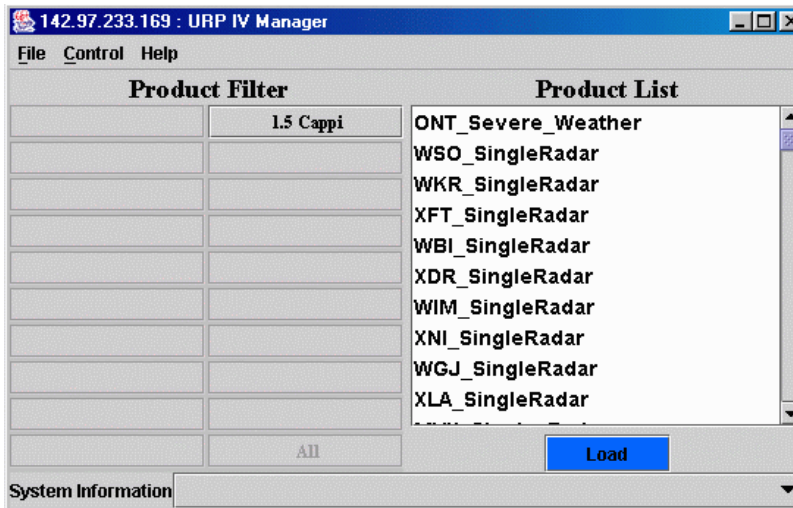


KNOBOLOGY OF NRP 2.0

IV Viewer

The NRP 2.0 interactive viewer is a Java program executed on your own system. This should be a considerable improvement over the old IV which ran from a web browser via a Java applet.

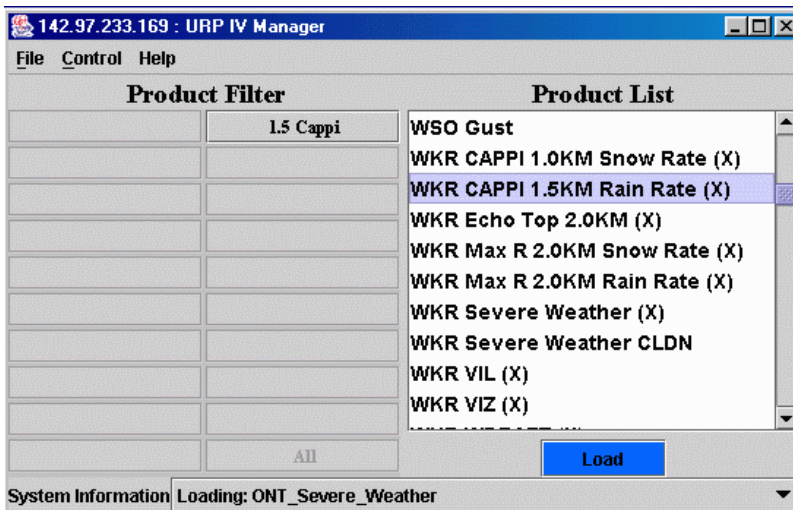
There are 2 significant new choices in the IV viewer, labeled “Severe Weather” and “<Radar name> Single Radar”. We will talk extensively about these later.



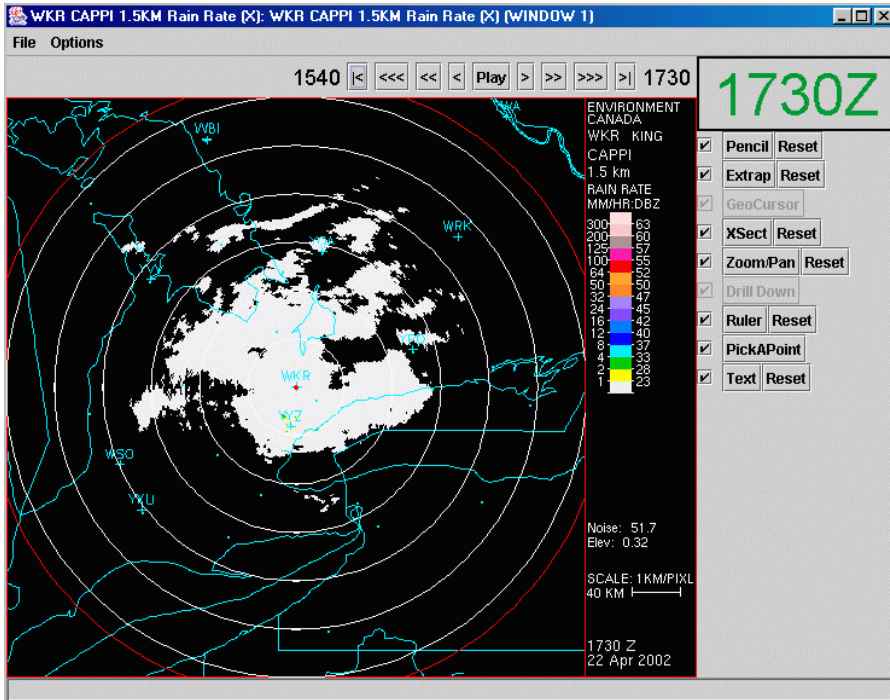
You can default to the old 1.2 way of doing things.

Scroll down on the product list

Choose from the product list any entry that has the radar name followed by a radar product, i.e. YKR CAPPI 1.5 Rain Rate (X) then load..



Result is the same picture that you would get from 1.2 interactive viewer, although the controls are different.



New Controls on IV viewer

All windows now have these new controls

Animation controls



2.0 animation controls are considerably different from 1.2

It includes more animation buttons and more times

Times of the first and last available pictures are displayed in black to the left and the right of the control buttons. These times will be important to note in cell view.

The BIG time is the time of the individual picture now being displayed. If it is green it is the latest available picture if not black.

The time steps backwards/forward are :

	<	>	5 minutes
	<<	>>	10 minutes
	<<<	>>>	30 minutes
first	I<	>I	latest available picture

There is a 5 minute button because there is some radar data available every 5 minutes.

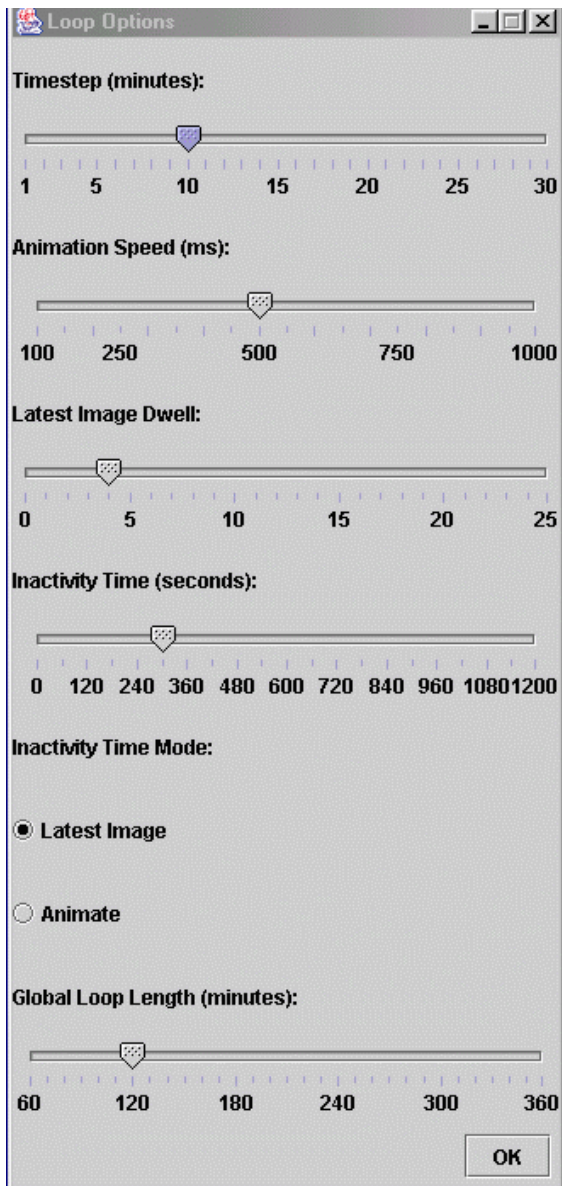
If you try to push a forward button and you are at the end of the loop, nothing will happen (this is a change from 1.2, which used to put you back at the beginning of the loop).

Most of the time there is no 5 minute data. If you try to go forward (backward) by 5 minutes the display will default to the time previous to that. So going reverse the pictures will change on the 5 minute; going forward they will change on the 10 minute.

All windows are time synched so if you start an animation on one window, all the windows will animate.

Changing animation settings.

Go to Options/loop settings on main IV window



Time Step: You can adjust so loops take pictures every 5, 10, 20, 30 minutes.

Speed: You can adjust the speed of the loop.

Latest image dwell: You can adjust how long the loop stops on the last picture, before the loop restarts.

Inactivity time and mode: You haven't touched the system in a while. After an adjustable period of time (up to 20 minutes) it will default to user selectable **Inactivity Time Mode**, either 1) latest image; or 2) animation loop.

Global loop length: You can adjust how long a loop you would like. The default is 2 hours.

Hint: You might go to 6 hours with 20 or 30 minute time steps in synoptic non-convective situations. Stick with 2 hours or less with convection.

New and Updated Functionalities

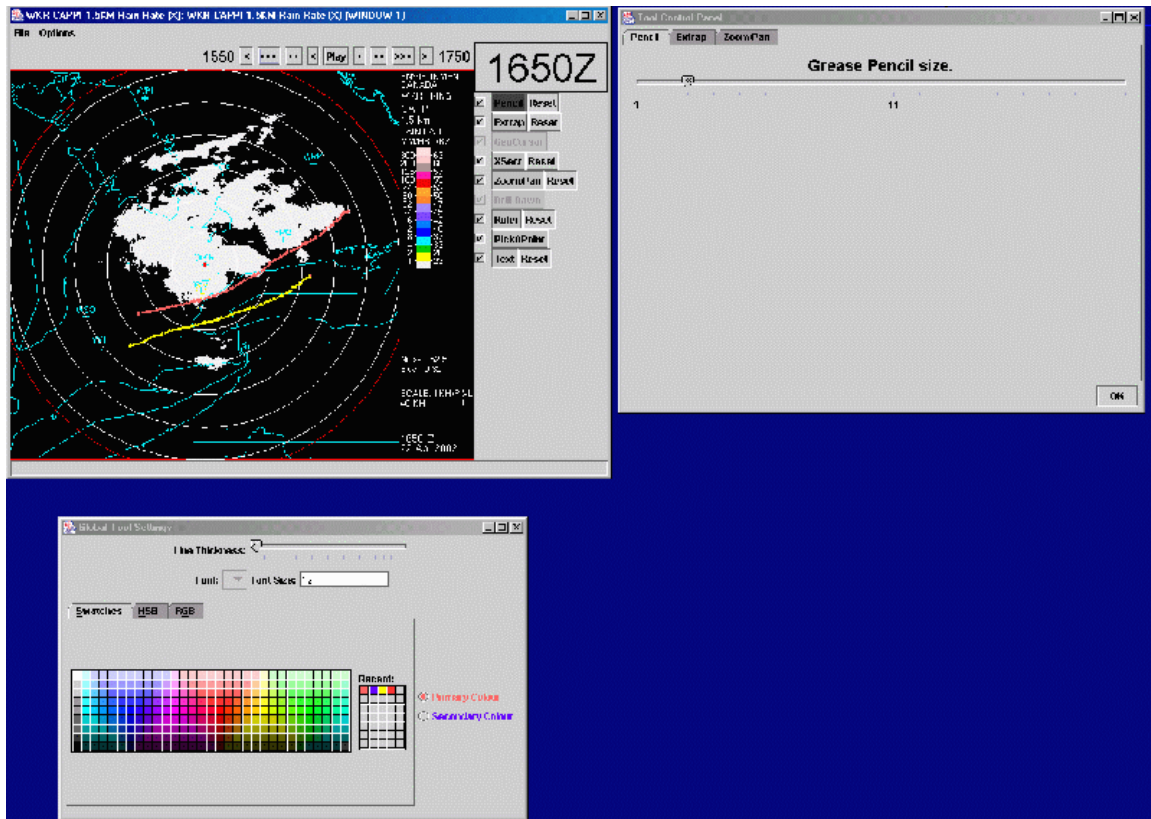


Check Mark: When it's off the functionality is still active but is not visible on the screen.

Reset undoes the functionality and resets to the default.

Pencil

This is a new functionality.



Click on pencil. It darkens.

Hold left button down. Moving the mouse will draw a line on the radar display.

If you don't like the line click right button on the line and it will disappear.

If you want to change the thickness of the line go to options/tools / grease pencil.

We can also change the colour of the line. Go to tools/ Global setting options. Choose primary/secondary colours.

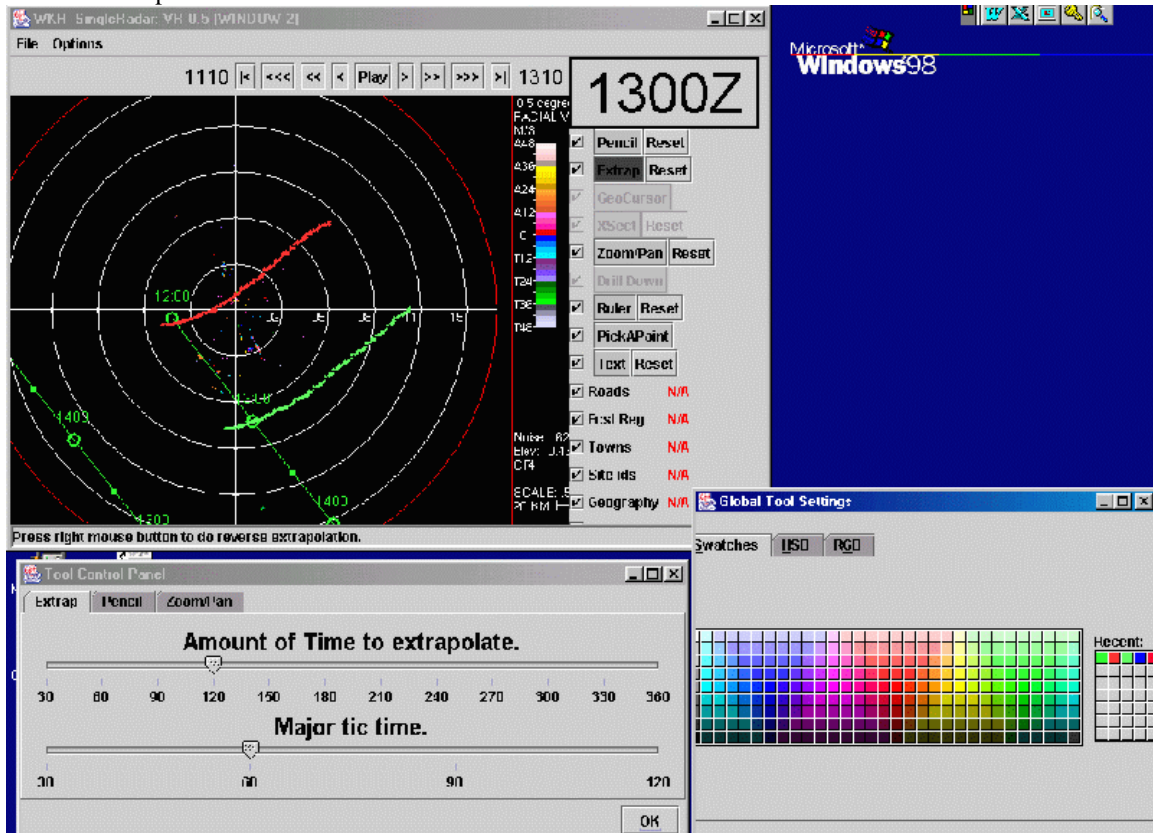
Hitting the check mark makes the function invisible on the screen but doesn't turn it off.

Go back one hour.

Draw another line.

Extrapolator

Click on extrapolator.



Click left button on point on the line at the earlier time.

Go to the later time, click left button on line. Function will extrapolate that speed forward in time.

Now go to another point, say it is the location of an aviation terminal. (YXU)

Click the right button. You will see a series of points and times going forward in time as you move upstream. Consider one of these upstream points. A radar feature located at that point will arrive at YXU at the time indicated.

Tool settings with extrapolator

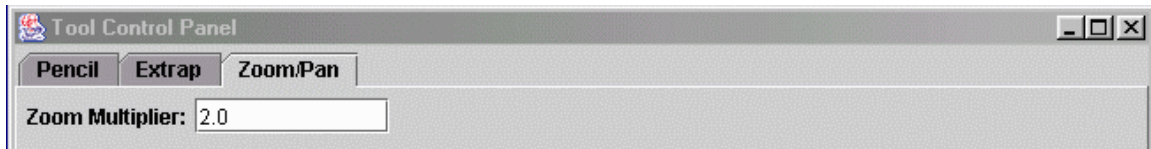
Click on options/tool settings/ extrapolator

Can adjust length of time ahead to extrapolate and the time segments associated with major and minor ticks.

Zoom and pan

Click on the function it darkens.
Click once on the left button and we zoom in.
The default zoom factor is 2 times.
Click once right button and we zoom out.

We can adjust the zoom factor.
Go up to options/tool settings/ zoom and pan.
Change the multiplier factor: e.g. a number of 1.2 changes the size by 20 percent each time.
Hit enter and OK.



Panning works the same as now... hold the left button down and move the mouse. Rest restores to 100 percent.

Pick a Point

Purpose: To find reflectivities at a certain Z threshold.

Click on Pick a point. It greys on.

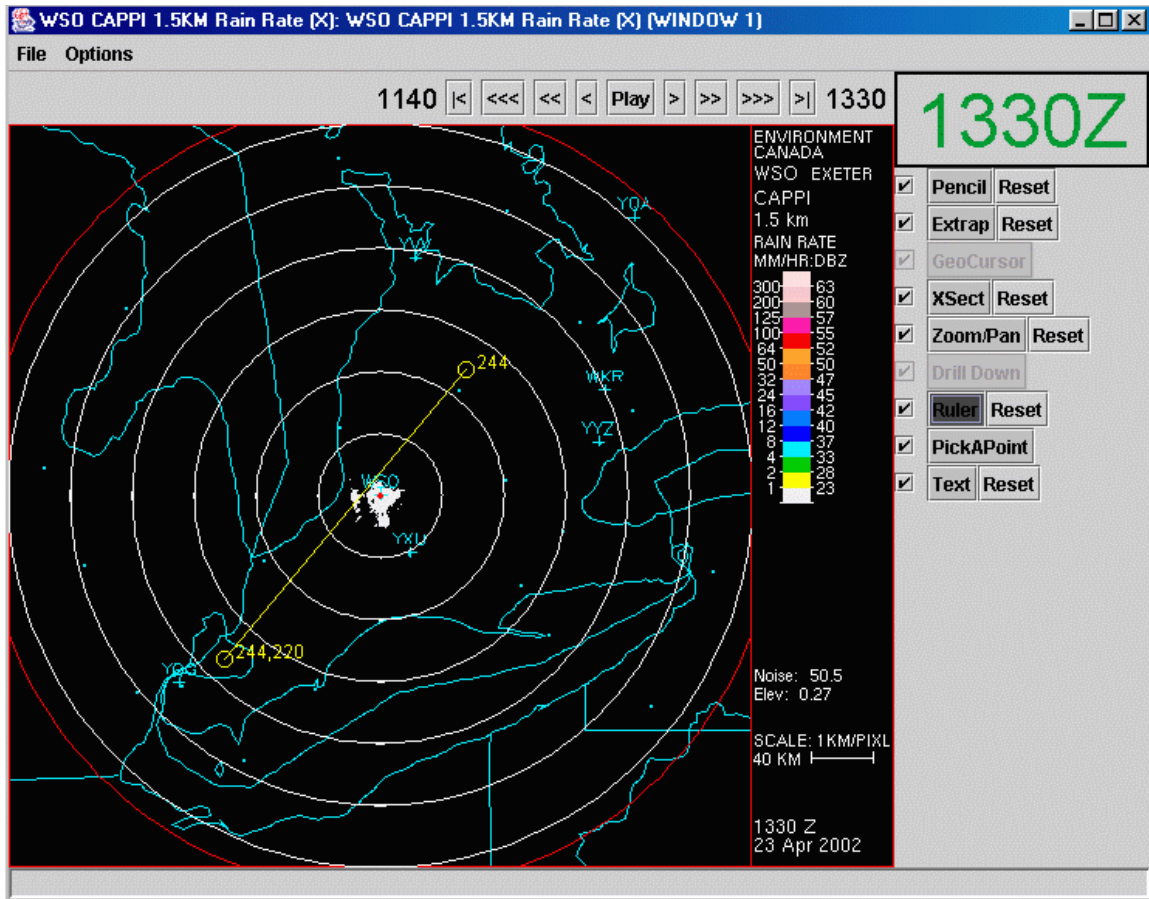
With left button click on a colour from the rain rate table. Colour will flash in the rain rate table and corresponding colour will flash on radar display.

Hint: If you are trying to find the strongest storm, reflectivity wise, start from the highest value then work down.

Ruler

Activate function.

With left button click on point on radar screen. Then move mouse and click on second point. Clicking on point 2 gives you the bearing of point 2 from point 1 and range in pixels. On the radar pictures resolution is one pixel = 1 km. Once line is drawn if you left click at point 1 it shows the bearing of point 1 from point 2. You can also click and hold and move the line around.



Text

Activate the function .

Left click on a point on the radar screen.

A dialogue box pops up.

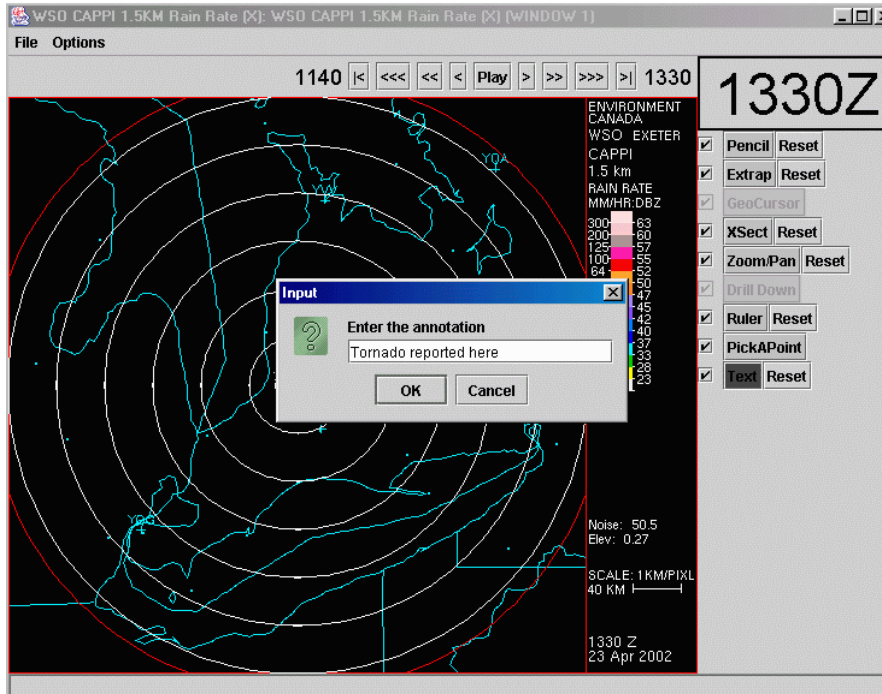
Move the pointer to the box.

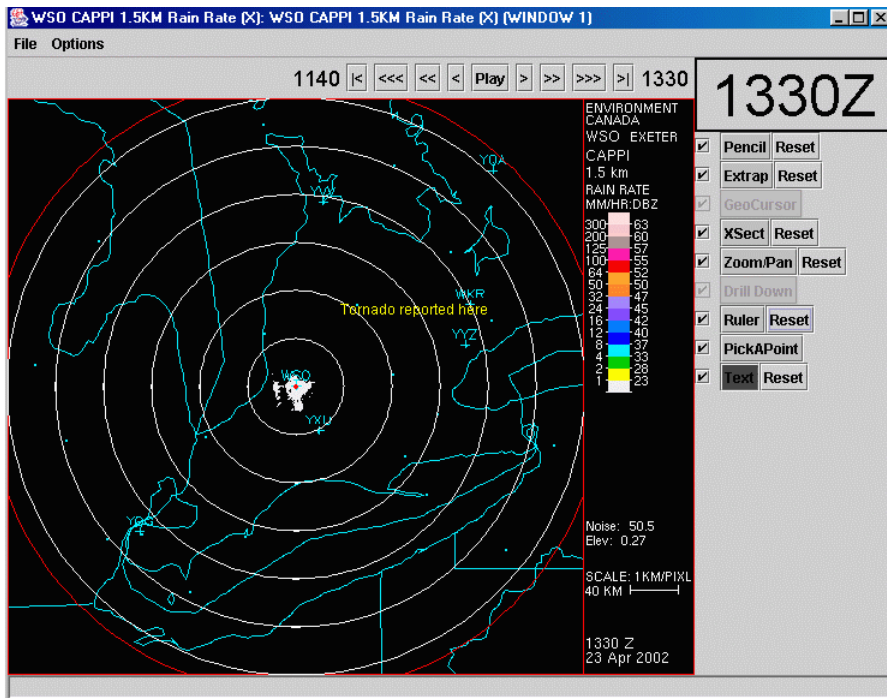
Enter text and push OK.

Click and hold on text and you can move it. Check mark turns it off and on.

Usage: You get a spotter report. You could annotate what storm it was associated with.

Is this text saved is a question?





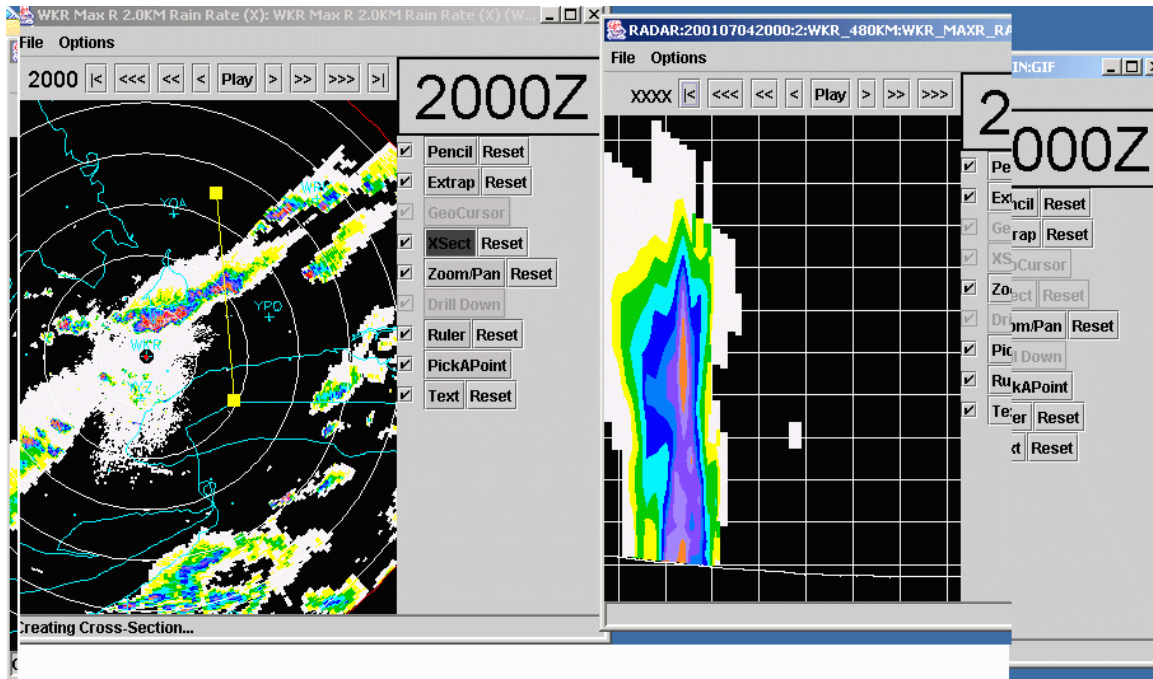
Create X-section.

At present can only be used from single radar product.

Activate function

Left click once with mouse on desired first point of cross section. Move mouse to second point and left click. You now have X-section line.

Right mouse click then creates cross section.



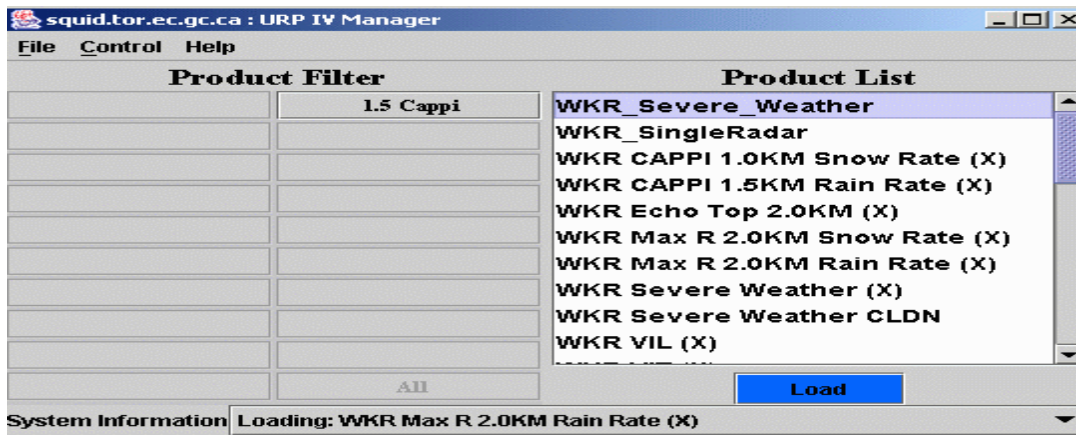
Line remains on screen.

A left click on either end of the line moves line and a new X-section can be created with a right click.

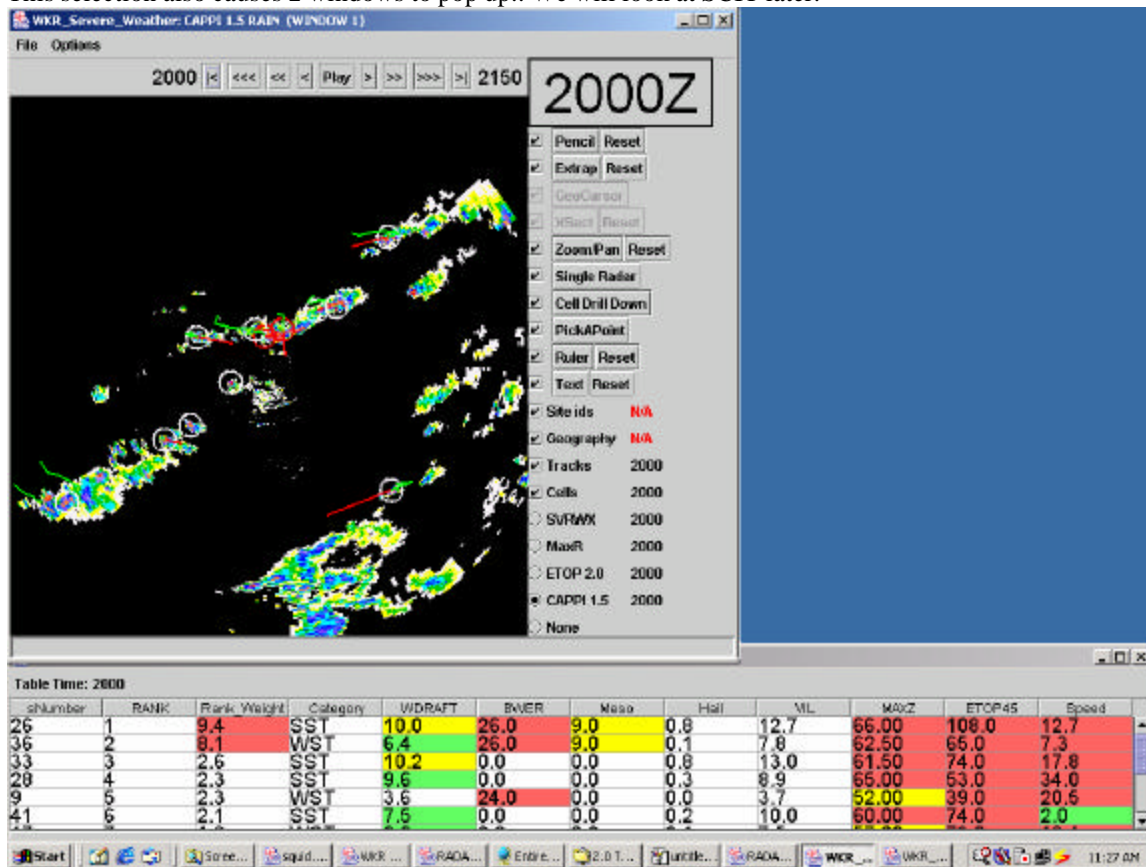
At present the cross section window opens up with all the functionalities of a regular window, like animation. If you start animation here or on another window time will change on all windows.

The Severe Weather (Composite) Radar View

From IV select Severe Weather.



This selection also causes 2 windows to pop up.. We will look at SCIT later.



The composite view includes all the radars within and vicinity of the forecast area of responsibility. When individual radars are not available for a particular time they show up as N/A on this display.

The composite consists of numerous data layers, some geographical and some of radar products.

Below text in the legend on the right, all the layers are listed.

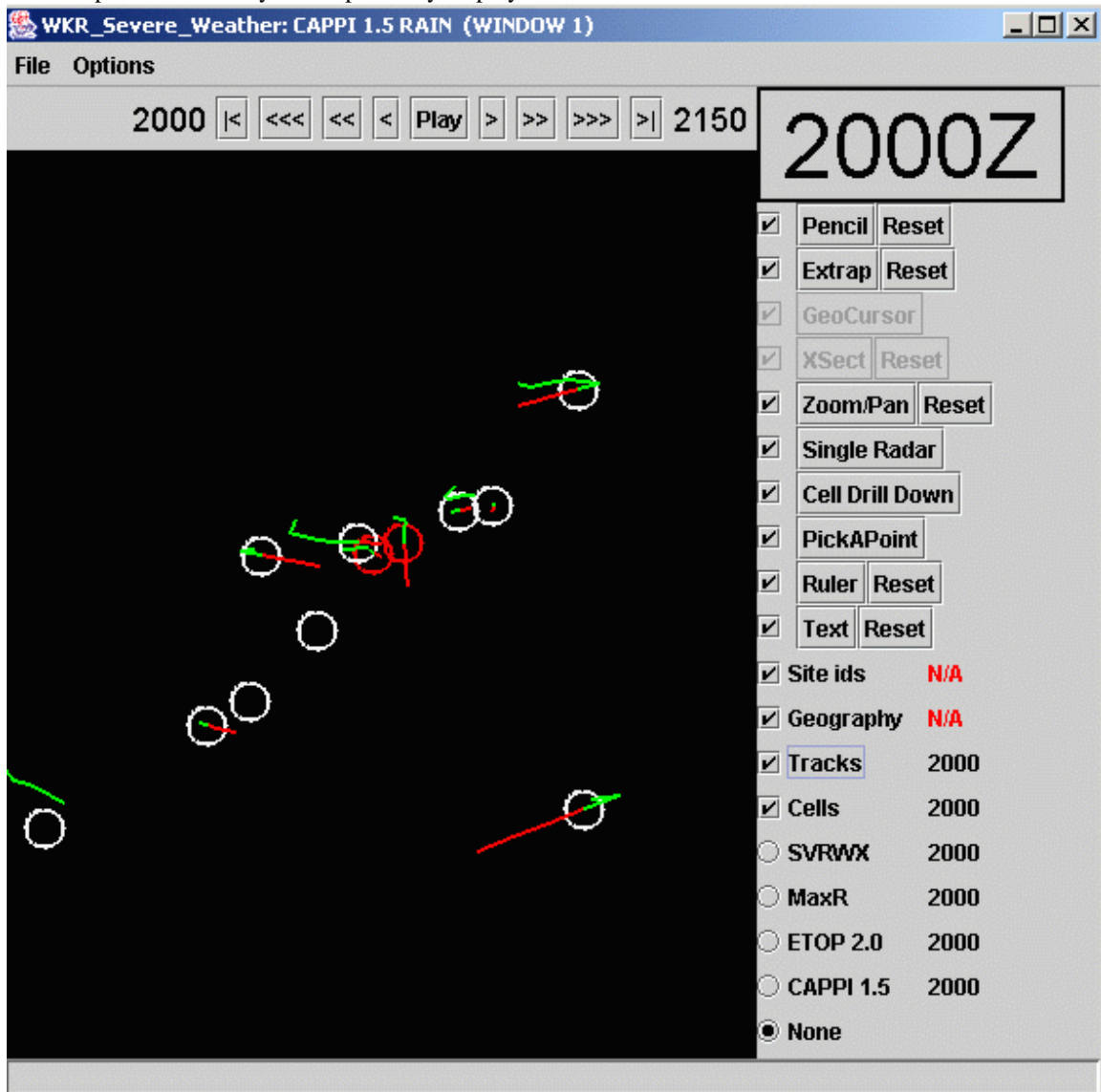
You can turn layers on and off, by clicking the box. When they are turned on the legend for geographic layers shows tick marks, radar shows circles darkened.

The times to the right of the radar product description are either black or red. Given the time you are on (indicated by the big time) black means, yes the product is available for that time, red means no.

If cells are not available you will not be able to do a drill down to cell view (see section on cell view)

Any number of geographical layers can be displayed at the same time, but only one radar layer. Red N/A besides a particular geographical layer implies it is not available.

None implies no radar layers are presently displayed.

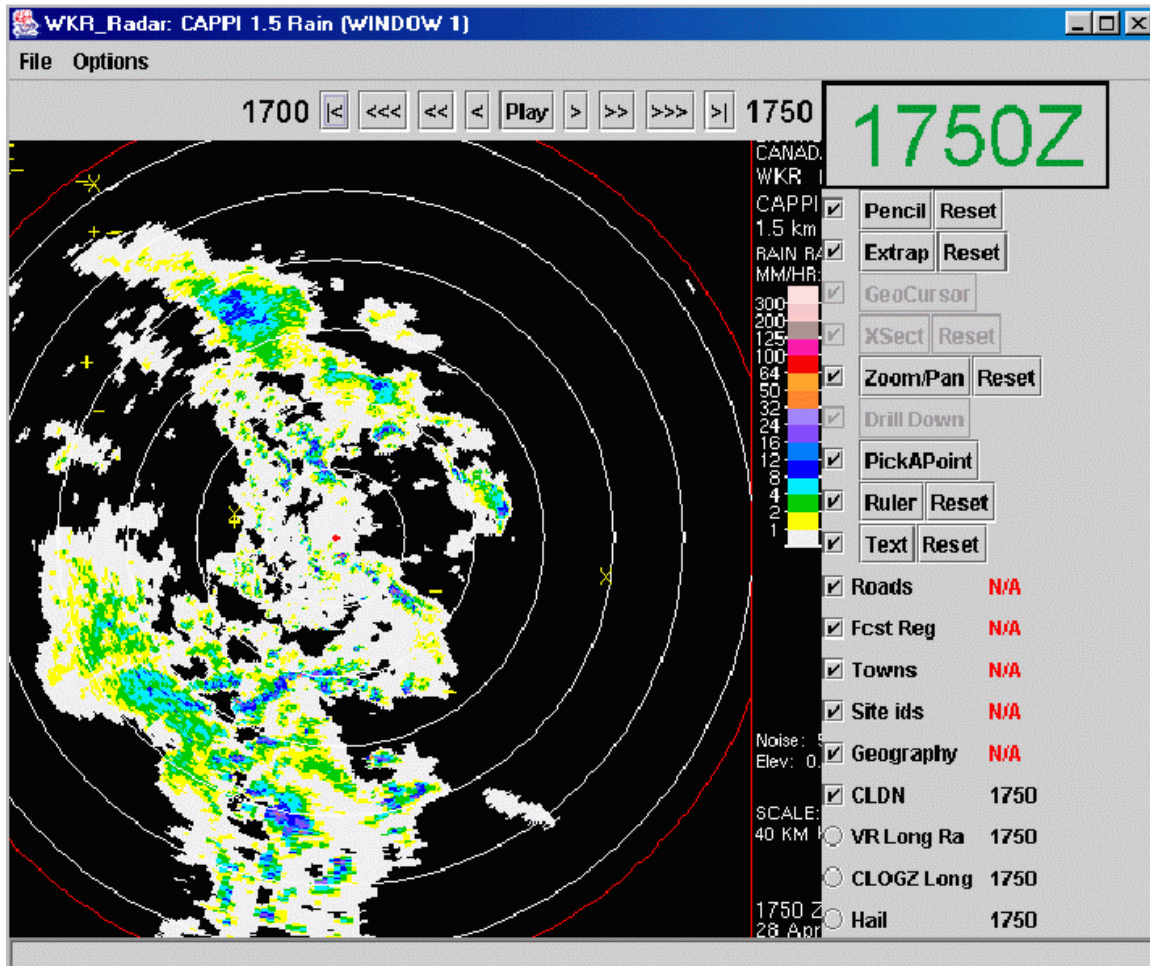


If you leave only cells and tracks turned on., the cells, as determined by the algorithm, show up as small coloured circles. The colour is indicative of the intensity of the storm, using the same scale as rank in the SCIT table.

Historical tracks of the cell (for the time period the tracking algorithm has determined that it has existed) are shown in green.

Forecast motions of the cell are shown in red. The forecast out to 30 minutes, is based on the change in position of the storm over the last 10 minutes.

Single radar view



From the composite control panel, click on single radar view. If you move your cursor over the composite picture, squares will show up when you cross an available radar site. Click the left button and the single radar view window will appear. This is not like the single product window we saw before. That only showed one type of radar data, i.e. 1.5 CAPPI.

The single radar view is a multiple layered product that includes a wide number of geographical and radar parameters from one radar site. It allows us to see things that are at the individual radar scale, for example outflows and lake breezes. For Canadian radars, at present there are 2 single radar views per radar, one Doppler one conventional. Conventional data is displayed at 1 km resolution, Doppler at .5 km. For U.S. radars there is one view that combines all the available products.

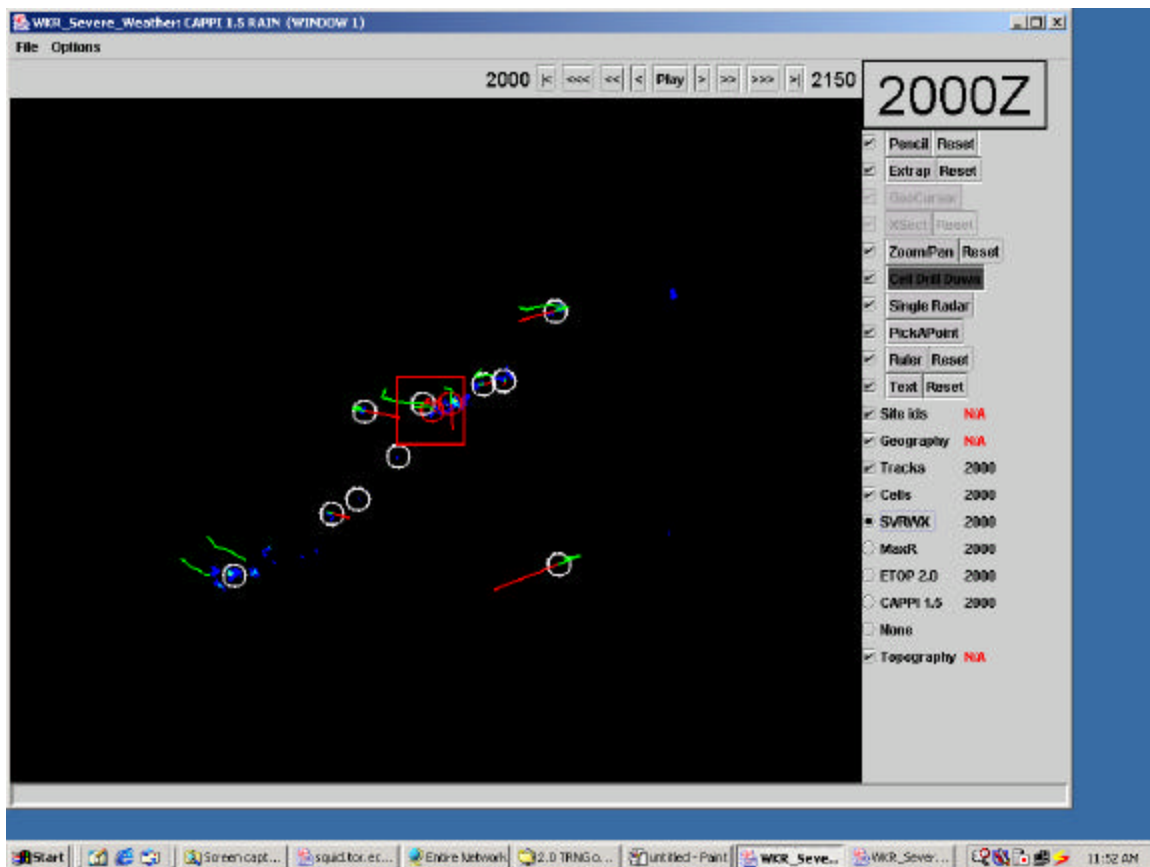
At present Doppler data is only available out to 113 km range, however soon second trip processing will be included to extend Doppler out to 226 km and the hope is to display all data at the .5 km resolution. To do this increases 4 fold the amount of memory required to display this info. It is on hold for the time being.

The geographical layers available in this view include topography, forecast regions, roads, towns, aviation terminals.

Another use of this product:

In situations where storms are seen by two different radars, only one is used to produce the cell ID. We can check the radar that was not chosen to verify the algorithms. Problem with single radar view. If you zoom in you have to pan to find colour scale.

CELL view selection from Severe Weather Composite view



Back to the composite severe weather view window

Make sure cells are available for that time (the time beside cell will be in black) The small circles on composite identify cells.

Select cell drill down function.

Move the cursor over the composite radar display.

Now, as you move over the screen, cells that have been identified by the algorithm are highlighted by a box..

Left click when you have a box around a cell you want to see.

The cell view window with it's 15 plus small views of the storm pops up.

We will see the details of this view later.

You can only drill down to one cell at a time.

If one cell view is active a new drill down from the composite will cancel the existing cell view..

SCIT (Severe cell identification table)

WKR_Severe_Weather: SCIT XML (WINDOW 2)

Table Time: 2000

sNumber	RANK	Rank_W...	Category	WDRAFT	BWER	Meso	Hail	VIL	MAXZ	ETOP45	Speed
26	1	9.4	SST	10.0	26.0	9.0	0.8	12.7	66.00	108.0	12.7
36	2	8.1	WST	6.4	26.0	9.0	0.1	7.8	62.50	65.0	7.3
33	3	2.6	SST	10.2	0.0	0.0	0.8	13.0	61.50	74.0	17.8
28	4	2.3	SST	9.6	0.0	0.0	0.3	8.9	65.00	53.0	34.0
9	5	2.3	WST	3.6	24.0	0.0	0.0	3.7	52.00	39.0	20.5
41	6	2.1	SST	7.5	0.0	0.0	0.2	10.0	60.00	74.0	2.0
17	7	1.8	WST	6.6	0.0	0.0	0.1	7.5	57.00	73.0	18.4

No row is selected.

The rows on this table list all the cells being detected at that time in order of rank.

If there is a cell presently being drilled down to, the edges of that row are highlighted in blue.

As you change the time through animation on other windows the SCIT changes to that time. This means that the rank of the storm you are following could well change.

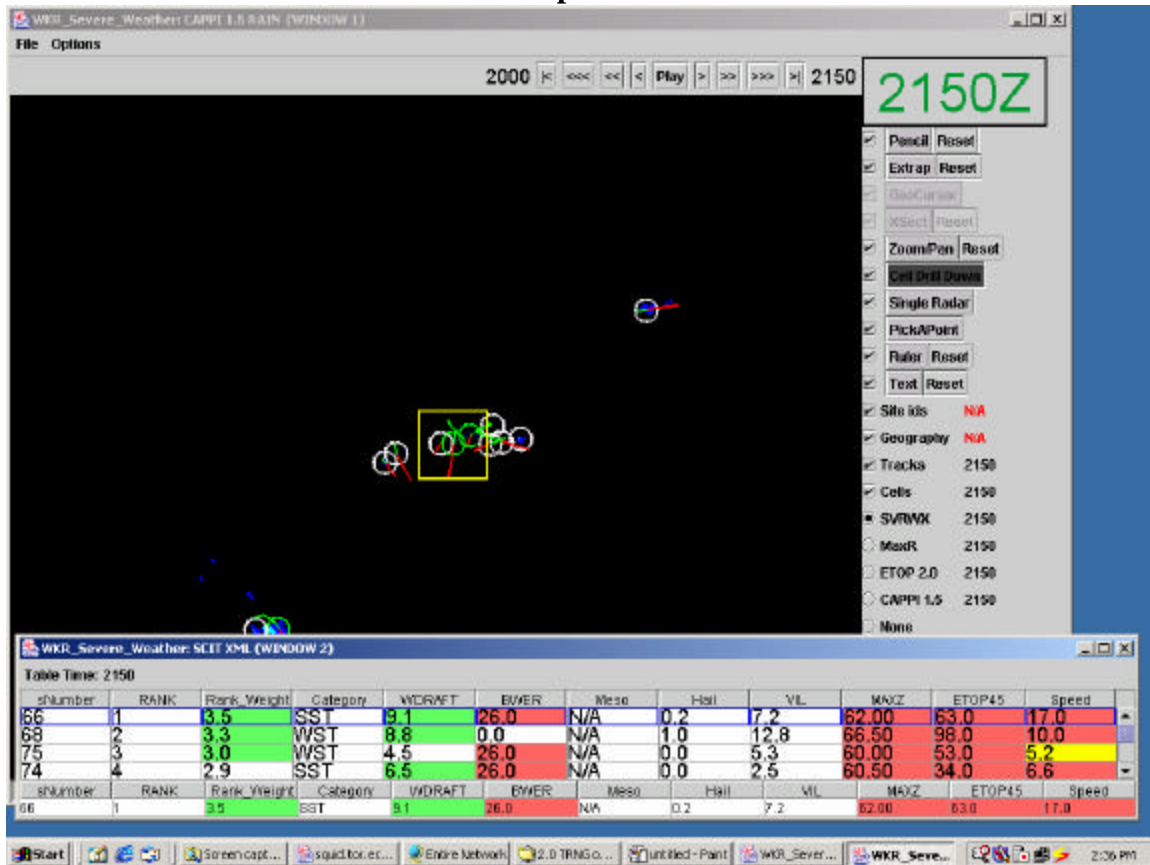
The values of the storm you are following show up in a separate row at the bottom of the table.

Cell numbers go up to 9999.

The speeds in WDRAFT and in "speed" (cell motion) are in m/s

You can get a cell view window to pop up by clicking the left button on to a row in the SCIT table.

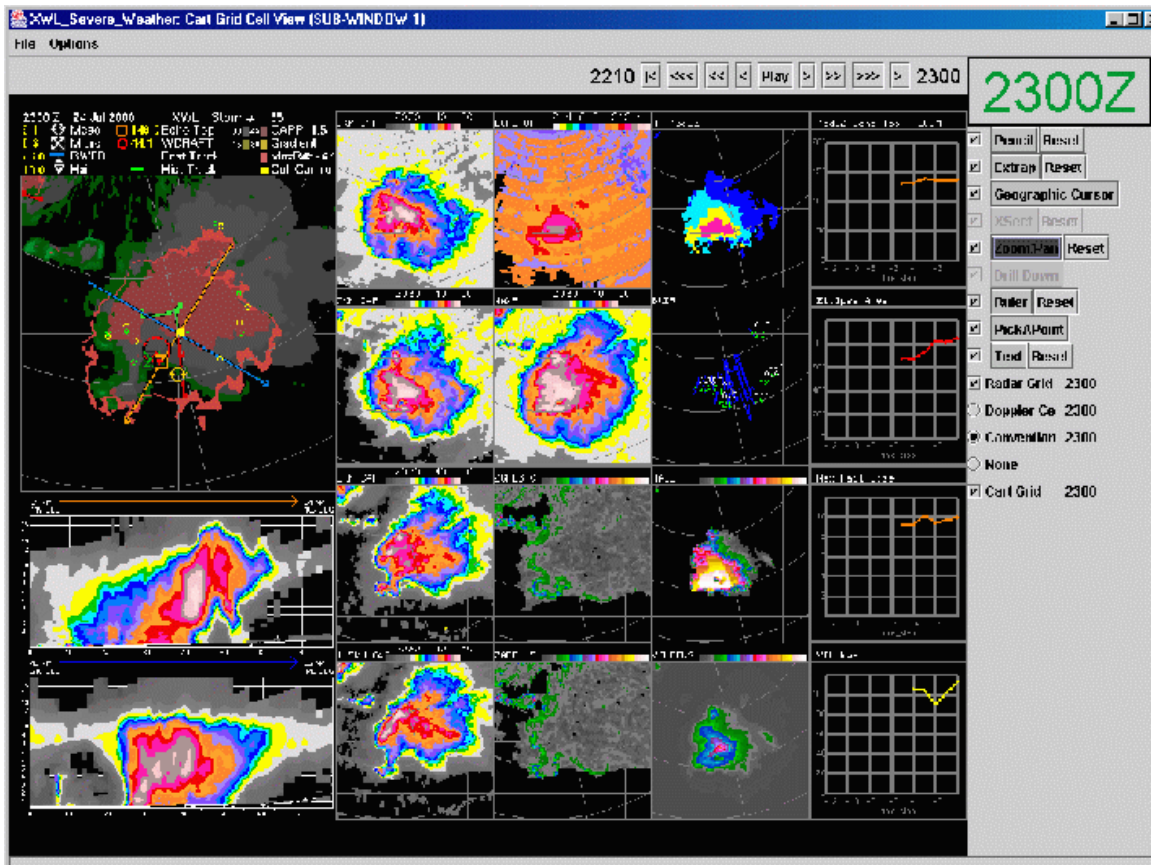
Link between SCIT and cells on the composite



If the composite window is active and cell view mode is turned on. RIGHT Click on a cell you are interested in. The row in the SCIT table corresponding to that cell will be highlighted in blue. If you then change the time, the location of that cell in the rank of the SCIT table will adjust according to the cell's rank at the new time.

If the SCIT window is active, RIGHT clicking a row will result in a box highlighting the corresponding cell in the composite

CELL VIEW



19 thumbnail views in conventional radar mode, 17 in Doppler view.

There are some new buttons on the right under text.

Radar grid: 20 km range rings and a few radials from location of the radar centre for orientation.
Cartesian grid: 20 km square boxes.

These 2 grids can be turned on and off.

If the “none” button for radar products is highlighted, you will just see the grids.

There are buttons for conventional view or Doppler view.

Geographic cursor:

Turn on the function.

Move cursor over the cell view.

Multiple pointers show up which mark the same geographic spot on each of the thumbnails.

The thumbnail windows in conventional view

The storm cell is centred in each of the views
Let's first do an overview.

First column:

Upper left: The ensemble product ; below that 2 automatically produced cross sections.

2nd column:

4 CAPPIS lined up vertically at 1.5, 3.0, 7.0 and 9.0 km from bottom to top.

3rd column:

From top to bottom: echo tops, MAXR; mid level gradient; low level gradient.

4th column:

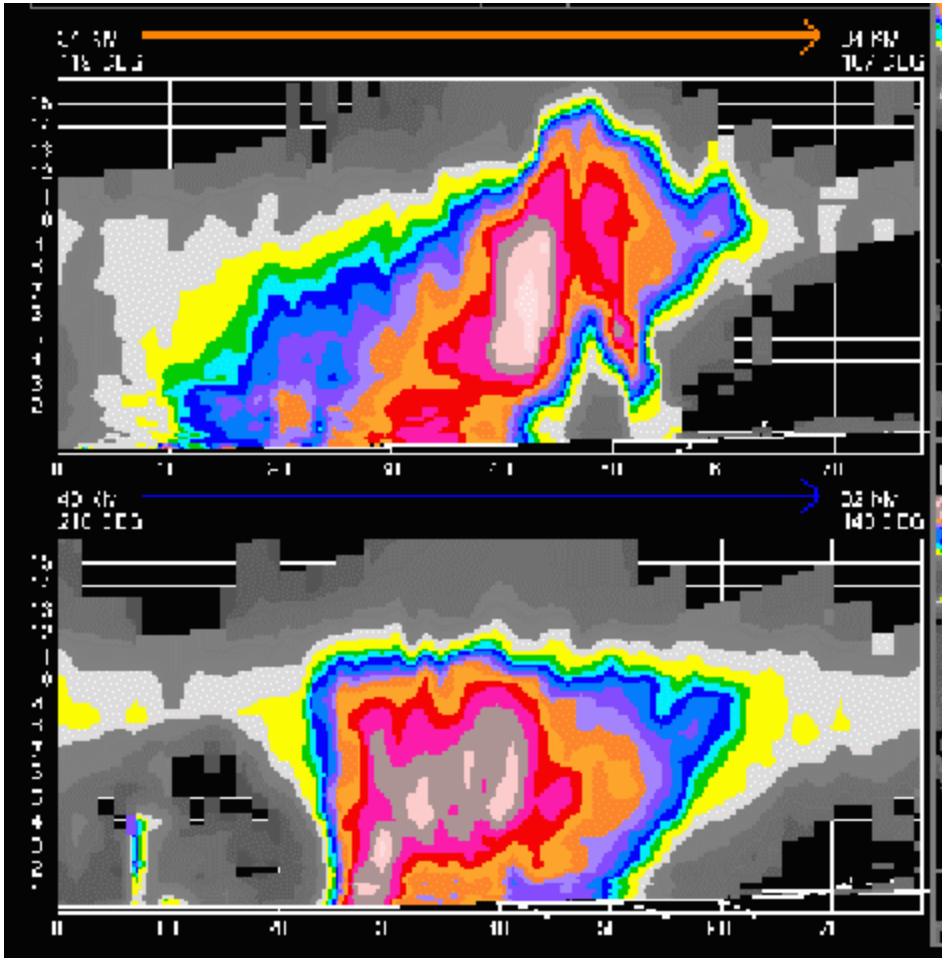
From top to bottom: maximum height of the 45 db reflectivity; BWER; Hail; VIL density

5th column:

Time diagrams of 4 severe weather parameters.

Details thumbnails of Conventional cell view
1st column - We'll talk about ensemble later on.

Auto cross section:



The upper one is taken through the center of the cell and the location of the 45 db top.
Lower one from the centre of the cell to location of highest valued BWER.
Arrows above cross section correspond to arrows on ensemble to indicate direction cross section was taken.
They often do NOT line up in a geographically correct sense.
The 2 cross sections can sometimes be in opposite directions.

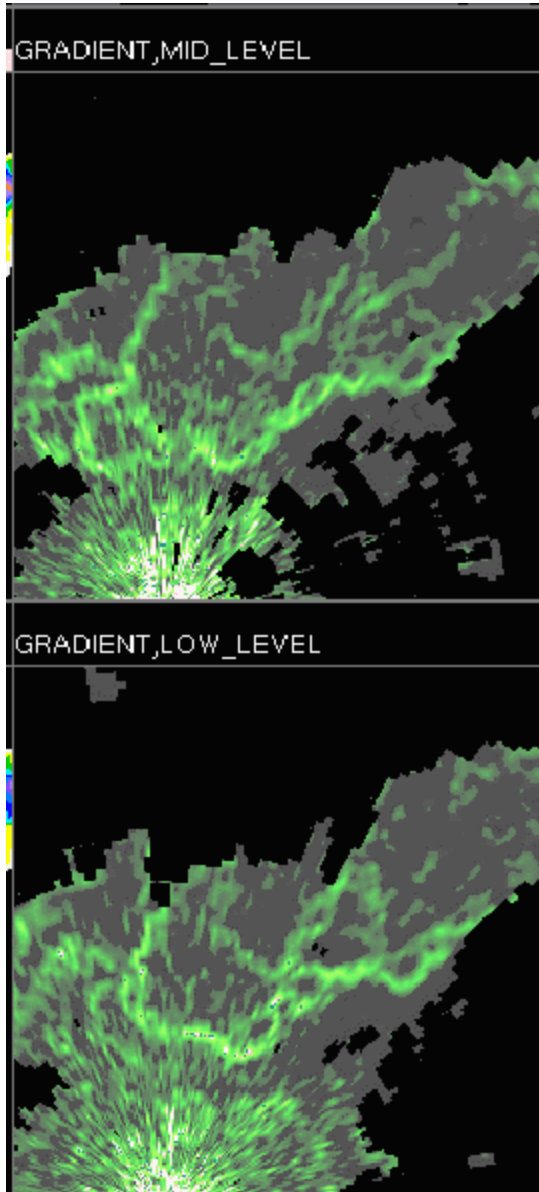
2nd column:

The 4 CAPPIS: reflectivities below 18 db show up in shades of grey.

3rd and 4th columns:

TOPS is standard product.

Gradient Products



Gradient Products:

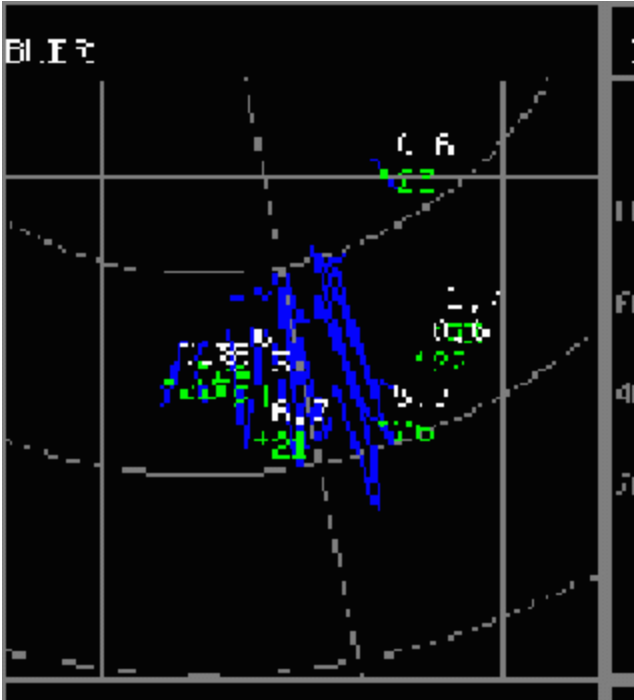
Mid level product is taken at 3 km; low level at 1.5 km.

Gray to green threshold is at 10 db/km ; then linear increase in colours corresponding to higher gradients.

4th column:

Severe weather is MAX height of 45 db reflectivity with thresholds at 5.5, 8.5, 10.5 and 12.0 km

BWER:



Plotted points are for BWER's with max values above 22. The point values are for the magnitude and the height of the highest value.

The blue lines are the outline of areas with BWER values above 16 (?). A blue point is whenever a bin exceeds the threshold. Points along a radial are joined to form a line. Ends of adjacent lines are joined to form the outline.

There are a lot of points with heights around 1 km. Initial investigation hypothesizes that only points with heights of BWER above 2 km are significant.

Hail :

The colour thresholds are in centimeters.

Time change graphs

5th column:

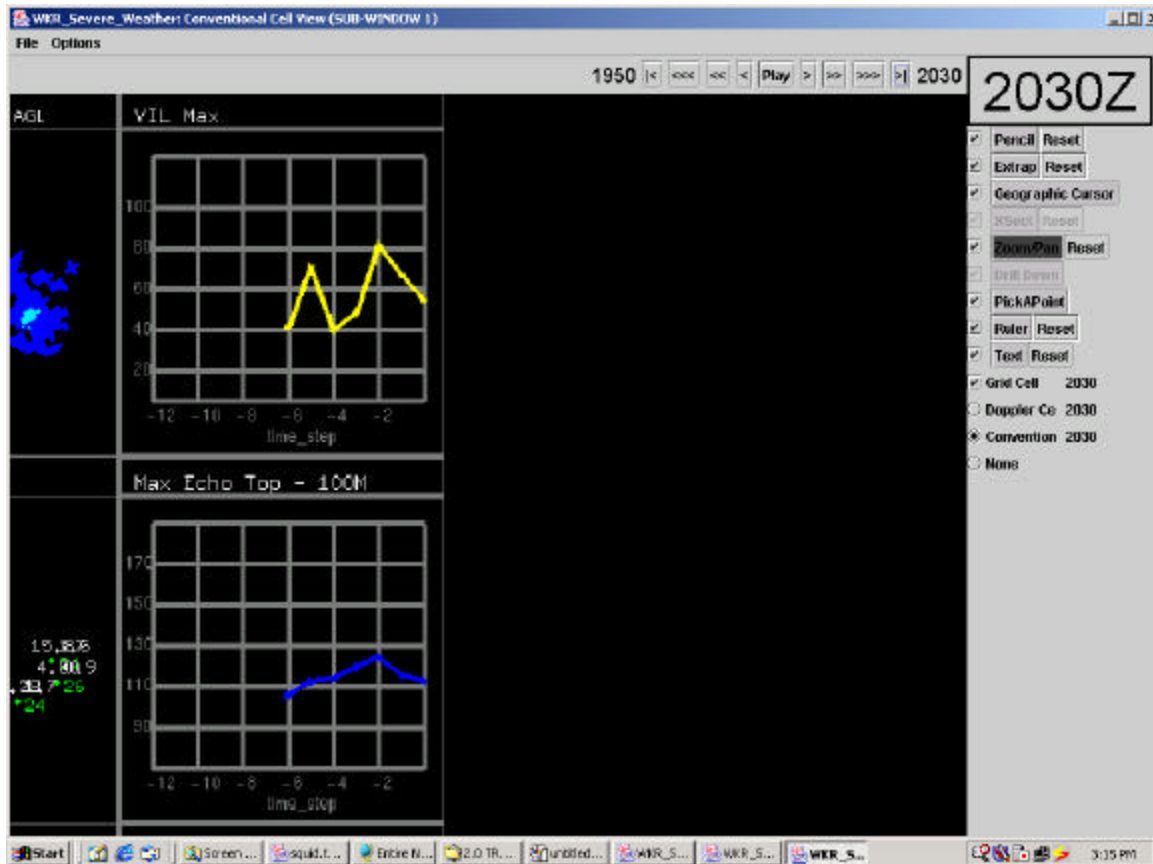
The change with time of 4 parameters

45db echo top.

Ellipse area of the cell

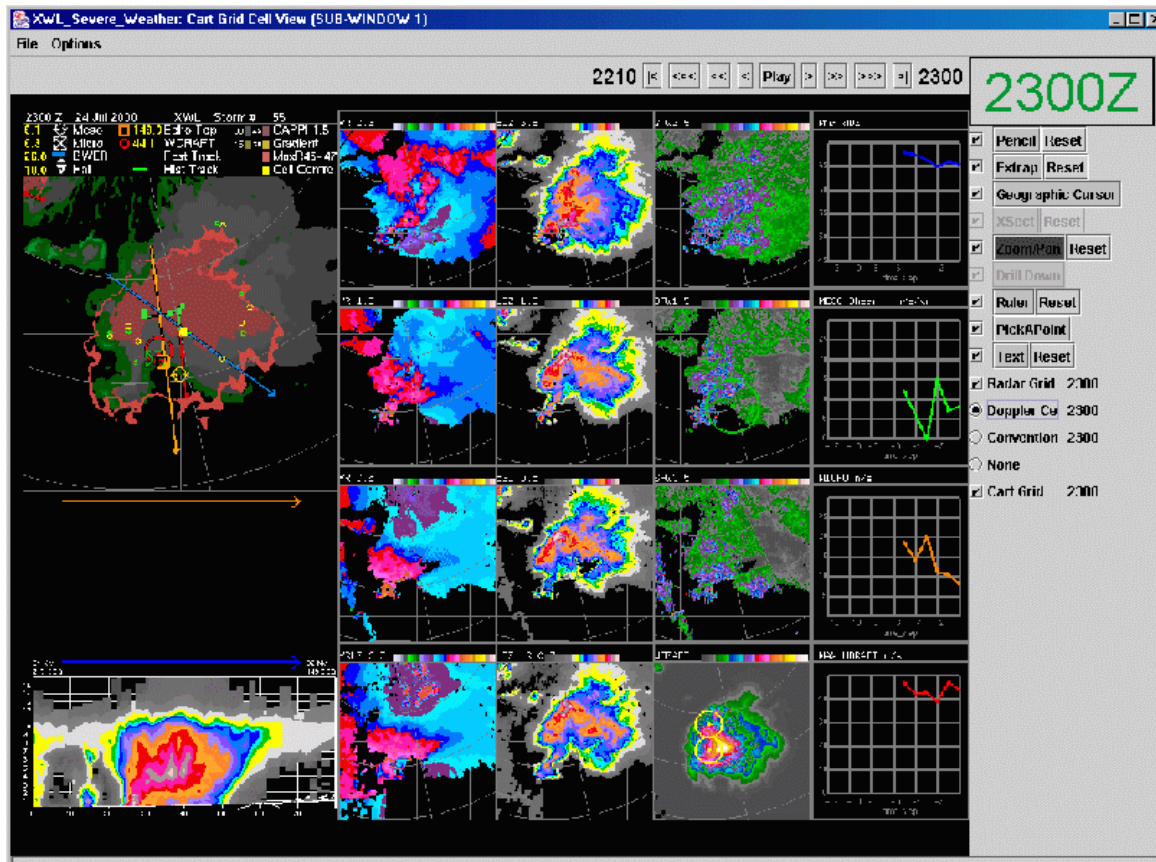
MAX hail

VIL density



Time is from left to right and is plotted in time steps of every 10 minutes. The legend on the bottom if multiplied by 10 gives you number of minutes before current time. The first time indicates when the cell was first detected. If a storm emerged from a split, this graph will show the history before the split.

Individual thumbnails of Doppler view



Column 1:
Same as conventional view

Column 2:
Radial velocity displays.
Bottom is the long range (2nd trip) Doppler data often folded.
Then 3 Doppler scans in correct vertical order.

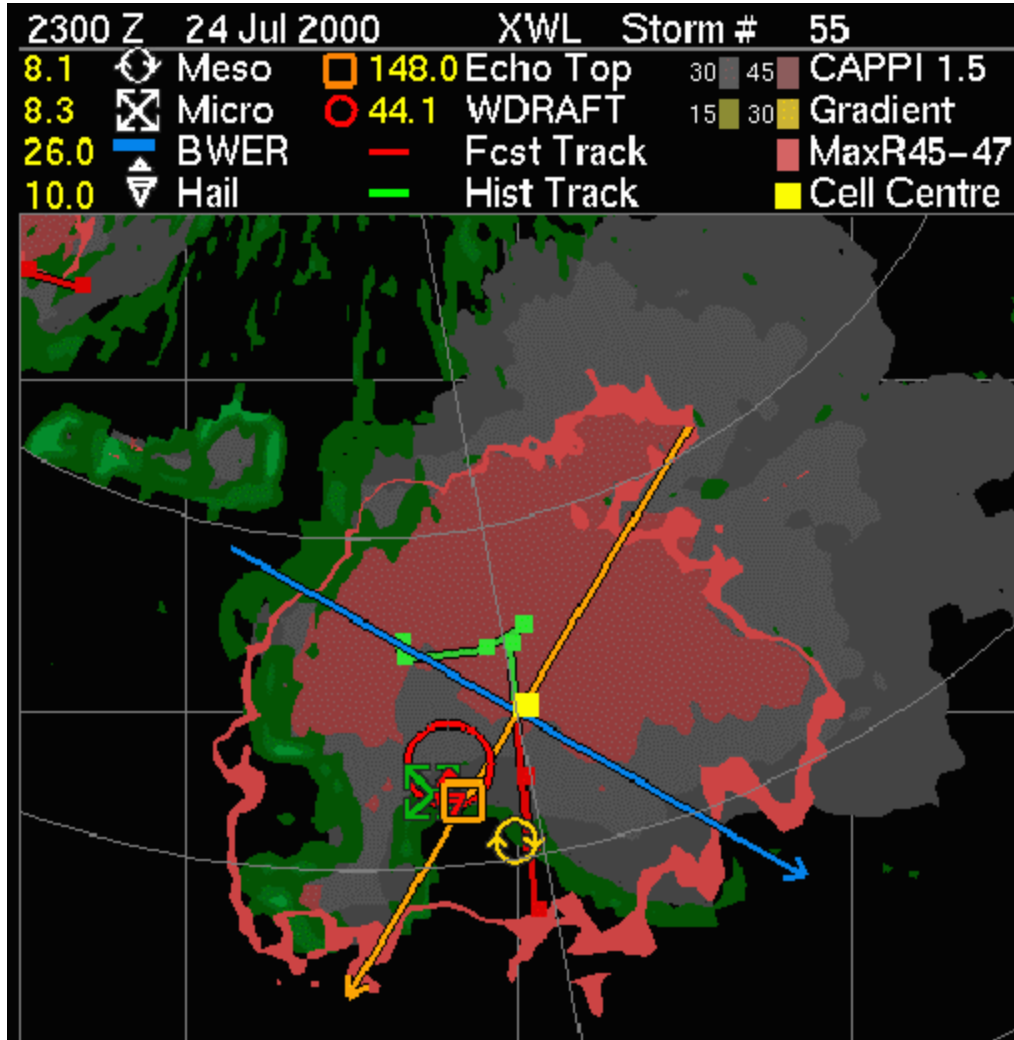
Column 3:
Corresponding logZ pictures to adjacent radial velocities in column 2

Column 4: from top to bottom
From top, 3 spectral widths corresponding to heights in adjacent columns. Middle one has the meso algorithm overlaid. Bottom one WDRIFT with MICRO overlaid.

Comments on Spectral width:

Theoretically spectral width should be high in turbulent areas, i.e. strong variation of winds in the same radar bin. So it should be high in convective areas. Further training and research needs to be done on this.

THE ENSEMBLE PRODUCT



Purpose is to see the pattern of distribution of all the algorithms with respect to a low height view of the storm.

It is twice the resolution of the other thumbnails.

The 30 and 45 db contours from the 1.5 CAPPI of the area of the view are plotted in grey and brown respectively.

The lighter coloured thick brown line shows the 45-47 db on the MAXR product. This is in order to see the overhang.

The cell centre, based on the cell ID algorithm, is plotted as a yellow square.

The lime green area is where the low level gradient is greater than 15 db/km

The historical and forecast tracks of the cell are plotted in green and blue. Note that tracks of adjacent cells which fall into the view area of the ensemble are also plotted.

The location of the highest values of
ECHOTOP
WDRAFT
MESO
MICRO
Are plotted in cartoon fashion.

The legend and the actual maximum values of these parameters are plotted in the legend at the top of the display. Also at the top of the page is the cell number and the radar from which the cell view was taken. These parameter values match the values shown in the SCIT table.

Loading profiles

You probably have a preferred way that you would like to see the composite, single radar , scit and cell views displayed. These preferences might include zoom default, colours time ticks etc. You can set up your own personal profile which will save these for you.

Go into file in IV window then save profile as.. Click

Small window shows up which will allow you to put in the name of your profile. During working with the system you can make changes to the profile you loaded by clicking on save profile.

