

AVOAZ Inversion

Prestack azimuthal inversion in frequency domain

User Manual

IPLAB

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1. Introduction

The **AVOAZ Inversion** IP_Seis plug-in (version: 2016.1.0.0, release date: December 2016) can be used for **AVOAZ** seismic inversion.

The technology allows to use several angle&azimuthal stack cubes to calculate acoustic impedance cube, Vp/Vs cube, density and anisotropic parameter cubes based on Ruger (1996) equations.

All calculations use frequency domain and Fast Fourier transfer. It is allow to create virtual cube as result and “on-flight” changes for several inversion parameters.

2. Start

Start: Seismic Attributes->

AVOAZ Inversion

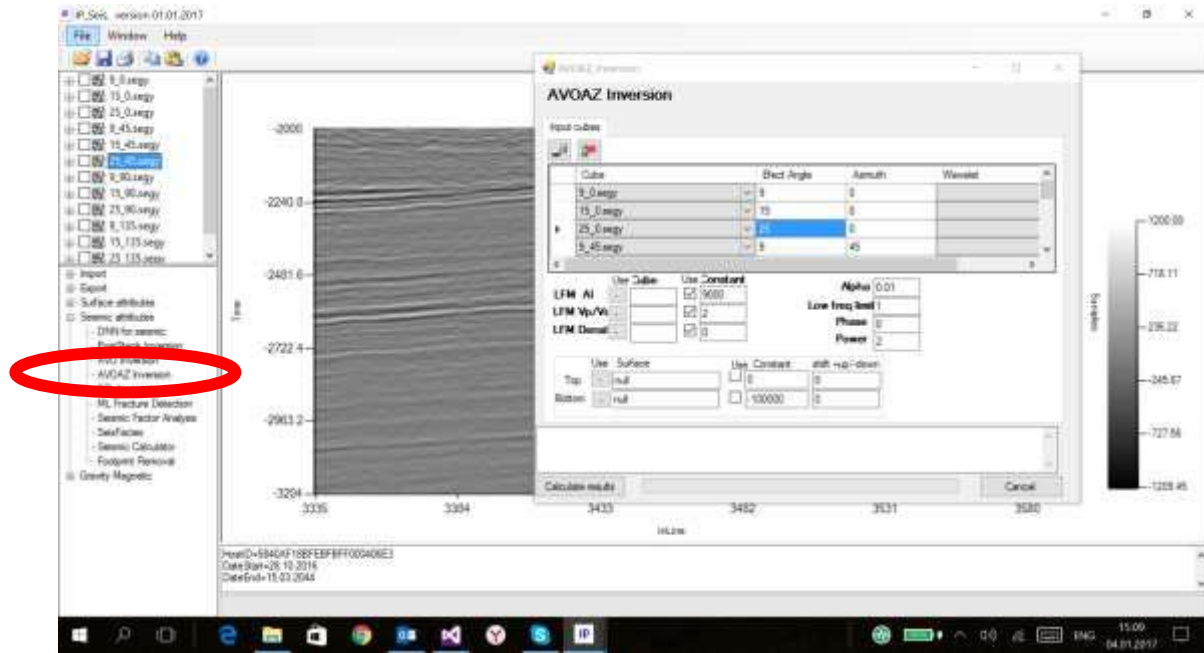


Figure 1: Project tree and programs tree to start **AVOAZ Inversion**.

3. Input parameters

AVOAZ Inversion

Input cubes

Cube	Effect Angle	Azimuth	Wavelet
9_0.segy	9	0	
15_0.segy	15	0	
25_0.segy	25	0	
9_45.segy	9	45	

LFM AI: ☐ Use Cube ☒ Use Constant 9000
 LFM Vp/Vs: ☐ Use Cube ☒ Use Constant 2
 LFM Density: ☐ Use Cube ☒ Use Constant 0

Alpha: 0.01
 Low freq limit: 1
 Phase: 0
 Power: 2

Top: ☐ Use Surface null ☐ Use Constant 0 shift +up/-down 0
 Bottom: ☐ Use Surface null ☐ Use Constant -100000 shift +up/-down 0

Calculate results Cancel

Figure 2: Input dialog view **AVO Inversion**

Input cubes: allow select angle stack cubes for inversion. It have to be only real cube (not virtual).

For every selected cube, must be defined:

Effect. angle: allow define effective angle for every selected cube for inversion.

Azimuth: allow define azimuth angle for every selected cube for inversion.

Wavelet: (optional) allow define wavelet for every selected cube for inversion. If not selected, statistical wavelet will be used - separate for every trace.

Low frequency model (LFM) can be defined like cube or like constant for three result cubes:

LFM AI for acoustic impedance

LFM Vp/Vs for relation Vp/Vs

LFM RHOB for density

Constant AI: define average value of the result. We use only constant value like low frequency model and the algorithm allow restore some low frequency close to zero frequency.

Tikhonov alpha: defined Tikhonov regularization parameter. If this parameter bigger then the result will be smoother.

Phase rotation: define angle (-180, 180) to phase rotation of the result cube.

Low frequency limit: define low frequency limit for the result cube.

Power allow to adjust inversion operator (recommended values for power from 0 to 4)

Calculation can be limited by

Top surface or constant, both with shifts

Bottom surface or constant, both with shifts

4. Results

Inversion result will be added like virtual cube (sub tree node to first source cube). Virtual cube allows edit same parameters ON-FLIGHT with visualization inline or crossline or slice.
To do it need to push right mouse bottom and start the dialog (figure 3).

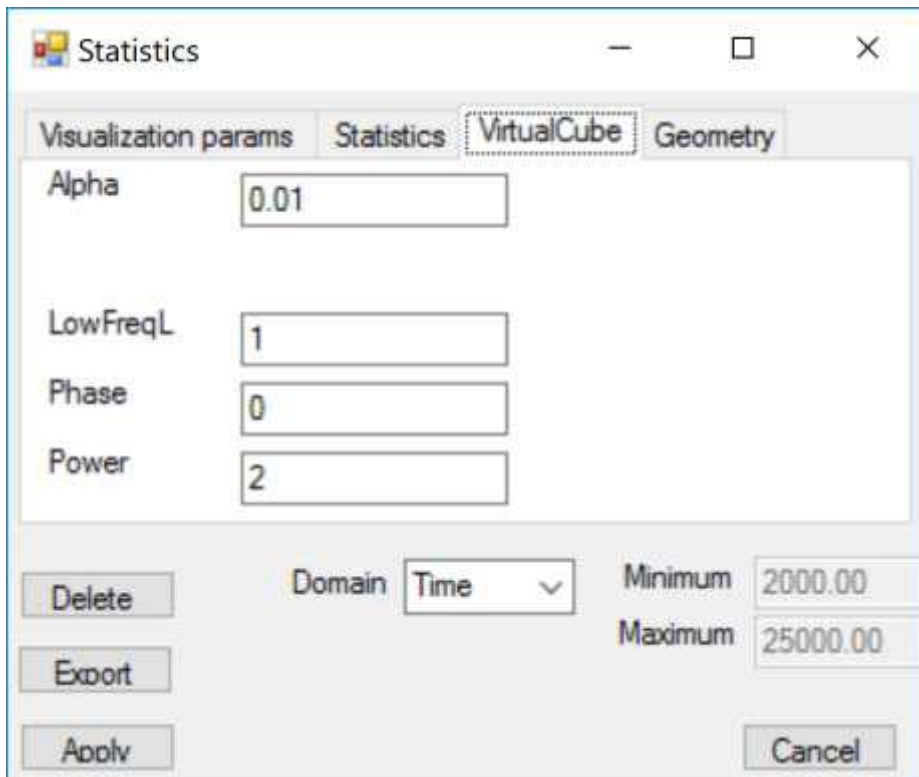


Figure 3: Statistic dialog view after right bottom pushing for virtual cube inline or crossline.