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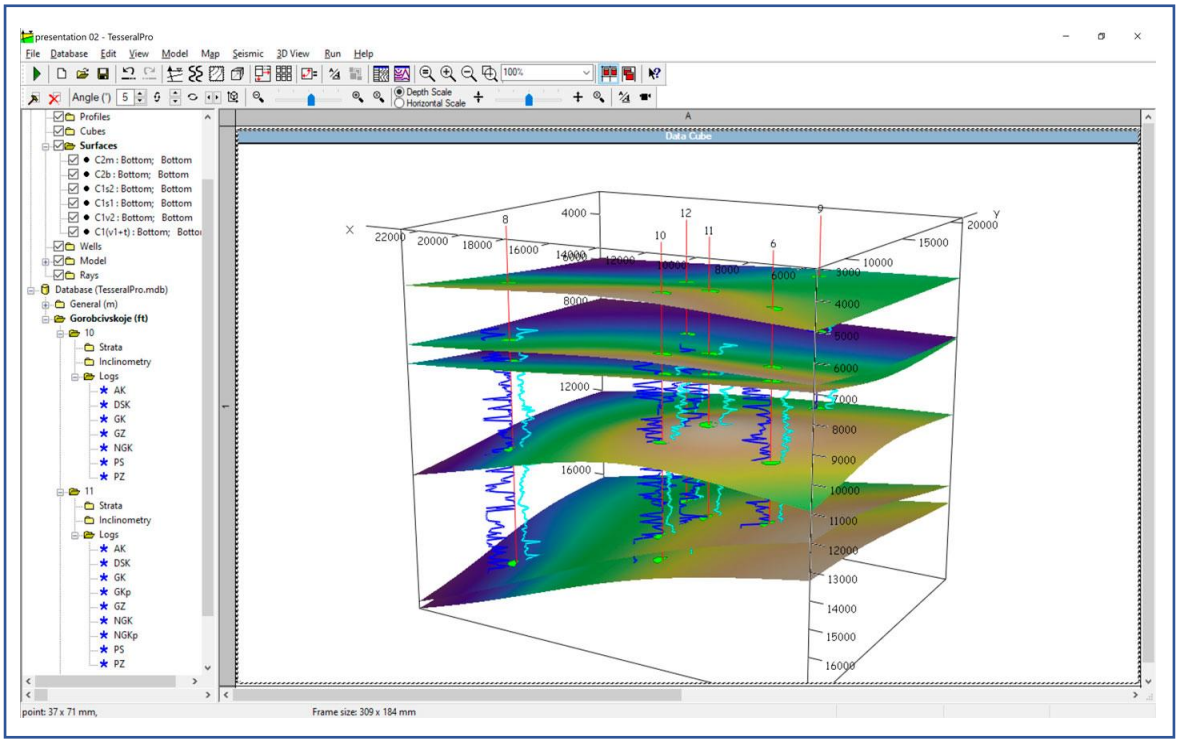
# Tesseral Pro




**Tesseral Pro** is designed for 2D, 2.5D and 3D full-wave modeling of seismic data by finite-difference methods, planning system of observations and data processing. The program allows you to set any observation systems, build complex depth models of the geological environment using GIS data, maps of geological surfaces or 2D and 3D seismic velocity models. Tesseral Pro offers an ingenious approach to thin-layered model development that delivers high accuracy and validity of the model while being simple and fast to build. For this, well log data, spatial position and inclination of boreholes, stratigraphic columns, horizon maps, etc. are used.

**Tesseral Pro features:**

- Design of 2D or 3D surveys with the calculation of maps of multiplicity and illumination of the section
- Evaluation of seismic resolution for complex geology and observation geometry
- Identification of processing artifacts that lead to interpretation errors
- Checking the robustness of any seismic interpretation
- Synthesizing seismic data for software development and testing
- Providing a clear understanding of converted-wave elements in the seismic section

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- Modeling AVO-dependence for anisotropic, porous, fluid-saturated, elastic and thin-layered media, as well as for curved boundaries complicated by changes in physical properties
- Modeling seismic records for surface, microseismic, VSP, and high frequency borehole observations
- Building a geological and geophysical model by arbitrary drawing them or from a scanned image, as well as obtaining complex multi-parameter models from available geophysical and geological data, such as velocity cubes, horizon maps, faults, well trajectories and breaks, well logs
- Seismogram calculation and data processing for various types of active and passive sources using a wide range of methods for approximating the wave equation
- Visualization and investigation of wave propagation and ray trajectories

**Tesseral Pro** allows the user to quickly create a model of any level of complexity by specifying the distribution of P and S wave propagation velocities, rock density, porosity, fluid properties, frequency dependent absorption and Thomsen parameters for transversely isotropic media. Fractures are taken into account by using the effective Schoenberg model. For clearer creation of thin-layered models, various auxiliary data can be used, such as well log data, spatial position and inclination of boreholes, stratigraphic columns, horizon maps, etc.

The available modeling tools allows quickly and accurately calculate the propagation of vibrations in an inhomogeneous medium and obtain 1D / 2D / 3D multicomponent (1C / 2C / 3C) data for various types of active and passive sources based on scalar, acoustic, elastic or elastic anisotropic wave equations. Each computational scheme can additionally include three additional modes:

- Generation of the field of first-arrival times, maximum signal energy, divergence, or rotor of the wavefield, which provide additional information used to calculate the Green's function for Kirchhoff depth migration
- Suppression of SV-waves in the source area, allowing to include / exclude surface waves generated by the source
- Accounting for frequency-independent absorption (quality factor)

**Setting Observation Geometry**

Arrangement of sources and receivers in orthogonal, diagonal, etc. directions, geometry of 2D and 3D VSP observations, SPS files, site map, satellite images or Google map - can form the basis of an observing system. At the same time, calculations of overlap and illumination maps for target horizons are available.

**Mesh model transformations**

There are 8 ways to transform data into a grid format, incl. splines, kriging and natural neighborhood.

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### Wave propagation visualization

**Tesseral Pro** provides simulated data analysis tools including ray tracing and waveform visualization. Ray-tracing methods complement finite-difference methods by allowing the identification of P-waves or converted waves reflected from targets on synthetic seismograms. Ray paths are rendered and can be grouped by reflective horizon, common shot point, common receiver, or common reflection point.

### Processing procedures

**Tesseral Pro** contains a variety of processing routines, including various trace sorting, NMO / STACK, 2D pre- and post-stack time and depth migrations, VSP migrations, time / depth conversion, DWM duplex and DSWM scattered duplex migrations, and others.

### Wave equation solution

3D-3C acoustic and elastic modeling methods provide an approximation of wave propagation in a realistic heterogeneous environment in all directions. This type of modeling can be applied in the study of geological objects such as reefs, salt domes, various types of faults, crevices, steeply dipping faults, etc. in areas where it is necessary to restore accurate 3D reservoir characteristics.

### Probing pulse

The user can select the type of the probing pulse and its frequency. Available both as a set of standard impulses (Rikker, Puzyrev, zero-phase, symmetric, minimum phase impulse, etc.), or setting your own, allowing to set complex source signatures and obtain seismograms as close as possible to real data.

### Parallel computing

**Tesseral Pro** allows to perform parallel calculations on multiple computers or cluster processors using a special add-on ("network" version - for Windows or "cluster" - for Linux-clusters), as well as using GPU graphics accelerators.
**Tesseral Pro** allows you to understand the strengths and weaknesses of the technology used and significantly reduce the time to adapt to new technologies.

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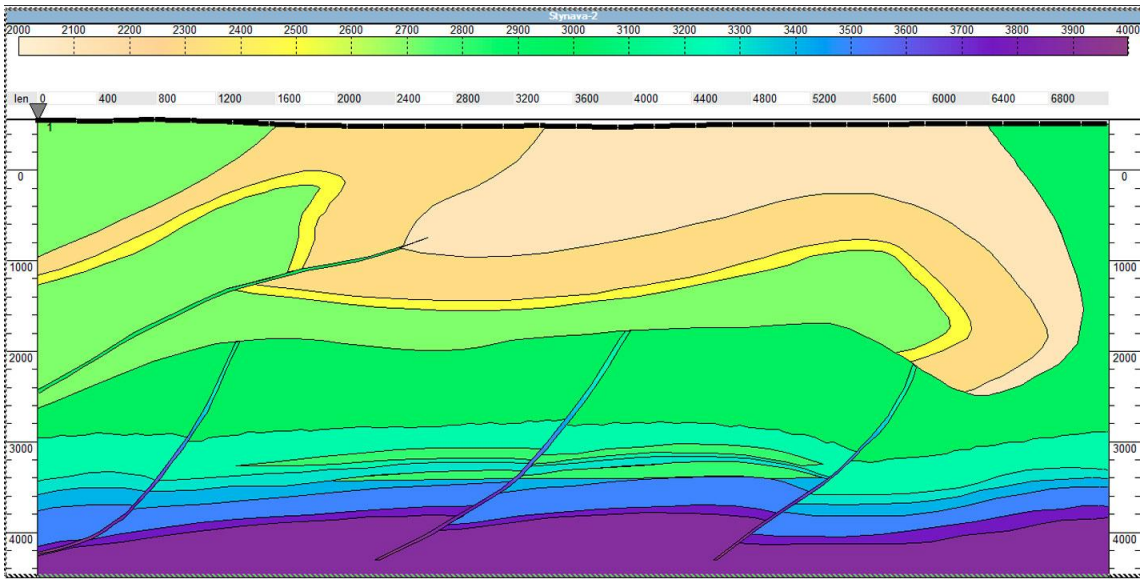


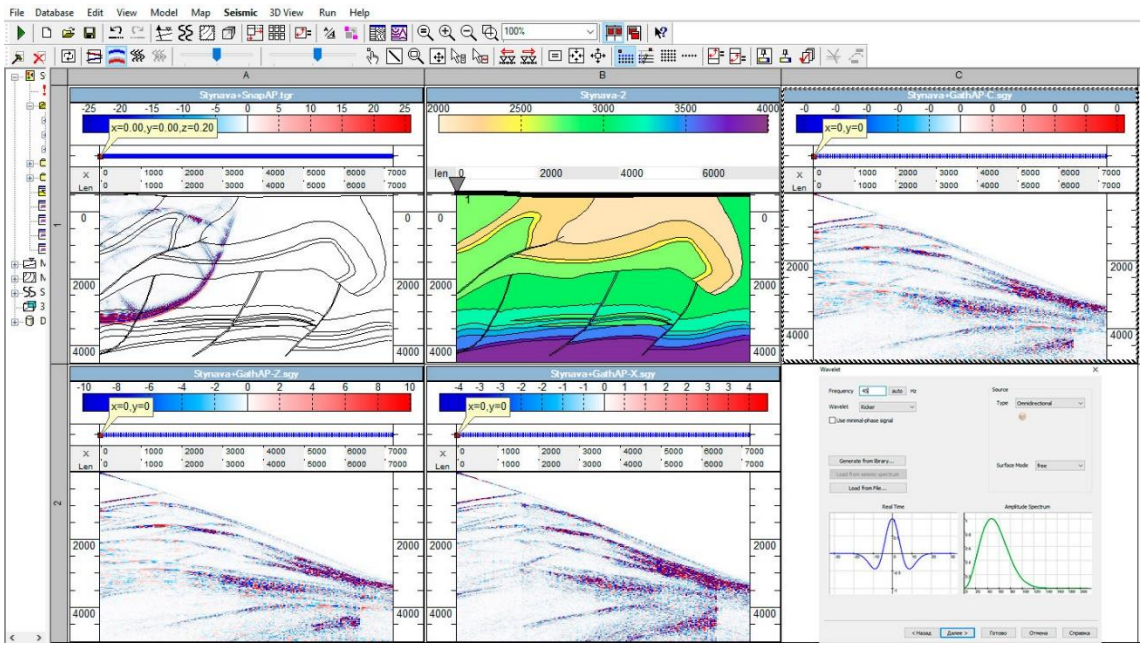

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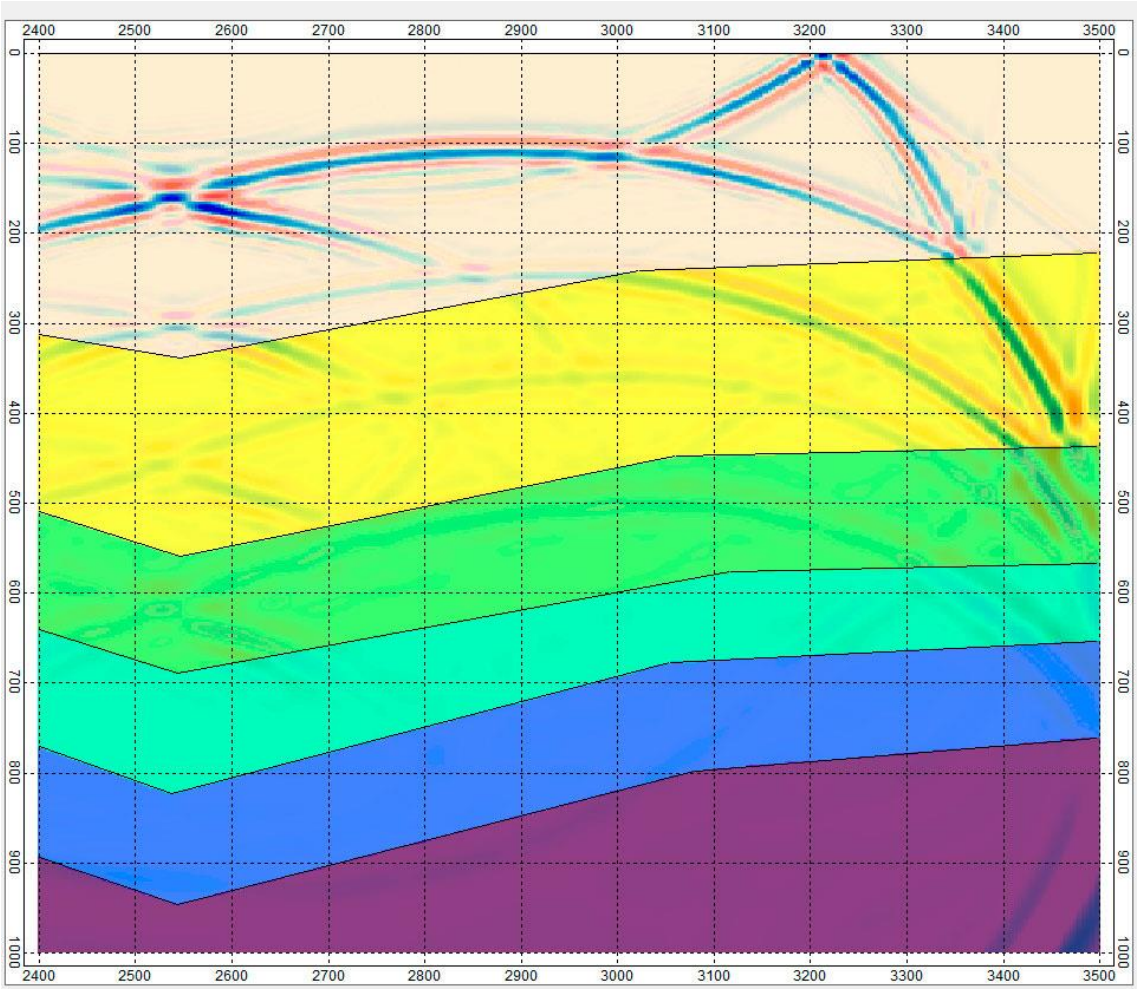


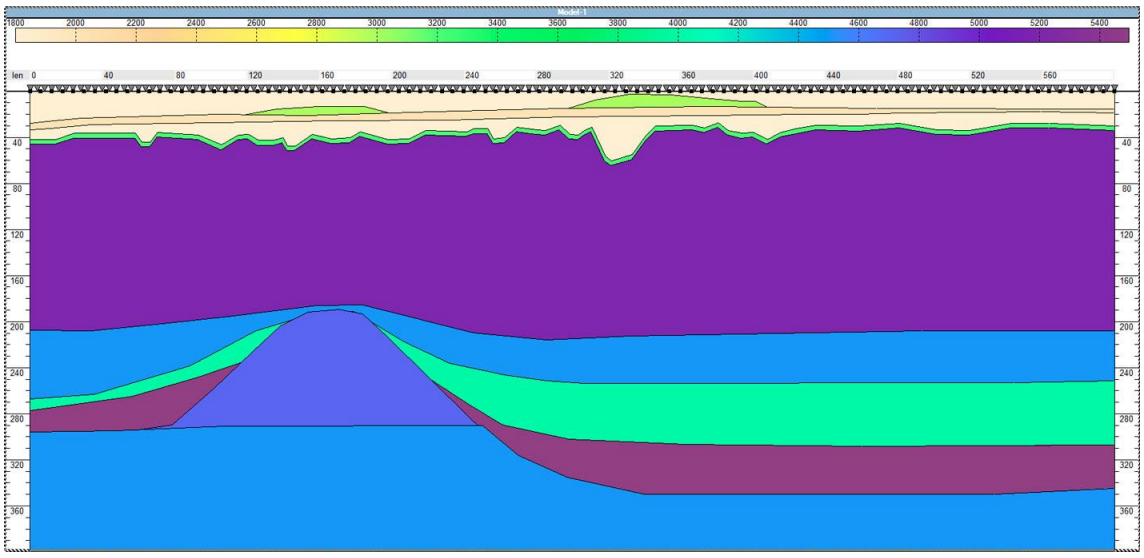

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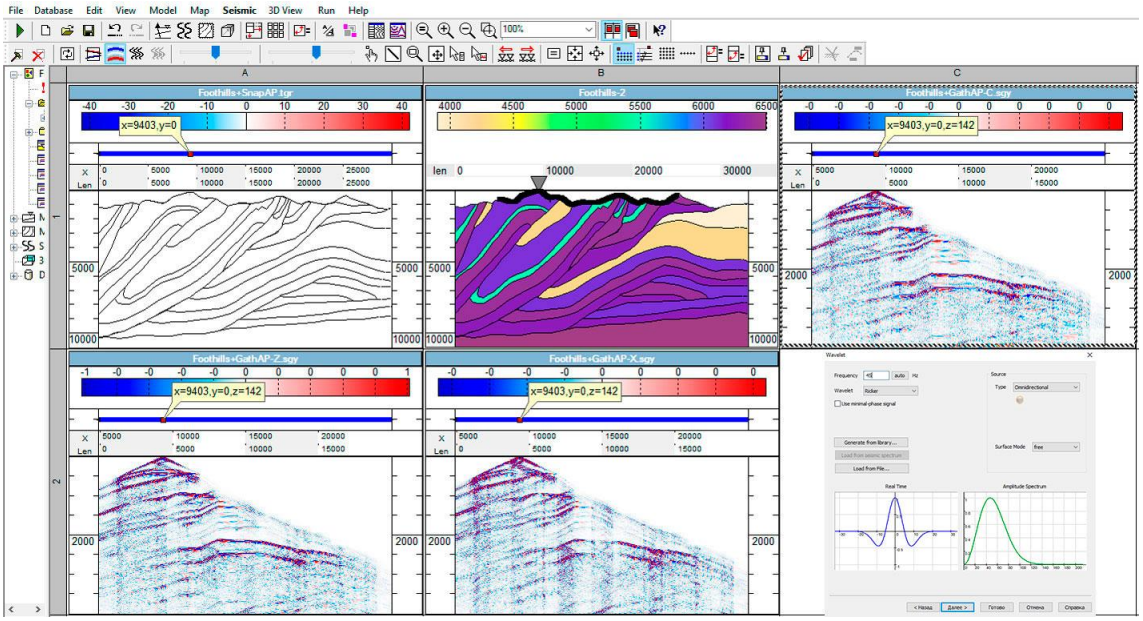


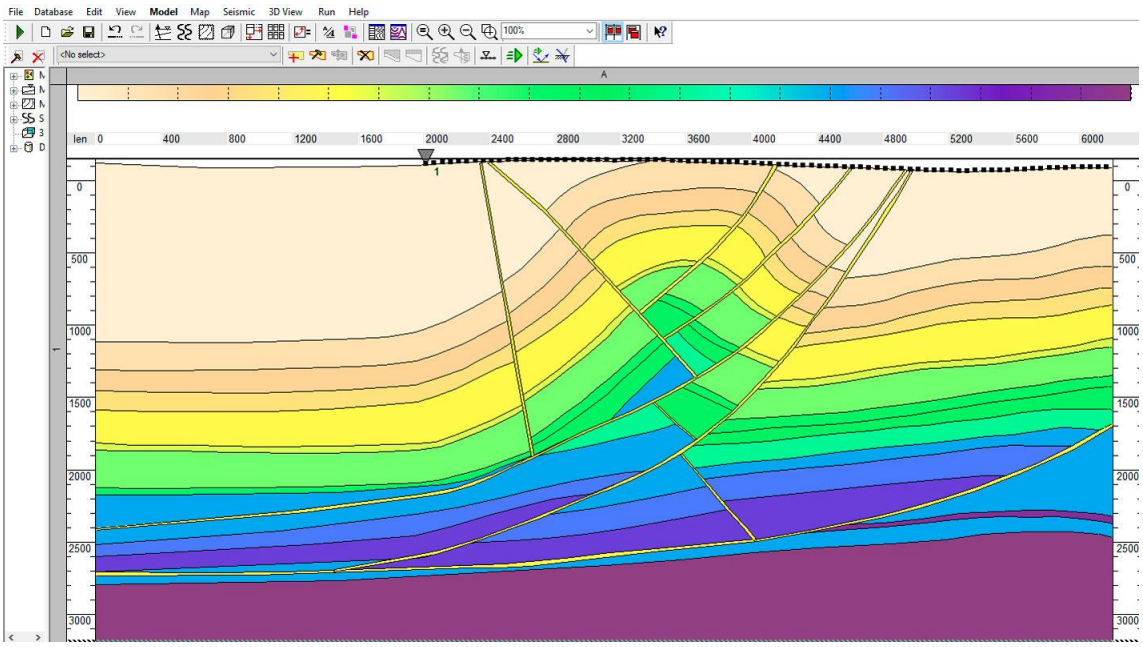

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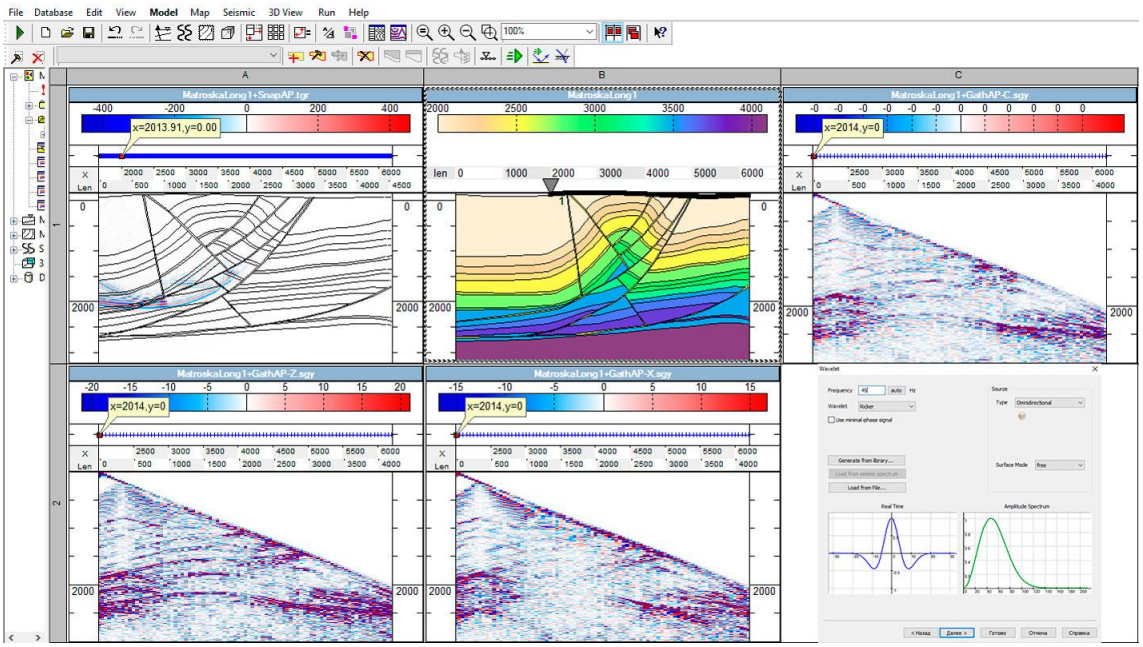


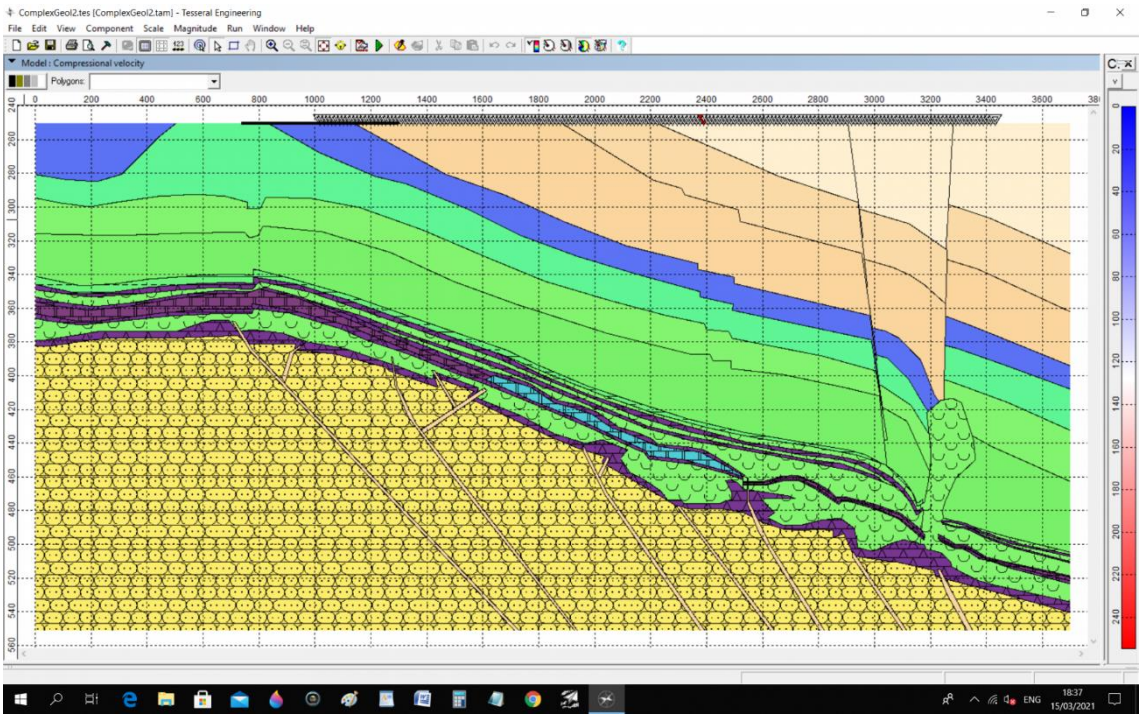

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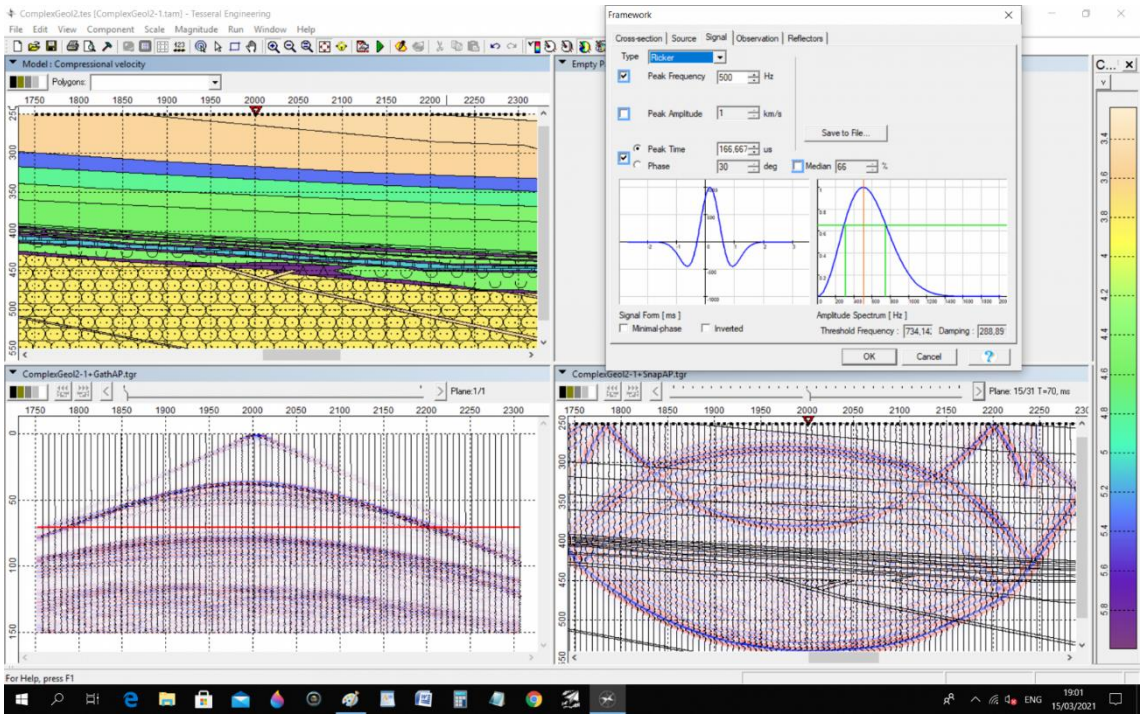


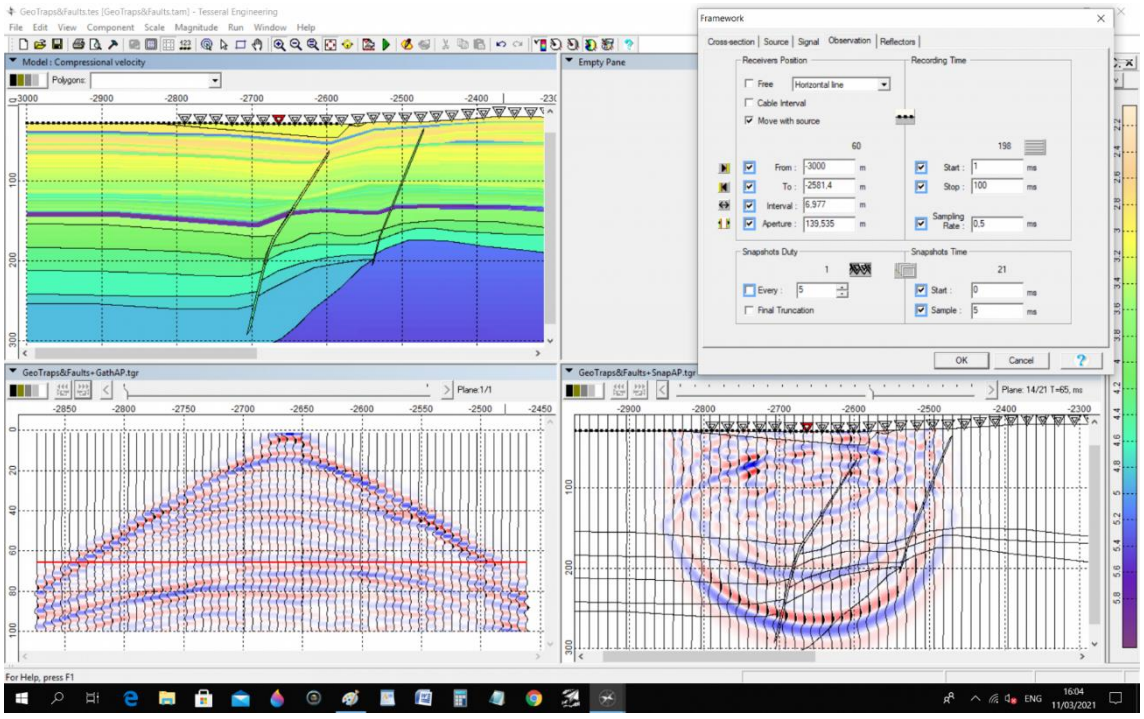

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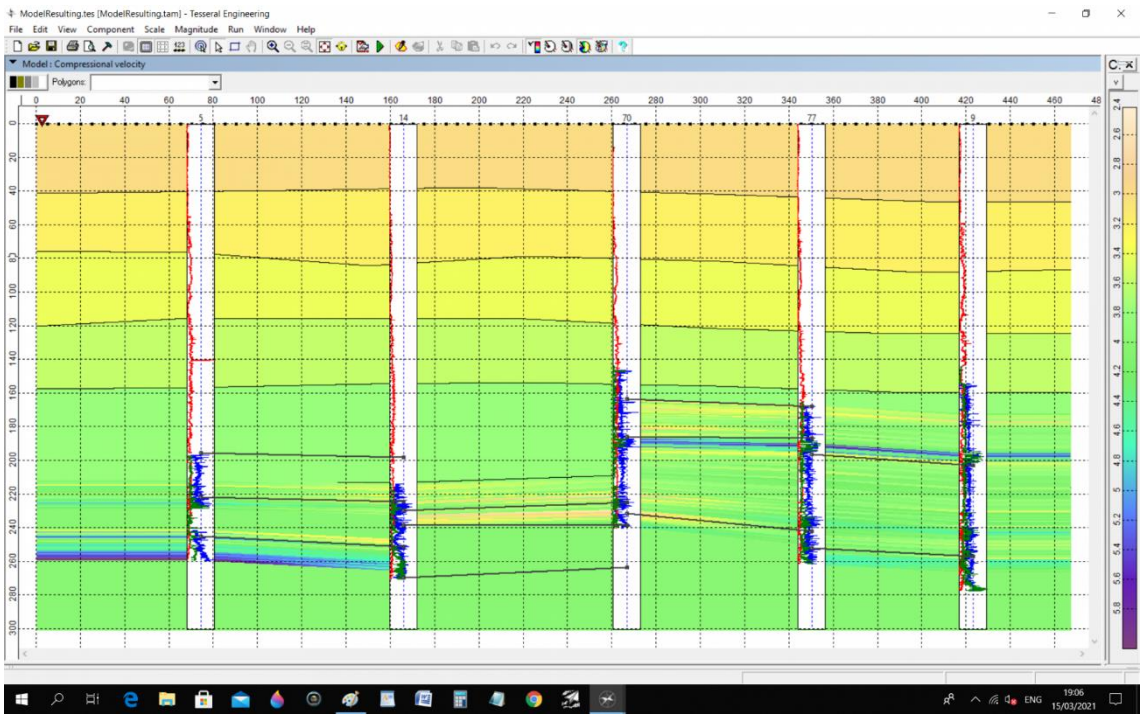


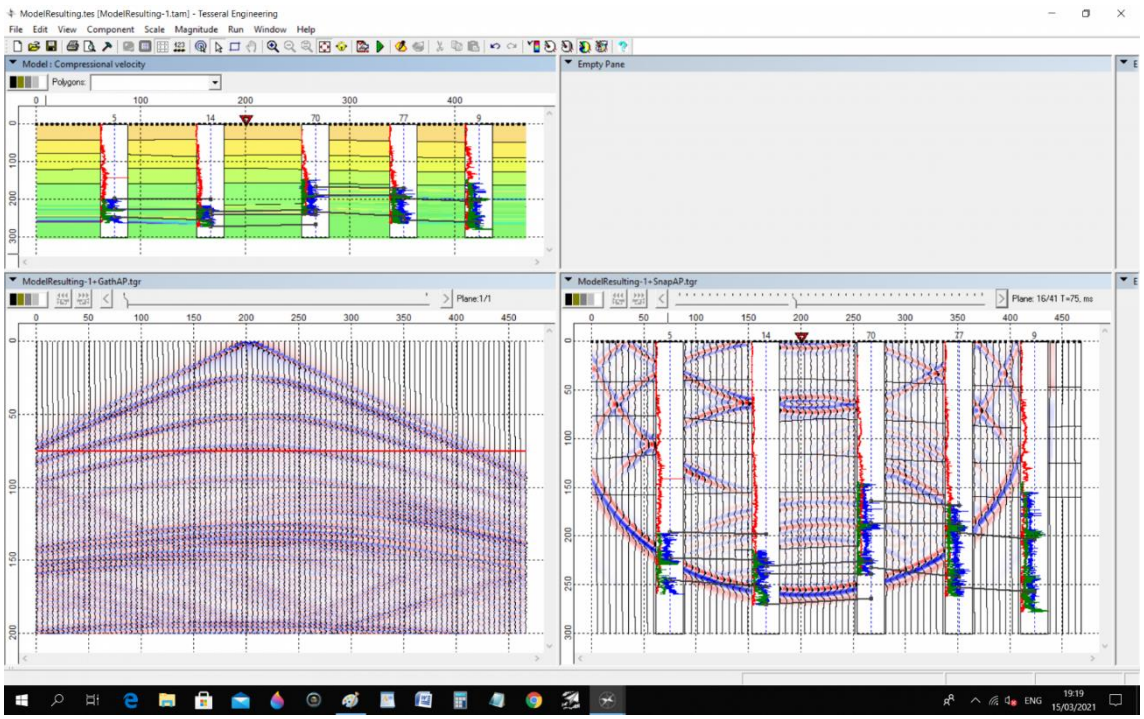

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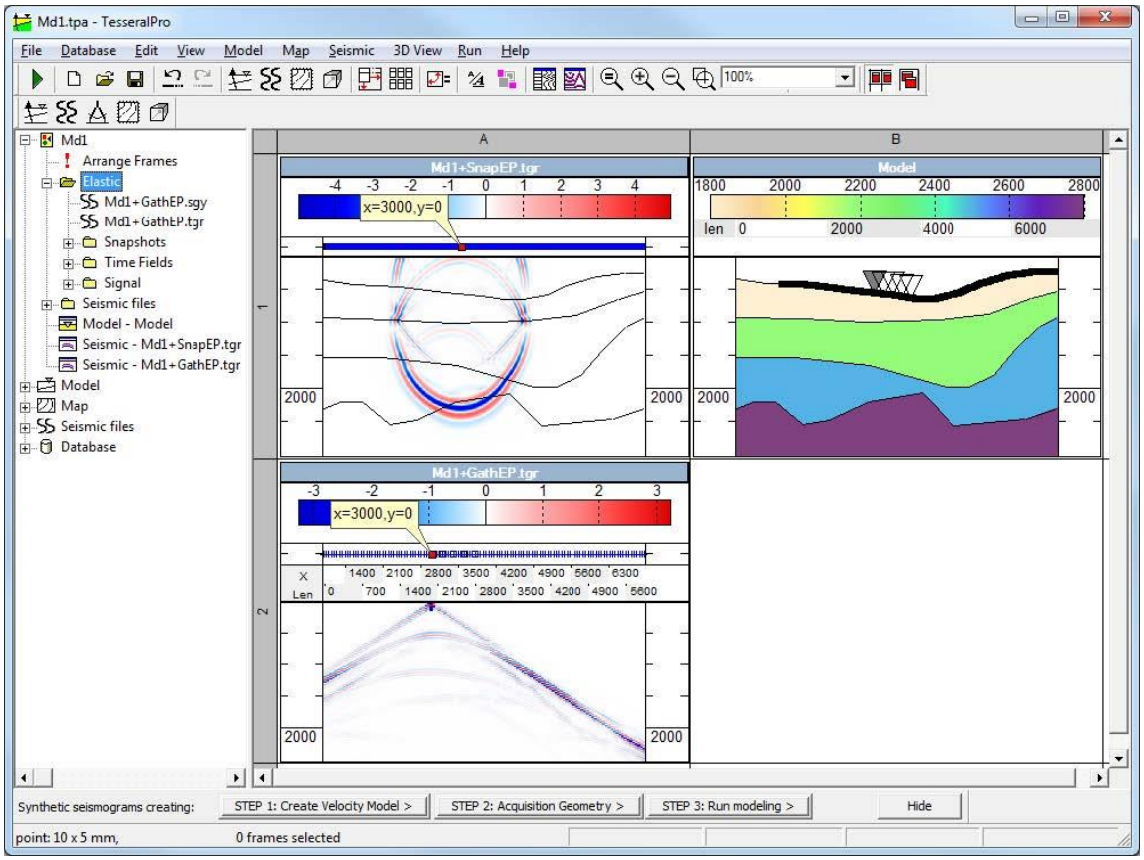

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