

**AVO Inversion**

**Prestack inversion in frequency domain**

**User Manual**

**IPLAB**

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## 1. Introduction

The **Prestack Inversion** IP\_Seis plug-in (version: 2016.1.0.0, release date: August 2016) can be used for prestack seismic inversion.

The technology allows to use several angle stack cubes to calculate acoustic impedance cube,  $V_p/V_s$  cube and density cube based on Aki - Richards equations.

All calculations use frequency domain for calculations. As a result it allows to create a virtual cube and "on flight" changes for several inversion parameters.

## 2. Start

**Start:** Seismic Attributes->  
**AVO Inversion**

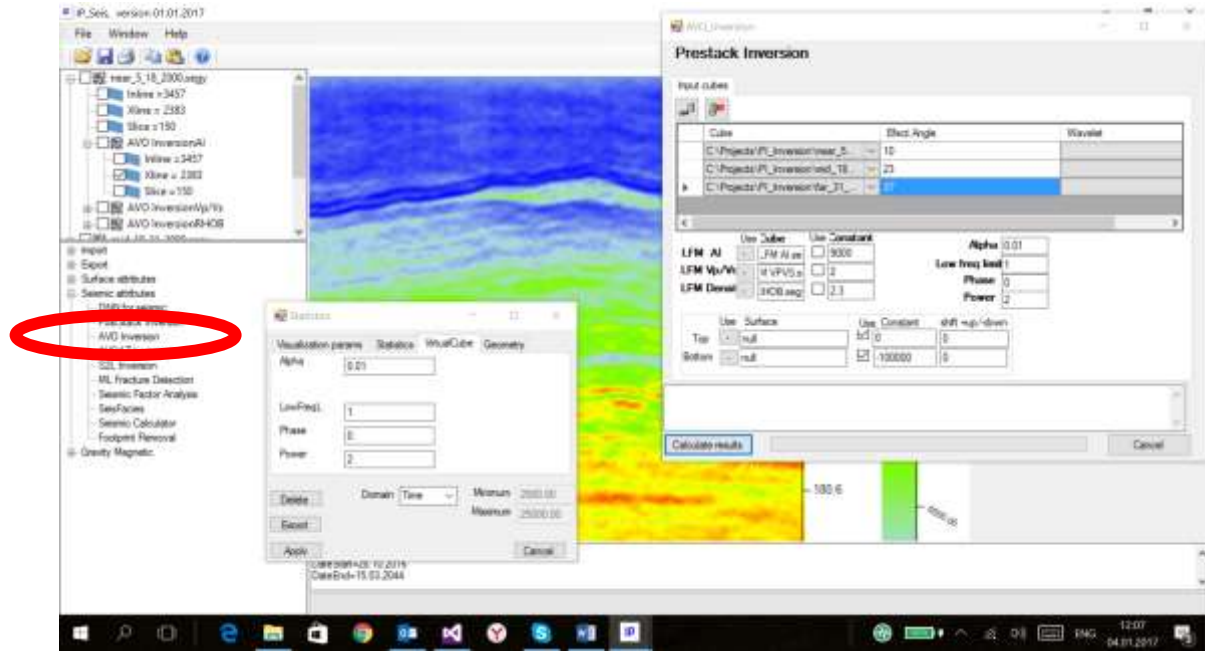


Figure 1: Project tree and programs tree to start **AVO Inversion**.

### 3. Input parameters

**AVO\_Inversion**

**Prestack Inversion**

Input cubes

Cube	Effect Angle	Wavelet
C:\Projects\PI_Inversion\near_5_20_2000...	10	
C:\Projects\PI_Inversion\mid_18_33_2000...	17	
C:\Projects\PI_Inversion\far_31_46_2000...	25	

Use Cube    Use Constant

LFM AI    ☒ M AI.segy    ☐ 9000

LFM Vp/Vs    ☒ M VPVS.z    ☐ 2

LFM Density    ☒ M RHOB    ☐ 2.3

Alpha    0.01

Low freq limit    1

Phase    0

Power    2

Use Surface    Use Constant    shift +up/-down

Top    ☒ null    ☐ 0    0

Bottom    ☒ null    ☐ -100000    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.

**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 allowing to restore some low frequencies 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 to edit the same parameters ON-FLIGHT with visualization inline or crossline or slice.  
To fulfil it, it is necessary to push a right mouse button and to start the dialog (figure 3).

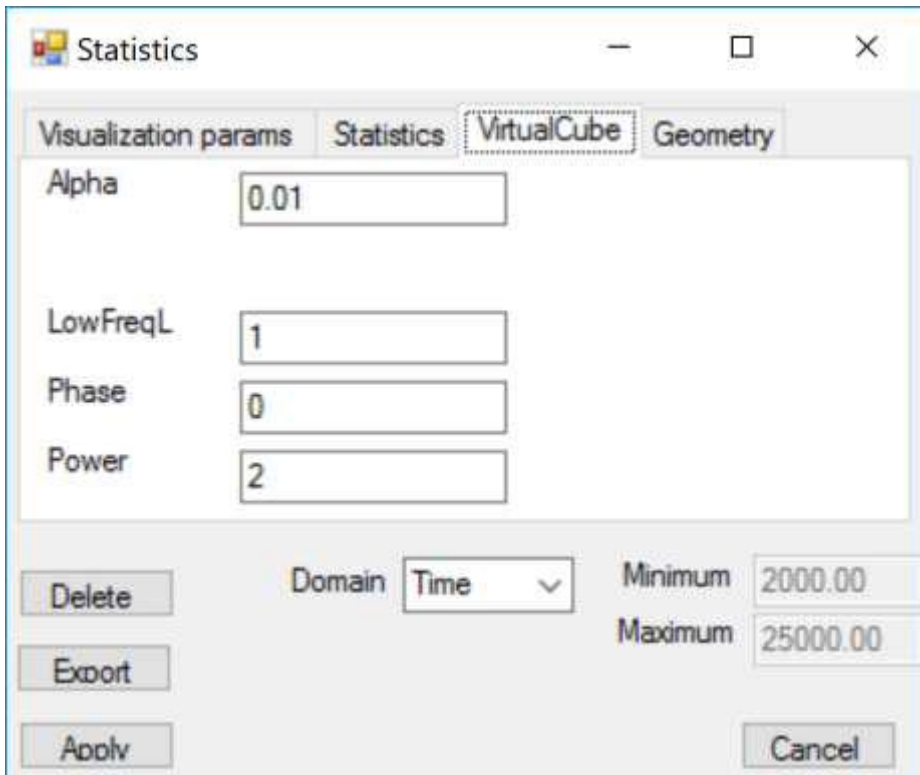


Figure 3: Statistic dialog view after right button pushing for virtual cube inline or crossline.