AFPS Level 2b Specifications

National Oceanic and Atmospheric Administration

Environmental Research Laboratories
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PREFACE

This document is a working internal document. It describes the specifications for the AFPS level 2b prototype due to be completed in September 1996. Specifications are subject to change without notice. Comments about this document may be addressed to afps@fsl.noaa.gov.

Date	Change
5/7/96	Auto create data mode has been removed from the main menu bar. An explicit version of auto create is still available via the time block editor.
5/7/96	Spatial Editor Data Selector button assignments and behavior has been changed. Button 2 clicks now toggle between active/inactive. SHIFT Button 2 makes the item the only active entry.
5/7/96	Clarifications of temporal editor display and editing of representative data.
5/7/96	Clarification of time block states: unloaded, loaded, visible, active/visible, and active/invisible.

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AFPS Project

1. Terminology

Table 1 - Terminology

Term	Definition
Parameter	A set of forecast grids with valid time periods for each grid (including the NULL set) identified by its name and source.
Parameter Name	The name of the parameter (e.g., Temperature).
Parameter Source	Parameter's source defined as the database where it is contained. For example, Fcst and RUC_14Dec95_0300 are sources.
Time Block State	The type of the last edit - such as user-modified, initialized, interpolated.
Editor States	The state of the time block, such as loaded, unloaded, visible, and active, as it pertains to the spatial editor.
Time Block History	A list of time block states, accompanied by the username and a timestamp.
Parameter Time Span (PTS)	A particular parameter's TimeRange. This PTS contains zero or more Time-Blocks.
TimeBlock	A forecast grid valid over a PTS.
Mutable	User modifiable PTS.
Mutable Parameter	A parameter that is generally editable, although not every time block and PTS may be editable.
Modified	A PTS whose TImeBlocks altered from the central database inventory.
Immutable	A PTS that not modification capable because it is either locked by another user or a read-only source.
User Edited	The time block state of user-edited is attached to a time block if the block has been edited using any of the three editors in the gfe, or from any other gfe.
gfe	The graphical forecast editor, consisting of the three editors plus menu items, is called the gfe.
Selection Time Range	A time range selected, by one of several means, for purposes of identifying one or more time blocks for one or more parameters.

Table 1 - Terminology

Term	Definition
Selected Parameter	A parameter that has been identified on the time block editor for edit operations. The intersection of selection time range and selected parameters indicate the selected time blocks.
Editor	A component of the gfe used for displaying and editing parameters.
Spatial Editor	An editor of the gfe that depicts parameters on a planar view.
Temporal Editor	An editor of the gfe that displays a time-series of parameters valid a a grid point or averaged over an area.
Time Block Editor	An editor of the gfe that displays the inventory of time blocks for parameters.
Configuration File	A file that contains user-configurable items to tailor the gfe.
Group	A set of parameters defined in a configuration file as a related set.
Quantum	The minimum TimeBlock time period span.
Same-parameter replace	A replace operation that copies data from one parameter to another, where each parameter has the same name.
Cross-parameter replace	A replace operation that copies data from one parameter to another, where each parameter has a unique name but identical units.
Shadow Block	A fixed time range for a mutable parameter into which a time block must fit exactly.
Reference Set	A set of selected gridpoints, that generally comprise an area.
Active Reference Set	The current set of selected gridpoints, which define the area of influence for the spatial editor gridpoint tools.
Spatial Editor Area Of Influence	The set of gridpoints that will be modified if the user performs an edit operation on the spatial editor. This is independent of the active reference set for freehand tools and may include a part of the active reference set for gridpoint tools.
Temporal Editor Area of Influence	The set of gridpoints that will be modified if the user performs an edit operation on the temporal editor. The temporal editor area of influence is always the same as the active reference set.
Data Selector	An individual “button” used in an editor to toggle on/off a parameter’s visibility, select the parameter for editing, and control the graphic/image appearance.
Data Selector Area	A group of Data Selectors.

2. General Data Assumptions

Each time block contains a change history. When the time block is first created, the source (initialization, interpolation) is tagged, and everytime the time block is saved/modified the time block is tagged.

Quantum (expressed in units of seconds) is defined in the configuration file and defines the smallest segment of the time blocks.

Inventory information for all database parameters is always locally accessible, even if not shown by the editors.

Only one mutable database is available when the system starts, passed to the program via a command line argument. Since only one mutable database can be open at one time, you cannot have both a Fcst and a Test database open.

The system runs in a real-time clock-offset mode and is set by a number contained in a command line argument. The default number is zero, which means that the system runs in real-time. Changing this number will make the system run in an offset time.

Loading a parameter into the gfe makes it available in all three editors.

AFPS can display data from one or more databases simultaneously.

When a time block is created, its state is edited, initialized, or interpolated, indicating how the data was loaded. In a copy-to procedure, the target time block's state is set to edited.

An edited or duplicated time block's state is edited.

If a parameter is duplicated, then there will be more than one time block. Extending a time block (using the duplicate mode) does not really happen; instead, additional time blocks are created. The internal scheme for storage of time blocks with the same data may be different.

Locks are made on the minimum amount of time possible - usually a time block in length. Doing a duplicate operation does not lock the original time block nor change the original time block state.

A time block can have five editor states once it is "introduced" into the system (through the parameter menu): unloaded, loaded, visible, active/visible, and active/invisible. If a time block is unloaded, then it exists on the time block editor but there isn't a corresponding spatial editor data selector. If it is loaded, then there is a corresponding data selector in the spatial editor. If visible, then it appears in the spatial editor data display area. If active/visible, then it is visible and selected for editing. The active/invisible state occurs if a time block was made active in the spatial editor and then its visibility is toggled off.

2.1 New Model Available Dialog

A non-modal dialog appears whenever a new model is available in AFPS. This dialog appears over the time block editor area. This dialog has a five-minute timeout, i.e., it will automatically be dismissed by the system if the user ignores it.

The dialog announces the arrival of new model data. The user has two choices - update editors or dismiss. The update editors option replaces all parameters from a previous version of the model with the newly arrived version of the model and then dismisses the dialog. The dismiss option simply dismisses the dialog. The algorithm is described in Section 7.3.3, *Update Parameters*, on page 15.

Multiple instances of this dialog may exist simultaneously. The dialog is illustrated in Figure 1.

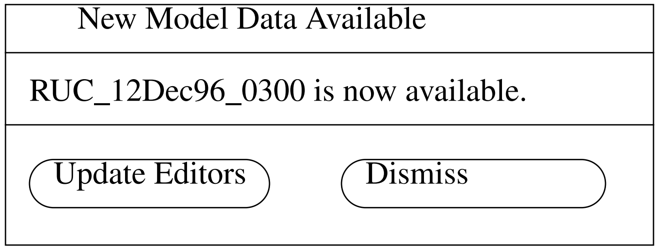


Figure 1 - New Model Available Dialog

3. General Layout of AFPS Grid Editors

There is a single window that contains one spatial editor, one time block editor, and one temporal editor. The location of each component is fixed in the layout. In addition to these three editors, a main menu bar, controller area, and time scale exist.

The user may change the size of each of the editors through the use of a "pane-stretcher" object. There is no minimum or maximum size for the editors except that the pane-stretcher must always be visible.

The main menu bar, controller area, and message area are fixed in size in the horizontal and vertical directions.

The horizontal widths of the spatial editor data selector, spatial editor legend, temporal editor data selector, and time block editor data selector are fixed in size.

The vertical extent of the time scale is fixed in size. The horizontal extent is the same size as the time block editor and temporal editor.

The main window can be resized. By default, it is approximately 1200 x 1010 pixels in size without the window decorations. Resizing the main window simply clips on the lower-right of the main window. No menu wrapping will occur and no resizing of other windows occur.

The initial horizontal size of the time scale, and the vertical size of the time block editor is identified in the configuration file. The size of the remainder of the components are automatically determined from this information.

During startup an additional window, showing initialization state, is temporarily displayed. It should graphically represent the following information:

- gatekeeper initialization state
- database server initialization state
- parameter initialization state

All three editors are data synchronized (i.e., all three editors display the same data set).

Non-modal dialogs pertaining to the spatial editor, such as set value and define based on value, generally are displayed over the time block editor to not obscure the spatial editor.

All dialogs have a “HELP” button to provide assistance.[1]

The layout and estimated initial pixel sizes of each component are shown in Figure 2.

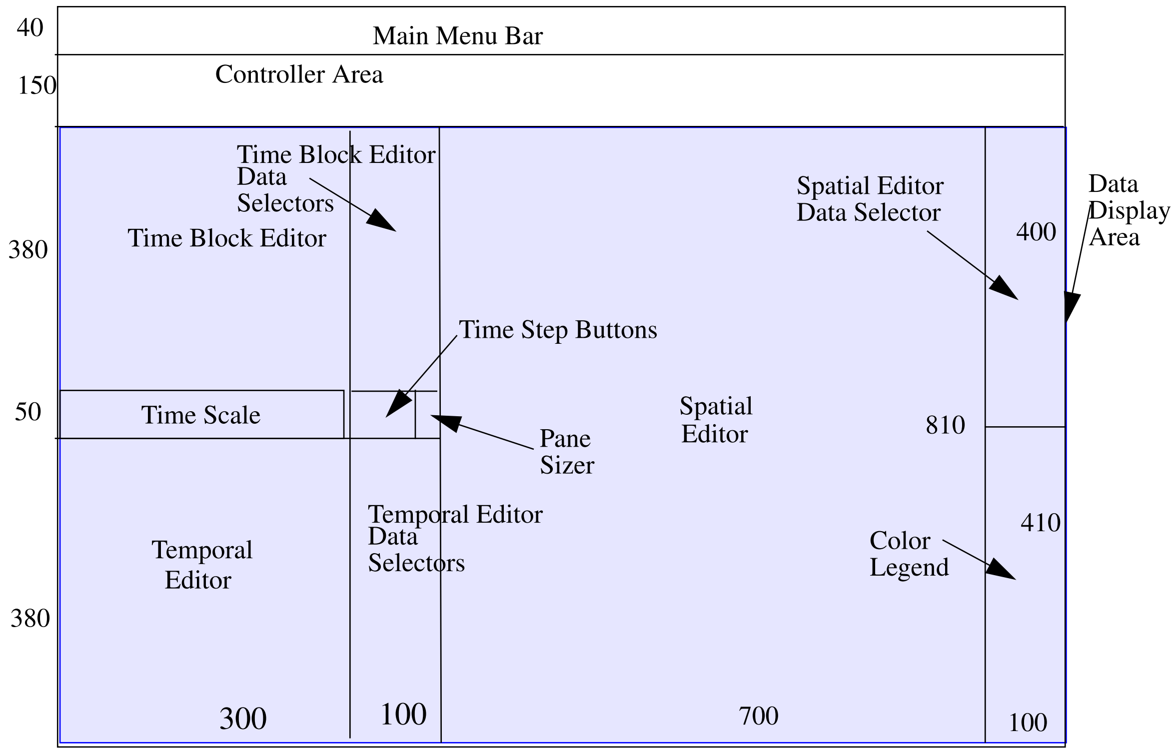


Figure 2 - AFPS Main Window Layout

The user interface colors are configurable. The specific fonts used in the gfe are described in Table 2.

The name of the AFPS window: “AFPS Graphical Forecast Editor” is used as the window title.

1. The help button may not appear in the drawings in this document, but they are necessary.

Table 2 - Fonts

Font	Purpose
-*-lucida*bright-medium-r-*--*-100-*	Contour Labels, Bounded Area Labels
-*-helvetica-medium-r-*--*-100-*	Horzontial Axis for time scale
-*-helvetica-medium-r-*--*-100-*	Vertical Axis for temporal editor scales
-*-lucida*bright-medium-r-*--*-140-*	Sample display on spatial editor
-*-lucida*bright-medium-r-*--*-100-*	Sample display on temporal editor
-*-lucidatypewriter-medium-r-*-*-*-100-*	Data Selector fonts (must be nonproportional)

4. Performance Characteristics

There should be no noticeable "flashing" when performing any edit operation on any of the editors or time scale (i.e., double-buffering should be used).

Performance times are shown in Table 3 on page 6.

Table 3 - Performance Characteristics[a]

Operation	Maximum Time Allowed (90% case)
Repaint any portion of the system due to an expose event, data updates, or other commands.	0.4 seconds
Bringing up any menu on the system.	1.0 seconds
Bringing up any dialog on the system.	2.0 seconds
Display updates caused by changing the set of parameters loaded in the editors.	2.0 seconds
Animation - to update the spatial editor, temporal editor, and time block editor	0.4 seconds

a. These performance times are based on a 75 x 75 grid.

5. gfe Command line Arguments

The command line arguments supported are listed in Table 4.

6. Pane-Sizer Specifications

The pane-sizer "object" should be easily identified through the use of graphics or colors.

Table 4 - Command Line Options

Option	Description
-p <portid>	RPC portnumber for gatekeeper
-h <hostname>	Hostname on which gatekeeper is running.
-m <mutable database>	Name of mutable database (category, subcategory)
-i <list of immutable categories>	List of immutable database categories
-c <config file name>	Name of the configuration file. There may be multiple instances of the configuration file.
-d <secondsInDRT>	Specifies the number of seconds displaced from the real time. A negative number makes the system run in the past.

The pane-sizer is enabled by pressing and dragging mouse button one over the object.

The pane-sizer can be released anywhere within the data display area.

An outline will be drawn showing the stretched size of the three editor windows during the drag operation.

The system will recalculate the size of the three editors when the pane-sizer is released.

The spatial editor will show the same area (as a minimum) when it is made smaller. The spatial editor will show the same area (up to the maximum size of the office domain) when it is made bigger. The aspect ratio is preserved.

The temporal editor and time block editor are clipped (i.e., the time block size is fixed and more or less of the data is shown).

The pane-sizer will always be visible. Thus, the time step selector, the time block editor data selector and temporal data selectors are also always visible.

7. Main Menu Bar Specifications

The layout of the main menu is shown in Figure 3 on page 8.

If the operation does not apply, the menu items will be dimmed, denoting the function is unavailable.

7.1 File Menu

7.1.1 Saving Data

A single command saves *individual* modified parameters. A second-level menu indicates the parameters that may be saved.

A single command saves *all* modified parameters.

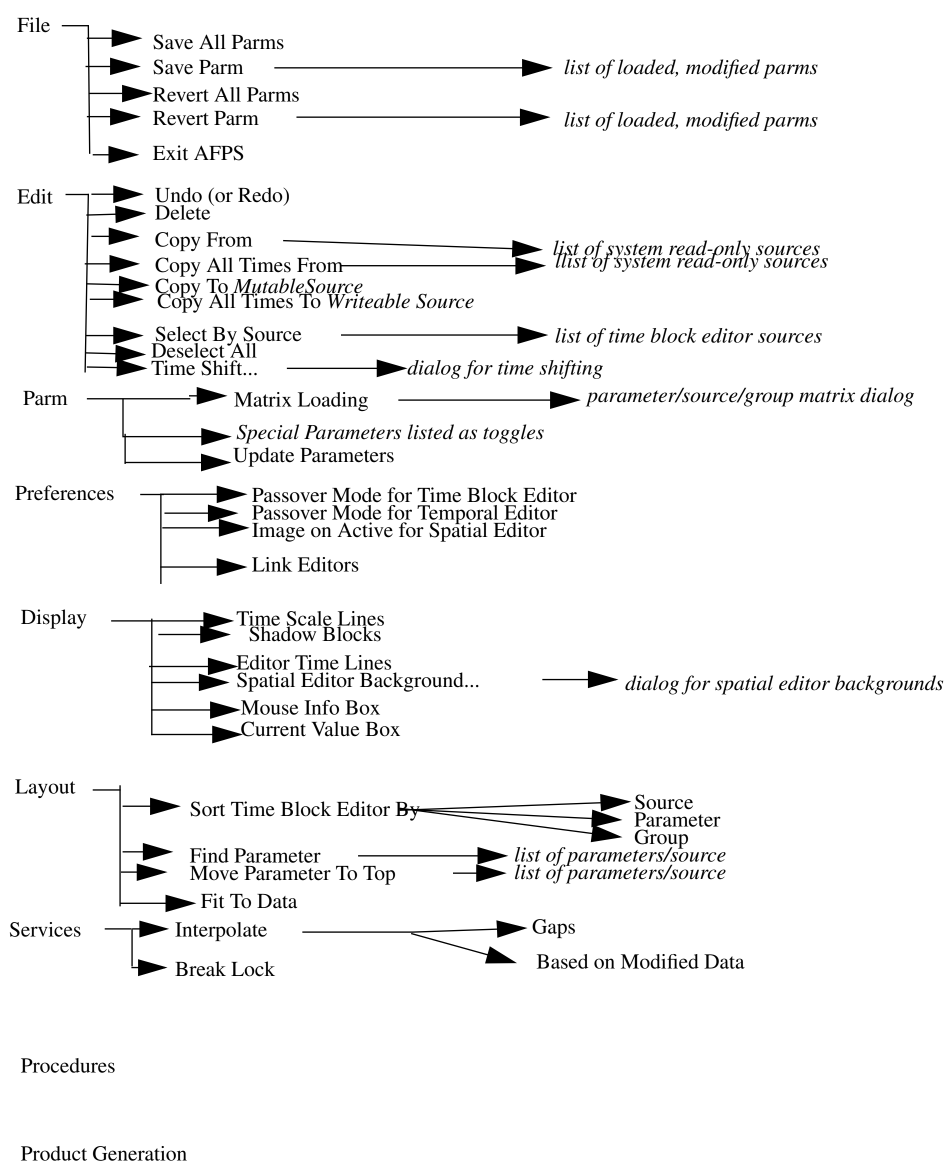


Figure 3 - Main Menu Layout

7.1.2 Reverting Data

Individual modified parameters may be reverted with a single command. A secondary menu lists the parameters that may be reverted. A YES/NO dialog box is displayed, warning that this will erase the user's changes and that the undo command cannot be used.

All modified parameters may be reverted with a single command. A YES/NO dialog box is displayed, warning that this will erase the user's changes and that the undo command cannot be used.

7.1.3 Exiting AFPS

The "Exit AFPS" option is used to stop the AFPS application.

If data has not been saved, a dialog with the options of *Discard Edits*, *Save First*, or *Cancel* is presented to the user. The title is *Exit AFPS?*.

If data has already been saved, a dialog with the options of *Yes* and *Cancel* is presented with the title of *Exit AFPS?* is presented.

7.2 Edit Menu

7.2.1 Undo Capability

Undo reverses the last operation executed, however, not all operations may be reversed.

Reversible operations are shown in Table 5 on page 9.

Table 5 - Operations With Undo Capability

Component	Operation
Main Menu	Undo
	Delete
	Copy To
	Copy From
	Copy All To
	Copy All From
	Time Shift
Time Block Editor	Duplicate

Table 5 - Operations With Undo Capability

Component	Operation
Controller Area	
Spatial Editor	Push/pull - increment/decrement, veer/back operations Smooth - smoothing operations, Set value - setting of the values Select Points - delete area Move/Copy - copy and move selected data Vector - adjusting the wind vector Paintbrush - painting grid points Spraycan - incrementing/decrementing Bulldoze - smoothing operations Pencil - adjust contour operation, define contour, generate grid
Temporal Editor	Adjust - adjust data, set direction Set Value - set value operation Layer - increment/decrement coverage, modify bases, modify tops, delete layer, add layer

Undo only reverses the *last* operation. Performing a duplicate followed by a save will not allow the user to select “undo” since the last operation was a save and save is irreversible.

After an undo operation, the menu item undo becomes redo. After a redo operation or any other operation that can be reversed, the label again becomes undo.

Undo is still enabled after operations such as changing the tool size. Undo only applies to the modification of data, and not reference set or attribute operations.

A separator exists between the UNDO and the DELETE items on the menu.

7.2.2 Delete Operations

Delete is not a valid operation if no mutable parameters are selected or when immutable parameters are selected. Delete is also invalid if no time blocks would be eliminated or if the time range is locked by another user.

Any time blocks contained within the parameter selection time range will be deleted.

7.2.3 Copy To/Copy From Operations

The copy to menu label is "Copy To *mutableSource*" where mutable source is the name of the source, such as Fcst.

All existing data in the selected time range is automatically deleted prior to the copy to.

Parameters may only be copied between identical parameter names.

The copy from menu lists all immutable sources that are loaded, plus the most recent version of each immutable source that aren't loaded.

The copy to/copy from operation looks at each destination shadow block for the selection time range and examines the available source data.

If no source blocks overlap the shadow block time range, nothing is copied to the shadow block.

If one or more available source blocks overlap the shadow block time range, a weighting algorithm is imposed. The overlap ratio (overlap duration/total source block duration) is calculated for each source block. The resulting value is compared with a user-defined threshold value (found in the config file) to determine which source time block samples are included in the destination shadow block. This threshold applies to all parameters and is not specified on a per-parameter basis.

Each parameter's sample algorithm is defined in the configuration file as max, min, time averaged, accumulative, or most predominant.

The *max* algorithm looks at all included source blocks, determines the maximum value for each grid point and writes this value to the destination block. This algorithm applies to scalar, vector (magnitude), and discrete data only. The vector direction component is carried along from the maximum value magnitude gridpoint.

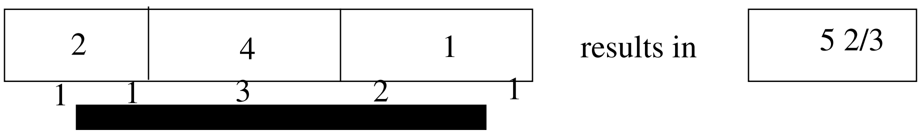
25	35	21	results in	35

The *min* algorithm looks at all included source blocks, determines the minimum value for each grid point and writes this value to the destination block. This algorithm applies to scalar, vector (magnitude), and discrete data only. The vector direction component is carried along from the minimum value magnitude gridpoint.

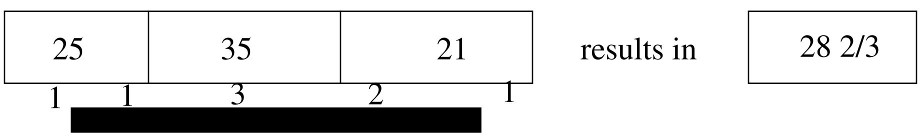
25	35	21	results in	21

The *most predominant* algorithm (overlap) looks at all included source blocks. This algorithms works on a gridpoint by gridpoint basis. This algorithm is only used for weather data (discrete dynamic). Similar intensities/precipitation types are replaced with just one (e.g., RW and R will result in either RW or R but not both).

The *accumulative* algorithm looks at each included source block and determines its rate (amount/quantum), the amount to be totaled (rate multiplied by the overlap time range). Accumulative algorithm applies only to scalar.



The *time averaged* algorithm calculates the overlap duration/destination duration and numerically averages those values. This algorithm applies only to scalar, vector, and discrete.



Copy from is enabled when at least one mutable and no immutable parameters are selected. The options (sources) for the copy is a list of all available immutable sources (even if they are not in the time block editor).

Copy to is enabled when only immutables parameters are selected, at least one parameter is selected, at least one of the selected immutable parameters exist in the mutable database (not the time block editor), and no two parameters of the same name are selected. This operation automatically loads the parameters that are mutable (and unmodified).

Note: if the user selects both immutable and mutable parameters, neither copy to or copy from operations are permitted.

7.2.4 Copy All Times From/ Copy All Times To

This operation applies to selected parameters only. The existing selection time range is ignored.

All data in the source for the selected parameter is copied to the destination in the same manner as described in copy to/copy from. This means the user doesn't have to set the time range, and behaves as if the time range completely encompasses the data set.

The copy all from/copy all to algorithm automatically updates the selection time range. The selection time range is set to the extent of the times modified. The set of selected parameters is changed to those mutable parameters that were updated.

7.2.5 Source Selection

Group selections can be made by source. Selecting a source selects all loaded parameters for the source and deselects all other parameters/sources. The selection time range remains the same.

The menu label for group selection is “Select By Source”.

7.2.6 Deselect All

The Deselect All entry deselects all parameters and undefines the selection time range.

7.2.7 Time Shifting

Time shifting is a menu option that brings up a dialog as shown in Figure 4.

Time shifting operates on the selected time range for just one selected parameter. If more than one parameter is selected, then time shifting is not permitted.

Time shifting is available only when no time ranges are locked by another user for the destination time range for the “copy” operation and the destination and source time range for the “move” operation. The selected time range is the source time range. The destination time range is defined as the selected time range shifted by the amount specified in the dialog.

The normal range of dialog is -48 hours to +48 hours, and is reduced to that possible based on other user’s locks. The dialog has an OK and a CANCEL button. The dialog is a slider with a readout showing the number of hours to shift. The hours can only be selected by the length of the shadow blocks.

Effectively all source data is cleared or copied, each time block is time shifted by the allowable amount, and then placed into the calculated destination time range.

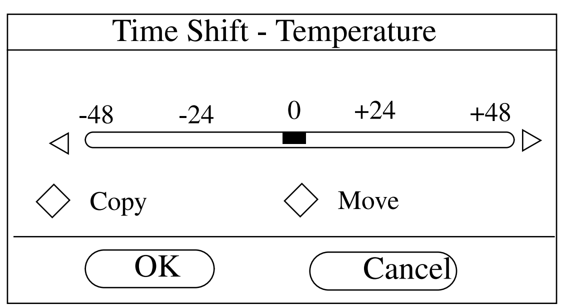


Figure 4 - Time Shift Dialog

7.3 Parm Menu

Screen updates only appear when load/upload is complete.

7.3.1 Matrix Loading

The parameters loaded appear first on the list on the time block editor data selector, spatial editor data selector, and temporal editor data selector. The time block editor and temporal editor are automatically scroll to the top parameter.

The time block editor data selector scroll bar position and the temporal editor data selector scroll bar position automatically adjusts to reflect the number of loaded parameters.

Parameters may be loaded or unloaded using a full-matrix approach. The matrix has rows of parameter names and columns of sources. The dialog shows the currently loaded parameters. The user can toggle any valid entry and then hit Okay to load/unload. Toggling row and column labels selects all valid entries in that row or column. Access the matrix through the Parm pull-down menu. The groups are ordered per configuration file entries, and the models are time-sorted with the mutable source first. The parameters are in alphabetical or group order depending upon a configurable item. The groups are only shown enabled when all source parameters defined are loaded (if available from a source). Only the latest version of the model runs are generally included, unless the show old models button is pressed. This dialog may display only a subset of the total number of parameters and sources. The parameters/sources not displayed can be viewed by moving the horizontal or vertical scrolls bars. Those parameters/sources that are not selected will show a grayed-out button as shown in Figure 5 on page 15 for Wind/15zRUC.

Parameter groups may be loaded/unloaded. The list of groups and their associated parameter names are defined in the configuration file. Loading a group ensures that all parameters defined by that group and available for the source will be loaded. Unloading a group ensures that all parameters defined by that group and available for the source will be unloaded. Note that loading or unloading groups may cause other groups to be loaded/unloaded as well.

If there are previous model runs in the editors, then those columns for those model runs are automatically included and cannot be turned off with “Show Previous Models”.

All new parameters are toggled off in the spatial editor and toggled on in the temporal editor. Any existing parameters that were still selected in the parm matrix dialog will keep their current visibility editor state.

This dialog is modal.

Color assignments are made to each parameter as they are loaded. The preferred colors are considered, if not already in use (by previously loaded parameters). If a color is not used, then the forecast data (mutable database) gets priority over other models.

7.3.2 Special Parameters

The special parameters contain a list of parameters that do not have a time range associated with them. Some examples are land-use and topography.

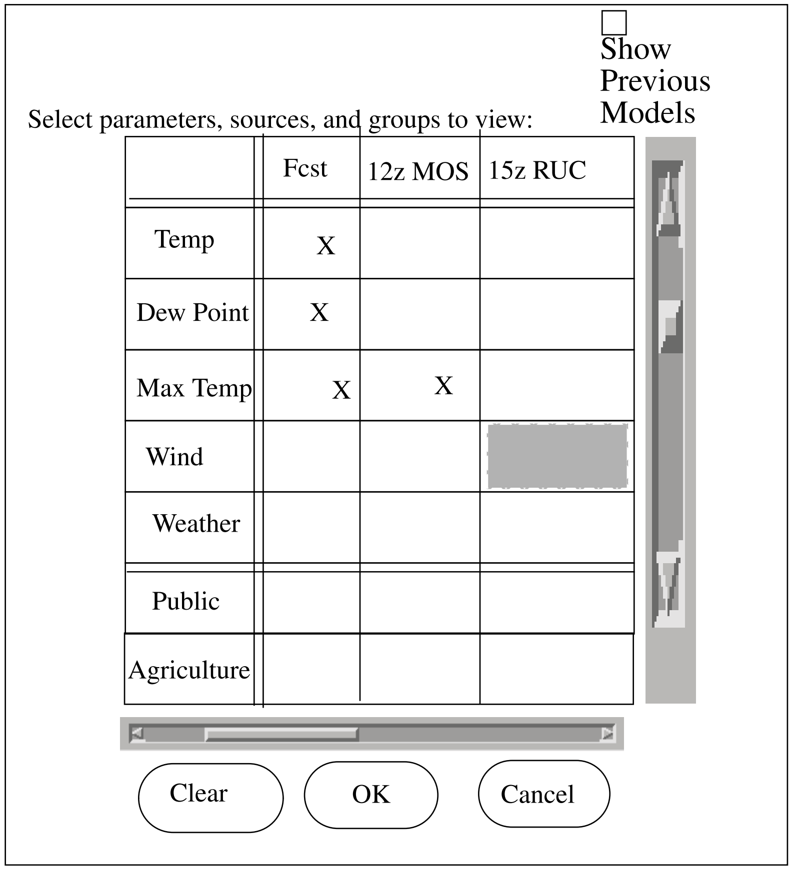


Figure 5 - Parm Selector Matrix Dialog

Special parameters have the following characteristics:

- Special parameters may be toggled on/off from this menu. Toggling on creates a spatial editor data selector.
- Special parameters do not appear in the temporal editor or the time block editor - nor is controlled by either of these editors.
- Special parameters may not be modified.
- Special parameters may be scalar, vector, or discrete.

7.3.3 Update Parameters

The update parameters option examines the available model list and the parameter sources that are currently loaded into the gfe. For all loaded parameters that do not represent the latest model time from a particular source, those parameters are replaced with the same parameters from the latest model source.

For example, if Temp/RUC_12Dec95_0300 and DewPoint/RUC_12Dec95_0600 are loaded and the latest model is RUC_12Dec95_0600, then the Temp/RUC_12Dec95_0300 will be replaced with Temp/RUC_12Dec95_0600. The Dew Point parameter will not be modified.

In the event that both the latest and an old version of a parameter exists, then the old version is simply removed.

7.4 Preferences Menu

7.4.1 Passover Mode for Time Block Editor Blocks

The spatial viewer may be toggled on/off for the time block editor. If off, no changes occur on the spatial editor while the user moves the pointer over the time block editor time blocks. If on, the spatial editor becomes a spatial viewer and the data shown in the spatial viewer is controlled by the pointer position over the time block editor.

7.4.2 Passover Mode for Temporal Editor Blocks

The spatial viewer may be toggled on/off for the temporal editor. If off, no changes occur on the spatial editor while the user moves the pointer over the temporal editor data panes. If on, the spatial editor becomes a spatial viewer and the data shown in the spatial viewer is controlled by the pointer position over the temporal editor.

7.4.3 Image Selected For Active in Spatial Editor

If this is toggled on, then the top active parameter in the spatial editor is automatically switched to the image display type when the parameter is made active/visible.

7.4.4 Link Editors During Edit Operations

This is a toggle button. If on the following linkage occurs:

- making a time block active (via button three popup) will scroll the temporal editor to that parameter and make it active/visible
- clicking on a time block to make it visible in the time block editor will scroll the temporal editor to that parameter and make it visible
- clicking on a time block editor data selector (turning it on only) will scroll the temporal editor to that parameter
- editing a time block on the temporal editor will scroll the time block editor to that parameter, turns on the parameter in the spatial editor, sets the current spatial editor time only if the system is in time-synchronized mode
- making a parameter active in the spatial editor will scroll the temporal editor and the time block editor to that parameter.

7.5 Layout Menu

7.5.1 Find Parameter

To position the time block editor and temporal editor to a specific parameter, select the parameter from the alphabetized list and both the time block editor and temporal editor scroll to that entry.

7.5.2 Move Parameter To Top

To move a specific parameter, select a parameter entry from the alphabetized list and that entry is moved to the top of the time block editor and temporal editor. The entire pane in the temporal editor is moved. An implicit find parameter occurs. Move parameter to top has no effect on the spatial editor.

7.5.3 Sort Time Block Editor By

A sort-time block editor operation permits sorting by source, parameter name, or group. The menu entry is dimmed when no parameters are loaded.

The sort order for group is by group, then source, and then parameter. The parameter goes into the first group encountered.

The sort order for parameter is alphabetical and sorts by parameter, then source.

The sort order for source is alphabetical beginning with the mutable source, then parameter.

No changes are made to the spatial and temporal editors.

7.5.4 Fit to Data

Commands the temporal editor to perform a fit-to-data operation on all existing data panes. See Section 15.3.5, *Fit To Data Algorithm*, on page 89 for details.

7.6 Services Menu

7.6.1 Interpolation Service

The interpolation button is enabled in two cases: interpolate gaps and interpolate user-modified. The conditions for these options are explained in detail below.

- Interpolate gaps - When a time range for any selected parameters contains only mutable parameters and at least one mutable gap.
- Interpolate user-modified - When a time range for any selected parameters contains at least two blocks edited by the user.

If no base time blocks are available within or outside the selected time range, then the interpolation service button is disabled.

If no base time blocks exist at the end of the selected time range, the system finds the nearest time block(s) in each direction outside of the selected time range and uses these in the request. The maximum number of time blocks searched in each direction is configurable. This rule of searching is applied in each direction.

If base time blocks exist in the selected time range, no searching outside the range is necessary. This rule is applied in each direction.

Interpolate gaps option replaces all gaps within the selected time range with multiple interpolated time blocks of one shadow block length.

Interpolated based on user-modified option first clears all non-user modified blocks in the selected time range and performs an interpolate gaps.

7.6.2 Break Lock Service

The break lock service button is enabled only when parameters are selected and the selection time range (per parameter) overlaps any parameters locked by other time range.

When the break lock is requested, a dialog box appears (per lock) that lists the owner of the lock, the parameter name/source, and the lock time range. A confirmation prompt is displayed, including a warning stating this operation cannot be undone and may be harmful to your health. Additionally, if the lock extends beyond the area specified by the user, an additional warning message will be presented.

7.7 Display

7.7.1 Backgrounds

Time Scale Lines

Toggle on/off subtle grid lines on time block editor/temporal editor.

The line color and pattern is configurable.

Editor Time Line

Toggle on/off the editor time line through the time block editor/temporal editor.

The line color and pattern is configurable.

Shadow Blocks

Toggle on/off the shadow block display on the time block editor.

Spatial Editor Background

The spatial editor background brings up a dialog showing all possible map backgrounds. The user may toggle on/off each of the backgrounds. Graphic color may be controlled from this dialog. The display will change immediately when an entry is changed. This is a non-modal dialog.

The dialog comes up initially over the time block editor.

The listing of available map backgrounds come from the map background server. The configuration file specifies the default map backgrounds to be displayed upon system startup.

The set of colors available for map backgrounds are placed in the configuration file. The system treats the map background colors and the meteorological data graphic colors independently of each other, thus allowing a map and meteorological data to be the same color.

The dialog should always show the state of each of the map backgrounds (whether visible or invisible).

Figure 6 shows the layout of the spatial editor background dialog.

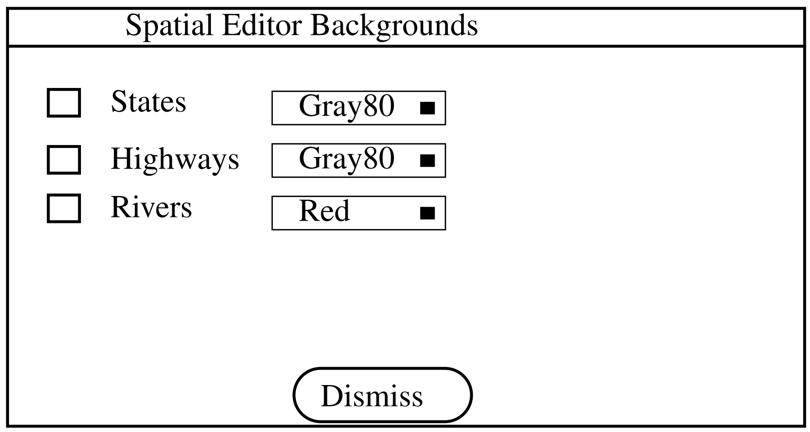


Figure 6 - Spatial Editor Background Dialog

7.7.2 Mouse Info Box

The mouse button one/two information dialog contains helpful reminders to the user to the functions that can be performed using the mouse. The contents of this area changes depending upon the current pointer location.

The mouse info box is enabled by selecting the command on the display menu from the main menu bar. The box may be dismissed from the information dialog.

The appearance of the dialog is shown in Figure 7.

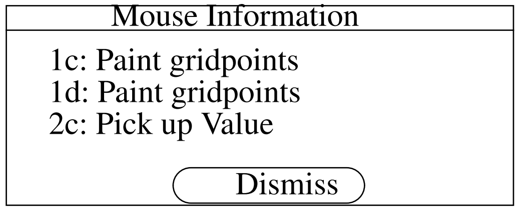


Figure 7 - Mouse Information Box

The info strings for AFPS are defined in Table 6. The abbreviations to denote the key presses and mouse buttons are shown in Table 7.

Table 6 - AFPS Info String Abbreviations

Key	Mouse Button	Mouse Operation	Info String Syntax
<none>	one	click	1c:
		drag	1d:
SHIFT		click	S1c:
		drag	S1d:
<none>	two	click	2c:
		drag	2d:
SHIFT		click	S2c:
		drag	S2d:

Table 7 - AFPS Info Strings and Commands

Object	Button 1 Click	Button 2 Click	Button 1 Drag	Button 2 Drag
Pane-sizer	N/A	N/A	Resize Editors	N/A
Time Block Editor Data Selector	Toggle Visibility	Select/Deselect Parm	N/A	N/A
Time Block Editor Data Panes	N/A	N/A	N/A	Select
Time Block Editor Time Block	Toggle Visibility	Select time range	Duplicate data (SHIFT) Copy data	Select time range
Time Scale	Set spatial editor time	Select time range	N/A	Select time range
Legend	Zoom toggle	Pick up value	N/A	Pick up value

Table 7 - AFPS Info Strings and Commands

Object	Button 1 Click	Button 2 Click	Button 1 Drag	Button 2 Drag
Spatial Data Selector	Toggle Visibility	Toggle Active (SHIFT) Make Only Active	N/A	N/A
Spatial Data Selector Display Type	Toggle Image/ Graphic display mode.	N/A	N/A	N/A
Spatial Editor Data Area	depends upon edit tool (Table 18 on page 69)	depends upon edit tool (Table 18 on page 69)	depends upon edit tool (Table 18 on page 69)	depends upon edit tool (Table 18 on page 69)
Edit Tool Icon	Select edit tool	N/A	N/A	N/A
Temporal Editor Pane Borders	N/A	N/A	Change Pane Size	Change Pane Size
Temporal Editor time block	depends upon edit tool (Table 20 on page 99)	depends upon edit tool (Table 20 on page 99)	depends upon edit tool (Table 20 on page 99)	depends upon edit tool (Table 20 on page 99)
Temporal Editor Data Selector	Toggle Visibility	Move to Top	N/A	N/A
Temporal Editor Scale	Zoom Out	Zoom In	Define Zoom Range	N/A

7.7.3 Current Value Box

The current value box describes the current values beneath the pointer location. For the time block editor, it reflects the time ranges and lock identifiers. For the spatial editor, it reflects the active parameters and their values beneath the cursor. For the temporal editor, it reflects all parameters in the data pane.

The current value box is enabled by selecting the command on the display menu from the main menu bar. The box may be dismissed from the information dialog.

The appearance of the dialog is shown in Figure 8.

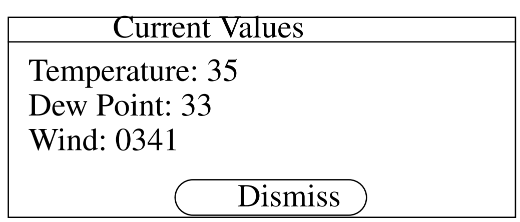


Figure 8 - Current Value Box

The current value strings for AFPS are listed in Table 8.

Table 8 - Current Value Strings

Object	Current Value String	
	top line	bottom line
Time Block Editor Time Block	Time range of the time block (both when passing over and when editing the time block). Durations are included.	Locked by information (wsid of locked by other)
Time Scale	Selection time range (appears when editing and when not editing).	Current spatial editor time.
Legend	Pick up value	N/A
Spatial Editor Data Area	parameter names (abbreviated if necessary) of all active parameters.	current value of all active parameters at the location of the pointer.
Temporal Editor Data Area	parameter names (abbreviated if necessary) of all parameters in the data area	current value plus time range of each parameter in a data pane

7.8 Procedures

<empty for now>

7.9 Product Generation

<empty for now>

8. Controller Area Specifications

The layout of the controller area is shown in Figure 9.

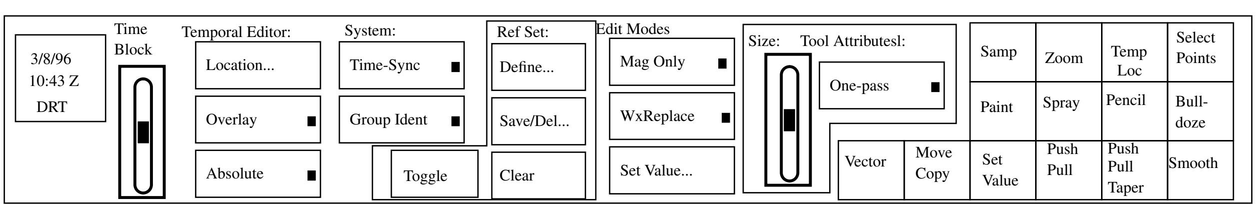


Figure 9 - Controller Area Layout

8.1 Time Block Size

Scale slider. The scaling slider adjusts the time block display size (pixels/quantum). There is a position for each of the possible zoom factors.

There are at least five scaling pixels per quantum editing choices, the selection is edited by moving the slider. The entries are defined in the configuration file.

The current scaling (not in units of pixels/quantum or time) is displayed on the scaling slider.

When the block size is changed, none of the editors are resized, even if the result is a truncated time block display.

The block size affects the scaling on the time block editor, time scale, and temporal editor.

The beginning displayed time for the time scale is fixed during block size changes. This causes the temporal editor to have a slightly different displayed time.

Figure 10 illustrates the appearance of the time block scaling control.

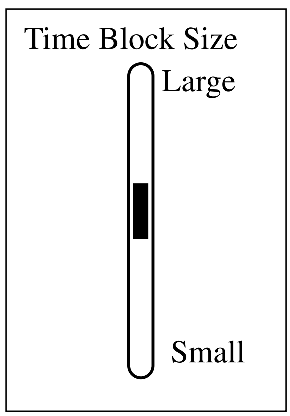


Figure 10 - Time Block Size

8.2 Current System Time

When the system is running in non-real time mode, a clear indication of this state is shown on the interface.

The current time of day (or the system DRT time) is presented in the controller area.

The current time is updated only once per minute.

Figure 11 illustrates the appearance of the current system time display.

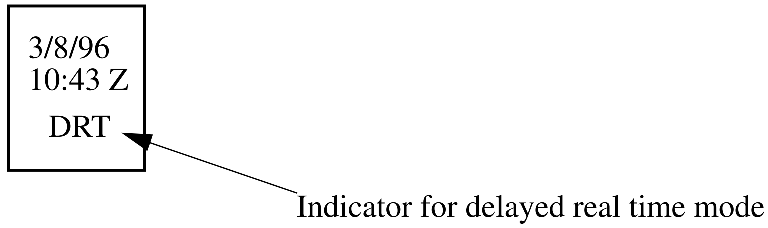


Figure 11 - Current Time Display

8.3 Sync/Async Mode

The gfe may be toggled between time sync and asynchronous mode. Time matching of visible (toggled on) parameters occurs automatically in time synchronized mode. There is no time matching for asynchronous mode.

The user interface object for this button is an abbreviated menu with two entries.

There is not a current spatial editor time defined when the system is in asynchronous mode.

The mode is automatically switched to time-synchronized mode when the editor time is set via the time scale.

When changing mode to sync from the button, the editor time is set to the previously saved editor time and the editor loads the previously saved set of parameters/data slices.

When changing mode to async from the button, the editor time is undefined and all currently displayed time blocks are toggled off for visibility (i.e., there will be no displayed data in the spatial editor) and the parameters are also toggled off. The set of visible parameters and current spatial editor time is saved during the transition from sync to async mode.

The async/sync mode is not related to the group identical data mode.

The time blocks displayed in the spatial editor in time-synchronized mode are those that intersect the current spatial editor time with the toggled on time block editor data selectors.

8.4 Group Identical Data Mode

The time block editor, spatial editor, and temporal editor may be toggled between editing individual time blocks or editing all contiguous time blocks with the identical data.

The user interface object for this button is an abbreviated menu with two entries.

Implicit splits are performed on the data during edits when the group identical data mode is off.

Switching modes affects the highlighting of time blocks on the time block editor.

The group identical mode is not related to the sync/async mode.

8.5 Reference Set

A reference set is a set of gridpoints which are used in conjunction with the temporal and spatial editors to indicate the area of influence.

8.5.1 Reference Set and Define Based On Value

A button on the controller area brings up a non-modal dialog. This dialog contains the set of reference sets, reference macros, and a define based on value entry field. Additional buttons allow the user to save the query as a named set, and to perform an operation on the active set of gridpoints. The operations are replace, add, intersection, and clear all.

Note that changes to the reference set will change the appearance of the temporal editor due to a new location or area being set.

The reference set dialog will be displayed over the time block editor when it first is made visible.

When an operation is performed (e.g., Add, Intersect, Replace), the reference set is changed. If the temporal location dialog is visible when the operation button is pressed, then the temporal location dialog is dismissed implicitly. For details on the temporal location dialog, see Section 8.6, *Temporal Editor Location*, on page 29.

The dialog can be moved by the user. The user may close the dialog. It cannot be resized by the user.

The dialog is not automatically updated when other users change the inventory of reference sets. The dialog is automatically updated when this user changes the inventory of reference sets (e.g., saving reference sets and saving query reference sets).

The dialog layout is shown in Figure 12 on page 26.

The actual query always appears on the text entry field.

The buttons in the named areas and queries are simply single-state buttons. When you click on them, the button name is added to the define based on value text entry field. If the user has not entered a logical operation before pressing on the button, then the operation is the one selected in the define based on value radio buttons. If the user has entered a logical operation (via the keyboard), then no operation is automatically inserted.

The define based on value radio buttons consist of an INTERSECT (&) and a COMBINE (|) buttons. They define the next implicit logical operation.

No state information is shown in the named areas or macros section of the dialog.

The query may be saved by pressing on the Save/Delete Query button. Another dialog will be brought up. Refer to Section 8.5.6, *Saving the Reference Set Query*, on page 28 for details on this dialog. You

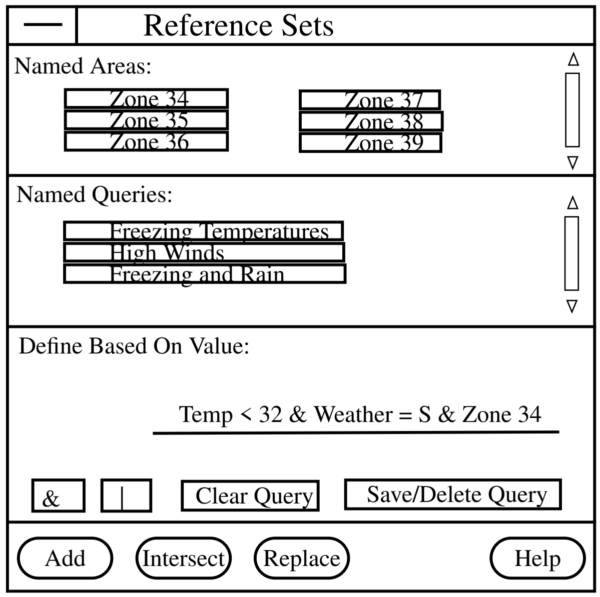


Figure 12 - Reference Set Dialog

may also delete any existing query using this dialog.

The "Add" button takes the defined dialog reference set performs a logical OR with the current set of selected grid points. The "Intersect" button takes the defined dialog reference set and performs a logical AND with the current set of selected grid points. The "Replace" button takes the defined dialog reference set and makes it the current set of selected grid points.

The "Clear Query" operation simply clears the query line and does not affect the active reference set.

The named area and named queries sections are organized in rows and columns. Scroll bars are used if necessary.

Syntax checking occurs when the operation buttons are pressed. In the event of an error, an error window will be displayed which will show the entered string, the first encountered error position, and a description of the error.

If the define based on value query string cannot be executed because of one of the following reasons, then no operation will occur and a warning message will be displayed. These cases are: Named Area unknown, Named Query unknown, Parameter not loaded.

Special parameters, such as elevation data, may also be used in the query if they exist in the spatial editor. For example, to select all gridpoints from 6000 ft to 7000 ft, the query line would read: Elev > 6000 & Elev < 7000. The elevation does not need to be displayed to use this feature.

8.5.2 Syntax Required in the Reference Set Dialog

The syntax is a sequence a terms that evaluate to a reference set, separated by logical operators. Each term can be either a static named area or a relational token.

A relational token consists of a parameter (name and source), relational operator, and numerical value or discrete value. The source is optional and defaults to the mutable database.

The parameter name must be the same as the label in the spatial editor data selector or time block editor data selector.

The tokens are case-insensitive. Spaces are ignored.

The relational operators permitted are: = (equal to), != (not equal), > (greater than), >= (greater than or equal to), <= (less than or equal to), < (less than), ~ (contains), !~ (not contains). The contains and not contains operators are only valid for the weather element.

The logical operators permitted are: & (intersect), | (union), ! (not), and parenthesis.

The order of precedence is left to right, except tokens in parenthesis are calculated first.

Values for the weather parameter only include weather type. Intensity and coverage are ignored. If the equal to operator is used, then an exact match is necessary for the grid point to be selected. If the contains operator is used, then the data only needs to contain all of the elements specified in the dialog. This relationship is shown in Table 9.

Table 9 - Weather Type Comparisons

	Weather Data Match			
Operator	**R**	**S**	**RS**	**RF**
= R	yes	no	no	no
= RS	no	no	yes	no
~ R	yes	no	yes	yes
~RS	no	no	yes	no

8.5.3 Clear Reference Set

A button on the controller area is used to clear the active reference set.

8.5.4 Toggle Reference Set

A button on the controller area is used to toggle the active reference set.

8.5.5 Save/Delete Reference Set

A button on the controller area is used to bring up a modal dialog to save the active reference set.

The user enters the name under which the reference set should be saved in a text entry field.

The user can choose whether this operation applies to a system set or a user name set. The default each time this dialog is brought up is user.

If the user name mode is enabled, then the entered string is automatically prefixed with the username. This appears in the text entry field and CANNOT be edited out.

If the system name mode is enabled, then no username appears in the text entry field. If one currently exists, it is deleted automatically.

If the delete button is depressed, then pressing the OK button will first prompt the user if they really want to delete a set. This is a YES/NO dialog. If the user answers yes, then the reference set is deleted.

If an attempt is made to delete a reference set that doesn't exist, no prompts or warnings are shown to the user.

The active reference set is converted to a sequence of world coordinate domains and stored in the reference set server.

The dialog appears as in Figure 13.

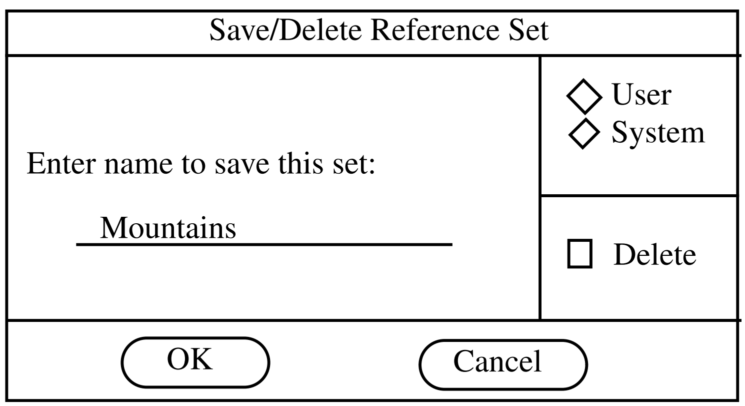


Figure 13 - Save Set Dialog

8.5.6 Saving the Reference Set Query

The reference set query currently may be saved through the use of a dialog. The dialog is accessed via the reference set dialog. (See Section 8.5, *Reference Set*, on page 25.)

This operation is identical to that described in the Section 8.5.5, *Save/Delete Reference Set*, on page 27 except for the following:

- the query string is stored in the reference set server
- this operation is not permitted if there are syntax errors in the query string (and an error is displayed)

• the title is “Save Query”

8.6 Temporal Editor Location

The temporal editor location may be set via a button on the controller area. This button brings up a non-modal dialog. The dialog should automatically be positioned over the time block editor area.

The name on the button reflects the current area or point represented by the temporal editor. In the event that the user creates a “random” area, the name on the button will show “Other”.

Changing the reference set through the use of edit tools (e.g., push-pull) will change the temporal editor mode to area. This will also cause the temporal editor location dialog to be dismissed implicitly.

8.6.1 Location Dialog

The location dialog is non-modal.

The location dialog contains the set of areas and point locations. An additional button (“Dismiss”) allows the user to remove the dialog.

The list of area and point locations is configurable by the user through the configuration file. The point locations map to a single gridpoint and can be specified as latitude/longitude in the configuration file along with their name. The area names map to reference set names of the same name. Unlike the reference set dialog which queries the database for the available set of reference names, the list of area names must be defined in the configuration file.

Clicking on any button in the location dialog will set the temporal editor immediately to that location or area.

The dialog can be moved by the user. The user may close the dialog. It cannot be resized by the user.

The dialog layout is shown in Figure 14 on page 30.

8.7 Temporal Editor Overlay Mode

The overlay time mode controls the loading of new parameters into the temporal editor.

The modes are overlay and non-overlay. If overlay mode is off, then each parameter will be placed in its own pane. If the mode is overlay, then the temporal editor will attempt to overlay the new parameter with another parameter with identical units.

This state only affects parameters that are loaded into the temporal editor after the state change, i.e., it does not affect existing parameters in the temporal editor.

The overlay mode is represented as a button on the controller area.

8.8 Temporal Editor Absolute/Relative Mode

Edits performed on the temporal editor are applied to the area of influence (reference set) depicted on the spatial editor. These may be applied in one of two methods: absolute or relative.

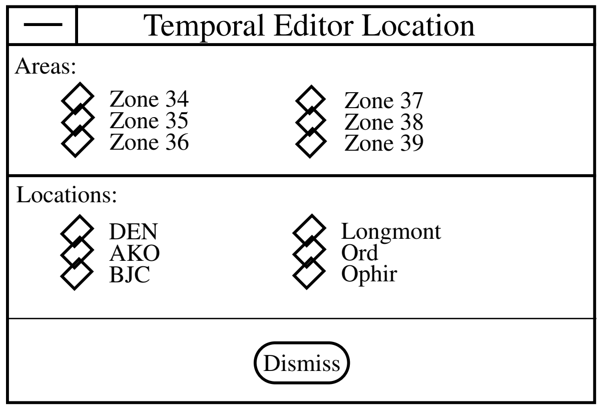


Figure 14 - Location Dialog

In absolute mode, an edit made on the temporal editor will have the effect of using the set value tool over the area of influence. Every point in the reference area will be set to that indicated by the temporal editor after an edit.

In relative mode, an edit made on the temporal editor will have the effect of using the push-pull tool over the area of influence. Every point in the reference area will be incremented/decremented by the magnitude of the edit on the temporal editor.

Relative mode is treated as absolute mode for weather data.

The absolute/relative mode is represented as a button on the controller area.

8.9 Spatial Editor Tool Size

The spatial editor tool size for freehand tools can be set via a slider in the controller area. The sizes are fixed labels as shown in Figure 15. Both even and odd sizes are allowed. When even sizes are specified, the bias is towards the upper-left of the area. The largest tool size is specified in the configuration file. If missing from the file, the maximum size defaults to 9x9.

8.10 Spatial Editor Freehand Mode

The spatial editor freehand mode button controls whether the freehand tools (paintbrush, spraycan, and bulldozer) are in continuous update or one-pass mode. If in continuous update, every time a single drag event goes over a gridpoint, it is modified. If in one-pass mode, then only once will the gridpoint get modified during a single drag event.

The mode is represented by an abbreviated menu consisting of two items: OnePass and Continuous.

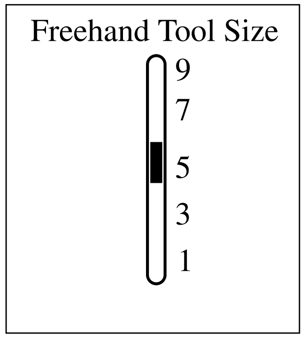


Figure 15 - Spatial Editor Tool Size Slider

8.11 Wind Edit Mode

The wind edit mode is an abbreviated menu consisting of three items: MagOnly, DirOnly, Both. It controls the component of the data to be modified from the spatial editor's smooth, set value, paintbrush, bulldoze, and vector tools.

8.12 Weather Edit Mode

The weather edit mode controls whether the spatial editor's paintbrush and set value tools and the temporal editor's set value tools should replace the existing weather data or be combined with the existing weather data. The weather edit mode is an abbreviated menu consisting of two items: Combine and Replace.

8.13 Set Tool Value Dialog

A button "Set Value..." is located in the controller area. This button brings up a non-modal dialog. The set tool value dialog provides controls to change the pick up for each active parameter. The dialog contains a single operation button - DISMISS. Changes made on these dialogs take effect immediately.

Note that the set value dialog has the current pick up values displayed for each active parameter in the spatial editor. Any of these values may be changed as needed.

All of these sliders reflect the current value as long as they are visible, even if the current value is changed via other means (such as clicking on the legend to set a value).

In the event that the set of active parameters change, the set value dialog also changes. The ordering of sliders in the dialog from left to right is the same as the top to bottom ordering of the active data selectors for the spatial editor.

An example of the dialog showing all data types is shown in Figure 16. The continuous scalar slider may be logarithmic or linear depending upon the configuration (per parameter) defined. It shares the same scaling as the legend.

The vector fields are represented by a slider for magnitude and a circle for direction. The circle contains a vector arrow which shows the direction the wind is blowing towards and a wind barb which shows the direction the wind is blowing from. The user can click or slide anywhere within the circle and the direction will be correctly set.

Note that the weather set value contains two parts: a legend and an “Other...” button. The legend contains a list of recently set and common weather types for convenience. An option (Other...) brings up the full dialog. The common weather types are defined in the configuration file.

The full weather dialog consists of two exclusive menus, a check button, and an abbreviated menu. The coverage/probability and intensities menus are dimmed when the no weather type is selected in the abbreviated menu. The abbreviated menu is used to select the weather type value. The description thus far has been for just one weather type. Multiple types of weather can exist. This is accomplished by dynamic multiple dialogs.

Each slider consists of a scale containing major and minor tick marks and labels plus a color bar representing the colors for a particular value.

Each slider has a label which indicates the parameter it represents. The current set value for each parameter is displayed between the slider and the parameter name.

Each slider contains an arrow pointing to the current pickup value for that parameter.

Each slider may be zoomed in by one step only.

Clicking button two on the slider will set the pick-up value for that parameter.

Dragging button two on the slider will show the “about-to-be-picked-up” value for that parameter with both the arrow and the numerical readout. When the button is released the pick up value is set. Implicit scrolling will occur if necessary on the slider if the slider is zoomed.

Clicking button one over the slider will zoom in the display, centered at the click location. Clicking button one again will zoom out the display to the original full view. There is only one zoom factor available which is configurable.

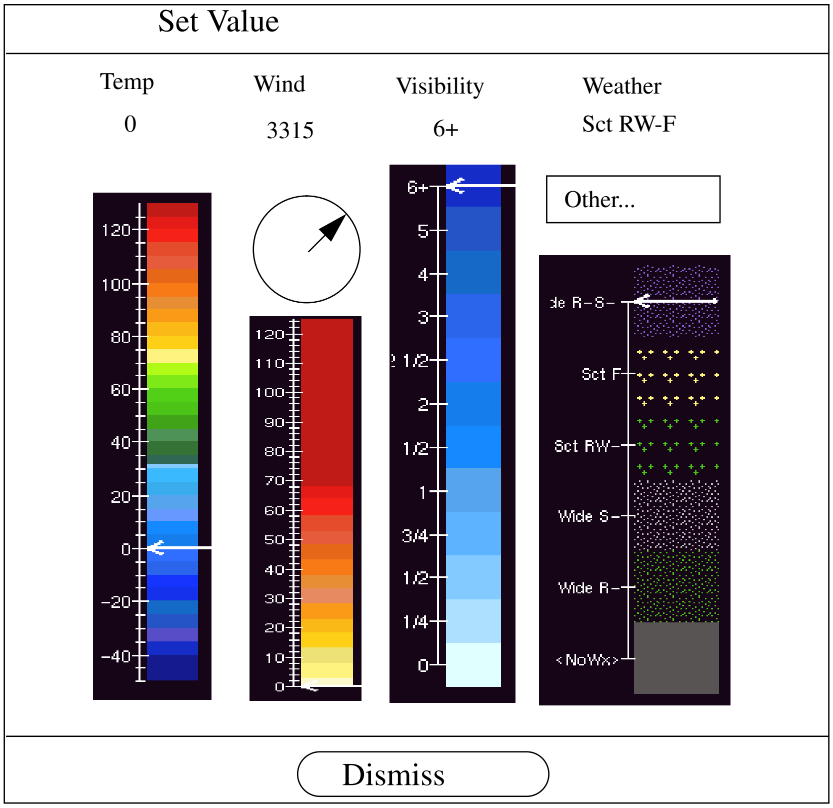
8.14 Spatial Editor Tool Attribute Area

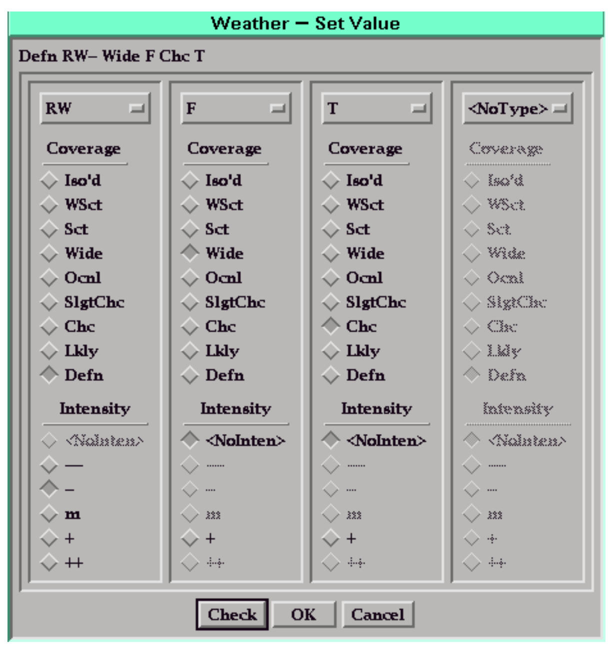
The attribute area is used to display unique attributes for some of the spatial editor tools. When those tools are not selected, then the attribute area will be blank.

8.14.1 Delta Value Slider

The delta value slider is active when the push/pull or spraycan tools are enabled for scalar or vector data and there is only one active parameter (Section 14.12.7, *Push/Pull Without Taper*, on page 73, Section 14.12.8, *Push/Pull With Taper*, on page 73, and Section 14.12.14, *Spraycan*, on page 79).

Example of the slider is shown in Figure 17. The range of values on the slider start at 0 and increase to a configurable amount. If not defined in the configuration file, then the upper limit is 10% of the pa-





Weather Dialog (modal)

Figure 16 - Set Value Dialogs

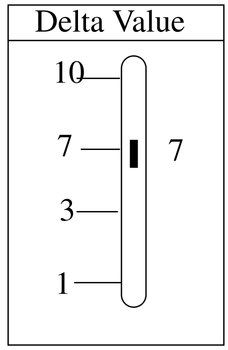


Figure 17 - Set Delta Value Slider

rameter's range.

8.14.2 Tool Value Indicator

The tool value indicator is active when the paintbrush or set value tools are enabled (Section 14.12.13, *Paintbrush*, on page 77 and Section 14.12.10, *Set Value*, on page 75). This isn't a control, but rather simply an indication of the tool values.

An example of the indicator is shown in Figure 18. There is an entry for each active parameter in the spatial editor.

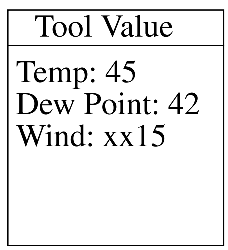


Figure 18 - Tool Value Indicator

8.15 Spatial Editor Edit Tool Palette

The spatial editor edit tool palette contains labeled icons for each of the possible edit tools. Each icon can have one of three states: selectable, selected, and dimmed (not selectable). An icon in the selected state indicates that the edit tool is active. In the selectable state, the icon may be selected which invokes the edit tool.

Only one edit tool may be in the selected state at a time.

An icon will be in the dimmed state if it is not available. It is not available under the following conditions:

- there are no active parameters
- the edit tool is not supported for ALL of the active parameters
- the data cannot be modified for ALL of the active parameters since the data is immutable or locked by another user
- all active parameters are invisible

The select points, zoom, and temporal location tools are never dimmed, even if there are no active parameters.

If an edit tool's state switches from selected to dimmed due to circumstances outlined above, that edit tool is still "selected" but unavailable for the moment. The system will not automatically switch edit tools to one that is available. An edit tool that was "selected" but is now available will become selected when the above circumstances are no longer true.

A chosen edit tool will remain the edit tool despite changes in visibility, active parameter changes, or time stepping. In the special case when a new parameter is activated and the edit tool cannot support the new parameter, the edit tool is not changed, but is put into the "selected" but not available mode.

The edit tool palette resembles that shown in Figure 19.

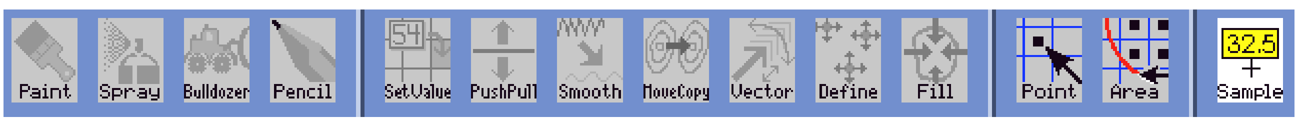


Figure 19 - Edit Tool Palette

The tools will be in three groups: freehand, gridpoint, and miscellaneous. The freehand tools are the paint, spray, bulldozer, and pencil. The gridpoint tools are: set value, push/pull, smooth, move/copy, and vector. The miscellaneous tools are: select points, sample, zoom, and temporal location.

9. Time Scale Specifications

9.1 Appearance

The time scale consists of an area with a time scale, plus a horizontal scroll bar.

Associated with the time scale are controls on the controller area to control the scaling (pixels/quantum).

A time scroll bar permits horizontal scrolling.

Selected time range on the time scale is indicated with a hatching pattern. Hatching color and pattern

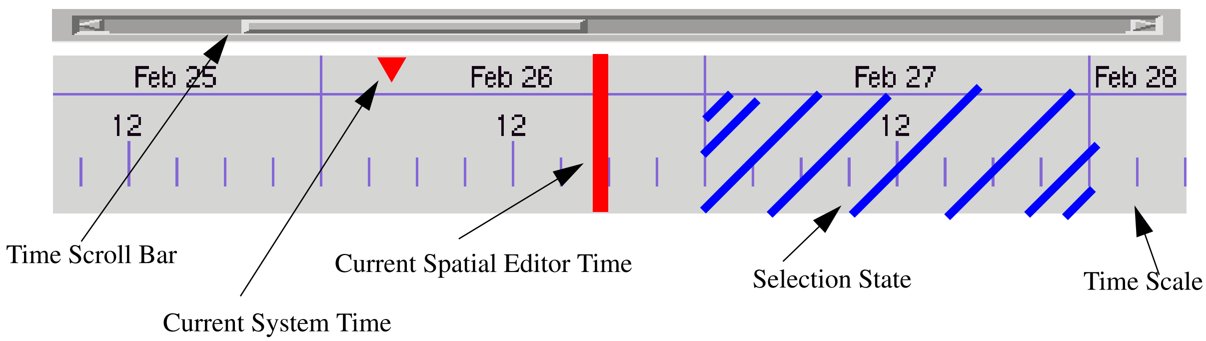


Figure 20 - Time Scale

are configurable.

The time axis is scrollable in units of one quantum.

A box (one quantum in length) appears on the time scale representing the current spatial editor time.

The time scale always shows GMT.

Regardless of scaling, dates will appear, even when only partial days appear on the time scale.

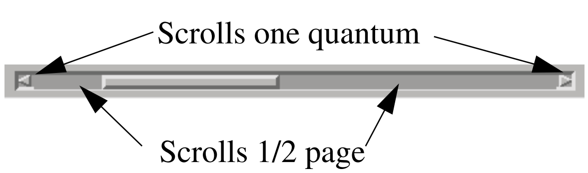
The day of the week will also appear near each date on the time scale.

A small triangle appears on the time scale which represents the current system time (updated once per hour). The color is configurable.

Time scale height is 50 pixels including the selection designator.

The text in the scale is white. The background color of the scale is black.

The minimum amount of horizontal scrolling is one quantum.



9.2 System TimeRange

The system time range (maximum scrollable times) is defined both as the entire time span of all loaded sets plus the current time - 1 day to current time + 6 days, plus all of the locks for the mutable database only. The (-1 and +6) times are configurable. The current time is the clock time + a time offset which allows the system to run in a delayed real time (DRT) mode.

The displayed time range is the visible portion of the time range displayed on the time scale.

The system time range is recalculated when parameters are loaded/unloaded, updated (inventory changes), and when the current time changes (once per quantum).

The system time range is also recalculated when the time scale is resized horizontally (through the pane-sizer mechanism) or scrolled horizontally. The time range is extended so that the newly displayable time range is contained within the system time range.

The position of the scroll bar automatically changes when the system time range changes or the pane-sizer is used to manually resize horizontally.

If the system time range recalculation excludes a portion of the currently displayed time range, the time block editor time range is extended to include the entire current time range.

9.3 Horizontal Resize of Time Scale

The time on the left of the time scale is fixed during resizing events, thus more or less total time is displayed.

The horizontal scroll bar indicator is automatically repositioned.

9.4 Setting the Selection Time Range

A single quantum selection time range is defined by clicking button two on the time scale.

A multiple quanta selection time range is defined by dragging button two on the time scale.

9.5 Controlling the Spatial Editor Time

The current spatial editor time is defined by clicking button one on the time scale. The system is placed in time-synchronized mode.

9.6 Other Actions Controlling the Time Scale

9.6.1 Actions on Time Block Editor that Affect the Time Scale

Selections made in the time block editor by dragging the pointer through the time block editor data panes will cause the selection time range to be changed. This is reflected on the time scale.

Clicking on a time block in time-synchronized mode will cause the spatial editor time to be changed.

9.6.2 Actions on Menus that Affect the Time Scale

Changes to the system mode for time-synchronized or asynchronous mode will affect the display of the current editor time on the time scale.

Changes to the time block size will affect the appearance of the time scale.

9.6.3 Actions on Spatial Editor that Affect the Time Scale

Changes on the time stepping buttons on the spatial editor will result in a a new editor time being calculated will cause a new editor time being displayed in the time scale.

9.6.4 Actions on Temporal Editor that Affect the Time Scale

Editing a time block on the temporal editor can have the effect of setting the spatial editor time (which is reflected in the time scale). This is controlled via the controller area described in Section 7.4.4, *Link Editors During Edit Operations*, on page 16.

10. Cursor Specifications

The normal cursor shape is a pointer.

10.1 Within the Time Block Editor

The cursor shapes change when the pointer is over a editable time block. The shape is .

During a duplicate operation, the cursor is changed to a copy cursor C . During a a shift skip-over duplicate operation or between parameters, the cursor is changed to a different copy cursor M .[2]

If the pointer is over a gap or an immutable time block, then the cursor shape doesn't change (remains the default cursor).

10.2 Within the Spatial Editor

The default cursor is used throughout the spatial editor.

10.3 Within the Temporal Editor

The standard default cursor is used throughout the temporal editor except when the cursor is over the temporal pane size adjusters. In this case, the cursor switches to or to indicate the controller.

10.4 Within the Pane Sizer

The pane sizer allows the user to change the layout in the horizontal, vertical, or both directions. The cursor will .

2. The "C" and "M" icons will be replaced by more representative icons during design/implementation.

11. Keyboard Bindings

<keyboard bindings are deferred>

12. Default Attributes

A default parameters set (defined in the configuration) appears automatically when the system is first started. The parameters list consists of the parameter name and source name. This source name is the category and not the actual source name which consists of the date-time stamp.

12.1 System Default Attributes

The following system attribute defaults are defined in the configuration file:

- Passover mode for Time Block Editor Blocks
- Passover mode for Temporal Editor Blocks
- Image Selected For Active In Spatial Editor
- Link Editors During Edit Operations
- Time Scale Lines
- Editor Time Line
- Shadow Blocks
- Sync/Async Mode
- Group Identical Data Mode
- Temporal Editor Overlay Mode
- Temporal Editor Absolute/Relative Mode
- Spatial Editor Freehand Mode
- Wind Edit Mode
- Weather Edit Mode

The following system attributes are not defined in the configuration file:

- No special parameters will be loaded.
- Time Block Size

12.2 Time Block Editor Default Attributes

The organization of the initial state of the time block editor is identical to the list of default parameters in the configuration file.

The initial vertical scroll position for the time block editor data selectors is the topmost parameters.

12.3 Time Scale Default Attributes

The initial horizontal scroll position is the leftmost displayable set of data.

As much time as possible will be displayed upon initial creation regardless of data inventory. The minimum spacing of time blocks is 6 pixels horizontally (one quantum). This is taken into account during the initial time block editor time range calculations (Section 9.2, *System TimeRange*, on page 36). If insufficient space is available, not all of the time block editor time range will be initially shown.

The initial spatial editor time will be the current system time.

12.4 Spatial Editor Default Attributes

No parameters will be toggled on for visibility.

No parameters are made active.

The sample edit tool is selected.

The initial pick up data value for each parameter is: Weather is set to no weather, discrete is set to the 1st element in the list, vector is set to North with zero magnitude, and scalar is set to zero (if available) or midpoint in the allowable range.

12.5 Temporal Editor Default Attributes

The initial vertical scroll position for the temporal editor data selectors is the topmost parameters.

No location is set for the temporal editor (no reference set is selected on the spatial editor).

13. Time Block Editor Specifications

13.1 Time Block Editor Assumptions

All "shadow blocks" are of equal length within a parameter. Shadow blocks go on for infinite time.

No real time block parameter assumptions should be made about the value within a gap, except for accumulation-type parameters sampled during copy to/copy from operations when the gap is considered to contain zeros.

13.2 Appearance

The time block editor window consists of one or more data panes and corresponding time block editor data selectors. The individual components are shown in Figure 21.

The time block editor shares the time scale with the temporal editor. For details on the time scale, see Section 9., *Time Scale Specifications*, on page 35.

A parameter scroll bar permit scrolling of the vertical axis. If there are too many parameters for available time block editor space, the remainder will be scrolled off the time block editor. If there are too few parameters to fill up the available time block editor space, then empty space (using a background color) will be presented to the user.

Each time block editor data pane contains a series of time blocks representing the available database data for a specific parameter.

Each time block editor data pane contains a series of shadow blocks representing the desired database data for a specific parameter.

Each time block editor data pane shows the selection time range and lock state information for a specific parameter.

A subtle vertical grid line mesh will be displayed through the parameters that match up with the major and minor (?) tick marks on the time scale and is used for reference. This may be toggled off.

13.2.1 Time Blocks

Each parameter's inventory is represented by time blocks comprising the parameter's available inventory.

Adjacent time blocks containing different data are displayed with a space between the time blocks. Adjacent time blocks containing identical data (i.e., data that has been duplicated) is displayed with no

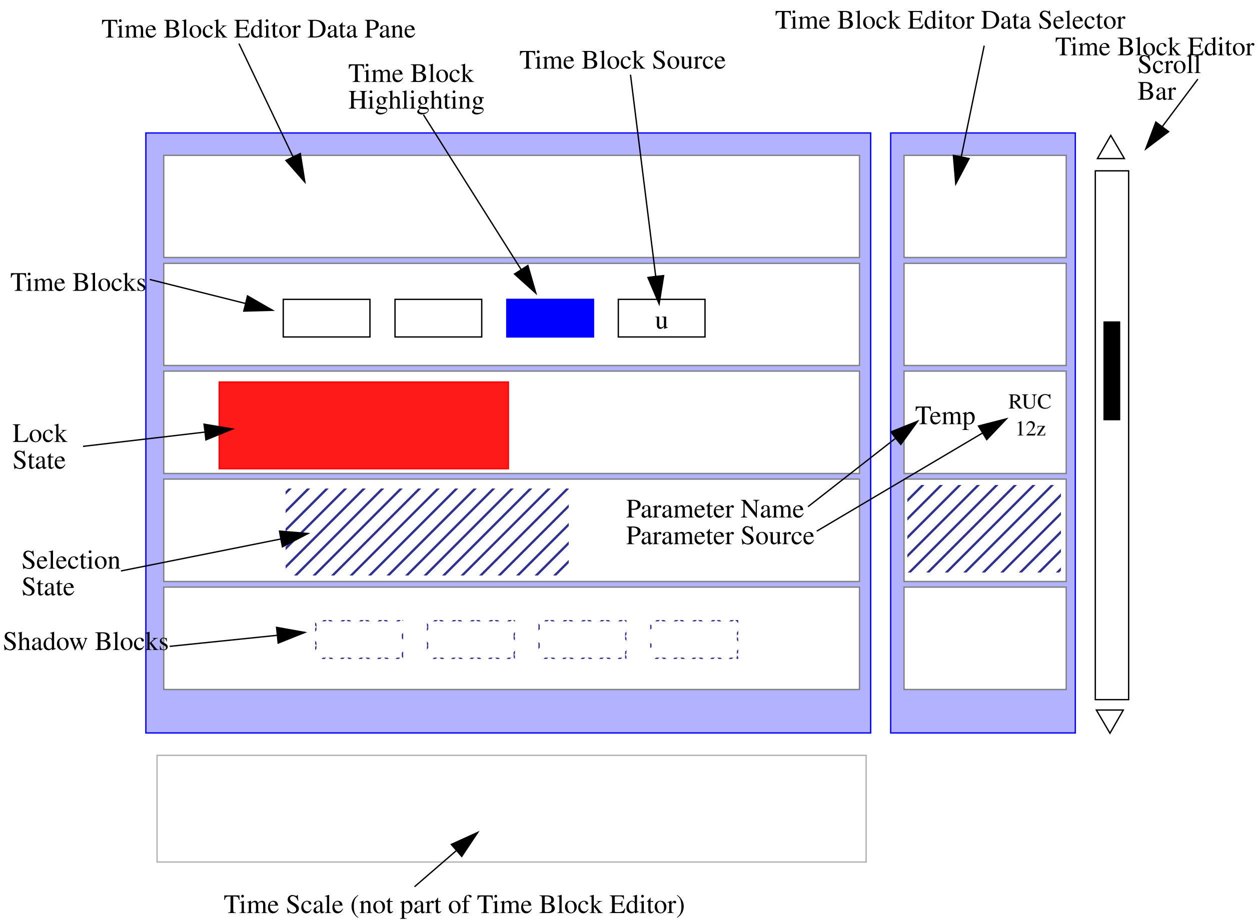
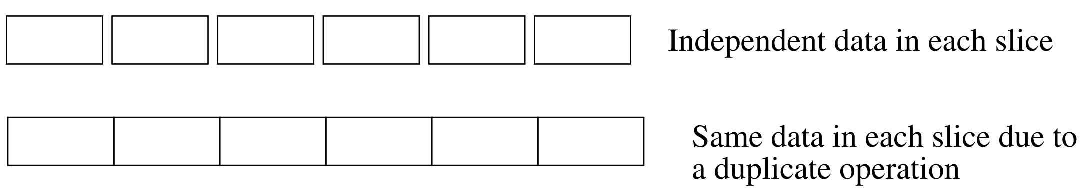


Figure 21 - Time Block Editor Layout

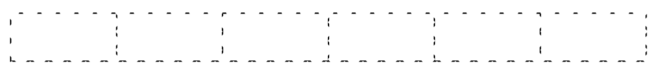
space between and with a thin separator bar at the minimum quanta (per parameter).



13.2.2 Shadow Blocks

The minimum parameter quantum requirements is defined by the configuration file. The information contained includes the start time, the duration, and any gap time between blocks. The start times may be specified either in GMT or local time.

"Shadow" blocks appear on the selection area indicating what resolution is required for each parameter. Shadow blocks can't be manipulated by the user and serve only as a reminder. Shadow blocks may have a stippled appearance (see the example below). Time blocks placed in shadow blocks must conform exactly to the time and duration of the shadow blocks. The line pattern and color of the shadow block is configurable.



Defining a shadow block with a time block places the time block over the shadow block, then the shadow block is no longer visible. The shadow block color is configurable as is its line pattern, but the line pattern is never solid.

Shadow blocks appear *only* for the mutable source and only if they are toggled on.

13.2.3 Selection State

The selection area consists of one or more parameter time spans with the same begin and end times.

Selection time ranges for each parameter are indicated with a hatching pattern. Hatching color and pattern are configurable.

The time block editor data selectors indicate selection state. The selection state is indicated by color and pattern and button depression.

13.2.4 Lock State

Parameter lock state is indicated by configurable colors displayed in the parameter background. Separate colors are used for locked by current user and locked by another user. These colors and fill pattern are configurable.

13.2.5 Data State

A character within each time block reflects the data state. The possible states are interpolated, edited by current user, edited by other user, and initialized. The character used for each state is configurable via the configuration file.

There is only one character placed on a group of identical time blocks, rather than one for each time block. It is centered.

13.2.6 Data Displayed in Spatial Editor State

There are five time block states that indicate the relationship between the time block editor time block and its appearance on the spatial editor: unloaded, loaded, visible, active/visible, and active/invisible. If a time block is unloaded, then it exists on the time block editor but there isn't a corresponding spatial editor data selector. If it is loaded, then there is a corresponding data selector in the spatial editor. If visible, then it appears in the spatial editor data display area. If active/visible, then it is visible and selected for editing. If active/invisible, then it is toggled off (invisible) and selected for editing.

The highlighting color (configurable) is used for time blocks if the time block is currently visible in the spatial editor. Default is dim yellow.

Another highlighting color (configurable) is used for the time block if the time block is the active/visible block (i.e., the one being edited) in the spatial editor. Default color is bright yellow.

The same highlighting color for the active/visible block is used if the time block is in the active/invisible state except that the time block is not filled in - instead the highlighting color outlines the standard gray color.

The standard gray color (configurable) is used for time blocks in the unloaded or loaded state.

13.2.7 Time Block Editor Data Selector

The parameter label on the time block editor data selector is a combination of the parameter and source name and represented by a two-line label. The source name is a simplified database name (e.g., 03z Ruc rather than RUC_03Jan96_0300). If the source is greater than 24 hours old, then the date must also appear. The source name should use a smaller font than the parameter name.

Temp	03Z RUC

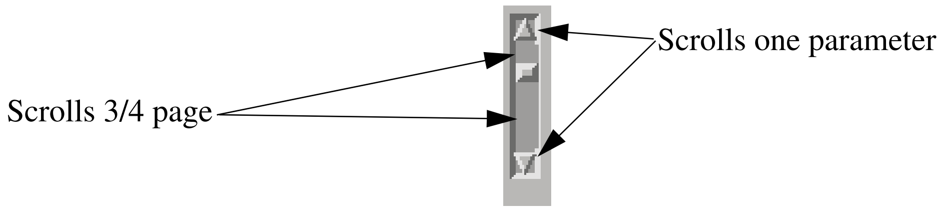
13.3 Implicit Scrolling Behavior

All drag operations result in implicit scrolling if necessary. This includes selection in the parameter field (horizontal and vertical), time scale (horizontal), and duplicate operations (horizontal and vertical).

13.4 Vertical Data Selector Scrolling

The parameter list is scrollable in units of one parameter.

The minimum amount of vertical scrolling is one parameter/source.



13.5 Time Block Editor Resize Behavior

Partial quanta are allowed to be displayed.

Vertical resize behavior - increase or decrease in the number of parameters visible. Individual parameter height is fixed. Parameters are added or subtracted from the bottom of the display during resizing, unless the time block editor is being enlarged the and have run out of parameters, then the parameters are added or subtracted from the top of the display.

Partial parameters are not displayed.

The vertical scroll bar is automatically repositioned.

13.6 Selection Method

When a parameter is selected, the selected parameter time range is computed and displayed. A parameter selection time range is the selection time range expanded to shadow block size. For example, if the shadow block starts at 0z and occurs every six hours and the user selects a time range ending at 2z, the entire 0z to 6z time range will be selected.

Parameters may be selected even if a selection time range isn't defined.

Note that the group identical mode does not affect the selection method.

13.6.1 Time Block Editor Data Selector

Button two on the time block editor data selector toggles the selection between on and off.

13.6.2 Dragging

Selections may also be made by dragging the cursor diagonally through multiple time block editor data panes. This method first deselects previously selected parameters and resets the selection time range. The parameters touched during the draw will become selected and the horizontal extent of the selection defines the selection time range.

13.6.3 Main Menu Group Selection

Group selections may be made through the main menus. (see 7.2.5, *Source Selection*, on page 13).

13.7 Duplicate Operations

Duplicates are performed by dragging button one.

Cursor shape changes over the time blocks for parameters and specific time blocks that can be duplicated or inter-parameter duplicated. This occurs during mouse button up events.

Duplicates occur on a per-shadow block basis (identical to the shadow block concept). Note that the group identical mode does not affect the duplicate operation.

The pointer position over the time block is identified by the cursor shape. It changes to indicate duplicate mode during the operation.

Skip-over mode is enabled by using the SHIFT key at the beginning of the duplicate operation.

Normal mode takes the time block located at the starting pointer position and copies it to all time blocks that the pointer is passed over (for the same parameter).

Skip-over mode takes the time block located at the starting pointer position and copies it to the time block that the pointer button is released over (for the same parameter).

The target and source time blocks are highlighted as the pointer passes over the target block. The highlight is indicated by a color outline around the time block.

The color outline for the source and destination blocks are configurable (and may differ).

13.8 Direct Inter-Parameter Copy (Duplicate)

The direct inter-parameter copy works in a similar manner to the duplicate operation (Section 13.7, *Duplicate Operations*, on page 46) except that it always operates in skip-over mode. The user presses the button over the source and drags to another parameter block and releases.

13.9 Time Block Commands

The time blocks displayed in the spatial editor can be controlled via the time block editor.

All spatial editor load modes are controlled by clicking button one over a time block.

The group identical data mode determines whether a single time block or a group of identical time blocks get edited (Section 8.4, *Group Identical Data Mode*, on page 24).

Time blocks have five states: unloaded, loaded, visible, active/visible, and active/invisible.

Table 10 describes the time block commands based on the initial visible state of the time block and the time-synchronized mode.

13.10 Data Selector Commands

An entire parameter may be toggled on/off by clicking button one over the time block editor data selector. This behavior is described in Table 11.

Table 10 - Time Block Commands

Mode	Initial State of the Time Block	Time Block Editor Operation
Time-Sync	Off	Sets the time block to visible and sets the current spatial editor time.
	On	Sets the time block to loaded and turns the parameter off. Does not affect the current editor time.
Async Mode	Off	Sets the time block to visible.
	On	Sets the time block to unloaded.

Table 11 - Time Block Editor Data Selector Commands

Mode	Initial State of the Data Selector	Time Block Editor Operation
Time-Sync	Off	Turns on the parameter. The time block that intersects the current spatial editor time changes to visible state.
	On	Turns off the parameter. The time block that intersects the current spatial editor time changes to loaded state.
Async Mode	Off	No effect.
	On	Turns off the parameter. All time blocks change to not loaded state for this parameter.

The parameter is toggled on implicitly when a time block moves from loaded to visible, or loaded to active/visible state.

In asynchronous mode, the parameter is implicitly turned off if the last time block for that parameter changes to not loaded state.

13.11 Spatial Viewer Mode

The spatial viewer (editor) shows only one time block at a time as the cursor passes over the time block in the time block editor.

All other previous time blocks configured for viewing/editing in the spatial editor are not visible.

The currently defined map background(s) appear in the spatial viewer.

The image-type display type is used to display the time block. No special parameters will be displayed. Map backgrounds are also displayed.

In spatial viewer mode, the legend appears for the displayed time block.

When the mouse exits the time block editor, then the spatial editor reverts to the previously displayed set of viewable/editable time blocks. The legend also reverts back to that previously.

The spatial viewer mode may be toggled off through the main menu bar.

No changes are made to the time block editor display of editor status for the spatial viewer mode (i.e., the active and visible blocks are not changed to show the single time block being viewed).

The spatial viewer is updated whenever you pass into a time block region. The time block region is defined as anywhere in a single parameter plus the entire time span of the time block. This is larger than the physical size of the time block.

The display remains the same when the user exits the time block region.

The spatial viewer mode may be toggled off. See Section 7.4.1, *Passover Mode for Time Block Editor Blocks*, on page 16.

13.12 Popup Menu on Button 3 Over TimeBlocks

There is a button three popup menu which can be activated when the pointer is over a time block.

13.12.1 Undo

This operation is dimmed if the last operation is not an undoable operation or isn't from the time block editor. Refer to Section 7.2.1, *Undo Capability*, on page 9 for the undoable features.

13.12.2 Direct Edit Mode

This operation is available via a button three popup over a time block or over a shadow block.

Table 12 describes the direct edit feature based on the initial visible state of the time block on the time block editor, and the time-synchronized mode. Table 13 describes the direct edit feature when selected

Table 12 - Direct Edit Feature - Time Block Exists

Mode	Initial State of Time Block	Time Block Editor Operation
Time-Sync	Off	The current spatial editor time is changed to the click location. The time block clicked becomes the only active time block. The parameter is turned on (if it was off).
	On	Simply makes this the only active time block.
Async Mode	Off	The time block clicked becomes the only active time block. The parameter is turned on (if it was off).
	On	Simply makes this the only active time block.

over a shadow block.

Table 13 - Direct Edit Feature - Over a Shadow Block

Mode	Time Block Editor Operation
Time-Sync	The current spatial editor time is changed to the click location. A time block is created automatically and becomes the only active time block(Section 14.12.16, *Pencil*, on page 80). The parameter is turned on (if it was off).
Async Mode	The current spatial editor time is changed to the click location. A time block is created automatically and becomes the only active time block(Section 14.12.16, *Pencil*, on page 80). The parameter is turned on (if it was off).

13.12.3 Get Information Service

Information may be obtained about the time block via the button three popup menu over the time block.

The following information is displayed:

- parameter name, grid size, units, and source
- time range
- history information
- wsid of the locker or the words "Locked by me" if the time block is locked.
- data state (e.g., initialized, user-edited)

This information will be presented in a scrollable window.

There is only a dismiss button on this dialog.

13.13 Other Objects Controlling the Time Block Editor

13.13.1 Spatial Editor Actions Causing Changes to Time Block Editor State

Changes made on the spatial editor data selector (Section 14.4, *Map Backgrounds*, on page 56) will affect the highlighting of the time blocks and the toggle state of the time block editor data selector.

Making a time block active via the spatial editor data selector will change the appearance of the corresponding time block in the time block editor. This also may have the effect of toggling on the time block editor data selector if it was off.

Toggling on/off a time block via the spatial editor data selector will change the appearance of the corresponding time block in the time block editor. This also has the effect of toggling the time block editor data selector on/off in sync mode. In async mode, the time block editor data selector is not toggled off if it was on.

Creating new data (Section 14.10, *Automatic Creation of Data via Time Block Editor Direct Edit Mode*, on page 67) will result in a time block appearing on the time block editor.

13.13.2 Time Scale Actions Causing Changes to Time Block Editor State

Clicking on the time scale places the system into time-synchronized mode. The time block editor will command the spatial editor to display the time blocks that intersect the new spatial editor time and the toggled-on time block editor data selector. The time block highlighting in the time block editor will reflect the visible/active state of the blocks in the spatial editor.

The group identical data mode determines whether a single time block or a group of identical time blocks get edited and therefore highlighted (Section 8.4, *Group Identical Data Mode*, on page 24).

13.13.3 Menu Actions Causing Changes to Time Block Editor State

Reverting data from the database server may change the positioning of the time blocks on the time block editor.

Undo, update editor, delete, time-shifting, interpolation, and copy to/from actions may change the data inventory presented on the time block editor.

Toggling group identical data mode may change the highlighting of the time blocks.

Changing the source selection may change the appearance of the time block editor due to different parameters being selected.

Changing the set of loaded parameters, breaking locks, and setting the completion state will change the appearance of the time block editor.

Find parameter, move parameter to top, and sort time block editor will change the layout of the time block editor.

Changing the display backgrounds (time scale lines and editor time line) will change the appearance of the time block editor.

Changing the time-synchronized mode and changing the time block size from the controller area will change the appearance of the time block editor.

13.13.4 Temporal Editor Actions Causing Changes to Time Block Editor State

If linked editors is toggled on (Section 7.4.4, *Link Editors During Edit Operations*, on page 16), then when edits are performed on the temporal editor, the time block editor will scroll to that parameter.

14. Spatial Editor

14.1 Spatial Editor Assumptions

Only one of the time blocks displayed in the spatial editor may be an image (i.e., images may not be overlaid).

Once an edit tool is chosen, it remains active (if possible). The edit tool is not switched when a new parameter is made active or when a new time block is edited.

Once a parameter or parameters are chosen to be active in time-synchronized mode, then that parameter or parameters will continue to be active as different parameters are toggled on/off, the editor time is changed, and data updates occur.

There doesn't need to be a corresponding time block available for a particular parameter while it is in the editor. You can have a visible and active parameter even if there is no data available.

Multi-parameter mode applies to all active parameters, even if individual active parameters are toggled off. If all active parameters are toggled off, then no editing may occur.

The display type of data does not change when the data is toggled on/off. The display type of data does not change when the data is made active unless the "image on active" option is enabled.

Color tables are shared across all parameters sharing the same units. Color tables are global (i.e., they are shared with the temporal editor).

Time blocks (or parameters) loaded are not automatically made active (except via the direct edit mode selection described in Section 13.2.2, *Shadow Blocks*, on page 42).

The office domain is the 1:1 view of the spatial editor. This is automatically calculated based on the data domain for each parameter plus a factor that is defined in the configuration file. The extra factor is used to provide "black" space around the gridded data.

The group identical data mode determines whether a single time block or a group of identical time blocks get edited (Section 8.4, *Group Identical Data Mode*, on page 24).

Special parameters (Section 7.3.2, *Special Parameters*, on page 14) are generally treated as normal parameters, with the exception that the time block editor and temporal editor do not show them or know about them. There is always a spatial editor data selector for toggled on special parameters.

14.2 Appearance

The components of the spatial editor consist of the data display, legend area, time step selector, and spatial editor data selector as identified in Figure 22 on page 52.

14.2.1 Data Display Area

The data display area contains zero or more map backgrounds, and zero or more meteorological displays of time blocks (time blocks). Other items displayed include sample, active reference set, spatial

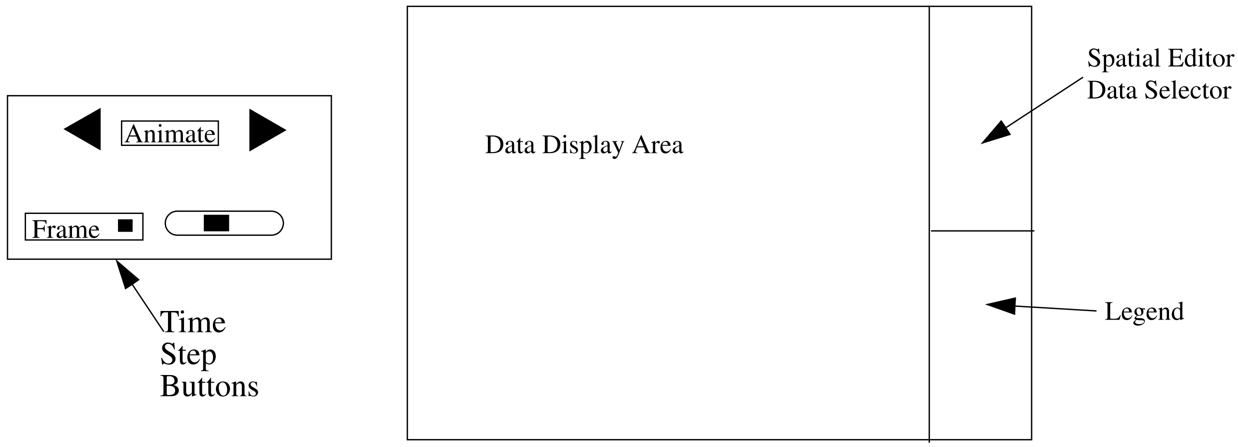


Figure 22 - Spatial Editor Layout

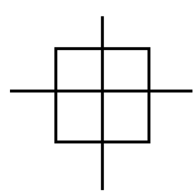
editor tool area of influence, and a temporal location indicator.

Each meteorological display may be displayed in a variety of different display formats, graphic colors, and color enhancement tables.

The system prevents more than one image display. The system prevents graphic colors from being the same for different time blocks.

The background of the spatial editor is black.

The temporal location indicator shows the grid point that the temporal editor displayed is keyed to. The size of the indicator is 30 x 30 pixels and its color is white outlined with a black border so it can be seen regardless of what colors appear beneath it. Note that this indicator appears only if the temporal editor is showing the values at a single gridpoint mode[1]. This is the indicator's appearance:

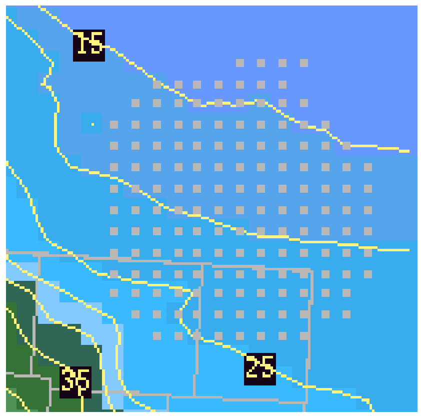


The reference set appears as a set of small filled squares on the display. The color is light gray/black. The size of the reference square is 3 x 3 pixels. The reference set uses two colors so it is always visible on the screen (to provide contrast when overlaid on any color).

1. Single gridpoint mode means that there are no reference sets active. In reality, there is a single gridpoint selected on the spatial editor.

The spatial editor tool area of influence (for both the freehand and gridpoint tools) appears as a set of small filled squares on the display. The color is white/black. the size of the reference square is 3 x 3 pixels. The spatial editor tool area of influence has a three-dimensional look to it to provide contrast when overlaid on any color. The spatial editor tool area of influence indicates the grid points that would be modified if an edit operation occurred at the current pointer location.

The spatial editor tool area of influence and reference set squares will be large enough to be seen but not too large, to prevent obscuring the image, as shown in Figure 23.



(doesn't show the black outlines)

Figure 23 - Appearance of Reference Set Dots

The gridpoints represented by the reference set and the spatial editor tool area of influence apply to the top active parameter and may not accurately represent the remainder of the parameters. The potential of differing geographical location or grid sizes per parameter make it necessary to enforce this.

Note that the reference set squares is also the temporal area of influence.

14.2.2 Legend Area

The legend area contains the color bar legend for the parameter displayed as an image in the spatial editor. If no parameters are displayed as images, then the legend area is blank.

The legend consists of a scale containing major and minor tick marks and labels plus a color bar representing the colors for a particular value.

The legend contains a label which indicates the parameter it represents.

The legend is fixed in size.

The legend contains an ascii label which shows the current picked-up data value for that parameter.

The legend contains an arrow pointing to the current pickup value for that parameter.

The scale for the legend is floating-point for scalar and vector data. The scale is discrete labels for discrete and weather data.

The scale may be linear or logarithmic for scalar data. This is defined in the config file.

The legend may be zoomed in by one step only (the amount is configurable).

14.2.3 Spatial Editor Data Selector Area

The spatial editor data selector area consists of two sections - the active parameters and the remainder of the parameters. These are clearly delineated. See Figure 24.

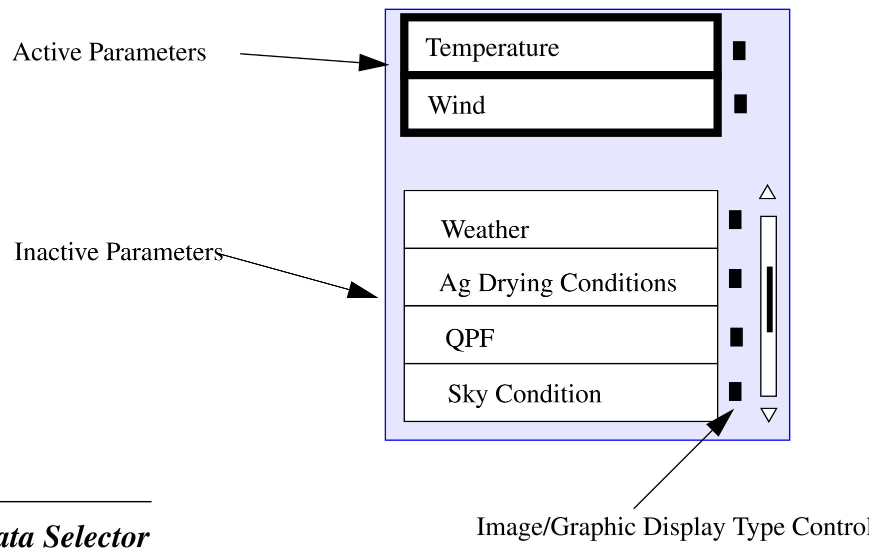


Figure 24 - Spatial Editor Data Selector

Each element of the data selector area (representing a single time block) is called a data selector.

In time-synchronized mode, the data selector area contains the entire list of parameters loaded into the system.

In asychronous mode, the data selector area contains the list of time blocks toggled on (from the time block editor) plus those that were previously displayed but are now toggled off (until the user toggles off the time block editor data selector for that parameter) since last going to asychronous mode.

The number of entries in both sections change as the user operates the system.

The data selector contains a label indicating the parameter name and source. A time range appears only in asynchronous mode to uniquely identify the time block. In time-synchronized mode, the indicator <no data> appears if there isn't a time block that corresponds to the intersection of the parameter and the current spatial editor time.

The data selector background color represents the base color used to display the data if the data is displayed as a graphic. The data selector background color is "gray90" if the data is displayed as an image. The data selector background color is black if the parameter is toggled off for visibility.

The text in the data selector must be of sufficient contrast to always be able to read it. White and black are the acceptable colors for this text.

If the user attempts to load more parameters or time blocks that there is available sufficient vertical space, a scroll bar will appear for the “inactive” section of the data selector area.

If the user attempts to make active more parameters that there is available sufficient vertical space, the remainder of the “active parameters” and the entire “inactive parameters” section is clipped.

14.2.4 Time Step Selector

The time step selector consists of step forwards, step backwards, animate/stop toggle, animation speed control, and a frame step/time step mode.

The step backwards/forwards buttons step the spatial editor to the next change in the active parameter(s).

The animate button alternately turns on animation and stops animation.

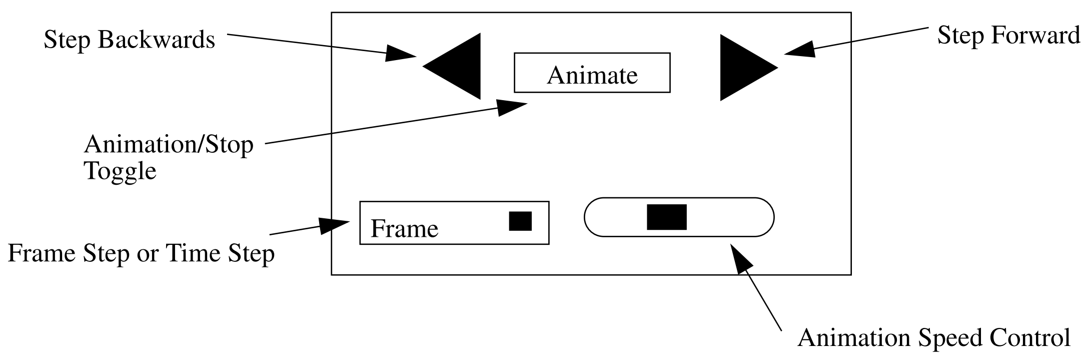


Figure 25 - Time Step Selector

14.3 Display Algorithms

14.3.1 Graphic Color Algorithm

Each parameter name has an preferred color to it which is used if possible. The assignment of color is made when the parameter is added via the parm menu to the system. If the color is not available (since it is being used by another parameter), then an alternate color will be chosen.

The system will ensure that no two parameters have the same color.

In asynchronous mode, the first time block will be given the assigned parameter color. All other time blocks for that parameter will be given alternate colors.

Colors will not change when parameters are toggled on/off.

If a user redefines the color for a given parameter and that conflicts with another parameter's color, the other parameter's color will automatically be reassigned by the system so not to conflict. This is the only case when colors are reassigned by the system.

The color assignments per parameter are shared with the temporal editor.

14.3.2 Visualization Algorithm

The visualization algorithm depends upon whether an existing image-type is displayed and whether the "image on active" mode is enabled. Details of the algorithm are shown in Table 14.

Table 14 - Visualization Algorithm

Action	Image on Active[a]	Result
Direct Edit from time block editor in sync or async mode	Yes	The selected time block is set to an image type. Any previously set image types are reset to graphic type.
	No	No changes.
Toggle on/off data selector visibility.	N/A	No changes.
Toggle on active.	Yes	The selected time block is set to an image type. Any previously set image types are reset to graphic type. If there is already an image type in the active set, then this time block is set to graphic. If there isn't an image type in the active set, then this time block is set to image and any previously set image types (in the inactive set) are reset to graphic.
	No	No changes.
Toggle off active.	N/A	No changes.
SHIFT click on data selector to make it the only active.	Yes	The selected time block is set to an image type. Any previously set image types are reset to graphic type.
	No	No changes.
New set of parameters loaded into system	N/A	Any existing image is preserved if the same parameter is still desired. All other parameters are graphical.

a. Image on Active for spatial editor.

14.4 Map Backgrounds

Map backgrounds consist of graphical boundaries, such as political, rivers, and highways. Text labels may also be contained in the map background to represent locations, such as cities.

The configuration file contains the listing of default map backgrounds.

Display control of the map backgrounds is enabled through the main menu bar. See Section 7.7.1, *Backgrounds*, on page 18 for further details.

14.5 Spatial Editor Data Selector Control

The spatial editor data selector control serves several purposes: select one or more parameters for editing, toggling on/off the visibility of parameters, and controlling the display characteristics of the parameter.

Clicking button one on a time block selector will toggle its visibility on/off. The appearance of the data selector will change.

Clicking button two on a time block selector will toggle its active state. The time block selector will be moved to top of the active area when made active and be moved to top of the inactive area when made inactive. Making a time block selector active also implicitly makes the time block visible.

Clicking button two with SHIFT depressed will make the time block the only active parameter. If it previously was inactive, then it is moved to the active list. If it previously was active, it remains active. In both cases, all other previously active time block selectors are moved to the inactive area.

The state changes in the time blocks for button one and two clicks are shown in Table 15.

Table 15 - Time Block State Changes

	Time Block State Change	
Action	**From**	**To**
Toggle on	Loaded	Visible
Toggle off	Visible	Loaded
Toggle active (previously invisible)	Loaded	Active/Visible
Toggle active (previously visible)	Visible	Active/Visible
Toggle inactive (previously invisible)	Active/Invisible	Loaded
Toggle inactive (previously visible)	Active/Visible	Visible

The appearance (display type) may be changed via a button on the right of the main data selector. If the button is on, then the display type is an image. If the button is off, then the display type is graphic. Clicking a button that is off will turn it on and will turn OFF all other buttons (since there can only be one image on the display at a time). Clicking a button that is on will turn it off and doesn't affect any other button.

The display type choices are image and graphic. The actual display type is determined from entries in the configuration file that define the image type and graphic type. The assignment of mapping graphic/ image to specific type may be changed via button three popup menus over the data selectors.

14.5.1 Data Selector Popup Menu

Display Attributes

A button three popup menu exists to modify the default color and display types for the parameter name. The entry on the menu is “Display Attributes...”

The “Display Attributes” dialog is used to set the display types for the image-type and graphic-type entries. Graphic colors may also be set. The list of choices in the “image type” consists of image and any combinations of image and graphics. The list of choices in the “graphic type” consists of combinations of the possible graphics. Graphic colors have a list of 10 or more colors and are defined in the configuration file. The selector for the graphic color (and the menu) is color-coded. It is not permissible to overlay wind barbs and wind arrows for the same parameter so these combinations will not be seen in the menus. For those parameters that only have one image possibility or one graphic possibility, the abbreviated menu is simply represented as a button.

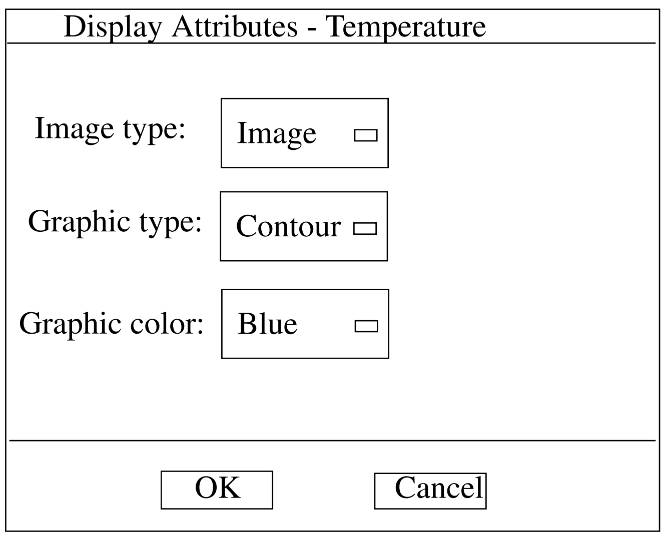


Figure 26 - Display Attributes Dialog

Save and Revert Time Block

An entry on the button three popup menu exists to save a single time block and to revert a single time block. The menu items are dimmed if the data has not been modified by the user (i.e., no lock). The menu names are “Save Time Block” and “Revert Time Block”.

Group identical mode (Section 8.4, *Group Identical Data Mode*, on page 24) does not affect this operation.

Contour Interval

An entry on the button three popup menu exists to change the contour interval. This option is available only for scalar data. The entry brings up the contour interval dialog as shown in Figure 27. Contour

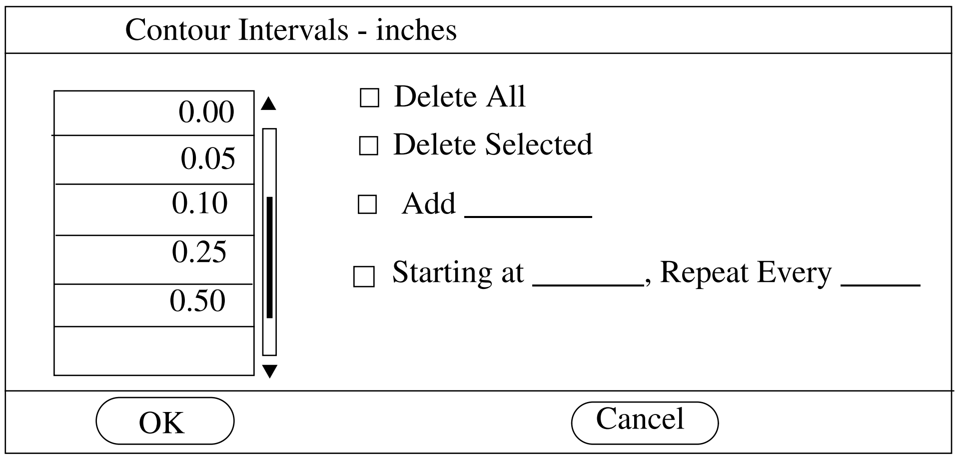


Figure 27 - Contour Interval Dialog

intervals are shared for all parameters with the same units.

The dialog lists the current contour intervals for the parameter in numerically ascending order. A scroll bar is displayed when there are too many entries to fit in the dialog. The delete all operation deletes all existing contour intervals. The delete selected deletes the selected contour value. A particular contour value may be selected by clicking on the contour value in the dialog.

The add operation permits the user to type in an entry. Pressing the ENTER key (or clicking on the box on the same line) will add the entry to the list and will clear the entry field. The list of contour values will be scrolled so that the new entry is visible.

The Starting At and Repeat Every operation allows the user to enter a starting value (also known as a base value) and then a repeat value. Clicking on the box near the entry field will add the contour values to the list. For example, if the user wanted a contour every five degrees with zero included, then the command would be repeat every 5 based on 0. The same result could be achieved using repeat every 5 based on 5.

The OK operation changes the contour values for all parameters sharing the same units and the Cancel operation simply exits the dialog.

The default contour interval per units is defined in the configuration file.

14.6 Legend Control

The color table assigned to the displayed image parameter (which is shared by all parameters with shared units) may be changed from a button three popup menu. This menu lists all possible color tables (for the units).

Clicking button two on the legend will set the pick-up value for that parameter.

Dragging button two on the legend will show the "about-to-be-picked-up" value for that parameter with both the arrow and the numerical readout. When the button is released the pick up value is set. Implicit scrolling will occur if necessary on the legend if the legend is zoomed.

Clicking button one over the legend will zoom in the display, centered at the click location. Clicking button one again will zoom out the display to the original full view. There is only one zoom factor available which is configurable.

14.7 Time Step Selector Control

Clicking button one on either time step control button will step the current time of the spatial editor forwards or backwards.

The amount of time to step is based on the active parameter(s) inventory. The step time is determined by the next change (to the set of active parameters) if there is more than one active parameter or by the next data available time block if there is only one active parameter. If there isn't any data available for the active parameters, then the time step selectors will step one shadow block.

If there are no active parameters, then the time step selectors will be dimmed.

Time stepping will scroll the time block editor and temporal editor if the step (newly calculated editor time) would not be visible. In this case, the newly calculated editor time appears in the center of the time block editor.

14.7.1 Animation

The animation feature permits animation over the displayed time range of the temporal editor/time block editor. All three editors (spatial, temporal, and time block editor) are involved during the animation process.

Animation will begin with the first time displayed in the time block editor.

The animation and step buttons are dimmed during asynchronous mode

Two modes of animation are possible: fixed time step rate and fixed data change rate. In fixed time step rate, the user can control the number of seconds per forecast hour. In this mode, a time block representing two hours will be displayed for exactly twice as long as a time block representing one hour. In the fixed data change rate, the user controls the number of seconds per frame. In this mode, a new frame will be presented to the user on a fixed interval regardless of the time duration of the time block. Blank screens may occur if no data is available for a particular time.

The new frame is calculated by the next change to the displayed active parameters. A blank display is not allowed.

Animation always occurs in the forward time direction. There is no dwell time associated with animation for the first frame. The dwell time for the last frame is the equivalent of one frame or one hour additional time.

Animation implicitly stops when the user attempts any operation that is listed below:

- changing the size of the editors through the pane stretcher
- clicking on the time step selector's step forward or step backwards buttons
- the system mode is changed to asychronous from time-synchronized
- an attempt to edit on the time block editor or the temporal editor

Animation is not affected (although the appearance of the screen may be affected) when the user performs any operation that is listed below:

- toggling on/off a parameter from either the time block editor or spatial editor
- changing the display type from the spatial editor data selector
- changing the animation attributes

Editing is not allowed on the spatial editor during the animation process. All spatial editor icons are dimmed.

The spatial editor will step according to the state described in the animation dialog.

Linked editor mode and passover mode (Section 7.3.3, *Update Parameters*, on page 15) are temporarily disabled during animation.

14.8 Other Objects Controlling the Spatial Editor

14.8.1 Time Block Editor Actions Causing Changes to Data Selector State

Table 16 shows the time block editor actions and their affect on the data selector.

Table 16 - Time Block Editor Actions and their effect on the DataSelector

Time Block Editor Action	Data Selector Effect
Parameter made active on the time block editor time block (button three popup)	Same as making a time block selector the only active time block (same as SHIFT click).
Sync mode: Parameter toggled off on time block editor data selector.	Same as toggling off visibility in a time block selector.
Sync mode: Parameter toggled on on time block editor data selector.	Same as toggling on visibility in a time block selector.

Table 16 - Time Block Editor Actions and their effect on the DataSelector

Time Block Editor Action	Data Selector Effect
Async mode: Time block toggled on in time block editor time block.	Same as toggling on visibility in a time block selector. If a time block selector does not already exist for the specific time block, then a new time block selector is created. This time block selector will appear at the top of the inactive list.
Async mode: Time block toggled off in time block editor time block.	Same as toggling off visibility in a time block selector.
Async mode: Parameter toggled off in time block editor data selector.[a]	Same as toggling off visibility of all time block selectors with the same parameter. All time block selectors for that parameter are deleted.

a. Note that you cannot toggle a parameter on in the time block editor data selector in async mode.

Other actions on the time block editor, such as duplicate and delete, may cause the spatial editor to change the data being displayed. External actions, such as data updated from another gfe will also cause a change to the data being displayed.

Selecting direct edit mode on a shadow block will cause the spatial editor to create a new time block, switch to the pencil tool, and place the tool into grid creation mode (Section 14.12.16, *Pencil*, on page 80).

14.8.2 Menu Actions Causing Changes to the Spatial Editor

Reverting data, interpolation, breaking locks, changing the spatial editor backgrounds, undo, delete, copy to/copy from, and time shifting may change the data that is displayed in the spatial editor.

Switching between the time-synchronized and asynchronous modes will change the number of spatial editor data selectors.

Changing reference sets or temporal location will affect the display due to the depicted reference set being changed.

Changing the spatial editor tool size will affect the display due to the depicted area of influence being changed.

Changing the spatial editor edit tool may affect the display due to the different methods of displaying the area of influence.

Selecting a new set of parameters from the parm menu may cause changes in the data displayed in the spatial editor.

14.8.3 Temporal Editor Actions Causing Changes to the Spatial Editor

If the linked editors mode is enabled (Section 7.4.4, *Link Editors During Edit Operations*, on page 16), then editing on the temporal editor may cause changes to the appearance of data on the spatial editor and will reset the current spatial editor time.

While the cursor is over the temporal editor, the reference set in the spatial editor is highlighted to indicate the temporal area of influence. This has the effect of changing all grey reference set dots to white area of influence dots.

14.8.4 Time Scale Actions Causing Changes to the Spatial Editor

Setting a new spatial editor time on the time scale may cause the spatial editor to change the set of displayed data.

14.9 Display Types for Spatial Editor

There are four types of data to be viewed on the Spatial Presentation: Scalar, Vector, Discrete Static, and Discrete Dynamic. Each of these may be displayed in various ways and may be combined with each other. Table 17 defines the possible display types based on the data type.

Table 17 - Spatial Editor Display Types

Data Type	Display Type
Scalar	Image
	Contour
Vector	Wind Barbs
	Arrows
	Image
Discrete Static	Image
	Boundaries
Discrete Dynamic	Image
	Boundaries

14.9.1 Image

Image displays are used for all data types. An Image Display consists of blocks of colored/patterned pixels which represent the value of the field. Each block will be exactly the size of one grid cell. (Figure 28 on page 64.)

The following characteristics apply to the Image Display:

- Color is determined by the value of the meteorological field. The fill pattern is always SOLID for continuous scalar, continuous vector, and discrete. It may be patterned for dynamic discrete data (e.g., Weather).
- The color pattern (color table) is based on the units of the parameter and is shared across all parameters with the same units.
- An Image will typically contain 20-60 colors.
- The Default Color Mapping is based on the units will be contained within the configuration

file. The mapping is configurable per units. Alternate color tables are also defined in the configuration file.

- The weather display consists of a colored pattern. The pattern reflects the coverage/probability. The color represents the weather type. Through the configuration file, the user may define colors for individual types (e.g., RW), combined types (TRW), individual types with intensities (e.g., RW+), and combined types with intensities (T+RW+A+). The system first looks for types or combined types with intensities, then individual types or combined types. If not found, a color is chosen from a list of common weather colors. In the event of complex weather, defined by three coverage/probabilities or more, a solid color will be used.
- An image cannot be overlaid on another image. Alternate types of depictions, such as contours, may be overlaid on an image.
- A legend consisting of a color bar and values for each color will be shown in the spatial editor legend area to the forecaster.

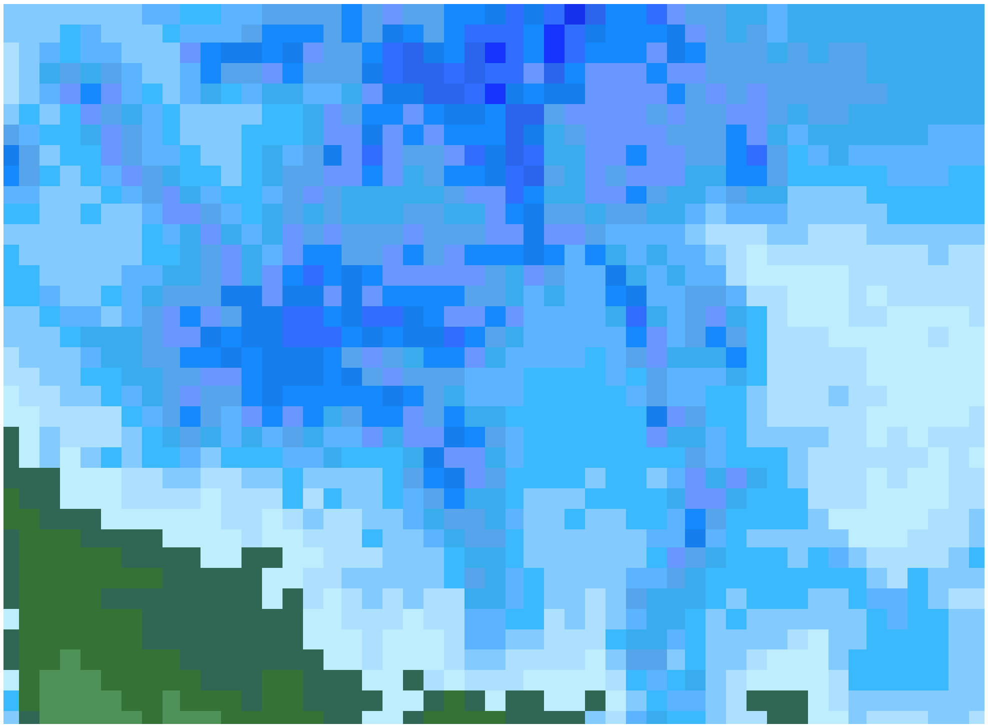


Figure 28 - Image Display

14.9.2 Contours

A Contour Display consists of labeled lines representing locations of equal values. It is used for both Continuous Scalar and Continuous Vector data. (Figure 29 on page 65.)

The following characteristics apply to the Contour Display:

- Color is user specified and placed within the configuration file. The color is configurable per weather parameter. This is called the graphic base color.
- The contour interval and/or specific contour values are defined in the configuration file and can be customized per parameters with the same units.

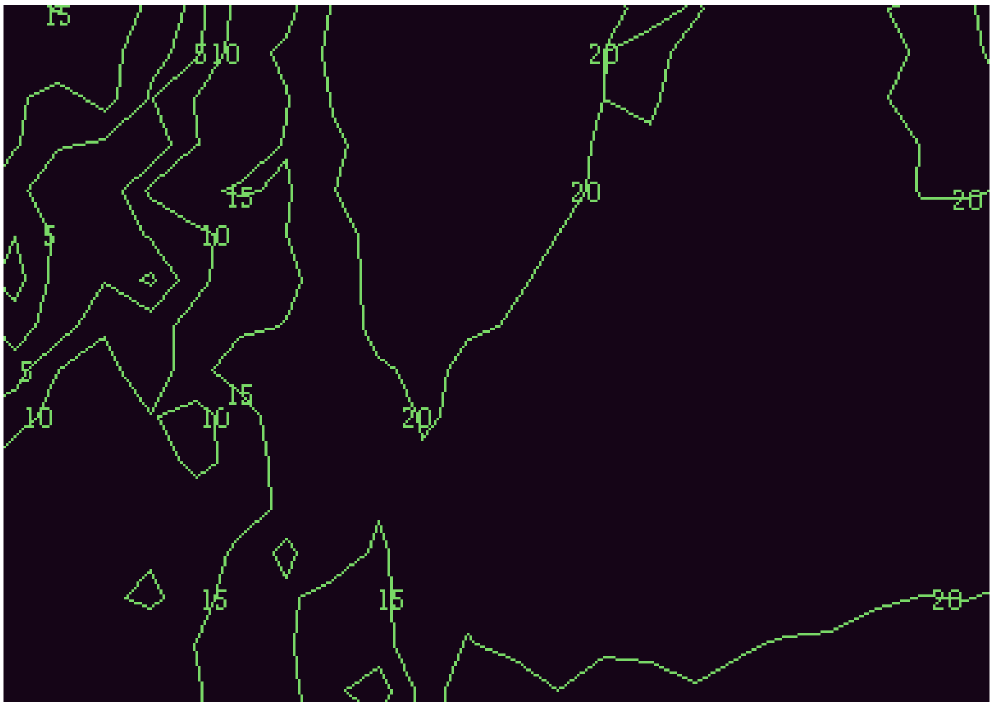


Figure 29 - Contour Display

14.9.3 Wind Barbs

The Wind Barb Display is used for Continuous Vector Data and consists of standard wind barbs regularly spaced on the display. Each wind barb will represent the wind for one grid cell. Some displays may not show a wind barb at every grid cell.

The following characteristics apply to the Wind Barb Display:

- Due to limited screen real estate, only a few of the grid points will be represented when not zoomed.[2] More and more grid points will be completely represented by wind barbs or vectors as the zoom amount is increased.
- The nominal size of the wind barb is defined in the configuration file.

2. For the wind barb and wind arrow displays.

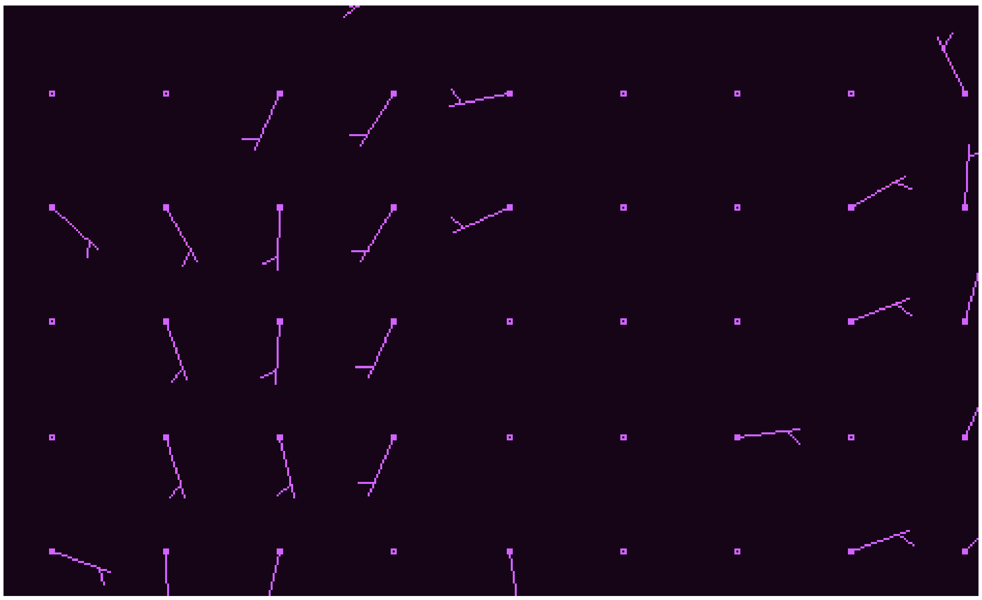


Figure 30 - Wind Barb Display

- The factor that relates the length of a arrow to the speed is logarithmic and dependent upon the maximum possible value of the parameter.

14.9.4 Arrows

The Arrow Display for Continuous Vector Data consists of arrows which are length encoded to represent wind speed. The direction of the wind arrow indicates the wind direction (i.e., the direction in which the wind is blowing). Each wind arrow represents the wind for one grid cell. Some displays may not show an arrow at every grid cell. (Figure 31 on page 67)

The following characteristics apply to the Wind Arrow Display:

- The length of the arrow indicates the speed.
- The maximum length of the arrow is defined in the configuration file.
- The factor that relates the length of a arrow to the speed is logarithmic and dependent upon the maximum possible value of the parameter.

14.9.5 Boundaries

The Boundaries Display for Discrete Static and Discrete Dynamic Data is used when the forecaster wishes to overlay discrete data on other parameters. (Figure 32 on page 68)

The Boundaries Display has the following characteristics:

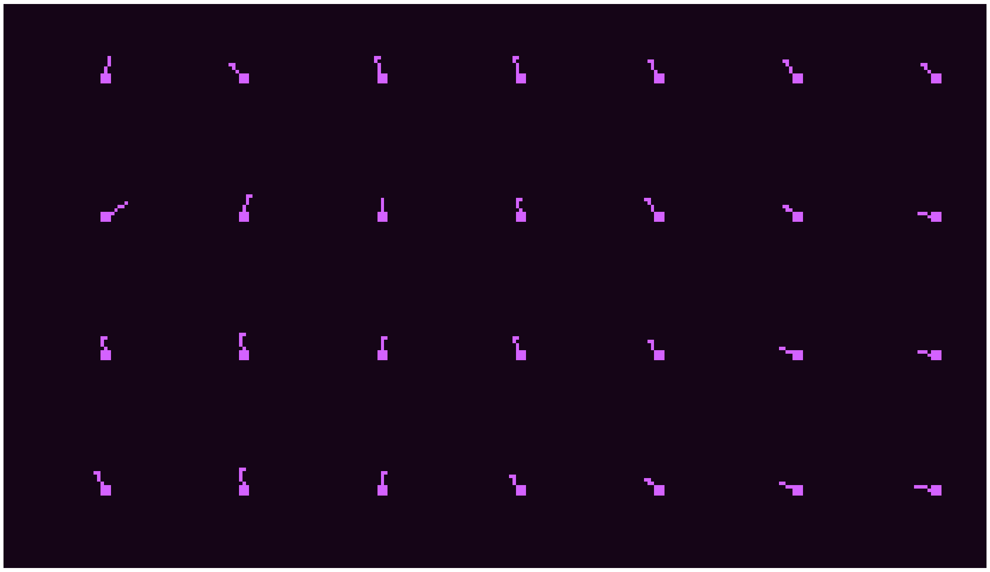


Figure 31 - Wind Arrow Display

- an enclosed boundary on the screen is identified as an area with homogeneous conditions
- a label exists along the boundary and within large areas to denote the value of the area
- it can be overlaid on top of an Image Display
- a single color is used for the entire boundary display

14.10 Automatic Creation of Data via Time Block Editor Direct Edit Mode

If the user chooses the direct edit mode over a shadow block on the time block editor (Section 13.12.2, *Direct Edit Mode*, on page 48), then the spatial editor will automatically enter data creation mode. The following characteristics occurs:

- The parameter becomes the only active parameter.
- The time block created will align itself with a shadow block.
- The spatial editor is set to use the pencil tool. The pencil tool is immediately placed in the grid creation mode.

Details about the grid creation is in Section 14.12.16, *Pencil*, on page 80.

14.11 Implicit Scrolling of Edit Tools

All tools will provide implicit scrolling.

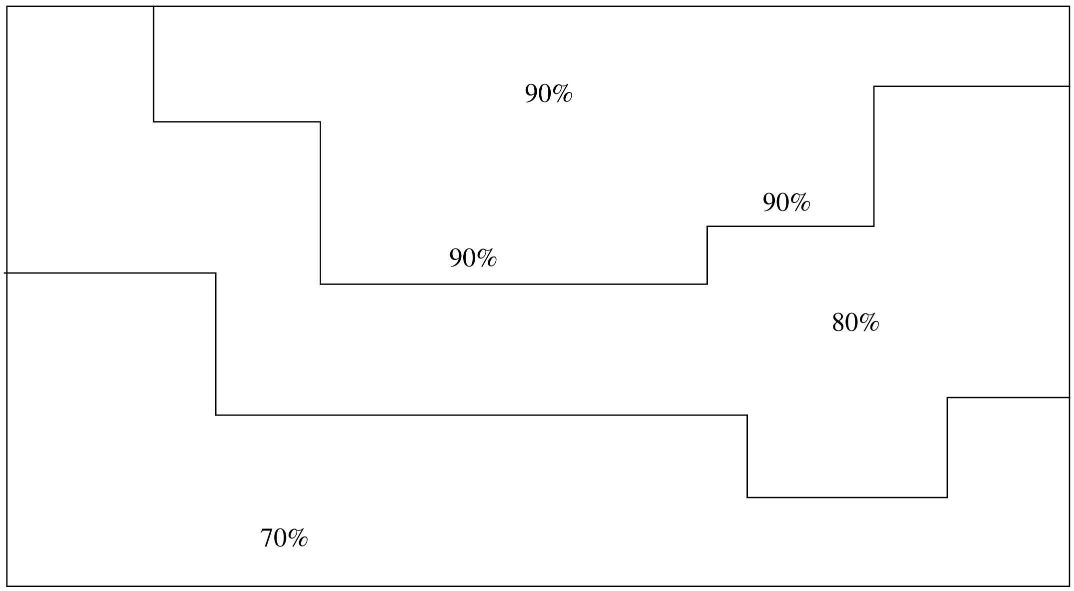


Figure 32 - Boundary Display

14.12 Spatial Presentation Edit Tools

One of the most critical components of the AFPS is the editing facility. The main goal of the forecaster is to use edit tools to manipulate data that define the state of the atmosphere. All AFPS forecast data are stored in gridded format. (Many displays do not show grid points, but gridded data is the basis for all displays and modifications.)

There are two ways to modify data using the AFPS: editing the gridded data directly and editing contours that are used later to recalculate the grid.

Direct grid editing or modifying gridded data will change the data display interactively, thus providing the user with immediate feedback. Two methods will be used to edit gridded data directly. One method, known as the Gridpoint Tool Set, is capable of making large adjustments to areas defined by the user. This method is a two-step process that requires the user to 1) define the gridpoints over which the edit operation will apply and then 2) apply the particular operation. The first step, i.e., tools that might be used to define an area to be manipulated, is described in the next section.

The other method of editing grids directly, the Freehand Tool Set, is used for making fine adjustments to the data over relatively small areas. These tools permit the forecaster to change small areas quickly with a one-step process.

In contrast to direct grid editing, contour modification tools will allow the forecaster to add new contours, delete existing contours, and change the value of a contour. After each edit operation is completed, the gridded field based on the newly modified contours.

There are several other tools which do not edit data, but serve to control the system. They are the Sample, Select Points, Temporal Location, and Zoom tools.

14.12.1 Mouse Button Assignments and Attribute Strings

The mouse button assignments appear in Table 18

Table 18 - Commands and Menus for Spatial Edit Tools

	Button 1		Button 2		Button 3
Tool	**Click**	**Drag**	**Click**	**Drag**	**Popup Menu**
Sample	Anchor Sample	Display Value at Current Location	Delete Individual Anchored Sample	N/A	Undo Clear Samples Load Samples Save Samples
Zoom	Zoom Out	Draw Rectangular Domain	Zoom In	Pan	Undo Full View
Temporal Location	Set Location	Display Value(s) at current Location, then set location on release	N/A	N/A	Undo
Select Points[a]	Select Contiguous Area[b]	Select Points	Deselect Contiguous Area	Deselect Points	Undo Delete Area
Push/Pull[c]	Increment (SHIFT) Veer wind direction	Select Points	Decrement (SHIFT) Back direction.	Deselect Points	Undo
Push/Pull with Taper[d]	Increment (SHIFT) Veer wind direction	Select Points	Decrement (SHIFT) Back direction.	Deselect Points	Undo
Smooth	Smooth Selected Gridpoints	Select Points		Deselect Points	Undo
Set Value	Set Value of Selected Gridpoints	Select Points	Pick up Data Value	Deselect Points	Undo
Move/ Copy		Copy Selected Data		Move Selected Data	Undo
Vector		Adjust Wind Vector			Undo

Table 18 - Commands and Menus for Spatial Edit Tools

	Button 1		Button 2		Button 3
Tool	Click	Drag	Click	Drag	Popup Menu
Paintbrush	Paint current gridpoint with data value.	Paint gridpoints with data value.	Pick up Data Value		Undo
Spraycan	Increment current gridpoint.	Increment gridpoints.	Decrement current gridpoint.	Decrement gridpoints.	Undo
Bulldoze	Smooth Current Gridpoints	Smooth Gridpoints.			Undo
Pencil		Adjust Contour	Pick up Data Value	Define New Contour	Undo Create Grid From Contours, Clear Contours, Generate Grid

a. this replaces the previous Area and Point tools.
b. The contiguous select applies only to discrete data.
c. The push/pull tool can be used to veer and back the direction using the SHIFT key for vector data only.
d. The push/pull tool can be used to veer and back the direction using the SHIFT key for vector data only.

14.12.2 Undo

This operation is dimmed if the last operation is not an undoable operation or isn't from the spatial editor. Refer to Section 7.2.1, *Undo Capability*, on page 9 for the undoable features.

14.12.3 Sample

The data may be sampled. The sample includes all the value of all active parameters (listed in the order of the active section of the spatial editor data selector).

The sample tool is available for any data type. If a parameter is active but there is no data for it displayed, then <no data> will be displayed for the sample. The sample tool is not available if there are no active parameters.

When different field are made active, the anchored sample displays will reflect the values for the new parameter(s).

The anchor locations are defined on a per spatial editor basis and do not change for new active parameters or time stepping.

The anchor sample operation permits the forecaster to anchor a sample display at the current location of the pointer showing the current value of all active parameters on the data field. As edit operations occur that cause the grid values to change, the anchored sample will be updated to properly show the value at the anchored point.

When mouse button one is pressed and dragged, a sample display showing the values for the active parameters under the pointer will follow the pointer.

Clicking mouse button two over an anchored sample display will remove it from the screen.

The clear samples operation permits the user to remove all anchored sample displays from the screen. It is accessed by pressing mouse button three to bring up the popup menu, and then selecting "Clear All Anchored Samples".

The load samples option available via a dialog allows the user to load a specific named sample set. The user can choose whether to replace, add, or remove the set of samples to the existing set of samples. The dialog is shown in Figure 33. If insufficient room exists in the vertical, then two-dimensional set of buttons are used.

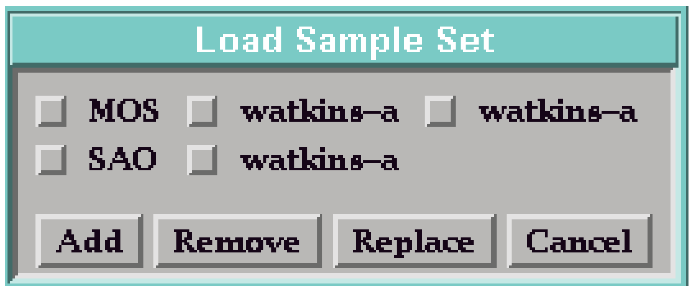


Figure 33 - Load Sample Set Dialog

The save samples option available via a dialog allows the user to save a specific named sample set which can later be called up on any workstations in the local group. The user can choose to delete a named sample set via this dialog. The user may also choose whether the save should be done to a system set or a username set. See Section 8.5.5, *Save/Delete Reference Set*, on page 27 for details on how the dialog behaves.

The load and save dialogs are modal (i.e., no other actions may be performed on the system until the Add, Remove, Replace or Cancel buttons are pressed.

14.12.4 Zoom

During zoom operations, the aspect ratio of each grid cell vs. the displayed pixel size is always preserved.

The zoom tool is always available.

The display may be zoomed in or zoomed out by a factor of 1.5 centered at the click location.

The maximum possible zoom is configurable. If not defined in the config file, it is the equivalent of one grid cell every 200 pixels.

In the event that the displayed is zoomed in/out such that some of the display area is showing data outside the office domain, then the system-calculated zoom area will be recalculated (warped) to the appropriate position.

The display may also be zoomed by drawing a box interactively on the screen to denote the area of zoom. The box will always preserve the aspect ratio of the window size.

Pans occur by pressing on a location and dragging that location elsewhere on the screen. The entire data is shifted by amount of the drag operation. During pan operations, the entire display is redrawn, but only when the user pauses for at least 0.4 seconds.

A full-view option from the button three popup will reset the viewable area to at least the office domain.

14.12.5 Temporal Location

The temporal location tool is always available.

The temporal location indicator is always visible (if the temporal editor is in single gridpoint mode), even when the temporal location tool is not active.

The temporal location may be set via a dialog accessible via the controller area. Refer to Section 8.6, *Temporal Editor Location*, on page 29 for details on this dialog.

Changing the temporal location affects the currently active reference set.

Dragging button one will cause the temporal editor to continuously update and display the data at that point. Releasing button one will then set the temporal editor location to reflect the data at the release point. The temporal location indicator will follow the pointer device.

Clicking button one will set the temporal editor location to the click location.

14.12.6 Select Points (formerly the Point and Area tools)

The Select Points Tool permits the user to select gridpoints for editing by interactively drawing boundaries on the screen. Multiple operations upon the selected areas can then be made using related tools (push/pull, vector, set value, move, and copy).

The select points tool is always available. The delete area operation is only available when all of the active parameters are mutable.

The select contiguous area operation applies only to the parameter on top of the active list and therefore this subtool is available only when there is at least one active parameter and that parameter is discrete. The select contiguous area operation is accessed via clicking on mouse button one. All gridpoints with the same or similar value will be selected. For discrete data, the data value must match exactly.

The deselect contiguous area operation is used to deselect all gridpoints around the clicked gridpoint that are selected regardless of data value.

The Delete Area operation applies to the spatial editor area of influence. It is available via button three popup menu. The data points in the selected area are deleted and then filled back in based on the surrounding area. This is similar to the previous Fill In Area tool.

Select and Deselect Point Operations

The select points operation is used to select all gridpoints that the pointer passes over and optionally, all points within the drawn area. The deselect points operation is used to deselect all gridpoints in a similar manner.

As the user drags the mouse across the screen, points will be selected (or deselected). The freehand tool size (Section 8.9, *Spatial Editor Tool Size*, on page 30) defines the influence (footprint) of the tool. If the user releases the mouse button at the same location[3] that the mouse was pressed, then the system assumes that all points within the drawn area should be selected (or deselected). Both starting and ending the draw along any boundary is also interpreted as the same location and points within the area will be selected (or deselected). Simply starting or ending the draw along a boundary is not interpreted as the same location.

This software algorithm is illustrated in Figure 34 on page 74.

Note that changing the reference set will change the temporal editor location and will implicitly dismiss the location dialog (Section 8.6, *Temporal Editor Location*, on page 29.

14.12.7 Push/Pull Without Taper

The Push/Pull gridpoint tool allows the user to increment or decrement a set of selected gridpoints in uniform steps. The amount of change per step is configurable by the user.

The push/pull tool is available only when there is a single parameter in the active area and when that parameter's data type is either continuous scalar, continuous vector, or discrete static.

The delta value is shared across all parameters with identical units. The delta amount may be set for continuous scalar and continuous vector data through the delta slider in the controller area (Section 8.14.1, *Delta Value Slider*, on page 32). The delta value is shared with the spraycan tool.

The delta value is not available for discrete static data. It is fixed to one step.

The increment operation increments all selected gridpoints by the delta amount the user has specified. Figure 35 shows the effect of using the push/pull tool. The change value is set to one and all selected points are uniformly incremented. This tool is click location dependent. If you click over a selected grid point, then only that contiguous area of selected gridpoints gets incremented/. If you click outside all selected grid points, then all selected grid points get incremented.

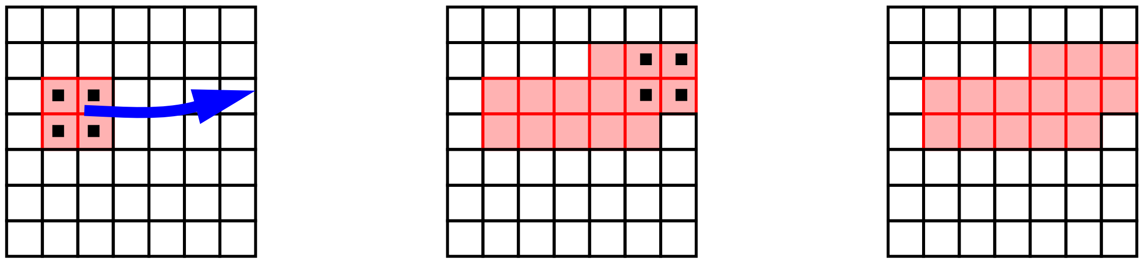
The decrement operation works in a similar manner to the increment operation except that the data values are decremented.

For vector data, the direction component may be backed or veered. The amount of backing or veering is configurable and set to 10 degrees by default.

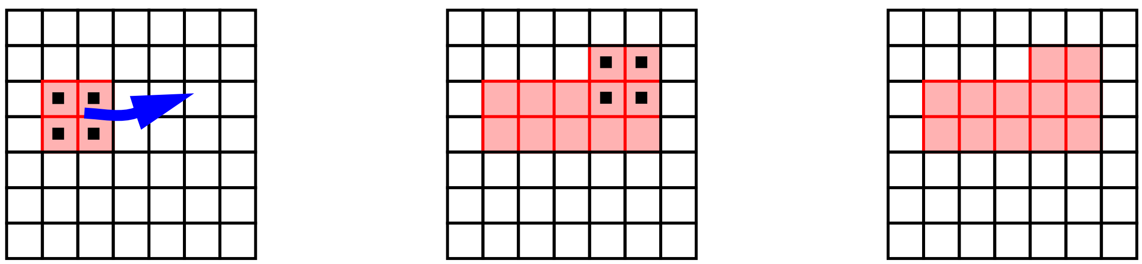
14.12.8 Push/Pull With Taper

The push/pull with taper tool is identical to the push/pull tool except that a taper is applied so that the most change occurs in the middle of the area of influence. The taper is linear.

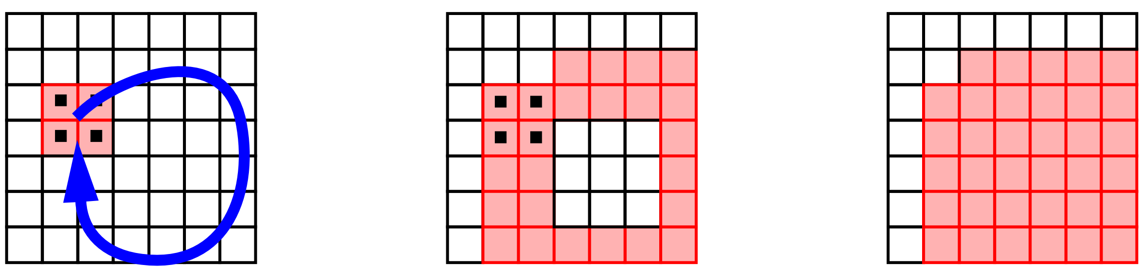
3. The same location is interpreted as the release is within the original footprint of the start location.



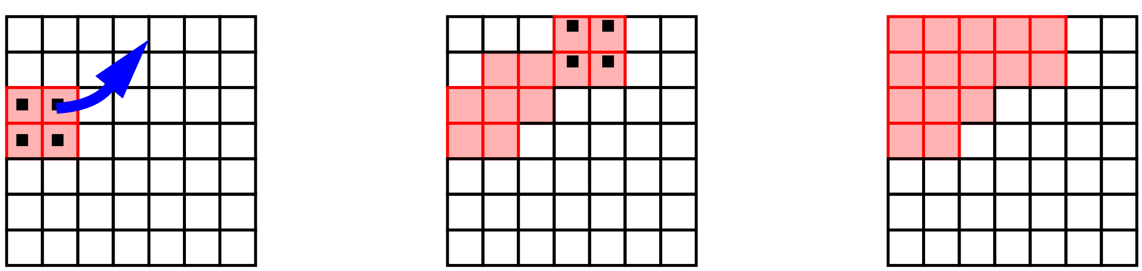
Select tool with a 2x2 pattern. The user presses the mouse in the left picture, and drags it to the right border. Since only one border is involved, it is a single line of dots.



The user presses the mouse in the left picture, and drags it to the middle. The result is a single line of dots since the starting and ending location are different.



The user presses the mouse in the left picture, and drags it back to the starting location. The result is an enclosed area since the starting and ending location are the same.



The user presses the mouse in the left picture on the border, and drags it to the top border. The result is an enclosed area since there are two boundaries involved.

Figure 34 - Define Gridpoints Algorithm

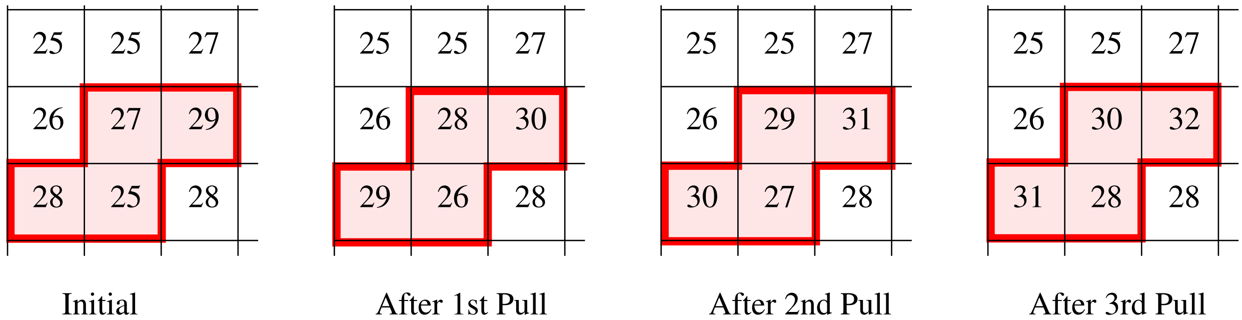


Figure 35 - Push/Pull Algorithm

There is no taper on the direction component for vector data.

14.12.9 Smooth

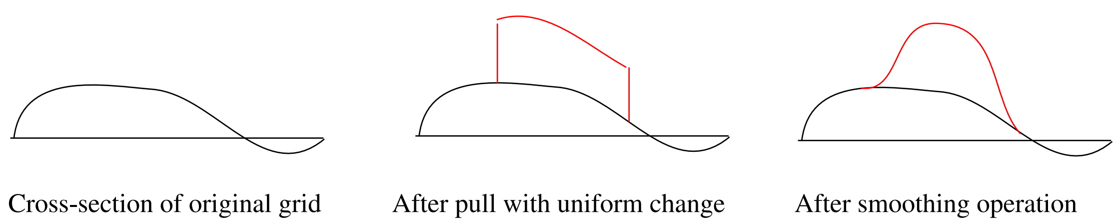
The Smooth tool allows the user to apply a 3 x 3 non-weighted filter to the set of selected gridpoints.

This tool is applies to all active parameters, as long as they are mutable and do not include “Weather”.

The Smooth tool can be used with Continuous Scalar, Continuous Vector (magnitude only, or magnitude and direction), and Discrete Static data.

Clicking button 1 will smooth the set of selected gridpoints. This tool is click location dependent. If you click over a selected grid point, then only that area gets smoothed. If you click outside all selected grid points, then all selected grid point areas get smoothed.

The smoothing operation has the following effect on the data:



The wind edit mode on the controller area (Section 8.11, *Wind Edit Mode*, on page 31) allows the user to choose whether the smoothing should be applied only to the magnitude component, the direction, or both components.

14.12.10 Set Value

The Set Value operation allows precise setting of values for selected gridpoints. The set value tool works on all data types. The tool is available when there is at least one active parameter and all active parameters are mutable. Set Value applies to all active parameters.

The “pick-up” value is set by clicking mouse button two over the data. The value under the pointer is picked up to set the tool’s value. The pick-up value is stored on a parameter-specific basis. All active parameters will have their pick up value set. In the case that there is more than one active parameter with the same parameter name, then only the first active parameter with the name’s value will be picked up.

The picked up values are clearly indicated on the tool attribute area (Section 8.14.2, *Tool Value Indicator*, on page 34).

The tool may also be initialized by picking up the value on the legend (if the parameter is being displayed as an image) or by using the non-modal set value dialog Section 8.13, *Set Tool Value Dialog*, on page 31.

Setting gridpoints to the picked-up value is accomplished using mouse button one. This tool is click location dependent. If you click over a selected grid point, then only that area gets the new data value. If you click outside all selected grid points, then all selected grid point areas get the new data value.

The wind edit mode on the controller area (Section 8.11, *Wind Edit Mode*, on page 31) allows the user to choose whether the set value operation should be applied only to the magnitude component, the direction, or both components.

The weather edit mode on the controller area (Section 8.12, *Weather Edit Mode*, on page 31) allows the user to choose whether the picked up data value is combined with the current value before setting or simply replaces the current value. For example, if the current value is Rain and the picked up data value is Snow, using set value in replace mode will set the data values to Snow, using set value in combine mode will set the data values to Rain and Snow.

14.12.11Move/Copy

The move/copy tools allows the forecaster to move or copy data from one selected area on the screen to another location on the screen.

The tool is available when there is at least one active parameter and all active parameters are mutable. Move/Copy applies to all active parameters and works on all data types.

This tool is click location dependent. You must use this tool over a selected area. If you attempt to use this tool outside all selected grid points, this tool has no operation.

The move operation allows the forecaster to move data identified by selected gridpoints from one location to another. Data is filled into the vacated spot using interpolation. Dragging with mouse button two will move the data identified by the selected gridpoints to the place indicated by the drag. Data for the vacated gridpoints will be interpolated from surrounding values and filled in. The interpolation scheme will be determined later by testing various possibilities. As the mouse is dragged, the moved data, along with area of influence dots will move across the screen to aid the user in positioning the data. The original data points during the drag will contain reference set dots.

The copy operation allows the user to copy a selected set of data to another location on the screen. It works in a similar manner to the move operation except that data is copied and the original location is not filled in. (Note that if there is overlap between the source and destination, that the source may be modified.)

14.12.12Vector

The Vector Tool is used only for Continuous Vector data. The Vector Tool permits the user to modify either or both components at the same time in a highly interactive mode. The user positions the pointer over a representative piece of data and drags to change the data.

The tool is available when there is at least one active parameter, all active parameters are mutable, and only vector data is active.

This tool is location dependent. You must use this tool over a selected area. If you attempt to use this tool outside all selected grid points, this tool has no operation. Only the selected area data values will be adjusted using this tool.

The wind edit mode on the controller area (Section 8.11, *Wind Edit Mode*, on page 31) allows the user to choose whether the vector tool should be applied only to the magnitude component, the direction, or both components.

To modify the data, the forecaster uses mouse button one to drag a graphical indicator to indicate the new wind velocity. The initial location of the drag represents zero wind. The data (and the graphic indicator) is updated during the drag operation. The graphic indicator is transitory and exists only during the drag operation.

If the wind edit mode is set to direction only, a unit length (e.g., 75 pixels) arrow is drawn to indicate the new direction. The forecaster drags around the mouse to modify the direction. The direction is determined by the direction of the mouse from the initial press point.

If the wind edit mode is set to magnitude only, a circle centered on the initial press location is drawn to indicate the magnitude. The radius of the circle indicates the magnitude. The scaling of magnitude to radius is logarithmic. A radius of 75 pixels indicate maximum possible magnitude.

If the wind edit mode is set to both components, a wind vector of varying length is drawn to indicate the magnitude/direction. The length represents the logarithmic magnitude and is 150 pixels maximum length.

The arrow graphical indicator always points in the direction the wind is blowing towards.

A value indicator appears centered at the initial drag location and indicates the wind direction, wind magnitude, or the wind vector depending upon the wind edit mode (Section 8.11, *Wind Edit Mode*, on page 31). The value indicator is transitory and exists only during the drag operation.

14.12.13Paintbrush

The paintbrush is used to set gridpoints to a specific value. As the user "paints" over gridpoints, those gridpoints are set to the current value of the paintbrush. It doesn't matter whether more than one pass is made since the same value is set on each pass.

The tool is available when there is at least one active parameter and all active parameters are mutable.

The value of the paintbrush is shared with the value of the set value tool. The value is parameter-specific.

The size of the paintbrush is shared with the other freehand tools (spraycan and bulldozer) and may be changed via the controller area (Section 8.9, *Spatial Editor Tool Size*, on page 30).

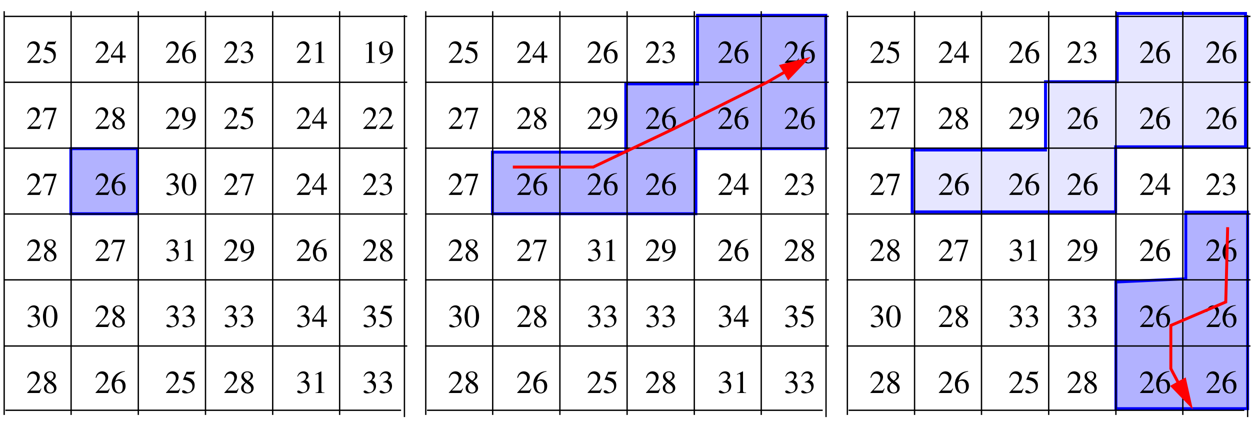
The paintbrush may be initialized by “dipping” it in the data. A mouse button two click on a location will pick up that value to be used for painting. The picked up values are clearly indicated on the tool attribute area (Section 8.14.2, *Tool Value Indicator*, on page 34). Values will be picked up for all active parameters. In the case that there is more than one active parameter with the same parameter name, then only the first active parameter with the name’s value will be picked up.

The paintbrush may also be initialized by picking up the value on the legend (if the parameter is being displayed as an image) or by using the non-modal set value dialog Section 8.13, *Set Tool Value Dialog*, on page 31).

“Painting” the data is accomplished either by clicking button one over the desired area or by dragging using button one. Clicking mouse button one will just set the area of influence (tool size) to the paintbrush’s value for all active parameter.

Any gridpoint that the pointer passes over when dragging with mouse button one down will have its value set to the current value of the paintbrush. The user may “lift” the paintbrush at any time by releasing mouse button one and then moving the pointer to a different location and begin painting again with the same value.

The figure below is for illustrative purposes only to show the effect of using the paintbrush. The value has been set to 26 and the paintbrush is 1x1.



Initial - Started at value 26.

After painting.

After more painting.

The wind edit mode on the controller area (Section 8.11, *Wind Edit Mode*, on page 31) allows the user to choose whether the paintbrush should be applied only to the magnitude component, the direction, or both components.

The weather edit mode on the controller area (Section 8.12, *Weather Edit Mode*, on page 31) allows the user to choose whether the picked up data value is combined with the current value before setting or simply replaces the current value. For example, if the current value is Rain and the picked up data value is Snow, using set value in replace mode will set the data values to Snow, using set value in combine mode will set the data values to Rain and Snow.

14.12.14Spraycan

The spraycan is used to increment/decrement gridpoints as mouse button drags occur. As the user “sprays” over gridpoints, those gridpoints are incremented/decremented. Depending upon the freehand mode (Section 8.10, *Spatial Editor Freehand Mode*, on page 30), the gridpoints are changed for every pass over them or just one-pass.

The tool is available when there is only one active parameter, it is mutable, and the active parameter is not weather (discrete dynamic).

The delta value of the spraycan is shared with the delta value of the push/pull tool. The delta amount may be set for continuous scalar and continuous vector data through the delta slider in the controller area (Section 8.14.1, *Delta Value Slider*, on page 32).

The size of the spraycan is shared with the other freehand tools (paintbrush and bulldozer) and may be changed via the controller area (Section 8.9, *Spatial Editor Tool Size*, on page 30).

Clicking mouse button one will just spray one gridpoint (and its surrounding gridpoints that fall within the tool size) as an increment operation. If one-pass mode is enabled, then all points are incremented by the delta value; otherwise, the center point will be incremented by the delta value with a taper applied to the edges of the tool influence. Note for Discrete Static data, the increment value for this operation is one discrete step and no taper is applied.

Dragging operations with mouse button one increments in a similar manner for all gridpoints touched by the spraycan. For each drag operation, the data values may only be incremented at most by one discrete step or the delta value. In order to increase a gridpoint further, the mouse button must be released and another drag operation started.

Decrement operations are similar to the increment operations except that data is decremented by one discrete step or the delta value.

14.12.15Bulldoze

The Bulldoze Tool performs nearly the same function as the smoothing operations available from the smooth tool, except that the Bulldoze Tool is interactive and allows smoothing of one point at a time while the Gridpoint Toolset smoothing operations smooth all selected gridpoints simultaneously. The Bulldoze tool applies a 3 x 3 weighting filter to the affected gridpoints. The Bulldoze tool works on a smooth per pass algorithm.

The tool is available when there is at least one active parameter, all active parameters are mutable, and the active parameters do not include weather (discrete dynamic).

Depending upon the freehand mode (Section 8.10, *Spatial Editor Freehand Mode*, on page 30), the gridpoints are changed for every pass over them or just once for the one-pass mode.

The size of the bulldoze tool is shared with the other freehand tools (paintbrush and spraycan) and may be changed via the controller area (Section 8.9, *Spatial Editor Tool Size*, on page 30).

Clicking button 1 will smooth the gridpoints at the current pointer location. Dragging mouse button one will smooth the gridpoints that are passed over.

The wind edit mode on the controller area (Section 8.11, *Wind Edit Mode*, on page 31) allows the user to choose whether the bulldoze operation should be applied only to the magnitude component, the direction, or both components.

14.12.16Pencil

The Pencil tool permits contour modification and defining a new grid from contours.

The tool is available when there is only one active parameter and it is mutable. This tool works on all data types.

The pencil tool is modal. The tool is either in grid modification or grid creation mode. The tool is initially (upon selection) in grid modification mode. Certain events cause the tool mode to change.

Grid Modification Mode

Grid modification mode is enabled when:

- the tool is first selected
- the *calculate grid* option is used from the button three popup menu
- a different time block is made active
- the time block is toggled off

The adjust position operation is used to modify the path of an existing contour (whether or not it is visible). The user positions the pointer at the starting location and does a mouse button one drag to draw the modified line. Neither the starting or ending position need to be on an existing visible contour. The value under the pointer is picked up on the press event and all gridpoints passed over during the drag are set to that value. The points that need reinterpolated are calculated. The new grid is then presented to the user.

Crossing of contours is permitted.

The add new contour operation is used to add a new contour to the grid. The user clicks button two to pick up a value (from the legend, the set value dialog, or from the grid data). Dragging with mouse button two will draw the new contour and assign the picked-up value to it.

In grid modification mode, the full grid is displayed (either as an image or as a graphic).

The undo operation will undo the last adjust position or last add new contour operation.

Grid Creation Mode

Grid creation mode is enabled when:

- new data is automatically being created
- the *create grid from contours* option is used from the button three popup menu

Switching to grid creation mode causes the following effect:

- the top parameter on the list becomes the only active parameter
- all parameters are switched to graphic display mode (i.e., there are no images on the editor)
- the active parameter is not visible
- a series of colored contour streaks will appear (after the first time). These colored contour streaks are the user-drawn contours.
- the legend is changed to the parameter being created.

The system "remembers" the contours drawn while in grid creation mode after the mode switches back to grid modification until one of the following events occur:

- a different time block is made active
- the time block is toggled off
- a different tool is selected
- an adjust position or add new contour operation is performed
- the *clear contours* option is used from the button three popup menu

A contour is defined by picking up a value, and then dragging mouse button two. The system paints the picked-up value as an image across the data display area. An undo command will remove the contour just drawn.

The generate grid option on the button three popup menu will calculate a grid based on the drawn contours and switch the system back to grid modification mode. In the event that no contours were drawn, the grid will contain a flat field of values as defined in the configuration file. Options on the button three popup consist of a generate grid, and a clear all contours command.

Upon selection of generate grid, spatial interpolation is performed to determine the entire contents of the grid. The system switches back to grid modification mode and the data is displayed as an image. An undo command at this point will place the system back into grid creation mode.

15. Temporal Editor

The temporal editor presents a time-series of multiple parameters in one or more data panes. Editing on the temporal editor changes the gridpoints corresponding to the temporal editor area of influence.

Editing can occur in an absolute or relative mode.

15.1 Temporal Editor Assumptions

The temporal editor displays either the time series of a gridpoint, or the average value time series of an area, depending upon the number of selected gridpoints (in the temporal editor area of influence).

If no temporal editor location is set and no reference set is active, then the temporal editor will remain blank.

Only one of the parameters displayed in a temporal editor pane may be an image (i.e., images may not be overlaid).

The display type of data does not change when the data is toggled on/off. The display type of data does not change when the data is made active unless the “image on active” option is enabled.

Color tables are shared across all parameters sharing the same units. Color tables are global (i.e., they are shared with the spatial editor).

The group identical data mode determines whether a single time block or a group of identical time blocks get edited (Section 8.4, *Group Identical Data Mode*, on page 24).

The area of influence for the temporal editor is identical to the reference set displayed on the spatial editor.

15.1.1 Representation of an Average Value

In the case of a single gridpoint making up the area of influence, the temporal editor shows the exact value of that data point.

In the case of multiple gridpoints making up the area of influence, the temporal editor shows an “average” of the values for the gridpoints. It does not show a range.

For scalar data, it is a numerical average of all gridpoints in the area of influence.

For vector data, the wind speed component represented is the numerical average of the magnitudes of the wind of all gridpoints in the area of influence. The wind direction component represented is the average direction of all gridpoints. The average direction is computed by taking unit vectors of wind for each gridpoint, breaking them into u and v components, and then computing the average direction.

For discrete data, it is the numerical average of all gridpoints in the area of influence, rounded to the nearest discrete value. The key entries are used to compute the numerical average and NOT the actual key string.

For weather data, it is the composite of all of the weathers (except the no weather case) that exceed a certain percentage coverage. For example, assume that the weather threshold is 15% and there are 100 gridpoints in the area of influence. If 20 points are RW-, 50 points TRW-, 15 points TRW-F, 5 points RW+, and 10 points no weather, then the composite would be RW- plus TRW- plus TRW-F, which equates to TRW-F since RW- would combine with TRW-.

15.1.2 Editing Influence of "Representative Values"

Edits on the temporal editor when a single gridpoint is the area of influence are always applied to the grid as the values indicate on the temporal editor. It does not matter if the editor is in relative or absolute mode.

When more than one gridpoint makes up the area of influence, then the edit influence on the grid depends upon the data type and the relative/absolute mode as shown in .

Table 19 - Edit Influence of "Representative Values" on the Temporal Editor

Edit Mode	Data Type	Result
Absolute	Scalar	Gridpoints in the area of influence are set to the same value as indicated on the temporal editor.
	Vector	
	Discrete	
	Weather	If in replace mode, then all gridpoints in the area of influence are set to the same value as indicated on the temporal editor. If in combine mode, then all gridpoints in the area of influence are combined with the value indicated on the temporal editor.
	Clouds	If in replace mode, then all gridpoints in the area of influence are set to the same value as indicated on the temporal editor. If in combine mode, then all gridpoints in the area of influence are combined with the value indicated on the temporal editor.
Relative	Scalar	Gridpoints in the area of influence are changed incrementally based on the amount of change made on the temporal editor to the "average".
	Vector	
	Discrete	
	Weather	If in replace mode, then all gridpoints in the area of influence are set to the same value as indicated on the temporal editor. If in combine mode, then all gridpoints in the area of influence are combined with the value indicated on the temporal editor.
	Clouds	If in replace mode, then all gridpoints in the area of influence are set to the same value as indicated on the temporal editor. If in combine mode, then all gridpoints in the area of influence are combined with the value indicated on the temporal editor.

15.2 Appearance

The main component of the temporal editor is the data pane. A temporal editor may have zero or more data panes. Each data pane contains a temporal editor data selector, a scale, and a data display area. The time scale is not part of the temporal editor although it does control the editor. Refer to Section 9., *Time Scale Specifications*, on page 35 for further details.

Data panes may be of differing heights.

The temporal editor components are identified in Figure 36.

15.2.1 Data Display Area

There is exactly one data display area per data pane.

The data display area contains a time-series depiction of more or more parameters. The y-axis represents the value of the parameter and the x-axis, the time. All parameters within a single data display area must share the same units.

A subtle vertical grid line mesh may be displayed through the parameters to assist the forecaster in interpreting the time component of the data. These match up with the major tick marks on the time scale. These may be toggled off through the main menu bar.

Each meteorological display may be displayed in a variety of different display formats, graphic colors, and color enhancement tables.

The system prevents more than one image display (per data display area). The system prevents graphic colors from being the same for different displays.

The background of the temporal editor is black.

The absolute minimum size of a data pane is the total height of the temporal editor data selectors for that pane or 100 pixels.

15.2.2 Scale

The scale shows the relationship of vertical position to parameter value.

There is exactly one scale per data pane.

The scale may be either logarithmic or linear for continuous scalar data (configurable on a per-parameter basis), is linear for vector data, and shows all available values for discrete data. The scale is not used for discrete dynamic weather data. The scale is logarithmic for discrete dynamic cloud data.

Figure 37 shows the appearance of the scale.

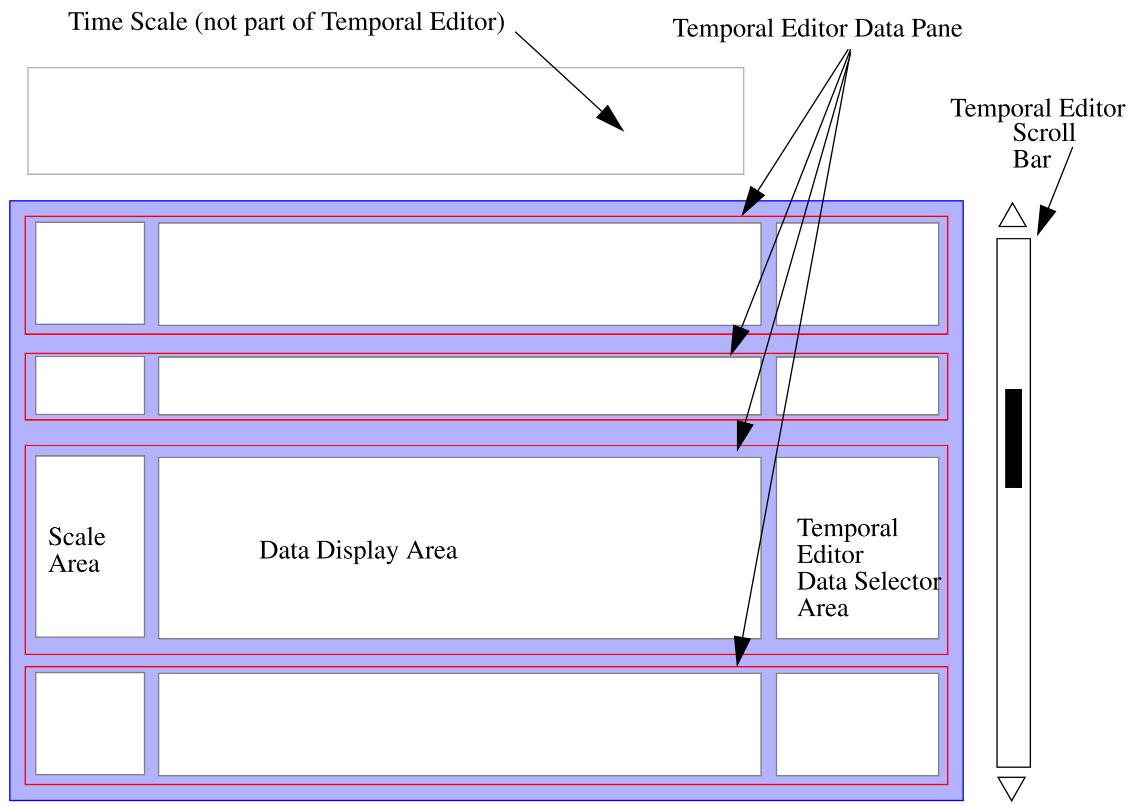


Figure 36 - Temporal Editor Layout

The scale background color is black.

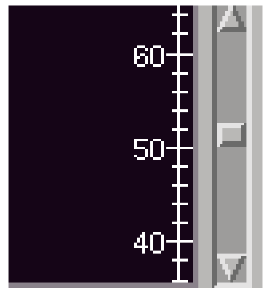


Figure 37 - Scale Appearance

15.2.3 Temporal Editor Data Selector

There is exactly one temporal editor data selector per data pane.

The temporal editor data selector contains one section as shown in Figure 38.

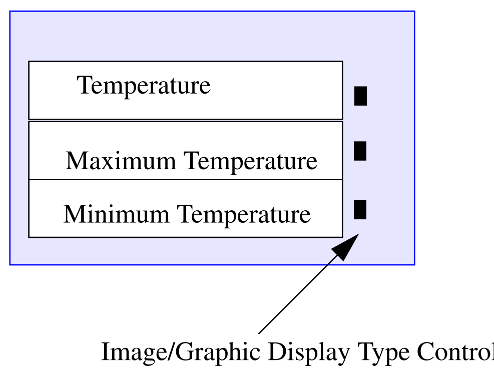


Figure 38 - Temporal Editor Data Selector

Each individual data selector (representing a parameter's time series) is called a time block selector.

All data selectors (for the entire temporal editor) contain the list of parameters loaded into the system. It doesn't matter whether the system is in time-synchronized or asynchronous mode. Each individual data selector contains one or more parameters.

The number of entries in both sections change as the user operates the system.

The time block selector contains a label indicating the parameter name and source.

The time block selector background color represents the base color used to display the data if the data is displayed as a graphic. The time block selector background color is “gray90” if the data is displayed as an image. The time block selector background color is black if the parameter is toggled off for visibility.

The text in the time block selector must be of sufficient contrast to always be able to read it. White and black are the acceptable colors for this text.

If the user attempts to load more parameters or time blocks that there is available sufficient vertical space, a scroll bar will appear for the “inactive” section of the data selector.

15.3 Display Algorithms

The display algorithms work on a per-pane basis.

15.3.1 Graphic Color Algorithm

Each parameter name has an preferred color to it which is used if possible. The assignment of color is made when the parameter is added via the parm menu to the system. If the color is not available (since it is being used by another parameter), then an alternate color will be chosen.

The system will ensure that no two parameters have the same color.

In asynchronous mode, the first time block will be given the assigned parameter color. All other time blocks for that parameter will be given alternate colors.

Colors will not change when parameters are toggled on/off.

If a user redefines the color for a given parameter and that conflicts with another parameter’s color, the other parameter’s color will automatically be reassigned by the system so not to conflict. This is the only case when colors are reassigned by the system.

The color assignments per parameter are shared with the spatial editor.

15.3.2 Visualization Algorithm

The visualization algorithm allows one image per data pane. The user may specify in the configuration file whether image types will be used for those data panes that have a single parameter loaded in them.

15.3.3 Overlay Algorithm

The overlay algorithm determines whether newly loaded parameters should be placed in separate panes or whether they should be overlaid with parameters with identical units. It is controlled from a controller area button (Section 8.7, *Temporal Editor Overlay Mode*, on page 29).

If the mode is overlay, then the software finds the first pane (starting at the top) that contains another parameter with identical units. If no panes are found that match that criteria, then a new pane is added to the bottom of the temporal editor.

The weather parameter is never overlaid.

15.3.4 Initial Size of Data Panes

The system determines the initial size of the data panes upon creation by looking for parameter-specific sizes in the configuration file. If more than one parameter is initially contained in a data pane, then the size of the data pane is the maximum of the parameter sizes. If no size is specified, then the initial size is 150 pixels vertically. In addition, the minimum size of the data pane is the height of all of the data selectors.

15.3.5 Fit To Data Algorithm

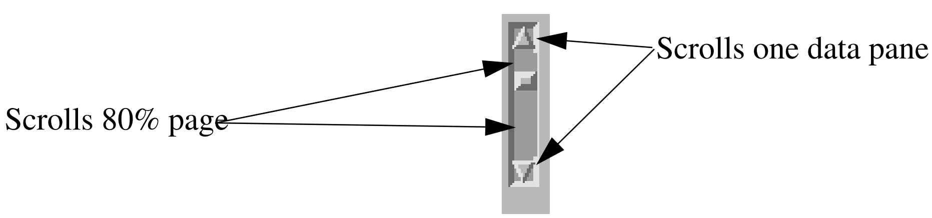
When a new parameter is added to the temporal editor, or data is moved between data panes, the new scaling for the changed pane is calculated from the data contained within the pane (for all time blocks). This is called fit-to-data. The calculations are expanded by 20% in each direction automatically by the system.

The user can choose whether the pane the parameter is loaded into should automatically be put into full view mode or fit-to-data mode. In the case where at least one parameter is set to fit-to-data, then the entire data pane is set to fit-to-data. These modes are identified by parameter name in the configuration file.

15.4 Vertical Temporal Editor Scrolling

The temporal editor may be scrolled in units of one data pane.

The minimum amount of vertical scrolling is one data pane.



15.5 Resizing of Individual Data Panes

Individual data panes may be resized by “grabbing” on the border between the panes. There is a border on both the top and bottom of each pane.

Changing the size of the data pane affects the size of that data pane only.

15.6 Temporal Editor Resize Behavior

Partial quanta are allowed to be displayed.

Vertical resize behavior - increase or decrease in the number of data panes visible. Data panes are added or subtracted from the bottom of the display during resizing, unless the temporal editor is being enlarged the and have run out of data panes, then the data panes are added or subtracted from the top of the display.

The vertical scroll bar is automatically repositioned.

Resizing the temporal editor does not resize the individual data panes.

15.7 Scale Control

The user may zoom in centered at the click location using mouse button two.

The user may zoom out centered at the click location using mouse button one.

The zoom factor is 1.5.

Dragging button one on the scale will define a new zoom from the start drag location to the end drag location.

The system will prevent zooming out past the "full view". This limit is the max/min allowable values as defined by the database (plus 20% in each direction)

A button three popup menu provides two choices: "fit to data", and "full view".

The "fit to data" option analyzes all loaded data in the data pane for all available time ranges, and sets the maximum/minimum viewable range to the calculated data limits plus 20% in each direction.

The "full view" option sets the scaling to show both the minimum and maximum allowed values.

The scale has no controls for discrete dynamic weather data.

The scale cannot be zoomed up more than 20:1.

15.8 Temporal Editor Data Selector Control

The temporal editor data selector control serves several purposes: select a parameter explicitly for editing, toggling on/off the visibility of parameters, and controlling the display characteristics of the parameter.

Clicking button one on a time block selector will toggle its visibility on/off. The appearance of the data selector will change.

Clicking button two on a time block selector simply moves the data selector to the top position and toggles the selector on if necessary. The purpose of moving the data selector to the top allows the user to control the implicit parameter selection edit capability (Section 15.13.1, *Implicit Selection of Parameter To Be Edited*, on page 98). T

The appearance (display type) may be changed via a button on the right of the main data selector. If the button is on, then the display type is an image. If the button is off, then the display type is graphic. Clicking a button that is off will turn it on and will turn OFF all other buttons (since there can only be one image in a data pane at a time). Clicking a button that is on will turn it off and doesn't affect any other button.

The display type choices are image and graphic. The actual display type is determined from entries in the configuration file that define the image type and graphic type. The assignment of mapping graphic/image to specific type may be changed via the main menu bar.

Note that implicit selection of the parameter may occur. This does not cause the ordering of the data selector to change. Implicit selection is described in Section 15.13.1, *Implicit Selection of Parameter To Be Edited*, on page 98.

15.8.1 Data Selector Popup Menu

Display Attributes

A button three popup menu exists to modify the default color and display types for the parameter name. The entry on the menu is “Display Attributes...”

The “Display Attributes” dialog is used to set the display types for the image-type and graphic-type entries. Graphic colors may also be set. The list of choices in the “image type” consists of image and any combinations of image and graphics. The list of choices in the “graphic type” consists of combinations of the possible graphics. The choice of colors is defined in the configuration file. The selector for the graphic color (and the menu) is color-coded. It is not permissible to overlay wind barbs and wind arrows for the same parameter so these combinations will not be seen in the menus. The abbreviated menus are replaced with a single button if there is only one choice.

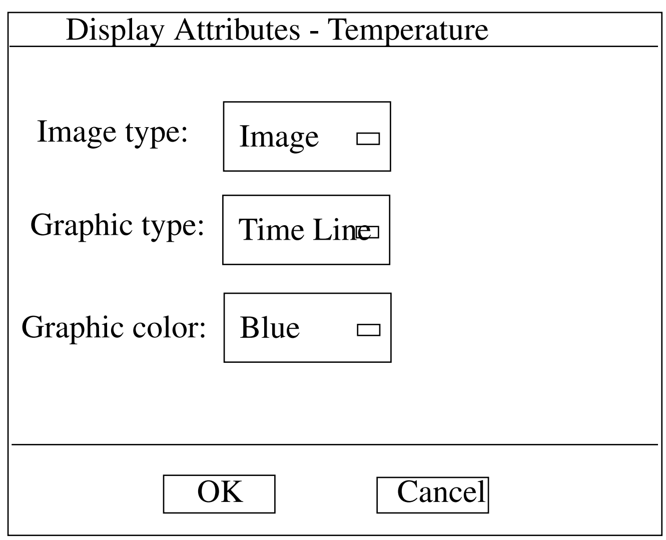


Figure 39 - Display Attributes Dialog

Move Parameter

A parameter may be moved from the existing data pane to either another compatible data pane or by itself. This is available via the button three menu entry “Move Parameter...”. This menu option is dimmed if the parameter is alone and cannot be combined with any other data panes.

Move parameter brings up the modal dialog shown in Figure 40. It shows all of the available combinations of data panes that the parameter may be moved into, plus an alone case (if the parameter isn’t already alone). The user selects the option and then clicks OK or Cancel.

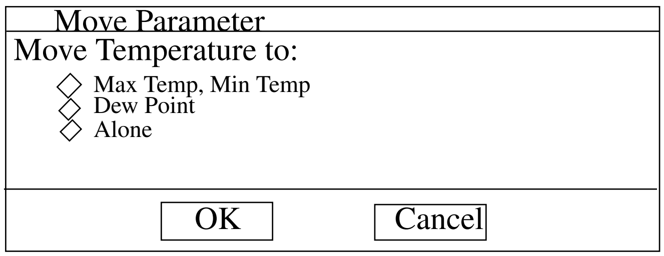


Figure 40 - Move Parameter Dialog

15.9 Other Objects Controlling the Temporal Editor

15.9.1 Time Block Editor Actions Causing Changes to Temporal Editor

If linked editors is enabled (Section 7.4.4, *Link Editors During Edit Operations*, on page 16), then the following operations will ensure that the parameter remains visible. Scrolling may occur implicitly.

- duplicate operation
- toggling on a time block
- making a time block active (also has the effect of making the parameter active on the temporal editor)
- toggling on a parameter on the time block editor data selector

15.9.2 Spatial Editor Actions Causing Changes to Temporal Editor

If linked editors is enabled (Section 7.4.4, *Link Editors During Edit Operations*, on page 16), then the following operations will ensure that the parameter and time block remain visible. Scrolling may occur implicitly.

- toggling on a parameter
- setting a parameter active

Edits performed on the spatial editor will cause the data displayed to be changed.

15.9.3 Menu Actions Causing Changes to Temporal Editor

Reverting data, undo, delete, copy to/from, time shifting, interpolation, breaking locks, and selection of new parameters to be loaded may cause displayed data to be changed.

Find parameter, move parameter to top, and rearrange temporal editor data panes may cause the ordering of the data in the panes to be changed.

Toggling on/off the time scale lines, toggling on/off the editor time lines, toggling group identical data mode, or changing the time block size will cause the appearance of the temporal editor to change.

Changing the reference set and changing the temporal editor location will cause the data displayed in the temporal editor to change.

15.10 Display Types for Temporal Editor

There are five types of data to be viewed on the Temporal Presentation. Each of these may be displayed in various ways.

15.10.1 Temporal Presentation Viewing

Data Type	Display Type
Continuous Scalar	Time Bar
	Color Bar
Continuous Vector	Time Bar with Wind Direction Indicator
	Color Bar with Wind Direction Indicator
Discrete Static	Time Bar
	Color Bar
Weather	Weather Color Bar
Clouds	Cloud Color Bar

As described in the *AFPS Graphical Forecast Editor Requirements* document, all temporal presentations may be stacked to view multiple parameters simultaneously and may also be overlaid if appropriate. Each temporal editor will have a locator map associated with it that will allow the user to select the location for time-series display. This locator map will also indicate the set of selected gridpoints for use when editing.

15.10.1.1 Time Bar

The Time Bar Display consists of horizontal lines that represent the data value over a time range. Vertical connection lines are displayed to assist the user in orientation. The Time Bar is used for Continuous scalar and discrete data. Figure 41 illustrates the time bar display.

The y-axis on the display is used to denote the value and the x-axis, the time. The characteristics that

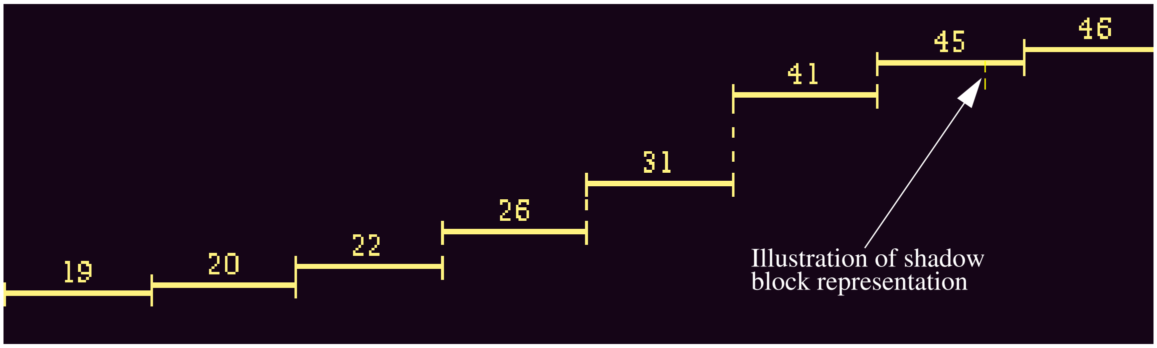


Figure 41 - Time Bar Display

apply to this presentation are:

- The color is fixed for a parameter and is the same color used in the spatial presentation.
- The color is configurable via the configuration file on a per parameter basis.
- The sample values are indicated on the display above each time bar segment if there is room. The density of the sample values vary. For example, if there isn't room to plot every number, then every other number will be displayed. Only one sample appears for a stretch of identical data.
- Solid tick marks appear on the end of a stretch of identical data. If the system is not in group identical data mode (Section 8.4, *Group Identical Data Mode*, on page 24), then intermediate dashed tick marks appear within a stretch of identical data at the shadow block boundaries.
- The y-scale may be linear or logarithmic for scalar data, and is by discrete categories for discrete data.

15.10.1.2 Color Bar

The color bar display depicts data as boxes of colors and patterns. The y-axis reflects the value of the parameter and the x-axis, the time. The color bar display is used for scalar and discrete data.

The color bar shown in Figure 42 illustrates how probability of precipitation might appear on the display.

The characteristics that apply to this presentation are:

- The color table is the same as that chosen by the forecaster for a particular parameter on the spatial presentation.
- The sample values are indicated on the display above each color bar segment if there is room. The density of the sample values vary. For example, if there isn't room to plot every number, then every other number will be displayed. Only one sample appears for a stretch of identical

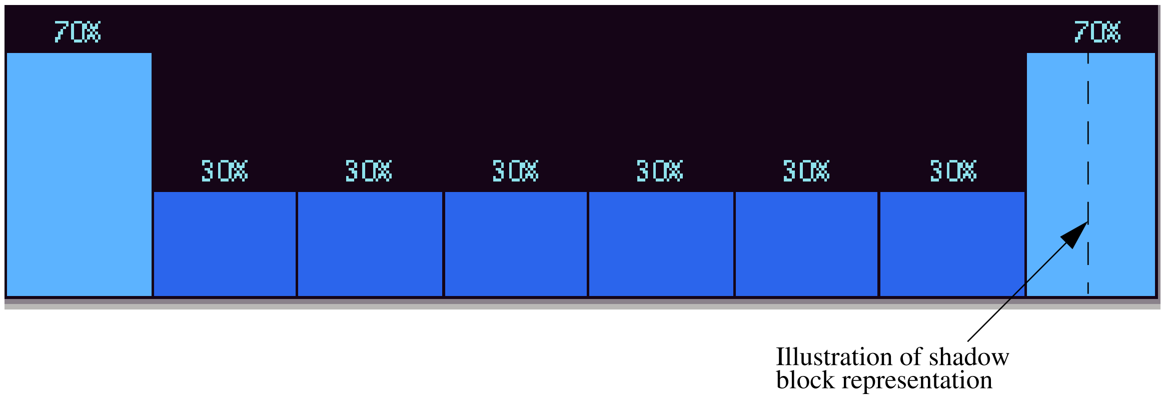


Figure 42 - Color Bar Display

data.

- Black separator lines appear at the end of a stretch of identical data. If the system is not in group identical data mode (Section 8.4, *Group Identical Data Mode*, on page 24), then intermediate dashed black marks appear within a stretch of identical data at the shadow block boundaries.
- The y-scale may be linear or logarithmic for scalar data, and is by discrete categories for discrete data.

15.10.1.3 Time Bar and Color Bar with Wind Direction Indicator

The Time Bar with Wind Direction Indicator and Color Bar with Wind Direction Indicator are essentially the same as the time bar and color bar displays except that plotted wind barbs (or arrows) indicate the direction of the wind for each time range. This presentation is used for Continuous Vector data.

Figure 43 shows the color bar with the wind direction indicator.

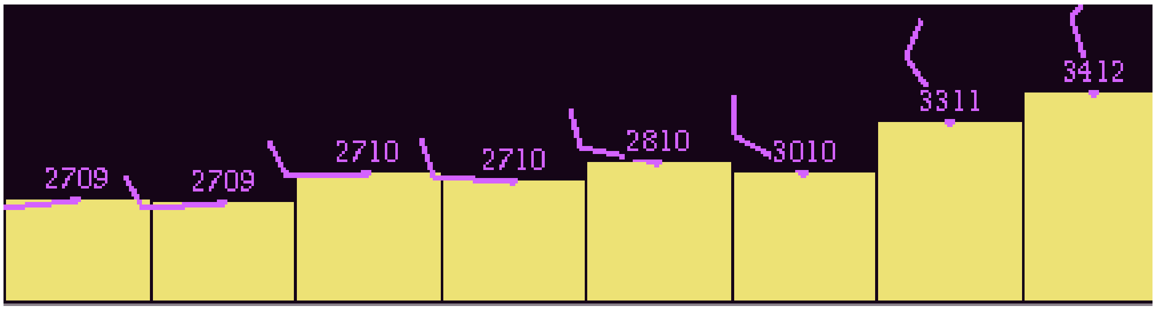


Figure 43 - Color Bar with Wind Direction Indicator

The additional characteristics that apply to this presentation are:

- The color of the wind direction indicator is fixed for the parameter is the same color used for the spatial presentation. The color matches the time bar color.

15.10.1.4 Weather Color Bar

The weather color bar display is used only for weather. It differs from the standard color bar in that multiple data values may appear for each time range. Each color/pattern represents a composite type of precipitation. The y-axis does not represent values. The x-axis represents time. Figure 44 illustrates the weather color bar.

The characteristics that apply to this presentation are:

- Each unique coverage is represented by a separate box.
- The color/pattern represents a composite type of precipitation.
- The color/pattern is configurable and is identical that the algorithm used by the spatial editor.
- The color represents the type and intensity of precipitation. The pattern represents the coverage/probability of precipitation.
- The sample values are indicated on the display in the center of each color bar segment if there is room. The density of the sample values vary. For example, if there isn't room to plot every number, then every other number will be displayed. Only one sample appears for a stretch of identical data.
- White separator lines appear at the end of a stretch of identical data. If the system is not in group identical data mode (Section 8.4, *Group Identical Data Mode*, on page 24), then intermediate dashed white marks appear within a stretch of identical data at the shadow block boundaries.

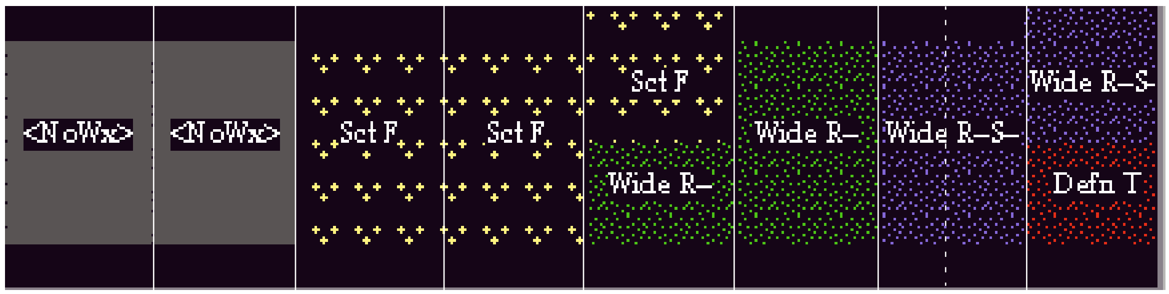


Figure 44 - Weather Color Bar

Illustration of shadow block representation

15.10.1.5 Vertical Color Bar

The Vertical Color Bar is similar to the color bars described above except that the y-axis represents height. The use of this display is limited to clouds and inversions, both of which may have multiple layers. Figure 45 illustrates the vertical color bar.

Additional characteristics of this depiction are:

- Each layer has its own “box.”
- The base/top of the clouds is shown by the vertical position of the layer on the y-axis.
- The fill pattern indicates additional attributes. For clouds, the cloud coverage is represented by pattern.
- The graphics generally are represented in a single color.
- The y-axis scale is not linear. It is logarithmic to provide the necessary detail near the ground.
- If top information is not available, then a ragged edge is shown on the display.
- The sample values are indicated on the display at the top of each color bar segment if there is room. The density of the sample values vary. For example, if there isn’t room to plot every number, then every other number will be displayed. Only one sample appears for a stretch of identical data.
- White separator lines appear at the end of a stretch of identical data. If the system is not in group identical data mode (Section 8.4, *Group Identical Data Mode*, on page 24), then intermediate dashed white marks appear within a stretch of identical data at the shadow block boundaries.A tag, if space permits, provides precise information.
- The scale may represent MSL (mean sea level) or AGL (above ground level) depending upon the specific units of the parameter.

15.11 Implicit Scrolling of Edit Tools

The edit tools provide implicit scrolling in the vertical direction only on the data display area.

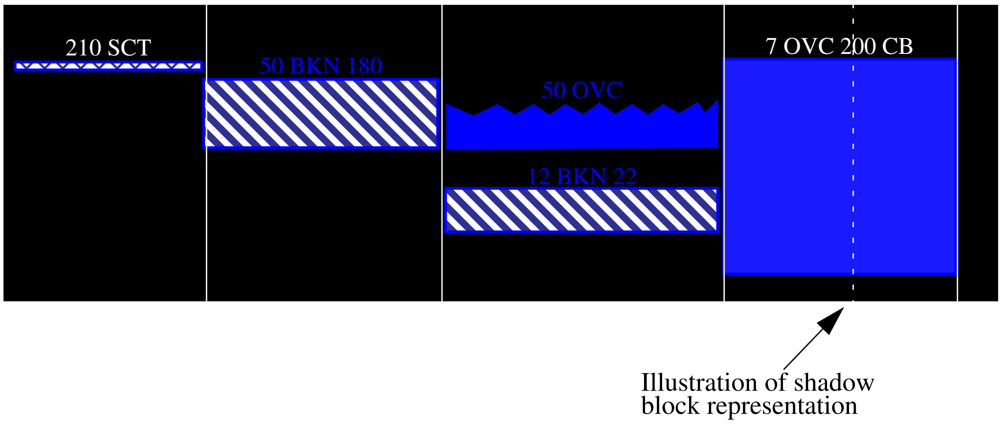


Figure 45 - Vertical Color Bar

15.12 Implicit Selection of Edit Tools

Edit tools will be implicitly chosen on the temporal editor. There is no corresponding edit tool palette similar to that existing for the spatial editor.

15.13 Editing Techniques

15.13.1 Implicit Selection of Parameter To Be Edited

The implicit method of parameter selection occurs during the adjust operation. The system determines the pointer location and then the closest parameter's value to that pointer's location. The closest parameter becomes the active parameter for that edit.

In the case where the user presses exactly halfway between two parameters or in other cases where there isn't a closest parameter (such as overlapping), the parameter made active is determined by the ordering of the parameters in the temporal editor data selector. The parameter chosen from the set of closest parameters is the one also closest to the top of the temporal editor data selector.

The user may control the order of the data selectors to change the behavior of the implicit selection algorithm as described in Section 15.8, *Temporal Editor Data Selector Control*, on page 90.

A parameter is not implicitly selected to be edited if it is toggled off.

No edits occur if the parameter chosen to be edited is immutable.

15.13.2 Effect of Edits on the Temporal Editor

Edits made on the temporal editor will affect all selected grid points (reference set). Depending upon the relative/absolute mode (Section 8.8, *Temporal Editor Absolute/Relative Mode*, on page 29), the absolute value set on the editor will also be set identically to all selected grid points, or the relative amount changes on the editor will be applied to the selected grid points.

Relative mode does not apply to weather data or cloud data. In this case, relative mode behaves identically to absolute mode for the weather and cloud layer parameters.

15.13.3 Mouse Button Assignments and Attribute Strings

The mouse button assignments appear in Table 20.

Table 20 - Commands and Menus for Temporal Edit Tools

	Button 1		Button 2		Button 3
Tool	**Click**	**Drag**	**Click**	**Drag**[a]	**Popup Menu**
Adjust (non-weather, non-clouds)	Adjust Data (SHIFT) Set Direction	Adjust Data (SHIFT) Set Direction[b]	N/A	N/A	Undo
Set Value (weather)	Set Value	N/A	Pick Up Value	N/A	Undo *list of common and recently weather types* Other... (for the weather dialog)
Layer (clouds)	Increment coverage of existing layer.	Modify Existing Layer - Bases (SHIFT) Modify Existing Layer - Tops	Decrement coverage of existing layer.	N/A	Undo Delete Layer Add Layer Toggle CB

a. Button two drags are reserved for duplicate-type operations for the TAF editor.

b. Dragging over the direction indicators sets the direction component of the data and not the magnitude component. This applies only to vector data.

15.13.4 Adjust Tool (non-weather)

The adjust tool affects only the y-axis (value) and not the x-axis (time). The adjust data operation allows the forecaster to position the pointer near the time line or color bar and press and drag with mouse button one to the new value.

The software determines the bar or point desired to be edited by looking at the x-position of the pointer and looking for the closest visible parameter in the vertical (Section 15.13.1, *Implicit Selection of Parameter To Be Edited*, on page 98). The resulting bar or point moves to the pointer location in the y direction. Upon release, the new value is applied to the selected set of gridpoints in either absolute or relative mode depending upon the system state. This technique applies to continuous scalar, the magnitude component of vector data, and discrete static data.

For vector data, the direction component may be in a similar manner except that the SHIFT key is used during the press and drag operation. The vertical scale for the data pane ranges from 0 - 360 degrees. As the user drags the pointer up and down, the direction will traverse the entire 360 degrees.

The current value of the data being edited will be displayed on the temporal editor during the edit operation in a similar manner to the temporal samples show earlier in this document[1] and will also be shown in the current value box (Section 7.7.3, *Current Value Box*, on page 21).

15.13.5 Set Value Tool (weather)

The set value tool affects only the time block for the clicked x-axis location. The set value operation allows the forecaster to pick up a weather value and then set that value by clicking on the desired time block. The weather value may be picked up from the spatial editor legend (if weather is being displayed as an image in the spatial editor), spatial editor data display area, or the temporal editor data display area. It may also be set through the set value dialog (Section 8.13, *Set Tool Value Dialog*, on page 31) or using the button three popup menu from the temporal editor.

The button three popup menu has a listing of common and recently set weather values. The common weather values are defined in the configuration file. The system keeps track of the previous five most recently set weather values. Those entries are also on the menu. The menu also has an “Other...” which displays the weather dialog for more complicated entries. The weather dialog is described in Section 8.13, *Set Tool Value Dialog*, on page 31.

The y-location clicked for the set value tool is ignored, i.e., the edit applies to the entire column.

The relative/absolute mode is ignored. The set value always functions in the absolute mode.

The software determines the time block desired to be edited by looking at the x-position of the pointer. Upon a click, the time block value is set. The combine/replace mode is used to determine whether the picked up data value is combined with the current value before setting or simply replaces the current value. For example, if the current value is Rain and the picked up data value is Snow, using set value in replace mode will set the data values to Snow, using set value in combine mode will set the data values to Rain and Snow. The combine/replace mode may be changed via the weather edit mode (Section 8.12, *Weather Edit Mode*, on page 31).

15.13.6 Layer Tool (clouds)

The layer tool is used for modifying cloud layer information. There are x attributes associated with a cloud layer. They are the base of the clouds, tops of the clouds, special cloud type (CB only), and coverage (sky condition). Many times the tops of the clouds are not specified.

The layout tool is used to create a cloud layer, change the attributes of an existing cloud layer (coverage, tops, and bottoms), and delete a cloud layer. Cloud layers may not overlap in the vertical.

The software determines the layer desired to be edited by looking for a layer at the position of the point-

1. The sample value will be shown even if there is insufficient room to display the value within the width of a time block.

er for clicks and drags. The parameter associated with the layer is selected to be active. This approach is similar to the implicit selection approach described in Section 15.13.1, *Implicit Selection of Parameter To Be Edited*, on page 98.

The current value of the layer being edited will be displayed on the temporal editor during the edit operation in a similar manner to the temporal samples show earlier in this document[2]. All layers associated with the active parameter for the time block will be shown in the info string current value box (Section 7.7.3, *Current Value Box*, on page 21).

Clicking button one or button two over an existing layer will change the coverage of that layer by incrementing and decrementing it in discrete steps respectively.

Dragging button one over an existing layer will adjust the base of that layer while keeping the tops (if defined) the same. Increasing the base of a layer so that it is higher than the previously defined tops for the layer will delete the tops information for the layer. Increasing or decreasing the base of a layer so that it overlaps with another existing layer will cause the other layer to be adjusted to prevent overlap.

Dragging button one with SHIFT depressed with modify the tops of an existing layer. Decreasing the tops of a layer below the base of the layer will delete the tops information for that layer. Increasing the tops of a layer so that it overlaps with another existing layer will cause the other layer to be adjusted to prevent overlap.

Existing layers may be deleted via a button three popup menu. The user must press button three while over a layer. The software will determine the layer desired using the approach outlined above. The layer will be deleted.

New layers may be added via a button three popup menu. The user positions the pointer where they would like a new layer to be created and selects “add layer” from the popup menu. A new layer is created for that data block. The attributes of the new data block are: no tops defined, base at the same level as the pointer press, coverage set to maximum, not CB type.

An existing layer may be toggled between cloud type of CB or not CB through the button three popup menu. The user positions the pointer to identify the layer, presses mouse button three, and then chooses Toggle CB from the popup menu.

2. The sample value will be shown even if there is insufficient room to display the value within the width of a time block.

16. API and Procedures

An API and syntax parser exists to run procedures.

16.1 API

The API is an accessible function set that simulates user interface operations. These operations are invoked via the user interface or from a procedure facility. Table 21 on page 103 lists all possible operations. The source name may be generic (e.g., RUC) which applies to the most recent model run.

Table 21 - API

Object	Operation	Description	Parameters
Time Scale	Select Time Range	Selects a time selector Time Range	Two times are given. The format of the time can include the words TODAY, NOW, YESTERDAY, TOMORROW plus any Z-time designator. The encompassing model data range also allowed by specifying the model source (e.g., RUC, Fcst, MOS).
Time Block Editor	Select Parameter	Selects a parameter for a subsequent operation	**Parameter Name, Source Name and Multiple** entries permitted. ALL is permitted for the parameter name and/or source name. Group names are permitted in lieu of the parameter name.
	Duplicate	Duplicates the gridded values over the specified TimeRange	Mutable parm name and time inside the time block to identify the block. Destination time range.
	Inter-Parm Duplicate	Duplicates gridded values from one specified TimeBlock to another specified TimeBlock of another parm	Source Parm Name and time inside the time block to identify the block. Target Mutable Parm Name and Target Mutable TimeRange.
Secondary Menu Bar	Define Based On Value	Selects a set of grid points based on value. The actual set of points are not set until data processing occurs (see the spatial editor object information) and then it occurs on a data slice by data slice basis. This command clears the set of points before continuing.	Define based on value query string
	Clear Set Gridpoints	Clear the selected grid points.	None
	Toggle Set Gridpoints	Toggle the selected grid points.	None.

Table 21 - API

Object	Operation	Description	Parameters
Main Menu	Load Parameter	Loads a Parameter/Source	Parameter Name, Source Name. and Multiple entries permitted. ALL is permitted for the parameter name and/or source name. Group names are permitted in lieu of the parameter name.
	Unload Parameter	Unloads a Parameter/Source	Parameter Name, Source Name. and Multiple entries permitted. ALL is permitted for the parameter name and/or source name. Group names are permitted in lieu of the parameter name.
	Save Parameter	Save the entire parameter to the database	Parameter Name and Multiple entries permitted. ALL is permitted for the parameter name. Group names are permitted in lieu of the parameter name.
	Delete	Removes TimeBlocks for the selected parameter and time range	None (The time range and selected parameters have been defined.)
	Copy From	Copies TimeBlocks from the specified source to the selected mutable Parameter/ Time Range	Source Name. None (The time range and selected parameters have been defined.)
	Copy To	Copies TimeBlocks from the currently selected set of Parameters/ Time Ranges to mutable parameters over the same TimeRange	None (The time range and selected parameters have been defined.)
	Copy All From	Copies all TimeBlocks from the specified source to the selected mutable parm list with the same name	Source Name. (The selected parameters have been defined)
	Copy All To	Copies all TimeBlocks from the selected immutable source/parm list to mutable parms with the same name	None. (The selected parameters have been defined)
	Break Lock	Break the lock on the selected parm name/ TimeRange	None. (The selected parameters and time range have already been defined separately.)
	Interpolate	Temporally interpolates the selected parameter over the selected TimeRange	Interpolate Option (gaps, non-completed, user-modified)
	Time Shift	Shift a contiguous group of time blocks forward or backward in time, based on the selected time range and parameters	Shift Amount (signed int)

Table 21 - API

Object	Operation	Description	Parameters
Spatial Editor	Select Parameter for Edit	Selects one parameter for editing	Parameter Name
	AppliesTo	Sets the applies to mode to direction only, magnitude only, or both components.	DIR, MAG, BOTH
	Replace/Combine	Sets the combine/replace mode to either replace or combine.	COMBINE, REPLACE
	Push/pull	Applies the push pull delta amount to the parameter selected for edit across all grids spanning the selected time range, and for all selected data points.	Delta amount.
	Smooth	Applies to smooth tool to the parameter selected for edit across all grids spanning the selected time range, and for all selected data points.	None.
	Set Value	Applies the set value tool to the parameter selected for edit across all grids spanning the selected time range, and for all selected data points.	Value to set.
	Move	Applies the move operation to the parameter selected for edit across all grids spanning the selected time range, and for all selected data points.	Amount to move.
	Copy	Applies the copy operation to the parameter selected for edit across all grids spanning the selected time range, and for all selected data points.	Amount to copy.

16.2 Global Commands

AFPS offers a facility that allows the user to define and run a procedure composed of the commands listed in Section 16.1, *API*, on page 103. For each step in the procedure, the user specifies the command and any required parameters. The syntax for each of the global commands specified in Table 22 on page 105. Spaces do not matter in the syntax.

Table 22 - Time Block Editor Procedure

Operation	Example Syntax
Load Parameter	LoadParameter: parmname1@sourcename1, parmname2@sourcename2
Unload Parameter	UnloadParameter: parmname1@sourcename1, parmname2@sourcename2

Table 22 - Time Block Editor Procedure

Operation	Example Syntax
Save Parameter	SaveParameter:parmname1,parmname2
Select Parameter	SelectParameter: parmname1,parmname2
Select Time Range	SelectTimeRange:TODAY+3z, 24h
Delete	Delete:
Copy From	CopyFrom:RUC
Copy To	CopyTo:
Copy All From	CopyAllFrom:ETA
Copy All To	CopyAllTo:
Break Lock	BreakLock:
Interpolate	Interpolate:option
Duplicate	Duplicate:Temperature,NOW, TOMORROW+3z, TOMORROW+6z
Inter-Parm Duplicate	InterDuplicate:Temperature, TODAY+15z, MaxTemp, TODAY+11z, 24h
Time Shift	TimeShift:+12h
Define Based On Value	DefineBasedOnValue:Temp < 32 & Weather ~ R
Clear Set Gridpoints	ClearSetGridpoints:
Toggle Set Gridpoints	ToggleSetGridpoints:
Select Parameter for Edit	SelectParameterForEdit: MaxTemp
AppliesTo	AppliesTo: BOTH
Replace/Combine	ReplaceCombine: COMBINE
Push/pull	PushPull: -5
Smooth	Smooth:
Set Value	SetValue: 1/2
Move	Move: (10,5)
Copy	Copy: (10,5)

17. Configuration File

The command line for the gfe can accept multiple configuration filenames. The initialization order is left-to-right for the files specified. Multiple configuration files are used primarily for site and specific user configurations.

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
General Parameter	DefaultParameters.parms	SeqOfTextString	Temp, Fcst, Temp, RUC, Weather, ETA	List of parameter names and parameter sources that initially appear on the gfe when it is started (page 39).
	Logrithmetic.parms	SeqOfTextString	QPF, SnowAcc	Each scalar parameter may be specified as having a logarithmic or linear scale which is used for the temporal pane scale, the legend, and the set value dialogs ((page 31)).
	Group.names	SeqOfTextString	Public, Aviation, Marine	List of available groups (page 14)
	group.parms	SeqOfTextString	QPF, SnowAcc	Listing of parameter names that are contained within the specified group (page 14)
	MatrixLoad.order	TextString	Alphabetical	Specifies the entry order in the matrix parameter load dialog. Choices are Alphabetical or Group. (page 14)
	Quantum	int	3600	Minimum number of seconds for the smallest editable unit of time ((page 2)).
	TimeBlock.sizes	SeqOfInt	1200, 3600, 7200	List of available time block scaling values in units of seconds per 100 pixels. (page 23)
Map Backgrounds	MapBackgrounds.default	SeqOfTextString	Counties, Zones	List of map backgrounds that automatically are displayed upon startup. (page 18)
	MapBackgrounds.availColors	SeqOfTextString	Blue, Red, Gray48	List of available map background graphic colors. The first entry is the default map background color used upon startup. (page 19)

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
Temporal Editor	TemporalEditor-Point.names	SeqOf-Text-String	BJC, DEN	List of temporal editor points names that are available through the temporal editor location dialog. This is a parallel array with TemporalEditorPoint.locations. (page 29)
	TemporalEditor-Point.locations	SeqOfCartCoord2DFloat	(-110.34, 44.6), (-108.22, 42.1)	List of temporal editor point locations that are available through the temporal editor location dialog. The units are longitude/latitude. This is a parallel array with TemporalEditorPoint.names. (page 29)
	TemporalEditorAreas	SeqOf-Text-String	Zone48, Zone59	List of temporal editor areas that are available through the temporal editor location dialog. The entries in this list should also exist in the reference set server (page 29)
System Time Range	SystemTime-Range.beforeCurrent-Time	int	48	A portion of the system time range calculation is based on a delta from the current system time. This item defines the number of hours before the system time range that is included in the calculation ((page 36)).
	SystemTime-Range.afterCurrent-Time	int	144	A portion of the system time range calculation is based on a delta from the current system time. This item defines the number of hours after the system time range that is included in the calculation ((page 36)).
Layout	TimeScale.horizSize	int	250	Initial horizontal size of time scale in pixels (page 4).
	TimeBlockEditor.vertSize	int	250	Initial vertical size of time block editor in pixels (page 4).

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
UI Colors	PrimaryBack-ground.color	Text-String	Gray75	General window color, time block color (page 5).
	PrimaryFore-ground.color	Text-String	Black	Text color on user interface (page 5).
	SecondaryBack-ground.color	Text-String	LightSteel-Blue	Palettes, parm windows, time block background (i.e., parm rows) (page 5).
	TertiaryBack-ground.color	Text-String	SlateBlue	The time-blocks window (i.e., space between and below the time-block rows) (page 5).
	Selected.color	Text-String	LightSky-Blue	This entry defines the color used to denote a selected parameter and time range on the time scale, time block editor data area, and time block editor data selector ((page 36)).
	Selected.fillPattern	Text-String	TRANS_25PC45DEG	This entry defines the fill pattern used to denote a selected parameter and time range on the time scale, time block editor data area, and time block editor data selector ((page 36)).
	TimeScaleLines.color	Text-String	Red	Defines the color used for the time scale lines that pass through the time block editor, time scale, and temporal editor. (page 18)
	TimeScaleLines.pat-tern	Text-String	TRANS_25PC45DEG	Defines the pattern used for the time scale lines that pass through the time block editor, time scale, and temporal editor. (page 18)
	EditorTimeLine.color	Text-String	Red	Defines the color used for the spatial editor time line that passes through the time block editor, time scale, and temporal editor. (page 18)
	EditorTimeLine.pat-tern	Text-String	TRANS_25PC45DEG	Defines the pattern used for the spatial editor time line that passes through the time block editor, time scale, and temporal editor. (page 18)
	CurrentSystem-Time.color	Text-String	Green	Defines the color used to denote the current system time on the time scale.
	ShadowBlock.color	Text-String	Blue	Defines the color used to denote a shadow block on the time block editor. (page 43)
	ShadowBlock.pattern	Text-String	SOLID	Defines the pattern used to denote a shadow block on the time block editor. (page 43)
	LockedByMe.color	Text-String	forestgreen	The color on the time block editor that denotes a time range locked by me. (page 43)

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
UI Colors	LockedByOther.color	Text-String	tomato2	The color on the time block editor that denotes a time range locked by someone other than me. (page 43)
	LockedByMe.pattern	Text-String	FULL	The pattern on the time block editor that denotes a time range locked by me. (page 43)
	LockedByOther.pattern	Text-String	FULL	The pattern on the time block editor that denotes a time range locked by someone other than me. (page 43)
	TimeBlockVisible.color	Text-String	DimYellow	This is the color of the time block when it indicates that the time block is visible in the spatial editor. (page 44)
	TimeBlockActive.color	Text-String	BrightYellow	This is the color of the time block when it indicates that the time block is active in the spatial editor. (page 44)
	TimeBlockSourceOutline.color	Text-String	White	During time block editor duplicate operations, the source time block is outlined with this color. (page 46)
	TimeBlockDestinationOutline.color	Text-String	Gray80	During time block editor duplicate operations, the destination time block(s) are outlined with this color. (page 46)
Data States	DataState.interpolated	Text-String	I	The data state of a time block is denoted by a single character in the middle of the time block on the time block editor. This entry defines the character used for the interpolated state. (page 43)
	DataState.initialized	Text-String	i	The data state of a time block is denoted by a single character in the middle of the time block on the time block editor. This entry defines the character used for the initialized state. (page 43)
	DataState.edited	Text-String	e	The data state of a time block is denoted by a single character in the middle of the time block on the time block editor. This entry defines the character used for the user-edited state. (page 43)
	DataState.otherUser	Text-String	o	The data state of a time block is denoted by a single character in the middle of the time block on the time block editor. This entry defines the character used for the other user edited state. (page 43)

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
Algorithms	CopyToCopy-From.significant-Threshold	int	25	This entry defines a threshold to determine which source time block samples should be included in the destination samples. The range is 0 through 100 (page 11).
	parmName.sam-pleAlgorithm	Text-String	Max	The parameter's sample algorithm used for copy to/ from operations. Allowable entries are Max, Min, TimeAveraged, Accumulative, and MostPredomi-nant. (page 11)
	Interpolation.blocks	int	2	Maximum number of time blocks searched in each direction outside the selection time range. (page 17)
Legend	Legend.zoom	int	4	Zoom factor for the one-step zoom capability on the legend and set value dialogs. (page 32)
Editor	MaxFreehandTool-Size	int	9	The maximum size of the freehand tools. Nine repre-sents 9x9 grid points. (page 30)
	OfficeDo-main.expand	CartCoor d2DInt	(10,20)	Expansion percentage for the automatically calcu-lated office domain based on the domains of each parameter. (page 51)
	WindIndicator.size	int	60	Maximum size of the wind indicator (barb or arrow). (page 65)
	MaxGridCellInPixels	int	150	Maximum number of pixels used to denote a grid cell. This defines the maximum possible zoom. (page 71)
	TemporalEditorVisu-alization	Text-String	Image	Specifies whether Image or Graphic visualizations should be used in the temporal editor when a single parameter exists per data pane. Choices are Image or Graphic. (page 88)

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
Parameter	*parmName*.pushPull-MaxValue	float	15.0	Maximum value on the push pull dialog for the given parameter. (page 32)
	parmName.push-PullVeerValue	float	10.0	Number of degrees to veer/back the vector for the push-pull tool. (page 73)
	parmName.sbDura-tion	int	7200	Number of seconds in duration for the shadow blocks for the given parameter. (page 43)
	parmName.sbRepeat-Interval	int	7200	Number of seconds to repeat the shadow blocks for the given parameter. (page 43)
	parmName.sbStart-Time	int	3600	Starting time in seconds since 0000 for the first shadow block for the given parameter. (page 43)
	parmName.sbTime-Mode	Text-String	GMT	Starting time units. Acceptable values are LOCAL or GMT. (page 43)
	parmName.spatialIm-ageType	Text-String	Image Con-tour	Specifies the spatial editor image display type(s) for the given parameter. (page 58)
	parmName.spatial-GraphicType	Text-String	Wind Barb	Specifies the spatial editor graphic display type(s) for the given parameter. (page 58)
	parmName.temporal-ImageType	Text-String	ColorBar	Specifies the temporal editor image display type(s) for the given parameter. (page 91)
	parmName.temporal-GraphicType	Text-String	Time Line Wind Barb	Specifies the temporal editor graphic display type(s) for the given parameter. (page 91)
	parmName. graphic-Color	Text-String	Yellow	Specifies the base graphic color for the given parame-ter. (page 65)
	Generic.colors	SeqOf-Text-String	“red”, “yel-low”, “blue”	List of colors to use for graphics when the requested color is not available. (page 58)
	parmName. tempo-ralDataPaneSize	int	200	Specifies the initial size of the data pane for the given parameter. (page 89)
	parmName.tempo-ralScaling	Text-String	FitToData	Specifies whether the initial scaling for the parameter in the temporal editor should be based on the data (“FitToData”) or full-size (“FullRange”). (page 89)
	parmName.default-Value	float	0.00	Specifies the default value for scalar data when creat-ing an empty grid. (page 81)
	parmName.default-MagValue	float	5	Specifies the default magnitude value for vector data when creating an empty grid. (page 81)
	parmName.default-DirValue	float	270	Specifies the default direction value for vector data when creating an empty grid. (page 81)

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
Parameter	*parmName*.default-Key	Text-String	"6+"	Specifies the default key for discrete and weather data when creating an empty grid. (page 81)
Unit-based	*units*.contourValues	SeqOf-Float	-25., -20., -15., -10., -5., 0	Specifies the contour values to be used for all scalar parameters with the given units. The contourValues are in ascending order. (page 59)
	units.colorTables	SeqOf-Text-String	Wide, Cool, Warm	List of available color table names for all parameters with the given units. The first listed color table is the default color table. (page 63)
Color Tables	*colorTableName*.col-orTableDefaultColor	Text-String	SlateBlue	This is the color used for the given color table name if a) the data value is less than the first value listed in the colorTableValues for scalar and vector data, or b) the data type is discrete and an insufficient number of colors is available in the colorTableValues for the dis-crete key (page 63)
	colorTableName.col-orTableValues	SeqOf-Float	0, 5, 10, 18, 34, 48	These numbers specify the point at which the defined colors in *.colorTableColors are used. The number of entries should match the number of entries in *.col-orTableColors. (page 63)
	colorTableName.col-orTableColors	SeqOf-Text-String	LightBlue, khaki1, gold1, salmon2, orange, tomato2	These strings specify the colors to be used for the color enhancement curve. For scalar and vector data, the number of entries should match the number of entries in *.colorTableValues. For discrete data, the number of entries should be at least the size of the discrete key (defined by the database). (page 63)
	colorTableName.col-orTableKeys	SeqOf-Text-String	"L", "M", "H"	These strings specify the discrete key value that match up with the *.colorTableColors. The number of entries should match the number of entries in *.colorTableColors. (page 63)
Defaults	PassoverModeTime-BlockEditor	Text-String	YES	Controls whether passover mode is initially enabled for the time block editor. Choices are YES and NO.
	PassoverModeTem-poralEditor	Text-String	YES	Controls whether passover mode is initially enabled for the temporal editor. Choices are YES and NO.
	ImageSelectedAc-tiveSpatialEditor	Text-String	NO	Controls whether image is displayed when a parame-ter is selected for editing. Choices are YES and NO.

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
Defaults	LinkEditors	Text-String	NO	Controls whether editors are linked. Choices are YES and NO.
	TimeScaleLines	Text-String	NO	Controls whether time scale lines should be displayed. Choices are YES and NO
	EditorTimeLines	Text-String	NO	Controls whether editor time lines should be displayed. Choices are YES and NO
	ShadowBlockDisplay	Text-String	NO	Controls whether the shadow block locations should be displayed. Choices are YES and NO
	SyncAsyncMode	Text-String	TIME-SYNC	Controls whether the system is in time-synchronized (TIME-SYNC) or asynchronous (ASYNC) mode.
	GroupIdenticalData	Text-String	YES	Controls whether identical data is grouped together for edits. Choices are YES and NO.
	TemporalEditorOverlay	Text-String	OVERLAY	Controls whether new parameters should be overlaid or kept in separate data panes for the temporal editor. Choices are OVERLAY and NON-OVERLAY.
	TemporalEditorAbsolute	Text-String	RELATIVE	Controls whether edits made on the temporal editor are in absolute (ABSOLUTE) mode or in relative (RELATIVE) mode.
	SpatialEditorFreehand	Text-String	ONE-PASS	Controls whether the freehand tools work in a one-pass mode (ONE-PASS) or in a continuous (CONT.) mode.
	WindEditMode	Text-String	MAG ONLY	Controls whether vector edits apply to just the magnitude component (MAG ONLY), the direction component (DIR ONLY), or both components (BOTH).
	WeatherEditMode	Text-String	REPLACE	Controls whether weather edits are to be combined with (COMBINE) or replace (REPLACE) existing data.

Table 23 - Configuration File

Category	Token	Data Type	Example	Description
Weather Color Tables	Weather.commonValues	SeqOf-Text-String	"Wide:R:-", "Wide:S:-"	List of common weather values that are always accessible through the weather dialog.
	WeatherCoverage.names	SeqOf-Text-String	"Iso'd", "WSct", "Sct"	List of weather coverages available. This is a parallel array with WeatherCoverage.fillPatterns. (page 63)
	WeatherCoverage.fillPatterns	SeqOf-Text-String	"Isolated", "WideScattered", "Scattered"	List of fill patterns to use for the various weather coverages. This is a parallel array with WeatherCoverage.names. (page 63)
	WeatherType.names	SeqOf-Text-String	T, R, RW, S	List of weather types and combinations of weather types that require a specific color for display. This is a parallel array with WeatherType.colors. (page 63)
	WeatherType.colors	SeqOf-Text-String	brown2, PaleGreen, Green, snow	List of colors to use for specific weather types. This array matches up with WeatherType.names. (page 63)
	Weather-TypeInten.names	SeqOf-Text-String		List of weather types with intensities and combinations of weather types and intensities that require a specific color for display. This is a parallel array with WeatherTypeInten.colors. (page 63)
	Weather-TypeInten.colors	SeqOf-Text-String		:List of colors to use for specific weather types with intensities and combinations with intensities. This array matches up with WeatherTypeInten.names. (page 63)
	WeatherGeneric.colors	SeqOf-Text-String	"red3", "green3", "gray80"	List of colors to use for weather when none of the WeatherType or WeatherTypeInten entries match. (page 63)
Cloud Display	CloudCoverage.coverage	SeqOf-Text-String	"Sct", "Bkn", "Ovc", "-Bkn"	List of cloud coverages available. This is a parallel array with CloudCoverage.fillPatterns. (page 97)
	CloucCoverage.pattern	SeqOf-Text-String	"Scattered", "Broken", "Overcast", "Thin Broken"	List of fill patterns to use for the various cloud coverages. This is a parallel array with CloudCoverage.names. (page 97)
Weather	Sampler.weatherPercentage	float	25	Percentage (0-100%) needed for the weather value to be included in the temporal editor display. (page 83)

18. On-line Help

18.1 Introduction

18.2 Scope

18.3 Main-Menu-Bar Pulldown Menu

18.4 Help Window

19. Relevant Bugs

The following table lists all **relevant** bugs that are in an "open" or "suspended" state and are categorized as either "Worksheet_GUI", "Worksheet_App", or "Miscellaneous". Note that the name "worksheet" has been changed to "time block editor".

Table 24 - Worksheet-related bugs

No.	Synopsis	Addressed in Spec?
2	Removed group remains highlighted in Group Menu	NP - Group menu removed
5	Initial worksheet size accommodates 1 parm instead of 6 parms	Yes - Section 4.3
8	Undo not implemented	Yes - Section 4.24
12	First group under Loadgroup comes up highlighted (may be related to bug 2)	NP - Group menu removed
24	User not informed when replace-to-fit will cause time block loss	No
25	Time blocks lost during replace-to-fit should be uniformly sampled from range	No
26	Clear operation should not be grouped with clipboard functions	? - Section 4.26 needs to reflect design given in description of bug 26
32	Users should be able to display contents of clipboard	Yes - Added to section 4.5
34	Need to indicate source of each timeblock	? - Section 4.2 presents the Preferences->Show option, but this does not provide the entire history of the time block. Need to further define the appearance and content of the time block history.
53	Whenever opened editors exist, there should always be an active editor	NP? - No concept of active editors anymore?
55	User should be able to mark time blocks complete	Yes - Section 4.23 added
56	Need terminology to differentiate parameter actions and state	Yes? - Section 1 is a start on the terminology.
182	Need way to allow scrolling when selecting edit (cross-hatch) area on worksheet	Yes - Section 4.8 addresses implicit scrolling for all drag operations.
258	Add Auto group load to worksheet. Resize worksheet appropriately	Yes - Addressed in section 4.3.

Table 24 - Worksheet-related bugs

No.	Synopsis	Addressed in Spec?
259	Pick better time for initial worksheet display	? - Section 4.3 defines initial horizontal scroll position as the leftmost displayable set of data.
272	Popup message should be given when user breaking lock state greater than selected area	Yes - section 4.19 addresses this
273	Info Dialog window can contain more info than user can see - need scrolling	Yes - section 4.18 addresses this
296	Dragging time arrow in worksheet causes flashing	NP - Time arrow removed from worksheet, also repaints will be performed as final operation for worksheet scrolls
305	Cancel and OK buttons perform identical actions on information popups	Yes - section 4.18
335	Copy To/From should automatically load the parameter in the worksheet	Yes - Section 4.17
337	When operating on an editor, change the worksheet editor “focus” to that editor	NP - Editors and worksheets are not connected in this manner anymore.
338	Need automatic initialization of forecast worksheet	Yes - with inclusion of macro capability in section 5
346	Allow alternative to using SHIFT key for coupled mode drags	No
347	Allow quantum to equal 1/2 hour	Yes - Section 2 states that quantum is defined in configuration file (as it is now).
348	Help line on worksheet needs to describe all mouse button behavior	Yes - Section 4.25 addresses this.
349	Want “thumbnail” of spatial editor while dragging time on worksheet	Yes - Section 4.2 addresses this
350	Copying should only clear the period of time actually being replaced	No - this change request is rejected
351	Specify target of copy operation via an insertion point	No - this change request is rejected
352	Use drag and drop for copy operations	No - this change request is rejected
355	Need better way to move temporal editors	NP
369	Would like a “Find Parameter” for the worksheet	Yes - Section 4.6 addresses this.
375	Resizing window should expand amount of viewable data	Yes - Section 4.4 addresses this.

Table 24 - Worksheet-related bugs

No.	Synopsis	Addressed in Spec?
376	Need quick way to make blocks bigger/smaller	Yes - Section 4.7 addresses this.
377	Button 2 selection behavior not consistent (as you move cursor into the time block)	No - this is a bug
378	All split blocks should become selected (after original, larger block was selected)	NP
382	Date does not appear with timescale 18 hours	Yes - section 4.2 addresses this
386	Add day of week to time scale	Yes - Section 4.2 addresses this
399	Nice to have worksheet capabilities on the editors	Yes - Section 6.1 addresses this
401	How about showing significant parm values in the worksheet	No - rejected
408	Need cue when group is automatically loaded into a worksheet	No -rejected
423	Would like element finder in worksheet	Yes - Duplicate of bug 369
438	Nice to have read-out of time you are at on worksheet	Yes?
440	Would like auto-backup feature in case of lock-up/reboot	No - to be addressed in overall spec
446	Label spatial editor icons according to source worksheet	NAP - Icons removed from spec, and only one worksheet
451	If AFPS hangs autosave all active (green) parms	No - to be addressed in overall spec
454	Allow 30 minute quanta for first 6 hours	No - Cannot specify different quanta for different time intervals
462	Switching to a shorter time scale often causes time blocks to "disappear"	No - rejected
468	Allow inter-parameter copies between worksheets	Yes
469	Auto-load parameter during worksheet copy to/copy from if necessary	Yes - Duplicate of bug 335
474	When a new group is loaded, the previously loaded group should be unloaded	No - user must clear first, then load new group Yes?
475	Coupled mode functioning should be changed to "push mode"	Yes - Section 4.22 addresses this
476	Allow time block copies across parameters, where applicable	Yes - Addressed in section 4.16.2

The following table lists all **relevant** bugs that are in an "open" or "suspended" state and are categorized as either “Spat_Edit_GUI”, “Spat_Edit_App”, or “Miscellaneous”.

Table 25 - Spatial Editor-related bugs

No.	Synopsis	Addressed in Spec?
96	Need “in-progress” indicator for events of long duraton (ex. Define Grid)	No
108	Unable to view or completely manipulate vectors at edges of editible area without zooming	No
110	Legend scales should be changeable (ex. QPF)	No?
112	User needs cues from the vector tool	No
128	Point/Area Set Threshold should be dimmed for discrete data	No
160	Legend pick-up value for vector direction based on last editible area pickup value	No
184	Add push/pull and spraycan capabilit for direciton only with vector data	?
185	Direction portion of vector tool dialog should use circular scale	No
206	Selection of legend values should be more flexible (ex. button 1 pickup, drags allowed)	?
303	Need way to set vector magniturde to 0 with the vector tool	?
327	Add text to tool icons	Yes?
336	Add group load capability to editors	Yes, I think
343	Show basic color patterns for Weather Legend always (rather than just what is loaded in the grids which may only be NoWx)	No
365	Move/Copy button 1/2 doesn’t feel right	No
367	Rivers background provides too much detail	No
370	Would like to be able to change map background colors/line type (i.e. dashed line)	?
373	Use 1d/2d in help strings for drags	Yes
380	Need area capabilities in move/copy tool	No
383	Weather Wide/WSct should be Wdsprd	No
384	Some weather coverage strings are too long	No
395	Wind barb effort to change size is far too cumber-some	Not allowed anymore?
397	Would like to edit dewpoint relative to temperature	No
398	Want tools to manipulate several parms at once	Yes

Table 25 - Spatial Editor-related bugs

No.	Synopsis	Addressed in Spec?
400	AFWG: Never unloaded parameter once it got into spatial editor	?
402	Need easier way to sync up temporal editor with spatial editor	Yes - ?
419	Legends should be visually attached to editors	Yes
420	Want viewing function for groups of parameters	Yes ?
422	Images flickering on workstation	?
430	Color tables for visibility, etc. make it difficult to see gridpoints	No
433	Spatial editor and panner should have common reference point	Not a problem since panner is removed
436	Add set (save?) and load on tool popups (in addition to clear and toggle	No
437	Don't really need "applies to" information string for vector paints since xxnn and nnxx readouts give this information	?
445	Want elevation as map background or weather element (parameter)	No
449	Need way to specify exact values in Set Value dialog boxes	?
456	Megan Terry: Areas too close together (temp for example), can't be edited separately	?
461	Vector tool needs 5 degree increments to be able to create 45 degree vector	No
477	Eliminate capability to interactively change size of wind arrows/barbs	Yes?
478	Add text to step icons	?
480	Allow a way to set a "temporal area of influence" so that a change to values on a spatial editor affects grids within a temporal influece	No

The following table lists all **relevant** bugs that are in an "open" or "suspended" state and are categorized as either "Temp_Edit_GUI", "Temp_Edit_App", or "Miscellaneous".

Table 26 - Temporal Editor-related bugs

No.	Synopsis	Addressedn Spec?
201	Locator map should be more strongly attached to its temporal editor	Yes?
233	Fit-to-data zoom should act on visible parms only	
247	Unnecessary paints occur during edits on discrete data	
263	No domain can be drawn on locator map when no parms are loaded in temporal editor	NP
271	Vertical scroll of temporal editor with up/down arrows too "slow"	
280	Help string does not necessarily apply to pane in focus	
321	Undo last edit from button 3 popup doesn't work	
322	Relative mode doesn't work correctly when location not in reference set	Yes
359	Want to directly resize pane with surrounding panes moved accordingly (note: behaviour is now correct with exception of moving top of pane where the pane is between panes and scrolling can occur up and down)	
371	AFWG: Want to go to any town by name	?
372	Hard to clear reference spots on locator map via button 2 drag	NP
381	East or west wind barbs blend in with magnitude bar	
385	Locator map "tease"	NP
389	If no location selected, give feedback	No
409	Need way to modify entire range of time slices	
421	Arrows initially too far apart	NP
424	Show influence type on window	
448	Resizing temporal window should show more time, not larger block sizes	Yes?
453	Have index to towns/cities in locator log	
460	Temporally overlapping clouds/weather,etc. makes confusing time blocks	
463	Click to adjust should cause incremental change in value rather than snap-to-position	
465	Always show sample on currently edited time slice	

Table 26 - Temporal Editor-related bugs

No.	Synopsis	Addressedn Spec?
480	Allow a way to set a "temporal area of influence" so that a change to values on a spatial editor affects grids within a temporal influece	No
483	Inconsistent display of area of influence when switching between point and area modes	NP?
485	Fit-to-data should be the default view	
486	Fit-to-data should always use 0 as the minimum value	