

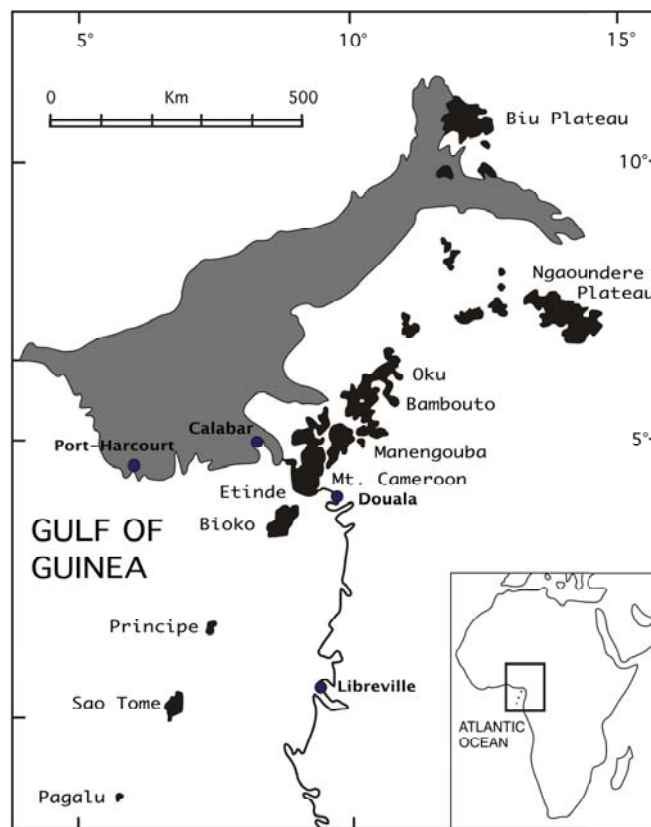
THE AFRICAN PASSIVE CONTINENTAL MARGIN IN THE GULF OF GUINEA: GEOSCIENTIFIC PROBLEMS

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The Gulf of Guinea is a part of the passive margin of the Atlantic Ocean near to the Equator in Central Africa. The Gulf of Guinea is characterized by the presence of a volcanic field forming the oceanic segment of the active Cameroon Volcanic Line (CVL), a line extending over 1500km from the Atlantic Ocean to the Africa continent in Cameroon with its oceanic segment underlined by the following volcanic islands: Bioko, Principe, Sao Tome, Annobon. The continental segment of the CVL starts at Mt, Cameroon (4100m) which is the main active volcano along the CVL with at least 17 eruptions since the 19th century. Mt. Cameroon Eruptions of 1922 and 1999 stretched over several km, entering the Atlantic Ocean at Bibundi for the first and ending about 300 m from the ocean for the second. Mt Cameroon area is the most seismically active zone of the CVL but little information is available for seismic activity within the oceanic segment of the CVL. A volcanic eruption or an earthquake within the Gulf of Guinea may provoke huge damage in coastal areas with are characterized by high population concentrations (07 cities with more than one million inhabitants). The Gulf of Guinea geology is completed by sedimentary formations currently undergoing massive hydrocarbons exploitation.

In the framework of future MARGINS activities main problems challenges concerning the Gulf of Guinea in Central Africa thus include:

- The building up of a comprehensive theory for the origin and nature of the Cameroon Volcanic Line, a unique example on Earth of an active intraplate alkaline tectonomagmatic alignment simultaneously developed into both oceanic and continental domains (Fitton, 1987; Halliday et al., 1990; Burke, 2001; Caldeira et al., 2002; Deruelle et al. 2007).
- The integration of the gulf of Guinea in an initiative for a the building up of a global warning system for tsunamis.
- The effects of massive hydrocarbons exploitation on climate change.



The Gulf of Guinea and the Cameroon Volcanic Line. Grey: Sedimentary formations of the Benue Through; Black: Cameroon Volcanic Line

In conclusion, the Gulf of Guinea comprises diversified geological environments formed by volcanic islands which are part of the active Cameroon Volcanic Line and sedimentary formations currently under heavy hydrocarbons development. Related geohazards to be investigated include oceanic volcanoes and earthquakes survey, study of potential effects of massive hydrocarbons exploitation on global climate change.

Summary references

- Burke K. (2001). Origin of the Cameroon Line of Volcano-capped swells. *Jour. Geology*, Vol. 109, pp. 349-362
- Caldeira R. and Munha J.M. (2002). Petrology of ultramafic nodules from Sao Tome Island, Cameroon Volcanic Line (oceanic sector). *Jour. African Earth Sciences* 34, pp. 231-246.
- Déruelle, B., Ngounouno, I and Demaiffe, D. (2007). The Cameroon Hot Line (CHL): A unique example of active alkaline intraplate structure in both oceanic and continental lithospheres. *Comptes Rendus Géosciences* 339, pp. 589-600.
- Fitton, J.G. (1987). The Cameroon line-West Africa: a comparison between oceanic and continental alkaline volcanism. *Géol. Soc. Spec. Publ.*, 30, pp. 273-291.
- Gaudru H. and Tchouankoue J. P. (2002). The 1999 eruption of Mt. Cameroon, WestAfrica. *Cogeoenvironment Newsletter* 18, pp. 12- 14.
- Halliday A.N., Davidson J.P., Holden P., DeWolf C., Lee D.-C, Fitton J.G. (1990). Trace element fractionation in plumes and the origin of HIMU mantle beneath the Cameroon line, *Nature* 347, 523–528.
- Marzoli A., Piccirillo E.M, Renne P.R., Bellieni G., Iacumin M., Nyobe J.B., Tongwa A.T. (2000). The Cameroon Volcanic Line revisited: petrogenesis of continental basaltic magmas from lithospheric and asthenospheric mantle sources, *J. Petrol.* 41, 87–109.
- Pintér, Zs., Tene Djoukam, J.F., Tchouankoue, J.P. & Szabó, Cs. (2009) Fluid inclusion study in upper mantle xenoliths along the Cameroon Volcanic Line. *European Current Research on Fluid Inclusions (ECROFI- XX)*, 21-27 September, 2009, Granada, Spain, Programme and Abstracts, p. 189-190.