

# Volume Curvature

Curvature attributes have been used recently to delineate faults, fractures and other structural features. Compared to other attributes, curvature attributes can reveal subtle faults and fine fractures, which are normally under the limit of seismic resolution. In many cases, they have significant impact on oil and gas reservoir evaluation, as well as unconventional resources. Curvature attributes are based on morphology. They give supplementary information on coherence attributes.

Today, curvature attributes are available in most commercial interpretation software packages. However, they are all horizon-based, which means all curvature attributes are computed based on either man or machine-picked horizons. As we all know, this not only causes a lot of acquisition artefacts but also makes the result subjective rather than objective. Furthermore, horizon-based curvatures are only available on known horizons, not helpful if the target is between horizons.

Since 2006, volume-based curvature attributes have been developed on dip/azimuth and show good signs and promise, although they are extremely slow to compute. Geomodeling has found a new approach to achieve these results with accuracy and relatively tremendous speed.

With Geomodeling's Volume Curvature Module, geoscientists can calculate the following curvature attributes directly from a 3-D seismic volume without picking horizons:

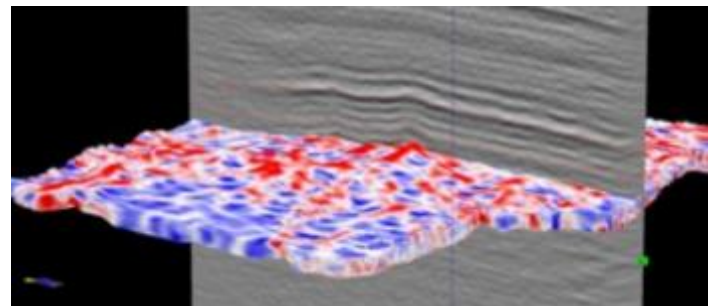
- contour curvature
- curvedness curvature
- dip angle
- dip curvature
- strike curvature
- azimuth

...more

- Gaussian curvature
- Lambertian reflectance
- maximum curvature
- mean curvature
- minimum curvature
- most negative curvature
- most positive curvature
- shape index

Volume curvature services are in high demand today by geoscientists who know the value of curvature results. With demand comes a high price tag. Today, volume curvature services are going for \$300 - \$500 per square mile. Investigate Geomodeling's Volume Curvature Module and discover the value to your interpretation, your organization and your budget.

To receive a demonstration on **Volume Curvature** and how you can apply these attributes **at your own desktop**, contact us at [www.geomodeling.com](http://www.geomodeling.com). We will show you how volume curvature detects information that your other attributes cannot show you – and faster - all within our VisualVoxAt software. VisualVoxAt is integrated software for seismic attribute generation, visualization, calibration, classification and interpretation. 🌐



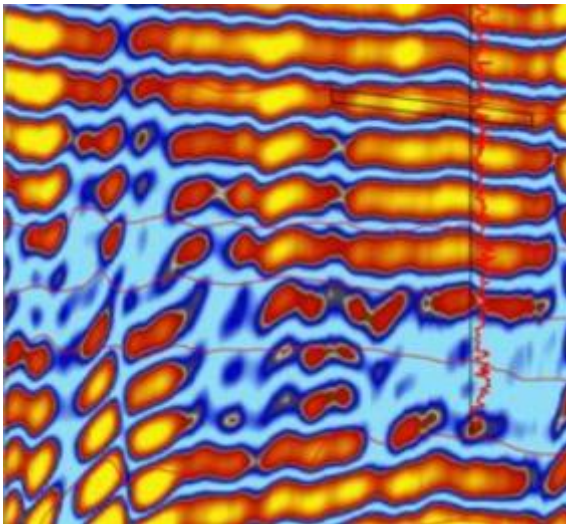
*Most Positive Curvature*

# so you want to learn more about Spectral Decomposition

Attend Geomodeling's training course on advanced spectral decomposition to understand basic spectral decomposition theory, implement VisualVoxAt's spectral decomposition methods, and interpret results.

This half-day course will review the basic theory of spectral decomposition and demonstrate its applications in characterizing channelized and thinly bedded reservoirs. Equipped with four spectral decomposition methods, VisualVoxAt will help you to evaluate your data with greater resolution than that offered by conventional seismic analysis techniques.

Whether you are new to spectral decomposition or have used it in past projects, you will discover the benefits of VisualVoxAt's latest spectral decomposition methods, and will understand which methods are best for solving specific geological problems.



*Comments or questions?  
Please contact us at [info@geomodeling.com](mailto:info@geomodeling.com)  
– we look forward to hearing from you.*

**spectral  
decomposition  
greatly improves  
resolution over old  
DFT methods**

The following topics are covered in the course:

- basic theory of spectral decomposition
- applications of spectral decomposition in reservoir characterization
- VisualVoxAt's four spectral decomposition methods:
  - discrete Fourier transform
  - continuous wavelet transform
  - time-frequency continuous wavelet transform
  - S-transform
- interpretation of spectral decomposition maps

The next two training dates for Advanced Spectral Decomposition are:

January 24, 2008, Thursday (9:00 a.m. – 12:00 p.m.)

February 27, 2008, Wednesday (1:00 p.m. – 4:00 p.m.)

Our training schedule, registration and course outlines for all Geomodeling training courses can be found at <http://www.geomodeling.com/training.htm>.

**Sign Up Today!**



## Tech Tip - Synthetic Stretch and Squeeze

Stretching and squeezing in VisualVoxAt is done between two tie points or above or below one tie point. VisualVoxAt interpolates linearly between the tie points and modifies the time-depth curve. The user can access the controls for stretch and squeeze by right clicking on the synthetic with the synthetic tool active.

VisualVoxAt also has an automatic stretch and squeeze function that is activated by using the icon (Figure 1). Remember that all icons in VisualVoxAt can be identified by resting your cursor on them until a tool tip pops up.

Synthetics in VisualVoxAt can be displayed as an insert, an overlay or in 3-D.

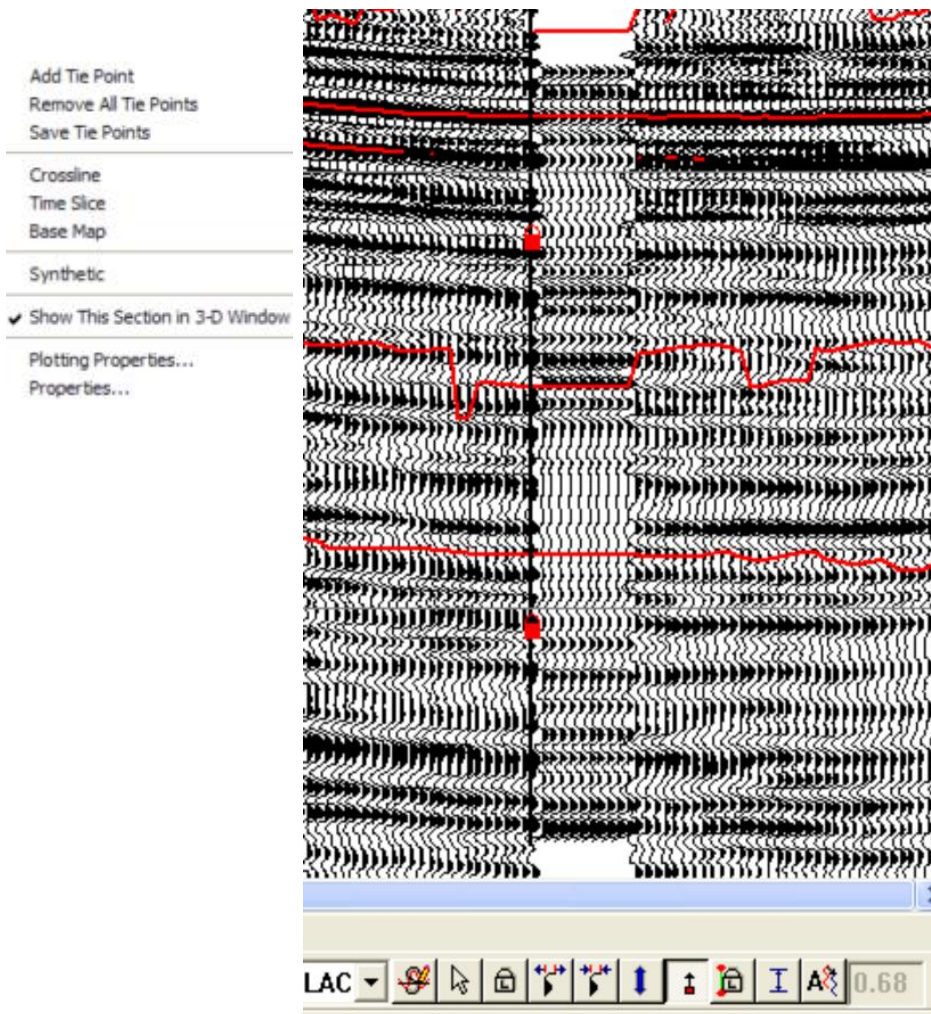
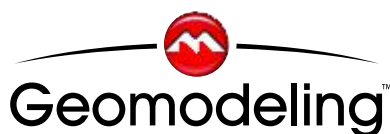


Figure 1. The synthetic is displayed as an insert. Locking is done between points. Always remember to check your time-depth spreadsheet after stretch squeeze. 🚫

Browse all of Geomodeling's technical tips on-line at [www.geomodeling.com/tech\\_tips.htm](http://www.geomodeling.com/tech_tips.htm)



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## Upcoming Event



In 2000, Geomodeling established an SBED research and development consortium with industry partners. The aim of the project was to develop SBED and SBEDStudio into commercial software packages for modeling geological heterogeneity below the resolution of seismic data, and modeling meter-scale heterogeneity of internal stratification and bounding surfaces in the genetic units.

Today, our work continues with global partners interested in developing these two software packages.

### Join us at our annual JIP Steering Group Meeting

**Date:**

Wed. April 2 - Fri. April 4th, 2008.

Arrival is Tuesday April 1 and we have planned an ice breaker from 5:00 to 7:00 p.m. at the hotel.

**Location:**

Banff Springs Hotel  
405 Spray Avenue  
Banff, Alberta, Canada  
T1L 1J4

<http://www.fairmont.com/banffsprings/>

We are asking that you register directly with us as we will be organizing directly with the Banff Springs.

For more information and how to register, [click here](#) or go to [http://www.geomodeling.com/news\\_g.htm](http://www.geomodeling.com/news_g.htm)

Interested in joining the SBED JIP?  
Email [info@geomodeling.com](mailto:info@geomodeling.com) 🚫