
VV	Vertical velocity

- W -

W	West
WA	Washington
WAA	Warm Air Advection
WBND	West bound
WDLY	Widely
WDSPRD	Widespread
WEA	Weather
WFO	Weather Forecast Office
WFOS	Weather Forecast Offices
WFP	Warm front passage
WI	Wisconsin
WIBIS	Will be issued
WINT	Winter
WK	Weak
WKDAY	Weekday
WKEND	Weekend
WKNG	Weakening
WKNS	Weakens
WKR	Weaker
WKST	Weakest
WKN	Weaken
WL	Will
WLY	Westerly
WND	Wind
WNDS	Winds
WNW	West-northwest
WNWLY	West-northwesterly
WNWRN	West-northwestern
WNWWD	West-northwestward
WO	Without
WPLTO	Western Plateau
WRM	Warm
WRMG	Warming
WRN	Western
WRMR	Warmer
WRMST	Warmest
WRMFNT	Warm front
WRMFNTL	Warm Frontal
WRNG	Warning
WRNGS	Warnings
WRS	Worse
WSHFT	Wind shift
WSHFTS	Wind Shifts
WSR-88D	NWS Dopplar Radar
WSTCH	Wasatch Range
WSW	West-southwest
WSWLY	West-southwesterly
WSWRN	West-southwestern
WSWWD	West-southwestward
WTR	Water
WTRS	Waters
WTSPT	Waterspout
WTSPTS	Waterspouts
WUD	Would
WV	West Virginia
WVS	Waves
WW	Severe Weather Watch
WWAMKC	SPC Status Report
WWD	Westward
WWS	Severe Weather Watches
WX	Weather
WY	Wyoming

- X -

XCP	Except
XPC	Expect
XPCD	Expected
XPCG	Expecting
XPCS	Expects
XPLOS	Explosive
XTND	Extend
XTNDD	Extended
XTNDG	Extending
XTRM	Extreme
XTRMLY	Extremely

- Y -

YDA	Yesterday
YKN	Yukon
YLSTN	Yellowstone

- Z -

ZL	Freezing drizzle
ZN	Zone
ZNS	Zones
ZR	Freezing rain