AAPG Datapages/Search and Discovery Article #90246 © 2016 AAPG Asia Pacific Region, AAPG/EAGE/MGS Conference, Innovation in Geoscience: Unlocking the Complex Geology of Myanmar, Yangon, Myanmar, November 19-20, 2015

The use of Seismic Geomorphology and Analogues for Exploration and Reservoir Characterization

Simon Lang[1], Bruce Ainsworth[1], Henry Posamentier[2], Andrew Madof[2], Kenn Ehman[2], and Elaine Campbell[2]

[1]Chevron Australia, Perth, Australia
[2]Chevron Energy Technology Co. Houston, TX, USA

Abstract

The ever-increasing costs of hydrocarbon exploration and development drives the need for greater accuracy and precision with respect to mitigating risk associated with lithology prediction. This is especially true in offshore Myanmar where to date only two wells have been drilled in water depths greater than 1000m. With the recent award of deep-water blocks and the acquisition of significant volumes of modern, high fidelity 3D data, seismic stratigraphic and especially seismic geomorphologic analyses will play an increasingly significant role. Such analyses, coupled with observations of modern analogues, have greatly enhanced our ability to predict lithology and better understand stratigraphic compartmentalization in advance of drilling. Enhanced geologic and geophysical understanding of lithology distribution centres initially on seismic pattern recognition, as they are manifested in plan as well as section view. This process involves the iterative interpretation of seismic section and plan view images and employs numerous workflows. Efficient workflows, involving slicing through seismic volumes, are critical to rapidly and accurately bringing such patterns to light. Recommended workflows include 1) time slicing, 2) horizon slicing, 3) and “creative datuming”, where no discrete continuous reflections are available. In addition, volume rendering such as optical stack slicing can also yield valuable insights. Horizon attributes such as 1) dip magnitude, 2) dip azimuth, 3) curvature, 4) roughness, and 5) simple illumination can yield critical insights that can be interpreted geologically. For maximum benefit to be derived from these workflows, however, the careful understanding of the geologic significance of observed patterns is required. The seismic analysis results are commonly compared with examples from known depositional settings derived from modern-, ancient outcrop- and producing field analogues. Ultimately, the aim is to reduce the uncertainty associated with prediction of three-dimensional subsurface lithologies that underpin exploration and reservoir characterization activities.