

Integrated Hydrocarbon Systems Study of the Santos Basin Pre-salt to Quantify and Reduce Risk from Play to Drillwell Scale: Santos Basin, Offshore Brazil

Sarah Gelman, S. Barboza¹, U. Bayram¹, E. Bowlin¹, K. Brittle¹, C. Lacerda¹, J. Matoush¹, G. Nolet¹, J. Pyburn¹, A. Savrda¹, J. Sitgreaves¹, J. Stewart¹, G. Stone¹, D. Tavernier¹, A. Tikku¹

¹ExxonMobil

ABSTRACT

Subsurface predictability is key to ensuring capital efficiency and increasing exploration success in this and future lower commodity price environments. To address this, we are pursuing a three-pronged approach toward predictability in the Santos Basin pre-salt play focused on: (a) lacustrine carbonate reservoir characterization, (b) CO₂ source and risk, and (c) integrated basin modeling for improved hydrocarbon commodity and fluid properties understanding. This presentation focuses on the basin modeling study, although the modeling is informed by and, in turn, provides additional constraints to both the reservoir and CO₂ studies. Our basin modeling approach utilizes constraints from the tectonic history of the basin by integrating basin analysis and salt restoration in 3-D. The thermal model is calibrated to temperature and maturity data in approximately 150 wells. Uncertainties are quantified and captured, and through coupled basin and migration modeling, scenarios are tested to reproduce the observed distribution of fields and failures across the basin. This work provides a foundation for improved commodity prediction and risk quantification scalable to play, lead, and drill well assessments. Analogous integrated basin modeling studies have proven valuable to acreage capture and lead ranking as well as pre-drill selectivity and drilling cost reduction.