The Society of Exploration Geophysicists and **GeoNeurale**

announce

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" THE ADVANCED SEISMIC ATTRIBUTES ANALYSIS "

3D Seismic Attributes for Prospect Identification and Reservoir Characterization

Course date and registration → contact: courses@geoneurale.com
Munich

WITH OpendTect SOFTWARE APPLICATIONS PRESENTATION
AND
ONLINE COURSE PREPARATION

DETAILED PROGRAM

ONLINE COURSE PREPARATION

PROPEDEUTICAL PHASE

GeoNeurale offers at request an online preparation to the coursecovering some useful fundamental mathematical applications. The preparation phase will start 2-3 weeks before the course.

SEISMIC ATTRIBUTES ANALYSIS SPECIFIC COURSE PROPEDEUTICALS
Seismic Inversion
Petrophysical Applications
Sonic and Density Logs, Synthetic Seismograms

Geostatistical Applications links in Seismic and Petrophysics
AVO / AVA Analysis

OPTIONAL TOPICS

Differential and Integral Calculus
Linear Algebra
Matrix and Tensors
Complex Numbers and Functions
Fourier Transform
Hilbert Transform
Convolution, Deconvolution
Filters
Green Function
Ricker Wavelet and Spectrum
Function shift / spectral changes
spectrum shift / function changes
Spatial Statistics
Markow Processes

INSTRUCTOR´S COMMENTS TO THE COURSE

1) Lot's has changed in the past 3 years. attributes continues to be a rapidly evolving area. there has been a lot done in geochronology, bandwidth extension, and Q estimation using spectral decomposition as an engine.

2) For companies interested in 'resource' plays we had an incredible growth in research. These are new "unconventionals" like shale gas (now called "mudrocks") and the mississippi lime play in oklahoma/kansas that add everyday new updates in the specific interpretation methodology.

3) The biggest change is in the area of multiattribute analysis. This course will cover interactive (graphical methods), statistical (geostat), neural networks, and cluster analysis using self-organizing maps and generative topographic mapping.

ACQUIRED KNOWLEDGE AFTER THE COURSE

Each participant will gain an intuitive understanding of the kinds of seismic features that can be identified by 3D seismic attributes, the sensitivity of seismic attributes to seismic acquisition and processing, and how 'independent' seismic attributes are coupled through geology.

Learner Outcomes:

- Use time slices, phantom horizon slices, and stratal slices through attribute volumes to illuminate stratigraphic features of geologic interest.

- Apply single and multiattribute color display techniques to effectively communicate attribute image features to others.

- Identify geological features highlighted by spectral decomposition and wavelet transforms in terms of thin bed tuning.

- Evaluate the impact of spatial and temporal analysis window size on the resolution of geologic features.

- Use folds and faults imaged by curvature attributes to predict paleo fractures.

- Predict which attributes can be used to image the lateral extent of features that fall below vertical seismic resolution.

- Couple mathematically independent attributes to map different components of the same geologic features (e.g. bright spots and structural high, differential compaction seen incurvature and edges seen in coherence).

- Recognize acquisition footprint on seismic attribute time and horizon slices.

- Apply attributes to azimuth-limited impedance volumes to identify fracture trends.

- Identify the limits of attribute analysis on data that have been poorly imaged.

- Differentiate and choose between relative, band-limited, model-driven, and geostatistical inversion algorithms.

- Choose an appropriate clustering algorithm to combine independent attributes to better delineate geologic features.

- Use visualization and crossplotting to validate attribute predictions using image logs, microseismic event maps, and well logs.

LIST OF TOPICS AND COURSE MATERIAL

Complex trace, horizon, and formation attributes

Multiattribute Display

Spectral Decomposition

Geometric Attributes

Attribute expression of tectonic deformation

Attribute expression of clastic deposition

Kujung reefs simple attribute

Kujung reefs geometric attribute

Attribute expression of carbonate deposition

Attribute expression of shallow stratigraphy and drilling hazards

Attribute expression of igeneous extrusive and intrusive rocks

Attributes and hydraulic fracturing of shale reservoirs

Impact of acquisition and processing on seismic attributes

Attributes prediction of fractures and stress

Data Conditioning

Inversion_for_acoustic_and_elastic_impedances

Image enhancement and object extraction

Interactive Multiattribute

Statistical Multiattribute Analysis

Unsupervised Multiattribute Classification

Supervised Multiattribute Classification

Reservoir Characterization Workflows

3D Texture Analysis

Glossary_of_technical_terms

References

FILES LIST: DEMO/ANIMATIONS

Amatitlan - fold - inline

Arcis_Horst_and_Graben_Shape_vs_Curvedness

Arcis_Horst_and_Graben_w_Reflector_Convergence

Arcis_Horst_and_Graben_w_k1_curvature_vs_strike

Arcis_Horst_and_Graben_w_rotation_about_normal

Arcis_Horst_and_Graben_w_rotation_about_normal_vertical_slices

CircleOfCurvature-Rotated

CircleOfCurvature-Rotated1

CircleOfCurvature

Coherence-aided fault interpretation workflow

Coral_atoll_formation_animation

EigenvaluesCurvatureAndQuadraticForms

bowl_movie

coherence_on_ellenburger

curve_cili

curve_dog

curve_monkey

curve_para

curve_sadle

dac_cbp_slice

dac_frazier_slice

diamond_m_roses

er_pf_cdps

er_pf_slice

k1_vs_strike_at_560ms

k2_vs_strike_box_probe_FWB

k2_vs_strike_slices_FWB

karstcountry_com_animation

kulong_reflector_convergence

proportionalslices2

smi_sobel_filter_about_horizon

str_ch

vinton_dip_azimuth_slices

west_texas_progradation_up

west_texas_progradational_seq