

Please fill in the name of the event you are preparing this manuscript for.	2020 International Petroleum Technology Conference
Please fill in your 5-digit IPTC manuscript number.	20IPTC-20000-Abstract
Please fill in your manuscript title.	Original Abstract

Please fill in your author name(s) and company affiliation.

Given Name	Surname	Company
Francis	Elisabeth	Saudi Aramco
Robert	Weight	Saudi Aramco
Jihong	Luo	Saudi Aramco
Andrew	Rees	Saudi Aramco
Akbar	Wicaksono	KAUST

This template is provided to give authors a basic shell for preparing your manuscript for submittal to an IPTC meeting or event. Styles have been included (Head1, Head2, Para, FigCaption, etc) to give you an idea of how your finalized paper will look before it is published by IPTC. All manuscripts submitted to IPTC will be extracted from this template and tagged into an XML format; IPTC's standardized styles and fonts will be used when laying out the final manuscript. Links will be added to your manuscript for references, tables, and equations. Figures and tables should be placed directly after the first paragraph they are mentioned in. The technical content of your paper WILL NOT be changed. Please start your manuscript below.

Abstract

The case study is located in Saudi Arabia. In this area, the targeted formation is an Ordovician proglacial channels deposited in a slowly subsiding platform. Uplift and erosion during the Hercynian Orogeny cause a significant removal of the Late Paleozoic section in some area of the basin.

Many wells were drilled in the Ordovician channels where reservoir pressure measurement initially indicated a normally pressured reservoir across the four hundred kilometers wide basin. Recent wells indicated overpressure reservoir with unexpected well flow and kick while drilling. In order to improve the safe well design of future wells and re-assess the optimization of required number of wells to reach production target, a multidisciplinary team of geoscientists conducted an integrated study in order to understand the overpressure mechanism and build a predictive mathematical model capable to locate the abnormal overpressure within the basin.

The integrated study reveals that the variable amount of erosion and uplift, the late tectonism along with the excess of pressure during hydrocarbon generation were the main controlling factor of the preservation of overpressure in some area of the basin. The reservoir pressure gradient increases with burial depth and changes across faults compartment. An equation, taking in account present-day burial depth, differential thermal heat flow and formation breaching magnitude, allows mapping laterally the variation of the pore pressure and predicts with accuracy the expected normal to overpressure regime in subsequent location in the basin. The study of sedimentology, petrophysics and mudgas data has led to an understanding of a basin-wide seal, with regional correspondence with the overpressure regime. The identification of this barrier was crucial to confirm or update while drilling the required safe mud weight to reach the deeper overpressure reservoirs.

This paper presents the results of the importance of the geological controlling factor on pore pressure prediction in a complex basin and provided a new understanding for the future exploitation of hydrocarbon of the Ordovician channels.