



The “siratany” salt in the onshore Morondava Basin of Madagascar: where does it come from ?

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The Morondava Basin of western Madagascar forms a transform/oblique margin in East Africa. In the eastern part of the onshore segment of the basin, edible salt (“siratany”) is produced locally with very basic methods. Whereas this salt is typically found on the surface of halite-rich top soils, as the possible product of weathering processes, halite was also found in nearby in-situ Eocene sandstones. We interpret these poorly documented and understood surface halite occurrences as a giveaway for an underlying, and so far undrilled, Jurassic salt basin in the central segment of the basin.

Due the regional Cretaceous to Neogene westward tilting of the entire Morondava Basin, it became an exhumed margin with a very thick (1000-2000 m) Permian to Lower Jurassic sequence being eroded away in eastern part of the basin. We speculate that the inferred Middle Jurassic salt deposited in N-S trending syn-rift troughs beneath the basin might have provided brines migrating updip to the surface largely responsible for the reported siratany occurrences. In Madagascar, salt has only been identified so far in the offshore Majunga Basin where its age is interpreted as Early to Middle Jurassic.

A useful analogue for migrating salty brines in an exhumed basin can be found in North Africa. Brine hosted in Ordovician sandstones in the Illizi Basin of Algeria is genetically linked to Triassic-Liassic evaporites deposited >400 km to the north in the Berkine Basin. This observation confirms that long distance, lateral brine migration could occur within the basin in the past. The hydrogeologic record preserved in aqueous fluid inclusions within the Ordovician sandstone documents a marked increase in formation water salinity during cooling and exhumation. The regional tilt also provided the driving mechanism for the late-stage remobilization of deep salt brines within the basin. This well-documented model could be applicable to the onshore Morondava Basin as an exhumed basin. The presence of a Jurassic salt basin beneath the onshore Morondava Basin, if correct, would highlight the possibility for pre-salt hydrocarbon exploration efforts in this large underexplored basin.