# Supporting Information for manuscript "Re-melting continental roots"

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# 1 Supplementary Figures

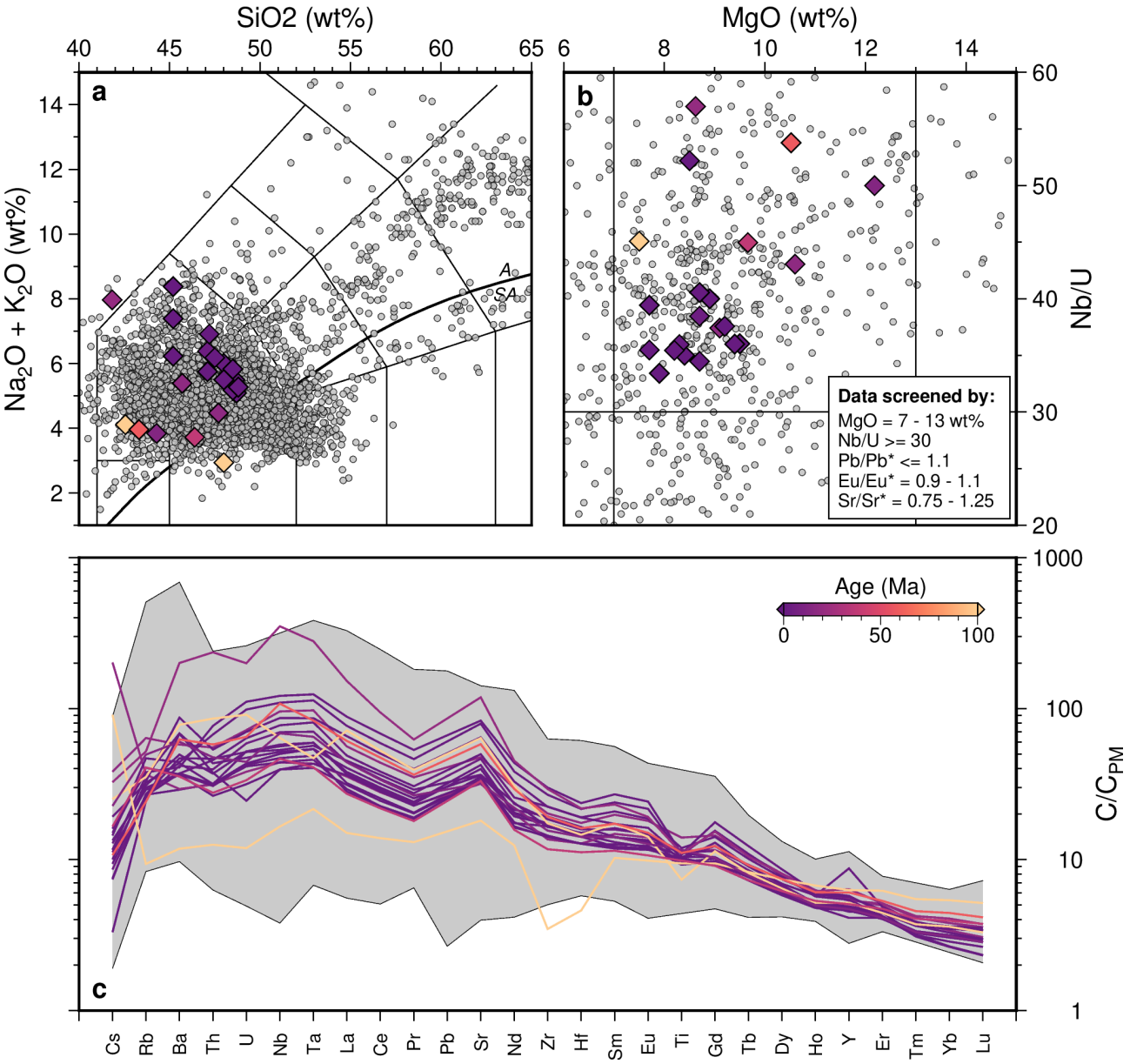


Figure 1: Geochemical characteristics of screened dataset. a) Total-alkali vs. silica diagram; large diamonds = screened samples coloured by age; small grey circles = distribution of existing east Australian samples from ref.[1]. The majority of samples are alkaline and fall in the alkali basalt and basanite fields. b) MgO against Nb/U to illustrate data screening process. Full screening criteria are summarized in inset. Symbols as in a). c) Trace element distribution of screened dataset, coloured by age and normalized to primitive mantle composition (PM)[2]. Grey polygon = distribution of all mafic east Australian samples (MgO > 7 wt%)[1].

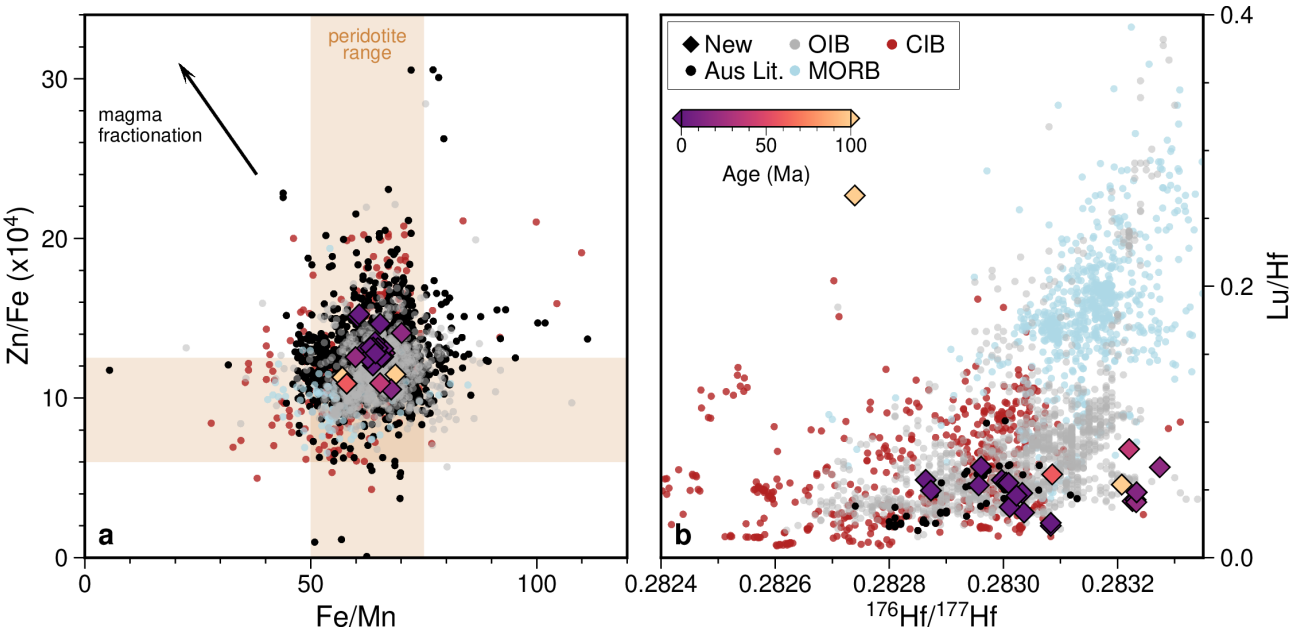


Figure 2: Discrimination of mantle sources. a) Zn/Fe vs. Fe/Mn to distinguish the influence of olivine-orthopyroxene versus clinopyroxene dominated source mantle (peridotite versus pyroxenite). Large diamonds = screened samples coloured by age; black circles = existing east Australian data[3,1]; grey/blue circles = ocean island basalts (OIB) and mid oceanic ridge basalts (MORB)[4]; red circles = continental intraplate basalts from GEOROC (see Section 2 for data sources); all datasets are screened for MgO > 7 wt%. Tan polygons = approximate peridotite compositional range[5,6]. b) Lu/Hf vs. $^{176}$Hf/$^{177}$Hf, symbols as in a). Samples from this study have constant Lu/Hf ratios that do not vary with Hf isotopic composition.

## 2 Data Sources of GEOROC Compilation

We have compiled global volcanic Hf isotope compositions from the GEOROC database (`https://georoc.eu`; version 2025-09-01). The compilation was generated with the "Chemistry" query option (abundances), using the following filters: HF176_HF177 $\geq 0$; material: whole-rock (and volcanic glass); rock type: volcanic rock; for all geological settings. All chemical variables were included for download, combined by "OR", as well as all metadata. Note that, as a consequence of combining data by "OR", this dataset may contain multiple analyses for the same sample.

This compilation was subsequently filtered to only include samples where an initial $^{176}$Hf/$^{177}$Hf ratio was reported or that are younger than 10 Ma. In addition, reported iron oxide values were recalculated to $FeO_T$ for all samples and samples from the following tectonic settings were excluded: ocean island, seamount, submarine ridge and convergent margin. The final dataset comprised 1,036 samples from 87 publications as cited below. The data files and python filtering script are archived in ref.[7].

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