



A Geochemical Approach on the Provenance Signatures of the Klondyke and Zigzag Formations and its Implication on the Oceanic to Island-arc Setting Evolution of the Baguio Mineral District, Philippines

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ABSTRACT

To resolve the question on the tectonic evolution of Baguio and its vicinity, the source geology of the sedimentary formations and their correlatives are investigated. Petrographic examination and geochemical analyses of sedimentary samples are carried out to address this problem. Whole rock major and trace element compositions of the sampled sedimentary units were analyzed using an X-Ray Fluorescence spectrometer and an inductively-coupled plasma mass spectrometer. Petrographic examination of selected samples shows a distinction between the Zigzag samples vis-à-vis the Klondyke, Amlang, Cataguintingan and Damortis samples. The Zigzag sandstones contain more quartz whereas the sandstones from the other formations are dominated by feldspars and lithic fragments. The geochemical signatures of the Zigzag samples are also distinct from the other sedimentary units. When plotted on various major oxides and trace element ratio diagrams, the Klondyke, Amlang and Cataguintingan samples are shown to have been derived from mafic igneous rocks. Geochemical data from the Zigzag samples suggest intermediate to felsic igneous rock sources. In terms of the tectonic setting, the Zigzag samples are inferred to be derived from a more evolved arc or an active margin based on their high K_2O/Na_2O values. Sediments that make up the other sedimentary units (Klondyke, Amlang, Cataguintingan) originated in an oceanic island arc setting. These information further constrains the recognized evolution of the Baguio Mineral District from an oceanic to an island arc environment.

Keywords: sediment petrography, sedimentary geochemistry, provenance, tectonic setting, Baguio District