



Effects of surface geology on the ground-motion at New Borg El-Arab City, Alexandria, Northern Egypt



Abuoelala A. Mohamed^a, A.M.A. Helal^b, A.M.E. Mohamed^{a,c}, M.M.F. Shokry^b,
 M. Ezzelarab^{a,c,*}

^a *Seismology Department, National Research Institute of Astronomy and Geophysics (NRIAG), Egypt*

^b *Geophysics Department, Faculty of Science, Ain Shams University, Egypt*

^c *Earthquake Monitoring Center (EMC), Sultan Qaboos University, Oman*

Received 11 June 2015; revised 5 October 2015; accepted 24 November 2015

Available online 21 December 2015

KEYWORDS

New Borg El-Arab City;
 Microtremor;
HVSR;
 Fundamental frequency;
 Microzonation;
 PGA;
 Site response

Abstract The effects of the near-surface geology on the ground-motion at New Borg El-Arab City were evaluated in the current work based on the analysis of the ambient noise records (microtremor). Sixty-nine microtremor measurements have been done in the studied area. The dataset was processed using horizontal-to-vertical-spectral ratio (*HVSR*) technique to estimate the fundamental frequencies corresponding to the ground-motion amplification due to the soil deposits. By spatial interpolation of the resulted fundamental frequencies (f_0) of all the measured sites, the zonation map was produced. This map was correlated with the geological features of the study area and demonstrated that the fundamental frequency ranges between 5.8 Hz and 7 Hz were corresponding to the sites located over Quaternary deposit. However, the fundamental frequencies (f_0) increased in the middle of the study area due to presence of parallel Alexandria limestone ridge. Finally, site effect was highlighted by performing a site response analysis. It indicated that, the PGA at surface of the analyzed site is 0.047 g and the maximum spectral acceleration (SA) is 0.157 g. It was also found that, the maximum spectral period from site response analysis is in a good agreement with that one from *HVSR* technique. This confirmed the robustness of *HVSR* for determination of fundamental period or frequency.

© 2015 Production and hosting by Elsevier B.V. on behalf of National Research Institute of Astronomy and Geophysics. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

* Corresponding author at: Seismology Department, National Research Institute of Astronomy and Geophysics (NRIAG), Egypt.

Peer review under responsibility of National Research Institute of Astronomy and Geophysics.



Production and hosting by Elsevier

1. Introduction

In the framework of urbanization in Egypt, many new cities have been constructed. New Borg El-Arab City is one of the cities whose establishment is mandated in the national plan of Egypt for the establishment of new urban communities.

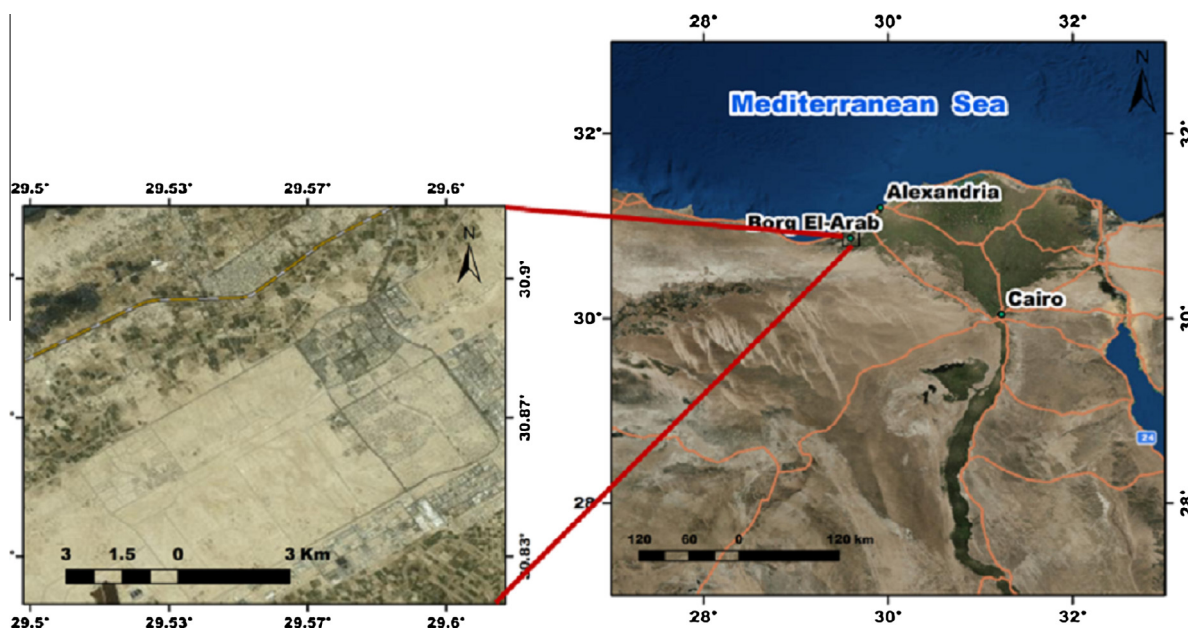


Figure 1 Location map of the studied area.

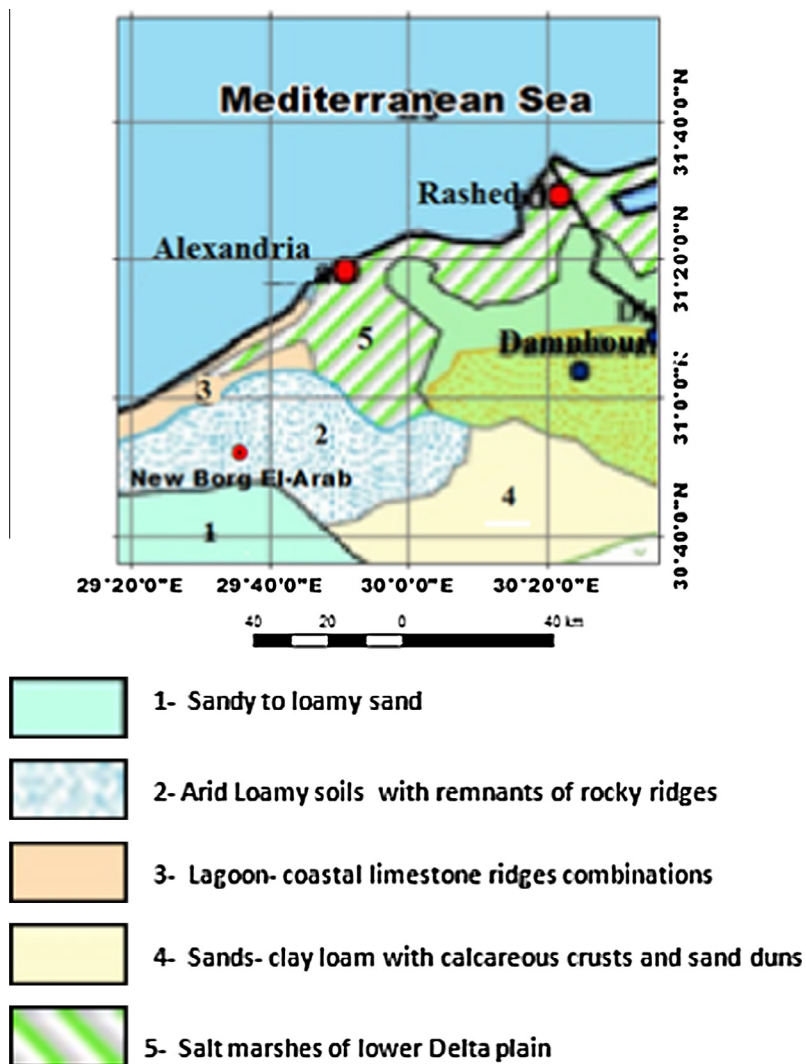


Figure 2 Soil map for the studied area and surrounding (after Omar, 2010).

Download English Version:

<https://daneshyari.com/en/article/1780555>

Download Persian Version:

<https://daneshyari.com/article/1780555>

[Daneshyari.com](https://daneshyari.com)