Geoscientists have found that seismic attributes are a valuable addition to seismic amplitude data in structural and stratigraphic interpretation, particularly in highlighting subtle geological features, such as faults, fractures, channels, and karst features. Many seismic attributes provide a more “geological-looking” data volume than seismic amplitude data, accelerating understanding of the geological setting of plays, and also enhancing presentations.

LMKR Volume Attributes for 3D seismic allows calculation of curvature and geometric attributes such as semblance and Event Similarity Prediction (ESP), based on spectral decomposition of the seismic amplitude data. It also supports calculation of time-based attributes based on time windows, instantaneous attributes based on Hilbert-transformed traces, and expression-based attributes calculated from mathematical combinations and operations on other attribute volumes. The spectral decomposition algorithm that is embedded is patented, and allows higher resolution decomposition than conventional approaches.

LMKR Volume Attributes reads and writes both SEG-Y and GeoGraphix 3dx data volumes, allowing easy integration with LMKR GeoGraphix applications as well as standalone use.

**Benefits**

- **Flexibility**
  Expression-based mathematical combinations of attributes allow interpreters to generate custom attributes to enable the best use of attribute analysis for a given geological play.

- **Accuracy**
  The LMKR patented spectral decomposition technique gives better resolution than conventional methods – a factor which is critically important in today’s unconventional plays.

- **Integration**
  LMKR GeoGraphix 3dx and 3dh seismic formats are supported, for rapid “what if” testing and visualization of attributes in the area of interest. Volume Attributes also supports SEG-Y input and output for data transfer to other applications.

- **Ease of use**
  Modern tab-based user interface and interactive menus with tool-tips guide even novice attribute users through their workflows.
Key Features

**Frequency-Based Attributes**
- Frequency-based attributes use a patented spectral decomposition technique for higher resolution results.

**Featured attributes:**
- Dip Magnitude
- Azimuth
- Event Similarity Prediction - ESP
- ESP (dip steered)
- Semblance
- Semblance (dip steered)
- Discontinuity
- Most positive curvature
- Maximum curvature
- Minimum curvature
- Mean curvature
- Gaussian curvature
- Dip curvature
- Strike curvature
- Contour curvature

**Expression-Based Attributes**
- Expression based attribute capabilities allow users to refine or create their own custom attributes as mathematical combinations of other attribute volumes.

**Time- & Hilbert-Based Attributes**
- Time-based attributes are calculated on a trace sample basis or over a user-specified time window. The Hilbert-based attributes are based on the Hilbert transform of the trace.

**Featured attributes:**
- Instantaneous Phase
- Instantaneous Q Factor
- Instantaneous Amplitude
- Instantaneous Frequency
- Instantaneous Bandwidth
- Amplitude Weighted Phase
- Normalized Amplitude
- Thin Bed Indicator
- RMS Amplitude
- Average Energy
- Mean Amplitude
- Maximum Magnitude
- Invert Polarity
- Remove DC Bias
- Absolute Amplitude

**Integration with LMKR GeoGraphix**
- Support for GeoGraphix 3dx and 3dh seismic formats allows quick and seamless visualization of attribute volumes in GeoGraphix SeisVision and GeoGraphix 3D visualization tools.

**Requirements**

**Hardware (MINIMUM)**
- 2.4GHz 64-bit Intel class or better
- 4GB RAM
- 1,024 x 768 graphics resolution
- CD-ROM drive
- 19-inch monitor

**Hardware (RECOMMENDED)**
- Quad 2.4 GHz 64-bit Intel class or better
- 8 GB RAM or greater
- NVIDIA GeForce or Quadro - 2GB video RAM
- DVD-RW drive
- Dual 21+-inch monitors

**Software**
- Microsoft® .NET 4.0
- Microsoft DirectX 11

**Operating System(s)**
- Windows® 7 Professional x64
- Windows® 7 Enterprise x64
- Windows® 7 Ultimate x64

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