**Dual Polarization and Multi-Incidence Angle Approach to Retrieve Soil Moisture and Surface Roughness with Specular Scattering Data by Minimising Soil Texture Effect**

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Retrieval of soil parameters (i.e., soil moisture, soil texture and surface roughness) is important to many studies such as environmental monitoring, prediction of soil erosion, agriculture, water management etc. It has been observed that very less work has been carried out in the direction of evaluating soil parameters with the combination of polarization characteristics and incidence angle characteristics. Further, retrieval of soil parameters with radar technology has been mostly studied with monostatic configuration whereas lesser attention has been provided for bistatic configuration. Therefore, in this paper, we analysed the effect of soil moisture, surface roughness and soil texture on specular scattering, which is specific case of bistatic scattering and developed an efficient approach to retrieve soil moisture and surface roughness by minimising the effect of soil texture on retrieval accuracy. Co-polarization and multi-incidence angle approach has been utilized to retrieve soil moisture and surface roughness respectively. We developed a bistatic scatterometer setup that is capable of changing polarization as well as incidence angle. Specular scattering coefficients were retrieved for five different soil texture fields and each soil texture field consist of six different moisture and five different surface roughness conditions. Regression analysis was carried to choose best incidence angle and co-polarization ratio was evaluated for this best incidence angle. It was observed that co-polarization ratio changes with the change in soil moisture whereas negligible changes were observed with the change in soil texture and surface roughness. An empirical relationship was developed between co-polarization ratio and soil moisture for retrieval of soil moisture. Further, Normalized specular scattering coefficient was evaluated by normalizing specular scattering coefficient at each incidence angle with specular scattering coefficient at 60°. It was observed that normalized specular scattering coefficient varies with rms surface height whereas negligible changes were observed with the change in soil moisture and soil texture. An empirical relationship was developed between rms surface heights and normalized specular scattering coefficient to retrieve rms surface height. This study is quit helpful for future bistatic mission.