

Whole-rock geochemical characterization of high-pressure mélanges in the Yuli belt, eastern Taiwan

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Three high-pressure (HP) mélange-like units have been recognized in the Yuli belt, which is probably the youngest blueschist belt of the world (Sandmann et al., 2013). The Yuli belt consists mainly of pelitic and psammitic schists. From north to south, the three HP units are Wanjung, Tamayen, and Chinshuichi, which comprise different and diverse rock types, including greenschist, chlorite schist, epidote amphibolite (\pm Fe-rich garnet), Mn-rich garnet epidote-blueschist, metagabbro (\pm omphacite), chlorite albitite, garnet chlorite-mica schist, glaucophane-bearing meta-plagiogranite (\pm omphacite, aegirine-augite), and serpentinite. Recent studies interpret the Tamayen and Chinshuichi areas as subduction-related mélanges (Tsai et al., 2013; Keyser et al., 2015). In order to constrain the protoliths of these metamafic-ultramafic rocks, representative samples from these three units (excluding serpentinite) were analyzed for major and trace element compositions by XRF and ICP-MS methods. Major element data reveal that Wanjung samples contain high Mg but almost no K, Tamayen samples contain high Mn and Fe, and Chinshuichi samples contain high Na and Si. In AFM diagrams, most of the studied mafic rocks are projected within the calc-alkaline field. In TiO_2 -MnO- P_2O_5 diagrams, Tamayen and Wanjung mafic rocks are plotted in the field of island arc tholeiite. In normalized multi-element diagrams, samples from each unit show multiple groups of patterns. Wanjung metagabbros show Eu positive anomalies and likely represent plagioclase-cumulate ultramafic protoliths. Most of the Tamayen blueschist (non-mafic) samples show Nb, Ta, and Ti negative anomalies in multi-element diagrams, and Ce and Eu negative anomalies in REE patterns, but greenschist and epidote-amphibolite samples do not show such features. Chinshuichi samples show similar trace element patterns as Tamayen but lack Ce and Eu negative anomalies.