Seismic parameter design for reservoir monitoring and improve PS fold distribution, Brooks, Alberta

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ABSTRACT

The main objective of this paper is to design a 3D-3C seismic survey in order to make possible 4D and reservoir studies to monitor CO₂ injection and map the underground layers and structures.

A porous and permeable formation (the Medicine Hat sandstone) as a reservoir with reliable cap (low permeability) that is the Colorado shale are injection targets for CO₂ sequestration and also for the seismic survey design. The project area is a field located southwest of Brooks, Alberta. The first part is data gathering and analysis results for velocity functions and frequency content of targets (shallow and deep) and the second part is the parameter estimation for preventing spatial aliasing and suitable resolution for the reservoir study with a glance to financial optimization. For the bin size and migration aperture estimation, constant and linear velocity methods were considered.

In this paper, we have improved azimuth and offset distributions in the whole bins for AVO study, increase unique fold and also a study and discussion about geometry for a better PS fold map that is possible with a random lay out pattern for the receivers / sources.

INTRODUCTION

The project area is located southwest of Brooks city, west of the Newell Lake. This field was selected due to CO₂ sequestration test then observing reservoir behaviour and geophysical responses during and after the injection process.

The proper designing parameters can guarantee success of seismic studies from processing to interpretation and 4D reservoir studies. Current paper has two parts, the first is background study for gathering required information for designing stage and designing parameters. The next part will introduce two option and compares designing attributes for them.