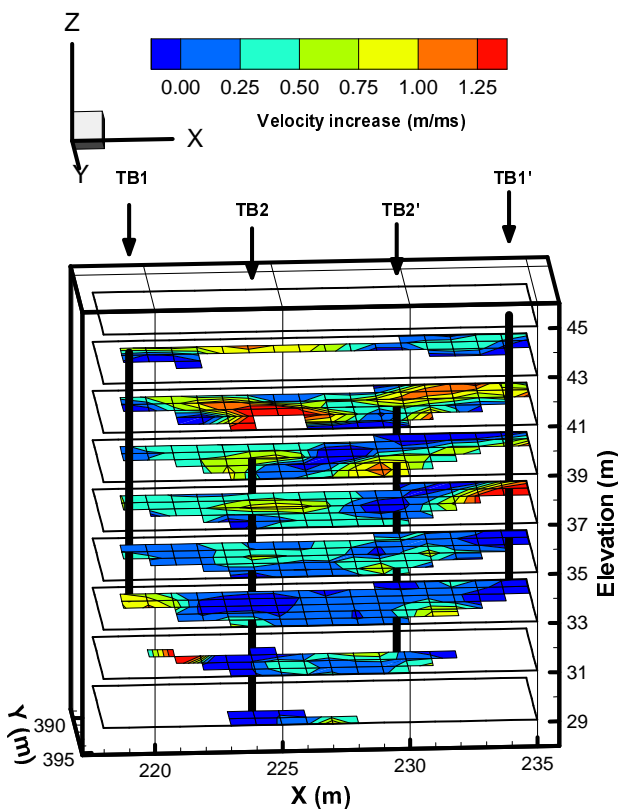
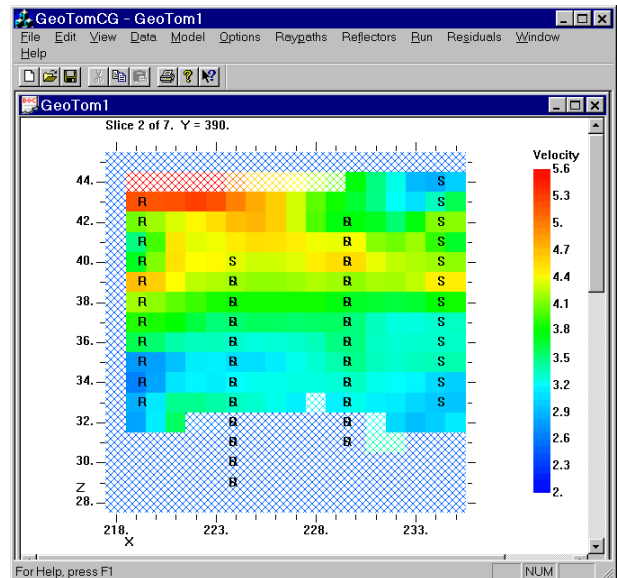


GeoTomCG 3-D tomographic Software for Windows by Daryl Tweeton

- Fully 3-D tomographic analyses.
- Versatile constraints for using site information to counteract nonuniqueness.
- Practical, easy to use.

• **Tomograms.** GeoTomCG can process and display crosshole or VSP seismic or radar data. The display to the right shows one vertical slice from a 3-D grid of calculated seismic velocities. S and R indicate source and receiver positions, respectively. The crosshatch pattern indicates areas with few raypaths.

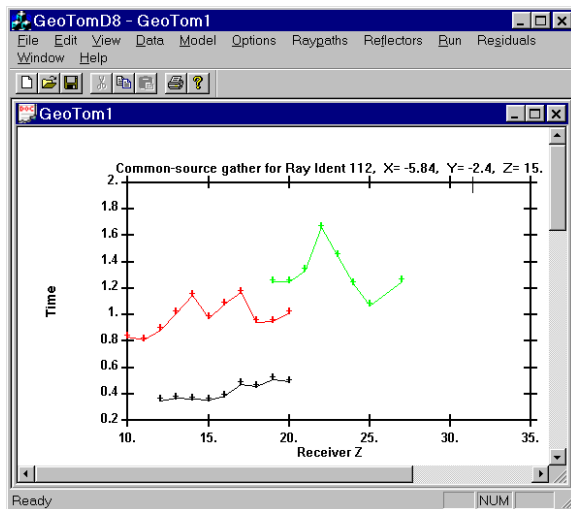


Postgrout minus pregrout velocities in right bank horizontal slices at odd values of elevation. View is from river toward bank, looking slightly downward.

GeoTomCG can export results for display by commercial 3-D graphics programs such as Tecplot®. A 3-D display of stacked horizontal slices generated by GeoTomCG from the results above and displayed by Tecplot is shown to the left. This display shows the increase in velocity where grout was injected through boreholes TB1, TB2, TB1', and TB2' to strengthen a stone bridge abutment.

- **Quality control.** GeoTomCG provides many features for checking the data and results. The display to the right shows a common-source gather for raypaths from one source position to the receivers in three different planes, as indicated by different colors. Data plot options allow plotting time or velocity against source or receiver X, Y, Z, or raypath identifiers.

Traveltimes can be processed to calculate velocities, or amplitudes processed to calculate attenuation coefficients. Sources and receivers can be in any configuration within a 3-D grid. Anisotropy can be specified for each point of the grid. Raypaths can be straight or curved.



Options for constraining the inversion to improve the reliability of results include:

1. Maximum and minimum calculated velocities.
2. Constant velocity in user-selected areas or volumes in the grid.
3. Groups of nodes with similar velocities, such as horizontal layers or vertical columns.
4. Constraints that take into account the uncertainty in site knowledge.

Adjustable damping and smoothing to reduce small-scale variations in calculated velocity.

GeoTomCG provides graphical displays of velocities, raypath densities, and other parameters for inspecting results and preparing preliminary reports. These displays can be copied to the Windows clipboard and pasted into documents. Plots for quality control include traveltimes versus distance, residual versus raypath angle, velocity versus raypath angle, and others. It also provides 3-D numerical results and 2-D slices of the 3-D grid as ASCII files that can be read by commercial 3-D and 2-D visualization programs for preparing formal reports and presentations. Velocities or amplitudes in two sets of results can be compared by differences or ratios.

Raypaths can be saved in a file and displayed. Curved-ray amplitude inversions can be performed with curved raypaths from prior traveltimes inversions. (Amplitude inversions cannot provide appropriate curved rays because ray bending depends on contrasts in velocity, not attenuation.)

The user's manual describes tomographic analyses of seismic and electromagnetic traveltimes and amplitude data. Examples with sample data files allow the user to practice traveltimes and amplitude data processing.

Over 60 copies have been sold worldwide, with many favorable comments from users. Julian Ivanov of the Kansas Geological Survey wrote, "**GeoTomCG** is very well designed and organized 3-D Tomography software. It is very user friendly! My needs as a customer were very well anticipated and met. Time-consuming tasks, like model building, are automatically handled. Also, I've been very pleased with the prompt and efficient customer support."

The Windows time-picking program **TomTime** provides output in the format used as input for **GeoTomCG**. It provides versatile display and filtering options for noisy data and for S-wave overlays.