Geodynamic Reconstruction, Tectono-Stratigraphical and Geophysical approach for the Interpretation of northeastern Tunisia Gulf of Tunis offshore

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To unravel the tectonic evolution, reconstruct the geometry of the flexural basin of the north-eastern sector of Tunisia, a tectonic-lithostratigraphic analysis of a grid of seismic reflection profiles has been carried out. This allowed identifying the lithostratigraphic succession in the area that ranges from Triassic to recent and mainly represented by deep to shallow marine deposits organized in two major sedimentary cycles, several reverse faults, and associated folds, the presence of normal listric faults and showed the role of thrusting. The study was concerned with tectonic events taking place during both Pyrenean and alpine deformation.
The alpine with a NW-SE direction and dated Late Miocene is responsible for the displacement of the Numidian flysch from North to South. The thick Late Miocene fluvial deposits are the first common sedimentary cover overlying unconformably the autochtonous, parautochtonous, and allochtonous sequences. It has an erosional contact with these different underlying sedimentary units. The Pyrenean with a WNW-ESE direction dated Late Cretaceous to Late Eocene, well defined by the Oligocene angular unconformity. The villafranchienne, the last phase of compression, has just increased the deformation already made during the alpine phase and we have a relaxation structural time between these two phases marked by the Messinian crisis. The geodynamic reconstruction was based on an interpreted post-deformation geological model and constrained by balancing the seismic section and shortening calculation of the seismic line trending NW-SE. Taking into consideration the succession of syn-Mesozoic and tertiary tectonic events: the two phases are well distinguished and defined on our seismic profiles limiting down and up the succession of various dips. The determination of shortening was a complex exercise due to a lack of parameters. However, we determined a value of about 9% in the foreland basin, for the folds between the Pyrenean and Alpine unconformity. This rate matches perfectly with the defined values obtained by several authors. The proposed geological model fits well the interpreted seismic section and the identified structure suggests the possibility of the presence of structural traps generated by sinistral strike-slip deformation after the alpine event.

Keywords: Seismic lithostratigraphy, Tectonic evolution , thrusting ,alpine and Pyrenean deformation shortening, northeastern Tunisia .

Merci de ne rien inscrire dans cette zone et ne pas modifier les marges des pieds de page et entêtes.