EARTH OBSERVATION SYMPOSIUM (B1)
Enhancing Earth Observations Through Space Radar (6)

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POLARIMETRIC RADAR CHARACTERISTICS ACCORDING TO DIFFERENT LAND COVER TYPES USING POLSAR DATA

Abstract

Analysis of fully polarimetric SAR data is an interesting and essential way to characterize the scattering behavior of many targets. The main objective of this study is to extracting relevant information about surface properties for geophysical applications using POLSAR data. We investigated on a physically based interpretation of observed polarimetric radar characteristics according to different land cover types as human-made or natural targets. In this study, multi-frequency, polarimetric SAR data acquired during the first SIR-C/XSAR mission over the Seoul and Gyunggi-do of Korea are analyzed. The used land cover data which were classified by image fusion using Landsat TM and IRS-1C Pan images were supplied by the Ministry of Environment of Republic of Korea. The test site for extracting of polarimetric radar information was chosen by different land cover types of land classification data and SAR image texture. The characteristics of polarization responses and polariemteric parameters to conditions present in urban, river, agricultural, and forested area were extracted and analyzed. The graphs of co-polarized and cross-polarized response and HH, VV, HV polarimetric parameters are discussed. Results of polarization responses and the relation of backscattering coefficients of polarimetric parameters showed that the dominant scattering property from these different fields varies depending on the land cover types. We also processed quad polarization SIR-C SAR data by target decomposition based on scattering mechanism and the polarimetric SAR image were segmented by unsupervised H/ and H/A/ classification and combination of Wishart classification algorithms. The radar responses and HH, HV, VV polarimetric parameters from SIR-C data and the decomposition and classification results about different land cover areas such as human-made and natural targets were compared.