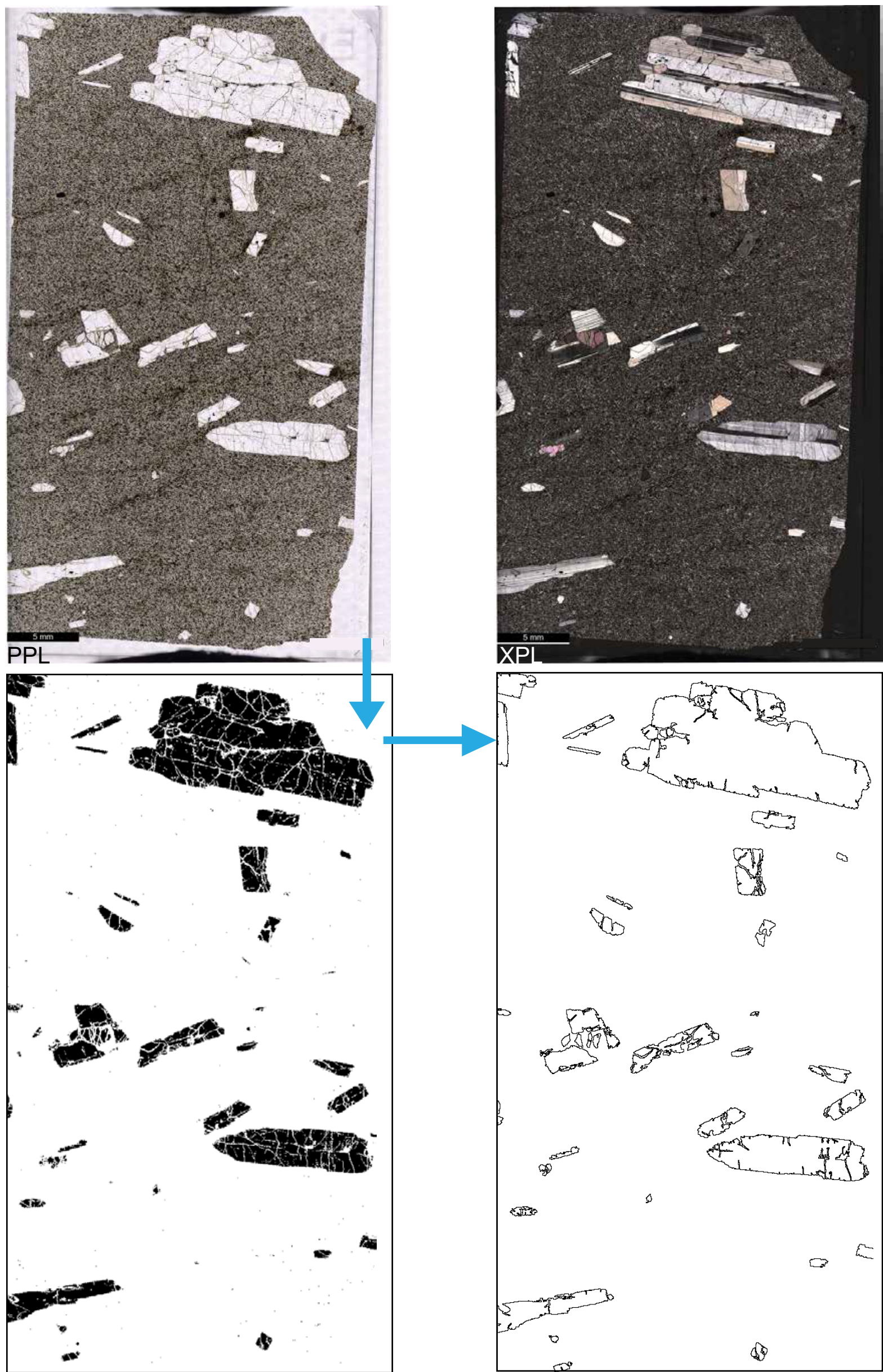


Supplementary Figures 1

Representative transmitted light photomicrographs (PPL- plane polarised light, XPL- cross polarised light) indicating the degree of porphyricity of the studied lavas from northern and southern volcanoes. Phenocryst volume % were calculated using the particle analysis tool in image J Fiji software (Data presented in Supplementary File 1).

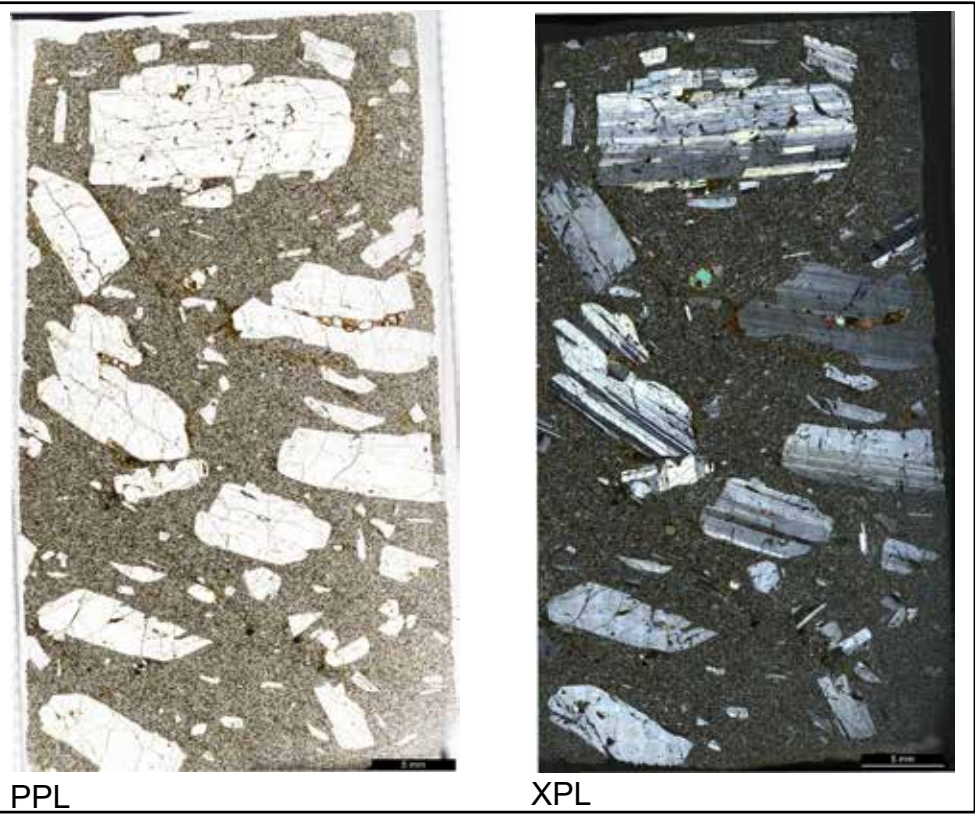
Southern segment
Volcano: Ebor
Sample No. Eb12
Age: 19.741 ± 0.08 (Tapu et al., 2021)
Porphyricity: 17 ± 2 Vol%



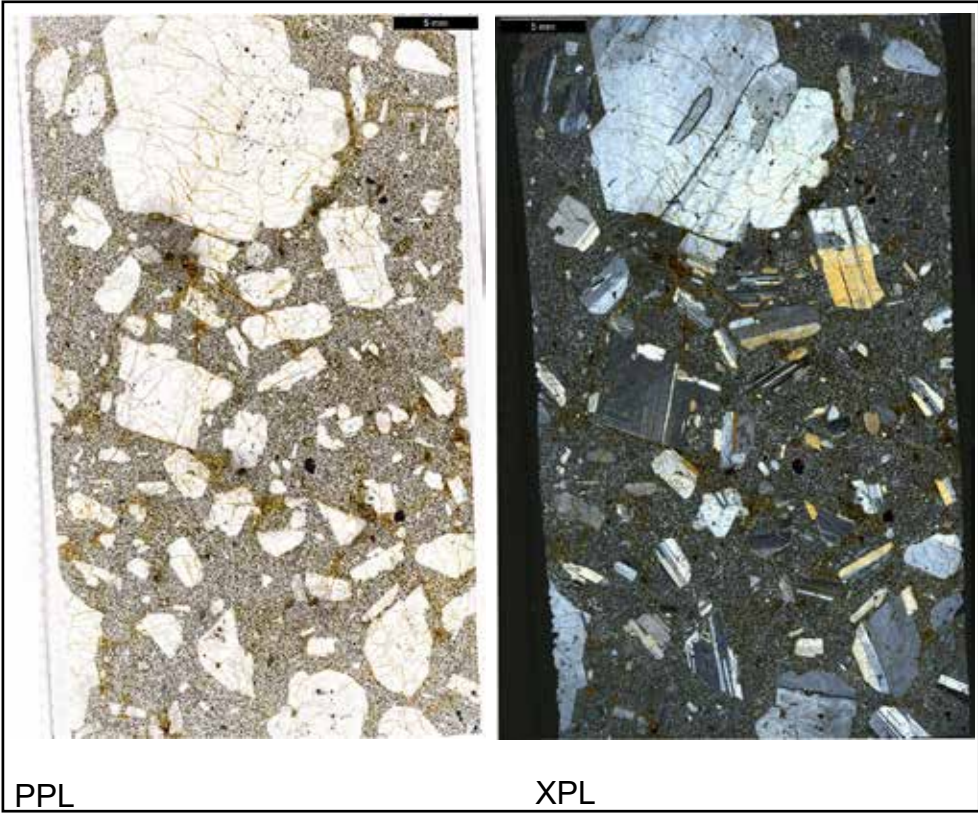
Contrast based threshold in plane polarised light

Extracting area % of the particles with more than 0.1 mm² size using particle analysis tool in Image J

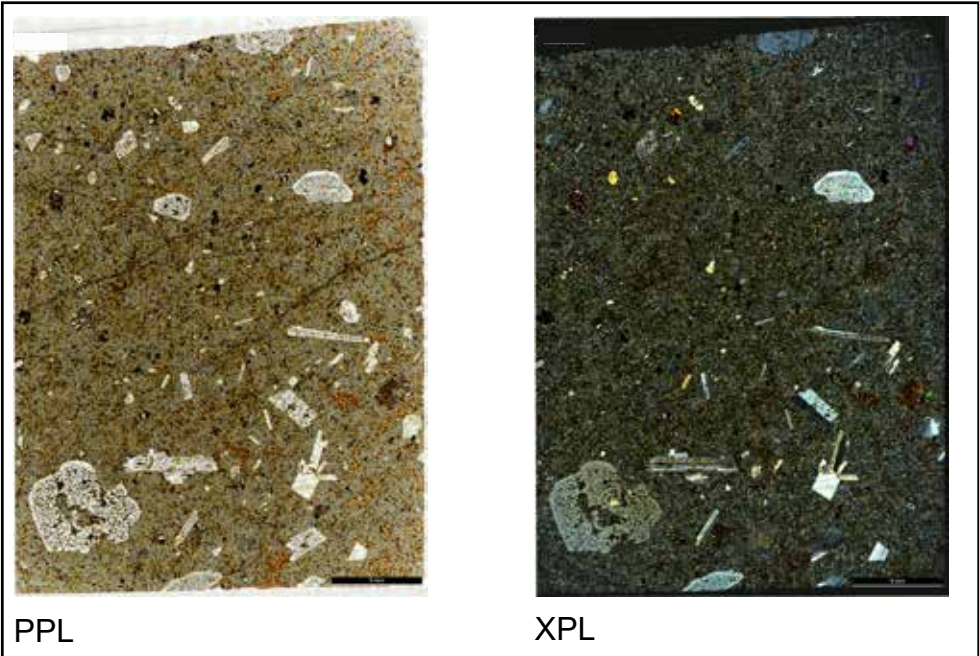
Southern segment
Volcano: Ebor
Sample No. Eb16
Age: 20.145 ± 0.10 (Tapu et al., 2021)
Porphyricity: 43 ± 2 Vol%



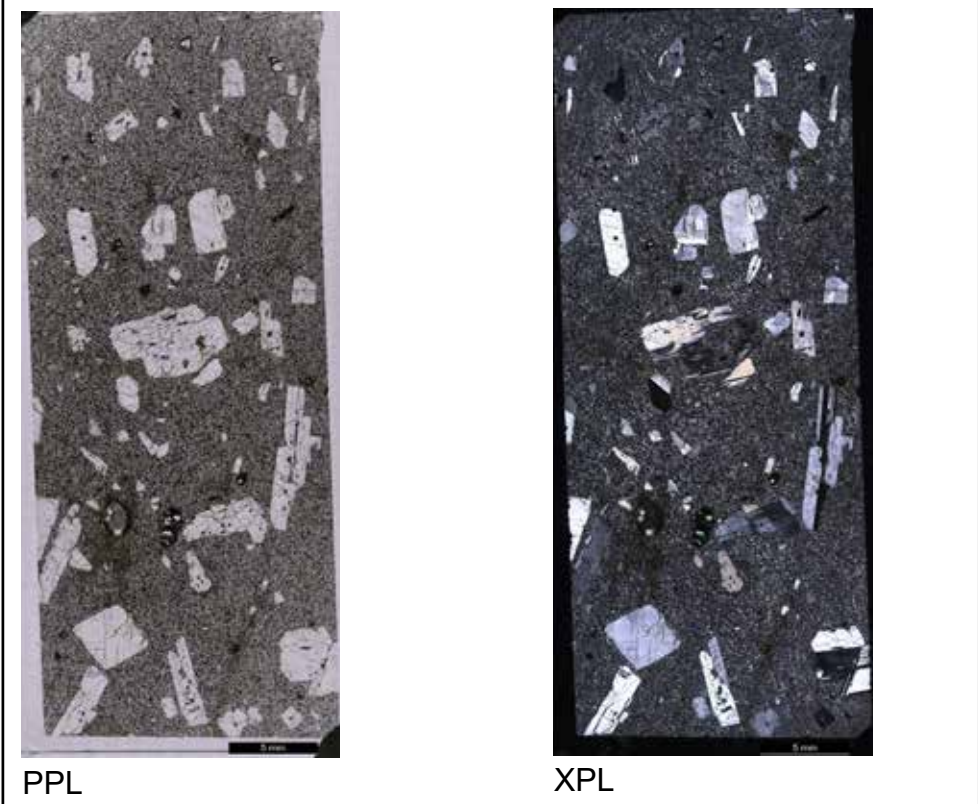
Southern segment
Volcano: Nandewar
Sample No. N8
Age: 19.089 ± 0.08 Ma (Tapu et al., 2021)
Porphyricity: 41 ± 2 Vol%



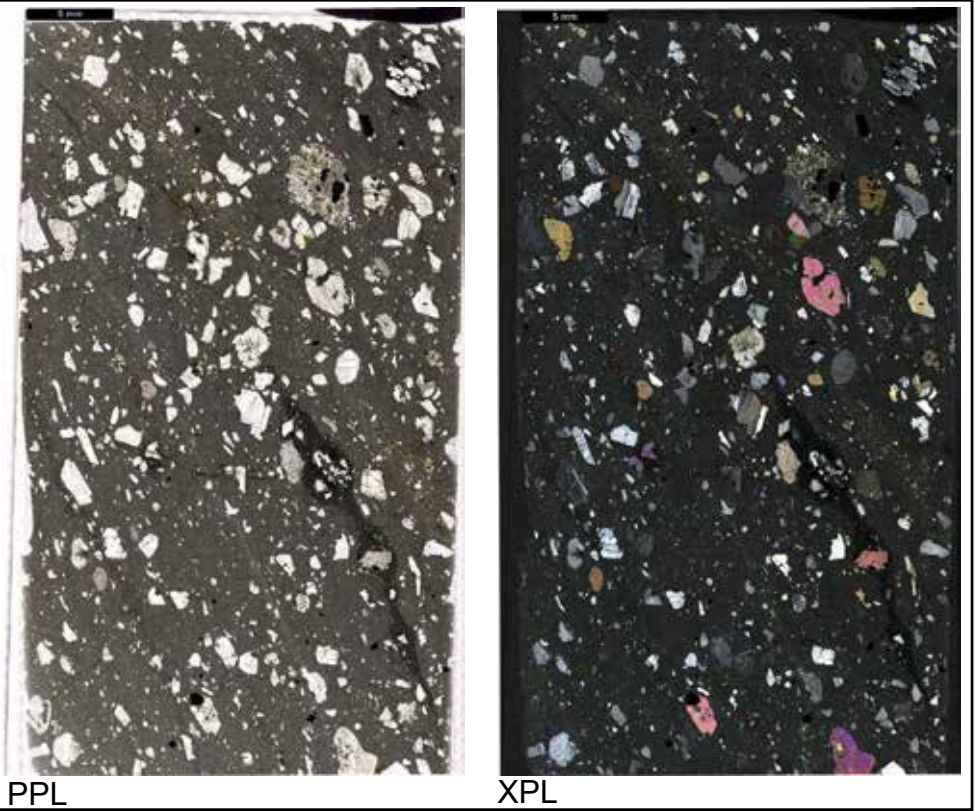
Southern segment
Volcano: Comboyne
Sample No. CBN16
Age: N/A
Porphyricity: 9 ± 0.5 Vol%



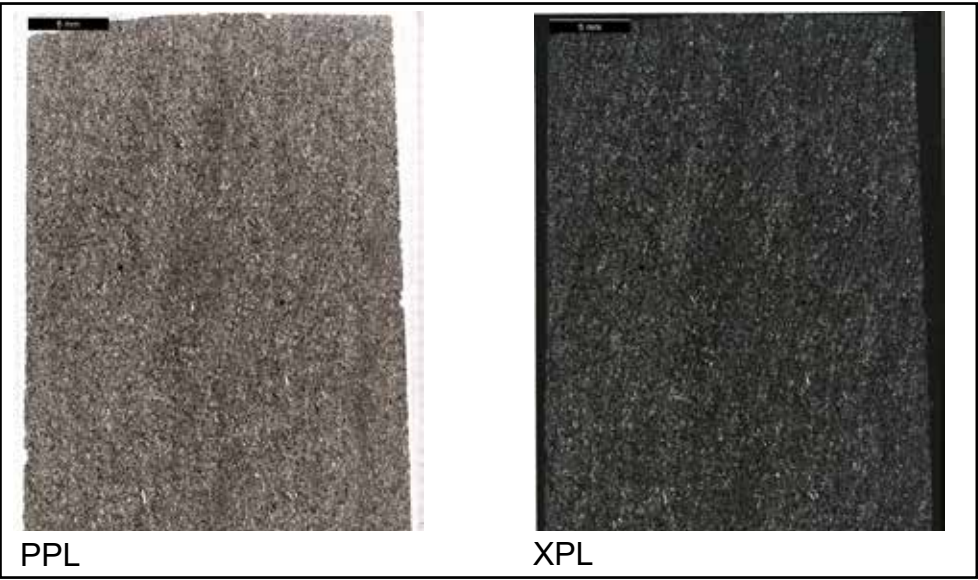
Southern segment
Volcano: Warrumbungles
Sample No. W11
Age: N/A
Porphyricity: 13 ± 0.5 Vol%



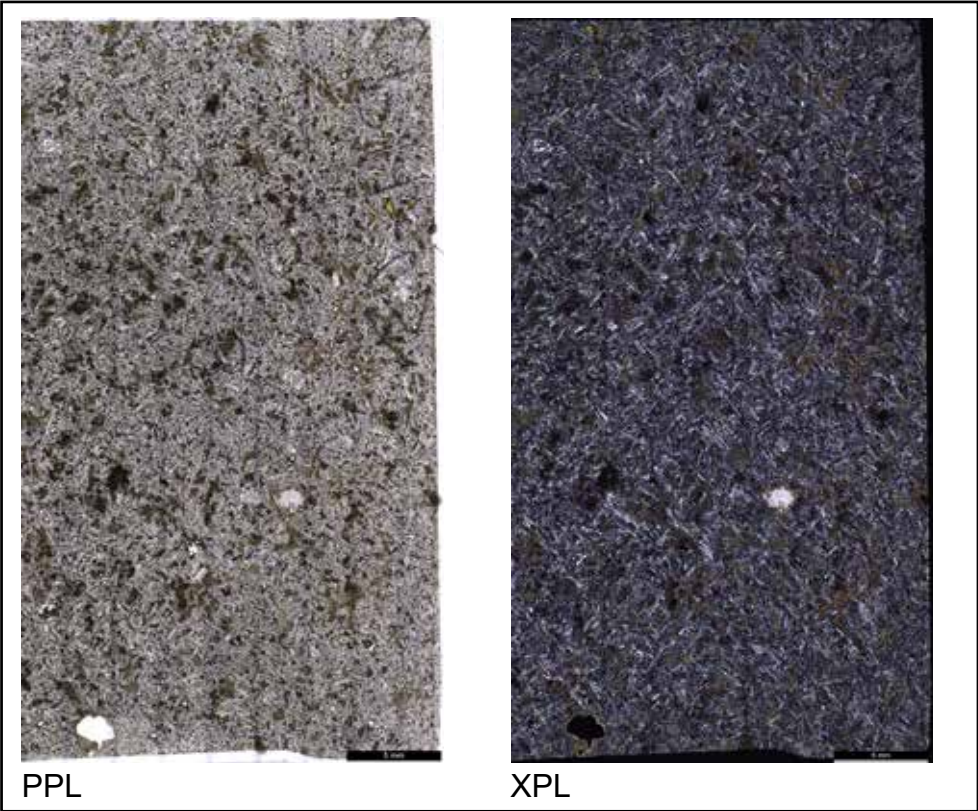
Southern segment
Volcano: Canoboblas
Sample No. Ca 13b
Age: 11.60 ± 0.11 (Tapu et al., 2021)
Porphyricity: 19 ± 2 Vol%



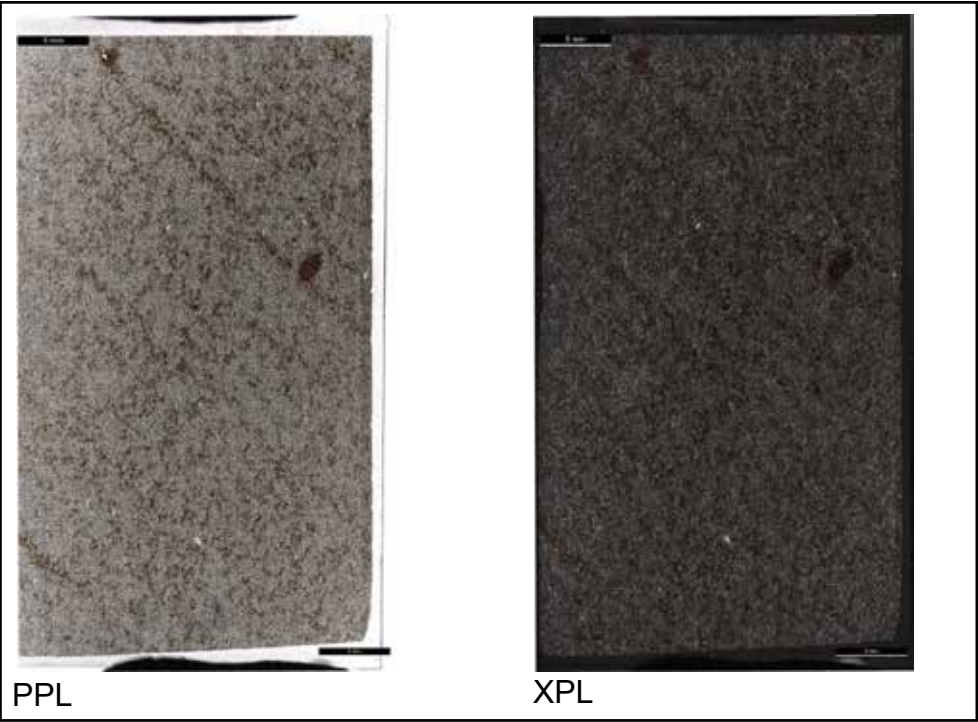
Northern segment
Volcano: Springsure
Sample No. BC66
Age: N/A
Porphyricity: <0.5 Vol%



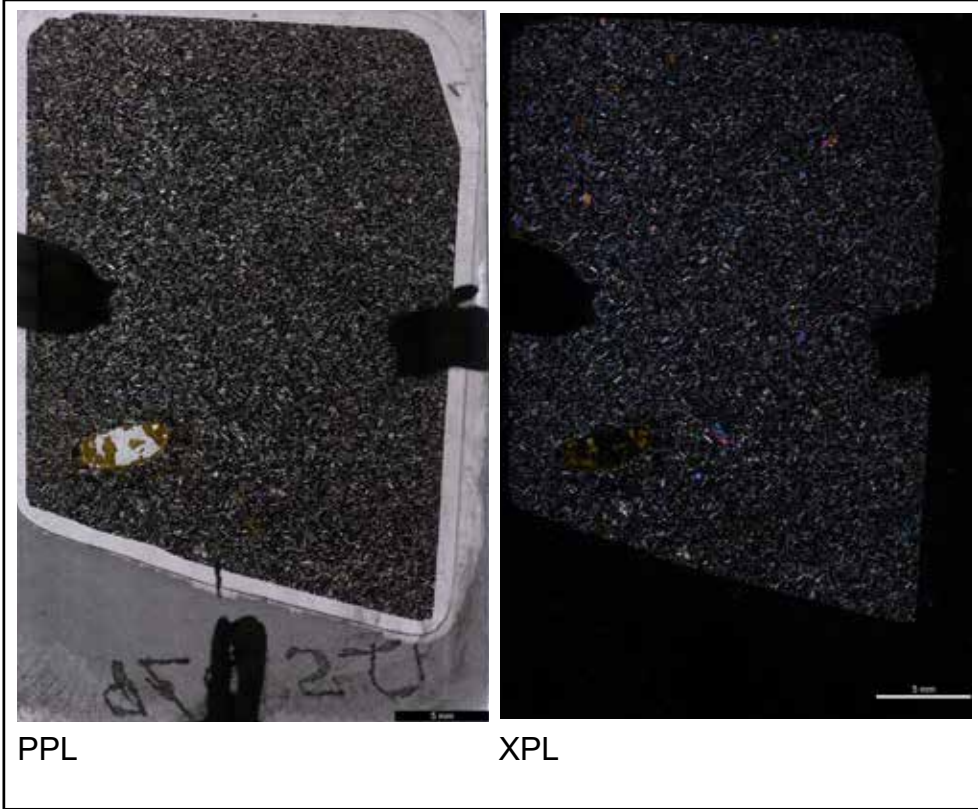
Northern segment
Volcano: Hillsborough
Sample No. CPH01
Age: N/A
Porphyricity: <0.5 vol%



Northern segment
Volcano: Buckland
Sample No. BC58
Age: N/A
Porphyricity: <0.5 Vol%

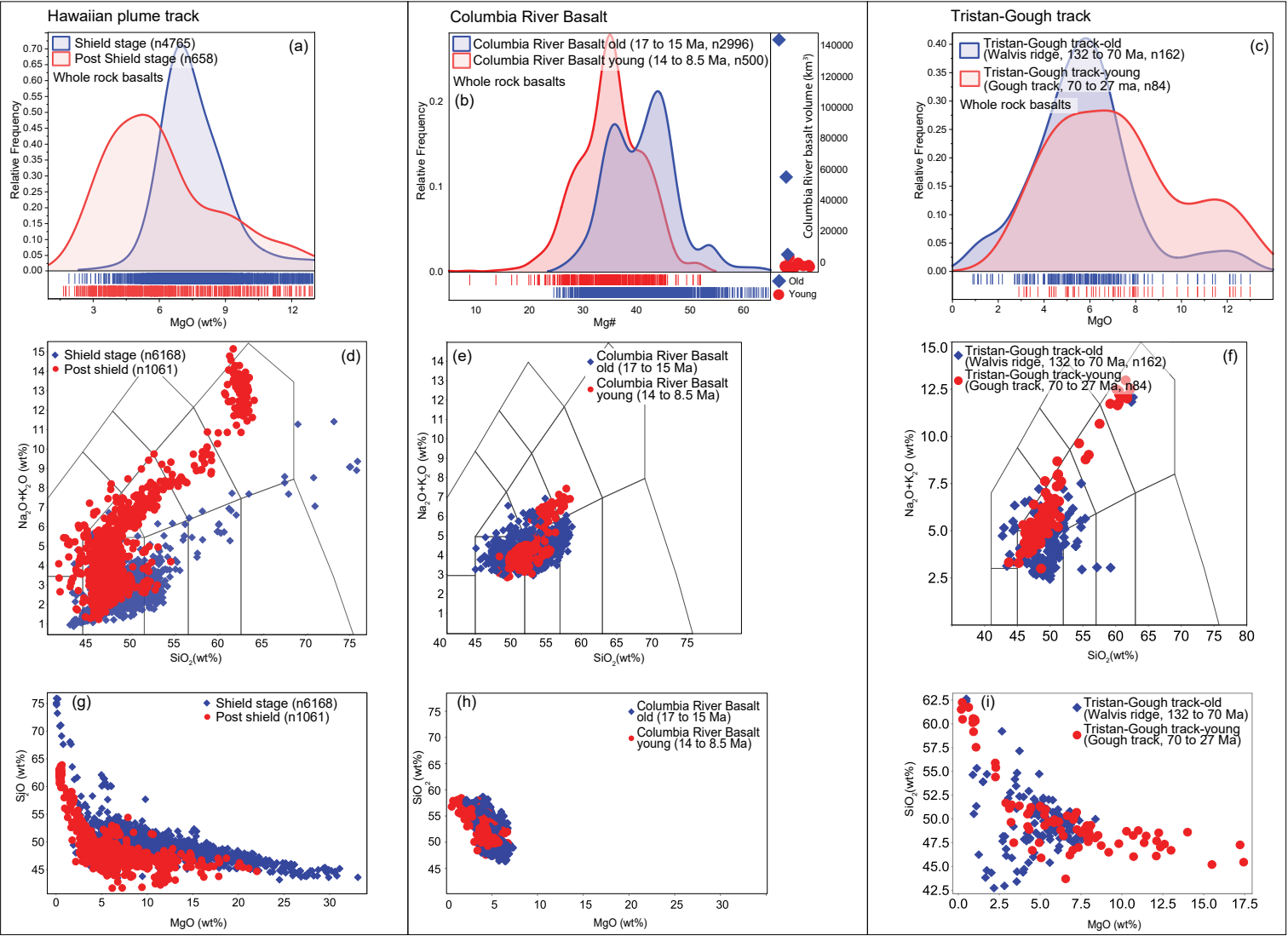
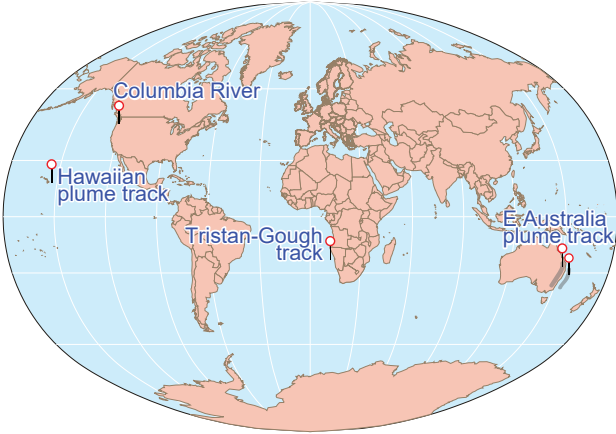


Northern segment
Volcano: Springsure
Sample No. IJS07B
Age: N/A
Porphyricity: <1 vol%



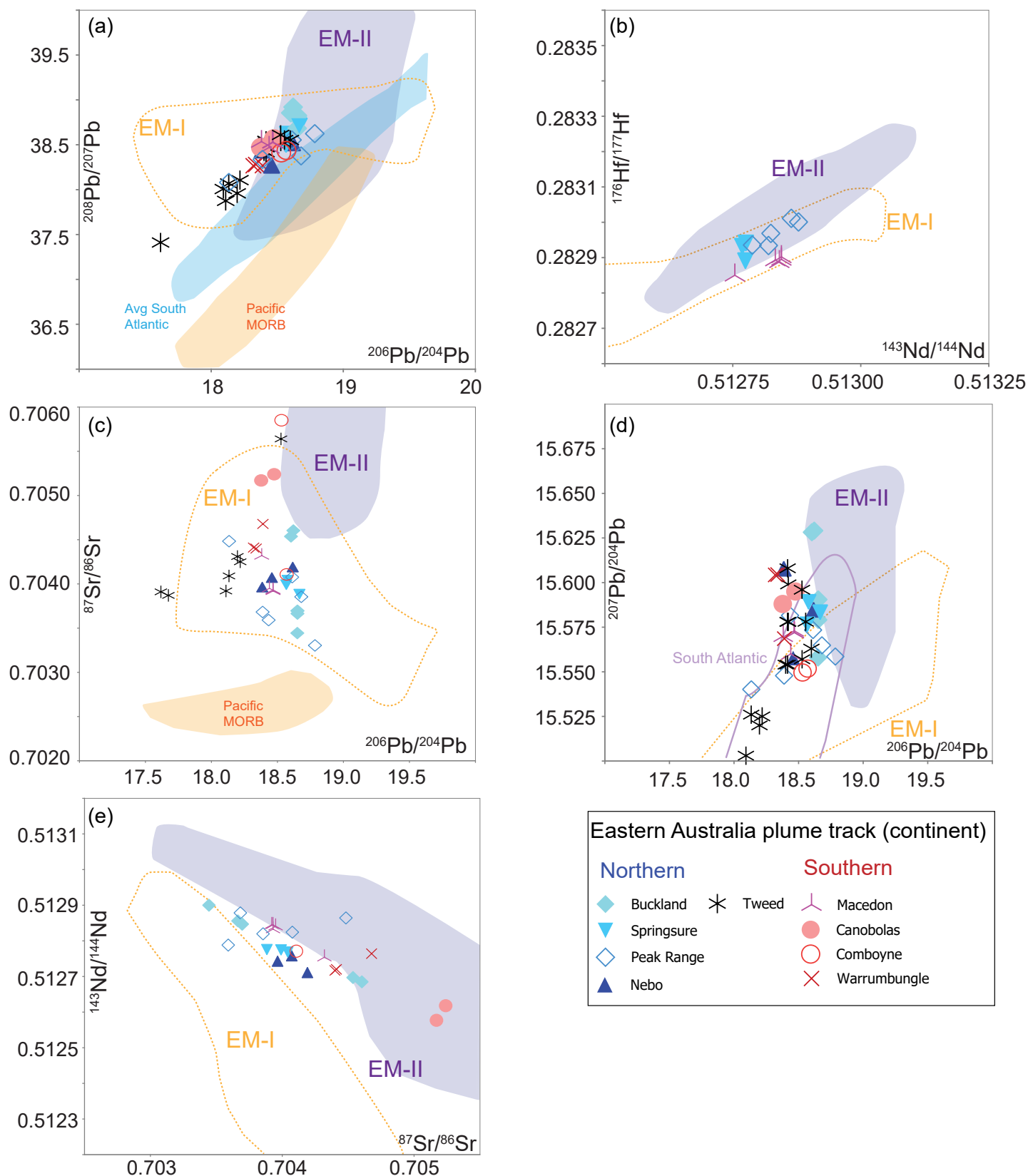
Supplementary Figure 2

Overview of bulk rock major element variations in Hawaii, Columbia River and Tristan-Gough plume tracks, where contrasts can be observed between strong plume flux (blue/diamond-shaped symbols) and where plume flux wanes with time or where volcanoes see decreasing magma fluxes (red/round shaped symbol) with increasing distance from the plume axis. (a, b, c) Probability distribution of MgO and Mg# of basalts, where $Mg\# = \text{molar } [MgO/(MgO + FeO)] \times 100$. (d, e, f) Total alkalis vs silica diagram (TAS, anhydrous basis; classification fields after Le Bas & Streckeisen, 1991). (g, h, i) Major element variations in bulk rocks. Geochemistry data was completed and curated from the GeoRoc database. Data presented in Supplementary File 4.



Supplementary Figure 3

Evidence of a common source component for the studied volcanoes in Northern (blue symbols) and southern (red symbols) volcanoes from east Australian continental hotspot track. Data compiled from Jones et al., 2018; Crossingham, 2018; Ball et al., 2021. EM-I fields – Pitcairn-Gambier, Gough and Tristan track (Gast et al., 1964; Sun, 1980; Woodhead and McCulloch, 1989; Le Roex et al., 1990; Class and le Roex, 2008; Willbold and Stracke, 2010; Garapic et al., 2015), EM-II field – Samoan Islands (Workman et al., 2004; Jackson et al., 2007, 2010, 2014). EM-I and EM-II reference fields are from Jones et al., 2018 and Crossingham, 2018.



Supplementary Figures 4

Petrographic and geochemical variations in Tasmanid Seamount Chain in offshore east Australia. (a, b) Probability distribution of phenocryst volume % and bulk rock basalt Mg#. (c, d) Bulk rock primitive mantle-normalised (Sun & McDonough, 1989) multi-element patterns. Data compiled from Crossingham et al., 2017

Eastern Australia plume track (offshore)

