We have analysed Sr-Nd-Hf and high-precision Pb isotope ratios (with a 207Pb/204Pb double spike) in intraplate volcanics and lithospheric mantle (LM) xenoliths (cpx) entrained in volcanism erupted in Jordan and Yemen. These data represent the first high-precision Hf-Pb isotopic study of continental volcanism and associated mantle xenoliths, and constrain the role of the LM as a source of volcanism. Jordanian rocks exhibit subtle isotopic variations (143Nd/144Nd = 0.51297-0.51285) that correlate with elemental data and, to a large extent, are not the result of crustal contamination. This heterogeneity represents mixing of 2-5% spinel-facies melts, potentially from shallow Arabian LM, with smaller degree melts (<1%) from a deep garnet-bearing asthenospheric(?) source. Volcanism was triggered by lithospheric-extension-activated melting of LM in the Dead Sea plate boundary region that, with time, allowed progressively deeper mantle to decompress, melt and mix with the shallower melts. Chemical and isotopic differences between Jordan and Yemen volcanism suggest the Afar plume has not been channelled NW beneath the Arabian plate. Key differences and similarities between the Jordan and Yemen rocks are: (a) a Late Archean crustal contaminant in Yemen as opposed to a juvenile Pan-African contaminant in Jordan; (b) a common shallow LM component in both areas despite different crustal ages (0.7 versus > 2 Ga); (c) contrasting deeper-seated mantle components which reflect melting of deep asthenosphere in Jordan and melting of shallow mantle metasomatised by
the Afar plume during flood volcanism in Yemen. Jordanian spinel lherzolites have a large range of isotopic compositions (143Nd/144Nd = 0.5135-0.5127; 176Hf/177Hf = 0.2836-0.2828; 206Pb/204Pb = 18.501-20.361). Radiogenic Pb is associated with unradiogenic Hf-Nd and LREE enrichment (Ce/Yb(N) > 1). Remarkably, preliminary cpx analyses define a Pb-Pb isochron of 1.34 ± 1 Ga, although the age of the overlying crust (0.7 Ga) and correlations with other isotopes suggest this a mixing line rather than having age significance. Interestingly, the xenoliths do not constitute an isotopic end-member for the inferred shallow LM component identified in both Jordan and Yemen. Thus, either the shallow component resides within the asthenosphere, which is difficult to reconcile with its shallow spinel-facies origin in the Jordan suite and estimates of Pan-African lithospheric thickness, or there is significant vertical isotopic stratification of the LM.