

Rescaling Data from Orthogonal to Corner Point Grids

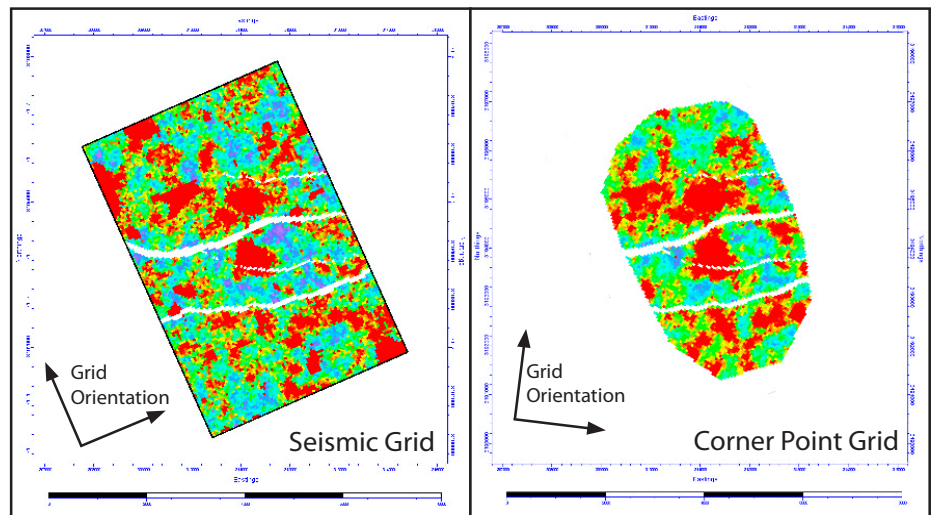
Transfers models from orthogonal (seismic) grids to corner point grids

Unique Zonal Adjustment technique ensures proper handling of both sampling and geometry

Flow geometry preserved for NTG, Porosity, and other volumes

Seismic derived property models in time are rescaled directly into CPG models in depth

The rescaled CPG models can be used as 3D trend models for cosimulation in EarthModel FT or other geomodeling programs



RockScale enables regridding and scaling in three dimensions of seismic derived properties from (orthogonal) gridding systems into mesh (CPG) gridding systems used in geologic modeling. It works in time and in depth and has the ability to regrid properties using unique Zonal Adjustment™ algorithms. These properties can then be used in a true 3D sense to assist in building more accurate reservoir models.

FULL USE OF 3D SEISMIC IMPROVES ACCURACY

Engineers and geologic modelers have long realized that incorporation of seismic data can improve the predictive capability of their reservoir models. The limitations have been in using the full 3D seismic or seismic-derived petrophysical properties to build the model, rather than simply reducing the 3D data to 2D maps of the averaged attribute in the reservoir layer.

EarthModel FT and RockScale use the new Stratigraphic Model Grid (SMG) to manage the transformation of the properties between the seismic grid and the Corner Point Grid of the Geologic Model. RockScale also ensures that the data is transferred in a manner that is structurally and stratigraphically correct, because getting the data into the correct layer is more important than getting it at the right depth. This includes the management of detailed structural models with many faults and sub para-sequences.

Additionally, Corner Point Grids can be rescaled into orthogonal grids to produce seismic synthetics for model QC purposes. This workflow can be used for evaluating 4D seismic studies and their relationship to fluid movement and detection using seismic data.

CRITICAL RESCALING ISSUES FOR SEISMIC MODELS

RockScale handles critical issues in preparing multi-million cell models from seismic and properly preserves geometry (including flow geometries) and volumetrics for:

- Net to Gross
- Effective Porosity
- Impedance (Shear and Acoustic)
- Any other volume prepared in a seismic gridding system

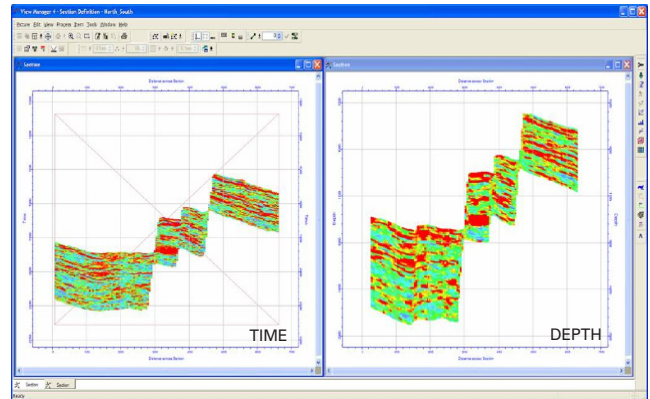
ZONAL ADJUSTMENT™

Zonal Adjustment is RockScale's method for properly incorporating 3D properties derived from the seismic data into flow simulation models. It solves the traditional problems of resampling, regridding, and upscaling.

The example (*right*) shows two versions of resampling, where the corner-point grid has very nearly the same resolution as the seismic grid, but the grids are not aligned. Note how the simple geometric resampling shows obvious grid artifacts and also how the coherent regions of high and low values are broken up by "noise". This stems from the small (sub-cell) lateral shifts and consequent small vertical shifts which make the property values incorrect. Flow units and associated net to gross are properly preserved using zonal adjustment.

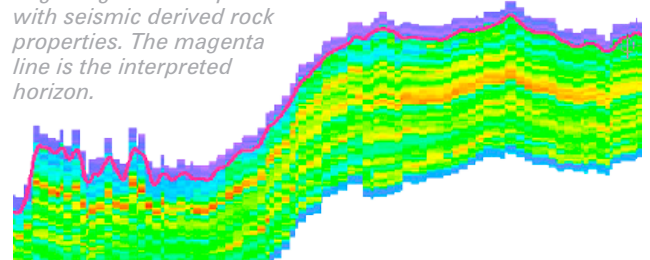
TIME - DEPTH CONVERSION

RockScale has the unique ability to take seismic properties in time and sample them into depth grids that have been prepared in EarthModel FT or other geomodeling packages.

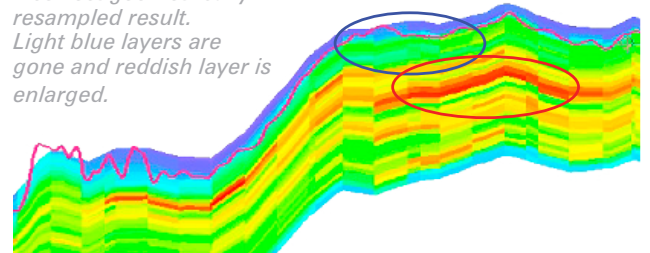


The workflow requires that the depth converted surfaces and faults are the same in both models and that similar methodologies have been used in each to describe the stratigraphic layering.

Regular gridded output with seismic derived rock properties. The magenta line is the interpreted horizon.



Incorrect geometrically resampled result. Light blue layers are gone and reddish layer is enlarged.



Corrected Model using Zonal Adjustment technique. Blue layers are preserved, and the orange area is similar to the original.

