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An overview of climatic features of the Ermenek River Basin

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Abstract

Ermenek River is one of the two rivers that constitute the upper basin of Göksu River, one of the most important rivers which flow into the Mediterranean Sea in South Turkey. This research was conducted in order to identify the climatic features of the aforementioned basin. The climatic observations obtained from the three meteorological stations in the basin form the basic data of the study. These data were analyzed and converted to maps and charts. Planetary and geomorphological factors shape the climatic features in the research area. The Mediterranean climate, with its hot and dry summers and rainy winters, prevails over the basin. However, because the study area is between Central Anatolia and the Mediterranean region, and a large part of the area is at least 1500 meters above sea level, Mediterranean mountain climate is seen especially in higher regions. Rainfall effectiveness decreases from the west to the east. As Mediterranean climate prevails in the lower parts of the basin, Mediterranean mountain climate is dominant in higher areas.

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1. Introduction

Climate is an important factor determining human activities according to location, time and period, in addition to its effect on geomorphology, hydrology, soil characteristics and natural vegetation. Climatic effect on physical factors can take a long time (Atalay and Efe, 2010; Efe, 1998; Efe, 2010). But it is a fact that current climatic conditions, particularly vegetation, are influential on the physical geography of an area such as hydrography and soil

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(Atalay and Efe, 2007; Efe et al., 2008). On the other hand, climate affects human geography along with physical factors directly and in a much shorter time (Bahadır, 2011; Arseni-Papadimitriou and Maheras, 1991; Global warming and climate change is important issue for the future projects especially on the coastal areas (Brochier and Ramieri, 2001; Xoplaki et al., 2003; Lionello, 2013; Metaxas et al., 1991; Kutiel and Maheras, 1998; Bozkurt, 2011; Perry 2000; Poulos et al., 1997).

2. Materials and Methods

Ermenek River Basin is a part of the Göksu River Basin in the middle region of the Taurus Mountains (Fig 1). This research was initiated with primarily reviewing the literature on the subject and study area, the sources procured were examined and compiled. Later, the observations of the Ermenek, Göktepe and Kazancı meteorological stations, which are within the boundaries of the study area, were obtained. Because the observation spans of these Meteorological stations are different from each other and even within the same station, the observation spans of precipitation and temperature are inconsistent, data from the meteorological stations near the study area, Hadım, Mut, Gülnar, Gazipaşa and Gündoğmuş, were also used. Furthermore, the climatic features of the study area which is located in a transit zone were compared to the meteorological data from Konya which is in a continental climate area and Mersin which represents Mediterranean climate, and their approximation and dissimilarity to these climates have been propounded. All data were analyzed and converted to tables from different angles such as average, maximum and minimum rates and multi-annual changes. The data from the tables were used in order to create charts and maps. Thornthwaite classification (Thornthwaite, 1948) was preferred in determining the climatic type.

3. Findings and Discussion

There are two main factors determining the climatic features of the Ermenek river basin. These are planetary factors and landforms.

3.1. Planetary Factors

Air circulations which are prevalent on the region determine the climatic features of the study area. These air circulations are a part of the "Westerlies" system which is dominant in the Northern Hemisphere. The study area and its vicinity are under the effect of two important air masses. These are polar (P) air mass which usually comes from the north in winter and tropical (T) air mass, which comes via Africa and the Mediterranean and effects Turkey in summer. Both these air masses can have marine (m) or continental (c) features based on where they have originated (Erol, 1993; Kadioğlu, 2000; Karabörk et al., 2007). Annual precipitation and temperature conditions in the study area are under the control of these two air masses. The geographical position and geomorphological features of the Ermenek river basin somewhat alter the effects of these two different air masses (Atalay, 2010).

The area falls under the influence of the tropical air mass coming from the south and the southeast at the beginning of summer. When the tropical (cT) air mass which is dehumidified when passing over the Mediterranean is effective, air temperature rises and precipitation does not occur. Along with this air mass that affects the area from the south and the southeast, at the same period; high pressure systems originating from Europe pass the Anatolian plateau and reach the study area at times. These cold polar air masses gets warmer while passing through Western Anatolia in summer period and reach the study area and its vicinity having lost their humidity. These air masses which occasionally create winds blowing from the northwest to the southeast, while scarcely causing precipitation, mitigate the effect of hot weather. Therefore, there is a long period of drought during the summer that ranges between 4-6 months in the study area.

From September onwards, the area falls under the influence of the polar air mass coming from the north and the tropical air masses coming from the south. Frontal activities caused by the encounter of these two air masses cause precipitation in the area. The continental polar (cP) air mass which is dominant in Central Anatolia throughout winter occasionally moves south and affects the study area. The polar air mass which creates high pressure causes a fall in temperature; but scarcely leads to precipitation. When the polar air mass is influential, the weather is clear

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