

**AAPG International Conference
Barcelona, Spain
September 21-24, 2003**

M'hammed El Mostaine¹ (1) Onarep, N/A, Morocco

Onshore Tarfaya-Layoune Depositional and Petroleum Systems

The Tarfaya - Layoune coastal basin corresponds to the southern Moroccan Atlantic passive margin. The basement is developed into horsts and grabens infilled by Triassic and Liassic syn-rift red clastic sediments and lacustrine source rocks. The post-rift megasequence begins with the Jurassic series corresponding to the development of a carbonate platform to the East and an open marine to the West. Along this Jurassic platform, elongated depocenter trending NNE-SSW, within which mature source rock composed of type II kerogen was developed. On the western borders of this trough, progradational sandstones were deposited. Over the Jurassic, the Lower Cretaceous deltaic clastic sediments are followed by the Albian and Cenomano -Turonian transgressive series composed of marls and limy bituminous shale rich in organic matter.

The only effect of the major alpine event, during the Oligocene and the Miocene, on this stable passive margin segment was limited to an erosional continental slope creating E-W tertiary channels where turbiditic sandstones are interbedded with shales and reworked organic rich limy shales.

From the East to the West, various petroleum systems and play concepts are defined in this basin. Triassic sandstones reservoirs on the top and along the horst borders could be sourced from the Palaeozoic and/or from the Triassic lacustrine shale.

Middle Jurassic prograding sandstones reservoirs located along the depocenter in combined structural and stratigraphic traps are sourced from Lower Jurassic within the depocenter.

Tertiary turbiditic sandstones, in a stratigraphic play in the coastal area are sourced from the rich organic Cretaceous shale.