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Estimation of Groundwater Level by Using Ground Penetrating Radar

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Abstract

Groundwater level estimation was carried out in the campus of Visvesvaraya National Institute of Technology (VNIT), Nagpur by Ground Penetrating Radar (GPR) survey. The study area/site comes under the basaltic terrain of eastern Deccan Volcanic Province. The radar wave reflection data was collected with the common-offset configuration of the GPR. The wave velocity was estimated by velocity analysis of Common Mid Point (CMP) data. The average velocities obtained were used for computing the dielectric value of the medium, which were substituted in the header file of the processed common offset data. The processed common offset profiles show high amplitude reflections from the water table. It has been observed that the velocity of electromagnetic waves increased from January to May and again minimized from May to June. These observations were validated by comparing the GPR profiles with the observations of groundwater level fluctuation monitored in the dug well situated close to the line of profile. This suggests that the velocities of EMR are related to the soil moisture.

Keywords: Groundwater, Ground-penetrating radar, Common midpoint method, Velocity analysis, VNIT, Nagpur