SANITAS

Seismic Statics, Two Ways

From conventional delay-time analysis to cascade anisotropic tomography

Getting the near-surface right is the difference between a stack that images the subsurface and one that doesn’t. This guide walks through Sanitas’ two statics pathways — the proven Traditional Refraction Statics workflow, and the Cascade Anisotropic Tomography workflow built for complex, azimuthally-varying near-surface conditions — so you can pick the right tool for your data.

Traditional Refraction and Turning-ray Tomography Statics

Delay-time & turning-ray tomographic workflows for conventional near-surface conditions.

Cascade Anisotropic Tomography

Multi-pass eikonal tomography with anisotropic correction for complex near-surface geology.

INSIDE THIS GUIDE

METHOD ONE

Traditional Seismic Statics

Conventional delay-time analysis and turning-ray tomography, inside Sanitas

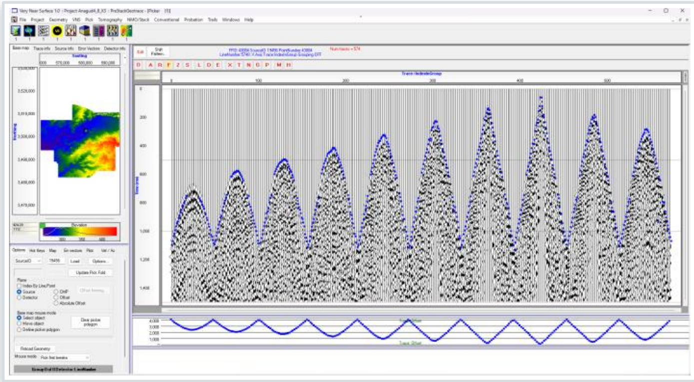
Traditional refraction statics starts with first breaks picked across multiple planes, then follows one of two proven paths to a near-surface correction:

Delay-Time Refraction Statics

Assign first breaks to refractors, run refraction analysis (refractor velocity + delay times), build the refractor model, and estimate statics directly.

Turning-Ray Tomographic Statics

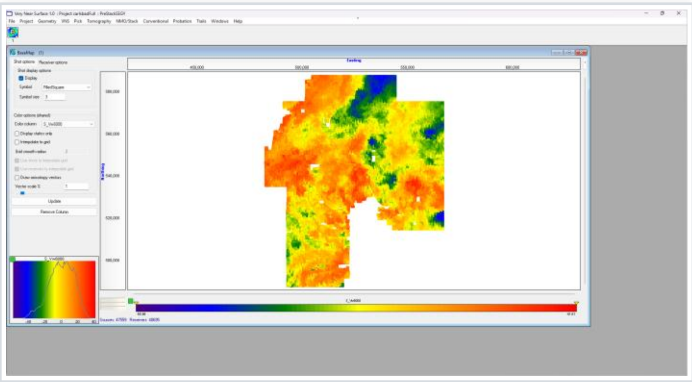
Define an initial tomographic model (velocity range, max depth), select reliable offsets, and iteratively build a turning-ray tomographic model.



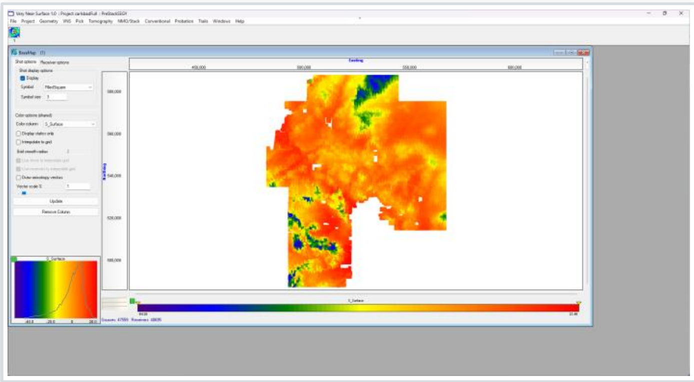
Multi-plane picking assigns first breaks to refractors

WORKFLOW

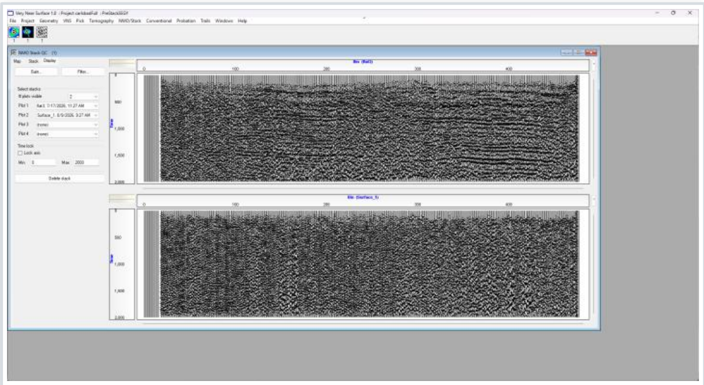
Pick First Breaks → **Refraction Analysis** → **Model Construction** → **Statics Calculation**



Delay-time statics solution



Turning-ray tomographic statics



Stack QC — CMP stack after conventional refraction statics

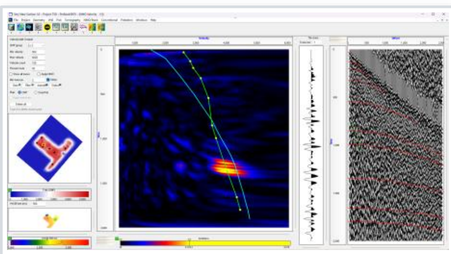
METHOD TWO

Cascade Anisotropic Tomography

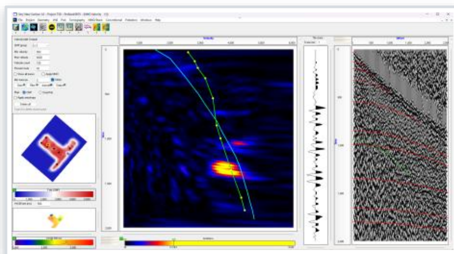
Multi-pass eikonal tomography built for azimuthally complex near-surface geology

Where a single tomographic pass falls short, Sanitas runs Eikonal tomography in cascade — multiple successive passes — combined with anisotropic analysis. The result is a first-of-its-kind workflow: statics AND anisotropic correction applied to both velocity analysis and the final stack, solving a problem no other land processing system addresses.

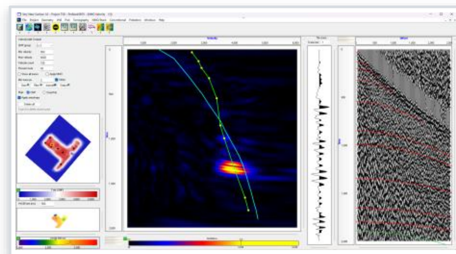
VELOCITY ANALYSIS — SEMBLANCE QUALITY



No statics applied

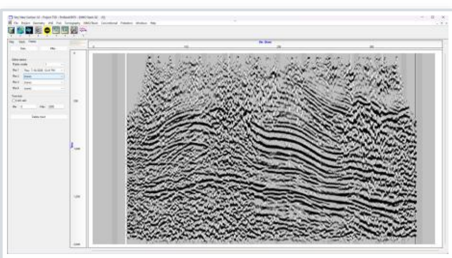


Cascade 3-3 statics

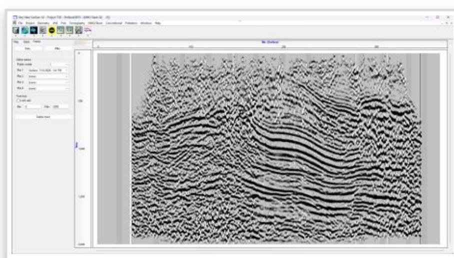


Cascade 3-3, anisotropy corrected

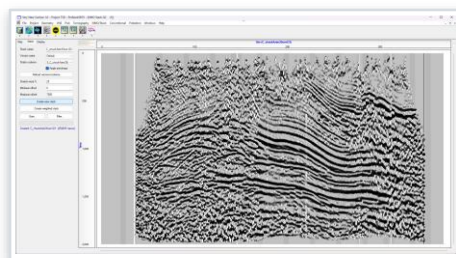
STACKED SECTION — PROFILE 1



Raw — no statics



Conventional tomo (surface)



Cascade 3-3, anisotropy applied

Why cascade + anisotropy matters

Azimuthal near-surface velocity variation degrades conventional statics. Cascading tomographic passes and removing the anisotropic component sharpens semblance picks and flattens reflectors that single-pass, isotropic methods leave misaligned.

CHOOSING A WORKFLOW

Which Statics Path Fits Your Data?

A side-by-side comparison, and the guided workflow that builds either one for you

	Traditional Refraction Statics	Cascade Anisotropic Tomography
Core method	Delay-time analysis or single-pass turning-ray tomography	Multi-pass (cascade) Eikonal tomography
Anisotropy	Not modeled	Explicitly analyzed and corrected
Best suited for	Conventional, laterally consistent near-surface	Complex, azimuthally-varying near-surface
Applied to	Statics only	Statics and anisotropic correction, on both velocity analysis and stacks
Guided by	Sanitas TrailMap: Trend → Tomo	Sanitas TrailMap: Trend → Cascade (with anisotropy)

GUIDED BY SANITAS TRAILMAP™

Neither workflow requires guesswork. The Sanitas TrailMap is an interactive tutor that carries you through the exact sequence of live, functioning Sanitas windows needed to reach a specific goal — picking LMO trends, building a tomography model, updating it with picks, and computing statics — using your own active project. Pre-built trail maps cover both paths in this guide, including Trend→Tomo, Trend→Cascade, and their anisotropy-aware variants.