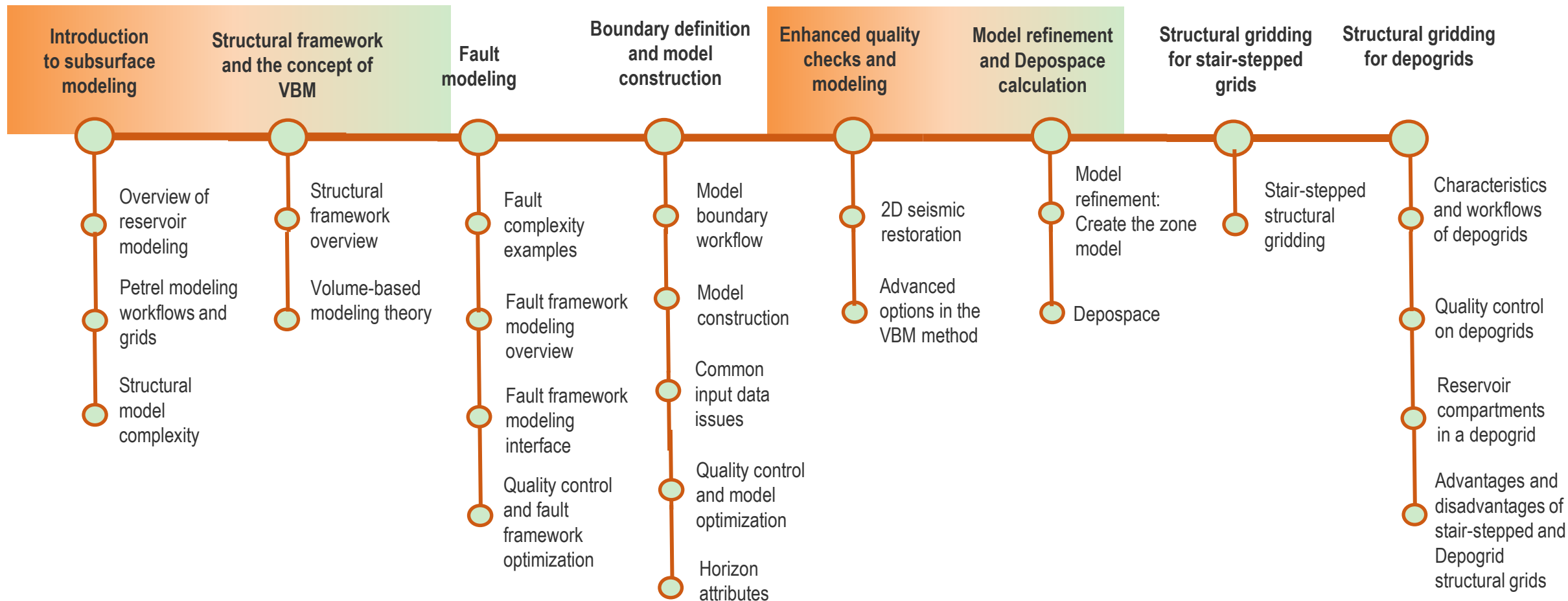


# Structural Framework Workflows for Petrel 2018

## Module 7: Structural gridding for stair-stepped grids

# Structural framework with Petrel 2018 – Modeling line



# Agenda

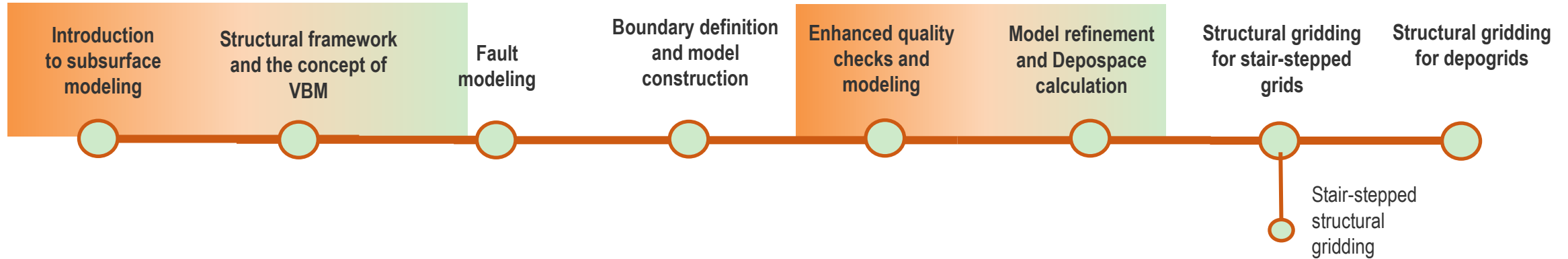
## Structural framework– Day 3

9.00-12.00	12.00-12.30	12.30-16.30	16.30-17.00
Structural gridding for stair-stepped grids	Lunch	Structural gridding for depogrids	Review and recap

### KEYWORDS



# Module 7: Structural gridding for stair-stepped grids



# Learning objectives

When you complete this module, you will know how to:

- construct a stair-stepped corner point grid from a structural framework
- generate the stair-stepped grid using the Depospace transform
- create alternative segmentations of your stair stepped grid
- use a stair-stepped grid in a dual-scale reservoir model (coarse-fine-coarse) workflow

# Structural gridding for stair-stepped grids

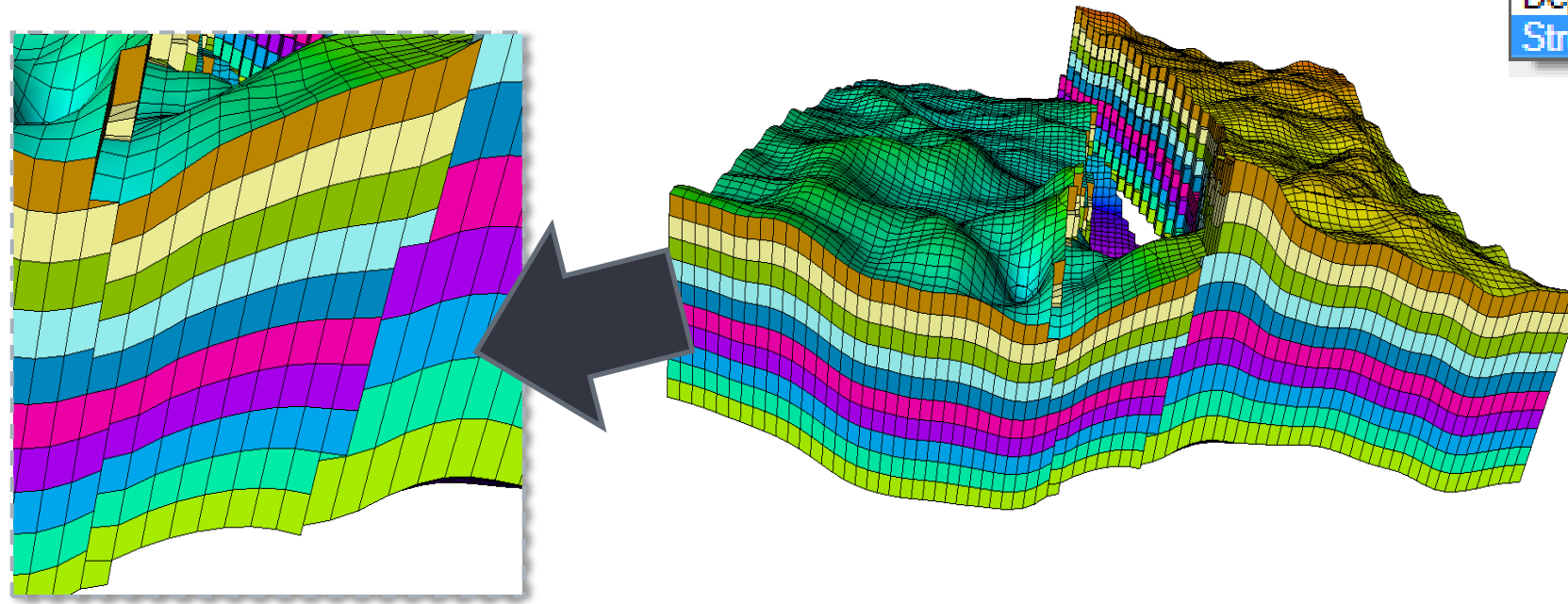


Stair-stepped  
structural gridding

- The workflow (Demo)
- Layer maps
- Depospace for Property modeling
- Segments on a stair-stepped grid

# Stair-stepped structural gridding

The workflow quickly generates stair-stepped corner point grids ready for simulation without the need for the Pillar gridding workflow.



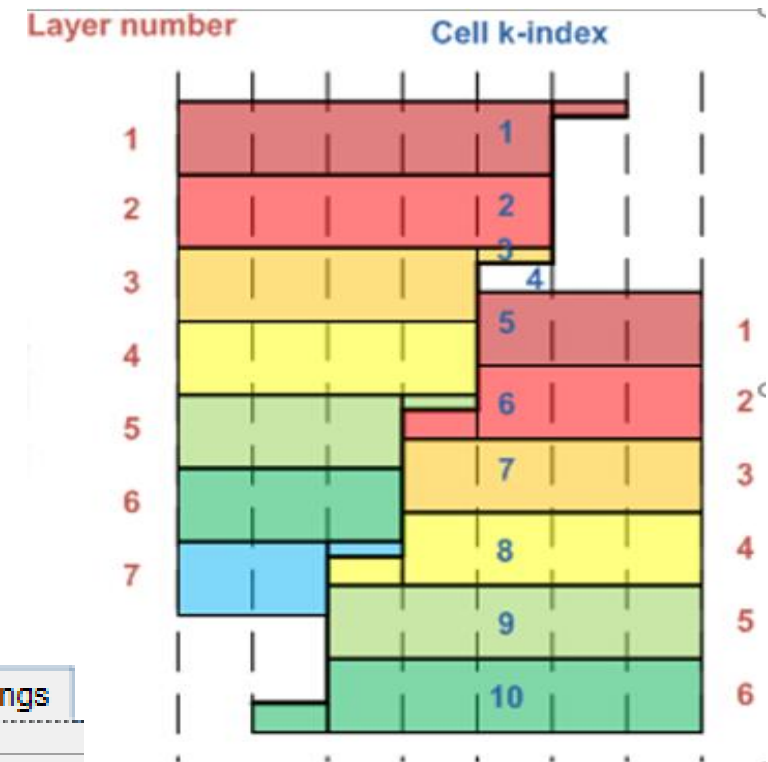
Depogrid  
Structural grid with stair-stepped faults

Use the same dialog box to  
create unstructured depogrids

# Layer maps (1)

In a single column of cells, there may be repeated geological sequences. Repeats are most obvious and intuitive when there are reverse faults, but they also can occur at geologically normal faults if block rotation causes the fault to go past the vertical.

- Need extra layers to honor this behavior
- Layer map (I,J, geological layer L) <-> (I,J, grid K)



Advanced

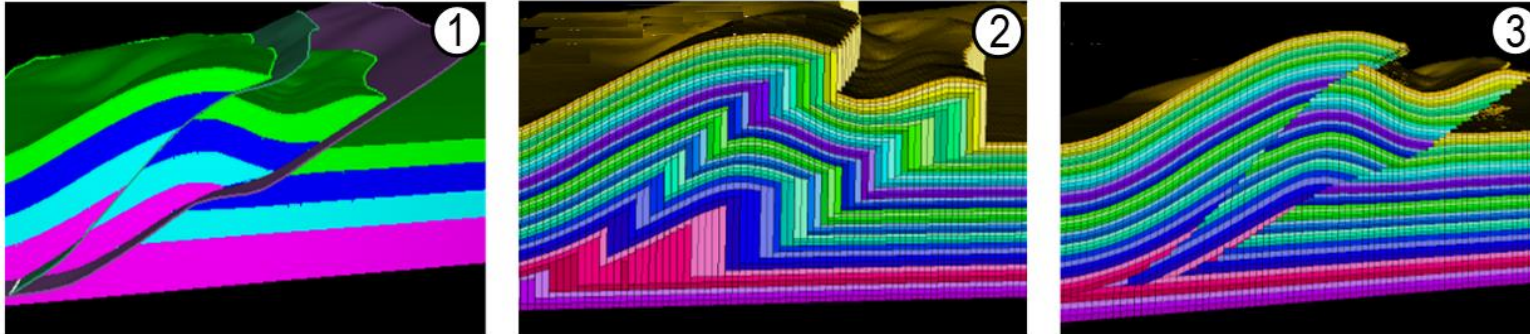
☒ Enable layer map creation ? ☐ Use depospace for property modeling ?

Hide settings



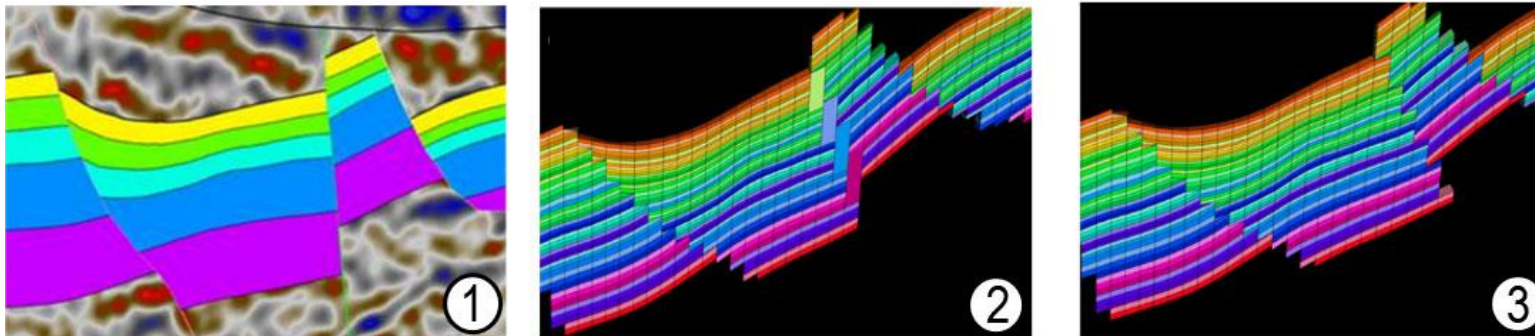
# Layer maps (2)

## Examples



Repeated geological layers across reverse faults in a synthetic thrust model

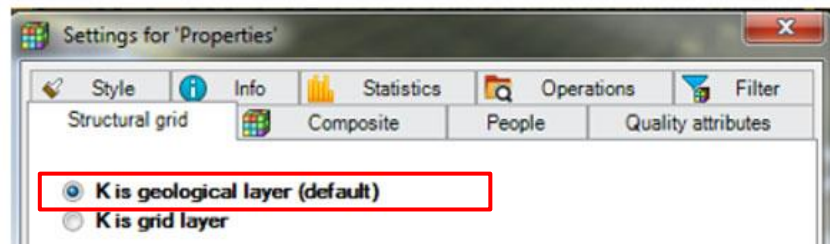
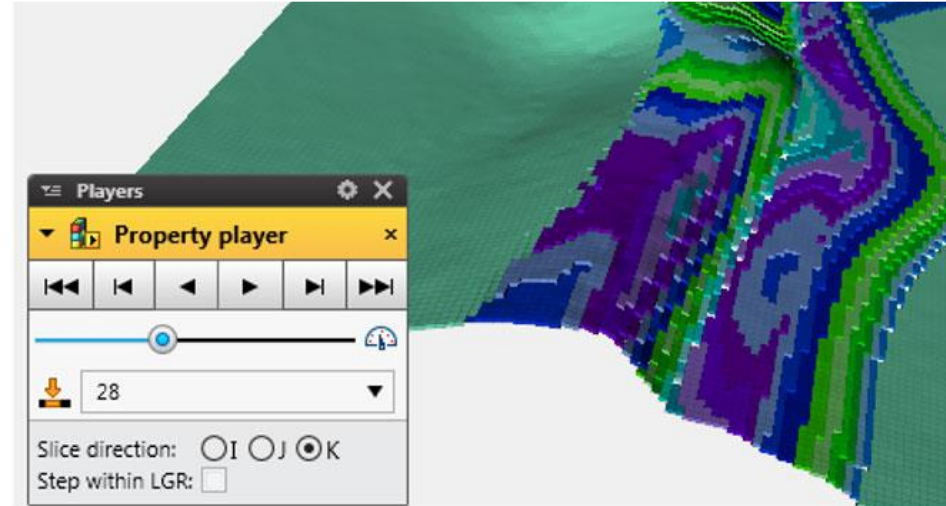
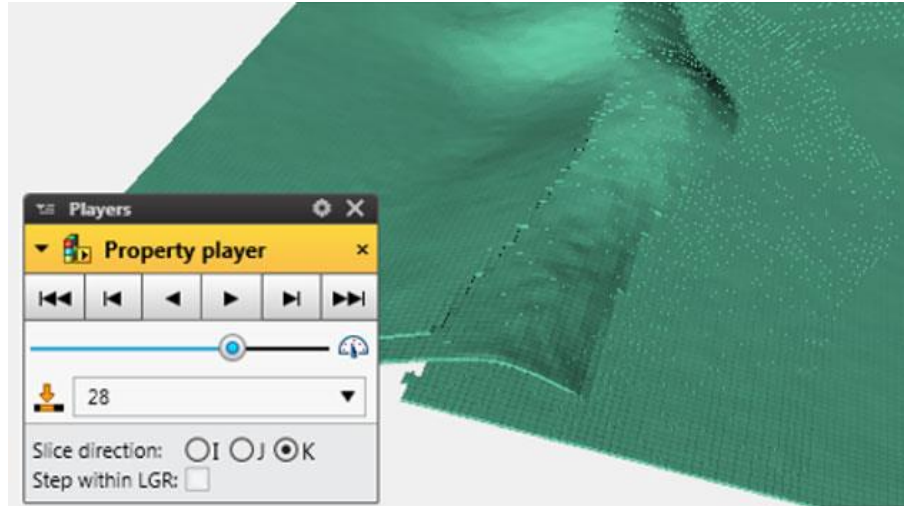
1. Reverse thrust faulting
2. No Layer map (no extra layers)  $L = K$
3. With Layer map (extra layers)  $L \neq K$



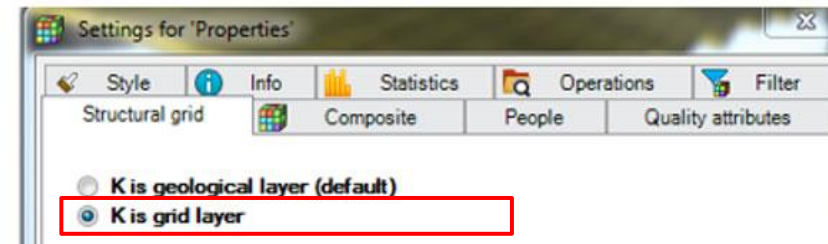
Repeated geological layers in a rotated normal fault block model

# Layer maps (3)

Switch between L and K slices using the Property player



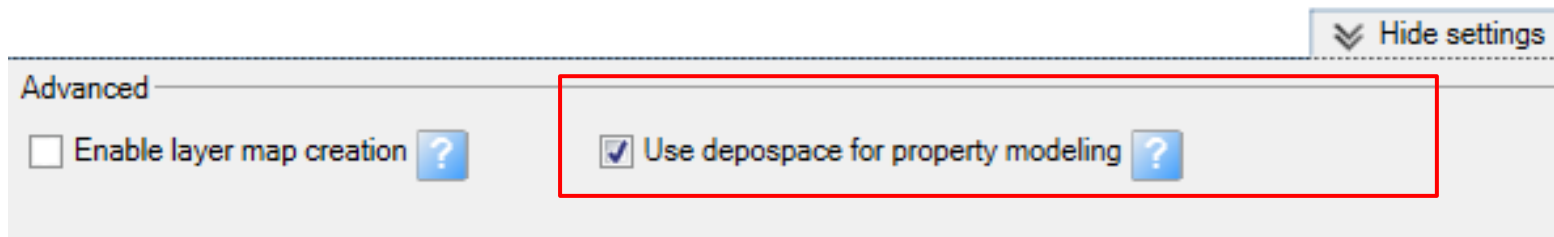
L layers



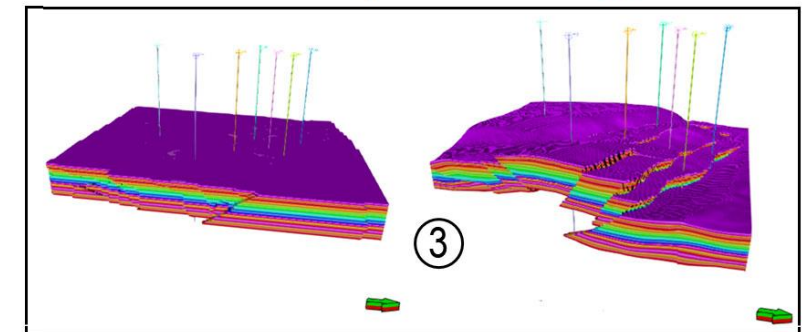
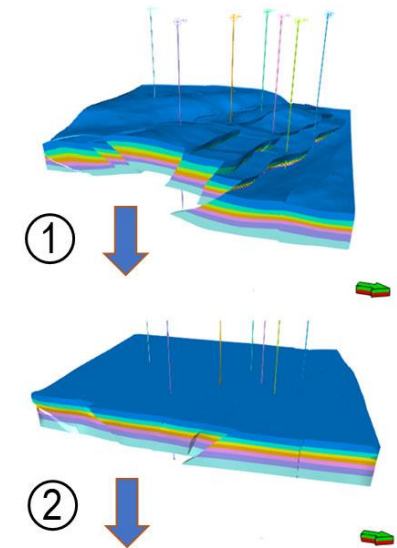
K slices

# Depospace for Property modeling

Generate a stair-stepped grid using the internal depositional space mapping for property modeling. Simulated properties are modeled in Depospace.

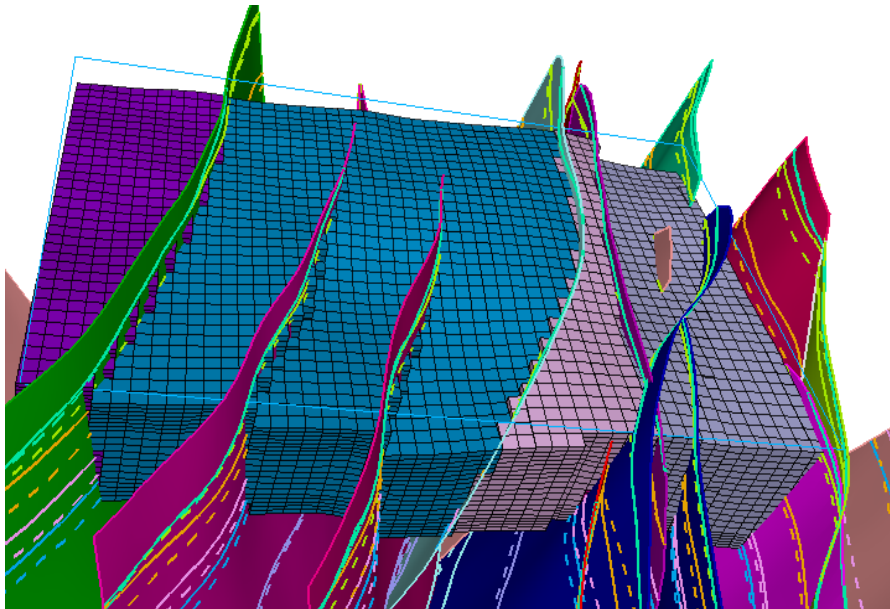


- 1 Structural model based on VBM
- 2 Depospace calculation
- 3 Structural grid based on VBM structural model using the option *Use depospace for property modeling*.

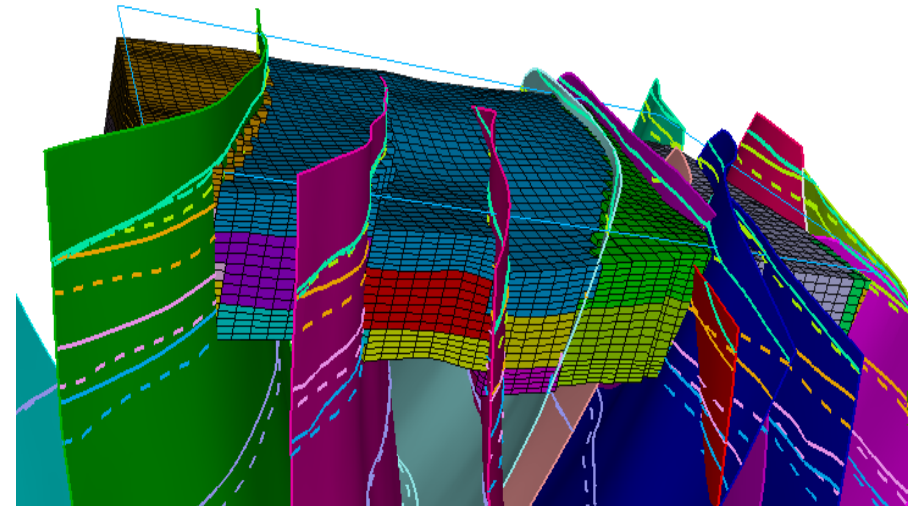


# Segments on a stair-stepped grid

Use to define reservoir compartments or regions for geomodeling and reservoir simulation workflows.



Region fault block property

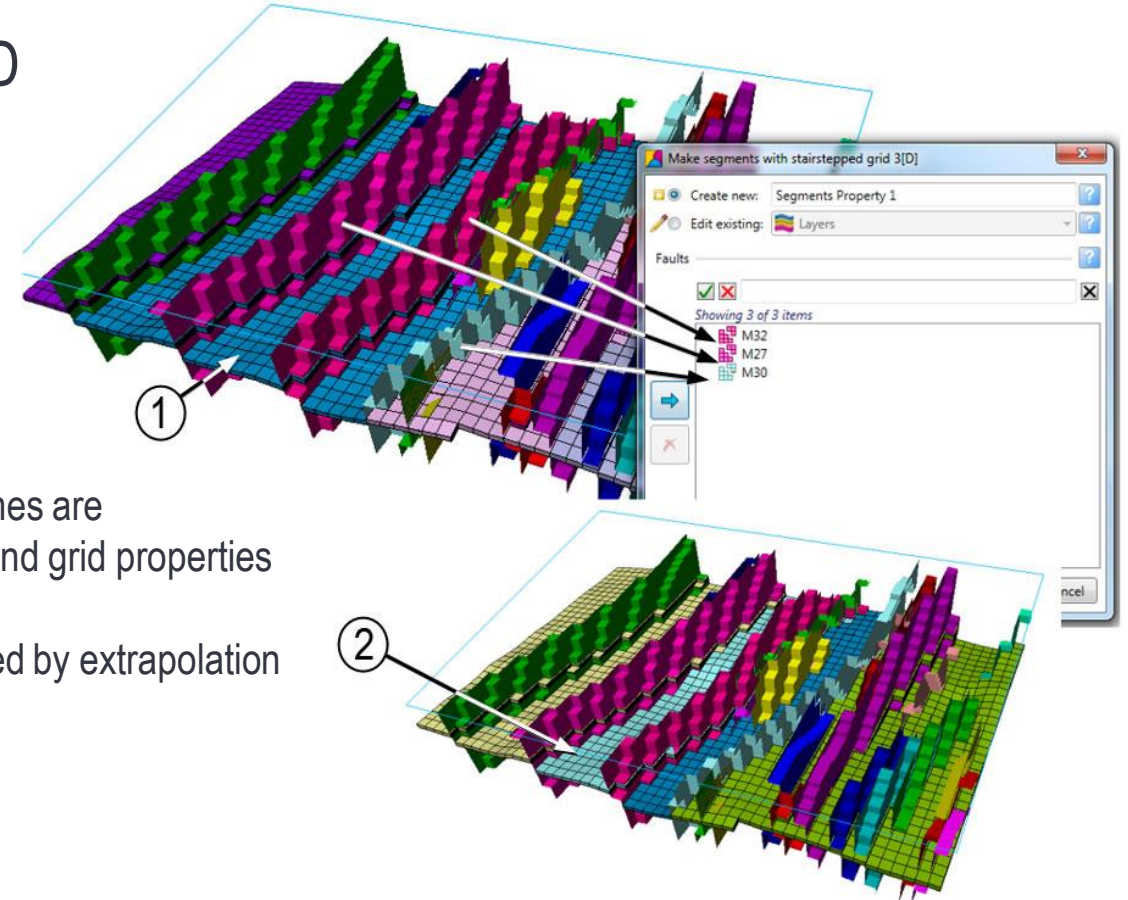


Region all zones property



# User defined segments on a stair-stepped grid

Created as volumes, bounded by extrapolation in 3D the selected stair-stepped faults.



- 1 Fault block property: 3D volumes are structurally isolated by faults and grid properties
- 2 Segment property: user-defined by extrapolation of the selected faults in 3D

# Exercises:

- Exercise: Build a full stair-stepped grid
- Exercise: QC the generated full stair-stepped grid
- Exercise: Build a single zone stair-stepped grid
- Exercise: Build a dual scale reservoir model on a stair-stepped grid

# Summary

In this module, you learned how to:

- construct a stair-stepped corner point grid from a structural framework
- generate the stair-stepped grid using the Depospace transform
- create alternative segmentations of your stair stepped grid
- use a stair stepped-grid in a dual-scale reservoir model (coarse-fine-coarse) workflow

# Learning game: Structural gridding for stair-stepped grids (1)



Instructions:  
There are several questions. Select the correct answers.



## Learning game: Structural gridding for stair-stepped grids (2)

What are the advantages of using Depospace for property modeling?

- a. More accurate population of depositional properties
- b. Repeated values in shadow of reverse faults
- c. Better geodetic distance preservation of variogram construction
- d. All the answers above are correct
- e. Both a. and c. are correct

## Learning game: Structural gridding for stair-stepped grids (3)

What is a Fault block property for a stair-stepped grid?

- a. 3D structural isolated volume bounded by grid faults and model boundary
- b. 3D volumes bounded by the extrapolation in 3D of user selected grid faults
- c. 3D volumes bounded by grid horizons to create a non-structurally isolated regions property
- d. Both a. and b. are correct

# Learning game: Structural gridding for stair-stepped grids (4)

What is a Segment property for a stair-stepped grid?

- a. 3D volumes bounded by grid horizons to create a non-structurally isolated regions property
- b. 3D structural isolated volume bounded by grid faults and model boundary
- c. 3D volumes bounded by the extrapolation in 3D of user selected grid faults
- d. All the answers above are correct