

Geochemistry, petrogenesis and metallogeny of granite-granodiorite plutons, Central Wallagga Area, Western Ethiopia

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The Western Ethiopian Pre-Cambrian rocks were mapped in the field, described, and assessed for possible occurrences of gold and platinum since 1938. Extensive studies were also done particularly in the central Wallagga area to assess the potential metallic mineralizations. In spite of all these attempts, the geology of this part of Ethiopia is poorly understood and its position with reference to Pan-African low-grade belt and the northern extension of the Mozambique Belt is not well defined. The crystalline basement in Western Ethiopia contains two major rock types: intensely migmatized high-grade gneisses and volcano-sedimentary greenschist assemblages with associated linear belts of ultrabasic rocks, remnants of ophiolite complexes; characteristically intruded by different episodes of plutonic rocks of variable composition. Pre-, Syn- and Post-tectonic plutonic suites constitute a considerable proportion of the basement rocks. Of these suites, granites and granodiorites are predominant. However, diorites, tonalites, gabbro and gabbroic anorthosite are not uncommon. Some alkaline and kimberlite like rocks were also found to occur in the area. The low-grade terrane is limited to the east and to the west by high grade gneisses and migmatites terrane. The geologic boundary between the terranes is tectonic, characterized by intense deformation, shearing and ultramytonitization. The geochemistry, petrogenetic relationships and mineralization of the plutonic rocks mentioned have not yet been studied; therefore, little is known about their roles and

relations with base metals occurrences of central Wallagga; and their contribution towards the understanding of the Mozambique and Arabian Nubian-Shield/PanAfrican/orogenic belts. Thus, we have begun to collect detailed and reliable field data, as well as petrographic and chemical analyses, supported by dating efforts, all of which are important to improve the understanding of the geology of the region. The anticipated results of our research should also contribute information towards exploration and possible mining. Ethiopia is located in a geographically important position with respect to the Mozambique Belt and the Arabian-Nubian Shield; thus, our data will contribute somewhat to a better understanding of the possible relation between these major orogenic belts in eastern Africa. Petrographic and geochemical data are reported for an initial suite of 23 rocks from the Central Wallagga area, representing a survey of representative rock types present in outcrop. The rocks range from ultrabasic to dioritic, syenitic and granitic in composition, with most rocks being of the granite or granodiorite variety. Representative rock samples were crushed, powdered, and analysed by XRF for major element contents, as well as by XRF, INAA, and ICP-MS for trace element contents. These rocks represent host rocks; initial analyses are geared towards understanding the petrogenesis of the granites to provide constraints on the conditions of mineralogenesis.