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# Geochemical and Petrological Survey in Northern Ethiopia Basement Rocks for Investigation of Gold and Base Metal Mineral Potential in Finarwa, Southeast Tigray, Ethiopia

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**Abstract :** The study is accompanied in northern Ethiopian basement rocks, Finarwa area, and its surrounding areas, south eastern Tigray. From the field observations, the geology of the area haven been described and mapped based on mineral composition, texture, structure, and colour of both fresh and weather rocks. Inductively coupled plasma mass spectrometry (ICP-MS) and atomic absorption spectrometry (AAS) have conducted to analysis gold and base metal mineralization. The ore mineral under microscope are commonly base metal sulphides pyrrhotite, Chalcopyrite, pentilanditeoccurring in variable proportions. Galena, chalcopyrite, pyrite, and gold mineral are hosted in quartz vein. Pyrite occurs both in quartz vein and enclosing rocks as a primary mineral. The base metal sulfides occur as disseminated, vein filling, and replacement. Geochemical analyses result determination of the threshold of geochemical anomalies is directly related to the identification of mineralization information. From samples, stream sediment samples and the soil samples indicated that the most promising mineralization occur in the prospect area are gold(Au), copper (Cu), and zinc (Zn). This is also supported by the abundance of chalcopyrite and sphalerite in some highly altered samples. The stream sediment geochemical survey data shows relatively higher values for zinc compared to Pb and Cu. The moderate concentration of the base metals in some of the samples indicates availability base metal mineralization in the study area requiring further investigation. The rock and soil geochemistry shows the significant concentration of gold with maximum value of 0.33ppm and 0.97 ppm in the south western part of the study area. In Finarwa, artisanal gold mining has become an increasingly widespread economic activity of the local people undertaken by socially differentiated groups with a wide range of education levels and economic backgrounds incorporating a wide variety of ‘labour intensive activities without mechanisation.

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