iRIC Software

Changing River Science

Morpho2DH

Tutorial

- Bed Material Load -

Produced by Hiroshi Takebayashi

Contents

I. Outline

I.1 Morpho2DH

Morpho2DH is a calculation solver that a debris/mud flow model is added to Morpho2D.
Morpho2D is the unsteady horizontal two dimensional bed deformation analysis solver which is developed by Hiroshi Takebayashi, Kyoto University. The governing equations are written in boundary fitted general coordinate system. In 2009, the solver was installed to RIC-Nays Version 1.0 which is the free software developed by RIC. Some functions are added to the original version and the improved version is installed into iRIC Version2.0 on March 2011. Morpho2D was unified with Nays2D and Nays2DH was developed. Hence, the development of Morpho2D was stopped on March 2014.

Morpho2DH is the horizontal two dimensional debris/mud flow analysis solver which can reproduce the transport and deposition process of debris/mud flow due to the landslides. Structures (ex. sabo dam, weir, house and so on) and horizontal distribution of erosion depth can be considered in the analysis.
Additionally, the unsteady horizontal two dimensional bed deformation analysis which can be performed using Morpho2D can be performed as it used to be.

I.2 Morpho2DH Tutorial - Bed Material Load -

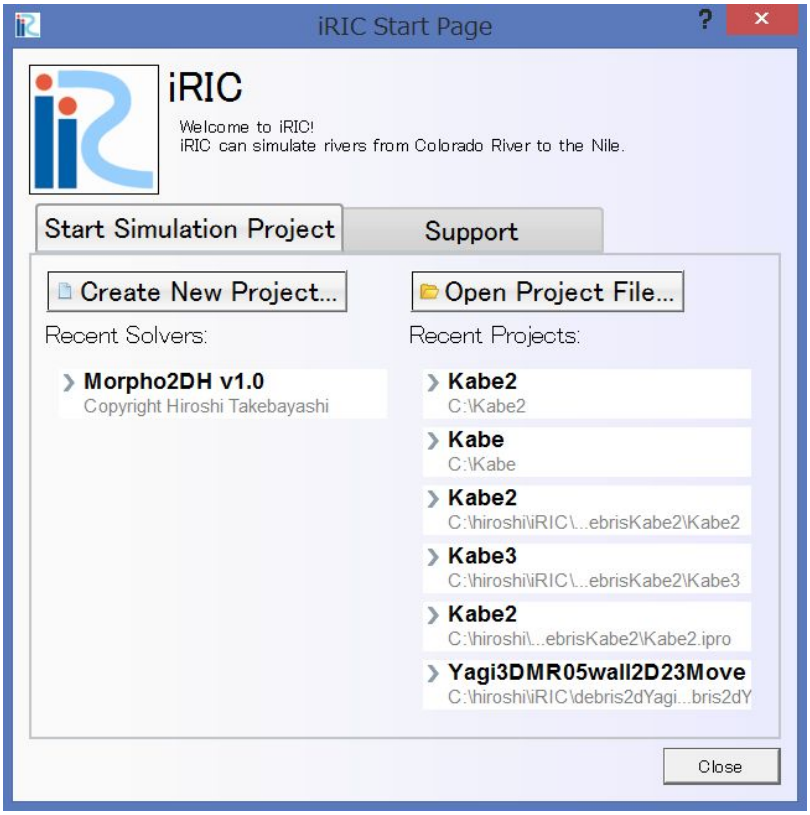
The purpose of the tutorial is to show the detailed procedure of the analysis from the beginning to end. Tutorials has enough explanations to perform analysis. However, if you cannot understand the tutorials, please refer iRIC user manual and Morpho2DH manual.

[Contents of Tutorial]

- Chapter II　Bed deformation analysis on bed composed of non-uniform sediment （Mekong River）
- Chapter III　Bed deformation analysis with vegetation（Mekong River）
- Chapter IV　Bed deformation analysis with river regulation works（Mekong River）

I.3 Open Morpho2DH

1. Startup iRIC and Select [Create New Project] from [iRIC Start Page] window.



※Operation of Start Page
Please refer iRIC user manual

Figure I-1(1) Startup window

2. Select [Morpho2DH] in ［Select Solver］ window and click OK.

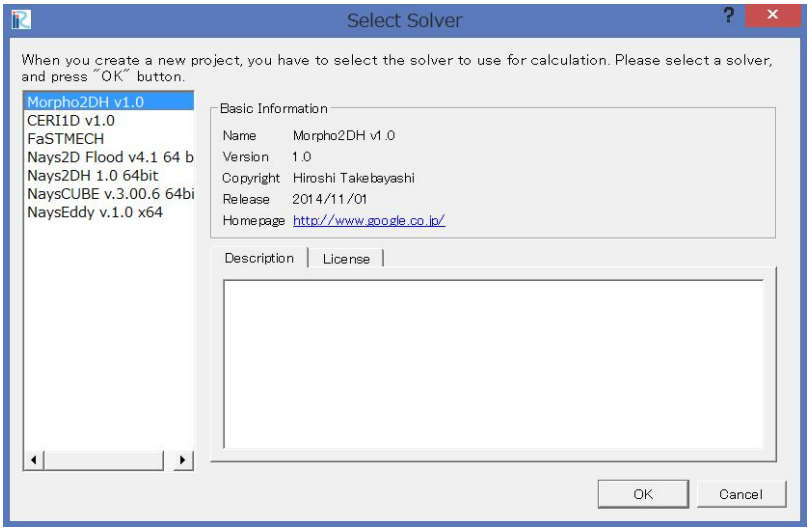


Figure I-1(2) Select solver

II. Bed deformation analysis on bed composed of non-uniform sediment（Mekong River）

◆ Purpose

The purpose of this chapter is for river engineers and university students who have no experience of bed deformation analysis to learn to perform bed deformation analysis on bed composed of non-uniform sediment by use of Morpho2DH and visualize the calculated results.

◆ Procedure

Procedure in this chapter is shown in Figure II-1.

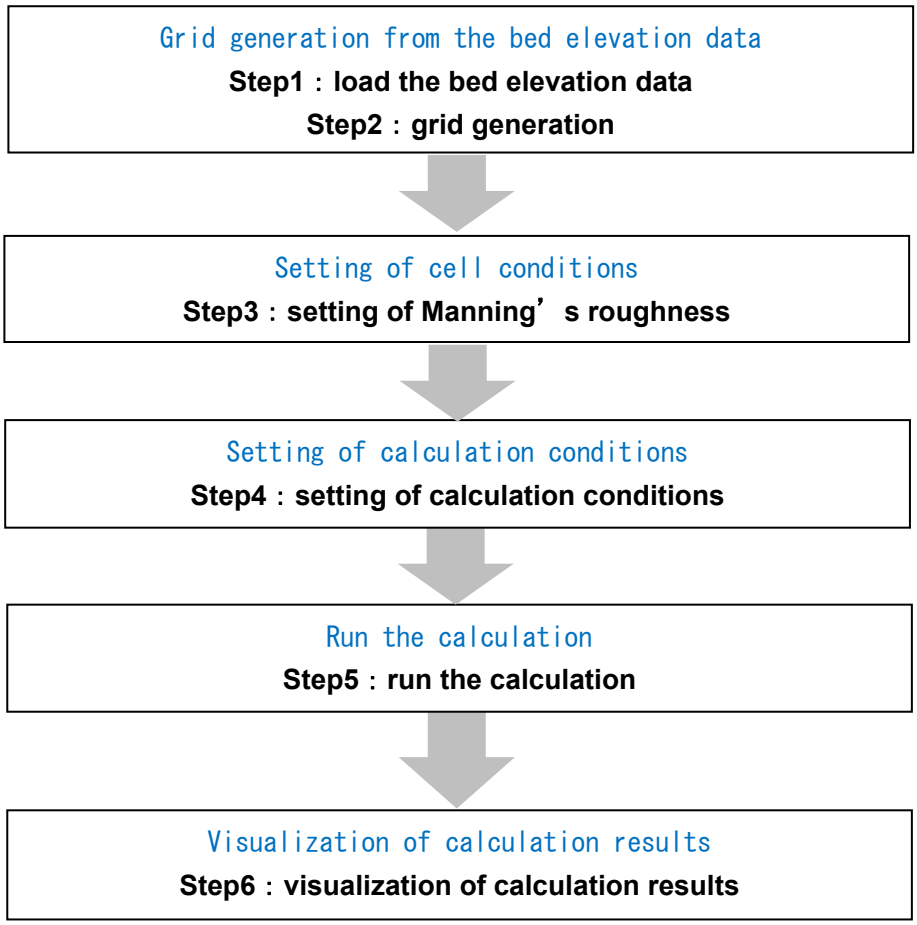


Figure II-1　Procedure in this chapter

II.1 Grid generation from bed elevation data

II.1.1 Load cross-section of the river

1. Click [Geographical Data]-[Elevation] in [import].

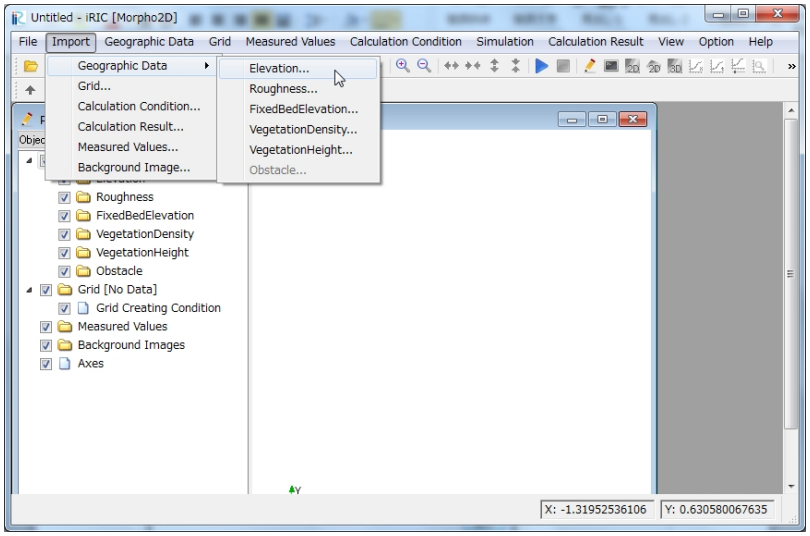


Figure II-2(1) Load the bed elevation data

※Grid generation method in Morpho2DH

Morpho2DH can select the following 4 grid generation methods.

- Grid generation from DEM
- Grid generation from cross-sectional data
- Geometric grid generation
- Grid generation for rectangular domain

In this chapter, Grid generation from cross-sectional data is described

2. Select [TanC.riv] in [Mekong] folder in Sample folder.

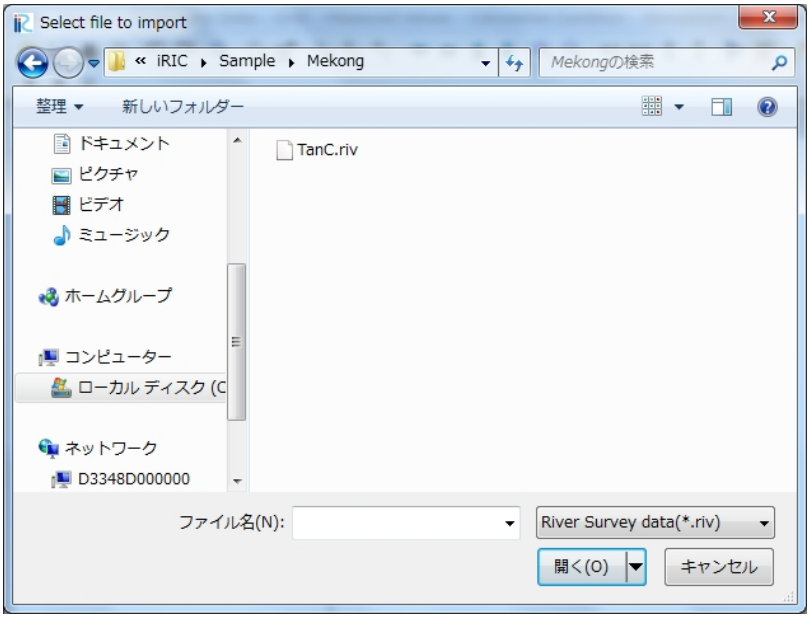


Figure II-2 (2) Load the bed elevation data

※Cross-sectional data

Cross-sectional data (*.riv) is composed of the bed elevation data in cross-section, distance from left bank, x and y coordinate at the both ends of the data.

Format of the cross-sectional data is explained in iRIC manual.

II.1.2 Grid generation

■ Selection of the grid generation algorithm

1. Click [Select algorithm to create grid] in [Grid].

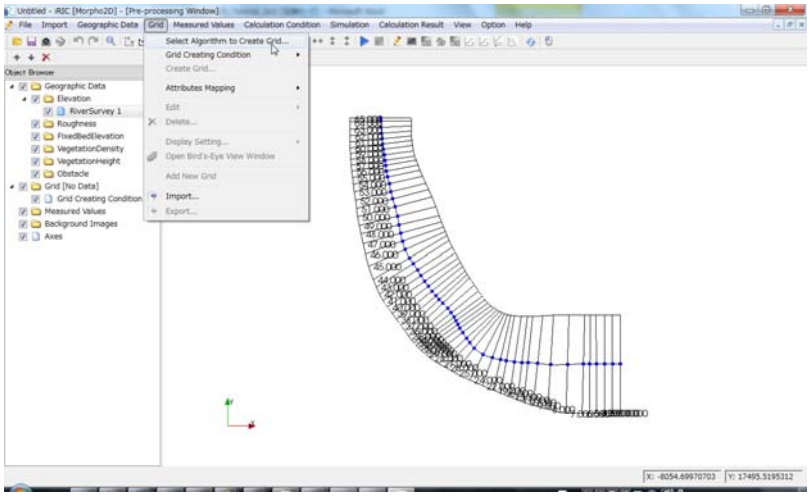


Figure II-3(1) Selection of the grid generation algorithm

2. Select [Create grid from river survey data] in [Algorithm] and click OK.

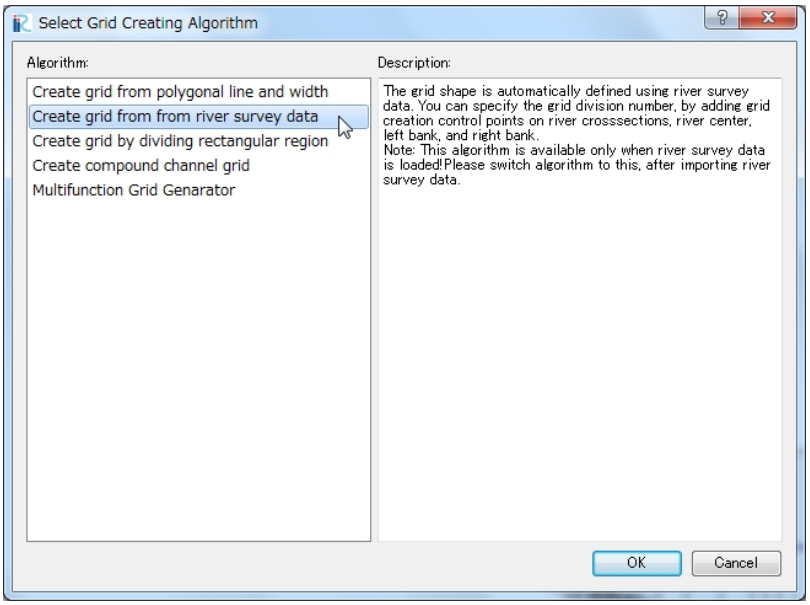
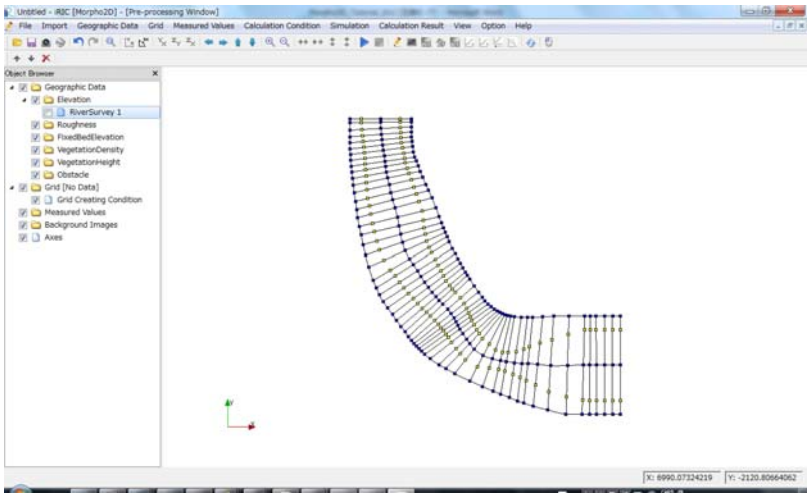


Figure II-3 (2) Selection of the grid generation algorithm

■ Division in transverse direction

1	When you click the blue line in transverse direction, the line becomes thicker.
2	Open small windows by right click and select [Add Division Points].



※4 regions
Cross-section can be divided into 4 regions (left high water channel, right high water channel, left low water channel, right low water channel). The division can be made in the bed elevation data file.

Figure II-4(1)　Add division points in transvers direction

3	Division number and division method are set in [Add Division Point] window and click OK.

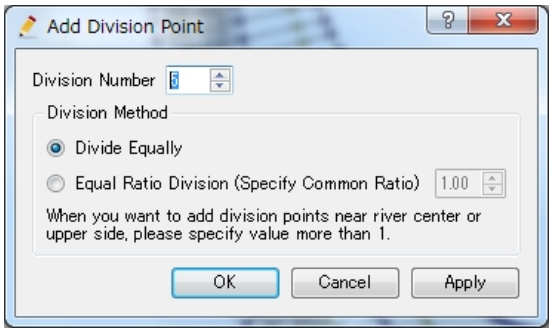


Figure II-4(2)　Add division points in transvers direction

4	This procedure is repeated for 4 regions.

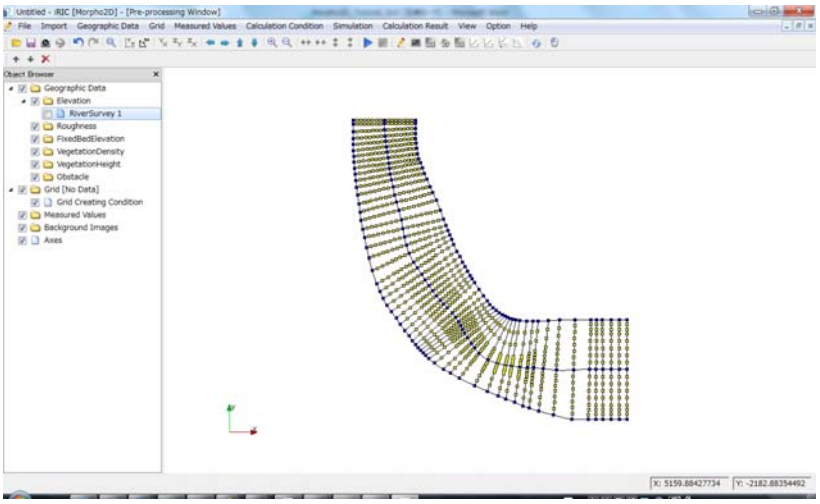


Figure II-4(3)　Add division points in transvers direction

■ Grid generation

1	Click [Grid generation] in [Grid].

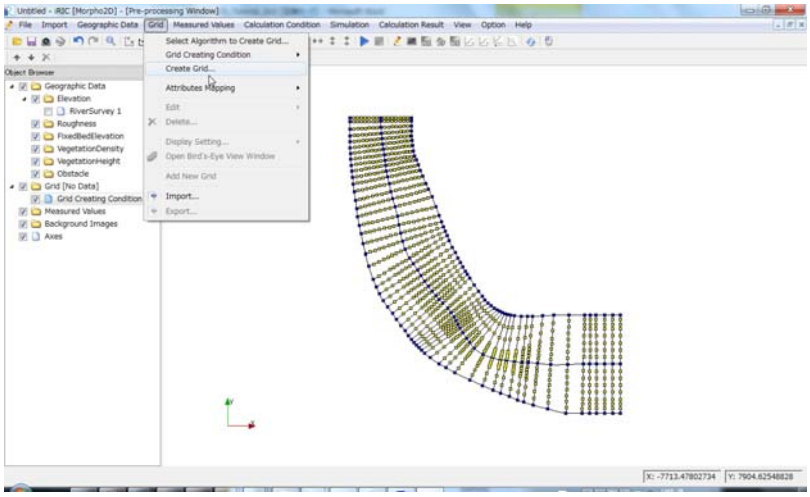


Figure II-5(1)　Grid generation

2	Press OK in [Grid generation] window.

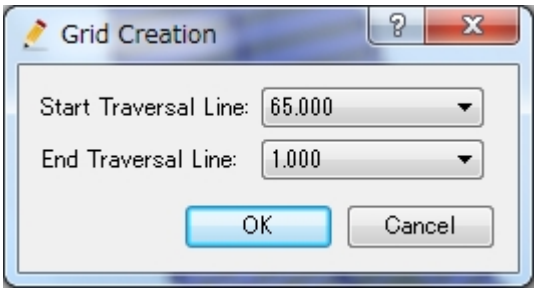


Figure II-5(2)　Grid generation

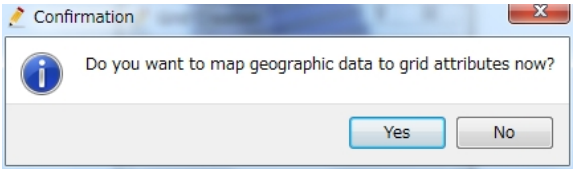


Figure II-5(3)　Grid generation

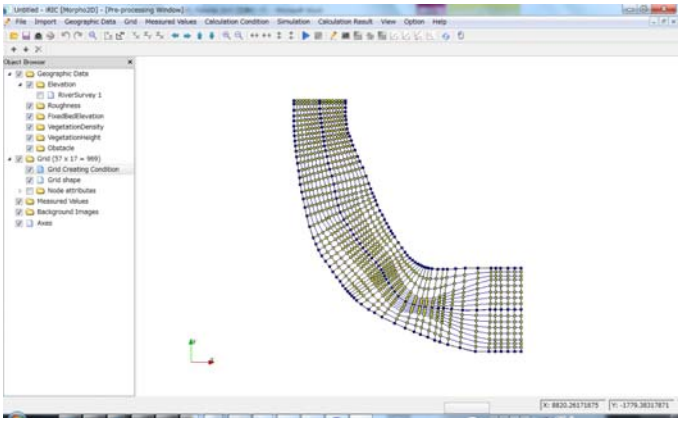


Figure II-5(4)　Grid generation

■ Coefficient of Manning's roughness

1	Click [Roughness] in [Object Browser] by right button of mouse and select [add] and [Polygon].

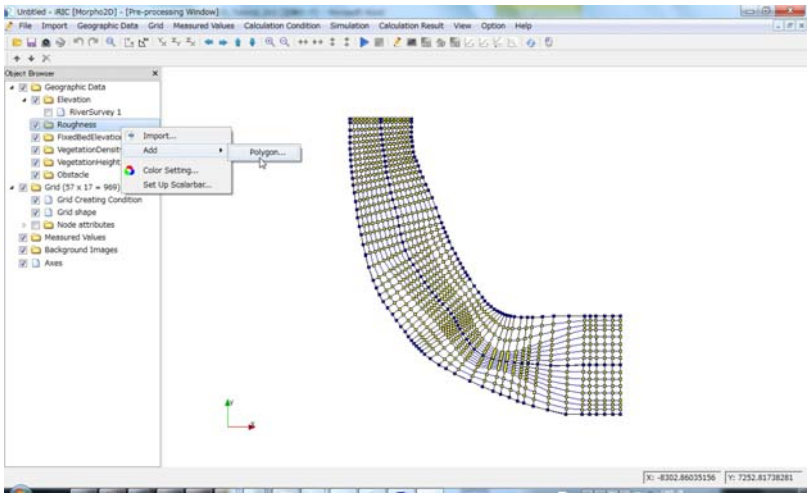


Figure II-6(1) Coefficient of Manning's roughness

2	Make a polygon by clicking at the corners of the polygon. The polygon should cover the whole calculation area. Double clicks stop to make the polygon.
3	Enter the roughness value in the small windows.

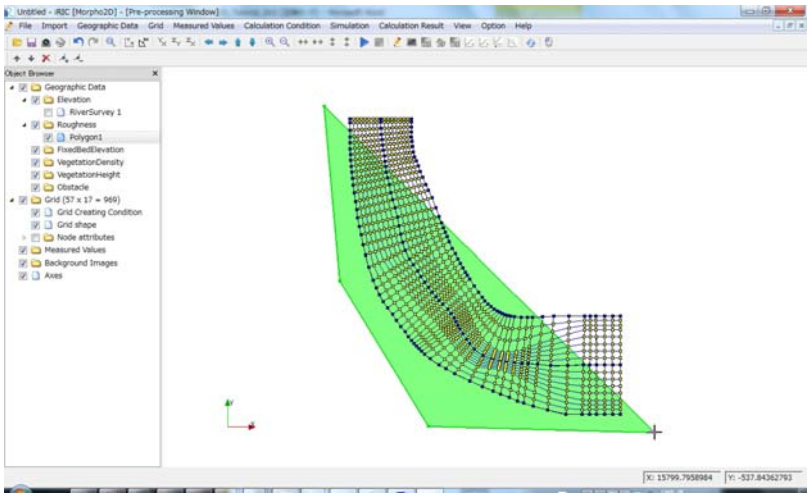


Figure II-6(2) Add division points in transvers direction

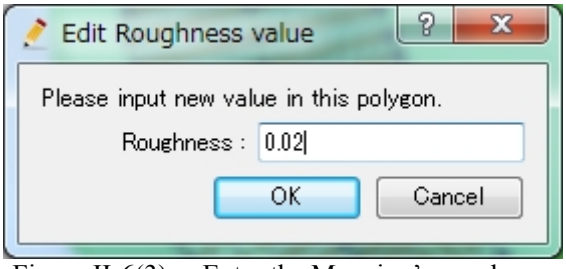


Figure II-6(3) Enter the Manning's roughness

4	Polygon is formed.

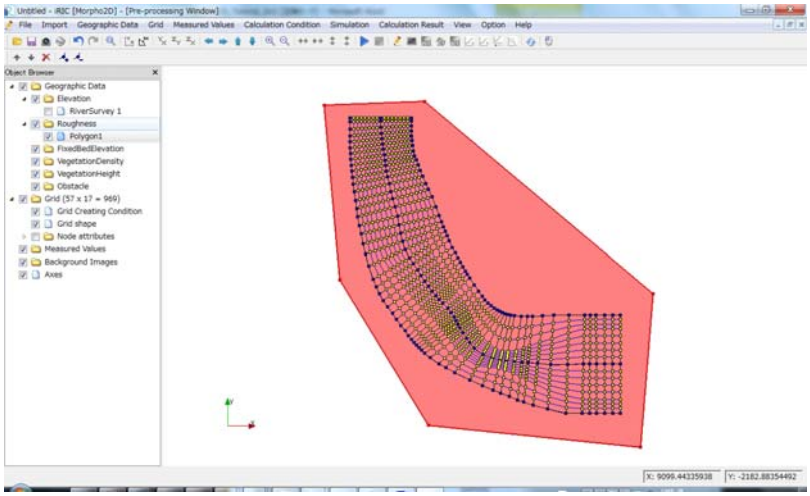


Figure II-6(4)　Add division points in transvers direction

II.1.3 Load background image

1. Click [Background Image] in [import].

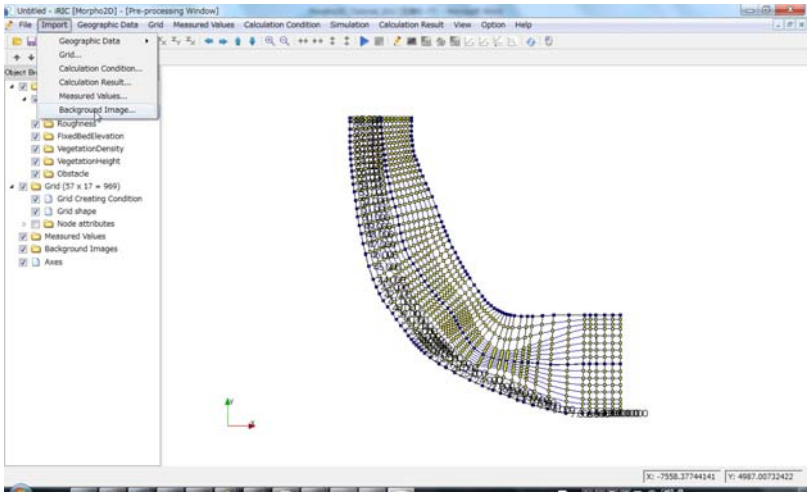


Figure II-7 (1) Load the background image

※Background image
When users create the numerical grids, background images help to decide the location of bank and so on.

2. Select [TanChau.jpg] in [Mekong] folder in Sample folder.

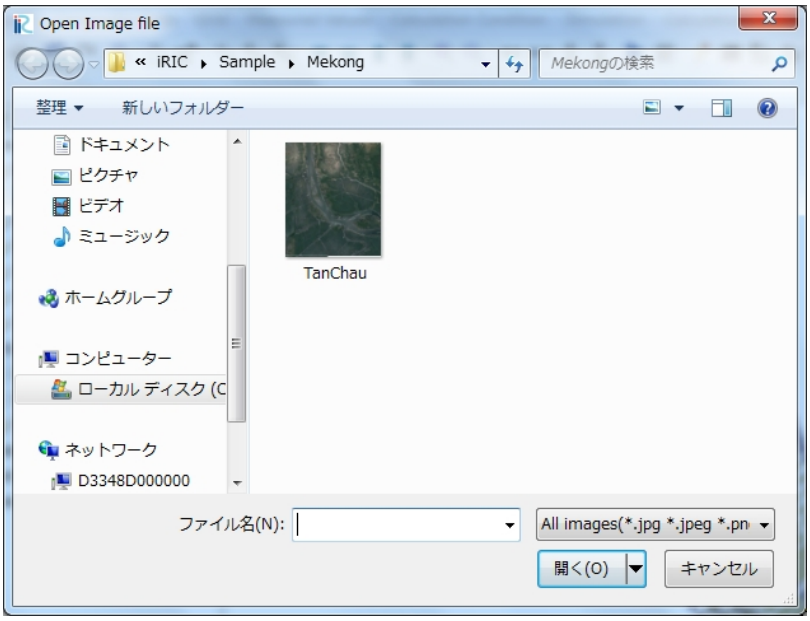


Figure II-7 (2) Load the background image

3. Background image is fitted to cross-sections by use of [Pan], [Rotate] and [Zoom]

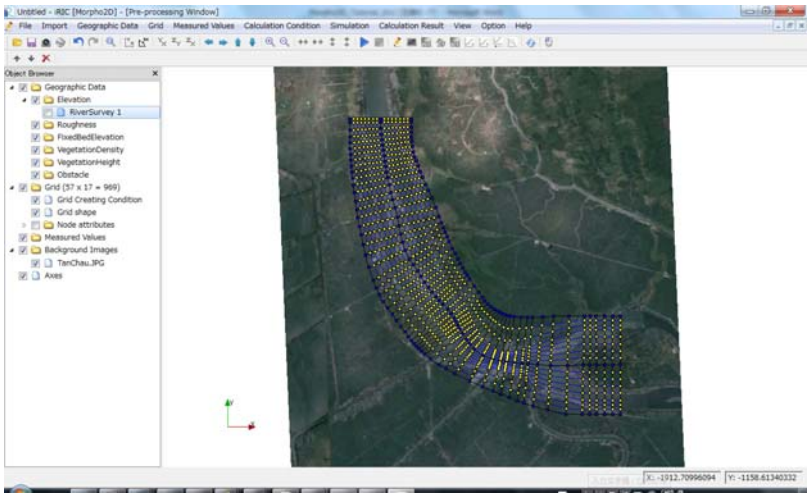
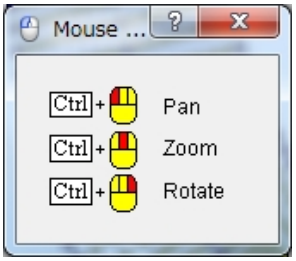


Figure II-7(3) Load the background image

※Hints for the fitting



Details are in iRIC user manual

II.2 Setting of calculation conditions

II.2.1 Setting of calculation conditions

■Selection of solver type

1	Click [Setting] in [Calculation Condition].

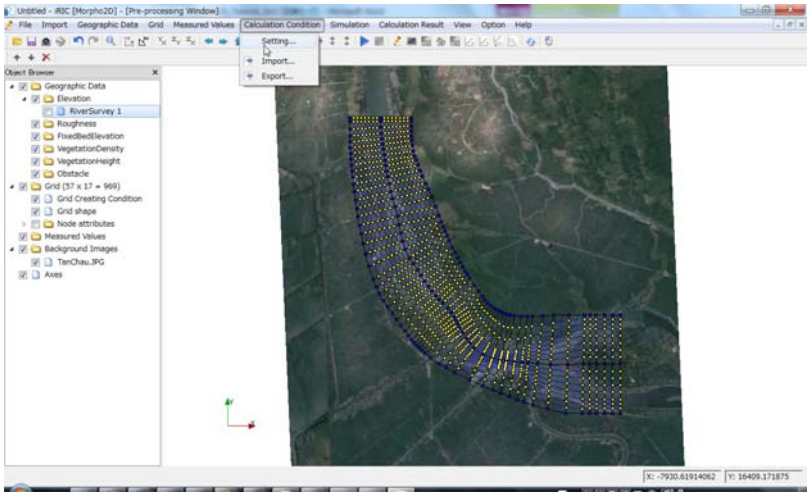


Figure II-8 Setting of calculation conditions

■Setting of boundary conditions

1	Click [Boundary Condition] in [Calculation Conditions] window.

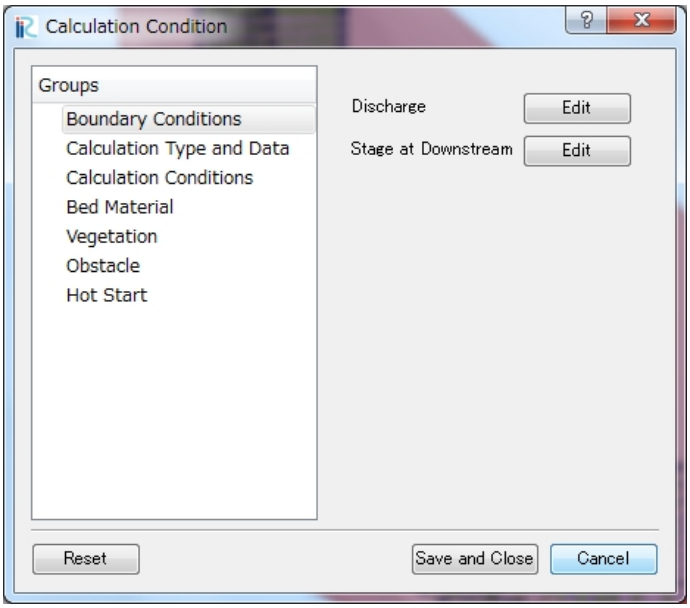


Figure II-9(1) Setting of boundary conditions

Water discharge at the upstream end is set in [Water Discharge] window. Not only reading the data from files but also inputting the data directly. Unit of the time is second. Unit of the water discharge is m3/s.

2	Click [Import] to load the water discharge data.

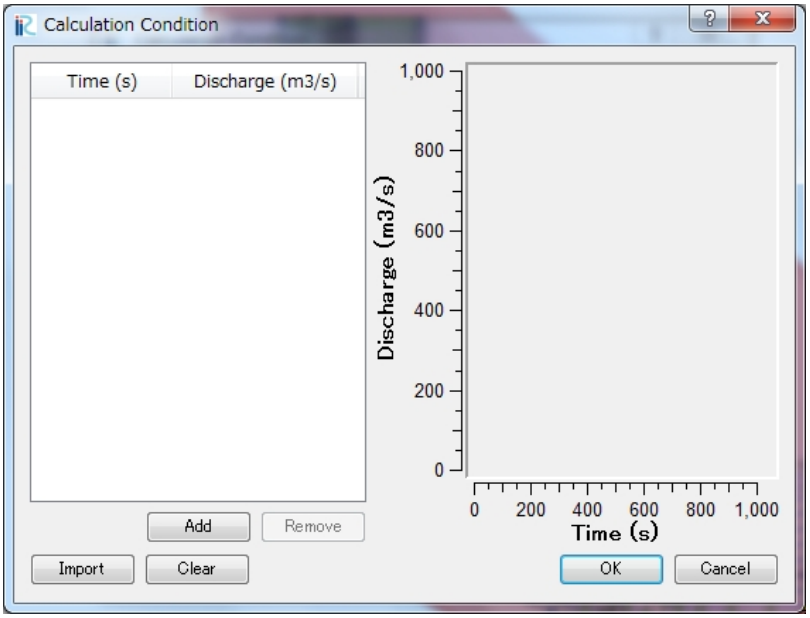


Figure II-9(2)　Setting of temporal change of water discharge

3	Select [Discharge.csv] and click [Open].

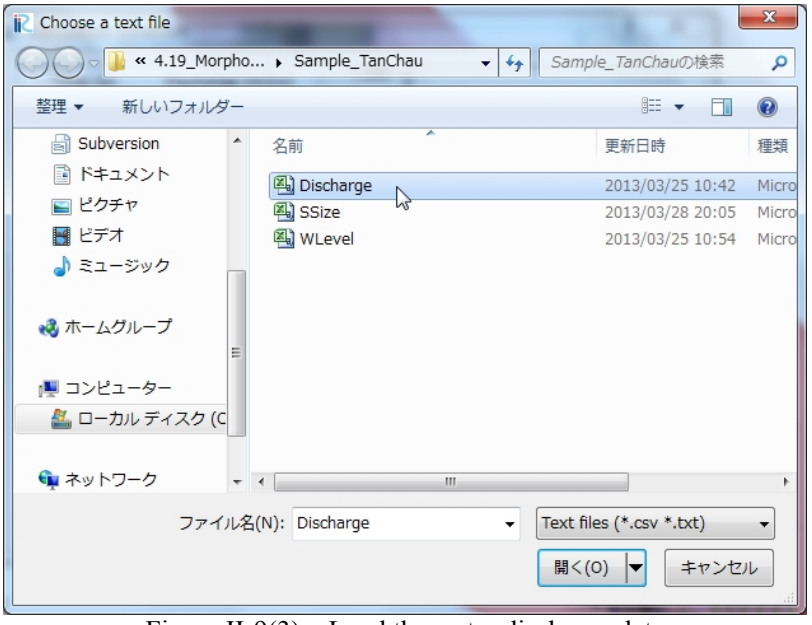


Figure II-9(3)　Load the water discharge data

4	Water discharge data is loaded and the values of water discharge and the hydrograph are shown in the window. Click [OK] and go back to [Calculation Condition] window.

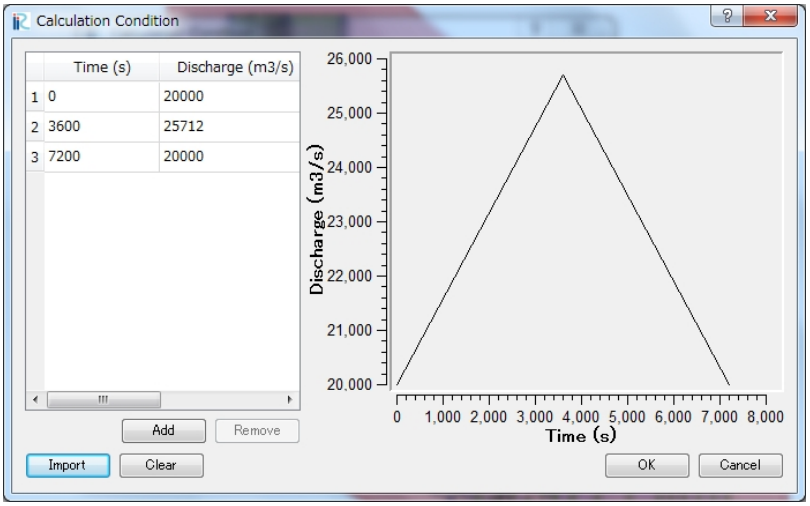


Figure II-9(4) Setting of hydrograph

5	Setting procedure of [Stage at Downstream] is the same as [Discharge]. Please select [WLevel.csv].

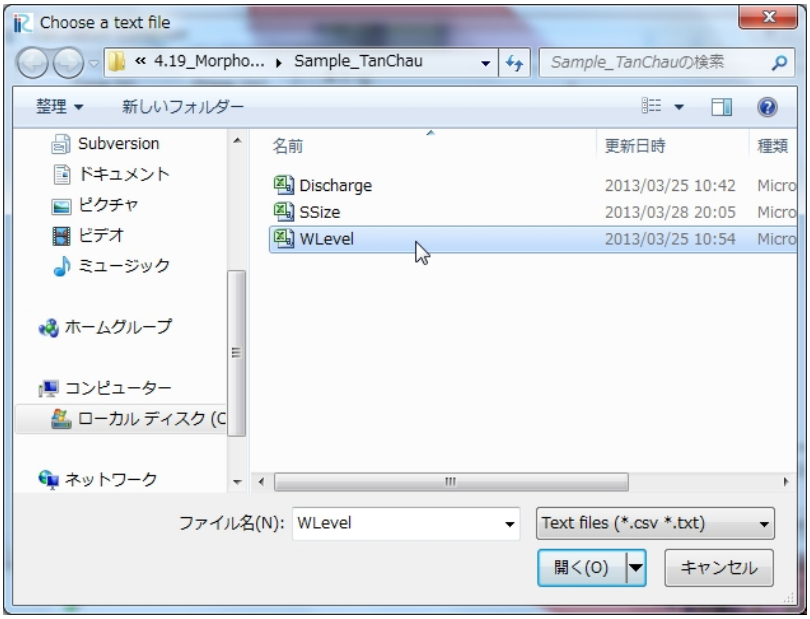


Figure II-9(5) Setting of temporal change of water level at downstream end

Water level at the upstream end is set in [Water Level] window. Not only reading the data from files but also inputting the data directly. Unit of the time is second. Unit of the water level is m.

■ Setting of the calculation type and output time step of data

1	Click [Calculation Type and Data] in [Calculation Condition] window.
2	Select [Bed Material Load] in [Calculation Type and Data].
3	[Start Time (s)] is 0.
4	[End Time (s)] is 7200 (s).
5	[Computational Time Step (s)] is 0.1 (s).
6	[Output Time Step for File (s)] is 60 (s).
7	[Output Time Step for Screen (s)] is 10 (s).
8	[Bed Deformation Start Time (s)] is 60 (s).

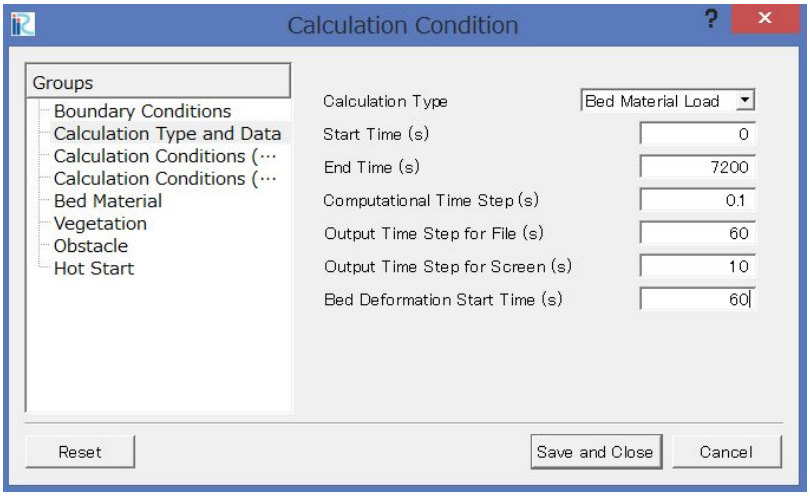


Figure II-10 Setting of calculation parameters

Select [Flow only] for flow calculation or [Bed Material Load] for bed deformation analysis considering bed material load in [Calculation Type and Data]

Start time of the calculation is set in [Start Time (s)]. Unit is second.

End time of the calculation is set in [End Time (s)]. Unit is second.

Time step Δt is set in [Computational Time Step (s)]. Unit is second. The time step is decided considering CFL condition.

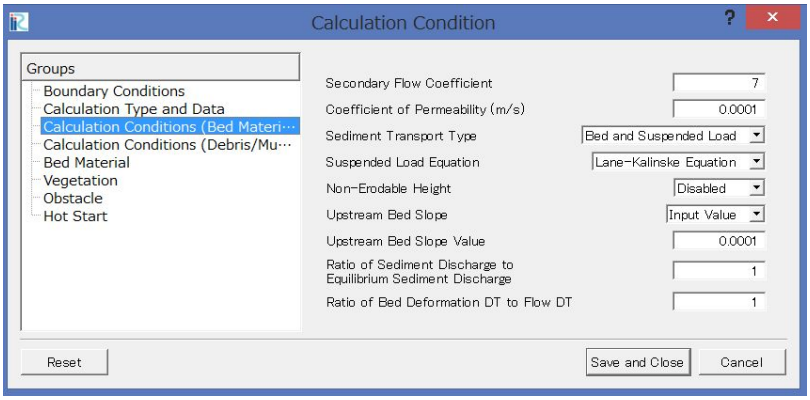
Output time step for file is set in [Output Time Step for File (s)]. Unit is second.

Output Time Step of calculation condition for Screen is set in [Output Time Step for Screen (s)]. Unit is second. Short time step makes the calculation time longer.

Start time of bed deformation is set in [Start Time of Bed Deformation (s)]. Unit is second. When the calculation domain is long or water discharge is small, start time of the bed deformation should be late.

■ Setting of calculation conditions

1	Click [Calculation Conditions (Bed Material Load)] in [Calculation Condition] window.
2	7 is set for [Secondary Flow Coefficient].
3	0.0001 is set for [Coefficient of Permeability (m/s)].
4	[Bed and Suspended Load] is selected in [Sediment Transport Type].
5	[Lane-Kalinske Equation] is selected in [Suspended Load Equation].
6	Select [Dsabled Non-Erodible Area] in [Non-erodible Height].
7	Select [Input Value] in [Upstream Bed Slope], because the averaged bed slope at Tan Chau area in the Mekong River is negative value.
8	0.0001 is set for [Upstream Bed Slope Value].
9	1 is selected in [Ratio of Sediment Discharge to Equilibrium Sediment Discharge].
10	1 is selected in [Ratio of Bed Deformation DT to Flow DT].



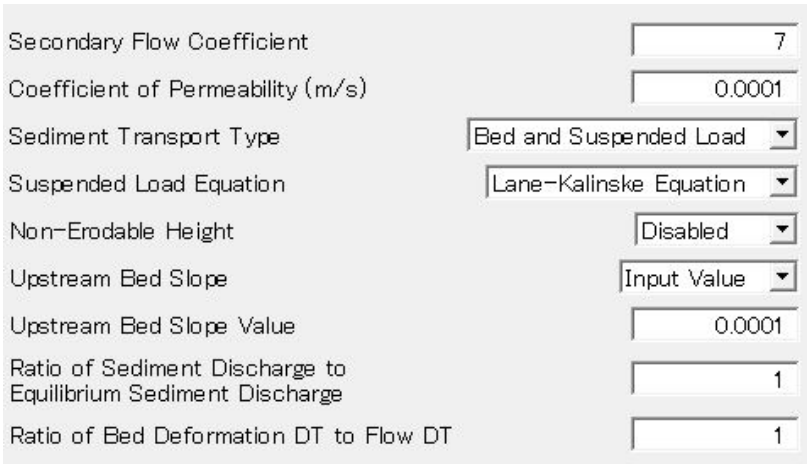


Figure II-11 Setting of calculation conditions

Secondary flow coefficient is set. The value should be between 7 and 11 in [Secondary Flow Coefficient].

Coefficient of permeability below the bed surface is set in [Coefficient of Permeability (m/s)]. Unit is m/s.

Select the sediment transport type. When you consider bed load only, please select [Bed load]. When you consider suspended load, please select [Bed and Suspended Load] in [Sediment Transport Type]

Select the suspended load equation. Uses can select Lane-Kalinske's equation or Itakura-Kishi's equation in [Suspended Load Equation]

When some parts of the bed composed of rock or weir is set in the calculation area, please select [Enabled (Value in Polygon)].

Select the treatment of bed slop at the upstream end in [Upstream Bed Slope]. When you use the average bed slope value, please select [Average]. When you input the bed slope value, please select [input Value].

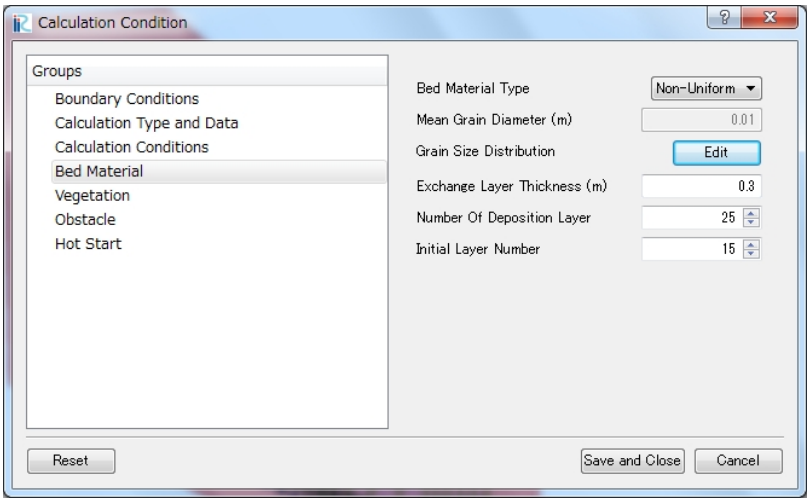
When you select [input Value] in [Upstream Bed Slope], please input the bed slope value in [Upstream Bed Slope Value].

Ratio of upstream sediment discharge to equilibrium sediment discharge is set in [Ratio of Upstream Sediment Discharge to Equilibrium Sediment Discharge]. For example, upstream boundary located at the dam, the ratio should be smaller than 1. When the upstream boundary located at the landslide location, the ration should be larger than 1.

Ratio of Bed Deformation Δt to Flow Δt is set in [Ratio of Bed Deformation DT to Flow DT]. Basically, users should use 1. In case, the unsteady characteristics of the flow is very week and users want to get faster, please set the value between 1 and 10.

■ Setting of bed material conditions

1	Click [Bed Material] in [Calculation Condition] window.
2	Select [Non-uniform] in [Bed Material Type].
3	[Mean Grain Diameter (m)] is available, when you select [Uniform] in [Bed Material Type].
4	[Grain Size Distribution] is available, when you select [Non-uniform] in [Bed Material Type]. Click [Edit] to load the size distribution data of both surface layer and bottom layers. Setting procedure of size distribution data of bed material is the same as [Discharge].



When bed material is treated as uniform sediment, please select [Uniform]. When bed material is treated as non-uniform sediment, please select [Non-uniform].

Input mean grain diameter in [Mean Grain Diameter (m)]. This function is available only for uniform sediment

Figure II-12(1) Setting of bed material conditions

5	Select [SSize.csv] and click [open].

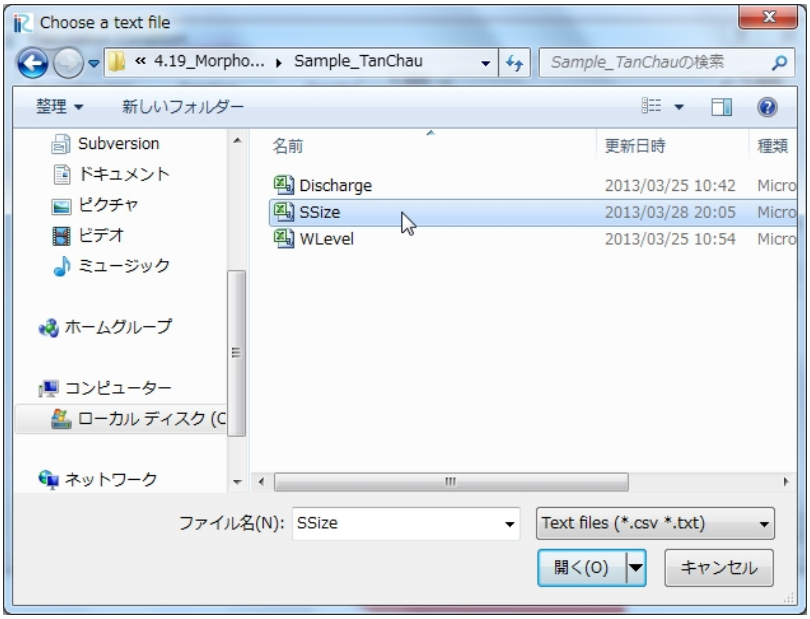


Figure II-12(2) Setting of bed material conditions

6 Fraction of each sediment size class of surface layer is shown in the second column and fraction of each sediment size class of bottom layer is shown in the third column.

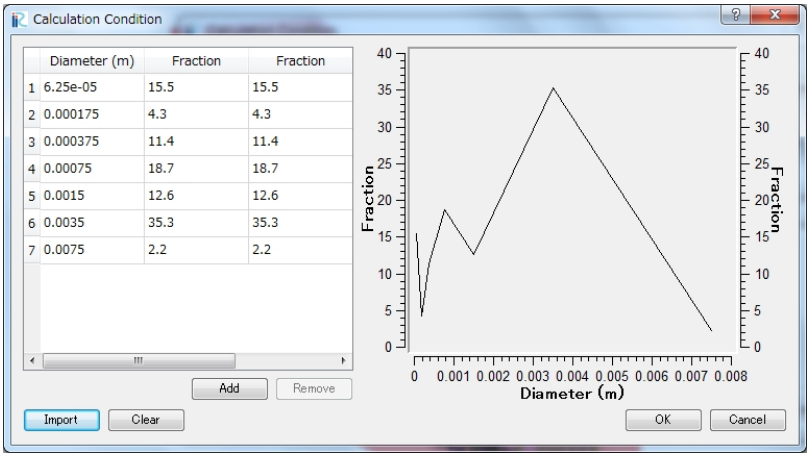


Figure II-12(3) Setting of bed material conditions

Both 100 (%) and 1 are available for the summation of fractions, because fractions are recalculated at the start of the calculation for the summation of the fractions to be 1 .

Lines of both surface and bottom size distribution are drawn. In the left figure, the same size distributions are used for the surface and the bottom layers. Hence the line of the size distribution seems one.

7 0.3m is used for [Exchange Layer Thickness (m)].
8 25 is used for [Number of Deposition Layer].
9 15 is used for [Initial Layer Number].

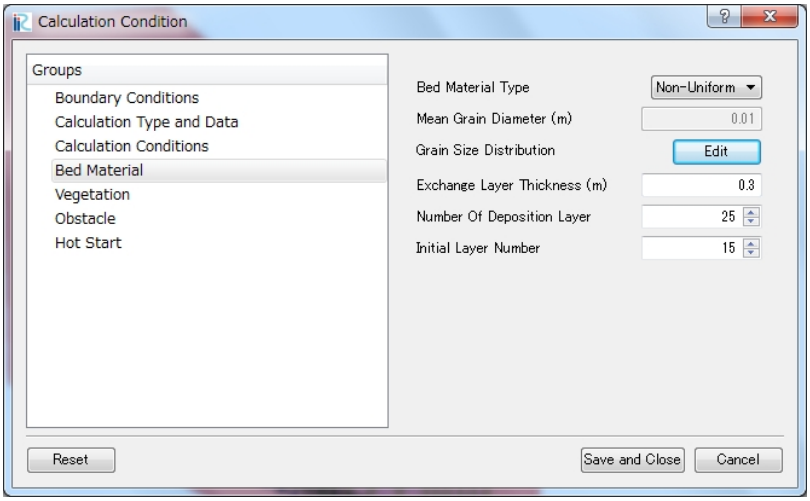


Figure II-12(2) Setting of bed material conditions

■ Setting of vegetation conditions

1 Click [Vegetation] in [Calculation Condition] window.
2 Select [Disabled] in [Vegetation Density].
3 Select [Disabled] in [Vegetation Height].

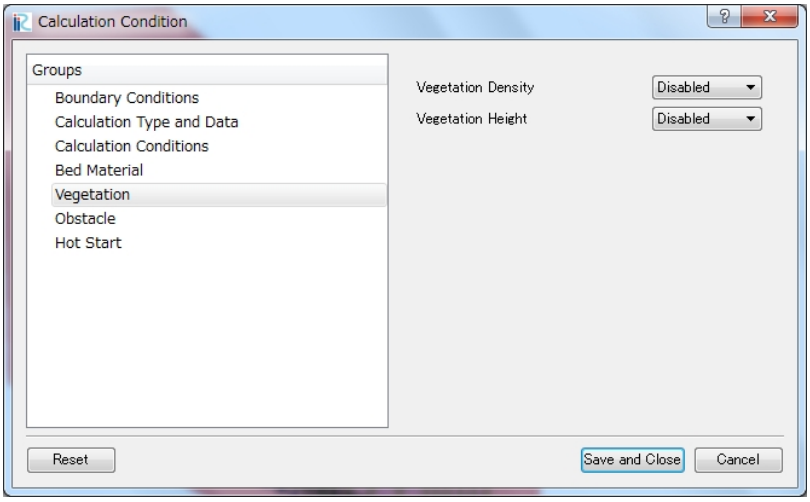


Figure II-13 Setting of vegetation conditions

If vegetation is considered, [Enabled] is always selected in [Vegetation Density]. Polygons of vegetation regions must be set and the vegetation density values must be inputted.

If vegetation height is considered, [Enabled] is selected in [Vegetation Height]. Polygons of vegetation regions must be set and the vegetation height values must be inputted. If [Disabled] is selected in [Vegetation Height], the vegetation height becomes infinity.

■ Setting of obstacle

1 Click [Obstacle] in [Calculation Condition] window.
2 [Disabled] is selected in [Obstacle].

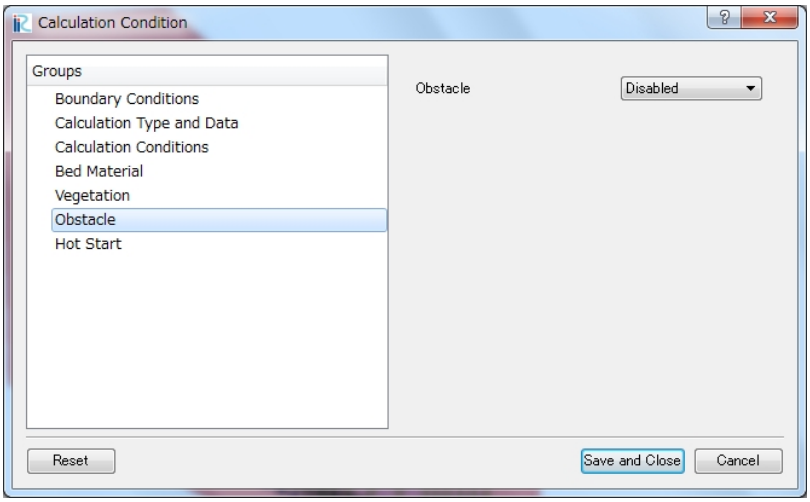
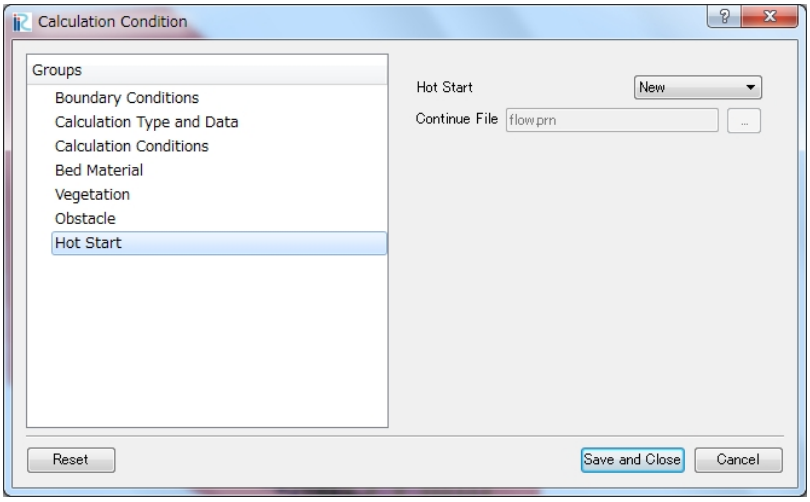


Figure II-14 Setting of obstacle conditions

If obstacles are considered, [Enabled] is selected in [Obstacle] and polygons of obstacle regions must be set.

■ Setting of hot start

1	Click [Hot Start] in [Calculation Condition] window.
2	Select [New] in [Hot Start].
3	No need to select [Continue File].



When users perform new calculation, please select [New]. When users want to start the calculation from the end of the previous calculation, please select [Continue].

Figure II-15 Setting of hot start

■ Finish of setting of calculation conditions

1	Click [Save and Close] in [Calculation Condition] window.

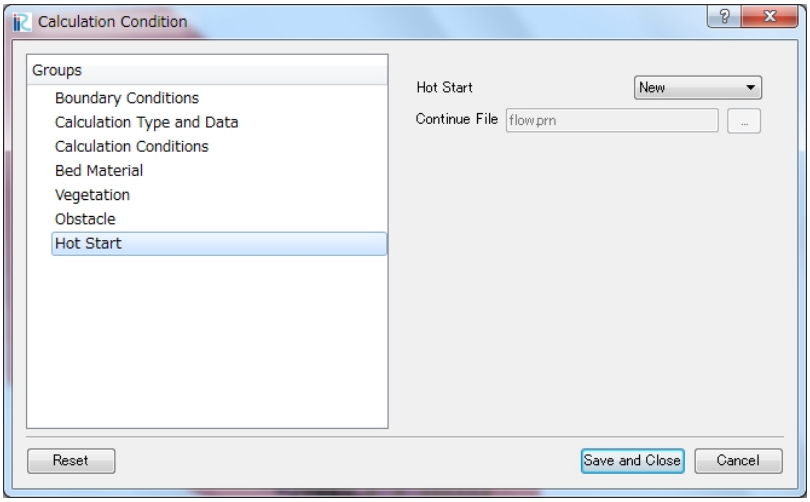


Figure II-16 Finish of setting of calculation conditions

II.3 Run the calculation

1	Click [Run] on the tool bar

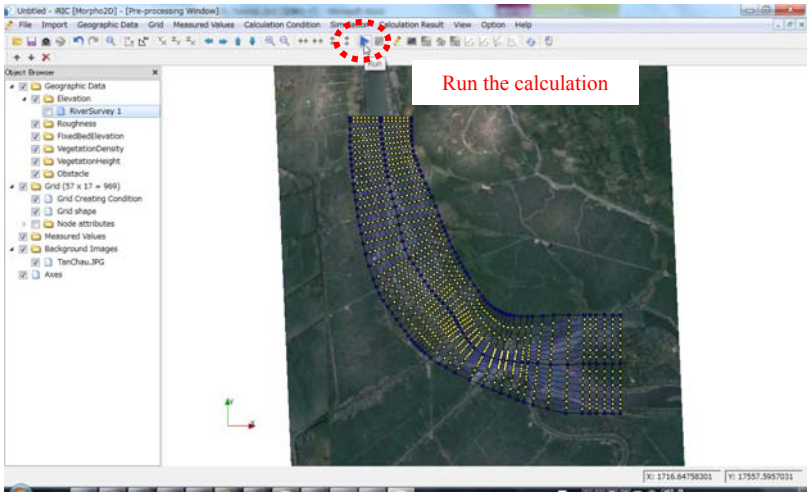


Figure II-17(1) Run the calculation

2	Please select [Yes] and [OK] in the warning window and the information window, respectively.

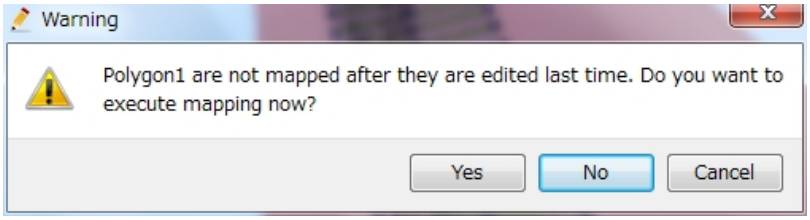


Figure II-17(2) Warning for mapping

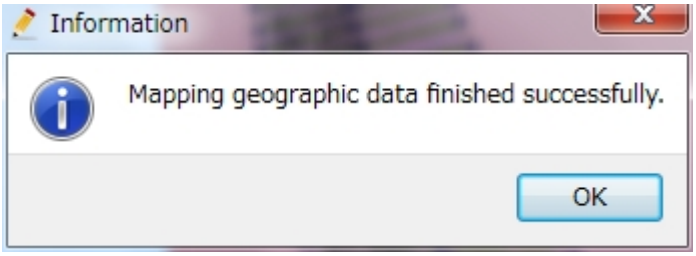


Figure II-17(3) Information for mapping

3	Click [Yes] in [Information] window.
4	Select [Save as File (*.ipro)] and click [OK] in [Select How to Save Project].
5	Decide the file name (ex. TanChau.ipro) and click [save] in [Save iRIC project file]

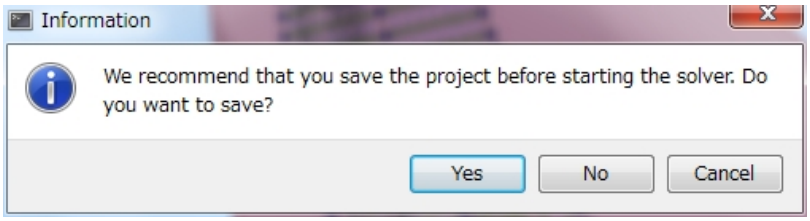


Figure II-17(4)　Information for save the project

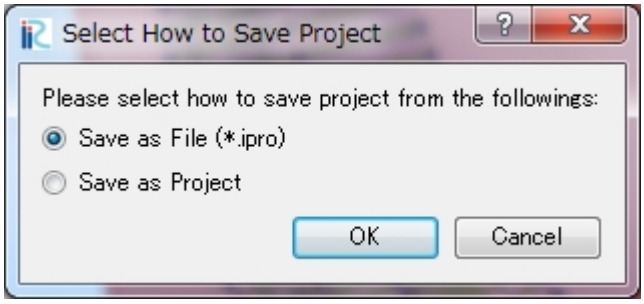


Figure II-17(5)　Select the save type

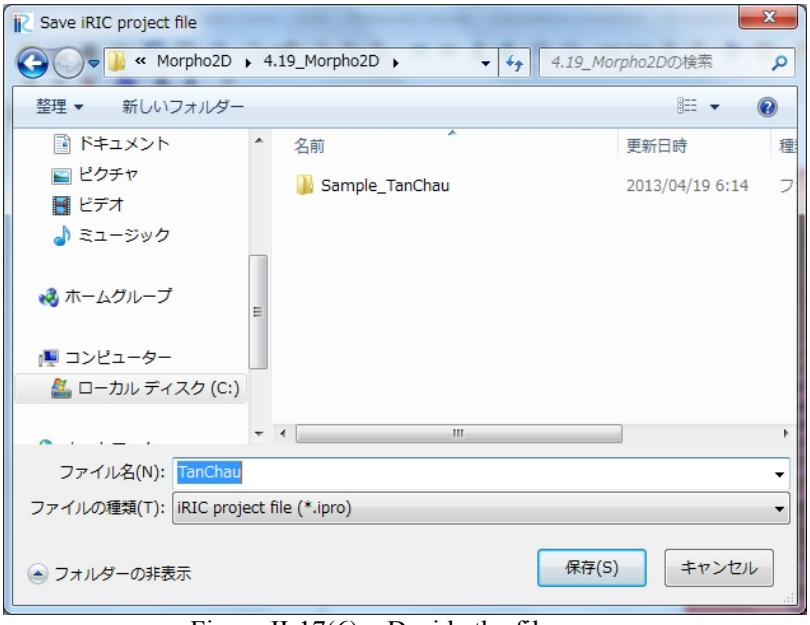


Figure II-17(6)　Decide the file name

6 Startup the gray colored screen automatically.

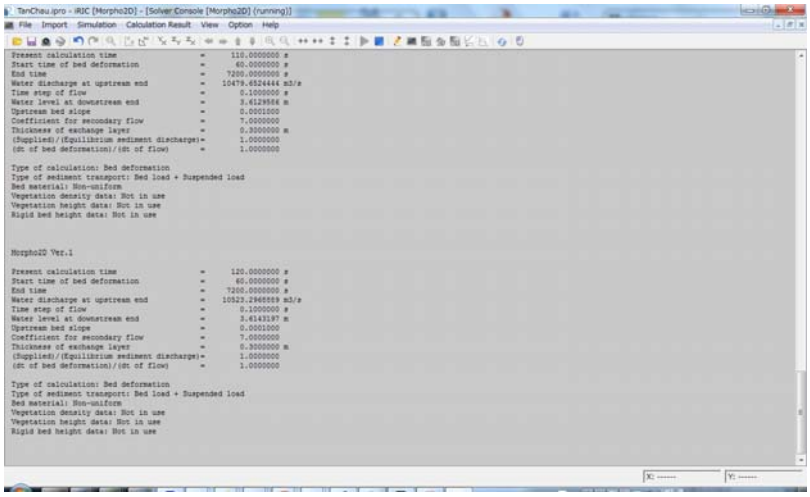


Figure II-17(7) Run the calculation

※ Information on the screen

Present calculation time (s)
Start time of bed deformation (s)
End time (s)
Water discharge at upstream end (m3/s)
Time step of flow (s)
Water level at downstream end (m)
Initial bed slope
Coefficient for secondary flow
Thickness of exchange layer (m)
(Supplied)/(Equilibrium sediment discharge)
(dt of bed deformation)/(dt of flow)
Type of calculation,
Type of sediment transport,
Type of bed material,
Vegetation density data,
Vegetation height data,
Rigid bed height data

7 When you want to check the calculation results during the calculation, please click [Reload calculation result] and draw figures of calculation results. The method how to draw the figures are explained in the next chapter.

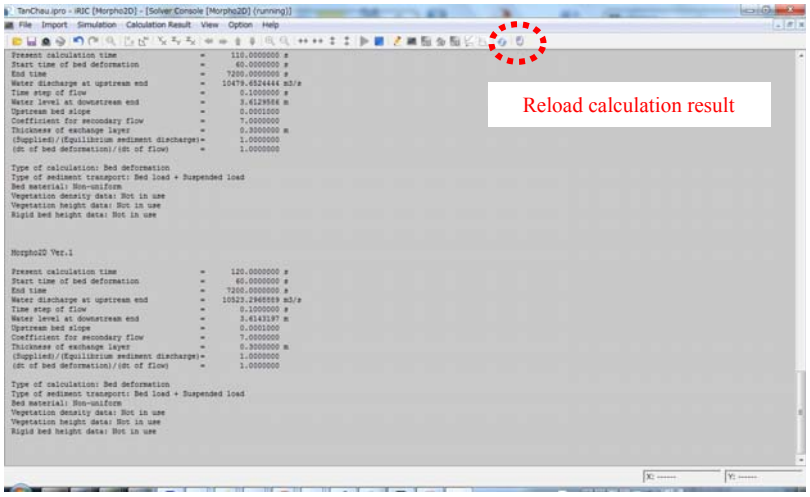


Figure II-17(8) Run the calculation

8 When ［Solver Finished］ window is appeared on the screen, click [OK].

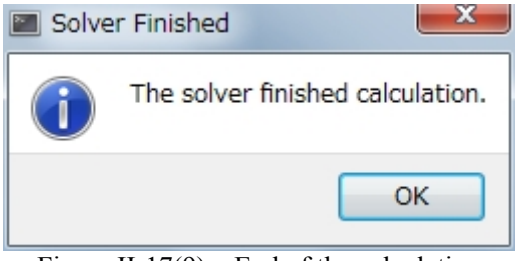


Figure II-17(9) End of the calculation

II.4 Visualization of calculation results

II.4.1 Visualization of calculation results

1	Click [Open New 2D Post-Processing Window].

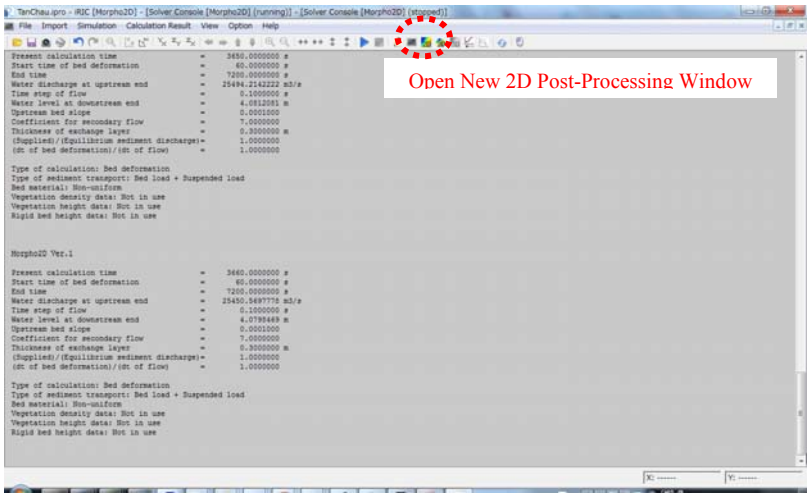
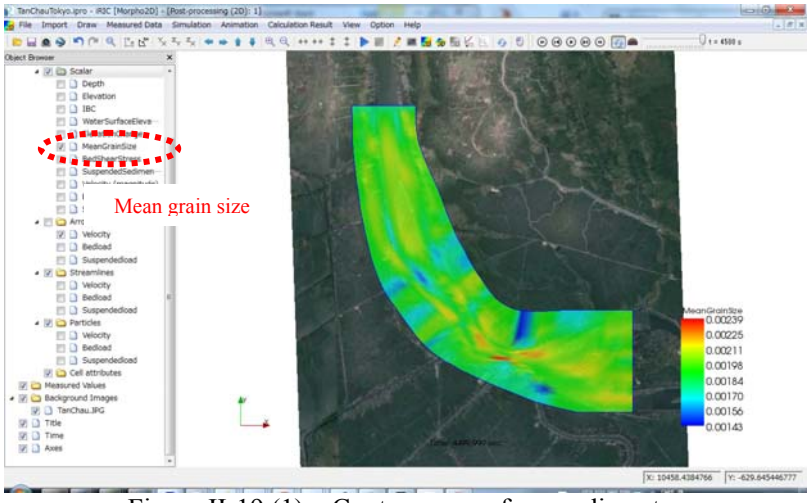


Figure II-18 Open New 2D Post-Processing Window

■ Contour map

1	Check [Scalar] in [Object Browser].
2	Check [TanChau.jpg] in [Background Images] in [Object Browser].
3	Horizontal distribution of mean sediment diameter is shown by selecting [MeanGrainSize].
4	By using animation tool bar, results can be checked by a movie.



You can draw the contour maps of water depth, bed elevation, wet/dry, water level, elevation change, mean diameter, non-dimensional shear stress, depth averaged concentration of suspended sediment, velocity magnitude, bed load, suspended load by Morpho2DH.

Figure II-19 (1) Contour map of mean diameter

5	When you want to modify contour, please open [Property] by clicking [Scalar] by the right click.
6	When you want to draw low water channel only, please select [Region Setting] in [Scalar setting] window.
7	[Custom Region] must be on in [Region Setting] and please set that [J Min] is 4 and [J Max] is 14.

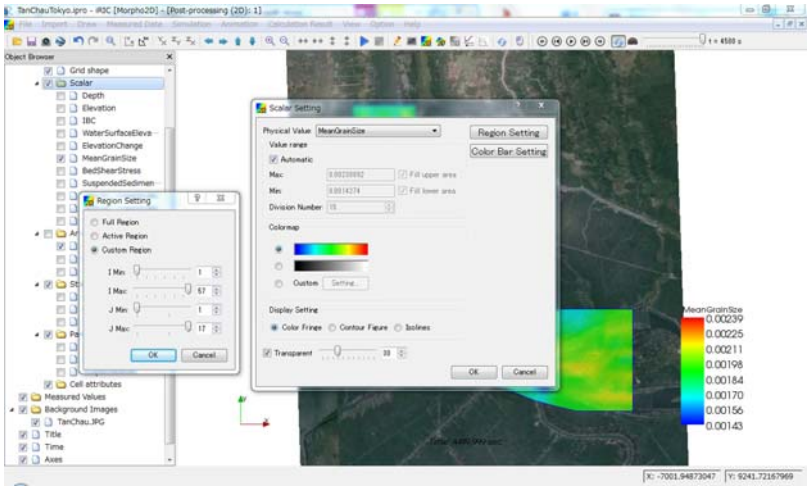


Figure II-19(2) Modification of contour

※Modification of contour

Here, for example, region is modified and contour map on floodplain is deleted. Another functions are introduced in iRIC uses manual

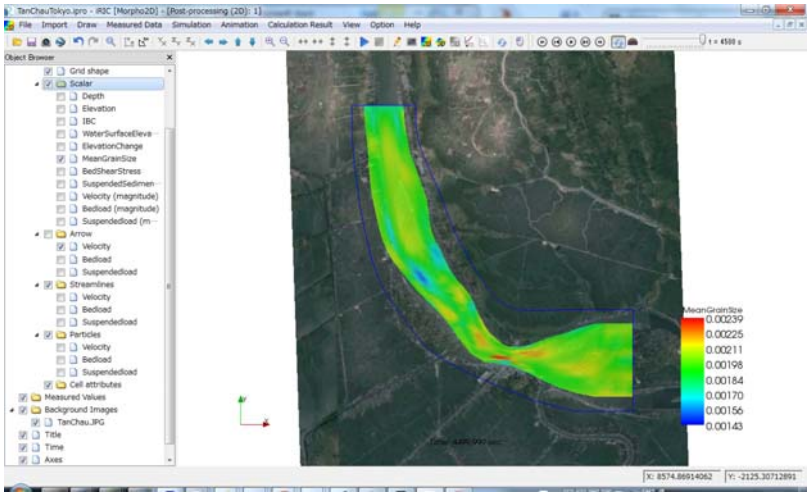
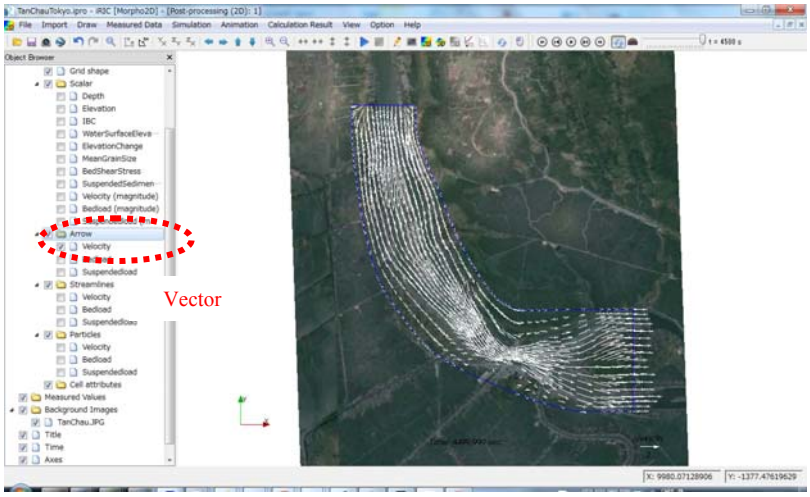


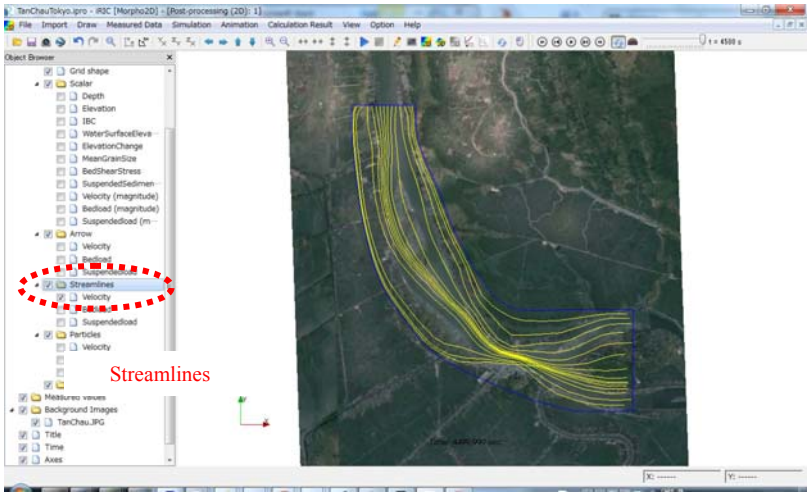
Figure II-19(3) Modification of contour

■ Other visualization functions

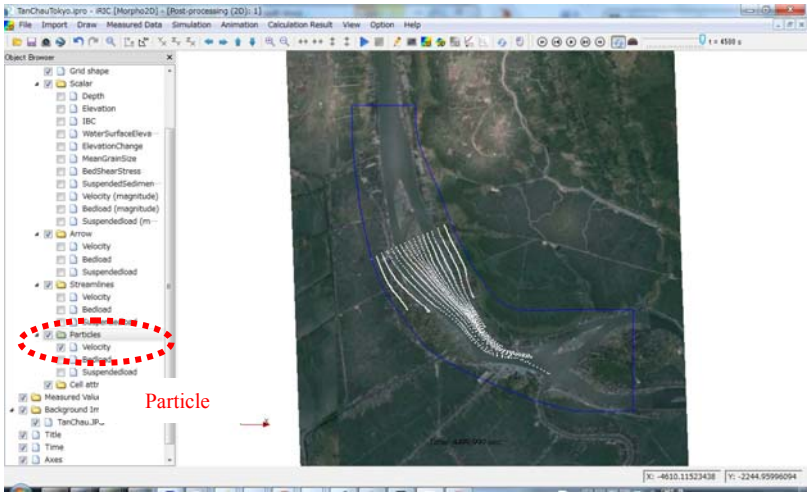
1	[Arrow], [Streamlines] and [Particles] can be drawn.



※ Vector
Check both [Arrow] and[Velocity]



※ Streamlines
Check both [Streamlines] and[Velocity]



※ Particle
Check both [Particles] and [Velocity] and run the animation.

Figure II-20 Other visualization functions

III. Bed deformation analysis with vegetation（Mekong River）

◆ Purpose

The purpose of this chapter is for person who finished Chapter II to learn to perform bed deformation analysis with vegetation by use of Morpho2DH.

◆ Procedure

Procedure in this chapter is shown in Figure III-1.

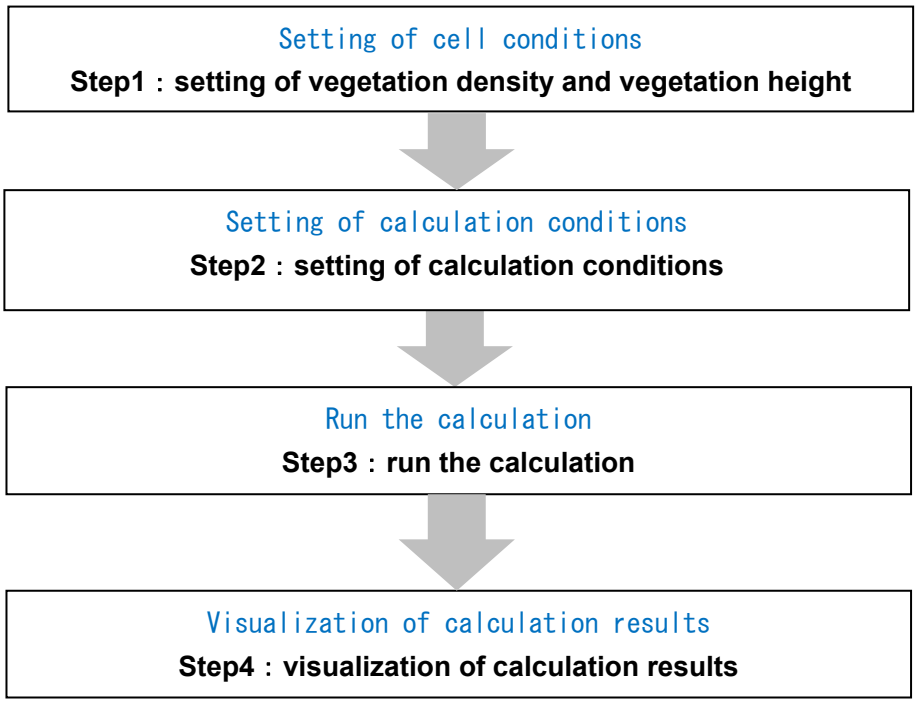


Figure III-1　Procedure in this chapter

III.1 Setting of vegetation density and vegetation height

III.1.1 Setting of vegetation density

■ Setting of vegetation density

1	Please click [VegetationDensity] in [Object Browser] by right button of the mouse and select [add] and [Polygon].

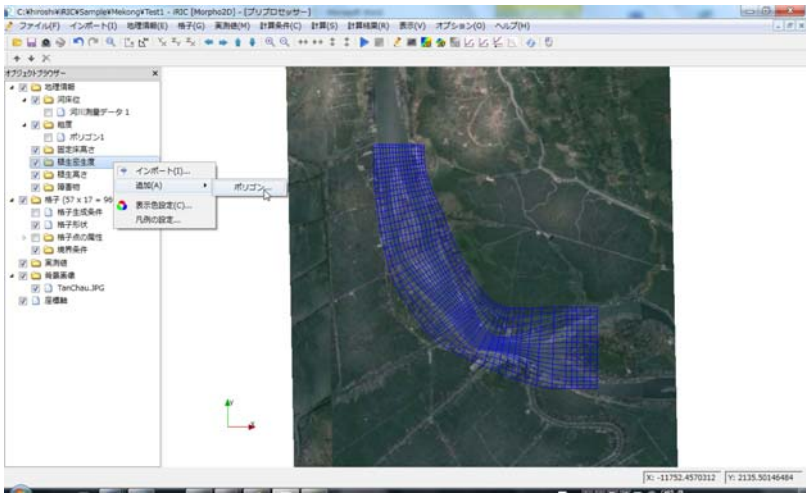


Figure III-2(1) Make a polygon

2	Make a polygon by clicking at the corners of the polygon. The polygon should cover the vegetation area (here, the sand bar in the upstream region). Double clicks stop to make the polygon.
3	Enter the vegetation density value.

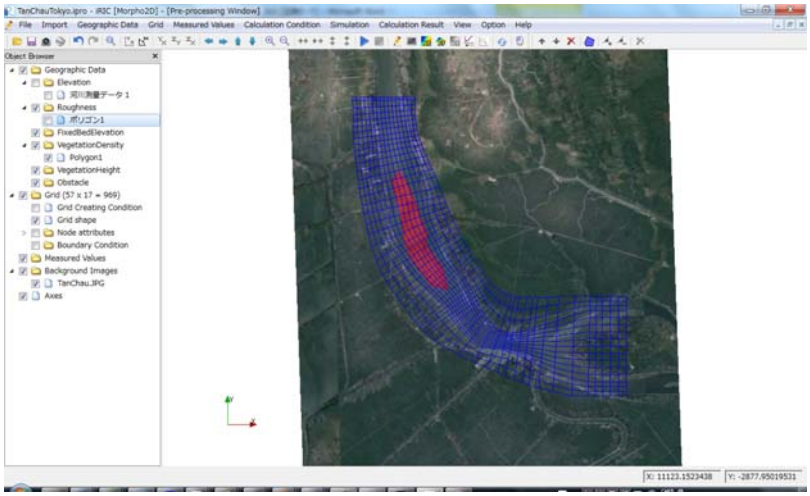


Figure III-2(2) Make a polygon

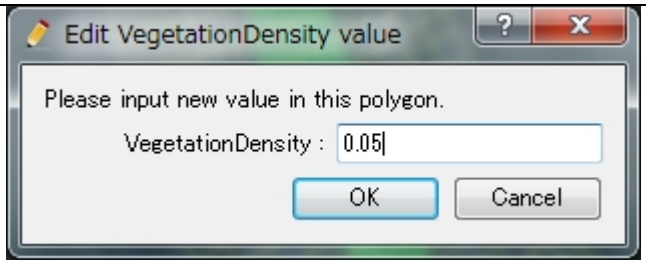


Figure III-2 (3) Enter the vegetation density

4	Polygon for vegetation height is the same as the polygon of vegetation density. Hence, the polygon of vegetation density is copied and is used for vegetation height. Click [Polygon1] in [VegetationDensity] in [Object Browser] by right button of the mouse and select [Copy].
5	Select [VegetationHeight] in [Select Geographic data] window and click [OK].

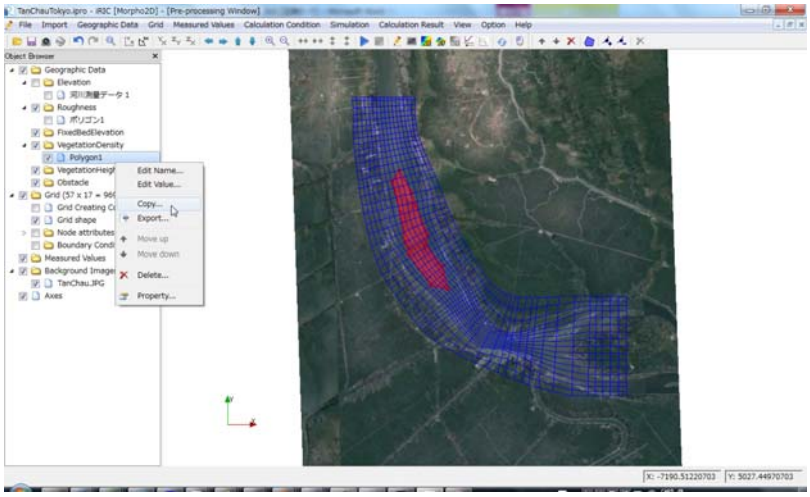


Figure III-2(4) Make a polygon

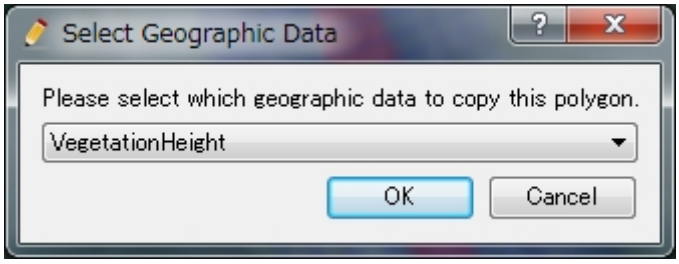


Figure III-2(5) Select the geographic data

III.1.2 Setting of calculation conditions of vegetation

■ Setting of vegetation density

1	Click [Vegetation] group in [Calculation Condition] window.
2	[Enabled] is selected in [Vegetation Density].
3	[Enabled] is selected in [Vegetation Height].

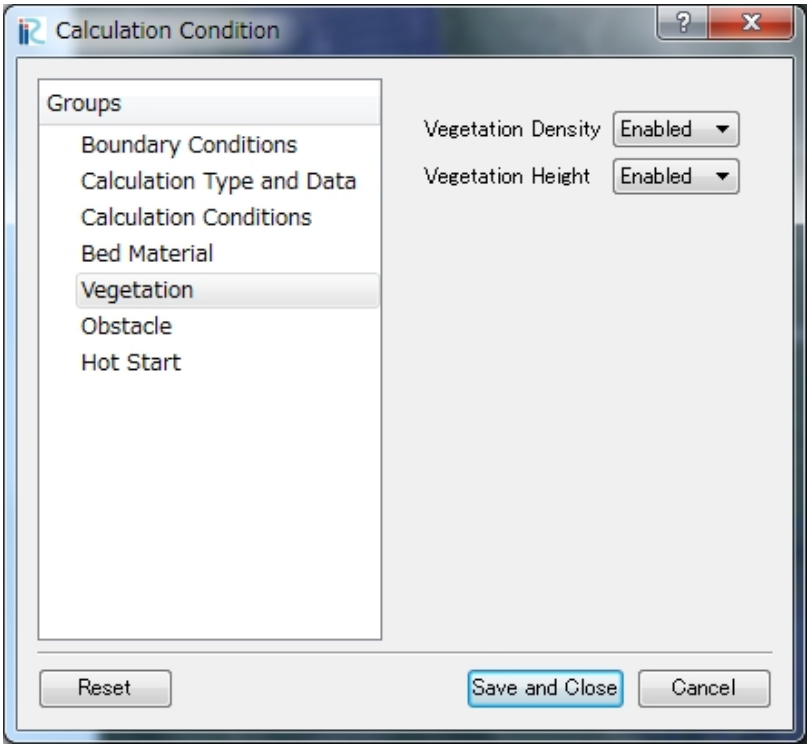


Figure III-3 Setting vegetation conditions

III.2 Run the calculation

1	Click [Run] in the tool bar.

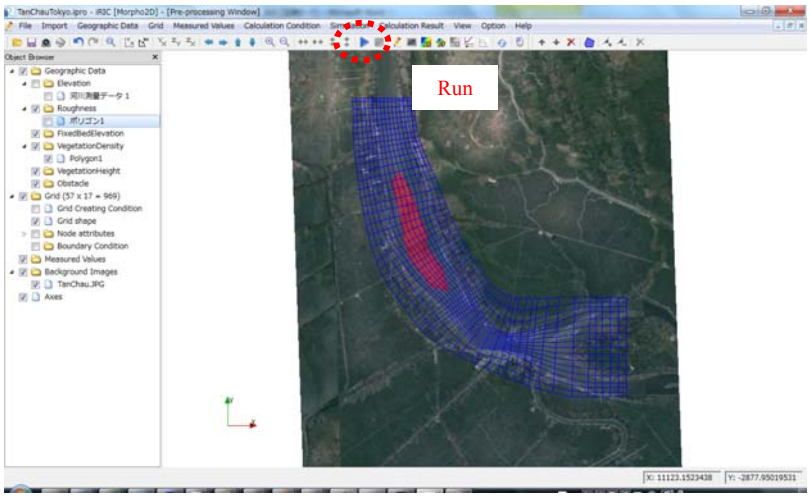


Figure III-4(1) Run the calculation

2	Please select [Yes] and [OK] in the warning window and the information window, respectively.

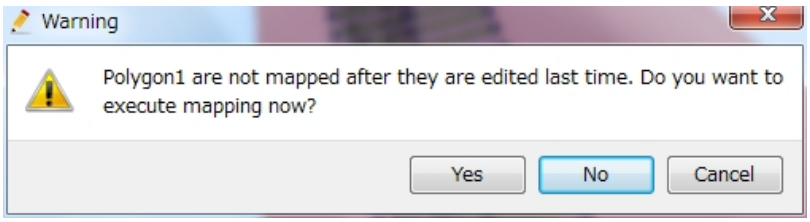


Figure III- 4(2) Warning for mapping

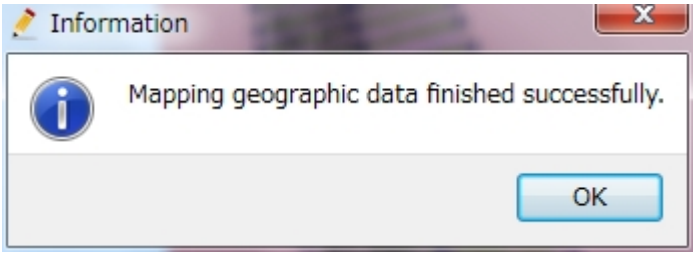


Figure III-4(3) Information for mapping

3	Click [Yes] in [Information] window.
4	Select [Save as File (*.ipro)] and click [OK] in [Select How to Save Project].

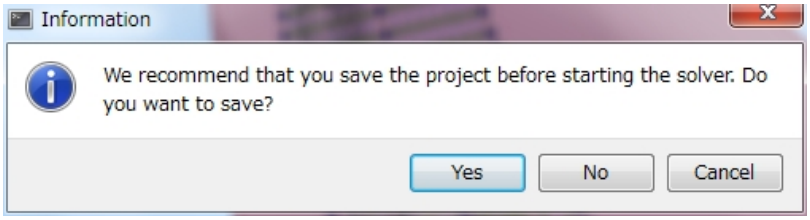


Figure III- 4(4) Information for save the project

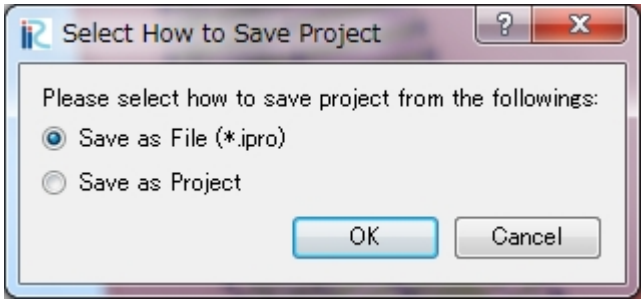


Figure III-4(5) Select the save type

5　Decide the file name (ex. TanChau.ipro) and click [save] in [Save iRIC project file]

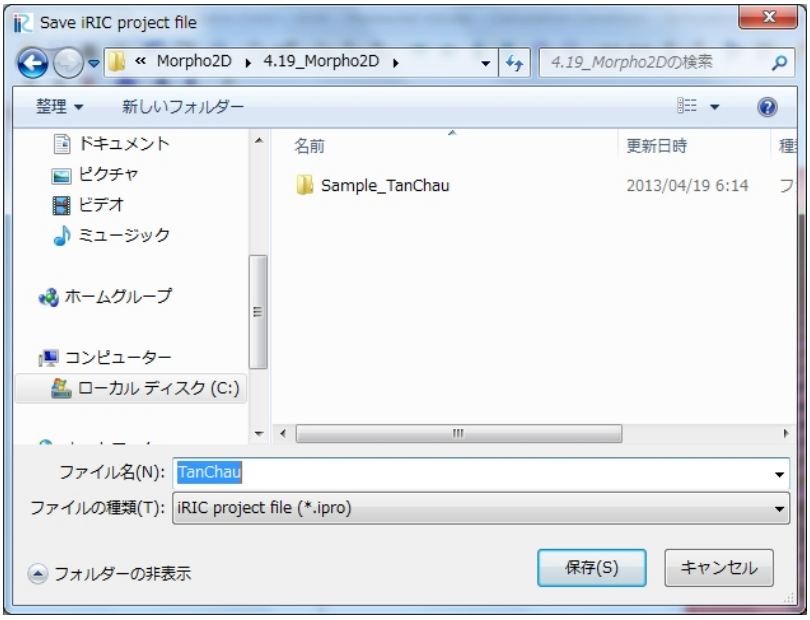


Figure III-5(6)　Decide the file name

6　Click [OK] in [Solver Finished］window.

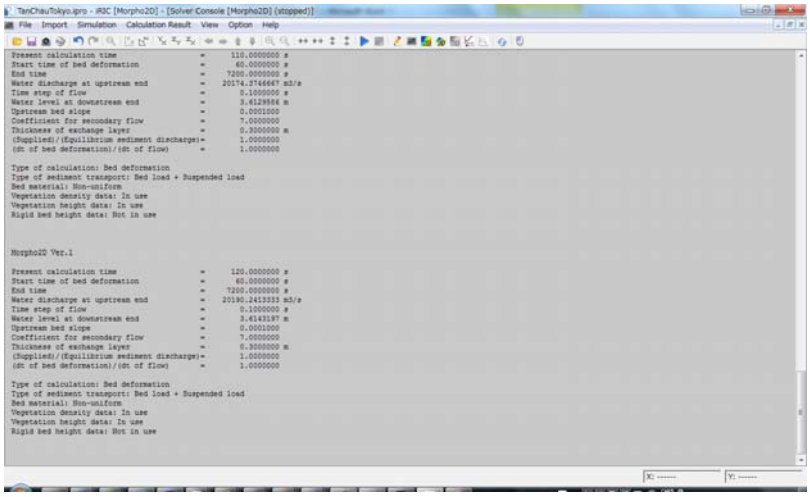


Figure III-5(7)　Run the calculation

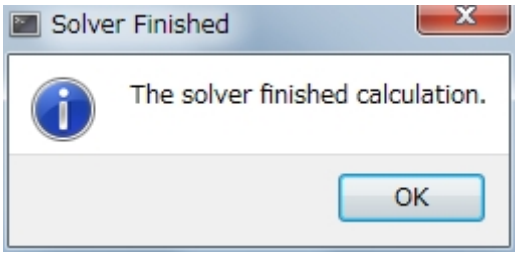


Figure III-5(8)　Finish of the calculation

III.3 Visualization of calculation results

III.3.1 Visualization of calculation results

1	Click [Open New 2D Post-Processing Window].

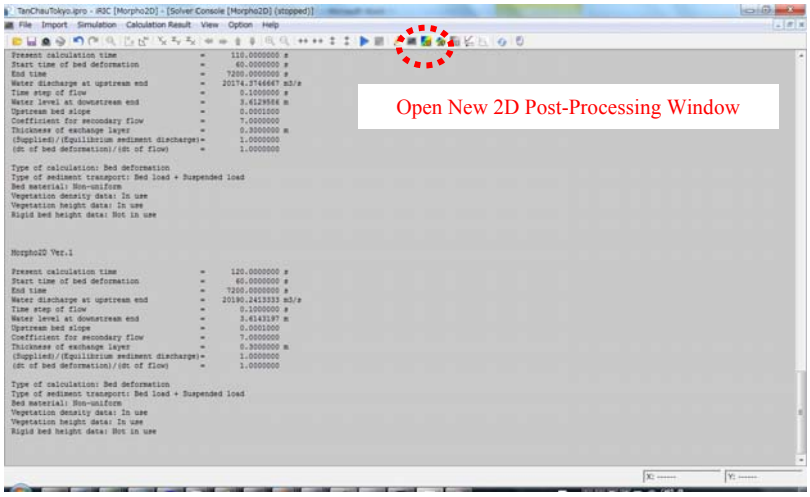


Figure III-6 Open New 2D Post-Processing Window

■ Contour map

1	Check [Scalar] in [Object Browser].
2	Check [TanChau.jpg] in [Background Images] in [Object Browser].
3	Horizontal distribution of mean sediment diameter is shown by checking [MeanGrainSize]. You can find that fine material is deposited in the vegetation area.

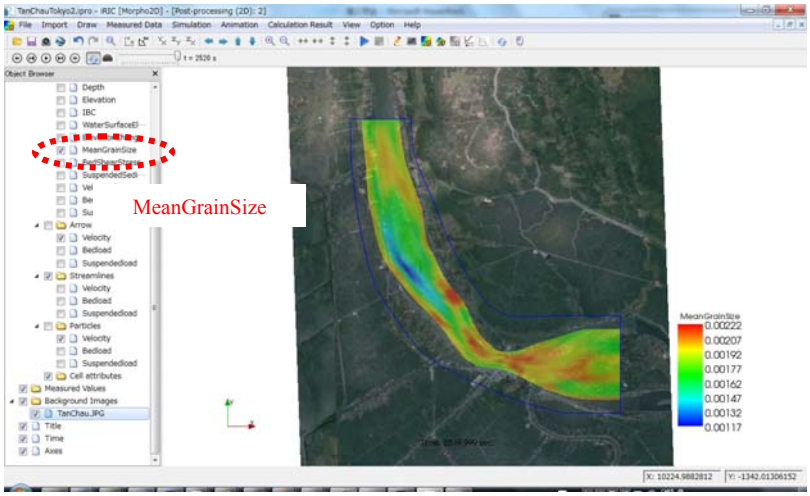
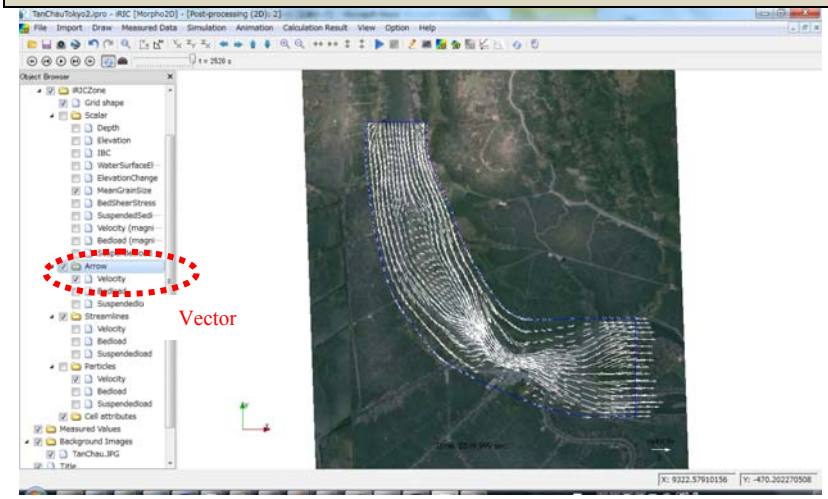


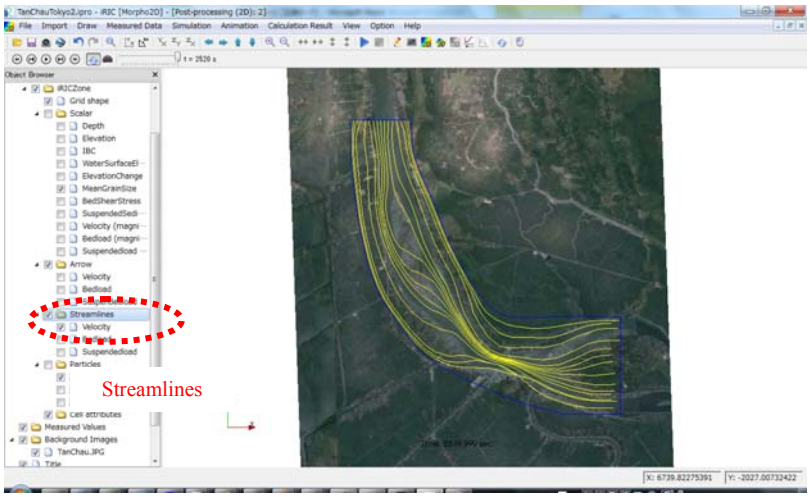
Figure III-7 Contour map of mean diameter

■ Other visualization functions

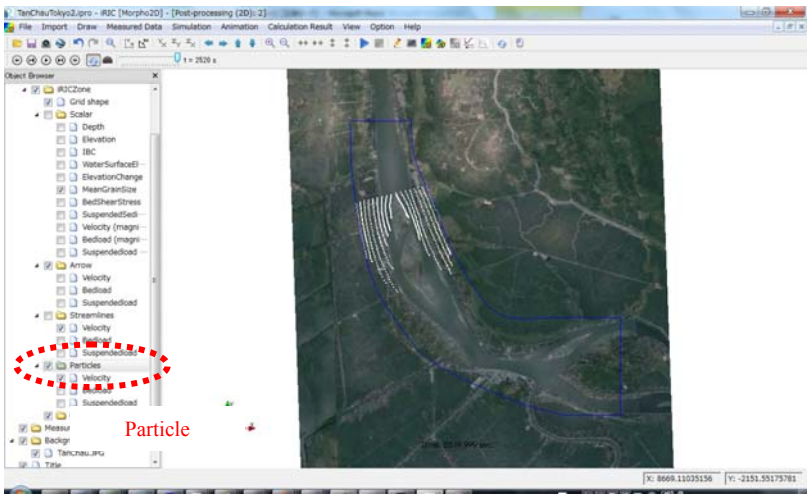
1	[Arrow], [Streamlines] and [Particles] can be drawn.



※ Vector
Check both [Arrow] and[Velocity]



※ Streamlines
Check both [Streamlines] and[Velocity]



※ Particle
Check both [Particles] and [Velocity] and run the animation.

Figure III-8 Other visualization function

IV. Bed deformation analysis with river regulation works （Mekong River）

◆ Purpose

The purpose of this chapter is for person who finished Chapter II and III to learn to perform bed deformation analysis with river regulation works by use of Morpho2DH.

◆ Procedure

Procedure in this chapter is shown in Figure IV-1.

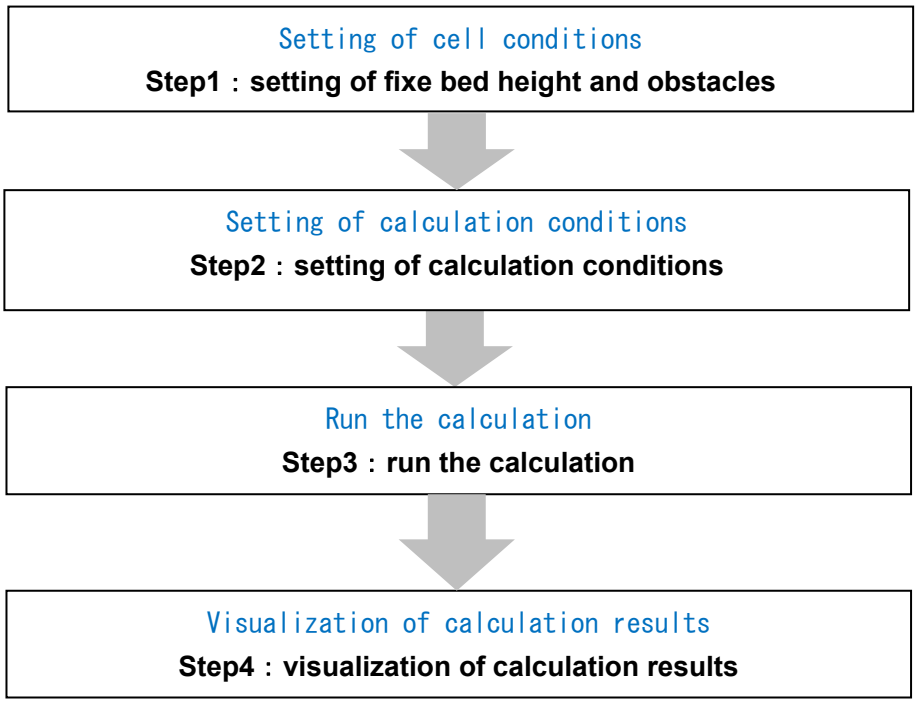


Figure IV-1　Procedure in this chapter

IV.1 Setting of fixed bed height data and obstacles

IV.1.1 Setting of fixed bed height data

■ **Setting of fixed bed height data**

1	Please click [FixedBedElevation] in [Object Browser] by right button of the mouse and select [add] and [Polygon].

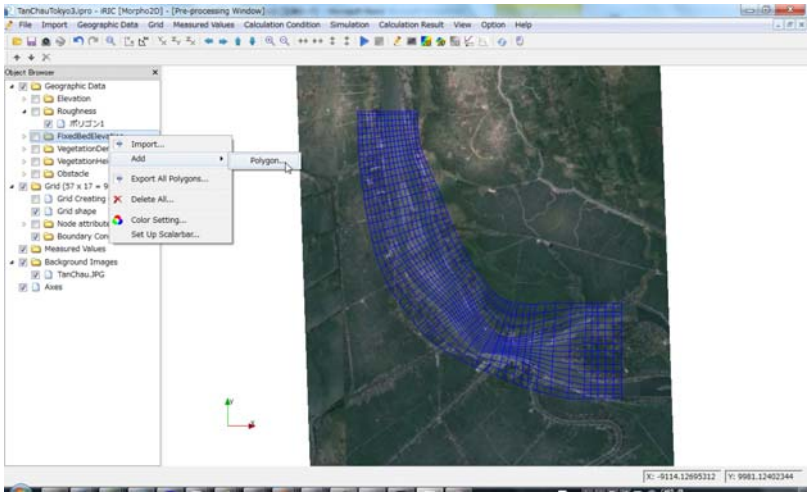


Figure IV-1(1) Make a polygon

2	Make a polygon by clicking at the corners of the polygon. The polygon should cover the fixed bed elevation area. Double clicks stop to make the polygon.
3	Enter the fixed bed elevation value.

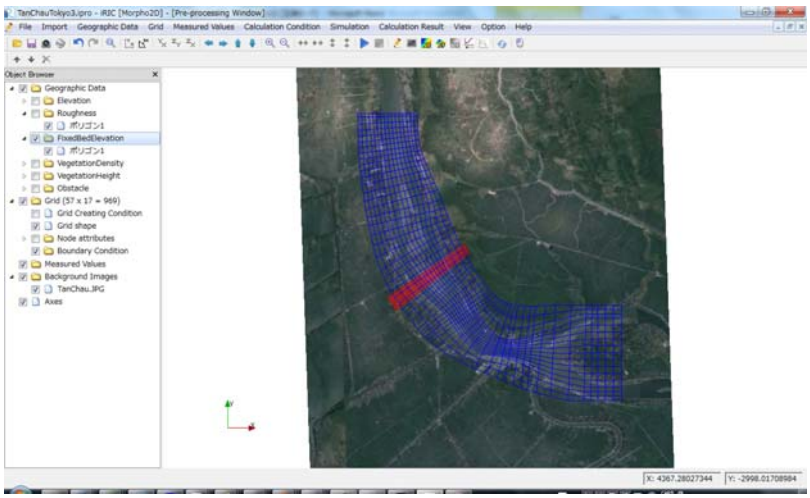


Figure IV-1(2) Make a polygon

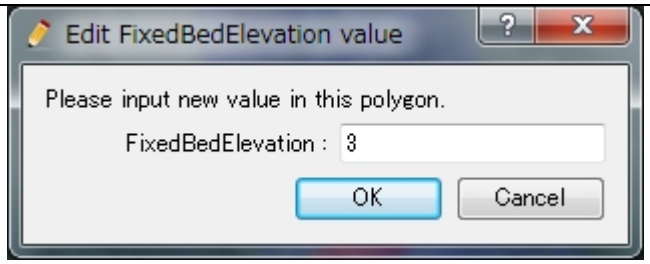


Figure IV-1(3) Input fixed bed height

IV.1.2 Setting of calculation conditions of obstacle

■ Setting of obstacles

1	Please click [Obstacle] in [Object Browser] by right button of the mouse and select [add] and [Polygon].

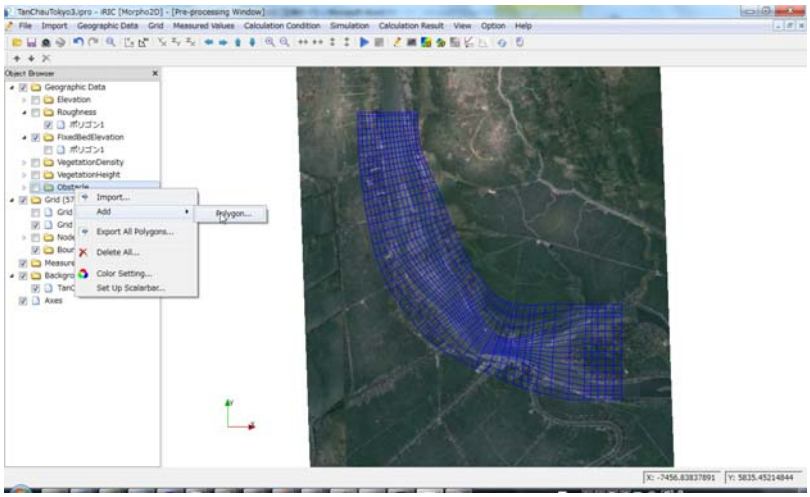


Figure IV-2(1) Make a polygon

2	Make a polygon by clicking at the corners of the polygon. The polygon should cover the obstacle area. Double clicks stop to make the polygon.
3	Select [Obstacle] in [Edit Obstacle Value] window and click [OK]

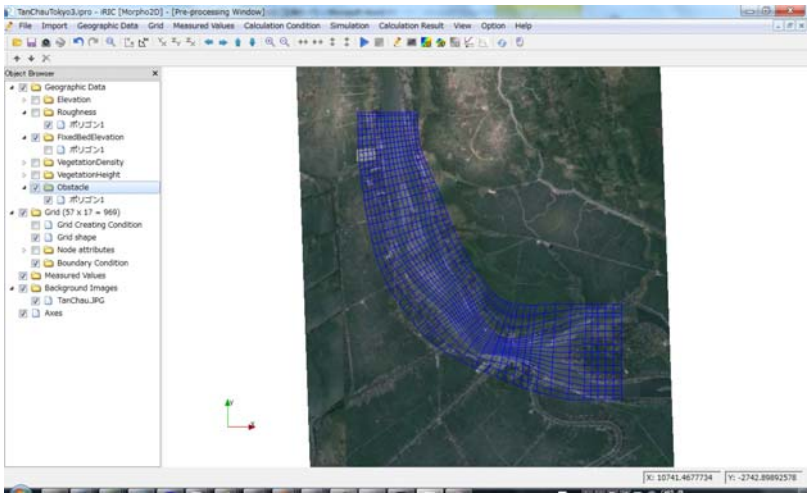


Figure IV-2(2)　Make a polygon

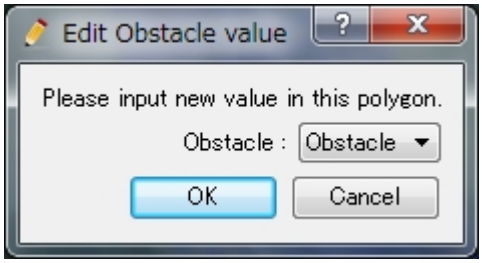
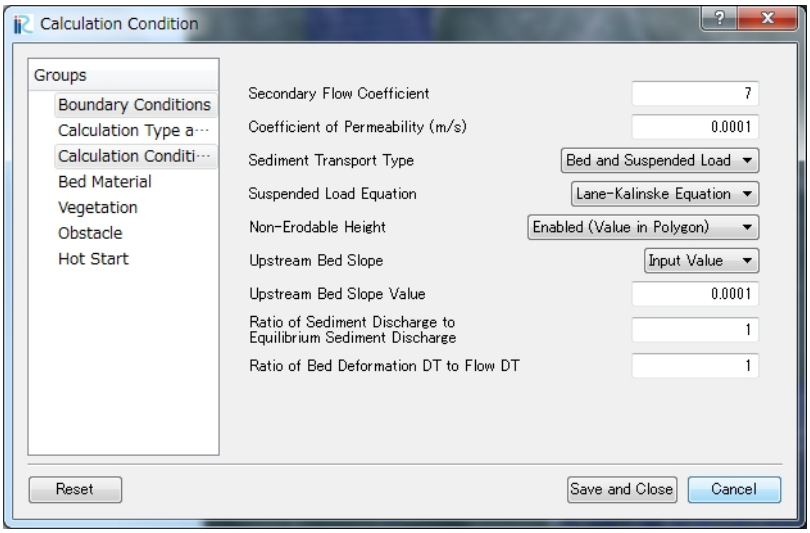


Figure IV-2(3)　Select the obstacle

IV.1.3 Setting of calculation conditions of fixed bed height and obstacles

■ Setting of fixed bed height

1	Click [Calculation Conditions] group in [Calculation Condition] window.
2	[Enabled (Value in Polygon)] is selected in [Non-erodible height].



When the initial bed elevation is used for the fixed bed height, please select [Enabled (Initial bed elevation)].

Figure IV-3 Setting of fixed bed height

■ Setting of obstacles

1	Click [Obstacle] group in [Calculation Condition] window.
2	[Enabled] is selected in [Obstacle].

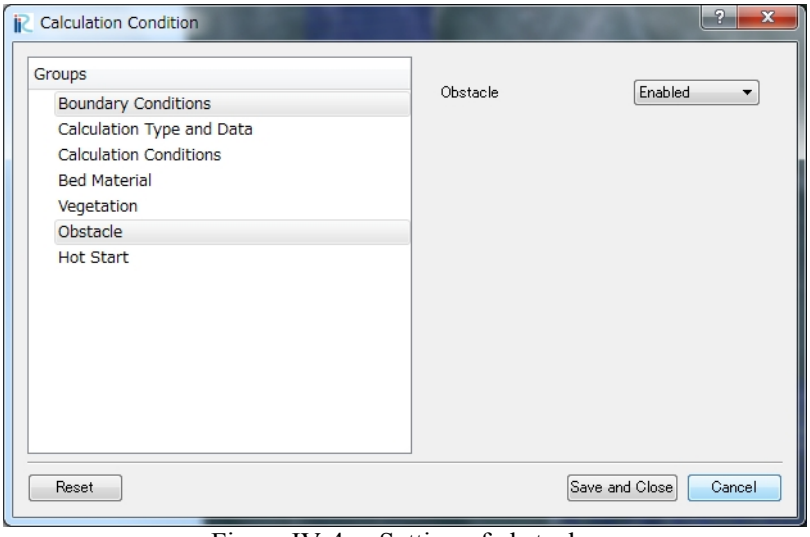


Figure IV-4 Setting of obstacles

IV.2 Run the calculation

1	Click [Run] in the tool bar.

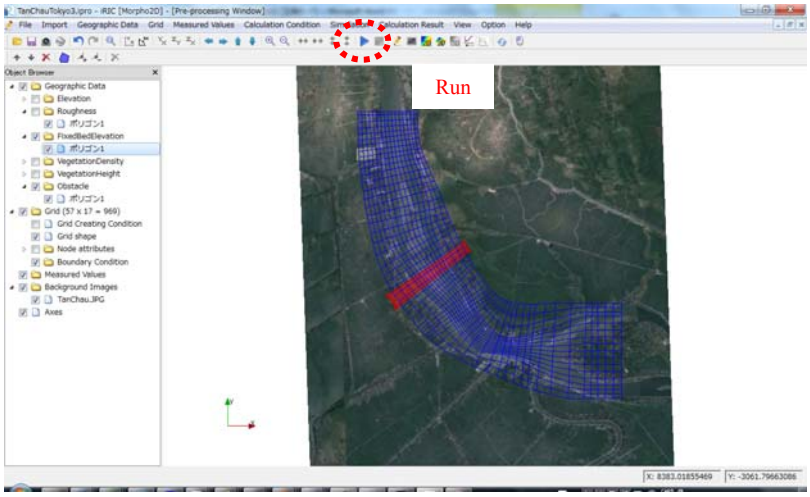


Figure IV-5(1)　Run the calculation

2	Please select [Yes] and [OK] in the warning window and the information window, respectively.

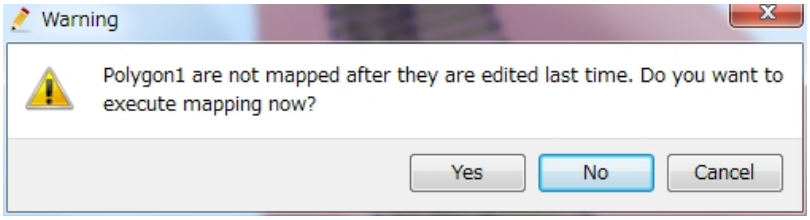


Figure IV-5(2)　Warning for mapping

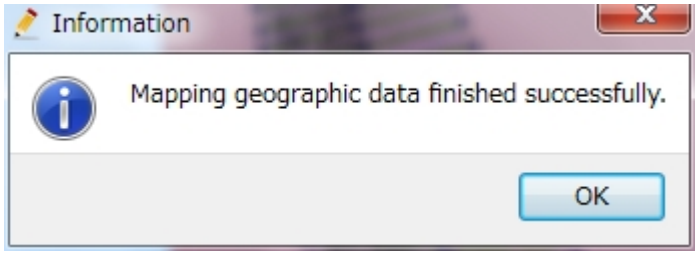


Figure IV-5 (3)　Information for mapping

3 Click [Yes] in [Information] window.
4 Select [Save as File (*.ipro)] and click [OK] in [Select How to Save Project].

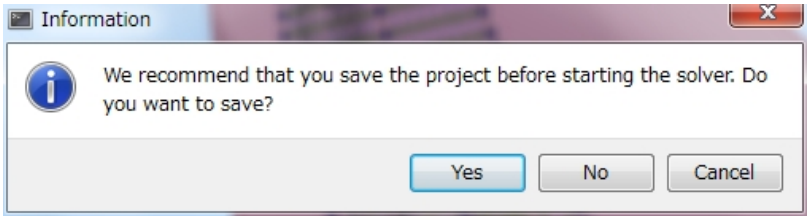


Figure IV-5(4) Information for save the project

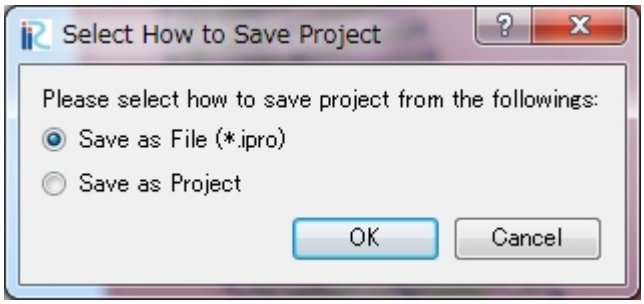


Figure IV-5(5) Select the save type

5 Decide the file name (ex. TanChau.ipro) and click [save] in [Save iRIC project file]

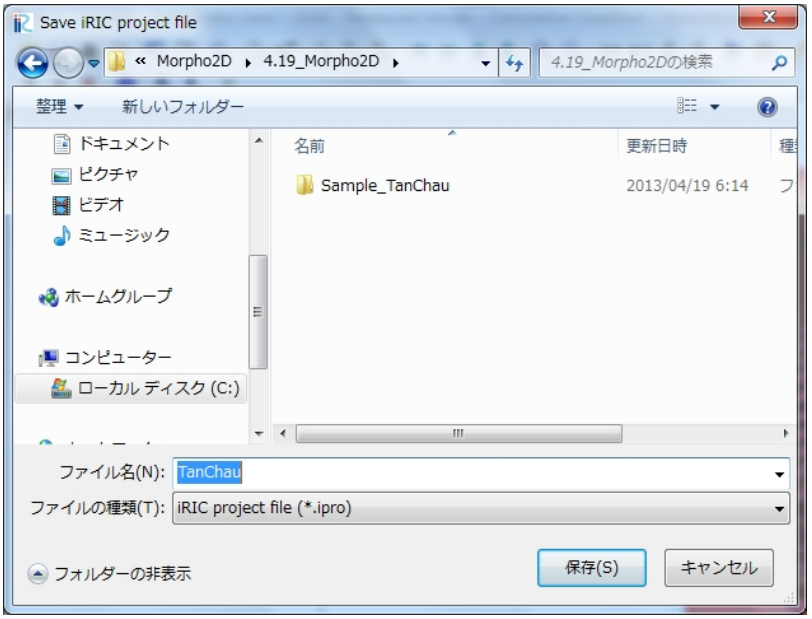


Figure IV- 5(6) Decide the file name

7	Click [OK] in [Solver Finished］window.

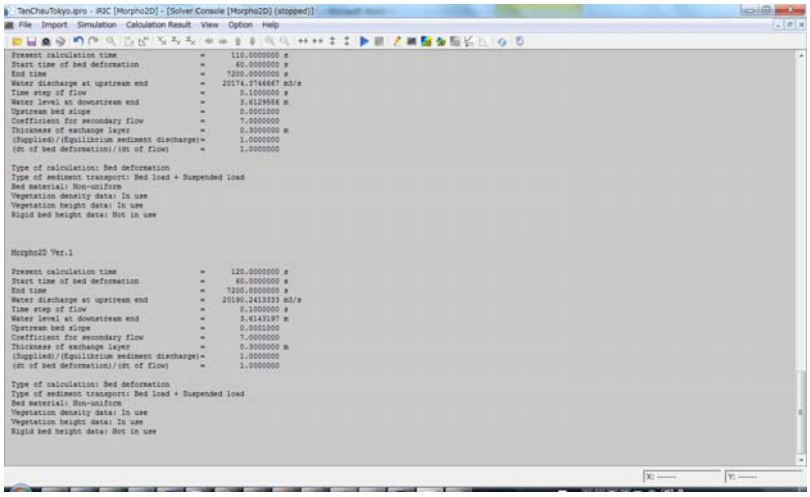


Figure IV-5(7)　Run the calculation

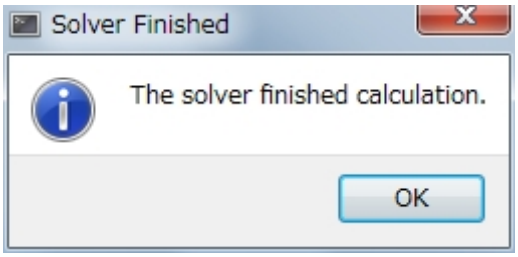


Figure IV-5(8)　Finish of the calculation

IV.3 Visualization of calculation results

IV.3.1 Visualization of calculation results

1	Click [Open New 2D Post-Processing Window].

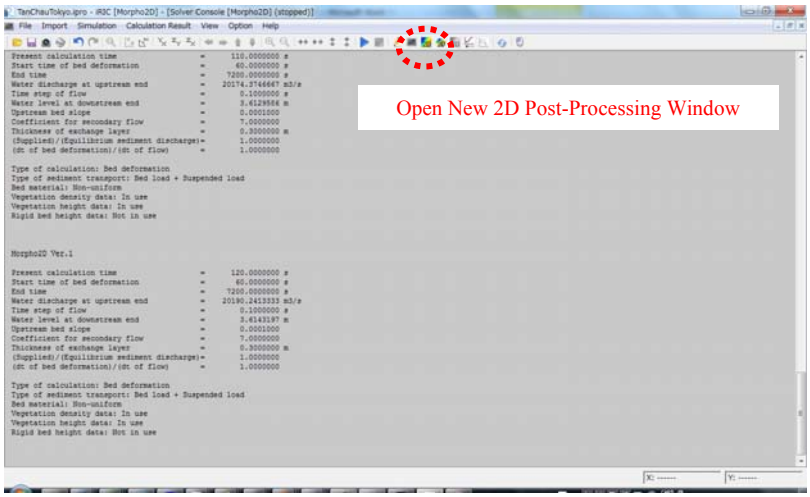


Figure IV-6 Open New 2D Post-Processing Window

■Contour map

1	Check [Scalar] in [Object Browser].
2	Check [TanChau.jpg] in [Background Images] in [Object Browser].
3	Horizontal distribution of water depth is shown by checking [Depth]. You can find that water depth is zero in the obstacle area and is shallow in the fixed bed area.

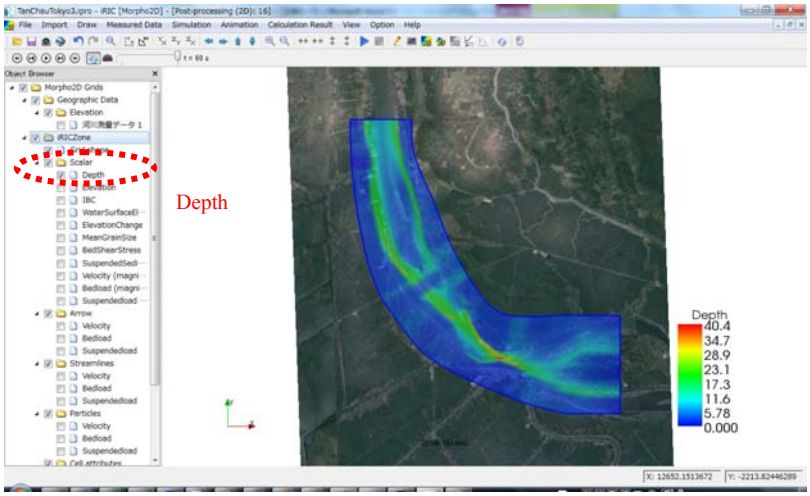


Figure IV-6(1) Contour map of water depth