# SimpleDEMViewer 6.9 SimpleDEMViewerAS 1.9

# User Manual



AS ( Mac App Store ) version has some limitations because sandboxing programing is required. <a>AS note</a> denotes those limitations and differences in each features. Last section lists up all of them.

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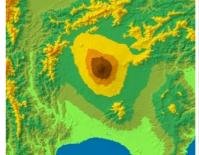
# 1. About SimpleDEMViewer

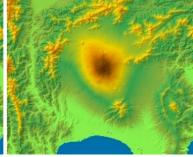
## Draws maps colored by elevation

Reads various Digital Elevation Model (DEM) data, and makes map colored by elevation with or without shading. It supports gradation color also.

- · Draws Parallels and Meridians.
- Shows latitude, longitude and elevation at the mouse point.
- · Draws contours calculated using DEMs.
- Support various DEM data available at online sites. See below.
- Makes maps with several projection methods. See below.

Two pictures at right show maps around Mt. Fuji in Japan using SRTM 3 seconds mesh DEMs with shading.





No gradation

With gradation

## **Supported DEM files**

Followings are supported. Refer next section.

- GTOPO30 (30 sec.)
- ETOPO1 (1 min. with sea depth, Treated as BIL form)
- ETOPO2 (2 min. with sea depth)
- ETOPO5 (5 min. with sea depth)
- GLOBE (30 sec.)
- SRTM (1 sec., 3 sec.)
- SRTM DTED (1 sec., 3 sec.)
- · USGS ascii ( Geo and UTM )
- USGS SDTS (Geo and UTM)
- 1km / 250m / 50m / 10m / 5m / 2m DEMs from GSI of Japan
   AS note> No support of 10m / 5m / 2m DEMs those have file extension 'LEM'.
- BIL form DEM ( with address boundary or no addressing )
- ASTER GDEM (1 sec. / GeoTiff)
- JAXA ALOS (1 sec. / GeoTiff)
- GeoTiff DEM
- netCDF DEM (GMT compatible format )
- PDS DEM ( Planetary Data System form NASA. File extension is 'IMG')
- ArcAscii DEM files ( Geo and UTM )
- HYDRO1k (no address data)

### Customizable items

- Elevation colors and its boundaries.
- · White Antarctica and Greenland.
- Gradation colors.
- · Lakes. Its color.
- Shading, light direction, shade strength.
- Shrink or expanding rate (between 2000% and 5%)
- Color, line width and intervals of Parallels and Meridians.
- · Adjust horizontal scale depending on latitude, so that horizontal and vertical scale will be the same.
- · Others.

## Other functions

- · Making lake data.
- Drawing contours.
- · Coloring by slope degrees.
- · Texture Mapping.



Conical projection map using ETOPO2

- Drawing bird's-eye View pictures.
- Drawing stereograph pictures.
- · Drawing SRVC relief maps.
- · Drawing panorama view pictures.
- · Go through landscape, 3D movie.
- · Drawing visible region.
- · Drawing geo-profile pictures.
- Drawing grayscale map pictures.
- · Drawing Orthographic projection maps.
- · Drawing Conical projection maps.
- · Drawing Mercator projection maps.
- · Drawing Equidistant projection maps.
- · Drawing Equi-area projection maps.
- Drawing Universal Transverse Mercator ( UTM ) projection maps.
- · Drawing Lambert Conformal Conic projection maps.
- · Saving pictures as picture files in various formats.
- · Creating and drawing memos, routes and areas on maps.
- Reading some external format data and draw them as user memo, route and area data.
- Export user data to text file and import them.

#### **Datum**

Always WGS84 is used, but calculations of distance and direction are based on a sphere its radius is 6371 km.

Even if DEMs stand on other than WGS84, SimpleDEMViewer uses WGS84 always, therefore you should aware of the datum of your data. One exception is Tokyo datum of older DEM files from GSI of Japan, their addresses are converted to WGS84 automatically.

## **Projection method**

Projection method depends on DEM data type.

#### **Geo DEM**

Longitude / Latitude coordinate ( Equidistant Cylindrical projection ). You can adjust horizontal axis to reduce distortion of the map depending on latitude.

#### **UTM DEM**

UTM of course.

#### XY plane of Japan DEM

Rectangular Plane Coordinate system defined in Japan.

#### Other plane DEM

Rectangular plane Coordinate system other than UTM and XY plane of Japan. You can define worlds local plane coordinate system such as NZTM2000 and CH1903+, etc.. They should stand on Transverse Mercator Projection like as UTM. It is applicable for BIL and ArcAscii DEMs. See "Manage Planes".

If you do not know the coordinate system of your DEMs, you can use them without addressing called General Plane DEM in this program. Such DEMs can be arranged in the map window, but could not link with any other data including other DEMs, User Data and texture maps.

#### No addressing DEM

No projection. No link with latitude and longitude. Only one DEM file can be shown on the map window.

#### Planets and the Moon

Supports DEMs for planets and the Moon using PDS or bil form DEMs. Refer <u>BIL</u> <u>form DEM data</u> section for BIL form DEMs.

All calculations are based on specified radius. Coordinate system should be geo-referenced. Following functions are not supported for planet DEMs.

- Drawing UTM projection map.
- Drawing white Antarctica and Greenland.
- Drawing sea and the Sun in panorama views.

## 2. Elevation Data

You should prepare at least one of following elevation data (DEM) separately.

All DEM data are treated as datum is WGS84 except older DEMs from GSI of Japan.

#### GTOPO30, HYDRO1k

Their data interval is 1 km nominally. GTOPO30 is bounded by Latitude and Longitude. HY-DRO1k requires header file (it's file extension is HDR).

You can download both at Elevation data site of USGS.

#### ETOPO1, ETOPO2, ETOPO5, GLOBE

They are 1, 2, 5 minutes and 30 seconds mesh data. First three have bathymetry data, and covers whole world by one file. ETOPO1 provided as BIL or GeoTiff, and SimpleDEMViewer treats them as BIL or GeoTiff.

You can download them at National Geographical Data Center (NGDC).

### SRTM 3sec/1sec

This data is obtained by Space Shuttle. It is bounded by Latitude and Longitude. It's data interval is 3 arc seconds or 1 arc seconds. Refer to Shuttle Radar Topography Mission (SRTM) site.

You can download them from above SRTM site in its original format (its file extension is HGT), or in BIL format.

#### SRTM DTED level 0/1/2 ( 30 sec / 3 sec / 1 sec )

"Finished" data derived from SRTM. Sea surface and some lake surfaces are flattened. You can order data SRTM site on DVDs.

### SRTM30plus

30 seconds mesh DEM derived from SRTM, and has bathymetry data. First 7 characters of the file name should be same as those of GTOPO30, and file extension should be "SRTM".

#### **USGS** ascii

You can download various elevation data in this format from USGS or some other data centers. Supports geo and UTM data. File extension should be "DEM".

#### **USGS SDTS**

You can download various elevation data in this format from USGS or some other data centers. File extension is always DDF. One DEM data consists of several files, although open dialog can select xxxxCEL0.DDF file only.

<AS note> You should select a folder instead of a file.

## 1km / 250m / 50m / 10m / 5m / 2m DEMs from GSI of Japan

Sold in CD-ROM only for Japanese region. You can purchase from Japan Map Center (JMC). <AS note> No support of 10m / 5m / 2m DEMs.

#### **BIL FORM DEM**

Supports 8 or 16 bits integer and 32 bits float format. Supports geo and UTM addressing. Supports elevation values in meters or feet. Refer next section.

You can download various elevation data in this format from USGS and other GIS data sites.

#### **ASTER GDEM**

One of GeoTiff form DEM. The data pitch is 1 arc-second. http://gdem.ersdac.jspacesystem-s.or.jp

#### JAXA ALOS World 3D-30m

One of GeoTiff form DEM. The data pitch is 1 arc-second. Paired mask file has sea area information. If no mask file exists in the same folder, the file is treated as general GeoTiff DEM.

http://www.eorc.jaxa.jp/ALOS/en/aw3d30/

<AS note> You should select a folder instead of a file.

#### **GeoTiff DEM**

Supports 8 or 16 bits integer and 32 bits float format. Unit is meter or feet for elevation. Supports geo and UTM and other plane DEMs, if it is plane DEM other than UTM, a dialog will appear to ask you which plane should be taken. Datum is ignored, all are treated as WGS84.

<as note> You can select any tiff format file by Open panel, error message will be shown after closing the panel if those are not DEM file.

#### Arc Ascii DEM

Arc/Info's exported text format DEMs. Supports geo, UTM and other plane DEMs. If UTM or other plane DEMs, will ask zone number or what plane. Elevation value should be in meters. File extension should be 'ASC'.

If you specify 0 for zone number, the DEM will be treated as "General plane DEM", that means no link with latitude and longitude.

You can download SRTM 3 sec ver.4 in this format at the CGIAR-CSI site.

#### netCDF DEM

GMT compatible netCDF format DEM files are supported. File extension should be 'GRD'.

<as note> You can select any file that has file extension 'GRD" by Open panel, error message will be shown after closing the panel if those are not DEM file.

### PDS DEM

Planetary Data System DEMs are derived from NASA space data. The Moon, Mercury, Mars and some other celestial bodies data are provided as DEM files. File extension should be 'IMG'. In case a separate label file, its file extension is 'LBL', is attached, it should exist in the same folder.

<as note> You can select any file that has file extension 'IMG" by Open panel, error message will be shown after closing the panel if those are not DEM file.

#### **DEMs for KASHMIR**

Dedicated format for KASHMIR 3D with the file extension 'dcm'. ( KASHMIR 3D is a program for MS Windows. )

#### **BIL form DEM data**

#### Requirements

- Each elements is 16 or 8 bits integer with sign bit, or 32 bits float. Supports Motorola and Intel byte order which is specified in header file. Default is Motorola format.
- Elements are stored in row major order (all the data for row 1, followed by all the data for row 2, etc.).
- Data interval is in degrees or seconds. Meters for UTM or no addressing DEMs.
- Each value is in meters or feet.
- · No LF nor CR characters.
- File extension should be BIL DEM or FLT. If FLT, data element should be 32 bits float.
- File size should be equal to "number of columns" times "number of rows" (times 2 if 16 bits element or times 4 for 32 bits float) described in header file.
- Header file must be exist in same folder. It's file name is same as elevation data but file extension. It's file extension should be HDR.
- Optionally BLW file is used to determine boundary addresses. It's file name is same as elevation data but file extension BLW.
- -9999 in elevation value means sea, except when 'NODATA -9999' specified.

#### HDR file (text file)

This file should describe followings. Other items are ignored.

Specify one entry in one line. Each line has a key and a value pair. Result has no guarantee if conflicted entries are specified.

Keys Values

NROWS number of rows NCOLS number of columns

NBITS number of bits per element, 8 or 16 for integer, 32 for float. Can be omitted if file

extension is FLT.

<followings are optional>

BYTEORDER If 'I' or 'LSBFIRST' is specified byte order is Intel, otherwise Motorola.

UTMZONE UTM zone number. Specify if addresses are based on UTM.

XYPLANE Plane ID defined in Manage Planes panel, or plane number of Japanese 19-

rectangular plane coordinate system.

If Plane ID contains space, enclose them with double quotation marks.

If 0 is specified, it means general plane coordinate system.

ULXMAP Longitude at the center of the north-west corner cell of the data in degrees, or UTM Y

address. X address for other plane coordinate system in meters.

ULYMAP Latitude at the center of the north-west corner cell of the data in degrees, or UTM X

address. Y address for other plane coordinate system in meters.

XLLCORNER Longitude at the lower-left corner of the south-west corner cell of the data in degrees, or

UTM Y address. X address for other plane coordinate system in meters.

YLLCORNER Latitude at the lower-left corner of the south-west corner cell of the data in degrees, or

UTM X address. Y address for other plane coordinate system in meters.

XLLCENTER Longitude at the center of the south-west corner cell of the data in degrees, or UTM Y

 $address.\,X\,address\,for\,other\,plane\,coordinate\,system\,in\,meters.$ 

YLLCENTER Latitude at the center of the south-west corner cell of the data in degrees, or UTM X

address. Y address for other plane coordinate system in meters.

XULCORNER Longitude at the upper-left corner of the north-west corner cell of the data in degrees, or

UTM Y address. X address for other plane coordinate system in meters.

YULCORNER Latitude at the upper-left corner of the north-west corner cell of the data in degrees, or

UTM X address. Y address for other plane coordinate system in meters.

XULCENTER Same as ULXMAP YULCENTER Same as ULYMAP

(Notes) Above five sets (ULXMAP/ULYMAP, XLLCORNER/YLLCORNER, XLLCENTER/

YLLCENTER, XULCORNER/YULCORNER, XULCENTER/YULCENTER) are

exclusive. If mixed, result is undefined.

XDIM Horizontal data pitch in degrees or seconds. If it is greater than or equal to 0.1, it is in

seconds. For UTM and other plane DEMs, value is in meters.

YDIM Vertical data pitch. value is same form as XDIM.

CELLSIZE Data pitch for horizontal and vertical. Don't specify XDIM and YDIM when this entry

exists.

SEALEVEL If data has special value for sea area, specify it. -9999m is assumed if not specified here

and NODATA is not -9999m.

NODATA If DEM file has no-data (void)-value, specify it.

NODATA\_VALUE Same as NODATA.

ELEVATIONUNIT Specify 'F' if elevation is in feet, otherwise omit this.

SKIPHEAD If data has extra bytes in the beginning of the file before elevation elements, specify

number of bytes to skip.

SKIPBYTES Same as SKIPHEAD

RADIUS Specify radius of the Moon or a planet other than the Earth in kilometer.

Instead of radius you can specify planet name for Moon, Mercury, Venus or Mars. If this entry is specified, coordinate system should be geo-referenced, otherwise DEM file is ignored. If you specify radius of the Earth, program assumes some planet other

than the Earth.

If addressing values are outside of geo address range (i.e. -180 to 180 and -90 to 90) and no UTMZONE nor XYPLANE is specified, 'XYPLANE 0' is assumed.

If four lines from ULXMAP to YDIM are not specified here and no BLW file is found, the DEM data will be treated as no address data.

<example 1=""></example>	
BYTEORDER	I
NROWS	3600
NCOLS	3600
NBITS	16
ULXMAP	-115.000138888
ULYMAP	35.999861111
XDIM	1.00000
YDIM	1.00000
<example 2=""></example>	
<example 2=""> byteorder</example>	lsbfirst
•	lsbfirst 3601
byteorder	
byteorder nrows	3601
byteorder nrows ncols	3601 3601
byteorder nrows ncols nbits	3601 3601 32

# **BLW file (text file)**

Values

-0.0002777777778 110.000138888889 39.999861111111

Lines

This file should describe following data in this order. Each line should have only one floating point number in text format.

1	Same as XDIM value.
2	( Ignore )
3	( Ignore )
4	Same as YDIM value, but always minus.
5	Same as ULXMAP value.
6	Same as ULYMAP value.
<examp< td=""><td>le&gt; 1 second mesh</td></examp<>	le> 1 second mesh
0.00027	777777778
0.0	
0.0	

## 3. Read Elevation Data

#### Read data

"File" => "Open" menu shows file selection panel. You can read elevation data by selecting individual files or folders through the panel. If you select a folder or folders, program reads all readable files in them. If files to be read are not compatible with files already read and showed in main window, an alert prompts you to dispose read data or cancel new reading.

If "Read two levels when folders selected." is checked, read files in folders those are in the folder you selected.

SimpleDEMViewer reads DEM files when you double click DEM files in Finder, or drop them on to application icon. Application icon accepts folder that contains DEM files.

Different format DEMs can be read and be laid in the map window as described in next section. UTM DEMs can be read at the same time if they are belong to the same UTM zone.

<AS note> You should select folder for SDTS and JAXA ALOS instead of individual files.

#### Mixture of different kind of DEMs

If several kind DEMs are read, map scale is based on the smallest pitch DEMs. The coordinate system is also determined by them. If it is UTM or other plane DEMs, whole map will be UTM or other plane coordinate.

If the coordinate system is UTM or other managed planes, map area extend up to 667 km. Location leaves far from center meridian more than 6 degrees, accuracy getting worse.

DEMs of different planets cannot be mixed.

## Start up time restoration

As a default, program restores DEMs and settings at starting if previous session ends without removing data. See "Save and restore working set" section.

To skip-restore function, start program with shift key pressing.

## Read as named working set

You can read previously defined DEM data set anytime with various settings. See "Save and restore working set" section.

#### Remove data

To remove read data, select "File" => "Remove data" menu, and select data to remove. If you read new DEMs without removing current data, and they are not compatible, you will be prompted to remove read data or cancel new reading.

## 4. Map Info Panel

Map Info Panel shows current DEM data type, scale, shading type and color set. You can change shading type, strength and color set from here and it affects map instantly.

## **Showing items**

DEM data type Type of DEMs currently showing. If they are UTM type,

shows zone number, and plane ID for DEMs defined in Man-

age Planes panel.

Scale Percentage of extending or shrinking rate based on one data

cell to one pixel ( if retina display, 4 pixels ) on the screen.

Also shows 1 / n style fractional number assuming that screen has 72 pixels per inch or 144 pixels per inch if retina

display.

Base latitude Base latitude for geo-referenced DEMs.

Lon / Lat Intervals of Meridians and Parallels. If they are same value,

shows only one.

Shading Shows shading type. You can change it by popup menu.

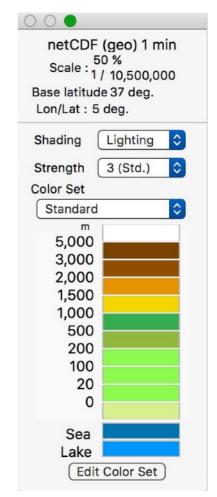
Strength Shows shading strength. You can change it by popup menu.

Color set Shows current color set with color set menu. you can select

color set here.

## **Operations**

- "Show / Hide Map Info Panel" under the "View" menu shows or hides this panel.
- Changing shading or color set in this panel affects map window immediately.
- Changing settings here affects Preferences settings also.
- "Edit color set" button shows Preferences panel.



# 5. Map Settings (Preferences)

You can specify colors, shading and other settings in "Preferences" dialog. Select "Preferences..." under the application menu to show the dialog.

#### **Elevation colors**

- Elevation color table is like a picture at right. Elevations are boundaries between colors in same row and next. You can change all colors and boundary
  elevations, sea color and lake color. Click each color box to change it's color
  or each elevations to change boundary elevation.. You can specify float values for boundary elevations in unit of meters.
- Number of elevation colors are variable between 3 and 30. Clicking [+] button adds a row before selected row. If none selected, adds one at top. Clicking [-] button remove selected row. You can not remove bottom row.
- Any place has elevation between boundaries are colored with its color.
   Places having elevations equal to boundary elevation, take upper side color when elevation is greater than 0 m, otherwise take lower side color.
- Sea color applied when elevation value is specified as sea, usually -9999 m is specified.
  - No sea color applied to ETOPO1 / ETOPO2 / ETOPO5 / SRTM plus and GEBCO since no sea level data exist.
- If gradation is on, colors are changed gradually from one elevation color to next elevation color. Take specified color when the elevation is mid of two boundary elevations. Gradation will not be applied if boundary elevation is 0 meter. Highest and lowest part are also exception.

#### Vacant color

Color for the region where no elevation data exists.

Select from white, black or sea color. Sea color varies depending on color set.

## Use gradation

Check if you want to draw elevation colors with gradation.

#### White Antarctica and Greenland

Make Antarctica to be white. Some low elevation outskirt of the land are depends on elevation colors.

Area over 1300 meter elevation on Greenland are drawn with white color. Picture at right is Greenland using ETOPO1 and etopo color set.

# Fill land of zero meters or less with a color just above zero meters.

When using a color set with seabed color like the "etopo" color set, draw the color of the land lower than the sea level with the color just above 0 meter. However, in the case of the Caspian

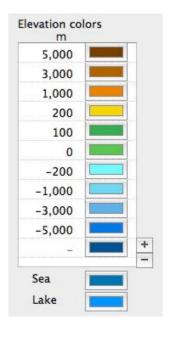
Sea it is applied only for area shallower than 28 meter, area deeper than it is drawn with the original level color.

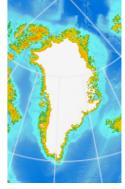
Target places are only followings.

Caspian sea. Dead sea. Northern lower land of Egypt, Libya and Algeria. Eritrea, England (about 120 km north of London). Salton Sea and Death valley U.S.A. Lake Eyre Australia. Turpan Basin China. Nagoya and Niigata Japan.

Do not turn on this switch if you use color set its color of zero meter or less is land color.

Picture at right is a sample drawing of Caspian Sea using ETOPO1 and "etopo" color set.





#### **Draw lakes**

Check if you want to draw lakes with lake color. You should create lake data to draw lakes for each DEM kinds. Refer to section "Drawing lakes".

## Treat 0 m as sea if DEM does not specify sea level

Some types of DEMs have sea area as 0 meter.

Be aware that inland 0 meter area also be treated as sea.

This option applied to DEMs when they are read when this option is on, no effect to DEMs already be read.

## Treat sea as no data region

Some DEMs have void or vacant area within their rectangle region. Program searches other DEMs to fill those region. If you check this option, sea area is treated as vacant area, so that you can draw land part of GTOPO30 and sea part of ETOPO1 for example. Set to off usually because of performance.

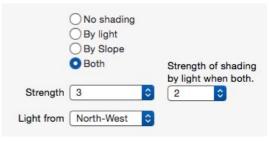
## Color sets

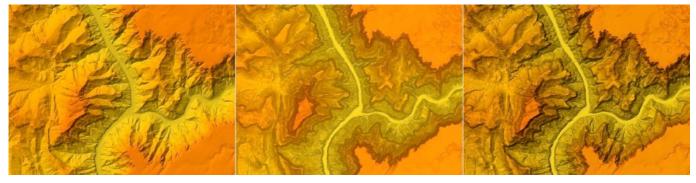
- A color set includes elevation colors, lake and sea colors, boundary elevations.
- You can create new color sets with names, they will appear in color set menu.
- · You can delete named color sets other than default color sets.

## Shading

- · Select one of "No shading", "By light", "By slope" and "Both".
- Strength has eight levels. 8 is most deep.
- You can select light direction from 8 direction menu when "By light" or "Both". Elevation angle is always 45 degrees.
- If "Both" you can select strength of shading by light between 1 and 5.
- If DEM has no address, assume upside towards north.

The picture below shows sample of each effect, left is by light, center is by slope, right is by both. DEM is 1/3 seconds NED of Grand Canyon.





#### **Parallels and Meridians**

- Select line interval between 30 degrees and 1 minute or automatic.
   Default is automatic. You can select different intervals for parallels and meridians.
- Select line color using Color Picker. Default is black.
- Specify line width in points. Default is 1 point. Float value is acceptable.

If the coordinate system is UTM or other managed planes, meridians will be drawn up to 10 degrees apart from base meridian for both side, but location accuracy getting worse if it leaves more than 6 degrees.

#### Base latitude

By default, each pixel of map has same size in degrees for horizontal and vertical dimensions, therefore pixels not on the equator are expanded horizontally wider as far from the equator. If your map is in large scale (e.g. SRTM) and you want to look around high latitude region, you can specify "Base latitude" to compensate this effect. Aspect ratio will be normalized at specified "Base latitude".

If you use SRTM 3seconds data and draw in 100%, each pixel represents 3 arc seconds in both latitude and longitude. It will be 6 arc seconds in longitude when you specify 60 degree as "Base latitude". "Base latitude" should be between 0 and 60.

"Set to current map center" sets base latitude to latitude of window center, but still restricted to 60. "Adjust Base Latitude" under the View menu do the same thing.

## Unit of milage

Specify unit of scale from "km", "mile" or "nautical mile".

Scale panel, Milage measuring, Route data milage, Geo-profile and Panorama view support it.

Base is the Equator.

Base is 36 degree.

## Address format to copy

Select address format to copy from D.M.S or degrees. It affects copy address on the main window and address view in any dialogs.

D.M.S LW N12.34.56.789 W123.45.54.321

DD 12.58244414 -123.7650892

## **Showing elevation**

You can show latitude, longitude and elevation value at the mouse point in the main window by moving mouse with option key pressing. You can select elevation value of nearest DEM element value or interpolated value. Interpolated value may exceed data value and actual elevation for peeks.

# Restore working set

Specify whether always restore status at start-up or only when user save the status manually at previous session.

Refer to "Save and restore working set" section.

#### Lake data folder

- Specify a folder to save lake data.
   Default folder is "~/Library/Application support/jp.jizoh/SDVr6/Lakes/".
   <a>AS note</a> "~/Library/Containers/jp.jizoh.SDVrAS/Data/Library/Application support/jp.jizoh/SDVrAS/Lakes/".
  </a>
- If you want to add lake data, you should have right to update the folder, otherwise you can share the lake data with other users.
- · Use default if you need not share lake data with other users.

#### Create world file

Specify to create a world file when saving grayscale map or stereograph to a file if available. See "Save pictures" section for conditions and file format.

## High density drawing

When using Mac with retina display, you can specify to create high density map to fit retina display. It makes map drawing little slower. Contour line get thinner and its drawing takes almost four times, also drawing visible region is same as such.

You should specify 144 dpi when saving picture, if you want a high density window picture.

## Other buttons

Reset Set all values in this dialog to program's default values except high density drawing and lake data

folder.

Redraw main window contents with current settings. Without clicking this button, latest settings

will be applied at next drawing.

# **6. Manage Projection Planes**

Define world's local planar coordinate systems which should use Transverse Mercator Projection like as UTM. Those systems should based on WGS84.

Coordinate systems defined here are identified by "Plane ID" you specified. You can refer Plane ID when reading some kind of DEM files.

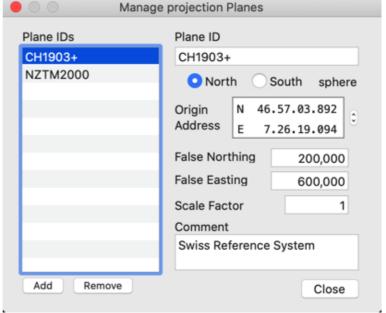
## Dialog

Select "Manage Projection Planes" under the File menu to show this dialog.

There are two predefined planes, "CH1903+" of Swiss and "NZTM2000" of New Zealand as examples. You can remove them if you want.

Plane ID Any characters to identify planes. North / South sphere Select one on which the plane is defined. Base Address Origin address of the coordinate plane in latitude and longitude. False Northing Y coordinate address at the origin. False Easting X coordinate address at the origin. ScaleFactor Scale factor at the central meridian, between 0.9990 and 1.0. Comment Any comment, will be shown

ing DEMs.



#### How to use

#### ArcAscii DEMs

Select from the plane menu in the selection dialog at reading time.

at selection dialog when read-

#### **Bil form DEMs**

Specify XYPLANE entry with Plane ID in the HDR file. XYPLANE CH1903+

If Plane ID includes spaces, use double quotation marks.

XYPLANE "Swiss Projection"





# 7. Manage Color Sets

You can manage (rename, remove, ordering in menu, export and import) color sets in a dialog under the File menu.

## Manage color sets

Dialog shows color sets other than standard three.

Select one color set shows its content in the right table.

To rename a color set, double click its name in the left table.

Select one and drag it to appropriate position to change order in the color set menu.

To remove color sets, select one or more color sets and click remove button.

## **Exporting**

You can write several color sets to a file to reuse them in other mac or in new system later, or pass it to your friends.

Select one or more color sets in the above dialog and click export button, and specify place and name of saved file. File extension is always 'jzcolr'.

## **Importing**

To read color set files, use "Import color sets" under the File menu. You can import old type color sets with file extension "sdcolr".

If the same name exists, a dialog appear and you can overwrite or enter new name. Even same name exists, if their contents are identical, it is skipped with no message.



# 8. Drawing Lakes

You can create lake data to draw lakes if lake region is flat in the DEM data. Lake data are created for each DEM types and be saved as separate files.

To create lake data, lake should be larger than 100 DEM data elements. If a lake surface is separated several elevation regions, you should make separate lake data for each regions. Picture at right is Lake Baykal using ETOPO2. It has different elevations for its northern and southern part. It requires you to make two lake data for one lake.

#### Create lake data

To create lake data, only one kind of DEMs are allowed in program. If more than one kind of DEMs are read, you cannot create lake data.

Select "Make lake data..." under "Tools" menu after reading DEM files to make lake data for them. "Making lake data" dialog appears and the cursor changes to a water bucket. If you click some point on the map, program checks around it whether any lake data can be created there or not. If it can do, click point address and elevation value are shown in the panel, and lake region is drawn by lake color. If not all lake region is drawn, click again remaining portion in the lake. After all available lake region drawn, enter lake name and click "Register" button. You can continue to create next lake data.

To finish creating lake data, click "Exit" button in the panel. Lake data are saved as lake data files.

Lake name Any name is acceptable. There is no need of uniqueness but preferable.

Click point Address of mouse clicked point.
Surface elevation Elevation of current lake surface.

Register Finish one lake data.

Clear Reset lake data creating status and clear fields,

Edit Display lake data table and delete, rename or change lake data. Refer next

paragraph.

Exit Finish creating lake data and save them.

#### Edit lake data

You can delete individual lake data, rename and change the rectangle bounding of lakes. Program uses elevation and boundary rectangle only to determine lake, therefore some places that has same elevation are drawn as lake, even if it is outside of the lake. To avoid that, you can create several lake data for one lake with adjusting rectangles.

Sometimes, lake and aside land elevations are equal, in such a situation, you may adjust rectangle to limit lake area.

#### Lake data files

Lake data are saved as a file for each DEM data types. Those files are saved into a lake data folder specified in the preference dialog. If you change it, SimpleDEMViewer replaces all the lake data by the data in the new folder.

You can copy it from another mac if it is created by ver. 5 or ver. 4.

#### **Notes**

- In the edit dialog, boundary rectangle of each lake data is shown by latitude and longitude, even if they are determined by UTM address for UTM DEMs. Such a case, latitude and longitude for north-west corner and south-east corner are shown in the dialog. It's the same for other-plane DEMs.
- Lake surface is not flat in SRTM DEMs usually, use SRTM DTED instead.
- · Cannot make lake data for DEMs those have no address information.

# 9. Map Handling

## Scaling

From scale menu or context menu, you can select scale between 2000 and 5% or specify values directly in "other" menu. If you change the scale using Scale menu, center of the main window keep its position. If you change it from context menu, mouse point will move to center of the window.

Scaling by pinch action on a track pad, in this case place at the mouse point retain its position in the map window.

Map is centered in window if scale is small enough to show all the world, or all the DEMs in case of UTM DEMs

#### Other scale menu

If you select other scale menu, a dialog will be displayed and you can specify any scale as follows in the dialog.

- Any percentage to data between 5 and 2000 percent.
- Specify milage in meter, km, yard or mile to data pixel, cm or inch in the map.
- Specify scale by fraction directly like as 1 / 1000000.

For second and third case, click calculate button after entering value, so that result scale will be set to the percentage field. In this case although only three decimals are displayed in the field, more significant decimals are kept.

## Reposition map by address (Jump to)

You can reposition the map to any place specified by latitude and longitude. Select "Find&Jump" => "Jump to..." menu to display dialog, and specify latitude and longitude. You have an option to draw a mark at the place after repositioning.

You can save the address with a name to reuse later, they will appear in a place menu of the dialog.

You may copy latitude and longitude in some web page and paste it to address field

here. Picture at right from USGS earthquake information page shows address consists of latitude and longitude. Any non-numeric characters are ignored but N, S, E, W. Refer to "Copy / Paste latitude & longitude" section.





# Reposition map by searching user data string

You can search a user data by string in title or node comment, and reposition the map so that the found data is positioned in the center of the window. Refer to "Find user data on the map" section.

# Reposition map by dragging showing frame in Index window

You can reposition map to any place specified in Index panel by dragging showing frame. Refer "Index Window" section.

# Scrolling

Supports drag scrolling and scrolling by wheel mouse or scroll gesture on a track pad. You can scroll one dot by pressing arrow keys. If retina display is used, scroll two pixels.

If DEM has geo address, you can rotate map horizontally around the world.

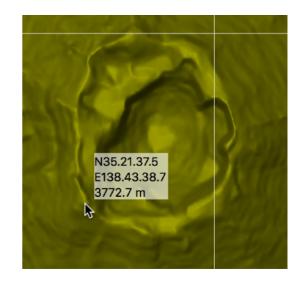
## Resize map window

You can set map window size by pixels. Select "View" => "Window size..." menu to display a dialog, specify width and height. Those values are applied to actual map portion without window frame and title bar.

You can drag the resize box or one of edges to change window size as usual.

# Showing address and elevation value

Move mouse on the map window with option key pressing to show latitude, longitude and elevation at the mouse point. Its elevation value is nearest cell value of DEM file or interpolated which you can select in Preferences.



# 10. Save and Restore Working Set

There are two situations to save working set. One is for the automatic restoration at the start-up. You can choose restoration occurs always or only when you had saved during previous session.

Another is the restoration when you want. Save working set with name, and restore it later. You can save many working sets with names, e.g. one is for world wide map, others for local maps, so that you can change maps easily with settings appropriate to DEM files.

## Restoration at start-up

Specify behavior of this function in "Misc." tab of Preferences. Select one of "Always" or "When saved manually". If "Always", working set is always saved before you quit SimpleDEMViewer automatically.

If not "Always", select "Save working set..." under "File" menu to show "Save working set" dialog, save and quit program. You can continue the job instead of quitting.

Restoration will be activated automatically at next start-up if status was saved. If you want to skip restoration, activate SimpleDEMViewer with shift key pressing. In this case, if not "Always" restoration is deferred to next time.

## Named saving and restoration

To save the working set, select "Save working set..." under "File" menu, enter any name to refer later, and click save button.

Click little triangle at the right to show existing names. If you select one of names in list, it will be copied to input field. Use it to overwrite or edit it to other name. When a name in the list is selected, you can remove it.

Saved names are listed in sub-menu of "Load saved working set" under the "File" menu.

Before loading saved working set, all DEMs, texture maps and user data are removed and panorama view settings are reset to defaults. All data files are reloaded even if same data files are used.

# Save as auto-reading at start-up. Save with a name to load mannualy. Name: undefine Cancel Save Save working status Save with a name to load mannualy. Name: etopo2@Australia Names Japan 50m @Fuji etopo2@europe

Cancel

Save

Remove

Save working status

# **Objects to restore**

Save read files and map drawing status, and restore them at next time. Data and information to be restored are followings.

- DEM files
- Texture maps
- User data
- Map position
- · Map scale
- Selected rectangle

Followings are saved in named working set.

- Settings in the preference dialog except misc page. In the misc page, only "Base latitude" is saved.
- · Contour settings.
- · Layer settings of user data.

#### Notes

Settings in the preference dialog are not restored for start-up restoration, but always remain between sessions.

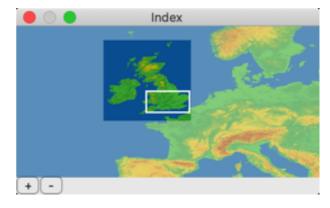
Only file pointers are saved for DEMs and texture files, they are read again at restoration time. They should reside in the system, otherwise will be ignored.

User data are saved as user data files for each memo, route and area. Even if there are new or updated data not saved yet, program quits without alert. Those data also restored in next time, but you'd better to save those data to files before quit to avoid losing data.

## 11. Index Window

Index window displays world map, shows area displayed in main window. White rectangle frame shows area that displayed in main window. Index window map shows also the area that DEMs are read with deep colors. This DEM region is always rectangle that cover all read DEMs, then it includes no DEM area.

Index window content will be rescaled and repositioned automatically when main window is rescaled or repositioned, so that white rectangle always be placed at the center of the window.



You can drag content map in the Index window temporarily. Drag map at outside of the white rectangle. It will be reset to default state when main window is redrawn.

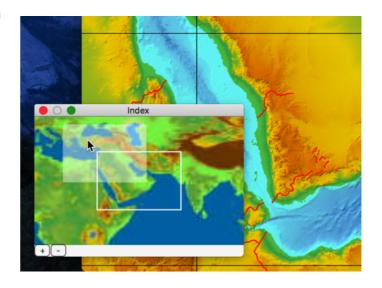
Show / hide index window can be done by "Show / Hide Index window" under the "View" menu.

You can enlarge index window contents up to 32 times. "+" button extends twice and "-" button shrinks to half.

You can expand index window size up to twice each in width and height.

Index window is not available if DEM has no address.

You can change main window map position using Index Window. To change map position, press mouse button inside of the white frame and drag it, release button where you want to show in the main window.



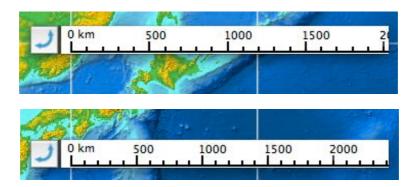
## 12. Scale Panel

When main window is front most, a scale panel appears.

Scale panel has two states, horizontal and vertical. If it is in horizontal state, the scale varies depends on latitude at bottom side of the scale panel, and it shows distance along latitude line. Horizontal scale is not available over 85 degree or under -85 degree area.

You can change state by click arc-arrow icon in the scale panel. You can show / hide scale panel by "Show / Hide scale panel" under "View" menu.

Scale unit can be changed among "km" "mile" and "nautical mile" in the preference dialog.



# 13. DEM Inspector

## Showing cell values of DEM files

DEM inspector panel shows elevation values of 7 by 7 cells around the address start inspector there. The address is shown as "Mark address". You can move range of showing cells by arrow keys or red arrow buttons on the panel. White rectangle frame appears on the map window, its inside area represents 7 by 7 cells. Red cross on the panel and on the main window map represent mark address.

Mark address

Center address

Each cell shows one of followings.

number Elevation value. Integer or float depends on DEM format.

Sea area. sea void Void area.

Out of DEM coverage. (n/a)

# Change elevation values

Double click a cell in the dialog to change an elevation value. To fix changed value, enter tab or return key, or click other cell.

Elevation value should be between -15000 and 15000 meters. You can enter "sea" or "void" instead of elevation value.

Changes are temporary. Those will be lost when guit program or

remove DEMs from program. Restore function does not maintain them. If you want to retain them for future use you should export DEM as new DEM file.

3762.30 3766.60 3770.70 3772.70

Set all cells

**DEM Inspector** 

N35.21.38.3 E138.43.38.5

N35.21.38.2 E138.43.38.6

3765.10 | 3769.90 | 3771.30 | 3770.60 | 3758.60 | 3753.80 | 3748.40

3763.60 3768.40 3771.50 3771.40 3769.20 3758.20 3752.60

3763.10 3767.50 3771.90 3774.90 3771.50 3759.90 3755.30

3759.60 | 3763.30 | 3767.70 | 3770.10 | 3770.20 | 3767.30 | 3760.70

3755.90 3757.60 3759.80 3760.50 3759.10 3758.60

3771.90

Copy all cells

3767.60

3758.00

3764.00 3770.20 3770.10 3758.80 3752.10 3747.30

### Set all cells to the same value

You can set all 7 by 7 cells to the same elevation value. To set the value, double click bottom left field, enter some elevation value and click "Set all cells" button.

You may use this function to flatten lake (or sea) surface.

# Copy all cell values

Copy all 7 by 7 cell values as string data. It has tab separator, so that you can paste to 7 by 7 cells in the sheet of Numbers.app.

Mark ad Center ad			42.0 W0 42.0 W0			<b>▲</b> ▼
4	4	6	1	5	8	void
2	1	5	-1	-4	void	void
-2	0	0	-6	-2	1	void
-5	0	-1	×	3	-5	void
5	7	2	1	2	-7	-12
2	8	-4	3	2	4	-14
-1	-1	5	5	8	13	-4
void	Set a	II cells	Co	opy all cell	s	Close

#### **Notes**

- Only base DEM is supported when several kinds of DEMs are read.
- Elevation values are shown as float number in meters when DEM file elevations are in feet.

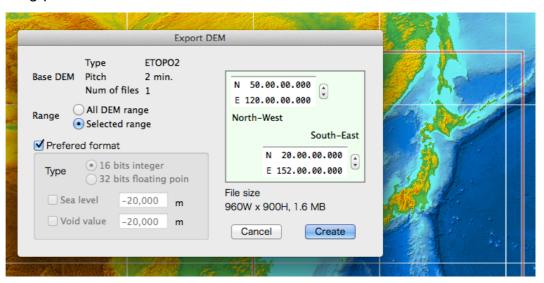
# 14. Export DEM File

#### Create new DEM file

Create a new DEM file from read DEMs, whole DEMs or some rectangle portion of DEMs. You can create new large DEM file from many small DEMs, or create smaller DEM from part of large DEM. Also, you can save amended DEMs changed in DEM Inspector. Output DEM file is always bil format.

Only base DEMs can be used to create new DEM file. DEMs should be based on WGS84 or no address DEMs, that means you cannot save old DEMs from GSI of Japan (those file extensions are one of TEM / SEM / MEM / LEM ).

Output DEM file format depends on source DEM but you can change bit width, that is 16 bits integer or 32 bits floating point.

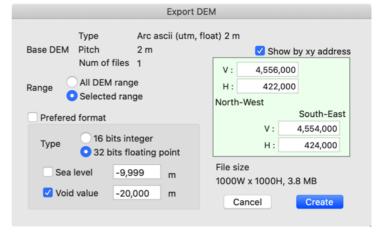


If DEM is based on UTM or other planes, you can specify range by XY address like as in the picture at right. If no address DEM, range shows only XY addresses.

## **Operations**

To show the dialog, select menu item "Export DEM..." under the "File" menu.

If you have selected rectangle region previously, "Selected range" is on, otherwise "All DEM range" is on at beginning. You can change it anytime.



Base DEM Showing base DEM type.

Range

All DEM range Includes all base DEMs.

Selected range Includes rectangular region bounded by latitude and longitude or XY addresses.

Preferred format Set items in the box to source formats.

Type Select bit width of output DEM file.

Sea level Specify elevation value treated as sea, copied to SEALEVEL entry in the HDR file.

Void value Specify elevation value treated as void data, copied to NODATA entry in the HDR file.

North-West / South-East

Shows rectangular region to create DEM file. 180 degree meridian should not be inside.

File size Shows calculated output file size. If the size exceeds 2 Giga bytes limit, letters will be red.

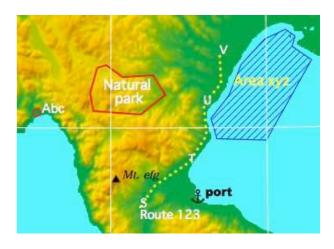
Click "Create" button to show save panel, specify name and place there. File extension is "bil" always. Bil and HDR files will be created.

## **Notes**

- Output DEM file can't exceeds 2 giga bytes.
- 180 degree meridian should not be inside.
- Byte order is Intel form (LSB) always.
- If selected range address does not match with DEM's boundary address, they are adjusted automatically.

## 15. User Data

You can make memos, routes and areas on the map. To create user data, start from pop-up menu by ctrl+click on the map. You can save them as files, read and show them later. You can pass those files some other person, so that they can see your memos and other user data. User data are categorized by "Kind" and "Layer". 10 Layers are provided, and they are identified by numbers 0 to 9. You can create any Kind identified by strings. You can control visibility of each user data by Layer and Kind combination User data cannot be shown and handling on the map of no address DEMs.



#### Memo data

Memos have a mark, title, address and comment. Mark and title are shown on the map. If you double click on the memo, its contents will be shown in a separate window. You can configure the memo data to display a picture or web page instead of contents dialog. 41 ready-made marks are provided, and you can use custom marks up to 50.

#### Route data

You can create any route connecting place to place. Routes have a line, a title and node comments. You can set line kind (solid line, dashed line, etc.), colors and width.

#### Area data

Area data is bounded by lines connecting points. Area type is one of frame only, translucent, hatching, etc.. Title is shown in the center of the area.

You can read ArcInfo exported file (e00 format) as user route data.

You can read GPX format GPS data file to create user memo or route data.

You can read Placemarks as user data from KML files.

## 16. Memo Data

#### About memo data

You can write memos link to an address (latitude and longitude). A memo consists of title, kind, mark, address, contents and elevation. Memos are shown on the map as a mark and title. You can make titles maximum 3 lines, and can set font and style.

Mark is drawn at the address and title are drawn at the right of the mark. If memo has no mark, title is drawn as below-center of the first line of the title points the address.

Memos have "kind" and "layer" code. Visibility of memos on the map can be controlled by kind and layer

Kind You can create new kind with any

string

Layer A number, 0 - 9

Mark Select one from prepared set. You can

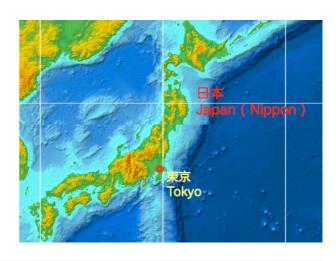
add any mark up to 50.

If mark or title string is double-clicked, memo content will be shown as next picture.

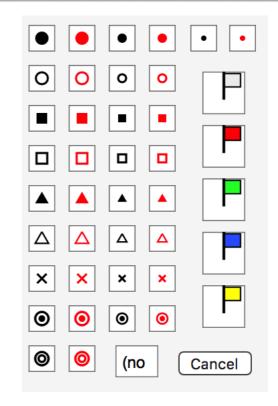
If url string is placed in the beginning of the contents field as picture below, pointed data (html document, a picture or a movie file) will be shown instead of above dialog when double-clicked. To show web page, you should turn it on in the Memo preference dialog.

<a href="http://www.metro.tokyo.jp/ENGLISH/index.htm">http://www.metro.tokyo.jp/ENGLISH/index.htm</a> size=( 800, 700 )
Capital city of Japan.
Reside at central Japan on Honshu island.

If DEM is no address type, you can't use memo data. You can format strings in comments field with HTML tags. Refer to section "Formatting contents with HTML tags".







Standard marks

#### Create new memo

Place the mouse cursor at the address in the map window, and control+click to show context menu, and select "Create memo". You can specify following items in the dialog.

Kind Select from menu, or input any words for new kind.

Layer Select one between 0 and 9 from menu.

Mark Select one from popup table.

Defaults button Set mark, layer and string attributes to defaults for "kind".

Title Any string to be shown on the map in 3 lines. If title exceeds 3 lines, remains will be

included in the 3rd line.

Address Latitude and longitude at the mouse point is set. Can be modified to any address.

Elevation Elevation DEM data of the above address is set. Can be modified to any value.

If elevation has no meaning or uncertain, specify -19999 or less.

String attributes Specify font, size, face, color and background for title string.

Comment Any comment strings. If url string parsed with '<' and '>' exist at the beginning, pointed data

( html documents, pictures or movies ) will be shown when memo is double-clicked.

When dialog appear, kind, layer, mark and string-attributes fields are set to those of previous

## Create memos directly from picture files with GPS information

Drop picture files on the map window to create memos. If those picture files have exif GPS information, memo data are created automatically. Those memos are created as followings.

- Kind and layer are set to those specified in "Memo preferences". Refer "Defaults of Memos".
- · Title is set to file name without extension.
- · Mark and string attributes are set to defaults of the kind.
- Latitude, longitude and elevation are extracted from GPS information of the picture.
- Comment field contains url of the file and creation date from exif information.

GPS address datum should be WGS84 except Tokyo.

<a href="AS">AS note"> Pictures should be placed in Memo Library. Even if pictures reside outside of Memo Library, Memo data will be created and pictures can be shown until program terminates. Saved such Memo data could not show picture later.

## **Update memos**

You can update each memo, or update common attributes of memos.

## Update one memo

there are three ways to call dialog to update each memo.

- Double-click a memo on the map during option key pressed.
- · Click "Edit" button on the memo-content-window displayed by double-click memo on the map.
- Select "Edit user data" under "User Data" menu. Select one memo in the list and click "Edit" button.

## **Update common attributes**

Select "Edit user data" under "User Data" menu. Select memos and click "Set all" button. You can update following attributes of every selected memos to same values.

- Kind
- Layer
- Mark
- · String attributes

## Show picture or html page

If url string parsed with '<' and '>' is placed at the beginning of contents field of memo, pointed data ( html document, a picture or a movie file ) will be shown when memo is double-clicked.

You have options to select destination to display those pictures or web pages. Options are

- Always in SimpleDEMViewer window.
- · Use web browser if those memo points web pages.
- Always use default application of the file to display such memo data.
   "default application" is determined by it's file extension. It may be "safari" or "Preview".

In the Memo tab of user data preferences dialog, you can specify this option.

Web site access is not allowed in default for security purpose. To allow it remove check from "Don't show web site" in user data preference.

#### **Url forms**

"http:" and "file:" forms are available for url string. To point files in the library folder, specify only sub portion under the library folder. Followings are examples. "Photos", "movies" and "hawaii.rtf" are placed at top level in the library folder.

Web page <a href="http://www.abcd.co.jp/pages/123.html">http://www.abcd.co.jp/pages/123.html</a> Local picture file <file:///User/Name/Picture/abc.jpg> Files in the Memo data library folder <Photos/Fujisan.jpg>

<movies/Cities/tokyo.mov>

<hawaii.rtf>

#### Url auto collection

Although you can enter url string directly, it is easier that dragging file icon to the memo dialog. If the dialog accepts file icon, its url string will be written as above 2 or 3 depending on where the file from.

If you drag & drop internet location file, the dialog takes pointed address instead of location file itself.

If dropped picture file has GPS information, latitude / longitude / elevation are taken for the dialog items. Also picture date (not the GPS time) will be placed in memo content.

ex) <file://photo001.jpg> Date(2006.02.02 15:20:30)

#### Window size

If pointed file is a picture or a movie file, SimpleDEMViewer get the appropriate window size from the file, otherwise you can specify window size with form of size = ( width, height ). For example

<a href="http://www.xyz.com/123park.html">http://www.xyz.com/123park.html</a> size = (700, 600)

## Formatting contents with HTML tags

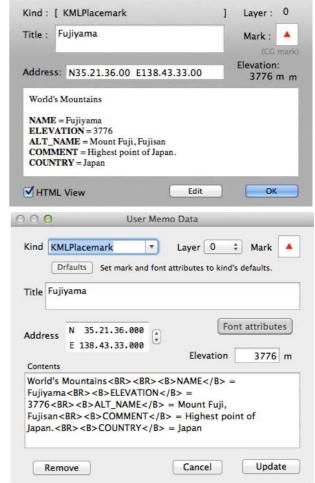
You can use HTML tags to format strings in contents field. For example, <br/> , <b></b>, <i></ i>, <h1></h1>, for each line break,bold, italic, header and paragraph. Any other HTML tags are acceptable but external reference to file or web site are ignored, and hyper links could not work.

Memo contents display panel (at right) shows "HTML view" check box when contents strings include HTML tags. Uncheck it to display full text including tags.

User Memo Edit Dialog shows full text of contents field always as right below picture. No WYSI-WYG editing function available, so you should enter tags manually, or copy from some HTML editor.

If contents field text includes '<' and '>" characters even no HTML tags or no external reference as described in previous section, some text disap-

pear in contents field of display panel. In such a case uncheck "HTML view" check box.



User Memo Data

## Pass memos to your friends

If you place memo content files in the memo data library, you can pass memo data with content data files to anyone using other Macs. If you place them outside of the library, it is difficult to pass memo data to other users to see your memo data on other Macs. There is no problem to pass memo data to other users if url points internet site or no url string specified.

### Move memos

Memo can be moved from original position. You can specify memo address in the update dialog, or simply drag memo mark in the map window.

To drag memo mark, select memo by clicking memo on the map first, then drag memo mark. If drag memo title, only the display position of title string will change without updating memo address. This display position of title string can not be saved.

In a picture window (such as Conical projection map), memo mark can not be moved but title string. If you drag title string to outside of the window, it is removed from the window.

### **Custom marks**

Any png pictures can be used as a memo mark.

First, create a folder named "MemoMark" in the "Memo data library folder". Place your png pictures there. Those pictures will be read by SimpleDEMViewer when it starts or library is selected, and will be displayed in the mark selection dialog.

Png picture file can have any file name but its file extension should be 'png'.

Picture size is free, however size of  $64 \times 64$  pixels are recommended, because marks are always drawn in the  $32 \times 32$  pixels rectangle.

Maximum number of custom marks is 50.

### **Defaults of memos**

Define kinds and defaults of each kind, also define "Memo data library folder". Do "User Data Preferences..." under "User Data" menu. Sequence of kinds in the list affects kind menu of the memo creation/update dialog.

New Create new kind.

Remove a kind. Kinds used by memos cannot be removed.

Rename Rename current one.
Up Move a kind upward.
Down Move kind downward.

String attributes Set default title string attributes for each kind.

Mark Click mark icon to change default mark for each kind.

You can define defaults includes string attributes and mark for each kind when only one kind is selected in the list. These defaults are referred when "defaults" button in the create/update memo dialog is clicked or when creating new memo first after program started.

## Destination to display pictures and web pages

- · Shown in own window.
- · Shown by web browser if web site is specified.
- Always shown by default application, such as Safari, Preview, etc..
   "default application" is determined from file name extension by system.

## Data library folder for user memo

Choose a folder to save data to be displayed as memo data content.

## Defaults for creating memo data by drag & drop

Select a kind and layer number as default values for new memo data creation by drag & drop a picture file.

## Memo data library folder

A folder for files referred by memo data content field, and for custom marks. You can specify any folder in the memo preferences dialog. Default is no library.

"MemoMark" folder containing custom marks should reside in this folder. Memo content files may be placed in this folder without folder structural restrictions.

### Read KML file as Memo Data

There are many type of data exist in KML (and KMZ) file, only simple Placemark with one Point is converted to one User Memo Data. Refer to KML Data section.

## 17. Route Data

## About route data

You can plot a route on the map window. A route has a line, title and node comments. You can specify line type, color and width. Title and node comments can have 3 lines. Font, size, style and color for those strings can be set.

If line segment length between nodes is longer than 150 km, it is drawn as a great circle, otherwise it is straight line on the screen.

Picture at right shows sample route data on a Orthographic projection map using ETOPO5.

Line types are solid line, broken line, chain

line, dotted line. Any colors are set to lines. Line thickness can be set from menu between 0.5 and 3.0 points.

Routes have "kind" and "layer". Visibility of each route on the map can be controlled by kind and layer.

Kind You can create new kind with any string.

Layer A number, 0 - 9.

You can create any kinds, and can delete them. They will be in kind menu.

If DEMs have no address info you can't use route data.

Route data is not restricted to route, but can be used as such rivers, administrative boundaries.

### Create new route data

To begin plotting new route, position mouse to an end of the route on the map. Do ctrl+click there, and select "Create route" from the context menu. Therefore a red line drawn from start point to mouse. Click mouse at the nodes, and double-click at the end node. If you click with option key, the node may have comment. If you make click on a string, any user data string, the string's address will be node address instead of mouse position, and the string itself is set to node comment. You can cancel last node by Esc key.

Creation dialog will appear after double-click, enter title, comments, line and string attributes as following list. You can modify each node address, and even add or delete nodes in the dialog.

Kind Select from menu, or input any words for new kind.

Layer Select one between 0 and 9 from menu.

Defaults Set layer, line and string attributes to defaults for "kind".

Title Any string to be shown on the map in 3 lines. If title exceeds 3 lines, remains will be

included in the 3rd line.

Line attributes

- Color Any colors from color picker dialog. Click color pane to show color picker panel. You

can specify opacity.

- Type Select a line type from menu.

- Thickness Select thickness of the line from menu.

Title attributes String attributes for title on the map. Refer String attributes.

Comment attributes String attributes for node comments on the map. Refer <u>String attributes</u>.

Number of nodes Shows number of nodes in the route, including both ends.

Mileage Total length of routes calculated on the assumption that the earth is ideal sphere with

radius of 6380 km.

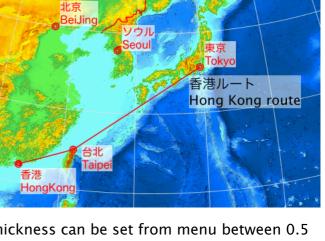
Node selection Select node to display details.

- top Show start node.

- prev. commented Show previous node that has comment. If there is no commented node, show start

node.

previouslastShow previous node.Show end node.



- next commented Show next node that has comment. If no commented node exist, show end node.

- next Show next node.

Node information

- (comment) Any string to be shown on the map in 3 lines. If comment exceeds 3 lines, remains

will be included in the 3rd line.

- Latitude & Longitude Showing node address of each node. Value can be modified.

- Elevation Elevation DEM data of the above address is set. Can be modified to any

value.

If elevation has no meaning or uncertain, specify -19999 or less.

Add node after this node Create new node between current node and next node. New node will be shown.

Delete this node Delete current node. Previous node will be shown.

Cancel creation of this route data.

Create this route data. Show it on the map.

When dialog appears, kind, layer, tile and comment attributes fields are set to those of previous one.

## **Update route data**

You can update each route, or update common attributes of route data.

## Update one route data

There are two ways to call dialog to update each route data.

- Double-click a route title or comment on the map during option key pressed. If it is done on one of the node comments, the node will be shown on the dialog.
- Select "Edit user data" under "User Data" menu. Select one route data in the list and click "Edit" button.

You can drag each node on the map to update its position. To start drag-editing mode, double click one of the string on the map during option and shift key are pressed. You can drag little black dot shown on each node. To finish drag-editing mode, click any point on the map other than those dots. Without entering drag editing mode, you can drag any node with option button pressing directly.

## **Update common attributes**

Select "Edit user data" under "User Data" menu. Select routes and click "Set all" button. You can update following attributes of every selected routes.

- Kind
- Layer
- · Line attributes
- · Title attributes
- · Comment attributes

### **Defaults for route data**

Define kinds and defaults for each kind. Do "User Data Preferences..." under "User Data" menu. Sequence of kinds in the list affects kind menu sequence of the route creation or update dialog.

New Create new kind.

Remove Remove a kind. Kinds used by memos cannot be removed.

Rename Rename current one.
Up Move a kind upward.
Down Move a kind downward.

Attributes Following attributes are set as defaults for each kind.

- Title attributes
- Comment attributes
- Line color
- Line width
- Type of line

You can define defaults for each kind when only one kind is selected in the list. These defaults are referred when "defaults" button in the create/update route data dialog is clicked.

## Read e00 files as user route data

e00 file contains Arc/Info interchange form data. SimpleDEMViewer reads e00 file and extract line data as user route data.

To read e00 file, do "Open" under "File" menu.

The file name will be "Kind" name of the user rout data. Data names have letters "Arc" follows by sequence number. All line and string attributes are fixed values, although you can change any attributes after reading with user data editing functions.

- Ignore all e00 file if it has no ARC data.
- Even if file contains area data, only boundaries are treated as routes.
- · Datum should be WGS84.

### Read KML file as Route Data

There are many type of data exist in KML (and KMZ) file, simple Placemarks with "LineString" will be converted to User Route Data. Refer to KML Data section.

## 18. Area Data

### About area data

Area data is a surface of the earth, bounded by points with addresses. Each area data has pattern and title showed on the map. The pattern is one of frame only, translucent, hatching (vertical, horizontal, right up, right down lines). Any color can be used for those patterns. Title string has maximum 3 lines, and font, size, style and colors are specifiable.

Area data have "kind" and "layer" code. Visibility of each area data on the map can be controlled by kind and layer.

kind: You can create new kind with any string.

Layer: A number between 0 and 9.

Several kinds are prepared as defaults, but you can create any kinds, and can remove prepared ones.

If DEMs have no address info you can't use area data.

Area data with holes are supported only when creating from external files such as KML. Can not create new Area data with holes by this program, and can not edit holes edge position.



To begin plotting new area, position mouse to an edge of the area on the map. Do ctrl+click there, and select "Create area" from the context menu. Therefore a red line drawn from start point to mouse. Click mouse at the nodes, and double-click at the end node. If you click on any user data string, the string's address will be node address instead of mouse position. You can cancel last node by Esc key.

Creation dialog will appear after double-click, enter title, line and string attributes as following list.

Kind Select from menu, or input any words for new kind.

Layer Select one between 0 and 9 from menu.

Defaults Set layer, line and string attributes to defaults for "kind".

Title Any string to be shown on the map in 3 lines. If title exceeds 3 lines, remains will be included in

the 3rd line.

Pattern Select an area pattern from menu.

Frame only, Translucent, Dots, Hatchings (Horizontal, Vertical, right up, right down)

Color Any colors from color picker dialog. Click color pane to show color picker dialog.

Title attributes String attributes for title on the map. Refer String attributes.

Area size Area size calculated on the assumption that the earth is ideal sphere with radius of 6380 km.

Cancel Cancel creation of this area data.

Create Create this area data. Show it on the map.

When dialog appears, kind, layer, area type, color and title attributes fields are set to those of previous one.

Addresses show far sides of area data.

## Update area data

You can update each area, or update common attributes of area data.

## Update one area data

There are two ways to call dialog to update each area data.

- Double-click an area tile on the map during option key pressed.
- Select "Edit user data" under "User Data" menu. Select one area data in the list and click "Edit" button.

You can drag each edge node on the map to update its position. To start drag-editing mode, double click title string on the map during option and shift key are pressed. You can drag little black dot shown on each node. To finish drag-editing mode, click any point on the map



other than those dots. Without entering drag editing mode, you can drag any node with option button pressing directly.

## **Update common attributes**

Select "Edit user data" under "User Data" menu. Select area data and click "Set all" button. You can update following attributes of every selected area data.

- Kind
- Layer
- Area pattern and color
- · Title attributes

### Defaults for area data

Define kinds and defaults for each kind. Do "User Data Preferences..." under "User Data" menu. Sequence of kinds in the list affects kind menu sequence of the area creation or update dialog.

New Create new kind.

Remove a kind. Kinds used by memos cannot be removed.

Rename Rename current one.
Up Move a kind upward.
Down Move a kind downward.

Attributes Following attributes are set as defaults for each kind.

Title attributesArea pattern

- color

You can define defaults for each kind when only one kind is selected in the list. These defaults are referred when "defaults" button in the create/update route data dialog is clicked.

### Read KML file as Area Data

There are many type of data exist in KML (and KMZ) file, simple Placemarks with Polygon will be converted to User Area Data. Refer to KML Data section.

## 19. GPX Data as User Memo and Route

GPX format GPS data includes waypoint / route / track data. Reading GPX file to create user memo or route data depends on them. Read the file using 'Open' under the File menu.

Addresses always be treated as WGS84. If elevation data exists, it will be copied as each point elevation. Its unit should be meter.

Kind of user data is always "GPX". If it is not exist already, one created automatically. If exists, all attributes of user data are copied from it. Layer is set to 0 (zero) always. If you want to use different marks depends on data, you should change individually or change all in edit user data dialog. Save them as user data file if needed.

### Memo data

Convert waypoint (WPT) data to memo data. Kind is always 'GPX'. You can change the kind anytime after reading to any kind as normal User Memo data.

Waypoint's name attributes is copied to title field of memo data. If no name attributes, title will be file name plus serial number in the file. <time>, <magvar>, <cmt>, <desc> attributes are copied to content field.

### Route data

Convert route (RTE) data and track (TRK) data to user route data. Kind is always 'GPX'. You can change the kind anytime after reading to any kind as normal User Route data.

If track data, each segment is converted to one user route data.

Name attributes is copied to title field of user route data. If no name attributes, title will be file name plus serial number in the file.

When 'rte', if each point has 'name' attribute, it is copied to node comment field. If no 'name', copy 'cmt' or 'time' attribute.

When 'TRK', if each point has 'time' attribute, it is copied to node comment field. If no 'time' attribute, copy 'name' or 'cmt' attribute.

## 20. KML Data as User Memo / Route / Area Data

There are many type of data exist in KML (and KMZ) file, only simple Placemarks are supported, other data are ignored. Convert "Point" data to User Memo data, "LineString" to User Route data, "Polygon" to User Area data. Refer some style attributes for label, line and polygon, but may not all attributes are converted to user data attributes, for example, polygons are treated as earth surface area always, extrude option is ignored.

### Common items

- User data kind will be set "KMLPlaceMark" always. It will be created automatically if not exist. If it exists, its attributes will be applied.
- Name entry in KML file is set to user data title field. If one Placemark contains many LineStrings or Polygons, all route or area data has same 'name'.
- · Layer of user data is 0 always.
- If altitudeMode is 'clampToGround', elevation value will be 'none', even other than 'clampToGround', if altitude is 0 set to 'none' also. For polygons ignore altitude and extrude option.
- Supports KMZ file that has only one KML file. If cannot read, unzip it previously and read it.
- You can change any attributes of read data, and save them as user data file for later use.

### Memo data

- · One point data is converted to one memo data.
- Kind of memo is "KMLPlacemark" and layer is always 0. If kind "KMLPlacemark" exists already, mark and title string attributes are taken from it. If the kind is created automatically, mark will be White Flag.
- If label style exists color and size are taken for title attributes.
- Content field of memo data is set to strings of "description". If 'description has "CDATA", its content is set to memo content field, so that if it contains HTML structure, its formatting is applied, but hyper link will not work.
- · Icon style is ignored always.

### Rout data

- One lineString data is converted to one route data.
- Kind of route data is "KMLPlacemark". If route kind "KMLPlacemark" exists already, title string attributes, line-type, line-width, line-color are taken from it. If Label style and line style are set in KML file, label color, label size, line width and line color are taken from it.

### Area data

- One polygon data is converted to one area data.
- Kind of area data is "KMLPlacemark". If area kind "KMLPlacemark" exists already, title string attributes and area-color are taken from it. If Label style is set in KML file, label color, label size are taken from it. Area pattern is "Translucent" if fill option is set in KML file, otherwise it will be "Frame only".
- · Alpha value of polygon color is ignored.
- Extrude option and altitude are ignored always, since user area data clamps to earth surface always.

## 21. Common Features of User Data

## Show / Hide user data

You can control visibility of each user data on the map using kind and layer. You can set each layer's visibility depending on map scale.

To set visibility control, display dialog by "Show/Hide user data" under "User Data" menu. You can set visibility for kinds and layers independently. Each user data will be shown on the map when its visibility is set to "show" for both Kind and Layer.

## by Kind

Following object's visibility can be set for each kind of data type.

- Data itself
- Title
- · Node comment for route

### by Layer

Layer setting is applied to all memo, route and area data. Two type of setting are available. One is just show / hide each layer, another is depending on map scale. Latter is optional. User data are visible when both are set to "show".

Visibility range is set by slider, drag edge of each slider to desired scale on the dialog.

## String attributes

Specify following attributes in separate dialog. Defaults for each kind can be set by preferences ( memo / route / area ) for each user data.

Font Select a font using Font panel.

Size Specify font size between 5 and 256 points. Style Specify bold, italic and shadow.attributes.

Letter color Specify any color for letters.

Background transparency Specify whether background is transparent or opaque Background color Specify color of opaque background. You can specify

opacity in color picker panel.

You can use 'Font Panel' to specify font, size. If you use 'Font Panel', 'italic' will be cleared.

Example of transparency.



## Save / Read user data

You can save all memos, routes or areas (created or read in a session) or data for selected kinds as a file. Do "Save user data" under "File" menu to save them with any name anywhere. File extension are set to "jzmemo", "jzrout" or "jzarea".

Alert dialog will appear when attempt to quit program without saving new or updated user data and "Restoration working set" function is not set to "Always".

To read user data file, do "Open" under "File" menu. You can double click user data file, or drop them on to application icon to read them. You can read old type data, their extensions are "sdmemo", "sdrout" and "sdarea" used by previous version.

Saving user data always creates new file, no update. You can make new file has same name as existing file to replace it.

### **Edit User Data**

You can edit individual data or group of data selected from a table, and also remove a data or group of data. You can edit any fields of a data, or common fields of a group.

### Show data in a table

Select "Edit user data..." under "User Data" menu to display the table filled with user data. Table shows kind, layer, name, latitude and longitude. Data sequence is selectable by any fields. For route and area data, latitude and longitude show center address of the bounding rectangle.

You can select data group appearing in the table using menus.

- Show memo, route or area data.
- Show all kinds or one kind.
- Show all layers or one layer.

## Change all

Select one or plural data and click "Change all" button. You can edit following fields.

memo kind, layer, mark, name string attributes.

route kind, layer, line attributes, name and comment string attributes.

area kind, layer, pattern attributes, name string attributes.

### Edit individual data

Select one data and click "Edit" Button. Edit dialog will appear and you can edit any fields. You can double-click on the data in the table to invoke editing.

### Remove data

Select one or plural data and click "Remove" button to remove them. Alert dialog shows count of data to remove. This operation is just removing them from memory, no affection to the file on a disk.

### Search data

Enter some string into search field, then those data that have the string in the title field will be shown in the table.

## **Export data**

Export User Data currently shown in the table, depending on Data Type,.Kind, Layer and search result. Refer next section.

## Find user data on the map

Any user data can be searched by sub-string of title or node comment shown on the map. Found user data (mark or node) are positioned at center of the window.

To search user data, show dialog by "Find..." under "Find&Jump" menu, enter some string to find and click "Find" button. To search next data that has same sub-string, do "Find next" under "Find&Jump" menu.

User data its position is out of the DEM data range can be searched, but cannot do search when no DEM data is read.

## 22.Export / Import User Data to / from Text File

You can export User Memo / Route / Area Data to text files, and import from text files. Those text files make available to use User data by other programs, and vise versa.

Memo Data text file format is TSV (Tab Separated Variable), so that you can check and edit them in table layout with application "Numbers". Other two are normal text files. TSV is also just a text file using tab character as a field separator.

String attributes are not exported nor imported. When importing, if "Kind" is predefined in the User Data Preferences, those predefined attributes are applied. If you want, you can set string attributes by "Change All" function in the Edit User Data dialog.

## **Export**

Press Export button in the User Data Edit Table described in the previous section. All data shown in table are written into one file. File extensions are fixed to TSV, ROUT, AREA for each Memo, Route and Area data respectively.

You have following options in the file saving dialog.

Address form In degrees or in degrees.minutes.seconds.

Number of Decimals for elevation integer, 1 or 2.



## **Import**

Select "Import User Data..." under the User Data menu to read text user data file. File extensions should be TSV, ROUT or AREA for each Memo, Route and Area data respectively.

### Text file format

All files should match followings.

- Text encoding is always UTF-8.
- Ignore lines as comment if first character in the line is semi-colon (;).
- If title or comment in Route and Area.data include spaces, enclosed them with double quotation marks.
- If any string such as title and content has line break characters, change them to \r or \n.

### **User Memo Data**

Write out following items, and read them.

Title Copy except line break character replaced by \n.

Kind Copy.

Layer Integer number,  $0 \sim 9$ .

Mark Number or mark name. Numbers for standard marks showed in Mark selection panel as tips.

Flags are Flag1 ~ Flag5. User marks are their file names.

Latitude and longitude

Latitude and longitude use each field, if D.M.S form is specified degrees, minutes and seconds

use each field.

Elevation Integer or decimals in meters. "(n/a)" is written if data has no elevation value. -20000 is

acceptable as no value for input.

Content Copy except line break character replaced by \n.

Example.  $(\rightarrow 1)$  is tab character.

;Title→ıKind→ıLayer→ıMark→ıLatitude→ıLongitude→ıElevation→ıContents

Tokyo\n東京→ıCity→ı0→ı35→i35.68333333→i139.75000000→ı(n/a)→ıCapital city of Japan.\nPopulation: 9 millions.

Picture below is screen shot of Numbers.app.

;Title	Kind	Layer	Mark	Latitude	Longitude	Elevation	Contents
Tokyo\n東京	City	0	35	35.68333333	139.75000000	(n/a)	Capital city of Japan.\nPopulation: 9 millions.
London	City	0	35	51.50000000	0.00000000	(n/a)	Capital of United Kingdom.\nPopultion: 7 millions.

### **User Route Data**

- First line except comment should specify address form.
- Datum is WGS84 always.
- One route data consists of a header line, a node header line, many node lines and a node trailer line. One file contains many routes data.
- The header line should begin with the key word "Route=", and specify route data attributes such as title, kind, layer, line attributes. Title and kind are required for every route data. If any other item is omitted, it will be the default values. If Kind is defined already in User Data Preferences, omitted items and string attributes are set to those predefined values.

### < Examples >

### ; Running courses

AddrForm= D

Route= "Our city marathon", Kind= "Running course", LineColor= red, Width= 1.5

Nodes\_Begin

Addr= (36.0123456, 139.33333), Elev= 456, Comment= "Start"

Addr= (36.0123456, 139.33375), Elev= 467)

. . .

Addr= ( 36.0123444, 139.3340 ), Elev= 499 Comment= "water"

. . .

Addr= (36.0123400, 139.33433), Elev= 555, Comment= "Goal"

Nodes\_End

### **Address forms**

AddrForm = form

The *form* is one of followings.

D in degrees ex.) 145.3254028 D.M.S separated by period ex.) 145.25.31.45

### Route header line forms

Kev words

Route= Kind= Layer= Line= LineColor= Width=

First two key words are required. Route = should be the first item and Kind = is the second. Other items can be specified in any order.

Route= Specify the title of this route, enclosed in double quotes. This will be shown in the map.

Kind= Specify kind, enclosed in double quotes.

Layer= Specify layer number between 0 and 9.

Line= Specify line type with following key words.

normal / dashed / dotandline / dots

Width= Specify line width in points between 0.5 and 30.0.

LineColor= Specify line color on the map by RGBA color components or color name. For RGBA color

components, specify each red, green, blue, alpha values between 0 and 1.0 enclosed in parenthe-

ses. The alpha value 1 is opaque, 0 means transparent. Supported color names are white, black, red, green and blue.

ex.) Color= (1,0,0,1)Color= white

### Node header line forms

Specify "Nodes\_Begin" only.

#### **Node line forms**

Kev words

Addr= Elev= Comment=

Addr= is required and should be the first item. Others are optional.

Specify latitude and longitude in this order putting parentheses around them. If south latitude, or Addr=

west longitude, put minus sign before the value.

Addr= (-41.0123, 173.5000) ex.)

Specify elevation in meter. If elevation is not available or applicable, specify less than or equal Elev=

to -1999 meter. If omit this key word, it has no elevation data instead of copy previous data.

Comment= Specify node comment, enclosed in double quotes.

> Comment= "Check point 1" ex.)

### Node trailer line forms

Specify "Nodes\_End" only.

**Defaults** 

If Kind is predefined in the User Data Preferences, Line=, Width= and LineColor= are set to those predefined values.

Layer=

Line= normal Width= 1.5 LineColor= red

Elev= No elevation value for the node.

### **User Area Data**

- First line except comment should specify address form.
- Datum is WGS84 always.
- One area data has a header line, a node header line, many node lines and a node trailer line.
- The header line should begin with the key word "Area=", and specify Area data attributes such as title, kind, layer and pattern. Title and kind are required for every Area data. If any other item is omitted, it will be the default values. If Kind is defined already in User Data Preferences, omitted items and string attributes are set to those predefined values.
- Node header line has a key word "Nodes\_Begin" only.
- Node lines specify each node address.
- Node trailer line has a key word "Nodes\_End" only.

< Sample >

; User Area Data

AddrForm= D

Area = "ABC National Park", Kind = "National park", Pattern = translucent, AreaColor = red Nodes Begin

Addr= ( 36.012456, 139.33333 ) Addr= ( 36.012344, 139.3340 ) Addr= ( 36.012400, 139.33433 ) Addr= ( 36.012302, 139.33421 ) Nodes\_End

#### Address forms

AddrForm = form

The *form* is one of followings.

D in degrees ex.) 145.3254028 D.M.S separated by period ex.) 145.25.31.45

### Area header line forms

Kev words

Area = Kind = Layer = Pattern = AreaColor =

First two key words are required. Area = should be the first item and Kind = is the second. Other items can be specified in any order.

Area= Specify the title of this area data enclosed in double quotes. It will be shown in the map.

Kind= Specify kind enclosed in double quotes.

Layer= Specify layer number between 0 and 9.

Pattern= Select pattern by key word below.

frame, translucent, dots, horizontal, vertical, rightUp, rightDown

AreaColor= Specify line color on the map by RGBA color components or color name. For RGBA color

components, specify each red, green, blue, alpha values between 0 and 1.0 enclosed in parentheses. The alpha value 1 is opaque, 0 means transparent. Supported color names are white, black,

red, green and blue.

ex.) AreaColor= (1,0,0,1)

ex.) AreaColor= green

### Node header line forms

Specify Node\_Begin only.

### **Node line forms**

Specify one address entry only.

Specify latitude and longitude in this order putting parentheses around them. If south latitude, or west longitude, put minus sign before the value.

ex.) Addr= (34.333333, -145.2333333)

### Node trailer line forms

Specify Node\_End only.

### **Defaults**

Addr=

If Kind is predefined in the User Data Preferences, Pattern= and AreaColor= are set to those predefined values.

Layer= 0
Pattern= dots
AreaColor= red

## 23. Texture Mapping

Any pictures can be used as texture of geo-surface, not only for the plane map but also for Bird's-eye views, Stereo-Graphs, Panorama views and any projection maps. Targets are satellite images such as Landsat, aerial photographs, land use maps, topographic maps and others. The picture at right uses a Landsat image.

To use texture, show a dialog from "Texture maps..." under the "Tools" menu. In this dialog you can

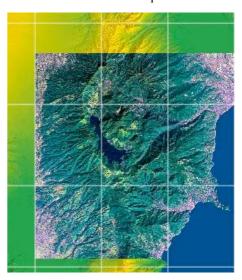
- · Read any picture file to use as texture.
- Remove those pictures.
- Define addresses of four corners.
- · Set transparency.

If read picture is GeoTiff, created by LSMixer3, world file attached or topographic maps from GSI of Japan, corner ad-

dresses are set automatically. Those texture are treated as "has native address". World file should be in Latitude and Longitude.

(Note: LSMixer3 is included in SimpleDEMViewer 3.9.5 package)

<a>AS note> Topographic maps from GSI of Japan is treated as normal picture, since can not recognize control file.</a>



## **Setting Dialog**

### List of texture

- · File names of textures are listed.
- If texture coverage overlapped each other, the texture upper in this list is used.
   Names can be dragged to change its order. If one of the texture is applied, other texture is not applied even if its opacity is less than 100 %.
- Turn off "Draw" check box to suspend use of the texture.

### Read

Click to read a picture file to use as a texture.

### Remove

· Remove selected file from texture list.

### **Show Pict**

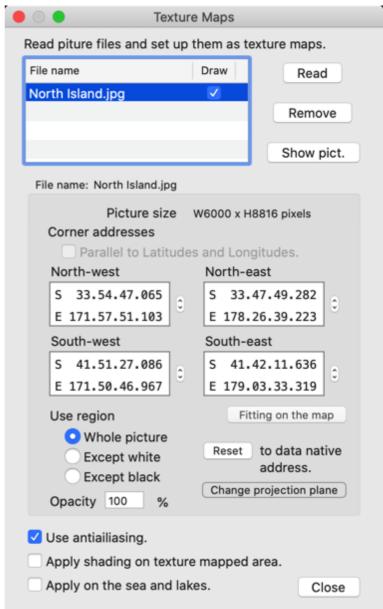
Show picture of selected texture in a separate window temporarily.

### Corner addresses

- If a texture is selected in the texture list, its content and settings are shown here.
- Only north-west and south-east corners can be set when the check box "Bounds by Latitude and Longitude" is checked.
- Specify Latitude and Longitude even if the picture has UTM addresses.
- You cannot define the texture range that contains south pole or north pole inside.

### Parallel to Latitudes and Longitudes

 Check if bounds are parallel to each axes to faster drawing. If the texture has UTM or other plane address, cannot check this.



### Use region

- Specify texture is full opaque or having transparent portion.
- Check "Except white" if the texture is topographic map with white background.
- Check "Except black" if the Landsat picture has black boundaries.

### **Opacity**

Specify opacity in percentage. If 100 %, color of the texture is taken to draw. If it is less than 100 %, mixed with the elevation color.

### Fitting on the map

- Show picture on the map window and place it to appropriate position.
- You can drag whole or each corner, extend or shrink whole picture.
   See below for operations.

### Reset to data native address

• Ignore any change to the corner addresses and set native addresses if the texture has them.

### Change projection plane

If the texture map has address specified by world file or GeoTiff and it is based on UTM or other planes, you can change zone number anytime after reading for correction.

### Use antialiasing

Check to use antialiasing for every texture mapping.

### Apply texture on the sea and lakes

Check to apply texture mapping on the sea and lake surface.

### Apply shading

• Specify do or not do shading on the textured portion. Sometimes it is better not do shading if the texture has shade natively such as Landsat picture or aero-photographs.

## Fitting on the map window

If you feel it difficult to enter four addresses directly, you can show texture on the map temporarily and place it correct position by dragging.

When you click "Fitting on the map" button, the dialog disappear and texture will be placed on the center of the map window, or at accurate place if addresses are already set. You can drag whole texture or drag each corner independently. You can expand or shrink texture coverage by clicking buttons in console panel.

Though main menu are inactive during this operation, you can expand, shrink or move the map by context menu, and can drag or scroll it.

You can do following operations from console panel.

### **Expand / Shrink**

• Expand the coverage of texture 1.1 times or shrink it by 1.1.

### Transparency (Slider)

- Set texture's translucent rate during this operation to clear the position.
- Transparent portion of the texture is drawn as translucent black.

### Cancel

· Cancel the positioning operation.

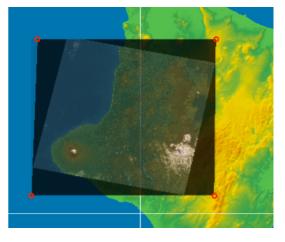
#### Done

· Quit positioning operation and use result.

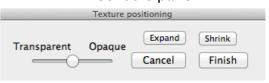
### World file

World file for texture map uses all 6 lines unlike one for DEM files. Letters a to f in the picture at right represent value of each line. The frame in the picture represents top left corner pixel.

Line 1. (a): Horizontal offset to right pixel.



Console panel



Line 2. (b): Vertical offset to right pixel.

Line 3. (c): Horizontal offset to below pixel.

Line 4. (d): Vertical offset to below pixel.

Line 5. (e): Horizontal coordinate at the center of the top left pixel.

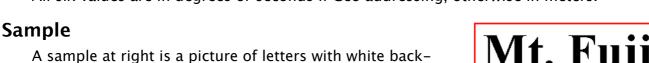
Line 6. (f): Vertical coordinate at the center of the top left pixel.

'a' has plus value always.

'b' and 'c' have minus value when slope down to right as this picture, plus value when down to left. Both are zero when picture is parallel to the axes.

'd' has minus value always.

All six values are in degrees or seconds if Geo addressing, otherwise in meters.



ground and red frame. Specifying white is transparent, and applied it to panorama view. If you use texture maps with white space like this sample or topographic map, use tiff or png format, otherwise letters and lines are not clear especially with jpeg format.

### Notes

- · Always specify addresses by Latitude and Longitude even if its native address is UTM or other planes.
- Alert will be display and cannot guit the dialog if you have not set addresses for all textures. If you cannot set them, remove them, or set temporary addresses using fitting-on-the-map function.
- Datum of GeoTiff is ignored, always assumed as WGS84.
- · Specified information will be saved with file name. When reading a texture file, stored information will be shown. If information exists for the name but picture sizes are different, they are treated as different file, and old information will be cleared.
- If a texture map has named planeID addressing, saved information may be changed invalidly if you manage several named plane IDs and change sequence or add plane IDs. Such a case, you should select plane ID again.



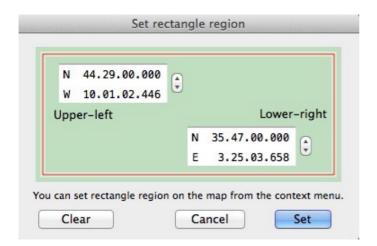
(e, f)

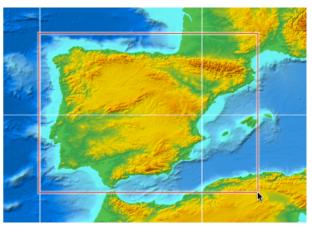


## 24. Select Rectangle Region

Any rectangle region on the main window can be specified for making bird's-eye views, stereographs, and saving map picture, or set range to search highest or lowest elevations.

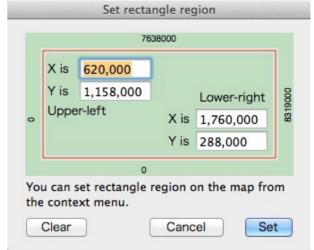
- Select "Select rectangle region..." from the context menu on the map, and move mouse cursor to make rectangle and click to define it.
- You can drag the frame of selected rectangle on the map window to adjust it.
- You can specify rectangle region with longitude and latitude. Go "Rectangle region..." under "Tools" menu to show setting dialog.
- To clear the selection, show above dialog and click clear button.





Picture at right is dialog for no address DEMs. All values are set in meters.

Four numbers outside of red rectangle show range of read DEM(s).



## 25. Copy / Paste Latitude and Longitude

You can copy and paste latitude and longitude as a text string during address control is focused in "Jump to address" dialog, "Memo" dialog and other dialogs. You can copy address on the main window at mouse point, use context menu to copy. You can select copied text format from proprietary format and two floating numbers in Preferences. Those text addresses are treated as "WGS-84".

### **Text format**

### **Proprietary format**

- · 'LW ' at start, latitude and longitude follow it.
- First character of latitude is 'N' or 'S' for north or south, 'E' or 'W' for longitude.

degrees

• Periods separate degrees, minutes and seconds.

```
ex)
LW N30.15.25.0 E111.10.30.0
LW S23.10.0 W44.50.10
ISO 6709
```

```
±DDMM.MMM±DDDMM.MMM degrees and minutes

±DDMMSS.SS±DDDMMSS.SS degrees, minutes and seconds

ex)
+26-110
-45.66666+15.25
-4540+1515
-4540.000+1515.000
+364533.000-1293636.333
```

### Two floating numbers

±DD.DDDD±DDD.DDDD

```
±dd.ddd ±ddd.ddd
+ sign can be omitted. Latitude first.
ex)
38.33333 141.0123333
+42 142.666666
-65.3333 -23.456666
```

### Two floating numbers and direction characters

Cdd.dddd Cddd.dddd or dd.ddddC ddd.ddddC

C is one of 'N' or 'S' for latitude, 'W' or 'E' for longitude. Any characters between them are ignored.

```
ex)
N33 E123
33N 123E
S5.11111 W99.5
E133.5678 N23.45678
Latitude 36.3333N Longitude 111.2345E
```

### Two number strings each has tow or three periods

Parts separated by period are treated as degrees, minutes and seconds from first.

```
e.g.
33.26.30 137.40.15, 33.26.30.123 137.40.15.789

These are translated to
33 26 30 137 40 15, 33 26 30.123 137 40 15.789
```

After this translation, they are treated as six numbers as described in next section.

### Various strings that contain some numbers

If it has three numbers, ignore third number and apply one of above.rules.

If it has four or six numbers and various characters, following steps are applied.

- Replace words 'North', 'South', 'West', 'East' to a character N, S, W, E respectively. Replace characters 北, 南, 西, 東 to a character N, S, W, E respectively.
- Replace all characters other than numbers, +, -. . (period), N, S, W, E, to space ignoring letter case. Control characters are replaced to space also.
- Separate four or six numbers at the center to two groups. Each group are treated as an address of degrees and minutes or degrees, minutes and seconds.
- If there are characters of N, S, W or E, decide which one is latitude or longitude depends on their position. If no those characters is found, first group should be latitude.

e.g.

+23.456789 -123.456789 2345.6 m N34°19'06.8" E131°34'05.0" 34:12:55 West 35:46:12.123 South 緯度34°19'06.8" 経度131°34'05.0"

東経135度1分2.567秒 北緯33度21分33.4秒

## 26. Show Place on External Map

You can show the place pointed in the main window on Apple's "Maps" or "Google map" on safari. Internet connection is required.

In the main window show context menu at some place and select "Show this place in Map-s.app" or "Google map", then the place is shown in them. Maps or safari is activated automatically if not active.

## Show by "Maps"

Activates Maps if not activated, and set center to the place, and shows a pin icon there. Set appropriate scale depends on scale of SimpleDEMViewer.

## Show by Google map

Activate safari ( or your default browser ) if not activated, access Google map and set center to the place. Set appropriate scale depends on scale of SimpleDEMViewer.

# 27. Measuring Milage

You can measure milage between two place along any route on the map.

To begin measuring, position mouse to start point on the map. Show context menu and select "Measure milage". Then a red line drawn from start point to mouse cursor and show milage near cursor.

Click mouse button at some points to fix the route, and double-click to finish measuring. If you click on any user data string, the string's address will be used instead of mouse position. You can cancel last node by Esc key.



## 28. Find Highest or Lowest Elevation

Find highest or lowest elevation point among the read DEMs. You can select search range from "Rectangle region", "Window region", or "Whole data". Result are shown in a small information window and a red-round-arrow on the map window. You can copy address and elevation value as a text string from the information window.

Result elevation is raw value in the DEM file, not interpolated one.

## **Operation**

- Choose "Find highest or lowest..." under "Tools" menu to show dialog.
- Select highest or lowest, select range and click "Find" button.
- Found point showed by red-round arrow on the map window, and information window displays details. If the point is out side of the window, map will be redrawn, so that the point sits in the center.

#### Results

Elevation Shows raw value in the DEM in meters.

Address Shows Latitude and Longitude. If there are many same elevation points, address of first

found point will be set.

If the DEM has no address, will be blank.

DEM file name DEM file name includes the point.

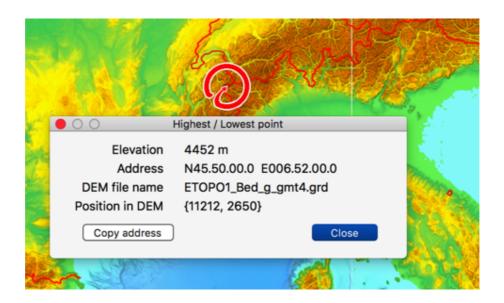
Position in DEM XY coordinate in the DEM file. The upper left corner is (0,0).

Click "Copy address" in result panel to copy strings to clip board includes the address and the elevation. DMS or DD format depends on setting in Preferences.

String example

DMS LW N33.10.15.33 W100.55.11.01 3770 m

DD 25.1234567 -96.8765432 1234 m



## 29. Contours

You can draw contour lines on the map in main window with or without index lines. You can select interval and its colors. Contour lines are drawn on the map once when you click the draw-contour button, and disappear when map is redrawn or scrolled.

With retina screen, and with specifing double density for drawing main window, contour width will be half, and takes four times longer.

Contour lines are drawn on the main window map and can be saved as pictures, and drawn on the projection maps. In those cases, contour settings are the same as for main window.

Contour on the main window is drawn as dot by dot always, but you can select line mode for saving main window map and projection maps, so that some draw software, such as Adobe Illustrator, can treat contour as lines. In this case you can specify line width. Drawing contour in line mode takes time much longer. Refer "Line mode" section below.

## Settings

Select "Draw contour lines" under the "Tools" menu to show the dialog. In the dialog, you can specify followings and draw contour lines.

Interval Enter any value directly in meters or feet. Minimum is 1

m or 1 ft.

Draw index lines for each

Check and select index pitch to draw index lines.

Color set Select color set for normal and index lines.

Normal Color for normal lines. Click color box to change it individually. Index Color for index lines. Click color box to change it individually.

Use different colors for under sea level

Check if you want to use different colors for under sea level. You can specify depth and color

for each line. Two colors can be used for sea depth.

Color 1 First color for sea depth. Click color box to change it
Color 2 Second color for sea depth. Click color box to change it

Depth Depth for each line in meters or feet, unit is the same as one for interval.

Color Color for each line. Select Color1 or Color2.

[+] [-] Add or delete lines.

Default button Reset all settings for under sea lines to default.

Don't draw above sea level.

Check if you do not want contour lines on

the land.

Don't draw sea level.

Check if you want no lines on seashore. Inland contour of 0 meter also disappear.

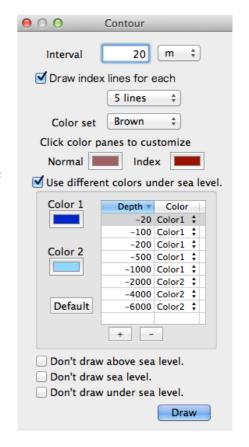
Don't draw under sea level.

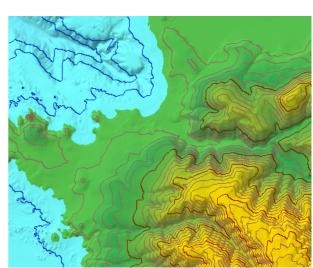
Check if you do not want contour lines

under sea level.

Draw button Click to draw contour on main window

map.

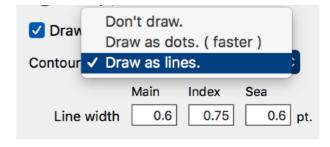




## Line mode

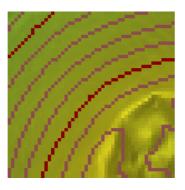
You can select line mode when saving main window map picture and creating projection maps in each dialog. In line mode, you can specify line width for normal lines, index lines and sea depth lines each. Other settings are the same as ones to main window.

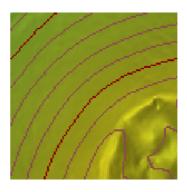
Following pictures show results of various settings and extended using graphic software. First



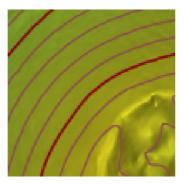
three pictures are saved as PNG and last one as PDF. All line width and color settings are default value.

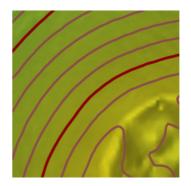
First one is drawn in dot mode and 72 dpi. Second one is drawn in dot mode and 144 dpi.





Third one is drawn in line mode and 144 dpi. Last one is drawn line mode and 144 dpi. Last one is saved as PDF, and extended by PDF Viewer.





### **Notes**

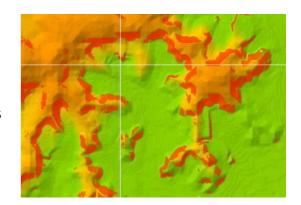
- Draw button does not erase previous drawing, so that if you changed the interval, you should erase previous contour lines by refreshing map window.
- For saving pictures and projection maps, last settings to draw on the main window map will be used.

## 30. Colorize by Slope

Colorize maps by colors showing slope steepness. You can specify seven steepness grade and colors to them.

Colors draw by this function will disappear when the map is redrawn. The result can be saved as picture files if the map is saved with window range.

In the right picture, red part shows steep slope over 30 degrees.



## **Settings**

Select "Colorizing by slope" under the "Tools" menu to show the dialog. You can specify degrees, colors and which part to draw. Click draw button after setting those.

Draw (check box) Select band to draw.

Slope degrees Specify lower limit in degrees for each band.

Colors for each band. Click on the color pane to change it. Colors can be copied by drag

& drop.

Limiting elevation Set drawing range by elevation.

Opacity Specify opacity for drawing colors override the map. 100% override completely. You see

no slope colors on the map when 0%.

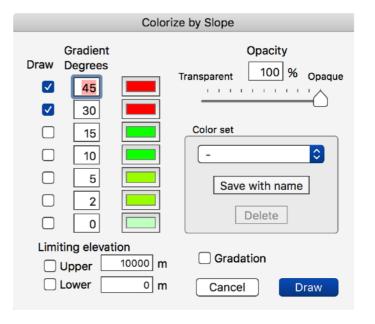
Colorset Save settings with name and show it in the menu.

Draw slope colors.

Because slope colors override current map without refresh, you need to refresh the map before redrawing slope colors usually.

### **Notes**

 Slope colors can be saved as picture files only when you specify window range and scale as same as the current window. Even if rectangle region is selected to draw slope colors, you should specify window range to save map picture with slope colors.



## 31. Bird's Eye View

Make a image of the terrain from DEM data. The image is based on a flat plate ignoring roundness of the Earth. If DEM has latitude and longitude, aspect ratio is optimized automatically based on center latitude of the picture.



## Settings

Show dialog by selecting "Bird's eye view..." under "Tools" menu.

### Target area

- There are three options. They are selected rectangle, window and whole data.
- If whole data is selected, Minimum rectangle that includes whole data is assumed. This rectangle doesn't stretch over meridian at 180 degree. If data exist both side of meridian 180 degree, the rectangle goes around the earth.
- When DEMs without address info are used, window range doesn't cover outside of the whole data range.

#### Face to

You can specify any direction in azimuth. Enter number values directly or use direction dial. Click tick mark or drag arrow head. Click N/E/S/W letters to face each.

### Shading

- · Select shade type as same as shading for main window.
- Light direction is one of eight directions. Elevation angle ( angle of incidence ) is always 45 degrees.
- Strength has 8 levels. 1 is most pale.

### Angle of depression

 Specify depression angle in degrees between 0 and 90. 0 means looking horizontally.

### Height emphasizing

 Select rate to emphasize elevation from menu. All elevations are multiplied by this rate.

### Picture scale

- Select shrink or expand rate from menu in percentage.
- Picture size is defined by target area size, azimuth, depression angle and rate.
- Maximum picture width and height are 65,500 pixels each.

### Colorize by slope

• Check to draw "Coloring by slope". Settings for main window map are applied.

### Use texture mapping

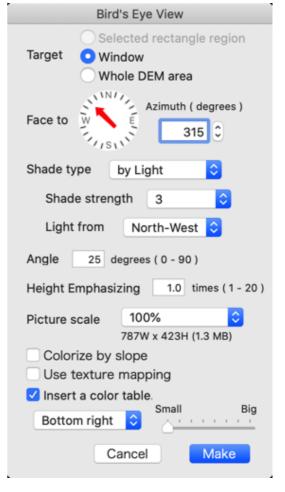
Check to use texture mapping. Settings for main window map are applied.

### Insert a color table

• Insert a color table into the picture. Select position and size.

## Add strings in the picture

You can add any one line text on the picture. Click on the picture with control key pressed, and select context menu "add string". In a dialog you can enter string and its attributes.



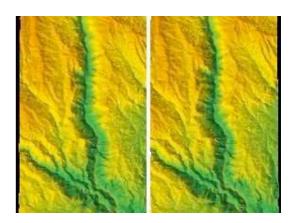
## 32. Stereographs

## Stereograph

This function makes a pair of pictures in a window to see 3D image. There are three types, parallel, crosseyed and analyph.

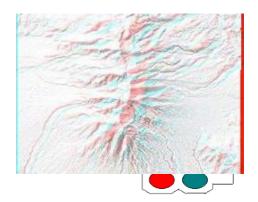
## Parallel and cross-eye

- Two pictures are slightly different perspectives of same area. In parallel mode, left eye looks at left picture and right eye at right picture. In cross-eye, left eye looks at right picture, and right eye at left one.
- Picture can be full colored, but rather small picture size.
   Some skill is required to look as 3D.



## **Anaglyph**

- Red color from picture for right eye, green and blue from picture for left eye compose an anaglyph picture.
- It's mandatory to see terrain that elevation colors contain both red and green or red and blue. It is better to set all elevation colors to white or other bright colors.
- To see anaglyph, prepare a pair of glasses with red glass in left, blue or green glass in right.



## **Settings**

Show dialog by selecting "Stereograph..." under "Tools" menu.

### Target area

- There are three options. They are selected rectangle, window and whole data.
- If whole data is selected, Minimum rectangle that includes whole data is assumed. This rectangle does not lay over meridian at 180 degree. If data exist both side of meridian 180 degree, the rectangle goes around the earth.
- When DEMs without address info are used, window range does not cover outside of the whole data range.

### Direction

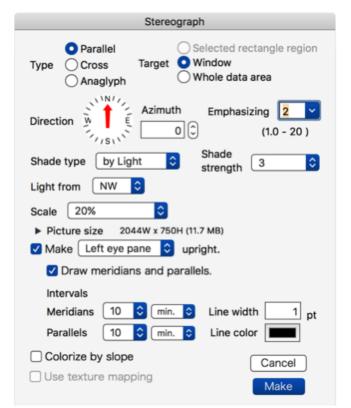
 You can specify any direction in azimuth. Enter number values directly or use direction dial. Click tick mark or drag arrow head. Click N/E/S/W letters to face each.

### Shading

- Select shade type as same as shading for main window.
- Light direction is one of eight directions. Elevation angle (angle of incidence) is always 45 degrees.
- · Strength has 8 levels. 1 is most pale.

### Height emphasizing

 Specify values between 1.0 and 20.0. 1.0 is similar to actual image, but it is difficult to recognize terrain unless ups and downs are significant. If too much emphasizing applied to mountainous area, getting difficult to recognize its image.



#### Scale

 Select scale rate from menu in percentage. You can not select larger scale that picture width or height exceeds 65500 pixels.

### Picture size

- Although default picture size is defined by target area size, direction and scale rate, you can set final picture size and distance of two pane in pixels for parallel and cross. No size option for anaglyph.
- Click triangle aside the string "Picture size" to show layout and input fields.
- · Enter width and height of final picture size.
- Span is the distance between centers of two panes.
- In layout picture, two black framed rectangles represent selected range. Yellow rectangle represents final picture. Relief maps are drawn in each green part.
- · Default button reset width, height and span to defaults.
- If layout is hidden, changing type, target range, direction or emphasizing resets to defaults always.
- Maximum picture width and height are 65,500 pixels each.

### Make one pane right projection

- Make one of two panes right projection to determine accurate address in the picture for processing later.
- · Select left or right pane.
- · You can select to draw Meridians and Parallels on it.

### Colorize by slope

• Check "Coloring by slope" to draw. Settings for main window map are applied.

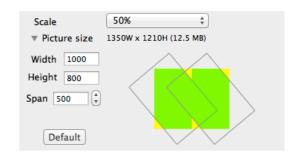
### Use texture mapping

• Check to use texture mapping. Settings for main window map are applied.

## Add strings on the picture

You can add any one line text on the picture. Click on the picture with control key pressed, and select context menu "Add string". In a dialog you can enter string and its attributes.

Added strings have no stereo effect.



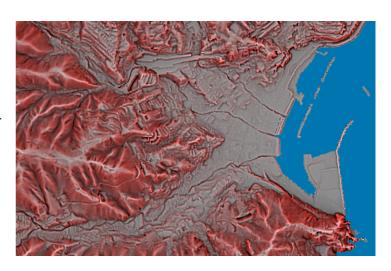
## 33. SRVC Relief Map

## What is SRVC Relief Map

New relief map formed with slope degrees, ridge-valley degrees and surface curvature. It is independent from light direction as normal shading relief map. Furthermore, it is easy to capture landscape image without any tools nor skills like as stereographs.

"SRVC" is an acronym of Slope, Ridge, Valley and Curvature.

- Land colors are automatic. Colors of sea and void region depend on Preferences setting.
- No lake is recognized. Draw it as plane land.
- Picture width is adjusted so that horizontal and vertical scale are the same at the center of the map. Therefore, even if you select window range, picture width may differ from window width.
- You can draw Meridians and Parallels, User Memo / Route / Area Data, and Contour. Their drawing conditions are depends on each settings on the main window.



## Dialog

Show dialog by selecting "Create SRVC Relief Map..." under the Tool menu.

Target There are four options. They are selected

rectangle, window, whole data and specified picture size. Last one extends around the cen-

ter of the window.

If whole data is selected, Minimum rectangle that includes whole data is assumed. This rectangle doesn't stretch over meridian at 180 degree. If data exist both side of meridian 180 degree, the rectangle goes around the earth.

When DEMs without address info are used, window range doesn't cover outside of the

whole data range.

Picture scale Select shrink or expand rate from menu in

percentage.

Picture size Determined by target type and scale. If target

type is the last one, you can specify width and height freely. Both should be less than or

equal to 65500 dots.

Emphasizing slope

Curvature

Default value is 3, select between 2 and 4 usually. If you want to draw flat area such as sea bed,

select bigger value.

Specify degree of applying surface curvature to the picture. Larger value enhances contrast of

ridge and valley. See sample pictures on next page.

Draw Meridians and Parallels.

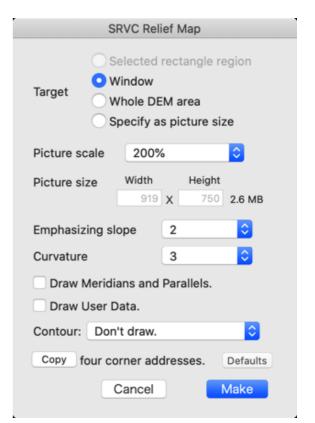
Check if you want to draw Meridians and Parallels on the picture. Interval, color and line width are the same as those of main win-

dow map.

Print latitudes and longitudes

Add latitude and longitude values to each line. To change font, click [A] button at right. You can change font, size and color.

33 \* 30 '



Draw Meridians and Parallels.

Print Latitudes and Longitudes.

 $\boldsymbol{A}$ 

Draw User Data Check if you want to draw user data on the projection map. All settings are the same as those of

main window map.

Contour Select one from the menu "Don't draw", "Draw as dots", "Draw as lines". If line mode, you

can set line width. Line intervals and colors are same as those of main window.

If you select line mode and save as PDF, you can edit contour with some draw software,

such as Adobe Illustrator, later.

Line mode takes time much longer, maybe

more than ten times than dot mode.



[Copy] four corner addresses.

Copy addresses of four corner to scrap. It consists of four lines, first line contains address of north-west corner, south-west, north-east, south-east follow it. Each address format depends on

setting in Preferences.

[Defaults] Reset to defaults all settings in this dialog.

## Add strings in the picture

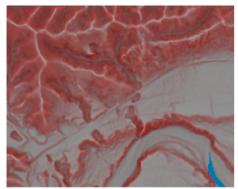
You can add any one line text on the picture. click on the picture with control key pressed, and select context menu "add string". In the dialog you can enter a string and its attributes.

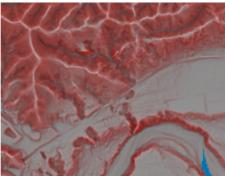
## Sample pictures

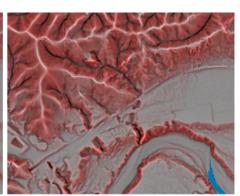
Emphasizing slope value is 3 Curvature value is 1

Curvature value is 3

Curvature value is 5







## 34. Panorama View

## What is panorama view

Panorama view represents your view from some place on land surface or in the air. You can create 360 degrees panorama view as one picture and can rotate it.

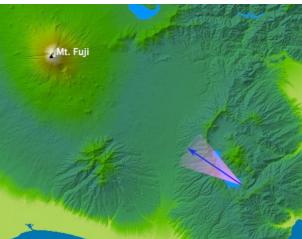
Parameters are ye point address, elevation, , eye direction, elevation angle, view angle, haze effect, colors and others. Default color set is same as main window map, but can create any

You can use a target instead of eye direction and elevation angle. If user data exist, you can set the target to any user data string.

Memo data strings, route data routes and strings can be drawn on the panorama picture, but no memo mark. Route is always normal line, line type and width are ignored.

Shading is the same as it of main window map, no shadow of mountains. Although you can draw the sun(s) at the time at the eye point, it has no relation with shading direction.





### Creation

There are tow ways to start creating panorama views as follows. Panorama view start drawing after you fix dialog settings and click "Draw" button. A window appears and the panorama will be drawn left to right with scrolling if needed.

### Start from context menu

At the point on the map you want to view from there, show context menu and select "Create Panorama View". An arrow and pink colored sector will appear toward mouse cursor. Move cursor toward target point, angle of the sector changes depends on cursor distance from eye point. Arrow direction is eye direction and angle of the sector will be view angle. Click somewhere to show creation dialog. If the mouse point is very near the eye point, view angle will be 360 degrees and direction will be set to north.

If the target was set previously, direction restricted to it.

If you start on a string or memo mark, its address and elevation are used as eye point, otherwise mouse point address and its surface elevation will be taken.

#### Start from Tools menu

Select "Create Panorama View" from the Tools menu, creation dialog appear instantly. All settings are the same as previous session. If it is the first time, window center will be eye point and towards north, view angle is set to 60 degrees.

### Cancel during drawing

Drawing panorama may take very long time depends on settings, if you want to cancel it, click close button of the window.

## **Settings**

### Eye point

Eye point consist of latitude, longitude and elevation. Elevation can be specified as surface elevation and lift above there, or elevation from sea level.

Address

Shows the mouse point address or string's base address when start by context menu, otherwise address set by previous session remains. You can change to any address. If address is changed, surface elevation will be changed to it of addressed surface.

Elevation at surface

Shows calculated elevation from the specified address, or elevation of string data when start by context menu. Elevation of string data maybe includes lift from surface already. You can enter any value here, but if you change the address it will be replaced with calculated one.

Even if elevation of string data is set originally, it will be changed as address changed. If address return to original, original elevation will be restored.

Above surface / Above sea

"Above surface" means final eye elevation is "Elevation at surface" plus value specified here. Eye elevation is value specified here when "Above sea" is selected. Although you can enter minus value here, if eye elevation is lower than surface elevation calculated from DEM, final panorama view maybe invalid.

Eye point name

User data title string is set here when this dialog started by **context** menu activated on a string in the map. You can change eye point by searching user data string. Click "Search" button to search user data and set its address and elevation. You can set new name even no user data exist in search dialog. Refer "Name search dialog for eye or target" section.

### Direction

Azimuth Eye direction between 0 and 360 degrees. North is 0 and clockwise. If "Fix on target" is

checked, this value is automatic.

View angle View width in degrees. Between 0.1 and 360. 360 degrees means all around eye point, and

panorama view can scroll through.

View angle limited to 120 degrees if stereograph is set or "Elevation angle" lower than -45 de-

grees or higher than 45 degrees.

Elevation angle Upward or downward angle between 60 and -60 degrees. If higher than 45 or lower than -45,

"View angle" limited to 120 degrees.

Target name User data title string is set here when target specified previously by context menu on a string in

the map. You can change target by searching user data string. Click "Search" button to search user data and set its address and elevation as target. "Fix on target" will be checked and "Azimuth" and "Elevation angle" are calculated automatically. You can set new name even no user

data exist in search dialog. Refer "Name search dialog for eye or target" section.

Fix on target If target is set, you can check or uncheck here. If checked, "Azimuth" and "Elevation angle" are

calculated automatically.

### Color setting

Like color set for main window, you can change colors, boundary elevations and save settings, in addition you can set sky color.

Color set menu Default is "Same as Map window". Same list of color set as color set menu in Preferences

dialog appears here.

Boundary elevations

Specify in meters and descending order.

Color box Click to set each color. You can copy color to another color box by dragging.

Sky color Specify color at top and color at horizon. Between them drawn by gradation color. Actual colors

depends on eye point elevation and haze effect settings. If haze effect is stronger, every colors

anywhere converges toward sky bottom color.

Save color set Create new color set of colors and elevations. It will appear in color set menu.

Remove color set user created.

## Other settings

Max. distance The scene calculated up to this distance. Land farther than this distance is drawn as sea.

If "Fix on target" is checked, "Max distance" should be longer than the distance between eye

point and target plus 5 km.

Min. distance The scene is calculated farther than this distance. Land closer than this distance is drawn as sea.

0 km is treated as 2 meters.

Picture size (Width x Height pixels)

Width and height each should be less than or equal to 65500 pixels.

Quality Trade off between speed and quality. Usually "Normal" is enough for quality and speed. Use

"Preview" to check composition if normal drawing takes longer time. Use "Fine" if result is bad

quality, for small pitch DEMs or steep mountain scene.

Emphasizing Specify value to multiply elevations by, between 1 and 10. Mountains become higher, sea

become deeper. Eye point elevation also will be multiplied.

Shading Light direction applied to everywhere, that means ignore time difference among the place. Even

if the Sun is drawn, it has no relation with shading.

- Shade strength Select between 1 and 5. Larger get deeper. Default is 3.

- Light from Select one from 8 direction menu. Default is east.

- Light angle Select elevation angle (angle of incidence) by menu between 10, 30, 45, 60 degrees. Default

is 45 degrees.

### Apply air refraction

Distant mountains looks higher because of light refraction in the air. The default value 0.133 is at the sea level of standard atmosphere. Although the value differ depends on altitude, there is no much difference in scene. There is much difference depends on local wether conditions, especially local air temperature such as a mirage in extreme case..

Specify value between 0 and 0.3.0 (zero) means no effect.

### Apply haze effect of distance

Because of haze effect, distant mountains getting dim.

- Thickness Specify strength of haze effect between 0

and 99.9.0 (zero) means no effect. Default value 20 is adjusted in Japanese atmosphere conditions. Smaller value fits to dry air.

Dimmed color getting towards sky (bot-

tom ) color.

### - Minimum distance

Apply haze effect farther than this distance. Default is 0 km.

## Apply mist effect of lower land

Dim lower land just as mist or cloud cover them. Lower elevation gets more density. Haze effect is 20



Haze effect is 30



### - Upper limit elevation

This effect is applied under this elevation. Effect is zero for this elevation, and lower elevation getting more dense towards lower limit elevation.

#### - Lower limit elevation this

Land lower than this elevation is drawn with sky color at horizon, so that if lower limit is 0 meter sea is drawn as horizon color always. To draw sea and sea shore in pale color, set lower limit to minus elevation value.

- Density Specify strength of effect between 0.1 and 99.9. Default value is 90. Dimmed color getting

towards sky (bottom) color as number becomes larger.

Lower land mist effect, elevation limit is 1500 m, eye point elevation is 2420 m.



Draw Sun

Draw the Sun or suns at specified date and time at the eye point. Refer "Draw Sun" section below.

#### Draw azimuth indexes

Draw azimuth index markers and azimuth numbers on the panorama view pictures. Numbers represent degrees and minutes. Pitch and others are automatic.

They appear just below upper edge, landscape may overwrite them.

### Use texture mapping

Check if you want to apply texture mapping if exist. Settings are the same as main window.

#### Draw user memo data

Check if you want to draw user memo title string on the scene if exist and visible. All settings are the same as those of main window, except.no mark drawn and string drawn vertically. String attributes can be change on a picture. Refer following sections.

### Draw user route data

Check if you want to draw user route on the scene if exist and is visible. All settings are the same as those of main window, except only color is applied from line attributes, no line type, no line width Strings are the same as user memo.

### **Draw Sun**

You can draw a sun or suns at the time you specify between 1 Jan. 1990 and 31 Dec. 2099.

Time zone Menu list up time zones near the eye

point Greenwich Mean Time and your mac's system time zone. It shows the nearest time zone but may not exact one.

GMT Time difference between selected time

zone and Greenwich Mean Time.



Set the time you want to draw.

Draw (n) suns ... with (t) minutes interval

Draw n suns before the time and n suns after the time. If you specify 5, 11 suns will be drawn, but some of them may be back of landscape.

Draw date and time

Check to draw date and time next to suns on the picture

Color of the sun Click color box to set color of the sun.

This program treat the earth as a sphere, so that between sun position and landscape has some error. Margin of error is less than a minute vertically and less than a few minutes horizontally.

Despite actual diameter of sun varies in season it is always drawn as 32 minutes in diameter.

## Stereograph

Create two panorama view from both side of specified eye point, one is for left eye, another is for right. Larger emphasizing makes distance of left and right eye point longer, then eye point may go underground if specified point is in a narrow valley. In such a case add some to elevation or cut near scene by set some value to "Minimum distance" other than zero.

Type Select one of parallel, cross or anaglyph.

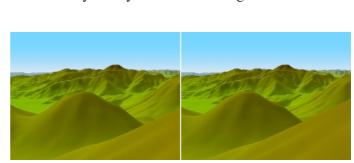
Emphasizing Select between 1 and 5 from menu. If distant view you may want to select larger number.

Default is 2.

Picture at right is parallel stereograph view.

Picture size field specify width and height for one view. If parallel or cross eye, picture width should be less than 32750.

View angle should be less than or equal to 120 degrees.





### Reset All

Set all values to default except eye point and target. If "Fix on target" is checked, azimuth and elevation angle are set to calculated value.

# Name search dialog for eye point or target

Dialog will appear as sheet when one of "search" buttons clicked. The table in the dialog shows all strings from user data those can be shown on the main window.

You can select one in the table or you may enter name, address and elevation directly., so that even no user data exist, eye point or target is treated as named point.

Table List up user data strings those can draw on the main window.

- type Memo, Route, Area or Node. Node is for node comment of route data, others are title string for

each user data.

Name Select one from table or enter directly.

Address Select one from table or enter directly.

Elevation Select one from table or enter directly.

Search string Search substring in the "Name" column text. Table shows only the data those have substring

typed here.

# Handling after completion

### Scrolling

Supports mouse wheel scrolling, drag scrolling, scroll gesture on track pad, If view angle is 360 degrees, you can rotate picture horizontally.

# **Auto scrolling**

Panorama view can scroll automatically if picture width is greater than or equal to 3000.

Pressing left or right arrow key start scrolling. More key down makes speed up or down, or change scrolling direction. If view is not 360 degrees, scrolling direction will change at both side. Space bar stops autoscrolling.

# Show place information

If you move the mouse on the picture, azimuth and elevation angle are shown at upper-left corner of the window.

If you move mouse to any string on the picture, string information appear aside it. It shows string itself, address, elevation and distance from eye point. Distance unit depends on preferences.

If you move mouse on the landscape with ctrl-key or option-key pressing, information of the place appears near the mouse cursor.

First and last information will disappear in six seconds if mouse doesn't move. Just click somewhere on the picture to clear those information immediately.



Mt. Fuji

3776 m

46.3 km

N 35.21.38 E 138.43.39

# Handling strings

You can move strings by drag them, and remove them by dragging them out of the window.

Attributes of any string on the picture can be changed. Show context menu on the string and select "Update string..." to do it. Refer next section "String dialog".

You can add a new string anywhere on the picture. Select "Add string..." from context menu. It has address if added on landscape, no address on the sky.

### String dialog

(Text field) Original string is set. You can change to any string.

Apply following attributes to all strings

Check to apply attributes to all string on the picture.

Vertical String is written vertically if checked, otherwise horizontally.

Leading line Draw straight line to string from its base point.

- Line width Specify line width between 0.1 and 3.0.

- Line color Click color box to set any color.

Font Showing font name. Click "Font panel" button to change. Size Showing font size. Enter directly or use font panel to change.

Font panel Click to show font panel.

String color Click color box to set any color.

Opaque background Back ground of the string has opaque if checked.

Back ground color Click color box to set any color.

Style Specify bold or not and italic or not.

You can use 'Font Panel' to specify font, size, style, Letter color. If you use 'Font Panel', 'italic' will be cleared.

### Set eye or target point from picture

Set new target or eye point from context menu.

Set to Target Set the place where **context** menu start to target.

Set to Eye Point Set the place where **context** menu start to eye point and show Panorama View creation dialog.

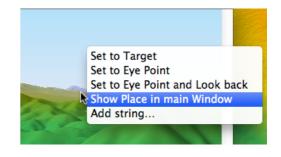
Set to Eye Point and Look back

Set the place where **context** menu start to eye point, current eye point to target and show Panora-

ma View creation dialog.

# Reposition map from a point of picture

Reposition the main window map as its center is some place in the picture. Show context menu at anywhere on the landscape, select "Show Place in Main Window".



### Show info

Select "Show info" under the File menu to show setting information. A sheet panel will appear and shows all settings of creation dialogs except colors and sun.

Click "Show creation dialog" button to show dialog having same settings with current view, colors and sun settings also set as same.

Click "Export settings" button to save all settings. Refer next section.

# **Export and import settings**

Saving all settings of some panorama view to a file, to refer later or to pass other users. Click "Export settings" button in a info panel of a panorama view window to save settings to a file. Saved settings includes colors and sun settings. The file extension is 'sdpano'.

Use 'Open' under the File menu to read this settings file. After the file is read, creation dialog will be shown. Required DEMs should be read previously, as exported file has no DEM file information. You can double click a setting file, or drop it on to application icon or main window to show panorama dialog.

- No DEM area is drawn as sea except using planet DEM.
- To check visibility of string, program uses elevation belong to it. If it is lower than calculated elevation from DEMs, uses calculated one. If the string has no elevation, calculated one is used.

- When result picture is saved as jpeg or tiff file, GPS information will be attached. They are Eye point address, elevation and azimuth.
- Antialiasing is applied to the sky lines automatically except preview mode.

# **35. 3D Movie**

### **About 3D Movie**

You can rotate landscape, or go through landscape at real time or faster speed. There are following three modes. You can control speed and direction by keyboard.

 Rotation mode. Rotate landscape around a point. · Flight mode. Flight as a plane in landscape. · Boat mode. Cruise by boat on the sea or a lake.

The movie window may not show landscape normally depending on your Mac. If your Mac's power is not enough to treat large data, try smaller data.

### **Functions**

### Common

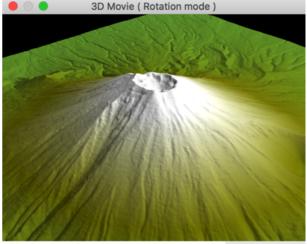
- Start OpenGL view using selected data range.
- Treat all data as they are on a flat plate.
- You can set window size at start and can change it anytime during playing.
- Support full screen mode. You can change anytime during playing.
- · You can set view angle at start and can change it later during playing.
- · Maximum viewable distance is determined by DEM data pitch automatically.
- Can display eye altitude in a movie window. ( Mac OS X 10.10 or newer. )
- Can display speed in a movie window except rotation mode. ( Mac OS X 10.10 or newer. )
- · Colors are same as elevation colors of map window, although shading can be specified independently.
- · You can select meters or feet for altitude unit.
- You can select speed unit from kph (kilometer per hour), mph (miles per hour) and knots (nautical miles per hour).

### **Rotation mode**

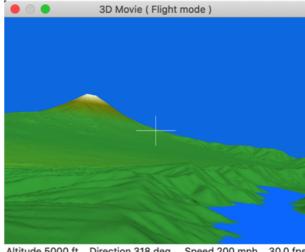
- · Automatically rotating 3D landscape around a specified point.
- · Before start you can set eye altitude and distance from center point.
- During playing, you can change direction and speed of rotation, can change eye altitude also.

# Flight mode

- · You can go through landscape like as flying by a plane. Even though simulate some of planes behavior include bank, this is not a flight simulator, no gravity, no aero dynamics and no cockpit equipment.
- You can start flight with specifying place, altitude, speed and direction.
- · You can go upward, downward, turn left, turn right, get slower or faster speed during playing.
- · You can set start place and direction on the map window using context menu.
- · Without changing going direction, you can see left front, right front or under front with angle of 45 degrees diagonally.
- · Can apply fog or mist effect.
- Show current place on the map in main window.



Altitude 30000 ft, Azimuth 220 deg., 30.0 fps



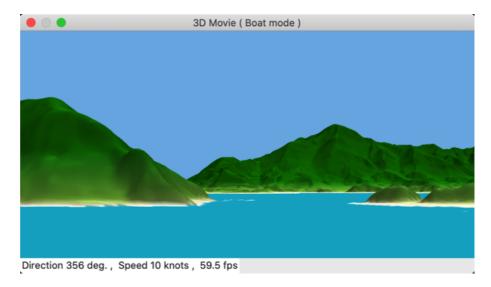
Altitude 5000 ft, Direction 318 deg., Speed 200 mph, 30.0 fps

### **Boat mode**

Differences from flight mode are follows.

- · Altitude is fixed to start up setting.
- · No bank during turn.
- Eye elevation can be specified between 0 and 20 degrees, and can change it during playing.
- · No under front view.

Activate boat mode on the flat surface, sea or lake.



# Dialog

To display start up dialog, select "Start 3D movie..." under the Tools menu. If you start using context menu on the main window, the dialog shows flight mode or boat mode, although you can select rotation mode.

All elevations and altitudes are based on sea level.

### Common

Target Select DEM data range in that you can flight, cruise or rotate it. There are three options. They

are selected rectangle, window and whole data.

Data size Showing DEM data size for selected range. If several type of DEMs are loaded, shortest data

pitch is taken for whole region. Maximum number is 40 millions, but larger size slower movie

or does not show correct movie depends

on Mac's power. If it is over 10 millions, the number will be written with colored letter. If movie is too slow or not show correctly, change the data range to smaller

range.

Window size Set window size at the beginning. You can

change to any size during playing. Minimum is 400 by 300. Should not exceeds

screen size.

Shade strength Select one between 1 and 5, bigger will be

darker.

Light from: Select light direction for shading.

View angle View width in degrees. Between 10 and

120. You can change it during playing.

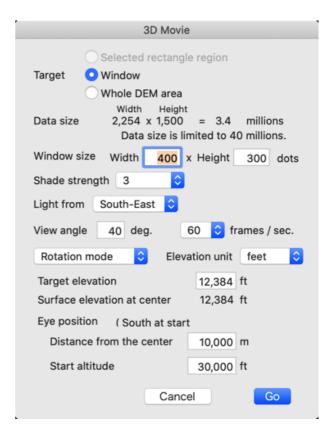
Elevation unit Select unit of elevation and altitude from

meter or feet. Selection is applied in the

dialog and 3D movie view.

frames / sec. Select number of frames to draw per

seconds between 10 and 60. Default is 30. If data size is large, the movie may not draw correct images for specified frame per seconds. On the less power Mac,



smaller number of frames is better to draw images, but may not be smooth movie.

Mode selection Select on of mode from menu. If this dialog is called from context menu on the main window,

flight mode or boat mode is selected, yet you can change to rotation mode.

### **Rotation mode**

Target elevation Specify elevation of rotation center. Surface elevation is set at first.

Surface elevation at center

Surface elevation of the center position of the selected range is set.

Eye position Determined by distance from the center and altitude. Start at south of the center point.

Distance from the center

Specify distance in meters. It is fixed during playing.

Starting altitude Specify altitude in meters or feet. You can change it during playing.

### Flight mode

Starting position Latitude and longitude of the start point. If

DEM has no address, XY address in meters are shown. If you activate this function from the Tool menu first, the start position is bottom center of the selected tar-

get area.

Altitude Starting altitude, should over surface

elevation.

Surface Surface elevation of the starting point is

set.

Direction Set starting direction in as an azimuth in degrees clockwise from the

north.

Speed Set starting speed in kph (kilometer per hour), mph (miles per

hour ) or knots ( nautical miles per hour ).

Apply fog effect Specify if you want to apply fog effect. Linear fog model of

OpenGL is taken, it is different from panorama view function.

Reset Reset settings to defaults. Starting position, view angle, direction, speed and fog effect are

affected.

### **Boat mode**

Position at start Same as flight mode.

Altitude Same as flight mode but fixed during

playing.

Surface Same as flight mode.

Direction Same as flight mode.

Speed Same as flight mode.

Elevation angle Upward angle between 0 and 20 degrees

for looking up.

Apply fog effect Same as flight mode.

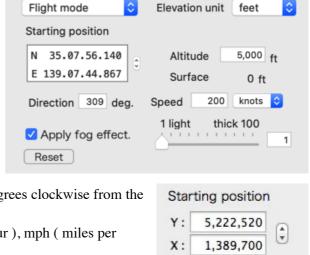
Reset settings to defaults. Starting posi-

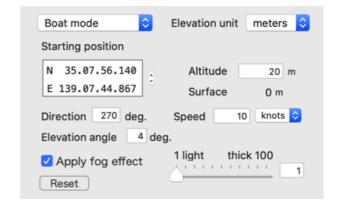
tion, view angle, direction, speed, elevation angle and fog effect are affected.

# Run time operations

#### Common

- · Window size can be changed as usual windows.
- Click zoom button to go full screen mode, or click full screen icon at the upper right of window on older system. 'esc' key return to normal window.
- '[' key extend view angle ( to show wider scene ), ']' key narrows view angle. Click once extend or narrower 10 percent. 10 degrees minimum and 120 degrees maximum.
- 'A' key shows or hides altitude, speed and other information on the information bar at the bottom of the window. On some older Macs, those cannot upgrade to Mojave, such information are shown in the movie.





· Space key pauses or restarts the movie.

#### Rotation mode

- Right and left arrow keys change rounding speed and direction. '/' key stops rounding.
- Up and down arrow key change eye altitude. Minimum altitude is 100 meters, maximum is 10 times of distance from the center.
- During paused by space key or stoped by '/' key, mouse wheel rotates the landscape,

### Flight mode

- · Right arrow key turns right, Left arrow key turns left.
- Up arrow key nose up, Down arrow key nose down.
- '.' (period) key gets slower speed, '.' (comma) key gets faster speed.
- '/' key returns to straight and level flight.
- '/' with control key returns to straight flight.
- 'c' key shows or hides white cross that points moving direction.
- 's' key shows left front scene, 'd' key shows right front scene, 'x' key shows down front scene. 'e' key returns to front scene.

#### **Boat mode**

- · Right arrow key turns right, Left arrow key turns left.
- Up and down arrow keys ups or downs eye direction.
- '.' (period) key gets slower speed, '.' (comma) key gets faster speed.
- '/' key returns straight.
- · 'c' key shows or hides white cross that points moving direction.
- 's' key shows left front scene, 'd' key shows right front scene, 'e' key returns to front scene.

### Save as movie file

You can make a movie file with capturing 3D movie window using QuickTimePlayer.

- First activate 3D movie, stop playing by pressing space bar at appropriate scene.
- · Set up QuickTimePlayer's screen recording function, and start recording.
- · Restart 3D movie by pressing space bar.
- You can use systems screen recording function under Mojave or newer.

- To guit SimpleDEMViewer, you should close 3D movie window first.
- If your Mac's fan rotates faster and noisy, play with smaller data size, or pauze the 3D movie by pressing space bar temporarily until Mac will be cooled.
- In the 3D movie, landscape is projected to a plane, differ from Panorama view that project it on a cylinder or corn, then projected landscapes are differ each other.

# 36. Visible Region

# What is Visible Region

The places from where can see some point, or can be seen from some point This "some point" called "Target" is any point on the land or any object such as mountain peaks or buildings

Result color is drawn on the main window map.

To check the visibility, the eye point is set to one meter high from the surface and looks to target.

# **Show dialog**

Select "Visible region..." under the "Tools" menu to show dialog, or select "Draw visible region..." from the context menu on the main window map. Latter case, the place where show context menu is set to the target.

Visible region from or to an antenna that is 20 m high at the peak of the mountain.

# Settings

Target Name is shown if it has name.

--(Address) Shows the mouse point address or string's base address when start by context menu, otherwise

address set by previous session remains. You can change to any address.

- Elevation Shows calculated elevation from the specified address, or elevation of string data when start by

context menu.

- Search button Click this button to show search name dialog. Select a name in the table shows user data titles

and node comments. Search name dialog is the same as it of Panorama View.

Range Select window or selected rectangle to draw.

Quality Select "Faster" or "Fine". Usually "Faster" is appropriate for speed and quality. If DEM data

pitch is short ( maybe less than 1 second ) and focused place is affected by steep mountains, use

Fine.

Draw on sea Check to draw on sea also, otherwise no drawing on sea.

Color for visible region

Click color box to change color to draw. If opacity is less than 100 %, actual color is different.

Transparent / Opaque

Specify opacity in percentage.

Air refraction factor

Same as in Panorama View . Use default value 0.133 usually.

- To clear this drawing do "Redraw map" under "View" menu.
- If you do this function twice with translucent color for two different target, places from where you can see both target is drawn thickly.
- To save result as picture file, specify window range, same scale as main window and 72 dpi in map saving dialog.

# 37. Geo-Profiles

You can make profile along <u>user route data</u>. You can configure its appearance after creating it

If user route data has node names, profile shows them with names, elevations, mileages from the start node.

### Creation

You should provide user route data before creating profile. Select "GeoProfile image" in the "Tools" menu. Select one route data to make profile along it, and click "Make" button. Profile picture window appears with default settings. You can configure appearance in settings panel. You should read all DEMs under the route before creating the profile.

# **Settings**

Height range Specify upper and lower limit in elevation. This determines picture height.

Level lines interval Select from 10/20/50/100/200/500/1000/2000/5000m/Auto.

Height emphasizing Select from 1/1.5/2/3/4/5/10/20 times.

Profile color Select one of white (only profile line), Gray (top is dark, lighter to bottom),

Elevation colors.

Elevation colors and gradation depend on preference settings if you select elevation

colors.

Draw Set show or no show for each items.

- levels Level lines and their height.

- names Node names for named node of user route data.

- elevations- mileages- Distance from start point.

Select one of named nodes or pitch.

Set base to right edge Position start point of route to right edge in profile picture. (flip horizontally)

Title Any title string to show at top center position in the picture. Default is route data title.

Apply Redraw profile picture.

Scale menu Select from Auto/200/100/50/20/10/5%. If auto is selected, scale depends on window

width.

Shrink button Set smaller scale in the above scale menu.
Enlarge button Set larger scale in the above scale menu.
Panel Show or hide configuration panel.

Always two level lines are drawn above the highest elevation.

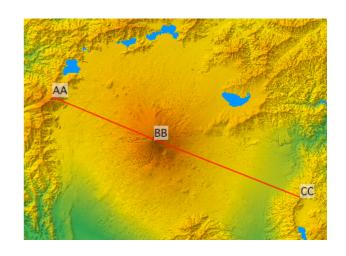
Set higher elevation for upper limit when names are intersect profile.

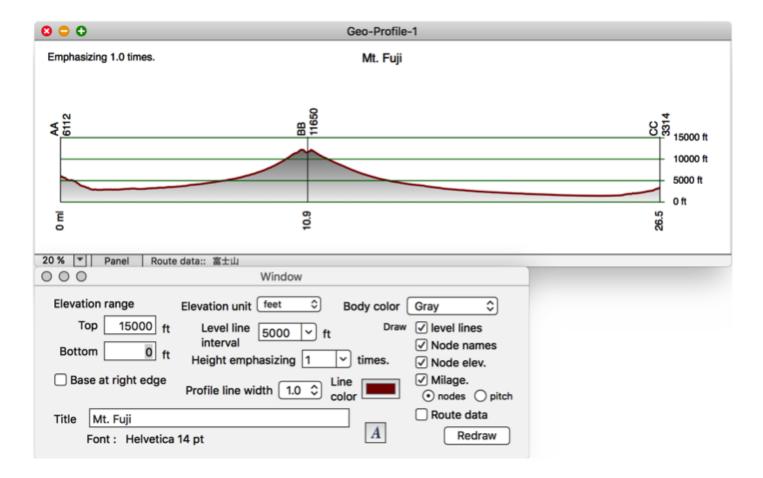
You can reflects new elevation color settings by clicking "Apply" button after changing elevation colors in preference dialog.

### Save as

You can save the profile as a picture file. Saved picture depends on current configurations. Whole picture is saved ignoring current window size.

- Data interval of profile is same as DEM data northsouth interval. E.g. 10 meters for 10 meter DEM, about 93 meters for 3 sec. mesh DEMs. If the map is extended in the main window, data interval is shorten in same rate of map scale.
- If a distance between route nodes is long enough, intermediate points are calculated as they are on the great circle.
- Elevations in the route data are ignored. Always use elevations calculated from DEMs.

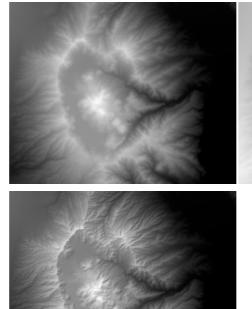




# 38. Grayscale Maps

You can create 8 bits or 16 bits grayscale map. It may be imported to some 3D rendering software.

Grayscale direction, high-white or low-white, is selectable. You can choose shading also.



With shading.

# **Dialog**

Select "Create Grayscale Map..." under the "Tools" menu to display the dialog. You can specify followings and click "Make" button to make grayscale map.

Target Select data range to create grayscale map. One of

selected rectangle region, window or whole data.

Picture scale Select picture size as percentage to the original

data.

Picture size Width and height should be less than 65,500 dots.

Bits per pixel Select 8 bits or 16 bits. Select 16 bits if you want

the result to use in 3D rendering software.

Range of grayscale

Map elevations to grayscale 0 to 255 or 65535.

- Use max. and min. of data

Highest and lowest elevations of DEM are used.

- Use max. of data, 0 m for min.

Highest elevation of DEM and 0 meter are used. If

lowest elevation is below 0 meter, it is used.

- Use below Use specified elevations to both limits. If highest or

lowest elevation of DEMs is out of limits, it is used.

Direction Select high-white or low-white.

Add ... m ... Add specified number of meters to the elevations

other than sea area to clear seashore in 3D software. Do not use this function if DEM has no sea info,

such as ETOPO and SRTM.

Do shading Check to apply shading.

- Light from Select one of eight direction.

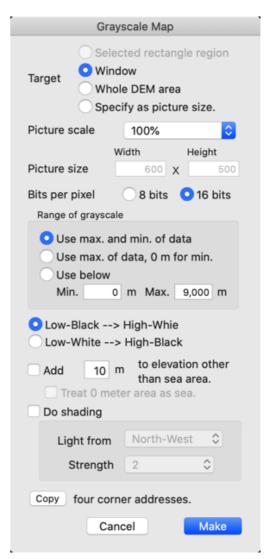
- Strength Select one between 1 and 5.

[Copy] four corner addresses

Copy addresses of four corner to scrap. It consists

of four lines, first line contains address of north-west corner, south-west, north-east, south-east

follow it. Each address format depends on setting in Preferences.



# Add strings in the picture

You can add any one line text on the picture. click on the picture with control key pressed, and select context menu "add string". In a dialog you can enter string and its attributes.

# Save as picture file

You can save grayscale map as a picture file as same as other pictures. You can select any picture format for 8 bits grayscale, but only tiff or png format for 16 bits.

### **Notes**

• With shading, white lines may appear along seashore. To remove them, specify 10 meters or so in "Add ... m ..." field.

# 39. Projection Maps

# About projection maps

Supports creating Orthographic, Conical, Mercator, Azimuthal Equidistant, Azimuthal Equiarea, Universal Transverse Mercator and Lambert Conformal Conic projection maps. Those maps are drawn in separate windows and can be saved as picture files in various format.

You can set center address of the map and size of the picture. Map scale will be the same scale of the main window. Also elevation colors and shading parameters will be the same those of the main window.

You can set projection center apart from map center except Mercator and UTM projection maps. In this case, equidistant circles will be drawn around the projection center. There is a sample picture at the last of this section.

To display the creation dialog, select "Create projection map" under the "Tools" menu or from the context menu on the main window. If context menu used, mouse point address is set to center address field, otherwise center address of the window is set.

To create projection maps require geo referenced DEMs, UTM DEMs or managed plane DEMs. No UTM projection map with celestial DEMs.

# **Settings**

Type menu

Select projection method.

Center address

Set center address of the map. Initially it is set to center address of the main window if called from Tools menu. It is mouse point address if called from context menu.

Latitude should be between 80 degree north and 80 degree south for Mercator, Conical and UTM projection maps, for Lambert conformal conic projection maps it should be between 80 and 20 north or between 20 and 80 south. This limitation is not applied if separate projection center specified.

Use separate projection center

Projection center address

You can set projection center to any address, but it should be inside the picture and latitude should be inside above limitation.

You cannot use separate projection center for Mercator and UTM projection maps.

If this address is specified, equidistant circles will be drawn around it, and scale at there instead of picture center is the same scale of the main window.

Picture size

Default is the size of main window. Width and height should be less than or equal to

65500 dots each.

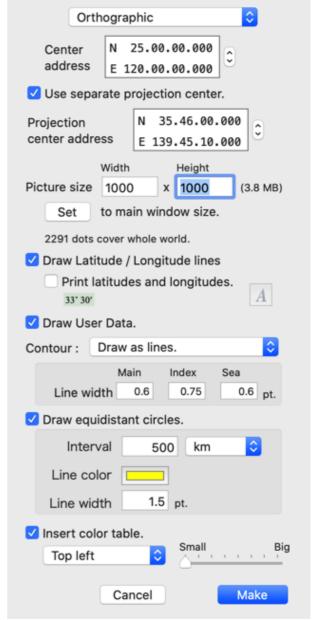
Set to main window size

Set picture size to the size of the main window.

Draw latitude and longitude lines

Check if you want to draw latitude and

longitude lines on the projection map. Interval, color and line width are the same as those of main window map.



Print latitudes and longitudes

Add latitude and longitude values to each line. To change font, click [A] button at right. You

can change font, size and color.

Draw user data Check if you want to draw user data on the projection map. All settings are the same as those of

main window map.

Contour Select one from the menu "Don't draw", "Draw as dots", "Draw as lines". If line mode, you

can set line width. Line intervals and colors are same as those of main window.

If you select line mode and save as PDF, you can edit contours with some draw software, such

as Adobe Illustrator, later.

Line mode takes time much longer, maybe more than ten times of dot mode.

Draw Equidistant circles

Check if you want to draw equidistant circles. This field will appear only for Orthographic,

Azimuthal Equidistant, Azimuthal Equi-Area projections.

- Interval Specify interval of the equidistant circle in unit of kilo-meter, miles or nautical miles.

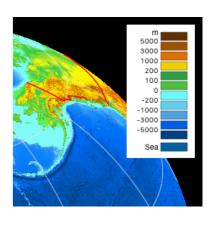
- Line color Click color box to change line color.

- Line width Select line width from the menu between 0.5 and 2.0 points.

Insert color table Insert a color table into the picture. Select position and size.

Lake color will appear when "Draw lakes" is set to on in

Preferences. Sea color is shown always.



# Orthographic projection map

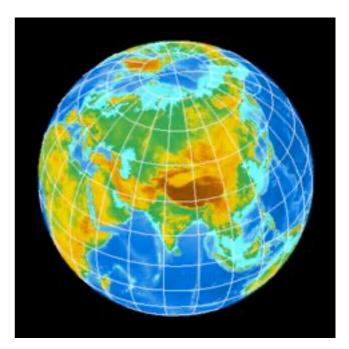
The orthographic projection is azimuthal parallel projection. If scale is small enough hemisphere of the earth is drawn in a circle like the picture at right.

You can specify projection center and picture size. The scale and latitude and longitude line interval are the same as those of main window map.

Picture at right is drawn as in the smallest size (5%) using ETOPO2.

To make this map, select "Orthographic projection map" under Tools menu Also available from context menu on the main window.

Scale of the center is the same as the scale of main window.

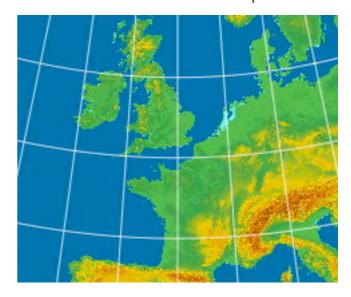


# Conical projection map

The map is projected to a cone that's apex is North pole or South pole depending on center latitude. The cone surface contacts with the globe surface at center latitude. If center latitude is equal to the Equator, the map projection method turn to cylindrical projection instead of conical projection.

Center latitude should be between 80 degree south and 80 degree north.

Picture at right uses ETOPO2, and scale rate is 8%. Center latitude is 40 degree.

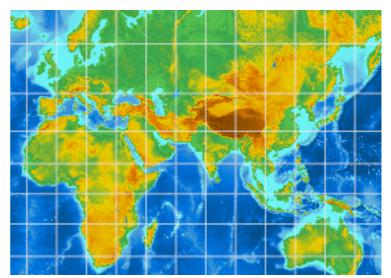


# Mercator projection map

You can create Mercator projection map around the specified center point. Scale on the Equator is same as the scale of main window.

Picture size you specify in the dialog defines drawing range, no affection to scale.

Picture at right is drawn in the smallest size (5%) using ETOPO2.

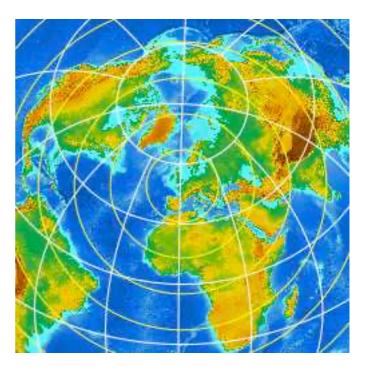


# Azimuthal Equidistant projection map

You can create Azimuthal Equidistant projection map around the specified center point. Scale is same as the scale of main window at the center point.

Picture size you specify in the dialog defines drawing range, no affection to scale.

Picture at right is drawn in the smallest size (5%) using ETOPO2, centered to Paris, France. Interval of equidistant circle is 2000 km.

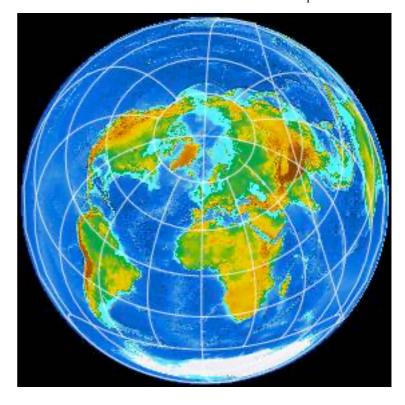


# Azimuthal Equi-area projection map

You can create Azimuthal Equi-area projection map around the specified center point. Scale is same as the scale of main window at the center point.

Picture size you specify in the dialog defines drawing range, no affection to scale.

Picture at right is drawn at 10% scale using ETOPO5, centered to Paris.

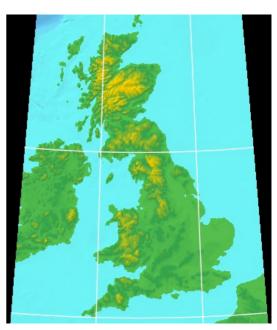


# Universal Transverse Mercator (UTM) projection map

You can create Universal Transverse Mercator (UTM) projection map around the specified center point. UTM zone number is determined by center address. If just equal to boundary longitude, smaller zone number is taken.

Both side of center meridian are drawn up to 6 degrees. North and South pole can be drawn, but center latitude should be between 80 and -80.

Zone number of the picture at right is 30, center meridian is 3 degree west.

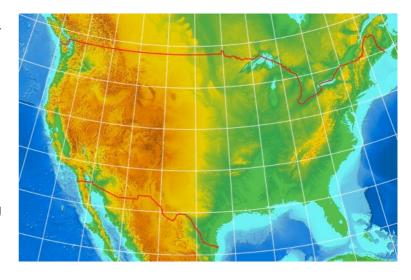


# **Lambert Conformal Conic Projection map**

You can create Lambert Conformal Conic projection map around the specified center point. Although standard projection method has two parallels touched surface of the earth, only one parallel at the center touch the surface here. Scale is same as the scale of main window at the center point.

Center latitude should be between 80 and 20 degrees north, or between 20 and 80 degrees south.

Sample picture below as created using ETOPO1 in 20 % scale centered at 40 degree north and 100 degree west.



# Strings in the picture

Strings (of user data) are draggable and removable. To remove strings, drag them outside of window.

You can add any text on the picture. Click on the picture with control key pressed, and select context menu "add string". In a dialog you can enter any string and its attributes. Strings (includes user data) are editable. Show context menu on a string and select "Update string" menu.

# Save as a picture

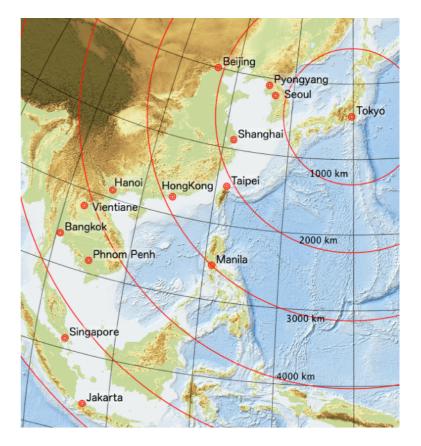
You can save projection map as picture files as same as other pictures. If picture format is jpeg, tiff or png, center address is written in the file as GPS information.

If you want to print the picture, save picture as pdf file. Strings and lines are maintained vector information in pdf file. If contours are drawn as lines, it also maintain vector information.

# Sample picture with separate projection center

This is Orthographic projection map centered on Tokyo.

Distance numbers are added after completion of drawing.



### 40. Picture Windows

This section describes handling windows of Bird's eye view, Stereograph, Grayscale map and projection maps. For main window, Panorama view and Geo-profile refer each section.

# **Compact view**

When the picture size is very large, you can shrink it to view whole picture. You can select one of 50%, 33.3%, 25%, 20%, 10%, 5%, 2% and 1% as small enough to see. If picture height becomes less than 600 pixels, no more shrinking available.

#+[ get smaller, #+] get bigger. #+0(zero) to original size ( 100% ).

As shown in picture at right, if cursor position is at top left corner of the picture window, a slider and buttons will appear. you can change percentage by them.

During being shrank, editing and moving string are not available.

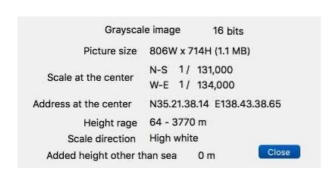
Latitude and longitude lines, equidistant circles and user data are not drawn if picture is shrank smaller than 20%.

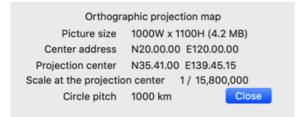


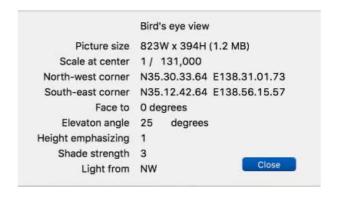
# Show picture info

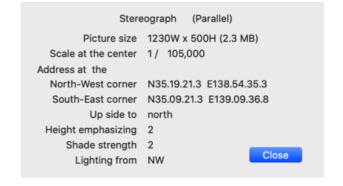
You can show information of pictures, such as size, address and some of creating settings. After selecting a picture window, do "Show info" under the File menu.

These are some samples.









# Save picture

Do "Save" under "File" menu when target picture window is in front. Whole picture saved as 100% size anyway it is shrank.

You can select picture file format and options. For 16 bits grayscale map, only tiff and png are available. If you want to print the picture, select pdf file so that strings and lines are printed finely.

Refer next section also.

Save Picture

Scale: 100%

Picture size

Resolution

Sea

0.6 pt.

Width

1,000 X

Heiaht

Print latitudes and longitudes.

Insert a color table.

Bottom right

Cancel

750 **2.9 MB** 

 $\boldsymbol{A}$ 

Big

Save

# 41. Save Pictures

You can save pictures of map image or pictures of other picture window images. Any picture file format is available as long as QuickTime supports. You can select pdf also.

Range

Selected rectangle

Whole DEM area

Window area

Size by pixel

Draw User Data.

Line width

Colorize by slope.

Create world file.

Contour: Draw as lines.

Main

Copy four corner addresses.

0.6

Index

0.75

If you want to save pictures to print, select pdf format especially when pictures include strings and lines.

# Saving map picture

Do "Save" under file menu when main window is most front except scale and index panels. A sheet dialog prompts you to select target area and scale. After clicking save button, you can specify file name and format in the file navigation dialog.

Range Select range for creating

picture. If you select "Size by pixel" specify width and height. In this case, picture center is set to the center of

the main window.

Scale Specify percentage to the DEM data. Initially, it is set to the same percentage of the main

window.

Picture size Specify width and height of the picture if range is "Size by pixel", otherwise set automatically.

These values are in points, actual pixels is twice when 144 dpi is selected. MB or GB value is size in the program, actual picture file size in the disk storage is vary depends on file format.

Resolution Select 72 or 144 dot per inch. When 144 dpi is selected, String size and line width are extended

twice to maintain balance with landscape as same as main window.

Draw user data Check to draw User Memo / Route / Area data.

Contour Select one from the menu "Don't draw", "Draw as dots", "Draw as lines". If line mode, you

can set line width. Line intervals and colors are same as those of main window.

If you select line mode and save as PDF, you can edit contour by some draw software, such as

Adobe Illustrator, later.

Line mode takes time much longer, maybe more than ten times than dot mode.

Colorize by slope Check to draw colorize by slope. Settings

previously used to draw in main window will be

taken.

Create world file Specify to create a world file. See below.

Print latitudes and longitudes

Check to add latitude and longitude value strings. No minus sign is added to west longitude and south latitude. No print if seconds part of the

address is not zero.

To change font, click [A] button at right. font panel will appear and you can change font, size

and color.

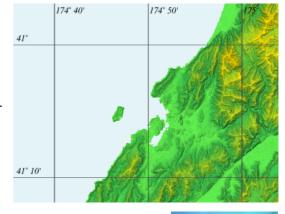
Insert color table Insert a color table into the picture. Select position from four corners and

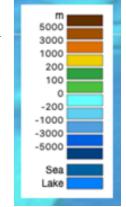
select size. Lake color will appear when "Draw lakes" is set to on in Prefer-

ences. Sea color is shown always.

[Copy] four corner addresses

Copy addresses of four corner to scrap. It consists of four lines, first line contains address of north-west corner, south-west, north-east, south-east follow it. Each address format depends on setting in Preferences.





# Saving other window pictures

You can save pictures of windows such as Bird's-eye view, Stereograph, Orthographic projection map, etc.. Do "Save" under "File" menu when target picture window is in front. You can specify file name and format in the file navigation dialog.

Always you saves pictures as new files, not update.

If the picture is 16 bits grayscale, you can select one of tiff or png.

### Create world file

You can create world files to use pictures with some GIS software. You can specify creation in the saving dialog for Map picture, in the Preferences dialog for grayscale maps.

Pictures satisfying following three can attach a world file.

- DEMs should be one of Geo, UTM or other plane coordinate.
- · Map pictures or grayscale pictures.
- File type is one of TIFF, JPEG, JPEG2000, PGN or BMP.

Format is the same as the HDR file for BIL form DEMs.

First line Horizontal data pitch in degrees or in meters.

Second line 0 Third line 0

4th line Vertical data pitch in degrees or in meters. Always minus value.

5th line Longitude at the center of the north-west corner cell of the data in degrees, or

coordinate address of UTM or XYPLANE.

6th line Latitude at the center of the north-west corner cell of the data in degrees, or

coordinate address of UTM or XYPLANE.

Extensions for world files are set as follows.

TIFF - TFW, JPEG - JGW, JPEG2000 - j2w, PNG - PGW, BMP - BPW

Note.: Many GIS software supports TFW but others.

# Save as GeoTiff

If you specify tiff format for saving picture, it will be GeoTiff automatically when DEMs are geo-referenced or UTM. Some GSI programs do not understand world file but GeoTiff.

Also Grayscale map and SRVC relief map and anaglyph that face to north and one pane is right projection can be saved as GeoTiff.

You should aware that datum in this GeoTiff file is WGS84 always even if DEMs are not based on WGS84.

<Note> This function is available on macOS 10.14 Mojave or newer.

### Add GPS information

GPS information (Latitude, Longitude and datum) are added in the picture as exif GPS information, when saving following pictures. Picture type should be jpeg or tiff. Latitude and longitude are at the center of the picture.

Map window, Bird's-eye, Stereograph, Grayscale and projection maps.

Eve direction and elevation are also attached to panorama views

# 42. Remove Data

You can remove data those are read in this program by the dialog looks like picture at right. Select "Remove data..." under the "File" menu to show the dialog. "Remove data" means just remove from the program memory, not delete from disk storage.

The dialog lists removable data such as DEMs, User Memo data, User Route data, User Area dat and texture maps in this order.

### **DEMs**

You can select each kind of DEMs to remove them. No individual file is selectable.

### User Memo / Route / Area data

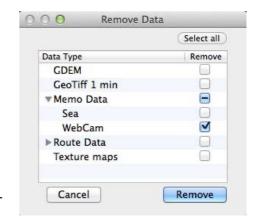
You can select kinds or select all for each data type. If you want remove individual data, you should go Edit User Data dialog.

If new or updated data exist and not saved yet, an alert message will appear.

### Texture maps

Remove all texture maps currently read. Individual texture map file can be removed through Texture Map dialog.

"Select all" button selects all items to remove all data. You can use #A shortcut key.



# 43. Menus

### Main Menu Bar

SimpleDEMViewer

About SimpleDEMViewer Show about dialog. Preferences.. Show preferences dialog.

Quit SimpleDEMViewer

File

Open... Read DEMs and user data files.

Close picture windows and some panels.

Remove data... Remove DEMs and / or user data.

Save Picture As... Save main window map or picture window as picture file.

Save Working Set... Save data and settings with or without name.

Load working set Load named working set. Saved names are listed in sub-

menu.

Export DEM... Create new DEM file from read DEMs.

Manage Projection Planes... Define world's local planar coordinate systems.

Manage color sets... Rename, remove color sets. Arrange color set menu items.

Export color sets as external file.

Import color sets
Show Info
Edit
Read color sets file and register them.
Show information panel for DEM or pictures.
(only Copy and Paste have custom functions)

Undo Redo Cut

Copy Copy address from address control.

Paste Paste address to address control.

Delete Select All

Special Characters...

View

Refresh Redraw map.
Expand Zoom in map.
Shrink Zoom out map.

Scale

2000% ~ 5% Apply new scale to map.
Other (nn%)... Specify custom scale to apply.

Adjust Base Latitude Set base latitude to center latitude of current window.

Window Size... Specify main window size as map size

Show (Hide) Index Map Show or hide index window. Show (Hide) Scale Panel Show or hide scale panel.

Change to Vertical (Horizontal) Scale

Swap scale panel between vertical and horizontal.

Find&Jump

Find a string in user data and reposition map.

Find Next Find another occurrence.

Jump to... Reposition map to the address specified.

User Data

Show/Hide User Data... Show dialog to set show / hide status.

Edit User Data... Show dialog with table of user data to editing.

Import Text User Data... Import text formed User Data.

User Data Preferences... Set defaults of user data, and maintaining user data kind.

Tools

Texture Maps... Read and set texture map.

Rectangle Region... Set or clear rectangle region on the main window. Find Highest/Lowest... Find highest or lowest elevation point in the read DEM.

Contour... Show a dialog to draw contour lines.

Slope Level... Show a dialog to colorize map by slope degrees. Visible Region.. Show a dialog to colorize map by Visible Region.

Bird's Eye View... Show a dialog to create Bird's-eye view picture. Panorama View... Show a dialog to create Panorama view picture.

Reset Panorama View
Stereograph...

GeoProfile...

Projection Maps...

Grayscale Map...

SRVC Relief Map...

Reset Panorama View settings to defaults.

Show a dialog to create Stereograph picture.

Show a dialog to create geo-profile picture.

Show a dialog to create projection maps.

Show a dialog to create Grayscale map.

Show a dialog to create SRVC relief map.

Create Lake Data... Start to create lake data.

Window Minimize Zoom

Bring all to front

Help

Online manual Show latest manual with safari (or another browser)

through internet.

SimpleDEMViewer Help Show some fags and topics in HelpViewer.

### **Context Menu on Main Window**

Show this place in

Maps.app Activate Maps and show this place in it. (OS X 10.9)

Google Map Activate safari ( or other browser ) and retrieve Google map

of this place.

Show DEM inspector Show DEM inspector panel showing cell values of DEM files.

Select Rectangle Region Start selecting rectangle region on the map.

Copy Address Copy address of the mouse point.

Centering Reposition map so that the mouse point will move to the

map center.

Scale Change scale and Reposition map so that the mouse point

will move to the map center.

2000% ~ 5% Change the scale to the selected percentage.

Other (nn%).. Change scale to any value.

Expand Expand map by changing scale one step larger in menu.

Shrink Shrink map by changing scale one step smaller in menu.

Create User Data

Memo... Create memo data at the mouse point.

Route... Start to create route data from the mouse point.
Area... Start to create area data from the mouse point.
Measure Milage Start to measure milage from the mouse point.

Create Panorama View... Start to create panorama view as you are on the mouse

point.

Set to panorama View Target

Draw Visible Region...

Set the mouse point as the target of panorama view.

Show dialog to draw visible region and set the mouse point

as the target.

Create Projection Map... Show dialog to create projection maps and set the mouse

point as the map center.

### **Context Menu on Panorama View**

Set to Target Set the mouse point as the target.

Set to Eye Point Set the mouse point as the eye point and show creation

dialog.

Set to Eye Point and Look back

Set the mouse point as the eye point, set the previous eye

point as the target and show creation dialog.

Show Place in Main Window Reposition map so that the mouse point place move to the

center.

Add (Edit) String... Add new string or update pointed string on the panorama

iew.

# 44. Limitations for AS Version

All App Store programs are required sandboxing, because of that some limitations are added comparing to SimpleDEMViewer V6. Following list shows all of them.

- Does not support DEMs from GSI of Japan, those have file extension 'LEM'.
- You should select folders instead of individual files for SDTS and JAXA ALOS DEMs.
- All tiff format files can be selected by Open panel even if those files are not DEM files. They will be checked after you close the panel. netCDF files those have file extension 'GRD', and PDS DEM files those have file extension 'IMG' are the same. Also bil form files are checked later if HDR file is exists or not.
- Cannot read alias files even they point DEM files if you select folders. You should select individual files for aliases.
- Topographic maps from GSI of Japan is just treated as normal pictures as a texture maps.
- User Memo Data cannot show pictures, if referencing pictures reside outside Memo Library.
- Closing the main window terminates application.