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Characterization of Limestone from Cement Plant at Berbera (Republic of Somaliland)

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Abstract

The results of physico-chemical characterization of limestone samples come from the Mesozoic limestone deposit areas in the region of Berbera (Republic of Somaliland) were reported in this paper. The chemical analysis was carried out by X-ray fluorescence analysis, FT-IR spectroscopy and thermal analysis. The physical characterization of limestone samples were performed in laboratory conditions. This investigation provided necessary data for subsequent utilization and exploitation of limestone in this region. The tested material is a good quality and purity. From the chemical composition point of view the tested limestone has a high content of about 96% CaCO₃, with small amount of clay minerals and with traces of quartz, which corresponds to the medium purity limestone. It was confirmed, that this limestone is suitable for cement production. The density and porosity measurement indicated that the medium to high density limestone is very compact with porosity lower than 4%. These data very good corresponds to relatively high Young's modulus up to 48 200 MPa and maximum strength of 204 MPa.

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1. Introduction

Republic of Somaliland (Northwestern Somalia) is situated on the northern side of the Horn of Africa. From the geological point of view the country is comprised mainly by Mesozoic and Tertiary continental-margin and marine sedimentary rocks deposited unconformably on Precambrian metamorphic and igneous rocks [1]. The Berbera plain is a wide down-faulted sector, parallel to Somaliland coast along the Gulf of Aden, limited towards the south by high fault of the Precambrian crystalline basement forming the high mountains [2]. The basement in Berbera plain is covered by a thick Meso-Cenozoic sedimentary succession, including marine limestone facies (Fig. 1).

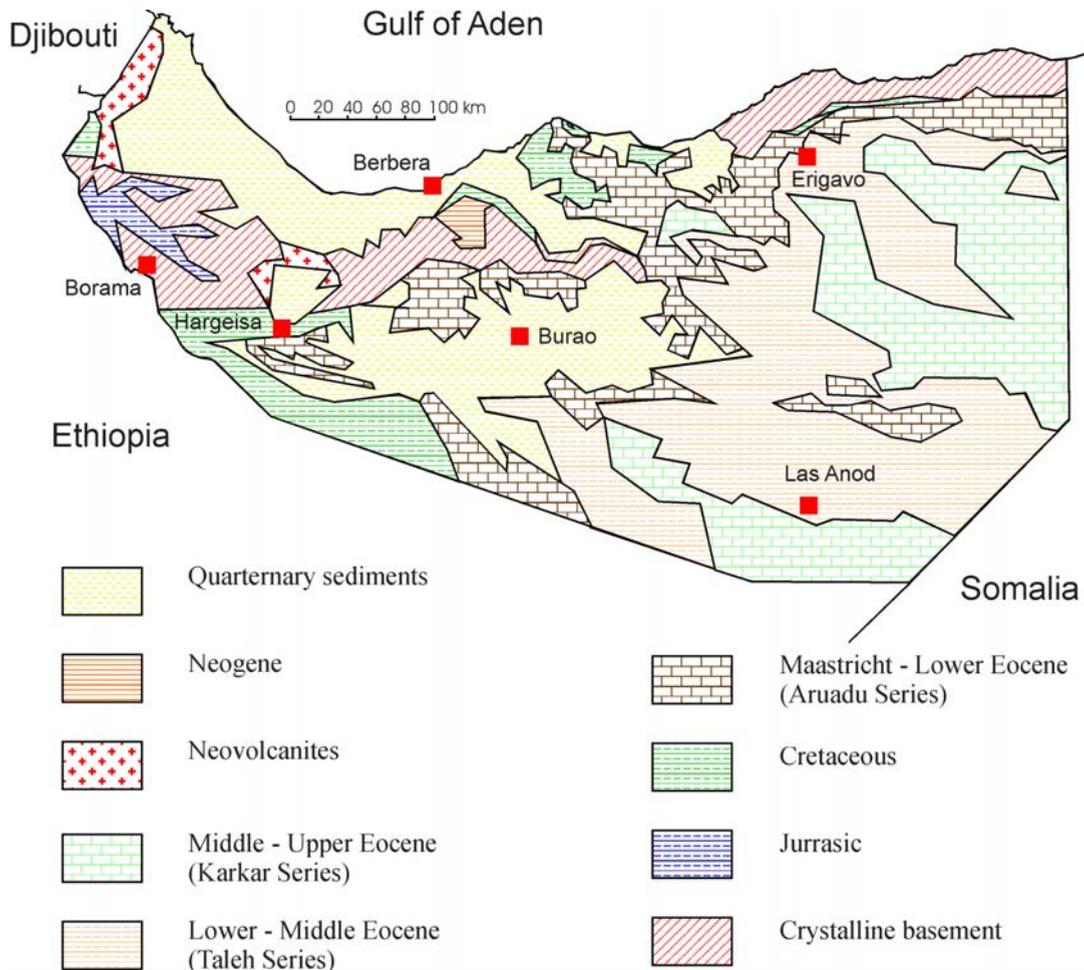


Fig. 1. Schematic geological map of Somaliland (modified from [3]).

In the early 1980s, a cement plant became operational at Berbera in Somaliland, however, the lack of proper maintenance, shortage of spare parts, lack of managerial staff and skilled workers during the civil war caused the closure of this plant and termination of cement production [4]. National cement consumption was estimated to be about 250 000 metric tons in 2012 [5], in view of this fact some plan to restart the country’s only cement plant at Berbera in Somaliland appears in recent time.

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