

**CADMAS-VR for Windows**

**Version 3.1.1**

**Operations Manual**

## History of Revision

Ver.	Month & Year	Revision
3.0	Feb. 2008	First Edition
3.0.1	Apr. 2008	Additions to Near/Far Settings and Capture functions
3.0.2	May 2008	Addition of Viewpoint Movement Path Settings
3.0.3	Jun. 2008	Addition of Animation Control GUI and other functions
3.0.4	Feb. 2009	Addition of Water Surface Expression and other functions
3.0.5	Feb. 2010	Addition of Whitecap Expression and structure functions.
3.0.6	Dec. 2010	Addition of STR, PARIDEM and AGENT functions
3.0.7	Feb. 2012	Addition of PARIDEM and KML file output functions
3.0.8	Oct. 2012	Additions to View Options and GUI Settings
3.0.9	Mar. 2014	Additions to File Caches functions
3.1.0	Mar. 2014	Additions to Play by Real Time functions
3.1.1	Feb. 2015	Additions to Data Output functions, and STR and AGENT functions

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# 1. Introduction

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## 1.1. Overview of CADMAS-VR

CADMAS-VR is a viewer that enables you to view CADMAS-SURF/3D graphic files, and object files created in Wavefront OBJ and COLLADA formats.

CADMAS-VR displays, together with object files, VOF (volume-of-fluid) surfaces, contours, current velocity vectors, terrain surfaces combining void ratios and nonanalytic regions, which are all included in CADMAS-SURF/3D graphic files. Cube mapping and bump mapping with shaders can also be applied to VOF surfaces to create highly-realistic waves.

There are two techniques to choose from for generating VOF surfaces; Height Field and Isosurface.

In generating VOF isosurfaces, a method using Deformed Cubes is applied, which is an algorithm of approximating volume data as groups of quadrilaterals. The Deformed Cubes method is simpler than other isosurface generation algorithms and has good curvature accuracy.

Moreover, CADMAS-VR employs OpenGL FREEDOM, thereby enabling naked-eye stereoscopy on PHILIPS' naked eye stereoscopic displays.

## 1.2. File Structure

The file structure of CADMAS-VR is shown in Table 1.1.

Files in the same directory as CADMAS-VR.exe and image files under the "texture" folder are required for initializing the application.

It is often the case that you can set an image you like as an environment file, e.g., setting a location for Cube Map image files. For more about environment files, please see 11. Environment Files.

Table 1.1 CADMAS-VR File Structure

ファイル構成	説明
CADMAS-VR	
bin	アプリケーションフォルダ
CADMAS-VR.exe	アプリケーション本体
CADMAS-VR_64.exe	アプリケーション本体(64bit)
CADMAS-VR_UsersManual.pdf	ドキュメントファイル
default.txprm	テクスチャパラメータ基本ファイル
ocean.frag	
ocean.vert	
ocean_clipper.flag	シェーダープログラムファイル
ocean_reflection.flas	
ocean_reflection_in_water.flag	
ocean_reflection_whitecap.flas	
times.ttf	フォントファイル
image	キャプチャ画像格納用フォルダ
texture	テクスチャ画像フォルダ
fresnel.bmp	シェーダ用画像ファイル
button	
back.png	
capture.pic.png	
forward.png	
loop.sw.png	
movie.onz	
pause.png	
play.onz	
snapshot.png	
stop.png	
to_end.png	
to_start.onz	アプリケーション用画像ファイル
CADMAS-VR.ico	
tex_exp.bmp	
view.add.onz	
view.capture.png	
view.delete.onz	
view.loopplay.png	
view.play.png	
view.save.onz	
view.stop.png	
xyz.bmp	
ColorMap	カラーマップ用画像ファイル
colormao.bmp	
fvcolormap.bmp	
Cube	
cube_xneg.bmp	
cube_xneg.cloudy.bmp	
cube_xpos.bmp	
cube_xpos.cloudy.bmp	
cube_vneg.bmp	
cube_vneg.cloudy.bmp	
cube_vpos.bmp	
cube_vpos.cloudy.bmp	
cube_zneg.bmp	
cube_zneg.cloudy.bmp	
cube_zpos.bmp	
cube_zpos.cloudy.bmp	
DBlue	
cube_xneg.bmp	
cube_xpos.bmp	
cube_vneg.bmp	
cube_vpos.bmp	
cube_zneg.bmp	
cube_zpos.bmp	
Dusk	
cube_xneg.bmp	
cube_xpos.bmp	
cube_vneg.bmp	
cube_vpos.bmp	
cube_zneg.bmp	
cube_zpos.bmp	
Land	地形テクスチャ用画像ファイル
ground.bmp	
Sky	空テクスチャ用画像ファイル
cloudy.bmp	
night.bmp	
sky.bmp	
sunrise.bmp	
sunset.bmp	
SLBump	シェーダー用画像ファイル
bum000.bmp	
Whitecap	白波シェーダー用画像ファイル
bubble.bmp	

### 1.3. Coordinate system

The coordinate system of CADMAS-VR is a right-handed coordinate system with the Z-axis pointing vertically upward.

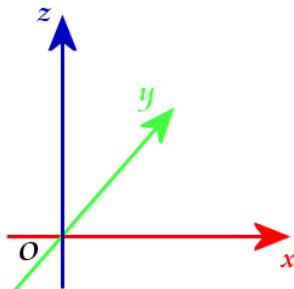


Fig. 1.1 CADMAS-VR Coordinate System

### 1.4. Compatible file formats

There are nine file formats readable by CADMAS-SURF-3D as follows.

- ① CADMAS-SURF/3D graphic files (file name extension grp, hereinafter referred to as "CADMAS-SURF/3D files")
  - a) CADMAS-SURF/3D files are graphic data files which are created by using CADMAS-SURF/3D, a numerical wave tank simulation program.
  - b) You can view the following data by loading CADMAS-SURF/3D files.
    - Wave surfaces  
Regions where the status of cells described in files is indicated by a NF value between 1 and 6 (water surfaces)
    - OBST  
Regions where the status of cells described in files is indicated by the NF value -1 (nonanalytic regions)
    - POROUS  
Regions where the void ratio of cells described in files is indicated by a gv value below 1
  - c) In the case where several files contain the same time data, the files are displayed in a non-specific order.

- d) CADMAS-SURF/3D files which are supported by CADMAS-VR are of the IVR001=0 and IVR002=1 versions.
- ② STOC files (file name extension stoc, hereinafter referred to as “CADMAS-SURF/3D files”)
- ③ Multigrid files (file name extension mg)
- ④ Topography files (file name extensions geo, depth, and ht)
- a) These are file formats for displaying terrain. CADMAS-VR supports geo files in binary format, and depth and ht files in text format.
  - b) geo files are created by converting depth and ht files within CADMAS-VR so that the files can be loaded quickly by CADMAS-VR.
  - c) depth files contain the following items which are described in text format.
    - Depth information at each grid point of an orthogonal equal-interval grid: one piece of information per row
    - Grid information is not described in depth files
    - The nx number of x-direction grid cells × the ny number of y-direction grid cells = grid size
    - x-direction grid coordinate: x0, x1, ..., xn  
y-direction grid coordinate: y0, y1, ..., ym

The grid coordinates are therefore described in the order of (x0, y0), (x1, y0), ... , (xn, y0), (x0, y1), ..., (xn, ym)  
(n = nx – 1, m = ny – 1)
  - d) ht files contain the following items which are described in text format.
    - The coordinates (xi, yi) at each grid point of an orthogonal equal-interval grid, and the z-direction height (zi) on the grid coordinates in the following format:

```
x0  y0  z0
x1  y1  z1
... one coordinate per row
```

    - The order of described coordinates does not necessarily correspond to the order of grid cells
    - The nx number of x-direction grid cells × the ny number of y-direction grid cells = grid size on the coordinates
- ⑤ CADMAS-STR files (file name extension neu)
- ⑥ CAMDAS-PARIDEM files (file name extension dat)
- ⑦ Files in Wavefront OBJ format (file name extensions obj and mtl, hereinafter referred to as object files)

- a) These are 3D object files which are written in text format by Wavefront.
  - b) The following tags are read.
    - Tags included in obj files: v, vn, vt, f, o, g, usemtl and mtllib
    - Tags included in mtl files: newmtl, Kd, Ka, Ks, Ns, and map\_Kd
  - c) The locations, angles and scales of individual object files cannot be controlled.
- ⑧ COLLADA files created by Google SketchUP (file name extension dae)
    - a) COLLADA files are 3D object files written in xml format.
    - b) The following information is read.
      - Apex, normal line and texture arrangement
      - Ambient, diffuse, specular, shininess
      - texture images
    - c) The locations, angles and scales of individual object files cannot be controlled.
  - ⑨ CADMAS-VR environment files (file name extension cvr)

## 2. Viewpoint movements

Viewpoint movements by mouse operations are as shown in the table below.

Table 2.1 How to Move the Viewpoint

No.	Mouse	Keyboard	Movement	Viewpoint Movement
1	Left button	-	Drag left and right, up and down	Back and forth, left and right parallel to the XY plane (①)
2	Left/right button	-	Drag up and down	Up and down perpendicular to the XY plane (②)
3	Right button	-	Drag up and down	Near and far in the direction of the line-of-sight (zoom in / zoom out) (③)
4	Middle button	-	Drag left and right	Left/right rotation parallel to the XY plane (④)
5	Middle button	-	Drag up and down	Vertical rotation perpendicular to the XY plane

コメントの追加 [O1]: この番号が原文では抜けている  
ようなのですが、図中の③のイメージに相当するもので  
しょうか?

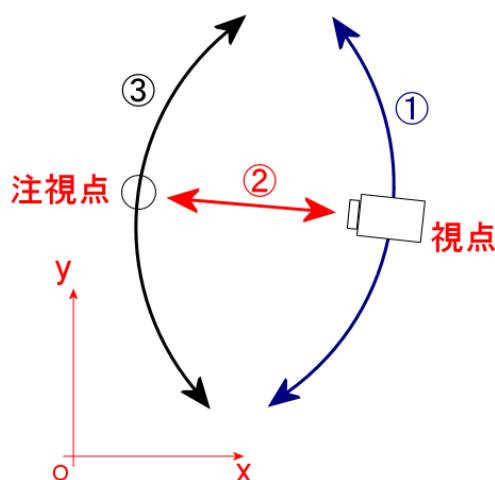


Fig. 2.1 Viewpoint Movements (Images of ①, ②and ③)

### 3. File Menu

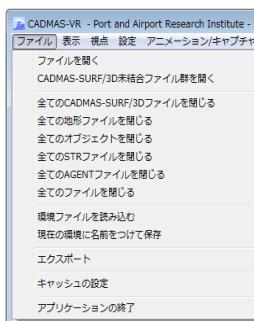


Fig. 3.1 File Menu

#### 3.1. Open CADMAS-SURF/3D Files

You can load CADMAS-SURF/3D files from the [Open dialog box](#). You can also specify several files at a time. All grp files are treated as multigrid files, and they are prioritized as they are loaded. Priorities are determined in the case where the regions of data overlap.

When several files are loaded at a time, they are sorted by file name and in descending order, and then prioritized. The Open dialog box below, for example, shows the priority order of data\_04.grp, data\_03.grp, data\_02.grp and data\_01.grp, descending from low to high.

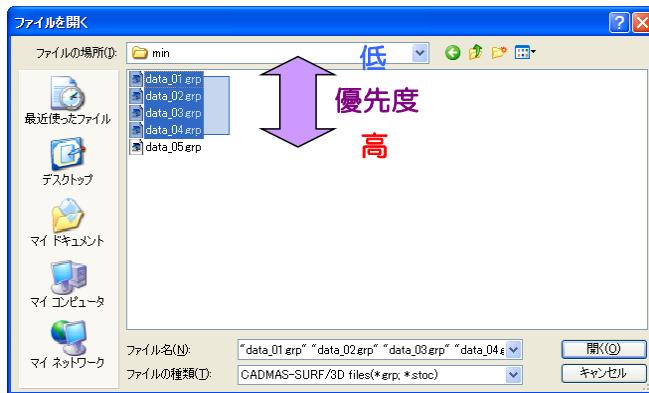


Fig. 3.2 Open Dialog Box

(Notes)

**コメントの追加 [O2]:** 日本語では大文字・小文字の区別がないので「」などを使って強調しますが、英語では“”を使わず、頭文字を大文字にすることで十分だと思います。

**コメントの追加 [O3]:** 「ファイルを開く」ダイアログ: Windows の英語版では単に Open のようです。

1. The entire operation may slow down when loading many files at a time.
2. The same file cannot be loaded twice.

### 3.1.1. Open STOC Files

With “CADMAS-SURF/3D files” selected from the file type drop-down list of the Open dialog box (Fig. 3.2), you can load files in STOC format as well as GRP files. Files in STOC format need a file name extension “stoc” attached to them.

Select STOC from the file type drop-down list of the Open dialog box; a list of STOC files will be displayed.

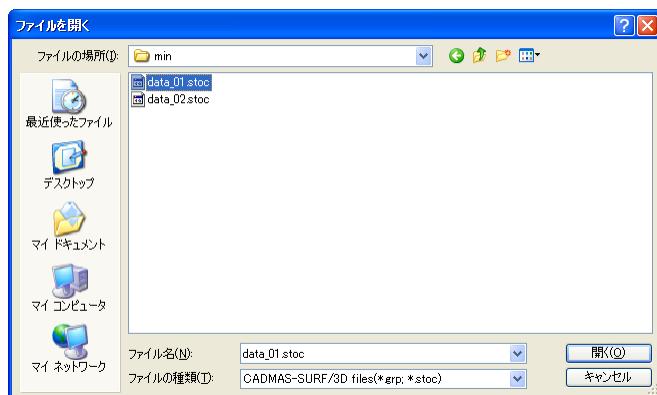


Fig. 3.3 Open Dialog Box (STOC)

Because loading STOC files is time consuming, they are converted to GRP files before being loaded. The following dialog box appears during file conversion.

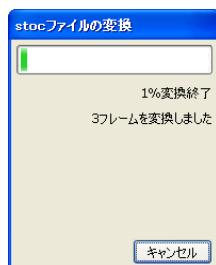


Fig. 3.4 STOC Conversion Dialog Box

A file converted from STOC format into GRP format is saved in the same folder, with a file name extension “.grp” added to the STOC file name, i.e., “data.stoc” changed to “data.stoc.grp”. CADMAS-VR automatically detects the converted file and skips further conversion.

Because file conversion takes time, it can be cancelled during the process. If cancelled, the conversion progress made up to the point of cancellation is saved with a file name “data.stoc-tmp.grp”.

All STOC files are treated as multigrid files, the same as GRP files.

### 3.1.2. Open Multigrid Files

Loading GRP or STOC files to view CADMAS-SURF/3D files as multigrid files is one way, and another way is to create “multigrid files (file name extension mg)” and describe GRP or STOC files in the multigrid files.

#### 3.1.2.1. Definition of Multigrid File

Multigrid file is a text file indicating the priority order of CADMAS-SURF/3D files in a multigrid context. A file name extension mg is attached to multigrid file names.

In a multigrid file, file names are described, one file with a full-path name per row, and sorted by priority from low to high.

Fig. 3.5 shows an example where data.grp\_ml06.stoc is the highest priority, and therefore, the wave surfaces and ground surfaces in data.grp\_ml05.stoc are not drawn in the region in which those in data.grp\_ml06.stoc are drawn.

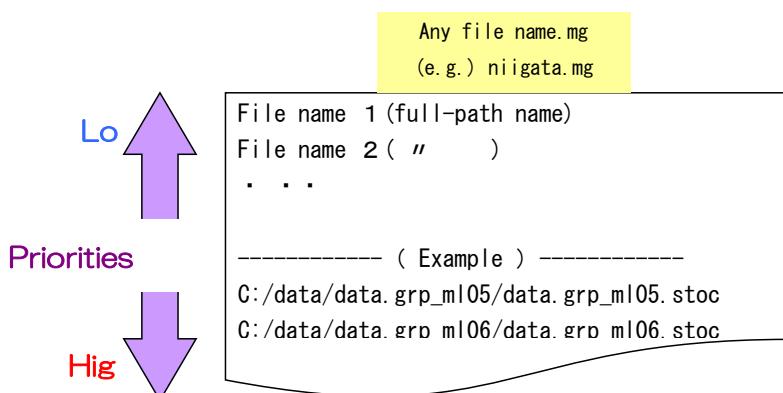


Fig. 3.5 Multigrid File - Example

### 3.1.2.2. Load Multigrid Files

To load a multigrid file, select Open from the File menu, and in the Open dialog box, as shown below, select “Multi-grid files (\*.mg)” from the file type drop-down list and specify the multigrid file (any file name.mg) you want to open.

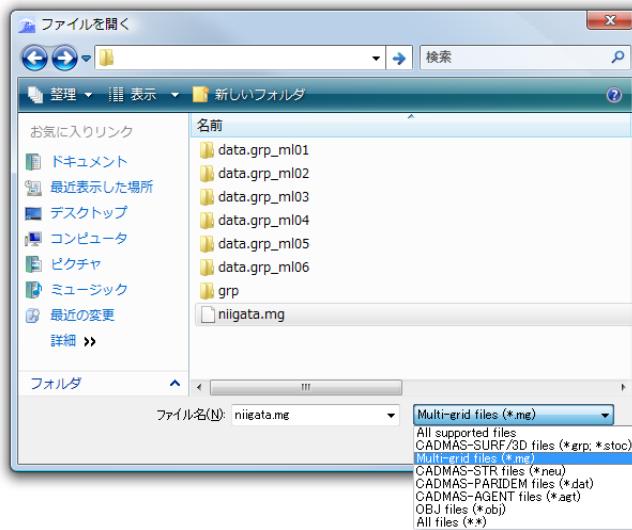
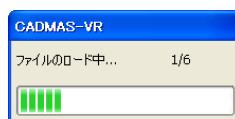


Fig. 3.6 Loading Multigrid Files

Upon opening a multigrid file, all the CADMAS-SURF/3D files which are described in the multigrid file will be loaded as multigrid files. The drawing attributes of these files can be specified as a whole or individually.

While loading files, “Loading...” is displayed on the right end of the status bar, and the pop-up window, as shown below, is also displayed.



### 3.2. Open Unlinked CADMAS-SURF/3D Files

Open a directory containing unlinked CADMAS-SURF/3D files.

All the grp files in the directory will be loaded.

### 3.3. Load Topography Files

To load a topography file, select Open from the File menu, and in the Open dialog box, as shown below, select “Topography files (\*.geo; \*.depth; \*.ht)” from the file type drop-down list and specify the topography file you want to open.

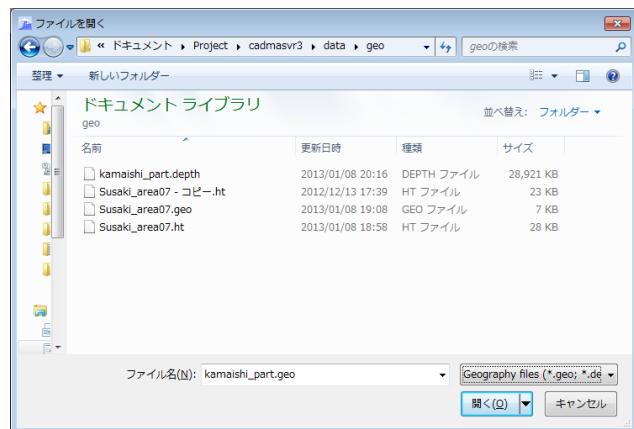


Fig. 3.7 Loading Topography Files

In the case of specifying a geo file, the file is loaded as it is to display geo data.

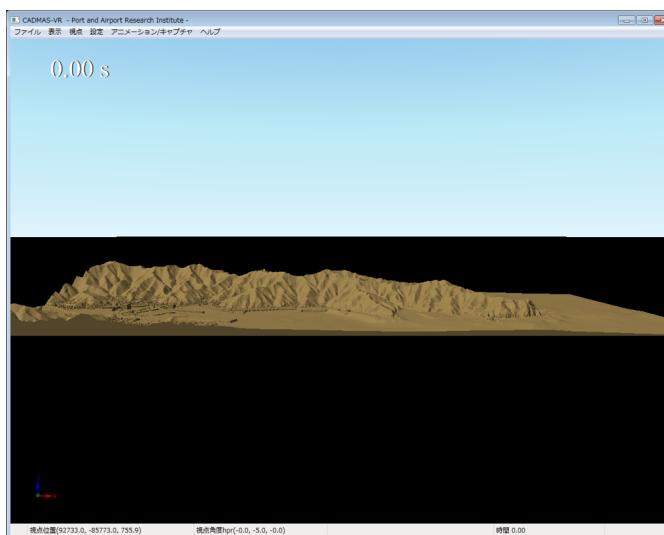


Fig. 3.8 Geo Data

Because loading depth and ht files is time consuming, they are converted to geo files before being loaded. The following pop-up window will be displayed during file conversion.



If there is already a geo file in the same folder, the geo file is loaded without file conversion.

For more about loading depth and ht files, please see 3.2.1. Open depth Files, and 3.2.2. Open ht Files.

### 3.3.1. Open depth Files

While selecting a depth file, if there is a geo file containing the same data in the same folder, the geo file will be loaded. If there is not a geo file in the folder, the depth file will be converted to a geo file.

The following dialog box appears in the case of file conversion into geo format.



Fig. 3.9 Grid Information Input Dialog Box

Input the grid information of a depth file in the grid information area of the dialog box. Click Create to start file conversion into geo format. If you click Cancel, the file conversion will be interrupted and no geo data will be loaded.

(Note)

The loading of a depth file and the preparation of geo data are carried out on the basis

**コメントの追加 [O4]:** 「depth ファイルを選択すると同じフォルダに geo ファイルがある場合は geo ファイルを読み込み、」意味がよくわからなかったのですが、「depth ファイルを選択する際に、同じフォルダに、同じデータ内容の geo ファイルがある場合」と解釈して訳しました。間違っていたらご指摘ください。

of the grid information entered into the ‘Grid Information Input’ dialog box. Geo data conversion is likely to fail if the grid size described in the grid information and the number of grids described in the depth file do not correspond to each other.

### 3.3.2. Open ht File

While selecting a ht file, if there is a geo file containing the same data in the same folder, the geo file will be loaded. If there is not a geo file in the folder, the ht file will be converted to a geo file.

コメントの追加 [O5]: See Comment [06].

(Note)

Unlike depth files, there is no need to input the grid information of ht files, as the grid information of ht files is calculated from their coordinate information.

### 3.4. Open CADMAS-STR Files

To load a CADMAS-STR file, select Open from the File menu, and in the Open dialog box, as shown below, select “CADMAS-STR files (\*.neu)” from the file type drop-down list and specify the CADMAS-STR file (any file name.neu) you want to open.

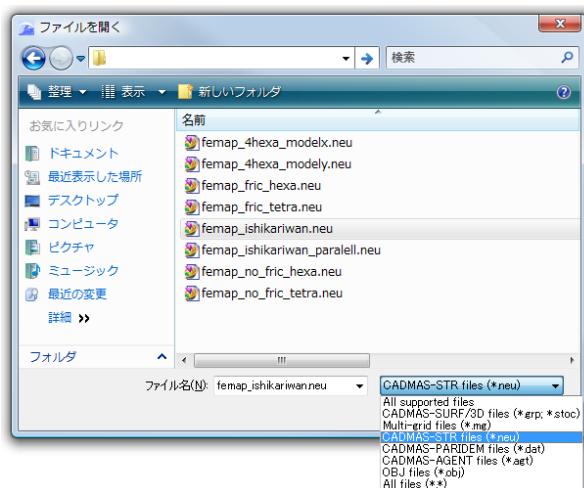


Fig. 3.10 Loading CADMAS-STR Files

Once a CADMAS-STR file has been loaded successfully, the file is displayed as shown below.

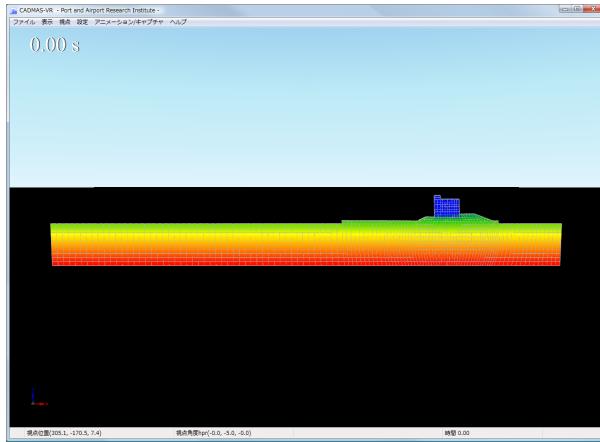


Fig. 3.11 Displaying a CADMAS-STR File

### 3.5. Open CADMAS-PARIDEM Files

To load a CADMAS-PARIDEM file, select Open from the File menu, and in the Open dialog box, as shown below, select “CADMAS-PARIDEM files (\*.dat)” from the file type drop-down list and specify the CADMAS-PARIDEM file (any file name.dat) you want to open.

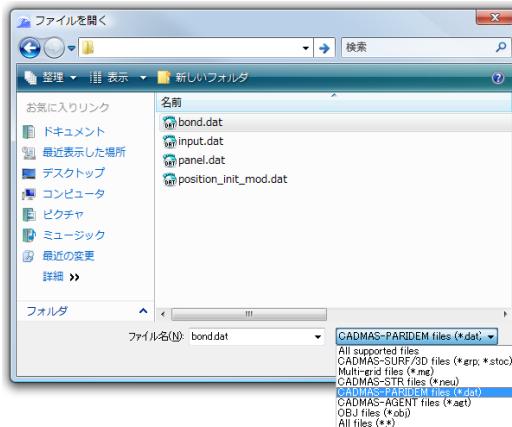


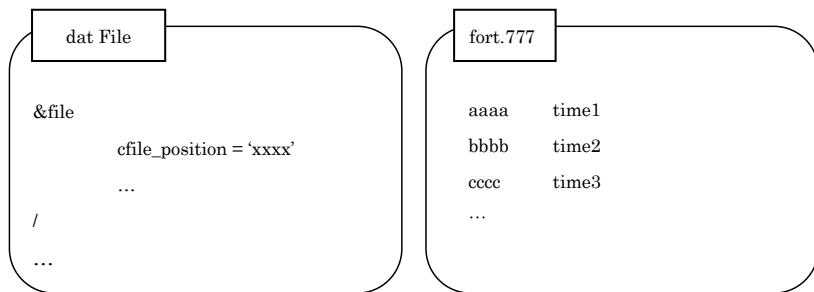
Fig. 3.12 Loading CADMAS-PARIDEM Files

(Notes)

To load CADMAS-PARIDEM data, it is necessary that a file called “fort.777” and a file

containing CADMAS-PARIDEM coordinate information, which corresponds to the number of rows written in fort.777, are included in the same folder as the “dat” file specified above.

The formats of the dat file and fort.777 are as follows.



CADMAS-PARIDEM coordinate information is described in a file, and the prefix of the file name is described in “cfile\_position” of a dat file.

Suffixes (no. of steps) of the name of the file containing the CADMAS-PARIDEM coordinate information and the timestamps (clock times) of the file are treated as a set, which is described, as many as the number of animation steps, in fort.777.

As a result, the name of the file containing the CADMAS-PARIDEM coordinate information becomes the following:

“xxxx\_aaaa”, “xxxx\_bbbb” and “xxxx\_cccc”.

### 3.6. Open CADMAS-AGENT Files

To load a CADMAS-AGENT file, select Open from the File menu, and in the Open dialog box, as shown below, select “CADMAS- AGENT files (\*.agt)” from the file type drop-down list and specify the CADMAS-AGENT file (any file name.agt) you want to open.

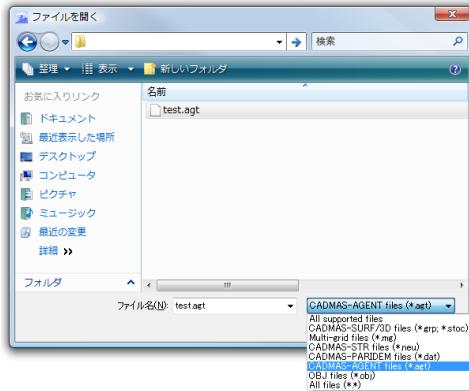


Fig. 3.13 Loading CADMAS- AGENT Files

### 3.7. Open Object Files

You can load object files (file name extension obj) in Wavefront OBJ format. Similar to CADMAS-SURF/3D files, you can specify several object files at a time.

Object files do not support animation.

### 3.8. Open COLLADA Files

You can load COLLADA files (file name extension dae) which are generated by Google SketchUP. Similar to CADMAS-SURF/3D files, you can specify several COLLADA files at a time.

COLLADA files do not support animation.

コメントの追加 [O6]: Sketch → Sketch 原文で誤記。

### 3.9. Close All CADMAS-SURF/3D Files

Close all the CADMAS-SURF/3D files that are currently open.

### 3.10. Close All Topography Files

Close all the topography files that are currently open.

### 3.11. Close All Objects

Close all the object files that are currently open.

### 3.12. Close All Files

Close all the files that are currently open.

### 3.13. Load Environment Files

You can load environment files (file name extension cvr). (For more about environment files, please see 11. Environment Files.)

### 3.14. Save as Current Environment

The current status of CADMAS-VR can be saved as an environment file (file name extension cvr).

(For the parameters to save, please see 11. Environment Files.)

### 3.15. Export

A CADMAS-SURF/3D file which is currently being loaded is converted and saved in KML format.

To export a file, select Export from the File menu, and enter the name of a KML file you want to save.

Once the file name has been determined, the following settings dialog box will appear.

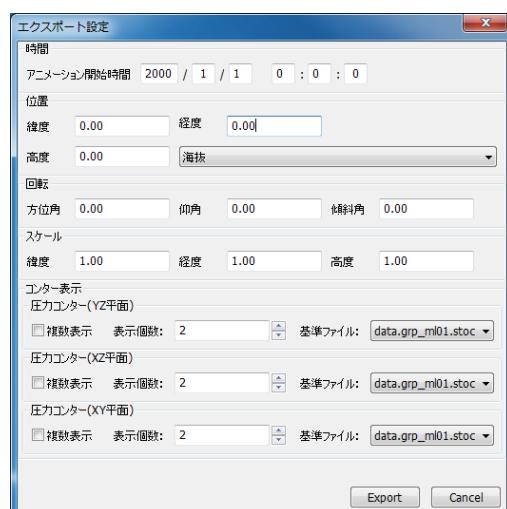


Fig. 3.14 Export Settings Dialog Box

#### ■ Animation Start Time

- Enter the time to start the animation of CADMAS-SURF/3D data: year/month/date, and hour:minute:second.

## ■ Location

- Enter a location of the data on earth.

Select an altitude reference point from the following five locations: Above Sea Level, Fixed to Ground, Relative to Ground, Fixed to Seabed and Relative to Seabed.

When Fixed to Ground or Fixed to Seabed is selected, the altitude value is disregarded and the reference point is fixed to the ground surface or the seabed defined by the latitude and longitude which have been entered.

## ■ Rotations

- Enter the orientation of the data with an azimuth angle, an elevation angle and an inclination angle.

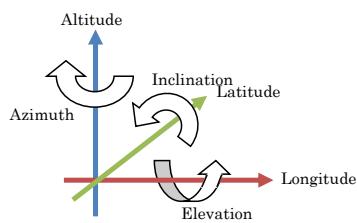


Fig. 3.15 Rotation Axes

## ■ Scale

- Enter the magnification ratio of the data.

## ■ Contours

- You can export several contours at a time.

If you want to export several contours at a time, check Multiple Views for each plane contour.

When Multiple Views is unchecked, only the contour which is currently being drawn will be exported.

- In the case of exporting several contours, as many contours as the number entered in No. of Contours will be output at equal intervals.  
Enter a number equal to or greater than 2 in No. of Contours.
- The contour output range is within the bounding box of the file which has been selected in Reference File.

### 3.16. Cache Settings



Fig. 3.16 Cache Settings

You can configure the cache settings to increase the grp drawing speed.

#### ■ Enable Cache

You can choose whether or not to use a cache file.

#### ■ Directory

Path : The directory in which a cache is saved is displayed.

Max. Size : The maximum size of the cache directory is displayed.

At the time of closing the application, if the size of the cache directory exceeds the maximum size, old cache files will be automatically deleted..

#### ■ Delete Cache Files

All the cache files in the cache directory are deleted.

(For further details about the cache, please see 12. File Cache.)

### 3.17. Close Application

CADMAS-VR finishes its operations.

## 4. Show Menu

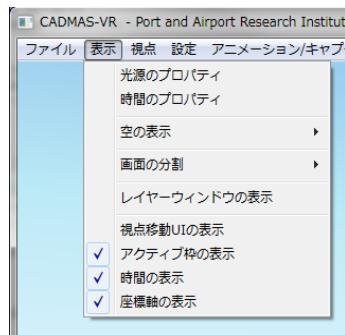


Fig. 4.1 Show Menu

### 4.1. Light Source Properties

You can configure the settings of light source locations and material information for entire scenes. Two light sources, Light Source 1 and Light Source 2, are available with CADMAS-VR. Light Source 2 is normally disabled, but it can be added by checking the Enable box.

The information of Light Source 2 is not reflected in images that are drawn using shaders.



Fig. 4.2 Scene Light Source Settings Dialog Box

## ■ Direction

- You can specify the direction of a light source. Parallel light travels from a specified point in the direction toward the coordinate origin. The numerical range possible to specify the direction of the light source is [-5.0 to 5.0] for x, y, and z respectively.

(e.g.) In the case of  $(X, Y, Z) = \{1.0, 1.0, 1.0\}$ :

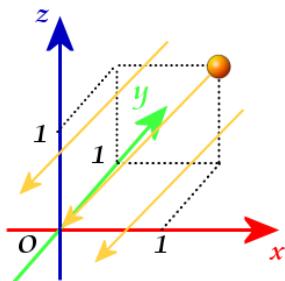


Fig. 4.3 Light Source

## ■ Light Source Materials

- You can configure the settings for specifying Diffuse Reflection (Diffuse), Ambient Reflection (Ambient) and Specular Reflection (Specular).

Diffuse Reflection (Diffuse) … the base color reflected by direct light

Ambient Reflection (Ambient) … reflection of indirect light

Specular Reflection (Specular) … reflection on a highlighted part

Shininess … the degree of smoothness of a material

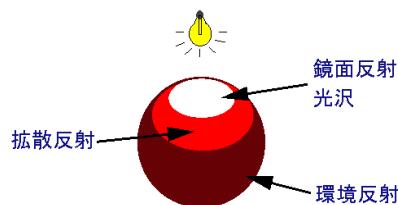


Fig. 4.4 Light Source Materials

## 4.2. Time Properties

Configure the settings for displaying time. Click Time Properties to bring up the following dialog box.

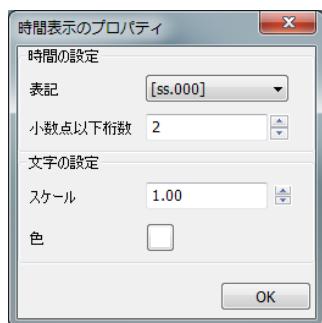


Fig. 4.5 Time Display Properties Dialog Box

### ■ Time Settings

#### ➤ Display

Select [ss.000] or [hh:mm:ss.000].

With [ss.000] selected, time is displayed in the “second.millisecond” format.

With [hh:mm:ss.000] selected, time is displayed in the “hour:minute:second” format.

1.90 s

With [ss.000] selected

00:00:01.90

With [hh:mm:ss.000] selected

Fig. 4.6 Selecting Time Display

#### ➤ Decimal Places

Specify the millisecond value by using integers between 1 and 10.

### ■ Text Settings

#### ➤ Scale

Specify the text size within the range of 0 to 10.

#### ➤ Color

Change the text color. Click to display the following dialog box.

Select a color and click OK. The text will turn into the color that has been selected.



Fig. 4.7 Color Settings Dialog Box

#### 4.3. Show Sky

You can change the sky texture. Six different textures are available to choose from: Blue Sky, Cloudy Sky, Sunrise, Sunset, Night and None. You cannot use any texture other than these textures.

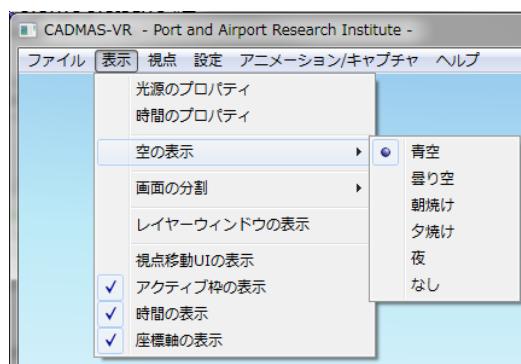


Fig. 4.8 Show Sky Menu



Fig. 4.9 Sky Textures

#### 4.4. View Options

You can split the screen into multiple panes.

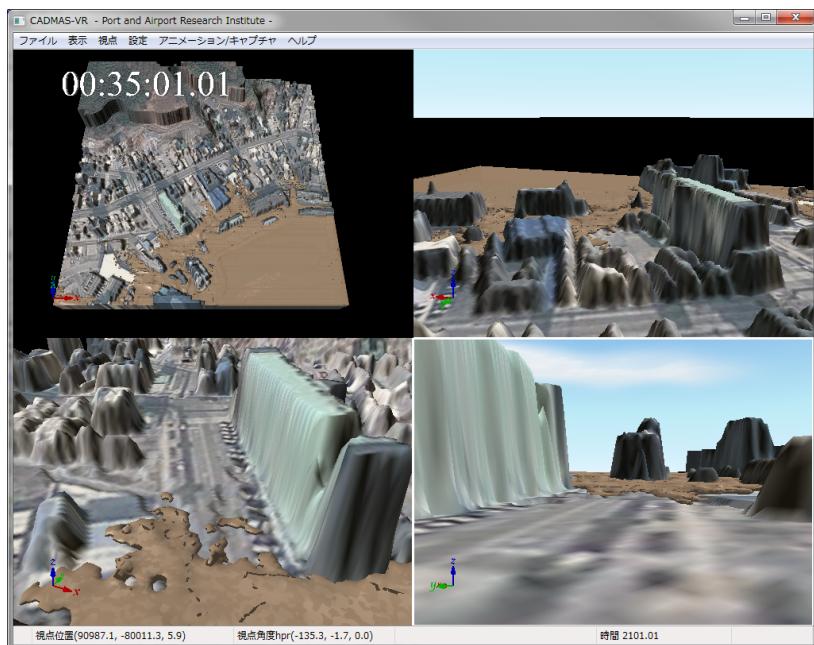


Fig. 4.10 : Quarter View

In quarter view, for example, click on each pane at a time to make it active. Viewpoint movements by mouse operations and other functions are enabled while the pane is active.

The pane is also displayed in a white frame while it is active.

#### 4.5. Show Layer Window

Layer window refers to a window in which you can set items that relate to the data of an opened file.

The layer window is constantly displayed. Select the Show Layer Window menu to bring the layer window to the forefront of the screen.

#### 4.5.1. Operations by Show Layer Window

The following operations are available in the Show Layer window.

In the Show Layer window, one row controller is created for each data file, and operations relevant to the data in the file are carried out.

- ① Check/uncheck for whether or not to show data (in CADMAS-SURF/3D files, Wave Surface, OBST and POROUS can be set separately)
- ② Check/uncheck for whether or not to show Wireframe (in CADMAS-SURF/3D files, Wave Surface, OBST and POROUS can be set separately)
- ③ FIT button : The viewpoint is moved to an automatically-calculated point so that the entire region of the file fits in the view.
- ④ Property button : The header information of the file is displayed in a dialog box (more about displayed information will be explained later).
- ⑤ Delete button : The file is closed.

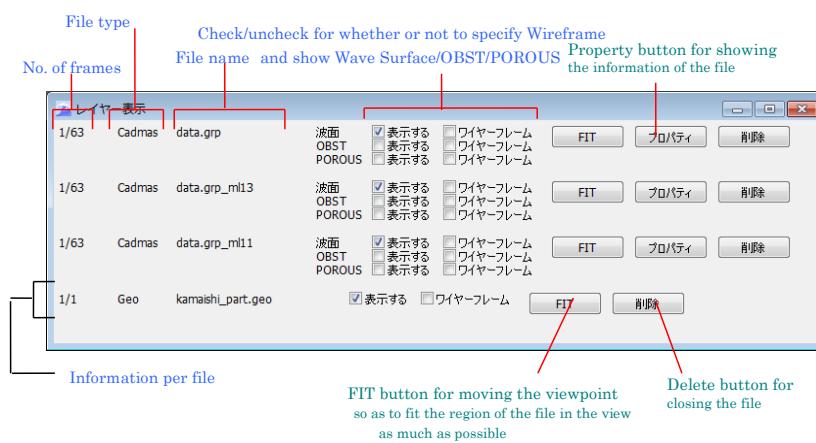


Fig. 4.11 Show Layer Window

#### 4.5.1.1. Show File Properties

By clicking the property button in ④ in the previous section, the header information of the file is displayed in a dialog box. The dialog box shows the following information.

- File Name
- Version : IVR001, IVR002
- Analytical Region Grid Size : (NUMI-1, NUMJ-1, NUMK-1)
- Analytical Region Coordinate Range :  
(XX(1,2), YY(1,2), ZZ(1,2)) — (XX(1,NUMI), YY(1,NUMJ), ZZ(1,NUMK))
- Output Region Cell Start No. : (I1 J1 K1)
- Output Region Cell End No. : (I2, J2, K2)
- No. of Interfaces : (NBX + NBY + NBZ)
- Physical Quantity Flag  
Base Quantity (LN, LV, LP, LF)  
Turbulence Quantity (LK)  
Temperature (LT)  
Density (LS)  
Porous Value (LG)  
Dummy (L1, L2)
- Output Time

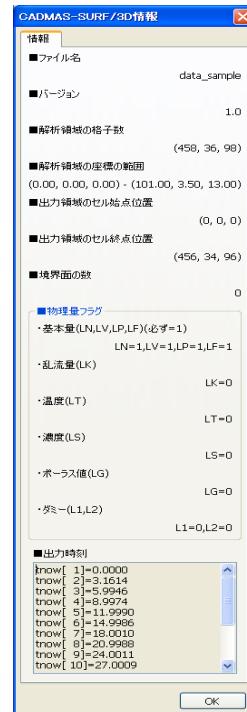


Fig. 4.12 File Properties

#### 4.6. Show Active Frame

You can choose whether or not to show the frame that defines an active frame in split view.

#### 4.7. Show Viewpoint Movement UI

You can choose whether or not to show Viewpoint Movement UI.

Viewpoint Movement UI is displayed in the bottom left corner of the screen. It is a function that allows parallel shifts and rotations of the viewpoint simply by clicking the left mouse button.

The triangles on the outside correspond to parallel shifts, and the triangles on the inside correspond to rotations.

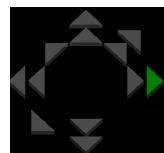


Fig. 4.13 Viewpoint Movement UI

#### 4.8. Show Time

You can choose whether or not to show the time on the screen.

For the time settings, please see 4.2 Time Properties.



Fig. 4.14 Time Display

You can also change the display position of the time by dragging it (on the right) to a desired position.

The display position is reset with a change to the window size.

#### 4.9. Show Coordinate Axes

You can choose whether or not to show the coordinate axes on the screen.

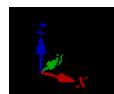


Fig. 4.15 Coordinate Axes

## 5. Viewpoint Menu

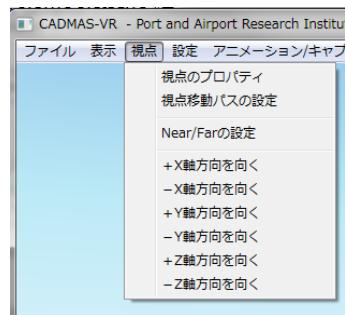


Fig. 5.1 Viewpoint Menu

### 5.1. Viewpoint Properties

You can specify viewpoint positions and directions.

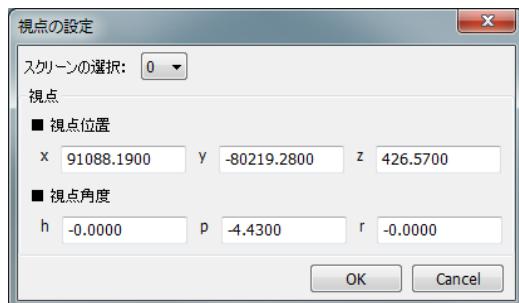


Fig. 5.2 Viewpoint Properties

- Select Screen
  - Select a screen for setting the viewpoint.
- Viewpoint Positions
  - Specify the viewpoint positions {x, y, z}.
- Viewpoint Angles
  - Specify the viewpoint directions {h, p, r}.

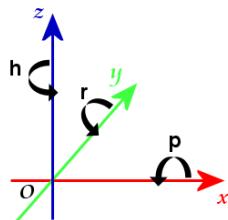


Fig. 5.3 Viewpoint Orientation

## 5.2. Viewpoint Movement Path Settings

You can determine viewpoint movements by specifying a path (track). You can also save the path so that you can view it later.

The viewpoint movements are realized by recording viewpoint positions and angles, i.e., pass-through points, and setting an interpolated value between the pass-through points to the viewpoint.

Viewpoint Movement Path Settings are available in the dialog box, as shown below, which appears by clicking the Viewpoint Movement Path Settings menu. The following explains how to adjust the settings in the dialog box.



Fig. 5.4 Viewpoint Movement Path Settings Dialog Box

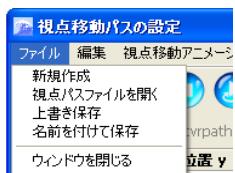
- ① This is the menu bar that is used in the Viewpoint Movement Path Settings dialog box. More will be explained later.
- ② These tool buttons represent the most often used functions. More will be explained later.
- ③ This is the name of a currently opened “viewpoint path file”.
- ④ You can set the frame rate value here. It is used in capturing images of viewpoint

movements. More will be explained later.

- ⑤ This is a viewpoint path list. The list shows viewpoint positions and angles that have been recorded. You can edit the list directly.

### 5.2.1. Menu Description

#### ▽ File Menu



##### ■ New

Create a new viewpoint movement path list.

##### ■ Open Viewpoint Path File

Open a saved viewpoint path file (file name extension cvrpath) from the Open dialog box.

##### ■ Save

The saved value of the current path file is overwritten with a new value. The Save dialog box opens for the first time.

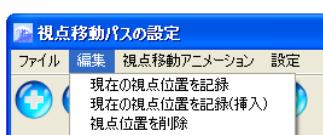
##### ■ Save as

A copy of the current path file is created and saved with a different name.

##### ■ Close Window

The window will be closed without saving the path list; be sure to save it manually before closing the window.

#### ▽ Edit Menu



##### ■ Record Current Viewpoint Position

The current viewpoint position and angle are recorded and added to the bottom of

the path list.

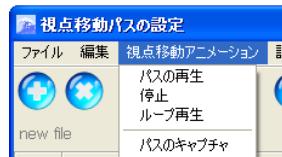
■ Record Current Viewpoint Position (Insert)

The current viewpoint position and angle are recorded and added above the currently focused row in the list.

■ Delete Viewpoint Position

Focused rows are deleted from the list.

#### ▽ Viewpoint Movement Animation Menu



■ Play Path

Click to play the current path list.

■ Stop

Click to stop playing the path list.

■ Play Loop

Click to play the path list in loop. [The time interval after the last row will be disregarded.]

コメントの追加 [07]: 「最終行の時間間隔は無視されます。」いまひとつ意味がわかりませんでした。左記のように訳してみましたが、解釈が異なるようでしたらご指摘ください。

■ Capture Path

Click to capture the path list while playing. The names, etc., of captured image files will be configured in accordance with the capture settings by CADMAS-VR.

#### ▽ Settings Menu



#### ■ Bring to Front

Click to always bring the dialog box to the forefront of the screen. It will be shown checked on the menu when selected.

#### ■ Viewpoint Interpolation Algorithm

Select the linear interpolation or the curve interpolation. The curve interpolation algorithm uses Catmull-Rom.

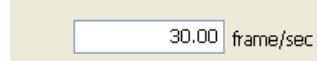
### 5.2.2. Other Functions

#### ■ Toolbar



The following functions are provided on the toolbar (left to right): Record Current Viewpoint Position, Delete Viewpoint Position, Play Path, Stop, Play Loop, Capture Path, and Save.

#### ■ Frame Rate Settings



The frame rate is used mainly for capturing images of viewpoint movements.

The example above shows that the frame rate is set to 30 frame/sec., and this means that 30 captured images are saved within one second which is a Time Interval set in the path list.

When a video is created from these images at 30 frame/sec, it is played by the second set by the Time Interval.

Normally, the higher the frame rate, the smoother the video.

#### ■ Path List

	位置 x	位置 y	位置 z	角度 h	角度 p	角度 r	時間間隔
1	0.00	-10.00	0.00	-0.00	0.00	-0.00	1.00
2	50.50	-99.25	16.60	-0.00	-5.00	-0.00	1.00
3	75.97	-94.44	33.44	12.25	-9.22	-0.00	1.00
4	75.97	-94.44	33.44	12.25	-9.22	-0.00	1.00

The path list shows viewpoint positions which have been recorded. The list can be

edited directly.

Click a number on the left side to select the viewpoint positions that correspond to the number. You can play the path list from a selected position.

Positions x, y and z refer to viewpoint position coordinates, and Angles h, p and r refer to viewpoint angles. (For h, p and r, please see Fig. 5.3 Viewpoint Orientation.)

Time Interval shows a period of time taken from one viewpoint to another. This is not only the time on CADMAS-VR but gives an indication of playback time when creating a video from captured images. The default value is 1 second, but can be changed directly in the list. The wider the time interval, the gentler the viewpoint movements. The time interval at the last viewpoint position is disregarded.

### 5.2.3. Viewpoint Path File

A path which has been set in the Viewpoint Movement Path Settings dialog box can be saved in a file which can be loaded later. The file storing the path is called “viewpoint path file” and has a file name extension “cvrpath”.

You can save the viewpoint path file and load it from the File menu (see 5.2.1 Menu Description).

コメントの追加 [O8]: 5.2.1「ファイル」メニュー参照  
→ メニュー説明

The viewpoint path file contains the following. It is a text file in CSV format. The path value can be changed in the dialog box; there is no need to edit the file directly.

```
0.00, -10.00, 0.00, -0.00, 0.00, -0.00, 1.00
50.50, -99.25, 16.60, -0.00, -5.00, -0.00, 1.00
75.97, -94.44, 33.44, 12.25, -9.22, -0.00, 1.00
75.97, -94.44, 33.44, 12.25, -9.22, -0.00, 1.00
```

Fig. 5.5 Viewpoint Path File Description

### 5.2.4. Points to Consider

The playback of a viewpoint movement path is not associated with the playback of a CADMAS-SURF/3D file. Playing both at the same time would likely cause unexpected results. The same applies to Capture.

In split view with several panes, only the pane indicated with screen no. 0 is valid.

### 5.2.5. Exemplar

The following example shows how to create a viewpoint movement path step by step.

1. Open the Viewpoint Movement Path Settings dialog box.



2. Select a viewpoint position at which you want to start the movement of a viewpoint, and click the Record Current Viewpoint Position button on the left end of the toolbar to record the viewpoint position.



3. Select a viewpoint position to pass through and record it by clicking the Record Current Viewpoint Position button. Repeat this step until you reach the final viewpoint position at which the viewpoint movement ends.



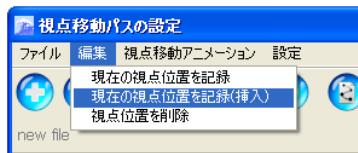
4. If you want to pause the viewpoint movement, record the same viewpoint position twice where you want to pause.

- (1) Select the viewpoint position to pause by clicking the corresponding row number.

The screenshot shows the 'Viewpoint Movement Path Setting' window. At the top, there are icons for file operations (New, Open, Save, Print, etc.) and a frame rate setting of '30.00 frame/sec'. Below the toolbar is a table with columns: 位置 x, 位置 y, 位置 z, 角度 h, 角度 p, 角度 r, and 時間間隔. The table contains four rows of data.

	位置 x	位置 y	位置 z	角度 h	角度 p	角度 r	時間間隔
1	0.00	-10.00	0.00	-0.00	0.00	-0.00	1.00
2	50.50	-99.25	16.60	-0.00	-5.00	-0.00	1.00
3	178.37	-40.46	47.03	69.31	-19.06	-0.00	1.00

(2) From the menu, select Record Current Viewpoint Position (Insert).



The row corresponding to the recorded current viewpoint position will be added above the selected viewpoint position.

The screenshot shows the same table as before, but now it includes a fifth row at the top. This new row represents the current viewpoint position and has the same values as the second row (50.50, -99.25, 16.60, -0.00, -5.00, -0.00, 1.00). The original rows are numbered 2, 3, and 4.

	位置 x	位置 y	位置 z	角度 h	角度 p	角度 r	時間間隔
1	0.00	-10.00	0.00	-0.00	0.00	-0.00	1.00
2	50.50	-99.25	16.60	-0.00	-5.00	-0.00	1.00
3	50.50	-99.25	16.60	-0.00	-5.00	-0.00	1.00
4	194.87	-47.63	41.55	71.84	-14.75	-0.00	1.00

Record Current Viewpoint Position (Insert) adds a row above a focused row. This method can also be used for adding a viewpoint position along the path. (While playing, pause where you want to add a viewpoint position, and move the focus to a cell you like in the next row by clicking the cell to carry out Record Current Viewpoint Position (Insert).)

コメントの追加 [O9]: 視点をパスの途中に追加 → 視点位置 (viewpoint position)?

5. After adding a few viewpoint positions, confirm the viewpoint movement by playing the path.

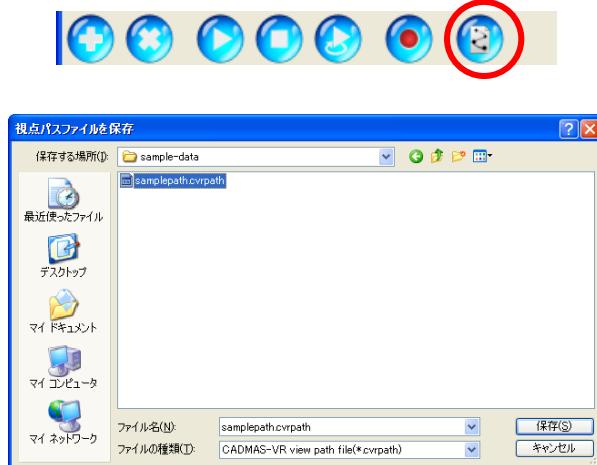
コメントの追加 [O10]: 視点をいくつか追加 → 視点位置 (viewpoint position)?

Click the Play Path button on the toolbar. Play Loop brings the path back to the start position after the final position.



6. Save the viewpoint path file. Click the Save button on the right end of the toolbar.

Specify the file name for the first time.



The saved file name will be displayed above the path list.

E:\data\grp\sample-data\samplepath.cvrpath

7. To capture images, click Capture Path on the toolbar. While playing, the same as Play Path, captured images will be saved.

Specify the name of a folder or file of captured images in accordance with the settings by CADMAS-VR.



### 5.3. Near / Far Settings

The positions of near and far-clip planes can be adjusted to reduce Z-fighting (a phenomenon in which hidden surface removal may fail when two or more polygons have similar depth values in the z-buffer).

As shown below, select Near/Far Settings from Viewpoint and make adjustments in the dialog box.



Fig. 5.6 Near/Far Settings

From Select Screen, select a screen and set the Near/Far values.

You can input the Near/Far values directly. Alternatively, click Auto Adjustment to set the Near/Far values to values estimated from the current viewpoint position and the position of a displayed object.

You can also check Auto to set the Near/Far values automatically, but the auto calculation per frame would likely affect the drawing performance.

#### 5.4. Viewpoint Direction Settings

You can specify the direction of a viewpoint, parallel to each axis, from its current position.

- Face to +X Axis

- The viewpoint faces in the +X axis direction.

- Face to -X Axis

- The viewpoint faces in the -X axis direction.

- Face to +Y Axis

- The viewpoint faces in the +Y axis direction.

- Face to -Y Axis
  - The viewpoint faces in the -Y axis direction.
- Face to +Z Axis
  - The viewpoint faces in the +Z axis direction.
- Face to -Z Axis
  - The viewpoint faces in the -Z axis direction.

## 6. Settings Menu

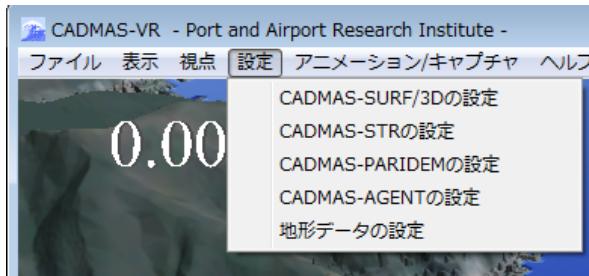


Fig. 6.1 Settings Menu

### 6.1. CADMAS-SURF/3D Settings

Open the CADMAS-SURF/3D Settings dialog box. You can specify the display settings, VOF, pressure contour and current velocity properties in a CADMAS-SURF/3D file. This dialog box will not be displayed if the CADMAS-SURF/3D file has not been loaded.



Fig. 6.2 CADMAS-SURF/3D Settings Dialog Box

- Bring to Front
  - Check the box and the dialog box will always be brought to the forefront of the screen even when the focus is shifted to something else.
- Select File Control
  - You will see a list of CADMAS-SURF/3D files loaded by CADMAS-VR. You can set the attributes of data selected from the list in the dialog box.
- Show Grid
  - Check the box and grids in the XZ and XY planes will be displayed. Grid numbers are also indicated, as shown below, in accordance with the specifications of CADMAS-SURF/3D file format.

(Note)

The range of analysis cell numbers is (2, 2, 2) – (NUMI-1, NUMJ-1, NUMK-1). These numbers always begin from 2, not 1 (GRP files)

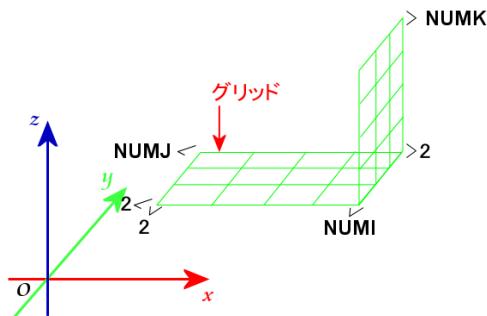
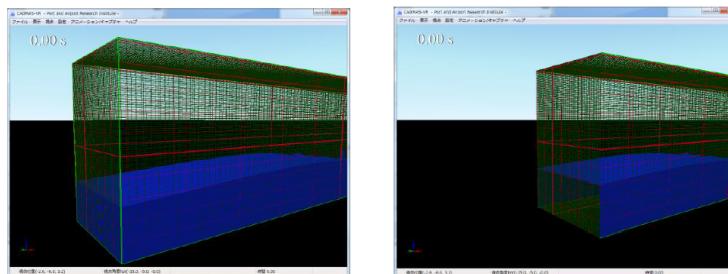


Fig. 6.3 Show Grid

- The grids are highlighted with red lines every 10 cells, and with bold red lines every 50 cells.
- If a clipping plane is enabled in the Pressure tab, the grids will be displayed with a clip position.



コメントの追加 [O11]: 逆?

#### ■ Show Analytical Region

- Check the box and an analytical region will be displayed in a wireframe. An analytical region is framed by a gray line and an input region is framed by a red line.  
(If the locations of the input and analytical regions are the same, the input region will be shown over the analytical region.)

コメントの追加 [O12]: 出力領域と解析領域が同じ: 両領域が同じ場所にある場合、と解釈しましたが、違うようでしたらご指摘ください。

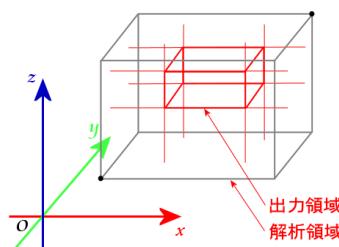


Fig. 6.4 Show Analytical Region

- OK
  - Click the button to close the dialog box.
- Cancel
  - Click the button to cancel the set value; the previously applied value will be used instead, and the dialog box will subsequently close.



#### 6.1.1. Wave Surface Tab

You can set the appearance and the reference height of a wave surface.

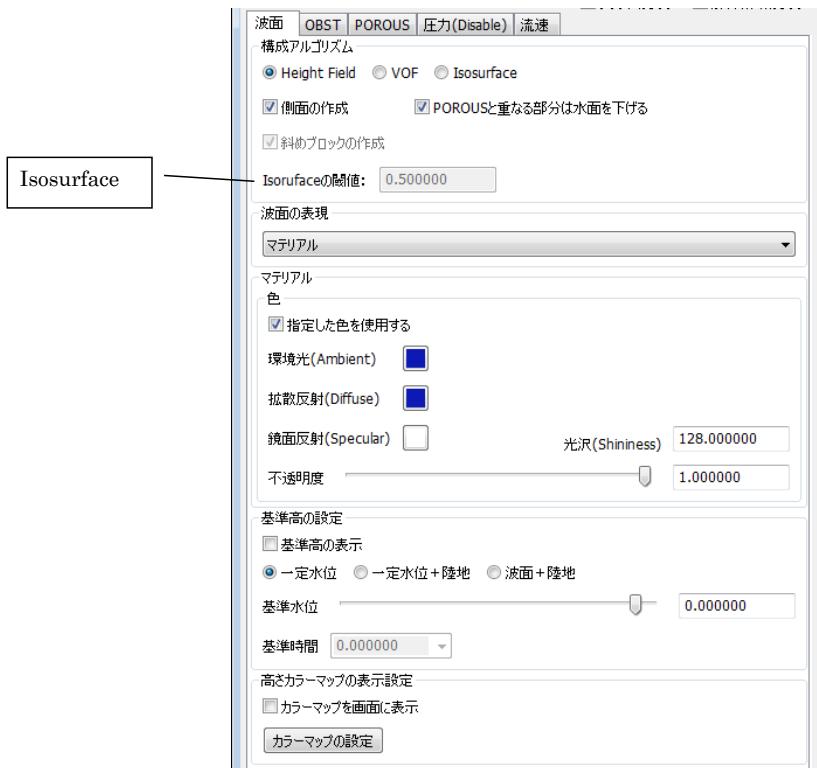


Fig. 6.5 Wave Surface Tab

- Structure Algorithm
  - You can specify an algorithm for generating a wave surface.

Three algorithms are available to choose from: Height Field, VOF (volume of fluid) and Isosurface.

The Height Field algorithm calculates water surface height information from a VOF function F, and structures a surface from the information value, using quad strips. This method only involves the acquisition of height information and the use of quad strips, and therefore saves time on structure processing.

The VOF algorithm is a method for generating a shape, true to values output by a solver, such as VOF function F, cell status NF, and inclined planar interface. Inclined planar interfaces do not provide shape continuity between adjacent cells in a wave surface; they somewhat give an appearance of rows of blocks.

Deformed cubes are used as a method of generating an isosurface. This method is an algorithm that approximates an isosurface by generating 4-sided polygons from volume data. Using this method, curved surfaces can also be generated with good accuracy, and all isosurfaces are drawn with squares. Drawing surfaces with quad strips ensures high drawing performance. Each isosurface is formed with reference to the NH and F values.

(Note) Due to the restrictions by the method, at least two cells are needed to form each side of an isosurface; otherwise the isosurface cannot be created.

➤ Create Profile

Check the box to create the profile of the wave surface.

This **value** is invalid if VOF is selected.

コメントの追加 [O13]: Should this be “function”?

➤ Decrease Water Surface When Overlapping POROUS

Check the box to decrease a water surface if the water surface position is the same as the POROUS position.

This **value** is invalid if Isosurface is selected.

コメントの追加 [O14]: See above.

➤ Create Slanted Block

Check the box to create slanted water surface blocks in VOF.

This **value** is invalid if Height Field or Isosurface are selected.

コメントの追加 [O15]: See above.

➤ Isosurface Threshold

Set the threshold of the isosurface. The default value is 0.5.

(Notes) Recalculation of the isosurface is time consuming.

This **value** is invalid if Height Field or VOF are selected.

コメントの追加 [O16]: See above.

Due to the restrictions by the method using deformed cubes, at least two cells are needed to form each side of an isosurface; otherwise the isosurface cannot be created.

#### ■ Water Surface Expression

- You can change the water surface expression from one to another. The applicable expression tools are Materials, Shaders (three types) and Color Map (Height, Current Velocity and Pressure). More about the Shaders will be explained later.

#### ■ Materials

- Apply Selected Materials
  - ❖ Check the box to apply the values you have selected. You must check the box if you want to make the water surface semitransparent.
- Select Colors for Diffuse, Ambient and Specular.  
Also, enter a Shininess value within the range of [0.0 to 128.0]
- Opacity  
If the Opacity is set to a value smaller than 1.0, the VOF surface becomes semitransparent, and if the value is set to 0.0, the VOF surface becomes completely transparent. The default value is 1.0.

#### ■ Reference Height Settings

- Show Reference Height
  - ❖ Check the box to display a reference height on the screen.
- You can set the height which is used as a benchmark when displaying the Height Color Map or the Dynamic Pressure Color Map. The following three reference heights are available to choose from:

Fixed Water Level: An input value of the Reference Water Level is applied.

Fixed Water Level + Land: An input frame of the Reference Time is used for calculating a wave surface and land. The input fixed value of the Reference Water Level is applied where the wave surface is located, and the land height is applied where the land is located.

Wave Surface + Land: An input frame of the Reference Time is used for calculating a wave surface and land. The wave surface height is applied where the wave surface is located, and the land height is applied where the

land is located.

- Input a Reference Water Level value; the value that serves as a benchmark. The value is used when Fixed Water Level or Fixed Water Level + Land is selected.
  - Input a Reference Time value; the value referred to for calculating a reference height. The value is used Fixed Water Level + Land or Wave Surface + Land is selected.
- Color Map Settings
- Check Show Color Map and the Color Bar will be displayed on the screen to indicate the Color Map that is used in the currently selected file.



You can also drag the Color Map to change its position on the screen.

- Click Color Map Settings to bring up the Color Map Settings dialog box.

コメントの追加 [O17]: 「以下に示す」は、6.1.1.1.で再度出てくるので、ここでは省きます。

#### 6.1.1.1. Color Map Settings Dialog

Click Color Map Settings to bring up the following Color Map Settings dialog box.

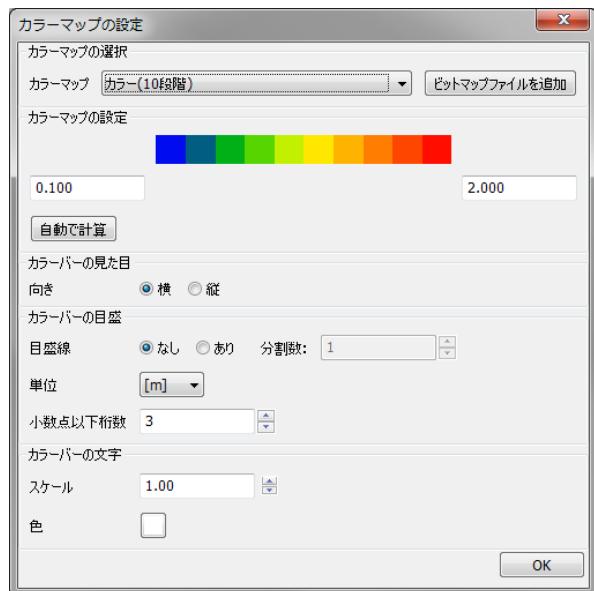


Fig 6.6 Color Map Settings

- Select Color Map
  - Select a Color Map from the Color Map list. You can also change it to a different one.
  - Click Add Bitmap File to bring up the Open dialog box and select a bitmap you like. You can add it as a Color Map.
- Color Map Settings
  - You can set the minimum and maximum values for Color Map allocation.
  - Auto Calculation
 

Auto Calculation acquires the minimum and maximum values of the current data and allocates them to the Color Map.
- Color Bar Options
  - The Color Bar can be displayed either horizontally or vertically.
- Color Bar Scale
  - Scale Marks
 

Select Yes to display scale marks. You can define the scale size using the integers from 1 to 100.

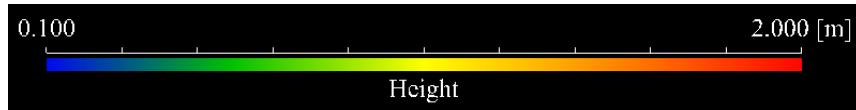


Fig. 6.7 Scale Marks and Scale Size

- Unit
 

Select a scale unit. Different units are available depending on the physical quantity of the Color Map. As you change the unit, the minimum and maximum values of the Color Map also change accordingly.
- Decimal Places
 

Set the number of digits after the decimal point for the minimum and maximum values of the Color Map on the screen.

Select from the range of integers 1 to 10.
- Color Bar Text
  - You can change the font size and color of the Color Bar.

**コメントの追加 [O18]:** 縦向き、横向き：図 6.6 の表示にしたがって、横向き、縦向きの順にしました。

#### 6.1.2. OBST Tab

You can configure the OBST settings from this tab.



Fig. 6.8 OBST Tab

#### ■ Structure Algorithm

- You can select an OBST structure algorithm. The default algorithm is Height Field.
- Check Create Profile to create a profile.  
This **value** is invalid if Solid Model is selected.

**コメントの追加 [O19]:** Should this be “function”?

#### ■ OBST Expression

- You can change the OBST expression from one to another. The expression tools applicable to terrain are Materials and Pressure Color Map.

#### ■ Image

- You can paste an image you like to an OBST section. You can also adjust the size and orientation of the image as well as saving and loading the parameters of the image.
- Apply Selected Image  
Check or uncheck the box for whether or not to show the image you have selected.
- Select Image File

You can select an image to paste to the OBST. Click to open the Open dialog box, as shown below, and select an image file (BMP or JPEG) you like. The file path of the selected file will be displayed in the textbox on the right. You cannot use this function if “all” is selected in Select File Control.

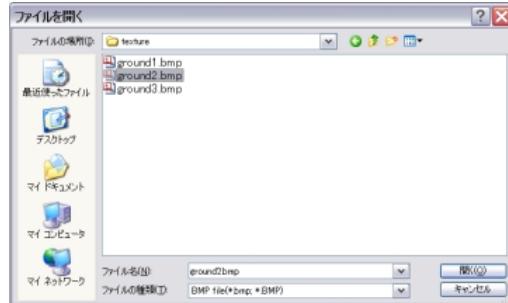


Fig. 6.9 Open Dialog Box for Selecting an Image File

➤ Adjust Position/Size

This control is enabled when the selected image is valid. Click to open the dialog box; you can adjust the position, size and direction of the image over the terrain.

You cannot use this tool if “all” is selected in Select File Control.

For more about the adjustments, please see Adjust Image Position/Size on OBST.

■ Colors

➤ Apply Selected Material

Check the box to apply specified values.

➤ Set the values of **Ambient Light** (Ambient), **Diffuse Reflection** (Diffuse) and **Specular Reflection** (Specular). The value of Shininess can also be set in the range of [0.0 to 128.0].

Opacity is not applicable to the OBST.

**コメントの追加 [O20]:** 環境反射: 図 6.8 によると、環境光。

**コメントの追加 [O21]:** 鏡面光: 図 6.8 によると、鏡面反射。

■ Adjust Image Position/Size on OBST

➤ The position and size of the image pasted to the OBST will be adjusted, upon selecting and opening it, so that the image fits in the output region of the OBST.

Click Adjust Position/Size to bring up the dialog box. The following explains how to adjust the image position and size in the dialog box.

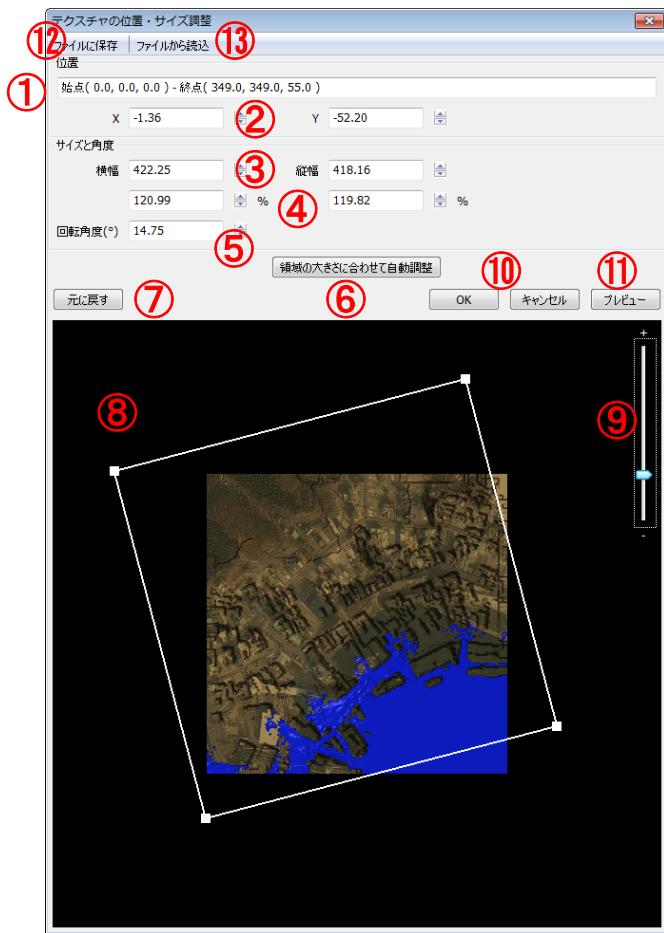


Fig. 6.10 Adjust Texture Position/Size Dialog Box

- ① Output region (Start/End coordinates) (not changeable)
- ② Image texture start position (relative coordinates to the region start point)
- ③ Image texture size (coordinate values)
- ④ Image texture size (percentages with the output region as 100)
- ⑤ Rotation angle (°)

コメントの追加 [O22]: 画像の: 図面ではテクスチャの。

- ⑥ Auto Adjust to Region Size  
Click to auto-adjust the image to the region size.  
This function is normally executed as the image file opens.
- ⑦ Restore  
Click to restore the previous values for which you clicked OK.  
Until OK is clicked, the values corresponding to the region size (reference values) will be restored.
- ⑧ The screen for adjusting the texture by mouse operations.
- ⑨ The zoom-in/zoom-out scrollbar
- ⑩ OK and Cancel  
OK ----- Click to store the current values and close the dialog box.  
Cancel --- Click to restore the previously-stored values and close the dialog box.  
\* Here, “store” means saving the values in the application temporarily; the values will be deleted upon closing the application or the file.
- ⑪ Preview  
The button is active when the set values are valid for preview.  
If the set values have been input directly (confirmed by Enter), Preview will run automatically.
- ⑫ Save  
The currently displayed set values will be saved in a parameter file.  
For further details, please see Save/Load Parameters.
- ⑬ Load  
Click to load the parameter file in which you saved the set values in ⑫.  
Once loaded, Preview will run automatically.  
For more details, please see the next section, Save/Load Parameters.
- ▽ In setting the position of the image (②), it is defined by a relative coordinates with the region start point at 0 (zero).
- ▽ In setting the region size (③, ④), the X-direction refers to the “width” and the Y-direction refers to the “depth”. In ④, the region size is 100%.
- ▽ In setting the rotation angle (⑤), the image rotates around the region start point as the center.

#### ➤ Save/Load Parameters

The values you have set in the Adjust Texture Position/Size dialog box can be saved in a file and reloaded. The following explains how to do it step by

コメントの追加 [O23]: 図 6.10 ではテクスチャの。

step.

Incidentally, these parameters can also be saved in an Environment File and reloaded. Use an Environment File if you want to save and reload other parameters together with terrain texture parameters.

More about Environmental Files will be explained later.

#### ❖ Save Parameters

Click Save (⑪) in the Adjust Texture Position/Size dialog box shown in Fig. 6.10 to open the Save dialog box. Name the file and save.

The file name extension is “txprm”, and the file will be recognized as a terrain image texture deformation parameter file.

コメントの追加 [O24]: 図 6.10 ではテクスチャの。

コメントの追加 [O25]: 図 6.8→6.10

The saved file contains the following in the text format.

Normally, there is no need to edit this text file directly.

```
angle=2.00
data file=C:\Data\pari\grp\min\sample_01.grp
file type=LAND_TEX_PARAM
texture file=C:\Data\pari\ bmp\ground_sample.bmp
x position=0.00
x size=28.31
y position=0.00
y size=3.45
```

Fig. 6.11 Image Parameter File Description

#### ❖ Load Parameters

Files in the same format as the file saved in Save Parameters (as in the previous section) can be loaded as terrain image texture deformation parameter files.

Click Load in the Adjust Texture Position/Size dialog box shown in Fig. 6.10 to open the Select dialog box, and then select a file to load (only the files with the file name extension “txprm” (as shown in Fig. 6.12 below) are readable).

コメントの追加 [O26]: 図 6.10 ではテクスチャの。

コメントの追加 [O27]: 図 6.8→図 6.10

コメントの追加 [O28]: 上記図 6.9→下記図 6.12

The set parameter values saved in the file will be restored.

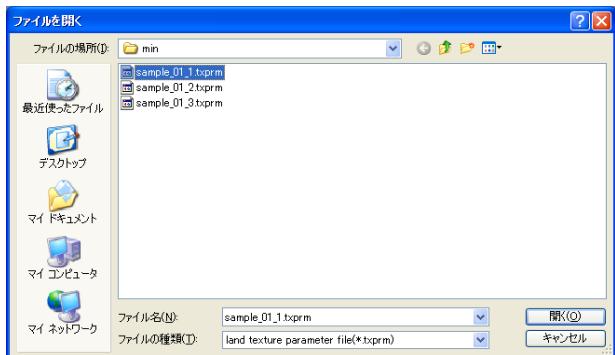


Fig. 6.12 Load Parameter Files

Points to Consider:

- ▽ You can paste one image to an OBST, i.e., one image per CADMAS-SURF/3D file (GRP or STOC). You also need to select one image per file in the case of multigrid. Parameters are also saved per CADMAS-SURF/3D file.
- ▽ The saved terrain image texture deformation parameter file essentially contains the parameters of the file data you selected at the time of saving, but the parameters can also be applied to different files.

### 6.1.3. POROUS Tab

You can configure the POROUS settings from this tab.

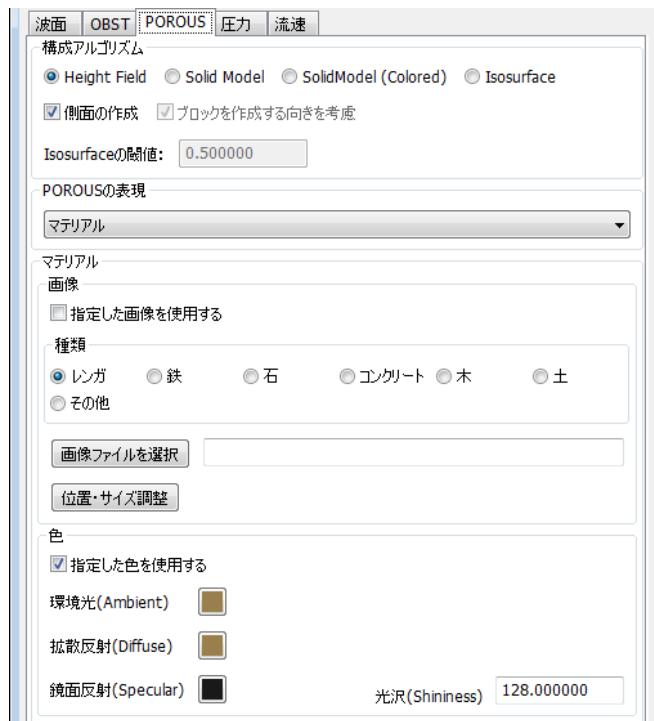


Fig 6.13 POROUS Tab

#### ■ Structure Algorithm

- You can select a POROUS structure algorithm. The default algorithm is Height Field.
- Create Profile

Check the box to create a profile.

This **value** is invalid if Solid Model or Solid Model (Colored) is selected.

コメントの追加 [O29]: Should this be “function”?

- Consider Direction When Creating Blocks

Check the box to create and concentrate blocks in a location where a surrounding POROUS value is high by Solid Model.

When unchecked, blocks will be created using the POROUS value which is regarded as a height from the ground.

- Isosurface Threshold

Set the threshold of the isosurface. The default value is 0.5.

(Notes) Recalculation of the isosurface is time consuming.

This value is invalid if Height Field, Solid Model or Solid Model (Colored) is selected.

コメントの追加 [O30]: See above.

Due to the restrictions by the method using deformed cubes, at least two cells are needed to form each side of an isosurface; otherwise the isosurface cannot be created.

#### ■ POROUS Expression

- You can change the POROUS expression from one to another. The expression tools applicable to POROUS are Materials and Pressure Color Map.

#### ■ Image

- You can paste an image you like to a POROUS section. You can also adjust the size and orientation of the image as well as saving and loading the parameters of the image.

##### ➤ Apply Selected Image

Check or uncheck the box for whether or not to show the image you have selected.

##### ➤ Type

Paste the image of the type you have specified. Select Other to paste the image you have selected from Select Image File.

##### ➤ Select Image File

You can select an image to paste to the POROUS. You cannot use this function if “all” is selected in Select File Control.

For more about how to use this function, please see 6.1.2 OBST Tab, Image.

#### ■ Colors

##### ➤ Apply Selected Colors

Check the box to apply specified values.

- Set the values of Ambient Light (Ambient), Diffuse Reflection (Diffuse) and Specular Reflection (Specular). The value of Shininess can also be set in the range of [0.0 to 128.0].

Opacity is not applicable to the POROUS.

コメントの追加 [O31]: 環境反射: 図 6.13 によると、環境光。

#### ■ Adjust Image Position/Size on POROUS

The position and size of the image pasted to the POROUS will be adjusted, upon selecting and opening it, so that the image fits in the output region of the POROUS. The size will be used as a reference for further adjustment of image

コメントの追加 [O32]: 鏡面光: 図 6.13 によると、鏡面反射。

position, size, etc.

Click Adjust Position/Size to bring up the dialog box. The following explains how to adjust the image position and size in the dialog box.

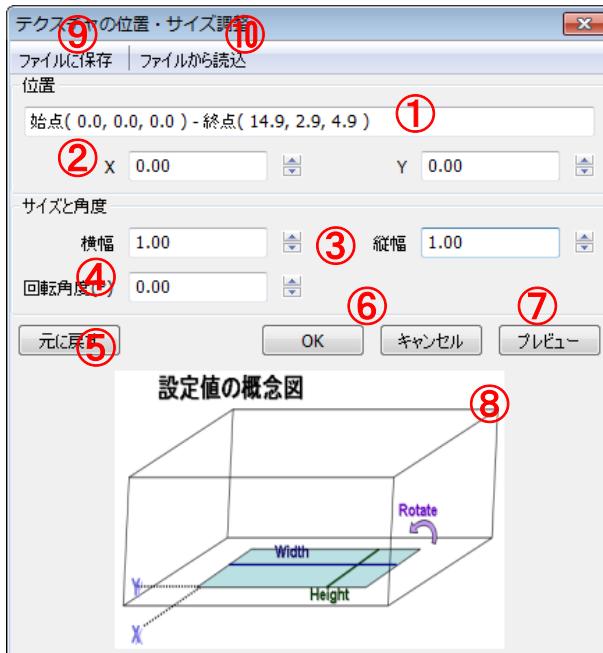


Fig 6.14 Adjust Image Position/Size Dialog Box

- ① Output region (Start/End coordinates) (not changeable)
- ② Image texture start position (relative coordinates to the region start point)
- ③ Image texture size (coordinate values)
- ④ Rotation angle (°)
- ⑤ Restore
- Click to restore the previous values for which you clicked OK.  
Until OK is clicked, the values corresponding to the region size (reference values) will be restored.
- ⑥ OK and Cancel  
OK ----- Click to store the current values and close the dialog box.  
Cancel --- Click to restore the previously-stored values and close the dialog box.  
\* Here, “store” means saving the values in the application temporarily; the

values will be deleted upon closing the application or the file.

⑦ Preview

The button is active when the set values are valid for preview.

If the set values have been input directly (confirmed by Enter), Preview will run automatically.

⑧ Schematic Diagram of Set Values

⑨ Save

The currently displayed set values will be saved in a parameter file.

For further details, please see Save/Load Parameters.

⑩ Load

Click to load the parameter file in which you saved the set values in ⑨.

Once loaded, Preview will run automatically.

For more details, please see the next section, Save/Load Parameters.

▽ In setting the position of the image (②), it is defined by a relative coordinates with the region start point at 0 (zero).

▽ In setting the region size (③), the X-direction refers to the “width” and the Y-direction refers to the “depth”. The region size is 100%.

▽ In setting the rotation angle (④), the image rotates around the region start point as the center.

#### 6.1.4. Pressure Tab

You can configure the pressure-related settings, such as the type of pressure and contour values, from this tab. (More about Show Sub-window will be explained later.)



Fig. 6.15 Pressure Tab

##### ■ Show Pressure

- You can change between Total Pressure and Dynamic Pressure. With Dynamic Pressure selected, you can further select from the following two types of values to be applied in Dynamic Pressure Algorithm.
  - ❖ Apply User Defined Water Level  
The value set in Reference Height Settings of the Wave Surface tab is used for calculating a reference wave height. The depth from it is then

used for calculating static pressure, which is **subtracted** from the total pressure to obtain the dynamic pressure.

❖ Apply Designated Timeframe

The timeframe pressure entered for Designated Time is regarded as static pressure, which is **subtracted** from the total pressure to obtain dynamic pressure.

**コメントの追加 [O33]:** 静水圧を引く: 全圧から静水圧を引くと解釈しましたが、間違っているかもしれません。

**コメントの追加 [O34]:** See above.

■ Pressure Contour 1 (YZ Plane)

- Check the box to display a pressure contour on the YZ plane which is perpendicular to the X-axis.
  - ❖ Check Clipping to enable clipping where a contour plane is shown.
  - ❖ Set Margin for more precise adjustment of the position of a clipping plane. The default value is 0.01. When the value is set to 0.0, the positions of the contour plane and the clipping plane match each other.

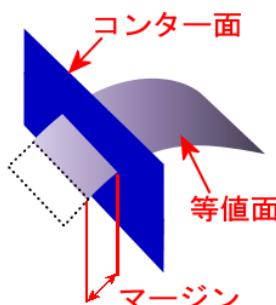


Fig. 6.16 Relationship between Margin and Contour Plane

(Note) When Isosurface and Create Profile are selected for Structure Algorithm in the POROUS tab, the isosurface is regenerated every time the clipping plane is moved; it is exceedingly time consuming.

■ Pressure Contour 2 (XZ Plane)

- Check the box to indicate a pressure contour on the XZ plane which is perpendicular to the Y-axis.

■ Pressure Contour 3 (XY Plane)

- Check the box to indicate a pressure contour on the XY plane which is perpendicular to the Z-axis.

■ Color Map Settings

- Check Show Color Map and the Color Bar will be displayed on the screen to indicate the Color Map that is used in the currently selected file.



You can also drag the Color Map to change its position on the screen.

- Click Color Map Settings to bring up the Color Map Settings dialog box. For more about the settings, please see 6.1.1.1. Color Map Settings Dialog.

#### 6.1.4.1. Show Pressure Contour Window

Check Show Sub-window. Another window will open to display a time series graph of pressure contours and physical quantities (pressure and current velocity).

Click in the Contour screen to select a physical quantity sample position you want to see in the graph. The selected position will be indicated on the screen with a white cross.

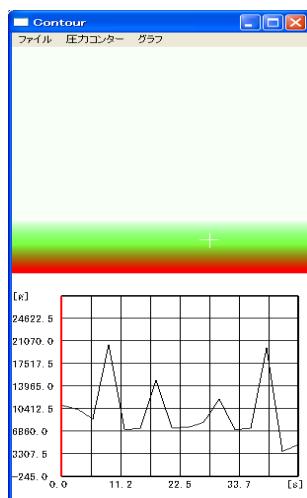


Fig. 6.17 Contour Sub-window

The following explains how to use the Sub-window.

##### 6.1.4.1.1. File Menu

- Close Window  
Click to finish using the Contour window.
- Save Graph

Click to save the currently displayed graph in bitmap format.



Fig. 6.18 File Menu

#### 6.1.4.1.2. Pressure Contour Menu

Select a contour you want to view.



Fig. 6.19 Pressure Contour Menu

#### 6.1.4.1.3. Graph Menu

Select a physical quantity you want to see in the graph.



Fig. 6.20 Graph Menu

### 6.1.5. Current Velocity Tab

You can configure the current velocity settings from this tab.



Fig. 6.21 Current Velocity Tab

- Show
  - Show
    - Check the box for whether or not to show a current velocity vector.
  - Show Direction
    - You can change the direction from one to another.
    - Select one from XYZ, X, Y and Z.

- Normalize  
Check the box to normalize and display the current velocity vector.  
The scale value will be multiplied after normalization.
- Scale Setting  
■ Simplify View
  - Simplify Drawing (LOD)  
Check the box to display the current velocity vector which is simplified according to the distance from the viewpoint.
  - LOD (Level of Detail) Index  
The index is a numerical value that indicates the level of simplification. The smaller the index, the greater the simplification of data. The index is valid only when LOD is being applied. The applicable value range is [1 to 100].
  - View Ratio (%)  
The current vector ratio can be set as a percentage within the range of 0 to 100. This function works separately from LOD.
  - Minimum View Value  
Only a current velocity being equal to or greater than the value you set will be displayed. The default value is 0 (zero), otherwise set the value above 0.
- Adjust View
  - View Position in Z-direction  
Specify a height relative to the grid base, as a percentage, to indicate the position of the peak velocity. The grid base is set to 0 (zero) and the grid top is set to 100. The default value is 50; half way up the grid.
  - Start Point Size  
Set the size of the point where the current velocity starts.
  - Current Velocity Linewidth  
Set the width of the line which represents the current velocity vector.  
\* The minimum/maximum values of Start Point Size and Current Velocity Linewidth are dependent on the capacity of your graphic hardware.
- Display Range Settings
  - Set the position and range of the current velocity vector to view.
  - Output Region Size  
Specify the size of an output region to display by entering cell numbers in the X, Y and Z directions respectively.
  - Display Position (Define by Cell Nos.)

コメントの追加 [O35]: 図 6.21 の「スケール」の部分から、このような意訳をしました。

コメントの追加 [O36]: 表示範囲の指定: 図 6.21 では設定。

Define the display range by specifying minimum and maximum position values for the coordinate axes with cell numbers. The range of cell numbers is based on the cell numbers used for specifying the size of the output region.

#### ■ Color Map Settings

- Check Show Color Map and the Color Bar will be displayed on the screen to indicate the Color Map that is used in the currently selected file.



You can also drag the Color Map to change its position on the screen.

- Click Color Map Settings to bring up the Color Map Settings dialog box. For more about the settings, please see 6.1.1.1. Color Map Settings Dialog.

#### 6.1.6. Data Output Tab

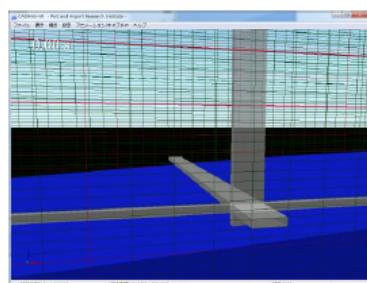
The physical values of selected cells are output in a CSV file.



Fig. 6.22 Data Output Tab

#### ■ Output Cell Nos.

- Select cell numbers to define coordinates to output.
- Check Show Position Guide to display the guidance which will indicate each cell position on the screen.



Position Guide

## ■ CSV Output

- Select a CSV file you want to save and output the physical values of the selected cells in the file.
- The CSV file is formatted as follows.

Line format:

Time t,	Flag NF,	VOF	Void Ratio	Turbulence	Turbulence	Pressure P
		Function F,	GV,	Quantity	Quantity	
				AK,	AE,	

\* GV: In the case of “Porous Value Time Dependent Output Flag=OFF”, the value described in the header is output.

\* In the case of AK/AE: Turbulence Quantity Output Flag=OFF, 0 (zero) is output.

```
0.000000, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2307.899902
0.494830, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2308.370850
1.000413, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2310.981934
1.488854, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2318.712402
2.015036, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2337.831787
2.499865, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2374.253662
3.021845, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2467.886230
3.523886, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2686.492188
4.011465, 0, 1.000000, 1.000000, 0.000000, 0.000000, 3084.781250
4.502433, 0, 1.000000, 1.000000, 0.000000, 0.000000, 3675.988770
4.995432, 0, 1.000000, 1.000000, 0.000000, 0.000000, 4113.494141
5.493513, 0, 1.000000, 1.000000, 0.000000, 0.000000, 3971.304443
5.983968, 0, 1.000000, 1.000000, 0.000000, 0.000000, 3486.822266
6.492184, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2947.789063
6.994463, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2602.522949
7.488146, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2453.010986
7.995468, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2396.049316
8.509590, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2358.685303
9.014301, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2343.450439
9.501409, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2334.248779
9.995877, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2331.425293
10.495280, 0, 1.000000, 1.000000, 0.000000, 0.000000, 2338.305908
```

コメントの追加 [O37]: 「ポーラス値時間依存出力フラグ」の対訳?

## 6.2. CADMAS-STR Settings

Open the dialog box for setting the properties of a CADMAS-STR file.

This dialog box will not be displayed if the CADMAS-STR file has not been loaded.



Fig. 6.22 CADMAS-STR Settings Dialog Box

- Bring to Front
  - Check the box and the dialog box will always be brought to the forefront of the screen even when the focus is shifted to something else.
- Select File Control
  - You will see a list of CADMAS-STR files loaded by CADMAS-VR. You can set the attributes of data selected from the list in the dialog box.
- Hide Object at STR Data Position
  - Check the box to hide data of a structure, etc., which is at the position of CADMAS-STR data. This makes the observation of the CADMAS-STR data easier.
- Displacement Scaling Parameter (%)
  - Set the parameter by entering a numerical value (%) to specify a maximum displacement amount in ratio to the STR data size (bounding box).
  - Peaks are internally regenerated as the scaling parameter is changed, which may cause a long delay in processing the data.
- STR Expression
  - You can change the STR expression from one to another. The applicable expression tools are Color Map and structure-specific colors.
- Select Display Value

- You can change the display value from one to another. [Select Pore Water Pressure or First Principal Stress Contour] to view. The default value is Pore Water Pressure.

- Color Map Settings

- Check Show Color Map and the Color Bar will be displayed on the screen to indicate the Color Map that is used in the currently selected file.
- Click Color Map Settings to bring up the Color Map Settings dialog box. For more about the settings, please see 6.1.1.1. Color Map Settings Dialog.

- Structure-specific Colors

- You can specify a color according to the structure type. The default color is gray.

**コメントの追加 [O38]:** 「間隙水圧か第一主応力コンターネットを…」：図 6.22 記載の項目と(第一主応力、表面圧力など)異なるようですが、原文のとおりに訳しました。

### 6.3. CADMAS-PARIDEM Settings

Open the dialog box for setting the properties of a CADMAS-PARIDEM file. This dialog box will not be displayed if the CADMAS-PARIDEM file has not been loaded.

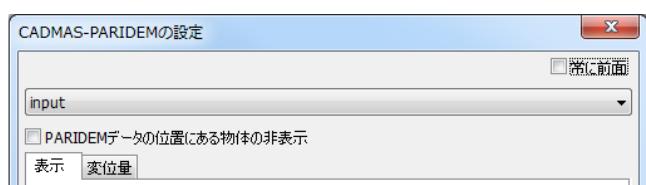


Fig. 6.23 CADMAS-PARIDEM Settings Dialog Box

#### ■ Bring to Front

- Check the box and the dialog box will always be brought to the forefront of the screen even when the focus is shifted to something else.

#### ■ Select File Control

- You will see a list of CADMAS-PARIDEM files loaded by CADMAS-VR. You can set the attributes of data selected from the list in the dialog box.

#### ■ Hide Object at PARIDEM Data Position

- Check the box to hide data of a structure, etc., which is at the position of CADMAS-PARIDEM data. This makes the observation of the CADMAS-PARIDEM data easier.

#### 6.3.1. Display Tab

You can configure the settings for displaying CADMAS-PARIDEM data from this tab.



Fig. 6.24 CADMAS-PARIDEM Display Tab

#### ■ Structure ID

- Select an ID in the loaded CADMAS-PARIDEM data.

The following settings are configured for each selected ID.

#### ■ Structure Algorithm

- Select an algorithm to view the CADMAS-PARIDEM data.

#### ■ Particle

- Set the particle scale.

This setting is available only when Particle is selected for Structure Algorithm.

#### ■ Structure Expression

- Set the structure material and texture for each ID.

This setting is available when Cuboid, Convex Closure or Isosurface is selected for Structure Algorithm.

#### ■ Image

- You can paste an image you like to a structure. You can also adjust the size

and orientation of the image as well as saving and loading the parameters of the image.

➤ **Apply Selected Image**

Check or uncheck the box for whether or not to show the image you have selected.

➤ **Type**

Paste the image of the type you have specified. Select Other to paste the image you have selected from Select Image File.

➤ **Select Image File**

Select an image to paste to the structure. For further details about how to use this function, please see 6.1.2 OBST Tab, Image.

➤ **Adjust Image Position/Size**

Adjust the position and size of the selected image. For more about how to use this function, please see 6.1.3 POROUS Tab, Adjust Image Position/Size on POROUS.

■ **Colors**

➤ **Apply Selected Colors**

Check the box to apply specified values.

➤ **Set the values of [Ambient Light] (Ambient), Diffuse Reflection (Diffuse) and [Specular Reflection] (Specular). The value of Shininess can also be set in the range of [0.0 to 128.0].**

コメントの追加 [O39]: 環境反射: 図 6.24 によると、環境光。

コメントの追加 [O40]: 鏡面光: 図 6.24 によると、鏡面反射。

### 6.3.2. Displacement Tab

You can configure the settings for the amount of CADMAS-PARIDEM displacement.



Fig. 6.25 CADMAS-PARIDEM Displacement Tab

■ **Displacement**

➤ Set the scale of displacement.

■ **Color Map Settings**

➤ Check Show Color Map and the Color Bar will be displayed on the screen to

indicate the Color Map that is used in the currently selected file.

- Click Color Map Settings to bring up the Color Map Settings dialog box. For more about the settings, please see 6.1.1.1. Color Map Settings Dialog.

#### 6.4. CADMAS-AGENT Settings

Open the dialog box for setting the properties of a CADMAS-AGENT file.

This dialog box will not be displayed if the CADMAS-AGENT file has not been loaded.



Fig. 6.26 CADMAS-AGENT Settings Dialog Box

##### ■ Bring to Front

- Check the box and the dialog box will always be brought to the forefront of the screen even when the focus is shifted to something else.

##### ■ Model

- Select the shape of model.
- Also, select the gender.
- Check Apply Multiple Colors to apply different colors to respective models.
- Check Show Status to display the ESCAPE/DEAD Status above the model.
- Check Auto-adjust Size for Distance and the size of the model will be adjusted automatically to correspond to the distance from the viewpoint.

- Set the value of Model Scale to specify a reference scale. The default value is 1.0.



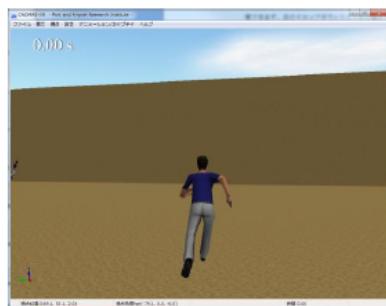
Male

Female

Sphere

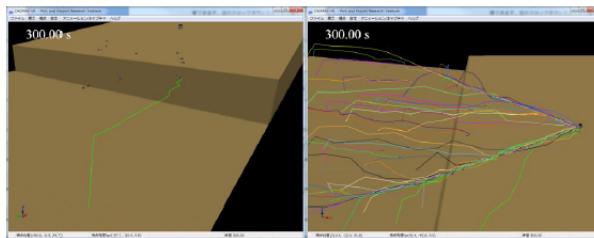
#### ■ Field of View

- Check View from AGENT and the AGENT viewpoint will be set to see the back of the model. Select an AGENT name from the dropdown list on the right.



#### ■ Trajectory

- Check Show AGENT Trajectory to view the trajectory of AGENT. Select an AGENT name from the dropdown list on the right. Select “all” to view all AGENT trajectories. When Apply Multiple Colors is selected, the trajectories will be shown in different colors with respective models.



#### ■ Displacement

- Check Show Displacement as Vector to display the amount of AGENT displacement.
- Set the value of Displacement Scale to specify as a displacement vector scale. The default value is 2.0.



### 6.5. Topography Data Settings

Open the dialog box for setting the properties of a topography file.

This dialog box will not be displayed if the topography file has not been loaded.

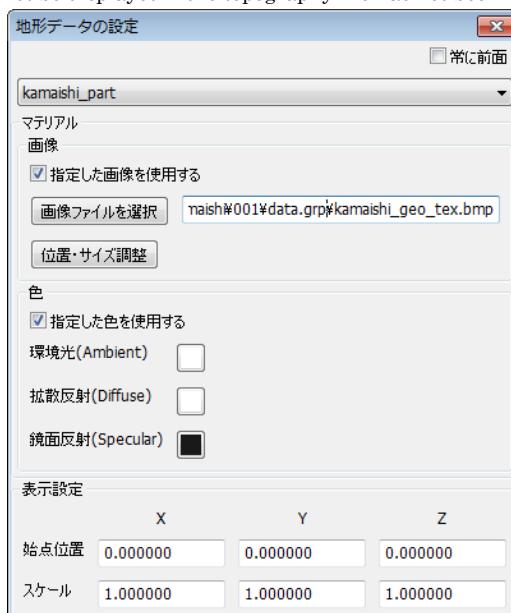


Fig. 6.27 Topography Data Settings Dialog Box

#### ■ Bring to Front

- Check the box and the dialog box will always be brought to the forefront of

the screen even when the focus is shifted to something else.

#### ■ Select File Control

- You will see a list of topography files loaded by CADMAS-VR. You can set the attributes of data selected from the list in the dialog box.

#### ■ Colors

- Set the values of **Ambient Light** (**Ambient**), **Diffuse Reflection** (**Diffuse**) and **Specular Reflection** (**Specular**). The value of **Shininess** can also be set in the range of [0.0 to 128.0].

#### ■ Image

- You can paste an image you like to a terrain. The image may be of the default texture, or a BMP or JPEG image. You can also adjust the size and orientation of the image as well as saving and loading the parameters of the image.

##### ➤ Apply Selected Image

Check or uncheck the box for whether or not to show the image you have selected.

##### ➤ Select Image File

You can select an image to paste to the terrain. For further details about how to use this function, please see 6.1.2 OBST Tab, Adjust Image Position/Size on OBST.

##### ➤ Adjust Position/Size

The position and size of the image pasted to the terrain will be adjusted, upon selecting and opening it, so that the image fits in the output region of the terrain. The size will be used as a reference for further adjustment of image position, size, etc.

Click Adjust Position/Size to bring up the dialog box in which you can adjust the position and size of the image. For further details about how to use this function, please see 6.1.2 OBST Tab, Adjust Image Position/Size on OBST.

#### ■ Display Settings

##### ➤ Start Point

You can change the start positions of the terrain. On the coordinates, a position is changed, by parallel movement, according to the difference between the value saved in the topography file and the input value.

##### ➤ Scale

You can change the scale in the X, Y and Z directions.

The default scale value is 1.0.

コメントの追加 [041]: 環境反射: 図 6.8 によると、環境光。

コメントの追加 [042]: 鏡面光: 図 6.8 によると、鏡面反射。

コメントの追加 [043]: 地形タブ: OBST Tab で統一しました。

地形のテクスチャ : Adjust Image Position/Size on OBST で統一しました。

コメントの追加 [044]: See Comment [045].

## 7. Animation / Capture Menu



Fig. 7.1 Animation/Capture Menu

### ■ Show Animation Control

- Click to open the window of Animation Control. Further details will be explained later.

### 7.1. Play, Stop, Play Loop, and Other Animation Operations

CADMAS-VR has conceptual time within the application, thus, managing time series data.

#### ■ Play (by time / by frame)

- by time : The set value of Time Interval (which will be explained later) is added to increase the conceptual time. Once the conceptual time has reached the output time of a file, the loading of the frames from the file will begin. The loading will stop when there are no more frames in the file. The shortcut key for this function is “p”.
- by frame : The frames in a file are loaded to play by the output time of the file. The loading will stop when there are no more frames in the file. The frame time is rounded off to one decimal place.

コメントの追加 [O45]: 大文字 P? 図 7.1 参照。

#### ■ Pause

- Click to pause at the current point of time. The shortcut key for this is “t”.

コメントの追加 [O46]: 小数点以下第二位未満の値は、四捨五入されます。: フレームタイムのことでしょうか?

#### ■ Stop

- Click to stop Play/Play Loop. The conceptual time goes back to 0 (zero) second.

コメントの追加 [O47]: 大文字 T? 図 7.1 参照。

#### ■ Play Loop

- After playing the last frame, the conceptual time goes back to 0 (zero) second,

and Play will start again. It continues to play until it is stopped (or paused).

- Back/Forward 1 Frame
  - Click to go back or forward by one frame from the current frame.
- Go to First/Last Frame
  - Click to go to the first or last frame from the current frame.
- Go to Target Frame
  - Click to go to the frame you have specified. You need to specify a file in order to specify a target frame.
- Go to Target Time
  - Click to go to the time you have specified. The frame nearest the target time will be loaded from each file.

## 7.2. Capture Current Frame

You can save the current scene as a bitmap file.

## 7.3. Capture Whilst Playing

(by time / by frame)

You can save the scene in each of the frames (the same animation operations as in Play), as a bitmap file, in a predetermined output directory, at a set time interval with [by time] selected, or at an output time held by data with [by frame] selected (the file names are numbered in sequence).

The output directory and the output file names are set in the Animation/Capture Properties dialog box.

You can use this feature accordingly; by time if you want to make a movie close to real-time animation, or by frame if you want to view data time more accurately.

## 7.4. Interval Time Settings

Set the value in seconds; the value will be added to the conceptual time at a given time while playing (by time). The default value is 1.0 second. (This value is invalid while playing (by frame)).



Fig. 7.2 Time Interval Setting

## 7.5. Capture Properties

Open the Capture Properties dialog box to configure the settings about Capture.



Fig. 7.3 Capture Properties

### ■ Captured Image Settings

#### ➤ Output Directory

Specify a folder to output capture images. You can also use the Browse button to specify a folder.

#### ➤ Output File Name, No. of Digits and Starting Number

Enter the base character string of a file name in Output File Name, and specify the number of digits and a starting number. The name of the captured image file will be output as [file name]xxx.bmp with [file name] replaced with the character string and xxx replaced with the number of digits.

## 7.6. Animation Control Window

Select Show Animation Control to open the window in which you can use the aforementioned animation-related functions by mouse operations.



Fig. 7.4 Animation Control Window

The available functions are explained as follows.

### ① Animation Control Buttons

The functions are (left to right): Play Loop, Stop, Go to First Frame, Back 1 Frame, Play, Pause, Forward 1 Frame, and Go to Last Frame.

They are the same functions as those explained in the previous section 7.1. Play, Stop, Play Loop, and Other Animation Operations.

Use the button ⑤ to switch between [by time] and [by frame].

Use the Play Loop button to switch between ON and OFF.



② Bring to Front

Check the box and the dialog box will always be brought to the forefront of the screen even when the focus is shifted to something else.

③ Capture Properties / Time Interval Setting

Click the buttons to configure the settings respectively. For more details, please see the previous sections 7.4 and 7.5.

④ Capture Current Frame / Capture Whilst Playing

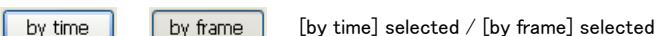
Click the buttons to operate the Capture functions.

Capture Current Frame (left) refers to the function described in 7.2.

Capture Whilst Playing (right) refers to the function described in 7.3.

⑤ by time / by frame

Click the button to switch between [by time] and [by frame]. The default is [by time].



⑥ Real Time



Fig. 7.5 Animation Control Window (Real Time)

The Real Time checkbox is active only when [by time] is selected. Check it to play animation on the basis of the real time. (If the processing falls behind, the animation is played upon completion of the processing.)

When playing real-time, the Time interval Setting button is switched to the Playing Speed Setting button. Set the multiplication of playing speed with respect to the real time for playing the animation.

## 8. Help Menu

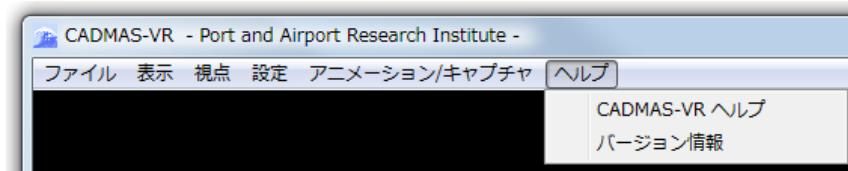


Fig. 8.1 Help Menu

### 8.1. CADMAS-VR Help

Click to open the Help page.

### 8.2. Version Information

Click to open the Version Information page.



Fig. 8.2 CADMAS-VR Version Information

## 9. Shaders

---

Cube mapping and bump mapping are applicable to VOF surfaces.

(Note)

- While shaders are valid, the information of Light Source 2 is not reflected.

### ■ Cube Map

➤ How to use cube map image files of your choice

- ① Be sure that you have six bitmap files available for cube mapping. The following names must be included in the file names.

cube\_xpos.bmp  
cube\_xneg.bmp  
cube\_ypos.bmp  
cube\_yneg.bmp  
cube\_zpos.bmp  
cube\_zneg.bmp

- ② Place the six bitmap files in a directory of your choice and set the values in an environment file (\*.cvr). (More about the environment file will be explained later.)

```
wave shader cubemap directory=../texture/Cube/test/
```

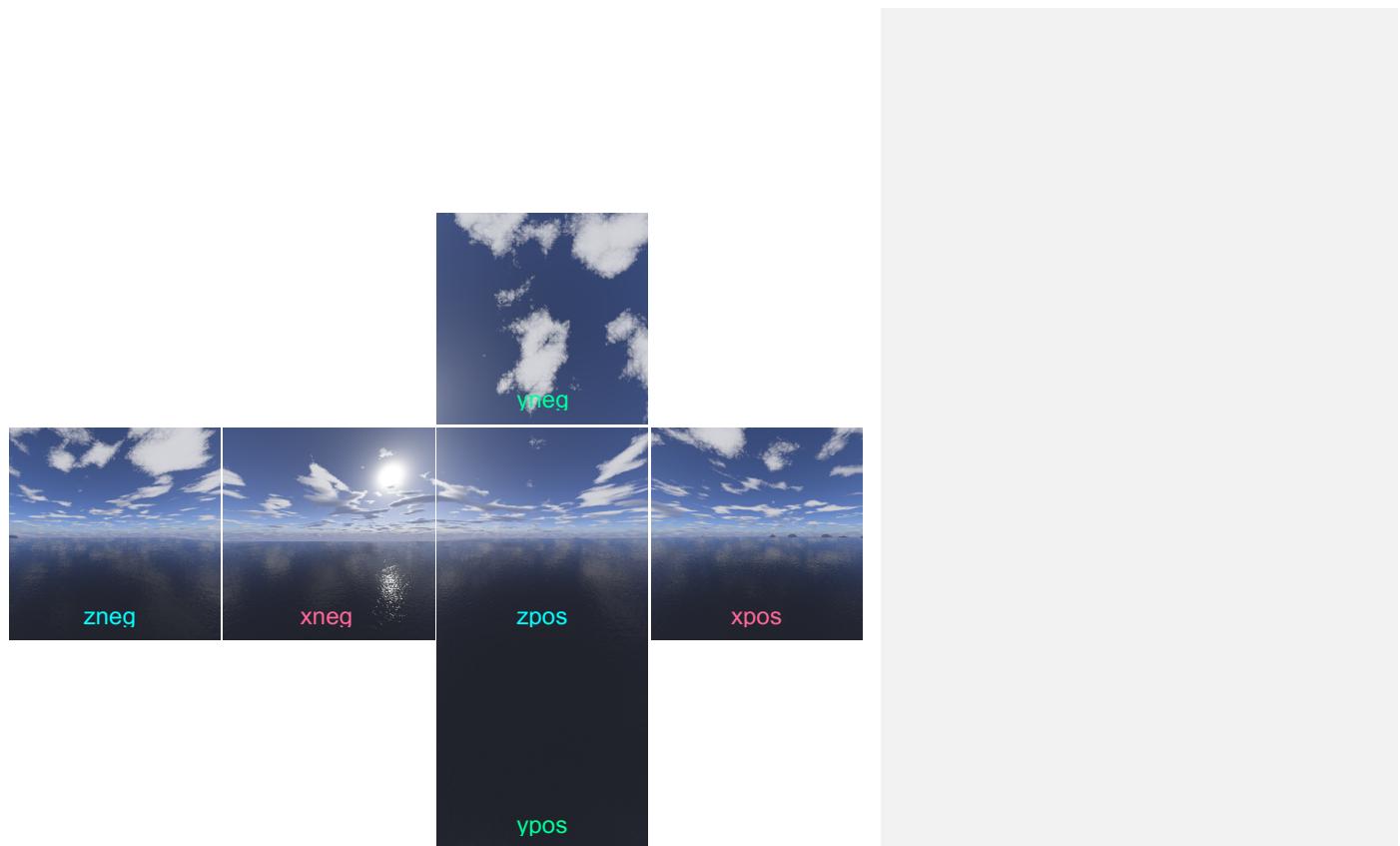


Fig. 9.1 Cube Map Images



Fig. 9.2 Cube Mapping

### ■ Bump Map

In an environment file, configure the settings about the size and moving speed of a bump map you want to apply. The settings are as follows. (More about the environment file will be explained later.)

```
wave shader bumpmap size=0.500000  
wave shader bumpmap speed=0.0100000
```

### ■ Whitecap

In an environment file, set the size of whitecap noise (ambiguity), the scale of whitecap density by height, and the threshold of whitecap height. The settings are as follows. (More about the environment file will be explained later.)

```
wave shader whitecap size=0.500000  
wave shader whitecap height scale=1.240000  
wave shader whitecap threshold height=1.500000
```

## 10. 3D View

CADMAS-VR supports 3D viewing using OpenGL Quad Buffered Stereo, Side by Side 3D viewing, and naked-eye 3D viewing using OpenGL Freedom.

### 10.1. Switch to 3D View

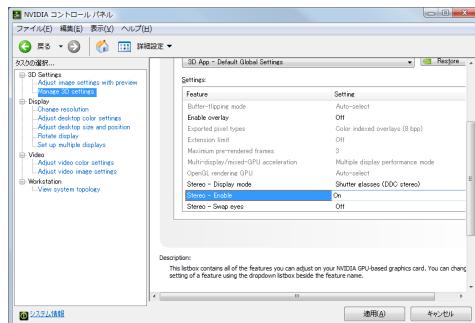
Press the ‘5’ key to switch to 3D view while CADMAS-VR is up and running. You can switch 3D view between ON and OFF. Workstations are usually supported with Side by Side 3D viewing. GPU workstations that support OpenGL Quad Buffered Stereo are capable of 3D viewing by Quad Buffer. For configuring the settings of Quad Buffered Stereo, please see 10.2.

Press the ‘7’ key and the ‘8’ key to adjust visual disparity; ‘7’ for increasing it and ‘8’ for decreasing it. Press the ‘9’ key and the ‘0’ key to adjust the point of gaze; ‘9’ for bringing it closer, and ‘0’ for moving it further away.

For 3D viewing with a HMD, use the full-screen mode. Press the spacebar to switch between the full-screen mode and the window mode.

### 10.2. 3D View Using OpenGL Quad buffered stereo

This function is available only on GPU workstations which support OpenGL Quad Buffered Stereo. Click to set Stereo to ON for 3D view in the GPU driver settings.



CADMAS-VR is executed while Stereo is ON in the driver settings and the stereo mode is selected, 3D viewing is realized by Quad Buffering.

## 11. Environment Files

---

You can save in an environment file the CADMAS-VR settings you have configured as well as loading them from the file. Use environment files for easy reproduction of scenes you have set.

You can save and load an environment file from the File menu.

Environment files are in text format, and the file name extension is cvr.

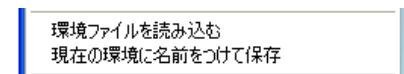


Fig. 11.1 File Menu for Environment Files

Environment files are normally saved and loaded for reproduction of set scenes. There is no need for editing an environment file directly, unless you want to set items which are configurable only from the environment file.

When loading an environment file, if another file specified as an environment file has already been loaded, only the settings will be updated.

The description format used for environment files is as follows.

Key name=value

The details of the settings are as follows.

(Notes)

1. The settings grayed in the tables are configurable only from environment files.
2. The settings for loading files are listed in no specific order, and the settings for saving files are sorted in ascending order. The listing order does not make any difference.

### 11.1. Settings Related to Data Files

Configure these settings mainly for specifying files you want to load.

#### ■ CADMAS-SURF/3D Files

Key name	入力値	デフォルト	説明
grp:1 file name	文字列 (GRP/STOC ファイル名)	–	読み込むCADMAS-SURF/3Dファイルを絶対 パスで指定します。数字は優先度を表し低- >高の順になっています。 (例) 1 2 3 4
grp:2 file name			
...			
grp:N file name			

#### ■ CADMAS-STR Files

Key name	入力値	デフォルト	説明
str:0 file name	文字列 (CADMAS- STR ファイル名)	–	読み込むCADMAS-STRファイルを指定しま す。
str:1 file name			
...			
str:N file name			

#### ■ CADMAS-PARIDEM Files

Key name	入力値	デフォルト	説明
dem:0 file name	文字列 (CADMAS- PARIDEM ファイル名)	–	読み込むCADMAS-PARIDEMファイルを指定し ます。
dem:1 file name			
...			
dem:N file name			

#### ■ OBJ Files

Key name	入力値	デフォルト	説明
obj:0 file name	文字列 (Obj ファイル名)	–	読み込むObjファイルを指定します。
obj:1 file name			
...			
obj:N file name			

#### ■ Topography Files

Key name	入力値	デフォルト	説明
geo:0 file name	文字列 (地形 ファイル名)	–	読み込む地形ファイルを指定します。
geo:1 file name			
...			
geo:N file name			

■ Other Settings

Key name	入力値	デフォルト	説明
file type	type name	CVR_ENV_FILE	CADMAS-VRの環境ファイルであることを示す 値です。変更は必要ありません。

## 11.2. Settings Related to Light Sources

Key name	入力値	デフォルト	説明
light-0 position	x y z =[-5,0,5,0]	-0.5 -0.5 1.0	光源1の位置を指定します。
light-0 diffuse	r g b =[0.0,1.0]	0.8 0.8 0.8	光源1の拡散反射を指定します。
light-0 ambient	r g b =[0.0,1.0]	0.2 0.2 0.2	光源1の環境反射を指定します。
light-0 specular	r g b =[0.0,1.0]	0.4 0.4 0.4	光源1の鏡面反射を指定します。
light-1 enable	yes/no	no	no … 光源2を無効にします。 yes … 光源2を有効にします。
light-1 position	x y z =[-5,0,5,0]	0.0 0.0 -1.0	光源2の位置を指定します。
light-1 diffuse	r g b =[0.0,1.0]	0.8 0.8 0.8	光源2の拡散反射を指定します。
light-1 ambient	r g b =[0.0,1.0]	0.2 0.2 0.2	光源2の環境反射を指定します。
light-1 specular	r g b =[0.0,1.0]	0.4 0.4 0.4	光源2の鏡面反射を指定します。

## 11.3. Settings Related to Panorama / Viewpoint

Key name	入力値	デフォルト	説明
sky type	Sunrise,Blue,CLOUDY,Sunset,Night,NoSky	Blue	空テクスチャを指定します。
back ground color	r g b	0.0 0.0 0.0	背景色を指定します。
view position	x y z	0 -10 0	視点位置を指定します。
view angle	hpr h=r[-180,180] p=[-90, 90]	0 0 0	視点の向きを指定します。
camera translate weight	x>0.0	0.01	カメラ(視点)の並進移動に関するウェイトを指定します。
camera rotate weight	x>0.0	0.01	カメラ(視点)の回転移動に関するウェイトを指定します。

#### 11.4. Settings Related to Capture

Key name	入力値	デフォルト	説明
capture image output dir	文字列	./image/	キャプチャ画像の保存先を指定します。
capture image file name	文字列	capImage	キャプチャ画像のファイル名の先頭部分を指定します。キャプチャ画像のファイル名は [filename]xxx.bmpとして出力され、[filename] の部分に指定した文字列が入ります。
capture image file begin number	$n >= 0$	1	キャプチャ画像のファイル名の開始番号を指定します。
capture image file number digit	$n > 0$	3	キャプチャ画像のファイル名の連番の桁数 ([filename]xxx.bmpのxxxの数) を指定します。

#### 11.5. Settings Related to Shaders

Key name	入力値	デフォルト	説明
wave shader cubemap directory	文字列	../texture/Cube/DBlue/	CubeMap用の画像があるディレクトリを指定します。
wave shader bumpmap size	$x > 0.0$	0.5	バンプマップのサイズを補正します。
wave shader bumpmap speed	$x >= 0.0$	0.01	バンプマップの移動するスピードを調整します。
wave shader whitecap size	$x > 0.0$	0.001	白波ノイズの大きさを調整します。
wave shader whitecap height scale	$x > 0.0$	-	高さに応じてどの程度白波を発生させるかのスケール値を設定します。読み込んだデータで自動計算します。
wave shader whitecap threshold height	$x >= 0.0$	1.5	白波を発生させる高さの閾値を設定します。

## 11.6. Settings Related to Data Drawing

Configure these settings to support loaded files.

### ■ CADMAS-SURF/3D Files

The character string “grp.:” and a file number N are added as the prefix of each key name, i.e., grp:N file name.

(e.g.) grp:N wave shader=NONE

: The shaders in CADMAS-SURF/3D data of file no. 1 are invalid.

Key name	入力値	デフォルト	説明
wave algorithm	HEIGHT_FIELD/ ISOSURFACE/ VOF	HEIGHT_FIELD	VOFの面を生成するアルゴリズムを指定します。
wave visible	yes/no	yes	no … 水面を表示しません yes … 水面を表示します
wave make side	yes/no	yes	no … VOFのサイドの面を作成しません yes … VOFのサイドの面を作成します
wave isosurface threshold	x=[0.0, 1.0]	0.5	VOFの等値面(Isosurface)を作成するときの閾値を指定します。
wave effect	MATERIAL_VOF/ SHADER_CUBE/ SHADER_REFLECT/ SHADER_WHITECAP/ COLORMAP_HEIGHT_VOF/ COLORMAP_PRESSURE_VOF/ COLORMAP_FV_VOF	MATERIAL_VOF	MATERIAL_VOF … 通常の描画を適用します SHADER_CUBE … キューブマップを適用したシェーダーを使用します SHADER_REFLECT … 反射と屈折を適用したシェーダーを使用します SHADER_WHITECAP … 反射、屈折、白波を適用したシェーダーを使用します COLORMAP_HEIGHT_VOF … 水面に高さカラーマップを適用します COLORMAP_PRESSURE_VOF … 水面に圧力カラーマップを適用します COLORMAP_FV_VOF … 水面に流速カラーマップを適用します
use input wave material	yes/no	yes	no … デフォルトの色をVOF面に使用します yes … 指定した色をVOF面に使用します
wave diffuse	rgb=[0.0, 1.0]	0.05 0.1 0.7	VOFの面の拡散反射を指定します。
wave ambient	rgb=[0.0, 1.0]	0.05 0.1 0.7	VOFの面の環境反射を指定します。
wave specular	rgb=[0.0, 1.0]	1.0 1.0 1.0	VOFの面の鏡面反射を指定します。
wave shininess	x=[0.0, 128.0]	128.0	VOFの面の光沢を指定します。
wave alpha	a=[0.0, 1.0]	1.0	VOFの面の不透明度を指定します。

Key name	入力値	デフォルト	説明
land algorithm	HEIGHT_FIELD/ SOLID	HEIGHT_FIELD	OBSTの生成アルゴリズムを指定します
land visible	yes/no	yes	no … OBSTを表示しません yes … OBSTを表示します
land effect	MATERIAL_TEXTURE_LAND/COLOMAP_PRESSURE_LAND	MATERIAL_TEXTURE_LAND	MATERIAL_TEXTURE_LAND … OBSTにマテリアルを適用します COLORMAP_PRESSURE_LAND … OBSTに圧力カラー マップを適用します
land make side	yes/no	yes	no … OBSTのサイドの面を作成しません。 yes … OBSTのサイドの面を作成します。
use input land material	yes/no	yes	no … デフォルトの色をOBSTに使用します yes … 指定した色をOBSTに使用します
land diffuse	rgb=[0.0, 1.0]	0.6 0.5 0.3	OBSTの拡散反射を指定します。
land ambient	rgb=[0.0, 1.0]	0.6 0.5 0.3	OBSTの環境反射を指定します。
land specular	rgb=[0.0, 1.0]	0.1 0.1 0.1	OBSTの鏡面反射を指定します。
land shininess	x=[0.0, 128.0]	128	OBSTの光沢を指定します。
enable land image	yes/no	no	no … OBSTに貼り付けた画像を非表示にします yes … OBSTに貼り付けた画像を表示します(画像が無効な場合は表示されません。)
land image file	BMPファイル	–	OBSTに貼り付ける画像ファイル(bmp)を絶対パスで指定します。 指定しなくとも問題ありません。
land image parameter file	txprm(地形画像変形用パラメータファイル)	–	OBSTに貼り付けた画像の位置・サイズ調整用パラメータを記述したファイルを絶対パスで指定します。 指定しなくとも問題ありません。
land image x position	x>=0.0	0.0	OBSTに貼り付ける画像の開始点のX座標を指定します。(出力領域開始点からの相対座標になります。)
land image y position	y>=0.0	0.0	OBSTに貼り付ける画像の開始点のY座標を指定します。(出力領域開始点からの相対座標になります。)
land image x size	x>=0.0	データ依存	OBSTに貼り付ける画像の横幅を指定します。
land image y size	y>=0.0	データ依存	OBSTに貼り付ける画像の奥行きを指定します。
land image angle	θ=[0, 360]	0.0	OBSTに貼り付ける画像の回転角度を指定します。単位は度数です。 (出力領域の開始点が回転中心になります。)

Key name	入力値	デフォルト	説明
structure algorithm	HEIGHT_FIELD/ SOLID/ COLORED_SOLID/ ISOSURFACE	HEIGHT_FIELD	POROUSの生成アルゴリズムを指定します
structure visible	yes/no	yes	no … POROUSの表示をしません yes … POROUSの表示をします
structure effect	MATERIAL_TEXTURE_LAND/COLORED_TEXTURE_LAND/COLORMAP_PRESSURE_LAND	MATERIAL_TEXTURE_LAND	MATERIAL_TEXTURE_LAND … POROUSにマテリアルを適用します COLORMAP_PRESSURE_LAND … POROUSに圧力カラーマップを適用します
structure make side	yes/no	yes	no … POROUSのサイドの面を作成しません。 yes … POROUSのサイドの面を作成します。
structure isosurface threshold	x=[0.0, 1.0]	0.5	POROUSの等値面(isosurface)を作成するときの閾値を指定します。
use input structure material	yes/no	no	no … デフォルトの色をPOROUSに使用します。 yes … 指定した色をPOROUSに使用します。
structure diffuse	rgb=[0.0, 1.0]	0.6 0.5 0.3	POROUSの拡散反射を指定します。
structure ambient	rgb=[0.0, 1.0]	0.6 0.5 0.3	POROUSの環境反射を指定します。
structure specular	rgb=[0.0, 1.0]	0.1 0.1 0.1	POROUSの鏡面反射を指定します。
structure shininess	x=[0.0, 128.0]	128	POROUSの光沢を指定します。
enable structure image	yes/no	yes	no … POROUSに貼り付けた画像を非表示にします。 yes … POROUSに貼り付けた画像を表示します。(画像が無効な場合は表示されません。)
structure image file	BMPファイル	-	POROUSに貼り付ける画像ファイル(bmp)を絶対パスで指定します。 指定しなくとも問題ありません。
structure image parameter file	texprm(地形画像変形用パラメータファイル)	-	POROUSに貼り付けた画像の位置・サイズ調整用パラメータを記述したファイルを絶対パスで指定します。 指定しなくとも問題ありません。
structure image x position	x>=0.0	0.0	POROUSに貼り付ける画像の開始点のX座標を指定します。(出力領域開始点からの相対座標になります。)
structure image y position	y>=0.0	0.0	POROUSに貼り付ける画像の開始点のY座標を指定します。(出力領域開始点からの相対座標になります。)
structure image x size	x>=0.0	データ依存	POROUSに貼り付ける画像の横幅を指定します。
structure image y size	y>=0.0	データ依存	POROUSに貼り付ける画像の奥行きを指定します。
structure image angle	θ=[0, 360]	0.0	POROUSに貼り付ける画像の回転角度を指定します。 単位は度数です。 (出力領域の開始点が回転中心になります。)

## ■ CADMAS-PARIDEM Files

The character string “dem” and a file number N are added as the prefix of each key name, i.e., dem:N file name.

コメントの追加 [O48]: dem → dat?

コメントの追加 [O49]: dem → dat?

Key name	入力値	デフォルト	説明
marching cube min grid size	数字 > 0.0	0.075	マーチングキューブ法で使用するグリッドサイズを指定します

## ■ OBJ Files

The character string “obj” and a file number N are added as the prefix of each key name, i.e., obj:N file name.

Key name	入力値	デフォルト	説明
model scale	x y z	1.0 1.0 1.0	Objデータのスケーリング値を指定します
model rotate	x y z	0.0 0.0 0.0	Objデータの回転値を指定します
model translate	x y z	0.0 0.0 0.0	Objデータの並行移動値を指定します

## ■ Topography Files

The character string “geo:” and a file number N are added as the prefix of each key name, i.e., geo:N file name.

Key name	入力値	デフォルト	説明
enable land material	yes/no	no	no … デフォルトの色を構造物に使用します。 yes … 指定した色を構造物に使用します。
land diffuse	rgb=[0.0, 1.0]	0.6 0.5 0.3	地形の拡散反射を指定します。
land ambient	rgb=[0.0, 1.0]	0.6 0.5 0.3	地形の環境反射を指定します。
land specular	rgb=[0.0, 1.0]	0.1 0.1 0.1	地形の鏡面反射を指定します。
enable land image	yes/no	yes	no … 地形に貼り付けた画像を非表示にします yes … 地形に貼り付けた画像を表示します(画像が無効な場合は表示されません。)
land image file	BMPファイル	-	地形に貼り付ける画像ファイル(bmp)を絶対パスで指定します。 指定しなくとも問題ありません。
land image parameter file	txprm(地形画像変形用パラメータファイル)	-	地形に貼り付けた画像の位置・サイズ調整用パラメータを記述したファイルを絶対パスで指定します。 指定しなくとも問題ありません。
land image x position	x>=0.0	0.0	地形に貼り付ける画像の開始点のX座標を指定します。(出力領域開始点からの相対座標になります。)
land image y position	y>=0.0	0.0	地形に貼り付ける画像の開始点のY座標を指定します。(出力領域開始点からの相対座標になります。)
land image x size	x>=0.0	データ依存	地形に貼り付ける画像の横幅を指定します。
land image y size	y>=0.0	データ依存	地形に貼り付ける画像の奥行きを指定します。
land image angle	$\theta=[0, 360]$	0.0	地形に貼り付ける画像の回転角度を指定します。単位は度数です。 (出力領域の開始点が回転中心になります。)
position	xyz	0.0 0.0 0.0	地形の開始位置を指定します。
scale	xyz	1.0 1.0 1.0	地形の各軸方向のスケーリングの値を指定します。

## 12. File Cache

CADMAS-VR has a function to store a calculation result as a cache file in a local HDD, and skip the calculation process if the same cache exists, thus, loading already calculated data from the cache very quickly. By this, the responsiveness of the application as a whole is greatly improved. The current version of CADMAS-VR supports cache functions in CADMAS-SURF/3D data (in grp, grp\_ml and stoc formats) only.

Cache files are stored in the C:\cache folder by default. Each cache file is determined by using, as a search key, the combination of the file name, timestamp, header information, and set parameter values of its original data, and is loaded as already calculated data only when these attributes are valid.

### 12.1. Change Folder to Save Cache

The folder to save cache is C:\cache by default, but you can also specify a different folder by configuring the environment variable setting.

Environment Variable Setting	Operation
"CADMASVR_CACHE_DIR" NO (Default)	Cache Folder=C:\cache
"CADMASVR_CACHE_DIR" YES	Cache Folder=Environment Variable Value

### 12.2. Cache Storage Limit

By default, there is no restriction on the storage capacity of the folder to save cache; the storage capacity is unlimited. You can limit the size of the folder by setting the environment variable, however, so that cache files will be deleted in order of least use.

For determining which cache file to be deleted, the Least-Recently-Used (LRU) algorithm is employed.

Environment Variable Setting	Operation
"CADMASVR_CACHE_SIZE" NO (Default)	Cache Capacity=15000MB (approx. 15GB)
"CADMASVR_CACHE_SIZE" YES	Cache Capacity = Environment Variable Value (Unit: MB)

**コメントの追加 [O50]:** 「未使用の時間が最も長いものから順に破棄していく」は、前の行の「最も使われていないものから順に」や Least-Recently-Used と意味的に重複するので、訳を省きました。