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The environmental, archaeological and historical evidence for regional climatic changes and their societal impacts in the Eastern Mediterranean in Late Antiquity

Adam Izdebski [a, *], Jordan Pickett [b], Neil Roberts [c], Tomasz Waliszewski [d]

[a] Institute of History, Jagiellonian University in Krakow, ul. Golebia 13, 31-007 Krakow, Poland
[b] Art and Archaeology of the Mediterranean World, University of Pennsylvania, Philadelphia, PA 19104, USA
[c] School of Geography, Earth and Environmental Sciences, Plymouth University, Plymouth PL4 8AA, UK
[d] Polish Centre of Mediterranean Archaeology and the Institute of Archaeology, University of Warsaw, ul. Nowy Świat 4, 00-497 Warsaw, Poland

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ABSTRACT

This paper examines the evidence for climatic changes in the Eastern Mediterranean for the period 200–800 AD and offers hypotheses on the role of climatic fluctuations in the societal developments that occurred in this region at the end of Antiquity. The geographical focus of the paper includes Anatolia and the Levant, two major regions of the Eastern Roman Empire that are rich in environmental, historical and archaeological data. The paper starts with the review of current research on the economic, settlement and vegetation history of the Eastern Mediterranean in Late Antiquity, which provides the necessary framework for the study of potential climate impacts. The core of the article is devoted to the analysis of the palaeoclimatic evidence, which is divided in two groups. The first one encompasses the direct evidence, that is palaeoclimate proxies and the textual record of extreme weather events, while the second includes indirect information on climate, in particular multi-proxy studies that include pollen analysis, archaeological evidence, and the historical evidence of subsistence crises. We conclude that during our study period there occurred three periods of substantially different climatic conditions. A late Roman drought ~350–470 AD was followed by a dramatic shift to much wetter climatic conditions. These in turn changed into increasing dryness after ~730 AD in Anatolia and ~670 AD in the Levant. The lack of chronological precision in the dating of the archaeological evidence and of some climatic records makes it impossible at present to make conclusive observations regarding the societal responses to these climatic fluctuations. Nonetheless in all probability, the extended and – in some areas - severe late Roman drought did not cause any major social upheaval or economic decline in Anatolia or the Levant, although it appears to have contributed to a change in patterns of water use in the cities. In contrast, the increased availability of moisture after ~470 AD does appear to have contributed to the expansion of rural settlement and agriculture into environmentally marginal terrain, including semi-arid areas such as the Negev. In this way climate probably contributed to the general economic prosperity of the late Roman Empire in the east of the Mediterranean basin. The end of this late Roman world system came about finally in mid-7th c. and, at least in Anatolia, is not directly associated with any shift in climatic conditions. Aridity during early Medieval times may be one of the main factors behind the gradual long-term decline of settlement on the marginal lands in the Levant following Islamic conquest.

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1. Introduction

Among the scholars specializing in the study of history and archaeology of Late Antiquity (ca. 3rd-7th c. AD), one may observe a growing awareness of the fact that during this period the Eastern Mediterranean not only experienced an impressive economic and cultural floruit, but it also witnessed significant fluctuations in climate. Among the first to observe that climate may have changed in the 5th-6th c. AD was Koder (1996, 1994), a few years later his work was followed by Hirschfeld (2004) who discussed the archaeological and textual evidence for a rise in humidity in 5th-6th-c. Palestine. Recently, Izdebski (2011) proposed that an increased

* Corresponding author.
E-mail address: adam.izdebski@uj.edu.pl (A. Izdebski).

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availability of water derived from precipitation contributed to the economic expansion in the countryside across Anatolia, the Levant and Mesopotamia, while Witakowski (2010) argued that a trend towards drier conditions in the 6th-7th c. AD brought about the collapse of the intensive rural settlement in northern Levant (a similar hypothesis has been put forward by Coulton (2012) for a part of South-Western Anatolia, but for the 8th c.). At the same time, in a review paper discussing palaeoclimate data from the Mediterranean and Europe, McCormick et al. (2012a) concluded that Late Antiquity was indeed characterised by significant instability of climate compared to the previous period. This potential for the study of the links between climate and society has been further discussed concerning the case of Anatolia by Haldon et al. (2014).

In the context of this growing number of hypotheses about how climate could influence the course of the societal changes in the Eastern Mediterranean during Late Antiquity, this paper adopts a different, more comprehensive approach (Izdebski et al., this issue). First of all, it aims at reviewing all of the existing evidence on climate change in the period of 200–800 AD/1750-1350 cal BP. In order to observe both shorter and longer-term developments, we consider a period beginning a hundred years before the traditional starting date for Late Antiquity (ca. AD 300), and ending some hundred years after the traditional dates for the end of this period (ca. AD 650–700).[1] Our discussion includes all types of palaeoclimate data, be it historical (unusual weather events and subsistence crises attested in the written sources), archaeological (responses to the changes in the amount of precipitation visible in the extant material record), and environmental (palaeoclimate data, such as stable isotopes, as well as referring to other environmental proxies, such as pollen-based reconstructions). It is only after establishing the course of climatic changes that occurred in our study period, as well as their spatial extent, that we discuss the potential links between climate and social change. Thus, in the final section of this paper, we review hypotheses about the impact of climate on the society in Anatolia and the Levant in Late Antiquity that can be proposed on the basis of the existing evidence. In order to provide the necessary background information, we begin our article by a short overview of the historical events, the settlement history of our region, and of the key environmental processes.

The geographical foci of this paper are Anatolia and the Levant, which are rich in data on both past climate and society. Together with Egypt they formed the heartland of the Eastern Roman Empire in Late Antiquity, and several palaeoclimate sites, as well as archaeological projects, are located in various parts of these two regions. Egypt, on the other hand, while endowed with a rich archaeological and historical record (it is the only region of the Mediterranean that possesses an exhaustive record of everyday life thanks to the papyri), remains a special case that cannot easily be analysed together with our two study regions. On the one hand, Egyptian agriculture depends entirely on the Nile floods, which in turn are determined by a climate system that operates over Eastern Africa and the Indian Ocean, and which is only indirectly linked to the climate system of the Mediterranean (Lionello, 2012). In particular, the Nile flood is determined by summer rainfall of monsoonal origin, whereas moisture availability and river regimes in the rest of the Eastern Mediterranean are controlled by winter-season cyclonic precipitation. What is more, the fact that the social and economic life of late antique Egypt is known to us in incredible detail as compared to other regions of the Eastern Empire makes it particularly difficult to arrive at conclusions that apply to both Egypt and the rest of the empire (for the history of Egypt in our period, see Bagnall, 1993). Looking westwards, Greece and the Balkans had a very different political and economic history to the rest of the Eastern Mediterranean. Whereas Anatolia and the Levant enjoyed relative peace and stability until the 7th c. AD, the Balkans were constantly devastated by 'barbarian' raids and migrations from the 5th c. AD. In addition, while there is abundant archaeological record from Greece for our study period, palaeoclimate evidence from here is rather sparse. Also, for reasons of brevity, we exclude Cyprus from our survey of archaeological evidence. Finally, we do not include archaeological or environmental data from the Sassanian Empire, located at the eastern limit of our study region, as we want to focus on a culturally and politically uniform world of the Roman Empire, which facilitates greatly our comparison of the environmental and societal processes.

2. Background

2.1. Social and economic history of Anatolia and the Levant in AD 200–800

Our study period begins with the 3rd century AD, which after the successful reigns of the Severan dynasty saw the so-called Crisis of the Third Century, which lasted from the death of Alexander Severus in AD 235 until the accession to the throne of Diocletian in AD 284. During this period, the Roman Empire faced numerous devastating wars both in Europe and in the Middle East, and the imperial throne was contested every few years by competing emperors and usurpers from different parts of the empire (Ziolkowski, 2011). Diocletian finally managed to re-install order and stability throughout his long reign, and despite some re-occurring conflicts between military and political leaders competing for the throne, the 4th c. AD can be considered an era of consolidation. It was during this period that the new political-economic structure of the Eastern Mediterranean came into being, with the foundation of the empire's new capital, Constantinople, in AD 330, which completely re-organised the economic networks in the East (Cameron, 1993). In AD 395, the political division between the western and eastern parts of the empire became permanent, and from that moment on the Balkans, Anatolia, Levant and Egypt constituted a separate political entity, that is the Eastern Roman Empire. Contrary to its western counterpart, the Eastern Empire fared relatively well during the 5th c. AD, except for the Balkan provinces which suffered almost continuous warfare with the Huns and the Goths. It is during this peaceful century (which also saw the further elaboration of the Christian creed) that the economic consequences of the founding of Constantinople became fully visible. Not only did the city receive large grain shipments from Egypt, but it also attracted the agricultural surplus, through trade and taxes, from other parts of the East. In addition, the growing interest on the part of the imperial government in collecting taxes in cash rather than in kind encouraged increasing monetization of the entire economy, and provided a further incentive for economic expansion (Banaji, 2007).

In the 6th c., during the reign of Justinian I which lasted almost half of this century, the Eastern Empire undertook a program of large-scale political and military expansion, which resulted in prolonged (although often successful) wars both in the western part of the Mediterranean and on the Persian frontier. However,

[1] Late Antiquity is not the only name used in archaeological and historical scholarship for the period of ca AD 300–650. Other names include early Byzantine (in particular with regard to the Levant), late Roman or early Christian period. For the period after AD 650, names commonly used include early medieval, early Islamic, or—in Anatolia - early Byzantine. The actual confusion is even greater, since each archaeological project tends to define the actual chronological limits of these periods in different ways; at times, the differences amount even to a hundred years. In this paper, we avoid the use of culture- or religion-specific names (such as early Byzantine or early Islamic) and use instead the general terms, Late Antiquity and the early Middle Ages. We also attempt at translating the periods used by specific archaeological projects into this general framework.

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