What's New in SubsurfaceAI 2024.1

April 2024

1: Multi-Scale Shared Database

1. Export seismic volume to VDS format
2. Attach VDS volume files to active project without data duplication
3. Export any seismic attribute volume to ZGY format
4. Attach ZGY volume files to active project without data duplication
5. Add option to select a geographic projection when generating a GeoTiff file
6. Import a spreadsheet (general column file) (?)
7. Support Grid North and True North in well path import
8. Be able to edit well path from well path spreadsheet
9. New 2-D seismic tree structure and RBM
10. New 2-D SEGY import UI
11. Reorganize templates in Template Manager
12. Be able to add new well log templates
13. Export strata-grid property realizations to eclipse grid
14. Convert culture data to polygon
15. Support importing petrel file formats of well objects (well header, well deviation, well tops)
16. Be able to import GeoTiff image file

2: Integrated Visualization

1. Arbitrary section slicing in both 2-D and 3-D windows
2. Quickly make a section window along a horizontal well
3. New controls for well data projection on seismic sections by projection polygon
4. VDS and ZGY files attached to a project can be visualized on 2-D and 3-D windows like volumes imported in SEG-Y format
5. Highlight part of the line that is visible in the seismic section window on base map window
6. Display order template to control the display order of objects in seismic section window
7. Bulk edit well color by well types
8. Display well production data in well section window
9. Draw intersection lines of fault mesh surface to a time (or depth) slice on base map
10. Be able to project well paths, tops and logs along the dip and azimuth of a reference surface to the seismic section

3: Well Log Data Analysis

1. Define proportion log from multiple well logs and visualize in well section and seismic section window
2. Convert T-D curve to regular well log curves
3. Add derivative and integration to well log filtering

4: Geologic Correlation of Well Logs

1. Be able to convert well correlation line to arbitrary section

5: Formation Property Modeling & Prediction

1. Machine learning for predicting any well log data upscaled to a formation, XGBoost and random tree
2. Performance analysis with Shapley values

6: Near Wellbore Modeling and Upscaling

1. Automate core plug data conditioning by simulated annealing and genetic algorithms

7: Basic Seismic Interpretation Workflow

1. Be able to convert interval velocity volume to average velocity volume
2. Calculate polynomial order trend surface
3. Horizon merging
4. Be able to make fault mesh surface from fault points and fault sticks and convert fault mesh surface to fault sticks
5. Mistie correction for 2-D seismic data
6. Digitize tie section for 2-D seismic data

8: AI for Seismic Interpretation

1. Multiple facies labeling, training, and prediction
2. Multi-user database stores training labels and models, AI tree, and AI tab in Data Manager
3. Be able to use models in different 3-D surveys and any user
4. Train labels on arbitrary seismic sections
5. Support AI workflow for 2-D seismic data (labeling, training, and prediction, etc.)
6. Change Interactive AI toolbar and its dependency on visualization windows (Add combo box to select active training label or folder; Add buttons to create new AI folder and highlight current AI label or folder on tree view)
7. AI label window to visualize AI labels stored in AI database
8. Convert facies volume to facies label and be able to convert part of the facies
9. Be able to convert AI predicted section to horizon label and edit sequence label and convert it to lines
10. Link AI model to a label and make prediction
11. Train AI model only using labels stored in AI database
12. Be able to predict AI volume on seismic volume directly using AI model from AI database
13. Support co-rendering object training and prediction
14. AI prediction toolbar for predicting using different AI models and convert prediction results to AI labels
15. Support external AI models (h5 format) for re-training
16. AI model and label spreadsheet and sort and search function

17. AI Resources Access Management tool to manage access permission of different user's AI model and labels
18. Different AI models (internal and external) are indicated by different icon color
19. Mode filtering to filter facies label in visualization of current section and converting process to from facies volume to facies label

9: Volume Interpretation and Visualization

1. Auto-extraction of fault sticks and fault surfaces from fault volume with customizable parameter controls

10: Seismic Attribute Calculation and Interpretive Processing

1. Generate time-domain volume when generating synthetic seismic volume from Vp depth-domain volume
2. Automatic gain control (AGC) on 2-D seismic data

11: Seismic Attribute Analysis

1. Facies classification with Rock Physics Templates (RPT)
2. Build strata-grid and extract seismic attributes for 2-D seismic data
3. Quickly extract instantaneous attributes from multiple volumes on multiple horizons

12: Machine Learning for Integrating Well Data and Seismic Attributes

Two algorithms are added to the 2023 release.

1. XGBoost (https://en.wikipedia.org/wiki/XGBoost)
2. Random forest (https://en.wikipedia.org/wiki/Random_forest)

Implementation of machine learning workflow on reservoir grid based on upscaled well log

13: Geostatistics for Integrating Well Data and Seismic Attributes

14: Production Prediction and Sweet Spot Mapping

15: Microseismic Data Analytics & Integration

1. New microseismic window showing microseismic points, seismic data, wells, strata-grid, horizons, tops on base map and two sections view; well completion data and microseismic attributes on time series histogram
2. Animation of microseismic points through time in both microseismic window and 3-D window

16: Static Reservoir Modeling

1. New UI of facies modeling and property modeling from training data (re-organize UI and revise the algorithms; add “3-D simulation”, save and load from template, etc.)
2. Build coarse target grid from facies grid