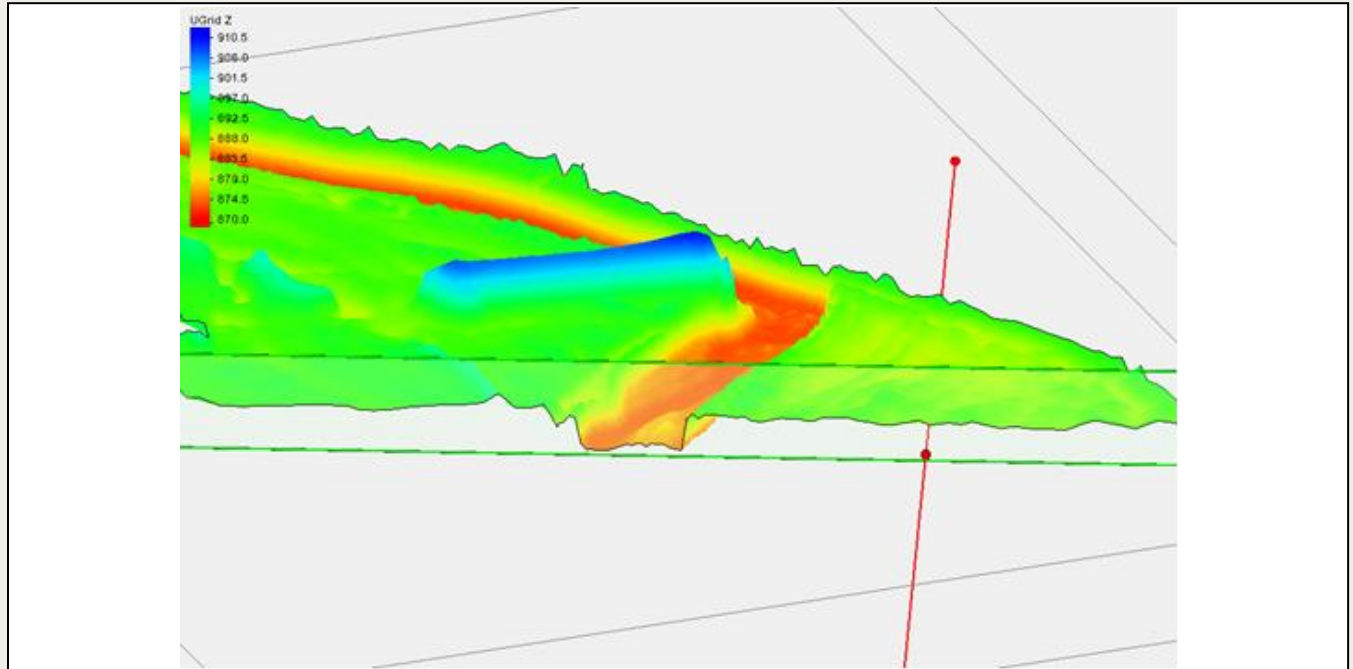




SMS 14.0 Tutorial

UGrid Clipping

Clip View for Unstructured Grids



Objectives

This tutorial describes the UGrid clipping tool. The UGrid clipping tool can be used to cut away a portion of a UGrid to visualize the data inside.

Prerequisite Tutorials

- Overview

Required Components

- SMS Core

Time

- 10–15 minutes

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1 Introduction

The UGrid clipping display option can be used to cut away a portion of an unstructured grid (UGrid) and visualize the data inside the grid. It can be used to cut part of the UGrid using a clipping plane, or by using scalar dataset values.

2 Using a Clipping Plane

For this section of the tutorial, a UGrid with a river channel will be opened. A clipping plane will then be used to cut away a portion of a UGrid to visualize cross sections.

To get started, do the following:

1. Launch SMS.
2. If SMS is already running, select *File* | **New** to ensure that the program settings are restored to the default state. Click **Don't Save** if asked to save changes.

2.1 Opening the UGrid Stratigraphy Project

Next, to open the SMS project containing the UGrid:

1. Click **Open**  to bring up the *Open* dialog.
2. Browse to the *data files* directory for this tutorial and select "Cimarron.sms".
3. Click **Open** to import the project and close the *Open* dialog.
4. Use the **Rotate**  tool to rotate the UGrid to be similar to Figure 1.

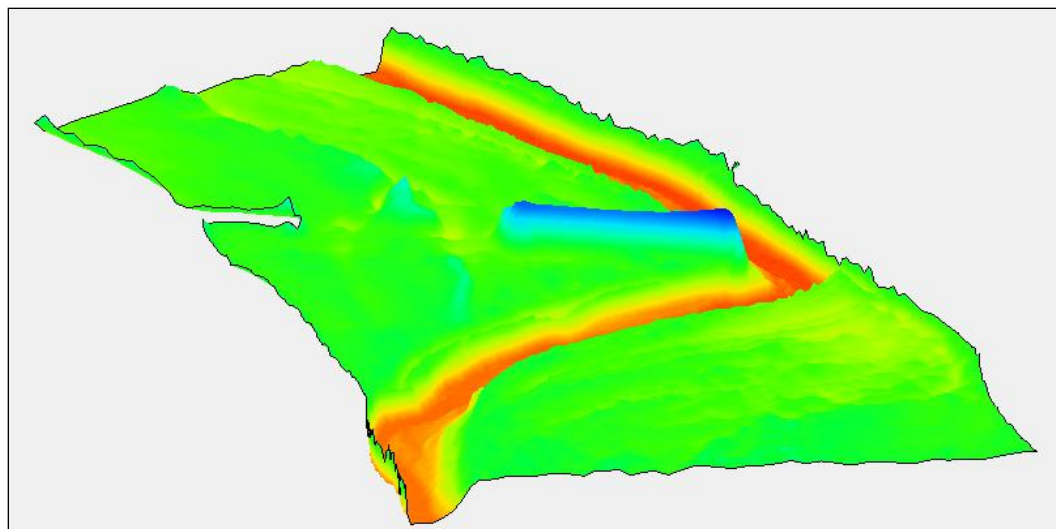


Figure 1 Initial project rotated to view channel

2.2 Setting a Clipping Plane

The location of the clipping plane can be specified manually by selecting a point on the plane, and the plane's normal vector. By default, the normal vector points away from the portion of the UGrid to be clipped.

Prior to creating the clipping plane, a point should be selected to start the clipping plane. A point along the channel was selected for this tutorial and its coordinates are used for the example below.

Turn on the clipping display option by doing the following:

1. Click **Display Options**  to bring up the *Display Options* dialog.
2. Select *UGrid: Cimarron UGrid* from the list on the left.
3. Turn on the *Clip* option, and click on the **Options...** button to its right to open the *UGrid Clip Settings* dialog.
4. The *Clip Type* should be set to "Plane".
5. Change the *Clip To* setting to "Partial Cells".
6. Enter the following values in the rest of the *UGrid Clip Settings* dialog:

Item	Value
Plane Point X	2160017
Plane Point Y	359578
Plane Point Z	0.0
Plane Normal X	1.0
Plane Normal Y	0.0
Plane Normal Z	0.0

7. Click **OK** to close the *UGrid Clip Settings* dialog.
8. Click **OK** to close the *Display Options* dialog.

The clipped UGrid should appear in the Graphics Window as shown in Figure 2.

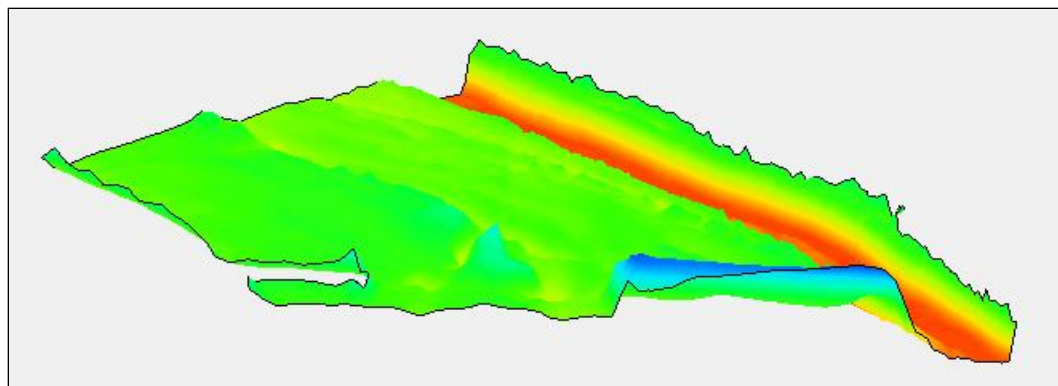


Figure 2 UGrid with clipping option

2.3 Using the Clipping Plane Widget

The clipping plane widget provides a much easier way to position the clipping plane.

1. Select the **Edit Plane**  tool (may need to have the "Cimarron UGrid" selected).

The clipping plane widget should appear in the Graphics Window as shown in Figure 3. The widget shows the plane as a translucent rectangle; the point defining the plane is shown in the rectangle, and the normal is shown as an arrowed line segment passing through the plane. A grayed out bounding box is displayed around the UGrid.

The plane, point, and normal can each be edited by clicking on them and dragging them within the bounding box in the Graphics Window. Dragging the clipping plane moves the plane point back and forth along the plane normal. Dragging the plane point moves it about the surface of the plane. And dragging tail or head of the normal vector changes the normal orientation about the plane point.

2. Change the clipping plane location by clicking in the plane and dragging it toward the back corner of the gray bounding box.

Experiment with moving the plane about the UGrid by also adjusting the plane point and normal.

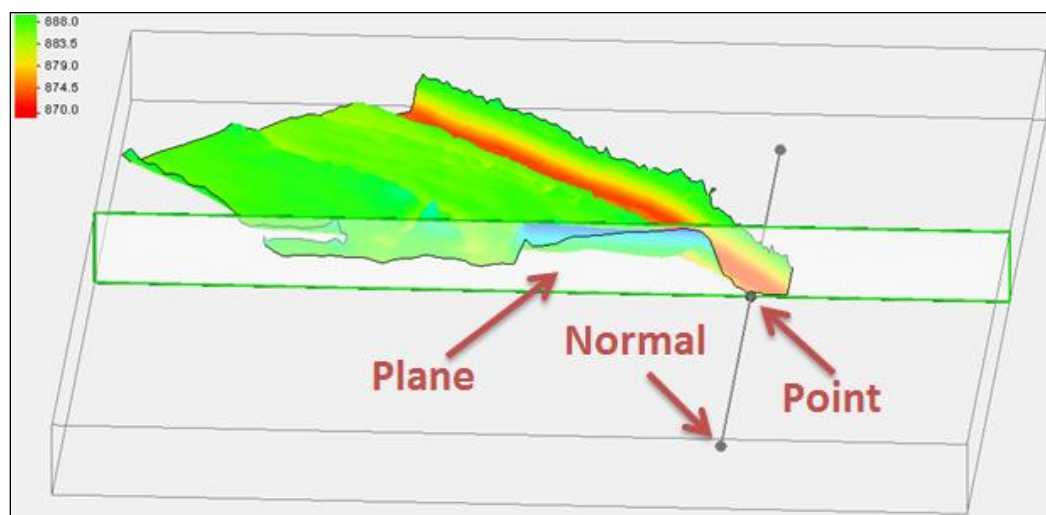


Figure 3 UGrid with clipping plane widget

3 Clipping to Scalar Values

This section of the tutorial will use an SMS project with a UGrid containing both ocean and land areas. The UGrid clip display option will be used to display only the ocean area.

3.1 Opening the UGrid Project

First, to open the SMS project containing the UGrid data:

1. Select **File | New** to close the “Cimarron.sms” project and, if desired, save the project to different location.
2. Click **Open**  to bring up the *Open* dialog.
3. Browse to the *data files* directory for this tutorial and select “OceanCity.sms”.
4. Click **Open** to import the project and close the *Open* dialog.

The UGrid should appear in the Graphics Window as shown in Figure 4, with contours turned on.

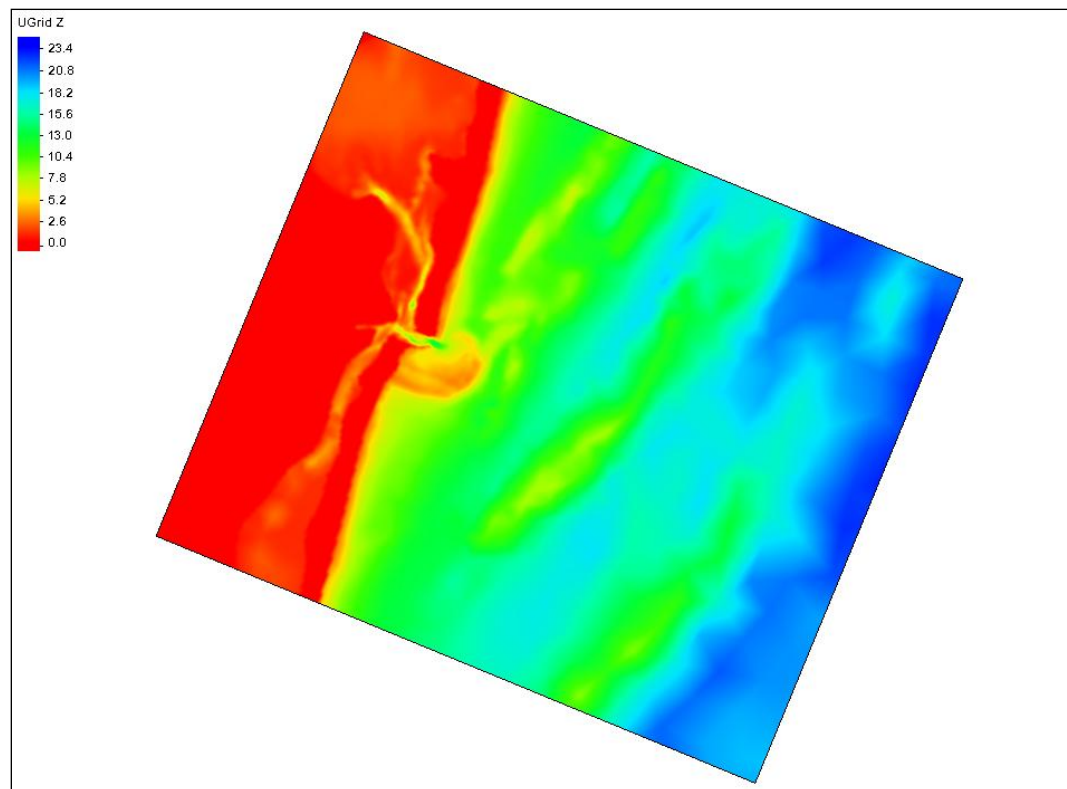


Figure 4 UGrid with contours

3.2 Clipping to UGrid Cells above a Scalar Value

Now to use scalar clipping to display the portion of the UGrid that is the ocean area:

1. Click **Display Options**  to bring up the *Display Options* dialog.
2. Select *UGrid: Inlet UGrid* in the list on the left.

3. Turn on the *Clip* option and select the **Options...** button to its right to open the *UGrid Clip Settings* dialog.
4. Change the *Clip Type* to “Scalar”.
5. The *Clip To* option should be set to “Whole Cells”.
6. Enter “0.1” for the *Scalar Value*.
7. Click **OK** to close the *UGrid Clip Settings* dialog.
8. Click **OK** to close the *Display Options* dialog.

The Graphics Window should display the ocean area as shown in Figure 5.

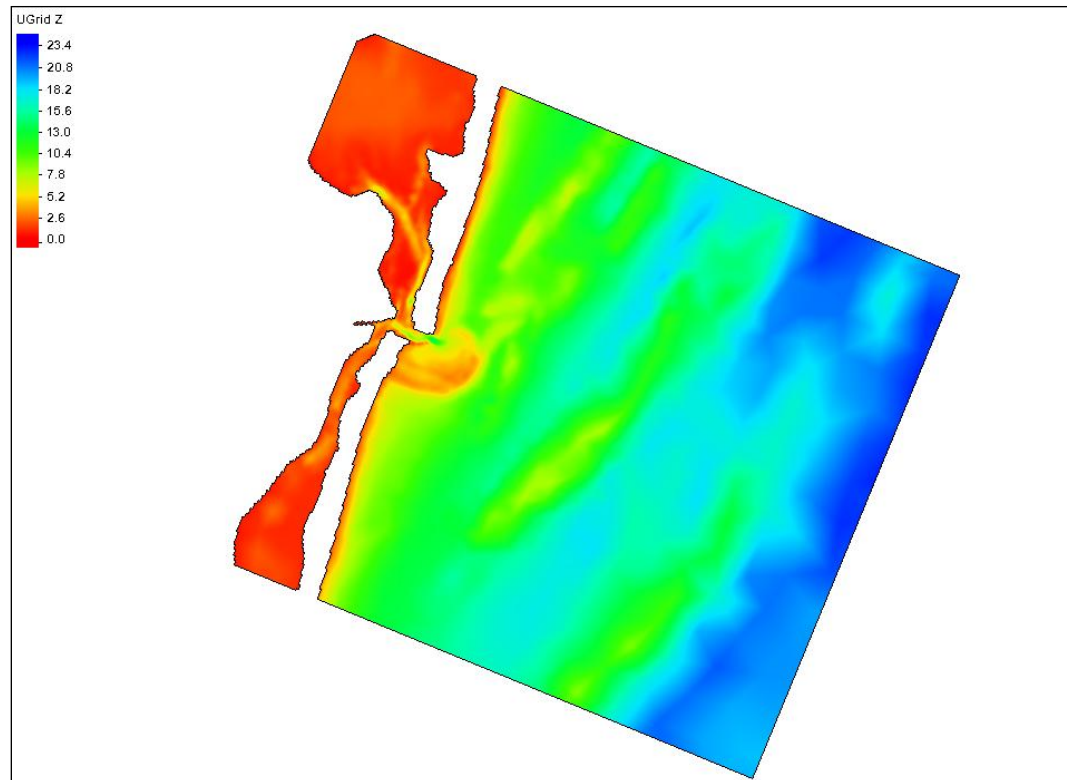


Figure 5 UGrid ocean area with scalar and whole cells

3.3 Clipping to Smoothed UGrid within a Scalar Range

The next step is to use the “Scalar Range” clip option to display only the coastline as well as using the “Partial Cells” option to get a smoother view of the coastline.

To use the scalar range option, change the clip display options:

1. Click **Display Options**  to bring up the *Display Options* dialog.
2. Select *UGrid:Inlet UGrid* in the list on the left.
3. Leave the *Clip* option on and select the **Options...** button to its right to open the *UGrid Clip Settings* dialog.
4. Change the *Clip Type* to “Scalar Range”.
5. Change the *Clip To* option to “Partial Cells”.
6. Enter “0.1” for the *Minimum Scalar Value*.

7. Enter "1" for the *Maximum Scalar Value*.
8. Click **OK** to close the *UGrid Clip Settings* dialog.
9. Click **OK** to close the *Display Options* dialog.

The Graphics Window should display the coastline as shown in Figure 6.



Figure 6 UGrid coastline with scalar range and partial cells

4 Conclusion

This concludes the "UGrid Clipping" tutorial. Topics covered in the tutorial include clipping UGrids with a clipping plane, clipping above or below a scalar value, and clipping to a scalar range.

Continue to explore the UGrid clipping feature or exit the program.