



Neural Networks and the Markov Chain Approach for Facies Analysis and Prediction from Well Logs in the Precipice-Evergreen Succession, Surat Basin: Implications for CO₂ Storage

Date: Thursday, 21st June 2018

Time: 3:30 pm to 5:00 pm

Registration: Please register online at <https://fesaus.org/>

Numbers are limited, book early to avoid disappointment!

Use Internet Explorer to register, other browsers often don't work. After registration, you should see a "Thank You for Registering" message and receive a confirmation email (could take several minutes).

Place: Santos Place
Lv. 22
32 Turbot Street, Brisbane
Brisbane, QLD 4000

Cost: **FESQ Members and Student Members free**

Presented by: **Jianhua He,**
Ph.D., Energy Initiative
University of Queensland

Abstract:

Facies analysis is crucial for reservoir evaluation because it affects the prediction of fluid flow and the mechanical properties of strata. Artificial Neural Networks (ANN) are a powerful way to use facies interpretations from core to determine facies in uncored wells. However, ANN do not incorporate information that relates to facies successions. A new method of an integration of Neural Network and Markov Chain Approach is proposed to produce more accurate facies predictions that can be incorporated into reservoir models.

Based on data from 8 cored wells in the northern Surat, 20 core facies based on grain size, sedimentary structures, and ichnological characteristics. Using statistical approaches, 20 core facies were simplified into 10 representative wireline log facies (WLF) with unique petrophysical parameters. The significance of vertical facies transitions was then assessed. Finally, neural networks were trained using cored wells under the control of the facies successions determined from the MCA.

The results of our analysis show that the accuracy of WLF prediction ranges from 66% to 99% (ca. 83%) with a convergence error of 0.53. The accuracy of facies recognition decreases step wise with decreasing log input data. For facies determination in our application -static reservoir modelling for CO₂ storage-a minimum number of input log data were required to achieve meaningful results.

The impact of this study is that it shows how accurate and realistic facies distributions can be understood in areas of sparse data by using uncored well data. It also allows us to establish better

Become a FESQ member for free by sending an email to fesqld@gmail.com.



Neural Networks and the Markov Chain Approach for Facies Analysis and Prediction from Well Logs in the Precipice-Evergreen Succession, Surat Basin: Implications for CO₂ Storage

About the presenter: **Jianhua He**



Jianhua He is a PhD from School of Energy Resources at China University of Geosciences, Beijing. Currently, he is part of the Energy Initiative at the University of Queensland working on the “Surat Deep Aquifer Appraisal Project” (UQ SDAAP). Jianhua has additional experience studying of unconventional oil and gas systems using multidisciplinary analytical approaches, including TOC content and lithofacies evaluation of shale reservoir from wireline logs, pore structure and fracture development characteristics of tight reservoir.