

# The development of User Interface for Multi-Beam data processing in Linux

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## ✓ Purpose

The IHO will intend to develop a suitable open-source based processing package which is produced a low or no cost software solution for the logging and processing of survey data

## ✓ Investigation

On the above purpose, The MB-System is a best choice of package to process the swath mapping sonar data. Due to its command line interface, the novices or MS-window users feel inconvenient for usage.

## ✓ Solution

To get ride of this inconveniency, Develop the User interface of MB-System for more efficient MB-data processing in Ubuntu Linux system

※ ***MB-System : Data Processing Package for Multi beam Echo Sounder, Side Scan Sonar***

## MB-System Manager System Architecture



### MB-System

Data Processing Package made by Columbia University. The MBM UI was developed using open-source software tools. These included the Eclipse, and the JDX software development tools. The applications were developed using Open Source Linux Operating System

## Operating environment

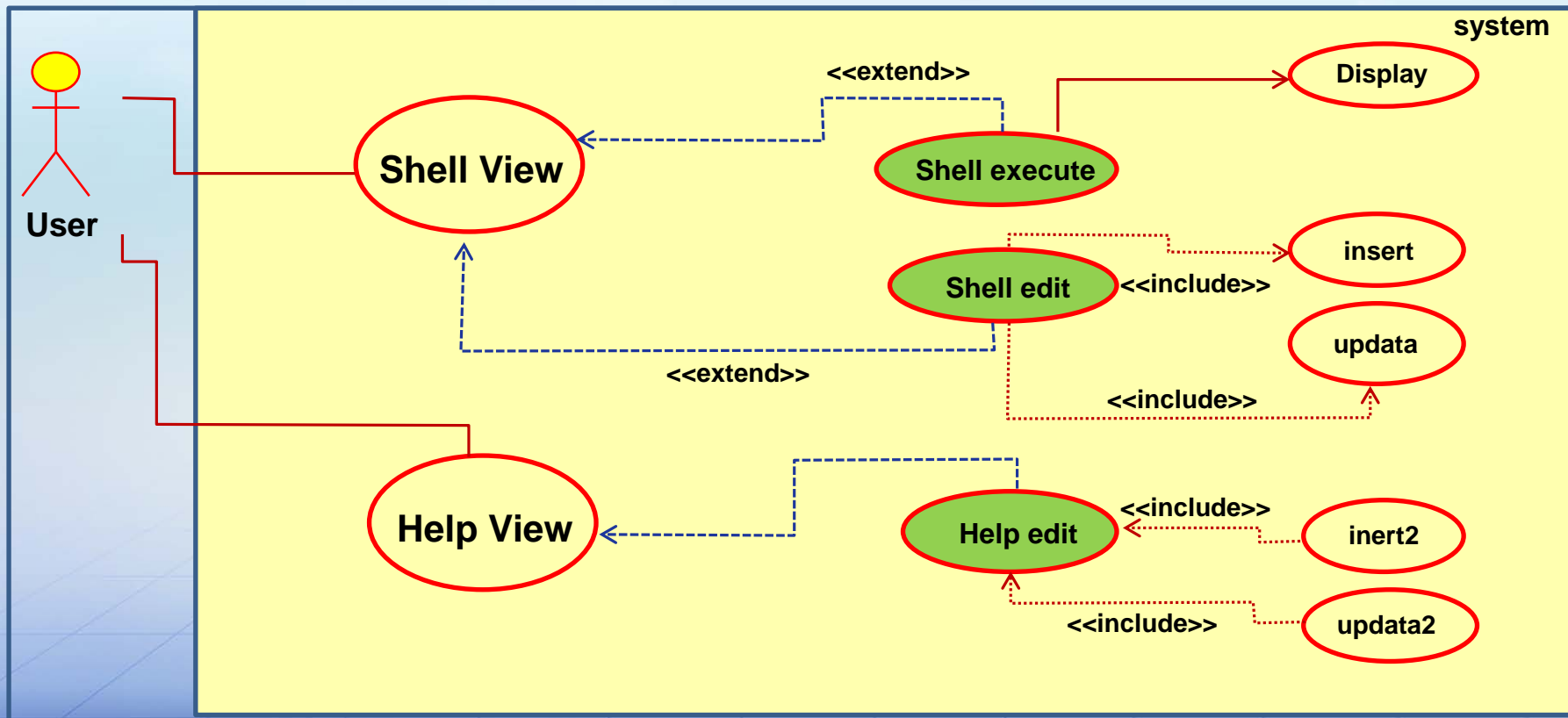
Division	Item	Specification
Hardware	CPU	Intel core 2 or above
	Main memory	1 GB
	Hard Disk	100 GB
Software	OS	Linux 2.2.x or above
	JAVA	Java Runtime Environment (JRE) 1.5.x or above
Tool	JAVA Editor	Eclipse 3.x or above
	JAVA Compiler	JDK 1.5x or above

## ❖ Problem

Inconvenient user interface for novice or MS-window user

## ❖ Solution

Developing User Interface, The executable commands of MB System convert to graphic button



# Design of System

**User choose shell script execute in window mode.**

MB System has two type of result display, the one is terminal text display and the other is graphic display in window.

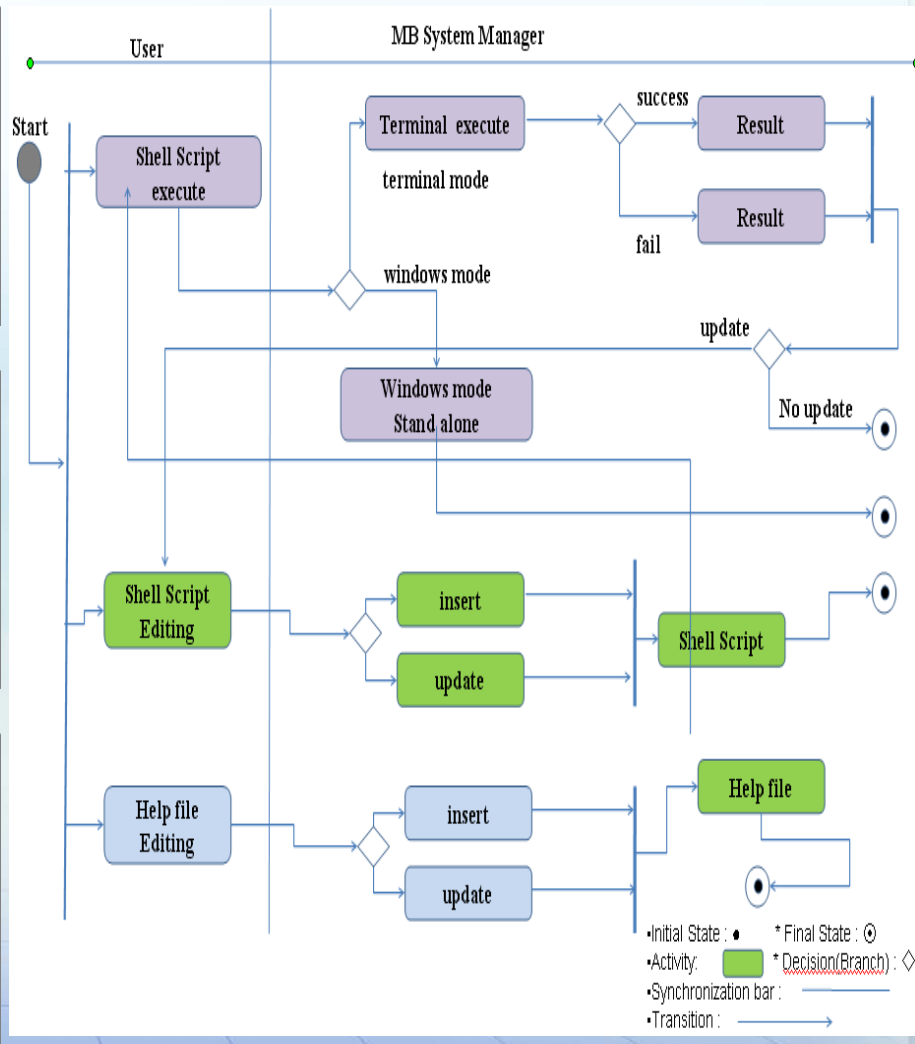
- Terminal execute : Display the result and Finish
- Window mode : Transfer the results to MB System manager

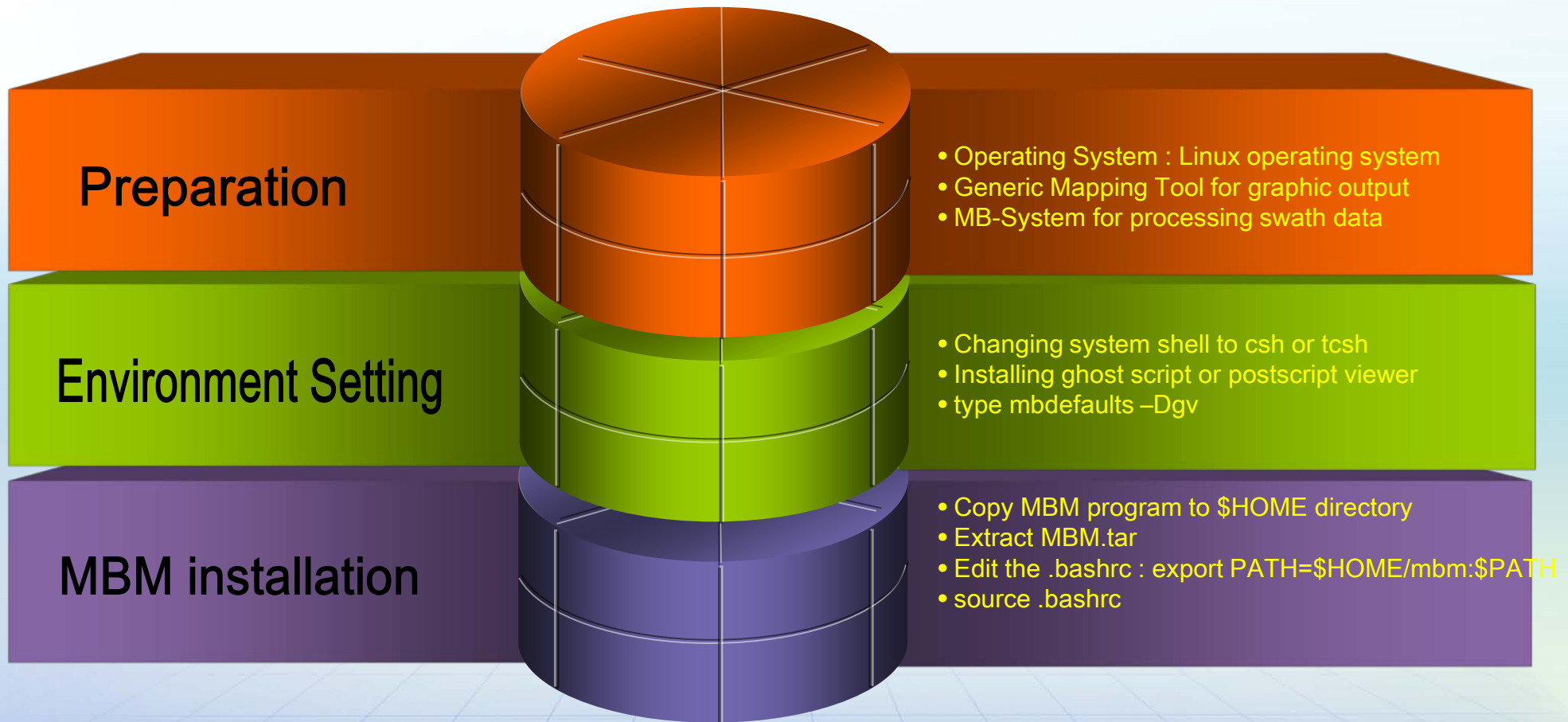
**User choose Shell Script Editing mode in window**

- insert mode : Insert new shell script.
- update mode : Update the established shell script.

**User choose Help file Editing mode**

- insert mode : Compile documents for MB system command.
- update mode : Modify established document for MB system command.





## Hlp directory

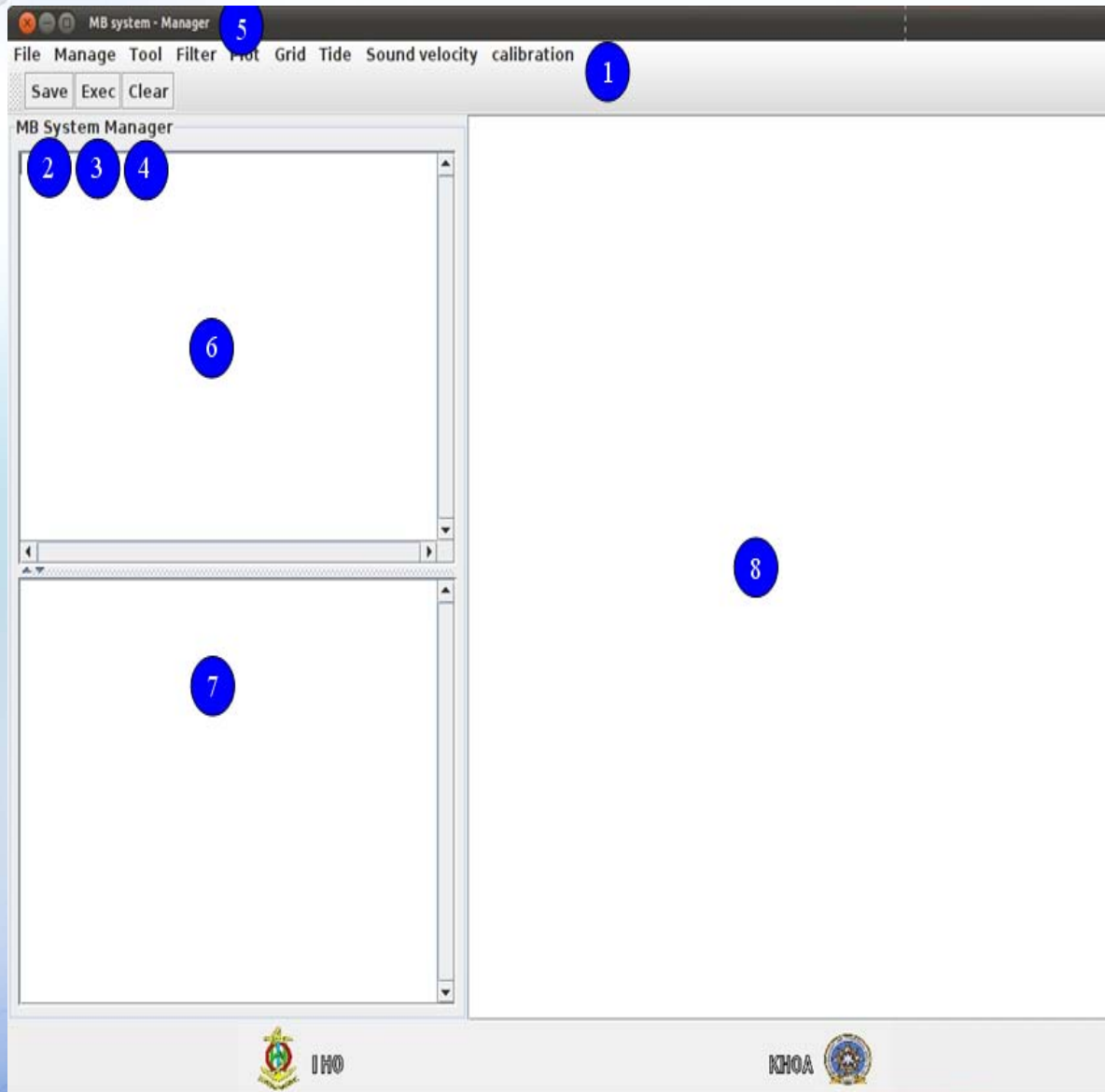
contain the help files of MB-System

## Sh directory

contain the shell script files of MB-System

```
./mbm/  
./mbm/mbm  
./mbm/mbm.jar  
./mbm/hlp/  
./mbm/hlp/mbfilter.hlp  
./mbm/hlp/mbgrid.hlp  
./mbm/hlp/grid_plot.hlp  
./mbm/hlp/mbbath.hlp  
./mbm/hlp/mbedit.hlp  
./mbm/hlp/mbnavedit.hlp  
./mbm/hlp/mi_mblevitus.hlp  
./mbm/hlp/grid_3dplot.hlp  
./mbm/hlp/mbdatalist.hlp  
./mbm/hlp/mbprocess.hlp  
./mbm/hlp/mblist.hlp  
./mbm/hlp/mbvelocitytool.hlp  
./mbm/sh/  
./mbm/sh/mblist.sh  
./mbm/sh/mbgrid.sh  
./mbm/sh/work.sh  
./mbm/sh/mbbath.sh  
./mbm/sh/grid_3dplot.sh  
./mbm/sh/grid_plot.sh  
./mbm/sh/mbprocess.sh  
./mbm/sh/mi_mblevitus.sh  
./mbm/sh/mbedit.sh  
./mbm/sh/mbnavedit.sh  
./mbm/sh/mbfilter.sh  
./mbm/sh/mbvelocitytool.sh  
./mbm/sh/mbdatalist.sh
```





- 1 Full-down Menu
- 2 Save the command and help file after editing
- 3 Execute MB-System shell script
- 4 Clear the contents of 8
- 5 Inform the current MB-System command
- 6 Show and Edit the current shell script
- 7 Show and Edit the help file
- 8 Display the results of the current command

# MB-Data processing

Manage

mbdatalist

**mblist**

mbinfo

Manage

mbdatalist

mblist

**mbinfo**

MB System Manager

2009/03/29/14/42/49.028000	124.595320	37.351641	180.20	15.37
2009/03/29/14/42/49.279000	124.595320	37.351631	180.20	15.34
2009/03/29/14/42/49.530000	124.595320	37.351621	180.19	15.34
2009/03/29/14/42/49.780000	124.595320	37.351612	180.18	15.34
2009/03/29/14/42/50.030000	124.595320	37.351602	180.18	15.34
2009/03/29/14/42/50.281000	124.595321	37.351592	180.19	15.34
2009/03/29/14/42/50.533000	124.595321	37.351582	180.20	15.34
2009/03/29/14/42/50.786000	124.595320	37.351572	180.22	15.34
2009/03/29/14/42/51.048000	124.595320	37.351562	180.24	15.34
2009/03/29/14/42/51.301000	124.595320	37.351551	180.26	15.37
2009/03/29/14/42/51.552000	124.595320	37.351541	180.28	15.37
2009/03/29/14/42/51.804000	124.595320	37.351532	180.30	15.37
2009/03/29/14/42/52.056000	124.595320	37.351522	180.32	15.37
2009/03/29/14/42/52.305000	124.595321	37.351512	180.33	15.37
2009/03/29/14/42/52.556000	124.595320	37.351502	180.34	15.37
2009/03/29/14/42/52.808000	124.595320	37.351493	180.35	15.37
2009/03/29/14/42/53.059000	124.595320	37.351483	180.35	15.37
2009/03/29/14/42/53.310000	124.595320	37.351473	180.35	15.34
2009/03/29/14/42/53.561000	124.595320	37.351463	180.35	15.34
2009/03/29/14/42/53.812000	124.595320	37.351453	180.35	15.34
2009/03/29/14/42/54.064000	124.595320	37.351444	180.37	15.34
2009/03/29/14/42/54.315000	124.595320	37.351433	180.38	15.30
2009/03/29/14/42/54.566000	124.595320	37.351423	180.40	15.30
2009/03/29/14/42/54.818000	124.595320	37.351414	180.43	15.30
2009/03/29/14/42/55.067000	124.595320	37.351404	180.46	15.30
2009/03/29/14/42/55.318000	124.595320	37.351393	180.48	15.37
2009/03/29/14/42/55.574000	124.595320	37.351383	180.50	15.37
2009/03/29/14/42/55.826000	124.595320	37.351374	180.51	15.37
2009/03/29/14/42/56.077000	124.595320	37.351364	180.53	15.37
2009/03/29/14/42/56.329000	124.595321	37.351355	180.53	15.26
2009/03/29/14/42/56.580000	124.595321	37.351346	180.54	15.26
2009/03/29/14/42/56.831000	124.595321	37.351336	180.54	15.26
2009/03/29/14/42/57.081000	124.595321	37.351327	180.55	15.26
2009/03/29/14/42/57.332000	124.595321	37.351316	180.55	15.19
2009/03/29/14/42/57.583000	124.595321	37.351307	180.56	15.19
2009/03/29/14/42/57.833000	124.595320	37.351297	180.56	15.19
2009/03/29/14/42/58.083000	124.595320	37.351288	180.56	15.19
2009/03/29/14/42/58.334000	124.595321	37.351274	180.56	15.34

-----END-----  
Total Line count:49777

MB System Manager

mbinfo -f-1 -i:/datalist\_all

Data Totals:

- Number of Records: 2980
- Bathymetry Data (151 beams):
  - Number of Beams: 449980
  - Number of Good Beams: 281990 62.67%
  - Number of Zero Beams: 130322 28.96%
  - Number of Flagged Beams: 37668 8.37%
- Amplitude Data (151 beams):
  - Number of Beams: 449980
  - Number of Good Beams: 281990 62.67%
  - Number of Zero Beams: 130322 28.96%
  - Number of Flagged Beams: 37668 8.37%
- Sidescan Data (2000 psws):
  - Number of Psws: 5960000
  - Number of Good Psws: 3331021 55.89%
  - Number of Zero Psws: 0 0.00%
  - Number of Flagged Psws: 2628979 44.11%

Navigation Totals:

- Total Time: 841.1049 hours
- Total Track Length: 260.0460 km
- Average Speed: 0.3092 km/hr ( 0.1671 knots)

Start of Data:

- Time: 05 19 1997 01:09:21.551000 (D139)
- Lon: 131.3667 Lat: 37.3125 Depth: 2267.1001 meters
- Speed: 24.8612 km/hr (13.4385 knots) Heading: 0.3000 degrees
- Sonar Depth: 0.0000 m Sonar Altitude: 2267.1001 m

End of Data:

- Time: 06 23 1997 02:15:39.115000 (D174)
- Lon: 131.3167 Lat: 37.6053 Depth: 2228.8000 meters
- Speed: 23.3788 km/hr (12.6372 knots) Heading: 358.7000 degrees
- Sonar Depth: 0.0000 m Sonar Altitude: 2228.8000 m

Limits:

- Minimum Longitude: 131.2695 Maximum Longitude: 132.0082
- Minimum Latitude: 37.0773 Maximum Latitude: 37.7981
- Minimum Sonar Depth: 0.0000 Maximum Sonar Depth: 0.0000
- Minimum Altitude: 0.0000 Maximum Altitude: 9701.9004
- Minimum Depth: 457.2000 Maximum Depth: 2423.8000
- Minimum Amplitude: 36.7887 Maximum Amplitude: 87.5387
- Minimum Sidescan: 0.3155 Maximum Sidescan: 36833.0401

The operation completed successfully

Track chart

## Plot

mbm\_grdplot

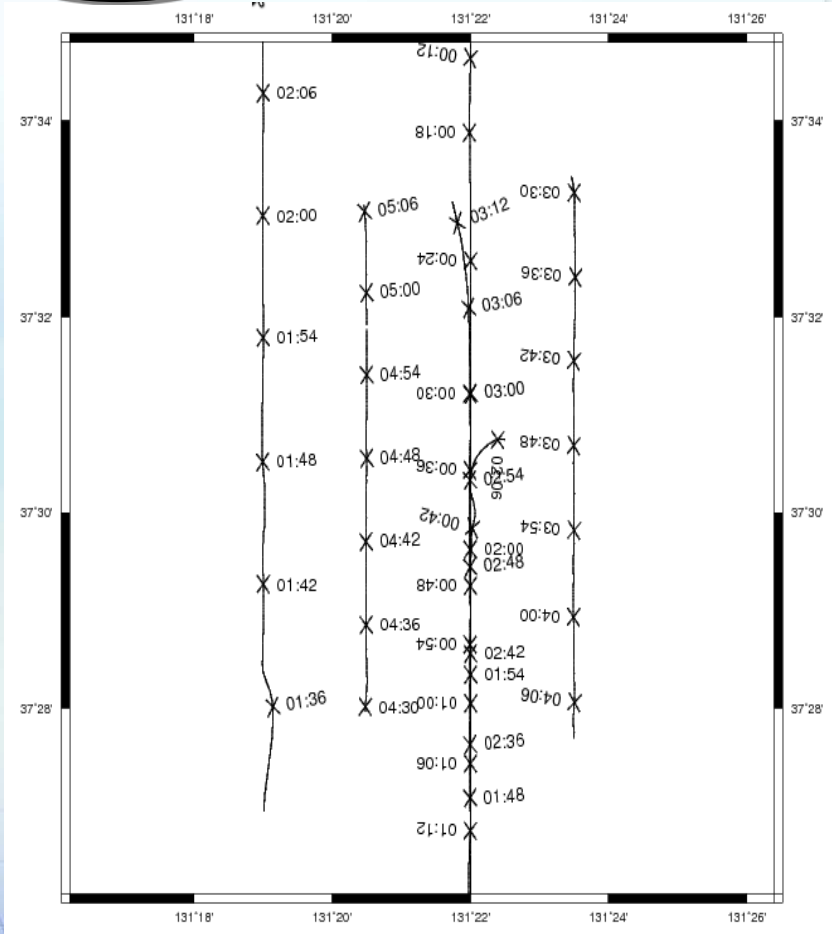
mbm\_grd3dplot

mbm\_plot

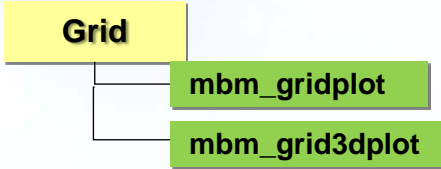
The screenshot shows the MB System Manager application window. The title bar reads "MB System - mbm\_plot". The menu bar includes "File", "Manage", "Tool", "Filter", "Plot", "Grid", "Tide", "Sound velocity", and "calibration". Below the menu bar are buttons for "Save", "Exec", and "Clear". The main window is divided into several panes:

- MB System Manager:** Contains command-line input for the `mbm_plot` command, including file paths and options like `-NP -X -N0.1/0.1 -R1 31.27/1 31.44`.
- Terminal/Log:** Displays the execution output, including "2362 pings read and plotted", "psbasemap: Constructing basemap", and "Total Line count:35". It also shows instructions for generating a Postscript plot and a list of processing commands for various data files.
- Command Line:** Shows the execution of the `mbm_plot` command with various options for projection, scale, and output format.

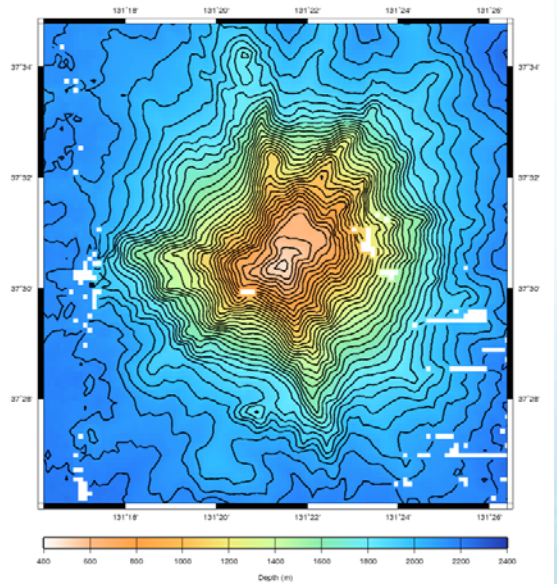
## Track-line



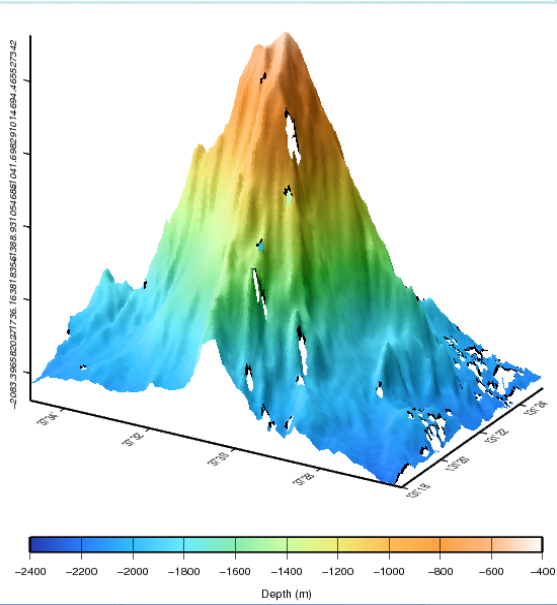
# MB-Data processing



**Grid\_plot**



**3D\_plot**



**MB System Manager**

```

#mbm_plot -F-1 -I ./datalist_all -NP -X -NO.1/0.1 -R131.27/131.44
#mbm_plot -F-1 -I ./datalist_all -G1 -X
#mbm_plot +-1 -I ./datalist_all -G2 -X -R131.27/131.44/3/.43
#gedit datalist_all

2362 pings read and plotted
psbasemap: Constructing basemap
===== END =====
Total Line count:35

Plot generation shellsript <./datalist_all.cmd> created.

Instructions:
Execute <./datalist_all.cmd> to generate Postscript plot <./datalist_all.ps>.
Executing <./datalist_all.cmd> also invokes gv to view the plot on the screen.
Saving GMT defaults...
Setting new GMT defaults...
Running mbcontour...
Running psbasemap...
Deleting surplus files...
Resetting GMT fonts...
Running gv in background...
[1] 4823
All done!

Program MBCONTOUR
Version $Id: mbcontour.c 1829 2010-02-05 02:53:39Z caress $
MB-system Version 5.2.1880

processing data in /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0519/sb
processing data in /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0519/sb
processing data in /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0519/sb
processing data in /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0519/sb
processing data in /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0519/sb
processing data in /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0623/sb
processing data in /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0623/sb
processing data in /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0623/sb
MBIO Warning: Datalist entry skipped because it could not be opened:
Datalist: /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0623/
File: /home/mbsystem/Documents/examples.5.1.0/data/seabeam2100/anyb_seabeam2100/0623/

2362 pings read and plotted
psbasemap: Constructing basemap
===== END =====
Total Line count:35
  
```

Anyongbok seamount in East Sea

- **To develop UI for MB-System using open source is the aim of this project. Although Some of programs in MB-system package are not fully expressed in MBM, It shows meaningful performance and results.**
- **The JAVA program is designed by the full-down menu method, so all users could easily understand the source code. To use this application for better, I put the storable and editable function, so processed scripts files can be reused.**
- **Also I am releasing the digital source code of the MBM program for all users in the attachment and, if necessary, you can modify and compile the source code.**
- **I hope MBM UI application could contribute to the development of the hydrographic fields .**

강원도  
GANGWON-DO

경상북도  
GYEONGSANGBUK-DO

**KOREA**

경상남도  
GYEONGSANGNAM-DO

동해  
EAST SEA

Dokdo

**Thank you**



**Korea Hydrographic and  
Oceanographic Administration**