Investigation of the architecture of the West African Craton and deep subterranean water reserves in the west Sahara Desert with electromagnetic geophysical data

Boukhalfa , Zakaria ; Comeau, Matthew J.; Bouzid , Abderrezak ; Boukhlouf, Walid ; Kasdi, Ahmed Seddik; Nemer, Zoubida ; Hamoudi, Mohamed ; Benhallou , Amel

Publication date
2024

Document Version
Final published version

Citation (APA)
Boukhalfa , Z., Comeau, M. J., Bouzid , A., Boukhlouf, W., Kasdi, A. S., Nemer, Z., Hamoudi, M., & Benhallou , A. (2024). *Investigation of the architecture of the West African Craton and deep subterranean water reserves in the west Sahara Desert with electromagnetic geophysical data*. Abstract from 26th International Electromagnetic Induction Workshop 2024, Beppu, Japan. https://www.emiw.org/emiw2024/abstracts/abstract-listing/pmfe-abstract-details?tx_powermail_pi2%5Baction%5D=show&tx_powermail_pi2%5Bcontroller%5D=Output&tx_powermail_pi2%5Bmail%5D=3900&cHash=997110ee56d45110a91cb0eb0ec114ec

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Investigation of the architecture of the West African Craton and deep subterranean water reserves in the west Sahara Desert with electromagnetic geophysical data

Zakaria Boukhalfa[1], Matthew J. Comeau[2], Abderrezak Bouzid[1], Walid Boukhlouf[1], Ahmed Seddik Kasdi[1], Zoubida Nemer[3], Mohamed Hamoudi[3], and Amel Benhallou[1]

[1] Centre de Recherche en Astronomie, Astrophysique et Géophysique (CRAAG), Algeria, Boukhalfa.Zakaria@yahoo.com; Bouzid_A@yahoo.fr; Boukhlouf_Walid@hotmail.fr; Kasdi.Ahmedseddik@gmail.com; Benhallou.Amel@gmail.com
[2] Delft University of Technology, The Netherlands, M.J.Comeau@tudelft.nl
[3] Université des Sciences et Technologie Houari Boumedien (USTHB), Algeria, MohamedHamoudi605@gmail.com, ZNamer516@gmail.com

SUMMARY

The West African Craton constitutes a significant geological domain within the African Precambrian basement, characterized by two cratonic sedimentary basins delineating three distinct Archaean and Paleoproterozoic metamorphic and magmatic shields. Among these shields, the Reguibat Shield features a basement primarily composed of Palaeoproterozoic rocks dating between 2.21 and 2.07 billion years ago. The formation of the West African Craton followed from the amalgamation of Archean, Paleoproterozoic, and Neoproterozoic terranes during the Pan-African orogeny, an event which occured approximately 750 to 550 million years ago. Superimposed upon this basement are Neoproterozoic and Palaeozoic sediments, notably within the Taoudenni Basin (alternatively referred to as the Hank Basin) to the south, the Reggane Basin to the east, and the Tindouf Basin to the north. The Adrar region, southwest Algeria, falls within the Taoudeni Basin, specifically aligning with the Reggane Basin.

In this work we present, for the first time, magnetotelluric data from the Adrar region. This (deeply-penetrating) electromagnetic geophysical technique can provide multi-scale imaging: for example, both regional and local imaging. The study has two objectives; one is to image the architecture of part of the West African Craton, specifically to elucidate and characterize its eastern limit. Another objective is the exploration of the distribution of deep subterranean water reserves, known to exist across the region, with the aim to help mitigate potential water scarcities in the west Sahara Desert, one of the hottest and driest places on Earth.

Keywords: Electrical Resistivity; Lithosphere; Craton; Water; Africa