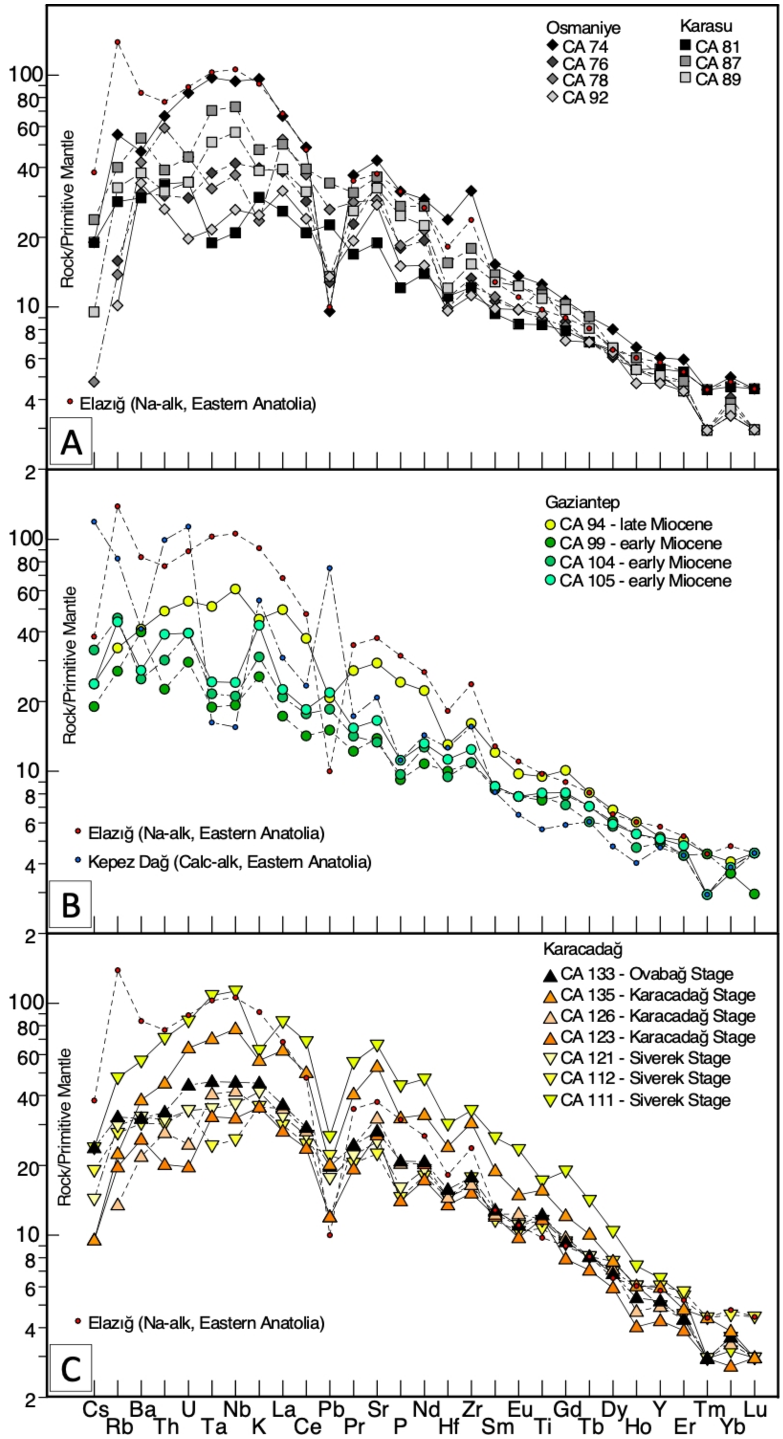

***Supplementary Figure 1. Primitive Mantle-normalised diagrams for all of the studies samples. A**, Dead Sea Fault Zone; **B,** Gaziantep; **C**, Karacadağ. A Na-alkaline basalt of Elazığ (Eastern Anatolia, from Di Giuseppe et al., 2017) and a subduction-related basaltic andesite of Kepez Dağ volcanic complex (Central-Eastern Anatolia, from Di Giuseppe et al., 2019) are reported for comparative purposes. Normalisation factors from McDonough and Sun (1995).*

Supplementary Table 1. *Major Elements, CIPW Norm and Trace elements of collected samples*
Supplementary Table 2. *Measured and age-corrected data for Sr-Nd-Pb radiogenic isotopes.*
Supplementary Table 3. *Estimates of Potential Temperature, Pressure and depth of magma segregation*

Supplementary Material

The mantle potential temperature and pressure at which magmas segregated from their peridotitic source were estimated using primary melt compositions (e.g., Albaréde, 1992; Herzberg et al., 2007; Putirka et al., 2007; Lee et al., 2009). Calculation and results are in Supplementary Table **3**). Starting from major element abundances, we calculated the primary magma compositions adding back equilibrium olivine until magmas equilibrates with olivine Fo_{90}, using the equations by Pearce (1978), and calculating the composition of equilibrium olivine using K_D $(Fe/Mg)^{ol/liq}$ = 0.31 (Putirka, 2005). According to this model, the amount of olivine added to equilibrate starting melt compositions to Fo_{90} source was estimated in between 16 and 25% for the selected samples. Then, to calculate potential temperatures and pressures, we used the thermobarometer from Lee et al. (2009). Here, the H_2O content in the melts was estimated by fractionation correction of Ce (ppm), assuming that the magmas emplaced in the study areas have the same H_2O/Ce ratios as oceanic basalts (~ 200; Herzberg et al., 2007). The estimated H_2O content was in the range of 0.8 to 2.3 wt.%. Results show that potential melting temperatures (T °C) varies from 1386 to 1528 °C, whereas estimated pressure (P) varies from 1.3 to 3.2 GPa, that is ≈38-97 km of depth (Supplementary Table **3**). Model results are also plotted in Figure 6**.**

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