

Computer assisted meteorology

BY FRANK PENNAUER

Frank Pennauer from Ontario, Canada, explains how he uses data from the internet for his personal thermal forecast on his webpage www.thermalforecast.com.

The sources for weather data available on the internet are numerous, to say the least. In this paper only the web addresses of the sources and the data from these sources required for thermal forecast presented herein are shown. With sample tables/diagrams obtained from these sources, it will be discussed how to interpret them. The web pages will be presented in the sequence as they are called up to process the data. It is suggested that this forecast is being done in the late afternoon or early evening on the day prior to the flying operation.

Will there be the a possibility of thermal development tomorrow?

First get a general picture of the expected weather condition for the next day from the the local weather forecast on radio or TV. Most TV-stations also will show the surface prognostic chart indicating high and low

pressure areas and frontal systems. If there is no indication of adverse weather conditions shown for you area continue to check with the information obtainable from the following web sites to see the chances for next days thermal activities in your area.

First you need to know the geographic coordinates of your airfield or flying area. These need to be converted into the metric system. To do this use following web site: <http://www.fcc.gov/mb/audio/bickel/DDDMSS-decimal.html>

Also note down the expected maximum forecast temperature given in the media for your area or your local weather office web site.

For this paper I have used the data to forecast the thermal activity expected at the gliding center in Narromine in Australia. It is most important to get a reliable forecast maximum temperature and dew point. I was fortunate to find this information for

Narromine in a local website: <http://www.weatherzone.com.au/nsw/cw-slopes-and-plains/narromine>

From this we get the maximum forecast temperature and also the dew point. So we mark down:

- The airfield coordinates in metric system
- Maximum forecast temperature in Centigrade
- The forecast dew point at the maximum temperature

For the sample calculation these are

- S -32.21 W 148.22
- 39 °C
- 16 °C

If you are unable to obtain temperature or dew point (the forecast dew point is normally difficult to obtain from the local forecast) from any of the sources above obtain the data from:

1. "Meteogram for computer model temperature and dew point data"

<http://ready.arl.noaa.gov/READYcmet.php>

first window (enter in metric)

lat -32.21 (minus for south of equator)
long 148.22 (if west of Greenwich meridian it has to preceded by a minus)

second window

select Meteogram GFS Model 0-192 hrs

third window

"Next"

fourth window

Starting date/time 1300 local time your location in GMT

e. g. sample 0300 UTC = 1300 local time Narromine

Text only

Insert access code and enter

GFS METEOGRAM

Latitude:-32.21 Longitude: 148.22

DATA INITIAL TIME: 31 JAN 2011 12Z

CALCULATION STARTED AT: 01 FEB 2011 03Z (this is 1300 local time Narromine)

HOURS OF CALCULATION: 6

| HR | HPA | TEMP 2M DEGC | DEW PT 2M DEGC | TEMP 850 MB DEGC | |
|------|--------|--------------------|----------------------|------------------------|---------------------------|
| + 0. | 1009.8 | 36.6 | 14.3 | 21.8 | Narromine 1300 local time |
| + 3. | 1007.6 | 36.9 | 15.7 | 23.7 | Narromine 1600 local time |
| + 6. | 1008.8 | 32.1 | 17.4 | 23.4 | |

From this meteogram extract max. temperature 36.9 °C and dew point 15.7 °C

Next call up :

2. Model Soundings

<http://ruc.noa.gov/>

First window - left column - Soundings click on Interactive (Java)(beta)

Second window. Click(mark) GFS

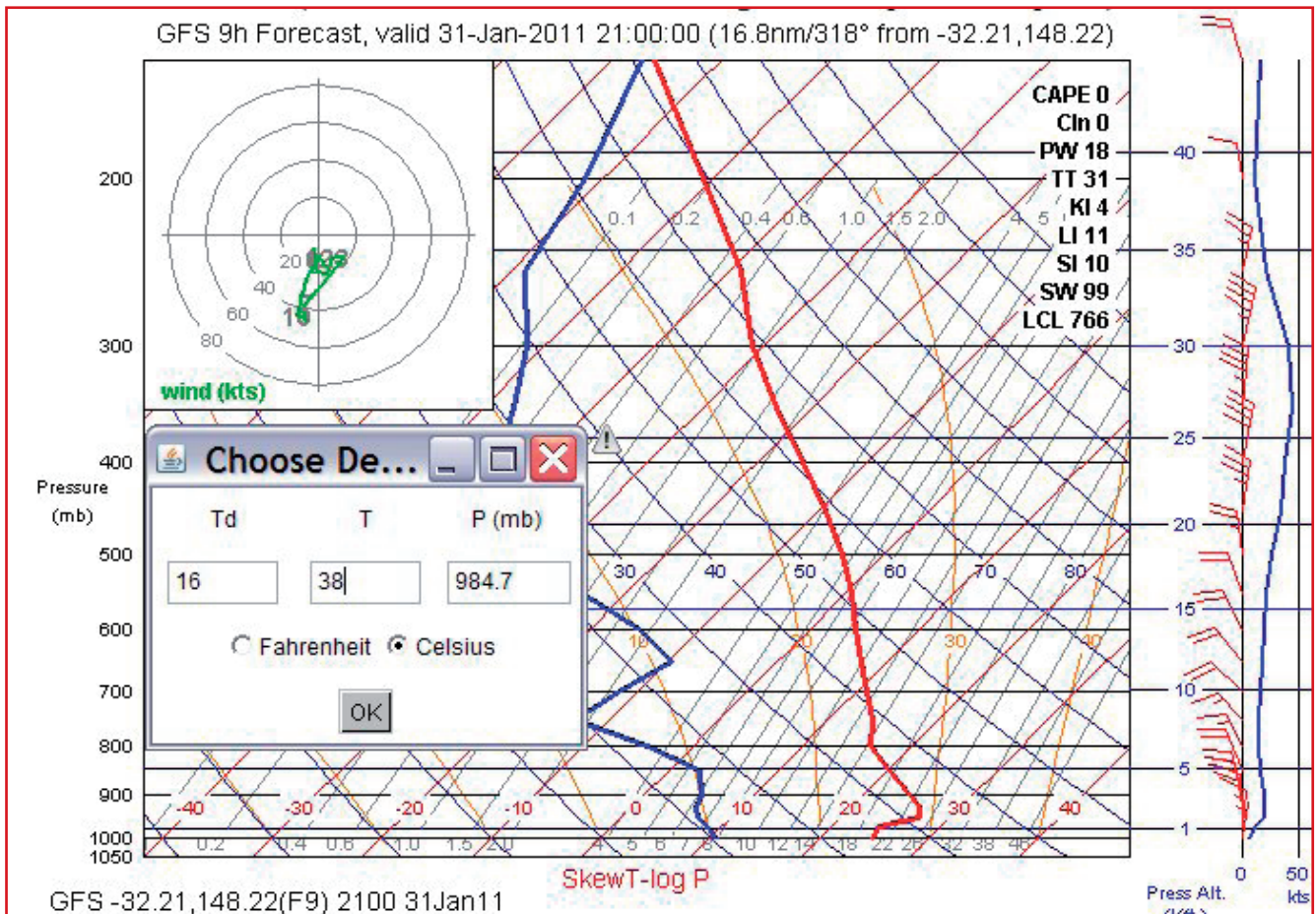
Start Valid Time *2011 Jan 31 2100 UTC

(this is Narromine 2011 Feb 1 0700 local time)

Name lat,long * -32.21 148.22 (Narromine in metric)

then Click on “Java based plots”

* required your location Sunrise Time in UTC *latitude and longitude of your location in metric (South is - ,West is -)



Work above window (skewT diagram) as follows:

At 1000mb line left click mouse and hold and move gradually up until the closest point to airfield elevation (in sample 790ft)

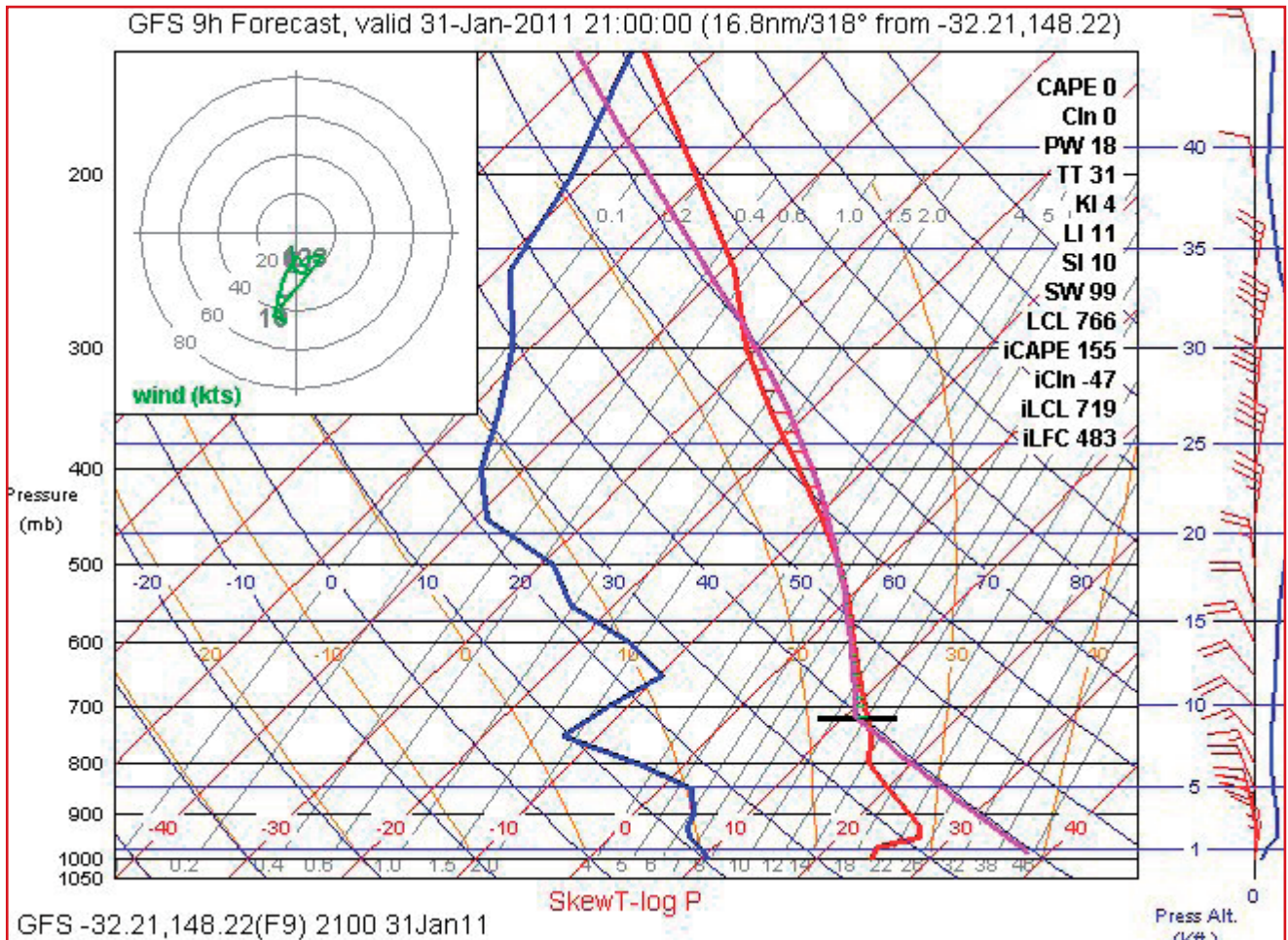
is shown on moving data block, then stop mouse movement and right click.

Subwindow "Choose De..." then opens.

Mark "dot" into "Celsius" then enter the Td - Dew Point from Meteogram (16°C) and T - Temperature (38°C). In this sample for

temperature medium value between Meteogram (37°C) and local forecast (39°C) was entered. P, the airfield msl pressure, has automatically loaded itself on right clicking of mouse previously.

Then - click OK.



The Result

This diagram shows that any developing thermal will rise (the magenta line) along the dry adiabat (black line), starting at 38°C at 790ft (airfield elevation). It rises dry adiabatically until it either intersects the environmental lapse rate line (red) or the dew point line (green dotted) which was started at 16°C at 790ft.

In this sample the dry adiabat intersects the dew point line and also the environmental lapse rate line at almost the same point at about the 720mb (8890 ft MSL) level, this is the convection base. It is at 8100 ft AGL (8890ft MSL minus 790ft MSL).

From this it can be predicted that blue (dry)

thermals will rise to 8100 ft AGL where with a high possibility condensation will take place with cumulus cloud development. The thermal would continue to rise (magenta line) along the moist adiabat (curved brown line).

With the shown temperature profile, small to medium size cumulus cloud development with the potential of some towering cumulus and a chance of scattered shower activity can be expected. Thermal strength cannot be determined from this diagram. How to assess thermal speed and climb rate will be subject of the next article.

Notes

The maximum forecast temperature by the local weather offices for the location closest to the flying area is often found to be the more realistic than the max temperature shown in the Meteogram or Skew T-diagram. If the temperature differs greatly interpolate and use a medium value.

If a surface dew point temperature at the maximum forecast temperature is also available from the local weather office use this value. Otherwise use the Dew Point Temperature shown on the Skew-T diagram or Meteogram. If rainfall in excess of five mm has occurred during the previous twelve hours increase the dew point by two deg C.