



## **Stratigraphical links between Miocene Alpine Foreland basin and Gulf of Lion Passive Margin during lowstands**

Jean-Loup Rubino (1), Christian Gorini (2), Estelle Leroux (2), Daniel Aslanian (3), Marina Rabineau (4), Olivier Parize (5), and David Besson (6)

(1) Total, Centre Scientifique et Technique Jean Feger, Avenue Laribau, 64018 Pau, France, (2) ISTEP, UMR7193, UPMC-CNRS, 4 place Jussieu, Paris, France, (3) IFREMER, DRO/GM/LGG, BP 70, 29280 Plouzané, France, (4) CNRS, UMR6538, Domaines Océaniques, IUEM, 29280 Plouzané, France, (5) Areva, Tour Areva ; 1 place Jean Millier, Arche Nord - Quartier Coupole, La Défense, France, (6) DREAL Centre, Département Hydrométrie 5, avenue Buffon 45064 Orléans cedex 2 France

Miocene peri-alpine foreland basin is connected toward the south with the Gulf of Lion passive margin and is predominantly filled by marine shallow water molassic deposits ranging from lower Miocene to Pliocene in age. Nine to ten depositional sequences are recorded and partly preserved in this basin and can be traced into the post rift part of the Gulf of Lion. One of the most surprising feature of the stratigraphic infill is the total lack of lowstand deposits within the foreland basin ; All superimposed sequences only includes transgressive and highstand System Tracts separated by erosional sequence boundaries and the development of incised valley networks filled by tidal deposits during transgression; Besson et al. 2005. It means that the entire foreland basin in SE France is exposed during lowstand periods without any preservation of fluvial deposits. By place few forced regression wedges are preserved at the transition between the foreland and the passive margin, close to the present day coastline. To date no real lowstand wedges have never been reported in the offshore of the Gulf of Lion.

A reinterpretation of the best old vintage 2D dip seismic profiles along the passive margin validates the idea that the foreland basin is entirely exposed as well as the proximal part of the passive margin; first because some incised valleys can be occasionally picked on the shelf and second mainly because well defined superimposed or juxtaposed prograding lowstand wedges with nicely defined clinofolds overlapping the sequence boundaries can be recognized on the distal part of the shelf from the Burdigalian to the Messinian. Their ages being constrained by the Calmar well calibration.

Unfortunately, they can't be continuously mapped all along the shelf break because of the strong erosion related to the Messinian Unconformity and the associated huge sea level fall. So we have to explain why during the lowstands, exceptionally long fluvial valley networks (more than 300km) can be developed. The first observation shows that the subsidence rate at least in the marginal part of the foreland basin, close to the forebulge, along the Rhone Valley, is very low and never exceed 40m/My. Second, the water depth of the deeper shelf series doesn't go deeper than 70 - 80m with shallowest water depth in the thresholds separating sub-basins.

Therefore eustatically driven Miocene sea level changes can probably be great enough during this stratigraphic interval (50 to 70m) to lead to the almost complete basin emergence. Finally fluvial over-incision could also be enhanced by tectonic uplift links to anticline growing or local diapirism.