Melting dynamics along backarc spreading axis

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The proximity of the Northeast Lau Spreading Centre (NELSC) to the Tongan subduction zone system allow us to determine the subduction influence in the backarc with increasing distance to the arc. Here, we present new geochemical data on 45 volcanic glass and 9 whole-rock lava samples from on- and off-axis localities of the spreading centre, a diagonal ridge and seamounts at the southern propagating tip sampled during RV Sonne cruise SO263 in 2018. Major element data show an increasing extent of fractional crystallisation in the lavas with longitude with the most primitive samples restricted to the western part of the NELSC. We used fractionation corrected major element compositions to model the melting systematics showing three main groups in $Na_{8.0}$ for samples >5 wt.% MgO with the lowest values in the diagonal ridge area indicating the highest degree of melting and lowest melting degrees in the central part of the ridge. The groups can also be distinguished in their trace element ratios indicating a complex mixing and melting system beneath the NELSC. The trace element ratios (e.g. Nb/Yb) show that the degree of mantle depletion is lowest in the central part of the ridge. Fluid sensitive ratios (e.g. Ba/Th, Pb/Ce or U/Nb) and H_2O data indicate a southward increasing influence of a subduction component in the lavas along the NELSC with a maximum at the off-axis lavas from the diagonal ridge and from the southern seamounts (~20 km south of the last ridge segment). To analyse this complex interaction between arc and backarc, we aim to compare the new data with literature data from the arc, nearby islands and adjacent spreading centres to decipher the increased fluid input from the diagonal ridge towards the south, source mixing, melting dynamics and melt flow with decreasing distance to the subduction zone.