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A new Method in the displaying of Deep Contact relationships of an intrusive body with the wall rocks: Ground Penetrating Radar (GPR) Buzlukdagi Syenitoids (Kırsehir-Turkey)

K. Deniz, S. Kadioglu, and Y.K. Kadioglu
Ankara University, Geological Engineering, Ankara, Turkey (kdeniz@eng.ankara.edu.tr)

Ground penetrating radar (GPR) method can be used in the geological studies for identifying the rock boundaries, joints and trace fractures. The research area comprises a part of alkaline igneous rocks (Buzlukdagi) at Central Anatolia, Turkey. These intrusive rocks are exposed as a small alkaline pluton which intruded into the metamorphic rocks in the composition of foid bearing syenitoid. The wall rock of the intrusive body mainly composed of migmatite and marble as a result of contact metamorphism of the dentritic and limestone rock units. The alkaline intrusive rocks have fine grain with holocrystalline texture at the contact zone. The wall rocks have a clear lineation with the melting signature in the form of migmatite. Marble rock blocks can be observed within the intrusive body at the outer zone of the contact. Fluorite bearing hydrothermal products can be seen along the fault and discontinuity zones within the alkaline unit in the studying area. Accordingly, joints and the fracture zones are very important for the mine researches in the region.

This study presents the results of an application of GPR method for determination of the rock boundaries, joints and fractures within the studying area. In this study, RAMAC CU II equipment was used with 250 MHz shielded antenna to observe the lithological boundaries and fractures of the study area. The GPR measurements were taken on eight profiles with different lengths and different measurement time in order to identify the discontinuities according to the increasing depth. Time axis was transformed to the depth axis according to the determined 0.11m/ns of electromagnetic wave velocity as a result of velocity analysis. Generally the geological discontinuities could be seen until 10-14m in depth on radargrams of the profiles, while the radargram of the profile 3, which had 115m length and 900 ns of measurement time, could show them until 48m in depth. The discontinuity and xenoliths of the wall rocks are observed as various length and width within the intrusive body.

Keywords: Ground Penetrating Radar (GPR), Marble xenolith, Fluorite, Migmatite.