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# 1 INTRODUCTION

## 1.1 WHAT IS IPVS\_CHARTS?

The Integrated Portable Visualization System (IPVS) was designed to provide the COAMPS-OS user with graphical data products that can be viewed from any computer platform using a web browser. The IPVS web page contains a standard set of weather products organized in tabular pages generated for each model area defined by the COAMPS-OS user. IPVS\_CHARTS allows the COAMPS-OS user to create custom weather products, which can be added to the IPVS web page.

IPVS\_CHARTS is a tool designed for the weather forecaster and briefer. It gives the forecaster and briefer a means to create weather charts to aid in the forecasting process and to produce professional briefings.

IPVS\_CHARTS is a unique data viewer because it accesses a four dimensional block of weather model data. Most data viewers are restricted to two- or three-dimensional data. For example, they might provide a two-dimensional map view with the ability to animate the map over time, thus providing a third dimension. IPVS\_CHARTS, on the other hand, has four dimensions that may be selected from: longitude, latitude, level and time. Two of these may be selected to create a two-dimensional map view that can be animated over either of the two remaining dimensions.

IPVS\_CHARTS allows a map view to be animated in time or level. There are many possibilities for both static and animated views. A longitude slice, defined at a specific latitude, plotted with a selected level (vertical cross-section) can be animated in latitude or time. A latitude slice, defined at a specific longitude, plotted with a selected level can be animated in time or longitude. Selected time sections may be plotted with any of the other three dimensions to produce useful combinations, such as: 1) a selected level range to be animated over latitude or longitude, 2) a latitude range to be animated over level or longitude, or 3) a longitude range to be animated over level or latitude. In addition to orthogonal slices along longitude and latitude lines, vertical slices along an arbitrary path can be animated over time.

This capability to animate, or loop, on one dimension while two others are fixed provides the user with the ability to scan the four dimensional block of data in a wide variety of ways. Using this feature makes IPVS\_CHARTS both a data viewer and a data scanner, which allows you to quickly spot forecast trends and key weather features. Weather data can be scanned by viewing data series using either of two methods: 1) automatically generated for the IPVS web page or 2) interactively using IPVS\_CHARTS directly.

In short, IPVS\_CHARTS removes much of the drudgery involved in preparing forecasts and briefs, which allows you to concentrate your time on making the best possible forecasts.

## 1.2 WHAT IS A CHART?

A chart is a two-dimensional representation of a data set from a numerical weather model, such as COAMPS run by COAMPS-OS or NOGAPS run at Fleet Numerical Meteorology and Oceanography Center (FNMOC). A chart may be a horizontal map view, a vertical profile at a point, or a vertical cross-section along a latitude or longitude line. Figure 1 below depicts a typical horizontal chart.

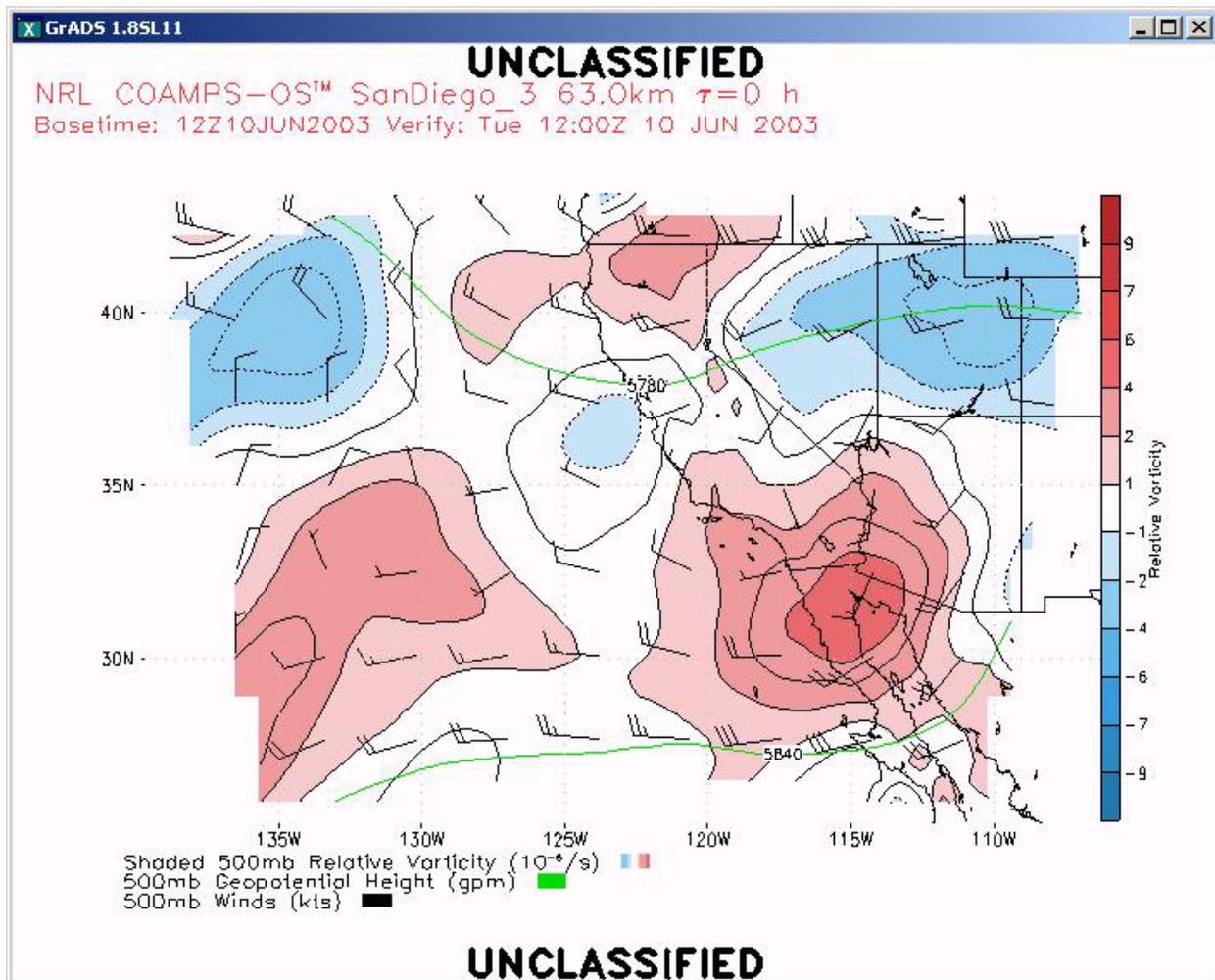


Figure 1. Typical horizontal chart.

Each chart has explicit labeling conventions that identify the data it represents. For example, Figure 1 represents the COAMPS model master grids of geopotential height at 500 millibars and relative vorticity and winds. This particular chart is an analysis that is valid for 12:00Z on 10 June 2003. A chart may be an **analysis**, which is based upon observation (NOGAPS) data at TAU 0. Alternatively it may represent a **prognosis**, which is based upon forecast (COAMPS) data. Different colors and/or line types indicate the different fields in a chart when multiple parameters are plotted.

Figure 1 shows **scalar** data, which are magnitudes with no associated direction (e.g., temperatures, pressures, and geopotential heights). This chart also depicts **vector** data, which have both magnitude and direction (e.g., winds and currents). Vector data is displayed in one of three ways. The first option is wind barbs, indicating magnitude by the number of barbs showing wind velocity. The second option is arrows, where the length of the arrows indicates magnitude. The third option is streamlines, which only show the direction of flow. Vector data and scalar data may be displayed on the same chart.

You can use IPVS\_CHARTS to create single charts and/or sequences of charts. If you wish to create a time series, only one chart must be defined. IPVS\_CHARTS will automatically create the other charts of the sequence. At this time, the IPVS web page only supports time sequences.

### 1.3 GETTING STARTED

Before using IPVS\_CHARTS, there are a several configuration steps that you must execute on your PC in order to achieve proper viewing of the IPVS\_CHARTS GUI.

First, close any xterms you have open and exit all applications that you may be running. Use the Settings Control Panel icon to access the Display icon. Adjust the Color Palette on the Settings Tab to 256 colors. Then follow the instructions below according to the X Windows server that you are running.

#### **Configuration steps for IPVS\_CHARTS using Reflection X:**

##### 1. TUNER:

Open the Reflection X server. On the “X Client Manager” toolbar under the “Tools” menu, select “Performance Tuner”. On the “Performance Tuner” in the “Test Categories” box click on “Select All”. Next click the “Run” button. Once the process has begun, do not move your mouse or do any keyboard entries until the tuner has completed the task. The process will take about three to five minutes.

##### 2. FONTS:

At this time, you can also configure Reflection X to meet the font requirements for IPVS\_CHARTS. In the “X Client Manager” under the “Setting” menu, select “Fonts”. Scroll the “Category” window on the left until the “Fonts” icon is visible. Under “Options” click on both “Use fonts in X format from font server” and “Allow font scaling”.

##### 3. SECURITY:

Finally, select “Security” under the “Settings” menu in the “X Client Manager”. Click on the “Security” icon, then click the “Edit” button. Scroll to the bottom of the list and add the IP address of the COAMPS-OS web server. Under the “File” menu select “Save”, then select “Exit”.

**Configuration steps for IPVS\_CHARTS using Hummingbird Exceed:**

**1. TUNER:**

From the Exceed menu select "Xconfig" and double-click on the "Performance" icon. In the "Performance" window, click on "Tune" and on the tuner window click on "Run All". Once the process has begun do not move the mouse or do any keyboard entries until the tuner has completed the task. The process will take about three to five minutes.

**2. FONTS:**

Under the "Xconfig" menu, click the "Font" icon. Click the "Font Database" Then select "Font DB File 75dpi". Scroll down and verify that "adobe helvetica medium and bold fonts are present". If this is not the case, check the Exceed software instructions and install new fonts. Otherwise, click OK in the "Font List" window then OK in the "Font Database" window.

**3. SECURITY:**

Under the "Xconfig" menu, click on the "Security" icon. Click on the "Edit" button in the "Host Access Control List" area. Scroll to the bottom of the list and add the IP address of the COAMPS-OS web server. Under the "File" menu, select "Save" then select "Exit".

## 2 USING IPVS\_CHARTS

### 2.1 MAKE A CHART

A chart is a two-dimensional representation of weather data produced from the model output of COAMPS-OS, or similar source. IPVS\_CHARTS is used to create charts that present the data in a graphical form.

The steps for creating a chart are as follows:

1. Launch IPVS\_CHARTS by selecting IPVS\_CHARTS from the Applications menu on the COAMPS-OS home page.

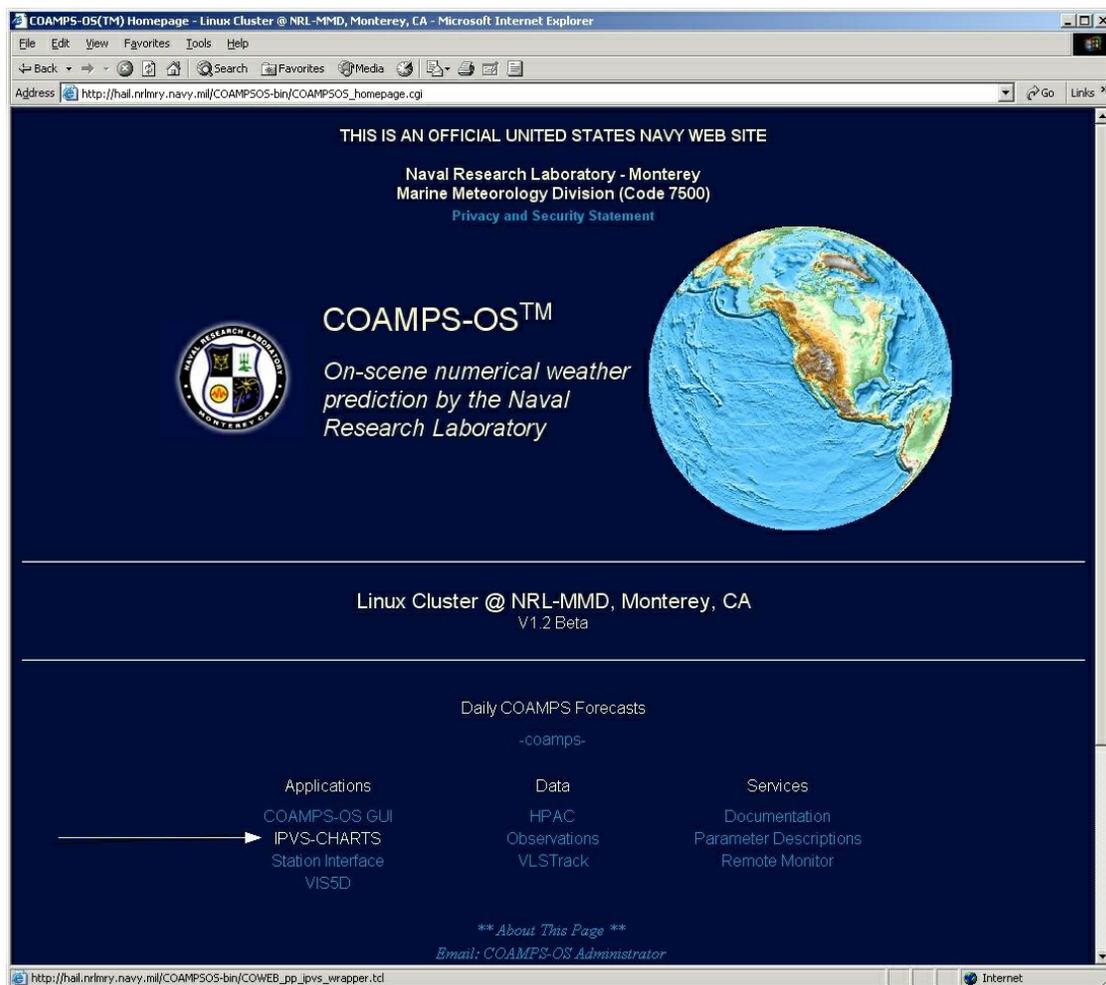


Figure 2. Access IPVS\_CHARTS from Applications link on COAMPS-OS home page

- IPVS\_CHARTS is password protected and prompts for a valid user and password (Figure 3).



Figure 3. Security Dialog for IPVS\_CHARTS

- IPVS\_CHARTS prompts you to select a data set by presenting you with a File Selection dialog (Figure 4).

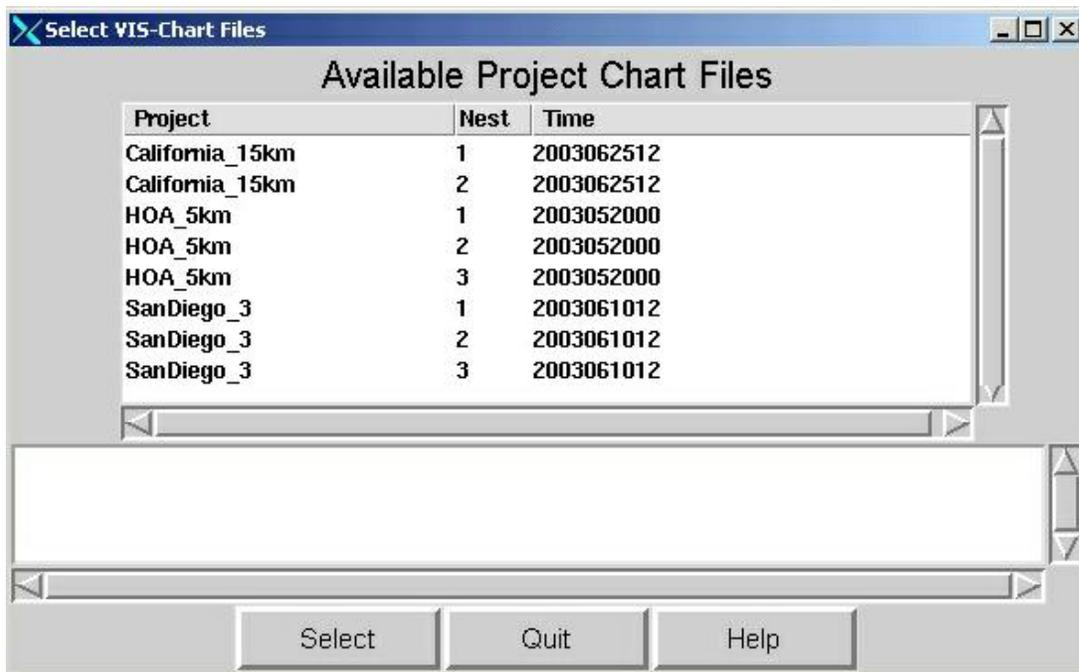
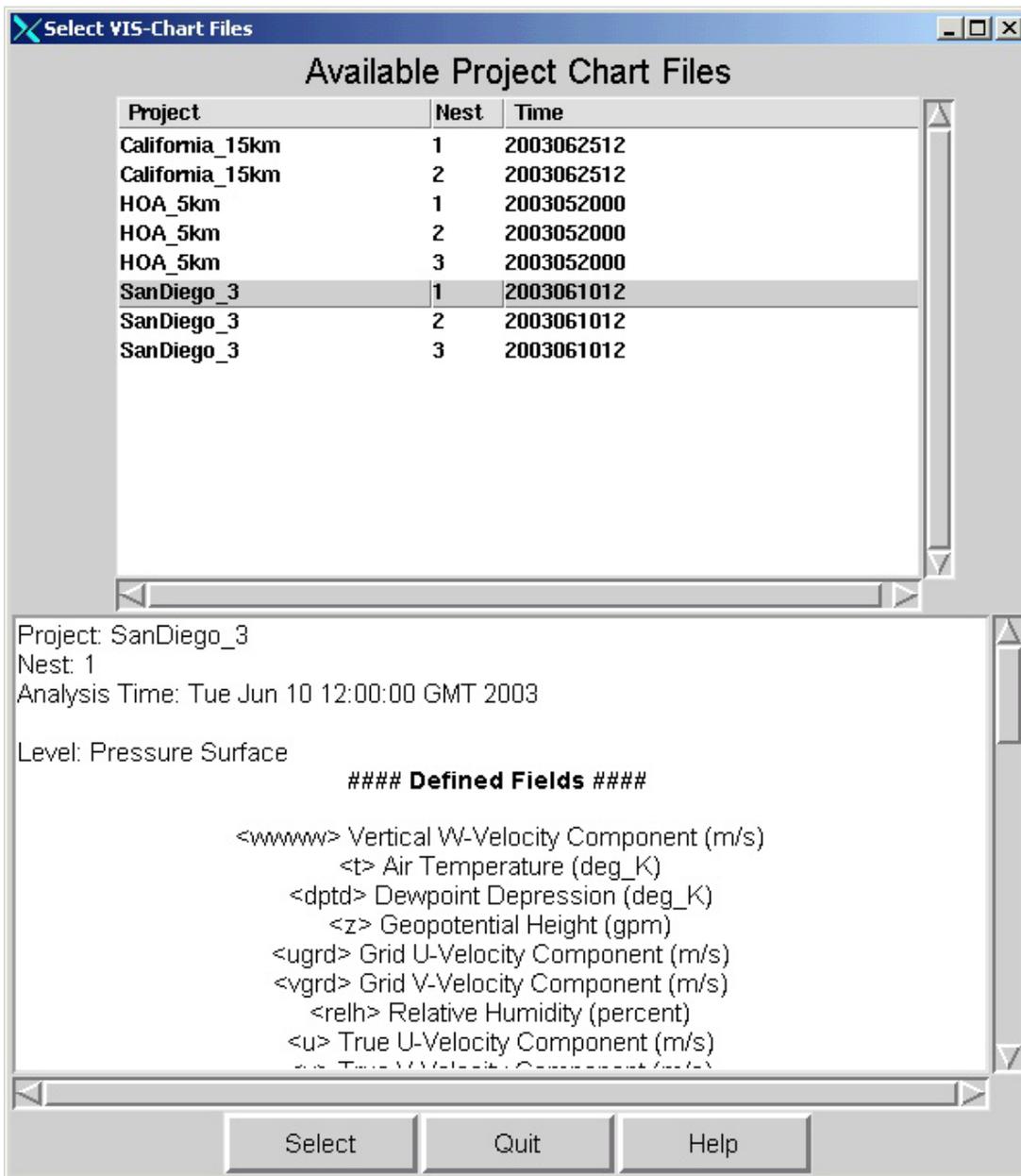


Figure 4. The File Selection Dialog for IPVS\_CHARTS

This File Selection dialog presents all of the available files, stored under the user's IPVS directory structure for COAMPS-OS, for all of current model areas. The files are listed

according to model area, grid geometry (e.g., nest 1 or 2) and base time with the format YYYYMMDD<00 or 12> (e.g. 2003062512 would be the data set for 12Z on 25 June 2003). Scroll down to the file for the desired model area, nest and base time.

- Once you have found the desired file, click on the file line to display the file information. Click "Select" to launch IPVS\_CHARTS with the file you have highlighted (Figure 5).



**Figure 5. Data files for IPVS\_CHARTS are listed for the user's IPVS directory**

- By default, IPVS\_CHARTS displays a plot of surface pressure analysis overlaid on a map representing the selected data file. IPVS\_CHARTS has two screen modes: Standard and Advanced. An example of the Advanced mode is shown in Figure 6 below.

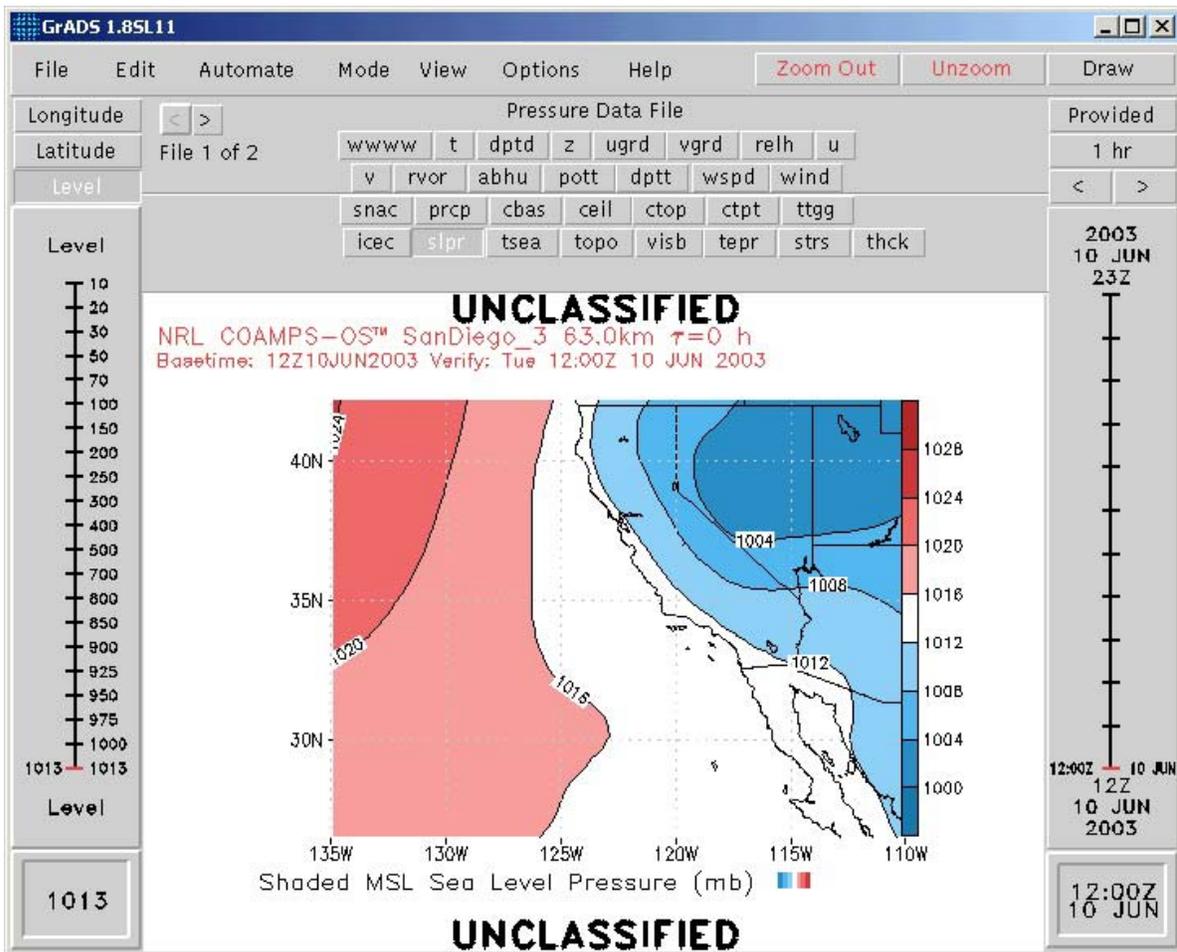


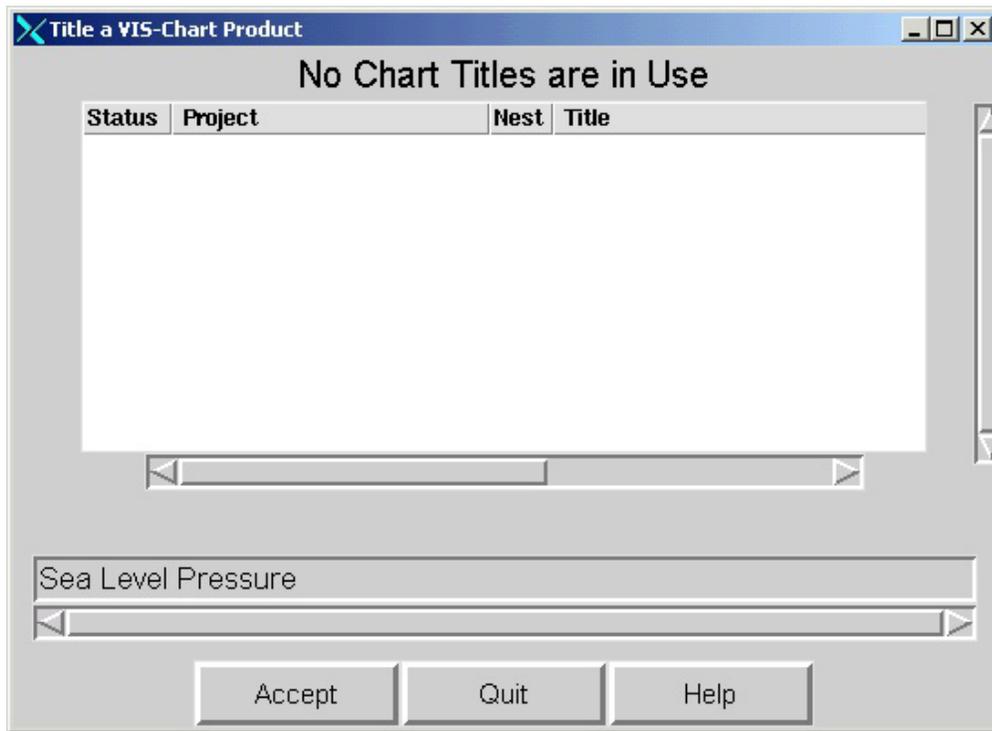
Figure 6. An example of an initial IPVS\_CHARTS screen in Advanced Mode

6. Use the IPVS\_CHARTS controls to create the chart or sequence of charts desired. The IPVS\_CHARTS section gives complete details on how to use the controls. Note: by selecting latitude, longitude, and level ranges, you can influence the type of chart produced (horizontal map, vertical profile, or vertical cross-section).
7. You have two options for storing your work. Save the chart product you have created to allow the COAMPS-OS system to automatically generate new charts each time new data are received. The second option is to save the images you created during this IPVS\_CHARTS session. This option provides you with snapshots of your creations. It does not save the definitions from which they were created nor does it result in the automatic generation of updates. The subparagraphs below describe how to perform each type of save.
  - a. **Saving Chart Definitions in the Automation List.** When you add a chart definition to the automation list, the computer will use the definition to generate a new set of chart images each time new data are received. If you use the same series of charts each day for a brief, you would want to use this option to ensure that you have a fresh set of charts each day, based upon the latest data. To add a chart to the automation list, pull down the

**Automate** menu, then select **Save Product** or **Save Product As** from the drop-down menu. **Save Product** is used to save a file that has been saved before. If you select **Save Product** the first time a products is saved, IPVS\_CHARTS will suggest what to name the chart, and it will present a confirmation dialog (Figure 7), which shows the chart name. Click on the **Accept** button to accept the chart name and proceed with the save. After the automation is saved, the computer will generate new images (e.g., as PNGs) in each update cycle and add them to the image database.



If you select **Save Product** for a single image that has not been previously saved, IPVS\_CHARTS will actually do a **Save Product As**.



**Figure 7. The Accept Confirmation dialog for Save Product option under the Automate menu.**

If you select the **Save Product As** option, the same **Accept Confirmation** dialog (Figure 8) appears. You can use this dialog to enter your own chart name for the automation, or to select and edit an existing chart name. Note: if you select an existing name, more than one chart will have the same name in the web page. This is not advised since only the name distinguishes each chart in the image table.

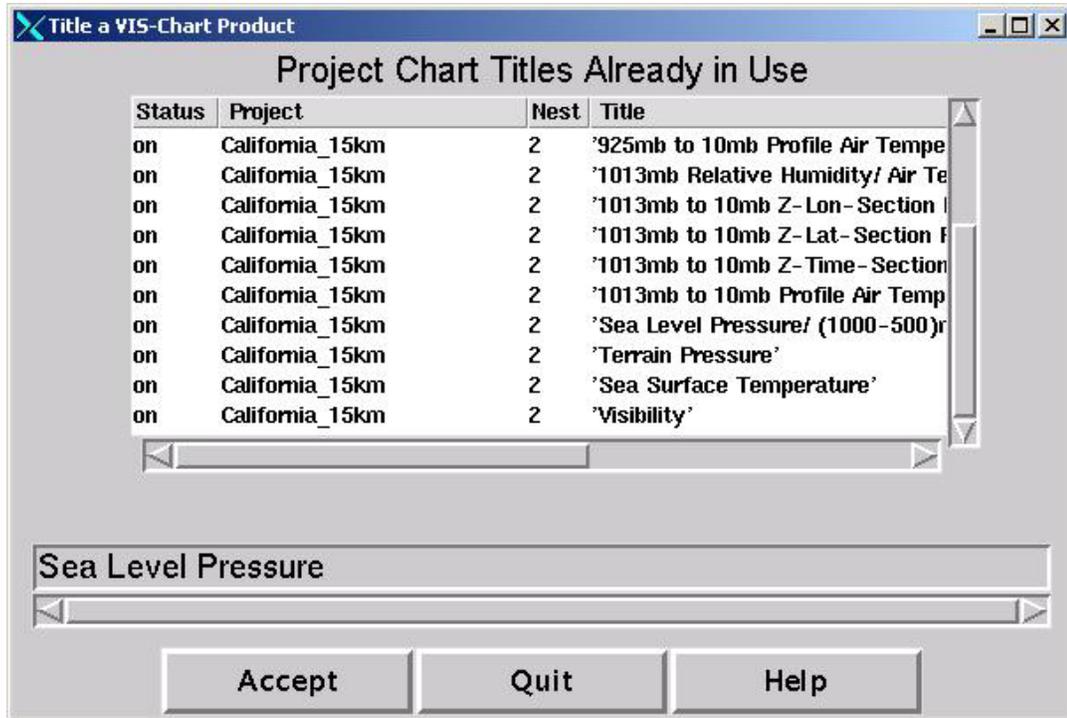


Figure 8. The Save File dialog for Add Product As option under the Automate menu.

- b. **Save Chart Images** There are two options for saving images, **Save Image** and **Save Image As**. **Save Image** is used to save a file that has been saved before, or to save a set of images (e.g., a time sequence). **Save Image** stores the file under the existing name. In the case of a sequence, it will be saved as an automatically generated name. After this selection has been made a dialog appears (Figure 9) confirming the file name or, in the case of a sequence, the file name of the first file in the sequence. Select **OK** to execute the save action.

 If you select *Save Image* for a single image that has not been previously saved, IPVS\_CHARTS will actually do a *Save Image As*.



Figure 9. The Confirmation dialog for Save Image option under the File menu.

**Save Image As** is used to save a file for the first time, save a copy under a different name, or to change the image format used. When you select **Save Image As**, a **Save As**

dialog will appear (Figure 10). To save the file under the default file name and using the default image format, simply click the **Save** button.

A custom file name and type may also be selected. The **File name** field allows you to enter the desired file name. When the dialog first appears, the default file name is displayed. To change the file name, click in the field and type the name you desire. The **Files of type** field lists available image formats that may be used for the file. The image format types include **PNG** (default, .png) and **GIF** (.gif). To select a type, simply add a period and the desired extension for image format after your file name in the **File Name** field. These formats can be used to export images into other programs (e.g., PowerPoint). Click **Save** to close the dialog and save the file under the name shown.

The names of images and any corresponding automation files are linked for easy recognition and future re-editing whenever **Save Image As** or **Save Product As** are used.

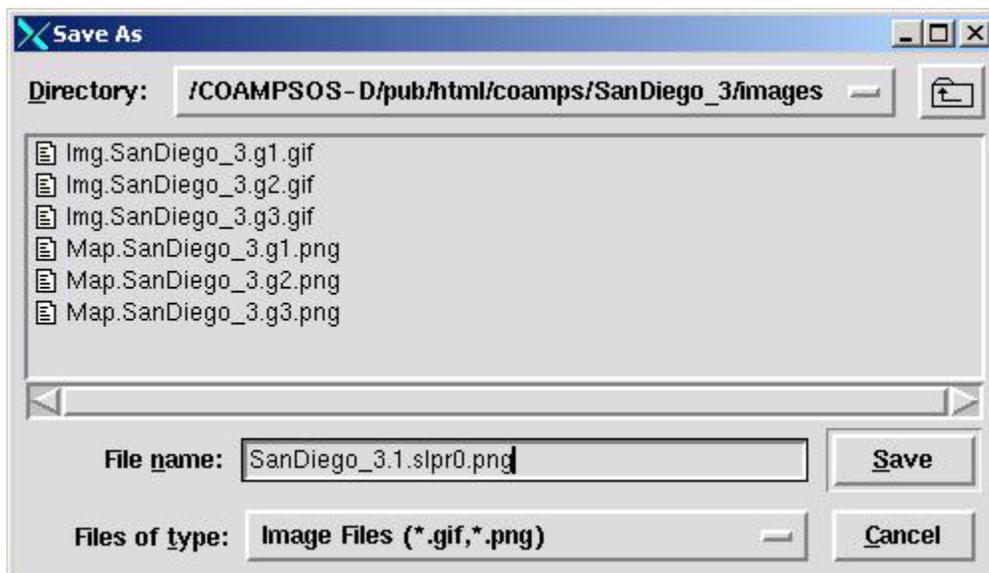


Figure 10. The Save As dialog for Save Image As option under the File menu.

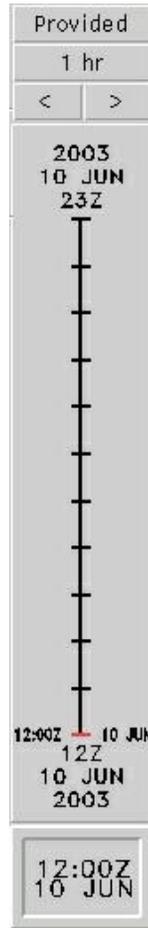
## 2.2 CREATE A SERIES OF CHARTS

The IPVS\_CHARTS gives you the tools to automatically create a time-sequence animation from a single chart display. You create the chart once, and IPVS\_CHARTS will automatically produce a chart with the same data for the range of the forecast times you select. The typical IPVS\_CHARTS screen for the Advanced mode is shown in Figure 6.

Instructions for using the IPVS\_CHARTS controls in both the Advanced and Standard modes can be found in Section 3. This section describes, in further detail, instructions for setting up your first chart. This may be a map-style chart, a vertical profile, or a vertical cross-section.

To create a time series of charts, follow the steps below.

1. Select a range of times on the time line at the right side of the chart (Figure 11).



**Figure 11. The time line editor tool.**

2. Use the middle mouse button to select the first and last points. The range between those two points will be filled in automatically. The selected time range will be highlighted in red. You can also select the time interval between charts by either increasing or decreasing the interval by clicking the < or > buttons.
3. Click the **Animate** button and the animation will be produced. Alternatively, you can pull down the **File** menu and select **Save Image** or **Save Image As**.



**Middle mouse click on the animation to stop cycling of images.**

As the animation is generated, each slide will be displayed briefly. If you selected **Save Image**, the animation is saved with a generic name and a confirmation dialog is displayed to allow you to confirm the default file name. If you selected **Save Image As**, a file selection dialog is displayed to let you enter your own file name or select one previously used. If you select a previously used file name, that file series will be overwritten with the new data.

## 3 EDIT A CHART

IPVS\_CHARTS (Figure 6) produces two-dimensional charts based upon gridded data fields produced by computer weather models. These can be horizontal map views at the surface or a selected pressure level, or they can be vertical cross-sections along latitude or longitude lines or arbitrary paths. Scalar data can be shown as line contours, color-filled contours, or block shaded (i.e., displayed as color filled grids). Vector data can be plotted as barbs, vector arrows, or streamlines. You can easily select the desired values, or ranges, of longitude, latitude, height (in altitude or pressure coordinates), and time to display a single plot, or a sequence of plots. You can plot one or more variables simply by clicking on variable type buttons. You can also customize the way each variable is plotted. A single plot or sequence of plots can be accessed in a number of ways: 1) saved into the *Images* directory, 2) plotted to a local printer, or 3) placed on the IPVS web page to be automatically updated at the end of each COAMPS-OS cycle.

When you launch IPVS\_CHARTS, a file selection dialog is displayed allowing you to select a set of grid data to be used for the charts. Refer to Section 2 of this document for instructions on getting started.



**At any time you wish to redisplay the chart, you can force this action by clicking on the “Draw” button in the upper right corner of the main IPVS\_CHARTS screen. A right mouse click on the “Draw” button forces a full redraw when portions of the display have been obscured by other windows covering the IPVS\_CHARTS screen**

### 3.1 USING THE EDITOR TOOLS

IPVS\_CHARTS has two screen modes: Advanced and Standard. The Advanced mode shows the time selection bar (Figure 11), dimension selector buttons and bars (Figure 12), and panels of parameter toggle buttons (Figure 13). These are convenient for quickly changing dimensions and parameters, but can be confusing for a new user. The Standard mode eliminates these providing a simple, clean map view of the data. Parameter and level selections (i.e., pressure levels or height surfaces) are made using Data and Level menus.

#### 3.1.1 Advanced Mode

The Advanced mode relies on time and dimension selector bars to set latitude, longitude, level and time and display an appropriate chart. Table 1 below describes the chart that will be inferred and displayed for every combination of selector settings. The results range from tabulated data to line plots to map plots to animations. The convenient access to dimensions and parameters allows the user to quickly scan through many options and conditions to track and diagnose data issues.

- a. **Time Selector** (Figure 11): Select the time span for the data set using the time scale on the right side of the IPVS\_CHARTS screen. To select a single time, click on the appropriate point on the scale. To select a range of times, middle-click on the first time in the range and middle-click again on the last time in the range. By selecting a range of times, a series of images will be generated that can be animated.

The arrow buttons (< and >), located at the top of the time scale, allow you to change the interval between ticks on the time scale. The time interpolation interval determines the number of interim charts that are computed and displayed between data times. For example, if you have data for 00Z and 12Z, a 2-hour interpolation interval means that there will be five intermediate charts labelled “Interpolated” and shown in an animation of the data. The interim charts are linearly interpolated in time between the data times. The smaller the time interpolation interval, the smoother your animation will be, but the more hard drive space it will occupy on your computer.



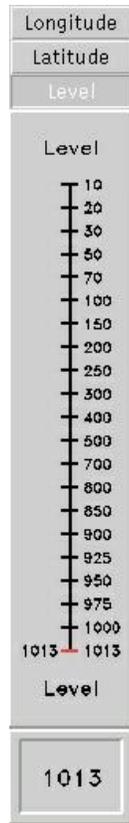
**The IPVS web page automatically displays time sequences only at the model forecast times. Time settings only affect session animations.**

- b. **Latitude/Longitude/Level Selector** (Figure 12): The **Longitude**, **Latitude**, and **Level** buttons toggle the scale between longitude, latitude, and level selection, respectively. These selectors allow you to create a variety of animations or static displays. Select a single value of the active parameter by clicking on the appropriate point on the scale. Select a range of values by clicking with the middle mouse button on the first value in the range. Then click with the middle mouse button on the last value in the range. If you select a single latitude and longitude and a range of levels, the end product will be a vertical profile of the selected parameter(s) at that point. If you select a single latitude, a range of longitudes, and a range of levels, you will see a vertical cross-section along the selected latitude between the selected longitude limits. If you select a single longitude, a range of latitudes and a range of levels, you will see a vertical cross-section along the selected longitude line between the selected latitudes.



**You can select the entire range of Latitude, Longitude or Level by double clicking with the left mouse button on the Selector bar when the desired dimension is activated.**

Static cross-sections, or one-dimensional animations, will be generated based upon your latitude, longitude or level selection. If a single latitude, longitude, or level value is selected, a static display will be created. If a range is displayed on the Selector, animation is produced. The **Draw/Animate** button confirms the impending action.



**Figure 12. The latitude, longitude and level selector tool. Level is active.**

The type of chart that is displayed is dependent upon the selections you have made for time, longitude, latitude and level. As well, the chart displayed is dependent upon which of the latitude/longitude/level buttons is activated.



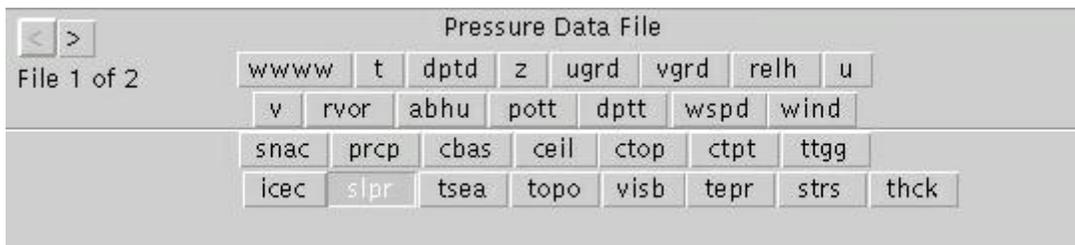
**Each time you activate a new dimension button, you must click Draw/Animate to update the chart.**

When IPVS\_CHARTS is initially launched the entire range for **Latitude** and **Longitude**, the base time for **Time**, and the surface **Level** are the default selections. **Level** is the activated dimension by default. Additional possible scenarios are shown in the table below.

**Table 1. Possible chart displays with associated dimension settings.**

<b>LONGITUDE (X)</b>	<b>LATITUDE (Y)</b>	<b>LEVEL (Z)</b>	<b>TIME (T)</b>	<b>ACTIVATED DIMENSION</b>	<b>RESULT</b>
Fixed	Fixed	Fixed	Fixed	Any	Printed values
Fixed	Fixed	Fixed	Varying	Any	Time line
Varying	Fixed	Fixed	Fixed	Any	Line plot vs. X
Varying	Fixed	Fixed	Varying	X Y Z	X-T section T animated line plot vs X T animated line plot vs X
Fixed	Varying	Fixed	Fixed	Any	Line plot vs Y
Fixed	Varying	Fixed	Varying	X Y Z	T animated line plot vs Y Y-T section T animated line plot vs Y
Varying	Varying	Fixed	Fixed	X Y Z	Line plot vs Y animated in X Line plot vs X animated in Y X-Y map
Varying	Varying	Fixed	Varying	X Y Z	Y-T section animated in X X-T section animated in Y X-Y map animated in T
Fixed	Fixed	Varying	Fixed	Any	Z vs variable
Fixed	Fixed	Varying	Varying	X Y Z	T animated Z vs variable T animated Z vs variable Z-T section
Varying	Fixed	Varying	Fixed	X Y Z	Z vs variable animated in X Z-X section Z-T section
Varying	Fixed	Varying	Varying	X Y Z	Z-T section animated in X Z-X section animated in T Z-T section animated in Z
Fixed	Varying	Varying	Fixed	X Y Z	Z-Y section Z vs variable animated in Y Line vs Y animated in Z
Fixed	Varying	Varying	Varying	X Y Z	Z-Y section animated in T Z-T section animated in Y Y-T section animated in Z
Varying	Varying	Varying	Fixed	X Y Z	Z-Y section animated in X Z-X section animated in Y X-Y map animated in Z
Varying	Varying	Varying	Varying	Any	Prohibited

- c. **Parameter Buttons** (Figure 13): In the IPVS\_CHARTS screen above the chart display area are the parameter buttons, representing the available parameters for the selected data set. Click on a parameter using the left mouse button to add the parameter to the display. You may display multiple parameters simultaneously by clicking the button for each parameter you desire.



**Figure 13. Sample view of parameter buttons located at the top of the IPVS\_CHARTS screen in Advanced mode.**

Examples of the parameters currently available for display are:

- **slpr** Surface pressure
- **t** Temperature
- **wspd** Wind speed
- **u** U-Velocity Component
- **v** V-Velocity Component
- **avor** Absolute vorticity
- **z** Geopotential height
- **dptt** Dew point temperature
- **wind** Wind speed and direction
- **relh** Relative humidity
- **divg** Divergence
- **thck** 1000-500 millibar thickness

The Pressure Data File shown in Figure 13 is one of two files opened simultaneously when a project and date group are selected. The second file is for Height surface data. By clicking on the right (>) arrow the parameter buttons will be displayed for the available Height data and the Level selector (Figure 12) will convert to height surface values. Any combination of Pressure and Height parameters can be selected and displayed.

Note: For additional model parameters refer to the COAMPS-OS home page. On this web page you will find a **Parameter Descriptions** link that includes a complete list of parameters with the full name, abbreviation, and additional information.

- d. **Adjusting the Display for a Data Type**: Right-click on a parameter button to invoke the **Parameter Options** dialog (Figure 14). The activated components of this dialog are dependent upon the selected data type. Additional information on this editor tool is provided in Section 3.3 Customizing Data Plots.

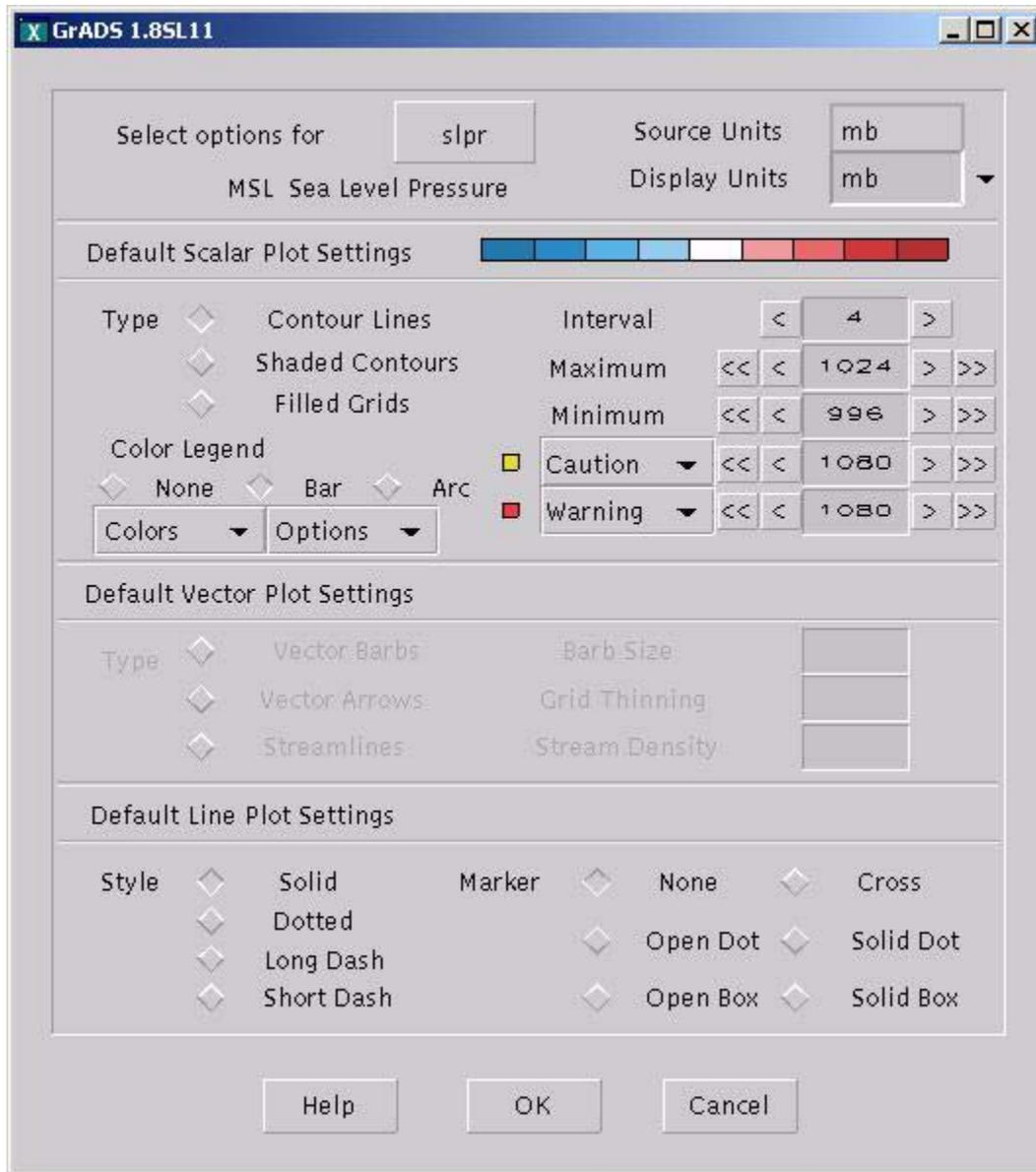


Figure 14. Typical Parameter Options dialog view.

- e. **Draw**: The currently selected data is displayed in the center of the screen. You can update the display (for example, after changing a parameter display setting) by clicking the **Draw** button. If you have selected a range of times, this will change the **Draw** button to an **Animate** button, and cause a plot to be displayed for each selected time. Whenever a range of values is selected on the left dimension bar, animation will result for that dimension. The **Draw/Animate** button always announces the impending action.

### 3.1.2 Standard Mode

The Standard mode (Figure 15) relies on dropdown menus to select data and their pressure or height level. Latitude and longitude are fixed to the full extent of the data files for the selected

project and subgrid nest. The session time is fixed to the analysis time (i.e., tau=0). The simplified map view allows the user to quickly compose typical charts that are most frequently needed. The Standard mode does not allow scanning data in any dimension or in time. Simplified methods for creating and viewing arbitrary cross-section and profile plots are available (Figure 26).

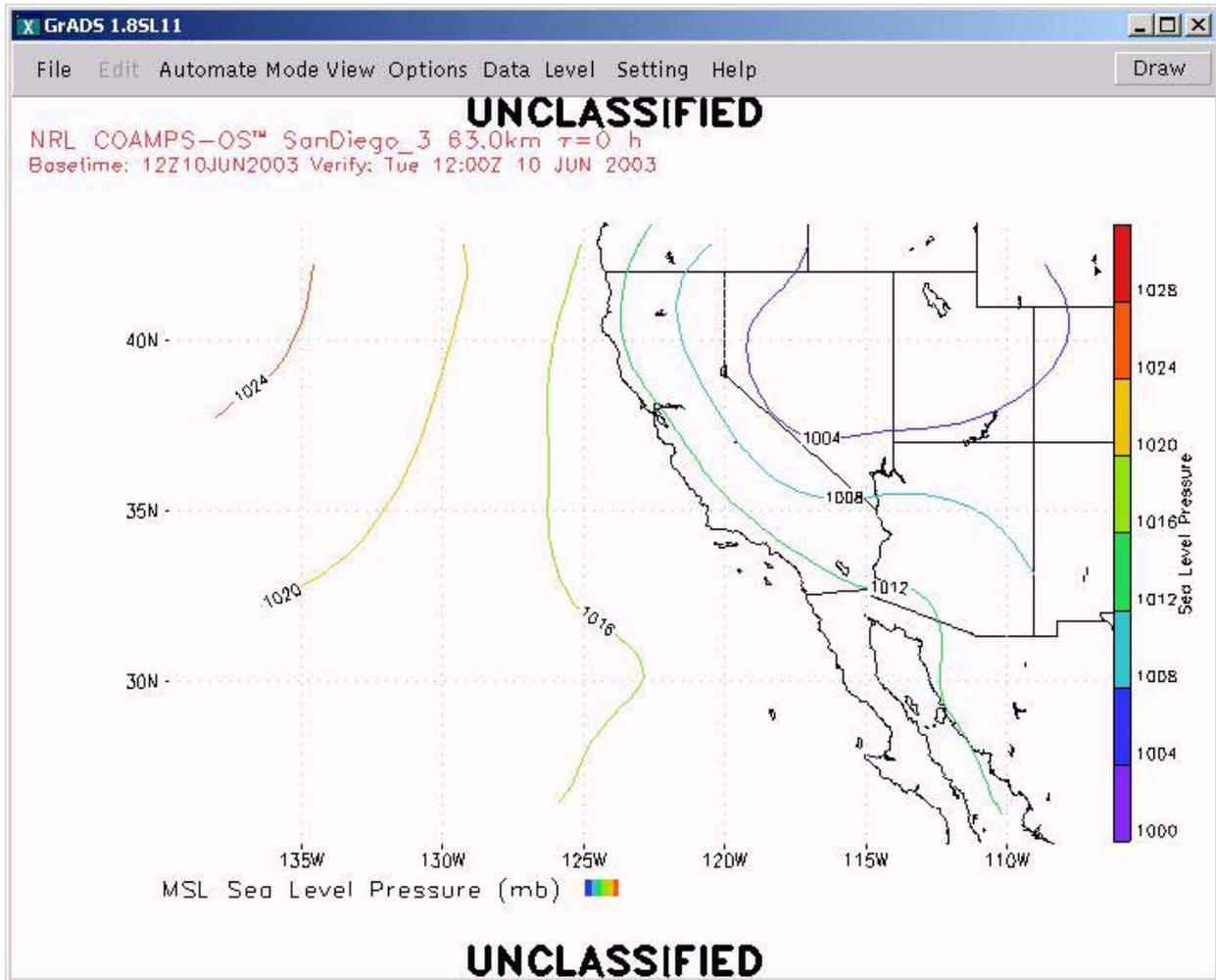
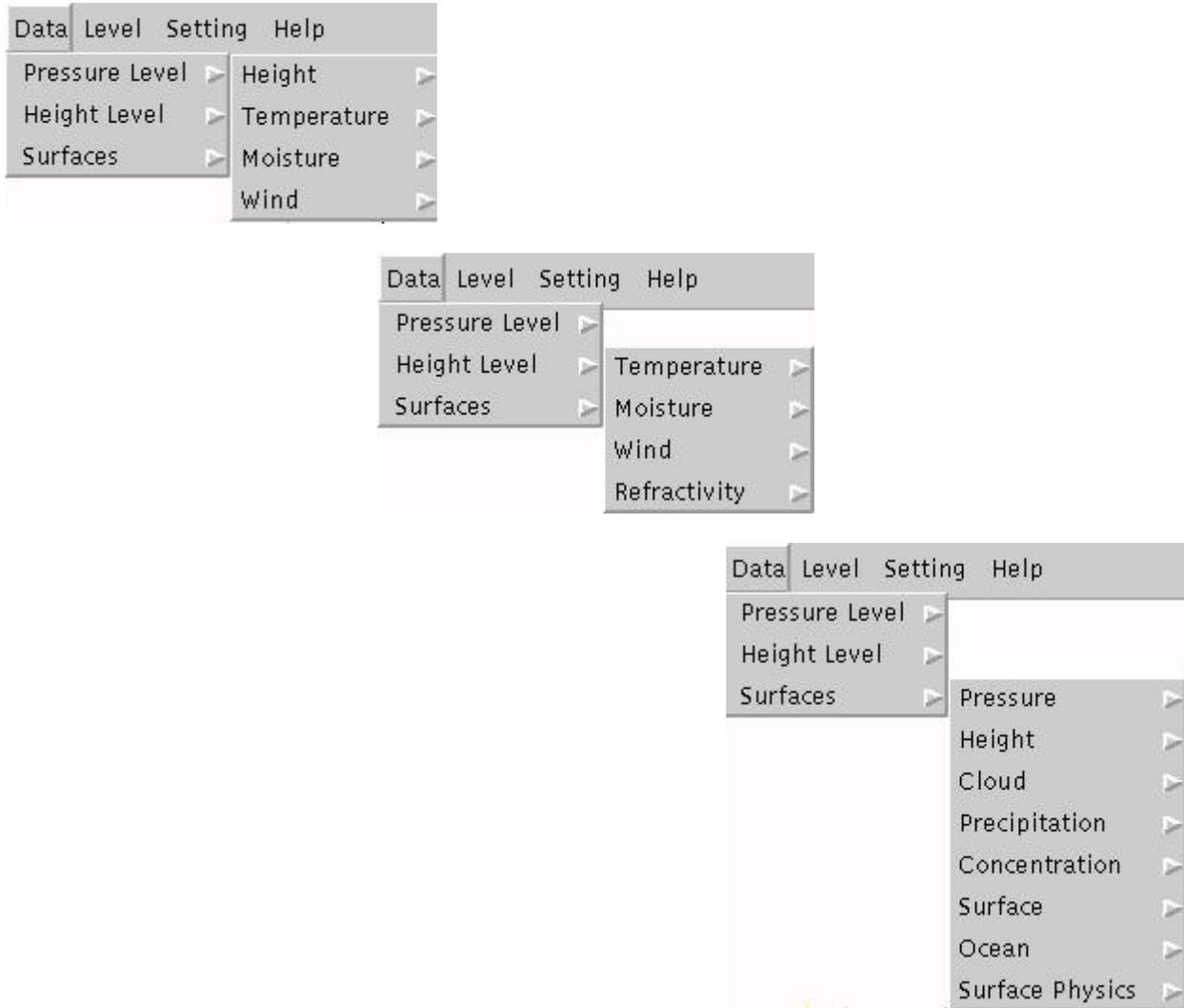


Figure 15. An example of an initial IPVS\_CHARTS screen in Standard mode.

- a. **Data Menus** (Figure 16): The Pressure Level, Height Level, and Surface data are listed in separate submenus and data categories to aid locating the many parameters that can be requested of the model.



**Figure 16. Data selection menus for Standard mode.**

- b. **Data Selection** (Figure 17): Table 2 lists all possible COAMPS-OS model parameters by their data category which defines where they will appear in the **Data** menus. Parameter selections are indicated with an asterisk. Selecting a marked item de-selects that item.

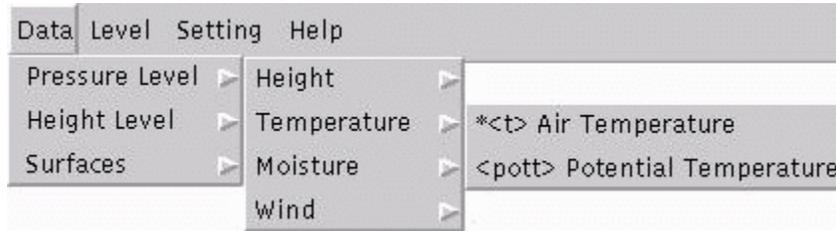


Figure 17. An example of parameter selection in Standard mode.

- c. **Data Levels** (Figure 18): Parameters selected with the **Data** menu automatically appear in the **Level** menu to allow level selection for upper level variables. Level selections are indicated with an asterisk. Selecting a marked level de-selects that level.

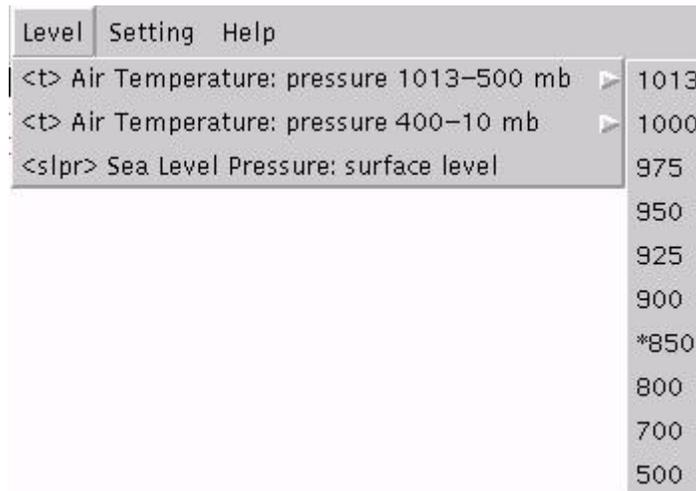


Figure 18. An example of Level selection in Standard mode.

Table 2. Data Categories for Standard Mode Data Menus

<p>Pressure  slpr = Sea Level Pressure  slpr2 = Sea Level Pressure (Mesinger Treadon method)  perp = Pressure Perturbation  tepr = Terrain Pressure  trpr = Tropopause Pressure  pppp = Total Pressure</p> <p>Height  z = Geopotential Height  dval = Geopotential Height  thck = 500mB-1000mB Height Thickness  geop = Geopotential Dynamic Height (m<sup>2</sup>/s<sup>2</sup>)  blht = Planetary Boundary Layer Height  frzl = Freezing Level Above Ground Surface  topo = Terrain Height</p> <p>Temperature  t = Air Temperature  tttt = Air Temperature  potp = Perturbation Potential Temperature  pott = Potential Temperature</p> <p>Moisture  abhu = Absolute Humidity  absh = Absolute Humidity  dptd = Dewpoint Depression  dptt = Dewpoint Temperature  relh = Relative Humidity  wvap = Water Vapor Mixing Ratio  vapr = Water Vapor Pressure</p> <p>Wind  ugrd = Grid U-Velocity Component  vgrd = Grid V-Velocity Component  uuuu = Grid U-Velocity Component  vvvv = Grid V-Velocity Component  wwwv = Vertical W-Velocity Component  u = True U-Velocity Component  v = True V-Velocity Component  utru = True U-Velocity Component  vtru = True V-Velocity Component  wspd = Wind Speed  wind = Vector wind  mxsp = Maximum Wind Speed  avor = Absolute Vorticity  ryor = Relative Vorticity  divv = Divergence  divg = Divergence</p> <p>Refractivity  evdh = Evaporative Duct Height  mmmm = Modified Refractivity  dmdz = Modified Refractivity Gradient  ocht = Optimum Coupling Height  nnnn = Refractivity</p> <p>Cloud  cbas = Cloud Base Height  cbrh = Cloud Base Height Using RH Threshold  ceil = Cloud Ceiling Height  ctop = Cloud Top Height  ctrh = Cloud Top Height Using RH Threshold  ctpt = Cloud Top Temperature  ctpr = Cloud Top Temp Using RH Threshold  ccvr = Total Cloud Coverage Using RH Threshold  qccc = Cloud Mixing Ratio  qiii = Ice Mixing Ratio  qrrr = Rain Mixing Ratio  qsss = Snow Mixing Ratio  wvap = Water Vapor Mixing Ratio</p> <p>Precipitation  cpac = Accumulated Convective Precipitation  conp = Bucket Convective Precipitation  spac = Accumulated Stable Precipitation  stap = Bucket Stable Precipitation  tpac = Accumulated Total Precipitation  prcp = Bucket Total Precipitation  lnqv = Precipitable Water  snac = Accumulated Snow  snow = Bucket Snow  snwp = Snow Depth</p>	<p>Heat  diab = Diabatic Heating Rate  evap = Evaporative Cooling Rate  heat = Heat Index  rhtr = Radiative Heating Rate (deg_K/s)  lrad = Long Wave Radiation  hflr = Latent Heat Flux  nrad = Net Radiation  hfls = Sensible Heat Flux  srad = Solar Radiation  trdn = Downward Total Radiation  trad = Radiative Heating Rate (watt/m<sup>2</sup>)  csrc = Source Emission Strength</p> <p>Concentration  arsl = Aerosol  cccc = Tracer Concentration  csum = Tracer Mass Dosage  visb = Visibility</p> <p>Turbulence  brin = Bulk Richardson Number  eeee = Turbulent Kinetic Energy  kkee = Turbulent Kinetic Energy  khkh = Eddy Mixing Coefficient for Heat  kmkm = Eddy Mixing Coeff. for Momentum  ksks = Smagorinsky Mixing Coefficient  mxgl = Mixing Length</p> <p>Surface  ttgg = Ground Sea Surface Temperature  temp = Surface Air Temperature  ugrds = Surface Grid U-Velocity Component  vgrds = Surface Grid V-Velocity Component</p> <p>Ocean  odep = Ocean Depth  land = Land Sea Table  nice = NOGAPS Ice Coverage  icec = Sea Ice Coverage  htsa = Altimeter Sea Surface Ht. Anomaly  tsea = Sea Surface Temperature  salt = Salinity</p> <p>Surface Physics  albd = Albedo  soil = Deep Soil Temperature  g8ra = GOES 8 Brightness Temperature  g9ra = GOES 9 Brightness Temperature  tstr = Scale Temperature for the Surface  hflt = Surface Heat Flux  trads = Surface Radiative Heating Rate  z0z0 = Surface Roughness  gwet = Ground Wetness  wvaps = Surface Water Vapor Mixing Ratio  vaprs = Surface Water Vapor Pressure  qstr = Scale Mixing Ratio for Surface  ustr = Scale Velocity for Surface Wind  strs = Wind Stress  wstr = Wind Stress vector  stru = Grid U-Component of Wind Stress  strv = Grid V-Component of Wind Stress  stut = True U-Component of Wind Stress  stvt = True V-Component of Wind Stress</p> <p>Boundary  bdpp = Boundary Perturbation Pressure  bdpr = Boundary Pressure  bdpt = Boundary Potential Temperature  bdtt = Boundary Temperature  bdvu = Boundary Grid U-Velocity Component  bdvv = Boundary Grid V-Velocity Component  bdvw = Boundary Grid W-Velocity Component  bdqv = Boundary Mixing Ratio</p> <p>Increment  dinc = Geopotential Height Increment  stin = Analyzed Increment of Surface Temp  dpin = Dewpoint Depression Increment  uinc = Grid U-Velocity Increment  vinc = Grid V-Velocity Increment</p> <p>Satellite  vis = Visible Channel  ir = Infa-Red Channel</p>
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## 3.2 THE IPVS\_CHARTS MENUS

To navigate through a menu's options, hold the left button down to scroll through menu and submenu options. Release the button and click on the option to make your selection. If you do not wish to select any of the displayed options, click anywhere on the screen to close the menu and start over. Alternatively to have menus stick, click the left button on a menu header to popup its submenu and repeat with single clicks on each submenu selection.

For all IPVS\_CHARTS menus, a triangle (arrow) next to a label or field indicates a drop down menu with additional options. An asterisk next to an option indicates the current selection.

### 1. File Menu



**Figure 19. File menu options.**

- a. *Open Grid*: Allows you to select a new data set for display. If there is a data set currently displayed, it will be closed before opening the new one.
- b. *Save Image*: Saves the current screen image in the current format (e.g., PNG which is the default) with a file name created by IPVS\_CHARTS. If you have previously used **Save Image As** during the current session, the screen image will be saved with the image type and file name that you specified.
- c. *Save Image As*: Allows you to save the current screen image as a GIF or PNG file type. The **Save Image As** option opens a **Save File** dialog that allows you to specify a file name or select an existing file name. If you select an existing file name, the data in that file will be overwritten by the new data. Note: using this option will set the file name base and file type for the remainder of the current session.
- d. *View Saved Image*: Allows you to view previously saved images. Images are viewed with the browser and may be printed or mailed electronically.
- e. *Print*: Prints the current screen display to the default UNIX printer configured for the UNIX “lp” command. If you wish to use a different printer, your UNIX System Administrator must set the LPDEST environment variable to the new printer destination.



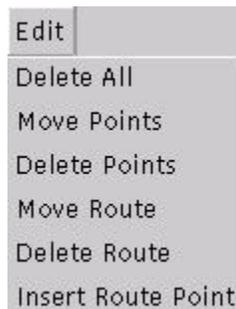
There are two methods for printing a chart from the IPVS web page using a PC. These methods ensure that the chart fits on one 8 1/2 X 11" piece of paper. 1) Select *Page Setup* under the *File* menu in your browser. Set the left and right margins to 0". Then select *Print*. 2) Select *Print* under the *File* menu. Select *Properties* from the Print dialog box. Set the output format to *landscape* to rotate the figure. Then select *OK*.

- f. *Quit*: Closes the IPVS\_CHARTS Editor, automatically saving the current settings into a user profile.



You should always close the IPVS\_CHARTS Editor by using the *Quit* option on the *File* menu rather than by using the *Close* option on the window's command menu. This will ensure that the user profile data needed for the next session are always saved. Each new session will start up in the configuration used when the last session was closed.

- 2. **Edit Menu** (Figure 20): is only available when **Section** or **Profile Mode** have been selected and cross-section or profile points have been identified.



**Figure 20. Edit menu options.**

- a. *Delete All*: Deletes all section and profile points.
- b. *Move Points*: Allows you to select and place section or profile points at new locations. Moved points can be reselected and moved until the current edit session has ended.
- c. *Delete Points*: Allows you to select/deselect and then delete section and profile points. Points can be selected, deselected and reselected until the current edit session has ended.
- d. *Delete Path*: Allows you to select/deselect and then delete a section path.
- e. *Move Path*: Allows you to select a section path and place the path at a new location. The first point picked becomes a reference point for the move. The next mouse click selection sets the new position for the first point and defines the vector used to move the entire path.
- f. *Insert Path Point*: Adds a new point to an existing path segment where you have clicked.

### 3. Automate Menu



**Figure 21. Automate menu options.**



**Figure 22. Save Product As and Open a Product submenu options.**

- a. *Save Product*: Re-saves a product that was previously saved in the current session or if an existing product has been opened and edited. If neither, **Save Product** defaults to **Save Product As**. Creates a template of data definitions for the selected data, zoom location, and plot ranges that were used to create the current chart. It then adds the template and a custom product script to the automation list. Based upon the chart definitions that you have established, a new set of images will automatically be generated each update cycle and stored in the web page database.
- b. *Save Product As*: When you choose **Save Product As**, a suggested chart name is generated for the product. Before the operation is executed, a confirmation dialog will appear with the suggested name of the chart (Figure 7). The dialog will provide you with the option to proceed or cancel. However, instead of saving the file with the suggested name, a text dialog appears (Figure 8) allowing you to enter a name or use an existing name.



The *Save Product As* dialog allows you to save products with the same name. However, it is recommended that you avoid this so charts can be easily identified by their row title. If you select an existing file name, two (or more charts) will appear with the same row name on the IPVS web page.

Products can be saved for the current project, e.g., SanDiego\_3, or as a Default product (Figure 21). Any products saved as a default product will be automatically applied to all currently running projects and new projects subsequently created.

- c. *Open a Saved Product*: Lets you open and reuse a previously saved project chart, a default chart, or an example chart template. If the chart that you choose is for a different project or data set than that which is currently displayed, IPVS\_CHARTS will attempt to create the chart for the current area and data set. Note: this may not always work. The requested parameters may not be available from the current data set or the geometry may not translate.
- d. *Delete Products*: Displays the list of chart files on the automation list. This option allows you to delete a chart file so that it no longer generates automated updates.

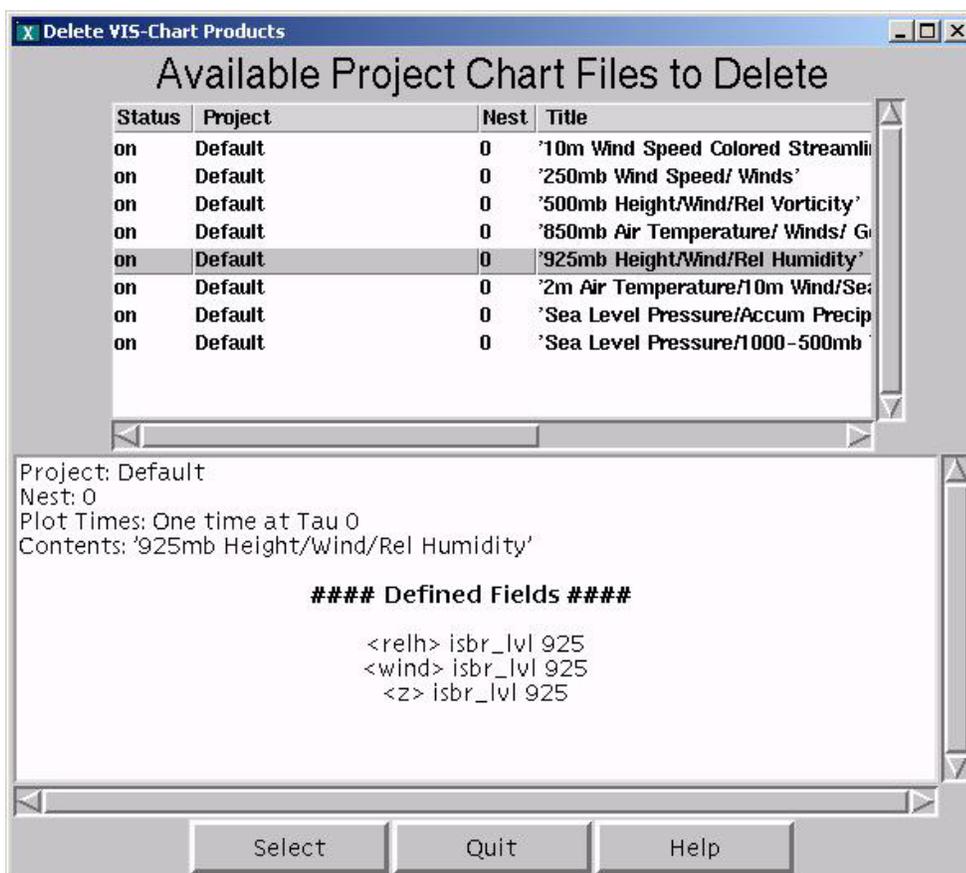


Figure 23. An example view of available chart files that may be deleted.



Multiple charts can be selected using Left-Button-Click + Shift key to select a range, or Left-Button-Click + Ctrl key to toggle individual selections.

- e. *Manage Web Products*: Allows products to be turned off or on without deleting them so they are still available for future use. Multiple charts can be selected/de-selected similar to deleting charts.

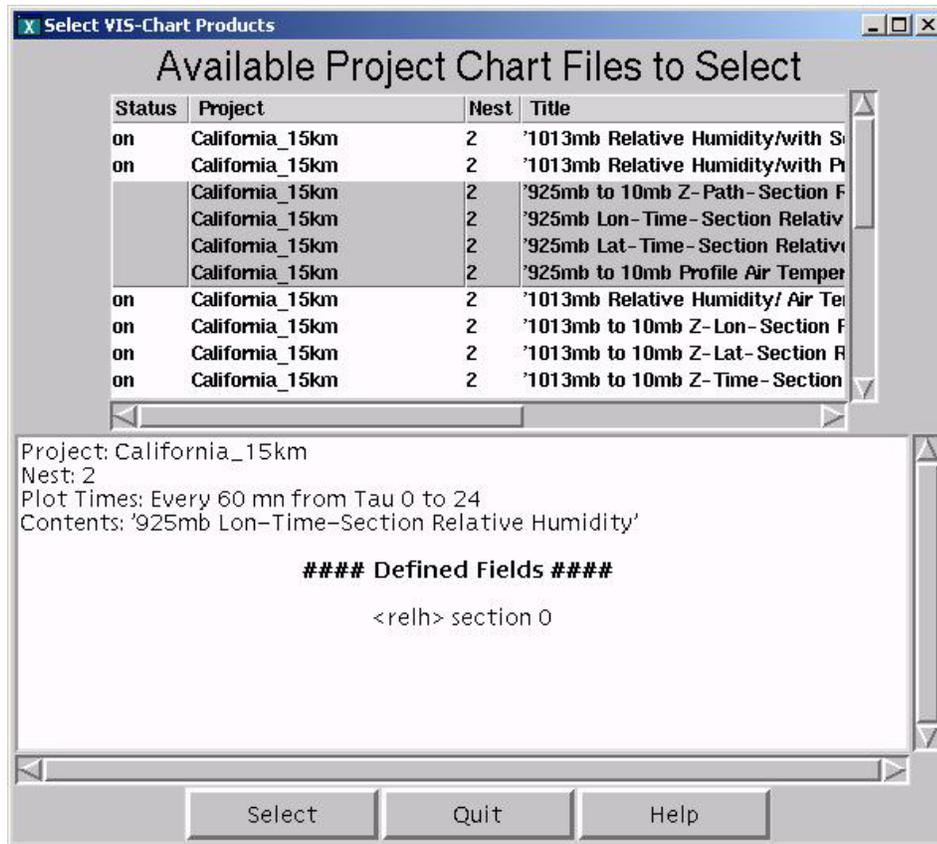


Figure 24. An example view of turning off several charts.

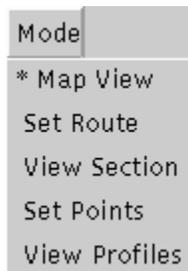
- f. *Update Web Page*: Allows the immediate, interactive update of additions, deletions, and changes to automated images created for the web page and allows you to review the new page. The web browser may require a reload, refresh, or exit/restart to display the changes. All charts, customized since the last web page update, are updated when the first request in a session is made to update the web page. This allows the IPVS\_CHARTS user to perform several edit sessions before committing changes to an updated web page.
4. **Mode Menu** controls the type of chart displayed. The menu contents vary with the mode selected (Standard or Advanced). Figure 25 below shows the Mode menu in Advanced mode. Figure 26 shows the Mode menu in Standard mode.

In Advanced mode, the **Same** and **Mixed Level** modes allow the data to be viewed over an area controlled by **Longitude**, **Latitude** and **Level**. The **Sections** and **Profiles** modes allow the data to be viewed along an arbitrary section path or at selected points, respectively.



**Figure 25. Mode menu options in Advanced mode.**

- a. *Same Level*: Allows you to synchronize **Level** of all displayed multi-level (e.g., upper air data) data to the same level. This facilitates the ability to recognize data correlation, especially while animating in level. Data can be scanned in longitude, latitude, and level by setting data ranges using the **Longitude**, **Latitude**, and **Level** buttons. Most combinations can be scanned in **Time**.
- b. *Mix Levels*: Allows you to display different data from different levels (e.g. 200mb wind and surface pressure) and/or the same data from different levels (e.g., 200mb wind and 500mb wind). Data scanning is limited because the levels are restricted.
- c. *Sections*: Allows you to define arbitrary paths by clicking on the desired map points after selecting the **Path** button. Selecting the **Section** button and clicking the **Draw** button lets you draw a vertical cross section of any selected data, except in the case of surface and single level variables.
- d. *Profiles*: Allows you to pick arbitrary points by clicking on the map at desired points of interest after selecting the **Point** button. Selecting the **Profile** button and clicking the **Draw** button lets you draw vertical profiles of any selected data.



**Figure 26. Mode menu options in Standard mode.**

- e. *Map View*: Allows you to view data charts in map view. Data scanning in level or time is not available.
- f. *Set Route*: Allows you to insert an arbitrary route with the mouse cursor by clicking on the map with the left mouse button.
- g. *View Sections*: Allows you to view the arbitrary vertical cross section by clicking the **Draw** button. Vertical cross sections can be viewed of any selected data, except in the case of surface and single level variables.

- h. *Set Points*: Allows you to insert profile points with the mouse cursor by clicking on the map with the left mouse button.
- i. *View Profiles*: Allows you to view profiles at arbitrary points. Clicking the **Draw** button lets you draw vertical profiles of any selected upper level data.

## 5. View Menu



**Figure 27. View menu options.**

- a. *Location*: Allows you to select the part of the map on which data will be plotted – over land, over water, or both (default). This affects all of the selected data.
- b. *Grid Lines*: Turns display of grid lines (latitude-longitude lines) on and off, and allows you to select dotted or solid lines for the display.
- c. *Grid Pitch*: If grid lines are turned on, allows you to select from a list of degree intervals for the grid lines. There is also an **auto** grid pitch that will limit the number of intervals to a maximum of ten along the longest dimension. The number of intervals will be updated as the chart is zoomed or unzoomed.
- d. *Political Bound.*: Allows you to select whether or not to display political boundaries (i.e., outlines of countries and states). If you wish to display the boundaries, select thick or thin according to the line size you desire. Otherwise, select **Off**.
- e. *Projection*: Allows you to select the map projection used for viewing the data. The options are:
  - i. *None*: No projection is used and scaling and accurate proportions are lost.
  - ii. *Lat-Long*: Rectilinear (Cartesian) projection is used.
  - iii. *NPS*: Polar Stereographic projection, centered at the North Pole, is used. Midlatitude plots appear as a wedge.

- iv. *SPS*: Polar Stereographic projection, centered at the South Pole, is used. Midlatitude plots appear as a wedge.
- f. *Topography*: Allows you to select how topography is displayed. The default is **Filled**, which simply paints land and sea in different colors. The option **Solid** turns off land-sea differentiation with a blue background. The **Shaded** option shows mountain ranges in shaded relief. The **Colored** option shows color-coded altitude contours. The **None** option lets the page background show through to simplify charts and printing.
- g. *Labels*: Allows you to choose whether to display labels for the Title, Forecast Time, Valid Time, Latitude and Longitude, Legends, and Frame.
- h. *View Style*: Allows you to select between web page and standard view. The web page differs from standard view in the title location and title contents. The web page view is only available for horizontal map views. Vertical cross-sections along a latitude, longitude or time only have the standard look available.

## 6. Options Menu



**Figure 28. Options menu options.**

- a. *Menu Mode*: Allows you to select between Advanced and Standard menu modes.
- b. *Level Units*: Allows you to select the units for the vertical coordinate system. The available unit choices are dependent upon the vertical coordinates (i.e., height or pressure) of the available data.
- c. *Site Labels*: Allows you to toggle on/off the display of location names for cities and weather stations.
- d. *Colors*: Provides options for selecting the colors for the following chart features:
  - i. *Schemes*: Allows you to set a coordinated set of background, label, and map colors at once. This option has a built in restriction that prevents drawing white labels on a white background.
  - ii. *Background*: Allows you to set the color of the page (area surrounding the map).
  - iii. *Titles*: Allows you to set the color of the titles.
  - iv. *Labels*: Allows you to set the color of the data labels.
  - v. *Axes*: Allows you to set the color for plot axes.
  - vi. *Map*: Allows you to set the color for map outlines and political boundaries.
  - vii. *Cities*: Allows you to set the font of the city names (this option is only available if Site labels has been turned on).
- e. *Fonts*: Provides options for selecting the fonts used in the chart display. The selections apply to all text on the image.
  - i. *Normal* (default): sans serif or Helvetica type font.
  - ii. *Bold*: sans serif or Helvetica type font but in a heavier style than **Normal**.

- iii. *Normal Roman*: serif typeface.
  - iv. *Bold Roman*: serif type face but heavier than **Normal Roman**.
  - v. *Italic*: slanted typeface.
- f. *Text Size*: Provides the capability to modify text size for each of the following: Titles, Legends, Symbols, Lat/Lon, and Cities. Each of these options has point size suboptions for changing text size. Each click increases or decreases the text size by ten percent.
- g. *Color Bars*: Provides the option for viewing multiple color bars combined into a single column or separate side-by-side columns.
7. **Help Menu** Contains links to an on-line PDF version of this document.

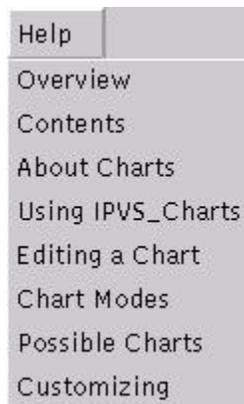


Figure 29. Help menu options.

### 3.3 CUSTOMIZING DATA PLOTS

The **Parameter Options** dialog (Figure 14) allows you to set the display options for parameters. To launch this dialog, right-click on the button (e.g., **slpr**) for the parameter you wish to edit. The parameter abbreviation and long name will be displayed at the top of the dialog. Note: Scalar Plot Settings or Vector Plot Settings will be activated according to the type of parameter that you have selected for editing.

#### 1. Units Settings

The **Parameter Options** dialog allows you to select the units that will be used to display the data in the source file. The units provided in the current data file are shown in the upper right corner in the **Source Units** field. To select different units, click in the **Display Units** field then drag the mouse down to the desired units.

#### 2. Scalar Plot Settings

The **Scalar Plot Settings** section allows you to select: 1) plot type, 2) color legend settings,

3) interval settings, and 4) flag thresholds. These options are described below.

- a. *Plot Type*: The three options for this setting are **Contour Lines**, **Shaded Contours**, and **Filled Grids**. These three options are grouped as radio buttons, where only one can be selected at a time.
  - i. *Contour Lines*: displays only the lines marking the contour values. This selection is preferable when you have multiple fields displayed.
  - ii. *Shaded Contours*: displays contour lines and color-fills the areas between the contours. This selection helps to quickly identify overall trends and features in a single-parameter display.
  - iii. *Filled Grids*: displays grid data as colored blocks of data at the resolution and the data grid. This selection brings attention to the resolution of the underlying grid.
- b. *Color Legend Settings*: Your legend options are as follows: 1) **None**, 2) **Bar**, or 3) **Arc**. If you wish to have a legend, either bar or arc can be selected, not both. If you elect to display a legend, you may further customize the legend appearance by selecting options from available color schemes menu (Figure 30) and custom color editor (Figure 31).

The color schemes are self-explanatory and can be previewed before updating to the display. After selecting a scheme, the color bar next to **Scalar Plot Settings** will display the associated color sequence. Rainbow is the default color scheme for all parameters.

There are a couple of considerations associated with color selections to note. When selecting **Fade to Background**, the topography option (under the **View** menu) must be set to **None**.

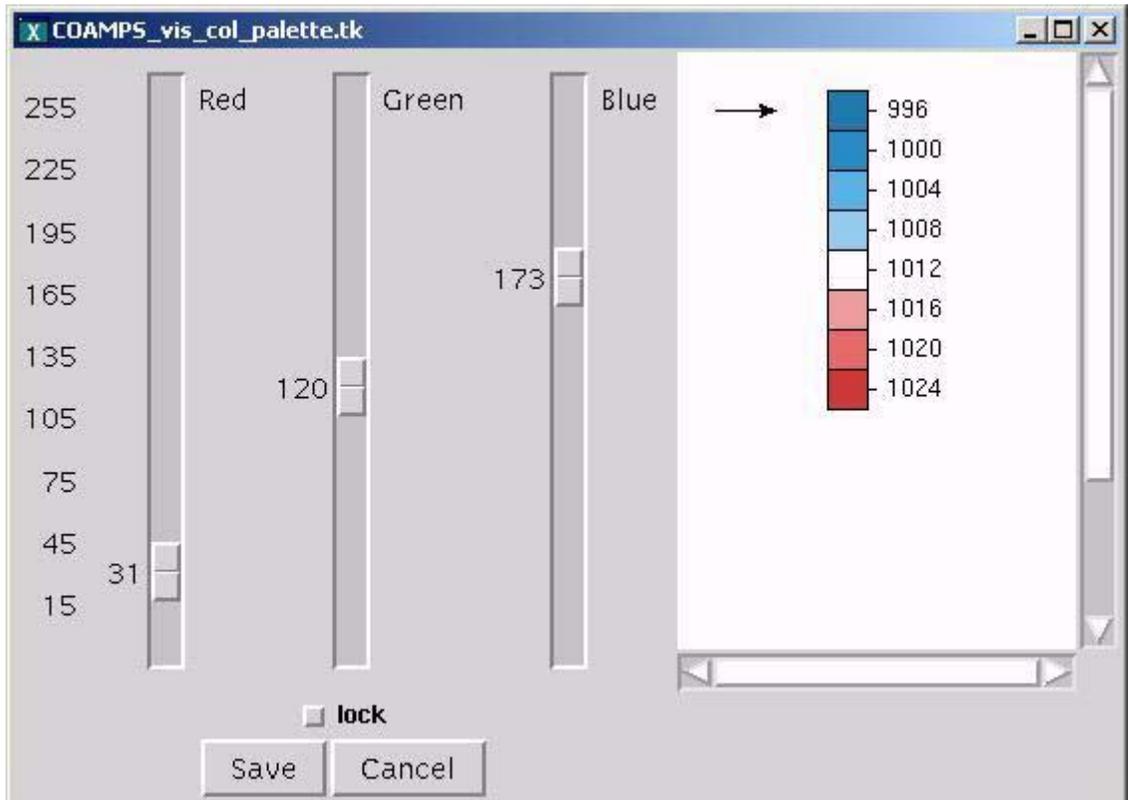


**Figure 30. Colors menu options in the Parameter Options dialog.**

All color sequences and data levels are automatically created. Occasionally a unique color sequence and data levels may be needed. By selecting **Customize** the color palette editor provides colors and data levels that can be edited. The initial colors and

level are those currently selected, so it is advised to approximate the desired custom sequence as close as possible using the available color schemes and level adjustments.

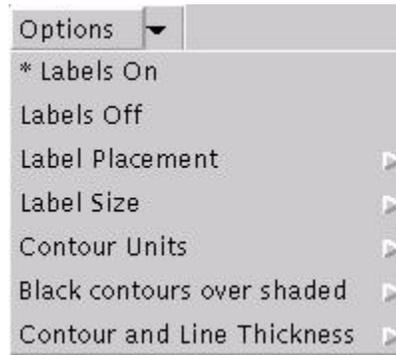
The **Custom** color selection will present the custom colors and levels, if previously saved for the displayed parameter.



**Figure 31. Custom color editor in the Parameter Options dialog.**

- c. *Labeling Options*: Additional settings for legends are found under Options next to the Colors menu. These are as follows:
  - i. *Label Placement* allows you to place labels only on horizontal sections of a contour, or on all contours, even if they are vertical.
  - ii. *Label Size* allows you to increase or decrease the label text size.
  - iii. *Contour Units* allows you to display the data units on contour labels just after the contour value.
  - iv. *Black contours over shaded* allows you to turn individual contour lines on or off. Because of the limited number of available colors, this feature is useful when a request is made for a large number (over 96) of contours.

- v. *Contour and Line Thickness* allows you to toggle between thick and thin for contour lines, streamlines and barbs.



**Figure 32. Options menu options in the Parameter Options dialog.**

When there are two or more parameters selected for the chart, you have several options for displaying the legends. There is one important consideration if you elect to have at least one of the color legends turned off. The parameter that has the color legend turned off will have a colored tag next to its full name located in the lower left corner of the chart. The color of this tag indicates the average data value for that parameter with respect to the color scheme that has been selected.

- d. *Interval Settings*: This allows you to set the interval between the contour lines. The data contour levels can be set using arrow buttons (<, >, <<, or >>). The single arrow buttons (< or >) adjust the displayed value by the value of the contour interval. The double arrow buttons (<< or >>) adjust the displayed value by twice the value of the interval. The numerical values for these fields may also be set manually by clicking in the field box. The allowable values will be restricted to one half (lower bound) to two times (upper bound) of the default value that is present when you first bring up the Parameter Options dialog.
  - i. *Maximum*: This control allows you to set the highest contour line value that will be displayed.
  - ii. *Minimum*: This control allows you to set the lowest contour line value that will be displayed.
- e. *Flag Thresholds*: These settings allow you to highlight data values of special concern using indicator colors. These values can be set using the same means as with the interval settings (arrows or manual entry). You can select Caution and Warning colors to be any of the following: black, white, red, green, blue, cyan, magenta, yellow, orange, purple, yellow/green, med. blue, dark yellow, aqua, dark purple, or gray.
  - i. *Caution*: This control allows you to set the level, above or below, which data are colored to signal a caution condition.
  - ii. *Warning*: This control allows you to set the level, above or below, which data are

colored to signal a warning condition. If the Warning level is *greater than* the caution level, all data values between the caution level and the warning level will be the color selected for Caution. All data values *greater than* the warning level will be the color selected for Warning. If the Caution level *equals* the Warning level, neither color will appear.



**When Warning level is *less than* the caution level all data values between the caution level and the warning level will be the color selected for Caution. All data values *less than* the warning level will be the color selected for Warning.**

### 3. Vector Plot Settings

The vector data (e.g., winds or currents) display options allow you to modify 1) vector representation, 2) grid spacing, and 3) stream density.

- a. *Vector representation*: These radio buttons are grouped to allow you to select one of the following: vector barbs, vector arrows, or streamlines.
  - i. *Vector Barbs*: Depicts vectors as a line showing the wind direction with barbs at the “from” end showing the wind speed (one barb = 10 knots, one half-barb = 5 knots, one “flag” = 50 knots). This is the most common convention used by meteorologists.
  - ii. *Vector Arrows*: displays the winds as arrows, with a point on the “to” end. The length of the arrow is proportional to the wind speed.
  - iii. *Streamlines*: displays the winds as streamlines that indicate the direction of air flow. Streamlines are colored according to magnitude unless a single color is chosen.
- b. *Barb Size*: This setting allows you to control the relative size of wind barbs. The final size is an automatic function of grid thinning, the model grid spacing and domain size.
- c. *Grid Thinning*: This setting allows you to reduce the number of points displayed in order to make the display more readable. The higher the value you set, the fewer points are displayed.
- d. *Stream Density*: This control allows you to adjust the density of the streamline display. Higher numbers yield more streamlines.

### 4. Line Plot Settings

- a. *Style*: This set of radio buttons allows you to select the line style that will be used to plot the contour lines or single line plots for this parameter. The optional styles include: **Solid** (default), **Dotted**, **Long Dash**, and **Short Dash**.
- b. *Marker*: This set of radio buttons allows you to select the marker that is displayed at each data point in single line plots. The default value (**None**) turns off marking of the data points. With any other selection, the selected marker will be plotted at each data point. The other selections include: **Open Dot**, **Open Box**, **Cross**, **Solid Dot**, and **Solid Box**.

## 5. Control Buttons

- a. *Help*: Displays this document.
- b. *OK*: Accepts all values currently displayed and closes the dialog.
- c. *Cancel*: Closes the dialog without making any changes to the values that were set previously.

## 3.4 ZOOM FUNCTIONS

You can magnify a particular area in two ways:

1. Use the middle mouse button to draw a box around the area you want the display to cover. When you let go of the mouse button, the map is redrawn to include only the area you selected. **Unzoom** and **Zoom Out** buttons appear at the top right.
2. Click once with the middle mouse button at a desired center point on the map. This method magnifies the display two times and centers it on the point you clicked. **Unzoom** and **Zoom Out** buttons appear at the top right. You can zoom as many times as you like using either method. The **Zoom Out** button always returns the screen to its original area, not to the previous zoom level. The **Unzoom** button will allow you to back out of your zoom, if you have zoomed in multiple times.



**Custom charts that are saved with a zoomed view will retain the zoom on the web page charts.**

## 3.5 SAVING YOUR WORK

There are two ways to save your work in IPVS\_CHARTS:

1. To save the current sequence as a set of images, click on the **File** menu and select either the **Save Image** or **Save Image As** option. The **Save Image** option saves the images in the current format with default file names. The **Save Image As** option presents a Save File dialog that allows you to enter the file name(s) and select the data type. The selected data type will set the default format for the current save as well as future saves.



**The Save File dialog also lets you change directories. However, it is recommended that you use the default directory so that IPVS\_CHARTS will be able to find the files you have saved.**

2. To make a chart sequence, click on the **Automate** menu and select either **Save Product** or **Save Product As** from the drop down menu. This automatically generates a new set of images during each update cycle. The **Save Product** option saves the sequence definitions with the current chart name. The **Save Product As** option presents a **Save File** dialog that allows you to enter the chart name(s).

The **Save Image As** type-in name must not have a period if the file extension (e.g., “gif”) is omitted. If the file extension is entered, only one period is allowed (e.g., slpr.gif). Any additional periods will automatically be converted to hyphens.

## 4 DEFINITIONS OF TERMS

<b>COAMPS</b>	Coupled Ocean/Atmosphere Mesoscale Prediction System
<b>FNMOG</b>	Fleet Numerical Meteorology and Oceanography Center
<b>GIF</b>	Graphics Interchange Format. One of several image formats supported by IPVS_CHARTS. Other image formats include: PNG.
<b>IPVS</b>	Integrated Portable Visualization System
<b>NOGAPS</b>	Navy Operational Global Atmospheric Prediction System
<b>PDF</b>	Portable Document Format.
<b>PNG</b>	Portable Network Graphics. One of several image formats supported by IPVS_CHARTS. Other image formats include: GIF.
<b>COAMPS-OS</b>	Coupled Ocean/Atmosphere Mesoscale Prediction System - On Scene

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