Early Miocene volcanism between slab windows revealed from detrital $^{40}Ar/^{39}Ar$ geochronology and geochemistry of the Magallanes Basin 50-52°S

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Integration of whole rock $^{40}Ar/^{39}Ar$ and detrital zircon U-Pb ages with geochemistry data from volcanic clasts, collected from the lower Miocene infill of the Magallanes Basin, was used to understand mafic sediment provenance and Neogene changes in arc magmatism during a complex development of multiple ridge subduction events in the southern Patagonian Andes. Within the basin, sandstone composition and conglomerate clast lithology document an upsection increase of mafic sediment through the early Miocene fluvial Río Guillermo Formation. Eocene plateau lavas, the Late Jurassic-Miocene Southern Patagonian Batholith, and the Late Jurassic Sarmiento Ophiolitic Complex have been proposed as sources of the mafic content. Detrital zircon U-Pb age distributions allow all three sources to be viable contributors to the basin. However, $^{40}Ar/^{39}Ar$ dating of the volcanic clasts reveals early Miocene ages (~22-24 Ma) and a single Cretaceous age (~101 Ma). The clasts are basaltic andesite and have La/Nb >2 indicating an arc derived melt source. We propose the clasts record a Miocene mafic continental arc source area in the Patagonian Andes, which has been removed by erosion. Furthermore, we suggest the early Miocene phase of arc volcanism, which post-dates the Eocene backarc plateau magmatism and pre-dates the middle Miocene to recent Chile Ridge backarc magmatism, reflects normal arc volcanism along the Patagonian margin.