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The Geochemical Correlations in Northwest Iberia: Searching for common trends in the allochthonous islands of rock across the Galicia-Trás-os-Montes Zone (GTMZ)

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The geology of the northwest Iberia includes of a series of thrusted massifs that have been isolated from each other by erosion (allochthonous klippes) and are collectively known as the Galicia-Trás-os-Montes Zone (GTMZ). The GTMZ comprises five main massifs: Malpica-Tuy in western Iberia; Cabo Ortegal and Órdenes massifs in northwest Spain; and Bragança and Morais in northeast Portugal. Mineral assemblages reveal a polycyclic metamorphism that has imprinted evidence of several tectonic collisions. Precambrian signatures are overprinted by at least two high-grade metamorphic episodes. The units present in the GTMZ show evidence of a burial-exhumation cycle during the Cambrian-Ordovician (500-480 Ma) in a subduction arc on the edge of Gondwana. More recent signatures represent terrane accretion and continental collisions between–Gondwana and Laurussia during the Variscan Orogeny (400-370 Ma). Tectonic collisions resulted in the creation of large nappe folds, which transported allochthonous units onto the Gondwanan margin (now Iberia). Subsequent uplift and erosion have exhumed the massifs to reveal tectonically dismembered “islands” of allochthonous material resting atop the autochthonous country rock. Despite dismemberment and geographical separation (spanning ~260 km), the massifs of the GTMZ appear to have relatively consistent stratigraphy and assemblages. Most studies in the region have included aspects of geodynamic modeling and tectonic reconstructions. However, few studies have quantitatively connected the units across the GTMZ using petrogenetic diagrams and normalized multi-element variation diagrams. The following study has examined the three main units of the GTMZ (i.e., Lower Allochthonous Thrust Complex; the Northern Ophiolitic Terrane, and Upper Allochthonous Terrane) and their associated subunits to quantitatively link petrologic fingerprints found in trace element geochemistry. Correlations across the GTMZ will provide clearer regional tectonics.