



Welcome to the June 2024 edition of GEOHORIZONS.

This issue is filled with articles that cater to both technical and general interests of the GEOHORIZONS readership. It opens with an *interview* with Dr. Manas Sharma, Director (E&D) of OIL, and includes a *memoir* by Mr. G. C. Katiyar, retired Executive Director of ONGC, and a veteran of the Indian oil industry. Additionally, the *Expert Answers* column features insights from two international industry specialists, Brian Russell and Miguel Bosch, who address the question, '*Are we really able to estimate the subsurface elastic properties quantitatively?*'

The June 2024 issue presents eight technical articles spanning a wide array of topics. The lead paper, '*Designing an integrated CO₂-EOR as CCUS cum blue hydrogen demonstration project: A step towards net-zero ONGC-2038*' by Mishra et al., is based on their award-winning oral presentation at the SPG Conference in Kochi in November 2023. The paper explores the viability of utilizing carbon dioxide for enhanced oil recovery and simultaneous sequestration. Highlighting a case study of CO₂ obtained from an oil refinery located 80 km from an aging oil reservoir, the authors detail laboratory studies, numerical simulations, design analysis for optimal surface facilities, and a techno-economic assessment of the project, forecasting its successful execution.

The second paper, titled '*Organofacies characterization and assessment of timing and extent of hydrocarbon generation of source rocks in Assam Shelf, northeastern India*' by Mandal et al., is based on the presentation at the SPG Conference in Kochi in November 2023, which

won the best poster presentation award. The source rocks for most oil reservoirs in the Upper Assam shelf range from immature to early mature, although the oils were generated at a comparatively higher maturation stage. The authors examine the characterization of various source organofacies, including custom kinetics, to assess the timing and extent of hydrocarbon generation.

In the paper entitled '*Analysis of stack power and velocity uncertainty as a function of different parameters*,' Singh explores the uncertainty in velocity determination from seismic data during processing in both isotropic and anisotropic media. This includes scenarios where the effect of statics on stack power is considered, as well as cases where a primary is mixed with a multiple associated with a lower velocity. The findings from this analysis are insightful.

Nanda in his paper entitled, '*Proterozoic wrench footprints in Bouguer anomaly map of the Outer Himalayas- (Jammu-Dehradun sector), India*', shows that even though wrench tectonic is commonly seen in seismic data, a classic example of wrench footprints was captured distinctly in a composite Bouguer anomaly map generated for the Jammu-Dehradun sector of the outer Himalayas in northern India. The interpretation of the composite gravity map for the area helped understand the regional tectonics and the type, nature, and configuration of the basement in the outer Himalayas.

In the paper entitled '*Compressional and shear velocity prediction using artificial neural networks in Bhagyam*

Field, Barmer Basin, India, Akhilesh et al. address the challenges posed by the lack of sonic and shear logs in wells for reservoir characterization. They discuss the use of empirical relationships for predicting these logs and the employment of artificial neural networks (ANNs). With data from the Bhagyam field in Rajasthan, India, the authors illustrate the use of ANNs to predict compressional and shear logs with high accuracy.

Chopra et al. in their paper entitled '*Application of key seismic spectral attributes for interpretation of subsurface channel features*', suggest the use of peak frequency and peak magnitude to identify high amplitude events or peak magnitude above the mean spectrum, instead of spectral decomposition that produces many spectral component volumes to interpret. The authors demonstrate that the suggested attributes when computed on spectrally balanced input seismic data and corendered, for example, by choosing peak frequency represented by hue and peak magnitude represented by saturation produce more convincing displays for interpretation where low reflectivity areas appear in grayer tones.


In their paper, '*Seismic pitfalls: the impact of converted waves on AVO; how to recognize and avoid them*,' Kumar et al. highlight the issue of P-wave seismic data contamination by converted waves. If not properly managed during AVO analysis, this can lead to the misidentification of reservoir zones. The authors use a Colombian case study to demonstrate how recognizing

and avoiding this pitfall can prevent costly mistakes in interpreting potential reservoir zones.

Kumar and Behera, utilizing wide-angle 3-C seismic data, have detailed the rock composition of the shallow upper crust (up to 15 km deep) in the Dharwar Craton (DC) of southern India in their paper entitled, '*Inversion of 3-C seismic data to delineate P- and S-wave velocity structure, composition, and anisotropy model of the Dharwar Craton, southern India.*' They provide valuable insights into the compositional units and lithological boundaries between the eastern and western parts of DC, as well as identifying anisotropy in the upper crustal blocks.

Our regular tutorial column features '*A Bayes' theorem tutorial*' by Brian Russell, who demonstrates the theorem's application using a seismic exploration example, moving away from the commonly used examples like apples and oranges or white and black balls.

In the SPG news column, we cover the recent activities of various SPG Chapters.

We are grateful to the authors for their significant contributions and hope our readers find the articles both enlightening and engaging. We welcome your thoughts on this edition of our journal. 

- Satinder Chopra, **Chief Editor**