

Seismic Inversion Vs Geological Modeling

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Abstract:

Geological modeling is an important tool for understanding the subsurface geology. However and due to technical and natural factors numerous challenges are faced during generating the geological models.

Geological modeling is, in the simplest way, trying to fill up the gabs between the wells with the rock properties and facieses.

Bearing this simple definition of geological modeling in mind, we can expect the kind of challenges to be faced while generating a geological model.

The two main challenges are the small amount of sparse data (i.e. Wells), and the complicated depositional environment in the study areas.

Seismic Inversion is a relatively new technique initiated basically to reduce the uncertainties coming from the geological models.

Seismic Inversion is, simply, playing back from seismic data to acoustic impedance.

Acoustic impedance is a function of lithology, porosity, water saturation, fluid content, pressure, etc. So having acoustic impedance cube in hand allows us to finish up with lots of other cubes like lithology cube, porosity cube, etc.

As geological modeling, Seismic Inversion is faced with many challenges; on top of all is the quality of the seismic data.

The fast development of the Seismic Inversion technique leads to the question: Can Seismic Inversion replace geological modeling? And what is needed for it to do so?

A study case from Block 5A is chosen to try to give an answer to this question.

A geological model was generated in the study area, and a pilot Seismic Inversion study was carried out in it