Geophysical Research Abstracts
Vol. 14, EGU2012-8841, 2012
EGU General Assembly 2012

Understanding Reservoir Quality in Ara Stringers of the Ediacaran - early Cambrian Petroleum System of the South Oman Salt Basin: Diagenetic relationships in space and time

S. Becker (1), L. Reuning (1), J. Morwinski (1), P.A. Kukla (1), S. Abe (2), S. Li (2), J.L. Urai (2), S. Farqani (3), G. Lopes Cardozo (3), and Z. Rawahi (3)

(1) Geological Institute, RWTH Aachen University, D-52056 Aachen, Germany, (2) Structural Geology, Tectonics and Geomechanics, RWTH Aachen University, D-52056 Aachen, Germany, (3) Petroleum Development Oman, Muscat, Oman

The Ediacaran-Early Cambrian Ara Group of the South Oman Salt Basin consists of six carbonate to evaporite (rock salt, gypsum) sequences. These Ara Group carbonates are termed A0C to A6C from the bottom towards the top of the basin. Differential loading of locally 5 km thick Cambrian to Ordovician clastics onto the mobile rock salt of the Ara Group caused growth of isolated salt diapirs, which resulted in strong fragmentation and faulting of the carbonate intervals into several isolated so-called 'stringers'. These carbonate stringers represent a unique intra-salt petroleum system, which has been successfully explored in recent years. However, some of the stringers failed to produce at significant rates due to the complex diagenetic history from the shallow to the deep burial realm.

The goal of this study is twofold. Firstly, to unravel the complex diagenesis and its relative timing and link them to the burial history of the salt basin. Secondly, to detect spatial distribution patterns of diagenetic phases and their effect on reservoir properties. Mineralogy, rock fabrics, paragenetic relationships and geochemistry of $\sim$ 400 samples from several petroleum wells from the late Neoproterozoic A2C interval were analyzed and combined with pre-existing data. The spatial distribution of diagenetic phases and petrophysical characteristics will be displayed in field-scale distribution maps. These maps comprise crucial information for better prediction of reservoir quality in the analyzed fields, planning of new exploration wells and better volumetric calculations.

An integration of the paragenetic sequence derived from thin-section analysis with results from finite element and discrete element models further helps to constrain the effect of salt tectonics on fracture formation and fluid evolution within the stringers.