Plate reconstructions prior to the Jurassic, lack the calibration from Oceanic seafloor, which is not preserved. Only the continental fragments can be constraint with paleomagnetic and other geoscience data.

The objective of this study is to bring together the key geosciences data to constrain the plate model to be able to explain the Khuff Formation Development and deformation.

Global constraints are needed in order to get a sensible plate tectonic model that underpin the evolution of the Permo-Triassic Khuff Formation along the passive margin of the Neo-Tethys Ocean.

Most geodynamic scenarios describe the plate tectonic process as an oceanic Tethys slab subducting under the Eurasian craton. Such models suggest subsequently tearing of a ribbon-like suit of continental basement terranes called ‘Cimmerian’ from the Gondwana margin to form the Neo-Tethys Ocean. The subduction zone subsequently consumes the Neo-Tethys as the Cimmerians terranes dock onto the Eurasia margin. This slab-pull and slab-push sequence of events has important implications for the Africa-Arabia margin. A careful mapping of the basement terranes is needed, which make up Africa-Arabia, to understand the intra-plate stresses and related subsidence patterns.

The inherited structural framework will either by re-activated or overtaken by others along the orientation of the stress applied from the plate margins. Examples of such re-activations can be found at various scales, from the basin-scale ones like Gawar and Qatar highs to the reservoir scales. Present-day examples as well as ancient analogues provide good constraints for the reconstructions. However detailed age-dating of the Permo-Triassic sequence is very significant.

Also the rifting process and subsequent drifting of the Cimmerian Terranes is diachronous along the Gondwana margin leading to different interpretation of facies developments and can be demonstrated with the regional distribution and thickness maps for the Arabian plate. Facies patterns, diagenetic and subsidence patterns follow this differential re-action on the Neo-Tethys ocean formation and subsequent destruction. As the subduction of Neo-Tethys and related process continues linkages can be made to rifting histories of the Atlantic margins in the Triassic and later. They develop further and finally break-up Pangea and Atlantic Ocean formation in Jurassic and Cretaceous leaves Arabia in a continent-continent collision complicating the post Khuff plate reconstruction story even more. As all reconstructions deal with present-day shapes for the continental fragments the Arabian plate ends at the Zagros main trust. From the available models, the relative slow extended rifting phase and relatively fast movement of the Cimmerian terranes as well as present-day analyzed passive margins like the South Atlantic an attempt is made to give estimates for the extended continental Arabian plate margin.
In conclusion we will have:

1) Have an integrated plate tectonic model for the Arabian plate in the Permo-Triassic

2) Calibrated the model to the relevant geosciences data available

3) By use of analogues from similar plate tectonic processes have provided a basis on which facies development for the Khuff formation and subsequent formation can be explained.