



The 3<sup>rd</sup> International Geography Symposium - GEOMED2013

## Geomorphological features and seismicity of Bigadiç plain and its immediate vicinity

Abdullah Soykan, Isa Cürebal, Recep Efe\*, Süleyman Sönmez

*Balıkesir University, Faculty of Arts and Sciences, Department of Geography, 10145 - Balıkesir*

### Abstract

Bigadiç plain is located in the southeast of Balıkesir, in the south of the Marmara region. The purpose of this study is to determine the geomorphological and seismic features of this plain and its immediate vicinity. To that end, geologic and topographic maps of the area were examined, and information on the processes of geomorphological configuration was obtained. In the meantime, an outline geomorphological map was generated. In addition, earthquakes and their effects on the area were gathered. Field studies were conducted in different time periods; information collected in the field. Data obtained from different sources were integrated, and the results were found. Miocene and Pliocene era volcanic formations have an important effect in the formation of Bigadiç basin. Alluvium belonging to the Quaternary era is the youngest geologic formation in the area. Rivers with parallel and sub parallel dendritic drainage patterns take their sources from high areas in the west and the east of Bigadiç plain, and flow towards Simav stream. These rivers lie along the east-west direction. Faultlines are located along the SE-NW direction, and the study area is seismotectonically situated between the North Anatolian Fault Zone and the Aegean Graben System. Some faults in the area intersect the Pliocene formations. The presence of epigenetic gorges and terraces at different elevations indicates that the area is topographically young and has a polycyclic structure. Bigadiç plain and its immediate vicinity have the characteristics of a tectonic basin and have substantially undergone faulting. This is an outgrowth of the fact that these areas are under the threat of devastating earthquakes. Bigadiç plain and its vicinity have suffered 27 large scale earthquakes in last two millenniums.

© 2013 The Authors. Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Selection and peer-review under responsibility of the Organizing Committee of GEOMED2013.

*Keywords:* Balıkesir; Bigadiç plain; geomorphology; seismicity.

\* Corresponding author. Tel.: +90/532 2474807; fax: none.

*E-mail address:* [recepefe@hotmail.com](mailto:recepefe@hotmail.com)

## 1. Introduction

We can explore the relationship between seismicity and landforms in space and time. Neotectonic activities played important role of shaping Western Anatolia. Some parts of the region were uplifted and some areas subsided. Antecedent of present day drainage system was consequence of these tectonic activities. Geomorphological structure of the area is closely reflected in the topography (Atalay, 1987; Efe, 1994; Efe et al., 2011).

Bigadiç depression is located in the south of Balıkesir, which is within south of the Marmara Region. The Sındığı plateau is in the south of Bigadiç depression while western foothills of Mt. Ulus are in the east of it. The western frontier, which passes the high area in the west of Bigadiç depression, stretches along all the way until the end of the Çağış plateau in the north. The north side is located in the Yeniköy plateau near Balıkesir depression. It loses its characteristics towards north and where Simav stream separates from the Kaleli strait and flows into Balıkesir plain. Marmara transitional climate prevails in the area (Cürebali et al., 2012). Forests consist of oaks observed in the vicinity of the plain. Most of the area is under the cultivation (Efe et al., 2013). The areas without vegetation underwent severe erosion and land degradation (Efe et al., 2008; Efe, 2010).

Miocene and Pliocene volcanic formations have an important role in the structure of Bigadiç basin. Late Cretaceous mélangé on the Yeniköy plateau, metasandstones that were formed during the Early Triassic era occur in the west of Değirmenli plain, and limestones belonging to the Permian form the basis under this volcanic coating. Volcanic formations here, particularly in the west and north of the depression, are covered by Late Miocene and Early Pliocene limestone, sandstone, marlstone, and clay deposits. The youngest formation in the area is alluvium belonging to the Quaternary period. These alluvial deposits are especially observed on the lower levels of Bigadiç and Değirmenli depressions and on the valley bottoms of Simav stream and its vicinity. Structure characteristics, including continuous fault lines, thrusts, and steep landforms, constitute a geological mosaic (Ercan et al., 1984)

Bigadiç depression and its vicinity are under the influence of the Mediterranean climate. However, not all characteristics of the Mediterranean climate can be observed. Eventhough winters are rainy as they are in the Mediterranean, average winter temperature is lower, and it snows more here as the area is close to the central Anatolia region. Forests in the area have largely been destroyed as a result of human activities and have turned into park-looking forests.

Rivers with parallel and subparallel dendritic drainage patterns, which take their source from the high areas between the west and east of Bigadiç depression and flow towards Simav stream, lie along the east-west direction. Yet, Kavak stream, Patlak and Höyücek streams on the Çağış plateau, Ayıtlı and Dombay streams, which are in the northwest of the depression, and Emirli stream lie along the NW - SE direction. Savucak and some minor streams flow along the north-south direction. Rivers on the Yarbaşı strait, Değirmenli plain and the Yeniköy plateau stretch along the east-west direction. Rivers in this area flow towards Simav stream.

Faultlines in the area lie along the southeast-northwest direction. This suggests that the study area is seismotectonically situated between the North Anatolian Fault Zone and the Aegean Graben System.

Since there are boron salts and borate deposits in Bigadiç depression and its immediate vicinity, few geological, thermomineral, and hydrogeological studies were conducted (Ketin, 1968; Yılmaz, 1971; Soykan, 1991 and 1994 ).

The estimated thickness of alluvium ranges between 75 and 100 meters (Esen, 1962). Kaleli and Dombay straits are epigenetic gorges while Yarbaşı strait is a break-through. There are faults and lineaments lying along the NE-SW direction in the west of Bigadiç plain and the north of Değirmenli plain (Erinç et al., 1985).

Some faults in the area cut through the Pliocene formations. The presence of epigenetic gorges and terraces at different elevations indicates that the area is young and has a polycyclic topography (Özoğul, 1987).

## 2. Geomorphological Features

### 2.1. Bigadiç Depression and its Immediate Vicinity

It is possible to geomorphologically classify Bigadiç depression into a few groups.

Download English Version:

<https://daneshyari.com/en/article/1116875>

Download Persian Version:

<https://daneshyari.com/article/1116875>

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