



ISSN NO. 2320-5407

ISSN: 2320-5407

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

REVIEWER'S REPORT

Manuscript No.: IJAR-50450

Date: 01-03-2025

Title: Morphotectonic analysis by coupling a digital terrain model (DEM), radar data (Sentinel-1C) and field data from the Eastern part of the Ouaddai massif (Eastern Chad)

Recommendation:

- Accept as it is.....**YES**.....
- Accept after minor revision.....
- Accept after major revision
- Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality	√			
Techn. Quality		√		
Clarity		√		
Significance			√	

Reviewer's Name: Khursheed Sultan

Reviewer's Decision about Paper: **Recommended for Publication.**

Comments (*Use additional pages, if required*)

Reviewer's Comment / Report

The study titled "*Morphotectonic analysis by coupling a digital terrain model (DEM), radar data (Sentinel-1C) and field data from the Eastern part of the Ouaddai massif (Eastern Chad)*" presents a comprehensive examination of the geological features and morphotectonic characteristics of the Ouaddai massif. The integration of digital terrain models (DEM), Sentinel-1C radar data, and direct field observations provides a well-rounded analysis of the study area.

Summary of Findings

The study area, situated between latitudes 13°15' and 13°45' North and longitudes 21°24' and 22°2' East, is located in the Asougha department of the Ouaddai province. Through the use of SRTM images, Sentinel-1C radar, and fieldwork, the researchers successfully identified three major morphological units:

REVIEWER'S REPORT

- **Unit I:** Low-altitude areas (< 700m) primarily consisting of valleys and plains with dominant watercourses.
- **Unit II:** The most extensive unit, with medium to high altitudes (700-900m), composed of hills and plateaux.
- **Unit III:** The highest elevation (> 900m), characterized by circumscribed hills and mountain ranges.

The analysis of Sentinel-1C radar data revealed two predominant fracture orientations: **ESE-WNW and SE-NW**, which are consistent with regional geological structures. Field observations confirmed the presence of fractured granitoids, aligning with the detected lineaments and indicating structural continuity between observed lithological features and remotely sensed data.

Geological Context

The geological framework of Chad, particularly within the Central African orogenic belt, is thoroughly reviewed. The study references previous research dating back to colonial times and highlights subsequent advancements in geological mapping. Notable formations include:

- **Neoproterozoic granitoids**, which dominate the Ouaddaï massif and exhibit various degrees of metamorphism.
- **Metasedimentary and metavolcanic rocks**, such as quartzite schists, marbles, cipolins, and migmatites.
- **Post-tectonic plutonic formations**, including calc-alkaline granites, syenites, diorites, and microgranites.
- **Volcanic and plutonic formations**, which provide insights into regional geotectonic evolution.

Methodological Approach

The integration of multiple geospatial and field-based methodologies significantly enhances the robustness of the study. The use of GIS software (ArcGIS, SNAP, Geomatica PC, RockWork, Global Mapper, Surfer) and structural analysis tools (Stéronet) facilitated the accurate delineation of geomorphological and structural features. The combination of remote sensing and ground-truthing allowed for a more precise interpretation of the tectonic setting and geological processes affecting the region.

Conclusion

This study successfully combines remote sensing techniques and field observations to provide a detailed morphotectonic assessment of the Eastern Ouaddaï massif. The identification of key

REVIEWER'S REPORT

structural trends and lithological characteristics contributes valuable knowledge to the geological understanding of the region. The results reinforce the importance of integrating modern geospatial technologies with traditional geological fieldwork to enhance geological mapping and structural analysis in complex terrains.