

Analysis of Polarimetric Decomposition, Backscattering Coefficient, and Sample Properties for Identification and Layer Thickness Estimation of Silica Sand Distribution Using L-Band Synthetic Aperture Radar

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Abstract	<p>Silica is one of the mineral needs of industry, especially in base materials for the primary or auxiliary raw materials. Silica sand on Rupert Island was identified on the northern coastline. Selected samples were measured to get the percentage of minerals/elements using X-ray fluorescence. Two adjacent scenes of ALOS PALSAR full-polarimetry data were used. The dielectric constant of samples was measured using a dielectric probe kit in the frequency range from 0.3 to 3.0 GHz and also used for calculating the backscattering coefficient. Freeman-Durdeen and Yamaguchi techniques were used to obtain the scattering decomposition of physical scattering from the incoherent object model base. Surface scattering is a very clear decomposition used to show the silica sand identification compared with other decompositions. From surface scattering, the backscattering coefficient value of silica sand resulted from -59 dB to -52 dB. Thickness estimation from satellite and field measurements show the minimum is 59 cm and the maximum is 74 cm, with the average differentiation between these measurements being 4.88 cm. The condition supported by the grain size of silica sand particles that have almost the same size and shape were conducted by using microscopic photograph testing. These values were caused by a slightly rough surface.</p>
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