

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



VERSION 2.0
BASEMAP GENERATION FOR THE APPLE® MACINTOSH™

By

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Open-File Report
90-452A Documentation and tutorial (Paper Copy)
90-452B Application disk(s)

DISCLAIMER

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Introduction

This document provides detailed information about McMap, a map generation program I authored as a byproduct of the U.S. Geological Survey program PRISM (Pliocene Paleoclimate Research, Interpretation, and Synoptic Mapping). It describes McMap's concepts and how to perform mapping and plotting tasks using McMap's features. After a brief section on getting started there is a tutorial. Throughout this manual any actions requiring clicking or menu selections via the mouse are highlighted in bold faced type. I recommend doing the tutorial if you have not used McMap before. All McMap commands and menus are treated in approximate order of appearance in the Reference section. The last section gives examples of some maps that can be created with McMap. It is assumed



that you are already familiar with basic Macintosh concepts and know your way around the desktop. If not, read the introductory information that came with your computer.

McMap is a simple base map generation program. You can plot line segments on the Macintosh screen from a file of latitude and longitude pairs. After completion of the map, the user can plot points on the map at given latitudes and longitudes with a short text entry at each location. Finished maps can be enhanced by adding text directly to the Graph window and by transfer to more elaborate graphics applications. McMap is written in Absoft MacFortran™ and makes extensive use of FaceWare's FaceIt™ Macintosh Interface. McMap works best with a hard disk but can be run off a floppy.

Contents of the McMap Package

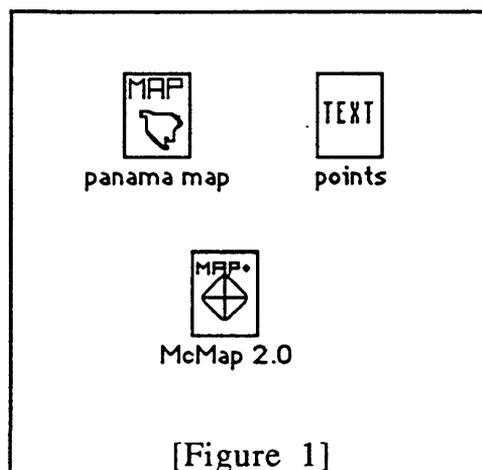
McMap comes on two 3.5" floppy disks:

The McMap Program disk contains the McMap 2.0 application, custom data files, and several map examples. The McMap Data disk contains 4 data files used by McMap 2.0 to construct predetermined hemispheric and global views of the earth.

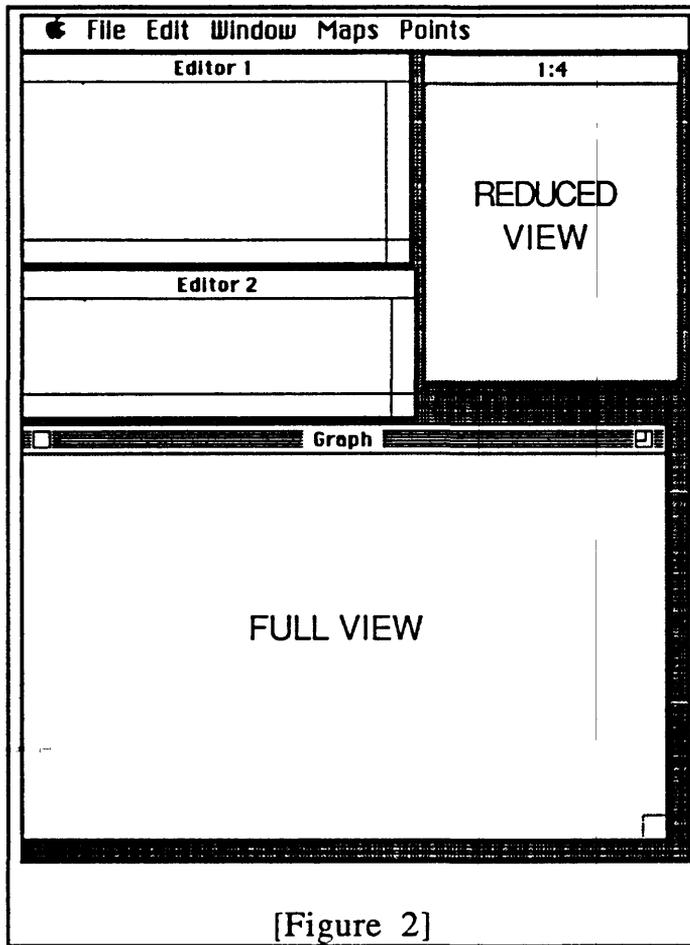
Getting Started

If you have a hard disk place the contents of both disks in a folder named McMap. It is important that all files used by McMap always be located in this folder. If you do not have a hard disk, you can run McMap off the floppy but it will be very slow. Important! Do not use Multifinder with version 2.0 of McMap.

There are three types of icons associated with McMap 2.0 (Fig. 1). The application itself has a diamond shape and the words MAP+. Maps (saved as PICT documents) have a crude outline of North America on them with the word MAP. Text files have the word TEXT printed on them. Figure 1 below shows the McMap 2.0 application, a text file named "points", and a map named "panama map".



To start the program, open the McMap folder and double click the McMap 2.0 icon. The program will take a few seconds to load and then you will be presented with 2 data editors, a reduced view graph window, and a full size graph window (Fig. 2). If you are working on a full page or larger display, the windows should fit on your screen. You can move them around to any chosen positions and sizes. On a regular Macintosh (Plus or SE) with small screen it is best to position the two text editors and reduced view graph window so that they can be seen. The Full view graph window can be resized to a thin rectangular shape at the bottom of the screen. Then, when you create a map, you will see it in the reduced view window. Later you can enlarge the full view window so that it fills the screen. Once you have the windows in a configuration you like, it is best to choose **Save Settings** from the **File** menu. This will preserve your window arrangements for future McMap sessions. As with any Macintosh application, windows can be closed by clicking the go away box in the upper left hand corner and zoomed by double clicking in the zoom box to the right of the window title (Fig. 2). Scroll bars work the same as all Macintosh applications.



Text Editors. McMap comes with four full screen text editing windows. These are powerful editors capable of handling most routine text editing jobs. Only 2 editors will be visible when you first start up McMap 2.0 but you can bring up the other editors at any



time from the **Window** menu. They are very useful for creating and viewing data to be used by McMap.

Graph Window. McMap has full view and reduced view Graph windows (Fig. 2). All graphics operations take place in the Graph Window. To create a map select **North Atlantic** or any other map type from the **Maps** menu. When presented with a color selection dialog, press **Cancel**. The cursor will change to a small "deck" of computer cards indicating that McMap is doing calculations. In a few seconds, the cursor will change back to a normal state and the map you chose will appear on your screen. This map can be printed by selecting **Print** from the **File** menu or saved as a PICT document by selecting **Save As** from the **File** menu. After being saved as a PICT document the map can be opened by any applications accepting the PICT format for enhancement. If you get a message like *?FILE NOT FOUND, CR TO CONTINUE* in the graph window you probably requested a map file (North Atlantic, World HI Res, N. H. Orthographic, etc.) but the data file for that map is not in the folder with the McMap application. Press return and restart the program after moving files dbase1 through dbase4 into the McMap folder.

Tutorial

The best way to learn on the Macintosh is by doing so follow the commands outlined in this section to gain a better understanding of what can and cannot be done with McMap.

If McMap is already open on your screen, use the **Select All** command under the **Edit** menu to select any text in **Editor 1** and then select **Clear** from the **Edit** menu to delete it. Do the same for **Editor 2**. Now click on the **Graph window**. If you have a map showing, choose **Select All** from the **Edit** menu and then choose **Combine** from the **Edit** menu to combine all objects into one picture. Now, select **Clear** from the **Edit** menu to clear the picture from the **Graph window**. If you have just started the McMap application you do not need to clear anything from the windows.

You should now see both **text editors** and the **Graph window** and all should be empty.

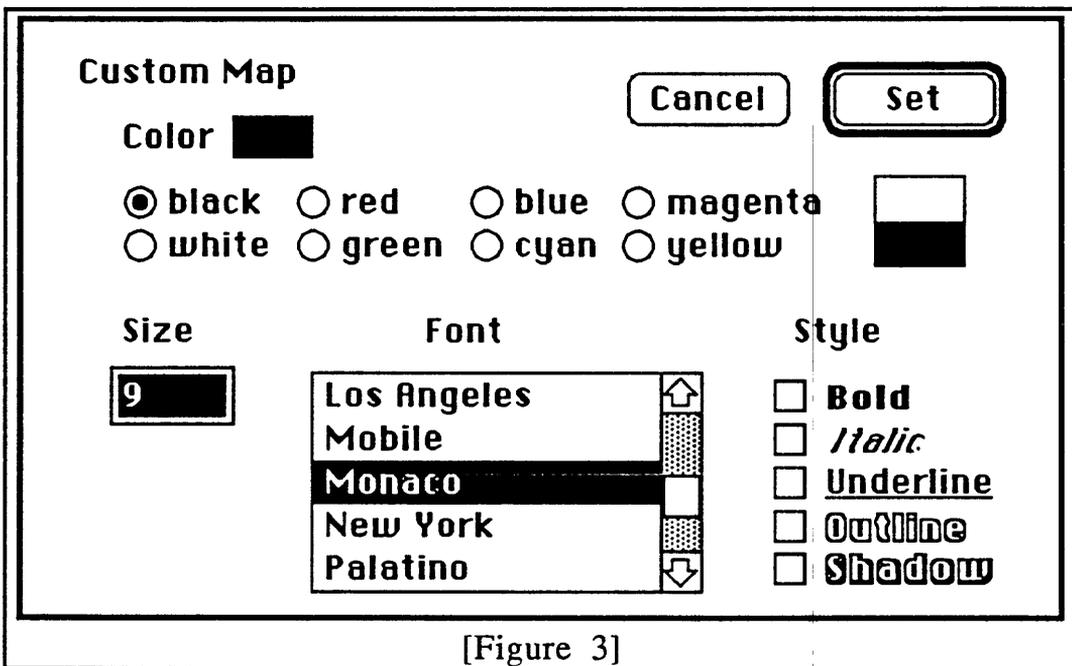
Point Files. Point files contain latitude (decimal degrees), longitude (decimal degrees), and optional text information for plotting points on maps created by McMap. The format of a point file is shown below:

5,1
44.35 -30.27 A152
31.83 -74.35 A167
00.58 -21.78 A180
70.05 8.32
54.00 -46.20 V273

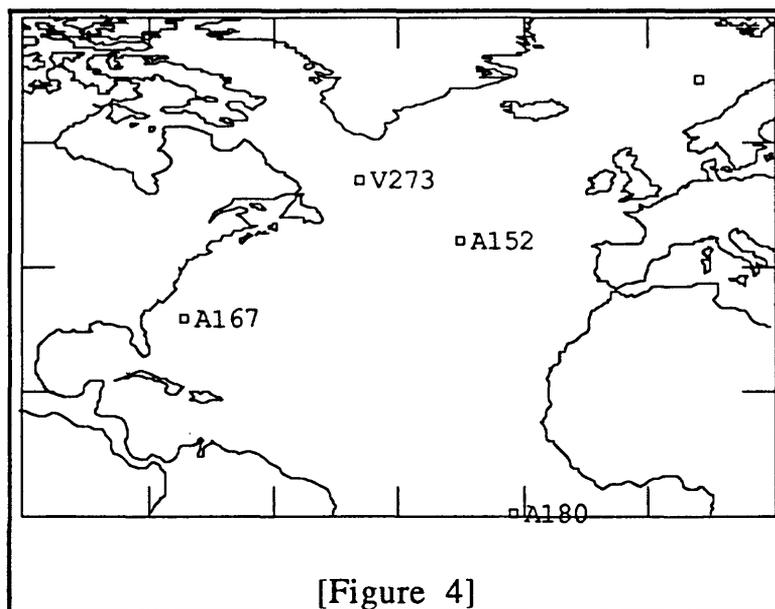
The last line of this file must be followed by a return. The first number on the first line of the file indicates the number of latitude, longitude pairs to follow (in this example 5). The next number on the first line is either 0 or 1 and is separated from the 5 by a comma. A zero [0] indicates that no text is to be plotted next to the point on the map. A one [1] indicates that text (≤ 5 characters in length) is to be found following the latitude longitude pairs and should be plotted next to the point on a map. The second through sixth lines in the example contain the latitude and longitude of each point (in decimal degrees) followed by a short text string to be plotted next to the point. The last line is followed by a return.

Type the numbers you see above into Text editor 1 exactly as you see them. The latitudes, longitudes, and text strings can be separated by one or more spaces or a tab character. Make sure you add a hard return after the last line. Now choose **Save As** from the **File** menu and supply a name like points when prompted. Click **Ok** and your file will be saved to disk with the name you supplied. You can also print this file by choosing **Print** from the **File** menu.

Now select **North Atlantic** from the **Map** menu. Choose the pen color for the map by clicking one of the colors if you have a color monitor. Then click **Set**. If you do not have a color monitor or wish to keep the default color selection click **Cancel**. After a few seconds, a map of the North Atlantic should appear on your screen. You can now click on the **Points** menu and pull down to **Squares**. When you let go of the mouse button you will see a dialog on the screen that explains what a points file is and how it is formatted. Click **Ok** when finished reading this dialog. You will be presented with a standard **Open** dialog and scrolling file list. Find the file you created before and click on it and then click the **Open** box (If at this point you did not have a points file, click **Cancel** and go back to a text editor to make one). A dialog will appear on the screen (Figure 3) that allows you to select pen color and Font size and style:



Make any selections you desire and then click **Set**. If you do not want to make a selection or wish to accept the current selection you can click **Set** or **Cancel**. In a few seconds the points will appear as small squares in the appropriate place on the map of the North Atlantic. Next to each square the text will appear to identify the different points. Your map should look something like Figure 4.



At this point you could plot a different set of points with a different symbol or color. You can plot as many different point sets as you wish on the same map. The Map and points actually exist as different pictures. Choosing **Save As** from the **File** menu at this point would only save the last set of plotted points. First you must combine the pictures into one picture. Choose **Select All** from the **Edit** menu. Next choose **Combine** from the **Edit** menu. Now choose **Save As** from the **File** menu. Supply a name when prompted and this map will be saved in PICT format to that name. The map can also be printed by choosing **Page Setup** and then **Print** from the **File** menu.

Text Entry. You may wish to enhance the map further before saving it. How about adding text to indicate the position of Greenland, Iceland, North America, and Africa. Hold down the **command** key and drag with the mouse to make a small rectangle somewhere off the map but on the **Graph** window. Now press the **Enter** key once. You will see a text entry cursor and can type text into the box. Before typing anything choose **Font, Style, Size** (Fig. 3) from the **Window** menu to set the characteristics of the text you are about to type. Change the **Font** to **Helvetica - Bold - 12 pt.** Click **Set** and then type **AFRICA**. When you are done typing, press the **Enter** key again to end text entry. Once the text entry is ended, it cannot be edited. Now move the cursor to the middle of the text entry box and slide it to any position on the screen. Slide the word **AFRICA** to the continent of **AFRICA**. If the text entry box is masking part of the outline of Africa itself, click on the word **AFRICA** to select it and choose **Send to Back** from the **Edit** menu. You can add a title or other additional text to the map at this point.

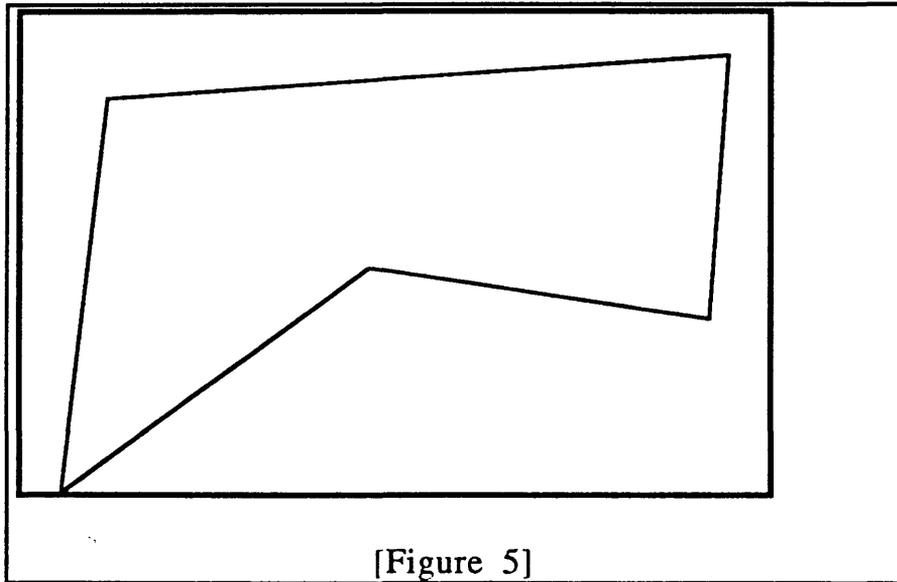


Once you have the map, points and any basic text you need you should **Select All** and **Combine** to form a PICT document that can be saved and opened in a full feature graphics application like Claris MacDraw.

Map Files. The user can supply a data file of latitude and longitude along with pen commands to plot custom maps not provided under the **Map** menu. The first line of the Map file must contain the northernmost latitude, southernmost latitude, westernmost longitude, and easternmost longitude, all separated by commas, space, or tab characters. Your map can be a small area within this latitude longitude rectangle or it can fill it, but no part of your map can extend beyond the rectangle. These latitudes and longitudes should be in decimal degrees.

```
45.00, -10.00, -100.00, -15.00
0 35.0 -90.0
1 40.0 -20.00
1 10.00 -22.05
1 15.98 -60.56
1 -9.5 -95.09
1 35.0 -90.0
9999 9999
```

The remaining lines of the file should contain a pen flag, and latitude longitude pairs in decimal degrees. The pen flag is a zero [0] or one [1]. A [0] tells the pen to move-to the latitude longitude given. A [1] tells the pen to draw a line to the latitude and longitude given. Your map is drawn via a number of move-to and line-to commands in this way. The end of your file must contain a line with 9999 9999 separated by a space or tab character and followed by a return. Type the file shown above into a text editor. Be sure to put a hard return after the last line of the file. Save the file by choosing **Save As** from the **File** menu. Give it a name like MYMAP. Now choose **Custom Map** from the **Maps** menu. You will be prompted for Colors and Font characteristics. For now just click the **Set** button. You will be presented with the Standard Open dialog. Find your MYMAP file and click on it and then click the **Open** button. In a few seconds the following map should appear on your screen (Fig. 5).



This map can be saved, printed, or enhanced with text as described above. You can also plot points on the map by going to an editor and creating a point file.

This is the end of the tutorial section. You now have a general idea of what McMap 2.0 can and cannot do for you. At this point it would be a good idea to clear the Graph window and plot several of the custom map files provided with the program: Australia, Panama, and Atlantic Coastal Plain. Try plotting these maps and then plotting the associated points files on them. After combining and saving as PICT, open these maps in MacDraw, SuperPaint, Delta Graph, Freehand, Illustrator, etc. The lines on the maps are drawn one pixel wide by one pixel high. The maps can be improved for printing by using one of these graphics packages to make the lines in the map thinner. Use charting programs like Delta Graph or Cricket Graph to place latitude- longitude grids on the finished maps.

Reference

File Menu

Open...The Open item is sensitive to the type of window currently active. If you have the Graph Window active, choosing Open... will bring up the standard Open File dialog with scrolling file list and will allow you to open a PICT file. Using the Open command with one of the 4 data editors active will allow you to open any ASCII text file created by McMap or any other text editor.

Save This menu selection will save the contents of the active window.



Save As... This menu selection will save the contents of the unnamed active window. If the Graph window is active the graph or map will be saved as a PICT file to the folder or disk you indicate with the name you supply.

Save Settings... Use this selection after moving or resizing windows to fit your display. Settings also saves page setup information for printing.

Delete... This selection will allow you to delete files on disk from within McMap.

Page Setup... This activates the standard Page Setup dialog.

Print... Print the contents of the active window. Brings up a dialog box with choices.

⌘-Return This menu item is always gray and not available to the user with version 2.0.

Transfer... Allows you to launch another application from McMap without returning to the desktop. Simply select transfer and you will be given a list of applications on the disk to transfer to. You may launch any one of the applications or Cancel.

Quit Use this selection to quit McMap.

Edit Menu

Undo Use this selection to undo last action in text Editor window.

Undo Resize Use this selection to undo last resizing of objects in Graph window.

Cut Cuts selected text from editor (object from graph window), stores in clipboard.

Copy Copies selected text from editor (object from graph window) and stores in clipboard.

Copy Frame Area Copies frame (drawn by holding down ⌘ key while dragging mouse) into clipboard as a bitmap.

Copy Table Copies selected text to the clipboard and places tabs in between text items. This is useful for transforming a rectangular selection of data to tab text prior to pasting into spreadsheet like editors of applications like Excel or Cricket Graph.

Paste Pastes current contents of clipboard at current insertion point.

Clear Clears last object drawn in graph window (selected text in Editor window).

Select All Select all text in current editor (objects in graph window).

Combine Combines selected pictures into a new picture.

Tabs-to-Spaces Convert tabs in current text selection to a user defined number of spaces.



Search For...Executes a search and replace routine to find all or some text strings. User can limit search to selected text and/or defined columns to speed search.

Done	%F-Find	%R-Replace	%A-All	%N-New	<input type="checkbox"/> %T-From Top	<input type="checkbox"/> %S-Selection
Search For: <input type="text"/>						<input type="checkbox"/> search columns:
where '#' = <input checked="" type="radio"/> '#' <input type="radio"/> SP <input type="radio"/> TAB <input type="radio"/> CR <input type="radio"/> LF <input type="radio"/> ASCII: <input type="text" value="32"/>						<input type="text" value="1"/>
Change To: <input type="text"/>						to
Help '#' = <input checked="" type="radio"/> '#' <input type="radio"/> SP <input type="radio"/> TAB <input type="radio"/> CR <input type="radio"/> LF <input type="radio"/> ASCII: <input type="text" value="32"/>						<input type="text" value="255"/>
<input checked="" type="checkbox"/> %I-Ignore Case <input type="checkbox"/> %W-Word <input type="checkbox"/> %E-Regular Expression						Expressions

Next Case Continues searching for text string last defined in Search For... menu item.

Bring to Front Brings selected picture to front of Graph Window.

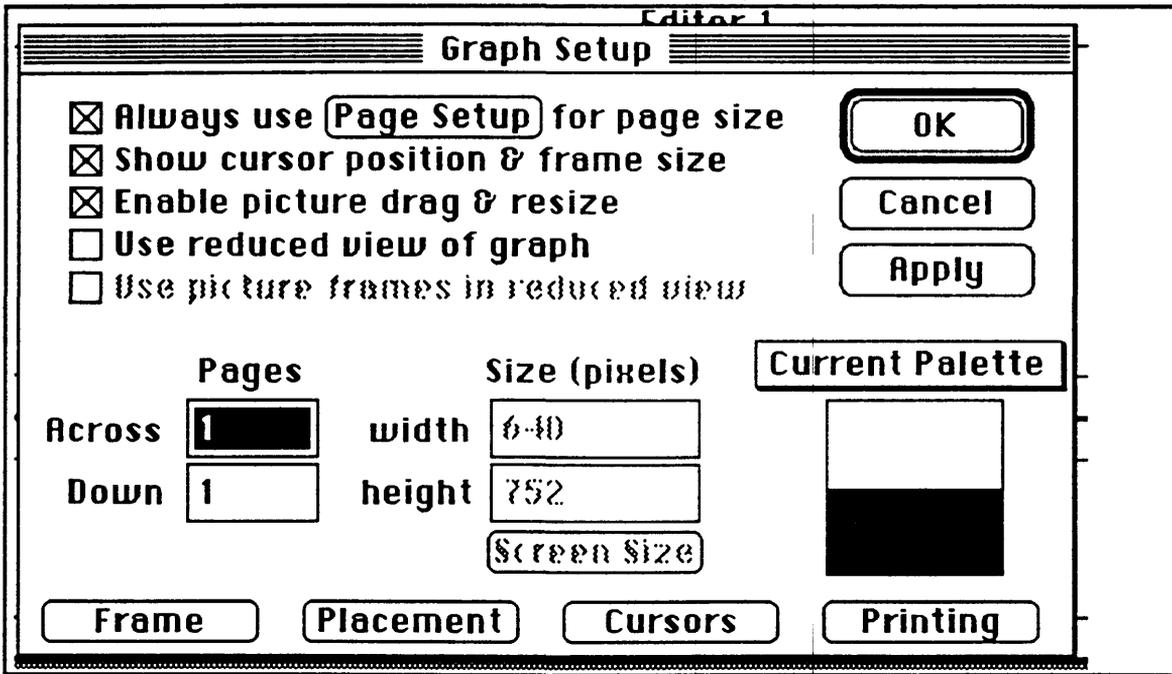
Send to Back Sends selected picture to back of Graph Window.

Window Menu

Editor Setup...Use to set tab size, auto indent, enter key designation, file handling, cursor position and selection information as shown below. Click on the Help button for help with this dialog box.

<input checked="" type="checkbox"/> 6 Tab Size	<input type="checkbox"/> Auto Indent	OK
Use ENTER key as:		Cancel
<input type="radio"/> TAB		
<input type="radio"/> Space-based TAB		
<input type="radio"/> %-Return		
<input checked="" type="radio"/> Scroll to Insertion Point		
File Handling:		Help
<input type="radio"/> Selection-based		
<input checked="" type="radio"/> One file per window		
<input checked="" type="checkbox"/> Show cursor position & selection size		

Graph Setup...Use to enable/disable various graph features. Click on the buttons at the bottom of this dialog box for information on Frames, Placement, Cursors, and Printing.



6 point Sets text in editor to 6 point Geneva.

9 point Sets text in editor to 9 point Geneva.

12 point Sets text in editor to 12 point Geneva.

Left Left justifies text being typed into the Graph window.

Right Right justifies text being typed into the Graph window.

Centered Centers text being typed into the Graph window.

Reduced View Makes the reduced view graph window the current window.

Graph Makes the full view graph window the current window.

Editor 1 Makes Editor 1 text editor window the current window.

Editor 2 Makes Editor 2 text editor window the current window.

Editor 3 Makes Editor 3 text editor window the current window.

Editor 4 Makes Editor 4 text editor window the current window.

Maps Menu



North Atlantic Produces a Equidistant Cylindrical projection of the North Atlantic Ocean and surrounding land areas.

World (Coarse) Produces a Equidistant Cylindrical projection of the World at a very coarse scale (Plots very quickly). This is useful for plotting large amounts of data on a global view. Once satisfied with the results, data can be plotted on the High Resolution World Map (above).

World (Hi Res) Produces a Equidistant Cylindrical projection of the World.

Northern Hemisphere (Orthographic) Produces an Orthographic Projection, North Polar aspect.

Northern Hemisphere (Stereographic) Produces a Stereographic Projection, North Polar aspect.

Southern Hemisphere (Orthographic) Produces an Orthographic Projection, South Polar aspect.

Southern Hemisphere (Stereographic) Produces a Stereographic Projection, South Polar aspect.

Custom Map Produces a custom Equidistant Cylindrical map from a user supplied text file with latitude - longitude pairs.

Points Menu

Circles Use this menu item to place circles with or without associated text at specific locations on a map.

Squares Use this menu item to place squares with or without associated text at specific locations on a map.

Crosses Use this menu item to place crosses with or without associated text at specific locations on a map.

Quick Maps

This section outlines the steps necessary to produce maps using the McMap application. It is intended as a checklist for those already familiar with McMaps features. If this is the first time you are using McMap, do the tutorial.

1. Make sure the Graph window is clear and active.
2. Select any of the map types from the Maps menu.
 - 2a. If your selection is any of the predefined maps make sure the dbase1 - dbase4 files are in the same folder as the McMap application.
 - 2b. If your selection is a custom map make sure you have a map file which has the boundaries of the map on the first line and 9999 9999 as the last line, followed by a return. Each line of the main part of the file should contain a pen movement command followed by a latitude and then a longitude in decimal degrees, all separated by commas. See Map Files (page 9) for details. Make sure this custom map file is in the same folder as the McMap application. When prompted, select this map file.
3. Your map should be drawn in the Graph window in several seconds to several minutes depending on the size of the map file and speed of the machine you are working on.
4. With the Graph window still active, choose circles, squares, or crosses from the Points menu.
5. You will be prompted for a points file which should be set up with the first line containing the number of points to be plotted and a flag indicating whether or not text will be plotted adjacent to each point. Each remaining line in the file will contain a latitude, longitude, and a text string if text is to be plotted. The last line of the file should be followed by a return. See Point Files (page 6) for details.
6. To print or save your Map (PICT format) you must first combine all objects into one drawing. To do this choose select all from the Edit menu. Next choose Combine from the edit menu. Now you can print or save as you would with any Macintosh application.



Notes

All maps except the hemispheric views use the equidistant cylindrical projection. The equator is the standard parallel, true to scale and free of distortion. Future versions of McMap will allow the user to select various common projections for custom map types.

Custom map files and point files are restricted to 7000 line segments and points respectively.

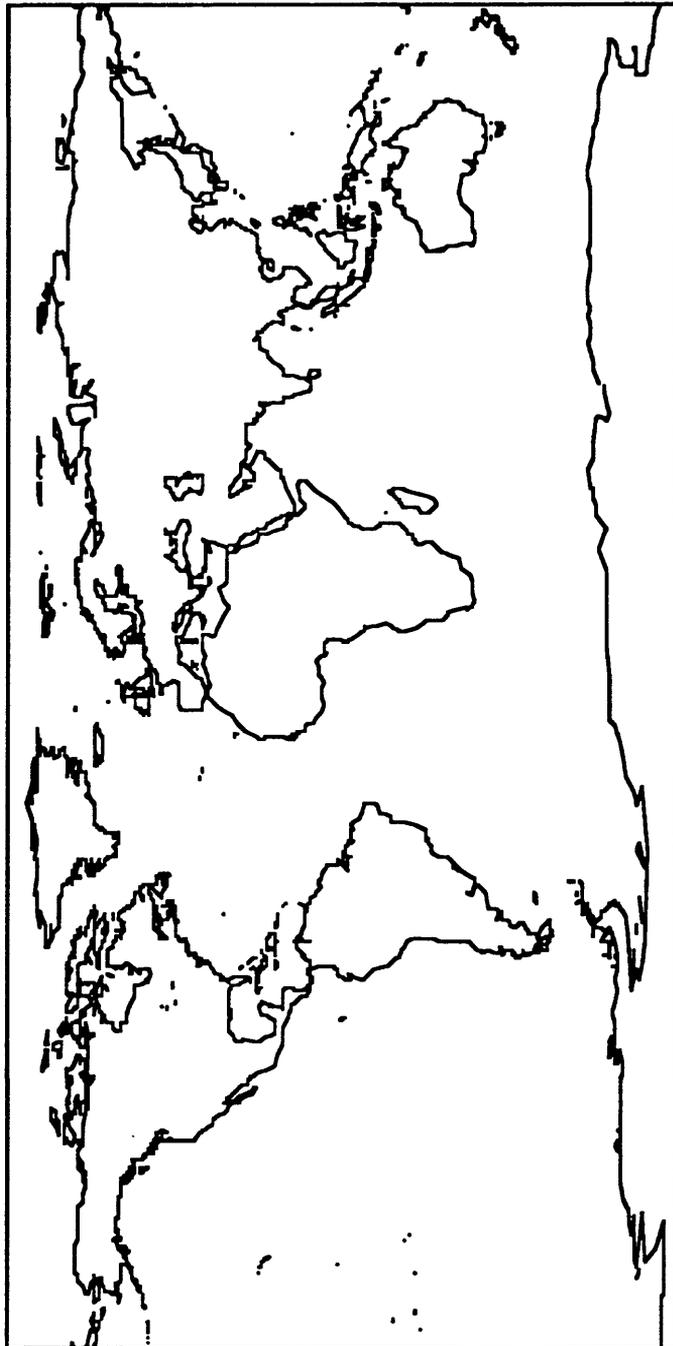
If you have suggestions for improvements to future versions contact me, Harry J. Dowsett, US Geological Survey, 970 National Center, Reston VA, 22092.

Maps Available

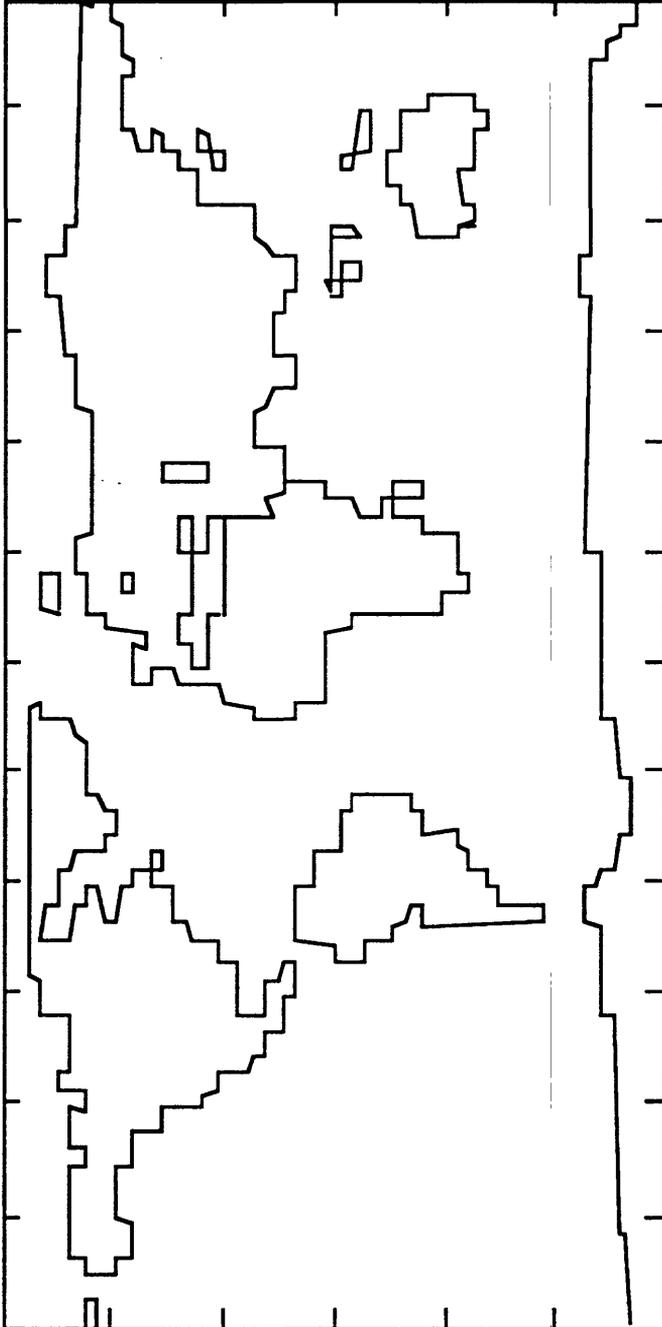
North Atlantic



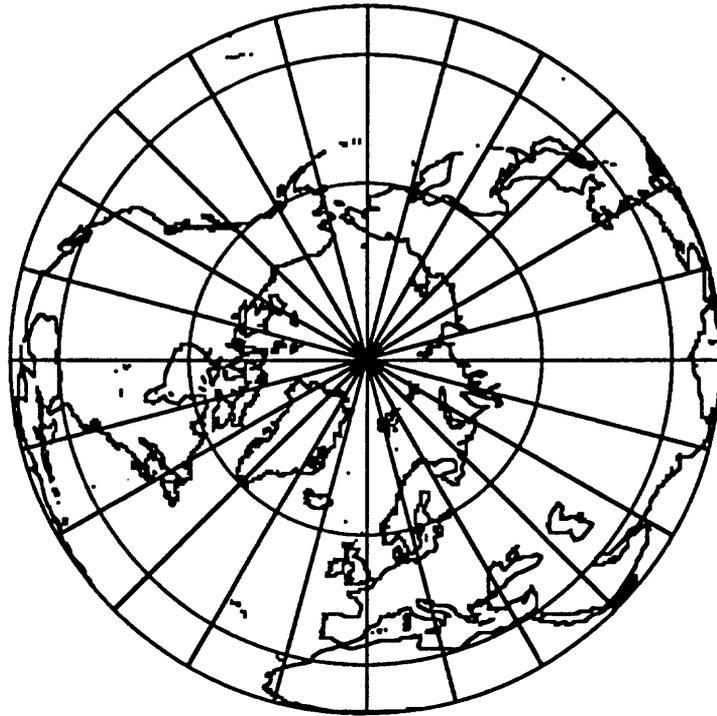
World Hi Res



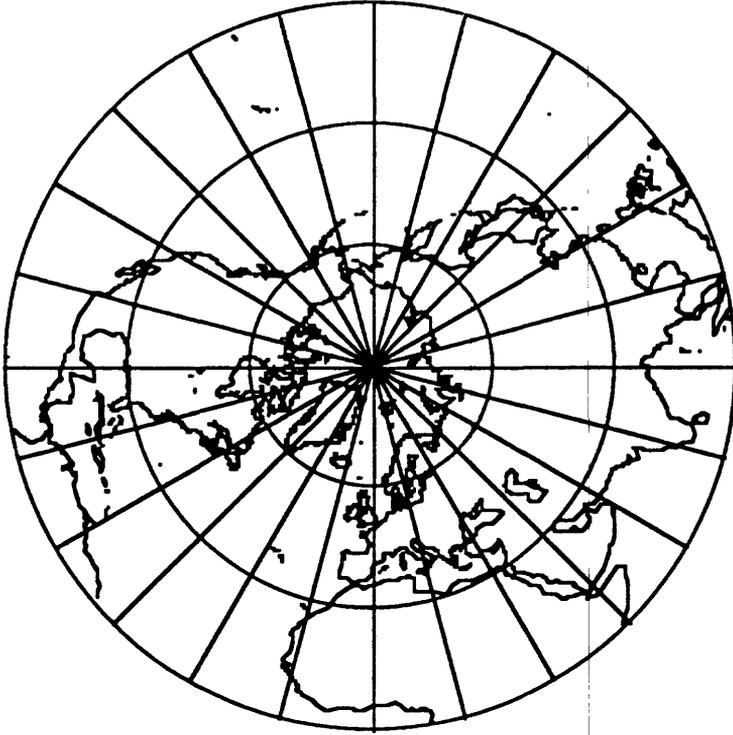
World Coarse



Northern Hemisphere Orthographic

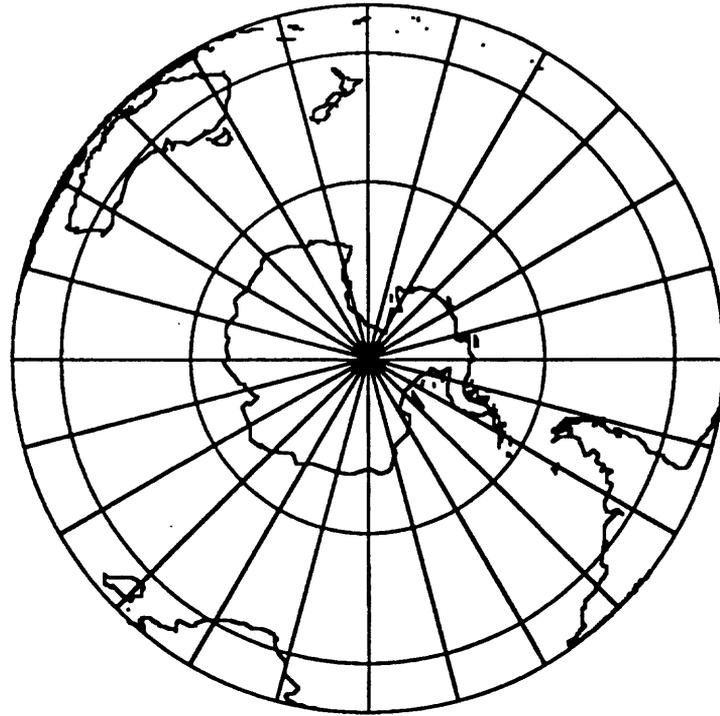


Northern Hemisphere Stereographic

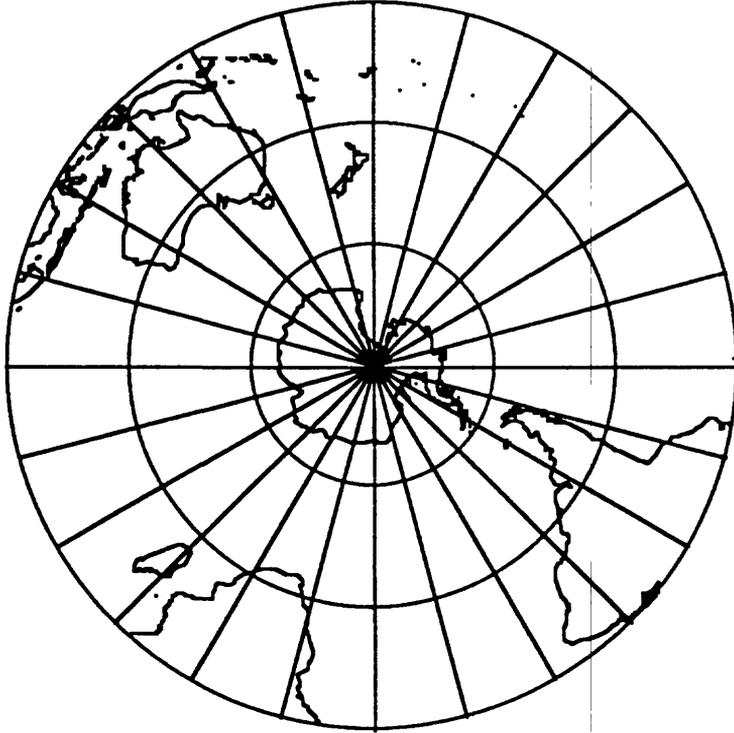




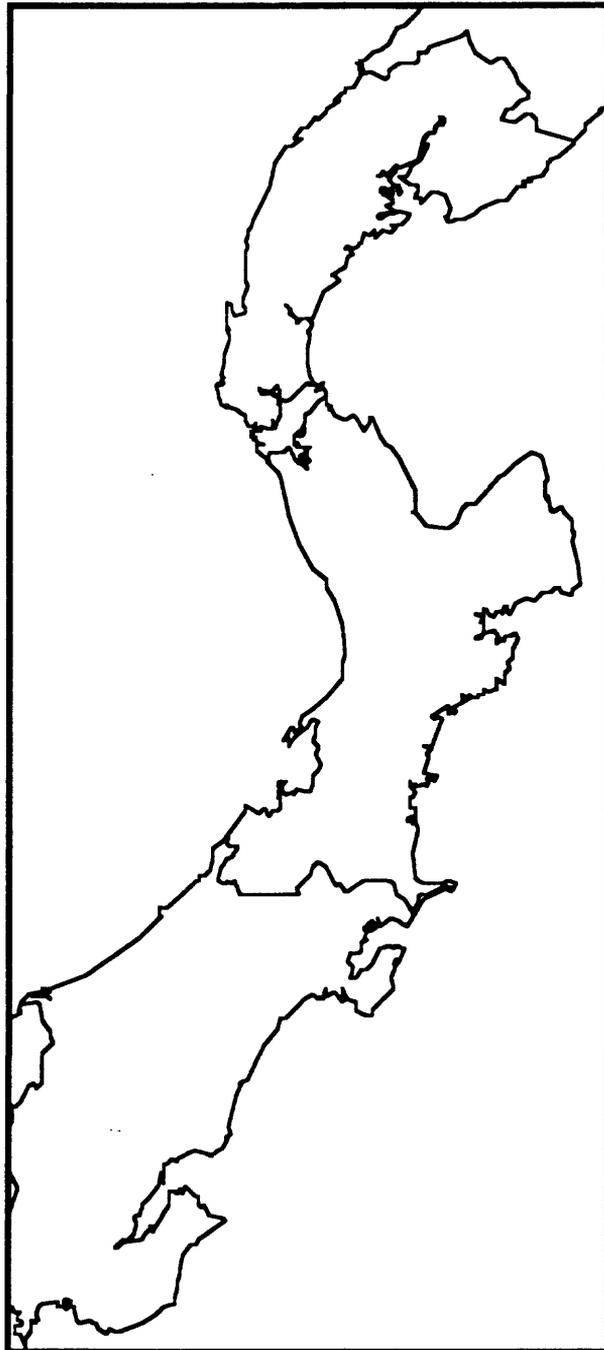
Southern Hemisphere Orthographic



Southern Hemisphere Stereographic



Custom Map Examples
Panama



Australia

