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D. Salze, O. Belcourt, M. Harouna

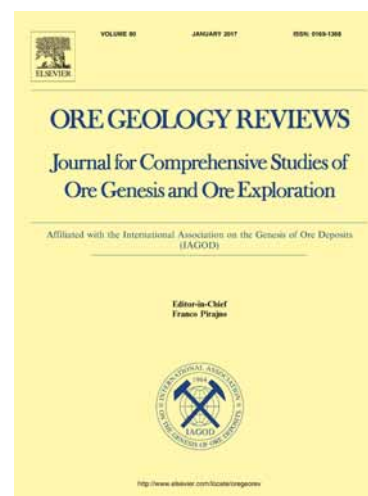
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The first stage in the formation of the uranium deposit of Arlit, Niger: role of a new non-continental organic matter

D. Salze^{a,c}, O. Belcourt^a, M. Harouna^b

^aLGEI, IMT Mines Ales, Univ Montpellier, Ales, France, (david.salze@mines-ales.fr, +33 4 66 78 53 11), corresponding author

^bFaculté des sciences-département de Géologie, B.P. 11302 Niamey, Niger

^cUniversité de Lorraine, CNRS, CREGU, GeoRessources, UMR 7359, Boulevard des Aiguillettes, B.P. 239, F-54506 Vandoeuvre-lès-Nancy, France

Abstract

The uranium deposits of Arlit are located in fluvial sandstone rich in organic matter of continental origin (type III) deposited in palaeochannels. Previous studies on Arlit deposits documented that organic matter of continental origin (type III) was the main contributor to the reduction of uranium from the oxidation state of uranium(VI) (U(VI)) to uranium(IV) (U(IV)). This study shows that migrated oils of non-continental origin strongly contributed to the genesis of uranium mineralization. The petrographic analyses showed that (i) solid bitumen, resulting from the polymerization of migrated oils, is present in abundance in the porosity of the sandstone and fractures at the level of the channels of the Tarat Formation (Tamou, Takriza, Southern Taza) and Guézouman Formation (mine sector of Akouta), and (ii) uranium mineralization is mainly associated with this migrated organic matter currently expressed in the form of solid bitumen. The association occurs at an infra-micrometric scale in the solid bitumen. The geochemical analysis, Rock-Eval, Py-GC-MS and GC-MS and the analysis of different indicators and biomarkers (n-alkanes, Pr/Ph, steranes...) indicate the presence of a second organic matter with a different signature to Type –III. The oils present in the porosity of the sandstone of the Guézouman and Tarat formations confirm that channels of these two formations are the traps of the oil migration.

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