Input Data Editing

There are few editing steps that must be completed before a 3D geological model is created. The steps include:

1. **Creating 3D Surfaces:**
   a. From Interpretations (3D Seismic Lines).
   b. From Fault Polygons (if the data available).
   c. From Fault Sticks (if the data available).
   d. From your own Fault Polygons.
2. **Editing the Created Surfaces - Removing Surface Peaks.**
3. **Projecting Fault Polygons on their Surfaces.**
   a. From Fault Polygons (from data available).
   b. From your own Fault Polygons.

How to Create 3D Surfaces from Interpretations

1. The first process in editing the input data is creating 3D surfaces out of the 3D seismic lines. This process is summarized by the following steps: Expand the **Utilities** item in the **Process Pane**, and then double click on the **Make/Edit Surface**. The **Make/Edit Surface** dialog box appears.

2. In the **Input Pane** window, select the 3D seismic lines whose surface is to be created; in this case select **Top Tarbert**. Then go to the **Geometry** tab, and select the **Automatic**.

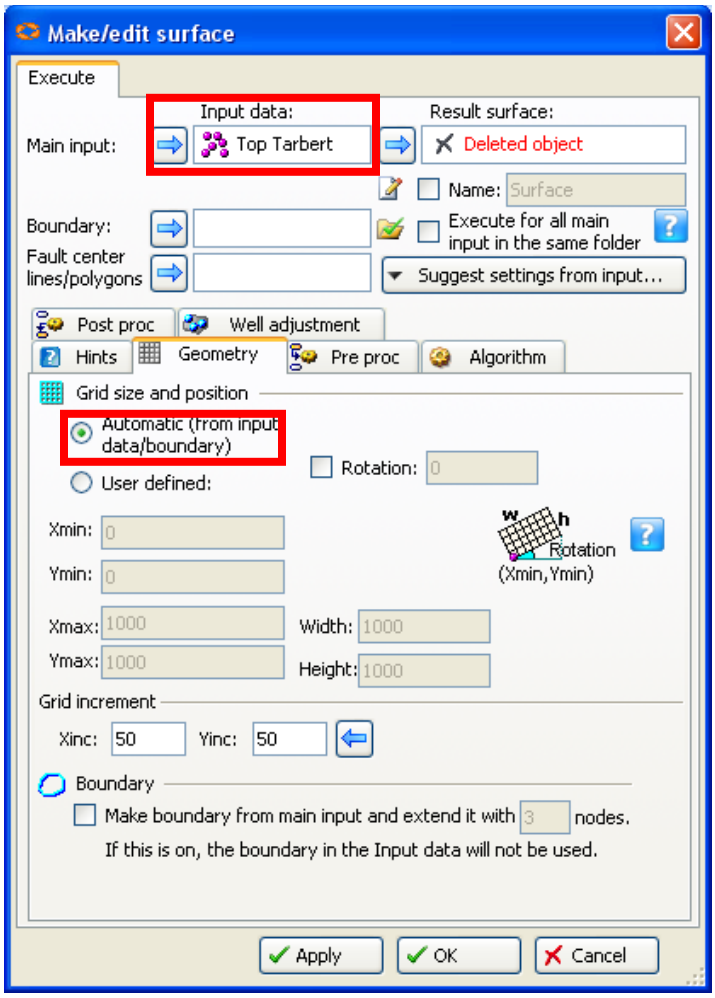


Fig. 9.1: The Make/edit surface form

3. Press **Apply**. A surface will be created in **Result surface** as shown in Fig. 9.2.

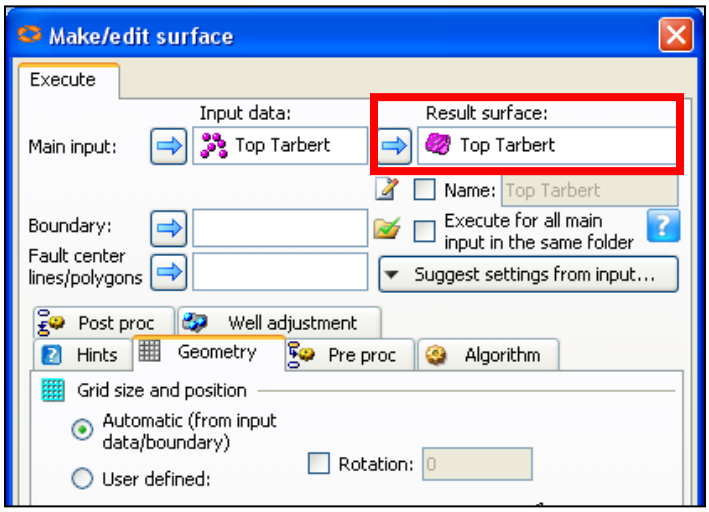


Fig.9.2: The Make/edit surface after adding the **Top Tarbet** for both Main input

4. Repeat the same process for the **Sea Bed**, **Base Cretaceous, Top Ness** and **Top Etive**. But before you create the other surfaces you have to **remove the previous surface** by right clicking and choose **Remove icon from drop site** and click **No.**

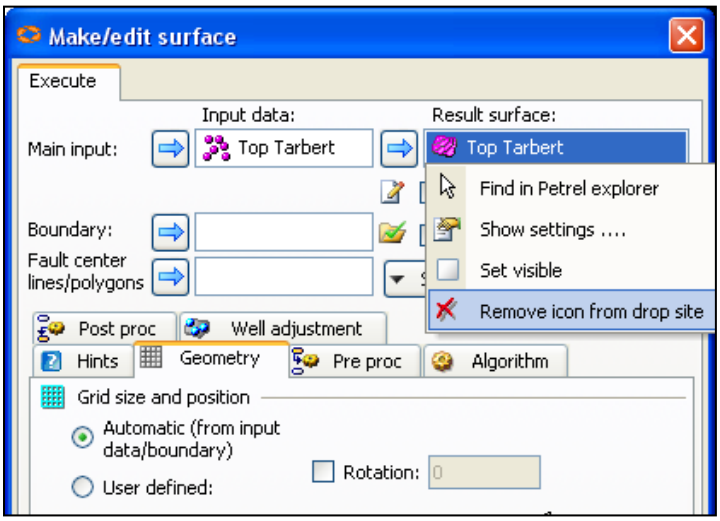


Fig.9.3: The Make/edit surface after removing the previous surface.

5. Click the **Insert** menu command and choose **New Folder.** Rename the folder to **Gullfaks Input.** And right click on this folder then choose **Insert folder.** Rename it to **Surfaces (time)**. **Move all the surfaces** into the **Surfaces (Time).**

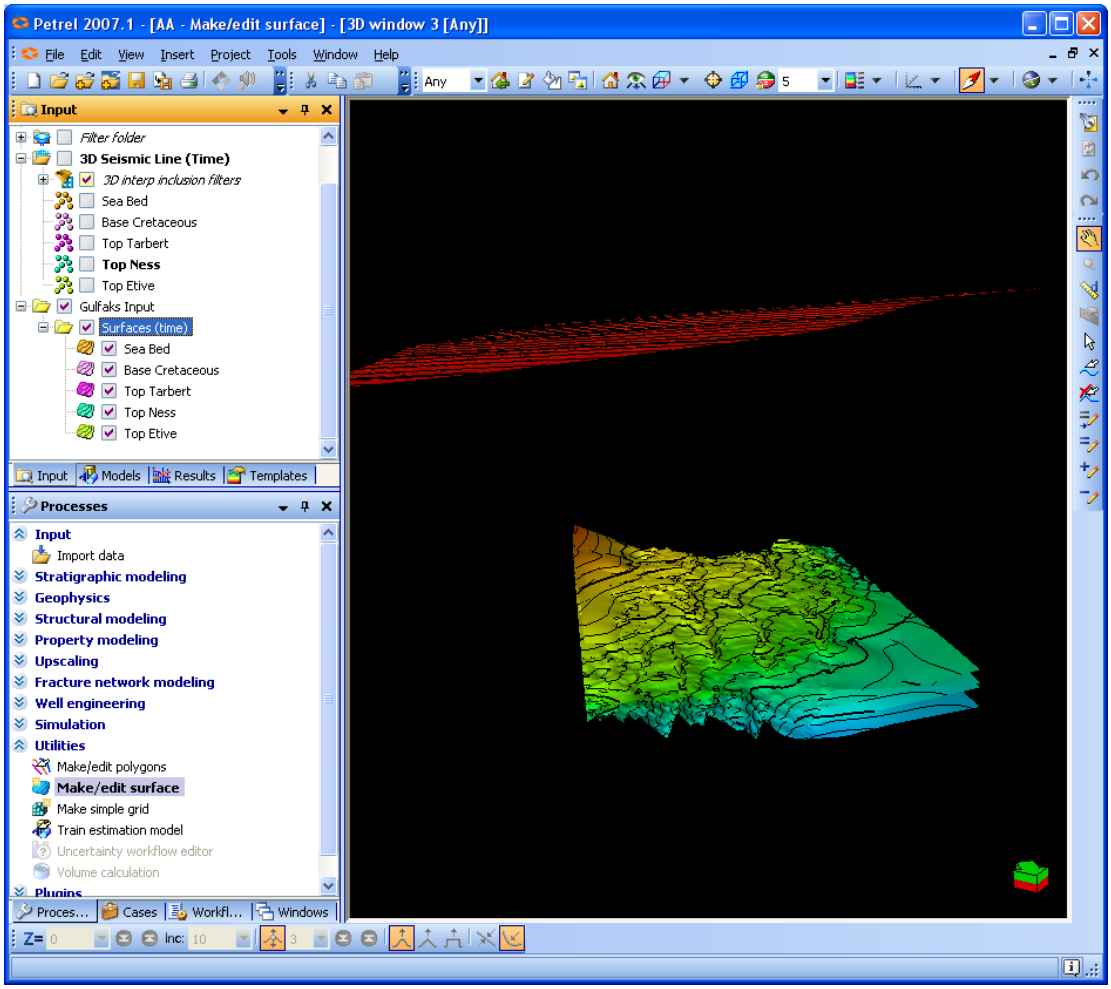


Fig.9.4: 3D Surfaces displayed in 3D window

The settings of the 3D Surfaces may be changed by:

1. For example, Right-click on **Top Tarbert Surface** then selects **Settings** and **hidden Contour Lines.**

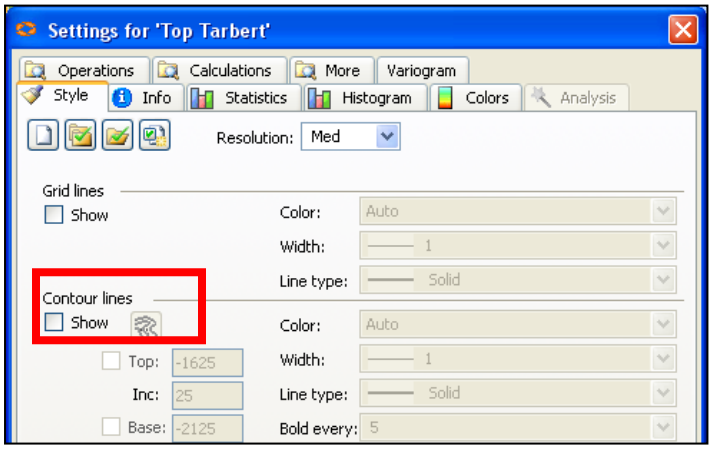


Fig.9.5: The Settings for **Top Tarbert Surafce**

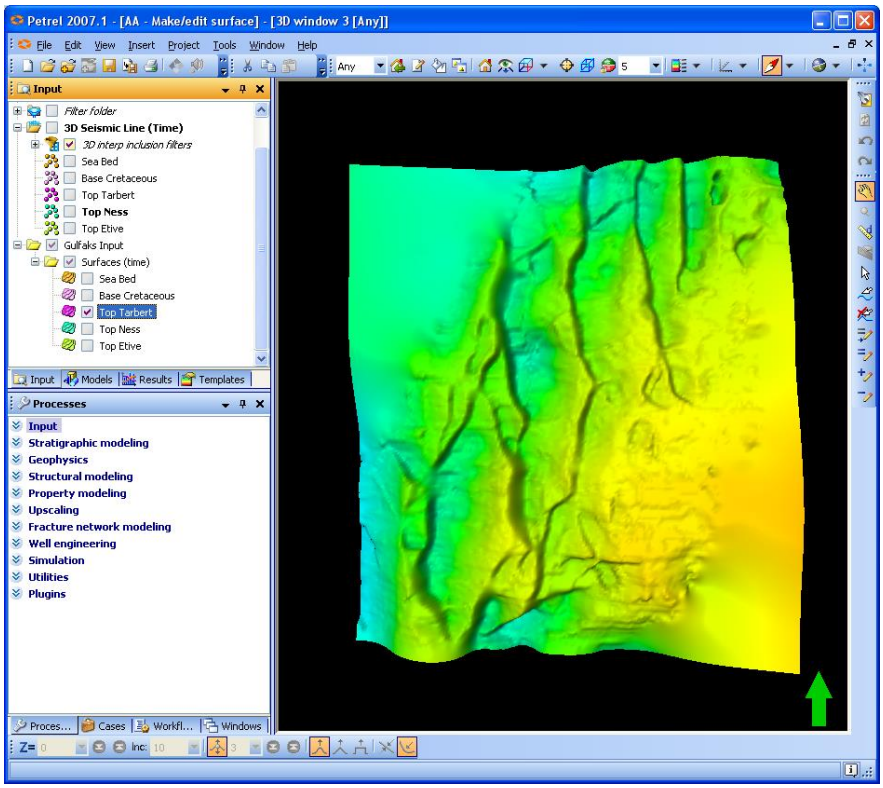


Fig.9.6: The **Top Tarbert Surafce** without contour lines

2. Go to the **Insert** pull down menu and select **New Annotations.**
3. Move the **Annotations** into the **Surfaces (Time) folder.**
4. Right-clicking on the **Annotations** and selecting **Settings…**
5. On the **Settings** tab, click on **Append item in the table** icon.
6. The Row form appears as shown in Fig.9.7
7. Select the **Sea Bed** surface, and click on the **input icon**.
8. On the Text tab, change the name.

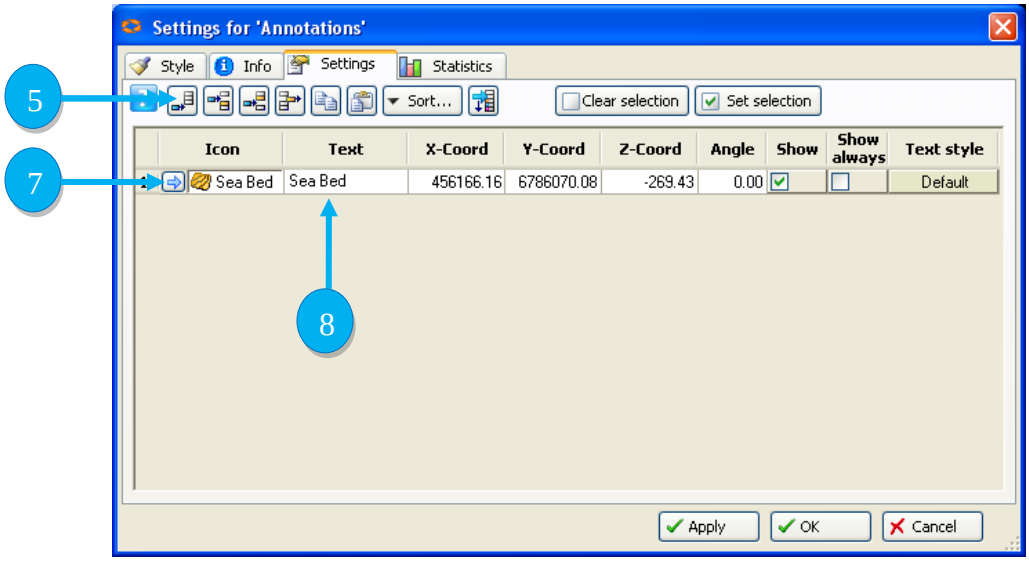


Fig.9.7: Settings for **"Annotations"**

9. Repeat the same process if you want to add more **Append item.**

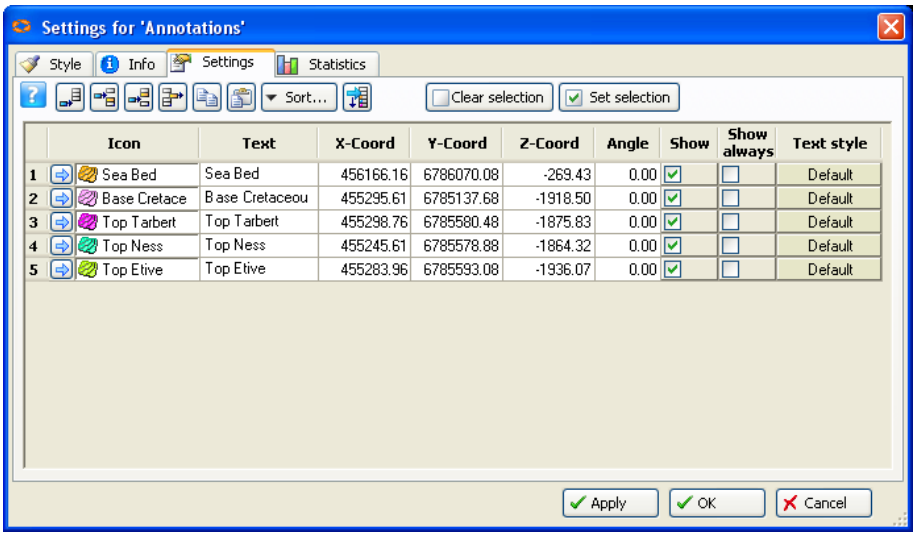


Fig.9.8: Settings for "Annotations" after adding all the surfaces.

Notice: Only one annotation object is allowed per project.

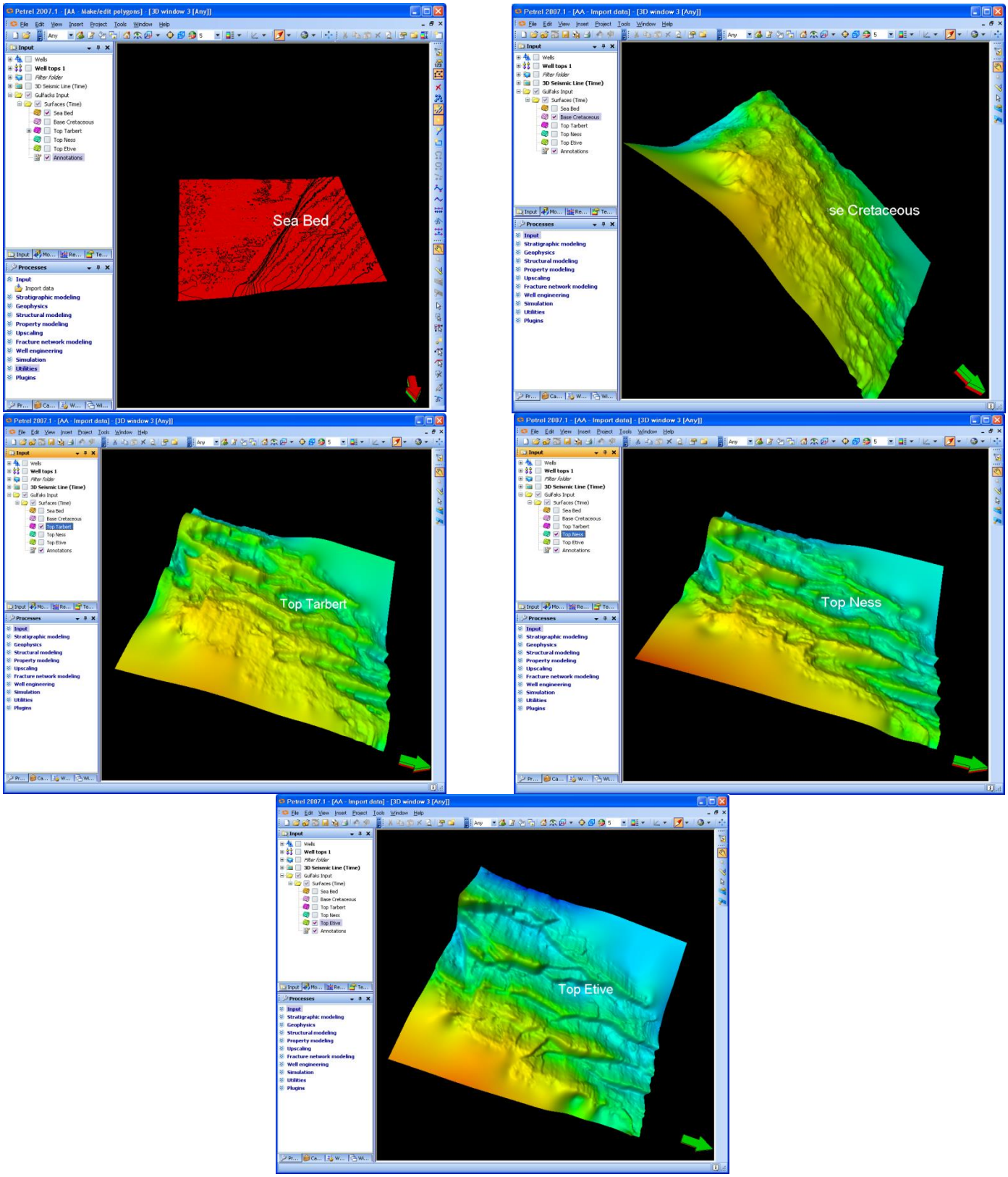


Fig.9.9: Surfaces with their Annotations dipaleyed in 3D window

10. Right click on the **Top Tarbert** surface then choose **Insert new attribute** and click **Ok.**

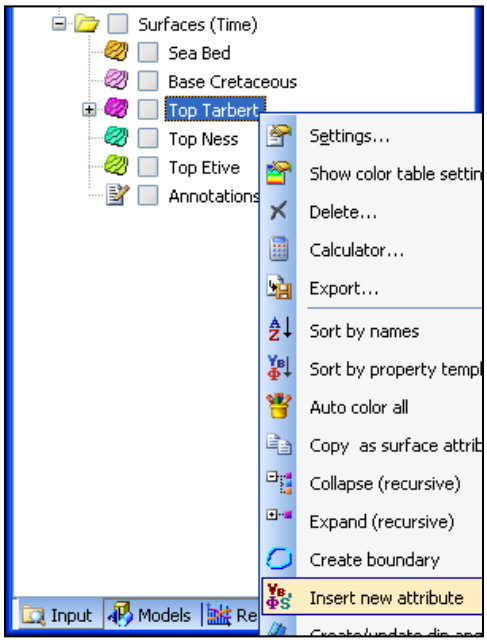


Fig.9.10: Insert new attribute for Top Tarbert

11. Right click on the **Continues**, from **Info** tab, rename it to **ST8511r92**. And change the template to **Seismic (default).**

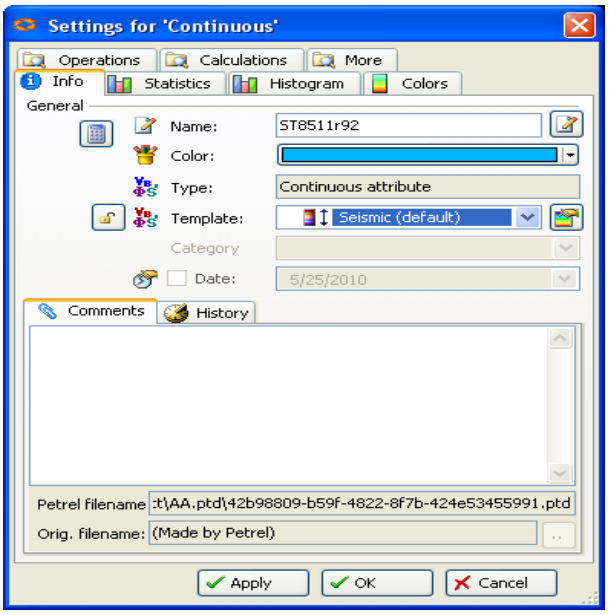


Fig.9.11: Settings for "Continuous"

How to Create 3D Surfaces from Fault Polygons (Data Available)

1. Expand the **Utilities** item in the **Process Pane**, and then double click on the **Make/Edit Surface**. The **Make/Edit Surface** dialog box appears.

2. In the **Input Pane** window, select the Fault Polygons whose surface is to be created; in this case select **Truncating fault**. Then go to the **Geometry** tab, and select the **Automatic**.

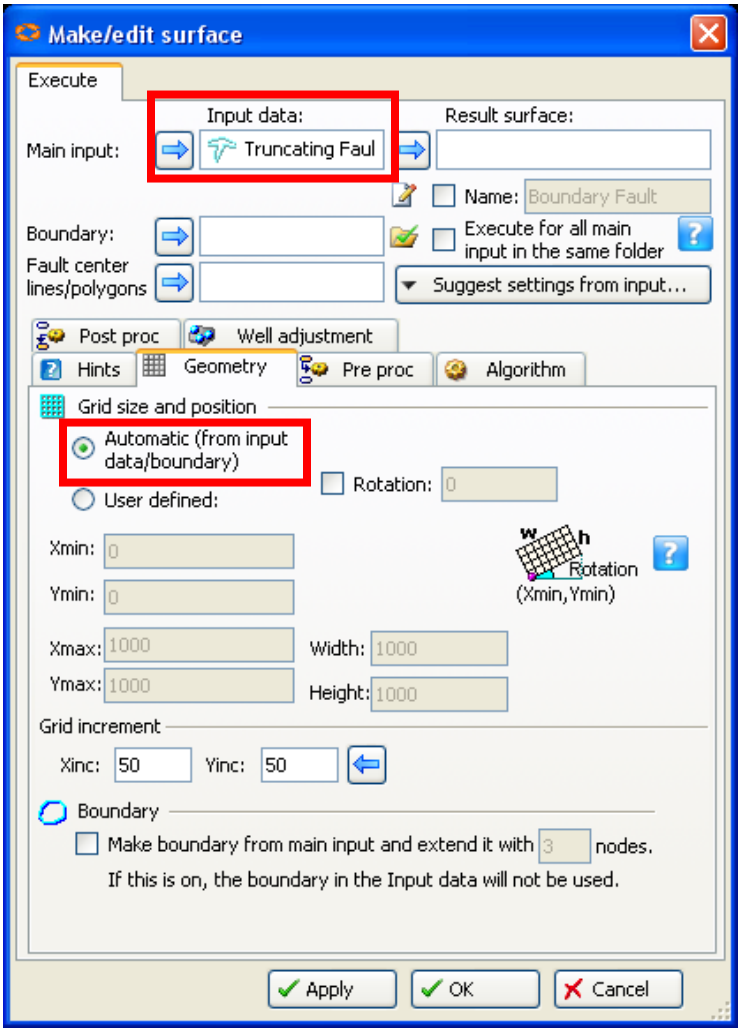


Fig.9.12: The Make/edit surface form

3. Press **Apply**. A fault sticks surface will be created in Result surface as shown in Fig. 9.13.

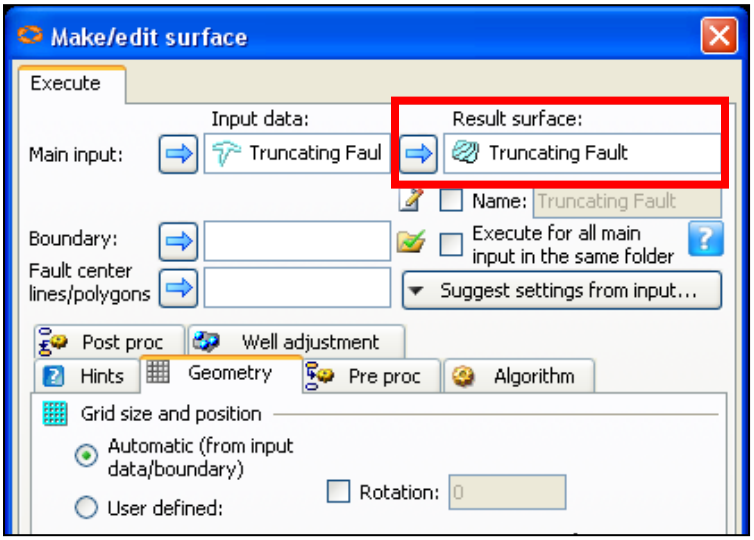


Fig.9.13: The Make/edit surface after adding the **Truncating fault polygon** for both Main input

4. Repeat the same process for **remain Fault Polygons**. But before you create the other Fault Polygon Surfaces you have to **remove the previous Fault Polygon Surface** by right clicking and choose **Remove icon from drop site** and click **No.**

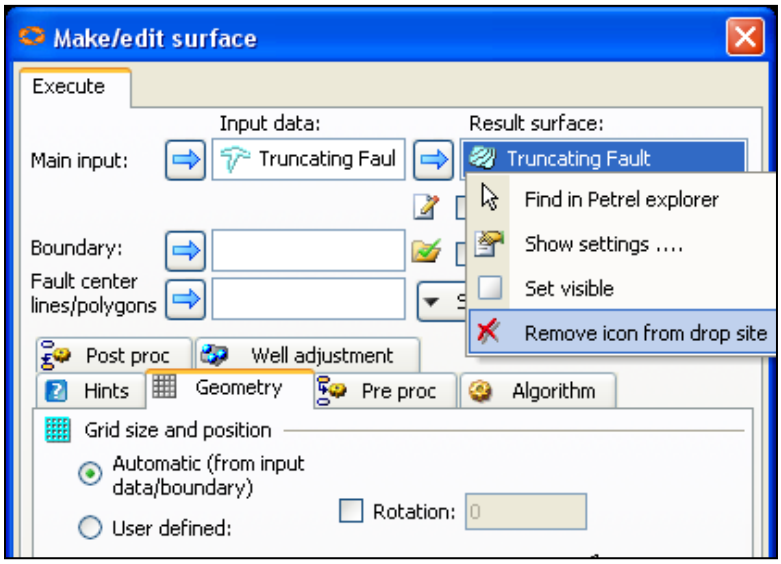


Fig.9.14: The Make/edit surface after removing the previous fault polygon surface.

5. Right click on the **Gullfaks Input** folder then choose **Insert folder.** Rename it to **Fault Polygons Surfaces.** And **move all Fault Polygons Surfaces** to this folder.

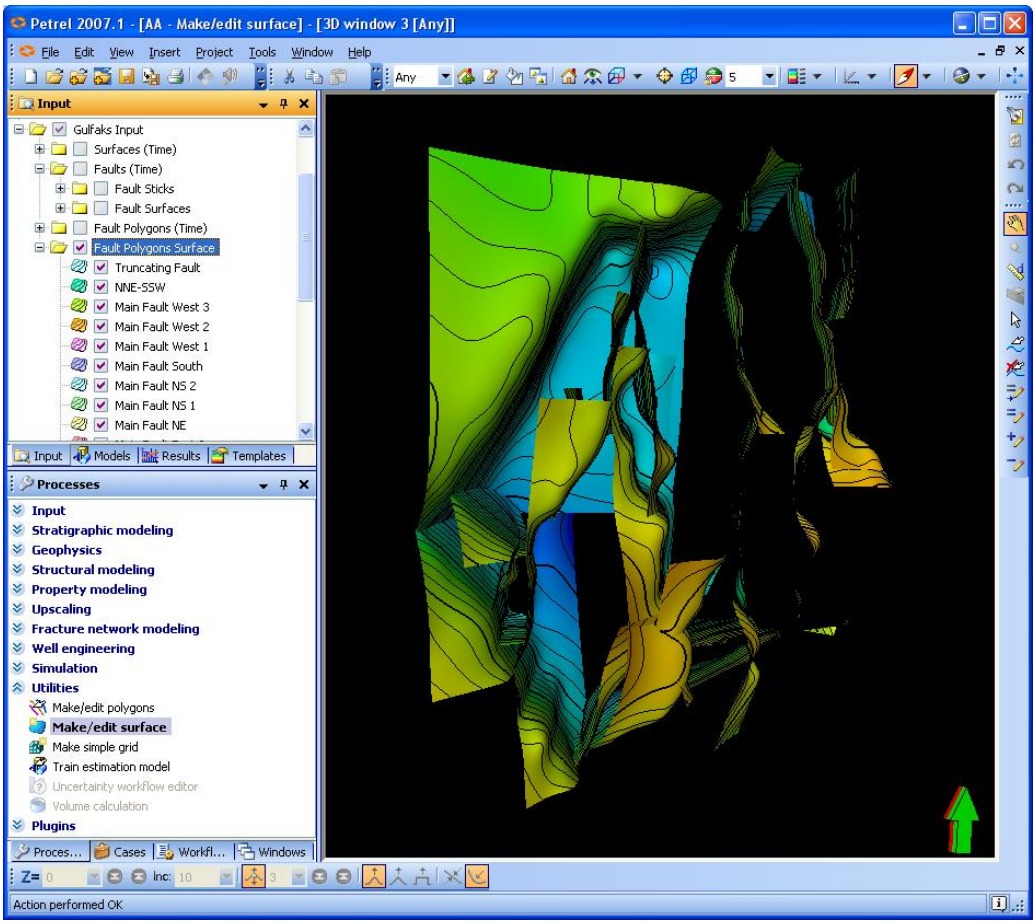


Fig.9.15: 3D Fault Polygons Surfaces displayed in 3D window

How to Create 3D Surfaces from Fault Sticks (Data Available)

1. Expand the **Utilities** item in the **Process Pane**, and then double click on the **Make/Edit Surface**. The **Make/Edit Surface** dialog box appears.

2. In the **Input Pane** window, select the Fault Sticks whose surface is to be created; in this case select **Truncating fault**. Then go to the **Geometry** tab, and select the **Automatic**.

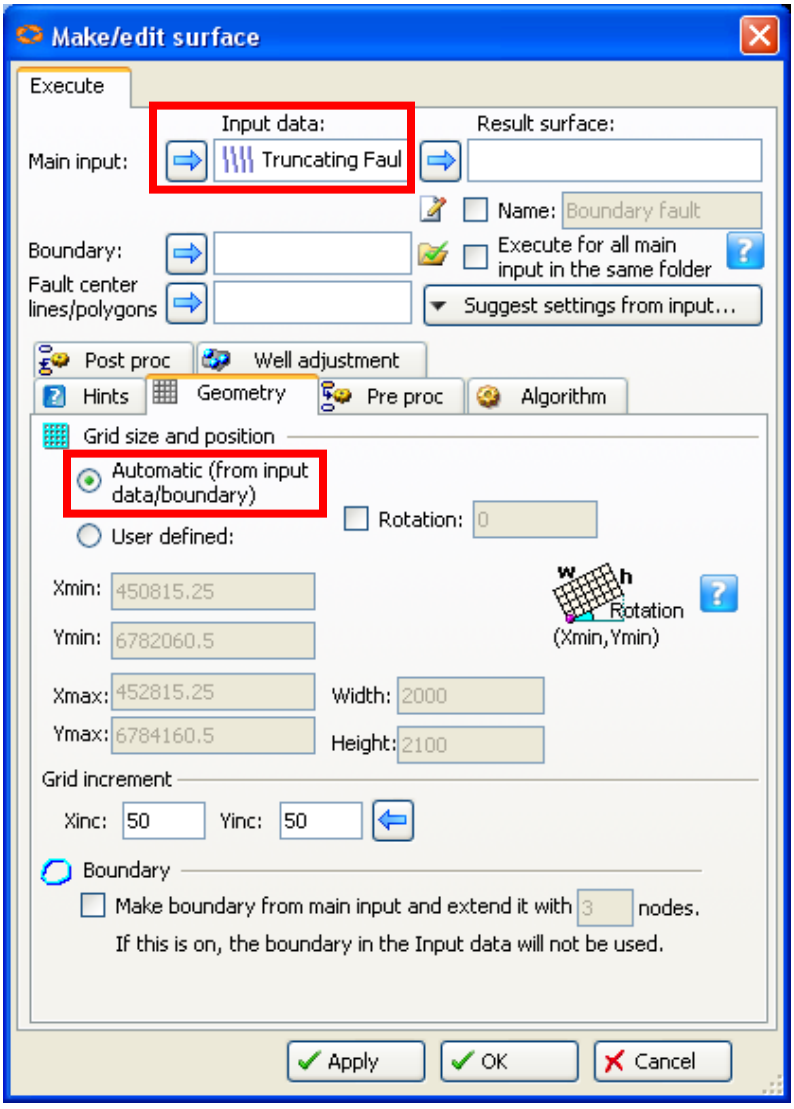


Fig. 9.16: The Make/edit surface form

3. Press **Apply**. A fault sticks surface will be created in Result surface as shown in Fig. 9.17.

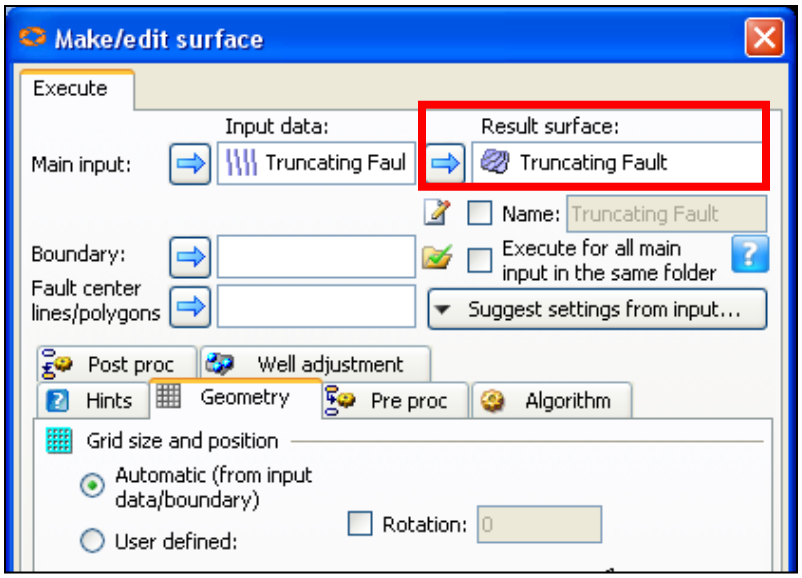


Fig.9.17: The Make/edit surface after adding the **Truncating fault sticks** for both Main input

4. Repeat the same process for **remain Fault Sticks**. But before you create the other Fault Sticks Surfaces you have to **remove the previous Fault Sticks Surface** by right clicking and choose **Remove icon from drop site** and click **No.**

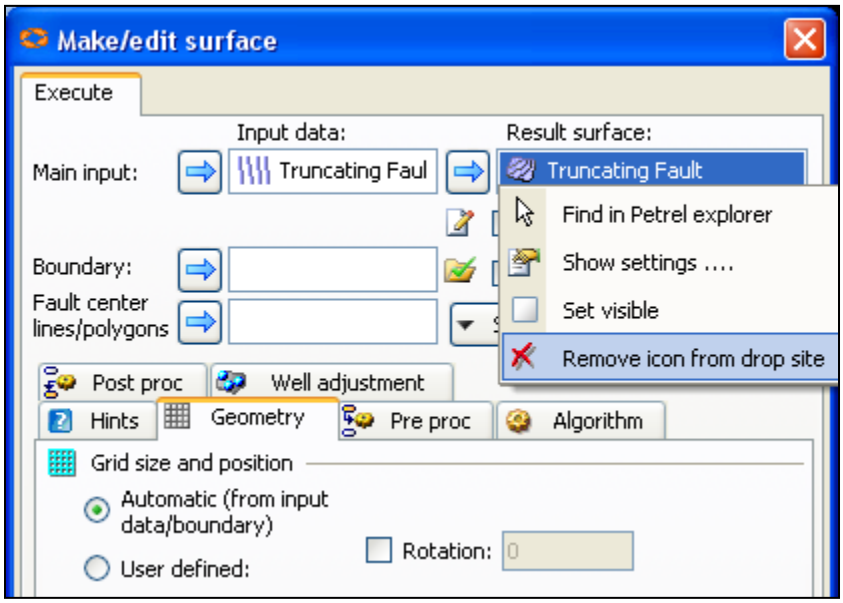


Fig. 9.18: The Make/edit surface after removing the previous **fault sticks surface.**

6. Right click on the **Faults (Time)** folder then choose **Insert folder.** Rename it to **Fault Surfaces.** And **move all Fault Sticks Surfaces** to this folder.

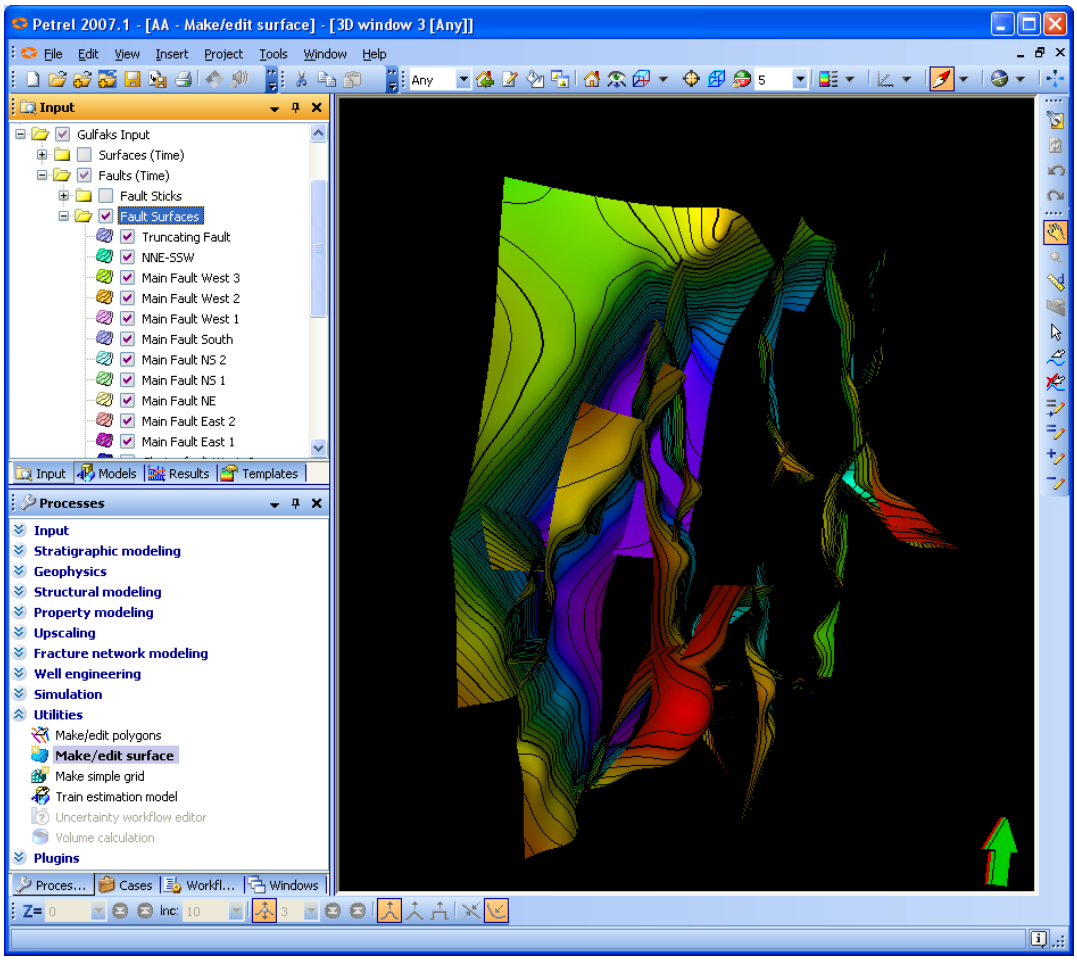


Fig.9.19: 3D Fault Sticks Surfaces displayed in 3D window

How to create 3D Surface from your own Fault Polygon

To create fault polygons on a certain surface, follow the steps:

1. Open a new **2D window** and display the surface whose fault polygons are to be created. In this case display the **Top Tarbert** surface.

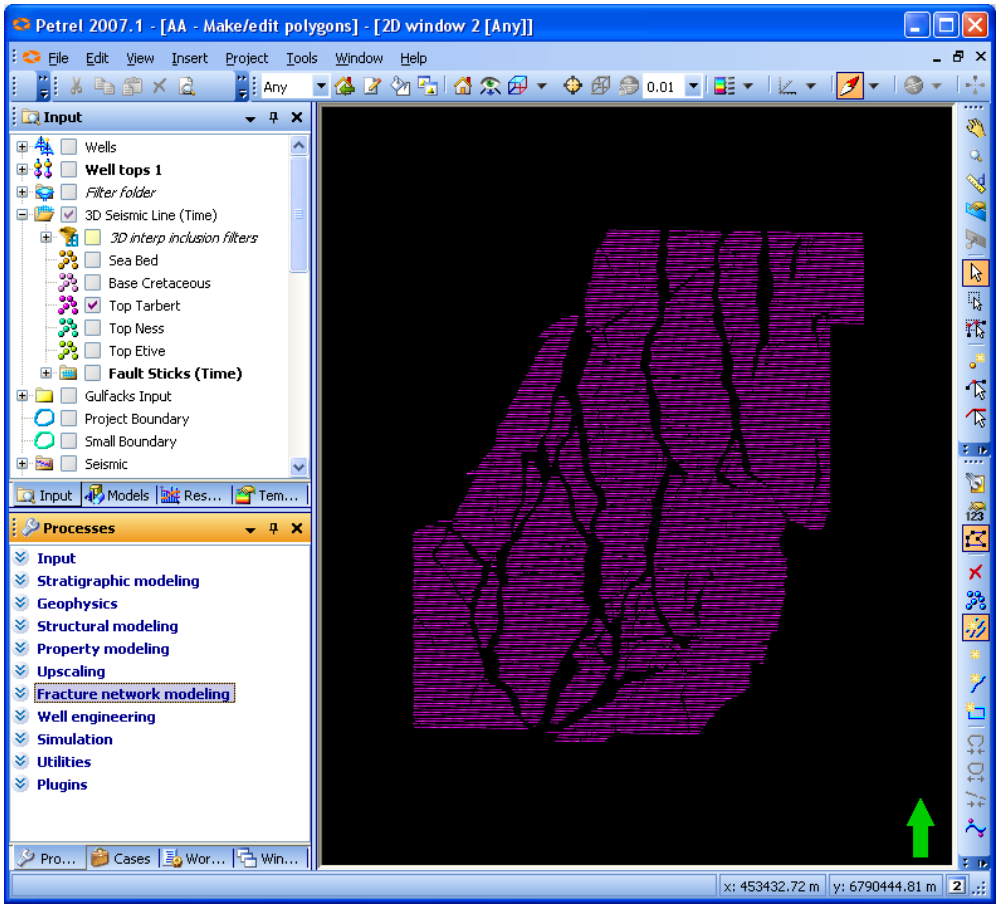


Fig.9.20: Top Tarbert surface displyed in 2D window

2. Activate the **Make/Edit Polygons** under **Utilities** in the **Processes** Pane.
3. The **Polygons Actions** toolbar displays. Click on the **Start New Set of Polygons** to start tracing a new set of fault polygons for the **TopTarbert** surface. Every time you start a new fault, you must click the **Start New Set of Polygon** icon as shown in Fig. 9.21.

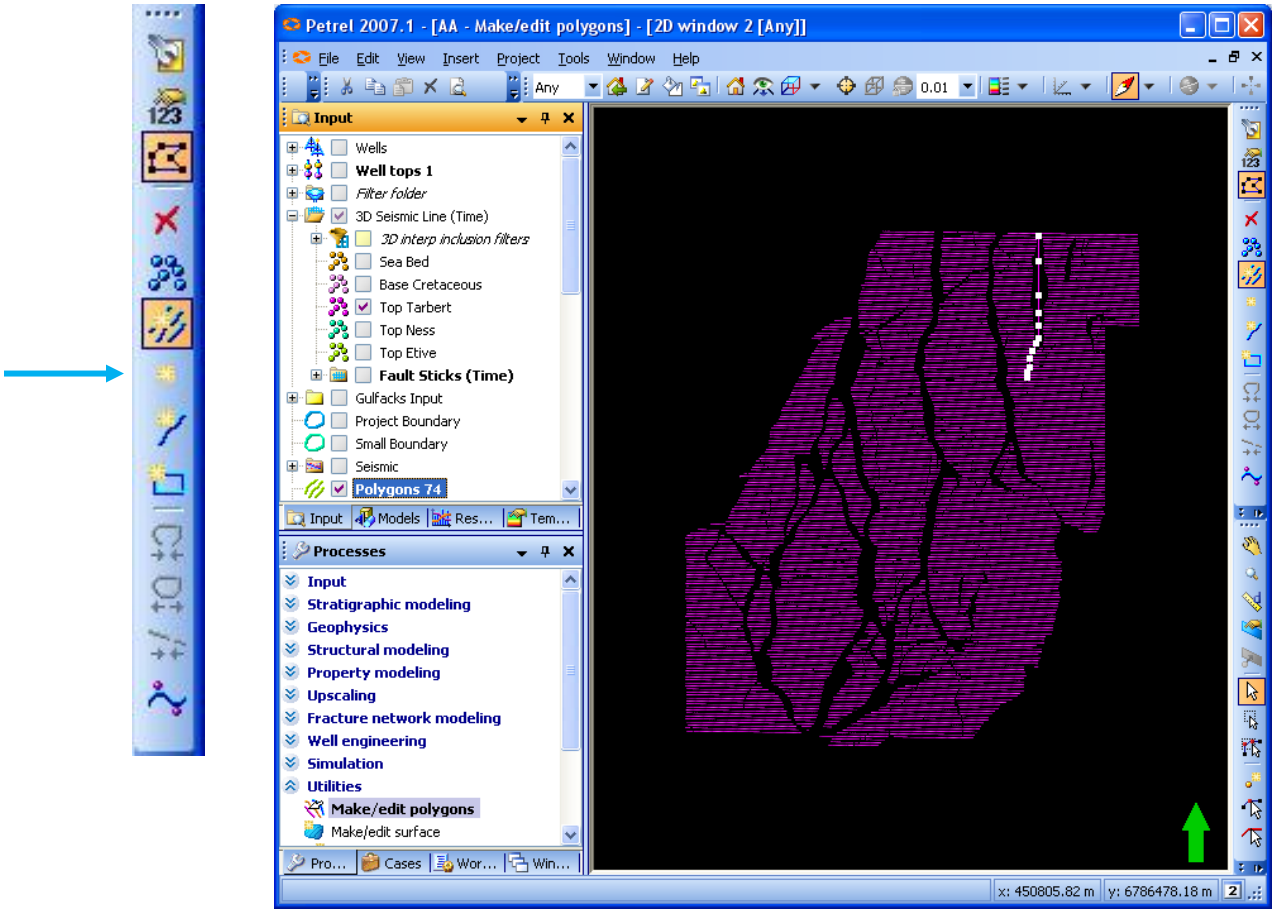


Fig.9.21: Creating fault polygons of the **Top Tarbert** surface with Tool bar

4. For completeness, create a new folder, rename it **Top Tarbert Polygon**, and place all fault polygons under this folder.

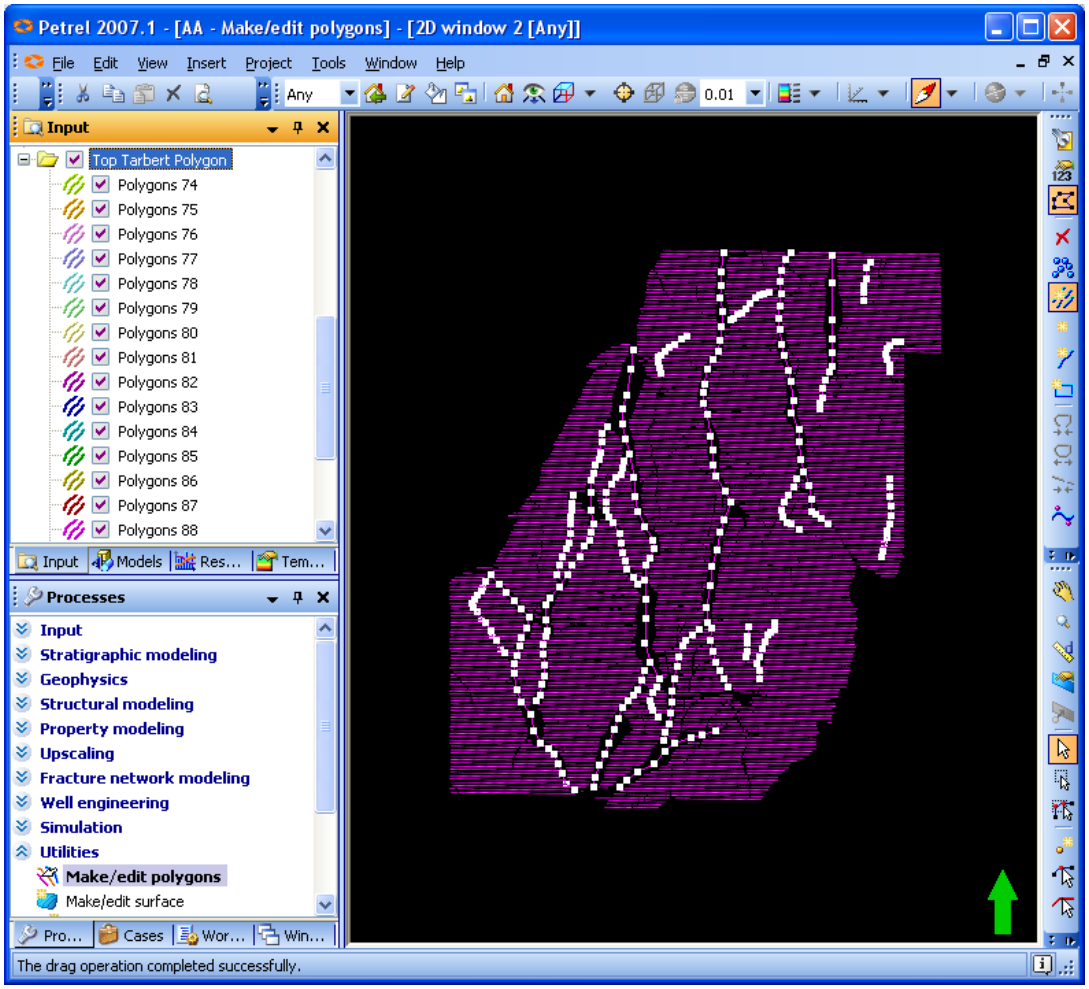


Fig.9.22: Top Tarbert fault surface

5. Repeat the same process for **Top Ness** and **Top Etive** surfaces. And make sure that you will create two folders and rename them, **Top Ness Polygons** and **Top Etive Polygons**. And place all fault polygons under each folder. As shown in Fig.9.23. and Fig.9.24.

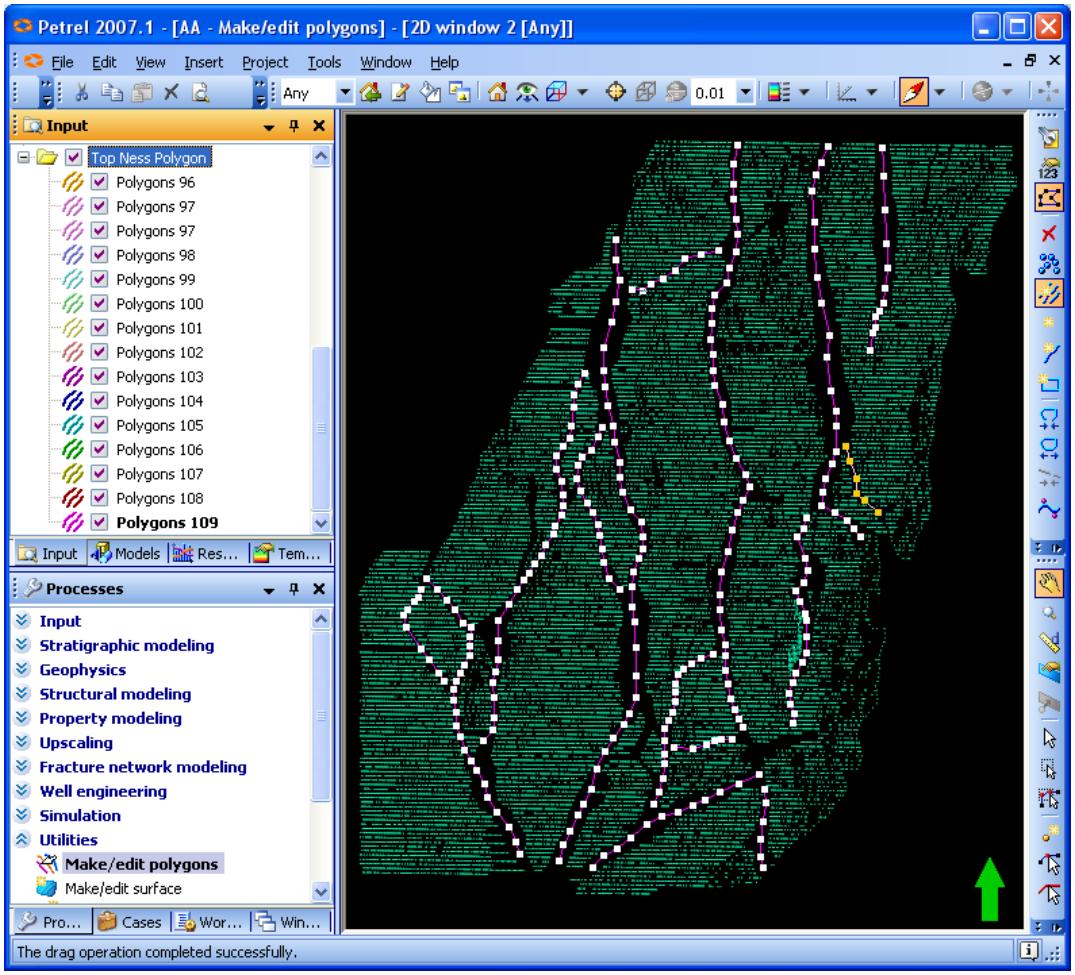


Fig.9.23: Top Ness fault surface

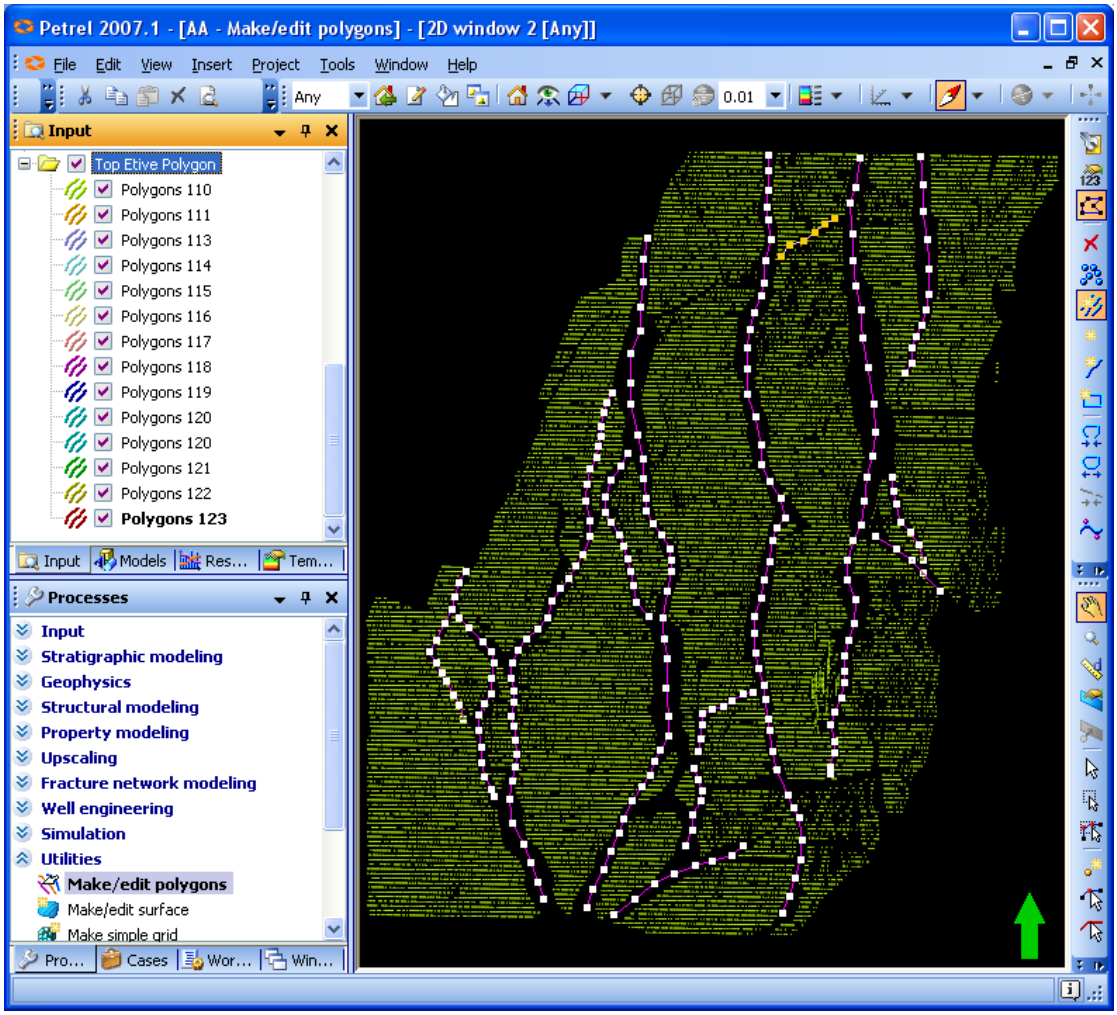


Fig.9.24: Top Etive fault surface

Editing Created Surfaces - Removing Surface Peak

Peaks or spikes depend on the data if it is shown or not.

Notice: The data that we are working on it, it not showing the Surface Peak. For that, we brought another data to show you how we can remove the Surface Peak.

Peak on the 3D surfaces can be removed with a simple click as follows;

1. Display the surface that contains the peak to be removed. Activate the **Make/Edit Surface** under **Utilities** in the **Process Pane** window. The **Surface Actions** toolbar displays as shown in Fig. 9.25.
2. Choose the **Peak Remover** button on the **Edit Surface Tools** toolbar

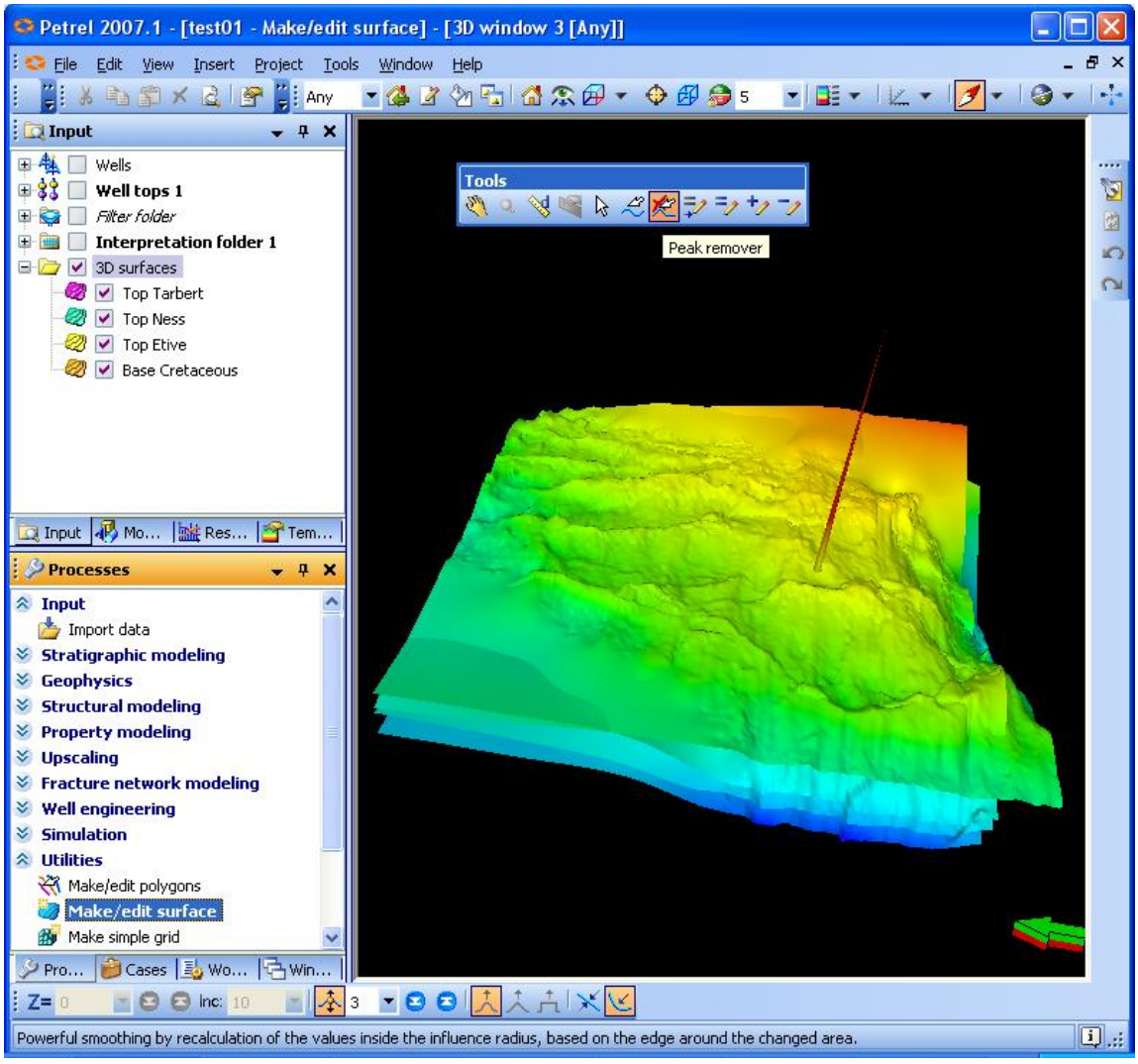


Fig.9.25: 3D surfaces displayed with peak and tool bar

3. Click on the peak to be removed. The peak disappears as shown in Fig. 9.26.

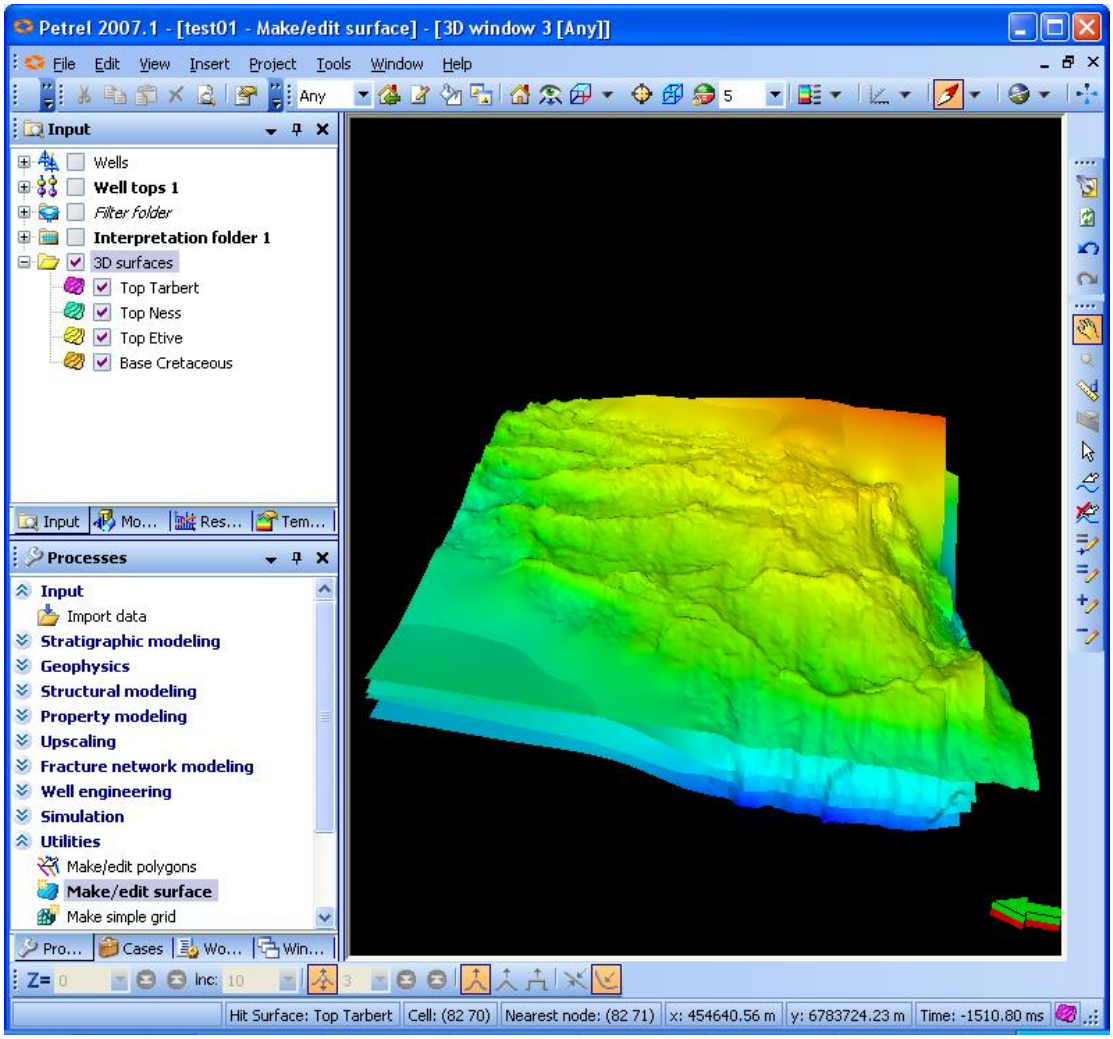


Fig.9.26: The 3D Surfaces after removing the peak

Projecting Fault Polygons on their Surfaces

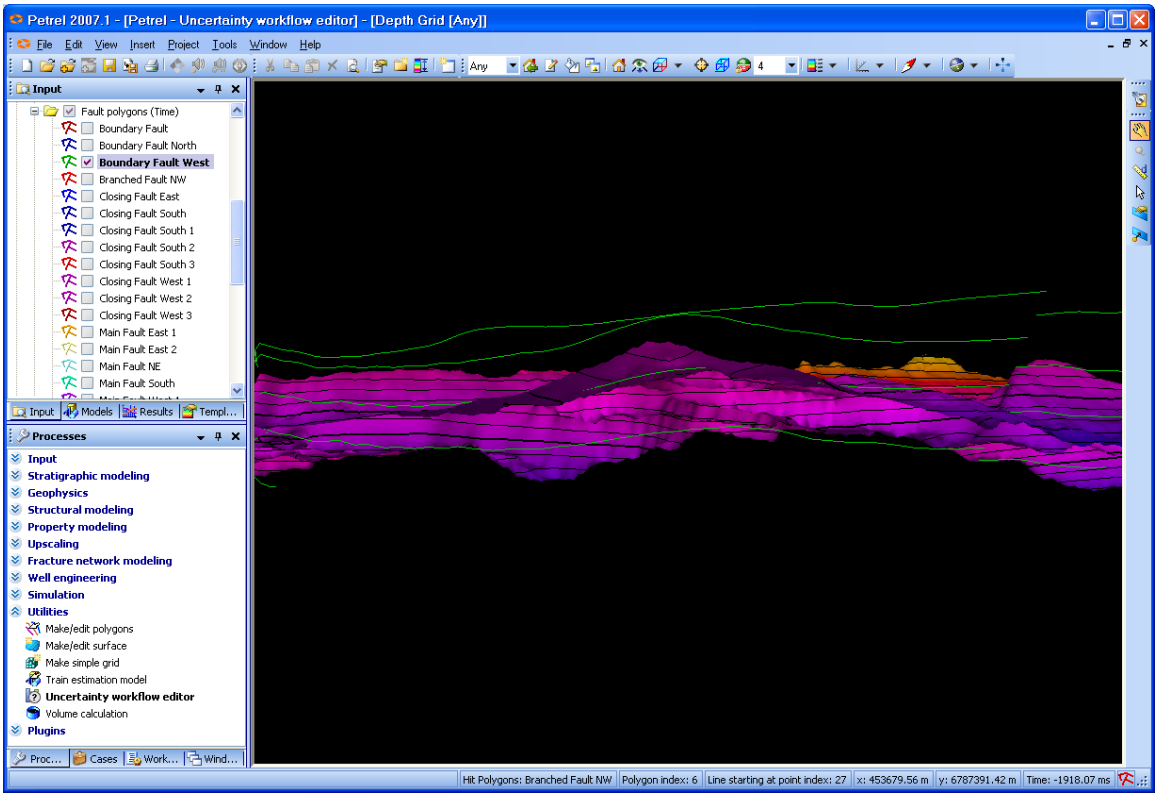
Fault polygons are often interpreted in the XY plane only; hence their Z-values will be set to 0 as shown in Fig. 7.19. It is an easy process, however, to get all fault polygons down to their respective surfaces. This will give them their Z-values at the correct position. This process is summarized by the following steps:

1. **From Fault Polygons** (from data available)

Dr.Hassan, we didn't know how we project the fault polygons on their surfaces.

If you lock at the demodata. For example (Boundary Fault West):

The single fault projected on all 3D surfaces.



2. From your own Fault Polygons.

1. Display **Top Tarbert** surface with **Top Tarbert Polygons.**

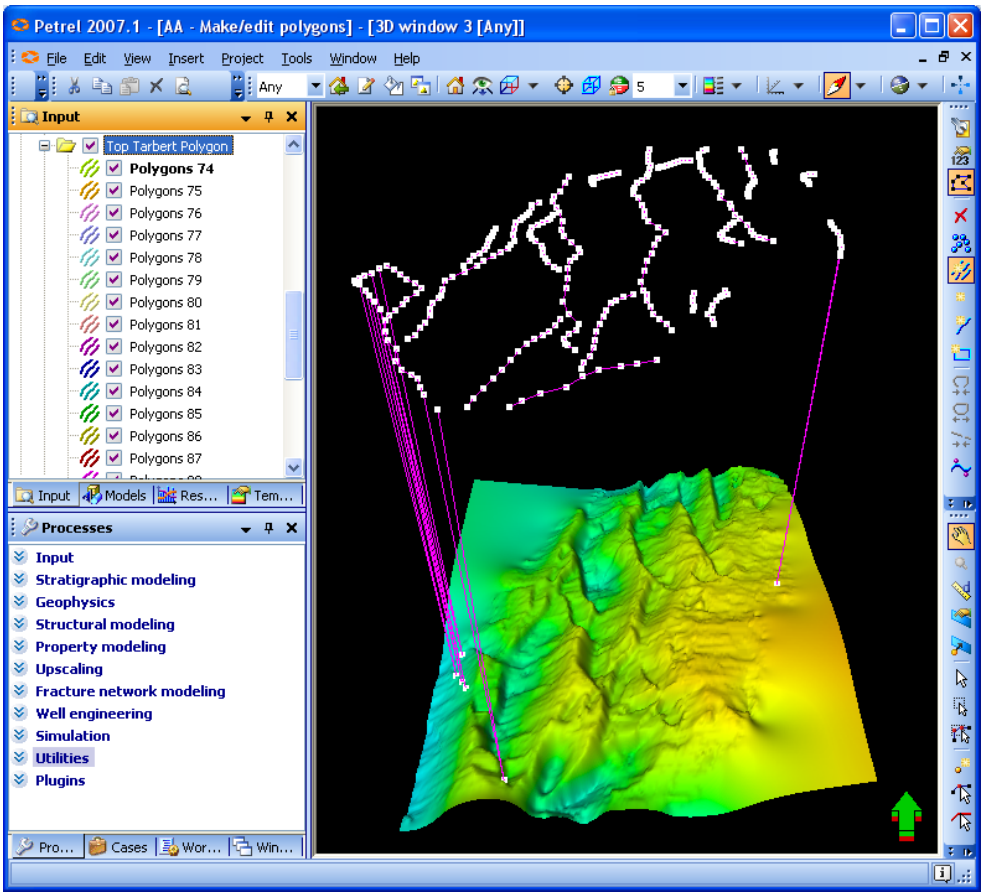


Fig.9.27: Fault polygons with 0 Z-values

2. Open the settings for the first fault polygon in **Top Tarbert polygons** folder, we will take (**Polygon 72**) as an example. and go to the **Calculations** tab as shown in Fig. 9.28.

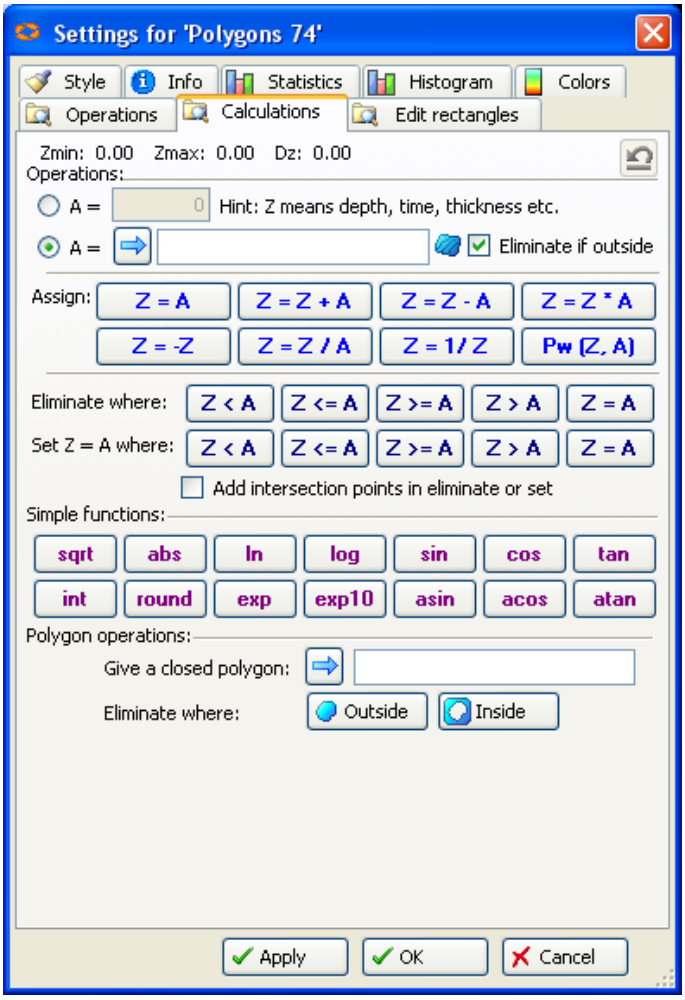


Fig. 9.28: Settings for Tarbert fault polygons dialog box

3. Select the **Top Tarbert** surface in the **Input Pane**, then click on the blue arrow beside the A= in the Settings dialog box.

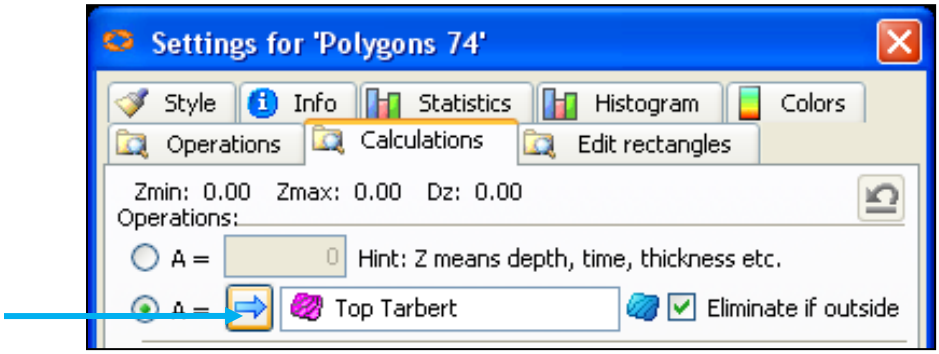


Fig.9.29: Settings for Top Tarbert fault polygons (**inserting surface**)

4. Press the Assign: **Z=A** button then press **Apply** and **OK** buttons.

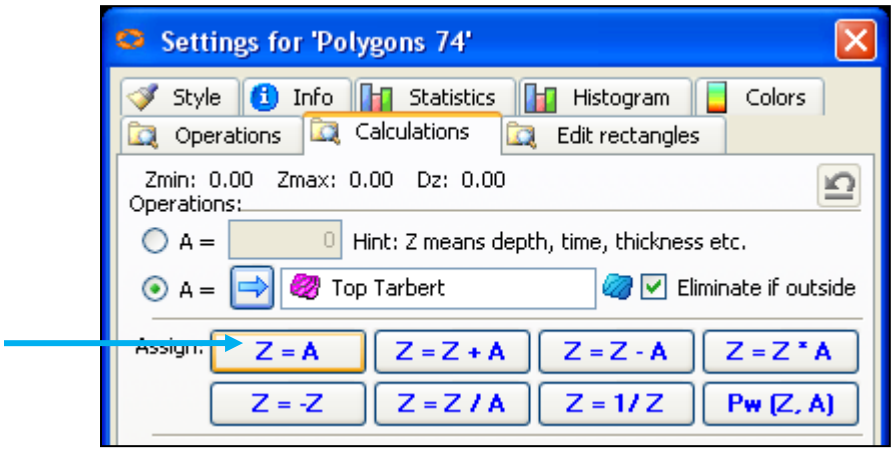


Fig.9.30: Settings for Top Tarbert fault polygons (**Z=A**)

5. Complete all the remain fault polygons for **Top Tarbert** surface. And all the fault polygons moves down to the surface as shown in Fig. 9.31.

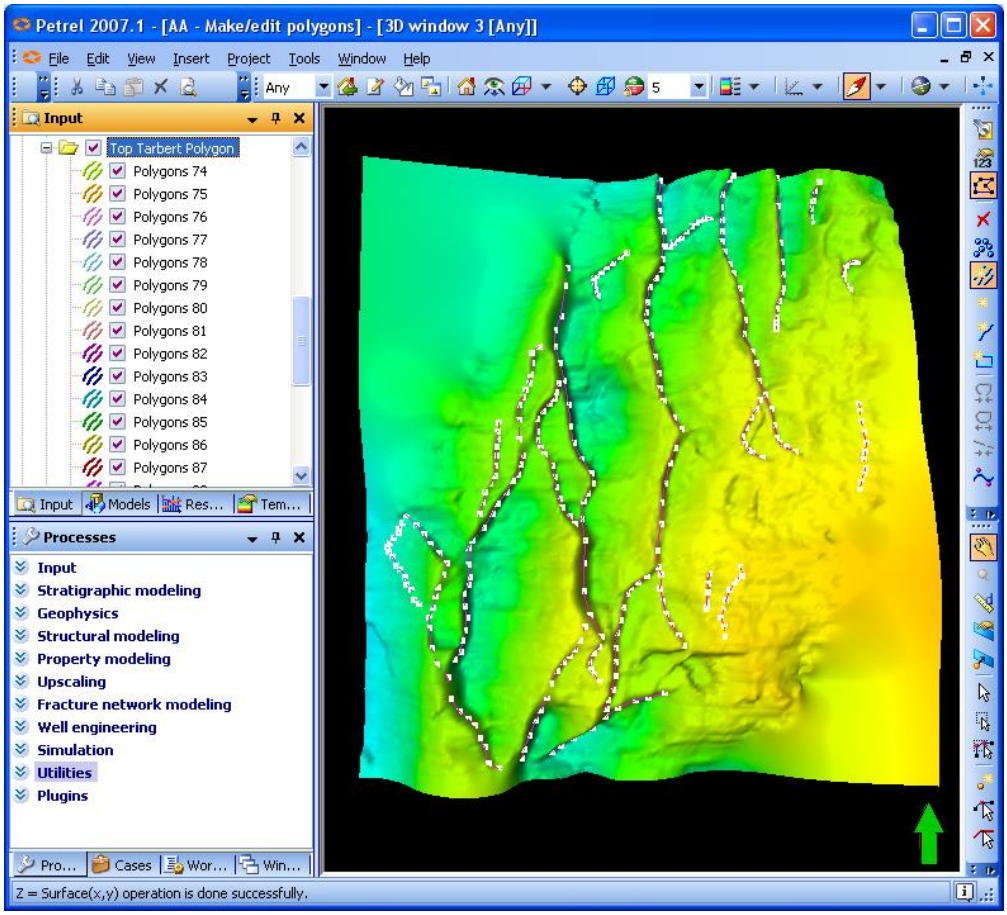


Fig. 9.31: Top Tarbert fault polygons projected on their surface

6. Repeat the same process for the **Top Ness** and **Top Etive** But remember you have to delete the previous surface and insert the new surface by click on **Delete** button.

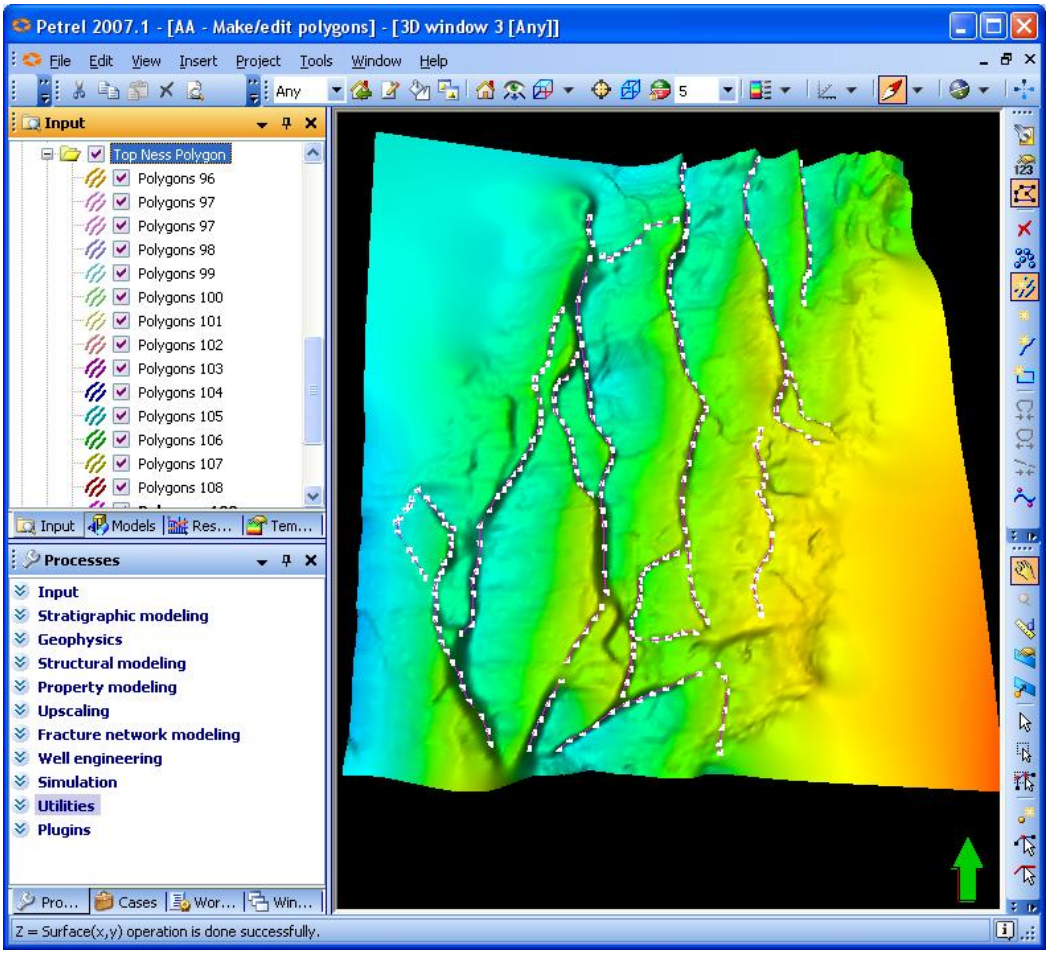


Fig. 9.32: Top Ness fault polygons projected on their surface

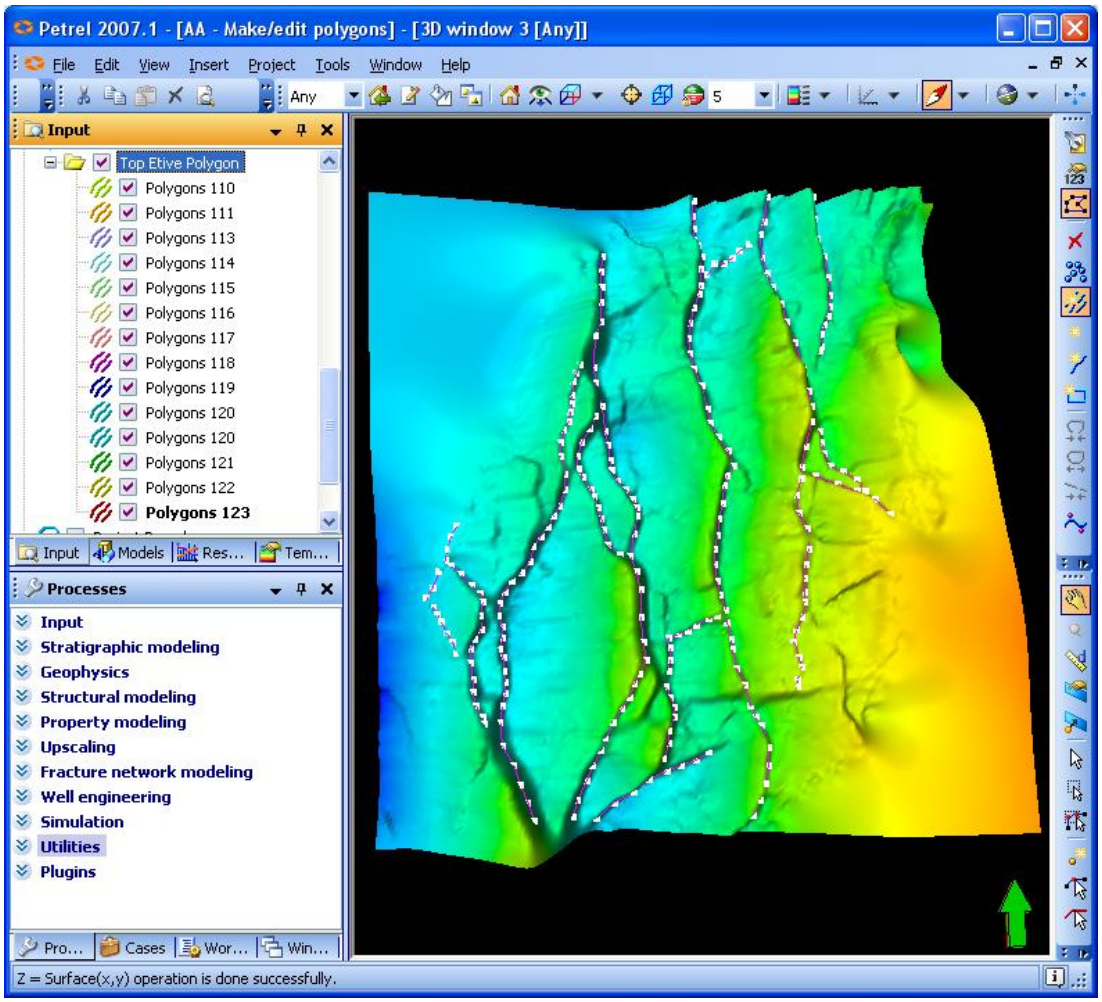


Fig. 9.33: Top Etive fault polygons projected on their surface