

Re-appraisal of the petroleum potential of the Congo Basin

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The Congo Basin (also called Cuvette Centrale) in the Democratic Republic of the Congo (DRC) is probably the last continental-scale sedimentary basin that is still poorly known in terms of petroleum system and related hydrocarbon resources. Two exploration surveys in the 1950s and the 1980's revealed no evidence for the presence of oil. Since then, several studies, mainly reprocessing and reinterpreting these old data, aiming at estimating the petroleum potential of the Congo Basin have been conducted to promote exploration and attract investors. Several possible potential source-rock levels, petroleum systems and possible plays were designated as target for exploration. Some studies have proposed the probable presence of giant deposits, suggesting that the DRC could become an important producer in the future. Stimulated by this renewed interest and the need to verify these optimistic conclusions, we re-analyzed the geological archives and samples stored in the collections of the Royal Museum for Central Africa. The Neoproterozoic and Early-Middle Palaeozoic black shales appear to be barren and over mature ($C_{org.}$ 0.1% in average). The Permian black shales are gas-prone (type III, higher plant derived, $C_{org.}$ between 0.3 and 2.4 %), but immature to early mature. The Jurassic and Cretaceous source rocks are of excellent quality (type I, dominantly algae, $C_{org.}$ up to 25%), but too immature. We also re-visited and re-sampled some reported oil seeps and conclude these to be due to anthropic pollution. In conclusion, with the current state of knowledge, there is no indication of active petroleum system in the Congo Basin. As these conclusions are based on a rather limited and incomplete geological and geophysical data, we do not exclude the possible existence of hidden and still to be found active petroleum systems. New exploration projects are therefore needed to improve the knowledge of this vast basin and in particular to identify areas where Mesozoic source rocks might have reached maturity.