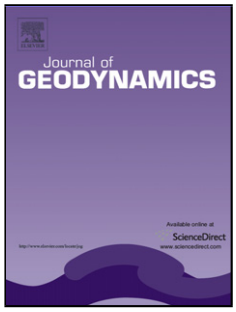

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PII: S0264-3707(17)30256-9
DOI: https://doi.org/10.1016/j.jog.2018.07.002
Reference: GEOD 1584

To appear in: *Journal of Geodynamics*

Received date: 1-11-2017
Revised date: 27-6-2018
Accepted date: 26-7-2018

Please cite this article as: Marcel J, Abate Essi JM, Meli'i JL, Nouck PN, Mahamat A, Manguelle-Dicoum E, Geodynamic insights of the Cameroon Volcanic Line (Western Africa) from isostatic gravity anomalies, *Journal of Geodynamics* (2018), https://doi.org/10.1016/j.jog.2018.07.002

Geodynamic insights of the Cameroon Volcanic Line (Western Africa) from isostatic gravity anomalies

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Highlights :

- Isostatic residual and regional anomalies have been computed based on Airy-Heiskanen local compensation model using gravity data.
- Isostatic equilibrium state of the study area belonging to the Cameroon Volcanic Line (CVL) is evaluated.
- Isostatic regional anomalies obtained outline two major crustal zones corresponding to Mount Cameroon and Kumbo regions.
- Most of the mountains of the study area are located in zones where isostatic residual anomalies are positive.
- The conditions of complete isostatic compensation are not satisfied in most of the mountains of the CVL.

Abstract

The Cameroon Volcanic Line (CVL) is one of the major features of the African Plate which consists of volcanic islands of the Gulf of Guinea in the Atlantic Ocean, volcanoes and plutonic complexes in the continent trending NE-SW. Volcanic activities of the CVL are still current with eruptions of Mount Cameroon (the latest in 2000) and emission of deadly gases from lakes Monoun and Nyos in 1984 and 1986 respectively. Based on Airy-Heiskanen local compensation model, this work computes isostatic gravity anomalies to study the geodynamics of the lithosphere beneath the CVL using the Earth Gravitational Model EGM2008 and the digital topographic data ETOPO1. Isostatic regional anomalies obtained outline two major crustal zones corresponding to two distinct quasi-ellipsoidal shape zones oriented NE-SW. The southern part of the CVL including Mount Cameroon, coastal and oceanic zones is characterized by the highest values, while the northern part comprising Kumbo zone, lakes Monoun and Nyos shows lower magnitudes. Successive and located positive anomalies observed on the isostatic residual anomaly map line up towards the CVL direction. These findings bring forward the fluctuations inside the crust and the lithosphere in conformity with