Chapter 12
Commonly used aviation meteorological data

Section 1 Aviation weather chart

- **1 Surface Aviation Weather Report Chart**
- **2 Significant Weather Prognostic Charts**
- **3 Wind And Temperatures Aloft Forecast**

1.1 Surface Aviation Weather Report

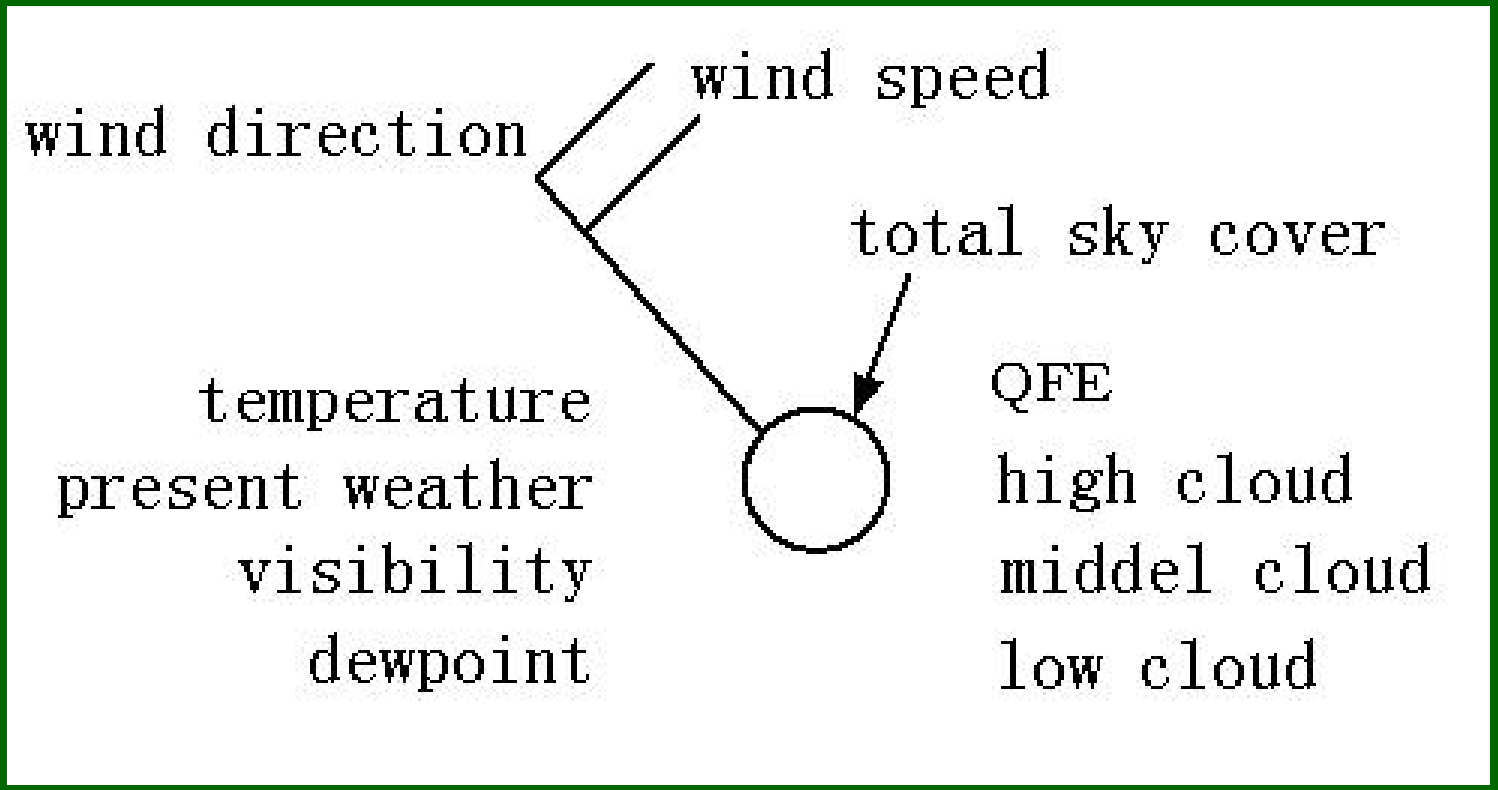
The function of aviation routine weather report

Estimate at present weather conditions and determination weather forecast accuracy, understanding weather change tendency

The content of aviation routine weather report

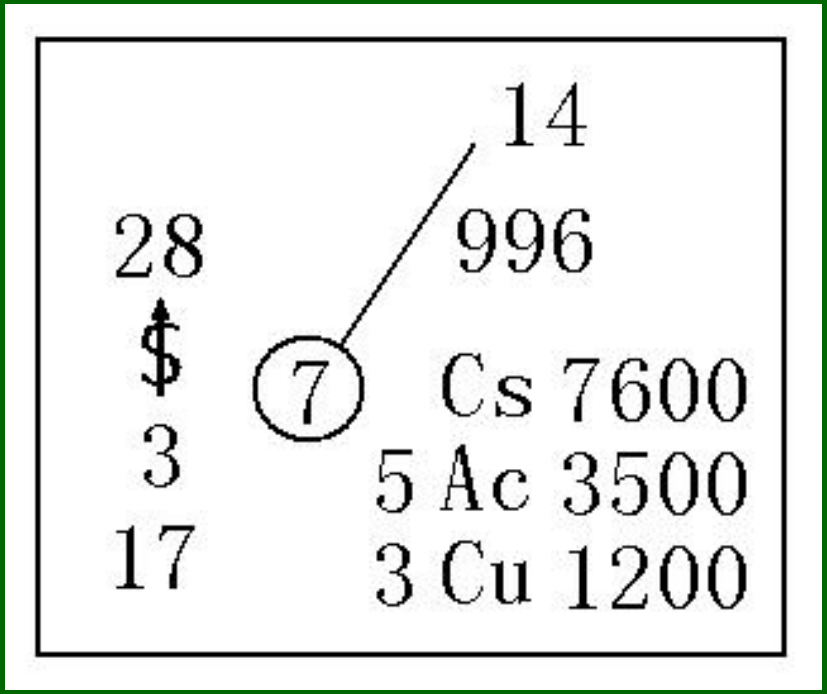
Station name, time (Universal Time), wind direction, wind speed, visibility /RVR (Runway visual range), weather phenomena, cloud, temperature/dew-point, barometric pressure value and supplement explanation and so on

1.1.1 The Surface Aviation Weather Report station model



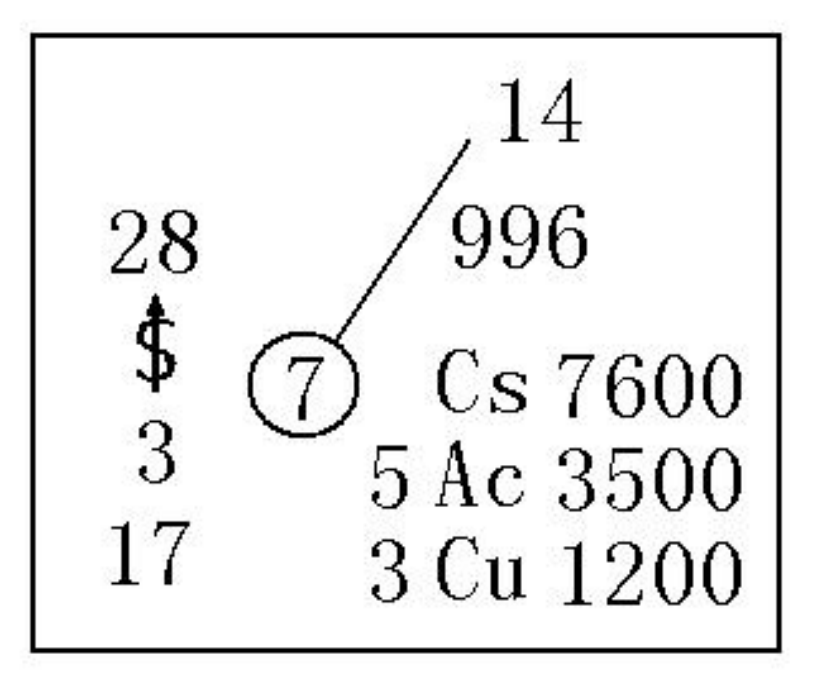
Plotting explanation

- **At the left side, the temperature, the weather phenomena, the visibility and the dew point fill in the method the same as the surface weather char**



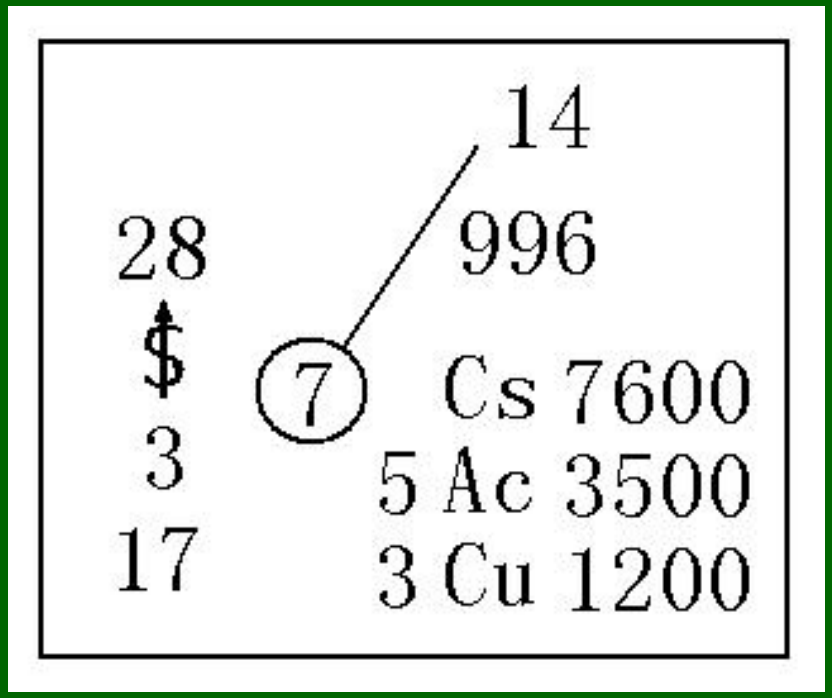
The total sky cover

- fills in according to eight minute systems cloud amounts, the sky unclear fills in “×”



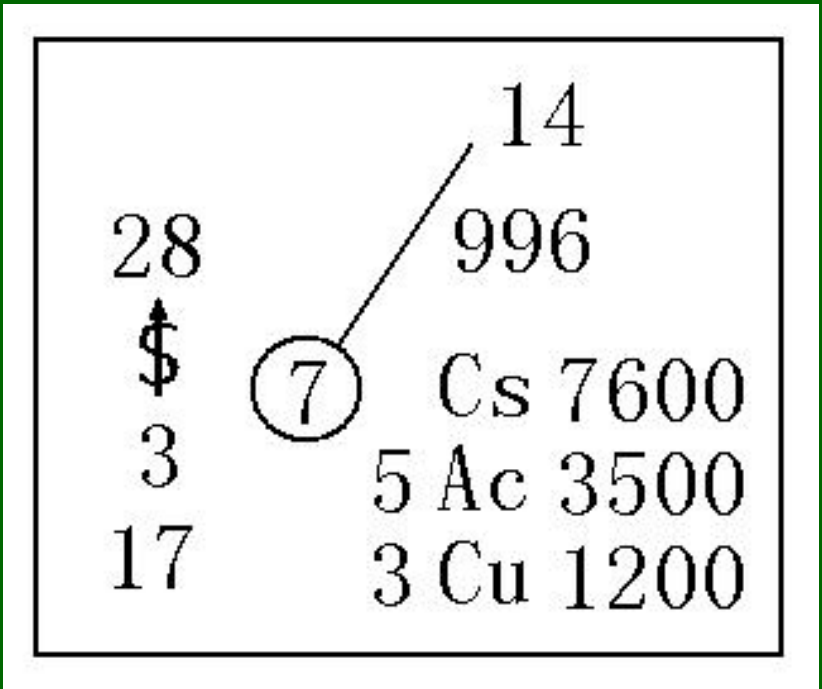
The wind direction and wind speed

- **The wind direction indicated according to 360° or 16 positions with the arrow pole that, the wind speed sections out with the number, the unit is m/s**



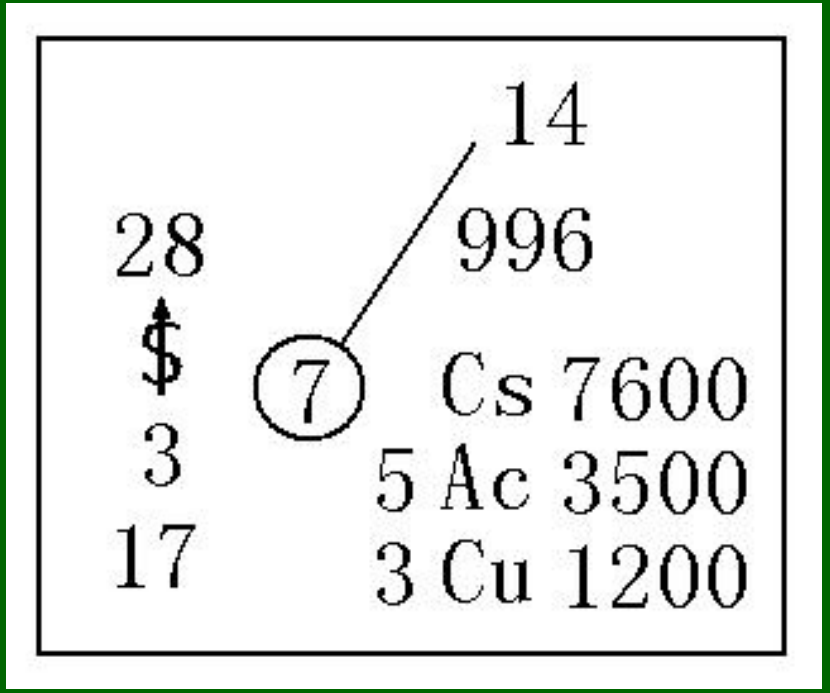
Barometric pressure

- use the QFE or the QNE (according to needs to choose) and expression by hPa.

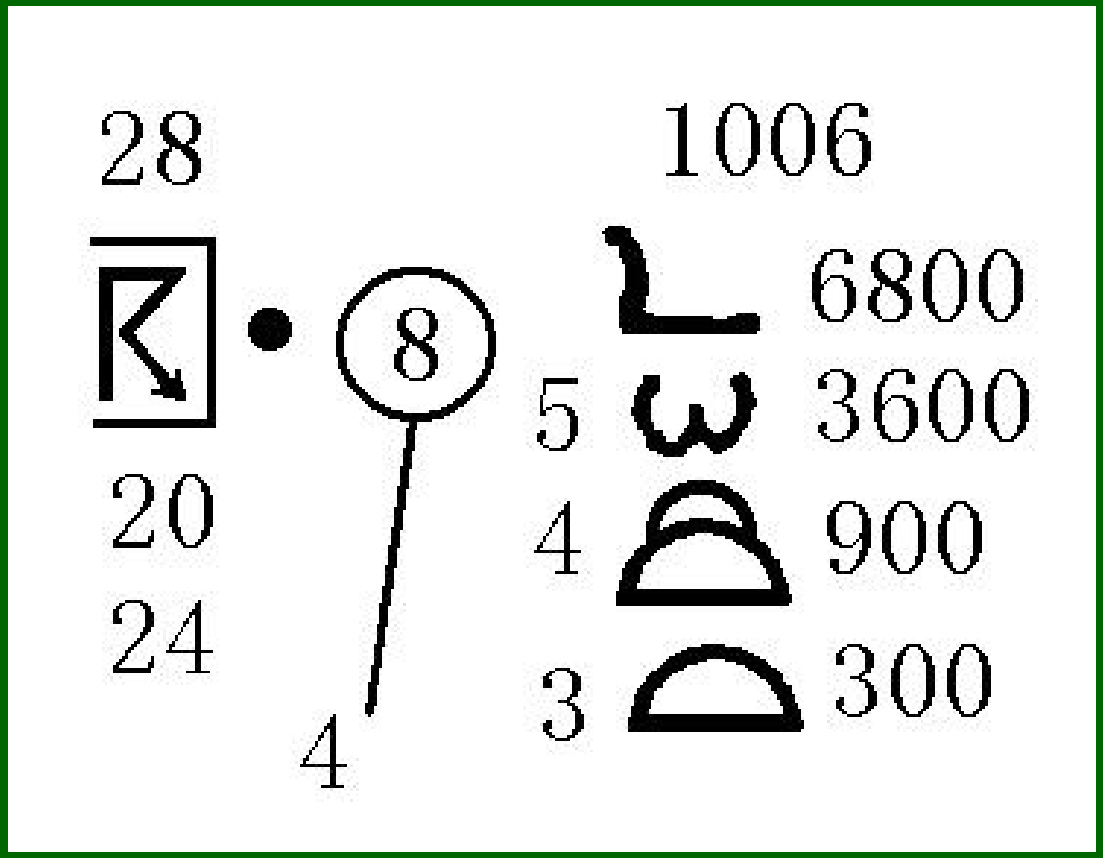


Cloud amount, cloud type, cloud height.

1. **The cloud amount with eight minute systems, generally fills in the accumulation cloud amount, the cloud type uses the plotting mark, cloud height uses the numerical code, the unit is m.**



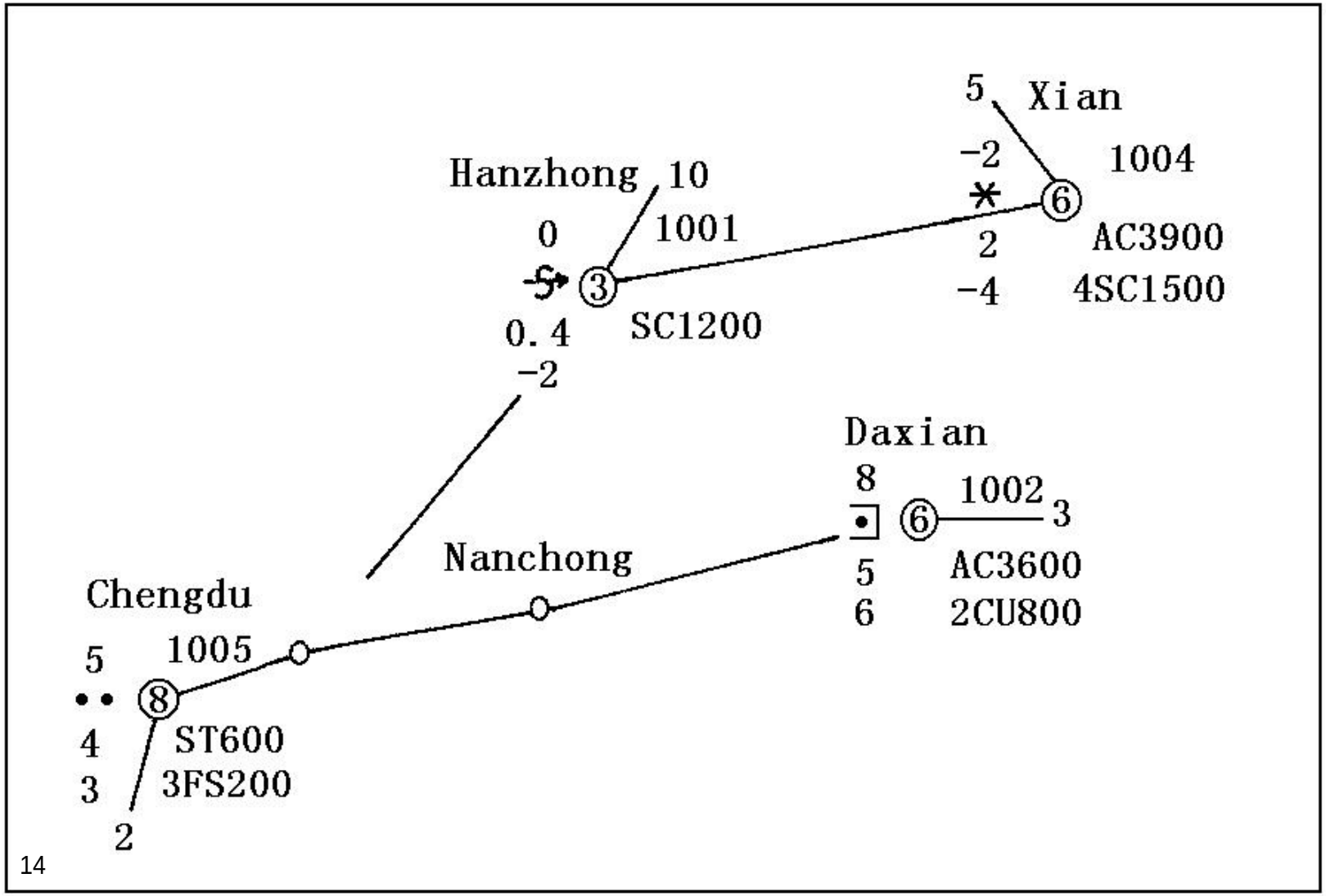
example of aviation weather report



1.2 Surface Aviation Weather Report Chart

- frequently is by the route form. The meteorological observatory fills in the weather live on the chart along the route at the identical time, enables the pilot clearly to understand the present weather in the route and the landing station, but several such live charts also will be allowed to see the tendency which the weather changes

Surface Aviation Weather Report Chart



2 Significant Weather Prognostic Charts

- Significant weather prognostic charts, called progs, it depicts weather conditions that are forecast to exist at a specific time in the future shown on the chart, portray forecast weather to assist in flight planning.

The classification of significant weather prognostic chart

The significant weather prognostic charts are generally divided in three kinds of height layer to offer:

- **Low-Level Significant Weather Prog Chart (SWL)**
- —the flight height is lower than FL100 (10 000 feet).
- **Middle-Level Significant Weather Prog Chart (SWM)**
- —the flight height is from FL 100 to FL250 (10 000 feet – 25 000 feet).
- **High-Level Significant Weather Prog Chart (SWH)**
- —the flight height is from 25,000 feet to 63,000 feet. This encompasses FL250 to FL630

Low-Level Significant Weather Prog Chart (SWL)

- **Main contents of the Significant Weather Prognostic Charts**
- Example of Low-Level Significant Weather Prog Chart

主要内容

（1）Significant weather

（2）Important weather system

（3）Cloud accompanying with significant weather

（4）Surface visibility below 5 000 m

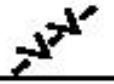
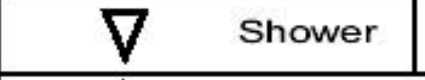
（5）pressure centre and fronts and their expected movements and developments;

（6）below FL100 0℃ isothermal layer altitude

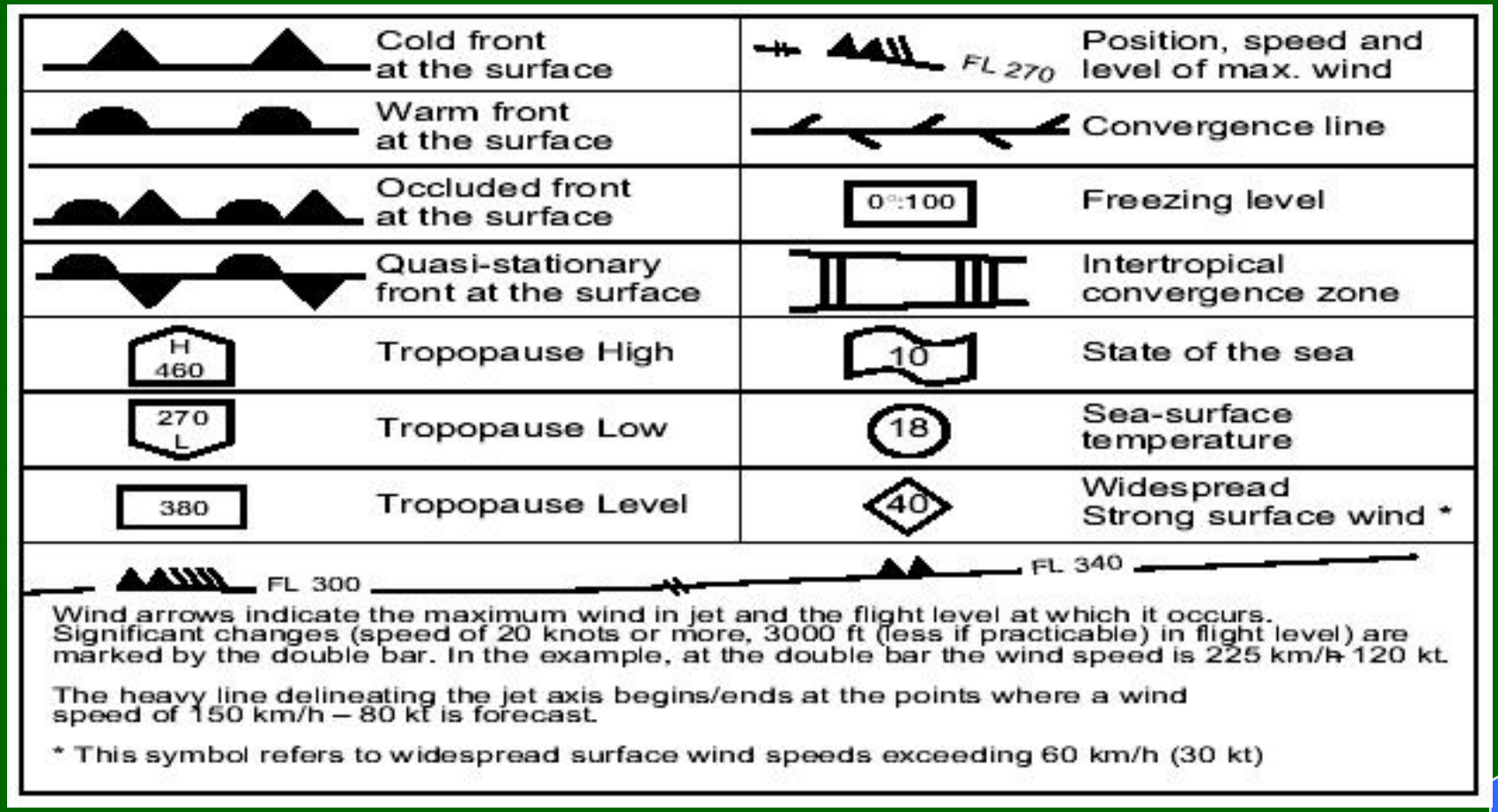
（7）Sea-surface temperature and state

（8）location of volcanic eruptions which are producing ash clouds of significance to aircraft operations, name of volcano and time of first eruption, if known;

Symbols for significant weather

	Thunderstorms		Drizzle
	Tropical cyclone		Rain
	Severe squall line		Snow
	Moderate turbulence		Shower / Hail
	Severe turbulence		Widespread blowing snow
	Mountain waves		Severe sand or dust haze
	Moderate aircraft icing		Widespread sandstorm or dust storm
	Severe aircraft icing		Widespread haze
	Widespread fog		Widespread mist
	Radioactive materials in the atmosphere		Widespread smoke
	Volcanic eruption		Freezing precipitation
	Mountain obscuration		Visible ash cloud

Important weather system



Cloud accompanying with significant weather

The cloud amount describes with the abbreviation

The cloud type uses the simple form mark.

The important weather and the cloud area scope encircles with the undulation line, the somewhat important weather and the cloud also section out the lower limit highly with the upper limit altitude, sometimes also uses the abbreviation to explain

Significant weather forecast commonly used abbreviation

- **Cloud type**
- CI = Cirrus
- CS = Cirrostratus
- AS = Altostratus
- SC = Stratocumulus
- CU = Cumulus
- CC = Cirrocumulus
- AC = Altocumulus
- NS = Nimbostratus
- ST = Stratus
- CB = Cumulonimbus

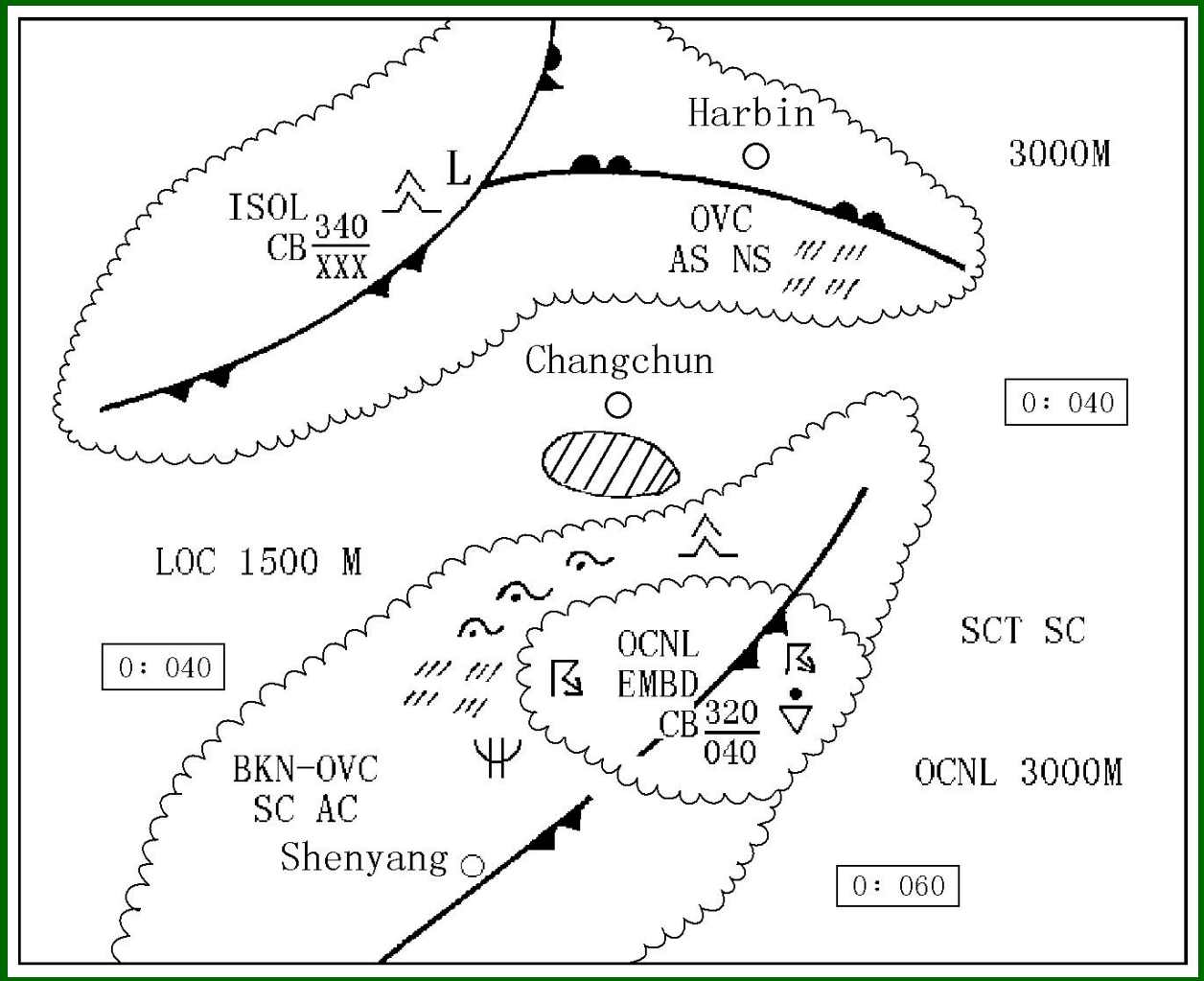
Significant weather forecast commonly used abbreviation

- **Cloud amount**
- Clouds except CB
- FEW = few (1/8 to 2/8)
- SCT = scattered (3/8 to 4/8)
- BKN = broken (5/8 to 7/8)
- OVC = overcast (8/8)
- SKC = sky clear (0/8).

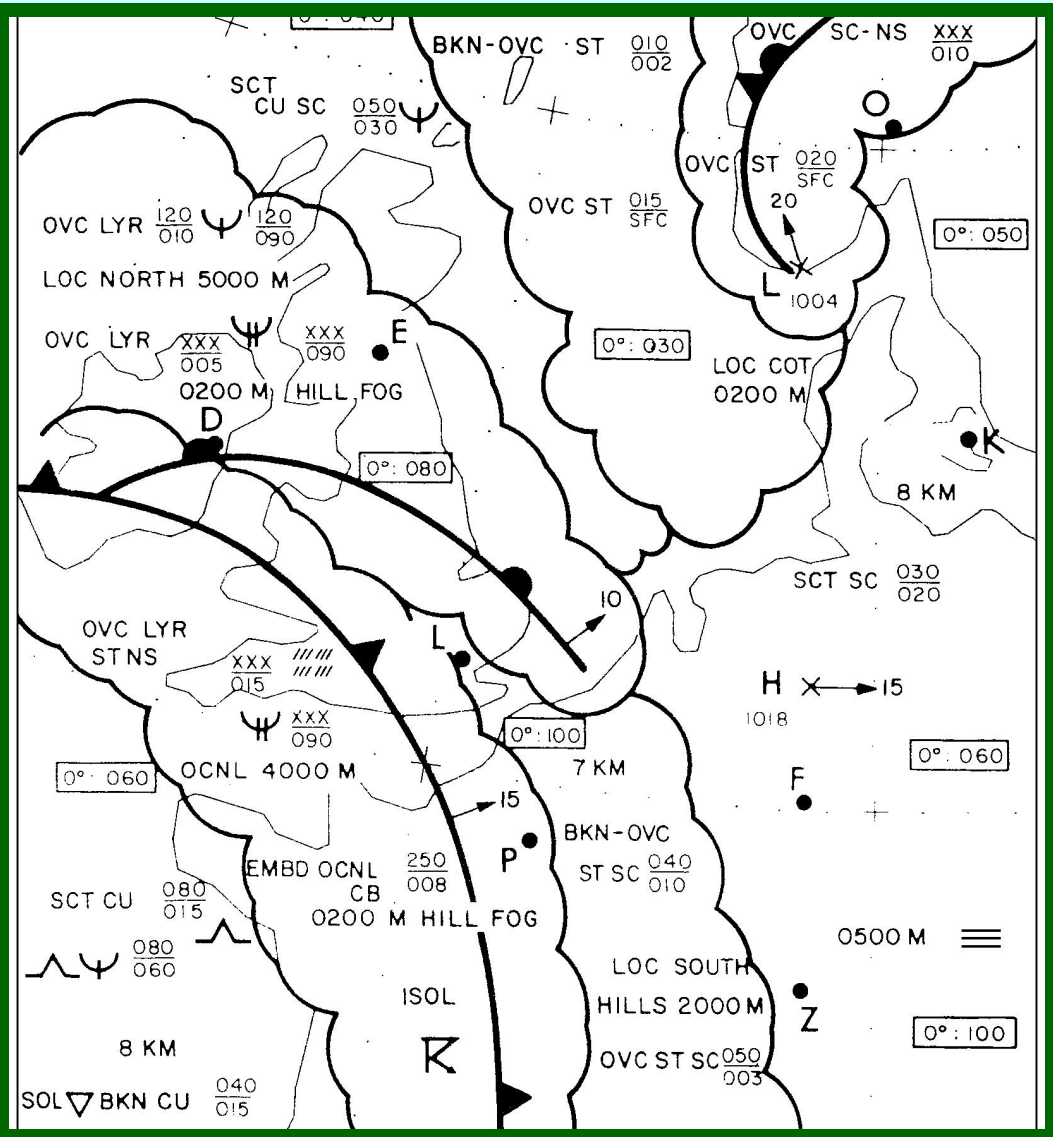
Significant weather forecast commonly used abbreviation

- CB only
- LOC = some places have CBs (local)
- ISOL = individual CBs (isolated)
- OCNL = well-separated CBs (occasional)
- FRQ = CBs with little or no separation (frequent)
- EMBD = CBs embedded in layers of other clouds or concealed by haze (embedded)

Example of Low-Level Significant Weather Prog Chart



Example of Low-Level Significant Weather Prog Chart



2.3 Middle-Level Significant Weather Prog Chart (SWM)

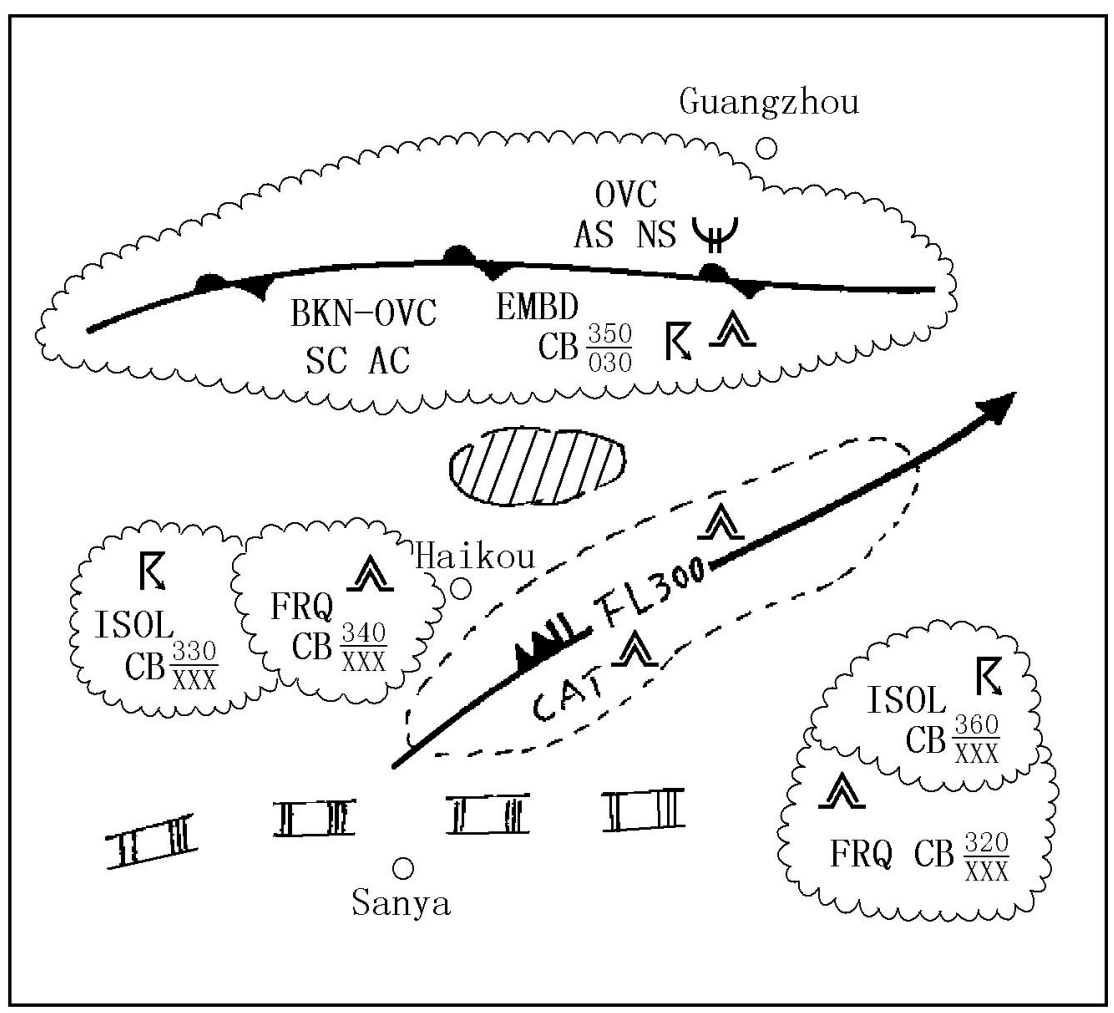
- On the Middle-Level Significant Weather Prog Chart the main content still was Figure 12-4 Significant weather phenomena, with Figure 12-5 weather system.
- With the Low-Level Significant Weather Prog Chart the different does not have the Surface visibility, the pressure centre, 0℃ isothermal layer altitude, Sea-surface temperature and state.

2.3 Middle-Level Significant Weather Prog Chart (SWM)

Increased appeared in the upper air flight meteorological condition:

- **1. Heavy broken line delineation of area of clear air turbulence (CAT), and its intensity is denoted by symbols.**
- **2. Heavy solid line show the position of jet stream axis with indication of wind direction,**
- **interrupted by wind speed in KT or km/h and height in flight levels.**
- **3. Ash cloud (AV).**

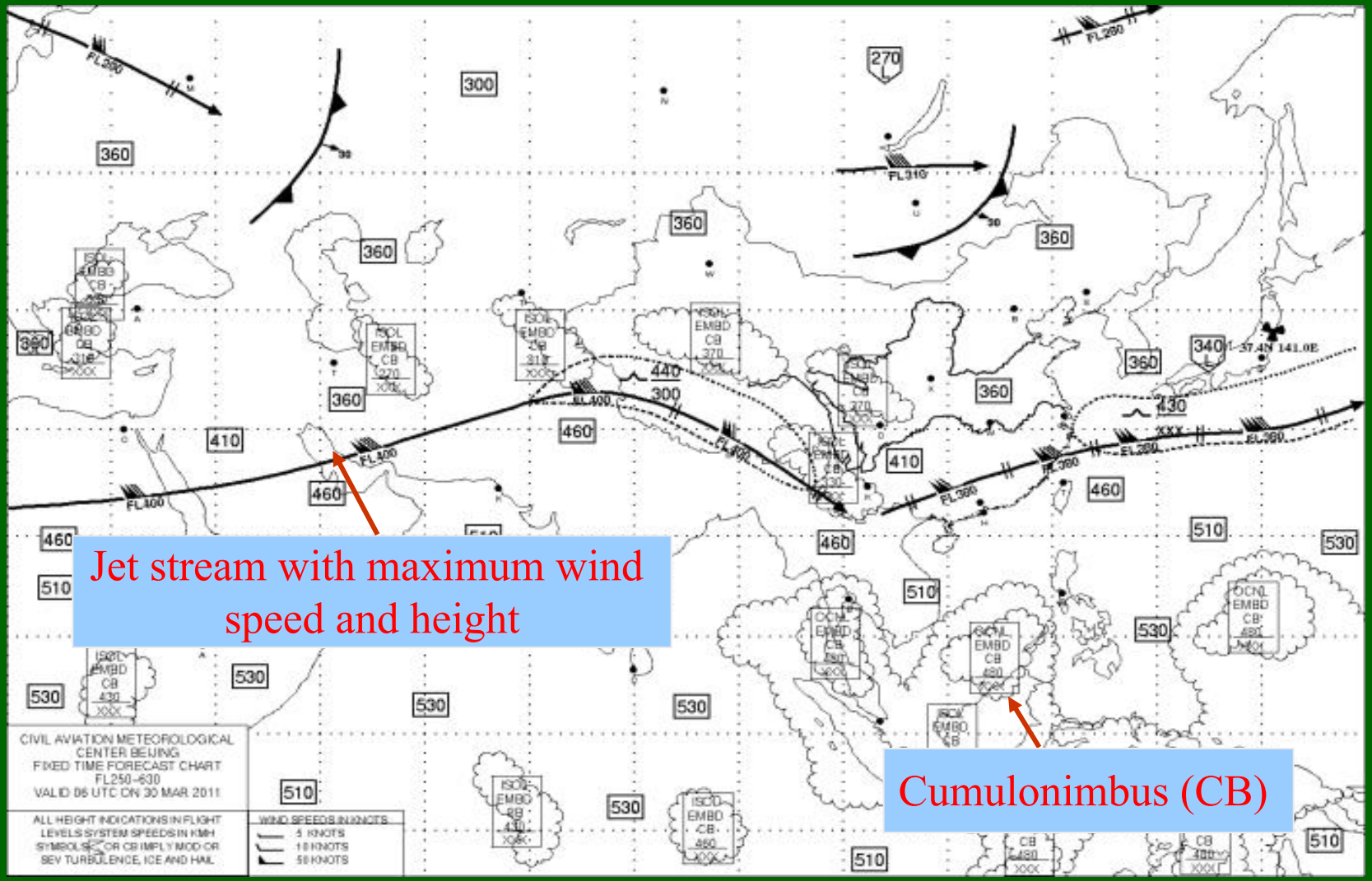
Example of Middle-Level Significant Weather Prog Chart



High-Level Significant Weather Prog Chart (SWH)

High-level significant weather prog chart have predicted all weather phenomenon of the middle level, Unlike it the cloud only predicts cumulonimbus, still have the height in flight levels of tropopause, the unit is 100 feet.

High-level Significant Weather Forecast Chart

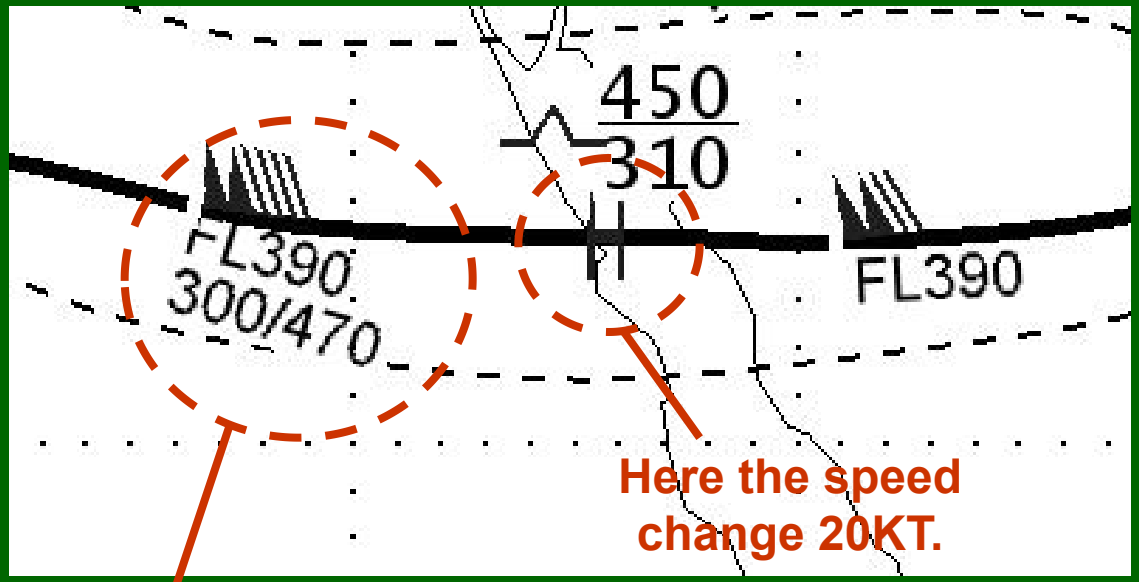


AMC: Asia

WAFS： Asia-Europe, Australia-Asia, Pacific

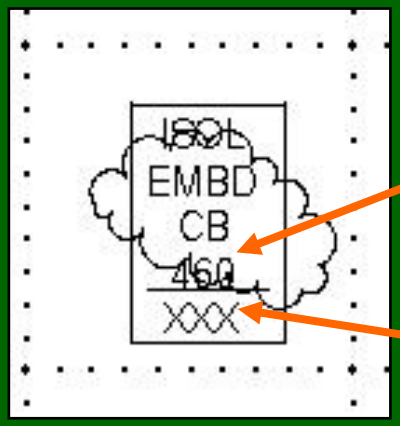
High-level Aviation Meteorological Parameter

- Jet streams
  - Location
  - Strength (≥80KT)
  - Depth of the 80KT (for jetstreams ≥120KT)



High-level Aviation Meteorological Parameter

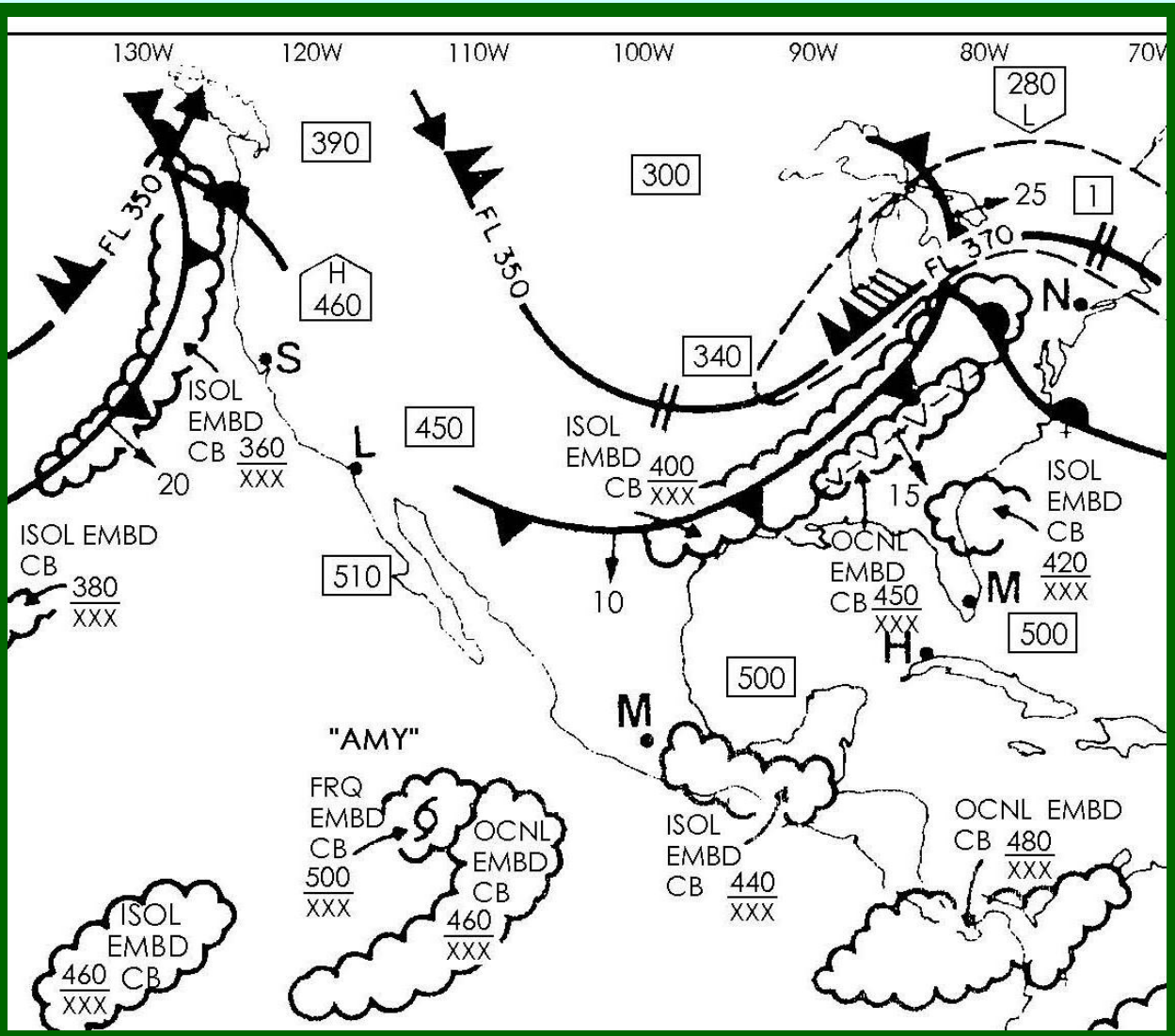
- **Cumulonimbus（CB）**
  - **ISOL (EMBD) CB**
  - **OCNL (EMBD) CB**
  - **FRQ CB**



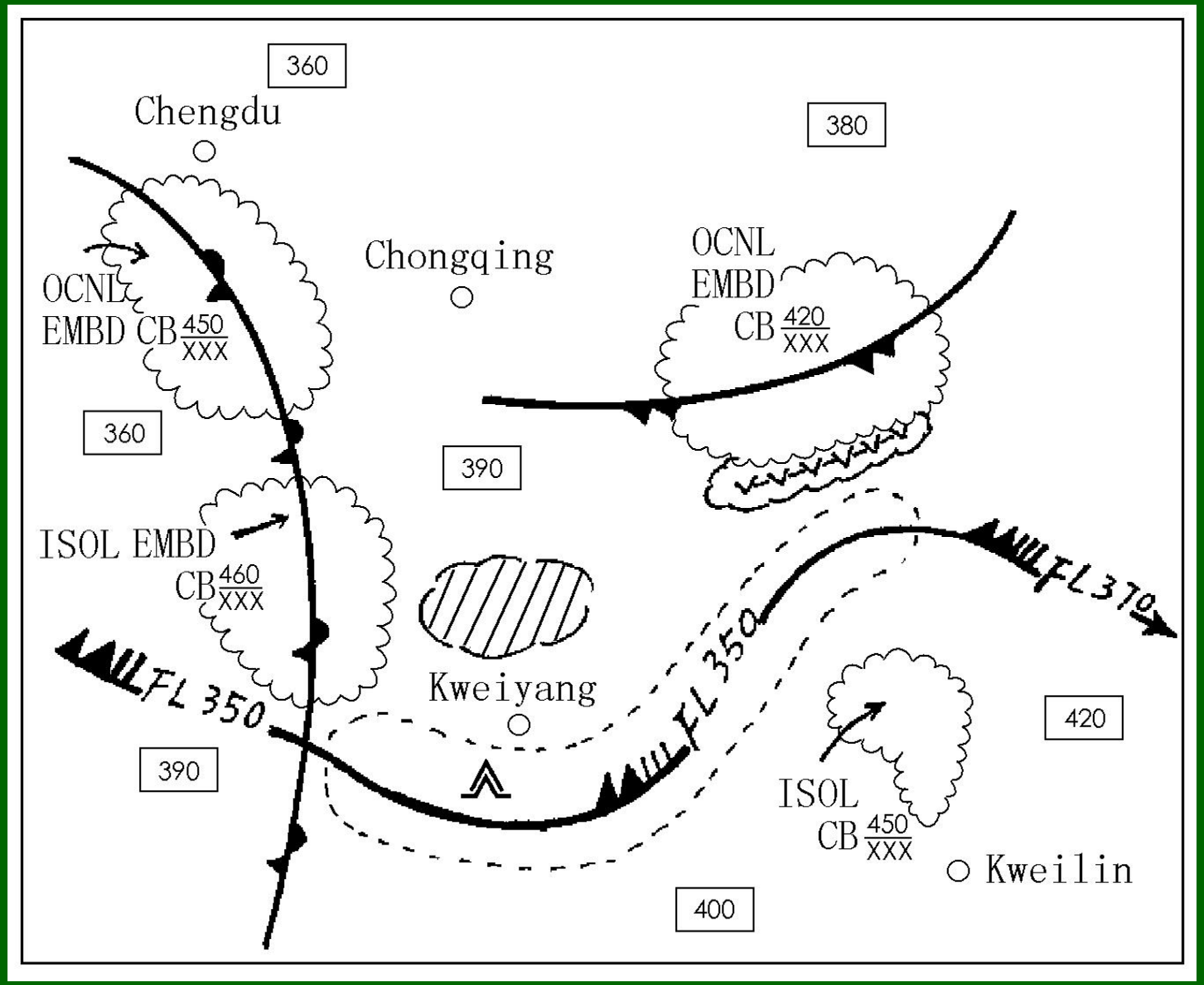
- ISOL: individual CBs, with maximum spatial coverage <50%
- OCNL: well-separated CBs, with maximum spatial coverage 50% ~75%
- FRQ : little or no separation, with maximum spatial coverage >75%
- EMBD : CB embedded within cloud layers and cannot be readily recognized

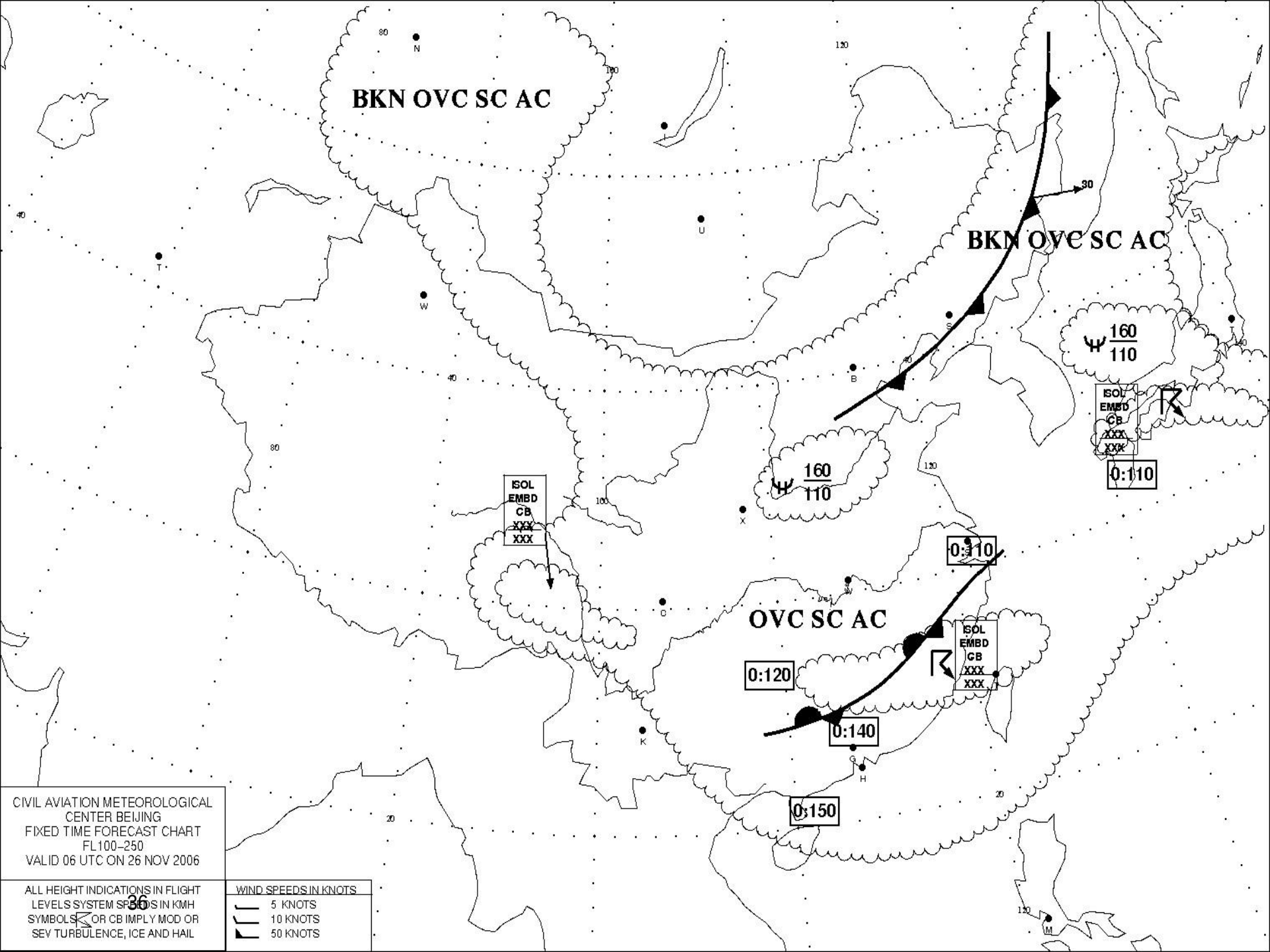
CB：thunderstorm, hail, moderate or severe icing and turbulence

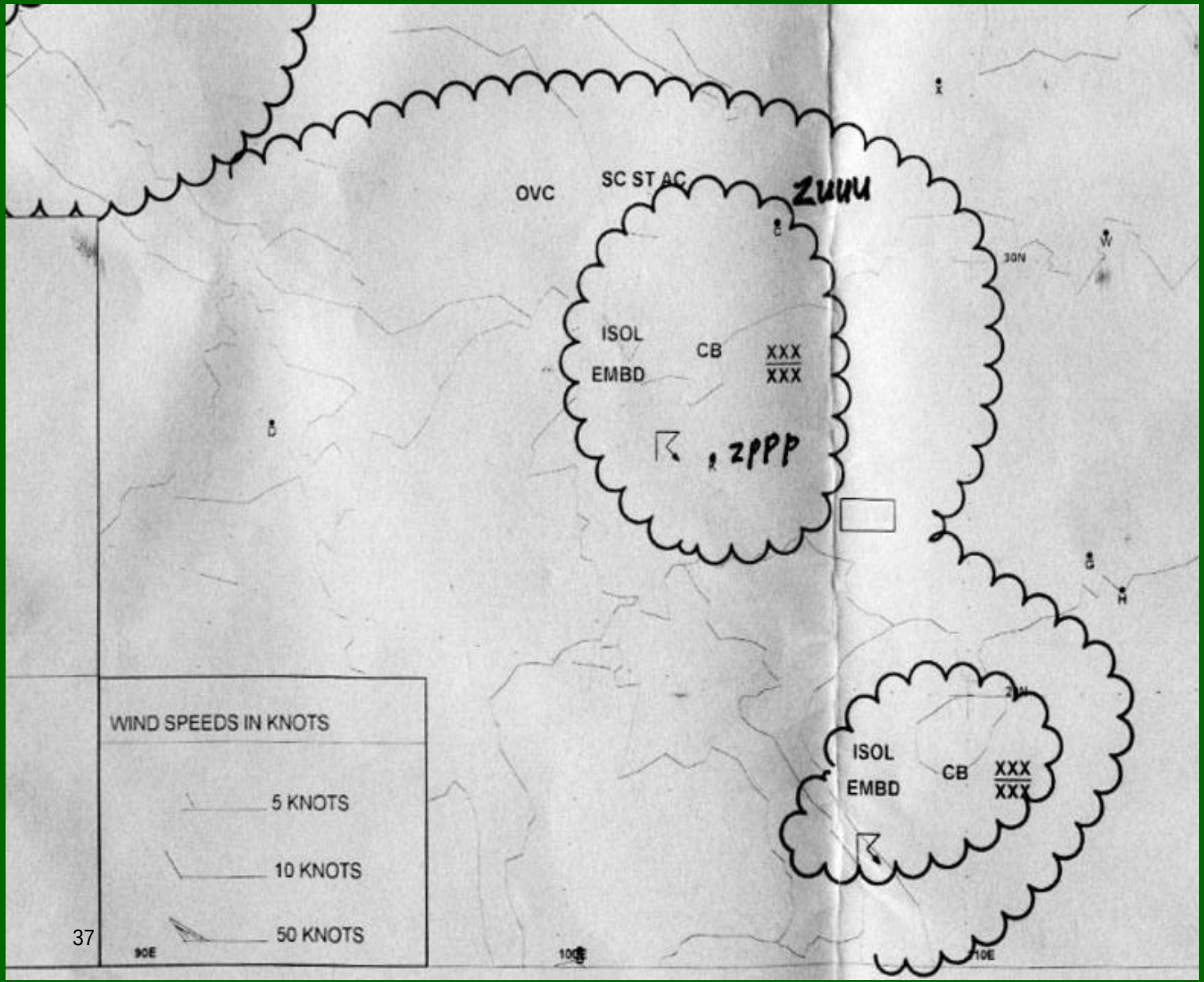
Example of High-Level Significant Weather Prog Chart

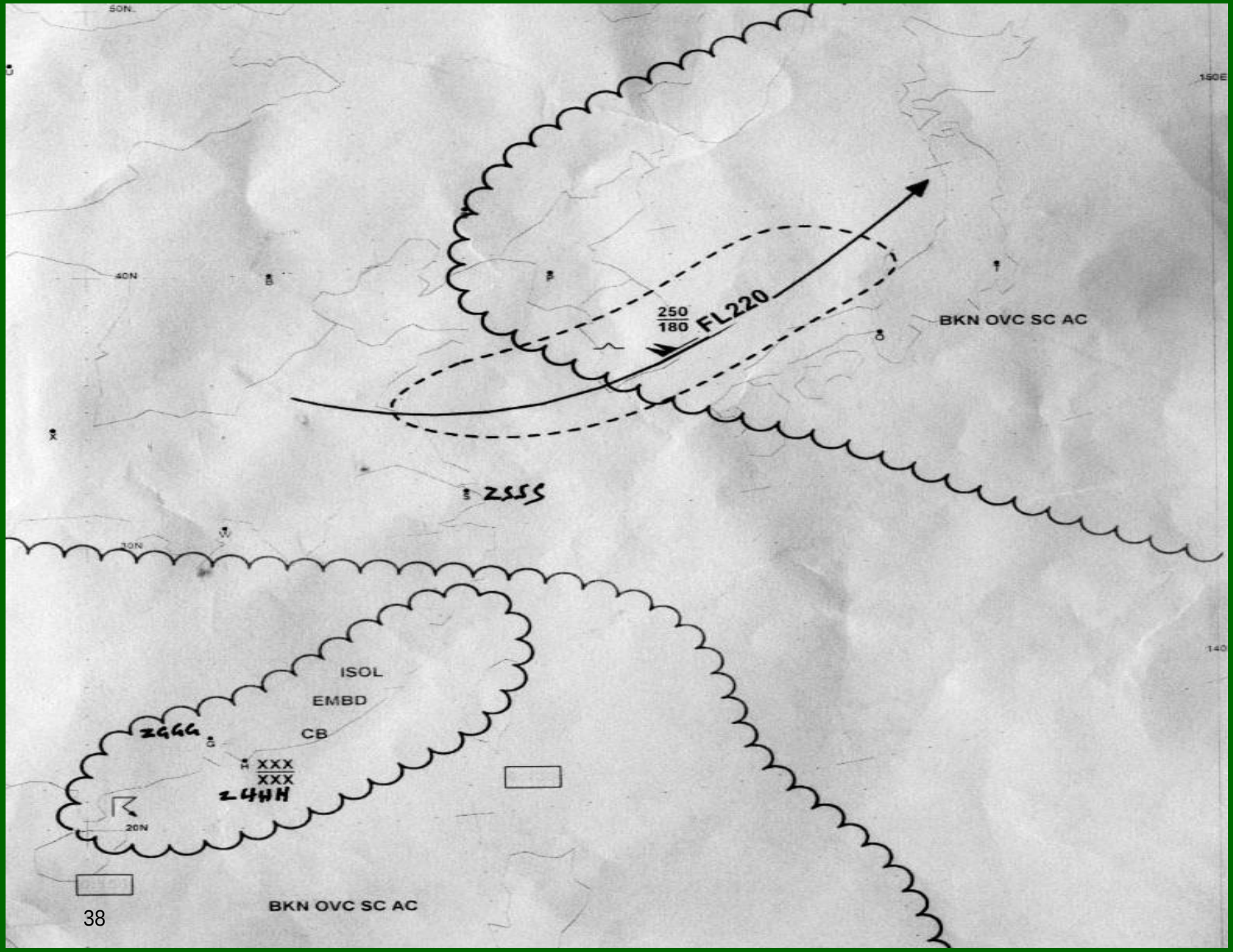


Example of High-Level Significant Weather Prog Chart




BKN OVC SC AC
BKN OVC SC AC
30
160
110
ISOL
EMBD
CB
XXX
XXX
0:110
160
110
ISOL
EMBD
CB
XXX
XXX
0:110
OVC SC AC
ISOL
EMBD
CB
XXX
XXX
0:120
0:140
0:150
CIVIL AVIATION METEOROLOGICAL
CENTER BEIJING
FIXED TIME FORECAST CHART
FL100–250
VALID 06 UTC ON 26 NOV 2006
ALL HEIGHT INDICATIONS IN FLIGHT
LEVELS SYSTEM SPEEDS IN KMH
SYMBOLS OR CB IMPLY MOD OR
SEV TURBULENCE, ICE AND HAIL
WIND SPEEDS IN KNOTS
5 KNOTS
10 KNOTS
50 KNOTS


OVC
SC ST AC
ISOL
EMBD
CB
XXX
XXX
WIND SPEEDS IN KNOTS
5 KNOTS
10 KNOTS
50 KNOTS
90E
100E
10E


50N
150E
40N
250
180
FL220
BKN OVC SC AC
2555
30N
140
ISOL
EMBD
CB
2666
XXX
XXX
24HH
20N
BKN OVC SC AC

3 Wind And Temperatures Aloft Forecast

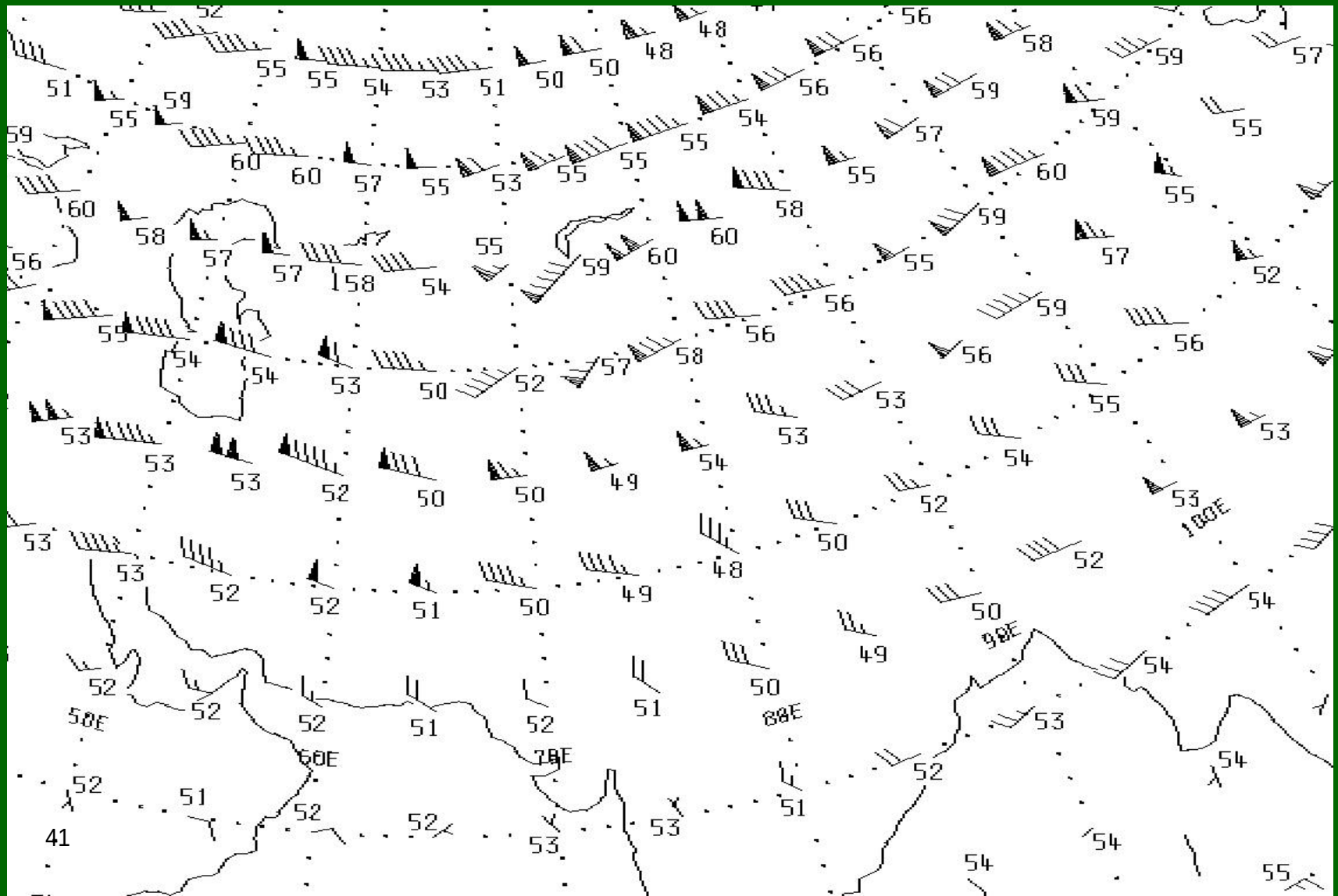
- The **Wind And Temperatures Aloft Forecast** provides is on the grid mesh point the different high wind direction, the wind speed and the temperature, these forecasts when makes the flight plan is extremely important.

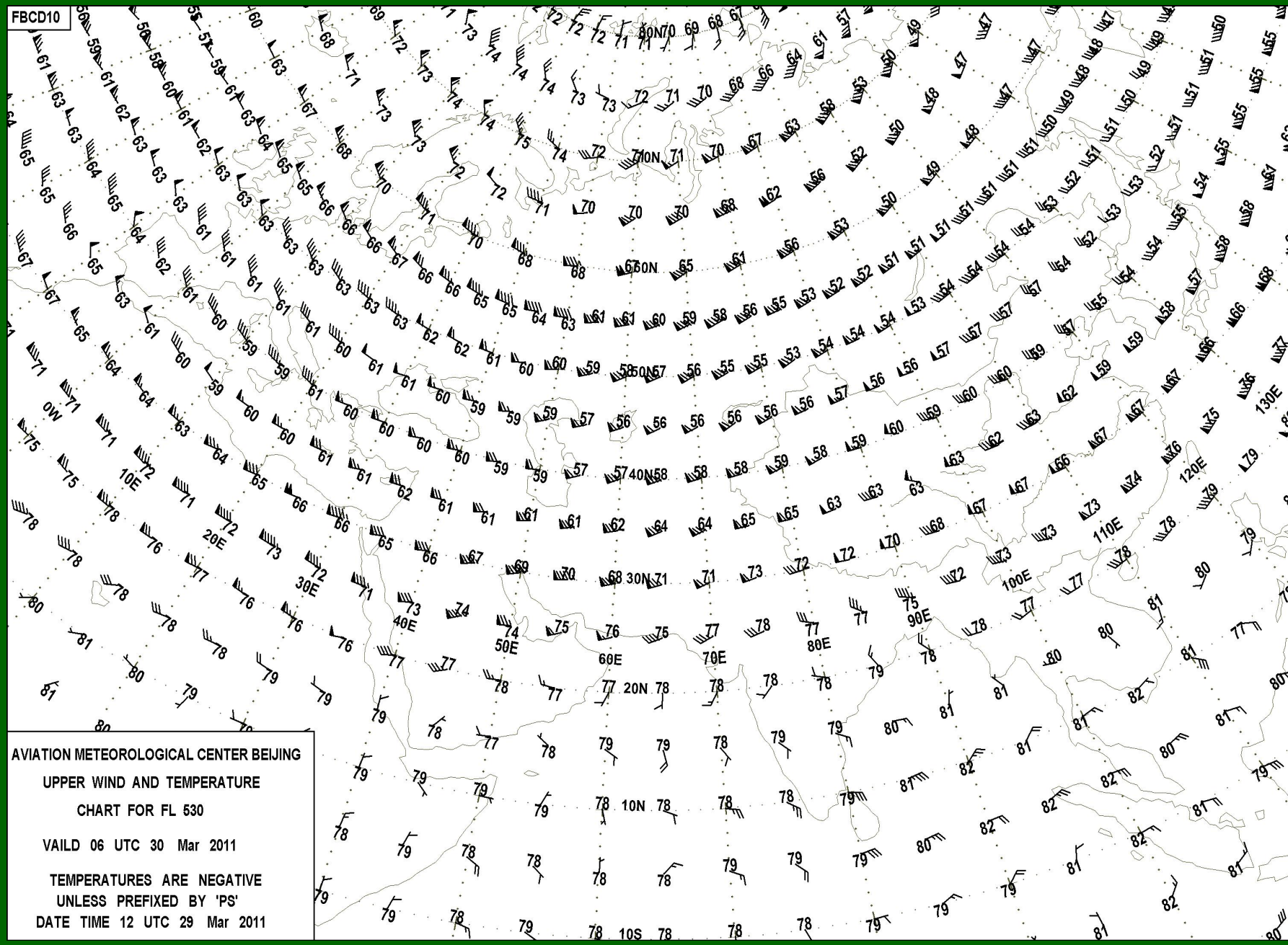
Wind expression on the **Wind And Temperatures Aloft Forecast**

5 knots (9.2 km/h)	
10 knots (18.5 km/h)	
50 knots (92.5 km/h)	

- In the wind and temperatures aloft forecast charts, the temperatures is noted by degrees Celsius they are all negatives unless prefixed by “+”.

The wind and temperature on standard constant-pressure surface




FBCD10
80N
70N
60N
50N
40N
30N
20N
10N
10S
0W
10E
20E
30E
40E
50E
60E
70E
80E
90E
100E
110E
120E
130E
AVIATION METEOROLOGICAL CENTER BEIJING
UPPER WIND AND TEMPERATURE
CHART FOR FL 530
VAILD 06 UTC 30 Mar 2011
TEMPERATURES ARE NEGATIVE
UNLESS PREFIXED BY 'PS'
DATE TIME 12 UTC 29 Mar 2011