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## Sedimentation, eustasy and tectonic constraints of the Eocene hydrocarbon systems of the Gulf of Gabes basin, Tunisia

Fatma Taktak<sup>1,2,3</sup>, Samir Bouaziz<sup>2</sup> and Saïd Tlig<sup>3</sup>

<sup>1</sup>University of Modern Sciences, UAE

<sup>2</sup>Ecole Nationale d'Ingénieurs de Sfax, Tunisia

<sup>3</sup>University Tunis-El Manar, Tunisia

The carbonate series in the Ashtart oilfield were studied using core samples taken in drill wells; wireline logs, biostratigraphic data based on nummulites, discocyclines and operculines, and seismic data. The petrographic study in thin sections helps reconstruct mid to outer-ramp settings of carbonate facies with mixed nummulitoclasts and nummulite accumulation. The main goal is to present a comprehensive sedimentary and structural architecture for the Gulf of Gabes Basin - GGB - during the Eocene time period, using a detailed interpretation of a near 2000-km line of migrated and multi-channel seismic reflection profiles acquired by the Compagnie Generale de Geophysique - CGG- in the period 1978–1995, to reconstitute the environments of deposition of large-scale sedimentary systems and structural elements which can be mapped in the studied basin, to those in the central and central-east provinces of Tunisia in the west. Furthermore, the geodynamic and depositional environment controls on the petroleum potential of Eocene series in the study area are also envisaged. Our study shows that transpressive stress in the study time interval, and wrenching of dominant NW-SE directed faults identified in seismic profiles, has constrained the uplift of blocks on which the carbonate shelf has formed; whereas sea-level rise and fall, and sub-sequent drowning have contributed to a carbonate-ramp development in three main stages dated middle ypresian, upper ypresian and upper ypresian-lower lutetian time periods using nummulites, operculines and discocyclines. Carbonate facies which correspond to the El Gariafm are organized in second and third order eustatic cycles which may be correlated with those defined in the global chart. Intraparticle porosity identified in coarse-grained foraminifered tests and nummulitoclasts, corrosion and dissolution of biochems due to burial diagenesis, as well as fracturing have constrained the reservoir quality. Triassic salt extrusions and magmatism associated with these deep-seated wrenching faults may have been accompanied by high heat flow and may have thus contributed to organic matter maturation in source-rocks of the Boudabbous and Chouabinefms and their migration into the Ashtart reservoir. Thick shaly series of the upper Eocene- Cherahilfm have also provided an impervious seal of the Ashtart petroleum system.

fatimtak@yahoo.fr  
f.taktak@ums.ae

## Multifunctional nickel(II) and copper(II) N,N'-ethylenebis(acetylacetoniminato) complexes

Manawadevi Y Udugala-Ganehenegge

University of Peradeniya, Sri Lanka

The paper describes an overview of multi functional properties of Nickel(II) and copper(II) N,N'-ethylenebis(acetylacetoniminato) Schiff base complexes. These complexes are found to be capable of acting as acid-base indicators, antimicrobial agents and electrocatalysts for reduction of carbon dioxide and carboxylic acids. In strong acid-weak base titrations, these complexes are better indicators than methyl orange, as they give very sharp and clearly visible colour changes at the end point. This is the first report of using metal complexes as acid-base indicators due to their distinctly reversible colour changes in the presence of strong acids and bases. Our direct bioautography and disk diffusion studies revealed the anti-microbial activity of these complexes against *Staphylococcus aureus*, *Escherichia coli* bacteria and *Cladosporium* and *Fusarium* Fungi species. Growth rate study of *Fusarium* reveals that copper (II) complex is more effective than nickel (II) complex for the growth rate reduction. Antibacterial activity of the complex seems to be specific. copper (II) complex shows a good antibacterial activity against *Staphylococcus aureus* spp. whereas nickel (II) complex shows a significant activity against *Escherichia coli* spp. The electrocatalytic activity of Nickel(II) complex is significantly higher than that of copper ( II) complex for CO<sub>2</sub> reduction. Both complexes are electrocatalysts for carboxylic acid reduction.

myug@pdn.ac.lk