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Provenance of the Upper Unit Sandstones of the Fortuna Formation of North-Eastern of Tunisia

The Fortuna formation outcrops in central, eastern and north-eastern Tunisia and is composed by detritic series of fluvio-deltaic origin that can be divided in to three units. The lower (Upper Oligocene) and middle (Lower Miocene) units were deposited in deltaic-lagoonal environment, while the upper unit (Aquitanian) consist of medium to coarse-quartz-rich sands deposited in braided fluvial system. In northeast Tunisia, sandstones of this upper unit can be classified as quartz-arenites, texturally mature (good roundness, sphericity and sorting), and containing scarce rock fragments and feldspars.

Provenance of the Fortuna sandstone was from the SW (Sahara Platform). The source area was characterized by quartz-cemented arenites (Palaeozoic Tassilis sandstone, Cretaceous "continental intercalaire" and Eocene sandstone) and by plutonic and metamorphic rocks (probably from Hoggar basement massif). Recycling is an important fact to explain high quartz contents in Fortuna sandstone as proven by the presence of inherited overgrowths, but this process together with transport, can not fully explain their extreme maturity. The source area was probably affected by an alteration mantle (saprolite) that fed the Miocene fluvial network, or arrived indirectly from recycling of the pre-Miocene sedimentary rocks.

The fluvial sandstones of the Fortuna formation (upper unit) have good potential as reservoir rocks because they are uncemented, showing high porosity and permeability, and also because of the absence of mudstones all along the succession. On the contrary, the reservoir quality of the deltaic-lagoonal facies (lower and middle units) is lower, as porosity is usually filled by carbonate cement and there are abundant mudstone intercalations.