# Recent Progress in the Characterization of Ordovician Glacial Reservoir in the Murzuq Basin, SW Libya

**Francisco Javier Bataller Torre[1], N. D. McDougall[2], and Andrea Moscariello[1]**

[1]University of Geneva, Geneva, Switzerland
[2]Independent Consultant, Madrid, Spain

## Abstract

This study focuses on the Murzuq Basin of SW Libya where Late Ordovician glacial reservoirs have been the object of several studies in recent years reflecting significant hydrocarbon reservoir potential as indicated by both continued exploration successes and ongoing development. However these reservoirs present a significant challenge due to their inherently complex internal architectures and significant lateral heterogeneities. This is of significant importance, not only for both exploration and reservoir production optimization, but also as it understanding can unravel opportunities for stratigraphic trapping and enhanced prospectivity in mature areas. Recently, severals efforts were dedicated to integrate subsurface datasets, such as 3D seismic with core data, conventional wireline logs and wellbore Micro-resistivity images and geochemical data. Through this study a comprehensive facies scheme optimized for the sub-surface but consistent with outcrops was established aimed to generate depositional models, characterize the complex internal architecture of the reservoir, establish a genetic stratigraphic framework and evaluate facies in terms of reservoir properties and stratigraphic trap potential. Results, integrating subsurface facies analysis and well-calibrated seismic stratigraphy support previous models, derived from outcrop analysis, suggesting that these complex reservoirs cannot be characterised by purely lithostratigraphic criteria. To aid in the assessment of these formations, a facies scheme is proposed, focused on subsurface data but also considering other published, outcrop-based, schemes. Additionally, an interpretation is presented of the internal architecture of the Upper Ordovician based on a succession of several ice advance-retreat cycles, not all of which are present across the study area. In this study the Spectral Gamma Ray ratios has been used as a correlation tool and demonstrated how Th/U varies with distance from the sediment source area; but also highlights that whilst SGR ratios are not able to consistently discriminate between individual facies associations, given the large standard deviations, they are nonetheless very useful as general predictors of broad depositional patterns. Predictive stratigraphic models are proposed for this complex package, based on both seismic stratigraphy and well-based sedimentology. The implications for future prospectivity and the significance for strati-graphic trap potential are also discussed.