

## **Re-Os geochronology of organic-rich sediments: implications for absolute age constraints of Proterozoic sedimentary basins**

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Previous studies have demonstrated the successful application of the Re-Os chronometer for accurate and precise dating of organic-rich sediments (ORS; Selby and Creaser, 2005). Here we apply this method to provide preliminary absolute age determinations for Proterozoic ORS of the Taoudeni basin, Mauritania, NW Africa.

The Taoudeni basin is one of the major structural units of the West African craton. The stratigraphy of the basin includes Proterozoic to Tertiary sediments and vast areas of Quaternary deposits. Problems in stratigraphic correlations across the basin arise, in part, from the vast size of the basin (>1M km<sup>2</sup>), the lack of volcanic horizons for U-Pb zircon geochronology and an unconformable contact between these sediments and the Archean basement. As a result, constraining depositional ages of sediments and the duration of sedimentation in this basin is extremely difficult.

The sedimentary cover of the craton includes a succession of sandstones, siltstones, dolostones and shales that were deposited in shallow marine and continental environments. Shales of this sequence are massive (laminations are typically absent), non-fissile black mudstones and are considered to have been deposited in a quiet outer shelf-offshore environment.

Previous Rb-Sr diagenetic clay geochronology proposed a basal Neoproterozoic age (874 ± 140 Ma, 2σ, MSWD = 760; recalculated using data from Clauer, 1976) for this stratigraphy. However, it has been suggested that this method is unsuitable for dating sediment deposition, because the constituent minerals of the clays suffer substantial exchange of Sr during post-depositional diagenesis (Dickin, 2005).

The shales used for Re-Os geochronology in this study have high total organic contents (7-10 wt. %) and are thermally immature / mature (Tmax = 431-437°C). The shales are enriched in Re (34-59 ppb) and Os, (0.6-1.0 ppb) particularly in comparison with the contents of average crust.

The preliminary Re-Os isotope data yield a model 1 age<sup>^</sup> with an uncertainty of ~ 1.6% (2 σ) and an MSWD of 0.52. This Re-Os age suggests a significant re-evaluation of the chronostratigraphy of the Taoudeni basin is needed and subsequently basin models and the Rodinia tectonic framework.

*Clauer, N. 1976, Mem Sci Geol, v. 45, p. 1-256.*

*Dickin, A. P. 2005, Radiogenic Isotope Geology: United Kingdom, Cambridge University Press, 492 p.*

*Selby, D. & Creaser, R.A. 2005, Geology, v. 33, p 545-548.*

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<sup>^</sup> Due to confidentiality issues the actual age determined for the Taoudeni black shales cannot be revealed at this time.