[PS]Biostratigraphy of Siliciclastic Reservoirs of the Arabian Plate: Current State and Future Challenges*

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Abstract

During the majority of the Phanerozoic Eon sedimentation in the Arabian Plate took place in terrestrial, transitional and more frequently shallow marine settings. The Mesozoic and Cenozoic Eras were dominated by carbonate sedimentation in most areas of the Arabian Plate. The biostratigraphic schemes of the few siliciclastic intervals are based on palynology (mostly terrestrial or proximal environments) and nannofossils and foraminifera for marine environments.

From Cambrian to Early Permian times sedimentation was essentially siliciclastic and the applicable biostratigraphic disciplines in oil industry are limited. Palynology plays a central role in the establishment of regional biozonation schemes and the definition of the region's chronostratigraphy.

While many Paleozoic intervals have an established biozonation with basinal to regional applicability there are still challenges such as Lower Paleozoic terrestrial and transitional environments (e.g. Amin and Miqrat formations and other Haima Group intervals of Oman). The scarcity of organic matter-bearing strata and general absence of fossils has limited the development of biostratigraphic schemes.

Similarly, the Neoproterozoic stratigraphy (both siliciclastic and carbonate-dominated) which have been targeted by exploration activities remain largely unknown. Field work in the Oman Mountains and Salalah region in recent years has allowed a better understanding of the lithostratigraphy of the region. Unfortunately, biostratigraphic indicators are limited to the macrofossil *Cloudina* sp. in the Ara Group (Ediacaran-Cambrian boundary) and palynological findings in the Abu Mahara and Nafun Groups of Oman and lateral equivalents. The recent discovery of macrofossils in the Masirah Bay Formation and chert-hosted palynomorphs in the Khufai Formation carbonates may shed light on the biostratigraphy of this interval.

The future challenges of Arabian Plate bio- and chronostratigraphy can be summarized as follows:

- Further analysis of the organic matter-bearing Lower Paleozoic terrestrial to transitional intervals;
- Usage of non-taxonomic stratigraphy, i.e., organic particle types and groups of particles distinctive of each interval;
- Fieldwork to test the potential of macrofossil content for biostratigraphy;
- Alternative extraction techniques such as thin sections of cherts and low-manipulation palynological processing;
- Further analysis of the palynological content of Neoproterozoic strata and possible correlation with other regions (Australia, China);
- Non-biostratigraphic methods such as chemostratigraphy and magnetic susceptibility stratigraphy.

Reference Cited

Konert, G., A. Afifi, S. Al-Hajri, and H. Droste, 2001, Paleozoic Stratigraphy and Hydrocarbon Habitat of the Arabian Plate: GeoArabia, v. 6/3, p. 407-442.

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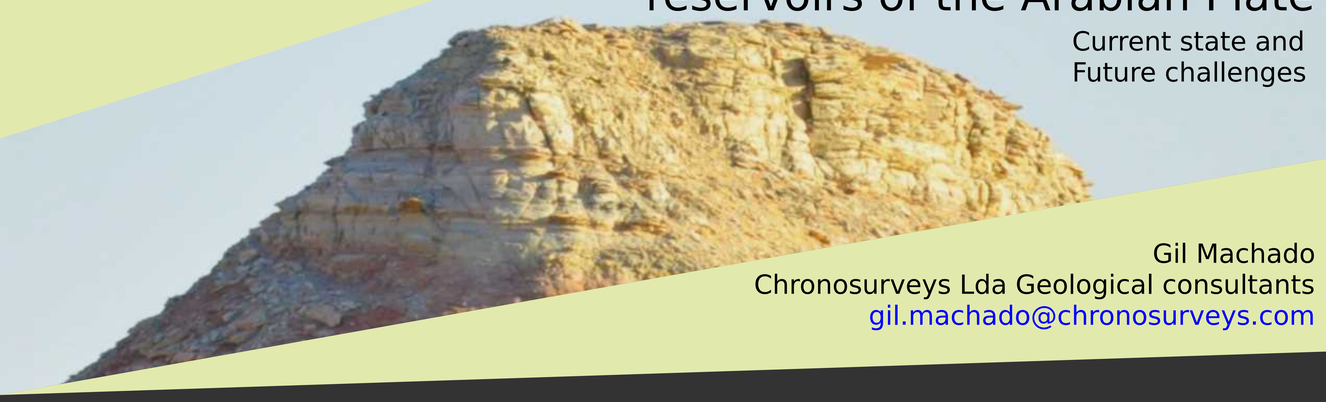
Biostratigraphy of siliciclastic reservoirs of the Arabian Plate

Current state and Future challenges



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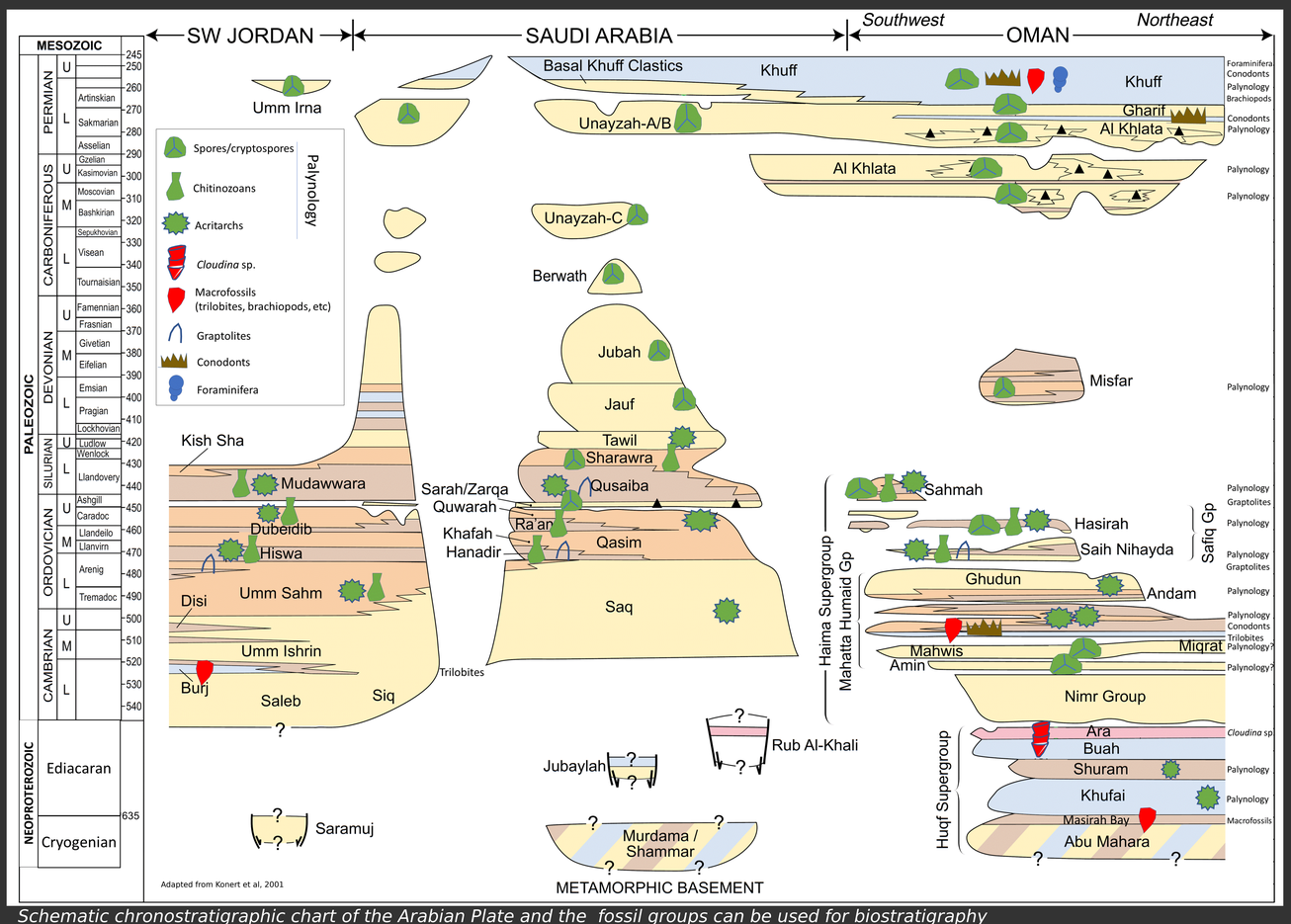
The Mesozoic and Cenozoic Eras in the Arabian Plate were dominated by carbonate sedimentation. The biostratigraphic schemes of the siliciclastic intervals are based on palynology, nannofossils and foraminifera.

From Cambrian to Early Permian times, sedimentation was essentially siliciclastic and the applicable biostratigraphic disciplines in the oil industry are limited. **Palynology** plays a central role in the establishment of regional biozonation schemes and the definition of the region's chronostratigraphy. The Neoproterozoic, Cambrian and part of the Ordovician sequences still lack biozonation schemes due to the overall scarcity of fossils. Recent fossil finds may shed light on these intervals' biostratigraphy.



Schematic chronostratigraphic chart of the Arabian Plate and the fossil groups can be used for biostratigraphy

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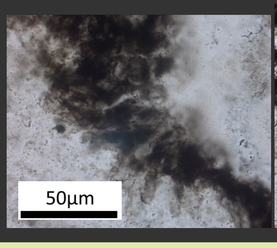
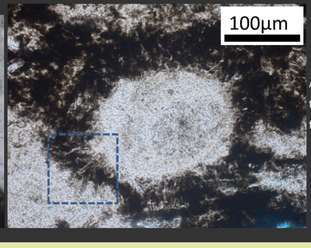
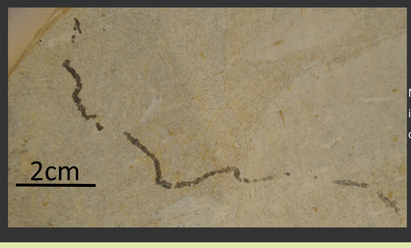




Acritarch preserved in thin section of chert nodule from the Khufai Fm.



Macrofossil remain in an outcrop sample of the Masirah Bay Fm.

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