



CASE STUDY

Integrated Reservoir Model: Inform Reservoir Distribution and Improve Geological Model

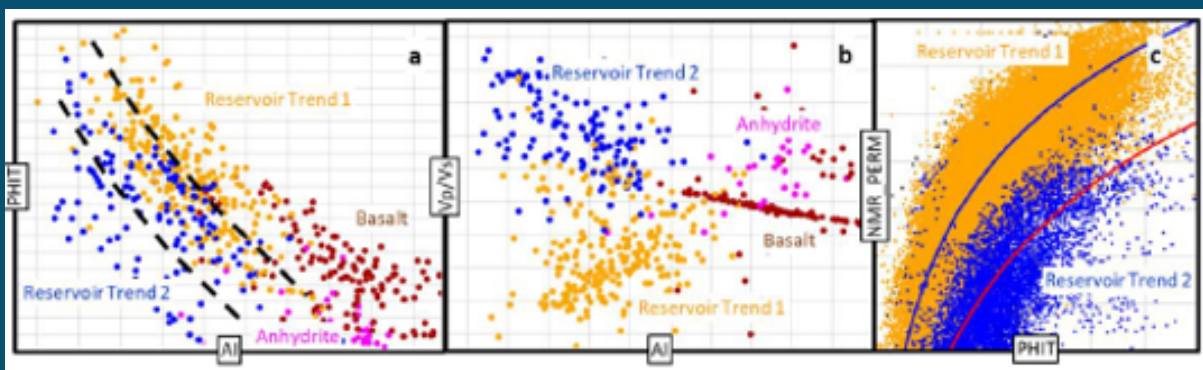
OVERVIEW

The oil-rich Santos Pre-Salt Basin offshore Brazil is actively being explored by oil and gas operators from around the world. Reservoir quality is a key subsurface uncertainty in the Pre-Salt carbonate reservoirs. Geostatistical inversion provides a framework to better understand the uncertainty and what the possible scenarios are in order to plan more accurate wells and estimate oil recovery.

CHALLENGES

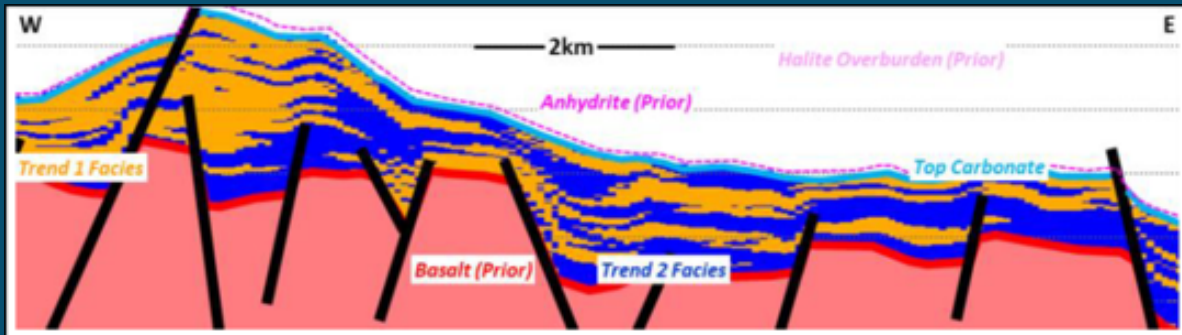
- Lack of understanding of the subsurface uncertainty
- Base evaporite anhydrite is problematic for quantitatively interpreting Pre-Salt reservoirs
- Poor lateral seismic amplitude due to illumination of overburden

(a) Acoustic impedance vs. total porosity (b) Acoustic impedance vs V_p/V_s filtered to seismic bandwidth (c) Observed NMR total porosity vs. permeability trends for two Santos Basin, Pre-Salt reservoirs



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Cross section from structural high to flank and off-structure colored by the two total porosity vs. permeability trends



An Example of Applying Geostatistical Inversion to Inform Reservoir Quality Distribution, Pre-Salt Santos Basin, Brazil - Utley et al, 2019 First EAGE Workshop Rio de Janeiro, Brazil 2019

SOLUTION

GeoSoftware #ReservoirExperts performed the following Geostatistical Inversion workflow:

- Rock Physics modelling to identify reservoir trends
- Seismic data conditioning
- Integration of 'Hard' and 'Soft' geologic prior trends with seismic inversion
- Estimation of facies, porosity and permeability

RESULTS

- ✓ Improved understanding of reservoir quality by integrating scenario depositional concept consistent with seismic data
- ✓ Help in estimating ultimate recovery & executing the development plan – Cost on average \$100M per well