Weather
Forecasting and interpretation

John Cochrane

GSD Sounding Plots | Pandora Internet Rac | ADDS - Prog Charts | Harvard Econ Depar

www.aviationweather.gov/adds/progs/

QICP Login Registration info

NOAA's National Weather Service

Aviation Weather Center

Aviation Digital Data Service (ADDS)

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Loc forecast by "City, St" or Zip Code

City, St Go

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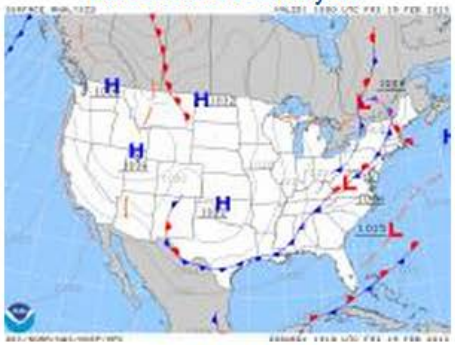
METARs | C&V | TAFs | PIREPs | AIR/SIGMETs | Satellite | Radar

Analysis and forecast surface conditions (prog charts)

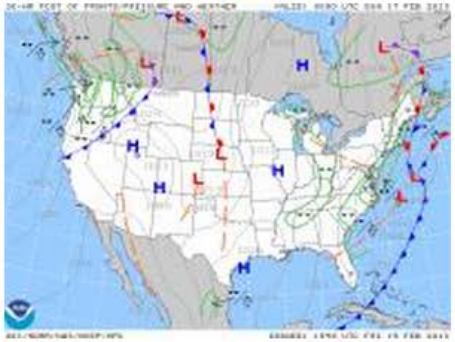
Latest surface analysis



12-h forecast

24-h forecast

36-h forecast

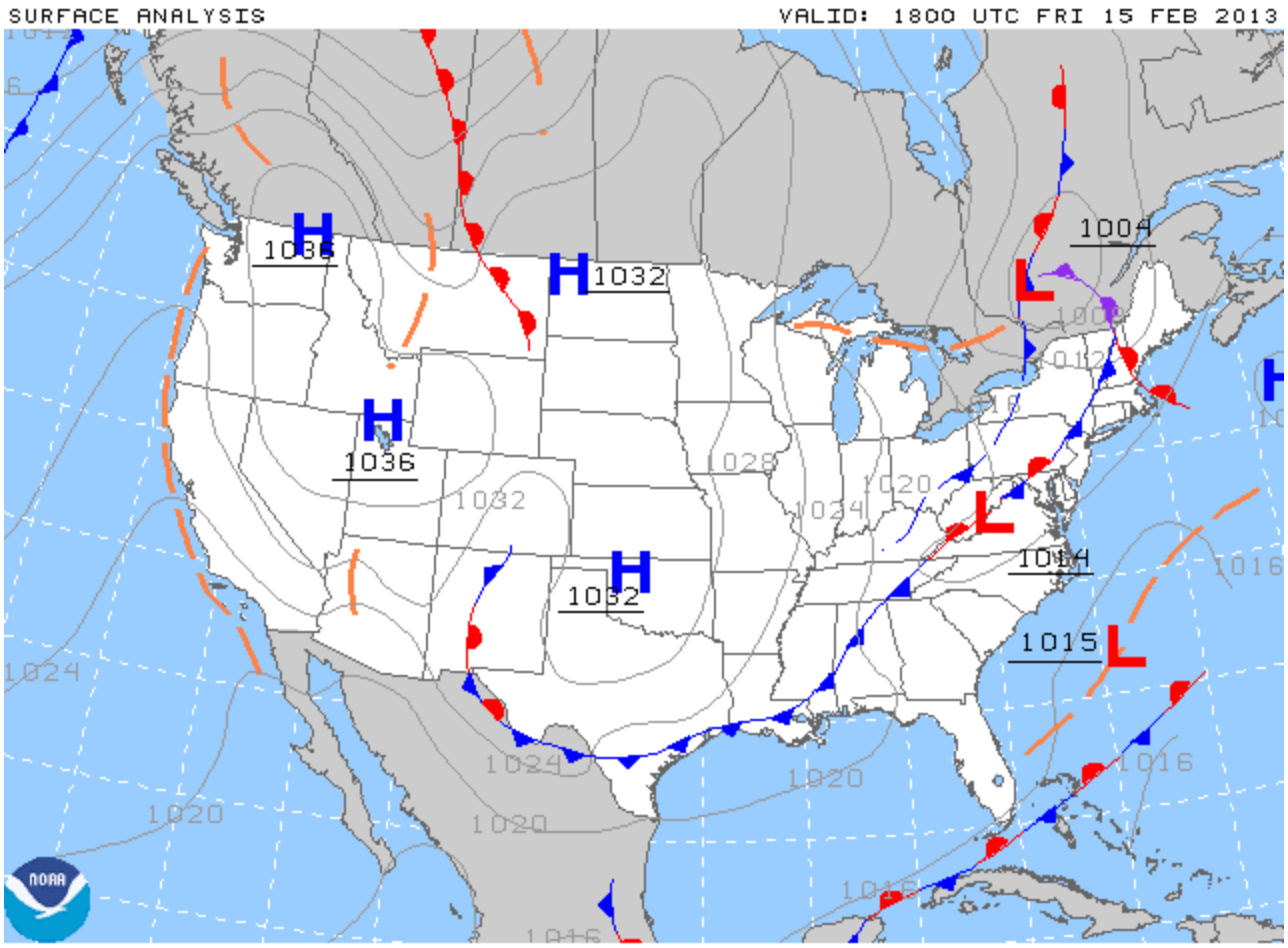


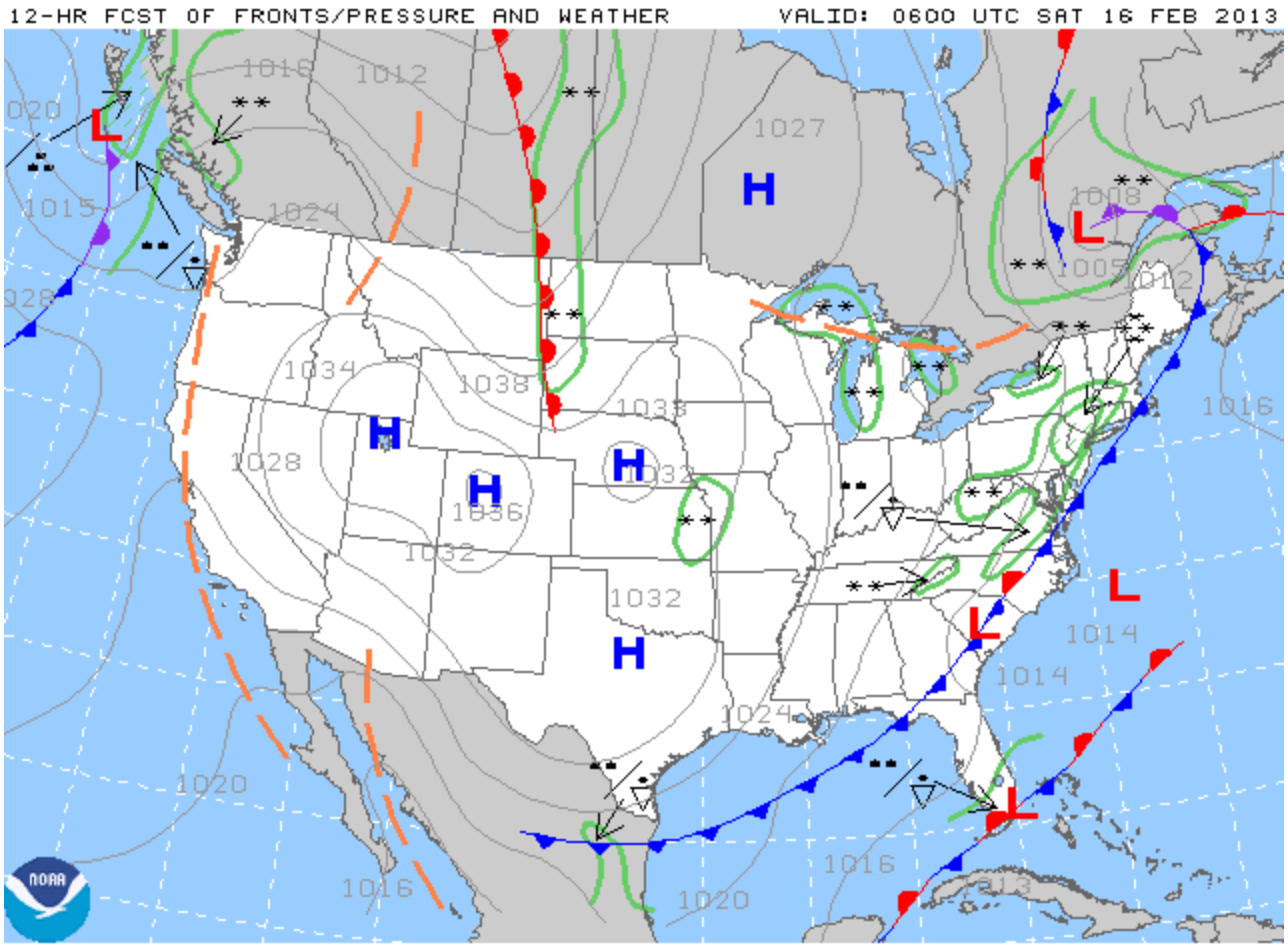
48-h forecast

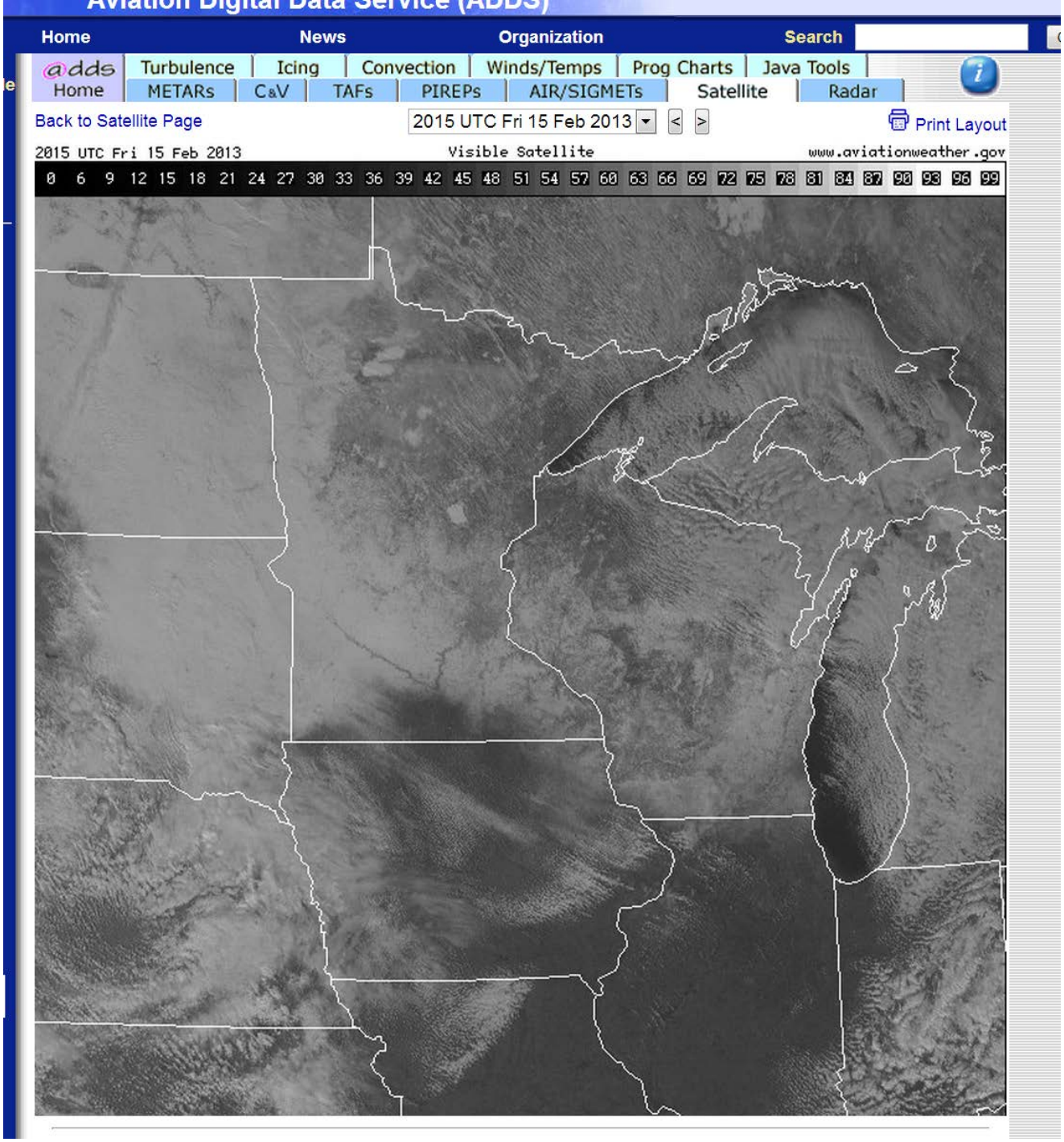
Significant Weather Charts (SIGWX)
- High Level (FL250-FL630)
- Mid Level (FL100-FL450)
- Low Level (SFC-FL240)

Turbulence Icing Convection Winds/Temps Progs Java Tools
METARs TAFs PIREPs SIGMET/AIRMET Satellite Radar

Page loaded: 20:54 UTC


SURFACE ANALYSIS
VALID: 1800 UTC FRI 15 FEB 2013
H
1036
H
1032
H
1036
H
1032
L
1004
L
1014
L
1015
1028
1024
1020
1016
1012
1008
DOC/NOAA/NWS/NCEP/HPC
ISSUED: 1918 UTC FRI 15 FEB 2013


12-HR FCST OF FRONTS/PRESSURE AND WEATHER
VALID: 0600 UTC SAT 16 FEB 2013
DOC/NOAA/NWS/NCEP/HPC
ISSUED: 1637 UTC FRI 15 FEB 2013
NOAA



Spots cloudstreets
Good for cirrus
(badly forecast)

METAR text: **KDPA 151952Z 31010KT 10SM SCT039 M01/M10 A3014 RMK AO2 SLP216 T10061100**

Conditions at: KDPA (CHICAGO/DUPAGE , IL, US) observed 1952 UTC 15 February 2013

Temperature: -0.6°C (31°F)

Dewpoint: -10.0°C (14°F) [RH = 49%]

Pressure (altimeter): 30.14 inches Hg (1020.7 mb)
[Sea-level pressure: 1021.6 mb]

Winds: from the NW (310 degrees) at 12 MPH (10 knots; 5.2 m/s)

Visibility: 10 or more miles (16+ km)

Ceiling: at least 12,000 feet AGL

Clouds: scattered clouds at 3900 feet AGL

Weather: no significant weather observed at this time

Cu!

Forecast for: KDPA (CHICAGO/DUPAGE , IL, US)

Text: **KDPA 151934Z 1520/1618 32012G17KT P6SM SCT040**

Forecast period: 2000 UTC 15 February 2013 to 0000 UTC 16 February 2013

Forecast type: FROM: standard forecast or significant change

Winds: from the NW (320 degrees) at 14 MPH (12 knots; 6.2 m/s)
gusting to 20 MPH (17 knots; 8.8 m/s)

Visibility: 6 or more miles (10+ km)

Clouds: scattered clouds at 4000 feet AGL

Weather: no significant weather forecast for this period

Text: **FM160000 30012KT P6SM BKN035 OVC080**

Forecast period: 0000 to 1500 UTC 16 February 2013

Forecast type: FROM: standard forecast or significant change

Winds: from the WNW (300 degrees) at 14 MPH (12 knots; 6.2 m/s)

Visibility: 6 or more miles (10+ km)

Ceiling: 3500 feet AGL

Clouds: broken clouds at 3500 feet AGL
overcast cloud deck at 8000 feet AGL

Weather: no significant weather forecast for this period

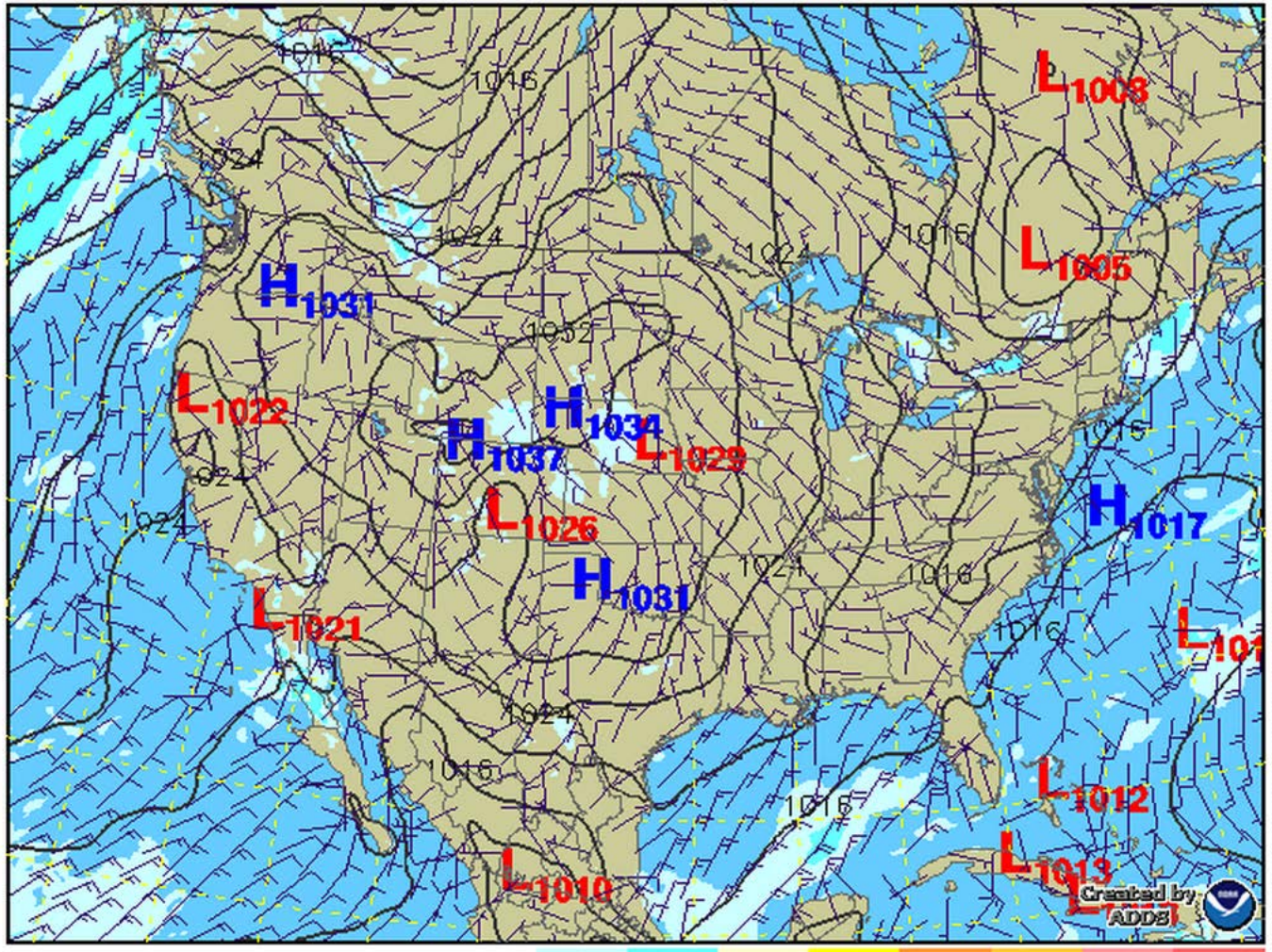
Increasing clouds

SFC | 2000 UTC Fri 15 Feb 2013 | < | >

Temperature | Wind Speed | Temperature difference | Wind Streamlines

Sea-level pressure (mb) / surface wind speed (kts)

Analysis valid 2000 UTC Fri 15 Feb 2013



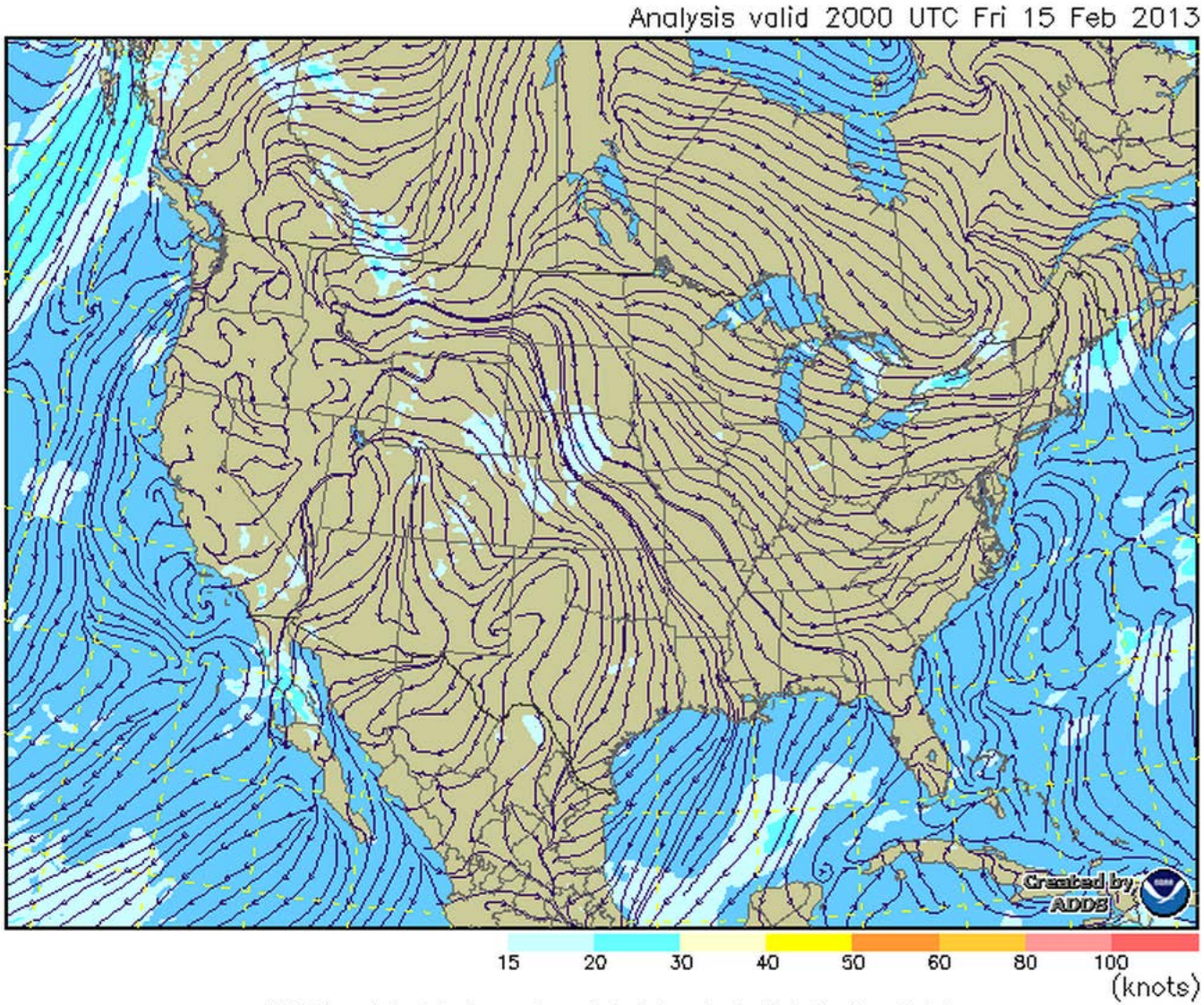
- Official NWS Textual FB Winds/Temps Aloft

Print Layout

SFC | 2000 UTC Fri 15 Feb 2013 | < | >

Temperature | Wind Speed | Temperature difference | Wind Streamlines

Surface wind speed (kts) and streamlines



ADDS temp/wind charts supplement, but do not substitute for, the official winds and temperatures aloft forecast contained in the FB product.

	high as 20 mph. Chance of precipitation is 30%.
Sunday	Rain. High near 45. Breezy, with a southeast wind 10 to 15 mph increasing to 15 to 20 mph in the afternoon. Winds could gust as high as 30 mph. Chance of precipitation is 100%. New precipitation amounts between a quarter and half of an inch possible.
Sunday Night	A 30 percent chance of showers before 9pm. Cloudy, then gradually becoming partly cloudy, with a low around 34. Breezy, with a south wind 15 to 20 mph, with gusts as high as 30 mph.
Monday	A 30 percent chance of snow showers. Cloudy, with a high near 39. Breezy, with a west wind 20 to 25 mph, with gusts as high as 40 mph.
Monday Night	A chance of flurries. Cloudy, with a low around 25. West wind 10 to 15 mph, with gusts as high as 30 mph.
Tuesday	Partly sunny, with a high near 36.
Tuesday Night	Partly cloudy, with a low around 25.
Wednesday	Mostly sunny, with a high near 43.
Wednesday Night	Partly cloudy, with a low around 26.
Thursday	A slight chance of showers. Partly sunny, with a high near 44.
Thursday Night	A chance of rain and snow. Mostly cloudy, with a low around 28.
Friday	A chance of snow. Mostly cloudy, with a high near 33.
Friday Night	A slight chance of snow. Mostly cloudy, with a low around 20.
Saturday	Cloudy, with a high near 29.

ADDITIONAL FORECASTS AND INFORMATION

ZONE AREA FORECAST FOR WILL COUNTY, IL

Forecast Discussion
Printable Forecast
Text Only Forecast

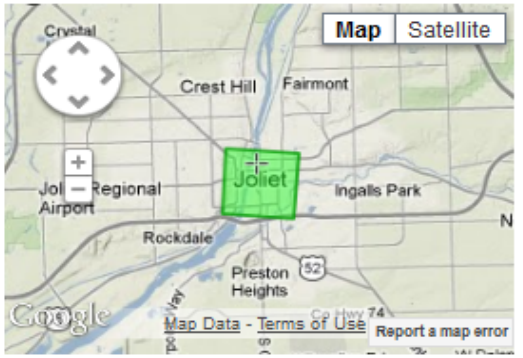
Hourly Weather Graph
Tabular Forecast
Quick Forecast

Air Quality Forecasts
International System of Units
About Point Forecasts

Hazardous Weather
Regional Weather Conditions

Weather Summary for Northern Illinois and Northwest Indiana
Past Weather Information

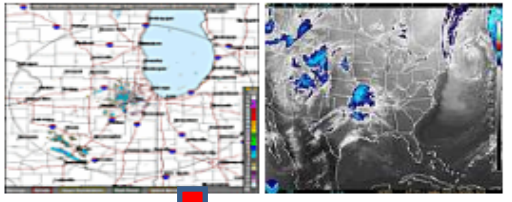
Click Map for Forecast Disclaimer



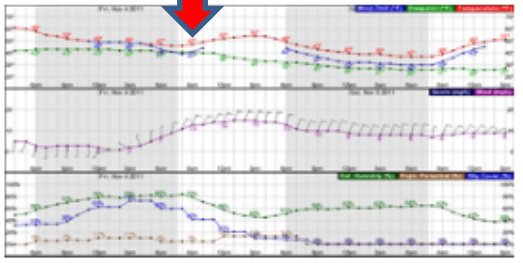
Requested Location Forecast Area

Lat/Lon: 41.52°N 88.08°W **Elevation:** 525 ft

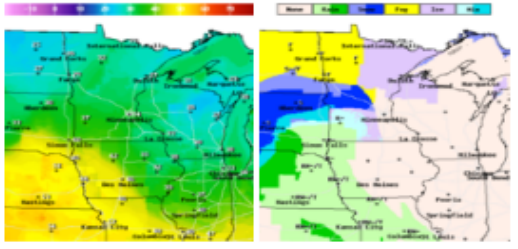
RADAR & SATELLITE IMAGES



HOURLY WEATHER GRAPH



NATIONAL DIGITAL FORECAST DATABASE



Local forecast by
"City, St" or Zip Code
City, St Go
RSS Feeds
Warnings
Current
By State/County...
UV Alerts
more....
Observations
Radar
Satellite
Snow Cover
Surface Weather...
Observed Precip
more....
Forecasts
Local
Graphical
Aviation
Marine
Hurricanes
Severe Weather
Fire Weather
more....
Text Messages
By State
By Message Type
National
Forecast Models
Numerical Models
MOS Prod Statistical Model
GFS-LAMP Prod Statistical Model
more....
Climate
Past Weather
Predictions
Weather Safety
Weather Radio
Hazard Assmt...
StormReady
TsunamiReady
Skywarn™
more....
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Information
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Tsunamis
Publications...
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Area Forecast Discussion

Issued by NWS Chicago, IL

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FXUS63 KLOT 151949
AFDLOT

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE CHICAGO/ROMEOVILLE IL
149 PM CST FRI FEB 15 2013

.DISCUSSION...
1026 AM CST

FOR MORNING UPDATE...

AREA OF FLURRIES/LIGHT SNOW SHOWERS WAS EXITING THE SOUTHEAST PART OF THE CWA THIS MID-MORNING...IN ASSOCIATION WITH WEAK FORCING PROVIDED BY A MID-LEVEL SHORT WAVE OVER THE WESTERN LAKES. SKIES HAVE BECOME MOSTLY SUNNY ACROSS MUCH OF THE CWA IN THE WAKE OF THIS WAVE WITH ASSOCIATED DRY LOW-LEVEL ADVECTION. ANOTHER WEAK MID-LEVEL TROUGH WAS EVIDENT IN WATER VAPOR/IR IMAGERY OVER WI/NORTHEAST IA...THOUGH THIS WAS ONLY PRODUCING SOME PATCHY MID CLOUDS IN THE DRY AIR MASS. THIS SHOULD SPREAD SOUTHEAST ACROSS OUR AREA THIS AFTERNOON...WITH DEEPENING OF STEEP LOW LEVEL BOUNDARY LAYER LAPSE RATES PER 12Z WRF-NAM FORECAST SOUNDINGS SUGGESTING THE POTENTIAL FOR THE DEVELOPMENT OF LOWER STRATOCU DECK BY LATE AFTERNOON. THEREFORE...WHILE A PERIOD OF PARTLY CLOUDY SKIES SHOULD PREVAIL THROUGH EARLY AFTERNOON...IT APPEARS REASONABLE TO EXPECT SOME INCREASE IN CLOUDS FROM THE NORTHWEST THIS AFTERNOON. WHILE THERE IS NOT MUCH IN THE WAY OF FORCING...COOLING OF THE LOW LEVELS DOES RESULT IN POTENTIAL STRATOCU DEVELOPMENT OCCURRING IN A FAVORABLE THERMAL RANGE FOR CRYSTAL DEVELOPMENT AND WILL MAINTAIN A MENTION OF A CHANCE OF FLURRIES...BUT NOT UNTIL LATER THIS AFTERNOON/EVENING.

WITH MORE SUNSHINE THAN PREVIOUSLY ANTICIPATED...HAVE BUMPED TEMPS A DEGREE OR SO IN SOME AREAS...ESPECIALLY ACROSS THE SOUTH WHERE MORNING TEMPS HAVE STARTED OUT IN THE MID 30S. OTHERWISE... PERSISTENT COLD ADVECTION SHOULD KEEP TEMPS FROM WARMING TOO MUCH DESPITE THE MID-FEBRUARY SUNSHINE.

RATZER

//PREV DISCUSSION...
303 AM CST

WATER VAPOR IMAGERY EARLY THIS MORNING SHOWS A DECENT SHORT WAVE DISTURBANCES DROPPING EAST-SOUTHEAST ACROSS MISSOURI AND ILLINOIS. THIS FEATURE CONTINUES TO PRODUCE SOME LIGHT SNOW SHOWERS AND FLURRIES ACROSS PORTIONS OF THE AREA. HOWEVER...FARTHER TO THE NORTHWEST...ACROSS SOUTHWESTERN WISCONSIN AND FAR NORTHWESTERN ILLINOIS...SKIES ARE BEGINNING TO CLEAR THIS CLEARING TREND SHOULD

&&

.AVIATION...

//ORD AND MDW CONCERNS...UPDATED 20Z...

* NORTHWEST WINDS OCCASIONALLY GUSTING BETWEEN 15 AND 20 KT UNTIL
  AROUND 00Z AND AGAIN TOMORROW.

PAW

//DISCUSSION...UPDATED 18Z...

VFR CONDITIONS PREVAILING EARLY THIS AFTERNOON IN THE WAKE OF A
DEPARTING UPPER LEVEL WAVE. YET ANOTHER WEAK WAVE WILL MOVE ACROSS
NORTHERN IL AND NORTHWEST IN OVERNIGHT. THIS WILL INCREASE THE
CLOUDS AT VFR LEVELS...BECOMING CEILINGS BY LATE AFTERNOON OR
EARLY EVENING. THERE IS POTENTIAL FOR SOME FLURRIES WITH THESE
CEILINGS BUT CONFIDENCE IS TOO LOW TO INCLUDE IN THE TAFS AT
THIS TIME. THEN CEILINGS SCATTERING OUT AGAIN SATURDAY BEHIND THE
WAVE.

PAW

//ORD AND MDW CONFIDENCE...UPDATED 20Z...

* HIGH CONFIDENCE IN ALL FORECAST ELEMENTS.

PAW

//OUTLOOK FOR ORD/MDW FOR 00Z SUNDAY-12Z FRIDAY...UPDATED 12Z...

SATURDAY NIGHT AND SUNDAY...VFR.

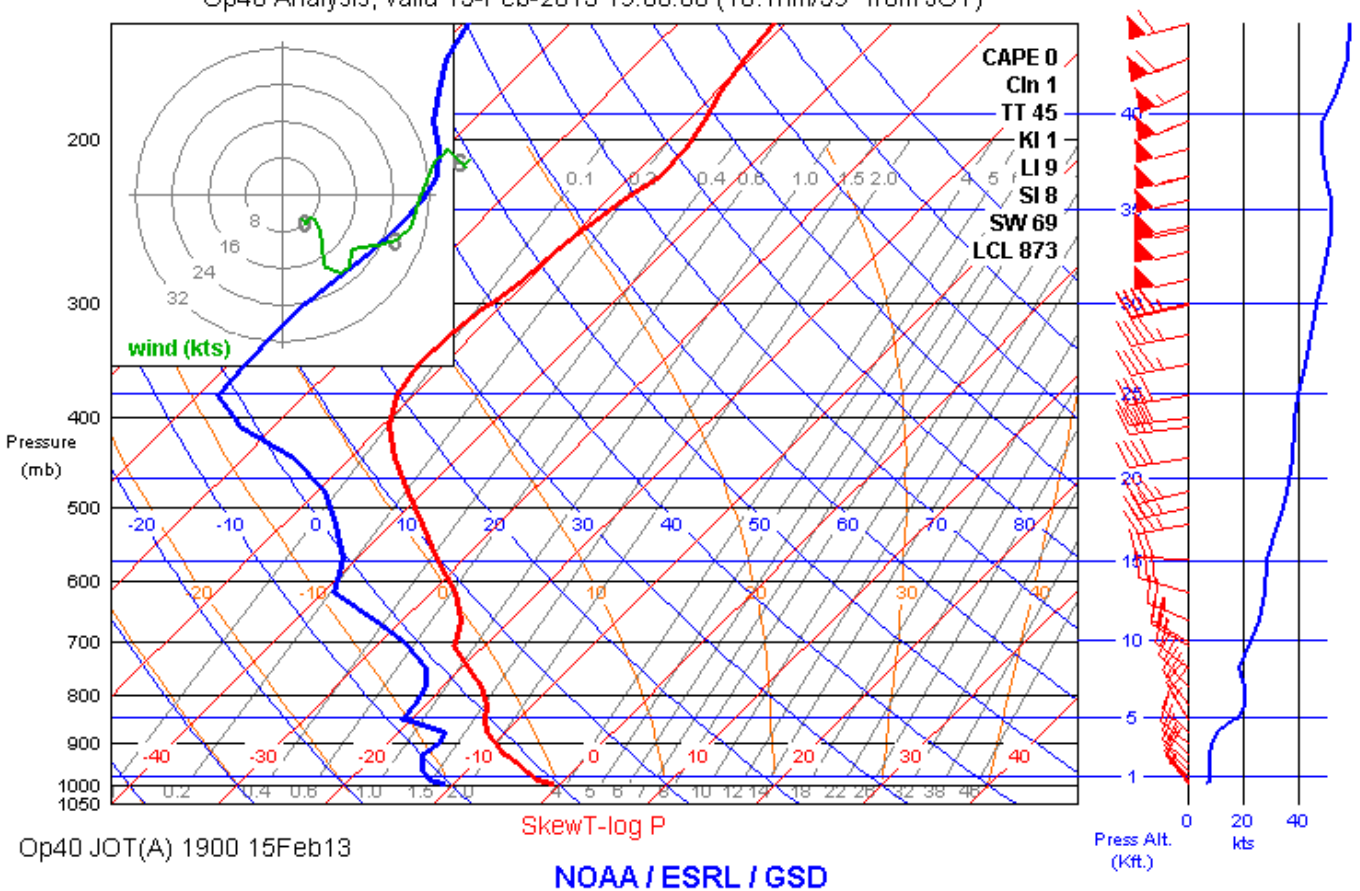
12Z and 18Z

(The old URL's will continue to work for the forseeable future.)

Latest Bak40 analysis is valid at **19:00 UTC**.
Latest Op40 analysis is valid at **19:00 UTC**.

For up-to-date information about the status of RAP runs, see the RUC/RAP forum (new window).
(You can subscribe to this forum to get email copies of new posts.)

Op40 Analysis, valid 15-Feb-2013 19:00:00 (10.1nm/59° from JOT)



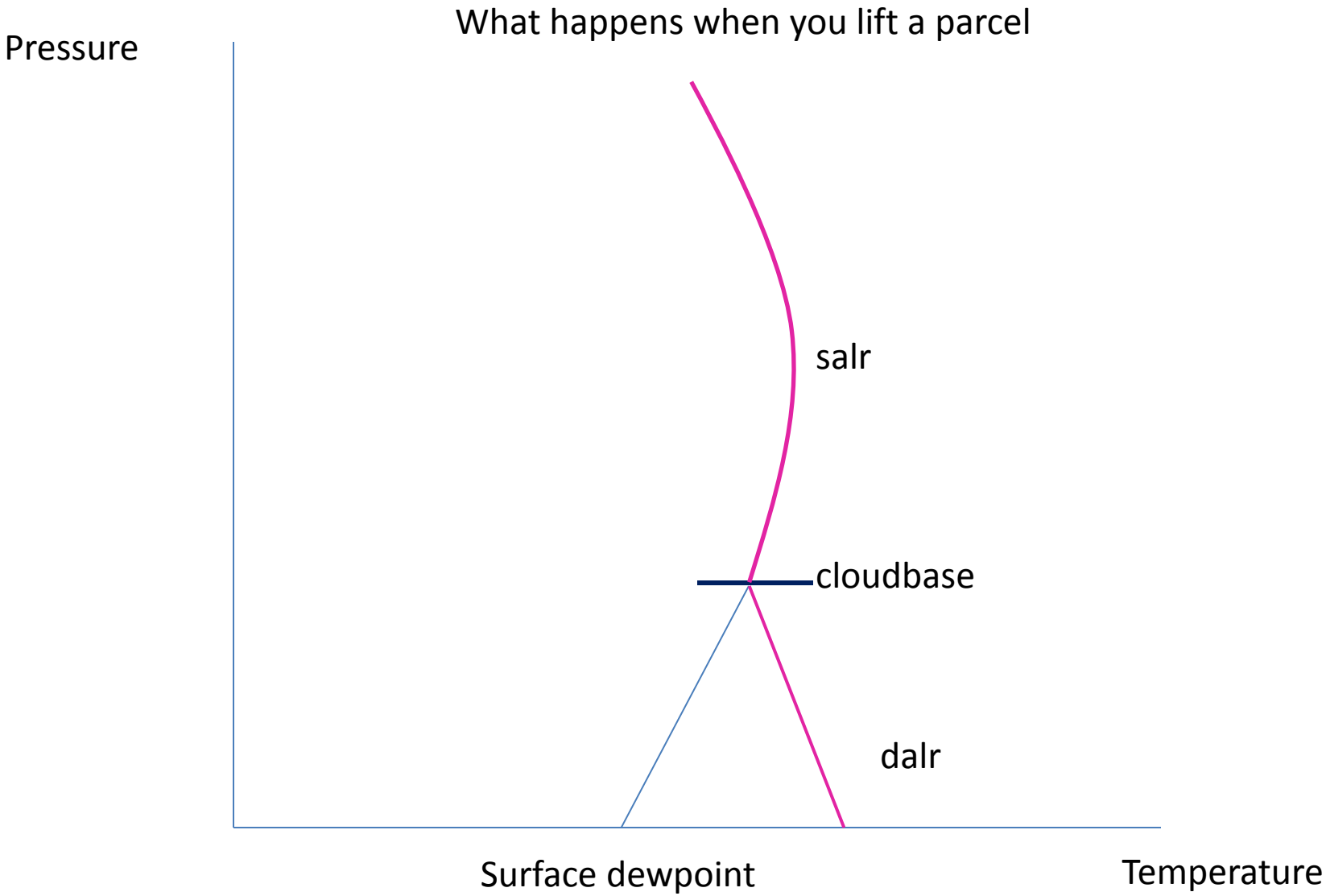
Op40 JOT(A) 1900 15Feb13

NOAA / ESRL / GSD

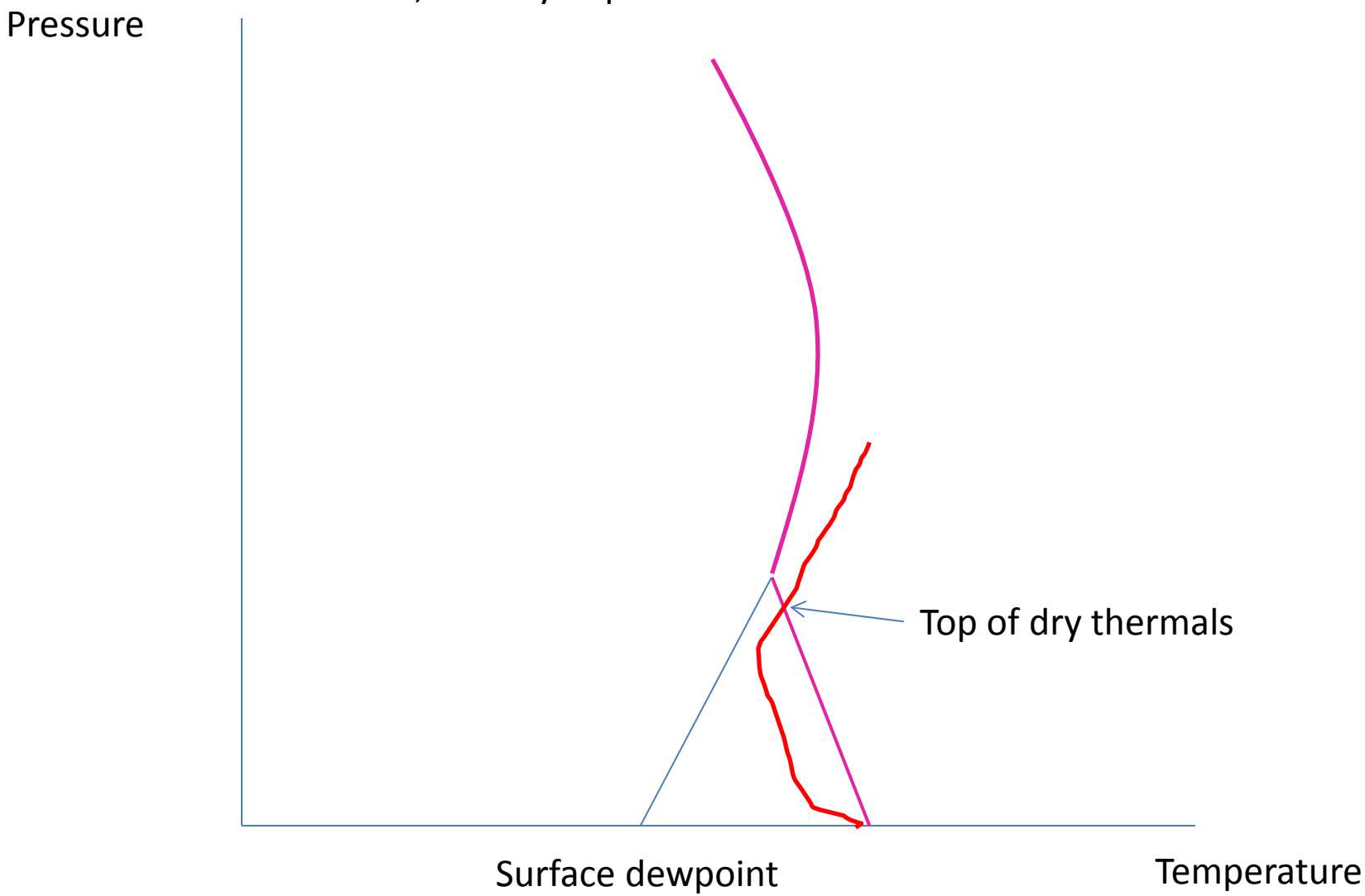
Load Soundings | Get text | 0.5 mb scale | SkewT/Tephi. | Wind scale: 40/100 | Simple plot

JOT(F11) 0600 16Feb13	JOT(F10) 0500 16Feb13	JOT(F9) 0400 16Feb13	JOT(F8) 0300 16Feb13
JOT(F7) 0200 16Feb13	JOT(F6) 0100 16Feb13	JOT(F5) 0000 16Feb13	JOT(F4) 2300 15Feb13
JOT(F3) 2200 15Feb13	JOT(F2) 2100 15Feb13	JOT(F1) 2000 15Feb13	JOT(A) 1900 15Feb13
JOT(F18) 1300 16Feb13	JOT(F17) 1200 16Feb13	JOT(F16) 1100 16Feb13	JOT(F15) 1000 16Feb13

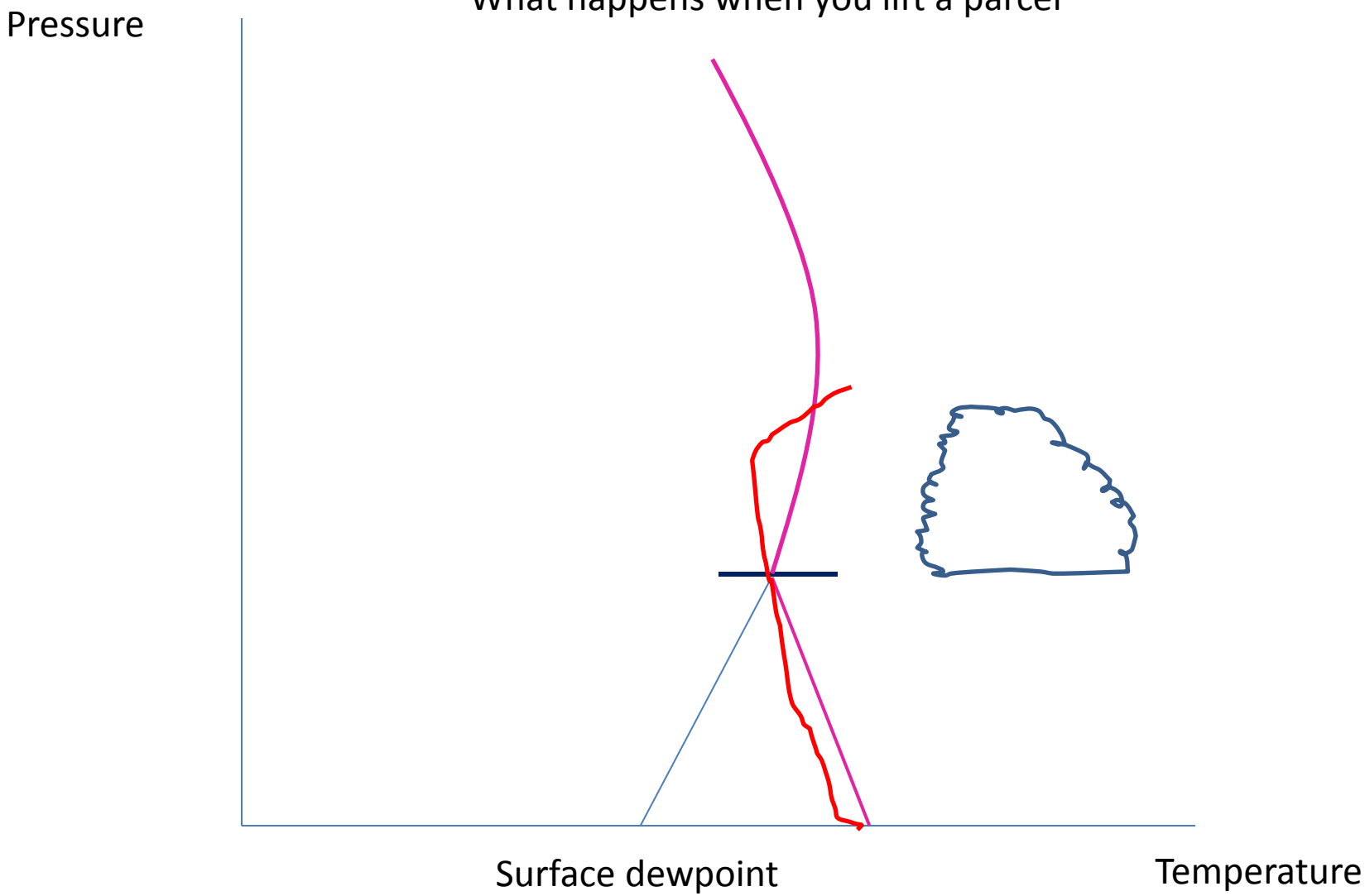
Red: Temp
Blue: Dew
No cirrus!


What happens when you lift a parcel
Pressure
salr
cloudbase
dalr
Surface dewpoint
Temperature

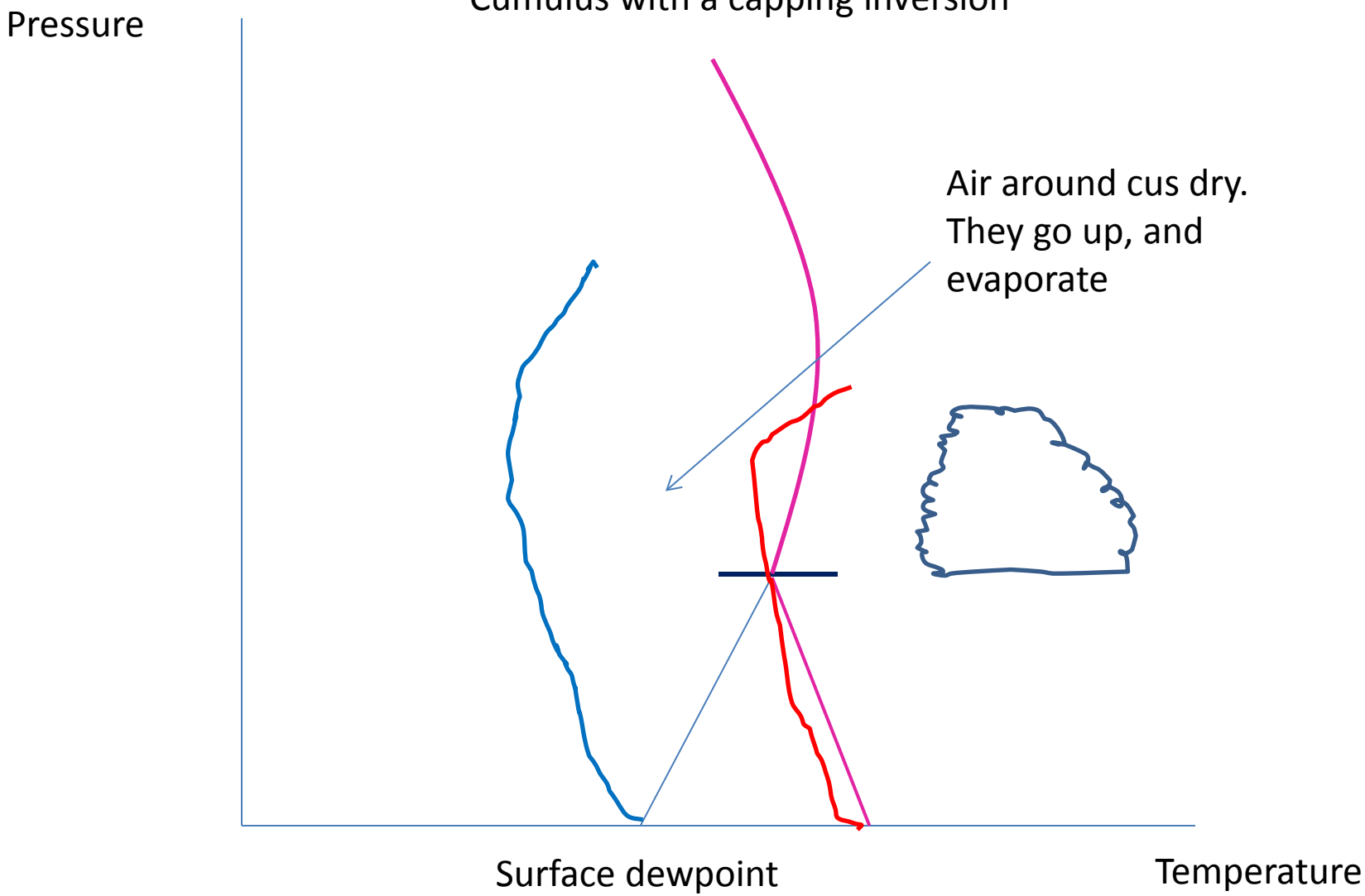
So, the day depends on the ambient air. Case 1: blue thermals



What happens when you lift a parcel

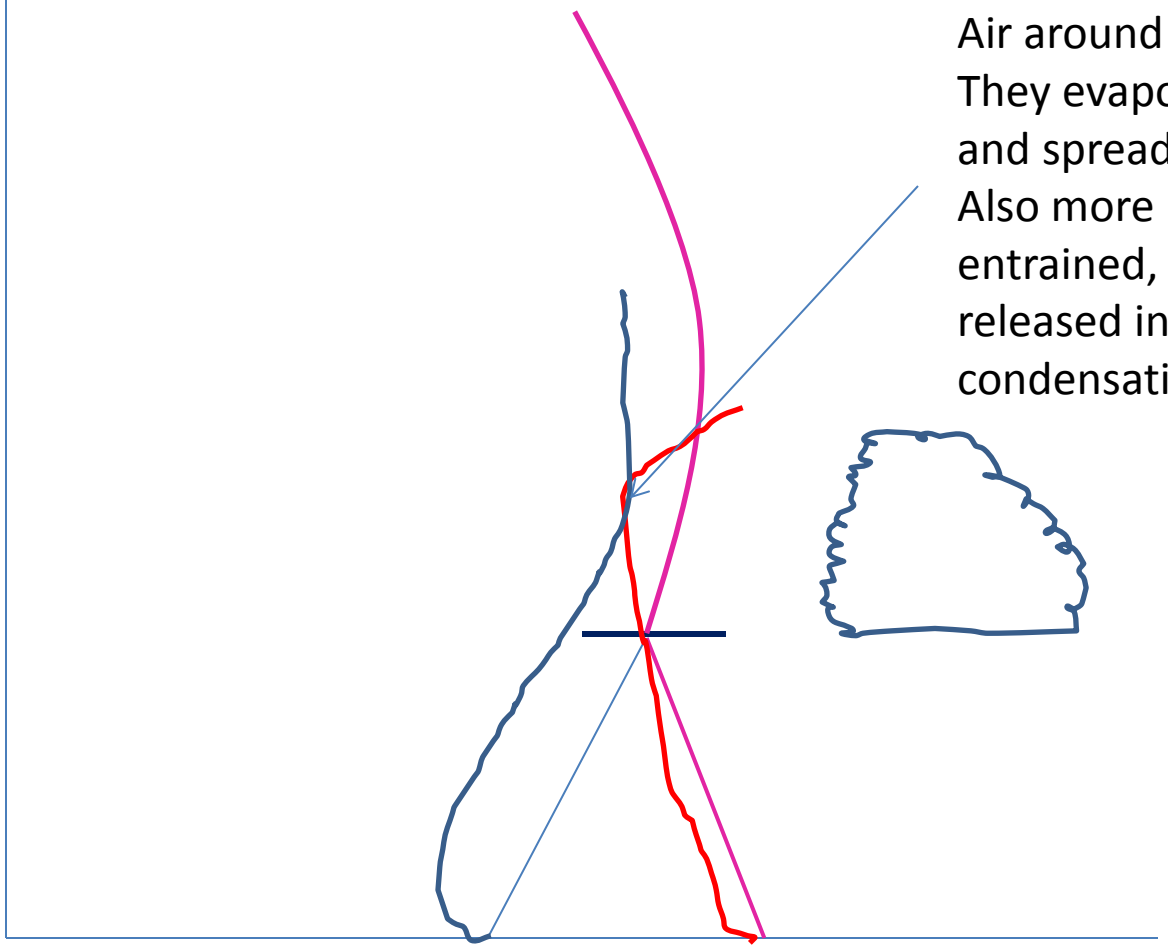


Cumulus with a capping inversion



The effect of wet surrounding air

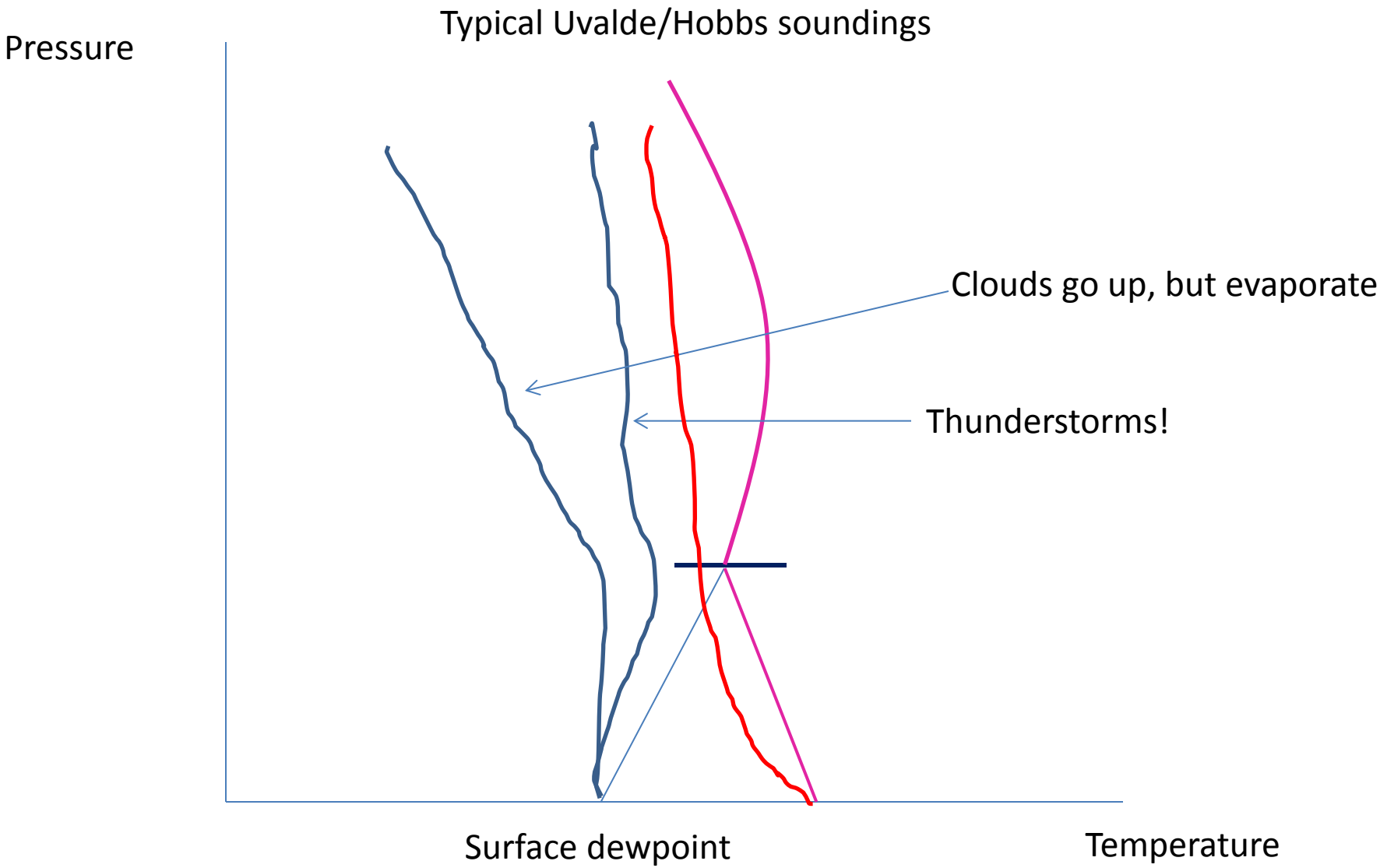
Pressure



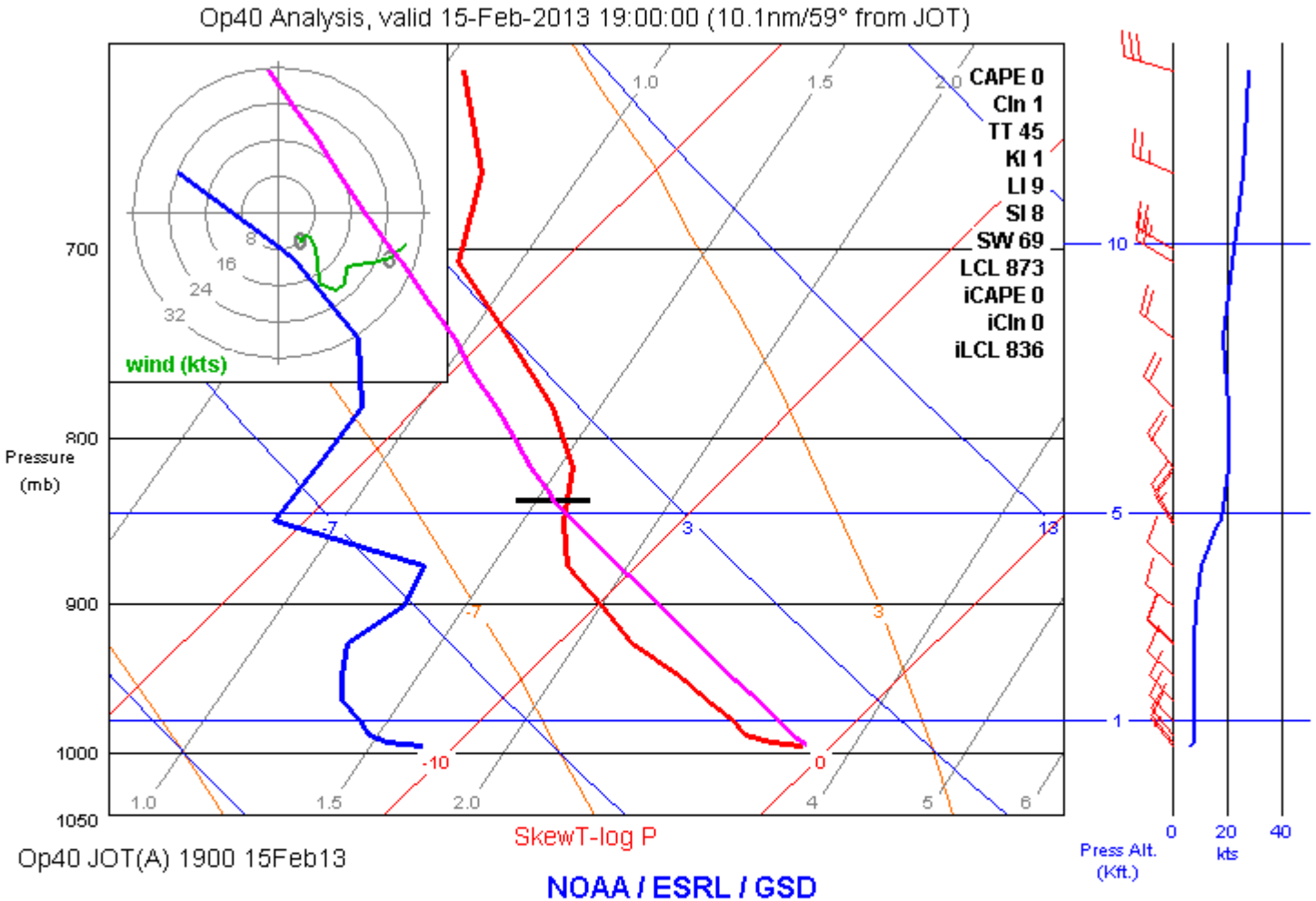
Air around cus wet. They evaporate slowly and spread out. Also more moist air is entrained, more heat released in condensation

Surface dewpoint

Temperature


Typical Uvalde/Hobbs soundings
Pressure
Clouds go up, but evaporate
Thunderstorms!
Surface dewpoint
Temperature

(You can subscribe to this forum to get email copies of new posts.)

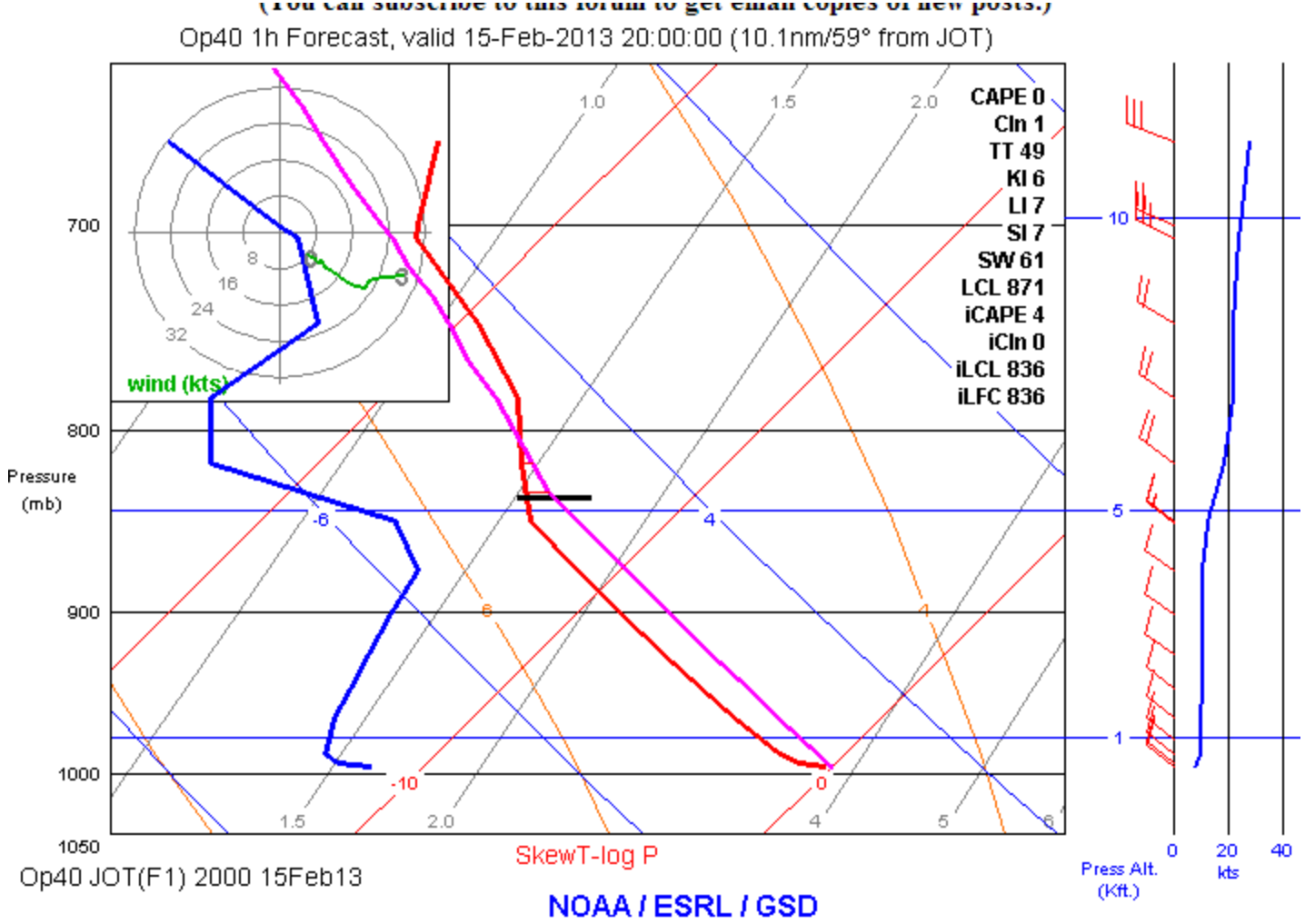


Purple:
lifted parcel

Cloudbase
Hard inversion
Mixing /shear
Dry aloft
Hockey stick
Ground moisture

Load Soundings | Get text | 150mb scale | SkewT/Tephi. | Wind scale: 40/100 | Simple plot

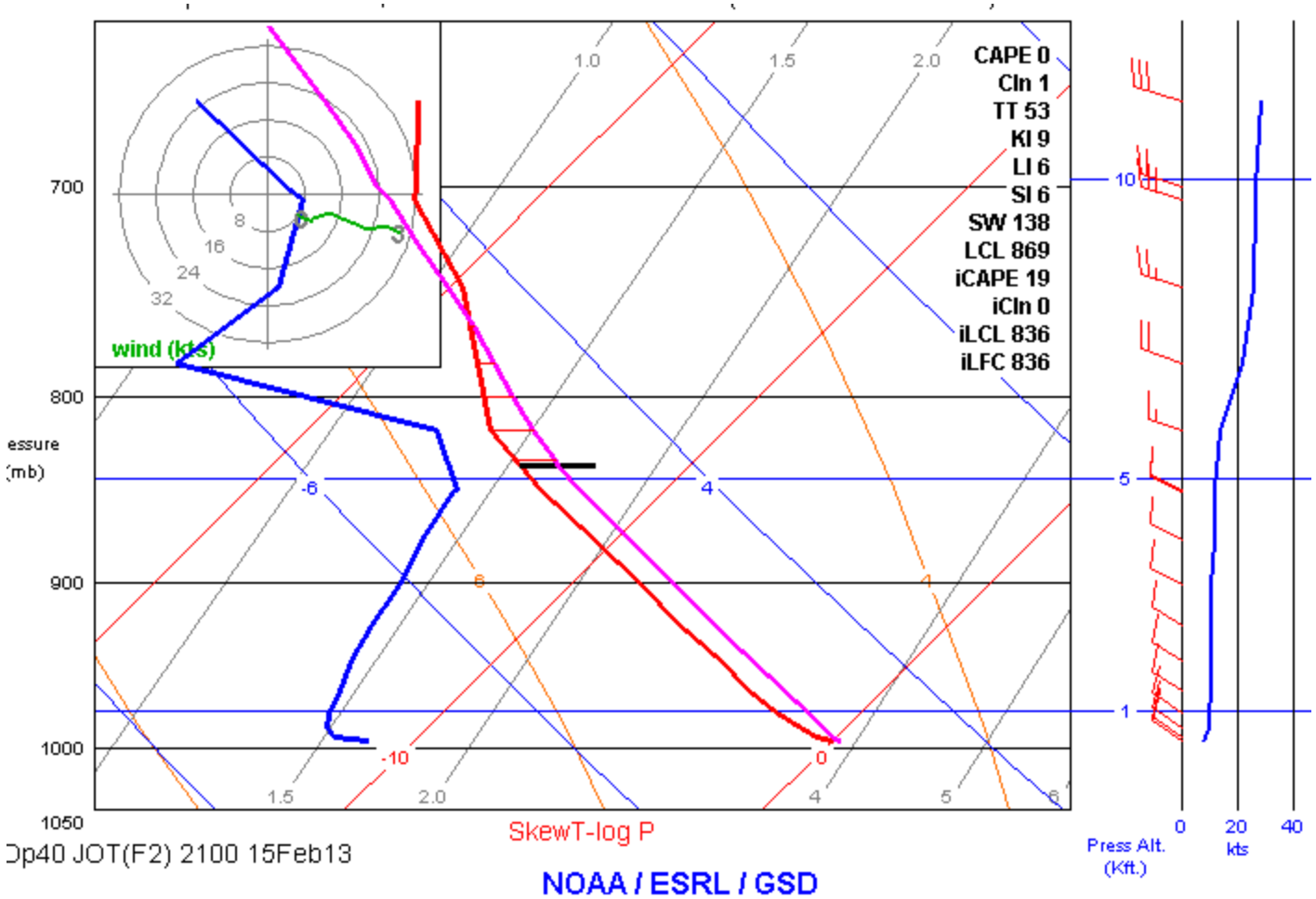
JOT(F11) 0600 16Feb13	JOT(F10) 0500 16Feb13	JOT(F9) 0400 16Feb13	JOT(F8) 0300 16Feb13
JOT(F7) 0200 16Feb13	JOT(F6) 0100 16Feb13	JOT(F5) 0000 16Feb13	JOT(F4) 2300 15Feb13
JOT(F3) 2200 15Feb13	JOT(F2) 2100 15Feb13	JOT(F1) 2000 15Feb13	JOT(A) 1900 15Feb13
JOT(F18) 1300 16Feb13	JOT(F17) 1200 16Feb13	JOT(F16) 1100 16Feb13	JOT(F15) 1000 16Feb13



Load Soundings | Get text | 150mb scale | SkewT/Tephi. | Wind scale: 40/100 | Simple plot

JOT(F11) 0600 16Feb13	JOT(F10) 0500 16Feb13	JOT(F9) 0400 16Feb13	JOT(F8) 0300 16Feb13
JOT(F7) 0200 16Feb13	JOT(F6) 0100 16Feb13	JOT(F5) 0000 16Feb13	JOT(F4) 2300 15Feb13
JOT(F3) 2200 15Feb13	JOT(F2) 2100 15Feb13	JOT(F1) 2000 15Feb13	JOT(A) 1900 15Feb13
JOT(F18) 1300 16Feb13	JOT(F17) 1200 16Feb13	JOT(F16) 1100 16Feb13	JOT(F15) 1000 16Feb13

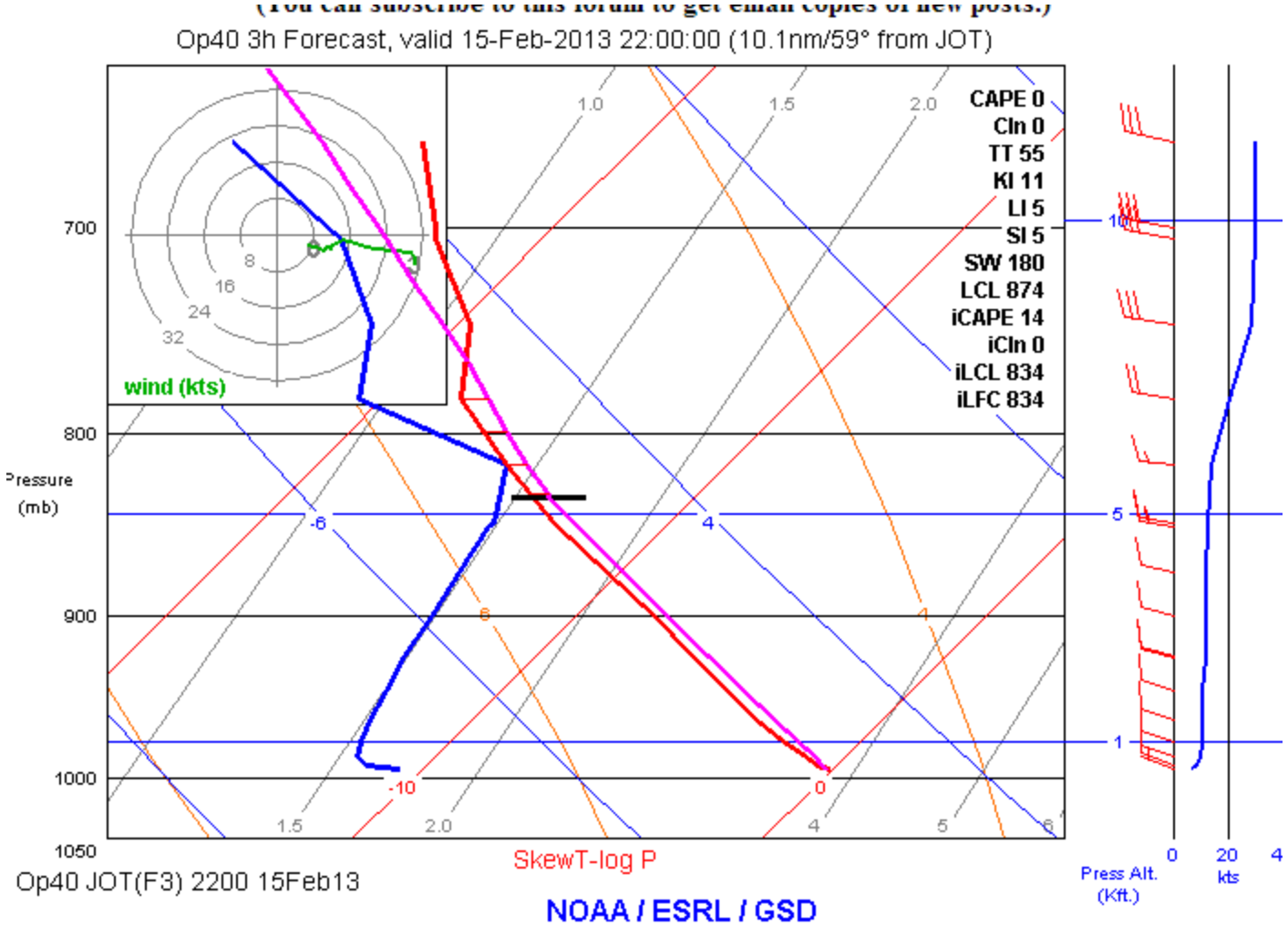
20:00
Greater mixing
Inversion rising
More clouds



Load Soundings | Get text | 150mb scale | SkewT/Tephi. | Wind scale: 40/100 | Simple plot

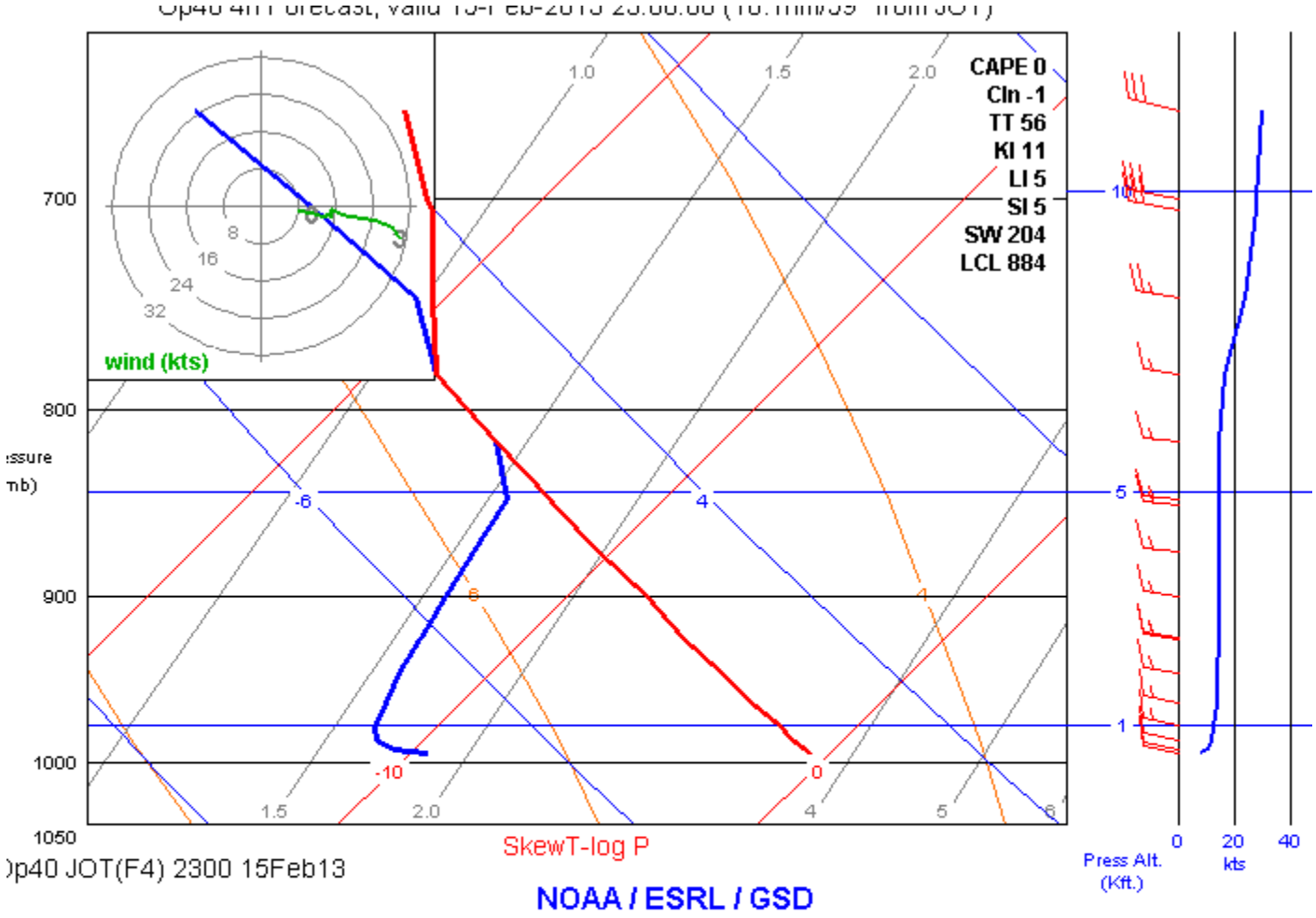
JOT(F11) 0600 16Feb13	JOT(F10) 0500 16Feb13	JOT(F9) 0400 16Feb13	JOT(F8) 0300 16Feb13
JOT(F7) 0200 16Feb13	JOT(F6) 0100 16Feb13	JOT(F5) 0000 16Feb13	JOT(F4) 2300 15Feb13
JOT(F3) 2200 15Feb13	JOT(F2) 2100 15Feb13	JOT(F1) 2000 15Feb13	JOT(A) 1900 15Feb13
JOT(F18) 1300 16Feb13	JOT(F17) 1200 16Feb13	JOT(F16) 1100 16Feb13	JOT(F15) 1000 16Feb13

2100
Moist air arriving
More clouds



22:00

More moisture & clouds.
Clouds won't evaporate – bkn
Losing hockey stick



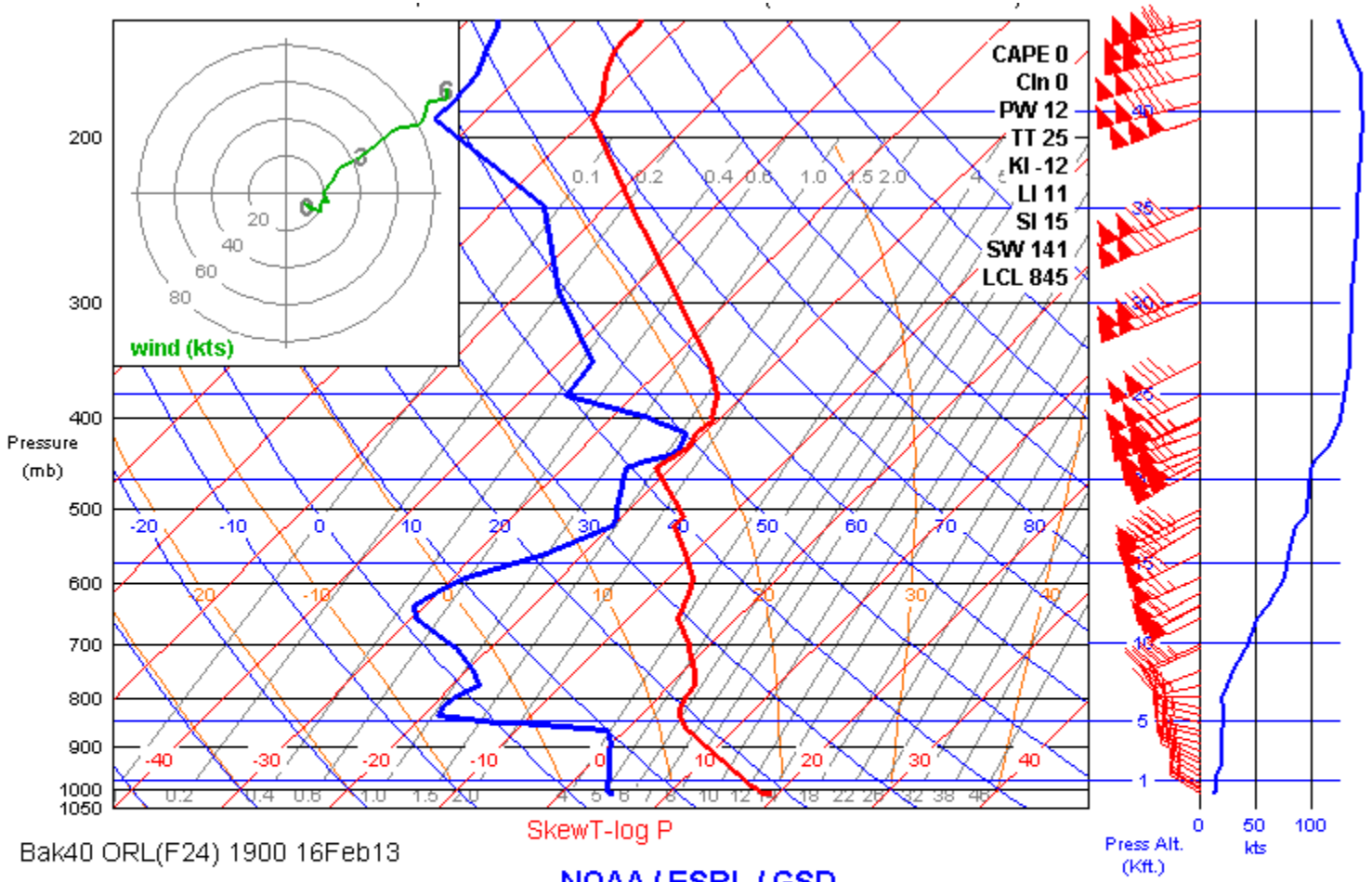
Load Soundings | Get text | 150mb scale | SkewT/Tephi. | Wind scale: 40/100 | Simple plot

JOT(F11) 0600 16Feb13	JOT(F10) 0500 16Feb13	JOT(F9) 0400 16Feb13	JOT(F8) 0300 16Feb13
JOT(F7) 0200 16Feb13	JOT(F6) 0100 16Feb13	JOT(F5) 0000 16Feb13	JOT(F4) 2300 15Feb13
JOT(F3) 2200 15Feb13	JOT(F2) 2100 15Feb13	JOT(F1) 2000 15Feb13	JOT(A) 1900 15Feb13
JOT(F18) 1300 16Feb13	JOT(F17) 1200 16Feb13	JOT(F16) 1100 16Feb13	JOT(F15) 1000 16Feb13

2300: Clouds!

Moral: The sounding changes over the day as

- Ground heats air
- Cold or warm air blows in (“advection”)
- Humid or dry air blows in



Saturday in Orlando: Cirrus

Load Soundings | Get text | 0.5 mb scale | SkewT/Tephi. | Wind scale: 40/100 | Simple plot

ORL(F24) 1900 16Feb13	ORL(F23) 1800 16Feb13	ORL(F22) 1700 16Feb13	ORL(F21) 1600 16Feb13
ORL(F20) 1500 16Feb13	ORL(F19) 1400 16Feb13	ORL(F18) 1300 16Feb13	ORL(F17) 1200 16Feb13
ORL(F16) 1100 16Feb13	ORL(F15) 1000 16Feb13	ORL(F14) 0900 16Feb13	ORL(F13) 0800 16Feb13
ORL(F12) 0700 16Feb13	ORL(F11) 0600 16Feb13	ORL(F10) 0500 16Feb13	ORL(F9) 0400 16Feb13

drjack.info/BLIP/univiewer.html

BLIPMAP UniViewer

BLIPMAP™ = Boundary Layer Information Prediction MAP created by Dr. John W. (Jack) Glendening, Meteorologist
This UniViewer requires: Javascript, Registration (free), a valid registration cookie, browser acceptance of "www.drjack.info" cookies, and basic BlipMap knowledge.
Registered users can view all BLIPMAPs.
Registered users can Logon (get a new cookie) here) or check their registration cookie status here.
UniViewer Notes give usage information. BlipMap News and helpful BlipMap links are below the viewer.
If this new overlay-capable UniViewer does not funcion properly with your browser, please post a report to the BLIPMAP Forum and instead use the old non-overlay UniViewer.

Region:
NE SE NC SC GP OK/TX NW SW CA/NV USA

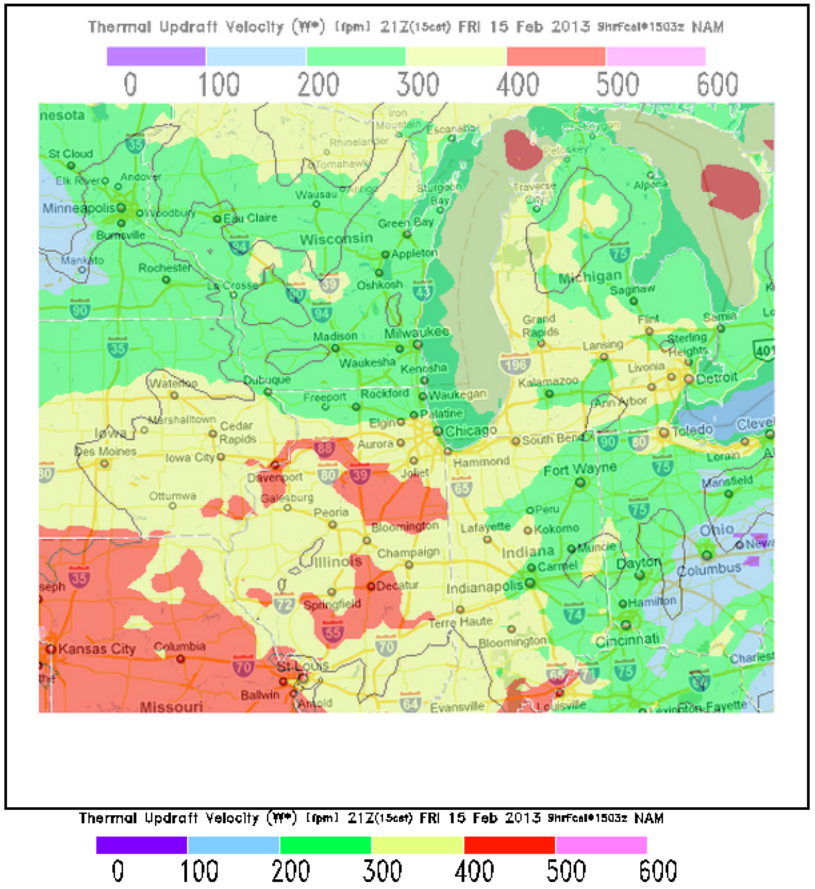
Mouse-Click Popups:
MiniBLIPSPOT ☑ BLIP SkewT ☑ Nonjava FSL SKewT ☐ Java FSL SkewT ☐

Browser:
Save Startup

Model+Day+Time:
RAP: CurrentDay Previous(-1)
RAP: 12z 15z 18z 21z 00z 03z

NAM: CurrentDay +1 +2 -1
NAM: 18z 21z

Parameter:
Thermal Velocity + B/S Ratio
Thermal Updraft Velocity
Buoyancy/Shear Ratio
Critical Updraft Height
BL Top Height (TI=0)
BL Depth
Thermal Hgt. Variability
BL Wind
BL Wind Speed
BL Wind Direction
BL Vertical Wind Shear
BL Max.Up/Down Motion
CU Cloudbase for CUpot>0
CUmulus Potential
CUmulus Cloudbase
OD Cloudbase for ODpot>0
OD Potential
OD Cloudbase
BL Max. Rel. Humidity
CAPE
Surface Heating
Surface Temperature
Surface Dew Point
Experimental
Experimental2
NAM: Total CloudCover
NAM: Surface Sun
Model Terrain Map
Actual Terrain Map



ReView: 11/11
Delete
PasteUp

Size:
NoZoom
FrameFit

PAN

Base Map:
ActualTopo
Geography
NoMap

Opacity:
BLIPMAP
BaseMap

Color Range:
Large
Small

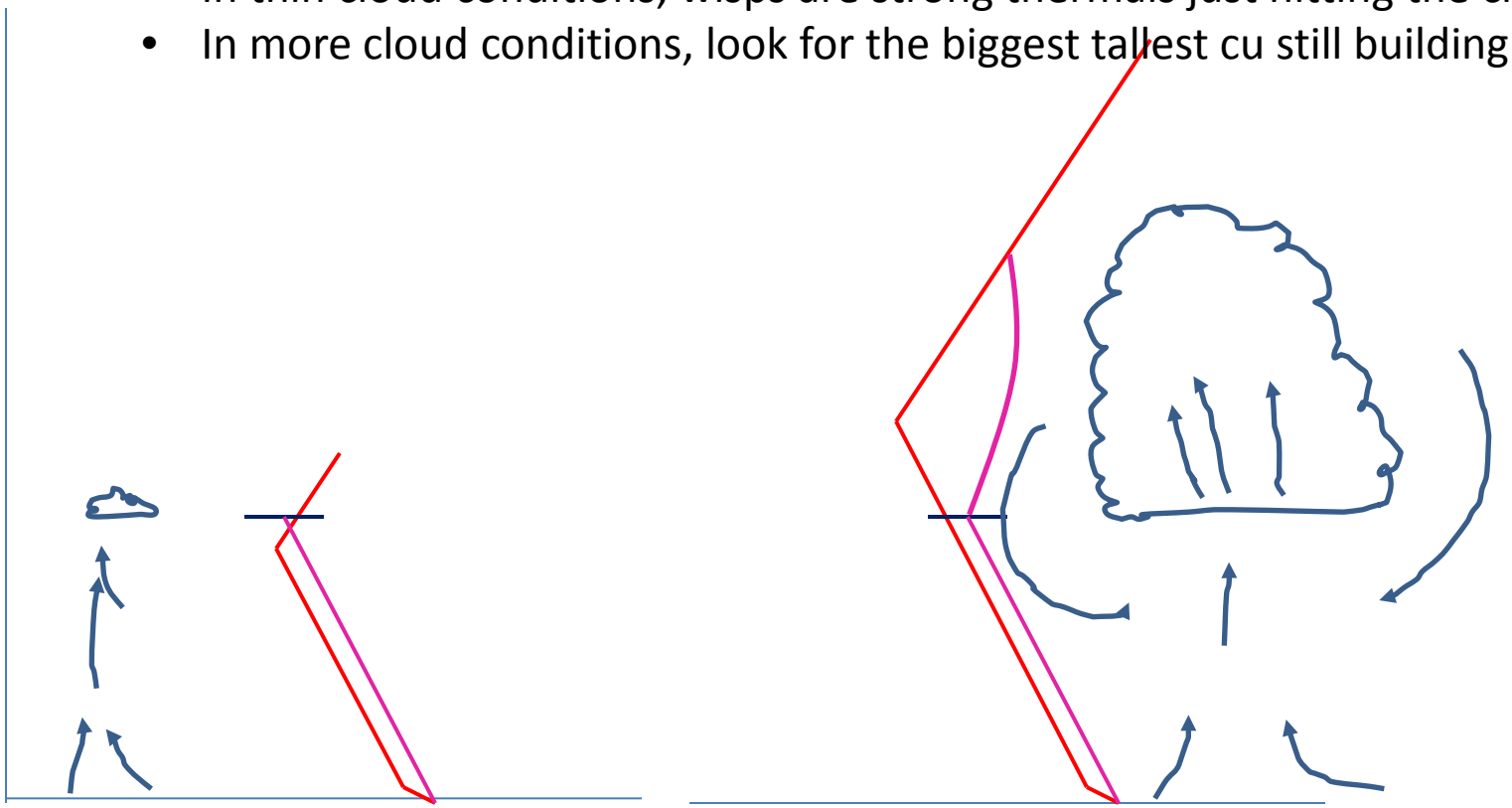
Blipmaps!

- Same analysis but over a wide area, see where to go.
- Thermal strength
- 300 = minimum
- 400 = good
- 500+ = great!
- Rap vs. Nam
- If it's bad, is it no sun or bad air?

"$W^* = [(g/T_o) Q_s D]^{1/3}$ where D is the boundary layer depth (or thermal depth), Q_s the surface heating, and (g/T_o) a known buoyancy constant "
This parameter assumes that buoyancy results solely from surface heating - but if convective clouds are present then additional buoyancy will be released aloft by condensation heating, increasing thermal strengths

Why thermals are stronger when there are cu

- Look for actively building cu!
- In thin cloud conditions, wisps are strong thermals just hitting the cloudbase
- In more cloud conditions, look for the biggest tallest cu still building



BLIPMAP Prediction Parameters and Description

BLIPMAP = Boundary Layer Information Prediction MAP

NB: The atmospheric Boundary Layer (**BL**) is the vertical region above the surface within which air has been mixed by thermal or windshear eddies, i.e. the region where glider pilots normally fly.

THERMAL PARAMETER FORECASTS:

Thermal Updraft Velocity (W*)

Average dry thermal updraft strength near mid-BL height. Subtract glider descent rate to get average vario reading for *cloudless* thermals. Updraft strengths will be stronger if convective clouds are present. W* depends upon both the BL depth and the surface heating. MoreInfo

Buoyancy/Shear Ratio (B/S)

Dry thermals may be broken up by wind shear and unworkable if B/S ratio is 5 or less. If convective clouds are present, the actual B/S ratio will be larger than calculated here. [This parameter is truncated at 20 for plotting.] MoreInfo

Height of Boundary Layer Top (TI=0 height)

Height of the average dry thermal tops, or Thermal Index TI=0 height. *Over flat terrain* maximum thermalling heights will be lower due to the glider descent rate and other factors. However, thermal tops will be higher over small-scale topography not resolved by the model and some pilots have reported that in elevated terrain the heights they can reach over local terrain features correspond better with the BL Top than with Hcrit. In the presence of clouds the thermal top will increase, but the maximum thermalling height will then be limited by the cloud base (see the "Cloud prediction parameters" section below). Further, when the mixing results from shear turbulence rather than thermal mixing this parameter is not useful for glider flying. [This parameter is truncated at 22,000 for plotting.] MoreInfo

Height of Critical Updraft Strength (Hcrit)

This parameter estimates the height at which the average dry updraft strength drops below 225 fpm and *over flat terrain* is expected to give better quantitative numbers for the maximum *cloudless* thermalling height than is the traditional BL Top (TI=0) height given above, especially when mixing results from wind shear rather than thermals. (Note: the present assumptions tend to *under*predict the max. thermalling height.) In the presence of clouds the maximum thermalling height may instead be limited by the cloud base (see the "Cloud prediction parameters" section below). [This parameter is truncated at 22,000 for plotting.] MoreInfo

Thermal Height Variability

This parameter estimates the variability (uncertainty) of the BL top (TI=0) height prediction which can result from meteorological variations. Specifically, it gives the expected increase of the BL Top if the actual surface temperature is 4 °F warmer than forecast. Larger values indicate greater variability and thus better thermalling over local "hot spots" or small-scale topography not resolved by the model. But larger values *also* indicate greater sensitivity to error in the predicted surface temperature, so actual conditions have a greater likelihood of differing from those predicted. MoreInfo

WIND PARAMETER FORECASTS:

Wind Speed in the Boundary Layer

The speed of the *vector-averaged* wind in the BL. This prediction can be misleading if there is a large change in wind direction through the BL (for a complex wind profile, *any* single number is not an adequate descriptor!). MoreInfo

Wind Direction in the Boundary Layer

The direction of the *vector-averaged* wind in the BL. This prediction can be misleading if there is a large change in wind direction through the BL (for a complex wind profile, *any* single number is not an adequate descriptor!). Note that there will be a abrupt artificial gradient at the "cross-over" between 0 and 360 degrees. MoreInfo

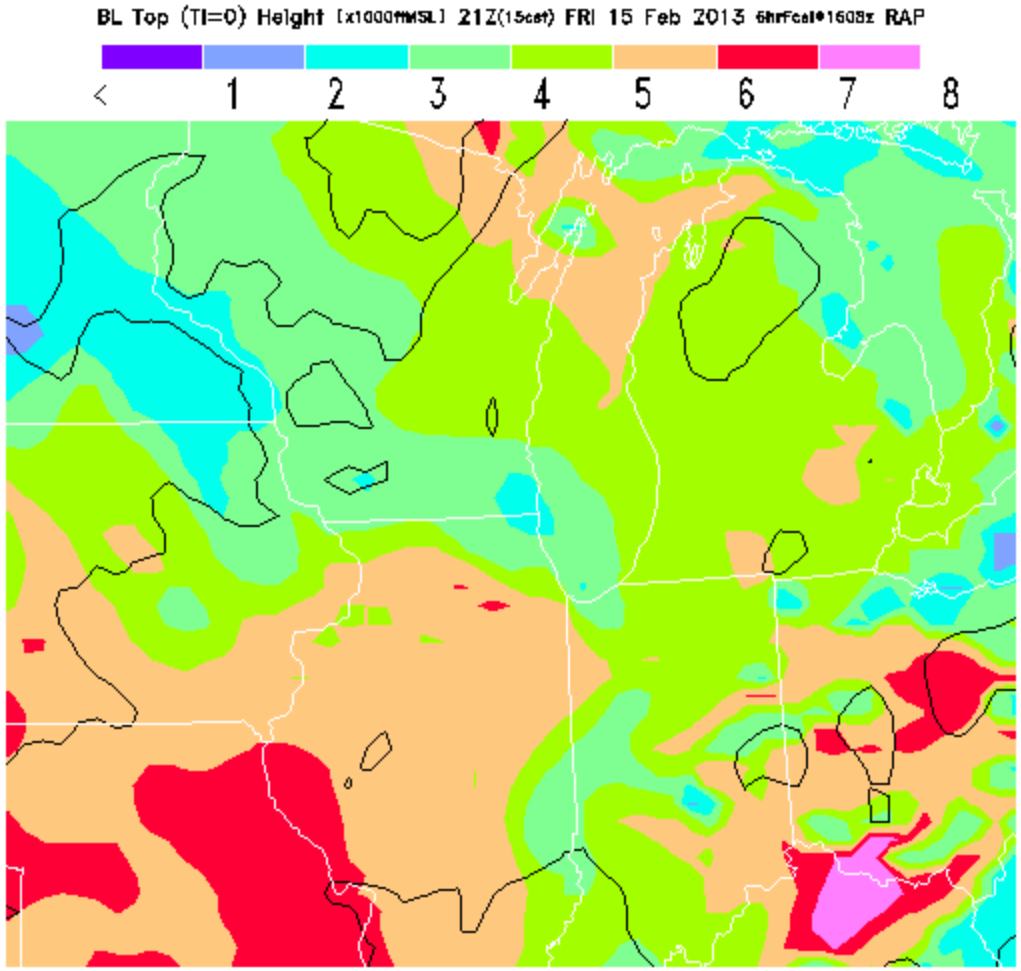
Wind Shear in the Boundary Layer

The magnitude of the *vector* wind difference between the top and bottom of the BL. Note that this represents *vertical* wind shear and does *not* indicate "shear lines" (which are *horizontal* changes of wind speed/direction). MoreInfo

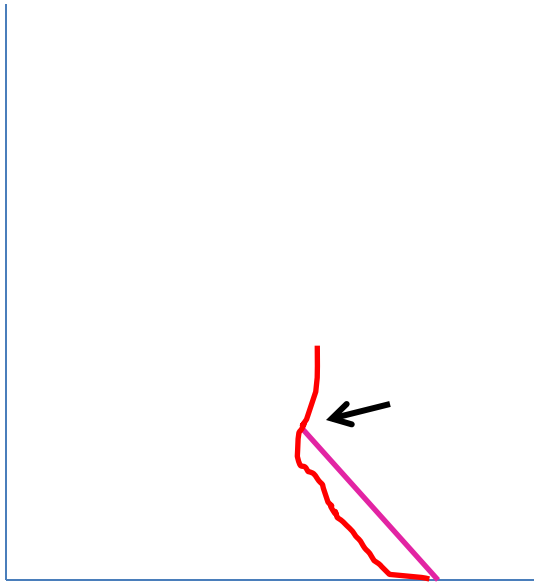
BL Max. Up/Down Motion (BL Convergence)

Maximum grid-area-averaged *extensive* upward or downward motion within the BL as created by horizontal wind convergence. Positive convergence is associated with local small-scale convergence lines (often called "shear lines" by pilots) - however, the actual size of such features is much smaller than can be resolved by the model so only stronger ones will be forecast and their predictions are subject to much error. If CAPE is also large, thunderstorms can be triggered. Negative convergence (divergence) produces subsiding vertical motion, creating low-level inversions which limit thermalling heights. This parameter can be noisy, so users should be wary. MoreInfo

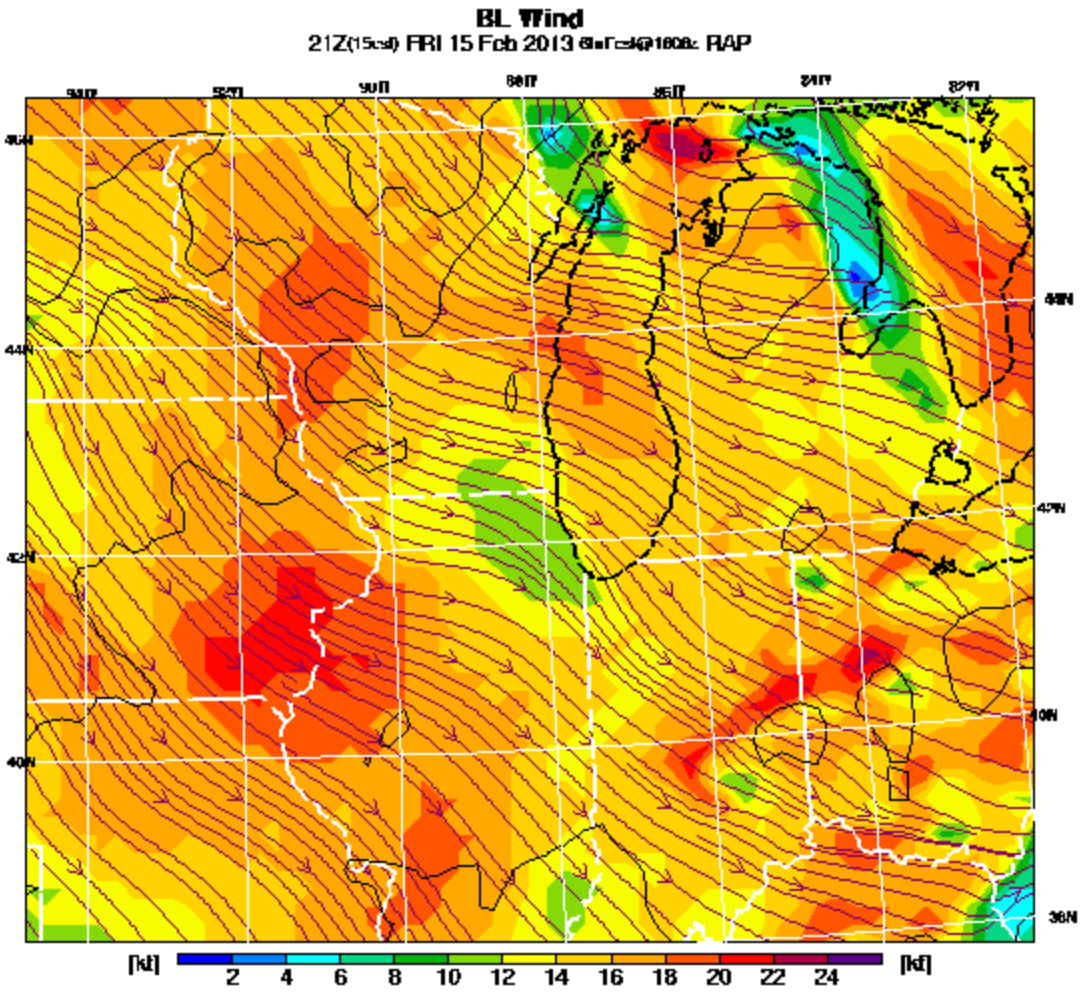
BL top TI=0 height.



- The most important parameter on blue days in Chicago
- With clouds it's the top of the clouds
- If it's bad, why? No sun? Low inversion? Wet ground?



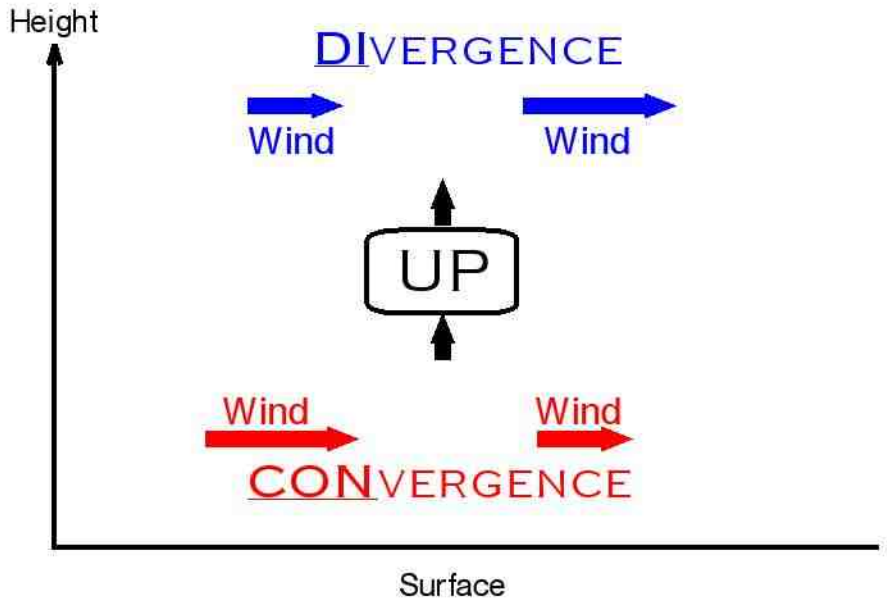
BL wind


BL Wind
21Z(15cst) FRI 15 Feb 2013
RAP
44N
40N
36N
[kt]
2 4 6 8 10 12 14 16 18 20 22 24
[kt]

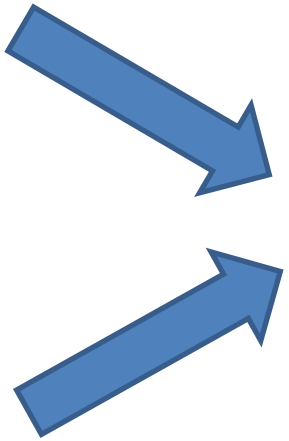
CONVERGENCE

aka "*horizontal* wind shear" ("shear line")

BLIPMAP predicts max. large-scale vertical velocity in BL

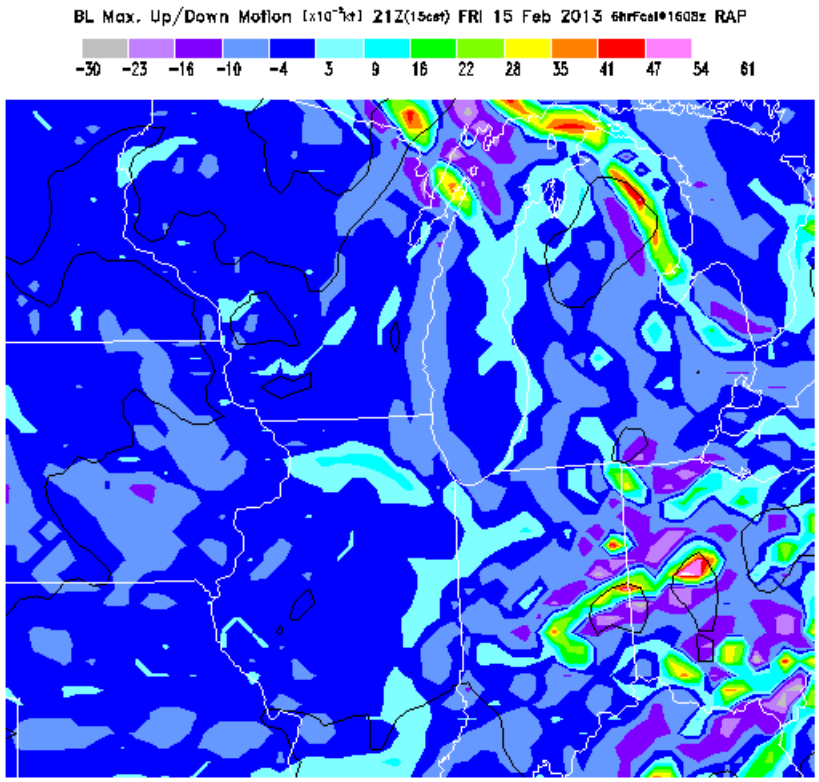


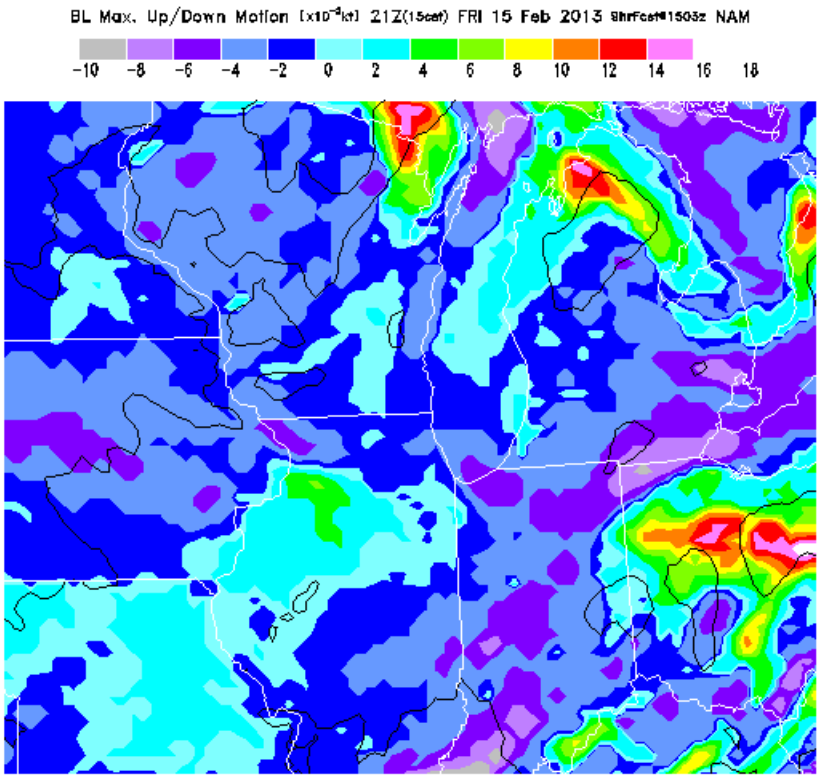
Also:



Up!

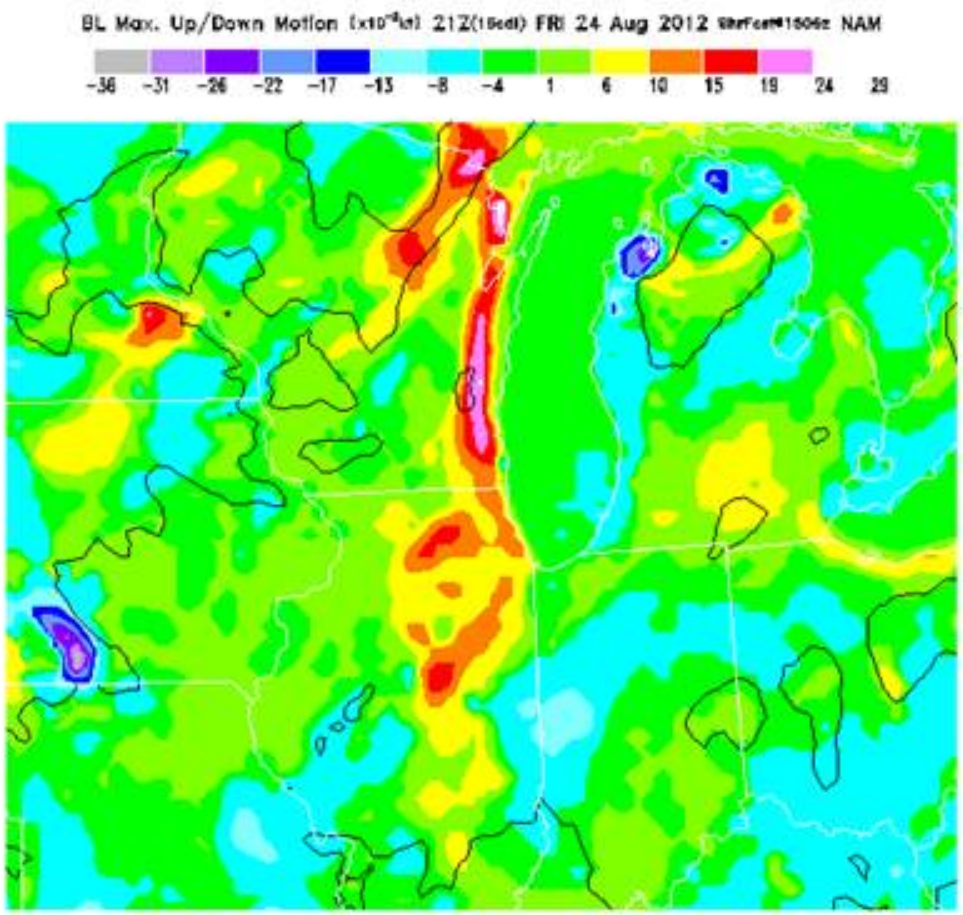
Up/down motion -- convergence



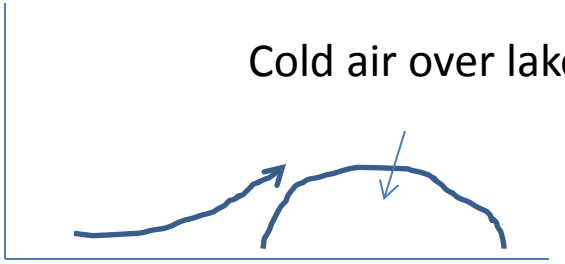


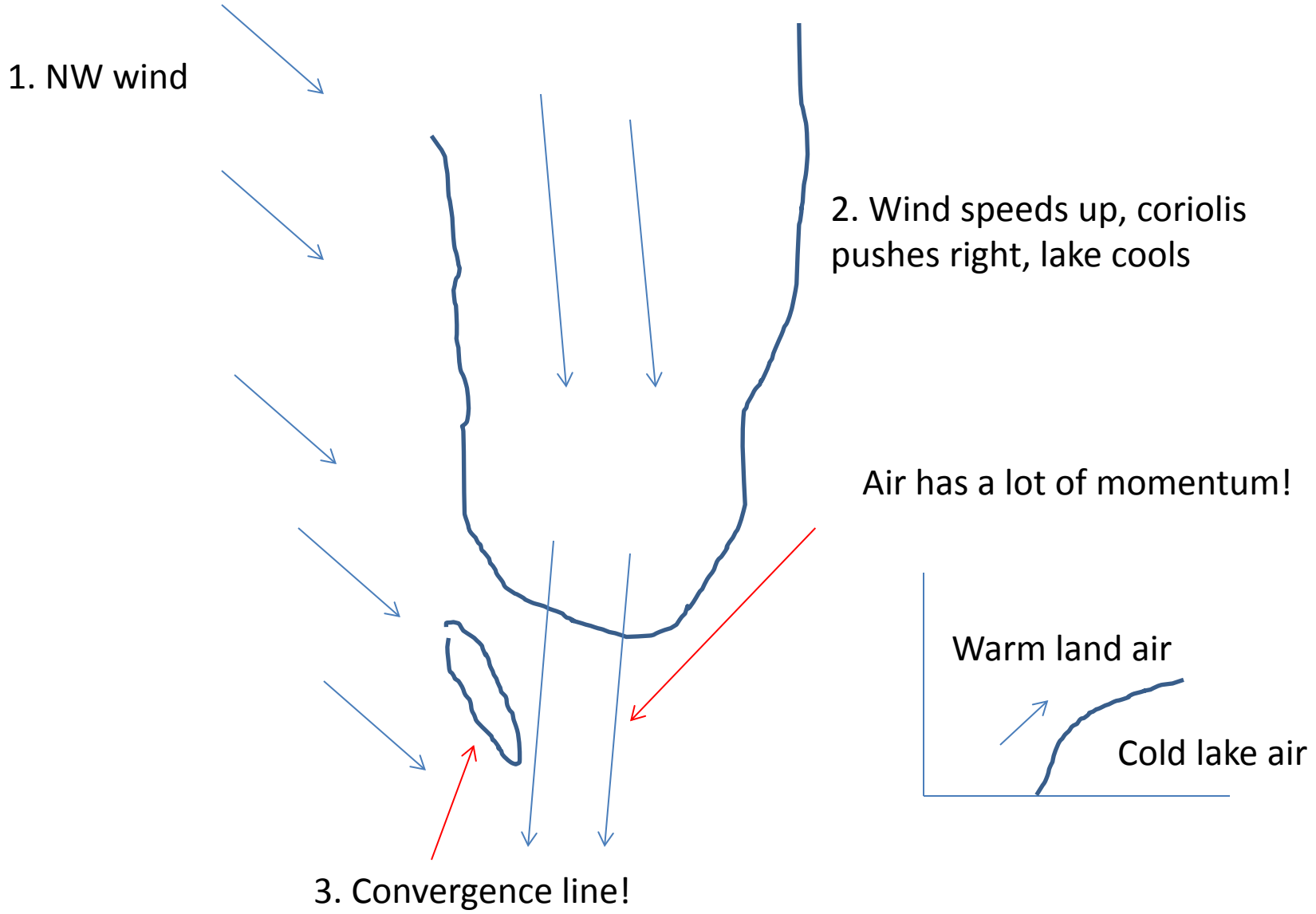
- Notice how wind slowing at Michigan shore (land friction) makes a convergence, speeding up at IL shore.
- Summer usually has the opposite pattern.
- E Michigan shore?
- Nam and Rap differ a lot – structures a bit too small for models

Summer lakeshore convergence

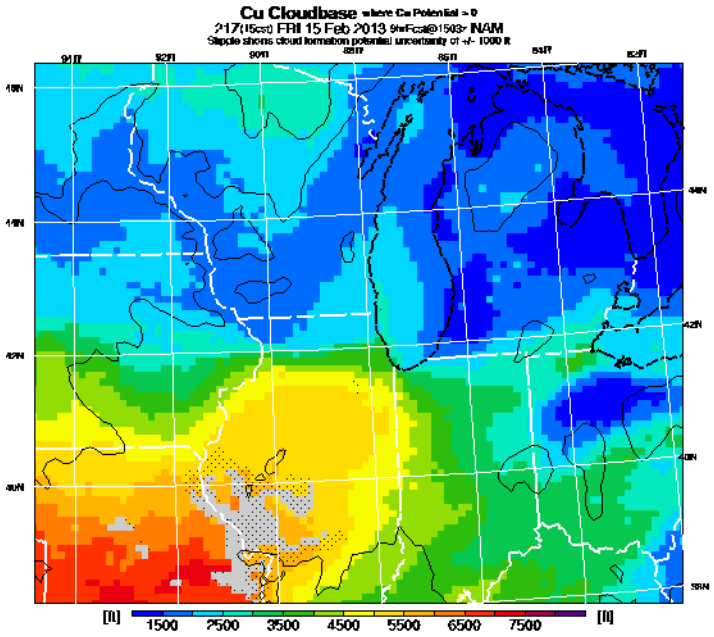


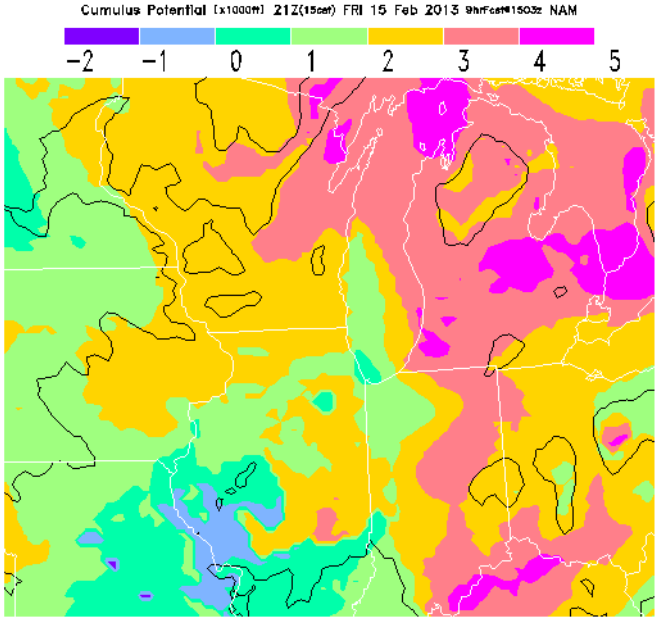
Summer



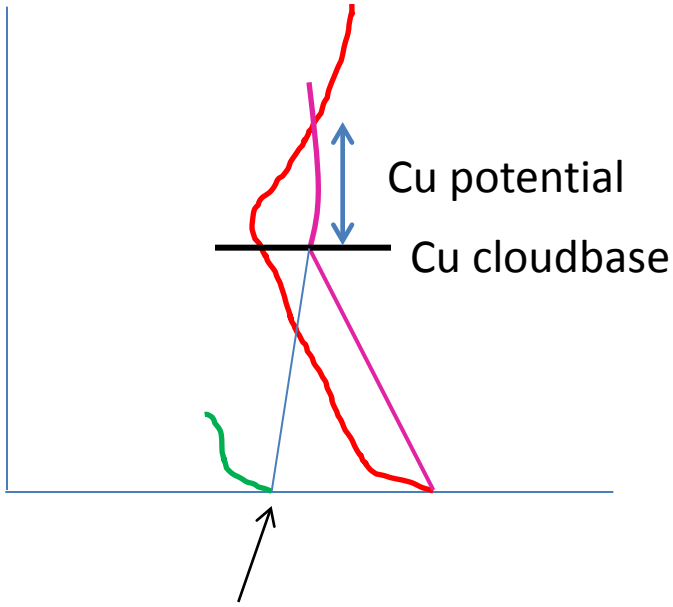

1. NW wind
2. Wind speeds up, coriolis pushes right, lake cools
Air has a lot of momentum!
Warm land air
Cold lake air
3. Convergence line!

- Fall: Lake is warm and humid!
- Bands of cu can line up across the wind!

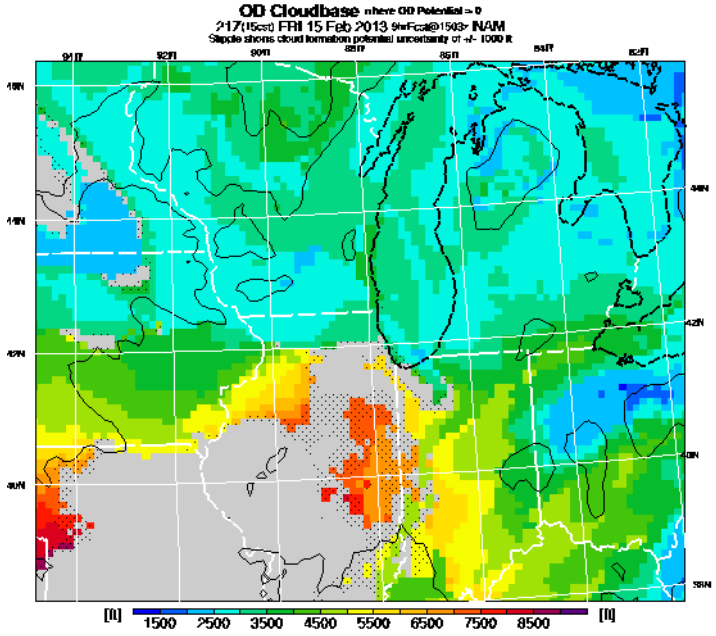


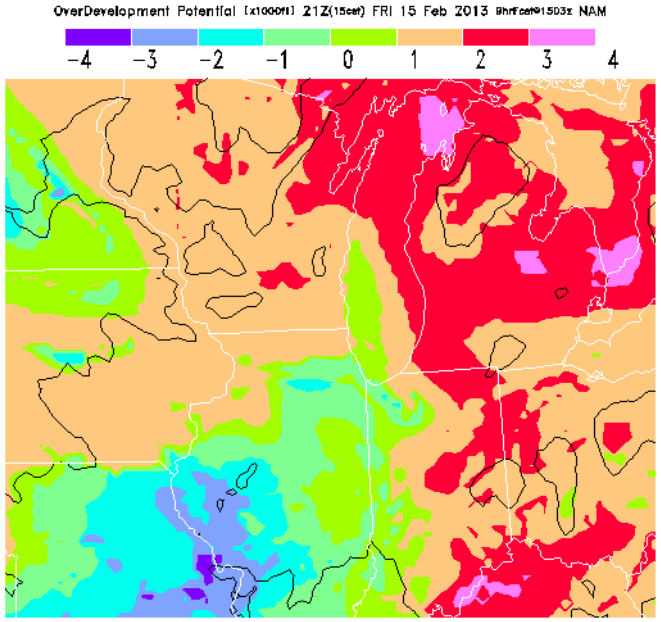


Cu potential, cu cloudbase



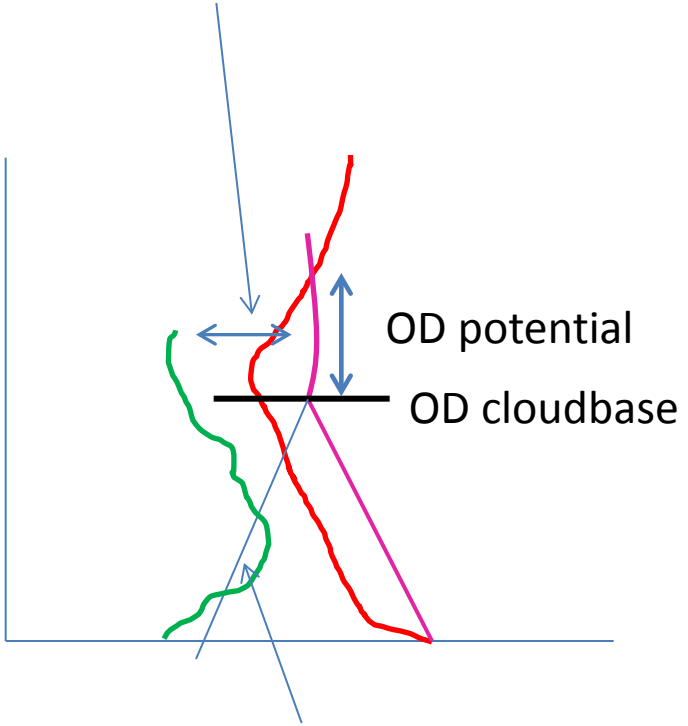
Very sensitive to dew point!
(Nam is wet, Rap is dry, neither models ground moisture well)



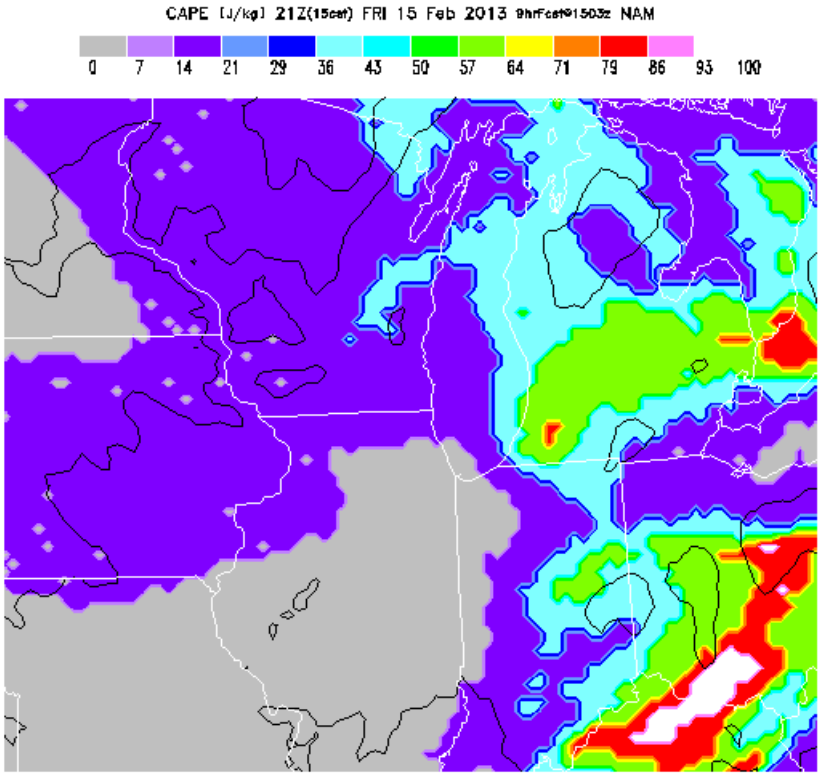


OD potential, cloudbase -- spreadout

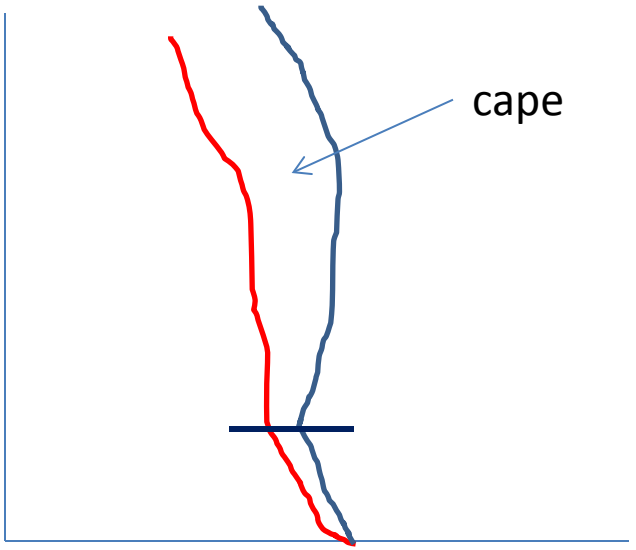
Look at sounding for spread above cloudbase to see if clouds will evaporate or spread out



OD uses average BL humidity, not surface, to forecast cloudbase

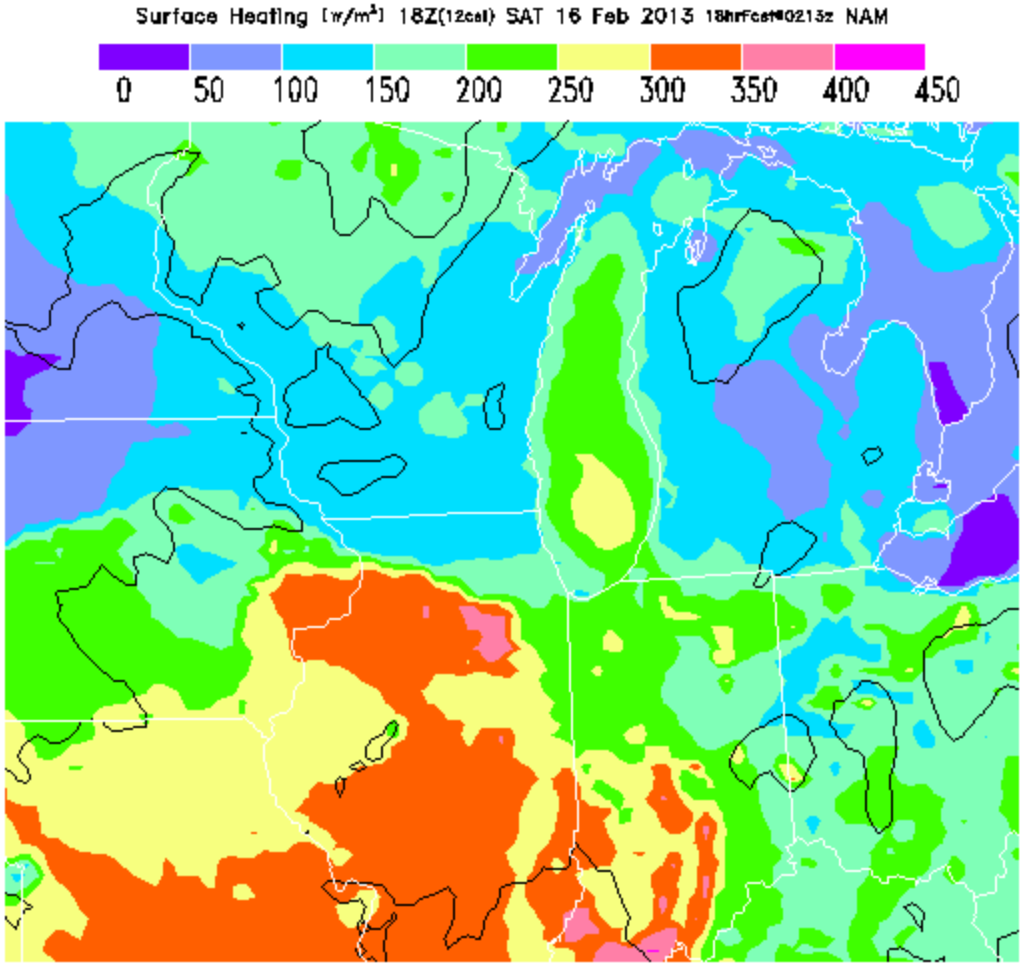


Cape: Thunderstorms?

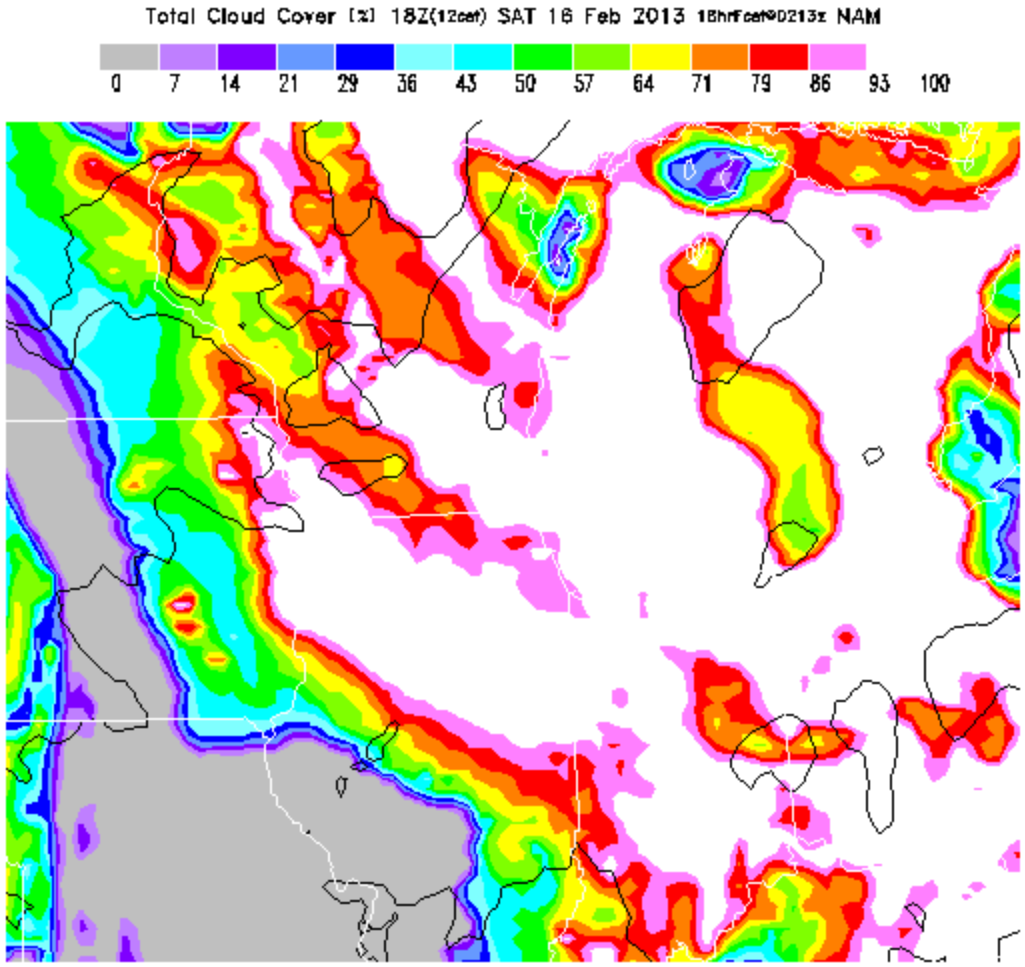


Convective Available Potential Energy is a measure of the atmospheric stability affecting *deep* convective cloud formation above the BL. Higher values indicates greater potential for strong thunderstorm development and larger updraft velocities. Thunderstorm strengths associated with CAPE values (as published by Wright-Patterson AFB) are: 0=none, 300-1000=weak, 1000-2500=moderate, 2500-5300=strong [note that these values are relative to the very large thunderstorms which occur in the Mid-West!]. This parameter only indicates the *potential* for thunderstorm formation - for thunderstorms to actually form also requires some triggering mechanism which produces upward motion, such as flow over a ridge or convergence. This parameter is obtained directly from model output and not from a BLIPMAP computation

Let the pros forecast thunderstorms

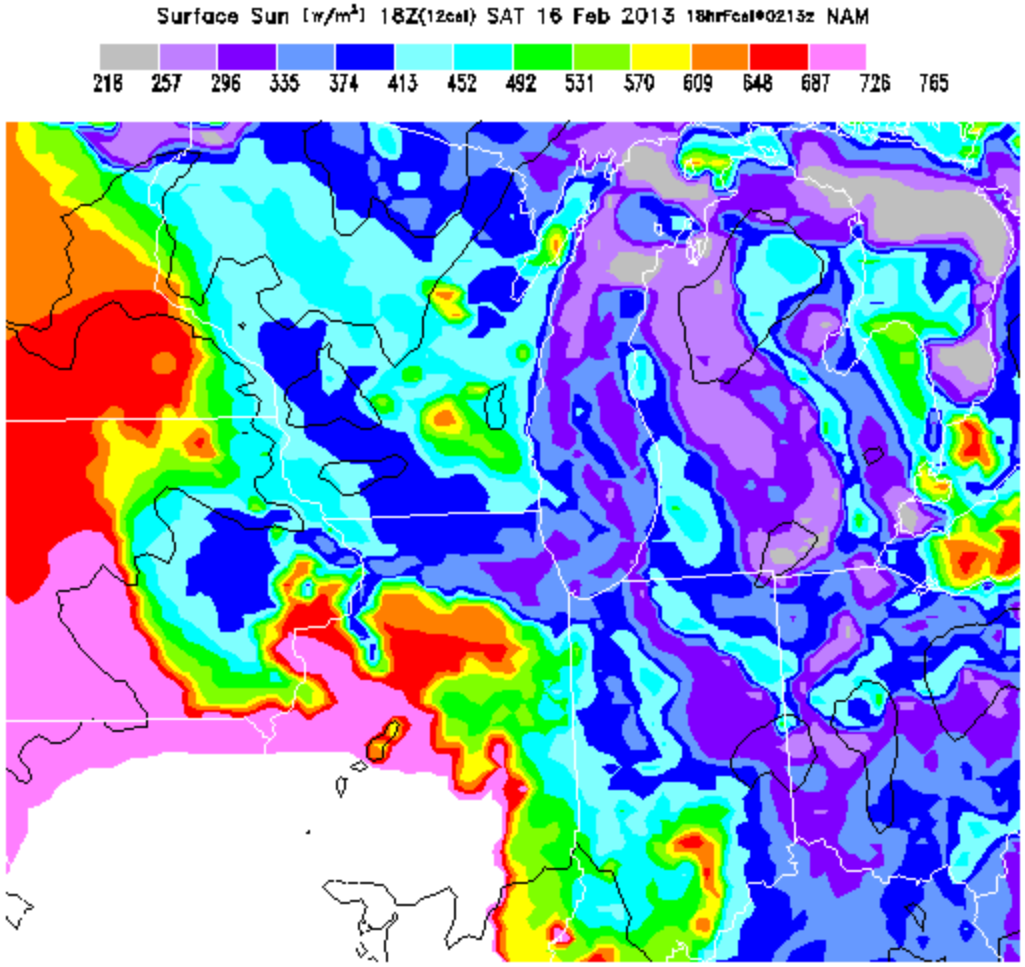


Surface heating:
How much energy the ground is putting in to the air
Ground water, crop type, city, cloud cover all influence it.



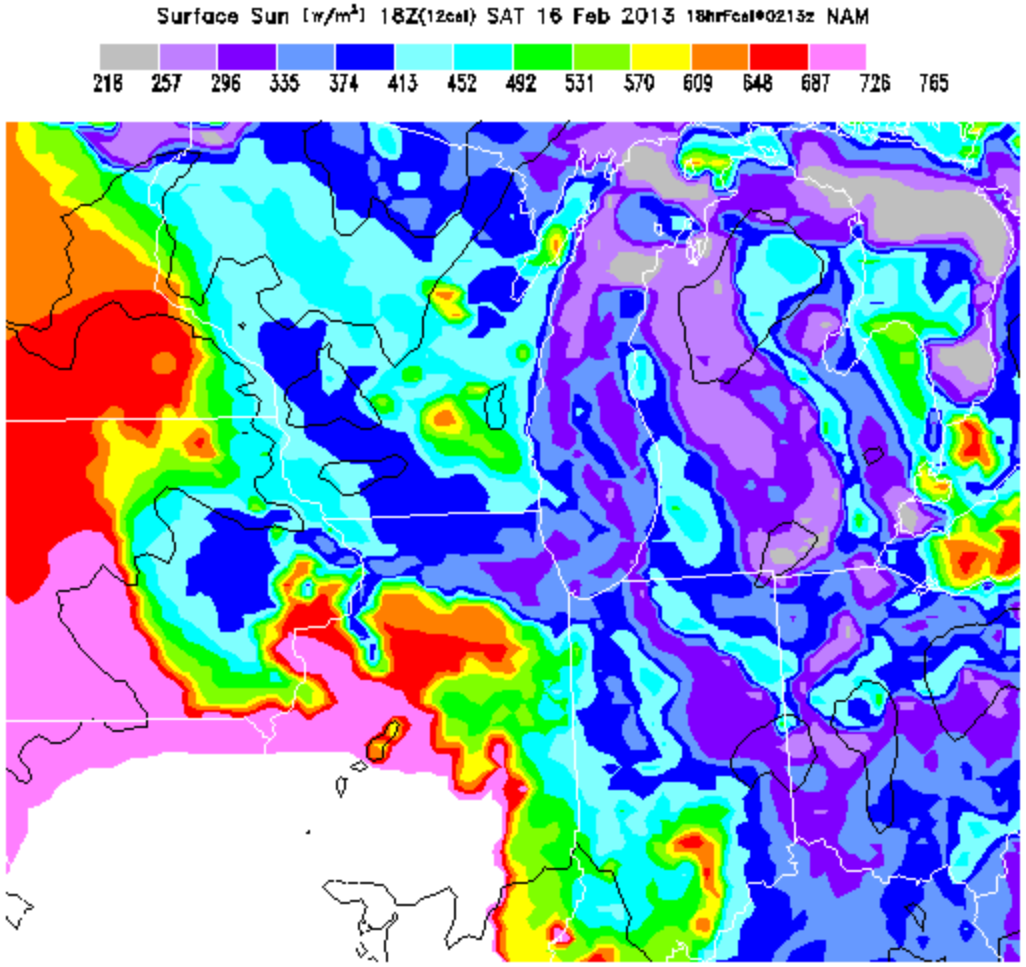
Total cloud cover

- Our one cirrus forecast tool
- Warning: Even thin cirrus gives 100%!
- 7-14% purple is ideal cumulus field



Surface sun:
How much solar energy is hitting the ground. A good measure of cloud cover x cloud thickness.

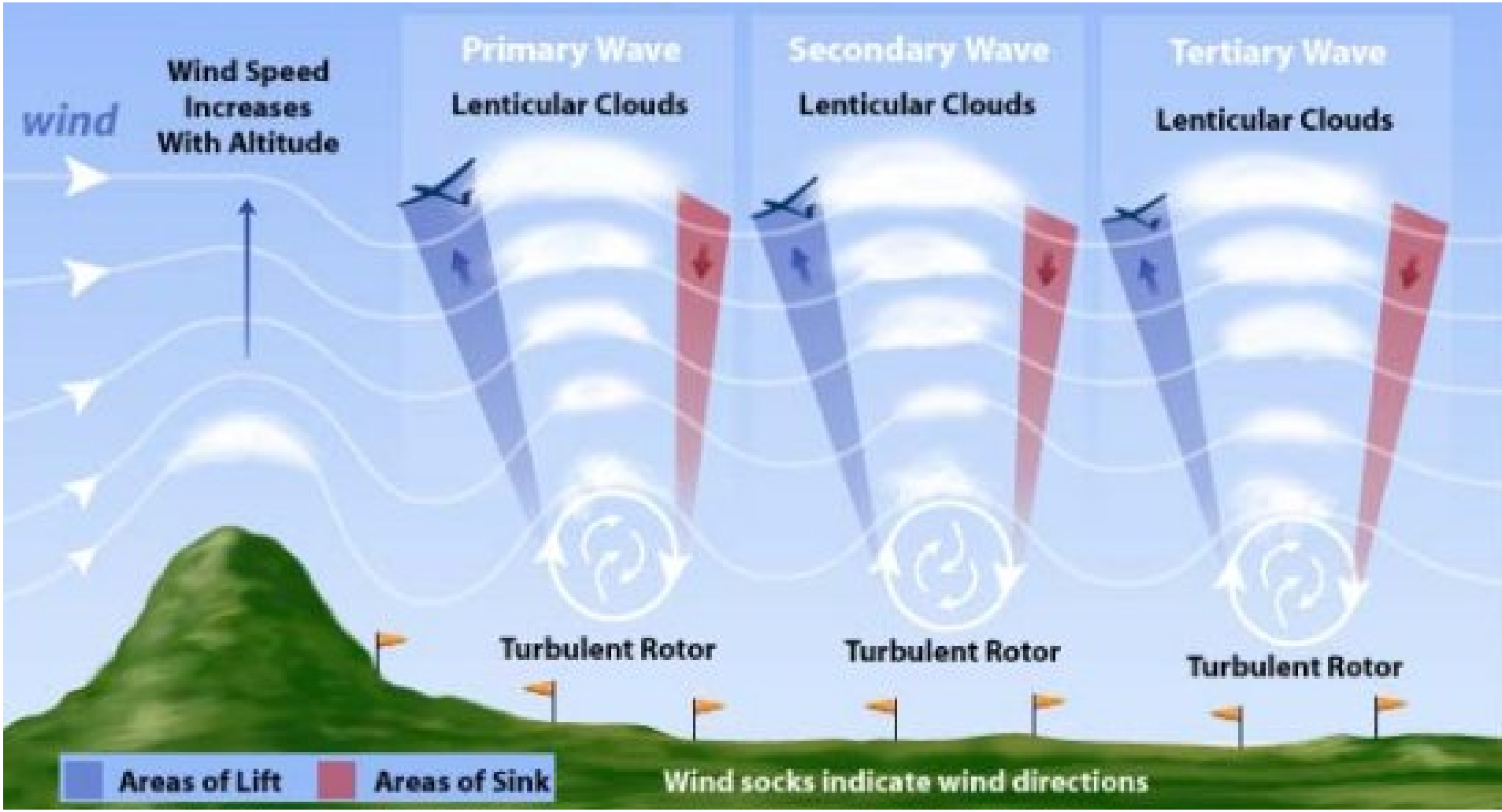
(Reminder: Solar heating: how much energy the ground transmits to the air. Total cloud cover: how much cloud, but not how thick)


Surface Sun [w/m²] 18Z(12cst) SAT 16 Feb 2013 18hrFcst@0213z NAM
218 257 296 335 374 413 452 492 531 570 609 648 687 726 765


Part II. Micro meteorology lessons in New Zeala
• Mostly mountain thermaling / easy glide to
• Exceptionally well run professional operatio

Day 1: Wave:

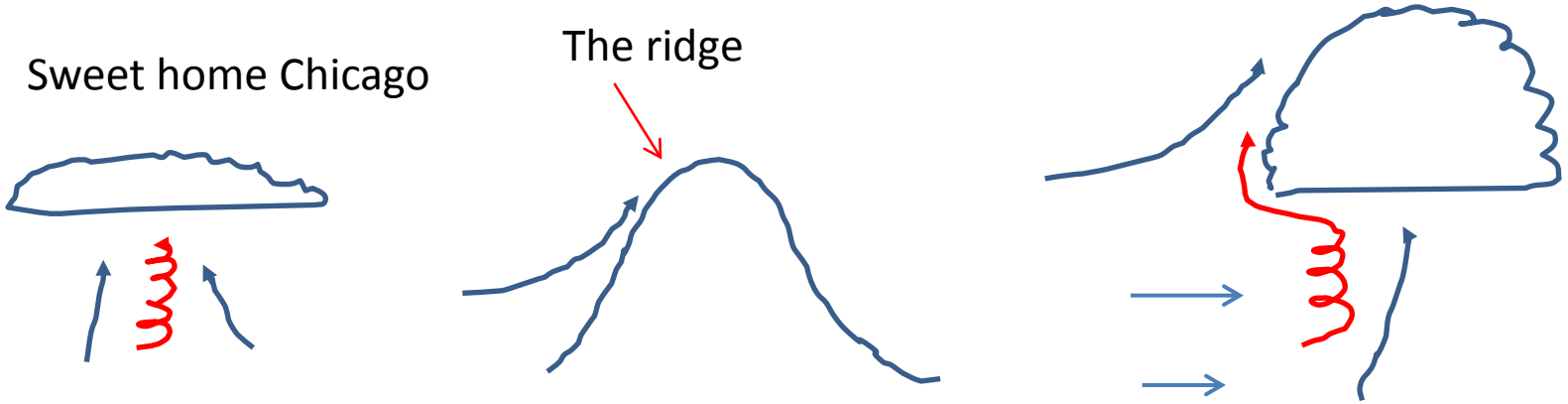
NOT!


wind
Wind Speed
Increases
With Altitude
Primary Wave
Lenticular Clouds
Secondary Wave
Lenticular Clouds
Tertiary Wave
Lenticular Clouds
Turbulent Rotor
Turbulent Rotor
Turbulent Rotor
Areas of Lift
Areas of Sink
Wind socks indicate wind directions

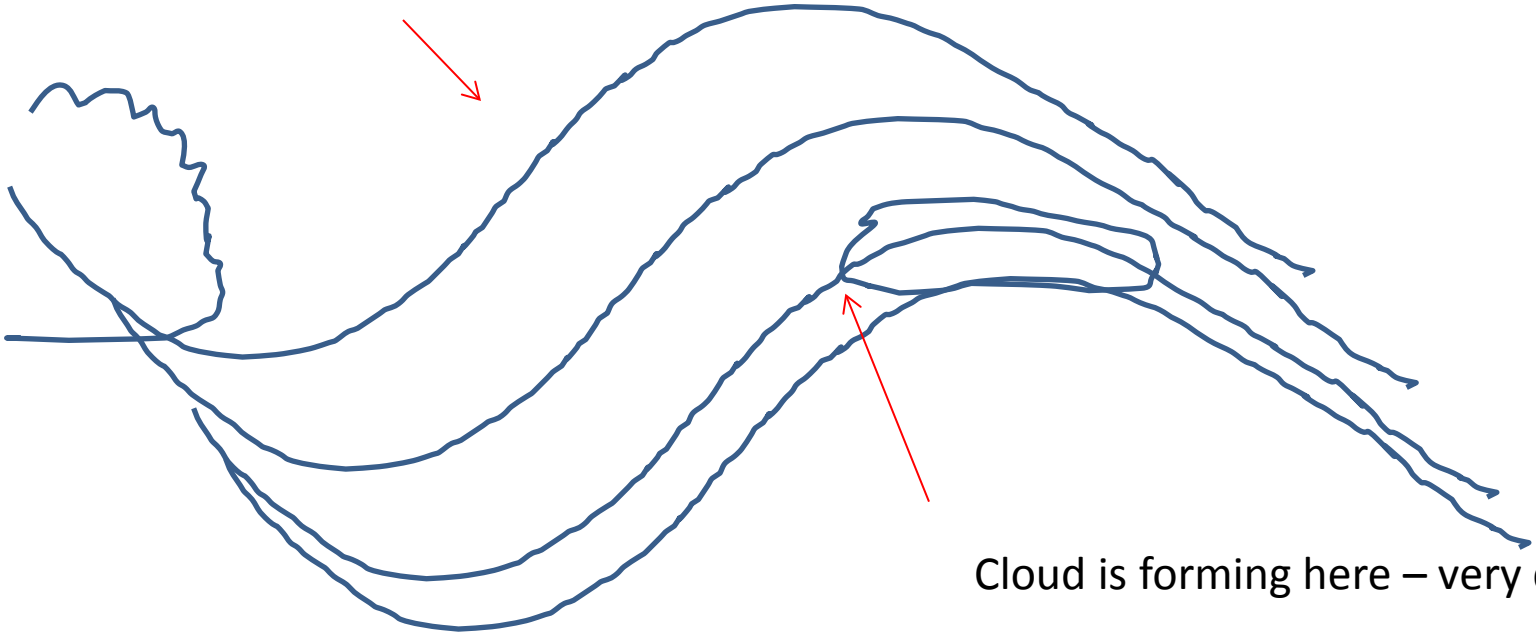
Cloud soaring
With wind shear

Sweet home Chicago

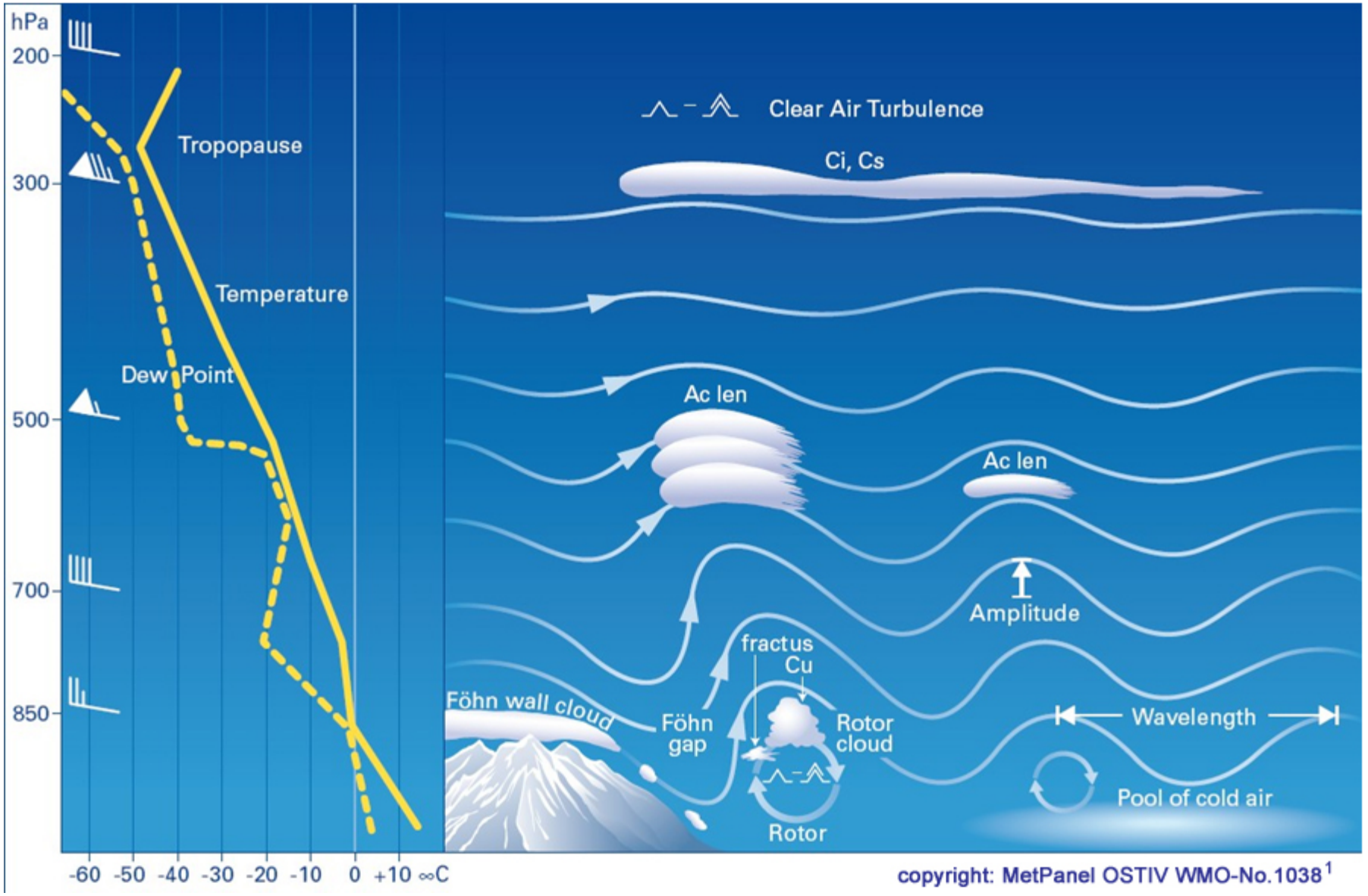
The ridge



Best lift is here out in the blue!

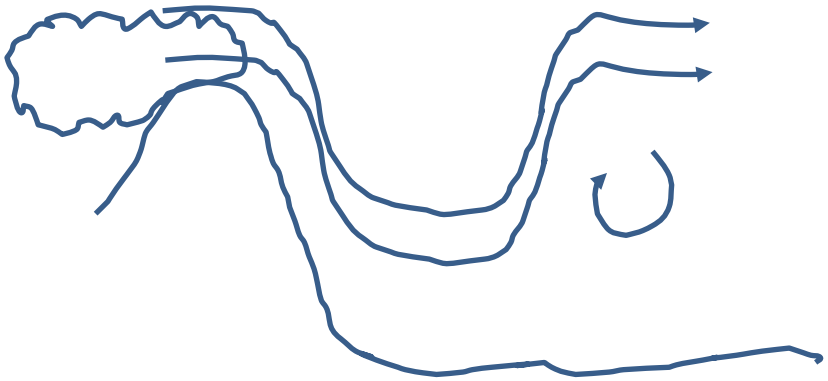


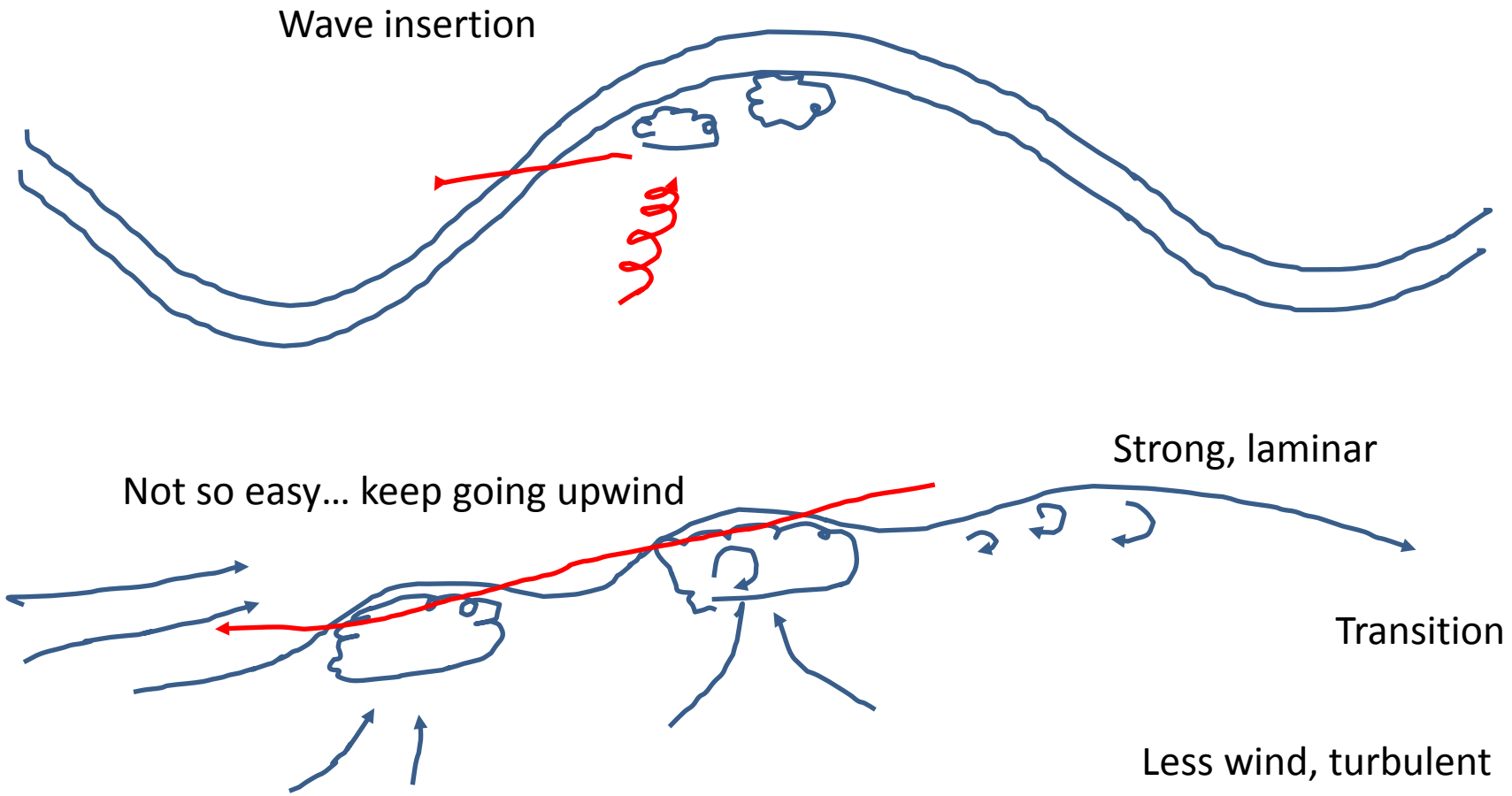
Cloud is forming here – very dangerous!




ZK-GQQ

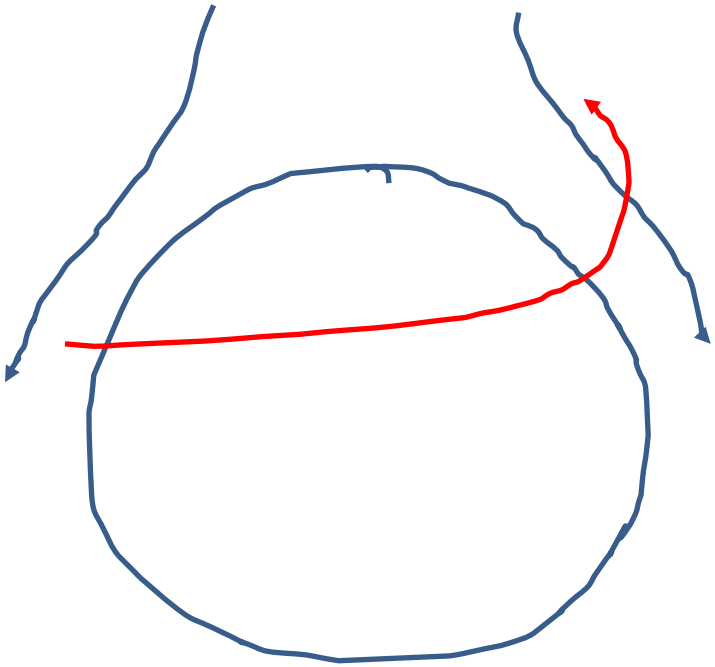
“Hydraulic Jump” with overlying wave

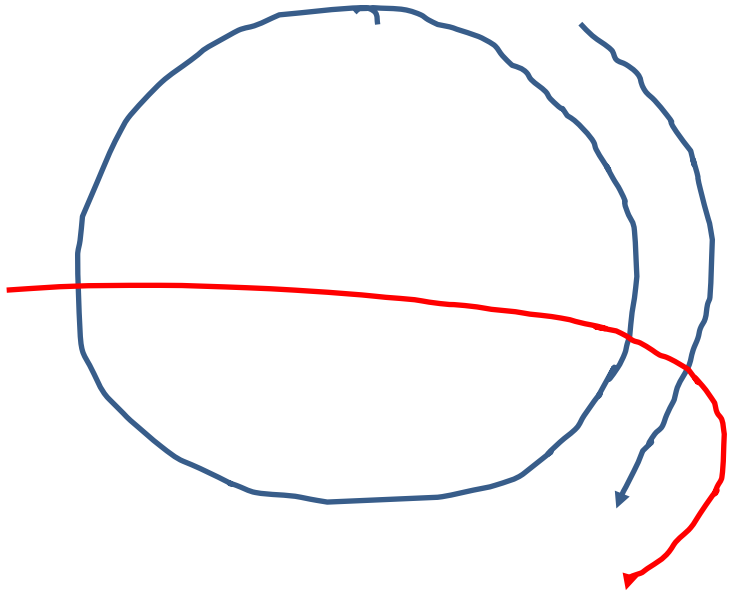



Wave insertion
Strong, laminar
Not so easy… keep going upwind
Transition
Less wind, turbulent

Lesson for Chicago

Why we turn in to the wind when we thermal!



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CEMETERY