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A revision of hominin fossil teeth from Fontana Ranuccio (Middle Pleistocene, Anagni, Frosinone, Italy)

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ABSTRACT

The Fontana Ranuccio hominin teeth (FR, Latium, Italy) are dated to the Middle Pleistocene. In previous studies these teeth were classified as two lower (left and right) second molars, one lower left central incisor and a badly worn incisor crown, the exact position of which could not be determined. In 2012 these remains were acquired by the Anthropological Service of S.B.A.L. (Italian Ministry of Culture) and for this reason re-analysed. In a thorough revision we have reassessed them both morphologically and dimensionally as two lower (left and right) first molars, one lower left lateral incisor and a possible upper left canine. The comparison with penecontemporaneous and diachronic samples shows that the Fontana Ranuccio teeth are morphologically similar to Atapuerca-Sima de los Huesos, Arago XIII and Neanderthal samples.

Introduction

The hominin fossil teeth from Fontana Ranuccio were discovered in the 1980s (Segre and Ascenzi, 1984; Ascenzi and Segre, 1996; Segre Naldini et al., 2009). The site is located in the Anagni intra-Apennine basin (Fig. 1), about 50 km southeast of Rome and about 40 km northeast of the famous site of Ceprano, where an early hominin skull was found in 1994 (Ascenzi and Segre, 1996). Recently, the hominin levels of the two sites were 'united' by a new dating of Ceprano. Both hominin levels were dated to the Middle Pleistocene, about 450 ka (thousands of years ago) for Fontana Ranuccio (Segre and Ascenzi, 1984; Segre Naldini et al., 2009) and 460–430 ka for Ceprano (Manzi et al., 2010). Magnetochronologically, the hominin levels at Fontana Ranuccio and Ceprano both fall well within the Brunhes normal polarity chron, and may thus be similar in age at 0.45 Ma (millions of years ago) (Muttoni et al., 2009). The layers of lithostratigraphy of Fontana Ranuccio (Segre and Ascenzi, 1984) are summarized in Fig. 2. The lithic and bone industry associated with the teeth suggest a cultural horizon attributable to the Acheulean (Segre and Ascenzi, 1984).

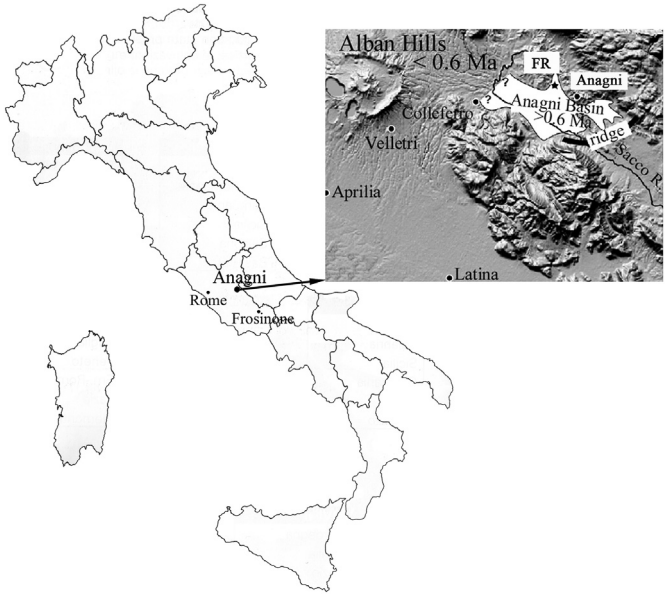

Figure 1. Location of the site. Scale 1:65 km.

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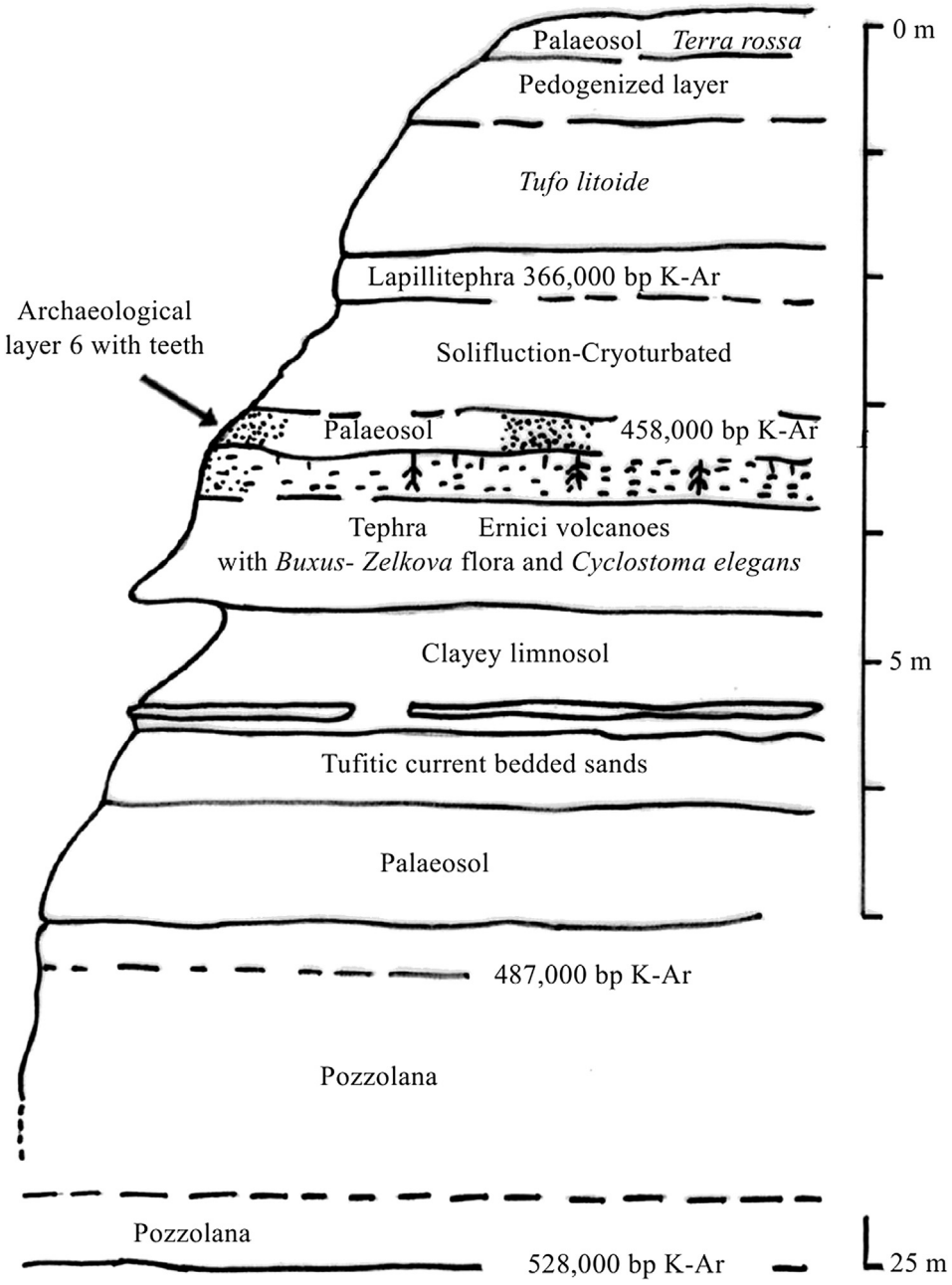

Figure 2. Stratigraphic position of the teeth (Segre and Ascenzi, 1984).

The vertebrate faunal assemblage of Fontana Ranuccio represents the last faunal unit (FU) of the Galerian Mammal Age (Azzaroli, 1983; Gliozzi et al., 1997; Sardella et al., 2006) and hence has biochronological relevance: the late Galerian faunas occurred in the Middle Pleistocene at approximately 0.45–0.40 Ma and were replaced around 0.35 Ma by more 'modern' mammal assemblages referable to the Aurelian Mammal Age (Gliozzi et al., 1997). Their chronology of about 450 ka apparently places the four teeth discovered at Fontana Ranuccio in the chronospecies *Homo heidelbergensis*. Currently there is no consensus view of hominin taxonomy for the European Middle Pleistocene and the debate is still continuing (Rightmire, 1998, 2001; Martinón-Torres et al., 2007, 2012; Hublin, 2009; Mounier et al., 2009, 2011; Stringer, 2012). Although only a small sample, an in-depth study of the Fontana Ranuccio teeth has the potential to shed further light on this debate. Held since 2012 by the Anthropological Service of the S.B.A.L. (Italian Ministry of Culture), the Fontana Ranuccio (FR) teeth were originally classified (Segre and Ascenzi, 1984; Ascenzi and Segre, 1996; Segre Naldini et al., 2009) as left (FR1L) and right (FR1R) lower second molars probably belonging to the same individual, a lower left central incisor (FR2) and a more doubtful specimen, a worn incisor (the exact position of which was not determined). The methods used for their original classification are not clear, because there was no systematic morphological comparison with other hominin teeth. Given that the FR teeth are an important Middle Pleistocene dental sample, in this study we rectify the lack of systematic morphological comparison with the benefit of non-invasive and non-destructive methods that allow