# Accepted Manuscript


Implications of horsts and grabens on the development of canyons and seismicity on the west africa coast

Peter S. Ola, Solomon S. Olabode

PII: S1464-343X(17)30474-0

DOI: 10.1016/j.jafrearsci.2017.12.003

Reference: AES 3084

To appear in: *Journal of African Earth Sciences*

Please cite this article as: Peter S. Ola, Solomon S. Olabode, Implications of horsts and grabens on the development of canyons and seismicity on the west africa coast, *Journal of African Earth Sciences* (2018), doi: 10.1016/j.jafrearsci.2017.12.003

# IMPLICATIONS OF HORSTS AND GRABENS ON THE DEVELOPMENT OF CANYONS AND SEISMICITY ON THE WEST AFRICA COAST

***Peter S. Ola and *Solomon S. Olabode**

***Applied Geology Department, Federal University of Technology, Akure, Nigeria.**

## ABSTRACT

Subsurface basement topography in the Nigerian portion of the Benin Basin has been studied using borehole data of wells drilled to the basement and one strike line seismic section. Two areas of a sharp drop in topography with a horst in between were observed in the study area. These features were projected to a seismic section in the offshore area of the Benin basin. The result depicts the structural features as horst and grabens coinciding with the Avon platform bounded on the right side by Ise graben, and the Orimedu graben to the left. The observed relationship of the grabens with the present day location of Avon Canyon on the seismic section also suggests an active subsidence along fractured zones. The subsidence, which probably is occurring along similar fracture zones in the Gulf of Guinea, could be responsible for the occasionally reported seismicity on the margin of West Africa. A detailed seismographic study of the fracture zones is recommended.

Keywords: Basement, Gulf of Guinea, Benin basin, horst, graben, seismicity, canyon**.**

## 1.0 INTRODUCTION

Faults associated with the Basement underlying sedimentary successions have become a widely recognized feature in both the continental and oceanic basements (Welsink *et al*., 1989; Edwards, 1992; King and Thrasher, 1992; Herzer and Wood, 1992; Leroy *et al*; 1992; Withjack *et al*., 1999; Hsiao *et al*., 2004). The recognition of these structural features is connected with improved quality of seismic reflection and gravity data. Such structural features are essential to the understanding the geological evolution of sedimentary basins as well as petroleum systems therein. In most cases, the basement structural configuration controls the incipient structures in the overlying sediments. The current interest in the analysis of the basement structures and their configuration is based on the roles basement faults and other structures play in shaping basement architecture, stratigraphic architecture as well as hydrocarbon accumulations (Platt, 1995; Idelsink *et al*., 1992; Walker *et al*., 1992; Ameen,