4D Direct Deterministic Inversion: Feasibility and Validation

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Contents

Project Overview

- ***Topic***: 4D Direct Deterministic Seismic Inversion: Feasibility and Validation
- ***Duration***: 8 weeks; 13 May – 5 July, 2024
- ***Location***: ExxonMobil Bangalore BTC
- ***Primary Point of Contact***: Prashant Mishra, Geoscientist, ExxonMobil BTC
- ***Technical Team Lead***: Anurag Pandey (IGA)
- ***Supervisor***: Sirshendu Chatterjee
- ***Manager***: Jennifer Erich

Project Summary

- ***Final Deliverables***:
  - Ranking of parameters used in the inversion paradigm based on it's effect on inversion results
  - Creating Pore Pressure and Water Saturation volumes from ΔIp & ΔIs volumes
- ***Workflow Outline***:
  - Data Loading; Theoretical Overview
  - Log Data Conditioning; QC
  - Well-to-Seismic Tie
  - Low Frequency Modelling
  - Inversion (1^{st} pass)
  - Final Inversion Results & Compilation of Deliverables

Training

- ***Softwares used***:
  - Jason Workbench, CGG
  - RokDoc, Ikon Science
  - Petrel, Schlumberger
- ***Networking***:
  - Interacted with TTLs of various disciplines in ExxonMobil BTC (FE, OpsGeo, Well-Planning, Uncon, RE) and advisors
  - Secondary Point of Contacts of project were from ExxonMobil Houston: Mike Helgerud, Dezhi Chu (4D TTL)
  - Interactive session with Jill Gregory, Geoscience Discipline Manager, ExxonMobil Houston

Applications and Challenges

- ***Applications***:
  - Cycle-time reduction of 4D inversion projects
  - Aided in Production Optimization (PNO) of a highly economic asset of ExxonMobil
  - Monitoring and identifying anomalous water sweep/gas saturated zones in the region
- ***Challenges***:
  - Short time period for submitting deliverables (normal inversion projects have a timeline of 10-12 weeks)
  - Less versatility of software used

Way Forward

- **Enriched basic concepts of 3D seismic inversion**
- **Learnt time-lapse seismic use cases and inversion paradigms**
- **Weekly interaction with Geoscientists aided in understanding of ExxonMobil strengths and team-work**
- **Improved the learning curve due to shorter duration leading to stricter deadlines**

Thank you