

# TerraNotes

Geological and Petrophysical Software for Oil and Gas Exploration

The official newsletter of TERRASCIENCES

February 2007

**Current TerraStation version: v7.57**

## AAPG 2007

We will be exhibiting at the AAPG convention. It will be held in Long Beach, California between the 1<sup>st</sup> and the 3<sup>rd</sup> April 2007.

Please stop by our booth (#1513) to say hello and see the latest version of the TerraStation. Both Andy Jagger and Fred Lambie of TERRASCIENCES' American operation will be manning the booth.

## Web Site Update

The TERRASCIENCES web site will be undergoing a complete overhaul in the next few weeks. A professional redesign should make it easier to navigate and provide more concise information for both sales and support.

We will make a further announcement once the new site is ready.

## Allan Smith departs for Occidental

It is with regret, we have to announce the departure of Allan Smith from our Houston office.

We enjoyed working with Allan and thank him for the excellent work he has done for us over the past six years.

All of us at TERRASCIENCES wish him well in his new role as a senior petrophysicist with Occidental Petroleum.

## European Borehole Imaging User Group

In early December 2006, Fred Lambie (TERRASCIENCES US) and Nigel Collins (TERRASCIENCES UK) - along with the much appreciated help of Task Geoscience as meeting hosts - participated in a group discussion related to the use of TerraStation II for borehole imaging applications. Many of the European users were present and the interaction was most productive.

A significant number of small enhancements were added to the product as a direct result of this meeting and some subsequent site visits to clients locations. Some of these additions include:

### Formation Viewer

- Added annotation to the track header to show the position of Pad 1 Azimuth and Borehole Highside.
- A sub-category filter is now available and is track specific
- When displaying borehole image data we have added warnings if bad caliper data is present and the bit size constant is not set.
- We have added some historical information when an image is saved using the **Save Processed Image** option.
- Image Form. We have added an option for linear-low, log-high color map scaling. Use the "Data minimum" value to set break point between linear and log based color scaling. Colors are mapped linearly from zero to the **Data minimum**, and mapped logarithmically from there to the **Data maximum**. It is only available when using a static image and Equal increment color mapping.

### IMAGELog

#### Pick Data tracks

- When exporting picks we now allow the X and Y deviation of the well and the depth to be output also.
- Tadpole track. Added an option to display tadpoles with a black outline around both head and tail. This is now the **Standard** setting. You can still display them without an outline by using the **Standard, No Rim** option.
- Tadpole track. If your category symbol code is now any of the following: -11 (circle), -12 (triangle), -13 (square), -14 (diamond) then a black outline (rim) will be drawn around these symbols.
- Tadpole track. Added an option to annotate the tadpoles with any combination of depth, dip, azimuth and category.

- Pick display tracks. Added an option to access the **Export Picks** and **Group Editing** functions from regular pick display tracks.
- Polar plot tracks (stereonet). If there are no valid picks within the interval, then we no longer draw an empty stereonet.
- Polar Plots. Added an option to display the polar grid as rim and quadrant only.

## Dip Analysis

### Cumulative Dip Plot

- You can now display the points based on sample count, rather than depth.
- Points can be color-coded by azimuth. Four colors are used to represent north, south, east, and west.

### Azimuth Vector Plot

- Points can be color-coded by azimuth. Four colors are used to represent north, south, east, and west.
- An option has been added to give more detailed display of low angle dips (between 0 and 10 degrees).
- You can click on any vector to display the depth, dip, and azimuth of that vector.

### Stereonet and Rose Diagrams

- The rose diagram petals are drawn in inverse size order. This avoids smaller petals being overprinted by larger ones, and thus being hidden.

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## Array Curves in TerraStation II v7

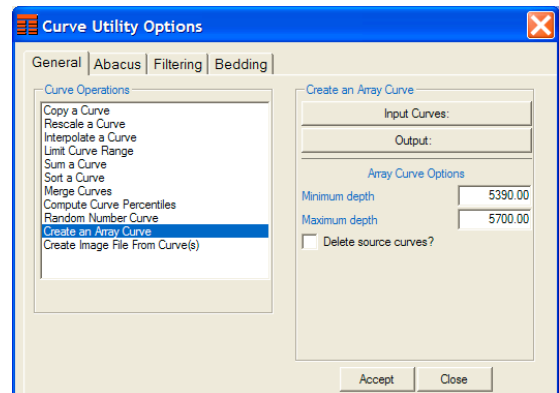
It is now possible to store two-dimensional curve information as an 'array' curve. This has the advantage of using only one available curve slot for the entire curve array. In earlier versions of TerraStation, if you had a 30 element CMR T2 array for example, this would have used up 30 curve slots, as each element was stored as a separate curve.

### Creating Array from Non-array Curves

Under the **Curve Utilities** options within **Petrophysical Analysis** there is an option called **Create an Array Curve** (shown below). Using the **Input Curves** button you select all of the individual curves you wish to combine into one array curve.

Use the **Output** button to create a new curve.

You can optionally choose to remove the input curves from the well by checking the **Delete source curves?** checkbox.



### Use Within TCL.

Within TCL, you can access individual elements of an array by using a simple addition to the curve name. For example:

```
VTEST = VCMR_T2{5}
```

This simple equation sets the value of the TEST curve to be equal to the value in the sixth element of the array curve called CMR\_T2. Why the sixth element when we used {5}? Because in TCL, array elements are always counted from zero, not one.

### Notes when Depth Shifting and Curve Splicing

When depth shifting or splicing an array curve, only the first element is displayed. However, the splicing and editing operations are applied to all elements of the array.

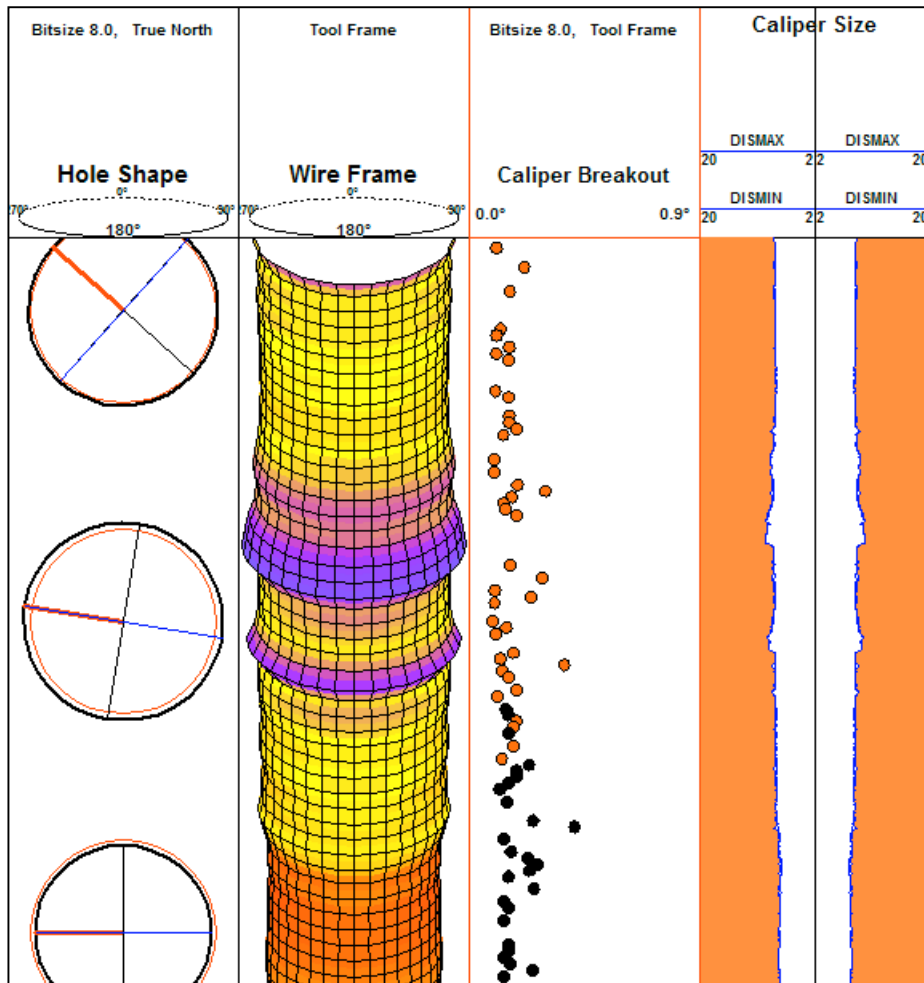
Other places where array curves are used include IMAGELog – Color Coded Curve track, Echo and Status in Petrophysics, and the NMR and CMR track types in IMAGELog.

## Recent TerraStation Enhancements

As it's been a while since the last newsletter, and we have continued our weekly schedule of updates to the TerraStation system, now seems a good time to review a few of the enhancements added in the last several months.

### Hole Shape Track

This is an IMAGELog track type we have added to provide a graphical representation of hole shape. The track type is **Hole Shape**. There are a number of different ways that you can do this – shown on the example below.



Example of hole shape display types

## Bubble Map and Starburst Map

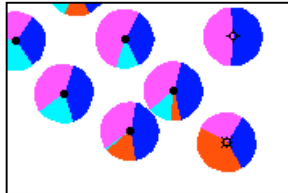
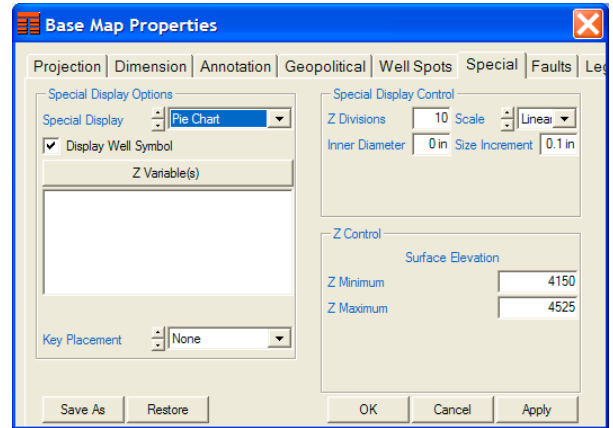
Two new styles of posting data have been added to the Base Map functions.

Under the **Special** tab of the Base Map Properties panel, set the Special Display toggle to either **Pie Chart** or **Starburst map**.

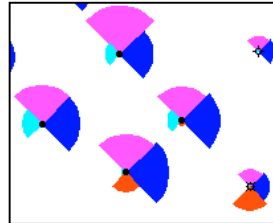
Next, select the **Z variables** to be used in supplying the data to the pie chart or starburst map.

Specify the number of divisions and other options, then press **Apply** to see the result.

Below are examples of each kind of display. In the starburst display each segment is scaled independently based on the range of the individual Z variables. You can control the Z variable range by clicking on the Z variable and then altering the **Z Minimum** and **Z Maximum** values in the **Z Control** part of the property sheet.



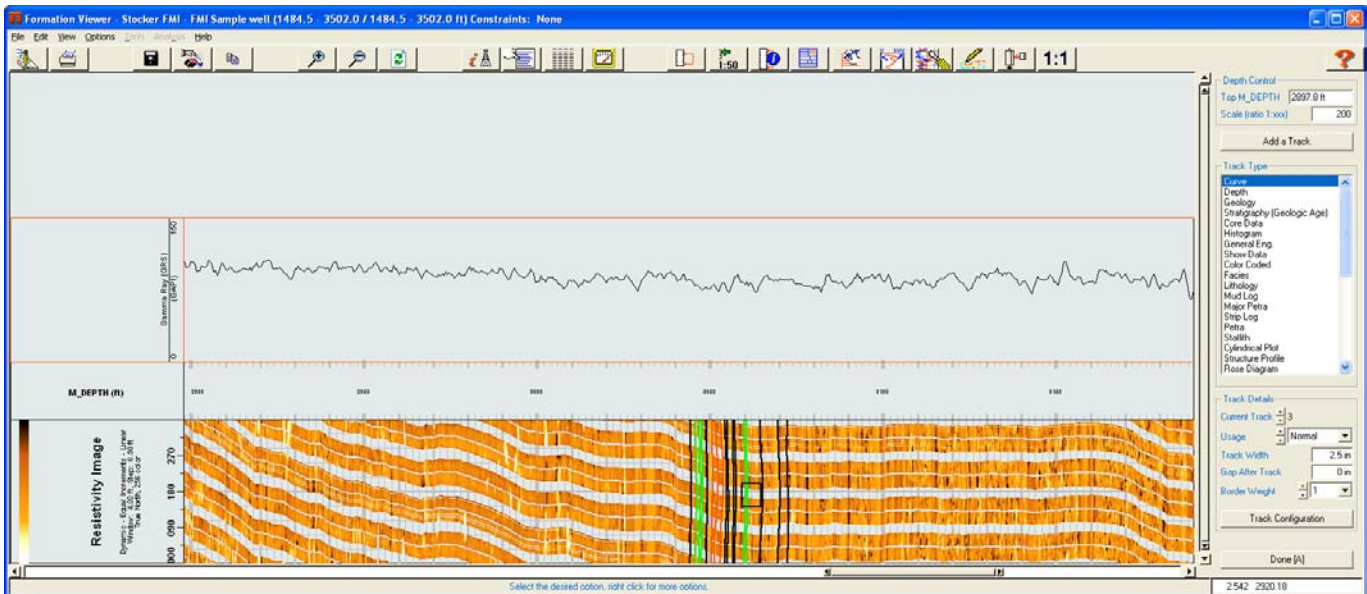
Pie chart example



Starburst example

## Rotate Screen Display

You can now flip any graphical display through 90 degrees. The option is found on the **View** pulldown menu and is called **Rotate**. It is primarily intended for use in IMAGELog and the Formation Viewer by users that have multiple or wide screens. It allows you to view more of the well on one screen (an example is shown below).



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## IMAGELog – A New Show Data Track Display Capability

In the last couple of releases we have added an additional capability to the **Show Data** track of **IMAGELog**. This track was originally intended as a “generic” symbol display track, but it gradually changed so that its major use was for identifying zones of hydrocarbon shows.

We have begun to re-use this data, which is stored in the .GSY auxiliary data file for a well, to represent other things. The newest addition is to display data as a “stacking sequence”. The idea is to allow a graphical representation of things that change in an upward or downward direction. Examples are whether a sequence is coarsening upward or fining upward, or whether a sequence represents rising or falling sea level.

An example of such a display is shown in the track on the right.

This ‘stacking sequence’ data can be differentiated from the current show data by setting the **CATEGORY** entry in the .GSY file to the value 4. You access the data file from the **Track Configuration** panel by clicking on the **View/Edit Data** button.

A quick way to do this is to click on the first desired line in the **CATEGORY** column, hold and move the mouse to highlight the **CATEGORY** entry for all the lines desired, and then right-click and select **Set to..** from the menu that appears. Then simply enter a 3 in the small box that appears and press **Accept**.

The title of the track was changed from the default of **Show Data** to **Stacking sequence** by simply typing in the desired track title on the Track Configuration panel.

We are sure the imagination of our users will find new and interesting ways to use this display option.

