

GEO165 METEOROLOGY

DETAILED INSTRUCTIONS FOR SURFACE SYNOPTIC CHART ANALYSIS

In the days before computerization the first step in weather map analysis was to plot the data. That's right every number and symbol had to be plotted on the map by hand.

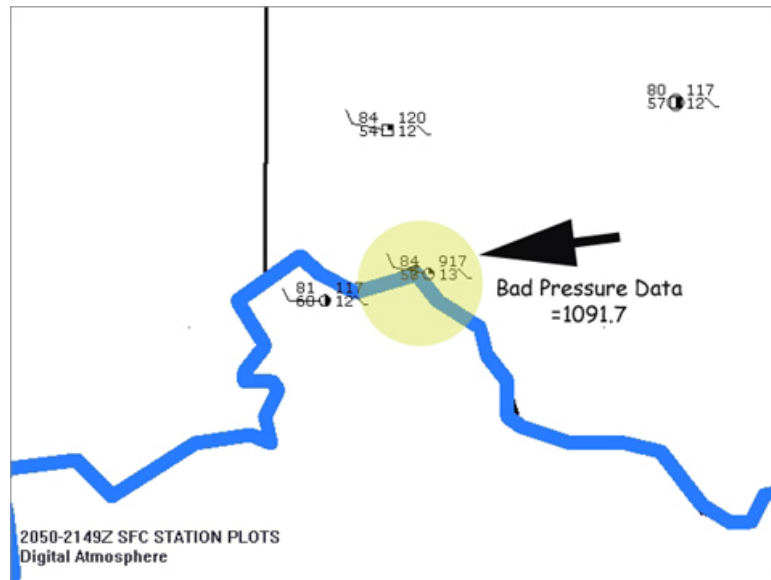
Today that step, and many others can be handled by computer.

Here are the steps we will take in analyzing the surface synoptic chart.

STEP 1. Take a close look at the plotted data.

[CLICK HERE TO LINK TO THE STATION MODEL KEY](#)

- ✓ If available look at earlier maps of the same weather system(s) to get an idea of the history of the present system.
- ✓ Look for: movement, change of movement (faster or slower), strengthening, weakening, change of precipitation, type, aerial extent and intensity.
- ✓ Look for areas of precipitation, fog and thunderstorms.
- ✓ Look for high and low pressure areas.
- ✓ Look for wind shifts, areas where the wind is strong and where the wind is calm.
- ✓ Get an overall feel for the map in front of you.
- ✓ What **air masses** dominate which regions?
- ✓ **Look for BAD DATA, errors are not that uncommon.**



STEP 2. Analyze isobars - IN PENCIL.

Standard contour intervals:

- ✓ National Map - 4 mb (hPa) (up and down from 1000 mb)
- ✓ Regional Map - 2 mb (hPa) (up and down from 1000 mb)
- ✓ Any map with a weak pressure gradient can be drawn using a 1 mb (hPa) interval.
- ✓ **The contour interval should reflect the pressure field,**
- ✓ Use the contour interval that gives the most information without making a crowded mess of the weather map.
- ✓ If part of the map works better with a 2mb contour interval and another part works better with a 4mb interval draw the map using the 4mb interval and **draw intermediate isobars where needed.**
- ✓ Intermediate isobars should be dashed.
- ✓ **WATCH FOR BAD DATA - IF A STATION IS 2MB - 4MB HIGHER THAN SURROUNDING STATIONS BE SUSPECT.**

STEP 3. Smooth isobars and draw over them in ink.

- ✓ Using a fine point **BLACK** Sharpie® or similar pen re-draw the isobars and smooth the lines.
- ✓ Leave gaps selectively to enter isobar values. Isobar values customarily are entered as 2-digit values i.e. "00", "02", "98".
- ✓ As you do this look for evidence of fronts
 - U and V-shaped trofs
 - Wind shift lines
 - Precipitation
 - Temperature and dew point changes
- ✓ **ENTER THE DATE AND TIME IN AN APPROPRIATE LOCATION IN BLACK INK NOW.**

STEP 4. Analyze fronts - IN PENCIL

- ✓ Look for the types of evidence listed in step 3 and sketch, in pencil where you think fronts are.
- ✓ Cold fronts are more distinct than warm fronts.
- ✓ Winter cold fronts are the most distinct and at times warm fronts at any time of the year may be almost impossible to find.
- ✓ **Wind Shift** (many variations possible)
 - Proceeding W/NW'ward across a Cold Front the wind shift is generally SW ->>> W ->>> NW
 - Proceeding S/SW'ward across a Warm Front the wind shift is generally SE->>>S ->>> SW

- ✓ A front may be quasi-stationary if winds on either side are parallel to the front.
- ✓ A front followed by strong winds (20-30 mph) will usually move faster than a front with weak winds **BEHIND IT**.
 - Behind a cold front means to the W or NW of the front
 - Behind a warm front means to the S or SW of the front
- ✓ From years of experience A **RULE OF THUMB** tells us the surface front will usually move at a speed of 60% to 70% of the wind velocity behind it.
- ✓ LABEL AIR MASSES [CLICK HERE TO LINK TO AIR MASS INFO](#)

STEP 5. Draw fronts in color using appropriate symbols.

[CLICK HERE TO LINK TO FRONTAL SYMBOLS](#)

STEP 6. Analyze Cloud cover.

- ✓ Broken and overcast areas should be outlined with a scalloped border with some light edge shading.
- ✓ This step gives a complete "synoptic" look at the weather but has been used less frequently with the advent of satellite images.

STEP 7. Analyze current weather.

[CLICK HERE FOR CURRENT WEATHER SYMBOLS](#)

- ✓ Shade lightly around and over stations with colored pencils to highlight the weather at the station.
 - **GREEN** Rain
 - **DARKER GREEN** Heavy Rain
 - **RED** Thunderstorm
 - **YELLOW** Fog, haze and non-precipitation
 - obstructions to visibility
 - **BLUE** Snow
 - **RED** Transitional winter
 - precipitation forms,
 - ice pellets (sleet) and freezing rain
- ✓ Once individual stations have been shaded try to delineate a contiguous area with that type of weather. And lightly shade it.

STEP 8. REVIEW THE ANALYSIS AND THINK FORWARD IN TIME, THE NEXT STEP IS FORECASTING!

A Few Interesting Web Sites:

<http://apollo.lsc.vsc.edu/classes/met130/notes/chapter14/tips.html>

http://www-das.uwyo.edu/~geerts/cwx/notes/chap15/forecast_rules.html

<http://apollo.lsc.vsc.edu/classes/met130/notes/chapter14>