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Pursuing pilgrims: Isotopic investigations of Roman and Byzantine mobility at Hierapolis, Turkey

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ABSTRACT

Using strontium isotope analysis, we investigated the mobility of Roman (1st to 7th century AD) and Byzantine (9th–13th century AD) individuals buried at the UNESCO World Heritage site of Hierapolis, Turkey. Results from Roman and Byzantine individuals show that while the majority of the population interred at this site have local strontium isotope values, there are some individuals with values outside the local range, which we identify as migrants. This conclusion agrees in particular with the known history of pilgrimage at Hierapolis in the Byzantine period (as defined above) and with the archaeological evidence of pilgrim badges associated with human burials unearthed from recent excavations. In addition, we present the first map of bioavailable strontium in southwestern Turkey.

1. Introduction

The analysis of human mobility during the Roman (Roman/early Byzantine periods, 1st–7th centuries AD) and Byzantine (the mid-Byzantine period, 9th–13th centuries AD) period in southwestern Turkey is especially important as there were significant societal changes in these times, which encompassed the end of the Roman Empire and the spread and consolidation of Christianity. The use of strontium isotope ratios ($^{87}Sr/^{86}Sr$) to reconstruct human mobility patterns is a well-established method and has been successfully used to reconstruct mobility of both prehistoric humans and animals at archaeological sites throughout the world (e.g. Copeland et al., 2011; Eerkens et al., 2014; Ericson, 1985; Evans et al., 2009; Hartman and Richards, 2014; Laffoon et al., 2012; Wright, 2012, Britton et al., 2011; Haverkort et al., 2008; Richards et al., 2008; Oelze et al., 2012).

While strontium analysis as a human migration indicator is prevalent in other areas, it has rarely been used in research on both the prehistoric or historical periods in southwestern Turkey, with some notable exceptions (Bogaard et al., 2014; De Cupere et al., 2015; Perry et al., 2016; Rich et al., 2016). The UNESCO World Heritage site of Hierapolis is an important location for the investigation of mobility patterns of Roman and Byzantine individuals because of the dramatic change in the city's development between the 6th/7th and the 9th/10th centuries. After the collapse of the classical city in the 6th/7th centuries, a new and smaller settlement emerged in the later period perhaps due to its importance as an agricultural and trading centre and the location of Christian heritage monuments and subsequent pilgrimage (Arthur, 2012; Leucci et al., 2013). In addition, the ancient city of Hierapolis, which lies near the present day village of Pamukkale, also contains some of the best-preserved Roman tombs and sarcophagi in the Mediterranean region, and a comparable number of simple Byzantine burials (Equini Schneider, 1971–1973; Hill et al., 2016; Ronchetta, 1987, 2005, 2012; Ronchetta et al., 2007; Wenn et al., 2017). Strontium isotopic analysis at Hierapolis can therefore be useful in providing

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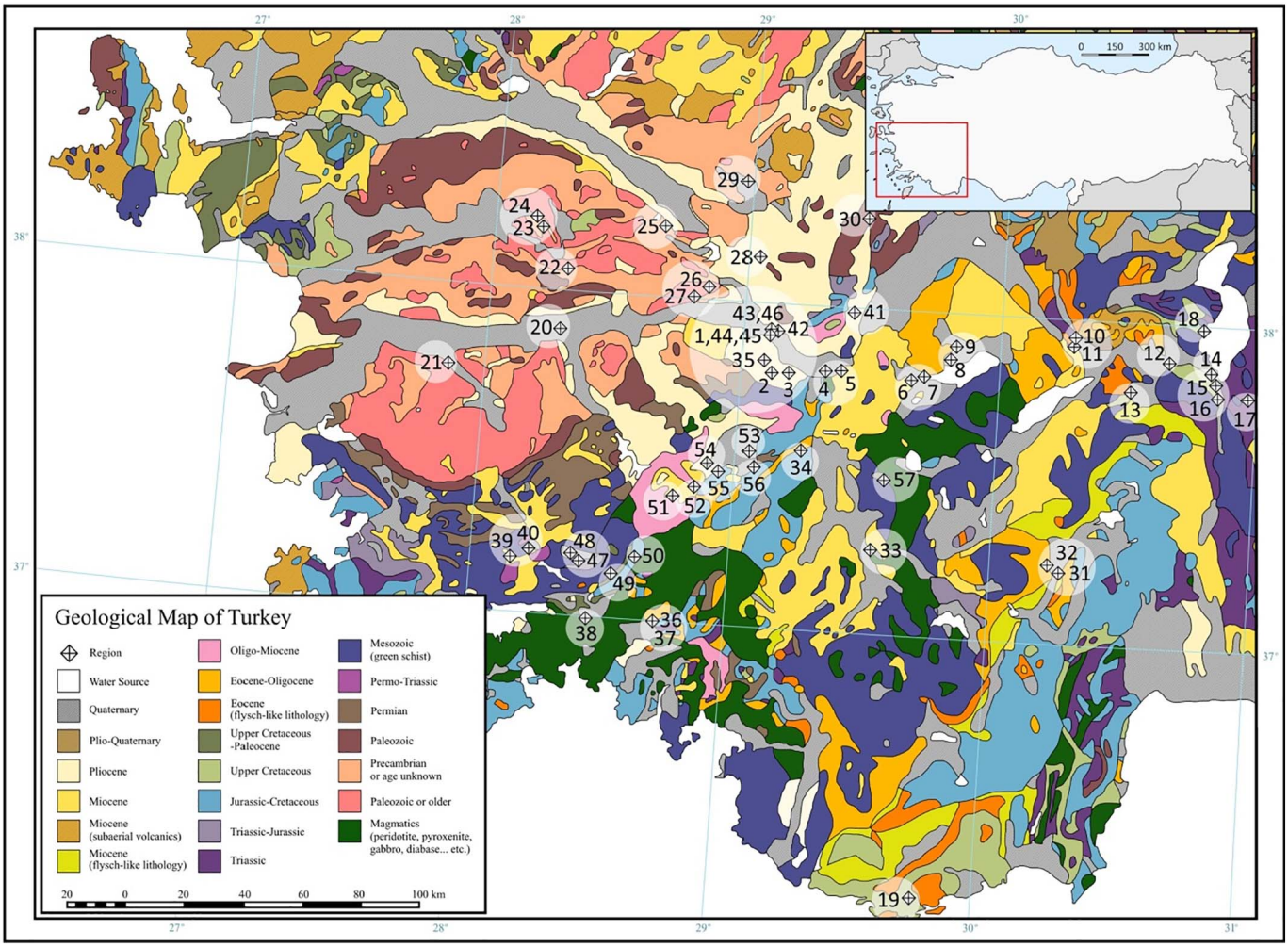

Fig. 1. Geological landscape of southwestern Turkey with strontium sampling sites plotted. See S.I. Table 1 for Sr values.

insights into the mobility patterns of individuals in the Roman and Byzantine periods. It is worth noting that the geological landscape of southwestern Turkey is highly heterogeneous, allowing for the examination of mobility both on a regional scale (between different geological areas within Turkey) and on a more international scale (values outside the southwestern Turkey range). We present data of the strontium isotope analysis of 47 individuals from Hierapolis, as well as the first bioavailable strontium map of southwestern Turkey.

2. Background

2.1. The site of Hierapolis

The ancient city of Hierapolis sits on a large, calcareous plateau approximately 350 m above sea level, in the southwestern Turkish province of Denizli (Fig. 1) (D'Andria, 2001; Arthur, 2012). Hierapolis was founded in the Hellenistic period sometime around 200 BCE and, despite a series of catastrophic earthquakes including a period of abandonment in the 7th–9th centuries, managed to remain an important town centre throughout most of the Roman and Byzantine periods (Fant and Reddish, 2003; Nuzzo et al., 2009; Scardozzi, 2015). At its peak in the Roman Imperial period, Hierapolis is estimated to have had a maximum population of 12,000 inhabitants, with a peak population size after the expansion of the city in the late 1st and 2nd centuries AD (Ahrens, 2017, 132). With this population size, Hierapolis was one of many typical middle-ranked cities of the so-called Greek East (Zuiderhoed, 2017, 53–54). Hanson (2011) lists 157 third ranking cities in Asia Minor, including Hierapolis. However, it is important to note that in Roman times a large majority of the population still resided in the countryside (Brandt, 2017).

In general, social mobility in Greek cities was much higher in the 1st to 3rd centuries AD than in the Hellenistic period, with positions in the city council now also available to wealthy citizens whose families did not belong to the old political elite. The necropoleis, or burial grounds, of Hierapolis reflect a society where many could purchase tomb monuments and where the degree of social display depended more on wealth than social position. As in other Greek cities, the society of Hierapolis was held together by strict laws and social norms, which are reflected in the inscriptions on the tomb monuments of the 1st to 4th centuries AD (Brandt, 2017). These Greek inscriptions list the names of the dead and describe the penalties for unauthorized use of the tomb by non-relatives of the owners (Ritti, 2004). The tombs were built as family tombs and contained the wider family, including freedmen, servants and slaves. Such tombs may have been used by the same family for hundreds of years.

A major transition at Hierapolis was after an earthquake in the mid-7th century AD. After this earthquake, Hierapolis was largely abandoned for more than a century, before the next period of rebuilding (Arthur, 2012). It was at this time that Hierapolis was transformed into a smaller city with a new urban structure and layout (Arthur, 2012; Scardozzi, 2015). In the Roman period all burials were found outside the town, though in the early Christian period the funerary trends shifted away from family plots and towards individualized burials (Wenn et al., 2017). In addition there was an increased importance in

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